

**COUNTY OF EL DORADO, CALIFORNIA
DEPARTMENT OF TRANSPORTATION**

**CONTRACT DOCUMENTS
INCLUDING
NOTICE TO BIDDERS, SPECIAL PROVISIONS, PROPOSAL, AND CONTRACT
FOR**

**U.S. 50 HOV LANES (PHASE 2A)
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE**

**On US Highway 50 in El Dorado County California
January 10, 2012**

**CONTRACT No. PW 09-30408, CIP No. 53113
03-ED-50- PM 2.90 to PM 6.70**

**Federal Aid Project
CML - 5925 (102)**

**FOR USE WITH
STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION, CALTRANS
STANDARD SPECIFICATIONS, MAY 2006
STANDARD PLANS, MAY 2006**

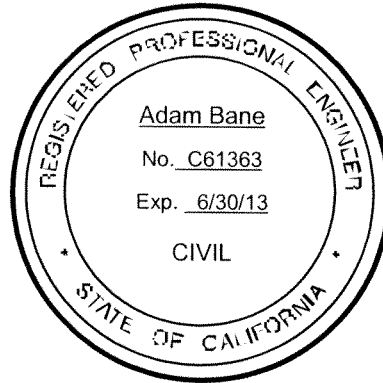
BID OPENING DATE: February 15, 2012

The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

NOTICE TO BIDDERS, SPECIAL PROVISIONS AND CONTRACT



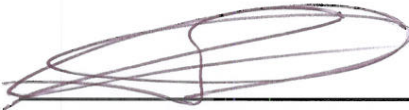
REGISTERED CIVIL ENGINEER



CONTRACT NO. 03-3A7124

The special provisions contained herein
have been prepared by or under the
direction of the following Registered
Person.

TRAFFIC



11-3-11

REGISTERED CIVIL ENGINEER



CONTRACT NO. 03-3A7124

The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

LANDSCAPE



LICENSED LANDSCAPE ARCHITECT



CONTRACT NO. 03-3A7124

The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

TRAFFIC ELECTRICAL

H. Golban

REGISTERED ELECTRICAL ENGINEER



CONTRACT NO. 03-3A7124

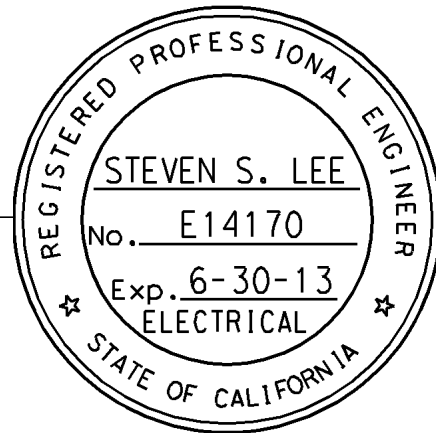
The special provisions contained herein
have been prepared by or under the
direction of the following Registered
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Steven S. Lee

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REGISTERED ELECTRICAL ENGINEER



**DEPARTMENT OF TRANSPORTATION
COUNTY OF EL DORADO, STATE OF CALIFORNIA**

**U.S. 50 HOV LANES, PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE
CONTRACT NO. PW NO. 09-30408, CIP NO. 53113**

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**DEPARTMENT OF TRANSPORTATION
COUNTY OF EL DORADO, CALIFORNIA**

NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN by the County of El Dorado, State of California, that sealed bids for work in accordance with the Project Plans (Plans) and Contract Documents designated:

**U.S. 50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE
CONTRACT NO. PW 09-30408, CIP NO. 53113**

will be received by the Clerk to the Board of Supervisors, at the Board of Supervisors Office, 330 Fair Lane, Placerville, California, until **Wednesday, February 15, 2012 at 2:00 PM**, at which time bids will be publicly opened and read by the El Dorado County Department of Transportation.

No Bid may be withdrawn after the time established for receiving bids or before the award and execution of the Contract, unless the award is delayed for a period exceeding sixty (60) calendar days. Bids shall be executed in accordance with the instructions given and forms provided in the bound Contract Documents furnished by the El Dorado County Department of Transportation. The Proposal shall not be detached and shall be submitted with the Contract Documents bid package in its entirety. All bids must be clearly marked on the envelope:

**"PROPOSAL FOR U.S. 50 HOV LANES PHASE 2 – “BASS LAKE ROAD UNDERCROSSING
TO CAMERON PARK DRIVE”
CONTRACT NO. PW 09-30408 CIP NO. 53113
TO BE OPENED AT 2:00 P.M. , WEDNESDAY, FEBRUARY 15, 2012**

LOCATION/DESCRIPTION OF THE WORK: The project is located near El Dorado Hills in El Dorado County. The Work to be done is shown on the Plans, and generally consists of, but is not limited to:

- A. Construction of HOV lanes on Route 50, removing existing median barrier, installing median concrete or three beam barrier, including stage construction to facilitate grading, installing permanent and temporary fence, drainage system removal and construction, concrete drainage boxes and inlets, grade ditch, earthwork excavation and embankment, rock base, asphalt concrete paving, signing and striping, pavement obliteration, permanent and temporary erosion control. Also installing or upgrading existing dikes, overhead signs and luminaires. Other items or details not mentioned above, that are required by the plans, Standard Plans, Standard Specifications, or these Special Provisions shall be performed, constructed or installed.
- B. Bids are required for the entire Work described herein.
- C. The contract time shall be ONE HUNDRED TWENTY (120) WORKING DAYS.
- D. For bonding purposes the anticipated project cost is less than \$ 14,000,000.
- E. A pre-bid meeting is scheduled for this project on Wednesday, February 1, 2012 at 2:00 PM, at the El Dorado County Department of Transportation, 2441 Headington Road, Placerville, CA. The meeting will be held in the downstairs conference room. Attendance at the pre-bid meeting is not mandatory.

OBTAINING OR INSPECTING CONTRACT DOCUMENTS: The Contract Documents and Plans may be examined at the El Dorado County Department of Transportation or may be purchased in person or by mail from the Department of Transportation, 2850 Fairlane Court, Placerville, California, 95667. The purchase price of each set of Contract Documents and Plans (half size plans are included in each set) is ONE HUNDRED dollars (\$100.00) and is not refundable. To receive Contract Documents and Plans by Federal Express, send request and payment prior to shipping and include an additional FIFTY dollars (\$50.00), for a total of ONE HUNDRED FIFTY dollars (\$150.00), to include shipping and handling. **Only Contract Documents purchased from the Department of Transportation will be acceptable for bid submittal.**

Supplemental Project Information consists of the contract cross-sections and an Informational Handout containing Hazardous Materials Report “Highway 50 Site Investigation , Postmile 2.9/6.7, Dated March 10, 2008”, Applicable Revised Standard Plans and New Standard Plans. The contract cross-sections and the Informational Handout will be provided to Contract document holders as .pdf files on the DOT’s website: <http://www.edcgov.us/Government/DOT/Bids.aspx>.

CONTRACTORS LICENSE CLASSIFICATION: Bidders shall be properly licensed to perform the Work pursuant to the Contractors' State License Law (Business and Professions Code Section 7000 et seq.) and shall possess a **CLASS A** license or equivalent combination of Classes required by the categories and type of Work included in the Contract Documents and Plans at the time the Contract is awarded, and shall maintain a valid license through completion and acceptance of the Work, including the guarantee and acceptance period. Failure of the successful Bidder to obtain proper adequate licensing for an award of the Contract shall constitute a failure to execute the Contract and shall result in the forfeiture of the Bidder's security.

BUSINESS LICENSE: The County Business License Ordinance provides that it is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Ordinance Code Section 5.08.070. The Bidder to whom an award is made shall comply with all of the requirements of the County Business License Ordinance, where applicable, prior to beginning work under this Contract and at all times during the term of this Contract.

REQUIRED LISTING OF PROPOSED SUBCONTRACTORS: Each Proposal shall have listed therein the name, contractor's license number and address of each subcontractor to whom the bidder proposes to subcontract portions of the work in an amount in excess of 0.5 % of the total bid 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 shall also describe in the Subcontractor Listing the work to be performed by each subcontractor listed. The work to be performed by the subcontractor shall be shown by listing the bid item number, bid item description, and portion of the work to be performed by the subcontractor in the form of a percentage calculated by dividing the work to be performed by the subcontractor by the respective bid item amount(s) (not by the total bid price). The percentage of each bid item subcontracted may be submitted with the Bidder's bid or sent via email or fax to Janel Gifford, El Dorado County Department of Transportation, email-Janel.Gifford@edcgov.us, Fax-(530) 626-0387 by 4:00 p.m. on the first business day after the bid opening. The email or fax shall contain the name of each subcontractor submitted with the Bidder's bid along with the bid item number, the bid item description, and the percentage of each bid item subcontracted, as described above. **At the time the contract is awarded**, all listed subcontractors shall be properly licensed to perform their designated portion of the work. The bidder's attention is directed to other provisions of the Act related to the imposition of penalties for failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

BRAND-SPECIFIC REQUIREMENT: The contract bid documents specify brand-specific products. The Board of Supervisors has made the required finding(s) that the Brand SENSYS, VSN 240 Vehicle Sensor Nodes with epoxy (sealant), Wireless Vehicle Detector System is designated in the contract bid documents as brand-specific in order to match other products in use on a particular public improvement either completed or in the course of completion and that the SENSYS Networks Inc., wireless vehicle detectors system is designated in the contract documents as brand-specific in order to obtain the necessary item that is only available from SENSYS Networks Inc.

Where the contract bid documents require a brand-specific item, Contractor must quote brand and model indicated; alternative brands will not be accepted.

BUY AMERICA: This project is subject to the "Buy America" provisions of the Surface Transportation Assistance Act of 1982, as amended by the Intermodal Surface Transportation Efficiency Act of 1991.

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PARTICIPATION: Bidders are advised that, as required by federal law, the County of El Dorado has implemented Disadvantaged Business Enterprise requirements for Underutilized Disadvantaged Business Enterprises (UDBE). Section 2, "Proposal Requirements and Conditions," under subsection titled "Disadvantaged Business Enterprises (DBE)" and Section 5, "General," under subsection titled "Performance of Subcontractors" of these special provisions cover the UDBE requirements.

Bidder will take all necessary affirmative steps to assure that minority firms, women's business enterprises and labor surplus area firms are used when possible.

The Underutilized Disadvantaged Business Enterprise (UDBE) contract goal is **7.8 %**.

Bidder's attention is directed to the UDBE Good Faith Effort Submittal Information Handout at <http://www.edcgov.us/Government/DOT/DBE.aspx>

NONDISCRIMINATION: Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

**NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM
(GOVERNMENT CODE SECTION 12990)**

Attention is further directed to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination," of the Standard Specifications, which is applicable to all nonexempt State contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The specifications are applicable to all nonexempt State construction contracts and subcontracts of \$5,000 or more.

Attention is also directed to the Special Provisions and to the draft Agreement contained in these Contract Documents for additional nondiscrimination and fair employment practices provisions that will apply to this federal-aid contract.

The Department of Transportation hereby notifies all Bidders that it will affirmatively ensure that in any Contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, national origin, religion, age, or disability in consideration for the award.

PREVAILING WAGE REQUIREMENTS:

In accordance with the provisions of California Labor Code Sections 1770 et seq, including but not limited to Sections 1773, 1773.1, 1773.2, 1773.6, and 1773.7, the general prevailing rate of wages in the county in which the Work is to be done has been determined by the Director of the California Department of Industrial Relations. These wage rates appear in the California Department of Transportation publication entitled General Prevailing Wage Rates.

Interested parties can obtain the current wage information by submitting their requests to the Department of Industrial Relations, Division of Labor Statistics and Research, PO Box 420603, San Francisco CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at <http://www.dir.ca.gov/dlsr/PWD>. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.

Copies of the general prevailing rate of wages in the county in which the Work is to be done are also on file at the Department of Transportation's principal office, and are available upon request, and in case of projects involving federal funds, federal wage requirements as predetermined by the United States Secretary of Labor have been included in the Contract Documents. Addenda to modify the Federal minimum wage rates, if necessary, will be issued as described in the Project Administration section of this Notice to Bidders.

In accordance with the provisions of Labor Code 1810, eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and Contractor and any subcontractor employed under this Contract shall conform to and be bound by the provisions of Labor Code Sections 1810 through 1815.

In the case of federally funded projects, where federal and state prevailing wage requirements apply, compliance with both is required. This project is funded in whole or part by federal funds. Contractor's attention is directed to Section 14 of the Special Provisions and the requirements of, and compliance with the Copeland Act (18 U.S.C. 874 and 29 CFR Part 3), the Davis-Bacon Act (40 U.S.C. 276a to 276a-7 and 29 CFR Part 5), and the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330 and 29 CFR Part 5).

If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, Contractor and subcontractors shall pay not less than the higher wage rate. The Department will not accept lower State wage rates not specifically included in the Federal minimum wage determinations. This includes "helper" (or other classifications based on hours of experience) or any other classification not appearing in the Federal wage determinations. Where Federal wage determinations do not contain the State wage rate determination otherwise available for use by Contractor and subcontractors, Contractor and subcontractors shall pay not less than the federal minimum wage rate which most closely approximates the duties of the employees in question.

The U.S. Department of Transportation (USDOT) provides a toll-free "hotline" service to report bid rigging activities. Bid rigging activities can be reported Mondays through Fridays, between 8:00 a.m. and 5:00 p.m., eastern time, at (800) 424-9071. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report these activities. The "hotline" is part of the USDOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All

information will be treated confidentially and caller anonymity will be respected.

BID SECURITY: A bid security shall be provided with each bid. Bid security shall be in an amount of not less than ten percent (10%) of the total amount of the Bid for bid and shall be cash, a certified check or cashier's check drawn to the order of the County of El Dorado or a Bidder's Bond executed by a surety satisfactory to the County of El Dorado **on the form provided in the Proposal section of these Contract Documents (do not detach the form).**

BID PROTEST PROCEDURE: The protest procedure is intended to handle and resolve disputes related to the bid award for this project pursuant to Title 49 Code of Federal Regulations Part 18 Section 18.36 (b) (12)(i)-(ii) and County of El Dorado policies and procedures. A protestor must exhaust all administrative remedies with the County of El Dorado before pursuing a protest with a Federal Agency. Reviews of protests by the Federal agency will be limited to:

(i.) Violations of Federal law or regulations and the standards of 49 CFR Part 18 Section 18.36 (b) (12) (i)-(ii). Violations of State of California or local law will be under the jurisdiction of the State of California or the County of El Dorado; and

(ii.) Violation of the County of El Dorado's protest procedures for failure to review a complaint or protest. Protests received by the Federal agency other than those specified above will be referred to the County of El Dorado.

The protest procedure is an extension of the formal bid process and allows those who wish to protest the recommendation of an award after bid the opportunity to be heard.

Policy: Upon completion of the bid evaluation, the Department of Transportation shall notify all bidders of the recommendation of award, the basis therefore, and the date and time on which the recommendation for award will be considered and acted upon by the Board of Supervisors. All bidders may attend the Board of Supervisors meeting at the time the agenda item is considered, address the Board of Supervisors, and be heard.

Procedure: If a bidder wishes to protest the award, the procedure shall be as follows:

1. The Department of Transportation will review the bids received in a timely fashion under the terms and conditions of the Notice to Bidders, and notify the bidders in writing, at the address designated in the bid, of its recommendation including for award or rejection of bids ("All Bidders Letter").

2. Within five (5) working days from the date of the "All Bidders Letter," the bidder protesting the recommendation for award shall submit a letter of protest to and shall be received by the County of El Dorado, Department of Transportation, Attention Janel Gifford, 2850 Fairlane Court, Placerville, CA 95667, and state in detail the basis and reasons for the protest. The bidder must provide facts to support the protest, including any evidence it wishes to be considered, together with the law, rule, regulation, or criteria on which the protest is based.

3. If the Department of Transportation finds the protest to be valid, it may modify its award recommendations and notify all bidders of that decision. If the Department of Transportation does not agree with the protest, or otherwise fails to resolve the protest, the Department of Transportation will notify the bid protestor and all interested parties of its decision and the date and time that the recommendation for award will be agendized for the Board of Supervisors' consideration and action. The Department of Transportation shall also include in its report to the Board of Supervisors the details of the bid protest.

4. The bidder may attend the Board of Supervisors meeting at which the recommendation and bid protest will be considered. The Board of Supervisors will take comment from the bidder, staff, and members of the public who wish to speak on the item. In the event that the bidder is not in attendance at that time, the bid protest may be dismissed by the Board of Supervisors without further consideration of the merits; and

In its discretion, the County of El Dorado may accept or reject any bids. The decision of the Board of Supervisors shall be final in accepting or rejecting the bid protest, awarding the bid, or rejecting any or all bids.

AWARD OF CONTRACT: Bids will be considered for award by the Board of Supervisors. The County of El Dorado reserves the right after opening bids to reject any or all bids, to waive any irregularity in a bid, or to make award to the lowest responsive, responsible Bidder and reject all other bids, as it may best serve the interests of the County.

As a condition of award, the successful Bidder will be required to submit bonds and evidence of insurance prior to execution of the Agreement by the County. Failure to meet this requirement shall constitute abandonment of the Bid by the

Bidder and forfeiture of the Bidder's security. Award will then be made to the next lowest, responsive, responsible Bidder.

ESCROW BID DOCUMENTS: The Bidders' attention is directed to the Special Provision in the Contract Documents entitled "Escrow Bid Documents" for the provisions requiring the successful bidder to submit in a sealed lockable container to the Department of Transportation all documentary information used to prepare its bid.

RETAINAGE FROM PAYMENTS: The Contractor may elect to receive one hundred percent (100%) of payments due under the Contract from time to time, without retention of any portion of the payment by the County, by depositing securities of equivalent value with the County in accordance with the provisions of Section 22300 of the Public Contract Code. Securities eligible for deposit hereunder shall be limited to those listed in Section 16430 of the Government Code, or bank or savings and loan certificates of deposit.

PROJECT ADMINISTRATION: All communications relative to the Contract Documents and Plans shall be directed to Janel Gifford in the El Dorado County Department of Transportation, 2850 Fairlane Court, Placerville, CA 95762, telephone: (530) 621-5974, Janel.Gifford@edcgov.us. No oral responses to any questions concerning the content of the Plans and Contract Documents will be given. All responses will be in the form of written addenda to the Contract Documents and Plans or written responses to bidders' inquiries. Responses to bidders' inquiries and addenda will be posted on the Department of Transportation website at www.edcgov.us/Government/DOT/Bids.aspx. It is the bidders' responsibility to check this website for responses and addenda during the bid period.

Inquiries or questions based on alleged patent ambiguity of the plans, specifications, or estimate must be communicated as a bidder inquiry prior to bid opening. Any such inquiries or questions, submitted after bid opening will not be treated as a bid protest.

BY ORDER OF the Director of the Department of Transportation, County of El Dorado, State of California.

Authorized by the Board of Supervisors on January 10, 2012, at Placerville, California.

By _____
James W. Ware, P.E.
Director of Transportation
County of El Dorado

**DEPARTMENT OF TRANSPORTATION
COUNTY OF EL DORADO, STATE OF CALIFORNIA**

**U.S. 50 HOV LANES, PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE
CONTRACT NO. PW NO. 09-30408, CIP NO. 53113**

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The Standard Plan sheets applicable to this contract include, but are not limited to those indicated below. Applicable Revised Standard Plans (RSP) and New Standard Plans (NSP) indicated below are included in the project plans as Standard Plan sheets.

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A10B Acronyms and Abbreviations (Sheet 2 of 2)

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A10D Symbols (Sheet 2 of 2)

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A20B Pavement Markers and Traffic Lines, Typical Details

A20C Pavement Markers and Traffic Lines, Typical Details

A20D Pavement Markers and Traffic Lines, Typical Details

A24A Pavement Markings – Arrows

RSP A24C Pavement Markings – Symbols and Numerals

RUMBLE STRIP

A40B Shoulder Rumble Strip Details – Ground-In Indentations

EXCAVATION AND BACKFILL

A62A Excavation and Backfill – Miscellaneous Details

A62F Excavation and Backfill – Metal and Plastic Culverts

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A63A Portable Concrete Barrier (Type 60K)

A63B Portable Concrete Barrier (Type 60K)

OBJECT MARKERS, DELINEATORS, CHANNELIZERS AND BARRICADES

A73A Object Markers

A73B Markers

A73C Delineators, Channelizers and Barricades

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RSP A76A Concrete Barrier Type 60

RSP A76C Concrete Barrier Type 60F
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 RSP A77A2 Metal Beam Guard Railing – Standard Railing Section (Steel Post with Notched Wood or Notched Recycled Plastic Block)
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 NSP A77C9 Metal Beam Guard Railing – Typical Vegetation Control at Fixed Object
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RSP A77G3 Metal Beam Guard Railing – Typical Layouts for Roadside Fixed Objects

METAL BEAM GUARD RAILING – END ANCHORAGE AND RAIL TENSIONING ASSEMBLY

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 RSP A77H2 Metal Railing – Rail Tensioning Assembly
 A77H3 Metal Railing – Anchor Cable and Anchor Plate Details

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- D75A Steel Pipe Inlets
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	PIPE RISER AND DRAINAGE INLET RISER CONNECTIONS
D93C	Pipe Riser with Debris Rack Cage
	PIPE COUPLING AND JOINT DETAILS
D97A	Corrugated Metal Pipe Coupling Details No. 1 – Annular Coupling Band Bar and Strap and Angle Connections
D97C	Corrugated Metal Pipe Coupling Details No. 3 – Helical and Universal Couplers
RSP D97D	Corrugated Metal Pipe Coupling Details No. 4 – Hugger Coupling Bands
RSP D97E	Corrugated Metal Pipe Coupling Details No. 5 – Standard Joint
RSP D97F	Corrugated Metal Pipe Coupling Details No. 6 – Positive Joint
RSP D97G	Corrugated Metal Pipe Coupling Details No. 7 – Downdrain
	PLANTING AND IRRIGATION
RSP H1	Planting and Irrigation – Abbreviations
RSP H2	Planting and Irrigation – Symbols
H3	Planting and Irrigation Details
RSP H5	Planting and Irrigation Details
RSP H7	Planting and Irrigation Details
	EROSION CONTROL
RNSP H51	Erosion Control Details (Fiber Roll)
NSP H53	Rolled Erosion Control Product
	TEMPORARY CRASH CUSHIONS, RAILING AND TRAFFIC SCREEN
RSP T1A	Temporary Crash Cushion, Sand Filled (Unidirectional)
RSP T1B	Temporary Crash Cushion, Sand Filled (Bidirectional)

RSP T2 Temporary Crash Cushion, Sand Filled (Shoulder Installations)

T3 Temporary Railing (Type K)

NSP T3A Temporary Railing (Type K)

PROJECT FUNDING SIGNS

RSP T7 Construction Project Funding Identification Signs

TEMPORARY TRAFFIC CONTROL SYSTEMS

T10 Traffic Control System for Lane Closure On Freeways and Expressways

T14 Traffic Control System for Ramp Closure

T15 Traffic Control System for Moving Lane Closure on Multilane Highways

T16 Traffic Control System for Moving Lane Closure on Multilane Highways

TEMPORARY WATER POLLUTION CONTROL

NSP T65 Temporary Water Pollution Control Details [Temporary Fence (Type ESA)]

ROADSIDE SIGNS

RS1 Roadside Signs, Typical Installation Details No. 1

RS2 Roadside Signs – Wood Post, Typical Installation Details No. 2

RS4 Roadside Signs, Typical Installation Details No. 4

OVERHEAD SIGNS (TRUSS)

S1 Overhead Signs – Truss, Instructions and Examples

S2 Overhead Signs – Truss, Single Post Type – Post Type II thru IX

S3 Overhead Signs – Truss, Single Post Type – Base Plate and Anchorage Details

S4 Overhead Signs – Truss, Single Post Type – Structural Frame Members Details No. 1

S5 Overhead Signs – Truss, Single Post Type – Structural Frame Members Details No. 2

S6 Overhead Signs – Truss, Gusset Plate Details

S8 Overhead Signs – Truss, Single Post Type – Round Pedestal Pile Foundation

S12 Overhead Signs – Truss, Structural Frame Details

S13 Overhead Signs – Truss, Frame Juncture Details

S16 Overhead Signs – Walkway Details No. 1

S17	Overhead Signs – Walkway Details No. 2
S17A	Overhead Signs – Walkway Details No. 3
S18	Overhead Signs – Walkway Safety Railing Details
S19	Overhead Signs – Truss, Sign Mounting Details – Laminated Panel – Type A
OVERHEAD AND ROADSIDE SIGNS PANELS	
S81	Overhead Laminated Sign – Single or Multiple Panel, Type A (1" Thick)
S85	Seam Closure, "H" Section Extrusion and Post Spacing Tables, Multi-Horizontal Laminated Panel Aluminum Signs
S86	Laminated Panel Details – Extrusions for Type A, B and H Panels
S87	Type A-1 Mounting Hardware – Overhead Laminated Type A Panel, Truss and Lightweight Sign Structures
S88	Type A-2 Mounting Hardware – Overhead Laminated Type A Panel, Bridge Mounted and Tubular Sign Structures
S93	Framing Details for Framed Single Sheet Aluminum Signs, Rectangular Shape
S94	Roadside Framed Single Sheet Aluminum Signs, Rectangular Shape
S95	Roadside Single Sheet Aluminum Signs, Diamond Shape
ELECTRICAL SYSTEMS – SYMBOLS AND ABBREVIATIONS	
RSP ES-1A	Electrical Systems (Symbols and Abbreviations)
RSP ES-1B	Electrical Systems (Symbols and Abbreviations)
RSP ES-1C	Electrical Systems (Symbols and Abbreviations)
ELECTRICAL SYSTEMS – SERVICE EQUIPMENT AND WIRING DIAGRAMS	
ES-2A	Electrical Systems (Service Equipment)
RSP ES-2C	Electrical Systems (Service Equipment Notes, Type III Series)
RSP ES-2D	Electrical Systems (Service Equipment and Typical Wiring Diagram, Type III – A Series)
ELECTRICAL SYSTEMS – LIGHTING STANDARDS	
RSP ES-6A	Electrical Systems (Lighting Standard, Types 15 and 21)
RSP ES-6E	Electrical Systems (Lighting Standard, Types 30 and 31)
ES-6F	Electrical Systems (Lighting Standard, Types 30 and 31, Slip Base Plate Details)

ELECTRICAL SYSTEMS – SIGNAL AND LIGHTING STANDARDS

RSP ES-7B Electrical Systems (Signal and Lighting Standard – Type 1 Standards and Equipment Numbering)

ELECTRICAL SYSTEMS – SIGNAL AND LIGHTING STANDARD DETAILS

ES-7M Electrical Systems (Signal and Lighting Standards – Details No. 1)

ES-7N Electrical Systems (Signal and Lighting Standards – Details No. 2)

ELECTRICAL SYSTEMS – PULL BOX DETAILS

ES-8 Electrical Systems (Pull Box Details)

ELECTRICAL SYSTEMS – ISOFOOTCANDLE DIAGRAMS AND FOUNDATION DETAILS

ES-10 Electrical Systems (Isofootcandle Diagrams)

ES-11 Electrical Systems (Foundation Installations)

ELECTRICAL SYSTEMS – SPLICING, WIRING DETAILS AND FUSE RATINGS

ES-13A Electrical Systems (Splicing Details)

ES-13B Electrical Systems (Wiring Details and Fuse Ratings)

ELECTRICAL SYSTEMS – SIGN ILLUMINATION EQUIPMENT AND CONTROLS

ES-15A Electrical Systems (Sign Illumination Equipment)

ES-15C Electrical Systems (Sign Illumination Equipment)

RSP ES-15D Electrical Systems (Lighting and Sign Illumination Control)

SECTION 1. SPECIFICATIONS AND PLANS

1-1.01 GENERAL

The work embraced herein shall be done in accordance with the Standard Specifications dated May 2006, the Standard Plans dated May 2006, High and Low Risk Facility Specifications, and Utility Special Provisions, of the Department of Transportation (Caltrans) insofar as the same may apply, County of El Dorado Design and Improvement Standards Manual, revised March 8, 1994 including Resolutions 199-91 and 58-94 to adopt changes to the Design and Improvement Standards Manual, and these special provisions.

Attention is directed to Appendix A of these special provisions containing Amendments to May 2006 Standard Specifications as issued by the State of California Department of Transportation. These Amendments are hereby incorporated into the contract documents to replace or supplement those sections of the Standard Specifications where an Amendment exists, and are to be treated the same as the Standard Specifications in relation to other Contract Documents.

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the indented text or table following the term shall be considered an amendment to the Standard Specifications. **In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.**

In case of conflict between the Standard Specifications, the Amendments to Standard Specifications, and these special provisions, the special provisions shall take precedence over and be used in lieu of the conflicting portions.

1-1.02 DEFINITIONS AND TERMS

As used in the contract documents, unless the contract otherwise requires, the following terms have the following meaning:

APPROVAL OF CONTRACT – Execution of the contract by the County of El Dorado Board of Supervisors

CALTRANS - The State of California Department of Transportation.

CONTRACTOR - Contractor responsible for constructing the "U.S. 50 HOV LANES PHASE 2A" project.

COUNTY – The County of El Dorado, a political subdivision of the State of California

DOT / DEPARTMENT / DEPARTMENT OF TRANSPORTATION / RECIPIENT - The Department of Transportation as created by the Board of Supervisors for the County of El Dorado.

US DOT – The United States of America Department of Transportation.

DEPUTY DIRECTOR - The Deputy Director of Engineering, Engineering Division or Deputy Director of Engineering, Transportation Planning and Land Development Division in the Department of Transportation for the County of El Dorado.

DIRECTOR OF TRANSPORTATION - The Director or Interim Director of Transportation in the Department of Transportation for the County of El Dorado.

ENGINEER / STATE HIGHWAY ENGINEER - The Director of Transportation in the Department of Transportation for the County of El Dorado, or his/her authorized representative (Resident Engineer).

FHWA – Federal Highway Administration.

LABORATORY - The established laboratory of the El Dorado County Department of Transportation or laboratories authorized by the Engineer to test materials and work involved in the contract.

MUTCD –California Manual on Uniform Traffic Control Devices, (FHWA’s MUTCD 2003 Edition including Revision 1 and 2, as amended for use in California), also called the California MUTCD 2010.

PLANS -The improvement plans titled “**IN EL DORADO COUNTY NEAR EL DORADO HILLS FROM 0.3 MILE WEST OF BASS LAKE ROAD UNDERCROSSING TO 0.1 MILE WEST OF CAMERON PARK DRIVE**” approved by El Dorado County Department of Transportation and the Standard Plans.

STANDARD PLANS - The May 2006 edition of the Standard Plans of the State of California, Department of Transportation (Caltrans).

STANDARD SPECIFICATIONS - The May 2006 edition of the Standard Specifications for the State of California, Department of Transportation (Caltrans).

STATE - The State of California, including its agencies, departments, or divisions, whose conduct or action is related to the work, or The County of El Dorado, a political subdivision of the STATE, and its Department of Transportation.

All other definitions and terms are in accordance with the Standard Specifications.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 GENERAL

The bidder’s attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which it must observe in the preparation of the proposal form and the submission of the bid.

The first sentence of the second paragraph in Section 2-1.05, "Proposal Forms," of the Standard Specifications is amended to read:

“The Proposal form is bound together with the Notice to Bidders, Special Provisions, Agreement and attendant documents.”

A Proposal shall be deemed “Non-Responsive” if the proposal is submitted without the entire Contract Document package attached.

In addition to whom the bidder proposes to directly subcontract portions of the Work as required in accordance with Section 2-1.054, “Required Listing of Proposed Subcontractors,” of the Standard Specifications, the list of subcontractors shall also set forth the percentage of the bid item that will be done by each subcontractor listed. A sheet for listing the subcontractors is included in the Proposal.

The first sentence of the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications is amended to read:

The bidder's bond shall conform to the bond form included in this proposal for the project “U.S. 50 HOV LANES, PHASE 2A BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE”, and shall be properly filled out and executed.”

(DO NOT DETACH THE FORM).

The proposal shall be attached to and submitted with the contract documents bid package in its entirety.

The form of the bidder’s bond mentioned in the last paragraph in Section 2-1.07, “Proposal Guaranty”, of the Standard Specifications will be found in the Proposal. **The Bidder shall furnish one Bidder’s Bond in an amount equal to at least ten percent (10%) of the total amount bid.**

In accordance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the proposal. Signing the proposal shall also constitute signature of the Noncollusion Affidavit.

The Contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of Title 49 CFR (Code of Federal Regulations) part 26 in the award and administration of US DOT assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as County deems appropriate. Each subcontract signed by the Contractor must include this assurance.

Failure of the bidder to fulfill the requirements of the special provisions for submittals required to be furnished after bid opening, including but not limited to escrowed bid documents, where applicable, may subject the bidder to a determination of the bidder's responsibility in the event it is the apparent low bidder on a future public works contracts.

2-1.02 REQUIRED LISTING OF PROPOSED SUBCONTRACTORS

Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications is amended to read:

2-1.054 Required Listing of Proposed Subcontractors; Each Proposal shall have listed therein the name, contractor's license number and address of each subcontractor to whom the bidder proposes to subcontract portions of the work in an amount in excess of 0.5 % of the total bid 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 shall also describe in the Subcontractor Listing the work to be performed by each subcontractor listed. The work to be performed by the subcontractor shall be shown by listing the bid item number, bid item description, and portion of the work to be performed by the subcontractor in the form of a percentage calculated by dividing the work to be performed by the subcontractor by the respective bid item amount(s) (not by the total bid price). The percentage of each bid item subcontracted may be submitted with the Bidder's bid or sent via email or fax to Janel Gifford, El Dorado County Department of Transportation, email-Janel.Gifford@edcgov.us, Fax-(530) 626-0387 by 4:00 p.m. on the first business day after the bid opening. The email or fax shall contain the name of each subcontractor submitted with the Bidder's bid along with the bid item number, bid item description, and the percentage of each bid item subcontracted, as described above. **At the time the contract is awarded,** all listed subcontractors shall be properly licensed to perform their designated portion of the work. The bidder's attention is directed to other provisions of the Act related to the imposition of penalties for failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

Forms for listing the subcontractors who will work on this Project are included in the Proposal section of these Contract Documents.

2-1.03 INCLUSION OF FEDERAL FORM 1273 CONTRACT PROVISIONS

In accordance with Section 12.9 of Chapter 12 of the Local Assistance Procedures Manual (LAPM), and Section 14 "FEDERAL REQUIREMENTS FOR FEDERAL-AID CONSTRUCTION PROJECTS" of these Contract Documents the provisions of FHWA Form 1273 are required to be physically incorporated into each contract, subcontract and subsequent lower-tier subcontracts. The provisions may not be incorporated by reference.

The prime Contractor is responsible for compliance with the requirements by all subcontractors and lower tier subcontractors. Failure of the prime contractor to comply with this requirement is grounds for County termination of the contract with the Contractor and debarment of the contractor by FHWA.

2-1.04 FEDERAL LOBBYING RESTRICTIONS

Section 1352, Title 31, United States Code prohibits Federal funds from being expended by the recipient or any lower tier subrecipient of a Federal-aid contract to pay for any person for influencing or attempting to influence a Federal agency or Congress in connection with the awarding of any Federal-aid contract, the making of any Federal grant or loan, or the entering into of any cooperative agreement.

If any funds other than Federal funds have been paid for the same purposes in connection with this Federal-aid contract, the recipient shall submit an executed certification and, if required, submit a completed disclosure form as part of the bid documents.

A certification for Federal-aid contracts regarding payment of funds to lobby Congress or a Federal agency is included in the Proposal. Standard Form - LLL, "Disclosure of Lobbying Activities," with instructions for completion of the Standard Form is also included in the Proposal. Signing the Proposal shall constitute signature of the Certification.

The above-referenced certification and disclosure of lobbying activities shall be included in each subcontract and any lower-tier contracts exceeding \$100,000. All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the Engineer.

The Contractor, subcontractors and any lower-tier contractors shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by the Contractor, subcontractors and any lower-tier contractors. An event that materially affects the accuracy of the information reported includes:

- A. A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or
- B. A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or,
- C. A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

2-1.05 DISADVANTAGED BUSINESS ENTERPRISE (DBE)

This project is subject to Title 49 CFR 26.13(b):

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

Take necessary and reasonable steps to ensure that DBEs have opportunity to participate in the contract (49 CFR 26).

To ensure there is equal participation of the DBE groups specified in 49 CFR 26.5, the County specifies a goal for Underutilized Disadvantaged Business Enterprises (UDBEs). UDBE is a firm that meets the definition of DBE and is a member of one of the following groups:

1. Black Americans
2. Native Americans
3. Asian-Pacific Americans
4. Women

References to DBEs include UDBEs, but references to UDBEs do not include all DBEs.

Make work available to UDBEs and select work parts consistent with available UDBE subcontractors and suppliers.

Meet the UDBE goal shown in the Notice to Bidders or demonstrate that you made adequate good faith efforts to meet this goal.

It is your responsibility to verify that the UDBE firm is certified as DBE at date of bid opening. For a list of DBEs certified by the California Unified Certification Program, go to:

http://www.dot.ca.gov/hq/bep/find_certified.htm

Only UDBE participation will count towards the UDBE goal. DBE participation will count towards the County's Overall DBE Goal and the California federally-mandated statewide overall DBE goal.

Credit for materials or supplies you purchase from UDBEs counts towards the goal in the following manner:

1. 100 percent counts if the materials or supplies are obtained from a UDBE manufacturer.
2. 60 percent counts if the materials or supplies are obtained from a UDBE regular dealer.

3. Only fees, commissions, and charges for assistance in the procurement and delivery of materials or supplies count if obtained from a UDBE that is neither a manufacturer or regular dealer. 49 CFR 26.55 defines "manufacturer" and "regular dealer."

You receive credit towards the goal if you employ a UDBE trucking company that performs a commercially useful function as defined in 49 CFR 26.55 (d) (1) through (4) and (6).

The Contractor shall also carry out applicable requirements of 49 CFR Part 18 in the award and administration of this USDOT-assisted Contract. The applicable requirements of 49 CFR Part 18 are as follows:

(a) Contracting with small and minority firms, women's business enterprise and labor surplus area firms.

- (1) Contractor will take all necessary affirmative steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used when possible.
- (2) Affirmative steps shall include:
 - (i) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
 - (ii) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
 - (iii) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority business, and women's business enterprises;
 - (iv) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises;
 - (v) Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce; and
 - (vi) Requiring the prime contractor, if subcontracts are to be let, to take the affirmative steps listed in paragraphs (a)(2) (i) through (v) of this section.

Bidder will take all necessary affirmative steps to assure that minority firms, women's business enterprises and labor surplus area firms are used when possible.

UDBE Commitment Submittal

Submit UDBE information on the "Local Agency Bidder-UDBE Commitment (Construction Contracts)," Exhibit 15-G(1), form included in the Proposal. If the form is not submitted with the bid, make a copy of the form from the Proposal before submitting your bid.

If the UDBE Commitment form is not submitted with the bid, the apparent low bidder, the 2nd low bidder, and the 3rd low bidder must complete and submit the UDBE Commitment form via email or fax to Janel Gifford, El Dorado County Department of Transportation, email-Janel.Gifford@edcgov.us, Fax-(530) 626-0387 by 4:00 pm on the 4th business day after bid opening.

Other bidders do not need to submit the UDBE Commitment form unless the County requests it. If the County requests you to submit a UDBE Commitment form, submit the completed form within 4 business days of the request via email or fax to Janel Gifford, El Dorado County Department of Transportation, email-Janel.Gifford@edcgov.us, Fax-(530) 626-0387.

Submit written confirmation from each UDBE stating that it is participating in the contract. Include confirmation with the UDBE Commitment form. A copy of a UDBE's quote will serve as written confirmation that the UDBE is participating in the contract.

If you do not submit the UDBE Commitment form with the UDBE quotes within the specified time, the County finds your bid nonresponsive.

Good Faith Efforts Submittal

If you have not met the UDBE goal, complete and submit the “UDBE Information - Good Faith Efforts,” Exhibit 15-H, form with the bid showing that you made adequate good faith efforts to meet the goal. Only good faith efforts directed towards obtaining participation by UDBEs will be considered. If good faith efforts documentation is not submitted with the bid, make a copy of Exhibit 15-H before submitting your bid. If good faith efforts documentation is not submitted with the bid, it must be received via email or fax to Janel Gifford, El Dorado County Department of Transportation, email- Janel.Gifford@edcgov.us, Fax-(530) 626-0387 by 4:00 pm on the 4th business day after bid opening.

If your UDBE Commitment form shows that you have met the UDBE goal or if you are required to submit the UDBE Commitment form, in order to protect your eligibility for award of the contract in the event the County finds that the UDBE goal has not been met, you must also submit good faith efforts documentation within the specified time.

Good faith efforts documentation must include the following information and supporting documents, as necessary:

1. Items of work you have made available to UDBE firms. Identify those items of work you might otherwise perform with your own forces and those items that have been broken down into economically feasible units to facilitate UDBE participation. For each item listed, show the dollar value and percentage of the total contract. It is your responsibility to demonstrate that sufficient work to meet the goal was made available to UDBE firms.
2. Names of certified UDBEs and dates on which they were solicited to bid on the project. Include the items of work offered. Describe the methods used for following up initial solicitations to determine with certainty if the UDBEs were interested, and the dates of the follow-up. Attach supporting documents such as copies of letters, memos, facsimiles sent, telephone logs, telephone billing statements, and other evidence of solicitation. You are reminded to solicit certified UDBEs through all reasonable and available means and provide sufficient time to allow UDBEs to respond.
3. Name of selected firm and its status as a UDBE for each item of work made available. Include name, address, and telephone number of each UDBE that provided a quote and their price quote. If the firm selected for the item is not a UDBE, provide the reasons for the selection.
4. Name and date of each publication in which you requested UDBE participation for the project. Attach copies of the published advertisements.
5. Names of agencies and dates on which they were contacted to provide assistance in contacting, recruiting, and using UDBE firms. If the agencies were contacted in writing, provide copies of supporting documents.
6. List of efforts made to provide interested UDBEs with adequate information about the plans, specifications, and requirements of the contract to assist them in responding to a solicitation. If you have provided information, identify the name of the UDBE assisted, the nature of the information provided, and date of contact. Provide copies of supporting documents, as appropriate.
7. List of efforts made to assist interested UDBEs in obtaining bonding, lines of credit, insurance, necessary equipment, supplies, and materials, excluding supplies and equipment that the UDBE subcontractor purchases or leases from the prime contractor or its affiliate. If such assistance is provided by you, identify the name of the UDBE assisted, nature of the assistance offered, and date. Provide copies of supporting documents, as appropriate.
8. Any additional data to support demonstration of good faith efforts.

The Department may consider UDBE Commitments of the 2nd and 3rd bidders when determining whether the low bidder made good faith efforts to meet the UDBE goal.

In accordance with 49 CFR 26.53(d) if the County determines that the apparent successful bidder failed to meet the Good Faith Effort requirements, the County will provide the apparent successful low bidder an opportunity for administrative reconsideration before awarding the contract. The County will provide the apparent successful low bidder an opportunity to submit written documentation or argument and meet in person with the reconsideration official concerning the issue of

whether it met the goal or made adequate good faith efforts to do so. The reconsideration official is someone who did not participate in the original determination that the goal or good faith effort was not met.

2-1.06 OPT OUT OF PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

You may opt out of payment adjustments for price index fluctuations as specified in “Payment Adjustments for Price Index Fluctuations” of these special provisions. If you elect to opt out of the provisions of the specifications, you must complete the “Opt Out of Payment Adjustments for Price Index Fluctuations” form. The completed form must be submitted with your bid.

2-1.07 COMPLIANCE WITH FEDERAL, STATE AND LOCAL AGENCY REQUIREMENTS

County is relying on federal assistance or grants as well as on state funds for all or a portion of the funding for the Work to be provided under this Contract. As a requirement of County’s use of federal and state funds, County is required to comply with certain federal and state contracting requirements and to extend those requirements to its third party contracts. Contractor shall comply and shall require its subcontractors to comply with all applicable provisions of federal and state regulations, including those required by Caltrans and Federal Highway Administration (FHWA) grant funding requirements, regulations, and related executive orders regarding the use, expenditure, control, reporting, allowable costs and management of such funds as well as these requirements detailed in 49 CFR Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments. Contractor shall comply and shall require its subcontractors to comply with the Fair Employment Practices Addendum attached as Exhibit B to the Draft Agreement and the Nondiscrimination Assurances attached as Exhibit C to the Draft Agreement of these Contract Documents. Contractor shall further comply with all applicable provisions of the Caltrans Local Assistance Procedures Manual and the Local Assistance Program Guidelines, all Title 23 Federal requirements and all applicable state and federal laws, regulations and policy; procedural or instructional memoranda. Failure of Contractor to comply with any federal or state provision may be the basis for withholding payments to Contractor and for such other remedies as may be appropriate including termination of this Contract. Contractor shall also comply with any flow-down or third-party contracting provisions which may be required under the federal and state regulations and which may apply to Contractor’s subcontracts, if any, associated with this Contract. Contractor shall ensure that all subcontractors submit certifications regarding federal lobbying activities as required by Section 1352, Title 31, United State Code and that all such certifications are made a part of any subcontracts entered into as a result of this Contract.

2-1.08 COST PRINCIPLES

The Federal Acquisition Regulations in Title 48, CFR, Part 31 et seq. as applicable, are the governing factors regarding allowable elements of cost for the Work to be performed under this Contract.

- A. Contractor and its subcontractors shall comply with 2 CFR Part 225 (formerly OMBA-87), Cost Principles for State, Local And Indian Tribal Governments; with Federal administrative procedures pursuant to 49 CFR, Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments; and with Contract Cost Principles, 48 CFR, Federal Acquisition Regulations System, Chapter 1, Parts 31 et seq., insofar as those regulations may apply to Contractor and its subcontractors. This provision shall apply to every sub-recipient receiving funds as a Contractor or subcontractor under this Contract.
- B. Any expenditures for costs for which Contractor has received payment or credit that are determined by subsequent audit to be unallowable under 2 CFR Part 225, 48 CFR, Parts 31 et seq. or 49 CFR, Part 18 are subject to repayment by Contractor to County.
- C. Travel and per diem reimbursements, if applicable, and third-party contract reimbursements to subcontractors will be allowable as project costs only after those costs are incurred and paid for by Contractor.
- D. Notwithstanding any other provision of the Contract Documents to the contrary, payments to Contractor for mileage, travel or subsistence expenses, if applicable, for Contractor’s staff or subcontractors claimed for reimbursement shall not exceed the lesser of (1) the rates to be paid to County employees under the current Board of Supervisors Travel Policy in effect at the time the expenses are incurred; or (2) the rates authorized to be paid to rank and file State employees under current State Department of Personnel Administration (DPA) rules. If the rates claimed are in excess of those authorized DPA rates, then Contractor is responsible for the cost difference, and any overpayments inadvertently paid by County shall be reimbursed to County by Contractor on demand within thirty (30) days of such demand.

- E. Contractor and its subcontractors shall establish and maintain accounting systems and records that properly accumulate and segregate funds received under this Agreement by line item. The accounting systems of Contractor and all subcontractors shall conform to Generally Accepted Accounting Principles (GAAP), shall enable the determination of incurred costs at interim points of completion, and shall provide support for reimbursement of payment vouchers or invoices.

2-1.09 BID PROTEST PROCEDURE

The protest procedure is intended to handle and resolve disputes related to the bid award for this project pursuant to Title 49 Code of Federal Regulations Part 18 Section 18.36 (b) (12)(i)-(ii) and County of El Dorado policies and procedures. A protestor must exhaust all administrative remedies with the County of El Dorado before pursuing a protest with a Federal Agency. Reviews of protests by the Federal agency will be limited to:

- (i.) Violations of Federal law or regulations and the standards of 49 CFR Part 18 Section 18.36 (b) (12)(i)-(ii). Violations of State of California or local law will be under the jurisdiction of the State of California or the County of El Dorado; and
- (ii.) Violation of the County of El Dorado's protest procedures for failure to review a complaint or protest. Protests received by the Federal agency other than those specified above will be referred to the County of El Dorado.

The protest procedure is an extension of the formal bid process and allows those who wish to protest the recommendation of an award after bid the opportunity to be heard.

Policy: Upon completion of the bid evaluation, the Department of Transportation shall notify all bidders of the recommendation of award, the basis therefore, and the date and time on which the recommendation for award will be considered and acted upon by the Board of Supervisors. All bidders may attend the Board of Supervisors meeting at the time the agenda item is considered, address the Board of Supervisors, and be heard.

Procedure: If a bidder wishes to protest the award, the procedure shall be as follows:

1. The Department of Transportation will review the bids received in a timely fashion under the terms and conditions of the Notice to Bidders, and notify the bidders in writing, at the address designated in the bid, of its recommendation including for award or rejection of bids ("All Bidders Letter").
2. Within five (5) working days from the date of the "All Bidders Letter," the bidder protesting the recommendation for award shall submit a letter of protest to and shall be received by the County of El Dorado, Department of Transportation, Attention Janel Gifford, 2850 Fairlane Court, Placerville, CA 95667, and state in detail the basis and reasons for the protest. The bidder must provide facts to support the protest, including any evidence it wishes to be considered, together with the law, rule, regulation, or criteria on which the protest is based.
3. If the Department of Transportation finds the protest to be valid, it may modify its award recommendations and notify all bidders of that decision. If the Department of Transportation does not agree with the protest, or otherwise fails to resolve the protest, the Department of Transportation will notify the bid protestor and all interested parties of its decision and the date and time that the recommendation for award will be agendized for the Board of Supervisors' consideration and action. The Department of Transportation shall also include in its report to the Board of Supervisors the details of the bid protest.
4. The bidder may attend the Board of Supervisors meeting at which the recommendation and bid protest will be considered. The Board of Supervisors will take comment from the bidder, staff, and members of the public who wish to speak on the item. In the event that the bidder is not in attendance at that time, the bid protest may be dismissed by the Board of Supervisors without further consideration of the merits; and

In its discretion, the County of El Dorado may accept or reject any bids. The decision of the Board of Supervisors shall be final in accepting or rejecting the bid protest, awarding the bid, or rejecting any or all bids.

SECTION 3. AWARD AND EXECUTION OF CONTRACT

3-1.01 GENERAL

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

3-1.02 AWARD OF CONTRACT

Section 3-1.01, "Award of Contract," of the Standard Specifications is amended to read:

The County of El Dorado reserves the right after opening bids to reject any or all bids, to waive any irregularity in a bid, or to make award to the lowest responsive, responsible Bidder and reject all other bids, as it may best serve the interests of the County. The award of the Contract, if it be awarded, will be to the lowest, responsive, responsible bidder whose Proposal complies with all the requirements prescribed. Such award, if made, will be made within sixty (60) days after the opening of the Proposals. This period will be subject to extension for such further period as may be agreed upon in writing between the Department and the bidder concerned.

All bids will be compared on the basis of the Proposal Pay Items and Bid Price Schedule of the quantities of work to be done.

The lowest, responsive, responsible bidder shall be the responsible, responsive bidder submitting the lowest additive total of all the bid items and meeting all other requirements. In the event of a discrepancy between the unit price bid and the extended unit total as stated on the Proposal, the amount bid for the unit price shall control and shall be utilized in calculating the additive total of the bid items for purposes of award, including revisions by Addenda, and as specified in the Proposal instructions.

A "LOCAL AGENCY BIDDER - DBE INFORMATION (Construction Contracts) Exhibit 15 –G(2)" form will be included in the contract documents to be executed by the successful bidder. The purpose of the form is to collect data required under 49 CFR 26. Even if no DBE participation will be reported, the successful bidder must execute and return the form. Information required on this form is in addition to the Local Agency Bidder – UDBE Commitment (Construction Contracts) Exhibit 15-G (1) form included in the Proposal section. The successful bidder's "LOCAL AGENCY BIDDER - DBE INFORMATION" (Construction Contracts) Exhibit 15 –G(2)" form should include the names, addresses and phone numbers of DBE firms that will participate, with a complete description of work or supplies to be provided by each, and the dollar value of each DBE transaction. When 100 percent of a contract item of work is not to be performed or furnished by a DBE, a description of the exact portion of that work to be performed or furnished by that DBE should be included in the DBE information, including the planned location of that work. A successful bidder certified as a DBE shall describe the work it has committed to performing with its own forces as well as any other work that it has committed to be performed by DBE subcontractors, suppliers and trucking companies.

The successful bidder shall provide written confirmation from each DBE that the DBE is participating in the contract. A copy of a DBE's quote will serve as written confirmation that the DBE is participating in the contract. If a DBE is participating as a joint venture partner, the successful bidder shall submit a copy of the joint venture agreement.

The "LOCAL AGENCY BIDDER - DBE INFORMATION (Construction Contracts) Exhibit 15 –G(2)" form shall be completed and returned to the County by the successful bidder with the executed contract, contract bonds and other required contract documents.

3-1.03 EXECUTION OF CONTRACT

Attention is directed to the "Notice to Bidders" and "Proposal" for this Contract. Barring some unforeseen irregularity, Notice of Award will be sent to the lowest responsive responsible bidder after approval by the El Dorado County Board of Supervisors.

The successful bidder shall return the signed Contract, the Contract bonds, **the completed "LOCAL AGENCY – DBE INFORMATION (Construction Contracts) Exhibit 15 – G(2)" form, the escrow bid documents with lockable container**, a California Form 590-Withholding Exemption Certificate, a County Payee Data Record Form in lieu of Federal Form W-9-Request for Taxpayer Identification Number and Certification, and certificates of insurance to the Office of the Department of Transportation **within ten (10) days, not including Saturdays, Sundays and legal holidays, of the date of the Notice of Award of Contract letter**. Priority delivery or mail of these documents should be to attention Janel Gifford at the El Dorado County Department of Transportation, 2850 Fairlane Court, Placerville CA 95667, Janel.Gifford@edcgov.us.

The failure of the successful bidder to furnish any bond required of it by law or by this Agreement, or the failure to execute the Contract, or the failure to provide the required insurance documents within the time fixed for the execution of the Contract and return of the bonds and insurance constitutes a failure to execute and return the Contract as required herein. Upon such failure or refusal to return the executed Agreement, or to provide the bonds or insurance documents required herein, the bidder's security shall be forfeited to the County.

3-1.04 ESCROW BID DOCUMENTS

Scope

The successful bidder shall submit to Janel Gifford, El Dorado County Department of Transportation, 2850 Fairlane Court, Placerville, CA, within ten (10) days, not including Saturdays, Sundays and legal holidays, of the date of the Notice of Award of the Contract letter, one sealed copy of all documentary information generated in preparation of bid prices for this project. This material is hereinafter referred to as Escrow Bid Documents (EBDs). The EBDs of the successful bidder will be held in escrow for the duration of the contract.

The successful bidder agrees, as a condition of execution of the Contract, that the EBDs constitute the only complete documentary information used in preparation of his bid. No other bid preparation information shall be considered in resolving disputes.

Nothing in the EBDs shall change or modify the terms or conditions of the Contract.

Ownership

The EBDs are and shall always remain the property of the Contractor subject only to joint review by County and the Contractor, except as provided for herein.

County stipulates and expressly acknowledges that the EBDs, as defined herein, constitute trade secrets. This acknowledgment is based on the County's express understanding that the information contained in the EBDs is not known outside the Contractor's business, is known only to a limited extent and only by a limited number of employees of the Contractor, is safeguarded while in the Contractor's possession, and is extremely valuable to competitors by virtue of it reflecting the Contractor's contemplated techniques of construction.

County acknowledges that EBDs and the information contained therein are made available to County only because such action is an express prerequisite to execution of the Contract by the County. County acknowledges that the EBDs include a compilation of information used in the Contractor's business, intended to give the Contractor an opportunity to obtain an advantage over competitors who do not know of or use the contents of the documentation. County agrees to safeguard the EBDs and all information contained therein to the fullest extent permitted by law.

Purpose

EBDs will be used to assist in the negotiation of price adjustments and variations and in the settlement of disputes, claims and other controversies. They will not be used for evaluation of the Contractor's anticipated methods of construction or to assess the Contractor's qualifications for performing the Work.

Format and Contents

Bidders may submit EBDs in their usual cost estimating format. It is not intended that extra work is required in preparing the bid but to ensure that the EBDs will be adequate to enable complete and proper understanding and proper interpretation for their intended use. The EBDs shall be in the English language only.

The EBDs shall clearly itemize the estimated costs of performing the work of each item contained in the Proposal Pay Items and Bid Schedule. Items should be separated into sub-items as required to present a complete and detailed cost estimate and allow a detailed cost review. The EBDs shall include all quantity take-offs, crews, assumed overtime, equipment, calculations of rates of production and progress, acceleration costs, copies of quotations from Subcontractors and suppliers, and memoranda, narratives, consultants reports, add/deduct sheets, and all other information used by the Contractor to arrive at the prices contained in the bid. Estimated costs shall be broken down into the Contractor's usual estimate categories such as direct labor, repair labor, equipment operation, equipment ownership, expendable materials, permanent materials, and subcontract costs as appropriate. Plant and equipment and indirect costs should be detailed in the Contractor's usual format. The Contractor's allocation of plant and equipment, indirect costs, contingencies, mark-up, and other items to each bid item shall be clearly indicated.

The EBDs shall clearly show in calculations, text, or both, the relationship between baseline indications presented in the Contract Documents and assumptions that form the basis for the Contractor's means, methods, equipment selection, rates of production, and costs.

All costs shall be identified. For bid items where the extended amount is less than \$10,000 estimated unit costs are acceptable without a detailed cost estimate, providing that labor, equipment, materials and subcontracts, as applicable, are included and provided that indirect costs, contingencies, and mark-up, as applicable, are allocated.

Bid Documents provided by County should not be included in the EBDs unless needed to comply with the above requirements.

Submittal

The EBDs shall be submitted by the successful bidder in a sealed lockable container within ten (10) days, not including Saturdays, Sundays, and legal holidays, of the date of the Notice of Award of the Contract letter. The container shall be clearly marked on the outside with the Bidder's name, date of submittal, project name, Contract No., and the words "Escrow Bid Documents".

The EBDs shall be accompanied by the "Bid Documentation Certification", signed by an individual authorized by the bidder to execute the bid, stating that the material in the Escrow Bid Documentation constitutes all the documentary information used in the preparation of the bid and that he or she has personally examined the contents of the EBDs container and has found that the documents in the container are complete.

"Escrow Bid Document Certification"

THE UNDERSIGNED HEREBY CERTIFIES THAT THE BID DOCUMENTATION CONTAINED HEREIN CONSTITUTES ALL THE INFORMATION USED IN PREPARATION OF THE BID AND THAT I HAVE PERSONALLY EXAMINED THESE CONTENTS AND HAVE FOUND THAT THIS BID DOCUMENTATION IS COMPLETE.

SIGNATURE:

NAME:
(Print)

TITLE:

FIRM:

DATE:

Prior to execution of the Contract by the County, the EBDs of the successful bidder will be examined, organized and inventoried by representatives of County, together with members of the Contractor's staff who are knowledgeable in how the bid was prepared. This examination is to ensure that the EBDs are authentic, legible, and complete. It will not include review of and will not constitute approval of proposed construction methods, estimating assumptions, or interpretations of the Contract Documents. Examination will not alter any condition(s) or term(s) of the Contract.

If all documentation required in the "Format and Contents" has not been included in the original submittal, additional documentation shall be submitted, at County's discretion, prior to execution of the Contract by the County. The detailed breakdown of estimated costs shall be reconciled and revised, if appropriate, by agreement between the Contractor and County before execution of the Contract by the County.

Failure of the successful bidder to furnish the EBDs in accordance with this special provision constitutes a failure to execute and return the Contract as required. Upon such failure to submit the EBDs as required herein, the bidder's security will be forfeited to the County. The County will then recommend that the Board of Supervisors award the Contract to the second lowest bidder, who shall comply with the EBDs provisions herein.

If the bidder's proposal is based on subcontracting any part of the Work, each Subcontractor whose total subcontract price exceeds five percent of the total contract price proposed by the bidder, shall provide separate EBDs to be included with those of the bidder. These documents will be opened and examined in the same manner and at the same time as the examination described above for the apparent successful bidder.

If the Contractor wishes to subcontract any portion of the Work after award, County retains the right to require the Contractor to submit EBDs from the Subcontractor for subcontracts that exceed 5% of the total contract amount before the subcontract is approved.

Storage

The EBDs shall be stored at the Department of Transportation's Office Engineer / Contract Services Unit at 2850 Fairlane Court, Placerville, CA. in the lockable container supplied by the Contractor. The Contractor shall provide the lockable container and the Contractor shall maintain possession of the key.

Examination

The EBDs shall be examined by both County and the Contractor, at any time deemed necessary by either County or the Contractor, to assist in the negotiation of price adjustments and change orders, or the settlement of disputes.

Examination of the EBDs is subject to the following conditions:

- a. As trade secrets, the EBDs are proprietary and confidential as described above.
- b. County and the Contractor shall each designate, in writing to the other party a minimum of ten calendar days prior to examination, representatives who are authorized to examine the EBDs. No other person shall have access to the EBDs.
- c. Access to the EBDs will take place only in the presence of duly designated representatives of both County and the Contractor.

Final Disposition

The EBDs and the lockable container will be returned to the Contractor at such time as the Contract has been completed and final settlement has been achieved.

Full compensation for preparing and submitting EBDs, furnishing the lockable container, for preparing and submitting EBDs for any subcontractor after award, and for examining EBDs shall be considered as included in the contract price for various items of work involved and no additional compensation will be allowed therefor.

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

4-1.01 GENERAL

Attention is directed to the provisions in Section 8-1.06, "Time of Completion," and in Section 8-1.07, "Liquidated Damages," of the Standard Specifications and these special provisions.

Section 8-1.03, "Beginning of Work" of the Standard Specifications shall not apply and shall be replaced with the following:

The contract working days shall begin on the date stated in the Notice to Proceed issued by the Department of Transportation.

The work shall be diligently prosecuted to completion before the expiration of one hundred twenty (120) **WORKING DAYS**.

The Contractor shall pay to the County of El Dorado the sum of eight thousand and three hundred (\$8,300) per day, for each and every calendar day's delay in finishing the work in excess of one hundred twenty (120) **WORKING DAYS**.

4-1.02 CONTRACT WORKING HOURS

Attention is directed to "Sound Control Requirements" and "Maintaining Traffic" of these special provisions.

The Contractor shall take steps including but not limited to utilizing multiple crews, working multiple shifts, and working concurrently at multiple locations, all as necessary to complete all work within the project working days specified in Section 4-1.01 of these Special Provisions.

4-1.03 PRE-CONSTRUCTION CONFERENCE AND WEEKLY MEETINGS

A pre-construction conference will be scheduled by the Engineer between the Engineer and the Contractor or its representative after the project is awarded and prior to the issuance of the Notice to Proceed. The conference will be held at the Construction Office, 2441 Headington Road, Placerville to discuss the work each DBE subcontractor will perform and important aspects of the project and all essential matters pertaining to the prosecution and the satisfactory completion of the project as required, and the Contractor shall bring all required schedules and documents to the meeting.

Before work can begin on a subcontract, the Department will require the Contractor to submit a completed "Subcontracting Request", Exhibit 16-B of the Caltrans Local Assistance Procedures Manual (LAPM) or equivalent. When the Engineer receives the completed form it will be checked for agreement of the first tier subcontractors and DBE's. The

Engineer will not approve the request when it identifies someone other than the DBE listed in the previously completed "LOCAL AGENCY BIDDER – DBE INFORMATION (Construction Contracts) Exhibit 15-G(2)" form or first tier subcontractor listed in the Subcontractors Listing form of the Proposal. The "Subcontracting Request" will not be approved until any discrepancies are resolved. If an issue cannot be resolved at that time, or there is some other concern, the Engineer will require the Contractor to eliminate the subcontractor in question before signing the subcontracting request. A change in the DBE or first tier subcontractor may be addressed during a substitution process at a later date.

Suppliers, vendors, or manufacturers listed on the "LOCAL AGENCY BIDDER – DBE INFORMATION (Construction Contracts) Exhibit 15-G(2)" form will be compared to those listed in the completed Exhibit 16-I "Notice of Materials to be Used", of the LAPM or equivalent. Differences must be resolved by either making corrections or requesting a substitution.

Substitutions will be subject to the Subletting and Subcontracting Fair Practices Act (FPA). The Department will require contractors to adhere to the provisions within Subletting and Subcontracting Fair Practices Act (State Law) Sections 4100-4114. FPA requires the Contractor to list all subcontractors in excess of one half of one percent (0.5%) of the Contractor's total bid or \$10,000, whichever is greater. The statute is designed to prevent bid shopping by contractors. The FPA explains that a contractor may not substitute a subcontractor listed in the original bid except with the approval of the awarding authority.

The Engineer will give the Contractor a blank Exhibit 17-F, "Final Report – Utilization of Disadvantaged Business Enterprises (DBE), First –Tier Subcontractors," from the Caltrans LAPM. This form must be completed and returned to the County with the Acceptance Statement which accompanies the Proposed Final Pay Estimate.

4-1.04 PROSECUTION AND PROGRESS

Attention is directed to the provisions of Section 8 of the Standard Specifications.

The Contractor shall notify the Engineer within five (5) working days of any occurrence, which in the Contractor's opinion, entitles it to an extension of time for completion. Such notice shall be in writing. The Engineer shall acknowledge, in writing, receipt of any such claim by the Contractor within five (5) working days of its receipt.

SECTION 5. GENERAL

SECTION 5-1. MISCELLANEOUS

5-1.01 CONTRACT BONDS

Attention is directed to Section 3-1.02, "Contract Bonds," of the Standard Specifications and these special provisions.

The performance bond shall be in a sum not less than one hundred percent of the total amount payable by the terms of the contract, name COUNTY as obligee, and name CALTRANS as additional obligee.

The payment bond shall be in a sum not less than one hundred percent of the total amount payable by the terms of the contract, name COUNTY as obligee, and name CALTRANS as additional obligee.

5-1.02 LABOR NONDISCRIMINATION

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOV. CODE, SECTION 12990)

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination," of the Standard Specifications, which is applicable to all nonexempt State contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The specifications are applicable to all nonexempt State construction contracts and subcontracts of \$5,000 or more.

Attention is also directed to the draft Agreement contained in these Contract Documents for additional nondiscrimination and fair employment practice provisions that will apply to this federal-aid Contract.

5-1.03 COST REDUCTION INCENTIVE

Attention is directed to Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications.

Prior to preparing a written cost reduction proposal, the Contractor shall request a meeting with the Engineer to discuss the proposal in concept. Items of discussion will also include permit issues, impact on other projects, impact on the project schedule, peer reviews, overall merit of the proposal, and review times required by the Department and other agencies.

If a cost reduction proposal submitted by the Contractor, and subsequently approved by the Engineer, provides for a reduction in contract time, 50 percent of that contract time reduction shall be credited to the State by reducing the contract working days, not including plant establishment. Attention is directed to "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions regarding the working days.

If a cost reduction proposal submitted by the Contractor, and subsequently approved by the Engineer, provides for a reduction in traffic congestion or avoids traffic congestion during construction, 60 percent of the estimated net savings in construction costs attributable to the cost reduction proposal will be paid to the Contractor. In addition to the requirements in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications, the Contractor shall provide detailed comparisons of the traffic handling between the existing contract and the proposed change, and estimates of the traffic volumes and congestion.

5-1.04 PREVAILING WAGE REQUIREMENTS:

In accordance with the provisions of California Labor Code Sections 1770 et seq., including but not limited to Sections 1773, 1773.1, 1773.2, 1773.6, and 1773.7, the general prevailing rate of wages in the county in which the Work is to be done has been determined by the Director of the California Department of Industrial Relations. These wage rates appear in the California Department of Transportation publication entitled General Prevailing Wage Rates. Interested parties can obtain the current wage information by submitting their requests to the Department of Industrial Relations, Division of Labor Statistics and Research, PO Box 420603, San Francisco CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at <http://www.dir.ca.gov/dlsr/PWD>. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.

Copies of the general prevailing rate of wages in the county in which the Work is to be done are also on file at the Department of Transportation's principal office, and are available upon request, and in case of projects involving federal funds, federal wage requirements as predetermined by the United States Secretary of Labor have been included in the Contract Documents. Addenda to modify the Federal minimum wage rates, if necessary, will be issued as described in the Project Administration section of this Notice to Bidders.

In accordance with the provisions of Labor Code 1810, eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and Contractor and any subcontractor employed under this Contract shall conform to and be bound by the provisions of Labor Code Sections 1810 through 1815.

In the case of federally funded projects, where federal and state prevailing wage requirements apply, compliance with both is required. This project is funded in whole or part by federal funds. Contractor's attention is directed to Section 14 of the Special Provisions and the requirements of, and compliance with the Copeland Act (18 U.S.C. 874 and 29 CFR Part 3), the Davis-Bacon Act (40 U.S.C. 276a to 276a-7 and 29 CFR Part 5), and the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330 and 29 CFR Part 5).

If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, Contractor and subcontractors shall pay not less than the higher wage rate. The Department will not accept lower State wage rates not specifically included in the Federal minimum wage determinations. This includes "helper" (or other classifications based on hours of experience) or any other classification not appearing in the Federal wage determinations. Where Federal wage determinations do not contain the State wage rate determination otherwise available for use by Contractor and subcontractors, Contractor and subcontractors shall pay not less than the federal minimum wage rate which most closely approximates the duties of the employees in question.

5-1.05 APPRENTICES

Attention is directed to Sections 1777.5, 1777.6 and 1777.7 of the California Labor Code and Title 8, California Code of Regulations Section 200 et seq. To ensure compliance and complete understanding of the law regarding 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, CA 94102, or one of its branch offices prior to commencement of work on the public works contract. Responsibility for compliance with this section lies with the Contractor.

It is County policy to encourage the employment and training of apprentices on public works contracts as may be permitted under local apprenticeship standards.

5-1.06 CERTIFIED PAYROLL

As required under the provisions of Labor Code Section 1776, the Contractor and any subcontractors shall keep accurate payroll records as follows:

1. The payroll records shall show the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor or subcontractors in connection with this project.
2. A certified copy of all payroll records enumerated above shall be available for inspection at all reasonable hours at the principal office of the Contractor as follows:
 - a. Make available or furnish to the employee or his or her authorized representative on request.
 - b. Make available for inspection or furnished upon request to a representative of the County, the State Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the State Department of Industrial Relations.
 - c. Make available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the County, the State Division of Labor Standards Enforcement, or the State Division of Apprenticeship Standards. The requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Contractor, subcontractor, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the Contractor.

5-1.07 DISPUTES RESOLUTION

As permitted by Public Contract Code section 20104, the County has elected to resolve any claims between the Contractor and the County pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2 of the Public Contract Code. Attention is directed to Section 9, "Measurement and Payment" of the Standard Specifications for the contract claim procedure. The provisions of that Section constitute a non-judicial claim settlement procedure, and also step one of a two-step claim presentment procedure by agreement under Section 930.2 of the California Government Code. Specifically, step one is compliance with the contract claim procedure in accordance with the Contract Documents, including, but not limited to, Section 9, "Measurement and Payment" of the Standard Specifications. Step two is the filing of a timely Government Code Section 910 et seq. claim in accordance with the California Government Code. Any such claim shall affirmatively indicate Contractor's prior compliance with the contract claim procedure herein and previous dispositions under Section 9, "Measurement and Payment" of the Standard Specifications. Any claim that fails to conform to the contract claim procedure required in step one may not be asserted in any subsequent Government Code Section 910 et seq. claim.

As a condition precedent to arbitration or litigation, claims must first be mediated. Mediation shall be non-binding and utilize the services of a mediator mutually acceptable to the parties and, if the parties cannot agree, a mediator selected by the American Arbitration Association from its panel of approved mediators trained in construction industry mediation. All statutes of limitations shall be tolled from the date of the demand for mediation until a date two weeks following the mediation's conclusion. The cost of mediation shall be equally shared by the parties.

If Contractor fails to comply with these claim procedures as to any claim, then Contractor waives its rights to such claim. County shall not be deemed to waive or alter any provision of this section or Section 9, "Measurement and Payment" of the Standard Specifications if, at County's sole discretion, County administers a claim in a manner not in accord with those provisions.

These provisions shall survive termination, breach, or completion of the Contract Documents.

5-1.08 PAYMENT OF WITHHELD FUNDS

The Department will retain 5% of the value of each progress payment (excluding mobilization payments) from each progress payment. In conformance with 49 CFR 26.29 the Department will release retention incrementally as follows:

1. When 25% of the total amount bid (excluding mobilization) has been completed, the Department will release all retention withheld up to this point;
2. When 50% of the total amount bid (excluding mobilization) has been completed, the Department will release all retention withheld since the previous release;
3. When 75% of the total amount bid (excluding mobilization) has been completed, the Department will release all retention withheld since the previous release.
4. The remaining retained funds shall be retained until thirty five (35) days after recordation of the Notice of Acceptance.

Work increments deemed complete by the Engineer under this section do not affect the Contractor's other contractual obligations pertaining to that work, including, but not limited to, the commencement of the warranty period or the Contractor's obligation of maintenance and responsibility for that increment of work. Relief from maintenance and responsibility shall be at the discretion of the Engineer and shall conform to the provisions of Section 7-1.15 "Relief from Maintenance and Responsibility" of the Standard Specifications.

The Contractor may elect to receive one hundred percent (100%) of payments due under the Contract from time to time, without retention of any portion of the payment by the County, by depositing securities of equivalent value with the County in accordance with the provisions of Section 22300 of the California Public Contract Code. Securities eligible for deposit hereunder shall be limited to those listed in Section 16430 of the Government Code, or bank or savings and loan certificates of deposit.

Funds withheld from progress payments to ensure performance of the contract that are eligible for payment into escrow or to an escrow agent pursuant to Section 22300 of the Public Contract Code do not include funds withheld or deducted from payment due to failure of the Contractor to fulfill a contract requirement.

5-1.09 RECORDS

The Contractor shall maintain cost accounting records for the contract pertaining to, and in such a manner as to provide a clear distinction between, the following 6 categories of costs of work during the life of the contract:

- A. Direct costs of contract item work.
- B. Direct costs of changes in character in conformance with Section 4-1.03C, "Changes in Character of Work," of the Standard Specifications.
- C. Direct costs of extra work in conformance with Section 4-1.03D, "Extra Work," of the Standard Specifications.
- D. Direct costs of work not required by the contract and performed for others.
- E. Direct costs of work performed under a notice of potential claim in conformance with the provisions in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications.
- F. Indirect costs of overhead.

Cost accounting records shall include the information specified for daily extra work reports in Section 9-1.03C, "Records," of the Standard Specifications. The requirements for furnishing the Engineer completed daily extra work reports shall only apply to work paid for on a force account basis.

The cost accounting records for the contract shall be maintained separately from other contracts, during the life of the contract, and for a period of not less than 3 years after the date of acceptance of the **work**. If the Contractor intends to file claims against the Department, the Contractor shall keep the cost accounting records specified above until complete resolution of all claims has been reached.

5-1.10 RECORDS EXAMINATION, AUDIT & RETENTION REQUIREMENTS

Contractor shall maintain and make available to the FHWA, the US DOT, the Comptroller General of the United States, the State of California, the California State Auditor, and County or to any of their duly authorized representatives all books, papers, job cost records, detailed cost estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractor records, and financial records related to or which arise out of the Work or under terms of this Contract. Contractor shall maintain such books, records, data and documents in accordance with generally accepted accounting

principles and in accordance with these special provisions and federal and state requirements. These books, papers, records, claims, and accounts shall be made available for examination during normal business hours and shall be readily available and accessible at Contractor's principal place of business in California, for audit during normal business hours at such place of business. Contractor shall provide office space, photocopies and other assistance to enable audit or inspection representatives to conduct such audits or inspections. This right to audit books and records directly related to this Contract shall also extend to any first-tier subcontractors employed under this Contract. Contractor shall incorporate this provision in any subcontract entered into as a result of this Contract and shall require its subcontractors to agree to cooperate with the above-listed agencies by making all appropriate and relevant Project records available to those agencies for audit and copying.

All of Contractor's books, papers, job cost records, detailed cost estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractor records, and financial records related to or which arise out of the work or under terms of this Contract shall be retained for access, inspection and/or audit by the FHWA, the US DOT, the Comptroller General of the United States, the State of California, the California State Auditor, County or their duly authorized representatives for at least three (3) years after County's final payment to Contractor and/or the final resolution of any claims under this Contract. Contractor shall incorporate this provision in any subcontract entered into as a result of this Contract.

5-1.11 SUBCONTRACTOR AND DBE RECORDS

The Contractor shall maintain records showing the name and business address of each first-tier subcontractor. The records shall also show the name and business address of every DBE subcontractor, DBE vendor of materials and DBE trucking company, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all of these firms. DBE prime contractors shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

Upon completion of the contract, a summary of these records shall be prepared on Exhibit 17-F, "Final Report – Utilization of Disadvantaged Business Enterprises (DBE), First –Tier Subcontractors (Form CEM-2402 (F)) and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer. The form shall be furnished to the Engineer with the Acceptance Statement, which accompanies the Proposed Final Pay Estimate. \$10,000 will be withheld from payment until the Form CEM-2402 (F) is submitted. The amount will be returned to the Contractor when a satisfactory Form CEM-2402 (F) is submitted.

Prior to the fifteenth of each month, the Contractor shall submit documentation to the Engineer showing the amount paid to DBE trucking companies. This monthly documentation shall indicate the portion of the revenue paid to DBE trucking companies. The Contractor shall also obtain and submit documentation to the Engineer showing the amount paid by DBE trucking companies to all firms, including owner-operators, for the leasing of trucks. If a The DBE who leases trucks from a non-DBE the Contractor may count only is entitled to credit only for the fee or commission the DBE it receives as a result of the lease arrangement.

The Contractor shall also obtain and submit documentation to the Engineer showing the truck number, owner's name, California Highway Patrol CA number, and if applicable, the DBE certification number of the owner of the truck for all trucks used during that month. This documentation shall be submitted on the form entitled "Monthly Trucking Verification Form" Form CEM-2404 (F) which is available from the Department.

5-1.12 DBE CERTIFICATION STATUS

If a DBE subcontractor is decertified during the life of the project, the decertified subcontractor shall notify the Contractor in writing with the date of decertification. If a subcontractor becomes a certified DBE during the life of the project, the subcontractor shall notify the Contractor in writing with the date of certification. The Contractor shall furnish the written documentation to the Engineer.

Upon completion of the contract "Disadvantage Business Enterprises (DBE) Certification Status Change Form", Form CEM-2403 (F) indicating the DBE's existing certification status shall be signed and certified correct by the Contractor. The certified form shall be furnished to the Engineer with the Acceptance Statement, which accompanies the Proposed Final Pay Estimate.

5-1.13 BUY AMERICA REQUIREMENTS

For a Federal-aid contract, furnish steel and iron materials to be incorporated into the work that are produced in the United States except:

1. Foreign pig iron and processed, pelletized, and reduced iron ore may be used in the domestic production of the steel and iron materials [60 Fed Reg 15478 (03/24/1995)]
2. If the total combined cost of the materials does not exceed the greater of 0.1 percent of the total bid or \$2,500, material produced outside the United States may be used

Production includes:

1. Processing steel and iron materials, including smelting or other processes that alter the physical form or shape (such as rolling, extruding, machining, bending, grinding, and drilling) or chemical composition
2. Coating application, including epoxy coating, galvanizing, and painting, that protects or enhances the value of steel and iron materials

For steel and iron materials to be incorporated into the work, submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications that certifies all production processes occurred in the United States except for the above exceptions.

5-1.14 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 Pub Cont Code § 4100 et seq., the County of El Dorado may exercise the remedies provided under Pub Cont Code § 4110. The County of El Dorado may refer the violation to the Contractors State License Board as provided under Pub Cont 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 must comply with the contract.

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 by the Engineer.

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. In accordance with Title 2 CFR Section 1200.220 the Debarment and Suspension Provisions apply to all subcontracts associated with this contract. Contractor shall require all subcontractors to execute a debarment and suspension certification such as the one provided in the Proposal section of these Contract Documents.

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

Each subcontract and any lower tier subcontract that may in turn be made shall include the "Required Contract Provisions Federal-Aid Construction Contracts" in Section 14 of these special provisions. Noncompliance shall be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or to become due, until correction is made. Failure to comply may result in termination of the contract.

5-1.15 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

Attention is directed to Section 7108.5 of the Business and Professions Code, which requires a prime contractor or subcontractor to pay any subcontractor not later than ten (10) days of receipt of each progress payment unless otherwise agreed to in writing. In addition, Federal Regulation (49CFR 26.29) requires a prime contractor or subcontractor to pay a subcontractor no later than thirty (30) days after receipt of each payment, unless any delay or postponement of payment among the parties takes place only for good cause and with the prior written approval of County. Any violation of Section 7108.5 shall subject the violating contractor or subcontractor to the penalties, sanction and other remedies of that section. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor.

Prime contractors shall include in their subcontracts language providing that prime contractors and subcontractors will use appropriate alternative dispute resolution mechanisms to resolve payment disputes.

5-1.16 PROMPT PAYMENT OF WITHHELD FUNDS TO SUBCONTRACTORS

The Department shall hold retainage from the prime Contractor and shall make prompt and regular incremental acceptances of portions, as determined by the Department, of the contract work and pay retainage to the prime Contractor based on these acceptances in accordance with "Payment of Withheld Funds" of these special provisions. The prime Contractor or subcontractor shall return all monies withheld in retention from the subcontractor within 30 days after receiving payment for work satisfactorily completed and accepted including incremental acceptances of portions of the contract work by the Department. Federal law (49CFR26.29) requires that any delay or postponement of payment over 30 days may take place only for good cause and with the Department's prior written approval. Any violation of this provision shall subject the violating Contractor or subcontractor to the penalties, sanctions, and remedies specified in Section 7108.5 of the California Business and Professions Code. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the prime contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract or performance, and/or noncompliance by a subcontractor.

5-1.17 PERFORMANCE OF SUBCONTRACTORS

The subcontractors listed by you in your Proposal shall list therein the name and address of each subcontractor to whom the bidder proposes to subcontract portions of the work in an amount in excess of one-half of one percent of the total bid 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 the Act related to the imposition of penalties for a failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

UDBEs must perform work or supply materials as listed in the "Local Agency Bidder - UDBE Commitment" form specified under Section 2, "Proposal Requirements and Conditions," of these special provisions. Do not terminate a UDBE listed subcontractor for convenience and perform the work with your own forces or obtain materials from other sources without prior written authorization from the Engineer.

The County grants authorization to use other forces or sources of materials for requests that show any of the following justifications:

1. Listed UDBE fails or refuses to execute a written contract based on plans and specifications for the project.
2. You stipulate a bond is a condition of executing the subcontract and the listed UDBE fails to meet your bond requirements.
3. Work requires a contractor's license and listed UDBE does not have a valid license under Contractors License Law.
4. Listed UDBE fails or refuses to perform the work or furnish the listed materials.
5. Listed UDBE's work is unsatisfactory and not in compliance with the contract.
6. Listed UDBE delays or disrupts the progress of the work.
7. Listed UDBE becomes bankrupt or insolvent.

If a listed UDBE subcontractor is terminated, you must make good faith efforts to find another UDBE subcontractor to substitute for the original UDBE. The substitute UDBE must perform at least the same amount of work as the original UDBE under the contract to the extent needed to meet the UDBE goal.

The substitute UDBE must be certified as a DBE at the time of request for substitution.

The County does not pay for work or material unless it is performed or supplied by the listed UDBE, unless the UDBE is terminated in accordance with this section.

5-1.18 INTEREST ON PAYMENTS

Interest shall be payable on progress payments, payments after acceptance, final payments, extra work payments, and claim payments as follows:

- A. Unpaid progress payments, payment after acceptance, and final payments shall begin to accrue interest 30 days after the receipt of an undisputed and properly submitted pay request from the Contractor defined herein as the pay estimate prepared by the Engineer and approved by the Contract Administrator for the County.
- B. Unpaid extra work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following receipt of a properly submitted and undisputed extra work bill. To be properly submitted, the bill must be submitted within 7 days of the performance of the extra work and in conformance with the provisions in Section 9-1.03C, "Records," and Section 9-1.06, "Partial Payments," of the Standard Specifications. An undisputed extra work bill not submitted within 7 days of performance of the extra work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.
- C. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments, and extra work payments shall be 10 percent per annum.
- D. The rate of interest payable on unpaid and undisputed claims shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to accept the claim statement.

The rate of interest payable on any award in arbitration shall not exceed 6% per annum in accordance with Public Contract Code Section 10240.13.

5-1.19 PUBLIC SAFETY

You are responsible to provide for public safety.

Do not construct a temporary facility that interferes with the safe passage of traffic.

Control dust resulting from the work, inside and outside the right-of-way.

Move workers, equipment, and materials without endangering traffic.

Whenever your operations create a condition hazardous to the public, furnish, erect and maintain those fences, temporary railing, barricades, lights, signs, and other devices and take any other necessary protective measures to prevent damage or injury to the public.

Any fences, temporary railing, barricades, lights, signs, or other devices furnished, erected and maintained by you are in addition to those for which payment is provided elsewhere in the specifications.

Provide flaggers whenever necessary to ensure that the public is given safe guidance through the work zone. Except as ordered, at locations where traffic is being routed through construction under one-way controls, move your equipment in compliance with the one-way controls.

Use of signs, lights, flags, or other protective devices must conform with the California MUTCD and as ordered. Signs, lights, flags or other protective devices must not obscure the visibility of, nor conflict in intent, meaning and function of either existing signs, lights and traffic control devices or any construction area signs or traffic control devices.

Keep existing traffic signals and highway lighting in operation. Other entities perform routine maintenance of these facilities during the work.

Cover signs that direct traffic to a closed area. Providing, maintaining, and removing the covers on construction area signs is paid as extra work under Section 4-1.03D, "Extra Work."

Install temporary illumination in a manner which the illumination and the illumination equipment does not interfere with public safety. The installation of general roadway illumination does not relieve you from furnishing and maintaining any protective devices.

Equipment must enter and leave the highway via existing ramps and crossovers and must move in the direction of public traffic. All movements of workmen and construction equipment on or across lanes open to public traffic must be performed in a manner that will not endanger the public. Your vehicles or other mobile equipment leaving an open traffic lane to enter the construction area, must slow down gradually in advance of the location of the turnoff to give traffic following an opportunity to slow down. When leaving a work area and entering a roadway carrying public traffic, your vehicles and equipment must yield to public traffic.

Immediately remove hauling spillage from roadway lanes or shoulders open to traffic. When hauling on roadways, trim loads and remove material from shelf areas to minimize spillage.

Notify the Engineer not less than 25 days and not more than 100 days before the anticipated start of an activity that will change the vertical or horizontal clearance available to public traffic, including shoulders.

If vertical clearance is temporarily reduced to 15.5 feet or less, place low clearance warning signs in accordance with the California MUTCD and as ordered. Signs must comply with the dimensions, color, and legend requirements of the California MUTCD and these specifications except that the signs must have black letters and numbers on an orange retroreflective background. W12-2P signs must be illuminated so that the signs are clearly visible.

Pave or provide full width continuous and cleared wood walks for pedestrian openings through falsework. Protect pedestrians from falling objects and curing water for concrete. Extend overhead protection for pedestrians not less than 4 feet beyond the edge of the bridge deck. Illuminate all pedestrian openings through falsework. Temporary pedestrian facilities must comply with the American with Disabilities Act of 1990 (ADA).

Do not store vehicles, material, or equipment in a way that:

1. Creates a hazard to the public
2. Obstructs traffic control devices

Do not install or place temporary facilities used to perform the work which interfere with the free and safe passage of public traffic.

Temporary facilities which could be a hazard to public safety if improperly designed shall comply with design requirements specified in the contract for those facilities or, if none are specified, with standard design criteria or codes appropriate for the facility involved. Working drawings and design calculations for the temporary facilities shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California and shall be submitted to the Engineer for approval pursuant to Section 5-1.02, "Plans and Working Drawings." The submittals shall designate thereon the standard design criteria or codes used. Installation of the temporary facilities shall not start until the Engineer has reviewed and approved the drawings.

If you appear to be neglectful or negligent in furnishing warning devices and taking protective measures, the Engineer may direct your attention to the existence of a hazard and the necessary warning devices must be furnished and installed and protective measures taken by you. If the Engineer points out the inadequacy of warning devices and protective measures, that action on the part of the Engineer does not relieve you from your responsibility for public safety or abrogate the obligation to furnish and pay for these devices and measures.

Install temporary railing (Type K) or other approved protection system under the following conditions:

1. Excavations: Where the near edge of the excavation is within 15 feet from the edge of an open traffic lane
2. Temporarily Unprotected Permanent Obstacles: When the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and you elect to install the obstacle

before installing the protective system; or you, for your convenience and as authorized, remove a portion of an existing protective railing at an obstacle and do not replace such railing completely the same day

3. Storage Areas: When material or equipment is stored within 15 feet of the edge of an open traffic lane and the storage is not otherwise prohibited by the provisions of these Standard Specifications and the special provisions
4. Height Differentials: When construction operations create a height differential greater than 0.15 feet within 15 feet of the edge of traffic lane

Temporary railing (Type K) does not need to be installed where excavations within 15 feet from edge of an open traffic lane are:

1. Covered with steel plates or concrete covers of adequate thickness to prevent accidental entry by traffic or the public
2. In side slopes, where the downhill slope is 4:1 (horizontal:vertical) or less unless a naturally occurring condition
3. Protected by existing barrier or railing

Offset the approach end of temporary railing (Type K) a minimum of 15 feet from the edge of an open traffic lane. Install the temporary railing on a skew toward the edge of the traffic lane of not more than one foot transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15-foot minimum offset cannot be achieved, the temporary railing must be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules must be installed at the approach end of the temporary railing.

Secure in place temporary railing (Type K) before starting work for which the temporary railing is required.

Where 2 or more lanes in the same direction are adjacent to the area where the work is being performed, including shoulders, the adjacent lane must be closed under any of the following conditions:

1. Work is off the traveled way but within 6 feet of the edge of traveled way, and approach speed is greater than 45 miles per hour
2. Work is off the traveled way but within 3 feet of the edge of traveled way, and approach speed is less than 45 miles per hour

Closure of the adjacent traffic lane is not required when:

1. Performing work behind a barrier
2. Paving, grinding, or grooving
3. Installing, maintaining, or removing traffic control devices except temporary railing (Type K)

Do not reduce an open traffic lane width to less than 10 feet. When traffic cones or delineators are used for temporary edge delineation, the line of cones or delineators is considered the edge of the traveled way.

If a traffic lane is closed with channelizers for excavation work, move the devices to the adjacent edge of the traveled way when not excavating. Space the devices the same as specified for the lane closure.

Do not move or temporarily suspend anything over a traffic lane open to the public unless the public is protected.

5-1.20 TESTING

Testing of materials and work shall conform to the provisions in Section 6-3, "Testing," of the Standard Specifications and these special provisions.

Whenever the provisions of Section 6-3.01, "General," of the Standard Specifications refer to tests or testing, it shall mean tests to assure the quality and to determine the acceptability of the materials and work.

The Engineer will deduct the costs for testing of materials and work found to be unacceptable, as determined by the tests performed by the Department, and the costs for testing of material sources identified by the Contractor which are not used for the work, from moneys due or to become due to the Contractor. The amount deducted will be determined by the Engineer.

5-1.21 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

Attention is directed to "Air Pollution Control" and "Dust Control" of these special provisions.

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 as defined in Section 25914.1 of the Health and Safety Code or a hazardous substance as defined in Section 25117 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.

5-1.22 AIR POLLUTION CONTROL

Attention is directed to the Section 7-1.01F, "Air Pollution Control" of the Standard Specifications, the section entitled "Dust Control" in these special provisions and these special provisions.

The Contractor's attention is directed to the El Dorado County Air Quality Management District Rules and Regulations, Ordinances and other applicable statutes relating to pollution prevention or abatement.

The Contractor shall comply with applicable State and County Air Quality Management District (AQMD) rules and regulations regarding reduction of construction related impacts on air quality, including the implementation of the following measures, as well as measures found else where in these special provisions and the Standard Specifications.

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

5-1.23 FINAL INSPECTION AND ACCEPTANCE OF THE CONTRACT

Section 7-1.17, "Acceptance of Contract" of the Standard Specifications is amended to read:

When the Engineer has made the final inspection and determines that the contract work has been completed in all respects in accordance with the plans and specifications, the Engineer will recommend to the Board of Supervisors that the contract be accepted and the Notice of Acceptance be recorded to accept the contract, and immediately upon and after the acceptance by the Board of Supervisors, notwithstanding Section 7-1.15 "Relief From Maintenance and Responsibility" of the Standard Specifications, the Contractor will be relieved of the duty of maintaining and protecting the work as a whole, and the Contractor will not be required to perform any further work thereon except work required under "Guarantee," of these Special Provisions; and the Contractor shall be relieved of the responsibility for injury to persons or property or damage to the work which occurs after the formal acceptance by the Board of Supervisors.

5-1.24 GUARANTEE

GENERAL

The Contractor shall guarantee the work is in accordance with contract requirements and remains free from substantial defects in materials and workmanship for a period of one year after contract acceptance. For certain portions of the work where the Director relieves the Contractor of responsibility in accordance with Section 7-1.15, "Relief from Maintenance and Responsibility," of the Standard Specifications, the guarantee period starts on the relief date and ends one year therefrom.

Substantial defects in materials and workmanship means defective work objectively manifested by damaged, displaced, or missing parts or components and workmanship resulting in improper function of materials, components, equipment, or systems, as installed or manufactured by the Contractor, subcontractor, supplier, or manufacturer.

During the guarantee period, the Contractor shall repair or replace contract work and associated work which is not in accordance with contract requirements or has substantial defects in materials and workmanship. The Contractor shall perform the corrective work with no expense to the Department other than State-provided field inspection services.

The guarantee of work excludes damage or displacement that is outside the control of the Contractor and caused by normal wear and tear, improper operation, insufficient maintenance, abuse, unauthorized modification, or natural disaster as described in Section 7-1.165, "Damage by Storm, Flood, Tsunami or Earthquake," of the Standard Specifications.

The Contractor shall have the same insurance coverage during corrective work operations as prior to contract acceptance, in accordance Section 7-1.12, "Indemnification and Insurance, Contractor's Insurance" of the Standard Specifications these special provisions.

The contract bonds furnished in accordance with Section 3-1.02, "Contract Bonds," of the Standard Specifications must remain in full force and effect during the guarantee period and until all corrective work is complete.

In the case of conflict between this guarantee provision and any warranty provision included in the contract, the warranty provision shall govern for the specific construction product or feature covered.

CORRECTIVE WORK

During the guarantee period, the Department will monitor performance of the highway facilities completed by the Contractor and will perform a thorough review of the contract work at least **60 days** before the expiration of the one-year guarantee.

If the Engineer discovers contract work not in compliance with contract requirements or that has substantial defects in materials and workmanship, at any time during the guarantee period, a list of items that require corrective work will be developed and forwarded to the Contractor. Within 15 days of receipt of a list, the Contractor shall submit to the Engineer a detailed plan for performing corrective work. The work plan shall include a start to finish schedule. It shall include a list of labor, equipment, materials, and any special services intended to be used. It shall clearly show related work including traffic control, temporary delineation, and permanent delineation.

The Contractor shall start the corrective and related work within 15 days of receiving notice from the Engineer that the Contractor's work plan is approved. The corrective work shall be diligently prosecuted and completed within the time allotted in the approved work plan.

If the Engineer determines that corrective work, covered by the guarantee, is urgently needed to prevent injury or property damage, the Engineer will give the Contractor a request to start emergency repair work and a list of items that require repair work. The Contractor shall mobilize within 24 hours and diligently perform emergency repair work on the damaged highway facilities. The Contractor shall submit a work plan within 5 days of starting emergency repair work.

If the Contractor fails to commence and execute, with due diligence, corrective work and related work required under the guarantee in the time allotted, the Engineer may proceed to have the work performed by State forces or other forces at the Contractor's expense. Upon demand, the Contractor shall pay all costs incurred by the Department for work performed by State forces or other forces including labor, equipment, material, and special services.

PAYMENT

Full compensation for performing corrective work; and related work such as traffic control, temporary delineation, and permanent delineation, and to maintain insurance coverage and bonds, shall be considered as included in the contract prices paid for the various contract items of work and no separate payment will be made therefor.

5-1.25 ACCESS FOR INSPECTION OF WORK

Representatives of the County, Caltrans, FHWA, the El Dorado Irrigation District, Pacific Gas and Electric, AT&T and COMCAST shall at all times have full access for inspection and testing of the work accomplished under this contract and the Contractor shall provide proper and safe facilities for such access.

5-1.26 SAFETY AND HEALTH PROVISIONS

Attention is directed to Section 7-1.06, "Safety and Health Provisions" of the Standard Specifications and these special provisions.

In addition to other specifications, definitions and provisions, the Contractor is also hereby categorized and designated as the following types of employer for this project:

- **Exposing Employer** – the employer whose employees are exposed to a hazard
- **Creating Employer** – the employer who actually is creating a hazard
- **Controlling Employer** – the employer who is responsible and who has the authority for ensuring that a hazardous condition is corrected
- **Correcting Employer** - the employer who has the responsibility for actually correcting a hazard

The Contractor's Safety Officer(s) shall be certified as a competent person for controlling this project's workplace safety. A Contractor's Safety Officer shall be on the site, at a minimum, each and every day that work is in progress or periodically when work is not active and shall have the authority to correct any safety violation. In addition, the Contractor is required to

develop a Safety Program specifically for this project, which will be available on site, at all times, and updated periodically during the project.

5-1.27 PROJECT APPEARANCE

The Contractor shall maintain a neat appearance to the work.

In areas visible to the public, the following shall apply:

A. When practicable, broken concrete and debris developed during clearing and grubbing shall be disposed of concurrently with its removal. If stockpiling is necessary, the material shall be removed or disposed of weekly.

B. Trash bins shall be furnished for debris from structure's construction. Debris shall be placed in trash bins daily. Forms or false work that are to be re-used shall be stacked neatly concurrently with their removal. Forms and false work that are not to be re-used shall be disposed of concurrently with their removal.

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

5-1.28 ARCHAEOLOGICAL DISCOVERIES

If archaeological materials, including but not limited to human skeletal material and disarticulated human bone, are discovered at the job site, protect and leave undisturbed and in place archaeological materials in accordance with the following codes and these special provisions:

1. California Public Resources Code, Division 5, Chapter 1.7 § 5097.5
2. California Public Resources Code, Division 5, Chapter 1.75 § 5097.98 and § 5097.99
3. California Administrative Code, Title 14 § 4308
4. California Penal Code, Part 1, Title 14 § 622-1/2
5. California Health and Safety Code, Division 7, Part 1, Chapter 2, § 7050.5

Archaeological materials are the physical remains of past human activity and include historic-period archaeological materials and prehistoric Native American archaeological materials. Nonhuman fossils are not considered to be archaeological except when showing direct evidence of human use or alteration or when found in direct physical association with archaeological materials as described in these special provisions.

Historic-period archaeological materials include cultural remains beginning with initial European contact in California, but at least 50 years old. Historical archaeological materials include:

1. Trash deposits or clearly defined disposal pits containing tin cans, bottles, ceramic dishes, or other refuse indicating previous occupation or use of the site
2. Structural remains of stone, brick, concrete, wood, or other building material found above or below ground or
3. Human skeletal remains from the historic period, with or without coffins or caskets, including any associated grave goods

Prehistoric Native American archaeological materials include:

1. Human skeletal remains or associated burial goods such as beads or ornaments
2. Evidence of tool making or hunting such as arrowheads and associated chipping debris of fine-grained materials such as obsidian, chert, or basalt
3. Evidence of plant processing such as pestles, grinding slabs, or stone bowls
4. Evidence of habitation such as cooking pits, stone hearths, packed or burnt earth floors or
5. Remains from food processing such as concentrations of discarded or burnt animal bone, shellfish remains, or burnt rocks used in cooking

Immediately upon discovery of archaeological materials, stop all work within a 60-foot radius of the archaeological materials and immediately notify the Engineer. Archaeological materials found during construction are the property of the

State. Do not resume work within the 60-foot radius of the find until the Engineer gives you written approval. If, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of an archeological 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," of the Standard Specifications.

The Department may use other forces to investigate and recover archaeological materials from the location of the find. When ordered by the Engineer furnish labor, material, tools and equipment, to secure the location of the find, and assist in the investigation or recovery of archaeological materials and the cost will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Full compensation for immediately notifying the Engineer upon discovery of archaeological materials and leaving undisturbed and in place archaeological materials discovered on the job site shall be considered as included in the contract price paid for various items of work involved and no additional compensation will be allowed therefor.

5-1.29 UTILITIES REQUIRED BY THE CONTRACTOR

All water, electric current, telephone, or other utility service, including portable sanitary facilities, required by the Contractor during construction shall be furnished at Contractor’s own expense.

5-1.30 SOUND CONTROL REQUIREMENTS

Sound control shall conform to these special provisions, and Section 7-1.01I “Sound Control Requirements” shall not apply.

Sound Level Criteria

The maximum allowable noise exposure shall be as specified in the following tables for work within the community types and land use designations as follows:

The work is located in a Community Region with High-Density Residential, Commercial, and Public Facilities.

MAXIMUM ALLOWABLE NOISE EXPOSURE FOR NONTRANSPORTATION NOISE SOURCES IN COMMUNITY REGIONS AND ADOPTED PLAN AREAS–CONSTRUCTION NOISE			
Land Use Designation ¹	Time Period	Noise Level (dB)	
		L_{eq}	L_{max}
Higher-Density Residential (MFR, HDR, MDR)	7 pm–10 pm	50	65
	10 pm–7 am	45	60
Commercial and Public Facilities (C, R&D, PF)	7 pm–7 am	65	75
	Any Time	80	90
Note:			
¹ Adopted Plan areas should refer to those land use designations that most closely correspond to the similar General Plan land use designations for similar development.			

The noise level requirement shall apply to the equipment on the job or related to the job measured at the affected building facade, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel. Each internal combustion engine used for any purpose on the job or related to the job shall be equipped with a muffler of a type recommended by the manufacturer.

As directed by the Engineer, the Contractor shall implement appropriate additional noise mitigation measures, including but not limited to changing the location of stationary construction equipment, shutting off idling equipment, rescheduling

Contractor's activity, notifying adjacent residents in advance of construction work, and installing acoustic barriers around stationary construction noise sources such that noise from construction does not exceed the limits specified above. If the existing background noise levels exceed the values above, then the limit for construction noise may be increased from the background noise level by the same percentage that the background noise level exceeds the values above.

At the Engineer's discretion and for the interest of the public safety and/or public convenience, the Engineer may waive the allowable noise levels.

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

5-1.31 COPYRIGHTS, TRADEMARKS, AND PATENTS

This project will be funded, in part, with federal funds. The USDOT reserve a royalty-free, non-exclusive, and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, for Federal Government proposes:

- a) The copyright in any work developed under a grant, sub-grant, or contract under a grant or subgrant;
- b) Any rights of copyright to which a grantee, subgrantee or a contractor purchases ownership with grant support; and
- c) The patent rights to any discovery or invention which arises or is developed in the course of or under such contract.

5-1.32 UTILITIES

Attention is directed to Section 8-1.10 "Utility and Non-Highway Facilities" and Section 15 "Existing Highway Facilities" of the standard specifications.

The Contractor shall determine by potholing or other means the exact utility locations in advance of performing the contract items of work especially placement of the drainage work.

If the Contractor while performing the Contract discovers utility facilities not identified by the Engineer in the Contract Plans or Specifications, the Contractor shall immediately notify the Engineer in writing. The Contractor shall schedule the project so as to allow the Engineer forty-eight (48) hours, excluding Saturdays, Sundays, and holidays, to determine the work to be done when a conflict exists. Owner of the utility facility shall have the sole discretion to perform the repairs or relocation work itself, or to permit the Contractor to do such repairs or relocation work at a reasonable price. In the event that the utility owner permits the Contractor to perform the work, the work will be paid for by the County, via Force Account Change Order. Compensation to the Contractor for said cost shall be in accordance with Section 4215 of the Government Code and with Section 9-1.03, "Force Account Payment" of the Standard Specifications.

Nothing herein shall be construed to require the Utility Owner to locate the presence of any existing services not expressly included in Government Code Section 4125, nor limit the Owner's rights or remedies set forth therein.

The Contractor shall protect from damage existing utility and other non-highway facilities that are to remain in place. This protection may consist of shoring an existing utility. Damage due to the Contractor's failure to exercise reasonable care shall be repaired at its cost and expense.

Attention is directed to the existence of certain underground facilities that may require special precautions be taken by the Contractor to protect the health, safety and welfare of workers and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 150 mm in diameter or pipelines operating at pressures greater than 415 kPa (gage); underground electric supply system conductors or cables, with potential to ground of more than 300 V, either directly buried or in a duct or conduit which do not have concentric grounded or other effectively grounded metal shields or sheaths.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 2 business days, but not more than 14 days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include, but are not limited to, the following:

Notification Center	Telephone Number
Underground Service Alert	811

The Contractor shall determine the exact location of existing underground utilities in conflict with the excavation by excavating with hand tools within the area of the approximate location of the underground utility as determined by the field marking provided in accordance with Section 4216.3 of the Government Code before using any power-operated or power-driven excavating or boring equipment within the approximate location of the underground utilities. Power-operated or power-driven excavating or boring equipment may be used for the removal of any existing pavement if there are no existing underground utilities contained in the pavement. If mutually agreeable with the utility company and Contractor, Contractor may utilize power-operated or power-driven excavating or boring equipment within the approximate location of the underground utilities and to any depth.

The Contractor shall notify the following listed utility companies' forty-eight (48) hours in advance of doing any work at the site of the project:

Underground Service Alert Phone: 811

El Dorado Irrigation District (EID)

Main # 24 hr: (530) 622-4513

Bob Rice
(530) 642-4079
Fax (530) 642-4079
4079 Mosquito Road
Placerville, Ca 95667

Comcast

Kip Miller
(650) 444-5865
Fax
8188 Elder Creek Road
Sacramento, Ca 95824

Pacific Gas and Electric Company

24 Hr # (800) 743-5000

Jennifer Donovan
(530) 621-7228
(530) 383-0973
4636 Missouri Flat Road
Placerville, Ca 95667

AT&T

24 Hr # (866) 346-1168

Astrid Willard
(916) 453-6136
Fax (916) 451-8504
3675 T Street Room 170
Sacramento, Ca 95816-6648

Full compensation for working around said facilities, performing any necessary potholing and coordination of facility relocation shall be considered as included in the prices paid for the various contract items and no additional compensation will be allowed therefor.

5-1.33 REPORTING

In order to monitor the progress of projects funded in whole or in part by federal funds, federal agencies rely heavily on inspection data. Inspections by the County shall be performed on a regular basis and data compiled in report form, as necessary, in conformance with 49CFR 18.40(c) Information to be supplied by Contractor shall be reported to County on an as requested basis.

Any subcontract entered into as a result of this Contract shall contain all of the provisions referenced and/or listed in this section.

5-1.34 ASSIGNMENT OF ANTITRUST ACTIONS

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor offers and agrees and will require all of its subcontractors and suppliers to agree to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract

or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to Contractor, without further acknowledgment by the parties.

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Government Code Sections 4550-4554, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery. Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under Government Code Sections 4550-4554 if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

5-1.35 RELATIONS WITH CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

This project lies within the boundaries of the Central Valley (Sacramento) Regional Water Quality Control Board (RWQCB).

The State Water Resources Control Board (SWRCB) has issued to the Department a permit that governs storm water and non-storm water discharges from the Department's properties, facilities, and activities. The Department's permit is entitled "Order No. 99 - 06 - DWQ, NPDES No. CAS000003, National Pollutant Discharge Elimination System (NPDES) Permit, Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation (Caltrans)." Copies of the Department's permit are available for review from the SWRCB, Division of Water Quality, 1001 "I" Street, P.O. Box 100, Sacramento, California 95812-0100, Telephone fax: (916) 341-5463 and may also be obtained at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/caltrans.shtml

This project is subject to the current statewide general permit issued by the SWRCB entitled "Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities" that regulates discharges of storm water and non-storm water from construction or demolition activities, including, but not limited to clearing, grading, grubbing, or excavation, or any other activity that results in land disturbance of equal to or greater than one acre. Copies of the statewide permit and modifications thereto are available for review from the SWRCB, Division of Water Quality, 1001 "I" Street, P.O. Box 100, Sacramento, California 95812-0100, Telephone fax: (916) 341-5463 and may also be obtained at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/

The NPDES permits that regulate this project, as referenced above, are referred to in this section as the "permit."

This project shall conform to the permits and modifications thereto. The Contractor shall maintain copies of the permit at the project site and shall make them available during construction.

The Contractor shall know and comply with provisions of Federal, State, and local regulations and requirements that govern the Contractor's operations and storm water and non-storm water discharges from the project site and areas of disturbance outside the project limits during construction. Attention is directed to Sections 7-1.01, "Laws to be Observed," 7-1.11, "Preservation of Property," 7-1.12, "Indemnification and Insurance", 8-1.10 "Utility and Non-Highway Facilities," and 9-1.055 "Penalty Withholds," of the Standard Specifications.

The Contractor shall notify the Engineer immediately upon request from the regulatory agencies to enter, inspect, sample, monitor, or otherwise access the project site or the Contractor's records pertaining to water pollution control work. The Contractor and the Department shall provide copies of correspondence, notices of violation, enforcement actions, or proposed fines by regulatory agencies to the requesting regulatory agency.

5-1.36 STATE OF CALIFORNIA ENCROACHMENT PERMIT

Portions of this project are located within the jurisdiction of the State of California. Prior to start of work within the State of California's right-of-way or work affecting the State of California facilities, the Contractor will be required to obtain an Encroachment Permit at the following State of California Transportation office:

CALTRANS, DISTRICT 3

PERMIT ENGINEER
703 B Street
P.O. Box 911
Marysville, CA 95901
(530) 741-4403

No fee will apply.

Full compensation for conforming to the provisions in this section and the requirements in the permit, including the cost of the permit, shall be considered as included in the contract prices paid for the various item or work and no additional compensation will be allowed therefore.

5-1.37 RESPONSIBILITY TO OTHER ENTITIES

The Contractor shall be responsible for any liability imposed by law and for injuries to or death of any person including, but not limited to, workers and the public or damage to property, and shall indemnify and save harmless any county, city or district, its officers and employees connected with the work, within the limits of which county, city or district the work is being performed, all in the same manner and to the same extent conforming to the provisions in Section 7-1.12, "Indemnification and Insurance," of the Standard Specifications, and Article 5 of the Agreement, for the protection of the State of California and all officers and employees thereof connected with the work.

5-1.38 PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

GENERAL

Summary

This section applies to asphalt contained in materials for pavement structural sections and pavement surface treatments such as hot mix asphalt (HMA), tack coat, asphaltic emulsions, bituminous seals, asphalt binders, and modified asphalt binders placed in the work. This section does not apply if you opted out of payment adjustment for price index fluctuations at the time of bid.

The Engineer adjusts payment if the California Statewide Crude Oil Price Index for the month the material is placed is more than 5 percent higher or lower than the price index at the time of bid.

The California Statewide Crude Oil Price Index is determined each month on or about the 1st business day of the month by the Department using the average of the posted prices in effect for the previous month as posted by Chevron, ExxonMobil, and ConocoPhillips for the Buena Vista, Huntington Beach, and Midway Sunset fields.

If a company discontinues posting its prices for a field, the Department determines the index from the remaining posted prices. The Department may include additional fields to determine the index.

For the California Statewide Crude Oil Price Index, go to:

<http://www.dot.ca.gov/hq/construc/crudeoilindex/>

If the adjustment is a decrease in payment, the Department deducts the amount from the monthly progress payment.

The Department includes payment adjustments for price index fluctuations when making adjustments under Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

If you do not complete the work within the contract time, payment adjustments during the overrun period are determined using the California Statewide Crude Oil Price Index in effect for the month in which the overrun period began.

If the price index at the time of placement increases:

1. 50 percent or more over the price index at bid opening, notify the Engineer.
2. 100 percent or more over the price index at bid opening, do not furnish material containing asphalt until the Engineer authorizes you to proceed with that work. The Department may decrease Bid item quantities, eliminate Bid items, or terminate the contract.

Submittals

Before placing material containing asphalt, submit the current sales and use tax rate in effect in the tax jurisdiction where the material is to be placed.

Submit certified weight slips for HMA, tack coat, asphaltic emulsions, and modified asphalt binders, including those materials not paid for by weight, as specified in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications. For slurry seals, submit certified weight slips separately for the asphaltic emulsion.

ASPHALT QUANTITIES**General**

Interpret the term "ton" as "tonne" for projects using metric units.

Hot Mix Asphalt

The Engineer calculates the quantity of asphalt in HMA using the following formula:

$$Q_h = \text{HMATT} \times [X_a / (100 + X_a)]$$

where:

$$\begin{aligned} Q_h &= \text{quantity in tons of asphalt used in HMA} \\ \text{HMATT} &= \text{HMA total tons placed} \\ X_a &= \text{theoretical asphalt content from job mix formula expressed as percentage of the weight of dry aggregate} \end{aligned}$$

Rubberized Hot Mix Asphalt

The Engineer calculates the quantity of asphalt in rubberized HMA (RHMA) using the following formula:

$$Q_{rh} = \text{RHMATT} \times 0.80 \times [X_{arb} / (100 + X_{arb})]$$

where:

$$\begin{aligned} Q_{rh} &= \text{quantity in tons of asphalt in asphalt rubber binder used in RHMA} \\ \text{RHMATT} &= \text{RHMA total tons placed} \\ X_{arb} &= \text{theoretical asphalt rubber binder content from the job mix formula expressed as percentage of the weight of dry aggregate} \end{aligned}$$

Modified Asphalt Binder in Hot Mix Asphalt

The Engineer calculates the quantity of asphalt in modified asphalt binder using the following formula:

$$Q_{mh} = \text{MHMATT} \times [(100 - X_{am}) / 100] \times [X_{mab} / (100 + X_{mab})]$$

where:

$$\begin{aligned} Q_{mh} &= \text{quantity in tons of asphalt in modified asphalt binder used in HMA} \\ \text{MHMATT} &= \text{modified asphalt binder HMA total tons placed} \\ X_{am} &= \text{specified percentage of asphalt modifier} \\ X_{mab} &= \text{theoretical modified asphalt binder content from the job mix formula expressed as percentage of the weight of dry aggregate} \end{aligned}$$

Hot Mix Asphalt Containing Reclaimed Asphalt Pavement (RAP)

The Engineer calculates the quantity of asphalt in HMA containing RAP using the following formulas:

$$Q_{rap} = \text{HMATT} \times [X_{aa} / (100 + X_{aa})]$$

where:

$$X_{aa} = X_{ta} - [(100 - X_{new}) \times (X_{ra} / 100)]$$

and

- Qrap = quantity in tons of asphalt used in HMA containing RAP
- HMATT = HMA total tons placed
- Xaa = asphalt content of HMA adjusted to account for the asphalt content in RAP expressed as percentage of the weight of dry aggregate
- Xta = total asphalt content of HMA expressed as percentage of the weight of dry aggregate
- Xnew = theoretical percentage of new aggregate in the HMA containing RAP determined from RAP percentage in the job mix formula
- Xra = asphalt content of RAP expressed as percentage

Tack Coat

The Engineer calculates the quantity of asphalt in tack coat (Qtc) as either:

1. Asphalt binder using the asphalt binder total tons placed as tack coat
2. Asphaltic emulsion by applying the formula in "Asphaltic Emulsion" to the asphaltic emulsion total tons placed as tack coat

Asphaltic Emulsion

The Engineer calculates the quantity of asphalt in asphaltic emulsions, including fog seals and tack coat, using the following formula:

$$Q_e = AETT \times (X_e / 100)$$

where:

- Qe = quantity in tons of asphalt used in asphaltic emulsions
- AETT = undiluted asphaltic emulsions total tons placed
- Xe = minimum percent residue specified in Section 94, "Asphaltic Emulsions," of the Standard Specifications based on the type of emulsion used

You may, as an option, determine "Xe" by submitting actual daily test results for asphalt residue for the asphaltic emulsion used. If you choose this option, you must:

1. Take 1 sample every 200 tons but not less than 1 sample per day in the presence of the Engineer from the delivery truck, at midload from a sampling tap or thief, and in the following order:
 - 1.1. Draw and discard the 1st gallon
 - 1.2. Take two separate 1/2-gallon samples
2. Submit 1st sample at the time of sampling
3. Provide 2nd sample within 3 business days of sampling to an independent testing laboratory that participates in the AASHTO Proficiency Sample Program
4. Submit test results from independent testing laboratory within 10 business days of sample date

Slurry Seal

The Engineer calculates the quantity of asphalt in slurry seals (Qss) by applying the formula in "Asphaltic Emulsion" to the actual quantity of asphaltic emulsion used in producing the slurry seal mix.

Modified Asphalt Binder

The Engineer calculates the quantity of asphalt in modified asphalt binder using the following formula:

$$Q_{mab} = MABTT \times [(100 - X_{am}) / 100]$$

where:

- Qmab = quantity in tons of asphalt used in modified asphalt binder
- MABTT = modified asphalt binder total tons placed
- Xam = specified percentage of asphalt modifier

Other Materials

For other materials containing asphalt not covered above, the Engineer determines the quantity of asphalt (Qo).

PAYMENT ADJUSTMENTS

The Engineer includes payment adjustments for price index fluctuations in progress pay estimates. If material containing asphalt is placed within 2 months during 1 estimate period, the Engineer calculates 2 separate adjustments. Each adjustment is calculated using the price index for the month in which the quantity of material containing asphalt subject to adjustment is placed in the work. The sum of the 2 adjustments is used for increasing or decreasing payment in the progress pay estimate.

The Engineer calculates each payment adjustment as follows:

$$PA = Q_t \times A$$

where:

PA = Payment adjustment in dollars for asphalt contained in materials placed in the work for a given month.

Q_t = Sum of quantities of asphalt ($Q_h + Q_{rh} + Q_{mh} + Q_{rap} + Q_{tc} + Q_e + Q_{ss} + Q_{mab} + Q_o$).

A = Adjustment in dollars per ton of asphalt used to produce materials placed in the work rounded to the nearest \$0.01.

For US Customary projects, use:

$A = [(I_u / I_b) - 1.05] \times I_b \times [1 + (T / 100)]$ for an increase in the crude oil price index exceeding 5 percent

$A = [(I_u / I_b) - 0.95] \times I_b \times [1 + (T / 100)]$ for a decrease in the crude oil price index exceeding 5 percent

I_u = California Statewide Crude Oil Price Index for the month in which the quantity of asphalt subject to adjustment was placed in the work.

I_b = California Statewide Crude Oil Price Index for the month in which the bid opening for the project occurred

T = Sales and use tax rate, expressed as a percent, currently in effect in the tax jurisdiction where the material is placed.

If the tax rate information is not submitted timely, the statewide sales and use tax rate is used in the payment adjustment calculations until the tax rate information is submitted.

5-1.39 AREAS FOR CONTRACTOR'S USE

Attention is directed to the provisions in Section 7-1.19, "Rights in Land and Improvements," of the Standard Specifications and these special provisions.

The highway right of way shall be used only for purposes that are necessary to perform the required work. The Contractor shall not occupy the right of way, or allow others to occupy the right of way, for purposes which are not necessary to perform the required work.

No State-owned parcels adjacent to the right of way are available for the exclusive use of the Contractor within the contract limits. The Contractor shall secure, at the Contractor's own expense, areas required for plant sites, storage of equipment or materials, or for other purposes.

No area is available within the contract limits for the exclusive use of the Contractor. However, temporary storage of equipment and materials on State property may be arranged with the Engineer, subject to the prior demands of State maintenance forces and to other contract requirements. Use of the Contractor's work areas and other State-owned property shall be at the Contractor's own risk, and the State shall not be held liable for damage to or loss of materials or equipment located within such areas.

5-1.40 PAYMENTS

In determining the partial payments to be made to the Contractor, only the following listed materials will be considered for inclusion in the payment as materials furnished but not incorporated in the work:

- A. Metal Sign Structures
- B. Corrugated Steel Pipe
- C. Miscellaneous Drainage Facilities
- D. Miscellaneous Iron and Steel
- E. Metal Beam Guard Railing
- F. Thrie Beam Barrier
- G. Alternative Flared Terminal System

H. Pavement Markers

5-1.41 SUPPLEMENTAL PROJECT INFORMATION

Supplemental project information included in the Information Handout are:

- 1 Hazardous Materials Report, "Highway 50 Site Investigation, Postmile 2.9/6.7, Dated March 10, 2008"
- 2 Applicable Revised Standard Plans and New Standard Plans

Supplemental project information available:

1. Cross sections

The Informational Handout and cross sections will be provided to the Contractor as .pdf files on the DOT website <http://www.edcgov.us/Government/DOT/Bids.aspx>.

5-1.42 MATERIAL SITES

Local material sites used by the Contractor shall be graded so that, at the time of final inspection of the contract, the sites will drain and will blend in with the surrounding terrain.

5-1.43 SOLID WASTE DISPOSAL AND RECYCLING REPORT

This work shall consist of reporting disposal and recycling of construction solid waste, as specified in these special provisions. For the purposes of this section, solid waste includes construction and demolition waste debris, but not hazardous waste.

Annually by the fifteenth day of January, the Contractor shall complete and certify Form CEM-4401, "Solid Waste Disposal and Recycling Report," which quantifies solid waste generated by the work performed and disposed of in landfills or recycled during the previous calendar year. The amount and type of solid waste disposed of or recycled shall be reported in tons. The Contractor shall also complete and certify Form CEM-4401 within 5 days following contract acceptance.

Form CEM-4401, "Solid Waste Disposal and Recycling Report" can be downloaded at:

<http://www.dot.ca.gov/hq/construc/manual2001>

If the Contractor has not submitted Form CEM-4401, by the dates specified above, the Department will withhold the amount of \$10,000 for each missing or incomplete report. The moneys withheld will be released for payment on the next monthly estimate for partial payment following the date that a complete and acceptable Form CEM-4401 is submitted to the Engineer. Upon completion of all contract work and submittal of the final Form CEM-4401, remaining withheld funds associated with this section, "Solid Waste Disposal and Recycling Report," will be released for payment. Withheld funds in conformance with this section shall be in addition to other moneys withheld provided for in the contract. No interest will be due the Contractor on withheld amounts.

Full compensation for preparing and submitting Form CEM-4401, "Solid Waste Disposal and Recycling Report," shall be considered as included in the contract price for the various items of work involved and no additional compensation will be allowed therefor.

5-1.44 ENVIRONMENTALLY SENSITIVE AREA

An ESA exists on this project.

Before start of work, protect the ESA by installing temporary fence (Type ESA) around the elderberry shrubs at Post Mile (PM) 3.91, 4.96, and 5.72.

Limited access to the ESA is allowed for safety or emergency work. Notify the Engineer 3 business days before planned entry date. Any other access to an ESA is prohibited.

Take the management measures shown in the following table for the corresponding ESA shown. Any access to an ESA other than that shown is prohibited.

ESA Management

Identification	Location	Management measures
Elderberry Shrubs	PM 3.91, 4.96, and 5.72	Temporary Fence (Type ESA) placed 20 feet beyond the edge of the shrub.

5-1.45 DISPUTE REVIEW BOARD

GENERAL

To assist in the resolution of disputes or potential claims arising out of the work of this project, a Dispute Review Board, hereinafter referred to as the "DRB," shall be established by the Engineer and Contractor cooperatively upon approval of the contract. The DRB is intended to assist the contract administrative claims resolution process as specified in the provisions in Section 9-1.04, "Notice of Potential Claim," and Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications and these special provisions. The DRB shall not serve as a substitute for provisions in the specifications in regard to filing potential claims. The requirements and procedures established in this section shall be a prerequisite to filing a claim, filing for arbitration, or filing for litigation prior or subsequent to project completion.

The DRB shall be utilized when dispute or potential claim resolution at the project level is unsuccessful. The DRB shall function as specified herein until the day of acceptance of the contract, at which time the work of the DRB will cease except for completion of unfinished reports. No DRB dispute meetings shall take place later than 30 days prior to acceptance of contract. After acceptance of contract, disputes or potential claims which have followed the dispute resolution processes of the Standard Specifications and these special provisions, but have not been resolved, shall be stated or restated by the Contractor, in response to the Proposed Final Estimate within the time limits provided in Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. The County will review those claims in conformance with the provisions in Section 9-1.07B of the Standard Specifications. Following the adherence to and completion of the contractual administrative claims procedure, the Contractor may file for arbitration in conformance with the provisions in Section 9-1.10, "Arbitration," of the Standard Specifications and these special provisions.

Disputes, as used in this section, shall include differences of opinion, properly noticed as provided hereinafter, between the County and Contractor on matters related to the work and other subjects considered by the County or Contractor, or by both, to be of concern to the DRB on this project, except matters relating to Contractor, subcontractor or supplier potential claims not actionable against the Department as specified in these special provisions or quantification of disputes for overhead type expenses or costs. Disputes for overhead type expenses or costs shall conform to the requirements of Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. Whenever the term "dispute" or "disputes" is used herein, it shall be deemed to include potential claims as well as disputes.

The DRB shall serve as an advisory body to assist in the resolution of disputes between the County and the Contractor, hereinafter referred to as the "parties." The DRB shall consider disputes referred to it, and furnish written reports containing findings and recommendations pertaining to those disputes, to the parties to aid in resolution of the differences between them. DRB findings and recommendations are not binding on the parties.

SELECTION PROCESS, DISCLOSURE AND APPOINTMENTS

The DRB shall consist of one member selected by the County and approved by the Contractor, one member selected by the Contractor and approved by the County, and a third member selected by the first 2 members and approved by both the County and the Contractor. The third member shall act as the DRB Chairperson.

DRB members shall be especially knowledgeable in the type of construction and contract documents potentially anticipated by the contract. DRB members shall discharge their responsibilities impartially as an independent body, considering the facts and circumstances related to the matters under consideration, pertinent provisions of the contract and applicable laws and regulations.

The County and the Contractor shall nominate and approve DRB members in conformance with the terms and conditions of the Dispute Review Board Agreement and these special provisions, within 45 days of the approval of the contract. Each party shall provide written notification to the other of the name of their selected DRB nominee along with the prospective member's complete written disclosure statement.

Disclosure statements shall include a resume of the prospective member's experience and a declaration statement describing past, present, anticipated, and planned relationships, including indirect relationships through the prospective member's primary or full-time employer, to this project and with the parties involved in this construction contract, including but not limited to, relevant subcontractors or suppliers to the parties, parties' principals, or parties' counsel. DRB members shall also include a full disclosure of close professional or personal relationships with all key members of the contract. Objections to nominees shall be based on a specific breach or violation of nominee responsibilities or on nominee

qualifications under these provisions unless otherwise specified. The Contractor or the County may, on a one-time basis, object to the other's nominee without specifying a reason and this person will not be selected for the DRB. Another person shall then be nominated within 15 days.

The first duty of the County and Contractor selected members of the DRB shall be to select and recommend a prospective third DRB member to the parties for final selection and approval. The first 2 DRB members shall proceed with the selection of the third DRB member immediately upon receiving written notification from the County of their selection, and shall provide their recommendation simultaneously to the parties within 15 days of the notification.

The first 2 DRB members shall select a third DRB member subject to mutual approval of the parties or may mutually concur on a list of potentially acceptable third DRB members and submit the list to the parties for final selection and approval of the third member. The goal in the selection of the third member is to complement the professional experience of the first 2 members and to provide leadership for the DRB's activities.

The third prospective DRB member shall supply a full disclosure statement to the first 2 DRB members and to the parties prior to appointment.

