



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**NOTICE TO BIDDERS
AND
SPECIAL PROVISIONS**

**FOR CONSTRUCTION ON STATE HIGHWAY IN ORANGE COUNTY IN
ANAHEIM FROM 0.3 MILE WEST OF TUSTIN AVENUE OVERCROSSING TO 0.3
MILE EAST OF 91/55 SEPARATION AND AT LAKEVIEW AVENUE
OVERCROSSING**

In District 12 On Route 91

Under

Bid book dated June 17, 2013

Standard Specifications dated 2010

Project plans approved April 15, 2013

Standard Plans dated 2010

Identified by

Contract No. 12-0C5604

12-Ora-91-8.1/9.3, 10.1

Project ID 1200000078

Electronic Advertising Contract

XS

Bids open Thursday, August 8, 2013

OSD

Dated June 17, 2013

IH

SPECIAL NOTICES

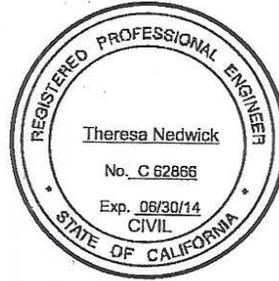
- The contract award period has been extended for this project. See section 3-1.04.

CONTRACT NO. 12-0C5604

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

STRUCTURES

Theresa Nedwick 04-17-13
REGISTERED CIVIL ENGINEER



ELECTRICAL

Vanessa Van Truong
REGISTERED ELECTRICAL ENGINEER



ELECTRICAL

Joanne Vo
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LANDSCAPE

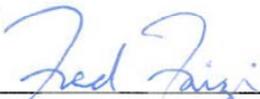
I-Hong Sun 2-6-13
LICENSED LANDSCAPE ARCHITECT DATE



CONTRACT NO. 12-0C5604

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

DESIGN


REGISTERED CIVIL ENGINEER



TRAFFIC DESIGN


REGISTERED CIVIL ENGINEER



HYDRAULICS

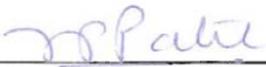

REGISTERED CIVIL ENGINEER



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STANDARD PLANS LIST

The standard plan sheets applicable to this Contract include those listed below. The applicable revised standard plans (RSPs) listed below are included in the project plans.

A10A	Abbreviations (Sheet 1 of 2)
A10B	Abbreviations (Sheet 2 of 2)
A10C	Lines and Symbols (Sheet 1 of 3)
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A77B1	Metal Beam Guard Railing - Standard Hardware
A77C1	Metal Beam Guard Railing - Wood Post and Wood Block Details
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A77G3	Metal Beam Guard Railing - Typical Layouts for Roadside Fixed Objects
A77G4	Metal Beam Guard Railing - Typical Layouts for Roadside Fixed Objects
A77G5	Metal Beam Guard Railing - Typical Layouts for Roadside Fixed Objects
A77G6	Metal Beam Guard Railing - Typical Layouts for Roadside Fixed Objects
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A77H3	Metal Railing - Anchor Cable and Anchor Plate Details
A77J3	Metal Beam Guard Railing - Connections to Abutments and Walls
A77J4	Metal Beam Guard Railing - Transition Railing (Type WB)
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A85A	Chain Link Fence Details
RSP A85B	Chain Link Fence Details
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A87B	Hot Mix Asphalt Dikes
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A88B	Curb Ramp and Island Passageway Details
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P2	Jointed Plain Concrete Pavement - Widened Slab Details
P3	Jointed Plain Concrete Pavement - Nondoweled shoulder Addition/Reconstruction
RSP P10	Concrete Pavement - Dowel Bar Details
P12	Concrete Pavement - Dowel Bar Basket Details
P17	Concrete Pavement - Tie Bar Basket Details
RSP P18	Concrete Pavement - Lane Schematics and Isolation Joint Detail
P20	Concrete Pavement - Joint Details

RSP P30	Concrete Pavement - End Panel Pavement Transitions
P33	Concrete Pavement - Lane Drop Paving Details No. 1
P34	Concrete Pavement - Lane Drop Paving Details No. 2
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D74C	Drainage Inlet Details
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RSP T9	Traffic Control System for Lane Closure on Freeways and Expressways
RSP T10	Traffic Control System for Lane Closure on Freeways and Expressways
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B7-5	Deck Drains
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S2	Overhead Signs - Truss, Single Post Type - Post Types II thru IX
S3	Overhead Signs - Truss, Single Post Type - Base Plate and Anchorage Details
S4	Overhead Signs - Truss, Single Post Type - Structural Frame Members Details No. 1
S5	Overhead Signs - Truss, Single Post Type - Structural Frame Members Details No. 2
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S7	Overhead Signs - Truss, Single Post Type - Square Pedestal Pile Foundation
S8	Overhead Signs - Truss, Single Post Type - Round Pedestal Pile Foundation
S9	Overhead Signs - Truss, Two Post Type - Post Types I-S thru VII-S
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S11	Overhead Signs - Truss, Two Post Type - Structural Frame Members

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S17	Overhead Signs - Walkway Details No. 2
S17A	Overhead Signs - Walkway Details No. 3
S18	Overhead Signs - Walkway Safety Railing Details
S19	Overhead Signs - Truss, Sign Mounting Details - Laminated Panel - Type A
S44	Overhead Signs - Lightweight, Type B, Connection Details
S45	Overhead Signs - Lightweight, Type C, Connection Details
S46	Overhead Signs - Lightweight, Sign Panel Mounting Details, Laminated Panel - Type A
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ES-15C	Electrical Systems (Sign Illumination Equipment)
ES-15D	Electrical Systems (Lighting and Sign Illumination Control)
ES-16A	Electrical Systems (Closed Circuit Television, 5' to 15' Overhead Sign Mounted Pole)

CANCELED STANDARD PLANS LIST

The standard plan sheets listed below are canceled and not applicable to this contract.

B3-1	Canceled on April 20, 2012
B3-2	Canceled on April 20, 2012
B3-3	Canceled on April 20, 2012
B3-4	Canceled on April 20, 2012
B3-7	Canceled on April 20, 2012
B3-8	Canceled on April 20, 2012
ES-8	Canceled on January 20, 2012
ES-10	Canceled on July 20, 2012

NOTICE TO BIDDERS

Bids open Thursday, August 8, 2013

Dated June 17, 2013

General work description: Widen rdwy and bridge, const retaining walls and new bypass off-ramp.

The Department will receive sealed bids for CONSTRUCTION ON STATE HIGHWAY IN ORANGE COUNTY IN ANAHEIM FROM 0.3 MILE WEST OF TUSTIN AVENUE OVERCROSSING TO 0.3 MILE EAST OF 91/55 SEPARATION AND AT LAKEVIEW AVENUE OVERCROSSING.

District-County-Route-Post Mile: 12-Ora-91-8.1/9.3, 10.1

Contract No. 12-0C5604

The Contractor must have either a Class A license or any combination of the following Class C licenses which constitutes a majority of the work: C-8, C-12.

The Department establishes no DVBE Contract goal but encourages bidders to obtain DVBE participation.

Bids must be on a unit price basis.

Complete the work, excluding plant establishment work, within 500 working days.

Complete the work, including plant establishment work, within 750 working days.

Complete the plant establishment work within 250 working days.

The estimated cost of the project is \$19,800,000.

No prebid meeting is scheduled for this project.

The Department will receive bids until 2:00 p.m. on the bid open date at 3347 Michelson Drive, Suite 100, Irvine, CA 92612-1692. 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*.

Present bidders' inquiries to the Department and view the Department's responses at:

http://www.dot.ca.gov/hq/esc/oe/project_status/bid_inq.html

Questions about alleged patent ambiguity of the plans, specifications, or estimate must be asked before bid opening. After bid opening, the Department does not consider these questions as bid protests.

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

Under Govt Code § 14835 et seq. and 2 CA Code of Regs § 1896 et seq., the Department gives preference to certified small businesses and non-small businesses who commit to 25 percent certified small business participation.

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 to contractors from that state on its public entity construction contracts.

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 Department has made available Notices of Suspension and Proposed Debarment from the Federal Highway Administration. For a copy of the notices, go to http://www.dot.ca.gov/hq/esc/oe/contractor_info. Additional information is provided in the Excluded Parties List System at <https://www.epls.gov>.

Department of Transportation

WAT

BID ITEM LIST

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
1	070030	LEAD COMPLIANCE PLAN	LS	LUMP SUM
2	080050	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM
3	090100	TIME-RELATED OVERHEAD (WDAY)	WDAY	500
4	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM
5	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM
6	120120	TYPE III BARRICADE	EA	8
7	120165	CHANNELIZER (SURFACE MOUNTED)	EA	79
8	128652	PORTABLE CHANGEABLE MESSAGE SIGN (LS)	LS	LUMP SUM
9	129000	TEMPORARY RAILING (TYPE K)	LF	10,100
10	129100	TEMPORARY CRASH CUSHION MODULE	EA	70
11	129150	TEMPORARY TRAFFIC SCREEN	LF	10,100
12	130100	JOB SITE MANAGEMENT	LS	LUMP SUM
13	130300	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM
14	130310	RAIN EVENT ACTION PLAN	EA	42
15	130320	STORM WATER SAMPLING AND ANALYSIS DAY	EA	17
16	130330	STORM WATER ANNUAL REPORT	EA	2
17	130530	TEMPORARY HYDRAULIC MULCH (BONDED FIBER MATRIX)	SQYD	6,620
18	130620	TEMPORARY DRAINAGE INLET PROTECTION	EA	53
19	130640	TEMPORARY FIBER ROLL	LF	2,400
20	130650	TEMPORARY GRAVEL BAG BERM	LF	2,510

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
21	130710	TEMPORARY CONSTRUCTION ENTRANCE	EA	2
22	130730	STREET SWEEPING	LS	LUMP SUM
23	130900	TEMPORARY CONCRETE WASHOUT	LS	LUMP SUM
24	141101	REMOVE YELLOW PAINTED TRAFFIC STRIPE (HAZARDOUS WASTE)	LF	3,120
25	141103	REMOVE YELLOW THERMOPLASTIC TRAFFIC STRIPE (HAZARDOUS WASTE)	LF	7,290
26	141120	TREATED WOOD WASTE	LB	49,500
27	150310	RAPID SETTING CONCRETE (PATCH)	CF	2
28	150608	REMOVE CHAIN LINK FENCE	LF	1,760
29	150662	REMOVE METAL BEAM GUARD RAILING	LF	3,580
30	150711	REMOVE PAINTED TRAFFIC STRIPE	LF	21,100
31	150712	REMOVE PAINTED PAVEMENT MARKING	SQFT	590
32	150714	REMOVE THERMOPLASTIC TRAFFIC STRIPE	LF	18,300
33	150715	REMOVE THERMOPLASTIC PAVEMENT MARKING	SQFT	730
34	150722	REMOVE PAVEMENT MARKER	EA	5,140
35	150742	REMOVE ROADSIDE SIGN	EA	18
36	150747	REMOVE ROADSIDE SIGN (STRAP AND SADDLE BRACKET METHOD)	EA	3
37	150757	REMOVE SIGN STRUCTURE (EA)	EA	3
38	150767	REMOVE BRIDGE MOUNTED SIGN	EA	2
39	150809	REMOVE CULVERT (LF)	LF	410
40	150820	REMOVE INLET	EA	6

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
41	150821	REMOVE HEADWALL	EA	8
42	151224	REMOVE DELINEATOR	EA	13
43	152386	RELOCATE ROADSIDE SIGN-ONE POST	EA	2
44	153103	COLD PLANE ASPHALT CONCRETE PAVEMENT	SQYD	110
45	153215	REMOVE CONCRETE (CURB AND GUTTER)	LF	700
46	153220	REMOVE CONCRETE (CHANNEL)	CY	390
47	153223	REMOVE UNSOUND CONCRETE	CF	2
48	153247	REMOVE CONCRETE (MISCELLANEOUS) (CY)	CY	190
49	044293	CORE CONCRETE (4 1/2")	LF	90
50	153306	CORE CONCRETE (6")	LF	147
51	155003	CAP INLET	EA	1
52	157561	BRIDGE REMOVAL (PORTION), LOCATION A	LS	LUMP SUM
53	157562	BRIDGE REMOVAL (PORTION), LOCATION B	LS	LUMP SUM
54	044294	REMOVE OBSTRUCTION (ABANDONED WATER PIPE)	LF	50
55	160102	CLEARING AND GRUBBING (LS)	LS	LUMP SUM
56	190101	ROADWAY EXCAVATION	CY	32,500
57	190107	ROADWAY EXCAVATION (TYPE Y-1) (AERIALY DEPOSITED LEAD)	CY	2,230
58 (F)	192001	STRUCTURE EXCAVATION	CY	568
59 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	73
60 (F)	044295	STRUCTURE EXCAVATION (TYPE A), LOCATION A	CY	1,858

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
61 (F)	044296	STRUCTURE EXCAVATION (TYPE A), LOCATION B	CY	251
62 (F)	044297	STRUCTURE EXCAVATION (TYPE A), LOCATION LEVEE	CY	864
63 (F)	192037	STRUCTURE EXCAVATION (RETAINING WALL)	CY	4,176
64 (F)	192055	STRUCTURE EXCAVATION (SOIL NAIL WALL)	CY	764
65	192057	STRUCTURE EXCAVATION (TYPE Y-1) (AERIALY DEPOSITED LEAD)	CY	151
66 (F)	192060	STRUCTURE EXCAVATION (GROUND ANCHOR WALL)	CY	90
67 (F)	193001	STRUCTURE BACKFILL	CY	136
68 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	215
69 (F)	044298	STRUCTURE BACKFILL (BRIDGE), LOCATION LEVEE	CY	506
70 (F)	193013	STRUCTURE BACKFILL (RETAINING WALL)	CY	6,374
71 (F)	193027	STRUCTURE BACKFILL (GROUND ANCHOR WALL)	CY	8
72 (F)	193028	STRUCTURE BACKFILL (SOIL NAIL WALL)	CY	91
73 (F)	193031	PERVIOUS BACKFILL MATERIAL (RETAINING WALL)	CY	783
74	194001	DITCH EXCAVATION	CY	94
75	200002	ROADSIDE CLEARING	LS	LUMP SUM
76	202006	SOIL AMENDMENT	CY	2
77	202011	MULCH	CY	1,600
78	202037	ORGANIC FERTILIZER	LB	21
79	204006	PLANT (GROUP F)	EA	37,100
80	204022	PLANT (GROUP Z)	EA	17

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
81	204035	PLANT (GROUP A)	EA	150
82	204038	PLANT (GROUP U)	EA	12
83	204096	MAINTAIN EXISTING PLANTED AREAS	LS	LUMP SUM
84	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM
85	206401	MAINTAIN EXISTING IRRIGATION FACILITIES	LS	LUMP SUM
86	206560	CONTROL AND NEUTRAL CONDUCTORS	LS	LUMP SUM
87	206602	1" ELECTRIC REMOTE CONTROL VALVE	EA	6
88	206604	1 1/2" ELECTRIC REMOTE CONTROL VALVE	EA	10
89	206605	2" ELECTRIC REMOTE CONTROL VALVE	EA	3
90	208465	SPRINKLER (TYPE A-5)	EA	99
91	208466	SPRINKLER (TYPE A-6)	EA	52
92	208467	SPRINKLER (TYPE A-7)	EA	3
93	208471	SPRINKLER (TYPE B-1)	EA	86
94	208473	SPRINKLER (TYPE B-3)	EA	84
95	208474	SPRINKLER (TYPE B-4)	EA	14
96	208481	SPRINKLER (TYPE C-1)	EA	28
97	208588	3" GATE VALVE	EA	5
98 (F)	208595	1" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	9,725
99 (F)	208596	1 1/4" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	1,175
100 (F)	208597	1 1/2" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	1,025

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
101 (F)	208598	2" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	2,025
102 (F)	208600	3" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	2,450
103	208683	BALL VALVE	EA	6
104 (F)	208739	10" CORRUGATED HIGH DENSITY POLYETHYLENE PIPE CONDUIT	LF	300
105	250301	CLASS 3 AGGREGATE SUBBASE	CY	15,000
106	260203	CLASS 2 AGGREGATE BASE (CY)	CY	9,610
107	280000	LEAN CONCRETE BASE	CY	700
108	390132	HOT MIX ASPHALT (TYPE A)	TON	4,690
109	390137	RUBBERIZED HOT MIX ASPHALT (GAP GRADED)	TON	2,340
110	394074	PLACE HOT MIX ASPHALT DIKE (TYPE C)	LF	210
111	394076	PLACE HOT MIX ASPHALT DIKE (TYPE E)	LF	2,230
112	394077	PLACE HOT MIX ASPHALT DIKE (TYPE F)	LF	1,310
113	401050	JOINTED PLAIN CONCRETE PAVEMENT	CY	1,570
114	025681	JOINTED PLAIN CONCRETE PAVEMENT, RAPID STRENGTH CONCRETE	CY	350
115	460210	GROUND ANCHOR (SUBHORIZONTAL)	EA	23
116	460300	SOIL NAIL	LF	13,410
117	025682	VIBRATION MONITORING	LS	LUMP SUM
118	490508	FURNISH STEEL PILING (HP 10 X 57)	LF	10,182
119	490509	DRIVE STEEL PILE (HP 10 X 57)	EA	222
120	490605	36" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	85

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
121	490609	60" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	328
122	044299	FURNISH PILING (CLASS 200) (ALTERNATIVE X)	LF	6,015
123	044300	DRIVE PILE (CLASS 200) (ALTERNATIVE X)	EA	119
124	498044	36" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	44
125	498050	54" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	60
126	498052	60" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	110
127	510000	SEAL COURSE CONCRETE	CY	468
128 (F)	510050	STRUCTURAL CONCRETE	CY	163
129 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	374
130 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	1,107
131 (F)	510060	STRUCTURAL CONCRETE, RETAINING WALL	CY	2,891
132 (F)	510072	STRUCTURAL CONCRETE, BARRIER SLAB	CY	565
133	510081	AGGREGATE BASE (APPROACH SLAB)	CY	3
134 (F)	510086	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N)	CY	48
135	510087	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE R)	CY	27
136 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	102.1
137	025683	MINOR CONCRETE (ANCHOR BLOCK)	CY	11
138	510805	DIAPHRAGM BOLSTER	EA	56
139 (F)	511055	CONCRETE SURFACE TEXTURE	SQFT	7,800
140 (F)	511064	FRACTURED RIB TEXTURE	SQFT	25,150

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
141	511106	DRILL AND BOND DOWEL	LF	1,424
142	511118	CLEAN EXPANSION JOINT	LF	393
143	519100	JOINT SEAL (MR 2")	LF	468
144 (F)	520101	BAR REINFORCING STEEL	LB	32,763
145 (F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	865,840
146 (F)	520103	BAR REINFORCING STEEL (RETAINING WALL)	LB	527,683
147 (F)	530200	STRUCTURAL SHOTCRETE	CY	206
148 (F)	560203	FURNISH SIGN STRUCTURE (BRIDGE MOUNTED WITH WALKWAY)	LB	8,160
149 (F)	560204	INSTALL SIGN STRUCTURE (BRIDGE MOUNTED WITH WALKWAY)	LB	8,160
150 (F)	560213	FURNISH SIGN STRUCTURE (LIGHTWEIGHT)	LB	8,156
151 (F)	560214	INSTALL SIGN STRUCTURE (LIGHTWEIGHT)	LB	8,156
152 (F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	80,916
153 (F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	80,916
154	560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	1,320
155	560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	200
156	560249	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-UNFRAMED)	SQFT	180
157	560251	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-FRAMED)	SQFT	150
158	560252	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-FRAMED)	SQFT	25
159	562004	METAL (RAIL MOUNTED SIGN)	LB	1,180
160	566011	ROADSIDE SIGN - ONE POST	EA	20

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
161	566012	ROADSIDE SIGN - TWO POST	EA	7
162	568001	INSTALL SIGN (STRAP AND SADDLE BRACKET METHOD)	EA	4
163	650014	18" REINFORCED CONCRETE PIPE	LF	330
164	650018	24" REINFORCED CONCRETE PIPE	LF	1,510
165	650026	36" REINFORCED CONCRETE PIPE	LF	2,630
166	650038	54" REINFORCED CONCRETE PIPE	LF	400
167	665117	18" BITUMINOUS COATED CORRUGATED STEEL PIPE (.079" THICK)	LF	9
168	703233	GRATED LINE DRAIN	LF	63
169	703317	18" BITUMINOUS COATED CORRUGATED STEEL PIPE RISER (.079" THICK)	LF	13
170	044301	6" WELDED STEEL PIPE CASING (BRIDGE)	LF	77
171	707217	36" PRECAST CONCRETE PIPE MANHOLE	LF	7
172	044302	DERRICK STONE (PIER NOSE)	CY	272
173	044303	BEDDING STONE (PIER NOSE)	CY	105
174	044304	RECONSTRUCT FACING STONE	CY	63
175 (F)	721017	ROCK SLOPE PROTECTION (FACING, METHOD B) (CY)	CY	7.6
176	721420	CONCRETE (DITCH LINING)	CY	32
177	044305	GROUTING RIPRAP	CY	16
178	729011	ROCK SLOPE PROTECTION FABRIC (CLASS 8)	SQYD	25
179	730045	MINOR CONCRETE (GUTTER) (CY)	CY	14
180	730070	DETECTABLE WARNING SURFACE	SQFT	12

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
181	731530	MINOR CONCRETE (TEXTURED PAVING)	CY	240
182	731623	MINOR CONCRETE (CURB RAMP)	CY	0.2
183 (F)	750001	MISCELLANEOUS IRON AND STEEL	LB	19,791
184 (F)	750497	MISCELLANEOUS METAL (RESTRAINER - BAR TYPE)	LB	896
185 (F)	750498	MISCELLANEOUS METAL (RESTRAINER - CABLE TYPE)	LB	15,425
186 (F)	750501	MISCELLANEOUS METAL (BRIDGE)	LB	1,076
187 (F)	750505	BRIDGE DECK DRAINAGE SYSTEM	LB	161
188	800360	CHAIN LINK FENCE (TYPE CL-6)	LF	1,820
189	802501	4' CHAIN LINK GATE (TYPE CL-6)	EA	1
190	820107	DELINEATOR (CLASS 1)	EA	10
191	820118	GUARD RAILING DELINEATOR	EA	40
192	820134	OBJECT MARKER (TYPE P)	EA	5
193	832003	METAL BEAM GUARD RAILING (WOOD POST)	LF	1,320
194 (F)	839521	CABLE RAILING	LF	369
195	839541	TRANSITION RAILING (TYPE WB)	EA	7
196	839581	END ANCHOR ASSEMBLY (TYPE SFT)	EA	4
197	839584	ALTERNATIVE IN-LINE TERMINAL SYSTEM	EA	2
198	839585	ALTERNATIVE FLARED TERMINAL SYSTEM	EA	6
199	044306	CONCRETE BARRIER (TYPE 60C MODIFIED)	LF	100
200	839701	CONCRETE BARRIER (TYPE 60)	LF	1,410

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
201	839704	CONCRETE BARRIER (TYPE 60D)	LF	199
202	044307	CONCRETE BARRIER (TYPE 60D MODIFIED 1)	LF	600
203	044308	CONCRETE BARRIER (TYPE 60D MODIFIED 2)	LF	80
204	044309	CONCRETE BARRIER (TYPE 60D MODIFIED 3)	LF	102
205 (F)	839725	CONCRETE BARRIER (TYPE 736)	LF	1,672
206 (F)	839726	CONCRETE BARRIER (TYPE 736A)	LF	1,879
207 (F)	839731	CONCRETE BARRIER (TYPE 736B)	LF	9.1
208	840504	4" THERMOPLASTIC TRAFFIC STRIPE	LF	17,900
209	840506	8" THERMOPLASTIC TRAFFIC STRIPE	LF	4,190
210	840508	8" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 12-3)	LF	1,310
211	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	1,750
212	840521	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 6-1)	LF	140
213	840525	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 36-12)	LF	23,300
214	840526	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 17-7)	LF	1,480
215	840656	PAINT TRAFFIC STRIPE (2-COAT)	LF	28,300
216	840666	PAINT PAVEMENT MARKING (2-COAT)	SQFT	590
217	850101	PAVEMENT MARKER (NON-REFLECTIVE)	EA	3,430
218	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	2,310
219	860090	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	LUMP SUM
220	860150	SIGNAL AND LIGHTING (TEMPORARY)	LS	LUMP SUM

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
221	860201	SIGNAL AND LIGHTING	LS	LUMP SUM
222	860400	LIGHTING (TEMPORARY)	LS	LUMP SUM
223	860460	LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM
224	025684	OCTA FACILITY (TEMPORARY)	LS	LUMP SUM
225 (F)	044310	COMMUNICATION CONDUIT (BRIDGE) (MODIFIED)	LF	1,736
226	025685	COMMUNICATION SYSTEM	LS	LUMP SUM
227	025686	COMMUNICATION SYSTEM (TEMPORARY)	LS	LUMP SUM
228	025687	OCTA FACILITY	LS	LUMP SUM
229	025688	RAMP METERING SYSTEM AND ELECTRIC SERVICE (IRRIGATION)	LS	LUMP SUM
230	869075	SYSTEM TESTING AND DOCUMENTATION	LS	LUMP SUM
231	999990	MOBILIZATION	LS	LUMP SUM

SPECIAL PROVISIONS

DIVISION I GENERAL PROVISIONS

1 GENERAL

Add to section 1-1.01:

Bid Items and Applicable Sections

Item code	Item description	Applicable section
044293	CORE CONCRETE (4 1/2")	15
044294	REMOVE OBSTRUCTION (ABANDONED WATER PIPE)	15
044295	STRUCTURE EXCAVATION (TYPE A), LOCATION A	19
044296	STRUCTURE EXCAVATION (TYPE A), LOCATION B	19
044297	STRUCTURE EXCAVATION (TYPE A), LOCATION LEVEE	19
044298	STRUCTURE BACKFILL (BRIDGE), LOCATION LEVEE	19
025681	JOINTED PLAIN CONCRETE PAVEMENT, RAPID STRENGTH CONCRETE	40
025682	VIBRATION MONITORING	
044299	FURNISH PILING (CLASS 200) (ALTERNATIVE X)	49
044300	DRIVE PILE (CLASS 200) (ALTERNATIVE X)	49
025683	MINOR CONCRETE (ANCHOR BLOCK)	51
044301	6" WELDED STEEL PIPE CASING (BRIDGE)	70
044302	DERRICK STONE (PIER NOSE)	72
044303	BEDDING STONE (PIER NOSE)	72
044304	RECONSTRUCT FACING STONE	72
044305	GROUTED RIPRAP	72
044306	CONCRETE BARRIER (TYPE 60C MODIFIED)	83
044307	CONCRETE BARRIER (TYPE 60D MODIFIED 1)	83
044308	CONCRETE BARRIER (TYPE 60D MODIFIED 2)	83
044309	CONCRETE BARRIER (TYPE 60D MODIFIED 3)	83
025684	OCTA FACILITY (TEMPORARY)	86
044310	COMMUNICATION CONDUIT (BRIDGE) (MODIFIED)	86
025685	COMMUNICATION SYSTEM	86
025686	COMMUNICATION SYSTEM (TEMPORARY)	86
025687	OCTA FACILITY	86
025688	RAMP METERING AND ELECTRIC SERVICE (IRRIGATION)	86

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5 CONTROL OF WORK

Add to section 5-1.09A:

The Department encourages the project team to exhaust the use of partnering in dispute resolution before engagement of an objective third party.

For certain disputes, a 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 DRB referral time following the Engineer's response to a *Supplemental Potential Claim Record*.

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 5-1.43.

Add to section 5-1.20A:

During the progress of the work under this Contract, work under the following contracts may be in progress at or near the job site of this Contract:

Coincident or Adjacent Contracts

Contract no.	County–Route–Post Mile	City	Type of work
12-0G3314	Ora-91-PM 9.20 to 15.90	Anaheim	Replace Highway Planting
12-0H0294	Ora-91-PM 0.00 to 10.10	Anaheim	Replace Concrete Pavement

Add to section 5-1.20C:

This project does not include work on the railroad property, but railroads are shown on the general plan sheet within project limits. Do not trespass on the railroad property at the following crossings:

SR-91: SCRRRA/Metrolink – North Olive UP, Bridge #55-195, PM 8.19/8.26, (DOT #027006U, PUC #101OL-1.40-B)

Add to section 5-1.23B(2):

For submittals to OSD Documents Unit, submit drawings and calculation sheets electronically in PDF format with at least 300 dpi resolution. You must have an email account and the following software on your computer with internet connection:

1. Operating system must be either:
 - 1.1. Windows XP
 - 1.2. Windows Vista
 - 1.3. Windows 7
2. Internet browsed must be either:
 - 2.1. Internet Explorer 7 or newer
 - 2.2. Mozilla Firefox 3.0 or newer

The Department provides 60 minutes of internet based training on use of the internet based electronic submittal service within 30 days of your request. Upon completion of training, the Department provides user names and passwords to your assigned representatives.

Additional training is provided if requested.

After completion of training, if you have questions about using the website to make a submittal, contact the Department at (916) 227-8497 or jeff.sims@dot.ca.gov.

Submit using the following basic instructions:

1. Open your internet browser and go to <https://www.submittalexchange.com/public/login.aspx>.
2. Enter your username and password.
3. Select the Log In button.
4. Select your project and go to the Activity Summary tab or the Full Log tab and click on the Submittal Log.
5. Locate the section that you would like to submit under and click on the description of the submittal. A dialog box displays.
6. Click on the second Browse button and locate the file you would like to submit on your computer.
7. Click open to attach your file to the dialog box. The name of your file appears under the Browse button.
8. Click Save. Your submittal is uploaded and notification is sent to the Department.

If submittal of more than 1 copy or set of shop drawings or calculations is specified, submit only 1 electronic copy.

Upon review completion, the Department returns 1 electronic copy that shows the authorized date.

The specifications for paper weight in section 5-1.23B(2) do not apply to electronic submittals.

Add to section 5-1.36D:

The utilities shown in the following table will not be rearranged. The utilities may interfere with pile driving, drilling activities, or substructure construction. If you want any of them rearranged or temporarily deactivated, make arrangements with the utility owner.

Utilities Not Rearranged for Pile Driving, Drilling Activities, or Substructure Construction

Utility	Location
Abandoned 36" Waterline (City of Anaheim)	Abutment 1, Pier 2, and Pier 3

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7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Replace section 7-1.02K(6)(j)(iii) with:

7-1.02K(6)(j)(iii) Earth Material Containing Lead

Section 7-1.02K(6)(j)(iii) includes specifications for handling, reusing, removing, and disposing of earth material containing nonhazardous waste concentrations of lead.

Submit a lead compliance plan.

Lead is present at nonhazardous waste concentrations in earth material on the job site at the locations shown below in the table, "Earth Material Management". The average lead concentrations are below 1,000 mg/kg total lead and below 5 mg/L soluble lead. The material on the job site at the listed locations:

1. Is not a hazardous waste

The background on construction project funding signs must be Type II retroreflective sheeting on the Authorized Material List for signing and delineation materials.

The legend must be retroreflective, except for nonreflective black letters and numerals. The colors blue and orange must comply with PR Color no. 3 and no. 6, respectively, as specified in the Federal Highway Administration's *Color Tolerance Chart*.

The legend for the type of project on construction project funding signs must read as follows:

Highway Construction

The legend for the types of funding on construction project funding signs must read as follows and in the following order:

FEDERAL HIGHWAY TRUST FUNDS

STATE HIGHWAY FUNDS

Measure M

The Engineer will provide the year of completion for the legend on construction project funding signs. Furnish and install a sign overlay for the year of completion within 10 working days of notification.

The legend for the year of completion on construction project funding signs must read as follows:

YEAR OF COMPLETION 2015

The size of the legend on construction project funding signs must be as described. Do not add any additional information unless authorized.

12-2.03 CONSTRUCTION

Install 2 Type 2 construction project funding signs at the locations designated by the Engineer before starting major work activities visible to highway users.

When authorized, remove and dispose of construction project funding signs upon completion of the project.

12-2.04 PAYMENT

Not Used

Replace 1st paragraph in section 12-3.06B(1) with:

Construction area warning and guide signs must have a black legend on a retroreflective, nonfluorescent-orange background. W10-1 advance warning sign for highway-rail grade crossings must have a black legend on a retroreflective, nonfluorescent-yellow background.

Add to section 12-3.12C:

Start displaying the message on the portable changeable message sign 15 minutes before closing the lane.

Place the portable changeable message sign in advance of the 1st warning sign for each:

1. Stationary lane closure
2. Off-ramp closure
3. Shoulder closure

Replace section 12-3.13 with:

12-3.13 IMPACT ATTENUATOR VEHICLE

12-3.13A General

12-3.13A(1) Summary

Section 12-3.13 includes specifications for protecting traffic and workers with an impact attenuator vehicle during moving lane closures and when placing and removing components of stationary lane closures, ramp closures, shoulder closures, or a combination.

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

1. Test level 3 if the preconstruction posted speed limit is 50 mph or more
2. Test levels 2 or 3 if the preconstruction posted speed limit is 45 mph or less

Comply with the attenuator manufacturer's instructions for:

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

Flashing arrow signs must comply with section 12-3.03. You may use a portable changeable message sign instead of a flashing arrow sign. If a portable changeable message sign is used as a flashing arrow sign, it must comply with section 6F.56 "Arrow Panels" of the *California MUTCD*.

12-3.13A(2) Definitions

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

12-3.13A(3) Submittals

Upon request, submit a certificate of compliance for each attenuator used on the project.

12-3.13A(4) Quality Control and Assurance

Do not start impact attenuator vehicle activities until authorized.

Before starting impact attenuator vehicle activities, conduct a preinstallation meeting with the Engineer, subcontractors, and other parties involved with traffic control to discuss the operation of the impact attenuator vehicle during moving lane closures and when placing and removing components of stationary traffic control systems.

Schedule the location, time, and date for the preinstallation meeting with all participants. Furnish the facility for the preinstallation meeting within 5 miles of the job site or at another location if authorized.

12-3.13B Materials

Attenuators must be a brand on the Authorized Material List for highway safety features.

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 or greater than 26,400 pounds.

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

Each impact attenuator vehicle must have:

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

12-3.13C Construction

Except where prohibited, use an impact attenuator vehicle:

1. To follow behind equipment and workers who are placing and removing components of a stationary lane closure, ramp closure, shoulder closure, or any combination. Operate the flashing arrow sign in the arrow or caution mode during this activity, whichever applies. Follow at a distance that prevents intrusion into the workspace from passing traffic.
2. As a shadow vehicle in a moving lane closure.

After placing components of a stationary traffic control system you may place the impact attenuator vehicle in advance of the work area or at another authorized location to protect traffic and workers.

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

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

12-3.13D Payment

Not Used

Replace section 12-3.14 with:

12-3.14 TEMPORARY TRAFFIC SCREEN

12-3.14A General

Section 12-3.14 includes specifications for constructing temporary traffic screen at the locations shown.

12-3.14B Materials

Temporary traffic screen panels must be new or used, CDX grade or better, plywood or weather-resistant strandboard mounted and anchored on Type K temporary railing.

Wale boards must be new or used Douglas fir, rough sawn, construction grade or better.

Pipe screen supports must be new or used schedule 40, galvanized steel pipe.

Nuts, bolts, and washers must be cadmium plated.

Screws must be black or cadmium-plated flat head, cross-slotted screws with full thread length.

12-3.14C Construction

Mount and anchor temporary traffic screen on top of Type K temporary railing.

Remove the traffic screen from the highway when the Engineer determines it is no longer required. The traffic screen that is removed becomes your property.

A lateral move of Type K temporary railing with attached temporary traffic screen is change order work if ordered and the repositioning is not shown.

12-3.14D Payment

Temporary traffic screen is measured along the line of the completed screen.

Add to section 12-4.02A:

If work including installing, maintaining, and removing Type K temporary railing is to be performed within 6 feet of the adjacent traffic lane, close the adjacent traffic lane.

Except as listed above, closure of the adjacent traffic lane is not required for installing, maintaining, and removing traffic control devices.

For grinding and grooving operations, sawcutting concrete slabs, and installing loop detectors with an impact attenuator vehicle as a shadow vehicle, closure of the adjacent traffic lane is not required.

Designated holidays are as shown in the following table:

Designated Holidays	
Holiday	Date observed
New Year's Day	January 1st
Washington's Birthday	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4th
Labor Day	1st Monday in September
Veterans Day	November 11th
Thanksgiving Day	4th Thursday in November
Christmas Day	December 25th

If a designated holiday falls on a Sunday, the following Monday is a designated holiday. If November 11th falls on a Saturday, the preceding Friday is a designated holiday.

Special days are The day after Thanksgiving, Lincoln's Birthday, Washington's Birthday, and Columbus day.

The maximum length of a single stationary lane closure is 1.5 miles.

Not more than 1 stationary lane closures will be allowed in each direction of travel at one time. If work vehicles or equipment are parked within 6 feet of a traffic lane, close the shoulder area as shown.

At each location where falsework is constructed over a street or route listed, provide openings through the bridge falsework. The type, minimum width, height, and number of openings at each location, and the location and maximum spacing of the falsework lighting, if required for each opening, must comply with the requirements shown in the table. The width of vehicular openings is the clear width between temporary railings or other protective work. The spacing shown in the table for falsework pavement lighting is the maximum distance from center to center, in feet, between fixtures.

Temporary railing is not required at the following location. In addition to the falsework pavement lighting specified, illuminate each side of each vehicular passageway between portals with a string of yellow 25 W lamps spaced at 12-

foot intervals, mounted at a height of 8 to 8-1/2 feet above the pavement.

Santa Ana River Bridge
Bridge No. 55-0106R/L

	Number	Width (feet)	Height (feet)
Maintenance Road	1	20	10
Levee	1	14	9.5
Bike Path	1	14	10
	Location	Spacing	
Falsework pavement lighting	R	22.5	

NOTE:
R = Right side of traffic
L = Left side of traffic

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

Have the necessary materials and equipment on site to erect or remove falsework over any 1 opening before detouring or stopping traffic.

Add between the 3rd and 4th paragraphs of the RSS for section 12-4.03:

For the following operations, submit the contingency plan and discuss with the Engineer at least 5 business days before starting that operation:

1. Full Roadway Closure _____
2. Bridge Work
3. Roadway Excavation, Structure Excavation
4. Cold Planing, Asphalt work, Striping

Replace the 4th paragraph of the RSS for section 12-4.03 with:

Submit any revisions to the contingency plan for an operation at least 2 business days before starting that operation. Do not close any lanes until the contingency plan has been authorized.

Add to section 12-4.03:

For each 10-minute interval or fraction thereof past the time specified to reopen the closure, the Department deducts the amount for damages per interval shown below. Damages are limited to 5 percent of the total bid per occurrence. Damages are not assessed if the Engineer orders the closure to remain in place beyond the scheduled pickup time.

Type of facility	Route or segment	Period	Damages/interval (\$)
Mainline		1st half hour	\$1600 / 10 minutes
		2nd half hour	\$2400 / 10 minutes
		2nd hour and beyond	\$3200 / 10 minutes
Connector		1st half hour	\$1400 / 10 minutes
		2nd half hour	\$2000 / 10 minutes
		2nd hour and beyond	\$2700 / 10 minutes

Replace "Reserved" in section 12-4.04 with:

Lane Closure Restriction for Designated Holidays and Special Days										
Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
x	H xx	xx	xx							
	SD xx									
x	xx	H xx	xx							
		SD xx								
	x	xx	H xx	xx						
			SD xx							
	x	xx	xx	H xx	xxx					
	x	xx	xx	SD xx	xxx					
				x	H xx					
				x	SD xx					
					x	H xx				
						SD xx				
						x	H xx	xx	xx	xx
							SD xx			

Legend:

	Refer to lane requirement charts
x	The full width of the traveled way must be open for use by traffic after 5:00 A.M..
xx	The full width of the traveled way must be open for use by traffic.
xxx	The full width of the traveled way must be open for use by traffic until 10:00 P.M..
H	Designated holiday
SD	Special day

Replace "Reserved" in section 12-4.05E with:

Chart no. 1 Complete Ramp Closure Hours/Ramp Lane Requirements																												
County: Orange							Route/Direction: 91/WB							PM: 8.1/9.3, 10.1														
Closure limits: (a) Tustin Ave off-ramp (b) Tustin Ave on-ramp																												
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		C	C	C	C	C																				C	C	
Fridays		C	C	C	C	C																					C	C
Saturdays		C	C	C	C	C	C	C	C	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	C	
Sundays		C	C	C	C	C	C	C	C	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	C	
Legend:																												

C Ramp may be closed completely																												
S Shoulder closure allowed																												

Work allowed within the highway where shoulder or lane closure is not required																												
REMARKS:																												

Replace "Reserved" in section 12-4.05D with:

Chart no. 2 Complete Connector Closure Hours/Connector Lane Requirements																											
County: Orange						Route/Direction:										PM: 8.1,9.3,10.1											
Closure limits: WB 91 on-ramp (connector) from NB 55																											
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		C	C	C	C																					C	C
Fridays		C	C	C	C																					C	C
Saturdays		C	C	C	C	C	C	C	C	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	C	
Sundays		C	C	C	C	C	C	C	C	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	C	
Legend:																											

C		Connector may be closed completely																									

S		Shoulder closure allowed																									

		Work allowed within the highway where shoulder or lane closure is not required																									
REMARKS:																											

Replace "Reserved" in section 12-4.05B with:

Chart no. 3 Freeway/Expressway Lane Requirements																										
County: Orange					Route/Direction: 91/WB/EB										PM: 8.1,9.3,10.1											
Closure limits: WB & EB 91 between 55/91 connector and Tustin Ave off-ramp																										
From hour to hour		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	3																			2	2
Fridays		1	1	1	1	3																			2	2
Saturdays		1	1	1	1	1	2	2	3																3	2
Sundays		1	1	1	1	1	2	2	3																3	2

Legend:

1	Provide at least 1 through freeway lane open in direction of travel
2	Provide at least 2 adjacent through freeway lanes open in direction of travel
3	Provide at least 3 adjacent through freeway lanes open in direction of travel
	Work allowed within the highway where shoulder or lane closure is not required

REMARKS: This chart is applicable in all cases except closing General Purpose Lane # 1, as OCTA requires closing the 91 Express Lanes concurrently. In that case Contractor shall follow chart # 7 & chart # 4 for WB Closure and chart # 8 & chart #5 for EB Closure.

Replace "Reserved" in section 12-4.05C with:

Chart no. 4 Complete 91 Express Lanes Closure Hours																										
County: Orange					Route/Direction: 91/WB										PM: 8.1/9.3,10.1											
Closure limits: From 55/91 connector to Tustin Ave Interchange																										
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																										C
Tuesdays	C	C	C	C																						C
Wednesdays	C	C	C	C																						C
Thursdays	C	C	C	C																						C
Fridays	C	C	C	C																						
Saturdays	C	C	C	C	C	C	C																			
Sundays																										

Legend:

C 91 Express Lanes may be closed completely

No 91 Express Lanes closure is allowed

REMARKS: 91 Express Lane shall be closed only when work is performed on the General Purpose Lane #1. The Contractor shall provide 10 days written notice to Caltrans Resident Engineer for approval for closure. For closure cancellation the Contractor shall provide at least 5 days advance written notice.

Chart #7 shall be consulted for General Purpose Lane # 1 closure.

Replace "Reserved" in section 12-4.05C with:

Chart no. 5 Complete 91 Express Lanes Closure Hours																										
County: Orange					Route/Direction: 91/EB										PM: 8.1/9.3.101											
Closure limits: From 55/91 connector to Tustin Ave Interchange																										
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
Monday																										C
Tuesday		C	C	C	C	C																				C
Wednesday		C	C	C	C	C																				C
Thursday		C	C	C	C	C																				C
Friday		C	C	C	C	C																				
Saturdays		C	C	C	C	C	C	C																		
Sundays																										

Legend:

C 91 Express Lanes may be closed completely

No 91 Express Lanes closure is allowed

REMARKS: 91 Express Lane shall be closed only when work is performed on the General Purpose Lane #1. The Contractor shall provide 10 days written notice to Caltrans Resident Engineer for approval for closure. For closure cancellation the Contractor shall provide at least 5 days advance written notice.

Chart # 8 shall be consulted for General Purpose Lane # 1 closure.

Replace "Reserved" in section 12-4.05E with:

Chart no. 6 Complete Ramp Closure Hours/Ramp Lane Requirements																										
County: Orange					Route/Direction: 91/WB										PM: 8.1/9.3, 10.1											
Closure limits: (a) Tustin Ave on-ramp																										
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		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Fridays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Saturdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Legend:																										

<input type="checkbox"/> C Ramp may be closed completely																										

REMARKS: Tustin Ave.on-ramp may be closed continuously for one time only lasting up to 16 calendar days and 6 hours, starting on a Friday at 11 PM and ending on or before Monday at 5 AM.																										

Replace "Reserved" in section 12-4.05C with:

Chart no. 7 General Purpose Lane #1 Closure Hours																										
County: Orange					Route/Direction: 91/WB										PM: 8.1/9.3,10.1											
Closure limits: From 55/91 connector to Tustin Ave Interchange																										
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																										C
Tuesdays	C	C	C	C																						C
Wednesdays	C	C	C	C																						C
Thursdays	C	C	C	C																						C
Fridays	C	C	C	C																						
Saturdays	C	C	C	C	C	C	C																			
Sundays																										

Legend:

C General Purpose Lane #1 may be closed completely

No Lanes closure is allowed

REMARKS: 91 Express Lane also shall be closed only when work is performed on the General Purpose Lane #1. The Contractor shall provide 10 days written notice to Caltrans Resident Engineer for approval for closure. For closure cancellation the Contractor shall provide at least 5 days advance written notice.

Chart # 4 shall be consulted for 91 Express Lane Closure.

Replace "Reserved" in section 12-4.05C with:

Chart no. 8 General Purpose Lane #1 Closure Hours																											
County: Orange					Route/Direction: 91/EB										PM: 8.1/9.3,10.1												
Closure limits: From 55/91 connector to Tustin Ave Interchange																											
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																											C
Tuesdays		C	C	C	C	C																					C
Wednesdays		C	C	C	C	C																					C
Thursdays		C	C	C	C	C																					C
Fridays		C	C	C	C	C																					
Saturdays		C	C	C	C	C	C	C																			
Sundays																											

Legend:

C General Purpose Lane #1 may be closed completely

No Lanes closure is allowed

REMARKS: 91 Express Lane also shall be closed only when work is performed on the General Purpose Lane #1. The Contractor shall provide 10 days written notice to Caltrans Resident Engineer for approval for closure. For closure cancellation the Contractor shall provide at least 5 days advance written notice.

Chart # 5 shall be consulted for 91 Express Lane Closure.

Replace section 12-5 with:

12-5 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

12-5.01 GENERAL

Section 12-5 includes specifications for closing traffic lanes, ramps, or a combination, with stationary lane closures on multilane highways. The traffic control system for a lane closure or a ramp closure must comply with the details shown.

