STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

NOTICE TO BIDDERS

AND

SPECIAL PROVISIONS

FOR CONSTRUCTION ON STATE HIGHWAY IN KINGS AND TULARE COUNTIES ABOUT 0.5 MILE EAST OF HANFORD FROM 0.5 MILE EAST OF ROUTE 43 / 198 SEPARATION TO 0.4 MILE WEST OF ROUTE 99 / 198 SEPARATION

In District 06 On Route 198

Under

Bid book dated June 15, 2009	Standard Specifications dated 2006
Project Plans approved September 15, 2008	Standard Plans dated 2006

Identified by

Contract No. 06-3568U4

06-Kin,Tul-198-R21.5/R28.3, 0.0/R3.4

Federal-Aid Project
HPLU-6206(015)E

Bids open Wednesday, August 5, 2009 OSD
Dated June 15, 2009 IH

****

SPECIAL NOTICES

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- The Department moved the Amendments to the Standard Specifications to the back of the book titled "Notice to Bidders and Special Provisions."

- The Department retitled the "Proposal and Contract" book to "Bid" book and:

  1. Simplified the language
  2. Moved clauses and the contract form from the "Proposal and Contract" book into the Amendments to the Standard Specifications
  3. Standardized the forms

- The Department retitled the "Notice to Contractors" to "Notice to Bidders" and:

  1. Simplified the language
  2. Moved clauses from the "Notice to Contractors" into the Amendments to the Standard Specifications
  3. Standardized instructions for bidders' inquiries

- The Department incorporated boilerplate special provisions into the Amendments to the Standard Specifications.

- The Department is implementing new Disadvantaged Business Enterprise requirements for Underutilized Disadvantaged Business Enterprises (UDBE). Section 2, "Bidding," under subsection titled "Disadvantaged Business Enterprises" and Section 5, "General," under subsection titled "Performance of UDBEs" of these special provisions cover the UDBE requirements.

- See Section 5 of the special provisions for new specifications regarding retentions.

- For this contract, the trigger threshold for asphalt price fluctuations is reduced from 10 to 5 percent. See section titled "Compensation Adjustments for Price Index Fluctuations" in Section 5 of these special provisions.

- The Department is implementing new contract requirements for submittal of Small Business Utilization Report forms. See section titled "Small Business Utilization Report" of these special provisions and bid item list.

- The Department has replaced Section 8, "Prosecution and Progress." This replacement affects references in a large number of other specifications. Due to the extent of affected specifications, these references will not be corrected until there is a change in technical content that merits a specification revision. Section 0, "Global Revisions," of the Amendments to the Standard Specifications covers references affected by the Section 8 replacement.

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STANDARD PLANS LIST

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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NOTICE TO BIDDERS

Bids open Wednesday, August 5, 2009
Dated June 15, 2009
General work description: Convert a 2-lane conventional highway to a 4-lane divided expressway.

The Department will receive sealed bids for CONSTRUCTION ON STATE HIGHWAY IN KINGS AND TULARE COUNTIES ABOUT 0.5 MILE EAST OF HANFORD FROM 0.5 MILE EAST OF ROUTE 43 / 198 SEPARATION TO 0.4 MILE WEST OF ROUTE 99 / 198 SEPARATION.

District-County-Route-Post Mile: 06-Kin,Tul-198-R21.5/R28.3, 0.0/R3.4

Contract No. 06-3568U4

The Contractor must have either a Class A license or one of the following Class C licenses: C-12.

The UDBE Contract goal is 7 percent.

Federal-aid project no.:
HPLU-6206(015)E

Bids must be on a unit price basis.
Complete the work within 500 working days.
The estimated cost of the project is $65,000,000.
No prebid meeting is scheduled for this project.

The Department will receive bids until 2:00 p.m. on the bid open date at 1120 N Street, Room 0200, MS 26, Sacramento, CA 95814. Bids received after this time will not be accepted.

The Department will open and publicly read the bids at the above location immediately after the specified closing time.

District office addresses are provided in the Standard Specifications.

Bidders' inquiries may be presented to the Department by following the instructions at:
http://www.dot.ca.gov/hq/esc/oe/project_status/bid_inq.html

The Department posts responses to the questions at the District Web sites.
Questions about alleged patent ambiguity of the plans, specifications, or estimate must be asked before bid opening. After bid opening, such questions will not be treated as bid protests.

Submit your bid with bidder's security equal to at least 10 percent of the bid.

Prevailing wages are required on this Contract. The Director of the California Department of Industrial Relations determines the general prevailing wage rates. Obtain the wage rates at the DIR Web site, http://www.dir.ca.gov, or from the Department's Labor Compliance Office of the district in which the work is located.

The federal minimum wage rates for this Contract as determined by the United States Secretary of Labor are available at http://www.dot.ca.gov/hq/esc/oe/federal-wages.

If the minimum wage rates as determined by the United States Secretary of Labor differs from the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, the Contractor and subcontractors must not pay less than the higher wage rate. The Department does 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 the Contractor and subcontractors, the Contractor and subcontractors must not pay less than the Federal minimum wage rate that most closely approximates the duties of the employees in question.

DEPARTMENT OF TRANSPORTATION

RMY/JJ

COPY OF BID ITEM LIST

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
1	070012	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM
2	070013	SMALL BUSINESS UTILIZATION REPORT	EA	9
3	070018	TIME-RELATED OVERHEAD	WDAY	500
4	071325	TEMPORARY FENCE (TYPE ESA)	LF	320
5	073013	48" TEMPORARY CULVERT	LF	400
6	015229	60" TEMPORARY REINFORCED CONCRETE PIPE INLET	LF	14
7	074016	CONSTRUCTION SITE MANAGEMENT	LS	LUMP SUM
8	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM
9	074028	TEMPORARY FIBER ROLL	LF	3,900
10	074032	TEMPORARY CONCRETE WASHOUT FACILITY	EA	4
11	074033	TEMPORARY CONSTRUCTION ENTRANCE	EA	10
12	074041	STREET SWEEPING	LS	LUMP SUM
13	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM
14	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM
15	120120	TYPE III BARRICADE	EA	940
16	120165	CHANNELIZER (SURFACE MOUNTED)	EA	1,090
17	128650	PORTABLE CHANGEABLE MESSAGE SIGN	LS	LUMP SUM
18	129000	TEMPORARY RAILING (TYPE K)	LF	5,360
19	129100	TEMPORARY CRASH CUSHION MODULE	EA	120
20	150662	REMOVE METAL BEAM GUARD RAILING	LF	1,190

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
21	150704	REMOVE YELLOW THERMOPLASTIC TRAFFIC STRIPE	LF	75,900
22	150714	REMOVE THERMOPLASTIC TRAFFIC STRIPE	LF	83,200
23	150715	REMOVE THERMOPLASTIC PAVEMENT MARKING	SQFT	230
24	150722	REMOVE PAVEMENT MARKER	EA	5,640
25	150742	REMOVE ROADSIDE SIGN	EA	22
26	150760	REMOVE SIGN STRUCTURE	EA	1
27	152320	RESET ROADSIDE SIGN	EA	3
28	152390	RELOCATE ROADSIDE SIGN	EA	11
29	156535	REMOVE BOX CULVERT	CY	540
30	157550	BRIDGE REMOVAL	LS	LUMP SUM
31	157560	BRIDGE REMOVAL (PORTION)	LS	LUMP SUM
32	160101	CLEARING AND GRUBBING	LS	LUMP SUM
33	170101	DEVELOP WATER SUPPLY	LS	LUMP SUM
34	190101	ROADWAY EXCAVATION	CY	80,800
35	190110	LEAD COMPLIANCE PLAN	LS	LUMP SUM
36 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	605
37 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	360
38	198001	IMPORTED BORROW	CY	1,180,000
39	203011	EROSION CONTROL (TYPE C)	ACRE	36
40	203012	EROSION CONTROL (DRILL SEED)	ACRE	100

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
41	203026	MOVE-IN/MOVE-OUT (EROSION CONTROL)	EA	9
42	208740	12" CORRUGATED HIGH DENSITY POLYETHYLENE PIPE CONDUIT	LF	4,020
43	220101	FINISHING ROADWAY	LS	LUMP SUM
44	250101	CLASS 1 AGGREGATE SUBBASE	CY	113,000
45	260201	CLASS 2 AGGREGATE BASE	CY	45,600
46	280000	LEAN CONCRETE BASE	CY	70,200
47	390131	HOT MIX ASPHALT	TON	73,600
48	397005	TACK COAT	TON	200
49	401000	CONCRETE PAVEMENT	CY	114,000
50	401082	SHOULDER RUMBLE STRIP (PCC, GROUND-IN INDENTATIONS)	STA	1,500
51	404092	SEAL PAVEMENT JOINT	LF	422,000
52	041545	FURNISH PILING (CLASS 90) (ALTERNATIVE "Y")	LF	1,260
53	041546	DRIVE PILE (CLASS 90) (ALTERNATIVE "Y")	EA	32
54	041547	FURNISH PILING (CLASS 140) (ALTERNATIVE "X")	LF	2,861
55	041548	DRIVE PILE (CLASS 140) (ALTERNATIVE "X")	EA	68
56	041549	FURNISH PILING (CLASS 140) (ALTERNATIVE "Y" MOD)	LF	2,580
57	041550	DRIVE PILE (CLASS 140) (ALTERNATIVE "Y" MOD)	EA	44
58	500001	PRESTRESSING CAST-IN-PLACE CONCRETE	LS	LUMP SUM
59 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	93
60 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	1,725

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
61 (F)	041551	STRUCTURAL CONCRETE (WING WALL)	CY	125
62 (F)	510086	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N)	CY	125
63 (F)	510129	CLASS 2 CONCRETE (BOX CULVERT)	CY	1,197
64 (F)	510135	CLASS 2 CONCRETE (HEADWALL)	CY	271
65 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	1
66	511106	DRILL AND BOND DOWEL	LF	350
67	041552	10' X 8' PRECAST CONCRETE BOX CULVERT	LF	1,318
68	515020	REFINISH BRIDGE DECK	SQFT	335
69	519081	JOINT SEAL (MR 1/2")	LF	117
70	519100	JOINT SEAL (MR 2")	LF	82
71 (F)	520101	BAR REINFORCING STEEL	LB	346,220
72 (F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	424,950
73 (F)	041553	BAR REINFORCING STEEL (WING WALL)	LB	12,378
74 (F)	560208	FURNISH SIGN STRUCTURE (TUBULAR)	LB	19,669
75 (F)	560209	INSTALL SIGN STRUCTURE (TUBULAR)	LB	19,669
76 (F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	28,304
77 (F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	28,304
78	560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	240
79	015230	FURNISH LAMINATED PANEL SIGN	SQFT	150
80	560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	1,400

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
81	560249	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-UNFRAMED)	SQFT	3,510
82	561016	60" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	99
83	566011	ROADSIDE SIGN - ONE POST	EA	330
84	566012	ROADSIDE SIGN - TWO POST	EA	13
85	620140	24" ALTERNATIVE PIPE CULVERT	LF	2,650
86	641107	18" PLASTIC PIPE	LF	260
87	650105	18" REINFORCED CONCRETE PIPE (RUBBER GASKET JOINT)	LF	28
88	650107	24" REINFORCED CONCRETE PIPE (RUBBER GASKET JOINT)	LF	1,630
89	015231	48" REINFORCED CONCRETE PRESSURE PIPE (RUBBER GASKET JOINT)	LF	270
90	015232	54" REINFORCED CONCRETE PRESSURE PIPE (RUBBER GASKET JOINT)	LF	390
91	655432	JACKED 48" REINFORCED CONCRETE PIPE (CLASS IV)	LF	40
92	703460	24" WELDED STEEL PIPE CASING (BRIDGE)	LF	277
93	705315	24" ALTERNATIVE FLARED END SECTION	EA	62
94	721009	ROCK SLOPE PROTECTION (FACING, METHOD B)	CY	670
95	729010	ROCK SLOPE PROTECTION FABRIC	SQFT	7,760
96	800007	FENCE (TYPE BW, 5 STRAND, METAL POST)	LF	93,200
97	800360	CHAIN LINK FENCE (TYPE CL-6)	LF	450
98	820107	DELINEATOR (CLASS 1)	EA	420
99	820110	MILEPOST MARKER	EA	20
100	820130	OBJECT MARKER	EA	24

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
101	832002	METAL BEAM GUARD RAILING (STEEL POST)	LF	1,080
102 (F)	833125	CONCRETE BARRIER (TYPE 25)	LF	1,228
103	015233	DOUBLE METAL BEAM GUARD RAILING (STEEL POST)	LF	50
104	839541	TRANSITION RAILING (TYPE WB)	EA	7
105	839581	END ANCHOR ASSEMBLY (TYPE SFT)	EA	3
106	839585	ALTERNATIVE FLARED TERMINAL SYSTEM	EA	12
107	839591	CRASH CUSHION, SAND FILLED	EA	2
108	840504	4" THERMOPLASTIC TRAFFIC STRIPE	LF	73,800
109	840506	8" THERMOPLASTIC TRAFFIC STRIPE	LF	37,200
110	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	17,900
111	840523	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 12-3)	LF	3,540
112	840525	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 36-12)	LF	140,000
113	840560	THERMOPLASTIC TRAFFIC STRIPE (SPRAYABLE)	LF	342,000
114	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	11,300
115	860403	HIGHWAY LIGHTING	LS	LUMP SUM
116	015234	MODEL 500 CHANGEABLE MESSAGE SIGN SYSTEM (LOCATION 1)	LS	LUMP SUM
117	015235	MODEL 500 CHANGEABLE MESSAGE SIGN SYSTEM (LOCATION 2)	LS	LUMP SUM
118	015236	ROADSIDE WEATHER INFORMAITON SYSTEM	LS	LUMP SUM
119	860931	TRAFFIC MONITORING STATION (LOCATION 1)	LS	LUMP SUM
120	860932	TRAFFIC MONITORING STATION (LOCATION 2)	LS	LUMP SUM

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
121	860933	TRAFFIC MONITORING STATION (LOCATION 3)	LS	LUMP SUM
122	860934	TRAFFIC MONITORING STATION (LOCATION 4)	LS	LUMP SUM
123	860935	TRAFFIC MONITORING STATION (LOCATION 5)	LS	LUMP SUM
124	999990	MOBILIZATION	LS	LUMP SUM

SPECIAL PROVISIONS

SECTION 1. (BLANK)

SECTION 2. BIDDING

2-1.01 DISADVANTAGED BUSINESS ENTERPRISES

The 3rd paragraph in Section 2-1.05, "Disadvantaged Business Enterprises," of the Standard Specifications does not apply.

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 Department 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 Department's 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 counts 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.

UDBE Commitment Submittal

Submit UDBE information on the Caltrans Bidder - UDBE - Commitment form included in the Bid book. If the form is not submitted with the bid, remove the forms from the Bid book 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 to Office Engineer. UDBE Commitment form must be received by the Department no later than 4:00 p.m. on the 4th business day after bid opening.

Other bidders do not need to submit the UDBE Commitment form unless the Department requests it. If the Department requests you to submit a UDBE Commitment form, submit the completed form within 4 business days of the request.

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 within the specified time, the Department finds your bid nonresponsive.

Good Faith Efforts Submittal

If you have not met the UDBE goal, complete and submit the Good Faith Efforts Documentation 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, it must be received by the Department no later than 4:00 p.m. 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, you must also submit good faith efforts documentation within the specified time to protect your eligibility for award of the contract in the event the Department finds that the UDBE goal has not been met.

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 its 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.

SECTION 3. CONTRACT AWARD AND EXECUTION

Reserved

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

The 1st working day is the 55th day after contract approval.

Do not start work at the job site, except for measuring controlling field dimensions and locating utilities, until the Engineer approves your submittal for:

1. Baseline Progress Schedule (Critical Path Method)
2. Storm Water Pollution Prevention Plan (SWPPP)
3. Notification of Dispute Resolution Advisor (DRA) or Dispute Review Board (DRB) nominee and disclosure statement as specified in Section 5-1.15, "Dispute Resolution," of the Standard Specifications

In addition to the above submittals, do not start work at the job site, except for measuring controlling field dimensions and locating utilities, until you submit:

1. Notice of Materials To Be Used.
2. Contingency plan for reopening closures to public traffic.

3. Written statement from the vendor that the order for the sign panels has been received and accepted by the vendor. The statement must show the dates that the materials will be shipped.
4. Written statement from the vendor that the order for electrical material has been received and accepted by the vendor. The statement must show the dates that the materials will be shipped.
5. Written statement from the vendor that the order for structural steel has been received and accepted by the vendor. The statement must show the dates that the materials will be shipped.

Measuring controlling field dimensions and locating utilities may start after approval of the Designated Biologist.

You may start work at the job site before the 55th day after contract approval if:

1. You obtain required approval for each submittal before the 55th day
2. The Engineer authorizes it in writing

The Department grants a time extension if a delay is beyond your control and prevents you from starting work at the job site on the 1st working day.

Complete the work within 500 working days.

SECTION 5. GENERAL

5-1.01 PERFORMANCE OF UDBEs

UDBEs must perform work or supply materials as listed in the Caltrans Bidder - UDBE - Commitment form specified under Section 2, "Bidding," 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 Department.

The Department 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 stipulated that a bond is a condition of executing the subcontract and the listed UDBE fails to meet your bond requirements.
3. Work requires a contractors 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 Department does not pay for work or material unless it is performed or supplied by the listed UDBE or an authorized substitute.

5-1.02 PARTNERING DISPUTE RESOLUTION

The Department encourages the project team to exhaust the use of partnering in dispute resolution before engagement of an objective third party. Comply with Section 5-1.102, "Partnering," of the Standard Specifications.

For certain disputes, facilitated partnering session or facilitated dispute resolution session may be appropriate and effective in clarifying issues and resolving all or part of a dispute.

To afford the project team enough time to plan and hold the session, a maximum of 20 days may be added to the dispute review board (DRB) referral time following the Engineer's written response to a supplemental notice of potential claim as specified in Section 5-1.15, "Dispute Resolution," of the Standard Specifications.

To allow this additional referral time, the project team must document its agreement and intention in the dispute resolution plan of the partnering charter. The team may further document agreement of any associated criteria to be met for use of the additional referral time.

If the session is not held, the DRB referral time remains in effect as specified in Section 5-1.15, "Dispute Resolution," of the Standard Specifications.

5-1.03 TRAINING

For the Federal training program, the number of trainees or apprentices is 33.

5-1.04 RETENTION EXCLUSION

The Department does not retain moneys from progress payments due to the Contractor for work performed (Pub Cont Code § 7202). The 3rd paragraph in Section 9-1.06, "Partial Payments," of the Standard Specifications does not apply.

5-1.05 FORCE ACCOUNT PAYMENT

Payment for extra work at force account will be determined by either non-subcontracted or subcontracted force account payment unless otherwise specified.

Non-Subcontracted Force Account Payment

When extra work to be paid for on a force account basis is performed by the Contractor, compensation will be determined in accordance with Section 9-1.03, "Force Account Payment," of the Standard Specifications and these special provisions.

The second, third and fourth paragraphs of Section 9-1.03A, "Work Performed by Contractor," of the Standard Specifications shall not apply.

Attention is directed to "Time-Related Overhead" of these special provisions.

To the total of the direct costs for work performed on a force account basis, computed as provided in Section 9-1.03A(1), "Labor," Section 9-1.03A(2), "Materials," and Section 9-1.03A(3), "Equipment Rental," of the Standard Specifications, there will be added the following markups:

Cost	Percent Markup
Labor	28
Materials	10
Equipment Rental	10

The above markups shall be applied to work performed on a force account basis, regardless of whether the work revises the current contract completion date.

The above markups, together with payments made for time-related overhead pursuant to "Time-Related Overhead" of these special provisions, shall constitute full compensation for all overhead costs for work performed on a force account basis. These overhead costs shall be deemed to include all items of expense not specifically designated as cost or equipment rental in conformance with the provisions in Section 9-1.03A(1), "Labor," Section 9-1.03A(2), "Materials," and Section 9-1.03A(3), "Equipment Rental," of the Standard Specifications. The total payment made as provided above and in the first paragraph of Section 9-1.03A, "Work Performed by Contractor," of the Standard Specifications shall be deemed to be the actual cost of the work performed on a force account basis, and shall constitute full compensation therefor.

Full compensation for overhead costs for work performed on a force account basis, and for which no adjustment is made to the quantity for time-related overhead conforming to the provisions in "Time-Related Overhead" of these special provisions, shall be considered as included in the markups specified above, and no additional compensation will be allowed therefor.

Subcontracted Force Account Payment

When extra work to be paid for on a force account basis is performed by a subcontractor approved in conformance with the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, compensation will be determined in accordance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications.

5-1.06 COMPENSATION ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

The provisions of this section shall apply only to the following contract items:

ITEM CODE	ITEM
390131	HOT MIX ASPHALT
397005	TACK COAT

The compensation payable for asphalt binder used in hot mix asphalt and tack coat will be increased or decreased in conformance with the provisions of this section for paving asphalt price fluctuations exceeding 10 percent (Iu/Ib is greater than 1.10 or less than 0.90) which occur during performance of the work.

The quantity of asphalt binder used in tack coat will be determined by multiplying the item quantity for tack coat included in a monthly estimate by the minimum percent residue specified in Section 94, "Asphaltic Emulsions," of the Standard Specifications. The asphaltic emulsion minimum percent residue will be based on the type of emulsion used by the Contractor.

At the Contractor's option, the Contractor may provide actual daily test results for asphalt binder residue for the tack coat used. Test results provided by the Contractor shall be from an independent testing laboratory that participates in the AASHTO Proficiency Sample Program. The Contractor shall take samples of asphaltic emulsion from the distributor truck at mid-load from a sampling tap or thief. Two separate 1/2 gallon samples shall be taken in the presence of the Engineer. The Contractor shall provide one sample to the Contractor's independent testing laboratory within 24 hours of sampling. The second sample shall be given to the Engineer. The test results from the Contractor's independent testing laboratory shall be delivered to the Engineer within 10 days from sample date.

The adjustment in compensation will be determined in conformance with the following formulae when the item of hot mix asphalt or tack coat or both are included in a monthly estimate:

A. Total monthly adjustment = AQ
B. For an increase in paving asphalt price index exceeding 10 percent:

$$A = 0.90\ (Iu/Ib - 1.10)\ Ib$$

C. For a decrease in paving asphalt price index exceeding 10 percent:

$$A = 0.90\ (Iu/Ib - 0.90)\ Ib$$

D. Where:

A = Adjustment in dollars per ton of paving asphalt used to produce hot mix asphalt and asphaltic emulsion residue used as tack coat rounded to the nearest $0.01.
Iu = The California Statewide Paving Asphalt Price Index which is in effect on the first business day of the month within the pay period in which the quantity subject to adjustment was included in the estimate.
Ib = The California Statewide Paving Asphalt Price Index for the month in which the bid opening for the project occurred.
Q = Quantity in tons of asphalt binder that was used in producing the quantity of hot mix asphalt shown under "This Estimate" on the monthly estimate using the amount of asphalt binder determined by the Engineer plus the quantity in tons of asphalt binder that would have been used as residue in the tack coat shown under "This Estimate" on the monthly estimate.

The adjustment in compensation will also be subject to the following:

A. The compensation adjustments provided herein will be shown separately on payment estimates. The Contractor shall be liable to the State for decreased compensation adjustments and the Department may deduct the amount thereof from moneys due or that may become due the Contractor.
B. Compensation adjustments made under this section will be taken into account in making adjustments in conformance with the provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.
C. In the event of an overrun of contract time, adjustment in compensation for asphalt binder included in estimates during the overrun period will be determined using the California Statewide Paving Asphalt Price Index in effect on the first business day of the month within the pay period in which the overrun began.

The California Statewide Paving Asphalt Price Index is determined each month on the first business day of the month by the Department using the median of posted prices in effect as posted by Chevron, ExxonMobil, and Union 76 for the Buena Vista, Huntington Beach, and Midway Sunset fields.

In the event that the companies discontinue posting their prices for a field, the Department will determine an index from the remaining posted prices. The Department reserves the right to include in the index determination the posted prices of additional fields.

The California Statewide Paving Asphalt Price Index is available on the Division of Engineering Services website at:

http://www.dot.ca.gov/hq/esc/oe/asphalt_index/astable.html

5-1.07 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.

5-1.08 PAYMENTS

Attention is directed to Sections 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these special provisions.

For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of the contract item of work which will be recognized for progress payment purposes:

A.	Clearing and Grubbing	$80,000
B.	Develop Water Supply	$50,000
C.	Progress Schedule (Critical Path Method)	$ 2,500
D.	Lead Compliance Plan	$ 5,000

After acceptance of the contract pursuant to the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes hereinabove listed for the item, will be included for payment in the first estimate made after acceptance of the contract.

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. Pipe Conduit
B. Pavement Dowels
C. Precast Concrete Box Culvert
D. Metal Sign Structures
E. Alternative Pipe Culverts
F. Reinforced Concrete Pipes
G. Plastic Pipes
H. Welded Steel Pipe Casing
I. Alternative Flared End Sections
J. Rock Slope Protection Fabric
K. Barbed Wire and Chain Link Fences
L. Metal Beam Guard Railings and Terminal End Treatments
M. Sand Filled Crash Cushions
N. Pavement Markers
O. Luminaires
P. Lighting Standards
Q. Piling
R. Prestressing Cast-In-Place Concrete
S. Type B Joint Seals
T. Bar Reinforcing Steel

5-1.09 SUPPLEMENTAL PROJECT INFORMATION

Supplemental project information attached to the project plans are:

1. Log of test borings.

Supplemental project information included in the Information Handout are:

1. Central Valley Flood Protection Board Permit.
2. United States Army Corps of Engineer Clean Water Act Section 404 permit.
3. State Water Quality Certification Section 401 permit.
4. California Department of Fish and Game 1602 Agreement.
5. United States Fish and Wildlife Service Biological Opinion
6. Foundation and Seismic Recommendations.
7. Foundation and Seismic Recommendations Addendum
8. Final Hydraulic Report
9. Investigated Material Sources (Optional borrow sites)
10. Underground Classification from Division of Occupational Safety and Health Mining and Tunneling Unit.

Supplemental project information available for inspection at the District Construction Duty Senior Office located at 855 M Street, Suite 200, Fresno, CA 93721 are:

1. Cross Sections.
2. Central Valley Flood Protection Board Permit.
3. United States Army Corps of Engineer Clean Water Act Section 404 permit.
4. State Water Quality Certification Section 401 permit.
5. California Department of Fish and Game 1602 Agreement.
6. United States Fish and Wildlife Service Biological Opinion
7. Dust Control Plan
8. Foundation and Seismic Recommendations.
9. Foundation and Seismic Recommendations Addendum
10. Final Hydraulic Report
11. Investigated Material Sources (Optional borrow sites)
12. Underground Classification from Division of Occupational Safety and Health Mining and Tunneling Unit.

Bridge as-built drawings are available.

5-1.10 SOUND CONTROL REQUIREMENTS

Sound control shall conform to the provisions in Section 7-1.01I, "Sound Control Requirements," of the Standard Specifications and these special provisions.

The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dBa at a distance of 50 feet. This requirement shall not relieve the Contractor from responsibility for complying with local ordinances regulating noise level.

The noise level requirement shall apply to the equipment on the job or related to the job, 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.

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 therefor.

5-1.11 HIGHWAY CONSTRUCTION EQUIPMENT

The first paragraph of Section 7-1.01D, "Vehicle Code," of the Standard Specifications shall not apply.

Pursuant to the authority contained in Section 591 of the Vehicle Code, the Department has determined that, within such areas as are within the limits of the project and are open to public traffic, the following requirements of the Vehicle Code will apply: the lighting requirements in Section 25803; the brake requirements in Chapter 3, Division 12; the splash apron requirements in Section 27600; and, when operated on completed or existing treated base, surfacing, pavement or structures, except as otherwise provided in Section 7-1.02, "Load Limitations," of the Standard Specifications, the weight limitation requirements contained in Division 15.

5-1.12 CALIFORNIA DEPARTMENT OF FISH AND GAME REQUIREMENTS

This project is located within the jurisdiction of the California Department of Fish and Game. An agreement regarding a stream or lake has been entered into by the Department of Transportation and the Department of Fish and Game. The Contractor shall be fully informed of the requirements of this agreement as well as rules, regulations, and conditions that may govern the Contractor's operations in these areas and shall conduct the work accordingly.

Attention is directed to "Supplemental Project Information" of these special provisions regarding environmental permits, agreements or additional information.

It is unlawful for any person to divert, obstruct or change the natural flow of the bed, channel or bank of a stream, river or lake without first notifying the Department of Fish and Game, unless the project or activity is noticed and constructed in conformance with conditions imposed under Fish and Game Code Section 1602.

Attention is directed to Sections 7-1.01, "Laws to be Observed," 7-1.01G, "Water Pollution," and 7-1.12, "Indemnification and Insurance," of the Standard Specifications.

Modifications to the agreement between the Department of Transportation and the Department of Fish and Game which are proposed by the Contractor shall be submitted in writing to the Engineer for transmittal to the Department of Fish and Game for their consideration.

When the Contractor is notified by the Engineer that a modification to the agreement is under consideration, no work shall be performed which is inconsistent with the original agreement or proposed modification until the departments take action on the proposed modifications. Compensation for delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The provisions of this section shall be made a part of every subcontract executed pursuant to this contract.

Modifications to any agreement between the Department of Transportation and the Department of Fish and Game will be fully binding on the Contractor. The provisions of this section shall be made a part of every subcontract executed pursuant to this contract.

5-1.13 RELATIONS WITH CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

This project lies within the boundaries of the Central Valley 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, Storm Water Permit Unit, 1001 "I" Street, P.O. Box 1977, Sacramento, California 95812-1977, Telephone: (916) 341-5254, and may also be obtained at:

http://www.swrcb.ca.gov/stormwtr/caltrans.html

The Department's permit references and incorporates by reference the current statewide general permit issued by the SWRCB entitled "Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity" that regulates discharges of storm water and non-storm water from construction activities disturbing one acre or more of soil in a common plan of development. Sampling and analysis requirements as specified in SWRCB Resolution No. 2001-46 are added to the statewide general permit. Copies of the statewide permit and modifications thereto are available for review from the SWRCB, Storm Water Permit Unit, 1001 "I" Street, P.O. Box 1977, Sacramento, California 95812-1977, Telephone: (916) 341-5254 and may also be obtained at:

http://www.swrcb.ca.gov/stormwtr/construction.html

A portion of this project is located within the jurisdiction of the Central Valley Region California Regional Water Quality Control Board. A Regional Water Quality Control Board 401 Certification has been issued covering work to be performed under this contract. The Contractor shall be fully informed of rules, regulations, and conditions that may govern the Contractor’s operations in the areas and shall conduct the work accordingly. A copy of the certification is included in the Information Handout and also is available for review at District Construction Duty Senior Office located at 855 M Street, Suite 200, Fresno, CA 93721.

Changes to the conditions in the certification proposed by the Contractor shall be submitted to the Engineer for transmittal to the Regional Water Quality Control Board for their approval. Changes shall not be implemented until approved in writing by the Regional Water Quality Control Board.

This project shall conform to the permits and modifications thereto. The Contractor shall maintain copies of the permits 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," and 7-1.12, "Indemnification and Insurance," of the Standard Specifications.

The Contractor shall be responsible for penalties assessed on the Contractor or the Department as a result of the Contractor's failure to comply with the provisions in "Water Pollution Control" of these special provisions or with the applicable provisions of the Federal, State, and local regulations and requirements.

Penalties as used in this section shall include fines, penalties, and damages, whether proposed, assessed, or levied against the Department or the Contractor, including those levied under the Federal Clean Water Act and the State Porter-Cologne Water Quality Control Act, 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 applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

WITHHOLDS

The Department will withhold money due the Contractor, in an amount estimated by the Department, to include the full amount of penalties and mitigation costs proposed, assessed, or levied as a result of the Contractor's violation of the permits, or Federal or State law, regulations, or requirements. Funds will be withheld by the Department until final disposition of these costs has been made. The Contractor shall remain liable for the full amount until the potential liability is finally resolved with the entity seeking the penalties. Instead of the withhold, the Contractor may provide a suitable bond in favor of the Department to cover the highest estimated liability for any disputed penalties proposed as a result of the Contractor's violation of the permits, law, regulations, or requirements.

If a regulatory agency identifies a failure to comply with the permits and modifications thereto, or other Federal, State, or local requirements, the Department will withhold money due the Contractor, subject to the following:

A. The Department will give the Contractor 30 days notice of the Department's intention to withhold funds from payments which may become due to the Contractor before acceptance of the contract. Funds withheld after acceptance of the contract will be made without prior notice to the Contractor.
B. No withholds of additional amounts out of payments will be made if the amount to be withheld does not exceed the amount being withheld from partial payments in accordance with Section 9-1.06, "Partial Payments," of the Standard Specifications.
C. If the Department has withheld funds and it is subsequently determined that the State is not subject to the entire amount of the costs and liabilities assessed or proposed in connection with the matter for which the withhold was made, the Department will return the excess amount withheld to the Contractor in the progress payment following the determination. If the matter is resolved for less than the amount withheld, the Department will pay interest at a rate of 6 percent per year on the excess withhold.

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.

5-1.14 RELATIONS WITH CENTRAL VALLEY FLOOD PROTECTION BOARD

Attention is directed to Section 7-1.11, "Preservation of Property," and Section 7-1.12, "Indemnification and Insurance," of the Standard Specifications.

The location of the Cross Creek Bridge is within an area controlled by the Central Valley Flood Protection Board. Permit No. 18353 BD has been approved by the Central Valley Flood Protection Board covering work to be performed under this contract. The Contractor shall be fully informed of rules, regulations and conditions that may govern his operations in the area and shall conduct the work accordingly.

Attention is directed to the conditions in the application that have been approved by the Central Valley Flood Protection Board for this project.

No stockpiles of material, temporary buildings or equipment shall remain in the floodway during the flood season from November 1 to July 15.

Changes in the above listed conditions proposed by the Contractor shall be submitted to the Engineer for transmittal to the Central Valley Flood Protection Board for approval. Changes shall not be implemented until approved in writing by the Central Valley Flood Protection Board.

Attention is directed to Section 8-1.06, "Time of Completion," of the Standard Specifications. Days during which the Contractor's operations are restricted in the floodway by the requirements of this section shall be considered to be nonworking days if these restrictions cause a delay in the current controlling operation or operations.

5-1.15 UNITED STATES FISH AND WILDLIFE SERVICE REQUIREMENTS

A portion of this project is located within the jurisdiction of the U. S. Fish and Wildlife Service (USFWS). The Department has entered into a programmatic agreement or has accepted a Biological Opinion for this project. The Contractor shall be fully informed of the requirements and all rules, regulations, and conditions that may govern the Contractor's operations in these areas and shall conduct the work accordingly.

Attention is directed to "Supplemental Project Information" of these special provisions regarding environmental permits, agreements or additional information.

The Contractor's attention is directed to the following terms or conditions that are among those established by the USFWS Biological Opinion for this project.

Modifications to the agreement between the Department and USFWS that are proposed by the Contractor shall be submitted in writing to the Engineer for consideration for transmittal to the USFWS for their consideration.

When the Contractor is notified by the Engineer that a modification to the agreement is under consideration, no work shall be performed which is inconsistent with the original agreement or proposed modification until the departments take action on the proposed modifications. Compensation for delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Modifications to the agreement between the Department and USFWS shall be fully binding on the Contractor. Compensation for delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The provisions of this section and approved modifications shall be made a part of every subcontract executed pursuant to this contract.

5-1.16 UNITED STATES ARMY CORPS OF ENGINEERS REQUIREMENTS

The Department and the Army Corps of Engineers (USACE) have entered into an agreement or received permits for project areas located within the jurisdiction of USACE. The Contractor shall be fully informed of the requirements of this agreement and all rules, regulations, and conditions that may govern the Contractor's operations in these areas and shall conduct the work accordingly.

Attention is directed to "Supplemental Project Information" of these special provisions regarding environmental permits, agreements or additional information.

Modifications to the agreement or permits between the Department and USACE that are proposed by the Contractor shall be submitted in writing to the Engineer for consideration for transmittal to the USACE for their consideration.

No work shall be performed which is inconsistent with the original agreement, permit or proposed modification prior to receiving written approval from the Engineer.

Modifications to the original agreement, permit or proposed modification between the Department and USACE shall be fully binding on the Contractor. Compensation for delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The provisions of this section and approved modifications shall be made a part of every subcontract executed pursuant to this contract.

5-1.17 SAN JOAQUIN KIT FOX PROTECTION

It is anticipated that kit fox, which is a listed species under the California and Federal Endangered Species Acts, may live within the project limits. Measures are included within the project to avoid "take" as defined by those laws. These measures may affect all work operations accordingly.

The Contractor shall be fully informed of rules, regulation, conditions, and guidance as described in these special provisions and applicable sections of the California Endangered Species Act and the Federal Endangered Species Act (16 U.S.C. 1531-1543). All employees, subcontractors, and Contractor's representatives on the project site shall receive a one-hour kit fox specific training provided by the State prior to performing on-site work. The Contractor shall submit a written request to the Engineer 10 days prior to the performance of any work requesting the kit fox training.

In addition to the above, the Contractor shall adhere to and perform the following:

A. Entrance into areas within the right of way not required for construction activities shall be restricted to the highway and associated paved or graded shoulders. Staging, parking, storage and other project related use areas shall be clearly marked on the ground.
B. Project-related traffic shall observe a 20 miles per hour speed limit except on roads or highways open for public use.

C. At the end of each working day, the Contractor shall take measures to prevent the entrapment of kit foxes in all excavated, steep-walled holes or trenches more than 0.6-m deep. Such measures shall include covering excavations with plywood or providing dirt or plank escape ramps from the trenches.
D. The Contractor shall inspect all pipes and culverts with a diameter greater than or equal to 4 inches before burying, capping, or other use. If a kit fox is discovered during this inspection, the pipe or culvert shall not be disturbed (other than to move it to a safe location if necessary) until after the fox has escaped.
E. The Contractor shall immediately notify the Engineer if a dead, injured or entrapped kit fox is found. Work in the immediate area may be temporarily halted while the State's Biologist at the direction of the Engineer consults with the California Department of Fish and Game and the U.S. Fish and Wildlife Service. Any entrapped kit fox shall be permitted to escape. The disposition of any carcasses or recovering animals shall be coordinated through the Engineer.
F. If a kit fox den is discovered, all construction activity within a (150 feet) radius of the den will be halted while the State consults with the U.S. Fish and Wildlife Service and California Department of Fish and Game. An Environmental Sensitive Area will be established around the den and entry into the area will be restricted.
G. The Contractor shall provide closed garbage containers where food-related trash is generated, and garbage shall be disposed of daily.
H. Pets are prohibited on work site.
I. The Contractor shall notify the Engineer of night-time construction 30 days prior to the start date.
J. The Contractor shall use tightly woven materials to prevent listed species from being entangled and injured inadvertently.

If in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of mitigation measures or adherence to protecting threatened or endangered species, the State will compensate the Contractor for such delays to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications, and not otherwise, except as provided in Section 8-1.10, "Utility and non-Highway Facilities," of the Standard Specifications.

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

5-1.18 AIR POLLUTION CONTROL DISTRICT REQUIREMENTS

This project is located within the jurisdiction of San Joaquin Valley Air Pollution Control District (SJVAPCD). A Dust Control Plan has been prepared, approved and is on file with the SJVAPCD. The Contractor shall be fully informed of the requirements of the Dust Control Plan and all rules, regulations, plans and conditions that may govern the Contractor's operations in these areas and shall conduct the work accordingly.

Copies of the Dust Control Plan are available for inspection at the District Construction Duty Senior Office District 06, located at 855 M Street, Suite 200, Fresno, CA 93721.

Attention is directed to Sections 7-1.01, "Laws to be Observed," 7-1.01F, "Air Pollution Control," 7-1.12, "Indemnification and Insurance," and Section 10, "Dust Control," of the Standard Specifications.

Modifications to the Dust Control Plan that are proposed by the Contractor shall be submitted in writing to the Engineer for consideration for transmittal to the SJVAPCD for their consideration.

When the Contractor is notified by the Engineer that a modification to the Dust Control Plan is under consideration, no work shall be performed which is inconsistent with the original Dust Control Plan or proposed modification prior to receiving written approval from the Engineer. Compensation for delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Modifications to the Dust Control Plan approved by the SJVAPCD and accepted by the Department shall be fully binding on the Contractor.

The provisions of this section and SJVAPCD approved modifications to the Dust Control Plan shall be made a part of every subcontract executed pursuant to this contract.

5-1.19 AIR QUALITY – BASIC NESHAP ASBESTOS NOTIFICATION

In compliance with Standard Specifications Section 7-1.01F, the Contractor shall notify the air pollution control district or air quality management district identified below as required by the National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40 CFR Part 61, Subpart M, and California Health and Safety Code section 39658(b)(1). A copy of the notification form and attachments shall be provided to the Engineer prior to submittal. Notification shall take place a minimum of 10 working days prior to starting demolition or renovation activities as defined in the NESHAP regulations.

The Contractor shall mail or otherwise deliver the original notification form with any necessary attachments to:

San Joaquin Air Pollution Control District
1990 E. Gettysburg Ave.
Fresno, CA 93726

The Contractor shall also notify other local permit agencies and utility companies prior to starting any demolition activities.

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

5-1.20 SWAINSON'S HAWK REQUIREMENTS

The California Endangered Species Act protects threatened and endangered species including the Swainson's hawk.

Swainson's hawks may nest within 0.5-mile of the project limits. If evidence of nesting Swainson's hawks is discovered between February 15 and September 15, the Contractor shall immediately stop work and notify the Engineer. The Contractor shall not disturb nesting birds or nests. The Department's biologist will evaluate the site. Work shall not resume until the Engineer provides written notification that work may begin in this location. No work shall be performed between February 15 and September 15 if the Engineer determines that construction will disturb nesting activity.

Between February 15 and September 15, the Contractor shall notify the Engineer 15 working days before disturbing the ground, vegetation, or structures. The Engineer will approve the beginning of work that disturbs the ground, vegetation, or structures between February 15 and September 15.

If, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in approving work that disturbs the ground, vegetation, or structures, the Contractor 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.

Attention is directed to Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications.

Nothing in this section shall relieve the Contractor from providing for public safety in conformance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

Full compensation for Swainson's hawk protection shall be considered as included in the various items of contract work and no separate payment will be allowed therefore.

5-1.21 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.

5-1.22 ENVIRONMENTALLY SENSITIVE AREA

An environmentally sensitive area (ESA) shall consist of an area within and near the limits of construction where access is prohibited or limited for the preservation of archeological site or existing vegetation, or protection of biological habitat as shown on the plans. The Engineer will determine the exact location of the boundaries of the ESA. No work shall be conducted within the ESA.

Attention is directed to Section 7—1.01 "Laws to be Observed," and Section 7—1.04 "Permits and Licenses," of the Standard Specifications regarding State and Federal regulations, permits, or agreements which pertain to an ESA.

Prior to beginning work, the boundaries of the ESA shall be clearly delineated by the placement of temporary fence (Type ESA) in conformance with the provisions in "Temporary Fence (Type ESA)" of these special provisions.

Vehicle access, storage or transport of materials or equipment, or other project related activities are prohibited within the boundaries of the ESA.

The Contractor shall mitigate damage or impacts to the ESA caused by the Contractor's operations, at the Contractor's expense. If the Engineer determines mitigation work will be performed by others, or if mitigation fees are assessed the Department, deductions from moneys due or to become due the Contractor will be made for the mitigation costs.

5-1.23 PRESERVATION OF PROPERTY

Attention is directed to Section 7-1.11, "Preservation of Property," of the Standard Specifications and these special provisions.

Existing trees, shrubs and other plants, that are not to be removed as shown on the plans or specified in these special provisions, and are injured or damaged by reason of the Contractor's operations, shall be replaced by the Contractor. The minimum size of tree replacement shall be 24 inch box and the minimum size of shrub replacement shall be 15-gallon. Replacement ground cover plants shall be from flats and shall be planted 12 inches on center. Replacement of Carpobrotus

ground cover plants shall be from cuttings and shall be planted 12 inches on center. Replacement planting shall conform to the requirements in Section 20-4.07, "Replacement," of the Standard Specifications. The Contractor shall water replacement plants in conformance with the provisions in Section 20-4.06, "Watering," of the Standard Specifications.

Damaged or injured plants shall be removed and disposed of in conformance with the provisions in Section 7-l.13,"Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. At the option of the Contractor, removed trees and shrubs may be reduced to chips. The chipped material shall be spread within the highway right of way at locations designated by the Engineer.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed not less than 20 working days prior to acceptance of the contract. Replacement plants shall be watered as necessary to maintain the plants in a healthy condition.

5-1.24 TUNNEL SAFETY ORDERS

The work to be performed at Station 238+70 on Route 198 has been classified "Potentially Gassy" by the State Division of Occupational Safety and Health under Section 8422 of the Tunnel Safety Orders of the California Code of Regulations.

The Contractor's attention is directed to Section 7-1.06, "Safety and Health Provisions," of the Standard Specifications. A change to the work as a direct result of the Contractor's planned operations that would cause work activities to fall under the requirements of the Tunnel Safety Orders, and that has not been shown on the plans or specified in these special provisions shall be reason for suspension of the work. The Contractor shall notify the Engineer not less than 20 days prior to worker exposure to a facility meeting the definition of a tunnel or shaft as described in Sections 8403 or 8405 of the Tunnel Safety Orders. The Department will obtain additional location classifications as may be necessary to allow the work to proceed.

The Contractor shall prominently post a notice of the classification and any special orders, rules, special conditions, or regulations at the tunnel work site, and all personnel shall be informed of the classification.

At least 7 days prior to beginning work covered by these provisions, the Contractor shall submit the name of the person designated as the on-site Safety Representative to the Engineer along with proof of certification by the Division of Occupational Safety and Health as having met the requirements of Section 8406 of the Tunnel Safety Orders of the California Code of Regulations.

5-1.25 AIR POLLUTION CONTROL DISTRICT REQUIREMENTS

This project is located within the jurisdiction of San Joaquin Valley Air Pollution Control District (SJVAPCD).

A complete Dust Control Plan proposed by the Contractor shall be submitted in writing to the Engineer for consideration. On Engineer’s approval, Contractor shall transmit the Dust Control Plan to the SJVAPCD for their approval. The complete Dust Control Plan approved by the SJVAPCD shall be submitted to the Engineer within 45 days after contract approval. Full compensation for preparing an approved Dust Control Plan shall be considered as included in the contract prices paid for various items of work involved and no additional compensation will be allowed therefor. Additional information on processing the Dust Control Plan may also be obtained at:

http://www.valleyair.org.

This project is also subject to Rule 9510 “Indirect Source Review” regulated by the SJVAPCD. Final approval of the Dust Control Plan cannot be obtained until all requirements of Rule 9510 have been satisfied. No field work shall begin prior to final approval of the Dust Control Plan. Additional information on satisfying Rule 9510 “Indirect Source Review” may also be obtained at:

http://www.valleyair.org.

The Contractor shall be fully informed of the requirements of the Dust Control Plan and Rule 9510 and all rules, regulations, plans and conditions that may govern the Contractor's operations in these areas and shall conduct the work accordingly.

Attention is directed to Sections 7-1.01, "Laws to be Observed," 7-1.01F, "Air Pollution Control," 7-1.12, "Indemnification and Insurance," and Section 10, "Dust Control," of the Standard Specifications.

Completed Dust Control Plan approved by the SJVAPCD and accepted by the Department shall be fully binding on the Contractor.

The provisions of this section and SJVAPCD approved Dust Control Plan shall be made a part of every subcontract executed pursuant to this contract.

SECTION 6. (BLANK)

SECTION 7. (BLANK)

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" ARS (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 ARS (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)

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")

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. Filtrona Extrusion, 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 5730
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
3. Garlock Rubber Technologies, Series 2000
4. P.B. Laminations, Aztec, Grade 102
5. Swarco Industries, "Director-2"
6. Trelleborg Industries, R140 Series
7. 3M Series 620 "CR", and Series A750
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. Ennis Paint Inc., "Flametape"

Ceramic Surfacing Laminate, 6" x 6"

1. Highway Ceramics, Inc.

CLASS 1 DELINEATORS

One Piece Driveable Flexible Type, 66-inch

1. Filtrona Extrusion, "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. Filtrona Extrusion, 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)

Surface Mount Type, 48-inch

1. Bent Manufacturing Company, Masterflex Model MF-180EX-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

CHANNELIZERS

Surface Mount Type, 36-inch

1. Bent Manufacturing Company, Masterflex Models MF-360-36 (Round) and MF-180-36 (Flat)
2. Filtrona Extrusion, 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

Lane Separation System

1. Filtrona Extrusion, "Flexi-Guide (FG) 300 Curb System"
2. Qwick Kurb, "Klemmfix Guide System"
3. Dura-Curb System
4. Tuff Curb

CONICAL DELINEATORS, 42-inch

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

1. Bent Manufacturing Company "T-Top"
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

OBJECT MARKERS

Type "K", 18-inch

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

Type "K-4" / "Q" Object Markers, 24-inch

1. Bent Manufacturing "Masterflex" Model MF-360-24
2. Filtrona Extrusion, 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

CONCRETE BARRIER MARKERS AND
TEMPORARY RAILING (TYPE K) REFLECTORS

Impactable Type

1. ARTUK, "FB"
2. Filtrona Extrusion, Models PCBM-12 and PCBM-T12
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 9304

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. Filtrona Extrusion, "Mini" (3" x 10")
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. Filtrona Extrusion, Model PCBM T-16
2. Safe-Hit, Model SH216RBM

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. Filtrona Extrusion, 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

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

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

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 VII, Super-High-Intensity (Typically Unmetallized Microprismatic Element)

1. 3M Series 3924S, Fluorescent Orange
2. 3M LDP Series 3970

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

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. Inteplast 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

8-1.02 STATE-FURNISHED MATERIALS

Attention is directed to Section 6-1.02, "State-Furnished Materials," of the Standard Specifications and these special provisions.

The following materials will be furnished to the Contractor:

A. Model 2070 controller units, including inductive loop detector sensor units for traffic monitoring stations.
B. Modems.

Model 500 changeable message sign, wiring harnesses, and controller assembly, including the controller unit and completely wired cabinet, will be furnished to the Contractor at Caltrans Maintenance Yard, 1283 N. West Avenue, Fresno.

The Contractor shall notify the Engineer not less than 48 hours before State-furnished material is to be picked up by the Contractor. A full description of the material and the time the material will be picked up shall be provided.

8-1.03 ENGINEERING FABRICS

Engineering fabrics shall conform to the provisions in Section 88, "Engineering Fabrics," of the Standard Specifications and these special provisions.

Filter fabric for this project shall be ultraviolet (UV) ray protected.

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.

The Department maintains a list of sources of fine and coarse aggregate that have been approved for use with a reduced amount of supplementary cementitious material in the total amount of cementitious material to be used. A source of aggregate will be considered for addition to the approved list if the producer of the aggregate submits to the Transportation Laboratory certified test results from a qualified testing laboratory that verify the aggregate complies with the requirements. Before the testing starts, the aggregate test shall be registered with the Department. A registration number can be obtained by calling (916) 227-7228. The registration number shall be used as the identification for the aggregate sample in correspondence with the Department. Upon request, a split of the tested sample shall be provided to the Department. Approval of aggregate will depend upon compliance with the specifications, based on the certified test results submitted, together with any replicate testing the Department may elect to perform. Approval will expire 3 years from the date the most recent registered and evaluated sample was collected from the aggregate source.

Qualified testing laboratories shall conform to the following requirements:

1. Laboratories performing ASTM Designation: C 1293 shall participate in the Cement and Concrete Reference Laboratory (CCRL) Concrete Proficiency Sample Program and shall have received a score of 3 or better on each test of the previous 2 sets of concrete samples.
2. Laboratories performing ASTM Designation: C 1260 shall participate in the Cement and Concrete Reference Laboratory (CCRL) Pozzolan Proficiency Sample Program and shall have received a score of 3 or better on the shrinkage and soundness tests of the previous 2 sets of pozzolan samples.

Aggregates on the list shall conform to one of the following requirements:

1. When the aggregate is tested in conformance with the requirements in California Test 554 and ASTM Designation: C 1293, the average expansion at one year shall be less than or equal to 0.040 percent; or
2. When the aggregate is tested in conformance with the requirements in California Test 554 and ASTM Designation: C 1260, the average of the expansion at 16 days shall be less than or equal to 0.15 percent.

If the aggregates used in the concrete are on the Department's list, the minimum amount of supplementary cementitious material shall conform to the following:

1. If fly ash or natural pozzolan conforming to the provisions in Section 90-2.01C, "Required Use of Supplementary Cementitious Materials," of the Standard Specifications is used, the minimum amount of supplementary cementitious material shall be 15 percent by weight of the total cementitious material; or
2. If silica fume conforming to the provisions in Section 90-2.01C, "Required Use of Supplementary Cementitious Materials," of the Standard Specifications is used, the minimum amount of supplementary cementitious material shall be 7 percent by weight of the total cementitious material.

The limitation on tricalcium silicate (C_3S) content in Type II cement specified in Section 90-2.01A, "Cement," of the Standard Specifications shall not apply.

8-2.02 PRECAST CONCRETE QUALITY CONTROL

GENERAL

Precast concrete quality control shall conform to these special provisions.

Unless otherwise specified, precast concrete quality control shall apply when any precast concrete members are fabricated in conformance with the provisions in Section 49, "Piling," or Section 51, "Concrete Structures," of the Standard Specifications.

Quality Control (QC) shall be the responsibility of the Contractor. The Contractor's QC inspectors shall perform inspection and testing prior to precasting, during precasting, and after precasting, and as specified in this section and additionally as necessary to ensure that materials and workmanship conform to the details shown on the plans, and to the specifications.

Quality Assurance (QA) is the prerogative of the Engineer. Regardless of the acceptance for a given precast element by the Contractor, the Engineer will evaluate the precast element. The Engineer will reject any precast element that does not conform to the approved Precast Concrete Quality Control Plan (PCQCP), the details shown on the plans, or to these special provisions.

The Contractor shall designate in writing a precast Quality Control Manager (QCM) for each precasting facility. The QCM shall be responsible directly to the Contractor for the quality of precasting, including materials and workmanship, performed by the Contractor and all subcontractors. The QCM shall be the sole individual responsible to the Contractor for submitting, receiving, and approving all correspondence, required submittals, and reports to and from the Engineer. The QCM shall not be employed or compensated by any subcontractor, or other persons or entities hired by subcontractors, or suppliers, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

Prior to submitting the PCQCP required herein, a meeting between the Engineer, the Contractor's QCM, and a representative from each entity performing precast concrete operations for this project, shall be held to discuss the requirements for precast quality control.

QC Inspectors shall either be 1) licensed as Civil Engineers in the State of California, or 2) have a current Plant Quality Personnel Certification, Level II, from the Precast/Prestressed Concrete Institute. A QC Inspector shall witness all precast concrete operations.

PRECAST CONCRETE QUALIFICATION AUDIT

Unless otherwise specified, no Contractors or subcontractors performing precast concrete operations for the project shall commence work without having successfully completed the Department's Precast Fabrication Qualification Audit, hereinafter referred to as the audit. The Engineer will perform the audit, and copies of the audit form, along with procedures for requesting and completing the audit, are available at the Transportation Laboratory or at:

http://www.dot.ca.gov/hq/esc/Translab/smbpubs.htm

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

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.

PRECAST CONCRETE QUALITY CONTROL PLAN

Prior to performing any precasting operations, 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, 3 copies of a separate PCQCP for each item of work to be precast. A separate PCQCP shall be submitted for each facility. As a minimum, each PCQCP shall include the following:

A. The name of the precasting firm, the concrete plants to be used, and any concrete testing firm to be used;
B. A manual prepared by the precasting firm that includes equipment, testing procedures, safety plan, and the names, qualifications, and documentation of certifications for all personnel to be used;
C. The name of the QCM and the names, qualifications, and documentation of certifications for all QC inspection personnel to be used;
D. An organizational chart showing all QC personnel and their assigned QC responsibilities;
E. The methods and frequencies for performing all required quality control procedures, including all inspections, material testing, and any required survey procedures for all components of the precast elements including prestressing systems, concrete, grout, reinforcement, steel components embedded or attached to the precast member, miscellaneous metal, and formwork;
F. A system for identification and tracking of required precast element repairs, and a procedure for the reinspection of any repaired precast element. The system shall have provisions for a method of reporting nonconforming precast elements to the Engineer; and
G. Forms to be used for Certificates of Compliance, daily production logs, and daily reports.

The Engineer shall have 4 weeks to review the PCQCP submittal after a complete plan has been received. No precasting shall be performed until the PCQCP is approved in writing by the Engineer.

A PCQCP that was previously approved by the Engineer no more than one year prior to the beginning of work on this contract will be acceptable for the entire period of this contract, provided the Engineer determines the PCQCP is for the same type of work that is to be performed on this contract.

An amended PCQCP or addendum shall be submitted to, and approved in writing by the Engineer, for any proposed revisions to the approved PCQCP. An amended PCQCP or addendum will be required for any revisions to the PCQCP, including but not limited to changes in concrete plants or source materials, changes in material testing procedures and testing labs, changes in procedures and equipment, changes in QC personnel, or updated systems for tracking and identifying precast elements. The Engineer shall have 2 weeks to complete the review of the amended PCQCP or addendum, once a complete submittal has been received. Work that is affected by any of the proposed revisions shall not be performed until the amended PCQCP or addendum has been approved.

After final approval of the PCQCP, amended PCQCP, or addendum, the Contractor shall submit 7 copies to the Engineer of each of these approved documents.

It is expressly understood that the Engineer's approval of the Contractor's PCQCP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformance with the requirements of the plans and specifications. The Engineer's approval shall neither constitute a waiver of any of the requirements of the plans and specifications nor relieve the Contractor of any obligation thereunder; and defective work, materials, and equipment may be rejected notwithstanding approval of the PCQCP.

REPORTING

The QC Inspector shall provide reports to the QCM on a daily basis for each day that precasting operations are performed.

A daily production log for precasting shall be kept by the QCM for each day that precasting operations, including setting forms, placing reinforcement, setting prestressing steel, casting, curing, post tensioning, and form release, are performed. The log shall include the facility location, and shall include a specific description of casting or related operations, any problems or deficiencies discovered, any testing or repair work performed, and the names of all QC personnel and the specific QC inspections they performed that day. The daily report from each QC Inspector shall also be included in the log. This daily log shall be available for viewing by the Engineer, at the precasting facility.

All reports regarding material tests and any required survey checks shall be signed by the person who performed the test or check, and then submitted directly to the QCM for review and signature prior to submittal to the Engineer. Corresponding names shall be clearly printed or type-written next to all signatures.

The Engineer shall be notified immediately in writing when any precasting problems or deficiencies are discovered and of the proposed repair or process changes required to correct them. The Engineer shall have 4 weeks to review these procedures. No remedial work shall begin until the Engineer approves these procedures in writing.

The following items shall be included in a precast report that is to be submitted to the Engineer following the completion of any precast element:

A. Reports of all material tests and any required survey checks;
B. Documentation that the Contractor has evaluated all tests and corrected all rejected deficiencies, and all repairs have been re-examined with the required tests and found acceptable; and
C. A daily production log.

At the completion of any precast element, and if the QCM determines that element is in conformance with these special provisions, 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. This Certificate of Compliance shall be submitted with the precast report. 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 and the provisions of the Standard Specifications and these special provisions.

PAYMENT

In the event the Engineer fails to complete the review of 1) a PCQCP, 2) an amended PCQCP or addendum, or 3) a proposed repair or process change, within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, 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.

All required repair work or process changes required to correct precasting operation deficiencies, whether discovered by the QCM, QC Inspector, or by the Engineer, and any associated delays or expenses to the Contractor caused by performing these repairs, shall be at the Contractor's expense.

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

SECTION 8-3. WELDING

8-3.01 WELDING

GENERAL

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.

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	2006
D1.4	2005
D1.5	2002
D1.6	1999

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.

Section 6.1.1.1 of AWS D1.5 is replaced with the following:

Quality Control (QC) shall be the responsibility of the Contractor. As a minimum, the Contractor shall perform inspection and testing of each weld joint prior to welding, during welding, and after welding as specified in this section and as necessary to ensure that materials and workmanship conform to the requirements of the contract documents.

Unless otherwise specified, Sections 6.1.3 through 6.1.4.3 of AWS D1.1, Section 7.1.2 of AWS D1.4, and Sections 6.1.1.2 through 6.1.3.3 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, and 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.

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

When any work is welded in conformance with the provisions in Section 75, "Miscellaneous Metal," of the Standard Specifications, not including Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications, Section 6.1.4 of AWS D1.1 is replaced with the following:

The QC Inspector shall be responsible for quality control acceptance or rejection of materials and workmanship and shall be currently certified as an AWS CWI in conformance with the requirements in AWS QC1, "Standard for AWS Certification of Welding Inspectors," or as a Welding Inspector Specialist (WIS) in conformance with the requirements in AWS B5.2, "Specification for the Qualification of Welding Inspector Specialists and Welding Inspector Assistants."

Section 6.14.6, "Personnel Qualification," of AWS D1.1, Section 7.8, "Personnel Qualification," of AWS D1.4, and Section 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.

Section 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 Sections 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.

Section 6.6.5, "Nonspecified NDT Other than Visual," of AWS D1.1, Section 7.6.5 of AWS D1.4 and Section 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.

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.

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.

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.

In addition to the requirements of AWS D1.1, welding procedures qualification for work welded in conformance with that code shall conform to the following requirements:

A. The travel speed, amperage, and voltage values that are used for tests conducted per AWS D1.1, Section 4.1.1, 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. The travel speed shall in no case vary by more than ±15 percent when using submerged arc welding.
B. 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.

In addition to the requirements of AWS D1.5, Section 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 two 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, Section 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, Section 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 Section 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 Section 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 Section 5.12 or 5.13.

E. Macroetch tests are required for WPS qualification tests, and acceptance shall be per AWS D1.5 Section 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 Section 6.26.2, excluding Section 6.26.2.2. Test plates that do not comply with both tests shall not be used.

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 when any work is welded in conformance with the provisions in Section 49, "Piling," Section 52, "Reinforcement," Section 55, "Steel Structures," or Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications.

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

http://www.dot.ca.gov/hq/esc/Translab/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.

When joint weld details that are not prequalified to the details of Section 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 2 weeks to complete the review of the proposed joint detail locations. In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, 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. 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. 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 2 weeks to review the qualifications and copy of the current certification of the independent third party. In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, 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 Contractor shall notify

the Engineer one week prior to performing any 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 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.

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. The welding is performed on pipe pile material at a permanent pipe manufacturing facility authorized to apply the American Petroleum Institute (API) monogram for API 5L pipe.

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.

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.

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 2 weeks 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. In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, 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.

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 one week 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. In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, 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.

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/smbresources.htm

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.

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 2 weeks 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. Unless otherwise specified, the Engineer shall be allowed 2 weeks 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. Should the Contractor elect to wait to encase or cover welds pending notification by the Engineer, and in the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, 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.

In addition to the requirements in AWS D1.1 and AWS D1.5, second-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 second-time repairs 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 one week to review these procedures. No remedial work shall begin until the repair procedures are approved in writing by the Engineer. In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, 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 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 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 which is certified under the AISC Quality Certification Program, Category Sbd, Conventional Steel Building Structures.

Welding Qualification Audit

Contractors or subcontractors performing welding operations for overhead sign and pole structures shall not deliver materials to the project without having successfully completed the Department's "Manufacturing Qualification Audit for Overhead Sign and Pole Structures," hereinafter referred to as the audit, not more than one year prior to the delivery of the materials. The Engineer will perform the audit. Copies of the audit form, and procedures for requesting and completing the audit, are available at the Transportation Laboratory or at:

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

An audit that was approved by the Engineer no more than one year prior to the beginning of work on this 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.

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. DESCRIPTION OF BRIDGE WORK

The bridge work to be done consists, in general, of the following as shown on the plans, described in the special provisions, and as briefly described below:

Cross Creek Bridge
Bridge No.45-0006 R/L

Widen an existing five-span reinforced concrete slab bridge approximately 190' long by 21' and construct a new five-span reinforced concrete slab bridge approximately 190' long and 42-6" wide.

Culvert at Lakeside Canal
Bridge No.45-0103

Construct a precast reinforced concrete box culvert approximately 439'-9" in length.

Road 68 Overcrossing
Bridge No.46-0265

Construct a two-span cast-in place, prestressed concrete box girder bridge approximately 235' long and 43'-6" wide.

SECTION 10. CONSTRUCTION DETAILS

SECTION 10-1. GENERAL

10-1.00 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 2 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

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.

10-1.01 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 "Move in/Move out (Erosion Control)" in these special provisions regarding the mobilization of equipment and materials for what may be several move in/move outs for erosion control work.

Attention is directed to "Migratory Birds Protection" and "United State Fish and Wildlife Service Requirements" of these special provisions.

The Contractor will be allowed to utilize the portion of the Cross Creek channel within the State right of way as an equipment crossing to cross under Route 198 when the channel is dry and during daylight hours only and subject to all terms and conditions specified in agreements with the Central Valley Flood Protection Board, the California Department of Fish and Game, the United States Fish and Wildlife Service and the United States Army Corps of Engineers.

Attention is directed to "Jointed Plain Concrete Pavement" of these special provisions in regards to providing Pre-Operation Conference, furnishing tests and mix proportions for concrete to be used in concrete pavement, "Test Strip" and the Just-In-Time Training prior to commencing pavement replacement operations.

Attention is directed to "Environmentally Sensitive Area" of these special provisions. Prior to beginning work, the boundaries of the Environmentally Sensitive Areas (ESA) shall be clearly delineated in the field.

The first order of work shall be to place the order for the electrical equipment.

The uppermost layer of new pavement shall not be placed until all underlying conduits and loop detectors have been installed.

Attention is directed to "Time Related Overhead," "Maintaining Traffic" and "Temporary Pavement Delineation" of these special provisions and to the stage construction 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 first order of work shall be the removal of existing pavement delineation 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.

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 of the traveled way, 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 are to be constructed 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 posts installed without the blocks and rail elements assembled and mounted thereon.

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.

The Engineer designates ground locations of erosion control by directing the placing of stakes or other suitable markers before application of erosion control materials as specified under "Erosion Control (Type C)" or "Erosion Control (Drill Seed)" of these special provisions.

10-1.02 MIGRATORY BIRD PROTECTION

The Contractor shall protect migratory birds, their occupied nests, and their eggs as specified in these special provisions.

Nesting or attempted nesting by migratory birds is anticipated to occur between, but not limited to, February 15 and September 15.

The Federal Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), Title 50 Code of Federal Regulations part 10, and California Department of Fish and Game Code Sections 3503, 3513, and 3800, protect migratory birds, their occupied nests, and their eggs.

The Federal and California Endangered Species Acts protect occupied and unoccupied nests of some threatened and endangered bird species. The Bald Eagle Protection Act (16 U.S.C. 668) prohibits the destruction of bald and golden eagles occupied and unoccupied nests.

When evidence of migratory bird nesting that may be adversely affected by construction activities is discovered, or when birds are injured or killed as a result of construction activities, the Contractor shall immediately stop work within 100 feet of the nests and notify the Engineer. Work shall not resume until the Engineer provides written notification that work may begin in this location.

Between February 15 and September 15, the Contractor shall notify the Engineer prior to the application of nest removal or application of exclusionary devices for work that will disturb the structures. The Engineer will approve the beginning of work disturbing structures, the ground, or vegetation between February 15 and September 15. Existing old nests shall be removed between September 16th and February 14th. Nest removal or exclusionary devices shall be used to prevent nesting. Removal of partial nests (completed 1/3 nest or less) is permitted between February 15 and September 15. Partial nests must be removed every 48 hours. If nests become occupied with eggs, any work that would interfere with or discourage swallows from returning to their nests shall not be permitted. If netting is used, the mesh size shall be ½ inch to ¾ inch in diameter. The attachment of the netting shall be secure and shall not be allowed to become loose. All exclusionary devices shall be inspected daily to prohibit swallows from nesting without causing them harm.

If, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in approving the work on structures, the Contractor 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.

Nest removal activities shall not deposit in, permit to pass into, or place nest materials where they can pass into the waters of this state.

"Migratory Bird Protection," shall include fines, penalties, and damages; whether proposed, assessed, or levied against the Department or the Contractor. Penalties shall also include payments made or costs incurred in settlement for alleged

violations of applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

Notwithstanding any other remedies authorized by law, the Department may retain or withhold monies 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 Federal or State law, regulations or requirements. The Department may retain funds 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. Upon final disposition, the Department shall inform the Contractor of the withheld amount.

Full compensation for migratory bird protection shall be considered as included in the various items of contract work and no separate payment will be allowed therefore.