An impasse shall be considered to have been reached if the parties are unable to approve a third member within 15 days of receipt of the recommendation of the first 2 DRB members, or if the first 2 DRB members are unable to agree upon a recommendation within their 15 day time limit. In the event of an impasse in selection of third DRB member the County and the Contractor shall each propose 3 candidates for the third DRB member position. The parties shall select the candidates proposed under this paragraph from the current list of arbitrators certified by the Public Works Contract Arbitration Committee created by Article 7.2 (commencing with Section 10245) of the State Contract Act. The first 2 DRB members shall then select one of the 6 proposed candidates in a blind draw.

No DRB member shall have prior direct involvement in this contract. No member shall have a financial interest in this contract or the parties thereto, within a period of 6 months prior to award of this contract or during the contract, except as follows:

- A. Compensation for services on this DRB.
- B. Ownership interest in a party or parties, documented by the prospective DRB member, that has been reviewed and determined in writing by the County to be sufficiently insignificant to render the prospective member acceptable to the County.
- C. Service as a member of other Dispute Review Boards on other contracts.
- D. Retirement payments or pensions received from a party that are not tied to, dependent on or affected by the net worth of the party.
- E. The above provisions apply to parties having a financial interest in this contract, including but not limited to contractors, subcontractors, suppliers, consultants, and legal and business services.

The Contractor or the County may reject any of the 3 DRB members who fail to fully comply at all times with all required employment and financial disclosure conditions of DRB membership as described in the Dispute Review Board Agreement and as specified herein. A copy of the Dispute Review Board Agreement is included in this section.

The Contractor, the County, and the 3 members of the DRB shall complete and adhere to the Dispute Review Board Agreement in administration of this DRB within 15 days of the parties' concurrence in the selection of the third member. No DRB meeting shall take place until the Dispute Review Board Agreement has been signed by all parties. The County authorizes the Engineer to execute and administer the terms of the Agreement. The person(s) designated by the Contractor as authorized to execute contract change orders shall be authorized to execute and administer the terms of this agreement, or to delegate the authority in writing. The operation of the DRB shall be in conformance with the terms of the Dispute Review Board Agreement.

COMPENSATION

The County and the Contractor shall bear the costs and expenses of the DRB equally. Each DRB member shall be compensated at an agreed rate of \$1,500 per day if time spent per meeting, including on-site time plus one hour of travel time, is greater than 4 hours. Each DRB member shall be compensated at an agreed rate of \$700 per day if time spent per meeting, including on-site time plus one hour of travel time, is less than or equal to 4 hours. The agreed rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof, that the DRB member is at an authorized DRB meeting. No additional compensation will be

made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time, (such as time spent evaluating and preparing recommendations on specific issues presented to the DRB), has been specifically agreed to in advance by the County and Contractor. Time away from the project, which has been specifically agreed to in advance by the parties, will be compensated at an agreed rate of \$150 per hour. The agreed amount of \$150 per hour shall include all incidentals including expenses for telephone, fax, and computer services. Members serving on more than one DRB involving the Department, regardless of the number of meetings per day, shall not be paid more than the all inclusive rate per day or rate per hour for an individual project. The County will provide, at no cost to the Contractor, administrative services such as conference facilities and secretarial services to the DRB. These special provisions and the Dispute Review Board Agreement state the provisions for compensation and expenses of the DRB. DRB members shall be compensated at the same daily and hourly rate. The Contractor shall make direct payments to each DRB member for their participation in authorized meetings and approved hourly rate charges from invoices submitted by each DRB member. The County will reimburse the Contractor for the County's share of the costs. There will be no markups applied to expenses connected with the DRB, either by the DRB members or by the Contractor when requesting payment of the County's share of DRB expenses. Regardless of the DRB recommendation, neither party shall be entitled to reimbursement of DRB costs from the other party.

REPLACEMENT OF DRB MEMBERS

Service of a DRB member may be terminated at any time with not less than 15 days notice as follows:

- A. The County may terminate service of the County appointed member.
- B. The Contractor may terminate service of the Contractor appointed member.
- C. Upon the written recommendation of the County and Contractor appointed members for the removal of the third member.
- D. Upon resignation of a member.
- E. The County or Contractor may terminate the service of any member who fails to fully comply with all required employment and financial disclosure conditions of DRB membership.

When a member of the DRB is replaced, the replacement member shall be appointed in the same manner as the replaced member was appointed. The appointment of a replacement DRB member will begin promptly upon determination of the need for replacement and shall be completed within 15 days. Changes in either of the DRB members chosen by the 2 parties will not require re-selection of the third member, unless both parties agree to such re-selection in writing. The Dispute Review Board Agreement shall be amended to reflect the change of a DRB member.

OPERATION

The following procedure shall be used for dispute resolution:

- A. If the Contractor objects to any decision, act or order of the Engineer, the Contractor shall give written notice of potential claim in conformance with the provisions in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications and these special provisions, including the provision of applicable cost documentation; or file written protests or notices in conformance with the provisions in the Standard Specifications and these special provisions.
- B. The Engineer will respond, in writing, to the Contractor's written supplemental notice of potential claim within 20 days of receipt of the notice.
- C. Within 15 days after receipt of the Engineer's written response, the Contractor shall, if the Contractor still objects, file a written reply with the Engineer, stating clearly and in detail the basis of the objection.
- D. Following an objection to the Engineer's written response, the Contractor shall refer the dispute to the DRB if the Contractor wishes to further pursue the objection to the Engineer's decision. The Contractor shall make the referral in writing to the DRB, simultaneously copied to the County, within 21 days after receipt of the written response from the Engineer. The written dispute referral shall describe the disputed matter in individual discrete segments so that it will be clear to both parties and the DRB what discrete elements of the dispute have been resolved, and which remain unresolved, and shall include an estimate of the cost of the affected work and impacts, if any, on project completion.
- E. By failing to submit the written notice of referral to the DRB, within 21 days after receipt of the Engineer's written response to the supplemental notice of potential claim, the Contractor waives future claims and arbitration on the matter in contention.
- F. The Contractor and the County shall each be afforded an opportunity to be present and to be heard by the DRB, and to offer evidence. Either party furnishing written evidence or documentation to the DRB must furnish copies of such information to the other party a minimum of 15 days prior to the date the DRB is scheduled to convene the

meeting for the dispute. Either party shall produce such additional evidence as the DRB may deem necessary to reach an understanding and a determination of the dispute. The party furnishing additional evidence shall furnish copies of such additional evidence to the other party at the same time the evidence is provided to the DRB. The DRB shall not consider evidence not furnished in conformance with the terms specified herein.

- G. Upon receipt by the DRB of a written referral of a dispute, the DRB shall convene to review and consider the dispute. The dispute meeting shall be held no earlier than 30 days and no later than 60 days after receipt of the written referral unless otherwise agreed to by all parties. The DRB shall determine the time and location of the DRB dispute meeting, with due consideration for the needs and preferences of the parties while recognizing the paramount importance of a timely hearing of the dispute.
- H. There shall be no participation of either party's attorneys at DRB dispute meetings.
- I. There shall be no participation of persons who are not directly involved in the contract or who do not have direct knowledge of the dispute, including but not limited to consultants, except for expert testimony allowed at the discretion of the DRB and with approval prior to the dispute meeting by both parties.
- J. The DRB shall furnish a report, containing findings and recommendations as described in the Dispute Review Board Agreement, in writing to both the County and the Contractor. The DRB may request clarifying information of either party within 10 days after the DRB dispute meeting. Requested information shall be submitted to the DRB within 10 days of the DRB request. The DRB shall complete its report, including minority opinion, if any, and submit it to the parties within 30 days of the DRB dispute meeting, except that time extensions may be granted at the request of the DRB with the written concurrence of both parties. The report shall include the facts and circumstances related to the matters under consideration, pertinent provisions of the contract, applicable laws and regulations, and actual costs and time incurred as shown on the Contractor's cost accounting records. The DRB shall make recommendations on the merit of the dispute and, if appropriate, recommend guidelines for determining compensation.
- K. Within 30 days after receiving the DRB's report, both the County and the Contractor shall respond to the DRB in writing signifying that the dispute is either resolved or remains unresolved. Failure to provide the written response within the time specified, or a written rejection of the DRB's recommendation or response to a request for reconsideration presented in the report by either party, shall conclusively indicate that the party(s) failing to respond accepts the DRB recommendation. Immediately after responses have been received from both parties, the DRB shall provide copies of both responses to the parties simultaneously. Either party may request clarification of elements of the DRB's report from the DRB prior to responding to the report. The DRB shall consider any clarification request only if submitted within 10 days of receipt of the DRB's report, and if submitted simultaneously in writing to both the DRB and the other party. Each party may submit only one request for clarification for any individual DRB report. The DRB shall respond, in writing, to requests for clarification within 10 days of receipt of such requests.
- L. The DRB's recommendations, stated in the DRB's reports, are not binding on either party. Either party may seek a reconsideration of a recommendation of the DRB. The DRB shall only grant a reconsideration based upon submission of new evidence and if the request is submitted within the 30-day time limit specified for response to the DRB's written report. Each party may submit only one request for reconsideration regarding an individual DRB recommendation.
- M. If the County and the Contractor are able to resolve their dispute with the aid of the DRB's report, the County and Contractor shall promptly accept and implement the recommendations of the DRB. If the parties cannot agree on compensation within 60 days of the acceptance by both parties of the DRB's recommendation, either party may request the DRB to make a recommendation regarding compensation.
- N. The County or the Contractor shall not call DRB members who served on the DRB for this contract as witnesses in arbitration proceedings which may arise from this contract, and all documents created by the DRB shall be inadmissible as evidence in subsequent arbitration proceedings, except the DRB's final written reports on each issue brought before it.
- O. The County and Contractor shall jointly indemnify and hold harmless the DRB members from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of and resulting from the findings and recommendations of the DRB.
- P. The DRB members shall have no claim against the County or the Contractor, or both, from claimed harm arising out of the parties' evaluations of the DRB's report.

DISPUTES INVOLVING SUBCONTRACTOR POTENTIAL CLAIMS

For purposes of this section, a "subcontractor potential claim" shall include any potential claim by a subcontractor (including also any pass through potential claims by a lower tier subcontractor or supplier) against the Contractor that is actionable by the Contractor against the Department which arises from the work, services, or materials provided or to be provided in connection with the contract. If the Contractor determines to pursue a dispute against the Department that

includes a subcontractor potential claim, the dispute shall be processed and resolved in conformance with these special provisions and in conformance with the following:

- A. The Contractor shall identify clearly in submissions pursuant to this section, that portion of the dispute that involves a subcontractor potential claim or potential claims.
- B. The Contractor shall include, as part of its submission pursuant to Step D above, a certification (False Claims Act Certification) by the subcontractor's or supplier's officer, partner, or authorized representative with authority to bind the subcontractor and with direct knowledge of the facts underlying the subcontractor potential claim. The Contractor shall submit a certification that the subcontractor potential claim is acknowledged and forwarded by the Contractor. The form for these certifications is available from the Engineer.
- C. At DRB dispute meetings involving one or more subcontractor potential claims, the Contractor shall require that each subcontractor involved in the dispute have present an authorized representative with actual knowledge of the facts underlying the subcontractor potential claim to assist in presenting the subcontractor potential claim and to answer questions raised by the DRB members or the Department's representatives.
- D. Failure by the Contractor to declare a subcontractor potential claim on behalf of its subcontractor (including lower tier subcontractors' and suppliers' pass through potential claims) at the time of submission of the Contractor's potential claims, as provided hereunder, shall constitute a release of the County by the Contractor of such subcontractor potential claim.
- E. The Contractor shall include in all subcontracts under this contract that subcontractors and suppliers of any tier (a) agree to submit subcontractor potential claims to the Contractor in a proper form and in sufficient time to allow processing by the Contractor in conformance with the Dispute Review Board resolution specifications; (b) agree to be bound by the terms of the Dispute Review Board provisions to the extent applicable to subcontractor potential claims; (c) agree that, to the extent a subcontractor potential claim is involved, completion of all steps required under these Dispute Review Board special provisions shall be a condition precedent to pursuit by the subcontractor of other remedies permitted by law, including without limitation of a lawsuit against the Contractor; and (d) agree that the existence of a dispute resolution process for disputes involving subcontractor potential claims shall not be deemed to create any claim, right, or cause of action by any subcontractor or supplier against the Department.

Notwithstanding the foregoing, this Dispute Review Board special provision shall not apply to, and the DRB shall not have the authority to consider, subcontractor potential claims between the subcontractor(s) or supplier(s) and the Contractor that are not actionable by the Contractor against the Department.

DISPUTE REVIEW BOARD AGREEMENT

A copy of the "Dispute Review Board Agreement" to be executed by the Contractor, County and the 3 DRB members after approval of the contract follows:

Form 6202 Rev

DISPUTE REVIEW BOARD AGREEMENT

(Contract Identification)

Contract No. _____

THIS DISPUTE REVIEW BOARD AGREEMENT, hereinafter called "AGREEMENT", made and entered into this _____ day of _____, _____, between the County of El Dorado, acting through the County of El Dorado Department of Transportation and the Director of Transportation, hereinafter called the "COUNTY," _____ hereinafter called the "CONTRACTOR," and the Dispute Review Board, hereinafter called the "DRB" consisting of the following members:

_____,
(Contractor Appointee)

_____,
(County Appointee)

and _____

(Third Person)

WITNESSETH, that

WHEREAS, the COUNTY and the CONTRACTOR, hereinafter called the "parties," are now engaged in the construction on the State Highway project referenced above; and

WHEREAS, the special provisions for the above referenced contract provides for the establishment and operation of the DRB to assist in resolving disputes; and

WHEREAS, the DRB is composed of three members, one selected by the COUNTY, one selected by the CONTRACTOR, and the third member selected by the other two members and approved by the parties;

NOW THEREFORE, in consideration of the terms, conditions, covenants, and performance contained herein, or attached and incorporated and made a part hereof, the COUNTY, the CONTRACTOR, and the DRB members hereto agree as follows:

SECTION I DESCRIPTION OF WORK

To assist in the resolution of disputes between the parties, the contract provides for the establishment and the operation of the DRB. The intent of the DRB is to fairly and impartially consider disputes placed before it and provide written recommendations for resolution of these disputes to both parties. The members of this DRB shall perform the services necessary to participate in the DRB's actions as designated in Section II, Scope of Work.

SECTION II SCOPE OF WORK

The scope of work of the DRB includes, but is not limited to, the following:

A. OBJECTIVE

The principal objective of the DRB is to assist in the timely resolution of disputes between the parties arising from performance of this contract. It is not intended for either party to default on their normal responsibility to amicably and fairly settle their differences by indiscriminately assigning them to the DRB. It is intended that the mere existence of the DRB will encourage the parties to resolve disputes without resorting to this review procedure. But when a dispute that is serious enough to warrant the DRB's review does develop, the process for prompt and efficient action will be in place.

B. PROCEDURES

The DRB shall render written reports on disputes between the parties arising from the construction contract. Prior to consideration of a dispute, the DRB shall establish rules and regulations that will govern the conduct of its business and reporting procedures in conformance with the requirements of the contract and the terms of this AGREEMENT. DRB recommendations, resulting from its consideration of a dispute, shall be furnished in writing to both parties. The recommendations shall be based on facts and circumstances involved in the dispute, pertinent contract provisions, applicable laws and regulations. The recommendations shall find one responsible party in a dispute; shared or "jury" determinations shall not be rendered. The DRB shall make recommendations on the merit of the dispute, and if appropriate, recommend guidelines for determining compensation. If the parties cannot agree on compensation within 60 days of the acceptance by both parties of the DRB's recommendation, either party may request the DRB to make a recommendation regarding compensation.

The DRB shall refrain from officially giving advice or consulting services to anyone involved in the contract. The individual members shall act in a completely independent manner and while serving as members of the DRB shall have no consulting business connections with either party or its principals or attorneys or other affiliates (subcontractors, suppliers, etc.) who have a beneficial interest in the contract.

During scheduled meetings of the DRB as well as during dispute meetings, DRB members shall refrain from expressing opinions on the merits of statements on matters under dispute or potential dispute. Opinions of DRB members expressed in private sessions shall be kept strictly confidential. Individual DRB members shall not meet with, or discuss contract issues with individual parties, except as directed by the DRB Chairperson. Such discussions or meetings shall be disclosed to both parties. Other discussions regarding the project between the DRB members and the parties shall be in the presence of all three members and both parties. Individual DRB members shall not undertake independent investigations of any kind pertaining to disputes or potential disputes, except with the knowledge of both parties and as expressly directed by the DRB Chairperson.

C. CONSTRUCTION SITE VISITS, PROGRESS MEETINGS AND FIELD INSPECTIONS

The DRB members shall visit the project site and meet with representatives of the parties to keep abreast of construction activities and to develop familiarity with the work in progress. Scheduled progress meetings shall be held at or near the project site. The DRB shall meet at least once at the start of the project, and at least once every 4 months thereafter. The frequency, exact time, and duration of additional site visits and progress meetings shall be as recommended by the DRB and approved by the parties consistent with the construction activities or matters under consideration and dispute. Each meeting shall consist of a round table discussion and a field inspection of the work being performed on the contract, if necessary. Each meeting shall be attended by representatives of both parties. The agenda shall generally be as follows:

1. Meeting opened by the DRB Chairperson.
2. Remarks by the COUNTY's representative.
3. A description by the CONTRACTOR's representative of work accomplished since the last meeting; the current schedule status of the work; and a forecast for the coming period.
4. An outline by the CONTRACTOR's representative of potential problems and a description of proposed solutions.
5. An outline by the COUNTY's representative of the status of the work as the COUNTY views it.
6. A brief description by the CONTRACTOR's or COUNTY's representative of potential claims or disputes which have surfaced since the last meeting.
7. A summary by the COUNTY's representative, the CONTRACTOR's representative, or the DRB of the status of past disputes and potential claims.

The COUNTY's representative will prepare minutes of all progress meetings and circulate them for revision and approval by all concerned within 10 days of the meeting.

The field inspection shall cover all active segments of the work, the DRB being accompanied by both parties' representatives. The field inspection may be waived upon mutual agreement of the parties.

D. DRB CONSIDERATION AND HANDLING OF DISPUTES

Upon receipt by the DRB of a written referral of a dispute, the DRB shall convene to review and consider the dispute. The dispute meeting shall be held no earlier than 30 days and no later than 60 days after receipt of the written referral, unless otherwise agreed to by all parties. The DRB shall determine the time and location of DRB dispute meetings, with due consideration for the needs and preferences of the parties while recognizing the paramount importance of speedy resolution of issues. No dispute meetings shall take place later than 30 days prior to acceptance of contract.

Normally, dispute meetings shall be conducted at or near the project site. However, any location that would be more convenient and still provide required facilities and access to necessary documentation shall be satisfactory.

Both parties shall be given the opportunity to present their evidence at these dispute meetings. It is expressly understood that the DRB members are to act impartially and independently in the consideration of the contract provisions, applicable laws and regulations, and the facts and conditions surrounding any dispute presented by either party, and that the recommendations concerning any such dispute are advisory and nonbinding on the parties.

The DRB may request that written documentation and arguments from both parties be sent to each DRB member, through the DRB Chairperson, for review before the dispute meeting begins. A party furnishing written documentation to the DRB shall furnish copies of such information to the other party at the same time that such information is supplied to the DRB.

DRB dispute meetings shall be informal. There shall be no testimony under oath or cross-examination. There shall be no reporting of the procedures by a shorthand reporter or by electronic means. Documents and verbal statements shall be received by the DRB in conformance with acceptance standards established by the DRB. These standards need not comply with prescribed legal laws of evidence.

The third DRB member shall act as Chairperson for dispute meetings and all other DRB activities. The parties shall have a representative at all dispute meetings. Failure to attend a duly noticed dispute meeting by either of the parties shall be conclusively considered by the DRB as indication that the non-attending party considers written submittals as their entire and complete argument. The claimant shall discuss the dispute, followed by the other party. Each party shall then be allowed one or more rebuttals until all aspects of the dispute are thoroughly covered. DRB members shall ask questions, seek clarification, and request further data from either of the parties as may be necessary to assist in making a fully informed

recommendation. The DRB may request from either party documents or information that would assist the DRB in making its findings and recommendations including, but not limited to, documents used by the CONTRACTOR in preparing the bid for the project. A refusal by a party to provide information requested by the DRB may be considered by the DRB as an indication that the requested material would tend to disprove that party's position. In large or complex cases, additional dispute meetings may be necessary in order to consider all the evidence presented by both parties. All involved parties shall maintain the confidentiality of all documents and information, as provided in this AGREEMENT.

During dispute meetings, no DRB member shall express an opinion concerning the merit of any facet of the case. DRB deliberations shall be conducted in private, with interim individual views kept strictly confidential.

After dispute meetings are concluded, the DRB shall meet in private and reach a conclusion supported by 2 or more members. Private sessions of the DRB may be held at a location other than the job site or by electronic conferencing as deemed appropriate, in order to expedite the process.

The DRB's findings and recommendations, along with discussion of reasons therefor, shall then be submitted as a written report to both parties. Recommendations shall be based on the pertinent contract provisions, applicable laws and regulations, and facts and circumstances related to the dispute. The report shall be thorough in discussing the facts considered, the contract language, law or regulation viewed by the DRB as pertinent to the issues, and the DRB's interpretation and philosophy in arriving at its conclusions and recommendations. The DRB's report shall stand on its own, without attachments or appendices. The DRB Chairperson shall furnish a copy of the written recommendation report to the El Dorado County Director of Transportation, 2850 Fairlane Court, Placerville, CA 95667. With prior written approval of both parties, the DRB may obtain technical services necessary to adequately review the disputes presented, including audit, geotechnical, schedule analysis and other services. The parties' technical staff may supply those services as appropriate. The cost of technical services, as agreed to by the parties, shall be borne equally by the 2 parties as specified in an approved contract change order. The CONTRACTOR will not be entitled to markups for the payments made for these services.

The DRB shall resist submittal of incremental portions of information by either party, in the interest of making a fully informed decision and recommendation.

The DRB shall make every effort to reach a unanimous decision. If this proves impossible, the dissenting member shall prepare a minority opinion, which shall be included in the DRB's report.

Although both parties should place weight upon the DRB's recommendations, they are not binding. Either party may appeal a recommendation to the DRB for reconsideration. However, reconsideration shall only be allowed when there is new evidence to present, and the DRB shall accept only one appeal from each party pertaining to an individual DRB recommendation. The DRB shall hear appeals in conformance with the terms described in the Section entitled "Dispute Review Board" in the special provisions.

E. DRB MEMBER REPLACEMENT

Should the need arise to appoint a replacement DRB member, the replacement DRB member shall be appointed in the same manner as the original DRB members were appointed. The selection of a replacement DRB member shall begin promptly upon notification of the necessity for a replacement and shall be completed within 15 days. This AGREEMENT shall be amended to indicate change in DRB membership.

SECTION III CONTRACTOR RESPONSIBILITIES

The CONTRACTOR shall furnish to each DRB member one copy of pertinent documents that are or may become necessary for the DRB to perform their function. Pertinent documents are written notices of potential claim, responses to those notices, drawings or sketches, calculations, procedures, schedules, estimates, or other documents which are used in the performance of the work or in justifying or substantiating the CONTRACTOR's position. The CONTRACTOR shall also furnish a copy of such pertinent documents to the COUNTY, in conformance with the terms outlined in the special provisions.

SECTION IV COUNTY RESPONSIBILITIES

The COUNTY will furnish the following services and items:

A. CONTRACT RELATED DOCUMENTS

The COUNTY will furnish to each DRB member one copy of Notice to Contractors and Special Provisions, Proposal and Contract, Plans, Standard Specifications, and Standard Plans, change orders, written instructions issued by the COUNTY

to the CONTRACTOR, or other documents pertinent to any dispute that has been referred to the DRB and necessary for the DRB to perform its function.

B. COORDINATION AND SERVICES

The COUNTY, through the Engineer, will, in cooperation with the CONTRACTOR, coordinate the operations of the DRB. The Engineer will arrange or provide conference facilities at or near the project site and provide secretarial and copying services to the DRB without charge to the CONTRACTOR.

SECTION V TIME FOR BEGINNING AND COMPLETION

Once established, the DRB shall be in operation until the day of acceptance of the contract. The DRB members shall not begin work under the terms of this AGREEMENT until authorized in writing by the COUNTY.

SECTION VI PAYMENT

A. ALL INCLUSIVE RATE PAYMENT

The COUNTY and the CONTRACTOR shall bear the costs and expenses of the DRB equally. Each DRB member shall be compensated at an agreed rate of \$1,500 per day if time spent per meeting, including on-site time plus one hour of travel time, is greater than 4 hours. Each DRB member shall be compensated at an agreed rate of \$700 per day if time spent per meeting, including on-site time plus one hour of travel time, is less than or equal to 4 hours. The agreed rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof, that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time has been specifically agreed to in advance by the COUNTY and CONTRACTOR. Time away from the project that has been specifically agreed to in advance by the parties will be compensated at an agreed rate of \$150 per hour. The agreed amount of \$150 per hour shall include all incidentals including expenses for telephone, fax, and computer services. Members serving on more than one DRB involving the County, regardless of the number of meetings per day, shall not be paid more than the all inclusive rate per day or rate per hour for an individual project. The COUNTY will provide, at no cost to the CONTRACTOR, administrative services such as conference facilities and secretarial services to the DRB.

B. PAYMENTS

DRB members shall be compensated at the same rate. The CONTRACTOR shall make direct payments to each DRB member for their participation in authorized meetings and approved hourly rate charges from invoices submitted by each DRB member. The COUNTY will reimburse the CONTRACTOR for its share of the costs of the DRB.

The DRB members may submit invoices to the CONTRACTOR for partial payment for work performed and services rendered for their participation in authorized meetings not more often than once per month during the progress of the work. The invoices shall be in a format approved by the parties and accompanied by a general description of activities performed during that billing period. Payment for hourly fees, at the agreed rate, shall not be paid to a DRB member until the amount and extent of those fees are approved by the COUNTY and CONTRACTOR.

Invoices shall be accompanied by original supporting documents, which the CONTRACTOR shall include with the extra work billing when submitting for reimbursement of the COUNTY's share of cost from the COUNTY. The CONTRACTOR will be reimbursed for one-half of approved costs of the DRB. No markups will be added to the CONTRACTOR's payment.

C. INSPECTION OF COSTS RECORDS

The DRB members and the CONTRACTOR shall keep available for inspection by representatives of the COUNTY and the United States, for a period of 3 years after final payment, the cost records and accounts pertaining to this AGREEMENT. If any litigation, claim, or audit arising out of, in connection with, or related to this contract is initiated before the expiration of the 3-year period, the cost records and accounts shall be retained until such litigation, claim, or audit involving the records is completed.

SECTION VII ASSIGNMENT OF TASKS OF WORK

The DRB members shall not assign the work of this AGREEMENT.

SECTION VIII TERMINATION OF DRB MEMBERS

DRB members may resign from the DRB by providing not less than 15 days written notice of the resignation to the COUNTY and CONTRACTOR. DRB members may be terminated by their original appointing power or by either party, for

failing to fully comply at all times with all required employment and financial disclosure conditions of DRB membership in conformance with the terms of the contract.

Service of a DRB member may be terminated at any time with not less than 15 days notice as follows:

- A. The State may terminate service of the State appointed member.
- B. The Contractor may terminate service of the Contractor appointed member.
- C. Upon the written recommendation of the State and Contractor appointed members for the removal of the third member.
- D. Upon resignation of a member.

When a member of the DRB is replaced, the replacement member shall be appointed in the same manner as the replaced member was appointed. The appointment of a replacement DRB member will begin promptly upon determination of the need for replacement and shall be completed within 15 days. Changes in either of the DRB members chosen by the 2 parties will not require re-selection of the third member, unless both parties agree to such a re-selection in writing. The Dispute Resolution Board Agreement shall be amended to reflect the change of a DRB member.

Each party shall document the need for replacement and substantiate the replacement request in writing to the other party and DRB members.

SECTION IX LEGAL RELATIONS

The parties hereto mutually understand and agree that the DRB member in the performance of duties on the DRB, is acting in the capacity of an independent agent and not as an employee of either party.

No party to this AGREEMENT shall bear a greater responsibility for damages or personal injury than is normally provided by Federal or State of California Law.

Notwithstanding the provisions of this contract that require the CONTRACTOR to indemnify and hold harmless the COUNTY, the parties shall jointly indemnify and hold harmless the DRB members from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of and resulting from the findings and recommendations of the DRB.

SECTION X CONFIDENTIALITY

The parties hereto mutually understand and agree that all documents and records provided by the parties in reference to issues brought before the DRB, which documents and records are marked "Confidential - for use by the DRB only," shall be kept in confidence and used only for the purpose of resolution of subject disputes, and for assisting in development of DRB findings and recommendations; that such documents and records will not be utilized or revealed to others, except to officials of the parties who are authorized to act on the subject disputes, for any purposes, during the life of the DRB. Upon termination of this AGREEMENT, said confidential documents and records, and all copies thereof, shall be returned to the parties who furnished them to the DRB. However, the parties understand that such documents shall be subsequently discoverable and admissible in court or arbitration proceedings unless a protective order has been obtained by the party seeking further confidentiality.

SECTION XI DISPUTES

Disputes between the parties hereto, including disputes between the DRB members and either party or both parties, arising out of the work or other terms of this AGREEMENT, which cannot be resolved by negotiation and mutual concurrence between the parties, or through the administrative process provided in the contract, shall be resolved by arbitration as provided in Section 9-1.10, "Arbitration," of the Standard Specifications. Disputes between the DRB and either party, which cannot be resolved by negotiation and mutual concurrence shall be resolved in the appropriate forum.

SECTION XII VENUE, APPLICABLE LAW, AND PERSONAL JURISDICTION

In the event that any party, including an individual member of the DRB, deems it necessary to institute arbitration proceedings to enforce any right or obligation under this AGREEMENT, the parties hereto agree that such action shall be initiated in the Office of Administrative Hearings of the State of California. The parties hereto agree that all questions shall be resolved by arbitration by application of California law and that the parties to such arbitration shall have the right of appeal from such decisions to the Superior Court in conformance with the laws of the State of California. Venue for the arbitration shall be Sacramento or any other location as agreed to by the parties.

SECTION XIII FEDERAL REVIEW AND REQUIREMENTS

On Federal-Aid contracts, the Federal Highway Administration shall have the right to review the work of the DRB in progress, except for private meetings or deliberations of the DRB that do not become part of the project records.

Other Federal requirements in this agreement shall only apply to Federal-Aid contracts.

SECTION XIV CERTIFICATION OF THE CONTRACTOR, THE DRB MEMBERS, AND THE COUNTY

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

DRB MEMBER

DRB MEMBER

By: _____

By: _____

Title: _____

Title : _____

DRB MEMBER

By : _____

Title : _____

CONTRACTOR

COUNTY OF EL DORADO
DEPARTMENT OF TRANSPORTATION

By: _____

By: _____

Title: _____

Title: _____

SECTION 6. (BLANK)

SECTION 7. CONTRACTOR'S INSURANCE

7-1.01 GENERAL INSURANCE REQUIREMENTS

THIS CONTRACT/AGREEMENT SHALL NOT BE EXECUTED BY COUNTY and the CONTRACTOR is not entitled to any rights, unless certificates of insurances, or other sufficient proof satisfactory to El Dorado County Risk Management Division that the following provisions have been complied with, and such certificate(s) are filed with the COUNTY.

Without limiting Contractor's indemnification provided herein, Contractor shall and shall require any of its subcontractors to procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Contractor, his agents, representatives, employees or subcontractors. The following policies of insurance shall be placed with insurers with a current A.M. Best's rating of no less than A-VII. Coverage shall be at least as broad as:

1. Workers' Compensation as required by law in the State of California, with Statutory Limits, and Employer's Liability Insurance with a limit of no less than \$1,000,000 per accident for bodily injury or disease.
2. Commercial General Liability (CGL) Insurance and Umbrella or Excess Liability Insurance: Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability and property damage liability for the following limits and including coverage for: Premises, operations, and mobile equipment; personal injury, products and completed operations; broad form property damage including completed operations; explosion, collapse, and underground hazards; contractual liability. The limits of liability shall be at least the amounts shown in the following table:

Total Bid	For Each Occurrence ¹	Aggregate for Products/Completed Operation	General Aggregate ²	Umbrella or Excess Liability ³
≤ \$1,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$5,000,000
> \$1,000,000				
≤ \$10,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$10,000,000
> \$10,000,000				
≤ \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$15,000,000
> \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$25,000,000

1. Combined single limit for bodily injury and property damage.
2. This limit shall apply separately to the Contractor's work under this contract.
3. The umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

* See exclusion provisions for Small Business subcontractors in Section 7-1.02 (5).

3. Automobile Liability: ISO Form Number CA 00 01 covering any auto (Code 1), or if Contractor has no owned autos, hired, (Code 8) and non-owned autos (Code 9), with limit no less than \$1,000,000 per accident for bodily injury and property damage.

4. In the event Contractor is a licensed professional and is performing professional services under this Contract, Professional Liability Insurance is required with a limit of liability of not less than One Million Dollars (\$1,000,000).

7-1.02 PROOF OF INSURANCE REQUIREMENTS

Contractor shall furnish proof of coverage satisfactory to the El Dorado County Risk Management Division as evidence that the insurance required herein is being maintained. The insurance will be issued by an insurance company acceptable to the Risk Management Division, or be provided through partial or total self-insurance likewise acceptable to the Risk Management Division. Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the County and the State of California.

If the Contractor uses a self-insurance program or self-insured retention, the Contractor shall provide the County and the State of California with the same protection from liability and defense of suits as would be afforded by first-dollar insurance. Execution of the Contract is the Contractor's acknowledgement that the Contractor will be bound by all laws as if the Contractor were an insurer as defined under Insurance Code Section 23 and that the self-insurance program or self-insured retention shall operate as insurance as defined under Insurance Code Section 22.

1. The County of El Dorado, its officers, officials, employees, and volunteers and the State of California, its officers, directors, agents (excluding agents who are design professionals), employees, and State Contractors doing work within the right-of-way limits, shall be named as additional insured under the general liability and excess liability policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this Contract. Coverage for such additional insured does not extend to liability:
 - a) Arising from any defective or substandard condition of the roadway which existed at or before the time the Contractor started work, unless such condition has been changed by the work or scope of the work requires the Contractor to maintain existing roadway facilities and the claim arises from the Contractor's failure to maintain;
 - b) For claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor that occurred during the course of the work; or
 - c) To the extent prohibited by Insurance Code Section 11580.04

2. Proof that the County and the State are named additional insureds shall be made as follows: by providing to the County's Risk Management Division and separately to the State, with a certified copy, or other acceptable evidence, of an endorsement to Contractor's insurance policy naming the County and the State of California additional insureds. Additional insured coverage for the County and the State of California shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured (Form B) endorsement form CG 2010, as published by the Insurance Services Office (ISO), or other form designated by the County or State of California. This form shall be delivered by Contractor to the County with the executed contract, bonds, and associated documents, and separately to the State, before issuance of the State's Encroachment Permit to the Contractor.
3. In the event Contractor cannot provide an occurrence policy, Contractor shall provide insurance covering claims made as a result of performance of this Contract for not less than three (3) years following completion of performance of this Contract.
4. Any deductibles or self-insured retentions must be declared to and approved by the County. At the option of the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the County, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.
5. Contractor shall require each of its subcontractors to procure and maintain commercial general liability insurance, umbrella or excess liability insurance, workers' compensation insurance and automobile liability insurance of the types and in the amounts specified above, or shall insure the activities of its subcontractors in its own policy in like amounts. For each subcontractor, the "Total Bid" in the Table above shall be interpreted as the total amount of work subcontracted to the subcontractor. Contractor shall also require each of its subcontractors to name Contractor and the County of El Dorado and any other additional insured listed above as additional insureds. The Contractor shall not require certified Small Business subcontractors to carry Liability Insurance that exceeds the limits in the table above. Notwithstanding the limits specified herein, at the option of the Contractor, the liability insurance limits for certified Small Business subcontractors of any tier may be less than those limits specified in the table. For Small Business subcontracts, "Total Bid" shall be interpreted as the amount of subcontracted work to a certified Small Business.

7-1.03 INSURANCE NOTIFICATION REQUIREMENTS

1. Contractor agrees no cancellation or material change in any policy shall become effective except upon thirty (30) days prior written notice to the County of El Dorado Project Manager at the office of the Department of Transportation, 2850 Fair Lane Court, Placerville, CA 95667.
2. Contractor agrees that the insurance required herein shall be in effect at all times during the term of this Contract. In the event said insurance coverage expires at any time or times during the term of this Contract, Contractor shall immediately provide a new certificate of insurance as evidence of the required insurance coverage. In the event Contractor fails to keep in effect at all times insurance coverage as herein provided, County may, in addition to any other remedies it may have, terminate this Contract upon the occurrence of such event. New certificates of insurance are subject to the approval of the Risk Management Division.

7-1.04 ADDITIONAL STANDARDS

Certificates shall meet such additional standards as may be determined by the Department either independently or in consultation with the Risk Management Division, as essential for protection of the County.

Contractor shall maintain completed operations coverage with a carrier acceptable to the County and State of California through the expiration of the patent deficiency in construction statute of repose set forth in Code of Civil Procedure Section 337.1.

7-1.05 COMMENCEMENT OF PERFORMANCE

Contractor shall not commence performance of this Contract unless and until compliance with each and every requirement of the insurance provisions is achieved.

7-1.06 MATERIAL BREACH

Failure of Contractor to maintain the insurance required herein, or to comply with any of the requirements of the insurance provisions, shall constitute a material breach of the entire Contract.

7-1.07 REPORTING PROVISIONS

Any failure to comply with the reporting provisions of the policies shall not affect coverage provided to the County, its officers, officials, employees or volunteers.

7-1.08 PRIMARY COVERAGE

The Contractor's insurance coverage shall be primary insurance as respects the County, its officers, officials, employees and volunteers and the State of California. Any insurance or self-insurance maintained by the County, its officers, officials, employees, volunteers or State of California, shall be in excess of the Contractor's insurance and shall not contribute with it.

7-1.09 PREMIUM PAYMENTS

The insurance companies shall have no recourse against the County of El Dorado its officers, agents, employees, or any of them for payment of any premiums or assessments under any policy issued by any insurance company.

7-1.10 CONTRACTOR'S OBLIGATIONS

Contractor's indemnity and other obligations shall not be limited by the insurance required herein and shall survive the expiration of this Contract.

7-1.11 GOVERNING PRECEDENCE

To the extent that this Section 7, "Contractor's Insurance," is inconsistent with 7-1.12, "Indemnification and Insurance," of the Standard Specifications May 2006, this Section shall govern; otherwise each and every provision of such Section 7-1.12 shall be applicable to this agreement

SECTION 8. MATERIALS

SECTION 8-1. MISCELLANEOUS

8-1.01 PREQUALIFIED AND TESTED SIGNING AND DELINEATION MATERIALS

The Department maintains the following list of Prequalified and Tested Signing and Delineation Materials. The Engineer shall not be precluded from sampling and testing products on the list of Prequalified and Tested Signing and Delineation Materials.

The manufacturer of products on the list of Prequalified and Tested Signing and Delineation Materials shall furnish the Engineer a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each type of traffic product supplied.

For those categories of materials included on the list of Prequalified and Tested Signing and Delineation Materials, only those products shown within the listing may be used in the work. Other categories of products, not included on the list of Prequalified and Tested Signing and Delineation Materials, may be used in the work provided they conform to the requirements of the Standard Specifications.

Materials and products may be added to the list of Prequalified and Tested Signing and Delineation Materials if the manufacturer submits a New Product Information Form to the New Product Coordinator at the Transportation Laboratory. Upon a Departmental request for samples, sufficient samples shall be submitted to permit performance of required tests. Approval of materials or products will depend upon compliance with the specifications and tests the Department may elect to perform.

PAVEMENT MARKERS, PERMANENT TYPE

Retroreflective With Abrasion Resistant Surface (ARS)

1. Apex, Model 921AR (4" x 4")
2. Ennis Paint, Models C88 (4" x 4"), 911 (4" x 4") and C80FH
3. Ray-O-Lite, Models "AA" ARC II (4" x 4") and ARC Round Shoulder (4" x 4")
4. 3M Series 290 (3.5" x 4")
5. 3M Series 290 PSA
6. Glowlite, Inc Model 988AR (4" x 4")

Retroreflective With Abrasion Resistant Surface (ARS)

(for recessed applications only)

1. Ennis Paint, Model 948 (2.3" x 4.7")
 2. Ennis Paint, Model 944SB (2" x 4")*
 3. Ray-O-Lite, Model 2002 (2" x 4.6")
 4. Ray-O-Lite, Model 2004 (2" x 4")*
- *For use only in 4.5 inch wide (older) recessed slots

Non-Reflective, 4-inch Round

1. Apex Universal (Ceramic)
2. Apex Universal, Models 929 (ABS) and 929PP (Polypropylene)
3. Glowlite, Inc. (Ceramic) and PP (Polypropylene)
4. Hi-Way Safety, Inc., Models P20-2000W and 2001Y (ABS)
5. Interstate Sales, "Diamond Back" (Polypropylene)
6. Novabrite Models Cdot (White) Cdot-y (Yellow), Ceramic
7. Novabrite Models Pdot-w (White) Pdot-y (Yellow), Polypropylene
8. Three D Traffic Works TD10000 (ABS), TD10500 (Polypropylene)
9. Ray-O-Lite, Ray-O-Dot (Polypropylene)

PAVEMENT MARKERS, TEMPORARY TYPE

Temporary Markers For Long Term Day/Night Use (180 days or less)

1. Vega Molded Products "Temporary Road Marker" (3" x 4")

2. Pexco LLC, Halftrack model 25, 26 and 35

Temporary Markers For Short Term Day/Night Use (14 days or less)

(For seal coat or chip seal applications, clear protective covers are required)

1. Apex Universal, Model 932
2. Pexco LLC, Models T.O.M., T.R.P.M., and "HH" (High Heat)
3. Hi-Way Safety, Inc., Model 1280/1281
4. Glowlite, Inc., Model 932

STRIPING AND PAVEMENT MARKING MATERIAL

Permanent Traffic Striping and Pavement Marking Tape

1. Advanced Traffic Marking, Series 300 and 400
2. Brite-Line, Series 1000
3. Brite-Line, "DeltaLine XRP"
4. Swarco Industries, "Director 35" (For transverse application only)
5. Swarco Industries, "Director 60"
6. 3M, "Stamark" Series 380 and 270 ES
7. 3M, "Stamark" Series 420 (For transverse application only)

Temporary (Removable) Striping and Pavement Marking Tape (180 days or less)

1. Advanced Traffic Marking, Series 200
2. Brite-Line, "Series 100", "Deltaline TWR"
3. Garlock Rubber Technologies, Series 2000
4. P.B. Laminations, Aztec, Grade 102
5. Swarco Industries, "Director-2", "Director 2-Wet Reflective"
6. Trelleborg Industries, R140 Series
7. 3M Series 620 "CR", Series 780 and Series 710
8. 3M Series A145, Removable Black Line Mask
(Black Tape: for use only on Hot mix asphalt surfaces)
9. Advanced Traffic Marking Black "Hide-A-Line"
(Black Tape: for use only on Hot mix asphalt surfaces)
10. Brite-Line "BTR" Black Removable Tape
(Black Tape: for use only on Hot mix asphalt surfaces)
11. Trelleborg Industries, RB-140
(Black Tape: for use only on Hot mix asphalt surfaces)

Preformed Thermoplastic (Heated in place)

1. Flint Trading Inc., "Hot Tape"
2. Flint Trading Inc., "Premark Plus"
3. Flint Trading Inc., "Flametape"

Ceramic Surfacing Laminate, 6" x 6"

1. Highway Ceramics, Inc.

CLASS 1 DELINEATORS

One Piece Driveable Flexible Type, 66-inch

1. Pexco LLC, "Flexi-Guide Models 400 and 566"
2. Carsonite, Curve-Flex CFRM-400
3. Carsonite, Roadmarker CRM-375
4. FlexStake, Model 654 TM
5. GreenLine Model CGD1-66

Special Use Type, 66-inch

1. Pexco LLC, Model FG 560 (with 18-inch U-Channel base)
2. Carsonite, "Survivor" (with 18-inch U-Channel base)
3. Carsonite, Roadmarker CRM-375 (with 18-inch U-Channel base)
4. FlexStake, Model 604

5. GreenLine Model CGD (with 18-inch U-Channel base)
6. Impact Recovery Model D36, with #105 Driveable Base
7. Safe-Hit with 8-inch pavement anchor (SH248-GP1)
8. Safe-Hit with 15-inch soil anchor (SH248-GP2) and with 18-inch soil anchor (SH248-GP3)
9. Safe-Hit RT 360 Post with Soil Mount Anchor (GPS)
10. Shur-Tite Products, Shur-Flex Drivable

Surface Mount Type, 48-inch

1. Bent Manufacturing Company, Masterflex Model MFEX 180-48
2. Carsonite, "Channelizer"
3. FlexStake, Models 704, 754 TM, and EB4
4. Impact Recovery Model D48, with #101 Fixed (Surface-Mount) Base
5. Three D Traffic Works "Channelflex" ID No. 522248W
6. Flexible Marker Support, Flexistiff Model C-9484
7. Safe-Hit, SH 248 SMR

CHANNELIZERS

Surface Mount Type, 36-inch

1. Bent Manufacturing Company, Masterflex Models MF-360-36 (Round) MF-180-36 (Flat) and MFEX 180—36
2. Pexco LLC, Flexi-Guide Models FG300PE, FG300UR, and FG300EFX
3. Carsonite, "Super Duck" (Round SDR-336)
4. Carsonite, Model SDCF03601MB "Channelizer"
5. FlexStake, Models 703, 753 TM, and EB3
6. GreenLine, Model SMD-36
7. Hi-way Safety, Inc. "Channel Guide Channelizer" Model CGC36
8. Impact Recovery Model D36, with #101 Fixed (Surface-Mount) Base
9. Safe-Hit, Guide Post, Model SH236SMA and Dura-Post, Model SHL36SMA
10. Three D Traffic Works "Boomerang" 5200 Series
11. Flexible Marker Support, Flexistiff Model C-9484-36
12. Shur-Tite Products, Shur-Flex

Lane Separation System

1. Pexco LLC, "Flexi-Guide (FG) 300 Curb System"
2. Qwick Kurb, "Klemmfix Guide System"
3. Dura-Curb System
4. Tuff Curb
5. FG 300 Turnpike Curb
6. Shur-Tite Products, SHUR-Curb , Model No. SF0200

CONICAL DELINEATORS, 42-inch

(For 28-inch Traffic Cones, see Standard Specifications)

1. Bent Manufacturing Company "T-Top", TDSC Series
2. Plastic Safety Systems "Navigator-42"
3. Traffix Devices "Grabber"
4. Three D Traffic Works "Ringtop" TD7000, ID No. 742143
5. Three D Traffic Works, TD7500
6. Work Area Protection Corp. C-42
7. Custom-Pak 4600 (Part No. 93005-0001)

OBJECT MARKERS

Type "K", 18-inch

1. Pexco LLC, Model FG318PE
2. Carsonite, Model SMD 615
3. FlexStake, Model 701 KM
4. Safe-Hit, Model SH718SMA

Type "Q" Object Markers, 24-inch

1. Bent Manufacturing "Masterflex" Model MF-360-24
2. Pexco LLC, Model FG324PE
3. Carsonite, "Channelizer"
4. FlexStake, Model 701KM
5. Safe-Hit, Models SH824SMA_WA and SH824GP3_WA
6. Three D Traffic Works ID No. 531702W and TD 5200
7. Three D Traffic Works ID No. 520896W
8. Safe-Hit, Dura-Post SHLQ-24"

**CONCRETE BARRIER MARKERS AND
TEMPORARY RAILING (TYPE K) REFLECTORS****Impactable Type**

1. ARTUK, "FB"
2. Pexco LLC, Models PCBM-12 and PCBM-T12, PCBM 912
3. Duraflex Corp., "Flexx 2020" and "Electriflexx"
4. Hi-Way Safety, Inc., Model GMKRM100
5. Plastic Safety Systems "BAM" Models OM-BARR and OM-BWAR
6. Three D Traffic Works "Roadguide" Model TD 9300

Non-Impactable Type

1. ARTUK, JD Series
2. Plastic Safety Systems "BAM" Models OM-BITARW and OM-BITARA
3. Vega Molded Products, Models GBM and JD
4. Plastic Vacuum Forming, "Cap-It C400"

METAL BEAM GUARD RAIL POST MARKERS

(For use to the left of traffic)

1. Pexco LLC, "Mini" (3" x 10"), I-Flex
2. Creative Building Products, "Dura-Bull, Model 11201"
3. Duraflex Corp., "Railrider"
4. Plastic Vacuum Forming, "Cap-It C300"

CONCRETE BARRIER DELINEATORS, 16-inch

(For use to the right of traffic)

1. Pexco LLC, Model PCBM T-16
2. Safe-Hit, Model SH216RBM
3. Three D Traffic Works "Roadguide" Model 9400

CONCRETE BARRIER-MOUNTED MINI-DRUM (10" x 14" x 22")

1. Stinson Equipment Company "SaddleMarker"

GUARD RAILING DELINEATOR

(Place top of reflective element at 48 inches above plane of roadway)

Wood Post Type, 27-inch

1. Pexco LLC, FG 427 and FG 527
2. Carsonite, Model 427
3. FlexStake, Model 102 GR
4. GreenLine GRD 27
5. Safe-Hit, Model SH227GRD
6. Three D Traffic Works "Guardflex" TD9100
7. New Directions Mfg, NDM27
8. Shur-Tite Products, Shur-Tite Flat Mount
9. Glasforms, Hiway-Flex, GR-27-00 "(approved 9-27-10)

Barrier, Guardrail Visibility Enhancement

1. UltraGuard Safety System, Potters Industries, Inc.

Steel Post Type

1. Carsonite, Model CFGR-327

RETROREFLECTIVE SHEETING**Channelizers, Barrier Markers, and Delineators**

1. Avery Dennison T-6500 Series (For rigid substrate devices only)
2. Avery Dennison WR-7100 Series
3. Nippon Carbide Industries, Flexible Ultralite Grade (ULG) II
4. Reflexite, PC-1000 Metalized Polycarbonate
5. Reflexite, AC-1000 Acrylic
6. Reflexite, AP-1000 Metalized Polyester
7. Reflexite, Conformalight, AR-1000 Abrasion Resistant Coating
8. 3M, High Intensity

Traffic Cones, 4-inch and 6-inch Sleeves

1. Nippon Carbide Industries, Flexible Ultralite Grade (ULG) II
2. Reflexite, Vinyl, "TR" (Semi-transparent) or "Conformalight"
3. 3M Series 3840
4. Avery Dennison S-9000C

Drums

1. Avery Dennison WR-6100
2. Nippon Carbide Industries, Flexible Ultralite Grade (ULG) II
3. Reflexite, "Conformalight", "Super High Intensity" or "High Impact Drum Sheeting"
4. 3M Series 3810

Barricades: Type I, Medium-Intensity (Typically Enclosed Lens, Glass-Bead Element)

1. Nippon Carbide Industries, CN8117
2. Avery Dennison, W 1100 series
3. 3M Series CW 44

Barricades: Type II, Medium-High-Intensity (Typically Enclosed Lens, Glass-Bead Element)

1. Avery Dennison, W-2100 Series

Vertical Clearance Signs: Structure Mounted

1. 3M Model 4061, Diamond Grade DG3, Fluorescent Yellow

Signs: Type II, Medium-High-Intensity (Typically Enclosed Lens, Glass-Bead Element)

1. Avery Dennison, T-2500 Series
2. Nippon Carbide Industries, Nikkalite 18000

Signs: Type III, High-Intensity (Typically Encapsulated Glass-Bead Element)

1. Avery Dennison, T-5500A and T-6500 Series
2. Nippon Carbide Industries, Nikkalite Brand Ultralite Grade II
3. 3M 3870 and 3930 Series
4. Changzhou Hua R Sheng, Series TM 1200

Signs: Type IV, High-Intensity (Typically Unmetallized Microprismatic Element)

1. Avery Dennison, T-6500 Series
2. Nippon Carbide Industries, Crystal Grade, 94000 Series
3. Nippon Carbide Industries, Model No. 94847 Fluorescent Orange
4. 3M Series 3930 and Series 3924S

Signs: Type VI, Elastomeric (Roll-Up) High-Intensity, without Adhesive

1. Avery Dennison, WU-6014

2. Novabrite LLC, "Econobrite"
3. Reflexite "Vinyl"
4. Reflexite "SuperBright"
5. Reflexite "Marathon"
6. 3M Series RS20

Signs: Type VIII, Super-High-Intensity (Typically Unmetallized Microprismatic Element)

1. Avery Dennison, T-7500 Series
2. Avery Dennison, T-7511 Fluorescent Yellow
3. Avery Dennison, T-7513 Fluorescent Yellow Green
4. Avery Dennison, W-7514 Fluorescent Orange
5. Nippon Carbide Industries, Nikkalite Crystal Grade Series 92800
6. Nippon Carbide Industries, Nikkalite Crystal Grade Model 92847 Fluorescent Orange

Signs: Type IX, Very-High-Intensity (Typically Unmetallized Microprismatic Element)

1. 3M VIP Series 3981 Diamond Grade Fluorescent Yellow
2. 3M VIP Series 3983 Diamond Grade Fluorescent Yellow/Green
3. 3M VIP Series 3990 Diamond Grade
4. Avery Dennison T-9500 Series
5. Avery Dennison, T9513, Fluorescent Yellow Green
6. Avery Dennison, W9514, Fluorescent Orange
7. Avery Dennison, T-9511 Fluorescent Yellow

Signs: Type XI, Very High Intensity (Typically Unmetallized Microprismatic Element)

1. 3M Diamond Grade, DG3, Series 4000
2. 3M Diamond Grade, DG3, Series 4081, Fluorescent Yellow
3. 3M Diamond Grade, DG3, Series 4083, Fluorescent Yellow/Green
4. 3M Diamond Grade, DG3, Series 4084, Fluorescent Orange
5. Avery Dennison, OmniCube, T-11500 Series
6. Avery Dennison, OmniCube, T-11511, Fluorescent Yellow
7. Avery Dennison, OmniCube, T-11513, Fluorescent Yellow Green
8. Avery Dennison, OmniCube, W-11514 Fluorescent Orange

SPECIALTY SIGNS

1. Reflexite "Endurance" Work Zone Sign (with Semi-Rigid Plastic Substrate)

ALTERNATIVE SIGN SUBSTRATES

Fiberglass Reinforced Plastic (FRP) and Expanded Foam PVC

1. Fiber-Brite (FRP)
2. Sequentia, "Polyplate" (FRP)
3. Intoplast Group "InteCel" (0.5 inch for Post-Mounted CZ Signs, 48-inch or less)(PVC)

Aluminum Composite, Temporary Construction Signs and Permanent Signs up to 4 foot, 7 Inches

1. Alcan Composites "Dibond Material, 80 mils"
2. Mitsubishi Chemical America, Alpolic 350
3. Bone Safety Signs, Bone Light ACM (temporary construction signs only)

SECTION 8-2. CONCRETE

8-2.01 PORTLAND CEMENT CONCRETE

Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

STRENGTH DEVELOPMENT TIME

The time allowed to obtain the minimum required compressive strength as specified in Section 90-1.01, "Description," of the Standard Specifications will be 56 days when the Contractor chooses cementitious material that satisfies the following equation:

$$\frac{(41 \times UF) + (19 \times F) + (11 \times SL)}{TC} \geq 7.0$$

Where:

- F = Fly ash or natural pozzolan conforming to the requirements in AASHTO Designation: M 295, Class F or N, including the amount in blended cement, pounds per cubic yard. F is equivalent to the sum of FA and FB as defined in Section 90-2.01C, "Required Use of Supplementary Cementitious Materials," of the Standard Specifications
- SL = GGBFS, including the amount in blended cement, pounds per cubic yard
- UF = Silica fume, metakaolin, or UFFA, including the amount in blended cement, pounds per cubic yard
- TC = Total amount of cementitious material used, pounds per cubic yard

For concrete satisfying the equation above, the Contractor shall test for the modulus of rupture or compressive strength specified for the concrete involved, at least once every 500 cubic yards, at 28, 42, and 56 days. The Contractor shall submit test results to the Engineer and the Transportation Laboratory, Attention: Office of Concrete Materials.

SUPPLEMENTARY CEMENTITIOUS MATERIALS

The Contractor may use rice hull ash as a supplementary cementitious material (SCM) to make minor concrete. Rice hull ash shall conform to the requirements in AASHTO Designation: M 321 and the following chemical and physical requirements:

Chemical Requirements	Percent
Silicon Dioxide (SiO ₂) ^a	90 min.
Loss on ignition	5.0 max.
Total Alkalies (as Na ₂ O) equivalent	3.0 max.

Physical Requirements	Percent
Particle size distribution	
Less than 45 microns	95
Less than 10 microns	50
Strength Activity Index with portland cement ^b	
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 ^c	0.10 max.
Surface Area when testing by nitrogen adsorption in conformance with ASTM D 5604	40.0 m ² /g min.

Notes:

^a A maximum of 1.0% of the SiO₂ may exist in crystalline form.

^b When tested in conformance with the requirements for strength activity testing of silica fume in AASHTO Designation: M 307

^c In the test mix, Type II or Type V portland cement shall be replaced with at least 12% RHA by weight.

For the purposes of calculating cementitious material requirements in Section 90-2.01C, "Required Use of Supplementary Cementitious Materials," of the Standard Specifications and these special provisions, rice hull ash is considered to be represented by the variable *UF*.

SECTION 8-3. WELDING

8-3.01 WELDING

GENERAL

Unless otherwise specified, Section 8-3, "Welding," shall apply to any welding that is specified to conform to an AWS welding code.

Requirements of the AWS welding codes shall apply unless otherwise specified in the Standard Specifications, on the plans, or in these special provisions. Wherever the abbreviation AWS is used, it shall be equivalent to the abbreviations ANSI/AWS or AASHTO/AWS.

Wherever reference is made to the following AWS welding codes in the Standard Specifications, on the plans, or in these special provisions, the year of adoption for these codes shall be as listed:

AWS Code	Year of Adoption
D1.1	2008
D1.3	2008
D1.4	2005
D1.5	2008
D1.6	2007
D1.8	2009

Flux cored welding electrodes conforming to the requirements of AWS A5.20 E6XT-4 or E7XT-4 shall not be used to perform welding for this project.

Unless otherwise specified, Clause 6.1.3 of AWS D1.1, paragraph 1 of Section 7.1.2 of AWS D1.4, and Clause 6.1.1.2 of AWS D1.5, are replaced with the following:

The QC Inspector shall be the duly designated person who acts for and on behalf of the Contractor for inspection, testing, and quality related matters for all welding.

Quality Assurance (QA) is the prerogative of the Engineer. The QA Inspector is the duly designated person who acts for and on behalf of the Engineer.

The QC Inspector shall be responsible for quality control acceptance or rejection of materials and workmanship.

When the term "Inspector" is used without further qualification, it shall refer to the QC Inspector.

Inspection and approval of all joint preparations, assembly practices, joint fit-ups, welding techniques, and the performance of each welder, welding operator, and tack welder shall be documented by the QC Inspector on a daily basis for each day welding is performed. For each inspection, including fit-up, Welding Procedure Specification (WPS) verification, and final weld inspection, the QC Inspector shall confirm and document compliance with the requirements of the AWS or other specified code criteria and the requirements of these special provisions on all welded joints before welding, during welding, and after the completion of each weld.

The Engineer shall have the authority to verify the qualifications or certifications of any welder, QC Inspector, or NDT personnel to specified levels by retests or other means approved by the Engineer.

When joint weld details that are not prequalified to the details of Clause 3 of AWS D1.1 or to the details of Figure 2.4 or 2.5 of AWS D1.5 are proposed for use in the work, the joint details, their intended locations, and the proposed welding parameters and essential variables, shall be approved by the Engineer. The Contractor shall allow the Engineer 15 days to complete the review of the proposed joint detail locations.

In addition to the requirements of AWS D1.1, welding procedure qualifications for work welded in conformance with this code shall conform to the following:

When a nonstandard weld joint is to be made using a combination of WPSs, a single test may be conducted combining the WPSs to be used in production, provided the essential variables, including weld bead placement, of each process are limited to those established in Table 4.5.

Upon approval of the proposed joint detail locations and qualification of the proposed joint details, welders and welding operators using these details shall perform a qualification test plate using the WPS variables and the joint detail to be used in production. The test plate shall have the maximum thickness to be used in production and a minimum length of 18 inches. The test plate shall be mechanically and radiographically tested. Mechanical and radiographic testing and acceptance criteria shall be as specified in the applicable AWS codes.

The Engineer will witness all qualification tests for WPSs that were not previously approved by the Department.

In addition to the requirements specified in the applicable code, the period of effectiveness for a welder's or welding operator's qualification shall be a maximum of 3 years for the same weld process, welding position, and weld type. If welding will be performed without gas shielding, then qualification shall also be without gas shielding. Excluding welding of fracture critical members, a valid qualification at the beginning of work on a contract will be acceptable for the entire period of the contract, as long as the welder's or welding operator's work remains satisfactory.

The Contractor shall notify the Engineer 7 days prior to performing any procedure qualification tests. Witnessing of qualification tests by the Engineer shall not constitute approval of the intended joint locations, welding parameters, or essential variables. The Contractor shall notify the Engineer using the "Standard TL-38 Inspection Form" located at:

<http://www.dot.ca.gov/hq/esc/Translab/OSM/smbforms.htm>

Clause 6.14.6, "Personnel Qualification," of AWS D1.1, Section 7.8, "Personnel Qualification," of AWS D1.4, and Clause 6.1.3.4, "Personnel Qualification," of AWS D1.5 are replaced with the following:

Personnel performing nondestructive testing (NDT) shall be qualified and certified in conformance with the requirements of the American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A and the Written Practice of the NDT firm. The Written Practice of the NDT firm shall meet or exceed the guidelines of the ASNT Recommended Practice No. SNT-TC-1A. Individuals who perform NDT, review the results, and prepare the written reports shall be either:

- A. Certified NDT Level II technicians, or;
- B. Level III technicians who hold a current ASNT Level III certificate in that discipline and are authorized and certified to perform the work of Level II technicians.

Clause 6.6.5, "Nonspecified NDT Other than Visual," of AWS D1.1, Section 7.6.5 of AWS D1.4 and Clause 6.6.5 of AWS D1.5 shall not apply.

For any welding, the Engineer may direct the Contractor to perform NDT that is in addition to the visual inspection or NDT specified in the AWS or other specified welding codes, in the Standard Specifications, or in these special provisions. Except as provided for in these special provisions, additional NDT required by the Engineer, and associated repair work, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications. Prior to release of welded material by the Engineer, if testing by NDT methods other than those originally specified discloses an attempt to defraud or reveals a gross nonconformance, all costs associated with the repair of the deficient area, including NDT of the weld and of the repair, and any delays caused by the repair, shall be at the Contractor's expense. A gross nonconformance is defined as the sum of planar type rejectable indications in more than 20 percent of the tested length.

When less than 100 percent of NDT is specified for any weld, it is expected that the entire length of weld meet the specified acceptance-rejection criteria. Should any welding deficiencies be discovered by additional NDT directed or performed by the Engineer that utilizes the same NDT method as that originally specified, all costs associated with the repair of the deficient area, including NDT of the weld and of the weld repair, and any delays caused by the repair, shall be at the Contractor's expense.

Repair work to correct welding deficiencies discovered by visual inspection directed or performed by the Engineer, and any associated delays or expenses caused to the Contractor by performing these repairs, shall be at the Contractor's expense.

WELDING QUALITY CONTROL

Welding quality control shall conform to the requirements in the AWS or other specified welding codes, the Standard Specifications, and these special provisions.

Unless otherwise specified, welding quality control shall apply to work welded in conformance with the provisions in the following:

- A. Section 49, "Piling," Section 52, "Reinforcement," Section 55, "Steel Structures," and Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications
- B. "Structural Steel for Building Work" of these special provisions

Unless otherwise specified, Clauses 6.1.4.1 and 6.1.4.3 of AWS D1.1, paragraph 2 of Section 7.1.2 of AWS D1.4, and Clauses 6.1.3.2 through 6.1.3.3 of AWS D1.5 are replaced with the following:

The QC Inspector shall be currently certified as an AWS Certified Welding Inspector (CWI) in conformance with the requirements in AWS QC1, "Standard for AWS Certification of Welding Inspectors."

The QC Inspector may be assisted by an Assistant QC Inspector provided that this individual is currently certified as an AWS Certified Associate Welding Inspector (CAWI) in conformance with the requirements in AWS QC1, "Standard for AWS Certification of Welding Inspectors." The Assistant QC Inspector may perform inspection under the direct supervision of the QC Inspector provided the assistant is always within visible and audible range of the QC Inspector. The QC Inspector shall be responsible for signing all reports and for determining if welded materials conform to workmanship and acceptance criteria. The ratio of QC Assistants to QC Inspectors shall not exceed 5 to 1.

The Contractor shall designate in writing a welding Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of welding, including materials and workmanship, performed by the Contractor and subcontractors.

The QCM shall be the sole individual responsible to the Contractor for submitting, receiving, reviewing, and approving all correspondence, required submittals, and reports to and from the Engineer. The QCM shall be a registered professional engineer or shall be currently certified as a CWI.

Unless the QCM is hired by a subcontractor providing only QC services, the QCM 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 QCM may be an employee of the Contractor.

The QCM shall sign and furnish to the Engineer, a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each item of work for which welding was performed. The certificate shall state that all of the materials and workmanship incorporated in the work, and all required tests and inspections of this work, have been performed in conformance with the details shown on the plans, the Standard Specifications, and these special provisions.

Welding inspection personnel or NDT firms to be used in the work 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, except for the following conditions:

- A. The work is welded in conformance with AWS D1.5 and is performed at a permanent fabrication or manufacturing facility that is certified under the AISC Quality Certification Program, Category CBR, Major Steel Bridges and Fracture Critical endorsement F, when applicable.
- B. Structural steel for building work is welded in conformance with AWS D1.1 and is performed at a permanent fabrication or manufacturing facility that is certified under the AISC Quality Certification Program, Category STD, Standard for Steel Building Structures.

For welding performed at such facilities, the inspection personnel or NDT firms may be employed or compensated by the facility performing the welding provided the facility maintains a QC program that is independent from production.

Unless otherwise specified, an approved independent third party will witness the qualification tests for welders or welding operators. The independent third party shall be a current CWI and shall not be an employee of the contractor performing the welding. The Contractor shall allow the Engineer 15 days to review the qualifications and copy of the current certification of the independent third party.

Prior to submitting the Welding Quality Control Plan (WQCP) required herein, a prewelding meeting between the Engineer, the Contractor's QCM, and a representative from each entity performing welding or inspection for this project, shall be held to discuss the requirements for the WQCP.

Information regarding the contents, format, and organization of a WQCP, is available at the Transportation Laboratory and at:

<http://www.dot.ca.gov/hq/esc/Translab/OSM/smbresources.htm>

The Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 2 copies of a separate WQCP for each subcontractor or supplier for each item of work for which welding is to be performed.

The Contractor shall allow the Engineer 15 days to review the WQCP submittal after a complete plan has been received. No welding shall be performed until the WQCP is approved in writing by the Engineer.

An amended WQCP or any addendum to the approved WQCP shall be submitted to, and approved in writing by the Engineer, for proposed revisions to the approved WQCP. An amended WQCP or addendum will be required for revisions to the WQCP, including but not limited to a revised WPS; additional welders; changes in NDT firms, QC, or NDT personnel or procedures; or updated systems for tracking and identifying welds. The Engineer shall have 7 days to complete the review of the amended WQCP or addendum. Work affected by the proposed revisions shall not be performed until the amended WQCP or addendum has been approved.

After final approval of the WQCP, amended WQCP, or addendum, the Contractor shall submit 7 copies to the Engineer of the approved documents. A copy of the Engineer approved document shall be available at each location where welding is to be performed.

All welding will require inspection by the Engineer. The Contractor shall request inspection at least 3 business days prior to the beginning of welding for locations within California and 5 business days for locations outside of California. The Contractor shall request inspection at:

<http://www.dot.ca.gov/hq/esc/Translab/OSM/smbforms.htm>

Continuous inspection shall be provided when any welding is being performed. Continuous inspection, as a minimum, shall include having a QC Inspector within such close proximity of all welders or welding operators so that inspections by the QC Inspector of each welding operation at each welding location does not lapse for a period exceeding 30 minutes.

A daily production log for welding shall be kept for each day that welding is performed. The log shall clearly indicate the locations of all welding. The log shall include the welders' names, amount of welding performed, any problems or deficiencies discovered, and any testing or repair work performed, at each location. The daily report from each QC Inspector shall also be included in the log.

The following items shall be included in a Welding Report that is to be submitted to the Engineer within 15 days following the performance of any welding:

- A. A daily production log.
- B. Reports of all visual weld inspections and NDT.
- C. Radiographs and radiographic reports, and other required NDT reports.
- D. A summary of welding and NDT activities that occurred during the reporting period.
- E. Reports of each application of heat straightening.
- F. A summarized log listing the rejected lengths of weld by welder, position, process, joint configuration, and piece number.
- G. Documentation that the Contractor has evaluated all radiographs and other nondestructive tests and corrected all rejectable deficiencies, and that all repaired welds have been reexamined using the required NDT and found acceptable.

The following information shall be clearly written on the outside of radiographic envelopes: name of the QCM, name of the nondestructive testing firm, name of the radiographer, date, contract number, complete part description, and all included weld numbers, report numbers, and station markers or views, as detailed in the WQCP. In addition, all interleaves shall have clearly written on them the part description and all included weld numbers and station markers or views, as detailed in the WQCP. A maximum of 2 pieces of film shall be used for each interleave.

Reports of all visual inspections and NDT shall be signed by the inspector or technician and submitted daily to the QCM for review and signature prior to submittal to the Engineer. Corresponding names shall be clearly printed or typewritten next to all signatures. Reports of all NDT, whether specified, additional, or informational, performed by the Contractor shall be submitted to the Engineer.

The Engineer will review the Welding Report to determine if the Contractor is in conformance with the WQCP. Except for field welded steel pipe piling, the Engineer shall be allowed 15 days to review the report and respond in writing after the complete Welding Report has been received. Prior to receiving notification from the Engineer of the Contractor's conformance with the WQCP, the Contractor may encase in concrete or cover welds for which the Welding Report has been submitted. However, should the Contractor elect to encase or cover those welds prior to receiving notification from the Engineer, it is expressly understood that the Contractor shall 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.

For field welded steel pipe piling, including bar reinforcement in the piling, the Contractor shall allow the Engineer 2 business days to review the Welding Report and respond in writing after the required items have been received. No field welded steel pipe piling shall be installed, and no reinforcement in the piling shall be encased in concrete until the Engineer has approved the above requirements in writing.

In addition to the requirements in AWS D1.1 and AWS D1.5, third-time excavations of welds or base metal to repair unacceptable discontinuities, regardless of NDT method, and all repairs of cracks require prior approval of the Engineer.

The Engineer shall be notified immediately in writing when welding problems, deficiencies, base metal repairs, or any other type of repairs not submitted in the WQCP are discovered, and also of the proposed repair procedures to correct them. For requests to perform third-time excavations or repairs of cracks, the Contractor shall include an engineering evaluation of the proposed repair. The engineering evaluation, at a minimum, shall address the following:

- A. What is causing each defect?
- B. Why the repair will not degrade the material properties?
- C. What steps are being taken to prevent similar defects from happening again?

The Contractor shall allow the Engineer 7 days to review these procedures. No remedial work shall begin until the repair procedures are approved in writing by the Engineer.

Clause 6.5.4 of AWS D1.5 is replaced with the following:

The QC Inspector shall inspect and approve each joint preparation, assembly practice, welding technique, joint fit-up, and the performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code and the approved Welding Procedure Specification (WPS) are met. The QC Inspector shall examine the work to make certain that it meets the requirements of Clauses 3 and 6.26. The size and contour of all welds shall be measured using suitable gages. Visual inspection for cracks in welds and base metal, and for other discontinuities shall be aided by strong light, magnifiers, or such other devices as may be helpful. Acceptance criteria different from those specified in this code may be used when approved by the Engineer.

In addition to the requirements of AWS D1.5, Clause 5.12 or 5.13, welding procedures qualification for work welded in conformance with that code shall conform to the following requirements:

- A. Unless considered prequalified, fillet welds shall be qualified in each position. The fillet weld soundness test shall be conducted using the essential variables of the WPS as established by the Procedure Qualification Record (PQR).
- B. For qualification of joints that do not conform to Figures 2.4 and 2.5 of AWS D1.5, a minimum of 2 WPS qualification tests are required. The tests shall be conducted using both Figure 5.1 and Figure 5.3. The test conforming to Figure 5.1 shall be conducted in conformance with AWS D1.5, Clause 5.12 or 5.13. The test conforming to Figure 5.3 shall be conducted using the welding electrical parameters that were established for the test conducted conforming to Figure 5.1. The ranges of welding electrical parameters established during welding per Figure 5.1 in conformance with AWS D1.5, Clause 5.12, shall be further restricted according to the limits in Table 5.3 during welding per Figure 5.3.
- C. Multiple zones within a weld joint may be qualified. The travel speed, amperage, and voltage values that are used for tests conducted per AWS D1.5 Clause 5.13 shall be consistent for each pass in a weld joint, and shall in no case vary by more than ± 10 percent for travel speed, ± 10 percent for amperage, and ± 7 percent for voltage as measured

from a predetermined target value or average within each weld pass or zone. The travel speed shall in no case vary by more than ± 15 percent when using submerged arc welding.

- D. For a WPS qualified in conformance with AWS D1.5 Clause 5.13, the values to be used for calculating ranges for current and voltage shall be based on the average of all weld passes made in the test. Heat input shall be calculated using the average of current and voltage of all weld passes made in the test for a WPS qualified in conformance with Clause 5.12 or 5.13.
- E. Macroetch tests are required for WPS qualification tests, and acceptance shall be per AWS D1.5 Clause 5.19.3.
- F. When a nonstandard weld joint is to be made using a combination of WPSs, a test conforming to Figure 5.3 may be conducted combining the WPSs to be used in production, provided the essential variables, including weld bead placement, of each process are limited to those established in Table 5.3.
- G. Prior to preparing mechanical test specimens, the PQR welds shall be inspected by visual and radiographic tests. Backing bar shall be 3 inches in width and shall remain in place during NDT testing. Results of the visual and radiographic tests shall comply with AWS D1.5 Clause 6.26.2, excluding Clause 6.26.2.2. Test plates that do not comply with both tests shall not be used.

WELDING FOR OVERHEAD SIGN AND POLE STRUCTURES

The Contractor shall meet the following requirements for any work welded in conformance with the provisions in Section 56-1, "Overhead Sign Structures," or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

Welding inspection personnel or NDT firms to be used in the work 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 except for when the welding is performed at a permanent fabrication or manufacturing facility that is certified under the AISC Quality Certification Program. The AISC Certification category for overhead sign structures shall be Simple Steel Bridge Structures (SBR), and the AISC Certification category for pole structures shall be Simple Steel Bridge Structures (SBR) or Standard for Steel Building Structures (STD).

Welding Qualification Audit

Contractors or subcontractors performing welding operations for overhead sign and pole structures shall have successfully completed the Department's "Manufacturing Qualification Audit for Overhead Sign and Pole Structures." Copies of the audit form and procedures for requesting and completing the audit are available at:

<http://www.dot.ca.gov/hq/esc/Translab/OSM/smbresources.htm>

An audit that was approved by the Engineer no more than 3 years prior to the award of the contract will be acceptable for the entire period of this contract provided the Engineer determines the audit was for the same type of work that is to be performed on this contract.

A list of facilities that have successfully completed the audit and are authorized to provide material for this contract is available at:

http://www.dot.ca.gov/hq/esc/Translab/OSM/smdocuments/Internet_auditlisting.pdf

Successful completion of an audit shall not relieve the Contractor of the responsibility for furnishing materials or producing finished work of the quality specified in these special provisions and as shown on the plans.

Welding Report

For work welded in conformance with the provisions in Section 56-1, "Overhead Sign Structures," or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, a Welding Report shall be submitted in conformance with the provisions in "Welding Quality Control" of these special provisions.

PAYMENT

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

SECTION 9. (BLANK)

SECTION 10. CONSTRUCTION DETAILS

SECTION 10-1. GENERAL

10-1.01 CONSTRUCTION PROJECT INFORMATION SIGNS

Before any major physical construction work readily visible to highway users is started on this contract, the Contractor shall furnish and erect 2 Type 1 Construction Project Information signs at the locations designated by the Engineer.

The signs and overlays shall be of a type and material consistent with the estimated time of completion of the project and shall conform to the details shown on the plans.

The sign letters, the border and the Department's construction logos shall conform to the colors (non-reflective) and details shown on the plans, and shall be on a white background (non-reflective). The colors blue and orange shall conform to PR Color Number 3 and Number 6, respectively, as specified in the Federal Highway Administration's Color Tolerance Chart.

The sign message to be used for fund types shall consist of the following, in the order shown:

FEDERAL HIGHWAY TRUST FUNDS
STATE HIGHWAY FUNDS
EL DORADO COUNTY TRANSPORTATION FUNDS

The sign message to be used for type of work shall consist of the following:

HIGHWAY CONSTRUCTION

The sign message to be used for the Year of Completion of Project Construction will be furnished by the Engineer. The Contractor shall furnish and install the "Year" sign overlay within 10 working days of notification of the year date to be used.

The letter sizes to be used shall be as shown on the plans. The information shown on the signs shall be limited to that shown on the plans.

The signs shall be kept clean and in good repair by the Contractor.

Upon completion of the work, the signs shall be removed and disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

Full compensation for furnishing, erecting, maintaining, and removing and disposing of the construction project information signs shall be considered as included in the contract lump sum price paid for construction area signs and no additional compensation will be allowed therefor.

10-1.02 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.

Attention is directed to "Highway Planting & Irrigation Systems" of these Special Provisions. Planting and irrigation work shall be completed within forty five (45) days after approval of the contract.

Cold plane work (if required) shall be complete before crack treatment.

Temporary fence (Type ESA) shall be installed as a first order of work.

The first order of work shall be to place the order for the electrical equipment. The Engineer shall be furnished a statement from the vendor that the order for the electrical equipment has been received and accepted by the vendor.

The uppermost layer of dense grade HMA shall not be placed until all work including but not limited to drainage facilities and electrical work below the pavement has been completed.

Attention is directed to "Maintaining Traffic" and "Temporary Pavement Delineation" of these special provisions and to the stage construction [and traffic handling sheets](#) of the plans.

Attention is directed to "Progress Schedule (Critical Path Method)" of these special provisions regarding the submittal of a general time-scaled logic diagram within 10 days after approval of the contract. The diagram shall be submitted prior to performing any work that may be affected by any proposed deviations to the construction staging of the project.

The work shall be performed in conformance with the stages of construction shown on the plans. Nonconflicting work in subsequent stages may proceed concurrently with work in preceding stages, provided satisfactory progress is maintained in the preceding stages of construction.

In each stage, after completion of the preceding stage, the removal of existing pavement delineation shall be as required by the planned work and as directed by the Engineer. Pavement delineation removal shall be coordinated with new delineation so that lane lines are provided at all times on traveled ways open to public traffic.

Before obliterating any pavement delineation (traffic stripes, pavement markings, and pavement markers) that is to be replaced on the same alignment and location, as determined by the Engineer, the pavement delineation shall be referenced by the Contractor, with a sufficient number of control points to reestablish the alignment and location of the new pavement delineation. The references shall include the limits or changes in striping pattern, including one- and 2-way barrier lines, limit lines, crosswalks and other pavement markings. Full compensation for referencing existing pavement delineation shall be considered as included in the contract prices paid for new pavement delineation and no additional compensation will be allowed therefor.

Prior to applying asphaltic emulsion (paint binder), the Contractor shall cover all manholes, valve and monument covers, grates, or other exposed facilities located within the area of application, using a plastic or oil resistant construction paper secured to the facility being covered by tape or adhesive. The covered facilities shall be referenced by the Contractor, with a sufficient number of control points to relocate the facilities after the uppermost layer of the new pavement has been placed. After completion of the paving operation, all covers shall be removed and disposed of in a manner satisfactory to the Engineer. Full compensation for covering manholes, valve and monument covers, grates, or other exposed facilities, referencing, and removing temporary cover shall be considered as included in the contract price paid for the item, and no additional compensation will be allowed therefor.

At the end of each working day if a difference in excess of 0.15 foot exists between the elevation of the existing pavement and the elevation of excavations within 5 feet left of traveled way and 8 feet right of the traveled way, that is not separated from public traffic by temporary railing (Type K), material shall be placed and compacted against the vertical cuts adjacent to the traveled way. During excavation operations, native material may be used for this purpose; however, once placing of the structural section commences, structural material shall be used. The material shall be placed to the level of the elevation of the top of existing pavement and tapered at a slope of 4:1 (horizontal:vertical) or flatter to the bottom of the excavation. Full compensation for placing the material on a 4:1 slope, regardless of the number of times the material is required, and subsequent removing or reshaping of the material to the lines and grades shown on the plans shall be considered as included in the contract price paid for the materials involved and no additional compensation will be allowed therefor. No payment will be made for material placed in excess of that required for the structural section.

At those locations exposed to public traffic where guard railings or barriers are to be constructed, reconstructed, or removed and replaced, the Contractor shall schedule operations so that at the end of each working day there shall be no post holes open nor shall there be any railing or barrier posts installed without the blocks and rail elements assembled and mounted thereon.

Within 10 days after the contract has been approved, furnish the Engineer a statement from the vendor that the order for the plants required for this contract, including inspection plants, has been received and accepted by the vendor. The statement from the vendor must include the names, sizes, and quantities of plants ordered and the anticipated date of delivery.

Place orders for replacement plants with the vendor at the appropriate time so that the roots of the replacement plants are not in a root-bound condition.

At least 60 days before applying seeds, furnish the Engineer a statement from the vendor that the order for the seed required for this contract has been received and accepted by the vendor. The statement from the vendor must include the names and quantity of seed ordered and the anticipated date of delivery.

At least 60 days before applying a straw other than wheat, barley, or rice, furnish the Engineer a statement from the vendor that the order for the type of straw required for this contract has been received and accepted by the vendor. The statement from the vendor must include the names and quantity of the type of straw ordered and the anticipated date of delivery.

10-1.03 WATER POLLUTION CONTROL

GENERAL

To comply with NPDES General Permit for "Storm Water Discharges Associated with Construction and Land Disturbance Activities" (Order No. 2009-0009-DWQ, NPDES No. CAS000002) hereinafter called the "Permit", the Department has prepared a Storm Water Pollution Prevention Plan (SWPPP) for the project and submitted it to the RWQCB via the RWQCB's Storm Water Multi Application Reporting and Tracking System (SMARTS). Notwithstanding the

Department's submission of a SWPPP to the RWQCB, you must prepare a SWPPP in accordance with this section that is specifically tailored to suit your operations and staging. If you choose to submit a SWPPP that is identical to the one the Department has entered into SMARTS or that incorporates elements thereof, submission of such a SWPPP shall be conclusive evidence that you have reviewed the incorporated elements of the Department's SWPPP thoroughly, determined that those elements satisfy this section and the Permit requirements as they relate to your operations and staging, adopted those elements as your own, and assumed full responsibility for any liability associated with SWPPP implementation.

Summary

Discharges of storm water from the project must comply with the Permit. Manage work activities to reduce the discharge of pollutants to surface waters, groundwater, or municipal separate storm sewer systems including work items shown in the Proposal Pay Items and Bid Price Schedule for:

1. Prepare SWPPP. SWPPP preparation includes obtaining SWPPP acceptance, amending the SWPPP, preparing a CSMP and a SAP, and monitoring and inspecting WPC practices at the job site.
2. Storm Water Annual Report. Storm Water Annual Report preparation includes certifications, monitoring and inspection results, and obtaining Storm Water Annual Report acceptance.
3. Storm Water Sampling and Analysis Day. Storm Water Sampling and Analysis Day includes reporting of storm water quality per qualifying rain event. If specified for the risk level, the work includes preparation, collection, analysis, and reporting of storm water samples for turbidity, pH, and other constituents.
4. Rain Event Action Plan. If specified for the project risk level, REAP preparation includes preparing and submitting REAP forms and monitoring weather forecasts.

Do not start work until:

1. SWPPP is accepted.
2. WDID is issued.
3. SWPPP review requirements have been fulfilled. If the RWQCB requires time for SWPPP review, allow 30 days for the RWQCB to review the SWPPP as specified under "Submittals" of these special provisions.

This project is Risk Level 2

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.

CSMP: Construction Site Monitoring Program.

NAL: Numeric Action Level.

NEL: Numeric Effluent Limit.

NPDES: National Pollutant Discharge Elimination System.

NOI: Notice of Intent.

normal working hours: The hours you normally work on this project.

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

QSD: Qualified SWPPP Developer.

QSP: Qualified SWPPP Practitioner.

qualified rain event: A qualified rain event is a storm that produces at least 0.5 inch of precipitation with a 48 hour or greater period between storms.

REAP: Rain Event Action Plan.

RWQCB: Regional Water Quality Control Board.

SAP: Sampling and Analysis Plan.

SSC: Suspended Sediment Concentration.

SWRCB: State Water Resources Control Board.

SWPPP: Storm Water Pollution Prevention Plan.

WDID: Waste Discharge Identification Number.

WPC: Water Pollution Control.

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

Submittals

Within 20 days after contract approval, start the following process for SWPPP acceptance:

1. Submit 3 copies of the SWPPP and allow 20 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 SWPPP within 15 days of receipt of the Engineer's comments. The Engineer's review resumes when the complete SWPPP is resubmitted.
3. When the Engineer accepts the SWPPP, submit an electronic copy and 4 printed copies of the accepted SWPPP.
4. If the Engineer requests changes to the SWPPP based on RWQCB comments, amend the SWPPP within 10 days.

Submit:

1. Storm water training records including training dates and subjects for employees and subcontractors. Include dates and subjects for ongoing training, including tailgate meetings.
2. Employee training records:
 - 2.1. Within 5 days of SWPPP 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

Prepare a Storm Water Annual Report for the reporting period from July 1st to June 30th. For the prior reporting period, submit the report no later than July 15th if construction occurs from July 1st through June 30th or within 15 days after contract acceptance if construction ends before June 30th.

Submit the Storm Water Annual Report as follows:

1. Submit 2 copies of the Storm Water Annual Report and allow 10 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 Storm Water Annual Report within 5 days of receipt of the Engineer's comments. The Engineer's review resumes when the complete Storm Water Annual Report is resubmitted.
3. When the Engineer accepts the Storm Water Annual Report, insert the WPC Manager's signed certification and the Engineer's signed certification.

Submit one electronic copy and 2 printed copies of the accepted Storm Water Annual Report.

Submit as required:

1. NAL Exceedance Reports
2. NEL Exceedance Reports
3. Visual Monitoring Reports
4. Inspection Reports
5. BMP Status Report

At least 5 days before operating any construction support facility, submit:

1. A plan showing the location and quantity of WPC practices associated with the construction support facility
2. A copy of the NOI approved by the RWQCB and the SWPPP approved by the RWQCB if you will be operating a batch plant or a crushing plant under the General Industrial Permit

Quality Control and Assurance

Training

Provide storm water training for:

1. Project managers
2. Supervisory personnel
3. Employees involved with WPC work

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

1. WPC 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 WPC training before working on the job site.
Conduct weekly training meetings covering:

1. WPC BMP 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

Training for personnel to collect water quality samples must include:

1. SAP review
2. Health and safety review
3. Sampling simulations

If you operate construction support facilities, protect storm water systems or receiving waters from the discharge of potential pollutants by using WPC 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 General 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." For the General Industrial Permit, go to:

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

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

The Preparation Manual and other WPC references are available at the Caltrans' "Construction Storm Water and Water Pollution Control" Web site. For the Web site, go to:

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

Water Pollution Control Manager

Assign one WPC Manager to implement the SWPPP. The WPC Manager must comply with the Permit qualifications for a QSP and a QSD. You may assign a different QSD to prepare the SWPPP.

The QSD must have the following qualifications:

1. Caltrans approved storm water management training described in Caltrans' "Construction Storm Water and Water Pollution Control" web site
2. Registration or certification described in the Permit

The QSP must meet the qualifications of the QSD or have the following certifications:

1. Caltrans approved storm water management training described in the Caltrans' "Construction Storm Water and Water Pollution Control" web site
2. Certification described in the Permit

At the job site, the WPC Manager must:

1. Be responsible for WPC work
2. Be the primary contact for WPC work
3. Oversee the maintenance of WPC practices
4. Oversee and enforce hazardous waste management practices
5. Have the authority to mobilize crews to make immediate repairs to WPC practices
6. Ensure that all employees have current water pollution control training
7. Implement the accepted SWPPP and amend the SWPPP when required

WPC Manager must oversee:

1. Inspections of WPC practices identified in the SWPPP
2. Inspections and reports for visual monitoring
3. Preparation and implementation of REAPs
4. Sampling and analysis
5. Preparation and submittal of:
 - 5.1. NAL exceedance reports
 - 5.2. NEL exceedance reports
 - 5.3. SWPPP annual certification
 - 5.4. Annual reports
 - 5.5. BMP status reports

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

General

SWPPP work includes preparing a SWPPP including a CSMP, obtaining SWPPP acceptance, amending the SWPPP, inspecting and reporting on WPC practices at the job site. The SWPPP must comply with the Preparation Manual and the Permit. The SWPPP must be submitted in place of the water pollution control program under Section 7-1.01G, "Water Pollution," of the Standard Specifications.

You may request, or the Engineer may order, changes to the WPC work. Changes may include the addition of new WPC practices. Additional WPC work will be paid for as extra work under Section 4-1.03D, "Extra Work," of the Standard Specifications.

The SWPPP must include sections as specified for the project risk level as follows:

1. For risk level 1:
 - 1.1. Schedule
 - 1.2. CSMP
2. For risk level 2:
 - 2.1. Schedule
 - 2.2. CSMP
 - 2.3. Adherence to Effluent Standards for NALs
 - 2.4. REAP
3. For risk level 3:
 - 3.1. Schedule
 - 3.2. CSMP
 - 3.3. Adherence to Effluent Standards for NALs and NELs
 - 3.4. REAP

The SWPPP must include WPC practices for:

1. 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. Activities or mobile operations related to contractor obtained NPDES permits
3. Construction support facilities

Amend the SWPPP annually and resubmit it by July 15th.

Amend the SWPPP if:

1. Changes in work activities could affect the discharge of pollutants
2. WPC practices are added by change order work
3. WPC practices are added at your discretion
4. Changes in the amount of disturbed soil are substantial
5. Objectives for reducing or eliminating pollutants in storm water discharges have not been achieved
6. There is a Permit violation

Whenever you amend the SWPPP, follow the same process specified for SWPPP acceptance.

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

SWPPP Schedule

The SWPPP schedule must:

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

Construction Site Monitoring Program (CSMP)

General

The QSD must prepare a CSMP as part of the SWPPP. The CSMP must be developed before starting work and be revised to reflect current construction activities as necessary.

The CSMP must include sections for the project risk level as follows:

1. For risk level 1:

- 1.1. Visual Monitoring
- 1.2. SAP for Non-Visible Pollutants
2. For risk level 2:
 - 2.1. Visual Monitoring
 - 2.2. SAP for Non-Visible Pollutants
 - 2.3. SAP for sediment and turbidity
 - 2.4. SAP for pH
3. For risk level 3:
 - 3.1. Visual Monitoring
 - 3.2. SAP for Non-Visible Pollutants
 - 3.3. SAP for sediment and turbidity
 - 3.4. SAP for pH
 - 3.5. SAP for receiving waters
 - 3.6. SAP for temporary active treatment systems

Visual Monitoring

The WPC Manager must oversee the performance of visual inspections for qualifying rain events.

For each qualifying rain event, perform visual inspections and record observations during normal working hours as follows:

1. Record the time, date, and rain gauge reading
2. Observe:
 - 2.1. Within 2 days before the storm:
 - 2.1.1. Drainage areas for spills, leaks, or uncontrolled pollutants
 - 2.1.2. Proper implementation of WPC practices
 - 2.1.3. Storm water storage areas for leaks and adequate freeboard
 - 2.2. Every 24 hours during the storm:
 - 2.2.1. WPC practices for effective operation
 - 2.2.2. WPC practices needing maintenance and repair
 - 2.3. Within 2 days after the storm event:
 - 2.3.1. Discharge locations
 - 2.3.2. WPC practices to evaluate the design, implementation, and effectiveness
 - 2.3.3. To identify where additional WPC practices may be needed

Perform non-stormwater discharge visual inspections as follows:

1. At least once during each of the following periods:
 - 1.1. January through March
 - 1.2. April through June
 - 1.3. July through September
 - 1.4. October through December
2. Observe flowing and contained storm water for the presence of floating and suspended materials, sheen on the surface, discoloration, turbidity, odors, and sources of observed pollutants
3. Observe the job site for the presence of authorized and unauthorized non-stormwater discharges and their sources

The WPC Manager must prepare visual inspection reports that include the following:

1. Name of personnel performing the inspection, inspection date, and date inspection report completed
2. Storm and weather conditions
3. Locations and observations
4. Corrective actions taken

Maintain visual inspections reports at the job site as part of the SWPPP.

Sampling and Analysis Plan (SAP)

General

Include a SAP in the CSMP to monitor the effectiveness of WPC practices.

The SAP must comply with the Preparation Manual.

Assign trained personnel to collect water quality samples. Document their training in the SAP.

Describe the following water quality sampling procedures in the SAP:

1. Sampling equipment
2. Sample preparation
3. Collection
4. Field measurement methods
5. Analytical methods
6. Quality assurance and quality control
7. Sample preservation and labeling
8. Collection documentation
9. Sample shipping
10. Chain of custody
11. Data management and reporting
12. Precautions from the construction site health and safety plan
13. Laboratory selection and certifications

Whenever assigned field personnel take samples, comply with the equipment manufacturer's recommendation for collection, analysis methods, and equipment calibration.

Samples taken for laboratory analysis must follow water quality sampling procedures and be analyzed by a State-certified laboratory under 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants."

The SAP must identify the State-certified laboratory, sample containers, preservation requirements, holding times, and analysis method. For a list of State-certified laboratories, go to:

<http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx>

Include procedure for sample collection during precipitation.

Retain water quality sampling documentation and analytical results with the SWPPP at the job site.

Show pollutant sampling locations on SWPPP drawings.

If discharges or sampling locations change because of changed work activities or knowledge of site conditions, amend the SAP.

If the project is risk level 2 or risk level 3, include procedures for collecting and analyzing at least 3 samples for each day of each qualifying rain event. Describe the collection of effluent samples at all locations where the storm water is discharged off-site.

Analytical Results and Evaluation

Submit an electronic copy (in file format .xls, .txt, .csv, .dbs, or .mdb) and a printed copy of water quality analytical results, and quality assurance and quality control within 48 hours of field analysis sampling, and within 30 days for laboratory analysis. Also provide an evaluation of whether the downstream samples show levels of the tested parameter that are higher than the control sample.

Electronic water quality analysis results must have the following information:

1. Sample identification number
2. Contract number
3. Constituent
4. Reported value
5. Analytical method
6. Method detection limit
7. Reported limit

SAP for Non-Visible Pollutants

The SAP must include a description of the sampling and analysis strategy for monitoring non-visible pollutants.

The SAP must identify potential non-visible pollutants present at the job site associated with any of the following:

1. Construction materials and waste
2. Existing contamination due to historical site usage
3. Application of soil amendments, including soil stabilization materials, with the potential to change pH or contribute toxic pollutants to storm water

SWPPP drawings must show the locations planned for storage and use of potential non-visible pollutants.

The SAP must include sampling procedures for the following conditions when observed during a storm water visual inspection. For each of the following, collect at least one sample for each qualifying storm event:

1. Materials or waste containing potential non-visible pollutants that are not stored under watertight conditions
2. Materials or waste containing potential non-visible pollutants that are stored under watertight conditions, but a breach, leakage, malfunction, or spill is observed; the leak or spill has not been cleaned up before precipitation; and material or waste could discharge non-visible pollutants to surface waters or drainage system
3. Chemical applications, including fertilizer, pesticide, herbicide, methyl methacrylate concrete sealant, or non-pigmented curing compound used during precipitation or within 24 hours preceding precipitation, and could discharge pollutants to surface waters or drainage system
4. Applied soil amendments, including soil stabilization materials that could change pH levels or contribute toxic pollutants to storm water runoff and discharge pollutants to surface waters or drainage system, unless available independent test data indicates acceptable concentrations of non-visible pollutants in the soil amendment
5. Storm water runoff from an area contaminated by historical usage of the site that could discharge pollutants to surface waters or drainage systems

The SAP must provide sampling procedures and schedule for:

1. Sample collection during the first 2 hours of each rain event that generate runoff
2. Sample collection during normal working hours
3. Each non-visible pollutant source
4. Uncontaminated control sample

The SAP must identify locations for sampling downstream and control samples, and reasons for selecting those locations. Select control sample locations where the sample will not come in contact with materials, waste, or areas associated with potential non-visible pollutants or disturbed soil areas.

SAP for Sediment and Turbidity

If the project is risk level 2 or risk level 3, sample and analyze for turbidity:

Parameter	Test Method	Detection Limit (Min)	Unit
Turbidity	Field test with calibrated portable instrument	1	NTU

If the project is risk level 3 and the turbidity NEL has been exceeded, sample and analyze for SSC:

Parameter	Test Method	Detection Limit (Min)	Unit
SSC	ASTM Method D3977-97	5	Mg/L

SAP for pH

If the project is risk level 2 or risk level 3, sample and analyze for pH:

Parameter	Test Method	Detection Limit (Min)	Unit
pH	Field test with calibrated portable instrument	0.2	pH units

SAP for Receiving Waters

If the project is risk level 3, describe procedures for obtaining samples from representative and accessible locations:

1. Upstream of the discharge point
2. Downstream of the discharge point

Show receiving water sampling locations on SWPPP drawings.

If there are several discharge points, describe procedures for obtaining samples from a single upstream and a single downstream location.

Rain Event Action Plan (REAP)

REAP work includes preparing and submitting REAP forms and monitoring weather forecasts. The WPC Manager must submit a REAP to protect the job site at least 48 hours before a predicted rain event.

Prepare a REAP when the National Weather Service is predicting at least a 50 percent probability of precipitation within 72 hours.

For the REAP, use approved forms and include:

1. Site location
2. Risk level
3. Contact information including 24-hour emergency phone numbers for:
 - 3.1. WPC Manager
 - 3.2. Erosion and sediment control providers or subcontractors
 - 3.3. Storm water sampling providers or subcontractors
4. Storm Information
5. Construction phase information for:
 - 5.1. Highway Construction including active and inactive areas for work activities for building roads and structures
 - 5.2. Plant Establishment including maintenance on vegetation installed for final stabilization where areas are inactive
 - 5.3. Suspension where work activities are suspended and areas are inactive
6. Construction phase information including:
 - 6.1. Construction activities
 - 6.2. Subcontractors and trades on the job site
 - 6.3. Pre-storm activities including:
 - 6.3.1. Responsibilities of the WPC Manager
 - 6.3.2. Responsibilities of the crew and crew size
 - 6.3.3. Stabilization for active and inactive disturbed soil areas
 - 6.3.4. Stockpile management
 - 6.3.5. Corrective actions taken for deficiencies identified during pre-storm visual inspection
 - 6.4. Activities to be performed during storm events including:
 - 6.4.1. Responsibilities of the WPC Manager
 - 6.4.2. Responsibilities of the crew and crew size
 - 6.4.3. BMP maintenance and repair
 - 6.5. Description of flood contingency measures

You must have the REAP onsite at least 24 hours before a predicted rain event. A printed copy of each REAP must be at the job site as part of the SWPPP.

Implement the REAP including mobilizing crews to complete activities no later than 24 hours before precipitation occurs.

IMPLEMENTATION REQUIREMENTS

SWPPP Implementation

Obtain, install, and maintain a rain gauge at the job site. Observe and record daily precipitation.

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 SWPPP:

1. Correct the deficiency immediately, unless the Engineer agrees to a later date for making the 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 Department may correct the deficiency and deduct the cost of correcting the deficiency from payment.

If the Engineer determines that resources sufficient to bring the Contractor into compliance with this section "Water Pollution Control" have not been allocated, the Engineer may redirect any and all of Contractor's resources available at the project site toward this effort. In the event that the Engineer redirects resources due to Contractor's non-compliance with the provisions of this section, "Water Pollution Control", the County will not be responsible for any delays to the Contractor's schedule resulting from the reallocation, and no compensation shall be made therefor.

Continue SWPPP implementation during any temporary suspension of work activities.

Install WPC practices when an area is inactive or before predicted precipitation, whichever occurs first, and as follows:

1. By September 1 install WPC practices such that disturbed areas without WPC practices do not exceed the lesser of 50% of the total amount of area to be disturbed for the project or 10 acres
2. By September 15 install WPC practices such that disturbed areas without WPC practices do not exceed the lesser of 25% of the total amount of area to be disturbed for the project or 5 acres
3. By October 1 install WPC practices such that disturbed areas without WPC practices do not exceed the lesser of 10% of the total amount of area to be disturbed for the project or 2 acres
4. By October 15 install WPC practices such that disturbed areas without WPC practices do not exceed the lesser of 5% of the total amount of area to be disturbed for the project or 1 acres

During fall and winter do not exceed the specified amount of disturbance unless weather conditions permit and you request in writing and receive a waiver from the Engineer. Include in your request a contingency plan for installing WPC practices should weather conditions change.

Numeric Action Levels (NALs)

If the project is risk level 2 or risk level 3, then it is subject to NALs:

Parameter	Test Method	Detection Limit (Min)	Unit	Numeric Action Level
pH	Field test with calibrated portable instrument	0.2	pH units	Lower NAL = 6.5 Upper NAL = 8.5
Turbidity	Field test with calibrated portable instrument	1	NTU	250 NTU

Numeric Effluent Limits (NELs)

If the project is risk level 3, then it is subject to NELs:

Parameter	Test Method	Detection Limit (Min)	Unit	Numeric Effluent Limit
pH	Field test with calibrated portable instrument	0.2	pH units	Lower NEL = 6.0 Upper NEL = 9.0
Turbidity	Field test with calibrated portable instrument	1	NTU	500 NTU

The storm event daily average for storms up to the 5-year, 24-hour storm, must not exceed the NEL for turbidity.

The daily average sampling results must not exceed the NEL for pH.

Storm Water Sampling and Analysis Day

Storm Water Sampling and Analysis Day work includes preparation, collection, analysis, and reporting of storm water samples for turbidity, pH, and other constituents. If the project is risk level 2 or risk level 3, and there is a qualified rain event that produces runoff, comply with the project's SAP for preparation, collection, analysis, and reporting of storm water samples. Collect:

1. Samples for each non-visible pollutant source and a corresponding uncontaminated control sample
2. Samples for turbidity, pH, and other constituents as specified

3. At least 3 samples for each day of each qualifying rain event
4. Samples for all locations where the storm water is discharged off-site

Perform sample collection during:

1. First 2 hours of each qualified rain event that produces runoff
2. Normal working hours

If the project is risk level 3, obtain receiving water samples.

You are not required to physically collect samples during dangerous weather conditions such as flooding or electrical storms.

If downstream samples show increased levels, assess WPC practices, site conditions, and surrounding influences to determine the probable cause for the increase.

Inspection

The WPC Manager must oversee inspections for WPC practices identified in the SWPPP:

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 WPC Manager must oversee daily inspections of:

1. Storage areas for hazardous materials and waste
2. Hazardous waste disposal and transporting activities
3. Hazardous material delivery and storage activities
4. WPC practices specified under "Construction Site Management" of these special provisions

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

The WPC Manager must prepare BMP status reports that include the following:

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

Within 24 hours of finishing the weekly inspection, the WPC Manager must submit:

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

REPORTING REQUIREMENTS

Storm Water Annual Report

Storm Water Annual Report work includes certifications, monitoring and inspection results, and obtaining Storm Water Annual Report acceptance. The WPC Manager must prepare a Storm Water Annual Report. The report must:

1. Use an approved report format
2. Include project information including description and location
3. Include storm water monitoring information including:
 - 3.1. Summary and evaluation of sampling and analysis results including laboratory reports
 - 3.2. Analytical methods, reporting units, detections limits for analytical parameters
 - 3.3. Summary of corrective actions
 - 3.4. Identification of corrective actions or compliance activities that were not implemented
 - 3.5. Summary of violations
 - 3.6. Names of individuals performing storm water inspections and sampling
 - 3.7. Logistical information for inspections and sampling including location, date, time, and precipitation
 - 3.8. Visual observations and sample collection records
4. Include documentation on training for:
 - 4.1. Individuals responsible for NPDES permit compliance
 - 4.2. Individuals responsible for BMP installation, inspection, maintenance, and repair
 - 4.3. Individuals responsible for preparing, revising, and amending the SWPPP

NAL Exceedance Report

If the project is risk level 2 or risk level 3 and an effluent sample exceeds a NAL, notify the Engineer and submit a NAL Exceedance Report no later than 48 hours after the conclusion of the storm event. The report must:

1. Include the following field sampling results and inspections:
 - 1.1. Analytical methods, reporting units, and detection limits
 - 1.2. Date, location, time of sampling, visual observation and measurements
 - 1.3. Quantity of precipitation of the storm event
2. Description of BMPs and corrective actions taken to manage NAL exceedance

NEL Violation Report

If the project is risk level 3 and an NEL is exceeded, notify the Engineer and submit a NEL Violation Report within 6 hours. The report must:

1. Include the following field sampling results and inspections:
 - 1.1. Analytical methods, reporting units, and detection limits
 - 1.2. Date, location, time of sampling, visual observations and measurements
 - 1.3. Quantity of precipitation of the storm event
2. Description of BMPs and corrective actions taken to manage NEL exceedance

If the project is risk level 2 or risk level 3, submit all sampling results to the Engineer no later than 48 hours after the conclusion of a storm event.

PAYMENT

The contract lump sum price paid for prepare storm water pollution prevention plan 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 SWPPP and CSMP, inspecting water pollution control practices, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

For projects with 60 working days or less, payments for SWPPP are made as follows:

1. After the Engineer accepts the SWPPP, the Department includes up to 75 percent of the bid item price in the monthly progress estimate
2. The Department pays for the remaining percentage of the bid item price in the Proposed Final Estimate.

For projects with more than 60 working days, payments for SWPPP are made as follows:

1. After the Engineer accepts the SWPPP, the Department includes up to 50 percent of the bid item price in the monthly progress estimate
2. The Department pays 40 percent of the bid item price over the life of the contract
3. The Department pays for the remaining 10 percent of the bid item in the Proposed Final Estimate.

If risk level 2 or 3, the Department pays \$500 for each Rain Event Action Plan submitted. The contract unit price paid for Rain Event Action Plan includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparation and submittal of REAP forms, and monitoring weather forecasts as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The Department does not adjust payment for an increase or decrease in the quantity of rain event action plans submitted. Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications does not apply.

The Department pays \$2,000 for each Storm Water Annual Report submitted. The contract unit price paid for Storm Water Annual Report includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparation and submittal of Storm Water Annual Report as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The Department does not adjust payment for an increase or decrease in the quantity of storm water annual reports submitted. Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications does not apply.

The work to complete the final Storm Water Annual Report contract item is excluded from Section 7-1.17, "Acceptance of Contract," of the Standard Specifications.

If risk level 2 or 3, the contract unit price paid for storm water sampling and analysis day includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparation,

collection, analysis, and reporting of storm water samples per qualifying rain event as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The Department does not adjust payment for an increase or decrease in the quantity of storm water sampling and analysis day. Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications does not apply.

You may request or the Engineer may order laboratory analysis of storm water samples. Laboratory analysis of storm water samples will be paid for as extra work under Section 4-1.03D, "Extra Work," of the Standard Specifications.

The Department does not pay for the preparation, collection, laboratory analysis, and reporting of storm water samples for non-visible pollutants if WPC practices are not implemented before precipitation or if a failure of a WPC practice is not corrected before precipitation.

The Department does not pay for implementation of WPC practices in areas outside the highway right-of-way not specifically provided for in the plans or in the special provisions.

The Department does not pay for WPC practices installed at your construction support facilities.

As stated in the special provisions for the individual WPC practices, the Department pays for WPC practices under Force Account Change Order, unless the WPC practice is required under Construction Site Management.

If you find it necessary to use WPC practices not specified in these special provisions to achieve compliance with local, state, and federal water pollution control regulations, then implementation, maintenance, and removal of the unspecified WPC practices shall be at your expense.

For each failure to submit a completed Storm Water Annual Report, the Department withholds \$10,000. This withhold is in addition to other withholds under Section 9-1.053 "Performance Failure Withholds," of the Standard Specifications.

Each failure to comply with any part of these special provisions and each failure to implement water pollution control practices are considered separate performance failures.

10-1.04 DUST CONTROL

Dust control shall conform to the provisions in Section 10, "Dust Control," of the Standard Specifications, Rules 223 and 223-2 (Dust Rules) of the Rules and Regulations of the El Dorado County Air Quality Management District (AQMD) and these special provisions.

Nothing in these special provisions shall be construed as relieving the Contractor of the responsibilities as set forth in Section 7, "Legal Relations and Responsibility" of the Standard Specifications.

The Dust Rules can be obtained from the AQMD, 330 Fair Lane, Placerville, CA, 95667, (530) 621-6662, and are available at:

[http://www.edcgov.us/Government/Air Quality Management/Construction_Dust_Rules.aspx](http://www.edcgov.us/Government/Air%20Quality%20Management/Construction_Dust_Rules.aspx).

Trace amounts (less than 0.25 percent) of naturally occurring asbestos (NOA) are present from Post Mile 2.9 to 6.7 on State Route 50 in El Dorado County.

Results of NOA sampling conducted for this project are included in Geocon's report titled Highway 50 Site Investigation, Post Mile 2.90 to 8.79.

Earthwork in areas containing NOA shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

The Contractor may temporarily stockpile surplus material from areas identified as containing NOA material. The Contractor shall cover temporary stockpiles with polyethylene sheeting of 0.040 mm 1.6 mil minimum thickness or stabilize stockpiles by other methods permitted by the Engineer.

PLAN PREPARATION, APPROVAL AND AMENDMENTS

The Contractor must submit a site specific Asbestos Dust Mitigation Plan (ADMP) to the AQMD meeting the requirements of Rule 223-2 for approval by the El Dorado County AQMD, prior to the start of any work. For projects exceeding 1 acre, where natural occurring asbestos is found to be present, the ADMP must comply with the State Asbestos Air Toxics Control Measure (CCR Title 17, Section 93105) and the County Ordinance (Chapter 8.44). The Contractor shall provide the Engineer with four (4) copies of the AQMD approved ADMP prior to the start of any work that may generate dust.

The Contractor shall prepare an amendment to the ADMP when there is a change in construction activities or operations not included in the ADMP, when Contractor's activities or operations violate a condition of the AQMD, or when directed by the Engineer. Amendments shall identify additional dust control practices or revised operations, including those areas or

operations not identified in the initially approved ADMP. Amendments to the ADMP shall be prepared and submitted for review and approval within a time approved by the Engineer.

The Contractor shall keep one (1) copy of the approved ADMP and approved amendments at the project site. The ADMP shall be made available upon request by a representative of the AQMD, California Air Resource Board, United States Environmental Protection Agency, or Caltrans. Requests by the public shall be directed to the Engineer.

The Contractor shall provide all notices to the AQMD and create and maintain all records as required by Rule 223-2. Copies of all required records shall be submitted to the Engineer within 30 calendar days of completion of all work subject to Rule 223-2.

The Contractor shall also submit a dust control schedule that describes the timing of grading or other work activities that could promote dust to the Engineer prior to the start of any work. The dust control schedule shall be updated by the Contractor to reflect changes in the Contractor's operations that would affect the necessary implementation of dust control practices.

DUST CONTROL

The Contractor shall implement the measures contained in the ADMP to control dust in accordance with Rule 223-2, the Standard Specifications and these special provisions, and as directed by the Engineer.

The Contractor is advised that significant dust control measures will be required during construction operations. In order to mitigate dust, past projects have required extensive pre-wetting to depths of cuts, the use of a dedicated water truck for each piece of earthmoving equipment (e.g., scrapers, dozers, excavators, loaders, haul trucks, backhoes, compactors, graders, etc.), and the use of rock track out pads and wheel wash stations at all points of egress from unpaved construction areas. These examples are not necessarily the exact mitigation measures needed on this project; rather, they have been listed to provide an idea of the extensive nature of dust control activities that may be necessary. The dust control measures that will be required to mitigate dust may impact the Contractor's productivity during construction activities. All impacts to productivity are considered included in the Contractor's bid price for the associated items of work and no additional compensation will be allowed therefore.

The Contractor shall know and fully comply with applicable provisions of the Permits and all modifications thereto, Dust Rules, and Federal, State, and local regulations and requirements that govern the Contractor's operations. Attention is directed to Sections 7-1.01, "Laws to be Observed," and 7-1.12, "Indemnification and Insurance," of the Standard Specifications.

The Contractor shall be responsible for penalties assessed or levied on the Contractor or the Department as a result of the Contractor's failure to comply with the provisions in this section "Dust Control" including, but not limited to, compliance with the applicable provisions of the Permits, Dust Rules, and Federal, State and local regulations and requirements as set forth therein.

Penalties as used in this section, "Dust Control," shall include fines, penalties and damages, whether proposed, assessed, or levied against the Department or the Contractor by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred in settlement for alleged violations of the Permits, Dust Rules, or applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

RETENTION OF FUNDS

Notwithstanding any other remedies authorized by law, the Department may retain money due the Contractor under the contract, in an amount determined by the Department, up to and including the entire amount of Penalties proposed, assessed, or levied as a result of the Contractor's violation of the Permits, Dust Rules, or Federal or State law, regulations or requirements. Funds may be retained by the Department until final disposition has been made as to the Penalties. The Contractor shall remain liable for the full amount of Penalties until such time as they are finally resolved with the entity seeking the Penalties.

Retention of funds for failure to conform to the provisions in this section, "Dust Control," shall be in addition to the other retention amounts required by the contract. The amounts retained for the Contractor's failure to conform to provisions in this section will be released for payment on the next monthly estimate for partial payment following the date when an approved ADMP has been implemented and maintained, and when dust has been adequately controlled, as determined by the Engineer.

When a regulatory agency identifies a failure to comply with the Permits and modifications thereto, Dust Rules, or other Federal, State or local requirements, the Department may retain money due the Contractor, subject to the following:

- A. The Department will give the Contractor thirty (30) days notice of the Department's intention to retain funds from partial payments which may become due to the Contractor prior to acceptance of the contract. Retention of funds from payments made after acceptance of the contract may be made without prior notice to the Contractor.
- B. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to "Payments of Withheld Funds" of these special provisions.
- C. If the Department has retained funds, and it is subsequently determined that the County is not subject to the entire amount of the Costs and Liabilities assessed or proposed in connection with the matter for which the retention was made, the Department shall be liable for interest on the amount retained for the period of the retention. The interest rate payable shall be six percent (6%) per annum.

During the first estimate period that the Contractor fails to conform to the provisions in this section, "Dust Control," the Department may retain an amount equal to twenty five percent (25%) of the estimated value of the contract work performed.

The Contractor shall notify the Engineer immediately upon request from the regulatory agencies to enter, inspect, sample, monitor, or otherwise access the project site or the Contractor's records pertaining to dust control work. The Contractor and the Department shall provide copies of correspondence, notices of violation, enforcement actions or proposed fines by regulatory agencies to the requesting regulatory agency.

PAYMENT

The contract lump sum price paid for prepare Asbestos Dust Mitigation Plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in developing, preparing, obtaining approval, revising, and amending the ADMP, for maintaining and submitting all dust control records, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The cost of performing dust control shall be considered as included in the various items of work and no additional compensation shall be allowed therefore.

10-1.05 CONSTRUCTION SITE MANAGEMENT

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 Caltrans Preparation Manual, Dewatering Guide, and BMP Manual.

Preparation Manual, Dewatering Guide, and BMP Manual are available from the Caltrans 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: Caltrans Construction Site Best Management Practices (BMP) Manual.

CDPH: California Department of Public Health

Dewatering Guide: Caltrans' 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: Caltrans 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

Quality Control and Assurance

Not Used

MATERIALS

Not Used

CONSTRUCTION

Spill Prevention and Control

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

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

Minor Spills

Clean up minor spills using the following procedures:

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

Semi-significant Spills

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

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

Significant or Hazardous Spills

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

1. Notify the Engineer and follow up with a written report
2. Obtain the services of a spills contractor or hazardous material team immediately
3. Notify the local emergency response team by dialing 911 and county officials at the emergency phone numbers kept at the job site
4. Notify the Governor's Office of Emergency Services Warning Center at (805) 852-7550
5. Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities under CFR Title 40, Parts 110, 119, and 302
6. Notify other agencies as appropriate, including:
 - 6.1. Fire Department

- 6.2. Public Works Department
- 6.3. Coast Guard
- 6.4. Highway Patrol
- 6.5. City Police or County Sheriff Department
- 6.6. Department of Toxic Substances
- 6.7. California Division of Oil and Gas
- 6.8. Cal OSHA
- 6.9. Regional Water Resources Control Board

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

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

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

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 when a stockpile area is inactive 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.

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 waste. 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 waste
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 Department 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 waste includes 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.

Non-Storm Water Management

Water Control and Conservation

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

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

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

Illegal Connection and Discharge Detection and Reporting

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

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

Look for the following evidence of illegal connections, discharges, or dumping:

1. Debris or trash piles
2. Staining or discoloration on pavement or soils
3. Pungent odors coming from drainage systems
4. Discoloration or oily sheen on water
5. Stains or residue in ditches, channels or drain boxes
6. Abnormal water flow during dry weather
7. Excessive sediment deposits
8. Nonstandard drainage junction structures
9. Broken concrete or other disturbances near junction structures

Vehicle and Equipment Cleaning

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

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

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

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

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

The WPC Manager must inspect vehicle and equipment cleaning facilities:

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

Vehicle and Equipment Fueling and Maintenance

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

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

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

1. On level ground
2. Protected from storm water run-on
3. If within the floodplain, located at least 100 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved
4. If outside the floodplain, located at least 50 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved

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

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

Recycle or properly dispose of used batteries and tires.

The WPC Manager must inspect vehicle and equipment maintenance and fueling areas:

1. Daily when vehicle and equipment maintenance and fueling occurs daily
2. Weekly when vehicle and equipment maintenance and fueling does not occur daily

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

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

Material and Equipment Used Over Water

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

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

Structure Removal Over or Adjacent to Water

Do not allow demolished material to enter storm water systems or watercourses. Use approved covers and platforms to collect debris. Use attachments on equipment to catch debris on small demolition activities. Empty debris catching devices daily and handle debris under "Waste Management" of these special provisions.

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

Paving, Sealing, Sawcutting, Grooving, and Grinding Activities

Prevent the following materials from entering storm drain systems or water courses:

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

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

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

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

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

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

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

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

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

Thermoplastic Striping and Pavement Markers

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

Do not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets or watercourses. Release all pressure from a melting tank before removing the lid to fill or service. Do not fill a melting tank above a level that is 6 inches below the top.

Collect bituminous material from the roadway after marker removal.

Pile Driving

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

Store pile driving equipment when not in use. Stored pile driving equipment must be:

1. Kept on level ground
2. Protected from storm water run-on
3. If within the floodplain, at least 100 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved
4. If outside the floodplain, at least 50 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved

If practicable, use vegetable oil instead of hydraulic fluid.

The WPC Manager must inspect the pile driving area for leaks and spills:

1. Daily when pile driving occurs daily
2. Weekly when pile driving does not occur daily

Concrete Curing

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

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

Concrete Finishing

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

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

Sweeping

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

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

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

If sediment or debris is observed, perform sweeping:

1. Within:
 - 1.1. 8 hours of predicted rain
 - 1.2. 1 hour if sediment or debris is observed during activities that requires sweeping
 - 1.3. 24 hours, if sediment and debris is observed during activities that do not require sweeping
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 according to the accepted SWPPP. 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 Caltrans "Field Guide for Construction Dewatering."
3. Ensure that any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
4. Discharge the water within the project limits. Dispose of the water in the same way as specified for material in Section 7-1.13 "Disposal of Material Outside the Highway Right of Way" of the Standard Specification if it cannot be discharged within project limits due to site constraints.
5. Do not discharge storm water or non-stormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface. Notify the Engineer immediately upon discovering any such condition.

The WPC manager must inspect dewatering activities:

1. Daily when dewatering work occurs daily
2. Weekly when dewatering work does not occur daily

PAYMENT

The contract lump sum price paid for construction site management includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in spill prevention and control, material management, waste management, non-stormwater 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.

10-1.06 TEMPORARY CONCRETE WASHOUT (PORTABLE)

GENERAL

Summary

This work includes removal and disposal of concrete waste by furnishing, maintaining, and removing portable temporary concrete washouts.

SWPPP must describe and include the use of a portable temporary concrete washout as a water pollution control practice for waste management and materials pollution control.

Submittals

At least 5 business days before concrete activities start, submit:

1. Name and location of off-site concrete waste disposal facility to receive concrete waste
2. Copy of permit issued by RWQCB for off-site commercial disposal facility
3. Copy of license for off-site commercial disposal facility
4. Copy of permit issued by state or local agency having jurisdiction over disposal facility if disposal site is located outside of the State of California

Quality Control and Assurance

Retain and submit records of disposed concrete waste including:

1. Weight tickets
2. Delivery and removal of temporary concrete washouts

MATERIALS

Portable Temporary Concrete Washout

Portable temporary concrete washout must:

1. Be a commercially available watertight container.
2. Have sufficient capacity to contain all liquid and concrete waste generated by washout activities without seepage or spills.
3. Have at least 55-gallon capacity.
4. Be labeled for the exclusive use as a concrete waste and washout facility. Stencil "Concrete Waste material" in 3-inch high letters on white background. Top of stenciling must be 12 inches from the top of the container.

Concrete Washout Sign

Concrete washout sign must comply with the provisions in Section 12-3.06B, "Portable Signs" of the Standard Specifications and:

1. Be approved by the Engineer
2. Consist of base, framework, and sign panel
3. Be made of plywood
4. Be minimum 2' x 4' in size
5. Read "Concrete Washout" with 3 inches high black letters on white background

CONSTRUCTION

Placement

Place portable temporary concrete washouts at job site:

1. Before concrete placement activities start
2. In the immediate area of concrete work as approved by the Engineer
3. No closer than 50 feet from storm drain inlets, open drainage facilities, ESAs, or watercourses
4. Away from construction traffic or public access areas

Install a concrete washout sign adjacent to each portable temporary concrete washout location.

Operation

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

Relocate portable temporary concrete washouts as needed for concrete construction work.

Replace portable temporary concrete washouts when filled to capacity. Do not fill higher than 6 inches below rim.

Your WPC manager must inspect portable temporary concrete washouts:

1. Daily if concrete work occurs daily
2. Weekly if concrete work does not occur daily

Maintenance

When relocating or transporting a portable temporary concrete washout within the job site, secure it to prevent spilling of concrete waste material. If any spilled material is observed, remove spilled material and place it into portable temporary concrete washout.

Removal

Dispose of concrete waste material at a facility specifically licensed to receive solid concrete waste, liquid concrete waste, or both. When portable temporary concrete washout is full, remove and dispose of concrete waste within 2 days.

PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing, maintaining, and removing the portable temporary concrete washout, including removal and disposal of concrete waste, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be considered as included in the lump sum price paid for Construction Site Management and no separate payment will be made therefor.

10-1.07 STREET SWEEPING

GENERAL

Summary

This work includes street sweeping.

The SWPPP must describe and include the use of street sweeping as a water pollution control practice for sediment control and tracking control.

Submittals

At least 5 business days before starting clearing and grubbing, earthwork, or other activities with the potential for tracking sediment or debris, submit:

1. Number of sweepers described in the SWPPP
2. Type of sweeper technology

Quality Control and Assurance

Retain and submit records of street sweeping including:

1. Quantity of sweeping waste disposal
2. Sweeping times and locations

CONSTRUCTION

Street Sweepers

Sweepers must use one of these technologies:

1. Mechanical sweeper followed by a vacuum-assisted sweeper
2. Vacuum-assisted dry (waterless) sweeper

3. Regenerative-air sweeper

Operation

Street sweeping must be done at:

1. Paved roads at job site entrance and exit locations
2. Paved areas within the job site that flow to storm drains or water bodies

Street sweeping must be done:

1. During clearing and grubbing activities
2. During earthwork activities
3. During trenching activities
4. During roadway structural section activities
5. When vehicles are entering and leaving the job site
6. After soil disturbing activities
7. After observing offsite tracking of material

Monitor paved roads at jobsite entrances and exit locations. Monitor paved areas and roadway within the jobsite that flow to storm drains or receiving waters. Street sweeping must be done:

1. Within 8 hours of predicted rain
2. Within 1 hour, if sediment or debris is observed during activities that require sweeping
3. Within 24 hours, if sediment or debris is observed during activities that do not require sweeping

At least 1 sweeper must be on the job site at all times when sweeping work is required. The sweeper must be in good working order.

Perform street sweeping to minimize dust. If dust generation is excessive or sediment pickup is ineffective, use water or a vacuum.

You may stockpile collected material on the jobsite according to the accepted SWPPP. 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.

Trash collected during street sweeping must be removed and disposed of under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Your WPCM must inspect paved roads at job site access points:

1. Daily if earthwork and other sediment or debris generating activities occur daily
2. Weekly if earthwork and other sediment or debris generating activities do not occur daily
3. When the National Weather Service predicts precipitation with a probability of at least 30 percent

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in street sweeping associated with Construction Site Management, including disposal of collected material, as shown on the plans, as specified in the Standard Specifications, these special provisions, and as directed by the Engineer shall be considered as included in the lump sum price paid for Construction Site Management and no separate payment will be made therefor.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in street sweeping associated with Dust Control, including disposal of collected material, as shown on the plans, as specified in the Standard Specifications, these special provisions, and as directed by the Engineer shall be considered as included in the various contract items of work and no separate payment will be made therefor.

10-1.08 TEMPORARY CHECK DAM

GENERAL

Summary

This work includes constructing, maintaining, and removing temporary check dams.

The SWPPP must describe and include the use of temporary check dams as a water pollution control practice for soil stabilization in flow conveyances.

Submittals

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

1. Fiber rolls
2. Gravel-filled bag fabric

MATERIALS

Fiber Rolls

Fiber rolls must:

1. Last for at least one year after installation
2. Be Type 1 or Type 2

If specified, Type 1 fiber rolls must be:

1. Made from an erosion control blanket:
 - 1.1. Classified by the Erosion Control Technology Council (ECTC) as ECTC 2D
 - 1.2. With a Universal Soil Loss Equation (USLE) C-Factor of not more than 0.20 at a 2:1 (horizontal:vertical) slope
 - 1.3. Capable to withstand a maximum shear stress of 1.75 pounds per square foot under ASTM D 6460
 - 1.4. With a minimum tensile strength of 75 pounds per foot under ASTM D 5035
 - 1.5. With top and bottom surfaces covered with lightweight non-synthetic netting
 - 1.6. Either of the following:
 - 1.6.1. Double net straw and coconut blanket with 70 percent straw and 30 percent coconut fiber
 - 1.6.2. Double net excelsior blanket with 80 percent of the wood excelsior fibers being 6 inches or longer
2. Rolled along the width
3. Secured with natural fiber twine every 6 feet and 6 inches from each end
4. Finished to be either:
 - 4.1. From 8 to 10 inches in diameter, from 10 to 20 feet long, and at least 0.5 pounds per linear foot
 - 4.2. From 10 to 12 inches in diameter, at least 10 feet long, and at least 2 pounds per linear foot

If specified, Type 2 fiber rolls must:

1. Be filled with rice or wheat straw, wood excelsior, or coconut fiber
2. Be covered with a biodegradable jute, sisal, or coir fiber netting
3. Have the netting secured tightly at each end
4. Be finished to be either:
 - 4.1. From 8 to 10 inches in diameter, from 10 to 20 feet long, and at least 1.1 pounds per linear foot
 - 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 rolls, wood stakes must be at least:

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

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

Rope

For Type 2 installation, rope must:

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

Gravel-filled Bag Fabric

Geosynthetic fabric for temporary gravel bag berm must consist of one of the following:

- Polyester
- Polypropylene
- Combined polyester and polypropylene

Sample under ASTM D 4354, Procedure C.