Traffic control system includes signs.

12-5.02 MATERIALS

Not Used

12-5.03 CONSTRUCTION

Each vehicle used to place, maintain, and remove components of a traffic control system on a multilane highway must be equipped with a Type II flashing arrow sign that must be in operation whenever the vehicle is being used for placing, maintaining, or removing the components. Vehicles equipped with a Type II flashing arrow sign not involved in placing, maintaining, or removing the components if operated within a stationary-type lane closure must display only the caution display mode. The sign must be controllable by the operator of the vehicle while the vehicle is in motion. If a flashing arrow sign is required for a lane closure, the flashing arrow sign must be operational before the lane closure is in place.

Species Name
Bat Species
Nesting Bird Species

14-6.02B Material

Not Used

14-6.02C Construction

14-6.02C(1) General

Not Used

14-6.02C(2) Protective Radius

Upon discovery of a regulated species, stop construction activities within a 100 radius of the discovery. Immediately notify the Engineer. Do not resume activities until receiving notification from the Engineer.

14-6.02C(3) Protocols

Not Used

14-6.02C(4) Biological Resource Information

Not Used

14-6.02C(5) Protection Measures

Within species protection area 1, implement the following protection measures:

1. Species Protection Area 1 is designated as the bridge structure in the project area.
2. Wildlife exclusion devices will be installed on the bridge structure in the project area. Movement, tampering, or modifications to exclusion devices are prohibited. If the contractor causes any damage to exclusion devices, the contractor will be responsible for all costs incurred.
3. Notify the Engineer immediately if damage to exclusion devices is caused or noticed.

14-6.02C(6) Monitoring Schedule

Not Used

14-6.02D Payment

Not Used

Replace section 14-7.03 with:

14-7.03 PALEONTOLOGICAL RESOURCE MONITORING

14-7.03A General

14-7.03A(1) Summary

Section 14-7.03 includes specifications for coordinating and cooperating with Department provided paleontological resources monitoring.

The Department will perform paleontological monitoring and salvage during construction operations and related activities involving subsurface disturbance under California Public Resources Code Section 5097.5 and the California Environmental Quality Act (CEQA). Activities involving subsurface disturbance include excavation and grading activities for construction of soundwalls and other improvements. The Department will provide a Paleontological Salvage Team consisting of a qualified Principal Paleontologist and Paleontological Monitors. The Engineer will make arrangements for the Paleontological Salvage Team to be at the job site.

All paleontological specimens within the highway are and remain the property of the Department once excavated.

14-7.03A(2) Submittals

Submit a schedule of subsurface disturbing activities at least 20 days before construction. Submit schedule updates at least 3 business days before implementing changes.

Submit a request for paleontological awareness training 15 days before the start of work.

14-7.03A(3) Quality Control and Assurance

Attend a pre-construction meeting with the Paleontological Salvage Team and the Engineer to establish procedures for cooperation and worker safety during monitoring and salvage activities.

All employees, subcontractors, and Contractor's representatives on the job site involved in subsurface disturbing activities must receive a one-hour paleontological resource awareness training program provided by the Department furnished Paleontological Salvage Team before performing work at the job site.

14-7.03B Materials

Not Used

14-7.03C Construction

14-7.03C(1) General

Subsurface disturbances are only permitted with authorization.

Notify the Engineer 20 days before start of subsurface disturbing activities.

The Paleontological Salvage Team will monitor and salvage appropriate fossil specimens identified during excavation. The Engineer may temporarily divert or stop construction operations in the vicinity of a paleontological find or notify you of the need to avoid disturbing an area pending removal of fossil specimens.

14-7.03D Payment

Additional excavation required due to discovery of paleontological remains, required by the Engineer or Paleontological Salvage Team is change order work.

Replace "14-8.03 RESERVED" with:

14-8.03 VIBRATION MONITORING

14-8.03A General

14-8.03A(1) Summary

Section 14-8.03 includes specifications relating to monitoring and controlling vibration for pile driving at Santa Ana River bridge No. 55-0106R/L., Project EA; No. 0C5601

14-8.03A(2) Vibration Instrumentation Engineer

The Vibration Instrumentation Engineer (VIE) must:

1. Be responsible directly to you for the quality of the work, including materials and workmanship performed by you and your subcontractors
2. Be your employee or hired by a subcontractor providing only vibration monitoring services
3. Not be employed or compensated by a subcontractor or by other persons or entities hired by subcontractors who will provide other services or materials for the project
4. Be registered as a civil engineer in the State
5. Have at least four years of experience in the installation and use of vibration monitoring instrumentation and in interpreting the measured data.

The VIE must be responsible for:

1. Supervising the initial installation of each vibration monitoring instrument
2. Implementing vibration monitoring plans

3. Supervising interpretations of vibration monitoring data
4. Maintaining vibration monitoring records

14-8.03A(3) Submittals

14-8.03A(3)(a) Survey of Existing Structure

Submit preconstruction and post-construction condition surveys of buildings and residential structures within 5 days of the survey.

14-8.03A(3)(b) Vibration Monitoring Plan

Vibration monitoring plan must include:

1. Name of the firm providing the vibration monitoring services and resumes of the VIE and any technical support personnel
2. Description of the instrumentation and equipment to be used, including manufacturer's product data, and material safety data sheet
3. Measurement locations and methods for mounting the vibration sensors
4. Procedures for data collection and analysis
5. Sample data sheet(s) format that will be used to record vibration
6. Means and methods of providing warning when the particle velocity equals or exceeds specified limits
7. Generalized plans of action to be implemented in the event the particle velocity equals or exceeds specified limits to control vibrations
8. Name of the "responsible person" who has the authority to stop the work causing excessive vibration

Allow 20 days for the Department's review.

14-8.03A(3)(c) Vibration Monitoring Report

Within a 5 working days after the background vibration monitoring completion, submit a hard copy report documenting the results at each of the monitoring locations.

During pile driving, you must provide weekly, hard copy reports summarizing any vibration monitoring data collected at specified vibration monitoring locations. Submit the weekly reports on or before the end of the following week.

Due to the volume of the data, the Engineer may decide to receive the data in Microsoft Excel.

All reports must be signed by the authorized VIE and must include the following:

1. Location of the monitoring equipment
2. Location of vibration sources (e.g. bent number, abutment number, pile number, etc.)
3. Summary tables indicating the date, time, as well as magnitude and frequency of maximum single-component peak particle velocity (PPV) measured during each one-hour interval of the monitoring period
4. Events that are responsible for the measured vibration levels
5. Field data forms (construction vibration monitoring only)
6. An appendix including tabulated or graphed measured data for every minute for the monitoring periods

Do not disclose any instrumentation data to third parties and do not publish data without written consent of the Department.

14-8.03A(3)(d) Quality Assurance

Within 5 days of receipt of each vibration monitoring instrument at the site, submit the following:

1. Record of laboratory calibration
2. Certification to indicate that the instrument is calibrated and maintained in accordance with the equipment manufacturer's calibration requirements and those calibrations are traceable to the U. S. National Institute of Standards and Technology (NIST)
3. Copy of the instruction manual and test equipment certification

14-8.03B Materials

Not Used

14-8.03C Construction

14-8.03C(1) General

You must:

1. Within 15 days before pile driving begins, perform a preconstruction condition survey of structures within a 250-foot radius of pile driving activities. The preconstruction condition survey must consist of photographs of existing cracks and any other architectural or structural problems or deficiencies.
2. Furnish and install vibration monitoring instrumentation.
3. Protect and maintain instruments and repair or replace damaged or inoperative instruments.
4. Collect, interpret, and report data.
5. Implement response actions when measured PPV is equal or exceeding 0.5 inches per second.
6. Within 5 days of the pile driving completion, perform a post-construction condition survey of structures that have adjacent instruments measuring a PPV of 0.3 inch per second or greater.

14-8.03C(2) Vibration Monitoring Equipment

Use portable seismographs for monitoring the velocities of ground vibrations resulting from pile driving activities.

The seismograph vibration sensors must be firmly mounted on the surface slab of concrete or asphalt, or firmly set in undisturbed soil with a sandbag on top.

Instrumentation personnel must conduct regular maintenance of seismograph installations.

14-8.03C(3) Equipment and Operation

Vibration monitoring instruments shall be furnished and installed by the Contractor and shall be capable of continuous operation with instant monitoring results. The vibration monitoring system shall be capable of measuring peak particle velocity and frequency levels as low as 0.04 inch/sec using a 3-axis geophone. The vibration monitoring system must undergo certified laboratory calibration conformance at least once a year. At the time of measurement the vibration monitoring system shall have a certificate that is not expired.

The Contractor shall have the instrument in place and functioning properly prior to any construction activities

14-8.03C(4) Vibration Monitoring and Recording

Perform vibration monitoring and recording during pile driving activities at buildings and residential structures within a 250-foot radius of pile driving activities. The distances must be measured from the point of pile driving.

Notify the Engineer at least 48 hours prior to beginning pile driving. Have the seismographs in place and functioning properly prior to any work within the distances as defined above. No pile driving is allowed within the monitoring zone unless monitoring equipment is functioning properly.

Set up the equipment in a manner such that an immediate warning is given when particle velocity equal to or exceeding 0.5 inch per second is produced. The warning emitted by the vibration monitoring equipment must be instantaneously transmitted to the designated person by means of warning lights, audible sounds, or electronic transmission.

Station monitoring equipment within 3 feet of the exterior of structures on the side facing the Contractor's work site. If permission to access a private property is not granted, the monitoring will be conducted at the closest public access area to the structure, such as sidewalk.

Immediately notify the Engineer when any monitoring equipment reading equals or exceeds 0.5 inches per second. You must take reasonable actions to reduce and maintain the monitoring equipment reading below a particle velocity of 0.5 inches per second next to the monitored structures.

14-8.03C(5) Qualification

The person who is responsible for the vibration monitoring and analysis must have the following qualifications:

- A. Professional Engineer, Geologist, Bachelor of Science or higher degree from a qualified program in engineering, physics or geology offered by an accredited university or college, and five years experience in vibration monitoring and control.
- B. Demonstrated substantial and responsible experience in preparing and implementing construction vibration monitoring plans and analyzing vibration impacts in an urban setting.

A technician under the supervision of the qualified person may conduct the actual measurements.

Compliance with this section does not relieve the contractor of full responsibility for damage caused by Contractor's operations

14-8.02C(6) Data Collection

Collect data using seismograph to document background vibrations at each monitoring location prior to pile driving activities. This monitoring must consist of a continuous recording of the maximum single-component PPV for one-minute intervals. Perform the background monitoring for a minimum of two non-consecutive workdays, spanning the hours during which construction activities will take place.

Monitor vibration during pile driving activities. This monitoring must consist of a continuous recording of the maximum single-component PPV for one-minute intervals

14-8.02D Payment

Additional areas to receive vibration monitoring will be paid for as extra work

Replace section 14-11.03 with:

14-11.03 MATERIAL CONTAINING HAZARDOUS WASTE CONCENTRATIONS OF AERIALLY DEPOSITED LEAD

14-11.03A General

14-11.03A(1) Summary

Section 14-11.03 includes specifications for hazardous waste management while excavating, stockpiling, transporting, placing, and disposing of material containing hazardous waste concentrations of aerially deposited lead (ADL). Handle material containing nonhazardous waste concentrations of lead under Section 7-1.02k(j)(iii).

ADL is present within the project limits.

The Department has received from the DTSC a variance regarding the use of material containing ADL. The variance applies if Type Y-1 material is shown. The variance is available for inspection at the Department of Transportation, District 12, 3347 Michelson Dr., Suite 100, Irvine, CA 92612-8894, Environmental Engineering Branch.

14-11.03A(2) Definitions

Type Y-1: Material that contains ADL in average concentrations (using the 90 percent Upper Confidence Limit) of 1.5 mg/L or less extractable lead (based on a modified waste extraction test using deionized water as the extractant) and 1,411 mg/kg or less total lead. This material is a California hazardous waste that may be reused as permitted under the variance of the DTSC provided that the lead contaminated soil is placed a minimum of 5 feet above the maximum historic water table elevation and covered with at least 1 foot of non-hazardous soil.

14-11.03A(3) Site Conditions

ADL concentration data and sample locations maps are included in the *Information Handout*.

Type Y-1 material exists from the surface to a depth of 4 feet, from the edge of existing pavement, from station 534+00 to station 484+00, along WB SR-91 and NB SR-55 to WB SR-91 bridge overcrossing at station 20+40 in the vicinity of B-21 location. Excavate only the upper 6 inches of material and place in the designated areas along the westbound SR-91 within proposed auxiliary lane or the proposed bypass lane. Place this material a minimum of 5 feet above the maximum water table elevation and cover with at least one foot of non-hazardous soil. No Type Y-1 will be placed in landscape areas. Any excess material generated from excavations in the above noted area and from stations 549+00 to 534+00 is considered as non-hazardous and may be reused or disposed of with no restrictions under Section 7-1.02k(j)(iii).

14-11.03A(4) Submittals

14-11.03A(4)(a) Lead Compliance Plan

Submit a lead compliance plan under section 7-1.02K(6)(j)(ii).

14-11.03A(4)(b) Excavation and Transportation Plan

Within 15 days after approval of the Contract, submit 3 copies of an excavation and transportation plan. Allow 7 days for review. If revisions are required, as determined by the Engineer, submit the revised plan within 7 days of receipt of the Engineer's comments. For the revision, allow 7 days for the review. Minor changes to or clarifications of the initial submittal may be made and attached as amendments to the excavation and transportation plan. In order to allow construction to proceed, the Engineer may conditionally approve the plan while minor revisions or amendments are being completed.

Prepare the written, project specific excavation and transportation plan establishing the procedures you will use to comply with requirements for excavating, stockpiling, transporting, and placing or disposing of material containing hazardous waste concentrations of ADL. The plan must comply with the regulations of the DTSC and Cal/OSHA and the requirements of the variance. The sampling and analysis portions of the excavation and transportation plan must meet the requirements for the design and development of the sampling plan, statistical analysis, and reporting of test results contained in US EPA, SW 846, "Test Methods for Evaluating Solid Waste," Volume II: Field Manual Physical/Chemical, Chapter Nine, Section 9.1. The plan must include the following elements:

1. Excavation schedule by location and date
2. Temporary locations of stockpiled material
3. Survey methods for Type Y-1 material burial locations
4. Dust control measures
5. Air monitoring. Include the following information:
 - 5.1. Location and type of equipment
 - 5.2. Sampling frequency
 - 5.3. Name and address of the accredited laboratory where the analysis was performed
6. Transportation equipment and routes
7. Method for preventing spills and tracking material onto public roads
8. Truck waiting and staging areas
9. Example of bill of lading to be carried by trucks transporting Type Y-1 or Y-2, material. The bill of lading must include:
 - 9.1. US Department of Transportation (US DOT) description including shipping name
 - 9.2. Hazard class
 - 9.3. Identification number
 - 9.4. Handling codes
 - 9.5. Quantity of material
 - 9.6. Volume of material
10. Spill Contingency Plan for material containing ADL

14-11.03A(4)(c) Burial Location Report

Within 5 business days of completing placement of Type Y-1 material at a burial location, submit a report for that burial location, including "Burial Location of Soil Containing Aerial Deposited Lead" form and

electronic geospatial vector data shapefiles of the top and bottom perimeters of the burial location. Submit to the Engineer and to:

ADL@dot.ca.gov

The Engineer notifies you of acceptance or rejection of the burial location report within 5 business days of receipt. If the report is rejected, you have 5 business days to submit a corrected report.

Not Used

14-11.03A(4)(d) Bill of Lading

Copies of the bills of lading must be submitted as an information handout upon placement of Type Y-1 material in its final location.

14-11.03A(5) Quality Control and Assurance

Excavation, reuse, and disposal of material with ADL must comply with rules and regulations of the following agencies:

1. US DOT
2. US EPA
3. California Environmental Protection Agency
4. CDPH
5. DTSC
6. Cal/OSHA
7. California Department of Resources Recycling and Recovery
8. RWQCB, Region 8, Santa Ana
9. State Air Resources Control Board
10. South Coast Air Quality Management District

Transport and dispose of material containing hazardous levels of lead under federal and state laws and regulations and county and municipal ordinances and regulations. Laws and regulations that govern this work include:

1. Health & Safety Code, Division 20, Chp 6.5 (California Hazardous Waste Control Act)
2. 22 CA Code of Regs, Div. 4.5 (Environmental Health Standards for the Management of Hazardous Waste)
3. 8 CA Code of Regs

14-11.03B Materials

Not Used

14-11.03C Construction

14-11.03C(1) General

Not Used

14-11.03C(2) Material Management

Place Type Y-1 material as shown and cover with a minimum 1 foot layer of nonhazardous soil or the pavement structure. Temporary surplus material may be generated on this project due to the requirements of stage construction.

14-11.03C(3) Dust Control

Excavation, transportation, placement, and handling of material containing ADL must result in no visible dust migration. A water truck or tank must be on the job site at all times while clearing and grubbing and performing earthwork operations in work areas containing ADL. Apply water to prevent visible dust.

14-11.03C(4) Surveying Type Y-1 Material Burial Locations

Survey the location of the bottom and top perimeters of each area where you bury Type Y-1 material (burial locations). The survey must be performed by or under the direction of one of the following:

1. Land surveyor licensed under the Bus & Prof Code, Chp 15 (commencing with § 8700)
2. Civil engineer licensed prior to January 1, 1982 under the Bus & Prof Code, Chp 7 (commencing with § 6700)

Survey 10 points to determine each burial location horizontally and vertically within the specified accuracies and to create closed polygons of the perimeters of the bottom and top of the burial location. If 10 points are not sufficient to define the polygon, add additional points until the polygon is defined. Establish the position of the bottom and top perimeters before placing subsequent layers of material that obstruct the location.

Report each burial location in California State Plane Coordinates in US Survey feet within the appropriate zone of the California Coordinate System of 1983 (CCS83) and in latitude and longitude. Horizontal positions must be referenced to CCS83 (epoch 2007.00 or later National Geodetic Survey [NGS] or California Spatial Reference Center [CSRC] published epoch) to an accuracy of 3 ft horizontally. The elevation of points identifying the burial location must locate the bottom and top of Type Y-1 material to an accuracy of 1 ft vertically. Elevations of the bottom and top of Type Y-1 material must be referenced to North American Vertical Datum of 1988 (NAVD88). Report accuracy of spatial data in US Survey feet under Federal Geographic Data Committee (FGDC)-STD-007.1-1998.

14-11.03C(5) Material Transportation

Before traveling on public roads, remove loose and extraneous material from surfaces outside the cargo areas of the transporting vehicles and cover the cargo with tarpaulins or other cover, as outlined in the approved excavation and transportation plan. You are responsible for costs due to spillage of material containing lead during transport. Transportation routes for Type Y-1 material must only include the highway.

14-11.03C(6) Disposal

Analyze surplus material for which the lead content is not known for lead before removing the material from within the project limits. Submit a sampling and analysis plan and the name of the analytical laboratory at least 15 days before beginning sampling and analysis. Use a CDPH ELAP certified laboratory. Sample at a minimum rate of 1 sample for each 200 cu yd of surplus material and test for lead using US EPA Method 6010B or 7000 series.

14-11.03D Payment

Payment for a lead compliance plan is not included in the payment for environmental stewardship work.

The Department does not pay for stockpiling of material containing ADL, unless the stockpiling is ordered. The Department does not pay for sampling and analysis unless it is ordered. The Department does not pay for additional sampling and analysis required by the receiving landfill.

Sampling, analyses, and reporting of results for surplus material not previously sampled is change order work.

Replace section 14-11.07 with:

14-11.07 REMOVE YELLOW TRAFFIC STRIPE AND PAVEMENT MARKING WITH HAZARDOUS WASTE RESIDUE

14-11.07A General

14-11.07A(1) Summary

Section 14-11.07 includes specifications for removing existing yellow thermoplastic and yellow painted traffic stripe and pavement marking. The residue from the removal of this material is a Department-generated hazardous waste.

Residue from removal of yellow thermoplastic and yellow painted traffic stripe and pavement marking contains lead chromate. The average lead concentration is at least 1,000 mg/kg total lead or 5 mg/l soluble lead. When applied to the roadway, the yellow thermoplastic and yellow painted traffic stripe and pavement marking contained as much as 2.6 percent lead. Residue produced from the removal of this yellow thermoplastic and yellow painted traffic stripe and pavement marking contains heavy metals in concentrations that exceed thresholds established by the Health & Safety Code and 22 CA Code of Regs.

For bidding purposes, assume the residue is not regulated under the Federal Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 et seq.

Work associated with disposal of hazardous waste residue regulated under RCRA as determined by test results is change order work.

Yellow thermoplastic and yellow paint may produce toxic fumes when heated.

14-11.07A(2) Submittals

14-11.07A(2)(a) General

Reserved

14-11.07A(2)(b) Lead Compliance Plan

Submit a lead compliance plan under section 7-1.02K(6)(j)(ii).

14-11.07A(2)(c) Work Plan

Submit a work plan for the removal, containment, storage, and disposal of yellow thermoplastic and yellow painted traffic stripe and pavement marking. The work plan must include:

1. Objective of the operation
2. Removal equipment
3. Procedures for removal and collection of yellow thermoplastic and yellow painted traffic stripe and pavement marking residue, including dust
4. Type of hazardous waste storage containers
5. Container storage location and how it will be secured
6. Hazardous waste sampling protocol and QA/QC requirements and procedures
7. Qualifications of sampling personnel
8. Analytical lab that will perform the analyses
9. DTSC registration certificate and CA Highway Patrol (CHP) Biennial Inspection of Terminals (BIT) Program compliance documentation of the hazardous waste hauler that will transport the hazardous waste
10. Disposal site that will accept the hazardous waste residue

The Engineer will review the work plan within 5 business days of receipt.

Do not perform work that generates hazardous waste residue until the work plan has been authorized.

Correct any rejected work plan and resubmit a corrected work plan within 5 business days of notification by the Engineer. A new review period of 5 business days will begin from date of resubmittal.

14-11.07A(2)(d) Analytical Test Results

Submit analytical test results of the residue from removal of yellow thermoplastic and yellow painted traffic stripe and pavement marking, including chain of custody documentation, for review and acceptance before:

1. Requesting the Engineer's signature on the waste profile requested by the disposal facility
2. Requesting the Engineer obtain an US EPA Generator Identification Number for disposal
3. Removing the residue from the site

14-11.07A(2)(e) U.S. Environmental Protection Agency Identification Number Request

Submit a request for the US EPA Generator Identification Number when the Engineer accepts analytical test results documenting that residue from removal of yellow thermoplastic and yellow painted traffic stripe and pavement marking is a hazardous waste.

14-11.07A(2)(f) Disposal Documentation

Submit documentation of proper disposal from the receiving landfill within 5 business days of residue transport from the project.

14-11.07B Materials

Not Used

14-11.07C Construction

Where grinding or other authorized methods are used to remove yellow thermoplastic and yellow painted traffic stripe and pavement marking that will produce a hazardous waste residue, immediately contain and collect the removed residue, including dust. Use a HEPA filter-equipped vacuum attachment operated concurrently with the removal operations or other equally effective approved methods for collection of the residue.

Make necessary arrangements to test the yellow thermoplastic and yellow paint hazardous waste residue as required by the disposal facility and these special provisions. Testing must include:

1. Total lead by US EPA Method 6010B
2. Total chromium by US EPA Method 6010B
3. Soluble lead by California Waste Extraction Test (CA WET)
4. Soluble chromium by CA WET
5. Soluble lead by Toxicity Characteristic Leaching Procedure (TCLP)
6. Soluble chromium by TCLP

From the first 220 gal of hazardous waste or portion thereof if less than 220 gal of hazardous waste are produced, a minimum of 4 randomly selected samples must be taken and analyzed individually. Samples must not be composited. From each additional 880 gal of hazardous waste or portion thereof if less than 880 gal are produced, a minimum of 1 additional random sample must be taken and analyzed. Use chain of custody procedures consistent with chapter 9 of US EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) while transporting samples from the project to the laboratory. Each sample must be homogenized before analysis by the laboratory performing the analyses. A sample aliquot sufficient to cover the amount necessary for the total and the soluble analyses must then be taken. This aliquot must be homogenized a 2nd time and the total and soluble analyses run on this aliquot. The homogenization process must not include grinding of the samples. Submit the name and location of the disposal facility that will be accepting the hazardous waste and the analytical laboratory along with the testing requirements not less than 5 business days before the start of removal of yellow thermoplastic and yellow painted traffic stripe and pavement marking. The analytical laboratory must be certified by the California Department of Public Health (CDPH) Environmental Laboratory Accreditation Program (ELAP) for all analyses to be performed.

After the Engineer accepts the analytical test results, dispose of yellow thermoplastic and yellow paint hazardous waste residue at a Class 1 disposal facility located in California under the requirements of the disposal facility operator within 30 days after accumulating 220 pounds of residue and dust.

If less than 220 pounds of hazardous waste residue and dust is generated in total, dispose of it within 30 days after the start of accumulation of the residue and dust.

The Engineer will sign all manifests as the generator within 2 business days of receiving and accepting the analytical test results and receiving your request for the US EPA Generator Identification Number. Use a transporter with a current DTSC registration certificate and that is in compliance with the CHP BIT Program when transporting hazardous waste.

14-11.07D Payment

Payment for a lead compliance plan is not included in the payment for environmental stewardship work.

If analytical test results demonstrate that the residue is a non-hazardous waste and the Engineer agrees, dispose of the residue at an appropriately permitted CA Class II or CA Class III facility. The Department does not adjust payment for this disposal.

Replace section 14-11.09 with:

14-11.09 TREATED WOOD WASTE

14-11.09A General

14-11.09A(1) Summary

Section 14-11.09 includes specifications for handling, storing, transporting, and disposing of treated wood waste (TWW).

Wood removed from metal beam guard railing and roadside signs is TWW. Manage TWW under 22 CA Code of Regs, Div. 4.5, Chp. 34.

14-11.09A(2) Submittals

For disposal of TWW, submit as an informational submittal a copy of each completed shipping record and weight receipt within 5 business days.

14-11.09B Materials

Not Used

14-11.09C Construction

14-11.09C(1) General

14-11.09C(2) Training

Provide training to personnel who handle TWW or may come in contact with TWW. Training must include:

1. All applicable requirements of 8 CA Code of Regs
2. Procedures for identifying and segregating TWW
3. Safe handling practices
4. Requirements of 22 CA Code of Regs, Div. 4.5, Chp. 34
5. Proper disposal methods

Maintain records of personnel training for 3 years.

14-11.09C(3) Storage

Store TWW before disposal using the following methods:

1. Elevate on blocks above a foreseeable run-on elevation and protect from precipitation for no more than 90 days.
2. Place on a containment surface or pad protected from run-on and precipitation for no more than 180 days.
3. Place in water-resistant containers designed for shipping or solid waste collection for no more than 1 year.
4. Place in a storage building as defined in 22 CA Code of Regs, Div. 4.5, Chp. 34, § 67386.6(a)(2)(C).

Prevent unauthorized access to TWW using a secured enclosure such as a locked chain link fenced area or a lockable shipping container located within the job site.

Resize and segregate TWW at a location where debris from the operation including sawdust and chips can be contained. Collect and manage the debris as TWW.

Provide water-resistant labels that comply with 22 CA Code of Regs, Div. 4.5, Chp. 34, §67386.5, to clearly mark and identify TWW and accumulation areas. Labels must include:

1. Caltrans, District number, Construction, Construction Contract number
2. District office address
3. Engineer's name, address, and telephone number
4. Contractor's contact name, address and telephone number
5. Date placed in storage

14-11.09C(4) Transporting and Disposal

Before transporting TWW, obtain an agreement from the receiving facility that the TWW will be accepted. Protect shipments of TWW from loss and exposure to precipitation. For projects with 10,000 pounds or more of TWW, request a US EPA Generator Identification Number from the Engineer at least 5 business days before the first shipment. Each shipment must be accompanied by a shipping record such as a bill of lading or invoice that includes:

1. Caltrans with district number
2. Construction Contract number
3. District office address
4. Engineer's name, address, and telephone number

Replace section 15-2.02B(3) with:

15-2.02B(3) Cold Planing Asphalt Concrete Pavement

15-2.02B(3)(a) General

Schedule cold planing activities to ensure that cold planing, placement of HMA, and reopening the area to traffic is completed during the same work shift:

For locations not listed above, schedule cold planing activities so that not more than 24 hours elapses between the time the pavement is cold planed and the HMA is placed.

If you do not complete HMA placement before opening the area to traffic, you must:

1. Construct a temporary HMA taper to the level of the existing pavement
2. Place HMA during the next work shift
3. Submit a corrective action plan that shows you will complete cold planing and placement of HMA in the same work shift. Do not restart cold planing activities until the Engineer approves the corrective action plan.

15-2.02B(3)(b) Materials

Use the same quality of HMA for temporary tapers that is used for the HMA overlay or comply with the specifications for minor HMA in section 39.

15-2.02B(3)(c) Construction

15-2.02B(3)(c)(i) General

Do not use a heating device to soften the pavement.

The cold planing machine must be:

1. Equipped with a cutter head width that matches the planing width. If the cutter head width is wider than the cold plane area shown, submit to the Engineer a request for using a wider cutter head. Do not cold plane unless the Engineer approves your request.
2. Equipped with automatic controls for the longitudinal grade and transverse slope of the cutter head and:
 - 2.1. If a ski device is used, it must be at least 30 feet long, rigid, and a 1-piece unit. The entire length must be used in activating the sensor.
 - 2.2. If referencing from existing pavement, the cold planing machine must be controlled by a self-contained grade reference system. The system must be used at or near the centerline of the roadway. On the adjacent pass with the cold planing machine, a joint-matching shoe may be used.
3. Equipped to effectively control dust generated by the planing operation
4. Operated so that no fumes or smoke is produced.

Replace broken, missing, or worn machine teeth.

15-2.02B(3)(c)(ii) Grade Control and Surface Smoothness

Furnish, install, and maintain grade and transverse slope references.

The depth, length, width, and shape of the cut must be as shown or as ordered. The final cut must result in a neat and uniform surface. Do not damage the remaining surface.

The completed surface of the planed asphalt concrete pavement must not vary more than 0.02 foot when measured with a 12-foot straightedge parallel with the centerline. With the straightedge at right angles to the centerline, the transverse slope of the planed surface must not vary more than 0.03 foot.

Where lanes are open to traffic, the drop-off of between adjacent lanes must not be more than 0.15 foot.

15-2.02B(3)(c)(iii) Temporary HMA Tapers

If a drop-off between the existing pavement and the planed area at transverse joints cannot be avoided before opening to traffic, construct a temporary HMA taper. The HMA temporary taper must be:

1. Placed to the level of the existing pavement and tapered on a slope of 30:1 (horizontal:vertical) or flatter to the level of the planed area
2. Compacted by any method that will produce a smooth riding surface

Completely remove temporary tapers before placing permanent surfacing.

15-2.02B(3)(c)(iv) Remove Planed Material

Remove cold planed material concurrent with planing activities so that removal does not lag more than 50 feet behind the planer.

15-2.02B(3)(d) Payment

Payment for removal of pavement markers, thermoplastic traffic stripe, painted traffic stripe, and pavement marking within the area of cold planing is included in the payment for cold plane asphalt concrete pavement of the types shown in the Bid Item List.

Replace section 15-2.02C(2) with:

15-2.02C(2) Remove Traffic Stripes and Pavement Markings Containing Lead

Residue from removing traffic stripes and pavement markings contains lead from the paint or thermoplastic. The average lead concentrations are less than 1,000 mg/kg total lead and 5 mg/L soluble lead. This residue:

1. Is a nonhazardous waste
2. Does not contain heavy metals in concentrations that exceed thresholds established by the Health and Safety Code and 22 CA Code of Regs
3. Is not regulated under the Federal Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 et seq.

Submit a lead compliance plan under section 7-1.02K(6)(j)(ii).

Payment for a lead compliance plan is not included in the payment for existing facilities work.

Payment for handling, removal, and disposal of pavement residue that is a nonhazardous waste is included in the payment for the type of removal work involved.

Replace section 15-2.02I with:

15-2.02I Remove Sign Structures

Removing overhead sign structures includes removal of:

1. Frames, braces, supports, and brackets
2. Portions of foundations
3. Sign panels
4. Mounting hardware for light fixtures
5. Walkways, safety railing, gutter
6. Electrical equipment for sign lighting
7. Hardware
8. Posts
9. Portions of foundations

Concrete foundations may be abandoned in place except that the top portion, including anchor bolts, reinforcing steel, and conduits, must be removed to a depth of not less than 4 feet below the adjacent finished grade. The resulting holes must be backfilled and compacted with material that is equivalent to the surrounding material.

Removing bridge mounted sign structures includes removal of:

1. Frames, braces, supports, and brackets
2. Portions of foundations

Wall zone	Beginning station	End station	Upper elevation (ft)	Lower elevation (ft)
1	1+00	7+20	312.46	262.0

Add to section 19-3.03B(1):

Excavation for piers 8 to 10, 17 and 18 in levee embankment must comply with section 19-10.

Replace the heading of section 19-3.03C with:

19-3.03B(4) Cofferdams

Replace the heading of section 19-3.03D with:

19-3.03B(5) Water Control and Foundation Treatment

Add to section 19-3.03E(1):

Backfill for piers 8 to 10, 17 and 18 in levee embankment must comply with section 19-10.

Replace item 3 in the list in the 9th paragraph of section 19-3.03K with:

3. Grout and shotcrete have cured for at least 72 hours or have attained a compressive strength of at least 3600 psi

Add to section 19-3.04:

At location A, where compaction is not required, payment for structure backfill is included in payment for the type of structure excavation involved.

Replace the 2nd and 3rd paragraphs of section 19-7.04 with:

Imported borrow is measured based on planned or authorized cross section for embankments as shown and the measured ground surface.

Quantities of roadway excavation, structure excavation, and ditch excavation used in constructing the embankment will be adjusted by multiplying by a grading factor. This grading factor is determined by the Engineer. The Department does not adjust payment if the grading factor determined by the Engineer does not equal the actual grading factor.

Add to section 19:

19-10 LEVEE EMBANKMENT

19-10.01 GENERAL

19-10.01A Summary

Section 19-10 includes specifications for reconstructing existing levee embankment after constructing piers of the Santa Ana River Bridge (Bridge No. 55-1016), drainage system 4i, or removing removal drainage system 3.

Levee embankment reconstruction includes:

1. Stockpiling material to be used for levee embankment, from that excavated under section 19-3, including removing unsatisfactory materials
2. Preparing areas to receive levee embankment material
3. Placing and compacting levee embankment material
4. Replacing removed material with borrow material if needed to complete levee embankment

19-10.01B Definitions

Satisfactory Materials: Satisfactory materials are any materials classified under ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, or CL-ML. Stones must be less than 9 inches in greatest dimension.

Unsatisfactory Materials: Unsatisfactory materials are those that do not meet the definition of satisfactory materials. Unsatisfactory materials also include any of the following:

1. Trash
2. Manure
3. Refuse
4. Root and other organic material
5. Asphalt
6. Broken concrete/cementitious materials
7. Materials classified under ASTM D 2487 as MH, CH, PT, OH or OL.

Degree of Compaction: Compaction expressed as a percentage of the maximum dry density determined under ASTM D 1557.

19-10.01C Submittals

1. Submit an earthwork plan including:
 - 1.1. General sequencing of work
 - 1.2. Methods and equipment to be used in excavating
 - 1.3. Methods of blending and stockpiling excavated material
 - 1.4. Location of stockpile
 - 1.5. Methods and equipment for fill placement, spreading, and compaction
2. Submit a plan including:
 - 2.1 Locations of the quality control density tests
 - 2.2 Limits of compacted fill
 - 2.3 Coordinates and elevations where the density tests are taken.
3. Maintain a log of all tests continuously in Microsoft Excel file format. Submit the test log weekly, both as a printed hard copy and electronically.

Test log includes:

- 3.1. Test number (if retest, include retest number)
- 3.2. Date
- 3.3. Feature of work
- 3.4. Station, offset and elevation of test location
- 3.5. Moisture content
- 3.6. Unit weight of dry soil
- 3.7. Percent of compaction
- 3.8. Optimum moisture content
- 3.9. Maximum dry unit weight
- 3.10. Proctor test number
- 3.11. Soil classification
- 3.12. Gradation (full set, uniform spacing)
- 3.13. In-place density test method used
- 3.14. Estimate of the volume of each type of material placed each week.

19-10.01D(1) Field and Laboratory Control

Inspections and test results must be certified by a geotechnical engineer registered in the State. These certifications must state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. The certifications must be documented in a compaction report signed by an engineer who is registered as a professional engineer in the State. The report must contain:

1. Test results
2. Test locations
3. Limits of certified fill
4. Statement that certifies that all fills were constructed in compliance with the plans and specifications.

Report moisture-density relations, field densities and gradations on authorized forms. All test reports must conform to ASTM requirements. Provide 1 copy of density data less dry weight determinations the day each test is taken. Provide the completed field density test and gradation report with the Quality Control Report the day after the test. Submit all data related to the treating of compacted fill materials within 24 hours of the completion of the tests.

19-10.01D(2) Laboratory Control

Establish moisture-density relations.

Classification of soil used for each maximum dry density test must comply with ASTM D 2487.

Particle size analysis must comply with ASTM D 422 and ASTM D 1140.

Make one 5- point maximum dry density test for every 10 field density tests. Make one moisture-density relation for each classification of soil materials.

Moisture-density relations must comply with ASTM D 1557.

19-10.01D(3) Field Control

Make at least one in-place test in each 2-foot layer of compacted fill or backfill. In-place tests include:

1. Gradation
2. Moisture content
3. In-place density test

Correlate field density tests to a specific Proctor test for determining relative compaction.

Make a 2-point compaction test on 1 sample from each density test. Two-point compaction test must comply with EM 1110-2-1911, Construction Control for Dams, Appendix B.

Make field density and gradation tests at locations throughout the fill.

Remove, replace, and recompact fills that do not comply with the tests. Retest replaced fills for compliance.

Field in-place density must comply with ASTM D 1556.

Field moisture content must comply with ASTM D 2216.

Classification of soil sample from each in-place density must comply with ASTM D 2487.

Particle size analysis must comply with ASTM D 442 and ASTM D 1140. Each sample for particle size analysis must be a minimum of 20 pounds and include the material tested for density.

19-10.02 MATERIALS

Use stockpiled excavated material. Remove any stockpiled material meeting the definition of "unsatisfactory material". Remove any stockpiled material not meeting the requirements of "satisfactory material".

Blend all satisfactory material before placement.

Determine gradation of fill and backfill material under ASTM C136, ASTM D422 and ASTM D1140.

19-10.03 CONSTRUCTION

Perform excavation and fill in a manner and sequence that will provide proper drainage at all times.

Support earthbanks and structures as necessary during excavation.

20 LANDSCAPE

Add to section 20-1.02B:

Pesticides used to control weeds must be limited to the following materials:

Aminopyralid
Diquat
Dithiopyr
Clopyralid MEA
Fluazifop-P-Butyl
Flumioxazin
Glyphosate
Imazapyr
Isoxaben (preemergent)
Oryzalin (preemergent)
Oxyfluorfen (non-odor type)
Pendimethalin (preemergent)
Prodiamine (preemergent)
Sethoxydim

Add to section 20-1.02B:

A granular preemergent may be used when applied to areas that will be covered with mulch, excluding plant basins. Granular preemergent must be limited to the following material:

1. Oxadiazon

Add to section 20-1.03C:

Granular preemergent must be applied before the placement of mulch. The preemergent application and mulch placement must be completed in a single area within the same work day.

Add to section 20-1.03B:

Before the application of preemergents, ground cover plants must have been planted a minimum of 3 days and must have been thoroughly watered.

A minimum of 100 days must elapse between applications of preemergents.

Except for ground cover plants, preemergents must not be applied within 18 inches of plants or within wildflower seeding areas.

Growth regulators must not be used.

Replace the last paragraph in section 20-1.03D with:

Dispose of pruned materials or reduce to chips and spread within the job site. Spread chipped material at locations determined by the Engineer. Chipped material must not be substituted for mulch, nor must the chipped material be placed within areas to receive mulch.

Add to the list in the 1st paragraph of section 20-2.01B:

3. A work plan for maintain existing planted areas.

Add to section 20-2.03D:

After deficiencies are corrected, perform work to maintain existing planted areas in a neat and presentable condition and to promote healthy plant growth. Submit a work plan that includes weeding, weed control, fertilization, watering, and controlling rodents and pests. The work plan must include the following requirements:

1. Weeds must be killed in existing planted areas as shown. Weeds in existing plant basins, including basin walls, must be killed by hand pulling.
2. Where pesticides are used to kill weeds, weeds must be killed before they reach the seed stage of growth or exceed 4 inches in length, whichever occurs first.
3. Where weeds are to be killed by hand pulling, weeds must be hand pulled before they reach the seed stage of growth or exceed 4 inches in length, whichever occurs 1st, except for tumbleweeds. Dispose of weeds the same day they are pulled.
4. Tumbleweeds must be killed by hand pulling before they reach the seed stage of growth or exceed 6 inches in length, whichever occurs 1st. Dispose of tumbleweeds the same day they are pulled.
5. Weeds killed in existing planted areas must extend beyond the outer limits of the existing planted areas to the adjacent edges of paving, fences, proposed plants and planting areas, and the clearing limits as described in section 20-7.03B.
6. Weeds must be killed within a 6 foot diameter area centered at each existing tree and shrub located outside of the existing planted areas.
7. Pesticides used for maintaining existing planted areas must comply with section 20-1.02B.
8. Water plants automatically if the new irrigation system for that area is operational.
9. Existing plant basins, if still required as determined by the Engineer, must be kept well-formed and free of silt. If the existing plant basins need repairs, and the basins contain mulch, replace the mulch after the repairs are done.

Replace section 20-3.01C(3) with:

20-3.01C(3) Control and Neutral Conductors Schedule of Values

Submit a schedule of values for control and neutral conductors. Submit the schedule after the wiring plans and diagrams for the electrical components of the irrigation system, except electrical service, have been authorized.

The unit descriptions shown in the table are the minimum. You may include additional unit descriptions. Include the quantity, value, and amount for those additional unit descriptions.

Use the authorized wiring plan and diagrams to determine the quantities required to complete the work.

No adjustment in compensation is made in the contract lump sum price paid for control and neutral conductors work due to differences between the quantities shown in the schedule of values for control and neutral conductors work and the quantities required to complete the work.

Schedule of Values for Control and Neutral Conductors

Contract no. 12-0C5604				
Unit description	Unit	Approximate quantity	Value	Amount
__ AWG (UF) conductors (provide size)	LF			
__ AWG (UF) conductors	LF			
__ AWG (UF) conductors	LF			
__ AWG armor-clad conductors	LF			
__ AWG armor-clad conductors	LF			
__ AWG armor-clad conductors	LF			
No. 5 or larger pull box	EA			
Splices	EA			
__ Sprinkler control conduit (provide size)	LF			
__ Sprinkler control conduit	LF			
__ Sprinkler control conduit	LF			

Total _____

Add to section 20-3.02R(1):

Ball valves must be PVC.

Add to section 20-3.02R(3)(b):

Remote control valves must be brass.

Add to section 20-3.02R(3)(b):

Valves must be straight pattern as shown.

Replace the last paragraph in section 20-3.03E(2) with:

Dispose of removed ground cover and prunings or reduce to chips and spread within the job site. Spread chipped material at locations determined by the Engineer. Chipped material must not be substituted for mulch, nor must the chipped material be placed within areas to receive mulch.

Add to section 20-3.03F(3):

Plastic pipe supply line mains must be installed not less than 1.5 feet below finished grade measured to the top of the pipe.

Replace "Reserved" in section 20-7.02D(1)(d) with:

Organic fertilizer must be one of the following and comply with the requirements of the following table:

Organic Fertilizer

Product	Guaranteed chemical analysis (N-P-K) (%)	Company
Biosol Mix®	7-2-3	Rocky Mountain Bio-Products Denver, CO
Fertil-Fibers™	6-4-1	Quattro Environmental, Inc. Coronado, CA
Sustane®	5-2-4	Sustane Natural Fertilizer, Inc. Cannon Falls, MN
Or equal ^a	(N) 5 to 7 (P) 1 to 5 (K) 1 to 10	--

^aOr equal must be pelleted or granular and be within the ranges shown for N-P-K. The cumulative (N) release rate must be no more than 70 percent the first 70 days after incubation (86 degrees F) with 100 percent at 350 days or more.

Add between the 3rd and 4th paragraphs of section 20-7.03B(1):

Dispose of removed existing plants or reduce to chips and spread within the job site. Spread chipped material at locations determined by the Engineer. Chipped material must not be substituted for mulch, nor must the chipped material be placed within areas to receive mulch.

Add to section 20-7.03B(2):

Weeds must be killed within ground cover areas and within the area extending beyond the outer limits of the ground cover areas to the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, existing planting, and fences. At those locations where ground cover areas are 12 feet or more from the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, and fences, the clearing limit must be 6 feet beyond the outer limits of the ground cover areas.

Weeds must be killed within mulch areas and within the area extending beyond the outer limits of the mulch areas to the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, existing planting and fences. At those locations where mulch areas are 12 feet or more from the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, and fences, the clearing limit must be 6 feet beyond the outer limits of the mulch areas.

Weeds must be killed within 2 feet of the edges of paved shoulders, dikes, curbs, and sidewalks.

Weeds must be killed within planting areas where plants are to be planted in groups or rows 15 feet or less apart and from within an area extending 6 feet beyond the outer limits of the groups or rows of plants.

Weeds must be killed within an area 6 feet in diameter centered at each plant location where the plants are to be planted more than 15 feet apart and are located outside of ground cover areas.

Weeds outside of mulched areas, plant basins, and ground cover must be controlled by mowing. Limits of mowing must extend from the weeds to be killed areas out to the edges of pavement, dikes, curbs, sidewalks, walls, and fences.

Existing ground cover must be killed and removed from within an area 6 foot in diameter centered at each plant location within existing ground cover areas.

Replace the 1st paragraph in section 20-7.03B(2) with:

Dispose of weeds killed during the initial roadside clearing.

Replace the 2nd paragraph in section 20-7.03B(3) with:

Dispose of mowed material and weeds killed during the after initial roadside clearing.

Add to section 20-7.03C:

Plants adjacent to drainage ditches must be located so that after construction of the basins, no portion of the basin wall is less than the minimum distance shown for each plant involved.

Add to section 20-7.03I(1):

A granular preemergent must be applied to areas to be covered with mulch outside of plant basins.

Add to section 20-9.01A:

The plant establishment period must be Type 2.

Add to section 20-9.03C:

Apply organic fertilizer to the plants during the 1st week of March and July of each year.

Add to section 20-9.03D:

If ordered, apply 1 application of a preemergent pesticide between 40 and 50 working days before completion of the plant establishment period. This work is change order work.