A delay to the controlling item due to migratory birds or their nests will be considered a temporary suspension of work in accordance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. Adjustments will be made for delays that the Engineer determines are not due to the Contractor's failure to perform the provision of the contract in the same manner as for suspensions due to unsuitable weather in Section 8-1.05.

10-1.03 MATERIAL CONTAINING LEAD

This work shall consist of handling material containing lead in conformance with the Standard Specifications and these special provisions. Material within the project limits is not a hazardous waste and does not require special disposal however, low levels of lead are present within the project limits.

Lead has been detected within the top 2 feet of material in unpaved areas within the highway right of way. Levels of lead found within the project limits range from less than 1.0 to 432 mg/kg total lead with an average concentration of 21.6 mg/kg total lead, as analyzed by EPA Test Method 6010 or EPA Test Method 7000 series.

After the Contractor has completed handling materials containing lead, in conformance with the plans, Standard Specifications, and these special provisions, the Contractor shall have no responsibility for such materials in place and shall not be obligated for further cleanup, removal, or remedial actions for such materials.

Handling material containing lead shall be in conformance with rules and regulations including, but not limited to, those of the following agencies:

California Division of Occupational Safety and Health Administration (Cal-OSHA)
California Central Regional Water Quality Control Board, Region 5 – Fresno

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

LEAD COMPLIANCE PLAN

The Contractor shall prepare a project specific Lead Compliance Plan to prevent or minimize worker exposure to lead while handling material containing lead. Attention is directed to Title 8, California Code of Regulations, Section 1532.1, "Lead," for specific Cal-OSHA requirements when working with lead.

The Lead Compliance Plan shall contain the elements listed in Title 8, California Code of Regulations, Section 1532.1(e)(2)(B). Before submission to the Engineer, the Lead Compliance Plan shall be approved by an Industrial Hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene. The Plan shall be submitted to the Engineer at least 7 days prior to beginning work in areas containing lead.

Prior to performing work in areas containing lead, personnel who have no prior training, including State personnel, shall complete a safety training program provided by the Contractor, that meets the requirements of Title 8, California Code of Regulations, Section 1532.1, "Lead," and the Contractor's Lead Compliance Program.

Personal protective equipment, training, and washing facilities, required by the Contractor's Lead Compliance Plan shall be supplied to State personnel by the Contractor. The number of State personnel will be 2.

The contract lump sum price paid for Lead Compliance Plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing the Lead Compliance Plan, including paying the Certified Industrial Hygienist, and for providing personal protective equipment, training and medical surveillance, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.04 WATER POLLUTION CONTROL

GENERAL

Water pollution control work shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications, section of these special provisions entitled "Relations With California Regional Water Quality Control Board," and these special provisions.

The Contractor may obtain other National Pollutant Discharge Elimination System (NPDES) permits that apply to activities and mobile operations within or outside of the project limits including hot mix asphalt batch plants, material borrow areas, concrete plants, staging areas, storage yards, or access roads.

The Contractor shall perform water pollution control work in conformance with the requirements in the "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual" and its addenda in effect on the day the Notice to Contractors is dated. This manual is referred to as the "Preparation Manual." Copies of the Preparation Manual may be obtained from:

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 references for performing water pollution control work are available from the Department's Construction Storm Water and Water Pollution Control web site at:

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

Before the start of job site activities, the Contractor shall provide training for project managers, supervisory personnel, and employees involved with water pollution control work. The training shall include:

A. Rules and regulations
B. Implementation and maintenance for:

    1. Temporary Soil Stabilization
    2. Temporary Sediment Control
    3. Tracking Control
    4. Wind Erosion Control

The Contractor shall designate in writing a Water Pollution Control Manager (WPCM). The Contractor shall submit a statement of qualifications describing the training, work history, and expertise of the proposed WPCM. The qualifications shall include either:

A. A minimum of 24 hours of Department approved storm water management training described at Department's Construction Storm Water and Water Pollution Control web site.
B. Certification as a Certified Professional in Erosion and Sediment Control (CPESC).

The WPCM shall be:

A. Responsible for water pollution control work.
B. The primary contact for water pollution control work.
C. Have authority to mobilize crews to make immediate repairs to water pollution control practices.

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

STORM WATER POLLUTION PREVENTION PLAN

The Contractor shall submit a Storm Water Pollution Prevention Plan (SWPPP) to the Engineer for approval. The SWPPP shall conform to the requirements in the Preparation Manual, the NPDES permit, and these special provisions. The

SWPPP shall be submitted in place of the water pollution control program required by the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications.

The SWPPP shall include water pollution control practices:

A. For storm water and non-storm water from areas outside of the job site related to construction activities for this contract such as:

    1. Staging areas.
    2. Storage yards.
    3. Access roads.

B. Appropriate for each season as described in "Implementation Requirements" of these special provisions.
C. For activities or mobile operations related to all NPDES permits.

The SWPPP shall include a schedule that:

A. Describes when work activities that could cause water pollution will be performed.
B. Identifies soil stabilization and sediment control practices for disturbed soil area.
C. Includes dates when these practices will be 25, 50, and 100 percent complete.
D. Shows 100 percent completion of these practices before the rainy season.

The SWPPP shall include the following temporary water pollution control practices and their associated contract items of work as shown on the plans or specified in these special provisions:

A. Temporary Sediment Control

    1. Street Sweeping
    2. Temporary Fiber Roll

B. Tracking Control

    1. Street Sweeping
    2. Temporary Construction Entrance

C. Wind Erosion Control

    1. Construction Site Management

D. Non-Storm Water Management

    1. Construction Site Management

E. Waste Management and Materials Pollution Control

    1. Construction Site Management
    2. Temporary Concrete Washout Facility

The SWPPP shall include the following contract items of work for permanent water pollution control as shown on the plans or as specified in these special provisions:

A. Erosion Control (Type C)
B. Erosion Control (Drill Seed)

Within 20 days after contract approval, the Contractor shall submit 3 copies of the SWPPP to the Engineer. The Contractor shall allow 20 days for the Engineer's review. If revisions are required, the Engineer will provide comments and specify the date that the review stopped. The Contractor shall revise and resubmit the SWPPP within 15 days of receipt of the Engineer's comments. The Engineer's review will resume when the complete SWPPP is resubmitted. When the Engineer approves the SWPPP, the Contractor shall submit 4 copies of the approved SWPPP to the Engineer. The Contractor may

proceed with construction activities if the Engineer conditionally approves the SWPPP while minor revisions are being completed. If the Engineer fails to complete the review within the time allowed and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay, the Contractor will be compensated for resulting losses, and an extension of time will be granted, as provided for in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The SWPPP shall include a copy of the California Department of Fish and Game Agreement, United States Army of Corps of Engineer Permit, Regional Water Quality Control Board Permit and Central Valley Flood Protection Board Permit.

The Contractor shall not perform work that may cause water pollution until the SWPPP has been approved by the Engineer. The Engineer's review and approval shall not waive any contract requirements and shall not relieve the Contractor from complying with Federal, State and local laws, regulations, and requirements.

The Contractor shall amend the SWPPP annually and shall resubmit it to the Engineer 25 days before the defined rainy season.

If there is a change in construction schedule or activities, the Contractor shall prepare an amendment to the SWPPP to identify additional or revised water pollution control practices. The Contractor shall submit the amendment to the Engineer for review within a time agreed to by the Engineer not to exceed the number of days specified for the initial submittal of the SWPPP. The Engineer will review the amendment within the same time allotted for the review of the initial submittal of the SWPPP.

If directed by the Engineer or requested in writing by the Contractor and approved by the Engineer, changes to the water pollution control work specified in these special provisions will be allowed. Changes may include addition of new water pollution control practices. The Contractor shall incorporate these changes in the SWPPP. Additional water pollution control work will be paid for as extra work in accordance with Section 4-1.03D, "Extra Work," of the Standard Specifications.

The Contractor shall keep a copy of the approved SWPPP at the job site. The SWPPP shall be made available when requested by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests from the public shall be directed to the Engineer.

IMPLEMENTATION REQUIREMENTS

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

If the Contractor or the Engineer identifies a deficiency in the implementation of the approved SWPPP, the deficiency shall be corrected immediately, unless an agreed date for correction is approved in writing by the Engineer. The deficiency shall be corrected before the onset of precipitation. If the Contractor fails 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 deficiencies from payments.

If the Contractor fails to conform to the provisions of this section, "Water Pollution Control," the Engineer may order the suspension of work until the project complies with the requirements of this section.

Year-Round

The Contractor shall monitor the National Weather Service weather forecast on a daily basis during the contract. The Contractor may use an alternative weather forecasting service if approved by the Engineer. Appropriate water pollution control practices shall be in place before precipitation.

The Contractor may discontinue earthwork operations for a disturbed area for up to 21 days and the disturbed soil area will still be considered active. When earthwork operations in the disturbed area have been completed, the Contractor shall implement appropriate water pollution control practices within 15 days, or before predicted precipitation, whichever occurs first.

Rainy Season

The Contractor shall provide soil stabilization and sediment control practices during the rainy season between October 15 and April 15.

The Contractor shall implement soil stabilization and sediment control practices a minimum of 10 days before the start of the rainy season.

During the defined rainy season, the active disturbed soil area of the project site shall be not more than 5 acres. The Engineer may approve expansions of the active disturbed soil area limit if requested in writing. The Contractor shall maintain soil stabilization and sediment control materials on site to protect disturbed soil areas.

INSPECTION AND MAINTENANCE

The WPCM shall inspect the water pollution control practices identified in the SWPPP as follows:

A. Before a forecasted storm,
B. After precipitation that causes site runoff,
C. At 24-hour intervals during extended precipitation,
D. On a predetermined schedule, a minimum of once every 2 weeks outside of the defined rainy season, and
E. On a predetermined schedule, a minimum of once a week during the defined rainy season.

The WPCM shall oversee the maintenance of the water pollution control practices.

The WPCM shall use the Storm Water Quality Construction Site Inspection Checklist provided in the Preparation Manual or an alternative inspection checklist provided by the Engineer. A copy of the completed site inspection checklist shall be submitted to the Engineer within 24 hours of finishing the inspection.

REPORTING REQUIREMENTS

If the Contractor identifies discharges into surface waters or drainage systems causing or potentially causing pollution, or if the project receives a written notice or order from a regulatory agency, the Contractor shall immediately inform the Engineer. The Contractor shall submit a written report to the Engineer within 7 days of the discharge, notice or order. The report shall include the following information:

A. The date, time, location, and nature of the operation, type of discharge and quantity, and the cause of the notice or order.
B. The water pollution control practices used before the discharge, or before receiving the notice or order.
C. The date of placement and type of additional or altered water pollution control practices placed after the discharge, or after receiving the notice or order.
D. A maintenance schedule for affected water pollution control practices.

Annual Certifications

By June 15 of each year, the Contractor shall complete and submit to the Engineer an Annual Certification of Compliance, as contained in the Preparation Manual.

PAYMENT

During each estimate period the Contractor fails to conform to the provisions in this section, "Water Pollution Control," or fails to implement the water pollution control practices shown on the plans or specified elsewhere in these special provisions as items of work, the Department will withhold 25 percent of the progress payment.

Withholds for failure to perform water pollution control work will be in addition to all other withholds provided for in the contract. The Department will return performance-failure withholds in the progress payment following the correction of noncompliance.

The contract lump sum price paid for prepare storm water pollution prevention plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing, obtaining approval of, and amending the SWPPP and inspecting water pollution control practices as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payments for prepare storm water pollution prevention plan will be made as follows:

A. After the SWPPP has been approved by the Engineer, 50 percent of the contract item price for prepare storm water pollution prevention plan will be included in the monthly progress estimate.
B. Forty percent of the contract item price for prepare storm water pollution prevention plan will be paid over the life of the contract.
C. After acceptance of the contract in conformance with the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, payment for the remaining 10 percent of the contract item price for prepare storm water pollution prevention plan will be made in conformance with the provisions in Section 9-1.07A, "Payment Prior to Proposed Final Estimate."

Implementation of water pollution control practices in areas outside the highway right of way not specifically provided for in the SWPPP or in these special provisions will not be paid for.

Water pollution control practices for which there are separate contract items of work will be measured and paid for as those contract items of work.

10-1.05 CONSTRUCTION SITE MANAGEMENT

Construction site management shall consist of controlling potential sources of water pollution before they come in contact with storm water systems or watercourses. The Contractor shall control material pollution and manage waste and non-storm water existing at the construction site by implementing effective handling, storage, use, and disposal practices.

Attention is directed to "Water Pollution Control" of these special provisions regarding the Contractor's appointment of a water pollution control manager (WPCM) for the project.

The Contractor shall train all employees and subcontractors regarding:

A. Material pollution prevention and control;
B. Waste management;
C. Non-storm water management;
D. Identifying and handling hazardous substances; and
E. Potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances.

Training shall take place before starting work on this project. New employees shall receive the complete training before starting work on this project. The Contractor shall have regular meetings to discuss and reinforce spill prevention and control; material delivery, storage, use, and disposal; waste management; and non-storm water management procedures.

Instructions for material and waste handling, storage, and spill reporting and cleanup shall be posted at all times in an open, conspicuous, and accessible location at the construction site.

Nonhazardous construction site waste and excess material shall be recycled when practical or disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, unless otherwise specified.

Vehicles and equipment at the construction site shall be inspected by the WPCM on a frequent, predetermined schedule, and by the operator each day of use. Leaks shall be repaired immediately, or the vehicle or equipment shall be removed from the construction site.

SPILL PREVENTION AND CONTROL

The Contractor shall implement spill and leak prevention procedures when chemicals or hazardous substances are stored. Spills of petroleum products; substances listed under CFR Title 40, Parts 110, 117, and 302; and sanitary and septic waste shall be contained and cleaned up as soon as is safe.

Minor spills involve small quantities of oil, gasoline, paint, or other material that can be controlled by the first responder upon discovery of the spill. Cleanup of minor spills includes:

A. Containing the spread of the spill,
B. Recovering the spilled material using absorption,
C. Cleaning the contaminated area, and
D. Disposing of contaminated material promptly and properly.

Semi-significant spills are those that can be controlled by the first responder with the help of other personnel. Cleanup of semi-significant spills shall be immediate. Cleanup of semi-significant spills includes:

A. Containing the spread of the spill;
B. Recovering the spilled material using absorption if the spill occurs on paved or an impermeable surface;
C. Containing the spill with an earthen dike and digging up contaminated soil for disposal if the spill occurs on dirt;
D. Covering the spill with plastic or other material to prevent contaminating runoff if the spill occurs during precipitation; and
E. Disposing of contaminated material promptly and properly.

Significant or hazardous spills are those that cannot be controlled by construction personnel. Notifications of these spills shall be immediate. The following steps shall be taken:

A. Construction personnel shall not attempt to cleanup the spill until qualified staff have arrived;
B. Notify the Engineer and follow up with a written report;
C. Obtain the services of a spills contractor or hazardous material team immediately;

D. Notify the local emergency response team by dialing 911 and county officials at the emergency phone numbers kept on the construction site;
E. Notify the Governor's Office of Emergency Services Warning Center at (805) 852-7550;
F. Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities in conformance with CFR Title 40, Parts 110, 119, and 302;
G. Notify other agencies as appropriate, including:

1. Fire Department,
2. Public Works Department,
3. Coast Guard,
4. Highway Patrol,
5. City Police or County Sheriff Department,
6 Department of Toxic Substances,
7. California Division of Oil and Gas,
8. Cal OSHA, or
9. Regional Water Resources Control Board.

The WPCM shall oversee and enforce proper spill prevention and control measures. Minor, semi-significant, and significant spills shall be reported to the Contractor's WPCM who shall notify the Engineer immediately.

The Contractor shall prevent spills from entering storm water runoff before and during cleanup. Spills shall not be buried or washed with water.

The Contractor shall keep material or waste storage areas clean, well organized, and equipped with enough cleanup supplies for the material being stored. Plastic shall be placed under paving equipment when not in use to catch drips.

MATERIAL MANAGEMENT

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

The Contractor shall implement the practices described in this section when taking delivery of, using, or storing the following materials:

A. Hazardous chemicals including:

1. Acids,
2. Lime,
3. Glues,
4. Adhesives,
5. Paints,
6. Solvents, and
7. Curing compounds;

B. Soil stabilizers and binders;
C. Fertilizers;
D. Detergents;
E. Plaster;
F. Petroleum products including:

1. Fuel,
2. Oil, and
3. Grease;

G. Asphalt components and concrete components; and
H. Pesticides and herbicides.

The Contractor shall supply the Material Safety Data Sheet to the Engineer for material used or stored. The Contractor shall keep an accurate inventory of material delivered and stored at the construction site.

Employees trained in emergency spill cleanup procedures shall be present when hazardous materials or chemicals are unloaded.

The Contractor shall use recycled or less hazardous products when practical.

Material Storage

The Contractor shall store liquids, petroleum products, and substances listed in CFR Title 40, Parts 110, 117, and 302 in containers or drums approved by the United States Environmental Protection Agency, and place them in secondary containment facilities.

Secondary containment facilities shall be impervious to the materials stored there for a minimum contact time of 72 hours.

Throughout the rainy season secondary containment facilities shall be covered during non-working days and when precipitation is predicted. Secondary containment facilities shall be adequately ventilated.

The Contractor shall keep the secondary containment facility free of accumulated rainwater or spills. After precipitation, or in the event of spills or leaks, accumulated liquid shall be collected and placed into drums within 24 hours. These liquids shall be handled as hazardous waste in accordance with the provisions in "Hazardous Waste" of these special provisions, unless testing determines them to be nonhazardous.

Incompatible materials, such as chlorine and ammonia, shall not be stored in the same secondary containment facility.

Materials shall be stored in the original containers with the original product labels maintained in legible condition. Damaged or illegible labels shall be replaced immediately.

The secondary containment facility shall 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 all of the volume of the largest container within the facility, whichever is greater.

The Contractor shall store bagged or boxed material on pallets. Throughout the rainy season, bagged or boxed material shall be protected from wind and rain during non-working days and when precipitation is predicted.

The Contractor shall provide sufficient separation between stored containers to allow for spill cleanup or emergency response access. Storage areas shall be kept clean, well organized, and equipped with cleanup supplies appropriate for the materials being stored.

The Contractor shall repair or replace perimeter controls, containment structures, covers, and liners as needed. Storage areas shall be inspected before and after precipitation, and at least weekly during other times.

Stockpile Management

The Contractor shall reduce or eliminate potential air and water pollution from stockpiled material including soil, paving material, or pressure treated wood. Stockpiles shall be located out of floodplains when possible, and at least 50 feet from concentrated flows of storm water, drainage courses, or inlets unless written approval is obtained from the Engineer.

The Contractor may discontinue adding or removing material for up to 21 days and a stockpile will still be considered active.

The Contractor shall protect active stockpiles with plastic or geotextile cover, soil stabilization measures, or with linear sediment barrier when precipitation is predicted. Active stockpiles of cold mix asphalt concrete shall be placed on an impervious surface and covered with plastic when precipitation is predicted.

The Contractor shall protect inactive soil stockpiles with a plastic or geotextile cover, or with soil stabilization measures at all times during the rainy season. A linear sediment barrier around the perimeter of the stockpile shall also be used. During the non-rainy season soil stockpiles shall be covered and protected with a linear sediment barrier when precipitation is predicted. The Contractor shall control wind erosion during dry weather as provided in Section 10, "Dust Control," of the Standard Specifications.

Stockpiles of portland cement concrete rubble, asphalt concrete (AC), hot mix asphalt (HMA), AC and HMA rubble, aggregate base, or aggregate subbase shall be covered with plastic or geotextile, or protected with a linear sediment barrier at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

Stockpiles of cold mix asphalt concrete shall be placed on and covered with impermeable material at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

Stockpiles of pressure treated wood shall be covered with impermeable material and placed on pallets at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

The Contractor shall repair or replace linear sediment barriers and covers as needed or as directed by the Engineer to keep them functioning properly. Sediment shall be removed when it accumulates to 1/3 of the linear sediment barrier height.

WASTE MANAGEMENT

Solid Waste

The Contractor shall not allow litter or debris to accumulate anywhere on the construction site, including storm drain grates, trash racks, and ditch lines. The Contractor shall pick up and remove trash and debris from the construction site at least once a week. The WPCM shall monitor solid waste storage and disposal procedures on the construction site. The Contractor shall provide enough dumpsters of sufficient size to contain the solid waste generated by the project. Dumpsters

shall be emptied when refuse reaches the fill line. Dumpsters shall be watertight. The Contractor shall not wash out dumpsters on the construction site. The Contractor shall provide additional containers and more frequent pickup during the demolition phase of construction

Solid waste includes:

A. Brick,
B. Mortar,
C. Timber,
D. Metal scraps,
E. Sawdust,
F. Pipe,
G. Electrical cuttings,
H. Non-hazardous equipment parts,
I. Styrofoam and other packaging materials,
J. Vegetative material and plant containers from highway planting, and
K. Litter and smoking material, including litter generated randomly by the public.

Trash receptacles shall be provided and used in the Contractor's yard, field trailers, and locations where workers gather for lunch and breaks.

Hazardous Waste

The Contractor shall implement hazardous waste management practices when waste is generated on the construction site from the following substances:

A. Petroleum products,
B. Asphalt products,
C. Concrete curing compound,
D. Pesticides,
E. Acids,
F. Paints,
G. Stains,
H. Solvents,
I. Wood preservatives,
J. Roofing tar, and
K. 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.

Nothing in these special provisions shall relieve the Contractor of the responsibility for compliance with Federal, State, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.

The WPCM shall oversee and enforce hazardous waste management practices. Production of hazardous materials and hazardous waste on the construction site shall be kept to a minimum. Perimeter controls, containment structures, covers, and liners shall be repaired or replaced when damaged.

The Contractor shall have a laboratory certified by the Department of Health Services (DHS) sample and test waste when hazardous material levels are unknown to determine safe methods for storage and disposal.

The Contractor shall segregate potentially hazardous waste from nonhazardous waste at the construction site. Hazardous waste shall be handled, stored, and disposed of as required in California Code of Regulations, Title 22, Division 4.5, Section 66262.34; and in CFR Title 49, Parts 261, 262, and 263.

The Contractor shall store hazardous waste in sealed containers constructed and labeled with the contents and date accumulated as required in California Code of Regulations, Title 22, Division 4.5; and in CFR Title 49, Parts 172, 173, 178, and 179. Hazardous waste containers shall be kept in temporary containment facilities conforming to the provisions in "Material Storage" of these special provisions.

There shall be adequate storage volume and containers shall be conveniently located for hazardous waste collection. Containers of hazardous waste shall not be overfilled and hazardous wastes shall not be mixed. Containers of dry waste that are not watertight shall be stored on pallets. The Contractor shall not allow potentially hazardous waste to accumulate on the ground. Hazardous waste shall be stored away from storm drains, watercourses, moving vehicles, and equipment.

The Contractor shall clean water based or oil based paint from brushes or equipment within a contained area and shall not contaminate soil, watercourses, or storm drain systems. Paints, thinners, solvents, residues, and sludges that cannot be

recycled or reused shall be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths shall be disposed of as solid waste.

The Contractor shall dispose of hazardous waste within 90 days of being generated. Hazardous waste shall be disposed of by a licensed hazardous waste transporter using uniform hazardous waste manifest forms and taken to a Class I Disposal Site. A copy of the manifest shall be provided to the Engineer.

Contaminated Soil

The Contractor shall identify contaminated soil from spills or leaks by noticing discoloration, odors, or differences in soil properties. Soil with evidence of contamination shall be sampled and tested by a laboratory certified by DHS. If levels of contamination are found to be hazardous, the soil shall be handled and disposed of as hazardous waste.

The Contractor shall prevent the flow of water, including ground water, from mixing with contaminated soil by using one or a combination of the following measures:

A. Berms,
B. Cofferdams,
C. Grout curtains,
D. Freeze walls, or
E. Concrete seal course.

If water mixes with contaminated soil and becomes contaminated, the water shall be sampled and tested by a laboratory certified by the DHS. If levels of contamination are found to be hazardous, the water shall be handled and disposed of as hazardous waste.

Concrete Waste

The Contractor shall implement practices to prevent the discharge of portland cement concrete, AC, or HMA waste into storm drain systems or watercourses.

Portland cement concrete, AC, or HMA waste shall be collected at the following locations and disposed of:

A. Where concrete material, including grout, is used;
B. Where concrete dust and debris result from demolition;
C. Where sawcutting, coring, grinding, grooving, or hydro-concrete demolition of portland cement concrete, AC, or HMA creates a residue or slurry; or
D. Where concrete trucks or other concrete-coated equipment is cleaned at the construction site.

Sanitary and Septic Waste

Wastewater from sanitary or septic systems shall not be discharged or buried within the Department right of way. The WPCM shall inspect sanitary or septic waste storage and monitor disposal procedures at least weekly. Sanitary facilities that discharge to the sanitary sewer system shall be properly connected and free from leaks.

The Contractor shall 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 provide a copy to the Engineer. The Contractor shall comply with local health agency requirements when using an on-site disposal system.

Liquid Waste

The Contractor shall not allow construction site liquid waste, including the following, to enter storm drain systems or watercourses:

A. Drilling slurries or fluids,
B. Grease-free or oil-free wastewater or rinse water,
C. Dredgings,
D. Liquid waste running off a surface including wash or rinse water, or
E. Other non-storm water liquids not covered by separate permits.

The Contractor shall hold liquid waste in structurally sound, leak proof containers such as:

A. Sediment traps,
B. Roll-off bins, or
C. Portable tanks.

Liquid waste containers shall be of sufficient quantity and volume to prevent spills and leaks. The containers shall be stored at least 50 feet from storm drains, watercourses, moving vehicles, and equipment.

The Contractor shall remove and dispose of deposited solids from sediment traps as provided in "Solid Waste" of these special provisions, unless determined infeasible by the Engineer.

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

Drilling fluids and residue shall be disposed of outside the highway right of way. If the Engineer determines that an appropriate location is available, fluids and residue exempt under California Code of Regulations, Title 23, Section 2511(g) may be dried by infiltration and evaporation in a leak proof container. The remaining solid waste may be disposed of as provided in "Solid Waste" of these special provisions.

NON-STORM WATER MANAGEMENT

Water Control and Conservation

The Contractor shall prevent erosion or the discharge of pollutants into storm drain systems or watercourses by managing the water used for construction operations. The Contractor shall obtain the Engineer's approval before washing anything on the construction site with water that could discharge into a storm drain system or watercourse. Discharges shall be reported to the Engineer immediately.

The Contractor shall implement water conservation practices when water is used on the construction site. Irrigation areas shall be inspected and watering schedules shall be adjusted to prevent erosion, excess watering, or runoff. The Contractor shall shut off the water source to broken lines, sprinklers, or valves, and they shall be repaired as soon as possible. When possible, water from waterline flushing shall be reused for landscape irrigation. Paved areas shall be swept and vacuumed, not washed with water.

Construction water runoff, including water from water line repair, shall be directed to areas to infiltrate into the ground and shall not be allowed to enter storm drain systems or watercourses. Spilled water shall not be allowed to escape water truck filling areas. When possible, the Contractor shall direct water from off-site sources around the construction site, or shall minimize contact with the construction site.

Illegal Connection and Discharge Detection and Reporting

The Contractor shall inspect the construction site and the site perimeter before beginning work for evidence of illegal connections, discharges, or dumping. Subsequently, the construction site and perimeter shall be inspected on a frequent, predetermined schedule.

The Contractor shall immediately notify the Engineer when illegal connections, discharges, or dumping are discovered. The Contractor shall take no further action unless directed by the Engineer. Unlabeled or unidentifiable material shall be assumed to be hazardous.

The Contractor shall look for the following evidence of illegal connections, discharges, or dumping:

A. Debris or trash piles,
B. Staining or discoloration on pavement or soils,
C. Pungent odors coming from drainage systems,
D. Discoloration or oily sheen on water,
E. Stains or residue in ditches, channels or drain boxes,
F. Abnormal water flow during dry weather,
G. Excessive sediment deposits,
H. Nonstandard drainage junction structures, or
I. Broken concrete or other disturbances near junction structures.

Vehicle and Equipment Cleaning

The Contractor shall limit vehicle and equipment cleaning or washing on the construction site to that necessary to control vehicle tracking or hazardous waste. Vehicles and equipment shall not be cleaned on the construction site with soap, solvents, or steam until the Engineer has been notified. The resulting waste shall be contained and recycled, or disposed of as provided in "Liquid Waste" or "Hazardous Waste" of these special provisions, whichever is applicable. The Contractor shall not use diesel to clean vehicles or equipment, and shall minimize the use of solvents.

The Contractor shall clean or wash vehicles and equipment in a structure equipped with disposal facilities. If using a structure is not possible, vehicles and equipment shall be cleaned or washed in an outside area with the following characteristics:

A. Located at least 50 feet from storm drainage systems or watercourses,

B. Paved with AC, HMA, or portland cement concrete,
C. Surrounded by a containment berm, and
D. Equipped with a sump to collect and dispose of wash water.

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

Wash racks shall discharge to a recycle system or to another system approved by the Engineer. Sumps shall be inspected regularly, and liquids and sediments shall be removed as needed.

Vehicle and Equipment Fueling and Maintenance

The Contractor shall fuel or perform maintenance on vehicles and equipment off the construction site whenever practical. When fueling or maintenance must be done at the construction site, the Contractor shall designate a site, or sites, and obtain approval from the Engineer before using. The fueling or maintenance site shall be protected from storm water, shall be on level ground, and shall be located at least 50 feet from drainage inlets or watercourses. The WPCM shall inspect the fueling or maintenance site regularly. Mobile fueling or maintenance shall be kept to a minimum.

The Contractor shall use containment berms or dikes around the fueling and maintenance area. Adequate amounts of absorbent spill cleanup material and spill kits shall be kept in the fueling and maintenance area and on fueling trucks. Spill cleanup material and kits shall be disposed of immediately after use. Drip pans or absorbent pads shall be used during fueling or maintenance unless performed over an impermeable surface.

Fueling or maintenance operations shall not be left unattended. Fueling nozzles shall be equipped with an automatic shutoff control. Vapor recovery fueling nozzles shall be used where required by the Air Quality Management District. Nozzles shall be secured upright when not in use. Fuel tanks shall not be topped-off.

The Contractor shall recycle or properly dispose of used batteries and tires.

Material and Equipment Used Over Water

Drip pans and absorbent pads shall be placed under vehicles or equipment used over water, and an adequate supply of spill cleanup material shall be kept with the vehicle or equipment. Drip pans or plastic sheeting shall be placed under vehicles or equipment on docks, barges, or other surfaces over water when the vehicle or equipment will be idle for more than one hour.

The Contractor shall provide watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools. Material shall be secured to prevent spills or discharge into water due to wind.

Structure Removal Over or Adjacent to Water

The Contractor shall not allow demolished material to enter storm water systems or watercourses. The Contractor shall use covers and platforms approved by the Engineer to collect debris. Attachments shall be used on equipment to catch debris on small demolition operations. Debris catching devices shall be emptied regularly and debris shall be handled as provided in "Waste Management" of these special provisions.

The WPCM shall inspect demolition sites within 50 feet of storm water systems or watercourses every day.

Paving, Sealing, Sawcutting, and Grinding Operations

The Contractor shall prevent the following material from entering storm drain systems or water courses:

A. Cementitious material,
B. Asphaltic material,
C. Aggregate or screenings,
D. Grinding or sawcutting residue,
E. Pavement chunks, or
F. Shoulder backing.

The Contractor shall cover drainage inlets and use linear sediment barriers to protect downhill watercourses until paving, sealing, sawcutting, or grinding operations are completed and excess material has been removed. Drainage inlets and manholes shall be covered during the application of seal coat, tack coat, slurry seal, or fog seal.

During the rainy season or when precipitation is predicted, paving, sawcutting, and grinding operations shall be limited to places where runoff can be captured. Seal coat, tack coat, slurry seal, or fog seal operations shall not begin if precipitation is predicted for the application or the curing period. The Contractor shall not excavate material from existing roadways during precipitation.

The Contractor shall vacuum up slurry from sawcutting operations immediately after the slurry is produced. Slurry shall not be allowed to run onto lanes open to public traffic or off the pavement.

The Contractor shall collect residue from portland cement concrete grinding operations with a vacuum attachment on the grinding machine. The residue shall not be left on the pavement or allowed to flow across the pavement.

Material excavated from existing roadways may be stockpiled as provided in "Stockpile Management" of these special provisions if approved by the Engineer. AC or HMA chunks used in embankment shall be placed above the water table and covered by at least one foot of material.

Substances used to coat asphalt trucks and equipment shall not contain soap, foaming agents, or toxic chemicals.

Thermoplastic Striping and Pavement Markers

Thermoplastic striping and preheating equipment shutoff valves shall work properly at all times when on the construction site. The Contractor shall not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets or watercourses. The Contractor shall not fill the preheating container to more than 6 inches from the top. Truck beds shall be cleaned daily of scraps or melted thermoplastic.

The Contractor shall not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets or watercourses. All pressure shall be released from melting tanks before removing the lid to fill or service. Melting tanks shall not be filled to more than 6 inches from the top.

The Contractor shall collect bituminous material from the roadway after marker removal.

Pile Driving

The Contractor shall keep spill kits and cleanup material at pile driving locations. Pile driving equipment shall be parked over drip pans, absorbent pads, or plastic sheeting where possible. When not in use, pile driving equipment shall be stored at least 50 feet from concentrated flows of storm water, drainage courses, or inlets. The Contractor shall protect pile driving equipment by parking it on plywood and covering it with plastic when precipitation is predicted. The WPCM shall inspect the pile driving area every day for leaks and spills.

The Contractor shall use vegetable oil instead of hydraulic fluid when practical.

Concrete Curing

The Contractor shall not overspray chemical curing compound. Drift shall be minimized by spraying as close to the concrete as possible. Drainage inlets shall be covered before applying curing compound.

The Contractor shall minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when curing concrete.

Concrete Finishing

The Contractor shall collect and dispose of water and solid waste from high-pressure water blasting. Drainage inlets within 50 feet shall be covered before sandblasting. The nozzle shall be kept as close to the surface of the concrete as possible to minimize drift of dust and blast material. Blast residue may contain hazardous material.

Containment structures for concrete finishing operations shall be inspected for damage before each day of use and before predicted precipitation. Liquid and solid waste shall be removed from the containment structure after each work shift.

DEWATERING

Dewatering shall consist of discharging accumulated storm water, ground water, or surface water from excavations or temporary containment facilities. The Contractor shall discharge water within the limits of the project.

Dewatering discharge shall not cause erosion, scour, or sedimentary deposits that impact natural bedding materials.

The Contractor shall conduct dewatering activities in accordance with the Field Guide for Construction Dewatering available at:

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

Before dewatering the Contractor shall submit a Dewatering and Discharge Plan to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications and "Water Pollution Control," of these special provisions. At a minimum, the Dewatering and Discharge Plan shall include the following:

A. A title sheet and table of contents;
B. A description of the dewatering and discharge operations detailing the locations, quantity of water, equipment, and discharge point;
C. The estimated schedule for dewatering and discharge (begin and end dates, intermittent or continuous);

D. Discharge alternatives such as dust control or percolation; and
E. Visual monitoring procedures with inspection log.

The Contractor shall not discharge storm water or non-storm water that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface and shall notify the Engineer immediately upon discovery.

If water cannot be discharged within the project limits due to site constraints it shall be disposed of in the same manner specified for material in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

PAYMENT

The contract lump sum price paid for construction site management shall include 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-storm water management, and dewatering and identifying, sampling, testing, handling, and disposing of hazardous waste, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.06 STREET SWEEPING

Street sweeping shall be conducted where sediment is tracked from the job site onto paved roads, as described in the approved Storm Water Pollution Prevention Plan (SWPPP) in accordance with "Water Pollution Control" of these special provisions, and as directed by the Engineer.

Street sweeping shall be one of the water pollution control practices for sediment control. The SWPPP shall include the use of street sweeping. Street sweeping shall be performed in accordance with Section 4, SC-7 in the Construction Site Best Management Practices Manual of the Caltrans Storm Water Quality Handbooks.

The number of street sweepers shall be as designated in the approved SWPPP. The Contractor shall maintain at least one sweeper on the job site at all times during the period that sweeping work is required. Sweepers shall be self-loading, motorized, and shall have spray nozzles. Sweepers may include a vacuum apparatus.

Street sweeping shall start at the beginning of clearing and grubbing and shall continue until completion of the project, or as directed by the Engineer. Street sweeping shall be performed immediately after soil disturbing activities occur or offsite tracking of material is observed. Street sweeping shall be performed so that dust is minimized. If dust generation is excessive or sediment pickup is ineffective as determined by the Engineer, the use of water or a vacuum will be required.

At the option of the Contractor, collected material may be temporarily stockpiled in accordance with the approved SWPPP. Collected material shall be disposed of at least once per week.

Material collected during street sweeping operations shall be disposed of in conformance with Section 7-1.13, "Disposal of Material Outside The Highway Right Of Way," of the Standard Specifications.

MEASUREMENT AND PAYMENT

The contract lump sum price paid for street sweeping shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in street sweeping, 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.

10-1.07 TEMPORARY CULVERTS

Temporary culverts shall be furnished, installed, maintained, and later removed as shown on the plans, as specified in these special provisions and as directed by the Engineer.

The size and type of temporary culvert to be installed at each location shall be at the option of the Contractor; however, the culvert shall be capable of sustaining the intended load and of discharging a quantity of water equivalent to the type and size of culvert shown on the plans. Adequacy as to equivalent strength and capacity shall be subject to approval, in writing, by the Engineer.

Used materials may be installed provided the used materials are good, sound and are suitable for the purpose intended, as determined by the Engineer.

Excavation and backfill for temporary culverts shall be performed in a manner that will provide adequate support for the culvert with a firm, nonsettling foundation for the roadbeds to be constructed over the culverts.

Temporary culverts that are damaged from any cause during the progress of the work shall be repaired or replaced by the Contractor at the Contractor's expense.

When no longer required for the work as determined by the Engineer, temporary culverts shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Removed temporary culverts that are not damaged may be installed in the permanent work provided the culverts conform to the requirements specified for the permanent work and the culverts are new when installed as temporary culverts.

Trenches and pits caused by the removal of temporary culverts shall be backfilled in conformance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Regardless of the sizes or kinds of temporary culverts installed, temporary culverts will be measured and paid for by the linear foot for the sizes of temporary culverts shown on the plans and listed in the Engineer's Estimate in the same manner specified for corrugated metal pipe in Section 66-4.01, "Measurement," and Section 66-4.02, "Payment," of the Standard Specifications.

Full compensation for maintaining, removing and disposing of temporary culverts shall be considered as included in the contract prices paid per linear foot for the various sizes or kinds of temporary culverts and no additional compensation will be allowed therefor.

10-1.08 TEMPORARY PIPE INLET

Temporary reinforced concrete pipe inlet shall be furnished, installed, maintained, and later removed as shown on the plans, as specified in these special provisions and as directed by the Engineer.

Used materials may be installed provided the used materials are good, sound and are suitable for the purpose intended, as determined by the Engineer.

Temporary reinforced concrete pipe inlet that are damaged from any cause during the progress of the work shall be repaired or replaced by the Contractor at the Contractor's expense.

Steel cover shall conform to the provisions for frames and covers in Section 75-1.02, "Miscellaneous Iron and Steel," of the Standard Specifications.

When no longer required for the work as determined by the Engineer, temporary reinforced concrete pipe inlet and steel cover shall be removed and 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.

Trenches and pits caused by the removal of temporary reinforced concrete pipe inlet shall be backfilled in conformance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Temporary reinforced concrete pipe inlet will be measured and paid for by the linear foot in the same manner specified for pipe inlet in Section 70-1.04, "Measurement," and Section 70-1.05, "Payment," of the Standard Specifications.

Full compensation for maintaining, removing and disposing of temporary pipe inlet shall be considered as included in the contract prices paid per linear foot for 60" temporary reinforced concrete pipe inlet and no additional compensation will be allowed therefor.

Full compensation for furnishing, installing, maintaining, removing and disposing of steel cover shall be considered as included in the contract price paid per linear foot for 60" temporary reinforced concrete pipe inlet and no separate payment will be made therefor.

10-1.09 TEMPORARY CONCRETE WASHOUT FACILITY

Temporary concrete washout facilities shall be constructed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary concrete washout facilities shall be one of the water pollution control practices for waste management and materials pollution control. The SWPPP shall include the use of temporary concrete washout facilities.

MATERIALS

Plastic Liner

Plastic liners shall be single ply, new polyethylene sheeting, a minimum of 10 mils thick and shall be free of holes, punctures, tears or other defects that compromise the impermeability of the material. Plastic liners shall not have seams or overlapping joints.

Gravel-filled Bags

Gravel bag fabric shall be nonwoven polypropylene geotextile (or comparable polymer) and shall conform to the following requirements:

Specification	Requirements
Weight per unit area, ounces per square yard, min. ASTM Designation: D 5261	8.0
Grab tensile strength (one inch grip), kilonewtons, min. ASTM Designation: D 4632*	205
Ultraviolet stability, percent tensile strength retained after 500 hours, ASTM Designation: D 4355, xenon arc lamp method	70

* or appropriate test method for specific polymer

Gravel bags shall be between 24 inches and 32 inches in length, and between 16 inches and 20 inches in width.

Yarn used for binding gravel bags shall be as recommended by the manufacturer or bag supplier and shall be of a contrasting color.

Gravel shall be between 3/8 inch and 3/4 inch in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials.

The opening of gravel-filled bags shall be secured to prevent gravel from escaping. Gravel-filled bags shall be between 30 pounds and 50 pounds in weight.

Straw Bales

Straw for straw bales shall conform to the provisions in Section 20-2.06, "Straw," of the Standard Specifications.

Straw bales shall be a minimum of 14 inches in width, 18 inches in height, 36 inches in length and shall have a minimum weight of 50 pounds. The straw bale shall be composed entirely of vegetative matter, except for binding material.

Straw bales shall be bound by either wire, nylon or polypropylene string. Jute or cotton binding shall not be used. Baling wire shall be a minimum of 16 gage in diameter. Nylon or polypropylene string shall be approximately 0.08-inch in diameter with 80 pounds of breaking strength.

Stakes

Stakes shall be wood or metal. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. They shall be straight and free of loose or unsound knots or other defects which would render them unfit for the purpose intended. Wood stakes shall be a minimum 2" x 2" in size. Metal stakes may be used as an alternative, and shall be a minimum of 0.5-inch in diameter. Stakes shall be a minimum of 4 feet in length. The tops of the metal stakes shall be bent at a 90-degree angle or capped with an orange or red plastic safety cap that fits snugly to the metal stake. The Contractor shall submit a sample of the metal stake and plastic cap, if used, for the Engineer's approval before installation.

Staples

Staples shall be as shown on the plans. An alternative attachment device such as geotextile pins or plastic pegs may be used instead of staples. The Contractor shall submit a sample of the alternative attachment device for the Engineer's approval before installation.

Signs

Wood posts for signs shall conform to the provisions in Section 56-2.02B, "Wood Posts," of the Standard Specifications. Lag screws shall conform to the provisions in Section 56-2.02D, "Sign Panel Fastening Hardware," of the Standard Specifications.

Plywood shall be freshly painted for each installation with not less than 2 applications of flat white paint. Sign letters shown on the plans shall be stenciled with commercial quality exterior black paint. Testing of paint will not be required.

INSTALLATION

Temporary concrete washout facilities shall be as follows:

1. Temporary concrete washout facilities shall be installed before beginning placement of concrete and located a minimum of 50 feet from storm drain inlets, open drainage facilities, and water courses unless determined infeasible by the Engineer. Temporary concrete washout facilities shall be located away from construction traffic or access areas at a location determined by the Contractor and approved by the Engineer.
2. A sign shall be installed adjacent to each washout facility at a location determined by the Contractor and approved by the Engineer. Signs shall be installed in conformance with the provisions in Section 56-2.03, "Construction," and Section 56-2.04, "Sign Panel Installation," of the Standard Specifications.

3. The length and width of a temporary concrete washout facility may be increased from the minimum dimensions shown on the plans upon approval of the Engineer.
4. Temporary concrete washout facilities shall be constructed in sufficient quantity and size to contain liquid and concrete waste generated by washout operations for concrete wastes. These facilities shall be constructed to contain liquid and concrete waste without seepage, spills, or overflow.
5. Berms for below grade temporary concrete washout facilities shall be constructed from compacted native material. Gravel may be used in conjunction with compacted native material.
6. A plastic liner shall be installed in below grade temporary concrete washout facilities.

Details for an alternative temporary concrete washout facility shall be submitted to the Engineer for approval at least 7 days before installation.

When temporary concrete washout facilities are no longer required for the work, as determined by the Engineer, the hardened concrete and liquid residue shall be removed and disposed of in conformance with the provisions in Section 15-3.02, "Removal Methods," of the Standard Specifications. Temporary concrete washout facilities 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.

Ground disturbance, including holes and depressions, caused by the installation and removal of the temporary concrete washout facilities shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary concrete washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 12 inches. Maintaining temporary concrete washout facilities shall include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials shall be removed and disposed of in conformance with the provisions in Section 15-3.02, "Removal Methods," of the Standard Specifications. Holes, rips, and voids in the plastic liner shall be patched and repaired by taping or the plastic liner shall be replaced. The plastic liner shall be replaced when patches or repairs compromise the impermeability of the material as determined by the Engineer.

Gravel bags shall be replaced when the bag material is ruptured or when the yarn has failed, allowing the bag contents to spill out.

Temporary concrete washout facilities shall be repaired or replaced on the same day the damage occurs. Damage to temporary concrete washout facilities resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

MEASUREMENT AND PAYMENT

Quantities of temporary concrete washout facilities will be measured as units determined from actual count in place.

The contract unit price paid for temporary concrete washout facility shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing a temporary concrete washout facility, complete in place, including excavation and backfill, maintenance, and removal, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.10 TEMPORARY FIBER ROLL

Temporary fiber roll shall be furnished, installed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary fiber roll shall be installed on excavation and embankment slopes and other disturbed soil areas, active or nonactive.

Temporary fiber roll shall be one of the water pollution control practices for sediment control. The SWPPP shall include the use of temporary fiber roll.

Temporary fiber roll shall be either Type 1 or Type 2.

MATERIALS

Fiber Roll

Fiber roll shall be either:

1. Constructed with a premanufactured blanket consisting of either wood excelsior, rice or wheat straw, or coconut fibers or a combination of these materials. The blanket shall be between 6 feet and 8 feet in width and between 65 feet and 95 feet in length. Wood excelsior shall be individual fibers, of which 80 percent shall be 6 inches or

longer in length. The blanket shall have a photodegradable plastic netting or biodegradable jute, sisal, or coir fiber netting on at least one side. The blanket shall be rolled along the width and secured with jute twine spaced 6 feet apart along the full length of the roll and placed 6 inches from the ends of each roll. The finished roll shall be between 8 inches and 10 inches in diameter, a minimum of 20 feet in length, and shall weigh a minimum of 0.5 pound per linear foot. More than one blanket may be required to achieve the finished roll diameter. When more than one blanket is required, blankets shall be jointed longitudinally with an overlap of 6 inches along the length of the blanket.

2. A premanufactured roll of rice or wheat straw, wood excelsior, or coconut fiber encapsulated within a photodegradable plastic or biodegradable jute, sisal, or coir fiber netting. The netting shall have a minimum durability of one year after installation. The netting shall be secured tightly at each end of the roll. Rolls shall be between 8 inches and 12 inches in diameter. Rolls between 8 inches and 10 inches in diameter shall have a minimum weight of 1 pound per linear foot and a minimum length of 20 feet. Rolls between 10 inches and 12 inches in diameter shall have a minimum weight of 3 pounds per linear foot and a minimum length of 10 feet.

Stakes

Wood stakes shall be a minimum of 1" x 1" x 24" in size for Type 1 installation, or a minimum of 1" x 2" x 24" in size for Type 2 installation. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. They shall be straight and free of loose or unsound knots and other defects which would render them unfit for the purpose intended. Metal stakes shall not be used.

Rope

Rope shall be biodegradable, such as sisal or manila, with a minimum diameter of 1/4 inch.

INSTALLATION

Temporary fiber roll shall be installed as follows:

1. Temporary fiber roll (Type 1): Furrows shall be constructed to a depth between 2 inches and 4 inches, and to a sufficient width to hold the fiber roll. Stakes shall be installed 24 inches apart along the length of the fiber rolls and stopped at 12 inches from each end of the rolls. Stakes shall be driven to a maximum of 2 inches above, or flush with the top of the roll.
2. Temporary fiber roll (Type 2): Rope and notched stakes shall be used to restrain the fiber rolls against the slope. Stakes shall be driven into the slope until the notch is even with the top of the fiber roll. Rope shall be knotted at each stake and laced between stakes. After installation of the rope, stakes shall be driven into the slope such that the rope will hold the fiber roll tightly to the slope. Furrows will not be required.
3. Temporary fiber rolls shall be placed 10 feet apart along the slope for slope inclination (horizontal:vertical) of 2:1 and steeper, 15 feet apart along the slope for slope inclination between 2:1 and 4:1, 20 feet apart along the slope for slope inclination between 4:1 and 10:1, and a maximum of 50 feet apart along the slope for slope inclination of 10:1 and flatter.
4. The bedding area for the fiber roll shall be cleared of obstructions including rocks, clods, and debris greater than one inch in diameter before installation.
5. Temporary fiber rolls shall be installed approximately parallel to the slope contour.

When no longer required, as determined by the Engineer, temporary fiber rolls shall be removed and 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. Temporary fiber rolls may be abandoned in place when approved in writing by the Engineer.

Ground disturbances including holes and depressions caused by the installation and removal of the temporary fiber roll shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary fiber rolls shall be maintained to disperse concentrated water runoff and to reduce runoff velocities. Split, torn, or unraveling rolls shall be repaired or replaced. Broken or split stakes shall be replaced. Sagging or slumping fiber rolls shall be repaired with additional stakes or replaced. Locations where rills and other evidence of concentrated runoff have occurred beneath the rolls shall be corrected. Temporary fiber rolls shall be repaired or replaced within 24 hours of identifying the deficiency.

MEASUREMENT AND PAYMENT

Quantities of temporary fiber rolls to be paid for will be determined by the linear foot measured along the centerline of the installed roll. Where temporary fiber rolls are joined and overlapped, the overlap will be measured as a single installed roll.

The contract price paid per linear foot for temporary fiber roll shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary fiber rolls, complete in place, including furrow excavation and backfill, and removal, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Damage to temporary fiber rolls resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

The cost of maintaining temporary fiber rolls will be borne equally by the State and the Contractor. The division of cost will be made by determining the cost of maintaining temporary fiber rolls in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying half of that cost to the Contractor.

Cleanup, repair, removal, disposal, or replacement due to improper installation or the Contractor's negligence will not be considered as included in the cost for performing maintenance.

10-1.11 TEMPORARY FENCE (TYPE ESA)

Temporary fence (Type ESA) shall be furnished, installed, maintained, and later removed in conformance with the details shown on the plans, as specified in these special provisions and as directed by the Engineer.

MATERIALS

Used materials may be installed provided the used materials conform to these special provisions.

High Visibility Fabric

High visibility fabric shall be machine produced, orange colored mesh manufactured from polypropylene or polyethylene. High visibility fabric may be made of recycled materials. Materials shall not contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. High visibility fabric shall be fully stabilized ultraviolet resistant, shall be a minimum of 4 feet in width with a maximum mesh opening of 2" x 2". High visibility fabric shall be furnished in one continuous width and shall not be spliced to conform to the specified width dimension.

Posts

Posts for temporary fence (Type ESA) shall be of one of the following:

A. Wood posts shall be fir or pine, shall have a minimum cross section of 2" x 2", and a minimum length of 5.25 feet. The end of the post to be embedded in the soil shall be pointed. Wood posts shall not be treated with wood preservative.
B. Steel posts shall have a "U," "T," "L," or other cross sectional shape that resists failure from lateral loads. Steel posts shall have a minimum weight of 0.75 pounds per linear foot and a minimum length of 5.25 feet. One end of the steel post shall be pointed and the other end shall have a high visibility colored top.

Fasteners

Fasteners for attaching high visibility fabric to the posts shall be as follows:

A. The high visibility fabric shall be attached to wooden posts with commercial quality nails or staples, or as recommended by the manufacturer or supplier.
B. Tie wire or locking plastic fasteners shall be used for attaching the high visibility fabric to steel posts. Maximum spacing of tie wire or fasteners shall be 24 inches along the length of the steel post.

INSTALLATION

Temporary fence (Type ESA) shall be installed as follows:

A. All fence construction activities shall be conducted from outside the ESA as shown on the plans or as staked.
B. Posts shall be embedded in the soil a minimum of 16 inches. Post spacing shall be 8 feet maximum from center to center and shall at all times support the fence in a vertical position.

C. Temporary fence (Type ESA) shall be constructed prior to clearing and grubbing work, shall enclose the foliage canopy (drip line) of protected plants, and shall not encroach upon visible roots of the plants.
D. Temporary fence (Type ESA) shall be located so that it is visible, as determined by the Engineer.

When Type ESA temporary fence is no longer required, as determined by the Engineer, the temporary fence shall be removed and 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, except when reused as provided in this section.

Holes caused by the removal of temporary fence (Type ESA) shall be backfilled in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary fence (Type ESA) that is damaged during the progress of the work shall be repaired or replaced by the Contractor the same day the damage occurs.

MEASUREMENT AND PAYMENT

Temporary fence (Type ESA) shall be measured and paid for in the same manner specified for fence (Type BW or WM, wood or metal posts) as provided in Section 80, "Fences," of the Standard Specifications.

Full compensation for maintaining, removing, and disposing of temporary fence (Type ESA) shall be considered as included in the contract price paid per linear foot for temporary fence (Type ESA) and no additional compensation will be allowed therefor.

10-1.12 TEMPORARY CONSTRUCTION ENTRANCE

Temporary construction entrances shall be constructed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary construction entrances shall be one of the water pollution control practices for tracking control. The SWPPP shall include the use of temporary construction entrances.

Temporary construction entrances shall be either Type 1 or Type 2.

MATERIALS

Temporary Entrance Fabric

Temporary entrance fabric shall be manufactured from polyester, nylon, or polypropylene material, or any combination thereof. Temporary entrance fabric shall be a nonwoven, needle-punched fabric, free of needles which may have broken off during the manufacturing process. Temporary entrance fabric shall be permeable and shall not act as a wicking agent.

Temporary entrance fabric shall be manufactured from virgin, recycled, or a combination of virgin and recycled polymer materials. No virgin or recycled materials shall contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. The Engineer may order tests to confirm the absence of biodegradable filler materials in conformance to the requirements in ASTM Designation: E 204 (Fourier Transformed Infrared Spectroscopy-FTIR).

Temporary entrance fabric shall conform to the following requirements:

Specification	Requirements
Weight per unit area, ounces per square yard, min. ASTM Designation: D 5261	6.5
Grab tensile strength (one inch grip), pounds, min. ASTM Designation: D 4632*	200
Elongation at break, percent min. ASTM Designation: D 4632*	50
Toughness, pounds, min. (percent elongation x grab tensile strength)	12,000

* or appropriate test method for specific polymer

Rocks

Rocks shall conform to the material quality requirements in Section 72-2.02, "Materials," of the Standard Specifications for shape and for apparent specific gravity, absorption, and durability index. Rocks used for the temporary entrance shall conform to the following sizes:

Square Screen Size (inch)	Percentage Passing	Percentage Retained
6	100	0
3	0	100

Corrugated Steel Panels

Corrugated steel panels shall be prefabricated and shall be pressed or shop welded, with a slot or hooked section to facilitate coupling at the ends of the panels.

INSTALLATION

Temporary construction entrances shall be installed as follows:

1. Before placing the temporary entrance fabric, the areas shall be cleared of all trash and debris. Vegetation shall be removed to the ground level. Trash, debris, and removed vegetation 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.
2. A sump shall be constructed within 20 feet of each temporary construction entrance as shown on the plans.
3. Before placing the temporary entrance fabric, the ground shall be graded to a uniform plane. The relative compaction of the top 1.5 feet shall be not less than 90 percent. The ground surface shall be free of sharp objects that may damage the temporary entrance fabric, and shall be graded to drain to the sump as shown on the plans.
4. Temporary entrance fabric shall be positioned longitudinally along the alignment of the entrance, as directed by the Engineer.
5. The adjacent ends of the fabric shall be overlapped a minimum length of 12 inches.
6. Rocks to be placed directly over the fabric shall be spread in the direction of traffic, longitudinally and along the alignment of the temporary construction entrance.
7. During spreading of the rocks, vehicles or equipment shall not be driven directly on the fabric. A layer of rocks a minimum 6 inches thick shall be placed between the fabric and the spreading equipment to prevent damage to the fabric.
8. For Type 2 temporary construction entrances, a minimum of 6 coupled panel sections shall be installed for each temporary construction entrance. Before installing the panels, the ground surface shall be cleared of all debris to ensure uniform contact with the ground surface.

Fabric damaged during rock placement shall be repaired by placing a new piece of fabric over the damaged area. The piece of fabric shall be large enough to cover the damaged area and provide a minimum 18-inch overlap on all edges.

Details for a proposed alternative temporary construction entrance or alternative sump shall be submitted to the Engineer for approval at least 7 days before installation. The Contractor may eliminate the sump if approved in writing by the Engineer.

When no longer required as determined by the Engineer, temporary construction entrances shall be removed and 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.

Ground disturbance, including holes and depressions, caused by the installation and removal of the temporary construction entrance, including the sumps, shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

While the temporary construction entrance is in use, pavement shall be cleaned and sediment removed at least once a day, and as often as necessary when directed by the Engineer. Soil and sediment or other extraneous material tracked onto existing pavement shall not be allowed to enter drainage facilities.

MAINTENANCE

The Contractor shall maintain temporary construction entrances throughout the contract or until removed. The Contractor shall prevent displacement or migration of the rock surfacing or corrugated steel panels. Significant depressions resulting from settlement or heavy equipment shall be repaired by the Contractor as directed by the Engineer.

Temporary construction entrances shall be maintained to minimize tracking of soil and sediment onto existing public roads.

If buildup of soil and sediment deter the function of the temporary construction entrance, the Contractor shall immediately remove and dispose of the soil and sediment, and install additional corrugated steel panels and spread additional rocks to increase the capacity of the temporary construction entrance.

Temporary construction entrances shall be repaired or replaced on the same day the damage occurs. Damage to the temporary construction entrance resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

MEASUREMENT AND PAYMENT

Quantities of temporary construction entrances will be determined from actual count in place.

The contract unit price paid for temporary construction entrance shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing temporary construction entrance, complete in place, including excavation and backfill, and removal, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The cost of maintaining the temporary construction entrance will be borne equally by the State and the Contractor. The division of cost will be made be determining the cost of maintaining temporary construction entrance in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying to the Contractor one-half of that cost.

Cleanup, repair, removal, disposal, or replacement due to improper installation or the Contractor's negligence will not be considered as included in the cost for performing maintenance.

10-1.13 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

The following definitions apply to this section:

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 VCEP as specified in Section 4-1.035B, "Value Engineering Change Proposal." 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:

1. Latest version of Primavera SureTrak Project Manager for Windows, or equivalent
2. Latest version of schedule-comparing HST SureChange, or equivalent

If a schedule software equivalent to SureTrak is proposed, it must be capable of generating files that can be imported into SureTrak. The schedule-comparing software must be compatible with schedule software submitted and must be able to

compare two schedules and provide 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 4-1.03, "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 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 SureTrak 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 agreement is not reached, you are allowed 15 days from the meeting with the Engineer to give notice 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.

10-1.14 TIME-RELATED OVERHEAD

The Contractor will be compensated for time-related overhead as described below and in conformance with "Force Account Payment" of these special provisions. The Contractor will not be compensated for time-related overhead for delays

to the controlling operations caused by the Engineer that occur prior to the first working day, but will be compensated for actual overhead costs incurred, as determined by an independent Certified Public Accountant audit examination and report.

Attention is directed to "Beginning of Work, Time of Completion and Liquidated Damages," "Force Account Payment," and "Progress Schedule (Critical Path Method)" of these special provisions.

The provisions in Section 9-1.08, "Adjustment of Overhead Costs," of the Standard Specifications shall not apply.

Time-related overhead shall consist of those overhead costs, including field and home office overhead, that are in proportion to the time required to complete the work. Time-related overhead shall not include costs that are not related to time, including but not limited to, mobilization, licenses, permits, and other charges incurred only once during the contract. Time-related overhead shall not apply to subcontractors of any tier, suppliers, fabricators, manufacturers, or other parties associated with the Contractor.

Field office overhead expenses include time-related costs associated with the normal and recurring operations of the construction project, and shall not include costs directly attributable to the work of the contract. Time-related costs of field office overhead include, but are not limited to, salaries, benefits, and equipment costs of project managers, general superintendents, field office managers and other field office staff assigned to the project, and rent, utilities, maintenance, security, supplies, and equipment costs of the project field office.

Home office overhead or general and administrative expenses refer to the fixed costs of operating the Contractor's business. These costs include, but are not limited to, general administration, insurance, personnel and subcontract administration, purchasing, accounting, and project engineering and estimating. Home office overhead costs shall exclude expenses specifically related to other contracts or other businesses of the Contractor, equipment coordination, material deliveries, and consultant and legal fees.

The quantity of time-related overhead associated with a reduction in contract time for cost reduction incentive proposals accepted and executed in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications shall be considered a construction cost attributable to the resultant estimated net savings due to the cost reduction incentive.

If the final increased quantity of time-related overhead exceeds 149 percent of the number of working days specified in the Engineer's Estimate, the Contractor shall, within 60 days of the Engineer's written request, submit to the Engineer an audit examination and report performed by an independent Certified Public Accountant of the Contractor's actual overhead costs. The audit examination and report shall depict the Contractor's project and company-wide financial records and shall specify the actual overall average daily rates for both field and home office overhead for the entire duration of the project, and whether the costs have been properly allocated. The rates of field and home office overhead shall exclude unallowable costs as determined in the Federal Acquisition Regulations, 48 CFR, Chapter 1, Part 31.

Independent Certified Public Accountant's audit examinations shall be performed in conformance with the requirements of the American Institute of Certified Public Accountants Attestation Standards. Audit examinations and reports shall determine if the rates of field office overhead and home office overhead are:

A. Allowable in conformance with the requirements of the Federal Acquisition Regulations, 48 CFR, Chapter 1, Part 31.
B. Adequately supported by reliable documentation.
C. Related solely to the project under examination.

Within 20 days of receipt of the Engineer's written request, the Contractor shall make its financial records available for audit by the State for the purpose of verifying the actual rate of time-related overhead specified in the audit submitted by the Contractor. The actual rate of time-related overhead specified in the audit, submitted by the Contractor, will be subject to approval by the Engineer.

If the Engineer requests the independent Certified Public Accountant audit, or if it is requested in writing by the Contractor, the contract item payment rate for time-related overhead, in excess of 149 percent of the number of working days specified in the Engineer's Estimate, will be adjusted to reflect the actual rate.

The cost of performing an independent Certified Public Accountant audit examination and submitting the report, requested by the Engineer, will be borne equally by the State and the Contractor. The division of the cost will be made by determining the cost of providing an audit examination and report in conformance with the provisions of Section 9-1.03B, "Work Performed by Special Forces or Other Special Services," of the Standard Specifications, and paying to the Contractor one-half of that cost. The cost of performing an audit examination and submitting the independent Certified Public Accountant audit report for overhead claims other than for the purpose of verifying the actual rate of time-related overhead shall be entirely borne by the Contractor. The cost of performing an audit examination and submitting the independent Certified Public Accountant audit report to verify actual overhead costs incurred prior to the first working day shall be entirely borne by the Contractor.

The quantity of time-related overhead to be paid will be measured by the working day, designated in the Engineer's Estimate as WDAY. The estimated number of working days is the number of working days, excluding days for plant

establishment, as specified in "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions. The quantity of time-related overhead will be increased or decreased only as a result of suspensions or adjustments of contract time which revise the current contract completion date, and which satisfy any of the following criteria:

A. Suspensions of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications, except:

    1. Suspensions ordered due to weather conditions being unfavorable for the suitable prosecution of the controlling operation or operations.
    2. Suspensions ordered due to the failure on the part of the Contractor to carry out orders given, or to perform the provisions of the contract.
    3. Suspensions ordered due to factors beyond the control of and not caused by the State or the Contractor, for which the Contractor is granted extensions of time in conformance with the provisions of the third paragraph of Section 8-1.07, "Liquidated Damages," of the Standard Specifications.
    4. Other suspensions that mutually benefit the State and the Contractor.

B. Extensions of contract time granted by the State in conformance with the provisions in the fifth paragraph in Section 8-1.07, "Liquidated Damages," of the Standard Specifications and set forth in approved contract change orders, in conformance with the provisions in Section 4-1.03, "Changes," of the Standard Specifications.
C. Reductions in contract time set forth in approved contract change orders, in conformance with the provisions in Section 4-1.03, "Changes," of the Standard Specifications.

In the event an early completion progress schedule, as defined in "Progress Schedule (Critical Path Method)" of these special provisions, is submitted by the Contractor and approved by the Engineer, the amount of time-related overhead eligible for payment will be based on the total number of working days for the project, in conformance with the provisions in "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions, rather than the Contractor's early completion progress schedule.

The contract price paid per working day for time-related overhead shall include full compensation for time-related overhead, including the Contractor's share of costs of the independent Certified Public Accountant audit of overhead costs requested by the Engineer, as specified in these special provisions, and as directed by the Engineer.

The provisions in Sections 4-1.03B, "Increased or Decreased Quantities," and 4-1.03C, "Changes in Character of the Work," of the Standard Specifications shall not apply to the contract item of time-related overhead.

Full compensation for additional overhead costs incurred during days of inclement weather when the contract work is extended into additional construction seasons due to delays caused by the State shall be considered as included in the time-related overhead paid during the contract working days, and no additional compensation will be allowed therefor.

Full compensation for additional overhead costs involved in performing additional contract item work that is not a controlling operation shall be considered as included in the contract items of work involved and no additional compensation will be allowed therefor.

Full compensation for overhead, other than time-related overhead measured and paid for as specified above, and other than overhead costs included in the markups specified in "Force Account Payment" of these special provisions, shall be considered as included in the various items of work and no additional compensation will be allowed therefor.

Overhead costs incurred by subcontractors of any tier, suppliers, fabricators, manufacturers, and other parties associated with the Contractor shall be considered as included in the various items of work and as specified in Section 9-1.03, "Force Account Payment," of the Standard Specifications.

For the purpose of making partial payments pursuant to the provisions in Section 9-1.06, "Partial Payments," of the Standard Specifications, the number of working days to be paid for time-related overhead in each monthly partial payment will be the number of working days, specified above to be measured for payment that occurred during that monthly estimate period, including compensable suspensions and right of way delays. Working days granted by contract change order due to extra work or changes in character of the work, will be paid for upon completion of the contract. The amount earned per working day for time-related overhead shall be the lesser of the following amounts:

A. The contract item price.
B. Twenty percent of the original total contract amount divided by the number of working days specified in "Beginning of Work, Time of Completion and Liquidated Damages," of these special provisions.

After acceptance of the contract in conformance with the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount of the total contract item price for time-related overhead not yet paid, will be included

for payment in the first estimate made after acceptance of the contract in conformance with the provisions in Section 9-1.07, "Payment After Acceptance," of the Standard Specifications.

10-1.15 OBSTRUCTIONS

Attention is directed to Section 8-1.10, "Utility and Non-Highway Facilities," and Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

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 6 inches in diameter or pipelines operating at pressures greater than 60 pounds per square inch (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.

If these facilities are not located on the plans in both alignment and elevation, no work shall be performed in the vicinity of the facilities, except as provided herein for conduit to be placed under pavement, until the owner, or the owner's representative, has located the facility by potholing, probing or other means that will locate and identify the facility. Conduit to be installed under pavement in the vicinity of these facilities shall be placed by the trenching method in conformance with the provisions in "Conduit" of these special provisions. If, in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the utility facilities not being located by the owner or the owner's representative, the State will compensate the Contractor for the delays to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications, and not otherwise, except as provided in Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications.