11

Test under ASTM D 4759. All properties are based on Minimum Average Roll Value (MARV).

12

Identify, store, and handle under ASTM D 4873.

13

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

14

Gravel-filled bag fabric must comply with:

Specification	Requirements
Grab breaking load 1-inch grip, lb, min. in each direction	205
Apparent elongation percent, min., in each direction	50
Water Flow Rate max. average roll value, gallons per minute/square foot	80-150
Permittivity 1/sec., min	1.2
Apparent opening size max. average roll value, U.S. Standard sieve size	40-80
Ultraviolet Degradation percent of original unexposed grab breaking load 500 hr, minimum	70

Gravel

Gravel for gravel-filled bags must be:

- From 3/8 to 3/4 inch in diameter
- Clean and free from clay balls, organic matter, and other deleterious materials

Gravel-filled Bags

Gravel-filled bags must:

- Be made from gravel-filled bag fabric.
- Have inside dimensions from 24 to 32 inches in length, and from 16 to 20 inches in width.
- Have the opening bound to retain the gravel. The opening must be sewn with yarn, bound with wire, or secured with a closure device.
- Weigh from 30 to 50 pounds when filled with gravel.

CONSTRUCTION

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

If check dams are to be placed in the same areas as erosion control blankets, then install the blankets before placing the check dams.

Temporary check dams must be:

1. Placed perpendicular to the centerline of the ditch or drainage line
2. Installed with sufficient spillway depth to prevent flanking of concentrated flow around the ends of the check dam
3. Type 1 for lashed fiber rolls, Type 2 for gravel-filled bags, or a combination:
 - 3.1. If the ditch is lined with concrete or hot mix asphalt, use temporary check dam (Type 2)
 - 3.2. If the ditch is unlined, you may use temporary check dam (Type 1) or (Type 2)

Temporary check dam (Type 1) must be:

1. Secured with rope and notched wood stakes.
2. Installed by driving stakes into the soil until the notch is even with the top of the fiber roll.
3. Installed by lacing the rope between stakes and over the fiber roll. Knot the rope at each stake.
4. Tightened by driving the stakes further into the soil forcing the fiber roll against the surface of the ditch or drainage line.

Temporary check dam (Type 2) must be:

1. Placed as a single layer of gravel bags
2. End-to-end to eliminate gaps

If you need to increase the height of the temporary check dam (Type 2):

1. Increase height by adding rows of gravel-filled bags
2. Stack bags in a way that the bags in the top row overlap the joints in the lower row
3. Stabilize dam by adding rows of bags at the bottom

MAINTENANCE

Maintain temporary check dams to provide sediment holding capacity and to reduce concentrated flow velocities.

Remove sediment deposits, trash, and debris from temporary check dams 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 temporary check dams by:

1. Removing sediment from behind the check dam when sediment is 1/3 the height of the check dam above ground
2. Repairing or adjusting the check dams when scour and other evidence of concentrated flow occur beneath the fiber roll
3. Repairing or replacing the fiber rolls or gravel-filled bags when they become split, torn, or unraveled
4. Adding stakes when the fiber rolls slump or sag
5. Replacing broken or split wood stakes

Repair temporary check dams within 24 hours of discovering damage unless the Engineer approves a longer period.

If your vehicles, equipment, or activities disturb or displace temporary check dams, repair temporary check dams at your expense.

The Department 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 temporary check dams are not required, they must be removed and disposed of under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

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

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing, maintaining, and removing the temporary check dams, 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 plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid for via Force Account Change Order. Payment of Subsistence and travel allowance shall be excluded from this Force Account Change Order.

10-1.09 TEMPORARY CONSTRUCTION ENTRANCE

GENERAL

Summary

This work includes constructing, maintaining, and removing temporary construction entrance to provide temporary access.

The SWPPP must describe and include the use of temporary construction entrance as a water pollution control practice for tracking control.

Temporary construction entrance must be Type 1, Type 2, or a combination.

Submittals

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

1. Temporary entrance fabric
2. Rock

Submit details for alternatives at least 5 business days before installation. You may propose alternatives for the following items:

1. Alternative sump
2. Alternative corrugated steel panels

If the Engineer approves, you may eliminate the sump.

MATERIALS

Temporary Entrance Fabric

Temporary entrance fabric must comply with Section 88-1.06 A, "Rock Slope Protection Fabric," of the Standard Specifications and shall be Class 10.

Rock

Rock must be Type A or Type B.

Rock (Type A) must comply with:

1. Requirements under Section 72-2.02, "Materials," of the Standard Specifications
2. Following sizes:

Square Screen Size (inch)	Percentage Passing	Percentage Retained
6	100	0
3	0	100

Rock (Type B) must be Railway Ballast Number 25. Do not use blast furnace slag. Railway Ballast Number 25 must comply with:

1. Description in AREMA Manual for Railway Engineering.
2. Following sizes:

Nominal Size Square Opening	Percentage Passing								
	3"	2-1/2"	2"	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4
2-1/2"-3/8"	100	80-100	60-85	50-70	25-50	-	5-20	0-10	0-3

3. Following properties:

Specification	Requirements
Percent material passing No. 200 sieve, max. ASTM: C 117	1.0
Bulk specific gravity, min. ASTM: C 127	2.60
Absorption, percent min. ASTM: C 127	1.0
Clay lumps and friable particles, percent max. ASTM: C 142	0.5
Degradation, percent max. ASTM: C 535	30
Soundness (Sodium Sulfate), percent max. ASTM: C 88	5.0
Flat, elongated particles, or both, percent max. ASTM: D 4791	5.0

Corrugated Steel Panels

Corrugated steel panels must:

1. Be made of steel.
2. Be pressed or shop welded
3. Have a slot or hook for connecting panels together

CONSTRUCTION

Prepare location for temporary construction entrance by:

1. Removing vegetation to ground level and clear away debris
2. Grading ground to uniform plane
3. Grading ground surface to drain
4. Removing sharp objects that may damage fabric
5. Compacting the top 1.5 feet of soil to at least 90 percent relative compaction

If temporary entrance (Type 1) is specified, use rock (Type A).

If temporary construction entrance (Type 2) is specified, use Rock (Type B) under corrugated steel panels. Use at least 6 corrugated steel panels for each entrance. Couple panels together.

Install temporary construction entrance by:

1. Positioning fabric along the length of the entrance
2. Overlapping sides and ends of fabric by at least 12 inches
3. Spreading rock over fabric in the direction of traffic
4. Covering fabric with rock within 24 hours
5. Keeping a 6 inch layer of rock over fabric to prevent damage to fabric by spreading equipment

Do not drive on fabric until rock is spread.

Unless the Engineer eliminates the sump, install a sump within 20 feet of each temporary construction entrance.

Repair fabric damaged during rock spreading by placing a new fabric over the damaged area. New fabric must be large enough to cover damaged area and provide at least 18-inch overlap on all edges.

Maintenance

Maintain temporary construction entrance to minimize generation of dust and tracking of soil and sediment onto public roads. If dust or sediment tracking increases, place additional rock unless the Engineer approves another method.

Repair temporary construction entrance if:

1. Fabric is exposed
2. Depressions in the entrance surface develop
3. Rock is displaced

Repair temporary construction entrance within 24 hours of discovering damage unless the Engineer approves a longer period.

During use of temporary construction entrance, do not allow soil, sediment, or other debris tracked onto pavement to enter storm drains, open drainage facilities, or watercourses. When material is tracked onto pavement, remove it within 24 hours unless the Engineer approves a longer period.

If your vehicles, equipment, or activities disturb or displace the temporary construction entrance, repair it at your expense.

Removal

When the Engineer determines that temporary construction entrance is not 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, including holes and depressions, caused by installation and removal of temporary construction entrance under Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing and maintaining temporary construction entrance, complete in place, including removal of temporary construction entrance, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be considered as included in the lump sum price paid for Construction Site Management and no separate payment will be made therefor.

No additional compensation will be made if the temporary construction entrance is relocated during the course of construction.

10-1.10 TEMPORARY DRAINAGE INLET PROTECTION

GENERAL

Summary

This work includes constructing, maintaining, and removing temporary drainage inlet protection. Drainage inlet protection settles and filters sediment before stormwater runoff discharges into storm drainage systems.

The SWPPP must describe and include the use of temporary drainage inlet protection as a water pollution control practice for sediment control.

Provide temporary drainage inlet protection to meet the changing conditions around the drainage inlet. Temporary drainage inlet protection must be:

1. Appropriate type to meet the conditions around the drainage inlet
2. Type 1, Type 2, Type 3A, Type 3B, Type 4, Type 4B, Type 5, Type 6A, Type 6B, or a combination

Submittals

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

1. Erosion control blanket
2. Fiber rolls
3. Safety cap for metal posts
4. Silt fence fabric
5. Sediment filter bag
6. Foam barrier
7. Rigid plastic barrier
8. Gravel-filled bag fabric

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

Geosynthetic Fabrics

Geosynthetic fabrics for temporary drainage inlet protection must consist of one of the following:

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

Geosynthetic fabrics for temporary drainage inlet must comply with the specifications for water pollution control in Section 88-1.05, "Water Pollution Control," of the Standard Specifications.

Foam barrier must comply with:

Foam Barrier

Property	ASTM Designation	Specification
Grab breaking load 1-inch grip, lb, min. in each direction	D 4632	200
Apparent elongation percent, min., in each direction	D 4632	15
Water Flow Rate max. average roll value, gallons per minute/square foot	D 4491	100-150
Permittivity 1/sec., min.	D 4491	0.05
Apparent opening size max. average roll value, U.S. Standard sieve size	D 4751	40
Ultraviolet Degradation percent of original unexposed grab breaking load 500 hr, minimum	D 4595	70

Sample under ASTM D 4354, Procedure C.

Test under ASTM D 4759. All properties are based on Minimum Average Roll Value (MARV).

Identify, store, and handle under ASTM D 4873.

Erosion Control Blanket

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)

Erosion control blanket classified as temporary and degradable must be one of the following:

1. Double net excelsior blanket:
 - 1.1. Classified as ECTC Type 2D
 - 1.2. Classified as an erosion control blanket
 - 1.3. Designed to last for at least one year after installation
 - 1.4. With a Universal Soil Loss Equation (USLE) C-Factor of not more than 0.20 at a 2:1 (horizontal:vertical) slope
 - 1.5. With 80 percent of the wood excelsior fibers being 6 inches or longer

- 1.6. Capable to withstand a maximum shear stress of 1.75 pounds per square foot under ASTM D 6460
 - 1.7. With a minimum tensile strength of 75 pounds per foot under ASTM D 5035
 - 1.8. With top and bottom surfaces covered with lightweight non-synthetic netting
2. Double net straw and coconut blanket:
 - 2.1. Classified as ECTC Type 2D
 - 2.2. Classified as an erosion control blanket
 - 2.3. Designed to last for at least one year after installation
 - 2.4. With a USLE C-Factor of not more than 0.20 at a 2:1 (horizontal:vertical) slope
 - 2.5. Comprised of 70 percent straw and 30 percent coconut fiber
 - 2.6. Capable to withstand a maximum shear stress of 1.75 pounds per square foot under ASTM D 6460
 - 2.7. With a minimum tensile strength of 75 pounds per foot under ASTM D 5035
 - 2.8. With top and bottom surfaces covered with lightweight non-synthetic netting
3. Jute netting:
 - 3.1. Classified as ECTC Type 3B
 - 3.2. Classified as an open weave textile and have from 14 to 20 strands per foot in each direction
 - 3.3. Designed to last for at least one year after installation
 - 3.4. With a USLE C-Factor of not more than 0.25 at a 1.5:1 (horizontal:vertical) slope
 - 3.5. Comprised of 100 percent unbleached and undyed spun yarn made of jute fiber
 - 3.6. With an average open area from 63 to 70 percent
 - 3.7. From 48 to 72 inches in width
 - 3.8. Capable to withstand a maximum shear stress of 2.0 pounds per square foot under ASTM D 6460
 - 3.9. With a minimum tensile strength of 100 pounds per foot under ASTM D 5035
 - 3.10. From 0.90 to 1.20 pounds per square yard in weight
4. Coir netting:
 - 4.1. Classified as ECTC Type 4
 - 4.2. Classified as an open weave textile and from 13 to 18 strands per foot in each direction
 - 4.3. Designed to last for at least three years after installation
 - 4.4. With a USLE C-Factor of not more than 0.25 at a 1:1 (horizontal:vertical) slope
 - 4.5. Comprised of 100 percent unbleached and undyed spun coir yarn made of coconut fiber
 - 4.6. With an average open area from 63 to 70 percent
 - 4.7. From 72 to 158 inches in width
 - 4.8. Capable to withstand a maximum shear stress of 2.25 pounds per square foot under ASTM D6460
 - 4.9. With a minimum tensile strength of 125 pounds per foot under ASTM D 5035
 - 4.10. From 1.20 to 1.67 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.

Rock

Rock must comply with:

1. Requirements under Section 72-2.02, "Materials," of the Standard Specifications
2. Following sizes:

Square Screen Size (inch)	Percentage Passing	Percentage Retained
6	100	0
3	0	100

Rope

Rope for fiber rolls must be:

1. Biodegradable, such as sisal or manila
2. At least 1/4 inch in diameter

Fiber Rolls

Fiber rolls must:

1. Last for at least one year after installation
2. Be Type 1 or Type 2

For Type 1, fiber rolls must be:

1. Made from an erosion control blanket classified as temporary and degradable
2. Rolled along the width
3. Secured with natural fiber twine every 6'-6" from each end
4. Finished to be either:
 - 4.1. From 8 to 10 inches in diameter, from 10 to 20 feet long, and at least 0.5 pounds per linear foot
 - 4.2. From 10 to 12 inches in diameter, at least 10 feet long, and at least 2 pounds per linear foot

For Type 2, fiber rolls must:

1. Be filled with rice or wheat straw, wood excelsior, or coconut fiber
2. Be covered with biodegradable jute, sisal, or coir fiber netting
3. Have netting secured tightly at each end
4. Be finished to be either:
 - 4.1. From 8 to 10 inches in diameter, from 10 to 20 feet long, and at least 1.1 pounds per linear foot
 - 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 rolls, wood stakes must be at least:

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

Posts

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.

Silt Fence

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 at least 8 inches

Gravel-filled Bags

Gravel-filled bags must:

1. Be made from fabric.
2. Have inside dimensions from 24 to 32 inches in length, and from 16 to 20 inches in width.
3. Have the opening bound to retain the gravel. The opening must be sewn with yarn, bound with wire, or secured with a closure device.
4. Weigh from 30 to 50 pounds when filled with gravel.

Gravel for gravel-filled bags must be:

1. From 3/8 to 3/4 inch in diameter
2. Clean and free from clay balls, organic matter, and other deleterious materials

Sediment Filter Bag

Sediment filter bag must:

1. Be made of fabric
2. Be sized to fit the catch basin or drainage inlet
3. Include a high-flow bypass

Sediment filter bag may include a metal frame. Sediment filter bags that do not have a metal frame and are deeper than 18 inches must:

1. Include lifting loops and dump straps
2. Include a restraint cord to keep the sides of the bag away from the walls of the catch basin

Foam Barriers

Foam barriers must:

1. Be filled with a urethane foam core
2. Have a geosynthetic fabric cover and flap
3. Have a triangular, circular, or square shaped cross section
4. Have a vertical height of at least 5 inches after installation

5. Have a horizontal flap of at least 8 inches in width
6. Have a length of at least 4 feet per unit
7. Have the ability to interlock separate units into a longer barrier so that water does not flow between the units
8. Be secured to:
 - 8.1. Pavement with 1-inch concrete nails with 1-inch washers and solvent-free adhesive
 - 8.2. Soil with 6-inch nails with 1-inch washers

Rigid Plastic Barriers

Rigid plastic barriers must:

1. Have an integrated filter
2. Have a formed outer jacket of perforated high density polyethylene (HDPE) or polyethylene terephthalate (PET)
3. Have a flattened tubular shaped cross section
4. Be made from virgin or recycled materials
5. Be free from biodegradable filler materials that degrade the physical or chemical characteristics of the finished filter core or outer jacket
6. Have a length of at least 4 feet per unit
8. Be secured to:

- 8.1 Pavement with 1-inch concrete nails with 1-inch washers and solvent-free adhesive, with gravel-filled bags, or a combination
- 8.2 Soil with 6-inch nails with 1-inch washers and wood stakes

9. Comply with the following properties:

Specification	Requirements
Grab tensile strength of outer jacket material, pounds/square inch, min. in each direction ASTM D 4632*	4000
Break strength of outer jacket, pounds/square inch ASTM D 4632*	1300
Permittivity of filter core, 1/sec., min. ASTM D 4491	0.38
Flow rate of filter core, gallons per minute per square foot, ASTM D 4491	100 min. 200 max.
Filter core aperture size, max., Average Opening Size (AOS), microns	425
Ultraviolet stability (outer jacket & filter core), percent tensile strength retained after 500 hours, min. ASTM D 4355 (xenon-arc lamp and water spray weathering method)	90

* or appropriate test method for specific polymer

If used at a curb inlet without a grate, rigid plastic barriers must:

1. Have a horizontal flap of at least 6 inches with an under-seal gasket to prevent underflows
2. Include a high-flow bypass
3. Have a vertical height of at least 7 inches after installation
4. Be sized to fit the catch basin or drainage inlet

If used at a grated catch basin without a curb inlet, rigid plastic barriers must:

1. Cover the grate by at least 2 inches on each side and have an under-seal gasket to prevent underflows
2. Include a high-flow bypass
3. Have a vertical height of at least 1.5 inches after installation
4. Be sized to fit the catch basin or drainage inlet

If used at a curb inlet with a grate, rigid plastic barriers must:

1. Have a horizontal flap that covers the grate by at least 2 inches on the 3 sides away from the curb opening and have an under-seal gasket to prevent underflows
2. Include a high-flow bypass
3. Have a vertical section that covers the curb opening by at least 5 inches after installation
4. Be sized to fit the catch basin or drainage inlet

If used as a linear sediment barrier, rigid plastic barriers:

1. Must have an installed height of at least 6 inches
2. May have a horizontal flap of at least 4 inches

Linear Sediment Barrier

Linear sediment barriers must consist of one or more of the following:

1. Silt fence
2. Gravel-filled bags
3. Fiber roll
4. Rigid plastic barrier
5. Foam barrier

Flexible Sediment Barrier

Flexible sediment barriers consist of one or more of the following:

1. Rigid plastic barrier
2. Foam barrier

CONSTRUCTION

For drainage inlet protection at drainage inlets in paved and unpaved areas:

1. Prevent ponded runoff from encroaching on the traveled way or overtopping the curb or dike. Use linear sediment barriers to redirect runoff and control ponding.
2. Clear the area around each drainage inlet of obstructions including rocks, clods, and debris greater than one inch in diameter before installing the drainage inlet protection.
3. Install a linear sediment barrier up-slope of the existing drainage inlet and parallel with the curb, dike, or flow line to prevent sediment from entering the drainage inlet.

Erosion Control Blanket

To install erosion control blanket and geosynthetic fabric:

1. Secure blanket or fabric to the surface of the excavated sediment trap with staples and embed in a trench adjacent to the drainage inlet
2. Anchor the perimeter edge of the erosion control blanket in a trench

Silt Fence

If silt fence is used as a linear sediment barrier:

1. Place fence along the perimeter of the erosion control blanket, with the posts facing the drainage inlet
2. Install fence with the bottom edge of the silt fence fabric in a trench. Backfill the trench with soil and compact manually

Gravel Bag Berm

If gravel bag berm is used as a linear sediment barrier:

1. Place gravel-filled bags end-to-end to eliminate gaps
2. Stack bags in a way that the bags in the top row overlap the joints in the lower row

If gravel bag berms are used for Type 3A and Type 3B:

1. Place gravel-filled bags end-to-end to eliminate gaps

2. Stack bags in a way that the bags in the top row overlap the joints in the lower row
3. Arrange bags to create a spillway by removing one or more gravel-filled bags from the upper layer

If used within shoulder area, place gravel-filled bags behind temporary railing (Type K).

Fiber Rolls

If fiber rolls are used as a linear sediment barrier:

1. Place fiber rolls in a furrow.
2. Secure fiber rolls with stakes installed along the length of the fiber rolls. Stakes must be installed from 6 to 12 inches from the end of the rolls.

If fiber rolls are used as a linear sediment barrier for Type 4A, place them over the erosion control blanket.

Foam Barriers

If foam barriers are used as a linear sediment barrier:

1. Install barriers with the horizontal flap in a 3 inch deep trench and secured with nails and washers placed no more than 4 feet apart
2. Secure barriers with 2 nails at the connection points where separate units overlap
3. Place barriers without nails or stakes piercing the core

Flexible Sediment Barriers

If flexible sediment barriers are used:

1. Secure barriers to the pavement with nails and adhesive, gravel-filled bags, or a combination
2. Install barriers flush against the sides of concrete, asphalt concrete, or hot mix asphalt curbs or dikes
3. Place barriers to provide a tight joint with the curb or dike and anchored in a way that runoff cannot flow behind the barrier

If flexible sediment barriers are used for Type 4B:

1. Secure barriers to the pavement according to the angle and spacing shown on the plans
2. Place barriers to provide a tight joint with the curb or dike. Cut the cover fabric or jacket to ensure a tight fit

Rigid Sediment Barriers

If rigid sediment barriers are used at a grated catch basin without a curb inlet:

1. Place barriers using the gasket to prevent runoff from flowing under the barrier
2. Secure barriers to the pavement with nails and adhesive, gravel-filled bags, or a combination

If rigid sediment barriers are used for linear sediment barriers:

1. Install barriers in a trench. Backfill the trench with soil and compact manually
2. Place barrier with separate units overlapping at least 4 inches
3. Reinforce barriers with a wood stake at each overlap
4. Fasten barriers to the wood stakes with steel screws, 16 gauge galvanized steel wire, or with UV stabilized cable ties that are from 5 to 7 inches in length

Sediment Filter Bags

Install sediment filter bags for Type 5 by:

1. Removing the drainage inlet grate
2. Placing the sediment bag in the opening
3. Replacing the grate to secure the sediment filter bag in place

MAINTENANCE

Maintain temporary drainage inlet protection to provide sediment holding capacity and to reduce runoff velocities.

Remove sediment deposits, trash, and debris from temporary drainage inlet protection 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 temporary drainage inlet protection by removing sediment from:

1. Behind flexible sediment barriers when sediment exceeds 1 inch in depth
2. Surface of the erosion control blanket when sediment exceeds 1 inch in depth
3. Sediment trap for Type 2 when the volume has been reduced by approximately one-half
4. Behind silt fence when the sediment is 1/3 the height of the silt fence fabric above ground
5. Sediment filter bags when filled or when the restraint cords are no longer visible

If rills and other evidence of concentrated runoff occur beneath the linear sediment barrier, repair or adjust the barrier.

If silt fence fabric becomes split, torn, or unraveled, repair or replace silt fence.

If geosynthetic fabric becomes split, torn, or unraveled, repair or replace foam barriers.

Repair or replace sagging or slumping linear sediment barriers with additional stakes. Replace broken or split wood stakes.

Reattach foam barriers and rigid plastic barriers that become detached or dislodged from the pavement.

Repair split or torn rigid plastic barriers with 16 gauge galvanized steel wire or UV stabilized cable ties that are from 5 to 7 inches in length.

For sediment filter bags without metal frames, empty by placing one inch steel reinforcing bars through the lifting loops and then lift the filled bag from the drainage inlet. For sediment filter bags with metal frames, empty by lifting the metal frame from the drainage inlet. Rinse before replacing in the drainage inlet. When rinsing the sediment filter bags, do not allow the rinse water to enter a drain inlet or waterway.

Repair temporary drainage inlet protection within 24 hours of discovering damage unless the Engineer approves a longer period.

If your vehicles, equipment, or activities disturb or displace temporary drainage inlet protection, repair temporary drainage inlet protection at your expense.

The Department 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 the temporary drainage inlet protection 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.

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

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing and maintaining the temporary drainage inlet protection, 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 plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid for via Force Account Change Order. Payment of Subsistence and travel allowance shall be excluded from this Force Account Change Order.

No additional compensation will be made if the temporary drainage inlet protection is relocated during the course of construction.

10-1.11 TEMPORARY EROSION CONTROL BLANKET

GENERAL

Summary

This work includes constructing, maintaining, and removing temporary erosion control blanket. Temporary erosion control blanket is used to cover and protect disturbed soil areas and soil from erosion by wind or water. Temporary erosion control blanket reduces channel erosion by protecting against scour created by concentrated flow.

The SWPPP must describe and include the use of temporary erosion control blanket as a water pollution control practice for soil stabilization.

Submittals

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

Erosion control blanket must be:

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

Erosion control blanket classified as temporary and degradable must be one of the following:

1. Double net excelsior blanket:
 - 1.1. Classified as ECTC Type 2D
 - 1.2. Classified as an erosion control blanket
 - 1.3. Designed to last for at least one year after installation
 - 1.4. With a Universal Soil Loss Equation (USLE) C-Factor of not more than 0.20 at a 2:1 (horizontal:vertical) slope
 - 1.5. With 80 percent of the wood excelsior fibers being 6 inches or longer
 - 1.6. Capable to withstand a maximum shear stress of 1.75 pounds per square foot under ASTM D 6460
 - 1.7. With a minimum tensile strength of 75 pounds per foot under ASTM D 5035
 - 1.8. With top and bottom surfaces covered with lightweight non-synthetic netting
2. Double net straw and coconut blanket:
 - 2.1. Classified as ECTC Type 2D
 - 2.2. Classified as an erosion control blanket
 - 2.3. Designed to last for at least one year after installation
 - 2.4. With a USLE C-Factor of not more than 0.20 at a 2:1 (horizontal:vertical) slope
 - 2.5. Comprised of 70 percent straw and 30 percent coconut fiber
 - 2.6. Capable to withstand a maximum shear stress of 1.75 pounds per square foot under ASTM D 6460
 - 2.7. With a minimum tensile strength of 75 pounds per foot under ASTM D 5035
 - 2.8. With top and bottom surfaces covered with lightweight non-synthetic netting
3. Jute netting:
 - 4.1. Classified as ECTC Type 3B
 - 4.2. Classified as an open weave textile and have from 14 to 20 strands per foot in each direction
 - 4.3. Designed to last for at least one year after installation
 - 4.4. With a USLE C-Factor of not more than 0.25 at a 1.5:1 (horizontal:vertical) slope
 - 4.5. Comprised of 100 percent unbleached and undyed spun yarn made of jute fiber
 - 4.6. With an average open area from 63 to 70 percent
 - 4.7. From 48 to 72 inches in width
 - 4.8. Capable to withstand a maximum shear stress of 2.0 pounds per square foot under ASTM D6460
 - 4.9. With a minimum tensile strength of 100 pounds per foot under ASTM D 5035
 - 4.10. From 0.90 to 1.20 pounds per square yard in weight
4. Coir netting:
 - 4.1. Classified as ECTC Type 4
 - 4.2. Classified as an open weave textile and from 13 to 18 strands per foot in each direction
 - 4.3. Designed to last for at least three years after installation

- 4.4. With a USLE C-Factor of not more than 0.25 at a 1:1 (horizontal:vertical) slope
- 4.5. Comprised of 100 percent unbleached and undyed spun coir yarn made of coconut fiber
- 4.6. With an average open area from 63 to 70 percent
- 4.7. From 72 to 158 inches in width
- 4.8. Capable to withstand a maximum shear stress of 2.25 pounds per square foot under ASTM D6460
- 4.9. With a minimum tensile strength of 125 pounds per foot under ASTM D 5035
- 4.10. From 1.20 to 1.67 pounds per square yard in weight

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 hydroseeding is to be done in the same area as erosion control blanket:

1. You must hydroseed before placing the double net excelsior or straw and coconut blankets
2. You may hydroseed before or after placing the jute or coir netting

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

1. Place the blanket loosely on the embankment or excavation 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
5. Secure the ends of the blanket in key trenches

If temporary erosion control blanket is installed in area of concentrated runoff including ditches and swales:

1. Place the blanket loosely along the ditch or swale with the longitudinal edges and joints parallel to the centerline of the ditch or swale
2. Place the blanket on the upper portion of the slope overlapping the blanket on the lower portion of the slope for transverse joints
3. Secure transverse joints of blankets in intermediate joint trenches
4. Overlap and staple the longitudinal and transverse joints
5. Secure the ends of the blanket in intermediate and key trenches

MAINTENANCE

Remove sediment deposits, trash, and debris from temporary 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 temporary 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 temporary 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 temporary 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 temporary erosion control blanket, repair erosion control blanket at your expense.

The Department 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 temporary 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.

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

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary erosion control blanket, complete in place, including trench excavation and backfill, maintenance and removal of temporary erosion control blanket, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid for via Force Account Change Order. Payment of Subsistence and travel allowance shall be excluded from this Force Account Change Order.

10-1.12 TEMPORARY FIBER ROLL

GENERAL

Summary

This work includes constructing, maintaining, and removing temporary fiber roll.

The SWPPP must describe and include the use of temporary fiber roll as a water pollution control practice for sediment control.

Submittals

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

Fiber roll must:

1. Last for at least one year after installation
2. Be Type 1 or Type 2

If specified, Type 1 fiber roll must be:

1. Made from an erosion control blanket:
 - 1.1. Classified by the Erosion Control Technology Council (ECTC) as ECTC 2D
 - 1.2. With a Universal Soil Loss Equation (USLE) C-Factor of not more than 0.20 at a 2:1 (horizontal:vertical) slope
 - 1.3. Capable to withstand a maximum shear stress of 1.75 pounds per square foot under ASTM D 6460
 - 1.4. With a minimum tensile strength of 75 pounds per foot under ASTM D 5035
 - 1.5. With top and bottom surfaces covered with lightweight non-synthetic netting
 - 1.6. That complies with one of the following:
 - 1.6.1. Double net straw and coconut blanket with 70 percent straw and 30 percent coconut fiber
 - 1.6.2. Double net excelsior blanket with 80 percent of the wood excelsior fibers being 6 inches or longer
2. Rolled along the width
3. Secured with natural fiber twine every 6 feet and 6 inches from each end
4. Finished to be either:

- 4.1. From 8 to 10 inches in diameter, from 10 to 20 feet long, and at least 0.5 pounds per linear foot
- 4.2. From 10 to 12 inches in diameter, at least 10 feet long, and at least 2 pounds per linear foot

If specified, Type 2 fiber roll must:

1. Be filled with rice or wheat straw, wood excelsior, or coconut fiber
2. Be covered with a biodegradable jute, sisal, or coir fiber netting
3. Have the netting secured tightly at each end
4. Be finished to be either:
 - 4.1. From 8 to 10 inches in diameter, from 10 to 20 feet long, and at least 1.1 pounds per linear foot
 - 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. 1" x 1" x 24" in size for Type 1 installation
2. 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.

Place fiber roll on slopes at the following spacing unless the plans show a different spacing:

1. 10 feet apart for slopes steeper than 2:1 (horizontal:vertical)
2. 15 feet apart for slopes from 2:1 to 4:1 (horizontal:vertical)
3. 20 feet apart for slopes from 4:1 to 10:1 (horizontal:vertical)
4. 50 feet apart for slopes flatter than 10:1 (horizontal:vertical)

Place fiber roll parallel to the slope contour. For any 20 foot section of fiber roll, do not allow the fiber roll to vary more than 5 percent from level.

Type 1 and 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 temporary fiber roll to provide sediment holding capacity and to reduce runoff velocities.

Remove sediment deposits, trash, and debris from temporary 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 temporary 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 temporary fiber roll within 24 hours of discovering damage unless the Engineer approves a longer period.

If your vehicles, equipment, or activities disturb or displace temporary fiber roll, repair temporary fiber roll at your expense.

The Department 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 temporary fiber roll is not required, they must be removed and disposed of under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

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

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing, maintaining, and removing the temporary 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 plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid for via Force Account Change Order. Payment of Subsistence and travel allowance shall be excluded from this Force Account Change Order.

10-1.13 TEMPORARY GRAVEL BAG BERM

GENERAL

Summary

This work includes constructing, maintaining, and removing temporary gravel bag berm.

The SWPPP must describe and include the use of temporary gravel bag berm as a water pollution control practice for sediment control.

Submittals

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

MATERIALS

Gravel-filled Bag Fabric

Geosynthetic fabric for temporary gravel bag berm 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.

Gravel-filled bag fabric must comply with:

Specification	Requirements
Grab breaking load 1-inch grip, lb, min. in each direction	205
Apparent elongation percent, min., in each direction	50
Water Flow Rate max. average roll value, gallons per minute/square foot	80-150
Permittivity l/sec., min	1.2
Apparent opening size max. average roll value, U.S. Standard sieve size	40-80
Ultraviolet Degradation percent of original unexposed grab breaking load 500 hr, minimum	70

Gravel

Gravel for gravel-filled bags must be:

1. From 3/8 to 3/4 inch in diameter
2. Clean and free from clay balls, organic matter, and other deleterious materials

Gravel-filled Bags

Gravel-filled bags must:

1. Be made from gravel-filled bag fabric.
2. Have inside dimensions from 24 to 32 inches in length, and from 16 to 20 inches in width.
3. Have the opening bound to retain the gravel. The opening must be sewn with yarn, bound with wire, or secured with a closure device.
4. Weigh from 30 to 50 pounds when filled with gravel.

CONSTRUCTION

Before constructing temporary gravel bag berm, remove obstructions including rocks, clods, and debris greater than 1 inch in diameter from the ground.

Temporary gravel bag berm must:

1. Be placed as a single layer of gravel bags to create a linear sediment barrier
2. Be placed end-to-end to eliminate gaps
3. Be placed parallel to the slope contour
4. Have the last 6 feet of the gravel bag berm angled up-slope

If you need to increase the height of the temporary gravel bag berm:

1. Increase height by adding rows of gravel-filled bags
2. Stack bags in a way that the bags in the top row overlap the joints in the lower row
3. Stabilize berm by adding rows at the bottom

If used within shoulder area, gravel-filled bags must be placed behind temporary railing (Type K).

MAINTENANCE

Maintain temporary gravel bag berm to provide sediment holding capacity and to reduce runoff velocities.

Remove sediment deposits, trash, and debris from temporary gravel bag berm 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 temporary gravel bag berm by:

1. Removing sediment from behind the gravel bag berm when sediment is 1/3 the height of the gravel bag berm above ground
2. Repairing or adjusting the gravel-filled bags when rills and other evidence of concentrated runoff occur beneath the gravel-filled bags
3. Repairing or replacing the gravel-filled bags when they become split, torn, or unraveled

Repair temporary gravel bag berm within 24 hours of discovering damage unless the Engineer approves a longer period.

If your vehicles, equipment, or activities disturb or displace temporary gravel bag berm, repair temporary gravel bag berm at your expense.

The Department 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 temporary gravel bag berm is not required, they must be removed and disposed of under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

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

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing, maintaining, and removing the temporary gravel bag berm, 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 plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid for via Force Account Change Order. Payment of Subsistence and travel allowance shall be excluded from this Force Account Change Order.

10-1.14 TEMPORARY SILT FENCE

GENERAL

Summary

This work includes installing, maintaining, and removing temporary silt fence.

The SWPPP must describe and include the use of temporary silt fence as a water pollution control practice for sediment control.

Submittals

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

MATERIALS

Silt Fence Fabric

Geosynthetic fabric for temporary 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

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 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, you 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 temporary silt fence to provide sediment holding capacity and to reduce runoff velocities.

Remove sediment deposits, trash, and debris from temporary 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 temporary 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 temporary silt fence within 24 hours of discovering damage unless the Engineer approves a longer period.

If your vehicles, equipment, or activities disturb or displace temporary silt fence, repair temporary silt fence at your expense.

The Department 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 temporary 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.

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

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing, maintaining, and removing the temporary 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 plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid for via Force Account Change Order. Payment of Subsistence and travel allowance shall be excluded from this Force Account Change Order.

10-1.15 TEMPORARY TACKED STRAW

GENERAL

Summary

This work includes applying, maintaining, and removing temporary tacked straw. Tacked straw uses a mixture of tackifier, fiber, and water to stabilize active and nonactive disturbed soil areas.

The SWPPP must describe and include the use of temporary tacked straw as a water pollution control practice for soil stabilization.

Submittals

At least 5 business days before applying tacked straw, submit:

1. Material Safety Data Sheet for the tackifier.
2. Product label describing the tackifier as an erosion control product.
3. List of pollutant indicators and potential pollutants for the use of temporary tacked straw. Pollutant indicators are described under "Sampling and Analysis Plan for Non-Visible Pollutants" in the Preparation Manual.
4. Determination of acute and chronic toxicity for aquatic organisms conforming to EPA methods for the tackifier.
5. Composition of ingredients including chemical formulation.

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

1. Tackifier
2. Fiber

Quality Control and Assurance

Retain and submit records of temporary tacked straw applications including:

1. Compliance with specified rates
2. Application area
3. Application time
4. Quantity

MATERIALS

Tackifier

The tackifier must be:

1. Nonflammable
2. Nontoxic to aquatic organisms
3. Free from growth or germination inhibiting factors
4. Either a plant-based product or a polymeric-emulsion blend

Tackifier classified as a plant-based product must be:

1. A natural high molecular weight polysaccharide
2. A high viscosity hydrocolloid that is miscible in water
3. Functional for at least 180 days
4. Labeled as either guar, psyllium, or starch

Guar must be:

1. A guar gum based product derived from the ground endosperm of the guar plant, cyanopsis tetragonolobus
2. Treated with dispersant agents for easy mixing
3. Able to be diluted at the rate of 1 to 5 pounds per 100 gallons of water

Psyllium must be:

1. Made of the finely ground muciloid coating of plantago ovata or plantago ispaghula seeds
2. Able to dry and form a firm but rewettable membrane

Starch must be a non-ionic, water-soluble granular material derived from corn, potato, or other plant-based source.

Tackifier classified as polymeric emulsion blend must be:

1. A liquid or dry powder formulation
2. Anionic with a residual monomer content that is at most 0.05 percent by weight

3. Functional for at least 180 days
4. A prepackaged product labeled as containing one of the following as the primary active ingredient of the polymeric emulsion blend:
 - 4.1 Acrylic copolymers and polymers
 - 4.2 Polymers of methacrylates and acrylates
 - 4.3 Copolymers of sodium acrylates and acrylamides
 - 4.4 Polyacrylamide (PAM) and copolymer of acrylamide
 - 4.5 Hydrocolloid polymers

Fiber

Fiber must be wood fiber, cellulose fiber, alternate fiber, or a combination of these fibers as specified. Fiber must be:

1. Free from lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, or chlorine bleach
2. Free from synthetic or plastic materials
3. At most 7 percent ash

If wood fiber is specified, wood fiber must be:

1. Long strand, whole wood fibers, thermo-mechanically processed from clean, whole wood chips
2. Not made from sawdust, cardboard, paper, or paper byproducts
3. At least 25 percent of fibers 3/8 inch long
4. At least 40 percent held on a No. 25 sieve

If cellulose fiber is specified, cellulose fiber must be made from natural or recycled pulp fiber, such as wood chips, sawdust, newsprint, chipboard, corrugated cardboard, or a combination of these materials.

If alternate fiber is specified, alternate fiber must be:

1. Long strand, whole natural fibers made from clean straw, cotton, corn, or other natural feed stock
2. At least 25 percent of fibers 3/8 inch long
3. At least 40 percent held on a No. 25 sieve

Coloring Agent

Use a biodegradable, nontoxic coloring agent free from copper, mercury, and arsenic to ensure the tacked straw contrasts with the application area.

Straw

Straw must comply with Section 20-2.06, "Straw," of the Standard Specifications and be:

1. Rice, wheat, or barley. Wheat and barley straw must be derived from irrigated crops.
2. Free of plastic, glass, metal, rocks, and refuse or other deleterious material.

CONSTRUCTION

Application

Apply temporary tacked straw when an area is ready to receive temporary erosion control under "Move-in/Move-out (Temporary Erosion Control)."

The quantity of tackifier in the mixture must be as recommended by the manufacturer.

The ratio of water to fiber and tackifier in the mixture must be as recommended by the manufacturer. The proportions of various erosion control materials may be changed by the Engineer to meet field conditions.

Apply tacked straw materials in separate applications in the following sequence:

1. Apply straw:
 - 1.1. At the rate of 2 tons per acre (slope measurement)
 - 1.2. To extend to the edge of retaining walls, dikes, paving and to within 4 feet from the flow line of paved and unpaved drainage ditches
 - 1.3. Using mechanical, pneumatic, or manual methods
2. Apply tackifier and fiber mixture:

2.1. At application rate indicated:

Material	Application Rate lbs/acre
Wood Fiber	1200-1500 lbs/acre
Cellulose Fiber	1200-1500 lbs/acre
Alternate Fiber	1200-1500 lbs/acre

2.2. During dry weather or at least 24 hours before predicted rain.

Do not apply tacked straw if:

1. Water is standing on or moving across the soil surface
2. Soil is frozen
3. Air temperature is below 40 °F during the tackifier curing period unless allowed by the manufacturer and approved by the Engineer

Do not over-spray tacked straw onto the traveled way, sidewalks, lined drainage channels, or existing vegetation.

Maintenance

Reapply tacked straw within 24 hours of discovering visible erosion, unless the Engineer approves a longer period.

Temporary tacked straw disturbed or displaced by the Contractor's vehicles, equipment, or operations must be reapplied at the Contractor's expense.

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

Removal

Remove tacked straw by mechanically blending it into the soil with track laying equipment, disking, or other approved method.

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials (including straw, tackifier, and fiber), tools, equipment, and incidentals, and for doing all the work involved in applying and maintaining temporary tacked straw, complete in place, including removal of tacked straw, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid for via Force Account Change Order. Payment of Subsistence and travel allowance shall be excluded from this Force Account Change Order.

10-1.16 TEMPORARY COVER

GENERAL

Summary

This work includes constructing, maintaining, and removing temporary cover.

The SWPPP must describe and include the use of temporary cover as a water pollution control practice for soil stabilization and stockpile management.

Submittals

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

1. Gravel-filled bag fabric
2. Temporary cover fabric

If you substitute a material in the following list, submit a sample of the alternative material for approval at least 5 business days before installation:

1. Alternative restrainer
2. Alternative linear sediment barrier

MATERIALS

Geosynthetic Fabrics

Geosynthetic fabrics 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 are 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.

Gravel-filled bag fabric must comply with:

Specification	Requirements
Grab breaking load 1-inch grip, lb, min. in each direction	205
Apparent elongation percent, min., in each direction	50
Water Flow Rate max. average roll value, gallons per minute/square foot	80-150
Permittivity l/sec., min	1.2
Apparent opening size max. average roll value, U.S. Standard sieve size	40-80
Ultraviolet Degradation percent of original unexposed grab breaking load 500 hr, minimum	70

The temporary cover fabric must be geosynthetic cover fabric, plastic sheeting, or a combination of both. Temporary cover fabric must be either:

1. Plastic sheeting consisting of a single-ply geomembrane material, 10 mils thick, that complies with ASTM D 5199
2. Geosynthetic cover fabric that complies with the following properties:

Specification	Requirements
Grab breaking load 1-inch grip, lb, min. in each direction	200
Apparent elongation percent, min., in each direction	50
Water Flow Rate max. average roll value, gallons per minute/square foot	75-120
Permittivity l/sec., min	0.08
Apparent opening size max. average roll value, U.S. Standard sieve size	100
Ultraviolet Degradation percent of original unexposed grab breaking load 500 hr, minimum	70

Gravel

Gravel for gravel-filled bags must be:

1. From 3/8 to 3/4 inch in diameter
2. Clean and free from clay balls, organic matter, and other deleterious materials

Gravel-filled Bags

Gravel-filled bags must:

1. Be made from gravel-filled bag fabric.
2. Have inside dimensions from 24 to 32 inches in length, and from 16 to 20 inches in width.
3. Have the opening bound to retain the gravel. The opening must be sewn with yarn, bound with wire, or secured with a closure device.
4. Weigh from 30 to 50 pounds when filled with gravel.

Restrainers

Restrainers must be used to secure the cover fabric or plastic sheeting to the surface of the slope or stockpile.

Restrainers must be one of the following:

1. Made of gravel-filled bags that are roped together and spaced no more than a 6 feet apart
2. Made of wooden lath and anchor restrainers as shown on the plans and the following:
 - 2.1 Wooden lath must be 2" x 4" x 8", made from fir or pine, and comply with Section 20-2.12, "Lumber," of the Standard Specifications
 - 2.2 Anchor restrainers must be made from steel reinforcing bars and spaced no more than 4 feet apart along the wooden lath
3. An approved alternate method

Rope

Rope must be at least 3/8 inch in diameter.

Rope must be one of the following:

1. Biodegradable, such as sisal or manila
2. Nondegradable, such as polypropylene or nylon

Linear Sediment Barrier

Linear sediment barriers consist of one or more of the following:

1. Gravel bag berm
2. Earthen berm
3. Approved alternate method

CONSTRUCTION

Temporary Cover Fabric

Install temporary cover fabric by:

1. Placing the temporary cover fabric loosely on the slope or stockpile with the longitudinal edges perpendicular to the slope contours
2. Placing the temporary cover fabric on the upper portion of the slope to overlap cover fabric on the lower portion of the slope
3. Placing the temporary cover fabric on the side of the prevailing wind to overlap the cover fabric on the downwind side of the slope
4. Anchoring the perimeter edge of the temporary cover fabric in key trenches
5. Overlapping edges of the temporary cover fabric by at least 2 feet
6. Placing restrainers at the overlap area and along the toe of the slope. Between overlaps, the restrainers must be spaced a maximum of 8 feet on center.
7. Ensuring that, if anchor restraints are used, the leg of the steel reinforcing bar pierces the temporary cover fabric and holds the wooden lath firmly against the surface of the slope or stockpile.

Linear Sediment Barrier

Protect excavation and embankment slopes with linear sediment barrier by:

1. Preventing run-on and concentrated flows from damaging the slopes
2. Placing the barrier parallel to the slope contour at the toe of the slope
4. Angling the last 6 feet of the barrier up-slope

Protect stockpiles with linear sediment barrier by:

1. Preventing run-on and concentrated flows from touching the stockpiled material
2. Surrounding the stockpile with a linear sediment barrier
3. Adding more linear sediment barrier within 24 hours of adding more material to the stockpile

If earthen berms are used as a linear sediment barrier, they must be:

1. At least 8 inches high and 36 inches wide
2. Compacted by hand or mechanical method

If gravel bag berms are used as a linear sediment barrier:

1. Place gravel bags as a single layer
2. Place gravel bags end-to-end to eliminate gaps

If you need to increase the height of the gravel bag berm:

1. Increase height by adding rows of gravel-filled bags
2. Stack bags in a way that the bags in the top row overlap the joints in the lower row
3. Stabilize berm by adding rows at the bottom

If you remove the temporary cover to do other work, replace and secure temporary cover within one hour.

MAINTENANCE

Maintain temporary cover to minimize exposure of the slopes or stockpile and prevent movement of the material beyond the linear sediment barrier.

Maintain temporary cover by:

1. Relocating and securing restrainers to keep the erosion control blankets in place. Temporary cover fabric that breaks free must be immediately secured.
2. Repairing or replacing the temporary cover fabric when the area covered by temporary cover becomes exposed or exhibits visible erosion.
3. Repairing or replacing the linear sediment barrier when washouts occur between joints or beneath the linear sediment barrier.
4. Repairing or replacing the temporary cover fabric when it becomes detached, torn, or unraveled.

Repair temporary cover within 24 hours of discovering damage unless the Engineer approves a longer period.

If your vehicles, equipment, or activities disturb or displace temporary cover, repair temporary cover at your expense.

REMOVAL

When the Engineer determines that temporary cover 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.

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

MEASUREMENT AND PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing and maintaining temporary cover for slopes other than stockpile slopes, complete in place, including restrainers and removal of temporary cover, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid for via Force Account Change Order. Payment of Subsistence and travel allowance shall be excluded from this Force Account Change Order.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing and maintaining temporary cover for stockpiles, complete in place, including restrainers and removal of

temporary cover, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be considered as included in the lump sum price paid for Construction Site Management and no separate payment will be made therefor.

10-1.17 TEMPORARY FENCE (TYPE ESA)

GENERAL

Summary

This work includes constructing, maintaining, and removing temporary fence (Type ESA). Temporary fence (Type ESA) provides a visible boundary adjacent to protected areas such as an environmentally sensitive area.

Signs are required for temporary fence (Type ESA).

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

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 high visibility fabric under ASTM D 4354, Procedure C.

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

Identify, store, and handle high visibility fabric rolls and samples under ASTM D 4873.

High visibility fabric must:

1. Contain ultraviolet inhibitors
2. Comply with the requirements shown in the following table:

Property	Specifications	Requirements
Width, inches, Min	Measured	48
Opening size inches	Measured	1" x 1" (Min) 2" x 4" (Max)
Color	Observed	Orange
Roll weight, lb Min for 4' x 100' roll	Measured	12
Tensile strength, lb Min, machine direction x cross direction	ASTM D 4595	225 x 95
Ultraviolet Degradation Percent of original unexposed grab breaking load 500 hr, minimum	ASTM D 4355	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.

Signs

Signs for temporary fence (Type ESA) must be:

1. Weatherproof and fade-proof and may include plastic laminated printed paper affixed to an inflexible weatherproof backer board
2. Attached to the high visibility fabric with tie wire or locking plastic fasteners

CONSTRUCTION

General

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

14. Edit if different sign spacing is required.

Install signs for temporary fence (Type ESA) as follows:

1. Attach signs with the top of the sign panel flush with the top of the high visibility fabric
2. Place signs 100 feet apart along the length and at each end of the fence

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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

Maintenance

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 and these special provisions, and as ordered by the Engineer.

10-1.18 COOPERATION

It is anticipated that work by another contractor may be in progress adjacent to or within the limits of this project during progress of the work on this contract. The following table lists contracts anticipated to be in progress during this contract.

Contract No.	Co-Rte-PM	Location	Type of Work
03-2F0204	ED-50-6.8/R14.2	Near El Dorado Hills from 0.3 Mile East of Bass Lake Road UC to Missouri Flat Road OC	HMA Overlay and Repair

Comply with Section 7-1.14, "Cooperation," of the Standard Specifications.

10-1.19 PROGRESS SCHEDULE (CRITICAL PATH METHOD)**GENERAL****Summary**

Comply with Section 8-1.04, "Progress Schedule," of the Standard Specifications, except you must:

1. Use a computer software to prepare the schedule
2. Furnish compatible software for the Engineer's exclusive possession and use

You are responsible for assuring that all activity sequences are logical and that each schedule shows a coordinated plan for complete performance of the work.

Definitions

contract completion date: The current extended date for completion of the contract shown on the weekly statement of working days furnished by the Engineer as specified in Section 8-1.06, "Time of Completion," of the Standard Specifications.

data date: The day after the date through which a schedule is current. Everything occurring earlier than the data date is "as-built" and everything on or after the data date is "planned."

early completion time: The difference in time between an early scheduled completion date and the contract completion date.

float: The difference between the earliest and latest allowable start or finish times for an activity.

milestone: An event activity that has zero duration and is typically used to represent the beginning or end of a certain stage of the project.

narrative report: A document submitted with each schedule that discusses topics related to project progress and scheduling.

near critical path: A chain of activities with total float exceeding that of the critical path but having no more than 10 working days of total float.

State owned float activity: The activity documenting time saved on the critical path by actions of the State. It is the last activity prior to the scheduled completion date.

time impact analysis: A schedule and narrative report developed specifically to demonstrate what effect a proposed change or delay has on the current scheduled completion date.

time-scaled network diagram: A graphic depiction of a CPM schedule comprised of activity bars with relationships for each activity represented by arrows. The tail of each arrow connects to the activity bar for the predecessor and points to the successor.

total float: The amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

Submittals

General Requirements

Submit to the Engineer baseline, monthly updated, and final updated schedules, each consistent in all respects with the time and order of work requirements of the contract. Perform work in the sequence indicated on the current accepted schedule.

Each schedule must show:

1. Calculations using the critical path method to determine controlling activities.
2. Duration activities less than 20 working days.
3. At least 50 but not more than 500 activities, unless authorized. The number of activities must be sufficient to assure adequate planning of the project, to permit monitoring and evaluation of progress, and to do an analysis of time impacts.
4. Each required constraint. Constraints other than those required by the special provisions may be included only if authorized.
5. State-owned float as the predecessor activity to the scheduled completion date.
6. Activities with identification codes for responsibility, stage, work shifts, location, and contract pay item numbers.

You may show early completion time on any schedule provided that the requirements of the contract are met. Early completion time is considered a resource for your exclusive use. You may increase early completion time by improving production, reallocating resources to be more efficient, performing sequential activities concurrently, or by completing activities earlier than planned. You may also submit for approval a Cost Reduction Proposal as specified in Section 5-1.14, "Cost Reduction Incentive" of the Standard Specifications that will reduce time of construction.

You may show a scheduled completion date that is later than the contract completion date on an update schedule, after the baseline schedule is accepted. Provide an explanation for a late scheduled completion date in the narrative report that is included with the schedule.

State-owned float is considered a resource for the exclusive use of the State. The Engineer may accrue State-owned float by the early completion of review of any type of required submittal when it saves time on the critical path. Prepare a time impact analysis, when requested by the Engineer, to determine the effect of the action as specified in "Time Impact Analysis." The Engineer documents State-owned float by directing you to update the State-owned float activity on the next updated schedule. Include a log of the action on the State-owned float activity and include a discussion of the action in the narrative report. The Engineer may use State-owned float to mitigate past, present, or future State delays by offsetting potential time extensions for contract change orders.

The Engineer may adjust contract working days for ordered changes that affect the scheduled completion date as specified in Section 4-1.03, "Changes," of the Standard Specifications. Prepare a time impact analysis to determine the effect of the change as specified in "Time Impact Analysis" and include the impacts acceptable to the Engineer in the next updated schedule. Changes that do not affect the controlling operation on the critical path will not be considered as the basis for a time adjustment. Changes that do affect the controlling operation on the critical path will be considered by the Engineer in decreasing time or granting an extension of time for completion of the contract. Time extensions will only be granted if the total float is absorbed and the scheduled completion date is delayed one or more working days because of the ordered change.

The Engineer's review and acceptance of schedules does not waive any contract requirements and does not relieve you of any obligation or responsibility for submitting complete and accurate information. Correct rejected schedules and resubmit them within 7 days of notification by the Engineer, at which time a new review period of 7 days will begin.

Errors or omissions on schedules do not relieve you from finishing all work within the time limit specified for completion of the contract. If, after a schedule has been accepted by the Engineer, either you or the Engineer discover that any aspect of the schedule has an error or omission, you must correct it on the next updated schedule.

Computer Software

Submit to the Engineer for review a description of proposed schedule software to be used. After the Engineer accepts the proposed software, furnish schedule software and all original software instruction manuals. All software must be compatible with the current version of the Windows operating system in use by the Engineer. The schedule software must include the latest version of Oracle Primavera P6 Professional Project Management for Windows, or equivalent.

If a schedule software equivalent to P6 is proposed, it must be capable of:

1. Generating files that can be imported into P6
2. Comparing 2 schedules and providing reports of changes in activity ID, activity description, constraints, calendar assignments, durations, and logic ties

The schedule software and schedule-comparing software will be returned to you before the final estimate. The Department will compensate you as specified in Section 4-1.03D, "Extra Work," of the Standard Specifications for replacement of software or manuals damaged, lost, or stolen after delivery to the Engineer.

Instruct the Engineer in the use of the software and provide software support until the contract is accepted. Within 15 days of contract approval, provide a commercial 8-hour (16-hour if software is other than Sure Trak) training session for 2 Department employees in the use of the software at a location acceptable to the Engineer. It is recommended that you also send at least 2 employees to the same training session to facilitate development of similar knowledge and skills in the use of the software. If schedule software other than P6 is submitted, then the training session must be a total of 16-hours for each Department employee.

Network Diagrams, Reports, and Data

Include the following with each schedule submittal:

1. Two sets of originally plotted, time-scaled network diagrams
2. Two copies of a narrative report
3. One read-only compact disk or floppy diskette containing the schedule data

The time-scaled network diagrams must conform to the following:

1. Show a continuous flow of information from left to right
2. Be based on early start and early finish dates of activities
3. Clearly show the primary paths of criticality using graphical presentation
4. Be prepared on 34" x 44"
5. Include a title block and a timeline on each page

The narrative report must be organized in the following sequence with all applicable documents included:

1. Transmittal letter
2. Work completed during the period
3. Identification of unusual conditions or restrictions regarding labor, equipment or material; including multiple shifts, 6-day work weeks, specified overtime or work at times other than regular days or hours
4. Description of the current critical path
5. Changes to the critical path and scheduled completion date since the last schedule submittal
6. Description of problem areas
7. Current and anticipated delays:
 - 7.1. Cause of delay
 - 7.2. Impact of delay on other activities, milestones, and completion dates
 - 7.3. Corrective action and schedule adjustments to correct the delay
8. Pending items and status thereof:
 - 8.1. Permits
 - 8.2. Change orders
 - 8.3. Time adjustments
 - 8.4. Noncompliance notices
9. Reasons for an early or late scheduled completion date in comparison to the contract completion date

Schedule submittals will only be considered complete when all documents and data have been submitted as described above.

Preconstruction Scheduling Conference

Schedule a preconstruction scheduling conference with your project manager and the Engineer within 15 days after contract approval. The Engineer will conduct the meeting and review the requirements of this section with you.

Submit a general time-scaled logic diagram displaying the major activities and sequence of planned operations and be prepared to discuss the proposed work plan and schedule methodology that comply with the requirements of this section. If you propose deviations to the construction staging, then the general time-scaled logic diagram must also display the deviations and resulting time impacts. Be prepared to discuss the proposal.

At this meeting, also submit the alphanumeric coding structure and activity identification system for labeling work activities. To easily identify relationships, each activity description must indicate its associated scope or location of work by including such terms as quantity of material, type of work, bridge number, station to station location, side of highway (such as left, right, northbound, southbound), lane number, shoulder, ramp name, ramp line descriptor, or mainline.

The Engineer reviews the logic diagram, coding structure, and activity identification system, and provide any required baseline schedule changes to you for implementation.

Baseline Schedule

Beginning the week following the preconstruction scheduling conference, meet with the Engineer weekly to discuss schedule development and resolve schedule issues until the baseline schedule is accepted.

Submit a baseline schedule within 20 days of contract approval. Allow 20 days for the Engineer's review after the baseline schedule and all support data are submitted. In addition, the baseline schedule submittal is not considered complete until the computer software is delivered and installed for use in review of the schedule.

The baseline schedule must include the entire scope of work and how you plan to complete all work contemplated. The baseline schedule must show the activities that define the critical path. Multiple critical paths and near-critical paths must be kept to a minimum. A total of not more than 50 percent of the baseline schedule activities must be critical or near critical, unless otherwise authorized.

The baseline schedule must not extend beyond the number of contract working days. The baseline schedule must have a data date of contract approval. If you start work before contract approval, the baseline schedule must have a data date of the 1st day you performed work at the job site.

If you submit an early completion baseline schedule that shows contract completion in less than 85 percent of the contract working days, the baseline schedule must be supplemented with resource allocations for every task activity and include time-scaled resource histograms. The resource allocations must be shown to a level of detail that facilitates report generation based on labor crafts and equipment classes for you and your subcontractors. Use average composite crews to display the labor loading of on-site construction activities. Optimize and level labor to reflect a reasonable plan for accomplishing the work of the contract and to assure that resources are not duplicated in concurrent activities. The time-scaled resource histograms must show labor crafts and equipment classes to be used. The Engineer may review the baseline schedule activity resource allocations using Means Productivity Standards or equivalent to determine if the schedule is practicable.

Updated Schedule

Submit an updated schedule and meet with the Engineer to review contract progress, on or before the 1st day of each month, beginning one month after the baseline schedule is accepted. Allow 15 days for the Engineer's review after the updated schedule and all support data are submitted, except that the review period will not start until the previous month's required schedule is accepted. Updated schedules that are not accepted or rejected within the review period are considered accepted by the Engineer.

The updated schedule must have a data date of the 21st day of the month or other date established by the Engineer. The updated schedule must show the status of work actually completed to date and the work yet to be performed as planned. Actual activity start dates, percent complete, and finish dates must be shown as applicable. Durations for work that has been completed must be shown on the updated schedule as the work actually occurred, including Engineer submittal review and your resubmittal times.

You may include modifications such as adding or deleting activities or changing activity constraints, durations, or logic that do not (1) alter the critical path(s) or near critical path(s) or (2) extend the scheduled completion date compared to that shown on the current accepted schedule. Justify in writing the reasons for any changes to planned work. If any proposed changes in planned work will result in (1) or (2) above, then submit a time impact analysis as specified in this section.

Time Impact Analysis

Submit a written time impact analysis (TIA) with each request for adjustment of contract time, or when you or the Engineer consider that an approved or anticipated change may impact the critical path or contract progress.

The TIA must illustrate the impacts of each change or delay on the current scheduled completion date or internal milestone, as appropriate. The analysis must use the accepted schedule that has a data date closest to and before the event. If the Engineer determines that the accepted schedule used does not appropriately represent the conditions before the event, the accepted schedule must be updated to the day before the event being analyzed. The TIA must include an impact schedule developed from incorporating the event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities. If the impact schedule shows that incorporating the event modifies the critical path and scheduled completion date of the accepted schedule, the difference between scheduled completion dates of the two schedules must be equal to the adjustment of contract time. The Engineer may construct and use an appropriate project schedule or other recognized method to determine adjustments in contract time until you provide the TIA.

Submit 2 copies of your TIA within 20 days of receiving a written request for a TIA from the Engineer. Allow the Engineer 15 days after receipt to review the submitted TIA. All approved TIA schedule changes must be shown on the next updated schedule.

If a TIA you submit is rejected, meet with the Engineer to discuss and resolve issues related to the TIA. If clarification is still needed, you are allowed 15 days to submit a protest by submitting a Request for Information (RFI). The Engineer responds to the RFI within 5 days. Proceed with the work unless otherwise ordered. If agreement is not reached, you are allowed 5 days from the date you receive the Engineer's response to your protest to submit an Initial Potential Claim Record as specified in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications. Only show actual as-built work, not unapproved changes related to the TIA, in subsequent updated schedules. If agreement is reached at a later date, approved TIA schedule changes must be shown on the next updated schedule. The Engineer withholds remaining payment on the schedule contract item if a TIA is requested and not submitted within 20 days. The schedule item payment resumes on the next estimate after the requested TIA is submitted. No other contract payment is withheld regarding TIA submittals.

Final Updated Schedule

Submit a final update, as-built schedule with actual start and finish dates for the activities, within 30 days after completion of contract work. Provide a written certificate with this submittal signed by your project manager or an officer of the company stating, "To my knowledge and belief, the enclosed final update schedule reflects the actual start and finish dates of the actual activities for the project contained herein." An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager.

PAYMENT

Progress schedule (critical path method) will be paid for at a lump sum price. The contract lump sum price paid for progress schedule (critical path method) includes full compensation for furnishing all labor, material, tools, equipment, and incidentals, including computer software, and for doing all the work involved in preparing, furnishing, and updating schedules, and instructing and assisting the Engineer in the use of computer software, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payments for the progress schedule (critical path method) contract item will be made progressively as follows:

1. A total of 25 percent of the item amount will be paid upon achieving all of the following:
 - 1.1. Completion of 5 percent of all contract item work.
 - 1.2. Acceptance of all schedules and approval of all TIAs required to the time when 5 percent of all contract item work is complete.
 - 1.3. Delivery of schedule software to the Engineer.
 - 1.4. Completion of required schedule software training.
2. A total of 50 percent of the item amount will be paid upon completion of 25 percent of all contract item work and acceptance of all schedules and approval of all TIAs required to the time when 25 percent of all contract item work is complete.
3. A total of 75 percent of the item amount will be paid upon completion of 50 percent of all contract item work and acceptance of all schedules and approval of all TIAs required to the time when 50 percent of all contract item work is complete.
4. A total of 100 percent of the item amount will be paid upon completion of all contract item work, acceptance of all schedules and approval of all TIAs required to the time when all contract item work is complete, and submittal of the certified final update schedule.

If you fail to complete any of the work or provide any of the schedules required by this section, the Engineer makes an adjustment in compensation as specified in Section 4-1.03C, "Changes in Character of Work," of the Standard Specifications for the work not performed. Adjustments in compensation for schedules will not be made for any increased or decreased work ordered by the Engineer in submitting schedules.

10-1.20 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES

Flagging, signs, and temporary traffic control devices furnished, installed, maintained, and removed when no longer required shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Category 1 temporary traffic control devices are defined as small and lightweight (less than 100 pounds) devices. These devices shall be certified as crashworthy by crash testing, crash testing of similar devices, or years of demonstrable safe performance. Category 1 temporary traffic control devices include traffic cones, plastic drums, portable delineators, and channelizers.

If requested by the Engineer, the Contractor shall provide written self-certification for crashworthiness of Category 1 temporary traffic control devices at least 5 business days before beginning any work using the devices or within 2 business days after the request if the devices are already in use. Self-certification shall be provided by the manufacturer or Contractor and shall include the following:

- A. Date,
- B. Federal Aid number (if applicable),
- C. Contract number, district, county, route and post mile of project limits,
- D. Company name of certifying vendor, street address, city, state and zip code,
- E. Printed name, signature and title of certifying person; and
- F. Category 1 temporary traffic control devices that will be used on the project.

The Contractor may obtain a standard form for self-certification from the Engineer.

Category 2 temporary traffic control devices are defined as small and lightweight (less than 100 pounds) devices that are not expected to produce significant vehicular velocity change, but may cause potential harm to impacting vehicles. Category 2 temporary traffic control devices include barricades and portable sign supports.

Category 2 temporary traffic control devices shall be on the Federal Highway Administration's (FHWA) list of Acceptable Crashworthy Category 2 Hardware for Work Zones. This list is maintained by FHWA and can be located at:

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/listing.cfm?code=workzone

The Department also maintains this list at:

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/pdf/Category2.pdf>

Category 2 temporary traffic control devices that have not received FHWA acceptance shall not be used. Category 2 temporary traffic control devices in use that have received FHWA acceptance shall be labeled with the FHWA acceptance letter number and the name of the manufacturer. The label shall be readable and permanently affixed by the manufacturer. Category 2 temporary traffic control devices without a label shall not be used.

If requested by the Engineer, the Contractor shall provide a written list of Category 2 temporary traffic control devices to be used on the project at least 5 business days before beginning any work using the devices or within 2 business days after the request if the devices are already in use.

Category 3 temporary traffic control devices consist of temporary traffic-handling equipment and devices that weigh 100 pounds or more and are expected to produce significant vehicular velocity change to impacting vehicles. Temporary traffic-handling equipment and devices include crash cushions, truck-mounted attenuators, temporary railing, temporary barrier, and end treatments for temporary railing and barrier.

Type III barricades may be used as sign supports if the barricades have been successfully crash tested, meeting the NCHRP Report 350 criteria, as one unit with a construction area sign attached.

Category 3 temporary traffic control devices shall be shown on the plans or on the Department's Highway Safety Features list. This list is maintained by the Division of Engineering Services and can be found at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

Category 3 temporary traffic control devices that are not shown on the plans or not listed on the Department's Highway Safety Features list shall not be used.

Full compensation for providing self-certification for crashworthiness of Category 1 temporary traffic control devices and for providing a list of Category 2 temporary traffic control devices used on the project shall be considered as included in the prices paid for the various items of work requiring the use of the Category 1 or Category 2 temporary traffic control devices and no additional compensation will be allowed therefor.

10-1.21 CONSTRUCTION AREA SIGNS

Construction area signs for temporary traffic control shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Furnish Sign" of these special provisions.

Attention is directed to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Type II retroreflective sheeting shall not be used on construction area sign panels. Type III, IV, VII, VIII, or IX retroreflective sheeting shall be used for stationary mounted construction area sign panels.

Attention is directed to "Construction Project Information Signs" of these special provisions regarding the number and type of construction project information signs to be furnished, erected, maintained, and removed and disposed of.

Unless otherwise shown on the plans or specified in these special provisions, the color of construction area warning and guide signs shall have black legend and border on orange background, except W10-1 or W47(CA) (Highway-Rail Grade Crossing Advance Warning) sign shall have black legend and border on yellow background.

Orange background on construction area signs shall be fluorescent orange.

Repair to construction area sign panels will not be allowed, except when approved by the Engineer. At nighttime under vehicular headlight illumination, sign panels that exhibit irregular luminance, shadowing or dark blotches shall be immediately replaced at the Contractor's expense.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 business days, but not more than 14 days, prior to commencing excavation for construction area sign posts. The regional notification centers include, but are not limited to, the following:

Notification Center	Telephone Number
Underground Service Alert	811

Excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes. The post hole diameter, if backfilled with portland cement concrete, shall be at least 4 inches greater than the longer dimension of the post cross section.

Construction area signs placed within 15 feet from the edge of the travel way shall be mounted on stationary mounted sign supports as specified in "Construction Area Traffic Control Devices" of these special provisions.

The Contractor shall maintain accurate information on construction area signs. Signs that are no longer required shall be immediately covered or removed. Signs that convey inaccurate information shall be immediately replaced or the information shall be corrected. Covers shall be replaced when they no longer cover the signs properly. The Contractor shall immediately restore to the original position and location any sign that is displaced or overturned, from any cause, during the progress of work.

10-1.22 MAINTAINING TRAFFIC

Maintaining traffic shall conform to the provisions in Sections 7-1.08, "Public Convenience," Section 7-1.09, "Public Safety," and Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Closure is defined as the closure of a traffic lane or lanes, including shoulder, ramp or connector lanes, within a single traffic control system.

Closures shall conform to the provisions in "Traffic Control System for Lane Closure" of these special provisions.

Work that interferes with public traffic shall be limited to the hours when lane closures are allowed, except for work required under Sections 7-1.08, "Public Convenience," and Section 7-1.09, "Public Safety."

The full width of the traveled way shall be open for use by public traffic as shown in the table "Lane Closure Restriction for Designated Legal Holidays and Special Days" included in this section, "Maintaining Traffic."

The full width of the traveled way shall be open for use by public traffic when construction operations are not actively in progress.

Designated legal holidays are: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, and December 25th. When a designated legal holiday falls on a

Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.

The maximum length of a single stationary lane closure shall be 1 mile.

Not more than 1 separate stationary lane closure will be allowed in each direction of travel at one time. Local authorities shall be notified at least 5 business days before work begins. The Contractor shall cooperate with local authorities to handle traffic through the work area and shall make arrangements to keep the work area clear of parked vehicles.

Adjacent ramps, in the same direction of travel, servicing 2 consecutive local streets shall not be closed simultaneously unless directed by the Engineer.

SC6-3(CA) (RAMP CLOSED) sign shall be used to inform motorists of the temporary closing of a connector, entrance ramp or exit ramp for 1 business day.

SC6-4(CA) (RAMP CLOSED) sign shall be used to inform motorists of the temporary closing of a connector, entrance ramp or exit ramp for more than 1 business day.

The SC6-3(CA) or SC6-4(CA) signs shall be installed at least 7 days before closing the connector or ramp, but not more than 15 days before the connector or ramp closure. The Contractor shall notify the Engineer at least 2 business days before installing the SC6-3(CA) or SC6-4(CA) signs.

A Portable Changeable Message Sign shall be installed at least 7 days before closing the ramp, but not more than 15 days before the ramp closure. The Contractor shall notify the Engineer at least 2 business days before installing the Portable Changeable Message Sign. The Portable Changeable Message Sign shall be placed at location as directed by the Engineer.

Accurate information shall be maintained on the SC6-3(CA) or SC6-4(CA) signs. The SC6-3(CA) or SC6-4(CA) signs, when no longer required, shall be immediately covered or removed.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders including sections closed to public traffic.

On multilane roadways, when work vehicles or equipment are parked within 6 feet of a traffic lane to perform active construction, the shoulder area shall be closed.

On multilane roadways, a minimum of one paved traffic lane, not less than 11 feet wide, shall be open for use by public traffic in each direction of travel.

If minor deviations from the lane requirement charts are required, a written request shall be submitted to the Engineer at least 15 days before the proposed date of the closure. The Engineer may approve the deviations if there is no significant increase in the cost to the State and if the work can be expedited and better serve the public traffic.

Full compensation for furnishing, erecting, maintaining, and removing and disposing of the SC6-3(CA), SC6-4(CA), W20-1, W21-5b, and C24(CA) signs shall be considered as included in the contract lump sum price paid for construction area signs and no additional compensation will be allowed therefor.

Lane Closure Restriction for Designated Legal Holidays and Special Days										
Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
x	H xx	xx	xx							
	SD xx									
x	xx	H xx	xx							
		SD xx								
	x	xx	H xx	xx						
			SD xx							
	x	xx	xx	H xx	xxx					
	x	xx	xx	SD xx	xxx					
				x	H xx					
				x	SD xx					
					x	H xx				
						SD xx				
						x	H xx	xx	xx	xx
							SD xx			
Legends:										
	Refer to lane closure charts									
x	The full width of the traveled way shall be open for use by public traffic after 0500 hrs.									
xx	The full width of the traveled way shall be open for use by public traffic.									
xxx	The full width of the traveled way shall be open for use by public traffic until 1900 hrs.									
H	Designated Legal Holiday									
SD	Special Day									

Chart No. 1 Freeway Lane Requirements																									
County: ED					Route: 50										PM: R2.9/6.7										
Closure Limits: EB from PM 2.9/6.7																									
FROM HOUR TO HOUR																									
	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	1	1	1	1														1	1	1	1	1
Fridays	1	1	1	1	1	1	1															1	1	1	1
Saturdays	1	1	1	1	1	1	1	1	1												1	1	1	1	1
Sundays	1	1	1	1	1	1	1	1	1	1									1	1	1	1	1	1	1
Legend:																									
<input type="checkbox"/> 1 Provide at least one through freeway lane open in direction of travel																									
<input type="checkbox"/> Work permitted within project right of way where shoulder or lane closure is not required.																									
REMARKS:																									
<ul style="list-style-type: none"> Ramp adjacent to closed lane may be closed at same time See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions. 																									

Chart No. 2 Freeway/ Lane Requirements																									
County: ED					Route: 50										PM: R2.9/6.7										
Closure Limits: WB from PM R2.9/6.7																									
FROM HOUR TO HOUR																									
	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	1	1																	1	1	1	1
Fridays	1	1	1	1	1																	1	1	1	1
Saturdays	1	1	1	1	1	1	1	1														1	1	1	1
Sundays	1	1	1	1	1	1	1	1													1	1	1	1	1
Legend:																									
<input type="checkbox"/> 1 Provide at least one through freeway lane open in direction of travel																									
<input type="checkbox"/> Work permitted within project right of way where shoulder or lane closure is not required.																									
REMARKS:																									
<ul style="list-style-type: none"> See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions. 																									

10-1.23 CLOSURE REQUIREMENTS AND CONDITIONS

Closures shall conform to the provisions in "Maintaining Traffic" of these special provisions and these special provisions.

CLOSURE SCHEDULE

A written schedule of planned closures for the next week period, defined as Sunday noon through the following Sunday noon, shall be submitted by noon each Monday. A written schedule shall be submitted not less than 25 days and not more than 100 days before the anticipated start of any operation that will:

1. Reduce horizontal clearances, traveled way, including shoulders, to two lanes or less due to such operations as temporary barrier placement and paving
2. Reduce the vertical clearances available to the public due to such operations as pavement overlay, overhead sign installation, or falsework or girder erection

The Closure Schedule shall show the locations and times of the proposed closures. The Closure Schedule request forms furnished by the Engineer shall be used. Closure Schedules submitted to the Engineer with incomplete or inaccurate information will be rejected and returned for correction and resubmittal. The Contractor will be notified of disapproved closures or closures that require coordination with other parties as a condition of approval.

Closure Schedule amendments, including adding additional closures, shall be submitted by noon to the Engineer, in writing, at least 3 business days in advance of a planned closure. The Engineer shall be notified of cancelled closures 2 business days before the date of closure.

CONTINGENCY PLAN

A detailed contingency plan shall be prepared for reopening closures to public traffic. If required by "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions, the contingency plan shall be submitted to the Engineer before work at the job site begins. Otherwise, the contingency plan shall be submitted to the Engineer within one business day of the Engineer's request.

LATE REOPENING OF CLOSURES

If a closure is not reopened to public traffic by the specified time, work shall be suspended in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. No further closures are to be made until the Engineer has accepted a work plan, submitted by the Contractor, that will insure that future closures will be reopened to public traffic at the specified time. The Engineer will have 2 business days to accept or reject the Contractor's proposed work plan. The Contractor will not be entitled to compensation for the suspension of work resulting from the late reopening of closures.

For each 10-minute interval, or fraction thereof past the time specified to reopen the closure, the Department will deduct the amount per interval shown below from moneys due or that may become due the Contractor under the contract. Damages are limited to 5 percent of project cost per occurrence and will not be assessed when the Engineer requests that the closure remain in place beyond the scheduled pickup time.

Type of Facility	Route or Segment	Period	Damages/interval (\$)
Mainline	Route 50	1st half hour	\$ <u>1,250</u> / 10 minutes
		2nd half hour	\$ <u>1,875</u> / 10 minutes
		2nd hour and beyond	\$ <u>2,500</u> / 10 minutes

COMPENSATION

The Engineer shall be notified of delays in the Contractor's operations due to the following conditions, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of those conditions, and the Contractor's loss due to that delay could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment and plant, the delay will be considered a right of way delay and will be compensated in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications:

1. The Contractor's proposed Closure Schedule is denied and his planned closures are within the time frame allowed for closures in "Maintaining Traffic" of these special provisions, except that the Contractor will not be entitled to compensation for amendments to the Closure Schedule that are not approved.
2. The Contractor is denied a confirmed closure.

Should the Engineer direct the Contractor to remove a closure before the time designated in the approved Closure Schedule, delay to the Contractor's schedule due to removal of the closure will be considered a right of way delay and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

10-1.24 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes and ramps in conformance with the details shown on the plans, the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" of these special provisions, and these special provisions.

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

During traffic stripe operations and pavement marker placement operations using bituminous adhesive, traffic shall be controlled, at the option of the Contractor, with either stationary or moving lane closures. During other operations, traffic shall be controlled with stationary lane closures. Attention is directed to the provisions in Section 84-1.04, "Protection From Damage," and Section 85-1.06, "Placement," of the Standard Specifications.

If components in the traffic control system are displaced or cease to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the components to the original condition or replace the components and shall restore the components to the original location.

STATIONARY LANE CLOSURE

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

Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign (including cellular phones and radios) which shall be in operation when the vehicle is being used for placing, maintaining or removing the components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining or removing the components when operated within a stationary type lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on the vehicles which are doing the placing, maintaining and removing of components of a traffic control system and shall be in place before a lane closure requiring the sign's use is completed.

MOVING LANE CLOSURE

Flashing arrow signs used in moving lane closures shall be truck-mounted. Changeable message signs used in moving lane closure operations shall conform to the provisions in Section 12-3.12, "Portable Changeable Message Signs," of the Standard Specifications, except the signs shall be truck-mounted and the full operation height of the bottom of the sign may be less than 7 feet above the ground, but should be as high as practicable.

Truck-mounted attenuators (TMA) for use in moving lane closures shall be any of the following approved models, or equal:

1. Hexfoam TMA Series 3000, Alpha 1000 TMA Series 1000, and Alpha 2001 TMA Series 2001, manufactured by Energy Absorption Systems, Inc., 35 East Wacker Drive, Suite 1100, Chicago, IL 60601:
 - 1.1. Northern California: Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, telephone (800) 884-8274, FAX (916) 387-9734
 - 1.2. Southern California: Traffic Control Service, Inc., 1818 E. Orangethorpe, Fullerton, CA 92831-5324, telephone (800) 222-8274, FAX (714) 526-9501
2. Cal T-001 Model 2 or Model 3, manufacturer and distributor: Hexcel Corporation, 11711 Dublin Boulevard, P.O. Box 2312, Dublin, CA 94568, telephone (925) 551-4900
3. Renco Rengard Model Nos. CAM 8-815 and RAM 8-815, manufacturer and distributor: Renco Inc., 1582 Pflugerville Loop Road, P.O. Box 730, Pflugerville, TX 78660-0730, telephone (800) 654-8182

Each TMA shall be individually identified with the manufacturer's name, address, TMA model number, and a specific serial number. The names and numbers shall each be a minimum 1/2 inch high and located on the left (street) side at the

lower front corner. The TMA shall have a message next to the name and model number in 1/2 inch high letters which states, "The bottom of this TMA shall be _____ inches ± _____ inch above the ground at all points for proper impact performance." Any TMA which is damaged or appears to be in poor condition shall not be used unless recertified by the manufacturer. The Engineer shall be the sole judge as to whether used TMAs supplied under this contract need recertification. Each unit shall be certified by the manufacturer to meet the requirements for TMA in conformance with the standards established by the Transportation Laboratory.

Approvals for new TMA designs proposed as equal to the above approved models shall be in conformance with the procedures (including crash testing) established by the Transportation Laboratory. For information regarding submittal of new designs for evaluation contact: Transportation Laboratory, 5900 Folsom Boulevard, Sacramento, California 95819.

New TMAs proposed as equal to approved TMAs or approved TMAs determined by the Engineer to need recertification shall not be used until approved or recertified by the Transportation Laboratory.

PAYMENT

The contract lump sum price paid for traffic control system shall include full compensation for furnishing all labor, materials (including signs), tools, equipment, and incidentals (including cellular phones and radios), and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

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 required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased traffic control necessary. The 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.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.03D of the Standard Specifications, will be paid for as a part of the extra work.

10-1.25 TEMPORARY PAVEMENT DELINEATION

Temporary pavement delineation shall be furnished, placed, maintained, and removed in conformance with the provisions in Section 12-3.01, "General," of the Standard Specifications and these special provisions. Nothing in these special provisions shall be construed as reducing the minimum standards specified in the California MUTCD or as relieving the Contractor from the responsibilities specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

GENERAL

When the work causes obliteration of pavement delineation, temporary or permanent pavement delineation shall be in place before opening the traveled way to public traffic. Laneline or centerline pavement delineation shall be provided for traveled ways open to public traffic. On multilane roadways (freeways and expressways) edgeline delineation shall be provided for traveled ways open to public traffic.

The Contractor shall perform the work necessary to establish the alignment of temporary pavement delineation, including required lines or markers. Surfaces to receive application of paint temporary pavement delineation shall be dry and free of dirt and loose material. Temporary pavement delineation shall not be applied over existing pavement delineation or other temporary pavement delineation. Temporary pavement delineation shall be maintained until superseded or replaced with a new pattern of temporary pavement delineation or permanent pavement delineation, or as determined by the Engineer.

Temporary pavement markers, including underlying adhesive, that are applied to the final layer of surfacing or existing pavement to remain in place or that conflicts with a subsequent or new traffic pattern for the area shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

TEMPORARY LANELINE DELINEATION

When lanelines are obliterated and temporary pavement delineation to replace the lines is not shown on the plans, the minimum laneline delineation to be provided for that area shall be temporary pavement markers placed at longitudinal intervals of not more than 24 feet. The temporary pavement markers shall be the same color as the laneline the pavement markers replace. Temporary pavement markers shall be, at the option of the Contractor, one of the temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (180 days or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. The temporary pavement markers shall be placed in conformance with the manufacturer's instructions. Temporary pavement markers for long term day/night use (180 days or less) shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not

be used to place the temporary pavement markers in areas where removal of the temporary pavement markers will be required.

Temporary laneline delineation consisting entirely of temporary pavement markers listed for short term day/night use (14 days or less), shall be placed on longitudinal intervals of not more than 24 feet and shall be used for a maximum of 14 days on lanes opened to public traffic. Before the end of the 14 days the permanent pavement delineation shall be placed. If the permanent pavement delineation is not placed within the 14 days, the Contractor shall replace the temporary pavement markers and provide additional temporary pavement delineation and shall bear the cost thereof. The additional temporary pavement delineation to be provided shall be equivalent to the pattern specified for the permanent pavement delineation for the area, as determined by the Engineer.

TEMPORARY EDGELINE DELINEATION

On multilane roadways (freeways and expressways), when edgelines are obliterated and temporary pavement delineation to replace those edgelines is not shown on the plans, the edgeline delineation to be provided for those areas adjacent to lanes open to public traffic shall be as follows:

1. Temporary pavement delineation for right edgelines shall, at the option of the Contractor, consist of either a solid 4-inch wide traffic stripe of the same color as the stripe it replaces, traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 100 feet.
2. Temporary pavement delineation for left edgelines shall, at the option of the Contractor, consist of either solid 4-inch wide traffic stripe of the same color as the stripe it replaces, traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 100 feet or temporary pavement markers placed at longitudinal intervals of not more than 6 feet.

Where removal of the 4-inch wide traffic stripe will not be required, painted traffic stripe conforming to the provisions of "Temporary Traffic Stripe (Paint)" of these special provisions may be used.

The lateral offset for traffic cones, portable delineators or channelizers used for temporary edgeline delineation shall be as determined by the Engineer. If traffic cones or portable delineators are used as temporary pavement delineation for edgelines, the Contractor shall provide personnel to remain at the project site to maintain the cones or delineators during the hours of the day that the portable delineators are in use.

Channelizers used for temporary edgeline delineation shall be the surface mounted type and shall be orange in color. Channelizer bases shall be cemented to the pavement in the same manner provided for cementing pavement markers to pavement in "Pavement Markers" of these special provisions, except epoxy adhesive shall not be used to place channelizers on the top layer of pavement. Channelizers shall be, at the Contractor's option, one of the surface mount types (36 inch) listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary edgeline delineation shall be removed when no longer required for the direction of public traffic as determined by the Engineer.

TEMPORARY TRAFFIC STRIPE (PAINT)

The painted temporary traffic stripe shall be complete in place at the location shown before opening the traveled way to public traffic. Removal of painted temporary traffic stripe will not be required.

Temporary painted traffic stripe shall conform to the provisions in Section 84-3, "Painted Traffic Stripes and Pavement Markings," of the Standard Specifications. The Contractor shall apply 2 coats regardless of whether on new or existing pavement.

MEASUREMENT AND PAYMENT

Temporary traffic stripe shown on the plans will be measured and paid for in the same manner specified for paint traffic stripe in Section 84-3.06, "Measurement," and Section 84-3.07, "Payment," of the Standard Specifications.

Temporary pavement markers shown on the plans will be measured and paid for in the same manner specified for retroreflective pavement markers in Section 85-1.08, "Measurement," and Section 85-1.09, "Payment," of the Standard Specifications.

Full compensation for furnishing, placing, maintaining, and removing the temporary pavement markers (including underlying adhesive, layout (dribble) lines to establish alignment of temporary pavement markers or used for temporary laneline delineation) for those areas where temporary laneline delineation is not shown on the plans and for providing equivalent patterns of permanent traffic lines for those areas when required, shall be considered as included in the contract prices paid for the items of work that obliterated the laneline pavement delineation and no separate payment will be made therefor.

Full compensation for furnishing, placing, maintaining, and removing temporary edgeline delineation not shown on the plans shall be considered as included in the contract prices paid for the items of work that obliterated the edgeline pavement delineation and no separate payment will be made therefor. The quantity of channelizers used as temporary edgeline delineation will not be included in the quantity of channelizer (surface mounted) to be paid for.

10-1.26 PORTABLE CHANGEABLE MESSAGE SIGNS

GENERAL

Summary

Work includes furnishing, placing, operating, maintaining, and removing portable changeable message signs. Comply with Section 12-3.12 "Portable Changeable Message Signs," of the Standard Specifications.

Definitions

useable shoulder area: Paved or unpaved contiguous surface adjacent to the traveled way with:

1. Sufficient weight bearing capacity to support portable changeable message sign
2. Slope not greater than 6:1 (horizontal:vertical)

Submittals

Upon request, submit a Certificate of Compliance for each portable changeable message sign under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Quality Control and Assurance

Comply with the manufacturer's operating instructions for portable changeable message sign.

Approaching drivers must be able to read the entire message for all phases at least twice at the posted speed limit before passing portable changeable message sign. You may use more than 1 portable changeable message sign to meet this requirement.

Only display the message shown on the plans or ordered by the Engineer or specified in these special provisions.

MATERIALS

Portable changeable message sign must have 24-hour timer control or remote control capability.

The text of the message displayed on portable changeable message sign must not scroll, or travel horizontally or vertically across the face of the message panel.

CONSTRUCTION

Continuously repeat the entire message in no more than 2 phases of at least 3 seconds per phase.

If useable shoulder area is at least 15 feet wide, the displayed message on portable changeable message sign must be minimum 18-inch character height. If useable shoulder area is less than 15 feet wide, you may use a smaller message panel with minimum 12-inch character height to prevent encroachment in the traveled way.

You or your representative must be available by cell phone for operations that require portable changeable message signs. Give the Engineer your cell phone number. When the Engineer contacts you, immediately comply with the Engineer's request to modify the displayed message.

Start displaying the message on portable changeable message sign 15 minutes before closing the lane.

Place portable changeable message sign in advance of the first warning sign for:

1. Each stationary lane closure
2. Each ramp closure
3. Each connector closure
4. Each shoulder closure
5. Each speed reduction zone

Place portable changeable message sign as far from the traveled way as practicable where it is legible to traffic and does not encroach on the traveled way. Place portable changeable sign before or at the crest of vertical roadway curvature where it is visible to approaching traffic. Avoid placing portable changeable message sign within or immediately after horizontal roadway curvature. Where possible, place portable changeable message sign behind guardrail or temporary railing (Type K).

Except where placed behind guardrail or temporary railing (Type K) use traffic control for shoulder closure to delineate portable changeable message sign.

Remove portable changeable message sign when not in use.

MEASUREMENT AND PAYMENT

The number of portable changeable message signs required at any one time (Minimum of 2 each) will be determined by the number of lane, shoulder and ramp closures, and detour to preceding ramp or next ramp that the Contractor determines are necessary for his operations.

Portable changeable message signs shall be measured per unit per day the sign is in use or sign working day (SWD). Portable changeable message signs at the project site but not in use will not be paid for.

The contract price paid per sign working day (SWD) for portable changeable message sign shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing, placing, operating, maintaining, repairing, replacing, transporting from location to location and removing the portable changeable message signs, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.27 CHANNELIZER

Channelizers shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Channelizers shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

When no longer required for the work as determined by the Engineer, channelizers and underlying adhesive used to cement the channelizer bases to the pavement shall be removed. Removed channelizers and adhesive shall become the property of the Contractor and shall be removed from the site of work.

10-1.28 TEMPORARY CRASH CUSHION MODULE

This work shall consist of furnishing, installing, and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the plans, as specified in these special provisions or where designated by the Engineer. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in conformance with the details shown on the plans and these special provisions.

Temporary crash cushions shall be secured in place prior to commencing work for which the temporary crash cushions are required.

Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 15 feet or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no longer required, as determined by the Engineer, sand filled temporary crash cushions shall be removed from the site of the work.

Sand filled temporary crash cushion modules shall be one of the following, or equal, and be manufactured after March 31, 1997:

1. Energite III and Fitch Inertial Modules, manufactured by Energy Absorption Systems, Inc., 35 East Wacker Drive, Suite 1100, Chicago, IL 60601:
 - 1.1. Northern California: Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, telephone (800) 884-8274, FAX (916) 387-9734
 - 1.2. Southern California: Traffic Control Service, Inc., 1818 E. Orangethorpe, Fullerton, CA 92831-5324, telephone (800) 222-8274, FAX (714) 526-9501
2. Traffix Sand Barrels, manufactured by Traffix Devices, Inc., 220 Calle Pintoresco, San Clemente, CA 92672, telephone (949) 361-5663, FAX (949) 361-9205
 - 2.1. Northern California: United Rentals, Inc., 1533 Berger Drive, San Jose, CA 95112, telephone (408) 287-4303, FAX (408) 287-1929
 - 2.2. Southern California: Statewide Safety & Sign, Inc., P.O. Box 1440, Pismo Beach, CA 93448, telephone (800) 559-7080, FAX (805) 929-5786

3. CrashGard Model CC-48 Sand Barrels, manufactured by Plastic Safety Systems, Inc., 2444 Baldwin Road, Cleveland, OH 44104:
 - 3.1. Northern California:
 - 3.1.1. Capitol Barricade Safety & Sign, 6329 Elvas Ave, Sacramento, CA 95819, telephone (888) 868-5021, FAX (916) 451-5388
 - 3.1.2. Sierra Safety, Inc., 9093 Old State Highway, New Castle, CA 95658, telephone (916) 663-2026, FAX (916) 663-1858
 - 3.2. Southern California: Hi Way Safety Inc., 13310 5th Street, Chino, CA 91710, telephone (909) 591-1781, FAX (909) 627-0999

Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color, as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified herein may be utilized. If used Fitch modules requiring a seal are furnished, the top edge of the seal shall be securely fastened to the wall of the module by a continuous strip of heavy duty tape.

Modules shall be filled with sand in conformance with the manufacturer's directions, and to the sand capacity in pounds for each module shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain not more than 7 percent water as determined by California Test 226.

Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

Temporary crash cushion modules may be placed on movable pallets or frames. Comply with dimensions shown on the plans. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement or bridge deck.

A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the plans, when the closest point of the crash cushion array is within 12 feet of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods determined by the Engineer.

At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in the permanent work.

Temporary crash cushion modules will be measured by the unit as determined from the actual count of modules used in the work or ordered by the Engineer at each location. Temporary crash cushion modules placed in conformance with Section 7-1.09, "Public Safety," of the Standard Specifications and modules placed in excess of the number specified or shown will not be measured nor paid for.

Repairing modules damaged by public traffic will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Modules damaged beyond repair by public traffic, when ordered by the Engineer, shall be removed and replaced immediately by the Contractor. Modules replaced due to damage by public traffic will be measured and paid for as temporary crash cushion module.

If the Engineer orders a lateral move of the sand filled temporary crash cushions and the repositioning is not shown on the plans, moving the sand filled temporary crash cushion will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications and these temporary crash cushion modules will not be counted for payment in the new position.

The contract unit price paid for temporary crash cushion module shall include full compensation for furnishing all labor, materials (including sand, pallets or frames and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing, installing, maintaining, moving, and resetting during a work period for access to the work, and removing from the site of the work when no longer required (including those damaged by public traffic) sand filled temporary crash cushion modules, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.29 TREATED WOOD WASTE

GENERAL

Summary

This work includes handling, storing, transporting, and disposing of treated wood waste (TWW).

Wood removed from [metal beam barrier](#), [thrie beam barrier](#) and [roadside signs](#) is treated with one or more of the following:

1. Creosote
2. Pentachlorophenol
3. Copper azole
4. Copper boron azole
5. Chromated copper arsenate
6. Ammoniacal copper zinc arsenate
7. Copper naphthenate
8. Alkaline copper quaternary

Manage TWW under Title 22 CA Code of Regulations, Division 4.5, Chapter 34.

Submittals

For disposal of TWW submit a copy of each completed shipping record and weight receipt to the Engineer within 5 business days of disposal.

CONSTRUCTION

Provide training to personnel who handle TWW or may come in contact with TWW that includes:

1. All applicable requirements of Title 8 CA Code of Regulations
2. Procedures for identifying and segregating TWW
3. Safe handling practices
4. Requirements of Title 22 CA Code of Regulations, Division 4.5, Chapter 34
5. Proper disposal methods

Store TWW before disposal using any of the following methods:

1. Elevate on blocks above a reasonably foreseeable run-on elevation and protect from precipitation
2. Place in water-resistant containers designed for shipping or solid waste collection
3. Place on a containment surface or pad protected from run-on and precipitation
4. Place in a storage building as defined in Title 22 CA Code of Regulations, Div. 4.5, Chp. 34, Section 67386.6 (a)(2)(c).

Prevent unauthorized access to TWW using a secured enclosure such as a locked chain link fenced area or a lockable shipping container located within the project limits.

Resize and segregate TWW at a location where debris from the operation including sawdust and chips can be contained. Collect and manage the debris as TWW.

Provide water-resistant labels, that comply with Title 22 CA Code of Regulations, Division 4.5, Chapter 34, to clearly mark and identify TWW and accumulation areas. Labels must include:

1. Caltrans, District number, Construction, contract number
2. District office address
3. Engineer's name, address, and telephone number
4. Contractor's contact name and telephone number
5. Date placed in storage

Before transporting TWW, obtain an agreement from the receiving facility that the treated wood waste will be accepted. Protect shipments of treated wood waste from loss and exposure to precipitation. For projects with 10,000 pounds or more of TWW, request a hazardous waste generator identification number from the Engineer at least 5 business days before the first shipment. Each shipment must be accompanied by a shipping record such as a bill of lading or invoice that includes:

1. Caltrans with district number
2. Construction contract number
3. District office address
4. Engineer's name, address, and telephone number
5. Contractor's contact name and telephone number
6. Receiving facility name and address
7. Waste description: treated wood waste (preservative type if known or unknown/mixture)

8. Project location
9. Estimated quantity of shipment by weight or volume
10. Date of transport
11. Date of receipt by the receiving TWW facility
12. Weight of shipment as measured by the receiving TWW facility
13. For projects with 10,000 pounds or more of TWW include the generator identification number

The shipping record must be at least a 4-part carbon or carbonless 8-1/2" x 11" form to allow retention of copies by the Engineer, transporter, and disposal facility.

Dispose of TWW at an approved TWW facility. A list of currently approved TWW facilities may be viewed at:

http://www.dtsc.ca.gov/HazardousWaste/upload/TWW_Confirmed_Landfill_List.pdf

Dispose of TWW within:

1. 90 days of generation if stored on blocks
2. 180 days of generation if stored on a containment surface or pad.
3. One year of generation if filling a water-resistant container, or 90 days after the container is full, whichever is shorter
4. One year of generation if storing in a storage building as defined in Title 22 CA code of Regulations, Div. 4.5, Chp. 34, Section 67386.6(a)(2)(C)

MEASUREMENT AND PAYMENT

Full compensation for handling, storing, transporting, and disposing TWW, including personnel training, is included in the contract price paid for the various items of work involved and no additional compensation will be allowed therefor.

10-1.30 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.

EARTH MATERIAL CONTAINING LEAD AND RESIDUE CONTAINING LEAD FROM PAINT AND THERMOPLASTIC

General

This work includes handling earth material and residue from paint and thermoplastic containing lead under these special provisions.

Submittals

Prepare a work plan to prevent or minimize worker exposure to lead while managing and handling earth materials, paint system debris, traffic stripe residue, and pavement marking residue containing lead. Regulations containing specific Cal/OSHA requirements when working with lead include 8 CA Code of Regs § 1532.1.

The plan must contain the items listed in 8 CA Code of Regs § 1532.1(e)(2)(B). Before submittal, a CIH must sign and seal the plan. Submit the plan at least 7 days before starting any activity that presents the potential for lead exposure. The Engineer notifies you of the acceptability of the plan within 4 business days of receipt.

Before starting any activity that presents the potential for lead exposure to employees who have no prior training, including State employees, provide a safety training program to these employees that complies with 8 CA Code of Regs § 1532.1 and your lead compliance program.

Submit copies of air monitoring or job site inspection reports made by or under the direction of the CIH under 8 CA Code of Regs § 1532.1 within 10 days after the date of monitoring or inspection.

Supply personal protective equipment, training, and washing facilities required by your lead compliance plan for 8 Department employees.

Project Conditions

Lead is present in earth material within the project limits at average concentrations below 1,000 mg/kg total lead and below 5 mg/l soluble lead. Earth material within the project limits:

1. Is not a hazardous waste
2. Does not require disposal at a permitted landfill or solid waste disposal facility

Lead has been detected in earth material in unpaved areas of the highway. Levels of lead found within the project limits range from less than 5.0 to 150 mg/kg total lead with an average concentration of 16.1 mg/kg total lead as analyzed by EPA Test Method 6010 or EPA Test Method 7000 series and based upon a 95% Upper Confidence Limit.

Residue from grinding or cold planing contains lead from paint and thermoplastic. The average lead concentrations are less than 1,000 mg/kg total lead and 5 mg/L soluble lead. This residue:

1. Is a nonhazardous waste
2. Does not contain heavy metals in concentrations that exceed thresholds established by the Health and Safety Code and 22 CA Code of Regs
3. Is not regulated under the Federal Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 et seq.

Construction

Handle earth material containing lead under all applicable laws, rules, and regulations, including those of the following agencies:

1. Cal/OSHA
2. CA Regional Water Quality Control Board, Region 5 – [Central Valley](#)
3. CA Department of Toxic Substances Control

If earth material is disposed of:

1. Dispose of under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way, " of the Standard Specifications
2. Disclose the lead concentration of the earth material to the receiving property owner when obtaining authorization for disposal on the property
3. Obtain the receiving property owner's acknowledgment of lead concentration disclosure in the written authorization for disposal
4. You are responsible for any additional sampling and analysis required by the receiving property owner

If you choose to dispose of earth material at a commercial landfill:

1. Transport it to a Class III or Class II landfill appropriately permitted to receive the material
2. You are responsible for identifying the appropriately permitted landfill to receive the earth material and for all associated trucking and disposal costs including any additional sampling and analysis required by the receiving landfill.

Measurement and Payment

Full compensation for handling earth material containing lead is included in the contract prices paid for [the various contract items of work involved](#) and no additional compensation will be allowed therefor.

Payment for handling, removal, and disposal of grinding or cold planing residue that is a nonhazardous waste is included in the payment for the type of removal work involved.

The contract lump sum price paid for lead compliance plan includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in preparing and implementing the plan as specified in this section.

ABANDON CULVERT

Existing culverts, where shown on the plans to be abandoned, shall be abandoned in place or, at the option of the Contractor, the culverts 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 90-10 "Minor Concrete," of the Standard Specifications. The concrete shall contain not less than 505 pounds of cementitious material per cubic yard.

Abandoning culverts in place shall conform to the following:

1. Culverts that intersect the side slopes shall be removed to a depth of not less than 3 feet measured normal to the plane of the finished side slope, before being abandoned.
2. Culverts 12 inches in diameter and larger, shall, at the Contractor's option, be backfilled with either sand, controlled low strength material or slurry cement backfill conforming to the provisions in Section 19-3.062, "Slurry Cement

Backfill," of the Standard Specifications by any method acceptable to the Engineer that completely fills the pipe. Sand backfill material shall be clean, free draining, and free from roots and other deleterious substances.

3. The ends of culverts shall be securely closed by a 0.5-foot thick tight fitting plug or wall of commercial quality concrete.

Culverts shall not be abandoned until their use is no longer required. The Contractor shall notify the Engineer in advance of any intended culvert abandonment.

Full compensation for concrete plugs, pipe removal, structure excavation, and backfill (including sand, controlled low strength material or slurry cement backfill) shall be considered as included in the contract unit price paid for abandon culvert and no additional compensation will be allowed therefor.

ABANDON INLET

Existing concrete drainage inlets, where shown on the plans to be abandoned, shall be abandoned. Removed frames and grates shall be disposed of.

REMOVE METAL BEAM BARRIER (SINGLE OR DOUBLE THRIE)

Existing metal beam barrier, where shown on the plans to be removed, shall be removed and disposed of.

Existing concrete anchors or steel foundation tubes shall be completely removed and disposed of. Full compensation for removing concrete anchors shall be considered as included in the contract price paid per linear foot for remove metal beam barrier (single or double thrie as applicable) and no separate payment will be made therefor.

Full compensation for removing cable anchor assemblies, terminal anchor assemblies or steel foundation tubes shall be considered as included in the contract price paid per linear foot for remove metal beam barrier (single or double thrie as applicable) and no separate payment will be made therefor.

REMOVE SIGN STRUCTURE

Existing sign structures, where shown on the plans to be removed, shall be removed and disposed of.

Bridge mounted sign structure removal shall consist of removing sign panels and frames, sign lighting electrical equipment, walkways with safety railings, structural braces and supports, and hardware.

A sign structure shall not be removed until the structure is no longer required for the direction of public traffic.

Electrical wiring shall be removed to the nearest pull box. Fuses within spliced connections in the pull box shall be removed and disposed of.

Electrical equipment, where shown on the plans, shall be salvaged.

REMOVE PAVEMENT MARKERS

Existing channelizers and pavement markers, including underlying adhesive, when no longer required for traffic lane delineation as determined by the Engineer, shall be removed and disposed of.

Full compensation for removing and disposing of channelizers and pavement markers and underlying adhesive shall be considered as included in the contract price paid per ton for hot mix asphalt and no separate payment will be made therefor.

REMOVE PIPE OR INLET

Existing pipes and inlets, where any portion of these structures is within 3 feet of the grading plane in excavation areas, or within one foot of original ground in embankment areas, or where shown on the plans to be removed, shall be completely removed and disposed of.

REMOVE ASPHALT CONCRETE DIKE

Existing asphalt concrete dike, where shown on the plans to be removed, shall be removed.

Prior to removing the dike, the outside edge of the asphalt concrete to remain in place shall be cut on a neat line to a minimum depth of 0.17-foot.

The dike shall be removed in such a manner that the surfacing which is to remain in place is not damaged.

The dike shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

REMOVE ROADSIDE SIGN

Existing roadside signs, at those locations shown on the plans to be removed, shall be removed and disposed of.

Existing roadside signs shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless otherwise directed by the Engineer.

RECONSTRUCT DOUBLE THRIE BEAM BARRIER

Existing **double thrie beam barrier**, where shown on the plans to be reconstructed, shall be reconstructed.

Attention is directed to "Order of Work" of these special provisions regarding the reconstruction of **double thrie beam barrier** at those locations exposed to public traffic.

Cable anchor assemblies or terminal anchor assemblies, including concrete anchors and steel foundation tubes, shall be completely removed and disposed of.

New posts, blocks, and hardware shall be furnished and used to reconstruct **double thrie beam barrier**. New posts and blocks shall conform to the provisions in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications.

Posts, blocks, and other components of the removed **double thrie beam barrier**, including terminal sections, that are not used in the reconstruction work shall be disposed of.

Full compensation for furnishing and installing new posts, blocks, and hardware; for connecting reconstructed **double thrie beam barrier** to existing structures, other flat concrete surfaces or terminal systems; and for removing and disposing of anchor assemblies shall be considered as included in the contract price paid per linear foot for reconstruct **double thrie beam barrier** and no separate payment will be made therefor.

ADJUST INLET

Existing pipe inlets and concrete drainage inlets shall be adjusted as shown on the plans.

Concrete shall be minor concrete conforming to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications. The concrete shall contain not less than 590 pounds of cementitious material per cubic yard.

Adjustment of inlets shall be performed before paving and shall be limited to the area to be paved or surfaced during the working day in which the adjustment is performed. The top of the inlet grate or cover shall be protected from the hot mix asphalt during paving operations by means of heavy plywood covers, steel plate covers or by other methods approved by the Engineer. Excess paving material shall be removed before rolling.

COLD PLANE ASPHALT CONCRETE PAVEMENT

GENERAL

Summary

This work includes cold planing existing asphalt concrete pavement.

Sequencing and Scheduling

Schedule cold planing activities so that not more than **3 days** elapses between the time the pavement is cold planed and the HMA is placed.

No cold planed area shall remain exposed during weekend traffic periods.

MATERIALS

HMA for temporary tapers must be of the same quality as the HMA used elsewhere on the project or comply with "Minor Hot Mix Asphalt" of these special provisions.

CONSTRUCTION

General

Perform planing of asphalt concrete pavement without the use of a heating device to soften the pavement.

Cold Planing Equipment

Cold planing machine must be:

1. Equipped with a cutter head width that matches the planing width. If the only available cutter head width is wider than the cold plane area shown, submit to the Engineer a request for using a wider cutter head. Do not cold plane until the Engineer approves your request.
2. Equipped with automatic controls to control the longitudinal grade and transverse slope of the cutter head and:
 - 2.1. If a ski device is used, it must be at least 30 feet long, rigid, and 1 piece unit. The entire length must be used in activating the sensor.
 - 2.2. If referencing from existing pavement, the cold planing machine must be controlled by a self-contained grade reference system. The system must be used at or near the centerline of the roadway. On the adjacent pass with the cold planing machine, a joint matching shoe may be used.

3. Equipped to effectively control dust generated by the planing operation.
4. Operated so that no fumes or smoke is produced.

Replace broken, missing, or worn machine teeth.

Grade Control and Surface Smoothness

Furnish, install, and maintain grade and transverse slope references.

The depth, length, width, and shape of the cut must be as shown or as ordered. The final cut must result in a neat and uniform surface. Do not damage remaining surface.

The completed surface of the planed asphalt concrete pavement must not vary more than 0.02 foot when measured with a 12-foot straightedge parallel with the centerline. The transverse slope of the planed surface must not vary more than 0.03 foot from the straightedge when placed at right angles to the centerline.

A drop-off of more than 0.15 foot is not allowed between adjacent lanes open to public traffic.

Temporary HMA Tapers

If a drop-off between the existing pavement and the planed area at transverse joints cannot be avoided before opening to traffic, construct a temporary HMA taper. HMA for temporary taper must be:

1. Placed to the level of the existing pavement and tapered on a slope of 30:1 (Horizontal: Vertical) or flatter to the level of the planed area
2. Compacted by any method that will produce a smooth riding surface
3. Completely removed before placing the permanent surfacing. The removed material must be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Disposal of Planed Material

The Contractor shall submit to the Engineer a Debris and Dust Removal Plan for acceptance 14 days prior to beginning cold plane operations. The Debris and Dust Removal Plan shall be a written detail of how the Contractor proposes to remove and control debris and dust during and after cold plane operations, including number and type of equipment used and timing of the operations on a daily basis, and shall include the contact information for the Contractor's Claim or Loss Control Agent.

Remove cold planed material concurrent with planing activities, within 50 feet of the planer or as ordered.

Dispose of planed material and under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

MEASUREMENT AND PAYMENT

Cold plane asphalt concrete pavement is measured by the square yard.

The contract price paid per square yard for cold plane asphalt concrete pavement includes full compensation for furnishing all labor, materials, tools, equipment, the Debris and Dust Removal Plan, and incidentals, and for doing all the work involved in cold planing asphalt concrete surfacing and disposing of planed material, including constructing, maintaining, removing temporary HMA tapers if applicable, as specified in the Standard Specifications and these special provisions and as directed by the Engineer.

Full compensation for removal of thermoplastic traffic stripe, painted traffic stripe, and pavement marking in areas of cold plane asphalt concrete is included in the contract price paid for cold plane asphalt concrete and no separate payment will be made therefor.

REMOVE CONCRETE BARRIER

Concrete, where shown on the plans to be removed, shall be removed.

Remove concrete barrier (Type K) will be measured by the linear foot, measured along the barrier before removal operations.

Concrete Barrier (Type K) removed shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

10-1.31 TRENCH AND EXCAVATION SAFETY

Attention is directed to Sections 5-1.02A, "Excavation Safety Plans," and 7-1.01E, "Trench Safety," of the Standard Specifications and OSHA 29 CFR Part 1926 Construction Industry Regulations and these special provisions.

The Contractor shall provide a safe means of egress in trenches and excavations 5 feet deep and greater by the use of sheeting, shoring, bracing, sloping of the sides of the trench or excavation, or equivalent method.

The Contractor shall submit a detailed plan showing the design of the sheeting, shoring, bracing or equivalent method which the Contractor proposes to use during construction to the Engineer in accordance with Section 5-1.02A of the Standard Specifications, except that this plan shall be submitted for the Engineer's review and acknowledgement within five (5) working days prior to any proposed work requiring protection. No excavation or trenching requiring protection shall commence until the "Shoring and Excavation Plan" is approved by the Engineer.

Full compensation for furnishing all labor, tools, equipment, and materials necessary to install sheeting, shoring and bracing, sloping the sides of trenches and excavations 5 feet deep and greater or equivalent method, in addition to preparing the "Shoring and Excavation Plan" as specified above, in accordance with the plans, the Standard Specifications and these special provisions shall be included in the lump sum contract price paid for trench and excavation safety and no additional compensation will be allowed therefor.

10-1.32 ROCK EXCAVATION

You are advised that hard rock likely exists that will require alternative excavation techniques, including but not limited to the use of hydraulic rock breaking equipment, blasting (if allowed by the Contract Documents), coring (for drilling operations), and/or chemical splitting agents. Payment for excavating any hard rock as described herein during the course of performing work under any contract item shall be considered paid for by the contract item that necessitates the excavation, and no additional compensation shall be provided therefor.

10-1.33 EARTHWORK

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Surplus excavated material shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Where a portion of the existing surfacing is to be removed, the outline of the area to be removed shall be cut on a neat line with a power-driven saw to a minimum depth of 0.17-foot before removing the surfacing. Full compensation for cutting the existing surfacing shall be considered as included in the contract price paid per cubic yard for roadway excavation and no additional compensation will be allowed therefor.

Reinforcement or metal attached to reinforced concrete rubble placed in embankments shall not protrude above the grading plane. Prior to placement within 2 feet below the grading plane of embankments, reinforcement or metal shall be trimmed to no greater than 3/4 inch from the face of reinforced concrete rubble. Full compensation for trimming reinforcement or metal shall be considered as included in the contract prices paid per cubic yard for the types of excavation shown in the Engineer's estimate, or the contract prices paid for furnishing and placing imported borrow or embankment material, as the case may be, and no additional compensation will be allowed therefor.

The quantity of roadway excavation in the Engineer's Estimate is designated as final pay.

10-1.34 CONTROLLED LOW STRENGTH MATERIAL

Controlled low strength material shall consist of a workable mixture of aggregate, cementitious materials, and water and shall conform to the provisions for slurry cement backfill in Section 19-3.062, "Slurry Cement Backfill," of the Standard Specifications and these special provisions.

At the option of the Contractor, controlled low strength material may be used as structure backfill for pipe culverts, except that controlled low strength material shall not be used as structure backfill for culverts having a diameter or span greater than 20 feet.

When controlled low strength material is used for structure backfill, the width of the excavation shown on the plans may be reduced so that the clear distance between the outside of the pipe and the side of the excavation, on each side of the pipe, is a minimum of 12 inches. This minimum may be reduced to 6 inches when the height of cover is less than or equal to 20 feet or the pipe diameter or span is less than 42 inches.

Controlled low strength material in new construction shall not be permanently placed higher than the basement soil. For trenches in existing pavements, permanent placement shall be no higher than the bottom of the existing pavement permeable drainage layer. If a drainage layer does not exist, permanent placement in existing pavements shall be no higher than one inch below the bottom of the existing asphalt concrete surfacing or no higher than the top of base below the existing

portland cement concrete pavement. The minimum height that controlled low strength material shall be placed, relative to the culvert invert, is 0.5 diameter or 0.5 height for rigid culverts and 0.7 diameter or 0.7 height for flexible culverts.

When controlled low strength material is proposed for use, the Contractor shall submit a mix design and test data to the Engineer for approval prior to excavating the trench for which controlled low strength material is proposed for use. The test data and mix design shall provide for the following:

- A. A 28-day compressive strength between 50 pounds per square inch and 100 pounds per square inch for pipe culverts having a height of cover of 20 feet or less and a minimum 28-day compressive strength of 100 pounds per square inch for pipe culverts having a height of cover greater than 20 feet. Compressive strength shall be determined in conformance with the requirements in ASTM Designation: D 4832.
- B. Cement shall be any type of portland cement conforming to the requirements in ASTM Designation: C 150; or any type of blended hydraulic cement conforming to the requirements in ASTM Designation: C 595M or the physical requirements in ASTM Designation: C 1157M. Testing of cement will not be required.
- C. Admixtures may be used in conformance with the provisions in Section 90-4, "Admixtures," of the Standard Specifications. Chemical admixtures containing chlorides as Cl in excess of one percent by weight of admixture, as determined in conformance with the requirements of California Test 415, shall not be used. If an air-entraining admixture is used, the maximum air content shall be limited to 20 percent. Mineral admixtures shall be used at the Contractor's option.

Materials for controlled low strength material shall be thoroughly machine-mixed in a pugmill, rotary drum or other approved mixer. Mixing shall continue until the cementitious material and water are thoroughly dispersed throughout the material. Controlled low strength material shall be placed in the work within 3 hours after introduction of the cement to the aggregates.

When controlled low strength material is to be placed within the traveled way or otherwise to be covered by paving or embankment materials, the material shall achieve a maximum indentation diameter of 3 inches prior to covering and opening to public traffic. Penetration resistance shall be measured in conformance with the requirements in ASTM Designation: D 6024.

Controlled low strength material used as structure backfill for pipe culverts will be considered structure backfill for compensation purposes.

10-1.35 SHOULDER BACKING

This work shall consist of constructing shoulder backing adjacent to the edge of new pavement surfacing in conformance with the details shown on the plans and these special provisions.

Shoulder backing material shall be clean and free from organic matter and other deleterious substances. Shoulder backing may include any combination of broken stone, crushed gravel, natural rough-surfaced gravel, sand, and processed reclaimed asphalt concrete pavement, portland cement concrete pavement, lean concrete base, and cement treated base. Shoulder backing material shall conform to the following grading requirements:

Shoulder Backing Grading Requirements

Sieve Sizes	Percentage Passing
2"	100
1"	75 - 100
3/4"	65 - 100
No. 4	35 - 60
No. 30	10 - 35
No. 200	5 - 15

Sand Equivalent for shoulder backing material shall be from 10 to 35 determined in conformance with California Test 217 except if 100 percent reclaimed asphalt concrete pavement is used, the Sand Equivalent requirement is 10 minimum.

If 100 percent reclaimed asphalt concrete pavement is used, shoulder backing material must conform to the following grading requirements:

**Shoulder Backing Grading
Requirements Using 100% Reclaimed
Asphalt Concrete Pavement**

Sieve Sizes	Percentage Passing
1-1/2"	100
3/4"	70 - 100
No. 4	30 - 80

If a combination of broken stone, crushed gravel, natural rough-surfaced gravel, and sand material is used, shoulder backing material shall conform to the following quality requirements:

**Shoulder Backing Quality Requirements Using Non-Reclaimed
Materials**

Specification	California Test	Requirement
Sand equivalent	217	10 - 30
Percentage crushed particles (% min.) ^a	205	
One fractured face		75
Two fractured faces		50
Durability index (min.)	229	25

Note:

^a Applies to material retained on No. 4 sieve only

Shoulder backing material shall have a minimum unit weight of 105 pounds per cubic foot determined in conformance with California Test 212 using the Rodding Method. Shoulder backing must be delivered at or near optimum moisture content.

Shoulder backing material that includes reclaimed asphalt concrete pavement shall not be placed within 100 feet measured horizontally of any culvert, watercourse, or bridge within the project limits.

The areas where shoulder backing is to be constructed shall be cleared of weeds, grass, and debris. Removed weeds, grass, and debris shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Prior to placement of shoulder backing material, basement material shall be scarified to a minimum depth of 0.25 foot. Immediately prior to placement of shoulder backing material, scarified material shall be watered. Shoulder backing material shall be placed, watered, and rolled a minimum of two passes with a steel tired roller weighing not less than 8 tons to form a smooth, compacted surface. Watering shall conform to the provisions in Section 17, "Watering," of the Standard Specifications.

Shoulder backing material shall not be deposited on new pavement surfacing prior to placing the material in the final position, nor shall the material be deposited onto new pavement surfacing during mixing, watering, and blading operations.

Shoulder backing construction shall be completed along the edges of any portion of new pavement surfacing within 5 days after completion of that portion of the new surfacing. Prior to opening a lane adjacent to uncompleted shoulder backing to uncontrolled public traffic, the Contractor shall furnish, place, and maintain portable delineators and W8-9 (LOW SHOULDER) signs off of and adjacent to the new pavement surfacing. Portable delineators shall be placed at the beginning and along the drop-off of the edge of pavement, in the direction of travel, at successive maximum intervals of 500 feet on tangents and 200 feet on curves. W8-9 (LOW SHOULDER) signs shall be placed at the beginning and along the drop-off at successive maximum intervals of 2,000 feet. The portable delineators and W8-9 (LOW SHOULDER) signs shall be maintained in place at each location until the shoulder backing is completed at that location. Portable delineators and signs shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, except the signs may be set on temporary portable supports or on barricades.

Quantities of shoulder backing will be measured by the ton in conformance with the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

The contract price paid per ton for shoulder backing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing shoulder backing, complete in place, including furnishing, placing, maintaining, and removing portable delineators, W8-9 (LOW SHOULDER) signs, and temporary supports or barricades for the signs, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.36 EROSION CONTROL (SEQUENCING)

Place erosion control treatments in the following sequence for each erosion control type identified:

Erosion Control (Type 1)

Erosion Control (Hydroseed)

Erosion Control (Type 2)

Rolled Erosion Control Product (Netting)

Erosion Control (Hydroseed)

10-1.37 ROLLED EROSION CONTROL PRODUCT (NETTING)

GENERAL

Summary

This work includes installing rolled erosion control product (netting).

Definitions

Rolled erosion control product (RECP): A long-term degradable material manufactured or fabricated into rolls designed to reduce soil erosion and assist in the growth, establishment and protection of vegetation.

Open weave textile (OWT): A degradable RECP composed of processed natural yarns woven into a matrix, used to provide erosion control and vegetation establishment.

Submittals

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

1. Netting
2. Fastener

MATERIALS

Netting

Netting must comply with the following:

1. Netting must be a OWT RECP.
2. Netting Type: [A](#).
3. Machine-made mats provided in rolled strips.
4. Minimum thickness: 0.30 inch.
5. Minimum width: 72 inches.
6. U.V. Stability under ASTM D 4355 (500 hours exposure): 80%
7. Physical properties in Table A:

Table A

Type	Number Of Nets	Net Type	Matrix	Maximum "C" Factor ¹	Minimum Sheer Stress ²	Functional Longevity (months)	Minimum Tensile Strength ³
A ⁴	Single Net	Organic	100% Woven Coir (Coconut Fiber)	0.25	3	36	125
B ⁵	Single Net	Organic	100% Woven Coir (Coconut Fiber)	0.25	4.4	36	125
C ⁶	Single Net	Organic	100% Woven Coir (Coconut Fiber)	0.25	4.6	36	125

Notes:

¹ Universal Soil Loss Equation (USLE) C-Factor for a 1.5:1 (H:V) unvegetated slope.² lb/ft² under ASTM D 6460.³ lb/ft under ASTM D 5035.⁴ Average open area of 65%, with a tolerance of ± two percent. Minimum weight of 11.8 ounces per square yard under ASTM D 3776.⁵ Average open area of 48%, with a tolerance of ± two percent. Minimum weight of 20 ounces per square yard under ASTM D 3776.⁶ Average open area of 38%, with a tolerance of ± two percent. Minimum weight of 26 ounces per square yard under ASTM D 3776.**Fasteners**Fasteners must be 11 gauge, 6-inch U-shaped staples with 6-inch legs, and 1-inch crown.**MEASUREMENT AND PAYMENT**

The quantity of rolled erosion control product (netting) will be measured by the square foot as determined from actual slope measurements of the areas covered by the rolled erosion control product (netting) excluding overlaps.

The contract price paid per square foot for rolled erosion control product (netting) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in rolled erosion control product (netting), complete in place, including fasteners, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.38 MOVE-IN/MOVE-OUT (EROSION CONTROL)

Move-in/move-out (Erosion Control) shall include moving onto the project when an area is ready to receive erosion control as determined by the Engineer, setting up all required personnel and equipment for the application of erosion control materials and moving out all personnel and equipment when erosion control in that area is completed.

Quantities of move-in/move-out (Erosion Control) will be determined as units from actual count as determined by the Engineer. For measurement purposes, a move-in followed by a move-out will be considered as one unit.

The contract unit price paid for move-in/move-out (Erosion Control) shall include full compensation for furnishing all labor, materials (excluding erosion control materials), tools, equipment, and incidentals and for doing all the work involved in moving in and removing from the project all personnel and equipment necessary for application of erosion control (Hydroseed), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

No adjustment of compensation will be made for any increase or decrease in the quantities of move-in/move-out (Erosion Control) required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to the item of move-in/move-out (Erosion Control).

10-1.39 EROSION CONTROL (HYDROSEED)

GENERAL

Summary

This work includes removing and disposing of weeds and applying erosion control materials including seed, fiber, organic fertilizer, straw, and tackifier to erosion control (Hydroseed) areas shown on the plans.

Comply with Section 20-3, "Erosion Control," of the Standard Specifications.

Comply with "Move-In/Move-Out (Erosion Control)" of these special provisions.

If notified by the Engineer that an area is ready to receive erosion control materials, start erosion control (Hydroseed) work within 5 business days of the Engineer's notification to perform the work.

The Engineer will designate the ground location of all erosion control (Hydroseed) areas in increments of one acre or smaller by directing the placing of stakes or other suitable markers. Furnish all tools, labor, materials, and transportation required to adequately indicate the various erosion control (Hydroseed) locations.

MATERIALS

Seed

Seed not required to be labeled under the California Food and Agricultural Code must be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts or by a seed technologist certified by the Society of Commercial Seed Technologists. Measure and mix individual seed species in the presence of the Engineer.

Seed must contain at most 1.0 percent total weed seed by weight.

Deliver seed to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag attached are not accepted. The Engineer takes a sample of approximately one ounce or 0.25 cup of seed for each seed lot greater than 2 pounds.

Seed must comply with the following:

Seed		
Botanical Name (Common Name)	Percent Germination (Minimum)	Pounds Pure Live Seed Per Acre (Slope Measurement)
Bromus carinatus ¹ (California Brome)	80	10
Eschscholzia californica ¹ (California Poppy)	75	2
Hordeum b. californicum ¹ (California Barley)	80	6
Leymus triticoides ¹ (Creeping Wild Rye)	80	6
Lupinus bicolor ¹ (Pigmy-Leaved Lupine)	80	5
Nassella pulchra ¹ (Purple Needlegrass)	70	6
	Total	35

Applicable when numbers below are shown after a Botanical Name/(Common Name) above:

¹Seed produced in California only.

Seed Sampling Supplies

At the time of seed sampling, provide the Engineer a glassine lined bag and custody seal tag for each seed lot sample.

Organic Fertilizer

Must be a pelleted or granular form and must be one of the following:

Organic Fertilizer		
Products	Guaranteed Chemical Analysis (N-P-K) (%)	Company
Biosol Mix® - Granular	7-2-3	Rocky Mountains Bioproducts Edwards, CO

Fertil-Fibers™	6-4-1	Quattro Environmental Coronado, CA
Sustane®	5-2-4	Natural Fertilizer of America Cannon Falls, MN
Approved Equal ¹	(N) 5 to 7 (P) 1 to 5 (K) 2 to 10	

¹Approved equal must be within the ranges shown for N-P-K. The cumulative (N) release rate must be no more than 70 percent the first 70 days after incubation (86° F) with 100 percent at 350 days or more.

Straw

Straw must be:

1. Rice

Straw must be free of plastic, glass, metal, rocks, and refuse or other deleterious material.