Control weeds by:

1. Hand pulling:
 - 1.1. In plant basins and on basin walls
 - 1.2. In ground cover planting areas without plant basins
2. Killing:
 - 2.1. In mulched areas and ground cover planting areas outside of plant basins
 - 2.2. In planting areas without ground cover plantings or located outside of ground cover areas
 - 2.3. In ground cover planting areas without plant basins
 - 2.4. Within medians, pavement, curbs, sidewalks, and other surfaced areas

AA

DIVISION V SURFACINGS AND PAVEMENTS
39 HOT MIX ASPHALT

Add to section 39-1.01:

Produce and place HMA Type A under the Standard construction process.

Produce and place RHMA-G under the Standard construction process.

Add to section 39-1.02C:

Asphalt binder used in HMA Type A must be PG 64-10.

Asphalt binder mixed with asphalt modifier and CRM for asphalt rubber binder must be PG 64-16.

Add to section 39-1.02E:

Aggregate used in HMA Type A must comply with the 3/4-inch HMA Types A and B gradation.

Aggregate for RHMA-G must comply with the 3/4-inch RHMA-G gradation.

Replace the 2nd, 3rd, and 4th paragraphs of section 39-1.11B(1) of the RSS for section 39-1.11 with:

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 from 5 to 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 authorized bond breaker under the conform tapers to facilitate the taper removal when paving operations resume.

Delete section 39-1.11B(2) of the RSS for section 39-1.11.

Replace the paragraph in 39-1.11C of the RSS for section 39-1.11 with:

If widening existing pavement, construct new pavement structure to match the elevation of the existing pavement's edge in increments of at least 0.15 feet before placing HMA over the existing pavement.

Add to section 39-1.11D of the RSS for section 39-1.11:

Pave shoulders and median borders adjacent to the lane before opening a lane to traffic.

Place shoulder conform tapers concurrently with the adjacent lane's paving.

Place additional HMA along the pavement's edge to conform to road connections and driveways. Hand rake, if necessary, and compact the additional HMA to form a smooth conform taper.

Replace the 2nd through 4th paragraphs of section 39-1.15C with:

Spread with a self-propelled spreader. After spreading, minor HMA must be ready for compacting without further shaping.

Compact with a vibratory roller providing a minimum of 7,000 lb centrifugal force. With the vibrator on, compact at least 3 complete coverages over each layer, overlapping to prevent displacement. The speed of the vibratory roller in miles per hour must not exceed the vibrations per minute divided by 1,000. If the layer thickness is less than 0.08 foot, turn the vibrator off. Complete the 1st coverage before the mixture's temperature drops below 250 degrees F.

The finished surface must be:

1. Textured uniformly
2. Compacted firmly
3. Without depressions, humps, and irregularities
4. In compliance with the straightedge specifications for smoothness

Replace section 39-1.17 with:

39-1.17 DATA CORES

39-1.17A General

39-1.17A(1) Summary

This work includes taking data cores and submitting the information.

Three business days before starting coring, submit proposed methods and materials for backfilling data core holes.

39-1.17A(2) Submittals

Submit the following to the Engineer and to Coring@dot.ca.gov:

1. Summary of data cores taken
2. Photograph of each data core

For each data core, the summary must include:

1. Project identification number
2. Date cored
3. Core identification number
4. Type of materials recovered
5. Type and approximate thickness of unstabilized material not recovered
6. Total core thickness
7. Thickness of each individual material to within:
 - 7.1 1/2 inch for recovered material
 - 7.2 1.0 inch for unstabilized material
8. Location including:
 - 8.1. County
 - 8.2. Route
 - 8.3. Post mile
 - 8.4. Lane number
 - 8.5. Lane direction
 - 8.6. Station

Each data core digital photograph must include a ruler laid next to the data core. Each photograph must include:

1. Core
2. Project identification number
3. Core identification number
4. Date cored
5. County

6. Route
7. Post mile
8. Lane number
9. Lane direction

39-1.17B Materials

Not Used

39-1.17C Construction

Take data cores that include the completed HMA pavement, underlying base, and subbase material. Protect data cores and surrounding pavement from damage.

Take 4- or 6-inch-diameter data cores:

1. At the beginning, end, and every 1/2 mile within the paving limits of each route on the project
2. After all paving is complete
3. From the center of the specified lane

On a 2-lane roadway, take data cores from either lane. On a 4-lane roadway, take data cores from each direction in the outermost lane. On a roadway with more than 4 lanes, take data cores from the median lane and the outermost lane in each direction.

Each core must include the stabilized materials encountered. You may choose not to recover unstabilized material, but you must identify the material. Unstabilized material includes:

1. Granular material
2. Crumbled or cracked stabilized material
3. Sandy or clayey soil

After submitting the data core summary and photograph, dispose of cores.

Replace section 39-1.30 with:

39-1.30 EDGE TREATMENT, HOT MIX ASPHALT PAVEMENT

39-1.30A General

Section 39-1.30 includes specifications for constructing the edges of HMA pavement as shown.

39-1.30B Materials

For the safety edge, use the same type of HMA used for the adjacent lane or shoulder.

39-1.30C Construction

The edge of roadway where the safety edge treatment is to be placed must have a solid base, free of debris such as loose material, grass, weeds, or mud. Grade areas to receive the safety edge as required.

The safety edge treatment must be placed monolithic with the adjacent lane or shoulder and shaped and compacted with a device attached to the paver.

The device must be capable of shaping and compacting HMA to the required cross section as shown. Compaction must be by constraining the HMA to reduce the cross sectional area by 10 to 15 percent. The device must produce a uniform surface texture without tearing, shoving, or gouging and must not leave marks such as ridges and indentations. The device must be capable of transition to cross roads, driveways, and obstructions.

For safety edge treatment, the angle of the slope must not deviate by more than ± 5 degrees from the angle shown. Measure the angle from the plane of the adjacent finished pavement surface.

If paving is done in multiple lifts, the safety edge treatment can be placed either with each lift or with the final lift.

Short sections of hand work are allowed to construct transitions for safety edge treatment.

For more information on the safety edge treatment, go to:

http://safety.fhwa.dot.gov/roadway_dept/pavement/safedge/

You can find a list of commercially available devices at the above Web site under "Frequently Asked Questions" and "Construction Questions."

39-1.30D Payment

Not Used

Replace section 39-1.31 with:

39-1.31 WARM MIX ASPHALT TECHNOLOGY OPTION

39-1.31A GENERAL

39-1.31A(1) Summary

You may produce HMA Type A, Type B, or RHMA-G using an approved warm mix asphalt (WMA) technology. For Department-approved WMA technologies, go to:

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

AASHTO T 324 (Modified) is AASHTO T 324, "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA)," with the following parameters:

1. Target air void content is 7 ± 1 percent
2. 4 test specimens
3. 6-inch gyratory compacted test specimen
4. Test temperature is 122 ± 2 degrees F
5. Impression measurements at every 100 passes
6. Inflection point as the number of wheel passes at the intersection of the creep slope and the stripping slope
7. Testing shut off after 25,000 passes
8. For RHMA test specimens:
 - 8.1. Superpave Gyratory Compactor ram pressure may be increased to a maximum 825 kPa
 - 8.2. Specimens may be held at a constant height for a maximum 90 minutes

HMA samples must be prepared under California Test 304, except the samples must be cured in a forced air draft oven at 275 degrees F for 4 hours \pm 10 minutes.

39-1.31A(2) Definitions

WMA: HMA produced at temperatures no greater than 275 degrees F.

HMA with WMA technology: HMA produced using additives to aid with mixing and compaction of HMA produced at temperatures greater than 275 degrees F.

39-1.31A(3) Submittals

39-1.31A(3)(a) General

With the JMF submittal as specified in section 39-1.03C, submit:

1. For WMA water injection foam technology:
 - 1.1. Name of technology
 - 1.2. Laboratory Procedure LP-12 test result for foamed bitumen expansion ratio dated within 12 months of submittal
 - 1.3. Laboratory Procedure LP-12 test result for foamed bitumen half-life dated within 12 months of submittal
 - 1.4. Optimum foaming water content
 - 1.5. Proposed HMA production temperature range
2. For WMA additive technology:
 - 2.1. Name of technology

- 2.2. Percent admixture by weight of binder and percent admixture by total weight of HMA as recommended by the manufacturer
- 2.3. Methodology for inclusion of admixture in laboratory-produced HMA
- 2.4. Proposed HMA production temperature range

The 4th and 5th paragraphs of section 39-1.03C do not apply. Instead submit:

1. California Test 371 test results for dry strength for untreated plant-produced HMA
2. California Test 371 test results for tensile strength ratio for untreated plant-produced HMA
3. California Test 204 test results for plasticity index if untreated plant-produced HMA test result determined under California Test 371 is below the specified HMA mix design requirements
4. California Test 371 test results for treated plant-produced HMA if untreated plant-produced HMA test result determined under California Test 371 is below the specified HMA mix design requirements
5. AASHTO T 324 (Modified) test results data showing number of passes with rut depth for plant-produced HMA
6. AASHTO T 324 (Modified) test results data showing number of passes at inflection point for plant-produced HMA

39-1.31A(3)(b) Prepaving Conference

With the JMF submittal, submit a list of names participating in the prepaving conference. Identify each participant's name, employer, title, and role in the production and placement of WMA or HMA with WMA technology.

39-1.31A(3)(c) Tests and Samples

The 6th paragraph of section 39-1.03C does not apply.

At production start-up and within $\pm 1,000$ tons of the halfway point of production of HMA produced using WMA technology, submit samples split from your HMA production sample for California Test 371 and AASHTO T 324 (Modified) test to the Engineer and METS, Attention: Moisture Test.

With the JMF submittal, at JMF verification, at production start-up, and for each 10,000 tons of HMA produced, submit California Test 371 test results and AASHTO T 324 (Modified) test results for mix design and production to the Engineer and electronically to:

Moisture_Tests@dot.ca.gov

With the JMF submittal, at JMF verification, at production start-up evaluation, and for each 10,000 tons of HMA produced, submit 1 tested sample set from the AASHTO T 324 (Modified) test to the Engineer.

39-1.31A(3)(d) Daily Production Log

Submit the log of production data, daily and upon request.

39-1.31A(4) Quality Control and Assurance

39-1.31A(4)(a) General

Not Used

39-1.31A(4)(b) Technical Representative

A technical representative from the WMA technology supplier must be present during the first 3 days of production and placement of WMA or HMA using WMA technology. The technical representative must advise you, the Engineer, and the HMA producer. The technical representative must direct the HMA mix operation as it relates to the WMA technology.

The technical representative must advise the HMA producer regarding HMA plant and HMA plant process-controller modifications necessary for integrating WMA technology with HMA plant. HMA plant modifications and WMA technology equipment, scales, and meters must comply with the Department's Materials Plant Quality Program (MPQP).

39-1.31A(4)(c) Prepaving Conference

Schedule a prepaving conference with the Engineer at a mutually agreed time and place. Make arrangements for the conference facility. Be prepared to discuss:

1. HMA production and placement
2. Method for incorporating WMA technology and any impacts on HMA production and placement including requirements for compaction and workmanship
3. Contingency plan

The following personnel must attend the prepping conference:

1. Project Manager
2. Superintendent
3. Technical representative for WMA technology
4. Asphalt binder supplier
5. HMA plant manager
6. HMA plant operators
7. HMA paving foreman

39-1.31A(4)(d) Quality Control Testing

In addition to the requirements specified in section 39-2.02B for Standard construction process and section 39-4.02C for QC/QA construction process and for Method construction process, perform sampling and testing at the specified frequency and location for the following additional quality characteristics:

Minimum Quality Control

Quality characteristic	Test method	Minimum sampling and testing frequency	Requirement			Sampling location	Maximum reporting time allowance
			HMA Type				
			A	B	RHMA-G		
Moisture susceptibility (minimum dry strength, psi)	California Test 371	First production day and 1 per every 10,000 tons	120	120	120	Loose mix behind the paver. See California Test 125	15 days
Moisture susceptibility (tensile strength ratio, %)	California Test 371		Report Only	Report Only	Report Only		
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) PG-58 PG-64 PG-70 PG-76	AASHTO T 324 (Modified)	First production day and 1 per every 10,000 tons	10,000	10,000	15,000	Loose mix behind the paver. See California Test 125	7 days ^a
Hamburg wheel track (inflection point minimum number of passes) PG-58 PG-64 PG-70 PG-76	AASHTO T 324 (Modified)		15,000	15,000	20,000		
			20,000	20,000	25,000		
			25,000	25,000	--		
			10,000	10,000	10,000		
			10,000	10,000	12,500		
			12,500	12,500	15,000		
			15,000	15,000	--		

^a Submit test data and 1 tested sample set.

39-1.31A(4)(e) Engineer's Acceptance

In addition to the requirements specified in section 39-2.03A for Standard construction process, section 39-3.02A for Method construction process, and section 39-4.04A for QC/QA construction process, the Engineer samples HMA for acceptance testing and tests for the following additional quality characteristic:

HMA Acceptance

Quality characteristic	Test method	Requirement			Sampling location
		HMA Type			
		A	B	RHMA-G	
Moisture susceptibility (minimum dry strength, psi)	California Test 371	120	120	120	Loose mix behind the paver. See California Test 125
Moisture susceptibility (tensile strength ratio, %)	California Test 371	Report Only ^a	Report Only ^a	Report Only ^a	
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) PG-58 PG-64 PG-70 PG-76	AASHTO T 324 (Modified)	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	15,000 20,000 25,000 --	Loose mix behind the paver. See California Test 125
Hamburg wheel track (inflection point minimum number of passes) PG-58 PG 64 PG-70 PG-76	AASHTO T 324 (Modified)	10,000 10,000 12,500 15,000	10,000 10,000 12,500 15,000	10,000 12,500 15,000 --	

^aThe Department does not use California Test 371 tensile strength ratio test results from production to determine specification compliance.

39-1.31B MATERIALS

39-1.31B(1) General

Not Used

39-1.31B(2) Foaming Bitumen

If water injection is used by the WMA technology, the foamed bitumen must have the following quality characteristics:

Quality Requirements for Foaming Bitumen

Quality characteristic	Test method	Requirement
Expansion ratio (minimum)	LP-12	4
Half-life (seconds minimum)	LP-12	4

For Laboratory Procedure LP-12, go to:

<http://www.dot.ca.gov/hq/esc/Translab/ofpm/fmplab.htm>

39-1.31B(3) Hot Mix Asphalt

39-1.31B(3)(a) General

Not Used

39-1.31B(3)(b) Mix Design

For WMA additive technology, produce HMA mix samples for your mix design using your methodology for inclusion of WMA admixture in laboratory produced HMA. For WMA water injection foam technology, the use of foamed asphalt for mix design is not required.

HMA mix design must comply with the following quality characteristics:

Hot Mix Asphalt Mix Design Requirements

Quality characteristic	Test method	HMA Type		
		A	B	RHMA
Moisture susceptibility (minimum dry strength, psi)	California Test 371	120	120	120
Moisture susceptibility (tensile strength ratio, %)	California Test 371	70	70	70
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth)	AASHTO T 324 (Modified)	PG-58	10,000	15,000
PG 64		15,000	20,000	
PG-70		20,000	25,000	
PG-76		25,000	--	
Hamburg wheel track (inflection point minimum number of passes)	AASHTO T 324 (Modified)	PG-58	10,000	10,000
PG 64		10,000	12,500	
PG-70		12,500	15,000	
PG-76		15,000	--	

If the determined test results under California Test 371 or AASHTO T 324 (Modified) for untreated plant produced HMA are less than the minimum requirement for the mix design, determine the plasticity index of the aggregate blend under California Test 204. Choose from the antistrip treatments based on plasticity index as shown in the following table:

Hot Mix Asphalt Antistrip Treatment Options

Quality characteristic	Test method	Treatment requirement
Plasticity index from 4 to 10 ^a	California Test 204	Dry hydrated lime with marination Lime slurry with marination
Plasticity index less than 4		Liquid antistrip Dry hydrated lime without marination Dry hydrated lime with marination Lime slurry with marination

^a If the plasticity index is greater than 10, do not use that aggregate blend.

Mix design for treated plant-produced HMA must comply with the mix design requirements, except if the tensile strength ratio test result for treated plant produced RHMA-G is less than the mix design requirement for tensile strength ratio, the minimum tensile strength ratio requirement is waived, but you must use any of the following antistrip treatments:

1. HMA aggregate lime treatment – slurry method
2. HMA aggregate lime treatment – dry lime method
3. Liquid antistrip treatment using 0.5 percent liquid antistrip

39-1.31B(3)(c) Job Mix Formula Verification

HMA produced for JMF verification must be produced using the WMA technology shown in the JMF submittal.

Perform the AASHTO T 324 (Modified) test for compliance with the mix design requirements. Submit test data and one tested sample set from the AASHTO T 324 (Modified) test.

The Engineer may verify that the HMA complies with the mix design requirements for AASHTO T 324 (Modified) and California Test 371.

If you request, the Engineer verifies RHMA-G quality requirements within 5 business days of sampling. The 2nd sentence in the 8th paragraph of section 39-1.03E does not apply.

39-1.31B(4) Production

39-1.31B(4)(a) General

For the Standard and QC/QA construction processes, HMA produced using WMA technology must be produced at a temperature between 240 and 325 degrees F.

For the Method construction process, HMA produced using WMA technology must be produced at the temperatures specified in section 39-1.08.

HMA additives used for antistripping treatment and WMA technologies may be either in a liquid or dry state.

The HMA plant must have a sampling device in the feed line connecting the additive storage to the additive metering system. The sampling equipment must comply with California Test 125.

39-1.31B(4)(b) Proportioning Warm Mix Asphalt Technologies

HMA plants using WMA technology must comply with the Department's MPQP.

Proportion all ingredients by weight. The HMA plant process controller (PPC) must be the sole source of ingredient proportioning control and be fully interfaced with all scales and meters used in the production process. The addition of the HMA additive must be controlled by the PPC.

Weighing and metering devices used for the production of additive enhanced HMA must comply with the requirements of the MPQP. If a loss-in-weight meter is used for dry HMA additive, the meter must:

1. Comply with the requirements of the MPQP
2. Have an automatic and integral material delivery control system for the refill cycle

Calibrate the loss-in-weight meter by:

1. Including at least 1 complete system refill cycle during each calibration test run
2. Operating the device in a normal run mode for 10 minutes immediately before starting the calibration process
3. Isolating the scale system within the loss-in-weight feeder from surrounding vibration
4. Checking the scale system within the loss-in-weight feeder for accuracy before and after the calibration process and daily during mix production
5. Using a 15-minute or 250-pound-minimum test run size for a dry ingredient delivery rate of less than 1 ton/hr
6. Complying with the limits of Table B, "Conveyor Scale Testing Extremes," in the MPQP

Produce additive enhanced HMA by using either a continuous mixing or a batch type HMA plant.

Liquid ingredient additive, including a normally dry ingredient made liquid, must be proportioned with a mass flow meter at continuous mixing plants. Use a mass flow meter or a container scale to proportion liquid additives at batch mixing plants.

Continuous mixing plants using HMA additives must comply with the following:

1. Dry ingredient additives for continuous production must be proportioned with a conveyor scale or a loss-in-weight meter.
2. HMA PPC and ingredient measuring systems must be capable of varying all ingredient feed rates proportionate with the dry aggregate delivery at all production rates and rate changes.

3. Liquid HMA additive must enter the production stream with the binder. Dry HMA additive must enter the production stream at or before the mixing area.
4. If dry HMA additives are used at continuous mixing HMA plants, baghouse dust systems must return all captured material to the mix.
5. HMA additive must be proportioned to within ± 0.3 percent of the target additive rate.

Batch mixing plants using HMA additives must comply with the following:

1. Metered HMA additive must be placed in an intermediate holding vessel before being added to the stream of asphalt binder as it enters the pugmill.
2. If a container scale is used, weigh additive before combining with asphalt binder. Keep the container scale separate from other ingredient proportioning. The container scale capacity must be no more than twice the volume of the maximum additive batch size. The container scale's graduations must be smaller than the proportioning tolerance or 0.001 times the container scale capacity.
3. Dry HMA additive proportioning devices must be separate from metering devices for the aggregates and asphalt binder. Proportion dry HMA additive directly into the pugmill or place in an intermediate holding vessel to be added to the pugmill at the appropriate time in the batch cycle. Dry ingredients for batch production must be proportioned with a hopper scale.
4. Zero tolerance for the HMA additive batch scale is ± 0.5 percent of the target additive weight. The indicated HMA additive batch scale weight may vary from the preselected weight setting by up to ± 1.0 percent of the target additive weight.

39-1.31B(4)(c) Production Data Collection

The HMA PPC must produce an electronic log of production data consisting of a series of snapshots captured at a maximum of 1-minute intervals throughout daily production. Each snapshot of production data must be a register of production activity at that time and not a summation of the data over the preceding interval to the previous snapshot. The amount of material represented by each snapshot is the amount produced during the 0.5-minute interval before and the 0.5-minute interval after the capture time. Collect and hold data for the duration of the contract and submit the electronic media, daily and upon request. The snapshot of production data must include the following:

1. Date of production
2. Production location
3. Time of day the data is captured
4. HMA mix type being produced and target binder rate
5. HMA additive type, brand, and target rate
6. Temperature of the binder and HMA mixture
7. For a continuous mix operation, the rate of flow of the dry aggregate calculated from the wet aggregate flow rate as determined by the conveyor scale
8. For a continuous mix plant operation, the rate of flow of the asphalt meter
9. For a continuous mix plant operation, the rate of flow of HMA additive meter
10. For a batch plant operation, actual batch weights of all ingredients
11. Dry aggregate to binder ratio calculated from metered ingredient output
12. Dry aggregate to HMA additive ratio calculated from metered output

Electronic media must be presented in a comma-separated values (CSV) or tab-separated values (TSV) format. Captured data, for the ingredients represented by production snapshot, must have allowances for sufficient fields to satisfy the amount of data required by these specifications and include data titles at least once per report.

39-1.31C CONSTRUCTION

You must request adjustments to the plant asphalt binder set point based on new RAP stockpiles average asphalt binder content. Do not adjust the HMA plant asphalt binder set point unless authorized.

The specified temperatures in section 39-1.11 for transporting, spreading and compacting of HMA apply to HMA produced using WMA technology. For the Method construction process, the specified temperatures in section 39-3.04 for transporting, spreading, and compacting of HMA apply to HMA produced using WMA technology.

W = Wheel path as "L" for left, "R" for right, or "B" for both
S = Beginning station to the nearest foot (i.e., 10+20) or beginning post mile to the nearest hundredth (i.e., 25.06) no leading zero
X = Profile operation as "EXIST" for existing pavement, "PAVE" for after paving, or "CORR" for after final surface pavement correction
PT = Pavement type (i.e., "concrete", etc.)

Electronic PPF files that do not follow this standardized naming convention will be rejected.

Within 2 business days of performing straightedge measurements, submit areas requiring smoothness correction. Identify locations of smoothness correction by:

1. Location Number
2. District-County-Route
3. Beginning station or post mile to the nearest 0.01 mile
4. For correction areas within a lane:
 - 4.1. Lane direction as NB, SB, EB, or WB
 - 4.2. Lane number from left to right in direction of travel
 - 4.3. Wheel path as "L" for left, "R" for right, or "B" for both
5. For correction areas not within a lane:
 - 5.1. Identify pavement area (i.e., shoulder, weight station, turnout)
 - 5.2. Direction and distance from centerline as "L" for left or "R" for right
6. Estimated size of correction area

Replace section 40-1.01C(14) with:

40-1.01C(14) Coefficient of Thermal Expansion

Fabricate test specimens from a single sample of concrete for coefficient of thermal expansion testing under AASHTO T 336. Submit 4 test specimens for assurance testing. Submit your test data at:

<http://169.237.179.13/cte/>

Replace "Reserved" in section 40-1.01D(1) with:

Provide a QC manager under section 11.

Replace section 40-1.01D(7)a with:

40-1.01D(7)(a) Coefficient of Thermal Expansion Testing

Perform coefficient of thermal expansion testing under AASHTO T 336 at a frequency of 1 test for each 5,000 cu yd of paving but not less than 1 test for projects with less than 5,000 cu yd of concrete. This test is not used for acceptance.

For field qualification, perform coefficient of thermal expansion testing under AASHTO T 336.

Replace section 40-1.01D(7)b with:

40-1.01D(7)(b) Smoothness Testing

Determine IRIs using the ProVAL ride quality analysis with a 250 mm filter. While collecting the profile data to determine IRI, record the following locations in the raw profile data:

1. Begin and end of all bridge approach slabs
2. Begin and end of all bridges
3. Begin and end of all culverts visible on the roadway surface

Determine the MRI for 0.1-mile fixed sections. A partial section less than 0.1 mile that is the result of an interruption to continuous pavement surface must comply with the MRI specifications for a full section. Adjust the MRI for a partial section to reflect a full section based on the proportion of a section paved.

Determine the areas of localized roughness. Use the ProVal smoothness assurance with a continuous IRI for each wheel path, 25-foot interval, and 250 mm filter.

Replace the paragraphs in section 40-1.01D(9) including the RSS for section 40-1.01D(9) with:

Test pavement smoothness using an IP except use a 12-foot straightedge at the following locations:

1. Traffic lanes less than 1,000 feet in length including ramps, turn lanes, and acceleration and deceleration lanes
2. Areas within 15 feet of manholes
3. Shoulders
4. Weigh-in-motion areas
5. Miscellaneous areas such as medians, gore areas, turnouts, and maintenance pullouts

For IP testing, wheel paths are 3 feet from and parallel to the edge of a lane. Left and right are relative to the direction of travel. The IRI is the pavement smoothness along a wheel path of a given lane. The MRI is the average of the IRI values for the left and right wheel path from the same lane.

IP equipment must display a current certification decal with expiration date.

Operate the IP according to the manufacturer's recommendations and AASHTO R57-10 at 1-inch recording intervals and a minimum 4 inch line laser sensor.

Notify the Engineer 2 business days before performing IP calibration and verification testing.

Conduct the following IP calibration and verification tests in the Engineer's presence each day before performing inertial profiling:

1. Block test. Verify the height sensor accuracy under AASHTO R57-10, section 5.3.2.3.
2. Bounce test. Verify the combined height sensor and accelerometer accuracy under AASHTO R57-10, section 5.3.2.3.2.
3. DMI test. Calibrate the accuracy of the testing procedure under AASHTO R56-10, section 8.4.
4. Manufacturer's recommended tests.

Conduct cross correlation IP verification test in the Engineer's presence before performing initial profiling. Verify cross correlation IP verification test at least annually. Conduct 5 repeat runs of the IP on an authorized test section. The test section must be on an existing asphalt concrete pavement surface 0.1 mile long. Calculate a cross correlation to determine the repeatability of your device under Section 8.3.1.2 of AASHTO R56-10 using ProVAL profiler certification analysis with a 3 feet maximum offset. The cross correlation must be a minimum of 0.92.

For each 0.1 mile section, your IRI values must be within 10 percent of the Department's IRI values. The Engineer may order you to recalibrate your IP equipment and reprofile. If your results are inaccurate due to operator error, the Engineer may disqualify your IP operator.

Notify the Engineer of start location by station and start time at least 2 business days before profiling.

Before testing the pavement smoothness, remove foreign objects from the surface, and mark the beginning and ending station on the pavement shoulder.

Replace the 2nd paragraph of the RSS for section 40-1.01D(13)(a) with:

Pavement smoothness may be accepted based on your testing in the absence of the Department's testing.

Replace the paragraphs in section 40-1.01D(13)(d) including the RSS for section 40-1.01D(13)(d) with: Where testing with an IP is required, the pavement surface must have:

1. No areas of localized roughness with an IRI greater than 120 in/mi
2. MRI of 60 in/mi or less within a 0.1 mile section

Where testing with a straightedge is required, the pavement surface must not vary from the lower edge of the straightedge by more than:

1. 0.01 foot when the straightedge is laid parallel with the centerline
2. 0.02 foot when the straightedge is laid perpendicular to the centerline and extends from edge to edge of a traffic lane
3. 0.02 foot when the straightedge is laid within 24 feet of a pavement conform

Replace "Reserved" in section 40-1.02I(1) with:

Liquid joint sealant for **Isolation Joints** must be **Silicone**.

Replace the list for the 7th paragraph of section 40-1.03G with:

1. Pavement surface must not vary from the lower edge of a 12-ft straightedge by more than:
 - 1.1. 0.01 foot when the straightedge is laid parallel with the centerline
 - 1.2. 0.02 foot when the straightedge is laid perpendicular to the centerline and extends from edge to edge of a traffic lane
 - 1.3. 0.02 foot when the straightedge is laid within 24 feet of a pavement conform
2. Dowel bars do not comply with specified placement tolerances
3. Concrete pavement thickness deficiency is greater than 0.05 foot
4. Final finishing does not comply with the specifications except coefficient of friction

Add after the 9th paragraph of section 40-1.03G:

Retest the test strip smoothness under section 40-1.01D(9).

Delete the 1st paragraph of section 40-1.03H(2).

Replace "Reserved" in section 40-1.03L(1) of the RSS for section 40-1.03L with:

Construct edge treatments as shown. Regrade when required for the preparation of safety edge areas.

Sections 40-1.03L(2) and 40-1.03L(3) do not apply to safety edges.

For safety edges placed after the concrete pavement is complete, concrete may comply with the requirements for minor concrete.

For safety edges placed after the concrete pavement is complete, install connecting bar reinforcement under section 52.

Saw cutting or grinding may be used to construct safety edges.

For safety edges, the angle of the slope must not deviate by more than ± 5 degrees from the angle shown. Measure the angle from the plane of the adjacent finished pavement surface.

Replace the 2nd and 3rd paragraphs of section 40-1.03Q(5) with:

Do not start corrective work until:

1. Pavement has cured 10 days
2. Pavement has at least a 550 psi modulus of rupture
3. Your corrective method is authorized

Correct the entire lane width and begin and end grinding at lines perpendicular to the roadway centerline. The corrected area must have a uniform texture and appearance.

Add after the 4th paragraph of section 40-1.03Q(5):

If corrections are made within areas where testing with an IP is required, retest the entire lane length with an IP under section 40-1.01D(9).

If corrections are made within areas where testing with a 12-foot straightedge is required, retest the corrected area with a straightedge under section 40-1.01D(9).

Replace "Reserved" in section 40-2 with:

40-2 JOINTED PLAIN CONCRETE PAVEMENT

40-2.01 GENERAL

40-2.01A Summary

Section 40-2 includes specifications for constructing JPCP.

40-2.01B Submittals

40-2.01B(1) General

Not Used

40-2.01B(2) Early Age Crack Mitigation System

At least 24 hours before each paving shift, submit the following information as an informational submittal:

1. Early age stress and strength predictions
2. Scheduled sawing and curing activities
3. Contingency plan for mitigating cracking

40-2.01C Quality Control and Assurance

40-2.01C(1) General

Not Used

40-2.01C(2) Quality Control Plan

The QC plan must include a procedure for identifying transverse contraction joint locations relative to the dowel bars longitudinal center and a procedure for consolidating concrete around the dowel bars.

40-2.01C(3) Early Age Crack Mitigation System

For PCC concrete pavement, develop and implement a system for predicting stresses and strength during the initial 72 hours after paving. The system must include:

1. Subscription to a weather service to obtain forecasts for wind speed, ambient temperatures, humidity, and cloud cover
2. Portable weather station with an anemometer, temperature and humidity sensors, located at the paving site
3. Early age concrete pavement stress and strength prediction computer program
4. Analyzing, monitoring, updating, and reporting the system's predictions

40-2.02 MATERIALS

Not Used

40-2.03 CONSTRUCTION

40-2.03A General

Transverse contraction joints on a curve must be on a single straight line through the curve's radius point.

40-2.03B Tie Bar Placement

If the curvature of a concrete pavement slab prevents equal spacing of tie bars to maintain the minimum clearance from transverse joints, space them from 15 to 18 inches.

40-2.03C Ramp Termini

For ramp termini, use heavy brooming normal to the ramp centerline to produce a coefficient of friction of at least 0.35 determined on the hardened surface under California Test 342.

40-2.03D Removal and Replacement

When replacing concrete, saw cut and remove to full depth and width.

Saw cut full slabs at the longitudinal and transverse joints. Saw cut partial slabs at joints and where the Engineer orders. You may make additional saw cuts within the removal area to facilitate slab removal or to prevent binding of the saw cut at the removal area's edge. Saw cut perpendicular to the slab surface.

Use slab lifting equipment with lifting devices that attach to the slab. After lifting the slab, paint the cut ends of dowels and tie bars.

Construct transverse and longitudinal construction joints between the new slab and existing concrete using dowel bars. For longitudinal joints, offset dowel bar holes from original tie bars by 3 inches. For transverse joints, offset dowel bar holes from the original dowel bar by 3 inches.

Drill holes and use chemical adhesive to bond the dowel bars to the existing concrete. Use an automated dowel bar drilling machine. Holes must be at least 1/8-inch greater than the dowel bar diameter. Clean the holes in compliance with the chemical adhesive manufacturer's instructions. Holes must be dry when you place chemical adhesive.

Immediately after inserting dowel bars into the chemical adhesive-filled holes, support the dowel bars and leave them undisturbed for the minimum cure time recommended by the chemical adhesive manufacturer.

Clean the faces of joints and underlying base from loose material and contaminants. Coat the faces with a double application of pigmented curing compound under section 28-2.03F. For partial slab replacements, place preformed sponge rubber expansion joint filler at new transverse joints under ASTM D 1752.

40-2.04 PAYMENT

Not Used

Replace "Reserved" in section 40-4 with:

40-4 JOINTED PLANE CONCRETE PAVEMENT WITH RAPID STRENGTH CONCRETE

40-4.01 GENERAL

40-4.01A Summary

Section 40-4 includes specifications for constructing JPCP with RSC (JPCP, RSC).

The specifications in section 40 for JPCP apply to JPCP, RSC.

40-4.01B Definitions

early age: The age less than 10 times the concrete final set time.

cold joint: A visible lineation which forms when placement of concrete is delayed, the concrete in place hardens prior to the next placement of concrete against it.

concrete raveling: The progressive disintegration of a concrete layer from the surface downward as a result of the dislodgement of aggregate particles.

final set time: Time a specific penetration resistance of 4,000 psi is achieved, determined under ASTM C 403.

full depth crack: Concrete crack that runs from one edge of the slab to the opposite or adjacent side of the slab.

opening age: Age at which the concrete achieves the specified strength for opening to traffic, including construction traffic.

40-4.01C Submittals

40-4.01C(1) General

Sections 40-1.01C(11) and 40-1.01C(12) do not apply to JPCP, RSC.

40-4.01C(2) Early Age Crack Mitigation System

At least 24 hours before each paving shift, submit the following information as an informational submittal:

1. Early age stress and strength predictions
2. Scheduled sawing and curing activities
3. Contingency plan if cracking occurs

40-4.01C(3) Rapid Strength Concrete

At least 45 days before the intended use, submit a sample of cement from each proposed lot and samples of proposed admixtures in the quantities ordered by the Engineer.

During JPCP, RSC pavement operations, submit uniformity reports for hydraulic cement at least once every 30 days to METS, Attention: Cement Laboratory. Uniformity reports must comply with ASTM C 917, except testing age and water content may be modified to suit the particular material.

At least 10 days before use in a trial slab, submit a mix design that includes:

1. Opening age
2. Proposed aggregate gradation
3. Proportions of hydraulic cement and aggregate
4. Types and amounts of chemical admixtures
5. Maximum time allowed between batching and placing
6. Range of ambient temperatures over which the mix design is effective
7. Final set time
8. Any special instructions or conditions such as water temperature requirements

Submit more than 1 mix design to plan for ambient temperature variations anticipated during RSC placement. Each mix design must have a maximum ambient temperature range of 18 degrees F.

Submit modulus of rupture development data for each mix design. You may use modulus of rupture development data from laboratory-prepared samples. The modulus of rupture development data must include tests at 1 hour before opening age, opening age, 1 hour after opening age, 24 hours, 7 days, and 28 days.

40-4.01D Quality Control and Assurance

40-4.01D(1) General

Sections 40-1.01D(4), 40-1.01D(5), 40-1.01D(6), 40-1.01D(7), and 40-1.01D(8), do not apply to JPCP, RSC.

40-4.01D(2) Quality Control Plan

The QC plan must include:

1. Names and qualifications of the lead QC manager and assistant QC managers
2. Contingency plan for correcting problems in production, transportation, or placement,
3. Provisions for determining if JPCP, RSC placement must be suspended
4. Outline procedure for the production, transportation, and placement of JPCP, RSC
5. Outline procedure for sampling and testing to be performed during and after JPCP, RSC construction
6. Forms to report concrete inspection, sampling, and testing
7. Location of your quality control testing laboratory and testing equipment during and after paving operations
8. List of the testing equipment to be used, including the date of last calibration
9. Names and certifications of quality control personnel including those performing sampling and testing
10. Outline procedure for placing and testing trial slabs, including:
 - 10.1. Locations and times
 - 10.2. Production procedures
 - 10.3. Placement and finishing methods

- 10.4. Sampling methods, sample curing, and sample transportation
- 10.5. Testing and test result reporting
- 11. Procedure for identifying transverse contraction joint locations relative to the dowel bars longitudinal center and a procedure for consolidating concrete around the dowel bars

The QC manager responsible for the production period involved must review and sign the sampling, inspection, and test reports before submittal. At least 1 QC manager must be present for:

- 1. Each stage of mix design
- 2. Trial slab construction
- 3. Production and construction of JPCP, RSC
- 4. Meetings with the Engineer relating to production, placement, or testing

A QC manager must not be a member of this project's production or paving crews, an inspector, or a tester. A QC manager must have no duties during the production and placement of JPCP, RSC except those specified.

40-4.01D(3) Trial Slabs

Before starting JPCP, RSC work, complete 1 trial slab for each mix design. Demonstrate that you are capable of constructing JPCP, RSC in compliance with the specifications within the specified time periods including delivery, placement, finishing, and curing times, and under similar atmospheric and temperature conditions expected during replacement operations.

Trial slabs must be 10 by 20 feet. The trial slab thickness must be at least 10 inches. Place trial slabs near the job site at a mutually-agreed location that is neither on the roadway nor within the project limits.

During trial slab construction, sample and split the aggregate for grading, cleanness value, and sand equivalent testing.

Within 20 minutes after RSC delivery for trial slabs, fabricate test beams under California Test 524. Use test beams to determine early age and 7-day modulus of rupture values.

Cure beams fabricated for early age testing such that the monitored temperatures in the beams and the slab are always within 5 degrees F. Monitor and record the internal temperatures of trial slabs and early age beams at intervals of at least 5 minutes. Install thermocouples or thermistors connected to strip-chart recorders or digital data loggers to monitor the temperatures. Temperature recording devices must be accurate to within ± 2 degrees F. Measure internal temperatures at 1 inch from the top, 1 inch from the bottom, and no closer than 3 inches from any edge until early age testing is completed.

Cure beams fabricated for 7-day testing under California Test 524 except place them into sand at a time that is from 5 to 10 times the final set time, or 24 hours, whichever is earlier.

Trial slabs must have an early age modulus of rupture of not less than 400 psi and a 7-day modulus of rupture of not less than 600 psi.

Dispose of trial slabs and test specimens for trial slabs.

40-4.01D(4) Early Age Crack Mitigation System

Develop and implement a system for predicting stresses and strength during the initial 72 hours after paving. The system must include:

- 1. Subscription to a weather service to obtain forecasts for wind speed, ambient temperatures, humidity, and cloud cover
- 2. Portable weather station with an anemometer, temperature and humidity sensors, located at the paving site
- 3. Early age concrete pavement stress and strength prediction computer program
- 4. Analyzing, monitoring, updating, and reporting the system's predictions

40-4.01D(5) Quality Control Testing

40-4.01D(5)(a) General

Provide a testing laboratory to perform quality control tests. Maintain sampling and testing equipment in proper working condition. Perform sampling under California Test 125.

Determine the modulus of rupture at opening age under California Test 524, except beam specimens may be fabricated using an internal vibrator under ASTM C 31. Test 3 beam specimens in the presence of the Engineer, and average the results. No single test represents more than that day's production or 130 cubic yards, whichever is less. RSC pavement must develop a minimum modulus of rupture of 400 psi at opening age. RSC pavement must develop a minimum modulus of rupture of 600 psi at 7 days after placement.

Determine the modulus of rupture at other ages using beams cured and tested under California Test 524 except place them in sand from 5 to 10 times the final set time or 24 hours, whichever is earlier.

40-4.01D(5)(b) Rapid Strength Concrete

Section 40-1.01D(7) does not apply to JPCP, RSC.

Perform quality control sampling, testing, and inspection throughout JPCP, RSC production and placement. Before any sampling and testing, give the Engineer at least 2 business days notice. Give the Engineer unrestricted access to your quality control inspectors, samplers, testers, and laboratories. Submit test results within 15 minutes of test completion. Record inspection, sampling, and testing on the forms accepted with the QC plan and submit them within 48 hours of completion of each paving shift and within 24 hours of the 7-day modulus of rupture tests.

Provide continuous process control and quality control sampling and testing throughout JPCP, RSC production and placement. Perform testing and sampling for the quality characteristics shown in the following table:

Quality Control Requirements

Quality characteristic	Test method	Minimum sampling and testing frequency
Cleanness value	California Test 227	1 per 650 cubic yards but not less than 1 per shift
Sand equivalent	California Test 217	1 per 650 cubic yards but not less than 1 per shift
Aggregate gradation	California Test 202	1 per 650 cubic yards but not less than 1 per shift
Air content ^a	California Test 504	1 per 130 cubic yards but not less than twice per shift
Yield	California Test 518	2 per day of production
Slump	ASTM C143	1 per 2 hours of per shift
Unit weight	California Test 518	1 per 650 cubic yards but not less than 2 per shift
Moisture ^b	California Test 223 or 226	1 per day

^a Testing required in freeze-thaw areas only.

^b Check calibration by comparing moisture meter reading with CT 223 or CT 226 test result.

For air content test, record the individual measurement and superimpose the action and suspension limits shown in the following table:

Air Content Action and Suspension Limits

Control parameter	Individual measurements	
	Action limit	Suspension limit
Air content, California Test 504	±1.0 %	±1.5 %

The action limit is the limiting value at which corrective actions must be made while production may continue. The suspension limit is the limiting value at which production must be suspended while corrections are made.

During placement of JPCP, RSC, fabricate beams and test for the modulus of rupture within the first 30 cu yd, at least once every 130 cu yd, and within the final truckload.

If requested, submit split samples and fabricate test beams for the Department's testing.

For determining the early age modulus of rupture, cure beams under the same conditions as the pavement until 1 hour before testing. Cure beams fabricated for the 7-day test under California Test 524.

Testing laboratories and testing equipment must comply with the Department's Independent Assurance Program.

If JPCP, RSC does not conform to the mix design requirements or the specifications, provide extra samples and testing. Sampling, fabricating, transporting, and testing extra samples is change order work. If the extra samples do not comply with the specifications, these costs are at your expense. If the extra samples comply with the specifications, the Department pays you for these costs.

40-4.01D(6) Acceptance Criteria

40-4.01D(6)(a) General

In section 40-1.01D13(a), the following concrete pavement acceptance testing do not apply to JPCP, RSC:

1. 28-day modulus of rupture, for PCC
2. Air content (freeze thaw)

40-4.01D(6)(b) Modulus of Rupture

RSC pavement is accepted based on the Department's testing for modulus of rupture strength at 7 days. The Engineer may accept RSC pavement that does not attain the specified modulus of rupture under section 40-4.04. The Department determines the modulus of rupture by testing 3 beams specimen and average the result. The testing is for each day of production or 130 cubic yards, whichever is less. The Engineer uses the modulus of rupture test results for accepting or rejecting the replacement pavement and pay factor adjustment for low modulus of rupture.

40-4.01D(6)(c) Concrete Pavement Smoothness

The concrete surface shall be free from concrete raveling. If the total surface area of concrete raveling is more than 5% of the concrete slab or greater than 4 square feet at any one raveling area. remove and replace the concrete.

40-4.01D(6)(d) Repair and Replacement of New Slabs

Comply with section 40-6.

If within 64 days of RSC placement there is one or more full-depth cracks, the Engineer rejects the area of RSC. Remove the rejected RSC slab at your expense and replace it.

40-4.02 MATERIALS

40-4.02A General

Sections 40-1.02B(2), 40-1.02B(2)(a), and 40-1.02B(2)(b) do not apply.

40-4.02B Rapid Strength Concrete

Choose the combined aggregate grading for RSC from either the 1-1/2 inch maximum or the 1-inch maximum combined grading in section 90-1.02C(4)(d).

Aggregate for RSC must be either:

1. Innocuous in conformance with the provisions in Section 90-2.02, "Aggregates.
2. When tested under ASTM C 1567 using the proposed aggregate and cementitious materials, the expansion is less than 0.10 percent. Submit test data with each mix design. Test data authorized by the Department no more than 3 years before the 1st day of the Contract is authorized for the entire Contract. The test data must be for the same concrete mix and must use the same materials and material sources to be used on the Contract.

RSC must develop the specified strength at opening age and 7-day modulus of rupture strengths.

40-4.02C Temporary Roadway Pavement Structure

Temporary roadway pavement structure consists of aggregate base and HMA. RSC not conforming to the specifications may serve as temporary roadway if:

1. The modulus of rupture is at least 200 psi
2. RSC thickness is greater than or equal to the existing concrete pavement surface layer
3. RSC is replaced during the next paving shift.

Aggregate base for temporary roadway pavement structure must be produced from any combination of broken stone, crushed gravel, natural rough-surfaced gravel, reclaimed concrete, and sand that complies with the 3/4-inch maximum grading specified in section 26-1.02B.

For HMA:

1. Choose the 3/8 inch or 1/2 inch HMA Type A or Type B aggregate gradation under section 39-1.02E.
2. Minimum asphalt binder content must be 6.8 percent for 3/8-inch aggregate gradation and 6.0 percent for 1/2 inch aggregate gradation.
3. Choose asphalt binder Grade PG 64-10, PG 64-16, or PG 70-10 under section

40-4.03 CONSTRUCTION

40-4.03A General

Sections 40-1.03N, and 40-1.03O do not apply to JPCP, RSC.

Do not apply:

1. Revised Section 40-1.03L(3) Final Finishing paragraph 6 and replace with :

Initial and final texturing must produce a coefficient of friction of at least 0.30 when tested under California Test 342. Notify the Engineer when the concrete pavement is scheduled to be opened to traffic. Allow at least 25 days for the Department to test for coefficient of friction.

2. Section 40-1-03P Par 4, and 5
3. Section 40-1.03Q(5) Par 2

40-4.03B Test Strip

Replace Section 40-1.03G paragraph 2 with the following:

The first paving activity must be to construct a test strip:

1. Equivalent in length to one shift paving operation with RSC except not to be less than 400 feet or exceed 1000 feet long
2. Same width as the planned paving
3. With the same equipment used for the planned paving

Demonstrate to the Engineer that RSC can be placed and achieve strength by the opening age.

Section 40-1.03G last paragraph does not apply.

40-4.03C Placing Concrete

Sections 40-1.03H(1), paragraph 2 does not apply to JPCP,RSC.