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

It is anticipated that the following utility facilities will be relocated prior to the dates shown:

Utility	Location	Date
Southern California	Gas line along south of existing Route 198 and west of 7th Avenue between Station 160+00 and Station 180+00, and along west of Road 68	July, 2009
Southern California Edison	Electrical line at: a). North of existing Route 198 (Tul. Co) between Station 13+00 and Station 19+00, between 53+00 and Station 59+00, between 6th and 7th Avenue, b). South of existing Route 198 between Station 158+00 and Station 172+00 and between 3rd and 1st Avenue c). Perpendicular to Route 198 (Tul. Co) at Station 13+00, and at Station 40+00, d). Along Road 52, Road 56, Road 60 and Road 68.	July, 2009
AT&T	Along north of existing Route 198 between 3rd and 1st Avenue and between 6th and 7th Avenue.	July, 2009

Installation of the following utility facilities will require coordination with the Contractor's operations. The Contractor shall make the necessary arrangements with the utility company, through the Engineer, and shall submit a schedule of work,

verified by a representative of the utility company, to the Engineer. The schedule of work shall provide not less than the following number of working days, as defined in Section 8-1.06, "Time of Completion," of the Standard Specifications for the utility company to complete their work:

Utility (address)	Location	Working Days
Southern California	Gas line along south of existing Route 198 and west of 6th Avenue	10
PG&E	S/W corner of Route 198 and 7th Ave	5

In the event that the utility facilities mentioned above are not removed or relocated by the date specified and, if in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the utility facilities not being removed or relocated by the date specified, the State will compensate the Contractor for the delays to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications, and not otherwise, except as provided in Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications.

10-1.16 SMALL BUSINESS UTILIZATION REPORT

Submit a completed Small Business Utilization Report form on or before the following dates for the prior reporting period:

1. January 15th
2. April 15th
3. July 15th
4. October 15th

Submit a completed final Small Business Utilization Report form within 30 days after contract acceptance.

The Department pays $250 for each report submitted. The contract unit price paid for small business utilization report includes full compensation for doing all the work involved in submitting the completed Small Business Utilization Report form. If you fail to submit a completed form by the specified time, you will not receive payment for that report.

The Department does not adjust payment for an increase or decrease in the quantity of small business utilization reports submitted. Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications does not apply.

The work to complete the final Small Business Utilization Report contract item is excluded from Section 7-1.17, "Acceptance of Contract," of the Standard Specifications.

Failure to submit the Small Business Utilization Report is not considered a performance failure. Section 9-1.053, "Performance Failure Withholds," of the Standard Specifications does not apply.

10-1.17 RIGHT OF WAY OBSTRUCTIONS

Attention is directed to the occupied improvements located within the right of way at:

The parcel (Parcel No.84897) on the northside of Route 198 from Station 79+80 to Station 92+75

It is anticipated that these improvements will be vacated and removed by February 1, 2010.

The Contractor shall take no action that will result in unnecessary inconvenience, disproportionate injury or any action coercive in nature to the occupants of these improvements who have not yet moved from the improvements.

In the event that the improvements mentioned above are not removed by the date specified and, if in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the improvements not being removed by the date specified, the State will compensate the Contractor for the delays to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

10-1.18 DUST CONTROL

Dust control shall conform to the provisions in Section 10, "Dust Control," of the Standard Specifications.

10-1.19 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications.

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 days before beginning any work using the devices or within 2 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/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 days before beginning any work using the devices or within 2 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/HighwaySafe.htm

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.

The term "construction area signs" shall include temporary object markers required for the direction of public traffic through or around the work during construction. Object markers listed or designated on the plans as construction area signs shall be considered to be signs and shall be furnished, erected, maintained, and removed by the Contractor in the same manner specified for construction area signs.

Object markers shall be stationary mounted on wood or metal posts in conformance with the details shown on the plans and the provisions in Section 82, "Markers and Delineators," of the Standard Specifications.

Marker panels for Type N (CA) object markers shall conform to the provisions for sign panels for stationary mounted signs.

Target plates for Type K (CA) object markers and posts, reflectors and hardware shall conform to the provisions in Section 82, "Markers and Delineators," but need not be new.

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, "Public Safety" of these special provisions 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.

Openings shall be provided through bridge falsework for the use of public traffic at each location where falsework is constructed over the streets or routes listed in the following table. The type, minimum width, height, and number of openings at each location, and the location and maximum spacing of falsework lighting, if required for each opening, shall conform to the requirements in the table. The width of vehicular openings shall be the clear width between temporary railings or other

protective work. The spacing shown for falsework pavement lighting is the maximum distance center to center in feet between fixtures.

Road 68 OC (Bridge No. 46-0265)

	Number	Width	Height
Vehicle Openings			
North bound	1	71	16.5
South bound	1	69	16.5

(Width and Height in feet)

The exact location of openings will be determined by the Engineer.

Closures are only allowed during the hours shown in the lane requirement charts included in this section "Maintaining Traffic," 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 when construction operations are not actively in progress.

Under one-way reversing traffic control operations, public traffic may be stopped in one direction for periods not to exceed 10 minutes.

Unless approved by the Engineer, the maximum length of a single stationary lane closure shall be 1.5 miles.

Unless approved by the Engineer, not more than 2 separate stationary lane closures will be allowed at one time. Concurrent stationary closures shall be spaced no closer than 5.0 miles apart.

C43(CA) (FRESH CONCRETE) sign shall be used at the beginning of the pavement slab replacement work area. The sign shall be in place during the entire curing period.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders including sections closed to public traffic.

When work vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed with fluorescent orange traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at 25-foot intervals to a point not less than 25 feet past the last vehicle or piece of equipment. A minimum of 9 traffic cones or portable delineators shall be used for the taper. A W20-1 (ROAD WORK AHEAD) or W21-5b (RIGHT/LEFT SHOULDER CLOSED AHEAD) or C24(CA) (SHOULDER WORK AHEAD) sign shall be mounted on a crashworthy portable sign support with flags. The sign shall be placed where designated by the Engineer. The sign shall be a minimum of 48" x 48" in size. The Contractor shall immediately restore to the original position and location a traffic cone or delineator that is displaced or overturned, during the progress of work.

A minimum of one paved traffic lane, not less than 11 feet wide, shall be open for use by public traffic.

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.

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.

Special Days are: Martin Luther King Junior Day, Lincoln's Birthday, Cesar Chavez Day, Easter Sunday, and Columbus Day.

Full compensation for furnishing, erecting, maintaining, and removing and disposing of the C43(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						
	x	xx	xx	**SD** xx						
				x	**H** xx					
					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 12:00 noon.
xx	The full width of the traveled way shall be open for use by public traffic.
H	Designated Legal Holiday
SD	Special Day

Chart No. 1 of 1
Conventional Highway Lane Requirements

County: Kings and Tulare	Route/Direction: Route 198 / East and Westbound	PM: R21.5 / R28.3, 0.0 / R3.4

Closure Limits: 0.9 mile of Route 43/198 Separation to 0.4 mile west of Route 99/198 Separation.

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	R	R	R	R	R	R														R	R	R	R	R	
Fridays	R	R	R	R	R	R																			
Saturdays																									
Sundays																				R	R	R	R	R	

Legend:

R	Provide at least one through traffic lane, not less than 11 feet in width, for use by both directions of travel (Reversing Control)
	Work permitted within project right of way where shoulder or lane closure is not required.

REMARKS:

1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.
2. Complete closure of an intersection shall not be allowed.
3. At the 4 lane section, provide at least one through traffic lane open in direction of travel during the following hours: From Sunday 7:00 p.m. to Friday 6:00 a.m.

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

By noon Monday, the Contractor shall submit a written schedule of planned closures for the following week period, defined as Sunday noon through the following Sunday noon. Closures involving work (temporary barrier placement and paving operations) that will reduce horizontal clearances, traveled way inclusive of shoulders, to 2 lanes or less shall be submitted not less than 25 days and not more than 125 days before the anticipated start of operation. Closures involving work (pavement overlay, overhead sign installation, falsework and girder erection) that will reduce the vertical clearances available to the public, shall be submitted not less than 25 days and not more than 125 days before the anticipated start of operation.

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. Approval of Closure Schedule amendments will be at the discretion of the Engineer.

The Engineer shall be notified of cancelled closures 2 business days before the date of closure.

Closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of the Engineer.

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.

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 IMPACT ATTENUATOR VEHICLE

GENERAL

Summary

Work includes protecting traffic and workers by using impact attenuator vehicle as a shadow vehicle when placing and removing components of a traffic control system, and when performing a moving lane closure.

Comply with Section 12-3.03, "Flashing Arrow Signs," of the Standard Specifications.

Impact attenuator vehicle must comply with the following test levels under National Cooperative Highway Research Program 350:

1. Test level 3 for pre-construction posted speed limit of 50 mph or more
2. Test levels 2 or 3 for pre-construction posted speed limit of 45 mph or less

Comply with the attenuator manufacturer's recommendations for:

1. Support truck
2. Trailer-mounted operation
3. Truck-mounted operation

Definitions

impact attenuator vehicle: Support truck towing a deployed attenuator mounted to a trailer or support truck with a deployed attenuator mounted to the support truck.

Submittals

Upon request, submit a Certificate of Compliance for attenuator to the Engineer under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Quality Control and Assurance

Attenuator must be a brand listed on the Department's pre-approved list at:

http://www.dot.ca.gov/hq/esc/approved_products_list/HighwaySafe.htm

MATERIALS

The combined weight of the support truck and the attenuator must be at least 19,800 pounds, except the weight of the support truck must not be less than 16,100 pounds or greater than 26,400 pounds.

If using the Trinity MPS-350 truck-mounted attenuator, the support truck must not have any underneath fuel tank mounted within 10'-6" of the rear of the support truck.

Each impact attenuator vehicle must:

1. Have standard brake lights, taillights, sidelights, and turn signals
2. Have an inverted "V" chevron pattern placed across the entire rear of the attenuator composed of alternating 4 inch wide non-reflective black stripes and 4 inch wide yellow retroreflective stripes sloping at 45 degrees
3. Have a Type II flashing arrow sign
4. Have a flashing or rotating amber light
5. Have an operable 2-way communication system for maintaining contact with workers

CONSTRUCTION

Use impact attenuator vehicle to follow behind equipment and workers who are placing and removing components of a traffic control system for a lane closure or a ramp closure. Flashing arrow sign must be operating in arrow mode during this activity. Follow at a distance to prevent intrusion into the workspace from passing traffic.

After placing components of a traffic control system for a lane closure or a ramp closure you may use impact attenuator vehicle in a closed lane and in advance of a work area to protect traffic and workers.

Use impact attenuator vehicle as a shadow vehicle under traffic control for a moving lane closure.

Secure objects including equipment, tools and ballast on impact attenuator vehicle to prevent loosening upon impact by an errant vehicle.

Do not use a damaged attenuator in the work. Replace, at your expense, an attenuator damaged from an impact during work.

MEASUREMENT AND PAYMENT

Full compensation for furnishing and operating impact attenuator vehicle is included in the contract lump sum price paid for traffic control system, and no additional compensation will be allowed therefor.

10-1.25 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes 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 from the responsibility to provide additional devices or take 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 closures are made for work periods only, at the end of each work period, all 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.

On multilane highway, 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 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.

On 2-lane 2 way highway, one-way traffic shall be controlled through the project in conformance with the plan entitled "Traffic Control System for Lane Closure on Two Lane Conventional Highways" and these special provisions.

Utilizing a pilot car will be at the option of the Contractor. If the Contractor elects to use a pilot car, the cones shown along the centerline on the plan need not be placed. The pilot car shall have radio contact with personnel in the work area. The maximum speed of the pilot car through the traffic control zone shall be 25 miles per hour.

MOVING LANE CLOSURE

Flashing arrow signs used in moving lane closures shall be truck-mounted. Flashing arrow signs shall be in the caution display mode when used on 2-lane highways. 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. 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." A 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 whether used TMAs supplied under this contract need recertification. Each unit shall be certified by the manufacturer to meet the requirements for TMAs 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, CA 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 (except for flagging costs), materials (including signs), tools, equipment, and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing, and disposing of the components of the traffic control system and for furnishing and operating the pilot car, (including driver, radios, other equipment, and labor required), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. Flagging costs will be paid for as provided in Section 12-2.02, "Flagging Costs," of the Standard Specifications.

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.

10-1.26 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.

Work necessary, including required lines or markers, to establish the alignment of temporary pavement delineation shall be performed by the Contractor. Surfaces to receive application of paint or removable traffic tape 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 and removable traffic tape that conflicts with a new traffic pattern or that is applied to the final layer of surfacing or existing pavement to remain in place shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

Temporary pavement delineation shall be used on or adjacent to lanes open to public traffic for a maximum of 14 days. 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, additional temporary pavement delineation shall be provided by the Contractor at no additional cost to the Department. 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.

Painted traffic stripe used for temporary delineation shall conform to Section 84-3, "Painted Traffic Stripes and Pavement Markings," of the Standard Specifications, except for payment. The number of coats shall be, at the option of the Contractor, either one or 2 coats. The quantity of painted traffic stripe used for temporary delineation will not be included in the quantities of paint traffic stripe to be paid for.

TEMPORARY LANELINE AND CENTERLINE DELINEATION

When lanelines or centerlines are obliterated, the minimum laneline and centerline delineation to be provided 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 or centerline the 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 (6 months or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Temporary pavement markers shall be placed in conformance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used to place pavement markers in areas where removal of the markers will be required.

Temporary laneline or centerline delineation consisting entirely of temporary pavement markers shall be placed on longitudinal intervals of not more than 24 feet.

Where removal of white 4-inch wide laneline traffic stripe will not be required, painted traffic stripe and clear retroreflective pavement markers shall be used for temporary laneline delineation. Temporary painted laneline delineation placed on portland cement concrete pavement shall consist of white traffic stripe supplemented by black contrast traffic stripe and clear retroreflective pavement markers, as shown on the plans. Temporary painted laneline and clear retroreflective pavement markers shall be placed on longitudinal intervals of not more than 48 feet. When the permanent pavement delineation is placed the black contrast stripe and clear retroreflective pavement markers may remain in place. The quantity

of painted traffic stripe used for temporary laneline delineation will not be included in the quantities of paint traffic stripe to be paid for.

Where "no passing" centerline pavement delineation is obliterated, the following "no passing" zone signing shall be installed before opening the lanes to public traffic. W20-1 (ROAD WORK AHEAD) signs shall be installed from 1,000 feet to 2,000 feet in advance of "no passing" zones. R4-1 (DO NOT PASS) signs shall be installed at the beginning and at every 2,000-foot interval within "no passing" zones. For continuous zones longer than 2 miles, W7-3a or W71(CA) (NEXT _____ MILES) signs shall be installed beneath the W20-1 signs installed in advance of "no passing" zones. R4-2 (PASS WITH CARE) signs shall be installed at the end of "no passing" zones. The exact location of "no passing" zone signing will be as determined by the Engineer and shall be maintained in place until permanent "no passing" centerline pavement delineation has been applied. The signing for "no passing" zones shall be removed when no longer required for the direction of public traffic. The signing for "no passing" zones shall conform to the provisions in "Construction Area Signs" of these special provisions, except for payment.

Full compensation for furnishing, placing, maintaining, and removing temporary pavement markers used for temporary laneline and centerline delineation and for providing equivalent patterns of permanent traffic lines for these areas when required shall be considered as included in the contract prices paid for the items of work that obliterated the laneline and centerline pavement delineation and no separate payment will be made therefor.

Full compensation for furnishing, placing, and maintaining temporary painted laneline and centerline pavement delineation shall be considered as included in the contract prices paid for the items of work that obliterated the laneline and centerline pavement delineation and no separate payment will be made therefor.

Full compensation for furnishing, placing, maintaining, and removing signing specified for "no passing" zones shall be considered as included in the contract prices paid for the items of work that obliterated the laneline and centerline pavement delineation and no separate payment will be made therefor.

TEMPORARY EDGELINE DELINEATION

When edgelines are obliterated on multilane roadways (freeways and expressways), the edgeline delineation to be provided for that area adjacent to lanes open to public traffic shall consist of, at the option of the Contractor, either solid 4-inch wide traffic stripe tape of the same color as the stripe it replaces, traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 100 feet. Where removal of the 4-inch wide traffic stripe will not be required, painted traffic stripe may be used.

Temporary removable construction grade striping and pavement marking tape shall be as listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Temporary removable construction grade striping and pavement marking tape when used shall be applied in conformance with the manufacturer's recommendations.

The lateral offset for traffic cones, portable delineators or channelizers used for temporary edgeline delineation shall be 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 hours of the day that the cones or 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.

Full compensation for furnishing, placing, maintaining, and removing temporary edgeline delineation 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.

10-1.27 BARRICADE

Barricades shall be furnished, placed and maintained at the locations shown on the plans, specified in the Standard Specifications or in these special provisions or where designated by the Engineer. Barricades shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Prequalified and Tested Signing and Delineation Materials" of these special provisions regarding retroreflective sheeting for barricades.

Construction area sign and marker panels conforming to the provisions in Section 12-3.06, "Construction Area Signs," of the Standard Specifications shall be installed on barricades in a manner determined by the Engineer at the locations shown on the plans.

Sign panels for construction area signs and marker panels installed on barricades shall conform to the provisions in Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications.

Full compensation for furnishing, installing, maintaining, and removing construction area signs and marker panels on barricades shall be considered as included in the contract unit price paid for the type of barricade involved and no separate payment will be made therefor.

Barricades shown on the plans as part of a traffic control system will be paid for as provided in "Traffic Control System for Lane Closure" of these special provisions and will not be included in the count for payment of barricades.

10-1.28 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 sufficient weight bearing capacity to support portable changeable message sign.

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

The text of the message displayed on portable 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.

Where 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.

Start displaying the message on portable changeable message sign 5 minutes before closing the lane.

Place two portable changeable message signs in advance of the first warning sign for:

1. Each stationary lane closure

Place one portable changeable message signs in advance of the first warning sign for:

1. One-way reversing lane closures,
2. Each off-ramp closure

For 5 days starting on the day of signal activation, place 1 portable changeable message sign in each direction of travel and display the message, "SIGNAL AHEAD -- PREPARE TO STOP."

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.

Except where placed behind guardrail, 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 contract lump sum price paid for portable changeable message signs shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in furnishing, placing, operating, modifying messages, maintaining, repairing, transporting from location to location and removing portable changeable message signs, complete in place as specified in the Standard Specifications and these special provisions, as shown in the plans and as directed by the Engineer.

Portable changeable message signs in excess of the number shown on the plans or specified in these special provisions will be paid for as extra work as specified in Section 4-1.03D, "Extra Work," of the Standard Specifications.

10-1.29 TEMPORARY RAILING

Temporary railing (Type K) shall be placed as shown on the plans, as specified in the Standard Specifications or these special provisions or where ordered by the Engineer and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Temporary railing (Type K) shall be secured in place before starting work for which the temporary railing is required.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary railing (Type K) placed in conformance with the provisions in "Public Safety" of these special provisions will be neither measured nor paid for.

10-1.30 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.

10-1.31 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.

Attention is directed to "Public Safety" and "Temporary Railing" of 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.

At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either Energite III Inertial Modules, Fitch Inertial Modules or TrafFix Sand Barrels manufactured after March 31, 1997, or equal:

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

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 the provisions in "Public Safety" of these special provisions 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.

10-1.32 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.

REMOVE METAL BEAM GUARD RAILING

Existing metal beam guard railing, 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 guard railing 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 guard railing 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.

Overhead sign structure removal shall consist of removing posts, frames, portions of foundations, sign panels, walkways with safety railings, and sign lighting electrical equipment.

A sign structure shall not be removed until the structure is no longer required for the direction of public traffic.

Concrete foundations may be abandoned in place, except that the top portion, including anchor bolts, reinforcing steel, and conduits shall be removed to a depth of not less than 3 feet below the adjacent finished grade. The resulting holes shall be backfilled and compacted with material equivalent to the surrounding material.

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 MARKER

Existing pavement markers, including underlying adhesive, when no longer required for traffic lane delineation as determined by the Engineer, shall be removed and disposed of.

REMOVE TRAFFIC STRIPE AND PAVEMENT MARKING

Traffic stripe and pavement marking shall be removed at the locations shown on the plans and as directed by the Engineer.

Attention is directed to "Water Pollution Control" of these special provisions.

Waste from removal of yellow and white thermoplastic traffic stripe and white thermoplastic pavement marking contains lead chromate in average concentrations greater than or equal to 5 mg/L Soluble Lead or 1000 mg/kg Total Lead. Yellow and white thermoplastic traffic stripe and white thermoplastic pavement marking exist as shown on the plans. Residue produced from the removal of yellow and white thermoplastic contains heavy metals in concentrations that exceed thresholds established by the California Health and Safety Code and Title 22 of the California Code of Regulations. The Contractor shall assume that the residue is not regulated under the Federal Resource Conservation and Recovery Act (RCRA). Yellow and white thermoplastic may produce toxic fumes when heated.

The removed yellow and white thermoplastic shall be disposed of at a Class 1 disposal facility in conformance with the requirements of the disposal facility operator within 40 days after accumulating 220 pounds of residue and dust. The Contractor shall make necessary arrangements to test the yellow and white thermoplastic residue as required by the disposal facility and these special provisions. Testing shall include, at a minimum, (1) Total Lead by EPA Method 6010B and Chromium by EPA Method 7000 series, (2) Soluble Lead and Chromium by California Waste Extraction Test, and (3) Soluble Lead and Chromium by Toxicity Characteristic Leaching Procedure. From the first 222 gallons of waste, or portion thereof if less than 222 gallons of waste are produced, a minimum of four randomly selected samples shall be taken and analyzed individually. Samples shall not be composited. From each additional 888 gallons of waste, or portion thereof if less than 888 gallons are produced, a minimum of one additional random sample shall be taken and analyzed. Each sample shall be homogenized prior to analysis by the laboratory performing the analyses. A sample aliquot sufficient to cover the amount necessary for the total and the soluble analyses shall then be taken. This aliquot shall be homogenized a second time and the total and soluble (if necessary) run on this aliquot. The homogenization process shall not include grinding of the samples. The Contractor shall submit the name and location of the disposal facility and analytical laboratory along with the testing requirements to the Engineer not less than 5 days prior to the start of removal of yellow and white thermoplastic traffic stripe and white thermoplastic pavement marking. The analytical laboratory shall be certified by the Department of Health Services Environmental Laboratory Accreditation Program for all analyses to be performed. Test results shall be provided to the Engineer for review prior to signing a waste profile as requested by the disposal facility, prior to issuing an EPA identification number, and prior to allowing removal of the waste from the site.

The Contractor shall prepare a project specific Lead Compliance Plan to prevent or minimize worker exposure to lead while handling removed yellow and white thermoplastic residue. Attention is directed to Title 8, California Code of Regulations, Section 1532.1, "Lead," for specific Cal-OSHA requirements when working with lead.

The Lead Compliance Plan shall contain the elements listed in Title 8, California Code of Regulations, Section 1532.1(e)(2)(B). Before submission to the Engineer, the Lead Compliance Plan shall be approved by an Industrial

Hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene. The Plan shall be submitted to the Engineer at least 7 days prior to beginning removal of yellow and white thermoplastic.

Prior to removing yellow and white thermoplastic traffic stripe and white thermoplastic pavement marking, personnel who have no prior training, including State personnel, shall complete a safety training program provided by the Contractor that meets the requirements of Title 8, California Code of Regulations, Section 1532.1, "Lead," and the Contractor's Lead Compliance Program.

Personal protective equipment, training, and washing facilities required by the Contractor's Lead Compliance Plan shall be supplied to State personnel by the Contractor. The number of State personnel will be 3.

Where grinding or other methods approved by the Engineer are used to remove yellow and white thermoplastic traffic stripe and white thermoplastic pavement marking, the removed residue, including dust, shall be contained and collected immediately. Collection shall be by a high efficiency particulate air (HEPA) filter equipped vacuum attachment operated concurrently with the removal operations or other equally effective methods approved by the Engineer. The Contractor shall submit a written work plan for the removal, storage, and disposal of yellow and white thermoplastic traffic stripe and white thermoplastic pavement marking to the Engineer for approval not less than 15 days prior to the start of the removal operations. Removal operations shall not be started until the Engineer has approved the work plan.

The removed yellow and white thermoplastic traffic stripe and white thermoplastic pavement marking residue shall be stored and labeled in covered containers. Labels shall conform to the provisions of Title 22, California Code of Regulations, Sections 66262.31 and 66262.32. Labels shall be marked with date when the waste is generated, the words "Hazardous Waste," composition and physical state of the waste (for example, asphalt grindings with thermoplastic), the word "Toxic," the name and address of the Engineer, the Engineer's telephone number, contract number, and Contractor or subcontractor. The containers shall be a type approved by the United States Department of Transportation for the transportation and temporary storage of the removed residue. The containers shall be handled so that no spillage will occur. The containers shall be stored in a secured fenced enclosure at a location within the project limits until disposal, as approved by the Engineer.

If the yellow and white thermoplastic traffic stripe and white thermoplastic pavement marking residue is transported to a Class 1 disposal facility as a hazardous waste, a manifest shall be used, and the transporter shall be registered with the California Department of Toxic Substance Control. The Engineer will obtain the United States Environmental Protection Agency Identification Number and sign all manifests as the generator within 2 working days of receiving sample test results and approving the test methods.

Nothing in these special provisions shall relieve the Contractor of the Contractor's responsibilities as specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

Attention is directed to "Material Containing Lead" of these special provisions regarding payment for the Lead Compliance Plan. One Lead Compliance Plan shall be prepared that addresses exposure to lead from traffic stripe and pavement marking and to prevent worker exposure to lead while handling material containing lead within the top 2 feet of material in unpaved areas within the highway right of way.

Full compensation for providing a written work plan for the removal, storage, and disposal of yellow and white thermoplastic traffic stripe and white pavement marking shall be considered as included in the contract prices paid per linear foot for remove yellow thermoplastic traffic stripe and remove thermoplastic traffic stripe or per square foot for remove thermoplastic pavement marking and no separate payment will be made therefor.

REMOVE DRAINAGE FACILITY

Existing box culverts, where shown on the plans to be removed, shall be completely removed and disposed of.

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.

RESET ROADSIDE SIGN

Existing roadside signs, where shown on the plans to be reset, shall be removed and reset.

Each roadside sign shall be reset on the same day that the sign is removed.

Two holes shall be drilled in each existing post as required to provide the breakaway feature shown on the plans.

RELOCATE ROADSIDE SIGN

Existing roadside signs shall be removed and relocated to the new locations shown on the plans.

Each roadside sign shall be installed at the new location on the same day that the sign is removed from its original location.

Two holes shall be drilled in each existing post as required to provide the breakaway feature shown on the plans.

REMOVE BASE AND SURFACING

Existing base and bituminous surfacing shown on the plans to be removed, shall be removed to a depth of at least 6 inches below the grade of the existing surfacing. Resulting holes and depressions shall be backfilled with earthy material selected from excavation to the lines and grade established by the Engineer.

Removing base and surfacing will be measured and paid for as roadway excavation.

EXISTING HIGHWAY IRRIGATION FACILITIES

Existing irrigation facilities within the limits of work shall remain in place. Irrigation facilities that are damaged by the Contractor's operation shall be reported immediately to the Engineer.

Existing below ground irrigation facilities will be marked by the Engineer. Marked Irrigation facilities damaged by the Contractor's operations shall be repaired or replaced at the Contractor's expense. The replacement and repair of damaged unmarked below ground irrigation facilities will be paid for as extra work as provided in Section 4-1.03D,"Extra Work," of the Standard Specifications.

Water shall be maintained in conformance with the provisions in Section 20-5.025, "Maintain Existing Water Supply," of the Standard Specifications.

BRIDGE REMOVAL

Removing bridges or portions of bridges shall conform to the provisions in Section 15-4, "Bridge Removal," of the Standard Specifications and these special provisions.

Bridge Removal shall consist of removing a complete existing bridge as shown on the plans at the following location:

Lakeside Canal
(Bridge No. 45-0005)

Bridge Removal (portion) shall consist of removing reinforced concrete barrier and wingwall on the existing bridge as shown on the plans at the following location:

Cross Creek Bridge
(Bridge No. 45-0006)

Removed materials that are not to be salvaged or used in the reconstruction 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.

The Contractor shall submit a complete bridge removal plan to the Engineer for each bridge listed above, detailing procedures, sequences, and all features required to perform the removal in a safe and controlled manner.

The bridge removal plan shall include, but not be limited to the following:

A. The removal sequence, including staging of removal operations.
B. Equipment locations on the structure during removal operations.
C. Temporary support shoring or temporary bracing.
D. Locations where work is to be performed over utilities.
E. Details, locations, and types of protective covers to be used.
F. Measures to assure that people, property, utilities, and improvements will not be endangered.

When protective covers are required for removal of portions of a bridge, or when superstructure removal work on bridges is involved, the Contractor shall submit working drawings, with design calculations, to the Engineer for the proposed bridge removal plan, and the bridge removal plan shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California. The design calculations shall be adequate to demonstrate the stability of the structure during all stages of the removal operations. Calculations shall be provided for each stage of bridge removal and shall include dead and live load values assumed in the design of protective covers. At a minimum, a stage will be considered to be removal of the deck, the soffit, or the girders, in any span; or walls, bent caps, or columns at support locations.

Temporary support shoring, temporary bracing, and protective covers, as required, shall be designed and constructed in conformance with the provisions in Section 51-1.06, "Falsework," of the Standard Specifications and these special provisions.

The assumed horizontal load to be resisted by the temporary support shoring and temporary bracing, for removal operations only, shall be the sum of the actual horizontal loads due to equipment, construction sequence or other causes, and an allowance for wind, but in no case shall the assumed horizontal load to be resisted in any direction be less than 5 percent of the total dead load of the structure to be removed.

The bridge removal plan shall conform to the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The number of sets of drawings, design calculations, and the time for reviewing bridge removal plans shall be the same as specified for falsework working drawings in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications.

For bridge removal that requires the Contractor's registered engineer to prepare and sign the bridge removal plan, the Contractor's registered engineer shall be present at all times when bridge removal operations are in progress. The Contractor's registered engineer shall inspect the bridge removal operation and report in writing on a daily basis the progress of the operation and the status of the remaining structure. A copy of the daily report shall be available at the site of the work at all times. Should an unplanned event occur or the bridge operation deviate from the approved bridge removal plan, the Contractor's registered engineer shall submit immediately to the Engineer for approval, the procedure of operation proposed to correct or remedy the occurrence.

REMOVE CONCRETE

Concrete, where shown on the plans to be removed, shall be removed and disposed of.

Attention is directed to Section 16, "Clearing and Grubbing," and Section 19-1.04, "Removal and Disposal of Buried Man-Made Objects," of the Standard Specifications and these special provisions.

Removed concrete 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.

10-1.33 CLEARING AND GRUBBING

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications and these special provisions.

Attention is directed to "Migratory Bird Protection" regarding clearing and grubbing of bird habitat.

Vegetation shall be cleared and grubbed only within the excavation and embankment slope lines.

10-1.34 WATERING

Developing a water supply and applying watering shall conform to the provisions in Section 17, "Watering," of the Standard Specifications.

10-1.35 EARTHWORK

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Attention is directed to "Material Containing Lead" of these special provisions.

The grading plane of embankments beneath structure approach slabs shall not project above the grade established by the Engineer.

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.

The portion of imported borrow placed within 4 feet of the finished grade shall have a Resistance (R-Value) of not less than 30.

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.

Imported borrow shall be mineral material including rock, sand, gravel, or earth. The Contractor shall not use man-made refuse in imported borrow including:

A. Portland cement concrete
B. Asphalt concrete
C. Hot mix asphalt

D. Material planed from roadway surfaces
E. Residue from grooving or grinding operations
F. Metal
G. Rubber
B. Mixed debris
C. Rubble

Imported borrow will be measured and paid for by the cubic yard and the quantity to be paid for will be computed in the following manner:

A. The total quantity of embankment will be computed in conformance with the provisions for roadway excavation in Section 19-2.08, "Measurement," of the Standard Specifications, on the basis of the planned or authorized cross section for embankments as shown on the plans and the measured ground surface.
B. The Contractor, at the Contractor's option, may compact the ground surface on which embankment is to be constructed before placing any embankment thereon. If the compaction results in an average subsidence exceeding 0.25-foot, the ground surface will be measured after completion of the compaction. The Engineer shall be allowed the time necessary to complete the measurement of an area before placement of embankment is started in that area.
C. The quantities of roadway excavation, and structure excavation which have been used in the embankment, will be adjusted by multiplying by a grading factor to be determined in the field by the Engineer. No further adjustment will be made in the event that the grading factor determined by the Engineer does not equal the actual grading factor.
D. The quantity of imported borrow to be paid for will be that quantity remaining after deducting the adjusted quantities of excavation from the total embankment quantity. No adjustment will be made for subsidence.
E. The Contractor may propose a plan whereby the Contractor would be paid on the basis of measured settlement in lieu of the allowance specified above. The proposal shall include complete details of the subsidence-measuring devices and a detailed plan of each installation. If the proposed plan is approved by the Engineer, the Contractor, at the Contractor's expense, shall provide, install and maintain the subsidence-measuring devices. The Engineer will take necessary readings to determine the progress of subsidence, if any, and the Contractor shall provide necessary assistance to make the readings.
F. Installed devices which are determined by the Engineer to have been damaged will not be used for the determination of subsidence for the area the devices represent in the pattern of approved installations. The subsidence of the area represented by that installation shall be considered zero, regardless of the subsidence measured at other installations.
G. The volumes required as a result of subsidence will be computed by the average-end-area method from the original measurements and the final measurements, including zero subsidence at all points and for all areas as provided herein. It shall be understood and agreed that the subsidence at the point of intersection of the side slopes (and end slopes at structures) with the ground line as established by the original cross sections shall be considered as zero. Unless otherwise agreed to by the Engineer, the subsidence shall be considered as zero at the points on the cross sections 50 feet beyond the beginning and ending of the instrumented area. The computed volumes for such subsidence will be added to the quantities of embankment measured as specified herein.
H. Detachable elements of the subsidence-measuring devices which can be salvaged without damage to the work shall remain the property of the Contractor and shall be removed from the highway right of way after final measurements are made.

Settlement periods are required for the bridge approach embankments at the bridges listed in the following table.

At the bridge bents listed in the following table, excavation for the footings, drilling holes for cast-in-place piles, or driving the foundation piles at each location shall not be done until the expiration of the settlement period for the embankment at the adjacent abutment of the same structure or an adjacent structure.

Surcharge embankments shall be constructed at or above the grading plane where listed in the following table:

Bridge Name or Number	Abutment Number	Bent Number	Surcharge Height (feet)	Settlement Period (days)
Bridge No. 46-0265	1&3		0.0 *	30

* At this location, the surcharge embankment shall be constructed by extending the grading plane (GP) in the "Elevation" view of the "Bridge Embankment Surcharge" detail of Standard Plan A62B horizontally to the centerline of abutment.

The duration of the required settlement period at each location will be determined by the Engineer. The estimated duration of the settlement periods are listed in the tables of settlement data. The Engineer may order an increase or decrease in any settlement period. An ordered increase or decrease in any settlement period will result in an increase or decrease in the

number of contract working days if the settlement period involved is considered to be the current controlling operation in conformance with the provisions in Section 8-1.06, "Time of Completion," of the Standard Specifications. Adjustments of contract time due to increases or decreases in settlement periods will be made by contract change order.

The removal of surplus embankment material placed as a settlement or surcharge embankment, including material removed to conform to the finished slope lines shown on the plans, will be paid for at the contract price per cubic yard for roadway excavation.

The geocomposite drain shall conform to the details shown on the plans and the following:

A. Attention is directed to "Engineering Fabrics" under "Materials" of these special provisions.
B. Geocomposite drain shall consist of a manufactured core not less than 0.25 inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate, through the drainage void, of at least 2.0 gallons per minute per foot of width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 3,500 psf.
C. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain produces the required flow rate and complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates for externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.
D. Filter fabric for the geocomposite drain shall conform to the provisions for fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications.
E. The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.
F. The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having nonconnecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.
G. The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 3 inches at all joints and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.
H. Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a minimum 6-inch overlap.
I. Plastic pipe shall conform to the provisions for edge drain pipe and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.
J. Treated permeable base to be placed around the slotted plastic pipe at the bottom of the geocomposite drain shall be cement treated permeable base conforming to the provisions for cement treated permeable base in Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions.
K. The treated permeable base shall be enclosed with a high density polyethylene sheet or PVC geomembrane, not less than 10 mils thick, which is bonded with a suitable adhesive to the concrete and geocomposite drain. Surfaces to receive the polyethylene sheet shall be cleaned before applying the adhesive. The treated permeable base shall be compacted with a vibrating shoe type compactor.

If structure excavation or structure backfill for bridges is not otherwise designated by type and payment for the structure excavation or structure backfill has not otherwise been provided for in the Standard Specifications or these special provisions, the structure excavation or structure backfill will be measured and paid for as structure excavation (bridge) or structure backfill (bridge), respectively.

Full compensation for the structure approach drainage system including geocomposite drain, plastic pipe, and drainage pads, treated permeable base, filter fabric, woven tape fabric, at the abutments of Road 68 Overcrossing (Br. No. 46-0265) shall be considered as included in the contract price paid per cubic yard for structure backfill (bridge) and no additional compensation will be allowed therefor.

10-1.36 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.

10-1.37 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.

When areas are ready to receive applications of erosion control (Types C or Drill Seed), as determined by the Engineer, the Contractor shall begin erosion control work in that area within 5 working days of the Engineer's notification to perform the erosion control work.

Attention is directed to the requirements of erosion control (Types C or Drill Seed) elsewhere in these special provisions.

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 (Types C or Drill Seed), 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).

10-1.38 EROSION CONTROL (TYPE C)

Erosion control (Type C) includes incorporating straw and applying other erosion control materials to embankment slopes that are 4:1 (horizontal:vertical) or steeper and more than 12 feet in slope length. Erosion control (Type C) must comply with Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Apply erosion control (Type C) when an area is ready to receive erosion control as determined by the Engineer and as specified under "Move-in/Move-out (Erosion Control)" of these special provisions.

Before applying erosion control materials, prepare soil surface under Section 19-2.05, "Slopes," of the Standard Specifications, except that rills and gullies exceeding 2 inches in depth or width must be leveled. Remove vegetative growth, temporary erosion control materials, and other debris from areas to receive erosion control.

Before applying erosion control materials, the Engineer designates the ground location of erosion control (Type C) in increments of one acre or smaller for smaller areas. Place stakes or other suitable markers at the locations designated by the Engineer. Furnish all tools, labor, and materials required to adequately indicate the various locations.

MATERIALS

Materials must comply with Section 20-2, "Materials," of the Standard Specifications and these special provisions.

Seed

Seed must comply with Section 20-2.10, "Seed," of the Standard Specifications. Seed not required to be labeled under the California Food and Agricultural Code shall 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 not more than 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 1 ounce or 0.25 cup of seed for each seed lot greater than 2 pounds, by the Engineer.

Seed must comply with the following:

Seed

Botanical Name (Common Name)	Percent Germination (Minimum)	Pounds Pure Live Seed Per Acre (Slope Measurement)
Clarkia amoena Farewell to Spring	40	2.0
Eschscholzia californica California Poppy	30	1.0
Festuca idahoensis 'Romeri' Blue Bunch Grass	30	7.0
Festuca Ovina 'Covar' Sheep's Fescue	30	7.5
Lasthenia glabrata Goldfields	30	0.5
Layia Platyglossa Tidy Tips	30	1.0
Linaria maroccana Toadflax	40	1.0
Lotus purshianus Purshings Lotus	30	1.0
Lupinus nanus Sky Lupine	40	3.0
Phacelia campanularia California Bluebells	30	2.25
Poa secunda Pine Bluegrass	20	3.25
Salvia farinacea (Blue Sage)	40	1.0

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.

Straw

Straw must comply with Section 20-2.06, "Straw," of the Standard Specifications and these special provisions.
Straw must be derived from rice.
Straw must be free of plastic, glass, metal, rocks, and refuse or other deleterious material.

APPLICATION

Apply erosion control materials in separate applications in the following sequence:

1. Apply straw and incorporate into the soil at the rate of 1.75 tons per acre (slope measurement).
2. Apply the following mixture in the rates indicated. If hydro-seeding equipment is used, the mixture must be applied within 60 minutes after the seed has been added to the mixture.

Material	Pounds Per Acre (Slope Measurement)
Seed	30.5
Fiber	600

3. Apply a second application of straw and incorporate into the soil at the rate of 1.75 tons per acre based on slope measurements.

The Engineer may change the rates of erosion control materials to meet field conditions.

MEASUREMENT AND PAYMENT

Erosion control (Type C will be measured by the square yard 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 yard or acre for erosion control (Type C) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying erosion control (Type C) complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.39 EROSION CONTROL (DRILL SEED)

Erosion control includes drilling seed into embankment and excavation slopes in the median that are 3:1 (horizontal:vertical) or flatter, and other areas designated by the Engineer.

Erosion control must comply with Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Do not seed a strip 2.0 feet wide adjacent to the edge of pavement.

Before applying erosion control materials, the Engineer designates the ground location of erosion control in increments of 1 acre or smaller for smaller areas. Place stakes or other suitable markers at the locations designated by the Engineer. Furnish tools, labor, and materials required to designate the various locations.

MATERIALS

Materials must comply with Section 20-2, "Materials," of the Standard Specifications and these special provisions.

Seed

Seed must comply with Section 20-2.10, "Seed," of the Standard Specifications. 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 not contain more than 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 will take a sample of approximately 1 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)
Eschscholzia californica California Poppy	30	1.0
Festuca idahoensis ‘Romeri’ Blue Bunch Grass	30	7.0
Festuca ovina ‘Covar’ Sheep’s Fescue	30	7.5
Lasthenia chrystostoma Dwarf Goldfields	30	0.5
Layia Platyglossa Tidy Tips	40	2.0
Lotus purshianus Purshings Lotus	30	1.0
Lupinus bicolor Pigmy-Leaved Lupine	40	4.0
Phacelia campanularia California Bluebells	40	2.25
Poa secunda Pine Bluegrass	20	4.0
Salvia fainacea Blue Sage	40	1.0

Seed Sampling Supplies

At the time of seed sampling, furnish a glassine lined bag and custody seal tag for each seed lot sample.

Stabilizing Emulsion

Stabilizing emulsion must comply with Section 20-2.11, "Stabilizing Emulsion," of the Standard Specifications.

Stabilizing emulsion:

1. Must be in a dry powder form
2. Must be a processed organic adhesive used as a soil tackifier
3. May be re-emulsifiable

EQUIPMENT

Seeding equipment must be a rangeland drill seeder. The seeder must be equipped with a fluffy seed box with agitators to prevent bridging and clogging. The seed box must have metal row dividers and individual box adjustment to meter seed flow.

APPLICATION

Apply erosion control material in separate applications as follows:

1. Drill seed in rows at a maximum distance of 8 inches apart. Drill seed to a depth of 1/4 inch at a rate of 30.25 pounds per acre.
2. A minimum of 3 passes in different directions with seeding equipment is required to distribute the seed and reduce uniform row appearance.
3. Apply the following mixture with hydro-seeding equipment at the corresponding rates:

Material	Pounds Per Acre (Slope Measurement)
Fiber	600
Stabilizing Emulsion (Solids)	125

The ratio of total water to total stabilizing emulsion in the mixture must be as recommended by the manufacturer.

The proportions of erosion control materials may be changed by the Engineer to meet field conditions.

MEASUREMENT AND PAYMENT

Erosion control (drill seed) will be measured 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 by the acre for erosion control (drill seed) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying erosion control (drill seed) 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 IRRIGATION CROSSOVERS

Irrigation crossovers shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Conduits shall be placed in open trenches in conformance with the provisions in Section 20-5.03B, "Conduit for Irrigation Crossovers," of the Standard Specifications.

Conduits shall be corrugated high density polyethylene (CHDPE) pipe. Corrugated high density polyethylene pipe shall conform to the requirements in ASTM Designation: F 405 or F 667, or AASHTO Designation: M 252 or M 294 and shall be Type S. Couplings and fittings shall be as recommended by the pipe manufacturer.

Installation of pull boxes shall conform to the provisions in Section 20-5.027I, "Conductors, Electrical Conduit and Pull Boxes," of the Standard Specifications. When no conductors are installed in electrical conduits, pull boxes for irrigation crossovers shall be installed on a foundation of compacted soil.

10-1.41 FINISHING ROADWAY

Finishing roadway shall conform to the provisions in Section 22, "Finishing Roadway," of the Standard Specifications.

10-1.42 AGGREGATE SUBBASE

Aggregate subbase must comply with Section 25, "Aggregate Subbases," of the Standard Specifications and these special provisions.

Aggregate subbase must be Class 1.

Do not store reclaimed asphalt concrete or aggregate subbase with reclaimed asphalt concrete within 100 feet measured horizontally of any culvert, watercourse, or bridge.

10-1.43 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.

10-1.44 LEAN CONCRETE BASE

Lean concrete base shall conform to the provisions in Section 28, "Lean Concrete Base," of the Standard Specifications and these special provisions.

The finished surface of lean concrete base shall not be above the grade established by the Engineer, or more than 0.05-foot below the grade established by the Engineer.

10-1.45 HOT MIX ASPHALT

GENERAL

Summary

This work includes producing and placing hot mix asphalt (HMA) Type A using the Quality Control / Quality Assurance process.

Comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

Submittals

With the job mix formula (JMF) submittal, submit:

1. California Test 204 plasticity index results
2. California Test 371 tensile strength ratio results for untreated HMA
3. California Test 371 tensile strength ratio results for treated HMA if untreated HMA tensile strength ratio is below 70

With the JMF submittal, submit to the Engineer and the Transportation Laboratory, Attention: Moisture Test, samples for California Test 371 split from your mix design samples of:

1. Aggregate
2. Supplemental fines
3. Asphalt binder
4. Antistrip treatment

On the first production day, submit samples split from your HMA production sample for California Test 371 to the Engineer and the Transportation Laboratory, Attention: Moisture Test.

Submit the California Test 371 test results for mix design and production to the Engineer and electronically to:

Moisture_Tests@dot.ca.gov

Quality Control and Assurance

For the mix design, determine the plasticity index of the aggregate blend under California Test 204. Choose an antistrip treatment and use the corresponding laboratory procedure for the mix design in compliance with:

Antistrip Treatment Lab Procedures for Mix Design

Antistrip Treatment	Lab Procedure
Plasticity index from 4 to 10 [a, b]	
Dry hydrated lime with marination	LP-6
Lime slurry with marination	LP-7
Plasticity index less than 4	
Liquid	LP-5
Dry hydrated lime without marination	LP-6
Dry hydrated lime with marination	LP-6
Lime slurry with marination	LP-7

Notes:
[a] If the plasticity index is greater than 10, do not use that aggregate blend.
[b] If the plasticity index is from 4 to 10, use dry hydrated lime with marination or lime slurry with marination.

For the mix design, determine tensile strength ratio under California Test 371 on untreated HMA. If the tensile strength ratio is less than 70:

1. Choose from the antistrip treatments specified based on plasticity index.
2. Test treated HMA under California Test 371.
3. Treat to a minimum tensile strength ratio of 70.

On the first production day and at least every 5,000 tons, sample HMA and test under California Test 371.

The Department does not use California Test 371 test results for JMF verification and production to determine specification compliance.

Perform quality control sampling and testing for the following additional quality characteristics:

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Requirement
Coarse Durability Index, D_c (min.)	CT 229	As necessary and designated in the QCP	65
Fine Durability Index, D_f (min.)	CT 229		50

The Engineer samples aggregate for acceptance testing and tests for the following additional quality characteristics:

Quality Characteristic	Test Method	Requirement
Coarse Durability Index, D_c (min.)	CT 229	65
Fine Durability Index, D_f (min.)	CT 229	50

MATERIALS

Asphalt Binder

The grade of asphalt binder mixed with aggregate for HMA Type A must be Grade 64-10.

Aggregate

Before the addition of asphalt binder and lime treatment, aggregate must comply with the following additional quality characteristics:

Quality Characteristic	Test Method	Requirement
Coarse Durability Index, D_c (min.)	CT 229	65
Fine Durability Index, D_f (min.)	CT 229	50

The aggregate for HMA Type A must comply with the ¾-inch grading.

Antistrip Treatment

Treat aggregate with lime slurry under "Lime Treatment of Hot Mix Asphalt Aggregates (Slurry Method)." For the mix design, use Lab Procedure LP-7.

Treat asphalt binder with liquid antistrip under "Liquid Antistrip Treatment of Asphalt Binder." For the mix design, use Lab Procedure LP-5.

CONSTRUCTION

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.

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.

10-1.46 HOT MIX ASPHALT AGGREGATE LIME TREATMENT - SLURRY METHOD

GENERAL

Summary

This work includes treating hot mix asphalt (HMA) aggregate with lime using the slurry method and placing it in stockpiles to marinate.

Treat aggregate for HMA Type A with lime slurry.

Submittals

Determine the exact lime proportions for fine and coarse virgin aggregate and submit them as part of the proposed job mix formula (JMF) under Section 39, "Hot Mix Asphalt," of the Standard Specifications.

Submit the averaged aggregate quality test results to the Engineer within 24 hours of sampling.

Submit a treatment data log from the slurry proportioning device in the following order:

1. Treatment date
2. Time of day the data is captured
3. Aggregate size being treated
4. Wet aggregate flow rate collected directly from the aggregate weigh belt
5. Moisture content of the aggregate just before treatment, expressed as a percent of the dry aggregate weight
6. Dry aggregate flow rate calculated from the wet aggregate flow rate
7. Lime slurry flow rate measured by the slurry meter
8. Dry lime flow rate calculated from the slurry meter output
9. Approved lime ratio for each aggregate size being treated
10. Actual lime ratio calculated from the aggregate weigh belt and the slurry meter output, expressed as a percent of the dry aggregate weight
11. Calculated difference between the approved lime ratio and the actual lime ratio
12. Dry lime and water proportions at the slurry treatment time

Every day during lime treatment, submit the treatment data log on electronic media in tab delimited format on a removable CD-ROM storage disk. Each continuous treatment data set must be a separate record using a line feed carriage return to present the specified data on one line. The reported data must include data titles at least once per report.

Quality Control and Assurance

The quality control plan (QCP) specified in Section 39-2, "Standard," and Section 39-4, "Quality Control / Quality Assurance," of the Standard Specifications must include aggregate quality control sampling and testing during aggregate lime treatment. Perform sampling and testing in compliance with:

Aggregate Quality Control During Lime Treatment

Quality Characteristic	Test Method	Minimum sampling and testing frequency
Sand Equivalent	CT 217	Once per 1,000 tons of aggregate treated with lime
Percent of crushed particles	CT 205	As necessary and as designated in the QCP
Los Angeles Rattler	CT 211	
Fine aggregate angularity	AASHTO T 304, Method A	
Flat and elongated particles	ASTM D 4791	
Coarse Durability Index	CT 229	
Fine Durability Index	CT 229	

Note: During lime treatment, sample coarse and fine aggregate from individual stockpiles. Combine aggregate in the JMF proportions. Run tests for aggregate quality in triplicate and report test results as the average of 3 tests.

The Engineer orders proportioning operations stopped for any of the following if you:

1. Do not submit the treatment data log.
2. Do not submit the aggregate quality control data.
3. Submit incomplete, untimely, or incorrectly formatted data.
4. Do not take corrective actions.
5. Take late or unsuccessful corrective actions.
6. Do not stop treatment when proportioning tolerances are exceeded.
7. Use malfunctioning or failed proportioning devices.

If you stop treatment, notify the Engineer of any corrective actions taken and conduct a successful 20-minute test run before resuming treatment.

For the aggregate to be treated, determine the moisture content at least once during each 2 hours of treatment. Calculate moisture content under California Test 226 or California Test 370 and report it as a percent of dry aggregate weight. Use the moisture content calculations as a set point for the proportioning process controller.

MATERIALS

High-calcium hydrated lime and water must comply with Section 24-1.02, "Materials," of the Standard Specifications.

Before aggregate is treated, it must comply with the aggregate quality specifications in "Hot Mix Asphalt," of these special provisions. Do not test treated aggregate for quality control except for gradation. The Engineer does not test treated aggregate for acceptance except for gradation.

The Engineer determines the combined aggregate gradation during HMA production after you have treated aggregate.

Treated aggregate must not have lime balls or clods.

CONSTRUCTION

General

Notify the Engineer at least 24 hours before the start of aggregate treatment.

Treat aggregate separate from HMA production.

Do not treat reclaimed asphalt pavement.

Add lime to the aggregate as slurry consisting of mixed dry lime and water at a ratio of 1 part lime to between 2 parts and 3 parts water by weight. The slurry must completely coat the aggregate.

Lime treat and marinate coarse and fine aggregates separately.

Immediately before mixing lime slurry with aggregate, water must not visibly separate from aggregate.

Treat aggregate and stockpile for marination only once.

The lime ratio is the pounds of dry hydrated lime per 100 pounds of dry aggregate expressed as a percent. Water content of slurry or untreated aggregate must not affect the lime ratio.

Lime ratio ranges are:

Aggregate Gradation	Lime Ratio
Coarse	0.4 to 1.0
Fine	1.5 to 2.0
Combined	0.8 to 1.5

The lime ratio for fine and coarse aggregate must be within ±0.2 percent of the lime ratio in the accepted JMF. The lime ratio must be within ±0.2 percent of the approved lime ratio when you combine the individual aggregate sizes in the JMF proportions.

If 3 consecutive sets of recorded treatment data indicate deviation more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment.

If a set of recorded treatment data indicates a deviation of more than 0.4 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the material represented by that set of data in HMA.

If 20 percent or more of the total daily treatment indicates deviation of more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the day's total treatment in HMA.

If you stop treatment for noncompliance, you must implement corrective action and successfully treat aggregate for a 20-minute period. Notify the Engineer before beginning the 20-minute treatment period.

Lime Slurry Proportioning

Proportion lime and water with a continuous or batch operation.

The device controlling slurry proportioning must produce a treatment data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily treatment. The data must be a treatment activity register and not a summation. The material represented by the data set is the amount produced 5 minutes before and 5 minutes after the capture time. For the contract's duration, collected data must be stored by the controller.

Proportioning and Mixing Lime Slurry Treated Aggregate

Treat HMA aggregate by proportioning lime slurry and aggregate by weight in a continuous operation.

Marinate treated aggregate in stockpiles from 24 hours to 60 days before using in HMA. Do not use aggregate marinated longer than 60 days.

MEASUREMENT AND PAYMENT

Full compensation for lime slurry treated aggregates shall be considered as included in the contract price paid per ton for HMA as designated in the Engineer's Estimate and no separate payment will be made therefor.

10-1.47 HOT MIX ASPHALT AGGREGATE LIME TREATMENT - DRY LIME METHOD

GENERAL

Summary

This work includes treating hot mix asphalt (HMA) aggregate with lime using the dry lime method either with marination or without.

Treat aggregate for HMA Type A with dry lime.

Marinate aggregate if the plasticity index determined under California Test 204 is from 4 to 10.

Submittals

Determine the exact lime proportions for fine and coarse virgin aggregate and submit them as part of the proposed job mix formula (JMF) under Section 39, "Hot Mix Asphalt," of the Standard Specifications.

If marination is required, submit in writing the averaged aggregate quality test results to the Engineer within 24 hours of sampling.

Submit in writing a treatment data log from the dry lime and aggregate proportioning device in the following order:

1. Treatment date
2. Time of day the data is captured
3. Aggregate size being treated
4. HMA type and mix aggregate size
5. Wet aggregate flow rate collected directly from the aggregate weigh belt
6. Aggregate moisture content, expressed as a percent of the dry aggregate weight
7. Flow rate of dry aggregate calculated from the flow rate of wet aggregate
8. Dry lime flow rate

9. Lime ratio from the accepted JMF for each aggregate size being treated
10. Lime ratio from the accepted JMF for the combined aggregate
11. Actual lime ratio calculated from the aggregate weigh belt output, the aggregate moisture input, and the dry lime meter output, expressed as a percent of the dry aggregate weight
12. Calculated difference between the approved lime ratio and the actual lime ratio

Every day during lime treatment, submit the treatment data log on electronic media in tab delimited format on a removable CD-ROM storage disk. Each continuous treatment data set must be a separate record using a line feed carriage return to present the specified data on one line. The reported data must include data titles at least once per report.

Quality Control and Assurance

If marination is required, the quality control plan (QCP) specified in Section 39-2, "Standard," and Section 39-4, "Quality Control / Quality Assurance," must include aggregate quality control sampling and testing during lime treatment. Perform sampling and testing in compliance with:

Quality Characteristic	Test Method	Minimum sampling and testing frequency
Sand Equivalent	CT 217	Once per 1,000 tons of aggregate treated with lime
Percent of crushed particles	CT 205	As necessary and as designated in the QCP
Los Angeles Rattler	CT 211	
Fine aggregate angularity	AASHTO T 304, Method A	
Flat and elongated particles	ASTM D 4791	
Coarse Durability Index	CT 229	
Fine Durability Index	CT 229	

Note: During lime treatment, sample coarse and fine aggregate from individual stockpiles. Combine aggregate in the JMF proportions. Run tests for aggregate quality in triplicate and report test results as the average of 3 tests.

The Engineer orders proportioning operations stopped for any of the following if you:

1. Do not submit the treatment data log
2. Do not submit the aggregate quality control data for marinated aggregate
3. Submit incomplete, untimely, or incorrectly formatted data
4. Do not take corrective actions
5. Take late or unsuccessful corrective actions
6. Do not stop treatment when proportioning tolerances are exceeded
7. Use malfunctioning or failed proportioning devices

If you stop treatment, notify the Engineer of any corrective actions taken and conduct a successful 20-minute test run before resuming treatment.

MATERIALS

Lime must be high-calcium hydrated lime. Lime and water must comply with Section 24-1.02, "Materials," of the Standard Specifications.

Before aggregate is treated, it must comply with the aggregate quality specifications. Do not test treated aggregate for quality control except for gradation. The Engineer does not test treated aggregate for acceptance except for gradation.

The Engineer determines the combined aggregate gradation during HMA production after you have treated aggregate.

Treated aggregate must not have lime balls or clods.

CONSTRUCTION

General

Notify the Engineer in writing at least 24 hours before the start of aggregate treatment.

Do not treat reclaimed asphalt pavement.

If marination is required:

1. Treat and marinate coarse and fine aggregates separately.
2. Treat aggregate and stockpile for marination only once.
3. Treat aggregate separate from HMA production.

The lime ratio is the pounds of dry hydrated lime per 100 pounds of dry aggregate expressed as a percent. Water content of untreated aggregate must not affect the lime ratio.

Lime ratio ranges are:

Aggregate Gradation	Lime Ratio
Coarse	0.4 to 1.0
Fine	1.5 to 2.0
Combined	0.8 to 1.5

The lime ratio for fine and coarse aggregate must be within ±0.2 percent of the lime ratio in the accepted JMF. The lime ratio must be within ±0.2 percent of the approved lime ratio when you combine the individual aggregate sizes in the JMF proportions.

Proportion dry lime by weight with a continuous operation.

The device controlling dry lime and aggregate proportioning must produce a treatment data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily treatment. The data must be a treatment activity register and not a summation. The material represented by a data set is the amount produced 5 minutes before and 5 minutes after the capture time. For the duration of the contract, collected data must be stored by the controller.

If 3 consecutive sets of recorded treatment data indicate deviation more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment of lime treated aggregates.

If a set of recorded treatment data indicates a deviation of more than 0.4 percent above or below the lime ratio in the accepted JMF, stop treatment of lime treated aggregates and do not use the material represented by that set of data in HMA.

If 20 percent or more of the total daily treatment indicates deviation of more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the day's treated aggregate in HMA.

If you stop treatment for noncompliance, you must implement corrective action and successfully treat aggregate for a 20-minute period. Notify the Engineer before beginning the 20-minute treatment period.

If you use a batch-type proportioning operation for HMA production, control proportioning in compliance with the specifications for continuous mixing plants. Use a separate dry lime aggregate treatment operation from HMA batching operations including:

1. Pugmill mixer
2. Controller
3. Weigh belt for the lime
4. Weigh belt for the aggregate

If using a continuous mixing operation for HMA without lime marinated aggregates, use a controller that measures the blended aggregate weight after any additional water is added to the mixture. The controller must determine the amount of lime added to the aggregate from the aggregate weigh belt input in connection with the manually input total aggregate moisture, the manually input target lime content, and the lime proportioning system output. Use a continuous aggregate weigh belt and pugmill mixer for the lime treatment operation in addition to the weigh belt for the aggregate proportioning to asphalt binder in the HMA plant. If you use a water meter for moisture control for lime treatment, the meter must comply with California Test 109.

At the time of mixing dry lime with aggregate, the aggregate moisture content must ensure complete lime coating. The aggregate moisture content must not cause aggregate to be lost between the point of weighing the combined aggregate continuous stream and the dryer. Add water for mixing and coating aggregate to the aggregate before dry lime addition. Immediately before mixing lime with aggregate, water must not visibly separate from aggregate.

The HMA plant must be equipped with a bag house dust system. Material collected in the dust system must be returned to the mix.

Mixing Dry Lime and Aggregate

Mix aggregate, water, and dry lime with a continuous pugmill mixer with twin shafts. Immediately before mixing lime with aggregate, water must not visibly separate from aggregate. Store dry lime in a uniform and free flowing condition. Introduce dry lime to the pugmill in a continuous operation. The introduction must occur after the aggregate cold feed and before the point of proportioning across a weigh belt and the aggregate dryer. Prevent loss of dry lime.

If marination is required, marinate treated aggregate in stockpiles between 24 hours and 60 days before using in HMA. Do not use aggregate marinated more than 60 days.

The pugmill must be equipped with paddles arranged to provide sufficient mixing action and mixture movement. The pugmill must produce a homogeneous mixture of uniformly coated aggregates at mixer discharge.

If the aggregate treatment operation is stopped longer than 1 hour, clean the equipment of partially treated aggregate and lime.

Aggregate must be completely treated before introduction into the mixing drum.

MEASUREMENT AND PAYMENT

Full compensation for dry lime treating HMA aggregate including marination shall be considered as included in the contract price paid per ton for HMA as designated in the Engineer's Estimate and no separate payment will be made therefor.

10-1.48 LIQUID ANTISTRIP TREATMENT

GENERAL

Summary

This work includes treating asphalt binder with liquid antistrip (LAS) treatment to bond the asphalt binder to aggregate in hot mix asphalt (HMA).

Submittals

For LAS, submit with the proposed job mix formula (JMF) submittal under Section 39, "Hot Mix Asphalt," of the Standard Specifications:

1. Materials Safety Data Sheet (MSDS)
2. One 1-pint sample
3. Infrared analysis including copy of absorption spectra

Submit a certified copy of test results and a MSDS for each LAS lot.

Submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each LAS shipment. With each certificate also submit:

1. Your signature and printed name
2. Shipment number
3. Material type
4. Material specific gravity
5. Refinery
6. Consignee
7. Destination
8. Quantity
9. Contact or purchase order number
10. Shipment Date

Submit proportions for LAS as part of the JMF submittal specified in Section 39-1.03, "Hot Mix Asphalt Mix Design Requirements," of the Standard Specifications. If you change the brand or type of LAS, submit a new JMF.

For each job site delivery of LAS, submit one 1/2-pint sample to the Transportation Laboratory. Submit shipping documents to the Engineer. Label each LAS sampling container with:

1. LAS type
2. Application rate
3. Sample date
4. Contract number

At the end of each day's production shift, submit production data in electronic and printed media. Present data on electronic media in tab delimited format. Use line feed carriage return with one separate record per line for each production data set. Allow sufficient fields for the specified data. Include data titles at least once per report. For each mixing operation type, submit in order:

1. Batch Mixing:

    1.1. Production date
    1.2. Time of batch completion
    1.3. Mix size and type
    1.4. Each ingredient's weight
    1.5. Asphalt binder content as percentage of dry aggregate weight
    1.6. LAS content as percentage of asphalt binder weight

2. Continuous Mixing:

    2.1. Production date
    2.2. Data capture time
    2.3. Mix size and type
    2.4. Flow rate of wet aggregate collected directly from the aggregate weigh belt
    2.5. Aggregate moisture content as percentage of dry aggregate weight
    2.6. Flow rate of asphalt binder collected from the asphalt binder meter
    2.7. Flow rate of LAS collected from the LAS meter
    2.8. Asphalt binder content as percentage of dry aggregate weight calculated from:

        2.8.1. Aggregate weigh belt output
        2.8.2. Aggregate moisture input
        2.8.3. Asphalt binder meter output

    2.9. LAS content as percentage of asphalt binder weight calculated from:

        2.9.1. Asphalt binder meter output
        2.9.2. LAS meter output

Quality Control and Assurance

For continuous mixing and batch mixing operations, sample asphalt binder before adding LAS. For continuous mixing operations, sample combined asphalt binder and LAS after the static mixer.

The Engineer orders proportioning operations stopped for any of the following if you:

1. Do not submit data
2. Submit incomplete, untimely, or incorrectly formatted data
3. Do not take corrective actions
4. Take late or unsuccessful corrective actions
5. Do not stop production when proportioning tolerances are exceeded
6. Use malfunctioning or failed proportioning devices

If you stop production, notify the Engineer of any corrective actions taken before resuming.

MATERIALS

LAS-treated asphalt binder must comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications. LAS does not substitute for asphalt binder.

LAS total amine value must be 325 minimum when tested under ASTM D 2074.

Use only 1 LAS type or brand at a time. Do not mix LAS types or brands.

Store and mix LAS under the manufacturer's recommendations.

CONSTRUCTION

LAS must be between 0.5 and 1.0 percent by weight of asphalt binder.

If 3 consecutive sets of recorded production data show actual delivered LAS weight is more than ±1 percent of the approved mix design LAS weight, stop production and take corrective action.

If a set of recorded production data shows actual delivered LAS weight is more than ±2 percent of the approved mix design LAS weight, stop production. If the LAS weight exceeds 1.2 percent of the asphalt binder weight, do not use the HMA represented by that data.

The continuous mixing plant controller proportioning the HMA must produce a production data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily production. The data must be a production activity register and not a summation. The material represented by the data is the amount produced 5 minutes before and 5 minutes after the capture time. For the duration of the contract, collected data must be stored by the plant controller or a computer's memory at the plant.

MEASUREMENT AND PAYMENT

Full compensation for LAS is included in the contract price paid per ton for HMA as designated in the Engineer's Estimate and no separate payment will be made therefor.

10-1.49 JOINTED PLAIN CONCRETE PAVEMENT

GENERAL

Jointed plain concrete pavement shall be constructed in conformance with the provisions in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications and these special provisions, and as shown on the plans.

Insert method for forming joints in pavement shall not be used.

PREPAVING CONFERENCE

Supervisory personnel of the Contractor and subcontractors who are to be involved in the concrete paving work shall meet with the Engineer at a prepaving conference, at a mutually agreed time, to discuss methods of accomplishing the paving work.

The Contractor shall provide a facility for the prepaving conference within 3 miles of the construction site or at a nearby location agreed to by the Engineer. Attendance at the prepaving conference is mandatory for the Contractor's project superintendent, paving construction foreman, subcontractor's workers, including foremen and personnel performing saw cutting, joint sealing, concrete plant manager, and concrete plant operator. Conference attendees shall sign an attendance sheet provided by the Engineer. Production and placement shall not begin nor proceed unless the above-mentioned personnel have attended the mandatory prepaving conference.

JUST-IN-TIME TRAINING

Attending a 4-hour Just-In-Time Training (JITT) shall be mandatory, and consist of a formal joint training class on portland cement concrete and paving techniques. Construction operations for portland cement concrete paving shall not begin until the Contractor's and the Engineer's personnel have completed the mandatory JITT. The Contractor's personnel included in the list of participants for the prepaving conference as well as the Engineer's representatives shall attend JITT. JITT shall be in addition to the prepaving conference.

The JITT class will be conducted for not less than 4 hours on portland cement concrete pavement and paving techniques. The training class may be an extension of the prepaving conference and shall be conducted at a project field location convenient for both the Contractor and the Engineer. The JITT class shall be completed at least 15 days, not including Saturdays or holidays, prior to the start of portland cement concrete paving operations. The class shall be held during normal working hours.

The JITT instructor shall be experienced in the construction methods, materials, and test methods associated with construction of portland cement concrete pavement and paving techniques. The instructor shall not be an employee of the Contractor or a member of the Engineer's field staff. A copy of the course syllabus, handouts, and presentation material shall be submitted to the Engineer at least 7 days before the day of the training. The Contractor and the Engineer shall mutually agree to course instructor, the course content, and training site. The instructor shall issue a certificate of completion to the participants upon completion of the class. The certificate of completion shall include the course title, date and location of the class, the name of the participant, instructor's name, location and telephone number.

The Contractor's or Engineer's personnel involved with portland cement concrete paving operations will not be required to attend JITT if they have completed equivalent training within the previous 12 months of the date of the JITT for this project. The Contractor shall provide a certificate of class completion as described above for each staff member to be excluded from the JITT class. The Engineer will provide the final determination for exclusion of staff member's participation. Attendees of the JITT shall complete, and submit to the Engineer, an evaluation of the training. The Engineer will provide the course evaluation form.