Tackifier

Tackifier must be:

1. Guar (Plant Based)

Tackifier must comply with the following:

1. Nonflammable
2. Nontoxic to aquatic organisms
3. Free from growth or germination inhibiting factors
4. Either a plant-based product or a polymeric-emulsion blend

Tackifier classified as a plant based product must comply with the following:

1. A natural high molecular weight polysaccharide
2. A high viscosity hydrocolloid that is miscible in water
3. Functional for at least 180 days
4. Labeled as either guar, psyllium, or starch

Guar:

1. A guar gum based product derived from the ground endosperm of the guar plant, cyanmopsis tetragonolobus
2. Treated with dispersant agents for easy mixing
3. Able to be diluted at the rate of 1 to 5 pounds per 100 gallons of water

Fiber

Fiber must be:

1. Wood
2. A combination of 50% Wood and 50% Cellulose.

Fiber must comply with the following:

1. Free from lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, or chlorine bleach
2. Free from synthetic or plastic materials
3. At most 7 percent ash

Wood Fiber must comply with the following:

1. Long strand, whole wood fibers, thermo-mechanically processed from clean, whole wood chips
2. Not made from sawdust, cardboard, paper, or paper byproducts
3. At least 25 percent of fibers 3/8 inch long
4. At least 40 percent held on a No. 25 sieve

Cellulose Fiber must comply with the following:

1. Made from natural or recycled pulp fiber, such as wood chips, sawdust, newsprint, chipboard, corrugated cardboard, or a combination of these materials

Coloring Agent

Use a biodegradable, nontoxic coloring agent free from copper, mercury, and arsenic.

CONSTRUCTION

Site Preparation

Immediately prior to applying seed to erosion control (Hydroseed) areas, trash and debris and weeds must be removed.

Removed weeds must be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Application

Apply erosion control (Hydroseed) materials in separate applications in the following sequence:

1. Apply the following mixture with hydroseeding equipment at the rates indicated within 60 minutes after the seed has been added to the mixture:

Material	Pounds Per Acre (Slope Measurement)
Seed	35
Fiber	600
Organic Fertilizer	500

2. Apply straw at the rate of 2 tons per acre based on slope measurements. Incorporation of straw will not be required. Distribute straw evenly without clumping or piling.
3. Apply the following mixture with hydro-seeding equipment at the corresponding rates:

Material	Pounds Per Acre (Slope Measurement)
Fiber	600
Organic Fertilizer	500
Tackifier	50

The ratio of total water to total tackifier in the mixture must be as recommended by the manufacturer.

Hydraulic application of erosion control (Hydroseed) materials for rolled erosion control product (Netting) areas must be applied by hose, from the ground. Erosion control (Hydroseed) materials must be applied onto the slope face such that the materials are well integrated into the rolled erosion control product (Netting) and in contact with ground surface. Application must be perpendicular to the slope face such that rolled erosion control product (Netting) materials are not damaged or displaced.

Once straw work is started in an area, complete tackifier applications in that area on the same working day.

The Engineer may change the rates of erosion control (Hydroseed) materials to meet field conditions.

For any area where erosion control (Hydroseed) materials are to be applied, the application of all erosion control (Hydroseed) materials to be applied to that area must be completed within 72 hours from when the first materials were applied.

MEASUREMENT AND PAYMENT

Erosion control (Hydroseed) will be measured by the square foot or by the acre, whichever is designated in the Engineer's Estimate. The area will be calculated on the basis of actual or computed slope measurements.

The contract price paid per square foot or acre for erosion control (Hydroseed) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in erosion control (Hydroseed) complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.40 AGGREGATE BASE

Aggregate base must comply with Section 26, "Aggregate Bases," of the Standard Specifications and these special provisions.

Aggregate base must be Class 2.

Do not store reclaimed asphalt concrete or aggregate base with reclaimed asphalt concrete within 100 feet measured horizontally of any culvert, watercourse, or bridge.

10-1.41 CRACK TREATMENT

GENERAL

Summary

This work includes treating cracks in asphalt concrete pavement including shoulders.

Crack treatment material must be for [hot](#) application.

Submittals

If your selected crack treatment material is on the Department's Pre-Qualified Products List, submit a Certificate of Compliance for crack treatment material under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. With the Certificate of Compliance, submit:

1. Manufacturer's name
2. Production location
3. Product brand or trade name
4. Product designation
5. Batch or lot number
6. Crack treatment material type
7. Contractor or subcontractor name
8. Contract number
9. Lot size
10. Shipment date
11. Manufacturer's signature

If your selected crack treatment material is not on the Department's Pre-Qualified Products List, submit a sample from each batch or lot to be used and test results for each sample 20 days before use. The test results must be from an independent testing laboratory and show compliance with the specifications and include the information specified for the Certificate of Compliance submittal. For hot-applied crack treatment material, submit a minimum 3-pound sample in a silicone release container.

With each delivery of crack treatment material to the job site, submit:

1. Manufacturer's heating and application instructions
2. Manufacturer's Materials Safety Data Sheet (MSDS)
3. Name of the manufacturer's recommended detackifier

Quality Control and Assurance

For hot-applied crack treatment material, at least once per project at a time chosen by the Engineer and in the Engineer's presence, collect two 3-pound minimum samples of crack treatment from the wand into silicone release boxes. Submit 1 sample to the Engineer.

MATERIALS

Crack treatment material must be Type 4 in compliance with:

Crack Treatment Material

Quality Characteristic ^a	ASTM Test Method ^b	Type 1 Material	Type 2 Material	Type 3 Material	Type 4 Material	Type 5 Material
Softening point (min.)	D 36	102 °C	96 °C	90 °C	84 °C	84 °C
Cone penetration at 77° F (max.)	D 5329	35	40	50	70	90
Resilience at 77° F, unaged, %	D 5329	20-60	25-65	30-70	35-75	40-80
Flexibility ^c	D 3111	0 °C	0 °C	0 °C	-11 °C	-28 °C
Tensile adhesion, %, (min.)	D 5329	300	400	400	500	500
Specific gravity (max.)	D 70	1.25	1.25	1.25	1.25	1.25
Asphalt compatibility	D 5329	Pass	Pass	Pass	Pass	Pass
Sieve test (percent passing)	See note d	100	100	100	100	100

Notes:

^a Cold-applied crack treatment material residue collected under ASTM D 6943, Method B and sampled under ASTM D 140 must comply with the grade specifications.

^b Except for viscosity, cure each specimen at a temperature of 23 °C ± 2 °C and relative humidity of 50 ± 10 percent for 24 ± 2 hours before testing.

^c For flexibility test, the specimen size must be 6.4 ± 0.2 mm thick x 25 ± 0.2 mm wide x 150 ± 0.5 mm long. Test mandrel diameter must be 6.4 ± 0.2 mm. Bend arc must be 180 degrees. Bend rate must be 2 ± 1 seconds. At least 4 of 5 test specimens must pass at the specified test temperature without fracture, crazing, or cracking.

^d For hot-applied crack treatment, dilute with toluene and sieve through a No. 8 sieve. For cold-applied crack treatment, sieve the product as-received through a No. 8 sieve. If the manufacturer provides a statement that added components passed the No. 16 sieve before blending, this requirement is void.

If crack treatment material is delivered to the job site in containers, each container must be marked with the following information. If crack treatment material is not delivered in containers, the following information must accompany the delivery:

1. Manufacturer's name
2. Production location
3. Product brand or trade name
4. Product designation
5. Crack treatment trade name
6. Batch or lot number
7. Maximum heating temperature
8. Expiration date for cold application only

Hot-applied crack treatment must be delivered to the job site premixed in cardboard containers with meltable inclusion liners or in a fully meltable package.

Sand applied to tacky crack treatment material must be clean, free of clay, and comply with:

Sand Gradation

Sieve Size	Percent Passing
No. 4	100
No. 50	0 - 30
No. 200	0 - 5

CONSTRUCTION

Treat cracks from 1/4 to 1 inch in width for the entire length of the crack. Fill or repair cracks wider than 1 inch as ordered.

Cracks must be clean and dry before treating. Before treating, blast cracks with oil-free compressed air at a pressure of at least 90 psi.

If the pavement temperature is below 40 °F or if there is evidence of moisture in the crack, use a hot air lance immediately before applying crack treatment. The hot air lance must not apply flame directly on the pavement.

Heat hot-applied crack treatment material in compliance with the manufacturer's instructions. Comply with the manufacturer's application instructions.

Insert crack treatment with a nozzle inserted into the crack. Fill the crack [recessed less than 1/4 inch](#). If after 2 days the crack treatment is more than 1/4 inch below the specified level, or the sealant fails or the crack re-opens, re-treat the crack.

Immediately remove crack treatment material spilled or deposited on the pavement surface.

Before opening to traffic, apply sand or the manufacturer's recommended detackifying agent to tacky crack treatment material on the traveled way. Sweep excess sand before opening to traffic.

MEASUREMENT AND PAYMENT

Crack treatment is measured by the lane-mile. A lane-mile consists of a paved lane and any adjacent shoulders. The Engineer determines the quantity paid from actual measurements along the edge of each paved lane parallel with the pavement centerline.

The contract price paid per lane-mile for crack treatment includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in treating cracks, complete in place, including crack treatment of shoulders, applying sand and sweeping excess sand, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Filling cracks wider than 1 inch will be paid for as extra work as specified in Section 4-1.03D, "Extra Work," of the Standard Specifications.

10-1.42 HOT MIX ASPHALT

GENERAL

Summary

This work includes producing and placing hot mix asphalt (HMA) Type [A](#) using the [Method](#) process. Comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

MATERIALS

Asphalt Binder

The grade of asphalt binder mixed with aggregate for HMA Type [A](#) must be [PG 64-16](#).

Aggregate

The aggregate for HMA Type [A](#) must comply with the [3/4-inch](#) grading.

CONSTRUCTION

Rumble Strips

Construct rumble strips in the top layer of new HMA surfacing.

Vertical Joints

Before opening the lane to public traffic, pave shoulders and median borders adjacent to a lane being paved.

Place HMA on adjacent traveled way lanes so that at the end of each work shift, the distance between the ends of HMA layers on adjacent lanes is between 5 feet and 10 feet. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. You may place Kraft paper or another approved bond breaker under the conform tapers to facilitate the taper removal when paving operations resume.

Widening

If widening existing pavement, construct new structural section to match the elevation of the existing pavement's edge for the project's entire length before placing [rubberized hot mix asphalt \(open graded\)](#) over the existing pavement.

Conform Tapers

Place additional HMA along the pavement's edge to conform to road connections and private drives. Hand rake, if necessary, and compact the additional HMA to form a smooth conform taper.

10-1.43 RUBBERIZED HOT MIX ASPHALT (OPEN GRADED)

GENERAL

Summary

This work includes producing and placing rubberized hot mix asphalt (open graded) (RHMA-O) using the [method](#) process.

Comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

MATERIALS

Asphalt binder mixed with asphalt modifier and crumb rubber modifier (CRM) for asphalt rubber binder must be PG 64-16.

The aggregate for RHMA-O must comply with the 3/8-inch grading.

The Engineer uses the following formula to determine the optimum asphalt binder content for RHMA-O:

$$OBC_2 = (OBC_1) \times 1.40$$

where:

OBC₁ = Optimum bitumen content using the specified PG asphalt binder under California Test 368.

OBC₂ = Optimum bitumen content using asphalt rubber binder.

CONSTRUCTION

Vertical Joints

Before opening the lane to public traffic, pave shoulders and median borders adjacent to a lane being paved.

10-1.44 HOT MIX ASPHALT (MISCELLANEOUS AREAS)

GENERAL

Summary

This work includes producing hot mix asphalt (HMA) and placing it on miscellaneous areas.

Comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

MEASUREMENT AND PAYMENT

If there is a contract item for place hot mix asphalt (miscellaneous area) paid for by the square yard, this item is limited to the areas listed on the plans and is in addition to the contract items for the materials involved.

10-1.45 MINOR HOT MIX ASPHALT

GENERAL

Summary

This work includes producing hot mix asphalt (HMA) at a central mixing plant and placing it as specified.

MATERIALS

For minor HMA:

1. Do not submit a job mix formula.
2. Choose the 3/8-inch or 1/2-inch HMA Type A or Type B aggregate gradation under Section 39-1.02E, "Aggregate," of the Standard Specifications.
3. Minimum asphalt binder content must be 6.8 percent for 3/8-inch aggregate gradation and 6.0 percent for 1/2-inch aggregate gradation.

4. Choose asphalt binder Grade PG 64-10, PG 64-16, or PG 70-10 under Section 92, "Asphalts," of the Standard Specifications.

If you request and the Engineer authorizes, you may reduce the minimum asphalt binder content. Tack coat must comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

10-1.46 RUMBLE STRIP

GENERAL

Summary

This work includes constructing rumble strips in the top layer of hot mix asphalt surfacing by ground-in methods.

CONSTRUCTION

Select the method and equipment for constructing ground-in indentations.

Do not construct rumble strips on structures or approach slabs.

Construct rumble strips within 2 inches of the specified alignment. The grinding equipment must be equipped with a sighting device enabling the operator to maintain the rumble strip alignment.

Indentations must comply with the specified dimensions within 0.06 inch in depth and 10 percent in length and width.

The Engineer orders grinding or removal and replacement of noncompliant rumble strips to bring them within specified tolerances. Ground surface areas must be neat and uniform in appearance.

The grinding equipment must be equipped with a vacuum attachment to remove residue from the roadbed.

Dispose of removed material under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

On ground areas, apply fog seal coat under Section 37-1, "Seal Coats," of the Standard Specifications.

MEASUREMENT AND PAYMENT

The contract item for **shoulder rumble strip (HMA, ground-in indentations)** is measured by the station along the length of the rumble strips without deductions for gaps between indentations.

The contract price paid per station for **shoulder rumble strip (HMA, ground-in indentations)** includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing rumble strip complete in place including furnishing and applying fog seal coat to the actual ground areas, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.47 INDIVIDUAL SLAB REPLACEMENT

GENERAL

Summary

This work includes removing existing concrete pavement, underlying **cement treated base and aggregate subbase**, and constructing rapid strength concrete (RSC) pavement.

Definitions

early age: Time less than 10 times the concrete's final set time.

final set time: Time a specific penetration resistance of 4,000 psi is achieved, determined under ASTM C 403.

individual slab replacement: Replacement of short segments of single or multiple sequential slabs and possibly underlying base in the same lane to match existing concrete thickness.

opening age: Time the concrete achieves the specified strength for opening to traffic.

Submittals

Mix Design

At least 10 days before use in a trial slab, submit a mix design for RSC that includes:

1. Opening age
2. Proposed aggregate gradation
3. Proportions of hydraulic cement and aggregate
4. Types and amounts of chemical admixtures

5. Maximum time allowed between batching and placing
6. Range of ambient temperatures over which the mix design is effective
7. Final set time
8. Any special instructions or conditions such as water temperature requirements

Submit more than 1 mix design to plan for ambient temperature variations anticipated during RSC placement. Each mix design must have a maximum ambient temperature range of 18 °F.

Submit modulus of rupture development data for each mix design. You may use modulus of rupture development data from laboratory-prepared samples. The testing ages for modulus of rupture development data must include 1 hour before opening age, opening age, one hour after opening age, 24 hours, 7 days, and 28 days.

Trial Slab

Submit split aggregate samples taken during trial slab construction.

Calibration Testing Certificates of Compliance

Submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications with each delivery of aggregate, cement, and admixtures to be used for calibration tests. Submit certified copies of the weight of each delivery. The Certificate of Compliance must state the source of materials used for the calibration tests is from the same source to be used in the work. The Certificate of Compliance must be signed by your authorized representative.

Cement and Admixtures

At least 45 days before intended use, submit a sample of cement from each proposed lot and samples of proposed admixtures in the quantities ordered by the Engineer.

During RSC pavement operations, submit uniformity reports for hydraulic cement at least once every 30 days to the Transportation Laboratory, Attention: Cement Laboratory. Uniformity reports must comply with ASTM C 917, except testing age and water content may be modified to suit the particular material.

Quality Control and Assurance

Pre-operation Conference

Meet with the Engineer at a pre-operation conference at a mutually agreed time and place. Make the arrangements for the conference facility. Discuss methods of performing the work.

Pre-operation conference attendees must sign an attendance sheet provided by the Engineer. The pre-operation conference must be attended by your:

1. Project superintendent
2. Project manager
3. Quality control manager
4. Paving foreman
5. Concrete plant manager
6. Concrete plant operator
7. Personnel performing saw cutting and joint sealing
8. Plant inspector
9. Paving machine operators
10. Inspectors
11. Samplers
12. Testers
13. Subcontractor's workers

Do not start paving activities including test strips until the listed personnel have attended a pre-operation conference.

The purpose of the pre-operation conference is to familiarize personnel with the project's requirements. Items to be discussed include the processes for:

1. Production
2. Transportation
3. Placement
4. Replacing pavement
5. Contingency plan
6. Sampling

7. Testing

Trial Slabs

Before starting work on individual slab replacement complete one trial slab for each rapid strength concrete mix design. Trial slabs demonstrate that you are capable of producing replacement concrete pavement in compliance with the specifications within the specified time periods including delivery, placement, finishing, and curing times, and under similar atmospheric and temperature conditions expected during replacement operations.

The trial slab must be at least 10' x 20'. The trial slab thickness must be at least 10 inches. Place trial slabs near the job site at a mutually-agreed location that is neither on the roadway nor within the project limits.

Within 20 minutes after rapid strength concrete delivery for trial slabs, fabricate test beams under California Test 524. Use beams to determine early age and 7-day modulus of rupture values.

Cure beams fabricated for early age testing so that the monitored temperatures in the beams and the trial slab are always within 5 °F. Monitor and record the internal temperatures of trial slabs and early age beams at intervals of at least 5 minutes. Install thermocouples or thermistors connected to strip-chart recorders or digital data loggers to monitor the temperatures. Temperature recording devices must be accurate to within ± 2 °F. Measure internal temperatures at 1 inch from the top, 1 inch from the bottom, and no closer than 3 inches from any edge until early age testing is completed.

Cure beams fabricated for 7-day testing under California Test 524 except place them into sand at a time that is from 5 to 10 times the final set time, or 24 hours, whichever is earlier.

Slabs must have an early age modulus of rupture of not less than 400 psi and a 7-day modulus of rupture of not less than 600 psi.

You may request to use ASTM C 805 or ASTM C 900 to estimate the modulus of rupture of the pavement. If the Engineer accepts these test methods, but either you or the Engineer later withdraw the request or acceptance, you must use the selected test method until 7 days after you notify the Engineer of withdrawal of the request or 7 days after the Engineer notifies you of withdrawal of acceptance. During trial slab curing, perform correlation testing to determine the relationship between the modulus of rupture and ASTM C 805 or ASTM C 900 test results that were performed. Establish the correlation by testing at 4 or more time intervals. At a minimum, perform tests 1 hour before and 1 hour after the opening age and 2 others within 15 minutes of the opening age. Calculate modulus of rupture estimates with either a linear, exponential, or logarithmic least squares best-fit equation, whichever provides the best correlation coefficient.

Dispose of trial slabs and test specimens for trial slabs under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Weighmaster Certificates

Weighmaster certificates for RSC, regardless of the proportioning method used, must include the information necessary to trace the manufacturer and the manufacturer's lot number for the cement being used. If proportioned into fabric containers, the certificates for the cement must contain date of proportioning, location of proportioning, and actual net draft cement weight. If proportioned at the pour site from a storage silo, the weighmaster certificates must contain date of proportioning, location of proportioning, and the net draft cement weight used in the load.

Engineer's Acceptance for Modulus of Rupture

RSC pavement must develop a minimum modulus of rupture of 400 psi before opening to traffic. RSC pavement must develop a minimum modulus of rupture of 600 psi 7 days after placement. The Engineer may accept RSC pavement that does not attain the specified moduli of rupture as specified in "Pay Factor Adjustment for Low Modulus of Rupture." The Engineer determines the modulus of rupture by testing 3 beam specimens under California Test 524 and averaging the results. You may fabricate beam specimens using an internal vibrator under ASTM C 31. No single test represents more than that day's production or 130 cubic yards, whichever is less.

The Engineer may estimate modulus of rupture at early age using the correlation established during trial slab placement. Beam specimens for early age must be cured so the temperature in the specimens is within 5 °F of the temperature in the pavement. Determine the modulus of rupture at other ages using beams cured and tested under California Test 524 except place them in sand from 5 to 10 times the final set time or 24 hours, whichever is earlier. Perform the testing to determine modulus of rupture values of the RSC pavement in the presence of the Engineer.

Pay Factor Adjustment for Low Modulus of Rupture

The Engineer adjusts payment for RSC for modulus of rupture as follows:

1. Payment for RSC with a modulus of rupture of 400 psi or greater before opening to traffic and 7-day modulus of rupture of 600 psi or greater is not adjusted.

2. Payment for RSC with a 7-day modulus of rupture less than 500 psi is not adjusted and no payment is made. Remove this RSC and replace it at your expense with RSC that complies with the specifications.
3. Payment for RSC with a modulus of rupture less than 300 psi before opening to traffic is not adjusted and no payment is made. Remove this RSC and replace it at your expense with RSC that complies with the specifications.
4. Payment for RSC with a modulus of rupture of 300 psi or greater before opening to traffic and a 7-day modulus of rupture greater than or equal to 500 psi is reduced by the percentage in the pay table for the quantity represented by the tests.

Percentage Pay Table

Modulus of Rupture (psi) at opening to traffic	7-Day Modulus of Rupture (psi)		
	Greater than or equal to 600	Less than 600 and greater than or equal to 550	Less than 550 and greater than or equal to 500
Greater than or equal to 400	100%	95%	90%
Less than 400 and greater than or equal to 350	95%	95%	90%
Less than 350 and greater than or equal to 300	80% ^a	80% ^a	80% ^a

^a The Engineer rejects any RSC area that develops 1 or more transverse cracks within 21 days after placement. Remove this RSC at your expense and replace it with RSC that complies with the specifications. A transverse crack is a crack running from one longitudinal edge of the panel to the other.

^a

MATERIALS

Temporary Roadway Pavement Structure

Aggregate Base

Aggregate base for temporary roadway pavement structure must be produced from any combination of broken stone, crushed gravel, natural rough-surfaced gravel, reclaimed concrete and sand. Grading of aggregate base must comply with the 3/4-inch maximum grading specified in Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications.

Hot Mix Asphalt

For hot mix asphalt:

1. Choose the 3/8-inch or 1/2-inch HMA Type A or Type B aggregate gradation under Section 39-1.02E, "Aggregate," of the Standard Specifications.
2. Minimum asphalt binder content must be 6.8 percent for 3/8-inch aggregate gradation and 6.0 percent for 1/2-inch aggregate gradation.
3. Choose asphalt binder Grade PG 64-10, PG 64-16, or PG 70-10 under Section 92, "Asphalts," of the Standard Specifications.

Bond Breaker

Bond breaker must be one of the following:

1. White curing paper under ASTM C 171
2. White opaque polyethylene film under ASTM C 171, except that the minimum thickness must be 6 mils
3. Paving asphalt, Grade PG 64-10, under Section 92, "Asphalts," of the Standard Specifications
4. Curing compound (5) under Section 90-7.01b, "Curing Compound Method," of the Standard Specifications

Rapid Strength Concrete

RSC must comply with one of the following:

1. Concrete complying with Section 90 "Portland Cement Concrete", except you may use Type III portland cement.
2. Concrete complying with section 90 "Portland Cement Concrete," except:
 - 2.1. You may use any cement that complies with the definition of hydraulic cement or blended hydraulic cement in ASTM C 219 and the requirements shown in the following table:

Hydraulic Cement

Test Description	Test Method	Requirement ^b
Contraction in air	California Test 527, W/C Ratio = 0.39 ±0.010	0.053 %, max.
Mortar expansion in water	ASTM C 1038	0.04 %, max.
Soluble chloride ^a	California Test 422	0.05 %, max.
Soluble sulfates ^a	California Test 417	0.30 %, max.
Thermal stability	California Test 553	90 %, min.
Compressive strength @ 3 days	ASTM C 109	2,500 psi

Note:

^a Perform test on a cube specimen fabricated under ASTM C 109. Cure the specimen at least 14 days and then pulverized to 100 percent passing the No. 50 sieve.

^b If you use chemical admixtures, include them when testing.

- 2.2. You may use citric acid or borax if you submit a written request from the cement manufacturer and a test sample.

Supplementary cementitious material is not required in RSC.

Choose the combined aggregate grading for RSC from either the 1-1/2 inch maximum or the 1-inch maximum combined grading as specified in Section 90-3.04, "Combined Aggregate Gradings," of the Standard Specifications.

You may use Type C accelerating or Type E accelerating and water reducing chemical admixtures as specified in Section 90-4, "Admixtures," of the Standard Specifications. The requirement for air entrainment of concrete in freeze-thaw areas only applies when portland cement is used.

CONSTRUCTION

Removing Existing Pavement and Base Materials

The Engineer determines the exact limits of individual slab replacement.

Remove existing concrete pavement and underlying base material and replace it with base material and concrete pavement within the same work period [after installing corrugated steel pipe culvert](#). If you remove existing pavement or base materials and you are unable to construct, finish, and cure concrete pavement before the specified traffic opening time, construct a temporary roadway pavement structure.

Saw cut the outline of concrete pavement to be removed with a power-driven saw except where adjacent to an asphalt concrete shoulder. Do not saw cut within concrete pavement slabs more than 2 days before concrete pavement slab removal. If you saw cut in work shifts that are before the actual removal work shift, do not make saw cuts parallel or diagonal to the traveled way. Saw cut so that traffic will not dislodge any pieces or segments.

Remove concrete pavement by non-impacting methods. Remove each pavement panel in 1 or more pieces without disturbing or damaging the underlying base.

Pavement and base removal must be performed without damage to pavement and base to remain in place.

Dispose of removed materials under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

After removing pavement and base to the required depth, [install corrugated steel pipe culvert](#), then grade to a uniform plane. Water and compact the material remaining in place to a firm and stable base. The finished surface of the remaining material must not extend above the grade established by the Engineer. At your expense, fill areas that were over-excavated during base removal with replacement material in the same operation as the base replacement.

Temporary Roadway Pavement Structure

Place hot mix asphalt and aggregate base where existing pavement is replaced for construction of a temporary roadway structural section. The quantity must be equal to the quantity of pavement removed during the work shift. If you place temporary roadway structural section, it must be maintained and later removed as the first order of work when individual slab replacement activities resume. The temporary roadway structural section must consist of 3-1/2 inch thick hot mix asphalt over aggregate base. RSC not conforming to the specifications may be used for temporary roadway pavement structure with the Engineer's approval.

Spread and compact aggregate base and hot mix asphalt by methods that produce a well-compacted, uniform base, with a surface of uniform smoothness, texture and density. Surfaces must be free from pockets of coarse or fine material. You may spread aggregate base and hot mix asphalt each in one layer. The finished surface of hot mix asphalt must not vary more than 0.05 foot from the lower edge of a 12-foot long straightedge placed parallel with the centerline and must match the elevation of existing concrete pavement along the joints between the existing pavement and temporary surfacing.

After removing temporary roadway structural section, you may stockpile removed aggregate base at the project site and reuse it for temporary roadway structural sections. When no longer required, dispose of standby material or stockpiled

material for temporary roadway structural sections under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Rapid Strength Concrete

General

Concrete pavement penetration specified in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications does not apply to RSC.

RSC must develop the specified opening age and 7-day modulus of rupture strengths.

Proportioning

Weighing, measuring, and metering devices used for proportioning materials must comply with Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

For batches with a volume of 1 cubic yard or more, proportioning must comply with one of the following methods:

1. Batch the ingredients at a central batch plant and charge them into a mixer truck for transportation to the pour site. Proportion ingredients under Section 90-5, "Proportioning," of the Standard Specifications.
2. Batch the ingredients except the cement at a central batch plant and charge them into a mixer truck for transportation to a cement silo and weigh system, which must proportion cement for charging into the mixer truck.
3. Batch ingredients except the cement at a central batch plant and charge them into a mixer truck for transportation to a location where pre-weighed containerized cement is added to the mixer truck. The cement pre-weighing operation must utilize a platform scale. The platform scale must have a maximum capacity of 2.75 tons with a maximum graduation size of 1 pound. Pre-weigh cement into a fabric container. The minimum amount of cement to be proportioned into any single container must be 1/2 of the total amount required for the load of RSC being produced.
4. Proportioned cement, water, and aggregate volumetrically.

For central batch plants, indicators for weighing and measuring systems such as over and under dials must be grouped so that each indicator's smallest increment can be accurately read from the control point of the proportioning operation. In addition, indicators for weighing and measuring cement batched from a remote weighing system must be placed so that each indicator can be accurately read from the control point of the proportioning operation.

Weighing equipment must be insulated from other equipment's vibration or movement. When the plant is operating, each draft's material weight must not vary from the designated weight by more than the specified tolerances. Each scale graduation must be 0.001 of the usable scale capacity.

Aggregate must be weighed cumulatively. Equipment for weighing aggregate must have a zero tolerance of ± 0.5 percent of the aggregate's designated total batch weight. Equipment for the separate weighing of the cement must have a zero tolerance of ± 0.5 percent of the cement's designated individual batch draft. Equipment for measuring water must have a zero tolerance of ± 0.5 percent of the water's designated weight or volume.

The weight indicated for any individual batch of material must not vary from the preselected scale setting by more than:

Batch Weight Tolerances

Material	Tolerance
Aggregate	± 1.0 percent of designated batch weight
Cement	± 0.5 percent of designated batch weight
Water	± 1.5 percent of designated batch weight or volume

Proportioning consists of dividing the aggregate into the specified sizes and storing them in separate bins, and then combining the aggregate with cement and water. Proportion dry ingredients by weight. Proportion liquid ingredients by weight or volume.

Handle and store aggregates under Section 90-5.01, "Storage of Aggregates," of the Standard Specifications. Proportion liquid admixtures under Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures," of the Standard Specifications.

Control aggregate discharged from several bins with gates or mechanical conveyors. The means of discharge from the bins and from the weigh hopper must be interlocked so that no more than 1 bin can discharge at a time, and the weigh hopper cannot be discharged until the required quantity from each of the bins has been deposited in the weigh hopper.

At the time of batching, dry and drain aggregates to a stable moisture content. Do not proportion aggregates with visible separation of water from the aggregate during proportioning. At the time of batching, the free moisture content of fine aggregate must not exceed 8 percent of its saturated, surface-dry weight.

If the proportioning plant has separate supplies of the same size group of aggregate with different moisture content, specific gravity, or surface characteristics affecting workability, exhaust 1 supply before using another supply.

Keep cement separated from the aggregate until discharged into the mixer. When discharged into the mixer, cement must be free of lumps and clods. Before reuse, clean fabric containers used for transportation or proportioning of cement.

Weigh systems for proportioning aggregate and cement must be individual and distinct from other weigh systems. Each weigh system must have a hopper, a lever system, and an indicator.

When ordered by the Engineer, determine the gross weight and tare weight of truck mixers on scales designated by the Engineer.

Install and maintain in operating condition an electrically actuated moisture meter. The meter must indicate on a readily visible scale the changes in the fine aggregate moisture content as it is batched. The meter must have a sensitivity of 0.5 percent by weight of the fine aggregate.

Obtain the Engineer's acceptance before mixing water into the concrete during hauling or after arrival at the delivery point. If the Engineer accepts additional water be incorporated into the concrete, the drum must revolve not less than 30 revolutions at mixing speed after the water is added and before starting discharge. Measure water added to the truck mixer at the job site through a meter in compliance with Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

Volumetric Proportioning

You may choose to proportion RSC by volume.

Handle and store aggregates under Section 90-5.01, "Storage of Aggregates," of the Standard Specifications. Proportion liquid admixtures under Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures," of the Standard Specifications.

Batch-mixer trucks must proportion cement, water, aggregate, and additives by volume. Aggregate feeders must be connected directly to the drive on the cement vane feeder. The cement feed rate must be tied directly to the feed rate for the aggregate and other ingredients. Only change the ratio of cement to aggregate by changing the gate opening for the aggregate feed. The drive shaft of the aggregate feeder must have a revolution counter reading to the nearest full or partial revolution of the aggregate delivery belt.

Proportion aggregate with a belt feeder operated with an adjustable cutoff gate delineated to the nearest quarter increment. The gate opening height must be readily determinable. Proportion cement by any method that complies with the accuracy tolerance specifications in Section 90-5.02, "Proportioning Devices," of the Standard Specifications. Proportion water with a meter under Section 9-1.01, "Measurement and Payment," of the Standard Specifications.

Calibrate the cutoff gate for each batch-mixer truck used and for each aggregate source. Calibrate batch-mixer trucks at 3 different aggregate gate settings that are commensurate with production needs. Perform at least 2 calibration runs for each aggregate gate.

Individual aggregate delivery rate check-runs must not deviate more than 1.0 percent from the mathematical average of all runs for the same gate and aggregate type. Each test run must be at least 1,000 pounds.

At the time of batching, dry and drain aggregates to a stable moisture content. Do not proportion aggregates with visible separation of water from the aggregate during proportioning. At the time of batching, the free moisture content of fine aggregate must not exceed 8 percent of its saturated, surface-dry weight.

If the proportioning plant has separate supplies of the same size group of aggregate with different moisture content, specific gravity, or surface characteristics affecting workability, exhaust 1 supply before using another supply.

Cover rotating and reciprocating equipment on batch-mixer trucks with metal guards.

Individual cement delivery rate check-runs must not deviate more than 1.0 percent of the mathematical average of 3 runs of at least 1,000 pounds each.

When the water meter operates from 50 to 100 percent of production capacity, the indicated weight of water delivered must not differ from the actual weight delivered by more than 1.5 percent for each of 2 runs of 300 gallons. Calibrate the water meter under California Test 109. The water meter must be equipped with a resettable totalizer and display the operating rate.

Conduct calibration tests for aggregate, cement, and water proportioning devices with a platform scale located at the calibration site. Platform scales for weighing test-run calibration material must have a maximum capacity of 2.75 tons with maximum graduations of 1 pound. Error test the platform scale within 8 hours of calibrating the batch-mixer truck proportioning devices. Perform error-testing with test weights under California Test 109. Furnish a witness scale that is within 2 graduations of the test weight load. The witness scale must be available for use at the production site throughout the production period. Equipment needed for the calibration of proportioning systems must remain available at the production site throughout the production period.

The batch-mixer truck must be equipped so that accuracy checks can be made. Recalibrate proportioning devices every 30 days after production starts or when you change the source or type of any ingredient.

A spot calibration is calibration of the cement proportioning system only. Perform a 2-run spot calibration each time 55 tons of cement passes through the batch-mixer truck. If the spot calibration shows the cement proportioning system does not comply with the specifications, complete a full calibration of the cement proportioning system before you resume production.

Proportion liquid admixtures with a meter.

Locate cement storage immediately before the cement feeder. Equip the system with a device that automatically shuts down power to the cement feeder and aggregate belt feeder when the cement storage level is less than 20 percent of the total volume.

Submit aggregate moisture determinations, made under California Test 223, at least every 2 hours during proportioning and mixing operations. Record moisture determinations and submit them at the end of each production shift.

Equip each aggregate bin with a device that automatically shuts down the power to the cement feeder and the aggregate belt feeder when the aggregate discharge rate is less than 95 percent of the scheduled discharge rate.

Proportioning device indicators must be in working order before starting proportioning and mixing operations and must be visible when standing near the batch-mixer truck.

Identifying numbers of batch-mixer trucks must be at least 3 inches in height, and be located on the front and rear of the vehicles.

Mix volumetric proportioned RSC in a mechanically operated mixer. You may use auger-type mixers. Operate mixers uniformly at the mixing speed recommended by the manufacturer. Do not use mixers that have an accumulation of hard concrete or mortar.

Do not mix more material than will permit complete mixing. Reduce the volume of material in the mixer if complete mixing is not achieved. Continue mixing until a homogeneous mixture is produced at discharge. Do not add water to the RSC after discharge.

Do not use equipment with components made of aluminum or magnesium alloys that may have contact with plastic concrete during mixing or transporting of RSC.

The Engineer determines uniformity of concrete mixtures by differences in penetration measurements made under California Test 533. Differences in penetration are determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load. The differences must not exceed 5/8 inch. Submit samples of freshly mixed concrete. Sampling facilities must be safe, accessible, clean, and produce a sample that is representative of production. Sampling devices and sampling methods must comply with California Test 125.

Do not use ice to cool RSC directly. If ice is used to cool water used in the mix, it must be melted before entering the mixer.

When proportioning and charging cement into the mixer, prevent variance of the required quantity by conditions such as wind or accumulation on equipment.

Each mixer must have metal plates that provide the following information:

1. Designed usage
2. Manufacturer's guaranteed mixed concrete volumetric capacity
3. Rotation speed

The device controlling the proportioning of cement, aggregate, and water must produce production data. The production data must be captured at 15-minute intervals throughout daily production. Each capture of production data represents production activity at that time and is not a summation of data. The amount of material represented by each production capture is the amount produced in the period from 7.5 minutes before to 7.5 minutes after the capture time. The daily production data must be submitted in electronic or printed media at the end of each production shift. The reported data must be in the order including data titles as follows:

1. Weight of cement per revolution count
2. Weight of each aggregate size per revolution count
3. Gate openings for each used aggregate size
4. Weight of water added to the concrete per revolution count
5. Moisture content of each used aggregate size
6. Individual volume of other admixtures per revolution count
7. Time of day
8. Day of week
9. Production start and stop times
10. Batch-mixer truck identification
11. Name of supplier
12. Specific type of concrete being produced
13. Source of the individual aggregate sizes
14. Source, brand, and type of cement
15. Source, brand and type of individual admixtures
16. Name and signature of operator

You may input production data by hand into a pre-printed form or it may be captured and printed by the proportioning device. Present electronic media containing recorded production data in a tab delimited format on a CD or DVD. Each capture of production data must be followed by a line feed carriage-return with sufficient fields for the specified data.

Base Replacement Layer

Replace removed base materials with RSC in a separate and distinct operation from replacing concrete pavement.

Finish the replacement base layer to the grade of the original base layer. Do not texture the surface. Finish to a smooth surface, free of projections such as mortar ridges, voids, and porous areas.

Bond Breaker

Place bond breaker between replacement pavement and existing lean concrete base, cement treated base, or new base replacement layer.

If you use curing paper or polyethylene film, place it in a wrinkle free manner. Overlap adjacent sheets a minimum of 6 inches in the same direction as the concrete pour.

If you use curing compound or paving asphalt, before application remove foreign and loose materials remaining from slab removal.

If you use paving asphalt, do not add water before applying asphalt to the base surface. Apply the paving asphalt in one even application at a rate from 0.02 to 0.10 gallon per square yard over the entire base surface area. Do not place concrete pavement until the paving asphalt has cured.

If you use curing compound, apply it in 2 separate applications. Apply each application evenly at a rate from 0.07 to 0.11 gallon per square yard over the entire base surface area.

Spreading, Compacting, and Shaping

The specifications for pavement thickness in Section 40, "Concrete Pavement," of the Standard Specifications do not apply.

You may use metal or wood side forms. Wood side forms must not be less than 1-1/2 inches thick. Side forms must be of sufficient rigidity, both in the form and in the connection with adjoining forms, that movement will not occur under forces from subgrading and paving equipment or from the pressure of concrete.

Side forms must remain in place until the pavement edge no longer requires the protection of forms. Clean and oil side forms before each use.

After you deposit the RSC on the subgrade, consolidate RSC with high-frequency internal vibrators. Consolidate adjacent to forms and across the full paving width. Place RSC as nearly as possible to its final position. Do not use vibrators for extensive shifting of RSC.

Spread and shape RSC with powered finishing machines supplemented by hand finishing.

After you mix and place RSC, do not add water to the surface to facilitate finishing. Use surface finishing additives as recommended by the manufacturer of the cement after their use is approved by the Engineer.

Joints

Before placing RSC against existing concrete, place 1/4-inch thick commercial quality polyethylene flexible foam expansion joint filler across the original transverse and longitudinal joint faces and extend the excavation's full depth. Place the top of the joint filler flush with the top of the pavement. Secure joint filler to the joint face of the existing pavement to prevent the joint filler from moving during the placement of RSC.

Construct transverse contraction joints in pavement widenings to match the spacing and skew of the contraction joints in the adjacent existing pavement. Where the existing transverse joint spacing in an adjacent lane exceeds 15 feet, construct an additional transverse contraction joint midway between the existing joints. Complete sawing of contraction joints within 2 hours of completion of final finishing. Cut contraction joints a minimum 1/3 the depth of the slab.

Final Finishing

If the Engineer determines by visual inspection the final texturing may not comply with the specifications for coefficient of friction, the Engineer tests to determine coefficient of friction. Open the pavement to traffic and allow 5 days after concrete placement for the Department to test for coefficient of friction. If pavement does not comply with the specifications for coefficient of friction, groove or grind the pavement under Section 42, "Groove and Grind Pavement," of the Standard Specifications. Perform grooving or grinding before the installation of any required joint seal or edge drains adjacent to the areas to be grooved or ground.

The Engineer tests for smoothness using a 12-foot straightedge placed parallel with and perpendicular to the centerline. Straightedge smoothness specifications do not apply to the pavement surface placed within 12 inches of existing concrete pavement except you must place a straightedge longitudinally with the midpoint coincident with the transverse construction joint. The concrete pavement surface must be within 0.02 foot of the straightedge's lower edge. Correct pavement at contact joints not in compliance with straightedge smoothness specifications within 48 hours by grinding.

Curing Method

Use the curing method recommended by the manufacturer of the cement for replacement pavement.

Replace Existing Pavement Delineation

Replace any existing pavement delineation removed, obliterated, or damaged by the work involved in replacing concrete pavement. Comply with the specifications for new delineation.

MEASUREMENT AND PAYMENT

Individual slab replacement is measured and paid for in the same manner specified for concrete pavement in Sections 40-4.01, "Measurement," and 40-4.02, "Payment," of the Standard Specifications.

The Engineer adjusts payment for individual slab replacement in compliance with "Pay Factor Adjustment for Low Modulus of Rupture."

Full compensation for the pre-operation conference is included in the contract price paid per cubic yard for individual slab replacement and no additional compensation will be allowed therefor.

Full compensation for removing and disposing of existing pavement and underlying base, constructing trial slabs, furnishing and placing bond breaker, and joint filler, furnishing and placing reinforcing steel as shown on the plans, furnishing and disposing of standby materials for temporary roadway structural section, constructing, maintaining, removing, and disposing of temporary roadway structural section, work involved in determining the modulus of rupture of RSC pavement, furnishing and applying replacement pavement delineation, are included in the contract price paid per cubic yard for individual slab replacement and no additional compensation will be allowed therefor.

If calibration of volumetric batch-trucks is performed more than 100 miles from the project limits, payment for individual slab replacement is reduced by \$1,000 per calibration session.

If RSC does not conform to the mix design requirements or the specifications, the Engineer orders you to provide extra samples and testing. The Engineer determines the costs for sampling, fabricating, transporting, and testing extra samples under Section 4-1.03D, "Extra Work," of the Standard Specifications. If the extra samples do not comply with the specifications, these costs are at your expense. If the extra samples comply with the specifications, the Engineer pays you for these costs.

10-1.48 PILING

GENERAL

Piling shall conform to the provisions in Section 49, "Piling," of the Standard Specifications, and these special provisions.

Unless otherwise specified, welding of any work performed in conformance with the provisions in Section 49, "Piling," of the Standard Specifications, shall be in conformance with the requirements in AWS D1.1.

Attention is directed to "Project Information" -and "Welding" of these special provisions.

Difficult pile installation is anticipated due to the presence of caving soils, high ground water, cobbles and boulders, and traffic control.

10-1.49 CAST-IN-DRILLED-HOLE CONCRETE PILES

GENERAL

Summary

Cast-in-drilled-hole (CIDH) concrete piling shall conform to the provisions in Section 49-4, "Cast-In-Place Concrete Piles," of the Standard Specifications and these special provisions.

The provisions of "Welding" of these special provisions shall not apply to temporary steel casings.

SUBMITTALS

Pile Installation Plan

The Contractor shall submit a pile installation plan to the Engineer for approval for all CIDH concrete piling. The pile installation plan shall be submitted at least 15 days before constructing CIDH concrete piling and shall include complete descriptions, details, and supporting calculations for the following:

- A. Concrete mix design, certified test data, and trial batch reports.
- B. Drilling or coring methods and equipment.
- C. Proposed method for casing installation and removal when necessary.
- D. Methods for placing, positioning, and supporting bar reinforcement

- E. Methods and equipment for determining the depth of concrete and actual and theoretical volume placed, including effects on volume of concrete when any casings are withdrawn.
- F. Methods and equipment for verifying that the bottom of the drilled hole is clean before placing concrete.
- G. Methods and equipment for preventing upward movement of reinforcement, including the Contractor's means of detecting and measuring upward movement during concrete placement operations.

For concrete placed under slurry, the pile installation plan shall also include complete descriptions, details, and supporting calculations for the following:

- A. Concrete batching, delivery, and placing systems, including time schedules and capacities. Time schedules shall include the time required for each concrete placing operation at each pile.
- B. Concrete placing rate calculations. When requested by the Engineer, calculations shall be based on the initial pump pressures or static head on the concrete and losses throughout the placing system, including anticipated head of slurry and concrete to be displaced.
- C. Suppliers' test reports on the physical and chemical properties of the slurry and any proposed slurry chemical additives, including Material Safety Data Sheet.
- D. Slurry testing equipment and procedures.
- E. Methods of removal and disposal of excavation, slurry, and contaminated concrete, including removal rates.
- F. Methods and equipment for slurry agitating, recirculating, and cleaning.

QUALITY ASSURANCE

Concrete Test Batch

Before concrete is deposited under slurry, a concrete test batch shall be produced and delivered to the project under conditions and in time periods similar to those expected during placement of concrete in the piles. Concrete shall be placed in an excavated hole or suitable container of adequate size to allow for testing as specified herein. Depositing of concrete under slurry will not be required. In addition to meeting the specified nominal slump, the concrete test batch shall meet the following requirements:

- A. For piles where the time required for each concrete placing operation, as submitted in the placing plan, will be 2 hours or less, the concrete test batch shall demonstrate that the proposed concrete mix design achieves a slump of at least 7 inches after twice that time has elapsed.
- B. For piles where the time required for each concrete placing operation, as submitted in the placing plan, will be more than 2 hours, the concrete test batch shall demonstrate that the proposed concrete mix design achieves a slump of at least 7 inches after that time plus 2 hours has elapsed.

The time period shall begin at the start of placement. Concrete shall not be vibrated or agitated during the test period. Slump tests will be performed in conformance with the requirements in California Test 556.

Upon completion of testing, concrete shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Preconstruction Meeting

A preconstruction meeting for CIDH concrete pile construction shall be held (1) at least 5 business days after submitting the pile installation plan and (2) at least 10 days before the start of CIDH concrete pile construction.

The meeting shall include the Engineer, the Contractor, and any subcontractors involved in the CIDH concrete pile construction.

The purpose of this meeting is to:

- A. Establish contacts and communication protocol between the Contractor, any subcontractors involved in CIDH concrete pile construction, and the Engineer
- B. Review the construction process, acceptance testing, and anomaly mitigation of CIDH concrete piles

The Contractor shall provide a facility for the meeting. The Engineer will conduct the meeting. The following will be discussed at the meeting:

- A. Pile placement plan, dry and wet
- B. Acceptance testing, including gamma-gamma logging, cross-hole sonic logging, and coring
- C. Pile Design Data Form
- D. Mitigation process
- E. Timeline and critical path activities

- F. Structural, geotechnical, and corrosion design requirements
- G. Future meetings, if necessary, for pile mitigation and pile mitigation plan review
- H. Safety requirements, including Cal/OSHA and Tunnel Safety Orders

MATERIALS

Concrete

Concrete deposited under slurry shall have a nominal slump equal to or greater than 7 inches, contain not less than 675 pounds of cementitious material per cubic yard, and be proportioned to prevent excessive bleed water and segregation. The nominal and maximum slump and penetration requirements in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications shall not apply.

Aggregate Grading

The combined aggregate grading shall be either the 1-inch maximum grading, the 1/2-inch maximum grading, or the 3/8-inch maximum grading and shall conform to the requirements in Section 90-3, "Aggregate Gradings," of the Standard Specifications.

When concrete is placed under slurry, the combined aggregate grading shall be either the 1/2-inch maximum grading or the 3/8-inch maximum grading and shall conform to the requirements in Section 90-3, "Aggregate Gradings," of the Standard Specifications.

Slurry

Mineral Slurry

Mineral slurry shall be mixed and thoroughly hydrated in slurry tanks, and slurry shall be sampled from the slurry tanks and tested before placement in the drilled hole.

Slurry shall be recirculated or continuously agitated in the drilled hole to maintain the specified properties.

Recirculation shall include removal of drill cuttings from the slurry before discharging the slurry back into the drilled hole. When recirculation is used, the slurry shall be sampled and tested at least every 2 hours after beginning its use until tests show that the samples taken from the slurry tank and from near the bottom of the hole have consistent specified properties. Subsequently, slurry shall be sampled at least twice per shift as long as the specified properties remain consistent.

Slurry that is not recirculated in the drilled hole shall be sampled and tested at least every 2 hours after beginning its use. The slurry shall be sampled mid-height and near the bottom of the hole. Slurry shall be recirculated when tests show that the samples taken from mid-height and near the bottom of the hole do not have consistent specified properties.

Slurry shall also be sampled and tested before final cleaning of the bottom of the hole and again just before placing concrete. Samples shall be taken from mid-height and near the bottom of the hole. Cleaning of the bottom of the hole and placement of the concrete shall not start until tests show that the samples taken from mid-height and near the bottom of the hole have consistent specified properties.

Mineral slurry shall be tested for conformance to the requirements shown in the following table:

MINERAL SLURRY		
PROPERTY	REQUIREMENT	TEST
Density (pcf) - before placement in the drilled hole - during drilling - before final cleaning - immediately before placing concrete	64.3* to 69.1* 64.3* to 75.0*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/quart) bentonite attapulgite	28 to 50 28 to 40	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8 to 10.5	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - before final cleaning - immediately before placing concrete	less than or equal to 4.0	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 2 pcf. Slurry temperature shall be at least 40°F when tested.		

Any caked slurry on the sides or bottom of hole shall be removed before placing reinforcement. If concrete is not placed immediately after placing reinforcement, the reinforcement shall be removed and cleaned of slurry, the sides of the drilled hole cleaned of caked slurry, and the reinforcement again placed in the hole for concrete placement.

Synthetic Slurry

Synthetic slurries shall be used in conformance with the manufacturer's recommendations and these special provisions. The following synthetic slurries may be used:

PRODUCT	MANUFACTURER
SlurryPro CDP	KB Technologies Ltd. 3648 FM 1960 West Suite 107 Houston, TX 77068 (800) 525-5237
Super Mud	PDS Company c/o Champion Equipment Company 8140 East Rosecrans Ave. Paramount, CA 90723 (562) 634-8180
Shore Pac GCV	CETCO Drilling Products Group 1350 West Shure Drive Arlington Heights, IL 60004 (847) 392-5800
Terragel of Novagel Polymer	Geo-Tech Drilling Fluids 220 N. Zapata Hwy, Suite 11A Laredo, TX 78043 (210) 587-4758

Inclusion of a synthetic slurry on the above list may be obtained by meeting the Department's requirements for synthetic slurries. The requirements can be obtained from the Offices of Structures Design, P.O. Box 168041, MS# 9-4/11G, Sacramento, CA 95816-8041.

Synthetic slurries listed may not be appropriate for a given site.

Synthetic slurries shall not be used in holes drilled in primarily soft or very soft cohesive soils as determined by the Engineer.

A manufacturer's representative, as approved by the Engineer, shall provide technical assistance for the use of their product, shall be at the site before introduction of the synthetic slurry into a drilled hole, and shall remain at the site until released by the Engineer.

Synthetic slurries shall be sampled and tested at both mid-height and near the bottom of the drilled hole. Samples shall be taken and tested during drilling as necessary to verify the control of the properties of the slurry. Samples shall be taken and tested when drilling is complete, but before final cleaning of the bottom of the hole. When samples are in conformance with the requirements shown in the following tables for each slurry product, the bottom of the hole shall be cleaned and any loose or settled material removed. Samples shall be obtained and tested after final cleaning and immediately before placing concrete.

SlurryPro CDP synthetic slurries shall be tested for conformance to the requirements shown in the following table:

SLURRYPRO CDP KB Technologies Ltd.		
PROPERTY	REQUIREMENT	TEST
Density (pcf) - during drilling - before final cleaning - just before placing concrete	less than or equal to 67.0* less than or equal to 64.0*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/quart) - during drilling -before final cleaning - just before placing concrete	50 to 120 less than or equal to 70	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	6 to 11.5	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - before final cleaning - just before placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 2 pcf. Slurry temperature shall be at least 40°F when tested.		

Super Mud synthetic slurries shall be tested for conformance to the requirements shown in the following table:

SUPER MUD PDS Company		
PROPERTY	REQUIREMENT	TEST
Density (pcf) - before final cleaning - just before placing concrete	less than or equal to 64.0*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/quart) - during drilling - before final cleaning - just before placing concrete	32 to 60 less than or equal to 60	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8 to 10.0	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - before final cleaning - just before placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 2 pcf. Slurry temperature shall be at least 40°F when tested.		

Shore Pac GCV synthetic slurries shall be tested for conformance to the requirements shown in the following table:

Shore Pac GCV CETCO Drilling Products Group		
PROPERTY	REQUIREMENT	TEST
Density (pcf) - before final cleaning - just before placing concrete	less than or equal to 64.0*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/quart) - during drilling - before final cleaning - just before placing concrete	33 to 74 less than or equal to 57	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8.0 to 11.0	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - before final cleaning - just before placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 2 pcf. Slurry temperature shall be at least 40°F when tested.		

Terragel or Novagel Polymer synthetic slurries shall be tested for conformance to the requirements shown in the following table:

TERRAGEL OR NOVAGEL POLYMER Geo-Tech Drilling Fluids		
PROPERTY	REQUIREMENT	TEST
Density (pcf) - during drilling - before final cleaning - just before placing concrete	less than or equal to 67.0* less than or equal to 64.0*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/quart) - during drilling - before final cleaning - just before placing concrete	45 to 104 less than or equal to 104	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	6.0 to 11.5	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - before final cleaning - just before placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 2 pcf. Slurry temperature shall be at least 40°F when tested.		

Water Slurry

At the option of the Contractor, water may be used as slurry when casing is used for the entire length of the drilled hole. Water slurry shall be tested for conformance to the requirements shown in the following table:

WATER SLURRY		
PROPERTY	REQUIREMENT	TEST
Density (pcf) - before final cleaning - just before placing concrete	63.5*	Mud Weight (Density) API 13B-1 Section 1
Sand Content (percent) - before final cleaning - just before placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, salt water slurry may be used and the allowable densities may be increased up to 2 pcf.		

CONSTRUCTION

General

CIDH concrete piling 24 inches in diameter or larger may be constructed by excavation and depositing concrete under slurry.

Portions of CIDH concrete piling shown on the plans to be formed shall be formed and finished in conformance with the provisions for concrete structures in Section 51, "Concrete Structures," of the Standard Specifications.

Placing Concrete

Concrete deposited under slurry shall be carefully placed in a compact, monolithic mass and by a method that will prevent washing of the concrete. Concrete deposited under slurry need not be vibrated. Placing concrete shall be a continuous operation lasting not more than the time required for each concrete placing operation at each pile, as submitted in the placing plan, unless otherwise approved in writing by the Engineer. Concrete shall be placed with concrete pumps and delivery tube system of adequate number and size to complete the placing of concrete in the time specified. The delivery tube system shall consist of one of the following:

- A. A tremie tube or tubes, each of which are at least 10 inches in diameter, fed by one or more concrete pumps.
- B. One or more concrete pump tubes, each fed by a single concrete pump.

The delivery tube system shall consist of watertight tubes with sufficient rigidity to keep the ends always in the mass of concrete placed. If only one delivery tube is utilized to place the concrete, the tube shall be placed near the center of the drilled hole. Multiple tubes shall be uniformly spaced in the hole. Internal bracing for the steel reinforcing cage shall accommodate the delivery tube system. Tremies shall not be used for piles without space for a 10-inch tube.

Spillage of concrete into the slurry during concrete placing operations shall not be allowed. Delivery tubes shall be capped with a watertight cap, or plugged above the slurry level with a good quality, tight fitting, moving plug that will expel the slurry from the tube as the tube is charged with concrete. The cap or plug shall be designed to be released as the tube is charged. The pump discharge or tremie tube shall extend to the bottom of the hole before charging the tube with concrete. After charging the delivery tube system with concrete, the flow of concrete through a tube shall be induced by slightly raising the discharge end. During concrete placement, the tip of the delivery tube shall be maintained as follows to prevent reentry of the slurry into the tube. Until at least 10 feet of concrete has been placed, the tip of the delivery tube shall be within 6 inches of the bottom of the drilled hole, and then the embedment of the tip shall be maintained at least 10 feet below the top surface of the concrete. Rapid raising or lowering of the delivery tube shall not be permitted. If the seal is lost or the delivery tube becomes plugged and must be removed, the tube shall be withdrawn, the tube cleaned, the tip of the tube capped to prevent entrance of the slurry, and the operation restarted by pushing the capped tube 10 feet into the concrete and then reinitiating the flow of concrete.

When slurry is used, a fully operational standby concrete pump, adequate to complete the work in the time specified, shall be provided at the site during concrete placement. The slurry level shall be maintained 10 feet above the piezometric head or within 12 inches of the top of the drilled hole, whichever is higher.

A log of concrete placement for each drilled hole shall be maintained by the Contractor when concrete is deposited under slurry. The log shall show the pile location, tip elevation, dates of excavation and concrete placement, total quantity of concrete deposited, length and tip elevation of any casing, and details of any hole stabilization method and materials used. The log shall include a 8-1/2" x 11" sized graph of the concrete placed versus depth of hole filled. The graph shall be plotted continuously throughout placing of concrete. The depth of drilled hole filled shall be plotted vertically with the pile tip oriented at the bottom and the quantity of concrete shall be plotted horizontally. Readings shall be made at least at each 5 feet of pile depth, and the time of the reading shall be indicated. The graph shall be labeled with the pile location, tip elevation, cutoff elevation, and the dates of excavation and concrete placement. The log shall be delivered to the Engineer within 1 working day of completion of placing concrete in the pile.

After placing reinforcement and before placing concrete in the drilled hole, if drill cuttings settle out of the slurry, the bottom of the drilled hole shall be cleaned. The Contractor shall verify that the bottom of the drilled hole is clean.

If a temporary casing is used, maintain concrete placed under slurry at a level at least 5 feet above the bottom of the casing. The equivalent hydrostatic pressure inside the casing must be greater than the hydrostatic pressure on the outside of the casing. The withdrawal of the casing must not cause contamination of the concrete with slurry.

Material resulting from using slurry shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Acceptance Testing and Mitigation

Vertical inspection pipes for acceptance testing shall be provided in all CIDH concrete piling 24 inches in diameter or larger, except when the holes are dry or when the holes are dewatered without the use of temporary casing in a manner that controls ground water.

The furnishing and placing of inspection pipes shall conform to the following:

- A. Inspection pipes shall be Schedule 40 PVC pipe with a nominal inside diameter of 2 inches. Watertight PVC couplers are permitted to facilitate pipe lengths in excess of those which are commercially available. The Contractor shall log the location of the inspection pipe couplers with respect to the plane of pile cut off, and these logs shall be delivered to the Engineer upon completion of the placement of concrete in the drilled hole.
- B. Each inspection pipe shall be capped at the bottom and shall extend from 3 feet above the pile cutoff down to the bottom of the reinforcing cage. A temporary top cap or similar means shall be provided to keep the pipes clean before testing. If pile cutoff is below the ground surface or working platform, inspection pipes shall be extended to 3 feet above the ground surface or working platform. Approved covers or railings shall be provided and inspection pipes shall be located as necessary to minimize exposure of testing personnel to potential falling hazards.
- C. Inspection pipes shall be completely clean, dry, and unobstructed at the time of testing providing a 2-inch diameter clear opening.
- D. The inspection pipes shall be installed in straight alignment, parallel to the main reinforcement, and securely fastened in place to prevent misalignment during installation of the reinforcement and placing of concrete in the hole. The CIDH concrete piling shall be constructed so that the relative distance of inspection pipes to vertical steel reinforcement shall remain constant.
- E. When any changes are made to the tip of CIDH concrete piling, the Contractor shall also extend the inspection pipes to the bottom of the reinforcing cage.

The following additional requirements apply if inspection pipes are not shown on the plans:

- A. Inspection pipes shall be placed radially around the pile, inside the outermost spiral or hoop reinforcement and no more than 1 inch clear of the outermost spiral or hoop reinforcement.
- B. Inspection pipes shall be placed around the pile at a uniform spacing not exceeding 33 inches measured along the circle passing through the centers of inspection pipes. A minimum of 2 inspection pipes per pile shall be used. Inspection pipes shall be placed to provide the maximum diameter circle that passes through the centers of the inspection pipes while maintaining the spacing required herein.
- C. Inspection pipes shall be placed a minimum of 3 inches clear of the vertical reinforcement. When the vertical reinforcement configuration does not permit this clearance while achieving radial location requirements, distance to vertical rebar shall be maximized while still maintaining the requirement for radial location.
- D. Where the dimensions of the pile reinforcement do not permit inspection pipes to be placed per these requirements, a plan for tube placement shall be submitted to the Engineer for approval in the Pile Placement Plan with a request for deviation before fabricating pile reinforcement.

After placing concrete, inspection pipes shall be filled with water to prevent debonding of the pipe. Before requesting acceptance tests, each inspection pipe shall be tested by the Contractor in the presence of the Engineer by passing a 1-1/4-inch-diameter rigid cylinder 4.5 feet long through the length of pipe. If an inspection pipe fails to pass the 1-1/4-inch-diameter cylinder, the Contractor shall immediately fill all inspection pipes in the pile with water.

For each inspection pipe that does not pass the 1-1/4-inch-diameter cylinder, the Contractor shall core a nominal 2-inch diameter hole through the concrete for the entire length of the pile. Cored holes shall be located as close as possible to the inspection pipes they are replacing and shall be no more than 5 inches clear from the reinforcement.

Coring shall not damage the pile reinforcement. Cored holes shall be made with a double wall core barrel system utilizing a split tube type inner barrel. Coring with a solid type inner barrel will not be allowed. Coring methods and equipment shall provide intact cores for the entire length of the pile. The coring operation shall be logged by an Engineering Geologist or Civil Engineer licensed in the State of California and experienced in core logging. Coring logs shall be in conformance with the Department's "Soil and Rock Logging, Classification, and Presentation Manual." Coring logs shall include Core Recovery (REC), Rock Quality Designation (RQD), locations of breaks, and complete descriptions of inclusions and voids encountered during coring, and shall be delivered to the Engineer upon completion. Concrete cores shall be preserved, identified with the exact location the core was recovered from within the pile, and delivered to the Engineer upon completion. The Engineer will evaluate the portion of the pile represented by the cored hole based on the submitted core logs.

Acceptance tests of the concrete will be made by the Engineer, without cost to the Contractor. Acceptance tests will evaluate the homogeneity of the placed concrete. Tests will include gamma-gamma logging conducted in conformance with California Test 233. The Contractor shall not conduct operations within 25 feet of the gamma-gamma logging operations. The Contractor shall separate reinforcing steel as necessary to allow the Engineer access to the inspection pipes to perform gamma-gamma logging or other acceptance testing. After requesting acceptance tests and providing access to the piles, the Contractor shall allow 15 days for the Engineer to conduct these tests and make determination of acceptance.

The Engineer may elect to perform additional tests to further evaluate a pile. These tests may include crosshole sonic logging and other means of inspection selected by the Engineer. The pile acceptance test report will indicate if the Department intends to perform any additional testing and when the testing will be performed. The Contractor shall allow the Department 20 additional days for a total of 50 days to perform these tests and to provide supplemental results. The Contractor may progress with the mitigation plan process without waiting for these supplemental results.

Inspection pipes and cored holes shall be dewatered and filled with grout after notification by the Engineer that the pile is acceptable. Grout shall conform to the provisions in Section 50-1.09, "Bonding and Grouting," of the Standard Specifications. Inspection pipes and holes shall be filled using grout tubes that extend to the bottom of the pipe or hole or into the grout already placed.

If acceptance testing performed by the Engineer determines that a pile does not meet the requirements of the specifications and California Test 233, Part 5C, then that pile will be rejected and all depositing of concrete under slurry or concrete placed using temporary casing for the purpose of controlling groundwater shall be suspended until written changes to the methods of pile construction are approved in writing by the Engineer.

The Engineer will determine whether the rejected pile requires mitigation due to structural, geotechnical, or corrosion concerns. The Engineer will consider the estimated size and location of the anomaly and potential effects upon the design. The Engineer will provide the conclusions of this analysis to the Contractor for development of a mitigation plan, if required. The Contractor shall allow 30 days for the Engineer to determine whether the pile requires mitigation and provide information to the Contractor. Day 1 of the 30 days shall be the 1st day after access has been provided to the Engineer to perform acceptance testing. If the Contractor submits additional information to the Engineer that modifies the size, shape, or nature of the anomaly, the Contractor shall allow 10 additional days for the subsequent analysis.

If a rejected pile does not require mitigation, you may repair the pile per an approved mitigation plan or the Department will deduct the amount shown in the table for each anomaly up to the maximum total deduction:

Anomaly Location	Anomaly Deduction		
	D < 4 feet	4 ≤ D < 6	D ≥ 6
Entirely or partially within the upper 2/3 of the pile length	\$1,000	\$2,000	\$4,000
Entirely within the lower 1/3 of the pile length	\$500	\$1,000	\$2,000
Maximum total deduction	\$2,000	\$4,000	\$8,000

Note:

D = Nominal pile diameter

The Department deducts the amount from any moneys due, or that may become due to the Contractor under the Contract.

If the Engineer determines that a rejected pile requires mitigation, the Contractor shall submit to the Engineer for approval a mitigation plan for repair, supplementation, or replacement for each rejected CIDH concrete pile conforming to

the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. If the Engineer determines that it is not feasible to repair the rejected pile, the Contractor shall not include repair as a means of mitigation and shall proceed with the submittal of a mitigation plan for replacement or supplementation of the rejected pile.

Pile mitigation plans shall include the following:

- A. The designation and location of the pile addressed by the mitigation plan.
- B. A review of the structural, geotechnical, and corrosion design requirements of the rejected pile.
- C. A step by step description of the mitigation work to be performed, including drawings if necessary.
- D. An assessment of how the proposed mitigation work will address the structural, geotechnical, and corrosion design requirements of the rejected pile.
- E. Methods for preservation or restoration of existing earthen materials.
- F. A list of affected facilities, if any, with methods and equipment for protection of these facilities during mitigation.
- G. The State assigned contract number, bridge number, full name of the structure as shown on the contract plans, District-County-Route-Post Mile, and the Contractor's (and Subcontractor's if applicable) name on each sheet.
- H. A list of materials, with quantity estimates, and personnel, with qualifications, to be used to perform the mitigation work.
- I. The seal and signature of an engineer who is licensed as a Civil Engineer by the State of California. This requirement is waived for approved mitigation plans when either of the following conditions are present:
 1. The proposed mitigation will be performed in conformance with the most recent Department approved version of "ADSC Standard Mitigation Plan 'A' - Basic Repair" without exception or modification.
 2. The Engineer has determined that the rejected pile does not require mitigation due to structural, geotechnical, or corrosion concerns, and the Contractor elects to repair the pile using most recent Department approved version of "ADSC Standard Mitigation Plan 'B' - Grouting Repair" without exception or modification.

The most recent Department approved version of the "ADSC Standard Mitigation Plan" is available at:

<http://www.dot.ca.gov/hq/esc/geotech/ft/adscmitplan.htm>

For rejected piles to be repaired, the Contractor shall submit a pile mitigation plan that contains the following additional information:

- A. An assessment of the nature and size of the anomalies in the rejected pile.
- B. Provisions for access for additional pile testing if required by the Engineer.

For rejected piles to be replaced or supplemented, the Contractor shall submit a pile mitigation plan that contains the following additional information:

- A. The proposed location and size of additional piles.
- B. Structural details and calculations for any modification to the structure to accommodate the replacement or supplemental piles.

All provisions for CIDH concrete piling shall apply to replacement piles.

The Contractor shall allow the Engineer 20 days to review the mitigation plan after a complete submittal has been received.

When repairs are performed, the Contractor shall submit a mitigation report to the Engineer within 10 days of completion of the repair. This report shall state exactly what repair work was performed and quantify the success of the repairs relative to the submitted mitigation plan. The mitigation report shall be stamped and signed by an engineer that is licensed as a Civil Engineer by the State of California. The mitigation report shall show the State assigned contract number, bridge number, full name of the structure as shown on the contract plans, District-County-Route-Post Mile, and the Contractor (and subcontractor if applicable) name on each sheet. The Engineer will be the sole judge as to whether a mitigation proposal is acceptable, the mitigation efforts are successful, and to whether additional repairs, removal and replacement, or construction of a supplemental foundation is required.

MEASUREMENT AND PAYMENT (PILING)

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in drilling or coring holes, disposing of the material resulting from drilling or coring holes, furnishing and placing concrete, slurry, depositing concrete under slurry, test batches, inspection pipes, filling inspection holes and pipes with grout, drilling oversized cast-in-drilled-hole concrete piling, filling cave-ins and oversized piles with concrete, and re-drilling

through concrete shall be considered as included in the contract prices paid per linear foot for cast-in-drilled-hole concrete piling of the types and sizes listed in the Engineer's Estimate, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, as directed by the Engineer, and no additional compensation will be allowed therefor.

10-1.50 CONCRETE STRUCTURES

Portland cement concrete structures shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications.

10-1.51 STEEL STRUCTURES

Construction of steel structures shall conform to the provisions in Section 55, "Steel Structures," of the Standard Specifications and these special provisions.

GENERAL

Attention is directed to "Welding" in Section 8, "Materials," of these special provisions.

MATERIALS

High-strength fastener assemblies and other bolts attached to structural steel with nuts and washers shall be zinc coated. When direct tension indicators are used in these assemblies, the direct tension indicator and all components of the fastener assembly shall be zinc coated by the mechanical deposition process.

ROTATIONAL CAPACITY TESTING PRIOR TO SHIPMENT TO JOB SITE

Rotational capacity tests shall be performed on all lots of high-strength fastener assemblies prior to shipment of these lots to the project site. Zinc-coated assemblies shall be tested after all fabrication, coating, and lubrication of components has been completed. One hardened washer shall be used under each nut for the tests.

The requirements of this section do not apply to high-strength cap screws or high-strength bolts used for slip base plates.

Each combination of bolt production lot, nut lot, and washer lot shall be tested as an assembly.

A rotational capacity lot number shall be assigned to each combination of lots tested. Each shipping unit of fastener assemblies shall be plainly marked with the rotational capacity lot number.

Two fastener assemblies from each rotational capacity lot shall be tested.

The following equipment, procedure, and acceptance criteria shall be used to perform rotational capacity tests on and determine acceptance of ASTM A 325 long bolts. Fasteners are considered to be long bolts when full nut thread engagement can be achieved when installed in a bolt tension measuring device:

A. Long Bolt Test Equipment:

1. Calibrated bolt tension measuring device with adequate tension capacity for the bolts being tested.
2. Calibrated dial or digital torque wrench. Other suitable tools will be required for performing Steps 7 and 8 of the Long Bolt Test Procedure. A torque multiplier may be required for large diameter bolts.
3. Spacer washers or bushings. When spacer washers or bushings are required, they shall have the same inside diameter and equal or larger outside diameter as the appropriate hardened washers conforming to the requirements in ASTM Designation: F 436.
4. Steel beam or member, such as a girder flange or cross frame, to which the bolt tension measuring device will be attached. The device shall be accessible from the ground.

B Long Bolt Test Procedure:

1. Measure the bolt length. The bolt length is defined as the distance from the end of the threaded portion of the shank to the underside of the bolt head.
2. Install the nut on the bolt so that 3 to 5 full threads of the bolt are located between the bearing face of the nut and the underside of the bolt head. Measure and record the thread stickout of the bolt. Thread stickout is determined by measuring the distance from the outer face of the nut to the end of the threaded portion of the shank.

3. Insert the bolt into the bolt tension measuring device and install the required number of washers, and additional spacers as needed, directly beneath the nut to produce the thread stickout measured in Step 2 of this procedure.
4. Tighten the nut using a hand wrench to a snug-tight condition. The snug tension shall not be less than the Table A value but may exceed the Table A value by a maximum of 2 kips.

Table A

High-Strength Fastener Assembly Tension Values to Approximate Snug-Tight Condition	
Bolt Diameter (inches)	Snug Tension (kips)
1/2	1
5/8	2
3/4	3
7/8	4
1	5
1-1/8	6
1-1/4	7
1-3/8	9
1-1/2	10

5. Match-mark the assembly by placing a heavy reference start line on the face plate of the bolt tension measuring device which aligns with (1) a mark placed on one corner of the nut and (2) a radial line placed across the flat on the end of the bolt or on the exposed portions of the threads of tension control bolts. Place an additional mark on the outside of the socket that overlays the mark on the nut corner such that this mark will be visible while turning the nut. Make an additional mark on the face plate, either 2/3 of a turn, one turn, or 1-1/3 turn clockwise from the heavy reference start line, depending on the bolt length being tested as shown in Table B.

Table B

Required Nut Rotation for Rotational Capacity Tests ^{(a) (b)}	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	2/3
Greater than 4 bolt diameters but no more than 8 bolt diameters	1
Greater than 8 bolt diameters, but no more than 12 bolt diameters ^(c)	1-1/3

(a) Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance shall be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance shall be plus or minus 45 degrees.

(b) Applicable only to connections in which all material within grip of the bolt is steel.

(c) When bolt length exceeds 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.

6. Turn the nut to achieve the applicable minimum bolt tension value listed in Table C. After reaching this tension, record the moving torque, in foot-pounds, required to turn the nut, and also record the corresponding bolt tension value in pounds. Torque shall be measured with the nut in motion. Calculate the value, T, where $T = [(the\ measured\ tension\ in\ pounds) \times (the\ bolt\ diameter\ in\ inches) / 48]$.

Table C

Minimum Tension Values for High-Strength Fastener Assemblies	
Bolt Diameter (inches)	Minimum Tension (kips)
1/2	12
5/8	19
3/4	28
7/8	39
1	51
1-1/8	56
1-1/4	71
1-3/8	85
1-1/2	103

7. Turn the nut further to increase bolt tension until the rotation listed in Table B is reached. The rotation is measured from the heavy reference line made on the face plate after the bolt was snug-tight. Record this bolt tension.
8. Loosen and remove the nut and examine the threads on both the nut and bolt.

C. Long Bolt Acceptance Criteria:

1. An assembly shall pass the following requirements to be acceptable: (1) the measured moving torque (Step 6) shall be less than or equal to the calculated value, T (Step 6), (2) the bolt tension measured in Step 7 shall be greater than or equal to the applicable turn test tension value listed in Table D, (3) the nut shall be able to be removed from the bolt without signs of thread stripping or galling after the required rotation in Step 7 has been achieved, (4) the bolt does not shear from torsion or fail during the test, and (5) the assembly does not seize before the final rotation in Step 7 is reached. Elongation of the bolt in the threaded region between the bearing face of the nut and the underside of the bolt head is expected and will not be considered a failure. Both fastener assemblies tested from one rotational capacity lot shall pass for the rotational capacity lot to be acceptable.

Table D

Turn Test Tension Values	
Bolt Diameter (inches)	Turn Test Tension (kips)
1/2	14
5/8	22
3/4	32
7/8	45
1	59
1-1/8	64
1-1/4	82
1-3/8	98
1-1/2	118

The following equipment, procedure, and acceptance criteria shall be used to perform rotational capacity tests on and determine acceptance of ASTM A 325 short bolts. Fasteners are considered to be short bolts when full nut thread engagement cannot be achieved when installed in a bolt tension measuring device:

A. Short Bolt Test Equipment:

1. Calibrated dial or digital torque wrench. Other suitable tools will be required for performing Steps 7 and 8 of the Short Bolt Test Procedure. A torque multiplier may be required for large diameter bolts.
2. Spud wrench or equivalent.
3. Spacer washers or bushings. When spacer washers or bushings are required, they shall have the same inside diameter and equal or larger outside diameter as the appropriate hardened washers conforming to the requirements in ASTM Designation: F 436.

4. Steel plate or girder with a hole to install bolt. The hole size shall be 1/16 inch greater than the nominal diameter of the bolt to be tested. The grip length, including any plates, washers, and additional spacers as needed, shall provide the proper number of threads within the grip, as required in Step 2 of the Short Bolt Test Procedure.

B. Short Bolt Test Procedure:

1. Measure the bolt length. The bolt length is defined as the distance from the end of the threaded portion of the shank to the underside of the bolt head.
2. Install the nut on the bolt so that 3 to 5 full threads of the bolt are located between the bearing face of the nut and the underside of the bolt head. Measure and record the thread stickout of the bolt. Thread stickout is determined by measuring the distance from the outer face of the nut to the end of the threaded portion of the shank.
3. Install the bolt into a hole on the plate or girder and install the required number of washers and additional spacers as needed between the bearing face of the nut and the underside of the bolt head to produce the thread stickout measured in Step 2 of this procedure.
4. Tighten the nut using a hand wrench to a snug-tight condition. The snug condition shall be the full manual effort applied to the end of a 12-inch long wrench. This applied torque shall not exceed 20 percent of the maximum allowable torque in Table E.

Table E

Maximum Allowable Torque for High-Strength Fastener Assemblies	
Bolt Diameter (inches)	Torque (ft-lb)
1/2	145
5/8	285
3/4	500
7/8	820
1	1220
1-1/8	1500
1-1/4	2130
1-3/8	2800
1-1/2	3700

5. Match-mark the assembly by placing a heavy reference start line on the steel plate or girder which aligns with (1) a mark placed on one corner of the nut and (2) a radial line placed across the flat on the end of the bolt or on the exposed portions of the threads of tension control bolts. Place an additional mark on the outside of the socket that overlays the mark on the nut corner such that this mark will be visible while turning the nut. Make 2 additional small marks on the steel plate or girder, one 1/3 of a turn and one 2/3 of a turn clockwise from the heavy reference start line on the steel plate or girder.
6. Using the torque wrench, tighten the nut to the rotation value listed in Table F. The rotation is measured from the heavy reference line described in Step 5 made after the bolt was snug-tight. A second wrench shall be used to prevent rotation of the bolt head during tightening. Measure and record the moving torque after this rotation has been reached. The torque shall be measured with the nut in motion.

Table F

Nut Rotation Required for Turn-of-Nut Installation ^{(a),(b)}	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	1/3

- (a) Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance shall be plus or minus 30 degrees.
- (b) Applicable only to connections in which all material within grip of the bolt is steel.

7. Tighten the nut further to the 2/3-turn mark as indicated in Table G. The rotation is measured from the heavy reference start line made on the plate or girder when the bolt was snug-tight. Verify that the radial line on the

bolt end or on the exposed portions of the threads of tension control bolts is still in alignment with the start line.

Table G

Required Nut Rotation for Rotational Capacity Test	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	2/3

8. Loosen and remove the nut and examine the threads on both the nut and bolt.

C. Short Bolt Acceptance Criteria:

1. An assembly shall pass the following requirements to be acceptable: (1) the measured moving torque from Step 6 shall be less than or equal to the maximum allowable torque from Table E, (2) the nut shall be able to be removed from the bolt without signs of thread stripping or galling after the required rotation in Step 7 has been achieved, (3) the bolt does not shear from torsion or fail during the test, and (4) the assembly shall not seize before the final rotation in Step 7 is reached. Elongation of the bolt in the threaded region between the bearing face of the nut and the underside of the bolt head will not be considered a failure. Both fastener assemblies tested from one rotational capacity lot shall pass for the rotational capacity lot to be acceptable.

INSTALLATION TENSION TESTING AND ROTATIONAL CAPACITY TESTING AFTER ARRIVAL ON THE JOB SITE

Installation tension tests and rotational capacity tests on high-strength fastener assemblies shall be performed by the Contractor prior to acceptance or installation and after arrival of the fastener assemblies on the project site. Installation tension tests and rotational capacity tests shall be performed at the job site, in the presence of the Engineer, on each rotational capacity lot of fastener assemblies.

The requirements of this section do not apply to high-strength cap screws or high-strength bolts used for slip base plates.

Installation tension tests shall be performed on 3 representative fastener assemblies in conformance with the provisions in Section 8, "Installation," of the RCSC Specification. For short bolts, Section 8.2, "Pretensioned Joints," of the RCSC Specification shall be replaced by the "Pre-Installation Testing Procedures," of the "Structural Bolting Handbook," published by the Steel Structures Technology Center, Incorporated.

The rotational capacity tests shall be performed in conformance with the requirements for rotational capacity tests in "Rotational Capacity Testing Prior to Shipment to Job Site" of these special provisions.

At the Contractor's expense, additional installation tension tests, tests required to determine job inspecting torque, and rotational capacity tests shall be performed by the Contractor on each rotational capacity lot, in the presence of the Engineer, if:

1. Any fastener is not used within 3 months after arrival on the job site,
2. Fasteners are improperly handled, stored, or subjected to inclement weather prior to final tightening,
3. Significant changes are noted in original surface condition of threads, washers, or nut lubricant, or
4. The Contractor's required inspection is not performed within 48 hours after all fasteners in a joint have been tensioned.

Failure of a job-site installation tension test or a rotational capacity test will be cause for rejection of unused fasteners that are part of the rotational capacity lot.

When direct tension indicators are used, installation verification tests shall be performed in conformance with Appendix Section X1.4 of ASTM Designation: F 959, except that bolts shall be initially tensioned to a value 5 percent greater than the minimum required bolt tension.

SEALING

When zinc-coated tension control bolts are used, the sheared end of each fastener shall be completely sealed with non-silicone type sealing compound conforming to the requirements in ASTM Designation: C 920. The sealant shall be gray in color and shall have a minimum thickness of 50 mils. The sealant shall be applied to a clean sheared surface on the same day that the splined end is sheared off.

WELDING

Table 2.2 of AWS D1.5 is superseded by the following table:

Base Metal Thickness of the Thicker Part Joined, inches	Minimum Effective Partial Joint Penetration Groove Weld Size*, inches
Over 1/4 to 1/2 inclusive	3/16
Over 1/2 to 3/4 inclusive	1/4
Over 3/4 to 1-1/2 inclusive	5/16
Over 1-1/2 to 2-1/4 inclusive	3/8
Over 2-1/4 to 6 inclusive	1/2
Over 6	5/8

* Except the weld size need not exceed the thickness of the thinner part

Dimensional details and workmanship for welded joints in tubular and pipe connections shall conform to the provisions in Part A, "Common Requirements of Nontubular and Tubular Connections," and Part D, "Specific Requirements for Tubular Connections," in Section 2 of AWS D1.1.

The requirement of conformance with AWS D1.5 shall not apply to work conforming to Section 56-1, "Overhead Sign Structures," or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

10-1.52 SIGN STRUCTURES

Sign structures for overhead signs shall conform to the provisions in Section 56-1, "Overhead Sign Structures," of the Standard Specifications, "Steel Structures" of these special provisions, and the following requirements.

Before commencing fabrication of sign structures, the Contractor shall submit 2 sets of working drawings to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The working drawings shall include sign panel dimensions, span lengths, post heights, anchorage layouts, proposed splice locations, a snugging and tensioning pattern for anchor bolts and high-strength bolted connections, and details for permanent steel anchor bolt templates. The working drawings shall be supplemented with a written quality control program that includes methods, equipment, and personnel necessary to satisfy the requirements specified herein.

Working drawings shall be 22" x 34" or 11" x 17" in size and each drawing and calculation sheet shall include the State assigned designations for the sign structure type and reference as shown on the contract plans, District-County-Route-Post Mile, and contract number.

The Engineer shall have 30 days to review the sign structure working drawings after a complete submittal has been received. No fabrication or installation of sign structures shall be performed until the working drawings are approved in writing by the Engineer.

Steel bolts not designated on the plans as high strength (HS) or stainless steel shall be for general applications and shall conform to the requirements in ASTM Designation: A 307.

A permanent steel template shall be used to maintain the proper anchor bolt spacing.

One top nut, one leveling nut, and 2 washers shall be provided for the upper threaded portion of each anchor bolt.

Flatness of surfaces for the following shall conform to the requirements in ASTM Designation: A 6/A 6M:

1. Base plates that are to come in contact with concrete, grout, or washers and leveling nuts
2. Plates in high-strength bolted connections

No holes shall be made in members unless the holes are shown on the plans or are approved in writing by the Engineer.

Partial joint penetration longitudinal seam welds for tapered tubular members shall have at least the minimum penetration shown but not less than 60 percent penetration, except that within 6 inches of circumferential welds, longitudinal seam welds shall be complete joint penetration groove welds. Longitudinal seam welds on structures having telescopic pole segment splices shall be complete joint penetration groove welds on the female end for a length on each end equal to the designated slip-fit splice length plus 6 inches.

Except for welds at posts shown as partial joint penetration welds, longitudinal seam welds of fabricated pipe posts shall be complete joint penetration groove welds.

The length of telescopic slip-fit splices shall be at least 1.5 times the inside diameter of the exposed end of the female section.

Steel members used for overhead sign structures shall receive nondestructive testing (NDT) in conformance with AWS D1.1 and the following:

1.

Weld Location	Weld Type	Minimum Required NDT
Splice welds around the perimeter of tubular sections, poles, and arms.	CJP groove weld with backing ring	100% UT ^a or RT ^b
Longitudinal seam welds	CJP or PJP ^c groove weld	Random 25% MT ^d
Longitudinal seam welds within 6 inches of a circumferential splice.	CJP groove weld	100% UT or RT
Welds attaching base plates, flange plates, or pole or mast arm plates, to poles or arm tubes.	CJP groove weld with backing ring and reinforcing fillet	$t \geq 5/16$ inch: 100%UT and MT $t < 5/16$ inch: 100% MT after root weld pass and final weld pass $t =$ pole or arm thickness
	External (top) fillet weld for socket-type connections	100% MT

- a ultrasonic testing
- b radiographic testing
- c partial joint penetration
- d magnetic particle testing

2. The acceptance and repair criteria for UT of welded joints where any of the members are less than 5/16 inch thick or where tubular sections are less than 13 inches in diameter shall conform to the requirements in AWS D1.1, Clause 6.13.3.1. A written procedure approved by the Engineer shall be used when performing this UT. These written procedures shall conform to the requirements in AWS D1.1, Annex K. The acceptance and repair criteria for other welded joints receiving UT shall conform to the requirements in AWS D1.1, Clause, Table 6.3 for cyclically loaded nontubular connections.
3. The acceptance and repair criteria for radiographic or real time image testing shall conform to the requirements of AWS D1.1 for tensile stress welds.
4. For longitudinal seam welds, the random locations for NDT will be selected by the Engineer. The cover pass shall be ground smooth at the locations to be tested. If repairs are required in a portion of a tested weld, the repaired portion shall receive NDT, and additional NDT shall be performed on untested portions of the weld. The additional NDT shall be performed on 25 percent of that longitudinal seam weld. After this additional NDT is performed and if more repairs are required, then that entire longitudinal seam weld shall receive NDT.

Circumferential welds and base plate to post welds may be repaired only one time without written permission from the Engineer.

All ferrous metal parts of tubular sign structures shall be galvanized and shall not be painted.

Full compensation for furnishing anchor bolt templates and for testing of welds shall be considered as included in the contract price paid per pound for furnish sign structure, and no additional compensation will be allowed therefor.

10-1.53 ROADSIDE SIGNS

Roadside signs shall be furnished and installed at the locations shown on the plans or where designated by the Engineer and in conformance with the provisions in Section 56-2, "Roadside Signs," of the Standard Specifications and these special provisions.

The Contractor shall furnish roadside sign panels in conformance with the provisions in "Furnish Sign" of these special provisions.

Wood posts shall be pressure treated after fabrication in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," of the Standard Specifications and AWP A Use Category System: UC4A, Commodity Specification A or B.

Roadside sign (barrier mounted) will be measured as units determined from actual count.

The contract unit price paid for roadside sign (barrier mounted) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing roadside signs (barrier mounted), complete in place, including the installation of sign panels, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.54 FURNISH SIGN

Signs shall be fabricated and furnished in accordance with details shown on the plans, the Traffic Sign Specifications, and these special provisions.

Traffic Sign Specifications for California sign codes are available for review at:

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/specs.htm>

Traffic Sign Specifications for signs referenced with Federal MUTCD sign codes can be found in Standard Highway Signs Book, administered by the Federal Highway Administration, which is available for review at:

http://mutcd.fhwa.dot.gov/ser-shs_millennium.htm

Information on cross-referencing California sign codes with the Federal MUTCD sign codes is available at:

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/specs.htm>

Temporary or permanent signs shall be free from blemishes that may affect the serviceability and detract from the general sign color and appearance when viewing during daytime and nighttime from a distance of 25 feet. The face of each finished sign shall be uniform, flat, smooth, and free of defects, scratches, wrinkles, gel, hard spots, streaks, extrusion marks, and air bubbles. The front, back, and edges of the sign panels shall be free of router chatter marks, burns, sharp edges, loose rivets, delaminated skins, excessive adhesive over spray and aluminum marks.

QUALITY CONTROL FOR SIGNS

The requirements of "Quality Control for Signs" in this section shall not apply to construction area signs.

No later than 14 days before sign fabrication, the Contractor shall submit a written copy of the quality control plan for signs to the Engineer for review. The Engineer will have 10 days to review the quality control plan. Sign fabrication shall not begin until the Engineer approves the Contractor's quality control plan in writing. The Contractor shall submit to the Engineer at least 3 copies of the approved quality control plan. The quality control plan shall include, but not be limited to the following requirements:

- A. Identification of the party responsible for quality control of signs,
- B. Basis of acceptance for incoming raw materials at the fabrication facility,
- C. Type, method and frequency of quality control testing at the fabrication facility,
- D. List (by manufacturer and product name) of process colors, protective overlay film, retroreflective sheeting and black non-reflective film,
- E. Recommended cleaning procedure for each product, and
- F. Method of packaging, transport and storage for signs.

No legend shall be installed at the project site. Legend shall include letters, numerals, tildes, bars, arrows, route shields, symbols, logos, borders, artwork, and miscellaneous characters. The style, font, size, and spacing of the legend shall conform to the Standard Alphabets published in the FHWA Standard Highway Signs Book. The legend shall be oriented in the same direction in accordance with the manufacturer's orientation marks found on the retroreflective sheeting.

On multiple panel signs, legend shall be placed across joints without affecting the size, shape, spacing, and appearance of the legend. Background and legend shall be wrapped around interior edges of formed panel signs as shown on plans to prevent delamination.

The following notation shall be placed on the lower right side of the back of each sign where the notation will not be blocked by the sign post or frame:

- A. PROPERTY OF STATE OF CALIFORNIA,
- B. Name of the sign manufacturer,
- C. Month and year of fabrication,
- D. Type of retroreflective sheeting, and
- E. Manufacturer's identification and lot number of retroreflective sheeting.

The above notation shall be applied directly to the aluminum sign panels in 1/4-inch upper case letters and numerals by die-stamp and applied by similar method to the fiberglass reinforced plastic signs. Painting, screening, or engraving the notation will not be allowed. The notation shall be applied without damaging the finish of the sign.

Signs with a protective overlay film shall be marked with a dot of 3/8 inch in diameter. The dot placed on white border shall be black, while the dot placed on black border shall be white. The dot shall be placed on the lower border of the sign before application of the protective overlay film and shall not be placed over the legend and bolt holes. The application method and exact location of the dot shall be determined by the manufacturer of the signs.

For sign panels that have a minor dimension of 48 inches or less, no splice will be allowed in the retroreflective sheet except for the splice produced during the manufacturing of the retroreflective sheeting. For sign panels that have a minor dimension greater than 48 inches, only one horizontal splice will be allowed in the retroreflective sheeting.

Unless specified by the manufacturer of the retroreflective sheeting, splices in retroreflective sheeting shall overlap by a minimum of one inch. Splices shall not be placed within 2 inches from edges of the panels. Except at the horizontal borders, the splices shall overlap in the direction from top to bottom of the sign to prevent moisture penetration. The retroreflective sheeting at the overlap shall not exhibit a color difference under the incident and reflected light.

Signs exhibiting a significant color difference between daytime and nighttime shall be replaced immediately.

Repairing sign panels will not be allowed except when approved by the Engineer.

The Department will inspect signs at the Contractor's facility and delivery location, and in accordance with Section 6, "Control of Materials," of the Standard Specifications. The Engineer will inspect signs for damage and defects before and after installation.

Regardless of kind, size, type, or whether delivered by the Contractor or by a common carrier, signs shall be protected by thorough wrapping, tarping, or other methods to ensure that signs are not damaged by weather conditions and during transit. Signs shall be dry during transit and shipped on pallets, in crates, or tier racks. Padding and protective materials shall be placed between signs as appropriate. Finished sign panels shall be transported and stored by method that protects the face of signs from damage. The Contractor shall replace wet, damaged, and defective signs.

Signs shall be stored in dry environment at all times. Signs shall not rest directly on the ground or become wet during storage. Signs, whether stored indoor or outdoor, shall be free standing. In areas of high heat and humidity signs shall be stored in enclosed climate-controlled trailers or containers. Signs shall be stored indoor if duration of the storage will exceed 30 days.

Screen processed signs shall be protected, transported and stored as recommended by the manufacturer of the retroreflective sheeting.

When requested, the Contractor shall provide the Engineer test samples of signs and materials used at various stages of production. Sign samples shall be 12" x 12" in size with applied background, letter or numeral, and border strip.

The Contractor shall assume the costs and responsibilities resulting from the use of patented materials, equipment, devices, and processes for the Contractor's work.

SHEET ALUMINUM

Alloy and temper designations for sheet aluminum shall be in accordance with ASTM Designation: B 209.

The Contractor shall furnish the Engineer a Certificate of Compliance in conformance with Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for the sheet aluminum.

Sheet aluminum shall be pretreated in accordance to ASTM Designation: B 449. Surface of the sheet aluminum shall be cleaned, deoxidized, and coated with a light and tightly adherent chromate conversion coating free of powdery residue. The conversion coating shall be Class 2 with a weight between 10 milligrams per square foot and 35 milligrams per square foot, and an average weight of 25 milligrams per square foot. Following the cleaning and coating process, the sheet aluminum shall be protected from exposure to grease, oils, dust, and contaminants.

Sheet aluminum shall be free of buckles, warps, dents, cockles, burrs, and defects resulting from fabrication.

Base plate for standard route marker shall be die cut.

RETROREFLECTIVE SHEETING

The Contractor shall furnish retroreflective sheeting for sign background and legend in conformance with ASTM Designation: D 4956 and "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Retroreflective sheeting shall be applied to sign panels as recommended by the retroreflective sheeting manufacturer without stretching, tearing, and damage.

Class 1, 3, or 4 adhesive backing shall be used for Type II, III, IV, VII, VIII, and IX retroreflective sheeting. Class 2 adhesive backing may also be used for Type II retroreflective sheeting. The adhesive backing shall be pressure sensitive and fungus resistant.

When the color of the retroreflective sheeting determined from instrumental testing is in dispute, the Engineer's visual test will govern.

PROCESS COLOR AND FILM

The Contractor shall furnish and apply screened process color, non-reflective opaque black film, and protective overlay film of the type, kind, and product that are approved by the manufacturer of the retroreflective sheeting.

The Contractor shall furnish the Engineer a Certificate of Compliance in accordance to Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for the screened process color, non-reflective opaque black film, and protective overlay film.

The surface of the screened process color shall be flat and smooth. When the screened process colors determined from the instrumental testing in accordance to ASTM Designation: D 4956 are in dispute, the Engineer's visual test will govern.

The Contractor shall provide patterns, layouts, and set-ups necessary for the screened process.

The Contractor may use green, red, blue, and brown reverse-screened process colors for background and non-reflective opaque black film or black screened process color for legend. The coefficient of retroreflection for reverse-screened process colors on white retroreflective sheeting shall not be less than 70 percent of the coefficient of retroreflection specified in ASTM Designation: D 4956.

The screened process colors and non-reflective opaque black film shall have the same outdoor weatherability as that of the retroreflective sheeting.

After curing, screened process colors shall withstand removal when tested by applying 3M Company Scotch Brand Cellophane Tape No. 600 or equivalent tape over the color and removing with one quick motion at 90° angle.

SINGLE SHEET ALUMINUM SIGN

Single sheet aluminum signs shall be fabricated and furnished with or without frame. The Contractor shall furnish the sheet aluminum in accordance to "Sheet Aluminum" of these special provisions. Single sheet aluminum signs shall be fabricated from sheet aluminum alloy 6061-T6 or 5052-H38.

Single Sheet aluminum signs shall not have a vertical splice in the sheet aluminum. For signs with depth greater than 48 inches, one horizontal splice will be allowed in the sheet aluminum.

Framing for single sheet aluminum signs shall consist of aluminum channel or rectangular aluminum tubing. The framing shall have a length tolerance of ±1/8 inch. The face sheet shall be affixed to the frame with rivets of 3/16-inch diameter. Rivets shall be placed within the web of channels and shall not be placed less than 1/2 inch from edges of the sign panels. Rivets shall be made of aluminum alloy 5052 and shall be anodized or treated with conversion coating to prevent corrosion. The exposed portion of rivets on the face of signs shall be the same color as the background or legend where the rivets are placed.

Finished signs shall be flat within a tolerance of ±1/32 inch per linear foot when measured across the plane of the sign in all directions. The finished signs shall have an overall tolerance within ±1/8 inch of the detailed dimensions.

Aluminum channels or rectangular aluminum tubings shall be welded together with the inert gas shielded-arc welding process using E4043 aluminum electrode filler wires as shown on the plans. Width of the filler shall be equal to wall thickness of smallest welded channel or tubing.

LAMINATED PANEL SIGN

Laminated panel signs shall consist of two sheet aluminum laminated to a honeycomb core and extruded aluminum frame to produce flat and rigid panels of one-inch or 2-1/2-inch nominal thickness.

The face of laminated panel signs shall be fabricated from sheet aluminum alloy 6061-T6 or 5052-H32 of 0.063-inch thickness. The back of laminated panel signs shall be fabricated from sheet aluminum alloy 3003-H14 of 0.040-inch thickness. The Contractor shall furnish sheet aluminum as provided in "Sheet Aluminum" of these special provisions.

The core material shall be phenolic impregnated kraft paper honeycomb and fungus resistant in accordance to Military Specification MIL-D-5272. The honeycomb cell size shall be 1/2 inch. Weight of the kraft paper shall be 80 pounds and impregnated minimum 18 percent by weight.

A laminating adhesive that can produce a resilient oil and water-resistant bond shall be used to adhere the extruded aluminum frame and the honeycomb core to the sheet aluminum. Edge and interior delamination occur when a 0.010-inch thick feeler gauge of 1/2 inch in length can be inserted into a depth of more than 1/2 inch between the extruded aluminum frame and the sheet aluminum. Laminated panel sign with delamination will be rejected.

Laminated panels shall be able to resist a wind load of 33 pounds per square foot for the following simple span lengths with a bending safety factor of 1.25:

Panel Type	Nominal Panel Thickness	Simple Span Length
A	one inch	9 feet 0 inch
B	one inch	9 feet 0 inch
	2-1/2 inch	14 feet 6 inches
H	2-1/2 inch	14 feet 6 inches

The tensile strength of laminated panels shall be at least 20 pounds per square inch when tested in accordance with the following modification and with ASTM Designations: C 297 and C 481, Cycle B after aging. Instead of spraying with hot water, the specimen shall be totally immersed in 158° F hot water. When requested by the Engineer or the Transportation

Laboratory, at least one test sample of 12" x 12" in size shall be taken for every 2,000 square feet of the panel production cycle or of the total factory production order, whichever occurs first.

Rivets used to secure the sheet aluminum to the perimeter frame shall be fabricated from aluminum alloy 5052 and anodized or treated with a conversion coating to prevent corrosion. Size of the aluminum rivets shall be 3/16 inch in diameter and placed at the corners of the laminated panels. Color of the exposed portion of the rivets shall be the same color as the sign background or legend on which the rivets are placed. Rivets or stainless steel screws shall be placed in holes drilled during fabrication in the perimeter frame.

On laminated multiple panel signs, a closure H-Section shall be placed in the top channel of the bottom panel. Perimeter frame of adjoining panel shall accommodate the closure H-Section in the closed position.

For signs with a depth of 5 feet 0 inch or less, the laminated panels shall be fabricated with no horizontal joints, splices or seams. For signs with a depth of greater than 5 feet 0 inch, the laminated panels may be fabricated in two panels.

The face of laminated panels shall be flat with a tolerance of $\pm 3/32$ inch per linear foot when measured across the plane of each panel in all directions. Where laminated panels adjoin, the gap between adjoining edges from one corner to the other corner shall not deviate by more than 1/32 inch. Non-adjoining edges from one corner to the other corner shall not deviate by more than 1/8 inch from a straight plane. The front and back sheet aluminum shall be flush with the perimeter frame. The panel edges shall be smooth.

Laminated panel signs shall be within +1/8 inch or -1/2 inch of the detailed dimensions. The difference in length between adjoining panels of multiple panel signs shall not be greater than 1/2 inch.

Overhead laminated panel signs shall be Type A and have a nominal thickness of one inch.

For overhead laminated signs with a length of 24 feet or less, the laminated panels shall be fabricated with no vertical joints, splices or seams. For signs with a length of greater than 24 feet, the length of each adjoining panel shall be as determined by the Engineer or as shown on the plans.

The perimeter frame of Type A overhead laminated panels shall be connected by self-tapping hex head stainless steel screws. Sealant shall be placed at the corners of the perimeter frame to prevent moisture penetration. The perimeter frame of Type A panels shall consist of extruded channel edges on the vertical sides and consist of modified "H" section extrusion on the horizontal sides. The modified "H" section extrusion acts as an integral retainer track for affixing the bolts to provide blind fastening of panels to the structure support.

The Contractor shall furnish mounting hardware for overhead laminated panel signs, such as closure H-sections, clamps, bolts, nuts, and washers. The clamps shall be cast aluminum alloy with a minimum tensile strength of 25 kips per square inch. Bolt torque used for installing clamps shall not exceed 100 inch-pounds.

MEASUREMENT AND PAYMENT

Furnishing signs (except for construction area signs) will be measured by the square foot and the quantity to be paid for will be the total area, in square feet, of the sign panel types installed in place.

The contract price paid per square foot for furnish sign of the types specified in the Engineer's estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in fabricating and furnishing the signs, including fastening hardware, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing and installing protective overlay on signs shall be considered as included in the contract price paid per square foot for furnish sign of the various types and no separate payment will be made therefor.

10-1.55 CORRUGATED METAL PIPE

Corrugated [steel pipe](#) culverts shall conform to the provisions in Section 66, "Corrugated Metal Pipe," of the Standard Specifications and these special provisions.

Corrugated steel pipe shall be fabricated from zinc-coated steel sheet.

10-1.56 OVERSIDE DRAIN

Hot mix asphalt overside drains shall conform to the provisions in Section 69, "Overside Drains," of the Standard Specifications.

10-1.57 MISCELLANEOUS FACILITIES

[Steel flared end section and corrugated steel pipe inlets](#) shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications.

10-1.58 SLOPE PROTECTION

Slope protection shall be placed or constructed in conformance with the provisions in Section 72, "Slope Protection," of the Standard Specifications [and these special provisions](#).

Rock slope protection fabric must be Class 8.

10-1.59 MISCELLANEOUS IRON AND STEEL

Miscellaneous iron and steel shall conform to the provisions in Section 75, "Miscellaneous Metal," of the Standard Specifications.

10-1.60 MARKERS AND DELINEATORS

Markers and delineators shall conform to the provisions in Section 82, "Markers and Delineators," of the Standard Specifications and these special provisions.

Concrete barrier markers (non-impactable) shall be as specified in "Prequalified and Tested Signing and Delineation Materials" elsewhere in these special provisions. Concrete barrier markers (non-impactable) shall be cemented to the barrier with rapid set type epoxy adhesive as provided for cementing pavement markers to pavement in Section 85-1.06, "Placement" of the Standard Specifications. Rapid set type epoxy adhesive shall conform to the requirements in Section 95-2.04, "Rapid Set Epoxy Adhesive for Pavement Markers" of the Standard Specifications. Concrete barrier markers (non-impactable) shall be applied only on clean, dry surfaces.

Quantities of concrete barrier markers (non-impactable) to be paid for will be determined as units from actual count in place.

The contract unit price paid for concrete barrier markers (non-impactable) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing concrete barrier markers (non-impactable) complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Markers and delineators on flexible posts shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Flexible posts shall be made from a flexible white plastic which shall be resistant to impact, ultraviolet light, ozone, and hydrocarbons. Flexible posts shall resist stiffening with age and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability.

Retroreflective sheeting for metal and flexible target plates shall be the retroreflective sheeting designated for channelizers, markers, and delineators conforming to the requirements in ASTM Designation: D 4956-95 and in conformance with the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

10-1.61 METAL BEAM GUARD RAILING

Metal beam guard railing shall be constructed in conformance with the provisions in Section 83-1, "Railings," of the Standard Specifications and these special provisions.

Attention is directed to "Order of Work" of these special provisions.

Line posts shall be steel. Blocks shall be wood or plastic.

ALTERNATIVE FLARED TERMINAL SYSTEM

Alternative flared terminal system shall be furnished and installed as shown on the plans and in conformance with these special provisions.

The allowable alternatives for a flared terminal system shall consist of one of the following or a Department approved equal.

- A. TERMINAL SYSTEM (TYPE FLEAT) - Terminal system (Type FLEAT) shall be a Flared Energy Absorbing Terminal 350 manufactured by Road Systems, Inc., located in Big Spring, Texas, and shall include items detailed for terminal system (Type FLEAT) shown on the plans. The Flared Energy Absorbing Terminal 350 can be obtained from the distributor, Universal Industrial Sales, P.O. Box 699, Pleasant Grove, UT 84062, telephone (801) 785-0505 or from the distributor, Gregory Highway Products, 4100 13th Street, S.W., Canton, OH 44708, telephone (330) 477-4800.
- B. TERMINAL SYSTEM (TYPE SRT) - Terminal system (Type SRT) shall be an SRT-350 Slotted Rail Terminal (8-post system) as manufactured by Trinity Industries, Inc., and shall include items detailed for terminal system (Type SRT) shown on the plans. The SRT-350 Slotted Rail Terminal (8-post system) can be obtained from the manufacturer, Trinity Industries, Inc., P.O. Box 99, 950 West 400S, Centerville, UT 84014, telephone (800) 772-7976.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance

shall certify that the terminal systems furnished conform to the contract plans and specifications, conform to the prequalified design and material requirements, and were manufactured in conformance with the approved quality control program.

Terminal systems shall be installed in conformance with the manufacturer's installation instructions and these requirements. Each terminal system installed shall be identified by painting the type of terminal system in neat black letters and figures 2 inches high on the backside of the rail element between system posts numbers 4 and 5.

For terminal system (Type SRT), the steel foundation tubes with soil plates attached shall be, at the Contractor's option, either driven, with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. The wood terminal posts shall be inserted into the steel foundation tubes by hand and shall not be driven. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 149° F or less. The edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

For terminal system (Type FLEAT), the soil tubes shall be, at the Contractor's option, driven with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. Wood posts shall be inserted into the steel foundation tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 149° F or less. The edges of the wood posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Surplus excavated material remaining after the terminal system has been installed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for alternative flared terminal system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing alternative flared terminal system, complete in place, including excavation, backfill and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.62 VEGETATION CONTROL (MINOR CONCRETE)

This work shall consist of furnishing and constructing vegetation control as specified in these special provisions, as shown on the plans and as directed by the Engineer.

MATERIALS

Minor Concrete

Concrete for vegetation control shall consist of a mixture of portland cement concrete, crumb rubber and concrete reinforcing fibers. Concrete shall conform to the provisions for minor concrete in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions. Components of the concrete for vegetation control shall be incorporated homogeneously at the concrete plant before delivery to the work site.

Crumb rubber for minor concrete shall be scrap tire crumb rubber consisting of ground or granulated rubber derived from a combination of passenger tires, truck tires or tire buffings. The scrap tire crumb rubber to be blended into the concrete shall be equivalent to 3 percent by mass of the combined mixture of concrete and scrap tire crumb rubber. Crumb rubber shall be ground or granulated at ambient temperature. The maximum size of individual particles shall not exceed 1/16-inch in diameter and 1/2-inch in fibrous length or 1/4-inch ground rubber chips. Crumb rubber shall not contain more than 0.01 percent of wire (by mass of crumb rubber) and shall be free of contaminants, except fabric. Fabric shall not exceed 0.05 percent by mass of crumb rubber.

Reinforcing fibers for minor concrete shall consist of polypropylene fibers with an engineered sinusoidal contoured profile, manufactured specifically for use as concrete reinforcement. Reinforcing fiber shall consist of a blended ratio of 4 parts of coarse monofilament fibers with maximum individual fiber lengths of 2-inch \pm 1/2-inch and 1 part of fine fibrillated polypropylene fibers of various lengths and thickness. Reinforcing fibers shall be of a commercial source, combined with the concrete in proportions as recommended by the manufacturer.

Grout

Grout for vegetation control shall conform to the provisions in Section 19-3.062, "Slurry Cement Backfill," of the Standard Specifications and these special provisions.

Not more than 188 pounds of cement shall be used for each cubic yard of material produced.

Aggregate for grout shall be commercial quality concrete sand.

Landscape Fabric

Landscape fabric shall be manufactured from thermally spun bonded polypropylene fabric and shall conform to the following:

Specification	Minimum Requirement
Grab Tensile Strength	135 lbs
Grab Elongation	70%
UV Resistance	70% @ 150 hours
Weight	3 ounces per square yard

Staples for landscape fabric shall be 2 inches in width, 6 inches in length and 11-gauge wire.

A copy of the manufacturer's product sheet, together with instructions for installation, shall be furnished to the Engineer 5 business days before installation.

A Certificate of Compliance for the landscape fabric shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

SITE PREPARATION

Clearing

Areas to receive vegetation control shall be cleared of trash and debris in conformance with Section 16, "Clearing and Grubbing," of the Standard Specifications and these special provisions.

Vegetation shall be removed to the ground. Cleared trash, debris and removed vegetation shall be disposed of outside the highway right of way in conformance with Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Earthwork

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Attention is directed to "Earth Material Containing Lead," of these special provisions regarding the handling and disposal of soil containing aerially deposited lead.

PLACEMENT

Landscape fabric shall be stapled to prevent shifting during concrete placement. Fabric shall lie flat, smooth, without bulges or wrinkles, and maintain uniform contact with the soil surface.

Grout shall be spread to completely fill voids as shown on the plans.

Minor concrete shall be struck off and compacted until a layer of mortar has been brought to the surface. Minor concrete shall receive a broom finish.

Two weakened plane joints shall be constructed in the minor concrete at each post location, perpendicular to the rail and in line with the edge of the grout. The joints shall be constructed to a minimum depth of one inch by scoring with a tool that will leave the corners rounded and ensure free movement of concrete at the joint.

The finished grade of vegetation control shall be uniform; maintaining planned flow lines, slope gradient and contours of the project site.

MEASUREMENT AND PAYMENT

Quantities of vegetation control (minor concrete) will be measured by the square yard computed from measurements of actual areas placed. Vegetation control (minor concrete) placed outside the dimensions shown on the plans will not be paid for.

The contract price paid per square yard for vegetation control (minor concrete) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing vegetation control (minor concrete), including clearing trash, debris and vegetation and excavation, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.63 CONCRETE BARRIER

Concrete barriers shall conform to the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

At those locations shown on the plans, concrete barrier markers shall be cemented to the barrier in conformance with the manufacturer's recommendations.

10-1.64 THRIE BEAM BARRIER

Thrie beam barrier shall conform to the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

Attention is directed to "Order of Work" of these special provisions.

10-1.65 THERMOPLASTIC TRAFFIC STRIPE AND PAVEMENT MARKING

Thermoplastic traffic stripes (traffic lines) and pavement markings shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

For each batch of thermoplastic material for traffic stripes and pavement markings, the Contractor shall submit to the Engineer:

1. Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications
2. Department's Materials Engineering and Testing Services notification letter stating that the material is approved for use
3. Material Safety Data Sheet

Thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification PTH-02ALKYD.

Within 14 days of applying a thermoplastic traffic stripe or pavement marking, the retroreflectivity of the traffic stripe or pavement marking shall be a minimum of 250 millicandelas per square meter per lux for white, and 150 millicandelas per square meter per lux for yellow. The Contractor shall test the retroreflectivity under ASTM E 1710.

Where striping joins existing striping, as shown on the plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Thermoplastic traffic stripes shall be applied at the minimum thickness and application rate as specified below. The minimum application rate is based on a solid stripe of 4 inches in width.

Minimum Stripe Thickness (inch)	Minimum Application Rate (lb/ft)
0.098	0.34

Thermoplastic traffic stripes and pavement markings shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

10-1.66 PAVEMENT MARKERS

Pavement markers shall be placed in conformance with the provisions in Section 85, "Pavement Markers," of the Standard Specifications and these special provisions.

Attention is directed to "Traffic Control System For Lane Closure" of these special provisions regarding the use of moving lane closures during placement of pavement markers with bituminous adhesive.

The Contractor shall furnish the Engineer certificates of compliance for the pavement markers in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Retroreflective pavement markers shall be marked as abrasion resistant on the body of the markers.

10-1.67 FURNISH FIELD OFFICE

This work shall consist of furnishing, maintaining, and removing a field office and associated services for the exclusive use of the County of El Dorado and Caltrans. If the Contractor provides a field office for contractor personnel, the Engineer's field office shall be provided as an entirely separate building.

As a requirement for this project, the Contractor shall furnish two offices (minimum 100 sq. Ft. Each) with a large common area (minimum 400 sq. ft.) that can support up to five inspectors for the entire time of construction. The office shall have a locking closet and a joint use bathroom (sink and flush toilet only required). The Contractor shall submit for Engineer's approval a floor plan of the proposed building to be used as the Engineer's field office prior to furnishing the Engineer's field office.

The Contractor shall provide the field office beginning no less than 14 days prior to beginning work, and shall be maintained continuously to no less than 21 days after final acceptance of the project, unless otherwise directed by the Engineer.

The office shall be located within three miles of the project site. The contractor shall maintain vehicle access and a minimum of five parking spaces adjacent to the trailer at all times. The office shall be equipped with heating and air conditioning. The office shall also have an alarm system and steel bars on windows if jobsite trailer is used as field office. The office shall be equipped with three separate telephone lines, one in each office and one in the common area, and a DSL or broadband connection with minimum download speed of 3.0 Mbps and minimum upload speed of 512 Kbps.

Weekly janitorial services shall be provided. Bottled drinking water delivery service shall be provided, including a water cooler.

All electrical, DSL, alarm system, and telephone utility costs for the construction office shall be borne by the Contractor. The office shall not be relocated without the consent and approval of the Engineer.

The contract lump sum price paid for furnish field office shall include full compensation for furnishing all labor materials, tools, equipment, and incidentals and for doing all the work involved in furnishing the field office, complete in place, including furnishings, office equipment, janitorial services, utilities, alarm system, DSL and maintenance as specified in these special provisions, and as directed by the Engineer.

SECTION 10-2 HIGHWAY PLANTING AND IRRIGATION SYSTEMS

10-2.01 GENERAL

The work performed in connection with highway planting and irrigation systems shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these special provisions.

COST BREAK-DOWN

The Contractor shall furnish the Engineer a cost break-down for the contract lump sum items of highway planting and irrigation system. Cost break-down tables shall be submitted to the Engineer for approval within 15 working days after the contract has been approved. Cost break-down tables will be approved, in writing, by the Engineer before any partial payment will be made for the applicable items of highway planting and irrigation system involved.

Cost break-downs shall be completed and furnished in the format shown in the samples of the cost break-downs included in this section. Line item descriptions of work shown in the samples are the minimum to be submitted. Additional line item descriptions of work may be designated by the Contractor. If the Contractor elects to designate additional line item descriptions of work, the quantity, value and amount for those line items shall be completed in the same manner as for the unit descriptions shown in the samples. The line items and quantities given in the samples are to show the manner of preparing the cost break-downs to be furnished by the Contractor.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and their values shall be included in the cost break-downs submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-downs submitted for approval.

The sum of the amounts for the line items of work listed in each cost break-down table for highway planting and for irrigation system work shall be equal to the contract lump sum price bid for Highway Planting and Irrigation System, respectively. Overhead and profit shall be included in each individual line item of work listed in a cost break-down table.

No adjustment in compensation will be made in the contract lump sum prices paid for highway planting and irrigation system due to differences between the quantities shown in the cost break-downs furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

Individual line item values in the approved cost break-down tables will be used to determine partial payments during the progress of the work and as the basis for calculating an adjustment in compensation for the contract lump sum items of highway planting and irrigation system due to changes in line items of work ordered by the Engineer. When the total of ordered changes to line items of work increases or decreases the lump sum price bid for either Highway Planting or Irrigation System by more than 25 percent, the adjustment in compensation for the applicable lump sum item will be determined in the same manner specified for increases and decreases in the total pay quantity of an item of work in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

HIGHWAY PLANTING COST BREAK-DOWN

Contract No. 53113

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
Pot Plant (Plant Group I)	EA	20		
Mulch	CYD	1		
Commercial Fertilizer (Packet)	EA	20		

TOTAL _____

IRRIGATION SYSTEM COST BREAK-DOWN

Contract No. 53113

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
1" Plastic Pipe (PR 200)	LF	284		
Sprinkler (Type C-2)	EA	20		
Cam Coupler Assembly	EA	1		

TOTAL _____

10-2.02 (BLANK)

10-2.03 (BLANK)

10-2.04 HIGHWAY PLANTING

The work performed in connection with highway planting shall conform to the provisions in Section 20-4, "Highway Planting," of the Standard Specifications and these special provisions.

HIGHWAY PLANTING MATERIALS

MATERIALS

Mulch

Mulch must consist of either wood chips or tree bark or a combination of both.

Commercial Fertilizer (Slow Release)

Commercial fertilizer (slow release) shall be a pelleted or granular form, shall be slow or controlled release with a nutrient release over an 8-month to 12-month period, and shall fall within the following guaranteed chemical analysis range:

Ingredient	Percentage
Nitrogen	16-21
Phosphoric Acid	6-8
Water Soluble Potash	4-10

Commercial Fertilizer (Packets)

Commercial fertilizer (packet) shall be slow or controlled release and shall be in a biodegradable packet form. The packet shall gradually release nutrients over a 12-month period. Each packet shall have a weight of 10 g ± 1 g and shall have the following guaranteed chemical analysis:

Ingredient	Percentage
Nitrogen	20
Phosphoric Acid	10
Water Soluble Potash	5

PLANTING

Place commercial fertilizer packets in the backfill of each plant at the time of planting and at the rate shown on the Plant List to within 6 inches to 8 inches of the soil surface and approximately one inch from the roots. When more than one fertilizer packet is required per plant, the packets must be distributed evenly around the root ball.

POT PLANTS (Plant Group I)

GENERAL

Summary

This work includes the planting of **pot** plants.

MATERIALS

Containers must be a minimum size of **4" x 4" x 14" deep**. Biodegradable containers must not be used. Plants must be removed from containers when planted.

CONSTRUCTION

Application

Plant between **October 1st** and **April 30th** and when the soil is moist to a minimum depth of **14** inches, unless otherwise approved in writing by the Engineer.

FOLIAGE PROTECTOR

Foliage protectors shall be installed in conformance with the details shown on the plans and these special provisions.

Foliage protector shall be constructed of either polypropylene or polyethylene material and shall be solid or open mesh construction. Foliage protectors shall be a minimum of 2 inch in diameter to a maximum of 4 inch in diameter and shall be a minimum of 3 feet in length.

Each foliage protector shall be held in place with two round stakes at least **3/8** inch nominal diameter or square stakes at least **3/8** inch x **3/8** inch in cross sectional dimensions. Stakes shall be made of wood and at least **4** feet in length. Support stakes shall be installed vertically, embedded in the soil, and fastened to the **plastic foliage protector** at 6 inch maximum centers **with plastic cable ties**. **Plastic foliage protector** shall be snug against stakes yet loose enough to be raised for application of pesticides or to perform weeding within the plant basin.

Steel stakes shall not be used.

Full compensation for foliage protectors shall be considered as included in the contract unit prices paid for the various plants involved and no additional compensation will be allowed therefor.

PLANT ESTABLISHMENT WORK

The plant establishment period shall be Type 2 and shall not be less than **75** working days.

Commercial fertilizer (slow release) shall be applied to trees, shrubs, vines and ground cover during the first week of **March** and **October** of the year. Commercial fertilizer shall be applied at the rates shown on the plans and shall be spread with a mechanical spreader wherever possible.

Weeds within plant basins shall be controlled by hand pulling.

At the option of the Contractor, plants of a larger container size than those originally specified may be used for replacement plants during the first 75 working days of the plant establishment period.

After 55 working days of the plant establishment period have been completed, replacement of plants, except for ground cover plants, shall be one-gallon size for seedlings, pot and liner size plants; 5-gallon size for one-gallon size plants; 15-gallon size for 5-gallon size plants; and other plant replacement plants shall be the same size as originally specified.

During the plant establishment period, if plants become restricted by foliage protectors, the tops of foliage protectors shall be removed. Foliage protectors shall be completely removed, including the support stakes, within 15 working days prior to completion of the plant establishment period.

The final inspection shall be performed in conformance with the provisions in Section 5-1.13, "Final Inspection," of the Standard Specifications and shall be completed a minimum of 20 working days before the estimated completion of the contract.

10-2.05 IRRIGATION SYSTEMS

Irrigation systems shall be furnished and installed in conformance with the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications, except materials containing asbestos fibers shall not be used.

Method A pressure testing shall conform to the provisions in Section 20-5.03H(1), "Method A", of the Standard Specifications, except leaks that develop in the tested portion of the system shall be located and repaired after each test period when a drop of more than 5 pounds per square inch is indicated by the pressure gage. After the leaks have been repaired, the one hour pressure test shall be repeated and additional repairs made until the drop in pressure is 5 pounds per square inch or less.

PIPE

Plastic Pipe

Plastic pipe supply lines must be polyvinyl chloride (PVC) 1120 or 1220 pressure rated pipe with the minimum pressure rating (PR) shown on the plans.

Plastic pipe supply lines less than 3 inches in diameter must have solvent cemented type joints. Primers must be used on the solvent cemented type joints.

A nonhardening joint compound must be used in place of the pipe thread sealant tape conforming to the provisions in Section 20-5.03E, "Pipe," of the Standard Specifications. Joint compounds must be applied in conformance with the manufacturer's recommendations.

Fittings for plastic pipe supply lines with a pressure rating (PR) of 315 must be Schedule 80.

SPRINKLERS

Sprinklers shall conform to the type, pattern, material, and operating characteristics listed in the "Sprinkler Schedule" shown on the plans.

CAM COUPLER ASSEMBLY

Cam coupler assemblies shall be fabricated as shown on the plans and in conformance with these special provisions.

Cam coupler assemblies shall consist of the following:

- A. Cam coupler,
- B. Dust cap,
- C. Check valve,
- D. Pipes,
- E. Fittings,
- F. Portland cement concrete support, and
- G. Valve box with woven wire cloth and gravel.

Cam couplers shall be manufactured of brass or bronze.

Cam coupler assemblies shall withstand a cold water working pressure of 150 psi.

SECTION 10-3. ELECTRICAL SYSTEMS

10-3.01 DESCRIPTION

Lighting and sign illumination, [modify wireless vehicle detection system](#), and maintaining existing traffic management system elements during construction shall conform to the provisions in Section 86, "Electrical Systems," of the Standard Specifications and these special provisions.

Lighting equipment is included in the following structures:

- A. [Overhead sign CS47](#)
- B. [Overhead sign CS48](#)
- C. [Overhead sign CS49](#)
- D. [Overhead sign CS50](#)
- E. [Overhead sign CS51](#)
- F. [Overhead sign CS52](#)
- G. [Overhead sign CS53](#)
- H. [Overhead sign CS54](#)
- I. [Overhead sign CS55](#)

10-3.02 COST BREAK-DOWN

Cost break-downs shall conform to the provisions in Section 86-1.03, "Cost Break-Down," of the Standard Specifications and these special provisions.

The Engineer shall be furnished a cost break-down for each contract lump sum item of work described in this Section 10-3.

The cost break-down shall be submitted to the Engineer for approval within [15](#) days after the contract has been approved. The cost break-down shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

10-3.03 MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION

Traffic Management System (TMS) elements include, but are not limited to ramp metering (RM) system, communication system, traffic monitoring stations, video image vehicle detection system (VIVDS), microwave vehicle detection system (MVDS), loop detection system, changeable message sign (CMS) system, extinguishable message sign (EMS) system, highway advisory radio (HAR) system, closed circuit television (CCTV) camera system, roadway weather information system (RWIS), visibility sensor, and fiber optic system.

Existing TMS elements, including detection systems, identified on the plans and located within the project limits shall remain in place and be protected from damage. If the construction activities require existing TMS elements to be nonoperational or off line, and if temporary or portable TMS elements are not shown on the plans, the Contractor shall provide for temporary or portable TMS elements. The Contractor shall receive the Engineer's approval on the type of temporary or portable TMS elements and installation method.

Before work is performed, the Engineer, the Contractor, and the Department's Traffic Operations Electrical representatives shall jointly conduct a pre-construction operational status check of all existing TMS elements and each element's communication status with the Traffic Management Center (TMC), including existing TMS elements that are not shown on the plans and elements that may not be impacted by the Contractor's activities. The Department's Traffic Operations Electrical representatives will certify the TMS elements' location and status, and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components.

The Contractor shall obtain written approval from the Engineer at least 72 hours before interrupting existing TMS elements' communication with the TMC that will result in the elements being nonoperational or off line. The Contractor shall notify the Engineer at least 72 hours before starting excavation activities.

Traffic monitoring stations and their associated communication systems, which were verified to be operational during the pre-construction operational status check, shall remain operational on freeway/highway mainline at all times, except:

1. For a duration of up to 15 days on any continuous segment of the freeway/highway longer than 3 miles
2. For a duration of up to 60 days on any continuous segment of the freeway/highway shorter than 3 miles

If the construction activities require existing detection systems to be nonoperational or off line for a longer time period or the spacing between traffic monitoring stations is more than the specified criteria above, and temporary or portable detection operations are not shown on the plans, the Contractor shall provide provisions for temporary or portable detection operations. The Contractor shall receive the Engineer's approval on the type of detection and installation before installing the temporary or portable detection.

If existing TMS elements shown on the plans or identified during the pre-construction operational status check, except traffic monitoring stations, are damaged or fail due to the Contractor's activity, where the elements are not fully functional, the Engineer shall be notified immediately. If the Contractor is notified by the Engineer that existing TMS elements have been damaged, have failed or are not fully functional due to the Contractor's activity, the damaged or failed TMS elements, excluding structure-related elements, shall be repaired or replaced, at the Contractor's expense, within 24 hours. For a structure-related elements, the Contractor shall install temporary or portable TMS elements within 24 hours. For nonstructure-related TMS elements, the Engineer may approve temporary or portable TMS elements for use during the construction activities.

The Contractor shall demonstrate that repaired or replaced elements operate in a manner equal to or better than the replaced equipment or as directed by the Engineer. If the Contractor fails to perform required repairs or replacement work, as determined by the Engineer, the State may perform the repair or replacement work and the cost will be deducted from monies due to the Contractor.

A TMS element shall be considered nonoperational or off line for the duration of time that active communications with the TMC is disrupted, resulting in messages and commands not transmitted from or to the TMS element.

The Contractor shall provide provisions for replacing existing TMS elements within the project limits, including detection systems, that were not identified on the plans or during the pre-construction operational status check that became damaged due to the Contractor's activities.