Place consecutive concrete loads without interruption. No cold joints are allowed

After mixing and placing JPCP, RSC, do not add water to the surface to facilitate final finishing. Use surface finishing additive as recommended by the manufacturer of the cement after their use is approved by the Department.

40-04.03D Joints

Before placing RSC against existing concrete, place 1/4-inch thick commercial quality polyethylene flexible foam expansion joint filler across the original transverse and longitudinal joint faces and extend the excavation's full depth. Place the top of the joint filler flush with the top of the pavement. Secure joint filler to the joint face of the existing pavement to prevent the joint filler from moving during the placement of RSC.

Where the existing transverse joint spacing in an adjacent lane exceeds 15 feet, construct an additional transverse contraction joint midway between the existing joints.

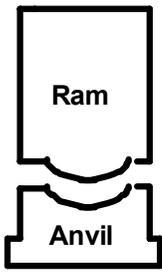
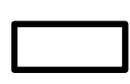
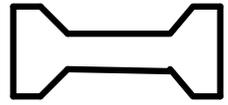
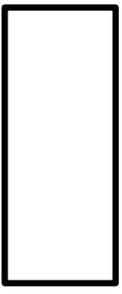
JPCP, RSC curing must comply with the RSC manufacture's written recommendations.

In addition to the specifications in section 40-1.03Q(4), after removing new pavement, clean the faces of joints and underlying base from loose material and contaminants. Coat the faces with curing compound under section 28-2.03F.

CALIFORNIA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION LABORATORY

PILE AND DRIVING DATA FORM

Structure Name : _____ Contract No.: _____
 _____ Project: _____
 Structure No.: _____ Pile Driving Contractor or
 Dist./Co./Rte./Post Mi: _____ Subcontractor _____ (Pile Driven By)

 <p>Ram Anvil</p>	<p>Hammer</p>	<p>Manufacturer: _____ Model: _____ Type: _____ Serial No.: _____ Rated Energy: _____ at _____ Length of Stroke _____ Modifications: _____ _____ _____</p>				
	<p>Capblock (Hammer Cushion)</p>	<p>Material: _____ Thickness: _____ in Area: _____ in² Modulus of Elasticity - E: _____ ksi Coefficient of Restitution - e: _____</p>				
	<p>Pile Cap</p>	<p> <table border="1"> <tr><td>Helmet</td></tr> <tr><td>Bonnet</td></tr> <tr><td>Anvil Block</td></tr> <tr><td>Drivehead</td></tr> </table> Weight: _____ kips </p>	Helmet	Bonnet	Anvil Block	Drivehead
Helmet						
Bonnet						
Anvil Block						
Drivehead						
	<p>Pile Cushion</p>	<p>Material: _____ Thickness: _____ in Area: _____ in² Modulus of Elasticity - E: _____ ksi Coefficient of Restitution - e: _____</p>				
	<p>Pile</p>	<p>Pile Type: _____ Length (In Leads): _____ ft Lb/ft.: _____ Taper: _____ Wall Thickness: _____ in Cross Sectional Area: _____ in² Design Pile Capacity: _____ kips Description of Splice: _____ _____ Tip Treatment Description: _____ _____</p>				

DISTRIBUTE:

Translab,
Foundation Testing

Translab,
Geotechnical Design

Resident Engineer

Note: If mandrel is used to drive the pile, attach separate manufacturer's detail sheet(s) including weight and dimensions.

Submitted By: _____
 Date: _____ Phone No.: _____

Add to section 49-2.01C(2):

If you encounter obstructions to driving, provide special driving tips or take other measures to prevent damage to the pile during driving.

Replace section 49-2.01C(3) with:

49-2.01C(3) Drilling

Do not use drilling to attain the specified tip elevations shown for driven piles at Santa Ana River Bridge, bridge No. 55-0106R/L.

You may use drilling to attain the specified tip elevation shown for driven piles at the locations and to the bottom of hole elevations shown in the following table:

Bridge no.	Bottom of hole elevation
Retaining Wall No. 21B Bridge No. 55E0146	215 feet

Add to section 49-2.01C(4):

Drive piles in predrilled holes at the locations as shown or as determined by the Engineer and to the bottom of hole elevations shown in the following table:

Bridge name or number	Abutment no.	Bent no	Top of abandoned water pipe elevation
Santa Ana River Bridge Bridge No. 55-0106R/L	1	Pier 2 and 3	218.4 feet

At Santa Ana River Bridge, after driving the pile, fill the space around the pile to the ground surface with lean concrete backfill complying with section 19-3.02D.

Add to section 49-2.01C(5):

Piles at Santa Ana River Bridge, bridge No. 55-0106R/L, abutment 1 through pier 11 that do not attain the nominal driving resistance at the specified tip elevations shown may be allowed to stand for a "set period" without driving. The "set period" must be at least 12 hours.

Drive piles at Santa Ana River Bridge, bridge No. 55-0106R/L, pier 12 through abutment 19, to the specified tip elevations shown and let the piles stand for a "set period" without driving. The "set period" must be at least 2 weeks.

After the "set period" has elapsed, redrive 2 piles or 10 percent of the piles in the footing, whichever is greater. The Engineer designates which piles are to be redriven. Redriving consists of operating the driving hammer at full rated energy on the pile and calculating the nominal driving resistance of the pile.

If the nominal driving resistance is attained for each pile designated to be redriven, the remaining piles in that footing are considered satisfactory and further driving will not be required. If redriving the designated piles demonstrates that the nominal driving resistance has not been attained, redrive all piles in the footing until the nominal driving resistance is attained.

Add to section 49-2.01D:

Removing portions of the 36 inch diameter abandoned water pipe for foundation work is paid as remove obstruction (Abandoned water pipe).

Add to section 49-3.02A(1):

The removal of portions of CIDH piles at Retaining Wall No. 454, bridge No. 55E0147 and Retaining Wall No. 519, bridge No. 55E0149, must comply with section 15-4.

Replace "Reserved" in section 49-3.02A(4)(b) with:

Schedule and hold a preconstruction meeting for CIDH concrete pile construction (1) at least 5 business days after submitting the pile installation plan and (2) at least 10 days before the start of CIDH concrete pile construction. You must provide a facility for the meeting.

The meeting must include the Engineer, your representatives, and any subcontractors involved in CIDH concrete pile construction.

The purpose of this meeting is to:

1. Establish contacts and communication protocol between you and your representatives, any subcontractors, and the Engineer
2. Review the construction process, acceptance testing, and anomaly mitigation of CIDH concrete piles

The Engineer will conduct the meeting. Be prepared to discuss the following:

1. Pile placement plan, dry and wet
2. Acceptance testing, including gamma-gamma logging, cross-hole sonic logging, and coring
3. *Pile Design Data Form*
4. Mitigation process
5. Timeline and critical path activities
6. Structural, geotechnical, and corrosion design requirements
7. Future meetings, if necessary, for pile mitigation and pile mitigation plan review
8. Safety requirements, including Cal/OSHA and Tunnel Safety Orders

Add to section 49-3.02B(6)(c):

The synthetic slurry must be one of the materials shown in the following table:

Material	Manufacturer
SlurryPro CDP	KB INTERNATIONAL LLC 735 BOARD ST STE 209 CHATTANOOGA TN 37402 (423) 266-6964
Super Mud	PDS CO INC 105 W SHARP ST EL DORADO AR 71731 (870) 863-5707
Shore Pac GCV	CETCO CONSTRUCTION DRILLING PRODUCTS 2870 FORBS AVE HOFFMAN ESTATES IL 60192 (800) 527-9948
Terragel or Novagel Polymer	GEO-TECH SERVICES LLC 220 N. ZAPATA HWY STE 11A-449A LAREDO TX 78043 (210) 259-6386

Use synthetic slurries in compliance with the manufacturer's instructions. Synthetic slurries shown in the above table may not be appropriate for a given job site.

Synthetic slurries must comply with the Department's requirements for synthetic slurries to be included in the above table. The requirements are available from the Offices of Structure Design, P.O. Box 168041, MS# 9-4/11G, Sacramento, CA 95816-8041.

SlurryPro CDP synthetic slurry must comply with the requirements shown in the following table:

SLURRYPRO CDP

Property	Test	Value
Density During drilling	Mud Weight (density), API 13B-1, section 1	≤ 67.0 pcf ^a
Before final cleaning and immediately before placing concrete		≤ 64.0 pcf ^a
Viscosity During drilling	Marsh Funnel and Cup. API 13B-1, section 2.2	50–120 sec/qt
Before final cleaning and immediately before placing concrete		≤ 70 sec/qt
pH	Glass electrode pH meter or pH paper	6.0–11.5
Sand content, percent by volume Before final cleaning and immediately before placing concrete	Sand, API 13B-1, section 5	≤ 0.5 percent

^aIf authorized, you may use slurry in salt water. The allowable density of slurry in salt water may be increased by 2 pcf.

Slurry temperature must be at least 40 degrees F when tested.

Super Mud synthetic slurry must comply with the requirements shown in the following table:

SUPER MUD

Property	Test	Value
Density During drilling	Mud Weight (Density), API 13B-1, section 1	≤ 64.0 pcf ^a
Before final cleaning and immediately before placing concrete		≤ 64.0 pcf ^a
Viscosity During drilling	Marsh Funnel and Cup. API 13B-1, section 2.2	32–60 sec/qt
Before final cleaning and immediately before placing concrete		≤ 60 sec/qt
pH	Glass electrode pH meter or pH paper	8.0–10.0
Sand content, percent by volume Before final cleaning and immediately before placing concrete	Sand, API 13B-1, section 5	≤ 0.5 percent

^aIf authorized, you may use slurry in salt water. The allowable density of slurry in salt water may be increased by 2 pcf.

Slurry temperature must be at least 40 degrees F when tested.

Shore Pac GCV synthetic slurry must comply with the requirements shown in the following table:

SHORE PAC GCV

Property	Test	Value
Density During drilling	Mud Weight (Density), API 13B-1, section 1	≤ 64.0 pcf ^a
Before final cleaning and immediately before placing concrete		≤ 64.0 pcf ^a
Viscosity During drilling	Marsh Funnel and Cup. API 13B-1, section 2.2	33–74 sec/qt
Before final cleaning and immediately before placing concrete		≤ 57 sec/qt
pH	Glass electrode pH meter or pH paper	8.0–11.0
Sand content, percent by volume Before final cleaning and immediately before placing concrete	Sand, API 13B-1, section 5	≤ 0.5 percent

^aIf authorized, you may use slurry in salt water. The allowable density of slurry in salt water may be increased by 2 pcf.

Slurry temperature must be at least 40 degrees F when tested.

1. Public notification letter with a list of delivery and posting addresses. The letter must describe the work to be performed and state the treatment work locations, dates, and times. Deliver the letter to residences and businesses within 100 feet of overlay work and to local fire and police officials not less than 7 days before starting overlay activities. Post the letter at the job site.
2. Airborne emissions monitoring plan. A CIH certified in comprehensive practice by the American Board of Industrial Hygiene must prepare and execute the plan. The plan must have at least 4 monitoring points including the mixing point, application point, and point of nearest public contact. Monitor airborne emissions during overlay activities.
3. Action plan for protecting the public if levels of airborne emissions exceed permissible levels.
4. Copy of the CIH's certification.

After completing methacrylate crack treatment activities, submit results from monitoring production airborne emissions as an informational submittal.

Submit working drawing for the concrete surface texture.

Add item 5 to the 1st paragraph of section 51-1.01D(3):

5. Supported in a vertical position and kept at authorized location for viewing.

Add to section 51-1.01D:

51-1.01D(6) Mock-up Panels

Construct mock-up panel after the test panels authorized.

Mock-up panel must:

1. Be constructed at authorized location
2. Be constructed and finished using the same personnel, materials, equipment, and methods to be used in the work
3. Full sized to the limits.
4. Be constructed in the actual 3 dimensional configuration, including all the form liner edge conditions to be encountered in the final construction, the interface edge between the form finish traverse and longitudinal form liner panel edges, and the finish and the hand textured concrete texture edges.
5. Have no visible edge variation.
6. Include proposed sample repairs of defects if the defects are repairable. Submit two mock-ups of similar defects with one repaired and the other unrepaired for comparison. The Engineer determines the extent of defects that can be repaired base on the sample repair methods authorized on the mock-up.

The Engineer uses the authorized mock-ups to determine acceptability of the work.

Replace "Reserved" in section 51-1.03E(12) with:

Concrete must comply with specifications for minor concrete except:

1. Maximum aggregate size must be from 3/8 to 1-1/2 inches
2. If you use the 3/8-inch maximum size aggregate grading, the concrete must contain at least 675 pounds of cementitious material per cubic yard

Drilling and bonding dowels must comply with section 51-1.03E(3).

Cleaning the construction joint surfaces between the existing concrete and the bolster concrete is not required.

Replace the 2nd paragraph in section 51-1.03F(5)(b)(i) of the RSS with:

For bridge widenings, texture the deck and approach slab surface longitudinally by longitudinal tining.

Add to section 51-1.03G(1):

Pebble texture must simulate the appearance of pebble rock. Pebble rock must impart a random pattern to the texture.

Cloud slate texture must simulate the appearance of cloud slate rock. Cloud slate must impart a random pattern to the texture.

Water texture must simulate the appearance of flowing water. Water texture must impart a random pattern to the texture.

Add to section 51-1.04:

The payment quantity for concrete surface texture does not include the area of the water pattern on the Type 60D (Modified 1) concrete barrier at Retaining Wall No. 454, bridge No. 55E0147.

Add to section 51-4.02A:

Polystyrene at Pier 9 of Santa Ana River Bridge, bridge No. 55-0106R/L must comply with section 51-2.01B(1).

Add to section 51-4.04:

Payment for polystyrene at Pier 9 of Santa Ana River Bridge, bridge No. 55-0106R/L is included in the payment for structural concrete (bridge) at said location.

Replace "Reserved" in section 51-7.02 with:

51-7.02A General

51-7.02A(1) Summary

Section 51-7.02 includes specifications for constructing PC drainage inlets.

Drainage system 1 type G2 drainage inlet must be fabricated of PC concrete.

51-7.02A(2) Definitions

Reserved

51-7.02A(3) Submittals

For inlets with oval or circular cross sections, submit shop drawings with calculations. Shop drawings and calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State. Allow 15 days for the Engineer's review.

Submit field repair procedures and a patching material test sample before repairs are made. Allow 10 days for the Engineer's review.

51-7.02A(4) Quality Control and Assurance

The Engineer may reject PC drainage inlets exhibiting any of the following:

1. Cracks passing through walls more than 1/16 inch wide
2. Nonrepairable honeycombed or spalled areas of more than 6 square inches
3. Noncompliance with reinforcement tolerances or cross sectional area shown
4. Wall or lid less than minimum thickness
5. Internal dimensions less than plan dimensions by 1 percent or 1/2 inch, whichever is greater
6. Defects affecting performance or structural integrity

**Replace section 70-6 with:
70-6 GRATED LINE DRAINS**

70-6.01 GENERAL

Section 70-6 includes specifications for constructing grated line drains.

Submit a Certificate of Compliance from the manufacturer.

70-6.02 MATERIALS

70-6.02A General

Concrete backfill must comply with the specifications for minor concrete.

70-6.02A Line Drain Channel

Drain channel sections must be manufactured using monolithic polymer concrete with no side extensions. The interior surface of the line drain channel must be smooth below the level of the frame, grate, and associated connections. Monolithic polymer concrete must consist of aggregate with either polyester resin or vinyl ester resin. The polymer concrete must have the values and properties shown in the following table:

Property	ASTM Test method	Value
Tensile strength, psi	C 307	1,450 min
Compressive strength, psi	C 579	11,600 min
Bending strength, psi	C 580	2,900 min
Moisture absorption, percentage	C 140	0.5 max
Chemical resistance	C 267	Pass
Freeze-thaw, number of cycles with out weight loss	C 666	1,600 min

70-6.02B Line Drain Frames and Grates

Frames and grates must be heavy duty rated under General Services Administration CID A-A-60005 *Frames, Covers, Gratings, Steps, Manholes, Sump and Catch Basin*. The design and performance requirements include the following:

1. Grated line drain frames and grates must be manufactured of ductile iron complying with section 75-1.02. Frames and grates include bolts, nuts, frame anchors, and other connecting hardware. Galvanizing or asphalt paint coating is not required.2. Frames and grates, whether one-piece or separate, must be classified heavy duty traffic rated with a transverse proof-load strength of 25,000 pounds
3. Grates and frames must be one piece anchored into the body of the line drain unless shown as removable. Removable grates must be separate from the frame and must:3.1 Be held in place by locking devices that are tamper resistant
3.2 Provide a minimum repetitive pullout resistance of 340 lb/ft of length after completion of 1,000 hours of salt spray testing under ASTM B 117
3.3. Be match marked in pairs before delivery to the work and grates must fit into the frames without rocking
4. If a combination of one piece frame and grate and removable grates are used, the locations of the removable grates are shown
5. Except for grates installed within designated pedestrian paths of travel, grate design must accept inflow of runoff through openings consisting of a minimum of 60 percent of the total top surface area of the grate. Individual openings or slots must have a dimension not greater than 2 inches measured in the direction of the grated line drain flow line.
6. Grates installed within designated pedestrian paths of travel must be certified as conforming to the requirements of the Americans with Disabilities Act.

70-6.03 CONSTRUCTION

Excavation and backfill must comply with section 19-3.

72-7.02 MATERIALS

72-2.02A Bedding Stone

Test for gradation under ASTM C 136. Bedding stone must comply with the rock grading shown in the following table:

Weight of Pieces, Pounds	Percent smaller by weight
50	100
30	40-60
10	20-40
1	0-20

Bedding stone must comply with ASTM D 5519, Test Method A.

72-7.02B Derrick Stone

Derrick stone must be:

1. Quarried stone
2. Uniformly graded
3. Range in size from 500 pounds to 3,000 pounds
4. 50 percent of the individual stones weigh more than 1,000 pounds
5. Conform to ASTM D 5519, Test Method A

Use salvaged derrick stone from existing debris walls in compliance with section 15-2.03. Any salvaged derrick stone not conforming to the above requirements will be removed.

72-7.03 CONSTRUCTION

72-7.03A General

Place stones in a uniform and well graded mass to the lines and grades shown.

Stone may be placed by dumping. Do not drop stone from a height greater than 18 inches.

72-7.03A(1) Bedding Stone

Prepared area to receive bedding must not vary more than one inch above or below the grade established by the Engineer when measured with a 10 foot straight edge.

Compaction is not required.

72-7.03A(2) Derrick Stone

Prepared area to receive bedding must not vary more than 6 inches above or below the grade established by the Engineer.

72-7.04 PAYMENT

Not used

**Replace section "72-8 RESERVE" with:
72-8 RECONSTRUCT FACING STONE**

72-8.01 GENERAL

Section 72-8 includes specifications for removing and constructing facing stone.

Removing existing facing stone must comply with section 15.

Constructing facing stone includes:

1. Placing RSP fabric
2. Placing filter blanket
3. Placing facing stone

72-8.02 MATERIALS

72-8.02A General

Rock must have properties shown in the following table:

Property	Test method	Specification
Specific gravity, minimum	ASTM C 127	2.6
Abrasion, maximum percentage	ASTM C 535	45

72-8.02B Fabric

Fabric must be class 8 RSP.

72-8.02C Filter Blanket

Filter blanket material consists of a mixture of sand and quarried stone and must comply with the grading requirements for the sieve sizes shown in the following table:

Sieve size	Percentage passing
3"	100
1-1/2"	65-100
1"	50-85
3/8"	20-50
No. 10	0-15

Filter blanket material must have a percentage of wear not to exceed 50% after 500 revolutions when tested with ASTM C 131.

72-8.02D Facing Stone

Facing stone must consist of quarry stones and comply with the grading shown in the following table:

Weight of pieces, Pounds	Percent smaller by weight
400	100
200	70-90
100	40-65
25	10-30
2	0-5

Use salvaged facing stone from existing piers in compliance with section 15-2.03. Any salvaged facing stone not conforming to the above requirements will be removed.

72-8.03 CONSTRUCTION

Local surface irregularities of the RSP must not vary from the planned slope by more than 1 foot as measured at right angles to the slope.

Stones may be placed by dumping. Do not drop stone from a height greater than 18 inches.

Place stones so that:

1. There is a minimum of voids
2. Larger stones are in the toe course and on the outside surface of the slope protection

72-8.04 PAYMENT

Not used

**Replace section "72-9 RESERVE" with:
72-9 GROUTED RIPRAP**

72-9.01 GENERAL

72-9.01A Summary

Section 72-9 includes specifications for constructing grouted riprap matching the existing.

72-9.01B Submittals

At least 15 days before rock delivering, submit a sample of rock.

72-9.01C Quality Control and Assurance

Construct a test panel at the job site before placing the permanent grouted riprap.

The test panel must be:

1. At least 4 by 6 feet
2. Constructed with the same materials for the permanent work
3. Finished and cured using the same methods for the permanent work

Determine alterations of slump to produce adequate penetration between the stone voids during the placement of the test panel.

If the test panel is rejected, construct another test panel.

72-9.02 MATERIALS

72-9.02A Riprap

Riprap must be clean quarried stone obtained from a single source and must comply with the grading shown in the following table:

15-inch (Thickness) Riprap

Weight of pieces, Pounds	Percent smaller by weight
170	100
70	65-100
50	50-70
35	30-50
10	0-15

72-9.02B Grout

Grout must consist of cement, aggregate and water. The cement content must be 705 lb/cu yd and the water content must be at most 8-1/2 gallons per 94 pounds of cement.

Cement must comply with section 90-1.02B(2).

Aggregate must comply with section 90-1.02C.

Water must comply with section 90-1.02D.

72-9.03 CONSTRUCTION

72-9.03A Placing Riprap

Do not place stones by dumping. Do not drop stone from a height greater than 18 inches.

Place stones so that the tops of the individual stones must not vary more than 1 1/2 inches from final grade.

Do not double decking thin flat stones to bring the surfaces up to the final grade.

72-9.03B Placing Grout

Place grout in two courses:

edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

For Type SKT terminal system, the soil tubes must be, at the Contractor's option, driven with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes must be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer must be moistened and thoroughly compacted. Wood posts must 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 must be coated with a grease that will not melt or run at a temperature of 149 degrees F or less. The edges of the wood posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

After installing the terminal system, dispose of surplus excavated material in a uniform manner along the adjacent roadway where designated by the Engineer.

Replace section 83-1.02C(3) with:

83-1.02C(3) Alternative Flared Terminal System

Alternative flared terminal system must be furnished and installed as shown on the plans and under these special provisions.

The allowable alternatives for a flared terminal system must consist of one of the following or a Department-authorized equal.

1. TYPE FLEAT TERMINAL SYSTEM - Type FLEAT terminal system must be a Flared Energy Absorbing Terminal 350 manufactured by Road Systems, Inc., located in Big Spring, Texas, and must include items detailed for Type FLEAT terminal system 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 Industries, Inc., 4100 13th Street, S.W., Canton, OH 44708, telephone (330) 477-4800.
2. TYPE SRT TERMINAL SYSTEM - Type SRT terminal system must be an SRT-350 Slotted Rail Terminal (8-post system) as manufactured by Trinity Highway Products, LLC, and must include items detailed for Type SRT terminal system shown on the plans. The SRT-350 Slotted Rail Terminal (8-post system) can be obtained from the manufacturer, Trinity Highway Products, LLC, P.O. Box 99, Centerville, UT 84012, telephone (800) 772-7976.

Submit a certificate of compliance for terminal systems.

Terminal systems must be installed under the manufacturer's installation instructions and these specifications. Each terminal system installed must 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 Type SRT terminal system, the steel foundation tubes with soil plates attached must be, at the Contractor's option, either driven, with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes must be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer must be moistened and thoroughly compacted. The wood terminal posts must be inserted into the steel foundation tubes by hand and must not be driven. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts must be coated with a grease that will not melt or run at a temperature of 149 degrees 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 Type FLEAT terminal system, the soil tubes must be, at the Contractor's option, driven with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes must be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer must be moistened and thoroughly compacted. Wood posts must 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 must be coated with a grease that will not melt or run at a temperature of 149

Replace "Reserved" in section 86-1.06B with:

Traffic Management System (TMS) elements include, but are not limited to ramp metering (RM) system, communication system, traffic monitoring stations, video image vehicle detection system (VIVDS), microwave vehicle detection system (MVDS), loop detection system, changeable message sign (CMS) system, extinguishable message sign (EMS) system, highway advisory radio (HAR) system, closed circuit television (CCTV) camera system, roadway weather information system (RWIS), visibility sensor, and fiber optic system.

Existing TMS elements, including detection systems, shown and located within the project limits must remain in place and be protected from damage. If the construction activities require existing TMS elements to be nonoperational or off line, and if temporary or portable TMS elements are not shown, the Contractor must provide for temporary or portable TMS elements. The Contractor must receive authorization on the type of temporary or portable TMS elements and installation method.

Before work is performed, the Engineer, the Contractor, and the Department's Traffic Operations Electrical representatives must jointly conduct a pre-construction operational status check of all existing TMS elements and each element's communication status with the Traffic Management Center (TMC), including existing TMS elements not shown and elements that may not be impacted by the Contractor's activities. The Department's Traffic Operations Electrical representatives will certify the TMS elements' location and status, and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components.

The Contractor must obtain authorization at least 72 hours before interrupting existing TMS elements' communication with the TMC that will result in the elements being nonoperational or off line. The Contractor must notify the Engineer at least 72 hours before starting excavation activities.

Traffic monitoring stations and their associated communication systems, which were verified to be operational during the pre-construction operational status check, must remain operational on freeway/highway mainline at all times, except:

1. For a duration of up to 15 days on any continuous segment of the freeway/highway longer than 3 miles
2. For a duration of up to 60 days on any continuous segment of the freeway/highway shorter than 3 miles

If the construction activities require existing detection systems to be nonoperational or off line for a longer time period or the spacing between traffic monitoring stations is more than the specified criteria above, and temporary or portable detection operations are not shown, the Contractor must provide provisions for temporary or portable detection operations. The Contractor must receive authorization on the type of detection and installation before installing the temporary or portable detection.

If existing TMS elements shown or identified during the pre-construction operational status check, except traffic monitoring stations, are damaged or fail due to the Contractor's activity, where the elements are not fully functional, the Engineer must be notified immediately. If the Contractor is notified by the Engineer that existing TMS elements have been damaged, have failed or are not fully functional due to the Contractor's activity, the damaged or failed TMS elements, excluding structure-related elements, must be repaired or replaced, at the Contractor's expense, within 24 hours. For a structure-related elements, the Contractor must install temporary or portable TMS elements within 24 hours. For nonstructure-related TMS elements, the Engineer may authorize temporary or portable TMS elements for use during the construction activities.

If fiber optic cables are damaged due to the Contractor's activities, the Contractor must install new fiber optic cables from an original splice point or termination to an original splice point or termination, unless otherwise authorized. Fiber optic cable must be spliced at the splice vaults if available. The amount of new fiber optic cable slack in splice vaults and the number of new fiber optic cable splices must be equivalent to the amount of slack and number of splices existing before the damage or as directed by the Engineer. Fusion splicing will be required.

The Contractor must demonstrate that repaired or replaced elements operate in a manner equal to or better than the replaced equipment. If the Contractor fails to perform required repairs or replacement

work, the Department may perform the repair or replacement work and the cost will be deducted from monies due to the Contractor.

A TMS element must be considered nonoperational or off line for the duration of time that active communications with the TMC is disrupted, resulting in messages and commands not transmitted from or to the TMS element.

The Contractor must provide provisions for replacing existing TMS elements within the project limits, including detection systems, that were not identified on the plans or during the pre-construction operational status check that became damaged due to the Contractor's activities.

If the pre-construction operational status check identified existing TMS elements, then the Contractor, the Engineer, and the Department's Traffic Operations Electrical representatives must jointly conduct a post construction operational status check of all existing TMS elements and each element's communication status with the TMC. The Department's Traffic Operations Electrical representatives will certify the TMS elements' status and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components. TMS elements that cease to be functional between pre and post construction status checks must be repaired at the Contractor's expense.

The Engineer will authorize the schedule for final replacement, the replacement methods and the replacement elements, including element types and installation methods before repair or replacement work is performed. The final TMS elements must be new and of equal or better quality than the existing TMS elements.

If no electrical work exists on the project and no TMS elements are identified within the project limits, the pre-construction operational status check is change order work.

Furnishing and installing temporary or portable TMS elements that are not shown, but are required when an existing TMS element becomes nonoperational or off line due to construction activities, is change order work.

Furnishing and installing temporary or portable TMS elements and replacing TMS elements that are not shown nor identified during the pre-construction operational status check and were damaged by construction activities is change order work.

If the Contractor is required to submit provisions for the replacement of TMS elements that were not identified, submitting the provisions is change order work.

Add to section 86-2.03B:

Use sleeve nuts on Type 1-A standards. The bottom of the base plate must be flush with finished grade.

Add to section 86-2.04A:

The sign mounting hardware must be installed at the locations shown.

Set the Type 1 standards with the handhole on the downstream side of the pole in relation to traffic or as shown.

Add to section 86-2.05A:

Conduit installed underground must be Type 1 unless otherwise specified on the project plans or in these special provisions.

Add to section 86-2.05B:

The conduit in a foundation and between a foundation and the nearest pull box must be Type 1.

Add to section 86-2.05C:

If a standard coupling cannot be used for joining Type 1 conduit, use a UL-listed threaded union coupling under section 86-2.05C, a concrete-tight split coupling, or a concrete-tight set screw coupling.

If Type 3 conduit is placed in a trench, not in the pavement or under concrete sidewalk, after the bedding material is placed and the conduit is installed, backfill the trench to not less than 4 inches above the conduit with minor concrete under section 90-2, except the concrete must contain not less than 421 pounds of cementitious material per cubic yard. Backfill the remaining trench to finished grade with backfill material.

After conductors have been installed, the ends of the conduits terminating in pull boxes, service equipment enclosures, and controller cabinets must be sealed with an authorized type of sealing compound.

The final 2 feet of conduit entering a pull box in a reinforced concrete structure may be Type 4.

Replace item 1 of the last paragraph in section 86-2.05C with:

1. Steel hangers, steel brackets, bearing plates, resin capsule anchors and other fittings must comply with section 75-1.03.

Add to the last paragraph of section 86-2.05C:

8. Coring through existing bridge deck must comply with section 15-5.07.

Delete items 2–5 in the list in the 2nd paragraph of section 86-2.06A(2).

Add to section 86-2.06A(2):

Do not place grout in the bottom of the pull box.

Replace "Reserved" in section 86-2.06B of the RSS for section 86-2.06 with:

86-2.06B(1) General

86-2.06B(1)(a) Summary

This work includes installing non-traffic-rated pull boxes.

86-2.06B(1)(b) Submittals

Before shipping pull boxes to the jobsite, submit a list of materials, Contract number, pull box manufacturer, manufacturer's instructions for pull box installation, and your contact information to METS.

Submit reports for pull box from an NRTL-accredited lab.

86-2.06B(1)(c) Quality Control and Assurance

86-2.06B(1)(c)(i) General

Pull boxes may be tested by the Department. Deliver pull boxes and covers to METS and allow 30 days for testing. When testing is complete, you will be notified. You must pick up the boxes and covers from the test site and deliver it to the job site.

Any failure of the pull box or the cover that renders the unit noncompliant with these specifications will be a cause for rejection. If the unit is rejected, you must allow 30 days for retesting. Retesting period starts when the replacement pull box is delivered to the test site. You must pay for all retesting costs. Delays resulting from the submittal of noncompliant materials does not relieve you from executing the Contract within the allotted time.

If the pull box submitted for testing does not comply with the specifications, remove the unit from the test site within 5 business days after notification that it is rejected. If the unit is not removed within that period, it may be shipped to you at your expense.

You must pay for all shipping, handling, and transportation costs related to the testing and retesting.

86-2.06B(1)(c)(ii) Functional Testing

The pull box and cover must be tested under ANSI/SCTE 77, "Specifications for Underground Enclosure Integrity."

86-2.06B(1)(c)(iii) Warranty

Provide a 2-year manufacturer replacement warranty for pull box and cover from the date of installation of the pull box and cover. All warranty documentation must be submitted before installation.

Replacement parts must be provided within 5 business days after receipt of failed pull box, cover, or both at no cost to the Department and must be delivered to the Department's Maintenance Electrical Shop at 1808 N Batavia St, Orange, CA 92865, Telephone (714) 974-3092.

86-2.06B(2) Materials

The pull box and cover must comply with ANSI/SCTE 77, "Specifications for Underground Enclosure Integrity," for Tier 22 load rating and must be gray or brown in color.

Each pull box cover must have an electronic marker cast inside.

Extension for the pull box must be of the same material as the pull box and attached to the pull box to maintain the minimum combined depths as shown.

Include recesses for a hanger if a transformer or other device must be placed in a pull box.

The bolts, nuts, and washers must be a captive bolt design.

The captive bolt design must be capable of withstanding a torque range of 55 to 60 ft-lb and a minimum pull out strength of 750 lb. Perform the test with the cover in place and the bolts torqued. The pull box and cover must not be damaged while performing the test to the minimum pull out strength.

Stainless steel hardware must have an 18 percent chromium content and an 8 percent nickel content.

Galvanize ferrous metal parts under section 75-1-.05.

Manufacturer's instructions must provide guidance on:

1. Quantity and size of entries that can be made without degrading the strength of the pull box below Tier 22 load rating
2. Where side entries cannot be made
3. Acceptable method to be used to create the entry

Tier 22 load rating must be labeled or stenciled by the manufacturer on the inside and outside of the pull box and on the underside of the cover.

86-2.06B(3) Construction

Do not install pull box in curb ramps or driveways.

A pull box for a post or a pole standard must be located within 5 feet of the standard. Place a pull box adjacent to the back of the curb or edge of the shoulder. If this is impractical, place the pull box in a suitable, protected, and accessible location.

Add to section 86-2.08A:

Wrap conductors around the projecting end of conduit in pull boxes as shown. Secure conductors and cables to the projecting end of the conduit in pull boxes.

Replace the 1st paragraph of section 86-2.09E with:

Splices must be insulated by "Method B."

For loop wire to loop detector lead-in cable (DLC) splices, install heat-shrink tubing over the entire splice after insulating the splice using "Method B." Place both the loop start wire and finish wire splice in the same heat-shrink tubing.

Delete 7th paragraph of section 86-2.09E.

Add to section 86-2.11A:

Continuous welding of exterior seams in service equipment enclosures is not required.

Add to Section 86-2.14

86-2.14D System Testing and Documentation

86-2.14D(1) General

System testing and documentation covers the integration testing (video and data) which is required to validate the operational performance of the communication system.

86-2.14D(1)(a) Submittals

System Documentation

Submit a draft copy of all documentation for review and approval before production of documentation. The Engineer will review and approve or reject the draft documentation within 4 weeks of receipt.

Modify the documentation if required and submit provisional documentation. The Engineer will approve or reject the provisional documentation within 3 weeks of receipt. Arrange for re-submission in a timely manner to meet the schedule in case the documents are rejected.

Submit draft documentation eight weeks before the start of installation. The draft documentation must show the general approach in preparing the final manuals.

Upon approval of the draft documentation, provisional documentation must be supplied 3 weeks before the start of site testing. The provisional documentation must be of the same format as the final manuals but with temporary insertion for items which cannot be finalized until the system is completed, tested and accepted.

Submit final documentation no later than 4 weeks after completion of the acceptance tests and it must incorporate all comments made during the approval stages. You will be responsible for all delays caused by non-compliance to the specified requirements.

Final documentation must be approved before its production.

Deliver ten copies of all final documents . The copies must be 8 ½" x 11" and bound in three-ring, hard-covered binders, complete with dividers.

Documentation must consist of the following types of manuals and drawings and must include the information described:

1, System Description and Technical Data:

- 1.1. The system description and technical data section must contain an overall description of the system and associated equipment and cables with illustrative block diagrams.
- 1.2 This section must identify all equipment and cables in the system stating the exact module and option number that are employed in the system. Technical data, specification and settings for every type of equipment or cable must be provided. Any modification that has been done on the equipment must be clearly described.

2. Configuration of Hardware and Software Documentation:

- 2.1 Provide proper documentation for all configurations of hardware and in-built software. The configurations of hardware and in-built software documentation must include a clear description of the system's functionalities and specifications. Description on each configuration of hardware and in-built software modules and programs must be provided.
3. Operations:
 - 3.1 Describe how to operate the system and each particular type of equipment and software. Equipment layout, layout of controls, displays, software operating procedures and all other information required to correctly operate the system and each functional unit must be provided.
 - 3.2. Procedures must also be provided for initial tune-up of the system and adjustment and checkout required to ensure that the system is functioning within the performance requirements. Warning of special procedures must be given. The functions and setting of all parameters must be explained.
4. Corrective Maintenance:
 - 4.1 Include fault diagnostic and repair procedures to permit locating and correcting faults at the replaceable module level. Procedures must include alignment and testing of the equipment following repair, the test equipment, tools, diagnostic software required and the test set up.
- 5, Preventative Maintenance:
 - 5.1 Include procedures for preventative maintenance in order to maintain the performance parameters of the system, equipment and cables within the requirements of the specifications.
6. Test Results:
 - 6.1. The test result section of the operations and maintenance must include a copy of the results for all the tests that you have conducted.
 - 6.2. You must provide system schematic drawings to identify the type of equipment at each location and the function of all equipment. The drawings must show how the system is interconnected. You must also provide a comprehensive list of cabling and wiring to clearly identify the interconnection and labeling of all equipment both in the field, at existing cable node, at existing hub, and at the TMC.

86-2.14D(1)(b) Quality Control and Assurance

86-2.14D(1)(b)(i) Subsystem testing

You must test all material, equipment and cable after installation. These tests must comply with the "Performance Testing" sub-sections for each individual item where applicable.

You must supply all test equipment required.

You must submit an installation and test plan which details the method of installation and site testing for all material, equipment, and cable and the associated schedule of activities. Five copies of the installation and test plan must be submitted for approval, at least 2 weeks before proposed testing dates.

The equipment and hardware must be installed as shown and described. Tests and inspections must include:

1. Visual inspection for damaged or incorrect installation.
2. Adjustments and alignment.
3. Measurement of parameters and operating conditions.

These tests must be performed in accordance with the approved installation and test plan.

You must notify the Engineer of your intent to proceed with installation and testing 48 hours before commencement of each test.

Installation documentation and test results must be provided for all material, equipment and cable before submission of the acceptance test plan and commencement of acceptance tests. The documentation must be in accordance with the contract and must include the following as appropriate:

1. Model and part number for all material
2. Test equipment model number, serial number, settings, and date of last calibration
3. All strap and switch settings
4. Record of all adjustments and levels
5. Alignment measurements
6. Identification of interconnections
7. All factory, laboratory and site test results

86-2.14D(1)(b)(ii) Physical Inspection

You must provide documentation to prove delivery of all material, equipment, cable and documentation. If any material or documentation is outstanding or have been replaced under pre-acceptance warranty a physical inspection and documentation must be provided for this material. The physical inspection must consist of inspecting all installed material to ensure that workmanship satisfies the specified requirements.

86-2.14D(1)(b)(iii) Data Link Testing

Data link testing for the alignment of data systems must be conducted after you submit a test plan and receive approval from the Engineer. The activities must include verification of data circuits in the low speed data links, high speed data ring network and in the integrated data system. Adjust levels required for the data system to operate.

The Contractor shall test all data links for temporary and permanent systems:

1. Between Hub #2 (SR 91 and SR 55) and the corresponding field elements as shown on the Plans.
2. Between Orange County Transportation Authority Traffic Management Center (OCTA TMC) EB 91 at Weir Canyon and the corresponding field elements as shown on the Plans.

End-to-end bit error rate tests (BERTS) shall be conducted employing two FODMs on the link at the bit rate to be employed. The BERTS shall be with the modem at the equipment sites configured in a loop back with the test setup at the respective cabinets, and Hub or Data Node as described above. BERT tests shall be a minimum of 3 hours for individual circuit configured for operation in accordance with these special provisions and the Plans including required bridges.

The bit error rate in both directions must be less than 1×10^{-6} at 9600 bps for all circuits.

86-2.14D(1)(b)(iv) Video Link Testing

The video link testing must be conducted after you submit a test plan and receives approval, based on these special provisions, plans and the manufacturer's recommended test procedures for the equipment involved. Measurements must be made from the baseband-in (output of camera control receiver) to baseband-out connections.

A video communication link must include a video transmitter, video receiver, interconnecting optical fiber, connectors and power supplies. The video link is to provide point-to-point transmission and reception of a full motion National Television System Committee (NTSC) baseband video signal using an optical fiber as the transmission medium. Video system performance tests for any particular video link must be performed after the associated camera has been installed and tested.

Each video link in the communication system must be tested with a video test signal at the transmitter input. You must perform all level adjustments and alignments required on the video link in order for it to operate in accordance with these special provisions. If any video link fails to meet the performance requirements, you must take all steps necessary to restore the failed link to the required performance.

Each video link in the communication system must be tested for qualitative performance with its associated camera turned on and connected to the BNC connector of the video link transmitter. You must measure and record the received optical power at the optical connector of the video receiver from the

video transmitter under test using a 90 percent APL (average picture level) flat field input to the transmitter.

You must measure, record and tabulate the receiver's dynamic range at the optical connector of the video receiver from the video transmitter under test using a 90 percent APL flat field input to the transmitter.

For all tests required under dynamic range at the optical connector, the measured optical attenuation of the fiber being used must be increased to the point at which the video test set just begins to show a 3 dB degradation of the video signal to noise ratio in accordance with TIA-250 video test procedures. The optical receive power into the video receiver must be measured and recorded. Then the optical attenuation must be decreased until the video test set once again shows degradation of the video and registers errors.

The output video signal must be connected to a monitor. The observed picture on the monitor will be assessed for qualitative performance.

You must measure, record and tabulate the receiver's dynamic range at the optical connector of the video decoder from the video encoder under test.

The optical power into the receiver exceed the manufacturer's specified saturation level. These minimum and maximum receive levels define the video decoder's dynamic range and must meet or exceed the specifications as specified elsewhere under these special provisions.

Each video link must be tested for the following performance characteristics. You must measure, record and demonstrate that the performance meets or exceeds the specified TIE-250 medium haul requirements listed below:

1. Differential gain
2. Differential phase
3. Chrominance to luminance delay inequality
4. Frequency response characteristic
5. Signal to noise ratio
6. Signal to low frequency noise
7. Signal-to-periodic-noise
8. Output signal level

86-2.14D(1)(b)(v) Acceptance Testing

Acceptance testing includes the preparation of an acceptance test plan, conducting acceptance tests and subsequent retests, and documentation of the results.

Final acceptance tests must be conducted after the site test results have been reviewed and accepted. These tests include the complete system in normal operations.

You must submit 5 copies of the acceptance test plan for approval before commencement of acceptance testing. The acceptance test plan must address the full testing requirements of the specifications.

The acceptance test plan must detail all tests to be performed, the test results which are expected and the test schedule. The acceptance test plan will include the following major tests and acceptance categories:

1. Successful acceptance of Subsystem testing
2. Performance tests after connecting the system.
3. Functional tests after connecting the system.

The model and part numbers and date of last calibration of all test equipment must be included with the test results.

Acceptance testing must not commence until all material required is delivered, installed, and aligned and all production test and site test documentation and results have been approved.

All acceptance test results must be fully documented and such documentation provided as a condition of acceptance.

86-2.14D(1)(b)(vi) Performance Tests

You must conduct operational performance tests on the following:

1. All video links from the camera output to the input of the color monitors in OCTA TMC
2. All data circuits operational from OCTA TMC to the field equipment.
3. All data circuits operational from Hub #2 to the field equipment.

Video tests must satisfy the end-to-end performance requirements under normal operating conditions. Video tests must be measured with the video test equipment injecting a test signal in place of the camera output in the field, as appropriate

You must test the video subsystem and record the results:

1. The video signal to noise must be measured according to TIA-250. The video signal to noise ratio must be measured and recorded with suitable video test equipment providing the video reference signal. The video signal to noise ratio must be greater than 47 dB.
2. The video signal to low frequency noise ratio must be measured according to TIA-250. The resulting video signal to low frequency noise ratio must be greater than 39 dB. If a Automatic Gain Control circuit does not allow measurement as per TIA-250, you must submit an alternative test plan for approval.
3. The video signal to periodic noise ratio must be measured according to TIA-250. The resulting video signal to periodic noise ratio must be greater than 52 dB.
4. If any circuit or element fails to satisfy the specified performance requirements, you must determine the cause and remedy the failure to the satisfaction of the Engineer. The full performance tests must be repeated under operating conditions as determined by the Engineer.

86-2.14D(1)(b)(vii) Functional Tests

You must test in the presence of the Engineer all integrated system functions to demonstrate that all circuits, cameras, camera control, and all equipment satisfies the functional requirements of the specifications.

Functional testing must include subjective testing of each camera image and verification of camera control from the camera control unit. The connectivity of each data channel must be demonstrated.

You must document all functional test results.

In the event that any aspect of the functional tests is determined by the Engineer to have failed, you must cease all acceptance testing and determine the cause of the failure. If the failure is due to a defect within your furnished portion of the system, You must make repairs to satisfaction. Acceptance testing must, at the discretion of the Engineer, be repeated from the start of functional tests.

86-2.14D(1)(b)(viii) Final Acceptance

The system will not be accepted until all of the following conditions have been met as follows:

1. Physical, performance, and functional acceptance tests have been completed and the results are approved.
2. All documentation has been completed and submitted.
3. All connections that were changed to perform acceptance tests are restored and tested.

Upon completion of acceptance tests you must connect all equipment to form a fully operational system.

86-2.14D(2) Materials

Not Used

86-2.14D(3) Construction

Not Used

86-2.14D(4) Payment

Not Used

Replace section 86-2.17:

86-2.17 Communication System

86-2.17(1) General

This work applies when fiber optic communication system is shown on the project plans.

86-2.17(1)(a) Summary

Fiber optic communication system consists of installing and testing fiber optic outside plant cable, fiber optic splice enclosure, fiber optic cable terminations, splice vault, innerduct, innerduct sealing plug, splice tray, tracer wire, color concrete back fill, warning tape, passive cable assemblies and components, and system verification, all as shown on the plans and in the special provisions.

86-2.17(1)(b) Definitions

Active Component Link Loss Budget: The active component link loss budget is the difference between the average transmitter launch power (in dBm) and the receiver maximum sensitivity (in dBm).

Connector: A mechanical device used to align and join 2 fibers together to provide a means for attaching to and decoupling from a transmitter, receiver, or another fiber (patch panel).

Connectorized: The termination point of a fiber after connectors have been affixed.

Couplers: Devices which mate fiber optic connectors to facilitate the transition of optical light signals from one connector into another. They are normally located within FDUs, mounted in panels. They may also be used unmounted, to join 2 simplex fiber runs.

End-to-End Loss: The maximum permissible end-to-end system attenuation is the total loss in a given link. This loss could be the actual measured loss, or calculated using typical (or specified) values. A designer should use typical values to calculate the end-to-end loss for a proposed link. This number will determine the amount of optical power (in dB) needed to meet the System Performance Margin.