Just-In-Time Training shall not relieve the Contractor of responsibility under the contract for the successful completion of the work in conformance with the requirements of the plans and specifications.

TEST STRIP

At the beginning of paving operations, the Contractor shall construct a test strip of concrete pavement from 650 feet to 1,000 feet in length. The paving width for the test strip shall be the same as that intended by the Contractor for production work. The Contractor shall use the same equipment to construct the test strip for the remainder of the paving operations, except as specified in this section. The Contractor shall not begin paving operations until the test strip has been evaluated in conformance with the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications regarding surface straight edge requirements, and "Profile Index" in this section; for dowel and tie bar alignment verification; concrete quality (except modulus of rupture); and pavement thickness. Additional test strips will be required when:

1. A portion of a test strip fails to conform to the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications for straight edge requirements;
2. A portion of the test strip fails to conform to profile requirements;
3. The Contractor proposes different paving equipment, including a batch plant, paver, dowel bar inserter, tie bar inserter, tining, or curing equipment;
4. The dowel bar tolerances are not met;
5. The pavement thickness deficiency is greater than 1/2 inch after grinding; or
6. A change in concrete mix proportions has occurred.

The Contractor shall perform coring of the test strips as part of the dowel and tie bar placement tolerance verification, and pavement thickness verification. The Engineer will select a minimum of six dowel bars that will be cored for each test strip. The Engineer will have the option of selecting up to 6 tie bars that will be cored for each test strip. After removal of cores, voids in concrete pavement shall be cleaned and filled with hydraulic cement grout conforming to the provisions in "Core Drilling for Dowel Placement Alignment Assurance Testing" in this section.

Before mechanical dowel bar inserters are used, the Contractor shall demonstrate that the insertion equipment will not leave surface irregularities such as depressions, dips, or high areas adjacent to the dowel bar insertion point, or voids or segregation around dowel bars.

Before placement of the test strip, the Contractor shall submit a written procedure to locate transverse weakened plane joints that will coincide with the center of the dowel bars being placed and locating the tie bars along the longitudinal joints. This procedure shall be submitted prior to the prepaving conference, and shall describe the control of inadvertent covering of paint markings after applying curing compound, excessive paint spray producing too large a paint dot marking for the accuracy required, misalignment by transferring marking spots, and inadequate staking of joints.

Construction of concrete pavement shall not proceed until the Engineer has completed an evaluation of the test strip. The Engineer shall be allowed 3 business days to evaluate the test strip. If, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the Engineer not completing the evaluation of the test strip within the time specified, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications. Test strips failing to conform to the specifications for concrete pavement shall be removed. Additional test strips shall be constructed until the Contractor constructs a test strip that conforms to the specifications for concrete pavement. Additional test strips shall conform to the requirements in this section, except the test strip shall be 650 feet in length.

Prior to constructing additional test strips, the Contractor shall change methods or equipment to construct a test strip that conforms to the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications, "Profile Index" of this section, and dowel bar alignment verification, without grinding or other corrective work.

The Engineer may waive the initial test strip if the Contractor proposes to use a batch plant mixer and paving equipment with the same personnel that were satisfactorily used on a Department project within the preceding 12 months. The personnel shall be individuals listed in the prepaving conference used on a preceding Department project.

Materials resulting from the construction and removal of rejected test strips shall become the property of the Contractor and shall be removed and 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.

MATERIALS

Concrete

Attention is directed to Section 90, "Portland Cement Concrete," of the Standard Specifications, regarding mix proportions for concrete being determined by the Contractor.

Primary aggregate gradings shall conform to the gradation requirements of Section 90-3, "Aggregate Gradings," of the Standard Specifications. When combined in the proportions determined by the Contractor, the percent passing the 3/8-inch sieve and retained on the No. 8 sieve shall not be less than 16 percent of the total aggregate.

The cementitious material content shall not exceed 675 pounds per cubic yard.

An air-entraining admixture conforming to the provisions in Section 90-4, "Admixtures," of the Standard Specifications shall be added to the concrete pavement in the amount required to result in an air content of 4 ±1.5 percent in the freshly mixed concrete.

Tie Bars

Tie bars shall be deformed reinforcing steel bars conforming to the requirements of ASTM Designation: A 615/A 615M, Grade 40 or 60, A 996/A 996M, Grade 50 or 60, or A 706/A 706M. Tie bars shall be epoxy-coated in conformance with the requirements in ASTM Designation: A 934/A 934M or A 775/A 775M and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except the epoxy-coating thickness after curing shall be between 7 mils to 16 mils. Fabrication, sampling and jobsite handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except the 2 samples shall be 30 inches long. Epoxy-coated tie bars shall not be bent.

Epoxy (Drill and Bond)

Epoxy for bonding tie bars and dowel bars to portland cement concrete shall be a two-component, epoxy-resin, conforming to the requirements of ASTM Designation: C 881, Type V, Grade 3 (Non-Sagging), Class A, B or C. The class used shall be dependent on the internal temperature of the hardened concrete at the time the epoxy is to be applied. Class A shall be used when the internal temperature is below 40 °F, but not lower than recommended by the manufacturer. Class B shall be used when the internal temperature is from 40 °F to 60 °F. Class C shall be used when the internal temperature is above 60 °F, but not higher than recommended by the manufacturer. A Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished with the epoxy. A copy of the manufacturer's recommended installation procedure shall be provided to the Engineer at least 7 days prior to the start of work. Epoxy shall be applied in conformance with the manufacturer's recommendations.

Dowel Bars

Dowel bars shall be plain round smooth, epoxy-coated steel conforming to the requirements in ASTM Designation: A 615/A 615M, Grade 40 or 60, the details shown on the plans and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except that the two samples required in ASTM Designation: D 3963/D 3963M shall be 18 inches long. Epoxy coating of dowel bars shall conform to the provisions in ASTM Designation: A 884/A 884M, Class A, Type 1 or Type 2, except that the bend test shall not apply.

Dowel bars shall be free from burrs or other deformations detrimental to free movement of the bars in the concrete.

Bond Breaker

Dowel bars shall be lubricated with a bond breaker over the entire bar. A bond breaker application of petroleum paraffin based lubricant or white-pigmented curing compound shall be used to coat the dowel bars completely prior to placement. Oil and asphalt based bond breakers shall not be used. Paraffin based lubricant shall be Dayton Superior DSC BB-Coat or Valvoline Tectyl 506 or an approved equal. Paraffin based lubricant shall be factory applied. White pigmented curing compound shall conform to the requirements of ASTM Designation: C 309, Type 2, Class A, and shall contain 22 percent minimum nonvolatile vehicles consisting of at least 50 percent paraffin wax. Curing compound shall be applied in 2 separate applications, the last application not more than 8 hours prior to placement of the dowel bars. Each application of curing compound shall be applied at the approximate rate of one gallon per 15 square yards.

Dowel Bar Baskets

Dowel bar baskets shall be manufactured with a minimum welded wire gage number of MW 65. Baskets shall be either U-frame or A-frame shape. J-frame shapes shall not be used. Baskets shall be fabricated in conformance with the requirements in ASTM Designation: A 82. Welding of baskets shall conform to the requirements in AASHTO Designation: M 254. A broken weld will be a cause for rejection of the basket. Baskets shall be Class A, Type 1 epoxy-coated in conformance with the requirements in ASTM Designation: A 884/A 884M. Fabrication and job-site handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except that sampling of epoxy-coated wire reinforcement will not be required. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of epoxy-coated wire reinforcement certifying that the coated bars conform to the requirements in ASTM

Designation: A 884/A 884M and the provisions in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications. The Certificate of Compliance shall include the certifications specified in ASTM Designation: A 884/A 884M and a statement that the coating material has been pre-qualified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

Concrete fasteners shall be used for anchoring dowel bar baskets to lean concrete base, hot mix asphalt used as base, asphalt treated permeable base, or cement treated permeable base. Concrete fasteners shall be driven fasteners such as concrete nails, used specifically for fastening to hardened concrete, or hot mix asphalt used as base. Concrete fasteners shall conform to the requirements of ASTM Designation: F 1667. Concrete nails used as fasteners on lean concrete base or hot mix asphalt used as base shall have a minimum shank diameter of 5/32 inch with a minimum shank length of 2-1/2 inches. Concrete nails used as fasteners on asphalt treated or cement treated permeable base shall have a minimum shank diameter of 5/32 inch with a minimum shank length of 4-3/4 inches. Shank length shall be the distance from the point to the bottom of the nail head. Clips and washers shall be commercial quality manufactured for use with dowel bar baskets. The surface of concrete fasteners, clips, and washers shall be either zinc electroplated or galvanized with a minimum coating thickness of 0.2-mil.

Tie Bar Baskets

Tie bar baskets shall be manufactured with a minimum welded wire gage number of MW 65. Baskets shall be either U-frame or A-frame shape. J-frame shapes shall not be used. Tie bar baskets shall be fabricated in conformance with the requirements in ASTM Designation: A 82. Welding of baskets shall conform to the requirements in AASHTO Designation: M 254. A broken weld will be a cause for rejection of the basket. Baskets shall be Class A, Type 1 epoxy-coated in conformance with the requirements in ASTM Designation: A 884/A 884M. Fabrication and job-site handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except that sampling of epoxy-coated wire reinforcement will not be required. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of epoxy-coated wire reinforcement certifying that the coated bars conform to the requirements in ASTM Designation: A 884/A 884M and the provisions in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications. The Certificate of Compliance shall include the certifications specified in ASTM Designation: A 884/A 884M and a statement that the coating material has been pre-qualified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

Concrete fasteners shall be used for anchoring tie bar baskets to lean concrete base, hot mix asphalt used as base, asphalt treated permeable base, or cement treated permeable base. Concrete fasteners shall be driven fasteners such as concrete nails, used specifically for fastening to hardened concrete, or hot mix asphalt used as base. Concrete fasteners shall conform to the requirements of ASTM Designation: F 1667. Concrete nails used as fasteners on lean concrete base or hot mix asphalt used as base shall have a minimum shank diameter of 5/32 inch with a minimum shank length of 2-1/2 inches. Concrete nails used as fasteners on asphalt treated or cement treated permeable base shall have a minimum shank diameter of 5/32 inch with a minimum shank length of 4-3/4 inches. Shank length shall be the distance from the point to the bottom of the nail head. Clips and washers shall be commercial quality manufactured for use with tie bar baskets. The surface of concrete fasteners, clips, and washers shall be either zinc electroplated or galvanized with a minimum coating thickness of 0.2-mil.

Reinforcement

Reinforcement shall be epoxy coated and shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications.

Preformed Compression Joint Sealant

Preformed compression seals shall conform to the requirements of ASTM Designation: D 2628. Preformed compression seals shall have 5 or 6 cells. Preformed compression seals for Types A2 and B joints shall have 4 or more cells. Lubricant adhesive used with preformed compression seals shall conform to the requirements of ASTM Designation: D 2835. Compression seals and lubricant adhesive shall be installed in conformance with the manufacturer's recommendations and these special provisions. The manufacturer's recommendations shall be submitted to the Engineer at the prepaving conference.

Each lot of compression seal and lubricant adhesive shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and shall be accompanied with storage instructions and precautionary instructions for use. The Certificate shall also be accompanied with a certified test report of the results of the required tests performed on the preformed compression joint sealant material within the previous 12 months prior to proposed use. The Certificate and accompanying test report shall be provided for each lot of joint seal prior to use on the project. The Contractor shall submit the manufacturer's data sheet with installation instructions and recommended type of preformed compression seal for the joint size and depth as shown on the plans. The manufacturer's

selected compression seal shall show evidence that the seal is being compressed at level between 40 percent and 50 percent for the joint width and depth shown on the plans.

Hydraulic Cement Grout (non-shrink)

Hydraulic cement grout (non-shrink) shall conform to the requirements in ASTM Designation: C 1107. At the Contractor's option, clean, uniformly rounded aggregate filler may be used to extend the grout. The extension of grout shall not exceed 60 percent of the weight of the grout or the maximum amount of grout extension recommended by the manufacturer, whichever is less. The moisture content of the aggregate filler shall not exceed 0.5-percent. Grading of the aggregate filler shall conform to the following:

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

PAVEMENT CONCRETE MIX PROPORTIONS

The Contractor shall determine the mix proportions for pavement concrete. The laboratory used to develop the mix proportions shall meet the requirements of ASTM Designation: C 1077, and shall have current AASHTO accreditation for test methods AASHTO Designation: T 97 or ASTM Designation: C 78, and AASHTO Designation: T 126 or ASTM Designation: C 192.

The minimum cementitious materials content or the maximum water to cementitious materials ratio shall be determined in conformance with the requirements in California Test 559. Trial mixtures shall be made no more than 24 months before field qualification. The minimum cementitious materials content or the maximum water to cementitious materials ratio shall be that determined from the trial mixtures curve to produce a minimum modulus of rupture of 560 pounds per square inch at 28 days age and 650 pounds per square inch at 42 days age. To account for variances in materials, production of concrete, and modulus of rupture testing, the Contractor shall include as part of the proposed mix proportions an increase to the cementitious material content or a decrease to the water to cementitious materials ratio, determined from trial mixtures, to ensure that portland cement concrete produced during paving operations conforms to the requirements in "Modulus of Rupture," in this section.

At least 15 days prior to field qualification, the Contractor shall submit the proposed pavement concrete mix proportions with laboratory test reports. Laboratory test reports shall include modulus of rupture determined for each trial mixture at ages of 10, 21, 28 and 42 days in conformance with the applicable portions of California Test 559.

Field Qualification

Field qualification of proposed mix proportions will be required prior to placement of pavement concrete. The Contractor shall perform field qualification and submit certified test data to the Engineer. Field qualification data shall be based upon the proposed use of materials, mix proportions, mixing equipment, procedures and size of batch.

Proposed concrete mix proportions will be field qualified when the test results of five beams from a single batch of concrete indicate the average modulus of rupture is at least 560 pounds per square inch with no single beam lower than 550 pounds per square inch at an age of the Contractor's choice but not later than 28 days. Beams shall be tested for modulus of rupture at a minimum of 10, 21, and 28 days of age. Test specimens shall be made and tested in conformance with the requirements in California Test 523.

The certified field qualification test data reports shall include the following:

1. Date of mixing,
2. Mixing equipment and procedures used,
3. Volume of batch in cubic yards and the weight or volume,
4. Type and source of ingredients used,
5. Penetration and slump of the concrete,
6. The air content of the concrete, and
7. The age at time of testing and strength of concrete specimens tested.

Field qualification test data reports shall be signed by a certified representative in charge of the laboratory that performed the tests.

If the Contractor changes a source of supply or proportions, the Contractor shall submit a new proposed mix design and furnish samples from the new source, or sources, at least 60 days prior to their intended use. The new mix proportions shall be trial batched and field qualified, unless, the Engineer determines the change is not substantive. No extension of contract time will be allowed for the time required to perform the sampling, testing, preparing and qualifying new mix proportions for new aggregate sources proposed by the Contractor.

MODULUS OF RUPTURE

The Engineer will test portland cement concrete pavement for modulus of rupture in conformance with the requirements in California Test 523. Acceptance will be on a lot basis. Each lot shall not to exceed 1,000 cubic yards of concrete pavement. The Engineer will determine sample locations. A minimum of six beam specimens shall be made from each sample. Beam specimens will be tested for modulus of rupture at 10, 21, and 28 days. The modulus of rupture for each lot will be calculated by averaging the results of two beams representing that lot tested at 28 days of age. The difference in modulus of rupture between each individual beam result shall not exceed 65 pounds per square inch.

The Contractor shall perform sampling and testing of beam specimens to determine if concrete pavement has achieved a modulus of rupture of 350 pounds per square inch when requesting early use of concrete pavement in conformance with the provisions in Section 90-8.03, "Protecting Concrete Pavement," of the Standard Specifications. Beam specimens shall be made and tested in conformance with the requirements in California Test 523.

INSTALLING TIE BARS

Tie bars shall be installed at longitudinal contact joints and longitudinal weakened plane joints as shown on the plans. Contiguous width of new portland cement concrete pavement tied together with tie bars shall not exceed 50 feet. Tie bars shall not be installed at joints between portland cement concrete and hot mix asphalt pavements.

Tie bars shall be installed at longitudinal joints by one of the following methods:

1. Drilling and bonding tie bars with two-component, epoxy-resin that conforms to this section. Drilled holes shall be cleaned in conformance with the epoxy manufacturer's instructions and shall be dry at the time of placing the epoxy and tie bars. Tie bars will be rotated 180º while being inserted into the epoxy filled holes. Immediately after inserting the tie bars into the epoxy, the tie bars shall be supported as necessary to prevent movement during curing and shall remain undisturbed until the epoxy has cured as specified by the manufacturer instructions. Tie bars that are improperly placed or bonded, as determined by the Engineer, will be rejected. If rejected, new holes shall be drilled and new tie bars shall be placed and securely bonded to the concrete. Rejected tie bars shall be cut flush with the joint face. Exposed ends of tie bars shall be epoxy coated. The center of the new holes shall be offset 3 inches horizontally from the center of the rejected hole to maintain the minimum clearance to the dowel bar. Work necessary to correct improperly bonded tie bars shall be performed at the Contractor's expense.
2. Inserting tie bars into the plastic slipformed concrete before finishing the concrete. Inserted tie bars shall have full contact between the bar and the concrete. When tie bars are inserted through the pavement surface, the concrete over the tie bars shall be reworked and refinished so that there is no evidence on the surface of the completed pavement that there has been an insertion performed. Loose tie bars shall be replaced by drilling and bonding as described in A above, at the Contractor's expense.
3. Using threaded dowel splice couplers fabricated from deformed bar reinforcement material, free of external welding or machining. Threaded dowel splice couplers shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and shall be accompanied with installation instructions. Installation of threaded dowel splice couplers shall conform to the requirements of the manufacturer's recommendations.
4. Using tie bar baskets that conform to these special provisions

Tie bars shall be oriented perpendicular to the pavement joint and parallel with the surface of the pavement at mid-slab depth. Tie bar alignment tolerances shall conform to the requirements for dowel bars except embedment length tolerance shall be ±2 inches.

If tie bar baskets are used, they shall be anchored to the base to hold the tie bars at the specified depth and alignment during concrete placement without displacement. A minimum of 8 alternating, equally spaced, concrete fasteners with clips shall be used to anchor each basket (4 per lower runner wire). Temporary spacer wires shall be cut or removed after the baskets are anchored into position before concrete placement. Concrete pavement shall not be placed if the baskets are not in place at least 200 feet in advance of the concrete placement operation. The Engineer may waive this requirement upon written request by the Contractor in areas where access is restricted or other construction limitations are encountered. The Contractor shall demonstrate that the baskets are anchored and shall not shift during concrete placement. The Contractor

shall provide longer concrete nails than the minimum lengths for the varying bases beneath the portland cement concrete when baskets demonstrate movement.

Full compensation for providing longer concrete nails shall be considered as included in the contract unit price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

DOWEL PLACEMENT

Dowel bars shall be centered on the joint within a tolerance of ±2 inches in the longitudinal direction directly over the contact joint or sawcut for the transverse weakened plane joints, as shown on the plans. Prior to placement of dowel bars, the Contractor shall submit to the Engineer a written procedure to identify the transverse weakened plane joint locations relative to the middle of the dowel bars and the procedure for consolidating concrete around the dowel bars.

Dowel bars shall be placed at transverse weakened plane joints within shoulder areas except at drainage inlets.

Dowel bars shall be placed at longitudinal joints as shown on the plans.

Dowel bars shall be placed as shown on the plans by using dowel bar baskets or by mechanical insertion.

When dowel bars are placed by mechanical insertion, the concrete over the dowel bars shall be reworked and refinished so that there is no evidence on the surface of the completed pavement that there has been any insertion performed. When drill and bonding of dowel bars is performed at contact joints, a grout retention ring shall be used.

When dowel bar baskets are used, they shall be anchored to the base to hold the dowel bars at the specified depth and alignment during concrete placement without displacement. A minimum of 8 alternating, equally spaced, concrete fasteners with clips shall be used to anchor each 12-foot dowel bar basket (4 per lower runner wire). At least 10 concrete fasteners shall be used for basket sections greater than 12 feet and less than or equal to 16 feet. Temporary spacer wires connecting dowel bar baskets shall be cut or removed after the dowel bar baskets are anchored into position prior to concrete placement. Paving shall be suspended when dowel bar baskets are not in place at least 200 feet in advance of the concrete placement operation. The Engineer may waive this requirement upon written request by the Contractor, in areas, where access is restricted, or other construction limitations are encountered. The Contractor shall demonstrate to the Engineer's satisfaction that dowel bar baskets are adequately anchored and not shift during concrete placement. The Contractor shall provide longer concrete nails than the minimum lengths for the varying bases beneath the portland cement concrete when anchored dowel bar baskets demonstrate movement.

Full compensation for providing longer concrete nails shall be considered as included in the contract unit price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

Dowel bar placement at transverse and longitudinal weakened plane joints	
Horizontal offset	±1 inch
Longitudinal translation	±2 inches
Horizontal skew	3/8 inch
Vertical skew	3/8 inch
Vertical depth	(d/3 +1/2 inch) from pavement surface to top of dowel bar or 5/8 inch below planned placement

Note: d = pavement thickness in inches

CORE DRILLING FOR DOWEL BAR AND TIE BAR PLACEMENT ALIGNMENT ASSURANCE TESTING

Coring to confirm dowel bar and tie bar placement, alignment, and concrete consolidation shall be provided by the Contractor throughout the project, at locations determined by the Engineer. Each day's paving shall be cored within 2 days by performing a minimum of 2 and a maximum of 4 tests for dowel bar placement and position for every 2,000 square yards of doweled pavement or fraction thereof and one test for tie bar placement and position for every 4,000 square yards of pavement with tie bars. One test shall consist of drilling two cores, one on each end of a dowel bar to expose both ends and allow measurement for proper alignment. The minimum core hole diameter shall be 5 inches. If the cores indicate that dowel bars or tie bars are not within the allowable tolerances or if air voids exist surrounding the dowel bars or tie bars, additional cores will be required to determine the limits and severity of unacceptable work.

The holes shall be cored by methods that will not damage the concrete adjacent to the holes. Immediately after coring, the concrete cores shall be submitted to the Engineer for inspection, and the cores shall be identified by the Contractor with a location description.

After removal of cores, core hole voids in concrete pavement shall be cleaned and filled with hydraulic cement grout (non-shrink). After placement of hydraulic cement grout, the material while still plastic shall be finished and textured to match the adjacent pavement surface. The backfill material shall be the same level as the pavement surface.

Water for core drilling operations shall be from a local domestic water supply, and shall contain not more than 1,000 parts per million of chlorides as CL, nor more than 1,300 parts per million of sulfates as SO_4, nor shall it contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

Water from core drilling operations shall not be permitted to fall on public traffic, to flow across shoulders or lanes occupied by public traffic, or to flow into gutters or other drainage facilities.

Dowel bar and tie bar alignment shall be within the specified tolerances. If dowel bars or tie bars are found to be installed improperly, the paving operations shall not continue until the Contractor has demonstrated to the Engineer that the problem which caused the improper dowel bar or tie bar positioning has been corrected.

Dowel bars in rejected joints shall be replaced by the Contractor by saw cutting on each side of the rejected joint a minimum of 3 feet, lifting out concrete to be removed, installing new dowel bars at the new transverse joints, installing dowel bars and preformed sponge rubber expansion joint filler along the longitudinal joints, placing concrete, and installing new joints. Preformed sponge rubber expansion joint filler shall conform to the requirements in ASTM Designation: D 1752. New dowel bar holes shall be drilled, not more than 1/8 inch greater than the dowel bar diameter, by the use of an automatic dowel-drilling rig for the dowels to be installed at the contact joints. Dowel bars shall be placed, as shown on the plans, for the 2 new transverse contact joints. Original exposed tie bars, located within the slab replacement area, shall be cut flush with the lane or pavement edge and dowel bars shall be installed to replace the tie bars at an offset of 3 inches, horizontally from the tie bar location. Holes for dowel bars to be placed along the longitudinal joint shall be drilled, not more than 1/8 inch greater than the dowel bar diameter, by the use of an automatic dowel-drilling rig for the dowel bars to be installed at the contact joints.

When requested by the Contractor and approved by the Engineer, dowel bars which are more than ±2 inches but less than ±3 inches from being centered directly over the sawcut for the transverse weakened plane joint, may remain in place, and the Contractor shall pay to the State the amount of $27.00 per square yard for the quantity of concrete pavement panels represented by the cores indicating incorrect dowel bar alignment or improper concrete consolidation around dowels. The quantity of concrete pavement area used to determine the amount of payment to the State will be calculated using the panel dimensions for panels adjacent to and inclusive of the joints with incorrect dowel bar alignment or improper concrete consolidation around dowel bars. The Department will reduce compensation from moneys due, or that may become due to the Contractor under the contract. This reduced compensation shall be in addition to other adjustments for incorrect tie bar alignment or improper concrete consolidation around tie bars as specified in these special provisions and for pavement thickness deficiency in conformance with the provisions in Section 40-1.135, "Pavement Thickness," of the Standard Specifications and in addition to other adjustments for deficient Cleanness Value and coarse aggregate grading; and for deficient Sand Equivalent and fine aggregate grading in conformance with the provisions in Section 90-2.02, "Aggregate," of the Standard Specifications.

Tie bars which are not within the specified tolerance for placement and position, as determined from inspection and measurements of cores, may remain in place when requested by the Contractor and approved by the Engineer. The Contractor shall pay to the State the amount of $20 per square yard for the quantity of concrete pavement panels represented by the cores indicating incorrect tie bar alignment or improper concrete consolidation around tie bars. The quantity of concrete pavement area used to determine the amount of payment to the State will be calculated using the panel dimensions for panels adjacent to and inclusive of the joints with incorrect tie bar alignment or improper concrete consolidation around tie bars. The Department will reduce compensation from moneys due, or that may become due to the Contractor under the contract. This reduced compensation will be in addition to other adjustments for incorrect dowel bar alignment or improper concrete consolidation around dowel bars as specified in these special provisions and for pavement thickness deficiency in conformance with the provisions in Section 40-1.135, "Pavement Thickness," of the Standard Specifications and in addition to other adjustments for deficient Cleanness Value and coarse aggregate grading; and for deficient Sand Equivalent and fine aggregate grading in conformance with the provisions in Section 90-2.02, "Aggregate," of the Standard Specifications.

PREFORMED COMPRESSION JOINT SEAL INSTALLATION

The compression seal alternative joint detail for transverse and longitudinal joints, as shown on the plans, shall apply only to weakened plane joints. Weakened plane joints shall be constructed by the sawing method. Should grinding or grooving be required over or adjacent to any joint after the compression seal has been placed, the joint materials shall be removed and disposed of, and replaced at the Contractor's expense. Compression seals shall be recessed below the final finished surface as shown on the plans.

Transverse weakened plane joints shall be Type A1 or B as shown on the plans. Longitudinal weakened plane joints shall be Type A2 or B as shown on the plans.

Seven days after the concrete pavement placement and not more than 4 hours before placing preformed compression joint seals, the joint walls shall be cleaned by the dry sand blast method and other means as necessary to remove from the joint objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, traces of sand, dust and loose material shall be removed from and near the joint for a distance along the pavement surfaces of at least 2 inches on each side of the joint by the use of a vacuum device. Surface moisture or dampness shall be removed at the joints by means of compressed air or moderate hot compressed air or other means approved by the Engineer. Drying procedures that leave a residue or film on the joint wall shall not be used. Sandblasting equipment shall have a maximum nozzle diameter size of 1/4 inch ± 1/32 inch and a minimum pressure of 90 pounds per square inch.

Longitudinal seals shall be installed before installing transverse seals. Longitudinal seals shall be continuous except at intersections with transverse seals. Transverse seals shall be installed in one continuous piece throughout each transverse joint. After the longitudinal seal is completed and the transverse seal is ready to be installed, a single cut with a sharp instrument or saw shall be made across the longitudinal seal at the middle of the intersection with the transverse seal. After the initial cut of the longitudinal seal, if the longitudinal joint material does not relax enough to allow proper installation of the transverse seal, the longitudinal joint material shall be trimmed precisely to accommodate the transverse seal and form a tight seal between the 2 joints.

An installation machine specifically designed for the installation of preformed compression joint seals shall be used to install the seal at the specified depth without cutting, nicking, or twisting the seal. The installation machine shall install the seal with no more than 4 percent stretch in the installed seal. Hand installation methods of installing seals will not be permitted.

The percentage of stretch shall be determined by laying a length of the preformed compression joint seal material cut to the exact length of the pavement joint to be sealed. The length shall then be measured. The cut length of preformed compression joint seal material shall then be installed in the joint. Excess amount of seal material remaining at the end of the joint shall be measured as the amount of stretch. The measured amount of stretch shall be divided by the original measured length to determine the percentage of stretch.

The completed seal shall not be twisted or have deformities that prevent the seal from making complete continuous contact with the joint walls. Seals installed that are twisted or deformed, or do not make continuous contact with joint walls or with greater than 4 percent stretch of the joint material will be rejected and removed.

CONSTRUCTING TRANSVERSE CONTACT JOINTS

A transverse contact (construction) joint shall be constructed, including dowel bars, at the end of each day's work or where concrete placement is interrupted for more than 30 minutes, to coincide with the next weakened plane joint location.

If sufficient concrete has not been mixed to form a slab to match the next weakened plane joint, when an interruption occurs, the excess concrete shall be removed and disposed of back to the last preceding joint. The cost of removing and disposing of excess concrete shall be at the Contractor's expense. Excess 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.

A metal or wooden bulkhead (header) shall be used to form the joint. The bulkhead shall be designed to accommodate the installation of dowel bars.

CONSTRUCTING TRANSVERSE JOINT CONNECTIONS AND ANCHORS

Concrete pavement joints at transitions to hot mix asphalt pavement, pavement end anchors and bridge approach slabs shall conform to the details as shown on the plans. Paint binder shall be applied to the concrete surface that hot mix asphalt pavement will contact. Paint binder shall be applied in conformance with the provisions in Section 39, "Hot Mix Asphalt," of the Standard Specifications.

PROFILE INDEX

The pavement surface shall be profiled, by the Contractor not more than 10 days following concrete placement, in the presence of the Engineer, using a California Profilograph or equivalent in conformance with the requirements in California Test 526, except a blanking band of zero (null) shall be used to determine the Profile Index. Two profiles shall be made within each traffic lane, one yard from and parallel with each lane line.

Profiled pavement shall conform to the following Profile Index requirements:

1. Pavement on tangent alignment and pavement on horizontal curves having a centerline radius of curve 2,000 feet or more shall have a Profile Index of 40 inches per mile or less.
2. Pavement on horizontal curves having a centerline radius of curve 1,000 feet or more but less than 2,000 feet and pavement within the superelevation transition of those curves shall have a Profile Index of 80 inches per mile or less.

Individual high points in excess of 5/16 inch, as determined by measurements of the profilogram in conformance with the requirements in California Test 526, except using a blanking band of zero (null), shall be reduced by grinding in conformance with the requirements in Section 40-1.10, "Final Finishing," of the Standard Specifications until the high points as indicated by reruns of the profilograph do not exceed 5/16 inch.

Pavement grinding shall not be performed before 10 days have elapsed after concrete placement, nor before the concrete has developed a modulus of rupture of at least 550 pounds per square inch.

CONSTRUCTING WEAKENED PLANE JOINTS (EARLY ENTRY SAW METHOD)

The Contractor may construct weakened plane joints using lighter weight concrete saws (early entry saws) specifically designed for sawing fresh concrete without the use of water. The early entry saws shall be capable of sawing joints within 2 hours of cure time after placement of the concrete pavement without ravelling or tearing, as defined in Section 40-1.08B(1), "Sawing Method," of the Standard Specifications. Joints sawed with early entry saws that develop random cracking shall be removed to the nearest controlled joint and replaced with concrete pavement containing dowel bars and tie bars in conformance with these special provisions and as shown on the plans. The removal and replacement work shall be at the Contractor's expense. Weakened plane joints not sawed within 2 hours of placing concrete pavement shall be sawed by conventional power driven wet-type concrete saws in conformance with the requirements of Section 40-1.08B(1), "Sawing Method," of the Standard Specifications.

Sawed grooves shall be cut to a maximum of 0.12-inch in width for longitudinal and transverse weakened plane joints made with early entry saws. The minimum depth of cut shall be calculated utilizing the formula in Section 40-1.08B(1), "Sawing Method," of the Standard Specifications except d = t/4.

TIE BARS ALONG LONGITUDINAL JOINT FOR SHORT RADIUS CURVES

When paving along short radius curves, the transverse joints shall be maintained in a single continuous straight line across lanes, through the radius point. Tie bars shall maintain minimum clearance from the transverse joint as shown on the plans. If the inside or outside curve of the panel does not allow equal uniform spacing of tie bars at 30 inches between tie bars, then the tie bars shall be equally spaced so that a minimum spacing of 15 inches to a maximum spacing of 30 inches is maintained between tie bars. Additional tie bars shall be considered as included in the contract price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

If dowel bars are specified along longitudinal joint for short radius curves, then dowel bars shall conform to the requirements of this special provision for tie bars spacing and tolerance.

MEASUREMENT AND PAYMENT

Sealing longitudinal and transverse weakened plane joints, and longitudinal isolation joints in portland cement concrete pavement will be measured by the foot. When a test strip conforms to the specifications for concrete pavement and remains a part of the project paving surface, the sealed pavement joints will be measured and paid for as seal pavement joint.

The contract price paid per foot for seal pavement joint shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing pavement joints complete in place, including sawing, cleaning and preparing the joints in the concrete pavement, furnishing and installing backer rod, repairing and patching spalled or raveled sawed joints, and replacing or repairing rejected joints, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Concrete pavement will be measured by the cubic yard in conformance with the provisions in Section 40-1.13, "Measurement," of the Standard Specifications. No deduction will be made for the volume of epoxy-coated dowel bars, epoxy-coated tie bars and, when used, tie bar baskets with fasteners and dowel bar baskets with fasteners, in the concrete pavement. When a test strip conforms to the specifications for concrete pavement and remains a part of the project paving surface, the concrete will be measured and paid for as concrete pavement.

The contract price paid per cubic yard for concrete pavement shall include full compensation for furnishing all labor, materials (including cementitious material in the amount determined by the Contractor), tools, equipment, and incidentals, and for doing all the work involved in constructing the portland cement concrete pavement complete in place, including furnishing and placing epoxy-coated dowel bars, epoxy-coated tie bars and, when used, any tie bar baskets and dowel bar baskets with fasteners, submittal to the Engineer all test data for determination of mix proportions of concrete for concrete pavement and for providing the facility, Contractor personnel and all the work involved in arranging and holding the prepaving conference, for constructing and repairing all joints; for performing all profile checks for Profile Index and furnishing final profilograms to the Engineer; for grooving and grinding required for final finishing; and for removing, and replacing pavement for deficient thickness, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for drilling holes and bonding tie bars with epoxy resin shall be considered as included in the contract price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

Full compensation for coring test strips for evaluation by the Engineer and for backfilling core holes with hydraulic cement grout when the test strip remains in place as part of the concrete pavement; and for constructing, coring and removing and disposing of test strips that are rejected shall be considered as included in the contract price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

Costs for providing JITT will be determined in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications, except no markups shall be added, and the Contractor will be paid for one half of the JITT cost. Costs for providing JITT shall include training materials, class site, and the JITT instructor including the JITT

instructor's travel, lodging, meals and presentation materials. All costs incurred by the Contractor or Engineer for attending JITT shall be borne by the party incurring the costs.

Full compensation for core drilling for dowel bar or tie bar alignment and backfilling with hydraulic cement grout shall be considered as included in the contract price per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

If the initial cores show that dowel bars or tie bars are out of alignment tolerances and the Engineer orders additional dowel bar or tie bar coring, full compensation for drilling the additional cores shall be considered as included in the contract price per cubic yard for concrete pavement 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 bar coring the additional cores will be paid for as extra work in conformance with the provisions in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Full compensation for drilling holes and bonding dowel bars with epoxy resin shall be considered as included in the contract price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

Full compensation for furnishing and placing epoxy coated reinforcement for transition end panel shall be considered as included in the contract price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

Full compensation for furnishing and placing paint binder (tack coat) for transition end panel shall be considered as included in the contract price paid per cubic yard for concrete pavement and no additional compensation will be allowed therefor.

10-1.50 SHOULDER RUMBLE STRIP (PORTLAND CEMENT CONCRETE, GROUND-IN INDENTATIONS)

This work shall consist of constructing ground-in shoulder rumble strips in portland cement concrete pavement as shown on the plans and as specified in these special provisions.

Shoulder rumble strips shall be constructed in the portland cement concrete pavement by grinding after the concrete has hardened. The indentations shall not be constructed before a period of 10 calendar days has elapsed after the concrete has been placed, nor before the concrete has developed a modulus of rupture of 551 psi.

Shoulder rumble strips shall not be constructed on structures or approach slabs.

Rumble strip indentations shall not vary from the specified dimensions by more than 0.06-inch or 1/16 inch in depth or 10 percent in length and width. Rumble strips shall be constructed within 2 inches of the required alignment. The grinding equipment shall be equipped with a sighting device that will enable the operator to maintain the alignment of the rumble strip.

Residue from grinding operations shall be picked up by means of a vacuum attachment to the grinding machine and shall not be allowed to flow across the pavement nor be left on the surface of the pavement.

The residue from grinding portland cement pavement may be disposed of at a site chosen by the Contractor if the Contractor obtains approval from the California Regional Water Quality Control Board having jurisdiction over the site. A copy of the approval shall be delivered to the Engineer before disposing residue at the site.

The noise level created by the combined grinding operation shall not exceed 86 dBA when measured at a distance of 50 feet at right angles to the direction of travel.

Finished rumble strips not meeting the specified tolerances, shall be brought within tolerance by either abrasive grinding or removal and replacement. The corrective method will be selected by the Engineer. Ground surface areas shall be neat and uniform in appearance. The corrective work shall be at the Contractor's expense.

Shoulder rumble strip (portland cement concrete, ground-in indentations) will be measured by the station along each shoulder on which the shoulder rumble strip is constructed, parallel with the adjacent traffic lane, without deductions for gaps between the ground-in indentations.

The contract price paid per station for shoulder rumble strip (portland cement concrete, ground-in indentations) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the shoulder rumble strip (portland cement concrete, ground-in indentations), complete in place, including removing and disposing of residue from grinding, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.51 DISPOSAL OF PORTLAND CEMENT CONCRETE (PCC) PAVEMENT GRINDING RESIDUES

Disposal of portland cement concrete (PCC) pavement grinding residues shall be in conformance with the provisions in Section 42, "Groove and Grind Pavement," of the Standard Specifications and these special provisions.

The Contractor shall include water pollution control measures to address the handling of the grinding pavement residue within the Storm Water Pollution Prevention Plan or Water Pollution Control Program, as specified in "Water Pollution Control" of these special provisions.

If the Contractor elects, and the Engineer approves, to use a temporary storage location outside of the highway right of way, the Contractor shall submit to the Engineer a copy of the agreement signed by the Contractor and the property owner and a release, in a form satisfactory to the Engineer, executed by the property owner, relieving the Department of any and all obligations. The Contractor shall obtain all necessary permits, licenses, and environmental clearances needed for the handling, storage, or disposal of grinding residues outside of the highway right of way, and copies thereof shall be included and described in the Storm Water Pollution Prevention Plan or Water Pollution Control Plan and submitted to the Engineer prior to use of any temporary storage location outside of the highway right of way.

Temporary storage of PCC pavement grinding residues shall not be allowed within the highway right of way. The Contractor may transport liquid PCC pavement grinding residues to an offsite temporary storage location if the Engineer provides written approval. The offsite temporary storage location shall be identified and protected in conformance with "Water Pollution Control" of these special provisions.

A Materials Information Handout is not available for disposal of PCC pavement grinding residues. The Contractor shall dispose of PCC pavement grinding residues in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside of the Right of Way," of the Standard Specifications. The facilities listed below were permitted by Regional Water Quality Control Board (RWQCB) or other agencies that may accept PCC pavement grinding and grooving residues as of July 1, 2004. If the Contractor is planning to use one of these sites, the Contractor shall determine if the facility has a current permit to accept PCC pavement grinding residues and if the facility can accept the waste at the time of generation.

Site Name	Location	Telephone	Waste Types / Restrictions
Clean Harbors Environmental Services Buttonwillow	2500 West Lokern Road Buttonwillow, CA	(562) 432-5445	Hazardous Solids and Non-Hazardous Liquids and Solids
Clean Harbors Environmental Services San Jose	1021 Berryessa San Jose, CA	(408) 451-5000	Hazardous and Non-Hazardous Liquids
Crosby & Overton, Inc.	1610 W. 17th Street Long Beach, CA	(562) 432-5445	Hazardous and Non-Hazardous Liquids
D/K Environmental	3650 East 26th Street Vernon, CA	(323) 268-5056	Hazardous and Non-Hazardous Liquids and Solids
DeMenno-Kerdoon	200 N. Alameda Street Compton, CA	(323) 268-5057 (310) 537-7100	Hazardous and Non-Hazardous Liquids and Solids
Filter Recycling Services, Inc.	180 West Monte Avenue Rialto, CA	(909) 424-1630	Hazardous and Non-Hazardous Liquids
K-Pure Water Works	8910 Rochester Ave Rancho Cucamonga, CA	(909) 476-2308	Non-Hazardous Liquids
Liquid Waste Management McKittrick	56533 Highway 58 McKittrick, CA	(559) 386-6104	Non-Hazardous Liquids and Solids
Onyx Environmental Services LLC	1704 W. First Street Azusa, CA	(626) 334-5117	Hazardous and Non-Hazardous Liquids and Solids
Phibro-Tech, Inc.	8851 Dice Road Santa Fe Springs, CA	(562) 698-8036	Hazardous and Non-Hazardous Liquids and Solids
Romic Environmental Technologies Corporation	2081 Bay Road East Palo Alto, CA	(650) 324-1638	Hazardous and Non-Hazardous Liquids
Seaport Environmental	700 Seaport Boulevard Redwood City, CA	(650) 364-8154	Non-Hazardous Liquids
Southwest Treatment Systems, Inc.	4120 Bandini Boulevard Los Angeles, CA	(800) 900-3366	Non-Hazardous Liquids
US Filter Recovery Services, Inc.	5375 S. Boyle Avenue Vernon, CA	(323) 277-1495	Hazardous and Non-Hazardous Liquids and Solids
Waste Management Kettleman City	35251 Old Skyline Road Kettleman City, CA	(559) 386-6104	Hazardous and Non-Hazardous Liquids and Solids

If the Contractor disposes of PCC pavement grinding residues at locations not listed above, the disposal shall be in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, and the following:

A. If the disposal facility is located within the State of California, the facility must be permitted by the RWQCB or other applicable agency, or the Contractor must obtain written approval from the RWQCB or other applicable agency.
B. If located outside of the State of California, the facility must be permitted by the applicable local, state, or federal agencies, or the Contractor must obtain written approval from the applicable local, state, or federal agencies.

The following shall be delivered to the Engineer at least 5 days before disposal of PCC pavement grinding residues:

A. The name, address, and telephone number of the disposal facility.
B. If the facility is not listed above:

1. Copy of the facility's RWQCB or other applicable agency permit, or
2. RWQCB's or other applicable agency's approval, or
3. Copy of the applicable agency permit if the final disposal location is located outside of the State of California.

The Contractor shall deliver landfill receipts and weight ticket of disposal of residues from PCC pavement grinding to the Engineer within 5 days of completing of PCC pavement grinding activities.

The Contractor shall make all arrangements and agreements for any temporary storage sites located outside of the right of way and disposal at the time of bidding. Costs related to obtaining approval for temporary storage and disposal within the State of California from the RWQCB or other applicable agency, or the applicable agency if the temporary storage or disposal location is located outside of the State of California, shall be borne by the Contractor and no additional payment shall be made therefore. Full compensation for all costs involved in temporary storage and disposing of PCC pavement grooving or grinding residues as specified in this section, including all costs of handling, temporary storage, hauling and disposal fees, shall be considered as included in the price paid for the contract item of work involving PCC pavement grinding residues and no additional compensation will be allowed therefore. Before acceptance of the contract, the Contractor shall submit to the Engineer written evidence that the owner of any property used as a temporary storage facility has satisfactorily complied with all requirements of State and local agencies.

10-1.52 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," "Precast Concrete Quality Control," and "Welding" of these special provisions.

Difficult pile installation for the Bridge No. 46-0265 is anticipated due to the presence of dense soils, and traffic control.

Difficult pile installation for the Bridge No. 45-0006R/L is anticipated due to the presence of soft bay mud overlying dense soils, and traffic control.

Alternative "X" type piles shall have a dimension, T, not less than 14 inches at Road 68 Overcrossing bridge.

Drilling

Drilling to obtain the specified penetration in conformance with the provisions in Section 49-1.05, "Driving Equipment," of the Standard Specifications shall only be used for driven type piles at the locations and to the bottom of hole elevations listed in the following table. Materials resulting from drilling holes shall be disposed of in conformance with the provisions in Section 19-2.06, "Surplus Material," of the Standard Specifications.

Bridge Name or Number	Abutment Number	Bent Number	Elevation of Bottom of Hole
Br. No. 46-0265	1 & 3		261.811 ft
Br. No. 46-0265		2	256.890 ft

Bridge Name or Number	Abutment Number	Bent Number	Elevation of Bottom of Hole
Br. No. 45-0006R/L	1 & 3		219.816 ft
Br. No. 45-0006R/L		2	219.816 ft

Predrilled Holes

Piles shall be driven in oversized drilled holes in conformance with the provisions in Section 49-1.06, "Predrilled Holes," of the Standard Specifications at the locations and to the corresponding bottom of hole elevations listed in the following table:

Bridge Name or Number	Abutment Number	Bent Number	Elevation of Bottom of Hole
Br. No. 46-0265	1 & 3		285.433 ft

PRECAST PRESTRESSED CONCRETE PILES

Splicing

Splicing of precast prestressed concrete piling shall be done in conformance with the details shown on the plans and these special provisions.

At the option of the Contractor, piles in excess of 80 feet in length may be spliced to attain the length necessary to comply with contract requirements.

Splices shall be located at least one half the distance from the bottom of footing to the specified pile tip.

Splicing may be done by either the dowel or sleeve splice method.

Epoxy mortar for use with dowel splice shall consist of a mixture of epoxy binder and aggregate. The epoxy mortar shall conform to the provisions in Section 95-1, "General," and Section 95-2.01, "Binder (Adhesive), Epoxy Resin Base," of the Standard Specifications. The mix proportions of epoxy mortar shall be 1 part binder to 1 part aggregate by volume. Aggregate shall consist of a combination of 1 part material passing the No. 30 sieve and 3 parts material passing the No. 20 sieve.

Epoxy conforming to the provisions in Section 95-1 and Section 95-2.01, "Binder (Adhesive), Epoxy Resin Base," of the Standard Specifications may be substituted for the epoxy mortar specified for the dowel splice.

Forms for retention of epoxy mortar or epoxy for the dowel splice shall be of a material which will prevent the escape of the mortar or epoxy from the joint.

Epoxy for use with sleeve splices shall conform to the provisions in Section 95-1, "General," and Section 95-2.11, "Epoxy Resin Adhesive for Injection Grouting of Portland Cement Concrete Pavements," of the Standard Specifications.

Sleeve splice material shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications. Galvanizing will not be required.

After insertion into the bottom portion of the pile, the top portion shall be held rigid until the epoxy has cured.

CAST-IN-DRILLED-HOLE CONCRETE PILES

Cast-in-drilled-hole 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.

Cast-in-drilled-hole concrete piles 24 inches in diameter or larger may be constructed by excavation and depositing concrete under slurry.

Materials

Concrete deposited under slurry shall have a nominal penetration equal to or greater than 3-1/2 inches. Concrete shall be proportioned to prevent excessive bleed water and segregation.

Concrete deposited under slurry shall contain not less than 675 pounds of cementitious material per cubic yard.

The combined aggregate grading used in concrete for cast-in-drilled-hole concrete piling shall be either the one-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.

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
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.		

Novagel Polymer synthetic slurries shall be tested for conformance to the requirements shown in the following table:

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

The Contractor shall submit a placing plan to the Engineer for approval prior to producing the test batch for cast-in-drilled-hole concrete piling and at least 10 working days prior to constructing piling. The plan shall include complete descriptions, details, and supporting calculations as listed below:

A. Requirements for all cast-in-drilled-hole concrete piling:

1. Concrete mix design, certified test data, and trial batch reports.
2. Drilling or coring methods and equipment.
3. Proposed method for casing installation and removal when necessary.
4. Plan view drawing of pile showing reinforcement and inspection pipes, if required.
5. Methods for placing, positioning, and supporting bar reinforcement.
6. Methods and equipment for accurately determining the depth of concrete and actual and theoretical volume placed, including effects on volume of concrete when any casings are withdrawn.
7. Methods and equipment for verifying that the bottom of the drilled hole is clean prior to placing concrete.
8. Methods and equipment for preventing upward movement of reinforcement, including the Contractor's means of detecting and measuring upward movement during concrete placement operations.

B. Additional requirements when concrete is placed under slurry:

1. Concrete batching, delivery, and placing systems, including time schedules and capacities therefor. Time schedules shall include the time required for each concrete placing operation at each pile.
2. 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.
3. Suppliers' test reports on the physical and chemical properties of the slurry and any proposed slurry chemical additives, including Material Safety Data Sheet.
4. Slurry testing equipment and procedures.
5. Methods of removal and disposal of excavation, slurry, and contaminated concrete, including removal rates.
6. Methods and equipment for slurry agitating, recirculating, and cleaning.

In addition to compressive strength requirements, the consistency of the concrete to be deposited under slurry shall be verified before use by producing a test batch. The test batch shall be produced and delivered to the project under conditions and in time periods similar to those expected during the placement of concrete in the piles. Concrete for the test batch shall be placed in an excavated hole or suitable container of adequate size to allow for testing as specified herein. Depositing of

test batch concrete under slurry will not be required. In addition to meeting the specified nominal penetration, the 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 test batch shall demonstrate that the proposed concrete mix design achieves either a penetration of at least 2 inches or a slump of at least 5 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 test batch shall demonstrate that the proposed concrete mix design achieves either a penetration of at least 2 inches or a slump of at least 5 inches after that time plus 2 hours has elapsed.

The time period shall begin at the start of placement. The concrete shall not be vibrated or agitated during the test period. Penetration tests shall be performed in conformance with the requirements in California Test 533. Slump tests shall be performed in conformance with the requirements in ASTM Designation: C 143/C143M. Upon completion of testing, the 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.

The 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. The 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 within 12 inches of the top of the drilled hole.

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 one working day of completion of placing concrete in the pile.

After placing reinforcement and prior to 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 temporary casing is used, concrete placed under slurry shall be maintained at a level at least 5 feet above the bottom of the casing. The withdrawal of casings shall not cause contamination of the concrete with slurry.

Acceptance Testing and Mitigation

Vertical inspection pipes for acceptance testing shall be provided in all cast-in-drilled-hole concrete piles that are 24 inches in diameter or larger, except when the holes are dry or when the holes are dewatered without the use of temporary casing to control ground water.

Inspection pipes shall be Schedule 40 polyvinyl chloride pipes with a nominal inside diameter of 2 inches. Each inspection pipe shall be capped top and bottom and shall have watertight couplers to provide a clean, dry and unobstructed 2-inch-diameter clear opening from 3 feet above the pile cutoff down to the bottom of the reinforcing cage.

Inspection pipes shall be placed around the pile, inside the outermost spiral or hoop reinforcement, and 3 inches clear of the vertical reinforcement, at a uniform spacing not exceeding 2 feet 9 inches measured along the circle passing through the centers of inspection pipes. A minimum of 2 inspection pipes per pile shall be used. When the vertical reinforcement is not bundled and each bar is not more than one inch in diameter, inspection pipes may be placed 2 inches clear of the vertical reinforcement. The inspection pipes shall be placed to provide the maximum diameter circle that passes through the centers of the inspection pipes while maintaining the clear spacing required herein. The 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 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.

After placing concrete and before requesting acceptance tests, each inspection pipe shall be tested by the Contractor in the presence of the Engineer by passing a 1.9-inch-diameter rigid cylinder 2 feet long through the complete length of pipe. If the 1.9-inch-diameter rigid cylinder fails to pass any of the inspection pipes, the Contractor shall attempt to pass a 1-1/4-inch-diameter rigid cylinder 4.5 feet long through the complete length of those pipes in the presence of the Engineer. 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.

The Contractor shall replace each inspection pipe that does not pass the 1-1/4-inch-diameter cylinder with a 2-inch-diameter hole cored 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 6 inches inside 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 concrete. 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 include 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 made available for inspection by the Engineer.

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. Tests may also include crosshole sonic logging and other means of inspection selected by the Engineer. 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 piling, the Contractor shall allow 3 weeks for the Engineer to conduct these tests and make determination of acceptance if the 1.9-inch-diameter cylinder passed all inspection pipes, and 4 weeks if only the 1-1/4-inch-diameter cylinder passed all inspection pipes. Should the Engineer fail to complete these tests within the time allowance, and if in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in inspection, the delay will be considered a right of way delay as specified in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

All inspection pipes and cored holes in a pile shall be dewatered and filled with grout after notification by the Engineer that the pile is acceptable. Placement and removal of water in the inspection pipes shall be at the Contractor's expense. Grout shall conform to the provisions in Section 50-1.09, "Bonding and Grouting," of the Standard Specifications. The 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, 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 Contractor shall submit to the Engineer for approval a mitigation plan for repair, supplementation, or replacement for each rejected cast-in-drilled-hole concrete pile, and this plan shall conform to the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. Prior to submitting this mitigation plan, the Engineer will hold a repair feasibility meeting with the Contractor to discuss the feasibility of repairing rejected piling. The Engineer will consider the size of the defect, the location of the defect, and the design information and corrosion protection considerations for the pile.

This information will be made available to the Contractor, if appropriate, for the development of the mitigation plan. 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.

If the Engineer determines that a rejected pile does not require mitigation due to structural, geotechnical, or corrosion concerns, the Contractor may elect to 1) repair the pile per the approved mitigation plan, or 2) not repair anomalies found during acceptance testing of that pile. For such unrepaired piles, the Contractor shall pay to the State, $300 per cubic yard for the portion of the pile affected by the anomalies. The volume, in cubic yards, of the portion of the pile affected by the anomalies, shall be calculated as the area of the cross section of the pile affected by each anomaly, in square yards, as determined by the Engineer, multiplied by the distance, in yards, from the top of each anomaly to the specified tip of the pile. If the volume calculated for one anomaly overlaps the volume calculated for additional anomalies within the pile, the calculated volume for the overlap shall only be counted once. In no case shall the amount of the payment to the State for any such pile be less than $300. The Department may deduct the amount from any moneys due, or that may become due the Contractor under the contract.

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.

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 piling.
B. Structural details and calculations for any modification to the structure to accommodate the replacement or supplemental piling.

All provisions for cast-in-drilled-hole concrete piling shall apply to replacement piling.

The Contractor shall allow the Engineer 3 weeks to review the mitigation plan after a complete submittal has been received.

Should the Engineer fail to review the complete pile mitigation submittal within the time specified, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the pile mitigation plan, an extension of time commensurate with the delay in completion of the work thus caused will be granted in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

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.

10-1.53 PRESTRESSING CONCRETE

Prestressing concrete shall conform to the provisions in Section 50, "Prestressing Concrete," of the Standard Specifications and these special provisions.

The details shown on the plans for cast-in-place prestressed box girder bridges are based on a bonded full length draped tendon prestressing system. For these bridges the Contractor may, in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications, propose an alternative prestressing system utilizing bonded partial length tendons provided the proposed system and associated details meet the following requirements:

A. The proposed system and details shall provide moment and shear resistances at least equal to those used for the design of the structure shown on the plans.
B. The concrete strength shall not be less than that shown on the plans.
C. Not less than 35 percent of the total prestressing force at any section shall be provided by full length draped tendons.
D. Anchorage blocks for partial length tendons shall be located so that the blocks will not interfere with the placement of the utility facilities shown on the plans or of any future utilities to be placed through openings shown on the plans.
E. Temporary prestressing tendons, if used, shall be detensioned, and the temporary ducts shall be filled with grout before completion of the work. Temporary tendons shall be either removed or fully encased in grout before completion of the work.
F. All details of the proposed system, including supporting checked calculations, shall be included in the drawings submitted in conformance with the provisions in Section 50-1.02, "Drawings," of the Standard Specifications.

Moments and shears for loads used in the design shown on the plans will be made available to the Contractor upon written request to the Engineer.

10-1.54 CONCRETE STRUCTURES

Portland cement concrete structures shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Attention is directed to "Precast Concrete Quality Control" of these special provisions.

Shotcrete shall not be used as an alternative construction method for reinforced concrete members unless otherwise specified.

When a roughened concrete surface is shown on the plans, the existing concrete surface shall be roughened to a full amplitude of approximately 1/4 inch by abrasive blasting, water blasting, or mechanical equipment.

Neoprene strip shall be furnished and installed at abutment shear keys and abutment backwall joint protection in conformance with the details shown on the plans, the provisions in the Standard Specifications, and these special provisions.

Furnishing and installing neoprene strip shall conform to the requirements for strip waterstops as provided in Section 51-1.145, "Strip Waterstops," of the Standard Specifications, except that the protective board will not be required.

Forms used to support the deck of cast-in-place box girders or to form the voids of precast members for the following structures may remain in place, provided the portions of the forms that obstruct access openings or conflict with utility facilities are removed, the forming system employed leaves no sharp projections into the cells or voids, and forms between hinges and 5 feet beyond access openings adjacent to hinges are removed:

Road 68 Overcrossing (Br. No. 46-0265)

Materials for access opening covers in soffits of new cast-in-place concrete box girder bridges shall conform to the provisions for materials in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

DECK CRACK TREATMENT

When methacrylate resin work is to be conducted within 100 feet of a residence, business, or public space, including sidewalks under a structure, the Contractor shall notify the public at least 7 days before starting work and monitor airborne emissions during the work. Public notification and monitoring of airborne emissions shall conform to the following:

A. The public safety plan required in Section 51-1.17A, "Deck Crack Treatment," of the Standard Specifications shall include a copy of the notification letter and a list of addresses and locations where the letter will be delivered and posted. The letter shall state the methacrylate resin work locations, dates, times, and what to expect. The letter shall be delivered to each residence and each business within 100 feet of the methacrylate resin work. The letter shall be delivered to local fire and police responders, and it shall be posted at the job site.

B. The public safety plan shall include an airborne emissions monitoring plan prepared by a certified industrial hygienist and a copy of the hygienist's certification. Airborne emissions shall be monitored at a minimum of 4 points including the point of mixing, the point of application, and the point of nearest public contact, as determined by the Engineer. At the completion of methacrylate resin work, a report by the certified industrial hygienist with results of the airborne emissions monitoring plan shall be submitted to the Engineer.

FALSEWORK

Falsework shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Temporary crash cushion modules, as shown on the plans and conforming to the provisions in "Temporary Crash Cushion Module" of these special provisions, shall be installed at the approach end of temporary railings which are located less than 15 feet from the edge of a traffic lane. For 2-way traffic openings, temporary crash cushion modules shall be installed at the departing end of temporary railings which are located less than 6 feet from the edge of a traffic lane.

The Contractor's engineer who signs the falsework drawings shall also certify in writing that the falsework is constructed in conformance with the approved drawings and the contract specifications prior to placing concrete. This certification shall include performing any testing necessary to verify the ability of the falsework members to sustain the stresses required by the falsework design. The engineer who signs the drawings may designate a representative to perform this certification. Where falsework contains openings for railroads, vehicular traffic, or pedestrians, the designated representative shall be qualified to perform this work, shall have at least 3 years of combined experience in falsework design or supervising falsework construction, and shall be registered as a Civil Engineer in the State of California. For other falsework, the designated representative shall be qualified to perform this work and shall have at least 3 years of combined experience in falsework design or supervising falsework construction. The Contractor shall certify the experience of the designated representative in writing and provide supporting documentation demonstrating the required experience if requested by the Engineer.

Welding and Nondestructive Testing

Welding of steel members, except for previously welded splices and except for when fillet welds are used where load demands are less than or equal to 1,000 pounds per inch for each 1/8 inch of fillet weld, shall conform to AWS D1.1 or other recognized welding standard. The welding standard to be utilized shall be specified by the Contractor on the working drawings. Previously welded splices for falsework members are defined as splices made prior to the member being shipped to the project site.

Splices made by field welding of steel beams at the project site shall undergo nondestructive testing (NDT). At the option of the Contractor, either ultrasonic testing (UT) or radiographic testing (RT) shall be used as the method of NDT for each field weld and any repair made to a previously welded splice in a steel beam. Testing shall be performed at locations selected by the Contractor. The length of a splice weld where NDT is to be performed, shall be a cumulative weld length equal to 25 percent of the original splice weld length. The cover pass shall be ground smooth at the locations to be tested. The acceptance criteria shall conform to the requirements of AWS D1.1, Section 6, for cyclically loaded nontubular connections subject to tensile stress. If repairs are required in a portion of the weld, additional NDT shall be performed on the repaired sections. The NDT method chosen shall be used for an entire splice evaluation including any required repairs.

For all field welded splices, the Contractor shall furnish to the Engineer a letter of certification which certifies that all welding and NDT, including visual inspection, are in conformance with the specifications and the welding standard shown on the approved working drawings. This letter of certification shall be signed by an engineer who is registered as a Civil Engineer in the State of California and shall be provided prior to placing any concrete for which the falsework is being erected to support.

For previously welded splices, the Contractor shall determine and perform all necessary testing and inspection required to certify the ability of the falsework members to sustain the stresses required by the falsework design. This welding certification shall (1) itemize the testing and inspection methods used, (2) include the tracking and identifying documents for previously welded members, (3) be signed by an engineer who is registered as a Civil Engineer in the State of California, (4) and shall be provided prior to erecting the members.

COST REDUCTION INCENTIVE PROPOSALS FOR CAST-IN-PLACE PRESTRESSED BOX GIRDER BRIDGES

Except as provided herein, cast-in-place prestressed box girder bridges shall be constructed in conformance with the details shown on the plans and the provisions in Section 50, "Prestressing Concrete," and Section 51, "Concrete Structures," of the Standard Specifications.

If the Contractor submits cost reduction incentive proposals for cast-in-place prestressed box girder bridges, the proposals shall be in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications and these special provisions.

The Engineer may reject any proposal which, in the Engineer's judgment, may not produce a structure which is at least equivalent to the planned structure.

At the time the cost reduction incentive proposal (CRIP) is submitted to the Engineer, the Contractor shall also submit 4 sets of the proposed revisions to the contract plans, design calculations, and calculations from an independent checker for all changes involved in the proposal, including revisions in camber, predicted deck profile at each construction stage, and falsework requirements to the Offices of Structure Design, Documents Unit, P.O. Box 942874, Sacramento, CA 94274-0001 (1801 30th Street, Sacramento, CA 95816), telephone (916) 227-8230. When notified in writing by the Engineer, the Contractor shall submit 12 sets of the CRIP plan revisions and calculations to the Offices of Structure Design for final approval and use during construction. The calculations shall verify that all requirements are satisfied. The CRIP plans and calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California.

The CRIP plans shall be either 11" x 17", or 22" x 34" in size. Each CRIP plan sheet and calculation sheet shall include the State assigned designations for the contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Post Mile. Each CRIP plan sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.

Within 3 weeks after final approval of the CRIP plan sheets, one set of the corrected good quality prints on 20-pound (minimum) bond paper, 22" x 34" in size, of all CRIP plan sheets prepared by the Contractor for each CRIP shall be furnished to the Offices of Structure Design, Documents Unit.

Each CRIP shall be submitted prior to completion of 25 percent of the contract working days and sufficiently in advance of the start of the work that is proposed to be revised by the CRIP to allow time for review by the Engineer and correction by the Contractor of the CRIP plans and calculations without delaying the work. The Contractor shall allow a minimum of 6 weeks for the review of a CRIP. In the event that several CRIPs are submitted simultaneously, or an additional CRIP is submitted for review before the review of a previously submitted CRIP has been completed, the Contractor shall designate the sequence in which the CRIPs are to be reviewed. In this event, the time to be provided for the review of any proposal in the sequence shall be not less than the review time specified herein for that proposal, plus 2 weeks for each CRIP of higher priority which is still under review.

Should the review not be complete by the date specified in the Contractor's CRIP, or such other date as the Engineer and Contractor may subsequently have agreed to in writing and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in review of CRIP plans and calculations, an extension of time commensurate with the delay in completion of the work thus caused will be granted as provided in Section 8-1.07, "Liquidated Damages," of the Standard Specifications except that the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications shall not apply.

Permits and approvals required of the State have been obtained for the structures shown on the plans. Proposals which result in a deviation in configuration may require new permits or approvals. The Contractor shall be responsible for obtaining the new permits and approvals before the Engineer will reach a decision on the proposal. Delays in obtaining permits and approvals will not be reason for granting an extension of contract time.

All proposed modifications shall be designed in conformance with the bridge design specifications and procedures currently employed by the Department. The proposal shall include all related, dependent or incidental changes to the structure and other work affected by the proposal. The proposal will be considered only when all aspects of the design changes are included for the entire structure. Changes, such as but not limited to, additional reinforcement and changes in location of reinforcement, necessary to implement the CRIP after approval by the Engineer, shall be made at the Contractor's expense.

Modifications may be proposed in (1) the thickness of girder stems and deck slabs, (2) the number of girders, (3) the deck overhang dimensions as specified herein, (4) the amount and location of reinforcing steel, (5) the amount and location of prestressing force in the superstructure, and (6) the number of hinges, except that the number of hinges shall not be increased. The strength of the concrete used may be increased but the strength employed for design or analysis shall not exceed 6,000 psi.

Modifications proposed to the minimum amount of prestressing force which must be provided by full length draped tendons are subject to the provisions in "Prestressing Concrete" of these special provisions.

No modifications will be permitted in (1) the foundation type, (2) the span lengths or (3) the exterior dimensions of columns or bridge superstructure, except that the overhang dimension from face of exterior girder to the outside edge of roadway deck may be uniformly increased or decreased by 25 percent on each side of the box girder section. Fixed connections at the tops and bottoms of columns shown on the plans shall not be eliminated.

The Contractor shall be responsible for determining construction camber and obtaining the final profile grade as shown on the plans.

The Contractor shall reimburse the State for the actual cost of investigating CRIPs for cast-in-place prestressed box girder bridges submitted by the Contractor. The Department will deduct this cost from any moneys due, or that may become due the Contractor under the contract, regardless of whether or not the proposal is approved or rejected.

DECK CLOSURE POURS

Where a deck closure pour is shown on the plans, reinforcement protruding into the closure space and forms for the closure pour shall conform to the following:

A. During the time of placement of concrete in the deck, other than for the closure pour itself, reinforcing steel which protrudes into the closure space shall be completely free from any connection to the reinforcing steel, concrete, or other attachments of the adjacent structure, including forms. The reinforcing steel shall remain free of any connection for a period of not less than 24 hours following completion of the pour.
B. Forms for the closure pour shall be supported from the superstructure on both sides of the closure space.

ELASTOMERIC BEARING PADS

Elastomeric bearing pads shall conform to the provisions in Section 51-1.12H, "Elastomeric Bearing Pads," of the Standard Specifications.

MEASUREMENT AND PAYMENT

Measurement and payment for concrete in structures shall conform to the provisions in Section 51-1.22, "Measurement," and Section 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for roughening existing concrete surfaces to a full amplitude of approximately 1/4 inch, where shown on the plans, shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no separate payment will be made therefor.

Full compensation for furnishing and installing access opening covers in soffits of new cast-in-place box girder bridges shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no separate payment will be made therefor.

Full compensation for furnishing and installing plastic pipe located at vertical drains used behind retaining walls and bridge abutments, including horizontal or sloping drains down slopes and across sidewalk areas, including excavation and backfill involved in placing the plastic pipe, shall be considered as included in the contract price paid per cubic yard for the various items of concrete work involved and no separate payment will be made therefor.

Full compensation for public notification and airborne monitoring for deck crack treatment 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.