If the pre-construction operational status check identified existing TMS elements, then the Contractor, the Engineer, and the Department's Traffic Operations Electrical representatives shall jointly conduct a post construction operational status check of all existing TMS elements and each element's communication status with the TMC. The Department's Traffic Operations Electrical representatives will certify the TMS elements' status and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components. TMS elements that cease to be functional between pre and post construction status checks shall be repaired at the Contractor's expense and as directed by the Engineer.

The Engineer will approve, in writing, the schedule for final replacement, the replacement methods and the replacement elements, including element types and installation methods before repair or replacement work is performed. The final TMS elements shall be new and of equal or better quality than the existing TMS elements.

PAYMENT

The contract lump sum price paid for maintaining existing traffic management system elements during construction shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in maintaining existing traffic management system elements as shown on the plans, specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

If no electrical work exists on the project and no TMS elements are identified within the project limits, the pre-construction operational status check will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Furnishing and installing temporary or portable TMS elements that are not shown on the plans, but are required when an existing TMS element becomes nonoperational or off line due to construction activities, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Furnishing and installing temporary or portable TMS elements and replacing TMS elements that are not shown on the plans nor identified during the pre-construction operational status check and were damaged by construction activities will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

If the Contractor is required to submit provisions for the replacement of TMS elements that were not identified, the provisions will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

10-3.04 CAST-IN-DRILLED-HOLE CONCRETE PILE FOUNDATIONS

GENERAL

Summary

This work includes constructing cast-in-drilled-hole concrete pile foundations for lighting standards.

Comply with Section 86-2.03, "Foundations," of the Standard Specifications of these special provisions.

MATERIALS

Concrete must contain not less than 590 pounds of cementitious material per cubic yard.

CONSTRUCTION

For standards located in sidewalk areas, the pile foundation must be:

1. Placed to final sidewalk grade before the sidewalk is placed
2. Square for the top 4 inches

PAYMENT

Payment for cast-in-drilled-hole concrete pile foundations shall conform to the provisions in Section 86-8, "Payment," of the Standard Specifications.

10-3.05 STANDARDS, STEEL PEDESTALS, AND POSTS

Standards, steel pedestals, and posts for lighting standards shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, "Steel Structures" of these special provisions, and the following requirements.

Steel bolts not designated on the plans as high-strength (HS) or stainless steel shall be for general applications and shall conform to the requirements in ASTM Designation: A 307.

Anchor bolts shall conform to the requirements in ASTM Designation: F 1554, Grade 36. High-strength (HS) anchor bolts shall conform to the requirements in ASTM Designation: F 1554, Grade 105.

Handhole reinforcement rings for standards, steel pedestals, and posts shall be continuous around the handholes.

10-3.06 CONDUIT

Conduit to be installed underground shall be Type 3 unless otherwise specified.

The conduit in a foundation and between a foundation and the nearest pull box shall be Type 3.

After conductors have been installed, the ends of **all** conduits shall be sealed with an approved type of sealing compound.

10-3.07 PULL BOXES

Pull boxes No. 3½, 5, and 6 proposed to be installed in soil, must be buried 6 inches to 8 inches below grade, except for communications pull boxes and splice vaults that contain only fiber optics. Cover the pull box with plastic sheet (20 mils) before burying the pull box.

Electronic markers (EM) shall be placed in the pull box before burying the pull box.

Plastic sheets, 20 mil thick, manufactured from high density polyethylene (HDPE) virgin compounds or polyvinyl chloride (PVC) virgin compounds, must be furnished and installed over the tops of the pull box and surrounding concrete, as shown on the plans and as directed by the Engineer.

Full compensation for burying pull boxes and special tools and 20 mil plastic sheet is included in the contract lump sum price paid for the items and work involved, and no additional compensation will be allowed therefor.

10-3.08 ELECTRONIC MARKERS

GENERAL

Electronic Marker (EM) **is placed in the underground facility. Such facility can be located when required, with the help of compatible Electronic Marker Locator (EML)** . The circuits of the EM, when excited by the compatible EML operating at standard industry frequencies, produces a uniform radio frequency (RF) field in all directions. The RF signal is picked up by the EML for precise location of the EM. Maximum signal strength appears when the EML is vertically above the EM.

The field and the range of the EM must be reliable for use in any terrain.

Electronic Markers must be passive and contain no batteries.

Passive Electronic Marker

The EM when activated by the EML sends uniform RF field in all directions and the exact location of the EM is at the point where the signal strength is vertically maximum.

MATERIALS LIST AND DRAWINGS

Submittals

The Contractor shall provide EM to mark underground facilities that can be located later with the help of an EML.

The Contractor shall provide one EM for every buried pull box.

Training

The Contractor must provide a copy of the training material to the Engineer for approval 15 days prior to the training. The content of the training shall include instruction on installing and locating the electronic marker.

Certificate of Compliance

A Certificate of Compliance for EM shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

FUNCTIONAL REQUIREMENTS

The EM must not require any particular orientation when buried and there shall not be any need for the EM to be leveled in the ground. The internal component must be capable of self-leveling and automatic orientation to a position providing maximum signal strength to the EML. The EM must be of the kind that it is just tossed in the trench or excavation and covered up with normal backfill.

The EM must be light weight, with no hazardous chemicals.

The EM must not require external or internal source of power and must be energized solely by electromagnetic energy received from the interrogating EML.

The EM must comply with the following features:

Specifications	
Shape	Spherical or geometrical shape
Weight	2 lbs (Maximum)
Diameter	6 inch (Maximum)
Color	Red for power and orange for communication
Frequency	Standard frequencies, compatible with EML devices
Range	Easily locatable up to five feet between EML and the EM
Detection offset	6 inches (Maximum)

The EM must conform to the following:

1. Housing should be leak tight, moisture resistant, pressure tested per industry standards applicable to buried enclosures, buried splices, and buried cables
2. Housing Material should be chemical resistant like high density polyethylene with no hazardous chemicals
3. Operating Temperature: -20 °C to +50 C
4. Storage Temperature: -20 °C to +70 C
5. Life: 15 years minimum

WARRANTY

The Contractor shall provide a manufacturer's warranty for the EM including estimate of expected life of 15 years.

PAYMENT

Full compensation for electronic markers shall be considered as included in the contract lump sum price paid for lighting and sign illumination and no additional compensation will be allowed therefor.

10-3.09 CONDUCTORS, CABLES, AND WIRING

Splices shall be insulated by "Method B".

Conductors and cables shall be secured to the projecting end of conduit in pull boxes to prevent pulling of cables.

Signal Interconnect Cable (SIC) shall be the 6-pair type.

Conductors shall be pulled into conduit by using a flat, woven, lubricated, soft-fiber polyester tape having a minimum tensile strength of 1800 pounds and printed sequential measurement markings at least every 3 feet.

10-3.10 MODIFY WIRELESS VEHICLE DETECTOR SYSTEM

GENERAL

Summary

Modify wireless vehicle detector system (WVDS) must consist of removing the existing vehicle sensor nodes (VSNs) and installing new VSNs in the roadway as shown on the plans and as described in these special provisions. The removal of existing VSNs and disposal of the same must be as described elsewhere in these special provisions. Comply with Section 86, "Electrical Systems," of the Standard Specifications, Department Standard Plans and these Special Provisions.

The new VSNs must be compatible to the existing Access Point (AP) and Repeater Point (RP)-mounted on a standard along the roadway shoulder and as shown on the plans.

VSN and epoxy (sealant) must be manufactured by Sensys Networks, Inc., 2560 Ninth Street, Suite 219, Berkeley, CA 94709, telephone (510) 548-4620.

VSN and epoxy (sealant) must be new and conform to the manufacturer's recommendations. The date of manufacture, as shown by date codes or serial numbers of electronic circuit assemblies, must not be more than 6 months from the scheduled start date of this installation.

Arrangements have been made to ensure that the Contractor can obtain the WVDS components directly from the manufacturer. The price quoted by the manufacturer for each component is as follows, not including sales tax or shipping.

Quotation

Part Number	Description	Quantity					
		1-99	100-499	500-999	1000-1499	1500-2999	3000+
VSN240-F	Flush-Mount Wireless Sensor	\$457	\$448	\$425	\$402	\$379	\$349
VSN240-EPX	Epoxy (sealant) tube for Installation	\$68	\$67	\$64	\$60	\$57	\$52

The above price will be firm for orders placed on or before May 31, 2012, provided delivery is accepted within 90 days after the order is placed.

Warranty

The Contractor must provide the manufacturer's written warranty against defects in material and workmanship for the VSNs, for a period of 24 months after installation. After final acceptance of the VSNs, all replacement assemblies covered under warranty must be provided within 10 days after receipt of failed units at no cost to the Department. All warranty documentation must be given to the Engineer prior to installation.

MATERIAL

Configuration

Each VSN must have the following programmable event reporting parameters:

1. Transmit interval from a minimum value of 6 seconds
2. Reporting latency from a minimum range of 6 to 30 seconds
3. Presence and Pulse modes
4. RF watchdog timer
5. Synchronize event reporting to AP clock or to detection events
6. Speed Trap: measurement/time interval between 2 consecutive VSN

Communication

The WVDS system communications must be:

- A. Wireless between the VSN and the AP.
- B. Wireless between RP and AP.

The communications link between the AP, RP, and VSN must conform to the following:

- A. The wireless communications link must be FCC-approved.

- B. The AP, RP and VSN must be reconfigurable by a user over the wireless interface. Reconfiguration must avoid interference from other users of the communications band. A minimum of 16 channels must be provided for this purpose per location.
 - C. The link budget must be 93 dB or greater.
- After an AP is powered on, the associated VSN(s) must respond within 100 seconds.

Vehicle Sensor Nodes

Each VSN must consist of a magnetometer sensor, a microprocessor with firmware in non-volatile memory, a wireless transceiver and a battery within a single housing; and 2-piece molded plastic shell.

The magnetometer sensor must detect the presence of a vehicle by a change in the vertical component of the earth's magnetic field within the detection zone corresponding to a 6-foot by 6-foot Type A inductive loop, with the VSN at the center. Each VSN must continuously report the presence of the vehicle until the vehicle leaves the detection zone, whereupon the VSN must report the absence of presence within 5 ±1 millisecond.

The VSN must automatically recalibrate in the event of a detector lock within 5 minutes.

Each VSN must be individually addressable with a unique identifier, and capable of transmitting its data to the AP. Each VSN must also be capable of receiving detector parameters, microprocessor firmware and other commands from the AP without loss of data.

Each VSN must have the following programmable detection parameters:

- 1. Onset sensitivity and delay
- 2. Off sensitivity
- 3. Holdover time
- 4. Adaptable orientation
- 5. Auto-recalibration timeout

The housing must be fully encapsulated to provide a minimum of 8 years of operation, over a temperature range of -35 to 165 degrees F. The housing must be capable of being installed in a cylindrical hole that is no larger than 4 inches in diameter and 3 inches deep.

Sealant

The sealant for the installation of the wireless detector sensor units in concrete must be a self-leveling joint sealant and will be applied at a minimum temperature of 32 degrees F. The surface to be bonded must be free of debris, moisture and anything else that will interfere with the sealant bond.

Excess sealant must be removed from the roadway and disposed of outside the State highway right of way as provided in Section 7-1.13 of the Standard Specifications.

CONSTRUCTION

Pre-construction Site Analysis

- A. The Contractor must ensure that the installed VSNs will not cause harmful interference to radio communication in the vicinity as required by FCC Part 15 requirements.
- B. The Contractor must ensure that each VSN will be installed such that each operates independently and does not interfere with WVDS components at another site or other equipment in the vicinity.
- C. The Contractor must ensure that each VSN will be installed within range of its corresponding AP, using RP as needed. All VSN assigned to either a RP or AP must be located with a ±60-degree horizontal cone, measured from perpendicular. The maximum distances between a VSN and the AP are as follows:

AP mounting height	Maximum distance from VSN to AP
12 feet	75 feet
18 feet	105 feet
24 feet	150 feet

Installation and Calibration

- A. The Contractor must not proceed with the installation of any VSN without the written approval from the Engineer of the Pre-construction Site Analysis.
- B. The Contractor must provide personnel skilled in the installation and calibration of VSNs .
- C. The Contractor must configure and demonstrate successful communication between each VSN, the RP (if necessary) and the AP to the Engineer prior to the installation of any component.

- D. The Contractor must install each VSN in the roadway per manufacturer's recommendations and as shown on the plans. Holes cored in the pavement must be cleaned and thoroughly dried before installing VSN. Residue resulting from core drilling must not be permitted to flow across shoulders or lanes occupied by public traffic and must be removed from the pavement surface by vacuuming or other approved method before any residue flows off of the pavement surface. Residue from core drilling must be disposed of as provided in Section 7-1.13, "Disposal of Material outside the Highway Right of Way," of the Standard Specifications. The cored pavement must be back-filled per manufacturer's recommendations. The Contractor must remove any excess epoxy from the roadway without the use of solvents and disposed of as provided in Section 7-1.13, "Disposal of Material outside the Highway Right of Way," of the Standard Specifications.
- G. After installation of all components, the Contractor must re-configure and demonstrate successful communication between each VSN, the RP (if necessary) and the AP to the Engineer.
- H. The Contractor is responsible for and must perform the following:
 - 1. Installation and materials must conform to the requirements of the manufacturer and these special provisions.
 - 2. Verify the performance of each site and submit recorded medium and other materials to the Engineer at the conclusion of the performance test. The accuracy of each site must be determined and documented so that each site may be approved or rejected separately by the Engineer. Failure to submit the materials at the conclusion of testing invalidates the test. The recorded medium serves as acceptance evidence and must not be used for calibration. The calibration must have been completed prior to testing and verification.
 - 3. All software needed for the analysis must be provided by the Contractor.

Acceptance Testing

The Contractor must notify the Engineer 15 working days before the location is ready for acceptance testing. Acceptance testing must be scheduled to be accomplished before the end of the normal work shift (M-F 0800 to 1600). The Contractor must demonstrate the operation of all WVDS units satisfying the functional requirements of these special provisions. The Engineer has the right to reject the VSN(s) if the demonstration fails.

The Contractor must also provide:

- 1. All equipment, documentation, materials and special tools required for acceptance testing of the system.
- 2. All software required to program, reconfigure and support the WVDS system and any components, installed in the appropriate equipment at the time of acceptance testing, and used for the acceptance test.

Accuracy of the WVDS system must be verified by comparing the WVDS vehicle counts to recorded video image counts for the same period. Accuracy testing must be done at 5 percent or one (whichever is greater) of the WVDS locations as selected by the Engineer. Clearly-visible, recorded video images for at least one peak period must be provided for all lanes that the WVDS was installed in. The recorded video images must show the viewed detection scene, detector(s) operation, the vehicle traffic count and time-stamp to 1/100 of a second must be made available so that the data can be overlaid on the recorded video. The 6-hour analysis periods and associated time synced data must be transferred to a USB portable mass storage device, 16 GB minimum, for viewing on a PC. The video camera must be located and oriented so that traffic is visible in all lanes. Video images must be time-stamped and analysis periods recorded to a USB portable mass storage device, 16 GB minimum, for viewing on a computer. The video field of view must totally encompass the area in which vehicles are detected. The Contractor must provide a means for synchronizing the test start and test ending times or provide software that displays time stamped WVDS data along with the video images of the moving vehicles. The Contractor must provide the Engineer with the original recording medium and documentation that supports the accuracy analysis and make a copy of these materials for their own use.

- 1. The accuracy test must start at a date and time specified by the Engineer. The following video recording and analysis options that depend on the available traffic conditions are acceptable; however the heaviest expected traffic conditions should be used, if possible. The minimum analysis period must be 30 minutes when the recording includes congested traffic (vehicles traveling at less than 20 mph for five or more minutes in any lane). The minimum analysis period must be 45 minutes when the traffic flow exceeds 1500 vehicles per hour in any lane during the test period. The minimum analysis period must be 60 minutes when the flow is less than 1500 vehicles per hour in every lane. The analysis must be based on a minimum of 500 detected vehicles in every lane and cover the same time period for all lanes. The time periods within the selected video will be selected by the Engineer. The total vehicle count for every lane must be used and include the first and last partial vehicles for each lane. Errors in the start and finish of the WVDS and manual counts are included in the performance criterion specified in these special provisions. Each real vehicle in the video should be identified as either detected correctly (DC), missed, (M), or over counted (OC).
- 2. WVDS unit count must be compared to vehicle counts under traffic conditions of the prior paragraph. The data accuracy must be determined by the formula:

Absolute value($100 * \{1 - [(TC-WC)/TC]\}$)

Where TC= Traffic Count derived from the media recording and WC = WVDS reported count over the same period of time.

3. Average overall accuracy must be greater than 95 percent across all lanes. Minimum accuracy for each time period must be greater than 90 percent per lane.

The Engineer will review the results from the acceptance testing and accept or reject the results within 7 days. Determination of any vehicle anomalies or unusual occurrences will be decided by the Engineer. Data or counts that are not agreed upon by the Engineer must be considered errors and count against the unit's calibration. If the Engineer determines that the WVDS does not meet the performance requirements, the Contractor will have seven days to re-calibrate and re-test the unit and re-submit new test data. Following three failed attempts, the Contractor must replace the WVDS system with a new unit.

Repair, replacement, and retesting of WVDS components due to failure or rejection must be at the Contractor's expense.

PAYMENT

The contract lump sum price paid for [modify](#) wireless vehicle detector system (WVDS) must include full compensation for furnishing all labor, materials, tools, equipment, warranty and incidentals, and for doing all the work involved in [removing existing and installing](#) VSNs, complete in place, including site analysis, set-up and configuration of the system, calibration of the device performance, verification of detector accuracy, testing, and re-testing of failed units, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

For progress pay purposes, a [modify](#) WVDS will not be included for payment until the Engineer accepts the acceptance testing and accuracy results as needed for that location.

10-3.11 SERVICE

Continuous welding of exterior seams in service equipment enclosures is not required.

Circuit breakers shall be the cable-in/cable-out type, mounted on non-energized clips. All circuit breakers shall be mounted vertically with the up position of the handle being the "ON" position.

10-3.12 NUMBERING ELECTRICAL EQUIPMENT

Self-adhesive reflective numbers shall be Contractor-furnished.

The numbers shall be placed on the equipment where designated by the Engineer.

Reflective numbers shall be applied to a clean surface.

Where shown on the plans, self-adhesive equipment numbers shall be placed [on the](#) electroliers and service pedestals. On service pedestals, the numbers shall be placed on the front door. On electroliers, the numbers shall be placed as shown on the plans.

10-3.13 LUMINAIRES

Ballasts shall be the lag regulator type.

10-3.14 PHOTOELECTRIC CONTROLS

Contactors shall be the mechanical armature type.

10-3.15 REMOVING, REINSTALLING OR SALVAGING ELECTRICAL EQUIPMENT

Haul salvaged electrical materials to [the Caltrans Maintenance Station at 11325 Sanders Drive, Rancho Cordova, CA](#) and stockpile.

Provide the equipment, as necessary, to safely unload and stockpile the material. [Call the Electrical Recycle Coordinator at \(916\) 859-7803 to arrange for delivery.](#) A minimum notice of 2 business days must be given prior to delivery.

Removal of Existing Vehicle Sensor Nodes (VSN)

[VSNs must be removed per procedure as recommended by manufacturer and conform to these special provisions.](#)

[Removal of VSNs from pavement must be done by trained personnel. Care must be taken to insure that the VSN casing is not punctured or crushed. Any VSN that appear to be damaged from the removal process must be returned to the manufacturer Sensys Networks, Inc. at 2560 Ninth Street, Berkeley, CA 94710 for disposal..](#)

VSNs use Lithium Thionyl Chloride (LTC) Batteries. LTC batteries may be extremely hazardous if not handled properly. Improper handling of the VSN may result in leakage of batteries or release of battery contents, explosion or fire.

Each VSN has one LTC battery. VSNs to be removed as shown on the plans (not reused or salvaged) and must be returned to the manufacturer for disposal.

The following are recommendations of the battery manufacturer for proper use and handling of batteries in the vehicle sensor nodes mentioned above:

1. Batteries must not be crushed or punctured.
2. Batteries must not be short-circuited.
3. Batteries must not be exposed to excessive heating.
4. Batteries must not be exposed to water.
5. Batteries and devices containing batteries must be disposed in accordance with local regulations.

VSN without plastic sensor cap removal procedure:

1. Prepare a core drill equipped with 5 inches hollow coring bit and 36 inches steel pry bar.
2. Locate and mark the sensor to be removed from the road.
3. Core a 5 inches diameter hole into the road around the sensor to a depth of approximately 2 1/2 inches.
4. Use the pry bar as needed to work the sensor/epoxy plug free from the bottom of the hole.
5. Pull the sensor/epoxy plug free from the hole. Remove loose dirt or debris.
6. Fill the holes resulting from removing sensors with material equivalent to the surrounding material.

10-3.16 DISPOSING OF ELECTRICAL EQUIPMENT

Sensys wireless vehicle detector system vehicle sensor nodes (VSN) contain Lithium Thionyl Chloride (LTC) batteries. LTC is designated as an extremely hazardous waste under Title 22, Division 4.5, Chapter 11, Article 5, Appendix 10 of the California Code of Regulations.

Each VSN has one built-in LTC battery. The removed vehicle sensor nodes contain LTC batteries which must be returned to the manufacturer, Sensys Networks, Inc. at 2560 Ninth Street, Berkeley, CA 94710 for disposal.

Shipment of VSNs containing batteries returned to the manufacturer must comply with the requirement of 49 CFR 173.185 "Lithium Batteries and Cells." All batteries must be packaged in such a manner that prevents short circuits under conditions normally encountered during transportation. Battery ends must to be covered to prevent them from touching one another. This can be accomplished by using duct tape on individual batteries. VSNs containing batteries must be placed in sealed plastic bags, and package with vermiculite to prevent accidental contact. The outer packaging must be in compliance with 49 CFR 173.24 and 173.24a.

The contractor is responsible for cleanup, management, disposal and associated costs of hazardous waste generated as a result of mishandling VSNs containing LTC batteries.

The contractor must notify the manufacturer at (510) 548-4260, 48 hours prior of delivery.

PAYMENT

Full compensation for hauling, stockpiling, and disposing of VSNs containing LTC is considered as included in the contract price paid for the various items of work and no additional compensation will be allowed therefor.

10-3.17 PAYMENT

Full compensation for hauling and stockpiling electrical materials shall be considered as included in the contract price paid for the item requiring the material to be salvaged and no additional compensation will be allowed therefor.

If any of the fabrication sites for the materials listed are located more than 300 air line miles from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impractical and difficult to determine the actual increase in these expenses, it is agreed that payment to the Contractor for furnishing these listed materials from each fabrication site located more than 300 air line miles from both Sacramento and Los Angeles will be reduced \$2,000:

1. Service equipment enclosures

SECTION 11. (BLANK)

SECTION 12. (BLANK)

SECTION 13. (BLANK)

SECTION 14. FEDERAL REQUIREMENTS FOR FEDERAL-AID CONSTRUCTION PROJECTS

GENERAL.—The work herein proposed will be financed in whole or in part with Federal funds, and therefore all of the statutes, rules and regulations promulgated by the Federal Government and applicable to work financed in whole or in part with Federal funds will apply to such work. The "Required Contract Provisions, Federal-Aid Construction Contracts, "Form FHWA 1273, are included in this Section 14. Whenever in said required contract provisions references are made to "SHA contracting officer", "SHA resident engineer", or "authorized representative of the SHA", such references shall be construed to mean "Engineer" as defined in Section 1-1.18 of the Standard Specifications.

PERFORMANCE OF PREVIOUS CONTRACT.—In addition to the provisions in Section II, "Nondiscrimination," and Section VII, "Subletting or Assigning the Contract," of the required contract provisions, the Contractor shall comply with the following:

The bidder shall execute the CERTIFICATION WITH REGARD TO THE PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS located in the proposal. No request for subletting or assigning any portion of the contract in excess of \$10,000 will be considered under the provisions of Section VII of the required contract provisions unless such request is accompanied by the CERTIFICATION referred to above, executed by the proposed subcontractor.

NON-COLLUSION PROVISION.—The provisions in this section are applicable to all contracts except contracts for Federal Aid Secondary projects.

Title 23, United States Code, Section 112, requires as a condition precedent to approval by the Federal Highway Administrator of the contract for this work that each bidder file a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the submitted bid. A form to make the non-collusion affidavit statement required by Section 112 as a certification under penalty of perjury rather than as a sworn statement as permitted by 28, USC, Sec. 1746, is included in the proposal.

PARTICIPATION BY MINORITY BUSINESS ENTERPRISES IN SUBCONTRACTING.—Part 26, Title 49, Code of Federal Regulations applies to this Federal-aid project. Pertinent sections of said Code are incorporated in part or in its entirety within other sections of these special provisions.

Schedule B—Information for Determining Joint Venture Eligibility

(This form need not be filled in if all joint venture firms are minority owned.)

1. Name of joint venture _____

2. Address of joint venture _____

3. Phone number of joint venture _____

4. Identify the firms, which comprise the joint venture. (The MBE partner must complete Schedule A.) _____

a. Describe the role of the MBE firm in the joint venture. _

b. Describe very briefly the experience and business qualifications of each non-MBE joint venturer: _____

5. Nature of the joint venture's business _____

6. Provide a copy of the joint venture agreement.

7. What is the claimed percentage of MBE ownership? _____

8. Ownership of joint venture: (This need not be filled in if described in the joint venture agreement, provided by question 6.).

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- a. Profit and loss sharing.
- b. Capital contributions, including equipment.
- c. Other applicable ownership interests.

9. Control of and participation in this contract. Identify by name, race, sex, and "firm" those individuals (and their titles) who are responsible for day-to-day management and policy decision-making, including, but not limited to, those with prime responsibility for:

a. Financial decisions _____

b. Management decisions, such as:

1. Estimating _____

2. Marketing and sales _____

3. Hiring and firing of management personnel _____

4. Purchasing of major items or supplies _____

c. Supervision of field operations _____

Note.—If, after filing this Schedule B and before the completion of the joint venture's work on the contract covered by this regulation, there is any significant change in the information submitted, the joint venture must inform the grantee, either directly or through the prime contractor if the joint venture is a subcontractor.

Affidavit

"The undersigned swear that the foregoing statements are correct and include all material information necessary to identify and explain the terms and operation of our joint venture and the intended participation by each joint venturer in the undertaking. Further, the undersigned covenant and agree to provide to grantee current, complete and accurate information regarding actual joint venture work and the payment therefore and any proposed changes in any of the joint venture arrangements and to permit the audit and examination of the books, records and files of the joint venture, or those of each joint venturer relevant to the joint venture, by authorized representatives of the grantee or the Federal funding agency. Any material misrepresentation will be grounds for terminating any contract which may be awarded and for initiating action under Federal or State laws concerning false statements."

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.....
Name of Firm	Name of Firm
.....
Signature	Signature
.....
Name	Name
.....
Title	Title
.....
Date	Date

Date _____
State of _____
County of _____

On this ___ day of _____, 19 __, before me appeared (Name) _____, to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of firm) _____ to execute the affidavit and did so as his or her free act and deed.

Notary Public _____
Commission expires _____

[Seal]
Date _____
State of _____
County of _____

On this ___ day of _____, 19 __, before me appeared (Name) _____ to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of firm) _____ to execute the affidavit and did so as his or her free act and deed.

Notary Public _____
Commission expires _____

[Seal]

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

(Exclusive of Appalachian Contracts)

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(DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. Selection of Labor: During the performance of this contract, the contractor shall not:

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively

ATTACHMENTS

A. Employment Preference for Appalachian Contracts (included in Appalachian contracts only)

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

- Section I, paragraph 2;
- Section IV, paragraphs 1, 2, 3, 4, and 7;
- Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor

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administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 26, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

III NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

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c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3)] issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c) the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit

as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. Apprentices and Trainees (Programs of the U.S. DOT):

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. Withholding:

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. Overtime Requirements:

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation:

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages:

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such

records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

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2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products, which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding re-

garding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever being an officer, agent, or employee of the United States, or any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more than \$10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub. L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub. L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized

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for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION—PRIMARY COVERED TRANSACTIONS

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

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d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

2. Instructions for Certification - Lower Tier Covered Transactions:

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION-LOWER TIER COVERED TRANSACTIONS

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract,

grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall

be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

FEDERAL-AID FEMALE AND MINORITY GOALS

In accordance with Section II, "Nondiscrimination," of "Required Contract Provisions Federal-aid Construction Contracts" the following are the goals for female utilization:

Goal for Women
(applies nationwide).....(percent) 6.9

The following are goals for minority utilization:

CALIFORNIA ECONOMIC AREA

..... Goal
..... (Percent)

174 Redding, CA:

Non-SMSA Counties 6.8
CA Lassen; CA Modoc;
CA Plumas; CA Shasta;
CA Siskiyou; CA Tehama.

175 Eureka, CA:

Non-SMSA Counties 6.6
CA Del Norte; CA Humboldt;
CA Trinity.

176 San Francisco-Oakland-San Jose, CA:

SMSA Counties:
7120 Salinas-Seaside-
Monterey, CA..... 28.9
CA Monterey.
7360 San Francisco-Oakland, CA. 25.6
CA Alameda; CA Contra Costa;
CA Marin; CA San Francisco;
CA San Mateo.
7400 San Jose, CA..... 19.6
CA Santa Clara.
7485 Santa Cruz, CA..... 14.9
CA Santa Cruz.
7500 Santa Rosa, CA..... 9.1
CA Sonoma.
8720 Vallejo-Fairfield- Napa, CA 17.1
CA Napa; CA Solano
Non-SMSA Counties 23.2
CA Lake; CA Mendocino;
CA San Benito.

177 Sacramento, CA:

SMSA Counties:
6920 Sacramento, CA 16.1
CA Placer; CA Sacramento;
CA Yolo.
Non-SMSA Counties 14.3
CA Butte; CA Colusa;
CA El Dorado; CA Glenn;
CA Nevada; CA Sierra;
CA Sutter; CA Yuba.

178 Stockton-Modesto, CA:

SMSA Counties:
5170 Modesto, CA 12.3
CA Stanislaus.
8120 Stockton, CA..... 24.3
CA San Joaquin.
Non-SMSA Counties 19.8
CA Alpine; CA Amador;
CA Calaveras; CA Mariposa;
CA Merced; CA Tuolumne.

179 Fresno-Bakersfield, CA:

SMSA Counties:
0680 Bakersfield, CA 19.1
CA Kern.
2840 Fresno, CA..... 26.1
CA Fresno.
Non-SMSA Counties 23.6
CA Kings; CA Madera;
CA Tulare.

180 Los Angeles, CA:

SMSA Counties:
0360 Anaheim-Santa Ana-Garden
Grove, CA. 11.9
CA Orange.
4480 Los Angeles-Long
Beach, CA 28.3
CA Los Angeles.
6000 Oxnard-Simi Valley-
Ventura, CA..... 21.5
CA Ventura.

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6780 Riverside-San Bernardino- Ontario, CA.....	19.0
CA Riverside; CA San Bernardino.	
7480 Santa Barbara-Santa Maria- Lompoc, CA.....	19.7
CA Santa Barbara.	
Non-SMSA Counties.....	24.6
CA Inyo; CA Mono; CA San Luis Obispo.	

181 San Diego, CA:

SMSA Counties	
7320 San Diego, CA.....	16.9
CA San Diego.	
Non-SMSA Counties.....	18.2
CA Imperial.	

In addition to the reporting requirements set forth elsewhere in this contract the Contractor and subcontractors holding subcontracts, not including material suppliers, of \$10,000 or more, shall submit for every month of July during which work is performed, employment data as contained under Form FHWA PR-1391 (Appendix C to 23 CFR, Part 230), and in accordance with the instructions included thereon.

FEDERAL REQUIREMENT TRAINING SPECIAL PROVISIONS

FEDERAL REQUIREMENT TRAINING SPECIAL PROVISION. -- As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training to develop full journeymen in the types of trades or job classification involved.

The goal for the number of trainees or apprentices to be trained under the requirements of this special provision will be 4.

In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees or apprentices are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of trainees or apprentices in each occupation shall be in their first year of apprenticeship or training.

The number of trainees or apprentices shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing work, the Contractor shall submit to the Department for approval the number of trainees or apprentices to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee or apprentice employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees or apprentices as provided hereinafter.

Training and upgrading of minorities and women toward journeymen status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority and women trainees or apprentices (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees or apprentices) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee or apprentice in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by both the Department and the Federal Highway Administration. The Department and the Federal Highway Administration will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee or apprentice for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with the State of California, Department of Industrial Relations, Division of Apprenticeship Standards recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerical-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some

offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training. Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein.

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This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees or apprentices are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or apprentice or pays the trainee's or apprentice's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee or apprentice as a journeyman, is caused by the

Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee or apprentice will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training

program. It is not required that all trainees or apprentices be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees or apprentices specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Only trainees or apprentices registered in a program approved by the State of California's State Administrator of Apprenticeship may be employed on the project and said trainees or apprentices shall be paid the standard wage specified under the regulations of the craft or trade at which they are employed.

The Contractor shall furnish the trainee or apprentice a copy of the program he will follow in providing the training. The Contractor shall provide each trainee or apprentice with a certification showing the type and length of training satisfactorily completed. The Contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision

APPENDIX A
to the contract documents for
HOV 50 PHASE 2A
Contract No. PW 09-30408 / CIP No. 53113

AMENDMENTS TO MAY 2006 STANDARD SPECIFICATIONS

AMENDMENTS TO MAY 2006 STANDARD SPECIFICATIONS

SECTION 0: GLOBAL REVISIONS

Issue Date: July 31, 2007

Global revisions are changes to contract documents not specific to a section of the Standard Specifications.

- In each contract document at each occurrence:
 1. Except where existing asphalt concrete is described, replace "asphalt concrete" with "hot mix asphalt"
 2. Except where existing AC is described, replace "AC" with "HMA" where AC means asphalt concrete

SECTION 1: DEFINITIONS AND TERMS

Issue Date: January 18, 2008

Section 1-1.01, "General," of the Standard Specifications is amended by adding the following:

- The Department is gradually changing the style and language of the specifications. The new style and language includes:

1. Use of:
 - 1.1. Imperative mood
 - 1.2. Introductory modifiers
 - 1.3. Conditional clauses
2. Elimination of:
 - 2.1. Language variations
 - 2.2. Definitions for industry-standard terms
 - 2.3. Redundant specifications
 - 2.4. Needless cross-references

- The use of this new style does not change the meaning of a specification not yet using this style.
- The specifications are written to the Bidder before award and the Contractor after. Before award, interpret sentences written in the imperative mood as starting with "The Bidder must" and interpret "you" as "the Bidder" and "your" as "the Bidder's." After award, interpret sentences written in the imperative mood as starting with "The Contractor must" and interpret "you" as "the Contractor" and "your" as "the Contractor's."
 - Unless an object or activity is specified to be less than the total, the quantity or amount is all of the object or activity.
 - All items in a list apply unless the items are specified as choices.
 - Interpret terms as defined in the Contract documents. A term not defined in the Contract documents has the meaning defined in Means Illustrated Construction Dictionary, Condensed Version, Second Edition.

The 1st table in Section 1-1.02, "Abbreviations," of the Standard Specifications is amended by adding:

SSPC	The Society for Protective Coatings
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Section 1, "Definitions and Terms," of the Standard Specifications is amended by adding the following sections:

1-1.082 BUSINESS DAY

- Day on the calendar except Saturday or holiday.

1-1.084 CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

- The California Manual on Uniform Traffic Control Devices for Streets and Highways (California MUTCD) is issued by the Department of Transportation and is the Federal Highway Administration's MUTCD 2003 Edition, as amended for use in California.

1-1.125 DEDUCTION

- Amount of money permanently taken from progress payment and final payment. Deductions are cumulative and are not retentions under Pub Cont Code § 7107.

1-1.205 FEDERAL-AID CONTRACT

- Contract that has a Federal-aid project number on the cover of the Notice to Contractors and Special Provisions.

1-1.245 HOLIDAY

1. Every Sunday
2. January 1st, New Year's Day
3. 3rd Monday in January, Birthday of Martin Luther King, Jr.
4. February 12th, Lincoln's Birthday
5. 3rd Monday in February, Washington's Birthday
6. March 31st, Cesar Chavez Day
7. Last Monday in May, Memorial Day
8. July 4th, Independence Day
9. 1st Monday in September, Labor Day
10. 2nd Monday in October, Columbus Day
11. November 11th, Veterans Day
12. 4th Thursday in November, Thanksgiving Day
13. Day after Thanksgiving Day
14. December 25th, Christmas Day

- If January 1st, February 12th, March 31st, July 4th, November 11th, or December 25th falls on a Sunday, the Monday following is a holiday. If November 11th falls on a Saturday, the preceding Friday is a holiday. Interpret "legal holiday" as "holiday."

1-1.475 WITHHOLD

- Money temporarily or permanently taken from progress payment. Withholds are cumulative and are not retentions under Pub Cont Code § 7107.

Section 1-1.255, "Legal Holidays," of the Standard Specifications is deleted.

Section 1-1.265, "Manual on Uniform Traffic Control Devices," of the Standard Specifications is deleted.

Section 1-1.266, "Manual on Uniform Traffic Control Devices California Supplement," of the Standard Specifications is deleted.

Section 1-1.39 "State," of the Standard Specifications is amended to read:

1-1.39 STATE

- The State of California, including its agencies, departments, or divisions, whose conduct or action is related to the work.

SECTION 3: AWARD AND EXECUTION OF CONTRACT

Issue Date: August 17, 2007

Section 3-1.025, "Insurance Policies," of the Standard Specifications is amended to read:

3-1.025 INSURANCE POLICIES

- The successful bidder shall submit:
 1. Copy of its commercial general liability policy and its excess policy or binder until such time as a policy is available, including the declarations page, applicable endorsements, riders, and other modifications in effect at the time of contract execution. Standard ISO form No. CG 0001 or similar exclusions are allowed if not inconsistent with Section 7-1.12, "Indemnification and Insurance." Allowance of additional exclusions is at the discretion of the Department.
 2. Certificate of insurance showing all other required coverages. Certificates of insurance, as evidence of required insurance for the auto liability and any other required policy, shall set forth deductible amounts applicable to each policy and all exclusions that are added by endorsement to each policy. The evidence of insurance shall provide that no cancellation, lapse, or reduction of coverage will occur without 10 days prior written notice to the Department.
 3. A declaration under the penalty of perjury by a certified public accountant certifying the accountant has applied Generally Accepted Accounting Principles (GAAP) guidelines confirming the successful bidder has sufficient funds and resources to cover any self-insured retentions if the self-insured retention is \$50,000 or higher.
- If the successful bidder uses any form of self-insurance for workers compensation in lieu of an insurance policy, it shall submit a certificate of consent to self-insure in accordance with the provisions of Section 3700 of the Labor Code.

Section 3-1.03, "Execution of Contract," of the Standard Specifications is amended to read:

3-1.03 EXECUTION OF CONTRACT

- The contract shall be signed by the successful bidder and returned, together with the contract bonds and the documents identified in Section 3-1.025, "Insurance Policies," within 10 business days of receiving the contract for execution.

Section 3-1.04, "Failure to Execute Contract," of the Standard Specifications is amended to read:

3-1.04 FAILURE TO EXECUTE CONTRACT

- Failure of the lowest responsible bidder, the second lowest responsible bidder, or the third lowest responsible bidder to execute the contract as required in Section 3-1.03, "Execution of Contract," within 10 business days of receiving the contract for execution shall be just cause for the forfeiture of the proposal guaranty. The successful bidder may file with the Department a written notice, signed by the bidder or the bidder's authorized representative, specifying that the bidder will refuse to execute the contract if it is presented. The filing of this notice shall have the same force and effect as the failure of the bidder to execute the contract and furnish acceptable bonds within the time specified.

Section 3-1.05, "Return of Proposal Guaranties," of the Standard Specifications is amended to read:

3-1.05 RETURN OF PROPOSAL GUARANTIES

- The Department keeps the proposal guaranties of the 1st, 2nd and 3rd lowest responsible bidders until the contract has been executed. The other bidders' guaranties, other than bidders' bonds, are returned upon determination of the 1st, 2nd, and 3rd apparent lowest bidders, and their bidders' bonds are of no further effect.

SECTION 4: SCOPE OF WORK

Issue Date: August 17, 2007

Section 4-1.01, "Intent of Plans and Specifications," of the Standard Specifications is amended by adding the following:

- Nothing in the specifications voids the Contractor's public safety responsibilities.

SECTION 5: CONTROL OF WORK

Issue Date: February 1, 2008

Section 5, "Control of Work," of the Standard Specifications is amended by adding the following sections:

5-1.005 GENERAL

- Failure to comply with any specification part is a breach of the contract and a waiver of your right to time or payment adjustment.
- After contract approval, submit documents and direct questions to the Engineer. Orders, approvals, and requests to the Contractor are by the Engineer.
- The Engineer furnishes the following in writing:

1. Approvals
2. Notifications
3. Orders

- The Contractor must furnish the following in writing:

1. Assignments
2. Notifications
3. Proposals
4. Requests, sequentially numbered
5. Subcontracts
6. Test results

- The Department rejects a form if it has any error or any omission.
- Convert foreign language documents to English.
- Use contract administration forms available at the Department's Web site.
- If the last day for submitting a document falls on a Saturday or holiday, it may be submitted on the next business day with the same effect as if it had been submitted on the day specified.

5-1.015 RECORD RETENTION, INSPECTION, COPYING, AND AUDITING

- Retain project records and make them available for inspection, copying, and auditing by State representatives from bid preparation through:

1. Final payment
2. Resolution of claims, if any

- For at least 3 years after the later of these, retain and make available for inspection, copying, and auditing cost records by State representatives including:

1. Records pertaining to bid preparation
2. Overhead
3. Payroll records and certified payroll
4. Payments to suppliers and subcontractors
5. Cost accounting records
6. Records of subcontractors and suppliers

- Maintain the records in an organized way in the original format, electronic and hard copy, conducive to professional review and audit.
- Before contract acceptance, the State representative notifies the Contractor, subcontractor, or supplier 5 days before inspection, copying, or auditing.
- If an audit is to start more than 30 days after contract acceptance, the State representative notifies the Contractor, subcontractor, or supplier when the audit is to start.

Section 5-1.01, "Authority of Engineer," of the Standard Specifications is amended by adding:

- Failure to enforce a contract provision does not waive enforcement of any contract provision.

Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications, and Special Provisions," of the Standard Specifications is amended to read:

5-1.04 CONTRACT COMPONENTS

- A component in one contract part applies as if appearing in each. The parts are complementary and describe and provide for a complete work.
- If a discrepancy exists:

1. The governing ranking of contract parts in descending order is:

- 1.1. Special provisions
- 1.2. Project plans
- 1.3. Revised Standard Plans
- 1.4. Standard Plans
- 1.5. Amendments to the Standard Specifications
- 1.6. Standard Specifications
- 1.7. Project information

2. Written numbers and notes on a drawing govern over graphics
3. A detail drawing governs over a general drawing
4. A detail specification governs over a general specification
5. A specification in a section governs over a specification referenced by that section

- If a discrepancy is found or confusion arises, request correction or clarification.

Section 5-1.07, "Lines and Grades," of the Standard Specifications is replaced with the following:

5-1.07 LINES AND GRADES

- The Engineer places stakes and marks under Chapter 12, "Construction Surveys," of the Department's Surveys Manual.

- Submit your request for Department-furnished stakes:

1. On a Request for Construction Stakes form. Ensure:

- 1.1. Requested staking area is ready for stakes
- 1.2. You use the stakes in a reasonable time

2. A reasonable time before starting an activity using the stakes

- Establish priorities for stakes and note priorities on the request.
- Preserve stakes and marks placed by the Engineer. If the stakes or marks are destroyed, the Engineer replaces them at the Engineer's earliest convenience and deducts the cost.

Section 5-1.116, "Differing Site Conditions," is amended to read:

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

5-1.116C Protests

- You may protest the Engineer's decision by:
 1. Submitting an Initial Notice of Potential Claim within 5 business days after receipt of the Engineer's notification
 2. Complying with claim procedures
- The Initial Notice of Potential Claim must detail the differences in your position from the Engineer's determination and support your position with additional information, including additional geotechnical data. Attach to the Initial Notice of Potential Claim a certification stating that you complied with Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work."
 - Promptly submit supplementary information when obtained.

SECTION 6: CONTROL OF MATERIALS

Issue Date: August 17, 2007

Section 6-1.05, "Trade Names and Alternatives," of the Standard Specifications is amended to read:

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

Section 6, "Control of Materials," of the Standard Specifications is amended by adding the following sections:

6-1.085 BUY AMERICA (23 CFR 635.410)

- For a Federal-aid contract, furnish steel and iron materials to be incorporated into the work that are produced in the United States except:

1. Foreign pig iron and processed, pelletized, and reduced iron ore may be used in the domestic production of the steel and iron materials [60 Fed Reg 15478 (03/24/1995)]
2. If the total combined cost of the materials does not exceed the greater of 0.1 percent of the total bid or \$2,500, material produced outside the United States may be used

- Production includes:

1. Processing steel and iron materials, including smelting or other processes that alter the physical form or shape (such as rolling, extruding, machining, bending, grinding, and drilling) or chemical composition
2. Coating application, including epoxy coating, galvanizing, and painting, that protects or enhances the value of steel and iron materials

- For steel and iron materials to be incorporated into the work, submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications that certifies all production processes occurred in the United States except for the above exceptions.

6-1.087 BUY AMERICA (PUB RES CODE § 42703(d))

- Furnish crumb rubber to be incorporated into the work that is produced in the United States and is derived from waste tires taken from vehicles owned and operated in the United States.

- For crumb rubber to be incorporated into the work, submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications that certifies only crumb rubber manufactured in the United States and derived from waste tires taken from vehicles owned and operated in the United States is used.

The 7th and 8th paragraph of Section 6-2.01, "General," of the Standard Specifications are amended to read:

- Upon the Contractor's written request, the Department tests materials from an untested local source. If satisfactory material from that source is used in the work, the Department does not charge the Contractor for the tests; otherwise, the Department deducts the test cost.

The 2nd sentence of the 7th paragraph of Section 6-2.02, "Possible Local Material Sources," of the Standard Specifications is amended to read:

- The Department deducts the charges for the removed material.

SECTION 7: LEGAL RELATIONS AND RESPONSIBILITIES

Issue Date: May 2, 2008

Section 7-1.01, "Laws To Be Observed," of the Standard Specifications is amended to read:

7-1.01 LAWS TO BE OBSERVED

- Comply with laws, regulations, orders, decrees, and permits applicable to the project. Indemnify and defend the State against any claim or liability arising from the violation of a law, regulation, order, decree, or permit

by you or your employees. Immediately report to the Engineer in writing a discrepancy or inconsistency between the contract and a law, regulation, order, decree, or permit.

The 3rd listed requirement of the 1st paragraph of Section 7-1.01A(2), "Prevailing Wage," of the Standard Specifications is amended to read:

3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the Contractor must diligently take corrective action to stop or rectify the failure, including withholding sufficient funds due the subcontractor for work performed on the public works project.

The 2nd paragraph of Section 7-1.01A(2), "Prevailing Wage," of the Standard Specifications is amended to read:

- Pursuant to Section 1775 of the Labor Code, the Division of Labor Standards Enforcement must notify the Contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages. If the Division of Labor Standards Enforcement determines that employees of a subcontractor were not paid the general prevailing rate of per diem wages and if the Department did not withhold sufficient money under the contract to pay those employees the balance of wages owed under the general prevailing rate of per diem wages, the Contractor must withhold an amount of moneys due the subcontractor sufficient to pay those employees the general prevailing rate of per diem wages if requested by the Division of Labor Standards Enforcement. The Contractor must pay any money withheld from and owed to a subcontractor upon receipt of notification by the Division of Labor Standards Enforcement that the wage complaint has been resolved. If notice of the resolution of the wage complaint has not been received by the Contractor within 180 days of the filing of a valid notice of completion or acceptance of the public works project, whichever occurs later, the Contractor must pay all moneys withheld from the subcontractor to the Department. The Department withholds these moneys pending the final decision of an enforcement action.

The 2nd paragraph of Section 7-1.01A(3), "Payroll Records," of the Standard Specifications is amended to read:

- The Department withholds the penalties specified in subdivision (g) of Labor Code § 1776 for noncompliance with the requirements in Section 1776.

The 4th paragraph of Section 7-1.01A(3), "Payroll Records," of the Standard Specifications is amended to read:

- The Department withholds for delinquent or inadequate payroll records (Labor Code § 1771.5). If the Contractor has not submitted an adequate payroll record by the month's 15th day for the period ending on or before the 1st of that month, the Department withholds 10 percent of the monthly progress estimate, exclusive of mobilization. The Department does not withhold more than \$10,000 or less than \$1,000.

The 5th paragraph of Section 7-1.01A(3), "Payroll Records," of the Standard Specifications is deleted.

Section 7-1.01A(6), "Workers' Compensation," of the Standard Specifications is amended to read:

7-1.01A(6) (Blank)

The fourth sentence of the second paragraph of Section 7-1.02, "Load Limitations," of the Standard Specifications is amended to read:

- Trucks used to haul treated base, portland cement concrete, or hot mix asphalt shall enter onto the base to dump at the nearest practical entry point ahead of spreading equipment.

Section 7-1.02, "Load Limitations," of the Standard Specifications is amended by adding the following paragraph after the 4th paragraph:

- Loads imposed on existing, new, or partially completed structures shall not exceed the load carrying capacity of the structure or any portion of the structure as determined by AASHTO LRFD with interims and California Amendments, Design Strength Limit State II. The compressive strength of concrete (f_c) to be used in computing the load carrying capacity shall be the smaller of the following:

1. Actual compressive strength at the time of loading
2. Value of f_c shown on the plans for that portion of the structure or 2.5 times the value of f_c (extreme fiber compressive stress in concrete at service loads) shown on the plans for portions of the structure where no f_c is shown

The first sentence of the eighth paragraph of Section 7-1.09, "Public Safety," of the Standard Specifications is amended to read:

- Signs, lights, flags, and other warning and safety devices and their use shall conform to the requirements set forth in Part 6 of the California MUTCD.

The sixteenth paragraph of Section 7-1.09, "Public Safety," of the Standard Specifications is amended to read:

- When vertical clearance is temporarily reduced to 15.5 feet or less, low clearance warning signs shall be placed in accordance with Part 2 of the California MUTCD and as directed by the Engineer. Signs shall conform to the dimensions, color, and legend requirements of the California MUTCD and these specifications except that the signs shall have black letters and numbers on an orange retroreflective background. W12-2P signs shall be illuminated so that the signs are clearly visible.

The last sentence of the 2nd paragraph of Section 7-1.11, "Preservation of Property," of the Standard Specifications is amended to read:

- The cost of the repairs must be borne by the Contractor and will be deducted.

Section 7-1.12, "Indemnification and Insurance," of the Standard Specifications is amended to read:

7-1.12 INDEMNIFICATION AND INSURANCE

- The Contractor's obligations regarding indemnification of the State of California and the requirements for insurance shall conform to the provisions in Section 3-1.025, "Insurance Policies," and Sections 7-1.12A, "Indemnification," and 7-1.12B, "Insurance," of this Section 7-1.12.

7-1.12A Indemnification

- The Contractor shall defend, indemnify, and save harmless the State, including its officers, employees, and agents (excluding agents who are design professionals) from any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, losses or liabilities, in law or in equity (Section 7-1.12A Claims) arising out of or in connection with the Contractor's performance of this contract for:

1. Bodily injury including, but not limited to, bodily injury, sickness or disease, emotional injury or death to persons, including, but not limited to, the public, any employees or agents of the Contractor, the State, or any other contractor; and
2. Damage to property of anyone including loss of use thereof; caused or alleged to be caused in whole or in part by any negligent or otherwise legally actionable act or omission of the Contractor or anyone directly or indirectly employed by the Contractor or anyone for whose acts the Contractor may be liable.

- Except as otherwise provided by law, these requirements apply regardless of the existence or degree of fault of the State. The Contractor is not obligated to indemnify the State for Claims arising from conduct delineated in Civil Code Section 2782 and to Claims arising from any defective or substandard condition of the highway that existed at or before the start of work, unless this condition has been changed by the work or the scope of the work requires the Contractor to maintain existing highway facilities and the Claim arises from the Contractor's failure to

maintain. The Contractor's defense and indemnity obligation shall extend to Claims arising after the work is completed and accepted if the Claims are directly related to alleged acts or omissions by the Contractor that occurred during the course of the work. State inspection is not a waiver of full compliance with these requirements.

- The Contractor's obligation to defend and indemnify shall not be excused because of the Contractor's inability to evaluate liability or because the Contractor evaluates liability and determine that the Contractor is not liable. The Contractor shall respond within 30 days to the tender of any Claim for defense and indemnity by the State, unless this time has been extended by the State. If the Contractor fails to accept or reject a tender of defense and indemnity within 30 days, in addition to any other remedy authorized by law, the Department may withhold such funds the State reasonably considers necessary for its defense and indemnity until disposition has been made of the Claim or until the Contractor accepts or rejects the tender of defense, whichever occurs first.

- With respect to third-party claims against the Contractor, the Contractor waives all rights of any type to express or implied indemnity against the State, its officers, employees, or agents (excluding agents who are design professionals).

- Nothing in the Contract is intended to establish a standard of care owed to any member of the public or to extend to the public the status of a third-party beneficiary for any of these indemnification specifications.

7-1.12B Insurance

7-1.12B(1) General

- Nothing in the contract is intended to establish a standard of care owed to any member of the public or to extend to the public the status of a third-party beneficiary for any of these insurance specifications.

7-1.12B(2) Casualty Insurance

- The Contractor shall procure and maintain insurance on all of its operations with companies acceptable to the State as follows:

1. The Contractor shall keep all insurance in full force and effect from the beginning of the work through contract acceptance.
2. All insurance shall be with an insurance company with a rating from A.M. Best Financial Strength Rating of A- or better and a Financial Size Category of VII or better.
3. The Contractor shall maintain completed operations coverage with a carrier acceptable to the State through the expiration of the patent deficiency in construction statute of repose set forth in Code of Civil Procedure Section 337.1.

7-1.12B(3) Workers' Compensation and Employer's Liability Insurance

- In accordance with Labor Code Section 1860, the Contractor shall secure the payment of worker's compensation in accordance with Labor Code Section 3700.

- In accordance with Labor Code Section 1861, the Contractor shall submit to the Department the following certification before performing the work:

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

- Contract execution constitutes certification submittal.

- The Contractor shall provide Employer's Liability Insurance in amounts not less than:

1. \$1,000,000 for each accident for bodily injury by accident
2. \$1,000,000 policy limit for bodily injury by disease
3. \$1,000,000 for each employee for bodily injury by disease

- If there is an exposure of injury to the Contractor's employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act, or under laws, regulations, or statutes applicable to maritime employees, coverage shall be included for such injuries or claims.

7-1.12B(4) Liability Insurance

7-1.12B(4)(a) General

• The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability and property damage liability for the following limits and including coverage for:

1. Premises, operations, and mobile equipment
2. Products and completed operations
3. Broad form property damage (including completed operations)
4. Explosion, collapse, and underground hazards
5. Personal injury
6. Contractual liability

7-1.12B(4)(b) Liability Limits/Additional Insureds

• The limits of liability shall be at least the amounts shown in the following table:

Total Bid	For Each Occurrence ¹	Aggregate for Products/Completed Operation	General Aggregate ²	Umbrella or Excess Liability ³
≤\$1,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$5,000,000
>\$1,000,000				
≤\$5,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$10,000,000
>\$5,000,000				
≤\$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$15,000,000
>\$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$25,000,000
<ol style="list-style-type: none"> 1. Combined single limit for bodily injury and property damage. 2. This limit shall apply separately to the Contractor's work under this contract. 3. The umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted. 				

• The Contractor shall not require certified Small Business subcontractors to carry Liability Insurance that exceeds the limits in the table above. Notwithstanding the limits specified herein, at the option of the Contractor, the liability insurance limits for certified Small Business subcontractors of any tier may be less than those limits specified in the table. For Small Business subcontracts, "Total Bid" shall be interpreted as the amount of subcontracted work to a certified Small Business.

• The State, including its officers, directors, agents (excluding agents who are design professionals), and employees, shall be named as additional insureds under the General Liability and Umbrella Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this contract. Coverage for such additional insureds does not extend to liability:

1. Arising from any defective or substandard condition of the roadway which existed at or before the time the Contractor started work, unless such condition has been changed by the work or the scope of the work requires the Contractor to maintain existing roadway facilities and the claim arises from the Contractor's failure to maintain;
2. For claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor that occurred during the course of the work; or
3. To the extent prohibited by Insurance Code Section 11580.04

• Additional insured coverage shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured (Form B) endorsement form CG 2010, as published by the Insurance Services Office (ISO), or other form designated by the Department.

7-1.12B(4)(c) Contractor's Insurance Policy is Primary

- The policy shall stipulate that the insurance afforded the additional insureds applies as primary insurance. Any other insurance or self-insurance maintained by the State is excess only and shall not be called upon to contribute with this insurance.

7-1.12B(5) Automobile Liability Insurance

- The Contractor shall carry automobile liability insurance, including coverage for all owned, hired, and nonowned automobiles. The primary limits of liability shall be not less than \$1,000,000 combined single limit each accident for bodily injury and property damage. The umbrella or excess liability coverage required under Section 7-1.12B(4)(b) also applies to automobile liability.

7-1.12B(6) Policy Forms, Endorsements, and Certificates

- The Contractor shall provide its General Liability Insurance under Commercial General Liability policy form No. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form No. CG0001.

7-1.12B(7) Deductibles

- The State may expressly allow deductible clauses, which it does not consider excessive, overly broad, or harmful to the interests of the State. Regardless of the allowance of exclusions or deductions by the State, the Contractor is responsible for any deductible amount and shall warrant that the coverage provided to the State is in accordance with Section 7-1.12B, "Insurance."

7-1.12B(8) Enforcement

- The Department may assure the Contractor's compliance with its insurance obligations. Ten days before an insurance policy lapses or is canceled during the contract period, the Contractor shall submit to the Department evidence of renewal or replacement of the policy.

- If the Contractor fails to maintain any required insurance coverage, the Department may maintain this coverage and withhold or charge the expense to the Contractor or terminate the Contractor's control of the work in accordance with Section 8-1.08, "Termination of Control."

- The Contractor is not relieved of its duties and responsibilities to indemnify, defend, and hold harmless the State, its officers, agents, and employees by the Department's acceptance of insurance policies and certificates.

- Minimum insurance coverage amounts do not relieve the Contractor for liability in excess of such coverage, nor do they preclude the State from taking other actions available to it, including the withholding of funds under this contract.

7-1.12B(9) Self-Insurance

- Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the State.

- If the Contractor uses a self-insurance program or self-insured retention, the Contractor shall provide the State with the same protection from liability and defense of suits as would be afforded by first-dollar insurance. Execution of the contract is the Contractor's acknowledgement that the Contractor will be bound by all laws as if the Contractor were an insurer as defined under Insurance Code Section 23 and that the self-insurance program or self-insured retention shall operate as insurance as defined under Insurance Code Section 22.

SECTION 8: PROSECUTION AND PROGRESS

Issue Date: August 17, 2007

The 2nd paragraph of Section 8-1.02, "Assignment," of the Standard Specifications is amended to read:

- If the Contractor assigns the right to receive contract payments, the Department accepts the assignment upon the Engineer's receipt of a notice. Assigned payments remain subject to deductions and withholds described in the contract. The Department may use withheld payments for work completion whether payments are assigned or not.

SECTION 9: MEASUREMENT AND PAYMENT

Issue Date: August 17, 2007

The last sentence of the 1st paragraph of Section 9-1.02, "Scope of Payment," of the Standard Specifications is amended to read:

- Neither the payment of any estimate nor of any retained percentage or withhold relieves the Contractor of any obligation to make good any defective work or material.

The 6th paragraph of Section 9-1.03C, "Records," of the Standard Specifications is deleted.

The 2nd sentence of the 14th paragraph of Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications is amended to read:

- Administrative disputes are disputes of administrative deductions or withholds, contract item quantities, contract item adjustments, interest payments, protests of contract change orders as provided in Section 4-1.03A, "Procedure and Protest," and protests of the Weekly Statement of Working Days as provided in Section 8-1.06, "Time of Completion."

Section 9-1.05, "Stop Notices," of the Standard Specifications is amended to read:

9-1.05 STOP NOTICE WITHHOLDS

- The Department may withhold payments to cover claims filed under Civ Code § 3179 et seq.

Section 9, "Measurement and Payment," of the Standard Specifications is amended by adding the following sections:

9-1.053 PERFORMANCE FAILURE WITHHOLDS

- During each estimate period you fail to comply with a contract part, including submittal of a document as specified, the Department withholds a part of the progress payment. The documents include quality control plans, schedules, traffic control plans, and water pollution control submittals.
 - For 1 performance failure, the Department withholds 25 percent of the progress payment but does not withhold more than 10 percent of the total bid.
 - For multiple performance failures, the Department withholds 100 percent of the progress payment but does not withhold more than 10 percent of the total bid.
 - The Department returns performance-failure withholds in the progress payment following the correction of noncompliance.

9-1.055 PENALTY WITHHOLDS

- Penalties include fines and damages that are proposed, assessed, or levied against you or the Department by a governmental agency or citizen lawsuit. Penalties are also payments made or costs incurred in settling alleged permit violations of Federal, State, or local laws, regulations, or requirements. The cost incurred may include the amount spent for mitigation or correcting a violation.
 - If you or the Department is assessed a penalty, the Department may withhold the penalty amount until the penalty disposition has been resolved. The Department may withhold penalty funds and notify you within 15 days of the withhold. If the penalty amount is less than the amount being withheld from progress payments for retentions, the Department will not withhold the penalty amount.
 - If the penalty is resolved for less than the amount withheld, the Department pays interest at a rate of 6 percent per year on the excess withhold. If the penalty is not resolved, the withhold becomes a deduction.
 - Instead of the withhold, you may provide a bond payable to the Department of Transportation equal to the highest estimated liability for any disputed penalties proposed.

9-1.057 PROGRESS WITHHOLDS FOR FEDERAL-AID CONTRACTS

- Section 9-1.057, "Progress Withholds for Federal-Aid Contracts," applies to a Federal-aid contract.
- The Department withholds 10 percent of a partial payment for noncompliant progress. Noncompliant progress occurs when:

1. Total days to date exceed 75 percent of the revised contract working days
2. Percent of working days elapsed exceeds the percent of value of work completed by more than 15 percent

- The Engineer determines the percent of working days elapsed by dividing the total days to date by the revised contract working days and converting the quotient to a percentage.

- The Engineer determines the percent of value of work completed by summing payments made to date and the amount due on the current progress estimate, dividing this sum by the current total estimated value of the work, and converting the quotient to a percentage. These amounts are shown on the Progress Payment Voucher.

- When the percent of working days elapsed minus the percent of value of work completed is less than or equal to 15 percent, the Department returns the withhold in the next progress payment.

The 3rd paragraph of Section 9-1.06, "Partial Payments," of the Standard Specifications is amended to read:

- For a non-Federal-aid project, the Department retains 10 percent of the estimated value of the work done and 10 percent of the value of materials estimated to have been furnished and delivered and unused or furnished and stored as part security for the fulfillment of the contract by the Contractor, except that at any time after 20 percent of the work has been completed, if the Engineer finds that satisfactory progress is being made, the Department may reduce the total amount being retained from payment pursuant to the above requirements to 5 percent of the total estimated value of the work and materials and may also reduce the amount retained from any of the remaining partial payments to 5 percent of the estimated value of the work and materials. In addition, on any partial payment made after 95 percent of the work has been completed, the Department may reduce the amount retained from payment pursuant to the requirements of this Section 9-1.06, to such lesser amount as the Department determines is adequate security for the fulfillment of the balance of the work and other requirements of the contract, but in no event is that amount reduced to less than 125 percent of the estimated value of the work yet to be completed as determined by the Engineer. The reduction is made only upon the request of the Contractor and must be approved in writing by the surety on the performance bond and by the surety on the payment bond. The approval of the surety must be submitted to the Disbursing Officer of the Department; the signature of the person executing the approval for the surety must be properly acknowledged and the power of attorney authorizing the person to give that consent must either accompany the document or be on file with the Department. The retentions specified in this paragraph are those defined in Pub Cont Code § 7107(b).

The 1st sentence of the 4th paragraph of Section 9-1.06, "Partial Payments," of the Standard Specifications is amended to read:

- The Department shall pay monthly to the Contractor, while carrying on the work, the balance not retained, as aforesaid, after deducting therefrom all previous payments and all sums to be deducted or withheld under the provisions of the contract.

The title and 1st and 2nd paragraphs of Section 9-1.065, "Payment of Withheld Funds," of the Standard Specifications are amended to read:

9-1.065 RELEASE OF RETAINED FUNDS

- The Department releases retained funds if you:
 1. Request release of the retention (Pub Cont Code § 10263) in writing
 2. Deposit securities equivalent to the funds you want released into escrow with the State Treasurer or with a bank acceptable to the Department
 3. Are the beneficial owner of and receive interest on the deposited securities substituted for the retained funds

The 2nd sentence Section 9-1.07A, "Payment Prior to Proposed Final Estimate," of the Standard Specifications is amended to read:

- The Department pays the balance due less previous payments, deductions, withholds, and retentions under the provisions of the contract and those further amounts that the Engineer determines to be necessary pending issuance of the proposed final estimate and payment thereon.

The 1st paragraph of Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications is amended to read:

- After acceptance by the Director, the Engineer makes a proposed final estimate of the total amount payable to the Contractor, including an itemization of the total amount, segregated by contract item quantities, extra work, and other basis for payment, and shows each deduction made or to be made for prior payments and amounts to be deducted, withheld, or retained under the provisions of the contract. Prior estimates and payments are subject to correction in the proposed final estimate. The Contractor must submit written approval of the proposed final estimate or a written statement of claims arising under or by virtue of the contract so that the Engineer receives the written approval or statement of claims no later than close of business of the 30th day after receiving the proposed final estimate. The Contractor's receipt of the proposed final estimate must be evidenced by postal receipt. The Engineer's receipt of the Contractor's written approval or statement of claims must be evidenced by postal receipt or the Engineer's written receipt if delivered by hand.

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)

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SECTION 15 EXISTING HIGHWAY FACILITIES

(Issued 05-01-09)

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 ₂ -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.

Preparing Soil

After you prepare an area for lime soil stabilization, test the soil to be stabilized every 500 cubic yards for relative compaction under California Test 231 and moisture content under California Test 226, and verify the surface grades.

Applying Lime

The Engineer determines the final application rate for each lime product proposed from the samples submitted. If the soil being stabilized changes, the Engineer changes the application rate. Based on California Test 373, the Engineer reports the application rates as the percent of lime by dry weight of soil. The Engineer provides the optimum moisture content determined under California Test 373 for each application rate.

Before applying lime, measure the temperature at the ground surface.

If lime in dry form is used, the Engineer verifies the application rate using the drop pan method once per 40,000 square feet stabilized, or twice per day, whichever is greater.

If lime in slurry form is used, report the quantity of slurry placed by measuring the volume of slurry in the holding tank once per 40,000 square feet stabilized, or twice per day, whichever is greater.

Mixing

For each day of initial mixing, test the moisture content. Sample the material immediately after initial mixing.

Randomly test the adequacy of the final mixing with a phenolphthalein indicator solution.

During mixing operations, measure the ground temperature at full mixing depth.

After mixing and before compacting, determine maximum density under California Test 216 from composite samples of the mixed material and at each distinct change in material. Test the moisture content of the mixed material under California Test 226. Test the gradation for compliance with "Materials."

Compaction

Test relative compaction on a wet weight basis.

After initial compaction, determine in-place density under California Test 231 and moisture content under California Test 226 at the same locations. The testing frequency must be 1 test per 250 cubic yards of lime stabilized soil. Test in 0.50-foot depth intervals.

Before requesting to compact material in layers greater than 0.50 foot, construct a test strip in the production area and demonstrate the test strip passes compaction tests using the proposed thickness. The test strip must contain no more material than 1 day's production. The Engineer tests at not more than 0.50-foot depth intervals regardless of the thickness of your layers.

Construct test pads by scraping away material to the depth ordered by the Engineer. If a compaction test fails corrective action must include the layers of material already placed above the test pad elevation.

Finish Grading

Do not proceed with construction activities for subsequent layers of material until the Engineer verifies the final grades of the lime stabilized soil.

Dispute Resolution

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. Notify the Engineer 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 lime producer

If split quality control or acceptance samples are not available, the ITP uses any available material representing the disputed material for evaluation.

24-1.02 MATERIALS

24-1.02A Lime

Lime must comply with ASTM C 977 and the following:

Lime		
Quality Characteristic	ASTM	Specification
Available Calcium and Magnesium Oxide(min., %)	C 25 ^a	High Calcium Quicklime: CaO > 90 Dolomitic Quicklime: CaO > 55 and CaO + MgO > 90
Loss on ignition (max., %)	C 25	7 (total loss) 5 (carbon dioxide) 2 (free moisture)
Slaking rate	C 110	30 °C rise in 8 minutes

Notes:

^a You may use ASTM C25 or ASTM C1301 and ASTM C1271.

A 0.5-pound sample of lime dry-sieved in a mechanical sieve shaker for 10 minutes ±30 seconds must comply with:

Sieve Sizes	Percentage Passing
3/8-inch	98-100

Slurry must:

1. Be free of contaminants
2. Contain at least the minimum dry solids
3. Have uniform consistency

If you prepare lime slurry, prepare it at the jobsite.

24-1.02B Water

If available, use potable water. Inform the Engineer if a water source other than potable water is used. If not using potable water, water for mixing soil and lime must:

1. Contain no more than 650 parts per million of chlorides as Cl, and no more than 1,300 parts per million of sulfates as SO₄
2. Not contain an amount of impurities that will cause a reduction in the strength of the stabilize soil

24-1.02C Mixed Material

Take a composite sample from 5 random locations after initial mixing. The moisture content of the composite sample tested under California Test 226 must be a minimum of 3 percent greater than optimum. Determine the

moisture versus density relationship of the composite sample material determined under California Test 216, except Part 2, Section E, Paragraph 6 is modified as follows:

After adjustment of the moisture content, compact each of the remaining test specimens in the mold, then record the water adjustment, tamper reading, and the corresponding adjusted wet density from the chart on Table 1 using the column corresponding to the actual wet weight of the test specimen compacted. Note each of these wet weights on Line I.

The mixed material before compaction excluding rock must comply with:

Sieve Sizes	Percentage Passing
1"	98 - 100
No. 4	60 - 100

24-1.02D Curing Treatment

Curing treatment may be any of the following:

1. Water cure
2. Curing seal
3. Moist material blanket

Curing seal must be SS or CSS grade asphaltic emulsion under Section 94, "Asphaltic Emulsions."

24-1.03 CONSTRUCTION

24-1.03A General

If using different types of lime or lime from more than one source, do not mix them. The Engineer determines separate application rates.

Deliver lime in full loads unless it is the last load needed for a work shift.

Apply lime at ground temperatures above 35 °F. Do not apply lime if you expect the ground temperature to drop below 35 °F before you complete mixing and compacting.

During mixing, maintain the in-place moisture of the soil to be stabilized a minimum 3 percent above the optimum moisture determined under California Test 216 as modified in "Mixed Material." During compaction and finish grading, add water to the surface to prevent drying until the next layer of mixed material is placed, or until you apply curing treatment.

Scarify the surface of lime stabilized soil at least 2 inches between each layer. Do not scarify the final surface of the lime stabilized soil.

Between the time of applying lime and 3 days after applying curing treatment, only allow equipment or vehicles on the soil being stabilized that are essential to the work.

24-1.03B Preparing Soil

Except for soil clods, remove rocks or solids larger than 1/3 of the layer thickness. Regardless of the layer thickness, remove rocks and solids greater than 4 inches. Notify the Engineer if you encounter rocks or solids greater than 1/3 of the layer thickness.

Before adding lime, place the soil to be stabilized to within 0.08 foot of the specified lines and grades and compact to not less than 90 percent relative compaction.

24-1.03C Applying Lime

Apply lime uniformly over the area to be stabilized using a vane spreader.

The Engineer determines the final application rate. Do not vary from this application rate by more than 5 percent.

Apply lime in dry form. If you request and the Engineer approves, you may apply lime in slurry form.

Lime slurry must be in suspension during application. Apply lime slurry uniformly making successive passes over a measured section or roadway until the specified lime content is reached. Apply the residue from lime slurry over the length of the roadway being processed.

24-1.03D Mixing

Lime and soil to be stabilized must be mixed uniformly at least twice to within 0.10 foot of the specified depth at any point. If the mixing depth exceeds the specified depth by more than 10 percent, add lime in proportion to the exceeded depth. The Department does not pay for this added lime.

Mix lime on the same day it is applied. After the initial mixing, allow a mellowing period for at least 36 hours before final mixing. Moisture content during the mellowing period determined under California Test 226 must be at least 3 percent higher than the optimum moisture content. You may add water and mix during the mellowing period.

Remix until the mixture is uniform with no streaks or pockets of lime.

Except for clods larger than 1 inch, mixed material must have a color reaction with sprayed phenolphthalein alcohol indicator solution.

Complete all the mixing work within 7 days of the initial application of lime.

24-1.03E Compaction

Begin compacting immediately after final mixing, but not less than 36 hours after the beginning of initial mixing.

Compact by using sheepfoot or segmented wheel rollers immediately followed by steel drum or pneumatic-tired rollers. Do not use vibratory rollers.

If you request and the Engineer approves, you may compact mixed material in layers greater than 0.50 foot.

If the specified thickness is 0.50 foot or less, compact in one layer. If the specified thickness is more than 0.50 foot, compact in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer must not exceed 0.50 foot unless you first demonstrate your equipment and methods provide uniform distribution of lime and achieve the specified compaction.

Use other compaction methods in areas inaccessible to rollers.

Compact the lime stabilized soil to at least 95 percent relative compaction determined under California Test 216 as modified under "Mixed Material." The relative compaction is determined on a wet weight basis.

24-1.03F Finish Grading

Maintain the moisture content of the lime stabilized soil through the entire finish grading operation at a minimum of 3 percent above optimum moisture content.

The finished surface of the lime stabilized soil must not vary more than 0.08 foot above or below the grade established by the Engineer unless the lime stabilized soil is to be covered by material paid for by the cubic yard, in which case the finished surface may not vary above the grade established by the Engineer.

If lime stabilized soil is above the allowable tolerance, trim, remove, and dispose of the excess material. Do not leave loose material on the finished surface. If finish rolling cannot be completed within 2 hours of trimming, defer trimming.

If lime stabilized soil is below the allowable tolerance, you may use trimmed material to fill low areas only if final grading and final compaction occurs within 48 hours of beginning initial compaction. Before placing trimmed material, scarify the surface of the area to be filled at least 2 inches deep.

Finish rolling of trimmed surfaces must be performed with at least 1 complete coverage with steel drum or pneumatic-tired rollers.

24-1.03G Curing

General

Choose the method of curing.

Apply the chosen cure method within 48 hours of completing the sheepfoot or segmented wheel compaction. Apply the chosen cure method within the same day of any trimming and finish grading.

Water Cure

Water may be used to cure the finished surface before you place a moist material blanket, or apply curing seal. Keep the surface above the optimum moisture content of the lime stabilized soil. Use this method for no more than 3 days, after which you must place a curing seal or moist material blanket.

Curing Seal

Curing seal equipment must have a gage indicating the volume of curing seal in the storage tank. If curing seal is used, apply it:

1. To the finished surface of lime stabilized soil under Section 94-1.06, "Applying," of the Standard Specifications
2. At a rate from 0.10 to 0.20 gallon per square yard. The Engineer determines the exact rate
3. When the lime stabilized soil is at optimum moisture
4. When the ambient temperature is above 40 °F and rising

Repair damaged curing seal the same day the damage occurs.

Moist Material Blanket

Moist material blanket consists of moist structural material. Moist material blanket may be a temporary or permanent layer of material of sufficient thickness to prevent drying of the lime stabilized soil. You may use moist material blanket if the lime stabilized soil can bear the weight of construction equipment. Maintain the moist material blanket above the optimum moisture content, as appropriate, until the next structural layer is placed.

24-1.04 MEASUREMENT AND PAYMENT

Lime stabilized soil is measured by the square yard determined from horizontal measurements of the planned surface of the lime stabilized soil.

Curing seal is measured under Section 94, "Asphaltic Emulsions." The amount of curing seal used is determined from the gauge specified for the curing equipment.

The contract item prices for the work involved with lime stabilized soil are paid:

1. Per square yard for lime stabilized soil
2. Per ton for lime
3. Per ton for asphaltic emulsion (curing seal)

Payment for the contract items involved with lime stabilized soil includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the lime stabilized soil, complete in place, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The Department does not adjust payment for lime.

Quantities of lime wasted or disposed of in a manner not specified, or remaining on hand after completion of the work, will not be paid for. If you use a partial load of lime, weigh the truck and the remaining lime on a scale under Section 9-1.01, "Measurement of Quantities," and submit a weighmaster certificate to the Engineer.

Full compensation for preparing soil to be stabilized is included in the contract price paid per square yard for lime stabilized soil, and no separate payment is made therefor, except removing and disposing of rocks and solids larger 1/3 of the layer thickness and larger than 4 inches from native soil or embankment other than imported borrow is paid for as extra work as provided in Section 4-1.03D, "Extra Work." Removing and disposing of rocks and solids larger than 1/3 of the lift thickness and larger than 4 inches from imported borrow is at your expense.

Full compensation for mixing, compacting, and maintaining the moisture content of the lime stabilized soil is included in the contract price paid per square yard for lime stabilized soil, and no separate payment is made therefor.

Full compensation for applying lime is included in the contract price paid per ton for lime, and no additional compensation is allowed therefor.

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 testing costs.

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SECTION 25 AGGREGATE SUBBASES
(Issued 02-16-07)

In Section 25-1.02A 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

Replace Section 25-1.02B with:

25-1.02B Class 4 Aggregate Subbase

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 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 27 CEMENT TREATED BASES
(Issued 07-31-07)**

In Section 27-1.02 replace the 1st paragraph with:

Cement shall be Type II portland cement conforming to the provisions in Section 90-2.01A, "Cement."

In Section 27-1.02 replace the 3rd paragraph with:

Aggregate for use in Class A cement treated base shall be of such quality that when mixed with cement in an amount not to exceed 5 percent by weight of the dry aggregate and compacted at optimum moisture content, the compressive strength of a sample of the compacted mixture shall not be less than 750 pounds per square inch at 7 days, when tested by California Test 312.

In Section 27-1.02 replace the 4th paragraph with:

Aggregate for use in Class B cement treated base shall have a Resistance (R-value) of not less than 60 before mixing with cement and a Resistance (R-value) of not less than 80 after mixing with cement in an amount not to exceed 2.5 percent by weight of the dry aggregate.

In Section 27-1.07 replace the 9th paragraph with:

When surfacing material is hot mix asphalt, the low areas shall be filled with hot mix asphalt conforming to the requirements for the lowest layer of hot mix asphalt to be placed as surfacing. This filling shall be done as a separate operation prior to placing the lowest layer of surfacing, and full compensation for this filling will be considered as included in the contract price paid for cement treated base and no additional compensation will be allowed therefor.

considered as included in the contract price paid per cubic yard for lean concrete base and no additional compensation will be allowed therefor.

^^

SECTION 29 TREATED PERMEABLE BASES
(Issued 05-15-09)

In Section 29-1.02B replace the 2nd paragraph with:

Cement shall be Type II portland cement conforming to the provisions in Section 90-2.01A, "Cement."

In Section 29-1.04A replace the 1st paragraph with:

Aggregates and asphalt for asphalt treated permeable base shall be stored, proportioned and mixed in the same manner provided for storing, proportioning and mixing aggregates and asphalt for hot mix asphalt in Section 39-1.08, "Production," except as follows:

1. The aggregate need not be separated into sizes.
2. The temperature of the aggregate before adding the asphalt binder shall be not less than 275° F nor more than 325° F.
3. Asphalt treated permeable base stored in excess of 2 hours shall not be used in the work.
4. The aggregate shall be combined with 2.5 percent paving asphalt by weight of the dry aggregate. After testing samples of the Contractor's proposed aggregate supply, the Engineer may order an increase or decrease in the asphalt content. If an increase or decrease is ordered, and the increase or decrease exceeds the specified amount by more than 0.1 percent by weight of the dry aggregate, the compensation payable to the Contractor for the asphalt treated permeable base will be increased or decreased on the basis of the total increase or decrease in asphalt.
5. The asphalt content of the asphalt mixture will be determined, at the option of the Engineer, by extraction tests in conformance with the requirements in California Test 310 or 362, or will be determined in conformance with the requirements in California Test 379. The bitumen ratio pounds of asphalt per 100 pounds of dry aggregate shall not vary by more than 0.5 pound of asphalt above or 0.5 pound of asphalt below the amount designated by the Engineer. Compliance with this requirement will be determined either by taking samples from trucks at the plant or from the mat behind the paver before rolling. If the sample is taken from the mat behind the paver, the bitumen ratio shall be not less than the amount designated by the Engineer, less 0.7 pound of asphalt per 100 pounds of dry aggregate.

In Section 29-1.04B replace the 2nd paragraph with:

Cement treated permeable base shall contain not less than 287 pounds of cement per cubic yard.

In Section 29-1.05 replace the 1st paragraph with:

Asphalt treated permeable base shall be spread and compacted as specified for hot mix asphalt under the "Method" construction process in Section 39, "Hot Mix Asphalt," and these specifications.

In Section 29-1.05 in the 8th paragraph, replace the 2nd sentence with:

The filter fabric shall conform to the provisions in Section 88-1.02, "Filtration," and shall be placed in conformance with the provisions for placing filter fabric for edge drains in Section 68-3.03, "Installation."

In Section 29-1.06 replace the 1st and 2nd paragraphs with:

Cement treated base shall be placed, spread, compacted, and shaped in conformance with the provisions in Section 40-3.04D, "Stationary Side Form Construction," and Section 40-3.04E, "Slip-Form Construction," except that vibrators shall not be used and the third paragraph in Section 40-3.04A, "General," shall not apply.

In Section 29-1.06 in the 9th paragraph, replace the 2nd sentence with:

The filter fabric shall conform to the provisions in Section 88-1.02, "Filtration," and shall be placed in conformance with the provisions for placing filter fabric for edge drains in Section 68-3.03, "Installation."

In Section 29-1.07 replace the 2nd paragraph with:

Hardened treated permeable base with a surface lower than 0.05 foot below the grade established by the Engineer shall be removed and replaced with treated permeable base which complies with these specifications, or if permitted by the Engineer, the low areas shall be filled with pavement material as follows:

1. When pavement material is hot mix asphalt, the low areas shall be filled with hot mix asphalt conforming to the requirements for the lowest layer of hot mix asphalt to be placed as pavement. This shall be done as a separate operation prior to placing the lowest layer of pavement.
2. When pavement material is portland cement concrete, the low areas shall be filled with pavement concrete at the time and in the same operation in which the pavement is placed.
3. Full compensation for filling low areas will be considered as included in the contract price paid per cubic yard for treated permeable base and no additional compensation will be allowed therefor.

^^

SECTION 37 BITUMINOUS SEALS

(Issued 06-05-09)

In Section 37-1.03 replace the 4th through 6th paragraphs with:

On 2-lane two-way roadways, W8-7 "LOOSE GRAVEL" signs and W13-1 (35) speed advisory signs shall be furnished and placed adjacent to both sides of the traveled way where screenings are being spread on a traffic lane. The first W8-7 sign in each direction shall be placed where traffic first encounters loose screenings, regardless of which lane the screenings are being spread on. The W13-1 (35) signs need not be placed in those areas with posted speed limits of less than 40 MPH. The signs shall be placed at maximum 2,000-foot intervals along each side of the traveled way and at public roads or streets entering the seal coat area as directed by the Engineer.

On multilane roadways (freeways, expressways and multilane conventional highways) where screenings are being spread on a traffic lane, W8-7 "LOOSE GRAVEL" signs and W13-1 (35) speed advisory signs shall be furnished and placed adjacent to the outside edge of the traveled way nearest to the lane being worked on. The first W8-7 sign shall be placed where the screenings begin with respect to the direction of travel on that lane. The W13-1 (35) signs need not be placed in those areas with posted speed limits of less than 40 MPH. The signs shall be placed at maximum 2,000-foot intervals along the edge of traveled way and at on-ramps, public roads or streets entering the seal coat area as directed by the Engineer.

The W8-7 and W13-1 signs shall be maintained in place at each location until final brooming of the seal coat surface at that location is completed. The W8-7 and W13-1 signs shall conform to the provisions for construction area signs in Section 12, "Construction Area Traffic Control Devices." The signs may be set on temporary portable supports with the W13-1 below the W8-7 or on barricades with the W13-1 sign alternating with the W8-7 sign.

In Section 37-1.07 replace the 2nd paragraph with:

Rollers shall be oscillating type pneumatic-tired rollers. A minimum of 2 pneumatic-tired rollers conforming to the provisions in Section 39-3.03 "Spreading and Compacting Equipment," shall be furnished.

In Section 37-1.09 replace the 2nd paragraph with:

The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in applying seal coat, complete in place, including furnishing, placing, maintaining, and removing W8-7 and W13-1 signs, when required, and temporary supports or barricades for the signs, as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.

In Section 37-2.05 replace the 6th paragraph with:

In addition to conforming to the provisions in Section 5-1.10, "Equipment," the identifying number of mixer-spreader trucks shall be at least 2 inches in height, located on the front and rear of the vehicle.

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**SECTION 39 ASPHALT CONCRETE
(Issued 09-16-11)**

**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)[HMA-O], 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, paving mat, paving grid, paving geocomposite grid, or geocomposite strip membrane 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 ± 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^2/s ($\times 10^{-6}$) at 100 °C	D 445	$X \pm 3^a$
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:

^a 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.) ^a	--	3/16
CRM specific gravity ^a	CT 208	1.1 – 1.2
Natural rubber content in high natural CRM (%) ^a	ASTM D 297	40.0 – 48.0

Note:

^a 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 is not a performance specification and only serves to indicate expected trends in asphalt rubber binder properties during binder production. 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 ^a							Limits
	45	60	90	120	240	360	1440	
Cone penetration @ 77 °F, 0.10-mm (ASTM D 217)	X ^b				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:

^a 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).

^b "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.)	CT 205				
One fractured face		90	25	--	90
Two fractured faces		75	--	90	75
Fine aggregate (% min.) (Passing No. 4 sieve and retained on No. 8 sieve.)	CT 205				
One fractured face		70	20	70	90
Los Angeles Rattler (% max.)	CT 211				
Loss at 100 Rev.		12	--	12	12
Loss at 500 Rev.		45	50	40	40
Sand equivalent (min.) ^a	CT 217	47	42	47	--
Fine aggregate angularity (% min.) ^b	CT 234	45	45	45	--
Flat and elongated particles (% max.) by weight @ 5:1)	CT 235	10	10	10	10

Notes:

^a Reported value must be the average of 3 tests from a single sample.

^b 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 ^a	4.0	4.0	Special Provisions
Voids in mineral aggregate (% min.)	LP-2			
No. 4 grading		17.0	17.0	--
3/8" grading		15.0	15.0	--
1/2" grading		14.0	14.0	18.0 – 23.0 ^b
3/4" grading	13.0	13.0	18.0 – 23.0 ^b	
Voids filled with asphalt (%)	LP-3			
No. 4 grading		76.0 – 80.0	76.0 – 80.0	Note d
3/8" grading		73.0 – 76.0	73.0 – 76.0	
1/2" grading		65.0 – 75.0	65.0 – 75.0	
3/4" grading	65.0 – 75.0	65.0 – 75.0		
Dust proportion	LP-4			
No. 4 and 3/8" gradings		0.9 – 2.0	0.9 – 2.0	Note d
1/2" and 3/4" gradings	0.6 – 1.3	0.6 – 1.3		
Stabilometer value (min.) ^c	CT 366			
No. 4 and 3/8" gradings		30	30	--
1/2" and 3/4" gradings	37	35	23	

Notes:

^a 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.

^b Voids in mineral aggregate for RHMA-G must be within this range.

^c 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."

^d 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. Antistripping 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 ± 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 all verification samples and the JMF submittal has been accepted. 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 premix the asphalt binder and asphalt modifier before adding CRM. If you premix asphalt binder and asphalt modifier, asphalt binder must be from 375 to 425 degrees F when you add the 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 425 °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 375 °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
PCC and existing HMA (AC) surfaces	0.03	0.04	0.03
Planed PCC and HMA (AC) surfaces	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
PCC and existing HMA (AC) surfaces	0.05	0.06	0.04
Planed PCC and HMA (AC) surfaces	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.

Asphalt binder must be from 285 °F to 350 °F and below the minimum melting point of the geosynthetic pavement interlayer when applied.

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 total layer thickness is from 0.125 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 ^a	CT 202	1 per 750 tons and any remaining part	JMF ± Tolerance ^b	JMF ± Tolerance ^b	JMF ± Tolerance ^b	JMF ± Tolerance ^b
Sand equivalent (min.) ^c	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 (%) ^{d, e}	Quality control plan	2 per business day (min.)	91 - 97	91 - 97	91 - 97	--
Stabilometer value (min.) ^{c, f} 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, whichever is more	30	30	--	--
			37	35	23	--
Air voids content (%) ^{c, g}	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 ^h	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)	CT 235		Report only	Report only	Report only	Report only
Fine aggregate angularity (% min.)	CT 234		45	45	45	--
Voids filled with asphalt (%) ⁱ 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	--
Voids in mineral aggregate (% min.) ⁱ 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 ^j 18.0 – 23.0 ^j	--
Dust proportion ¹ 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 ₀	12-foot straightedge, must-grind, and PI ₀	12-foot straightedge, must-grind, and PI ₀	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:

^a Determine combined aggregate gradation containing RAP under Laboratory Procedure LP-9.

^b The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

^c Report the average of 3 tests from a single split sample.

^d Required for HMA Type A, Type B, and RHMA-G if the specified paved thickness is at least 0.15 foot.

^e Determine maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

^f 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."

^g 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.

^h For adjusting the plant controller at the HMA plant.

ⁱ Report only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.

^j 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 ^a	CT 202	JMF ± Tolerance ^c	JMF ± Tolerance ^c	JMF ± Tolerance ^c	JMF ± Tolerance ^c			
Sieve						3/4 "	1/2 "	3/8 "
1/2"						X ^b		
3/8"							X	
No. 4								X
No. 8						X	X	X
No. 200	X	X	X					
Sand equivalent (min.) ^d	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 (%) ^{e, f}	CT 375	91 – 97	91 – 97	91 – 97	--			
Stabilometer value (min.) ^{d, g}	CT 366	30 37	30 35	-- 23	-- --			
No. 4 and 3/8" gradings 1/2" and 3/4" gradings								
Air voids content (%) ^{d, h}	CT 367	4 ± 2	4 ± 2	Specification ± 2	--			
Percent of crushed particles Coarse aggregate (% min.)	CT 205	90 75	25 --	-- 90	90 75			
One fractured face Two fractured faces								
Fine aggregate (% min) (Passing No. 4 sieve and retained on No. 8 sieve.)								
One fractured face		70	20	70	90			
Los Angeles Rattler (% max.)	CT 211	12 45	-- 50	12 40	12 40			
Loss at 100 rev. Loss at 500 rev.								
Fine aggregate angularity (% min.)	CT 234	45	45	45	--			
Flat and elongated particles (%, max. by weight @ 5:1)	CT 235	Report only	Report only	Report only	Report only			
Voids filled with asphalt (%) ¹	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	--			
No. 4 grading								
3/8" grading								
1/2" grading								
3/4" grading								
Voids in mineral aggregate (% min.) ⁱ	LP-2	17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0 – 23.0 ^j 18.0 – 23.0 ^j	--			
No. 4 grading								
3/8" grading								
1/2" grading								
3/4" grading								
Dust proportion ¹	LP-4	0.9 – 2.0 0.6 – 1.3	0.9 – 2.0 0.6 – 1.3	Report only	--			
No. 4 and 3/8" gradings 1/2" and 3/4" gradings								
Smoothness	Section	12-foot	12-foot	12-foot	12-foot			

	39-1.12	straightedge, must-grind, and PI ₀	straightedge, must-grind, and PI ₀	straightedge, must-grind, and PI ₀	straightedge 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

^a The Engineer determines combined aggregate gradations containing RAP under Laboratory Procedure LP-9.

^b "X" denotes the sieves the Engineer considers for the specified aggregate gradation.

^c The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

^d The Engineer reports the average of 3 tests from a single split sample.

^e 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."

^f The Engineer determines maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

^g 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."

^h 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.

ⁱ Report only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.

^j 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 ^a	CT 202	JMF ± Tolerance ^b	JMF ± Tolerance ^b	JMF ± Tolerance ^b	JMF ± Tolerance ^b
Sand equivalent (min.) ^c	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.) ^{c, d} 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 (%) ^{c, e}	CT 367	4 ± 2	4 ± 2	Specification ± 2	--
Fine aggregate angularity (% min.)	CT 234	45	45	45	--
Flat and elongated particles (% max. by weight @ 5:1)	CT 235	Report only	Report only	Report only	Report only
Voids filled with asphalt (%) ^f 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.) ^f 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 ^g	
		13.0	13.0	18.0 – 23.0 ^g	
Dust proportion ^f 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 and must-grind	12-foot straightedge and must-grind	12-foot straightedge and must-grind	12-foot straightedge 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

^aThe Engineer determines combined aggregate gradations containing RAP under Laboratory Procedure LP-9.

^bThe tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

^cThe Engineer reports the average of 3 tests from a single split sample.

^dModify 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."

^eThe 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.

^fReport only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.

^g 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	Minimum Atmospheric and Surface Temperatures			
	Atmospheric, ° F		Surface, ° F	
	Unmodified Asphalt Binder	Modified Asphalt Binder ^a	Unmodified Asphalt Binder	Modified Asphalt Binder ^a
< 0.15	55	50	60	55
0.15 – 0.25	45	45	50	50

Note:

^a 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	Minimum Sampling and Testing Frequency	HMA Type			Location of Sampling	Max. Reporting Time Allowance
			A	B	RHMA-G		
Aggregate gradation ^a	CT 202	1 per 750 tons	JMF ± Tolerance ^b	JMF ± Tolerance ^b	JMF ± Tolerance ^b	CT 125	24 hours
Asphalt binder content (%)	CT 379 or 382		JMF ±0.45	JMF ±0.45	JMF ±0.5	Loose Mix Behind Paver See CT 125	
Percent of maximum theoretical density (%) ^{c, d}	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 ^e	CT 226 or CT 370	2 per day during production	--	--	--	Stock-piles or cold feed belts	--
Sand equivalent (min.) ^f	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.) ^{f, g} 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 (%) ^{f, h}	CT 367		4 ± 2	4 ± 2	Specification ± 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 designated 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 45	-- 50	12 40		CT 125
Fine aggregate angularity (% min.)	CT 234			45	45	45		CT 125
Flat and elongated particle (% max. by weight @ 5:1)	CT 235			Report only	Report only	Report only		CT 125
Voids filled with asphalt (%) ⁱ 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.) ⁱ 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 ^j 18.0 – 23.0 ^j	LP-2		
Dust proportion ¹ 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 PI ₀	12-foot straight-edge, must-grind, and PI ₀	12-foot straight-edge, must-grind, and PI ₀	--		
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	

Notes:

^a Determine combined aggregate gradation containing RAP under Laboratory Procedure LP-9.

^b The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

- ^c Required for HMA Type A, Type B, and RHMA-G if the specified paved thickness is at least 0.15 foot.
- ^d Determine maximum theoretical density (California Test 309) at the frequency specified for test maximum density under California Test 375, Part 5 D.
- ^e For adjusting the plant controller at the HMA plant.
- ^f Report the average of 3 tests from a single split sample.
- ^g 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."
- ^h 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.
- ⁱ Report only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.
- ^j 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, QF_C , or an individual quality factor, QF_{QCi} for $i = 3, 4, \text{ or } 5$, is below 0.90 determined under Section 39-4.03F, "Statistical Evaluation," using quality control data
2. An individual quality factor, QF_{QCi} for $i = 1 \text{ or } 2$, is below 0.75 using quality control data
3. Quality characteristics for which a quality factor, QF_{QCi} , is not determined has 2 consecutive 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

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. QC worksheet with updated test results from the HMAPay program
 - 2.2. Test forms with the testers' signatures and Quality Control Manager's initials.
 - 2.3. Inspection forms with the inspectors' signatures and Quality Control Manager's initials.
 - 2.4. A list and explanation of deviations from the specifications or regular practices.
 - 2.5. 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 total paved thickness is less than 0.15 foot
2. Areas where the total 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.

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 (Q_u)

$$Q_u = \frac{USL - \bar{X}}{s}$$

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 _U or P _L	Upper Quality Index Q _U or Lower Quality Index Q _L												
	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_U or Q_L does not correspond to a value in the table, use the next lower value.

2. If Q_U or Q_L are negative values, P_U or P_L is equal to 100 minus the table value for P_U or P_L .

Quality Factor Determination

Determine individual quality factors, QF_{QC_i} , using percent defective = $P_U + P_L$ and:

Quality Factor	Quality Factors												
	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
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_{QC*i*} = 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 α = 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	∞	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				Weight -ing Factor (w)	Test Method	HMA Type		
							A	B	RHMA-G
	Aggregate gradation ^a					CT 202	JMF ± Tolerance ^c		
	Sieve	3/4"	1/2"	3/8"					
1	1/2"	X ^b	--	--	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 (%) ^{d, e}				0.40	CT 375	92 – 96	92 – 96	91 – 96
	Sand equivalent (min.) ^f					CT 217	47	42	47
	Stabilometer value (min.) ^{f, g}					CT 366			
	No. 4 and 3/8" gradings						30	30	--
	1/2" and 3/4" gradings						37	35	23
	Air voids content (%) ^{f, h}					CT 367	4 ± 2	4 ± 2	Specifica-tion ± 2
	Percent of crushed particles coarse aggregate (% min.)					CT 205			
	One fractured face						90	25	--
	Two fractured faces						75	--	90
	Fine aggregate (% min.)								
	(Passing No. 4 sieve and retained on No. 8 sieve.)								
	One fractured face						70	20	70
	HMA moisture content (% max.)					CT 226 or CT 370	1.0	1.0	1.0
	Los Angeles Rattler (% max.)					CT 211			
	Loss at 100 rev.						12	--	12
	Loss at 500 rev.						45	50	40
	Fine aggregate angularity (% min.)					CT 234	45	45	45
	Flat and elongated particle (% max. by weight @ 5:1)					CT 235	Report only	Report only	Report only
	Voids in mineral aggregate (% min.) ⁱ								(Note j)
	No. 4 grading						17.0	17.0	--
	3/8" grading					LP-2	15.0	15.0	--
	1/2" grading						14.0	14.0	18.0 - 23.0
	3/4" grading						13.0	13.0	18.0 - 23.0
	Voids filled with asphalt (%) ⁱ								
	No. 4 grading					LP-3	76.0 - 80.0	76.0 - 80.0	Report only
	3/8" grading						73.0 - 76.0	73.0 - 76.0	
	1/2" grading						65.0 - 75.0	65.0 - 75.0	
	3/4" grading						65.0 - 75.0	65.0 - 75.0	
	Dust proportion ¹					LP-4			
	No. 4 and 3/8" gradings						0.9 - 2.0	0.9 – 2.0	Report only
	1/2" and 3/4" gradings						0.6 - 1.3	0.6 – 1.3	

	Smoothness		Section 39-1.12	12-foot straight-edge, must-grind, and PI ₀	12-foot straight-edge, must-grind, and PI ₀	12-foot straight-edge, must-grind, and PI ₀
	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:

^a The Engineer determines combined aggregate gradations containing RAP under Laboratory Procedure LP-9.

^b "X" denotes the sieves the Engineer considers for the specified aggregate gradation.

^c The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

^d 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."

^e The Engineer determines maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

^f The Engineer reports the average of 3 tests from a single split sample.

^g 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."

^h 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.

ⁱ Report only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.

^j 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 calculates QF_{QC_i} for $i = 1, 2, 3,$ and 4 using quality control data and QF_{QC_i} for $i = 5$ using quality assurance data.

The Engineer stops production and terminates a lot if:

1. The lot's composite quality factor, QF_C , or an individual quality factor, QF_{QC_i} for $i = 3, 4,$ or 5 , is below 0.90 determined under Section 39-4.03F, "Statistical Evaluation"
2. An individual quality factor, QF_{QC_i} for $i = 1$ or 2 , is below 0.75
3. Quality characteristics for which a quality factor, QF_{QC_i} , 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, QF_{QC_i} , 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, QF_{QC_i} , for any quality factor $i = 1$ through 5 or a lot's composite quality factor, QF_C , 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, QF_{QC_i} 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, QF_{QC_5} , 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, QF_C , which is a composite of weighted individual quality factors, QF_{QC_i} , 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, QF_C , is 0.90 or greater
2. Each individual quality factor, QF_{QC_i} for $i = 3, 4,$ and 5 , is 0.90 or greater
3. Each individual quality factor, QF_{QC_i} for $i = 1$ 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.
$WHMATT_i =$	Total tons of waived quality characteristic HMA.
$QF_{QC_i} =$	Running quality factor for the individual quality characteristic. QF_{QC_i} for $i = 1$ through 4 must be from verified Contractor's QC results. QF_{QC_5} 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_{QCi} , 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_{QCi} , must be determined using the referee tests.

For any quality factor, QF_{QCi} , for $i = 1$ through 5, dispute resolution:

1. If the difference between the quality factors for QF_{QCi} 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_{QCi} 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.

13. Epoxy powder coating

40-1.02B Curing Compound Samples

Submit split curing compound samples to the Transportation Laboratory.

40-1.02C Drilled Corings

Submit each core taken for Engineer's acceptance in a plastic bag. Mark each core with a location description.

40-1.02D Independent Third Party Air Content Testing Laboratory

Before testing, submit for the Engineer's approval the name of a laboratory that will test drilled core specimens for air content in cases of dispute.

40-1.02E Dowel Bars

Before placing dowel bars, submit a procedure for identifying transverse contraction joint locations relative to the dowel bars' longitudinal center and a procedure for consolidating concrete around the dowel bars.

40-1.02F Concrete Field Qualification

Submit field qualification data and test reports including:

1. Mixing date
2. Mixing equipment and procedures used
3. Batch volume in cubic yards
4. Type and source of ingredients used
5. Penetration of the concrete
6. Air content of the plastic concrete
7. Age and strength at time of concrete beam testing

Field qualification test reports must be certified with a signature by an official in responsible charge of the laboratory performing the tests.

40-1.02G Frequency Measuring Device (Tachometer)

Submit calibration documentation and operational guidelines for frequency measuring devices for concrete consolidation vibrators.

40-1.02H Manufacturer's Recommendations and Instructions

If used and at least 15 days before delivery to the job site, submit manufacturer's recommendations and instructions for storage and installation of:

1. Threaded tie bar splice couplers
2. Chemical adhesive (drill and bond)
3. Silicone liquid sealant
4. Asphalt rubber liquid sealant
5. Preformed compression seals
6. Joint filler material

40-1.02I Mix Proportions

At least 15 days before starting testing for mix proportions under California Test 559, submit a copy of the AASHTO accreditation for your laboratory determining the mix proportions. At least 30 days before starting field qualification, submit under California Test 559 the proposed concrete mix proportions, the corresponding mix identifications, and laboratory test reports including the modulus of rupture for each trial mixture at 10, 21, 28, and 42 days.

40-1.02J Preformed Compression Seal

Submit the manufacturer's data sheet used to develop the recommended preformed compression seal based on the joint dimensions.

40-1.02K Concrete Pavement Early Age Crack Mitigation System

At least 24 hours before each paving shift, submit:

1. Early age stress and strength predictions
2. Scheduled sawing and curing activities
3. Contingency plan if volunteer cracking occurs

At least 24 hours before paving, meet with the Engineer to review the submittals for the early age crack mitigation system.

During paving, update the system with current weather data obtained from a portable weather station. Before paving concrete pavement with these updates, submit new stress and strength predictions and curing and sawing activity schedules.

40-1.02L Profilograms

Submit profilograms within 5 business days of initial profiling and within 2 business days of profiling corrected sections.

Submit 1 electronic copy of profile information in ".erd" format or other ProVAL compatible format to the Engineer and to:

Smoothness@dot.ca.gov

Submit the original of final profilograms before the Engineer accepts the contract.
Submitted profilograms become the Department's property.

40-1.02M Protecting Concrete Pavement During Cold Weather

Submit a plan for protecting concrete pavement when the average ambient daily temperature is below 40 °F and daytime ambient temperature is less than 50 °F during the initial 72 hours after paving.

40-1.02N Quality Control Charts

Submit updated quality control charts each paving day.

40-1.02O Quality Control Plan

At least 30 days before the start of field qualification, submit a concrete pavement quality control plan (QCP).

40-1.03 QUALITY CONTROL AND ASSURANCE

40-1.03A Contractor Quality Control Plan

Establish, implement, and maintain a QCP for concrete pavement. The QCP must describe the organization and procedures you use to:

1. Control the production process
2. Determine if changes to the production process are needed
3. Implement changes

The QCP must address the elements affecting concrete pavement quality including:

1. Mix proportions
2. Aggregate gradation
3. Materials quality
4. Stockpile management

5. Line and grade control
6. Proportioning
7. Mixing and transportation
8. Placing and consolidation
9. Contraction and construction joints
10. Dowel bar placement, alignment, and anchorage
11. Tie bar placement
12. Modulus of rupture
13. Finishing and curing
14. Surface smoothness
15. Joint sealant and compression seal installation

The QCP must include details of corrective action to be taken if any process is out of control. As a minimum, a process is out of control if any of the following occurs:

1. For fine and coarse aggregate gradation, 2 consecutive running averages of 4 tests are outside the specification limits
2. For fine and coarse aggregates, the moisture content of either aggregate changes by more than 0.5 percentage point from any reading
3. For individual penetration or air content measurements:
 - 3.1. One point falls outside the suspension limit line
 - 3.2. Two points in a row fall outside the action limit line

Stop production and take corrective action for out of control processes except fine and coarse aggregate moisture content or the Engineer rejects subsequent material.

40-1.03B Quality Control Testing

Select random locations and perform sampling and testing in compliance with:

Quality Control Testing		
Test	Frequency	Test Method
Cleanness value	2 per day	CT 227
Sand equivalent	2 per day	CT 217
Aggregate gradation	2 per day	CT 202
Air content (freeze thaw) ^a	1 per hour	CT 504
Air content (non-freeze thaw)	1 per 4 hours	CT 504
Density	1 per 4 hours	CT 518
Penetration	1 per 4 hours	CT 533
Calibration of moisture meter ^{b, c}	1 per day	CT 223 or CT 226

Notes:

^a If air entrainment is specified, make at least 1 air content measurement per hour. If air entrainment is not specified, make at least 1 air content measurement per 4 hours.

^b Make at least 1 measurement of moisture content per week to check the calibration of an electronically actuated moisture meter.

^c Random location sampling and testing is not applicable.

If air entrainment is specified, the testing laboratory and tester must be qualified under the Department's Independent Assurance Manual. The manual is available from the Transportation Laboratory.

40-1.03C Control Charts

Maintain control charts to identify potential problems and assignable causes. Post a copy of each control chart at a location determined by the Engineer.

Individual measurement control charts must use the target values in the mix proportions as indicators of central tendency.

Develop linear control charts for:

1. Cleanness value
2. Sand equivalent
3. Fine and coarse aggregate gradation
4. Air content
5. Penetration

Control charts must include:

1. Contract number
2. Mix proportions
3. Test number
4. Each test parameter
5. Action and suspension limits
6. Specification limits
7. Quality control test results

For fine and coarse aggregate gradation control charts, record the running average of the previous 4 consecutive gradation tests for each sieve and superimpose the specification limits.

For penetration and air content control charts, record the individual measurements and superimpose the following action and suspension limits:

Control Parameter	Individual Measurements	
	Action Limit	Suspension Limit
Penetration, CT 533	1 inch	1-1/2 inch
Air content, CT 504	±1.0 percent	±1.5 percent

40-1.03D Contractor's Laboratory

Use a laboratory that complies with ASTM C 1077 to determine the mix proportions for concrete pavement. The laboratory must have a current AASHTO accreditation for:

1. AASHTO T 97 or ASTM C 78
2. ASTM C 192/C 192M

40-1.03E Joint Sealant and Compression Seal Installation Training

Before installing joint sealant or compression seals, arrange for a representative from the joint sealant or compression seal manufacturer to provide training on the cleaning and preparation of the joint and installing the sealant or seal. Until your personnel and the Department's personnel have been trained, do not install joint sealant or compression seals.

40-1.03F Frequency Measuring Device (Tachometer)

Before each day's concrete pavement placement and at intervals not to exceed 4 hours of production, test and record vibration frequency for concrete consolidation vibrators.

40-1.03G Early Age Concrete Pavement Crack Mitigation System

Develop and implement a system for predicting concrete pavement stresses and strength during the initial 72 hours after paving. The system must include:

1. Subscribing to a weather service to obtain forecasts for wind speed, ambient temperatures, humidity, and cloud cover
2. Portable weather station with anemometer, temperature and humidity sensors, located at the paving site
3. Early age concrete pavement stress and strength prediction computer program

4. Analyzing, monitoring, updating, and reporting the system's predictions

40-1.03H Curing Compound

Sample curing compound from shipping containers at the manufacturer's source of supply. Split the samples.

40-1.03I Concrete Pavement Smoothness

Within 10 days after paving, measure the Profile Index (PI_0) of the concrete pavement surface using a zero (null) blanking band under California Test 526.

For the following concrete pavement areas, the Engineer does not require a profilograph and you must test and correct high points determined by a 12-foot straightedge placed parallel with and perpendicular to the centerline:

1. Horizontal curves with a centerline radius of curvature less than 1,000 feet including concrete pavement within the superelevation transitions of those curves.
2. Exit ramp termini, truck weigh stations, and weigh-in-motion areas
3. Where steep grades and superelevation rates greater than 6 percent are present on:
 - 3.1. Ramps
 - 3.2. Connectors
4. Turn lanes and areas around manholes or drainage transitions
5. Acceleration and deceleration lanes for at-grade intersections
6. Shoulders and miscellaneous gore areas

Use a California Profilograph or equivalent to determine the concrete pavement profile. If the profilograph uses a mechanical recorder, use an electronic scanner to reduce the profilogram.

The profilograph operator must be qualified under the Department's Independent Assurance Manual. The manual is available from the Transportation Laboratory.

40-1.03J Profilograph Test Procedure

Notify the Engineer at least 2 business days before performing profilograph testing. Each day before performing profilograph testing, notify the Engineer of the start location. Perform profilograph testing in the Engineer's presence.

Before starting profilograph testing, remove foreign objects from the concrete pavement surface.

Before starting profilograph testing, calibrate the profilograph in the Engineer's presence. If the Engineer chooses not to be present during profilograph testing, you may perform the testing with the Engineer's written approval. Note the Engineer's absence on the profilogram.

Determine PI_0 values for the final concrete pavement surface of each 0.1-mile section of a traffic lane. Take 2 profiles within each traffic lane, 3 feet from and parallel with the edge of each lane. Each section's PI_0 is the average of the PI_0 values for the measurements within that traffic lane. A section that is less than 0.01 mile and is the result of an interruption to continuous concrete pavement surface must comply with the PI_0 specifications for a full section. Adjust the PI_0 for a partial section to reflect a full section.

Use stationing to locate vertical deviations greater than 0.3 inches. The profilogram stationing must be the same as the project stationing. Note 0.1-mile segments on the profilogram.

Label the profilogram with:

1. Contract number
2. County and route number
3. Stationing
4. Operator's name
5. Test date
6. Test number
7. Traffic direction
8. Traffic lane (numbered from left to right in direction of travel)
9. Test wheel path (left or right in direction of travel)
10. Test direction

11. Paving direction

40-1.03K Smoothness Corrective Action

Correct concrete pavement not complying with the Engineer's acceptance specifications for smoothness by grinding under Section 42-2, "Grinding."

Do not grind before:

1. Ten days after concrete pavement placement
2. The concrete has developed a modulus of rupture of at least 550 psi

Grind the entire lane width. When completed, the lane width must be uniform in texture and appearance. Square the corrected area's start and end normal to the paved surface's centerline.

Retest sections where corrections were made.

40-1.03L Engineer's Acceptance

General

The Engineer accepts concrete pavement based on the Department's testing for the following concrete pavement quality characteristics. A single test represents no more than the quantity specified:

Concrete Pavement Acceptance		
Quality Characteristic	Quantity	Test
28-day modulus of rupture	1,000 cubic yards	CT 523
Thickness	1,200 square yards for primary area measurements	CT 531
Dowel bar placement	700 square yards	Measurement
Tie bar placement	4,000 square yards	Measurement
Coefficient of friction	One day's paving	CT 342
Air content (freeze-thaw) ^a	One day's paving	CT 504

Note:

^a Air content tests must be performed under California Test 504 if air entrainment is specified.

At the Department's option, the Engineer also accepts concrete pavement based on your or the Department's testing for smoothness. A single test represents no more than 0.1 mile.

The Engineer considers other concrete pavement quality characteristics in determining final acceptance. The Engineer's acceptance of modulus of rupture, thickness, dowel bar and tie bar placement, coefficient of friction, smoothness, and air content does not constitute final concrete pavement acceptance.

Modulus of Rupture

The Engineer accepts concrete pavement for modulus of rupture on a lot basis. The minimum modulus of rupture for each lot is 570 psi at 28 days.

For each lot of concrete for concrete pavement:

1. Quantity must not exceed 1,000 cubic yards.
2. Department determines the modulus of rupture of test beams aged 10 days and 28 days.
3. Department calculates the modulus of rupture by averaging the individual test results of 2 beams aged for 28 days.
4. Difference in the individual test results of beams aged 28 days must not exceed 12 percent when tested by Method 1, or 16 percent when tested by Method 2. The Engineer calculates the difference relative to the average of the 2 test results.

The Department provides molds and machines for modulus of rupture acceptance testing. Provide material and labor the Engineer may require.

Concrete Pavement Smoothness

If the Department tests for smoothness, the tests are performed under Section 40-1.03I, "Concrete Pavement Smoothness."

The Engineer accepts concrete pavement for smoothness in compliance with the following:

1. For tangents and horizontal curves having a centerline radius of curvature 2,000 feet or more, the PI_0 must be at most 3 inches per 0.1-mile section.
2. For horizontal curves having a centerline radius of curvature from 1,000 to 2,000 feet including concrete pavement within the superelevation transitions of those curves, the PI_0 must be at most 6 inches per 0.1-mile section.
3. If using a profilograph to measure smoothness, the surface must not have individual high points greater than 0.3 inch.
4. If using a straightedge to measure smoothness, the surface must be within 0.02 foot of the straightedge's lower edge.

Profile index specifications apply to existing pavement within 50 feet of the transverse joint separating new concrete pavement and the existing pavement.

If the Department's profilograph test results do not match yours, the Engineer may order you to recalibrate your profilograph equipment and perform a retest. If your test results are inaccurate due to operator error, the Engineer may disqualify your profilograph operator. If the Engineer determines your test results are inaccurate, the Engineer does not make adjustments to payment or contract time for recalibrating, retesting, and delays.

Concrete Pavement Thickness

The Engineer accepts concrete pavement for thickness based on coring in the primary area, which is the area placed in 1 day for each thickness. Concrete pavement thickness must not be deficient by more than 0.05 foot.

After corrective grinding has been completed, core concrete pavement in the primary area under Section 40-3.16, "Obtaining Drilled Cores," at locations determined by the Engineer and in the Engineer's presence. The core specimen diameter must be 4 inches. To identify the limits of concrete pavement deficient in thickness by more than 0.05 foot, you may divide primary areas into secondary areas. Specifications that may affect concrete pavement thickness such as allowable tolerances for subgrade construction do not change the thickness specified for concrete pavement.

In each primary area, the Engineer measures concrete pavement thickness every 1,200 square yards and any remaining area. The Engineer measures cores under California Test 531 to the nearest 0.01 foot. Core at least 1 foot from existing, contiguous, and parallel concrete pavement not constructed as part of this contract.

You may request the Engineer make additional thickness measurements and use them to determine the average thickness variation. The Engineer determines the locations with random sampling methods.

If each thickness measurement in a primary area is less than 0.05 foot deficient, the Engineer calculates the average thickness deficiency in that primary area. The Engineer uses 0.02 foot for a thickness difference more than 0.02 foot over the specified thickness.

For each thickness measurement in a primary area deficient by more than 0.05 foot, the Engineer determines a secondary area where the thickness deficiency is more than 0.05 foot. The Engineer determines this secondary area by measuring the thickness of each concrete pavement slab adjacent to the measurement found to be more than 0.05 foot deficient. The Engineer continues to measure the thickness until an area that is bound by slabs with thickness deficient by 0.05 foot or less is determined.

Slabs without bar reinforcement are defined as the areas bound by longitudinal and transverse joints and concrete pavement edges. Slabs with bar reinforcement are defined as the areas bound by longitudinal joints and concrete pavement edges and 15-foot lengths. Secondary area thickness measurements in a slab determine that entire slab's thickness.

The Engineer measures the remaining primary area thickness after removing the secondary areas from consideration for determining the average thickness deficiency.

The Engineer determines the slabs to remove and replace.

Required Use of Air-Entraining Admixtures

If air-entraining admixtures are specified, the Engineer may choose to accept concrete pavement for air content based on your air content quality control tests. The Engineer decides to use your air content quality control tests

based on a t -test that determines the difference in the means of your test and the Engineer's verification tests. The Engineer calculates the t -value of the test data 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 your quality control tests (minimum of 2 required)
- n_v = Number of verification tests (minimum of 1 required)
- \bar{X}_c = Mean of your quality control tests
- \bar{X}_v = Mean of the verification tests
- S_p = Pooled standard deviation
(When $n_v = 1$, $S_p = S_c$)
- S_c = Standard deviation of your quality control tests
- S_v = Standard deviation of the verification tests (when $n_v > 1$)

The Engineer compares your quality control test results with the Department's verification test results at a level of significance of $\alpha = 0.01$. The Engineer compares the t -value to t_{crit} , determined from:

t_{crit}	
degrees of freedom ($n_c + n_v - 2$)	t_{crit} (for $\alpha = 0.01$)
1	63.657
2	9.925
3	5.841
4	4.604
5	4.032
6	3.707
7	3.499
8	3.355
9	3.250
10	3.169

If the t -value calculated is less than or equal to t_{crit} , your quality control test results are verified. If the t -value calculated is greater than t_{crit} , quality control test results are not verified.

If your quality control test results are not verified, core at least 3 specimens from concrete pavement under Section 40-3.16, "Obtaining Drilled Cores." The Engineer selects the core locations. Your approved third party independent testing laboratory must test these specimens for air content under ASTM C 457. The Engineer compares these test results with your quality control test results using the t -test method. If your quality control test results are verified based on this comparison, the Engineer uses the quality control test results for acceptance of concrete pavement for air content. If your quality control test results are not verified based on this comparison, the Engineer uses the air content of core specimens determined under ASTM C 457 for acceptance.

Dowel Bar and Tie Bar Placement

The Engineer uses core specimens to evaluate and accept concrete pavement for:

1. Dowel bar placement
2. Tie bar placement
3. Concrete consolidation

Obtain cores under Section 40-3.16, "Obtaining Drilled Cores." The Engineer determines the core locations. Each core must have a nominal diameter of 4 inches. Core each day's paving within 2 business days in compliance with:

1. One test for every 700 square yards of doweled concrete pavement or remaining fraction of that area. Each dowel bar test consists of 2 cores, 1 on each dowel bar end to expose both ends and allow measurement.
2. One test for every 4,000 square yards of concrete pavement with tie bars or remaining fraction of that area

If the tests indicate dowel or tie bars are not placed within the specified tolerances or if there are air voids around the dowel or tie bars, core additional specimens to determine the limits of unacceptable work.

The Engineer determines the slabs to remove and replace.

If the Engineer approves your request, slabs may remain in place with an adjustment in payment for:

1. Dowel bars with centers from ± 2 inches to ± 3 inches from the saw cut of a transverse contraction joint or with deficient concrete consolidation around the dowel bars
2. Tie bars placed outside their specified placement and position or with deficient concrete consolidation around the tie bars

Bar Reinforcing Steel

The Engineer accepts concrete pavement for bar reinforcing steel based on inspection before concrete placement.

Curing Compound

Curing compound sampled from shipping containers from the manufacturer's supply source or from the job site must match the test results for viscosity, nonvolatile content, and pigment content within the specified tolerances listed in the precision and bias statements for the test methods.

40-2 MATERIALS

40-2.01 CONCRETE

40-2.01A General

Concrete must comply with Section 90, "Portland Cement Concrete."

40-2.01B Aggregate

The specifications for reduction in Operating Range and Contract Compliance for cleanness value and sand equivalent specified under Section 90-2.02A, "Coarse Aggregate," and Section 90-2.02B, "Fine Aggregate," do not apply to concrete pavement.

Combined aggregate gradings must comply with Section 90-3, "Aggregate Gradings," and the difference between the percent passing the 3/8-inch sieve and the percent passing the No. 8 sieve must not be less than 16 percent of the total aggregate.

40-2.01C Cementitious Material

Concrete for concrete pavement must contain from 505 pounds to 675 pounds cementitious material per cubic yard. The specifications for reducing cementitious material content in Section 90-4.05, "Optional Use of Chemical Admixtures," do not apply to concrete pavement.

40-2.01D Mix Proportions

Your laboratory determining mix proportions must determine the minimum cementitious materials content or the maximum water to cementitious materials ratio under California Test 559 and:

1. You must make trial mixtures no more than 24 months before field qualification.
2. Modulus of rupture used to determine the minimum cementitious materials content or maximum water to cementitious materials ratio must be 570 psi at 28 days age and 650 psi at 42 days age.

3. Your laboratory must determine an increase in the cementitious materials content or a decrease in the water to cementitious materials ratio from the trial mixtures to ensure concrete pavement complies with the specifications.

If changing an aggregate supply source or the mix proportions, produce a trial batch and field-qualify the new concrete. The Engineer does not adjust contract time for performing sampling, testing, and qualifying new mix proportions or changing an aggregate supply source.

40-2.01E Field Qualification

Proposed mix proportions must be field qualified before you place concrete pavement. Use an American Concrete Institute (ACI) certified "Concrete Laboratory Technician, Grade I" to perform field qualification tests and calculations.

The Engineer accepts field qualification if five beams made and tested under California Test 523 comply with the following:

1. At a minimum, beams are tested at 10, 21, and 28 days of age
2. At your choice of age not later than 28 days, no single beam's modulus of rupture is less than 550 psi and the average modulus of rupture is at least 570 psi

40-2.02 TIE BARS

Tie bars must be one of the following:

1. Epoxy-coated steel reinforcing bar. Bar reinforcing must comply with either ASTM A 615/A 615M, Grade 40 or 60; ASTM A 996/A 996M; or ASTM A 706/A 706M. Epoxy coating must comply with Section 52-1.02B, "Epoxy-coated Reinforcement."
2. Stainless-steel bar. Stainless-steel bar must be descaled, pickled, and polished solid stainless-steel bars UNS Designation S31603 or S31803, Grade 60 under ASTM A 955/A 955M.
3. Low carbon, chromium-steel bar. Low carbon, chromium-steel bar must comply with ASTM A 1035/A 1035M.

Fabricate, sample, and handle epoxy-coated deformed tie bars at the job site under ASTM D 3963/D 3963M and Section 52-1.02B, "Epoxy-coated Reinforcement."

Do not bend epoxy-coated tie bars.

40-2.03 DOWEL BARS

40-2.03A General

Dowel bars must be plain steel bars and one of the following:

1. Epoxy-coated bar. Epoxy bars must comply with ASTM A 615/A 615M, Grade 40 or 60. Epoxy coating must comply with Section 52-1.02B, "Epoxy-coated Reinforcement."
2. Stainless-steel bar. Stainless-steel bars must be descaled, pickled, and polished solid stainless-steel bars, UNS Designation S31603 or S31803, Grade 60 under ASTM A 276/A 276M, and ASTM A 955/A 955M.
3. Low carbon, chromium-steel bars. Low carbon, chromium-steel bars must comply with ASTM A 1035/A 1035M.

Fabricate, sample, and handle epoxy-coated dowel bars at the job site under ASTM D 3963/D 3963M and Section 52-1.02B, "Epoxy-coated Reinforcement," except each sample must be 18 inches long. Sample each load delivered to the job site.

40-2.03B Dowel Bar Lubricant

Dowel bar lubricant must be petroleum paraffin-based or curing compound. Paraffin-based lubricant must be Dayton Superior DSC BB-Coat or Valvoline Tectyl 506 or an approved equal and must be factory-applied. Curing

compound must be curing compound (3) under Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

40-2.04 CURING COMPOUND

Curing compound must be curing compound (1) or (2) with white pigment under Section 90-7.01B, "Curing Compound Method."

Reflectance must be at least 60 percent when tested under ASTM E 1347.

40-2.05 CHEMICAL ADHESIVE (DRILL AND BOND)

Chemical adhesive for drilling and bonding dowels and tie bars must be prequalified. A list of prequalified chemical adhesives is available on the Department's Materials Engineering and Testing Services website. The prequalified list indicates the appropriate chemical adhesive system for the concrete temperature and installation conditions.

Each chemical adhesive system must clearly and permanently show the manufacturer's name, model number of the system, manufacturing date, lot number, shelf life or expiration date, and current International Conference of Building Officials (ICBO) Evaluation Report number. Each chemical adhesive carton must include the manufacturer's recommended installation procedures and warning or precautions required by State or Federal laws and regulations.

40-2.06 DOWEL AND TIE BAR BASKETS

Dowel and tie bar baskets must be:

1. Minimum W10 wire size number under ASTM A 82/A 82M
2. Either U-frame or A-frame shape
3. Welded under Section 7.4 of ASTM A 185/A 185M

You may epoxy-coat dowel and tie bar baskets under Section 52-1.02B, "Epoxy-coated Reinforcement," and the following:

1. Epoxy-coated dowel and tie bar baskets must comply with ASTM A 884/A 884M, Class A, Type 1 or Type 2.
2. Epoxy-coating under ASTM A 884/ A 884M, Class A, Type 2 must be purple or gray.

If tie bars or dowel bars are stainless steel, tie bar and dowel bar baskets must be stainless steel.

If tie bars or dowel bars are low carbon, chromuim-steel, tie bar or dowel bar baskets must comply with ASTM A 1035/A 1035M.

Handle epoxy-coated dowel and tie-bar baskets at the manufacturing plant and job site under ASTM D 3963/D 3963M and Section 52-1.02B, "Epoxy-coated Reinforcement."

Fasteners must be driven fasteners under ASTM F 1667. Fasteners on lean concrete base or asphalt concrete must have a minimum shank diameter of 3/16 inch and a minimum shank length of 2 1/2 inches. For asphalt treated permeable base or cement treated permeable base, the shank diameter must be at least 3/16 inch and the shank length must be at least 5 inches.

Fasteners, clips, and washers must have a minimum 0.2-mil thick zinc coating applied either by electroplating or galvanizing.

40-2.07 BACKER RODS

Backer rods must be Type 1 under ASTM D 5249. Backer rod diameter must be at least 25 percent greater than the sawcut joint width. Backer rod material must be expanded, crosslinked, closed-cell polyethylene foam. No bond or adverse reaction may occur between the backer rod and sealant.

40-2.08 JOINT FILLER MATERIAL

Joint filler for isolation joints must be preformed expansion joint filler for concrete (bituminous type) under ASTM D 994.

40-2.09 HYDRAULIC CEMENT GROUT (NON-SHRINK)

Hydraulic cement grout (non-shrink) must comply with ASTM C 1107/ C 1107M. Use clean, uniform, rounded aggregate filler to extend the grout. Aggregate filler must not exceed 60 percent of the grout mass or the maximum recommended by the manufacturer, whichever is less. Aggregate filler moisture content must not exceed 0.5 percent. Aggregate filler must comply with:

Sieve Size	Percentage Passing
1/2-inch	100
3/8-inch	85 - 100
No. 4	10 - 30
No. 8	0 - 10
No. 16	0 - 5

40-2.10 BAR REINFORCEMENT

Bar reinforcement must comply with Section 52, "Reinforcement."

40-2.11 JOINT SEALANT

40-2.11A General

Do not use hot-pour sealant that will melt the backer rod.

40-2.11B Silicone Joint Sealant

Silicone joint sealant must be low modulus furnished in a one-part silicone formulation. Do not use acid cure sealant. Silicone joint sealant must be compatible with the surface it is applied to and comply with:

Silicone Joint Sealant

Property	Test Method	Specification
Tensile stress, 150% elongation, 7-day cure at 77 °F ± 2 °F and 45% to 55% R.H. °	ASTM D 412 (Die C)	45 psi max.
Flow at 77 °F ± °F	ASTM C 639 a	Must not flow from channel
Extrusion Rate at 77 °F ± 2 °F	ASTM C 603 b	3 to 9 oz/min.
Specific Gravity	ASTM D 792 Method A	1.01 to 1.51
Durometer Hardness, at 0 °F, Shore A, cured 7 days at 77 °F ±2 °F	ASTM C 661	10 to 25
Ozone and Ultraviolet Resistance, after 5,000 hours	ASTM C 793	No chalking, cracking or bond loss
Tack-free at 77 °F ±2 °F and 45% to 55% R.H.°	ASTM C 679	Less than 75 minutes
Elongation, 7 day cure at 77 °F ±2 °F and 45% to 55% R.H. °	ASTM D 412 (Die C)	500 percent min.
Set to Touch, at 77 °F ±2 °F and 45% to 55% R.H. °	ASTM D 1640	Less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.
Bond, to concrete mortar-concrete briquettes, air cured 7 days at 77 °F ±2 °F	AASHTO T 132 °	50 psi min.
Movement Capability and Adhesion, 100% extension at 0 °F after, air cured 7 days at 77 °F ±2 °F , and followed by 7 days in water at 77 °F ±2 °F	ASTM C 719d	No adhesive or cohesive failure after 5 cycles

Notes:

^a ASTM C 639 Modified (15 percent slope channel A).

^b ASTM C 603, through 0.12-inch opening at 50 psi.

^c Mold briquettes under AASHTO T 132, saw in half and bond with a 0.60-inch maximum thickness of sealant and test under AASHTO T 132. Briquettes must be dried to constant mass at 212 °F ±10 °F.

^d Prepare 12" x 1" x 3" concrete blocks under ASTM C 719. Use a sawed face for bond surface. Seal 2 inches of block leaving 0.50 inch on each end of specimen unsealed. The depth of sealant must be 0.40 inch and the width 0.50 inch.

^e R.H. equals relative humidity.

After application, silicone joint sealant must not flow on grades up to 15 percent.

40-2.11C Asphalt Rubber Joint Sealant

Asphalt rubber joint sealant must:

1. Be a mixture of paving asphalt and ground rubber containing not less than 22 percent ground rubber by weight. One hundred percent of ground rubber must pass a No. 8 sieve. Ground rubber must be vulcanized or a combination of vulcanized and devulcanized materials.
2. Comply with ASTM D 6690, Type II except:
 - 2.1. The cone penetration requirement must not exceed 120 at 77 F, 5 ounces, 5 seconds.
 - 2.2. The resilience requirement must be a minimum 50 percent recovery when tested at 77 F.
3. Have a Ring and Ball softening point of 135 °F minimum when tested under AASHTO T 53.
4. Be capable of being melted and applied to cracks and joints at temperatures below 400 °F.
5. Not be applied when the concrete pavement surface temperature is below 50 °F.

40-2.11D Preformed Compression Joint Seals

Preformed compression joint seals must comply with ASTM D 2628. Lubricant adhesive used with the seals must comply with ASTM D 2835. Preformed compression joint seals must have 5 or 6 cells, except seals for Type A2 and Type B joints may have 4 cells. Install preformed compression joint seals in compliance with the

manufacturer's recommendations. Show evidence that the seals are compressed from 40 to 50 percent for the joint width and depth.

40-2.12 WATER

Water for core drilling must be from a local domestic water supply. Water must not contain:

1. More than 1,000 parts per million of chlorides as CL
2. More than 1,300 parts per million of sulfates as SO₄
3. Impurities in a quantity to cause concrete discoloration or surface etching

40-3 CONSTRUCTION

40-3.01 WATER SUPPLY

Before placing concrete pavement, develop enough water supply for the work.

40-3.02 SUBGRADE PREPARATION

Immediately before placing concrete, the subgrade to receive concrete pavement must be:

1. In compliance with the specified compaction and elevation tolerances
2. Free of loose and extraneous material
3. Uniformly moist, but free of standing or flowing water
4. Excavated for thickened parts of concrete pavement end anchors with no disturbed compaction outside the end anchor dimensions

If cement treated permeable base is specified, cover the base surface with asphaltic emulsion before placing concrete pavement. Apply the asphaltic emulsion uniformly at a rate of 0.1 gallons per square yard. Asphaltic emulsion must comply with anionic slow-setting type, SS1h grade in Section 94, "Asphaltic Emulsions." Repair damaged asphaltic emulsion before placing concrete pavement.

40-3.03 PROPORTIONING

Proportion aggregate and bulk cementitious materials under Section 90-5, "Proportioning."

40-3.04 PLACING CONCRETE

40-3.04A General

Place concrete pavement with stationary side forms or slip-form paving equipment.

Place consecutive concrete loads within 30 minutes of each other. Construct a transverse construction joint when concrete placement is interrupted by more than 30 minutes. The transverse construction joint must coincide with the next contraction joint location, or you must remove fresh concrete pavement to the preceding transverse joint location.

Place concrete pavement in full slab widths separated by construction joints or monolithically in multiples of full lane widths with a longitudinal contraction joint at each traffic lane line.

Do not retemper concrete.

If the concrete pavement surface width is constructed as specified, you may construct concrete pavement sides on a batter not flatter than 6:1 (vertical:horizontal).

40-3.04B Concrete Pavement Widening

If concrete pavement is placed adjacent to existing pavement not constructed as part of the contract, grind the existing concrete pavement lane or shoulder adjacent to the new concrete pavement. Perform the grinding before new concrete pavement is placed. The new concrete pavement must match the elevation of the existing concrete pavement after grinding. Grind existing concrete pavement under Section 42-2, "Grinding," except profile index must comply with the pavement smoothness specifications in Section 40-1.03, "Quality Control and Assurance."

Use paving equipment with padded crawler tracks or rubber-tired wheels on the existing concrete pavement with enough offset to avoid breaking or cracking the existing concrete pavement's edge.

40-3.04C Concrete Pavement Transition Panel

For concrete pavement placed in a transition panel, texture the surface with a drag strip of burlap, a broom, or a spring steel tine device that produces scoring in the finished surface. The scoring must be either parallel with or transverse to the centerline. For the method you choose, texture at the time that produces the coarsest texture.

40-3.04D Stationary Side Form Construction

Stationary side forms must be straight and without defects including warps, bends, and indentations. Side forms must be metal except at end closures and transverse construction joints where other materials may be used.

You may build up side forms by attaching a section to the top or bottom. If attached to the top of metal forms, the attached section must be metal.

The side form's base width must be at least 80 percent of the specified concrete pavement thickness.

Side forms including interlocking connections with adjoining forms must be rigid enough to prevent springing from subgrading and paving equipment and concrete pressure.

Construct subgrade to final grade before placing side forms. Side forms must bear fully on the foundation throughout their length and base width. Place side forms to the specified grade and alignment of the finished concrete pavement's edge. Support side forms during concrete placing, compacting, and finishing.

After subgrade work is complete and immediately before placing concrete, true side forms and set to line and grade for a distance that avoids delays due to form adjustment.

Clean and oil side forms before each use.

Side forms must remain in place for at least 1 day after placing concrete and until the concrete pavement edge no longer requires protection from the forms.

Spread, screed, shape, and consolidate concrete with 1 or more machines. The machine must uniformly distribute and consolidate the concrete. The machines must operate to place the concrete pavement to the specified cross section with minimal hand work.

Consolidate the concrete without segregation. If vibrators are used:

1. The vibration rate must be at least 3,500 cycles per minute for surface vibrators and 5,000 cycles per minute for internal vibrators
2. Amplitude of vibration must cause perceptible concrete surface movement at least 1 foot from the vibrating element
3. Use a calibrated tachometer for measuring frequency of vibration
4. Vibrators must not rest on side forms or new concrete pavement
5. Power to vibrators must automatically cease when forward or backward motion of the paving machine is stopped

Use high-frequency internal vibrators within 15 minutes of depositing concrete on the subgrade to uniformly consolidate the concrete across the paving width including adjacent to forms. Do not use vibrators to shift the mass of concrete.

40-3.04E Slip-Form Construction

If slip-form construction is used, spread, screed, shape, and consolidate concrete to the specified cross section with slip-form machines and minimal hand work. Slip-form paving machines must be equipped with traveling side forms and must not segregate the concrete.

Do not deviate from the specified concrete pavement alignment by more than 0.1 foot.

Slip-form paving machines must use high frequency internal vibrators to consolidate concrete. You may mount vibrators with their axes parallel or normal to the concrete pavement alignment. If mounted with axes parallel to the concrete pavement alignment, space vibrators no more than 2.5 feet measured center to center. If mounted with axes normal to the concrete pavement alignment, space the vibrators with a maximum 0.5-foot lateral clearance between individual vibrators.

Each vibrator must have a vibration rate from 5,000 cycles per minute to 8,000 cycles per minute. The amplitude of vibration must cause perceptible concrete surface movement at least 1 foot from the vibrating element. Use a calibrated tachometer to measure frequency of vibration.

40-3.05 TIE BAR PLACEMENT

Place tie bars perpendicular to the longitudinal concrete pavement joint and parallel with the concrete pavement surface at mid-slab depth with the following tolerances:

1. Not less than 1/2-inch below the saw cut depth of joints
2. With not less than 2 inches clearance from the concrete pavement's surface and bottom
3. With embedment length tolerance of ± 2 inches

Install tie bars at longitudinal joints by 1 of the following methods:

1. Drill concrete and bond tie bars with chemical adhesive in compliance with the manufacturer's instructions. Clean and dry drilled holes before placing chemical adhesive and tie bars. After inserting tie bars into chemical adhesive, support the bars to prevent movement during curing. If the Engineer rejects a tie bar installation, cut the tie bar flush with the joint face and coat the exposed end of the tie bar with chemical adhesive under Section 40-2, "Materials." Offset new holes 3 inches horizontally from the rejected hole's center.
2. Insert tie bars into plastic slip-formed concrete before finishing. Inserted tie bars must have full contact between the bar and the concrete. If tie bars are inserted through the plastic concrete surface, eliminate evidence of the insertion by reworking the concrete over the tie bars.
3. Use threaded tie bar splice couplers fabricated from deformed bar reinforcement free of external welding or machining.
4. Use tie bar baskets. Anchor baskets at least 200 feet in advance of the concrete placement activity. If you request a waiver, describe the construction limitations or restricted access preventing the advanced anchoring. After the baskets are anchored and before the concrete is placed, cut and remove temporary spacer wires and demonstrate the tie bars do not move from their specified depth and alignment during concrete placement. Use fasteners to anchor tie bar baskets.

If tie bars are not placed correctly, stop paving activities until you demonstrate to the Engineer correction of the cause.

40-3.06 DOWEL BAR PLACEMENT

Center dowel bars within 2 inches in the longitudinal direction on transverse contraction joints or construction joints.

If using curing compound as lubricant, apply the curing compound to dowels in 2 separate applications. Lubricate each dowel bar entirely with bond breaker before placement. The last application must be applied not more than 8 hours before placing the dowel bars. Apply each curing compound application at a rate of 1 gallon per 150 square feet.

If dowel bars are placed by mechanical insertion, eliminate evidence of the insertion by reworking the concrete over the dowel bars. If drilling and bonding dowel bars at construction joints, use a grout retention ring.

If using dowel bar baskets, anchor them with fasteners.

Use at least 10 fasteners for basket sections greater than 12 feet and less than or equal to 16 feet. Baskets must be anchored at least 200 feet in advance of the concrete placement activity unless the Engineer approves your waiver request. If requesting a waiver, describe the construction limitations or restricted access preventing the advanced anchoring. After the baskets are anchored and before the concrete is placed, cut and remove temporary spacer wires and demonstrate the dowel bars do not move from their specified depth and alignment during concrete placement.

Place dowel bars in compliance with:

Dowel Bar Tolerances

Dimension	Tolerance
Horizontal offset	±1 inch
Longitudinal translation	±2 inches
Horizontal skew	3/8 inch, max
Vertical skew	3/8 inch, max
Vertical depth	<p>The minimum distance below the concrete pavement surface must be:</p> <p align="center">$DB = d/3 + 1/2$ inch</p> <p>where: DB = vertical distance in inches, measured from concrete pavement surface to any point along the top of dowel bar d = concrete pavement thickness in inches</p> <p>The maximum distance below the depth shown on the plans must be 0.05 foot.</p>

If dowel bars are not placed correctly, stop paving activities until you demonstrate to the Engineer correction of the cause.

Remove and replace the concrete pavement 3 feet on either side of a joint with a rejected dowel bar.

40-3.07 BAR REINFORCEMENT

Place bar reinforcement under Section 52, "Reinforcement." Bar reinforcement must be more than 1/2 inch below the saw cut depth at concrete pavement joints.

40-3.08 JOINTS

40-3.08A General

Concrete pavement joints consist of:

1. Longitudinal and transverse construction joints
2. Longitudinal and transverse contraction joints
3. Isolation joints

Construction joints must be normal to the concrete pavement surface.

Until contract acceptance and except for joint filler material, keep joints free of foreign material including soil, gravel, concrete, or asphalt mix.

Volunteer cracks are cracks not coincident with constructed joints.

Repair concrete pavement damaged during joint construction under Section 40-3.17B, "Repair of Spalls, Raveling, and Tearing."

Do not bend tie bars or reinforcement in existing concrete pavement joints.

40-3.08B Construction Joints

Construction joints form where fresh concrete is placed against hardened concrete, existing pavements, or structures.

Before placing concrete at construction joints, apply a curing compound under Section 90-7.01B, "Curing Compound Method," to the vertical surface of existing or hardened concrete and allow it to dry.

Use a metal or wooden bulkhead to form transverse construction joints. If dowel bars are specified, the bulkhead must allow dowel bar installation.

40-3.08C Contraction Joints

In multilane monolithic concrete pavement, use the sawing method to construct longitudinal contraction joints. Construct transverse contraction joints by the sawing method.

Construct transverse contraction joints within 1 foot of their specified spacing. If a slab length of less than 5 feet would be formed, adjust the transverse contraction joint spacing.

Construct transverse contraction joints across the full concrete pavement width regardless of the number or types of longitudinal joints crossed. In areas of converging and diverging pavements, space transverse contraction joints so their alignment is continuous across the full width where converging and diverging pavements are contiguous. Longitudinal contraction joints must be parallel with the concrete pavement centerline. Transverse and longitudinal contraction joints must not deviate by more than 0.1 foot from either side of a 12-foot straight line, except for longitudinal joints parallel to a curving centerline.

40-3.08D Isolation Joints

Construct isolation joints by saw cutting a minimum 1/8-inch width to full concrete pavement depth at the existing concrete pavement's edge and removing the concrete to expose a flat vertical surface. Before placing concrete, secure joint filler material that prevents new concrete from adhering to the existing concrete face.

Dispose of concrete saw cutting residue under Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way."

40-3.08E Sawing Method

The sawing method is cutting a groove in the concrete pavement with a power driven concrete saw. Grooves for longitudinal and transverse contraction joints must be the minimum width possible for the type of saw used. If necessary, the top of the joint must be sawn wider to provide space for joint sealant. Immediately wash slurry from the joint with water under 100 psi maximum pressure.

Saw longitudinal and transverse contraction joints before volunteer cracking occurs and after the concrete is hard enough to saw without spalling, raveling, or tearing.

To keep foreign material out of grooves before joint sealant or compression seal installation, you may use joint filler in sawed contraction joints. Joint filler must not react adversely with the concrete or cause concrete pavement damage. After sawing and washing a joint, install joint filler material that keeps moisture in the adjacent concrete during the 72 hours after paving. If you install joint filler material, the specifications for spraying the sawed joint with additional curing compound under Section 40-3.13, "Curing," do not apply. If using absorptive filler material, moisten the filler immediately before or after installation.

40-3.09 JOINT SEALANT AND COMPRESSION SEAL INSTALLATION

40-3.09A General

At least 7 days after concrete pavement placement and not more than 4 hours before installing joint sealant or compression seal materials, use dry sand blasting and other methods to clean the joint walls of objectionable material such as soil, asphalt, curing compound, paint, and rust. The maximum sand blasting nozzle diameter must be 1/4 inch. The minimum pressure must be 90 psi. Sand blast each side of the joint at least once, in at least 2 separate passes. Hold the nozzle at an angle to the joint from 1 to 2 inches from the concrete pavement. Using a vacuum, collect sand, dust, and loose material at least 2 inches on each side of the joint. Remove surface moisture and dampness at the joints with compressed air that may be moderately hot.

Before you install joint sealant or compression seal, the joint wall must be free of moisture, residue, or film.

If grinding or grooving over or adjacent to sealed joints, remove joint sealant or compression seal materials and dispose of them under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way." After grinding or grooving, replace the joint sealant or compression seal materials.

40-3.09B Liquid Sealant

Do not install liquid sealant in construction joints.

Install backer rods when the concrete pavement temperature is above the air dew point and when the air temperature is at least 40 °F.

Install liquid sealant immediately after installing the backer rod. Install sealant using a mechanical device with a nozzle shaped to introduce the sealant from inside the joint. Extrude sealant evenly and with continuous contact

with the joint walls. Recess the sealant surface after placement. Remove excess sealant from the concrete pavement surface.

Do not allow traffic over sealed joints until the sealant is set.

40-3.09C Preformed Compression Seal

Do not install preformed compression seal in construction or isolation joints.

Install longitudinal seals before transverse seals. Longitudinal seals must be continuous except at intersections with transverse seals. Install transverse seals in 1 continuous piece for the entire transverse length of concrete pavement. With a sharp instrument, cut across the longitudinal seal at the intersection with transverse construction joints. If the longitudinal seal does not relax enough to properly install the transverse seal, trim the longitudinal seal to form a tight seal between the 2 joints.

Use a machine specifically designed for preformed compression seal installation. The machine must install the seal:

1. To the specified depth
2. To make continuous contact with the joint walls
3. Without cutting, nicking, or twisting the seal
4. With less than 4 percent stretch

Lay a length of preformed compression seal material cut to the exact length of the pavement joint to be sealed. The Engineer measures this length. After you install the length of preformed compression joint sealant, the Engineer measures the excess amount of material at the joint end. The Engineer divides the excess amount length by the original measured length to determine the percentage of stretch.

40-3.10 SHOULDER RUMBLE STRIP

If specified, construct shoulder rumble strips by rolling or grinding indentations in new concrete pavement.

Select the method and equipment for constructing ground-in indentations.

Do not construct shoulder rumble strips on structures or approach slabs.

Construct rumble strips within 2 inches of the specified alignment. Roller or grinding equipment must be equipped with a sighting device enabling the operator to maintain the rumble strip alignment.

Indentations must not vary from the specified dimensions by more than 1/16 inch in depth or more than 10 percent in length and width.

The Engineer orders grinding or removal and replacement of noncompliant rumble strips to bring them within specified tolerances. Ground surface areas must be neat and uniform in appearance.

The grinding equipment must be equipped with a vacuum attachment to remove residue.

Dispose of removed material under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way."

40-3.11 PRELIMINARY FINISHING

40-3.11A General

Preliminary finishing must produce a smooth and true-to-grade finish. After preliminary finishing, mark each day's concrete pavement with a stamp. The stamp must be approved by the Engineer before paving starts. The stamp must be approximately 1' x 2' in size. The stamp must form a uniform mark from 1/8 to 1/4 inch deep. Locate the mark 20 feet ± 5 feet from the transverse construction joint formed at each day's start of paving and 1 foot ± 0.25 foot from the concrete pavement's outside edge. The stamp mark must show the month, day, and year of placement and the station of the transverse construction joint. Orient the stamp mark so it can be read from the concrete pavement's outside edge.

Do not apply more water to the concrete pavement surface than can evaporate before float finishing and texturing are completed.

Allow enough time to complete finishing activities during daylight. Work may continue after daylight if the Engineer approves lighting you provide.

40-3.11B Stationary Side Form Finishing

If stationary side form construction is used, give the concrete a preliminary finish by the machine float method or the hand method.

If using the machine float method:

1. Use self-propelled machine floats.
2. Determine the number of machine floats required to perform the work at a rate equal to the concrete delivery rate. When the time from concrete placement to machine float finishing exceeds 30 minutes, stop concrete delivery. When machine floats are in proper position, you may resume concrete delivery and paving.
3. Machine floats must run on side forms or adjacent concrete pavement lanes. If running on adjacent concrete pavement, protect the adjacent concrete pavement surface under Section 40-3.15, "Protecting Concrete Pavement."
4. Floats must be hardwood, steel, or steel-shod wood. Floats must be equipped with devices that adjust the under side to a true flat surface.

If using the hand method, finish concrete smooth and true to grade with manually operated floats or powered finishing machines.

40-3.11C Slip-Form Finishing

If slip-form construction is used, the slip-form paver must give the concrete pavement a preliminary finish. You may supplement the slip-form paver with machine floats.

Before the concrete hardens, correct concrete pavement edge slump in excess of 0.02 foot exclusive of edge rounding.

40-3.12 FINAL FINISHING

After completing preliminary finishing, round the edges of the initial paving widths to a 0.04-foot radius. Round transverse and longitudinal construction joints to a 0.02-foot radius.

Before curing, texture the pavement. Perform initial texturing with a burlap drag or broom device that produces striations parallel to the centerline. Perform final texturing with a steel-tined device that produces grooves parallel with the centerline.

Construct longitudinal grooves with a self-propelled machine designed specifically for grooving and texturing concrete pavement. The machine must have tracks to maintain constant speed, provide traction, and maintain accurate tracking along the pavement surface. The machine must have a single row of rectangular spring steel tines. The tines must be from 3/32 to 1/8 inch wide, on 3/4-inch centers, and must have enough length, thickness, and resilience to form grooves approximately 3/16 inch wide. The machine must have horizontal and vertical controls. The machine must apply constant down pressure on the pavement surface during texturing. The machines must not cause ravel.

Construct grooves over the entire pavement width in a single pass except do not construct grooves 3 inches from the concrete pavement edges and longitudinal joints. Final texture must be uniform and smooth. Use a guide to properly align the grooves. Grooves must be parallel and aligned to the pavement edge across the pavement width. Grooves must be from 1/8 to 3/16 inch deep after concrete has hardened.

For irregular areas and areas inaccessible to the grooving machine, you may hand-construct grooves in compliance with the hand method under Section 40-3.11B, "Stationary Side Form Finishing." Hand-constructed grooves must comply with the specifications for machine-constructed grooves.

Initial and final texturing must produce a coefficient of friction of at least 0.30 when tested under California Test 342. Notify the Engineer when the concrete pavement is scheduled to be opened to traffic. Allow at least 25 days for the Department to test for coefficient of friction from the later of:

1. Seven days after concrete placement
2. When the concrete pavement has attained a modulus of rupture of 550 psi

Do not open the concrete pavement to traffic unless the coefficient of friction is at least 0.30.

Correct concrete pavement not complying with the Engineer's acceptance criteria for coefficient of friction by grooving or grinding under Section 42, "Groove and Grind Pavement."

Do not grind before:

1. Ten days after concrete pavement placement

2. Concrete has developed a modulus of rupture of at least 550 psi

Before opening to traffic, allow at least 25 days for the Department to retest sections for coefficient of friction after corrections are made.

40-3.13 CURING

Cure the concrete pavement's exposed area with waterproof membrane or curing compound (1) or (2) under Section 90-7.01, "Methods of Curing." When side forms are removed within 72 hours of the start of curing, also cure the concrete pavement edges.

If curing compound is used, apply it with mechanical sprayers. Reapply curing compound to sawcuts and disturbed areas.

40-3.14 EARLY USE OF CONCRETE PAVEMENT

If requesting early use of concrete pavement:

1. Furnish molds and machines for modulus of rupture testing
2. Sample concrete
3. Fabricate beam specimens
4. Test for modulus of rupture under California Test 523

When you request early use, concrete pavement must have a modulus of rupture of at least 350 psi. Protect concrete pavement under Section 40-3.15, "Protecting Concrete Pavement."

40-3.15 PROTECTING CONCRETE PAVEMENT

Protect concrete pavement under Section 90-8, "Protecting Concrete."

Maintain the concrete pavement temperature at not less than 40 °F for the initial 72 hours.

Protect the concrete pavement surface from activities that cause damage and reduce texture and coefficient of friction. Do not allow soil, gravel, petroleum products, concrete, or asphalt mixes on the concrete pavement surface.

Construct crossings for traffic convenience. If the Engineer approves your request, you may use Type III portland cement in the concrete for crossings. Do not open crossings until the Department determines by California Test 523 the concrete pavement's modulus of rupture is at least 550 psi.

Do not open concrete pavement to traffic or use equipment on the concrete pavement for 10 days after paving nor before the concrete has attained a modulus of rupture of 550 psi except:

1. If the equipment is for sawing contraction joints
2. If the Engineer approves your request, one side of paving equipment's tracks may be on the concrete pavement after a modulus of rupture of 350 psi has been attained, provided:
 - 2.1. Unit pressure exerted on the concrete pavement by the paver does not exceed 20 psi
 - 2.2. You change the paving equipment tracks to prevent damage or the paving equipment tracks travel on protective material such as planks
 - 2.3. No part of the track is closer than 1 foot from the concrete pavement's edge

If concrete pavement damage including visible cracking occurs, stop operating paving equipment on the concrete pavement and repair the damage.

40-3.16 OBTAINING DRILLED CORES

Drill concrete pavement cores under ASTM C 42/ C 42M. Core drilling equipment must use diamond impregnated bits.

Clean, dry, and fill core holes with hydraulic cement grout (non-shrink) or pavement concrete. Coat the core hole walls with epoxy under the specifications for epoxy adhesive for bonding new concrete to old concrete in Section 95, "Epoxy." The backfill must match the adjacent concrete pavement surface elevation and texture.

Do not allow residue from core drilling to fall on traffic, flow across shoulders or lanes occupied by traffic, or flow into drainage facilities including gutters.

40-3.17 REPAIR, REMOVAL, AND REPLACEMENT

40-3.17A General

Working cracks are full-depth cracks essentially parallel to a planned contraction joint beneath which a contraction crack has not formed. If the Engineer orders, take 4-inch nominal diameter cores on designated cracks under Section 40-3.16, "Obtaining Drilled Cores."

40-3.17B Repair of Spalls, Raveling, and Tearing

Before concrete pavement is open to traffic, repair spalls, raveling, and tearing in sawed joints. Make repairs in compliance with the following:

1. Saw a rectangular area with a diamond-impregnated blade at least 2 inches deep.
2. Remove unsound and damaged concrete between the saw cut and the joint and to the saw cut's depth. Do not use a pneumatic hammer heavier than 15 pounds. Do not damage concrete pavement to remain in place.
3. Dispose of removed concrete pavement under Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way."
4. Clean the repair area's exposed surfaces with high pressure abrasive water blasting. Further clean and dry the exposed surfaces with compressed air free of moisture and oil.
5. Apply epoxy as specified for epoxy resin adhesive for bonding new concrete to old concrete under Section 95, "Epoxy." Apply the epoxy with a stiff bristle brush.
6. Apply a portland cement concrete or mortar patch immediately following the epoxy application. Install an insert to prevent bonding of the sides of planned joints.

Repair spalls if they are:

1. Deeper than 0.05 foot
2. Wider than 0.04 foot
3. Longer than 0.3 foot

40-3.17C Route and Seal Working Cracks

Treat working cracks within 0.5 foot of either side of a planned contraction joint in compliance with the following:

1. Route and seal the crack with epoxy resin in compliance with the following:
 - 1.1. Use a powered rotary router mounted on wheels, with a vertical shaft and a routing spindle that casters as it moves along the crack
 - 1.2. Form a reservoir 3/4 inch deep by 3/8 inch wide in the crack
 - 1.3. Use equipment that does not cause raveling or spalling
 - 1.4. Place liquid sealant
2. Treat the contraction joint adjacent to the working crack in compliance with the following:
 - 2.1. Use epoxy resin under ASTM C 881/C 881M, Type IV, Grade 2 for Type B joints and secondary saw cuts for Type A1 and Type A2 joints
 - 2.2. Pressure inject epoxy resin under ASTM C 881/C881M, Type IV, Grade 1 for narrow saw cuts including initial saw cuts for Type A1 and Type A2 joints

If a working crack intersects a contraction joint, route and seal the working crack and seal the contraction joint as specified for installing liquid sealant under Section 40-3.09, "Joint Seal and Joint Sealant Installation."

40-3.17D Removal and Replacement of Slabs

As specified, remove and replace slabs or partial slabs for:

1. Insufficient thickness
2. Dowel bar misalignment
3. Working cracks more than 0.5 foot from a planned contraction joint

40-4 MEASUREMENT AND PAYMENT

40-4.01 MEASUREMENT

The contract item for concrete pavement as designated in the Verified Bid Item List is measured by the cubic yard. The Engineer calculates the pay quantity volume based on the plan dimensions. The Engineer does not measure concrete pavement placed outside those dimensions unless it was ordered by the Engineer.

The contract items for sealing joints as designated in the Verified Bid Item List are measured by the linear foot. Sealing joints are measured from field measurements for each type of sealed joint.

The contract item for shoulder rumble strips is measured by the station along each shoulder on which the rumble strips are constructed without deductions for gaps between indentations.

40-4.02 PAYMENT

The contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the concrete pavement, complete in place including bar reinforcement, tie bars, dowel bars, anchors, and fasteners, as shown on the plans and as specified in these specifications and the special provisions, and as directed by the Engineer.

The Engineer adjusts payment for each primary area deficient in average thickness in compliance with the following:

Average Thickness Deficiency (foot)	Deficiency Adjustment (\$/yd ²)
0.01	0.90
0.02	2.30
0.03	4.10
0.04	6.40
0.05	9.11

If the average thickness deficiency is less than 0.01 foot, the Engineer does not adjust payment for thickness deficiency. If the average thickness deficiency is more than 0.01 foot, the Engineer rounds to the nearest 0.01 foot and uses the adjustment table.

Full compensation for core drilling and backfilling the cores ordered by the Engineer for measuring concrete pavement thickness and determining full-depth cracks is included in the contract price paid per cubic yard for concrete pavement as designated in the Engineer's Estimate and no additional compensation will be allowed therefor. The Department does not pay for additional concrete pavement thickness measurements requested by the Contractor.

The Department does not pay for the portion of concrete that penetrates treated permeable base.

Full compensation for the quality control plan is included in the contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List and no separate payment will be made therefor.

Full compensation for furnishing and applying asphaltic emulsion on cement treated permeable base is included in the contract price paid per cubic yard for concrete pavement as designated in the Engineer's Estimate and no separate payment will be made therefor.

Full compensation for repairing joints is included in the contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List and no separate payment will be made therefor.

Full compensation for furnishing, calibrating, and operating profilograph equipment for Profile Index, for submitting profilograms, and for performing corrective work is included in the contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List and no separate payment will be made therefor.

Full compensation for grooving and grinding for final finishing is included in the contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List and no separate payment will be made therefor.

Full compensation for removing and replacing joint material for grooving and grinding is included in the contract price per cubic yard for concrete pavement as designated in the Verified Bid Item List and no separate payment will be made therefor.

Full compensation for removing and replacing slabs is included in the contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List and no separate payment will be made therefor.

Full compensation for drilling holes and bonding tie bars with chemical adhesive is included in the contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List and no additional compensation will be allowed therefor.

Full compensation for repairing damage caused by operating paving equipment on new concrete pavement is included in the contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List and no separate payment will be made therefor.

The material and work necessary for the construction of crossings for public convenience, and their subsequent removal and disposal, will be paid for at the contract prices for the items of work involved and if there are no contract items for the work involved, payment for concrete pavement crossings will be made by extra work as specified in Section 4-1.03D, "Extra Work."

The Department will reduce payments to the Contractor by \$56.12 per square yard for concrete pavement slabs allowed to remain in place represented by cores indicating dowel bars placed with their centers from ±2 inches to ±3 inches from the saw cut of a transverse contraction joint

The Engineer will calculate the reduced payment using the slab dimensions adjacent to and inclusive of the joints with misplaced dowel bars. This reduced payment is in addition to other specified payment reductions.

The Department will reduce payments to the Contractor by \$59.56 per square yard for concrete pavement allowed to remain in place represented by cores indicating either of the following:

- 1. Tie bars placed outside their specified placement and position tolerances
- 2. Bar reinforcement placed outside their specified placement and position tolerances

The Engineer will calculate the reduced payment using the slab dimensions adjacent to and inclusive of the joints with misplaced tie bars. This reduced payment is in addition to other specified payment reductions.

Full compensation for core drilling for checking dowel or tie bar alignment and backfilling the cores is included in the contract price paid per cubic yard for concrete pavement as designated in the Engineer's Estimate and no additional compensation will be allowed therefor.

If the initial cores show that dowel bars or tie bars are out of tolerance for alignment and the Engineer orders additional dowel or tie bar coring, full compensation for drilling the additional cores is included in the contract price paid per cubic yard for concrete pavement as designated in the Verified Bid Item List and no additional compensation will be allowed therefor.

If the initial cores show that dowel bars or tie bars are within alignment tolerances and the Engineer orders more dowel or tie bar coring, the additional cores will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

The Department will not pay for additional coring to check dowel or tie bar alignment you request.

Full compensation for performing profilograph tests, furnishing the profilograms and electronic files to the Engineer, and for performing corrective work is included in the contract price paid per cubic yard for the type of concrete pavement as designated in the Verified Bid Item List and no additional compensation will be allowed therefor.

The contract prices paid per linear foot for seal pavement joint, seal isolation joint, and seal longitudinal isolation joint include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing pavement joints and sealing isolation joints, complete in place, as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.

The contract price paid per station for shoulder rumble strip includes full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the rumble strip complete in place, as shown on the plans, as specified in these Standard Specifications and as directed by the Engineer.

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SECTION 41 PAVEMENT SUBSEALING AND JACKING
(Issued 01-05-07)

In Section 41-1.02 replace the 2nd and 3rd paragraphs with:

Cement for grout shall be Type II portland cement conforming to the provisions in Section 90-2.01A, "Cement."

Fly ash shall conform to the requirements in AASHTO Designation: M 295 for either Class C or for Class F. The brand of fly ash used in the work shall conform to the provisions for approval of admixture brands in Section 90-4.03, "Admixture Approval."

In Section 41-1.02 replace the 5th paragraph with:

Chemical admixtures and calcium chloride may be used. Chemical admixtures in the grout mix shall conform to the provisions in Section 90-4, "Admixtures." Calcium chloride shall conform to ASTM Designation: D 98.

^^

SECTION 42 GROOVE AND GRIND PAVEMENT
(Issued 05-15-09)

In Section 42-2.02 replace the 3rd paragraph with:

Existing portland cement concrete pavement not constructed as part of the project shall be ground as follows:

Grinding shall be performed so that the pavement surface on both sides of all transverse joints and cracks has essentially the same depth of texture and does not vary from a true plane enough to permit a 0.006-foot thick shim 0.25-foot wide to pass under a 3-foot straightedge adjacent to either side of the joint or crack when the straightedge is laid on the pavement parallel to centerline with its midpoint at the joint or crack. After grinding has been completed, the pavement shall conform to the straightedge and profile requirements specified in Section 40-1.03, "Quality Control and Assurance."

Abnormally depressed areas due to subsidence or other localized causes will be excluded from testing with the profilograph and 12-foot straightedge specified in Section 40-1.03. The accumulated total of the excluded areas shall not exceed 5 percent of the total area to be ground. Profilograph testing shall end 25 feet prior to excluded areas and shall resume 25 feet following the excluded areas.

In Section 42-2.03 replace the 2nd paragraph with:

Replacement concrete paving shall conform to the provisions in Section 40, "Concrete Pavement." Replacement pavement may be spread and shaped by any suitable powered finishing machines, supplemented by handwork as necessary. Consolidation of the concrete shall be by means of high-frequency internal vibrators within 15 minutes after the concrete is deposited on the subgrade. Vibrating shall be done with care and in such manner to assure adequate consolidation adjacent to forms and uniformly across the full paving width. Use of vibrators for extensive shifting of the mass of concrete will not be permitted. Methods of spreading, shaping and compacting that result in segregation, voids or rock pockets shall be discontinued, and the Contractor shall adopt methods which will produce dense homogeneous pavement conforming to the required cross section. Finishing may be performed by hand method, as specified in Section 40-3.11B, "Stationary Side Form Finishing."

^^

SECTION 49 PILING

(Issued 12-19-08)

In Section 49-1.03 replace the 4th paragraph with:

Modification to the specified installation methods and specified pile tip elevation will not be considered at locations where settlement, tension demands, or lateral load demands control design pile tip elevations or when the plans state that specified pile tip elevation shall not be revised.

In Section 49-1.03 in the 6th paragraph, replace the 1st sentence with:

Indicator compression pile load testing shall conform to the requirements in ASTM Designation: D 1143-81.

In Section 49-1.03 in the 7th paragraph, replace the 1st sentence with:

Indicator tension pile load testing shall conform to the requirements in ASTM Designation: D 3689-90.

In Section 49-1.03 replace the 9th paragraph with:

The Contractor shall furnish piling of sufficient length to obtain the specified tip elevation shown on the plans or specified in the special provisions.

In Section 49-1.04 replace the 6th paragraph with:

The Contractor may use additional cementitious material in the concrete for the load test and anchor piles.

In Section 49-6.01 replace the 1st paragraph with:

The length of timber, steel, and precast prestressed concrete piles, and of cast-in-place concrete piles consisting of driven shells filled with concrete, shall be measured along the longest side, from the tip elevation shown on the plans to the plane of pile cut-off.

In Section 49-6.02 add:

When pile tips are revised by the Engineer for timber, steel, and precast prestressed concrete piles, and for cast-in-place concrete piles consisting of driven shells filled with concrete, the additional length required, including all materials, equipment, and labor for furnishing, splicing, and installing the piling, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

^^

SECTION 50 PRESTRESSING CONCRETE

(Issued 06-05-09)

In Section 50-1.05 replace the 1st paragraph with:

Prestressing steel shall be high-tensile wire conforming to the requirements in ASTM Designation: A 421, including Supplement I; high-tensile seven-wire strand conforming to the requirements in ASTM Designation: A 416; or uncoated deformed (Type II) high-strength steel bars conforming to the requirements in ASTM Designation: A 722, including all supplementary requirements. The maximum weight requirement of ASTM Designation: A 722 will not apply.

In Section 50-1.05 in the 3rd paragraph, delete item A.

In Section 50-1.07 replace the 2nd paragraph with:

Ducts shall be fabricated with either welded or interlocked seams. Galvanizing of the welded seam will not be required. Ducts shall have sufficient strength to maintain their correct alignment during placing of concrete. Joints between sections of duct shall be positive metallic connections which do not result in angle changes at the joints. Waterproof tape shall be used at the connections. Ducts shall be bent without crimping or flattening. Transition couplings connecting the ducts to anchoring devices shall be either ferrous metal or polyolefin. Ferrous metal transition couplings need not be galvanized.

In Section 50-1.07 replace the 7th paragraph with:

All ducts with a total length of 400 feet or more shall be vented. Vents shall be placed at intervals of not more than 400 feet and shall be located within 6 feet of every high point in the duct profile. Vents shall be 1/2 inch minimum diameter standard pipe or suitable plastic pipe. Connections to ducts shall be made with metallic or plastic structural fasteners. Plastic components, if selected, shall not react with the concrete or enhance corrosion of the prestressing steel and shall be free of water soluble chlorides. The vents shall be mortar tight, taped as necessary, and shall provide means for injection of grout through the vents and for sealing the vents. Ends of vents shall be removed one inch below the roadway surface after grouting has been completed.

In Section 50-1.08 in the 11th paragraph, replace item B with:

- B. When the concrete is designated by class or cementitious material content, either the concrete compressive strength shall have reached the strength shown on the plans at the time of stressing or at least 28 days shall have elapsed since the last concrete to be prestressed has been placed, whichever occurs first.

In Section 50-1.09 replace the 2nd and 3rd paragraphs with:

Grout shall consist of cement and water and may contain an admixture if approved by the Engineer. Cement shall conform to the provisions in Section 90-2.01A, "Cement."

In Section 50-1.11 replace the 1st paragraph with:

No separate payment will be made for pretensioning precast concrete members. Payment for pretensioning precast concrete members shall be considered as included in the contract price paid for furnish precast members as provided for in Section 51, "Concrete Structures."

^^

SECTION 51 CONCRETE STRUCTURES

(Issued 08-05-11)

In Section 51-1.05 in the 11th paragraph, replace the 1st sentence with:

Form panels for exposed surfaces shall be furnished and placed in uniform widths of not less than 3 feet and in uniform lengths of not less than 6 feet, except at the end of continuously formed surfaces where the final panel length required is less than 6 feet.

In Section 51-1.06A(3) in the 1st paragraph, replace items E and F with:

- E. When timber members are used to brace falsework bents which are located adjacent to roadways or railroads, all connections for the timber bracing shall be of the bolted type using 5/8-inch diameter or larger bolts or coil rod with a root diameter equal to that of the shank of a 5/8-inch diameter bolt.
- F. Falsework member clearances must be at least those shown in the following table:

Falsework member	Clearances	
	To railing members, barriers, and anchored temporary railings	To unanchored temporary railings
Footings	0'-3"	2'-0"
Piles	1'-0"	2'-9"
Other members	2'-0"	2'-9"

In Section 51-1.06C in the 11th paragraph, replace the 1st sentence with:

Falsework for box culverts and other structures with decks lower than the roadway pavement and with span lengths of 14 feet or less shall not be released until the last placed concrete has attained a compressive strength of 1,600 psi, provided that curing of the concrete is not interrupted.

In Section 51-1.11 replace the 6th paragraph with:

Construction methods and equipment employed by the Contractor shall conform to the provisions in Section 7-1.02, "Load Limitations."

In Section 51-1.12D replace the 4th paragraph with:

Expanded polystyrene shall be a commercially available polystyrene board. Expanded polystyrene shall have a minimum flexural strength of 35 psi determined in conformance with the requirements in ASTM Designation: C 203 and a compressive yield strength of between 16 and 40 psi at 5 percent compression. Surfaces of expanded polystyrene against which concrete is placed shall be faced with hardboard. Hardboard shall be 1/8 inch minimum thickness, conforming to ANSI A135.4, any class. Other facing materials may be used provided they furnish equivalent protection. Boards shall be held in place by nails, waterproof adhesive, or other means approved by the Engineer.

In Section 51-1.12F replace the 3rd paragraph with:

Type A and AL joint seals shall consist of a groove in the concrete that is filled with field-mixed silicone sealant.

In Section 51-1.12F in the 6th paragraph, replace the table with:

Movement Rating (MR)	Seal Type
MR ≤ 1 inch	Type A or Type B
1 inch < MR ≤ 2 inches	Type B
2 inches < MR ≤ 4 inches	Joint Seal Assembly (Strip Seal)
MR > 4 inches	Joint Seal Assembly (Modular Unit) or Seismic Joint

In Section 51-1.12F(3)(a) replace the 1st and 2nd paragraphs with:

The sealant must consist of a 2-component silicone sealant that will withstand up to ±50 percent movement. Silicone sealants must be tested under California Test 435 and must comply with the following:

Specification	Requirement
Modulus at 150 percent elongation	8-75 psi
Recovery	21/32 inch max.
Notch Test	Notched or loss of bond 1/4 inch, max.
Water Resistance	Notched or loss of bond 1/4 inch, max.
Ultraviolet Exposure 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:

HMWM Resin		
Property	Requirement	Test Method
Volatile Content *	30 percent, maximum	ASTM D 2369
Viscosity *	25 cP, maximum, (Brookfield RVT with UL adaptor, 50 RPM at 77°F)	ASTM D 2196
Specific Gravity *	0.90 minimum, at 77°F	ASTM D 1475
Flash Point *	180°F, minimum	ASTM D 3278
Vapor Pressure *	1.0 mm Hg, maximum, at 77°F	ASTM D 323
Tack-free Time	400 minutes, maximum, at 25°C	Specimens prepared per California Test 551
PCC Saturated Surface-Dry Bond Strength	3.5 MPa, minimum at 24 hours and 21 ± 1°C	California Test 551

*Test must be performed before adding initiator.

Sand for abrasive sand finish must:

1. Be commercial quality dry blast sand
2. Have at least 95 percent pass the No. 8 sieve and at least 95 percent retained on the No. 20 sieve when tested under California Test 205

Absorbent material must be diatomaceous earth, abrasive blast dust, or substitute recommended by the HMWM resin supplier and approved by the Engineer.

51-1.17A(4) Construction

HMWM resin system applied by machine must be:

1. Combined in volumetric streams of promoted resin to initiated resin by static in-line mixers
2. Applied without atomization

HMWM resin system may be applied manually. Limit the quantity of resin mixed for manual application to 5 gallons at a time.

Prepare the area to be treated by abrasive blasting. Curing compound, surface contaminants, and foreign material must be removed from the bridge deck surface. Sweep the deck surface clean after abrasive blasting and blow loose material from cracks using high-pressure air.

The deck surface must be dry when abrasive blast cleaning is performed. When abrasive blast cleaning within 10 feet of public traffic, remove dust and residue from abrasive blast cleaning using a vacuum attachment operating concurrently with blasting equipment. If the deck surface becomes contaminated before placing HMWM, abrasive blast clean the contaminated area and sweep the deck clean.

The deck must be dry before applying HMWM resin. The concrete surface must be at least 50 degrees F and at most 100 degrees F. Relative humidity must be expected to be at most 85 percent during the work shift.

Thoroughly mix all components of the HMWM resin system. Apply HMWM resin to the deck surface within 5 minutes of mixing at approximately 90 sq ft per gallon. The Engineer determines the exact application rate. The resin gel time must be between 40 and 90 minutes. HMWM resin that thickens during application is rejected.

Spread the HMWM resin system uniformly. Completely cover surfaces to be treated and fill all cracks. Redistribute excess resin using squeegees or brooms within 10 minutes of application. For textured or grooved deck surfaces, excess resin must be removed from the texture indentations.

Apply the abrasive sand finish of at least 2 pounds per square yard or until saturation as determined by the Engineer no sooner than 20 minutes after applying resin. Apply absorbent material before opening lane to traffic. Remove excess sand and absorbent material by vacuuming or power sweeping.

Traffic or equipment will be allowed on the overlay after the Engineer has determined:

- 1. The treated deck surface is tack free and non-oily
- 2. The sand cover adheres and resists brushing by hand
- 3. Excess sand and absorbent material has been removed
- 4. No material will be tracked beyond limits of treatment by traffic

In Section 51-1.18C replace the 2nd paragraph with:

When Class 2 surface finish (gun finish) is specified, ordinary surface finish shall first be completed. The concrete surfaces shall then be abrasive blasted to a rough texture and thoroughly washed down with water. While the washed surfaces are damp, but not wet, a finish coating of machine applied mortar, approximately 1/4 inch thick, shall be applied in not less than 2 passes. The coating shall be pneumatically applied and shall consist of either (1) sand, cementitious material, and water mechanically mixed prior to its introduction to the nozzle, or (2) premixed sand and cementitious material to which water is added prior to its expulsion from the nozzle. The use of admixtures shall be subject to the approval of the Engineer as provided in Section 90, "Portland Cement Concrete." Unless otherwise specified, supplementary cementitious materials will not be required. The proportion of cementitious material to sand shall be not less than one to 4, unless otherwise directed by the Engineer. Sand shall be of a grading suitable for the purpose intended. The machines shall be operated and the coating shall be applied in conformance with standard practice. The coating shall be firmly bonded to the concrete surfaces on which it is applied.

In Section 51-1.18C replace the 5th paragraph with:

When surfaces to be finished are in pedestrian undercrossings, the sand shall be silica sand and the cementitious material shall be standard white portland cement.

In Section 51-1.23 add:

Full compensation for deck crack treatment, including the public safety plan, shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge, and no additional compensation will be allowed therefor.

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SECTION 52 REINFORCEMENT

(Issued 06-05-09)

In Section 52-1.02(B) between the 3rd and 4th paragraphs, add:

The epoxy powder coating shall be selected from the Department's Pre-Qualified Products List.

In Section 52-1.02(B) replace the 14th paragraph with:

Except for lap splices, splices for epoxy-coated reinforcement shall be coated with a corrosion protection covering that is selected from the Department's Pre-Qualified Products List. The covering shall be installed in accordance with the manufacturer's recommendations.

In Section 52-1.07 in the 11th paragraph, replace the table with:

Height Zone (H) (Feet above ground)	Wind Pressure Value (psf)
$H \leq 30$	20
$30 < H \leq 50$	25
$50 < H \leq 100$	30
$H > 100$	35

In Section 52-1.08B(1) replace the 1st paragraph with:

Mechanical splices to be used in the work shall be selected from the Department's Pre-Qualified Products List.

In Section 52-1.08B(1) in the 2nd paragraph, replace the table with:

Reinforcing Bar Number	Total Slip
4	0.020-inch
5	0.020-inch
6	0.020-inch
7	0.028-inch
8	0.028-inch
9	0.028-inch
10	0.036-inch
11	0.036-inch
14	0.048-inch
18	0.060-inch

In Section 52-1.08B(1), in the 6th paragraph, delete item C.

In Section 52-1.08B(2) in the 6th paragraph, replace the subparagraph with:

The minimum preheat and interpass temperatures shall be 400° F for Grade 40 bars and 600° F for Grade 60 bars. Immediately after completing the welding, at least 6 inches of the bar on each side of the splice shall be covered by an insulated wrapping to control the rate of cooling. The insulated wrapping shall remain in place until the bar has cooled below 200° F.

Replace Section 52-1.08B(3) with:

52-1.08B(3) Resistance Butt Welds

Shop produced resistance butt welds shall be produced by a fabricator who is selected from the Department's Pre-Qualified Products List.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of splice material. The Certificate of Compliance shall include heat number, lot number and mill certificates.

In Section 52-1.08C replace the 3rd paragraph with:

Testing on prequalification and production sample splices shall be performed at an approved independent testing laboratory. The laboratory shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors who will provide other services or materials for the project.

The independent testing laboratory shall be selected from the Department's Pre-Qualified Products List.

In Section 52-1.08C replace the 5th paragraph with:

Prequalification and production sample splices and testing shall conform to California Test 670 and these specifications.

In Section 52-1.08C delete the 6th paragraph.

In Section 52-1.08C replace the 8th paragraph with:

Each sample splice, as defined herein, shall be identified as representing either a prequalification or production test sample splice.

In Section 52-1.08C in the 10th paragraph, delete the last sentence.

Replace Section 52-1.08C(1) with:

52-1.08C(1) Splice Prequalification Report

Before using any service splices or ultimate butt splices in the work, the Contractor shall submit a Splice Prequalification Report. The report shall include the following:

- A. A copy of the manufacturer's product literature giving complete data on the splice material and installation procedures.
- B. Names of the operators who will be performing the splicing.
- C. Descriptions of the positions, locations, equipment, and procedures that will be used in the work.
- D. Certifications from the fabricator for prequalification of operators and procedures based on sample tests performed no more than 2 years before submitting the report. Each operator shall be certified by performing 2 sample splices for each bar size of each splice type that the operator will be performing in the work. For deformation-dependent types of splice devices, each operator shall be certified by performing 2 additional samples for each bar size and deformation pattern that will be used in the work.

Prequalification sample splices shall be tested by an approved independent testing laboratory and shall conform to the appropriate production test criteria and slip requirements specified herein. When epoxy-coated reinforcement is required, resistance butt welded sample splices shall have the weld flash removed by the same procedure as will be used in the work, before coating and testing. The Splice Prequalification Report shall include the certified test results for all prequalification sample splices.

The QCM shall review and approve the Splice Prequalification Report before submitting it to the Engineer for approval. The Contractor shall allow 2 weeks for the review and approval of a complete report before performing any service splicing or ultimate butt splicing in the work.

In Section 52-1.08C(2)(a) replace the 1st, 2nd, 3rd, 4th, and 5th paragraphs with:

Production tests shall be performed by an approved independent testing laboratory for all service splices used in the work. A production test shall consist of testing 4 sample splices prepared for each lot of completed splices. The samples shall be prepared by the Contractor using the same splice material, position, operators, location, and equipment, and following the same procedure as used in the work.

At least one week before testing, the Contractor shall notify the Engineer in writing of the date and location where the testing of the samples will be performed.

The 4 samples from each production test shall be securely bundled together and identified with a completed sample identification card before shipment to the approved independent testing laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 samples of splices shall not be tested.

Before performing any tensile tests on production test sample splices, one of the 4 samples shall be tested for, and shall conform to, the requirements for total slip in Section 52-1.08B(1), "Mechanical Splices." Should this sample not meet the total slip requirements, one retest, in which the 3 remaining samples are tested for total slip, will be allowed. Should any of the 3 remaining samples not conform to the total slip requirements, all splices in the lot represented by this production test will be rejected.

If 3 or more sample splices from a production test conform to the provisions in this Section 52-1.08C(2), "Service Splice Test Criteria," all splices in the lot represented by this production test will be considered acceptable.

Replace Section 52-1.08C(2)(b) with:

52-1.08C(2)(b) Quality Assurance Test Requirements for Service Splices

In addition to the required production tests, the Contractor shall concurrently prepare 4 service quality assurance sample splices for:

- A. The first production test performed.
- B. One of every 5 subsequent production tests, or fraction thereof, randomly selected by the Engineer.

These service quality assurance sample splices shall be prepared in the same manner as specified herein for service production sample splices.

The service quality assurance sample splices shall be shipped to the Transportation Laboratory for quality assurance testing. Each set of 4 sample splices shall be securely bundled together and identified by location and contract number with weatherproof markings before shipment. Bundles containing fewer than 4 samples of splices will not be tested. Sample splices not accompanied by the supporting documentation required in Section 52-1.08B(1), "Mechanical Splices," for mechanical splices, or in Section 52-1.08B(3), "Resistance Butt Welds," for resistance butt welds, will not be tested.

Quality assurance testing will be performed in conformance with the requirements for service production sample splices in Section 52-1.08C(2)(a), "Production Test Requirements for Service Splices."

Replace Section 52-1.08C(3) with:

52-1.08C(3) Ultimate Butt Splice Test Criteria

Ultimate production and quality assurance sample splices shall be tensile tested in conformance with the requirements described in ASTM Designation: A 370 and California Test 670.

Each sample splice shall be identified as representing a prequalification, production, or quality assurance sample splice.

The portion of hoop reinforcing bar, removed to obtain a sample splice, shall be replaced using a prequalified ultimate mechanical butt splice, or the hoop shall be replaced in kind.

Reinforcing bars, other than hoops, from which sample splices are removed, shall be repaired using ultimate mechanical butt splices conforming to the provisions in Section 52-1.08C(1), "Splice Prequalification Report," or the bars shall be replaced in kind. These bars shall be repaired or replaced such that no splices are located in any "No Splice Zone" shown on the plans.

Ultimate production and quality assurance sample splices shall rupture either: 1) in the reinforcing bar but outside of the affected zone, provided that the sample splice has visible necking or 2) anywhere, provided that the sample splice has achieved the strain requirement for necking.

When tested in conformance with the requirements in California Test 670, "Necking (Option I)," the visible necking shall be such that there is a visible decrease in the sample's cross-sectional area at the point of rupture.

When tested in conformance with the requirements in California Test 670, "Necking (Option II)," the strain requirement for necking shall be such that the largest measured strain is not less than 6 percent for No. 11 and larger bars, or not less than 9 percent for No. 10 and smaller bars.

The affected zone is the portion of the reinforcing bar where any properties of the bar, including the physical, metallurgical, or material characteristics, have been altered by fabrication or installation of the splice. The weld and one inch adjacent to the weld will be considered part of the affected zone.

In Section 52-1.08C(3)(a) replace the 1st paragraph with:

Production tests shall be performed for all ultimate butt splices used in the work. A production test shall consist of testing 4 sample splices removed from each lot of completed splices.

In Section 52-1.08C(3)(a) replace the 3rd paragraph with:

After notification has been received, the Engineer will randomly select the 4 sample splices to be removed from the lot and place tamper-proof markings or seals on them. These ultimate production sample splices shall be removed by the Contractor, and tested by an approved independent testing laboratory.

In Section 52-1.08(C)(3)(a) replace the 5th, 6th, and 7th paragraphs with:

A sample splice will be rejected if a tamper-proof marking or seal is disturbed before testing.

The 4 sample splices from each production test shall be securely bundled together and identified with a completed sample identification card before shipment to the approved independent testing laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 sample splices shall not be tested.

Before performing any tensile tests on production test sample splices, one of the 4 sample splices shall be tested for, and shall conform to, the requirements for total slip in Section 52-1.08B(1), "Mechanical Splices." Should this sample splice not meet these requirements, one retest, in which the 3 remaining sample splices are tested for total slip, will be allowed. Should any of the 3 remaining sample splices not conform to these requirements, all splices in the lot represented by this production test will be rejected.

Replace Section 52-1.08C(3)(b) with:

52-1.08C(3)(b) Quality Assurance Test Requirements for Ultimate Butt Splices

In addition to the required production tests, the Contractor shall concurrently prepare 4 ultimate quality assurance sample splices for:

- A. The first production test performed.
- B. One of every 5 subsequent production tests, or fraction thereof, randomly selected by the Engineer.

These ultimate quality assurance sample splices shall be prepared in the same manner as specified herein for ultimate production sample splices.

The ultimate quality assurance sample splices shall be shipped to the Transportation Laboratory for quality assurance testing. Each set of 4 sample splices shall be securely bundled together and identified by location and contract number with weatherproof markings before shipment. Bundles containing fewer than 4 samples of splices will not be tested. Sample splices not accompanied by the supporting documentation required in Section 52-1.08B(1), "Mechanical Splices," for mechanical splices, or in Section 52-1.08B(3), "Resistance Butt Welds," for resistance butt welds, will not be tested.

Quality assurance testing will be performed in conformance with the requirements for ultimate production sample splices in Section 52-1.08C(3)(a), "Production Test Requirements for Ultimate Butt Splices."

Replace Section 52-1.08D with:

A Production Test Report for all testing performed on each lot shall be prepared by the approved independent testing laboratory performing the testing and submitted to the QCM for review and approval. The report shall be signed by an engineer who represents the laboratory and is registered as a Civil Engineer in the State of California. The report shall include, as a minimum, the following information for each test: contract number, bridge number, lot number and location, bar size, type of splice, length of mechanical splice, length of test specimen, physical condition of test sample splice, any notable defects, total measured slip, and ultimate tensile strength of each splice. In addition, the report shall include location of visible necking area and largest measured strain for ultimate butt splices.

The QCM must review, approve, and forward each Production Test Report to the Engineer for review before the splices represented by the report are encased in concrete. The Engineer will have 3 working days to review each

Production Test Report and respond in writing after a complete report has been received. Should the Contractor elect to encase any splices before receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection.

Quality assurance test results for each bundle of 4 samples of splices will be reported in writing to the Contractor within 3 working days after receipt of the bundle by the Transportation Laboratory. In the event that more than one bundle is received on the same day, 2 additional working days shall be allowed for providing test results for each additional bundle received. A test report will be made for each bundle received. Should the Contractor elect to encase splices before receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection.

^^

SECTION 53 SHOTCRETE

(Issued 11-02-07)

In Section 53-1.01 replace the 3rd paragraph with:

The dry-mix process shall consist of delivering dry mixed aggregate and cementitious material pneumatically or mechanically to the nozzle body and adding water and mixing the materials in the nozzle body. The wet-mix process shall consist of delivering mixed aggregate, cement, and water pneumatically to the nozzle and adding any admixture at the nozzle.

In Section 53-1.02 replace the 1st through 4th paragraphs with:

Cementitious material, fine aggregate, and mixing water shall conform to the provisions in Section 90, "Portland Cement Concrete."

Shotcrete to be mixed and applied by the dry-mix process shall consist of one part cementitious material to not more than 4.5 parts fine aggregate, thoroughly mixed in a dry state before being charged into the machine. Measurement may be either by volume or by weight. The fine aggregate shall contain not more than 6 percent moisture by weight.

Shotcrete to be mixed and applied by the wet-mix process shall consist of cementitious material, fine aggregate, and water and shall contain not less than 632 pounds of cementitious material per cubic yard. A maximum of 30 percent pea gravel may be substituted for fine aggregate. The maximum size of pea gravel shall be such that 100 percent passes the 1/2 inch screen and at least 90 percent passes the 3/8 inch screen.

Admixtures may be added to shotcrete and shall conform to the provisions in Section 90-4, "Admixtures."

In Section 53-1.04 in the 3rd paragraph, replace item C with:

- C. Aggregate and cementitious material that have been mixed for more than 45 minutes shall not be used unless otherwise permitted by the Engineer.

Replace Section 53-1.07 with:

53-1.07 MEASUREMENT

Quantities of shotcrete will be measured by the cubic yard computed from measurements, along the slope, of actual areas placed and the theoretical thickness shown on the plans. The Department does not pay for shotcrete placed outside the dimensions shown on the plans or to fill low foundation.

In Section 55-2.01 replace the table in the 5th paragraph with:

Material Conforming to ASTM Designation: A 709/A 709M	CVN Impact Value (Ft. Lbs at Temp.)
Grade 36	15 at 40° F
Grade 50* (2 inches and under in thickness)	15 at 40° F
Grade 50W* (2 inches and under in thickness)	15 at 40° F
Grade 50* (Over 2 inches to 4 inches in thickness)	20 at 40° F
Grade 50W* (Over 2 inches to 4 inches in thickness)	20 at 40° F
Grade HPS 50W* (4 inches and under in thickness)	20 at 10° F
Grade HPS 70W (4 inches and under in thickness)	25 at -10° F
Grade 100 (2 ¹ / ₂ inches and under in thickness)	25 at 0° F
Grade 100W (Over 2 ¹ / ₂ inches to 4 inches in thickness)	35 at 0° F

* If the yield point of the material exceeds 65,000 psi, the temperature for the CVN impact value for acceptability shall be reduced 15° F for each increment of 10,000 psi above 65,000 psi

In Section 55-2.01 replace the Structural Steel Materials table with:

Structural Steel Materials	
Material	Specification
Structural steel:	
Carbon steel	ASTM: A 709/A 709M, Grade 36 or {A 36/A 36M} ^a
High strength low alloy columbium vanadium steel	ASTM: A 709/A 709M, Grade 50 or {A 572/A 572M, Grade 50} ^a
High strength low alloy structural steel	ASTM: A 709/A 709M, Grade 50W, Grade HPS 50W, or {A 588/A 588M} ^a
High strength low alloy structural steel plate	ASTM: A 709/A 709M, Grade HPS 70W
High-yield strength, quenched and tempered alloy steel plate suitable for welding	ASTM: A 709/A 709M, Grade 100 and Grade 100W, or {A 514/A 514M} ^a
Steel fastener components for general applications:	
Bolts and studs	ASTM: A 307
Anchor bolts	ASTM: F 1554 or A 307, Grade C
High-strength bolts and studs	ASTM: A 449, Type 1
High-strength threaded rods	ASTM: A 449, Type 1
High-strength nonheaded anchor bolts	ASTM: F 1554, Grade 105, Class 2A
Nuts	ASTM: A 563, including Appendix X1 ^b
Washers	ASTM: F 844
Components of high-strength steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM: A 325, Type 1
Tension control bolts	ASTM: F 1852, Type 1
Nuts	ASTM: A 563, including Appendix X1 ^b
Hardened washers	ASTM : F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM: F 959, Type 325, zinc-coated
Carbon steel for forgings, pins and rollers	ASTM: A 668/A 668M, Class D
Alloy steel for forgings	ASTM: A 668/A 668M, Class G
Pin nuts	ASTM: A 36/A 36M
Carbon-steel castings	ASTM: A 27/A 27M, Grade 65-35, Class 1
Malleable iron castings	ASTM: A 47/A 47M, Grade 32510 (Grade 22010)
Gray iron castings	ASTM: A 48, Class 30B
Carbon steel structural tubing	ASTM: A 500, Grade B or A 501

Steel pipe (Hydrostatic testing will not apply)	ASTM: A 53, Type E or S, Grade B; A 106, Grade B; or A 139, Grade B
Stud connectors	AASHTO/AWS D1.5

- a Grades that may be substituted for the equivalent ASTM Designation: A 709 steel, at the Contractor's option, subject to the modifications and additions specified and to the requirements of A 709.
- b Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.

In Section 55-2.04 delete the 1st paragraph.

Delete Section 55-2.05.

In Section 55-3.05 replace the 1st paragraph with:

Surfaces of bearing and base plates and other metal surfaces that are to come in contact with each other or with ground concrete surfaces shall be flat to within 1/32-inch tolerance in 12 inches and to within 1/16-inch tolerance overall. Surfaces of bearing and base plates and other metal bearing surfaces that are to come in contact with preformed fabric pads, elastomeric bearing pads, or mortar shall be flat to within 1/8-inch tolerance in 12 inches and to within 3/16-inch tolerance overall.

In Section 55-3.07 in the 1st paragraph, replace item B with:

- B. The radius of bend measured to the concave face shall conform to the requirements in ASTM Designation: A6/A6M

In Section 55-3.10 in the 1st paragraph, replace item B with:

- B. Internal threads shall conform to the requirements in ASTM Designation: A 563.

In Section 55-3.19 replace the 3rd paragraph with:

Immediately before setting bearing assemblies or masonry plates directly on ground concrete surfaces, the Contractor shall thoroughly clean the surfaces of the concrete and the metal to be in contact and shall apply a coating of nonsag polysulfide or polyurethane caulking conforming to the requirements in ASTM Designation: C 920 to contact areas to provide full bedding.

In Section 55-4.01 in the 1st paragraph, replace item D with:

- D. To determine the pay quantities of galvanized metal, the weight to be added to the calculated weight of the base metal for the galvanizing will be determined from the table of weights of zinc coatings specified in ASTM Designation: A 153/A 153M.

^^

**SECTION 56 SIGNS
(Issued 09-16-11)**

In Section 56-1.02A replace the 1st paragraph with:

Bars and plates shall be structural steel complying with one or more of the following:

1. ASTM Designation: A36/A36M
2. ASTM Designation: A709/A709M, Grade 36 or 50
3. ASTM Designation: A572/A572M, Grade 50

Other open shapes shall be structural steel complying with one or more of the following:

1. ASTM Designation: A36/A36M
2. ASTM Designation: A709/A709M, Grade 36 or 50
3. ASTM Designation: A992/A992M

Light fixture mounting channel shall be a continuous slot channel made from one of the following:

1. Steel complying with ASTM Designation: A1011/A1011M, Designation SS, Grade 33
2. Extruded aluminum of alloy 6063-T6 complying with ASTM Designation: B221 or B221M

In Section 56-1.02E replace the 1st paragraph with:

Pipe posts shall be welded or seamless steel pipe conforming to the requirements in ASTM Designation: A 53/A 53M, Grade B; ASTM Designation: A 106/A 106M, Grade B; or API Specification 5L PSL2 Grade B or Grade X42R or Grade X42M. At the option of the Contractor, posts may be fabricated from structural steel conforming to the requirements in ASTM Designation: A 36/A 36M.

Pipe posts shall not be spiral seam welded.

In Section 56-1.02F replace item B of the 1st paragraph with:

- B. Material for gratings shall be structural steel conforming to the requirements in ASTM Designation: A 1011/A 1011M, Designation CS, Type B or Designation SS, Grade 36, Type 1.

In Section 56-1.03 replace the 5th paragraph with:

Clips, eyes, or removable brackets shall be affixed to all signs and all posts and shall be used to secure the sign during shipping and for lifting and moving during erection as necessary to prevent damage to the finished galvanized or painted surfaces. Brackets on tubular sign structures shall be removed after erection. Details of the devices shall be shown on the working drawings.

In Section 56-1.05 replace the 3rd paragraph with:

Galvanizing shall conform to the provisions in Section 75-1.05, "Galvanizing," except that when permission is granted by the Engineer, surfaces may be coated with zinc by the metalizing process. Metalizing shall be performed in conformance with the AWS requirements. The thickness of the sprayed zinc coat shall be 10 ± 2 mils. The thickness of the sprayed zinc coat on faying surfaces shall not be more than 10 mils.

In Section 56-1.05, add:

Zinc solders or zinc alloys that contain tin shall not be used to repair a damaged galvanized surface.

In Section 56-1.07, add:

Bridge-mounted signs shall not be fastened to concrete elements of bridges or railings before the concrete attains a compressive strength of 2,500 psi.

In Section 56-1.10 replace the 4th paragraph with:

The contract price paid per pound for install sign structure of the type or types designated in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing sign structures, complete in place, including installing anchor bolt assemblies, removable sign panel frames, and sign panels and performing any welding, painting or galvanizing required during installation, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

In Section 56-2.03 replace the 4th paragraph with:

Backfill material for metal posts shall consist of minor concrete conforming to the provisions in Section 90-10, "Minor Concrete," and shall contain not less than 463 pounds of cementitious material per cubic yard.

^^

SECTION 59 PAINTING

(Issued 09-16-11)

In Section 59-1.01 add:

Coatings selected for use shall conform to the volatile organic compound limits specified for the air quality district where the project is located.

In Section 59-1.03 replace the 3rd paragraph with:

Painting shall be done in a neat and workmanlike manner. Unless otherwise specified, paint shall be applied by brush, or spray, or roller, or any combination of these methods. Gun extensions shall not be used.

In Section 59-1.03 replace the 5th paragraph with:

Unless otherwise specified, should 7 days elapse between paint applications, the painted surface shall be pressure rinsed prior to the next paint application. Pressure rinsing is defined as a pressurized water rinse with a minimum nozzle pressure of 1,160 psi. During rinsing, the tip of the pressure nozzle shall be placed between 12 inches and 18 inches from the surface to be rinsed. The nozzle shall have a maximum fan tip angle of 30°.

In Section 59-2.01 replace the 2nd paragraph with:

Unless otherwise specified, no painting Contractors or subcontractors will be permitted to perform work without having the following current "SSPC: The Society for Protective Coatings" (formerly the Steel Structures Painting Council) certifications in good standing throughout the duration of the contract:

- A. For cleaning and painting structural steel in the field, certification in conformance with the requirements in Qualification Procedure No. 1, "Standard Procedure For Evaluating Painting Contractors (Field Application to Complex Industrial Structures)" (SSPC-QP 1).
- B. For removing paint from structural steel, certification in conformance with the requirements in Qualification Procedure No. 2, "Standard Procedure for the Qualification of Painting Contractors (Field Removal of Hazardous Coatings from Complex Structures)" (SSPC-QP 2, Category A).
- C. For cleaning and painting structural steel in a permanent painting facility, certification in conformance with the requirements in 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.

Replace Section 59-2.05 with:

59-2.05 CLEANING PAINTED SURFACES

All previously painted surfaces shall be cleaned by pressure washing or steam cleaning before other cleaning or painting activities are performed. Gloss on the existing paint shall be removed without removing sound paint. Areas of gloss remaining after cleaning shall be roughened using 100 to 200-grit sandpaper. Any paint that becomes loose, curled, lifted, or that loses its bond after cleaning shall be removed to sound paint or metal.

Pressure washing includes cleaning surfaces using a pressure wash system with a nozzle pressure from 2,500 to 5,000 psi and a maximum fan tip angle of 45 degrees.

Steam cleaning includes cleaning dirt, grease, loose chalky paint, and other foreign material from surfaces using steam. The steam temperature at the nozzle shall be from 265 to 375 degrees F. A biodegradable detergent shall be used during steam cleaning. After steam cleaning, cleaned surfaces shall be rinsed clean with fresh water. Steam cleaning shall not be performed more than 2 weeks before painting or other phases of cleaning. Steam-cleaned surfaces shall not be painted until they are thoroughly dry and 24 hours have elapsed after steam cleaning.

In Section 59-2.12 replace the 3rd and 4th paragraphs with:

Contact surfaces of stiffeners, railings, built up members or open seam exceeding 6 mils in width that would retain moisture, shall be caulked with polysulfide or polyurethane sealing compound conforming to the requirements in ASTM Designation: C 920, Type S, Grade NS, Class 25, Use O, or other approved material.

The dry film thickness of the paint will be measured in place with a calibrated Type 2 magnetic film thickness gage in conformance with the requirements in SSPC-PA 2, "Measurement of Dry Coating Thickness with Magnetic Gages," of the "SSPC: The Society for Protective Coatings," except that there shall be no limit to the number or location of spot measurements to verify compliance with specified thickness requirements.

^^

**SECTION 63: CAST-IN-PLACE CONCRETE PIPE
(Issued 10-21-11)**

**Replace Section 63 with:
SECTION 63: (BLANK)**

^^

**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:

Mortar placed where edge drain outlets and vents connect to drainage pipe and existing drainage inlets shall conform to the provisions in Section 51-1.135, "Mortar."

In Section 68-3.03 replace the 13th paragraph with:

Cement treated permeable material, which is not covered with hot mix asphalt within 12 hours after compaction of the permeable material, shall be cured by either sprinkling the material with a fine spray of water every 4 hours during daylight hours or covering the material with a white polyethylene sheet, not less than 6 mils thick. The above curing requirements shall begin at 7:00 a.m. on the morning following compaction of the cement treated permeable material and continue for the next 72 hours or until the material is covered with hot mix asphalt, whichever is less. The cement treated permeable material shall not be sprayed with water during the first 12 hours after compacting, but may be covered with the polyethylene sheet during the first 12 hours or prior to the beginning of the cure period.

In Section 68-3.03 replace the 17th and 18th paragraphs with:

Hot mix asphalt for backfilling trenches in existing paved areas shall be produced from commercial quality aggregates and asphalt and mixed at a central mixing plant. The aggregate shall conform to the 3/4 inch grading, or the 1/2 inch grading for Type A and Type B hot mix asphalt specified in Section 39-1.02E, "Aggregate." The amount of asphalt binder to be mixed with the aggregate shall be between 4 percent and 7 percent by weight of the dry aggregate, as determined by the Engineer.

Hot mix asphalt backfill shall be spread and compacted in approximately 2 equal layers by methods that will produce a hot mix asphalt surfacing of uniform smoothness, texture and density. Each layer shall be compacted before the temperature of the mixture drops below 250 °F. Prior to placing the hot mix asphalt backfill, a tack coat of asphaltic emulsion conforming to the provisions in Section 94, "Asphaltic Emulsions," shall be applied to the vertical edges of existing pavement at an approximate rate of 0.05 gallon per square yard.

In Section 68-3.03 replace the 20th paragraph with:

Type A pavement markers conforming to the details shown on the plans and the provisions in Section 85, "Pavement Markers," shall be placed on paved shoulders or dikes at outlet, vent and cleanout locations as directed by the Engineer. The waiting period for placing pavement markers on new hot mix asphalt surfacing will not apply.

Replace Section 68-3.05 with:

68-3.05 PAYMENT

The contract price paid per linear foot for plastic pipe (edge drain) of the size or sizes shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing edge drains complete in place, including excavation (and removal of any concrete deposits that may occur along the lower edge of the concrete pavement in Type 1 installations) and hot mix asphalt backfill for Type 1 edge drain installation, tack coat, filter fabric, and treated permeable material, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The contract price paid per linear foot for plastic pipe (edge drain outlet) of the size or sizes shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing edge drain outlets, vents and cleanouts complete in place, including outlet and vent covers, expansion plugs, pavement markers, concrete splash pads, connecting outlets and vents to drainage facilities, and excavation and backfill [aggregate base, hot mix asphalt, tack coat, and native material] for outlets, vents, and cleanouts to be installed in embankments and existing shoulders, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

^^

SECTION 69 OVERSIDE DRAINS

(Issued 07-31-07)

In Section 69-1.01 replace the 1st paragraph with:

This work shall consist of furnishing and installing entrance tapers, pipe downdrains, tapered inlets, flume downdrains, anchor assemblies, reducers, slip joints and hot mix asphalt overside drains to collect and carry surface drainage down the roadway slopes as shown on the plans or as directed by the Engineer and as specified in these specifications and the special provisions.

Replace Section 69-1.02D with:

69-1.02D Hot Mix Asphalt

Hot mix asphalt for overside drains shall conform to the provisions in Section 39-1.13, "Miscellaneous Areas."

Replace Section 69-1.04 with:

69-1.04 HOT MIX ASPHALT OVERSIDE DRAINS

Hot mix asphalt overside drains shall be constructed as shown on the plans or as directed by the Engineer. The hot mix asphalt shall be placed in conformance with the provisions in Section 39-1.13, "Miscellaneous Areas."

In Section 69-1.06 replace the 2nd paragraph with:

Quantities of hot mix asphalt placed for overside drains will be paid for as provided in Section 39-5, "Measurement and Payment," for hot mix asphalt placed in miscellaneous areas.

^^

SECTION 70 MISCELLANEOUS FACILITIES

(Issued 11-30-10)

In Section 70-1.02C replace the 2nd paragraph with:

Precast concrete flared end sections shall conform to the requirements for Class III Reinforced Concrete Pipe in AASHTO Designation: M 170M. Cementitious materials and aggregate shall conform to the provisions in Section 90-2, "Materials," except that grading requirements shall not apply to the aggregate. Use of supplementary cementitious material shall conform to the requirements in AASHTO Designation: M 170. The area of steel reinforcement per linear foot of flared end section shall be at least equal to the minimum steel requirements for circular reinforcement in circular pipe for the internal diameter of the circular portion of the flared end section. The basis of acceptance of the precast concrete flared end section shall conform to the requirements of Section 5.1.2 of AASHTO Designation: M 170.

In Section 70-1.02H replace the 1st paragraph with:

Precast concrete pipe risers and pipe reducers, and precast concrete pipe sections, adjustment rings and tapered sections for pipe energy dissipators, pipe inlets and pipe manholes shall conform to the requirements in AASHTO Designation: M 199M/M 199, except that the cementitious material and aggregate shall conform to the provisions in Section 90-2, "Materials," except that grading requirements shall not apply to the aggregate. Use of supplementary cementitious material shall conform to the requirements in AASHTO Designation: M 170.

In Section 70-1.03 replace the 2nd paragraph with:

Cutoff walls for precast concrete flared end sections shall be constructed of minor concrete conforming to the provisions in Section 90-10, "Minor Concrete." Minor concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

^^

**SECTION 72 SLOPE PROTECTION
(Issued 03-13-09)**

In Section 72-4.04 replace the 6th paragraph with:

Pervious backfill material, if required by the plans, shall be placed as shown. A securely tied sack containing one cubic foot of pervious backfill material shall be placed at each weep hole and drain hole. The sack material shall conform to the requirements for filter fabric in Section 88-1.02, "Filtration."

^^

**SECTION 73 CONCRETE CURBS AND SIDEWALKS
(Issued 06-05-09)**

In Section 73-1.01 in the 2nd paragraph, replace item 2 with:

- 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.

^^

**SECTION 74 PUMPING PLANT EQUIPMENT
(Issued 07-01-08)**

In Section 74-1.02 delete the 2nd paragraph.

^^

SECTION 75 MISCELLANEOUS METAL

(Issued 07-01-11)

In Section 75-1.02 replace the 6th paragraph with:

Manhole frames and covers shall conform to AASHTO M 306.

In Section 75-1.02 replace the 10th paragraph with:

Unless otherwise specified, materials shall conform to the following specifications:

Material	Specification
Steel bars, plates and shapes	ASTM Designation: A 36/A 36M or A 575, A 576 (AISI or M Grades 1016 through 1030)
Steel fastener components for general applications:	
Bolts and studs	ASTM Designation: A 307
Headed anchor bolts	ASTM Designation: A 307, Grade B, including S1 supplementary requirements
Nonheaded anchor bolts	ASTM Designation: F 1554 or A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation: M 314 supplementary requirements, or AASHTO Designation: M 314, Grade 36 or 55, including S1 supplementary requirements
High-strength bolts and studs, threaded rods, and nonheaded anchor bolts	ASTM Designation: A 449, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1*
Washers	ASTM Designation: F 844
Components of high-strength steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM Designation: A 325, Type 1
Tension control bolts	ASTM Designation: F 1852, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1*
Hardened washers	ASTM Designation: F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM Designation: F 959, Type 325, zinc-coated
Stainless steel fasteners (Alloys 304 & 316) for general applications:	
Bolts, screws, studs, threaded rods, and nonheaded anchor bolts	ASTM Designation: F 593 or F 738M
Nuts	ASTM Designation: F 594 or F 836M
Washers	ASTM Designation: A 240/A 240M and ANSI B 18.22M
Carbon-steel castings	ASTM Designation: A 27/A 27M, Grade 65-35, Class 1
Malleable iron castings	ASTM Designation: A 47, Grade 32510 or A 47M, Grade 22010
Gray iron castings Inside a roadbed Outside a roadbed	AASHTO M 306 AASHTO M306 except only AASHTO M105, Class 35B is allowed
Ductile iron castings	ASTM Designation: A 536, Grade 65-45-12
Cast iron pipe	Commercial quality
Steel pipe	Commercial quality, welded or extruded
Other parts for general applications	Commercial quality

*Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dyed dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.

In Section 75-1.03 replace the 13th paragraph with:

Concrete anchorage devices shall be mechanical expansion or resin capsule types installed in drilled holes or cast-in-place insert types. The anchorage devices shall be selected from the Department's Pre-Qualified Products List. The qualification requirements for concrete anchorage devices may be obtained from the Pre-Qualified Products List Web site.

The anchorage devices shall be a complete system, including threaded studs, hex nuts, and cut washers. Thread dimensions for externally threaded concrete anchorage devices prior to zinc coating shall conform to the requirements in ASME Standard: B1.1 having Class 2A tolerances or ASME Standard: B1.13M having Grade 6g tolerances. Thread dimensions for internally threaded concrete anchorage devices shall conform to the requirements in ASTM A 563.

In Section 75-1.03 replace the 18th paragraph with:

Mechanical expansion anchors shall, when installed in accordance with the manufacturer's instructions and these specifications and tested in conformance with the requirements in California Test 681, withstand the application of a sustained tension test load of at least the following values for at least 48 hours with a movement not greater than 0.035 inch:

Stud Diameter (inches)	Sustained Tension Test Load (pounds)
*3/4	5,000
5/8	4,100
1/2	3,200
3/8	2,100
1/4	1,000

* Maximum stud diameter permitted for mechanical expansion anchors.

Resin capsule anchors shall, when installed in accordance with the manufacturer's instructions and these specifications and tested in conformance with the requirements in California Test 681, withstand the application of a sustained tension test load of at least the following values for at least 48 hours with a movement not greater than 0.010 inch:

Stud Diameter (inches)	Sustained Tension Test Load (pounds)
1-1/4	31,000
1	17,900
7/8	14,400
3/4	5,000
5/8	4,100
1/2	3,200
3/8	2,100
1/4	1,000

At least 25 days before use, the Contractor shall submit one sample of each resin capsule anchor per lot to the Transportation Laboratory for testing. A lot of resin capsule anchors is 100 units, or fraction thereof, of the same brand and product name.

In Section 75-1.03 replace the 20th paragraph with:

A Certificate of Compliance for concrete anchorage devices shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance."

In Section 75-1.03 replace the 24th paragraph with:

Sealing compound, for caulking and adhesive sealing, shall be a polysulfide or polyurethane material conforming to the requirements in ASTM Designation: C 920, Type S, Grade NS, Class 25, Use O.

In Section 75-1.035 in the 3rd paragraph, replace the 1st sentence with:

Cables shall be 3/4 inch preformed, 6 x 19, wire strand core or independent wire rope core (IWRC), galvanized in conformance with the requirements in Federal Specification RR-W-410, right regular lay, manufactured of improved plow steel with a minimum breaking strength of 23 tons.

In Section 75-1.035 in the 4th paragraph, replace item C with:

- C. Nuts shall conform to the requirements in ASTM Designation: A 563 including Appendix X1, except lubrication is not required.

In Section 75-1.035 replace the 12th paragraph with:

Concrete for filling cable drum units shall conform to the provisions in Section 90-10, "Minor Concrete," or at the option of the Contractor, may be a mix with 3/8-inch maximum size aggregate and not less than 675 pounds of cementitious material per cubic yard.

In Section 75-1.05 replace the 6th paragraph with:

Galvanizing of iron and steel hardware and nuts and bolts, when specified or shown on the plans, shall conform to the requirements in ASTM Designation: A 153/A 153M, except whenever threaded studs, bolts, nuts, and washers are specified to conform to the requirements in ASTM Designation: A 307, A 325, A 449, A 563, F 436, or F 1554 and zinc coating is required, they shall be hot-dip zinc coated or mechanically zinc coated in conformance with the requirements in the ASTM Designations. Unless otherwise specified, galvanizing shall be performed after fabrication.

In Section 75-1.05 replace the 8th paragraph with:

Tapping of nuts or other internally threaded parts to be used with zinc coated bolts, anchor bars or studs shall be done after galvanizing and shall conform to the requirements for thread dimensions and overtapping allowances in ASTM Designation: A 563.

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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.

Property	Test Method	Requirements
Compressive Strength		
at 3 hours, MPa	California Test 551	21 min.
at 24 hours, MPa	California Test 551	35 min.
Flexure Strength		
at 24 hours, MPa	California Test 551	3.5 min.
Bond Strength: at 24 hours		
SSD Concrete, MPa	California Test 551	2.1 min.
Dry Concrete, MPa	California Test 551	2.8 min.
Water Absorption, %	California Test 551	10 max.
Abrasion Resistance		
at 24 hours, grams	California Test 550	25 max.
Drying Shrinkage at 4 days, %	ASTM Designation: C 596	0.13 max.
Soluble Chlorides by weight, %	California Test 422	0.05 max.
Water Soluble Sulfates by weight, %	California Test 417	0.25 max.

2. Magnesium phosphate concrete shall be formulated for minimum initial set time of 15 minutes and minimum final set time of 25 minutes at 70° F. The materials, prior to use, shall be stored in a cool, dry environment.
3. Mix water used with water activated material shall conform to the provisions in Section 90-2.03, "Water."
4. The quantity of water for single component type or liquid activator (for dual component type) to be blended with the dry component, shall be within the limits recommended by the manufacturer and shall be the least amount required to produce a pourable batter.
5. Addition of retarders, when required and approved by the Engineer, shall be in conformance with the manufacturer's recommendations.
6. Before using concrete material that has not been previously approved, a minimum of 45 pounds shall be submitted to the Engineer for testing. The Contractor shall allow 45 days for the testing. Each shipment of concrete material that has been previously approved shall be accompanied by a Certificate of Compliance as provided in Section 6-1.07, "Certificates of Compliance."
7. Magnesium phosphate concrete shall not be mixed in containers or worked with tools containing zinc, cadmium, aluminum or copper metals. Modified high alumina based concrete shall not be mixed in containers or worked with tools containing aluminum.
8. The surface of any dowel coated with zinc or cadmium shall be coated with a colored lacquer before installation of the dowel. The lacquer shall be allowed to dry thoroughly before embedment of the dowels.
9. The holes shall be drilled by methods that will not shatter or damage the concrete adjacent to the hole. The diameter of the drilled hole shall be 1/2 inch larger than the nominal diameter of the dowels.
10. The drilled holes shall be clean and dry at the time of placing the bonding material and the steel dowels. Bonding material and dowel shall completely fill the drilled hole. The surface temperature shall be 40° F or above when the bonding material is placed.
11. After bonding, dowels shall remain undisturbed for a minimum of 3 hours or until the bonding material has reached a strength sufficient to support the dowels. Dowels that are improperly bonded, as determined by the Engineer, shall be removed. The holes shall be cleaned or new holes shall be drilled and the dowels replaced and securely bonded to the concrete. Removing, redrilling and replacing improperly bonded dowels shall be performed at the Contractor's expense. Modified high alumina based concrete and portland cement based concrete shall be cured in conformance with the provisions in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. Magnesium phosphate concrete shall not be cured.

In Section 83-2.02D(1) replace the 8th paragraph with:

Granular material for backfill between the 2 walls of concrete barrier (Types 50E, 60F, 60GE and 60SF), as shown on the plans, shall be placed without compaction.

In Section 83-2.02D(2) in the 1st paragraph, replace item b with:

- b. If the 3/8-inch maximum size aggregate grading is used to construct extruded or slip-formed concrete barriers, the cementitious material content of the minor concrete shall be not less than 675 pounds per cubic yard.

In Section 83-2.02D(2) replace the 3rd paragraph with:

The concrete paving between the tops of the 2 walls of concrete barrier (Types 50E, 60F, 60GE, and 60SF) and the optional concrete slab at the base between the 2 walls of concrete barrier (Types 50E, 60F, 60GE, and 60SF) shall be constructed of minor concrete conforming to the provisions of Section 90-10, "Minor Concrete," except that the minor concrete shall contain not less than 505 pounds of cementitious material per cubic yard.

In Section 83-2.02D(2) replace the 8th paragraph with:

Granular material for backfill between the 2 walls of concrete barrier (Types 50E, 60F, 60GE and 60SF) shall be earthy material suitable for the purpose intended, having no rocks, lumps or clods exceeding 1-1/2 inches in greatest dimension.

In Section 83-2.03 replace the 8th and 9th paragraphs with:

Concrete barriers, except Type 50E, Type 60F, Type 60GE, and Type 60SF will be measured along the top of the barrier.

Concrete barriers Type 50E, Type 60F, Type 60GE, and Type 60SF will be measured once along the centerline between the 2 walls of the barrier.

In Section 83-2.04 replace the 3rd paragraph with:

The contract prices paid per linear foot for concrete barrier of the type or types listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the concrete barriers, complete in place, including bar reinforcing steel, steel dowels and drilling and bonding dowels in structures, hardware for steel plate barrier, miscellaneous metal, excavation, backfill (including concrete paving for, and granular material or concrete slab used as backfill in Type 50E, Type 60F, Type 60GE, and Type 60SF concrete barrier), and disposing of surplus material and for furnishing, placing, removing and disposing of the temporary railing for closing the gap between existing barrier and the concrete barrier being constructed, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

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SECTION 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.

AA

SECTION 86 SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

(Issued 09-16-11)

Replace Section 86 with:

SECTION 86 ELECTRICAL SYSTEMS

86-1 GENERAL

86-1.01 DESCRIPTION

Section 86 includes specifications for installing, modifying, and removing:

- 1. Traffic signal
- 2. Interconnect system
- 3. Ramp metering system
- 4. Flashing beacon system
- 5. Lighting system
- 6. Sign illumination system
- 7. Traffic monitoring station
- 8. Communication system
- 9. Electrical equipment in structure
- 10. Falsework lighting

Comply with Part 4 of the California MUTCD. Nothing in this Section 86 is to be construed as to reduce the minimum standards in this manual.

The locations of electrical system elements are approximate; the Engineer will approve final location.

86-1.015 DEFINITIONS

Definitions pertain only to Section 86, "Electrical Systems."

actuation: As defined in the California MUTCD.

channel: Discrete information path.

controller assembly: Controller unit and auxiliary equipment housed in a rainproof cabinet to control a system's operations.

controller unit: Part of the controller assembly performing the basic timing and logic functions.

detector: As defined in the California MUTCD.

electrolier: Complete assembly of lighting standard and luminaire.

flasher: Device to open and close signal circuits at a repetitive rate.

flashing beacon control assembly: Switches, circuit breakers, terminal blocks, flasher, wiring, and necessary electrical components all housed in a single enclosure to properly operate a beacon.

inductive loop detector: Detector capable of being actuated by inductance change caused by vehicle passing or standing over the loop.

lighting standard: Pole and mast arm supporting the luminaire.

luminaire: Assembly that houses the light source and controls the light emitted from the light source.

magnetic detector: Detector capable of being actuated by induced voltage caused by vehicle passing through the earth's magnetic field.

powder coating: A coating applied electrostatically using UV-stable polymer exterior grade powder.

pre-timed controller assembly: Operates traffic signals under a predetermined cycle length.

signal face: As defined in the California MUTCD.

signal head: As defined in the California MUTCD.

signal indication: As defined in the California MUTCD.

signal section: As defined in the California MUTCD.

signal standard: Pole and mast arm supporting one or more signal faces with or without a luminaire mast arm.

traffic-actuated controller assembly: Operates traffic signals under the varying demands of traffic as registered by detector actuation.

traffic phase: Signal phase as defined in the California MUTCD.

vehicle: As defined in the California Vehicle Code.

86-1.02 REGULATIONS AND CODEElectrical equipment must comply with one or more of the following:

1. ANSI
2. ASTM
3. 8 CA Code of Regs § 2299 et seq.
4. EIA
5. NEMA
6. NETA
7. UL

Materials and workmanship must comply with:

1. FCC
2. ITE
3. NEC
4. NRTL
5. Public Utilities Commission, General Order No. 95, "Rules for Overhead Electrical Line Construction"
6. Public Utilities Commission, General Order No. 128, "Rules for Construction of Underground Electric Supply and Communication Systems"

86-1.03 COST BREAK-DOWN

Determine quantities required to complete work. Submit the quantities as part of the cost breakdown.

The sum of the amounts for the units of work listed in the cost breakdown must equal the contract lump sum price bid for the work. Include overhead and profit for each unit of work listed in the cost breakdown. If mobilization is a bid item, include bond premium, temporary construction facilities, and material plants into the mobilization bid item, otherwise, include in each unit of work listed in the cost breakdown. Do not include costs for traffic control system in the cost breakdown.

The cost breakdown may be used to determine partial payment and to calculate payment adjustments for additional costs incurred due to a change order. If a change order increases or decreases the quantities, payment adjustment may be determined under Section 4-1.03B, "Increased or Decreased Quantities."

The cost breakdown must include type, size, and installation method for:

1. Foundations
2. Standards and poles
3. Conduit
4. Pull boxes
5. Conductors and cables
6. Service equipment enclosures
7. Telephone demarcation cabinet
8. Signal heads and hardware
9. Pedestrian signal heads and hardware
10. Pedestrian push buttons
11. Loop detectors
12. Luminaires and lighting fixtures

86-1.04 EQUIPMENT LIST AND DRAWINGS

Within 15 days of contract approval, submit for review a list of equipment and materials that you propose to install. Comply with Section 5-1.02, "Plans and Working Drawings." The list must include:

1. Name of manufacturer

2. Dimension
3. Item identification number
4. List of components

The list must be supplemented by other data as required, including:

1. Schematic wiring diagrams
2. Scale drawings of cabinets showing location and spacing of shelves, terminal blocks, and equipment, including dimensioning
3. Operation manual

Submit 2 copies of the above data. The Engineer will review within 15 days.

Electrical equipment that is manufactured as detailed on the plans will not require detailed drawings and diagrams.

Furnish 3 sets of computer-generated cabinet schematic wiring diagrams.

The cabinet schematic wiring diagram must be placed in a heavy duty plastic envelope and attached to the inside of the door of each cabinet.

Prepare diagrams, plans, and drawings using graphic symbols in IEEE 315, "Graphic Symbols for Electrical and Electronic Diagrams."

86-1.05 CERTIFICATE OF COMPLIANCE

Submit a Certificate of Compliance for all electrical material and equipment to the Engineer under Section 6-1.07, "Certificates of Compliance."

86-1.06 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS

Keep existing electrical system or approved temporary replacement in working order during the progress of the work. Shutdown is allowed for alteration or removal of the system. Traffic signal shutdown must be limited to normal working hours. Lighting system shutdown must not interfere with the regular lighting schedule.

Notify the Engineer before performing work on the existing system.

Notify the local traffic enforcement agency before traffic signal shutdown.

If existing or temporary system must be modified, work not shown on the plans or specified in the special provisions, but required to keep the system in working order will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

The State or local agency will:

1. Continue the operation and maintenance of existing electrical facilities
2. Continue to provide electrical energy to operate existing electrical facilities
3. Repair or replace existing facilities damaged by public traffic
4. Pay for electrical energy to operate existing or new facilities undergoing the functional tests described in Section 86-2.14C, "Functional Testing"

Verify location and depth of existing detectors, conduits, pull boxes, and other electrical facilities before using tools or equipment that may damage those facilities or interfere with an electrical system.

Notify the Engineer immediately if existing facility is damaged by your activities. Repair or replace damaged facility promptly. If you fail to complete the repair or replacement, promptly, the State will repair or replace and deduct the costs.

Damaged detectors must be replaced within 24 hours at your expense. If you fail to complete the repair within 24 hours, the State will repair and deduct the repair costs.

If roadway remains open to traffic while an existing lighting system is modified:

1. Keep existing system in working order
2. Make final connection so the modified circuit is in operation by nightfall

Keep temporary electrical installations in working order until no longer required. Remove temporary installations as specified in Section 86-7, "Removing, Reinstalling or Salvaging Electrical Equipment."

These provisions do not void your responsibilities as specified in Section 7-1.12, "Indemnification and Insurance," and Section 7-1.16, "Contractor's Responsibility for the Work and Materials."

During traffic signal system shutdown, place W3-1a, "STOP AHEAD," and R1-1, "STOP," signs in each direction to direct traffic through the intersection. For 2-lane approaches, place 2 R1-1 signs.

W3-1a and R1-1 signs must comply with Section 12-3.06, "Construction Area Signs." Use a minimum size of 30 inches for the R1-1 sign.

Cover signal faces when the system is shut down overnight. Cover temporary W3-1a and R1-1 signs when the system is turned on.

86-1.07 SCHEDULING OF WORK

Except service installation and service equipment enclosure, do not work above ground until all materials are on hand to complete electrical work at each location. Schedule work to allow each system to be completed and ready for operation before opening the corresponding section of the roadway to traffic.

If street lighting exists or is installed in conjunction with traffic signals, do not turn on the signals until the street lighting is energized.

Traffic signals will not be placed in operation until the roadways to be controlled are open to public traffic.

Lighting and traffic signals, including flashing operation, will not be placed in operation before starting the functional test period specified in Section 86-2.14, "Testing."

Do not pull conductors into conduit until:

1. Pull boxes are set to grade
2. Metallic conduit is bonded

In vehicular undercrossings, soffit lights must be in operation as soon as practicable after falsework has been removed from the structure. Lighting for pedestrian structures must be in operation before opening the structure to pedestrian traffic.

If the Engineer orders soffit lights or lighting for pedestrian structures to be activated before permanent power service is available, the cost of installing and removing temporary power service will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

The initial traffic signal turn-on must be made between 9:00 a.m. and 2:00 p.m. Before the initial turn-on, all equipment, including pedestrian signals, pedestrian push buttons, vehicle detectors, lighting, signs, and pavement delineation must be installed and in working order. Direct louvers, visors, and signal faces to maximize visibility.

Start functional tests on any working day except Friday or the day before a legal holiday. You must notify the Engineer 48 hours before the start of functional test.

86-1.08 (BLANK)

86-2 MATERIALS AND INSTALLATION

86-2.01 EXCAVATING AND BACKFILLING

Dispose of surplus excavated material under Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way."

Backfill as specified in Section 19-3, "Structure Excavation and Backfill." Compact backfill in conduit trenches outside the hinge point of slopes and not under pavement to a minimum relative compaction of 90 percent. Compact backfill within hinge points and in areas where pavement is to be constructed to a minimum relative compaction of 95 percent.

Backfill trenches and restore sidewalk, pavement, and landscaping at one intersection before starting excavation at another intersection.

If excavating on a street or highway, restrict closure to 1 lane at a time.

86-2.02 REMOVING AND REPLACING IMPROVEMENTS

Replace or reconstruct sidewalk, curb, gutter, concrete pavement, asphalt concrete pavement, underlying material, lawn, plant, and other facilities damaged by your activities. Replacement material must be of equal or better quality than the material replaced. Work must be in a serviceable condition.

If a part of a square or slab of concrete sidewalk, curb, gutter, or driveway is broken or damaged, the entire square or slab must be removed and reconstructed.

Cut outline of PCC sidewalk or driveway to be removed:

1. Using a power-driven saw
2. On a neat line
3. To a 0.17-foot minimum depth

86-2.03 FOUNDATIONS

Except for concrete for cast-in-drilled-hole concrete pile foundation, PCC must comply with Section 90-10, "Minor Concrete."

Construct concrete foundation on firm ground.

After each post, standard, and pedestal is properly positioned, place mortar under the base plate. Finish exposed portion to present a neat appearance. Mortar must comply with Section 51-1.135, "Mortar," except mortar must have:

1. 1 part by volume of cementitious material
2. 3 parts by volume of clean sand

Reinforced cast-in-drilled-hole concrete pile foundation must comply with Section 49, "Piling," except:

1. Material resulting from drilling holes must be disposed of as specified in Section 86-2.01, "Excavating and Backfilling"
2. Concrete for cast-in-drilled-hole concrete pile will not be considered as designated by compressive strength

Form exposed portion of the foundation to present a neat appearance and true to line and grade. The top of a foundation for post and standard must be finished to curb or sidewalk grade. Forms must be rigid and securely braced in place. Conduit ends and anchor bolts must be placed at proper height and position. Anchor bolts must be installed a maximum of 1:40 from vertical and held in place by rigid top and bottom templates. Use a steel bottom template at least 1/2 inch thick that provides proper spacing and alignment of anchor bolts near the embedded bottom end. Install bottom template before placing footing concrete.

Provide new foundation and anchor bolts of the proper type and size for relocated standards.

Steel parts must be galvanized as specified in Section 75-1.05, "Galvanizing."

Provide 2 nuts and washers for the upper threaded part of each anchor bolt. Provide 3 nuts and washers for each anchor bar or stud.

Do not weld high-strength steel used for anchor bolt, anchor bar, or stud.

Before placing concrete, moisten forms and ground. Keep forms in place until the concrete sets for at least 24 hours and is strong enough to prevent damage to surface.

Except if located on a structure, construct foundation for post, standard, and pedestal monolithically.

Apply ordinary surface finish as specified in Section 51-1.18A, "Ordinary Surface Finish."

If a foundation must be extended for additional depth, the extension work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

Do not erect post, pole, standard, pedestal, or cabinet until the foundation is set for a minimum of 7 days.

The Engineer will choose the plumbing or raking technique for posts, standards, and pedestals. Plumb or rake by adjusting the leveling nuts before tightening nuts. Do not use shims or similar devices. After final adjustments of both top nuts and leveling nuts on anchorage assemblies have been made, and each post, standard, and pedestal on structure is properly positioned, tighten nuts as follows:

1. Tighten leveling nuts and top nuts, following a crisscross pattern, until bearing surfaces of all nuts, washers, and base plates are in firm contact.
2. Use an indelible marker to mark the top nuts and base plate with lines showing relative alignment of the nut to the base plate.
3. Tighten top nuts, following a crisscross pattern, an additional 1/6th of a turn.

In unpaved areas, construct a raised PCC pad in front of each controller cabinet.

Completely remove foundations not to be reused or abandoned.

If abandoning a foundation, remove the top of foundation, anchor bolts, and conduits to a minimum depth of 0.5 foot below sidewalk surface or original ground. Backfill the resulting hole with material equivalent to the surrounding material.

86-2.04 STANDARDS, STEEL PEDESTALS AND POSTS

Bolts, including anchor bolts, nuts, and washers for signal and lighting support structures must comply with Section 55-2, "Materials." Except for bearing-type connection or slip-base, high-strength bolted connection must comply with Section 55-3.14, "Bolted Connections." Welding, nondestructive testing of welds, and acceptance and repair criteria for steel member nondestructive testing must comply with American Welding Society (AWS) D1.1.

Using stainless steel rivets, attach rectangular corrosion-resistant metal identification tag on all standards and poles, except Type 1:

1. Above the hand hole, near the base of standards and poles
2. On the underside of mast arms near the arm plate

The lettering on each identification tag must be depressed or raised, 1/4 inch tall, legible, and include the following information:

1. Name of the manufacturer
2. Date of manufacture
3. Identification number
4. Contract number
5. Unique identification code that is:
 - 5.1. Assigned by the manufacturer
 - 5.2. Traceable to a particular contract and the welds on that component
 - 5.3. Readable after the support structure is coated and installed

Type 1 standard and steel pedestal for controller cabinet must be manufactured of one of the following:

1. 0.12-inch or thicker galvanized steel
2. 4-inch standard weight galvanized steel pipe as specified in ASTM A 53
3. 4-inch Type 1 conduit with the top designed for post-top slip-fitter

Ferrous metal parts of a standard that has a shaft length of 15 feet or longer must comply with the provisions in Section 55-2, "Materials," and the following:

1. Standard must be manufactured from sheet steel of weldable grade having a minimum yield strength of 40,000 psi after manufacturing.
2. Certified test report verifying compliance with minimum yield strength requirements must be submitted. Test report may be the mill test report for the as-received steel or if the as-received steel has a lower yield strength than required you must provide test data assuring that your method of cold forming will consistently increase the tensile properties of the steel to meet the specified minimum yield strength. Test data must include tensile properties of the steel after cold forming for specific heats and thicknesses.
3. If a single-ply 5/16-inch thick pole is specified, a 2-ply pole with equivalent section modulus may be substituted.
4. Standard may be manufactured of full-length sheets or shorter sections. Each section must be manufactured from 1 or 2 pieces of sheet steel. If 2 pieces are used, the longitudinal welded seams must be directly opposite from one another. If the sections are butt-welded together, the longitudinal welded seams of adjacent sections must be placed to form continuous straight seams from base to top of standard.
5. Butt-welded circumferential joints of tubular sections requiring CJP groove welds must be made using a metal sleeve backing ring inside each joint. The sleeve must be 1/8 inch nominal thickness, or thicker, and manufactured from steel having the same chemical composition as the steel in the tubular sections to be joined. If the sections to be joined have different specified minimum yield strengths, the steel in the sleeve

- must have the same chemical composition as the tubular section having the higher minimum yield strength. The width of the metal sleeve must be consistent with the type of nondestructive testing selected and must be a minimum width of 1 inch. At fitting time, the sleeve must be centered at the joint and in contact with the tubular section at the point of the weld.
6. Welds must be continuous.
 7. Weld metal at the transverse joint must extend to the sleeve, making the sleeve an integral part of the joint.
 8. During manufacturing, longitudinal seams on vertical tubular members of cantilevered support structures must be centered on and along the side of the pole that the pole plate is located. Longitudinal seams on horizontal tubular members, including signal and luminaire arms, must be within ± 45 degrees of the bottom of the arm.
 9. Longitudinal seam weld in steel tubular section may be made by the electric resistance welding process.
 10. Longitudinal seam weld must have 60 percent minimum penetration, except:
 - 10.1. Within 6 inches of circumferential weld, longitudinal seam weld must be CJP groove weld.
 - 10.2. Longitudinal seam weld on lighting support structure having telescopic pole segment splice must be CJP groove weld on the female end for a length on each end equal to the designated slip-fit splice length plus 6 inches.
 11. Exposed circumferential weld, except fillet and fatigue-resistant weld, must be ground flush with the base metal before galvanizing or painting. Ground flush is specified as -0, +0.08-inch.
 12. Circumferential weld and base plate-to-pole weld may be repaired only one time.
 13. Exposed edges of the plates that make up the base assembly must be finished smooth and exposed corners of the plates must be broken. Provide shafts with slip-fitter shaft caps.
 14. Surface flatness requirements of ASTM A 6 apply to plates:
 - 14.1. In contact with concrete, grout, or washers and leveling nuts
 - 14.2. In high-strength bolted connections
 - 14.3. In joints, where cap screws are used to secure luminaire and signal arms
 - 14.4. Used for breakaway slip-base assemblies
 15. Standard must be straight with a maximum variation of:
 - 15.1. 1 inch measured at the midpoint of a 30-foot to 35-foot standard
 - 15.2. 3/4 inch measured at the midpoint of a 17-foot to 20-foot standard
 - 15.3. 1 inch measured 15 feet above the base plate for Type 35 and Type 36 standards
 16. Zinc-coated nuts used on fastener assemblies having a specified preload obtained by specifying a prescribed tension, torque value, or degree of turn must be provided with a colored lubricant, clean and dry to the touch. The lubricant color must contrast the zinc coating color on the nut so the presence of the lubricant is visually obvious. Lubricant must be insoluble in water or the fastener components must be shipped to the job site in a sealed container.
 17. Do not make additional holes in structural members.
 18. Standard with an outside diameter of 12 inches or less must be round. Standard with an outside diameter greater than 12 inches must be round or multisided. Multisided standard must be convex with a minimum of 12 sides and have a minimum bend radius of 4 inches.
 19. Manufacture mast arm from material specified for standard.
 20. Manufacture cast steel option for slip base from material of Grade 70-40, as specified in ASTM A 27/A 27M. Other comparable material may be used if approved by the Engineer. The casting tolerances must comply with the Steel Founders' Society of America's recommendations for green sand molding.
 21. One casting from each lot of a maximum of 50 castings must be radiographed as specified in ASTM E 94. Casting must comply with the acceptance criteria for severity level 3 or better for the types and categories of discontinuities in ASTM E 186 and E 446. If the casting fails the inspection, 2 additional castings must be radiographed. If the 2 additional castings fail the inspection, the entire lot will be rejected.
 22. Material certification, consisting of physical and chemical properties, and radiographic film of the casting must be filed at the manufacturer's office. Certification and film must be available for inspection.

23. High-strength bolts, nuts, and flat washers used to connect slip-base plate must comply with ASTM A 325 or A 325M and be galvanized as specified in Section 75-1.05, "Galvanizing."
24. Plate washers must be manufactured by saw cutting and drilling steel plate. Steel plate must comply with AISI 1018 and be galvanized as specified in Section 75-1.05, "Galvanizing." Before galvanizing, remove burrs and sharp edges and chamfer both sides of holes to allow the bolt head to make full contact with the washer without tension.
25. High-strength cap screws for attaching arms to standards must comply with ASTM A 325, A 325M, or A 449, and the mechanical requirements in ASTM A 325 or A 325M after galvanizing. Cap screws must be galvanized as specified in Section 75-1.05, "Galvanizing." Coat threads of cap screws with a colored lubricant, clean and dry to the touch. Lubricant color must contrast the zinc-coating color on the cap screw so the presence of the lubricant is visually obvious. Lubricant must be insoluble in water or the fastener components must be shipped to the job site in a sealed container.
26. Bolted connection attaching signal or luminaire arm to pole must be considered slip critical. Galvanized faying surfaces of plates on luminaire, signal arm, and pole must be roughened by hand using a wire brush before assembly and must comply with requirements for Class C surface conditions for slip-critical connections in "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts," a specification approved by the Research Council on Structural Connections (RCSC). Paint for faying surfaces must be as specified in the RCSC specification for Class B coating.
27. The Engineer will randomly take samples of fastener components from each production lot and submit to the Transportation Laboratory with test reports as specified in ASTM fastener specifications for QA testing and evaluation. The Engineer will determine sample sizes for each fastener component.

Change in mast arm configuration is allowed as long as the mounting height and stability are maintained.

Before manufacturing, details must be adjusted to ensure that cap screw heads can be turned using conventional installation tools. During manufacturing process, to avoid interference with the cap screw heads, the position of the luminaire arm on the arm plate must be properly located.

Configure mast arm as a smooth curving arm.

Push button post, pedestrian barricade, and guard post must comply with ASTM A 53.

Assemble and tighten slip base when pole is on the ground. Threads of heavy hex nuts for each slip-base bolt must be coated with additional lubricant that is clean and dry to the touch. Tighten high strength slip-base bolts to within ± 10 foot-pounds of the following:

Slip-Base Bolt-Tightening Requirements

Standard Type	Torque (foot-pounds)
15-SB	150
30	150
31	200
36-20A	165

Hole in shaft of existing standard, due to removal of equipment or mast arms, must be sealed by fastening a galvanized steel disk to cover the hole. Fasten using a single central galvanized steel fastener. Seal edges of disk and hole with polysulfide or polyurethane sealing compound of Type S, Grade NS, Class 25, and Use O, as specified in ASTM C 920.

If existing standard is ordered to be relocated or reused, remove large dents, straighten shafts, and replace parts that are in poor condition. You must furnish anchor bolts or bars and nuts required for relocating or reusing standard. Repair and replacement work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

New nuts, bolts, cap screws, and washers must be provided if:

1. Standard or mast arm is relocated
2. Used standard or mast arm is State furnished

If the standard has a slip base, a new keeper plate must be provided.

86-2.05 CONDUIT

Run conductors in conduit except for overhead and where conductors are run inside poles.

You may use a larger size conduit than specified as long as you use it for the entire length between outlets. Do not use reducing coupling.

New conduit must not pass through existing foundations for standards.

86-2.05A Material

Conduit and conduit fitting must be UL or NRTL listed and comply with the following:

Conduit and Conduit Fitting Requirements

Type 1	Hot-dip galvanized rigid steel conduit and conduit couplings must comply with UL 6 and ANSI C80.1. Zinc coating testing must comply with copper sulfate test requirements in UL 6. Conduit couplings for rigid steel conduit must be electrogalvanized.
Type 2	Hot-dip galvanized rigid steel conduit must comply with requirements for Type 1 conduit and be coated with polyvinyl chloride (PVC) or polyethylene. Exterior thermoplastic coating must have a minimum thickness of 35 mils. Internal coating must have a minimum thickness of 2 mils. Coated conduit must comply with UL 6; NEMA RN 1; or NRTL PVC-001.
Type 3	Rigid nonmetallic PVC conduit must comply with UL 651. Type A extruded rigid PVC conduit and extruded rigid HDPE conduit must comply with UL 651A. Coilable, smooth-wall, continuous length HDPE conduits must comply with UL 651B. Install at underground locations only.
Type 4	Waterproof flexible metal conduit must consist of conduit with a waterproof non-metallic sunlight-resistant jacket over an inner flexible metal core. Type 4 conduit must be UL listed for use as the grounding conductor.
Type 5	Intermediate steel conduit and conduit couplings must comply with UL 1242 and ANSI C80.6. Zinc coating testing must comply with copper sulfate test requirements in UL 1242. Conduit couplings for intermediate rigid steel conduit must be electrogalvanized. Type 5 conduit must only be used if specified.

Bonding bushings to be installed on metal conduit must be insulated and either galvanized or zinc alloy type.

Fittings for steel conduit and for watertight flexible metal conduit must be UL listed at UL 514B.

86-2.05B Use

Install Type 1 conduit on all exposed surfaces and at the following locations:

1. In concrete structures
2. Between a structure and nearest pull box

Exposed conduit installed on painted structure must be painted the same color as the structure.

Change or extend existing conduit runs using the same material. Install pull box if an underground conduit changes from the metallic type to Type 3.

Minimum trade size of conduit must be:

1. 1-1/2 inches from electrolier to adjacent pull box
2. 1 inch from pedestrian push button post to adjacent pull box
3. 2 inches from signal standard to adjacent pull box
4. 3 inches from controller cabinet to adjacent pull box
5. 2 inches from overhead sign to adjacent pull box
6. 2 inches from service equipment enclosure to adjacent pull box
7. 1-1/2 inches if unspecified

Two conduits must be installed between controller cabinet and adjacent pull box.

86-2.05C Installation

Whether shop or field cut, ream ends of conduit to remove burrs and rough edges. Make cuts square and true. Slip joints and running threads are not allowed for coupling conduit. If a standard coupling cannot be used for coupling metal type conduit, use a threaded union coupling that is UL or NRTL listed. Tighten couplings for metal conduit to maintain a good electrical connection through conduit run.

Cut Type 3 conduit with tools that will not deform the conduit. Use solvent weld for connections.

Cut Type 2 conduit with pipe cutters; do not use hacksaws. Coated conduit must be threaded with standard conduit-threading dies. Tighten conduit into couplings or fittings using strap wrenches or approved groove-joint pliers.

Protect shop-cut threads from corrosion as follows:

Shop-Cut Thread Protection

Steel conduit and conduit couplings	ANSI C80.1
Electrical intermediate metal conduit and conduit couplings	ANSI C80.6

Paint conduits as specified in Section 91, "Paint." Apply 2 coats of approved unthinned zinc-rich primer of organic vehicle type. Do not use aerosol cans. Paint the following parts of conduits:

1. All exposed threads
2. Field-cut threads before installing conduit couplings to steel conduit
3. Damaged surfaces on metal conduit

Do not remove shop-installed conduit couplings.

Damaged Type 2 conduit or conduit coupling must be wrapped with at least 1 layer of 2 inch wide, 20 mil minimum thickness PVC tape, as specified in ASTM D 1000, with a minimum tape overlap of 1/2 inch. Before applying the tape, conduit or fitting must be cleaned and painted with 1 coat of rubber-resin based adhesive as recommended by the tape manufacturer. You may repair damaged spots in the thermoplastic coating by painting over with a brushing type compound supplied by the conduit manufacturer instead of the tape wrap.

The ends of Types 1, 2, or 5 conduit must be threaded and capped with standard pipe caps until wiring is started. The ends of Types 3 and 4 conduit must be capped until wiring is started. If caps are removed, replace with conduit bushings. Fit insulated bonding bushings on the end of metal conduit ending in pull box or foundation. Bell or end bushings for Type 3 conduit must be non-metallic type.

Conduit bends, except factory bends, must have a radius of not less than 6 times the inside diameter of the conduit. If factory bends are not used, bend the conduit without crimping or flattening using the longest radius practicable. Bend conduits as follows:

Conduit-Bending Requirements

Type 1	By methods recommended by the conduit manufacturer and with equipment approved for the purpose.
Type 2	Use standard bending tool designed for use on thermoplastic coated conduit. Conduit must be free of burrs and pits.
Type 3	By methods recommended by the conduit manufacturer and with equipment approved for the purpose. Do not expose conduit to direct flame.
Type 4	--
Type 5	By methods recommended by the conduit manufacturer and with equipment approved for the purpose.

Install pull tape in conduit that is to receive future conductors. The pull tape must be a flat woven lubricated soft-fiber polyester tape with a minimum tensile strength of 1,800 pounds and have printed sequential measurement markings every 3 feet. At least 2 feet of pull tape must be doubled back into the conduit at each end.

Existing underground conduit to be incorporated into a new system must be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air.

Install conduit to a depth of not less than 30 inches below finished grade, except in sidewalk and curbed paved median areas, where it must be at least 18 inches below grade. You may lay conduit on existing pavement within new curbed median.

Conduit coupling must be a minimum of 6 inches from face of foundation.

Place a minimum of 2 inches of sand bedding in the trench before installing Type 2 or Type 3 conduit. Place a minimum of 4 inches of same material over conduit before placing additional backfill material.

Obtain approval from the Engineer before disturbing pavement. If obstruction is encountered, obtain approval from Engineer to cut small holes in the pavement to locate or remove obstruction. If jacking or drilling method is used, keep jacking or drilling pit 2 feet away from edge of pavement. Pavement must not be weakened or subgrade softened from excess water use.

Conduit used for jacking or drilling must be removed; install new conduit for completed work. If a hole larger than the conduit is pre-drilled and you install conduit by hand or by method recommended by the conduit manufacturer with equipment approved for purpose, you may install Type 2 or Type 3 conduit under pavement.

If trenching in pavement method is specified, conduit installation under pavement that is not a freeway lane or freeway to freeway connector ramp, must comply with the following:

1. Use Type 3 conduit. Place conduit under pavement in a trench approximately 2 inches wider than the outside diameter of conduit, but not exceeding 6 inches in width. Trench depth must not exceed the greater of 12 inches or conduit trade size plus 10 inches, except that at pull boxes the trench may be hand dug to required depth. The top of the installed conduit must be a minimum of 9 inches below finished grade.
2. Trenching installation must be completed before placing final pavement layer.
3. Cut pavement to be removed with a rock cutting excavator. Minimize shatter outside the removal area.
4. Place conduit in bottom of trench and backfill with minor concrete as specified in Section 90-10, "Minor Concrete.". Minor concrete must contain a minimum of 590 pounds of cementitious material per cubic yard. If the trench is in asphalt concrete pavement and pavement overlay is not placed, backfill the top 0.10 foot of trench with minor HMA.
5. Before spreading HMA, apply tack coat as specified in Section 39, "Hot Mix Asphalt."
6. Backfill trenches, except for the top 0.10 foot, by the end of each day. The top 0.10 foot must be filled within 3 days after trenching.

Conduit installed beneath railroad tracks must be:

1. Type 1 or 2
2. 1-1/2-inch minimum diameter
3. Placed a minimum depth of 42 inches below bottom of the rail

If jacking or drilling method is used, construct jacking pit to a minimum of 13 feet from the centerline of track at the near side of jacking pit. Cover jacking pit with substantial planking if left overnight.

Conduit ending in standard or pedestal must not extend more than 3 inches vertically above the foundation and must be sloped toward the handhole opening. Conduit entering through the side of non-metallic pull box must end inside the box within 2 inches of the wall and 2 inches above the bottom and be sloped toward the top of box to facilitate pulling of conductors. Conduit entering through the bottom of a pull box must end 2 inches above the bottom and be located near the end walls to leave the major portion of the box clear. At outlet, conduit must enter from the direction of the run.

Underground conduit runs, including under sidewalks, that are adjacent to gasoline service stations or other underground gasoline or diesel storage, piping, or pumps and that lead to a controller cabinet, circuit breaker panel, service, or enclosure where an arc may occur during normal operations must be sealed if the conduit is within the limits specified in the NEC for Class 1, Division 1. Use Type 1 or Type 2 conduit for these runs.

Conduit for future use in structures must be threaded and capped. Conduit leading to soffit, wall, or other lights or fixtures below pull box grade must be sealed and made watertight, except where conduit ends in a No. 9 or No. 9A pull box.

Support for conduit in or on wall or bridge superstructure must comply with the following:

1. Steel hangers, steel brackets, and other fittings must comply with Section 75-1.03, "Miscellaneous Bridge Metal."
2. Construct precast concrete conduit cradles using minor concrete and commercial quality welded wire fabric. Minor concrete must comply with Section 90-10, "Minor Concrete," and contain a minimum of 590 pounds of cementitious material per cubic yard. The cradles must be moist cured for a minimum of 3 days. Bond precast concrete cradles to structure with epoxy adhesives specified in one of the following:
 - 2.1. Section 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete"
 - 2.2. Section 95-2.04, "Rapid Set Epoxy Adhesive for Pavement Markers"
 - 2.3. Section 95-2.05, "Standard Set Epoxy Adhesive for Pavement Markers"
3. Use pipe sleeve or form opening for conduit through bridge superstructure concrete. Sleeve or opening through either prestressed member or conventionally reinforced precast member must be:
 - 3.1. Transverse to the member
 - 3.2. Through the web
 - 3.3. Not more than 3 inches maximum gross opening in concrete
4. Where conduits pass through the abutment concrete, wrap conduit with 2 layers of asphalt-felt building paper securely taped or wired in place. Fill space around conduit that runs through bridge abutment wall with mortar as specified in Section 51-1.135, "Mortar," except the proportion of cementitious material to sand must be 1 to 3. Fill the space around conduits that run through abutments after prestressing is completed.
5. Run surface-mounted conduit straight and true, horizontal or vertical on the wall, and parallel to wall on ceiling or other similar surfaces. Support conduit at a maximum of 5-foot intervals or closer where necessary to prevent vibration or unsightly deflection. The supports must include galvanized malleable iron conduit clamps and clamp backs secured with expansion anchorage devices as specified for concrete anchorage devices in Section 75-1.03, "Miscellaneous Bridge Metal." Threaded studs must be galvanized and be of the largest diameter that will pass through the mounting hole in conduit clamp.
6. Where pull boxes are placed in conduit runs, conduit must be fitted with threaded bushings and bonded.
7. Mark location of conduit end in structure, curb, or wall with a "Y" that is a minimum of 3 inches tall, directly above conduit.

86-2.05D Expansion Fittings

Install expansion fitting where the conduit crosses an expansion joint in structure. Each expansion fitting for metal conduit must include a copper bonding jumper having the ampacity specified in NEC.

Each expansion-deflection fitting for expansion joints of 1-1/2-inch movement rating must be watertight and include a molded neoprene sleeve, a bonding jumper, and 2 silicon bronze or zinc-plated iron hubs. Each fitting must allow a minimum of 3/4-inch expansion, contraction, and lateral deflection.

86-2.06 PULL BOXES

You may use a larger standard size pull box than that shown on the plans or specified. Pull box, cover, and extensions must be of the same material.

86-2.06A Materials

Pull box, cover, and extension for installation in ground or sidewalk area must be precast reinforced PCC or non-PCC material. Non-PCC material must:

1. Be fire resistant with a burn rate no greater than 0.3-inch per minute per 0.1 inch of thickness when tested as specified in ASTM D 635
2. Show no significant change in physical properties with exposure to weather
3. Be dense, free of voids or porosity, and gray or brown in color

Non-PCC pull box must comply with the following:

1. Top dimensions must not exceed the bottom dimensions by more than 1 inch.
2. Extension must be of the same material as the pull box and attached to pull box to maintain the minimum combined depths.
3. Cover must not fail and must not deflect more than 1/4 inch when a vertical force of 1,500 pounds is applied through a 1/2" x 3" x 6" steel plate to a non-PCC cover on a pull box. Center the steel plate on cover with its longitudinal axis coinciding with longitudinal axis of cover.

Non-PCC pull boxes must be of sufficient rigidity that when a designated concentrated force is applied perpendicularly to the midpoint of one of the long sides at the top while the opposite long side is supported by a rigid surface, it must be possible to remove the cover without the use of tools. The designated concentrated force must be 150 pounds for a No. 3-1/2 pull box and must be 100 pounds for a No. 5 or No. 6 pull box.

If a transformer or other device must be placed in a non-metallic pull box, include recesses for hanger.

Secure cover, except ceiling pull box cover, with 3/8-inch hold down bolts, cap screws, or studs, washers, and brass stainless steel or other non-corroding-metal nut. Stainless steel hardware must have an 18 percent chromium content and an 8 percent nickel content.

Galvanize ferrous metal parts as specified in Section 75-1.05, "Galvanizing."

Traffic pull box must be provided with steel cover and special concrete footing. Steel cover must have a embossed non-skid pattern.

Traffic pull box and cover must comply with ASTM C857, "Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures," for H20 loading. You must be able to place the load anywhere on box and cover for 1 minute without causing cracks or permanent deformations.

No. 3-1/2(T) and No. 5(T) traffic pull box must be reinforced with a galvanized Z bar welded frame and cover similar to that shown on the plans for No. 6(T) pull box. Frame must be anchored to box with 1/4" x 2-1/4" concrete anchors. Four concrete anchors must be included for No. 3-1/2(T) pull box; one placed in each corner. Six concrete anchors for must be included for No. 5(T) and No. 6(T) pull boxes; one placed in each corner and one near the middle of each of the longer sides.

Hold down screws must be 3/8 inch hex flange cap screws of Type 316 stainless steel. Nut must be zinc plated carbon steel, vibration resistant, and have a wedge ramp at the root of the thread. Nut must be spot welded to the underside or manufactured with galvanized Z bar pull box frame.

Steel cover must be countersunk approximately 1/4 inch to accommodate bolt head. When tightened, bolt head must not exceed more than 1/8 inch above the top of cover. A 1/4 inch tapped hole and brass bonding screw must be included.

Concrete placed around and under traffic pull box must be minor concrete as specified in Section 90-10, "Minor Concrete."

86-2.06B Cover Marking

Marking must be clearly defined, uniform in depth, and parallel to either the long or short sides of cover.

Marking letters must be between 1 inch to 3 inch high.

Before galvanizing steel or cast iron cover, apply marking by one of the following methods:

1. Use cast iron strip at least 1/4-inch thick with letters raised a minimum of 1/16 inch. Fasten strip to cover with 1/4 inch flathead stainless steel machine bolts and nuts. Peen bolts after tightening.
2. Use sheet steel strip at least 0.027-inch thick with letters raised a minimum of 1/16 inch. Fasten strip to cover by spot welding, tack welding, or brazing, with 1/4 inch stainless steel rivets or 1/4 inch roundhead stainless steel machine bolts and nuts. Peen bolts after tightening.
3. Bead weld the letters on cover so that letters are raised a minimum of 3/32 inch.

86-2.06C Installation and Use

Space pull boxes no more than 200 feet apart. You may install additional pull boxes to facilitate the work.

Pull box in ground or sidewalk area must be installed as follows:

1. Embed bottom of pull box in crushed rock.
2. Place a layer of roofing paper on crushed rock.
3. Place mortar over layer of roofing paper. Mortar must be 0.50 inch to 1 inch thick and be sloped toward the drain hole.

4. Make a 1-inch drain hole in center of pull box through mortar and roofing paper.
5. Place mortar between pull box and pull box extension, and around conduits.

Reconstruct sump of existing pull box if disturbed by your operations. Remove old grout and replace with new if the sump was grouted.

After installation of traffic pull box, install steel cover and keep bolted down when your activities are not in progress at the pull box. When steel cover is placed for final time, cover and Z bar frame must be cleaned of debris and securely tightened.

86-2.07 (BLANK)

86-2.08 CONDUCTORS AND CABLES

Conductor must be copper wire that complies with ASTM B 3 and B 8.

Wire size must comply with the following:

Wire Size Requirements

Conductor usage	Requirement
In loop detector lead-in cable	ASTM B 286
Everywhere except in loop detector lead-in cable	American Wire Gage (AWG) ^a

^aExcept conductor diameter must not be less than 98 percent of specified AWG diameter.

Single conductor and cable, except detector lead-in cable, must have clear, distinctive, and permanent markings on the outer surface throughout its length. The markings must include the manufacturer's name or trademark, insulation type letter designation, conductor size, voltage, and temperature rating, and for cables, it must also include number of conductors.

86-2.08A Conductor Identification

Conductor insulation must be a solid color with a permanent stripe as specified below. The solid color must be homogeneous through the full depth of insulation. Identification stripe must be continuous throughout the length of conductor. For conductor sizes No. 2 and larger, the insulation may be black and the ends of the conductors must be taped for a minimum length of 20 inches with electrical insulating tape of the required color.

Conductor Identification

Circuit	Signal Phase or Function	Identification			Size
		Insulation Color ⁱ		Band Symbols ^f	
		Base	Stripe ^a		
Vehicle Signals ^{a,b,d}	2,6	Red, Yel, Brn	Blk	2,6	14
	4,8	Red, Yel, Brn	Ora	4,8	14
	1,5	Red, Yel, Brn	None	1,5	14
	3,7	Red, Yel, Brn	Pur	3,7	14
	Ramp Meter 1	Red, Yel, Brn	None	NBR	14
	Ramp Meter 2	Red, Yel, Brn	Blk	NBR	14
Pedestrian Signals ^d	2p,6p	Red, Brn	Blk	2p,6p	14
	4p,8p	Red, Brn	Ora	4p,8p	14
	1p,5p	Red, Brn	None	1p,5p	14
	3p,7p	Red, Brn	Pur	3p,7p	14
Pedestrian Push Buttons ^d	2p,6p	Blu	Blk	P-2,P-6	14
	4p,8p	Blu	Ora	P-4,P-8	14
	1p,5p	Blu	None	P-1,P-5	14
	3p,7p	Blu	Pur	P-3,P-7	14
Traffic Signal Controller Cabinet	Ungrounded Circuit Conductor	Blk	None	CON-1	6
	Grounded Circuit Conductor	Wht	None	CON-2	6
Highway Lighting Pull Box to Luminaire	Ungrounded-Line 1	Blk	None	NBR	14
	Ungrounded-Line 2	Red	None	NBR	14
	Grounded	Wht	None	NBR	14
Multiple Highway Lighting	Ungrounded-Line 1	Blk	None	ML1	10
	Ungrounded-Line 2	Red	None	ML2	10
Lighting Control	Ungrounded to PEU	Blk	None	C1	14
	Switching leg from PEU unit or SM transformer	Red	None	C2	14
Service	Ungrounded-Line 1 (Signals)	Blk	None	NBR ^e	6
	Ungrounded-Line 2 (Lighting)	Red ^h	None	NBR ^e	8
Sign Lighting	Ungrounded-Line 1	Blk	None	SL-1	10
	Ungrounded-Line 2	Red	None	SL-2	10
Flashing Beacons ^g	Ungrounded between Flasher and Beacons	Red or Yel	None	F-Loc. ^c	14
Grounded and Common	Pedestrian Push Buttons	Wht	Blk	NBR	14
	Signals and Multiple Lighting	Wht	None	NBR	10
	Flashing Beacons and Sign Lighting	Wht	None	NBR	12
	Lighting Control	Wht	None	C-3	14
	Multiple Service	Wht	None	NBR	14
Railroad Preemption		Blk	None	R	14
Spares		Blk	None	NBR	14

NBR = No Band Required PEU=Photoelectric unit

^aOn overlaps, insulation is striped for 1st phase in designation. e.g., phase (2+3) conductor is striped as for phase 2.

^bBand for overlap and special phases as required.

^cFlashing beacons having separate service do not require banding.

^dThese requirements do not apply to signal cable.

^e"S" if circuit is switched on line side of service equipment by utility.

^fBand conductors in each pull box and near ends of termination points. On signal light circuits, a single band may be placed around 2 or 3 ungrounded conductors comprising a phase.

^gUngrounded conductors between service switch and flasher mechanism must be black and banded.

^hBlack acceptable for size No. 2 and larger. Tape ends for 20 inches with indicated color.

ⁱColor Code: Yel-Yellow, Brn-Brown, Blu-Blue, Blk-Black, Wht-White, Ora-Orange, Pur-Purple.

86-2.08B Multiple Circuit Conductors

Conductor for multiple circuit must be UL or NRTL listed and rated for 600 V(ac) operation. Insulation for No. 14 to No. 4 conductors must be one of the following:

1. Type TW PVC as specified in ASTM D 2219
2. Type THW PVC
3. Type USE, RHH, or RHW cross-linked polyethylene

Minimum insulation thickness must comply with the following:

Insulation Thickness		
Insulation Type	Conductor Size	Insulation Thickness (mils)
USE, RHH, or RHW	No. 14 to No. 10	39
	No. 8 to No. 2	51
THW or TW	No. 14 to No. 10	27
	No. 8	40
	No. 6 to No. 2	54

Insulation for No. 2 and larger conductor must be one of the types listed above or Type THWN.

Conductor for wiring wall and soffit luminaire must be stranded copper with insulation rated for use at temperatures up to 125 °C.

86-2.08C Signal Cable

Signal cable, except for the 28-conductor type, must:

1. Not be spliced
2. Be marked in each pull box with the signal standard information it is connecting to

Signal cable must comply with the following:

1. Cable jacket must be:
 - 1.1. Black polyethylene with an inner polyester binder sheath
 - 1.2. Rated for 600 V(ac) and 75 °C
2. Filler material, if used, must be polyethylene material.
3. Conductor must be solid copper with Type THWN insulation as specified in Section 86-2.08, "Conductors and Cables," and ASTM B 286. The minimum thickness of Type THWN insulation must be 12 mils for conductor sizes No. 14 to No. 12 and 16 mils for conductor size No. 10. The minimum thickness of nylon jacket must be 4 mils.

Conductor Signal Cable Requirements

Cable Type ^a	Conductor Quantity and Type	Cable Jacket Thickness (mils)		Maximum Nominal Outside Diameter (inch)	Conductor Color Code	Remarks
		Average	Minimum			
3CSC	3 - No. 14	44	36	0.40	blue/black, blue/orange, white/black stripe	Use for pedestrian push buttons and spare
5CSC	5 - No. 14	44	36	0.50	red, yellow, brown, black, white	
9CSC	8 - No. 14 1 - No. 12	60	48	0.65	No. 12 - white No. 14 - red, yellow, brown, black, and red/black, yellow/black, brown/black, white/black stripe	
12CSC	11 - No. 14 1 - No. 12	60	48	0.80	No. 12 - white No. 14 - see "12CSC Color Code and Functional Connection" table	Use for vehicle signals, pedestrian signals, spares, and signal common
28CSC	27 - No. 14 1 - No. 10	80	64	0.90	No. 10 - white No. 14 - see "28CSC Color Code and Functional Connection" table	Keep signal commons in each cable separate except at the signal controller. Label each cable as "C1" or "C2" in pull box. Use "C1" for signal phases 1, 2, 3, and 4. Use "C2" for phases 5, 6, 7, and 8.

^aConductor signal cable description starts with the number of conductors, followed by "CSC". (e.g., a signal cable with 3 conductors is labeled "3CSC".)

12CSC Color Code and Functional Connection

Color Code	Termination	Phase
Red	Vehicle signal red	2, 4, 6, or 8
Yellow	Vehicle signal yellow	2, 4, 6, or 8
Brown	Vehicle signal green	2, 4, 6, or 8
Red/black stripe	Vehicle signal red	1, 3, 5, or 7
Yellow/black stripe	Vehicle signal yellow	1, 3, 5, or 7
Brown/black stripe	Vehicle signal green	1, 3, 5, or 7
Black/red stripe	Spare, or use as required for red or DONT WALK	
Black/white stripe	Spare, or use as required for yellow	
Black	Spare, or use as required for green or WALK	
Red/white stripe	Ped signal DONT WALK	
Brown/white stripe	Ped signal WALK	

28CSC Color Code and Functional Connection

Color Code	Termination	Phase
Red/black stripe	Vehicle signal red	2 or 6
Yellow/black stripe	Vehicle signal yellow	2 or 6
Brown/black stripe	Vehicle signal green	2 or 6
Red/orange stripe	Vehicle signal red	4 or 8
Yellow/orange stripe	Vehicle signal yellow	4 or 8
Brown/orange stripe	Vehicle signal green	4 or 8
Red/silver stripe	Vehicle signal red	1 or 5
Yellow/silver stripe	Vehicle signal yellow	1 or 5
Brown/silver stripe	Vehicle signal green	1 or 5
Red/purple stripe	Vehicle signal red	3 or 7
Yellow/purple stripe	Vehicle signal yellow	3 or 7
Brown/purple stripe	Vehicle signal green	3 or 7
Red/2 black stripes	Ped signal DONT WALK	2 or 6
Brown/2 black stripes	Ped signal WALK	2 or 6
Red/2 orange stripes	Ped signal DONT WALK	4 or 8
Brown/2 orange stripes	Ped signal WALK	4 or 8
Red/2 silver stripes	Overlap A, C red	OLA, OLC
Brown/2 silver stripes	Overlap A, C green	OLA, OLC
Red/2 purple stripes	Overlap B, D red	OLB, OLD
Brown/2 purple stripes	Overlap B, D green	OLB, OLD
Blue/black stripe	Ped push button	2 or 6
Blue/orange stripe	Ped push button	4 or 8
Blue/silver stripe	Overlap A, C yellow	OLA(y), OLC(y)
Blue/purple stripe	Overlap B, D yellow	OLB(y), OLD(y)
White/black stripe	Ped push button common	
Black/red stripe	Railroad preemption	
Black	Spare	

86-2.08D Signal Interconnect Cable (SIC)

Signal interconnect cable must be a 3-pair or 6-pair type with stranded tinned copper No. 20 conductors. Each conductor insulation must be 13 mils minimum nominal thickness, color-coded, polypropylene material. Conductors must be in twisted pairs. Color coding distinguishes each pair. Each pair must be wrapped with an aluminum polyester shield and must have a No. 22 or larger stranded tinned copper drain wire inside the shielded pair.

Cable jacket must be black, high density polyethylene, rated for a minimum of 300 V(ac) and 60 °C, and must have a minimum nominal wall thickness of 40 mils. Cable jacket or moisture-resistant tape directly under the outer jacket must be marked as specified in Section 86-2.08.

You must have a minimum of 6 feet of slack at each controller cabinet. Splicing is allowed only if shown on the plans.

Insulate conductor splice with heat-shrink tubing and overlap at least 0.6 inch. Cover overall cable splice with heat-shrink tubing and overlap the cable jacket at least 1-1/2 inch.

86-2.09 WIRING

Run conductors in conduit, except for overhead and temporary installations and where conductors are run inside poles.

Solder by hot iron, pouring, or dipping method, connectors and terminal lugs for conductor sizes No. 8 and smaller. Do not perform open-flame soldering.

86-2.09A Circuitry

Do not run traffic signal indication conductors to a terminal block on a standard unless connected to a mounted signal head.

Use only 1 conductor to connect to each terminal of a pedestrian push button.
 The common for pedestrian push button circuit must be separate from traffic signal circuit grounded conductor.

86-2.09B Installation

Use a UL- or NRTL-listed inert lubricant for placing conductors in conduit.

Pull conductors into conduit by hand using pull tape specified in Section 86-2.05C, "Installation." Do not use winches or other power-actuated pulling equipment.

If adding new conductors or removing existing conductors, remove all conductors, clean conduit as specified in Section 86-2.05C, "Installation," and pull all conductors in conduit as 1 unit.

If traffic signal conductors are run in lighting standard containing street lighting conductors from a different service point, you must encase the traffic signal conductors or the lighting conductors with a flexible or rigid metal conduit for a length until the 2 types of conductors are no longer in the same raceway.

If less than 10 feet above grade, enclose temporary conductors in flexible or rigid metal conduit.

Leave slack for each conductor as follows:

Conductor Slack Requirements

Location	Slack (feet)
Signal standard	1
Lighting standard	1
Signal and lighting standard	1
Pull box	3
Splice	3
Standards with slip base	0

After conductors are installed, seal ends of conduits with an approved sealing compound.

To form a watertight seal, tape ends of spare conductors and conductors ending in pull boxes.

Conductors and cables inside fixture or cabinet must be neatly arranged and tied together by function with self-clinching nylon cable ties or enclosed in plastic tubing or raceway.

Identify conductors for signal overlap phase as specified for vehicle signals in the table titled "Conductor Identification."

Permanently identify conductors by function. Place identification on each conductor, or each group of conductors forming a signal phase, at each pull box and near the end of conductors.

Label, tag, or band conductors by mechanical methods. Identification must not move along the conductors.

86-2.09C Connectors and Terminals

Connectors and terminals must be UL- or NRTL-listed crimp type. Use manufacturer-recommended tool for connectors and terminals to join conductors. Comply with MIL-T-7928.

Terminate stranded conductors smaller than No. 14 in crimp style terminal lugs.

86-2.09D Splicing and Terminations

Splices are allowed for:

1. Grounded conductors in pull box.
2. Pedestrian push button conductors in pull box.
3. Conductors in pull box adjacent to each electrolier or luminaire.
4. Ungrounded traffic signal conductors in pull box, if traffic signals are modified.
5. Ungrounded traffic signal conductors to a terminal compartment or signal head on a standard with conductors of the same phase in the pull box adjacent to the standard.
6. Ungrounded lighting circuit conductors in pull box, if lighting circuits are modified.

86-2.09E Splice Insulation

Splice must function under continuous submersion in water.

Multi-conductor cable must be spliced and insulated to form a watertight joint and to prevent moisture absorption by the cable.

Low-voltage tape must be:

1. UL or NRTL listed
2. Self-fusing, oil and flame-resistant, synthetic rubber
3. PVC, pressure-sensitive adhesive of 6 mils minimum thickness

Insulating pad must be a combination of an 80-mils thick electrical grade PVC laminate and a 120-mils thick butyl splicing compound with removable liner.

Heat-shrink tubing must comply with the following:

1. Be medium or heavy wall thickness, irradiated polyolefin tubing with an adhesive mastic inner wall.
2. Before contraction, minimum wall thickness must be 40 mils.
3. Heating must be as recommended by the manufacturer. Do not perform open-flame heating.
4. When heated, the inner wall must melt and fill crevices and interstices of the covered object and the outer wall must shrink to form a waterproof insulation.
5. After contraction, each end of the heat-shrink tubing or the open end of end cap of heat-shrink tubing must overlap the conductor insulation at least 1-1/2 inches. Coat ends and seams with electrical insulation coating.
6. Comply with requirements for extruded insulated tubing at 600 V(ac) in UL Standard 468D and ANSI C119.1, and the following requirements:

Heat-Shrink Tubing Requirements

Shrinkage Ratio	33 percent, maximum, of supplied diameter when heated to 125 °C and allowed to cool to 25 °C
Dielectric Strength	350 kV per inch, minimum
Resistivity	25 ¹³ Ω per inch, minimum
Tensile Strength	2,000 psi, minimum
Operating Temperature	-40 °C to 90 °C (135 °C in emergency)
Water Absorption	0.5 percent, maximum

7. If 3 or more conductors are to be enclosed in 1 splice, place mastic around each conductor before placing inside tubing. Use mastic type recommended by heat-shrink tubing manufacturer.

You may use "Method B" as an alternative method for splice insulation. Use at least 2 thicknesses of electrical insulating pad. Apply pad to splice as recommended by manufacturer.

86-2.095 FUSED SPLICE CONNECTORS

Install a fused disconnect splice connector in each ungrounded conductor, between the line and the ballast, in the pull box adjacent to each luminaire. Connector must be accessible in the pull box.

For 240 and 480 V(ac) circuits, each connector must simultaneously disconnect both ungrounded conductors. Connector must not have exposed metal parts, except for the head of stainless steel assembly screw. Recess head of stainless steel assembly screw a minimum of 1/32 inch below top of plastic boss that surrounds the head.

Splice connector must protect fuse from water or weather damage. Contact between fuse and fuseholder must be spring loaded. Splice connector terminals must be:

1. Rigidly crimped, using a tool recommended by manufacturer of fused splice connector, onto ungrounded conductors
2. Insulated
3. Watertight

Fuses must be standard mid-gage ferrule type, with "Non-Time-Delay" feature, and 13/32" x 1-1/2".

86-2.10 BONDING AND GROUNDING

Secure all metallic components, mechanically and electrically, to form a continuous system that is effectively grounded.

Bonding jumper must be copper wire or copper braid of the same cross sectional area as a No. 8 or larger to match the load. Equipment grounding conductors must be color coded as specified in NEC or be bare.

Attach bonding jumper to standard as follows:

Bonding Jumper Attachment	
Standard type	Requirements
Standard with handhole and traffic pull box lid cover	Use UL-listed lug and 3/16-inch diameter or larger brass or bronze bolt. Run jumper to conduit or bonding wire in adjacent pull box. Grounding jumper must be visible after the standard is installed and mortar pad is placed on foundation.
Standard without handhole	Use UL-listed ground clamp on each anchor bolt.
Slip-base standard	Use UL-listed ground clamp on each anchor bolt or attach UL-listed lug to bottom slip-base plate with 3/16-inch diameter or larger brass or bronze bolt.

Ground one side of secondary circuit of step-down transformer.

Ground metal conduit, service equipment, and grounded conductor at service point as specified by NEC and service utility, except grounding electrode conductor must be No. 6 or larger.

Equipment bonding and grounding conductors are required in conduit. Run a No. 8 minimum bare copper wire continuously in conduit system. The bonding wire must be sized as specified in the NEC.

Ground electrode must be:

1. 1 piece
2. 10-foot minimum length of one of the following:
 - 2.1. Galvanized steel rod or pipe not less than 3/4 inch in diameter
 - 2.2. Copper clad steel rod not less than 5/8 inch in diameter
3. Installed as specified in NEC
4. Bonded to service equipment using one of the following:
 - 4.1. Ground clamp
 - 4.2. Exothermic weld
 - 4.3. No. 6 or larger copper conductor

On wood pole, metallic equipment mounted less than 8 feet above ground surface must be grounded.

Bond metallic conduit in non-metallic pull box using bonding bushing or bonding jumper.

Bond metallic conduit in metal pull box using bonding bushings and bonding jumpers connected to bonding wire running in the conduit system.

86-2.11 SERVICE

Electrical service installation and materials must comply with service utility requirements.

If service equipment is to be installed on utility-owned pole, you must furnish and install conduit, conductors, and other necessary material to complete service installation. Service utility will decide riser and equipment position.

Install service equipment early on to allow service utility to schedule its work before project completion.

Furnish each service with a circuit breaker that simultaneously disconnects all ungrounded service entrance conductors.

Circuit breakers must:

1. Be quick-break on either automatic or manual operation.

2. Have operating mechanism that is enclosed and trip-free from operating handle on overload.
3. Be trip indicating.
4. Have frame size plainly marked.
5. Have trip rating clearly marked on operating handle.
6. Have overload tripping of breakers not influenced by ambient temperature range of -18 °C to 50 °C.
7. Be internal trip type.
8. Be UL or NRTL listed and comply with UL 489 or equal.
9. Have minimum interrupting capacity of 10,000 A, rms, if used as service disconnect.

Service equipment enclosure must be a NEMA 3R enclosure with dead-front panel and a hasp with a 7/16-inch hole for a padlock. Enclosure must be field marked as specified in the NEC to warn qualified persons of potential electric arc flash hazards.

Service equipment enclosure, except Types II and III, must be galvanized or have a factory-applied rust-resistant prime coat and finish coat.

Types II and III service equipment enclosures must be manufactured from one of the following:

1. Galvanized sheet steel
2. Sheet steel plated with zinc or cadmium after manufacturing
3. Aluminum

Manufacture service equipment enclosure as specified in Section 86-3.04A, "Cabinet Construction." Overlapping exterior seams and doors must comply with requirements for NEMA 3R enclosures in the NEMA Enclosure Standards.

If an alternative design is proposed for Type II or III service equipment enclosure, submit plans and shop drawings to the Engineer for approval before manufacturing.

Except for falsework lighting and power for your activities, when you submit a written request, the Engineer will arrange:

1. With the service utility to complete service connections for permanent installations and the Department will pay all costs and fees required by the service utility. Submit request at least 15 days before service connections are required.
2. For furnishing electrical energy. Energy used before contract completion will be charged to you, except cost of energy used for public benefit as ordered by the Engineer will be paid by the Department or local authorities.

Full compensation for furnishing and installing State-owned or permanent service poles, service equipment, conduit, conductors, and pull boxes, including equipment, conduit, and conductors placed on utility-owned poles, is included in the contract item of electrical work involved and no additional compensation will be allowed therefor.

If the service point is indeterminate and is shown on the plans as "approximate location" or "service point not yet established," the labor and materials required for making the connection between the service point, when established, and the nearest pull box shown on the plans will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

86-2.12 WOOD POLES

Wood poles must comply with the following:

1. Class 5 or larger as specified in ANSI O 5.1
2. Less than 180-degree twist in grain over the full length
3. 4-inch or less sweep
4. Beveled top
5. Placed in ground at least 6 feet
6. Length must be:
 - 6.1. 25 feet for service pole
 - 6.2. 35 feet for other

After each pole is set in ground, backfill space around pole with selected earth or sand, free of rocks and other deleterious material, placed in 4-inch thick layers. Moisten each layer and thoroughly compact.

Manufacture mast arm from standard pipe, free from burrs. Each mast arm must have an insulated wire inlet and wood pole mounting brackets for mast arm and tie-rod cross arm. Manufacture tie rod from structural steel and pipe.

Mount mast arm for luminaire to provide a 34-foot mounting height for a 200 W high pressure sodium luminaire and 40-foot mounting height for 310 W high pressure sodium luminaire. Traffic signals and flashing beacons on mast arm must provide a minimum vertical clearance of 17 feet from bottom of equipment to pavement.

After manufacturing, pressure-treat pole as specified in Section 58, "Preservative Treatment of Lumber, Timber and Piling," and AWPAs Use Category System: UC4B, Commodity Specification D.

If specified, treat pole with waterborne wood preservative.

86-2.13 LIGHTING AND SIGN ILLUMINATION CONTROL

Enclosure for the circuit breaker for lighting and sign illumination control must:

1. Be NEMA 3R
2. Be galvanized, cadmium plated, or powder-coated
3. Include dead front panel and a hasp with a 7/16 inch diameter hole for padlock

86-2.14 TESTING

86-2.14A Materials Testing

Deliver material and equipment to be tested to either the Transportation Laboratory or a testing location ordered by the Engineer.

Allow 30 days for acceptance testing from the time material or equipment is delivered to test site. You must pay for all shipping, handling, and related transportation costs associated with testing. If equipment is rejected, you must allow 30 days for retesting. Retesting period starts when corrected equipment is delivered to test site. You must pay for all retesting costs. Delays resulting from submittal of non-compliant materials do not relieve you from executing the contract within the allotted time.

If equipment submitted for testing does not comply with specifications, remove the equipment within 5 business days after notification that the equipment is rejected. If equipment is not removed within that period, it may be shipped to you at your expense.

When testing is complete, you will be notified. You must pick up the equipment at the test site and deliver it to the job site.

Testing and quality control procedures for all other traffic signal controller assemblies must comply with NEMA TS Standards for Traffic Control Systems.

86-2.14B Field Testing

Before starting functional testing, perform the following tests in the presence of the Engineer:

86-2.14B(1) Continuity

Test each circuit for continuity.

86-2.14B(2) Ground

Test each circuit for grounds.

86-2.14B(3) Insulation Resistance

Perform insulation resistance test at 500 V(dc) on each circuit between the circuit and a ground. Insulation resistance must be 10 M Ω minimum on all circuits, except for inductive loop detector circuits that must have an insulation resistance value at least 100 M Ω .

86-2.14C Functional Testing

Test periods must comply with Section 86-1.07, "Scheduling of Work."

Acceptance of new or modified traffic signal will be made only after all traffic signal circuits have been thoroughly tested.

Perform functional test to show that each part of the system functions as specified.

Functional test for each new or modified system must include at least 5 business days of continuous, satisfactory operation. If unsatisfactory performance of the system occurs, the condition must be corrected and the system retested until the 5 business days of continuous, satisfactory operation is obtained.

Except for new or modified parts of existing lighting circuit and sign illumination system, the State or local agency will maintain the system during test period and pay the electrical energy cost. Except for electrical energy, you must pay the cost of necessary maintenance performed by the State or local agency on new circuits or on the portions of existing circuits modified under the contract.

Shutdown of electrical system caused by traffic from a power interruption or from unsatisfactory performance of State-furnished materials does not constitute discontinuity of the functional test.

86-2.15 GALVANIZING

Galvanize as specified in Section 75-1.05, "Galvanizing." Cabinet material may be galvanized before manufacturing as specified in ASTM A 653/653M, Coating Designation G 90.

Steel pipe standard and pipe mast arm must be hot-dip galvanized after manufacturing and must comply with Section 75-1.05, "Galvanizing." . Remove spikes from galvanized surfaces.

A minimum of 10 inches of upper end of anchor bolts, anchor bars or studs, and nuts and washers must be galvanized as specified in Section 75-1.05, "Galvanizing."

After galvanizing, bolt threads must accept galvanized standard nuts without requiring tools or causing removal of protective coatings.

Galvanizing existing materials in an electrical installation will not be required.

86-2.16 PAINTING

Paint electrical equipment and material as specified in Section 59, "Painting," and the following:

1. Use paint material specified in Section 91, "Paint."
2. Factory or shop cleaning methods for metals are acceptable if equal to the methods specified.
3. Instead of temperature and seasonal restrictions for painting as specified in Section 59, "Painting," paint may be applied to equipment and materials for electrical installations if ordered by the Engineer.
4. Ungalvanized ferrous surface to be painted must be cleaned before applying prime coat. Blast cleaning is not required.
5. If an approved prime coat is applied by manufacturer, and in good condition, the 1st primer application is not required.
6. Existing equipment to be painted in the field, including State-furnished equipment, must be washed with a stiff bristle brush using a solution of water containing 2 tablespoons of heavy duty detergent powder per gallon. After rinsing, surface must be wire-brushed with a coarse, cup-shaped, power-driven brush to remove badly bonded paint, rust, scale, corrosion, grease, or dirt. Dust or residue remaining after wire brushing must be removed before priming.
7. Do not paint galvanized metal guard post, galvanized equipment, State-furnished controller cabinet, and wood poles for traffic signal or flashing beacon.
8. New galvanized metal surface to be painted in the field must be cleaned as specified for existing equipment before applying the prime coat. Do not wire brush new galvanized surface.
9. After erection, examine exterior surface for damaged primer, clean, and spot coat with primer.
10. Paint Types II and III steel service equipment enclosures with a polymeric or an enamel coating system matching Color No. 14672, light green, of Federal Standard 595B. Coating must be commercially smooth and free of flow lines, paint washout, streaks, blisters, and other defects that would impair serviceability or detract from general appearance. Coating must comply with the following:
 - 10.1. Coating hardness - Finish must have pencil lead hardness of HB, minimum, using an Eagle Turquoise pencil.

- 10.2. Salt spray resistance - Undercutting coating system's film must not exceed 1/8-inch average, from lines scored diagonally and deep enough to expose the base metal, after 336 hours of exposure in a salt spray cabinet complying with ASTM B 117.
 - 10.3. Adherence - Must not have coating loss when tested as specified in California Test 645. Perform testing by applying coating to 4" x 8" x 0.024" test specimens of the same material as the cabinet, using the same application method.
11. Finish interior of metal signal visor, louver, and front face of back plates with 2 applications of lusterless black exterior grade latex paint formulated for application to properly prepared metal surface. Good condition factory finish will be acceptable.
 12. Finish metal signal section, signal head mounting, brackets and fittings, outside of visor, pedestrian push button housing, pedestrian signal section and visor, and back face of back plate with 2 applications of lusterless black or dark olive green exterior grade latex paint formulated for application to properly prepared metal surface. Match dark olive green color to Color Chip No. 68 filed at the Transportation Laboratory.
 13. Prepare and finish conduit and conduit fitting above ground the same as adjacent standard or post.
 14. Relocated, reset or modified equipment previously finished as specified in this section, except for previously-finished galvanized standard with traffic signal yellow enamel, must be given a spot finishing application on newly primed areas and 1 finishing application over the entire surface. If signal face or mounting brackets are required to be painted under this section, all signal faces and mounting brackets on the same mounting must be repainted.
 15. Small rusted or repaired areas of relocated or reset galvanized equipment must be cleaned and painted as specified in Section 75-1.05, "Galvanizing," for repairing damaged galvanized surfaces.
 16. Stencil equipment number neatly on the standard or adjacent structure. Obtain number from the Engineer.
 17. Perform painting neatly. The Engineer reserves the right to require use of brushes if the work performed by paint spraying machine is unsatisfactory.

86-3 CONTROLLER ASSEMBLIES

86-3.01 CONTROLLER ASSEMBLIES

A controller assembly houses a complete mechanism for controlling the operation of traffic signals or other systems.

Model 170 and Model 2070, specified as a Model 170/2070 controller assembly, includes a Model 170, 170E or 2070 controller unit, a wired cabinet, and all auxiliary equipment required to control the system.

86-3.02 (BLANK)

86-3.03 (BLANK)

86-3.04 CONTROLLER CABINETS

Controller cabinets for controller assemblies other than Model 170/2070 must comply with the following:

86-3.04A Cabinet Construction

Cabinet must be rainproof and the top crowned 1/2 inch or slanted toward the back to prevent standing water.

Cabinet and door must be manufactured from one of the following:

1. 0.073-inch minimum thickness cold-rolled steel with continuously-welded exterior seams
2. 0.073-inch minimum thickness stainless steel with overlapping exterior seams complying with Type 4 enclosures of the NEMA Enclosure Standards
3. 0.125-inch minimum thickness aluminum with continuously-welded exterior seams

Exterior welds must be ground smooth and edges filed to a radius of at least 0.03 inch.

Cabinet manufactured from cold-rolled steel must comply with Section 86-2.16, "Painting," and the following:

1. Cabinet manufactured from cold-rolled steel must be finished with a polymeric or an enamel coating system conforming to Color No. 14672 of Federal Standard 595B.
2. Cabinet must not have coating loss when 2 test specimens, 4" x 8", of the same material and coating as the cabinet are tested. Two 9-inch-diagonal scratches exposing bare metal will be made on a specimen. Soak specimen in demineralized water for 192 hours. Tightly affix a 1-inch wide strip of masking tape to the surface and remove with one quick motion. Specimen showing evidence of blistering, softening, or peeling of paint or coating from the base metal will be rejected. Testing must comply with California Test 645, except passing 180 Degree Bend Test is not required.
3. Metal must be prepared by the 3-step, iron phosphate conversion coating bonderizing technique.
4. Inside walls, doors, and ceiling of the housing must be the same as the outside finish.

Cabinet manufactured from stainless steel must comply with the following:

1. Use annealed or quarter-hard stainless steel that complies with ASTM A 666 for Type 304, Grades A or B.
2. Use gas tungsten arc welding (GTAW) process with bare stainless steel welding electrodes. Electrodes must comply with AWS A5.9 for ER308 chromium-nickel bare arc welding electrodes.
3. Procedures, welder, and welding operator must comply with requirements and practices recommended in AWS C5.5.
4. Ground or brush exposed, exterior surfaces of stainless steel cabinet to a 25 to 50-microinch finish using iron-free abrasives or stainless steel brushes.
5. After grinding or brushing, cabinet must not show rust discoloration when:
 - 5.1. Exposed for 48 hours in a salt spray cabinet as specified in ASTM B 117
 - 5.2. Exposed 24 hours in a tap water spray cabinet with the water temperature between 38 °C and 45 °C
6. After the test, cabinet showing rust discoloration anywhere on its surface will be rejected. Rejected cabinets may be cleaned, passivated, and resubmitted for testing.

Cabinet manufactured from aluminum sheet must comply with ASTM B 209 or B 209M for 5052-H32 aluminum sheet, and the following:

1. Use gas metal arc welding (GMAW) process with bare aluminum welding electrodes. Electrodes must comply with AWS A5.10 for ER5356 aluminum alloy bare welding electrodes.
2. Procedures, welder, and welding operator for welding must comply with requirements in AWS B3.0, "Welding Procedure and Performance Qualification," and to practices recommended in AWS C5.6.
3. Surface finish of each aluminum cabinet must comply with MIL-A-8625 for a Type II, Class I coating, except anodic coating must have a minimum thickness of 0.0007 inch and a minimum coating weight of 0.001 ounce per square inch. The anodic coating must be sealed in a 5 percent aqueous solution of nickel acetate, pH 5.0 to 6.5, for 15 minutes at 97 °C. Before applying anodic coating, clean and etch cabinets using the steps below:
 - 3.1. Clean by immersing into inhibited alkaline cleaner, Oakite 61A, Diversey 909, or equal, 6 to 8 ounces per gallon at 71 °C for 5 minutes.
 - 3.2. Rinse in cold water.
 - 3.3. Etch in solution of 1-1/2 ounce of sodium fluoride and 4 to 6 ounces of sodium hydroxide per gallon of distilled water at 60 °C to 65 °C for 5 minutes.
 - 3.4. Rinse in cold water.
 - 3.5. Immerse in 50 percent by volume nitric acid solution at room temperature for 2 minutes.
 - 3.6. Rinse in cold water.

Cabinet must have:

1. Single front door with:
 - 1.1. 44-inch maximum door width.
 - 1.2. Lock, when closed and latched, that is locked.

- 1.3. Police panel mounted on door, equipped with a keyed lock and 2 police keys. Each police key must have a shaft at least 1-3/4 inch in length.
2. Dust-tight gasketing on all door openings, permanently bonded to the metal. Mating surface of the gasketing must be covered with silicone lubricant to prevent sticking.
3. Handle that:
 - 3.1. Allows padlocking in closed position
 - 3.2. Has a minimum length of 7 inches
 - 3.3. Has a 5/8-inch, minimum, steel shank
 - 3.4. Is manufactured of cast aluminum, or zinc-plated or cadmium-plated steel
4. Cabinet door frame with:
 - 4.1. Latching mechanism that:
 - 4.1.1. Holds tension on and forms a firm seal between door gasketing and frame.
 - 4.1.2. Is a 3-point cabinet latch with nylon rollers that have a minimum diameter of 3/4 inch and equipped with ball bearings.
 - 4.1.3. Has a center catch and a pushrod made of zinc-plated or cadmium-plated steel. Pushrod must be at least 1/4" x 3/4" and turned edgewise at outer supports. Cadmium plating must comply with MIL-QQ-416. Zinc plating must comply with MIL-QQ-325.
 - 4.2. Hinging that:
 - 4.2.1. Has 3-bolt butt hinges, each having a stainless steel fixed pin. Hinges must be stainless steel or may be aluminum for aluminum cabinet.
 - 4.2.2. Is bolted or welded to the cabinet. Hinge pins and bolts must not be accessible when door is closed.
 - 4.2.3. Has a catch to hold the door open at 90 degrees and 180 degrees, \pm 10 degrees, if a door is larger than 22 inches in width or 6 square feet in area. Catch must be at least 3/8-inch diameter, stainless steel plated rod capable of holding door open at 90 degrees in a 60 mph wind at an angle perpendicular to the plane of the door.
5. Lock that:
 - 5.1. Is solid brass, 6-pin tumbler, rim type
 - 5.2. Has rectangular, spring-loaded bolts
 - 5.3. Is left hand and rigidly mounted with stainless steel machine screws approximately 2 inches apart
 - 5.4. Extends 1/8 to 3/8 inch beyond the outside surface of door
6. 2 keys that are removable in the locked and unlocked positions.

Submit alternative design details for review and approval before manufacturing cabinet.
 Use metal shelves or brackets that will support controller unit and auxiliary equipment.
 Machine screws and bolts must not protrude outside the cabinet wall.

86-3.04B Cabinet Ventilation

Each controller cabinet must have:

1. 8 screened, 1/2-inch diameter or larger, raintight vent holes, in lower side or bottom of cabinet. You may use louvered vents with a permanent metal mesh or 4-ply woven polypropylene air filter held firmly in place, instead.
2. Electric fan with ball or roller bearings and capacity of at least 100 cubic feet per minute. Fan must be thermostatically controlled and manually adjustable to turn on between 32 °C and 65 °C with a differential

of not more than 6 °C between automatic turn on and turn off. Fan circuit must be fused at 125 percent of ampacity of installed fan motor.

Fan and cabinet vent holes must be positioned to direct bulk of airflow over controller unit or through ventilating holes of controller unit.

86-3.04C Cabinet Wiring

Conductors used in controller cabinet wiring must:

1. Be neatly arranged and laced, or enclosed in plastic tubing or raceway.
2. End with properly sized captive or spring-spade terminal or be soldered to a through-panel solder lug on the back side of the terminal block. Apply crimp-style connector with proper tool to prevent opening of handle until crimp is completed.

Controller cabinet must have an equipment grounding conductor bus that is grounded to the cabinet and connected to metal conduit system or other approved ground with a No. 8, or larger, grounding conductor.

With all cabinet equipment in place and connected, resistance between grounded conductor terminal bus and equipment grounding conductor bus must be 50 MΩ, minimum, when measured with an applied voltage of 150 V(dc).

If direct current is to be grounded, connect to equipment ground only.

Use two or more terminal blocks for field connection. Install field terminal within 22 inches from front of cabinet and orient for screwdriver operation. Terminal must be a minimum of 5 inches above foundation.

No more than 3 conductors per terminal are allowed. Two flat metal jumpers, straight or U shaped, may be placed under terminal screw. At least 2 full threads of terminal screws must be fully engaged when screw is tightened. Live parts must not extend beyond the barrier.

86-3.05 CABINET ACCESSORIES

86-3.05A Labels

Include permanently printed, engraved, or silk-screened label for equipment and removable items of equipment.

Labeling must match cabinet wiring diagram. Label for shelf-mounted equipment must be on shelf face below item. Label for wall-mounted equipment must be below item.

86-3.05B Convenience Receptacle

Mount convenience receptacle in a readily accessible location inside the cabinet.

Convenience receptacle must be a duplex, 3-prong, NEMA 5-15R grounding type outlet that complies with UL Standard 943.

86-3.05C Surge Arrestor

Surge arrestor must reduce effects of power line voltage transients and have ratings as follows:

Surge Arrestor Requirements

Recurrent peak voltage	184 V(ac)
Energy rating, maximum	20 J
Power dissipation, average	0.85 W
Peak current for pulses less than 7 μs	1,250 A

Standby current must be 1 mA or less for 120 V(ac), 60 Hz sinusoidal input.

86-3.05D Terminal Blocks

Terminal block must be rated 600 V(ac), minimum, and have nickel-, silver-, or cadmium-plated brass binder head screw terminal.

Heavy duty terminal block must be rated at 20 A and have 12 position with No. 10 x 5/16-inch nickel-plated brass binder head screws and nickel-plated brass inserts. Each position must have 2 screw-type terminals. Terminal block must be barrier type with shorting bars in each of the 12 positions, and must have integral type marking strips.

Light duty terminal block must be rated at 5 A and have 12 positions with No. 6 x 1/8 inch binder head screws. Each position must have 1 screw-type terminal.

86-3.06 COMPONENTS

86-3.06A Toggle Switches

Toggle switch must:

1. Have poles as required
2. Be rated at 200 percent of circuit current for circuits of 10 A or less and 125 percent of circuit current for circuits over 10 A

86-3.06B Cartridge Fuses

Install cartridge fuse in panel-mounted fuseholder. Fuse type and rating must be as recommended by the fuse manufacturer for protecting the load.

86-3.06C Circuit Breakers

Circuit breaker must comply with Section 86-2.11, "Service," except breaker must have a minimum interrupting capacity of 5,000 A, rms.

86-3.06D Connectors

Use connector designed to interconnect various parts of circuit together and constructed for the application involved. Design connector for positive connection of circuit and easy insertion and removal of mating contacts. Connector must be permanently keyed to prevent improper connection of circuit.

Connector, or device plugging into connector, must have positive connection to prevent a circuit from breaking due to vibration, a pull on connecting cable, or similar disruptive force.

86-4 TRAFFIC SIGNAL FACES AND FITTINGS

86-4.01 VEHICLE SIGNAL FACES

Each vehicle signal face must:

1. Be adjustable and allow for 360-degree rotation about vertical axis
2. Comply with ITE publication ST-017B, "Vehicle Traffic Control Signal Heads"
3. Comply with California Test 604, except for arrow and "X" faces
4. Have 3 sections arranged vertically: red at top, yellow at center, and green at bottom
5. Be of the same manufacturer and material, if more than 1 is installed at an intersection, except for programmed visibility type
6. Be sealed with neoprene gasket at top opening
7. Be LED modules

86-4.01A Signal Sections

Each signal section must comply with the following:

1. Maximum height must be 10-1/4 inches for an 8-inch section and 14-3/4 inches for a 12-inch section.
2. Housing must:
 - 2.1. Be either die-cast or permanent mold-cast aluminum, or if specified, be structural plastic.
 - 2.2. Comply with ITE publication ST-017B if die-cast or permanent mold-cast aluminum is used.
 - 2.3. Have a 1-piece, hinged, square-shaped door designed to allow access for relamping without the use of tools. Door must be secured to hold the door closed during loading tests. Module or lens must be watertight and mounted in the door.
3. Hinge pins, door latching devices, and other exposed hardware must be Type 304 or 305 stainless steel. Interior screws and fittings must be stainless steel, or steel with a corrosion resistant plating or coating.

4. Opening must be placed on top and bottom to receive 1-1/2-inch pipe. The 8-inch and 12-inch sections of an individual manufacturer must be capable of joining to form a signal face in any combination. This interchangeability is not required between metal and plastic sections.
5. Gaskets must be made of a material that is not affected if installed in a section with metal or plastic housing that is continuously operated for 336 hours.

Structural failure is described as follows:

Signal Section Structural Failure

Signal Section Type	Requirements	Description of Structural Failure
Metal	California Test 666	Fracture within housing assembly or deflection of more than half the lens diameter of signal section during wind load test
Plastic	California Test 605	Fracture within housing assembly or deflection of more than 10 degrees in either the vertical or horizontal plane after wind load has been removed from front of signal face, or deflection of more than 6 degrees in either the vertical or horizontal plane after wind load has been removed from back of signal face

86-4.01A(1) Metal Signal Sections

Each metal signal section must have a metal visor. Metal signal faces requiring backplates must have metal backplates.

86-4.01A(2) Plastic Signal Sections

Housing must be molded in 1 piece, or fabricated from 2 or more pieces and joined into a single piece. Plastic must have ultraviolet stability, be unaffected by lamp heat, and be self-extinguishing. Housing and door must be colored throughout and be black, matching Color No. 17038, 27038, or 37038 of Federal Standard 595B.

Each face section must be joined to adjacent section by one of the following:

1. Minimum of 3 machine screws for 8-inch sections and 4 machine screws for 12-inch sections, installed through holes near front and back of housing. Each screw must be a No. 10 and have a nut, flat washer, and lock washer.
2. Two machine screws, each with a nut, flat washer, and lock washer, installed through holes near the front of the housing, and a fastening through the 1-1/2-inch pipe opening. Fastening must have 2 large flat washers to distribute the load around the pipe opening and 3 carriage bolts, each with a nut and lock washer. Minimum screw size must be No. 10. Minimum carriage bolt size must be 1/4 inch.

Supporting section of each signal face supported only at top or bottom must have reinforcement.

Reinforcement plate must be either sheet aluminum, galvanized steel, or cast aluminum. Each plate must be a minimum of 0.11-inch thick and have a hole concentric with 1-1/2-inch pipe-mounting hole in the housing. Place reinforcement plate as follows:

Reinforcement Plate Placement

Type of Reinforcement Plate	Placement
Sheet aluminum	Inside and outside of housing
Galvanized steel	Inside of housing
Cast aluminum	Outside of housing

Reinforcement plates placed outside of the housing must be finished to match signal housing color and be designed to allow proper serrated coupling between signal face and mounting hardware. Minimum of 3 No. 10 machine screws must be installed through holes in each plate and matching holes in the housing. Each screw must have a round or binder head, a nut, and lock washer.

If signal face is supported by a Type MAS side attachment slip-fitter inserted between 2 sections, place spacers between the 2 sections. Vertical dimension of spacers must allow proper seating of serrations between the slip-fitter

and the 2 sections. In addition to the fastening through the large openings in housing, the 2 sections must join with at least 2 machine screws through holes near the front of housing and the spacers, and through matching holes in a reinforcing plate installed in housing. Machine screws must be No. 10 minimum size. Spacers must be made of same material as signal housing.

If reinforcing webs are used to connect back of housing to top, bottom, and sides, reinforcing plates are not required.

Holes for machine screws must be either cast or drilled during signal section manufacturing. Surround each hole with a 1/8-inch minimum width boss to allow contact between signal sections about axis of hole.

Each plastic signal section must have a plastic or metal visor. Plastic signal faces requiring backplates must have plastic backplates.

Serrated nylon washer must be inserted between each plastic signal section and metal mounting assembly. Each washer must be between 3/16- and 1/4-inch thick. Serrations must match those on signal section and mounting assembly.

86-4.01B Electrical Components

Conductors must be connected to a terminal block mounted inside, at the back of housing. Terminal block must have enough screw type terminals or NEMA type tab connectors to end all field and module or lamp conductors independently. Permanently identify terminal with field conductors attached or color code conductors to facilitate field wiring.

86-4.01C Visors

Include removable visor with each signal section. Comply with ITE publication ST-017B. Visors are classified by lens enclosure as full circle, tunnel or cap. Bottom opens for tunnel type and both, bottom and lower sides open for cap type. Visors must be tunnel type.

Visor must have a downward tilt between 3 and 7 degrees with a length of:

1. 9-1/2-inch minimum for nominal 12-inch round lenses
2. 7 inch for nominal 8-inch round lenses

Metal visor must be formed from 0.050-inch, minimum thickness, aluminum alloy sheet.

Plastic visor must be either formed from sheet plastic or assembled from one or more injection, rotational, or blow-molded plastic sections. Material must be of a black homogeneous color with lusterless finish. Sections must be joined using thermal, chemical, or ultrasonic bonding, or with aluminum rivets and washers permanently colored to match visor.

Secure each visor to its door and prevent removal or permanent deformation when wind load specified in California Test 605 for plastic visors or 666 for metal visors is applied to its side for 24 hours.

If directional louvers are used, fit louvers snugly into full-circular signal visors. Outside cylinder must be constructed of 0.030-inch nominal thickness, or thicker, sheet steel and vanes must be constructed of 0.016-inch nominal thickness, or thicker, sheet steel, or the cylinder and vanes must be constructed of 5052-H32 aluminum alloy of equal thickness.

86-4.02 (BLANK)

86-4.03 (BLANK)

86-4.04 BACKPLATES

Background light must not be visible between backplate and signal face or between sections.

Plastic backplates must be either formed from sheet plastic or assembled from extruded, molded, or cast sections. Sections must be factory joined using one of the following:

1. Appropriate solvent cement
2. Aluminum rivets and washers painted or permanently colored to match backplate
3. No. 10 machine screws with washers, lock washers, and nuts, painted to match backplate

Backplate material must be of black homogeneous color with a lusterless finish. Secure each plastic backplate to the plastic signal face in a manner that prevents its removal or permanent deformation when the wind-load test is applied to either the front or back of signal face. Permanent deformation of any portion of backplate must not exceed 5 degrees forward or backward after wind loading is applied for 24 hours.

If plastic backplate requires field assembly, join with at least 4 No. 10 machine screws at each field-assembled joint. Each machine screw must have an integral or captive flat washer, a hexagonal head slotted for a standard screwdriver, and either a locking nut or a nut and lockwasher. Machine screws, nuts, and washers must be stainless steel or steel with a zinc or black-oxide finish.

If a metal backplate has 2 or more sections, fasten sections with rivets or aluminum bolts peened after assembly to avoid loosening.

Instead of the screws shown on the plans, you may use self-threading No. 10 steel screws to fasten plastic backplates to plastic signal face. Each screw must have an integral or captive flat washer, a hexagonal head slotted for a standard screwdriver, and is stainless steel or steel with a zinc or black-oxide finish.

86-4.05 PROGRAMMED VISIBILITY VEHICLE SIGNAL FACES

Programmed visibility signal face and its installation must comply with Section 86-4.01, "Vehicle Signal Faces," Section 86-4.04, "Backplates," and Section 86-4.08, "Signal Mounting Assemblies."

Each programmed visibility signal section must:

1. Have a nominal 12-inch diameter circular or arrow indication
2. Comply with ITE publication ST-017B for color and arrow configuration
3. Have a cap visor
4. Have an adjustable connection that provides incremental tilting from 0 to 10 degrees above or below horizontal while maintaining a common vertical axis through couplers and mountings

Terminal connection must allow external adjustment about the mounting axis in 5-degree increments.

Signal must be mountable with ordinary tools and capable of servicing without tools. Preset adjustment at 4 degrees below horizontal.

Visibility of each programmed visibility signal face must be capable of adjustment or programming, within the face. When programmed, each signal face's indication must be visible only in those areas or lanes to be controlled, except that during dusk and darkness a faint glow to each side is allowed.

You must program the head as recommended by the manufacturer.

86-4.06 PEDESTRIAN SIGNAL FACES

Message symbols for pedestrian signal faces must be white "WALKING PERSON" and Portland orange "UPRAISED HAND." Comply with ITE Standards: "Pedestrian Traffic Control Signal Indications" and California MUTCD. Each symbol's height must be at least 10 inches and width must be at least 6-1/2 inches.

Luminance of "UPRAISED HAND" symbol must be 1,100 foot-lamberts, minimum, and luminance of "WALKING PERSON" symbol must be 1,550 foot-lamberts, minimum, when tested as specified in California Test 606.

Uniformity ratio of an illuminated symbol must not exceed 4 to 1 between the highest luminance area and the lowest luminance area.

Luminance difference between a nonilluminated symbol and the background around the symbol must be less than 30 percent when viewed with the visor and front screen in place and at a low sun angle.

Each housing, including front screen, must have maximum overall dimensions of 18-1/2-inch width, 19-inch height, and 11-1/2-inch depth.

All new pedestrian signal faces installed at an intersection must be the same make and type.

86-4.06A Type A

Each Type A pedestrian signal face must include a housing, 1 LED pedestrian signal combo module and a front screen.

86-4.06B Front Screen

Front screen installation for each Type A signal must comply with one of the following:

1. Install, tilting downward, at an angle of 15±2 degrees out from the top, an aluminum honeycomb screen with 0.2-inch cells, 3/8-inch thick, or a plastic screen of 3/8-inch squares, 1/2-inch thick with wall thickness of 1/16-inch. Completely cover message plate. Include a clear front cover of 1/8-inch minimum thickness acrylic plastic sheet or 1/16-inch minimum thickness polycarbonate plastic. Hold screen and cover firmly in place with stainless steel or aluminum clips or stainless steel metal screws.
2. Install a 1-1/2-inch deep eggcrate or Z crate type screen of 1/32-inch nominal thickness polycarbonate. Mount screening in a frame constructed of 0.040-inch minimum thickness aluminum alloy or polycarbonate. Install screen parallel to face of message plate and hold in place with stainless steel screws.

The Department will test screens in a horizontal position with its edges supported. When a 3-inch diameter, 4-pound steel ball is dropped on the screen from a height of 4 feet above, the front screen must not fracture, separate at the welds, or compress more than 1/8-inch. When pedestrian housing is used to support front screen during test, remove message plate from pedestrian signal housing, so there is no back support for the screen.

Screen and frame must be one of the following:

1. Manufactured from aluminum anodized flat black
2. Finished with lusterless black exterior grade latex paint formulated for application to properly prepared metal surfaces
3. Manufactured from flat black plastic

86-4.06C Housing

Pedestrian signal housing must comply with Section 86-4.01A, "Signal Sections."

86-4.06D Finish

Paint exterior of each housing as specified in Section 86-2.16, "Painting."

86-4.06E Control

Pedestrian signals must be controllable by solid-state switching devices specified for traffic signal controller assemblies.

86-4.06F Terminal Blocks

Include light duty terminal block, as specified in Section 86-4.01B, "Electrical Components," with each pedestrian signal face.

86-4.07 (BLANK)

86-4.08 SIGNAL MOUNTING ASSEMBLIES

Signal mounting assembly must include:

1. 1-1/2-inch standard steel pipe or galvanized conduit
2. Pipe fitting made of ductile iron, galvanized steel, aluminum alloy Type AC-84B No. 380, or bronze
3. Mast arm and post top slip-fitters, and terminal compartments made of cast bronze or hot-dip galvanized ductile iron

After installation, clean and paint exposed threads of galvanized conduit brackets and bracket areas damaged by wrench or vise jaws. Use wire brush to clean and apply 2 coats of approved unthinned zinc-rich primer, organic vehicle type, as specified in Section 91, "Paint." Do not use aerosol can.

Fit each terminal compartment with a terminal block having a minimum of 12 positions, each with 2 screw-type terminals. Each terminal must accommodate at least five No. 14 conductors. Include a cover on compartment for ready access to terminal block. Terminal compartment used to bracket mount signals must be bolted securely to pole or standard.

Horizontal dimension of mounting assembly members between vertical centerline of terminal compartment or slip-fitter, and the vertical centerline of each signal face must not exceed 11 inches, except where required for proper signal face alignment or to allow programming of programmed visibility signal faces.

Mounting assembly members must be plumb or level, symmetrically arranged, and securely assembled.

Mounting assembly must be watertight, and free of sharp edges or protrusions that might damage conductor insulation. Include positive locking serrated fittings that, if mated with similar fittings on signal faces, will prevent faces from rotating.

Orient each mounting assembly to allow maximum horizontal clearance to adjacent roadway.

Use slip-fitter for post-top mounting of signals. Fit slip-fitter over a 4-1/2-inch outside diameter pipe or tapered standard end. Include cadmium-plated steel set screws. Include an integral terminal compartment for each slip-fitter used to post-top mount signals with brackets.

Do not install signal faces at an intersection until all other signal equipment, including complete controller assembly, is in place and ready for operation. You may mount signal faces if covered or not directed toward traffic.

86-4.09 FLASHING BEACONS

Flashing beacon must include:

1. Single section traffic signal face with yellow or red LED module indications
2. Backplate
3. Tunnel visor
4. Flashing beacon control assembly

Beacon flasher unit must be independent of intersection flasher unit.

86-4.09A Flashing Beacon Control Assembly

86-4.09A(1) Enclosure

Enclosure must be:

1. NEMA 3R with a dead front panel and a hasp with a 7/16-inch hole for a padlock
2. Powder coated, hot-dip galvanized, or factory-applied rust resistant prime coat and finish coat

86-4.09A(2) Circuit Breakers and Switches

Circuit breakers must comply with Section 86-2.11, "Service."

Switch for manually operating sign lighting circuit must be a single-hole-mounting toggle type with a single pole and throw and rated at 12 A, 120 V(ac). Furnish switch with an indicating nameplate reading "Auto-Test."

86-4.09A(3) Flasher

Comply with Section 8, "Solid-State Flashers," of NEMA Standards publication No. TS 1.

Flasher must be a solid-state device with no contact points or moving parts.

Include 2 output circuits to allow alternate flashing of signal faces. Flasher must be able to carry a minimum of 10 A per circuit at 120 V(ac).

86-4.09A(4) Wiring

Conductors and wiring in the enclosure must comply with Section 86-2.09B(1), "Cabinet and Enclosure Installation."

86-4.09A(5) Terminal Blocks

Terminal blocks must be:

1. Rated 25 A, 600 V(ac)
2. Molded phenolic or nylon material
3. Barrier type with plated brass screw terminals and integral marking strips

86-5 DETECTORS

86-5.01 VEHICLE DETECTORS

Sensor unit and isolator must comply with TEES.

86-5.01A Inductive Loop Detectors

86-5.01A(1) General

Inductive loop detector includes a completely installed loop or group of loops, in the roadway, lead-in cable, and a sensor unit, with power supply installed in a controller cabinet.

86-5.01A(2) (Blank)

86-5.01A(3) Construction Materials

Conductor for each inductive loop detector must be continuous, unspliced, and one of the following:

Conductor Options for Inductive Loop Detector

Option	Specifications
Type 1 loop wire	Type RHW-USE neoprene-jacketed or Type USE cross-linked polyethylene insulated, No. 12, stranded copper wire with a 40 mils minimum thickness at any point.
Type 2 loop wire	Type THWN or Type XHHW, No. 14, stranded copper wire in a plastic tubing. Plastic tubing must be polyethylene or vinyl, rated for use at 105 °C, and resistant to oil and gasoline. Outside diameter of tubing must be 0.27 inch maximum with a wall thickness of 0.028 inch minimum.

Conductor for loop detector lead-in cable must be two No. 16, 19 x 29, stranded, tinned copper wires, comply with the calculated cross sectional area of ASTM B 286, Table 1, and be one of the following:

Conductor Options for Loop Detector Lead-In Cable

Option	Specifications
Type B lead-in cable	Insulated with 20 mils of high-density polyethylene. Conductors must be twisted together with at least 2 turns per foot and the twisted pair must be protected with a copper or aluminum polyester shield. A No. 20, minimum, copper drain wire must be connected to equipment ground within cabinet. Cable must have a high-density polyethylene or high-density polypropylene outer jacket with a nominal thickness of 32 mils. Include an amorphous interior moisture penetration barrier of nonhydroscopic polyethylene or polypropylene fillers.
Type C lead-in cable	Comply with International Municipal Signal Association (IMSA) Specification No. 50-2. A No. 20, minimum, copper drain wire must be connected to equipment ground within cabinet.

86-5.01A(4) Installation Details

Install loop conductors without splices and end in nearest pull box. Seal open end of cable jacket or tubing similar to splicing requirements to prevent water from entering. Do not make final splices between loops and lead-in cable until loop operations under actual traffic conditions is approved.

Splice all loop conductors for each direction of travel for same phase of a traffic signal system, in same pull box, to a detector lead-in cable that runs from pull box adjacent to loop detector to a sensor unit mounted in controller cabinet.

End all loop conductors in a pull box or terminal strip in the cabinet.

Identify and band conductors for inductive loop installations. Band, in pairs, by lane, in the pull box adjacent to the loops and near the end of conductors in the cabinet. Bands must comply with Section 86-2.09, "Wiring."

If HMA surfacing is to be placed, install loop conductors before placing uppermost layer of HMA. Install conductors in compacted layer of HMA immediately below the uppermost layer. Install conductors as shown on the plans, except fill slot with sealant flush to the surface.

When cutting loops:

1. Residue from slot cutting activities must not be allowed to flow across shoulders or lanes occupied by public traffic and must be removed from the pavement surface before residue flows off. Dispose of residue

from slot cutting activities under Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way."

2. Surplus sealant must be removed from adjacent road surface without using solvents before setting.

Sealant for filling slots must comply with one of the following:

Elastomeric Sealant

Polyurethane material that will, within stated shelf life, cure only in the presence of moisture. Sealant must be suitable for use in both HMA and PCC.

The cured sealant must have the following performance characteristics:

Performance Characteristics of Cured Sealant

Specification	ASTM	Requirement
Hardness (indentation) at 25 °C and 50% relative humidity. (Type A, Model 1700 only)	D 2240 Rex.	65-85
Tensile Strength: Pulled at 508 mm per minute	D 412 Die C	3.45 MPa, min.
Elongation: Pulled at 508 mm per minute	D 412 Die C	400%, min.
Flex at -40 °C: 0.6-mm free film bend (180°) over 13-mm mandrel	--	No cracks
Weathering Resistance: Weatherometer 350 h, cured 7 days at 25 °C @ 50% relative humidity	D 822	Slight chalking
Salt Spray Resistance: 28 days at 38 °C with 5% NaCl, Die C & pulled at 508 mm per minute	B 117	3.45 MPa, min. tensile 400%, min. elongation
Dielectric Constant over a temperature range of -30 °C to 50 °C	D 150	Less than 25% change

Asphaltic Emulsion Sealant

Comply with State Specification 8040-41A-15. Use for filling slots in HMA pavement that are a maximum of 5/8 inch in width. Do not use where the slope causes the material to run from the slot. Material must not be thinned beyond manufacturer's recommendations. Place material when air temperature is at least 7 °C.

Hot-Melt Rubberized Asphalt Sealant

Hot-melt rubberized asphalt must be:

1. In solid form at room temperature and fluid at application temperature of 190 °C to 205 °C. Fumes must be non-toxic.
2. Suitable for use in both HMA and PCC.
3. Melted in a jacketed, double-boiler type melting unit. Temperature of heat transfer medium must not exceed 245 °C.
4. Applied with a pressure feed applicator or pour pot, when the pavement surface temperature is greater than 4 °C.
5. Packaged in containers clearly marked "Detector Loop Sealant" and specifying manufacturer's batch and lot number.

The cured sealant must have the following performance characteristics:

Performance Characteristics of Cured Sealant

Specification	ASTM	Requirement
Cone Penetration, 25 °C, 150 g, 5 s	D 5329, Sec. 6	3.5 mm, max
Flow, 60 °C	D 5329, Sec. 8	5 mm, max
Resilience, 25 °C	D 5329, Sec. 12	25%, min
Softening Point	D 36	82 °C, min
Ductility, 25 °C, 50 mm/min	D 113	300 mm, min
Flash Point, COC, °C	D 92	288 °C, min
Viscosity, Brookfield Thermosel, No. 27 Spindle, 20 rpm, 190 °C	D 150	Less than 25% change

86-5.01B Magnetic Detectors

Cable from pull box, adjacent to magnetic detector sensing element, to the field terminals in the controller cabinet must be the type specified for inductive loop detectors.

86-5.02 PEDESTRIAN PUSH BUTTON ASSEMBLIES

Housing must be either die-cast or permanent mold-cast aluminum, or ultraviolet stabilized, self-extinguishing structural plastic, if specified. Plastic housing must be black matching Color No. 17038, 27038 or 37038 of Federal Standard 595B, and colored throughout. Assembly must be rainproof and shockproof in any weather condition.

Switch must be a single-pole, double-throw, switching unit, with screw type terminals, rated 15 A at 125 V(ac), and must have:

1. Plunger actuator and a U frame to allow recessed mounting in push button housing
2. Operating force of 3.5 pounds
3. 1/64-inch maximum pretravel
4. 7/32-inch minimum overtravel
5. 0.0004- to 0.002-inch differential travel
6. 2-inch minimum diameter actuator

Where pedestrian push button is attached to a pole, shape housing to fit the pole curvature and secure. Include saddles to make a neat fit if needed.

Where a pedestrian push button is mounted on top of a 2-1/2-inch diameter post, fit housing with a slip-fitter and use screws for securing rigidly to post.

Pedestrian push button signs must be porcelain enameled metal or structural plastic.

Install push button and sign on crosswalk side of pole.

Point arrows on push button signs in the same direction as the corresponding crosswalk.

Attach sign on Type B push button assembly.

For Type C pedestrian push button assembly, mount instruction sign on the same standard as the push button assembly, using 2 straps and saddle brackets. Straps and saddle brackets must be corrosion-resisting chromium nickel steel and comply with ASTM A 167, Type 302B. Theft-proof bolts must be stainless steel with a chromium content of at least 17 percent and a nickel content of at least 8 percent.

86-6 LIGHTING

86-6.01 HIGH PRESSURE SODIUM LUMINAIRES

High pressure sodium luminaires must be the enclosed cutoff type.

Housing must be manufactured from aluminum. Painted or powder-coated housing must withstand a 1,000-hour salt spray test as specified in ASTM B 117.

Other metal parts must be corrosion resistant.

Each housing must include a slip-fitter that can be mounted on a 2-inch pipe tenon and can be adjusted 5 degrees from the axis of the tenon. Clamping brackets of slip-fitter must not bottom out on housing bosses when adjusted within the ±5 degree range.

The slip-fitter mounting bracket must not permanently set in excess of 0.020-inch when the 3/8-inch diameter cap screw used for mounting is tightened to 10 foot-pounds.

Luminaire to be mounted horizontally on mast arm, when tested as specified in California Test 611, must be capable of withstanding cyclic loading for a minimum of 2 million cycles without failure of any luminaire parts as follows:

Cyclic Loading

Plane	Internal Ballast	Minimum Peak Acceleration Level ^a
Vertical	Removed	3.0 G peak-to-peak sinusoidal loading (same as 1.5 G peak)
Horizontal ^b	Installed	1.5 G peak-to-peak sinusoidal loading (same as 0.75 G peak)
Vertical	Installed	1.0 G peak-to-peak sinusoidal loading (same as 0.5 G peak)

^aG = Acceleration of gravity

^bPerpendicular to direction of mast arm

If a photoelectric unit receptacle is included, a raintight shorting cap must be installed. If luminaire housing has a hole for the receptacle, hole must be permanently closed, covered, and sealed with weatherproof material.

Optical system must be in a sealed chamber and include:

1. Reflector shaped so that a minimum of light is reflected through the arc tube of the lamp. Reflector surface must be specular and protected by either an anodized finish or a silicate film on its specular surface.
2. Refractor or lens mounted in a door frame that is hinged to the housing and secured with a spring-loaded latch. Refractor must be made of glass or polycarbonate plastic. Lens must be made of heat- and impact-resistant glass.
3. Lamp socket that is a porcelain enclosed mogul-multiple type. Shell must include integral lamp grips to assure electrical contact under conditions of normal vibration. Socket must be mounted in the luminaire to allow presetting a variety of specified light distribution patterns. Socket must be rated for 1,500 W and 600 V(ac), and a 4 kV pulse.
4. Lamp.

Sealing must be provided by a gasket between the reflector and:

1. Refractor or lens
2. Lamp socket

Chamber must allow for filtered flow of air in and out of the chamber from lamp heat. Filtering must be accomplished by either a separate filter or a filtering gasket.

If components are mounted on a down-opening door, door must be hinged and secured to luminaire housing separately from refractor or flat lens frame. Door must be easily removable and replaceable, and secured to housing to prevent accidental opening when refractor or flat lens frame is opened.

Field wires connected to luminaire must terminate on a barrier-type terminal block secured to the housing. Terminal screws must be captive and equipped with wire grips for conductors up to No. 6. Each terminal positions must be clearly identified.

Minimum light distribution for each luminaire must meet the isolux diagrams.

Maximum brightness of each cutoff luminaire, with the lamp indicated, must be as follows:

Cutoff Type

Lamp ANSI Code No.	Lamp Wattage	Maximum Brightness foot-lamberts
S55	150	40
S66	200	40
S50	250	50
S67	310	60
S51	400	75

Brightness readings will be taken using a brightness meter with an acceptance angle of 1.5 degrees. When measured on the 90-degree and 270-degree lateral angle line, maximum brightness must not exceed above specified

brightness when meter is located at a horizontal distance of 120 feet and a vertical distance of 7.5 feet between luminaire and meter, or at an angle of 3 degrees 35 minutes from the horizontal to the line between luminaire and meter. Measurements must be made from 90-degree line and 270-degree line, and averaged. Lamp used for each test must operate at wattage necessary to produce the following light output:

Light Output	
Lamp Wattage	Lumens
150	16,000
200	22,000
250	27,000
310	37,000
400	50,000

86-6.01A High Pressure Sodium Lamp Ballasts

Each ballast must:

1. Operate the lamp for its rated characteristics and wattage
2. Continuously operate at ambient air temperatures from -20 °C to 25 °C without reduction in ballast life
3. Operate for at least 180 cycles of 12 hours on and 12 hours off, with the lamp circuit in an open or short-circuited condition and without measurable reduction in operating requirements
4. Have a design life of not less than 60,000 hours
5. Provide proper starting and operating waveforms, voltage, and current
6. Provide reliable lamp starting and operation at ambient temperature down to -20 °C for the rated life of lamp

Ballast must be tested as specified in ANSI C82.6-1980, "Methods of Measurement of High-Intensity-Discharge Lamp Ballasts."

Starting aids for ballast of a given lamp wattage must be interchangeable between ballasts of same wattage and manufacturer, without adjustment.

Each integral ballast must consist of separate components that can be easily replaced. An encapsulated starting aid will be counted as a single component. Each component must include screw terminals, NEMA tab connectors, or a single multi-circuit connector. Conductors and terminals must be identified.

Mount heat-generating component so as to use the portion of the luminaire it is mounted to as a heat sink. Place capacitor a maximum practicable distance from heat-generating components or thermally shield to limit the case temperature to 75 °C.

Transformer and inductor must be resin-impregnated for protection against moisture. Capacitors, except those in starting aids, must be metal cased and hermetically sealed.

The Department will test high-pressure sodium lamp ballast. High-pressure sodium lamp ballast must have a characteristic curve that will intersect both of the lamp-voltage limit lines between the wattage limit lines and remain between the wattage limit lines throughout the full range of lamp voltage. This requirement must be met at the rated input voltage of the ballast and at the lowest and highest rated input voltage of the ballast.

Throughout the lifetime of the lamp, ballast curve must fall within the specified limits of the lamp voltage and wattage.

Ballast for luminaires must be located in the luminaire housing.

86-6.01A(1) Regulator Type Ballasts

Regulator type ballast must comply with the following:

1. For nominal input voltage and lamp voltage, ballast design center must not vary more than 7.5 percent from rated lamp wattage.
2. Ballast must be designed for a capacitance variance of ±6 percent that will not cause more than ±8 percent variation in lamp wattage regulation during rated lamp life.
3. Lamp current crest factor must not exceed 1.8 for input voltage variation of ±10 percent at any lamp voltage during lamp life.

Regulator-type ballast must be one of the following:

Regulator-Type Ballast

Ballast Type	Power Factor	Lamp Regulation
Lag-type ^a	Not less than 90 percent throughout the life of lamp when ballast is operated at nominal line voltage with a nominally-rated reference lamp	Lamp wattage regulation spread does not vary by more than 18 percent for ±10 percent input voltage variation from nominal through life
Lead-type ^b	Not less than 90 percent throughout the life of lamp when ballast is operated at nominal line voltage with a nominally-rated reference lamp	Lamp wattage regulation spread does not vary by more than 30 percent for ±10 percent input voltage variation from nominal through life

^aPrimary and secondary windings must be electrically isolated

^bConstant wattage autoregulator (CWA)

86-6.01A(2) Nonregulator Type Ballasts

Each nonregulator type ballast must comply with the following:

1. For nominal input voltage and lamp voltage, ballast design center must not vary more than 7.5 percent from rated lamp wattage.
2. Lamp current crest factor must not exceed 1.8 for input voltage variation of ±5 percent at any lamp voltage during lamp life.

Nonregulator-Type Ballast

Ballast Type	Power Factor	Lamp Regulation
Autotransformer or High-Reactance	Not less than 90 percent throughout the life of lamp when ballast is operated at nominal line voltage with a nominally-rated reference lamp	Lamp wattage regulation spread does not vary by more than 25 percent for ±5 percent input voltage variation from nominal through life

86-6.01B High Pressure Sodium Lamps

High pressure sodium lamps must comply with ANSI C 78.42, "High Pressure Sodium Lamps," when tested as specified in ANSI C 78.389, "American National Standard for Electric Lamps - High Intensity Discharge-Methods of Measuring Characteristics." High pressure sodium lamps must have a minimum average rated life of 24,000 hours.

86-6.02 LOW PRESSURE SODIUM LUMINAIRES

Each low pressure sodium luminaire must be completely assembled with a lamp and ballast, and must:

1. Be the enclosed type, either semi-cutoff or cutoff type.
2. Include housing, reflector, refractor or lens, lamp socket, integral ballast, removable ballast tray, lamp support, terminal strip, capacitor, and slip fitter. Reflector may be an integral part of the housing.

Luminaire housing must be minimum 1/16-inch thick, corrosion resistant die cast aluminum sheet and plate with concealed continuous welds, or minimum nominal wall thickness of 3/32-thick acrylonitrile-butadiene-styrene sheet material, on a cast aluminum frame that provides mounting for all electrical components and slip fitter. Housing must be divided into optical and power compartments that are individually accessible for service and maintenance. Position and clamp luminaire to pipe tenon by tightening mounting bolts.

Painted exterior surface of luminaire must be finished with a fused coating of electrostatically applied polyester powder paint or other ultraviolet inhibiting film. Color must be aluminum gray.

High temperature neoprene, or equal, sealing ring must be installed in pipe tenon opening to prevent entry of water and insects into power and optical compartments.

Access to power unit assembly must be through a weathertight hinged cover, secured with spring type latches or captive screws, to luminaire housing.

Hardware must be stainless steel or cadmium plated. Use machine screws or bolts to secure removable components. Do not use sheet metal screws.

Semi-cutoff luminaires and molded refractor style cutoff luminaires must include a refractor. Other cutoff luminaires must include a flat lens.

Refractor must be 1-piece injection molded polycarbonate of 3/32 inch minimum thickness, or 1-piece injection molded acrylic of 1/8 inch minimum thickness. Flat lens must be 1-piece polycarbonate of 3/32 inch minimum thickness, mounted to metal frame. Refractor assembly and flat lens assembly must be constructed to rigidly maintain its shape, and hinged and secured with spring type latches to luminaire housing. Alternate methods of manufacturing refractor may be approved provided minimum specified thicknesses are maintained.

Lamp socket must be high temperature, flame retardant thermoset material with self-wiping contacts or equivalent. Socket must be rated for 660 W and 1,000 V(ac). Position of socket and support must maintain the lamp in correct relationship with reflector and refractor for designed distribution pattern.

Isofootcandle distribution must be ANSI Type III, short or Type IV, medium distribution, for cutoff or semi-cutoff luminaires.

With a 40-foot mounting height, each type of luminaire must maintain a minimum of 0.2 footcandle at least 60 feet each side, along the longitudinal roadway line below the luminaire, and a minimum of 0.35 footcandle at a transverse roadway distance from luminaire location equal to 1.5 times the luminaire mounting height.

Certified luminaire performance data must be provided. This data must include complete photometric test data in isofootcandle charts at a scale of 1 inch equals 20 feet, for the luminaire and lamp sizes shown on the plans.

Alternate data may be in horizontal footcandle values recorded on a 15' x 15' area extending 90 feet longitudinally each side of the light source, and 15 feet behind and 90 feet in front of the light source, for luminaire and lamp sizes, and mounting height shown on the plans. Horizontal footcandle levels in data submitted must equal or exceed levels specified. Failure to meet referenced values will be justification for rejection of the luminaires.

Photometric testing must be performed and certified by an independent and recognized testing laboratory.

Low pressure sodium lamps must:

1. Be 180 W, single-ended, bayonet base, tubular gas discharge lamp
2. Maintain a minimum of 93 percent of initial lumens during rated life and must comply with the following minimum performance requirements:

Performance Requirements

Lamp Designation	ANSI L74-RF-180
Initial Lumens	33,000 lumens
Rated Ave. Life (@ 10 hrs/Start)	18,000 hours
Operating Position	Horizontal ±20 degrees

3. Reach 80 percent of light output within 10 minutes and must restrike within 1 minute after an outage due to power interruption or voltage drop at the lamp socket
4. Identify the month and year of installation.
5. Have an autotransformer or high-reactance type ballast. The ballast must comply with the following:
 - 5.1. Lamp current crest factor must not exceed 1.8 at nominal line voltage
 - 5.2. Ballast loss must not exceed 24 percent for 180 W ballast at nominal line voltage

Autotransformer or High-Reactance Type Ballast

Ballast Type	Power Factor	Lamp Operation
Autotransformer or High-Reactance	Not less than 90 percent when ballast is operated at nominal line voltage with a nominally-rated reference lamp	Lamp wattage regulation spread does not vary by more than ±6 percent for ±10 percent input voltage variation from nominal through life

A multi-circuit connector must be included for quick disconnection of ballast tray.

86-6.03 SOFFIT AND WALL LUMINAIRES

Soffit and wall luminaire must be weatherproof and corrosion resistant.

Each flush-mounted soffit luminaire must consist of:

1. Metal body with two 1-inch minimum conduit hubs and provisions for anchoring into concrete
2. Prismatic refractor made of heat-resistant polycarbonate mounted in a door frame and clearly identified as to street side
3. Specular anodized aluminum reflector
4. Ballast located either within housing or in a ceiling pull box as shown on the plans
5. Lamp socket

The door frame assembly must be hinged, gasketed, and secured to body by at least 3 machine screws.

Each pendant soffit luminaire must be enclosed and gasketed, have an aluminum finish, and include:

1. Reflector with a specular anodized aluminum finish
2. Refractor made of heat-resistant polycarbonate
3. Optical assembly hinged and latched for lamp access and a device to prevent dropping
4. Ballast designed for operation in a raintight enclosure
5. Galvanized metal box with a gasketed cover, 2 captive screws, and 2 chains to prevent dropping and for luminaire mounting

Each wall-mounted luminaire must consist of:

1. Cast metal body
2. Prismatic refractor, made of glass, mounted in a door frame
3. Aluminum reflector with a specular anodized finish
4. Integral ballast
5. Lamp socket
6. Gasket between refractor and body
7. At least two 5/16-inch minimum diameter mounting bolts

Cast-aluminum bodies to be cast into or mounted against concrete must have a thick application of alkali-resistant bituminous paint on all surfaces to be in contact with concrete.

Each soffit luminaire and wall luminaire must include a 70 W high-pressure sodium lamp with a minimum average rated life of 24,000 hours. Each lamp socket must be positioned to locate the light center of the lamp within 1/2 inch of light center location of the luminaire design.

Ballast must comply with Section 86-6.01A, "High Pressure Sodium Lamp Ballasts." Wall luminaire ballast must be located in luminaire housing or, if shown on the plans, in a pull box adjacent to luminaire.

86-6.04 PEDESTRIAN CROSSING FIXTURES

Before starting fixture manufacturing, submit fixture design for approval. If requested, submit 1 complete prototype fixture for approval at least 30 days before manufacturing the fixtures. The prototype fixture will be returned to you, and if permitted, the fixture may be installed in the work.

Lens in door section must be formed of 1-1/2-inch methyl methacrylate rod cut and fire-glazed for a clear finish or a cast unit with equivalent tolerances and finish.

Lens must be secured to door section with an extruded lens retainer of 6063-T5 aluminum alloy that fits the lens shape. Lens retainer must fit the full length of lens on both sides. Continuous lens retainer for the full length of 3 lenses is allowed. Z bars of 5052-H32 or 5005-H14 aluminum alloy, 1/16 inch minimum thickness may be substituted for extruded lens retainer.

A captive positive-keyed screw-type latching device requiring a special socket wrench must be installed at upper edge to secure door in the closed position as shown on the plans. Furnish 2 special wrenches to the Engineer.

Each fixture must include a F48T12/CW rapid start fluorescent lamp with recessed, double contact base installed on back side of door directly behind lens.

Each lampholder must be UL listed for outdoor use without an enclosure and with 1,500 mA rapid start fluorescent lamp. Lampholder must be spring-loaded type.

For each lamp, the distance from face of lampholder to the lamp must be designed to provide a compression of at least 0.10-inch on the spring-type lampholder when lamp is in place. Lamp must have positive mechanical and electrical contact when lamp is in place. Socket on spring-type lampholder must have enough travel to allow lamp installation. Spring must not be a part of current-carrying circuit.

Ballast must be high-power-factor type with weatherproof leads for operation of one 48-inch rapid-start lamp. Ballast must be UL listed for outdoor operation on 110 to 125 V(ac) 60 Hz circuit and rated at 1,500 mA.

Conductors from ballast leads to lampholder must be minimum size of No. 16, stranded, and UL-listed copper AWM. Splicing of lampholder conductors to ballast leads must be performed by using mechanically secure connectors.

Conductors in fixture except ballast leads and entrance line conductors, must be UL-listed AWM.

Provide sufficient slack in the conductors to allow the fixture door to fully open.

Circuit conductors entering the fixture must be terminated on molded phenolic barrier-type terminal blocks rated at 15 A and 600 V(ac) and must have integral-type white waterproof-marking strips. Current-carrying parts of terminal blocks must be insulated from fixture with integral plugs or strips to provide protection from line-to-ground flashover voltage. Terminal blocks must be attached to wireway cover in top section. If you use sectionalized terminal blocks, each section must include an integral barrier on each side and be capable of rigid mounting and alignment.

Exposed surfaces of fixture must be uniform in appearance and free from significant defects, including improper fit, dents, deep scratches and abrasions, burrs, roughness, off-square ends, holes off-center or jagged, and surface irregularities. Screws for attaching components to fixture door, including Z bars, ballasts, and terminal block, must be tapped into door from the inside only. Screwheads, nuts, or other fasteners must not be removable from the outside.

86-6.04A Pedestrian Undercrossing Fixtures

Fixture shell must be cast aluminum alloy, industrial type or Federal Class 18 aluminum of 1/4 inch minimum thickness.

Door must be 1 piece of 6061-T6 aluminum alloy of 1/8 inch minimum thickness.

Continuous piano hinge must be Type 1100 aluminum alloy. The piano hinge must be welded or riveted to door section with 1/8 inch aluminum rivets. Matching holes must be drilled in the hinge and lower edge of fixture. After shell is in place, door assembly must be attached by minimum 3/8-inch No. 8 stainless steel self-tapping screws.

A neoprene gasket must be attached to frame to provide a cushion between the shell and the door.

Chain or other device must be included to prevent the door, when fully opened, from coming in contact with the undercrossing wall.

Fixture must be held in place by three 3/8" x 8" anchor bolts with 2 nuts each.

Fixture surfaces in contact with concrete, and with anchor bolts and nuts must be painted with a thick application of alkali-resistant bituminous paint. Paint must comply with MIL-P-6883.

Circuit conductor entering the fixture must be terminated on 2-position terminal blocks.

Both ends of fixture must have holes for 1-inch conduit. Unused holes must be plugged with pressed metal closures.

86-6.04B Pedestrian Overcrossing Fixtures

Fixture shell must consist of:

1. Top section and a door section of extruded 6063-T5 aluminum alloy, each with a nominal 1/8 inch wall thickness
2. 2 cast-end sections of 319 aluminum alloy
3. Internal wireway cover of 505-H32 aluminum alloy

Top section and door section must be joined together on one side by a continuous hinge formed as part of the 2 extrusions and must overlay to allow locking on the other side. Hinge must be treated with a silicone grease that will prevent the entrance of water by capillary action.

Wireway cover with 3/16 inch hemmed ends up and terminal blocks and circuit conductors must be inserted before welding end sections and must provide clearance at both ends for conductors. Cover must be fastened by at least two 1/4 inch No. 4 self-threading sheet metal screws with binding head and blunt point. You may substitute blind rivets of equivalent strength.

One or more bronze sash chains or other device must be included to prevent door from opening to an extent that will damage the hinge.

Lampholder must include heat-resistant circular cross section neoprene sealing gasket, silver-coated contacts, and waterproofed lead entrance for use with a 1,500 mA rapid start fluorescent lamp.

Ballast must be at most 13-1/4 inches long.

Circuit conductors entering the fixture must be terminated on 3-position terminal blocks.

Electrical system of pedestrian overcrossing must be grounded by a No. 8 copper wire installed in conduit from fixture to fixture, from end fixture to conduit fitting on end post and from conduit fitting on end post to grounding bushing in nearest pull box.

Ground wire must be secured to inside of telescoping sleeve end casting where conductors are carried and to the inside of Type LB conduit fitting on end post by a connecting lug and a No. 8 self-threading pan screw.

Lamp, lampholder, ballast, and fixture wire, must be attached to door section. Terminal blocks must be attached to top section or wireway cover.

Three No. 10, solid copper circuit conductors must be installed between terminal blocks as part of each completed fixture.

Before shipment to job site, fixture must be completely manufactured and assembled in the shop.

86-6.05 INDUCTION SIGN LIGHTING FIXTURES

Each induction sign lighting fixture must include housing with door, reflector, refractor or lens, lamp, power coupler, high frequency generator, socket assembly, fuse block, and fuses.

Each induction sign lighting fixture must:

1. Be designed for mounting near the bottom of sign panel on an overhead sign structure.
2. Be an enclosed design and be raintight and corrosion resistant.
3. Have a minimum average rating of 60,000 hours.
4. Be for a wattage of 87 W, 120/240 V(ac).
5. Have a power factor greater than 90 percent and total harmonic distortion less than 10 percent.
6. Be UL approved for wet locations and be FCC Class A-listed.
7. Not exceed 44 pounds in weight.
8. Include the manufacturer's brand name, trademark, model number, serial number, and date of manufacture on packaged assembly. Same information must be permanently marked on the outside and inside of housing.
9. Comply with minimum horizontal footcandle requirement shown on the plans.
10. Be a maximum height of 12 inches above the top of the mounting rails.

If fixture is located so that the light center of the lamp is 55 inches in front of, 1 foot below, and centered on a 10-foot high by 20-foot wide sign panel, the ratio of maximum to minimum illuminance level on the panel must not exceed 12 to 1 in 95 percent of the points measured. Illuminance gradient must not exceed 2 to 1 and is defined as the ratio of minimum illuminance on a 1-foot square of panel to that on an adjacent 1-foot square of panel.

Each fixture must have a mounting assembly that will allow fixture to be mounted on continuous slot channels. Mounting assembly must be either cast aluminum, hot-dip galvanized steel plate, or steel plate that has been galvanized and finished with a polymeric coating system or same finish that is used for housing.

Housing must have a door designed to hold a refractor or lens, and to open without the use of special tools. Housing and door must be manufactured of sheet or cast aluminum, and have a powder coat or polyester paint finish of a gray color resembling unfinished manufacturing. Sheet aluminum must comply with ASTM B 209 or B 209M for 5052-H32 aluminum sheet. External bolts, screws, hinges, hinge pins, and door closure devices must be corrosion resistant.

Housing must include weep holes.

Door must be hinged to housing on side of fixture away from the sign panel and include 2 captive latch bolts or other latching device. Door must be designed to lock in the open position, 50 degrees minimum from the plane of the door opening, with an 85-mph 3-second-wind-gust load striking the door from either side.

Door and housing must be gasketed to be raintight and dusttight. Thickness of gasket must be 1/4 inch, minimum.

Fixture height must be less than 12 inches above the top of mounting rails.

Reflector must be 1 piece, made from specularly finished aluminum protected with an electrochemically applied anodized finish or a chemically applied silicate film, and designed so deposited water due to condensation will drain away. Reflector must be secured to housing with a minimum of 2 screws and removable without removing any fixture parts. Do not attach reflectors to outside of housing.

Refractor or lens must have a smooth exterior and must be manufactured from the material as follows:

Refractor and Lens Material Requirements

Component	Manufactured From
Flat lens	Heat-resistant glass
Convex lens	Heat resistant, high-impact resistant tempered glass
Refractor	Borosilicate heat resistant glass

Refractor and convex lens must be designed or shielded so no fixture luminance is visible if fixture is approached directly from the rear and viewing level is the bottom of the fixture. If a shield is used, it must be an integral part of the door casting.

Each fixture must include an 85 W induction lamp with an interior wall that is fluorescent phosphor-coated. Light output must be at least 70 percent at 60,000 hours. Lamp must have a minimum color-rendering index of 80, be rated at a color temperature of 4,000K and be removable without the use of tools.

Lamp socket must be a porcelain enclosed mogul type with a shell that contains integral lamp grips to assure electrical contact under normal vibration conditions. Center contact must be spring-loaded. Shell and center contact must be nickel-plated brass. Socket must be rated for 1,500 W and 600 V(ac).

Power coupler must include a construction base with antenna, heat sink, and electrical connection cable, and be designed so it can be removed with common hand tools.

High frequency generator must:

1. Start and operate lamps at an ambient temperature of -25 °C or greater for the rated life of the lamp
2. Operate continuously at ambient air temperatures from -25 °C to 25 °C without reduction in generator life
3. Have a design life of at least 100,000 hours at 55 °C
4. Have an output frequency of 2.65 MHz ± 10 percent
5. Have radio frequency interference that complies with FCC Title 47, Part 18, regulations regarding harmful interference
6. Be replaceable with common hand tools
7. Mounted so the fixture can be used as a heat sink

Conductor terminal must be identified by the component terminal the conductor connects to.

Submit a copy of the high frequency generator test methods and results from the manufacturer with each lot of fixtures.

Each fixture must include a barrier-type fuse block for terminating field connections. Fuse block must:

1. Be secured to housing and be accessible without removal of any fixture parts
2. Be mounted to leave a minimum of 1/2 inch air space from sidewalls of housing
3. Be designed for easy removal of fuses with a fuse puller, be rated at 600 V(ac), and have box terminals.

Fuses must be 13/32-inch diameter, 1-1/2 inch long ferrule type and UL or NRTL listed. For 120 V(ac) input fixture, only the ungrounded conductor must be fused and there must be a solid link between the neutral and the high frequency generator.

If shown on the plans, include a wire guard to prevent damage to the refractor or lens. Guard must be constructed of 1/4-inch minimum diameter galvanized steel wire, and either hot-dip galvanized or electroplated-zinc coated as specified in ASTM B 633, Service Condition SC4 with a clear chromate dip treatment. Guard elements must be spaced to prevent rocks larger than 1-1/2-inch diameter from passing through.

86-6.06 SIGN LIGHTING FIXTURES FOR FLASHING BEACON

Sign lighting fixture must:

1. Be UL or NRTL listed for outdoor installation
2. Include a hood with side outlet tapped for conduit, a symmetrical 10-inch steel reflector with a white porcelain-enamel finish, and a medium base socket
3. Be rated at 150 W minimum

86-6.07 INTERNALLY ILLUMINATED STREET NAME SIGNS

Sign fixture must be:

1. Designed and constructed to prevent deformation or failure when subjected to an 85 mph 3-second-wind-gust load as specified in AASHTO publication, "Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals," and its interim revisions
2. Manufactured from all new material and all ferrous parts must be galvanized or cadmium-plated
3. Type A or B signs

Top and bottom must be formed or extruded aluminum and must be attached to formed or cast aluminum end fittings. Housing must be designed for continuous sealing between top and bottom assemblies, and end fittings, and be constructed to resist torsional twist and warp. Opening or removing 1 panel must allow access to the interior of the sign for lamp, ballast, and fuse replacement.

Photoelectric unit sockets are not allowed.

For Type A sign, both sides must be hinged at the top to allow installation or removal of sign panel, and to allow access to interior of sign.

For Type B sign, sign panel must be slide-mounted into housing.

Reflectors may be used to obtain required sign brightness. Reflectors must be formed aluminum with acrylic baked white enamel surface having a minimum reflectance of 0.85.

Sign panel must be slide-mounted or rigid-mounted in a frame, with white legend, symbols, arrows, and border on each face. Background must be green.

Sign panels surface must be evenly illuminated. Average of brightness readings for letters must be 150 foot-lamberts, minimum. Light transmission factor of sign panel must provide a letter to background brightness ratio between 10 to 1 and 20 to 1. Background luminance must not vary by more than 40 percent from the average background brightness reading. Luminance of letters, symbols, and arrows must not vary by more than 20 percent from their average brightness readings.

Sign panels must be translucent, high impact, resistant plastic panels of one of the following:

1. Glass fiber reinforced acrylated resin
2. Polycarbonate resin
3. Cellulose acetate butyrate plastic

Paint on the outside of plastic must be protected by a plastic film that seals the front surface of panel and filters out ultraviolet radiation. Paint must be acrylic plastic type.

Surface must be free of blemishes in the plastic or coating that may impair the serviceability or detract from the general appearance and color matching of sign.

White or green color must not fade or darken when sign is exposed to an accelerated test of ultraviolet light equivalent to 2 years of outdoor exposure. Green color of sign, when not illuminated, must match Color No. 14109 of Federal Standard 595B.

Sign panel must not crack or shatter when a 1-inch diameter, steel ball with a weight of 2.4 ounces is dropped from a height of 8.5 feet above the sign panel to any point of sign panel. For this test, sign panel must be lying in a horizontal position and supported within its frame.

For Type A sign, gasket must be installed between sign panel frame and fixture housing to prevent water entry between frame and fixture housing. Gasket must be uniform and even-textured, and be the closed-cell, sponge-neoprene type, designed for use at temperatures between -20 °C and +74 °C.

Gasket must be neatly applied to thoroughly degreased, clean surface with a suitable heat-resistant adhesive that will not allow the gasket to slip at temperatures between -20 °C and +74 °C.

Ballast must be high power factor type and capable of starting the lamp at -20 °C and above.

Ballast for Type A sign must be rated at 200 mA. Ballasts for Type B sign must be rated at 430 mA. Ballast must be UL or NRTL listed for operation on 110 to 125 V(ac), 60 Hz circuits, and comply with ANSI C 82.1 and ANSI C 82.2.

Lampholder must be UL or NRTL listed for outdoor use and of the spring-loaded type. Lampholder must have silver-coated contacts and waterproofed entrance leads for use with a rapid-start fluorescent lamp. Removal of lamp from socket must de-energize the primary of ballast. Each lampholder must include heat-resistant, circular cross section, partially-recessed neoprene ring to seal against lamp ends and protect electrical contacts from moisture, dirt or other injurious elements.

Distance between face of lampholders must be designed to provide compression of at least 0.10 inch on the spring-type lampholder when lamp is in place. Lamp must have positive mechanical and electrical contact when lamp is in place. Socket on spring-type lampholder must have sufficient travel to allow lamp installation. Spring must not be a part of current carrying circuit. Lampholder must match lamp requirements and must not increase cathode filament circuit resistance by more than 0.10 Ω.

Lamp must comply with ANSI C 78.

Wiring connections in fixture must be terminated on molded, phenolic, barrier-type, terminal blocks rated at 15 A, 1,000 V(ac), and must have integral-type white waterproof-marking strips. Current carrying parts of terminal blocks must be insulated from fixture with integral plugs or strips to provide protection from line-to-ground flashover voltage. If you choose to use sectionalized terminal blocks, each section must include an integral barrier on each side and be capable of rigid mounting and alignment. Terminal screws must be No. 10, minimum.

Fuses must be Type 3AG, miniature, slow-blowing type with appropriate current and voltage ratings.

Fuseholder must be a panel-mounting type with threaded or bayonet-type knob that grips the fuse tightly for extraction. Use a separate fuse for each ballast.

Screened weep holes must be constructed at strategic locations in members subject to moisture collection.

Fasteners, screws, and hardware must be passive stainless steel, Type 302 or 304, or aluminum Type 6060-T6.

Top of fixture housing must have 2 free-swinging mounting brackets. Each bracket must be adjustable vertically for leveling the sign to either a straight or curved mast arm. Bracket assembly must allow fixture to swing perpendicular to the sign panel.

Hinge pins for the free-swinging brackets must have a minimum diameter of 1/4 inch.

Message, as shown on the plans, must be displayed on both sign panels.

If not shown on the plans, the message and the size of symbols or arrows will be given by the Engineer at your request. Letters must be 8-inch upper case and 6-inch lower case, Series E.

Fixture conductors must be UL- or NRTL-listed AWM stranded copper wire with 28 mils, minimum, thermoplastic insulation, rated at 1,000 V(ac) and rated for use at 90 °C. Conductors must be No. 16 minimum and must match color coding of ballast leads.

Conductors within the fixture must be secured with easily removable spring cross straps, not clamped, in the chassis or fixture. Straps must be installed 12 inches apart or less.

Stranded copper conductors connected to screw-type terminals must terminate in approved crimp-type ring connectors.

Splices are not allowed within fixture.

Submit shop drawings showing the message for each sign, including size of letters, symbols or arrows, as shown on the plans. If requested, you must supply, without cost to the State, sufficient samples of materials to be used in the manufacturing of the sign or a complete sign assembly, to allow adequate testing and evaluation of compliance to specified requirements.

86-6.08 PHOTOELECTRIC CONTROLS

Photoelectric controls must be capable of directly switching multiple lighting systems.

86-6.08A Types

Photoelectric control type must comply with the following:

Photoelectric Control Types

Type I	Includes a remote photoelectric unit and a test switch housed in an enclosure.
Type II	Includes a remote photoelectric unit, a separate contactor located in a service equipment enclosure, and a test switch located in service equipment enclosure.
Type III	Includes a remote photoelectric unit, a separate contactor, and a test switch housed in an enclosure.
Type IV	Includes a photoelectric unit that plugs into an EEI-NEMA twist-lock receptacle integral with the luminaire.
Type V	Includes a photoelectric unit, contactor, and test switch located in service equipment enclosure.

A switch to allow manual operation of lighting circuit must be included for each Type I, Type II, Type III, and Type V photoelectric control. Switches must be single-hole mounting toggle type, single-pole, single-throw, rated at 12 A with a voltage rating that matches the circuit. Switches must have an indicating nameplate reading "Auto-Test" and be connected in parallel with the load contacts of the photoelectric unit. Test switches must not have an "OFF" position.

Photoelectric unit for Types I, II, and III photoelectric controls, must be pole-top mounted.

86-6.08B Equipment Details

86-6.08B(1) Photoelectric Unit

Photoelectric unit must:

1. Have an output in response to changing light levels. Response level must remain stable throughout life of control unit.
2. Have a "turn-on" between 1 and 5 footcandles, and a "turn-off" between 1.5 and 5 times "turn-on." Measurements must be made by procedures in EEI-NEMA standards for physical and electrical interchangeability of light-sensitive control devices used in the control of roadway lighting.
3. Have a EEI-NEMA type receptacle. Mounting brackets must be used where pole-top mounting is not possible. Photoelectric controls must be installed at locations show on the plans and oriented.
4. Be screened to prevent artificial light from causing cycling.
5. Have a supply voltage rating of 60 Hz, 105-130 V(ac), 210-240 V(ac), or 105-240 V(ac), as specified.
6. Have a load rating of 800 W minimum, incandescent, high intensity discharge, or fluorescent.
7. Operate at a temperature range of -20 °C to 55 °C.
8. Have a power consumption less than 10 W.
9. Be housed in a weatherproof enclosure.
10. Have a base with a 3-prong, EEI-NEMA standard, twist-lock plug mounting.
11. Have a "fail-on" feature.

Unit components must not require periodic replacement.

Photoelectric controls, except Type IV and Type V, must include a 4-inch minimum inside diameter, pole-top mounting adaptor containing a terminal block, and cable supports or clamps to support pole wires.

For switching 480 V(ac), 60 Hz circuits, a 100 VA, minimum, 480/120 V(ac) transformer must be installed in the contactor enclosure to allow 120 V(ac) for the photoelectric control unit. If more than 1 photoelectric unit is to be installed at a location, a single transformer with a volt-ampere rating capable of handling the total controlled load, may be used.

86-6.08B(2) Contactor

Contactor must:

1. Have contacts rated to switch the specified lighting load
2. Be normally open
3. Be the mechanical armature type with contacts of fine silver, silver alloy, or superior alternative material

86-6.08B(3) Enclosure

Enclosure for Type I and Type III photoelectric controls must be NEMA 3R. Enclosure must be supplied with a factory-applied rust-resistant prime coat and finish coat. Two applications of paint to match the color of the standard must be applied as specified in Section 86-2.16, "Painting." Enclosure may be hot-dip galvanized instead of painting. A minimum of 2-1/2 inches must be provided between contactor terminals and end of enclosure for wiring connections. Enclosure must be mounted on the same standard as the photoelectric unit at a height of about 6 feet above finished grade.

86-6.08B(4) Terminal Blocks

Terminal blocks must be rated at 25 A, 600 V(ac), molded from phenolic or nylon material, and of the barrier type with plated-brass screw terminals and integral-type marking strips.

86-6.09 TRANSFORMERS

Multiple-to-multiple transformers must be single-phase dry type designed for operation on a 60 Hz supply.

86-6.09A Electrical Requirements

Transformers must have a decal showing a connection diagram. Diagram must show either color-coding or wire-tagging with primary (H1, H2) or secondary (X1, X2) markers, and the primary and secondary voltage and volt-ampere rating. Transformers must comply with the following:

Transformer Electrical Requirements	
Transformer Characteristic	Multiple-to-Multiple Unit
Rating	120/480 V(ac), 240/480 V(ac), or 480/120 V(ac)
Efficiency	Exceed 95 percent
Secondary Voltage Regulation and Tolerance	±3 percent from half load to full load

Secondary 480 V(ac) windings must be center-tapped.

86-6.09B Physical Requirements

External leads for multiple-to-multiple secondary connections must be Type USE, No. 10, rated 600 V(ac).

Transformer leads must extend a minimum of 12 inches from the case.

Transformer insulation must be NEMA 185 C or better.

Multiple-to-multiple transformers must withstand the application of 2,200 V(ac) from core to coils and from coil to coil for a 1-minute period.

The above tests must be made immediately after operation of transformer at full load for 24 hours.

Non-submersible transformers must include metal half-shell coil protection, have moisture resistant synthetic varnish impregnated windings, and be suitable for outdoor operation in a raintight enclosure.

Each transformer to be installed in a pull box must be the submersible type and include a handle and a hanger.

86-6.09C Submersible Type Transformers

Submersible type transformers must be securely encased in a rugged corrosion resistant, watertight case and must withstand a 5-day test submerged in 2 feet of salt water, 2 percent salt by weight, with 12-hour on and off periods. The operating periods must be at full load.

Leads of submersible transformers must be brought out through one or more sealed hubs and secured to withstand a 100 pound static pull without loosening or leaking.

86-6.10 (BLANK)

86-6.11 FALSEWORK LIGHTING

86-6.11A General

Falsework lighting must include lighting to illuminate the pavement, portals, and pedestrian walkways at or under openings in the falsework required for traffic.

Lighting for pedestrian walkway illumination must be installed at all pedestrian openings through or under falsework.

Before starting falsework opening construction, you must submit a plan of proposed lighting installations for review and obtain approval. Approval will be made as specified in Section 5-1.02, "Plans and Working Drawings."

You must design falsework lighting so that required maintenance can be performed with a minimum of inconvenience to public traffic. Closing of traffic lanes for routine maintenance will not be permitted on roadways with posted speed limits greater than 25 mph.

Pavement under falsework with portals less than 150 feet apart and falsework portals must be illuminated only during the hours of darkness as defined in Division 1, Section 280, of the California Vehicle Code. Photoelectric switches must be used to control falsework lighting systems. Pavement under falsework with portals 150 feet or more apart and all pedestrian openings through falsework must be illuminated 24 hours per day.

Lighting fixtures must be aimed to avoid glare to oncoming motorists.

Type NMC cable with No. 12 minimum conductors, with ground wire, must be used. Fasten cable to supporting structure at sufficient intervals to adequately support cable and within 12 inches from every box or fitting. Conductors within 8 feet of ground must be enclosed in a 1/2 inch or larger metal conduit.

Each illumination system must be on a minimum of 1 separate branch circuit at each bridge location. Each branch circuit must be fused, not to exceed 20 A.

For falsework lighting, you must arrange with the serving utility to complete service connections. You must pay for energy, line extension, service, and service hookup costs.

At completion of project or when ordered by the Engineer, falsework lighting equipment will become your property and you must remove it from the job site.

You may propose a lighting plan that fulfills light intensity requirements to the systems specified herein. You must supply sufficient data to allow evaluation of alternative methods.

86-6.11B Pavement Illumination

Illumination of pavement at vehicular openings through falsework must comply with the following:

1. Fixture must include R/FL commercial type floodlamp holder with protective covers.
2. Fixture must be fully adjustable with brackets and locking screws, and allow mounting directly to a standard metal junction box.
3. Lamp must be medium-base 120 V(ac), 120 W, minimum, PAR-38 quartz-halogen floodlamp.
4. A continuous row of fixture types required must be installed at locations and spacing specified. Fixtures must be installed beneath falsework structure, with the end fixtures not further than 10 feet inside portal faces. Fixtures must be installed and energized immediately after the members supporting them have been erected.
5. Fixtures along the sides of the opening must be placed not more than 4 feet behind or 2 feet in front of the roadway face of the temporary railing. Mounting heights of fixtures must be between 12 and 16 feet above the roadway surface and must present an unobstructed light pattern on the pavement.

86-6.11C Portal Illumination

Illumination of falsework portals must comply with the following:

1. On each side of each entrance portal, plywood sheet clearance guides, 4 feet wide by 8 feet high, must be fastened vertically, facing traffic, with the bottom of the panel 3 feet to 4 feet above the roadway. The center of the panel must be located approximately 3 feet horizontally behind the roadway face of the railing. Panels must be freshly painted for each installation with not less than 2 applications of flat white paint. Paint testing will not be required.
2. If ordered by the Engineer, in order to improve the general appearance of the painted surfaces, you must repaint designated areas and that painting will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

3. Falsework portals must be illuminated on the side facing traffic with 150 W, minimum, PAR reflector floodlamps mounted on the structure directly over each vertical support adjacent to the traveled way, as needed to uniformly illuminate the exterior falsework beam, the clearance guides, and the overhead clearance sign. Each lamp must be supported approximately 16 feet above the pavement and approximately 6 feet in front of the portal face.
4. Portal lighting and clearance guides must be installed on the day that vertical members are erected.

86-6.11D Pedestrian Walkway Illumination

Illumination of pedestrian openings through or under falsework must comply with the following:

1. Fixtures must be flush-mounted in the overhead protection shield and equipped with a damage-resistant clear polycarbonate diffuser lens. Lamps must be standard incandescent 100 W, 120 V(ac).
2. Fixtures must be centered over the passageway at intervals of not more than 15 feet with the end fixtures not more than 7 feet inside the end of the pedestrian openings.
3. Pedestrian passageway light systems must be installed immediately after the overhead protection shield is erected.

86-7 REMOVING, REINSTALLING OR SALVAGING ELECTRICAL EQUIPMENT

86-7.01 REMOVING ELECTRICAL EQUIPMENT

Existing electrical equipment, pull boxes, and conduits, to be removed and not reused or salvaged, become your property and you must dispose of it under Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way." Unused underground conduit may be abandoned in place after all conductors have been removed, except that conduit terminations from conduit to be abandoned must be removed from pull boxes to remain.

Exercise care in salvaging equipment so that it will not be damaged or destroyed. Mast arms must be removed from standards. Luminaires, signal heads, and signal mounting assemblies must be removed from standards and mast arms.

Holes resulting from removing pull boxes must be filled with material equivalent to the surrounding material.

86-7.02 REINSTALLING REMOVED ELECTRICAL EQUIPMENT

If removed electrical equipment is to be reinstalled, you must supply all necessary materials and equipment, including signal mounting assemblies, anchor bolts, nuts, washers, and concrete as required to complete the new installation.

Luminaires to be reinstalled must be cleaned and relamped.

Existing materials required to be reused and found to be unsatisfactory by the Engineer must be replaced with new material and the replacement cost will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

86-8 PAYMENT

86-8.01 PAYMENT

The contract lump sum price or prices paid for signal, ramp metering, flashing beacon, lighting, sign illumination, traffic monitoring station, highway advisory radio systems, closed circuit television systems, or combinations thereof; for modifying or removing those systems; for temporary systems; or the lump sum or unit prices paid for various units of those systems; or the lump sum or per foot price paid for conduit of the various sizes, types, and installation methods listed in the Engineer's Estimate include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing, modifying, or removing the systems, combinations or units thereof, including any necessary pull boxes (except if the type required is shown as a separate contract item); excavation and backfill; concrete foundations (except if shown as a separate contract item); pedestrian barricades; furnishing and installing illuminated street name signs; installing sign panels on pedestrian barricades, on flashing beacon standards, and on traffic signal mast arms; restoring sidewalk, pavement and appurtenances damaged or destroyed during construction; salvaging existing materials; and making all required tests, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

If poles for electrical systems are manufactured from a source located more than 300 air-line miles from Sacramento and Los Angeles, the Department will deduct \$5,000 for inspection costs for each inspection site. If

poles for electrical systems are manufactured from a source located more than 3,000 air-line miles from Sacramento and Los Angeles, the Department will deduct \$8,000 for inspection costs for each inspection site.

Full compensation for all additional materials and labor, not shown on the plans or specified, that are necessary to complete the installation of the various systems, is included in the prices paid for the systems, or units thereof, except as provided in Section 86-1.06, "Maintaining Existing and Temporary Electrical Systems," and no additional compensation will be allowed therefor.

If shown as a contract item, the contract price paid per foot for cast-in-drilled-hole concrete pile (signal foundation) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing reinforced concrete pile foundations of the size shown on the Engineer's Estimate, including drilling holes, disposing of the material resulting from drilling holes, furnishing and placing anchor bolt assemblies and reinforcing steel, complete in place, as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.

If shown as a contract item, non-reinforced PCC foundations will be measured and paid for by the cubic yard for foundation concrete in the same manner as specified for minor concrete (minor structure) in Section 51, "Concrete Structures."

If shown as a separate contract item by the lump sum or per foot, interconnection conduit and cable includes all interconnection conductors, and conduit and pull boxes containing interconnection cable and no other conductors. The quantity of interconnection conduit and cable to be paid for by the foot is the length of that conduit. Compensation for conduit containing interconnection cable and other conductors is included in the contract price paid for the item requiring the other conductors.

Full compensation for furnishing, installing, maintaining, and removing falsework lighting equipment is included in the contract prices paid for the items of work involved in the structure that requires the falsework lighting and no additional compensation will be allowed therefor.

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SECTION 88 ENGINEERING FABRICS
(Issued 06-05-09)

Replace Section 88 with:
SECTION 88 GEOSYNTHETICS

88-1.01 GENERAL

88-1.01A Summary

Section 88 includes specifications for geosynthetics. Geosynthetics are used for:

1. Filtration
2. Drainage
3. Reinforcement
4. Water pollution control
5. Channel and shore protection
6. Pavement interlayer
7. Separation and stabilization

88-1.01B Submittals

Submit:

1. Certificate of Compliance under Section 6-1.07, "Certificates of Compliance"
2. Samples representing each lot
3. Minimum average roll values (MARV)

Label submittals with the manufacturer's name and product information.

88-1.01C Quality Control and Assurance

Treat geosynthetics to resist degradation from exposure to sunlight. Using covers, protect geosynthetics from moisture, sunlight, and shipping and storage damage.

88-1.02 FILTRATION

88-1.02A Filter Fabric

Geosynthetics used for filter fabric must be permeable and nonwoven. Filter fabric must consist of 1 of the following:

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

Filter fabric must comply with:

Property	ASTM	Filter Fabric		
		Specification		
		Class A	Class B	Class C
Grab breaking load, 1-inch grip, lb minimum in each direction	D 4632	157		
Apparent elongation, percent minimum in each direction	D 4632	50		
Hydraulic bursting strength, psi minimum	D 3786	210		
Ultraviolet resistance, percent minimum retained grab breaking load, 500 hr	D 4355	70		
Permittivity, sec ⁻¹ minimum	D 4491	0.5	0.2	0.1
Apparent opening size, average roll value, U.S. Standard sieve size maximum	D 4751	40	60	70

88-1.03 DRAINAGE

88-1.03A Geocomposite Wall Drain

Geocomposite wall drain must consist of a polymeric core with filter fabric integrally bonded to 1 or both sides of the core creating a stable drainage void.

Filter fabric must comply with Section 88-1.02, "Filtration."

Geocomposite wall drain must comply with:

Geocomposite Wall Drain		
Property	ASTM	Specification
Thickness with fabric, inches maximum	--	2
Transmissivity, gradient = 1.0, normal stress = 5,000 psf, gal/min/ft	D 4716	4

88-1.04 REINFORCEMENT

88-1.04A Geotechnical Subsurface Reinforcement

General

Geosynthetic used for geotechnical subsurface reinforcement must be either of the following:

1. Geotextile
2. Geogrid

Geotextile permittivity must be at least 0.05 sec⁻¹ determined under ASTM D 4491.

Geogrid must have a regular and defined open area. The open area must be from 50 to 90 percent of the total grid area.

Long Term Design Strength

Long Term Design Strength (LTDS) of geosynthetic reinforcement is the ultimate tensile strength in the primary strength direction divided by reduction factors. Calculate the LTDS from the guidelines in Geosynthetic Research Institute (GRI) Standard Practice GG4a, GRI GG4b, or GRI GT7.

The product of the appropriate reduction factors must be at least 1.30. Determine the reduction factor for creep using a 75-year design life for permanent applications and a 5-year design life for temporary applications. Determine the installation damage reduction factor based on the characteristics of the backfill materials used.

If test data is not available, use default values of reduction factors in the GRI Standard Practice to calculate LTDS.

Submit the LTDS and its supporting calculations at least 15 days before placing geosynthetic reinforcement. Do not install before the Engineer's approval. The LTDS must be signed by an engineer who is registered as a civil engineer in the State.

88-1.05 WATER POLLUTION CONTROL

Geosynthetics used for water pollution control must comply with:

Water Pollution Control Geosynthetics

Property	ASTM	Application				
		Silt Fence		Sediment Filter Bag	Gravel-Filled Bags	Temporary Cover
		Woven	Non-woven			
Grab breaking load, 1-inch grip, lb minimum in each direction	D 4632	120	120	255	205	200
Apparent elongation, percent minimum, in each direction	D 4632	15	50	--	--	50
Water flow rate, gallons per minute/square foot minimum and maximum average roll value	D 4491	10 - 100	100 - 150	80 - 200	80 - 150	75 - 120
Permittivity, sec ⁻¹ minimum	D 4491	0.1	1.1	1.0	0.2	1.0
Apparent opening size, inches maximum average roll value	D 4751	0.023	0.023	0.033	0.016	0.007
Ultraviolet resistance, percent minimum retained grab breaking load, 500 hr.	D 4355	70	70	70	70	70

88-1.06 CHANNEL AND SHORE PROTECTION

88-1.06A Rock Slope Protection

Rock slope protection (RSP) fabric must be a permeable, nonwoven, needle-punched geotextile. RSP fabric consists of 1 of the following:

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

Polymers must be either virgin compounds or clean reworked material. Do not subject virgin compounds to use or processing other than required for initial manufacture. Clean reworked material must be previously processed material from the processor's own production that has been reground, pelletized, or solvated. RSP fabric must not consist of more than 20 percent by weight of clean reworked material. Do not use recycled materials from either post-consumer or post-industrial sources.

Class 8 or Class 10 RSP fabric must comply with:

Rock Slope Protection Fabric

Property	ASTM	Specification	
		Class 8	Class 10
Weight, oz/yd ² minimum	D 5261	7.5	9.5
Grab breaking load, lb 1-inch grip, min. in each direction	D 4632	200	250
Apparent elongation, percent min., in each direction	D 4632	50	50
Permittivity, sec ⁻¹ , minimum	D 4491	1.0	0.70
Apparent opening size, U.S. Standard sieve size minimum and maximum	D 4751	70 - 100	70 - 100
Ultraviolet resistance, percent minimum retained grab breaking load, 500 hr.	D4355	70	70

88-1.07 PAVEMENT INTERLAYER

88-1.07A Paving Fabric

Geosynthetics used for paving fabric must be nonwoven. Paving fabric must comply with:

Geosynthetic Paving Fabric

Property	ASTM	Specification
Mass per unit area, oz/yd ² minimum	D 5261	4.1
Grab breaking load, lb 1-inch grip, minimum, in each direction	D 4632	100
Apparent elongation, percent minimum in each direction	D 4632	50
Hydraulic bursting strength, psi minimum	D 3786	200
Melting point, °F minimum	D 276	325
Asphalt retention, gal/yd ² minimum	D 6140	0.2

88-1.07B Paving Mat

Geosynthetics used for paving mat must be a nonwoven fiberglass and polyester hybrid material. Paving mat must comply with:

Geosynthetic Paving Mat

Property	ASTM	Specification
Breaking force, lb/2 inches minimum	D 5035	45
Ultimate elongation, percent maximum	D 5035	5
Mass per unit area, oz/ sq yd minimum	D 5261	3.7
Melting point, °F minimum	D 276	400
Asphalt retention, gal/yd ² minimum	D 6140	0.10

88-1.07C Paving Grid

Geosynthetics used for paving grid must be a geopolymer material formed into a grid of integrally connected elements with openings. Paving grid must comply with:

Geosynthetic Paving Grid

Property	Test	Specification		
		Class I	Class II	Class III
Tensile strength at ultimate, lb/in ^a minimum	ASTM D 6637	560 x 1,120	560	280
Aperture size, inch minimum	Calipered	0.5	0.5	0.5
Elongation, % maximum	ASTM D 6637	12	12	12
Mass per area, oz / sqyd minimum	ASTM D 5261	16	10	5.5
Melting point, °F minimum	ASTM D 276	325	325	325

Note:

^a For Class I, machine direction x cross direction. For Class II and Class III, both directions.

88-1.07D Paving Geocomposite Grid

Paving geocomposite grid consists of paving grid specified under Section 88-1.07C, "Paving Grid," bonded or integrated with paving fabric specified under Section 88-1.07A, "Paving Fabric."

Paving geocomposite grid must have a peel strength of at least 10 pounds per foot determined under ASTM D 413.

88-1.07E Geocomposite Strip Membrane

Geocomposite strip membrane must consist of various widths of strips manufactured from of asphaltic rubber and geosynthetics. Geocomposite strip membrane must comply with:

Geocomposite Strip Membrane

Property	ASTM	Specification
Strip tensile strength, lbs/inch minimum	D 882	50
Elongation at break, % minimum	D 882	50
Resistance to puncture, lbs. minimum	E 154	200
Permeance, perms maximum	E 96/E 96M	0.10
Pliability, 1/4 inch mandrel with sample conditioned at 25 °F	D 146	No cracks in fabric or bitumen
Melting point, °F	D 276	325

88-1.08 SEPARATION AND STABILIZATION

88-1.08A Subgrade Enhancement Geotextile

Subgrade enhancement geotextile must consist of either of the following:

1. Polyester
2. Polypropylene

Subgrade enhancement geotextile must comply with:

Subgrade Enhancement Geotextile

Property	ASTM	Specification ^a				
		Class A1	Class A2	Class B1	Class B2	Class B3
Elongation at break, %	D 4632	<50	≥50	<50	<50	≥50
Grab tensile strength, lb minimum	D4632	250	160	--	320	200
Wide width tensile strength at 5% strain, lb/ft minimum	D 4595	--	--	2,000	--	--
Wide width tensile strength at ultimate strength, lb/ft minimum	D 4595	--	--	4,800	--	--
Tear strength, lb minimum	D 4533	90	60	--	120	80
Puncture strength, lb minimum	D 6241	500	310	620	620	430
Permittivity, sec ⁻¹ minimum	D 4491	0.05	0.05	0.20	0.20	0.20
Apparent opening size, inches maximum	D 4751	0.012	0.012	0.024	0.012	0.012
Ultraviolet stability (retained strength after 500 hrs exposure), % minimum	D 4355	70	70	70	70	70

Notes:

^a Specifications are based on minimum average roll value in the weaker principle direction except apparent opening size is based on maximum average roll value.

88-1.09 PAYMENT

The Department measures and pays for geosynthetics under the specifications requiring their use.

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 ± 1 hours after mixing the concrete and placed in lime water at 73 ± 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 ± 3 °F and 50 ± 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 (±)
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_3S 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 by intergrinding portland cement clinker and granulated blast furnace slag, ground granulated blast furnace slag (GGBFS), or pozzolan; by blending portland cement and either GGBFS or finely divided pozzolan; or by 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_2O plus 0.658 times the percentage of K_2O , 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 ₃)	1.5 max.
Loss on ignition	1.2 max.
Available Alkalies (as Na ₂ 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 ₂) + Aluminum Oxide (Al ₂ O ₃)	92.0 min.
Calcium Oxide (CaO)	1.0 max.
Sulfur Trioxide (SO ₃)	1.0 max.
Loss on ignition	1.2 max.
Available Alkalies (as Na ₂ O) equivalent	1.0 max.

Physical Requirements	Percent
Particle size distribution	
Less than 45 microns	95
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 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 greater than 10 percent and 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 LiNO₃ 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 greater than 10 percent and 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 LiNO₃ 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_f, 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 ^a
Sand Equivalent:		
Operating Range	217	75, min.
Contract Compliance	217	71, min.

^a 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 SO₄, 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 SO₄, when tested in conformance with California Test 417. In no case shall the water contain an amount of impurities that will cause either of the following results when compared to the same test using distilled or deionized water: 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.

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 SO₄, 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 (Na₂O + 0.658 K₂O) 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 dispensed 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 (LiNO₃) must be 30 percent +/- 0.5 percent by weight
 2. Sulfate (SO₄) must be less than 1000 ppm
 3. Chloride (Cl) must be less than 1000 ppm
 4. Alkalis (Na₂O + 0.658 K₂O) 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 ± 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 used, 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, "Automatic Proportioning." 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.

For concrete pavement, aggregate and bulk cementitious material must be proportioned by weight by means of automatic proportioning devices.

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 ± 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 ± 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 ± 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 ± 0.5 percent of their designated individual batch weights. Equipment for measuring water shall have a zero tolerance of ± 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 Automatic Proportioning

Automatic proportioning devices shall be authorized by the Department.

For concrete pavement, 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 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 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 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 weight 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, if allowed by the Engineer, 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.

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).

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 a truck mixer or agitator 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 cementitious materials 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 cementitious materials 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 cementitious materials 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 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 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 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 ± 50 square feet per gallon of the nominal rate specified, and the average application rate shall be within ± 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 of the concrete placed in the work is at least 85 percent of the specified strength. 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 or when prequalification is specified, 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 600 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 allowed 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 ^a	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 % ^b	T 44	99	99	99	99	99
Viscosity at 135°C, ^c 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, ^e 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 ^f 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 ^d 5000	31 ^d 5000	28 ^d 5000	22 ^d 5000	34 ^d 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:

- Use as asphalt rubber base stock for high mountain and high desert area.
- 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 Engineer waives this specification if the supplier certifies the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.
- Test the sample at 3°C higher if it fails at the specified test temperature. G*sin(delta) remains 5000 kPa maximum.
- "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.
- "PAV" means Pressurized Aging Vessel.

Performance graded polymer modified asphalt binder (PG Polymer Modified) is:

Performance Graded Polymer Modified Asphalt Binder^a

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 % ^b	T 44 ^c	98.5	98.5	98.5
Viscosity at 135°C, ^d 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 ^f , Test Temp., °C Minimum recovery, %	T 301	25 75	25 75	25 65
PAV ^g 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:

1. 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.

^^
**SECTION 95 EPOXY
(Issued 06-05-09)**

Replace the table in Section 95-2.11 with:

Characteristics of Adhesive:

Test ^a	California Test	Requirement
Brookfield Viscosity, No. 3 Spindle at 20 rpm, Poise at 77°F	434, Part 4	0.9 max.
Gel time, minutes	434, Part 1	2 to 15
Slant Shear Strength on Dry Concrete, psi, after 4 days of cure in air at 77° F ±2° F	434, Part 5 ^b	3,000 min.
Slant Shear Strength on Wet Concrete, psi, after 4 days of cure in air at 77° F ±2° F	434, Part 5 ^b	1,700 min.
Tensile Strength, psi	434, Part 7, except test after 4 days of cure at 77° F ±2° F	4,500 min.
Elongation, %	434, Part 7, except test after 4 days of cure at 77° F ±2° F	10 max.

^a The mixing ratio used will be that recommended by the manufacturer.

^b For slant shear strength on concrete, delete Sections B-1 and B-5 of California Test 434, Part 5. For dry concrete, use Step "2" below only. For wet concrete, use both Steps "1" & "2":

1. Soak blocks in water for 24 hours at 77° F ±2° F. Remove and wipe off excess water.
2. Mix epoxy as described in California Test 434, Part 1, and apply a coat approximately 0.010-inch thick to each diagonal surface. Place four 0.125-inch square pieces of shim stock 0.012-inch thick on one block to control final film thickness. Before pressing the coated surfaces together, leave the blocks so that the coated surfaces are horizontal until the epoxy reacts slightly to prevent excessive flow.

END OF AMENDMENT

APPENDIX B
to the contract documents for
HOV 50 LANE PHASE 2A
Contract No. PW 09-30408 / CIP No. 53113

FEDERAL WAGE RATES

FEDERAL WAGE RATES

General Decision Number: CA100009 11/18/2011 CA9

Superseded General Decision Number: CA20080009

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

Counties: Alpine, Amador, Butte, Colusa, El Dorado, Glenn, Lassen, Marin, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo and Yuba Counties in California.

BUILDING CONSTRUCTION PROJECTS (excluding Amador County only);
DREDGING CONSTRUCTION PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); AND HIGHWAY CONSTRUCTION PROJECTS

Modification Number Publication Date

0	03/12/2010
1	03/26/2010
2	07/02/2010
3	07/09/2010
4	08/13/2010
5	08/27/2010
6	09/10/2010
7	09/24/2010
8	10/01/2010
9	10/15/2010
10	10/29/2010
11	11/05/2010
12	11/19/2010
13	12/03/2010
14	01/21/2011
15	01/28/2011
16	02/11/2011
17	02/18/2011
18	03/18/2011
19	04/08/2011
20	04/15/2011

21	05/13/2011
22	06/03/2011
23	06/24/2011
24	07/01/2011
25	07/15/2011
26	07/29/2011
27	08/05/2011
28	08/12/2011
29	08/19/2011
30	09/02/2011
31	09/16/2011
32	09/30/2011
33	11/04/2011
34	11/18/2011

ASBE0016-001 08/01/2011

AREA 1: ALAMEDA, CONTRA COSTA, LAKE, MARIN, MENDOCINO, MONTEREY, NAPA, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, & SONOMA COUNTIES

AREA 2: ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LASSEN, MADERA, MARIPOSA, MERCED, MODOC, MONO, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN JOAQUIN, SHASTA, SIERRA, SISKIYOU, STANISLAU, SUTTER, TEHEMA, TRINITY, TULARE, TUOLUMNE, YOLO, & YUBA COUNTIES

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, Protective Coverings, Coatings, and Finishes to all types of mechanical systems)		
Area 1.....	\$ 53.05	17.25
Area 2.....	\$ 41.40	17.25

ASBE0016-007 01/01/2010

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging)		

and disposing of all
insulation materials from
mechanical systems, whether
they contain asbestos or not).....\$ 15.18 2.80

BOIL0549-002 01/01/2009

	Rates	Fringes
BOILERMAKER		
(1) Marin & Solano Counties. \$ 40.17	\$ 40.17	22.32
(2) Remaining Counties.....\$ 37.01	\$ 37.01	22.25

BRCA0003-001 08/01/2008

	Rates	Fringes
MARBLE FINISHER.....\$ 28.02	\$ 28.02	12.12

BRCA0003-004 05/01/2011

AREA 1: ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN,
LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA,
SIERRA, SUTTER, TEHAMA, YOLO AND YUBA COUNTIES

AREA 2: MARIN, NAPA, SISKIYOU, SOLANO, SONOMA AND TRINITY
COUNTIES

	Rates	Fringes
BRICKLAYER		
AREA 1.....\$ 35.11	\$ 35.11	18.99
AREA 2.....\$ 39.85	\$ 39.85	22.00

SPECIALTY PAY:

- (A) Underground work such as tunnel work, sewer work, manholes, catch basins, sewer pipes and telephone conduit shall be paid \$1.25 per hour above the regular rate. Work in direct contact with raw sewage shall receive \$1.25 per hour in addition to the above.
- (B) Operating a saw or grinder shall receive \$1.25 per hour above the regular rate.
- (C) Guniting nozzle person shall receive \$1.25 per hour above the regular rate.