Fiber Distribution Unit (FDU): An enclosure or rack mountable unit containing both a patch panel with couplers and splice tray(s). The unit's patch panel and splice trays may be integrated or separated by a partition.

FO: Fiber optic.

FOOP: Fiber optic outside plant cable.

FOTP: Fiber optic test procedure(s) as defined by TIA/EIA standards.

Jumper: A short cable, typically one meter or less, with connectors on each end, used to join 2 CMH couplers or a CMH to active electronic components.

Light Source: Portable fiber optic test equipment that, when coupled with a power meter, is used to perform end-to-end attenuation testing. It contains a stabilized light source operating at the wavelength of the system under test.

Link: A passive section of the system, the ends of which are connectorized. A link may include splices and couplers. For example, a video link may be from a FO transmitter to a video multiplexer (MUX).

Optical Time Domain Reflectometer (OTDR): Fiber optic test equipment similar in appearance to an oscilloscope that is used to measure the total amount of power loss in a FO cable between 2 points. It provides a visual and printed display of the losses associated with system components such as fiber, splices and connectors.

Patch Panel: A precision drilled metal frame containing couplers used to mate 2 fiber optic connectors.

Pigtail: A short optical fiber permanently attached to a source, detector, or other fiber optic device.

Power Meter: Portable fiber optic test equipment that, when coupled with a light source, is used to perform end-to-end attenuation testing. It contains a detector that is sensitive to light at the designed wavelength of the system under test. Its display indicates the amount of optical power being received at the end of the link.

Segment: A section of FO cable that is not connected to any active device and may or may not have splices per the design.

SMFO: Single mode Fiber Optic Cable.

Splice: The permanent joining of two fiber ends using a fusion splicer.

Splice Enclosure: An environmentally sealed container used to organize and protect splice trays. The container allows splitting or routing of fiber cables from multiple locations. Normally installed in a splice vault.

Splice Tray: A container used to organize and protect spliced fibers.

Splice Vault: An underground container used to house excess cable and/or splice enclosures.

Tight Buffered, Non-Breakout Cable (Tight Buffer Cable): Type of cable construction where each glass fiber is tightly buffered (directly coated) with a protective thermoplastic coating to 900 μm (compared to 250 μm for loose tube fibers).

86-2.17(1)(c) Submittals

A minimum of 10 working days before the scheduled delivery of the fiber optic outside plant cable to the project site, submit documentation of detailed factory test procedures and results for the Engineer's review and approval.

The procedures must identify the cable tests performed and conducted. Included in the test procedures must be the model, manufacturer, configuration, calibration and alignment and operating procedures for all proposed test equipment.

Submit two copies of the manufacturer's cable installation procedures and technical support information to the Engineer at least two weeks before the scheduled delivery of the cable to the project site.

86-2.17(1)(d) Quality Control and Assurance

Testing must include the tests on elements of the passive fiber optic components: (1) at the factory, (2) after delivery to the project site but prior to installation, (3) after installation and (4) during final system testing. Test the active components after installation.

You must provide all personnel, equipment, instrumentation and materials necessary to perform all field testing. Notify the Engineer two working days prior to all field tests. The notification must include the exact location or portion of the system to be tested.

86-2.17(1)(d)(i) Factory Testing

You must provide the documentation from the original cable manufacturer for the factory testing and of compliance with the fiber specifications as listed in the Fiber Characteristics Table. Before shipment, but while on the shipping reel, 100 percent of all fibers must be tested for attenuation. Test results must be recorded and dated. Copies of the results must be (1) maintained on file by the manufacturer with a file identification number for a minimum of seven years, (2) attached to the cable reel in a waterproof pouch, and (3) You must provide a copy to the Engineer. Copies of the test results must also be filed with the copy accompanying the shipping reel in a separate weather proof envelope.

86-2.17(1)(d)(ii) Arrival on Site

Physically inspect the cable and reel on delivery.

Measure the attenuation for 100 percent of the fibers to confirm that the cable meets requirements. Singlemode fibers must be tested at 1310 nm and 1550 nm after arrival on site. Attenuation readings in one direction must be recorded on the cable data sheet.

Test results must be recorded, dated, compared to the detailed factory test results documents, and submitted to the Engineer.

Attenuation deviations from the shipping records of greater than 5 percent must be brought to the attention of the Engineer. The cable must not be installed until completion of this test sequence and the Engineer provides written approval.

The failure of any single fiber in the cable to comply with the special provisions is cause for rejection of the entire reel.

If the test results are unsatisfactory, the reel of fiber optic cable must be considered unacceptable and all records corresponding to that reel of cable must be marked accordingly. Replace the unsatisfactory reels of cable with new reels of cable at your expense. Test the new reels of cable to demonstrate acceptability. Submit copies of the test results to the Engineer.

Allow 5 working days for the Engineer to review the "arrival on site test" results and notify you of the results of the review.

86-2.17(1)(d)(iii) After Cable Installation

After the fiber optic cable has been pulled but before breakout and termination, test 100 percent of all the fibers with an OTDR for attenuation.

Singlemode fibers must be tested at 1310 nm and 1550 nm after cable installation. Attenuation readings for each direction must be recorded on the cable data sheet.

Test results must be recorded, dated, and compared to the detailed test procedures documents at the factory. Submit copies of traces and test results to the Engineer.

If the OTDR test results are unsatisfactory, the FO cable segment will be unacceptable. Replace the unsatisfactory segment of cable with a new segment, without additional splices, at the your expense. Test the new segment of cable to demonstrate acceptability. Submit copies of the test results to the Engineer.

Allow 10 working days for the Engineer to review the "after cable installation test" results and notify you of the results of the review.

86-2.17(1)(d)(iv) Outdoor Splices

At the conclusion of all outdoor splices at one location, and before they are enclosed and sealed, test all splices with the OTDR, in both directions. Splices in segments must be tested at 1310 nm and at 1550 nm. Individual fusion splice losses must not exceed 0.07 dB. Measurement results must be recorded, dated, validated by the OTDR trace printout and filed with the records of the respective cable runs. Submit copies of traces and test results to the Engineer. If the OTDR test results are unsatisfactory, the splice is unacceptable. Replace the unsatisfactory splice at the your expense. Test the new splice to demonstrate acceptability. Submit copies of the test results to the Engineer.

86-2.17(1)(d)(v) Passive Interconnect Package Testing and Documentation

All the components of the passive interconnect package (FDUs, pigtails, jumpers, couplers and splice trays as shown on the plans and in the special provisions) must comprise a unit from a manufacturer who is regularly engaged in the production of the fiber optic components.

In developing the passive interconnect package, each SC termination (pigtail or jumper) must be tested for insertion attenuation loss with the use of an optical power meter and light source. In addition, all singlemode terminations must be tested for return reflection loss. These values must meet the loss requirements specified earlier and must be recorded on a tag attached to the pigtail or jumper.

Once assembly is complete, the manufacturer must visually verify that all tagging, including loss values, is complete. Then as a final quality control measure, the manufacturer must do an "end to end" optical power meter/light source test from pigtail end to jumper lead end to assure continuity and overall attenuation loss values.

The final test results must be recorded, along with previous individual component values, on a special form assigned to each FDU. The completed form must be dated and signed by the Manufacturer's Quality Control supervisor. One copy of this form will be attached in a plastic envelope to the assembled FDU unit. Copies will be provided separately to you and to the Engineer, and must be also be maintained on file by the manufacturer or supplier.

86-2.17(1)(d)(vi) System Verification at Completion

For Caltrans

You must test all fiber optic cables (temporary and permanent) as shown on the Plans between Hub #2 (SR 91 and SR 55) and Data Node 6 (EB 91 and Brookhurst St.) and between Hub #2 and the splice vault at the Orange and Riverside county line

For Orange County Transportation Authority (OCTA)

You must test all fiber optic cables (temporary and permanent) as shown on the Plans between CCTV 1 and OCTA Transportation Management Center located at SR-91 and Weir Canyon.

OTDR Testing. - Once the passive cabling system has been installed and is ready for activation, test 100 percent of the fiber links with the OTDR for attenuation. Print out must include at least link number, fiber color, buffer color and cable number. Test results must be recorded, dated, compared and filed with previous copies. Submit a hard copy printout and a electronic copy of the traces and test results along with a licensed copy of the associated software on a Windows XP PC compatible CD to the Engineer. If the OTDR test results are unsatisfactory, replace the link at your expense. Test the new link to demonstrate acceptability. Submit copies of the test results to the Engineer.

Power Meter and Light Source. - At the conclusion of the final OTDR testing, test 100 percent of all fiber links end to end, with a power meter and light source, in accordance with EIA Optical Test Procedure 171 and in the same wavelengths specified for the OTDR tests. Conduct these tests in both directions. Test results must be recorded, compared and proven to be within the design link loss budgets, and filed with the other recordings of the same links. Submit copies of the test results to the Engineer.

Link Loss Budget Worksheet. - The Link Loss Budget Worksheet shown in Appendix A must be completed for 100 percent of all links in the fiber optic system, using the data gathered during cable verification. Include the completed worksheets as part of the system documentation.

Test Failures. - If the link loss measured from the power meter and light source exceeds the calculated link loss, or the actual location of the fiber ends does not agree with the expected location of the fiber ends (as would occur with a broken fiber), the fiber optic link will not be accepted. Replace the unsatisfactory segments of cable or splices with a new segment of cable or splice at your expense. The OTDR testing, power meter and light source testing and Link Loss Budget Worksheet must be completed for the repaired link to determine acceptability. Submit copies of the test results to the Engineer. The removal and replacement of a segment of cable must be interpreted as the removal and replacement of a single contiguous length of cable connecting two splices, two connectors or one splice and one connector. The removal of only the small section containing the failure and therefore introducing new unplanned splices, will not be allowed.

APPENDIX A

Link Loss Budget Worksheet

Contract No. _____ Contractor: _____

Approved by Caltrans: _____

Date: _____ Operator: _____

Link Number: _____ Fiber Color: _____

Buffer Color: _____ Cable No.: _____

Test Wavelength (Circle one): 1310 1550

Expected Location of fiber ends: End 1: _____ End 2: _____

OTDR Test Results: Forward Loss: Reverse Loss: Average Loss:	_____ dB _____ dB _____ dB	1A 1B 1C
Power Meter and Light Source Test Results: Forward Loss: Reverse Loss: Average Loss [(2A + 2B)/2]:	_____ dB _____ dB _____ dB	2A 2B 2C
Calculated Fiber Loss: Length of the link (from OTDR): Allowed loss per km of fiber: Total Allowed Loss due to the fiber (3A * 3B):	_____ km 0.4 dB/km _____ dB	3A 3B 3C
Calculated Splice Loss: Number of Splices in the Link: Allowed Link Loss per Splice: Total Allowed Loss due to Splices (4A * 4B):	_____ 0.07 dB _____ dB	4A 4B 4C
Calculated Link Loss: Connector Loss: Total Link Loss (5A + 3C + 4C):	0.9 dB _____ dB	5A 5B
Cable Verification: Compare Power Meter Average Loss to Calculated Link Loss (2C - 5B): If the value of 6A is greater than zero, the link has failed the Test. See "Test Failures" in these special provisions.	_____ dB	6A

To Be Completed by Caltrans:

Resident Engineer's Signature: _____

Cable Link Accepted: _____

86-2.17(2) Materials

86-2.17(2)(a) Fiber Optic Outside Plant Cable

86-2.17(2)(a)(i) General

Each fiber optic outside plant cable (FOP) for this project must be all dielectric, non-gel water blocking materials, duct type, with loose buffer tubes and must conform to the special provisions. Cables with singlemode fibers must contain singlemode (SM) dual-window (1310 nm and 1550 nm) fibers in the quantities shown below and on the plans.

Type	Cable
Type A cable	36 SM fibers
Type B cable	72 SM fibers
Type C cable	72 SM fibers
Type D cable	12 SM fibers

The optical fibers must be contained within loose buffer tubes. The loose buffer tubes must be stranded around an all dielectric central member. Aramid yarn or fiberglass must be used as a primary strength member, and a polyethylene outside jacket must provide for overall protection.

All fiber optic (FO) cable on this project must be from the same manufacturer, who is regularly engaged in the production of this material.

The cable must comply with all the requirements of RUS-Chapter XVII, Title 7, Section 1755.900 and as specified in the special Provisions.

86-2.17(2)(a)(ii) Materials

Each optical fiber must be glass and consist of a doped silica core surrounded by concentric silica cladding. All fibers in the buffer tube must be usable fibers, and must be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of these specifications. The required fiber grade SM must reflect the maximum individual fiber attenuation, to guarantee the required performance of each and every fiber in the cable.

The coating must be a dual layered, UV cured acrylate. The coating must be mechanically or chemically strippable without damaging the fiber.

The cable must comply with the optical and mechanical requirements over an operating temperature range from -40 to +70 °C. The cable must be tested in accordance with EIA-455-3A (FOTP-3), "Procedure to Measure Temperature Cycling Effects on Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components." The change in attenuation at extreme operational temperatures (from -40 to +70 °C) for singlemode fiber must not be greater than 0.20 dB/km, with 80 percent of the measured values no greater than 0.10 dB/km. The singlemode fiber measurement is made at 1550 nm.

For all fibers the attenuation specification must be a maximum attenuation for each fiber over the entire operating temperature range of the cable.

Singlemode fibers within the finished cable must meet the requirements in the following table:

Parameter	Singlemode
Type	Step Index
Core diameter	8.3 μm (nominal)
Cladding diameter	125 μm \pm 1.0 μm
Core to Cladding Offset	\leq 1.0 μm
Coating Diameter	250 μm \pm 15 μm
Cladding Non-circularity defined as: [1-(Min cladding Dia \div Max cladding Dia.)] \times 100	\leq 2.0 percent
Proof/Tensile Test	345 MPa, Min
Attenuation: (-40 to +70 °C) @1310 nm @1550 nm	\leq 0.4 dB/km \leq 0.3 dB/km
Attenuation at the Water Peak	\leq 2.1 dB/km @ 1383 \pm 3 nm
Chromatic Dispersion: Zero Dispersion Wavelength Zero Dispersion Slope	1301.5 to 1321.5 nm \leq 0.092 ps/(nm ² *km)
Maximum Dispersion:	\leq 3.3 ps/(nm*km) for 1285 – 1330 nm $<$ 18 ps/(nm*km) for 1550 nm
Cut-Off Wavelength	$<$ 1260 nm
Mode Field Diameter (Petermann II)	9.3 \pm 0.5 μm at 1300 nm 10.5 \pm 1.0 μm at 1550 nm

86-2.17(2)(a)(iii) Fiber Color Coding

Optical fibers must be distinguishable from others in the same buffer tube by means of color coding according to the following:

1. Blue (BL)	7. Red (RD)
2. Orange (OR)	8. Black (BK)
3. Green (GR)	9. Yellow (YL)
4. Brown (BR)	10. Violet (VL)
5. Slate (SL)	11. Rose (RS)
6. White (WT)	12. Aqua (AQ)

The colors must be targeted in accordance with the Munsell color shades and must meet EIA/TIA-598 "Color Coding of Fiber Optic Cables."

Buffer tubes containing fibers must also be color coded with distinct and recognizable colors according to the same table listed above for fibers.

The color formulation must be compatible with the fiber coating and the buffer tube filling compound, and be heat stable. It must not fade or smear or be susceptible to migration and it must not affect the transmission characteristics of the optical fibers and must not cause fibers to stick together.

Submit a manufacturer's sample of fiber optic cable, 10 feet in length, with part numbers and original catalog and documents, to the Engineer.

86-2.17(2)(a)(iv) Cable Construction

86-2.17(2)(a)(iv)(a) General

The fiber optic cable must consist of, but not be limited to, the following components:

1. Buffer tubes
2. Central member
3. Filler rods

4. Stranding
5. Core and cable flooding
6. Ripcord
7. Outer jacket
8. Strand steel messenger (for temporary aerial fiber optic cable only)

Buffer Tubes. - Loose buffer tubes must provide clearance between the fibers and the inside of the tube to allow for expansion without constraining the fiber. The fibers must be loose or suspended within the tubes and must not adhere to the inside of the tube. Each buffer tube must contain 6 or 12 fibers.

The loose buffer tubes must be extruded from a material having a coefficient of friction sufficiently low to allow free movement of the fibers. The material must be tough and abrasion resistant to provide mechanical and environmental protection of the fibers, yet designed to permit safe intentional "scoring" and breakout, without damaging or degrading the internal fibers.

Buffer tube must have a non-gel water-blocking material used to prevent water intrusion and migration. The filling compound must be non-toxic and dermatologically safe to exposed skin. It must be chemically and mechanically compatible with all cable components, non-nutritive to fungus, non-hygroscopic and electrically non-conductive. The filling compound must be free from dirt and foreign matter and must be readily removable with conventional nontoxic solvents.

Buffer tubes must be stranded around a central member by a method that will prevent stress on the fibers when the cable jacket is placed under strain, such as the reverse oscillation stranding process.

Central Member. - The central member which functions as an anti-buckling element must be a glass reinforced plastic rod with similar expansion and contraction characteristics as the optical fibers and buffer tubes. A linear overcoat of low density polyethylene must be applied to the central member to achieve the optimum diameter to provide the proper spacing between buffer tubes during stranding.

Filler Rods. - Filler rods may be included in the cable to lend symmetry to the cable cross-section where needed. Filler rods must be solid medium or high density polyethylene. The diameter of filler rods must be the same as the outer diameter of the buffer tubes.

Stranding. - Completed buffer tubes must be stranded around the overcoated central member using stranding methods, lay lengths and positioning such that the cable must meet mechanical, environmental and performance specifications. A polyester binding must be applied over the stranded buffer tubes to hold them in place. Binders must be applied using tension sufficient to secure the buffer tubes to the central member without crushing the buffer tubes. The binders must be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage.

Core and Cable Flooding. - The cable core interstices must be filled with a polyolefin based compound to prevent water ingress and migration. The flooding compound must be homogeneous, non-hygroscopic, electrically non-conductive, and non-nutritive to fungus. The compound must also be nontoxic, dermatologically safe and compatible with all other cable components.

Ripcord. - The cable must contain at least one ripcord under the jacket for easy sheath removal.

Outer Jacket. - The jacket must be free of holes, splits, and blisters and must be medium or high density polyethylene (PE), or medium density cross-linked polyethylene with minimum nominal jacket thickness of 40.0 ± 3 mil. Jacketing material must be applied directly over the tensile strength members and flooding compound and must not adhere to the aramid strength material. The polyethylene must contain carbon black to provide ultraviolet light protection and must not promote the growth of fungus.

The jacket or sheath must have clear, distinctive and permanent markings showing the manufacturer's name, the words "Optical Cable", the number of fibers, "SM", year of manufacture, and sequential measurement markings every 3 feet. The actual length of the cable must be within -0/+1 percent of the length marking. The marking must be in a contrasting color to the cable jacket. The height of the marking must be approximately 0.1-inch.

86-2.17(2)(a)(v) Functional Requirements

The FO cable must withstand water penetration when tested with a one meter static head or equivalent continuous pressure applied at one end of a 3-foot length of filled cable for one hour. No water must leak through the open cable end. Testing must be done in accordance with ANSI/EIA-455-82 (FOTP-82), "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable."

A representative sample of cable must be tested in accordance with ANSI/EIA/TIA-455-81A "Compound Flow (Drip) Test for Filled Fiber Optic Cable". The test sample must be prepared in accordance with Method A. No preconditioning period must be conducted. The cable must exhibit no flow (drip or leak) at 70°C as defined in the test method.

Crush resistance of the finished FO cables must be 220 N/cm applied uniformly over the length of the cable without showing evidence of cracking or splitting when tested in accordance with EIA-455-41 (FOTP-41), "Compressive Loading Resistance of Fiber Optic Cables." The average increase in attenuation for the fibers must be ≤ 0.10 dB at 1550 nm (singlemode) for a cable subjected to this load. The cable must not exhibit any measurable increase in attenuation after removal of load. Testing must be in accordance with EIA-455-41 (FOTP-41), except that the load must be applied at the rate from 0.10 to 0.75 inch per minute and maintained for 10 minutes.

The cable must withstand 25 cycles of mechanical flexing at a rate of 30 ± 1 cycles/minute. The average increase in attenuation for the fibers must be ≤ 0.20 dB at 1550 nm (singlemode) at the completion of the test. Outer cable jacket cracking or splitting observed under 10x magnification constitutes failure. The test must be conducted in accordance with EIA-455-104 (FOTP-104), "Fiber Optic Cable Cyclic Flexing Test," with the sheave diameter a maximum of 20 times the outside diameter of the cable. The cable must be tested in accordance with Test Conditions I and II of (FOTP-104).

The cable must withstand 20 impact cycles. The average increase in attenuation for the fibers must be ≤ 0.20 dB at 1550 nm (singlemode). The cable jacket must not exhibit evidence of cracking or splitting. The test must be conducted in accordance with EIA-455-25 (FOTP-25), "Impact Testing of Fiber Optic Cables and Cable Assemblies."

The finished cable must withstand a tensile load of 610 pounds without exhibiting an average increase in attenuation of greater than 0.20 dB. The test must be conducted in accordance with EIA-455-33 (FOTP-33), "Fiber Optic Cable Tensile Loading and Bending Test." The load must be applied for one-half hour in Test Condition II of the EIA-455-33 (FOTP-33) procedure.

86-2.17(2)(a)(vi) Packaging and Shipping Requirements

The completed cable must be packaged for shipment on reels. The cable must be wrapped in a weather and temperature resistant covering. Both ends of the cable must be sealed to prevent the ingress of moisture.

Each end of the cable must be securely fastened to the reel to prevent the cable from coming loose during transit. Ten feet of cable length on each end of the cable must be accessible for testing.

Each cable reel must have a durable weatherproof label or tag showing the manufacturer's name, the cable type, the actual length of cable on the reel, your name, the contract number, and the reel number. A shipping record must also be included in a weatherproof envelope showing the above information and also include the date of manufacture, cable characteristics (size, attenuation, bandwidth, etc.), factory test results, cable identification number and any other pertinent information.

The minimum hub diameter of the reel must be at least thirty times the diameter of the cable. The FO cable must be in one continuous length per reel with no factory splices in the fiber. Each reel must be marked to indicate the direction the reel should be rolled to prevent loosening of the cable.

86-2.17(2)(a)(vii) Installation

Installation procedures must conform to the cable manufacturer's procedures for the specific cable being installed. Mechanical aids may be used, provided that a tension measuring device is placed in tension to the end of the cable, and the allowable tension does not exceed 500 lbf or the manufacturer's recommended pulling tension whichever is less. A calibrated break-away feature must be employed to work in tandem with the tension measuring device and limit excessive tension by disengaging when a set tension is exceeded.

When mechanical aids are proposed for use in pulling fiber optic cable, submit information on the proposed methods and the conditions for use. The submittal must conform to the information submittal requirements, including the time frames for review and approval, as described in "Air Blown Method," of the special provisions.

Except when the "Air Blown Method" is used, FO cable must be installed using a cable pulling lubricant recommended by the FO cable or the conduit manufacturer and a non-abrasive pull tape.

Splices must be limited to locations as shown on the plans and as directed by the Engineer.

During cable installation, the bend radius must be maintained at not less than twenty times the outside diameter of the cable. The stress relief component must be installed at the entrance to the FDU as recommended by the manufacturer. The cable grips for installing the fiber optic cable must have a ball bearing swivel to prevent the cable from twisting during installation. The final installed bend radius of the fiber optic cable must be no less than ten times the outside diameter of the cable.

FO cable must be installed without splices except where specifically allowed on the plans. If splice locations are not shown on the plans, splicing must be limited to one cable splice every 3.5 miles. Any midspan access splice or FDU termination must involve only those fibers being spliced as shown on the plans. Cable splices must be located in splice enclosures, installed in splice vaults shown on the plans. A minimum of 65 feet of slack must be specified for each FO cable at each splice vault. A minimum of 50 feet of slack must be provided at each vault without a cable splice. Slack must be divided equally on each side of the FO splice enclosure.

Only one FO cable must be installed in each conduit unless shown or provided otherwise.

86-2.17(2)(a)(viii) Labeling

Label fiber optic cables in a permanent and consistent manner. Labels must be made of a material designed for permanent labeling. Labels must be mechanically marked with permanent ink on non-metal type labels, or embossed lettering on metal type labels; hand written labels must not be used. Metal tags must be constructed of stainless steel. Metal tags are required for use on fiber optic cables. Use of non-metal label materials must be only as approved by the Engineer. At vaults and other underground locations, all labels and imprinting must be weatherproof. Affix labels per the manufacturer's recommendations in a manner that will not cause damage to the cable or fiber.

86-2.17(2)(a)(viii)(a) Cable Identification

Identification used for labeling of the fiber optic cables must be as shown on the plans.

86-2.17(2)(a)(viii)(b) Label Placement

Fiber Optic Cables. - All cables must be labeled at all terminations, even if no connections or splices are made, and at fiber optic vault entrance and exit points (where splicing is required at the vault).

Cable to Cable Splices. - The cable must be labeled at entry to splice enclosure.

Cable to Fiber Distribution Units. - The cable must be labeled at entry to the FDU. Only one cable must be terminated in each FDU. The FDU must be labeled on the face of the FDU. Individual connections must be clearly marked on the face of the FDU in the designated area as directed by the Engineer.

Fibers. - Fiber labels must be placed next to the connectors of the individual fibers.

Jumpers. - Equipment to FDU Jumpers must be labeled as to the equipment type connected and must be labeled at both ends. FDU to FDU jumpers must be labeled with the cable ID-TYPE-START-END information at each end.

86-2.17(2)(a)(ix) Fiber Optic Splicing

Unless otherwise allowed, FO cable splices must be fusion type. The mean splice loss must not exceed 0.07 dB per splice. The mean splice loss must be obtained by measuring the loss through the splice in both directions and then averaging the resultant values.

The field splices must connect the fibers of the two FO cable lengths together. These splices must be placed in a splice tray and these splice tray(s) must then be placed in the splice enclosure.

Fibers of the same buffer tube, but not being spliced must be placed in a splice tray alongside spliced fibers. Buffer tubes that do not require enclosed fibers to be spliced must not be disturbed and placed in the splice enclosure.

The termination splices must connect the FO cable span ends with pigtails. The termination splices must be placed in a splice tray and the splice tray(s) must then be placed in the fiber distribution unit (FDU). The individual fibers must be looped one full turn within the splice tray to avoid micro bending. A 2-inch minimum bend radius must be maintained during installation and after final assembly in the optical fiber splice tray. Each bare fiber must be individually restrained in a splice tray. The optical fibers in buffer tubes and the placement of the bare optical fibers in the splice tray must be such that there is no discernible tensile force on the optical fiber.

All splices must be protected with a metal reinforced thermal shrink sleeve.

All fiber optic cables must be labeled in the splice tray. Pigtail ends must also be labeled to identify the destination of the fiber.

86-2.17(2)(b) Fiber Optic Splice Enclosure

The fiber optic field splices must be enclosed in splice enclosures which must be complete with splice organizer trays, brackets, clips, cable ties, and sealant, as needed. The splice enclosure must be suitable for a direct burial or pull box application. Manufacturer's installations must be supplied to the Engineer prior to the installation of any splice enclosures. Location of the splice enclosures must be where a splice is required as shown on the plans, designated by the Engineer, or described in the special provisions.

The splice enclosure must conform to the following specifications:

1. Non-filled thermoplastic case
2. Rodent proof, water proof, re-enterable and moisture proof
3. Expandable from 2 cables per end to 8 cables per end by using adapter plates
4. Cable entry ports must accommodate 0.40-inch to 1-inch diameter cables
5. Multiple grounding straps
6. Accommodate up to 8 splice trays
7. Suitable for "butt" or "through" cable entry configurations
8. Place no stress on finished splices within the splice trays

The size of the enclosure must allow all the fibers of the largest fiber optic cable to be spliced to a second cable of the same size, plus 12 additional pigtails. The enclosure must fit into the fiber optic splice vault and must leave sufficient space for routing of the fiber optic communication cables, without exceeding the minimum bending radius of any cable.

All materials in the enclosures must be nonreactive and must not support galvanic cell action.

Adequate splice trays must be specified to splice all fibers of the largest fiber optic cable, plus 12 pigtails.

The enclosure must be sealed using a procedure recommended by the manufacturer that will provide a waterproof environment for the splices. Encapsulant must be injected between the inner and outer enclosures.

Care must be taken at the cable entry points to ensure a tight salt resistant and waterproof seal is made which will not leak upon aging. It is acceptable to have multiple pigtails enter the fiber splice enclosure through one hole as long as all spaces between the cables are adequately sealed.

Bolt the splice enclosure to the side wall of the fiber optic vault.

The fiber optic splice enclosure must be suitable for a temperature range from 32 to 104°F.

Each splice must be individually mounted and mechanically protected in the splice tray.

You must install the fiber splice enclosure in the fiber optic vaults where splicing is required. The fiber optic splice enclosures must be securely fastened to the fiber optic vault or wall using standard hardware as recommended by the enclosure manufacturer.

You must provide all mounting hardware required to securely mount the enclosures.

86-2.17(2)(c) Splice Tray

Splice trays must accommodate a minimum of 12 fusion splices and must allow for a minimum bend radius of 1.75 inch. Individual fibers must be looped one full turn within the splice tray to allow for future splicing. No stress is to be applied on the fiber when it is located in its final position. Buffer tubes must be secured near the entrance of the splice tray to reduce the chance of an inadvertent tug on the pigtail and damage to the fiber. The splice tray cover must be transparent.

Splice trays in the splice enclosure must conform to the following:

1. Accommodate up to 24 fusion splices
2. Place no stress on completed splices within the tray
3. Accommodate "butt" or "feed through" splicing applications.
4. Stackable with a transparent snap-on hinge cover
5. Buffer tubes securable with channel straps
6. Contain fiber retention strips.
7. Must be able to accommodate a fusion splice with the addition of an alternative splice holder
8. Must be labeled after splicing is completed.

Only one single splice tray may be secured by a bolt through the center of the tray in the fiber termination unit. Multiple trays must be securely held in place as per the manufacturer's recommendation.

86-2.17(2)(d) Passive Cable Assemblies And Components

The FO cable assemblies and components must be compatible components, designed for the purpose intended, and manufactured by a company regularly engaged in the production of material for the fiber optic industry. All components or assemblies must be best quality and non-corroding. All components or assemblies of the same type must be from the same manufacturer.

86-2.17(2)(e) Fiber Optic Cable Assemblies and Pigtails

Cable assemblies (jumpers and pigtails) must be products of the same manufacturer. The cable used for cable assemblies must be made of fiber meeting the performance requirements for the FO cable being connected.

Pigtails must be of simplex (one fiber) construction, in 900 µm tight buffer form with a PVC jacket with manufacturer identification information, and a nominal outer jacket diameter of 0.12 inch. Single mode simplex cable jackets must be yellow in color. All pigtails must be factory terminated and tested and at least 3 feet in length.

Jumpers may be of simplex or duplex design. Duplex jumpers must be of duplex round cable construction, and must not have zipcord (siamese) construction. All jumpers must be at least 6.6 feet in length, sufficient to avoid stress and allow orderly routing.

The outer jacket of duplex jumpers must be colored according to the single mode color (yellow) specified above. The 2 inner simplex jackets must be contrasting colors to provide easy visual identification for polarity.

86-2.17(2)(f) Fiber Optic Cable Connectors

Connectors must be of the ceramic ferrule SC type for SM. Indoor SC connector body housings must be either nickel plated zinc or glass reinforced polymer construction. Outdoor SC connector body housing must be glass reinforced polymer.

The associated coupler must be of the same material as the connector housing.

All FO connectors must be the 0.1 inch SC connector ferrule type with Zirconia Ceramic material with a PC (Physical Contact) pre-radiused tip.

The connector operating temperature range must be -40 to 158 degrees F. Insertion loss must not exceed 0.4 dB for single mode, and the return reflection loss on single mode connectors must be at least 55 dB. Connection durability must be less than a 0.2 dB change per 500 mating cycles per EIA-455-21A (FOTP-21).

All terminations must provide a minimum 50 lbf pull out strength. Factory test results must be documented and submitted before installing any of the connectors. Single mode connectors must have a yellow color on the body and/or boot that renders them easily identifiable.

Field terminations must be limited to splicing of adjoining cable ends and/or cables to SC pigtails.

86-2.17(2)(g) Splice Vault

Splice vaults shall be 60 inch (L) x 30 inch (W) x 30 inch (D) nominal inside dimensions and shall conform to the provisions in Section 86-2.06, "Pull Boxes," of the Standard Specifications and these special provisions. Covers shall be in two-piece torsion assisted section. Hold down bolts or cap screws and nuts shall be brass, stainless steel or other non-corroding metal. Cover portions shall have inset lifting pull slots. Cover markings shall be "TOS COMMUNICATION" on individual cover section. Enclosures, covers and extensions shall be concrete gray color. Vault and covers may be constructed of reinforced portland cement concrete or of non-PCC material.

Non-PCC vault and covers shall be of sufficient rigidity that when a 100 lbf concentrated force is applied perpendicularly to the midpoint of one of the long sides at the top, while the opposite long side is supported by a rigid surface, it shall be possible to remove the cover without the use of tools. When a vertical force of 1500 lbf is applied, through a 0.5 inch by 3 inch by 6 inch steel plate, to a non-PCC cover in place on a splice vault, the cover shall not fail and shall not deflect more than 0.25 inch.

Splice vaults shall be installed as detailed and where shown on the plans. Splice vaults and covers shall have an AASHTO HS 20-44 rating where shown on the plans, except in areas protected from vehicular traffic, may be rated for AASHTO H5 loads (25 percent of HS 20-44).

86-2.17(2)(h) Innerduct

Innerduct shall be installed wherever fiber optic (FO) cable is installed in conduit. Four innerducts shall be installed in one each Size 4 inch conduit. Each fiber optic cable shall be installed in its own innerduct.

Copper cable shall not be mixed with FO cable within the same innerduct.

Innerduct must consist of an extruded flexible, smooth corrugated or ribbed high density polyethylene (HDPE) tubing installed inside electrical conduit. The fiber optic cable shall be installed in the tubing. Innerduct within a conduit run shall be continuous without splices or joints.

Unless otherwise shown on the plans, innerduct for new conduit shall be nominal 1.0 inch inside diameter with wall thickness of 0.0906 inch \pm 0.003 inch, and shall meet the following requirements:

- A. Polyethylene for innerduct shall have a density of 59.6187 lb/ft³ \pm 0.3121 lb/in³ (ASTM Designation: D 1505) and shall conform to the applicable requirements of ASTM Designation: D 3485, D 3035, D 2239, and D 2447, and the applicable requirements of NEMA TC7 and TC2. Tensile yield strength shall be 3300 psi minimum in accordance with the requirements in ASTM Designation: D 638.
- B. The polyethylene forming each innerduct shall be color coded in accordance with the cable type that it contains as follows:
 - 1. Type A – black
 - 2. Type B – orange
 - 3. Type C – yellow
 - 4. Type D – blue

The innerducts shall be shipped on reels marked with the manufacturer, the contract number, and the size and length of the innerduct. The product on reels shall be covered with aluminized material to protect colors from UV deterioration during shipment and storage.

Installation procedures shall conform to the procedures specified by the innerduct manufacturer.

86-2.17(2)(i) Innerduct Sealing Plugs

Except as otherwise noted, all fiber optic cable conduits and empty innerducts must have their ends sealed with commercial preformed plugs which prevent the passage of gas, dust and water into these

conduits and their included innerducts. Sealing plugs must be installed within each splice vault, pull box, cabinet, or building.

Sealing plugs shall be removable and reusable. Plugs sealing, conductor or cable shall be the split type that permits installation or removal without removing conductors or cables.

Sealing plugs that seal between the 4 inch fiber optic conduits shall seal the conduit simultaneously with one self contained assembly having an adjustable resilient filler of polyurethane elastomer clamped between backing ends and compressed with stainless steel hardware. Sealing plugs shall be capable of withstanding a pressure of 5 psi.

Sealing plugs that seal between the 4 inch fiber optic conduits shall seal the conduit simultaneously with one self contained assembly having an adjustable resilient filler of polyurethane elastomer clamped between backing ends and compressed with stainless steel hardware. Sealing plugs shall be capable of withstanding a pressure of 5 psi.

Sealing plugs used to seal 4 inch fiber optic conduit and innerduct must be capable of withstanding a pressure of 5 psi.

A sealing plug that seals an empty fiber optic conduit or innerduct must have an eye or other type of capturing device (on the side of the plug that enters the conduit) to attach onto the pull tape, so the pull tape will be easily accessible when the plug is removed.

86-2.17(3) Construction

86-2.17(3)(a) Fiber Optic Cable Terminations

Fiber optic cable must continue within the conduit to the designated termination point for cable termination. All components must be the size and type required for the specified fiber. Fiber optic cable terminations may take place in several locations such as TOS cabinets and camera sites.

At the FDU, the cable jacket of the fiber optic cable, must be removed exposing the filler rods, and buffer tubes. The exposed length of the buffer tubes must be at least the length recommended by the FDU manufacturer which allows the tubes to be secured to the splice trays. The remainder of the tubes must be removed to expose sufficient length of the fibers in order to properly install on the splice tray, as described in "Splicing," elsewhere in the special provisions

86-2.17(3)(b) Colored Concrete Backfill

Concrete backfill for the installation of conduits that will contain FO cable must be a medium to dark, red color to clearly distinguish the concrete backfill from other concrete and soil. The concrete must be pigmented by the addition of commercial quality cement pigment to the concrete mix. The concrete backfill must comply with the specifications for minor concrete.

The size of the aggregate shall not be larger than 0.375 inch.

86-2.17(3)(c) Warning Tape

Warning tape must be furnished, installed and placed in the trench over conduits to receive communication fiber optic cable, as shown on the plans.

The warning tape must have:

DESCRIPTION	PARAMETERS
Thickness	not be less than 4 mil thick
Width	4 inch
Material	pigmented polyolefin film
Tensile strength	minimum of 2800 PSI
Elongation	minimum of 500 percent elongation before breakage
Printed Text height	0.75 inch
Message background color	bright orange color background
Message statement	CAUTION: BURIED FIBER OPTIC CABLE - CALTRANS (949) 936-3400
Message spacing intervals	approximately 36 inch

The printed warning must not be removed by the normal handling and burial of the tape and must be rated to last the service life of the tape.

The construction of the warning tape must be such that it will not delaminate when it is wet. It must be resistant to insects, acid, alkaline and other corrosive elements in the soil.

Warning tape must be manufactured by Condux International, Inc.; Allen System, Inc.; Reef Industries, Inc. or equal.

86-2.17(3)(d) Tracer Wire

Tracer wire must be provided and placed in the trench over PVC conduits containing fiber optic cable. The wire shall be placed 2 inches above the uppermost conduit in the trench or secured to the top of the uppermost conduit in the trench.

Tracer wire shall be No. 8 stranded, minimum, copper conductor with type TW, THW, RHW, or USE insulation. The tracer wire shall form a mechanically and electrically continuous line throughout the length of the trench. Where trenched communication conduit joins metal conduit that has been jacked or drilled, the tracer wire must be bonded to the metal conduit with a brass grounding clamp.

A minimum of 5 feet of slack shall be extended into each pull box and splice vault from each direction. The wires shall be carefully placed so as not to be damaged by backfilling operations.

Conduit entering or exiting a reinforced concrete structure will not require tracer wire to the first pull box or fiber optic splice box. Tracer wire may be spliced at intervals of not less than 500 feet and in pull boxes. Splices shall conform to the provisions in Section 86-2.09, "Wiring," of the Standard Specifications.

86-2.17(4) Payment

Not Used

Replace section 86-2.18 with:

86-2.18 NUMBERING ELECTRICAL EQUIPMENT

The placement of numbers on electrical equipment will be done by others.

Replace section 86-4.01D(1)(c)(ii) with:

86-4.01D(1)(c)(ii) Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED signal modules for a minimum period of 48 months after installation of LED signal modules. Replacement LED signal modules must be provided within 15 days after receipt of failed LED modules at your expense. The Department pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED signal modules must be delivered to State Maintenance Electrical Shop at 1808 N Batavia St, Orange, CA 92865, Telephone (714) 974-3092.

Add to section 86-4.01D(2)(a):

LED signal module must be manufactured for 12-inch programmable visibility sections.

Add to section 86-4:

86-4.06 LIGHT EMITTING DIODE METER-ON

86-4.06A General

86-4.06A(1) Summary

Section 86-4.03J includes specifications for installing LED meter-on in type A modified pedestrian signal.

86-4.06A(2) Submittals

Before shipping LED signal modules to job site, submit to METS:

1. Delivery form including district number, EA, and contact information
2. List containing all LED signal module serial numbers anticipated for use
3. LED signal modules

Submit warranty documentation before installation.

86-4.06A(3) Quality Control and Assurance

86-4.06A(3)(a) General

Module must be one listed on the Pre-Qualified Products List for LED traffic signals at:

http://www.dot.ca.gov/hq/esc/approved_products_list/pdf/led_traffic_signals.pdf

The Department will test LED signal module shipments per Normal Sampling Plan ANSI/ASQC Z1.4, Tables for Inspection by Attributes. The Department completes testing within 30 days after delivery to METS. LED signal modules tested or submitted for testing must be representative of typical production units. LED signal modules will be tested under California Test 604. All parameters of the specification may be tested on the modules. LEDs must be spread evenly across the module. Measurements will be performed at the rated operating voltage of 120 V (ac).

After testing, pick up accepted LED signal modules from METS and deliver to the job site.

86-4.06A(3)(b) Warranty

Furnish a 4-year replacement warranty from the manufacturer of the LED signal modules against any defects or failures. The effective date of the warranty is the date of installation. Furnish replacement components within 15 days after receipt of the failed parts. The Department does not pay for the replacement. Deliver replacement LED signal modules to the following department maintenance electrical shop:

Caltrans Maintenance Yard
1808 N. Batavia Street
Orange, CA 92865 + 4106

86-4.06B Materials

LED Meter on module must:

1. Be weather tight and connect directly to electrical wiring.
2. Be capable of optical unit replacement.
3. Be AllInGaP technology
4. Be ultra bright type rated for 100,000 hours of continuous operation from -40 to +74 degrees C
5. Each module must provide an average luminous intensity of 1,547 foot-lambert or more throughout the useful life over the operating temperature range.
6. The uniformity ratio of an illuminated symbol must not exceed 4 to 1 between the highest luminance area and the lowest luminance area in the module.
7. The color output of the module must comply with the requirements of Section 5.3 in the ITE Publication: Equipment and Material Standards, Chapter 3 (Pedestrian Traffic Control Signal Indications).
8. 'Meter On' must be lunar white with measured chromatical coordinates of LED module operating over a temperature range of -40 to +74 degrees C is:
 - x: not less than 0.280, nor greater than 0.320
 - y: not less than 1.055X - 0.0128, nor greater than 1.055X +0.0072
9. Be a single, self-contained device, not requiring on-site assembly for installation into standard Type A housing.
10. Module Identification
 - 10.1. Each module must have the manufacturer's name, trademark, model number, serial number, date of manufacture month and year, and lot number as identification permanently marked on the back of the module.

- 10.2. The following operating characteristics must be permanently marked on the back of the module: rated voltage and rated power in Watts and Volt-Ampere.
11. Maximum power consumption requirements for the LED modules in Watts are:
- 11.1. 15.0 at 25 degrees C.
 - 11.2. 17.0 at 74 degrees C.

LED Meter on modules must have an operational lifecycle rating of 48 months. During the operational lifecycle, LED signal modules must meet all parameters of this specification.

Individual LEDs must be wired such that a catastrophic loss or failure of one LED will result in loss of not more than 5 percent of the module light output. Failure of an individual LED in a string must not result in the loss of entire string or other indication.

Wiring and terminal block must comply with Section 13.02 of ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads." The LED module must be supplied with spade lugs and 3 secured, color-coded, 3-foot long, 600 V, 20 AWG minimum stranded jacketed copper wires. Wires must comply with NEC, rated for service at +105 degrees C.

LED Meter on module must operate:

1. At a frequency of 60 ± 3 Hz, over a voltage range from 95 to 135 V (ac), without perceptible flicker to the unaided eye. Fluctuations of line voltage must have no visible effect on luminous intensity of the indications. Rated voltage for measurements must be 120 V (ac).
2. Compatible with currently used State controller assemblies, including solid state load switches, flashers, and conflict monitors. Comply with TEES Chapters 3 and 6. If a 20 mA alternating current or less is applied to the unit, the voltage read across the 2 leads must be 15 V (ac) or less.

LED Meter on module on-board circuitry must:

1. Include voltage surge protection to withstand high-repetition noise transients. The voltage surge protection must comply with NEMA Standard TS2, Section 2.1.6.
2. Comply with FCC, Title 47, SubPart B, Section 15 regulations for Class A emission limits for electronic noise.

LED signal module must provide a power factor of 0.90 or greater.

Total harmonic distortion from current and voltage induced into an alternating current power line by LED signal module must not exceed 20 percent at an operating temperature of 25 degrees C.

When power is applied to LED signal module, light emission must occur within 90 ms.

Power supply must be integral to the module.

Internal components must be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Lens and LED signal module material must comply with the ASTM specifications for that material.

Enclosures containing either the power supply or electronic components of LED signal module, except lenses, must be made of UL94VO flame-retardant material.

LED signal module must have prominent and permanent vertical markings for accurate indexing and orientation within the signal housing. Markings must include an up arrow, or the word "UP" or "TOP."

Lenses must have 3/16 inch, minimum thickness, clear acrylic or polycarbonate plastic or 1/8 inch nominal thickness glass fiber reinforced plastic with molded one piece neoprene gasket. Message lettering for "METER" must be "Series C," 4-1/2 inches high with uniform 1/2 inch stroke, and for "ON" must be "Series C," 6 inches high, with uniform one inch stroke. Letters must be clear, transparent or translucent, with black opaque background silk screened on to the second surface of the lens.

86-4.06C Construction

No special tools for installation are allowed.

Add to section 86-5.01A(1):

Loop detector lead-in cable must be Type C.

For Type E detector loops, sides of the slot must be vertical and the minimum radius of the slot entering and leaving the circular part of the loop must be 1-1/2 inches. Slot width must be a maximum of 5/8 inch. Loop wire for circular loops must be Type 2. Slots of circular loops must be filled with elastomeric sealant or hot-melt rubberized asphalt sealant.

Fill slots in concrete with elastomeric, hot-melt rubberized asphalt or epoxy sealant for loop detectors.

Add to section 86-5.01:

86-5.01E VIDEO IMAGE VEHICLE DETECTION SYSTEM

86-5.01E(1) General

86-5.01E(1)(a) Summary

Section 86-5.01E includes installing new or used video image vehicle detection system (VIVDS) for signal and lighting (temporary).

86-5.01E(1)(b) Definitions

Video Detection Unit (VDU): Processor unit that converts the video image from the camera and provides vehicle detection in defined zones. Unit includes an image processor, extension module, and communication card.