10-1.55 PRECAST CONCRETE BOX CULVERTS

Precast concrete box culvert shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and the following:

A. Earthwork, including sand bedding, shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications.
B. Reinforcement shall conform to the requirements in welded wire fabric of ASTM Designation: A 185/A 185M or A 497/A 497M, at the Contractor's option.
C. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be provided to the Engineer for each precast member shipment. The certificate shall be signed by the manufacturer's quality control representative and shall state that all materials and workmanship comply in all respects with the specification requirements and all approved submittals.
D. The dry cast method of construction will be permitted when designated on the working drawings. When the dry cast method is used, the results shall be equal in all respects to those obtained by conformance with the provisions in Section 51, "Concrete Structures," of the Standard Specifications and adequate arrangements shall be made and carried out for curing, finishing, and protecting the concrete. External vibrators shall be used and the forms shall be sufficiently rigid to resist displacement or damage. The dry casting forms may be removed at any time after consolidating the concrete providing no slumping of the concrete occurs.
E. Working drawings shall be submitted to the Engineer for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. Working drawings shall show the construction method, precast unit dimensions, configuration of the reinforcement (including splice type and location), and height of earth cover.
F. The Contractor shall select the allowable combination of concrete dimensions and reinforcement, where more than one allowable combination of concrete dimensions and reinforcement for precast concrete box culvert is shown on the plans.

G. Concrete for precast units shall be sampled and tested by the precast manufacturer for compressive strength at least once every production shift and not less often than once daily. Test result records shall be available to the Engineer at all times during regular work shifts.
H. Each precast unit shall be clearly marked by indentation, waterproof paint, or other approved means. Markings shall include the State contract number, date of manufacture, name or trademark of the manufacturer, and design earth cover. Each precast unit shall be clearly marked by indentation on either the inner or outer surface during the process of manufacture so that the location of the top will be evident immediately after the forms are stripped. In addition, the word "top" shall be lettered with waterproof paint on the inside and outside surfaces of the top of each precast unit.
I. Manufacturing tolerances for precast concrete box culvert sections shall conform to the requirements in Section 11, "Permissible Variations," of AASHTO Specification: M 259.
J. The ends of the precast members shall be so formed that the sections can be laid together to make a continuous line of box sections with a smooth interior free of appreciable irregularities in the flow line.
K. Handling devices or holes will be permitted in each member for the purpose of handling and laying. Cored and handling holes shall be plugged and sealed so the members meet all the requirements in the specification.
L. Splices in circumferential reinforcement shall be made by lapping. Welded connections at splices for the outside apron of steel will be allowed only in the splice area shown on the plans. The wall reinforcement on the inside of the box may be lapped and welded at any location or connected by welding at the corners to the slab reinforcement at the inside of the box.
M. The exposure of spacers, standoffs, or the ends of longitudinals used to position the reinforcement shall not be a cause for rejection. Spacers or standoffs shall not be welded to circumferential reinforcement. Spacers or standoffs may be welded to longitudinal reinforcement.
N. Laying of precast concrete box culvert shall conform to the provisions for laying reinforced concrete pipe in Section 65-1.07, "Laying Pipe," of the Standard Specifications and these special provisions.
O. Joints shall conform to the provisions for cement mortar or resilient material joints in Section 65-1.06, "Joints," of the Standard Specifications. An external sealing band conforming to the requirements in ASTM Designation: C 877 may be used in lieu of the joint material in Section 65-1.06.
P. Precast concrete box culvert will be measured and paid for by the linear foot in the same manner as specified for reinforced concrete pipe in Sections 65-1.09, "Measurement," and 65-1.10, "Payment," of the Standard Specifications.
Q. Full compensation for erecting precast concrete box culvert members shall be considered as included in the contract price paid per linear foot for precast concrete box culvert and no additional compensation will be allowed therefor.

10-1.56 STRUCTURE APPROACH SLABS (TYPE N)

This work shall consist of constructing reinforced concrete approach slabs, structure approach drainage system, and treated permeable base at structure approaches in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

GENERAL

Attention is directed to "Engineering Fabrics" of these special provisions.

STRUCTURE APPROACH DRAINAGE SYSTEM

Geocomposite Drain

Geocomposite drain shall consist of a manufactured core not less than 0.25 inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate through the drainage void of at least 2 gallons per minute per foot of width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 3,500 psf.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates and the externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.

Filter fabric for the geocomposite drain shall conform to the provisions for filter fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications.

The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.

The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having non-connecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.

The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 3 inches at all joints and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wraparound at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.

Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a 6-inch overlap.

Plastic Pipe

Plastic pipe shall conform to the provisions for pipe for edge drains and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.

Drainage Pads

Concrete for use in drainage pads shall be minor concrete, except the concrete shall contain not less than 505 pounds of cementitious material per cubic yard.

Treated Permeable Base At Bottom Of Geocomposite Drains

Treated permeable base to be placed around the slotted plastic pipe at the bottom of geocomposite drains shall conform to the provisions in "Treated Permeable Base Under Approach Slab." If asphalt treated permeable base is used, it shall be placed at a temperature of not less than 180 °F nor more than 230 °F.

The filter fabric to be placed over the treated permeable base at the bottom of geocomposite drains shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications.

ENGINEERING FABRICS

Filter fabric to be placed between the structure approach embankment material and the treated permeable base shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications and these special provisions.

The subgrade to receive the filter fabric, immediately prior to placing, shall conform to the compaction and elevation tolerance specified for the material involved.

Filter fabric shall be aligned, handled, and placed in a wrinkle-free manner in conformance with the manufacturer's recommendations.

Adjacent borders of the filter fabric shall be overlapped from 12 inches to 18 inches or stitched. The preceding roll shall overlap the following roll in the direction the material is being spread or shall be stitched. When the fabric is joined by stitching, it shall be stitched with yarn of a contrasting color. The size and composition of the yarn shall be as recommended by the fabric manufacturer. The number of stitches per one inch of seam shall be 5 to 7.

Equipment or vehicles shall not be operated or driven directly on the filter fabric.

Woven tape fabric to be placed between the treated permeable base and the approach slab shall be a fabric made of woven strips or tapes and shall conform to the following:

Property	ASTM Designation	Requirement
Weight, ounces per square yard, min.	D 3776	3
Grab Tensile Strength, pounds, min.	D 4632	50
Elongation, percent, max.	D 4632	35
Toughness, pounds, min. (Percent elongation times grab tensile strength)	----	1,200

Woven tape fabric shall be treated to provide a minimum of 70 percent breaking strength retention after 500 hours exposure when tested in conformance with the requirements in ASTM Designation: D 4355. The Contractor shall notify the Engineer, in writing, of the source of woven tape fabric at least 45 days prior to use.

TREATED PERMEABLE BASE UNDER APPROACH SLAB

Treated permeable base under structure approach slabs shall consist of constructing either an asphalt treated permeable base or a cement treated permeable base in accordance with Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions.

The type of treatment to be used shall be at the option of the Contractor.

The Contractor shall notify the Engineer in writing, not less than 30 days prior to the start of placing the treated permeable base, which type of treated permeable base will be furnished. Once the Contractor has notified the Engineer of the selection, the type to be furnished shall not be changed without a prior written request to do so and approval thereof in writing by the Engineer.

Asphalt treated permeable base shall be placed at a temperature of not less than 200 °F nor more than 250 °F. Material stored in excess of 2 hours shall not be used in the work.

Asphalt treated permeable base material may be spread in one layer. The base material shall be compacted with a vibrating shoe type compactor or rolled with a roller weighing at least 1.5 tons but not more than 5 tons. Rolling shall begin as soon as the mixture has cooled sufficiently to support the weight of the rolling equipment without undue displacement.

Cement treated permeable base material may be spread in one layer. The base material shall be compacted with either a vibrating shoe type compactor or with a steel-drum roller weighing at least 1.5 tons but not more than 5 tons. Compaction shall begin within one-half hour after the spreading operation and shall consist of 2 complete coverages of the treated material.

APPROACH SLABS

Concrete for use in approach slabs shall contain not less than 675 pounds of cementitious material per cubic yard.

Steel components of abutment ties, including plates, nuts, washers, and rods, shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

The steel angle at the concrete barrier joint shall conform to the provision in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Structure approach slabs shall be cured for not less than 5 days prior to opening to public traffic, unless, at the option of the Contractor, the structure approach slabs are constructed using concrete with a nonchloride Type C chemical admixture conforming to these special provisions.

Portland cement for use in concrete using a nonchloride Type C chemical admixture shall be Type II or Type III conforming to the provisions in Section 90-2.01, "Cementitious Materials," of the Standard Specifications. Mortar containing the Type II portland cement to be used and Ottawa sand shall not contract in air more than 0.053 percent when tested in conformance with California Test 527.

The nonchloride Type C chemical admixture, approved by the Engineer, shall conform to the requirements in ASTM Designation: C 494/C 494M and Section 90-4, "Admixtures," of the Standard Specifications.

The concrete with nonchloride Type C chemical admixture shall be prequalified prior to placement in conformance with the provisions for prequalification of concrete specified by compressive strength in Section 90-9.01, "General," of the Standard Specifications and the following:

A. Immediately after fabrication of the 5 test cylinders, the cylinders shall be stored in a temperature medium of 70 °F ± 3 °F until the cylinders are tested.
B. The 6-hour average strength of the 5 test cylinders shall not be less than 850 psi. Not more than 2 test cylinders shall have a strength of less than 800 psi.

Building paper shall be commercial quality 30-pound asphalt felt.

Polyvinyl chloride (PVC) conduit used to encase the abutment tie rod shall be of commercial quality.

The top surface of approach slabs shall be finished and treated in conformance with the provisions for decks in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications. Edges of slabs shall be edger finished.

Approach slabs shall be cured with pigmented curing compound (1) in conformance with the provisions for curing structures in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

Structure approach slabs constructed using concrete with a nonchloride Type C chemical admixture shall be cured for not less than 6 hours prior to opening to public traffic. The curing period shall be considered to begin at the start of discharge of the last truckload of concrete to be used in the slab.

If the ambient temperature is below 65 °F during the curing period for approach slabs using concrete with a nonchloride Type C chemical admixture, an insulating layer or blanket shall be used to cover the surface. The insulating layer or blanket shall have an R-value rating given in the table below. At the Contractor's option, a heating tent may be used in lieu of or in combination with the insulating layer or blanket.

Temperature Range During Curing Period	R-value, minimum
55 °F to 65 °F	1
45 °F to 55 °F	2
39 °F to 45 °F	3

JOINTS

Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12D, "Sheet Packing, Preformed Pads, and Board Fillers," of the Standard Specifications.

Type AL joint seals shall conform to the provisions in Section 51-1.12F, "Sealed Joints" of the Standard Specifications. The sealant may be mixed by hand-held, power-driven agitators and placed by hand methods.

The pourable seal between the steel angle and concrete barrier shall conform to the requirements for Type A and AL seals in Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications. The sealant may be mixed by hand-held, power-driven agitators and placed by hand methods. Immediately prior to placing the seal, the joint shall be thoroughly cleaned, including abrasive blast cleaning of the concrete surfaces, so that all foreign material and concrete spillage are removed from all joint surfaces. Joint surfaces shall be dry at the time the seal is placed.

MEASUREMENT AND PAYMENT

Structural concrete, approach slab (Type N) will be measured and paid for in conformance with the provisions in Section 51-1.22, "Measurement," and Section 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for the structure approach drainage system including geocomposite drain, plastic pipe, and drainage pads, treated permeable base, filter fabric, woven tape fabric, miscellaneous metal, pourable seals, epoxy-coated bar reinforcement and epoxy-coated miscellaneous bridge metal, shall be considered as included in the contract price paid per cubic yard for structural concrete, approach slab of the type shown in the Engineer's Estimate, and no additional compensation will be allowed therefor.

10-1.57 DRILL AND BOND DOWELS

Drilling and bonding dowels shall conform to the details shown on the plans, the provisions in Section 83-2.02D(1), "General," of the Standard Specifications, and these special provisions.

Dowels shall conform to the provisions for bar reinforcement in "Reinforcement" of these special provisions.

If reinforcement is encountered during drilling before the specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

Unless otherwise provided, dowels to be bonded into drilled holes will be paid for as bar reinforcing steel (bridge).

Unless otherwise provided, drilling and bonding dowels will be measured and paid for by the linear foot determined by the number and the required depth of holes as shown on the plans or as ordered by the Engineer.

The contract price paid per linear foot for drill and bond dowel shall include full compensation for furnishing all labor, materials (except reinforcing steel dowels), tools, equipment, and incidentals, and for doing all the work involved in drilling the holes, including coring through reinforcement when approved by the Engineer, and bonding the dowels, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.58 SEALING JOINTS

Joints in concrete bridge decks and joints between concrete structures and concrete approach slabs must be sealed in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

When ordered by the Engineer, a joint seal larger than called for by the Movement Rating shown on the plans must be furnished and installed. Payment to the Contractor for furnishing the larger seal and for saw cutting the increment of additional depth of groove required will be determined as provided in Section 4-1.03, "Changes," of the Standard Specifications.

10-1.59 REFINISHING BRIDGE DECKS

Surfaces of bridge decks that are exposed when existing railings, curbs, or sidewalks are removed shall be prepared and refinished flush with the adjoining deck surface with portland cement concrete or rapid setting concrete, at the option of the Contractor, in conformance with these special provisions.

The exact area to be refinished will be designated by the Engineer.

Attention is directed to "Public Safety" of these special provisions.

When work is being performed within 10 feet of a traffic lane or performed over traffic, dust and residue from deck preparation and cleaning shall be removed or controlled by vacuum, water spray, or shield methods approved by the Engineer.

Concrete shall be removed without damage to concrete that is to remain in place. Damage to concrete that is to remain in place shall be repaired to a condition satisfactory to the Engineer.

The concrete in deck areas to be refinished shall be removed to a depth of approximately 3/4 inch below the adjoining deck surface. A 3/4-inch deep saw cut shall be made along the perimeter of areas prior to removing the concrete.

Existing areas of the deck more than 3/4 inch below the adjoining deck surface shall be prepared by removing not less than 1/4 inch of surface material to expose sound aggregate.

Concrete removal may be done by abrasive blast cutting, abrasive sawing, impact tool cutting, machine rotary abrading, or by other methods, all to be approved by the Engineer. Cut areas shall be cleaned free of dust and all other loose and deleterious materials by brooming, abrasive blast cleaning, and high pressure air jets. Equipment shall be fitted with suitable traps, filters, drip pans, or other devices to prevent oil or other deleterious matter from being deposited on the deck.

Existing reinforcement, exposed during the removal of concrete, that is to remain in place shall be protected from damage.

Steel dowels shall be cut off flush with the existing concrete or cut off at the bottom of concrete removal, whichever is lower. Patching around or over dowels in sound concrete will not be required. Existing voids around dowels, where refinishing is not required, shall be chipped back to sound concrete, the dowels shall be removed one inch below the finished surface, and the hole shall be filled with rapid setting concrete.

Refinishing isolated high areas in the existing deck may be accomplished by cutting the concrete down to be flush with the plane of the adjoining deck surface by abrasive sawing, grinding, impact tool cutting, or by other methods to be approved by the Engineer. When grinding is performed to bring the deck concrete flush with the adjoining deck surface, the resulting surface shall have a coefficient of friction of not less than 0.35 as determined by California Test 342.

PORTLAND CEMENT CONCRETE

An epoxy adhesive shall be applied to the surfaces to be refinished before placing the portland cement concrete. Immediately prior to applying the adhesive, the area to receive the adhesive shall be cleaned by abrasive blasting and blown clean by compressed air to remove dust and any other loose material. The area to be covered shall be surface dry and the ambient temperature shall be 50 °F or above when the adhesive is applied.

The epoxy adhesive shall be furnished and applied in conformance with the provisions in Section 95-1, "General," and Section 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete," of the Standard Specifications. The exact rate of applying epoxy adhesive will be as determined by the Engineer. The adhesive shall be worked onto the surface with stiff brushes or equal.

Portland cement concrete used to fill the prepared areas shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and the following:

A. The concrete shall contain a minimum of 675 pounds of cementitious material per cubic yard.
B. The amount of free water used in concrete shall not exceed 280 pounds per cubic yard.
C. The aggregate shall contain between 50 and 55 percent fine aggregate and the remainder shall be pea gravel. The grading of pea gravel shall be such that 100 percent passes the 1/2-inch sieve and not more than 5 percent passes the No. 16 sieve, unless a larger size is ordered by the Engineer.
D. Admixtures shall be furnished and used if directed by the Engineer.
E. Immediately after depositing on the newly placed adhesive, the portland cement concrete shall be thoroughly consolidated until all voids are filled and free mortar appears on the surface and then struck off to the required grade.
F. Concrete shall be cured as provided in Section 90-7.03, "Curing Structures," of the Standard Specifications.
G. No loads of any kind shall be applied to the portland cement concrete for at least 7 days after placing, unless otherwise permitted by the Engineer.

RAPID SETTING CONCRETE

The concrete used to fill the prepared areas shall be a high-strength material consisting of either magnesium phosphate concrete, modified high alumina based concrete, or portland cement based concrete. Magnesium phosphate concrete shall conform to the requirements for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and these special provisions. Modified high alumina based concrete and portland cement based concrete shall be water activated and shall conform to the requirements for single component (water activated) magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and the following:

A. A clean uniform rounded aggregate filler may be used to extend the concrete. The moisture content of the aggregate shall not exceed 0.5 percent. Grading of the aggregate shall conform to the following:

Sieve Size	Percentage Passing
1/2"	100
No. 16	0-5

B. The amount of aggregate filler shall conform to the manufacturer's recommendation, but in no case shall the concrete strengths be less than that specified for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications.
C. Mixing of components of dual component (with a prepackaged liquid activator) magnesium phosphate shall be by complete units, supplied by the manufacturer. Portions of units shall not be used. Water shall not be added to dual component magnesium phosphate.
D. Immediately prior to applying the rapid setting concrete, the surface shall be dry and blown clean by compressed air to remove accumulated dust and any other loose material. If the surface becomes contaminated at any time prior to placing the concrete, the surface shall be cleaned by abrasive blasting. The surface temperature of the areas to be covered shall be 39 °F or above when the concrete is applied. Methods proposed to heat said surfaces are subject to approval by the Engineer. The surface for the magnesium phosphate concrete shall be dry. The surfaces for modified high alumina based concrete or portland cement based concrete may be damp but not saturated.
E. Magnesium phosphate concrete shall not be mixed in containers or worked with tools containing zinc, cadmium, aluminum, or copper. Modified high alumina based concrete shall not be mixed in containers or worked with tools containing aluminum.
F. Concrete shall not be retempered. Finishing tools that are cleaned with water shall be thoroughly dried before working the concrete.
G. When placing concrete on slopes exceeding 5 percent, the Engineer may require the Contractor to provide a flow controlled modified material.
H. 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.
I. Unless otherwise permitted in writing by the Engineer, public traffic shall not be permitted on the new concrete until at least 24 hours after final set.

FINISHING REQUIREMENTS

In advance of the curing operations, the surface of the concrete shall be textured by brooming with a stiff bristled broom or by other suitable devices that will result in uniform scoring. Brooming shall be performed transversely. The operation shall be performed at a time and in a manner that produces a hardened surface having a uniform texture and a coefficient of friction of not less than 0.35 as determined by California Test 342.

Refinished surfaces that are found to have a coefficient of friction less than 0.35 shall be ground or grooved by the Contractor at his expense in conformance with the applicable provisions in Section 42, "Groove and Grind Pavement," of the Standard Specifications.

In the longitudinal direction, refinished surfaces shall not vary more than 0.02 foot from the lower edge of a 12-foot straightedge. The refinished surface shall be flush with the existing adjoining surface.

MEASUREMENT AND PAYMENT

No adjustment of compensation will be made for any increase or decrease in the quantity of refinish bridge deck, 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 contract item of refinish bridge deck.

The quantity in square feet of refinish bridge deck to be paid for will be determined from the lengths and widths of the refinished areas, measured horizontally, plus 0.2 square foot for patching around each dowel.

The contract price paid per square foot for refinish bridge deck shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in refinishing areas of the existing bridge deck (including cutting steel dowels), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.60 REINFORCEMENT

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

The Department's mechanical splices prequalified list can be found at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

The provisions in "Welding Quality Control" of these special provisions shall not apply to resistance butt welding.

Reinforcement shown on the plans to be galvanized shall be galvanized in conformance with the provisions in Section 75-1.05,"Galvanizing," of the Standard Specifications.

MEASUREMENT AND PAYMENT

Measurement and payment for reinforcement in structures shall conform to the provisions in Section 52-1.10, "Measurement," and Section 52-1.11, "Payment," of the Standard Specifications and these special provisions.

Full compensation for galvanizing steel reinforcement shall be considered as included in the prices paid for the various items of work involved and no additional compensation will be allowed therefor.

10-1.61 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 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) x (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 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.

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 provisions in Federal Specification TT-S-230, Type II. 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.

10-1.62 SIGN STRUCTURES

Sign structures and foundations 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.

Should the Engineer fail to complete the review within the time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the sign structure working drawings, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

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.

Longitudinal seam welds shall have 60 percent minimum penetration, except that within 6 inches of circumferential welds, longitudinal seam welds shall be complete joint penetration (CJP) groove welds. In addition, longitudinal seam welds on structures having telescopic pole segment splices shall be CJP groove welds on the female end for a length on each end equal to the designated slip fit splice length plus 6 inches.

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> 3/16 inch: 100%UT and MT t< 3/16 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, Section 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, Section 6, 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.

10-1.63 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 AWPA Use Category System: UC4A, Commodity Specification A or B.

10-1.64 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 palettes, 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.

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 removable sign panel frame and 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.

10-1.65 ALTERNATIVE PIPE

Alternative pipe culverts must comply with Section 62, "Alternative Culverts," of the Standard Specifications.

10-1.66 PLASTIC PIPE

Plastic pipe shall conform to the provisions in Section 64, "Plastic Pipe," of the Standard Specifications.

10-1.67 REINFORCED CONCRETE PIPE

Reinforced concrete pipe shall conform to the provisions in Section 65, "Reinforced Concrete Pipe," of the Standard Specifications and these special provisions.

GENERAL

Where embankment will not be placed over the top of the pipe, a relative compaction of not less than 85 percent shall be required below the pipe spring line for pipe installed using Method 1 backfill in trench, as shown on Standard Plan A62D. Where the pipe is to be placed under the traveled way, a relative compaction of not less than 90 percent shall be required unless the minimum distance between the top of the pipe and the pavement surface is the greater of 4 feet or one half of the outside diameter of the pipe.

Except as otherwise designated by classification on the plans or in the specifications, joints for culvert and drainage pipes shall conform to the plans or specifications for standard joints.

Timber bulkheads shall be constructed and placed across the ends of unconnected reinforced concrete pipe as shown on the plans. Wood for timber bulkheads shall be construction heart grade redwood at least one inch thick.

MATERIALS

The concrete for reinforced concrete pipe must contain not less than 470 pounds of cementitious material per cubic yard with a water–cementitious material ratio not to exceed 0.35 by weight. Supplementary cementitious material is optional. Reinforcement shall have a minimum cover of 1 inch except for pipe diameters less than or equal to 18 inches the minimum cover must be 3/4 inch.

MEASUREMENT AND PAYMENT

Compensation for constructing and placing timber bulkheads shall be considered as included in the contract price paid per linear foot for the reinforced concrete pipe involved and no separate payment will be made therefor.

10-1.68 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.

10-1.69 MISCELLANEOUS FACILITIES

Alternative flared end sections shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications.

10-1.70 WELDED STEEL PIPE CASING (BRIDGE)

Welded steel pipe casings through bridges shall be of the size shown and shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

Unless otherwise shown on the project plans, casings shall be installed at each abutment, and casings shall be extended to the greater of: (1) 5 feet beyond the approach slab, (2) 5 feet beyond the end of the adjacent wingwall, or (3) 20 feet beyond the abutment.

WORKING DRAWINGS

Working drawings for temporary support of casing pipe at the abutments shall be submitted for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings" of the Standard Specifications.

MATERIALS

Casing pipe

Casing pipe shall be welded steel pipe conforming to the provisions in Section 70-1.02B, "Welded Steel Pipe," of the Standard Specifications, except that the pipe shall be treated in accordance with the following requirements, prior to shipping. Exterior surfaces of welded steel pipe shall be cleaned and coated in conformance with the requirements in ANSI/AWWA C213 or at the option of the Contractor, cleaned, primed, and coated in accordance with specifications of ANSI/AWWA C214.

Pipe wrapping tape

Wrapping tapes for pipe in contact with the ground shall be a pressure sensitive polyvinyl chloride or polyethylene tape having thickness of 50 mils, minimum.

Concrete pipe supports

Concrete pipe supports shall consist of either a precast or cast-in-place concrete pipe cradle, galvanized steel pipe clamp, 2 anchor bolts, and where shown on the plans, a stainless steel pipe protection shield.

Concrete pipe supports and pipe stops shall conform to the dimensions shown on the plans and shall be constructed minor concrete conforming to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications,, commercial quality wire mesh, and reinforcement. The concrete pipe supports and pipe stops shall be moist cured for not less than 3 days.

Epoxy adhesive

Epoxy adhesive shall conform to the provisions in Section 95, "Epoxy," of the Standard Specifications and one of the following:

A. Section 95-2.01, "Binder (Adhesive), Epoxy Resin Base," for load bearing applications.
B. Section 95-2.04, "Rapid Set Epoxy Adhesive for Pavement Markers."
C. Section 95-2.05, "Standard Set Epoxy Adhesive for Pavement Markers."

CONSTRUCTION

If a blockout is provided in the bridge abutment wall for casing pipe, the space between the casing pipe and bridge abutment wall shall be filled with mortar conforming to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications.

Openings for utilities through bridge superstructure concrete shall either be formed or shall consist of pipe sleeves.

Wrapping and coating pipe

Damaged coating on steel pipe casing in contact with earth shall be wrapped as follows:

A. Pipe to be wrapped shall be thoroughly cleaned and primed as recommended by the tape manufacturer.
B. Tapes shall be tightly applied with 1/2 uniform lap, free from wrinkles and voids to provide not less than a 100—mil thickness.
C. Field joints and fittings for wrapped pipe shall be covered by double wrapping 50—mil thick tape. Wrapping at joints shall extend a minimum of 6 inches over adjacent pipe coverings. Width of tape for wrapping fittings shall not exceed 2 inches. Adequate tension shall be applied so tape will conform closely to contours of joint.

Where a welded steel pipe casing passes through the abutment wall, the welded steel pipe casing shall be additionally wrapped with 2 layers of 15—pound asphalt-felt building paper, securely taped or wired in place.

MEASUREMENT AND PAYMENT

Measurement and payment for welded steel pipe casing (bridge) for each size listed in the Engineers Estimate shall conform to the provisions in Sections 70-1.04, "Measurement," and 70-1.05, "Payment," of the Standard Specifications.

Full compensation for furnishing and installing steel brackets, steel cover plates, mortar and building paper, casing, concrete supports, and other fittings shall be considered as included in the contract prices paid per linear foot for the sizes of welded steel pipe casing (bridge) involved, and no additional compensation will be allowed therefor.

10-1.71 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 shall be woven or nonwoven type fabric, Type A or Type B, at the option of the Contractor.

10-1.72 TYPE BW FENCE

Type BW fence shall conform to the provisions in Section 80, "Fences," of the Standard Specifications and these special provisions.

The fence material shall be fastened to metal posts. Metal posts shall be painted a green color.

10-1.73 CHAIN LINK FENCE

Chain link fence shall be Type CL-6 and shall conform to the provisions in Section 80, "Fences," of the Standard Specifications.

10-1.74 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.

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.

10-1.75 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 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.

10-1.76 CONCRETE BARRIER

Concrete barriers shall conform to the provisions in Section 83-2, "Barriers," of the Standard Specifications.

10-1.77 TRANSITION RAILING (TYPE WB)

Transition railing (Type WB) shall be furnished and installed in conformance with details shown on the plans, the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

The 10-gage rail elements shall conform to the requirements of Class B, Type 1 thrie beam guard railing as shown in AASHTO Designation: M 180. End caps shall conform to the requirements of Class A, Type 1 thrie beam guard railing as shown in AASHTO Designation: M 180.

Surplus excavated material remaining after the transitional railing (Type WB) has been constructed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for transition railing (Type WB) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing transition railing (Type WB), complete in place, including drilling holes for wood posts, driving posts, 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.

10-1.78 CRASH CUSHION, SAND FILLED

Sand filled crash cushions shall be furnished and installed as shown on the plans and in conformance with these special provisions.

A sand filled crash cushion shall consist of a grouping of sand filled modules.

Crash cushions shall be installed at locations as shown on the plans.

At the Contractor's option, modules for use in sand filled crash cushions shall be either Energite III Inertial Modules, Fitch Inertial Modules or TrafFix Sand Barrels manufactured after March 31, 1997, or equal:

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

Modules contained in the 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 exterior components of the modules shall be formulated or processed to resist deterioration from ambient ultraviolet rays. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects.

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 crash cushions comply with the contract plans and specifications, conform to the prequalified design and material requirements, and were manufactured in conformance with the approved quality control program.

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 placed on bridge decks shall be provided with positioning blocks fastened to the deck surface. Positioning blocks shall be shaped as segments of a ring and placed along the inner or outer periphery of the module wall. A minimum of 2 blocks, a minimum of one-sixth of a ring in length shall be provided for each module. Positioning blocks and fasteners shall be of a material that is corrosion and water resistant.

Module cylinders 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.

Lids shall be securely attached as recommended by the manufacturer.

A Type R or Type 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 approved by the Engineer.

Sand filled crash cushions, regardless of the number of modules required in each sand filled crash cushion, will be measured and paid for by the unit as crash cushion, sand filled. The quantity to be paid for will be determined from actual count of the units in place in the completed work.

The contract unit price paid for crash cushion, sand filled shall include full compensation for furnishing all labor, materials (including sand and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing crash cushions, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.79 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.

Thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification PTH-02ALKYD.

Retroreflectivity of the thermoplastic traffic stripes and pavement markings shall conform to the requirements in ASTM Designation: D 6359-99. White thermoplastic traffic stripes and pavement markings shall have a minimum initial retroreflectivity of 250 mcd m^{-2} lx^{-1}. Yellow thermoplastic traffic stripes and pavement markings shall have a minimum initial retroreflectivity of 150 mcd m^{-2} lx^{-1}.

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.

At the option of the Contractor, permanent traffic striping and pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the thermoplastic traffic stripes and pavement markings specified herein. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications.

If permanent tape is placed instead of thermoplastic traffic stripes and pavement markings, the tape will be measured and paid for by the linear foot as thermoplastic traffic stripe and by the square foot as thermoplastic pavement marking.

10-1.80 THERMOPLASTIC TRAFFIC STRIPE (SPRAYABLE)

Sprayable thermoplastic traffic stripes (traffic lines) shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Sprayable thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification No. PTH-02SPRAY.

Retroreflectivity of the sprayable traffic stripes shall conform to the requirements in ASTM Designation: D 6359-99. White sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of 250 mcd m^{-2} lx^{-1}. Yellow sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of 150 mcd m^{-2} lx^{-1}.

At the option of the Contractor, permanent traffic striping and pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the sprayable thermoplastic traffic stripes. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications.

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.

Sprayable thermoplastic material shall be applied to the pavement at a minimum thickness of 0.039-inch and a minimum rate of 0.13-lb/ft. The minimum application rate is based on a solid stripe of 4 inches in width.

Sprayable thermoplastic material shall be applied to the pavement at a temperature between 351° F and 401° F, unless a different temperature is recommended by the manufacturer.

Sprayable thermoplastic traffic stripes shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

If permanent tape is placed instead of sprayable thermoplastic traffic stripes, the tape will be measured and paid for by the linear foot as thermoplastic traffic stripe (sprayable).

Sprayable thermoplastic traffic stripes will be measured by the linear foot along the line of the traffic stripes, without deductions for gaps in broken traffic stripes. A double traffic stripe, consisting of two 4-inch wide yellow stripes, will be measured as one traffic stripe.

The contract price paid per linear foot for thermoplastic traffic stripe (sprayable) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in applying sprayable thermoplastic traffic stripes (regardless of the number, widths, and patterns of individual stripes involved in each traffic stripe) including establishing alignment for stripes, and layout work, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.81 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.

SECTION 10-2. (BLANK)

SECTION 10-3. SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

10-3.01 DESCRIPTION

Highway lighting, traffic monitoring stations, model 500 changeable message sign systems, and roadside weather information systems shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

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 FOUNDATIONS

Reinforced cast-in-drilled-hole concrete pile foundations for traffic signal and lighting standards shall conform to the provisions in "Piling" of these special provisions, except for payment.

10-3.04 STANDARDS, STEEL PEDESTALS, AND POSTS

Standards, steel pedestals, and posts for traffic signal and 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: F1554, Grade 105.

Handhole reinforcement rings for standards, steel pedestals, and posts shall be continuous around the handholes.

10-3.05 CONDUIT

Conduit to be installed underground shall be Type 3 unless otherwise specified. Detector termination conduits shall be Type 3.

The conduit in a foundation and between a foundation and the nearest pull box shall be Type 1.

After conductors have been installed, the ends of conduits terminating in pull boxes, service equipment enclosures, and controller cabinets shall be sealed with an approved type of sealing compound.

At those locations where conduit is required to be installed under pavement and existing underground facilities require special precautions in conformance with the provisions in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" in conformance with the provisions in Section 86-2.05C, "Installation," of the Standard Specifications.

10-3.06 CONDUCTORS AND WIRING

Splices shall be insulated by "Method B" or, at the Contractor's option, splices of conductors shall be insulated with heat-shrink tubing of the appropriate size after thoroughly painting the spliced conductors with electrical insulating coating.

TELEPHONE CABLE

Telephone cable shall consist of six pair, No. 19 minimum, solid tinned copper conductors conforming to the requirements of RUS Bulletin 1753F-205 (PE-39).

10-3.07 BONDING AND GROUNDING

Bonding and grounding shall conform to the provisions in Section 86-2.10, "Bonding and Grounding," of the Standard Specifications and these special provisions.

Bonding jumpers in standards with handholes and traffic pull box lid covers shall be attached by a UL listed lug using 3/16-inch diameter or larger brass or bronze bolts and shall run to the conduit or bonding wire in the adjacent pull box. The grounding jumper shall be visible after the standard has been installed and the mortar pad and cap have been placed on the foundation.

Standards without handholes shall have bonding accomplished by jumpers attached to UL listed ground clamps on each anchor bolt.

For slip base standards or slip base inserts, bonding shall be accomplished by jumpers attached to UL listed ground clamps on each anchor bolt, or a UL listed lug attached to the bottom slip base plate with a 3/16-inch diameter or larger brass or bronze bolt.

Equipment bonding and grounding conductors are required in conduits, except when the conduits contain combinations of loop lead-in cable, fiber optic cable, or signal interconnect cable. A No. 8 minimum, bare copper wire shall run continuously in circuits, except for series lighting circuits, where No. 6 bare copper wire shall run continuously. The bonding wire size shall be increased to match the circuit breaker size in conformance with the Code, or shall be as shown on the plans. Conduits to be installed for future conductors, may omit the copper wire.

Bonding of metallic conduits in metal pull boxes shall be by means of bonding bushings and bonding jumpers connected to the bonding wire running in the conduit system.

10-3.08 SERVICE

Type III service equipment enclosures shall be the aluminum type.

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.

Circuits with Model 500 changeable message signs shall have service equipment enclosures which have main busses and terminal lugs rated for 100 A, minimum, and a No. 2 bare copper ground wire.

10-3.09 CONTROLLER CABINETS

The Model 334 cabinets shall conform to the provisions in Section 86-3.03, "Model 170 and Model 2070 Controller Assemblies," of the Standard Specifications and these special provisions.

Cabinets shall be Type 1 and shall consist of a Type 1 housing (A), a mounting cage 1, and the following listed equipment. The equipment shall conform to the provisions of Chapter 6 of the Traffic Signal Control Equipment Specifications (TSCES).

A. Service panel No. 1
B. Power distribution assembly
C. Input file No. 3, upper part

D. Input file No. 3, lower part
E. C1 harness
F. Controller and equipment shelves
G. Dual fan assembly with thermostatic control
H. Mechanical armature-type relays
I. Input panel No. 3

Police panels will not be required.

Prior to shipping to the project site, each Model 334 cabinet shall be submitted to the Transportation Laboratory for acceptance testing.

Foundations for Type 1 housing shall conform to the details in the plans for Model 332A and 334 cabinets.

The Engineer shall be notified when each Model 334 cabinet is ready for the functional test. The functional test will be conducted by State forces.

The following equipment shall be provided with each power distribution assembly:

A. Two each of Duplex NEMA Type 5-20R controller receptacle
B. One each of 30 A, 1-pole, 120 V(ac) Main circuit breaker
C. One each of 15 A, 1- pole, 120 V(ac) circuit breaker
D. Two each of 20 A, 1- pole, 120 V(ac) circuit breaker

Three shelves shall be furnished as shown on the plans. Each shelf shall be attached to the tops of 2 supporting angles with 4 screws. Supporting angles shall extend from the front to the back rails. Two supporting angles will be State furnished and 4 shall be Contractor furnished. The front of the shelf shall abut the front member of the mounting cage. The shelves shall be arranged as shown on the plans. The angles shall be designed to support a minimum of 50 pounds each. The horizontal side of each angle shall be a minimum of 3 inches. The angles shall be vertically adjustable.

Three terminal blocks shall be furnished as shown on the plans. Terminal blocks shall conform to the requirements in Chapter 6, Section 5, Subsection 6.5.3, Paragraph 5.3.1 of the TSCES, except that the screw size shall be 8-32.

10-3.10 STATE-FURNISHED CONTROLLER UNITS

The Model 2070 controller units will be State-furnished as provided under "Materials" of these special provisions.

State forces will maintain controller units. The Contractor's responsibility for controller units shall be limited to conforming to the provisions in Section 6-1.02, "State-Furnished Materials," of the Standard Specifications.

10-3.11 MODEMS

The modems will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

The modems will be installed by State forces.

10-3.12 DETECTORS

Loop detector sensor units will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Loop wire shall be Type 2.

Loop detector lead-in cable shall be Type B.

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

10-3.13 TRAFFIC MONITORING STATION

Traffic monitoring station shall conform to the details shown on the plans and these special provisions.

Inductive loop detectors for traffic monitoring station and the installation thereof shall conform to the provisions in "Detectors" of these special provisions.

SCREENED TRANSMISSION CABLE

Screened transmission cable (STC) shall be RG-58C/U coaxial cable. Cable shall be rated for direct burial. Sufficient cable to reach the cabinet shall be supplied with each axle sensor. The STC shall not be spliced. STC terminations shall be made using properly sized captive or spring spade type terminals, crimped and soldered.

PIEZO AXLE SENSORS

Piezo axle sensor shall be Class II and use for classification purposes. Piezo axle sensors shall consist of a piezo-electric copolymer surrounded by a 1/4" wide x 1/16" thick outer brass sheath. Each sensor shall be 6' in length with a screened transmission cable (STC) attached. The Engineer will determine the exact location of the inductive loop detector/piezo axle sensors.

The axle sensor shall be installed in a channel as shown on the plans, per manufacturer's specifications, and as directed by the Engineer. The channel shall be filled with epoxy grout. The epoxy grout shall consist of an acrylic resin and a benzoyl peroxide catalyst. The grout shall not exceed 170 F while curing, and shall be adequately set before re-opening the lane to traffic.

All sawed pavement slots containing screened transmission cable shall be filled with elastomeric sealant. Elastomeric sealant shall conform to Section 86-5.01A(5), "Installation Details" of the Standard Specifications.

TESTING

The piezo axle sensors shall be tested prior to and after installation. The sensors shall be checked out prior to putting them into the road to determine if any damage has been done to the sensor during shipping and handling. The followings tests shall be done prior to installation:

Capacitance

Measure the capacitance of the sensor with the attached lead in cable. This shall be 20 percent of the sensor's data sheet provided by the manufacturer. The meter shall be typically set on a 20 nF range. The red probe shall be connected to the center of the cable and the black probe to the outer braid. No hands shall be holding across the two connections.

Dissipations Factor

With the capacitance set on the scale indicated above, switch the meter over to Dissipation Factor. The reading shall be less than 0.04.

Resistance

Measure the resistance across the sensor. The meter should be set on the 20 MΩ setting. The meter should read in excess of 20 MΩ, which is typically displayed with a "1".

Testing After Installation

Once the sensor is installed and the grout has cured, retest the sensor according to the instructions above. An oscilloscope shall be connected to the sensor and typical waveforms be collected for a truck and a car. These shall then be printed out and saved for permanent records. The output of the sensor will depend on the type of the installation, sensor length, cable length and epoxies used for the installation. Typical settings for the cope would be 200 mV/div for a voltage setting and 50 ms/div for a time setting. The trigger shall be set at about 50 mV for a positive going signal.

10-3.14 LUMINAIRES

Ballasts shall be the lag or lead regulator type.

10-3.15 MODEL 500 CHANGEABLE MESSAGE SIGN SYSTEM

Model 500 changeable message sign (CMS) systems consist of a Model 500 changeable message sign, a Model 170 controller assembly in a completely wired Type 1 or similar cabinet and the required wiring and auxiliary equipment required to control the CMS shown on the plans and in conformance with these special provisions.

The Model 500 changeable message signs, wiring harnesses and Model 170 controller assembly including controller unit and completely wired cabinet, but without anchor bolts, will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Model 500 changeable message sign system components will conform to the requirements in "Specifications for Changeable Message Sign System," issued by the State of California, Department of Transportation, and to the addenda thereto current at the time of project advertising. Model 170 controller assemblies will conform to the requirements in "Traffic Signal Control Equipment Specifications," issued by the State of California, Department of Transportation, and to the addenda thereto current at the time of project advertising.

Attention is directed to "Sign Structures" of these special provisions.

The sign assembly shall be installed on the sign structure. The controller cabinet foundation shall be constructed as shown on the plans for Model 334 cabinets (including furnishing and installing anchor bolts), the controller cabinet shall be

installed on the foundation, and the field wiring connections shall be made to the terminal blocks in the sign assembly and in the controller cabinet.

Field conductors No. 12 and smaller shall terminate with spade terminals. Field conductors No. 10 and larger shall terminate in spade or ring terminals.

A listing of field conductor terminations, in each State-furnished changeable message sign and controller cabinet, will be furnished free of charge to the Contractor at the site of the work.

The location of the foundation for each controller cabinet will be determined by the Engineer.

State forces will maintain the sign assemblies. The Contractor's responsibility shall be limited to conformance with the provisions in Section 6-1.02, "State-Furnished Materials," of the Standard Specifications.

10-3.16 ROADSIDE WEATHER INFORMATION SYSTEM

Roadside Weather Information System (RWIS) shall be furnished and installed as shown on the plans and as specified in these special provisions. RWIS shall be installed as recommended by the RWIS Manufacturer/Supplier. The Contractor shall be responsible for delivering a fully tested and operational system.

The system shall consist of the following:

1. Sensing devices for measurement of surface and atmospheric conditions.
2. Remote Processing Unit (RPU) for data collection, storage and transmission of sensor information.

DESCRIPTION

The RWIS shall include all hardware, software, and licenses to operate as follows:

Pavement surface sensors shall measure pavement surface temperature, chemical concentration and pavement surface condition inputs and communicate the signals to the RPU.

Atmospheric sensors shall measure their respective weather parameters and communicate the signals to the RPU.

The RPU shall monitor and store the following conditions for access by the existing Weather Server (WS):

1. Road surface such as dry, wet, frost covered, snow covered, icy, and freeze-point. Chemical factor (percentage) shall also be monitored.
2. Environmental (atmospheric) conditions such as air temperature, dew point, relative humidity, precipitation and wind speed/direction.

The RPU shall process the output from the sensors, store the data locally and, upon request, send the data to the existing WS by a wireless communications device to be provided by the State.

EQUIPMENT

All RWIS equipment furnished on this project shall be state-of-the-art and in current manufacture at the time of purchase.

All equipment, instrumentation, and tools used for RWIS installation shall be in accordance with the Manufacturer/Supplier's recommendations and instructions.

Final placement of equipment shall be as directed by the Engineer.

Cable lengths shall not exceed manufacturer's requirements.

REMOTE PROCESSING UNIT

The Remote Processing Unit (RPU) shall be installed at the location shown on the plans, as recommended by the Manufacturer/Supplier, and as directed by the Engineer. The RPU shall gather data from all connected sensors and process, store, and transmit this data to the WS located at the Regional Transportation Management Center (RTMC). The RPU shall be capable of collecting data from the following:

1 To 8 Pavement Surface Sensors
1 To 8 Subsurface Temperature Sensors
1 Air Temperature/Relative Humidity Sensor
1 Wind Speed/Direction Sensor
1 Present Weather Sensor

The RPU shall operate in a range of 100-130 V(ac) at 50-60 Hz and shall not use more than approximately 50 W of continuous power. The primary power shall be installed and fused at 15A with voltage protection.

The RPU shall monitor its own operation and reset itself if the RPU software enters an indeterminate state or if the user requests a reset from the user terminal.

The RPU design shall maximize the use of solid state components and modular circuit cards for ease of maintenance. All circuitry of the RPU, the voltage inputs, the sensor inputs, and the communications ports shall be designed and tested to provide transient and surge protection. The RPU shall provide stable operation over a temperature range of -40°F to 160°F and 0-90% RH non-condensing.

The RPU shall contain operational self-test routines to automatically detect and log problems with the RPU.

Each RPU shall be enclosed in a NEMA 4 lockable aluminum enclosure that is resistant to damage by weather and vandals. It shall be mounted on a free-standing non-climbable, corrosion-resistant, aluminum tower. The RPU shall be located along the roadway in the vicinity of the surface sensors as shown on the plan. RPU enclosure shall be sized to house equipment and provide working clearances for maintenance.

The RPU software shall be capable of calculating the 24-hour accumulation of precipitation and storing this information for subsequent displays on the user terminal.

RPU DATA COMMUNICATIONS

The RPU shall be furnished with a modem. The RPU shall communicate with the WS via Ethernet communications interface port on the RPU. Communications protocols shall adhere to current National Transportation Communications for Intelligent Transportation Systems Protocol (NTCIP) 1204-Object Definitions for Environmental Sensor Stations (ESS) Version 1 including Amendment 1 (November 2001). Proprietary protocols shall not be used.

The existing WS located at the Regional Transportation Management Center will poll the RPU at a specified time interval to transfer and refresh its data. The proper communications operation will be verified prior to acceptance. The Contractor shall make all the necessary modifications to the WS to support the communications protocol while ensuring that communication to the other sites that are not part of this contract are not affected.

PAVEMENT SURFACE SENSORS

The pavement surface sensor shall be a single unit, solid state, thermally passive, and constructed of a material with sufficient strength and durability to function as a stable system over a range of temperatures from -22°F to 122°F.

The sensors shall sample pavement, surface conditions in real time and be non-destructive to pavement, environment, or personnel. The sensor head shall be self-contained and shall not require adjustment after initial installation in the pavement.

The sensors shall function satisfactorily during all climatic conditions and shall include protection against lightning.

Sensor heads performance shall not be degraded by weather conditions or the use of ice control chemicals. Vehicle traffic impact shall not deteriorate the sensor head or degrade performance.

The sensors shall be installed in the pavement and shall emit electronic signal information concerning pavement conditions. The sensor heads shall be designed for flush mounting in the pavement, have thermal characteristics similar to the most commonly used road surface materials, and approximate the pavement surface texture and color.

Each sensor head shall be supplied with a waterproof input-output cable, sealed to the head to form an integral part of the assembly.

The sensor shall be supplied with 150 feet of attached molded cable that is waterproofed and sealed as an integral part of the assembly. The sensor shall electronically sample the following pavement conditions:

Pavement surface temperature at the sensor head.
Dry pavement condition.
Wet pavement condition above 32°F.
Wet but not frozen pavement condition at or below 32°F.
Snowy or icy pavement condition at or below 32°F.

In addition, the pavement sensor shall supply data for determining the following pavement surface conditions:

A. Freeze point temperature of the moisture/ice-control-chemical-solution present on the surface of the pavement sensor.
B. Depth of the moisture/ice-control-chemical-solution present on the surface of the pavement sensor in the range of 10 mils to 510 mils.
C. Percentage of ice particles present in the moisture/ice-control-chemical-solution present on the surface of the pavement sensor.

The Contractor shall supply field test documentation from the Manufacturer/Supplier which substantiates pavement sensor performance.

Each sensor head shall be capable of proper operation when connected to lengths of cable up to 2460 feet from the RPU.
Surface sensor cable shall conform to Manufacturer/Supplier requirements.

SENSOR LEAD-IN CABLE

Sensor lead-in (SLI) cable shall conform to the Manufacturer/Supplier's requirements and the following:

A. Filled Telephone Cable Type PE-39 shall be used in extending Surface Sensor and/or Sub-Surface Temperature Probe inside ducting or direct buried installations.
B. l9 AWG, 6 pair, approximate O.D. is ½-inch, polypropylene or polyethylene insulation, polyethylene jacket, duct or direct burial.
C. The cable shield shall be aluminum, copper, or Gopher Resistant, as recommended by the RWIS manufacturer.

SURFACE SENSOR INSTALLATION

Slots cut in pavement for sensor installation shall be filled with sealant as recommended by the sensor manufacturer.

PRESENT WEATHER SENSOR

The Present Weather Sensor shall be a versatile instrument, which can function as a precipitation classifier, precipitation rate meter, and a close range visibility sensor.

The sensor shall be able to differentiate between rain, snow, and drizzle as well as measure actual precipitation as water equivalent.

Precipitation rate error shall be less than 10% for the full expected range of 0.1-inchto 20-inch per hour, with less than a 5% error within the more normal range of 0.4-inch to 4-inch per hour.

Sensor housing shall be all-weather and ice-proof with heated optics to prevent ice, dew, or frost build-up. Normal operating temperature range shall be from -58°F to 122°F. The present weather sensor shall be mounted at the same location as the RPU, as directed by the Engineer.

SUBSURFACE TEMPERATURE PROBE

The Subsurface Temperature Probe shall measure the temperature below the roadway pavement surface near the interface between the subgrade and the soil below.

The probe shall be installed under the roadway near the surface sensors as shown on the plans.

The temperature sensing element of the probe shall operate over the temperature range -22°F to 122°F.

The probe shall be supplied with 150 feet of attached cable, which is waterproofed and sealed as an integral part of the assembly. Each sensor shall be capable of operating at extended cable lengths, up to 2500 feet from the RPU without additional amplification.

AIR TEMPERATURE / RELATIVE HUMIDITY SENSOR

The Air Temperature/Relative Humidity Sensor shall have an air temperature sensing element which operates over the temperature range of -22°F to 122°F with a survival operating range of -35°F to 176°F.

The relative humidity sensing element shall have a measuring range of 10% to l00% RH. The operating temperature range is -22°F to 122°F.

System dew point temperature shall be calculated from the air temperature and relative humidity.

Both atmospheric sensing elements shall be mounted at the RPU location roughly 6.5 feet above ground level in a solar/wind-radiation shield.

The combined sensor shall operate to specifications at cable lengths up to 150 feet from the RPU.

WIND SPEED / DIRECTION SENSOR

The Wind Speed/Direction Sensor shall have an operating range of 0 mph to 100 mph

The sensor survival operation limit shall be 164 mph with an operating azimuth of 360 degrees mechanical and 355 degrees electrical.

The temperature operating range shall be -40°F to 140°F with a survival operating range to 185°F.

It shall be installed 32 feet above ground level at each RPU.

The sensor shall operate to specifications at cable lengths up to 150 feet from the RPU.

EQUIPMENT WARRANTY

The Contractor shall provide from the manufacturer a limited, on-site, warranty coverage on all equipment for a twelve month period after acceptance and shall provide full warranty documentation with their contract submittals.

A 24-hour toll-free telephone number for technical support shall be included for the warranty period.

QUALITY ASSURANCE

The Contractor shall provide the materials, installation manuals and instruction, technical training, and such other services as required to assure effective installation, testing, and operation of the system including but not limited to:

A. Sensors, sensor-embedding kits, and splicing kits for installing the sensor heads in the pavement.
B. Cable
   1. Manufacturer/Supplier shall make all connections of sensor cable at the RPU enclosure.
   2. Cable splicing manual.
   3. Splicing kits for surface/subsurface sensors.
C. Remote Processor Unit (RPU).
   1. NEMA 4 enclosure.
   2. Electronics rack (installed by Manufacturer/Supplier).
   3. All atmospheric sensors required, including cable and mounting plates.
   4. Mounting plates and hardware.
   5. RPU.
D. Pre-construction conference (one day) with Contractor and Engineer to furnish instruction on installation procedures for sensor installation, cable splicing and complete system installation.

ON-SITE ASSISTANCE AND TRAINING

Manufacturer/Supplier shall provide On-site Assistance and Training as follows:

A. Provide a Field Service Engineer to furnish final installation, support for system inspection, turn-on and alignment (commissioning) and attend pre-construction conference.

TESTING

Contractor shall test that the RPU properly communicates with the existing NS and that all data from the RPU is collected and transmitted to the NS.

INSTRUMENT TOWER ASSEMBLIES

Tower assemblies, shall consist of 3-sided truss type construction manufactured of aluminum angle and furnished in three 10 foot sections. Sections are attached to each other and to the base with 1/3-inch stainless steel hardware. The tower is to be equipped with a lockable fold-over device to facilitate servicing the atmospheric sensors. Mesh or other means shall be provided to prevent climbing and vandalism.

Tower construction details shall be as recommended by the Manufacturer.

INSTRUMENT TOWER FOUNDATION

Tower foundation, including anchor bolts, shall be constructed, as shown on the plans and as directed by the Engineer to accommodate tower installation.

10-3.17 REMOVING, REINSTALLING OR SALVAGING ELECTRICAL EQUIPMENT

Salvaged electrical materials shall be hauled to Caltrans Maintenance Yard, 1283 N. West Avenue, Fresno, CA 93728 and stockpiled.

The Contractor shall provide the equipment, as necessary, to safely unload and stockpile the material. A minimum notice of 2 business days shall be given prior to delivery.

10-3.18 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.

The contract lump sum price paid for model 500 changeable message sign system at various locations shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in changeable message sign system, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for roadside weather information system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in roadside weather information

system, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for providing electric service for future well pumps shall be considered as included in the contract lump sum price paid for highway lighting and no separate payment will be made 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. Changeable message signs
2. Service equipment enclosures
3. Telephone demarcation cabinets
4. Model 334 cabinets furnished by the Contractor

AMENDMENTS TO THE STANDARD SPECIFICATIONS

DATED MAY 2009

AMENDMENTS ISSUE DATE: 05-01-09

SECTION 0 GLOBAL REVISIONS
(Issued 05-01-09)

Global revisions are changes to contract documents not specific to a section of the Standard Specifications.
In each contract document at each occurrence, interpret the following terms as shown:

Term	Interpretation	Conditions
AC	HMA	1. Where AC means asphalt concrete 2. Except where existing AC is described
Asphalt concrete	Hot mix asphalt	Except where existing asphalt concrete is described
Controlling operation	Controlling activity	--
Engineer's Estimate	Verified Bid Item List	--
Engineering fabrics	Geosynthetics	--
Notice to Contractors	Notice to Bidders	--
Project information	Supplemental project information	Except in "Contract Project Information Signs"
Clause referring to a delay as a right-of-way delay	Delay under Section 8-1.09, "Delays"	--
Reference to a working day or non–working day under Section 8-1.06, "Time of Completion"	Working day as defined in Section 1-4.02, "Glossary"	--
Time extension due to an unanticipated event not caused by either party or an issue involving a third party under Section 8-1.07, "Liquidated Damages"	Non–working day	--
Time extension due to an act of the Engineer or of the Department not contemplated by the contract	Time adjustment under Section 8-1.09B, "Time Adjustments"	--

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SECTION 1 DEFINITIONS AND TERMS
(Issued 05-01-09)

Replace Section 1 with:

SECTION 1 GENERAL
1-1 GENERAL
1-1.01 GENERAL

Section 1 includes general rules of interpretation.

The Department is gradually standardizing 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.

Sections 1 through 9 include general specifications applicable to every contract unless specified as applicable under certain conditions.

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."

Omission of "a," "an," and "the" is intentional. These articles have been omitted in some specifications for streamlining purposes.

Unless an object or activity is specified to be less than the total, the quantity or amount is all of the object or activity.

A plural term includes the singular.

All items in a list apply unless the items are specified as choices.

Headings are included for the purposes of organization and referencing. Inclusion of a heading with no related content, "Reserved," or "Not Used" does not indicate that no specification exists for that subject; applicable specifications may be covered in a general or referenced specification.

1-2 REFERENCES

1-2.01 REFERENCES

Where Standard Specifications refer to the special provisions to describe the work, interpret the reference as a reference to the Bid Item List, the special provisions, or both.

Interpret a reference to a section of the Standard Specifications as a reference to the Standard Specifications as revised by any amendment, special provision, or both.

A reference within parentheses to a law or regulation is included in the contract for convenience only and is not a comprehensive listing of related laws and regulations. Lack of a reference does not indicate no related laws or regulations exist.

Where the version of a referenced document is not specified, use the current version in effect on the date of Notice to Bidders.

A reference to a subsection includes the section's general specifications of which the subsection is a part.

A code not specified as a Federal code is a California code.

1-3 ABBREVIATIONS AND MEASUREMENT UNITS

1-3.01 ABBREVIATIONS

Abbreviations

Abbreviation	Meaning
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMA	archaeological monitoring area
ANSI	American National Standards Institute
APHA	American Public Health Association
API	American Petroleum Institute
AREMA	American Railway Engineering and Maintenance-of-Way Association
ASME	American Society of Mechanical Engineers

ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
CIH	Certified Industrial Hygienist
DBE	Disadvantaged Business Enterprise
DVBE	Disabled Veteran Business Enterprise
EIA	Electronic Industries Alliance
ESA	environmentally sensitive area
ETL	Electrical Testing Laboratories
FHWA	Federal Highway Administration
IEEE	Institute of Electrical and Electronics Engineers
NETA	National Electrical Testing Association, Inc.
NEMA	National Electrical Manufacturers Association
PLAC	permit, license, agreement, certification, or any combination of these
SSPC	The Society for Protective Coatings
UL	Underwriters' Laboratories Inc.

1-3.02 MEASUREMENT UNITS

Measurement Units

Symbols as used in the specifications	Symbols as used in the Bid Item List	Meaning
A	—	amperes
	ACRE	acre
	CF	cubic foot
	CY	cubic yard
--	EA	each
g	--	gram
ksi	--	kips per square inch
	GAL	gallon
h	H	hour
	LB	pound
--	LS	lump sum
	LF	linear foot
	LNMI	lane mile
	MFBM	thousand foot board measure
	MI	mile
	MSYD	thousand station yard
Ω	--	ohm
pcf	--	pounds per cubic foot
s	--	second
	STA	100 feet
	SQFT	square foot
	SQYD	square yard
	TAB	tablet
ton	TON	2,000 pounds
V	--	volt
W	--	watt
--	WDAY	working day

1-4 DEFINITIONS

1-4.01 GENERAL

Interpret terms as defined in the contract documents. A construction-industry term not defined in the contract documents has the meaning defined in Means Illustrated Construction Dictionary, Condensed Version, Second Edition.

1-4.02 GLOSSARY

aerially deposited lead: Lead primarily from vehicle emissions deposited within unpaved areas or formerly unpaved areas.

archaeological monitoring area: Area within, near, or straddling the project limits where access is allowed, but work is subject to archaeological monitoring.

archaeological resources: Remains of past human activity, including historic and prehistoric material (e.g., tools and tool fragments, hearth and food remains, structural remains, and human remains).

acceptance: Formal written acceptance by the Director of an entire contract that has been completed in all respects in accordance with the plans and specifications and any modifications to them previously approved.

base: Layer of specified material of planned thickness placed immediately below the pavement or surfacing.

basement material: Material in excavation or embankments underlying the lowest layer of subbase, base, pavement, surfacing, or other specified layer to be placed.

bid item: Specific work unit for which the bidder provides a price.

Bid Item List: List of bid items and the associated quantities.

Bid Item List, verified: Bid Item List with verified prices. The Contract Proposal of Low Bidder at the Department's Web site is the verified Bid Item List.

bridge: Structure, with a bridge number, that carries a utility facility, or railroad, highway, pedestrian or other traffic, over a water course or over or under or around any obstruction.

building-construction contract: Contract that has "building construction" on the cover of the Notice to Bidders and Special Provisions.

business day: Day on the calendar except Saturday or holiday.

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.

Certified Industrial Hygienist: Industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.

conduit: Pipe or tube in which smaller pipes, tubes, or electrical conductors are inserted or are to be inserted.

contract: Written and executed contract between the Department and the Contractor.

contract bonds: Security for the payment of workers and suppliers furnishing materials, labor, and services and for guaranteeing the Contractor's work performance.

contract item: Bid item.

Contractor: Person or business or its legal representative entering into a contract with the Department for performance of the work.

culvert: Structure, other than a bridge, that provides an opening under a roadway for drainage or other purposes.

day: 24 consecutive hours running from midnight to midnight; calendar day.

deduction: Amount of money permanently taken from progress payment and final payment. Deductions are not retentions under Pub Cont Code § 7107.

Department: Department of Transportation as defined in St & Hwy Code § 20 and authorized in St & Hwy Code § 90; its authorized representatives.

detour: Temporary route for traffic around a closed road part. A passageway through a job site is not a detour.

Director: Department's Director.

Disabled Veteran Business Enterprise: Business certified as a DVBE by the Office of Small Business and DVBE Services, Department of General Services.

divided highway: Highway with separated traveled ways for traffic, generally in opposite directions.

Engineer: Department's Chief Engineer acting either directly or through properly authorized agents; the agents acting within the scope of the particular duties delegated to them.

environmentally sensitive area: Area within, near, or straddling the project limits where access is prohibited or limited to protect environmental resources.

Federal-aid contract: Contract that has a Federal-aid project number on the cover of the Notice to Bidders and Special Provisions.

fixed costs: Labor, material, or equipment cost directly incurred by the Contractor as a result of performing or supplying a particular bid item that remains constant regardless of the item's quantity.

frontage road: Local street or road auxiliary to and located generally on the side of an arterial highway for service to abutting property and adjacent areas and for control of access.

grading plane: Basement material surface on which the lowest layer of subbase, base, pavement, surfacing, or other specified layer is placed.

highway: Whole right of way or area that is reserved for and secured for use in constructing the roadway and its appurtenances.

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."

informal-bid contract: Contract that has "Informal Bid Authorized by Pub Cont Code §10122" on the cover of the Notice to Bidders and Special Provisions.

Information Handout: Supplemental project information furnished to bidders as a handout.

laboratory: Laboratory authorized by the Department to test materials.

liquidated damages: Amount prescribed in the specifications, pursuant to the authority of Pub Cont Code § 10226, to be paid to the State or to be deducted for each day's delay in completing the whole or any specified portion of the work beyond the time allowed in the specifications.

material shortage: Shortage of raw or produced material that is area-wide and caused by an unusual market condition, except if any of the following occurs:

1. Shortage relates to a produced, nonstandard material
2. Supplier's and the Contractor's priority for filling an order differs
3. Event outside the U.S. for a material produced outside the U.S.

median: Portion of a divided highway separating the traveled ways for traffic in opposite directions including inside shoulders.

Notice to Bidders: Document that provides a general work description, bidder and bid specifications, and the time and location the Department receives bids.

paleontological resources: Fossils and the deposits they are found in. Fossils are evidence of ancient life preserved in sediments and rock. Examples of paleontological resources are remains of (1) animals, (2) animal tracks, (3) plants, and (4) other organisms. Archaeological resources are not paleontological and fossils found within an archaeological resource are generally considered archaeological resources, not paleontological resources.

pavement: Uppermost layer of material placed on the traveled way or shoulders. This term is used interchangeably with surfacing.

plans: Official project plans and Standard Plans, profiles, typical cross sections, working drawings and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions and details of the work to be performed. These documents are to be considered as a part of the plans.

In the above definition, the following terms are defined as follows:

Standard Plans: Standard Plans issued by the Department.

project plans: Specific details and dimensions peculiar to the work supplemented by the Standard Plans insofar as the same may apply.

roadbed: Area between the intersection of the upper surface of the roadway and the side slopes or curb lines. The roadbed rises in elevation as each increment or layer of subbase, base, surfacing or pavement is placed. Where the

medians are so wide as to include areas of undisturbed land, a divided highway is considered as including 2 separate roadbeds.

roadway: Highway portion included between the outside lines of sidewalks, or curbs, slopes, ditches, channels, waterways, and including all the appertaining structures, and other features necessary to proper drainage and protection.

shoulder: Roadway portion contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

special provisions: Specific clauses setting forth conditions or requirements peculiar to the work and supplementary to these Standard Specifications. The Department's publication titled "Labor Surcharge And Equipment Rental Rates" is part of the special provisions.

specifications: Directions, provisions, and requirements contained in these Standard Specifications, Amendments to the Standard Specifications, and the special provisions. Where the term "these specifications" or "these Standard Specifications" is used in this book, it means the provisions set forth in this book.

State: State of California, including its agencies, departments, or divisions, whose conduct or action is related to the work.

Structure Design: Offices of Structure Design of the Department.

subbase: Layer of specified material of planned thickness between a base and the basement material.

subgrade: Roadbed portion on which pavement, surfacing, base, subbase, or a layer of any other material is placed.

substructure: Bridge portions below the bridge seats, tops of piers, haunches of rigid frames, or below the spring lines of arches. Backwalls and parapets of abutments and wingwalls of bridges are portions of the substructure.

superstructure: Bridge portion except the bridge substructure.

supplemental project information: Information relevant to the project, specified as supplemental project information, and made available to bidders.

surfacing: Uppermost layer of material placed on the traveled way, or shoulders. This term is used interchangeably with pavement.

traffic lane: Portion of a traveled way for the movement of a single line of vehicles.

traveled way: Portion of the roadway for the movement of vehicles, exclusive of shoulders.

total bid: Sum of the item totals as verified by the Department; original contract price.

withhold: Money temporarily or permanently taken from progress payment. Withholds are not retentions under Pub Cont Code § 7107.

work: All the work specified, indicated, shown or contemplated in the contract to construct the improvement, including all alterations, amendments, or extensions to it made by contract change order or other written orders of the Engineer.

working day: Time measure unit for work progress. A working day is any day except:

1. Saturdays and holidays
2. A day when you cannot perform work on the controlling activity for at least 50 percent of the day with at least 50 percent of the normal labor and equipment due to any of the following:

    2.1. Adverse weather-related conditions that cause you to dismiss the crew
    2.2. Maintaining traffic under the contract
    2.3. The Engineer's direction to suspend the controlling activities for reasons unrelated to your performance
    2.4. An unanticipated event not caused by either party such as:

        2.4.1. Act of God (Pub Cont Code § 7105)
        2.4.2. Act of a public enemy
        2.4.3. Epidemic
        2.4.4. Fire
        2.4.5. Flood
        2.4.6. Governor-declared state of emergency
        2.4.7. Landslide
        2.4.8. Quarantine restriction

    2.5. An issue involving a third-party, including:

        2.5.1. Industry or area-wide labor strike
        2.5.2. Material shortage
        2.5.3. Freight embargo

2.5.4. Jurisdictional requirement of a law enforcement agency

2.5.5. Workforce labor dispute of a utility or non-highway facility owner resulting in a utility or non-highway facility reconstruction not described and not solely for the Contractor's convenience

1-5 DISTRICTS

District Composition and Office Addresses

District	Counties	Location Address	Mailing Address
1	Del Norte (DN), Humboldt (Hum), Lake (Lak), Mendocino (Men)	1656 UNION ST EUREKA, CA	PO BOX 3700 EUREKA CA 95502
2	Lassen (Las), Modoc (Mod), Plumas (Plu), Shasta (Sha), Siskiyou (Sis), Tehama (Teh), Trinity (Tri)	1657 RIVERSIDE DR REDDING, CA	PO BOX 496073 REDDING CA 96049-6073
3	Butte (But), Colusa (Col), El Dorado (ED), Glenn (Gle), Nevada (Nev), Placer (Pla), Sacramento (Sac), Sierra (Sie), Sutter (Sut), Yolo (Yol), Yuba (Yub)	703 B ST MARYSVILLE, CA	PO BOX 911 MARYSVILLE CA 95901
4	Alameda (Ala), Contra Costa (CC), Marin (Mrn), Napa (Nap), San Francisco (SF), San Mateo (SM), Santa Clara (SCl), Solano (Sol), Sonoma (Son)	111 GRAND AVE OAKLAND, CA	PO BOX 23660 OAKLAND CA 94623-0660
5	Monterey (Mon), San Benito (SBt), San Luis Obispo (SLO), Santa Barbara (SB), Santa Cruz (SCr)	50 HIGUERA ST SAN LUIS OBISPO, CA	50 HIGUERA ST SAN LUIS OBISPO CA 93401-5415
6	Fresno (Fre), Kern (Ker), Kings (Kin), Madera (Mad), Tulare (Tul)	1352 W. OLIVE AVE FRESNO, CA	PO BOX 12616 FRESNO CA 93728-2616
7	Los Angeles (LA), Ventura (Ven)	100 S. MAIN ST LOS ANGELES	100 S MAIN ST LOS ANGELES CA 90012
8	Riverside (Riv), San Bernardino (SBd)	464 W 4TH ST SAN BERNARDINO, CA	464 W 4TH ST SAN BERNARDINO CA 92401-1400
9	Inyo (Iny), Mono (Mno)	500 S MAIN ST BISHOP, CA	500 S MAIN ST BISHOP CA 93514-3423
10	Alpine (Alp), Amador (Ama), Calaveras (Cal), Mariposa (Mpa), Merced (Mer), San Joaquin (SJ), Stanislaus (Sta), Tuolumne (Tuo)	1976 E CHARTER WAY STOCKTON, CA	PO BOX 2048 STOCKTON CA 95201
11	Imperial (Imp), San Diego (SD)	4050 TAYLOR ST SAN DIEGO, CA	4050 TAYLOR ST SAN DIEGO CA 92110-2737
12	Orange (Ora)	3347 MICHELSON DR STE 100 IRVINE, CA	3347 MICHELSON DR STE 100 IRVINE CA 92612-0661

A project with work in District 1, 2, or 3 is a North Region project. For Districts 1, 2, and 3, interpret each reference to the district office as the North Region office. The North Region office address is the District 3 address.

1-6 WEB SITES, ADDRESSES, AND TELEPHONE NUMBERS

Web Sites, Addresses, and Telephone Numbers

Agency, Department Unit, or Reference	Web Site	Address	Telephone No.
Bid Document Unit		MSC 26 BID DOCUMENT UNIT DEPARTMENT OF TRANSPORTATION 1120 N ST RM 200 SACRAMENTO CA 95814-5605	
Department	www.dot.ca.gov		
Department of General Services, Office of Small Business and DVBE Services	www.pd.dgs.ca.gov/smbus/default.htm	OFFICE OF SMALL BUSINESS AND DVBE SERVICES DEPARTMENT OF GENERAL SERVICES 707 3RD ST WEST SACRAMENTO CA 95605-2811	(800) 559-5529 (916) 375-4940
Department of Industrial Relations	www.dir.ca.gov		
Department of Industrial Relations, Division of Apprenticeship Standards		455 GOLDEN GATE AVENUE SAN FRANCISCO, CA 94102	
Office Engineer		MSC 43 OFFICE ENGINEER DEPARTMENT OF TRANSPORTATION 1727 30TH ST SACRAMENTO CA 95816-7005	
Office Engineer–Verified Bid Results	http://www.dot.ca.gov/hq/esc/oe/awards/bidsum_html/6week_list.html.		
Offices of Structure Design, Documents Unit		MSC 9-4/4I DOCUMENTS UNIT OFFICES OF STRUCTURE DESIGN DEPARTMENT OF TRANSPORTATION 1801 30TH ST SACRAMENTO CA 95816-7006	(916) 227-0716
Publication Distribution Unit		PUBLICATION UNIT DEPARTMENT OF TRANSPORTATION 1900 ROYAL OAKS DRIVE SACRAMENTO CA 95815-3800	
Transportation Laboratory		MATERIALS AND ENGINEERING TESTING SERVICES AND GEOTECHNICAL SERVICES DEPARTMENT OF TRANSPORTATION 5900 FOLSOM BLVD SACRAMENTO CA 95819-4612	(916) 227-7000
Department's Pre-Qualified Products List	http://www.dot.ca.gov/hq/esc/approved_products_list		

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SECTION 2 PROPOSAL REQUIREMENTS AND CONDITIONS
(Issued 03-13-09)

Replace Section 2 with:

SECTION 2 BIDDING

2-1.01 GENERAL

Section 2, "Bidding," includes specifications related to bid eligibility and the bidding process.

2-1.02 BID INELIGIBILITY

A firm that has provided architectural or engineering services to the Department for this contract before bid submittal for this contract is prohibited from any of the following:

1. Submit a bid
2. Subcontract for a part of the work
3. Supply materials

2-1.03 BID DOCUMENTS

2-1.03A General

Standard Specifications and Standard Plans may be viewed at the Department's Web site and may be purchased at the Publication Distribution Unit.

Special provisions, Amendments to the Standard Specifications, and project plans may be viewed at:

1. Department's Web site
2. District office of the district in which the work is located
3. Districts 4 and 12 offices
4. Bid Document Unit

For an informal-bid contract, special provisions, Amendments to the Standard Specifications, and project plans may be viewed at:

1. Department's Web site
2. Bid Document Unit

Bid books, special provisions, Amendments to the Standard Specifications, and project plans may be obtained at the Bid Document Unit. To expedite orders, you may obtain these documents by faxing an order to (916) 654-7028. Fax orders must include credit card charge number, card expiration date, and authorizing signature.

2-1.03B Supplemental Project Information

Logs of test borings attached to the project plans are supplemental project information. The Department makes other supplemental information available as specified in the special provisions.

The Information Handout may be viewed and obtained at the Bid Document Unit.

If rock cores are available, you may view them by sending a request to Coreroom@dot.ca.gov.

Make your request at least 7 days before viewing. Include in your request:

1. District-County-Route
2. Bridge number
3. Contract number
4. Viewing date
5. Contact information, including telephone number.

If bridge as-built drawings are available:

1. For a project in District 1 through 6 or 10, you may request them from the Office of Structure Maintenance and Investigations, fax (916) 227-8357
2. For a project in District 7, 8, 9, 11, or 12, you may request them from the Office of Structure Maintenance and Investigations, fax (916) 227-8357, and are available at the Office of Structure Maintenance and Investigations, Los Angeles, CA, telephone (213) 897-0877

As-built drawings may not show existing dimensions and conditions. Where new construction dimensions are dependent on existing bridge dimensions, verify the field dimensions and adjust dimensions of the work to fit existing conditions.

2-1.04 SMALL BUSINESS ENTERPRISE GOAL

The Department has established an overall 25 percent small business participation goal. To determine if the goal is achieved, the Department is tracking small business participation on all contracts.

Contractors, subcontractors, suppliers, and service providers who qualify as small business are encouraged to apply for certification as a small business by submitting their application to the Department of General Services, Office of Small Business and DVBE Services.

2-1.05 DISADVANTAGED BUSINESS ENTERPRISES

Section 2-1.05, "Disadvantaged Business Enterprises," applies to a Federal-aid contract.

Under 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.

In order to ensure the Department achieves its federally mandated statewide overall DBE goal, the Department encourages the participation of DBEs as defined in 49 CFR 26.

2-1.06 DISABLED VETERAN BUSINESS ENTERPRISES

2-1.06A General

Section 2-1.06, "Disabled Veteran Business Enterprises," applies to a non-Federal-aid contract.

Take necessary and reasonable steps to ensure that DVBEs have opportunity to participate in the contract.

Comply with Mil & Vet Code § 999 et seq.

2-1.06B No Goal

Section 2-1.06B, "No Goal," applies if no DVBE goal is shown in the Notice to Bidders.

The Department encourages bidders to obtain DVBE participation in order to ensure the Department achieves its State-mandated overall DVBE goal.

2-1.06C Goal

Section 2-1.06C, "Goal," applies if a DVBE goal is shown in the Notice to Bidders.

Make work available to DVBEs and select work parts consistent with available DVBE subcontractors and suppliers.

Meet the goal shown or demonstrate that you made good faith efforts to meet this goal.

2-1.07 SMALL BUSINESS AND NON–SMALL BUSINESS SUBCONTRACTOR PREFERENCES

2-1.07A General

Section 2-1.07, "Small Business and Non–Small Business Subcontractor Preferences (Govt Code § 14835 et seq. and 2 CA Code of Regs § 1896 et seq.)," applies to a non-Federal-aid contract.

2-1.07B Small Business Preference

The Department allows a bidder certified as a small business by the Office of Small Business and DVBE Services, Department of General Services, a preference if:

1. You completed a Request for Small Business Preference or Non–Small Business Preference form
2. You attached a copy of your Office of Small Business and DVBE Services small business certification to the form
3. The low bidder is not certified as a small business

The bidder's signature on the Request for Small Business Preference or Non–Small Business Preference form certifies that the bidder is certified as a small business at the time and day of bid or has submitted a complete application to the Department of General Services. The complete application and any required substantiating documentation must be received by the Department of General Services by 5:00 p.m. on bid opening date.

The Department of General Services determines if a bidder was certified on bid opening date. The Department confirms the bidder's status as a small business before applying the small business preference.

The small business preference is a reduction for bid comparison in the total bid submitted by the small business subcontractor by the lesser of:

1. 5 percent of the verified total bid of the low bidder
2. $50,000

If this reduction results in the small business contractor becoming the low bidder, the contract award is based on the total bid, not the reduced bid.

2-1.07C Non–Small Business Subcontractor Preference

The Department allows a bidder not certified as a small business by the Office of Small Business and DVBE Services, Department of General Services, a preference if:

1. You completed a Request for Small Business Preference or Non–Small Business Preference form
2. The low bidder is not certified as a small business and has not requested preference
3. The Certified Small Business Listing for the Non–Small Business Preference form shows that you are subcontracting at least 25 percent to certified small businesses.

The non–small business subcontractor preference is a reduction for bid comparison in the total bid submitted by the non–small business contractor requesting the preference by the lesser of:

1. 5 percent of the verified total bid of the low bidder
2. $50,000

If this reduction results in the non–small business contractor becoming the low bidder or a tie with a non-small business low bidder not requesting the preference, the contract award is based on the total bid, not the reduced bid.

A non-small business bidder cannot displace a small business bidder.

2-1.08 DVBE INCENTIVE EVALUATION

Section 2-1.08, "DVBE Incentive Evaluation," applies to a non-Federal-aid contract.

The Department applies the Small Business and Non–Small Business preference during bid verification and proceeds with the following evaluation for DVBE incentive.

The Department grants a DVBE incentive to bidders who achieve a DVBE participation of 1 percent or greater of the value of their bid (Mil & Vet Code and Code of Regs § 1896.98 et seq).

The DVBE incentive is a reduction, for bid comparison only, in the total bid submitted by the lesser of:

1. Percentage of DVBE achievement, rounded to 2 decimal places, of the verified total bid of the low bidder
2. 5 percent of the verified total bid of the low bidder
3. $100,000

The Department applies DVBE incentive and determines if bid ranking changes.

A non-small business bidder cannot displace a small business bidder. However, a small business bidder with higher DVBE achievement can displace another small business bidder.

The Department proceeds with awarding the contract to the new low bidder and posts the new verified bid results at its Office Engineer Web site.

2-1.09 PREFERENCE HIERARCHY

Section 2-1.09, "Preference Hierarchy," applies to a non-Federal-aid contract.

If a small business bidder and a non–small business bidder request preferences and the reductions result in a tied bid, the Department awards the contract to the small business bidder.

If a DVBE bidder and a non-DVBE bidder request preferences and the reduction results in a tied bid, the Department awards the contract to the DVBE bidder.

2-1.10 CALIFORNIA COMPANIES

Section 2-1.10, "California Companies," applies to a non-Federal-aid contract.

Under Pub Cont Code § 6107, the Department gives preference to a "California company," as defined, for bid comparison purposes over a nonresident contractor from any state that gives or requires a preference to be given contractors from that state on its public entity construction contracts.

Complete a California Company Preference form.

The California company reciprocal preference amount is equal to the preference amount applied by the state of the nonresident contractor with the lowest responsive bid unless the California company is eligible for a small business preference or a non–small business subcontractor preference; in which case the preference amount is the greater of the two, but not both.

If the low bidder is not a California company and a California company's bid with reciprocal preference is equal to or less than the lowest bid, the Department awards the contract to the California company on the basis of its total bid, not the reduced bid used for comparison except as specified in Section 2-1.09, "Preference Hierarchy."

2-1.11 JOB SITE AND DOCUMENT EXAMINATION

Examine the job site and bid documents.

Bid submission is your acknowledgment that you have examined the job site and bid documents and are satisfied with:

1. General and local conditions to be encountered
2. Character, quality, and scope of work to be performed
3. Quantities of materials to be furnished
4. Character, quality, and quantity of surface and subsurface materials or obstacles
5. Requirements of the contract

2-1.12 BID DOCUMENT COMPLETION

2-1.12A General

Complete forms in the Bid book. Submit the forms with your bid except:

1. For the following 2 forms for non-federal-aid non-informal-bid contracts:

   1.1. Certified DVBE Summary and DVBE - Good Faith Efforts forms. You may submit these forms with your bid. If you do not and you are the low bidder or the 2nd or 3rd low bidder, submit them so that they are received at the Office Engineer no later than 4:00 p.m. on the 4th business day after bid opening. If a DVBE joint venture is used, submit the joint venture agreement with the Certified DVBE Summary form. Other bidders may be required to submit these forms if bid ranking changes.

   1.2. Certified Small Business Listing for the Non–Small Business Preference form. If you are applying for the non–small business subcontractor preference, you may submit this information with your bid. If you do not, submit it so that it is received at the Office Engineer no later than 4:00 p.m. on the 2nd business day after bid opening. The listed subcontractors and suppliers must be certified as a small business at the time and day of bid or must have submitted a complete application to the Department of General Services. The complete application and any required substantiating documentation must be received by the Department of General Services by 5:00 p.m. on bid opening date.

2. On the Subcontractor List you may either submit the percentage of each bid item subcontracted with your bid or fax the percentage to (916) 227-6282 within 24 hours after bid opening.

Except for the percentage of each bid item subcontracted, do not fax submittals.

The Department determines a bidder has made good faith efforts if it submits evidence that it:

1. Contacted the Office of Small Business and DVBE Services, Department of General Services

2. Advertised in trade media and media focusing on DVBEs unless time limits the Department imposes do not allow the advertising
3. Submitted invitations to bid to potential DVBE contractors
4. Considered available DVBEs

2-1.12B Bid Item List and Bid Comparison

Submit a bid based on the work item quantities the Department shows in the Bid Item List.

For a lump sum based bid, the Department compares bids based on the total price.

For a unit price based bid, the Department compares bids based on the sum of the item totals.

For a cost plus time based bid, the Department compares bids based on the sum of the item totals and the total bid for time.

2-1.12C Subcontractor List

In the Subcontractor List, list each subcontractor to perform work:

1. In an amount in excess of 1/2 of 1 percent of the total bid or $10,000, whichever is greater (Pub Cont Code § 4100 et seq.)
2. That is a 1st tier DVBE subcontractor regardless of percentage of the total bid

The Subcontractor List must show the name, address, and work portions to be performed by each subcontractor listed. Show work portion by bid item number, description, and percentage of each bid item subcontracted.

2-1.13 BIDDER'S SECURITY

Submit your bid with one of the following forms of bidder's security equal to at least 10 percent of the bid:

1. Cash
2. Cashier's check
3. Certified check
4. Bidder's bond signed by a surety insurer who is licensed in California

Make checks and bonds payable to the Department of Transportation.

If using a bidder's bond, you may use the form in the Bid book. If you do not use the form in the Bid book, use a form containing the same information.

2-1.14 BID SUBMITTAL

Submit your bid:

1. Under sealed cover
2. Marked as a bid
3. Identifying the contract number and the bid opening date

If an agent other than the authorized corporation officer or a partnership member signs the bid, file a Power of Attorney with the Department either before opening bids or with the bid. Otherwise, the bid may be nonresponsive.

2-1.15 BID WITHDRAWAL

An authorized agent may withdraw a bid before the bid opening date and time by submitting a written bid withdrawal request at the location where the bid was submitted. Withdrawing a bid does not prevent you from submitting a new bid.

After the bid opening time, you cannot withdraw a bid.

2-1.16 BID OPENING

The Department publicly opens and reads bids at the time and place described in the Notice to Bidders.

2-1.17 BID REJECTION

The Department may reject:

1. All bids

2. A nonresponsive bid

2-1.18 BID RELIEF

The Department may grant bid relief under Pub Cont Code § 5100 et seq. Submit any request for bid relief to the Office Engineer. For Relief of Bid Request form, go to:

http://www.dot.ca.gov/hq/esc/oe/contractor_info/relief.pdf

2-1.19 SUBMITTAL FAILURE HISTORY

The Department considers a bidder's past failure to submit documents required after bid opening in determining a bidder's responsibility.

2-1.20 BID RIGGING

Section 2-1.20, "Bid Rigging," applies to a Federal-aid contract.

The U.S. Department of Transportation (DOT) provides a toll-free hotline to report bid rigging activities. Use the hotline to report bid rigging, bidder collusion, and other fraudulent activities. The hotline number is (800) 424-9071. The service is available Monday through Friday between 11:00 a.m. and 8:00 p.m. and is confidential and anonymous. The hotline is part of the DOT's effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General.

^^

SECTION 3 AWARD AND EXECUTION OF CONTRACT
(Issued 11-07-08)

Replace Section 3 with:

SECTION 3 CONTRACT AWARD AND EXECUTION

3-1.01 SCOPE

Section 3, "Contract Award and Execution," includes specifications related to contract award and execution.

3-1.02 CONTRACT AWARD

Submit any bid protest to the Office Engineer.

If the Department awards the contract, the award is made to the lowest responsible bidder within the number of days shown in the following table:

Contract Award Period

Days (after bid opening)	Project Estimated Cost shown in the Notice to Bidders
30	< $200 million
60	≥ $200 million

The Department may extend the specified award period if the bidder agrees.

3-1.03 CONTRACT BONDS (PUB CONT CODE §§ 10221 AND 10222)

The successful bidder must furnish 2 bonds:

1. Payment bond to secure the claim payments of laborers, workers, mechanics, or materialmen providing goods, labor, or services under the contract. This bond must be equal to at least 100 percent of the total bid.
2. Performance bond to guarantee the faithful performance of the contract. This bond must be equal to at least 50 percent of the total bid.

The Department furnishes the successful bidder with bond forms.

3-1.04 CONTRACTOR LICENSE

For a Federal-aid contract, the Contractor must be properly licensed as a contractor (Pub Cont Code § 10164) from contract award through contract acceptance.

For a non-Federal-aid contract:

1. The Contractor must be properly licensed as a contractor from bid opening through contract acceptance (Bus & Prof Code § 7028.15)
2. Joint venture bidders must obtain a joint venture license before contract award (Bus & Prof Code § 7029.1)

3-1.05 INSURANCE POLICIES

The successful bidder must 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 CPA certifying the accountant has applied 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 under Labor Code § 3700.

3-1.06 SMALL BUSINESS PARTICIPATION REPORT

Complete and sign the Small Business (SB) Participation Report form included in the contract documents even if no small business participation is reported.

3-1.07 PAYEE DATA RECORD

Complete and sign the Payee Data Record form included in the contract documents.

3-1.08 CALTRANS BIDDER - DBE INFORMATION FORM

Section 3-1.08, "Caltrans Bidder - DBE Information Form," applies to a Federal-aid contract.

Complete and sign the Caltrans Bidder - DBE Information form included in the contract documents even if no DBE participation is reported.

Provide written confirmation from each DBE that the DBE is participating in the contract. A copy of a DBE's quote serves as written confirmation. If a DBE is participating as a joint venture partner, the Department encourages you to submit a copy of the joint venture agreement.

3-1.09 CONTRACT EXECUTION

The successful bidder must sign the contract.

Deliver to the Office Engineer:

1. Signed Contract form
2. Contract bonds
3. Documents identified in Section 3-1.05, "Insurance Policies"
4. Small Business Participation Report
5. Payee data record
6. For a Federal-aid contract, Caltrans Bidder - DBE Information form

For an informal-bid contract, the Office Engineer must receive these documents before the 5th business day after the bidder receives the contract. For all other contracts, the Office Engineer must receive these documents before the 10th business day after the bidder receives the contract.

The bidder's security may be forfeited for failure to execute the contract within the time specified (Pub Cont Code §§ 10181, 10182, and 10183).

The following is a copy of the Contract form:

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

CONTRACT

DES-OE-0103A (NEW 3/2008)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. _____

This contract is entered into between the State of California's Department of Transportation and the Contractor named below:

_____

CONTRACTOR'S NAME

The parties agree to comply with the terms of the following exhibits that are by this reference made a part of this contract.

Exhibit A - Bid book dated _____

Exhibit B - Notice to Bidders and Special Provisions dated _____

Exhibit C - Project Plans approved _____

Exhibit D - Standard Specifications dated _____

Exhibit E - Standard Plans dated _____

Exhibit F - Addenda

Exhibits A, B, C, and F are those exhibits identified with the same contract number as this contract.

This contract has been executed by the following parties:

CONTRACTOR

CONTRACTOR'S NAME *(if other than an individual, state whether a corporation, partnership, etc.)*

BY *(Authorized Signature)*	DATE SIGNED *(Do not type)*

PRINTED NAME AND TITLE OF PERSON SIGNING

FEDERAL EMPLOYER IDENTIFICATION NUMBER

DEPARTMENT OF TRANSPORTATION

BY *(Authorized Signature)*	DATE SIGNED *(Do not type)*

PRINTED NAME AND TITLE OF PERSON SIGNING

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

3-1.10 BIDDERS' SECURITIES

The Department keeps the securities of the 1st, 2nd, and 3rd low bidders until the contract has been executed. The other bidders' securities, other than bidders' bonds, are returned upon determination of the 1st, 2nd, and 3rd low bidders, and their bidders' bonds are of no further effect (Pub Cont Code § 10184).

^^

SECTION 4 SCOPE OF WORK
(Issued 05-01-09)

Add to Section 4-1.01:

Nothing in the specifications voids the Contractor's public safety responsibilities.

Add:

4-1.015 PROJECT DESCRIPTION

Construct the work described in the special provisions and on project plans and by the bid items. The special provisions, project plans, and bid item descriptions set forth the specifications that apply.

In Section 4-1.03A replace the 3rd paragraph with:

Where the protest concerning an approved contract change order relates to the adjustment of contract time for the completion of the work, the time to be allowed is determined as specified in Section 8-1.09, "Delays."

Add:

4-1.035 VALUE ENGINEERING

4-1.035A General

Reserved

4-1.035B Value Engineering Change Proposal

You may submit a VECP to reduce any of the following:

1. Total cost of construction
2. Construction activity duration
3. Traffic congestion

Before preparing a VECP, meet with the Engineer to discuss:

1. Proposal concept
2. Permit issues
3. Impact on other projects
4. Project impacts, including traffic, schedule, and later stages
5. Peer reviews
6. Overall proposal merits
7. Review times required by the Department and other agencies

The VECP must not impair the project's essential functions or characteristics, such as:

1. Service life
2. Operation economy
3. Maintenance ease
4. Desired appearance

5. Design and safety

The VECP must include:

1. Description of the contract specifications and drawing details for performing the work and the proposed changes.
2. Itemization of contract specifications and drawing details that would be changed.
3. Detailed cost estimate for performing the work under the existing contract and under the proposed change. Determine the estimates under Section 9-1.03, "Force Account Payment."
4. Deadline for the Engineer to decide on the changes.
5. Bid items affected and resulting quantity changes.

The Department is not required to consider a VECP. If a VECP is similar to a change in the plans or specifications being considered by the Department at the time the proposal is submitted or if the proposal is based on or similar to drawings or specifications adopted by the Department before Contract award, the Department does not accept the VECP and may make these changes without VECP payments.

Until the Department approves a change order incorporating the VECP or parts of it, continue to perform the work under the contract. If the Department does not approve a change order before the deadline stated in the VECP or other date you subsequently stated in writing, the VECP is rejected. The Department does not adjust time or payment for a rejected VECP.

The Department decides whether to accept a VECP and the estimated net construction-cost savings from adopting the VECP or parts of it.

The Department may require you to accept a share of the investigation cost as a condition of reviewing a VECP. After written acceptance, the Department considers the VECP and deducts the agreed cost.

If the Department accepts the VECP or parts of it, the Department issues a change order that:

1. Incorporates changes in the contract necessary to implement the VECP or the parts adopted
2. Includes the Department's acceptance conditions
3. States the estimated net construction-cost savings resulting from the VECP
4. Obligates the Department to pay you 50 percent of the estimated net savings

In determining the estimated net construction-cost savings, the Department excludes your VECP preparation cost and the Department's VECP investigation cost, including parts paid by you.

If a VECP providing for a reduction in working days is accepted by the Department, 50 percent of the reduction is deducted from contract time.

If a VECP providing for a reduction in traffic congestion or avoiding traffic congestion is accepted by the Department, the Department pays 60 percent of the estimated net savings in construction costs attributable to the VECP. Submit detailed traffic handling comparisons between the existing contract and the proposed change, including estimates of the traffic volumes and congestion.

The Department may apply an accepted VECP for general use on other contracts.

If an accepted VECP is adopted for general use, the Department pays only the contractor who first submitted the VECP and only to the contracts awarded to that contractor before the submission of the accepted VECP.

If the Department does not adopt a general-use VECP, an identical or similar submitted proposal is eligible for acceptance.

4-1.035C Value Analysis Workshop

Section 4-1.035C, "Value Analysis Workshop," applies to a non-building-work contract with a total bid of over $5 million.

You may request a value analysis workshop by submitting a request after contract approval.

The Department offers a value analysis workshop to:

1. Identify value enhancing opportunities
2. Consider changes to the contract that will reduce the total cost of construction, construction activity duration, or traffic congestion without impairing the essential functions specified for a VECP in Section 4-1.035B, "Value Engineering Change Proposal."

If the request is authorized, you and the Engineer:

1. Schedule a value analysis workshop
2. Select a facilitator and workshop site

3. Agree to other workshop administrative details

The workshop must be conducted under the methods described in the Department's Value Analysis Team Guide available at:

http://www.dot.ca.gov/hq/oppd/value/

The facilitator must be a certified value specialist as recognized by the Society of American Value Engineers.

The Department reimburses you for 1/2 of the workshop cost. The workshop cost is the sum of the workshop-facilitator cost and the workshop-site cost. The Department determines the workshop cost based on the facilitator and workshop-site invoice prices minus any available or offered discounts. The Department does not pay you for any other associated costs.

^^

SECTION 5 CONTROL OF WORK
(Issued 12-19-08)

Add:

5-1.005 GENERAL

Failure to comply with any specification part is a waiver of your right to an adjustment of time and payment related to that part.

After contract approval, submit documents and direct questions to the Engineer. Orders, approvals, authorizations, and requests to the Contractor are by the Engineer.

The Engineer furnishes the following in writing:

1. Approvals
2. Authorizations
3. Notifications
4. 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.

Add to 5-1.01:

Failure to enforce a contract provision does not waive enforcement of any contract provision.

Add:

5-1.012 PARTNERING

5-1.012A General

The Department strives to work cooperatively with all contractors; partnering is our way of doing business. The Department encourages project partnering among the project team, made up of significant contributors from the Department and the Contractor, and their invited stakeholders.

For a project with a total bid greater than $1 million, professionally facilitated project partnering is encouraged.

For a project with a total bid greater than $10 million, professionally facilitated project partnering is required.

In implementing project partnering, you and the Engineer manage the contract by:

1. Using early and regular communication with involved parties
2. Establishing and maintaining a relationship of shared trust, equity, and commitment
3. Identifying, quantifying, and supporting attainment of mutual goals
4. Developing strategies for using risk management concepts
5. Implementing timely communication and decision making
6. Resolving potential problems at the lowest possible level to avoid negative impacts
7. Holding periodic partnering meetings and workshops as appropriate to maintain partnering relationships and benefits throughout the life of the project
8. Establishing periodic joint evaluations of the partnering process and attainment of mutual goals

Partnering does not void any contract part.

The Department's "Field Guide to Partnering on Caltrans Construction Projects" current at the time of bid is available to the project team as reference. This guide provides structure, context, and clarity to the partnering process requirements. This guide is available at the Department's Partnering Program website:

http://www.dot.ca.gov/hq/construc/partnering.html

In implementing project partnering, the project team must:

1. Create a partnering charter that includes:

    1.1. Mutual goals, including core project goals and may also include project-specific goals and mutually supported individual goals.
    1.2. Partnering maintenance and close-out plan.
    1.3. Dispute resolution plan that includes a dispute resolution ladder and may also include use of facilitated dispute resolution sessions.
    1.4. Team commitment statement and signatures.

2. Participate in monthly partnering evaluation surveys to measure progress on mutual goals and may also measure short-term key issues as they arise.
3. Evaluate the partnering facilitator on Forms CEM-5501 and CEM-5502. The Engineer provides the evaluation forms to the project team and collects the results. The Department makes evaluation results available upon request. Facilitator evaluations must be completed:

    3.1. At the end of the initial partnering workshop on Form CEM-5501.
    3.2. At the end of the project close-out partnering workshop on Form CEM-5502.

4. Conduct a project close-out partnering workshop.
5. Document lessons learned before contract acceptance.

5-1.012B Partnering Facilitator, Workshops, and Monthly Evaluation Surveys

The Engineer sends you a written invitation to enter into a partnering relationship after contract approval. Respond within 15 days to accept the invitation and request the initial and additional partnering workshops. After the Engineer receives the request, you and the Engineer cooperatively:

1. Select a partnering facilitator that offers the service of a monthly partnering evaluation survey with a 5-point rating and agrees to follow the Department's "Partnering Facilitator Standards and Expectations" available at the Department's Partnering Program website
2. Schedule initial partnering workshop
3. Determine initial workshop site and duration
4. Agree to other workshop administrative details

Additional partnering workshops and sessions are encouraged throughout the life of the project as determined necessary by you and the Engineer, recommended quarterly.

5-1.012C Training in Partnering Skills Development

For a project with a total bid of $25 million or greater, training in partnering skills development is required.

For a project with a total bid between $10 million and $25 million, training in partnering skills is optional.

You and the Engineer cooperatively schedule the training session and select a professional trainer, training site, and 1 to 4 topics from the following list to be covered in the training:

1. Active Listening
2. Building Teams
3. Change Management
4. Communication
5. Conflict Resolution
6. Cultural Diversity
7. Dealing with Difficult People
8. Decision Making
9. Effective Escalation Ladders
10. Emotional Intelligence
11. Empathy
12. Ethics
13. Facilitation Skills
14. Leadership
15. Partnering Process and Concepts
16. Project Management
17. Project Organization
18. Problem Solving
19. Running Effective Meetings
20. Time Management
21. Win-Win Negotiation

Before the initial partnering workshop, the trainer conducts a 1-day training session in partnering skills development for the Contractor's and the Engineer's representatives. This training session must be a separate session from the initial partnering workshop and must be conducted locally. The training session must be consistent with the partnering principles under the Department's "Field Guide to Partnering on Caltrans Construction Projects."

Send at least 2 representatives to the training session. One of these must be your assigned representative as specified in Section 5-1.06, "Superintendence," of the Standard Specifications.

5-1.012D Payment

The Department pays you for:

1. 1/2 of partnering workshops and sessions based on facilitator and workshop site cost
2. 1/2 of monthly partnering evaluation survey service cost
3. Partnering skills development trainer and training site cost

The Department determines the costs based on invoice prices minus any available or offered discounts. The Department does not pay markups on these costs.

The Department does not pay for wages, travel expenses, or other costs associated with the partnering workshops and sessions, monthly partnering evaluation surveys, and training in partnering skills development.

Add:

5-1.015 RECORDS

5-1.015A General

Reserved

5-1.015B Record Retention

Retain project records from bid preparation through:

1. Final payment
2. Resolution of claims, if any

For at least 3 years after the later of these, retain cost records, including records of:

1. Bid preparation
2. Overhead
3. Payrolls
4. Payments to suppliers and subcontractors
5. Cost accounting

Maintain the records in an organized way in the original format, electronic and hard copy, conducive to professional review and audit.

5-1.015C Record Inspection, Copying, and Auditing

Make your records available for inspection, copying, and auditing by State representatives for the same time frame specified under Section 5-1.015B, "Record Retention." The records of subcontractors and suppliers must be made available for inspection, copying, and auditing by State representatives for the same period. Before contract acceptance, the State representative notifies the Contractor, subcontractor, or supplier 5 business 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.

5-1.015D Cost Accounting Records

Maintain cost accounting records for the project distinguishing between the following work cost categories:

1. Contract item work
2. Work character changes
3. Force account work
4. Extra work
5. Work performed under protests and claim notifications
6. Overhead
7. Subcontractors, suppliers, owner-operators, and professional services

Cost accounting records must include:

1. Final cost code lists and definitions
2. Itemization of the materials used and corresponding vendor's invoice copies
3. Direct cost of labor
4. Equipment rental charges
5. Workers' certified payrolls
6. Equipment:

    6.1. Size
    6.2. Type
    6.3. Identification number
    6.4. Hours operated

5-1.015E Extra Work Bills

Maintain separate records for force account costs.

Submit extra work bills using the Department's Internet extra work billing system.

The Contractor submitting and the Engineer approving an extra work bill using the Internet force account work billing system is the same as each party signing the report.

The Department provides billing system:

1. Training within 30 days of your written request
2. Accounts and user identification to your assigned representatives after a representative has received training

Each representative must maintain a unique password.

Replace Section 5-1.04 with:

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. Supplemental 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.

Add:

5-1.055 SUBCONTRACTING

5-1.055A General

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

If you violate Pub Cont Code § 4100 et seq., the Department may exercise the remedies provided under Pub Cont Code § 4110. The Department may refer the violation to the Contractors State License Board as provided under Pub Cont Code § 4111.

Except for a building-construction non-federal-aid contract, perform work equaling at least 30 percent of the value of the original total bid with your employees and with equipment owned or rented by you, with or without operators.

Each subcontract must comply with the contract.

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

Submit copies of subcontracts upon request.

Before subcontracted work starts, submit a Subcontracting Request form.

Do not use a debarred contractor; a current list of debarred contractors is available at the Department of Industrial Relations' Web site.

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

5-1.055B Disadvantaged Business Enterprises

Section 5-1.055B, "Disadvantaged Business Enterprises," applies to a Federal-aid contract.

Use each subcontractor as listed on the Subcontractor List form unless you receive authorization for a substitution.

The Department requests the Contractor to:

1. Notify the Engineer of any changes to its anticipated DBE participation
2. Provide this notification before starting the affected work

Maintain records including:

1. Name and business address of each 1st-tier subcontractor
2. Name and business address of each DBE subcontractor, DBE vendor, and DBE trucking company, regardless of tier
2. Date of payment and total amount paid to each business

If you are a DBE contractor, include the date of work performed by your own forces and the corresponding value of the work.

Before the 15th of each month, submit a Monthly DBE Trucking Verification form.

For a DBE that leases trucks from a non-DBE, count only the fee or commission the DBE receives as a result of the lease arrangement.

If a DBE subcontractor is decertified before completing subcontracted work, the subcontractor must notify you in writing of the decertification date. If a subcontractor becomes a certified DBE before completing subcontracted work, the subcontractor must notify you in writing of the certification date. Submit the notifications. On contract work completion, complete a Disadvantaged Business Enterprises (DBE) Certification Status Change form. Submit the form within 90 days of contract acceptance.

Upon contract work completion, complete a Final Report – Utilization of Disadvantaged Business Enterprises (DBE), First-Tier Subcontractors form. Submit it within 90 days of contract acceptance. The Department withholds $10,000 until the form is submitted. The Department releases the withhold upon submission of the completed form.

5-1.055C Disabled Veteran Business Enterprises

Section 5-1.055C, "Disabled Veteran Business Enterprises," applies to a non-Federal-aid contract.

If a DVBE goal is shown in the Notice to Bidders:

1. Use each DVBE as shown on the Certified DVBE Summary form unless you receive authorization for a substitution
2. The requirement that DVBEs be certified by the bid opening date does not apply to DVBE substitutions after contract award
3. Maintain records of subcontracts made with certified DVBEs. Include in the records:

    3.1. Name and business address of each business
    3.2. Total amount paid to each business

4. For the purpose of determining compliance with Pub Cont Code § 10115 et seq.:

    4.1. Provide the Department relevant information requested
    4.2. Upon reasonable notice and during normal business hours, permit access to its premises for the purpose of:

        4.2.1. Interviewing employees
        4.2.2. Inspecting and copying books, records, accounts and other material that may be relevant to a matter under investigation

If no DVBE goal is shown in the Notice to Bidders and if you obtain DVBE participation, submit the participating DVBE names and value of work or supplies supplied by each DVBE transaction upon contract completion.

5-1.055D Non–Small Businesses

Section 5-1.055D, "Non–Small Businesses," applies to a non-Federal-aid contract.

Use each subcontractor as shown on the Certified Small Business Listing for the Non–Small Business Preference form unless you receive authorization for a substitution.

The requirement that small businesses be certified by the bid opening date does not apply to small business substitutions after contract award.

Maintain records of subcontracts made with certified small business subcontractors and records of materials purchased from certified small business suppliers. Include in the records:

1. Name and business address of each business
2. Total amount paid to each business

For the purpose of determining compliance with 2 CA Code of Regs § 1896 et seq.:

1. Provide the Department relevant information requested.
2. Upon reasonable notice and during normal business hours, permit access to its premises for the purpose of:

    2.1. Interviewing employees
    2.2. Inspecting and copying books, records, accounts and other material that may be relevant to a matter under investigation

Replace Section 5-1.07 with:

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.

Replace Section 5-1.116 with:

5-1.116 DIFFERING SITE CONDITIONS (23 CFR 635.109)

5-1.116A Contractor's Notification

Promptly notify the Engineer if you find either of the following:

1. Physical conditions differing materially from either of the following:

    1.1. Contract documents
    1.2. Job site examination

2. Physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract

Include details explaining the information you relied on and the material differences you discovered.

If you fail to notify the Engineer promptly, you waive the differing site condition claim for the period between your discovery of the differing site condition and your notification to the Engineer.

If you disturb the site after discovery and before the Engineer's investigation, you waive the differing site condition claim.

5-1.116B Engineer's Investigation and Decision

Upon your notification, the Engineer investigates job site conditions and:

1. Notifies you whether to resume affected work
2. Decides whether the condition differs materially and is cause for an adjustment of time, payment, or both

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 2-1.11, "Job Site and Document Examination."

Promptly submit supplementary information when obtained.

Replace Section 5-1.14 with:

5-1.14 COST REDUCTION INCENTIVE

Comply with Section 4-1.035B, "Value Engineering Change Proposal."

Add:

5-1.15 DISPUTE RESOLUTION

5-1.15A General

Section 5-1.15, "Dispute Resolution," applies to a contract with 100 or more working days.

In the Dispute Resolution Advisor Agreement and in the Dispute Review Board Agreement, interpret a reference to the special provisions as a reference to the Amendments to the Standard Specifications. In the Dispute Review Board Agreement, replace "Proposal and Contract" with "Bid book." Where the section title does not match the section number for a reference, refer to the referenced title.

5-1.15B Dispute Resolution Advisor

Section 5-1.15B, "Dispute Resolution Advisor," applies to a contract from $3 million to $10 million.

A dispute resolution advisor, hereinafter referred to as "DRA", is chosen by the Department and the Contractor to assist in the resolution of disputes. The DRA is a part of the contract administrative claims 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. The DRA shall not serve as a substitute for filing a protest or a notice of potential claim.

The DRA shall be established by the Department and the Contractor within 30 days of contract approval.

The Department and the Contractor shall each propose 3 potential DRA candidates. Each potential candidate shall provide the Department and the Contractor with their disclosure statement. The disclosure statement shall include a resume of the potential candidate's experience and a declaration statement describing past, present, anticipated, and planned relationships with all parties involved in this contract.

The Department and the Contractor shall select one of the 6 nominees to be the DRA. If the Department and the Contractor cannot agree on one candidate, the Department and the Contractor shall each choose one of the 3 nominated by the other. The final selection of the DRA will be decided by a coin toss between the two candidates.

The Department and the Contractor shall complete and adhere to the Dispute Resolution Advisor Agreement. No DRA meeting shall take place until the Dispute Resolution Advisor Agreement has been signed by all parties, unless all parties agree to sign it at the first meeting.

If DRA needs outside technical services, technical services shall be preapproved by both the Department and the Contractor.

DRA recommendations are nonbinding.

The Contractor shall not use the DRA for disputes between subcontractors or suppliers that have no grounds for a lawsuit against the Department.

DRA replacement is selected in the same manner as the original selection. The appointment of a replacement DRA will begin promptly upon determination of the need for replacement. The Dispute Resolution Advisor Agreement shall be amended to reflect the change of the DRA.

Failure of the Contractor to participate in selecting DRA will result in the withhold of 25 percent of the estimated value of all work performed during each estimate period that the Contractor fails to comply. DRA withholds will be released for

payment on the next monthly progress payment following the date that the Contractor has provided assistance in choosing the DRA and no interest will be due the Contractor.

The State and the Contractor shall bear the costs and expenses of the DRA equally.

The DRA shall be compensated at an agreed rate of $1,500 per day for time spent per meeting either at the start of the project or for a dispute. A member serving on more than one State DRA or Dispute Review Board, regardless the number of meetings per day shall not be paid more than the agreed rate per day. The agreed rate 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 DRA is at an authorized DRA meeting.

No additional compensation will be made for time spent by the DRA to review and research activities outside the official DRA meetings unless that time, such as time spent evaluating and preparing recommendations on specific issues presented to the DRA, has been specifically agreed to in advance by the State and Contractor. Time away from the project that has been specifically agreed to in advance by the Department and the Contractor 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.

The State will provide conference facilities for DRA meetings at no cost to the Contractor.

The Contractor shall make direct payments to the DRA for participation in authorized meetings and approved hourly rate charges from invoices submitted.

The State will reimburse the Contractor for the State's share of the costs.

There will be no markups applied to expenses associated with the DRA, either by the DRA or by the Contractor when requesting payment of the State's share of DRA expenses. Regardless of the DRA recommendation, neither party will be entitled to reimbursement of DRA costs from the other party.

The Contractor shall submit extra work bills and include invoices with original supporting documents for reimbursement of the State's share.

The cost of technical services will be borne equally by the State and Contractor. There will be no markups for these costs.

A copy of the "Dispute Resolution Advisor Agreement" to be executed by the Contractor, State and the DRA is as follows:

Form CEM 6206 Rev (04-06-07)

DISPUTE RESOLUTION ADVISOR AGREEMENT

_____
(Contract Identification)

Contract No. _____

THIS DISPUTE RESOLUTION ADVISOR AGREEMENT, hereinafter called "AGREEMENT", made and entered into this _____ day of _____, _____, between the State of California, acting through the California Department of Transportation and the Director of Transportation, hereinafter called the "STATE," _____ hereinafter called the "CONTRACTOR," and _____, the Dispute Resolution Advisor, hereinafter called the "DRA." .

WITNESSETH, that

WHEREAS, the STATE 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 DRA to assist in resolving disputes; and

WHEREAS, the DRA is composed of one person, chosen by the CONTRACTOR and the STATE;

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

SECTION I DESCRIPTION OF WORK

To assist in the timely resolution of disputes between the parties, the contract provides for the establishment and the operation of the DRA. The DRA is to fairly and impartially consider disputes placed before it and provide recommendations for resolution of these disputes to the parties. The DRA shall provide recommendations based on the facts related to the dispute, the contract and applicable laws and regulations. The DRA shall perform the services necessary to participate in the DRA's actions as designated in Section III, Scope of Work.

SECTION II DRA QUALIFICATIONS

DRA shall be knowledgeable in the type of construction and contract documents anticipated by the contract and shall have completed training through the Dispute Review Board Foundation. In addition, it is desirable for the DRA to have served on several State Dispute Review Boards (DRB).

No DRA shall have prior direct involvement in this contract. No DRA shall have a financial interest in this contract or parties thereto, including but not limited to the CONTRACTOR, subcontractors, suppliers, consultants, and legal and business services, within a period 6 months prior to award and during this contract. Exceptions to above are compensation for services on this or other DRAs and DRBs or retirement payments or pensions received from a party that are not tied to, dependent on or affected by the net worth of the party.

DRA shall fully disclose all direct or indirect professional or personal relationships with all key members of the contract.

SECTION III SCOPE OF WORK

The Scope of Work of the DRA includes, but is not limited to, the following:

A. PROCEDURES

The DRA shall meet with the parties at the start of the project to establish procedures 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. The DRA established procedures shall only be implemented upon approval by the parties. Subsequent meetings shall be held only to hear disputes between the parties.

The DRA shall not meet with, or discuss contract issues with individual parties.

State shall provide the DRA with the contract and all written correspondence regarding the dispute between the parties and, if available, the Contractor's supplemental notice of potential claim, and the Engineer's response to the supplemental notice of potential claim.

The parties shall not call the DRA who served on this contract as a witness in arbitration proceedings, which may arise from this contract.

The DRA shall have no claim against the STATE or the CONTRACTOR, or both, from claimed harm arising out of the parties' evaluations of the DRA's opinions.

B. DISPUTE MEETING

The term "dispute meeting" as used in this subsection shall refer to both the informal and traditional dispute meeting processes, unless otherwise noted.

If the CONTRACTOR requests a dispute meeting with the DRA, the Contractor must simultaneously notify the STATE. Upon being notified of the need for a dispute meeting, the DRA shall review and consider the dispute. The DRA shall determine the time and location of the dispute meeting with due consideration for the needs and preferences of the parties, while recognizing the importance of a speedy resolution to the dispute.

Dispute meetings shall be conducted at any location that would be convenient and provide required facilities and access to necessary documentation.

Only the STATE's Resident Engineer or Area Construction Engineer and the CONTRACTOR's or subcontractor's, if the dispute involves a subcontractor, Superintendent or Project Manager may present information at a dispute meeting. 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. The exception to this is technical services, as described below:

> The DRA, with approval of the parties, 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 two parties as specified in an approved contract change order. The CONTRACTOR shall not be entitled to markups for the payments made for these services.

At the dispute meeting the DRA may ask questions, seek clarification, and request further clarification of data presented by either of the parties as may be necessary to assist in making a fully informed recommendation. However, the DRA shall

refrain from expressing opinions on the merits of statements on matters under dispute during the parties' presentations. Each party will be given ample time to fully present its position, make rebuttals, provide relevant documents, and respond to DRA questions and requests.

There shall be no testimony under oath or cross-examination, during DRA dispute meetings. 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 DRA in conformance with the rules and regulations established at the first meeting between the DRA and parties. These established rules and regulations need not comply with prescribed legal laws of evidence.

Failure to attend a dispute meeting by either of the parties shall be conclusively considered by the DRA as indication that the non-attending party considers all written documents and correspondence submitted 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 at the meeting until all aspects of the dispute are thoroughly covered.

1. TRADITIONAL DISPUTE MEETING:

The following procedure shall be used for the traditional dispute meeting:

a. Within 5 days, after receiving the STATE's written response to the CONTRACTOR's supplemental notice of potential claim, the CONTRACTOR shall refer the dispute to the DRA, if the CONTRACTOR wishes to further pursue the dispute. The CONTRACTOR shall make the referral in writing to the DRA, simultaneously copied to the STATE. The written dispute referral shall describe the disputed matter in individual discrete segments, so that it will be clear to both parties and the DRA 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.

b. The parties shall each be afforded an opportunity to be present and to be heard by the DRA, and to offer evidence. Either party furnishing written evidence or documentation to the DRA must furnish copies of such information to the other party a minimum of 10 days prior to the date the DRA is scheduled to convene the meeting for the dispute. Either party shall produce such additional evidence as the DRA 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 DRA. The DRA shall not consider evidence not furnished in conformance with the terms specified herein.

c. Upon receipt by the DRA of a written referral of a dispute, the DRA shall convene to review and consider the dispute. The dispute meeting shall be held no later than 25 days after receipt of the written referral unless otherwise agreed to by all parties.

d. The DRA shall furnish a written report to both parties. The DRA may request clarifying information of either party within 5 days after the DRA dispute meeting. Requested information shall be submitted to the DRA within 5 days of the DRA request. The DRA shall complete its report and submit it to the parties within 10 days of the DRA dispute meeting, except that time extensions may be granted at the request of the DRA with the written concurrence of both parties. The report shall summarize the facts considered, the contract language, law or regulation viewed by the DRA as pertinent to the dispute, and the DRA's interpretation and philosophy in arriving at its conclusions and recommendations and, if appropriate, recommends guidelines for determining compensation. The DRA's written opinion shall stand on its own, without attachments or appendices.

e. Within 10 days after receiving the DRA's report, both parties shall respond to the DRA 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 DRA'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 DRA recommendation. Immediately after responses have been received from both parties, the DRA shall provide copies of both responses to the parties simultaneously. Either party may request clarification of elements of the DRA's report from the DRA prior to responding to the report. The DRA shall consider any clarification request only if submitted within 5 days of receipt of the DRA's report, and if submitted simultaneously in writing to both the DRA and the other party. Each party may submit only one request for clarification for any individual DRA report. The DRA shall respond, in writing, to requests for clarification within 5 days of receipt of such requests.

f. Either party may seek a reconsideration of the DRA's recommendation. The DRA shall only grant reconsideration based upon submission of new evidence and if the request is submitted within the 10 day time limit specified for response to the DRA's written report. Each party may submit only one request for reconsideration regarding an individual DRA recommendation.

g. If the parties are able to settle their dispute with the aid of the DRA's report, the STATE and CONTRACTOR shall promptly accept and implement the settlement of the parties. If the parties cannot agree on compensation

within 30 days of the acceptance by both parties of the settlement, either party may request the DRA to make a recommendation regarding compensation.

2. INFORMAL DISPUTE MEETING

An informal dispute meeting shall be convened, only if, the parties and the DRA agree that this dispute resolution process is appropriate to settle the dispute.
The following procedure shall be used for the informal dispute meeting:

a. The parties shall furnish the DRA with one copy of pertinent documents requested by the DRA that are or may become necessary for the DRA to perform its function. The party furnishing documents shall furnish such documents to the other party at the same time the document is provided to the DRA.
b. After the dispute meeting has concluded; the DRA shall deliberate in private the same day, until a response to the parties is reached or as otherwise agreed to by the parties.
c. The DRA then verbally delivers its recommendation with findings to the parties.
d. After the recommendation is presented, the parties may ask for clarifications.
e. Occasionally the DRA on complex issues may be unable to formulate a recommendation based on the information given at a dispute meeting. However, the DRA may provide the parties with advice on strengths and weaknesses of their prospective positions, in the hope of the parties reaching settlement.
f. If the parties are able to settle their dispute with the aid of the DRA's opinion, the STATE and CONTRACTOR shall promptly accept and implement the settlement of the parties.
g. The DRA will not be bound by its oral recommendation in the event that a dispute is later heard by the DRA in a traditional dispute meeting.

Unless the dispute is settled, use of the informal dispute meeting does not relive the parties of their responsibilities under Section 5-1.12, "Dispute Resolution Advisor," of the Special Provisions or Subsection, "Traditional Dispute Meeting," of this AGREEMENT. There will be no extension of time allowed for the process to permit the use of the informal dispute meeting, unless otherwise agreed to by the parties.

SECTION IV TIME FOR BEGINNING AND COMPLETION

Once established, the DRA shall be in operation until the day the Director accepts the contract. The DRA shall not begin work under the terms of this AGREEMENT until authorized in writing by the STATE or as agreed to by the parties.

SECTION V PAYMENT

DRA shall be compensated at an agreed rate of $1,500 per day for time spent per meeting, either at the start of the project or for a dispute. A member serving on more than one State DRA or DRB, regardless the number of meetings per day, shall not be paid more than the agreed rate per day. The agreed rate shall be considered full compensation for onsite time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof that the DRA is at an authorized DRA meeting. No additional compensation will be made for time spent by DRA to review and research activities outside the official DRA meetings unless that time, (such as time spent evaluating and preparing recommendations on specific issues presented to the DRA), has been specifically agreed to in advance by the parties. 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. The State will provide administrative services such as conference facilities to the DRA.

A. PAYMENT PROCESSING

CONTRACTOR shall make direct payments to DRA for their participation in authorized meetings and approved hourly rate charges, from invoices submitted by the DRA, and technical services.

DRA 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 DRA until the amount and extent of those fees are approved by the STATE and CONTRACTOR.

B. INSPECTION OF COSTS RECORDS

DRA and the CONTRACTOR shall keep available for inspection by representatives of the STATE 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 VI ASSIGNMENT OF TASKS OF WORK

DRA shall not assign the work of this AGREEMENT.

SECTION VII TERMINATION OF A DRA MEMBER

DRA may resign after providing not less than 15 days written notice of the resignation to the STATE and CONTRACTOR. The DRA may be terminated, by either party, for failing to fully comply at all times with all required employment or financial disclosure conditions of DRA membership in conformance with the terms of the contract and this AGREEMENT. Each party shall document the need for replacement and substantiate the replacement request in writing to the other party and the DRA.

SECTION VIII LEGAL RELATIONS

The parties hereto mutually understand and agree that the DRA in the performance of duties 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 STATE, the parties shall jointly indemnify and hold harmless the DRA 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 DRA.

SECTION IX CONFIDENTIALITY

The parties hereto mutually understand and agree that all documents and records provided by the parties in reference to issues brought before the DRA, which documents and records are marked "Confidential - for use by the DRA only," shall be kept in confidence and used only for the purpose of resolution of subject disputes, and for assisting in development of DRA 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 this AGREEMENT. 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 DRA. However, the parties understand that such documents may be subsequently discoverable and admissible in court or arbitration proceedings unless a protective order has been obtained by the party seeking further confidentiality.

SECTION X DISPUTES

Disputes between the parties arising out of the work or other terms of this AGREEMENT that 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 DRA and the parties that cannot be resolved by negotiation and mutual concurrence shall be resolved in the appropriate forum.

SECTION XI VENUE, APPLICABLE LAW, AND PERSONAL JURISDICTION

In the event that any party, including the DRA, 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 XII FEDERAL REVIEW AND REQUIREMENTS

On Federal-Aid contracts, the Federal Highway Administration shall have the right to review the work of the DRA in progress, except for private meetings or deliberations of the DRA.

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

SECTION XIII CERTIFICATION OF CONTRACTOR, DRA, AND STATE

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

DRA

By: _____

Title: _____

CONTRACTOR	CALIFORNIA STATE DEPARTMENT OF TRANSPORTATION
By: _____	By: _____
Title: _____	Title: _____

5-1.15C Dispute Review Board

Section 5-1.15C, "Dispute Review Board," applies to a contract over $10 million.

5-1.15C(1) 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 State 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 State and Contractor on matters related to the work and other subjects considered by the State 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 State 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.

5-1.15C(2) Selection Process, Disclosure and Appointments

The DRB shall consist of one member selected by the State and approved by the Contractor, one member selected by the Contractor and approved by the State, and a third member selected by the first 2 members and approved by both the State 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 State 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 must 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 State 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 State 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 State 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 State 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 State to be sufficiently insignificant to render the prospective member acceptable to the State.
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 State 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 State, 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 State 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.

5-1.15C(3) Compensation

The State and the Contractor shall bear the costs and expenses of the DRB equally. Each DRB member shall be compensated at an agreed rate of $1,200 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 State 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 $125 per hour. The agreed amount of $125 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 State 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 State will reimburse the Contractor for the State'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 State's share of DRB expenses. Regardless of the DRB recommendation, neither party shall be entitled to reimbursement of DRB costs from the other party.

5-1.15C(4) 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 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.
E. The State 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.

5-1.15C(5) 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 State, 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 State 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 State 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 State 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 State and the Contractor are able to resolve their dispute with the aid of the DRB's report, the State 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 State 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 State 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 State or the Contractor, or both, from claimed harm arising out of the parties' evaluations of the DRB's report.

5-1.15C(6) 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 State 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.

5-1.15C(7) Dispute Review Board Agreement

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

Form 6202 Rev (09/01/02)

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 State of California, acting through the California Department of Transportation and the Director of Transportation, hereinafter called the "STATE," _____ _____ hereinafter called the "CONTRACTOR," and the Dispute Review Board, hereinafter called the "DRB" consisting of the following members:

_____ ,
(Contractor Appointee)

_____ ,
(State Appointee)

and _____
(Third Person)

WITNESSETH, that

WHEREAS, the STATE 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 STATE, 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 STATE, 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 STATE'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 STATE's representative of the status of the work as the STATE views it.
6. A brief description by the CONTRACTOR's or STATE's representative of potential claims or disputes which have surfaced since the last meeting.
7. A summary by the STATE's representative, the CONTRACTOR's representative, or the DRB of the status of past disputes and potential claims.

The STATE'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 DRB Coordinator, Division of Construction, MS 44, P.O. Box 942874, Sacramento, CA 94274.

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 STATE, in conformance with the terms outlined in the special provisions.

SECTION IV STATE RESPONSIBILITIES

The STATE will furnish the following services and items:

A. CONTRACT RELATED DOCUMENTS

The STATE 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 STATE 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 STATE, 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 STATE.

SECTION VI PAYMENT

A. ALL INCLUSIVE RATE PAYMENT

The STATE and the CONTRACTOR shall bear the costs and expenses of the DRB equally. Each DRB member shall be compensated at an agreed rate of $1,200 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 STATE 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 $125 per hour. The agreed amount of $125 per hour shall include all incidentals including expenses for telephone, fax, and computer services. Members serving on more than one DRB involving the State, 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 STATE 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 STATE 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 STATE 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 STATE's share of cost from the STATE. 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 STATE 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 STATE 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.

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 STATE, 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.

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.

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

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

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

DRB MEMBER

By: _____

Title: _____

DRB MEMBER

By: _____

Title :_____

DRB MEMBER

By :_____

Title :_____

CONTRACTOR

By: _____

Title: _____

CALIFORNIA STATE DEPARTMENT
OF TRANSPORTATION

By: _____

Title: _____

Add:

5-1.16–5-17 (BLANK)

Add:

5-1.18 PROPERTY AND FACILITY PRESERVATION

5-1.18A General

Preserve property and facilities, including:

1. Adjacent property
2. Department's instrumentation
3. ESAs
4. Lands administered by other agencies
5. Railroads and railroad equipment
6. Roadside vegetation not to be removed
7. Utilities
8. Waterways

Immediately report damage to the Engineer.

If you cause damage, you are responsible.

Install sheet piling, cribbing, bulkheads, shores, or other supports necessary to support existing facilities or support material carrying the facilities.

Dispose of temporary facilities when they are no longer needed.

If you damage plants not to be removed:

1. Dispose of them outside the right of way unless the Engineer allows you to reduce them to chips and spread the chips within the highway at locations designated by the Engineer
2. Replace them

Replace plants with plants of the same species.

Replace trees with 24-inch-box trees.

Replace shrubs with No. 15 container shrubs.

Replace ground cover plants with plants from flats. Replace Carpobrutus ground cover plants with plants from cuttings. Plant ground cover plants 1 foot on center.

If a plant establishment period is specified, replace plants before the start of the plant establishment period; otherwise, replace plants at least 30 days before Contract acceptance.

Water each plant immediately after planting and saturate the backfill soil around and below the roots or ball of earth around the roots of each plant. Water as necessary to maintain plants in a healthy condition until Contract acceptance.

The Department may make a temporary repair to restore service to a damaged facility.

If working on or adjacent to railroad property, do not interfere with railroad operations.

For an excavation on or affecting railroad property, submit work plans showing the system to be used to protect railroad facilities. Allow 65 days for the Engineer's review of the plans. Do not perform work based on the plans until the Engineer notifies you they are accepted.

5-1.18B Nonhighway Facilities (Including Utilities)

The Department may rearrange a nonhighway facility during the Contract. Rearrangement of a nonhighway facility includes installation, relocation, alteration, or removal of the facility.The Department may authorize facility owners and their agents to enter the highway to perform rearrangement work for their facilities or to make connections or repairs to their property. Coordinate activities to avoid delays.

Notify the Engineer at least 3 business days before you contact the regional notification center under Govt Code § 4216 et seq. Failure to contact the notification center prohibits excavation.

Before starting work that could damage or interfere with underground infrastructure, locate the infrastructure described in the Contract, including laterals and other appurtenances, and determine the presence of other underground infrastructure inferred from visible facilities such as buildings, meters, or junction boxes.

Notify the Engineer if the infrastructure described in the Contract cannot be found. If after giving the notice, you find the infrastructure in a substantially different location than described, finding the infrastructure is paid for as extra work as specified in Section 4-1.03D, "Extra Work."

Underground infrastructure described in the Contract may be in different locations than described, and additional infrastructure may exist.

Upon discovering an underground main or trunk line not described in the Contract, immediately notify the Engineer and the infrastructure owner. The Engineer orders the locating and protecting of the infrastructure. The locating and protecting is paid for as extra work as specified in Section 4-1.03D, "Extra Work." If ordered, repair infrastructure damage. If the damage is not due to your negligence, the repair is paid for as extra work as specified in Section 4-1.03D, "Extra Work."

If necessary underground infrastructure rearrangement is not described in the Contract, the Engineer may order you to perform the work. The rearrangement is paid for as extra work as specified in Section 4-1.03D, "Extra Work."

If you want infrastructure rearrangement different from that described in the Contract:

1. Notify the Engineer
2. Make an arrangement with the infrastructure owner
3. Obtain authorization for the rearrangement
4. The Department does not adjust time or payment for rearrangement different from the Contract
5. Pay the infrastructure owner any additional cost

Immediately notify the Engineer of a delay due to the presence of main line underground infrastructure not described in the Contract or in a substantially different location or due to rearrangement different from the Contract. The Department pays for one of these delays in the same manner as specified for a right of way delay in Section 8-1.09, "Right of Way Delays."

^^

SECTION 6 CONTROL OF MATERIALS
(Issued 05-01-09)

Replace Section 6-1.05 with:

6-1.05 SPECIFIC BRAND OR TRADE NAME AND SUBSTITUTION

A reference to a specific brand or trade name establishes a quality standard and is not intended to limit competition. You may use a product that is equal to or better than the specified brand or trade name if approved.

Submit a substitution request within a time period that:

1. Follows Contract award
2. Allows 30 days for review
3. Causes no delay

Include substantiating data with the substitution request that proves the substitution:

1. Is of equal or better quality and suitability
2. Causes no delay in product delivery and installation

Add:

6-1.075 GUARANTEE

Guarantee the work remains free from substantial defects for 1 year after contract acceptance except for work parts for which you were relieved of maintenance and protection. Guarantee each of these relieved work parts for 1 year after the relief date.

The guarantee excludes damage or displacement caused by an event outside your control including:

1. Normal wear and tear
2. Improper operation
3. Insufficient maintenance
4. Abuse
5. Unauthorized change
6. Act of God

During the guarantee period, repair or replace each work portion having a substantial defect.

The Department does not pay for corrective work.

During corrective work activities, provide insurance coverage specified for coverage before contract acceptance.

The contract bonds must be in full force and effect until the later of:

1. Expiration of guarantee period
2. Completion of corrective work

If a warranty specification conflicts with Section 6-1.075, "Guarantee," comply with the warranty specification.

During the guarantee period, the Engineer monitors the completed work. If the Engineer finds work having a substantial defect, the Engineer lists work parts and furnishes you the list.

Within 10 days of receipt of the list, submit for authorization a detailed plan for correcting the work. Include a schedule that includes:

1. Start and completion dates
2. List of labor, equipment, materials, and any special services you plan to use
3. Work related to the corrective work, including traffic control and temporary and permanent pavement markings

The Engineer notifies you when the plan is authorized. Start corrective work and related work within 15 days of notice.

If the Engineer determines corrective work is urgently required to prevent injury or property damage:

1. The Engineer furnishes you a request to start emergency repair work and a list of parts requiring corrective work
2. Mobilize within 24 hours and start work
3. Submit a corrective work plan within 5 days of starting emergency repair work

If you fail to perform work as specified, the Department may perform the work and bill you.

In Section 6-1.08 delete the 2nd paragraph.

Add:

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.

Add:

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.

In Section 6-2.01 delete the 4th paragraph.

In Section 6-2.01 replace the 7th paragraph with:

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.

In Section 6-2.01 delete the 8th paragraph.

In Section 6-2.02 delete the 3rd paragraph.

In Section 6-2.02 in the 7th paragraph, replace the 2nd sentence with:

The Department deducts the charges for the removed material.

In Section 6-2.03 in the 3rd paragraph, replace the 5th sentence with:

No allowance or additional compensation will be made for lost time or for delay in completing the work due to moving the Contractor's plant from the designated mandatory source to the alternative mandatory source, other than a time adjustment as specified in Section 8-1.09, "Delays."

In Section 6-3.01 delete the 4th paragraph.

In Section 6-3.01 in the 6th paragraph, delete the 1st sentence.

In Section 6-3.01 add:

As used in Section 6-3.01, "Testing," tests are tests to assure the quality and to determine the acceptability of the work. The Department deducts costs of testing work found to be noncompliant.

^^

SECTION 7 LEGAL RELATIONS AND RESPONSIBILITY
(Issued 05-01-09)

Replace Section 7-1.01 with:

7-1.01 LAWS TO BE OBSERVED

Comply with laws, regulations, orders, decrees, and PLACs 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 PLAC 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 PLAC.

In Section 7-1.01A replace the 1st clause with:

Work on the job site must comply with Labor Code §§ 1727 and 1770-1815 and 8 CA Code of Regs § 16000 et seq. Work includes roadside production and processing of materials.

In Section 7-1.01A(2) in the 1st paragraph, replace item 3 with:

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.

In Section 7-1.01A(2), replace the 2nd paragraph with:

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.

In Section 7-1.01A(2) replace 7th paragraph with:

Changes in general prevailing wage determinations apply to the contract when the Director of Industrial Relations has issued them at least 10 days before advertisement (Labor Code § 1773.6 and 8 CA Code of Regs 16204).

In Section 7-1.01A(3) replace the 2nd paragraph with:

The Department withholds the penalties specified in subdivision (g) of Labor Code § 1776 for noncompliance with the requirements in Section 1776.

In Section 7-1.01A(3) replace the 4th paragraph with:

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.

In Section 7-1.01A(3) delete the 5th paragraph.

Replace Section 7-1.01A(6) with:

7-1.01A(6) (Blank)

Replace Section 7-1.01F with:

7-1.01F Environmental Stewardship

Comply with Section 14.

Replace Section 7-1.01I with:

7-1.01I (Blank)

In Section 7-1.02 in the 2nd paragraph, replace the 4th sentence with:

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.

In Section 7-1.02 between the 4th and 5th paragraphs, add:

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

In Section 7-1.06 in the 1st paragraph, add:

The Contractor's Injury and Illness Prevention Program shall be submitted to the Engineer. The program shall address the use of personal and company issued electronic devices during work. The use of entertainment and personal communication devices in the work zone shall not be allowed. Workers may use a communication device for business purposes in the work area, at a location where their safety and the safety of other workers and the traveling public is not compromised.

Replace Section 7-1.07 with:

7-1.07 Lead Compliance Plan

Section 7-1.07 applies if a bid item for a lead compliance plan is included in the Contract.

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 5 State employees.

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.

Replace Section 7-1.08 with:

7-1.08 PUBLIC CONVENIENCE

Compliance with the provisions of this section does not relieve you of your responsibility for public safety.

Construction activities must not inconvenience the public or abutting property owners. Schedule and conduct work to avoid unnecessary inconvenience to the public and abutting property owners. Avoid undue delay in construction activities to reduce the public's exposure to construction.

Where possible, route traffic on new or existing paved surfaces.

Maintain convenient access to driveways, houses, and buildings. When the abutting property owner's access across the right of way line is to be eliminated or replaced under the contract, the existing access must not be closed until the replacement access facilities are usable. Construct temporary approaches to crossings and intersecting highways.

Provide a reasonably smooth and even surface for use by traffic at all time during excavation of roadways and construction of embankments. Before other grading activities, place fill at culverts and bridges to allow traffic to cross. If ordered, excavate roadway cuts in layers and construct embankments in partial widths at a time alternating construction from one side to the other and routing traffic over the side opposite the one under construction. Install or construct culverts on only 1/2 the width of the traveled way at a time; keep the traveled way portion being used by traffic open and unobstructed until the opposite side of the traveled way is ready for use by traffic.

Upon completion of rough grading or placing any subsequent layer, bring the surface of the roadbed to a smooth and even condition, free of humps and depressions and satisfactory for the use of the public.

After subgrade preparation for a specified layer of material has been completed, repair any damage to the roadbed or completed subgrade, including damage due to use by the public.

While subgrade and paving activities are underway, allow the public to use the shoulders. If half-width paving methods are used, allow the public to use the side of the roadbed opposite the one under construction. If enough width is available, keep open a passageway wide enough to accommodate at least 2 lanes of traffic at locations where subgrade and paving activities are underway. Shape shoulders or reshape subgrade as necessary to accommodate traffic during subgrade preparation and paving activities.

Apply water or dust palliative for the prevention or alleviation of dust nuisance.

Install signs, lights, flares, temporary railing (Type K), barricades and other facilities to direct traffic. Furnish flaggers whenever necessary to direct the movement of the public through or around the work.

You will be required to pay the cost of replacing or repairing all facilities installed under extra work for the convenience or direction or warning of the public which are lost while in your custody, or are damaged by your operations to such an extent as to require replacement or repair.

The Engineer may order or consent to your request to open a completed section of surfacing, pavement, or structure roadway surface for public use. You will not be compensated for any delay to your construction activities caused by the public. This does not relieve you from any other contractual responsibility.

Replace Section 7-1.09 with:

7-1.09 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 4-1.03, "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 20 days and not more than 90 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.

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, and unless a barrier is present, the adjacent lane must be closed under any of the following conditions:

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

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.

Replace Section 7-1.11 with:

7-1.11 PRESERVATION OF PROPERTY

Comply with Section 5-1.18, "Property and Facility Preservation."

Replace Section 7-1.12 with:

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 3-1.05, "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

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.

Replace Section 7-1.125 with:

7-1.125 Legal Actions Against the Department

If legal action is brought against the Department over compliance with a State or Federal law, rule, or regulation applicable to highway work, then:

1. If the Department, in complying with a court order, prohibits you from performing work, the resulting delay is a suspension related to your performance, unless the Department terminates the contract.
2. If a court order other than an order to show cause or the final judgment in the action prohibits the Department from requiring you to perform work, the Department may delete the prohibited work or terminate the contract.

In Section 7-1.13 delete the 5th and 6th paragraphs.

Add:

7-1.50 FEDERAL LAWS FOR FEDERAL-AID CONTRACTS

7-1.50A General

Section 7-1.50, "Federal Laws for Federal-Aid Contracts," includes specifications required in a Federal-aid construction contract and applies to a Federal-aid contract.

Form FHWA-1273 is included in the contract in Section 7-1.50B, "FHWA-1273." Some contract terms on the form are different than those used in other contract parts as shown in the following table:

FHWA-1273 Terms and Department Equivalencies

FHWA-1273 Term	Equivalent Term Used in Other Contract Parts
SHA	Department
SHA contracting officer	Engineer
SHA resident engineer	Engineer

7-1.50B FHWA-1273

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with revised Section VI

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

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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 (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 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 have 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 specifications, 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 23, 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, timeclocks, 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).

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 that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked 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

(As of May 22, 2007, Form FHWA-47 is no longer required.)

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.

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 regarding 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 of 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 that $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 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 judgement 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
   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.

7-1.50C Female and Minority Goals

To comply with Section II, "Nondiscrimination," of "Required Contract Provisions Federal-Aid Construction Contracts," the Department is including in Section 7-1.50C, "Female and Minority Goals," female and minority utilization goals for Federal-aid construction contracts and subcontracts that exceed $10,000.

The nationwide goal for female utilization is 6.9 percent.

The goals for minority utilization [45 Fed Reg 65984 (10/3/1980)] are as follows:

Minority Utilization Goals

	Economic Area	Goal (Percent)
174	Redding CA: Non-SMSA Counties: CA Lassen; CA Modoc; CA Plumas; CA Shasta; CA Siskiyou; CA Tehema	6.8
175	Eureka, CA Non-SMSA Counties: CA Del Norte; CA Humboldt; CA Trinity	6.6
176	San Francisco-Oakland-San Jose, CA: SMSA Counties: 7120 Salinas-Seaside-Monterey, CA CA Monterey 7360 San Francisco-Oakland CA Alameda; CA Contra Costa; CA Marin; CA San Francisco; CA San Mateo 7400 San Jose, CA CA Santa Clara, CA 7485 Santa Cruz, CA CA Santa Cruz 7500 Santa Rosa CA Sonoma 8720 Vallejo-Fairfield-Napa, CA CA Napa; CA Solano Non-SMSA Counties: CA Lake; CA Mendocino; CA San Benito	 28.9 25.6 19.6 14.9 9.1 17.1 23.2
177	Sacramento, CA: SMSA Counties: 6920 Sacramento, CA CA Placer; CA Sacramento; CA Yolo Non-SMSA Counties CA Butte; CA Colusa; CA El Dorado; CA Glenn; CA Nevada; CA Sierra; CA Sutter; CA Yuba	 16.1 14.3
178	Stockton-Modesto, CA: SMSA Counties: 5170 Modesto, CA CA Stanislaus 8120 Stockton, CA CA San Joaquin Non-SMSA Counties CA Alpine; CA Amador; CA Calaveras; CA Mariposa; CA Merced; CA Toulumne	 12.3 24.3 19.8
179	Fresno-Bakersfield, CA SMSA Counties: 0680 Bakersfield, CA CA Kern 2840 Fresno, CA CA Fresno Non-SMSA Counties: CA Kings; CA Madera; CA Tulare	 19.1 26.1 23.6
180	Los Angeles, CA: SMSA Counties: 0360 Anaheim-Santa Ana-Garden Grove, CA CA Orange 4480 Los Angeles-Long Beach, CA CA Los Angeles 6000 Oxnard-Simi Valley-Ventura, CA CA Ventura	 11.9 28.3 21.5

	6780 Riverside-San Bernardino-Ontario, CA CA Riverside; CA San Bernardino 7480 Santa Barbara-Santa Maria-Lompoc, CA CA Santa Barbara Non-SMSA Counties CA Inyo; CA Mono; CA San Luis Obispo	19.0 19.7 24.6
181	San Diego, CA: SMSA Counties 7320 San Diego, CA CA San Diego Non-SMSA Counties CA Imperial	 16.9 18.2

For each July during which work is performed under the contract, you and each non-material-supplier subcontractor with a subcontract of $10,000 or more must complete Form FHWA PR-1391 (Appendix C to 23 CFR 230). Submit the forms by August 15.

7-1.50D Training

Section 7-1.50D, "Training," applies if a number of trainees or apprentices is specified in the special provisions.

As part of your equal opportunity affirmative action program, provide on-the-job training to develop full journeymen in the types of trades or job classifications involved.

You have primary responsibility for meeting this training requirement.

If you subcontract a contract part, determine how many trainees or apprentices are to be trained by the subcontractor.

Include these training requirements in your subcontract.

Where feasible, 25 percent of apprentices or trainees in each occupation must be in their 1st year of apprenticeship or training.

Distribute the number of apprentices or trainees among the work classifications on the basis of your needs and the availability of journeymen in the various classifications within a reasonable recruitment area.

Before starting work, submit to the Department:

1. Number of apprentices or trainees to be trained for each classification
2. Training program to be used
3. Training starting date for each classification

Obtain the Department's approval for this submitted information before you start work. The Department credits you for each apprentice or trainee you employ on the work who is currently enrolled or becomes enrolled in an approved program.

The primary objective of Section 7-1.50D, "Training," is to train and upgrade minorities and women toward journeymen status. Make every effort to enroll minority and women apprentices or trainees, such as conducting systematic and direct recruitment through public and private sources likely to yield minority and women apprentices or trainees, to the extent they are available within a reasonable recruitment area. Show that you have made the efforts. In making these efforts, do not discriminate against any applicant for training.

Do not employ as an apprentice or trainee an employee:

1. In any classification in which the employee has successfully completed a training course leading to journeyman status or in which the employee has been employed as a journeyman
2. Who is not registered in a program approved by the US Department of Labor, Bureau of Apprenticeship and Training

Ask the employee if the employee has successfully completed a training course leading to journeyman status or has been employed as a journeyman. Your records must show the employee's answers to the questions.

In your training program, establish the minimum length and training type for each classification. The Department and FHWA approves a program if one of the following is met:

1. It is calculated to:

    1.1. Meet the your equal employment opportunity responsibilities

1.2. Qualify the average apprentice or trainee for journeyman status in the classification involved by the end of the training period

2. It is registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training and it is administered in a way consistent with the equal employment responsibilities of federal-aid highway construction contracts

Obtain the State's approval for your training program before you start work involving the classification covered by the program.

Provide training in the construction crafts, not in clerk-typist or secretarial-type positions. Training is allowed in lower level management positions such as office engineers, estimators, and timekeepers if the training is oriented toward construction applications. Training is allowed in the laborer classification if significant and meaningful training is provided and approved by the division office. Off-site training is allowed if the training is an integral part of an approved training program and does not make up a significant part of the overall training.

The Department reimburses you 80 cents per hour of training given an employee on this contract under an approved training program:

1. For on-site training
2. For off-site training if the apprentice or trainee is currently employed on a federal-aid project and you do at least one of the following:

   2.1. Contribute to the cost of the training
   2.2. Provide the instruction to the apprentice or trainee
   2.3. Pay the apprentice's or trainee's wages during the off-site training period

3. If you comply with Section 7-1.50D, "Training"

Each apprentice or trainee must:

1. Begin training on the project as soon as feasible after the start of work involving the apprentice's or trainee's skill
2. Remain on the project as long as training opportunities exist in the apprentice's or trainee's work classification or until the apprentice or trainee has completed the training program

Furnish the apprentice or trainee:

1. Copy of the program you will comply with in providing the training
2. Certification showing the type and length of training satisfactorily completed

Maintain records and submit reports documenting your performance under Section 7-1.50D, "Training."

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SECTION 8 PROSECUTION AND PROGRESS
(Issued 05-01-09)

Replace Section 8 with:

SECTION 8 PROSECUTION AND PROGRESS

8-1.01 (BLANK)

8-1.02 ASSIGNMENT

No third-party agreement relieves you or your surety of your responsibility to complete the work. Do not sell, transfer, or otherwise dispose of any contract part without prior written consent from the Department.

If you assign 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.

8-1.025 PRECONSTRUCTION CONFERENCE

Attend a preconstruction conference with key personnel, including your assigned representative, at a time and location determined by the Engineer. Submit documents as required before the preconstruction conference. You may begin work before the preconstruction conference.

Be prepared to discuss the following topics and documents:

Topics	Document
Claim resolution	Notice of Potential Claims
Contractor's representation	Assignment of Contractor's representative
DBE and DVBE	Final utilization reports
Equipment	Equipment list
Labor compliance and equal employment opportunity	Job site posters and benefit and payroll reports
Material inspection	Notice of Materials to be Used
Materials on hand	Request for Payment for Materials on Hand
Measurements	--
Partnering	Field Guide to Partnering on Caltrans Construction Projects
Quality control	QC plans
Safety	Injury and Illness Prevention Program and job site posters
Schedule	Baseline schedule and Weekly Statement of Working Days
Subcontracting	Subcontracting Request
Surveying	Survey Request
Traffic control	Traffic contingency plan and traffic control plans
Utility work	--
Weight limitations	--
Water Pollution Control	SWPPP or WPCP
Work restrictions	PLACs
Working drawings	--

8-1.03 BEGINNING OF WORK

Begin work within 15 days after receiving notice that the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department. Submit a written notice 72 hours before beginning work. If the project has more than one location of work, submit a separate notice for each location.

You may begin work before receiving the notice of contract approval if you:

1. Deliver the signed contract, bonds, and evidence of insurance to the Department
2. Submit 72-hour notice
3. Obtain an encroachment permit from the Department
4. Are authorized by the Department to begin
5. Perform work at your own risk
6. Perform work under the contract

The Engineer does not count working days for days worked before contract approval.

If the contract is approved, work already performed that complies with the contract is authorized.

If the contract does not get approved, leave the job site in a neat condition. If a facility has been changed, restore it to its former or equivalent condition at your expense.

The Department does not adjust time for beginning before the approval date.

8-1.04 PROGRESS SCHEDULE

8-1.04A General

Reserved

8-1.04B Critical Path Method Schedule

The following definitions apply to critical path method schedules:

activity: Task, event, or other project element on a schedule that contributes to completing the project. Activities have a description, start date, finish date, duration, and one or more logic ties.
baseline schedule: The initial schedule showing the original work plan beginning on the date of contract approval. This schedule shows no completed work to date and no negative float or negative lag to any activity.
controlling activity: Construction activity that extends the scheduled completion date if delayed.
critical path: Longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path extends the scheduled completion date.
critical path method (CPM): Network based planning technique using activity durations and relationships between activities to calculate a schedule for the entire project.
revised schedule: Schedule that incorporates a proposed or past change to logic or activity durations.
scheduled completion date: Planned project completion date shown on the current schedule.
updated schedule: Current schedule developed from the accepted baseline and any subsequent accepted updated or revised schedules through regular monthly review to incorporate actual past progress.

Before or at the preconstruction conference, submit a CPM baseline schedule.

Submit a monthly updated schedule that includes the status of work completed to date and the work yet to be performed as planned.

On each schedule, show:

1. Planned and actual start and completion date of each work activity, including applicable:

    1.1. Submittal development
    1.2. Submittal review and approval
    1.3. Material procurement
    1.4. Contract milestones and constraints
    1.5. Equipment and plant setup
    1.6. Interfaces with outside entities
    1.7. Erection and removal of falsework and shoring
    1.8. Test periods
    1.9. Major traffic stage change
    1.10. Final cleanup

2. Order that you propose to prosecute the work
3. Logical links between the time-scaled work activities
4. All controlling activities
5. Legible description of each activity
6. At least one predecessor and one successor to each activity, except for project start and project end milestones
7. Duration of not less than one working day for each activity
8. Start milestone date as the contract approval date

You may include changes on updated schedules that do not alter the critical path or extend the schedule completion date compared to the current schedule. Changes may include:

1. Adding or deleting activities
2. Changing activity constraints
3. Changing durations
4. Changing logic

If any proposed change in planned work results in altering the critical path or extending the scheduled completion date, submit a revised schedule within 15 days of the proposed change.

For each schedule submittal:

1. Submit a plotted original, time-scaled network diagram on a sheet of at least 8.5" x 11" with a title block and timeline
2. If a computer program is used to make the schedule, submit a read-only compact disc or diskette containing the schedule data. Label the compact disc or diskette with:

    2.1. Contract number
    2.2. CPM schedule number and date produced
    2.3. File name

If there is no contract item for progress schedule (critical path method), full compensation for this work is included in the contract prices paid for the items of work involved, and no additional compensation will be allowed therefor.

8-1.05 TEMPORARY SUSPENSION OF WORK

8-1.05A General

The Engineer may suspend work wholly or in part due to any of the following:

1. Conditions are unsuitable for work progress.
2. You fail to do any of the following:

    2.1. Fulfill the Engineer's orders.
    2.2. Fulfill a contract part.
    2.3. Perform weather-dependent work when conditions are favorable so that weather-related unsuitable conditions are avoided or do not occur.

Upon the Engineer's written order of suspension, suspend work immediately. Provide for public safety and a smooth and unobstructed passageway through the work zone during the suspension as specified in Sections 7-1.08, "Public Convenience," and 7-1.09, "Public Safety." Resume work when ordered.

8-1.05B Suspensions Unrelated to Contractor Performance

For a suspension unrelated to your performance, providing for a smooth and unobstructed passageway through the work during the suspension will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

The days during a suspension unrelated to your performance are non-working days.

8-1.05C Suspensions Related to Contractor Performance

For a suspension related to your performance, the Department may provide for a smooth and unobstructed passageway through the work during the suspension and deduct the cost from payments.

The days during a suspension related to your performance are working days.

8-1.06 TIME OF COMPLETION

The time to complete the work is specified in the special provisions.

The Engineer issues a Weekly Statement of Working Days by the end of the following week unless the contract is suspended for reasons unrelated to your performance.

The Weekly Statement of Working Days shows:

1. Working days and non-working days during the reporting week
2. Time adjustments
3. Work completion date computations, including working days remaining
4. Controlling activities

You may protest a Weekly Statement of Working Days by:

1. Submitting a Notice of Potential Claim within 5 days of receipt of the Weekly Statement of Working Days
2. Following the dispute and claim procedures specified in Sections 9-1.04, "Notice of Potential Claim," and 9-1.07B, "Final Payment and Claims."

8-1.07 LIQUIDATED DAMAGES

8-1.07A General

The Department specifies liquidated damages (Pub Cont Code § 10226). Liquidated damages, if any, accrue starting on the 1st day after the expiration of the working days through the day of contract acceptance except as specified in Sections 8-1.07B, "Failure to Complete Work Parts within Specified Times," and 8-1.07C, "Failure to Complete Work Parts by Specified Dates."

The Department withholds liquidated damages before the accrual date if the anticipated liquidated damages may exceed the value of the remaining work.

Liquidated damages for all work, except plant establishment, are:

Liquidated Damages		
Total Bid		Liquidated Damages per Day
From over	To	
$0	$50,000	$1,200
$50,000	$120,000	$1,500
$120,000	$1,000,000	$1,900
$1,000,000	$5,000,000	$3,000
$5,000,000	$10,000,000	$5,400
$10,000,000	$30,000,000	$8,300
$30,000,000	$100,000,000	$10,500
$100,000,000	$250,000,000	$28,500

If all work, except plant establishment, is complete and the total number of working days has expired, liquidated damages are $950 per day.

8-1.07B Failure to Complete Work Parts within Specified Times

The Department may deduct specified damages from payments for each day in completing a work part beyond the time specified for completing the work part.

Damages for untimely completion of work parts may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Department does not simultaneously assess damages for untimely completion of work parts and for the whole work.

Damages accrue starting the 1st day after a work part exceeds the specified time through the day the specified work part is complete.

8-1.07C Failure to Complete Work Parts by Specified Dates

The Department may deduct specified damages from payments for each day in completing a work part beyond the specified completion date for the work part.

Damages for untimely work part completion may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Department does not simultaneously assess damages for untimely work part completion and the whole work.

Damages accrue starting the 1st day after an unmet completion date through the day the work part is complete.

8-1.07D Director Days

If the work is not completed within the working days, the Director may grant director days if it serves the State's best interest.

By granting director days, the Director adds working days to the contract. The Director may either grant enough days to eliminate the liquidated damages or fewer. In the latter case, the Department deducts liquidated damages for the remaining overrun in contract time. The Director may deduct the Department's engineering, inspection, and overhead costs incurred during the period of extension granted as director days.

8-1.08 TERMINATION OF CONTROL

The Department may terminate your control of the work for failure to do any of the following (Pub Cont Code § 10253):

1. Supply an adequate workforce
2. Supply material as described
3. Pay subcontractors (Pub Cont Code §10262)

4. Prosecute the work as described in the contract

The Department may also terminate your control for failure to maintain insurance coverage.

For a Federal-aid contract, the Department may terminate your control of the work for failure to include "Required Contract Provisions, Federal-Aid Construction Contracts" in subcontracts.

The Department gives you and your surety notice at least 5 days before terminating control. The notice describes the failures and the time allowed to remedy the failures. If failures are not remedied within the time provided, the Department takes control of the work.

The Department may complete the work if the Department terminates your control or you abandon the project (Pub Cont Code § 10255). The Department determines the unpaid balance under Pub Cont Code § 10258 and the contract.

At any time before final payment of all claims, the Department may convert a termination of control to a termination of contract.

8-1.09 DELAYS

8-1.09A General

An excusable delay is a delay of a controlling activity beyond your control, not foreseeable when the work began such as:

1. Change in the work
2. Department action that is not part of the contract
3. Presence of an underground utility main not described in the contract or in a location different from that specified
4. Described facility reconstruction not reconstructed as described, by the utility owner by the date specified, unless the reconstruction is solely for your convenience
5. Department's failure to obtain timely access to the right-of-way
6. Department's failure to perform an action in the time specified

A critical delay is a delay that extends the schedule completion date.

If requesting a delay-related time or payment adjustment, follow the dispute and claim procedures specified in Sections 9-1.04, "Notice of Potential Claim," and 9-1.07B, "Final Payment and Claims."

Minimize and mitigate impacts of delays.

8-1.09B Time Adjustments

For an excusable critical delay, the Department may make a time adjustment. The Engineer uses information from the schedule to evaluate requests for time adjustments.

If requesting an adjustment, submit a revised schedule showing the delay's effect on the controlling activity. If the delay has:

1. Occurred, submit records of dates and what work was performed during the delayed activity
2. Not occurred, submit the expected dates or duration of the delayed activity

If the Engineer requests, update the schedule to the last working day before the start of the delay.

8-1.09C Payment Adjustments

The Department may make a payment adjustment for an excusable delay that affects your costs.

Only losses for idle equipment, idle workers, and equipment moving or transporting are eligible for delay-related payment adjustments.

The Engineer determines payment for idle time of equipment in the same manner as determinations are made for equipment used in the performance of extra work paid for on a force account basis as specified in Section 9-1.03A(3), "Equipment Rental," with the following exceptions:

1. Delay factor in the Labor Surcharge and Equipment Rental Rates applies to each equipment rental rate
2. Daily number of payable hours equals the normal working hours during the delay, not to exceed 8 hours per day
3. Delay days exclude non-working days
4. Markups are not added

The Engineer determines payment adjustment for idle workers under Section 9-1.03A(1), "Labor," but does not add markups.

The Engineer includes costs due to necessary extra equipment moving or transporting.

8-1.10 (BLANK)

8-1.11 TERMINATION OF CONTRACT

8-1.10A General

The Director may terminate the contract if it serves the State's best interest. The Department issues you a written notice, implements the termination, and pays you.

8-1.10B Relief from Responsibility for Work

On receiving a termination notice:

1. Stop work
2. Notify subcontractors and suppliers of the contract termination and stop contract-related work
3. Perform the Engineer-ordered work to secure the job site for termination
4. Remove equipment
5. If authorized, settle termination-related claims and liabilities involving subcontractors and suppliers; assign to the Department the rights, titles, or interests held by you with respect to these parties

8-1.10C Responsibility for Materials

On receiving a termination notice, protect unused material until:

1. You submit an inventory of materials already produced, purchased, or ordered but not yet used; include the location of the material.
2. The Engineer identifies materials that will be retained by the Department. Submit bills of sales or other records of material title.
3. The Engineer confirms that unused materials paid by progress payment and materials furnished by the State have been delivered and stored as ordered.
4. Titles are transferred for materials purchased by the Department.

Dispose of materials that will not be retained by the Department.

8-1.10D Contract Acceptance after Termination

The Engineer recommends contract acceptance after determining completion of:

1. Contract work ordered to be completed before termination
2. Other work ordered to secure the project before termination
3. Material delivery and title transfer

Payment is made as specified in Section 9-1.07B, "Final Payment and Claims."

8-1.10E Payment Adjustment for Termination

If the Department issues a termination notice, the Engineer determines payment for termination based on the following:

1. Direct cost for the work:

    1.1. Including mobilization, demobilization, securing the job site for termination, and losses from the sale of materials
    1.2. Not including the cost of materials you keep, profit realized from the sale of materials, the cost of material damaged by an occurrence as defined in Section 7-1.165, "Damage by Storm, Flood, Tsunami or Earthquake," and other credits.

2. Cost of remedial work, as estimated by the Engineer, is not reimbursed.
3. Allowance for profit not to exceed 4 percent of the cost of the work. Prove a likelihood of having made a profit had the contract not been terminated.
4. Material handling costs for material returned to the vendor or disposed of as ordered.

5. Costs in determining the payment adjustment due to the termination, excluding attorney fees and litigation costs.

Termination of the contract does not relieve the surety of its obligation for any just claims arising out of the work performed.

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SECTION 9 MEASUREMENT AND PAYMENT
(Issued 05-01-09)

In Section 9-1.02 in the 1st paragraph, replace last sentence with:

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.

Add to Section 9-1.02:

The Department pays 10 percent per year interest for unpaid and undisputed:

1. Progress payments
2. After-acceptance payment except for claims

For these payments, interest starts to accrue 30 days after the 1st working day following the 20th day of the month payment is due.

The Department pays 6 percent per year interest for accepted claims. Interest starts to accrue 61 days after the Department accepts a Final Claim Statement.

The Department pays 6 percent per year interest for awards in arbitration (Civ Code § 3289).

If the amount of a deduction or withhold exceeds final payment, the Department invoices you for the difference, to be paid upon receipt.

In Section 9-1.03A replace the 2nd paragraph with:

To the total of the direct costs computed as provided in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental," there will be added a markup of 35 percent to the cost of labor, 15 percent to the cost of materials, and 15 percent to the cost of equipment rental.

In Section 9-1.03A replace the 4th paragraph with:

If a subcontractor performs work at force account, accept an additional 10 percent markup to the total cost of that work paid at force account, including markups specified in Section 9-1.03, "Force Account Payment," as reimbursement for additional administrative costs.

Replace Section 9-1.03B with:

The Contractor, and all subcontractors obtained before or after contract execution, shall itemize the labor, material, and equipment rental costs, and shall not be deemed specialists unless the selected Contractor or available subcontractors on site are not capable of performing the specialty work and it is not the special service industry's established practice to provide cost itemization. In addition, the Engineer may approve work required to be performed at an off-site manufacturing plant or machine shop to be paid as a non-itemized specialist billing. To obtain approval as a specialist, the Contractor shall submit on behalf of the subcontractor a request to the Engineer prior to the start of the proposed specialist work.

If approval is granted, the Engineer will accept the non-itemized invoices for specialty work performed, provided the invoices are at current market rates. Markup percentages of Section 9-1.03A, "Work Performed by Contractor," will not apply. A markup of 10 percent will be added to the total cost of the extra work. The 10 percent markup shall reimburse the Contractor for additional administrative costs, and no other payment will be made by reason of performance of the extra work by a specialist.

If approval is not granted prior to the start of the proposed specialty work, the Contractor or subcontractor shall itemize labor, material, and equipment rental costs and apply percentage markups as required by Section 9-1.03A, "Work Performed by Contractor."

In Section 9-1.03C delete the 6th paragraph.

In Section 9-1.04 replace the 2nd paragraph with:

Disputes will not be considered unless you have first complied with specified notice or protest requirements, including Section 4-1.03, "Changes," Section 5-1.116, "Differing Site Conditions (23 CFR 635.109)," Section 5-1.18B "Nonhighway Facilities (Including Utilities)," and Section 8-1.06, "Time of Completion."

In Section 9-1.04 in the 10th paragraph, replace item C with:

C. When additional monetary compensation is requested, the exact amount requested calculated in conformance with Section 9-1.03, "Force Account Payment," or Section 8-1.09B, "Time Adjustments," including an itemized breakdown of individual costs. These costs shall be segregated into the following cost categories:

In Section 9-1.04 in the 14th paragraph, replace the 2nd sentence with:

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."

Replace Section 9-1.05 with:

9-1.05 STOP NOTICE WITHHOLDS

The Department may withhold payments to cover claims filed under Civ Code § 3179 et seq.

Add:

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.

Add:

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.

Add:

9-1.057 PROGRESS WITHHOLDS

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.

In Section 9-1.06 in the 4th paragraph, replace the 1st sentence with:

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.

In Section 9-1.065 replace the title and the 1st and 2nd paragraphs with:

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

In Section 9-1.07A, replace the 2nd sentence with:

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.

In Section 9-1.07B, replace the 1st paragraph with:

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.

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SECTION 10 DUST CONTROL
(Issued 02-06-09)

Replace Section 10 with:
SECTION 10 (BLANK)

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SECTION 12 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES
(Issued 11-07-08)

In Section 12-1.01 in the 2nd paragraph, replace the 1st sentence with:

Attention is directed to Part 6 of the California MUTCD.

Replace Section 12-2.01 with:

12-2.01 FLAGGERS

Flaggers while on duty and assigned to traffic control or to give warning to the public that the highway is under construction and of any dangerous conditions to be encountered as a result thereof, shall perform their duties and shall be provided with the necessary equipment in conformance with Part 6 of the California MUTCD. The equipment shall be furnished and kept clean and in good repair by the Contractor at the Contractor's expense.

All flaggers shall wear safety apparel meeting the requirements of ANSI/ISEA 107-2004 for Class 2 or 3 garment and complying with 71 Fed Reg 67792.

In Section 12-3.01 replace the 1st paragraph with:

In addition to the requirements in Part 6 of the California MUTCD, all devices used by the Contractor in the performance of the work shall conform to the provisions in this Section 12-3.

In Section 12-3.06 in the 1st paragraph, replace the 2nd sentence with:

Construction area signs are shown in or referred to in Part 6 of the California MUTCD.

In Section 12-3.06 in the 4th paragraph, replace the 1st sentence with:

All construction area signs shall conform to the dimensions, color and legend requirements of the plans, Part 6 of the California MUTCD and these specifications.

In Section 12-3.06 in the 8th paragraph, replace the 1st sentence with:

Used signs with the specified sheeting material will be considered satisfactory if they conform to the requirements for visibility and legibility and the colors conform to the requirements in Part 6 of the California MUTCD.

^^

SECTION 14 (BLANK)
(Issued 03-13-09)

Replace Section 14 with:

SECTION 14 ENVIRONMENTAL STEWARDSHIP

14-1 GENERAL

14-1.01 GENERAL

Environmental stewardship includes both environmental compliance and environmental resource management.

If an ESA is shown on the plans:

1. The boundaries shown are approximate; the Department marks the exact boundaries on the ground
2. Do not enter the ESA unless authorized
3. If the ESA is breached, immediately:
   3.1. Secure the area and stop all operations within 60 feet of the ESA boundary
   3.2. Notify the Engineer
4. If the ESA is damaged, the Department determines what efforts are necessary to remedy the damage and who performs the remedy; you are responsible for remedies and charges.

14-2 CULTURAL RESOURCES

14-2.01 GENERAL

Reserved

14-2.02 ARCHAEOLOGICAL RESOURCES

If archaeological resources are discovered at the job site, do not disturb the resources and immediately:

1. Stop all work within a 60-foot radius of the discovery
2. Protect the discovery area
3. Notify the Engineer

The Department investigates. Do not take archaeological resources from the job site. Do not resume work within the discovery area until authorized.

If, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of an archaeological find, or investigation or recovery of archeological materials, you will be compensated for resulting losses, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

If ordered, furnish resources to assist in the investigation or recovery of archaeological resources. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

14-2.03 ARCHAEOLOGICAL MONITORING AREA

Section 14-2.03 applies if an AMA is described in the Contract.

The Department assigns an archaeological monitor to monitor job site activities within the AMA. Do not work within the AMA unless the archeological monitor is present.

The Engineer and the Department archaeological monitor conduct an AMA location field review with you at least 5 business days before start of work. The Department marks the exact boundaries of the AMA on the ground.

If temporary fence (Type ESA) for an AMA is described in the Contract, install temporary fence (Type ESA) to define the boundaries of the AMA during the AMA location field review.

At least 5 business days before starting work within an AMA, submit a schedule of days and hours to be worked for the Engineer's approval. If you require changes in the schedule, submit an update for the Engineer's approval at least 5 business days before any changed work day.

If archaeological resources are discovered within an AMA, comply with Section 14-2.02, "Archaeological Resources."

14-2.04 HISTORIC STRUCTURES

Reserved

14-3 COMMUNITY IMPACTS AND ENVIRONMENTAL JUSTICE

Reserved

14-4 NATIVE AMERICAN CONCERNS

Reserved

14-5 AESTHETICS

Reserved

14-6 BIOLOGICAL RESOURCES

14-6.01 GENERAL

Reserved

14-6.02 BIRD PROTECTION

Protect migratory and nongame birds, their occupied nests, and their eggs.

The Department anticipates nesting or attempted nesting from February 15 to September 1.

The federal Migratory Bird Treaty Act, 16 USC § 703–711, and 50 CFR Pt 10 and Fish & Game Code §§ 3503, 3513, and 3800 protect migratory and nongame birds, their occupied nests, and their eggs.

The federal Endangered Species Act of 1973, 16 USC §§ 1531 and 1543, and the California Endangered Species Act, Fish & Game Code §§ 2050–2115.5, prohibit the take of listed species and protect occupied and unoccupied nests of threatened and endangered bird species.

The Bald and Golden Eagle Protection Act, 16 USC § 668, prohibits the destruction of bald and golden eagles and their occupied and unoccupied nests.

If migratory or nongame bird nests are discovered that may be adversely affected by construction activities or an injured or killed bird is found, immediately:

1. Stop all work within a 100-foot radius of the discovery.
2. Notify the Engineer.

The Department investigates. Do not resume work within the specified radius of the discovery until authorized.

When ordered, use exclusion devices, take nesting prevention measures, remove and dispose of partially constructed and unoccupied nests of migratory or nongame birds on a regular basis to prevent their occupation, or perform any combination of these. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

Prevent nest materials from falling into waterways.

Bird protection that causes a delay to the controlling activity is a condition unfavorable to the suitable prosecution of work as specified in Section 8-1.05, "Temporary Suspension of Work."

14-7 PALEONTOLOGICAL RESOURCES

If paleontological resources are discovered at the job site, do not disturb the material and immediately:

1. Stop all work within a 60-foot radius of the discovery
2. Protect the area
3. Notify the Engineer

The Department investigates and modifies the dimensions of the protected area if necessary. Do not take paleontological resources from the job site. Do not resume work within the specified radius of the discovery until authorized.

14-8 NOISE AND VIBRATION

14-8.01 GENERAL

Reserved

14-8.02 NOISE CONTROL

Do not exceed 86 dBa at 50 feet from the job site activities from 9 p.m. to 6 a.m. Use an alternative warning method instead of a sound signal unless required by safety laws.

Equip an internal combustion engine with the manufacturer-recommended muffler. Do not operate an internal combustion engine on the job site without the appropriate muffler.

14-9 AIR QUALITY

14-9.01 AIR POLLUTION CONTROL

Comply with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the Contract, including air pollution control rules, regulations, ordinances, and statutes provided in Govt Code § 11017 (Pub Cont Code § 10231).

Do not burn material to be disposed of.

14-9.02 DUST CONTROL

Prevent and alleviate dust by applying water, dust palliative, or both under Section 14-9.01.

Apply water under Section 17, "Watering."

Apply dust palliative under Section 18,"Dust Palliative."

If ordered, apply water, dust palliative, or both to control dust caused by public traffic. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

14-10 SOLID WASTE DISPOSAL AND RECYCLING

14-10.01 SOLID WASTE DISPOSAL AND RECYCLING

Submit an annual Solid Waste Disposal and Recycling Report between January 1 and 15 for each year work is performed under the Contract at any time during the previous calendar year. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project from January 1 through December 31 of the previous calendar year.

Submit a final annual Solid Waste Disposal and Recycling Report within 5 business days after Contract acceptance. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project from January 1 to Contract acceptance.

For each failure to submit a completed form, the Department withholds $10,000.

14-11 HAZARDOUS WASTE AND CONTAMINATION

14-11.01 GENERAL

Reserved

14-11.02 ASBESTOS AND HAZARDOUS SUBSTANCES

Upon discovery, immediately stop working in and notify the Engineer of areas where asbestos or a hazardous substance is present if the:

1. Contractor reasonably believes the substance is asbestos as defined in Labor Code § 6501.7 or a hazardous substance as defined in Health & Safety Code §§ 25316 and 25317
2. Presence is not described in the Contract
3. Substance has not been made harmless

14-12 OTHER INTERAGENCY RELATIONS

Reserved

14-13 PAYMENT

Payment for work specified in Section 14 is included in the payment for the bid items involved unless:

1. Bid item for the work is shown in the verified Bid Item List
2. Work is specified as paid for as extra work

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SECTION 15 EXISTING HIGHWAY FACILITIES

(Issued 05-01-09)

In Section 15-1.02 replace the 1st paragraph with:

Existing facilities which are to remain in place shall be protected in conformance with the provisions in Sections 5-1.18, "Property and Facility Preservation," and 7-1.12, "Indemnification and Insurance."

^^

SECTION 19 EARTHWORK

(Issued 11-21-08)

Replace Section 19-1.02 with:

19-1.02 (BLANK)

Replace Section 19-1.03 with:

19-1.03 GRADE TOLERANCE

Immediately prior to placing subsequent layers of material thereon, the grading plane shall conform to one of the following:

A. When hot mix asphalt is to be placed on the grading plane, the grading plane at any point shall not vary more than 0.05 foot above or below the grade established by the Engineer.
B. When subbase or base material to be placed on the grading plane is to be paid for by the ton, the grading plane at any point shall not vary more than 0.10 foot above or below the grade established by the Engineer.
C. When the material to be placed on the grading plane is to be paid for by the cubic yard, the grading plane at any point shall be not more than 0.05 foot above the grade established by the Engineer.

In Section 19-3.025C replace the 1st paragraph with:

Cementitious material used in soil cement bedding shall conform to the provisions in Section 90-2.01, "Cementitious Materials." Supplementary cementitious material will not be required.

In Section 19-3.025C replace the 4th paragraph with:

The aggregate, cementitious material, and water shall be proportioned either by weight or by volume. Soil cement bedding shall contain not less than 282 pounds of cementitious material per cubic yard. The water content shall be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

In Section 19-3.062 replace the 1st paragraph with:

Slurry cement backfill shall consist of a fluid, workable mixture of aggregate, cementitious material, and water.

In Section 19-3.062 replace the 5th paragraph with:

Cementitious material shall conform to the provisions in Section 90-2.01, "Cementitious Materials." Supplementary cementitious material will not be required.

In Section 19-3.062 replace the 8th paragraph with:

The aggregate, cementitious material, and water shall be proportioned either by weight or by volume. Slurry cement backfill shall contain not less than 188 pounds of cementitious material per cubic yard. The water content shall be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

^^

Replace Section 20-2.03 with:

20-2.03 SOIL AMENDMENT

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

Soil amendment producers shall comply with the following:

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

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

1. Green material consisting of chipped, shredded, or ground vegetation; or clean processed recycled wood products
2. Biosolids
3. Manure
4. Mixed food waste

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

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

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

Soil amendment must comply with the following:

Physical/Chemical Requirements

Property	Test Method	Requirement
pH	*TMECC 04.11-A, Elastometric pH 1:5 Slurry Method, pH Units	6.0–8.0
Soluble Salts	TMECC 04.10-A, Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0-10.0
Moisture Content	TMECC 03.09-A, Total Solids & Moisture at 70+/- 5 deg C, % Wet Weight Basis	30–60
Organic Matter Content	TMECC 05.07-A, Loss-On-Ignition Organic Matter Method (LOI), % Dry Weight Basis	30–65
Maturity	TMECC 05.05-A, Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	 80 or Above 80 or Above
Stability	TMECC 05.08-B, Carbon Dioxide Evolution Rate mg CO_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.

^^

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.

^^

SECTION 28 LEAN CONCRETE BASE
(Issued 07-31-07)

In Section 28-1.02 replace the 1st paragraph with:

Cement shall be Type II portland cement conforming to the provisions in Section 90-2.01A, "Cement."

In Section 28-1.02 replace the 6th paragraph with:

Aggregate shall be of such quality that, when mixed with cement in an amount not to exceed 300 pounds per cubic yard, and tested in conformance with the requirements in California Test 548, the compressive strength of a sample will be not less than 700 pounds per square inch at 7 days.

In Section 28-1.06 replace the 2nd paragraph with:

In advance of curing operations, lean concrete base to be surfaced with hot mix asphalt shall be textured with a drag strip of burlap, a broom or a spring steel tine device which will produce scoring in the finished surface. The scoring shall be parallel with the centerline or transverse thereto. The operation shall be performed at a time and in a manner to produce the coarsest texture practical for the method used.

In Section 28-1.08 replace the 2nd paragraph with:

Hardened lean concrete base with a surface lower than 0.05 foot below the grade established by the Engineer shall be removed and replaced with lean concrete 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, and full compensation for this filling will be considered as included in the contract price paid per cubic yard for lean concrete base and no additional compensation will be allowed therefor.
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 that the pavement is placed. Full compensation for this filling will be 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 03-13-09)

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 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 08-17-07)

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.

^^

SECTION 39 ASPHALT CONCRETE
(Issued 03-13-09)

Replace Section 39 with:

SECTION 39 HOT MIX ASPHALT

39-1 GENERAL

39-1.01 DESCRIPTION

Section 39 includes specifications for producing and placing hot mix asphalt (HMA) by mixing aggregate and asphalt binder at a mixing plant and spreading and compacting the HMA mixture.

The special provisions specify one or more type of HMA, including:

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

The special provisions specify the HMA construction process, including:

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

39-1.02 MATERIALS

39-1.02A Geosynthetic Pavement Interlayer

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

39-1.02B Tack Coat

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

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

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

With each dilution, submit in writing:

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

39-1.02C Asphalt Binder

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

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

39-1.02D Asphalt Rubber Binder

General

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

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

The combined asphalt binder and asphalt modifier must be 80.0 ± 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 (x 10^{-6}) at 100 °C	D 445	X ± 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. In the design, designate the asphalt, asphalt modifier, and CRM and their proportions. The profile is not a 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	CT 205				
Coarse aggregate (% min.)					
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.)					
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]	AASHTO T 304 Method A	45	45	45	--
Flat and elongated particles (% max. by weight @ 5:1)	ASTM D 4791	10	10	10	10

Notes:
[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. Materials Safety Data Sheets (MSDS) for:

   4.1. Asphalt binder
   4.2. Base asphalt binder used in asphalt rubber binder
   4.3. CRM and asphalt modifier used in asphalt rubber binder

4.4. Blended asphalt rubber binder mixture
4.5. Supplemental fine aggregate except fines from dust collectors
4.6. Antistrip additives

If the JMF must be verified or if the Engineer requests, submit samples of the following materials in labeled containers weighing no more than 50 pounds each (notify the Engineer at least 2 business days before sampling materials):

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.

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

Test samples from the HMA plant to be used to determine possible JMF adjustments.

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. The Engineer verifies each proposed JMF within 20 days of receiving verification samples. Verification is testing for compliance with the specifications for:

1. Aggregate quality
2. Aggregate gradation (JMF TV ± tolerance)
3. Asphalt binder content (JMF TV ± tolerance)
4. HMA quality specified in the table Hot Mix Asphalt Mix Design Requirements except:

   4.1. Air voids content (design value ± 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 ± 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 ± 0.3 percent from OBC)

If you request in writing, the Engineer verifies RHMA-G quality requirements within 3 business days of sampling.

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 prepares 3 briquettes from a single split sample. To verify the JMF for stability, 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 ±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 reverifies 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
4. Samples of aggregates, asphalt binder, and additives
5. Samples of the following materials obtained in the presence of the Engineer and placed in labeled containers weighing no more than 50 pounds each:

    5.1. 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.

    5.2. RAP from stockpiles or RAP system. Samples must be at least 60 pounds.

    5.3. Asphalt binder from the binder supplier. Samples must be in two 1-quart cylindrical shaped cans with open top and friction lids.

    5.4. 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. Split samples into at least 2 parts. You must test 1 part and provide the Engineer a part. The Engineer retains samples until you provide test results for your part on Form CEM-3514.

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

The Engineer may verify aggregate qualities during this review period.

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

1. The Engineer verifies each proposed JMF within 30 days of receiving verification samples.
2. You may not adjust the JMF due to a failed verification.
3. For each HMA type and aggregate gradation specified, the Engineer verifies at the State's expense 1 proposed JMF.
4. 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, mix them for at least 20 minutes. When you add CRM, the asphalt binder and asphalt modifier must be between 375 °F and 440 °F.

Do not use asphalt rubber binder during the first 45 minutes of the reaction period. During this period, the asphalt rubber binder mixture must be between 350 °F and the lower of 425 °F or 25 °F below the asphalt binder's flash point indicated in the MSDS.

If any asphalt rubber binder is not used within 4 hours after the reaction period, discontinue heating. If the asphalt rubber binder drops below 375 °F, reheat before use. If you add more scrap tire CRM to the reheated asphalt rubber binder, the binder must undergo a 45-minute reaction period. The added scrap tire CRM must not exceed 10 percent of the total asphalt rubber binder weight. Reheated and reacted asphalt rubber binder must comply with the viscosity specifications for asphalt rubber binder in Section 39-1.02, "Materials." Do not reheat asphalt rubber binder more than twice.

39-1.09 SUBGRADE, TACK COAT, AND GEOSYNTHETIC PAVEMENT INTERLAYER

39-1.09A General

Prepare subgrade or apply tack coat to surfaces receiving HMA. If specified, place geosynthetic pavement interlayer over a coat of asphalt binder.

39-1.09B Subgrade

Subgrade to receive HMA must comply with the compaction and elevation tolerance specifications in the sections for the material involved. Subgrade must be free of loose and extraneous material. If HMA is paved on existing base or pavement, remove loose paving particles, dirt, and other extraneous material by any means including flushing and sweeping.

39-1.09C Tack Coat

Apply tack coat:

1. To existing pavement including planed surfaces
2. Between HMA layers
3. To vertical surfaces of:

    3.1. Curbs
    3.2. Gutters
    3.3. Construction joints

Before placing HMA, apply tack coat in 1 application at the minimum residual rate specified for the condition of the underlying surface:

Tack Coat Application Rates for HMA Type A, Type B, and RHMA-G

HMA over:	Minimum Residual Rates (gallons per square yard)		
	CSS1/CSS1h, SS1/SS1h and QS1h/CQS1h Asphaltic Emulsion	CRS1/CRS2, RS1/RS2 and QS1/CQS1 Asphaltic Emulsion	Asphalt Binder and PMRS2/PMCRS2 and PMRS2h/PMCRS2h Asphaltic Emulsion
New HMA (between layers)	0.02	0.03	0.02
Existing AC and PCC pavement	0.03	0.04	0.03
Planed pavement	0.05	0.06	0.04

Tack Coat Application Rates for OGFC

OGFC over:	Minimum Residual Rates (gallons per square yard)		
	CSS1/CSS1h, SS1/SS1h and QS1h/CQS1h Asphaltic Emulsion	CRS1/CRS2, RS1/RS2 and QS1/CQS1 Asphaltic Emulsion	Asphalt Binder and PMRS2/PMCRS2 and PMRS2h/PMCRS2h Asphaltic Emulsion
New HMA	0.03	0.04	0.03
Existing AC and PCC pavement	0.05	0.06	0.04
Planed pavement	0.06	0.07	0.05

If you dilute asphaltic emulsion, mix until homogeneous before application.

Apply to vertical surfaces with a residual tack coat rate that will thoroughly coat the vertical face without running off.

If you request in writing and the Engineer authorizes, you may:

1. Change tack coat rates
2. Omit tack coat between layers of new HMA during the same work shift if:

    2.1. No dust, dirt, or extraneous material is present
    2.2. The surface is at least 140 °F

Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.

Close areas receiving tack coat to traffic. Do not track tack coat onto pavement surfaces beyond the job site.

Asphalt binder tack coat must be between 285 °F and 350 °F when applied.

39-1.09D Geosynthetic Pavement Interlayer

Place geosynthetic pavement interlayer in compliance with the manufacturer's recommendations.

Before placing the geosynthetic pavement interlayer and asphalt binder:

1. Repair cracks 1/4 inch and wider, spalls, and holes in the pavement. The State pays for this repair work under Section 4-1.03D, "Extra Work."
2. Clean the pavement of loose and extraneous material.

Immediately before placing the interlayer, apply 0.25 gallon ± 0.03 gallon of asphalt binder per square yard of interlayer or until the fabric is saturated. Apply asphalt binder the width of the geosynthetic pavement interlayer plus 3 inches on each side. At interlayer overlaps, apply asphalt binder on the lower interlayer the same overlap distance as the upper interlayer.

Align and place the interlayer with no overlapping wrinkles, except a wrinkle that overlaps may remain if it is less than 1/2 inch thick. If the overlapping wrinkle is more than 1/2 inch thick, cut the wrinkle out and overlap the interlayer no more than 2 inches.

The minimum HMA thickness over the interlayer must be 0.12 foot thick including conform tapers. Do not place the interlayer on a wet or frozen surface.

Overlap the interlayer borders between 2 inches and 4 inches. In the direction of paving, overlap the following roll with the preceding roll at any break.

You may use rolling equipment to correct distortions or wrinkles in the interlayer.

If asphalt binder tracked onto the interlayer or brought to the surface by construction equipment causes interlayer displacement, cover it with a small quantity of HMA.

Before placing HMA on the interlayer, do not expose the interlayer to:

1. Traffic except for crossings under traffic control and only after you place a small HMA quantity
2. Sharp turns from construction equipment
3. Damaging elements

Pave HMA on the interlayer during the same work shift.

39-1.10 Spreading And Compacting Equipment

Paving equipment for spreading must be:

1. Self-propelled
2. Mechanical
3. Equipped with a screed or strike-off assembly that can distribute HMA the full width of a traffic lane
4. Equipped with a full-width compacting device
5. Equipped with automatic screed controls and sensing devices that control the thickness, longitudinal grade, and transverse screed slope

Install and maintain grade and slope references.

The screed must produce a uniform HMA surface texture without tearing, shoving, or gouging.

The paver must not leave marks such as ridges and indentations unless you can eliminate them by rolling.

Rollers must be equipped with a system that prevents HMA from sticking to the wheels. You may use a parting agent that does not damage the HMA or impede the bonding of layers.

In areas inaccessible to spreading and compacting equipment:

1. Spread the HMA by any means to obtain the specified lines, grades and cross sections.
2. Use a pneumatic tamper, plate compactor, or equivalent to achieve thorough compaction.

39-1.11 Transporting, Spreading, And Compacting

Do not pave HMA on a wet pavement or frozen surface.

You may deposit HMA in a windrow and load it in the paver if:

1. Paver is equipped with a hopper that automatically feeds the screed
2. Loading equipment can pick up the windrowed material and deposit it in the paver hopper without damaging base material
3. Activities for deposit, pick-up, loading, and paving are continuous
4. HMA temperature in the windrow does not fall below 260 °F

You may pave HMA in 1 or more layers on areas less than 5 feet wide and outside the traveled way including shoulders. You may use mechanical equipment other than a paver for these areas. The equipment must produce a uniform smoothness and texture.

HMA handled, spread, or windrowed must not stain the finished surface of any improvement including pavement.

Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, or compactors.

HMA must be free of:

1. Segregation
2. Coarse or fine aggregate pockets
3. Hardened lumps

Longitudinal joints in the top layer must match specified lane edges. Alternate longitudinal joint offsets in lower layers at least 0.5 foot from each side of the specified lane edges. You may request in writing other longitudinal joint placement patterns.

Until the adjoining through lane's top layer has been paved, do not pave the top layer of:

1. Shoulders

2. Tapers
3. Transitions
4. Road connections
5. Driveways
6. Curve widenings
7. Chain control lanes
8. Turnouts
9. Turn pockets

If the number of lanes change, pave each through lane's top layer before paving a tapering lane's top layer. Simultaneous to paving a through lane's top layer, you may pave an adjoining area's top layer including shoulders. Do not operate spreading equipment on any area's top layer until completing final compaction.

If HMA (leveling) is specified, fill and level irregularities and ruts with HMA before spreading HMA over base, existing surfaces, or bridge decks. You may use mechanical equipment other than a paver for these areas. The equipment must produce a uniform smoothness and texture. HMA used to change an existing surface's cross slope or profile is not HMA (leveling).

If placing HMA against the edge of existing pavement, sawcut or grind the pavement straight and vertical along the joint and remove extraneous material without damaging the surface remaining in place. If placing HMA against the edge of a longitudinal or transverse construction joint and the joint is damaged or not placed to a neat line, sawcut or grind the pavement straight and vertical along the joint and remove extraneous material without damaging the surface remaining in place. Repair or remove and replace damaged pavement at your expense.

Rolling must leave the completed surface compacted and smooth without tearing, cracking, or shoving. Complete finish rolling activities before the pavement surface temperature is:

1. Below 150 °F for HMA with unmodified binder
2. Below 140 °F for HMA with modified binder
3. Below 200 °F for RHMA-G

If a vibratory roller is used as a finish roller, turn the vibrator off.

Do not use a pneumatic tired roller to compact RHMA-G.

For Standard and QC/QA, if a 3/4-inch aggregate grading is specified, you may use a 1/2-inch aggregate grading if the specified paved thickness is from 0.15 foot to 0.20 foot thick.

Spread and compact HMA under Section 39-3.03, "Spreading and Compacting Equipment," and Section 39-3.04, "Transporting, Spreading, and Compacting," for any of the following:

1. Specified paved thickness is less than 0.15 foot.
2. Specified paved thickness is less than 0.20 foot and a 3/4-inch aggregate grading is specified and used.
3. You spread and compact at:

    3.1. Asphalt concrete surfacing replacement areas
    3.2. Leveling courses
    3.3. Areas the Engineer determines conventional compaction and compaction measurement methods are impeded

Do not allow traffic on new HMA pavement until its mid-depth temperature is below 160 °F.

If you request in writing and the Engineer authorizes, you may cool HMA Type A and Type B with water when rolling activities are complete. Apply water under Section 17, "Watering."

Spread sand at a rate between 1 pound and 2 pounds per square yard on new RHMA-G, RHMA-O, and RHMA-O-HB pavement when finish rolling is complete. Sand must be free of clay or organic matter. Sand must comply with Section 90-3.03, "Fine Aggregate Grading." Keep traffic off the pavement until spreading sand is complete.

39-1.12 SMOOTHNESS

39-1.12A General

Determine HMA smoothness with a profilograph and a straightedge.

Smoothness specifications do not apply to OGFC placed on existing pavement not constructed under the same project.

If portland cement concrete is placed on HMA:

1. Cold plane the HMA finished surface to within specified tolerances if it is higher than the grade specified by the Engineer.
2. Remove and replace HMA if the finished surface is lower than 0.05 foot below the grade specified by the Engineer.

39-1.12B Straightedge

The HMA pavement top layer must not vary from the lower edge of a 12-foot long straightedge:

1. More than 0.01 foot when the straight edge is laid parallel with the centerline
2. More than 0.02 foot when the straightedge is laid perpendicular to the centerline and extends from edge to edge of a traffic lane
3. More than 0.02 foot when the straightedge is laid within 24 feet of a pavement conform

39-1.12C Profilograph

Under California Test 526, determine the zero (null) blanking band Profile Index (PI_0) and must-grinds on the top layer of HMA Type A, Type B, and RHMA-G pavement. Take 2 profiles within each traffic lane, 3 feet from and parallel with the edge of each lane.

A must-grind is a deviation of 0.3 inch or more in a length of 25 feet. You must correct must-grinds.

For OGFC, only determine must-grinds when placed over HMA constructed under the same project. The top layer of the underlying HMA must comply with the smoothness specifications before placing OGFC.

Profile pavement in the Engineer's presence. Choose the time of profiling.

On tangents and horizontal curves with a centerline radius of curvature 2,000 feet or more, the PI_0 must be at most 3 inches per 0.1-mile section.

On horizontal curves with a centerline radius of curvature between 1,000 feet and 2,000 feet including pavement within the superelevation transitions, the PI_0 must be at most 6 inches per 0.1-mile section.

Before the Engineer accepts HMA pavement for smoothness, submit written final profilograms.

Submit 1 electronic copy of profile information in Microsoft Excel and 1 electronic copy of longitudinal pavement profiles in ".erd" format or other ProVAL compatible format to the Engineer and to:

Smoothness@dot.ca.gov

The following HMA pavement areas do not require a PI_0. You must measure these areas with a 12-foot straightedge and determine must-grinds with a profilograph:

1. New HMA with a total thickness less than or equal to 0.25 foot
2. HMA sections of city or county streets and roads, turn lanes and collector lanes that are less than 1,500 feet in length

The following HMA pavement areas do not require a PI_0. You must measure these areas with a 12-foot straightedge:

1. Horizontal curves with a centerline radius of curvature less than 1,000 feet including pavement within the superelevation transitions of those curves
2. Within 12 feet of a transverse joint separating the pavement from:

    2.1. Existing pavement not constructed under the same project
    2.2. A bridge deck or approach slab

3. Exit ramp termini, truck weigh stations, and weigh-in-motion areas
4. If steep grades and superelevation rates greater than 6 percent are present on:

    4.1. Ramps
    4.2. Connectors

5. Turn lanes
6. Areas within 15 feet of manholes or drainage transitions
7. Acceleration and deceleration lanes for at-grade intersections
8. Shoulders and miscellaneous areas
9. HMA pavement within 3 feet from and parallel to the construction joints formed between curbs, gutters, or existing pavement

39-1.12D Smoothness Correction

If the top layer of HMA Type A, Type B, or RHMA-G pavement does not comply with the smoothness specifications, grind the pavement to within tolerances, remove and replace it, or place a layer of HMA. The Engineer must authorize your choice of correction before the work begins.

Remove and replace the areas of OGFC not in compliance with the must-grind and straightedge specifications, except you may grind OGFC for correcting smoothness:

1. At a transverse joint separating the pavement from pavement not constructed under the same project
2. Within 12 feet of a transverse joint separating the pavement from a bridge deck or approach slab

Corrected HMA pavement areas must be uniform rectangles with edges:

1. Parallel to the nearest HMA pavement edge or lane line
2. Perpendicular to the pavement centerline

Measure the corrected HMA pavement surface with a profilograph and a 12-foot straightedge and correct the pavement to within specified tolerances. If a must-grind area or straightedged pavement cannot be corrected to within specified tolerances, remove and replace the pavement.

On ground areas not overlaid with OGFC, apply fog seal coat under Section 37-1, "Seal Coats."

39-1.13 MISCELLANEOUS AREAS AND DIKES

Miscellaneous areas are outside the traveled way and include:

1. Median areas not including inside shoulders
2. Island areas
3. Sidewalks
4. Gutters
5. Gutter flares
6. Ditches
7. Overside drains
8. Aprons at the ends of drainage structures

Spread miscellaneous areas in 1 layer and compact to the specified lines and grades.

For miscellaneous areas and dikes:

1. Do not submit a JMF.
2. Choose the 3/8-inch or 1/2-inch HMA Type A and Type B aggregate gradations.
3. Minimum asphalt binder content must be 6.8 percent for 3/8-inch aggregate and 6.0 percent for 1/2-inch aggregate. If you request in writing and the Engineer authorizes, you may reduce the minimum asphalt binder content.
4. Choose asphalt binder Grade PG 70-10 or the same grade specified for HMA.

39-1.14 RUMBLE STRIP

Construct rumble strips by rolling or grinding indentations in the top layer of new HMA surfacing.

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. Roller or grinding equipment must be equipped with a sighting device enabling the operator to maintain the rumble strip alignment.

Rolled-in indentations must not vary from the specified dimensions by more than 10 percent.

Ground-in indentations must comply with the specified dimensions within 0.06 inch in depth or 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."

On ground areas, apply fog seal coat under Section 37-1, "Seal Coats."

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, which-ever is more	 30 37	 30 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 designat-ed in the QCP. At least once per project	 90 75 70	 25 -- 20	 -- 90 70	 90 75 90
Los Angeles Rattler (%, max.) Loss at 100 rev. Loss at 500 rev.	CT 211		 12 45	 -- 50	 12 40	 12 40

Flat and elongated particles (%, max. by weight @ 5:1)	ASTM D 4791		Report only	Report only	Report only	Report only
Fine aggregate angularity (%, min.)	AASHTO T 304, Method A		45	45	45	--
Voids filled with asphalt (%) [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 [i] 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				
No. 4 and 3/8" gradings		30	30	--	--
1/2" and 3/4" gradings		37	35	23	--
Air voids content (%) [d, h]	CT 367	4 ± 2	4 ± 2	Specification ± 2	--
Percent of crushed particles	CT 205				
Coarse aggregate (%, min.)					
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.)					
One fractured face		70	20	70	90
Percent of crushed particles	CT 205				
Coarse aggregate (%, min.)					
One fractured face		90	25	--	90
Two fractured faces		75	--	90	75
Los Angeles Rattler (%, max.)	CT 211				
Loss at 100 rev.		12	--	12	12
Loss at 500 rev.		45	50	40	40
Fine aggregate angularity (%, min.)	AASHTO T 304, Method A	45	45	45	--
Flat and elongated particles (%, max. by weight @ 5:1)	ASTM D 4791	Report only	Report only	Report only	Report only
Voids filled with asphalt (%) [i]	LP-3				
No. 4 grading		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		
Voids in mineral aggregate	LP-2				--

(% min.) [i] No. 4 grading 3/8" grading 1/2" grading 3/4" grading		 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 [i] 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 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]	CT 366				
No. 4 and 3/8" gradings		30	30	--	--
1/2" and 3/4" gradings		37	35	23	--
Percent of crushed particles	CT 205				
Coarse aggregate (% min.)					
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.)					
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
Air voids content (%) [c, e]	CT 367	4 ± 2	4 ± 2	Specification ± 2	--
Fine aggregate angularity (% min.)	AASHTO T 304, Method A	45	45	45	--
Flat and elongated particles (% max. by weight @ 5:1)	ASTM D 4791	Report only	Report only	Report only	Report only
Voids filled with asphalt (%) [f]	LP-3			Report only	--
No. 4 grading		76.0 – 80.0	76.0 – 80.0		
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		
Voids in mineral aggregate (% min.) [f]	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 [g]	
3/4" grading		13.0	13.0	18.0 – 23.0 [g]	
Dust proportion [f]	LP-4			Report only	--
No. 4 and 3/8" gradings		0.9 – 2.0	0.9 – 2.0		
1/2" and 3/4" gradings		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-	Section 92-

				1.02(C) and Section 39-1.02D	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] The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."
[c] The Engineer reports the average of 3 tests from a single split sample.
[d] 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."
[e] 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.
[f] Report 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	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 sublot is 750 tons except HMA paved at day's end greater than 250 tons is a sublot. If HMA paved at day's end is less than 250 tons, you may either make this quantity a sublot or include it in the previous sublot'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	--	--	--	Stockpiles 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 neces-sary and designat-ed in QCP. At least once per project.	90 75 70	25 -- 20	-- 90 70	CT 125	48 hours
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.)	AASHTO T 304, Method A		45	45	45	CT 125	
Flat and elongated particle (% max. by weight @ 5:1)	ASTM D 4791		Report only	Report only	Report only	CT 125	
Voids filled with asphalt (%) [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 [i] 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, Q_{FC}, or an individual quality factor, QF_{QCi} for i = 3, 4, or 5, is below 0.90 determined under Section 39-4.03F, "Statistical Evaluation"
2. An individual quality factor, QF_{QCi} for i = 1 or 2, is below 0.75
3. Quality characteristics for which a quality factor, QF_{QCi}, is not determined has 2 consecutive acceptance or quality control tests not in compliance with the specifications

39-4.03D Charts And Records

Record sampling and testing results for quality control on forms provided in the "Quality Control Manual for Hot Mix Asphalt," or on forms you submit with the QCP. The QCP must also include form posting locations and submittal times.

Submit quality control test results using the Department's statistical evaluation program, HMAPay, available at

www.dot.ca.gov/hq/construc/hma/index.htm

39-4.03E Records Of Inspection And Testing

During HMA production, submit in writing a daily:

1. HMA Construction Daily Record of Inspection. Also make this record available at the HMA plant and job site each day.
2. HMA Inspection and Testing Summary. Include in the summary:

    2.1. Test forms with the testers' signatures and Quality Control Manager's initials.
    2.2. Inspection forms with the inspectors' signatures and Quality Control Manager's initials.
    2.3. A list and explanation of deviations from the specifications or regular practices.
    2.4. A signed statement by the Quality Control Manager that says:

    "It is hereby certified that the information contained in this record is accurate, and that information, tests, or calculations documented herein comply with the specifications of the contract and the standards set forth in the testing procedures. Exceptions to this certification are documented as part of this record."

Retain for inspection the records generated as part of quality control including inspection, sampling, and testing for at least 3 years after final acceptance.

39-4.03F Statistical Evaluation

General

Determine a lot's composite quality factor, QF_C, and the individual quality factors, QF_{QCi}. Perform statistical evaluation calculations to determine these quality factors based on quality control test results for:

1. Aggregate gradation
2. Asphalt binder content
3. Percent of maximum theoretical density

The Engineer grants a waiver and you must use 1.0 as the individual quality factor for percent of maximum theoretical density, QF_{QC5}, for HMA paved in:

1. Areas where the specified paved thickness is less than 0.15 foot
2. Areas where the specified paved thickness is less than 0.20 foot and a 3/4-inch grading is specified and used
3. Dig outs
4. Leveling courses
5. Areas where, in the opinion of the Engineer, compaction or compaction measurement by conventional methods is impeded

Statistical Evaluation Calculations

Use the Variability-Unknown / Standard Deviation Method to determine the percentage of a lot not in compliance with the specifications. The number of significant figures used in the calculations must comply with AASHTO R-11, Absolute Method.

Determine the percentage of work not in compliance with the specification limits for each quality characteristic as follows:

1. Calculate the arithmetic mean ($\overline{X}$) of the test values

$$\overline{X} = \frac{\Sigma x}{n}$$

where:

x = individual test values
n = number of test values

2. Calculate the standard deviation

$$s = \sqrt{\frac{n\,(\Sigma x^2)-(\Sigma x)^2}{n(n-1)}}$$

where:

$\sum(x^2)$ = sum of the squares of individual test values
$(\sum x)^2$ = sum of the individual test values squared
n = number of test values

3. Calculate the upper quality index (Qu)

$$Q_u = \frac{USL - \overline{X}}{s}$$

where:

USL = target value plus the production tolerance or upper specification limit
s = standard deviation
$\overline{X}$ = arithmetic mean

4. Calculate the lower quality index (QL);

$$Q_L = \frac{\overline{X} - LSL}{s}$$

where:

LSL = target value minus production tolerance or lower specification limit
s = standard deviation
$\overline{X}$ = 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

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_{QCi}, using percent defective = $P_U + P_L$ and:

Quality Factors

Quality Factor	Maximum Allowable Percent Defective ($P_U + P_L$)												
	Sample Size (n)												
	5	6	7	8	9	10-11	12-14	15-17	18-22	23-29	30-42	43-66	>66
1.05				0	0	0	0	0	0	0	0	0	0
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
	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
Reject	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:

1. 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_{QCi} = 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 sublot. When there are less than 20 sequential sublots, the Engineer uses the maximum number of sequential sublots available. The 21st sublot becomes the 1st sublot (n = 1) in the next lot.

The t-value for a group of test data is computed as follows:

$$t = \frac{\left|\overline{X}_c - \overline{X}_v\right|}{S_p\sqrt{\frac{1}{n_c} + \frac{1}{n_v}}} \quad \text{and} \quad S_p^2 = \frac{S_c^2(n_c - 1) + S_v^2(n_v - 1)}{n_c + n_v - 2}$$

where:

n_c = Number of quality control tests (2 minimum, 20 maximum).
n_v = Number of verification tests (minimum of 1 required).
$\overline{X}_c$ = Mean of quality control tests.
$\overline{X}_v$ = Mean of verification tests.
S_p = Pooled standard deviation (When $n_v = 1$, $S_p = S_c$).
S_c = Standard deviation of quality control tests.
S_v = Standard deviation of verification tests (when $n_v > 1$).

The comparison of quality control test results and the verification test results is at a level of significance of $\alpha = 0.025$. The Engineer computes t and compares it to the critical t-value, t_{crit}, from:

Critical T-Value

Degrees of freedom (n_c+n_v-2)	t_{crit} (for α = 0.025)	Degrees of freedom (n_c+n_v-2)	t_{crit} (for α = 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 $\overline{X}_v$ and $\overline{X}_c$ comply with acceptance specifications, the quality control tests are verified. You may continue to produce and place HMA with the following allowable differences:

1. $\left|\overline{X}_v - \overline{X}_c\right| \leq 1.0$ percent for any grading
2. $\left|\overline{X}_v - \overline{X}_c\right| \leq 0.1$ percent for asphalt binder content

If the t-value computed is greater than t_{crit} and the $\left|\overline{X}_v - \overline{X}_c\right|$ 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]							
	Sieve	3/4"	1/2"	3/8"					
1	1/2"	X [b]	--	--	0.05	CT 202	JMF ± Tolerance [c]		
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] No. 4 and 3/8" gradings 1/2" and 3/4" gradings					CT 366	 30 37	 30 35	 -- 23
	Air voids content (%) [f, h]					CT 367	4 ± 2	4 ± 2	Specifica-tion ± 2
	Percent of crushed particles coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Passing No. 4 sieve and retained on No. 8 sieve.) One fractured face					CT 205	 90 70 70	 25 -- 20	 -- 90 70
	HMA moisture content (%, max.)					CT 226 or CT 370	1.0	1.0	1.0
	Los Angeles Rattler (% max.) Loss at 100 rev. Loss at 500 rev.					CT 211	 12 45	 -- 50	 12 45
	Fine aggregate angularity (% min.)					AASHTO T 304, Method A	45	45	45
	Flat and elongated particle (% max. by weight @ 5:1)					ASTM D 4791	Report only	Report only	Report only
	Voids in mineral aggregate (% min.) [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	(Note j) -- -- 18.0 - 23.0 18.0 - 23.0
	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
	Dust proportion [i] No. 4 and 3/8" gradings 1/2" and 3/4" gradings					LP-4	 0.9 - 2.0 0.6 - 1.3	 0.9 – 2.0 0.6 – 1.3	Report only

	Smoothness		Section 39-1.12	12-foot straight-edge, must-grind, and 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 stops production and terminates a lot if:

1. The lot's composite quality factor, Q_{FC}, or an individual quality factor, QF_{QCi} for i = 3, 4, or 5, is below 0.90 determined under Section 39-4.03F, "Statistical Evaluation"
2. An individual quality factor, QF_{QCi} for i = 1 or 2, is below 0.75
3. Quality characteristics for which a quality factor, QF_{QCi}, 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_{QCi}, 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, $QF_{QCi,}$ 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_{QCi} 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_{QC5}, 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_{QCi}, 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_{QCi} for i = 3, 4, and 5, is 0.90 or greater
3. Each individual quality factor, QF_{QCi} 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:

$$PA = \sum_{i=1}^{n} HMACP * wi * \left[QFQCi * (HMATT - WHMATTi) + WHMATTi\right] - (HMACP * HMATT)$$

where:

PA =	Payment adjustment rounded to 2 decimal places.
HMACP =	HMA contract price.
HMATT =	HMA total tons represented in the lot.
$WHMATT_i$ =	Total tons of waived quality characteristic HMA.
QF_{QCi} =	Running quality factor for the individual quality characteristic. QF_{QCi} for i = 1 through 4 must be from verified Contractor's QC results. QF_{QC5} 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 sublot becomes the 1st sublot (n = 1) in the next lot. When the 21st sequential sublot becomes the 1st sublot, 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 sublot 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.

Full compensation for spreading sand on RHMA-G, RHMA-O, and RHMA-O-HB surfaces and for sweeping and removing excess sand is included in the contract price paid per ton for rubberized hot mix asphalt as designated in the Engineer's Estimate and no separate payment will be made therefor.

If the Engineer fails to comply with a specification within a specified time, and if, in the opinion of the Engineer, work completion is delayed because of the failure, the Engineer adjusts payment and contract time under Section 8-1.09, "Right of Way Delays."

If the dispute resolution ITP determines the Engineer's test results are correct, the Engineer deducts the ITP's testing costs from payments. If the ITP determines your test results are correct, the State pays the ITP's testing costs. If, in the Engineer's opinion, work completion is delayed because of incorrect Engineer test results, the Engineer adjusts payment and contract time under Section 8-1.09, "Right of Way Delays."

^^

SECTION 40 PORTLAND CEMENT CONCRETE PAVEMENT

(Issued 01-05-07)

Replace Section 40-1.015 with:

40-1.015 (Blank)

Replace Section 40-1.05 with:

40-1.05 PROPORTIONING

Aggregate and cementitious material proportioning shall conform to the provisions in Section 90-5, "Proportioning."

Replace Section 40-1.105 with:

40-1.105 EXIT RAMP TERMINI

Concrete pavement shall be constructed at the ends of exit ramps when required by the plans or the special provisions. Texturing for exit ramp termini shall be by means of heavy brooming in a direction normal to ramp centerline. The hardened surface shall have a coefficient of friction not less than 0.35 as determined by California Test 342. Minimum cementitious material content of concrete in pavement for exit ramp termini shall be 590 pounds per cubic yard.

In Section 40-1.14 replace the 1st paragraph with:

The contract price paid per cubic yard for concrete pavement shall include full compensation for furnishing all labor, materials (including cementitious material in the amount specified), tools, equipment, and incidentals, and for doing all the work involved in constructing the portland cement concrete pavement, complete in place, as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.

^^

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 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 04-04-08)

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 05-02-08)

In Section 51-1.05 in the 11th paragraph, replace the 1st sentence with:

Form panels for exposed surfaces shall be furnished and placed in uniform widths of not less than 3 feet and in uniform lengths of not less than 6 feet, except at the end of continuously formed surfaces where the final panel length required is less than 6 feet.

In Section 51-1.06C in the 11th paragraph, replace the 1st sentence with:

Falsework for box culverts and other structures with decks lower than the roadway pavement and with span lengths of 14 feet or less shall not be released until the last placed concrete has attained a compressive strength of 1,600 psi, provided that curing of the concrete is not interrupted.

In Section 51-1.11 replace the 6th paragraph with:

Construction methods and equipment employed by the Contractor shall conform to the provisions in Section 7-1.02, "Load Limitations."

In Section 51-1.12D replace the 4th paragraph with:

Expanded polystyrene shall be a commercially available polystyrene board. Expanded polystyrene shall have a minimum flexural strength of 35 psi determined in conformance with the requirements in ASTM Designation: C 203 and a compressive yield strength of between 16 and 40 psi at 5 percent compression. Surfaces of expanded polystyrene against which concrete is placed shall be faced with hardboard. Hardboard shall be 1/8 inch minimum thickness, conforming to ANSI A135.4, any class. Other facing materials may be used provided they furnish equivalent protection. Boards shall be held in place by nails, waterproof adhesive, or other means approved by the Engineer.

In Section 51-1.12F replace the 3rd paragraph with:

Type A and AL joint seals shall consist of a groove in the concrete that is filled with field-mixed silicone sealant.

In Section 51-1.12F in the 6th paragraph, replace the table with:

Movement Rating (MR)	Seal Type
MR ≤ 1 inch	Type A or Type B
1 inch < MR ≤ 2 inches	Type B
2 inches < MR ≤ 4 inches	Joint Seal Assembly (Strip Seal)
MR > 4 inches	Joint Seal Assembly (Modular Unit) or Seismic Joint

In Section 51-1.12F(3)(a) replace the 1st and 2nd paragraphs with:

The sealant must consist of a 2-component silicone sealant that will withstand up to ±50 percent movement. Silicone sealants must be tested under California Test 435 and must comply with the following:

Specification	Requirement
Modulus at 150 percent elongation	8-75 psi
Recovery	21/32 inch max.
Notch Test	Notched or loss of bond 1/4 inch, max.
Water Resistance	Notched or loss of bond 1/4 inch, max.
Ultraviolet Exposure ASTM Designation: G 154, Table X2.1,Cycle 2.	No more than slight checking or cracking.
Cone Penetration	4.5-12.0 mm

In Section 51-1.12F(3)(a) delete the 3rd and 8th paragraphs.

In Section 51-1.12F(3)(a) replace the 10th paragraph with:

A Certificate of Compliance accompanied by a certified test report must be furnished for each batch of silicone sealant in conformance with the provisions in Section 6-1.07, "Certificates of Compliance."

In Section 51-1.12F(3)(b) replace the 2nd paragraph with:

The preformed elastomeric joint seal must conform to the requirements in ASTM D 2628 and the following:

1. The seal must consist of a multichannel, nonporous, homogeneous material furnished in a finished extruded form.
2. The minimum depth of the seal measured at the contact surface must be at least 95 percent of the minimum uncompressed width of the seal as designated by the manufacturer.
3. When tested in conformance with the requirements in California Test 673 for Type B seals, joint seals must provide a movement rating (MR) of not less than that shown on the plans.
4. The top and bottom edges of the joint seal must maintain continuous contact with the sides of the groove over the entire range of joint movement.
5. The seal must be furnished full length for each joint with no more than 1 shop splice in any 60-foot length of seal.
6. The Contractor must demonstrate the adequacy of the procedures to be used in the work before installing seals in the joints.
7. One field splice per joint may be made at locations and by methods approved by the Engineer. The seals are to be manufactured full length for the intended joint, then cut at the approved splice section and rematched before splicing. The Contractor must submit splicing details prepared by the joint seal manufacturer for approval before beginning splicing work.
8. Shop splices and field splices must have no visible offset of exterior surfaces and must show no evidence of bond failure.
9. At all open ends of the seal that would admit water or debris, each cell must be filled to a depth of 3 inches with commercial quality open cell polyurethane foam or closed by other means subject to approval by the Engineer.

In Section 51-1.12F(3)(b) replace the 7th paragraph with:

The joint seal must be installed full length for each joint with equipment that does not twist or distort the seal, elongate the seal longitudinally, or otherwise cause damage to the seal or to the concrete forming the groove.

In Section 51-1.12F(3)(b) in the 11th paragraph, replace the 1st sentence with:

Samples of the prefabricated joint seals, not less than 3 feet in length, will be taken by the Engineer from each lot of material.

In Section 51-1.12H(1) in the 6th paragraph, replace the 4th and 5th sentences with:

Each ply of fabric shall have a breaking strength of not less than 800 pounds per inch of width in each thread direction when 3" x 36" samples are tested on split drum grips. The bond between double plies shall have a minimum peel strength of 20 pounds per inch.

In Section 51-1.12H(1) in the 8th paragraph in the table, replace the hardness (Type A) requirements with:

Hardness (Type A)	D 2240 with 2kg mass.	55 ±5

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 51-1.135 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 16 feet of cracks whose width at any location exceeds 0.02 inch, the deck shall be treated with methacrylate resin. 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 application of methacrylate resin and sand. If grinding is required, deck treatment shall take place before grinding.

51-1.17A(1) Submittals

Before starting deck treatment, the Contractor shall submit plans in conformance with Section 5-1.02, "Plans and Working Drawings," for the following:

1. Public safety plan for the use of methacrylate resin

2. Placement plan for the construction operation

The plans shall identify materials, equipment, and methods to be used.
The public safety plan for the use of methacrylate resin shall include details for the following:

1. Shipping
2. Storage
3. Handling
4. Disposal of residual methacrylate resin and the containers

The placement plan for construction shall include the following:

1. Schedule of deck treatment for each bridge. The schedule shall be consistent with "Maintaining Traffic" of the special provisions and shall include time for the Engineer to perform California Test 342.
2. Methods and materials to be used, including the following:

    2.1. Description of equipment for applying the resin
    2.2. Description of equipment for applying the sand
    2.3. Gel time range and final cure time for the resin

If the measures proposed in the safety plan are inadequate to provide for public safety associated with the use of methacrylate 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.

In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

51-1.17A(2) Materials

Before using methacrylate resin, a Material Safety Data Sheet shall be submitted for each shipment of resin.

Methacrylate resin shall be low odor and have a high molecular weight. Before adding initiator, the resin shall have a maximum volatile content of 30 percent when tested in conformance with the requirements in ASTM Designation: D 2369, and shall conform to the following:

PROPERTY	REQUIREMENT	TEST METHOD
* 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	Specimen 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 shall be performed before adding initiator.		

51-1.17A(3) Testing

The Contractor shall allow 20 days for sampling and testing by the Engineer of the methacrylate resin before proposed use. If bulk resin is to be used, the Contractor shall notify the Engineer in writing at least 15 days before the delivery of the bulk resin to the job site. Bulk resin is any resin stored in containers in excess of 55 gallons.

Before starting production treatment, the Contractor shall treat a test area of approximately 500 square feet that is within the project limits and at a location approved by the Engineer. When available the test area shall be outside of the traveled way. Weather and pavement conditions during the test treatment shall be similar to those expected on the deck. Equipment used for testing shall be similar to those used for deck treating operations.

During test and production deck treatment, test tiles shall be used to evaluate the resin cure time. The Contractor shall coat at least one 4" x 4" commercial quality smooth glazed tile for each batch of methacrylate resin. The coated tile shall be placed adjacent to the corresponding treated area. Sand shall not be applied to the test tiles.

The acceptance criteria for a treated area is as follows:

1. The test tiles are dry to the touch.
2. The treated deck surface is tack free (non-oily).
3. The sand cover adheres and resists brushing by hand.
4. Excess sand has been removed by vacuuming or sweeping.
5. The coefficient of friction is at least 0.35 when tested in conformance with California Test 342.

Deck treatment on the test area shall demonstrate that the methods and materials meet the acceptance criteria and that the production work will be completed within the specified time for maintaining traffic.

If a test or production area fails to meet the acceptance criteria, as determined by the Engineer, the treatment will be rejected, and the treatment shall be removed and replaced until the area complies with the acceptance criteria.

51-1.17A(4) Construction

Equipment shall be fitted with suitable traps, filters, drip pans, or other devices as necessary to prevent oil or other deleterious material from being deposited on the deck.

Before deck treatment with methacrylate resin, the bridge deck surface shall be cleaned by abrasive blasting, and all loose material shall be blown from visible cracks using high-pressure air. Concrete curing seals shall be cleaned from the deck surface to be treated, and the deck shall be dry when blast cleaning is performed. If the deck surface becomes contaminated at any time before placing the resin, the deck surface shall be cleaned by abrasive blasting.

Where abrasive blasting is being performed within 10 feet of a lane occupied by public traffic, the residue including dust shall be removed immediately after contact between the abrasive and the surface being treated. The removal shall be by a vacuum attachment operating concurrently with the abrasive blasting operation.

A compatible promoter/initiator system shall be capable of providing the resin gel time range shown on the placement plan. Gel time shall be adjusted to compensate for the changes in temperature throughout treatment application.

Resin shall be applied by machine and by using a two-part resin system with a promoted resin for one part and an initiated resin for the other part. This two-part resin system shall be combined at equal volumes to the spray bars through separate positive displacement pumps. Combining of the 2 components shall be by either static in-line mixers or by external intersecting spray fans. The pump pressure at the spray bars shall not be great enough to cause appreciable atomization of the resin. Compressed air shall not be used to produce the spray. A shroud shall be used to enclose the spray bar apparatus.

At the Contractor's option, manual application may be used. For manual application, (1) the quantity of resin mixed with promoter and initiator shall be limited to 5 gallons at a time, and (2) the resin shall be distributed by squeegees and brooms within 10 minutes after application.

The Contractor shall apply methacrylate resin only to the specified area. Barriers, railing, joints, and drainage facilities shall be adequately protected to prevent contamination by the treatment material. Contaminated items shall be repaired at the Contractor's expense.

The relative humidity shall be less than 90 percent at the time of treatment. The prepared area shall be dry and the surface temperature shall be at least 50 °F and not more than 100 °F when the resin is applied. The rate of application of promoted/initiated resin shall be approximately 90 square feet per gallon; the exact rate shall be determined by the Engineer.

The deck surfaces to be treated shall be completely covered with resin so the resin penetrates and fills all cracks. The resin shall be applied within 5 minutes after complete mixing. A significant increase in viscosity shall be cause for rejection. Excess material shall be redistributed by squeegees or brooms within 10 minutes after application. For textured deck surfaces, including grooved surfaces, excess material shall be removed from the texture indentations.

After the resin has been applied, at least 20 minutes shall elapse before applying sand. The sand shall be commercial quality dry blast sand. At least 95 percent of the sand shall pass the No. 8 sieve and at least 95 percent shall be retained on

the No. 20 sieve. The sand shall be applied at a rate of approximately 2 pounds per square yard or until refusal as determined by the Engineer.

Traffic will not be allowed on treated areas until the acceptance criteria has been met as determined by the Engineer.

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 execution of 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.

^^

SECTION 52 REINFORCEMENT
(Issued 12-07-07)

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) in the 2nd paragraph, replace the table with:

Reinforcing Bar Number	Total Slip
4	0.010-inch
5	0.010-inch
6	0.010-inch
7	0.014-inch
8	0.014-inch
9	0.014-inch
10	0.018-inch
11	0.018-inch
14	0.024-inch
18	0.030-inch

In Section 52-1.08B(2) in the 6th paragraph, replace the subparagraph with:

The minimum preheat and interpass temperatures shall be 400º F for Grade 40 bars and 600º 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 200º F.

In Section 52-1.08C in the 3rd paragraph, replace item A with:

A. Proper facilities, including a calibrated tensile testing machine capable of breaking the largest size of reinforcing bar to be tested.

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(2)(a) replace the 5th paragraph with:

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.

In Section 52-1.08C(3) replace the 2nd paragraph with:

A minimum of 1 control bar shall be removed from the same bar as, and adjacent to, all ultimate prequalification, production, and quality assurance sample splices. The lengths of control bars shall conform to the lengths specified for sample splices in California Test 670. The portion of adjacent bar remaining in the work shall also be identified with weatherproof markings that correspond to its adjacent control bar.

In Section 52-1.08C(3) in the 6th paragraph, replace the 2nd sentence with:

In addition, necking of the bar, as defined in California Test 670, shall occur at rupture regardless of whether the bar breaks inside or outside the affected zone.

^^

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.

Replace Section 53-1.08 with:

53-1.08 PAYMENT

The contract price paid per cubic yard for shotcrete shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing shotcrete, including preparing the foundation, wire reinforcement, structure backfill, joint filling material, and if required by the plans, drains with sacked pervious backfill material, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

^^

SECTION 55 STEEL STRUCTURES

(Issued 05-02-08

In Section 55-1.05 replace the 3rd paragraph with:

Construction methods and equipment employed by the Contractor shall conform to the provisions in Section 7-1.02, "Load Limitations."

In Section 55-2.01 in the 5th paragraph in the table, replace the CVN impact value for Grade HPS 50W with:

Grade HPS 50W* (4 inches and under in thickness)	20 at 10 ºF

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 or with asbestos sheet packing 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 55-3.10 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 55-3.19 replace the 5th paragraph with:

Mortar to be placed below masonry plates or bearing plates of the bearing assemblies and in anchor bolt sleeves or canisters shall conform to the provisions in Section 51-1.135, "Mortar," except that the proportion of cementitious material to sand shall be 1:3.

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 03-16-07)

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 56-1.10 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 05-01-06)

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 64 PLASTIC PIPE
(Issued 07-31-07)

In Section 64-1.06 replace the 1st paragraph with:

At locations where pipe is to be backfilled with concrete as shown on the plans, the concrete backfill shall be constructed of minor concrete or Class 4 concrete conforming to the provisions in Section 90, "Portland Cement Concrete." Minor concrete shall contain not less than 380 pounds of cementitious material per cubic yard. The concrete to be used will be designated in the contract item or shown on the plans.

In Section 64-1.06 replace the 3rd paragraph with:

The surface of the concrete backfill shall be broomed with a heavy broom to produce a uniform rough surface if hot mix asphalt is to be placed directly thereon.

^^

SECTION 65 REINFORCED CONCRETE PIPE
(Issued 07-31-07)

In Section 65-1.02 replace the 1st paragraph with:

Cementitious material and aggregate shall conform to the provisions in Section 90-2, "Materials" except that mortar strengths relative to Ottawa sand and grading requirements shall not apply to the aggregate. Use of supplemental cementitious material shall conform to AASHTO Designation: M 170.

In Section 65-1.02A(1) in the 11th paragraph, replace item c with:

c. Cementitious material and aggregate for non-reinforced concrete pipe shall conform to the provisions in Section 65-1.02, "Materials."

In Section 65-1.035 replace the 1st paragraph with:

At locations where pipe is to be backfilled with concrete as shown on the plans, the concrete backfill shall be constructed of minor concrete or Class 4 concrete in conformance with the provisions in Section 90, "Portland Cement Concrete." Minor concrete shall contain not less than 380 pounds of cementitious material per cubic yard. The concrete to be used will be designated in the contract item.

In Section 65-1.035 replace the 3rd paragraph with:

The surface of the concrete backfill shall be broomed with a heavy broom to produce a uniform rough surface if hot mix asphalt is to be placed directly thereon.

In Section 65-1.06 in the 2nd paragraph, replace the 1st subparagraph with:

Cement Mortar. - Mortar shall be composed of one part cementitious material and 2 parts sand by volume. Supplementary cementitious material will not be required.

^^

SECTION 66 CORRUGATED METAL PIPE
(Issued 07-31-07)

In Section 66-1.045 replace the 1st paragraph with:

At locations where pipe is to be backfilled with concrete as shown on the plans, the concrete backfill shall be constructed of minor concrete or Class 4 concrete conforming to the provisions in Section 90, "Portland Cement Concrete." Minor concrete shall contain not less than 380 pounds of cementitious material per cubic yard. The concrete to be used will be designated in the contract item or shown on the plans.

In Section 66-1.045 replace the 3rd paragraph with:

The surface of the concrete backfill shall be broomed with a heavy broom to produce a uniform rough surface if hot mix asphalt is to be placed directly thereon.

^^

SECTION 68 SUBSURFACE DRAINS
(Issued 07-31-07)

In Section 68-3.02D replace the 1st and 2nd paragraphs with:

Concrete for splash pads shall be produced from minor concrete conforming to the provisions in Section 90-10, "Minor Concrete." Minor concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

Mortar placed where edge drain outlets and vents connect to drainage pipe and existing drainage inlets shall conform to the provisions in Section 51-1.135, "Mortar."

In Section 68-3.03 replace the 13th paragraph with:

Cement treated permeable material, which is not covered with hot mix asphalt within 12 hours after compaction of the permeable material, shall be cured by either sprinkling the material with a fine spray of water every 4 hours during daylight hours or covering the material with a white polyethylene sheet, not less than 6 mils thick. The above curing requirements shall begin at 7:00 a.m. on the morning following compaction of the cement treated permeable material and continue for the next 72 hours or until the material is covered with hot mix asphalt, whichever is less. The cement treated permeable material shall not be sprayed with water during the first 12 hours after compacting, but may be covered with the polyethylene sheet during the first 12 hours or prior to the beginning of the cure period.

In Section 68-3.03 replace the 17th and 18th paragraphs with:

Hot mix asphalt for backfilling trenches in existing paved areas shall be produced from commercial quality aggregates and asphalt and mixed at a central mixing plant. The aggregate shall conform to the 3/4 inch grading, or the 1/2 inch grading for Type A and Type B hot mix asphalt specified in Section 39-1.02E, "Aggregate." The amount of asphalt binder to be mixed with the aggregate shall be between 4 percent and 7 percent by weight of the dry aggregate, as determined by the Engineer.

Hot mix asphalt backfill shall be spread and compacted in approximately 2 equal layers by methods that will produce a hot mix asphalt surfacing of uniform smoothness, texture and density. Each layer shall be compacted before the temperature of the mixture drops below 250 ºF. 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 07-18-08)

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 mortar strengths relative to Ottawa sand and 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 mortar strengths relative to Ottawa sand and 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 07-31-07)

In Section 73-1.01 in the 2nd paragraph, replace item 2 with:

2. Minor concrete shall contain not less than 463 pounds of cementitious material per cubic yard except that when extruded or slip-formed curbs are constructed using 3/8-inch maximum size aggregate, minor concrete shall contain not less than 548 pounds of cementitious material per cubic yard.

In Section 73-1.06 replace the 15th paragraph with:

Where hot mix asphalt or portland cement concrete pavements are to be placed around or adjacent to manholes, pipe inlets or other miscellaneous structures in sidewalk, gutter depression, island paving, curb ramps or driveway areas, the structures shall not be constructed to final grade until after the pavements have been constructed for a reasonable distance on each side of the structures.

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SECTION 74 PUMPING PLANT EQUIPMENT
(Issued 07-01-08)

In Section 74-1.02 delete the 2nd paragraph.

^^

SECTION 75 MISCELLANEOUS METAL
(Issued 01-18-08)

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 at:

http://www.dot.ca.gov/hq/esc/approved_products_list

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 ANSI Standard: B1.1 having Class 2A tolerances or ANSI 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:

The Pre-Qualified Products List for concrete anchorage devices has been developed from data previously furnished by suppliers or manufacturers for each type and size. Approval of additional anchorage device types and sizes is contingent upon the Contractor submitting to the Engineer one sample of each type of concrete anchorage device, manufacturer's installation instructions, and certified results of tests, either by a private testing laboratory or the manufacturer, indicating compliance with the above requirements.

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, or F 436 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.

^^

SECTION 80 FENCES
(Issued 01-05-07)

In Section 80-3.01F replace the 4th paragraph with:

Portland cement concrete for metal post and brace footings and for deadmen shall be minor concrete conforming to the provisions in Section 90-10, "Minor Concrete." Minor concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

In Section 80-4.01C replace the 4th paragraph with:

Portland cement concrete for metal post and for deadmen shall be produced from minor concrete conforming to the provisions in Section 90-10, "Minor Concrete." Minor concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

^^

SECTION 83 RAILINGS AND BARRIERS
(Issued 04-03-09)

In Section 83-1.02 replace the 7th paragraph with:

Mortar shall conform to the provisions in Section 51-1.135, "Mortar," and shall consist of one part by volume of cementitious material and 3 parts of clean sand.

In Section 83-1.02B in the 24th paragraph in the 8th subparagraph, replace the 1st sentence with:

Anchor cable 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 83-1.02E in the 6th paragraph, replace the 2nd sentence with:

Cable shall be galvanized in conformance with the requirements in Federal Specification RR-W-410.

In Section 83-1.02I replace the 5th paragraph with:

Where shown on the plans, cables used in the frame shall be 5/16 inch in diameter, wire rope, with a minimum breaking strength of 5,000 pounds and shall be galvanized in conformance with the requirements in Federal Specification RR-W-410.

In Section 83-1.02I replace the 14th paragraph with:

Chain link fabric shall be 11-gage conforming to one of the following:

1. AASHTO Designation: M181, Type I, Class C
2. AASHTO Designation: M181, Type IV, Class A
3. ASTM F 1345, Class 2

In Section 83-2.02D(1) replace the 5th paragraph with:

When concrete barriers are to be constructed on existing structures, the dowels shall be bonded in holes drilled in the existing concrete. Drilling of holes and bonding of dowels shall conform to the following:

1. The bonding materials shall be either magnesium phosphate concrete, modified high alumina based concrete or portland cement based concrete. Magnesium phosphate concrete shall be either single component (water activated) or dual component (with a prepackaged liquid activator). Modified high alumina based concrete and portland cement based concrete shall be water activated. Bonding materials shall conform to the following requirements:

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(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, 60E, 60GE, and 60SE) and the optional concrete slab at the base between the 2 walls of concrete barrier (Types 50E, 60E, 60GE, and 60SE) 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.

^^

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.

^^

SECTION 86 SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS
(Issued 08-15-08)

In Section 86-1.02 delete the 2nd paragraph.

In Section 86-2.02 in the 1st paragraph, replace the 1st sentence with:

Improvements such as sidewalks, curbs, gutters, portland cement concrete and hot mix asphalt pavement, underlying material, lawns and plants and any other improvements removed, broken or damaged by the Contractor's operations, shall be replaced or reconstructed with the same kind of material as found on the work or with materials of equal quality.

In Section 86-2.03 replace the 3rd, 4th, and 5th paragraph with:

Except when located on structures, foundations for posts, standards, and pedestals shall be placed "in the solid" and monolithic.

After each post, standard, and pedestal is in proper position, mortar shall be placed under the base plate as shown on the plans. The exposed portions shall be finished to present a neat appearance. Mortar shall conform to Section 51-1.135, "Mortar," except the mortar shall consist of one part by volume of cementitious material and 3 parts of clean sand.

Reinforced cast-in-drilled-hole concrete pile foundations shall conform to the provisions in Section 49, "Piling," with the following exceptions:

A. Material resulting from drilling holes shall be disposed of in conformance with the provisions in Section 86-2.01, "Excavating and Backfilling,"
B. Concrete for cast-in-drilled-hole concrete piles will not be considered as designated by compressive strength.

In Section 86-2.05C in the 18th paragraph, replace item D with:

D. The conduit shall be placed in the bottom of the trench, and the trench shall be backfilled with minor concrete conforming to the provisions in Section 90-10, "Minor Concrete." Minor concrete shall contain not less than 590 pounds of cementitious material per cubic yard. Concrete backfill shall be placed to the pavement surface except, when the trench is in hot mix asphalt pavement and additional pavement is not being placed, the top 0.10 foot of the trench shall be backfilled with hot mix asphalt produced from commercial quality paving asphalt and aggregates.

In Section 86-2.05C in the 18th paragraph, replace item E with:

E. Prior to spreading hot mix asphalt, tack coat shall be applied in conformance with the provisions in Section 39, "Hot Mix Asphalt." Spreading and compacting of hot mix asphalt shall be performed by any method which will produce a hot mix asphalt surfacing of uniform smoothness, texture and density.

In Section 86-2.05C in the 23rd paragraph, replace item C with:

C. Precast concrete conduit cradles shall conform to the dimensions shown on the plans and shall be constructed of minor concrete and commercial quality welded wire fabric. Minor concrete shall conform to the provisions in Section 90-10, "Minor Concrete," and shall contain not less than 590 pounds of cementitious material per cubic yard. The cradles shall be moist cured for not less than 3 days.

In Section 86-2.05C in the 23rd paragraph, replace item G with:

G. The space around conduits through bridge abutment walls shall be filled with mortar conforming to the provisions in Section 51-1.135, "Mortar," except that the proportion of cementitious material to sand shall be 1 to 3.

In Section 86-2.07 replace the 5th paragraph with:

Concrete placed around and under traffic pull boxes as shown on the plans shall be minor concrete conforming to the provisions in Section 90-10, "Minor Concrete."

In Section 86-2.08A in the table, replace the traffic signal controller cabinet requirements with:

Traffic Signal Controller Cabinet	Ungrounded Circuit Conductor	Blk	None	CON-1	6
	Grounded Circuit Conductor	Wht	None	CON-2	6

In Section 86-4.06 in the 1st paragraph, replace the 1st sentence with:

Message symbols for pedestrian signal faces shall be white WALKING PERSON and Portland orange UPRAISED HAND conforming to the requirements in the Institute of Transportation Engineers Standards: "Pedestrian Traffic Control Signal Indications" and the "California MUTCD."

In Section 86-4.07 in the 10th paragraph, replace the 2nd sentence with:

The color of "UPRAISED HAND" shall be Portland orange conforming to the requirements of the Institute of Transportation Engineers Standards: "Pedestrian Traffic Control Signal Indications" and the "California MUTCD."

In Section 86-5.01A(5) in section "Elastomeric Sealant" in the 1st paragraph, replace the 2nd sentence with:

Sealant shall be suitable for use in both hot mix asphalt and portland cement concrete.

In Section 86-5.01A(5) in section "Asphatic Emulsion Sealant" in the 1st paragraph, replace the 1st sentence with:

Asphaltic emulsion sealant shall conform to the requirements in State Specification 8040-41A-15 and shall be used only for filling slots in hot mix asphalt pavement.

In Section 86-5.01A(5) in section "Hot-Melt Rubberized Asphalt Sealant" in the 1st paragraph, replace the 3rd sentence with:

Sealant shall be suitable for use in both hot mix asphalt and portland cement concrete.

In Section 86-5.01A(5) in section "Hot-Melt Rubberized Asphalt Sealant," replace the 10th paragraph with:

If hot mix asphalt surfacing is to be placed, the loop conductors shall be installed prior to placing the uppermost layer of hot mix asphalt. The conductors shall be installed, as shown on the plans, in the compacted layer of hot mix asphalt immediately below the uppermost layer. Installation details shall be as shown on the plans, except the sealant shall fill the slot flush to the surface.

In Section 86-5.01D replace the 1st paragraph with:

When a foundation for a pressure-sensitive vehicle detector is to be removed, the hole left by removing the detector frame and foundation shall be filled with minor concrete, except the roadway surface shall be reconstructed with material to match existing surfacing. Minor concrete shall conform to the provisions in Section 90-10, "Minor Concrete," except that the concrete shall contain not less than 420 pounds of cementitious material per cubic yard for hot mix asphalt surfaced roadways and not less than 590 pounds of cementitious material per cubic yard for portland cement concrete surfaced roadways.

In Section 86-8.01 replace the 1st paragraph with:

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 shall 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, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer, including any necessary pull boxes (except when the type required is shown as a separate contract item); excavation and backfill; concrete foundations (except when 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.

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SECTION 88: ENGINEERING FABRICS
(Issued 03-13-09)

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

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

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:

Filter Fabric

Property	ASTM	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

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 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.

88-1.04B 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	50	50
Water flow rate, gallons per minute/square foot maximum average roll value	D 4491	10 - 50	100 - 150	80 - 200	80 - 150	75 - 120
Permittivity, sec^{-1} minimum	D 4491	0.05	0.05	1.5	1.2	0.08
Apparent opening size, U.S. Standard sieve size maximum average roll value	D 4751	30	30	20 - 40	40 - 80	100
Ultraviolet resistance, percent minimum retained grab breaking load, 500 hr.	D 4355	70	70	70	70	70

88-1.06 CHANNEL AND SHORE 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 filter fabric specified under Section 88-1.02, "Filtration."

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 PAYMENT

The Department measures and pays for geosynthetics under the specifications requiring their use.

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SECTION 90 PORTLAND CEMENT CONCRETE

(Issued 12-05-08)

Replace Section 90 with:

SECTION 90 PORTLAND CEMENT CONCRETE

90-1 GENERAL

90-1.01 DESCRIPTION

Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

The Contractor shall determine the mix proportions for concrete in conformance with these specifications.

Class 1 concrete shall contain not less than 675 pounds of cementitious material per cubic yard.

Class 2 concrete shall contain not less than 590 pounds of cementitious material per cubic yard.

Class 3 concrete shall contain not less than 505 pounds of cementitious material per cubic yard.

Class 4 concrete shall contain not less than 420 pounds of cementitious material per cubic yard.

Minor concrete shall contain not less than 550 pounds of cementitious material per cubic yard unless otherwise specified in these specifications or the special provisions.

Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic yard of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content (Pounds/CY)
Concrete designated by compressive strength:	
Deck slabs and slab spans of bridges	675 min., 800 max.
Roof sections of exposed top box culverts	675 min., 800 max.
Other portions of structures	590 min., 800 max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	675 min.
Roof sections of exposed top box culverts	675 min.
Prestressed members	675 min.
Seal courses	675 min.
Other portions of structures	590 min.
Concrete for precast members	590 min., 925 max.

Whenever the 28-day compressive strength shown on the plans is greater than 3,600 pounds per square inch, the concrete shall be designated by compressive strength. If the plans show a 28-day compressive strength that is 4,000 pounds per square inch or greater, an additional 14 days will be allowed to obtain the specified strength. The 28-day compressive strengths shown on the plans that are 3,600 pounds per square inch or less are shown for design information only and are not a requirement for acceptance of the concrete.

Concrete designated by compressive strength shall be proportioned such that the concrete will attain the strength shown on the plans or specified in the special provisions.

Concrete shall be proportioned to conform to the following shrinkage limitations when tested in conformance with the requirements of AASHTO Designation: T 160, modified as follows:

Condition	Maximum Shrinkage of Laboratory Cast Specimens at 28 days Drying (average of 3, %)
Paving 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 for which the mix proportions have been determined by the Contractor, or in advance of revising those 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 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 supplementary cementitious material 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 supplementary cementitious material 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 or commercial quality 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 a supplementary cementitious material, or a blended cement.

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 cementitious materials meeting this Section 90-2.01 are kept separate from other cementitious materials. Sampling cementitious materials shall be in conformance with California Test 125.

The Contractor shall furnish a Certificate of Compliance for cementious 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.

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 and shall be comprised of an intimate and uniform blend

of Type II or Type V cement and supplementary cementitious material in an amount conforming to the requirements in Section 90-2.01C, "Required Use of Supplementary Cementitious Materials."

In addition, blended cement, 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 alkalies, 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 in the special provisions or with the approval of the Engineer. Type III portland cement shall conform to the additional requirements listed above for Type II portland cement.

90-2.01B Supplementary Cementitious Materials (SCM)

Fly ash shall conform to the requirements in AASHTO Designation: M 295, Class F, and the following:

A. Calcium oxide content shall not exceed 10 percent.
B. 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.
C. Commingling of fly ash from different sources at uncontrolled ratios is permissible only if the following criteria are satisfied:

    1. Sources of fly ash to be commingled shall be on the approved list of materials for use in concrete.
    2. Testing of the commingled product is the responsibility of the fly ash supplier.
    3. Each fly ash's running average of density shall not differ from any other by more than 0.01-pound per cubic inch at the time of commingling.
    4. 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.
    5. The final product of commingled fly ash shall conform to the requirement in AASHTO Designation: M 295.

Raw or calcined natural pozzolans shall conform to the requirements in AASHTO Designation: M 295, Class N and the following requirements:

A. Calcium oxide content shall not exceed 10 percent.
B. 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.

Ground Granulated Blast Furnace Slag (GGBFS) shall conform to the requirements in AASHTO Designation: M 302, Grade 100 or Grade 120.

Silica Fume shall conform 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.

90-2.01C Required Use Of Supplementary Cementitious Materials

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 the following:

A. If a blended cement conforming to the provisions in Section 90-2.01A, "Cement," is used, the minimum amount of SCM incorporated into the cement shall conform to the provisions in this Section 90-2.01C.
B. Fly ash or natural pozzolan, silica fume, or GGBFS shall not be used with Type IP or Type IS cements.

Use of SCMs shall conform to the following:

A. If fly ash or natural pozzolan is used:

1. The minimum amount of portland cement shall not be less than 75 percent by weight of the specified minimum cementitious material content.
2. The minimum amount of fly ash or natural pozzolan shall be 25 percent by weight of the total amount of cementitious material.
3. The total amount of fly ash or natural pozzolan shall not exceed 35 percent by weight of the total amount of cementitious material to be used in the mix. If Section 90-1.01, "Description," specifies a maximum cementitious material content in pounds per cubic yard, the total weight of portland cement and fly ash or natural pozzolan per cubic yard shall not exceed the specified maximum cementitious material content.

B. If silica fume is used:

1. The amount of silica fume shall not be less than 10 percent by weight of the total amount of cementitious material.
2. The amount of portland cement shall not be less than 75 percent by weight of the specified minimum cementitious material content.
3. If Section 90-1.01, "Description," specifies a maximum cementitious material content in pounds per cubic yard, the total weight of portland cement and silica fume per cubic yard shall not exceed the specified maximum cementitious material content.

C. If GGBFS is used:

1. The minimum amount of GGBFS shall be either:
   a. Forty percent of the total cementitious material to be used, if the aggregates used in the concrete are on the Department's list of "Approved Aggregates For Use in Concrete with Reduced Fly Ash."
   b. No less than 50 percent.

2. The amount of GGBFS shall not exceed 60 percent by weight of the total amount of cementitious materials to be used.

90-2.02 AGGREGATES

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]
Mortar Strengths Relative to Ottawa Sand	515	95%, min.
Sand Equivalent:		
Operating Range	217	75, min.
Contract Compliance	217	71, min.

a Fine aggregate developing a color darker than the reference standard color solution may be accepted if it is determined by the Engineer, from mortar strength tests, that a darker color is acceptable.

In lieu of the above Sand Equivalent requirements, a Sand Equivalent "Operating Range" limit of 71, minimum, and a Sand Equivalent "Contract Compliance" limit of 68, minimum, will be used to determine the acceptability of the fine aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

A. Fine aggregate sampled at the completion of processing at the aggregate production plant had a Sand Equivalent value of not less than 82 when tested by California Test 217; and

B. Prequalification tests performed in conformance with California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

90-2.03 WATER

In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1,000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1,300 parts per million of sulfates as SO_4, when tested in conformance with California Test 417. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1,300 parts per million of sulfates as SO_4, when tested in conformance with California Test 417. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with the requirements in ASTM Designation: C 191 or ASTM Designation: C 266 or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in conformance with the requirements in ASTM Designation: C 109, when compared to the results obtained with distilled water or deionized water, tested in conformance with the requirements in ASTM Designation: C 109.

In nonreinforced concrete work, the water for curing, for washing aggregates and for mixing shall be free from oil and shall not contain more than 2,000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, or more than 1,500 parts per million of sulfates as SO_4, when tested in conformance with California Test 417.

In addition to the above provisions, water for curing concrete shall not contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

Water reclaimed from mixer wash-out operations may be used in mixing concrete. The water shall not contain coloring agents or more than 300 parts per million of alkalis ($Na_2O + 0.658\ K_2O$) 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 conform to the requirements in the following ASTM Designations:

A. Chemical Admixtures—ASTM Designation: C 494.
B. Air-entraining Admixtures—ASTM Designation: C 260.

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:

	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	
Sieve Sizes	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:

	Percentage Passing	
Sieve Sizes	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.

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.

Admixture brands will be considered for addition to the approved list if the manufacturer of the admixture submits to the Transportation Laboratory a sample of the admixture accompanied by certified test results demonstrating that the admixture complies with the requirements in the appropriate ASTM Designation and these specifications. The sample shall be sufficient to permit performance of all required tests. Approval of admixture brands will be dependent upon a determination as to compliance with the requirements, based on the certified test results submitted, together with tests the Department may elect to perform.

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 the dosage used in determining approval of the admixture.

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 required for concrete pavement, dispensers for liquid admixtures shall operate automatically with the batching control equipment. The dispensers shall be equipped with an automatic warning system in good operating condition that will provide a visible or audible signal at the point at which proportioning operations are controlled when the quantity of admixture measured for each batch of concrete varies from the preselected dosage by more than 5 percent, or when the entire contents of the measuring unit are not emptied from the dispenser into each batch of concrete.

Unless liquid admixtures are added to premeasured water for the batch, their discharge into the batch shall be arranged to flow into the stream of water so that the admixtures are well dispersed throughout the batch, except that air-entraining admixtures may be dispensed directly into moist sand in the batching bins provided that adequate control of the air content of the concrete can be maintained.

Liquid admixtures requiring dosages greater than one-half gallon per cubic yard shall be considered to be water when determining the total amount of free water as specified in Section 90-6.06, "Amount of Water and Penetration."

90-4.11 BLANK

90-5 PROPORTIONING

90-5.01 STORAGE OF AGGREGATES

Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size shall be avoided and the various sizes shall not become intermixed before proportioning.

Aggregates shall be stored or stockpiled and handled in a manner that prevent contamination by foreign materials. In addition, storage of aggregates at batching or mixing facilities that are erected subsequent to the award of the contract and that furnish concrete to the project shall conform to the following:

A. Intermingling of the different sizes of aggregates shall be positively prevented. The Contractor shall take the necessary measures to prevent intermingling. The preventive measures may include, but are not necessarily limited to, physical separation of stockpiles or construction of bulkheads of adequate length and height; and
B. Contamination of aggregates by contact with the ground shall be positively prevented. The Contractor shall take the necessary measures to prevent contamination. The preventive measures shall include, but are not necessarily limited to, placing aggregates on wooden platforms or on hardened surfaces consisting of portland cement concrete, asphalt concrete, or cement treated material.

In placing aggregates in storage or in moving the aggregates from storage to the weigh hopper of the batching plant, any method that may cause segregation, degradation, or the combining of materials of different gradings that will result in any size of aggregate at the weigh hopper failing to meet the grading requirements, shall be discontinued. Any method of handling aggregates that results in excessive breakage of particles shall be discontinued. The use of suitable devices to reduce impact of falling aggregates may be required by the Engineer.

90-5.02 PROPORTIONING DEVICES

Weighing, measuring, or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, automatic weighing systems shall comply with the requirements for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." Automatic devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and supplementary cementitious material for one batch of concrete is a single operation of a switch or starter.

Proportioning devices shall be tested as frequently as the Engineer may deem necessary to ensure their accuracy.

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the weight of each batch of material shall not vary from the weight designated by the Engineer by more than the tolerances specified herein.

Equipment for cumulative weighing of aggregate shall have a zero tolerance of ±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 supplementary cementitious material shall have a zero tolerance of ±0.5 percent of the designated total batch weight of the cement and supplementary cementitious material. Equipment for weighing cement or supplementary cementitious material 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, supplementary cementitious material shall be 99 to 102 percent of its designated batch weight. When supplementary cementitious material 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 supplementary cementitious material shall be 99 to 102 percent of the sum of their designated batch weights; 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, supplementary cementitious material, or cement plus supplementary cementitious material 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) 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 supplementary cementitious material 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 supplementary cementitious material are weighed cumulatively, the cement shall be weighed first.

If cement and supplementary cementitious material are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the supplementary cementitious material 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 supplementary cementitious material shall be discharged into the mixer simultaneously with the aggregate.

The scales and weigh hoppers for bulk weighing cement, supplementary cementitious material, or cement plus supplementary cementitious material shall be separate and distinct from the aggregate weighing equipment.

For batches of one cubic yard or more, the batching equipment shall conform to one of the following combinations:

A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
B. Single box and scale indicator for all aggregates.
C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

In order to check the accuracy of batch weights, the gross weight and tare weight of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed on scales designated by the Engineer.

90-5.03A Proportioning For Pavement

Aggregates and bulk supplementary cementitious material for use in pavement shall be proportioned by weight by means of automatic proportioning devices of approved type conforming to these specifications.

The Contractor shall install and maintain in operating condition an electronically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by weight of the fine aggregate.

The batching of cement, supplementary cementitious material, or cement plus supplementary cementitious material 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 supplementary cementitious material hoppers or the cement plus supplementary cementitious material 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 supplementary cementitious material charging mechanisms and cement and supplementary cementitious material are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the weight of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."

If concrete is completely mixed in stationary paving mixers, the supplementary cementitious materials shall be weighed in a separate weigh hopper and the supplementary cementitious material 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, supplementary cementitious material, aggregates, and water uniformly before discharge, weighing the supplementary cementitious material cumulatively with the cement is permitted. Certification shall contain the following:

A. Test results for 2 compressive strength test cylinders of concrete taken within the first one-third and 2 compressive strength test cylinders of concrete taken within the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength";
B. Calculations demonstrating that the difference in the averages of 2 compressive strengths taken in the first one-third is no greater than 7.5 percent different than the averages of 2 compressive strengths taken in the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;" and
C. The mixer rotation speed and time of mixing before discharge that are required to produce a mix that meets the requirements above.

The discharge gate on the cement and supplementary cementitious material hoppers or the cement plus supplementary cementitious material hopper shall be designed to permit regulating the flow of cement, supplementary cementitious material, or cement plus supplementary cementitious material into the aggregate as directed by the Engineer.

If separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.

Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and so that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.

If the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required mass is discharged into the weigh box, after which the gate shall automatically close and lock.

The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

90-6 MIXING AND TRANSPORTING

90-6.01 GENERAL

Concrete shall be mixed in mechanically operated mixers, except that when permitted by the Engineer, batches not exceeding 1/3 cubic yard may be mixed by hand methods in conformance with the provisions in Section 90-6.05, "Hand-Mixing."

Equipment having components made of aluminum or magnesium alloys that would have contact with plastic concrete during mixing, transporting, or pumping of portland cement concrete shall not be used.

Concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cementitious material.

Uniformity of concrete mixtures will be determined by differences in penetration as determined by California Test 533, or slump as determined by ASTM Designation: C 143, and by variations in the proportion of coarse aggregate as determined by California Test 529.

When the mix design specifies a penetration value, the difference in penetration, determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed 1/2-inch. When the mix design specifies a slump value, the difference in slump, determined by comparing slump tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed the values given in the table below. Variation in the proportion of coarse aggregate will be determined by comparing the results of tests of 2 samples of mixed concrete from the same batch or truck mixer load and the difference between the 2 results shall not exceed 170 pounds per cubic yard of concrete.

Average Slump	Maximum Permissible Difference
Less than 4"	1"
4" to 6"	1 1/2"
Greater than 6" to 9"	2"

The Contractor shall furnish samples of the freshly mixed concrete and provide satisfactory facilities for obtaining the samples.

90-6.02 MACHINE MIXING

Concrete mixers may be of the revolving drum or the revolving blade type, and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. Mixers and agitators that have an accumulation of hard concrete or mortar shall not be used.

The temperature of mixed concrete, immediately before placing, shall be not less than 50° F or more than 90° F. Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits. Neither aggregates nor mixing water shall be heated to exceed 150° F. If ice is used to cool the concrete, discharge of the mixer will not be permitted until all ice is melted.

The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one-fourth of the specified mixing time.

Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions that reduce or vary the required quantity of cementitious material in the concrete mixture.

Paving and stationary mixers shall be operated with an automatic timing device. The timing device and discharge mechanism shall be interlocked so that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.

The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

The size of batch shall not exceed the manufacturer's guaranteed capacity.

When producing concrete for pavement or base, suitable batch counters shall be installed and maintained in good operating condition at job site batching plants and stationary mixers. The batch counters shall indicate the exact number of batches proportioned and mixed.

Concrete shall be mixed and delivered to the job site by means of one of the following combinations of operations:

A. Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in truck agitators or in nonagitating hauling equipment (central-mixed concrete).
B. Mixed partially in a stationary mixer, and the mixing completed in a truck mixer (shrink-mixed concrete).
C. Mixed completely in a truck mixer (transit-mixed concrete).
D. Mixed completely in a paving mixer.

Agitators may be truck mixers operating at agitating speed or truck agitators. Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates on which is plainly marked the various uses for which the equipment is designed, the manufacturer's guaranteed capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum or blades.

Truck mixers shall be equipped with electrically or mechanically actuated revolution counters by which the number of revolutions of the drum or blades may readily be verified.

When shrink-mixed concrete is furnished, concrete that has been partially mixed at a central plant shall be transferred to a truck mixer and all requirements for transit-mixed concrete shall apply. No credit in the number of revolutions at mixing speed will be allowed for partial mixing in a central plant.

90-6.03 TRANSPORTING MIXED CONCRETE

Mixed concrete may be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturer of the equipment as agitating speed, or in non-agitating hauling equipment, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable for adequate placement and consolidation in place, and provided the mixed concrete after hauling to the delivery point conforms to the provisions in Section 90-6.01, "General."

Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity and shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.

Bodies of nonagitating hauling equipment shall be constructed so that leakage of the concrete mix, or any part thereof, will not occur at any time.

Concrete hauled in open-top vehicles shall be protected during hauling against rain or against exposure to the sun for more than 20 minutes when the ambient temperature exceeds 75° F.

No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer. If the Engineer authorizes additional water to be incorporated into the concrete, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharge is commenced.

The rate of discharge of mixed concrete from truck mixer-agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

If a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours or before 250 revolutions of the drum or blades, whichever occurs first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or if the temperature of the concrete is 85° F or above, the time allowed may be less than 1.5 hours. If an admixture is used to retard the set time, the temperature of the concrete shall not exceed 85° F, the time limit shall be 2 hours, and the revolution limitation shall be 300.

If nonagitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85° F or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

Each load of concrete delivered at the job site shall be accompanied by a weighmaster certificate showing the mix identification number, nonrepeating load number, date and time at which the materials were batched, the total amount of water added to the load, and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This weighmaster certificate shall also show the actual scale weights (pounds) for the ingredients batched. Theoretical or target batch weights shall not be used as a substitute for actual scale weights.

Weighmaster certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on a 3 1/2-inch diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be "line feed, carriage return" (LFCR) and "one line, separate record" with allowances for sufficient fields to satisfy the amount of data required by these specifications.

The Contractor may furnish a weighmaster certificate accompanied by a separate certificate that lists the actual batch weights or measurements for a load of concrete provided that both certificates are imprinted with the same nonrepeating load number that is unique to the contract and delivered to the jobsite with the load.

Weighmaster certificates furnished by the Contractor shall conform to the provisions in Section 9-1.01, "Measurement of Quantities."

90-6.04 TIME OR AMOUNT OF MIXING

Mixing of concrete in paving or stationary mixers shall continue for the required mixing time after all ingredients, except water and admixture, if added with the water, are in the mixing compartment of the mixer before any part of the batch is released. Transfer time in multiple drum mixers shall not be counted as part of the required mixing time.

The required mixing time, in paving or stationary mixers, of concrete used for concrete structures, except minor structures, shall be not less than 90 seconds or more than 5 minutes, except that when directed by the Engineer in writing, the requirements of the following paragraph shall apply.

The required mixing time, in paving or stationary mixers, except as provided in the preceding paragraph, shall be not less than 50 seconds or more than 5 minutes.

The minimum required revolutions at the mixing speed for transit-mixed concrete shall not be less than that recommended by the mixer manufacturer, but in no case shall the number of revolutions be less than that required to consistently produce concrete conforming to the provisions for uniformity in Section 90-6.01, "General."

When a high range water-reducing admixture is added to the concrete at the job site, the total number of revolutions shall not exceed 300.

90-6.05 HAND-MIXING

Hand-mixed concrete shall be made in batches of not more than 1/3 cubic yard and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than one foot in total depth. On this mixture shall be spread the dry cementitious materials and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

90-6.06 AMOUNT OF WATER AND PENETRATION

The amount of water used in concrete mixes shall be regulated so that the penetration of the concrete as determined by California Test 533 or the slump of the concrete as determined by ASTM Designation: C 143 is within the nominal values shown in the following table. When the penetration or slump of the concrete is found to exceed the nominal values listed, the mixture of subsequent batches shall be adjusted to reduce the penetration or slump to a value within the nominal range shown. Batches of concrete with a penetration or slump exceeding the maximum values listed shall not be used in the work. If Type F or Type G chemical admixtures are added to the mix, the penetration requirements shall not apply and the slump shall not exceed 9 inches after the chemical admixtures are added.

Type of Work	Nominal		Maximum	
	Penetration (inches)	Slump (inches)	Penetration (inches)	Slump (inches)
Concrete Pavement	0 - 1	—	1 1/2	—
Non-reinforced concrete facilities	0 - 1 1/2	—	2	—
Reinforced concrete structures				
Sections over 12 inches thick	0 - 1 1/2	—	2 1/2	—
Sections 12 inches thick or less	0 - 2	—	3	—
Concrete placed under water	—	6 - 8	—	9
Cast-in-place concrete piles	2 1/2 - 3 1/2	5 - 7	4	8

The amount of free water used in concrete shall not exceed 310 pounds per cubic yard, plus 20 pounds for each required 100 pounds of cementitious material in excess of 550 pounds per cubic yard.

The term free water is defined as the total water in the mixture minus the water absorbed by the aggregates in reaching a saturated surface-dry condition.

If there are adverse or difficult conditions that affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic yard of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 pounds of water per added 100 pounds of cementitious material per cubic yard. Full compensation for additional cementitious material and water added under these conditions shall be considered as included in the contract price paid for the concrete work involved and no additional compensation will be allowed therefor.

The equipment for supplying water to the mixer shall be constructed and arranged so that the amount of water added can be measured accurately. Any method of discharging water into the mixer for a batch shall be accurate within 1.5 percent of the quantity of water required to be added to the mix for any position of the mixer. Tanks used to measure water shall be designed so that water cannot enter while water is being discharged into the mixer and discharge into the mixer shall be made rapidly in one operation without dribbling. All equipment shall be arranged so as to permit checking the amount of water delivered by discharging into measured containers.

90-7 CURING CONCRETE

90-7.01 METHODS OF CURING

Newly placed concrete shall be cured by the methods specified in this Section 90-7.01 and the special provisions.

90-7.01A Water Method

The concrete shall be kept continuously wet by the application of water for a minimum curing period of 7 days after the concrete has been placed.

Cotton mats, rugs, carpets, or earth or sand blankets may be used as a curing medium to retain the moisture during the curing period.

If a curing medium consisting of cotton mats, rugs, carpets, polyethylene sheeting, polyethylene sheeting on burlap, or earth or sand blankets is to be used to retain the moisture, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface. At the expiration of the curing period, the concrete surfaces shall be cleared of all curing media.

At the option of the Contractor, a curing medium consisting of white opaque polyethylene sheeting extruded onto burlap may be used to cure concrete structures. The polyethylene sheeting shall have a minimum thickness of 4-mil, and shall be extruded onto 10-ounce burlap.

At the option of the Contractor, a curing medium consisting of polyethylene sheeting may be used to cure concrete columns. The polyethylene sheeting shall have a minimum thickness of 10-mil achieved in a single layer of material.

If the Contractor chooses to use polyethylene sheeting or polyethylene sheeting on burlap as a curing medium, these media and any joints therein shall be secured as necessary to provide moisture retention and shall be within 3 inches of the concrete at all points along the surface being cured. When these media are used, the temperature of the concrete shall be monitored during curing. If the temperature of the concrete cannot be maintained below 140° F, use of these curing media shall be disallowed.

When concrete bridge decks and flat slabs are to be cured without the use of a curing medium, the entire surface of the bridge deck or slab shall be kept damp by the application of water with an atomizing nozzle as specified above, until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for a period of not less than 7 days.

90-7.01B Curing Compound Method

Surfaces of the concrete that are exposed to the air shall be sprayed uniformly with a curing compound.

Curing compounds to be used shall be as follows:

1. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B, except the resin type shall be poly-alpha-methylstyrene.
2. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B.
3. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class A.
4. Nonpigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class B.
5. Nonpigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class A.
6. Nonpigmented curing compound with fugitive dye conforming to the requirements in ASTM Designation: C 309, Type 1-D, Class A.

The infrared scan for the dried vehicle from curing compound (1) shall match the infrared scan on file at the Transportation Laboratory.

The loss of water for each type of curing compound, when tested in conformance with the requirements in California Test 534, shall not be more than 0.28-pounds per square yard in 24 hours.

The curing compound to be used will be specified elsewhere in these specifications or in the special provisions.

If the use of curing compound is required or permitted elsewhere in these specifications or in the special provisions and no specific kind is specified, any of the curing compounds listed above may be used.

Curing compound shall be applied at a nominal rate of one gallon per 150 square feet, unless otherwise specified.

At any point, the application rate shall be within ±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 CURING PAVEMENT

The entire exposed area of the pavement, including edges, shall be cured by the waterproof membrane method, or curing compound method using curing compound (1) or (2) as the Contractor may elect. Should the side forms be removed before the expiration of 72 hours following the start of curing, the exposed pavement edges shall also be cured. If the pavement is cured by means of the curing compound method, the sawcut and all portions of the curing compound that have been disturbed by sawing operations shall be restored by spraying with additional curing compound.

Curing shall commence as soon as the finishing process provided in Section 40-1.10, "Final Finishing," has been completed. The method selected shall conform to the provisions in Section 90-7.01, "Methods of Curing."

When the curing compound method is used, the compound shall be applied to the entire pavement surface by mechanical sprayers. Spraying equipment shall be of the fully atomizing type equipped with a tank agitator that provides for continual agitation of the curing compound during the time of application. The spray shall be adequately protected against wind, and the nozzles shall be so oriented or moved mechanically transversely as to result in the minimum specified rate of coverage being applied uniformly on exposed faces. Hand spraying of small and irregular areas, and areas inaccessible to mechanical spraying equipment, in the opinion of the Engineer, will be permitted. When the ambient air temperature is above 60° F, the Contractor shall fog the surface of the concrete with a fine spray of water as specified in Section 90-7.01A, "Water Method." The surface of the pavement shall be kept moist between the hours of 10:00 a.m. and 4:30 p.m. on the day the concrete is placed. However, the fogging done after the curing compound has been applied shall not begin until the compound has set sufficiently to prevent displacement. Fogging shall be discontinued if ordered in writing by the Engineer.

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.

90-8.03 PROTECTING CONCRETE PAVEMENT

Pavement concrete shall be maintained at a temperature of not less than 40° F for 72 hours.

Except as provided in Section 7-1.08, "Public Convenience," the Contractor shall protect concrete pavement against construction and other activities that abrade, scar, discolor, reduce texture depth, lower coefficient of friction, or otherwise damage the surface. Stockpiling, drifting, or excessive spillage of soil, gravel, petroleum products, and concrete or asphalt mixes on the surface of concrete pavement is prohibited unless otherwise specified in these specifications, the special provisions or permitted by the Engineer.

If ordered by the Engineer or shown on the plans or specified in the special provisions, pavement crossings shall be constructed for the convenience of public traffic. The material and work necessary for the construction of the crossings, and their subsequent removal and disposal, will be paid for at the contract unit prices for the items of work involved and if there are no contract items for the work involved, payment for pavement crossings will be made by extra work as provided in Section 4-1.03D, "Extra Work.". Where public traffic will be required to cross over the new pavement, Type III portland cement may be used in concrete, if permitted in writing by the Engineer. The pavement may be opened to traffic as soon as the concrete has developed a modulus of rupture of 550 pounds per square inch. The modulus of rupture will be determined by California Test 523.

No traffic or Contractor's equipment, except as hereinafter provided, will be permitted on the pavement before a period of 10 days has elapsed after the concrete has been placed, nor before the concrete has developed a modulus of rupture of at least 550 pounds per square inch. Concrete that fails to attain a modulus of rupture of 550 pounds per square inch within 10 days shall not be opened to traffic until directed by the Engineer.

Equipment for sawing weakened plane joints will be permitted on the pavement as specified in Section 40-1.08B, "Weakened Plane Joints."

When requested in writing by the Contractor, the tracks on one side of paving equipment will be permitted on the pavement after a modulus of rupture of 350 pounds per square inch has been attained, provided that:

A. Unit pressure exerted on the pavement by the paver shall not exceed 20 pounds per square inch;
B. Tracks with cleats, grousers, or similar protuberances shall be modified or shall travel on planks or equivalent protective material, so that the pavement is not damaged; and
C. No part of the track shall be closer than one foot from the edge of pavement.

In case of visible cracking of, or other damage to the pavement, operation of the paving equipment on the pavement shall be immediately discontinued.

Damage to the pavement resulting from early use of pavement by the Contractor's equipment as provided above shall be repaired by the Contractor.

The State will furnish the molds and machines for testing the concrete for modulus of rupture, and the Contractor, at the Contractor's expense, shall furnish the material and whatever labor the Engineer may require.

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 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 28-day 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 curing 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 curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the requirements in ASTM Designation: C 42.

No single compressive strength test shall represent more than 320 cubic yards.

If a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders that have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. If the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

When concrete is specified by compressive strength, 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 cure days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

Trial batch test reports, in order to be acceptable, shall indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 580 pounds per square inch greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches that were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

Tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. Equipment employed in testing shall be in good condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

The certified test data and trial batch test reports shall include the following information:

A. Date of mixing.
B. Mixing equipment and procedures used.
C. The size of batch in cubic yards and the weight, type, and source of all ingredients used.
D. Penetration or slump (if the concrete will be placed under water or placed in cast-in-place concrete piles) of the concrete.
E. The air content of the concrete if an air-entraining admixture is used.
F. The age at time of testing and strength of all concrete cylinders tested.

Certified test data and trial batch test reports shall be signed by an official of the firm that performed the tests.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class 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.

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."

90-10.02B Aggregate

Aggregate shall be clean and free from deleterious coatings, clay balls, roots, and other extraneous materials.

Use of crushed concrete or reclaimed aggregate is acceptable only if the aggregate satisfies all aggregate requirements.

The Contractor shall submit to the Engineer for approval, a grading of the combined aggregate proposed for use in the minor concrete. After acceptance of the grading, aggregate furnished for minor concrete shall conform to that grading, unless a change is authorized in writing by the Engineer.

The Engineer may require the Contractor to furnish periodic test reports of the aggregate grading furnished. The maximum size of aggregate used shall be at the option of the Contractor, but in no case shall the maximum size be larger than 1 1/2-inch or smaller than 3/4-inch.

The Engineer may waive, in writing, the gradation requirements in this Section 90-10.02B, if, in the Engineer's opinion, the furnishing of the gradation is not necessary for the type or amount of concrete work to be constructed.

90-10.02C Water

Water used for washing, mixing, and curing shall be free from oil, salts, and other impurities that would discolor or etch the surface or have an adverse affect on the quality of the concrete.

90-10.02D Admixtures

The use of admixtures shall conform to the provisions in Section 90-4, "Admixtures."

90-10.03 PRODUCTION

Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice that will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and that conforms to requirements specified herein. Recognized standards of good practice are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or the Department.

The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."

The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.

Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature

of concrete of more than 90° F will be considered conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.

The required mixing time in stationary mixers shall be not less than 50 seconds or more than 5 minutes.

The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.

When a high range water-reducing admixture is added to the concrete at the job site, the total number of revolutions shall not exceed 300.

Each load of ready-mixed concrete shall be accompanied by a weighmaster certificate that shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The weighmaster certificate shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.

A Certificate of Compliance conforming to the provisions in Section 6–1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets contract requirements, including minimum cementitious material content specified.

90-10.04 CURING MINOR CONCRETE

Curing minor concrete shall conform to the provisions in Section 90-7, "Curing Concrete."

90-10.05 PROTECTING MINOR CONCRETE

Protecting minor concrete shall conform to the provisions in Section 90-8, "Protecting Concrete," except the concrete shall be maintained at a temperature of not less than 40° F for 72 hours after placing.

90-10.06 MEASUREMENT AND PAYMENT

Minor concrete will be measured and paid for in conformance with the provisions specified in the various sections of these specifications covering concrete construction when minor concrete is specified in the specifications, shown on the plans, or indicated by contract item in the Engineer's Estimate.

90-11 MEASUREMENT AND PAYMENT

90-11.01 MEASUREMENT

Portland cement concrete will be measured in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.

For concrete measured at the mixer, the volume in cubic feet shall be computed as the total weight of the batch in pounds divided by the density of the concrete in pounds per cubic foot. The total weight of the batch shall be calculated as the sum of all materials, including water, entering the batch. The density of the concrete will be determined in conformance with the requirements in California Test 518.

90-11.02 PAYMENT

Portland cement concrete will be paid for in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.

Full compensation for furnishing and incorporating admixtures required by these specifications or the special provisions will be considered as included in the contract prices paid for the concrete involved and no additional compensation will be allowed therefor.

Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

Should the Contractor use admixtures in conformance with the provisions in Section 90-4.05, "Optional Use of Chemical Admixtures," or Section 90-4.07, "Optional Use of Air-entraining Admixtures," or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them into the concrete at the Contractor's expense and no additional compensation will be allowed therefor.

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SECTION 91 PAINT
(Issued 05-1-06)

Replace Section 91-3 with:

91-3 PAINTS FOR TIMBER

91-3.01 WOOD PRIMER, LATEX-BASE

Classification:

This specification covers a ready-mixed priming paint for use on unpainted wood or exterior woodwork. It shall conform with the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for exterior wood primers, and be listed on the Exterior Latex Wood Primer MPI List Number 6.

91-3.02 PAINT; LATEX-BASE FOR EXTERIOR WOOD, WHITE AND TINTS

Classification:

This specification covers a ready-mixed paint for use on wood surfaces subject to outside exposures. This paint shall conform to the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for Paint, Latex, Exterior, and shall be listed on the following MPI Approved Products List:

A. Exterior Latex, Flat MPI Gloss Level 1, MPI List Number 10.
B. Exterior Latex, Semi-Gloss, MPI Gloss Level 5, MPI List Number 11.
C. Exterior Latex, Gloss, MPI Gloss Level 6, MPI List Number 119.

Unpainted wood shall first be primed with wood primer conforming to the provisions in Section 91-3.01, "Wood Primer, Latex-Base."

Replace Section 91-4 with:

91-4 MISCELLANEOUS PAINTS

91-4.01 THROUGH 91-4.04 (BLANK)

91-4.05 PAINT; ACRYLIC EMULSION, EXTERIOR WHITE AND LIGHT AND MEDIUM TINTS

Classification:

This specification covers an acrylic emulsion paint designed for use on exterior masonry. This paint shall conform to the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for Paint, Latex, Exterior, and shall be listed on the following MPI Approved Products Lists:

A. Exterior Latex, Flat MPI Gloss Level 1, MPI List Number 10.
B. Exterior Latex, Semi-Gloss, MPI Gloss Level 5, MPI List Number 11.
C. Exterior Latex, Gloss, MPI Gloss Level 6, MPI List Number 119.

This paint may be tinted by using "universal" or "all purpose" concentrates.

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SECTION 92 ASPHALTS
(Issued 03-21-08)

Replace Section 92 with:

SECTION 92 ASPHALTS

92-1.01 DESCRIPTION

Asphalt is refined petroleum or a mixture of refined liquid asphalt and refined solid asphalt that are prepared from crude petroleum. Asphalt is:

1. Free from residues caused by the artificial distillation of coal, coal tar, or paraffin
2. Free from water
3. Homogeneous

92-1.02 MATERIALS

GENERAL

Furnish asphalt under the Department's "Certification Program for Suppliers of Asphalt." The Department maintains the program requirements, procedures, and a list of approved suppliers at:

http://www.dot.ca.gov/hq/esc/Translab/fpm/fpmcoc.htm

Transport, store, use, and dispose of asphalt safely.
Prevent the formation of carbonized particles caused by overheating asphalt during manufacturing or construction.

GRADES

Performance graded (PG) asphalt binder is:

Performance Graded Asphalt Binder

Property	AASHTO Test Method	Specification Grade				
		PG 58-22 [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	T 315	58	64	64	64	70
Minimum G*/sin(delta), kPa		1.00	1.00	1.00	1.00	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	T 315	58	64	64	64	70
Minimum G*/sin(delta), kPa		2.20	2.20	2.20	2.20	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	T 315	22 [d]	31 [d]	28 [d]	22 [d]	34 [d]
Maximum G*sin(delta), kPa		5000	5000	5000	5000	5000
Creep Stiffness, Test Temperature, °C	T 313	-12	0	-6	-18	0
Maximum S-value, Mpa		300	300	300	300	300
Minimum M-value		0.300	0.300	0.300	0.300	0.300

Notes:

a. Use as asphalt rubber base stock for high mountain and high desert area.

b. The Engineer waives this specification if the supplier is a Quality Supplier as defined by the Department's "Certification Program for Suppliers of Asphalt."

c. The Engineer waives this specification if the supplier certifies the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.

d. Test the sample at 3°C higher if it fails at the specified test temperature. G*sin(delta) remains 5000 kPa maximum.

e. "RTFO Test" means the asphaltic residue obtained using the Rolling Thin Film Oven Test, AASHTO Test Method T 240 or ASTM Designation: D 2872. The residue from mass change determination may be used for other tests.

f. "PAV" means Pressurized Aging Vessel.

Performance graded polymer modified asphalt binder (PG Polymer Modified) is:

Performance Graded Polymer Modified Asphalt Binder [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:

a. Do not modify PG Polymer Modified using acid modification.

b. The Engineer waives this specification if the supplier is a Quality Supplier as defined by the Department's "Certification Program for Suppliers of Asphalt."

c. The Department allows ASTM D 5546 instead of AASHTO T 44

d. The Engineer waives this specification if the supplier certifies the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.

e. 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.

f. Tests without a force ductility clamp may be performed.

g. "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.