BRCA0003-008 07/01/2010

	Rates	Fringes
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TERRAZZO FINISHER.....	\$ 30.30	13.77
TERRAZZO WORKER/SETTER..	\$ 39.30	21.20

BRCA0003-010 01/01/2011

	Rates	Fringes
TILE FINISHER		
Area 1.....	\$ 21.21	10.01
Area 2.....	\$ 21.26	12.44
Area 3.....	\$ 21.44	12.31
Area 4.....	\$ 20.93	11.79
Tile Layer		
Area 1.....	\$ 36.08	11.95
Area 2.....	\$ 34.41	13.68
Area 3.....	\$ 38.61	13.73
Area 4.....	\$ 35.45	13.68

AREA 1: Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Sutter, Tehema, Yolo, Yuba

AREA 2: Alpine, Amador

AREA 3: Marin, Napa, Solano, Siskiyou

AREA 4: Sonoma

BRCA0003-014 08/01/2008

	Rates	Fringes
MARBLE MASON.....	\$ 39.22	18.58

CARP0034-001 07/01/2011

	Rates	Fringes
Diver		
Assistant Tender, ROV Tender/Technician.....	\$ 36.75	28.04
Diver standby.....	\$ 41.43	28.04
Diver Tender.....	\$ 40.43	28.04
Diver wet.....	\$ 82.86	28.04
Manifold Operator (mixed gas).....	\$ 45.43	28.04
Manifold Operator (Standby). \$	40.43	28.04

DEPTH PAY (Surface Diving):

050 to 100 ft \$2.00 per foot

101 to 150 ft \$3.00 per foot

151 to 220 ft \$4.00 per foot

SATURATION DIVING:

The standby rate shall apply until saturation starts. The saturation diving rate applies when divers are under pressure continuously until work task and decompression are complete. The diver rate shall be paid for all saturation hours.

DIVING IN ENCLOSURES:

Where it is necessary for Divers to enter pipes or tunnels, or other enclosures where there is no vertical ascent, the following premium shall be paid: Distance traveled from entrance 26 feet to 300 feet: \$1.00 per foot. When it is necessary for a diver to enter any pipe, tunnel or other enclosure less than 48" in height, the premium will be \$1.00 per foot.

WORK IN COMBINATION OF CLASSIFICATIONS:

Employees working in any combination of classifications within the diving crew (except dive supervisor) in a shift are paid in the classification with the highest rate for that shift.

CARP0034-003 07/01/2011

	Rates	Fringes
Piledriver.....	\$ 36.75	28.04

CARP0035-001 08/01/2011

AREA 1: MARIN, NAPA, SOLANO & SONOMA

AREA 3: SACRAMENTO

AREA 4: ALPINE, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO & YUBA

	Rates	Fringes
Drywall Installers/Lathers:		
Area 1.....	\$ 37.50	25.28
Area 3.....	\$ 32.12	25.28
Area 4.....	\$ 30.77	25.28
Drywall Stocker/Scrapper		
Area 1.....	\$ 18.75	14.44

Area 3.....	\$ 16.06	14.44
Area 4.....	\$ 15.39	14.44

 CARP0035-009 07/01/2011

Marin County

	Rates	Fringes
CARPENTER		
Bridge Builder/Highway Carpenter.....	\$ 37.50	24.84
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 37.65	24.84
Journeyman Carpenter.....	\$ 37.50	24.84
Millwright.....	\$ 37.60	26.43

 CARP0035-010 07/01/2010

AREA 1: Marin, Napa, Solano & Sonoma Counties

AREA 2: Alpine, San Benito and Santa Cruz

AREA 3: Alpine, Butte, Colusa, El Dorado, Glenn, Lassen, Modoc,
 Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou,
 Sutter, Tehama, Trinity, Yolo & Yuba counties

	Rates	Fringes
Modular Furniture Installer		
Area 1		
Installer I.....	\$ 22.11	14.98
Installer II.....	\$ 18.68	14.98
Lead Installer.....	\$ 25.56	15.48
Master Installer.....	\$ 29.78	15.48
Area 2		
Installer I.....	\$ 19.46	14.98
Installer II.....	\$ 16.51	14.98
Lead Installer.....	\$ 22.43	15.48
Master Installer.....	\$ 26.06	15.48
Area 3		
Installer I.....	\$ 18.51	14.98
Installer II.....	\$ 15.74	14.98
Lead Installer.....	\$ 21.31	15.48
Master Installer.....	\$ 24.73	15.48

CARP0046-001 07/01/2011

El Dorado (West), Placer (West), Sacramento and Yolo Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 37.50	24.84
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 31.77	24.84
Journeyman Carpenter.....	\$ 31.62	24.84
Millwright.....	\$ 34.12	26.43

Footnote: Placer County (West) includes territory West of and including Highway 49 and El Dorado County (West) includes territory West of and including Highway 49 and territory inside the city limits of Placerville.

CARP0046-002 07/01/2011

Alpine, Colusa, El Dorado (East), Nevada, Placer (East),
Sierra, Sutter and Yuba Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 37.50	24.84
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 30.42	24.84
Journeyman Carpenter.....	\$ 30.27	24.84
Millwright.....	\$ 32.77	26.43

CARP0152-003 07/01/2011

Amador County

	Rates	Fringes
Carpenters		

Bridge Builder/Highway Carpenter.....	\$ 37.50	24.84
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 30.42	24.84
Journeyman Carpenter.....	\$ 30.27	24.84
Millwright.....	\$ 32.77	26.43

CARP0180-001 07/01/2011

Solano County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 37.50	24.84
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 37.65	24.84
Journeyman Carpenter.....	\$ 37.50	24.84
Millwright.....	\$ 37.60	26.43

CARP0751-001 07/01/2011

Napa and Sonoma Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 37.50	24.84
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 37.65	24.84
Journeyman Carpenter.....	\$ 37.50	24.84
Millwright.....	\$ 37.60	26.43

CARP1599-001 07/01/2011

Butte, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama
and Trinity Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 37.50	24.84
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 30.42	24.84
Journeyman Carpenter.....	\$ 30.27	24.84
Millwright.....	\$ 32.77	26.43

* ELEC0006-002 12/01/2010

MARIN, NAPA, SOLANO & SONOMA COUNTIES

	Rates	Fringes
Sound & Communications		
Installer.....	\$ 29.87	3%+12.95
Technician.....	\$ 34.01	3%+12.95

SCOPE OF WORK INCLUDES-

SOUND & VOICE TRANSMISSION (Music, Intercom, Nurse Call, Telephone); FIRE ALARM SYSTEMS [excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs],

TELEVISION & VIDEO SYSTEMS, SECURITY SYSTEMS, COMMUNICATIONS SYSTEMS that transmit or receive information and/or control systems that are intrinsic to the above.

EXCLUDES-

Excludes all other data systems or multiple systems which include control function or power supply; excludes installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excludes energy management systems.

ELEC0180-001 06/01/2011

NAPA AND SOLANO COUNTIES

Rates	Fringes
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CABLE SPLICER.....	\$ 48.16	3%+19.88
ELECTRICIAN.....	\$ 42.81	3%+19.88

 ELEC0340-002 12/01/2010

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN,
 NEVADA, PLACER, PLUMAS, SACRAMENTO, TRINITY, YOLO, YUBA COUNTIES

	Rates	Fringes
Communications System		
Sound & Communications		
Installer.....	\$ 24.13	3%+10.65
Sound & Communications		
Technician.....	\$ 27.75	3%+10.65

SCOPE OF WORK

Includes the installation testing, service and maintenance, of the following systems which utilize the transmission and/or transference of voice, sound, vision and digital for commercial, education, security and entertainment purposes for the following TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call system, radio page, school intercom and sound, burglar alarms, and low voltage master clock systems.

A. SOUND AND VOICE TRANSMISSION/TRANSFERENCE SYSTEMS

Background foreground music Intercom and telephone interconnect systems, Telephone systems, Nurse call systems, Radio page systems, School intercom and sound systems, Burglar alarm systems, Low voltage master clock systems, Multi-media/multiplex systems, Sound and musical entertainment systems, RF systems, Antennas and Wave Guide.

B. FIRE ALARM SYSTEMS

Installation, wire pulling and testing

C. TELEVISION AND VIDEO SYSTEMS Television monitoring and surveillance systems, Video security systems, Video entertainment systems, Video educational systems, Microwave transmission systems, CATV and CCTV

D. SECURITY SYSTEMS Perimeter security systems
 Vibration sensor systems Card access systems Access control systems Sonar/infrared monitoring equipment

E. COMMUNICATIONS SYSTEMS THAT TRANSMIT OR RECEIVE INFORMATION AND/OR CONTROL SYSTEMS THAT ARE INTRINSIC TO THE ABOVE LISTED SYSTEMS SCADA (Supervisory Control and Data Acquisition) PCM (Pulse Code Modulation) Inventory Control Systems Digital Data Systems Broadband and Baseband and Carriers Point of Sale Systems VSAT Data Systems Data Communication Systems RF and Remote Control Systems Fiber Optic Data Systems WORK EXCLUDED Raceway systems are not covered (excluding Ladder-Rack for the purpose of the above listed systems). Chases and/or nipples (not to exceed 10 feet) may be installed on open wiring systems. Energy management systems. SCADA (Supervisory Control and Data Acquisition) when not intrinsic to the above listed systems (in the scope). Fire alarm systems when installed in raceways (including wire and cable pulling) shall be performed at the electrician wage rate, when either of the following two (2) conditions apply:

1. The project involves new or major remodel building trades construction.
2. The conductors for the fire alarm system are installed in conduit.

 ELEC0340-003 06/01/2011

ALPINE (West of Sierra Mt. Watershed), AMADOR, BUTTE, COLUSA, EL DORADO (West of Sierra Mt. Watershed), GLENN, LASSEN, NEVADA (West of Sierra Mt. Watershed), PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA (West of Sierra Mt. Watershed), SUTTER, TEHAMA, TRINITY, YOLO & YUBA COUNTIES

	Rates	Fringes
ELECTRICIAN		
Remaining area.....	\$ 38.93	16.57
Sierra Army Depot, Herlong.	\$ 48.66	3%+13.25
Tunnel work.....	\$ 40.88	3%+13.25

CABLE SPLICER: Receives 110% of the Electrician basic hourly rate.

 ELEC0401-005 12/01/2009

ALPINE (east of the main watershed divide), EL DORADO (east of the main watershed divide), NEVADA (east of the main watershed), PLACER (east of the main watershed divide) and SIERRA (east of the main watershed divide) COUNTIES:

	Rates	Fringes
ELECTRICIAN.....	\$ 35.40	13.02+3%

 ELEC0551-004 06/01/2011

MARIN AND SONOMA COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 46.00	14.38

 ELEC0659-006 01/01/2011

DEL NORTE, MODOC and SISKIYOU COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 29.78	3%+\$13.55

 ELEC0659-008 02/01/2010

DEL NORTE, MODOC & SISKIYOU COUNTIES

	Rates	Fringes
Line Construction		
(1) Cable Splicer.....	\$ 47.34	13.74
(2) Lineman, Pole Sprayer, Heavy Line Equipment Man....	\$ 42.27	13.54
(3) Tree Trimmer.....	\$ 29.70	9.94
(4) Line Equipment Man.....	\$ 36.35	10.85
(5) Powdermen, Jackhammermen.....	\$ 31.90	10.00
(6) Groundman.....	\$ 29.59	10.24

 ELEC1245-004 06/01/2011

ALL COUNTIES EXCEPT DEL NORTE, MODOC & SISKIYOU

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer.....	\$ 47.87	13.87
(2) Equipment specialist (operates crawler tractors, commercial motor		

vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 38.23	12.80
(3) Groundman.....	\$ 29.25	12.53
(4) Powderman.....	\$ 42.75	12.97

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day,
Independence Day, Labor Day, Veterans Day, Thanksgiving Day
and day after Thanksgiving, Christmas Day

ELEV0008-001 01/01/2011

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 56.14	21.785

FOOTNOTE:

PAID VACATION: Employer contributes 8% of regular hourly
rate as vacation pay credit for employees with more than 5
years of service, and 6% for 6 months to 5 years of service.

PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day,
Labor Day, Veterans Day, Thanksgiving Day, Friday after
Thanksgiving, and Christmas Day.

ENGI0003-008 07/01/2009

	Rates	Fringes
Dredging: (DREDGING: CLAMSHELL & DIPPER DREDGING; HYDRAULIC SUCTION DREDGING:)		
AREA 1:		
(1) Leverman.....	\$ 38.94	22.58
(2) Dredge Dozer; Heavy duty repairman.....	\$ 33.98	22.58
(3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator.....	\$ 32.86	22.58
(4) Bargeman; Deckhand; Fireman; Leveehand; Oiler....	\$ 29.56	22.58
AREA 2:		
(1) Leverman.....	\$ 40.94	22.58
(2) Dredge Dozer; Heavy duty repairman.....	\$ 35.98	22.58
(3) Booster Pump		

Operator; Deck		
Engineer; Deck mate;		
Dredge Tender; Winch		
Operator.....	\$ 34.86	22.58
(4) Bargeman; Deckhand;		
Fireman; Leveehand; Oiler....	\$ 31.56	22.58

AREA DESCRIPTIONS

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2: MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:

Area 1: Northernmost part
Area 2: Remainder

CALAVERAS COUNTY:

Area 1: Remainder
Area 2: Eastern part

COLUSA COUNTY:

Area 1: Eastern part
Area 2: Remainder

ELDORADO COUNTY:

Area 1: North Central part
Area 2: Remainder

FRESNO COUNTY:

Area 1: Remainder
Area 2: Eastern part

GLENN COUNTY:

Area 1: Eastern part
Area 2: Remainder

LASSEN COUNTY:

Area 1: Western part along the Southern portion of border with Shasta County
Area 2: Remainder

MADERA COUNTY:

Area 1: Except Eastern part

Area 2: Eastern part

MARIPOSA COUNTY

Area 1: Except Eastern part

Area 2: Eastern part

MONTERREY COUNTY

Area 1: Except Southwestern part

Area 2: Southwestern part

NEVADA COUNTY:

Area 1: All but the Northern portion along the border of
Sierra County

Area 2: Remainder

PLACER COUNTY:

Area 1: All but the Central portion

Area 2: Remainder

PLUMAS COUNTY:

Area 1: Western portion

Area 2: Remainder

SHASTA COUNTY:

Area 1: All but the Northeastern corner

Area 2: Remainder

SIERRA COUNTY:

Area 1: Western part

Area 2: Remainder

SISKIYOU COUNTY:

Area 1: Central part

Area 2: Remainder

SONOMA COUNTY:

Area 1: All but the Northwestern corner

Area 2: Remainder

TEHAMA COUNTY:

Area 1: All but the Western border with Mendocino & Trinity
Counties

Area 2: Remainder

TRINITY COUNTY:

Area 1: East Central part and the Northeastern border with
Shasta County

Area 2: Remainder

TUOLUMNE COUNTY:

Area 1: Except Eastern part

Area 2: Eastern part

ENGI0003-018 07/01/2010

"AREA 1" WAGE RATES ARE LISTED BELOW

"AREA 2" RECEIVES AN ADDITIONAL \$2.00 PER HOUR ABOVE AREA 1 RATES.

SEE AREA DEFINITIONS BELOW

	Rates	Fringes
OPERATOR: Power Equipment (AREA 1:)		
GROUP 1.....	\$ 37.77	23.00
GROUP 2.....	\$ 36.24	23.00
GROUP 3.....	\$ 34.76	23.00
GROUP 4.....	\$ 33.38	23.00
GROUP 5.....	\$ 32.11	23.00
GROUP 6.....	\$ 30.79	23.00
GROUP 7.....	\$ 29.65	23.00
GROUP 8.....	\$ 28.51	23.00
GROUP 8-A.....	\$ 28.30	23.00
OPERATOR: Power Equipment (Cranes and Attachments - AREA 1:)		
GROUP 1		
Cranes.....	\$ 38.65	23.00
Oiler.....	\$ 29.39	23.00
Truck crane oiler.....	\$ 31.68	23.00
GROUP 2		
Cranes.....	\$ 36.89	23.00
Oiler.....	\$ 29.18	23.00
Truck crane oiler.....	\$ 31.42	23.00
GROUP 3		
Cranes.....	\$35.14	23.00
Hydraulic.....	\$30.79	23.00
Oiler.....	\$ 28.90	23.00
Truck Crane Oiler.....	\$31.18	23.00
OPERATOR: Power Equipment (Piledriving - AREA 1:)		
GROUP 1		
Lifting devices.....	\$ 38.99	23.00

Oiler.....	\$ 29.73	23.00
Truck crane oiler.....	\$ 32.01	23.00
GROUP 2		
Lifting devices.....	\$ 37.17	23.00
Oiler.....	\$ 29.46	23.00
Truck Crane Oiler.....	\$ 31.76	23.00
GROUP 3		
Lifting devices.....	\$ 35.49	23.00
Oiler.....	\$ 29.24	23.00
Truck Crane Oiler.....	\$ 31.47	23.00
GROUP 4.....	\$ 33.72	23.00
GROUP 5.....	\$ 31.08	23.00
GROUP 6.....	\$ 28.85	23.00
OPERATOR: Power Equipment (Steel Erection - AREA 1)		
GROUP 1		
Cranes.....	\$ 39.62	23.00
Oiler.....	\$ 30.07	23.00
Truck Crane Oiler.....	\$ 32.30	23.00
GROUP 2		
Cranes.....	\$ 37.85	23.00
Oiler.....	\$ 29.80	23.00
Truck Crane Oiler.....	\$ 32.08	23.00
GROUP 3		
Cranes.....	\$ 36.37	23.00
Hydraulic.....	\$ 31.42	23.00
Oiler.....	\$ 29.58	23.00
Truck Crane Oiler.....	\$ 31.81	23.00
GROUP 4.....	\$ 34.35	23.00
GROUP 5.....	\$ 33.05	23.00
OPERATOR: Power Equipment (Tunnel and Underground Work - AREA 1:)		
SHAFTS, STOPES, RAISES:		
GROUP 1.....	\$ 33.87	23.00
GROUP 1-A.....	\$ 36.34	23.00
GROUP 2.....	\$ 32.61	23.00
GROUP 3.....	\$ 31.28	23.00
GROUP 4.....	\$ 30.14	23.00
GROUP 5.....	\$ 29.00	23.00
UNDERGROUND:		
GROUP 1.....	\$ 33.77	23.00
GROUP 1-A.....	\$ 36.34	23.00
GROUP 2.....	\$ 32.51	23.00
GROUP 3.....	\$ 31.18	23.00
GROUP 4.....	\$ 30.04	23.00
GROUP 5.....	\$ 28.90	23.00

FOOTNOTE: Work suspended by ropes or cables, or work on a

Yo-Yo Cat: \$.60 per hour additional.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Operator of helicopter (when used in erection work); Hydraulic excavator, 7 cu. yds. and over; Power shovels, over 7 cu. yds.

GROUP 2: Highline cableway; Hydraulic excavator, 3-1/2 cu. yds. up to 7 cu. yds.; Licensed construction work boat operator, on site; Power blade operator (finish); Power shovels, over 1 cu. yd. up to and including 7 cu. yds. m.r.c.

GROUP 3: Asphalt milling machine; Cable backhoe; Combination backhoe and loader over 3/4 cu. yds.; Continuous flight tie back machine assistant to engineer or mechanic; Crane mounted continuous flight tie back machine, tonnage to apply; Crane mounted drill attachment, tonnage to apply; Dozer, slope brd; Gradall; Hydraulic excavator, up to 3 1/2 cu. yds.; Loader 4 cu. yds. and over; Long reach excavator; Multiple engine scraper (when used as push pull); Power shovels, up to and including 1 cu. yd.; Pre-stress wire wrapping machine; Side boom cat, 572 or larger; Track loader 4 cu. yds. and over; Wheel excavator (up to and including 750 cu. yds. per hour)

GROUP 4: Asphalt plant engineer/box person; Chicago boom; Combination backhoe and loader up to and including 3/4 cu. yd.; Concrete batch plant (wet or dry); Dozer and/or push cat; Pull- type elevating loader; Gradesetter, grade checker (GPS, mechanical or otherwise); Grooving and grinding machine; Heading shield operator; Heavy-duty drilling equipment, Hughes, LDH, Watson 3000 or similar; Heavy-duty repairperson and/or welder; Lime spreader; Loader under 4 cu. yds.; Lubrication and service engineer (mobile and grease rack); Mechanical finishers or spreader machine (asphalt, Barber-Greene and similar); Miller Formless M-9000 slope paver or similar; Portable crushing and screening plants; Power blade support; Roller operator, asphalt; Rubber-tired scraper, self-loading (paddle-wheels, etc.); Rubber- tired earthmoving equipment (scrapers); Slip form paver (concrete); Small tractor with drag; Soil stabilizer (P & H or equal); Spider plow and spider puller; Tubex pile rig; Unlicensed constuction work boat operator, on site; Timber skidder; Track loader up to 4 yds.; Tractor-drawn scraper; Tractor, compressor drill combination; Welder; Woods-Mixer (and other similar Pugmill

equipment)

GROUP 5: Cast-in-place pipe laying machine; Combination slusher and motor operator; Concrete conveyor or concrete pump, truck or equipment mounted; Concrete conveyor, building site; Concrete pump or pumpcrete gun; Drilling equipment, Watson 2000, Texoma 700 or similar; Drilling and boring machinery, horizontal (not to apply to waterliners, wagon drills or jackhammers); Concrete mixer/all; Person and/or material hoist; Mechanical finishers (concrete) (Clary, Johnson, Bidwell Bridge Deck or similar types); Mechanical burm, curb and/or curb and gutter machine, concrete or asphalt); Mine or shaft hoist; Portable crusher; Power jumbo operator (setting slip-forms, etc., in tunnels); Screed (automatic or manual); Self-propelled compactor with dozer; Tractor with boom D6 or smaller; Trenching machine, maximum digging capacity over 5 ft. depth; Vermeer T-600B rock cutter or similar

GROUP 6: Armor-Coater (or similar); Ballast jack tamper; Boom- type backfilling machine; Assistant plant engineer; Bridge and/or gantry crane; Chemical grouting machine, truck-mounted; Chip spreading machine operator; Concrete saw (self-propelled unit on streets, highways, airports and canals); Deck engineer; Drilling equipment Texoma 600, Hughes 200 Series or similar up to and including 30 ft. m.r.c.; Drill doctor; Helicopter radio operator; Hydro-hammer or similar; Line master; Skidsteer loader, Bobcat larger than 743 series or similar (with attachments); Locomotive; Lull hi-lift or similar; Oiler, truck mounted equipment; Pavement breaker, truck-mounted, with compressor combination; Paving fabric installation and/or laying machine; Pipe bending machine (pipelines only); Pipe wrapping machine (tractor propelled and supported); Screed (except asphaltic concrete paving); Self-propelled pipeline wrapping machine; Soils & materials tester; Tractor; Self-loading chipper; Concrete barrier moving machine

GROUP 7: Ballast regulator; Boom truck or dual-purpose A-frame truck, non-rotating - under 15 tons; Truck-mounted rotating telescopic boom type lifting device, Manitex or similar (boom truck) - under 15 tons; Cary lift or similar; Combination slurry mixer and/or cleaner; Drilling equipment, 20 ft. and under m.r.c.; Firetender (hot plant); Grouting machine operator; Highline cableway signalperson; Stationary belt loader (Kolman or similar); Lift slab machine (Vagtborg and similar types); Maginnes internal full slab vibrator; Material hoist (1 drum); Mechanical

trench shield; Pavement breaker with or without compressor combination); Pipe cleaning machine (tractor propelled and supported); Post driver; Roller (except asphalt); Chip Seal; Self-propelled automatically applied concrete curing machine (on streets, highways, airports and canals); Self-propelled compactor (without dozer); Signaller; Slip-form pumps (lifting device for concrete forms); Tie spacer; Tower mobile; Trenching machine, maximum digging capacity up to and including 5 ft. depth; Truck-type loader

GROUP 8: Bit sharpener; Boiler tender; Box operator; Brakeperson; Combination mixer and compressor (shotcrete/gunite); Compressor operator; Deckhand; Fire tender; Forklift (under 20 ft.); Generator; Gunite/shotcrete equipment operator; Hydraulic monitor; Ken seal machine (or similar); Mixermobile; Oiler; Pump operator; Refrigeration plant; Reservoir-debris tug (self-propelled floating); Ross Carrier (construction site); Rotomist operator; Self-propelled tape machine; Shuttlecar; Self-propelled power sweeper operator (includes vacuum sweeper); Slusher operator; Surface heater; Switchperson; Tar pot fire tender; Tugger hoist, single drum; Vacuum cooling plant; Welding machine (powered other than by electricity)

GROUP 8-A: Elevator operator; Skidsteer loader-Bobcat 743 series or smaller, and similar (without attachments); Mini excavator under 25 H.P. (backhoe-trencher); Tub grinder wood chipper

ALL CRANES AND ATTACHMENTS

GROUP 1: Clamshell and dragline over 7 cu. yds.; Crane, over 100 tons; Derrick, over 100 tons; Derrick barge pedestal-mounted, over 100 tons; Self-propelled boom-type lifting device, over 100 tons

GROUP 2: Clamshell and dragline over 1 cu. yd. up to and including 7 cu. yds.; Crane, over 45 tons up to and including 100 tons; Derrick barge, 100 tons and under; Self-propelled boom-type lifting device, over 45 tons; Tower crane

GROUP 3: Clamshell and dragline up to and including 1 cu. yd.; Cranes 45 tons and under; Self-propelled boom-type lifting device 45 tons and under; Boom Truck or dual purpose A-frame truck, non-rotating over 15 tons;

Truck-mounted rotating telescopic boom type lifting device,
Manitex or similar (boom truck) over 15 tons;

PILEDRIVERS

GROUP 1: Derrick barge pedestal mounted over 100 tons;
Clamshell over 7 cu. yds.; Self-propelled boom-type lifting
device over 100 tons; Truck crane or crawler, land or barge
mounted over 100 tons

GROUP 2: Derrick barge pedestal mounted 45 tons to and
including 100 tons; Clamshell up to and including 7 cu.
yds.; Self-propelled boom-type lifting device over 45 tons;
Truck crane or crawler, land or barge mounted, over 45 tons
up to and including 100 tons; Fundex F-12 hydraulic pile rig

GROUP 3: Derrick barge pedestal mounted under 45 tons; Self-
propelled boom-type lifting device 45 tons and under;
Skid/scow piledriver, any tonnage; Truck crane or crawler,
land or barge mounted 45 tons and under

GROUP 4: Assistant operator in lieu of assistant to engineer;
Forklift, 10 tons and over; Heavy-duty repairperson/welder

GROUP 5: Deck engineer

GROUP 6: Deckhand; Fire tender

STEEL ERECTORS

GROUP 1: Crane over 100 tons; Derrick over 100 tons; Self-
propelled boom-type lifting device over 100 tons

GROUP 2: Crane over 45 tons to 100 tons; Derrick under 100
tons; Self-propelled boom-type lifting device over 45 tons
to 100 tons; Tower crane

GROUP 3: Crane, 45 tons and under; Self-propelled boom-type
lifting device, 45 tons and under

GROUP 4: Chicago boom; Forklift, 10 tons and over; Heavy-duty
repair person/welder

GROUP 5: Boom cat

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TUNNEL AND UNDERGROUND WORK

GROUP 1-A: Tunnel bore machine operator, 20' diameter or more

GROUP 1: Heading shield operator; Heavy-duty repairperson; Mucking machine (rubber tired, rail or track type); Raised bore operator (tunnels); Tunnel mole bore operator

GROUP 2: Combination slusher and motor operator; Concrete pump or pumpcrete gun; Power jumbo operator

GROUP 3: Drill doctor; Mine or shaft hoist

GROUP 4: Combination slurry mixer cleaner; Grouting Machine operator; Motorman

GROUP 5: Bit Sharpener; Brakeman; Combination mixer and compressor (gunite); Compressor operator; Oiler; Pump operator; Slusher operator

AREA DESCRIPTIONS:

POWER EQUIPMENT OPERATORS, CRANES AND ATTACHMENTS, TUNNEL AND UNDERGROUND [These areas do not apply to Piledrivers and Steel Erectors]

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2 - MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:

Area 1: Northernmost part

Area 2: Remainder

CALAVERAS COUNTY:

Area 1: Except Eastern part

Area 2: Eastern part

COLUSA COUNTY:

Area 1: Eastern part

Area 2: Remainder

DEL NORTE COUNTY:

Area 1: Extreme Southwestern corner

Area 2: Remainder

ELDORADO COUNTY:

Area 1: North Central part

Area 2: Remainder

FRESNO COUNTY

Area 1: Except Eastern part

Area 2: Eastern part

GLENN COUNTY:

Area 1: Eastern part

Area 2: Remainder

HUMBOLDT COUNTY:

Area 1: Except Eastern and Southwestern parts

Area 2: Remainder

LAKE COUNTY:

Area 1: Southern part

Area 2: Remainder

LASSEN COUNTY:

Area 1: Western part along the Southern portion of border
with Shasta County

Area 2: Remainder

MADERA COUNTY

Area 1: Remainder

Area 2: Eastern part

MARIPOSA COUNTY

Area 1: Remainder

Area 2: Eastern part

MENDOCINO COUNTY:

Area 1: Central and Southeastern parts

Area 2: Remainder

MONTEREY COUNTY

Area 1: Remainder

Area 2: Southwestern part

NEVADA COUNTY:

- Area 1: All but the Northern portion along the border of Sierra County
- Area 2: Remainder

PLACER COUNTY:

- Area 1: All but the Central portion
- Area 2: Remainder

PLUMAS COUNTY:

- Area 1: Western portion
- Area 2: Remainder

SHASTA COUNTY:

- Area 1: All but the Northeastern corner
- Area 2: Remainder

SIERRA COUNTY:

- Area 1: Western part
- Area 2: Remainder

SISKIYOU COUNTY:

- Area 1: Central part
- Area 2: Remainder

SONOMA COUNTY:

- Area 1: All but the Northwestern corner
- Area 2: Remainder

TEHAMA COUNTY:

- Area 1: All but the Western border with Mendocino & Trinity Counties
- Area 2: Remainder

TRINITY COUNTY:

- Area 1: East Central part and the Northeast border with Shasta County
- Area 2: Remainder

TULARE COUNTY;

- Area 1: Remainder
- Area 2: Eastern part

TUOLUMNE COUNTY:

- Area 1: Remainder
- Area 2: Eastern Part

ENGI0003-019 06/27/2011

SEE AREA DESCRIPTIONS BELOW

	Rates	Fringes
OPERATOR: Power Equipment (LANDSCAPE WORK ONLY)		
GROUP 1		
AREA 1.....	\$ 28.64	13.42
AREA 2.....	\$ 28.64	13.42
GROUP 2		
AREA 1.....	\$ 25.04	13.42
AREA 2.....	\$ 27.04	13.42
GROUP 3		
AREA 1.....	\$ 20.43	13.42
AREA 2.....	\$ 22.43	13.42

GROUP DESCRIPTIONS:

GROUP 1: Landscape Finish Grade Operator: All finish grade work regardless of equipment used, and all equipment with a rating more than 65 HP.

GROUP 2: Landscape Operator up to 65 HP: All equipment with a manufacturer's rating of 65 HP or less except equipment covered by Group 1 or Group 3. The following equipment shall be included except when used for finish work as long as manufacturer's rating is 65 HP or less: A-Frame and Winch Truck, Backhoe, Forklift, Hydragraphic Seeder Machine, Roller, Rubber-Tired and Track Earthmoving Equipment, Skiploader, Straw Blowers, and Trencher 31 HP up to 65 HP.

GROUP 3: Landscape Utility Operator: Small Rubber-Tired Tractor, Trencher Under 31 HP.

AREA DESCRIPTIONS:

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2 - MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:

Area 1: Northernmost part

Area 2: Remainder

CALAVERAS COUNTY:

Area 1: Except Eastern part

Area 2: Eastern part

COLUSA COUNTY:

Area 1: Eastern part

Area 2: Remainder

DEL NORTE COUNTY:

Area 1: Extreme Southwestern corner

Area 2: Remainder

ELDORADO COUNTY:

Area 1: North Central part

Area 2: Remainder

FRESNO COUNTY

Area 1: Except Eastern part

Area 2: Eastern part

GLENN COUNTY:

Area 1: Eastern part

Area 2: Remainder

HUMBOLDT COUNTY:

Area 1: Except Eastern and Southwestern parts

Area 2: Remainder

LAKE COUNTY:

Area 1: Southern part

Area 2: Remainder

LASSEN COUNTY:

Area 1: Western part along the Southern portion of border
with Shasta County

Area 2: Remainder

MADERA COUNTY

Area 1: Remainder

Area 2: Eastern part

MARIPOSA COUNTY

Area 1: Remainder

Area 2: Eastern part

MENDOCINO COUNTY:

Area 1: Central and Southeastern parts

Area 2: Remainder

MONTEREY COUNTY

Area 1: Remainder

Area 2: Southwestern part

NEVADA COUNTY:

Area 1: All but the Northern portion along the border of
Sierra County

Area 2: Remainder

PLACER COUNTY:

Area 1: All but the Central portion

Area 2: Remainder

PLUMAS COUNTY:

Area 1: Western portion

Area 2: Remainder

SHASTA COUNTY:

Area 1: All but the Northeastern corner

Area 2: Remainder

SIERRA COUNTY:

Area 1: Western part

Area 2: Remainder

SISKIYOU COUNTY:

Area 1: Central part

Area 2: Remainder

SONOMA COUNTY:

Area 1: All but the Northwestern corner

Area 2: Remainder

TEHAMA COUNTY:

Area 1: All but the Western border with mendocino & Trinity
Counties

Area 2: Remainder

TRINITY COUNTY:

Area 1: East Central part and the Northeastern border with
Shasta County

Area 2: Remainder

TULARE COUNTY;

Area 1: Remainder

Area 2: Eastern part

TUOLUMNE COUNTY:

Area 1: Remainder

Area 2: Eastern Part

IRON0002-004 07/01/2010

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 26.58	15.26
Ornamental, Reinforcing and Structural.....	\$ 33.00	23.73

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland, Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island, Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base, Naval Post Graduate School - Monterey, Yermo Marine Corps Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

LABO0067-002 04/01/2010

AREA "A" - ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO AND SANTA CLARA COUNTIES

AREA "B" - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES

	Rates	Fringes
Asbestos Removal Laborer		
Areas A & B.....	\$ 18.68	6.60
LABORER (Lead Removal)		
Area A.....	\$ 36.25	6.68
Area B.....	\$ 35.25	6.68

ASBESTOS REMOVAL-SCOPE OF WORK: Site mobilization; initial site clean-up; site preparation; removal of asbestos-containing materials from walls and ceilings; or from pipes, boilers and mechanical systems only if they are being scrapped; encapsulation, enclosure and disposal of asbestos-containing materials by hand or with equipment or machinery; scaffolding; fabrication of temporary wooden barriers; and assembly of decontamination stations.

LABO0067-003 07/01/2009

AREA A: ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO & SANTA CLARA

AREA B: ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SANCRMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SIERRA, SHASTA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO & YUBA COUNTIES

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person		
Area A.....	\$ 26.89	14.93
Area B.....	\$ 25.89	14.93
Traffic Control Person I		
Area A.....	\$ 27.19	14.93
Area B.....	\$ 26.19	14.93
Traffic Control Person II		
Area A.....	\$ 24.69	14.93
Area B.....	\$ 23.69	14.93

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of

temporary/permanent signs, markers, delineators and crash cushions.

LABO0067-006 06/28/2010

AREA "A" - ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO AND SANTA CLARA COUNTIES

AREA "B" - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, EL DORADO, FRESNO, GLENN, KINGS, LASSEN, MADERA, MARIPOSA, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES

	Rates	Fringes
Laborers: (CONSTRUCTION CRAFT LABORERS - AREA A:)		
Construction Specialist		
Group.....	\$ 27.84	15.82
GROUP 1.....	\$ 27.14	15.82
GROUP 1-a.....	\$ 27.36	15.82
GROUP 1-c.....	\$ 27.19	15.82
GROUP 1-e.....	\$ 27.69	15.82
GROUP 1-f.....	\$ 27.72	15.82
GROUP 1-g (Contra Costa County).....	\$ 27.34	15.82
GROUP 2.....	\$ 26.99	15.82
GROUP 3.....	\$ 26.89	15.82
GROUP 4.....	\$ 20.58	15.82

See groups 1-b and 1-d under laborer classifications.

Laborers: (CONSTRUCTION CRAFT LABORERS - AREA B:)		
Construction Specialist		
Group.....	\$ 26.84	15.82
GROUP 1.....	\$ 26.14	15.82
GROUP 1-a.....	\$ 26.36	15.82
GROUP 1-c.....	\$ 26.19	15.82
GROUP 1-e.....	\$ 26.69	15.82
GROUP 1-f.....	\$ 26.72	15.82
GROUP 2.....	\$ 25.99	15.82
GROUP 3.....	\$ 25.89	15.82
GROUP 4.....	\$ 19.58	15.82

See groups 1-b and 1-d under laborer classifications.

Laborers: (GUNITE - AREA A:)		
GROUP 1.....	\$ 28.10	15.82
GROUP 2.....	\$ 27.60	15.82

GROUP 3.....	\$ 27.60	15.82
GROUP 4.....	\$ 27.60	15.82
Laborers: (GUNITE - AREA B:)		
GROUP 1.....	\$ 27.10	15.82
GROUP 2.....	\$ 26.60	15.82
GROUP 3.....	\$ 26.01	15.82
GROUP 4.....	\$ 25.89	15.82
Laborers: (WRECKING - AREA A:)		
GROUP 1.....	\$ 27.14	15.82
GROUP 2.....	\$ 26.99	15.82
Laborers: (WRECKING - AREA B:)		
GROUP 1.....	\$ 26.14	15.82
GROUP 2.....	\$ 25.99	15.82
Landscape Laborer (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS - AREA A:)		
(1) New Construction.....	\$ 26.89	15.82
(2) Establishment Warranty Period.....	\$ 20.58	15.82
Landscape Laborer (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS - AREA B:)		
(1) New Construction.....	\$ 25.89	15.82
(2) Establishment Warranty Period.....	\$ 19.58	15.82

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement;

Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and bucket; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 1-g, CONTRA COSTA COUNTY: Pipelayer (including grade checking in connection with pipelaying); Caulker; Bander; Pipewrapper; Conduit layer; Plastic pipe layer; Pressure pipe tester; No joint pipe and stripping of same, including repair of voids; Precast manhole setters, cast in place manhole form setters

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and

piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material cleaner" is to be utilized under the following conditions:
A: at demolition site for the salvage of the material.
B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Guniting laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

LABO0067-010 07/01/2010

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1.....	\$ 33.35	16.08
GROUP 2.....	\$ 33.12	16.08

GROUP 3.....	\$ 32.87	16.08
GROUP 4.....	\$ 32.42	16.08
GROUP 5.....	\$ 31.88	16.08
Shotcrete Specialist.....	\$ 33.87	16.08

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Guniting and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Guniting & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0073-001 07/01/2009

	Rates	Fringes
Plasterer tender.....	\$ 28.37	14.14

LABO0139-002 07/01/2009

NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
LABORER (Brick)		
Mason Tender-Brick.....	\$ 27.28	14.93

LABO0185-002 07/01/2009

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC,

NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU,
SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes
LABORER		
Mason Tender-Brick.....	\$ 27.03	14.93

LABO0291-001 07/01/2009

MARIN COUNTY

	Rates	Fringes
LABORER		
Mason Tender-Brick.....	\$ 28.28	14.93

PAIN0016-004 06/01/2011

MARIN, NAPA, SOLANO & SONOMA COUNTIES

	Rates	Fringes
Painters:.....	\$ 32.71	19.16

PREMIUMS:

EXOTIC MATERIALS - \$0.75 additional per hour.

SPRAY WORK: - \$0.50 additional per hour.

INDUSTRIAL PAINTING - \$0.25 additional per hour

[Work on industrial buildings used for the manufacture and processing of goods for sale or service; steel construction (bridges), stacks, towers, tanks, and similar structures]

HIGH WORK:

over 50 feet - \$2.00 per hour additional

100 to 180 feet - \$4.00 per hour additional

Over 180 feet - \$6.00 per hour additional

PAIN0016-005 07/01/2011

ALPINE, BUTTE, COLUSA, EL DORADO (west of the Sierra Nevada Mountains), GLENN, LASSEN (west of Hwy. 395, excluding Honey Lake); MARIN, MODOC, NAPA, NEVADA (west of the Sierra Nevada Mountains), PLACER (west of the Sierra Nevada Mountains), PLUMAS, SACRAMENTO, SHASTA, SIERRA (west of the Sierra Nevada Mountains), SISKIYOU, SOLANO, SONOMA, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes
DRYWALL FINISHER/TAPER..	\$ 36.24	18.07

PAIN0016-007 01/01/2011

ALPINE, AMADOR, BUTTE, COLUSA. EL DORADO (west of the Sierra Nevada Mountains), GLENN, LASSEN (west of Highway 395, excluding Honey Lake), MODOC, NEVADA (west of the Sierra Nevada Mountains), PLACER (west of the Sierra Nevada Mountains), PLUMAS, SACRAMENTO, SHASTA, SIERRA (west of the Sierra Nevada Mountains), SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO & YUBA COUNTIES

	Rates	Fringes
Painters:.....	\$ 27.78	15.27

SPRAY/SANDBLAST: \$0.50 additional per hour.
EXOTIC MATERIALS: \$1.00 additional per hour.
HIGH TIME: Over 50 ft above ground or water level \$2.00 additional per hour. 100 to 180 ft above ground or water level \$4.00 additional per hour. Over 180 ft above ground or water level \$6.00 additional per hour.

PAIN0016-008 07/01/2011

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 44.87	17.11

PAIN0169-004 07/01/2011

MARIN , NAPA & SONOMA COUNTIES; SOLANO COUNTY (west of a line defined as follows: Hwy. 80 corridor beginning at the City of Fairfield, including Travis Air Force Base and Suisun City; going north of Manakas Corner Rd., continue north on Suisun Valley Rd. to the Napa County line; Hwy. 80 corridor south on Grizzly Island Rd. to the Grizzly Island Management area)

	Rates	Fringes
GLAZIER.....	\$ 41.88	18.49

* PAIN0567-001 01/01/2011

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains); AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

	Rates	Fringes
Painters:		
Brush and Roller.....	\$ 23.68	9.06
Spray Painter & Paperhanger..	\$ 24.53	9.06

PREMIUMS:
 Special Coatings (Brush), and Sandblasting = \$0.50/hr
 Special Coatings (Spray), and Steeplejack = \$1.00/hr
 Special Coating Spray Steel = \$1.25/hr
 Swing Stage = \$2.00/hr

*A special coating is a coating that requires the mixing of 2 or more products.

 PAIN0567-007 07/01/2011

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains) AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 25.69	10.65

 PAIN0567-010 07/01/2010

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains); AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

Rates	Fringes
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Drywall		
(1) Taper.....	\$ 26.54	9.74
(2) Steeplejack - Taper, over 40 ft with open space below.....	\$ 28.04	9.79

PAIN0767-004 07/01/2011

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC,
NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU,
SOLANO (Remainder), SUTTER, TEHAMA, TRINITY, YOLO, YUBA

	Rates	Fringes
GLAZIER.....	\$ 32.24	20.79

PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr. Day,
President's Day, Memorial Day, Independence Day, Labor Day,
Veteran's Day, Thanksgiving Day, and Christmas Day.

Employee required to wear a body harness shall receive \$1.50
per hour above the basic hourly rate at any elevation.

PAIN1176-001 07/01/2011

HIGHWAY IMPROVEMENT

	Rates	Fringes
Parking Lot Striping/Highway Marking:		
GROUP 1.....	\$ 31.35	11.65
GROUP 2.....	\$ 26.65	11.65
GROUP 3.....	\$ 26.96	11.65

CLASSIFICATIONS

GROUP 1: Striper: Layout and application of painted traffic
stripes and marking; hot thermo plastic; tape, traffic
stripes and markings

GROUP 2: Gamecourt & Playground Installer

GROUP 3: Protective Coating, Pavement Sealing

PAIN1237-001 07/01/2011

ALPINE; COLUSA; EL DORADO (west of the Sierra Nevada

Mountains); GLENN; LASSEN (west of Highway 395, beginning at Stacey and including Honey Lake); MODOC; NEVADA (west of the Sierra Nevada Mountains); PLACER (west of the Sierra Nevada Mountains); PLUMAS; SACRAMENTO; SHASTA; SIERRA (west of the Sierra Nevada Mountains); SISKIYOU; SUTTER; TEHAMA; TRINITY; YOLO AND YUBA COUNTIES

	Rates	Fringes
SOFT FLOOR LAYER....	\$ 28.25	16.42

PLAS0300-003 07/01/2009		

	Rates	Fringes
PLASTERER		
AREA 295: Alpine, Amador, Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sutter, Tehema, Trinity, Yolo & Yuba Counties..	\$ 32.82	15.10
AREA 355: Marin, Napa & Sonoma Counties.....	\$ 32.82	15.30

PLAS0300-005 06/28/2010		

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...\$	28.65	18.56

PLUM0038-002 07/01/2011		

MARIN AND SONOMA COUNTIES

	Rates	Fringes
PLUMBER (Plumber, Steamfitter, Refrigeration Fitter)		
(1) Work on wooden frame structures 5 stories or less excluding high-rise buildings and commercial work such as hospitals, prisons, hotels, schools,		

casinos, wastewater treatment plants, and resarch facilities as well as refrigeration pipefitting, service and repair work - MARKET RECOVERY RATE....	\$ 49.09	37.36
(2) All other work - NEW CONSTRUCTION RATE.....	\$ 57.75	39.74

 PLUM0038-006 07/01/2011

MARIN & SONOMA COUNTIES

	Rates	Fringes
Landscape/Irrigation Fitter (Underground/Utility Fitter).....	\$ 49.09	28.85

 * PLUM0228-001 10/01/2011

BUTTE, COLUSA, GLENN, LASSEN, MODOC, PLUMAS, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY & YUBA COUNTIES

	Rates	Fringes
PLUMBER.....	\$ 36.20	22.30

 PLUM0343-001 07/01/2011

NAPA AND SOLANO COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER		
Light Commercial.....	\$ 30.60	17.85
All Other Work.....	\$ 45.80	24.30

DEFINITION OF LIGHT COMMERCIAL:

Work shall include strip shopping centers, office buildings, schools and other commercial structures which the total plumbing bid does not exceed Two Hundred and Fifty Thousand (\$250,000) and the total heating and cooling does not exceed Two Hundred Fifty Thousand (\$250,000); or Any projects bid in phases shall not qualify unless the total project is less than Two Hundred Fifty Thousand (\$250,000) for the plumbing bid; and Two Hundred Fifty Thousand (\$250,000) for the heating and cooling bid. Excluded are

hospitals, jails, institutions and industrial projects,
regardless size of the project

FOOTNOTES: While fitting galvanized material: \$.75 per hour
additional. Work from trusses, temporary staging,
unguarded structures 35' from the ground or water: \$.75 per
hour additional. Work from swinging scaffolds, boatswains
chairs or similar devices: \$.75 per hour additional.

PLUM0350-001 01/01/2011

EL DORADO COUNTY (Lake Tahoe area only); NEVADA COUNTY (Lake
Tahoe area only); AND PLACER COUNTY (Lake Tahoe area only)

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 34.60	10.50

PLUM0355-001 07/01/2011

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC,
NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA,
SISKIYOU, SOLANO, SUTTER, TEHAMA, TRINITY, YOLO, AND YUBA
COUNTIES

	Rates	Fringes
Underground Utility Worker /Landscape Fitter.....	\$ 28.20	7.65

* PLUM0442-003 10/01/2011

AMADOR (South of San Joaquin River) and ALPINE COUNTIES

	Rates	Fringes
PLUMBER.....	\$ 35.95	22.55

PLUM0447-001 07/01/2011

AMADOR (north of San Joaquin River), EL DORADO (excluding Lake
Tahoe area), NEVADA (excluding Lake Tahoe area); PLACER
(excluding Lake Tahoe area), SACRAMENTO AND YOLO COUNTIES

	Rates	Fringes
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PLUMBER/PIPEFITTER

Journeyman.....	\$ 39.82	20.30
Light Commercial Work.....	\$ 29.78	9.57

ROOF0081-006 08/01/2010

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
Rofer.....	\$ 34.06	9.54

ROOF0081-007 08/01/2011

ALPINE, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO, AND YUBA COUNTIES

	Rates	Fringes
Rofer.....	\$ 31.88	10.90

SFCA0483-003 08/01/2011

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 50.59	23.70

SFCA0669-003 04/01/2011

ALPINE, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes
SPRINKLER FITTER.....	\$ 32.65	17.75

SHEE0104-006 07/01/2009

MARIN, NAPA, SOLANO SONOMA & TRINITY COUNTIES

	Rates	Fringes
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Sheet Metal Worker		
Mechanical Contracts		
\$200,000 or less.....	\$ 43.32	26.40
All other work.....	\$ 47.73	26.67

 SHEE0104-014 07/01/2009

MARIN, NAPA, SOLANO, SONOMA AND TRINITY COUNTIES

	Rates	Fringes
SHEET METAL WORKER (Metal Decking and Siding only).....	\$ 33.43	24.31

 SHEE0162-006 07/01/2011

AMADOR, COLUSA, EL DORADO, NEVADA, PLACER, SACRAMENTO, SUTTER, YOLO AND YUBA COUNTIES

	Rates	Fringes
SHEET METAL WORKER.....	\$ 37.51	24.78

 SHEE0162-007 07/01/2011

AIPINE COUNTY

	Rates	Fringes
SHEET METAL WORKER.....	\$ 33.71	22.79

 SHEE0162-008 07/01/2011

BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, YOLO AND YUBA COUNTIES

	Rates	Fringes
Sheet Metal Worker (Metal decking and siding only).....	\$ 34.31	26.78

 SHEE0162-014 07/01/2011

BUTTE, GLENN, LASSEN, MODOC, PLUMAS, SHASTA, SIERRA, SISKIYOU

AND TEHAMA COUNTIES

	Rates	Fringes
SHEET METAL WORKER		
Mechanical Jobs \$200,000 & under.....	\$ 28.86	23.46
Mechanical Jobs over \$200,000.....	\$ 37.76	23.96

TEAM0094-001 07/01/2009

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 27.13	18.99
GROUP 2.....	\$ 27.43	18.99
GROUP 3.....	\$ 27.73	18.99
GROUP 4.....	\$ 28.08	18.99
GROUP 5.....	\$ 28.43	18.99

FOOTNOTES:

Articulated dump truck; Bulk cement spreader (with or without auger); Dumpcrete truck; Skid truck (debris box); Dry pre-batch concrete mix trucks; Dumpster or similar type; Slurry truck: Use dump truck yardage rate.
Heater planer; Asphalt burner; Scarifier burner; Industrial lift truck (mechanical tailgate); Utility and clean-up truck: Use appropriate rate for the power unit or the equipment utilized.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Dump trucks, under 6 yds.; Single unit flat rack (2-axle unit); Nipper truck (when flat rack truck is used appropriate flat rack shall apply); Concrete pump truck (when flat rack truck is used appropriate flat rack shall apply); Concrete pump machine; Fork lift and lift jitneys; Fuel and/or grease truck driver or fuel person; Snow buggy; Steam cleaning; Bus or personhaul driver; Escort or pilot car driver; Pickup truck; Teamster oiler/greaser and/or serviceperson; Hook tender (including loading and unloading); Team driver; Tool room attendant (refineries)

GROUP 2: Dump trucks, 6 yds. and under 8 yds.; Transit mixers, through 10 yds.; Water trucks, under 7,000 gals.; Jetting trucks, under 7,000 gals.; Single-unit flat rack

(3-axle unit); Highbed heavy duty transport; Scissor truck; Rubber-tired muck car (not self-loaded); Rubber-tired truck jumbo; Winch truck and "A" frame drivers; Combination winch truck with hoist; Road oil truck or bootperson; Buggymobile; Ross, Hyster and similar straddle carriers; Small rubber-tired tractor

GROUP 3: Dump trucks, 8 yds. and including 24 yds.; Transit mixers, over 10 yds.; Water trucks, 7,000 gals. and over; Jetting trucks, 7,000 gals. and over; Vacuum trucks under 7500 gals. Trucks towing tilt bed or flat bed pull trailers; Lowbed heavy duty transport; Heavy duty transport tiller person; Self-propelled street sweeper with self-contained refuse bin; Boom truck - hydro-lift or Swedish type extension or retracting crane; P.B. or similar type self-loading truck; Tire repairperson; Combination bootperson and road oiler; Dry distribution truck (A bootperson when employed on such equipment, shall receive the rate specified for the classification of road oil trucks or bootperson); Ammonia nitrate distributor, driver and mixer; Snow Go and/or plow

GROUP 4: Dump trucks, over 25 yds. and under 65 yds.; Water pulls - DW 10's, 20's, 21's and other similar equipment when pulling Aqua/pak or water tank trailers; Helicopter pilots (when transporting men and materials); Lowbedk Heavy Duty Transport up to including 7 axles; DW10's, 20's, 21's and other similar Cat type, Terra Cobra, LeTourneau Pulls, Tournorocker, Euclid and similar type equipment when pulling fuel and/or grease tank trailers or other miscellaneous trailers; Vacuum Trucks 7500 gals and over and truck repairman

GROUP 5: Dump trucks, 65 yds. and over; Holland hauler; Low bed Heavy Duty Transport over 7 axles

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates

listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material,

etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

APPENDIX C
to the contract documents for
HOV 50 PHASE 2A
Contract No. PW 09-30408 / CIP No. 53113

PERMITS

AGREEMENT

**County of El Dorado, State of California
Department of Transportation**

Contract No. PW 09-30408, CIP NO. 53113

**U.S 50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE**

THIS AGREEMENT ("Agreement") approved by the Board of Supervisors this ___st day of _____, in the year of 2012, made and concluded, in duplicate, between the COUNTY OF EL DORADO, a political subdivision of the State of California, by the Department of Transportation thereof, the party of the first part hereinafter called "County," and [contractor], party of the second part hereinafter called "Contractor."

RECITALS:

WHEREAS, County has caused the above-captioned project to be let to formal bidding process; and

WHEREAS, Contractor has duly submitted a bid response for the captioned project upon which County has awarded this Contract;

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

Article 1. THE WORK

The improvement contemplated in the performance of this Contract is an improvement over which the County shall exercise general supervision. The County therefore, shall have the right, but not the duty, to assume full and direct control over this Contract whenever the County at its sole discretion, shall determine that its responsibility is so required.

The Contractor shall complete the Work as specified or indicated under the Bid Schedule(s) of the County's Contract Documents entitled:

**U.S 50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE**

The project is located in El Dorado County near El Dorado Hills, California. The Work to be done is shown on the Plans, described in the Special Provisions and generally consists of, but is not limited to:

Construction of HOV lanes on Route 50, removing existing median barrier, installing median concrete or thrie beam barrier, including stage construction to facilitate grading, installing permanent and temporary fence, drainage system removal and construction, concrete drainage boxes and inlets, grade ditch, earthwork excavation and embankment, rock base, asphalt concrete paving, signing and striping, pavement obliteration, permanent and temporary erosion control. Also installing or upgrading existing dikes, overhead signs and luminaires.

Article 2. CONTRACT DOCUMENTS

The Contract Documents consist of: the Notice to Bidders; the bid forms which include the accepted Proposal, Bid Price Schedule and Total Bid, Subcontractors Listing, UDBE Information, Equal Employment Opportunity Certification, Section 10285.1 Statement, Section 10162 Questionnaire, Section 10232 Statement, Noncollusion

Affidavit, Debarment, Suspension, Ineligibility and Voluntary Exclusion Certification, Non-lobbying Certification for Federal-Aid Contracts, Disclosure of Lobbying Activities (Standard Form LLL), Form FHWA 1273; the Contract which includes this Agreement with all Exhibits thereto including Exhibit "B" Fair Employment Practices Adendum, and Exhibit "C" Nondiscrimination Assurances, the Performance Bond, and Payment Bond, the LOCAL AGENCY BIDDER – DBE INFORMATION form; the drawings listed and identified as the Project Plans; the Special Provisions which incorporate by reference the Caltrans Standard Plans, dated May 2006, and Standard Specifications, dated May 2006, Amendments to the May 2006 Standard Specifications, and standard drawings from the Design and Improvement Standards Manual of the County of El Dorado, revised March 8, 1994 including Resolution 199-91 and Resolution 58-94 to adopt changes to the Design and Improvement Standards Manual; all Addenda incorporated in those documents before their execution, and all Contract Change Orders issued in accordance with the Contract Documents which may be delivered or issued after the Effective Date of this Agreement and are not attached hereto; the prevailing Labor Surcharge And Equipment Rental Rates (when required) as determined by the California Department of Transportation to be in effect on the date the Work is accomplished; all the obligations of County and of Contractor which are fully set forth and described therein; and all Contract Documents which are hereby specifically referred to and by such reference made a part hereof. All Contract Documents are intended to cooperate so that any work called for in one and not mentioned in the other is to be executed the same as if mentioned in all Contract Documents. Contractor agrees to perform all of its promises, covenants, and conditions set forth in the Contract Documents, and to abide by and perform all terms and conditions set forth therein. In case of conflict between this Agreement and any other contract document, this Agreement shall take precedence.

Article 3. COVENANTS AND CONTRACT PRICE

County hereby promises and agrees with said Contractor to employ, and does hereby employ, said Contractor to provide the material and to do the Work according to the terms and conditions of the Contract Documents herein contained and referred to, for the prices hereinafter set forth, and hereby contracts to pay the same at the time, in the manner and upon the conditions herein set forth; and the said parties for themselves, their heirs, executors, administrators, successors and assigns, do hereby agree to the full performance of the covenants herein contained. County shall pay Contractor for the completion of the Work in accordance with the Contract Documents in current funds the Contract Prices named in Contractor's Bid and Bid Price Schedule, a copy of which is attached hereto as Exhibit A.

Article 4. COMMENCEMENT AND COMPLETION

The Work to be performed under this Contract shall commence on the date specified in the Notice to Proceed issued by County, and the Work shall be fully completed within the time specified in the Notice to Proceed pursuant to Section 4 of the Special Provisions.

County and Contractor recognize that time is of the essence of the Agreement and that County will suffer financial loss if the Work is not completed within the time specified in Section 4 of the Special Provisions annexed hereto, plus any extensions thereof allowed in accordance with Section 4 of the Special Provisions. They also recognize the delays, expense, and difficulties involved with proving in a legal proceeding the actual loss suffered by County if the Work is not completed on time. Accordingly, instead of requiring any such proof, County and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay County the sum of **Eight Thousand Three Hundred dollars (\$8,300.00) per day**, as liquidated damages and not as a penalty, for each and every calendar day's delay in finishing the Work in excess of the contract time prescribed herein.

Article 5. INDEMNITY

To the fullest extent allowed by law, Contractor shall defend, indemnify, and hold County, its officers, officials, employees, and volunteers, the State of California (State), its officers, directors, agents (excluding agents who are design professional), and employees, State Contractors doing work within the project limits, and any federal government agencies associated with this Contract harmless against and from any and all claims, suits, losses, damages, and liability for damages, including attorney's fees and other costs of defense brought for or on account of

injuries to or death of any person, including but not limited to, workers and the public, or on account of injuries to or death of County, State or federal government agency employees, or damage to property, or any economic, consequential or special damages which are claimed or which shall in any way arise out of or be connected with Contractor's services, operations or performance hereunder, regardless of the existence or degree of fault or negligence on the part of the County, the State or any federal government agencies, the Contractor, subcontractors or employees of any of these, except for the active, or sole negligence of the County, the State or any federal government agencies their officers and employees, or where expressly prescribed by statute.

The duty to indemnify and hold harmless the County, the State and any federal government agencies associated with this Contract specifically includes the duties to defend set forth in Section 2778 of the Civil Code. The insurance obligations of Contractor are separate, independent obligations under the Contract Documents, and the provisions of this defense and indemnity are not intended to modify nor should they be construed as modifying or in any way limiting the insurance obligations set forth in the Contract Documents.

Article 6. GUARANTEES

Contractor shall repair or replace any or all work provided hereunder which is defective due to faulty materials, poor workmanship, or defective equipment at no expense to County, ordinary wear or tear and unusual abuse or neglect excepted, during the term of the Contract and for a period of one (1) year after Contract Acceptance.

Contractor shall be required to repair or replace any and all adjacent facilities or areas which have been damaged or displaced due to Contractor's work performed under this Agreement at no expense to County during the term of this Agreement and for a period of one (1) year after Contract Acceptance.

If a warranty or guarantee exceeding one (1) year is provided by the supplier or manufacturer of any equipment or materials used in this Project, or if a warranty or guarantee exceeding one (1) year is required elsewhere in these Contract Documents, then the guarantee for such equipment or materials shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials, and Contractor shall supply County with all warranty and guaranty documents relative to equipment and materials incorporated in the job and guaranteed by its suppliers or manufacturers.

The parties agree that this guarantee and the rights and obligations accruing therefrom shall be in addition to, and not by way of limitation in any manner whatsoever to, the rights, obligations, warranties or remedies otherwise provided for by law.

In the event of Contractor's failure to comply with the above mentioned conditions within ten (10) calendar days after being notified in writing by County, Contractor hereby authorizes County to proceed to have said defects repaired and made good at Contractor's expense, and Contractor will honor and pay all costs and charges therefore upon written demand.

Article 7. VENUE

Any litigation arising out of this Contract shall be brought in El Dorado County and governed by California law.

Article 8. ASSIGNMENT OF ANTITRUST ACTIONS

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

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Government Code Sections 4550-4554, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery. Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under Government Code Sections 4550-4554 if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

Article 9. TERMINATION BY COUNTY FOR CONVENIENCE

County reserves the right to terminate the Contract at any time upon determination by County's representative that termination of the Contract is in the best interest of County. County shall issue Contractor a written notice specifying that the Contract is to be terminated.

Upon receipt of said written notice, Contractor shall stop all work under the Contract except: (1) work specifically directed to be completed prior to termination, (2) work the Inspector deems necessary to secure the project for termination, (3) removal of equipment and plant from the site of the Work, (4) action that is necessary to protect materials from damage, (5) disposal of materials not yet used in the Work as directed by County, and (6) clean up of the site.

If the Contract is terminated for County's convenience as provided herein, all finished or unfinished work and materials previously paid for shall, at the option of County, become its property. Contractor shall be paid an amount which reflects costs incurred for work provided to the date of notification of termination. In addition, Contractor shall be paid the reasonable cost, as solely judged by County, and without profit, for all work performed to secure the project for termination.

Article 10. TERMINATION BY COUNTY FOR CAUSE

If Contractor is adjudged as bankrupt or insolvent, or makes a general assignment for the benefit of its creditors or if a trustee or receiver is appointed for Contractor or for any of its property, or if Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or on more than one occasion fails to supply sufficient skilled workmen or suitable material or equipment, or on more than one occasion fails to make prompt payments to subcontractors for labor, materials, or equipment, or disregards the authority of the County's representative, or the Engineer, if one is appointed, or violates any of the Contract assurances, nondiscrimination provisions or any other federal or state requirements as identified in Section 2-1.07 of the Special Provisions, or otherwise violates any provision of the Contract Documents, then County may, without prejudice to any other right or remedy and after giving Contractor and its Surety a minimum of ten (10) days from delivery of a written termination notice, terminate the services of Contractor and take equipment and machinery thereon owned by Contractor and finish the Work by whatever method County may deem expedient. In such case, Contractor shall not be entitled to receive any further payment until the Work is finished.

Without prejudice to other rights or remedies County may have, if Contractor fails to begin delivery of materials and equipment, to commence Work within the time specified, to maintain the rate of delivery of material, to execute the Work in the manner and at such locations as specified, or fails to maintain a work program which will ensure County's interest, or, if Contractor is not carrying out the intent of the Contract, an Inspector's written notice may be served upon Contractor and the Surety on its faithful performance bond demanding satisfactory compliance with the Contract. If Contractor or its Surety does not comply with such notice within five (5) days after receiving it, or after starting to comply, fails to continue, County may exclude it from the premises and take possession of all material and equipment, and complete the Work by County's own forces, by letting the unfinished Work to another Contractor, or by a combination of such methods.

Where Contractor's services have been so terminated by County, said termination shall not affect any right of County against Contractor then existing or which may thereafter accrue. Any retention or payment of monies by County due Contractor will not release Contractor from compliance with the Contract Documents.

If the unpaid balance of the Contract price exceeds the direct and indirect costs of completing the Work, including compensation for additional professional services, such excess shall be paid to Contractor. If the sums under the Contract are insufficient for completion, Contractor or Surety shall pay to County within five (5) days after the completion, all costs in excess of the Contract price. In any event, the cost of completing the Work shall be charged against Contractor and its Surety and may be deducted from any money due or becoming due from County.

The provisions of this Article shall be in addition to all other rights and remedies available to County under law.

If after notice of termination, it is determined for any reason that Contractor was not in default, the rights and obligations of the parties shall be the same as if the notice of termination had not been issued. The Contract shall be equitably adjusted to compensate for such termination.

Article 11. WORKERS' COMPENSATION CERTIFICATION

Contractor shall comply with Labor Code Sections 3700 et seq., requiring it to obtain Workers' Compensation Insurance, and sign a certificate of knowledge thereof.

CERTIFICATE OF KNOWLEDGE - LABOR CODE SECTION 3700

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

Signed: _____ Date _____

Article 12. WARRANTY

Contractor warrants to County that materials and equipment furnished for the Work will be of good quality and new, unless otherwise required or permitted under the Contract Documents, that the Work will be free from defects or flaws and is of the highest quality of workmanship and that the Work will conform with the requirements herein. Work not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective.

Article 13. RETAINAGE

The retainage from payment is set forth in Section "PAYMENT OF WITHHELD FUNDS" of the Special Provisions. Contractor may elect to receive one hundred percent (100%) of payments due as set forth in the Contract Documents, without retention, by depositing securities of equivalent value with County, in accordance with, and as set forth in Section 22300 of the Public Contract Code. Securities eligible for deposit hereunder shall be limited to those listed in Section 16430 of the Government Code, or bank or savings and loan certificates of deposit.

Article 14. DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM

Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy, as County deems appropriate. Contractor shall include this assurance in every subcontract entered into as a result of this Agreement.

Article 15. PROMPT PAYMENT OF SUBCONTRACTORS

Prompt Progress Payment to Subcontractors

Attention is directed to Section 7108.5 of the Business and Professions Code, which requires a prime contractor or subcontractor to pay any subcontractor not later than ten (10) days of receipt of each progress payment unless otherwise agreed to in writing. In addition, Federal Regulation (49CFR 26.29) requires a prime contractor or subcontractor to pay a subcontractor no later than thirty (30) days after receipt of each payment, unless any delay or postponement of payment among the parties takes place only for good cause and with the prior written approval of County. Any violation of Section 7108.5 shall subject the violating contractor or subcontractor to the penalties, sanction and other remedies of that section. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor.

Prime contractors shall include in their subcontracts language providing that prime contractors and subcontractors will use appropriate alternative dispute resolution mechanisms to resolve payment disputes.

Prompt Payment of Withheld Funds to Subcontractors

The Department shall hold retainage from the prime Contractor and shall make prompt and regular incremental acceptances of portions, as determined by the Department, of the contract work and pay retainage to the prime Contractor based on these acceptances in accordance with "Payment of Withheld Funds" of these special provisions. The prime Contractor or subcontractor shall return all monies withheld in retention from the subcontractor within 30 days after receiving payment for work satisfactorily completed and accepted including incremental acceptances of portions of the contract work by the Department. Federal law (49CFR26.29) requires that any delay or postponement of payment over 30 days may take place only for good cause and with the Department's prior written approval. Any violation of this provision shall subject the violating Contractor or subcontractor to the penalties, sanctions, and remedies specified in Section 7108.5 of the California Business and Professions Code. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the prime contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract or performance, and/or noncompliance by a subcontractor.

Article 16. PREVAILING WAGE REQUIREMENTS

In accordance with the provisions of California Labor Code Sections 1770 et seq., including but not limited to Sections 1773, 1773.1, 1773.2, 1773.6, and 1773.7, the general prevailing rate of wages in the county in which the Work is to be done has been determined by the Director of the California Department of Industrial Relations. These wage rates appear in the California Department of Transportation publication entitled General Prevailing Wage Rates.

Interested parties can obtain the current wage information by submitting requests to the Department of Industrial Relations, Division of Labor Statistics and Research, PO Box 420603, San Francisco CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at <http://www.dir.ca.gov/dlsr/PWD>. The rates at the time of the bid

advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.

Copies of the general prevailing rate of wages in the County in which the Work is to be done are also on file at the Department of Transportation's principal office, and are available upon request, and in case of projects involving federal funds, federal wage requirements have been included in the Contract Documents.

In accordance with the provisions of Labor Code Section 1810, eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and Contractor and any subcontractor employed under this Contract shall also conform to and be bound by the provisions of Labor Code Sections 1810 through 1815.

In the case of federally funded projects, where federal and state prevailing wage requirements apply, compliance with both is required. This project is funded in whole or part by federal funds. Contractor's attention is directed to Section 14 of the Special Provisions and the requirements of, and compliance with the Copeland Act (18 U.S.C. 874 and 29 CFR Part 3), the Davis-Bacon Act (40 U.S.C. 276a to 276a-7 and 29 CFR Part 5), and the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330 and 29 CFR Part 5).

If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, Contractor and subcontractors shall pay not less than the higher wage rate. The Department will not accept lower State wage rates not specifically included in the Federal minimum wage determinations. This includes "helper" (or other classifications based on hours of experience) or any other classification not appearing in the Federal wage determinations. Where Federal wage determinations do not contain the State wage rate determination otherwise available for use by Contractor and subcontractors, Contractor and subcontractors shall pay not less than the federal minimum wage rate which most closely approximates the duties of the employees in question.

Article 17. NONDISCRIMINATION

- A. In connection with its performance under this Contract, Contractor shall comply with all applicable nondiscrimination statutes and regulations during the performance of this Contract including, but not limited to the following: Contractor, its employees, subcontractors and representatives shall not unlawfully discriminate against any employee or applicant for employment because of race, color, sex, sexual orientation, religion, ancestry or national origin, physical disability, medical condition, marital status, political affiliation, family and medical care leave, pregnancy leave or disability leave. Contractor will take affirmative action to ensure that employees are treated during employment, without regard to their race, color, sex, sexual orientation, religion, ancestry or national origin, physical disability, medical condition, marital status, political affiliation, family and medical care leave, pregnancy leave or disability leave. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor shall post in conspicuous places, available to employees for employment, notices to be provided by State setting forth the provisions of this Fair Employment section. Contractor shall, unless exempt, comply with the applicable provisions of the Fair Employment and Housing Act (Government Code, Sections 12900 et seq.) and applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Sections 7285.0 et seq.); the applicable regulations of the Fair Employment and Housing Commission implementing Government Code, Section 12990, set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations incorporated into this Agreement by reference and made a part hereof as if set forth in full; and Title VI of the Civil Rights Act of 1964, as amended. Contractor, its employees, subcontractors and representatives shall give written notice of their obligations under this clause as required by law.
- B. Where applicable, Contractor shall include these nondiscrimination and compliance provisions in any of its subcontracts that affect or are related to the Work performed herein.

- C. The Congress of the United States, the Legislature of the State of California and the Governor of the State of California, each within their respective jurisdictions, have prescribed certain nondiscrimination requirements with respect to contract and other work financed with public funds. Contractor agrees to comply with the requirements of Exhibit B, marked "Fair Employment Practices Addendum" and the requirements of Exhibit C, marked "Nondiscrimination Assurances," including Appendices A through D to Exhibit C, both of which exhibits and all of the Appendices to Exhibit C are incorporated herein and made by reference a part hereof. Contractor further agrees that any agreement entered into by Contractor with a third party for the performance of project-related work shall incorporate Exhibits B and C and Appendices A through D to Exhibit C (with third party's name replacing Contractor) as essential parts of such agreement to be enforced by that third party as verified by Contractor.
- D. Contractor's signature executing this Contract shall provide any certifications necessary under the federal laws and the laws of the State of California, including but not limited to Government Code Section 12990 and Title 2, California Code of Regulations, Section 8103.

Article 18. CONTRACTOR ASSURANCES

By executing this Contract, Contractor certifies that it:

- a. Will abide by all administrative, contractual or legal remedies in instances where Contractor violates or breaches contract terms, and will comply with sanctions and penalties as the Contract Administrator deems appropriate.
- b. Will comply with the termination for cause and termination for convenience provisions of the Contract including the manner by which such termination may be effected and the basis for settlement afforded by those provisions.
- c. Will comply with Executive Order 11246 of September 24, 1965, entitled "Equal Employment Opportunity," as amended by Executive Order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 CFR Chapter 60).
- d. Will comply with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR Part 3).
- e. Will comply with the Davis-Bacon Act (40 U.S.C. 276a to 276a-7) as supplemented in Department of Labor regulations (29 CFR part 3).
- f. Will comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by Department of Labor regulations (29 CFR Part 5).
- g. Will comply with County, State of California and FHWA requirements and regulations pertaining to: (a) reporting; (b) patent rights with respect to any discovery or invention which arises or is developed in the course of or under this Contract; and (c) copyrights and rights in data.
- h. Will comply with all applicable standards, orders or requirements issued under Section 306 of the Clean Air Act (42 U.S.C. 1857 [h]), Section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).
- i. Will comply with mandatory standards and policies relating to energy efficiency, which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub. : 94-163, 89 Stat. 871).
- j. Will comply with: (i) Section 504 of the Rehabilitation Act of 1973 (Rehabilitation Act) which prohibits discrimination on the basis of disability in federally assisted programs; (ii) the Americans with Disabilities

Act (ADA) of 1990 which prohibits discrimination on the basis of disability irrespective of funding; and (iii) all applicable regulations and guidelines issued pursuant to both the Rehabilitation Act and the ADA.

Any subcontract entered into as a result of this Contract shall contain all of the provisions of this Article.

Article 19. BUSINESS LICENSE

The County Business License Ordinance provides that it is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Ordinance Code Section 5.08.070. Contractor warrants and represents that it shall comply with all of the requirements of the County Business License Ordinance, where applicable, prior to beginning work under this Contract and at all times during the term of this Contract.

Article 20. CONTRACT ADMINISTRATOR

The County Officer or employee with responsibility for administering this Agreement is John Kahling, Deputy Director, Engineering, Construction Division, Department of Transportation, or successor.

Article 21. AUTHORIZED SIGNATURES

The parties hereto represent that the undersigned individuals executing this Agreement on behalf of their respective parties are fully authorized to do so by law or other appropriate instrument and to bind upon said parties the obligations set forth herein.

IN WITNESS WHEREOF, the said Department of Transportation of the County of El Dorado, State of California, has caused this Agreement to be executed by County's Board of Supervisors, on its behalf, and the said Contractor has signed this Agreement the day and year written below.

COUNTY OF EL DORADO

Dated _____

Board of Supervisors
Attest:
Suzanne Allen de Sanchez
Clerk of the Boars of Supervisors

Dated _____

Deputy Clerk

CONTRACTOR

Dated _____

By _____
President

License No.

Federal Employer Identification Number

By _____
Corporate Secretary

NOTE: If Contractor 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 contracts on behalf of the corporation; if Contractor is a co-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 on behalf of the co-partnership; and if Contractor is an individual, his/her signature shall be placed above. Contractor executing this document on behalf of a corporation or partnership shall be prepared to demonstrate by resolution, article, or otherwise that it is appropriately authorized to act in these regards. For such corporation or partnership, such authority shall be demonstrated to the satisfaction of County. If signature is by an agent, other than officer of a corporation or a member of a partnership, an appropriate Power of Attorney shall be on file with the Department prior to signing this document.

Mailing Address: _____

Business Address: _____

City, Zip: _____

Phone: _____

Fax: _____

END OF AGREEMENT

U.S. 50 HOV Lanes Phase 2A
Contract No. 53113
January 10, 2012

County of El Dorado DOT
Agreement

EXHIBIT A

**CONTRACTOR'S BID AND BID PRICE SCHEDULE
(ENGINEER'S ESTIMATE)**

**U.S. 50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE**

CONTRACT NO. PW 09-30408 – CIP NO. 53113

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
1	070012	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM		
2	071325	TEMPORARY FENCE (TYPE ESA)	LF	560		
3	072010	TRENCH AND EXCAVATION SAFETY	LS	LUMP SUM		
4	074014	FURNISH FIELD OFFICE	LS	LUMPS SUM		
5	074016A	PREPARE ABSESTOS DUST MITIGATION PLAN	LS	LUMP SUM		
6	074016	CONSTRUCTION SITE MANAGEMENT	LS	LUMP SUM		
7	074019	PREPARE STORM WATER POLLUTION PREVENETION PLAN	LS	LUMP SUM		
8	074056	RAIN EVENT ACTION PLAN	EA	10	500	\$5,000
9	074057	STORM WATER ANNUAL REPORT	EA	2	2,000	\$4,000
10	074058	STORM WATER SAMPLING AND ANALYSIS DAY	EA	10		
11	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM		
12	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM		
13	120159	TEMPORARY TRAFFIC STRIPE (PAINT)	LF	24,800		
14	120165	CHANNELIZER (SURFACE MOUNTED)	EA	11		

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
15	120300	TEMPORARY PAVEMENT MARKER	EA	530		
16	128650	PORTABLE CHANGEABLE MESSAGE SIGN	SWD	240		
17	129000	TEMPORARY RAILING (TYPE K)	LF	36,000		
18	129100	TEMPORARY CRASH CUSHION MODULE	EA	28		
19	150206	ABANDON CULVERT	EA	5		
20	150221	ABANDON INLET	EA	5		
21	150665	REMOVE SINGLE METAL BEAM BARRIER	LF	790		
22	150667	REMOVE DOUBLE THRIE BEAM BARRIER	LF	15,500		
23	150742	REMOVE ROADSIDE SIGN	EA	47		
24	150767	REMOVE BRIDGE MOUNTED SIGN	EA	2		
25	150771	REMOVE ASPHALT CONCRETE DIKE	LF	440		
26	150806	REMOVE PIPE	LF	48		
27	150820	REMOVE INLET	EA	7		
28	151570	RECONSTRUCT DOUBLE THRIE BEAM BARRIER	LF	890		
29	152430	ADJUST INLET	EA	2		
30	153103	COLD PLANE ASPHALT CONCRETE PAVEMENT	SQYD	81,400		
31	153229	REMOVE CONCRETE BARRIER (TYPE K)	LF	740		
32	F 190101	ROADWAY EXCAVATION	CY	42,800		

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
33	190110	LEAD COMPLIANCE PLAN	LS	LUMP SUM		
34	198007	SHOULDER BACKING	TON	660		
35	200001	HIGHWAY PLANTING	LS	LUMP SUM		
36	203026	MOVE-IN/MOVE-OUT (EROSION CONTROL)	EA	3		
37	203031	EROSION CONTROL (HYDROSEED) (SQFT)	SQFT	157,000		
38	203034	ROLLED EROSION CONTROL PRODUCT (NETTING)	SQFT	65		
39	207099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM		
40	208000	IRRIGATION SYSTEM	LS	LUMP SUM		
41	260201	CLASS 2 AGGREGATE BASE	CY	48,400		
42	374207	CRACK TREATMENT	LNMI	5		
43	390131	HOT MIX ASPHALT (TYPE A)	TON	43,500		
44	390138	RUBBERIZED HOT MIX ASPHALT (OPEN GRADED)	TON	6,380		
45	394053	SHOULDER RUMBLE STRIP (HMA, GROUND-IN INDENTATIONS)	STA	580		
46	394074	PLACE HOT MIX ASPHALT DIKE (TYPE C)	LF	680		
47	394076	PLACE HOT MIX ASPHALT DIKE (TYPE E)	LF	1,120		
48	394077	PLACE HOT MIX ASPHALT DIKE (TYPE F)	LF	260		
49	394090	PLACE HOT MIX ASPHALT (MISCELLANEOUS AREA)	SQYD	6,340		
50	397005	TACK COAT	TON	39		

ITEM NO.		ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
51		41105	INDIVIDUAL SLAB REPLACEMENT (RSC)	CY	19		
52	(F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	13		
53	(F-P)	560203	FURNISH SIGN STRUCTURE (BRIDGE MOUNTED WITH WALKWAY)	LB	5,315		
54	(F)	560204	INSTALL SIGN STRUCTURE (BRIDGE MOUNTED WITH WALKWAY)	LB	5,315		
55	(F-P)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	92,474		
56	(F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	92,474		
57		560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	1,500		
58		560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	490		
59		560249	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-UNFRAMED)	SQFT	240		
60		560251	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063" -FRAMED)	SQFT	22		
61		560252	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080" -FRAMED)	SQFT	350		
62		561104	54" CAST -IN-DRILLED HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	140		
63		561016	60" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	23		
64		562002A	ROADSIDE SIGN (BARRIER MOUNTED)	EA	3		
65		566011	ROADSIDE SIGN - ONE POST	EA	24		
66		566012	ROADSIDE SIGN - TWO POST	EA	8		
67		568001	INSTALL SIGN (STRAP AND SADDLE BRACKET METHOD)	EA	13		
68	(P)	665025	24" CORRUGATED STEEL PIPE (.138" THICK)	LF	1,050		

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
69	(P)	665075	18" CORRUGATED STEEL PIPE (.138" THICK)	LF	9	
70	(P)	700639	36" CORRUGATED STEEL PIPE INLET (.109" THICK)	LF	71	
71	(P)	721011	ROCK SLOPE PROTECTION (BACKING NO. 2, METHOD B)	CY	14	
72	(P)	729010	ROCK SLOPE PROTECTION FABRIC	SQYD	30	
73	(F-P)	750001	MISCELLANEOUS IRON AND STEEL	LB	4,080	
74		820107	DELINEATOR (CLASS 1)	EA	44	
75		820110A	HIGHWAY MARKER	EA	13	
76		820151	OBJECT MARKER (TYPE L-1)	EA	8	
77		830130A	CONCRETE BARRIER MARKER (NON-IMPACTABLE)	EA	110	
78	(P)	832002	METAL BEAM GUARD RAILING (STEEL POST)	LF	230	
79		832070	VEGETATION CONTROL (MINOR CONCRETE)	SQYD	7,460	
80	(P)	839303	SINGLE THRIE BEAM BARRIER (STEEL POST)	LF	580	
81	(P)	839312	DOUBLE THRIE BEAM BARRIER (STEEL POST)	LF	13,000	
82		839581	END ANCHOR ASSEMBLY (TYPE SFT)	EA	6	
83	(P)	839585	ALTERNATIVE FLARED TERMINAL SYSTEM	EA	6	
84		839706	CONCRETE BARRIER (TYPE 60G)	LF	1,390	
85		839708	CONCRETE BARRIER (TYPE 60GC)	LF	1,770	
86		839709A	CONCRETE BARRIER (TYPE 60GE MODIFIED)	LF	270	

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
87	840504	4" THERMOPLASTIC TRAFFIC STRIPE	LF	67,400		
88	840506	8" THERMOPLASTIC TRAFFIC STRIPE	LF	4,060		
89	840508	8" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 12-3)	LF	2,620		
90	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	830		
91	840525	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 36-12)	LF	63,100		
92	840526	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 17-7)	LF	2,680		
93	(P) 850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	2,500		
94	860090	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	LUMP SUM		
95	860460	LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM		
96	860891A	MODIFY WIRELESS VEHICLE DETECTION SYSTEM	LS	LUMP SUM		
97	999990	MOBILIZATION	LS	LUMP SUM		
TOTAL BID						

(F) Final Pay Quantity
(P) Item Eligible for Partial Payment
(LS) Lump Sum
(SWD) Sign working day

EXHIBIT B

FAIR EMPLOYMENT PRACTICES ADDENDUM

1. In the performance of this Agreement, Contractor will not discriminate against any employee for employment because of race, color, sex, sexual orientation, religion, ancestry or national origin, physical disability, medical condition, marital status, political affiliation, family and medical care leave, pregnancy leave or disability leave. Contractor will take affirmative action to ensure that employees are treated during employment, without regard to their race, color, sex, sexual orientation, religion, ancestry or national origin, physical disability, medical condition, marital status, political affiliation, family and medical care leave, pregnancy leave or disability leave. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor shall post in conspicuous places, available to employees for employment, notices to be provided by State setting forth the provisions of this Fair Employment section.

2. Contractor and all subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Government Code Section 1290-0 et seq.), and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code, Section 12900(a-f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are incorporated into this Agreement by reference and made a part hereof as if set forth in full. Each of Contractor's contractors and all subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreements, as appropriate.

3. Contractor shall include the nondiscrimination and compliance provisions of this clause in all contracts and subcontracts to perform work under this Agreement.

4. Contractor will permit access to the records of employment, employment advertisements, application forms and other pertinent data and records by County, State, the State Fair Employment and Housing Commission or any other agency of the State of California designated by State, for the purposes of investigation to ascertain compliance with the Fair Employment section of this Agreement.

5. Remedies for Willful Violation:

- (a) County may determine a willful violation of the Fair Employment provision to have occurred upon receipt of a final judgment to that effect from a court in an action to which Contractor was a party, or upon receipt of a written notice from the Fair Employment and Housing Commission that it has investigated and determined that Contractor has violated the Fair Employment Practices Act and had issued an order under Labor Code Section 1426 which has become final or has obtained an injunction under Labor Code Section 1429.
- (b) For willful violation of this Fair Employment provision, County shall have the right to terminate this Agreement either in whole or in part, and any loss or damage sustained by County in securing the goods or services thereunder shall be borne and paid for by Contractor and by the surety under the performance bond, if any, and County may deduct from any moneys due or thereafter may become due to Contractor, the difference between the price named in the Agreement and the actual cost thereof to County to cure Contractor's breach of this Agreement.

EXHIBIT C

NONDISCRIMINATION ASSURANCES

Contractor hereby agrees that, as a condition to receiving any federal financial assistance from County or the State, acting for the U.S. Department of Transportation, it will comply with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d-42 U.S.C. 2000d-4 (hereinafter referred to as the Act), and all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, "Nondiscrimination in Federally-Assisted Programs of the Department of Transportation - Effectuation of Title VI of the Civil Rights Act of 1964" (hereinafter referred to as the Regulations), the Federal-aid Highway Act of 1973, and other pertinent directives, to the end that in accordance with the Act, Regulations, and other pertinent directives, no person in the United States shall, on the grounds of race, color, sex, national origin, religion, age or disability, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which County receives federal financial assistance from the Federal Department of Transportation. Contractor hereby gives assurance that Contractor will promptly take any measures necessary to effectuate this agreement. This assurance is required by subsection 21.7(a) (1) of the Regulations.

More specifically, and without limiting the above general assurance, Contractor hereby gives the following specific assurances with respect to its Federal-aid Program:

1. That Contractor agrees that each "program" and each "facility" as defined in subsections 21.23 (e) and 21.23 (b) of the Regulations, will be (with regard to a "program") conducted, or will be (with regard to a "facility") operated in compliance with all requirements imposed by, or pursuant to, the Regulations.

2. That Contractor shall insert the following notification in all solicitations for bids for work or material subject to the Regulations made in connection with the Federal-aid Program and, in adapted form, in all proposals for negotiated agreements:

Contractor hereby notifies all bidders that it will affirmatively insure that in any agreement entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, national origin, religion, age, or disability in consideration for an award.

3. That Contractor shall insert the clauses of Appendix A of this assurance in every agreement subject to the Act and the Regulations.

4. That the clauses of Appendix B of this Assurance shall be included as a covenant running with the land, in any deed effecting a transfer of real property, structures, or improvements thereon, or interest therein.

5. That where Contractor receives federal financial assistance to construct a facility, or part of a facility, the Assurance shall extend to the entire facility and facilities operated in connection therewith.

6. That where Contractor receives federal financial assistance in the form, or for the acquisition, of real property or an interest in real property, the Assurance shall extend to rights to space on, over, or under such property.

7. That Contractor shall include the appropriate clauses set forth in Appendix C and D of this Assurance, as a covenant running with the land, in any future deeds, leases, permits, licenses, and similar agreements entered into by Contractor with other parties:

Appendix C;

(a) For the subsequent transfer of real property acquired or improved under the Federal-aid Program; and
Appendix D;

(b) For the construction or use of or access to space on, over, or under real property acquired, or improved under the Federal-aid Program.

8. That this assurance obligates Contractor for the period during which federal financial assistance is extended to the program, except where the federal financial assistance is to provide, or is in the form of, personal property or real property of interest therein, or structures, or improvements thereon, in which case the assurance obligates Contractor or any transferee for the longer of the following periods:

(a) The period during which the property is used for a purpose for which the federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits; or

(b) The period during which Contractor retains ownership or possession of the property.

9. That Contractor shall provide for such methods of administration for the program as are found by the U.S. Secretary of Transportation, or the official to whom he delegates specific authority, to give reasonable guarantee that Contractor, other recipients, sub-grantees, applicants, sub-applicants, transferees, successors in interest, and other participants of federal financial assistance under such program will comply with all requirements imposed by, or pursuant to, the Act, the Regulations, this Assurance and the Agreement.

10. That Contractor agrees that County, the United States and the State of California have a right to seek judicial enforcement with regard to any matter arising under the Act, the Regulations, and this Assurance.

11. Contractor shall not discriminate on the basis of race, religion, age, disability, color, national origin or sex in the award and performance of any State assisted contract or in the administration of County's DBE Program or the requirements of 49 CFR Part 26. Contractor shall take all necessary and reasonable steps under 49 CFR Part 26 to ensure non discrimination in the award and administration of State assisted contracts. County's DBE Race-Neutral Implementation Agreement is incorporated by reference in this Agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this Agreement. Upon notification to the recipient of its failure to carry out its approved DBE Race-Neutral Implementation Agreement, State may impose sanctions as provided for under 49 CFR Part 26 and may, in appropriate cases, refer the matter for enforcement under 18 USC 1001 and/or the Program Fraud Civil Remedies Act of 1985 (31 USC 3801 et. seq.).

These Assurances are given in consideration of and for the purpose of obtaining any and all federal grants, loans, agreements, property, discounts or other federal financial assistance extended after the date hereof to County by State, acting for the U.S. Department of Transportation, and is binding on Contractor, other recipients, subgrantees, applicants, sub-applicants, transferees, successors in interest and other participants in the Federal-aid Highway Program.

APPENDIX A
to
EXHIBIT C

During the performance of this Agreement, Contractor, for itself, its assignees and successors in interest (hereinafter collectively referred to as "Contractor") agrees as follows:

(1) **Compliance with Regulations:** Contractor shall comply with the regulations relative to nondiscrimination in federally assisted programs of the Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Agreement.

(2) **Nondiscrimination:** Contractor, with regard to the work performed by it during the Agreement, shall not discriminate on the grounds of race, color, sex, national origin, religion, age, or disability in the selection and retention of sub-applicants, including procurements of materials and leases of equipment. Contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the Agreement covers a program set forth in Appendix b of the Regulations.

(3) **Solicitations for Sub-agreements, Including procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by Contractor for work performed under s Sub-agreement, including procurements of materials or leases of equipment, each potential sub-applicant or supplier shall be notified by Contractor of the Contractor's obligations under this Agreement and the Regulations relative to nondiscrimination on the grounds of race, color or national origin.

(4) **Information and Reports:** Contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to Contractor's books, records, accounts, other sources of information, and its facilities as may be determined by County, State or FHWA to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of Contractor is in the exclusive possession of another who fails or refuses to furnish this information, Contractor shall so certify to County, State or the FHWA as appropriate, and shall set forth what efforts Contractor has made to obtain the information.

(5) **Sanctions for Noncompliance:** In the event of Contractor's noncompliance with the nondiscrimination provisions of this Agreement, County shall impose such agreement sanctions as it, the State or the FHWA may determine to be appropriate, including, but not limited to:

- (a) withholding of payments to Contractor under the Agreement within a reasonable period of time, not to exceed 90 days; and/or
- (b) cancellation, termination or suspension of the Agreement, in whole or in part.

(6) **Incorporation of Provisions:** Contractor shall include the provisions of paragraphs (1) through (6) in every sub-agreement, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

Contractor shall take such action with respect to and sub-agreement or procurement as County, State or FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance, provided, however, that, in the event Contractor becomes involved in, or is threatened with, litigation with a sub-applicant or supplier as a result of such direction, Contractor may request County or State enter into such litigation to protect the interests of County or State, and, in addition, Contractor may request the United States to enter into such litigation to protect the interests of the United States.

**APPENDIX B
to
EXHIBIT C
(NOT USED)**

APPENDIX C
to
EXHIBIT C
(NOT USED)

APPENDIX D
to
EXHIBIT C
(NOT USED)

**COUNTY OF EL DORADO
PAYMENT BOND**

(Section 3247, Civil Code)

Bond No. _____

WHEREAS, the County of El Dorado, a political subdivision of the State of California, hereafter referred to as "Obligee", has awarded to Contractor

_____ hereafter referred to as "Principal", a contract for the work described as follows:

**U.S.50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE
CONTRACT NO. PW 09-30408, CIP NO. 53113**

WHEREAS, the State of California, acting through its Department of Transportation is hereafter referred to as "Additional Obligee", both Obligee and Additional Obligee collectively hereafter referred to as "Obligees":

AND, WHEREAS, said Principal is required to furnish a bond in connection with said contract, guaranteeing the faithful performance thereof:

NOW, THEREFORE, we the undersigned Principal and Surety are held and firmly bound unto the Obligees in the sum of _____ Dollars, (\$ _____) to be paid to the Obligees, for which payment we bind ourselves, jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH,

That if said Principal or its 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 such claimant, or any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the Principal and his subcontractors pursuant to Section 18806 of the Revenue and Taxation 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 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.

Dated: _____

Correspondence or Claims relating to this bond should be sent to the Surety at the following address:

PRINCIPAL

SURETY

ATTORNEY-IN-FACT

NOTE: Signatures of those executing for the Principal and for the Surety must be properly acknowledged, and a Power of Attorney attached for the Surety.

NOTARY ACKNOWLEDGMENTS ATTACHED

PRINCIPAL

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

SURETY

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

PERFORMANCE BOND

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS, that we _____

the Contractor in the Contract hereto annexed, as Principal, and _____

as Surety, are held firmly bound unto the County of El Dorado, a political subdivision of the State of California, hereinafter called the "Obligee", and the State of California, acting through its Department of Transportation hereafter referred to as "Additional Obligee", both Obligee and Additional Obligee collectively hereafter referred to as "Obligees"

in the sum of _____ DOLLARS, (\$ _____) lawful money of the United States, for which payment,

well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

Signed, sealed and dated: _____

The condition of the above obligation is such that if said Principal as Contractor in the Contract hereto annexed shall faithfully perform each and all of the conditions of said Contract to be performed by him, and shall furnish all tools, equipment, apparatus, facilities, transportation, labor and material, other than material, if any, agreed to be furnished by the Obligees, necessary to perform and complete, and to perform and complete in a good and workmanlike manner, the work of **PW 09-30408, CIP No. 53113 for the U.S. 50 HOV LANES PHASE 2A, BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE** in strict conformity with the terms and conditions set forth in the Contract hereto annexed, then this obligation shall be null and void; otherwise this bond shall remain in full force and effect and the said Surety will complete the Contract work under its own supervision, by Contract or otherwise, and pay all costs thereof for the balance due under terms of the Contract, 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 shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work.

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

This guarantee shall insure the Obligees during the work required by any Contract and for a period of one (1) year from the date of acceptance of the work against faulty or improper materials or workmanship that may be discovered during that time.

No right of action shall accrue under this bond to or for the use of any person other than the Obligees named herein.

Dated: _____, 20_____.

Correspondence or Claims relating to this bond should be sent to the Surety at the following address:

PRINCIPAL

SURETY

ATTORNEY-IN-FACT

NOTE: Signatures of those executing for the Principal and the Surety must be properly acknowledged, and a Power of Attorney attached for the Surety.

NOTARY ACKNOWLEDGMENTS ATTACHED

PRINCIPAL

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

SURETY

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

(Because some colored inks will not reproduce in copy machines, please use black ink to complete this Proposal)
COMPLETING BID IN PENCIL, ERASURES, OVERWRITES, AND USE OF CORRECTION FLUID OR TAPE ARE NOT ACCEPTABLE. BID PROPOSALS WITH PENCIL, ERASURES, OVERWRITES, OR USE OF CORRECTION FLUID OR TAPE WILL BE REJECTED. ALL CHANGES MUST BE LINED OUT AND CORRECTIONS INSERTED ADJACENT TO THE CHANGE AND INITIALED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE.

PROPOSAL

(to be attached to and submitted with this bound Contract Document bid package)

**TO: THE DEPARTMENT OF TRANSPORTATION,
COUNTY OF EL DORADO,
STATE OF CALIFORNIA**

for the construction of

**U.S. 50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE
CONTRACT NO. PW 09-30408, CIP NO. 53113**

NAME OF BIDDER _____

BUSINESS P.O. BOX _____

CITY, STATE, ZIP _____

BUSINESS STREET ADDRESS _____

(Please include even if P.O. Box used)

CITY, STATE, ZIP _____

TELEPHONE NO: AREA CODE () _____

FAX NO: AREA CODE () _____

The work for which this Proposal is submitted is for the construction in accordance with these Contract Documents (including the payment of not less than the State general prevailing wage rates or Federal minimum wage rates set forth herein), the Project Plans described below, including any addenda thereto, the Contract annexed hereto, and also in accordance with the California Department of Transportation Standard Plans, dated May 2006, the Standard Specifications, dated May 2006, Amendments to the May 2006 Standard Specifications, standard drawings from the Design and Improvement Standards Manual of the County of El Dorado, revised March 8, 1994 including Resolutions 199-91 and 58-94 to adopt changes to the Design and Improvement Standards Manual; the Labor Surcharge and Equipment Rental Rates in effect on the date the work is accomplished, and in accordance with the General Prevailing Wage rates. The Project Plans and Contract Documents for the work to be done are entitled:

U.S. 50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE
CONTRACT NO. PW 09-30408, CIP NO. 53113

Bids are to be submitted for the entire work. The amount of the bid for comparison purposes will be the total of all the items.

The Bidder shall 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 this purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the item price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

- (a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount as the entry in the item 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;
- (b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc., from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentage wise the unit price or item total in the Department's Final Estimate of cost.

If this Proposal is accepted and the undersigned Bidder shall fail to enter into the Contract and furnish the two bonds in the sums required by the State Contract Act, with surety satisfaction to the County of El Dorado and the State of California, and submit escrow bid documents in locked container in accordance with the Special Provisions within ten (10) days, not including Saturdays, Sundays, and legal holidays, of the date of the letter notice from the County of El Dorado that the Contract has been awarded, the County of El Dorado may, at its option, determine that the Bidder has abandoned the Contract, and thereupon this Proposal and the acceptance thereof shall be null and void and the forfeiture of such security accompanying this Proposal shall operate and the same shall be the property of the County of El Dorado.

The undersigned, as Bidder, declares under penalty of perjury under the laws of the State of California that the only persons 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 it has carefully examined the location of the proposed work, the annexed proposed form of Contract, and the Plans therein referred to; and that it proposes, and agrees if this Proposal is accepted, that it will contract with the County of El Dorado, in the form of the copy of the Draft Contract annexed hereto, to provide all necessary machinery, tools, apparatus, and other means of construction, and to do all the work and furnish all the materials specified in the Contract, in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that it will take in full payment therefore the following item prices, to wit:

**PROPOSAL PAY ITEMS AND BID PRICE SCHEDULE
(ENGINEER'S ESTIMATE)**

**U.S. 50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE
CONTRACT NO. PW 09-30408, CIP NO. 53113**

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
1	070012	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM		
2	071325	TEMPORARY FENCE (TYPE ESA)	LF	560		
3	072010	TRENCH AND EXCAVATION SAFETY	LS	LUMP SUM		
4	074014	FURNISH FIELD OFFICE	LS	LUMPS SUM		
5	074016A	PREPARE ABSESTOS DUST MITIGATION PLAN	LS	LUMP SUM		
6	074016	CONSTRUCTION SITE MANAGEMENT	LS	LUMP SUM		
7	074019	PREPARE STORM WATER POLLUTION PREVENETION PLAN	LS	LUMP SUM		
8	074056	RAIN EVENT ACTION PLAN	EA	10	500	\$5,000
9	074057	STORM WATER ANNUAL REPORT	EA	2	2,000	\$4,000
10	074058	STORM WATER SAMPLING AND ANALYSIS DAY	EA	10		
11	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM		
12	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM		
13	120159	TEMPORARY TRAFFIC STRIPE (PAINT)	LF	24,800		
14	120165	CHANNELIZER (SURFACE MOUNTED)	EA	11		
15	120300	TEMPORARY PAVEMENT MARKER	EA	530		
16	128650	PORTABLE CHANGEABLE MESSAGE SIGN	SWD	240		

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
17	129000	TEMPORARY RAILING (TYPE K)	LF	36,000		
18	129100	TEMPORARY CRASH CUSHION MODULE	EA	28		
19	150206	ABANDON CULVERT	EA	5		
20	150221	ABANDON INLET	EA	5		
21	150665	REMOVE SINGLE METAL BEAM BARRIER	LF	790		
22	150667	REMOVE DOUBLE THRIE BEAM BARRIER	LF	15,500		
23	150742	REMOVE ROADSIDE SIGN	EA	47		
24	150767	REMOVE BRIDGE MOUNTED SIGN	EA	2		
25	150771	REMOVE ASPHALT CONCRETE DIKE	LF	440		
26	150806	REMOVE PIPE	LF	48		
27	150820	REMOVE INLET	EA	7		
28	151570	RECONSTRUCT DOUBLE THRIE BEAM BARRIER	LF	890		
29	152430	ADJUST INLET	EA	2		
30	153103	COLD PLANE ASPHALT CONCRETE PAVEMENT	SQYD	81,400		
31	153229	REMOVE CONCRETE BARRIER (TYPE K)	LF	740		
32	F 190101	ROADWAY EXCAVATION	CY	42,800		
33	190110	LEAD COMPLIANCE PLAN	LS	LUMP SUM		
34	198007	SHOULDER BACKING	TON	660		
35	200001	HIGHWAY PLANTING	LS	LUMP SUM		

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
36	203026	MOVE-IN/MOVE-OUT (EROSION CONTROL)	EA	3		
37	203031	EROSION CONTROL (HYDROSEED) (SQFT)	SQFT	157,000		
38	203034	ROLLED EROSION CONTROL PRODUCT (NETTING)	SQFT	65		
39	207099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM		
40	208000	IRRIGATION SYSTEM	LS	LUMP SUM		
41	260201	CLASS 2 AGGREGATE BASE	CY	48,400		
42	374207	CRACK TREATMENT	LNMI	5		
43	390131	HOT MIX ASPHALT (TYPE A)	TON	43,500		
44	390138	RUBBERIZED HOT MIX ASPHALT (OPEN GRADED)	TON	6,380		
45	394053	SHOULDER RUMBLE STRIP (HMA, GROUND-IN INDENTATIONS)	STA	580		
46	394074	PLACE HOT MIX ASPHALT DIKE (TYPE C)	LF	680		
47	394076	PLACE HOT MIX ASPHALT DIKE (TYPE E)	LF	1,120		
48	394077	PLACE HOT MIX ASPHALT DIKE (TYPE F)	LF	260		
49	394090	PLACE HOT MIX ASPHALT (MISCELLANEOUS AREA)	SQYD	6,340		
50	397005	TACK COAT	TON	39		
51	41105	INDIVIDUAL SLAB REPLACEMENT (RSC)	CY	19		
52	(F) 510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	13		
53	(F-P) 560203	FURNISH SIGN STRUCTURE (BRIDGE MOUNTED WITH WALKWAY)	LB	5,315		
54	(F) 560204	INSTALL SIGN STRUCTURE (BRIDGE MOUNTED WITH WALKWAY)	LB	5,315		

ITEM NO.		ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
55	(F-P)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	92,474		
56	(F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	92,474		
57		560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	1,500		
58		560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	490		
59		560249	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-UNFRAMED)	SQFT	240		
60		560251	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063" -FRAMED)	SQFT	22		
61		560252	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080" -FRAMED)	SQFT	350		
62		561104	54" CAST -IN-DRILLED HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	140		
63		561016	60" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	23		
64		562002A	ROADSIDE SIGN (BARRIER MOUNTED)	EA	3		
65		566011	ROADSIDE SIGN - ONE POST	EA	24		
66		566012	ROADSIDE SIGN - TWO POST	EA	8		
67		568001	INSTALL SIGN (STRAP AND SADDLE BRACKET METHOD)	EA	13		
68	(P)	665025	24" CORRUGATED STEEL PIPE (.138" THICK)	LF	1,050		
69	(P)	665075	18" CORRUGATED STEEL PIPE (.138" THICK)	LF	9		
70	(P)	700639	36" CORRUGATED STEEL PIPE INLET (.109" THICK)	LF	71		
71	(P)	721011	ROCK SLOPE PROTECTION (BACKING NO. 2, METHOD B)	CY	14		
72	(P)	729010	ROCK SLOPE PROTECTION FABRIC	SQYD	30		
73	(F-P)	750001	MISCELLANEOUS IRON AND STEEL	LB	4,080		

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
74	820107	DELINEATOR (CLASS 1)	EA	44		
75	820110A	HIGHWAY MARKER	EA	13		
76	820151	OBJECT MARKER (TYPE L-1)	EA	8		
77	830130A	CONCRETE BARRIER MARKER (NON-IMPACTABLE)	EA	110		
78	(P) 832002	METAL BEAM GUARD RAILING (STEEL POST)	LF	230		
79	832070	VEGETATION CONTROL (MINOR CONCRETE)	SQYD	7,460		
80	(P) 839303	SINGLE THRIE BEAM BARRIER (STEEL POST)	LF	580		
81	(P) 839312	DOUBLE THRIE BEAM BARRIER (STEEL POST)	LF	13,000		
82	839581	END ANCHOR ASSEMBLY (TYPE SFT)	EA	6		
83	(P) 839585	ALTERNATIVE FLARED TERMINAL SYSTEM	EA	6		
84	839706	CONCRETE BARRIER (TYPE 60G)	LF	1,390		
85	839708	CONCRETE BARRIER (TYPE 60GC)	LF	1,770		
86	839709A	CONCRETE BARRIER (TYPE 60GE MODIFIED)	LF	270		
87	840504	4" THERMOPLASTIC TRAFFIC STRIPE	LF	67,400		
88	840506	8" THERMOPLASTIC TRAFFIC STRIPE	LF	4,060		
89	840508	8" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 12-3)	LF	2,620		
90	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	830		
91	840525	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 36-12)	LF	63,100		
92	840526	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 17-7)	LF	2,680		

ITEM NO.		ITEM CODE	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE (In Figures)	TOTAL PRICE (In Figures)
93	(P)	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	2,500		
94		860090	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	LUMP SUM		
95		860460	LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM		
96		860891A	MODIFY WIRELESS VEHICLE DETECTION SYSTEM	LS	LUMP SUM		
97		999990	MOBILIZATION	LS	LUMP SUM		
TOTAL BID							<hr/>

(F) Final Pay Quantity
(P) Item Eligible for Partial Payment
(LS) Lump Sum
(SWD) Sign working day

(NOTICE: Bidder's failure to execute the questionnaires and statements contained in this Proposal as required by applicable laws and regulations, or the determinations by El Dorado County based upon those questionnaires and statements, may prohibit award of the subject Contract to the Bidder.)

SUBCONTRACTORS LISTING

The Bidder shall list the name, address, and license number, of each subcontractor to whom the Bidder proposes to subcontract portions of the work, as required by the provisions in "Required Listing of Proposed Subcontractors" of the Special Provisions. The Bidder shall also list the work portion to be performed

Name	Location of Business	License No.	Bid Item Number and Bid Item Description	Percentage of Each Bid Item Subcontracted

by each subcontractor by listing the bid item number, bid item description, and portion of the work to be performed by the subcontractor in the form of a percentage calculated by dividing the work to be performed by the subcontractor by the respective bid item amount(s) (not by the total bid price).

(THE BIDDER'S EXECUTION ON THE SIGNATURE PORTION OF THIS PROPOSAL SHALL ALSO CONSTITUTE AN ENDORSEMENT AND EXECUTION OF THOSE CERTIFICATIONS WHICH ARE A PART OF THIS PROPOSAL)

EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

	<u>Has</u>	<u>Has Not</u>
The Bidder _____	_____	_____
Proposed Subcontractor(s) _____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

hereby certifies the above information regarding participation in a previous contract or subcontract subject to the equal opportunity clauses, as required by Executive Orders 10925, 11114, 11246, and 11375, and as supplemented by 41 CFR 60, and that, where required he has filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b)(1)), and must be submitted by Bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of \$10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

Public Contract Code Section 10285.1 Statement

In conformance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the Bidder hereby declares under penalty of perjury under the laws of the State of California that the Bidder has _____, has not _____ been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "Bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

Note: The Bidder must place a check mark after "has" or "has not" in one of the blank spaces provided. The above Statement is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Statement. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Public Contract Code Section 10162 Questionnaire

In conformance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Yes _____ No _____

If the answer is yes, explain the circumstances in the following space.

Public Contract Code Section 10232 Statement

In conformance with Public Contract Code Section 10232, the Bidder, hereby states under penalty of perjury [under the laws of the State of California](#), that no more than one final unappealable finding of contempt of court by a Federal Court has been issued against the Bidder within the immediately preceding two year period because of the Bidder's failure to comply with an order of a Federal Court which orders the Bidder to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Statement and Questionnaire.
Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

NONCOLLUSION AFFIDAVIT

(Title 23 United States Code Section 112 and
Public Contract Code Section 7106)

In conformance with Title 23 United States Code Section 112 and Public Contract Code 7106 the Bidder declares 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.

NOTE:

The above Noncollusion Affidavit is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Noncollusion Affidavit.

Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

**DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION
CERTIFICATION, UNITED STATES DEPARTMENT OF TRANSPORTATION(USDOT) 2
CODE OF FEDERAL REGULATIONS (CFR) 1200 FEDERAL AGENCY REGULATIONS
FOR GRANTS AND AGREEMENTS AND EXECUTIVE ORDER 12549**

The Bidder, under penalty of perjury, certifies that, except as noted below, he/she or any other person associated therewith in the capacity of owner, partner, director, officer, or manager:

- is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any Federal agency;
- has not been suspended, debarred, voluntarily excluded or determined ineligible by any Federal agency within the past 3 years;
- does not have a proposed debarment pending; and
- has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space.

Exceptions will not necessarily result in denial of award, but will be considered in determining Bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Bidder further agrees by submitting this Proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where any lower tier participant is unable to certify to this statement, it shall attach an explanation to its proposal to the prime contractor.

Notes: Providing false information may result in criminal prosecution or administrative sanctions. The above certification is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Certification.

NON-LOBBYING CERTIFICATION FOR FEDERAL-AID CONTRACTS

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

- (1) No federal or state appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any federal or state agency, a member of the State Legislature or United States Congress, an officer or employee of the Legislature or Congress, or an employee of a Member of the Legislature or Congress in connection with the awarding of any state or federal contract, including this Contract, the making of any federal grant, the making of any state or federal loan, the entering into of any cooperative contract, and the extension, continuation, renewal, amendment, or modification of any state or federal contract, grant, loan, or cooperative contract.
- (2) If any funds other than federal appropriated funds have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any federal agency, a member of Congress, an officer or employee of Congress or an employee of a member of Congress in connection with this Contract, grant, local, or cooperative contract, the Bidder shall complete and submit Standard Form-LLL, " Disclosure of Lobbying Activities," in accordance with the form instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Bidder also agrees by submitting its bid or Proposal that it shall require that the language of this certification be included in all of its subcontracts which exceed \$100,000 and that all such subcontractors shall certify and disclose accordingly. If the Bidder is awarded this Contract, it shall ensure that all subcontractors submit certifications regarding federal lobbying activities as required by Section 1352, Title 31, United States Code and that all such certifications are made a part of any subcontracts entered into as a result of this Contract.

DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352

1. Type of Federal Action: <input type="checkbox"/> a. contract <input type="checkbox"/> b. grant <input type="checkbox"/> c. cooperative agreement <input type="checkbox"/> d. loan <input type="checkbox"/> e. loan guarantee <input type="checkbox"/> f. loan insurance	2. Status of Federal Action: <input type="checkbox"/> a. bid/offer/application <input type="checkbox"/> b. initial award <input type="checkbox"/> c. post-award	3. Report Type: <input type="checkbox"/> a. initial <input type="checkbox"/> b. material change For Material Change Only: year _____ quarter _____ date of last report _____
4. Name and Address of Reporting Entity: <input type="checkbox"/> Prime <input type="checkbox"/> Subawardee Tier _____, if known Congressional District, if known: _____	5. If Reporting Entity in No. 4 is Subawardee. Enter Name and Address of Prime: Congressional District, if known: _____	
6. Federal Department/Agency:	7. Federal Program Name/Description: CFDA Number, if applicable _____	
8. Federal Action Number, if known:	9. Award Amount, if known: \$ _____	
10. a. Name and Address of Lobbying Entity (if individual, last name, first name, MI):	b. Individuals Performing Services (including address if different from No. 10a) (last name, first name, MI):	
<i>(attach Continuation Sheet(s) if necessary)</i>		
11. Amount of Payment (check all that apply): \$ _____ <input type="checkbox"/> actual <input type="checkbox"/> planned	13. Type of Payment (check all that apply) <input type="checkbox"/> a. retainer <input type="checkbox"/> b. one-time fee <input type="checkbox"/> c. commission <input type="checkbox"/> d. contingent fee <input type="checkbox"/> e. deferred <input type="checkbox"/> f. other, specify: _____	
12. Form of Payment (check all that apply): <input type="checkbox"/> a. cash <input type="checkbox"/> b. in-kind; specify: nature _____ value _____		
14. Brief Description of Services Performed or to be performed and Date(s) of Service, including officer(s), employee(s), or member(s) contacted, for Payment Indicated in Item 11: <i>(attach Continuation Sheet(s) if necessary)</i>		
15. Continuation Sheet(s) attached: Yes <input type="checkbox"/> No <input type="checkbox"/>		
16. Information requested through this form is authorized by Title 31 U.S.C. Section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.	Signature: _____ Print Name: _____ Title: _____ Telephone No.: _____ Date: _____	
Federal Use Only:		

Authorized for Local Reproduction
Standard Form - 111
Standard Form LLL Rev. 09-12-97

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of covered Federal action or a material change to previous filing pursuant to title 31 U.S.C. Section 1352. The filing of a form is required for such payment or agreement to make payment to lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress an officer or employee of Congress or an employee of a Member of Congress in connection with a covered Federal action. Attach a continuation sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence, the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last, previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District if known. Check the appropriate classification of the reporting entity that designates if it is or expects to be a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the first tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in Item 4 checks "Subawardee" then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organization level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identification in item 1 (e.g., Request for Proposal (RFP) number, Invitation for Bid (IFB) number, grant announcement number, the contract grant. or loan award number, the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitments for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, State and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influenced the covered Federal action.
(b) Enter the full names of the individual(s) performing services and include full address if different from 10 (a). Enter Last Name, First Name and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed or will be expected to perform and the date(s) of any services rendered. Include all preparatory and related activity not just time spent in actual contact with Federal officials. Identify the Federal officer(s) or employee(s) contacted or the officer(s) employee(s) or Member(s) of Congress that were contacted.
15. Check whether or not a continuation sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name title and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.

SF-LLL-Instructions Rev. 06-04-90

OPT OUT OF PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

You may opt out of the payment adjustments for price index fluctuations as specified in "Payment Adjustments for Price Index Fluctuations" of the special provisions. If you elect to opt out of the provisions of this specification, complete this form and submit it with your bid.

Bidder Name: _____

Contract No. PW 09-03408

I opt out of the payment adjustments for price index fluctuations.

Date: _____

Signature: _____

Accompanying this proposal is _____

(NOTICE: INSERT THE WORDS "CASH(\$ ___),"CASHIER'S CHECK," "CERTIFIED CHECK," OR "BIDDERS BOND," AS THE CASE MAY BE)

in amount equal to at least ten percent of the total of the bid.

The names of all persons interested in the forgoing Proposal as principals are as follows:

IMPORTANT NOTICE: If the Bidder or other interested person is a corporation, state legal name of corporation and place of incorporation, also names of the president, secretary, treasurer, and executive officer thereof; if a partnership, state name of partnership, also names of all individual partners; if Bidder or other interested person is an individual, state first and last names in full.

Licensed in accordance with an act providing for the registration of Contractors,

License No. _____ Classification(s) _____

(A Copy of the afore-referenced license must be attached hereto.)

ADDENDA: This Proposal is submitted with respect to the changes to the Contract included in addenda number (s) _____

(Fill in addenda numbers if addenda have been received and insert, in this Proposal, any Proposal Pay Items and Bid Price Schedules that were received as part of the addenda)

By my signature on this Proposal I certify, under penalty of perjury under the laws of the State of California, that the foregoing questionnaire and statements of Public Contract Code Sections 10162, 10232, and 10285.1 are true and correct and that the Bidder has complied with the requirements of Sections 4104 of the Subletting and Subcontracting Fair Practices Act and of Section 8103 of the Fair Employment and Housing Commission Regulations (Chapter 5 of Division 4 of Title 2 of the California Code of Regulations). By my signature on this Proposal I further certify, under penalty of perjury under the laws of the State of California and the United States of America, that the Noncollusion Affidavit required by Title 23 United States Code, Section 112 and Public Contract Code Section 7106; and the Equal Employment Opportunity Certification; and the Title 2, Code of Federal Regulations, Part 1200 Debarment, Suspension, Ineligibility, and Voluntary Exclusion, Certification; Fair Employment Practices Addendum, and Non-discrimination Assurances, and the Non-lobbying Certification for Federal-Aid Contracts and the Disclosure of Lobbying Activities (Standard Form LLL); are true and correct.

The person or persons executing this Proposal on behalf of a corporation or partnership shall be prepared to demonstrate by resolution, article, or otherwise, that such person is or that such persons are appropriately authorized to act in these regards for such corporation or partnership. Such authority shall be demonstrated to the satisfaction of the County of El Dorado.

If the signature is by an agent other than an officer of a corporation or a member of a partnership, a power of attorney authorizing said act by the agent on behalf of his principal shall be submitted with the bid forms; otherwise, the bid may be disregarded as irregular and unauthorized.

The Bidder's execution on the signature portion of this Proposal shall constitute an endorsement and execution of those affidavits, declarations and certifications which are part of this Proposal.

Executed this _____ day of _____, 2012

at _____ County, State of _____

Date: _____



Name and Title of Bidder _____

Name of Firm _____

END OF PROPOSAL

NOTE: PLEASE REFER TO INSTRUCTIONS ON THE NEXT PAGE OF THIS FORM

LOCAL AGENCY: EL DORADO COUNTY

LOCATION: Bass Lake Road Undercrossing to Cameron Park Drive

PROJECT DESCRIPTION: US Highway 50 HOV Phase 2A.

TOTAL CONTRACT AMOUNT: \$ _____

BID DATE: _____

BIDDER'S NAME: _____

CONTRACT UDBE GOAL: **7.8%**

CONTRACT ITEM NO.	ITEM OF WORK AND DESCRIPTION OR SERVICES TO BE SUBCONTRACTED OR MATERIALS TO BE PROVIDED (or contracted if the bidder is a UDBE)	UDBE CERT NO. AND EXPIRATION DATE	NAME OF EACH UDBE (Must be certified on the date bids are opened - include UDBE address and phone number)	DOLLAR AMOUNT UDBE

For Local Agency to Complete:

Local Agency Contract Number: _____

Federal-aid Project Number: _____

Federal Share: _____

Contract Award Date: _____

Local Agency certifies that all UDBE certifications have been verified and information is complete and accurate.

Print Name Signature Date
Local Agency Representative

(Area Code) Telephone Number: _____

Total Claimed UDBE Participation \$ _____ %
OF TOTAL AMOUNT BID

Signature of Bidder

Date (Area Code) Tel. No.

Person to Contact (Please Type or Print)

Local Agency Bidder UDBE Commitment (Construction Contracts)
(Rev 6/26/09)

Distribution: (1) Original – Local agency files

PLEASE NOTE: It is the bidder's responsibility to verify that the UDBE(s) falls into one of the following groups in order to count towards the UDBE contract goal: 1) African Americans; 2) Asian-Pacific Americans; 3) Native Americans; 4) Women. This information may be submitted with your bid. If it is not, and you are the apparent low bidder or the second or third low bidder, it must be submitted and received as specified in the Special Provisions. Failure to submit the required UDBE commitment will be grounds for finding the bid nonresponsive

A UDBE is a firm meeting the definition of a DBE as specified in 49 CFR and is one of the following groups: African Americans, Asian-Pacific Americans, Native Americans, or Women.

The form requires specific information regarding the construction contract: Local Agency, Location, Project Description, Total Contract Amount, Bid Date, Bidder's Name, and Contract UDBE Goal.

The form has a column for the Contract Item Number and Item of Work and Description or Services to be Subcontracted or Materials to be provided by UDBEs. Prime contractors shall indicate all work to be performed by UDBEs including, if the prime is a UDBE, work performed by its own forces, if a UDBE. The UDBE shall provide a certification number to the Contractor and expiration date. Enter the UDBE prime's and subcontractors' certification numbers. The form has a column for the Names of UDBE contractors to perform the work (who must be certified on the date bids are opened and include the UDBE address and phone number).

IMPORTANT: Identify **all** UDBE firms participating in the project regardless of tier. Names of the First-Tier UDBE Subcontractors and their respective item(s) of work listed should be consistent, where applicable, with the names and items of work in the "List of Subcontractors" submitted with your bid.

There is a column for the UDBE participation dollar amount. (If 100% of item is not to be performed or furnished by the UDBE, describe exact portion of time to be performed or furnished by the UDBE.) See Section "Disadvantaged Business Enterprise (DBE)," of the Special Provisions (construction contracts), to determine how to count the participation of UDBE firms. Enter the Total Claimed UDBE Participation dollars and percentage of the total amount bid that these dollars represent.

Exhibit 15-G1 must be signed and dated by the person bidding. Also list a phone number in the space provided and print the name of the person to contact.

UDBE INFORMATION—GOOD FAITH EFFORTS, EXHIBIT 15-H

The County of El Dorado established an Under-utilized Disadvantaged Business Enterprise (UDBE) goal of **7.8%** for this project. The information provided herein shows that a good faith effort was made.

Lowest, second lowest and third lowest bidders shall submit the following information to document adequate good faith efforts. Bidders should submit the following information even if the “Local Agency Bidder – UDBE Commitment” form indicates that the bidder has met the UDBE goal. This will protect the bidder’s eligibility for award of the contract if the administering agency determines that the bidder failed to meet the goal for various reasons, e.g., a UDBE firm was not certified at bid opening, or the bidder made a mathematical error.

Submittal of only the “Local Agency Bidder – UDBE Commitment” form may not provide sufficient documentation to demonstrate that adequate good faith efforts were made.

The following items are listed in the Section entitled “Submission of UDBE Commitment” of the Special Provisions:

- A. The names and dates of each publication in which a request for UDBE participation for this project was placed by the bidder (please attach copies of advertisements or proofs of publication):

Publications	Dates of Advertisement

- B. The names and dates of written notices sent to certified UDBEs soliciting bids for this project and the dates and methods used for following up initial solicitations to determine with certainty whether the UDBEs were interested (please attach copies of solicitations, telephone records, fax confirmations, etc.):

Names of UDBEs Solicited	Date of Initial Solicitation	Follow Up Methods and Dates

- C. The items of work which the bidder made available to UDBE firms, including, where appropriate, any breaking down of the contract work items (including those items normally performed by the bidder with its own forces) into economically feasible units to facilitate UDBE participation. It is the bidder's responsibility to demonstrate that sufficient work to facilitate UDBE participation was made available to UDBE firms.

Items of Work	Bidder Normally Performs Item (Y/N)	Breakdown of Items	Amount (\$)	Percentage Of Contract

- D. The names, addresses and phone numbers of rejected UDBE firms, the reasons for the bidder's rejection of the UDBEs, the firms selected for that work (please attach copies of quotes from the firms involved), and the price difference for each UDBE if the selected firm is not a UDBE:

Names, addresses and phone numbers of rejected UDBEs and the reasons for the bidder's rejection of the UDBEs:

Names, addresses and phone numbers of firms selected for the work above:

- E. Efforts made to assist interested UDBEs in obtaining bonding, lines of credit or insurance, and any technical assistance or information related to the plans, specifications and requirements for the work which was provided to UDBEs:

- F. Efforts made to assist interested UDBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, excluding supplies and equipment the UDBE subcontractor purchases or leases from the prime contractor or its affiliate:

- G. The names of agencies, organizations or groups contacted to provide assistance in contacting, recruiting and using UDBE firms (please attach copies of requests to agencies and any responses received, i.e., lists, Internet page download, etc.):

Name of Agency/Organization	Method/Date of Contact	Results

- H. Any additional data to support a demonstration of good faith efforts (use additional sheets if necessary):

NOTE: USE ADDITIONAL SHEETS OF PAPER IF NECESSARY.

COUNTY OF EL DORADO

BIDDER'S BOND

this form MUST be used

KNOW ALL PEOPLE BY THESE PRESENTS, THAT WE _____
_____, as PRINCIPAL, and

as Surety are held and firmly bound unto the County of El Dorado, a political subdivision of the State of California (hereinafter referred to as "Obligee") and the State of California, acting through its Department of Transportation hereafter referred to as "Additional Obligee" (both Obligee and Additional Obligee collectively hereafter referred to as "Obligees"), in the penal sum of **TEN PERCENT (10%) OF THE AMOUNT OF THE TOTAL BID PRICE** of the Principal above named, submitted by said Principal to the Obligees for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made to the Obligees, we the Principal and Surety 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

TEN PERCENT (10%) OF THE AMOUNT OF THE TOTAL BID PRICE

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT:

WHEREAS, the Principal has submitted the above-mentioned Bid to the Obligees, as aforesaid, for certain construction specifically described as follows, for which bids are to be opened at **Placerville**, El Dorado County, California, for the construction of the

**U.S. 50 HOV LANES PHASE 2A
BASS LAKE ROAD UNDERCROSSING TO CAMERON PARK DRIVE
CONTRACT NO. PW 09-30408, CIP NO. 53113**

NOW, THEREFORE, if the aforesaid Principal is awarded the Contract and, within the time and manner required under the Contract Documents, after the prescribed forms are presented to it for signature, enters into a written contract, in the prescribed form, in accordance with the Bid, and files two bonds with the Obligees, 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 virtue.

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

IN WITNESS WHEREOF, we have set our hands and seals on this _____ day of _____ 20__

(seal) _____
Principal

(seal) _____
Surety

Address: _____

(NOTE: Signature of those executing for the Surety shall be properly acknowledged, and accompanied by a Certificate of Acknowledgment.)

SURETY

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)