Video Image Sensor Assembly (VIS): An enclosed and environmentally-protected camera assembly used to collect the video image.

Video Image Vehicle Detection System (VIVDS): A system that detects video images of vehicles in defined zones and provides video output.

86-5.01E(1)(c) Submittals

Submit documentation within 30 days after Contract approval but before installing VIVDS equipment.

The documentation submittal must include:

1. Site Analysis Report: Written analysis for each detection site, recommending the optimum video sensor placement approved by the manufacturer.
2. Lane Configuration: Shop drawing showing:
 - 2.1. Detection zone setback
 - 2.2. Detection zone size
 - 2.3. Camera elevation
 - 2.4. Selected lens viewing angle
 - 2.5. Illustration of detection zone mapping to reporting contact output
 - 2.6. Illustration of output connector pin or wire terminal for lane assignment.
3. Configuration Record: Windows XP PC compatible CD containing:
 - 3.1. Proposed zone designs
 - 3.2. Calibration settings
4. Mounting and Wiring Information: Manufacturer approved wiring and service connection diagrams.
5. Communication Protocol: Industry standard available in public domain. Document defining:
 - 5.1. Message structure organization
 - 5.2. Data packet length
 - 5.3. Message usability
 - 5.4. Necessary information to operate a system from a remote windows based personal computer.
6. Programming Software: CD containing set up and calibration software that observes and detects the vehicular traffic, including bicycles, motorcycles, and sub-compact cars, with overlay of detection zones and allows adjustment of the detection sensitivity for a traffic signal application.
7. Detector Performance DVD Recordings and Analysis: Performance analysis based on 24-hour DVD recording of contiguous activity for each approach. Include:

- 7.1. Two contiguous hours of sunny condition, with visible shadows projected a minimum of 6 feet into the adjacent lanes
- 7.2. Two 1-hour night periods with vehicle headlights present.

Allow 7 days for the Engineer to review the documentation submittal.

If the Engineer requires revisions, submit a revised submittal within 5 days of receipt of the Engineer's comments and allow 5 days for the Engineer to review. If agreed to by the Engineer, revisions may be included as attachments in the resubmittal. The Engineer may conditionally approve, in writing, resubmittals that include revisions submitted as attachments, in order to allow construction activities to proceed.

Upon the Engineer's approval of the resubmittal, submit copies of the final documents (with approved revisions incorporated) to the Engineer.

Submit an acceptance testing schedule for approval 15 days before starting acceptance testing.

When beginning acceptance testing of VIVDS and detector performance and analysis, submit approved copies of the following:

1. Configuration Record: Windows XP PC compatible CD containing:
 - 1.1. Final zone designs
 - 1.2. Calibration settings to allow reinstallation.
2. Mounting and Wiring Information: Final wiring and service connection diagrams.
 - 2.1. One copy for the Engineer
 - 2.2. A second copy wrapped in clear self-adhesive plastic, be placed in a heavy duty plastic envelope, and secured to the inside of the cabinet door.

86-5.01E(1)(d) Quality Control and Assurance

86-5.01E(1)(d)(1) General

VIVDS and support equipment required for acceptance testing could be new or used.

86-5.01E(2) Materials

86-5.01E(2)(a) General

VIVDS must include necessary firmware, hardware, and software for designing the detection patterns or zones at the intersection or approach. Detection zones must be created with a graphic user interface designed to allow to anyone trained in VIVDS system setup to configure and calibrate a lane in less than 15 minutes.

All equipment, cables, and hardware must be part of an engineered system that is designed by the manufacturer to fully interoperate with all other system components. Mounting assemblies must be corrosion resistant. Connectors installed outside the cabinets and enclosures must be corrosion resistant, weather proof, and watertight. Exposed cables must be sunlight and weather resistant.

86-5.01E(2)(a)(1) Physical and Mechanical Requirements

VIVDS must include:

1. VIS and mounting hardware. Use a clamping device as mounting hardware on a pole or mast-arm.
2. VDU
3. Power supply
4. Surge suppression
5. Cables
6. Connectors
7. Wiring for connecting to the Department-furnished Model 332L traffic controller cabinet.
8. Communication card

86-5.01E(2)(a)(2) Electrical

VIVDS must operate between 90 to 135 V(ac) service as specified in NEMA TS-1. VIS, excluding the heater circuit, must draw less than 10 W of power. Power supply or transformer for the VIVDS must meet the following minimum requirements:

Minimum Requirements for Power Supply and Transformers

Item	Power Supply	Transformer
Power Cord	Standard 120 V(ac), 3 prong cord, 3 feet minimum length (may be added by Contractor)	Standard 120 V(ac), 3 prong cord, 3 feet minimum length (may be added by Contractor)
Type	Switching mode type	Class 2
Rated Power	Two times (2x) full system load	Two times (2x) full system load
Operating Temperature	From -37 to 74 °C	From -37 to 74 °C
Operating Humidity Range	From 5 to 95 percent	From 5 to 95 percent
Input Voltage	From 90 to 135 V(ac)	From 90 to 135 V(ac)
Input Frequency	60 ± 3 Hz	60 ± 3 Hz
Inrush Current	Cold start, 25 A Max. at 115 V(ac)	N/A
Output Voltage	As required by VIVDS	As required by VIVDS
Overload Protection	From 105 to 150 percent in output pulsing mode	Power limited at >150 percent
Over Voltage Protection	From 115 to 135 percent of rated output voltage	N/A
Setup, Rise, Hold Up	800ms, 50ms, 15ms at 115 V(ac)	N/A
Withstand Voltage	I/P-0/P:3kV, I/P-FG:1.5kV, for 60 s.	I/P-0/P:3kV, I/P-FG:1.5kV, for 60 s
Working Temperature	Not to exceed 70°C at 30 percent load	Not to exceed 70 °C at 30 percent load
Safety Standards	UL 1012, UL 60950	UL 1585

Field terminated circuits must include transient protection as specified in IEEE Standard 587-1980, Category C. Video connections must be isolated from ground.

86-5.01E(2)(a)(3) Technical Requirements

Camera and zoom lens assembly must be housed in an environmentally sealed enclosure that complies with NEMA 4 standards. Enclosure must be watertight and protected from dust. Enclosure must include a thermostat controlled heater to prevent condensation and to ensure proper lens operation at low temperatures. Adjustable sun shield that diverts water from the camera's field of view must be included. Connectors, cables and wiring must be enclosed and protected from weather. An environmentally sealed (protected from dust and moisture ingress) connector must be used at the rear plate of the housing. Wiring to the connector must be sealed with silicone or putty compound.

Each camera and its mounting hardware must be less than 10 pounds and less than 1 square foot equivalent pressure area. Only one camera must be mounted on a luminaire arm. Top of camera must not be more than 12 inches above top of luminaire arm.

VIS must use a charge-coupled device (CCD) element, support National Television Standards Committee (NTSC) and RS170 video output formats, and have a horizontal resolution of at least 360 lines. VIS must include an auto gain control (AGC) circuit, have a minimum sensitivity to scene luminance from 0.01 to 930 foot-candle, and produce a usable video image of vehicular traffic under all roadway lighting conditions regardless of the time of day. VIS must have a motorized lens with variable focus and zoom control with an aperture of f/1.4 or better. Focal length must allow ± 50 percent adjustment of the viewed detection scene.

A flat panel video display with a minimum 8-inch screen and that supports NTSC video output must be enclosed in the Model 332L cabinet for viewing video detector images and for performing diagnostic testing. Display must be viewable in direct sunlight. Each VIVDS must have video system connections that support the NTSC video output format, can be seen in each camera's field of view, and has a

program to allow the user to switch to any video signal at an intersection. System must allow independent viewing of a scene while video recording other scenes without interfering with the operation of the system's output.

VDU must operate between -37 to +74 °C and from 0 to 95 percent relative humidity.

VDU front panel must have indicators for power, communication, presence of video input for each VIS, and a real time detector output operation. Hardware or software test switch must be included to allow the user to place either a constant or momentary call for each approach. Indicators must be visible in daylight from 5 feet away.

VDU must have a serial communication port, EIA 232/USB 2.0 that supports sensor unit setup, diagnostics, and operation from a local PC compatible laptop with Windows XP or later version operating system. VIVDS must have an Ethernet communication environment, including Ethernet communication card. VIVDS must include central and field software to support remote real-time viewing and diagnostics for operational capabilities through wide area network (WAN).

VDU, image processors, extension modules, and video output assemblies must be inserted into the controller input file slots using the edge connector to obtain limited 24 V(dc) power and to provide contact closure outputs. Cabling the output file to a "D" connector on the front of the VDU is acceptable. No rewiring to the standard Model 332L cabinet is allowed. Controller cabinet resident modules must comply with the requirements in Chapter 1 and Sections 5.2.8, 5.2.8.1, 5.2.8.2, 5.4.1, 5.4.5, 5.5.1, 5.5.5, and 5.5.6 of TEES.

86-5.01E(2)(a)(4) Functional Requirements

VIVDS must support normal operation of existing detection zones while a zone is being added or modified. Zone must flash or change color on a viewing monitor when vehicular traffic is detected. Length and width of each detection zone for each lane must be approved by the Engineer.

Software and firmware must detect vehicular traffic presence, provide vehicle counts, set up detection zones, test VIVDS performance, and allow video scene and system operation viewing from the local traffic management center/office. VIVDS must support a minimum of 2 separate detection patterns or zones that can be enacted by a remote operator at the signal controller cabinet.

VIVDS detection zone must detect vehicles by providing an output for presence and pulse. At least one detection output must be provided for each detection zone. One spare detection output must be provided for each approach. Detection performance must be achieved for each detection zone with a maximum of 8 user-defined zones for every camera's field of view.

VIVDS must detect the presence of vehicles under all types of adverse weather and environmental conditions, including snow, hail, fog, dirt, dust or contaminant buildup on the lens or faceplate, minor camera motion due to winds, and vibration. Under low visibility conditions, the VIVDS must respond by selecting a fail-safe default pattern, placing a constant call mode for all approaches. VIVDS outputs must assume a fail-safe "on" or "call" pattern for presence detection if video signal or power is not available and must recover from a power failure by restoring normal operations within 3 minutes without manual intervention. If powered off for more than 90 days, system must maintain the configuration and calibration information in memory.

Detection algorithm must be designed to accommodate naturally occurring lighting and environment changes, specifically the slow moving shadows cast by buildings, trees, and other objects. These changes must not result in a false detection or mask a true detection. VIVDS must not require manual interventions for day-night transition or for reflections from poles, vehicles or pavement during rain and weather changes. VIVDS must suppress blooming effects from vehicle headlights and bright objects at night.

Vehicle detection must call service to a phase only if a demand exists and extend green service to the phase until the demand is taken care of or until the flow rates have reduced to levels for phase termination. VIVDS must detect the presence of vehicular traffic at the detection zone positions and provide the call contact outputs to the Model 170E or Model 2070 controller assembly with the following performance:

Detector Performance

Requirements	Performance during AMBER and RED interval	Performance during GREEN interval
Average response time after vehicle enters 3 feet into detection zone or after exiting 3 feet past detection zone	≤ 1 s	≤ 100 ms
Maximum number of MISSED CALLS in 24-hour duration, where MISSED CALLS are greater than 5 s during AMBER and RED intervals and greater than 1 s during GREEN intervals (upon entering 3 feet of detection zone or after exiting 3 feet past detection zone).	0	10
Maximum number of FALSE CALLS in 24-hour duration (calls greater than 500ms without a vehicle present)	20	20

VIVDS must be able to locally store, for each lane, vehicle count data in 5, 15, 30, and 60 minute intervals for a minimum period of 7 days and be remotely retrievable. VIVDS must count vehicular traffic in detection zone with a 95 percent accuracy or better for every hour counted over a morning or an evening peak hour. VIVDS detection zone tested must have a minimum range of 50 feet behind the limit line for each approach. Testing period will be pre-approved by the Engineer 48 hours in advance.

86-5.01E(3) Construction

Install VDU in a Department-furnished Model 170E or Model 2070 controller assembly. Install VIS power supply or transformer on a standard DIN rail using standard mounting hardware and power conductors wired to DIN rail mounted terminal blocks in the controller cabinet.

Wiring must be routed through end caps or existing holes. New holes for mounting or wiring must be shop-drilled.

Wire each VIS to the controller cabinet with a wiring harness that includes all power, control wiring, and coaxial video cable. Attach harness with standard MIL type and rated plugs. Cable type and wire characteristics must comply with manufacturer's recommendations for the VIS to cabinet distance. Wiring and cables must be continuous, without splices, between the VIS and controller cabinet. For setup and diagnostic access, terminate serial data communication output conductors at TB-0 and continue for a minimum of 10 feet to a DB9F connector. Tape ends of unused and spare conductors to prevent accidental contact to other circuits.

Label conductors inside the cabinet for the functions depicted the approved detailed diagrams. Label cables with permanent cable labels at each end.

Adjust the lens to view 110 percent of the largest detection area dimension. Zones or elements must be logically combined into reporting contact outputs that are equivalent to the detection loops and with the detection accuracy required.

Verify the performance of each unit, individually, and submit the recorded average and necessary material at the conclusion of the performance test. Determine and document the accuracy of each unit, individually, so that each unit may be approved or rejected separately. Failure to submit necessary material at the conclusion of testing invalidates the test. The recorded media serves as acceptance evidence and must not be used for calibration. Calibration must have been completed before testing and verification.

Verify the detection accuracy by observing the VIVDS performance and recorded video images for a contiguous 24-hour period. The recorded video images must show the viewed detection scene, the

detector call operation, the signal phase status for each approach, the vehicular traffic count, and time-stamp to 1/100 of a second, all overlaid on the recorded video. Transfer the 24-hour analysis to DVD.

VIVDS must meet the detection acceptance criterion specified in table titled "Detector Performance."

Calculate the VIVDS's vehicular traffic count accuracy as $100[1-(|TC-DC|/TC)]$, where DC is the detector's vehicular traffic count and TC is the observed media-recorded vehicular traffic count and where the resulting fraction is expressed as an absolute value.

The Engineer will review the data findings and accept or reject the results within 7 days. Vehicle anomalies or unusual occurrences will be decided by the Engineer. Data or counts not agreed by the Engineer will be considered errors and count against the unit's calibration. If the Engineer determines that the VIVDS does not meet the performance requirements, you must re-calibrate and retest the unit, and resubmit new test data within 7 days. After 3 failed attempts, you must replace the VIVDS with a new unit.

Notify the Engineer 20 days before the unit is ready for acceptance testing. Acceptance testing must be scheduled to be completed before the end of a normal work shift. You must demonstrate that all VIS and VDUs satisfy the functional requirements.

Replace section 86-6.01 with:

86-6.01 LED LUMINAIRES

86-6.01A General

86-6.01A(1) Summary

Section 86-6.01 includes specifications for installing LED luminaires.

86-6.01A(2) Definitions

CALiPER: Commercially Available LED Product Evaluation and Reporting. A U.S. DOE program that individually tests and provides unbiased information on the performance of commercially available LED luminaires and lights.

correlated color temperature: Absolute temperature in kelvin of a blackbody whose chromaticity most nearly resembles that of the light source.

house side lumens: Lumens from a luminaire directed to light up areas between the fixture and the pole (e.g., sidewalks at intersection or areas off of the shoulders on freeways).

International Electrotechnical Commission (IEC): Organization that prepares and publishes international standards for all electrical, electronic and related technologies.

junction temperature: Temperature of the electronic junction of the LED device. The junction temperature is critical in determining photometric performance, estimating operational life, and preventing catastrophic failure of the LED.

L70: Extrapolated life in hours of the luminaire when the luminous output depreciates 30 percent from initial values.

LM-79: Test method from the Illumination Engineering Society of North America (IESNA) specifying test conditions, measurements, and report format for testing solid state lighting devices, including LED luminaires.

LM-80: Test method from the IESNA specifying test conditions, measurements, and report format for testing and estimating the long term performance of LEDs for general lighting purposes.

National Voluntary Laboratory Accreditation Program (NVLAP): U.S. DOE program that accredits independent testing laboratories to qualify.

power factor: Ratio of the real power component to the complex power component.

street side lumens: Lumens from a luminaire directed to light up areas between the fixture and the roadway (e.g., traveled ways, freeway lanes).

surge protection device (SPD): Subsystem or component that can protect the unit against short duration voltage and current surges.

total harmonic distortion: Ratio of the rms value of the sum of the squared individual harmonic amplitudes to the rms value of the fundamental frequency of a complex waveform.

86-6.01A(3) Submittals

Submit a sample luminaire to METS for testing after the manufacturer's testing is completed. Include the manufacturer's testing data.

Product submittals must include:

1. LED luminaire checklist.
2. Product specification sheets, including:
 - 2.1. Maximum power in watts.
 - 2.2. Maximum designed junction temperature.
 - 2.3. Heat sink area in square inches.
 - 2.4. Designed junction to ambient thermal resistance calculation with thermal resistance components clearly defined.
 - 2.5. L70 in hours when extrapolated for the average nighttime operating temperature.
3. IES LM-79 and IES LM-80 compliant test reports from a CALIPER-qualified or NVLAP-approved testing laboratory for the specific model submitted.
4. Photometric file based on LM-79 test report.
5. Initial and depreciated isofootcandle diagrams showing the specified minimum illuminance for the particular application. The diagrams must be calibrated to feet and show a 40 by 40 foot grid. The diagrams must be calibrated to the mounting height specified for that particular application. The depreciated isofootcandle diagrams must be calculated at the minimum operational life.
6. Test report showing SPD performance as tested under ANSI/IEEE C62.41.2 and ANSI/IEEE C62.45.
7. Test report showing mechanical vibration test results as tested under California Test 611 or equal.
8. Data sheets from the LED manufacturer that include information on life expectancy based on junction temperature.
9. Data sheets from the power supply manufacturer that include life expectancy information.

Submit documentation of a production QA performed by the luminaire manufacturer that ensures the minimum performance levels of the modules comply with the section 86-6.01 specifications and includes a documented process for resolving problems. Submit documentation as an informational submittal.

Submit warranty documentation as an informational submittal before installing LED luminaires.

86-6.01A(4) Quality Control and Assurance

86-6.01A(4)(a) General

The Department may perform random sample testing on the shipments. The Department completes testing within 30 days after delivery to METS. Luminaires are tested under California Test 678. All parameters specified in section 86-6.01 specifications may be tested on the shipment sample. When testing is complete, the Department notifies you. Pick up the equipment from the test site and deliver to the job site.

One sample luminaire must be fitted with a thermistor or thermo-couple temperature sensor. A temperature sensor must be mounted on the LED solder pad as close to the LED as possible. A temperature sensor must be mounted on the power supply case. Light bar or modular systems must have 1 sensor for each module mounted as close to the center of the module as possible. Other configurations must have at least 5 sensors per luminaire. Contact METS for advice on sensor location. Thermocouples must be either Type K or C. Thermistors must be a negative temperature coefficient type with a nominal resistance of 20 k Ω . The appropriate thermocouple wire must be used. The leads must be a minimum of 6 feet. Documentation must accompany the test unit that details the type of sensor used.

The sample luminaires must be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at a temperature of +70 degrees F before performing any testing.

The luminaire lighting performance must be depreciated for the minimum operating life by using the LED manufacturer's data or the data from the LM-80 test report, whichever results in a higher lumen depreciation.

Failure of the luminaire that renders the unit noncompliant with section 86-6.01 specifications is cause for rejection. If a unit is rejected, allow 30 days for retesting. The retesting period starts when the replacement luminaire is delivered to the test site.

If a luminaire submitted for testing does not comply with section 86-6.01, remove the unit from METS within 5 business days after notification the unit is rejected. If the unit is not removed within that period, the Department may ship the unit to you and deduct the cost.

86-6.01A(4)(b) Warranty

Furnish a 7-year replacement warranty from the manufacturer of the luminaires against any defects or failures. The effective date of the warranty is the date of installation. Furnish replacement luminaires within 10 days after receipt of the failed luminaire. The Department does not pay for the replacement. Deliver replacement luminaires to the following department maintenance electrical shop:

Caltrans Maintenance Yard
 1808 N. Batavia Street
 Orange, CA 92865 + 4106

86-6.01B Materials

86-6.01B(1) General

The luminaire must include an assembly that uses LEDs as the light source. The assembly must include a housing, an LED array, and an electronic driver. The luminaire must:

1. Be UL listed under UL 1598 for luminaires in wet locations or an equivalent standard from a recognized testing laboratory
2. Have a minimum operational life of 63,000 hours
3. Operate at an average operating time of 11.5 hours per night
4. Be designed to operate at an average nighttime operating temperature of 70 degrees F
5. Have an operating temperature range from -40 to +130 degrees F
6. Be defined by the following application:

Application	Replaces
Roadway 1	200 Watt HPS mounted at 34 ft
Roadway 2	310 Watt HPS mounted at 40 ft
Roadway 3	310 Watt HPS mounted at 40 ft with back side control
Roadway 4	400 Watt HPS mounted at 40 ft

The individual LEDs must be connected such that a catastrophic loss or a failure of 1 LED does not result in the loss of more than 20 percent of the luminous output of the luminaire.

86-6.01B(2) Luminaire Identification

Each luminaire must have the following identification permanently marked inside the unit and outside of its packaging box:

1. Manufacturer's name
2. Trademark
3. Model no.
4. Serial no.
5. Date of manufacture (month-year)
6. Lot number
7. Contract number
8. Rated voltage
9. Rated wattage
10. Rated power in VA

86-6.01B(3) Electrical Requirements

The luminaire must operate from a 60 ± 3 Hz AC power source. The fluctuations of line voltage must have no visible effect on the luminous output. The operating voltage may range from 120 to 480 V(ac). The luminaire must operate over the entire voltage range or the voltage range must be selected from either of the following options:

1. Luminaire must operate over a voltage range of 95 to 277 V(ac). The operating voltages for this option are 120 V(ac) and 240 V(ac).
2. Luminaire must operate over a voltage range of 347 to 480 V(ac). The operating voltage for this option is 480 V(ac).

The power factor of the luminaire must be 0.90 or greater. The total harmonic distortion, current and voltage, induced into an AC power line by a luminaire must not exceed 20 percent. The maximum power consumption allowed for the luminaire must be as shown in the following table:

Application	Maximum consumption (Watts)
Roadway 1	165
Roadway 2	235
Roadway 3	235
Roadway 4	300

86-6.01B(4) Surge Suppression and Electromagnetic Interference

The luminaire on-board circuitry must include an SPD to withstand high repetition noise transients caused by utility line switching, nearby lightning strikes, and other interferences. The SPD must protect the luminaire from damage and failure due to transient voltages and currents as defined in Tables 1 and 4 of ANSI/IEEE C64.41.2 for location category C-High. The SPD must comply with UL 1449. The SPD performance must be tested under ANSI/IEEE C62.45 based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High.

The luminaires and associated on-board circuitry must comply with the Class A emission limits provided in 47 CFR 15, subpart B concerning the emission of electronic noise.

86-6.01B(5) Compatibility

The luminaire must be operationally compatible with currently used lighting control systems and photoelectric controls.

86-6.01B(6) Photometric Requirements

The luminaire must maintain a minimum illuminance level throughout the minimum operating life. The L70 of the luminaire must be the minimum operating life or greater. The measurements must be calibrated to standard photopic calibrations. The minimum maintained illuminance values measured at a point must be as shown in the following table:

Application	Mounting height (ft)	Minimum maintained illuminance (fc)	Light pattern figure (isofootcandle curve)
Roadway 1	34	0.15	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(82)^2} + \frac{(y - 20)^2}{(52)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.</p>
Roadway 2	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(82)^2} + \frac{(y - 20)^2}{(52)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.</p>
Roadway 3	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(92)^2} + \frac{(y - 23)^2}{(55)^2} = 1$ <p>for $y \geq 0$ (street side)</p> <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 23 feet to the house side of the pattern.</p>

Roadway 4	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(92)^2} + \frac{(y - 23)^2}{(55)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 23 feet to the house side of the pattern.</p>
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The luminaire must have a correlated color temperature range from 3,500 to 6,500 K. The color rendering index must be 65 or greater.

The luminaire must not allow more than:

1. 10 percent of the rated lumens to project above 80 degrees from vertical
2. 2.5 percent of the rated lumens to project above 90 degrees from vertical

86-6.01B(7) Thermal Management

The passive thermal management of the heat generated by the LEDs must have enough capacity to ensure proper operation of the luminaire over the minimum operation life. The LED maximum junction temperature for the minimum operation life must not exceed 221 degrees F.

The junction-to-ambient thermal resistance must be 95 degrees F per watt or less. The use of fans or other mechanical devices is not allowed. The heat sink material must be aluminum or other material of equal or lower thermal resistance.

The luminaire must contain circuitry that automatically reduces the power to the LEDs to a level that ensures the maximum junction temperature is not exceeded when the ambient outside air temperature is 100 degrees F or greater.

86-6.01B(8) Physical and Mechanical Requirements

The luminaire must be a single, self-contained device, not requiring job site assembly for installation. The power supply for the luminaire is integral to the unit. The weight of the luminaire must not exceed 35 lb. The maximum effective projected area when viewed from either side or either end must be 1.4 sq ft. The housing color must match a color no. from 26152 to 26440 or from 36231 to 36375, or color no. 36440 of FED-STD-595.

The housing must be fabricated from materials designed to withstand a 3,000-hour salt spray test under ASTM B 117. All aluminum used in housings and brackets must be of a marine grade alloy with less than 0.2 percent copper. All exposed aluminum must be anodized.

Each refractor or lens must be made from UV-inhibited high impact plastic such as acrylic or polycarbonate or heat- and impact-resistant glass and be resistant to scratching. Polymeric materials except lenses of enclosures containing either the power supply or electronic components of the luminaire must be made of UL94VO flame retardant materials. Paint or powder coating of the housing must comply with section 86-2.16. A chromate conversion undercoating must be used underneath a thermoplastic polyester powder coat.

Each housing must be provided with a slip fitter capable of mounting on a 2-inch pipe tenon. This slip fitter must fit on mast arms with outside diameters from 1-5/8 to 2-3/8 inches. The slip fitter must be capable of being adjusted a minimum of ±5 degrees from the axis of the tenon in a minimum of five steps: +5, +2.5, 0, -2.5, -5. The clamping brackets of the slip fitter must not bottom out on the housing bosses when adjusted within the designed angular range. No part of the slip fitter mounting brackets on the luminaires must develop a permanent set in excess of 1/32 inch when the two or four 3/8-inch diameter cap screws used for mounting are tightened to 10 ft-lb. Two sets of cap screws may be furnished to allow the slip fitter to be mounted on the pipe tenon in the acceptable range without the cap screws bottoming out in the threaded holes. The cap screws and the clamping brackets must be made of corrosion resistant

materials or treated to prevent galvanic reactions and be compatible with the luminaire housing and the mast arm.

The assembly and manufacturing process for the LED luminaire must be designed to ensure internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources. When tested under California Test 611, the luminaire to be mounted horizontally on the mast arm must be capable of withstanding the following cyclic loading for a minimum of 2 million cycles without failure of any luminaire part:

Cyclic Loading		
Plane	Power supply	Minimum peak acceleration level
Vertical	Installed	3.0 g peak-to-peak sinusoidal loading (same as 1.5 g peak)
Horizontal ^a	Installed	1.5 g peak-to-peak sinusoidal loading (same as 0.75 g peak)

^aPerpendicular to the direction of the mast arm

The housing must be designed to prevent the buildup of water on top of the housing. Exposed heat sink fins must be oriented to allow water to freely run off of the luminaire and carry dust and other accumulated debris away from the unit. The optical assembly of the luminaire must be protected against dust and moisture intrusion to at least an ANSI/IEC rating of IP66. The power supply enclosure must be protected to at least an ANSI/IEC rating of IP43.

Each mounted luminaire must be furnished with an ANSI C136.10-compliant, locking type photocontrol receptacle and a rain tight shorting cap. The receptacle must comply with section 86-6.11A.

When the components are mounted on a down-opening door, the door must be hinged and secured to the luminaire housing separately from the refractor or flat lens frame. The door must be secured to the housing such that accidental opening is prevented. A safety cable must mechanically connect the door to the housing.

Field wires connected to the luminaire must terminate on a barrier type terminal block secured to the housing. The terminal screws must be captive and equipped with wire grips for conductors up to no. 6. Each terminal position must be clearly identified.

The power supply must be rated for outdoor operation and have at least an ANSI/IEC rating of IP65.

The power supply must be rated for a minimum operational life equal to the minimum operational life of the luminaire or greater.

The power supply case temperature must have a self rise of 77 degrees F or less above ambient temperature in free air with no additional heat sinks.

The power supply must have 2 leads to accept standard 0-10 V(dc). The dimming control must be compatible with IEC 60929. If the control leads are open or the analog control signal is lost, the circuit must default to 100-percent power.

Conductors and terminals must be identified.

Add to section 86-8.01:

Payment for highway lighting at interesections in connection with signals is included in the payment for signal and lighting.

Payment for other roadway lighting on the project is included in the payment for lighting and sign illumination.

For each item shown in the following table, the Department deducts the corresponding amount shown:

Source Inspection Expense Deductions

Item	Distance ^a	Deduction
Service equipment enclosures	> 300	\$2,000

^aDistance is air-line miles from both Sacramento and Los Angeles to the inspection source.

**DIVISION X MATERIALS
87 MATERIALS—GENERAL**

Replace section 87-2 with:
87-2 AGGREGATE

87-2.01 GENERAL

87-2.01A Summary

Section 87-2 includes specifications for furnishing aggregate.

87-2.01B Definitions

stockpile lot: Stockpile or portion of a stockpile of steel slag aggregate used.

87-2.01C Submittals

Submit a certificate of compliance for:

1. Each stockpile lot
2. Steel slag

87-2.02 MATERIALS

87-2.02A General

Do not use air-cooled iron blast furnace slag to produce aggregate for:

1. Structure backfill material
2. Pervious backfill material
3. Permeable material
4. Reinforced or prestressed PCC component or structure

Do not use aggregate produced from slag resulting from a steel-making process except in:

1. Imported borrow
2. AS
3. Class 2 AB
4. HMA

Steel slag used to produce aggregate for AS and Class 2 AB must be crushed such that 100 percent of the material will pass a 3/4-inch sieve and then control aged for at least 3 months under conditions that will maintain all portions of the stockpiled material at a moisture content in excess of 6 percent of the dry weight of the aggregate.

For steel slag aggregate, provide separate stockpiles for controlled aging of the slag. An individual stockpile must not contain less than 10,000 tons or more than 50,000 tons of slag. The material in each individual stockpile must be assigned a unique lot number, and each stockpile must be identified with a permanent system of signs. Maintain a permanent record of:

1. Dates for:
 - 1.1. Completion of stockpile
 - 1.2. Start of controlled aging
 - 1.3. Completion of controlled aging
 - 1.4. Making of tests
2. Test results

For each stockpile of steel slag aggregate, moisture tests must be made at least once each week. The time covered by tests that show a moisture content of 6 percent or less is not included in the aging time.

Notify METS and the Engineer upon completion of each stockpile and the start of controlled aging and upon completion of controlled aging. Do not add aggregate to a stockpile unless a new aging period is started.

Steel slag used for imported borrow must be weathered for at least 3 months.

Each delivery of aggregate containing steel slag for AS or Class 2 AB must include a delivery tag for each load. The tag must identify the lot by the stockpile number, slag aging location, and stockpile completion and controlled aging start date.

You may blend air-cooled iron blast furnace slag or natural aggregate in proper combinations with steel slag aggregate to produce the specified gradings.

California Test 202 is modified by California Test 105 whenever the difference in sp gr between the coarse and fine portions of the aggregate or between the blends of different aggregates is 0.2 or more.

For slag used as aggregate in HMA, the Kc factor requirements in California Test 303 do not apply.

If steel slag aggregates are used to produce HMA, no other aggregates may be used in the mixture except that up to 50 percent of the material passing the no. 4 sieve may consist of iron blast furnace slag aggregates, natural aggregates, or a combination of these. If iron blast furnace aggregates, natural aggregates, or a combination of these are used in the mixture, each aggregate type must be fed to the drier at a uniform rate. Maintain the feed rate of each aggregate type within 10 percent of the amount set. Provide adequate means for controlling and checking the feeder accuracy.

Store steel slag aggregate separately from iron blast furnace slag aggregate. Store each slag aggregate type separately from natural aggregate.

For HMA produced from steel slag aggregates, iron blast furnace slag aggregates, natural aggregates, or any combination of these, the same aggregate must be used throughout any one layer. Once an aggregate type is selected, do not change it without authorization.

Aggregate containing slag must comply with the applicable quality requirements for the bid items in which the aggregate is used.

87-2.03 CONSTRUCTION

Do not place aggregate produced from slag within 1 foot of a non-cathodically protected pipe or structure unless the aggregate is incorporated in concrete pavement, in HMA, or in treated base.

Do not place slag aggregate used for embankments within 18 inches of finished slope lines measured normal to the plane of the slope.

Whenever slag aggregate is used for imported borrow, place a layer of topsoil at least 24 inches thick after compaction over the slag aggregate in highway planting areas.

87-2.04 PAYMENT

The Department reduces the payment quantity of HMA if:

1. Steel slag aggregates are used to produce HMA
2. The sp gr of a compacted stabilometer test specimen is in excess of 2.40

The Department prepares the stabilometer test specimen under California Test 304 and determines the sp gr of the specimen under Method C of California Test 308.

**REVISED STANDARD SPECIFICATIONS
APPLICABLE TO THE 2010 EDITION
OF THE STANDARD SPECIFICATIONS**

REVISED STANDARD SPECIFICATIONS DATED 04-19-13

Revised standard specifications are under headings that correspond with the main-section headings of the *Standard Specifications*. A main-section heading is a heading shown in the table of contents of the *Standard Specifications*. A date under a main-section heading is the date of the latest revision to the section.

Each revision to the *Standard Specifications* begins with a revision clause that describes a revision to the *Standard Specifications* or introduces a revision to the *Standard Specifications*. For a revision clause that describes a revision, the date on the right above the clause is the publication date of the revision. For a revision clause that introduces a revision, the date on the right above a revised term, phrase, clause, paragraph, or section is the publication date of the revised term, phrase, clause, paragraph, or section. For a multiple-paragraph or multiple-section revision, the date on the right above a paragraph or section is the publication date of the paragraphs or sections that follow.

Any paragraph added or deleted by a revision clause does not change the paragraph numbering of the *Standard Specifications* for any other reference to a paragraph of the *Standard Specifications*.

DIVISION I GENERAL PROVISIONS

1 GENERAL

04-19-13

Replace "current" in the 2nd paragraph of section 1-1.05 with:

most recent

04-20-12

Add to the 4th paragraph of section 1-1.05:

04-20-12

Any reference directly to a revised standard specification section is for convenience only. Lack of a direct reference to a revised standard specification section does not indicate a revised standard specification for the section does not exist.

Add to the 1st table in section 1-1.06:

04-19-13

LCS	Department's lane closure system
POC	pedestrian overcrossing
QSD	qualified SWPPP developer
QSP	qualified SWPPP practitioner
TRO	time-related overhead
WPC	water pollution control

Delete the abbreviation and its meaning for *UDBE* in the 1st table of section 1-1.06.

06-20-12

Delete "Contract completion date" and its definition in section 1-1.07B.

10-19-12

Delete "critical delay" and its definition in section 1-1.07B.

10-19-12

Replace "day" and its definition in section 1-1.07B with:

10-19-12

day: 24 consecutive hours running from midnight to midnight; calendar day.

1. **business day:** Day on the calendar except a Saturday and a holiday.
2. **working day:** Time measure unit for work progress. A working day is any 24-consecutive-hour period except:
 - 2.1. Saturday and holiday.
 - 2.2. Day during which you cannot perform work on the controlling activity for at least 50 percent of the scheduled work shift with at least 50 percent of the scheduled labor and equipment due to any of the following:
 - 2.2.1. Adverse weather-related conditions.
 - 2.2.2. Maintaining traffic under the Contract.
 - 2.2.3. Suspension of a controlling activity that you and the Engineer agree benefits both parties.
 - 2.2.4. Unanticipated event not caused by either party such as:
 - 2.2.4.1. Act of God.
 - 2.2.4.2. Act of a public enemy.
 - 2.2.4.3. Epidemic.
 - 2.2.4.4. Fire.
 - 2.2.4.5. Flood.
 - 2.2.4.6. Governor-declared state of emergency.
 - 2.2.4.7. Landslide.
 - 2.2.4.8. Quarantine restriction.
 - 2.2.5. Issue involving a third party, including:
 - 2.2.5.1. Industry or area-wide labor strike.
 - 2.2.5.2. Material shortage.
 - 2.2.5.3. Freight embargo.
 - 2.2.5.4. Jurisdictional requirement of a law enforcement agency.
 - 2.2.5.5. Workforce labor dispute of a utility or nonhighway facility owner resulting in a nonhighway facility rearrangement not described and not solely for the Contractor's convenience. Rearrangement of a nonhighway facility includes installation, relocation, alteration, or removal of the facility.
 - 2.3. Day during a concurrent delay.
3. **original working days:**
 - 3.1. Working days to complete the work shown on the *Notice to Bidders* for a non-cost plus time based bid.
 - 3.2. Working days bid to complete the work for a cost plus time based bid.

Where working days is specified without the modifier "original" in the context of the number of working days to complete the work, interpret the number as the number of original working days as adjusted by any time adjustment.

Replace "Contract" in the definition of "early completion time" in section 1-1.07B with:

10-19-12

work

Replace "excusable delay" and its definition in section 1-1.07B with:

10-19-12

delay: Event that extends the completion of an activity.

1. **excusable delay:** Delay caused by the Department and not reasonably foreseeable when the work began such as:
 - 1.1. Change in the work
 - 1.2. Department action that is not part of the Contract
 - 1.3. Presence of an underground utility main not described in the Contract or in a location substantially different from that specified
 - 1.4. Described facility rearrangement not rearranged as described, by the utility owner by the date specified, unless the rearrangement is solely for the Contractor's convenience
 - 1.5. Department's failure to obtain timely access to the right-of-way
 - 1.6. Department's failure to review a submittal or provide notification in the time specified
2. **critical delay:** Excusable delay that extends the scheduled completion date
3. **concurrent delay:** Occurrence of at least 2 of the following events in the same period of time, either partially or entirely:
 - 3.1. Critical delay
 - 3.2. Delay to a controlling activity caused by you
 - 3.3. Non-working day

Replace "project" in the definition of "scheduled completion date" in section 1-1.07B with:

10-19-12

work

Add to section 1-1.07B:

10-19-12

Contract time: Number of original working days as adjusted by any time adjustment.

06-20-12

Disadvantaged Business Enterprise: Disadvantaged Business Enterprise as defined in 49 CFR 26.5.

Replace "PO BOX 911" in the District 3 mailing address in the table in section 1-1.08 with:

04-20-12

703 B ST

Add to the table in section 1-1.11:

01-20-12

Office Engineer--All Projects Currently Advertised	http://www.dot.ca.gov/hq/esc/oe/weekly_ads/all_advertised.php	--	--
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AA

2 BIDDING

10-19-12

Replace the 3rd paragraph of section 2-1.06B with:

01-20-12

If an *Information Handout* or cross sections are available:

1. You may view them at the Contract Plans and Special Provisions link at the Office Engineer–All Projects Currently Advertised Web site
2. For an informal-bid contract, you may obtain them at the Bidders' Exchange street address

01-20-12

Add a paragraph break between the 1st and 2nd sentences of the 5th paragraph of section 2-1.06B.

Add between "and" and "are" in item 2 in the list in the 7th paragraph of section 2-1.06B:

they

04-20-12

06-20-12

Delete "Underutilized" in "Underutilized Disadvantaged Business Enterprises" in the heading of section 2-1.12B.

Delete *U* in *UDBE* at each occurrence in section 2-1.12B.

06-20-12

Replace the 2nd paragraph of section 2-1.12B(1) with:

To ensure equal participation of DBEs provided in 49 CFR 26.5, the Department shows a goal for DBEs.

06-20-12

Delete the 3rd paragraph of section 2-1.12B(1):

06-20-12

Replace the 7th paragraph of section 2-1.12B(1) with:

All DBE participation will count toward the Department's federally-mandated statewide overall DBE goal.

06-20-12

Replace "offered" at the end of the 2nd sentence of item 7 in the list of 2nd paragraph of section 2-1.12B(3) with:

provided

06-20-12

Delete the 2nd paragraph of section 2-1.33A.

01-20-12

Replace the 3rd paragraph of section 2-1.33A with:

Except for each subcontracted bid item number and corresponding percentage and proof of each required SSPC QP certification, do not fax submittals.

01-20-12

5 CONTROL OF WORK

10-19-12

Add between "million" and ", professionally" in the 3rd paragraph of section 5-1.09A:

and 100 or more working days

10-19-12

Add to the list in the 4th paragraph of section 5-1.09A:

9. Considering discussing with and involving all stakeholders in evaluating potential VECPs

10-19-12

Add to the end of item 1.1 in the list in the 7th paragraph of section 5-1.09A:

, including VECPs

10-19-12

Replace the 1st paragraph of section 5-1.09C with:

For a contract with a total bid over \$10 million and 100 or more working days, training in partnering skills development is required.

10-19-12

Delete the 2nd paragraph of section 5-1.09C.

10-19-12

Replace "at least 2 representatives" in the 5th paragraph of section 5-1.09C with:

field supervisory personnel

10-19-12

Replace the 1st and 2nd sentences in the 7th paragraph of section 5-1.13B(1) with:

If a DBE is decertified before completing its work, the DBE must notify you in writing of the decertification date. If a business becomes a certified DBE before completing its work, the business must notify you in writing of the certification date.

06-20-12

Replace "90" in the last sentence of the 7th paragraph of section 5-1.13B(1) with:

30

06-20-12

Replace "Underutilized" in "Underutilized Disadvantaged Business Enterprises" in the heading of section 5-1.13B(2) with:

Performance of

06-20-12

Delete *U* in *UDBE* at each occurrence in section 5-1.13B(2).

06-20-12

Replace the 3rd paragraph of section 5-1.13B(2) with:

06-20-12

Do not terminate or substitute a listed DBE for convenience and perform the work with your own forces or obtain materials from other sources without authorization from the Department.

Replace item 6 in the list in the 4th paragraph of section 5-1.13B(2) with:

06-20-12

6. Listed DBE is ineligible to work on the project because of suspension or debarment.

Add to the list in the 4th paragraph of section 5-1.13B(2):

06-20-12

8. Listed DBE voluntarily withdraws with written notice from the Contract.
9. Listed DBE is ineligible to receive credit for the type of work required.
10. Listed DBE owner dies or becomes disabled resulting in the inability to perform the work on the Contract.
11. Department determines other documented good cause.

Add between the 4th and 5th paragraphs of section 5-1.13B(2):

07-20-12

Notify the original DBE of your intent to use other forces or material sources and provide the reasons. Provide the DBE with 5 days to respond to your notice and advise you and the Department of the reasons why the use of other forces or sources of materials should not occur. Your request to use other forces or material sources must include:

1. 1 or more of the reasons listed in the preceding paragraph
2. Notices from you to the DBE regarding the request
3. Notices from the DBE to you regarding the request

Add between "terminated" and ", you" in the 5th paragraph of section 5-1.13B(2):

07-20-12

or substituted

Replace "Contract" in item 1 in the list in the 5th paragraph of section 5-1.13C with:

10-19-12

work

Replace "Reserved" in section 5-1.20C with:

10-19-12

If the Contract includes an agreement with a railroad company, the Department makes the provisions of the agreement available in the *Information Handout* in the document titled "Railroad Relations and Insurance Requirements." Comply with the requirements in the document.

Add between the 2nd and 3rd paragraphs of section 5-1.23A:

10-19-12

Submit action and informational submittals to the Engineer.

7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

07-27-12

Replace "20 days" in the 14th paragraph of section 7-1.04 with:

09-16-11

25 days

Replace "90 days" in the 14th paragraph of section 7-1.04 with:

09-16-11

125 days

Add between the 18th and 19th paragraphs of section 7-1.04:

09-16-11

Temporary facilities that could be a hazard to public safety if improperly designed must comply with design requirements described in the Contract for those facilities or, if none are described, with standard design criteria or codes appropriate for the facility involved. Submit shop drawings and design calculations for the temporary facilities and show the standard design criteria or codes used. Shop drawings and supplemental calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Replace the 2nd paragraph of section 7-1.11A with:

07-27-12

A copy of form FHWA-1273 is included in section 7-1.11B. The training and promotion section of section II refers to training provisions as if they were included in the special provisions. The Department specifies the provisions in section 7-1.11D of the *Standard Specifications*. If a number of trainees or apprentices is required, the Department shows the number on the *Notice to Bidders*. Interpret each FHWA-1273 clause shown in the following table as having the same meaning as the corresponding Department clause:

FHWA-1273 Nondiscrimination Clauses

FHWA-1273 section	FHWA-1273 clause	Department clause
Training and Promotion	In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.	If section 7-1.11D applies, section 7-1.11D supersedes this subparagraph.
Records and Reports	If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.	If the Contract requires on-the-job training, collect and report training data.

Replace the form in section 7-1.11B with:

07-20-12

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

2. Subject to the applicability criteria noted in the following sections, 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.

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, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) 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 provisions of the Americans with 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 contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its 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, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program 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 minorities and women.

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 minorities and women 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 minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women 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, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such 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 its 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 their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

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. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

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 employees who are minorities and women 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 good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 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 good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith 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 contracting agency 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 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 minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. 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. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor 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 contracting agency deems appropriate.

11. 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 the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours 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; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency 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](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics 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 issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, 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 29 CFR 5.5(a)(4). 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. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) 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.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), 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 Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The 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.

(3) In the event the contractor, the laborers or mechanics to be employed in the 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. The Wage and Hour 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.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. 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 shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as 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.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor 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, so 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 contracting agency 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.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of 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. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) 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 shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each 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 Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) 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 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, 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 FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action 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.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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 U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or 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 Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen 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 worker 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 on 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 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's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

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 journeymen 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 determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

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 U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman 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 wage rate on the wage determination which provides for less than full fringe benefits for apprentices. 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.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor 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. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. 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.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 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 U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the 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 or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys 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 (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

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 contracting agency. 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 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased 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 or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

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 or propose 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 VI 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 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 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 contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

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 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. 3704).

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.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

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, Form FHWA-1022 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:

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 under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

- a. By signing and submitting this proposal, the prospective first tier 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 first tier 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 first tier 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 contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier 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," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first 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 entering into this transaction.

g. The prospective first tier 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 Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

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 is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective 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.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) 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 (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective 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 Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

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," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers to any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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 exceeding the \$25,000 threshold.

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 is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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 Participants:

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 participating in covered transactions 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.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is 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 its bid or proposal that the participant 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.

Replace "Contract" in the 3rd paragraph of section 8-1.02D(2) with:

10-19-12

work

Replace "Contract" in item 9 in the list in the 4th paragraph of section 8-1.02D(4) with:

10-19-12

work

Replace "Contract completion" in the 4th paragraph of section 8-1.02D(6) with:

10-19-12

work completion

Replace "Contract working days" in the 4th paragraph of section 8-1.02D(6) with:

10-19-12

original working days

Delete items 1.3 and 1.4 in the list in the 1st paragraph of section 8-1.02D(10).

04-20-12

Replace the last paragraph of section 8-1.04B with:

10-19-12

The Department does not adjust time for starting before receiving notice of Contract approval.

Replace the 1st paragraph of section 8-1.05 with:

10-19-12

Contract time starts on the last day specified to start job site activities in section 8-1.04 or on the day you start job site activities, whichever occurs first.

Replace the 2nd paragraph of section 8-1.05 with:

10-19-12

Complete the work within the Contract time.

Delete "unless the Contract is suspended for reasons unrelated to your performance" in the 4th paragraph of section 8-1.05.

10-19-12

Replace the headings and paragraphs in section 8-1.06 with:

10-19-12

The Engineer may suspend work wholly or in part due to conditions unsuitable for work progress. Provide for public safety and a smooth and unobstructed passageway through the work zone during the suspension as specified under sections 7-1.03 and 7-1.04. Providing the passageway is force account work. The Department makes a time adjustment for the suspension due to a critical delay.

The Engineer may suspend work wholly or in part due to your failure to (1) fulfill the Engineer's orders, (2) fulfill a Contract part, or (3) perform weather-dependent work when conditions are favorable so that weather-related unsuitable conditions are avoided or do not occur. The Department may provide for a

Cost	Percent markup
Labor	30
Materials	10
Equipment rental	10

Delete ", Huntington Beach," in the 3rd paragraph of section 9-1.07A.

04-20-12

Replace the formula in section 9-1.07B(2) with:

04-20-12

$$Q_h = HMATT \times X_a$$

Replace "weight of dry aggregate" in the definition of the variable X_a in section 9-1.07B(2) with:

04-20-12

total weight of HMA

Replace the formula in section 9-1.07B(3) with:

04-20-12

$$Q_{rh} = RHMATT \times 0.80 \times X_{arb}$$

Replace "weight of dry aggregate" in the definition of the variable X_{arb} in section 9-1.07B(3) with:

04-20-12

total weight of rubberized HMA

Replace the heading of section 9-1.07B(4) with:

04-20-12

Hot Mix Asphalt with Modified Asphalt Binder

Add between "in" and "modified" in the introductory clause of section 9-1.07B(4):

04-20-12

HMA with

Replace the formula in section 9-1.07B(4) with:

04-20-12

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

Replace "weight of dry aggregate" in the definition of the variable X_{mab} in section 9-1.07B(4) with:

04-20-12

total weight of HMA

Replace the formula in section 9-1.07B(5) with:

04-20-12

$$Q_{rap} = HMATT \times X_{aa}$$

Replace "weight of dry aggregate" in the definitions of the variables X_{aa} and X_{ta} in section 9-1.07B(5) with:

04-20-12

total weight of HMA

Add after the variable definitions in section 9-1.07B(9):

04-20-12

The quantity of extender oil is included in the quantity of asphalt.

Replace the headings and paragraphs in section 9-1.11 with:

10-19-12

9-1.11A General

Section 9-1.11 applies if a bid item for time-related overhead is included in the Contract. If a bid item for time-related overhead is included, you must exclude the time-related overhead from every other bid item price.

9-1.11B Payment Quantity

The TRO quantity does not include the number of working days to complete plant establishment work.

For a contract with a TRO lump sum quantity on the Bid Item List, the Department pays you based on the following conversions:

1. LS unit of measure is replaced with WDAY
2. Lump sum quantity is replaced with the number of working days bid
3. Lump sum unit price is replaced with the item total divided by the number of working days bid

9-1.11C Payment Inclusions

Payment for the TRO bid item includes payment for time-related field- and home-office overhead for the time required to complete the work.

The field office overhead includes time-related expenses associated with the normal and recurring construction activities not directly attributed to the work, including:

1. Salaries, benefits, and equipment costs of:
 - 1.1. Project managers
 - 1.2. General superintendents
 - 1.3. Field office managers
 - 1.4. Field office staff assigned to the project
2. Rent
3. Utilities
4. Maintenance
5. Security
6. Supplies
7. Office equipment costs for the project's field office

The home-office overhead includes the fixed general and administrative expenses for operating your business, including:

1. General administration
2. Insurance
3. Personnel and subcontract administration
4. Purchasing
5. Accounting
6. Project engineering and estimating

Payment for the TRO bid item does not include payment for:

1. The home-office overhead expenses specifically related to:
 - 1.1. Your other contracts or other businesses
 - 1.2. Equipment coordination
 - 1.3. Material deliveries
 - 1.4. Consultant and legal fees
2. Non-time-related costs and expenses such as mobilization, licenses, permits, and other charges incurred once during the Contract
3. Additional overhead involved in incentive/disincentive provisions to satisfy an internal milestone or multiple calendar requirements
4. Additional overhead involved in performing additional work that is not a controlling activity
5. Overhead costs incurred by your subcontractors of any tier or suppliers

9-1.11D Payment Schedule

For progress payments, the total work completed for the TRO bid item is the number of working days shown for the pay period on the *Weekly Statement of Working Days*.

For progress payments, the Department pays a unit price equal to the lesser of the following amounts:

1. Price per working day as bid or as converted under section 9-1.11B.
2. 20 percent of the total bid divided by the number of original working days

For a contract without plant establishment work, the Department pays you the balance due of the TRO item total as specified in section 9-1.17B.

For a contract with plant establishment work, the Department pays you the balance due of the TRO item total in the 1st progress payment after all non-plant establishment work is completed.

9-1.11E Payment Adjustments

The 3rd paragraph of section 9-1.17C does not apply.

The Department does not adjust the unit price for an increase or decrease in the TRO quantity except as specified in section 9-1.11E.

Section 9-1.17D(2)(b) does not apply except as specified for the audit report below.

If the TRO bid item quantity exceeds 149 percent of the quantity shown on the Bid Item List or as converted under section 9-1.11B, the Engineer may adjust or you may request an adjustment of the unit price for the excess quantity. For the adjustment, submit an audit report within 60 days of the Engineer's request. The report must be prepared as specified for an audit report for an overhead claim in section 9-1.17D(2)(b).

Within 20 days of the Engineer's request, make your financial records available for an audit by the State for the purpose of verifying the actual rate of TRO described in your audit. The actual rate of TRO described is subject to the Engineer's authorization.

The Department pays the authorized actual rate for TRO in excess of 149 percent of the quantity shown on the Bid Item List or as converted under section 9-1.11B.

The Department pays for 1/2 the cost of the report; the Contractor pays for the other 1/2. The cost is determined under section 9-1.05.

Delete "revised Contract" in item 1 of the 1st paragraph of section 9-1.16E(2).

10-19-12

Replace "2014" in the 1st paragraph of section 9-1.16F with:

10-19-12

2020

Replace "NEL violation" in item 3.6.2 in the list in the 1st paragraph of section 13-1.01D(3)(c) with:

04-19-13

receiving water monitoring trigger

Replace the 1st paragraph in section 13-2.01B with:

04-19-13

Within 7 days after Contract approval, submit 2 copies of your WPCP for review. Allow 5 business days for review.

After the Engineer authorizes the WPCP, submit an electronic copy and 3 printed copies of the authorized WPCP.

If the RWQCB requires review of the authorized WPCP, the Engineer submits the authorized WPCP to the RWQCB for its review and comment. If the Engineer orders changes to the WPCP based on the RWQCB's comments, amend the WPCP within 3 business days.

Replace the 1st paragraph in section 13-3.01B(2)(a) with:

04-19-13

Within 15 days of Contract approval, submit 3 copies of your SWPPP for review. The Engineer provides comments and specifies the date when the review stopped if revisions are required. Change and resubmit a revised SWPPP within 15 days of receiving the Engineer's comments. The Department's review resumes when a complete SWPPP has been resubmitted.

When the Engineer authorizes the SWPPP, submit an electronic copy and 4 printed copies of the authorized SWPPP.

If the RWQCB requires review of the authorized SWPPP, the Engineer submits the authorized SWPPP to the RWQCB for its review and comment. If the Engineer requests changes to the SWPPP based on the RWQCB's comments, amend the SWPPP within 10 days.

Replace "NELs" in item 3.1 in the 3rd paragraph of section 13-3.01B(2)(a) with:

04-19-13

receiving water monitoring triggers

Replace section 13-3.01B(6)(c) with:

04-19-13

13-3.01B(6)(c) Receiving Water Monitoring Trigger Report

Whenever a receiving water monitoring trigger is exceeded, notify the Engineer and submit a receiving water monitoring trigger report within 48 hours after conclusion of a storm event. The report must include:

1. Field sampling results and inspections, including:
 - 1.1. Analytical methods, reporting units, and detection limits
 - 1.2. Date, location, time of sampling, visual observation and measurements
 - 1.3. Quantity of precipitation from the storm event
2. Description of BMPs and corrective actions

Replace "NEL" in the 6th paragraph of section 13-3.01C(1) with:

04-19-13

receiving water monitoring trigger

Replace section 13-3.01C(3) with:

04-19-13

13-3.01C(3) Receiving Water Monitoring Trigger

For a risk level 3 project, receiving water monitoring triggers must comply with the values shown in the following table:

Receiving Water Monitoring Trigger

Parameter	Test method	Detection limit (min)	Unit	Value
pH	Field test with calibrated portable instrument	0.2	pH	Lower limit = 6.0 Upper limit = 9.0
Turbidity	Field test with calibrated portable instrument	1	NTU	500 NTU max

The storm event daily average for storms up to the 5-year, 24-hour storm must not exceed the receiving water monitoring trigger for turbidity.

The daily average sampling results must not exceed the receiving water monitoring trigger for pH.

04-19-13

Delete "and NELs are violated" in the 3rd paragraph of section 13-3.03C.

Replace "working days" at each occurrence in section 13-3.04 with.

10-19-12

original working days

04-19-13

Delete the 1st sentence in the 2nd paragraph of section 13-4.03C(3).

Add between the 2nd and 3rd paragraphs of section 13-4.03C(3):

04-19-13

Manage stockpiles by implementing water pollution control practices on:

1. Active stockpiles before a forecasted storm event
2. Inactive stockpiles according to the WPCP or SWPPP schedule

Replace the paragraph in section 13-4.04 with:

04-20-12

Not Used

10-19-12

Delete "or stockpile" in the 3rd paragraph of section 13-5.02F.

5. Be fastened securely to the existing frame without projections above the surface of the road or into the clear opening

Add to the end of section 15-4.01A(2):

Allow 20 days for review of the bridge removal work plan.

04-19-13

Replace the 1st paragraph of section 15-5.01C(1) with:

Before starting deck rehabilitation activities, complete the removal of any traffic stripes, pavement markings, and pavement markers.

10-19-12

Replace the 2nd and 3rd paragraphs of section 15-5.01C(2) with:

Perform the following activities in the order listed:

10-19-12

1. Abrasive blast the deck surface with steel shot. Perform abrasive blasting after the removal of any unsound concrete and placement of any rapid setting concrete patches.
2. Sweep the deck surface.
3. Blow the deck surface clean using high-pressure air.

Replace the 2nd paragraph of section 15-5.01C(4) with:

Before removing asphalt concrete surfacing, verify the depth of the surfacing at the supports and midspans of each structure (1) in each shoulder, (2) in the traveled way, and (3) at the roadway crown, if a crown is present.

10-19-12

Delete "and concrete expansion dams" in the 3rd paragraph of section 15-5.01C(4).

04-19-13

Replace the 2nd paragraph of section 15-5.03A(2) with:

For a contract with less than 60 original working days, submit certificates of compliance for the filler material and bonding agents.

10-19-12

Replace "51-1.02C" in the 1st paragraph of section 15-5.03B with:

51-1.02F

04-19-13

Replace the 4th paragraph of section 15-5.03B with:

For a contract with less than 60 original working days, alternative materials must be authorized before use.

10-19-12

Add between the 5th and 6th paragraphs of section 15-5.03C:

The final surface finish of the patched concrete surface must comply with section 51-1.03F.

10-19-12

Delete the 4th paragraph of section 15-5.05C.

10-19-12

Replace "51-1.03F(5)" in the 3rd paragraph of section 15-5.06C(1) with:

51-1.01D(4)

10-19-12

Replace "51-1.03E(5)" in the 5th paragraph of section 15-5.06C(1) with:

51-1.03F(5)

10-19-12

Delete the 9th paragraph of section 15-5.06C(1).

10-19-12

Delete the 15th paragraph of section 15-5.06C(1).

04-19-13

Add to section 15-5.06C(1):

Texture the polyester concrete surface before gelling occurs by longitudinal tining under 51-1.03F(5)(b)(iii), except do not perform initial texturing.

10-19-12

Replace section 15-5.06C(2) with:

15-5.06C(2) Reserved

04-19-13

Delete the 3rd paragraph of section 15-5.06D.

04-19-13

Replace the 1st paragraph in section 15-5.07B(4) with:

Payment for furnishing dowels is not included in the payment for core and pressure grout dowel.

10-19-12

Replace section 15-5.09 with:

15-5.09 POLYESTER CONCRETE EXPANSION DAMS

04-19-13

15-5.09A General

Section 15-5.09 includes specifications for constructing polyester concrete expansion dams.

Polyester concrete expansion dams must comply with the specifications for polyester concrete overlays in section 15-5.06, except a trial slab is not required.

Replace "sets" in the 3rd and 4th paragraphs of section 19-3.01A(2)(d) with:

copies

04-19-13

Add to section 19-3.01A(3)(b):

For soil nail walls, wall zones are specified in the special provisions.

01-20-12

For ground anchor walls, a wall zone is the entire wall unless otherwise specified in the special provisions.

Delete the 2nd sentence in the 4th paragraph of section 19-3.01A(3)(b).

01-20-12

Replace "90" in the paragraph of section 19-3.02G with:

90-1

01-18-13

Replace the heading of section 19-3.03C with:

19-3.03B(4) Cofferdams

04-19-13

Replace the heading of section 19-3.03D with:

19-3.03B(5) Water Control and Foundation Treatment

04-19-13

Replace the 1st paragraph of section 19-3.03E(3) with:

Compact structure backfill behind lagging of soldier pile walls by hand tamping, mechanical compaction, or other authorized means.

01-20-12

Replace the 2nd paragraph of section 19-3.03F with:

Do not backfill over or place material over slurry cement backfill until 4 hours after placement. When concrete sand is used as aggregate and the in-place material is free draining, you may start backfilling as soon as the surface water is gone.

01-20-12

Add between the 2nd and 3rd paragraphs of section 19-3.03K:

Before you excavate for the installation of ground anchors in a wall zone:

01-20-12

1. Complete stability testing
2. Obtain authorization of test data

binder replacement: Amount of RAP binder in OBC in percent.

surface course: Upper 0.2 feet of HMA exclusive of OGFC.

Add to the end of the paragraph in section 39-1.02A:

10-19-12

as shown

Replace the paragraphs in section 39-1.02F with:

02-22-13

39-1.02F(1) General

You may produce HMA Type A or B using 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 at a substitution rate not exceeding 25 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 JMF submittal. The JMF must include the percent of RAP used.

Provide enough space for meeting RAP handling requirements at your facility. Provide a clean, graded, well-drained area for stockpiles. Prevent material contamination and segregation.

If RAP is from multiple sources, blend the RAP thoroughly and completely. RAP stockpiles must be homogeneous.

Isolate the processed RAP stockpiles from other materials. Store processed RAP in conical or longitudinal stockpiles. Processed RAP must not be agglomerated or be allowed to congeal in large stockpiles.

AASHTO T 324 (Modified) is AASHTO T 324, "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA)," with the following parameters:

1. Target air voids must equal 7 ± 1 percent
2. Number of test specimens must be 4
3. Test specimen must be a 6-inch gyratory compacted specimen
4. Test temperature must be set at 140 ± 2 degrees F
5. Measurements for impression must be taken at every 100 passes
6. Inflection point defined as the number of wheel passes at the intersection of the creep slope and the stripping slope
7. Testing shut off must be set at 25,000 passes

39-1.02F(2) Substitution Rate of 15 Percent or Less

For a RAP substitution rate of 15 percent or less, you may stockpile RAP during the entire project.

39-1.02F(3) Substitution Rate Greater than 15 Percent

For a RAP substitution rate greater than 15 percent, fractionate RAP into 2 sizes, a coarse fraction RAP retained on 1/4-inch screen and a fine fraction RAP passing 1/4-inch screen.

Sample and test processed RAP at a minimum frequency of 1 sample per 1000 tons with a minimum of 6 samples for each processed RAP stockpile. The asphalt binder content and specific gravity must meet the processed RAP quality characteristics. If a processed RAP stockpile is augmented, sample and test processed RAP quality characteristics at a minimum frequency of 1 sample per 500 tons of augmented RAP.

The processed RAP asphalt binder content must be within ± 2.0 percent of the average processed RAP stockpile asphalt binder content when tested under ASTM D 2172, Method B. If a new processed RAP stockpile is required, the average binder content of the new processed RAP stockpile must be within ± 2.0 percent of the average binder content of the original processed RAP stockpile.

The maximum specific gravity for processed RAP must be within ± 0.06 when tested under California Test 309 of the average maximum specific gravity reported on page 4 of your *Contractor Hot Mix Asphalt Design Data* form.

Replace "less than 10 percent" in note "b" in the table in the 5th paragraph of section 39-1.02E with:

01-20-12

10 percent or less

Replace items 7 and 8 in the 5th paragraph of section 39-1.03A with:

02-22-13

7. Substitution rate by more than 5 percent if your assigned RAP substitution rate is 15 percent or less
8. Substitution rate by more than 3 percent if your assigned RAP substitution rate is greater than 15 percent
9. Average binder content by more than 2 percent from the average binder content of the original processed RAP stockpile used in the mix design
10. Maximum specific gravity of processed RAP by more than ± 0.060 from the average maximum specific gravity of processed RAP reported on page 4 of your *Contractor Hot Mix Asphalt Design Data* form
11. Any material in the JMF

Replace the 1st paragraph of section 39-1.03B with:

02-22-13

Perform a mix design that produces HMA with the values for the quality characteristics shown in the following table:

HMA Mix Design Requirements

Quality characteristic	Test method	HMA type		
		A	B	RHMA-G
Air void content (%)	California Test 367	4.0	4.0	Section 39-1.03B
Voids in mineral aggregate (% min.) No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	17.0	17.0	--
		15.0	15.0	--
		14.0	14.0	18.0–23.0
		13.0	13.0	18.0–23.0
Voids filled with asphalt (%) No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	65.0–75.0	65.0–75.0	Note a
		65.0–75.0	65.0–75.0	
		65.0–75.0	65.0–75.0	
		65.0–75.0	65.0–75.0	
Dust proportion No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367	0.6–1.2	0.6–1.2	Note a
		0.6–1.2	0.6–1.2	
Stabilometer value (min.) No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 366	30	30	--
		37	35	23

^a Report this value in the JMF submittal.

For RAP substitution rate greater than 15 percent, the mix design must comply with the additional quality characteristics shown in the following table:

**Additional HMA Mix Design Requirements
for RAP Substitution Rate Greater Than 15 Percent**

Quality characteristic	Test method	HMA type		
		A	B	RHMA-G
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth)	AASHTO T 324 (Modified) ^a			
PG-58		10,000	10,000	--
PG-64		15,000	15,000	
PG-70		20,000	20,000	
PG-76 or higher		25,000	25,000	
Hamburg wheel track (inflection point minimum number of passes)	AASHTO T 324 (Modified) ^a			
PG-58		10,000	10,000	--
PG-64		10,000	10,000	
PG-70		12,500	12,500	
PG-76 or higher		15000	15000	
Moisture susceptibility (minimum dry strength, psi)	California Test 371 ^a	120	120	--
Moisture susceptibility (tensile strength ration, %)	California Test 371 ^a	70	70	--

^aTest plant produced HMA.

For HMA with RAP, the maximum binder replacement must be 25.0 percent of OBC for surface course and 40.0 percent of OBC for lower courses.

For HMA with a binder replacement less than or equal to 25 percent of OBC, you may request that the PG asphalt binder grade with upper and lower temperature classifications be reduced by 6 degrees C from the specified grade.

For HMA with a binder replacement greater than 25 percent but less than or equal to 40 percent of OBC, you must use a PG asphalt binder grade with upper and lower temperature classifications reduced by 6 degrees C from the specified grade.

Replace item 4 in the list in the 1st paragraph of section 39-1.03C with:

4. JMF renewal on a *Caltrans Job Mix Formula Renewal* form, if applicable

01-20-12

Add after the last paragraph of section 39-1.03C:

For RAP substitution rate greater than 15 percent, submit with the JMF submittal:

1. California Test 371 tensile strength ratio and minimum dry strength test results
2. AASHTO T 324 (Modified) test results

02-22-13

For RAP substitution rate greater than 15 percent, submit California Test 371 and AASHTO T 324 (Modified) test results to the Engineer and to:

Moisture_Tests@dot.ca.gov

Replace the 2nd paragraph of section 39-1.03E with:

04-20-12

Use the OBC specified on your *Contractor Hot Mix Asphalt Design Data* form. No adjustments to asphalt binder content are allowed. Based on your testing and production experience, you may submit an adjusted aggregate gradation TV on a *Contractor Job Mix Formula Proposal* form before verification testing. Aggregate gradation TV must be within the TV limits specified in the aggregate gradation tables.

Add between the 3rd and 4th paragraphs of section 39-1.03E:

04-20-12

Asphalt binder set point for HMA must be the OBC specified on your *Contractor Hot Mix Asphalt Design Data* form. When RAP is used, asphalt binder set point for HMA must be:

$$\text{Asphalt Binder Set Point} = \frac{\frac{BC_{OBC}}{\left(1 - \frac{BC_{OBC}}{100}\right)} - R_{RAP} \left[\frac{BC_{RAP}}{\left(1 - \frac{BC_{RAP}}{100}\right)} \right]}{100 + \frac{BC_{OBC}}{\left(1 - \frac{BC_{OBC}}{100}\right)}}$$

Where:

BC_{OBC} = optimum asphalt binder content, percent based on total weight of mix

R_{RAP} = RAP ratio by weight of aggregate

BC_{RAP} = asphalt binder content of RAP, percent based on total weight of RAP mix

Replace item 4 in the list in the 8th paragraph of section 39-1.03E with:

04-20-12

4. HMA quality specified in the table titled "HMA Mix Design Requirements" except:
 - 4.1. Air void content, design value ± 2.0 percent
 - 4.2. Voids filled with asphalt, report only
 - 4.3. Dust proportion, report only

Replace the 12th paragraph of section 39-1.03E with:

04-20-12

If tests on plant-produced samples do not verify the JMF, the Engineer notifies you and you must submit a new JMF or submit an adjusted JMF based on your testing. JMF adjustments may include a change in aggregate gradation TV within the TV limits specified in the aggregate gradation tables.

Replace the 14th paragraph of section 39-1.03E with:

01-20-12

A verified JMF is valid for 12 months.

Replace the last sentence in the 15th paragraph of section 39-1.03E with:

01-20-12

This deduction does not apply to verifications initiated by the Engineer or JMF renewal.

Replace the 16th paragraph of section 39-1.03E with:

02-22-13

Except for RAP substitution rate greater than 15 percent, for any HMA produced under the QC/QA process the Department does not use California Test 371 test results for verification.

Add between the 1st and 2nd paragraphs of section 39-1.03F:

04-20-12

Target asphalt binder content on your Contractor *Job Mix Formula Proposal* form and the OBC specified on your *Contractor Hot Mix Asphalt Design Data* form must be the same.

Delete the 4th paragraph of section 39-1.03F.

01-20-12

Replace items 3 and 5 in the list in the 6th paragraph of section 39-1.03F with:

01-20-12

3. Engineer verifies each proposed JMF renewal within 20 days of receiving verification samples.
5. For each HMA type and aggregate gradation specified, the Engineer verifies at the Department's expense 1 proposed JMF renewal within a 12-month period.

Add between the 6th and 7th paragraphs of section 39-1.03F:

01-20-12

The most recent aggregate quality test results within the past 12 months may be used for verification of JMF renewal or the Engineer may perform aggregate quality tests for verification of JMF renewal.

Replace section 39-1.03G with:

04-20-12

39-1.03G Job Mix Formula Modification

For an accepted JMF, you may change asphalt binder source one time during production.

Submit your modified JMF request a minimum of 3 business days before production. Each modified JMF submittal must consist of:

1. Proposed modified JMF on *Contractor Job Mix Formula Proposal* form
2. Mix design records on *Contractor Hot Mix Asphalt Design Data* form for the accepted JMF to be modified
3. JMF verification on *Hot Mix Asphalt Verification* form for the accepted JMF to be modified
4. Quality characteristics test results for the modified JMF as specified in section 39-1.03B. Perform tests at the mix design OBC as shown on the *Contractor Asphalt Mix Design Data* form
5. If required, California Test 371 test results for the modified JMF.

With an accepted modified JMF submittal, the Engineer verifies each modified JMF within 5 business days of receiving all verification samples. If California Test 371 is required, the Engineer tests for California Test 371 within 10 days of receiving verification samples.

The Engineer verifies the modified JMF after the modified JMF HMA is placed on the project and verification samples are taken within the first 750 tons following sampling requirements in section 39-1.03E, "Job Mix Formula Verification." The Engineer tests verification samples for compliance with:

1. Stability as shown in the table titled "HMA Mix Design Requirements"
2. Air void content at design value ± 2.0 percent
3. Voids in mineral aggregate as shown in the table titled "HMA Mix Design Requirements"
4. Voids filled with asphalt, report only

5. Dust proportion, report only

If the modified JMF is verified, the Engineer revises your *Hot Mix Asphalt Verification* form to include the new asphalt binder source. Your revised form will have the same expiration date as the original form.

If a modified JMF is not verified, stop production and any HMA placed using the modified JMF is rejected.

The Engineer deducts \$2,000 from payments for each modified JMF verification. The Engineer deducts an additional \$2,000 for each modified JMF verification that requires California Test 371.

Add to section 39-1.03:

01-20-12

39-1.03H 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.

Replace "3 days" in the 1st paragraph of section 39-1.04A with:

01-20-12

3 business days

Replace the 2nd sentence in the 2nd paragraph of section 39-1.04A with:

01-20-12

During production, take samples under California Test 125. You may sample HMA from:

Replace the 2nd paragraph of section 39-1.04E with:

02-22-13

For RAP substitution rate of 15 percent or less, sample RAP once daily.

For RAP substitution rate of greater than 15percent, sample processed RAP twice daily.

Perform QC testing for processed RAP aggregate gradation under California Test 367, appendix B, and submit the results with the combined aggregate gradation.

Replace "5 days" in the 1st paragraph of section 39-1.06 with:

01-20-12

5 business days

Replace the 3rd paragraph of section 39-1.08A with:

04-20-12

During production, you may adjust hot or cold feed proportion controls for virgin aggregate and RAP.

Add to section 39-1.08A:

04-20-12

During production, asphalt binder set point for HMA Type A, HMA Type B, HMA Type C, and RHMA-G must be the OBC shown in *Contractor Hot Mix Asphalt Design Data* form. For OGFC, asphalt binder set

point must be the OBC shown on *Caltrans Hot Mix Asphalt Verification* form. If RAP is used, asphalt binder set point for HMA must be calculated as specified in section 39-1.03E.

02-22-13

For RAP substitution rate of 15 percent or less, you may adjust the RAP by ± 5 percent.

For RAP substitution greater than 15, you may adjust the RAP by ± 3 percent.

04-20-12

You must request adjustments to the plant asphalt binder set point based on new RAP stockpiles average asphalt binder content. Do not adjust the HMA plant asphalt binder set point until authorized.

Replace the 3rd paragraph of section 39-1.08B with:

09-16-11

Asphalt rubber binder must be from 375 to 425 degrees F when mixed with aggregate.

Replace section 39-1.11 with:

01-18-13

39-1.11 CONSTRUCTION

39-1.11A General

Do not place HMA on wet pavement or a 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, pickup, loading, and paving are continuous
4. HMA temperature in the windrow does not fall below 260 degrees F

You may place 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 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

39-1.11B Longitudinal Joints

39-1.11B(1) General

Longitudinal joints in the top layer must match specified lane edges. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the specified lane edges. You may request other longitudinal joint placement patterns.

A vertical longitudinal joint of more than 0.15 ft is not allowed at any time between adjacent lanes open to traffic.

For HMA thickness of 0.15 ft or less, the distance between the ends of the adjacent surfaced lanes at the end of each day's work must not be greater than can be completed in the following day of normal paving.

For HMA thickness greater than 0.15 ft, you must 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 from 5 to 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 authorized bond breaker under the conform tapers to facilitate the taper removal when paving operations resume.

39-1.11B(2) Tapered Notched Wedge

For divided highways with an HMA lift thickness greater than 0.15 foot, you may construct a 1-foot wide tapered notched wedge joint as a longitudinal joint between adjacent lanes open to traffic. A vertical notch of 0.75 inch maximum must be placed at the top and bottom of the tapered wedge.

The tapered notched wedge must retain its shape while exposed to traffic. Pave the adjacent lane within 1 day.

Construct the tapered portion of the tapered notched wedge with an authorized strike-off device. The strike-off device must provide a uniform slope and must not restrict the main screed of the paver.

You may use a device attached to the screed to construct longitudinal joints that will form a tapered notched wedge in a single pass. The tapered notched wedge must be compacted to a minimum of 91 percent compaction.

Perform QC testing on the completed tapered notch wedge joint as follows:

1. Perform field compaction tests at the rate of 1 test for each 750-foot section along the joint. Select random locations for testing within each 750-foot section.
2. Perform field compaction tests at the centerline of the joint, 6 inches from the upper vertical notch, after the adjacent lane is placed and before opening the pavement to traffic.
3. Determine maximum density test results.
4. Determine percent compaction of the longitudinal joint as the ratio of the average of the field compaction values and the maximum density test results.

For HMA under QC/QA construction process, the additional quality control compaction results associated with the tapered notch wedge will not be included in the computation of any quality factor and process control.

For acceptance of the completed tapered notch wedge joint, take two 4- or 6-inch diameter cores 6 inches from the upper vertical notch of the completed longitudinal joint for every 3,000 feet at locations designated by the Engineer. Take cores after the adjacent lane is placed and before opening the pavement to traffic. Cores must be taken in the presence of the Engineer and must be marked to identify the test sites. Submit the cores. One core will be used for determination of the field density and 1 core will be used for dispute resolution. The Engineer determines:

1. Field compaction by measuring the bulk specific gravity of the cores under California Test 308, Method A
2. Percent compaction as the ratio of the average of the bulk specific gravity of the core for each day's production to the maximum density test value

For HMA under QC/QA construction process, the additional quality assurance testing by the Engineer to determine field compaction associated with the tapered notch wedge will not be included in the Engineer's verification testing and in the computation of any quality factor and process control.

Determine percent compaction values each day the joint is completed and submit values within 24 hours of testing. If the percent compaction of 1 day's production is less than 91 percent, that day's notched wedge joint is rejected. Discontinue placement of the tapered notched wedge and notify the Engineer of changes you will make to your construction process in order to meet the specifications.

For HMA under QC/QA construction process, quantities of HMA placed in the completed longitudinal joint will have a quality factor QF_{QC5} of 1.0.

39-1.11C Widening Existing Pavement

If widening existing pavement, construct new pavement structure to match the elevation of the existing pavement's edge before placing HMA over the existing pavement.

39-1.11D Shoulders, Medians, and Other Road Connections

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 changes, 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.

39-1.11E Leveling

If leveling with HMA is specified, fill and level irregularities and ruts with HMA before spreading HMA over the base, existing surfaces, or bridge decks. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture. HMA used to change an existing surface's cross slope or profile is not paid for as 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.

39-1.11F Compaction

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 degrees F for HMA with unmodified binder
2. Below 140 degrees F for HMA with modified binder
3. Below 200 degrees 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 construction processes, if 3/4-inch aggregate grading is specified, you may use a 1/2-inch aggregate grading if the specified total paved thickness is at least 0.15 foot and less than 0.20 foot thick.

Spread and compact HMA under sections 39-3.03 and 39-3.04 if any of the following applies:

1. Specified paved thickness is less than 0.15 foot.
2. Specified paved thickness is less than 0.20 foot and 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 for which the Engineer determines conventional compaction and compaction measurement methods are impeded

Do not open new HMA pavement to public traffic until its mid-depth temperature is below 160 degrees F.

If you request and if authorized, you may cool HMA Type A and Type B with water when rolling activities are complete. Apply water under section 17-3.

Spread sand at a rate from 1 to 2 lb/sq yd 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 90-1.02C(4)(c). Keep traffic off the pavement until spreading sand is complete.

Replace the 5th and 6th paragraphs of section 39-1.12C with:

07-20-12

On tangents and horizontal curves with a centerline radius of curvature 2,000 feet or more, the PI_0 must be at most 2.5 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 5 inches per 0.1-mile section.

Add to section 39-1.12:

01-20-12

39-1.12E Reserved

Add to section 39-1.14:

01-20-12

Prepare the area to receive HMA for miscellaneous areas and dikes, including any excavation and backfill as needed.

Replace "6.8" in item 3 in the list in the 4th paragraph of section 39-1.14 with:

04-20-12

6.4

Replace "6.0" in item 3 in the list in the 4th paragraph of section 39-1.14 with:

04-20-12

5.7

Replace "6.8" in the 1st paragraph of section 39-1.15B with:

04-20-12

6.4

Replace "6.0" in the 1st paragraph of section 39-1.15B with:

04-20-12

5.7

Replace the 1st paragraph of section 39-2.02B with:

02-22-13

Perform sampling and testing at the specified frequency for the quality characteristics shown in the following table:

Minimum Quality Control—Standard Construction Process

Quality characteristic	Test method	Minimum sampling and testing frequency	HMA type			
			A	B	RHMA-G	OGFC
Aggregate gradation ^a	California Test 202	1 per 750 tons and any remaining part at the end of the project	JMF ± Tolerance ^b			
Sand equivalent (min) ^c	California Test 217		47	42	47	--
Asphalt binder content (%)	California Test 379 or 382		JMF±0.40	JMF±0.40	JMF ± 0.40	JMF ± 0.40
HMA moisture content (% max)	California Test 226 or 370	1 per 2,500 tons but not less than 1 per paving day	1.0	1.0	1.0	1.0
Field compaction (% max. theoretical density) ^{d,e}	QC plan	2 per business day (min.)	91–97	91–97	91–97	--
Stabilometer value (min) ^c No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 366	1 per 4,000 tons or 2 per 5 business days, whichever is greater	30	30	--	--
			37	35	23	--
Air void content (%) ^{c,f}	California Test 367		4 ± 2	4 ± 2	TV ± 2	--
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants ^g	California Test 226 or 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	California Test 205	As designated in the QC plan. At least once per project	90	25	--	90
			75	--	90	75
Los Angeles Rattler (% max) Loss at 100 rev.	California Test 211		70	20	70	90
			12	--	12	12

Loss at 500 rev.			45	50	40	40
Flat and elongated particles (% max by weight @ 5:1)	California Test 235		Report only	Report only	Report only	Report only
Fine aggregate angularity (% min) ^h	California Test 234		45	45	45	--
Voids filled with asphalt (%) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367		65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 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	California Test 367		17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0–23.0 18.0–23.0	--
Dust proportion ^l No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367		0.6-1.2 0.6–1.2	0.6-1.2 0.6–1.2	Report only	--
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) ^j PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is more	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--	--
Hamburg wheel track (inflection point minimum number of passes) ^j PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is more	10,000 10,000 12,500 15000	10,000 10,000 12,500 15000	--	--
Moisture susceptibility (minimum dry strength, psi) ^j	California Test 371	For RAP ≥15% 1 per 10,000 tons or 1 per project whichever is greater	120	120	--	--
Moisture susceptibility (tensile strength ratio, %) ^j	California Test 371	For RAP ≥15% 1 per 10,000 tons or 1	70	70	--	--

		per project whichever is greater				
Smoothness	Section 39-1.12	--	12-foot straight- edge, must grind, and PI ₀			
Asphalt rubber binder viscosity @ 375 °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
CRM	Section 39-1.02D	Section 39-1.04C	--	--	Section 39-1.02D	Section 39-1.02D

^a Determine combined aggregate gradation containing RAP under California Test 367.

^b The tolerances must comply with the allowable tolerances in section 39-1.02E.

^c Report the average of 3 tests from a single split sample.

^d Determine field compaction for any of the following conditions:

1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot.
2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.

^e To determine field compaction use:

1. In-place density measurements using the method specified in your QC plan.
2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.

^f 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.

^g For adjusting the plant controller at the HMA plant.

^h The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

ⁱ Report only.

^j Applies to RAP substitution rate greater than 15 percent.

Replace the 1st paragraph of section 39-2.03A with:

02-22-13

The Department samples for acceptance testing and tests for the quality characteristics shown in the following table:

HMA Acceptance—Standard Construction Process

Quality characteristic	Test method	HMA type						
		A	B	RHMA-G	OGFC			
Aggregate gradation ^a	California Test 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	California Test 217	47	42	47	--			
Asphalt binder content (%)	California Test 379 or 382	JMF±0.40	JMF±0.40	JMF ± 0.40	JMF ± 0.40			
HMA moisture content (% max)	California Test 226 or 370	1.0	1.0	1.0	1.0			
Field compaction (% max. theoretical density) ^{e, f}	California Test 375	91–97	91–97	91–97	--			
Stabilometer value (min) ^d No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 366	30 37	30 35	-- 23	-- --			
Air void content (%) ^{d, g}	California Test 367	4 ± 2	4 ± 2	TV ± 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	California Test 205	90 75 70	25 -- 20	-- 90 70	90 75 90			
Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.	California Test 211	12 45	-- 50	12 40	12 40			
Fine aggregate angularity (% min) ^h	California Test 234	45	45	45	--			
Flat and elongated particles (% max by weight @ 5:1)	California Test 235	Report only	Report only	Report only	Report only			
Voids filled with asphalt (%) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 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	California Test 367	17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0–23.0 18.0–23.0	--			
Dust proportion ⁱ	California			Report only	--			

No. 4 and 3/8" gradings 1/2" and 3/4" gradings	Test 367	0.6-1.2 0.6-1.2	0.6-1.2 0.6-1.2		
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) ^j PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--	--
Hamburg wheel track (inflection point minimum number of passes) ^j PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	10,000 10,000 12,500 15000	10,000 10,000 12,500 15000	--	--
Moisture susceptibility (minimum dry strength, psi) ^j	California Test 371	120	120	--	--
Moisture susceptibility (tensile strength ration, %) ^j	California Test 371	70	70	--	--
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	12-foot straight- edge and must grind
Asphalt binder	Various	Section 92	Section 92	Section 92	Section 92
Asphalt rubber binder	Various	--	--	Section 92- 1.01D(2) and section 39-1.02D	Section 92-1.01D(2) and section 39-1.02D
Asphalt modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D
CRM	Various	--	--	Section 39-1.02D	Section 39-1.02D

^a The Engineer determines combined aggregate gradations containing RAP under California Test 367.

^b "X" denotes the sieves the Engineer tests for the specified aggregate gradation.

^c The tolerances must comply with the allowable tolerances in section 39-1.02E.

^d The Engineer reports the average of 3 tests from a single split sample.

^e The Engineer determines field compaction for any of the following conditions:

1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot.
2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.

^f To determine field compaction, the Engineer uses:

1. California Test 308, Method A, to determine in-place density of each density core.
2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.

^g 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.

^h The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

ⁱ Report only.

^j Applies to RAP substitution rate greater than 15 percent.

Replace the 5th paragraph of section 39-2.03A with:

01-20-12

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 if any of the following applies:

1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot and any layer is less than 0.15 foot.
2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.2 foot and any layer is less than 0.20 foot.

Replace the 1st paragraph of section 39-3.02A with:

02-22-13

The Department samples for acceptance testing and tests for the quality characteristics shown in the following table:

HMA Acceptance—Method Construction Process

Quality characteristic	Test method	HMA type			
		A	B	RHMA-G	OGFC
Aggregate gradation ^a	California Test 202	JMF ± tolerance ^b	JMF ± tolerance ^b	JMF ± tolerance ^b	JMF ± tolerance ^b
Sand equivalent (min) ^c	California Test 217	47	42	47	--
Asphalt binder content (%)	California Test 379 or 382	JMF±0.40	JMF±0.40	JMF ± 0.40	JMF ± 0.40
HMA moisture content (% max)	California Test 226 or 370	1.0	1.0	1.0	1.0
Stabilometer value (min) ^c No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 366	30 37	30 35	-- 23	-- --
Percent of crushed particles Coarse aggregate (% min) One fractured face Two fractured faces Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve.) One fractured face	California Test 205	90 75 70	25 -- 20	-- 90 70	90 75 90
Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.	California Test 211	12 45	-- 50	12 40	12 40
Air void content (%) ^{c, d}	California Test 367	4 ± 2	4 ± 2	TV ± 2	--
Fine aggregate angularity (% min) ^e	California Test 234	45	45	45	--
Flat and elongated particles (% max by weight @ 5:1)	California Test 235	Report only	Report only	Report only	Report only
Voids filled with asphalt (%) ^f No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	Report only	--
Voids in mineral aggregate (% min) ^f No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0–23.0 18.0–23.0	--
Dust proportion ^f No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367	0.6–1.2 0.6–1.2	0.6–1.2 0.6–1.2	Report only	--
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) ^g PG-58 PG-64	AASHTO T 324 (Modified)	10,000 15,000	10,000 15,000	--	--

PG-70 PG-76 or higher		20,000 25,000	20,000 25,000		
Hamburg wheel track (inflection point minimum number of passes) ^g	AASHTO T 324 (Modified)			--	--
PG-58		10,000	10,000		
PG-64		10,000	10,000		
PG-70		12,500	12,500		
PG-76 or higher		15000	15000		
Moisture susceptibility (minimum dry strength, psi) ^g	California Test 371	120	120	--	--
Moisture susceptibility (tensile strength ration, %) ^g	California Test 371	70	70	--	--
Smoothness	Section 39-1.12	12-foot straight- edge and must-grind	12-foot straight- edge and must-grind	12-foot straight- edge and must-grind	12-foot straight- edge and must-grind
Asphalt binder	Various	Section 92	Section 92	Section 92	Section 92
Asphalt rubber binder	Various	--	--	Section 92- 1.01D(2) and section 39-1.02D	Section 92- 1.01D(2) and section 39-1.02D
Asphalt modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D
CRM	Various	--	--	Section 39-1.02D	Section 39-1.02D

^a The Engineer determines combined aggregate gradations containing RAP under California Test 367.

^b The tolerances must comply with the allowable tolerances in section 39-1.02E.

^c The Engineer reports the average of 3 tests from a single split sample.

^d 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.

^e The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

^f Report only.

^g Applies to RAP substitution rate greater than 15 percent.

Replace "280 degrees F" in item 2 in the list in the 6th paragraph of section 39-3.04 with:

285 degrees F

01-20-12

Replace "5,000" in the 5th paragraph of section 39-4.02C with:

10,000

02-22-13

Replace the 7th paragraph of section 39-4.02C with:

Except for RAP substitution rate of greater than 15 percent, the Department does not use results from California Test 371 to determine specification compliance.

02-22-13

Replace the 8th paragraph of section 39-4.02C with:

02-22-13

Comply with the values for the HMA quality characteristics and minimum random sampling and testing for quality control shown in the following table:

Minimum Quality Control—QC/QA Construction Process

Quality characteristic	Test method	Minimum sampling and testing frequency	HMA Type			Location of sampling	Maximum report-ing time allow-ance
			A	B	RHMA-G		
Aggregate gradation ^a	California Test 202	1 per 750 tons	JMF ± tolerance ^b	JMF ± tolerance ^b	JMF ± tolerance ^b	California Test 125	24 hours
Asphalt binder content (%)	California Test 379 or 382		JMF±0.40	JMF±0.40	JMF ±0.40	Loose mix behind paver See California Test 125	
Field compaction (% max. 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	California Test 226 or 370	2 per day during production	--	--	--	Stock-piles or cold feed belts	--
Sand equivalent (min) ^f	California Test 217	1 per 750 tons	47	42	47	California Test 125	24 hours
HMA moisture content (% max)	California Test 226 or 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 California Test 125	24 hours
Stabilometer value (min) ^f	California Test 366	1 per 4,000 tons or 2 per 5 business days, whichever is greater	30	30	--		48 hours
No. 4 and 3/8" gradings 1/2" and 3/4" gradings			37	35	23		
Air void content (%) ^{f,g}	California Test 367		4 ± 2	4 ± 2	TV ± 2		

Percent of crushed particles coarse aggregate (% min.): One fractured face Two fractured faces	California Test 205	As designated in QC plan. At least once per project.	90	25	--	California Test 125	48 hours
			75	--	90		
Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve): One fractured face			70	20	70		
Los Angeles Rattler (% max): Loss at 100 rev. Loss at 500 rev.	California Test 211		12	--	12	California Test 125	
			45	50	40		
Fine aggregate angularity (% min) ⁿ	California Test 234		45	45	45	California Test 125	
Flat and elongated particle (% max by weight @ 5:1)	California Test 235		Report only	Report only	Report only	California Test 125	
Voids filled with asphalt (%) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367				Report only		
			65.0–75.0	65.0–75.0			
		65.0–75.0	65.0–75.0				
		65.0–75.0	65.0–75.0				
		65.0–75.0	65.0–75.0				
Voids in mineral aggregate (% min.) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367						
		17.0	17.0	--			
		15.0	15.0	--			
		14.0	14.0	18.0–23.0			
		13.0	13.0	18.0–23.0			

Dust proportion ⁱ No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367		0.6–1.2 0.6–1.2	0.6–1.2 0.6–1.2	Report only		
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) ⁱ PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is greater	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--	--	
Hamburg wheel track (inflection point minimum number of passes) ⁱ PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is greater	10,000 10,000 12,500 15000	10,000 10,000 12,500 15000	--	--	
Moisture susceptibility (minimum dry strength, psi) ^j	California Test 371	1 per 10,000 tons or 1 per project whichever is greater	120	120	--	--	
Moisture susceptibility (tensile strength ratio, %) ^j	California Test 371	1 per 10,000 tons or 1 per project whichever is greater	70	70	70	--	
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 @ 375 °F, centipoises	Section 39-1.02D	--	--	--	1,500–4,000	Section 39-1.02D	24 hours
CRM	Section 39-1.02D	--	--	--	Section 39-1.02D	Section 39-1.02D	48 hours

- ^a Determine combined aggregate gradation containing RAP under California Test 367.
- ^b The tolerances must comply with the allowable tolerances in section 39-1.02E.
- ^c Determines field compaction for any of the following conditions:
 1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot.
 2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.
- ^d To determine field compaction use:
 1. In-place density measurements using the method specified in your QC plan.
 2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.
- ^e For adjusting the plant controller at the HMA plant.
- ^f Report the average of 3 tests from a single split sample.
- ^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 The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.
- ⁱ Report only.
- ^j Applies to RAP substitution rate greater than 15 percent.

Replace the 1st sentence in the 1st paragraph of section 39-4.03B(2) with:

01-20-12

For aggregate gradation and asphalt binder content, the minimum ratio of verification testing frequency to quality control testing frequency is 1:5.

Replace the 2nd "and" in the 7th paragraph of section 39-4.03B(2) with:

01-20-12

or

Replace the 1st paragraph of section 39-4.04A with:

02-22-13

The Engineer samples for acceptance testing and tests for the following quality characteristics:

HMA Acceptance—QC/QA Construction Process

Index (i)	Quality characteristic				Weight -ing factor (w)	Test method	HMA type		
							A	B	RHMA-G
		Aggregate gradation ^a				California Test 202	JMF ± Tolerance ^c		
	Sieve	3/4"	1/2"	3/8"					
1	1/2"	X ^b	--	--	0.05				
1	3/8"	--	X	--	0.05				
1	No. 4	--	--	X	0.05				
2	No. 8	X	X	X	0.10				
3	No. 200	X	X	X	0.15				
4	Asphalt binder content (%)				0.30	California Test 379 or 382	JMF±0.40	JMF±0.40	JMF ± 0.40
5	Field compaction (% max. theoretical density) ^{d, e}				0.40	California Test 375	92–96	92–96	91–96
	Sand equivalent (min) ^f					California Test 217	47	42	47
	Stabilometer value (min) ^f No. 4 and 3/8" gradings 1/2" and 3/4" gradings					California Test 366	30 37	30 35	-- 23
	Air void content (%) ^{f, g}					California Test 367	4 ± 2	4 ± 2	TV ± 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					California Test 205	90 75	25 --	-- 90
	HMA moisture content (% max)					California Test 226 or 370	1.0	1.0	1.0
	Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.					California Test 211	12 45	-- 50	12 40
	Fine aggregate angularity (% min) ^h					California Test 234	45	45	45
	Flat and elongated particle (% max by weight @ 5:1)					California Test 235	Report only	Report only	Report only
	Voids in mineral aggregate (% min) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading					California Test 367	17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 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		California Test 367	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	Report only
	Dust proportion ¹ No. 4 and 3/8" gradings 1/2" and 3/4" gradings		California Test 367	0.6–1.2 0.6–1.2	0.6–1.2 0.6–1.2	Report only
	Hamburg Wheel Tracker (minimum number of passes at 0.5 inch average rut depth) ^j PG-58 PG-64 PG-70 PG-76 or higher		AASHTO T 324 (Modified)	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--
	Hamburg Wheel Tracker (inflection point minimum number of passes) ^j PG-58 PG-64 PG-70 PG-76 or higher		AASHTO T 324 (Modified)	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--
	Moisture susceptibility (minimum dry strength, psi) ^j		California Test 371	120	120	--
	Moisture susceptibility (tensile strength ratio %) ^j		California Test 371	70	70	70
	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 92-1.01D(2) and section 39-1.02D
	Asphalt modifier		Various	--	--	Section 39-1.02D
	CRM		Various	--	--	Section 39-1.02D

Replace the 2nd and 3rd paragraphs in section 40-1.01D(4) with:

01-20-12

The QC plan must include details of corrective action to be taken if any process is out of control. As a minimum, a process is out of control if any of the following occurs:

1. For fine and coarse aggregate gradation, 2 consecutive running averages of 4 tests are outside the specification limits
2. For individual penetration or air content measurements:
 - 2.1. One point falls outside the suspension limit line
 - 2.2. Two points in a row fall outside the action limit line

Stop production and take corrective action for out of control processes or the Engineer rejects subsequent material.

Replace the 1st paragraph in section 40-1.01D(5) with:

01-20-12

Determine the minimum cementitious materials content. Use your value for minimum cementitious material content for MC in equation 1 and equation 2 of section 90-1.02B(3).

Replace the 1st sentence of the 3rd paragraph of section 40-1.01D(9) with:

01-20-12

Use a California profilograph to determine the concrete pavement profile.

Replace the title of the table in section 40-1.01D(13)(a) with:

01-20-12

Concrete Pavement Acceptance Testing

Replace the 2nd and 3rd paragraphs in section 40-1.01D(13)(a) with:

01-20-12

Pavement smoothness may be accepted based on the Department's testing. A single test represents no more than 0.1 mile.

Acceptance of modulus of rupture, thickness, dowel bar and tie bar placement, coefficient of friction, smoothness, and air content, does not constitute final concrete pavement acceptance.

Delete item 4 in the list in the 2nd paragraph in section 40-1.01D(13)(c)(2).

01-20-12

Replace items 1 and 2 in the list in the 2nd paragraph in 40-1.01D(13)(d) with:

01-20-12

1. For tangents and horizontal curves having a centerline radius of curvature 2,000 feet or more, the PI_0 must be at most 2-1/2 inches per 0.1-mile section.
2. For horizontal curves having a centerline radius of curvature from 1,000 to 2,000 feet including concrete pavement within the superelevation transitions of those curves, the PI_0 must be at most 5 inches per 0.1-mile section.

Replace the 1st and 2nd variables in the equation in section 40-1.01D(13)(f) with:

01-20-12

n_c = Number of your quality control tests (minimum of 6 required)

n_v = Number of verification tests (minimum of 2 required)

Replace "Your approved third party independent testing laboratory" in the 4th paragraph of section 40-1.01D(13)(f) with:

01-20-12

The authorized laboratory

Replace item 2 in the list in the 2nd paragraph of section 40-1.01D(13)(g):

01-20-12

2. One test for every 4,000 square yards of concrete pavement with tie bars or remaining fraction of that area. Each tie bar test consists of 2 cores with 1 on each tie-bar-end to expose both ends and allow measurement.

Replace section 40-1.01D(13)(h) with:

01-20-12

40-1.01D(13)(h) Bar Reinforcement

Bar reinforcement is accepted based on inspection before concrete placement.

Replace the paragraph in section 40-1.02B(2) with:

01-20-12

PCC for concrete pavement must comply with section 90-1 except as otherwise specified.

Replace the paragraphs in section 40-1.02D with:

01-20-12

Bar reinforcement must be deformed bars.

If the project is not shown to be in high desert or any mountain climate region, bar reinforcement must comply with section 52.

If the project is shown to be in high desert or any mountain climate regions, bar reinforcement must be one of the following:

1. Epoxy-coated bar reinforcement under section 52-2.03B except bars must comply with either ASTM A 706/A 706M; ASTM A 996/A 996M; or ASTM A 615/A 615M, Grade 40 or 60. Bars must be handled under ASTM D 3963/D 3963M and section 52-2.02C.
2. Low carbon, chromium steel bar complying with ASTM A 1035/A 1035M

Replace the paragraphs in section 40-1.02E with:

01-20-12

Tie bars must be deformed bars.

If the project is not shown to be in high desert or any mountain climate region, tie bars must be one of the following:

1. Epoxy-coated bar reinforcement. Bars must comply with either section 52-2.02B or 52-2.03B except bars must comply with either ASTM A 706/A 706M; ASTM A 996/A 996M; or ASTM A 615/A 615M, Grade 40 or 60.
2. Stainless-steel bars. Bars must be descaled, pickled, polished, and solid stainless-steel bars under ASTM A 955/A 955M, Grade 60, UNS Designation S31603 or S31803.
3. Low carbon, chromium-steel bars under ASTM A 1035/A 1035M.

If the project is shown to be in high desert or any mountain climate region, tie bars must be one of the following:

1. Epoxy-coated bar reinforcement. Bars must comply with section 52-2.03B except bars must comply with either ASTM A 706/A 706M; ASTM A 996/A 996M; or ASTM A 615/A 615M, Grade 40 or 60.
2. Stainless-steel bars. Bars must be descaled, pickled, polished, and solid stainless-steel bars under ASTM A 955/A 955M, Grade 60, UNS Designation S31603 or S31803.

Fabricate, sample, and handle epoxy-coated tie bars under ASTM D 3963/D 3963M, section 52-2.02C, or section 52-2.03C.

Do not bend tie bars.

Replace the 1st, 2nd, and 3rd paragraphs in section 40-1.02F with:

01-20-12

Dowel bars must be plain bars. Fabricate, sample, and handle epoxy-coated dowel bars under ASTM D 3963/D 3963M and section 52-2.03C except each sample must be 18 inches long.

If the project is not shown to be in high desert or any mountain climate region, dowel bars must be one of the following:

1. Epoxy-coated bars. Bars must comply with ASTM A 615/A 615M, Grade 40 or 60. Epoxy coating must comply with either section 52-2.02B or 52-2.03B.
2. Stainless-steel bars. Bars must be descaled, pickled, polished, and solid stainless-steel bars under ASTM A 955/A 955M, Grade 60, UNS Designation S31603 or S31803.
3. Low carbon, chromium-steel bars under ASTM A 1035/A 1035M.

If the project is shown to be in high desert or any mountain climate region, dowel bars must be one of the following:

1. Epoxy-coated bars. Bars must comply with ASTM A 615/A 615M, Grade 40 or 60. Epoxy coating must comply with section 52-2.03B.
2. Stainless-steel bars. Bars must be descaled, pickled, polished, and solid stainless-steel bars under ASTM A 955/A 955M, Grade 60, UNS Designation S31603 or S31803.

Replace the paragraphs in section 40-1.02G with:

01-20-12

For dowel and tie bar baskets, wire must comply with ASTM A 82/A 82M and be welded under ASTM A 185/A 185M, Section 7.4. The minimum wire-size no. is W10. Use either U-frame or A-frame shaped assemblies.

If the project is not shown to be in high desert or any mountain climate region. Baskets may be epoxy-coated, and the epoxy coating must comply with either section 52-2.02B or 52-2.03B.

If the project is shown to be in high desert or any mountain climate region, wire for dowel bar and tie bar baskets must be one of the following:

1. Epoxy-coated wire complying with section 52-2.03B
2. Stainless-steel wire. Wire must be descaled, pickled, and polished solid stainless-steel. Wire must comply with (1) the chemical requirements in ASTM A 276/A 276M, UNS Designation S31603 or S31803 and (2) the tension requirements in ASTM A 1022/ A 1022M.

Handle epoxy-coated tie bar and dowel bar baskets under ASTM D 3963/D 3963M and either section 52-2.02B or 52-2.03B.

Fasteners must be driven fasteners under ASTM F 1667. Fasteners on lean concrete base or HMA must have a minimum shank diameter of 3/16 inch and a minimum shank length of 2-1/2 inches. For asphalt

treated permeable base or cement treated permeable base, the shank diameter must be at least 3/16 inch and the shank length must be at least 5 inches.

Fasteners, clips, and washers must have a minimum 0.2-mil thick zinc coating applied by either electroplating or galvanizing.

Replace the 1st paragraph in section 40-1.02H with:

01-20-12

Chemical adhesive for drilling and bonding dowels and tie bars must be on the Authorized Material List. The Authorized Material List indicates the appropriate chemical adhesive system for the concrete temperature and installation conditions.

Replace section 40-1.02I(2) with:

01-20-12

40-1.02I(2) Silicone Joint Sealant

Silicone joint sealant must be on the Authorized Material List.

Replace the last sentence in section 40-1.02I(4) with:

01-20-12

Show evidence that the seals are compressed from 30 to 50 percent for the joint width at time of installation.

Replace the paragraph in section 40-1.02L with:

01-20-12

Water for core drilling may be obtained from a potable water source, or submit proof that it does not contain:

1. More than 1,000 parts per million of chlorides as Cl
2. More than 1,300 parts per million of sulfates as SO₄
3. Impurities that cause pavement discoloration or surface etching

Replace the paragraph in section 40-1.03B with:

01-20-12

Before placing concrete pavement, develop enough water supply for the work under section 17.

Replace the last paragraph in section 40-1.03D(1) with:

01-20-12

Removal of grinding residue must comply with section 42-1.03B.

Replace the 1st and 2nd paragraphs in section 40-1.03E(6)(c) with:

01-20-12

Install preformed compressions seals in isolation joints if specified in the special provisions.

Install longitudinal seals before transverse seals. Longitudinal seals must be continuous except splicing is allowed at intersections with transverse seals. Transverse seals must be continuous for the entire transverse length of concrete pavement except splices are allowed for widenings and staged construction. With a sharp instrument, cut across the longitudinal seal at the intersection with transverse

construction joints. If the longitudinal seal does not relax enough to properly install the transverse seal, trim the longitudinal seal to form a tight seal between the 2 joints.

If splicing is authorized, splicing must comply with the manufacturer's written instructions.

Replace the 12th and 13th paragraphs in section 40-1.03G with:

01-20-12

Construct additional test strips if you:

1. Propose different paving equipment including:
 - 1.1. Paver
 - 1.2. Dowel bar inserter
 - 1.3. Tie bar inserter
 - 1.4. Tining
 - 1.5. Curing equipment
2. Change concrete mix proportions

You may request authorization to eliminate the test strip if you use paving equipment and personnel from a Department project (1) for the same type of pavement and (2) completed within the past 12 months. Submit supporting documents and previous project information with your request.

Replace the 1st paragraph in section 40-1.03I with:

01-20-12

Place tie bars in compliance with the tolerances shown in the following table:

Tie Bar Tolerance	
Dimension	Tolerance
Horizontal and vertical skew	10 degrees maximum
Longitudinal translation	± 2 inch maximum
Horizontal offset (embedment)	± 2 inch maximum
Vertical depth	1. Not less than 1/2 inch below the saw cut depth of joints 2. When measured at any point along the bar, not less than 2 inches clear of the pavement's surface and bottom

Replace item 4 in the list in the 2nd paragraph in section 40-1.03I with:

01-20-12

4. Use tie bar baskets. Anchor baskets at least 200 feet in advance of pavement placement activity. If you request a waiver, describe the construction limitations or restricted access preventing the advanced anchoring. After the baskets are anchored and before paving, demonstrate the tie bars do not move from their specified depth and alignment during paving. Use fasteners to anchor tie bar baskets.

Replace "The maximum distance below the depth shown must be 0.05 foot." in the table in section 40-1.03J with:

01-20-12

The maximum distance below the depth shown must be 5/8 inch.

Replace sections 40-1.03L and 40-1.03M with:

01-20-12

40-1.03L Finishing

40-1.03L(1) General

Reserved

40-1.03L(2) Preliminary Finishing

40-1.03L(2)(a) General

Preliminary finishing must produce a smooth and true-to-grade finish. After preliminary finishing, mark each day's paving with a stamp. The stamp must be authorized before paving starts. The stamp must be approximately 1 by 2 feet in size. The stamp must form a uniform mark from 1/8 to 1/4 inch deep. Locate the mark 20 ± 5 feet from the transverse construction joint formed at each day's start of paving and 1 ± 0.25 foot from the pavement's outside edge. The stamp mark must show the month, day, and year of placement and the station of the transverse construction joint. Orient the stamp mark so it can be read from the pavement's outside edge.

Do not apply more water to the pavement surface than can evaporate before float finishing and texturing are completed.

40-1.03L(2)(b) Stationary Side Form Finishing

If stationary side form construction is used, give the pavement a preliminary finish by the machine float method or the hand method.

If using the machine float method:

1. Use self-propelled machine floats.
2. Determine the number of machine floats required to perform the work at a rate equal to the pavement delivery rate. If the time from paving to machine float finishing exceeds 30 minutes, stop pavement delivery. When machine floats are in proper position, you may resume pavement delivery and paving.
3. Run machine floats on side forms or adjacent pavement lanes. If running on adjacent pavement, protect the adjacent pavement surface under section 40-1.03P. Floats must be hardwood, steel, or steel-shod wood. Floats must be equipped with devices that adjust the underside to a true flat surface.

If using the hand method, finish pavement smooth and true to grade with manually operated floats or powered finishing machines.

40-1.03L(2)(c) Slip-Form Finishing

If slip-form construction is used, the slip-form paver must give the pavement a preliminary finish. You may supplement the slip-form paver with machine floats.

Before the pavement hardens, correct pavement edge slump in excess of 0.02 foot exclusive of edge rounding.

40-1.03L(3) Final Finishing

After completing preliminary finishing, round the edges of the initial paving widths to a 0.04-foot radius. Round transverse and longitudinal construction joints to a 0.02-foot radius.

Before curing, texture the pavement. Perform initial texturing with a burlap drag or broom device that produces striations parallel to the centerline. Perform final texturing with a steel-tined device that produces grooves parallel with the centerline.

Construct longitudinal grooves with a self-propelled machine designed specifically for grooving and texturing pavement. The machine must have tracks to maintain constant speed, provide traction, and maintain accurate tracking along the pavement surface. The machine must have a single row of rectangular spring steel tines. The tines must be from 3/32 to 1/8 inch wide, on 3/4-inch centers, and must have enough length, thickness, and resilience to form grooves approximately 3/16 inch deep. The machine must have horizontal and vertical controls. The machine must apply constant down pressure on the pavement surface during texturing. The machines must not cause ravels.

Construct grooves over the entire pavement width in a single pass except do not construct grooves 3 inches from the pavement edges and longitudinal joints. Final texture must be uniform and smooth. Use a guide to properly align the grooves. Grooves must be parallel and aligned to the pavement edge across the pavement width. Grooves must be from 1/8 to 3/16 inch deep after the pavement has hardened.

For irregular areas and areas inaccessible to the grooving machine, you may hand-construct grooves under section 40-1.03L(2) using the hand method. Hand-constructed grooves must comply with the specifications for machine-constructed grooves.

Initial and final texturing must produce a coefficient of friction of at least 0.30 when tested under California Test 342. Notify the Engineer when the pavement is scheduled to be opened to traffic to allow at least 25 days for the Department to schedule testing for coefficient of friction. Notify the Engineer when the pavement is ready for testing which is the latter of:

1. Seven days after paving
2. When the pavement has attained a modulus of rupture of 550 psi

The Department tests for coefficient of friction within 7 days of receiving notification that the pavement is ready for testing.

Do not open the pavement to traffic unless the coefficient of friction is at least 0.30.

40-1.03M Reserved

Replace the 4th paragraph of 40-1.03P with:

01-20-12

Construct crossings for traffic convenience. If authorized, you may use RSC for crossings. Do not open crossings until the Department determines that the pavement's modulus of rupture is at least 550 psi under California Test 523 or California Test 524.

Replace the 1st paragraph of section 40-6.01A with:

01-20-12

Section 40-6 includes specifications for applying a high molecular weight methacrylate resin system to pavement surface cracks that do not extend the full slab depth.

Replace the 4th paragraph of section 40-6.01C(2) with:

01-20-12

If the project is in an urban area adjacent to a school or residence, the public safety plan must also include an airborne emissions monitoring plan prepared by a CIH certified in comprehensive practice by the American Board of Industrial Hygiene. Submit a copy of the CIH's certification. The CIH must monitor the emissions at a minimum of 4 points including the mixing point, the application point, and the point of nearest public contact. At work completion, submit a report by the industrial hygienist with results of the airborne emissions monitoring plan.

Delete the 1st sentence of the 2nd paragraph in section 40-6.02B.

01-20-12

Replace item 4 in the list in the last paragraph in section 40-6.03A with:

01-20-12

4. Coefficient of friction is at least 0.30 under California Test 342

Replace the 2nd paragraph of section 49-2.01D with:

01-20-12

Furnish piling is measured along the longest side of the pile from the specified tip elevation shown to the plane of pile cutoff.

Replace "sets" in the 1st paragraph of section 49-2.04A(3) with:

04-19-13

copies

Replace the 3rd and 4th paragraphs of section 49-2.04B(2) with:

10-19-12

Piles in a corrosive environment must be steam or water cured under section 90-4.03.

If piles in a corrosive environment are steam cured, either:

1. Keep the piles continuously wet for at least 3 days. The 3 days includes the holding and steam curing periods.
2. Apply curing compound under section 90-1.03B(3) after steam curing.

Add to section 49-3.01A:

01-20-12

Concrete must comply with section 51.

Replace the 1st paragraph of section 49-3.01C with:

01-20-12

Except for CIDH concrete piles constructed under slurry, construct CIP concrete piles such that the excavation methods and the concrete placement procedures provide for placing the concrete against undisturbed material in a dry or dewatered hole.

Replace "Reserved" in section 49-3.02A(2) with:

01-20-12

dry hole:

1. Except for CIDH concrete piles specified as end bearing, a drilled hole that:
 - 1.1. Accumulates no more than 12 inches of water in the bottom of the drilled hole during a period of 1 hour without any pumping from the hole during the hour.
 - 1.2. Has no more than 3 inches of water in the bottom of the drilled hole immediately before placing concrete.
2. For CIDH concrete piles specified as end bearing, a drilled hole free of water without the use of pumps.

Replace "Reserved" in section 49-3.02A(3)(a) with:

01-20-12

If plastic spacers are proposed for use, submit the manufacturer's data and a sample of the plastic spacer. Allow 10 days for review.

Replace item 5 in the list in the 1st paragraph of section 49-3.02A(3)(b) with:

10-19-12

5. Methods and equipment for determining:
 - 5.1. Depth of concrete
 - 5.2. Theoretical volume of concrete to be placed, including the effects on volume if casings are withdrawn
 - 5.3. Actual volume of concrete placed

Add to the list in the 1st paragraph of section 49-3.02A(3)(b):

01-18-13

8. Drilling sequence and concrete placement plan.

Replace item 2 in the list in the 1st paragraph of section 49-3.02A(3)(g) with:

01-20-12

2. Be sealed and signed by an engineer who is registered as a civil engineer in the State. This requirement is waived for either of the following conditions:
 - 2.1. The proposed mitigation will be performed under the current Department-published version of *ADSC Standard Mitigation Plan 'A' - Basic Repair* without exception or modification.
 - 2.2. The Engineer determines that the rejected pile does not require mitigation due to structural, geotechnical, or corrosion concerns, and you elect to repair the pile using the current Department-published version of *ADSC Standard Mitigation Plan 'B' - Grouting Repair* without exception or modification.

Replace item 1 in the list in the 1st paragraph of section 49-3.02A(4)(d)(ii) with:

01-20-12

1. Inspection pipes must be schedule 40 PVC pipe complying with ASTM D 1785 with a nominal pipe size of 2 inches. Watertight PVC couplers complying with ASTM D 2466 are allowed to facilitate pipe lengths in excess of those commercially available. Log the location of the inspection pipe couplers with respect to the plane of pile cutoff.

Add to section 49-3.02A(4)(d)(iv):

01-20-12

If the Engineer determines it is not feasible to use one of ADSC's standard mitigation plans to mitigate the pile, schedule a meeting and meet with the Engineer before submitting a nonstandard mitigation plan.

The meeting attendees must include your representatives and the Engineer's representatives involved in the pile mitigation. The purpose of the meeting is to discuss the type of pile mitigation acceptable to the Department.

Provide the meeting facility. The Engineer conducts the meeting.

Replace the 1st paragraph of section 49-3.02B(5) with:

01-20-12

Grout used to backfill casings must comply with section 50-1.02C, except:

1. Grout must consist of cementitious material and water, and may contain an admixture if authorized. Cementitious material must comply with section 90-1.02B, except SCMs are not required. The minimum cementitious material content of the grout must not be less than 845 lb/cu yd of grout.
2. Aggregate must be used to extend the grout as follows:

2. Each jack used to tension prestressing steel permanently anchored at 25 percent or more of its specified minimum ultimate tensile strength must be calibrated by METS within 1 year of use and after each repair. You must:
 - 2.1. Schedule the calibration of the jacking equipment with METS
 - 2.2. Verify that the jack and supporting systems are complete, with proper components, and are in good operating condition
 - 2.3. Mechanically calibrate the gages with a dead weight tester or other authorized means before calibration of the jacking equipment by METS
 - 2.4. Provide enough labor, equipment, and material to (1) install and support the jacking and calibration equipment and (2) remove the equipment after the calibration is complete
 - 2.5. Plot the calibration results
3. Each jack used to tension prestressing steel permanently anchored at less than 25 percent of its specified minimum ultimate tensile strength must be calibrated by an authorized laboratory within 6 months of use and after each repair.

Replace "diameter" in item 9 in the list in the 1st paragraph of section 50-1.02D with:

cross-sectional area

04-20-12

Add to section 50-1.02:

50-1.02G Sheathing

09-16-11

Sheathing for debonding prestressing strand must:

1. Be split or un-split flexible polymer plastic tubing
2. Have a minimum wall thickness of 0.025 inch
3. Have an inside diameter exceeding the maximum outside diameter of the strand by 0.025 to 0.14 inch

Split sheathing must overlap at least 3/8 inch.

Waterproofing tape used to seal the ends of the sheathing must be flexible adhesive tape.

The sheathing and waterproof tape must not react with the concrete, coating, or steel.

Add to section 50-1.03B(1):

01-20-12

After seating, the maximum tensile stress in the prestressing steel must not exceed 75 percent of the minimum ultimate tensile strength shown.

Add to section 50-1.03B(2):

09-16-11

50-1.03B(2)(e) Debonding Prestressing Strands

Where shown, debond prestressing strands by encasing the strands in plastic sheathing along the entire length shown and sealing the ends of the sheathing with waterproof tape.

Distribute the debonded strands symmetrically about the vertical centerline of the girder. The debonded lengths of pairs of strands must be equal.

Do not terminate debonding at any one cross section of the member for more than 40 percent of the debonded strands or 4 strands, whichever is greater.

Thoroughly seal the ends with waterproof tape to prevent the intrusion of water or cement paste before placing the concrete.

AA

51 CONCRETE STRUCTURES

04-19-13

Replace the paragraphs of section 51-1.01A with:

10-19-12

Section 51-1 includes general specifications for constructing concrete structures.

Earthwork for the following concrete structures must comply with section 19-3:

1. Sound wall footings
2. Sound wall pile caps
3. Culverts
4. Barrier slabs
5. Junction structures
6. Minor structures
7. Pipe culvert headwalls, endwalls, and wingwalls for a pipe with a diameter of 5 feet or greater

Falsework must comply with section 48-2.

Joints must comply with section 51-2.

Elastomeric bearing pads must comply with section 51-3.

Reinforcement for the following concrete structures must comply with section 52:

1. Sound wall footings
2. Sound wall pile caps
3. Barrier slabs
4. Junction structures
5. Minor structures
6. PC concrete members

You may use RSC for a concrete structure only where the specifications allow the use of RSC.

Replace the heading of section 51-1.01D(4) with:

04-19-13

Testing Concrete Surfaces

Add to section 51-1.01D(4)(a):

04-19-13

The Engineer tests POC deck surfaces for smoothness and crack intensity.

Add to the list in the 1st paragraph of section 51-1.01D(4)(b):

04-19-13

3. Completed deck surfaces, including ramps and landings of POCs

Replace the 4th paragraph in section 51-1.01D(4)(b) with:

04-19-13

Except for POCs, surface smoothness is tested using a bridge profilograph under California Test 547. Two profiles are obtained in each lane approximately 3 feet from the lane lines and 1 profile is obtained in

each shoulder approximately 3 feet from the curb or rail face. Profiles are taken parallel to the direction of traffic.

Add between the 5th and 6th paragraphs of section 51-1.01D(4)(b):

04-19-13

POC deck surfaces must comply with the following smoothness requirements:

1. Surfaces between grade changes must not vary more than 0.02 foot from the lower edge of a 12-foot-long straightedge placed parallel to the centerline of the POC
2. Surface must not vary more than 0.01 foot from the lower edge of a 6-foot-long straightedge placed perpendicular to the centerline of the POC

Add to section 51-1.01D(4)(d):

04-19-13

The Engineer measures crack intensity of POC deck surfaces after curing, before prestressing, and before falsework release. Clean the surface for the Engineer to measure surface crack intensity.

In any 100 sq ft portion of a new POC deck surface, if there are more than 10 feet of cracks having a width at any point of over 0.02 inch, treat the deck with methacrylate resin under section 15-5.05. Treat the entire deck width between the curbs to 5 feet beyond where the furthest continuous crack emanating from the 100 sq ft section is 0.02 inch wide. Treat the deck surface before grinding.

Add to section 51-1.03C(2)(c)(i):

04-20-12

Permanent steel deck forms are only allowed where shown or if specified as an option in the special provisions.

Replace the 3rd paragraph of section 51-1.03C(2)(c)(ii) with:

04-20-12

Compute the physical design properties under AISI's *North American Specification for the Design of Cold-Formed Steel Structural Members*.

Replace the 8th paragraph of section 51-1.03D(1) with:

10-19-12

Except for concrete placed as pipe culvert headwalls and endwalls, slope paving and aprons, and concrete placed under water, consolidate concrete using high-frequency internal vibrators within 15 minutes of placing concrete in the forms. Do not attach vibrators to or hold them against forms or reinforcing steel. Do not displace reinforcement, ducts, or prestressing steel during vibrating.

Add to section 51-1.03E(5):

08-05-11

Drill the holes without damaging the adjacent concrete. If reinforcement is encountered during drilling before the specified depth is attained, notify the Engineer. Unless coring through the reinforcement is authorized, drill a new hole adjacent to the rejected hole to the depth shown.

Add to section 51-1.03F(5)(a):

04-19-13

For approach slabs, sleeper slabs, and other roadway surfaces of concrete structures, texture the roadway surface as specified for bridge deck surfaces in section 51-1.03F(5)(b).

Replace "Reserved" in section 51-1.03F(5)(b) with:

04-20-12

51-1.03F(5)(b)(i) General

Except for bridge widenings, texture the bridge deck surfaces longitudinally by grinding and grooving or by longitudinal tining.

10-19-12

For bridge widenings, texture the deck surface longitudinally by longitudinal tining.

04-20-12

In freeze-thaw areas, do not texture PCC surfaces of bridge decks.

51-1.03F(5)(b)(ii) Grinding and Grooving

When texturing the deck surface by grinding and grooving, place a 1/4 inch of sacrificial concrete cover on the bridge deck above the finished grade shown. Place items to be embedded in the concrete based on the final profile grade elevations shown. Construct joint seals after completing the grinding and grooving.

Before grinding and grooving, deck surfaces must comply with the smoothness and deck crack treatment requirements.

Grind and groove the deck surface as follows:

1. Grind the surface to within 18 inches of the toe of the barrier under section 42-3. Grinding must not reduce the concrete cover on reinforcing steel to less than 1-3/4 inches.
2. Groove the ground surfaces longitudinally under section 42-2. The grooves must be parallel to the centerline.

51-1.03F(5)(b)(iii) Longitudinal Tining

When texturing the deck surface by longitudinal tining, perform initial texturing with a burlap drag or broom device that produces striations parallel to the centerline. Perform final texturing with spring steel tines that produce grooves parallel with the centerline.

The tines must:

1. Be rectangular in cross section
2. Be from 3/32 to 1/8 inch wide on 3/4-inch centers
3. Have enough length, thickness, and resilience to form grooves approximately 3/16 inch deep

Construct grooves to within 6 inches of the layout line of the concrete barrier toe. Grooves must be from 1/8 to 3/16 inch deep and 3/16 inch wide after concrete has hardened.

For irregular areas and areas inaccessible to the grooving machine, you may hand construct grooves. Hand-constructed grooves must comply with the specifications for machine-constructed grooves.

Tining must not cause tearing of the deck surface or visible separation of coarse aggregate at the surface.

Add to section 51-1.03F:

04-19-13

51-1.03F(6) Finishing Pedestrian Overcrossing Surfaces

Construct deck surfaces, including ramps and landings of POCs to the grade and cross section shown. Surfaces must comply with the specified smoothness, surface texture, and surface crack requirements.

The Engineer sets deck elevation control points for your use in establishing the grade and cross section of the deck surface. The grade established by the deck elevation control points includes all camber allowances. Except for landings, elevation control points include the beginning and end of the ramp and will not be closer together than approximately 8 feet longitudinally and 4 feet transversely to the POC centerline. Landing elevation control points are at the beginning and the end of the landing.

Broom finish the deck surfaces of POCs. Apply the broom finish perpendicular to the path of travel. You may apply water mist to the surface immediately before brooming.

Clean any discolored concrete by abrasive blast cleaning or other authorized methods.

Replace the paragraphs of section 51-1.04 with:

10-19-12

If concrete involved in bridge work is not designated by type and is not otherwise paid for under a separate bid item, the concrete is paid for as structural concrete, bridge.

The payment quantity for structural concrete includes the volume in the concrete occupied by bar reinforcing steel, structural steel, prestressing steel materials, and piling.

The payment quantity for seal course concrete is the actual volume of seal course concrete placed except the payment quantity must not exceed the volume of concrete contained between vertical planes 1 foot outside the neat lines of the seal course shown. The Department does not adjust the unit price for an increase or decrease in the seal course concrete quantity.

Structural concrete for pier columns is measured as follows:

1. Horizontal limits are vertical planes at the neat lines of the pier column shown.
2. Bottom limit is the bottom of the foundation excavation in the completed work.
3. Upper limit is the top of the pier column concrete shown.

The payment quantity for drill and bond dowel is determined from the number and depths of the holes shown.

Replace section 51-2.01B(2) with:

04-19-13

51-2.01B(2) Reserved

04-19-13

Delete the 4th paragraph of section 51-2.01C.

Replace "SSPC-QP 3" in the 1st paragraph of section 51-2.02A(2) with:

10-19-12

AISC-420-10/SSPC-QP 3

Replace the 2nd and 3rd paragraphs of section 51-2.02B(3)(b) with:

04-20-12

Concrete saws for cutting grooves in the concrete must have diamond blades with a minimum thickness of 3/16 inch. Cut both sides of the groove simultaneously for a minimum 1st pass depth of 2 inches. The completed groove must have:

1. Top width within 1/8 inch of the width shown or ordered
2. Bottom width not varying from the top width by more than 1/16 inch for each 2 inches of depth
3. Uniform width and depth

Cutting grooves in existing decks includes cutting any conflicting reinforcing steel.

Replace "sets" in the 1st and 2nd paragraphs of section 51-2.02D(1)(c)(ii) with:

copies

04-19-13

Replace "set" in the 7th paragraph of section 51-2.02D(1)(c)(ii) with:

copy

04-19-13

Add to the 1st paragraph of section 51-2.02D(3):

POC deck surfaces must comply with section 51-1.03F(6) before placing and anchoring joint seal assemblies.

04-19-13

Replace "sets" in the 2nd paragraph of section 51-2.02E(1)(c) with:

copies

04-19-13

Replace "set" in the 6th paragraph of section 51-2.02E(1)(c) with:

copy

04-19-13

Replace the 2nd paragraph of section 51-2.02E(1)(e) with:

Except for components in contact with the tires, the design loading must be the AASHTO LRFD Bridge Design Specifications Design Truck with 100 percent dynamic load allowance. Each component in contact with the tires must support a minimum of 80 percent of the AASHTO LRFD Bridge Design Specifications Design Truck with 100 percent dynamic load allowance. The tire contact area must be 10 inches measured normal to the longitudinal assembly axis by 20 inches wide. The assembly must provide a smooth-riding joint without slapping of components or tire rumble.

08-05-11

Replace "sets" in the 1st and 2nd paragraphs of section 51-2.02F(1)(c) with:

copies

04-19-13

Add between the 1st and 2nd paragraphs of section 51-4.01A:

Prestressing concrete members must comply with section 50.

10-19-12

Delete the 2nd paragraph of section 51-4.01A.

04-20-12

Replace the 3rd paragraph of section 51-4.01C(2) with:

04-20-12

For segmental or spliced-girder construction, shop drawings must include the following additional information:

1. Details showing construction joints or closure joints
2. Arrangement of bar reinforcing steel, prestressing tendons, and pressure-grouting pipe
3. Materials and methods for making closures
4. Construction joint keys and surface treatment
5. Other requested information

For segmental girder construction, shop drawings must include concrete form and casting details.

Replace "sets" in the 1st paragraph of section 51-4.01C(3) with:

04-19-13

copies

Delete the 1st and 2nd paragraphs of section 51-4.02A.

10-19-12

Replace the 3rd paragraph of section 51-4.02B(2) with:

04-20-12

For segmental or spliced-girder construction, materials for construction joints or closure joints at exterior girders must match the color and texture of the adjoining concrete.

Add to section 51-4.02B(2):

04-20-12

At spliced-girder closure joints:

1. If shear keys are not shown, the vertical surfaces of the girder segment ends must be given a coarse texture as specified for the top surface of PC members.
2. Post-tensioning ducts must extend out of the vertical surface of the girder segment closure end sufficiently to facilitate splicing of the duct.

For spliced girders, pretension strand extending from the closure end of the girder segment to be embedded in the closure joint must be free of mortar, oil, dirt, excessive mill scale and scabby rust, and other coatings that would destroy or reduce the bond.

Add to section 51-4.03B:

04-20-12

The specifications for prestressing force distribution and sequencing of stressing in the post-tensioning activity in 50-1.03B(2)(a) do not apply if post-tensioning of spliced girders before starting deck construction is described. The composite deck-girder structure must be post-tensioned in a subsequent stage.

Temporary spliced-girder supports must comply with the specifications for falsework in section 48-2.

Before post-tensioning of spliced girders, remove the forms at CIP concrete closures and intermediate diaphragms to allow inspection for concrete consolidation.

You must provide enclosures for cleaning and painting structural steel. Cleaning and painting of new structural steel must be performed in an Enclosed Shop as defined in AISC-420-10/SSPC-QP 3. Maintain atmospheric conditions inside enclosures within specified limits.

Except for blast cleaning within closed buildings, perform blast cleaning and painting during daylight hours.

Replace item 1 in the list in the 2nd paragraph of section 59-2.03C(1) with:

10-19-12

1. Apply a stripe coat of undercoat paint on all edges, corners, seams, crevices, interior angles, junctions of joining members, weld lines, and similar surface irregularities. The stripe coat must completely hide the surface being covered. If spot blast cleaning portions of the bridge, apply the stripe coat of undercoat paint before each undercoat and follow with the undercoat as soon as practical. If removing all existing paint from the bridge, apply the undercoat first as soon as practical and follow with the stripe coat of undercoat paint for each undercoat.

Replace the heading of section 59-2.03C(2) with:

04-19-13

Zinc Coating System

Add to section 59-2.03C(2)(a):

04-19-13

Coatings for new structural steel and connections between new and existing structural steel must comply with the requirements shown in the following table:

Zinc Coating System		
Description	Coating	Dry film thickness (mils)
All new surfaces:		
Undercoat	Inorganic zinc primer, AASHTO M 300 Type I or II	4–8
Finish coat ^a	Exterior grade latex ^b , 2 coats	2 minimum each coat, 4–8 total
Total thickness, all coats		8–14
Connections to existing structural steel:^c		
Undercoat	Inorganic zinc primer, AASHTO M 300 Type I or II	4–8
Finish coat ^a	Exterior grade latex ^b , 2 coats	2 minimum each coat, 4–8 total
Total thickness, all coats		8–14

^aIf no finish coats are described, a final coat of inorganic zinc primer is required.

^bExterior grade latex must comply with section 91-2.02 unless otherwise specified.

^cIncludes the following locations:

1. New and existing contact surfaces
2. Existing member surfaces under new HS bolt heads, nuts, or washers
3. Bare surfaces of existing steel after trimming, cutting, drilling, or reaming
4. Areas within a 4-inch radius from the point of application of heat for welding or flame cutting

Add to section 59-2.03C:

04-19-13

59-2.03C(3) Moisture-Cured Polyurethane Coating System

Reserved

59-2.03C(4) State Specification Paint Waterborne Coating System

59-2.03C(4)(a) General

The State Specification PWB coating system for existing structural steel must comply with the requirements shown in the following table:

State Specification PWB Coating System

Surface	Description	State Specification PWB Coating	Dry film thickness (mils)
Surfaces cleaned to bare metal ^a :	1st undercoat	145	2-3
	2nd undercoat	146	2-3
	1st finish coat	171	1.5-3
	2nd finish coat	172	1.5-3
	Total thickness, all coats	--	7-12
Existing painted surfaces to be topcoated:	Undercoat	146	2-3
	1st finish coat	171	1.5-3
	2nd finish coat	172	1.5-3
	Total thickness, new coats	--	5-9

^aIncludes locations of spot blast cleaning

59-2.03C(4)(b) Finish Coats

Pressure rinse undercoated surfaces to receive finish coats. Perform pressure rinsing no sooner than 72 hours after the final application of undercoat.

The 1st finish coat must be applied within 48 hours of pressure rinsing.

Apply the 1st finish coat in 2 applications. The 1st application consists of a spray-applied mist application. Apply the 2nd application after the mist application has dried to a set-to-touch condition as determined using the procedure in section 7 of ASTM D 1640.

Apply the 2nd finish coat after the 1st finish coat has dried 12 hours unless authorized. You may apply the 2nd finish coat in a single application.

Add to section 59-5.01:

04-19-13

Where specified, prepare and paint sign structures under sections 59-2 and 59-3.

Instead of submitting proof of the certification complying with SSPC-QP 1, you may submit documentation with the painting quality work plan showing compliance with the requirements in section 3 of SSPC-QP 1.

Instead of submitting proof of the certification complying with SSPC-QP 2, you may submit documentation with the painting quality work plan showing compliance with the requirements in sections 4.2 through 4.4 of SSPC-QP 2, Category A.

Instead of submitting proof of the certification complying with AISC-420-10/SSPC-QP 3 (Enclosed Shop), you may submit documentation with the painting quality work plan showing compliance with the requirements in sections 5 through 18 of AISC-420-10/SSPC-QP3.

86 ELECTRICAL SYSTEMS

10-19-12

Replace section 86-2.06 with:

01-20-12

86-2.06 PULL BOXES

86-2.06A General

86-2.06A(1) Cover Marking

Marking must be clearly defined, uniform in depth, and parallel to either the long or short sides of the cover.

Marking letters must be 1 to 3 inches high.

Before galvanizing steel or cast iron cover, apply marking by one of the following methods:

1. Use cast iron strip at least 1/4 inch thick with letters raised a minimum of 1/16 inch. Fasten strip to cover with 1/4-inch flathead stainless steel machine bolts and nuts. Peen bolts after tightening.
2. Use sheet steel strip at least 0.027 inch thick with letters raised a minimum of 1/16 inch. Fasten strip to cover by spot welding, tack welding, or brazing, with 1/4-inch stainless steel rivets or 1/4-inch roundhead stainless steel machine bolts and nuts. Peen bolts after tightening.
3. Bead weld the letters on cover such that the letters are raised a minimum of 3/32 inch.

86-2.06A(2) Installation and Use

Space pull boxes no more than 200 feet apart. You may install additional pull boxes to facilitate the work.

You may use a larger standard size pull box than that shown on the plans or specified.

A pull box in ground or sidewalk area must be installed as follows:

1. Embed bottom of the pull box in crushed rock.
2. Place a layer of roofing paper on the crushed rock.
3. Place grout over the layer of roofing paper. Grout must be 0.50 to 1 inch thick and sloped toward the drain hole.
4. Make a 1-inch drain hole in the center of the pull box through the grout and roofing paper.
5. Place grout between the pull box and the pull box extension, and around conduits.

The top of the pull box must be flush with the surrounding grade or the top of an adjacent curb, except in unpaved areas where the pull box is not immediately adjacent to and protected by a concrete foundation, pole, or other protective construction. Place the pull box 1-1/4 inches above the surrounding grade. Where practical, place a pull box shown in the vicinity of curbs or adjacent to a standard on the side of the foundation facing away from traffic. If a pull box is installed in a sidewalk area, adjust the depth of the pull box so that the top of the pull box is flush with the sidewalk.

Reconstruct the sump of an existing pull box if disturbed by your activities. Remove old grout and replace with new if the sump was grouted.

86-2.06B Non-Traffic-Rated Pull Boxes

Reserved

86-2.06C Traffic Pull Boxes

Traffic pull box and cover must comply with ASTM C857, "Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures," for HS20-44 loading. You must be able to place the load anywhere on the box and cover for 1 minute without causing cracks or permanent deformations.

Frame must be anchored to the box with 1/4 by 2-1/4 inch concrete anchors. Four concrete anchors must be included for No. 3-1/2(T) pull box; one placed in each corner. Six concrete anchors must be included for No. 5(T) and No. 6(T) pull boxes; one placed in each corner and one near the middle of each of the longer sides.

Nuts must be zinc-plated carbon steel, vibration resistant, and have a wedge ramp at the root of the thread.

After installation of traffic pull box, install the steel cover and keep it bolted down when your activities are not in progress at the pull box. When the steel cover is placed for the final time, the cover and Z bar frame must be cleaned of debris and tightened securely.

Steel cover must be countersunk approximately 1/4 inch to accommodate the bolt head. When tightened, the bolt head must not exceed more than 1/8 inch above the top of the cover.

Concrete placed around and under traffic pull boxes must be minor concrete.

Replace "project" in the 3rd paragraph of section 86-2.11A with:

10-19-12

work

Replace "Contract" in item 2 in the list in the 11th paragraph of section 86-2.11A with:

10-19-12

work

AA

88 GEOSYNTHETICS

01-18-13

Replace the row for hydraulic bursting strength in the table in the 2nd paragraph of section 88-1.02B with:

10-19-12

Puncture strength, lb min	ASTM D 6241	310
Trapezoid tearing strength, lb min	ASTM D 4533	56

Replace the 3rd paragraph in section 88-1.02C with:

10-19-12

Geocomposite wall drain must be from 0.25 to 2 inches thick.

Replace the value for permittivity of woven fabric in the table in the 1st paragraph of section 88-1.02E with:

01-20-12

0.05

Replace the value for apparent size opening of nonwoven fabric in the table in the 1st paragraph of section 88-1.02E with:

01-20-12

0.012

Replace the table in the 1st paragraph of section 88-1.02G with:

01-20-12

Sediment Filter Bag

Property	Test	Values	
		Woven	Nonwoven
Grab breaking load, lb, 1-inch grip min, in each direction	ASTM D 4632	200	250
Apparent elongation, percent min, in each direction	ASTM D 4632	10	50
Water flow rate, gal per minute/sq ft min and max average roll value	ASTM D 4491	100-200	75-200
Permittivity, sec ⁻¹ min	ASTM D 4491	1.0	1.0
Apparent opening size, inches max average roll value	ASTM D 4751	0.023	0.012
Ultraviolet resistance, % min retained grab breaking load, 500 hr.	ASTM D 4355	70	70

Replace the table in the 1st paragraph of section 88-1.02H with:

01-20-12

Temporary Cover

Property	Test	Values	
		Woven	Nonwoven
Grab breaking load, lb, 1-inch grip min, in each direction	ASTM D 4632	200	200
Apparent elongation, percent min, in each direction	ASTM D 4632	15	50
Water flow rate, gal per minute/sq ft min and max average roll value	ASTM D 4491	4-10	80-120
Permittivity, sec ⁻¹ min	ASTM D 4491	0.05	1.0
Apparent opening size, inches max average roll value	ASTM D 4751	0.023	0.012
Ultraviolet resistance, % min retained grab breaking load, 500 hr.	ASTM D 4355	70	70

Replace section 88-1.02P with:

01-18-13

88-1.02P Biaxial Geogrid

Geosynthetics used for biaxial geogrid must be a punched and drawn polypropylene material formed into an integrally formed biaxial grid. When tested under the referenced test methods, properties of biaxial geogrid must have the values shown in the following table:

