



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**NOTICE TO BIDDERS
AND
SPECIAL PROVISIONS**

**FOR CONSTRUCTION ON STATE HIGHWAY IN SAN DIEGO COUNTY IN AND
NEAR SAN DIEGO ON ROUTE 11 FROM ROUTE 11/905 SEPARATION TO
ENRICO FERMI DRIVE AND ON ROUTE 905 FROM 0.1 MILE EAST OF
LA MEDIA ROAD UNDERCROSSING TO 0.2 MILE WEST OF AIRWAY ROAD
UNDERCROSSING**

In District 11 On Routes 11, 905

Under

Bid book dated July 1, 2013

Standard Specifications dated 2010

Project plans approved April 22, 2013

Standard Plans dated 2010

Identified by

Contract No. 11-056324

11-SD-11, 905 - 0.0/1.6,R9.9/R10.7

Project ID 1100020519

Electronic Advertising Contract

**Bids open Thursday, August 22, 2013
Dated July 1, 2013**

**XS
AADD
OSD
IH**

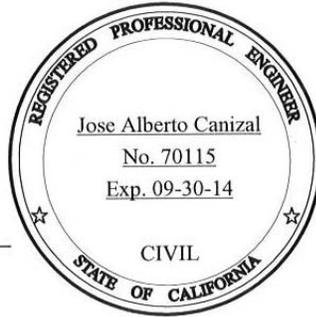
CONTRACT NO. 11-056324

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

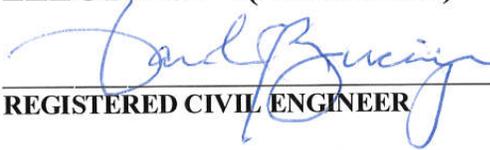
HIGHWAY



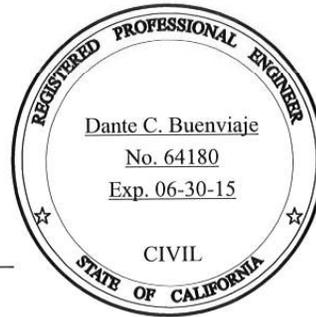
REGISTERED CIVIL ENGINEER



ELECTRICAL (HIGHWAY)



REGISTERED CIVIL ENGINEER



LANDSCAPE



Handwritten signature of Catherine R. Banner in blue ink, written over a horizontal line.

LICENSED LANDSCAPE ARCHITECT



CONTRACT NO. 11-056324
11 0002 0519

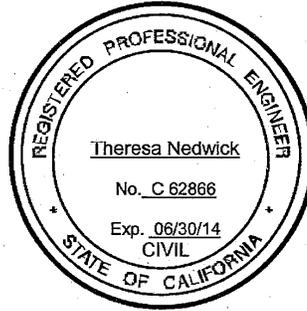
The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

STRUCTURES

Theresa Nedwick

03-18-13

REGISTERED CIVIL ENGINEER



HIGHWAY (UTILITIES)

Arturo A. Reyes

REGISTERED CIVIL ENGINEER

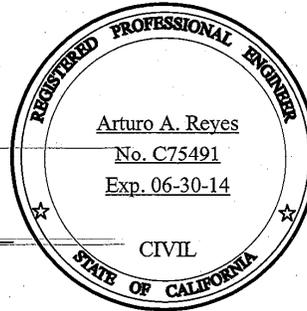


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STANDARD PLANS LIST

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S87	Type A-1 Mounting Hardware - Overhead Laminated Type A Panel, Truss and Lightweight Sign Structures
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ES-16B	Electrical Systems (Closed Circuit Television, 25' to 45' 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 22, 2013

Dated July 1, 2013

General work description: Construct freeway connection to Route 905.

The Department will receive sealed bids for CONSTRUCTION ON STATE HIGHWAY IN SAN DIEGO COUNTY IN AND NEAR SAN DIEGO ON ROUTE 11 FROM ROUTE 11/905 SEPARATION TO ENRICO FERMI DRIVE AND ON ROUTE 905 FROM 0.1 MILE EAST OF LA MEDIA ROAD UNDERCROSSING TO 0.2 MILE WEST OF AIRWAY ROAD UNDERCROSSING.

District-County-Route-Post Mile: 11-SD-11, 905 - 0.0/1.6,R9.9/R10.7

Contract No. 11-056324

The Contractor must have either a Class A license or a combination of Class C licenses which constitutes a majority of the work.

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 460 working days.

Complete the work, including plant establishment work, within 710 working days.

Complete the plant establishment work within 250 working days.

The estimated cost of the project is \$58,000,000.

No prebid meeting is scheduled for this project.

The Department will receive bids until 2:00 p.m. on the bid open date at 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

D11JAC

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	460
4	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM
5	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM
6	120120	TYPE III BARRICADE	EA	63
7	120140	BARRICADE (LEFT IN PLACE)	EA	44
8	120166	CHANNELIZER (SURFACE MOUNTED) (LEFT IN PLACE)	EA	59
9	120199	TRAFFIC PLASTIC DRUM	EA	78
10	128651	PORTABLE CHANGEABLE MESSAGE SIGN (EA)	EA	4
11	129000	TEMPORARY RAILING (TYPE K)	LF	11,100
12	026055	ALTERNATIVE TEMPORARY CRASH CUSHION SYSTEM	EA	3
13	130100	JOB SITE MANAGEMENT	LS	LUMP SUM
14	130300	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM
15	130310	RAIN EVENT ACTION PLAN	EA	43
16	130320	STORM WATER SAMPLING AND ANALYSIS DAY	EA	13
17	130330	STORM WATER ANNUAL REPORT	EA	3
18	130505	MOVE-IN/MOVE-OUT (TEMPORARY EROSION CONTROL)	EA	6
19	130530	TEMPORARY HYDRAULIC MULCH (BONDED FIBER MATRIX)	SQFT	3,990,000
20	130610	TEMPORARY CHECK DAM	LF	3,250

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
21	130620	TEMPORARY DRAINAGE INLET PROTECTION	EA	180
22	130640	TEMPORARY FIBER ROLL	LF	103,000
23	130710	TEMPORARY CONSTRUCTION ENTRANCE	EA	9
24	130730	STREET SWEEPING	LS	LUMP SUM
25	130900	TEMPORARY CONCRETE WASHOUT	LS	LUMP SUM
26	141120	TREATED WOOD WASTE	LB	12,400
27	150204	ABANDON CULVERT (LF)	LF	1,780
28	150221	ABANDON INLET	EA	2
29	026056	ABANDON 10" SEWER	LF	960
30	026057	ABANDON 12" SEWER	LF	700
31	026058	ABANDON SEWER MANHOLE	EA	5
32	150305	OBLITERATE SURFACING	SQYD	4,810
33	150605	REMOVE FENCE	LF	3,400
34	150620	REMOVE GATE	EA	5
35	150662	REMOVE METAL BEAM GUARD RAILING	LF	2,100
36	150711	REMOVE PAINTED TRAFFIC STRIPE	LF	28,900
37	150715	REMOVE THERMOPLASTIC PAVEMENT MARKING	SQFT	42
38	150742	REMOVE ROADSIDE SIGN	EA	3
39	150757	REMOVE SIGN STRUCTURE (EA)	EA	2
40	150771	REMOVE ASPHALT CONCRETE DIKE	LF	310

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
41	150776	REMOVE DRAINAGE FACILITY (EA)	EA	28
42	150809	REMOVE CULVERT (LF)	LF	1,410
43	150824	REMOVE SEWER MANHOLE	EA	1
44	150841	REMOVE SEWER PIPE	LF	61
45	150857	REMOVE ASPHALT CONCRETE SURFACING	SQYD	8,860
46	026059	REMOVE BOLLARD	EA	5
47	152356	RELOCATE IRRIGATION FACILITIES	EA	1
48	152390	RELOCATE ROADSIDE SIGN	EA	1
49	152641	MODIFY SIGN STRUCTURE	EA	1
50	153120	REMOVE CONCRETE (LF)	LF	65
51	153121	REMOVE CONCRETE (CY)	CY	2,390
52	026060	REMOVE ROCK SLOPE PROTECTION	CY	2,470
53	026061	REMOVE GUARD HOUSE	LS	LUMP SUM
54	155232	SAND BACKFILL	CY	180
55	160102	CLEARING AND GRUBBING (LS)	LS	LUMP SUM
56	170101	DEVELOP WATER SUPPLY	LS	LUMP SUM
57	190101	ROADWAY EXCAVATION	CY	901,000
58 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	6,630
59 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	6,455
60	026062	SLURRY CEMENT BACKFILL	CY	44

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
61	194001	DITCH EXCAVATION	CY	3,940
62	198010	IMPORTED BORROW (CY)	CY	135,000
63	200002	ROADSIDE CLEARING	LS	LUMP SUM
64	026063	NATIVE SOD	SQFT	49,400
65	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM
66	026064	TRUCK WATERING	LS	LUMP SUM
67 (F)	208029	4" SUPPLY LINE (BRIDGE)	LF	240
68	208739	10" CORRUGATED HIGH DENSITY POLYETHYLENE PIPE CONDUIT	LF	690
69	208907	EXTEND 10" CONDUIT	LF	12
70	210010	MOVE-IN/MOVE-OUT (EROSION CONTROL)	EA	4
71	026065	CHECK DAM	LF	170
72	210250	EROSION CONTROL (BONDED FIBER MATRIX) (SQFT)	SQFT	2,420,000
73	210360	COMPOST SOCK	LF	97,100
74	210600	COMPOST	SQFT	2,470,000
75	210630	INCORPORATE MATERIALS	SQFT	2,470,000
76	250401	CLASS 4 AGGREGATE SUBBASE	CY	38,800
77	250501	CLASS 5 AGGREGATE SUBBASE	CY	585,000
78	260203	CLASS 2 AGGREGATE BASE (CY)	CY	34,200
79	374002	ASPHALTIC EMULSION (FOG SEAL COAT)	TON	7
80	390131	HOT MIX ASPHALT	TON	25,300

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
81	390136	MINOR HOT MIX ASPHALT	TON	370
82	394074	PLACE HOT MIX ASPHALT DIKE (TYPE C)	LF	720
83	394076	PLACE HOT MIX ASPHALT DIKE (TYPE E)	LF	13,400
84	394077	PLACE HOT MIX ASPHALT DIKE (TYPE F)	LF	1,770
85	394090	PLACE HOT MIX ASPHALT (MISCELLANEOUS AREA)	SQYD	5,230
86	397005	TACK COAT	TON	33
87	401050	JOINTED PLAIN CONCRETE PAVEMENT	CY	24,000
88	404092	SEAL PAVEMENT JOINT	LF	89,100
89	404093	SEAL ISOLATION JOINT	LF	6,510
90 (F)	477021	MECHANICALLY STABILIZED EMBANKMENT, LOCATION A	SQFT	31,706
91 (F)	477022	MECHANICALLY STABILIZED EMBANKMENT, LOCATION B	SQFT	23,763
92	490617	90" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	249
93	044376	FURNISH PILING (CLASS 200) (ALTERNATIVE W)(MODIFIED)	LF	3,473
94	044377	DRIVE PILE (CLASS 200) (ALTERNATIVE W)(MODIFIED)	EA	100
95	498052	60" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	250
96	500001	PRESTRESSING CAST-IN-PLACE CONCRETE	LS	LUMP SUM
97 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	1,467
98 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	7,442
99 (F)	510072	STRUCTURAL CONCRETE, BARRIER SLAB	CY	1,540
100 (F)	510086	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N)	CY	763

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
101 (F)	510090	STRUCTURAL CONCRETE, BOX CULVERT	CY	6,501
102 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	706
103 (F)	511064	FRACTURED RIB TEXTURE	SQFT	2,859
104 (F)	044378	FRACTURED RIB TEXTURE (MODIFIED)	SQFT	2,177
105	519088	JOINT SEAL (MR 1")	LF	230
106	519097	JOINT SEAL ASSEMBLY (MR 5")	LF	80
107	519100	JOINT SEAL (MR 2")	LF	448
108 (F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	1,842,529
109 (F)	520107	BAR REINFORCING STEEL (BOX CULVERT)	LB	1,302,118
110	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	171,000
111	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	171,000
112	026066	INSTALL SIGN PANEL ON EXISTING STRUCTURE	SQFT	730
113	560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	2,530
114	560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	210
115	560249	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-UNFRAMED)	SQFT	260
116	560251	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-FRAMED)	SQFT	77
117	560252	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-FRAMED)	SQFT	90
118	026067	ROADSIDE SIGN - ONE POST (WEED CONTROL MAT RUBBER)	EA	5
119	566011	ROADSIDE SIGN - ONE POST	EA	27
120	566012	ROADSIDE SIGN - TWO POST	EA	3

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
121	026068	SIGN POST SUPPORT SYSTEM	EA	4
122	568001	INSTALL SIGN (STRAP AND SADDLE BRACKET METHOD)	EA	2
123	620002	6" ALTERNATIVE PIPE CULVERT	LF	10
124	620100	18" ALTERNATIVE PIPE CULVERT	LF	2,150
125	620140	24" ALTERNATIVE PIPE CULVERT	LF	7,280
126	620220	36" ALTERNATIVE PIPE CULVERT	LF	1,450
127	650018	24" REINFORCED CONCRETE PIPE	LF	2,210
128	650026	36" REINFORCED CONCRETE PIPE	LF	5,150
129	026069	36" REINFORCED CONCRETE PIPE DOWNDRAIN	LF	87
130	650034	48" REINFORCED CONCRETE PIPE	LF	1,490
131	650038	54" REINFORCED CONCRETE PIPE	LF	1,130
132	650046	66" REINFORCED CONCRETE PIPE	LF	150
133	026070	MODIFIED 84" REINFORCED CONCRETE PIPE	LF	1,160
134	026071	3" PLASTIC PIPE (APPROACH SLAB DRAIN)	LF	100
135	705206	24" CONCRETE FLARED END SECTION	EA	4
136	705210	36" CONCRETE FLARED END SECTION	EA	5
137	707467	36" REINFORCED CONCRETE PIPE RISER	LF	300
138	721013	ROCK SLOPE PROTECTION (1/4 T, METHOD B) (CY)	CY	1,190
139	721017	ROCK SLOPE PROTECTION (FACING, METHOD B) (CY)	CY	720
140	721420	CONCRETE (DITCH LINING)	CY	560

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
141	721430	CONCRETE (CHANNEL LINING)	CY	970
142	721431	CONCRETE (CONCRETE APRON)	CY	130
143 (F)	044379	SLOPE PAVING (ROCK COBBLE)	SQFT	19,302
144	729011	ROCK SLOPE PROTECTION FABRIC (CLASS 8)	SQYD	1,550
145	731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	390
146	731530	MINOR CONCRETE (TEXTURED PAVING)	SQYD	2,590
147 (F)	750001	MISCELLANEOUS IRON AND STEEL	LB	92,472
148 (F)	750041	ISOLATION CASING	LB	13,670
149 (F)	750505	BRIDGE DECK DRAINAGE SYSTEM	LB	9,751
150	026072	18" WELDED STEEL PIPE CASING	LF	290
151	026073	20" WELDED STEEL PIPE CASING	LF	500
152	026074	10" POLYVINYL CHLORIDE SEWER PIPE	LF	750
153	026075	10" POLYVINYL CHLORIDE SEWER PIPE (FUSION)	LF	320
154	026076	12" POLYVINYL CHLORIDE SEWER PIPE	LF	690
155	026077	15" POLYVINYL CHLORIDE SEWER PIPE	LF	61
156	026078	SEWER MANHOLE (DEPTH<15')	EA	5
157	026079	SEWER MANHOLE (DEPTH>15')	EA	4
158	026080	LOCKING MANHOLE COVER (CAST IRON)	EA	3
159	026081	LOCKING MANHOLE COVER (COMPOSITE)	EA	6
160	026082	SEWER FLOW DIVERSION	LS	LUMP SUM

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
161	026083	CATHODIC PROTECTION SYSTEM	EA	4
162	800103	TEMPORARY FENCE (TYPE CL-6)	LF	1,850
163	800361	CHAIN LINK FENCE (TYPE CL-6, VINYL-CLAD)	LF	7,920
164	026084	STEEL PIPE GATE	EA	2
165	802501	4' CHAIN LINK GATE (TYPE CL-6)	EA	1
166	026085	6' CHAIN LINK GATE (TYPE CL-6, VINYL CLAD)	EA	18
167	802560	10' CHAIN LINK GATE (TYPE CL-6)	EA	2
168	820107	DELINEATOR (CLASS 1)	EA	200
169	820110	MILEPOST MARKER	EA	10
170	820118	GUARD RAILING DELINEATOR	EA	200
171	820130	OBJECT MARKER	EA	6
172	832001	METAL BEAM GUARD RAILING	LF	2,100
173	833080	CONCRETE BARRIER (TYPE K)	LF	680
174	026086	BOLLARD	EA	5
175	839301	SINGLE THRIE BEAM BARRIER	LF	1,910
176	839310	DOUBLE THRIE BEAM BARRIER	LF	850
177	839521	CABLE RAILING	LF	1,310
178	839541	TRANSITION RAILING (TYPE WB)	EA	7
179	839581	END ANCHOR ASSEMBLY (TYPE SFT)	EA	12
180	839584	ALTERNATIVE IN-LINE TERMINAL SYSTEM	EA	1

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
181	839585	ALTERNATIVE FLARED TERMINAL SYSTEM	EA	14
182	839700	CONCRETE BARRIER (TYPE 60F)	LF	33
183	839701	CONCRETE BARRIER (TYPE 60)	LF	6,830
184 (F)	839702	CONCRETE BARRIER (TYPE 60A)	LF	172
185	839712	CONCRETE BARRIER (TYPE 60SC)	LF	310
186	026087	CONCRETE BARRIER (TYPE 60 MOD)	LF	36
187 (F)	839725	CONCRETE BARRIER (TYPE 736)	LF	4,213
188 (F)	839735	CONCRETE BARRIER (TYPE 742)	LF	1,411
189	840516	THERMOPLASTIC PAVEMENT MARKING (ENHANCED WET NIGHT VISIBILITY)	SQFT	320
190	840655	PAINT TRAFFIC STRIPE (1-COAT)	LF	14,300
191	840656	PAINT TRAFFIC STRIPE (2-COAT)	LF	39,800
192	840666	PAINT PAVEMENT MARKING (2-COAT)	SQFT	5,530
193	846001	4" THERMOPLASTIC TRAFFIC STRIPE (ENHANCED WET NIGHT VISIBILITY)	LF	37,000
194	846004	4" THERMOPLASTIC TRAFFIC STRIPE (ENHANCED WET NIGHT VISIBILITY) (BROKEN 17-7)	LF	1,550
195	846005	4" THERMOPLASTIC TRAFFIC STRIPE (ENHANCED WET NIGHT VISIBILITY) (BROKEN 36-12)	LF	15,300
196	846009	8" THERMOPLASTIC TRAFFIC STRIPE (ENHANCED WET NIGHT VISIBILITY)	LF	4,860
197	846010	8" THERMOPLASTIC TRAFFIC STRIPE (ENHANCED WET NIGHT VISIBILITY) (BROKEN 12-3)	LF	910
198	850101	PAVEMENT MARKER (NON-REFLECTIVE)	EA	3,460
199	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	2,010
200	860090	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	LUMP SUM

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
201	860407	LIGHTING (PARKING LOT)	LS	LUMP SUM
202	860460	LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM
203	860774	SPRINKLER CONTROL CONDUIT (BRIDGE) (LF)	LF	250
204	860797	ELECTRIC SERVICE (IRRIGATION)	LS	LUMP SUM
205	860931	TRAFFIC MONITORING STATION (LOCATION 1)	LS	LUMP SUM
206	860932	TRAFFIC MONITORING STATION (LOCATION 2)	LS	LUMP SUM
207	860990	CLOSED CIRCUIT TELEVISION SYSTEM	LS	LUMP SUM
208	861100	RAMP METERING SYSTEM	LS	LUMP SUM
209	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
026055	ALTERNATIVE TEMPORARY CRASH CUSHION SYSTEM	12
026056	ABANDON 10" SEWER	15
026057	ABANDON 12" SEWER	15
026058	ABANDON SEWER MANHOLE	15
026059	REMOVE BOLLARD	15
026060	REMOVE ROCK SLOPE PROTECTION	15
026061	REMOVE GUARD HOUSE	15
026062	SLURRY CEMENT BACKFILL	19
026063	NATIVE SOD	20
026064	TRUCK WATERING	20
026065	CHECK DAM	21
044376	FURNISH PILING (CLASS 200) (ALTERNATIVE W) (MODIFIED)	49
044377	DRIVE PILE (CLASS 200) (ALTERNATIVE W) (MODIFIED)	49
044378	FRACTURED RIB TEXTURE (MODIFIED)	51
026066	INSTALL SIGN PANEL ON EXISTING STRUCTURE	56
026067	ROADSIDE SIGN - ONE POST (WEED CONTROL MAT RUBBER)	56
026068	SIGN POST SUPPORT SYSTEM	56
026069	36" REINFORCED CONCRETE PIPE DOWNDRAIN	65
026070	MODIFIED 84" REINFORCED CONCRETE PIPE	65
026071	3" PLASTIC PIPE (APPROACH SLAB DRAIN)	68
044379	SLOPE PAVING (ROCK COBBLE)	72
026072	18" WELDED STEEL PIPE CASING	77
026073	20" WELDED STEEL PIPE CASING	77
026074	10" POLYVINYL CHLORIDE SEWER PIPE	77
026075	10" POLYVINYL CHLORIDE SEWER PIPE (FUSION)	77
026076	12" POLYVINYL CHLORIDE SEWER PIPE	77
026077	15" POLYVINYL CHLORIDE SEWER PIPE	77
026078	SEWER MANHOLE (DEPTH<15')	77
026079	SEWER MANHOLE (DEPTH>15')	77
026080	LOCKING MANHOLE COVER (CAST IRON)	77
026081	LOCKING MANHOLE COVER (COMPOSITE)	77
026082	SEWER FLOW DIVERSION	77
026083	CATHODIC PROTECTION SYSTEM	77
026084	STEEL PIPE GATE	80
026085	6' CHAIN LINK GATE (TYPE CL-6, VINYL CLAD)	80
026086	BOLLARD	83
026087	CONCRETE BARRIER (TYPE 60 MOD)	83

AA

2 BIDDING

Replace section 2-1.06C with:

2-1.06C Project Plans

The Department will issue the project plans in phases. Phase 1 project plans may be viewed on the date of the *Notice to Bidders*. Phase 2 project plans will be provided to you within 30 days after Contract approval. Work shown on phase 2 project plans is change order work.

Phase 1 project plans include:

1. Title Sheet
2. Typical Cross Sections
3. Key Map and Line Index
4. Project Control
5. Right of Way Parcel Key Map
6. Layouts
7. Profiles and Superelevation Diagrams
8. Temporary Water Pollution Control Plans
9. Temporary Water Pollution Control Details
10. Temporary Water Pollution Control Quantities
11. Erosion Control Legend/Plans/Details
12. Erosion Control Quantities
13. Contour Grading
14. Drainage Plans/Profiles/Details
15. Drainage Quantities
16. Sanitary Sewer Plans/Details
17. Sanitary Sewer Quantities
18. Utility Plans
19. Construction Area Signs
20. Stage Construction Plans/Details
21. Stage Construction Quantities
22. Traffic Handling Plans
23. Pavement Delineation Quantities
24. Sign Quantities
25. Summary of Quantities
26. Special Electrical Structure Plans
27. Log-of-Test Borings
28. Sanyo Avenue Undercrossing Br. No. 57-1226
29. Route 11/125 Separation Br. No. 57-1227 R/L
30. W11-905 Connector Br. No. 57-1228F
31. E905-E11/Rte 905 Connection Separation Br. No. 57-1229G
32. MSE Wall Plans

Phase 2 project plans include:

1. Construction Details
2. Pavement Delineation and Sign Plans/Details
3. Sign Details
4. Landscape Plans
5. Electrical Plans

Project plan sheets marked "Preliminary for Bidding Purposes Only". are not complete. These plans show the scope of work and are to be used for bidding purposes only.

Add to section 2-1.06B:

The Department makes the following supplemental project information available:

Supplemental Project Information

Means	Description
Included in the <i>Information Handout</i>	Geotechnical Design Report, Dated May 13, 2013 Geotechnical Design Report for MSE Walls, Dated November 15, 2012 Foundation Report for E905-E11/RTE 905 Connector Separation, Dated September 26, 2012 Foundation Report for Route 11/125 Separation (Right Bridge), Dated September 17, 2012 Foundation Report for Route 11/125 Separation (Left Bridge), Dated September 17, 2012 Foundation Report for Sanyo Avenue UC, Dated August 8, 2012 Foundation Report for W11-W905 Connector, Dated October 16, 2012 District 11 Materials Design Report, Dated January 4, 2012 Corrosion Study, Dated August 3, 2012 Underground Classification Numbers: C062-073-13T, & C063-073-13T, Dated November 14, 2012 Otay Water District Water Availability Letter, Dated May 23, 2012 Approved Materials List for Wastewater, Dated April 2012 Initial Site Assessment, Dated November 2010
Available as specified in the <i>Standard Specifications</i>	Design Cross Sections
Included with the project plans	Log of Test Borings

Replace in section 2-1.44 with:

2-1.44 ESCROW OF BID DOCUMENTATION

Escrowed bid documentation must contain all documents, including calculations, used to compile the bid submittal. Clearly itemize your estimated costs of performing the work. Calculations must be complete and detailed enough to allow for an in-depth analysis of your bid. These are the only documents that will be accepted from you regarding preparation of the bid for use in resolution of disputes.

An authorized representative from each of the 1st, 2nd, and 3rd apparent low bidders must submit bid documentation for escrow.

Submit the name of the person authorized to deliver the documentation, to the Duty Senior before the close of business on the first Monday following bid opening.

The authorized person must submit documentation to the Duty Senior for escrow on the first Tuesday after bid opening between the hours of 1:00 p.m. and 2:00 p.m.

Submit bid documentation to the Department at the following location:

DISTRICT 11 CONSTRUCTION DUTY SENIOR
 4050 Taylor Street

San Diego, CA 92110

TELEPHONE NUMBER (619) 688-6635

FAX NUMBER (619) 688-6988

E-MAIL Duty.Senior.Const.District11@dot.ca.gov

If notified, the 4th and subsequent apparent low bidders must present bid documentation for escrow.

Nothing in the escrowed documentation is to be construed to change or modify the terms or conditions of the contract.

The Department will not use escrowed bid documentation for preaward evaluation of your anticipated methods of construction or to assess your qualifications for performing the work.

Failure to submit the actual and complete bid documentation as specified herein within the time specified is cause for rejection of the bid.

Bid documentation for escrow must include:

1. Quantity takeoffs.
2. Rate schedules for the direct costs and the time- and nontime-related indirect costs for:
 - 2.1. Labor (by craft).
 - 2.2. Plant and equipment ownership and operation.
 - 2.3. Permanent and expendable materials, insurance, and subcontracted work.
3. Estimated construction schedules, including sequence and duration, and development of production rates.
4. Quotations, terms, and limitations of quotes and subcontracts related to subcontractors, manufacturers, and suppliers.
5. Estimates of field and home office overhead.
6. Estimated contingency and profit for each bid item of work.
7. Names of the persons responsible for preparing the bidder's estimate and other reports, calculations, assumptions, and supplemental information used by the bidder to arrive at the estimate submitted with the Bid book.
8. Bid documentation for each subcontractor, manufacturer, and supplier whose subcontract or purchase orders exceed or are expected to exceed \$250,000.00. Bid documentation for other subcontractors, manufacturers, and suppliers may be submitted, if required by the bidder, or requested by the subcontractor, manufacturer, or supplier.

If the bidder is a joint venture, the bid documentation must include the joint venture agreement, the joint venture estimate comparison, and final reconciliation of the joint venture bid.

The bid documentation of a subcontractor, manufacturer, or supplier must conform to the same requirements as the bidder's documentation.

The Department provides copies of the verified Bid books submitted by the 1st, 2nd, and 3rd low bidders to the respective bidders for inclusion in the bid documentation to be escrowed.

Bid documentation must be submitted as a paper copy in a sealed container, clearly marked with the bidder's name, date of submittal, contract number, and the words, "Bid Documentation for Escrow."

Signing the bid form certifies that you have examined the contents and have submitted all documents used in preparation of the bid submittal for escrow.

Subcontracts and purchase orders not executed or entered into at the time of bid must be submitted for inclusion in the escrowed documentation within 14 days of execution of the subcontract or purchase order.

To substitute a subcontractor, manufacturer, or supplier you must submit replacement bid documentation for review, approval, and escrow before authorization of the substitution will be granted.

The authorized representatives of the low bidder and the Department will evaluate the apparent low bidder's documents for escrow for legibility and to ensure authenticity.

Upon request, the bid documentation of a subcontractor, manufacturer, or supplier will be evaluated only by the subcontractor, manufacturer, or supplier and the Department and must be placed in a separate container within the bidder's container. The request from the subcontractor, manufacturer, or supplier must be included with the bid documentation.

Evaluation of subcontractors', manufacturers', and suppliers' bid documentation will be accomplished in the same manner as for the bidder's bid documentation.

Evaluation of bid documentation will not include review or constitute approval of:

1. Proposed construction methods
2. Estimating assumptions
3. Interpretation of the contract.

Acceptance or rejection of the bid documentation by the Department will be completed within 48 hours from the time the bid documentation is submitted by the low bidder.

Once the documentation has been evaluated and deemed to be legible and authentic it will be inventoried and escrowed.

The evaluation will not alter any conditions or terms of the contract.

At the completion of the evaluation, the bid documentation will be sealed and jointly deposited at an agreed commercial business in San Diego, CA.

Bid documentation submitted by the second and third apparent low bidders will be jointly deposited at an agreed commercial business in San Diego, CA.

If the apparent low bid is withdrawn or rejected, the bid documentation of the next low bidder will be evaluated and inventoried in the manner specified above, then sealed and deposited again in escrow.

Upon execution of the contract or rejection of all bids, the bid documentation will be returned to the unsuccessful bidders.

Components of the escrowed bid documentation may be examined by your designated representatives and the Department, at any time deemed necessary by either you or the Department or to assist in the negotiation of price adjustments and change orders, or to assist in the potential resolution or in the settlement of claims or disputes.

The joint examination must be performed within 15 days of receipt of a written request to do so by either party. Refusal by you to participate in the joint examination of escrowed bid documentation will be considered as a failure by you to exhaust administrative claim remedies with respect to the particular protest, notice of potential claim, or claim. In addition, this refusal by you constitutes a bar to future arbitration with respect to the protest, potential claim, or claim as provided by Pub Cont Code § 10240.2.

If requested by a Dispute Resolution Advisor or Dispute Resolution Board, the escrowed bid documentation may be used to assist the Advisor or Board in its recommendations.

The bid documentation submitted by the bidder is, and shall remain, the property of the bidder, and is subject to only joint review by the Department and the bidder.

If a subcontractor, manufacturer, or supplier requests, its bid documentation shall be subject to only joint examination by the subcontractor, supplier, or manufacturer and the Department unless it involves a dispute or claim against the Department.

The Department stipulates and expressly acknowledges that the submitted bid documentation constitutes trade secrets and will not be deemed public records. This acknowledgment is based on the Department's express understanding that the information contained in the bid documentation is not known outside the bidder's business, is known only to a limited extent and only by a limited number of employees of the bidder, is safeguarded while in the bidder's possession, is extremely valuable to the bidder and could be extremely valuable to the bidder's competitors by virtue of it reflecting the bidder's contemplated techniques of construction.

The Department acknowledges that the bid documentation includes a compilation of information used in the bidder's business, intended to give the bidder an opportunity to obtain an advantage over competitors who do not know of or use the contents of the documentation.

The Department agrees to safeguard the bid documentation, and all information contained therein, against disclosure, including disclosure of subcontractor bid documentation to you and other subcontractors, to the fullest extent permitted by law.

In the event of arbitration or litigation, the bid documentation shall be subject to discovery, and the Department assumes no responsibility for safeguarding the bid documentation unless you have obtained an appropriate protective order issued by the arbitrator or the court.

Bid documentation will be held in escrow until the Contract has been completed, the ultimate resolution of all disputes and claims has been achieved, and receipt of final payment has been accepted by you. The escrowed bid documentation will then be released from escrow.

The Department pays for the direct cost of depositing the bid documentation in escrow at the agreed commercial business.

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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	Location	Type of work
11-056334	SD-11-0.0 / 2.8	San Diego	Construct New 4 Lane Highway and Commercial Vehicle Enforcement Facility
11-056344	SD-11-2.4 / 2.4	San Diego	Construct Land Port of Entry
11-298204	SD-905-6.2 / 10.6	San Diego	Roadway Rehabilitation
11-288814	SD-11, 125, 905 - R10.7, 0.4, 0.0	San Diego	Construct NB Connectors to SR-125

Replace section 5-1.20D with:

5-1.20D Occupied Improvements within the Right-of-Way

Occupied improvements are within the right-of-way at:

1. Parcels No. 34803, 34804, 34805
2. Parcels No. 34806, 34807, 34818, 34808

The parcels listed in subparagraph 1 above will be vacated and available by May 2014.

The parcels listed in subparagraph 2 above will be vacated and available by July 2014.

Do not take any action that will result in unnecessary inconvenience or disproportionate injury to or that is coercive in nature to the occupants of the improvements.

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. Chrome
 - 2.2. Internet Explorer 7 or newer
 - 2.3. 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 accounts and user identification 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://app.attolist.com>.
2. Enter your username and password. Your username is always your e-mail address.
3. Select the Log In button.
4. If you are logging in for the first time, you will be prompted to fill out your profile information. After the profile is filled out, you will be directed to your All Projects page. If you have logged in before, you will be directed to the All Projects page.
5. On the All Projects page, expand the project in question by selecting the plus on the circular icon to the left of the project name.
6. To access the Submittals Module, select the Submittals hyperlink, located beneath the Construction Administration section.
7. Select the Add Submittal button from the top right of the interface.
8. The system will bring up a Submittal form; fill it out as follows:
 - 8.1. "Add a New Submittal" Section:
 - 8.1.1. Select the Select Number from Register hyperlink and pick the specification section from the register. The system will fill out the Specification Section, Sequential Number, Revision Number and Submittal Title for you. If the project does not have a submittal register, manually fill out the Specification Section and Submittal Title fields; the system will fill out the Sequential Number and Revision Number for you.
 - 8.1.2. Select the number of copies. In most cases, the default "N/A – PDF" is appropriate. If you are sending actual copies (such as samples or other physical items), select the

- number of copies. The software will automatically fill out today's date for the date received/sent and it will automatically populate the due date.
- 8.1.3. Select the submittal type. The Trades/Disciplines will automatically fill out based on the submittal register, if they were not provided or if the project does not have a submittal register, manually select the trades/disciplines.
 - 8.1.4. Select the correct Category if the project has them. Categories are generally used for different phases or structures within a larger project. Multiple Categories may be selected, if appropriate.
 - 8.1.5. Select whether or not the item is a substitution. The Subcontractor/Manufacturer field and the Contractor Transmittal Number field are to be used at the project administrator's discretion.
- 8.2. "Review Comments" Section: If you are sending actual copies in step 8.1.2, enter the courier or other delivery information.
 - 8.3. "Add Attachments" Section:
 - 8.3.1. Select the Choose File button(s) to Upload the pdf(s) of the submittal documentation.
 - 8.3.2. Give each item a title.
 - 8.4. "Submittal Register" Section: It is not necessary to adjust this section.
 - 8.5. "Notify Design Lead" Section: Click Send to submit to the OSD Documents Unit. The OSD Documents Unit will be notified of the submittal's existence.

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:

No construction is permitted within 75 feet of either side of the existing Calpeak overhead electrical alignment located between Station 25+00 and Station 28+00 ("A" Line) before February, 1 2014 until Calpeak Electric relocates their overhead facility.

Contractor Arranged Time for Utility Relocation

Installation of the utilities shown in the following table requires coordination with your activities. Make the necessary arrangements with the utility company through the Engineer and submit a schedule:

1. Verified by a representative of the utility company
2. Allowing the time shown for notifying the utility owner and time to complete the work

The duration of the work in the schedule must equal or exceed the number of Notification Days (N days) and Working Days (W days) for the utility owner to complete their work:

Notification Days is the minimum number of calendar days written notice the Engineer provides the owner that the site will be ready for utility work.

Type of Utility	Utility Work Description	Utility Owner & Address	Location of Utility	Utility N/W Days
Otay Water District 10" ACP & 18" CCP Water line	Pothole existing facility	Otay Water District 2554 Sweetwater Springs Boulevard Spring Valley, CA 91978	"A" Line Sta 45+75 Lt 75', Sta 52+10 Lt 150', Sta 52+10 Rt 200'.	21/10

Type of Utility	Utility Work Description	Utility Owner & Address	Location of Utility	Utility N/W Days
Otay Water District 12" ACP Water Line	Temporary re-route water service lines, Remove, Replace 12" ACP.	Otay Water District 2554 Sweetwater Springs Boulevard Spring Valley, CA 91978	"A" Line Sta 38+95	21/25

The utilities shown in the following table will not be rearranged. The utilities may interfere with pile driving, drilling activities, substructure work, or other work. Work within 20-feet of the listed utility facilities will require coordination with your construction operations. Make the necessary arrangements with the utility company through the Engineer and submit a schedule:

1. Verified by a representative of the utility company
2. Allowing the time shown for notifying the utility owner and time to complete the work

The duration of the work in the schedule must equal or exceed the number of Notification Days (N days) and Working Days (W days) for the utility owner to complete their work:

Notification Days is the minimum number of calendar days written notice the Engineer provides the owner that the site will be ready for utility work.

Type of Utility	Utility Work Description	Utility Owner & Address	Location of Utility	Utility N/W Days
SDGE 30" Gas Line	Confer with Owner	SDGE 6875 Consolidated Way San Diego, CA 92121-2602	"SNY" Line Sta 307+94, "SNY" Line Sta 309+63	42/15

Utilities Requiring Coordination with Contractor's Construction Operation

Installation of the listed utility facilities will require coordination with your construction operations. Make the necessary arrangements with the utility company through the Engineer and submit a schedule:

1. Verified by a representative of the utility company
2. Allowing the time shown for notifying the utility owner and time to complete the work

Site Preparation by Contractor

Installation of the listed utility facilities will require listed site preparation operations be completed by you first.

Make the necessary arrangements with the utility company through the Engineer and submit a schedule:

1. Verified by a representative of the utility company
2. Allowing the time shown for notifying the utility owner and time to complete the work

The duration of the work in the schedule must equal or exceed the number of Notification Days (N days) and Working Days (W days) for the utility owner to complete their work:

Notification Days is the minimum number of calendar days written notice the Engineer provides the owner that the site will be ready for utility work. The Utility Working Days begin when the site preparation requirements have been completed and required notification provided.

Site Preparation Type	Site Preparation Work
(A)	Sewer Relocation & Drainage Installation
(B)	Sewer Relocation & Drainage Installation
(C)	Sewer Relocation & Drainage Installation

Utility Work by Owners

Site Preparation Type (by Contractor)	Type of Utility	Utility Owner & Address	Location of Utility	Utility Work Description	Utility N/W Days
(A)	10" ACP Water line	Otay Water District 2554 Sweetwater Springs Boulevard Spring Valley, CA 91978	"A" Line Sta 38+85 to 45+80	10" ACP Removal	21/15
(B)	10" ACP Water line	Otay Water District 2554 Sweetwater Springs Boulevard Spring Valley, CA 91978	"A" Line Sta 45+80 to 52+10	New 10" PVC Installation	21/25
(C)	18" CCP Water line	Otay Water District 2554 Sweetwater Springs Boulevard Spring Valley, CA 91978	"A" Line Sta 52+10	Remove 18" CCP. Replace with New 18"CML&C in 32" Steel Casing	21/35

6 CONTROL OF MATERIALS

Add to section 6-2.03:

The Department furnishes you with:

- Model 2070 controller assembly, including controller unit, completely wired controller cabinet, and detector sensor units
- Piezo electric sensor elements, plastic standoffs and epoxy sealant
- Model 2070 controller unit

The Department furnishes you with completely wired controller cabinets with auxiliary equipment but without controller unit at the Department Coronado Maintenance Station, 1700 Glorietta Plaza, Coronado, CA 92118, telephone (619) 522-6554. At least 48 hours before you pick up the materials, inform the Engineer of what you will pick up and when you will pick it up.

AA

8 PROSECUTION AND PROGRESS

Replace "Reserved" in section 8-1.04C with:

Section 8-1.04B does not apply.

Start job site activities within 70 days after receiving notice that the Contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department.

Do not start job site activities until the Department authorizes or accepts your submittal for:

1. CPM baseline schedule
2. WPCP or SWPPP, whichever applies
3. Notification of DRA or DRB nominee and disclosure statement

You may enter the job site only to measure controlling field dimensions and locating utilities.

Do not start other job site activities until all the submittals from the above list are authorized or accepted and the following information is received by the Engineer:

1. *Notice of Materials To Be Used.*
2. Contingency plan for reopening closures to public traffic.
3. Written statement from the vendor that the order for the sign panels has been received and accepted by the vendor. The statement must show the dates that the materials will be shipped.
4. Written statement from the vendor that the order for electrical material has been received and accepted by the vendor. The statement must show the dates that the materials will be shipped.
5. Written statement from the vendor that the order for structural steel has been received and accepted by the vendor. The statement must show the dates that the materials will be shipped.

You may start job site activities before the 70th day after Contract approval if you:

1. Obtain specified authorization or acceptance for each submittal before the 70th day
2. Receive authorization to start

Submit a notice 72 hours before starting job site activities. If the project has more than 1 location of work, submit a separate notice for each location.

Replace section 8-1.09 with:

8-1.09 INCENTIVE/DISINCENTIVE FOR EARLY COMPLETION

The Department pays you the incentive for each day you complete the corresponding work part fewer than the working days shown in the following table except as specified for the maximum total incentive and deducts the disincentive for each day you complete the corresponding work part more than the working days shown in the following table except as specified for the maximum total disincentive:

Incentive/Disincentive for Work Part Completion within Specified Times

Work part	Working days	Incentive amount	Disincentive amount
Items of work specified below and corresponding to Stage-1 as shown on the stage construction plans.	275	\$6,000.00 per Day	\$6,000.00 per Day

With in the following limits; on the "LR" line from station 52+00 to station 60+18.06, on the "WB" line from station 638+00 to station 650+28.53, on "LMD1A" line from station 53+00 to station 58+84.04, on the

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

Add to section 12-3.12C:

Start displaying the message on the portable changeable message sign 30 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
4. Speed reduction zone

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.

Do not use an impact attenuator vehicle to place, remove, or place and remove components of a stationary traffic control system on 2-lane, 2-way road where the useable shoulder width is less than 10 feet.

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.

12-3.13 Payment

Not Used

Add section 12-3:

12-3.18 ALTERNATIVE TEMPORARY CRASH CUSHION SYSTEM

12-3.18A General

12-3.18A(1) Summary

This section includes specifications for installing and maintaining alternative temporary crash cushion system as shown under the manufacturer's installation instructions and these special provisions.

The allowable alternatives for temporary crash cushion must consist of one of the following National Cooperative Highway Research Program (NCHRP) Report 350, Test Level 3 devices, or a Department-approved equal.

12-3.18C Submittals

Submit to the engineer a certificate of compliance and a copy of the manufacturer's installation instructions for the alternative temporary crash cushion.

12-3.18D Materials

An alternative temporary crash cushion must be one of the following:

1. TYPE SMART - SCI100GM - Non-Gating, re-directive impact attenuator manufactured by SCI Products Inc., and must include items detailed for Quadguard CZ crash cushion shown on the manufacturer plans and installation instructions. The SCI 100GM crash cushion can be obtained from the distributor, D&M Traffic Services, 845 Reed Street, Santa Clara, CA 95050, telephone (408) 436-1127.
2. TYPE TAU II - Non-Gating, redirective impact attenuator manufactured by Barrier Systems, Inc., and must include items detailed for Type TAU-II crash cushion shown on the manufacturer plans and installation instructions. The TAU-II crash cushion can be obtained from the distributor, Statewide Safety & Signs, 13755 Blaisdell Place, Poway, CA 92064 , telephone (800) 559-7080.
3. TYPE QUADGUARD CZ - Non-Gating, re-directive impact attenuator manufactured by Energy Absorption, Inc., and must include items detailed for Quadguard CZ crash cushion shown on the manufacturer plans and installation instructions. The Quadguard CZ can be obtained from the distributor, National Trench Safety LLC, 1421 N. Baxter Street, Anaheim, CA 92806, telephone (714) 491-7393.

12-3.18E Construction

The alternative temporary crash cushion must be installed in conformance with the manufacturer's installation instructions.

Concrete anchorage devices for attaching alternative temporary crash cushion to the base slab is limited to those provided by the manufacturer.

Concrete anchor slab when required must comply with section 51, except the strength is to be 4,000 psi at 28 days.

Roadway excavation if required must comply with section 19-2.

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

12-3.18F Payment

Not used

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.

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.

Personal vehicles of your employees must not be parked on the traveled way or shoulders, including sections closed to traffic.

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.

Sanyo Avenue UC
 Bridge #57-1226, Route 11, PM 0.9
 Sanyo Avenue

	Number	Width (feet)	Height (feet)
Vehicle openings	2	26	15
Pedestrian openings	1	5	15
	Location	Spacing	
Falsework pavement lighting	R and L	30 staggered 1/2 space	

NOTE:
 R = Right side of traffic
 L = Left side of traffic
 C = Centered overhead

E905-E11/Rte 905 Connector Separation
 Bridge #57-1229G, Route 11, PM 10.5
 Eastbound Route 905

	Number	Width (feet)	Height (feet)
Vehicle openings	1	46	15
	Location	Spacing	
Falsework pavement lighting	R and L	30	

NOTE:
 R = Right side of traffic
 L = Left side of traffic
 C = Centered overhead

E905-E11/Rte 905 Connector Separation
 Bridge #57-1229G, Route 11, PM 10.5
 Westbound Route 905

	Number	Width (feet)	Height (feet)
Vehicle openings	1	46	15
	Location	Spacing	
Falsework pavement lighting	R and L	30	

NOTE:
 R = Right side of traffic
 L = Left side of traffic
 C = Centered overhead

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

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	Route 905	1st half hour	\$1,000 / 10 minutes
		2nd half hour	\$1,000 / 10 minutes
		2nd hour and beyond	\$1,000 / 10 minutes

Replace "Reserved" in section 12-4.04 with:

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

Legend:

	Refer to lane requirement charts
x	The full width of the traveled way must be open for use by traffic after 1200.
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 0500.
H	Designated holiday

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

Chart no. B1 Freeway/Expressway Lane Requirements																									
County: SD							Route/Direction: EB/ 905							PM: R9.73 – R11.59											
SD																									
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																									
Fridays																									
Saturdays																									
Sundays																									

Legend:

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

REMARKS:

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

Chart no. C1 Complete Freeway/Expressway Closure Hours																											
County: SD					Route/Direction: EB/ 905										PM: R5.16 – R9.73												
Closure Description: Jct. Rte. 805 to La Media Rd.																											
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																					
Saturdays																											
Sundays																										C	C
REMARKS:																											
<p>This chart to be used a maximum of (2) nights only for Overhead sign work</p> <p>No other closure that conflicts with or shares any elements of the following detour will be permitted.</p> <p>Detour EB 905 Mainlane Full Closure @ Britannia Blvd.</p> <ul style="list-style-type: none"> - Detour EB 905 Mainlane full closure traffic at Britannia Blvd. via easterly on Rte. 905 to EB 905 Off-ramp to Britannia Blvd., thence northerly on Britannia Blvd. to Otay Mesa Rd., thence easterly on Otay Mesa Rd. to La Media Rd., thence southerly on La Media Rd. to EB 905 On-ramp from La Media Rd. <p>NOTE: Place a PCMS (Portable Changeable Message Sign) on EB 905 at a location at the discretion of Construction Field Personnel – warning the public of the closure / detour ahead.</p>																											

**Chart no. C2
Complete Freeway/Expressway Closure Hours**

County: SD	Route/Direction: EB/ 905	PM: R7.23 – R11.59																								
Closure Description: 2.50 Mi. west of La Media Rd. to Siempre Viva Rd.																										
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
Fridays	C	C	C	C	C																					
Saturdays				C	C	C	C																			
Sundays				C	C	C	C																	C	C	C

Legend:

- C Freeway or expressway may be closed completely
- No complete freeway or expressway closure is allowed

REMARKS:

This closure will be used a maximum of 20 times only for the Erection and Removal of False Work, Overhead sign and pavement delineation work

No other closure that conflicts with or shares any elements of the following detour will be permitted.

Detour EB 905 Mainlane Full Closure @ La Media Rd.

- Detour EB 905 Mainlane full closure traffic at La Media Rd. via easterly on Rte. 905 to EB 905 Off-ramp to La Media Rd., thence southerly on La Media Rd. to Siempre Viva Rd., thence easterly on Siempre Viva Rd. to SR-905.

NOTE: Place a PCMS (Portable Changeable Message Sign) on EB 905 at a location at the discretion of Construction Field Personnel – warning the public of the closure / detour ahead.

**Chart no. C3
Complete Freeway/Expressway Closure Hours**

County: SD	Route/Direction: WB/ 905	PM: R11.97 – R9.73																									
Closure Description: The Mexican Border to La Media Rd.																											
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																							
Saturdays																											
Sundays					C	C	C	C																			

Legend:
 C Freeway or expressway may be closed completely
 No complete freeway or expressway closure is allowed

REMARKS:

This closure will be used a maximum of (20) twenty times only for the Erection and Removal of False work, OH sign, and pavement delineations.

No other closure that conflicts with or shares any elements of the following detour will be permitted.

Detour WB 905 Mainlane Full Closure @ Siempre Viva Rd.

- Detour WB 905 Mainlane full closure to WB 905 Off-ramp to Siempre Viva Rd., thence westerly on Siempre Viva Rd. to La Media Rd., thence northerly on La Media Rd. to WB 905 On-ramp from La Media Rd.

NOTE: Place a PCMS (Portable Changeable Message Sign) on WB 905 at a location at the discretion of Construction Field Personnel – warning the public of the closure / detour ahead.

**Chart no. C4
Complete Freeway/Expressway Closure Hours**

County: SD	Route/Direction: EB/ 905	PM: R5.16 – R7.0																								
Closure Description: Jct. Rte. 805 to 0.25 Mi. east of Caliente Ave. OC																										
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																					
Saturdays																										
Sundays																										C

Legend:

- C Freeway or expressway may be closed completely
- No complete freeway or expressway closure is allowed

REMARKS:

This chart to be used a maximum of (3) nights only for placement of Overhead signs
 No other closure that conflicts with or shares any elements of the following detour will be permitted.

Detour EB 905 Mainlane Full Closure @ Caliente Ave.

- Detour EB 905 Mainlane full closure traffic at Caliente Ave. via easterly on Rte. 905 to EB 905 Off-ramp to Caliente Ave., thence on to EB On-ramp from Caliente Ave.

NOTE: Place a PCMS (Portable Changeable Message Sign) on EB 905 at a location at the discretion of Construction Field Personnel – warning the public of the closure / detour ahead.

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

Chart no. E1 Complete Ramp Closure Hours/Ramp Lane Requirements		
County: SD	Route/Direction: EB/ 905	PM:
SD	EB/ 905	
SD	EB/ 905	
SD	WB/ 905	
SD	WB/ 905	
Closure Limits: EB 905 On-ramp from Britannia Blvd.		
EB 905 Off-ramp to La Media Rd.		
EB 905 On-ramp from La Media Rd.		
WB 905 Off-ramp to La Media Rd.		
WB 905 On-ramp from La Media Rd.		
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
Fridays		C C C C C C C C
Saturdays		C C C C C C C C
Sundays		C C C C C C C C
Legend:		
<input type="checkbox"/> C	Ramp may be closed completely	
<input type="checkbox"/>	Work allowed within the highway where shoulder or lane closure is not required	
REMARKS:		
NOTE: When an Off-ramp is closed completely, place a PCMS (Portable Changeable Message Sign) in the direction of travel allowing the traffic the option to use the preceding Off-ramp and warning them of the ramp closure ahead.		

**Chart no. E2
Complete Ramp Closure Hours**

County: SD	Route/Direction: EB/ 905		PM:																								
SD	WB/ 905																										
SD	WB/ 905																										
SD	WB/ 905																										
Closure Limits: EB 905 On-ramp from La Media Rd.																											
WB 905 On-ramp from Siempre Viva Blvd.																											
WB 905 Off-ramp to La Media Rd.																											
WB 905 On-ramp from La Media Rd.																											
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
Fridays	C	C	C	C	C					C	C	C	C	C	C	C	C										
Saturdays										C	C	C	C	C	C	C	C										
Sundays										C	C	C	C	C	C	C	C								C	C	C
Legend:																											
<input type="checkbox"/> C Ramp may be closed completely <input type="checkbox"/> Work allowed within the highway where shoulder or lane closure is not required																											
REMARKS:																											
NOTE: When an Off-ramp is closed completely, place a PCMS (Portable Changeable Message Sign) in the direction of travel allowing the traffic the option to use the preceding Off-ramp and warning them of the ramp closure ahead.																											

Chart no. E3 Complete Ramp Closure Hours/Ramp Lane Requirements																											
County: SD					Route/Direction: EB/ 905										PM:												
Closure Limits: EB 905 Off-ramp to Siempre Viva Blvd.																											
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
Fridays		C	C	C	C	C																					
Saturdays					C	C	C	C	C																		
Sundays					C	C	C	C	C																C	C	C
Legend:																											
<input type="checkbox"/> C		Ramp may be closed completely																									
<input type="checkbox"/>		Work allowed within the highway where shoulder or lane closure is not required																									
REMARKS:																											
<p>This chart to be used in conjunction with chart C2 only.</p> <p>NOTE: When an Off-ramp is closed completely, place a PCMS (Portable Changeable Message Sign) in the direction of travel allowing the traffic the option to use the preceding Off-ramp and warning them of the ramp closure ahead.</p>																											

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

Chart no. H1 Road Lane Requirements																									
County: SD	Route/Direction: NB/SB Sanyo Ave.												PM:												
Closure Description: At SR-11 OC																									
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	X	X	X	X	X																	X	X	X	X
Fridays	X	X	X	X	X																				
Saturdays																									
Sundays																						X	X	X	X

Legend:

X	Street may be closed
	Work allowed within the highway where shoulder or lane closure is not required

REMARKS:
 No other closure that conflicts with or shares any elements of the following detour will be permitted.

This chart to be used a maximum of 10 times.

Allow access to Local traffic.

All side streets within this closure may be closed

Detour NB Sanyo Ave. Full Closure @ SR-11 OC
 Detour NB Sanyo Ave. full closure traffic at SR-11 OC via northerly on Sanyo Ave./Heinrich Hertz Dr. to Airway Rd., thence easterly on Airway Rd. to Enrico Fermi Dr., thence northerly on Enrico Fermi Dr. to Otay Mesa Rd., thence westerly on Otay Mesa Rd. to Sanyo Ave.

Detour SB Sanyo Ave. Full Closure @ SR-11 OC
 Detour EB Otay Mesa Rd. to SB Sanyo Ave. full closure traffic at SR-11 OC via easterly on Otay Mesa Rd. to Enrico Fermi Dr., thence southerly on Enrico Fermi Dr. to Airway Rd., thence westerly on Airway Rd. to Sanyo Ave.

NOTE: Place Ground Mounted Signs on EB & WB Airway Rd, NB & SB Sanyo Ave., and EB & WB Otay Mesa Rd. at locations at the discretion of Construction Field Personnel – warning the public of the closure / detour ahead.

**Chart no. H2
Road Lane Requirements**

County: SD	Route/Direction: NB/SB Sanyo Ave.	PM:																									
Closure Description: At SR-11 OC																											
From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	1	1	1	1	1																						
Fridays	1	1	1	1	1																						
Saturdays									1	1	1	1	1	1	1	1											
Sundays									1	1	1	1	1	1	1	1											
Legend:																											
<input type="checkbox"/> 1 Provide at least 1 through traffic lane open in direction of travel																											
<input type="checkbox"/> Work allowed within the highway where shoulder or lane closure is not required																											
REMARKS:																											

**Chart no. H3
Road Lane Requirements**

County: SD	Route/Direction: NB/SB Sanyo Ave.	PM:																								
Closure Description: At SR-11 OC																										
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	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fridays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Saturdays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sundays	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Legend:

X Street may be closed

REMARKS:

This chart shall be used (3) three times only, each time for a period of one month

No other closure that conflicts with or shares any elements of the following detour will be permitted.

Allow access to Local traffic.

All side streets within this closure may be closed

Detour NB Sanyo Ave. Full Closure @ SR-11 OC

Detour NB Sanyo Ave. full closure traffic at SR-11 OC via northerly on Sanyo Ave./Heinrich Hertz Dr. to Airway Rd., thence easterly on Airway Rd. to Enrico Fermi Dr., thence northerly on Enrico Fermi Dr. to Otay Mesa Rd., thence westerly on Otay Mesa Rd. to Sanyo Ave.

Detour SB Sanyo Ave. Full Closure @ SR-11 OC

Detour EB Otay Mesa Rd. to SB Sanyo Ave. full closure traffic at SR-11 OC via easterly on Otay Mesa Rd. to Enrico Fermi Dr., thence southerly on Enrico Fermi Dr. to Airway Rd., thence westerly on Airway Rd. to Sanyo Ave.

NOTE: Place Ground Mounted Signs on EB & WB Airway Rd, NB & SB Sanyo Ave., and EB & WB Otay Mesa Rd. at locations at the discretion of Construction Field Personnel – warning the public of the closure / detour ahead.

Chart no. H4 Road Lane Requirements																											
County: SD	Route/Direction: NB/SB Enrico Fermi Dr.												PM:														
Closure Description: At SR-11 OC																											
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	X	X	X	X	X																				X	X	X
Fridays	X	X	X	X	X																						
Saturdays				X	X	X	X	X	X	X	X																
Sundays				X	X	X	X	X	X	X	X														X	X	X

Legend:

Street may be closed

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

REMARKS:

This chart shall be used for 10 Nights only.

Allow access to Local Traffic

All side streets within this closure may be closed

No other closure that conflicts with or shares any elements of the following detour will be permitted.

Detour NB Enrico Fermi Dr. Full Closure @ SR-11 OC
 Detour NB Enrico Fermi Dr. full closure traffic at SR-11 OC via northerly on Enrico Fermi Dr. to Airway Rd., thence westerly on Airway Rd. to Sanyo Ave., thence northerly on Sanyo Ave. to Otay Mesa Rd., thence easterly on Otay Mesa Rd. to Enrico Fermi Dr.

Detour SB Enrico Fermi Dr. Full closure @ SR-11 OC
 Detour SB Enrico Fermi Dr. full closure traffic at SR-11 OC via southerly on Enrico Fermi Dr. to Otay Mesa Rd., thence westerly on Otay Mesa Rd. to Sanyo Ave., thence southerly on Sanyo Ave. to Airway Rd., thence easterly on Airway Rd. to Enrico Fermi Dr.

NOTE: Place Ground mounted signs on NB & SB Enrico Fermi Dr., EB & WB Airway Rd., EB & WB Otay Mesa Rd. at locations at the discretion of Construction Field Personnel – warning the public of the closure / detour ahead.

**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 and moving lane closures on multilane highways and 2-lane, 2-way 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

Vehicles equipped with attenuators must comply with section 12-3.13 of the special provisions.

12-5.03 CONSTRUCTION

12-5.03A General

During traffic striping and pavement marker placement using bituminous adhesive, control traffic with a stationary or a moving lane closure. During other activities, control traffic with stationary lane closures.

Whenever components of the traffic control system are displaced or cease to operate or function as specified from any cause, immediately repair the components to the original condition or replace the components and restore the components to the original location.

12-5.03B Stationary Lane Closures

For a stationary lane closure, ramp closure, or a combination, made only for the work period, remove the components of the traffic control system from the traveled way and shoulder, except for portable delineators placed along open trenches or excavation adjacent to the traveled way at the end of each work period. You may store the components at selected central locations designated by the Engineer within the limits of the highway.

For multilane freeways and expressways, do not place the traffic cones shown to be placed transversely across closed traffic lanes and shoulders.

12-5.03C Moving Lane Closures

A changeable message sign used in a moving lane closure must comply with section 12-3.12 except the sign must be truck-mounted. The full operational height to the bottom of the sign may be less than 7 feet above the ground but must be as high as practicable.

A flashing arrow sign used in a moving lane closure must be truck-mounted. Operate the flashing arrow sign in the caution display mode whenever it is being used on a 2-lane, 2-way highway.

12-5.04 PAYMENT

Traffic control system for lane closure is paid for as traffic control system.

The requirements in section 4-1.05 for payment adjustment do not apply to traffic control system. Adjustments in compensation for traffic control system will be made for an increase or decrease in traffic control work if ordered and will be made on the basis of the cost of the necessary increased or decreased traffic control. The adjustment will be made on a force account basis for increased work and estimated on the same basis in the case of decreased work.

A traffic control system required by change order work is paid for as a part of the change order work.

Replace section 12-8 with:

12-8 TEMPORARY PAVEMENT DELINEATION

12-8.01 GENERAL

Section 12-8 includes specifications for placing, applying, maintaining, and removing temporary pavement delineation.

Painted traffic stripe used for temporary delineation must comply with section 84-3. Apply 1 or 2 coats.

Temporary signing for no-passing zones must comply with section 12-3.06.

12-8.02 MATERIALS

12-8.02A General

Not Used

12-8.02B Temporary Lane Line and Centerline Delineation

Temporary pavement markers must be the same color as the lane line or centerline markers being replaced. Temporary pavement markers must be one of the temporary pavement markers on the Authorized Material List for short-term day or night use, 14 days or less, or long-term day or night use, 180 days or less.

12-8.02C Temporary Edge Line Delineation

Temporary, removable, construction-grade striping and pavement marking tape must be one of the types on the Authorized Material List. Apply temporary, removable, construction-grade striping and pavement marking tape under the manufacturer's instructions.

12-8.03 CONSTRUCTION

12-8.03A General

Whenever work activities obliterate pavement delineation, place temporary or permanent pavement delineation before opening the traveled way to traffic. Place lane line and centerline pavement delineation for traveled ways open to traffic. On multilane roadways, freeways, and expressways, place edge line delineation for traveled ways open to traffic.

Establish the alignment for temporary pavement delineation, including required lines or markers. Surfaces to receive an application of paint or removable traffic tape must be dry and free of dirt and loose material. Do not apply temporary pavement delineation over existing pavement delineation or other temporary pavement delineation. Maintain temporary pavement delineation until it is superseded or you replace it with a new striping detail of temporary pavement delineation or permanent pavement delineation.

Place temporary pavement delineation on or adjacent to lanes open to traffic for a maximum of 14 days. Before the end of the 14 days, place the permanent pavement delineation. If the permanent pavement delineation is not placed within the 14 days, replace the temporary pavement markers with additional temporary pavement delineation equivalent to the striping detail specified for the permanent pavement delineation for the area. The Department does not pay for the additional temporary pavement delineation.

When the Engineer determines the temporary pavement delineation is no longer required for the direction of traffic, remove the markers, underlying adhesive, and removable traffic tape from the final layer of surfacing and from the existing pavement to remain in place. Remove temporary pavement delineation that conflicts with any subsequent or new traffic pattern for the area.

12-8.03B Temporary Lane Line and Centerline Delineation

Whenever lane lines or centerlines are obliterated, the minimum lane line and centerline delineation must consist of temporary pavement markers placed longitudinally at intervals not exceeding 24 feet. The temporary pavement markers must be temporary pavement markers on the Authorized Material List for short-term day or night use, 14 days or less, or long-term day or night use, 180 days or less. Place temporary pavement markers under the manufacturer's instructions. Cement the markers to the surfacing with the adhesive recommended by the manufacturer, except do not use epoxy adhesive to place pavement markers in areas where removal of the markers will be required.

For temporary lane line or centerline delineation consisting entirely of temporary pavement markers, place the markers longitudinally at intervals not exceeding 24 feet.

Where removal of the white, 4-inch wide, lane line traffic stripe is not required, apply temporary painted traffic stripe and place clear retroreflective pavement markers for temporary lane line delineation. Temporary painted lane line delineation placed on portland cement concrete pavement must consist of a white traffic stripe supplemented by a black-contrast traffic stripe and clear retroreflective pavement markers. Place the temporary painted lane line and clear retroreflective pavement markers longitudinally at intervals not exceeding 48 feet. The black contrast stripe and clear retroreflective pavement markers may remain in place at locations where you will be placing permanent pavement delineation.

12-8.03C Temporary Edge Line Delineation

Whenever edge lines are obliterated on multilane roadways, freeways, and expressways, place edge line delineation for that area adjacent to lanes open to traffic consisting of (1) solid, 4-inch wide traffic stripe tape of the same color as the stripe being replaced, (2) traffic cones, (3) portable delineators or channelizers placed longitudinally at intervals not exceeding 100 feet. You may apply temporary painted traffic stripe where removal of the 4-inch wide traffic stripe will not be required.

The Engineer determines the lateral offset for traffic cones, portable delineators, and channelizers used for temporary edge line delineation. If traffic cones or portable delineators are used for temporary pavement delineation for edge lines, maintain the cones or delineators during hours of the day when the cones or delineators are being used for temporary edge line delineation.

Species Name
Burrowing Owls
Migratory Birds

The Department anticipates nesting or attempted nesting by migratory and nongame birds from February 1 to August 31.

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 ft radius of the discovery or as defined in the table below. Immediately notify the Engineer. Do not resume activities until receiving notification from the Engineer.

Regulated species name	Protective radius
Burrowing Owl	250 feet
Migratory Birds	100 feet

14-6.02C(3) Protocols

Not used.

14-6.02C(4) Biological Resource Information

Implement the following biological resource information requirements.

1. A Biologist will be provided by the State to present an Environmental Educational Program to all the Contractor's personnel at the first scheduled safety meeting held by the Contractor's Project Manager, or as agreed upon by the Engineer and the Contractor.
2. The content of the educational program will focus on: 1) the purpose for resource protection, 2) the identification of sensitive resource areas within the project limits, 3) used of sensitive construction practices, 4) protocol for conflict resolution of recommended resource protection methods, 5) ramifications of non-compliance.
3. For new contractor personnel, a refresher Environmental Educational Program will be provided as determined by the Biologist and presented at the scheduled safety meeting held by the Contractor's Project Manager or as agreed upon by the Engineer and the Contractor.

14-6.02C(5) Protection Measures

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

1. All clearing of vegetation will take place September 1 through January 31, which is outside of the bird nesting season.
2. If construction activities occur during the nesting season (February 1 through August 31), a pre-construction survey will be conducted by a qualified Biologist provided by the State for this project to ensure no nesting birds are present within the proposed work area. During the bird nesting season the Contractor shall notify the Engineer in writing 15 working days prior to beginning work disturbing the ground, vegetation, or trees. The notification shall include the timing and order of work to be performed. The Contractor shall not begin work without written authorization from the Engineer.
3. For burrowing owls, a pre-construction survey to identify active burrows within the proposed work area and 250 feet beyond the work area would be conducted no more than 3 days prior to initiation of construction by the Biologist.

4. If evidence of bird nesting is discovered during the nesting season, the Contractor shall immediately notify the Engineer. The bird nesting area shall be designated as an Environmentally Sensitive Area (ESA). The Biologist will determine the nesting boundary limits.

14-6.02C(6) Monitoring Schedule

Not used.

14-6.02D Payment

Not Used

**Replace section 14-7.03 with:
14-7.03 PALEONTOLOGICAL RESOURCES**

14-7.03A General

14-7.03A(1) Summary

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

The Department will perform paleontological resources mitigation during construction operations and related activities involving subsurface disturbance under California Public Resources Code Section 5097.5 and the California Environmental Quality Act (CEQA). The Department will provide a Paleontological Mitigation Team consisting of a qualified Principal Paleontologist and Paleontological Monitors. The Engineer will make arrangements for the Paleontological Mitigation Team to be at the job site.

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

14-7.03A(2) Definitions

Paleontological Resources Mitigation: monitoring for fossils and salvage or in place stabilization if fossils are found.

14-7.03A(3) Submittals

Submit a schedule of subsurface disturbing activities at least 15 days before construction. Submit schedule updates at least 3 business days before implementing changes.

Submit a request for paleontological awareness training 10 days before the start of work.

14-7.03A(4) Quality Control and Assurance

Attend a pre-construction meeting with the Paleontological Mitigation Team and the Engineer to establish procedures for coordination, cooperation, and worker safety during mitigation activities.

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

14-7.03B Materials

Not Used

14-7.03C Construction

14-7.03C(1) General

Within the boundaries of the project area, no construction or related activities, which may involve subsurface disturbance, are permitted without authorization.

Notify the Engineer 15 days before start of subsurface disturbing activities.

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

14-7.03D Payment

Any additional excavation required due to the discovery of fossils by the Paleontological Mitigation Team is change order work.

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, roadside sign 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

Not Used

14-11.09C(2) Training

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

1. 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. 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 grinding or cold planing residue that is a nonhazardous waste is included in the payment for the type of removal work involved.

Delete the 4th paragraph in section 15-2.02B(2)

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 15-2.02F with:

15-2.02F Remove Asphalt Concrete Dikes

Before removing the dike, cut the outside edge of the asphalt concrete on a neat line and to a minimum depth of 0.17 foot.

Replace section 15-2.0I 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 2 feet below the adjacent finished grade. The resulting holes must be backfilled and compacted with material that is equivalent to the surrounding material.

Remove signs conduit and wiring to the nearest pull box. Remove fuses within spliced connections in the pull box.

Replace section 15-2.05B with:

15-2.05B Abandon Manholes

Abandon manholes as shown.

Replace section 15-2.05C with:

15-2.05C Abandon Culverts and Pipelines

15-2.05C(1) General

Abandon culverts or pipelines by removing portions of the culverts or pipelines, filling the inside, and backfilling the depressions and trenches to grade. As an alternative to abandoning a culvert or pipeline, you may remove the culvert or pipeline, dispose of it, and backfill.

Notify the Engineer before abandoning a culvert or pipeline.

15-2.05C(2) Materials

Openings into existing structures that are to remain in place must be plugged with minor concrete under section 90.

15-2.05C(3) Construction

Wherever culverts or pipelines intersect side slopes, remove them to a depth of at least 3 feet. Measure the depth normal to the plane of the finished side slope. Abandon the remaining portion of the culvert or pipeline.

Culverts or pipelines that are 12 inches or more in diameter must be completely filled by authorized methods. Backfill with sand that is clean, free draining, and free from roots and other deleterious substances. As an alternative to sand, you may backfill with one of the following:

1. Controlled low-strength material under section 19-3.02F
2. Slurry cement backfill under section 19-3.02D

Ends of culverts and pipelines must be securely closed by a 6-inch-thick, tight-fitting plug or wall of commercial-quality concrete.

15-2.05C(4) Payment

If backfilling inside the culvert or pipeline is required, payment for backfilling inside the culvert or pipeline is paid for as sand backfill. Payment for backfilling outside the culvert or pipeline is included in the payment for abandon culvert or abandon pipeline.

Replace section 15-2.05D with:

15-2.05D Abandon Inlets

Abandon pipe inlets and concrete drainage inlets as shown.

The top portion of the inlets must be removed to a depth of 2 feet below finished grade.

Replace section 15-2.07B with:

15-2.07B Modify Sign Structures

Modify sign structures as shown.

Electrical work for sign lighting must comply with section 86.

New metal components for sign modification must comply with section 56-3.

Subsidence is considered as zero at:

1. Intersection of the side slope and end slope at structures with the ground line as established by the original cross-sections
1. Points on the cross-sections 50 feet beyond the start and end of the area with subsidence-measuring devices, unless the Engineer agrees otherwise

The additional quantity of material for embankment work due to subsidence is determined by the average-end-area method from the original measurements and the final measurements, including zero subsidence at specified areas.

After final measurements are made, remove detachable elements of the subsidence-measuring devices.

Add to section 19-6.03D:

Settlement periods are required for embankments at the earth retaining structures as shown in the following table:

Earth retaining structure number	Surcharge height (feet)	Settlement period (days)
MSE Wall 1, 57E0128	0	30
MSE Wall 2, 57E0129	0	30

Add to section 19-7.02C:

The portion of imported borrow placed within 4 feet of the finished grade must have a resistance (R-Value) of at least 10.

Replace the 2nd and 3rd paragraph 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.

The quantity of imported borrow is the quantity remaining after deducting the adjusted quantities from excavations from the total embankment quantity and adding the quantity for subsidence as specified in section 19-6.03B.

Add to section 20-7.03I:

20-7.03I(17) Native Sod

Comply with section 20-7.03I(14), except that cultivate is not required.

Comply with section 21-1.03N.

Do not install native sod during storm events.

Immediately prior to installing native sod truck water to lightly moisten soil. Truck watering must comply with section 20-16.

Cover the outer edges of native sod with soil so that the roots are not exposed. You may use soil obtained from the adjacent areas.

Native sod areas will not be required to be mowed or trimmed.

Add to section 20-9.01A:

The plant establishment period must be Type 2.

Replace section 20-9.01C(1) with:

Submit watering schedules for use during the plant establishment period as follows:

1. Weekly watering schedules for watering native sod during the first 8 weeks after installation.
2. Monthly watering schedules for watering native sod beginning the 9th week after installation, and continuing until completion of the plant establishment period.

Submit watering schedules on the first business day of the week or the month as required.

Submit updated watering schedules within 5 business days after any changes have been made to the authorized schedules.

Control weeds by:

1. Hand pulling:
 - 1.1. In native sod areas

Replace section 20-9.03I with:

20-9.03I Watering

Water applied to native sod during the plant establishment period must comply with section 20-16.

The amount and frequency of truck watering may vary depending on temperature, length of day, season, rainfall and soil type. After installation, water native sod to develop roots with a minimum depth of 6-8 inches using the following guidelines:

1. Day-1: lightly apply enough water to penetrate sod and 2 inches of soil.
2. Day-2 to Day-14: lightly apply water to keep the soil moist throughout the day to a depth of 2 inches. Watering four to six times a day may be necessary, for five to six minutes each. Do not let soil become soggy.
3. Week-3 to week-4: increase the amount and reduce the frequency of watering at a gradual pace until the second month. During this time verify that the sod roots are establishing.
4. Second and third months: water deeply three times a week.
5. Fourth, fifth and sixth months: water deeply two times a week.
6. Seventh, eighth and ninth months: water deeply once a week.
7. Tenth, eleventh and twelfth months: water deeply once every other week.

Antistrip Treatment Laboratory Procedures for Mix Design

Antistrip treatment	Laboratory procedure
Plasticity index from 4 to 10 ^a	
Dry hydrated lime with marination	LP-6
Lime slurry with marination	LP-7
Plasticity index less than 4	
Liquid	LP-5
Dry hydrated lime without marination	LP-6
Dry hydrated lime with marination	LP-6
Lime slurry with marination	LP-7

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

For the mix design of HMA Type A produced under the QC/QA construction process, determine the tensile strength ratio under California Test 371 on untreated HMA. If the tensile strength ratio is less than 70:

1. Choose from the antistrip treatments specified based on the plasticity index
2. Test treated HMA under California Test 371
3. Treat to a minimum tensile strength ratio of 70

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.

Replace the headings and paragraphs in section 39-1.12 with:

39-1.12A General

Section 39-1.12 includes specifications for measuring pavement smoothness with an inertial profiler (IP) and straightedge, analyzing the data with FHWA's engineering software ProVAL, and correcting deficient smoothness.

The RSS for sections 39-1.12 and 39-1.12C do not apply.

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. HMA pavement within 3 feet from and parallel to the construction joint formed between curbs, gutters, or existing pavement
3. Areas within 15 feet of manholes
4. Shoulders
5. Weigh-in-motion areas
6. Miscellaneous areas such as medians, gore areas, turnouts, and maintenance pullouts

Where IP testing is required, pavement smoothness for each lane must be determined by the international roughness index (IRI) for the left and right wheel paths in an individual lane and then averaging the results. The average of the IRIs from the left and right wheel paths for the same lane is the

mean roughness index (MRI) of the lane. The wheel paths are a pair of lines 3 feet from and parallel to the edge of a lane. Left and right wheel paths are based on the direction of travel.

Where IP testing is required, identify areas of localized roughness. Areas of localized roughness must be identified using the ProVAL smoothness assurance analysis by calculating continuous IRI for each wheel path with a 25-foot interval.

Collect profiling data under AASHTO R 56 and analyze data using 250 mm and IRI filters.

Interpret references to "must-grinds" as "localized roughness" and "PI₀" as "MRI" in the RSS for section 39.

39-1.12B Submittals

At least 5 business days before start of initial profiling or changing profiler or operator, submit:

1. IP certification issued by Texas Transportation Institute (TTI). The certification must be not more than 12 months old.
2. Operator certification for the IP issued by TTI. The operator must be certified for each different model of IP device operated. The certification must be not more than 36 months old.
3. List of manufacturer's recommended test procedures for IP calibration and verification.

Within 2 business days after cross correlation testing, submit ProVAL profiler certification analysis report for cross correlation test results performed on test section to the Engineer and to the electronic mailbox address:

smoothness@dot.ca.gov

Within 2 business days after each day of inertial profiling, submit profile data to the Engineer and to the electronic mailbox address:

smoothness@dot.ca.gov

The profiling data must include:

1. Raw profile data for each lane.
2. ProVAL ride quality analysis report for IRIs of left and right wheel paths of each lane. Submit in pdf file format.
3. ProVAL ride quality analysis report for MRIs of each lane. Submit in pdf file format.
4. ProVAL smoothness assurance analysis report for IRIs of left wheel path. Submit in pdf file format.
5. ProVAL smoothness assurance analysis report for IRIs of right wheel path. Submit in pdf file format.
6. GPS data file for each lane in GPS exchange. Submit in GPS eXchange file format.
7. Manufacturer's recommended IP calibration and verification tests results.
8. AASHTO IP calibration and verification test results including bounce, block, and distance measurement instrument (DMI).

Submit the raw profile data in unfiltered electronic pavement profile file (PPF) format. Name the PPF file using the following naming convention:

YYYYMMDD_TTCCRRR_D_L_W_S_X_PT.PPF

where:

YYYY = year

MM = Month, leading zero

DD = Day of month, leading zero

TT = District, leading zero

CCC = County, 2 or 3 letter abbreviation as shown in section 1-1.08

RRR = Route number, no leading zeros

D = Traffic direction as NB, SB, WB, or EB

L = Lane number from left to right in direction of travel

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, "INTER" for after prepaving smoothness correction, "PAVE" for after paving, and "CORR" for after final surface pavement correction
- PT = Pavement type (i.e., HMA, RHMA, HMA-O, RHMA-O, RHMA-G, etc.)

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

39-1.12C Inertial Profiler Calibration and Verification Tests

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

Operate the IP according to the manufacturer's recommendations and AASHTO R 57 at 1-inch recording intervals.

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 R 57, section 5.3.2.3.
2. Bounce test. Verify the combined height sensor and accelerometer accuracy under AASHTO R 57, section 5.3.2.3.2.
3. DMI test. Calibrate the accuracy of the testing procedure under AASHTO R 56, 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 R 56 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.

39-1.12D Acceptance Criteria

For areas that require pavement smoothness determined using an IP, the pavement surface must:

1. Have no areas of localized roughness with an IRI greater than 120 in/mi
2. Comply with the MRI requirements shown in the following tables for a 0.1 mile section:

HMA^a Pavement Smoothness Acceptance Criteria

HMA thickness	MRI requirement
> 0.20 foot	60 in/mi or less
≤0.20 foot	75 in/mi or less

^a Except OGFC

OGFC Pavement Smoothness Acceptance Criteria

OGFC placement on	MRI requirement
New construction, or HMA overlay	60 in/mi or less
Existing pavement	75 in/mi or less
Milled surface	75 in/mi or less

For areas that require pavement smoothness determined using a 12-foot straightedge, the HMA 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

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

39-1.12E Smoothness Testing

39-1.12E(1) General

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

Remove foreign objects on the pavement surface before testing.

Mark the beginning and ending station on the pavement shoulder before testing. Stationing must be the same when profiling more than one surface.

39-1.12E(2) Inertial Profiler

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 using the ProVAL ride quality analysis. Profile the left and right wheel paths of each lane. Calculate the MRI of each lane. 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 using a continuous IRI for each wheel path with a 25-foot interval. Localized roughness greater than 120 in/mi must be corrected regardless of the IRI values of a 0.1-mile section.

Determine the MRI of the HMA, except OGFC. If the MRI of the final pavement surface is greater than the MRI acceptance requirement in the table titled "HMA Pavement Smoothness Acceptance Criteria" in section 39-1.12D, correct to the MRI acceptance requirement in the table.

The final surface of HMA must meet MRI acceptance requirements in the table titled "HMA Pavement Smoothness Acceptance Criteria" in section 39-1.12D before placing OGFC.

Determine the MRI of the OGFC. If OGFC MRI is greater than the accepted value in the table titled "OGFC Pavement Smoothness Acceptance Criteria" in section 39-1.12D, correct to the MRI acceptance requirement in the table.

39-1.12E(3) Straightedge

Measure areas that require 12-foot straightedge. If the straightedge measurement is greater than the accepted value in section 39-1.12D, correct to the acceptance requirement.

39-1.12F Smoothness Correction

If the final surface of the pavement does not comply with section 39-1.12D, grind the pavement to within specified tolerances, remove and replace it, or place an overlay of HMA. Do not start corrective work until your method is authorized.

Smoothness correction of the final pavement surface must leave at least 75 percent of the specified HMA thickness. If ordered, core the pavement at the locations determined by the Engineer. Coring, including traffic control, is change order work. Remove and replace deficient pavement areas where the overlay thickness is less than 75 percent of the thickness specified as determined by the Engineer.

If you choose to correct OGFC, the Engineer determines if the corrective method causes raveling. OGFC that is raveling must be removed and replaced.

Corrected HMA pavement areas must be uniform rectangles with edges:

1. Parallel to the nearest HMA pavement edge or lane line
2. Perpendicular to the pavement centerline

On ground areas not to be overlaid with OGFC, apply fog seal coat under section 37-2.

Where corrections are made within areas requiring testing with IP, reprofile the entire lane length with the IP device.

Where corrections are made within areas requiring testing with a 12-foot straightedge, retest the corrected area with the straightedge.

Add to section 39-1.14:

In median areas adjacent to slotted median drains, each layer of HMA must not exceed 0.15 foot maximum compacted thickness.

Replace "Reserved" in section 39-1.18 with:

39-1.18A General

39-1.18A(1) Summary

Treat HMA aggregate with lime using the dry lime method either with marination or without.

39-1.18A(2) Submittals

Determine the exact lime proportions for fine and coarse virgin aggregate and submit them as part of the proposed JMF.

If marination is required, submit the averaged aggregate quality test results within 24 hours of sampling.

Submit a treatment data log from the dry lime and aggregate proportioning device in the following order:

1. Treatment date
2. Time of day the data is captured
3. Aggregate size being treated
4. HMA type and mix aggregate size
5. Wet aggregate flow rate collected directly from the aggregate weigh belt
6. Aggregate moisture content, expressed as a percent of the dry aggregate weight
7. Flow rate of dry aggregate calculated from the flow rate of wet aggregate
8. Dry lime flow rate
9. Lime ratio from the accepted JMF for each aggregate size being treated
10. Lime ratio from the accepted JMF for the combined aggregate
11. Actual lime ratio calculated from the aggregate weigh belt output, the aggregate moisture input, and the dry lime meter output, expressed as a percent of the dry aggregate weight
12. Calculated difference between the authorized lime ratio and the actual lime ratio

Each day during lime treatment, submit the treatment data log on electronic media in tab delimited format on a removable CD-ROM storage disk. Each continuous treatment data set must be a separate record using a line feed carriage return to present the specified data on 1 line. The reported data must include data titles at least once per report.

39-1.18A(3) Quality Control and Assurance

If marination is required, the QC plan must include aggregate quality control sampling and testing during lime treatment. Sample and test in compliance with minimum frequencies shown in the following table:

Aggregate Quality Control During Lime Treatment

Quality characteristic	Test method	Minimum sampling and testing frequency
Sand equivalent	California Test 217	Once per 1,000 tons of aggregate treated with lime
Percent of crushed particles	California Test 205	As necessary and as designated in the QC plan
Los Angeles Rattler	California Test 211	
Fine aggregate angularity	California Test 234	
Flat and elongated particles	California Test 235	

Note: During lime treatment, sample coarse and fine aggregate from individual stockpiles. Combine aggregate in the JMF proportions. Run tests for aggregate quality in triplicate and report test results as the average of 3 tests.

For any of the following, the Engineer orders proportioning operations stopped if you:

1. Do not submit the treatment data log
2. Do not submit the aggregate quality control data for marinated aggregate
3. Submit incomplete, untimely, or incorrectly formatted data
4. Do not take corrective actions
5. Take late or unsuccessful corrective actions
6. Do not stop treatment when proportioning tolerances are exceeded
7. Use malfunctioning or failed proportioning devices

If you stop treatment, notify the Engineer of any corrective actions taken and conduct a successful 20-minute test run before resuming treatment.

39-1.18B Materials

High-calcium hydrated lime and water must comply with section 24-2.02.

Before virgin aggregate is treated, it must comply with the aggregate quality specifications. Do not test treated aggregate for quality control except for gradation. The Department does not test treated aggregate for acceptance except for gradation.

The Engineer determines the combined aggregate gradation during HMA production after you have treated the aggregate.

Treated aggregate must not have lime balls or clods.

39-1.18C Construction

39-1.18C(1) General

Notify the Engineer at least 24 hours before the start of aggregate treatment.

Do not treat RAP.

Marinate aggregate if the plasticity index determined under California Test 204 is from 4 to 10.

If marination is required:

1. Treat and marinate coarse and fine aggregates separately.
2. Treat the aggregate and stockpile for marination only once.
3. Treat the aggregate separate from HMA production.

The lime ratio is the pounds of dry hydrated lime per 100 lb of dry virgin aggregate expressed as a percentage. Water content of slurry or untreated aggregate must not affect the lime ratio.

Aggregate gradations must have the lime ratio ranges shown in the following table:

Aggregate gradation	Lime ratio percent
Coarse	0.4–1.0
Fine	1.5–2.0
Combined	0.8–1.5

The lime ratio for fine and coarse aggregate must be within ± 0.2 percent of the lime ratio in the accepted JMF. The lime ratio must be within ± 0.2 percent of the authorized lime ratio when you combine the individual aggregate sizes in the JMF proportions.

Proportion dry lime by weight with a continuous operation.

The device controlling dry lime and aggregate proportioning must produce a treatment data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily treatment. The data must be a treatment activity register and not a summation. The material represented by a data set is the quantity produced 5 minutes before and 5 minutes after the capture time. For the duration of the Contract, collected data must be stored by the controller.

If 3 consecutive sets of recorded treatment data indicate deviation more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment.

If a set of recorded treatment data indicates a deviation of more than 0.4 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the material represented by that set of data in HMA.

If 20 percent or more of the total daily treatment indicates deviation of more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the day's treated aggregate in HMA.

If you stop treatment for noncompliance, you must implement corrective action and successfully treat aggregate for a 20-minute period. Notify the Engineer before beginning the 20-minute treatment period.

If you use a batch-type proportioning operation for HMA production, control proportioning in compliance with the specifications for continuous mixing plants. Use a separate dry lime aggregate treatment operation from HMA batching operations including:

1. Pugmill mixer
2. Controller
3. Weigh belt for the lime
4. Weigh belt for the aggregate

If using a continuous mixing operation for HMA without lime marinated aggregates, use a controller that measures the blended aggregate weight after any additional water is added to the mixture. The controller must determine the quantity of lime added to the aggregate from the aggregate weigh belt input in connection with the manually input total aggregate moisture, the manually input target lime content, and the lime proportioning system output. Use a continuous aggregate weigh belt and pugmill mixer for the lime treatment operation in addition to the weigh belt for the aggregate proportioning to asphalt binder in the HMA plant. If you use a water meter for moisture control for lime treatment, the meter must comply with California Test 109.

At the time of mixing dry lime with aggregate, the aggregate moisture content must ensure complete lime coating. The aggregate moisture content must not cause aggregate to be lost between the point of weighing the combined aggregate continuous stream and the dryer. Add water for mixing and coating aggregate to the aggregate before dry lime addition. Immediately before mixing lime with aggregate, water must not visibly separate from aggregate.

The HMA plant must be equipped with a bag-house dust system. Material collected in the dust system must be returned to the mix.

39-1.18C(2) Mixing Dry Lime and Aggregate

Mix aggregate, water, and dry lime with a continuous pugmill mixer with twin shafts. Immediately before mixing lime with aggregate, water must not visibly separate from the aggregate. Store dry lime in a uniform and free-flowing condition. Introduce dry lime to the pugmill in a continuous operation. The introduction must occur after the aggregate cold feed and before the point of proportioning across a weigh belt and the aggregate dryer. Prevent loss of dry lime.

If marination is required, marinate treated aggregate in stockpiles from 24 hours to 60 days before using in HMA. Do not use aggregate marinated more than 60 days.

The pugmill must be equipped with paddles arranged to provide sufficient mixing action and mixture movement. The pugmill must produce a homogeneous mixture of uniformly coated aggregates at mixer discharge.

If the aggregate treatment operation is stopped longer than 1 hour, clean the equipment of partially treated aggregate and lime.

Aggregate must be completely treated before introduction into the mixing drum.

39-1.18D Payment

Not Used

Replace "Reserved" in section 39-1.19 with:

39-1.19A General

39-1.19A(1) Summary

Treat HMA aggregate with lime using the slurry method and place it in stockpiles to marinate.

39-1.19A(2) Submittals

Determine the exact lime proportions for fine and coarse virgin aggregate and submit them as part of the proposed JMF.

Submit the averaged aggregate quality test results to the Engineer within 24 hours of sampling.

Submit a treatment data log from the slurry proportioning device in the following order:

1. Treatment date
2. Time of day the data is captured
3. Aggregate size being treated
4. Wet aggregate flow rate collected directly from the aggregate weigh belt
5. Moisture content of the aggregate just before treatment, expressed as a percent of the dry aggregate weight
6. Dry aggregate flow rate calculated from the wet aggregate flow rate
7. Lime slurry flow rate measured by the slurry meter
8. Dry lime flow rate calculated from the slurry meter output
9. Authorized lime ratio for each aggregate size being treated
10. Actual lime ratio calculated from the aggregate weigh belt and the slurry meter output, expressed as a percent of the dry aggregate weight
11. Calculated difference between the authorized lime ratio and the actual lime ratio
12. Dry lime and water proportions at the slurry treatment time

Every day during lime treatment, submit the treatment data log on electronic media in tab delimited format on a removable CD-ROM storage disk. Each continuous treatment data set must be a separate record using a line feed carriage return to present the specified data on 1 line. The reported data must include data titles at least once per report.

39-1.19A(3) Quality Control and Assurance

The QC plan must include aggregate quality control sampling and testing during aggregate lime treatment. Sample and test in compliance with frequencies in the following table:

Aggregate Quality Control During Lime Treatment

Quality characteristic	Test method	Minimum sampling and testing frequency
Sand equivalent	California Test 217	Once per 1,000 tons of aggregate treated with lime
Percent of crushed particles	California Test 205	As necessary and as designated in the QC plan
Los Angeles Rattler	California Test 211	
Fine aggregate angularity	California Test 234	
Flat and elongated particles	California Test 235	

Note: During lime treatment, sample coarse and fine aggregate from individual stockpiles. Combine aggregate in the JMF proportions. Run tests for aggregate quality in triplicate and report test results as the average of 3 tests.

For any of the following, the Engineer orders proportioning operations stopped if you:

1. Do not submit the treatment data log
2. Do not submit the aggregate quality control data
3. Submit incomplete, untimely, or incorrectly formatted data
4. Do not take corrective actions
5. Take late or unsuccessful corrective actions
6. Do not stop treatment when proportioning tolerances are exceeded
7. Use malfunctioning or failed proportioning devices

If you stop treatment, notify the Engineer of any corrective actions taken and conduct a successful 20-minute test run before resuming treatment.

For the aggregate to be treated, determine the moisture content at least once during each 2 hours of treatment. Calculate moisture content under California Test 226 or 370 and report it as a percent of dry aggregate weight. Use the moisture content calculations as a set point for the proportioning process controller.

39-1.19B Materials

High-calcium hydrated lime and water must comply with section 24-2.02.

Before virgin aggregate is treated, it must comply with the aggregate quality specifications. Do not test treated aggregate for quality control except for gradation. The Engineer does not test treated aggregate for acceptance except for gradation.

The Engineer determines the combined aggregate gradation during HMA production after you have treated the aggregate. If RAP is used, the Engineer determines combined aggregate gradations containing RAP under Laboratory Procedure LP-9.

Treated aggregate must not have lime balls or clods.

39-1.19C Construction

39-1.19C(1) General

Notify the Engineer at least 24 hours before the start of aggregate treatment.

Treat aggregate separate from HMA production.

Do not treat RAP.

Add lime to the aggregate as slurry consisting of mixed dry lime and water at a ratio of 1 part lime to from 2 to 3 parts water by weight. The slurry must completely coat the aggregate.

Lime treat and marinate coarse and fine aggregates separately.

Immediately before mixing lime slurry with the aggregate, water must not visibly separate from the aggregate.

Treat the aggregate and stockpile for marination only once.

The lime ratio is the pounds of dry hydrated lime per 100 lb of dry virgin aggregate expressed as a percentage. Water content of slurry or untreated aggregate must not affect the lime ratio.

The following aggregate gradations must have the lime ratio ranges shown in the following table:

Aggregate gradation	Lime ratio percent
Coarse	0.4–1.0
Fine	1.5–2.0
Combined virgin aggregate	0.8–1.5

The lime ratio for fine and coarse aggregate must be within ± 0.2 percent of the lime ratio in the accepted JMF. The lime ratio must be within ± 0.2 percent of the authorized lime ratio when you combine the individual aggregate sizes in the JMF proportions. The lime ratio must be determined before the addition of RAP.

If 3 consecutive sets of recorded treatment data indicate deviation more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment.

If a set of recorded treatment data indicates a deviation of more than 0.4 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the material represented by that set of data in HMA.

If 20 percent or more of the total daily treatment indicates deviation of more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the day's total treatment in HMA.

If you stop treatment for noncompliance, you must implement corrective action and successfully treat aggregate for a 20-minute period. Notify the Engineer before beginning the 20-minute treatment period.

39-1.19C(2) Lime Slurry Proportioning

Proportion lime and water with a continuous or batch operation.

The device controlling slurry proportioning must produce a treatment data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily treatment. The data must be a treatment activity register and not a summation. The material represented by the data set is the quantity produced 5 minutes before and 5 minutes after the capture time. For the Contract's duration, collected data must be stored by the controller.

39-1.19C(3) Proportioning and Mixing Lime Slurry Treated Aggregate

Treat HMA aggregate by proportioning lime slurry and aggregate by weight in a continuous operation.

Marinate treated aggregate in stockpiles from 24 hours to 60 days before using in HMA. Do not use aggregate marinated longer than 60 days.

39-1.19D Payment

Not Used

Replace "Reserved" in section 39-1.20 with:

39-1.20A General

39-1.20A(1) Summary

Treat asphalt binder with liquid antistripping (LAS) treatment to bond the asphalt binder to aggregate in HMA.

39-1.20A(2) Submittals

For LAS, submit with the proposed JMF submittal:

1. MSDS
2. One 1-pint sample
3. Infrared analysis including copy of absorption spectra

Submit a certified copy of test results and an MSDS for each LAS lot.

Submit a certificate of compliance for each LAS shipment. With each certificate of compliance, submit:

1. Your signature and printed name
2. Shipment number
3. Material type
4. Material specific gravity
5. Refinery
6. Consignee
7. Destination
8. Quantity
9. Contact or purchase order number
10. Shipment date

Submit proportions for LAS as part of the JMF submittal. If you change the brand or type of LAS, submit a new JMF.

For each job site delivery of LAS, submit one 1/2-pint sample to METS. Submit shipping documents to the Engineer. Label each LAS sampling container with:

1. LAS type
2. Application rate
3. Sample date
4. Contract number

At the end of each day's production shift, submit production data in electronic and printed media. Present data on electronic media in tab delimited format. Use line feed carriage return with 1 separate record per line for each production data set. Allow sufficient fields for the specified data. Include data titles at least once per report. For each mixing operation type, submit in order:

1. Batch mixing:
 - 1.1. Production date
 - 1.2. Time of batch completion
 - 1.3. Mix size and type
 - 1.4. Each ingredient's weight
 - 1.5. Asphalt binder content as a percentage of the dry aggregate weight
 - 1.6. LAS content as a percentage of the asphalt binder weight
2. Continuous mixing:
 - 2.1. Production date
 - 2.2. Data capture time
 - 2.3. Mix size and type
 - 2.4. Flow rate of wet aggregate collected directly from the aggregate weigh belt
 - 2.5. Aggregate moisture content as percentage of the dry aggregate weight
 - 2.6. Flow rate of asphalt binder collected from the asphalt binder meter
 - 2.7. Flow rate of LAS collected from the LAS meter
 - 2.8. Asphalt binder content as percentage of total weight of mix calculated from:
 - 2.8.1. Aggregate weigh belt output
 - 2.8.2. Aggregate moisture input
 - 2.8.3. Asphalt binder meter output
 - 2.9. LAS content as percentage of the asphalt binder weight calculated from:
 - 2.9.1. Asphalt binder meter output
 - 2.9.2. LAS meter output

39-1.20A(3) Quality Control and Assurance

For continuous mixing and batch mixing operations, sample asphalt binder before adding LAS. For continuous mixing operations, sample combined asphalt binder and LAS after the static mixer.

The Engineer orders proportioning operations stopped for any of the following if you:

1. Do not submit data
2. Submit incomplete, untimely, or incorrectly formatted data
3. Do not take corrective actions
4. Take late or unsuccessful corrective actions
5. Do not stop production when proportioning tolerances are exceeded
6. Use malfunctioning or failed proportioning devices

If you stop production, notify the Engineer of any corrective actions taken before resuming.

39-1.20B Materials

LAS-treated asphalt binder must comply with the specifications for asphalt binder in section 39-1.02C. Do not use LAS as a substitute for asphalt binder.

LAS total amine value must be 325 minimum when tested under ASTM D 2074.

Use only 1 LAS type or brand at a time. Do not mix LAS types or brands.

Store and mix LAS under the manufacturer's instruction.

39-1.20C Construction

LAS must be from 0.5 to 1.0 percent by weight of asphalt binder.

If 3 consecutive sets of recorded production data show actual delivered LAS weight is more than ± 1 percent of the authorized mix design LAS weight, stop production and take corrective action.

If a set of recorded production data shows actual delivered LAS weight is more than ± 2 percent of the authorized mix design LAS weight, stop production. If the LAS weight exceeds 1.2 percent of the asphalt binder weight, do not use the HMA represented by that data.

The continuous mixing plant controller proportioning the HMA must produce a production data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily production. The data must be a production activity register and not a summation. The material represented by the data is the quantity produced 5 minutes before and 5 minutes after the capture time. For the duration of the Contract, collected data must be stored by the plant controller or a computer's memory at the plant.

39-1.20D Payment

Not Used

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

Add to section 39-6:

The bid item for place hot mix asphalt (miscellaneous area) is limited to the areas shown and is in addition to the bid items for the materials involved.

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

40-1.01D(9) Pavement Smoothness

40-1.01D(9)(a) General

Notify the Engineer 2 business days before performing smoothness testing including IP calibration and verification testing. The notification must include start time and locations by station.

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

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

40-1.01D(9)(b) Straightedge Testing

Identify locations of areas requiring 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

40-1.01D(9)(c) Inertial Profile Testing

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

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 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 R 56 using ProVAL profiler certification analysis with a 3 feet maximum offset. The cross correlation must be a minimum of 0.92.

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 R 57, section 5.3.2.3.
2. Bounce test. Verify the combined height sensor and accelerometer accuracy under AASHTO R 57, section 5.3.2.3.2.
3. DMI test. Calibrate the accuracy of the testing procedure under AASHTO R 56, section 8.4.
4. Manufacturer's recommended tests.

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.

Operate the IP according to the manufacturer's recommendations and AASHTO R 57 at 1-inch recording intervals and a minimum 4 inch line laser sensor.

Collect IP data under AASHTO R 56. IP data must include:

1. Raw profile data for each lane
2. ProVAL ride quality analysis report for the international roughness index (IRI) of left and right wheel paths of each lane. Submit in pdf file format.
3. ProVAL ride quality analysis report for the mean roughness index (MRI) of each lane. Submit in pdf file format.
4. ProVAL smoothness assurance analysis report for IRIs of left wheel path. Submit in pdf file format
5. ProVAL smoothness assurance analysis report for IRIs of right wheel path. Submit in pdf file format.
6. GPS data file for each lane in GPS exchange. Submit in GPS eXchange file format.
7. Manufacturer's recommended IP calibration and verification tests results.
8. AASHTO IP calibration and verification test results including bounce, block, and distance measurement instrument (DMI).

Submit the IP raw data in unfiltered electronic pavement profile file (PPF) format. Name the PPF file using the following naming convention:

YYYYMMDD_TTCCRRR_D_L_W_S_X_PT.PPF

where:

YYYY = year

MM = Month, leading zero

DD = Day of month, leading zero

TT = District, leading zero

CCC = County, 2 or 3 letter abbreviation as shown in section 1-1.08

RRR = Route number, no leading zeros

D = Traffic direction as NB, SB, WB, or EB

L = Lane number from left to right in direction of travel

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.)

Determine IRIs using the ProVAL ride quality analysis with 250 mm and IRI filters. 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

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.

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 and IRI filters.

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 longitudinal isolation joint must be silicone.

Longitudinal contraction joint must be Type A2. Transverse contraction joint must be Type B.

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).

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.

Proprietary earth retaining system	Web site/e-mail	Address	Telephone no.
Welded Wire Wall	http://www.hilfiker.com	HILFIKER RETAINING WALLS 1902 HILFIKER LN EUREKA CA 95503-5711	(707) 443-5093 (800) 762-8962
Reinforced Earth – 5 ft cruciform	http://www.reinforcedearth.com	THE REINFORCED EARTH COMPANY 1660 HOTEL CIR N STE 304 SAN DIEGO CA 92108-2803	(619) 688-2400
Reinforced Earth – 5 ft square	http://www.reinforcedearth.com	THE REINFORCED EARTH COMPANY 1660 HOTEL CIR N STE 304 SAN DIEGO CA 92108-2803	(619) 688-2400
Retained Earth	http://www.reinforcedearth.com	THE REINFORCED EARTH COMPANY 1660 HOTEL CIR N STE 304 SAN DIEGO CA 92108-2803	(619) 688-2400
MSE Plus – 5 ft square	http://www.mseplus.com	SSL 4740 SCOTTS VALLEY DR STE E 209 SCOTTS VALLEY CA 95066-4240	(831) 430-9300
MSE Plus – 5 by 6 ft	http://www.mseplus.com	SSL 4740 SCOTTS VALLEY DR STE E 209 SCOTTS VALLEY CA 95066-4240	(831) 430-9300
Landmark Reinforced Soil Wall System	dsandri@anchorwall.com	ANCHOR WALL SYSTEMS INC 2525 COSTERO MAGESTUOSO SAN CLEMENTE CA 92673-6424	(949) 363-6663
KeySystem 1	http://www.keystonewalls.com	KEYSTONE RETAINING WALL SYSTEMS 4444 W 78TH ST MINNEAPOLIS MN 55435-5406	(952) 897-1040
Mesa Retaining Wall System	http://www.tensarcorp.com	TENSAR INTERNATIONAL CORPORATION 2500 NORTHWIND PKWY STE 500 ALPHARETTA GA 30009-2247	(770) 344-2000

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48 TEMPORARY STRUCTURES

Add to section 48-2.01C(2):

The review time for shop drawings for specific structures or portions of structures is shown in the following table:

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	$\leq 64.0 \text{ pcf}^a$
Before final cleaning and immediately before placing concrete		$\leq 64.0 \text{ pcf}^a$
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		$\leq 60 \text{ sec/qt}$
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	$\leq 0.5 \text{ percent}$

^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	$\leq 64.0 \text{ pcf}^a$
Before final cleaning and immediately before placing concrete		$\leq 64.0 \text{ pcf}^a$
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		$\leq 57 \text{ sec/qt}$
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	$\leq 0.5 \text{ percent}$

^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.

AA

51 CONCRETE STRUCTURES

Add to section 51-1.01C(1):

If the methacrylate crack treatment is performed within 100 feet of a residence, business, or public space, submit a public safety plan that includes the following:

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.

Add to section 51-1.03C(2)(b):

Where shown, remove soffit forms for deck slabs of CIP box girders.

Replace "Reserved" in section 51-1.03A with:

Vertical, horizontal, radial, or normal dimensions shown on the typical section are for zero percent cross slope. You may construct superelevated concrete box girder structures with the typical section rotated around the profile grade line in superelevation areas, that have the following characteristics:

1. Sloping exterior girders
2. Straight, uninterrupted cross slope between edges of deck
3. A single profile grade line

For portions of superstructures rotated about the profile grade:

1. Horizontal distances between the profile grade line and the edges of deck must be as shown
2. Girder widths and slab thicknesses must be as shown
3. Interior girder stems must remain vertical

Replace the 1st paragraph in section 51-1.03F(5)(b)(i) with:

Texture the bridge deck surfaces and approach slabs longitudinally by grinding and grooving or by longitudinal tining.

Add to section 51-1.04:

The payment quantity for fractured rib texture does not include the area of fractured rib texture on mechanically stabilized embankment walls

At Sanyo Avenue UC, bridge No. 57-1226's abutments, the payment quantity for fractured rib texture (modified) include the area of fractured rib texture and square pattern texture.

High density polyethylene used for wedges may contain up to 10% recycled material content.

56-8.04 Payment

Not used

Add to section 56:

56-8 ROADSIDE SIGN (WEED CONTROL MAT RUBBER)

56-9.01 GENERAL

56-9.01A Summary

Section 56-8 includes specifications for constructing weed control using rubber weed control mat for roadside sign.

56-9.01 Submittals

Submit:

1. Copy of the manufacturer's installation instructions before placing weed control mat
2. Certificate of compliance for the weed control mat

56-9.02 MATERIALS

Rubber weed control mat must:

1. Be made from 100 percent California derived recycled tire rubber. Recycled tire rubber:
 - 1.1. May include polyester based tire fiber
 - 1.2. Must be free of metal
2. Be black or near black in color, with less than 15 percent small color chips
3. Be flame resistant
4. Match the length, width, and overlap shown
5. Be at least 0.5 inch thick.
6. Weigh at least 26 lb/sq yd
7. Be either individual mats or a continuous roll product

Adhesive caulking must be as specified by the rubber mat manufacturer.

56-9.03 CONSTRUCTION

In areas to receive weed control mat, cut vegetation to the ground and remove it.

After clearing, grade areas to receive weed control mat to a smooth surface and compact to a relative compaction of not less than 90 percent. Earthwork must comply with section 19. Spread surplus excavated material uniformly adjacent to the roadway, unless otherwise specified in section 14-11.

Place weed control mat beneath roadside signs as shown on the plans.

Gaps and openings in the rubber mat at post holes must be minimized. Openings at post holes must be one of the following:

1. Precut by the manufacturer
2. Fabricated in the field by cutting mats along scribe lines provided by the manufacturer
3. Formed by punching the guardrail posts through the rubber mat material

Cuts other than those required to install mat around post will be rejected.

Join weed control mats per the manufacturer's instructions.

Seal joints between mats and adjacent posts, pavement edge, and dikes with adhesive caulking. Do not leave gaps between the mat and adjacent post, pavement, or dike.

Upon completion, the weed control mat surface must be flat, smooth, and in uniform contact with the soil, without bulges or wrinkles. Maintain flow lines, slope gradients, and contours of the job site.

Screen Size (Inches)	Percentage Passing (By Mass)
8	100
6	50-85
4	0-50

72-11.04B(2) Cement

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

72-11.04B(3) Mortar

Hydrated lime must comply with ASTM C 207, Type S.

Mortar sand must be commercial quality and free of organic impurities and lumps of clay and shale.

Mortar must consist by volume of 1 part cement, 0–0.5 part hydrated lime, and 2.25–3 parts mortar sand. Add enough water to make a workable mortar. Accurately measure and thoroughly mix each batch of mortar. Do not retemper mortar more than one hour after mixing. Reduce the amount of lime as necessary to prevent leaching and efflorescence on finished surfaces.

For the mortar, you may use a proprietary, premixed packaged blend of cement, lime, and sand, without color, that requires only water to prepare for use as brick mortar or grout. Packages of the premixed mortar must show the manufacture's name, brand, weight, and color identification. Submit the manufacturer's instructions for mixing proportions and procedures.

72-11.04C Construction

72-11.04C(1) General

Stiff broom finish area construction must comply with section 72-11.01C.

Joints must be straight and of uniform and equal width.

Protect surfaces of completed cobble stone, concrete, and other materials exposed to view from spillage, splatters, and other deposits of cementitious materials from cobble stone construction. Remove these deposits without damage to the materials or exposed surfaces. Stains, efflorescence, laitance, splashes, or spots on the faces of cobble stone exposed to view must be removed.

72-11.04C(2) Installation on a Mortar Bedding

The top surface of the air-blown mortar or concrete base must be lightly and evenly scored horizontally and vertically with a metal scratcher having grooves not more than 1 inch apart.

Cure the air-blown mortar or concrete base by the water method for at least 2 days.

Lay and embed cobble stones in thick mortar as shown. Embedment must be shoved tight so that mortar is flushed into the joints.

Unless authorized, space remaining between placed cobbles must not exceed 1.5 inches.

Reset loose rocks, or rock with a gap greater than 3/4 inch, measured from the edge of the rock to the surrounding mortar bedding.

Do not allow any traffic on the completed surface for at least 24 hours, or more if ordered.

Schedule to complete the work in the same day, including placement, finishing and application of curing in any section bounded by permissible construction joints.

Place concrete after cobble stones have been set and clean cobble stone surfaces under section 72-3.03E, except that the minimum penetration of concrete shall be 4 inches.

72-11.04D Payment

Not Used

AA

77 LOCAL INFRASTRUCTURE

Replace "Reserved" in section 77 with:

77-1 GENERAL

77-1.01 GENERAL

77-1.01A Summary

Section 77-1 includes general specifications for constructing local infrastructure.

Notify the Engineer at least 10 days before starting utility work.

77-1.01B Submittals

Submit a complete set of as-build drawings within 30 days of installation. As-build drawings must be 24 by 36 inches in size and on 20 pound paper. Text must be a minimum nominal height of 5/32.

77-1.02 MATERIALS

Not used

77-1.03 CONSTRUCTION

Not Used

77-1.04 PAYMENT

Not Used

77-2 SEWER

77-2.01 GENERAL

77-2.01A Summary

Section 77-2 includes specifications for performing sewer work.

Existing services are to remain operational until the Engineer determines they are no longer needed.

77-2.01B Sewage Spill Response

Call the City of San Diego 24 hour emergency notification number at (619) 515-3525, the County of San Diego Emergency Operations Center 'Station M' at (858) 565-5255 and act immediately to control a sewage spill. Take all appropriate steps to contain it according to the sewage spill response plan and flow diversion plan. Immediately notify the Engineer, City of San Diego, and County of San Diego representatives and report project name, location, Contractor name, Project Engineer and Resident Engineer's names.

The Engineer may institute further corrective actions to fully comply with existing laws, ordinances, codes, orders or other pertinent regulations. You are responsible for all costs incurred for the corrective action including mitigation measures or habitat restoration, and obtaining after-the-fact permits if necessary, in any environmentally sensitive area. These permits include those from the City of San Diego Planning and Development Review Department, California Coastal Commission, U. S. Army Corps of Engineers, the California Department of Fish and Game, and all relevant agencies.

You are responsible for paying any fines assessed from a sewage spill.

77-2.01C Submittals

77-2.01C(1) General

Not Used

77-2.01C(2) Sewage Spill Response

Within 5 days from spill occurrence, submit a report to the agency and a copy to the Engineer as an informational submittal describing the following information:

1. Location of the spill
2. Nature and estimated volume
3. Date and time
4. Duration
5. Cause
6. Type of remedial efforts or clean up measures taken, including erosion control measures
7. Date and time of implementation
8. Corrective or preventive actions taken to avoid further spills
9. Equipment used in spill response
10. Environmentally-sensitive habitat, if any, impacted
11. Results of any necessary monitoring
12. List of who was notified at the County, City, date and time you were notified of the spill, date and time you arrived on site

77-2.01C(3) Testing

Submit test results signed by the supervisor performing the work.

77-2.01C(4) Materials

Submit product data for the manhole PVC liner. Product data includes physical and chemical resistance properties, details and dimensions. Submit shop drawings showing installation procedures, dimensions, location and types of joints or weld strips. Show returns, corners, joins and coverage.

Submit product data for the manhole polyurethane coating, including application procedures and surface preparation requirements.

Submit product data for manhole epoxy lining coating.

For the cathodic protection system and joint bonding, submit product data for:

1. Wire and cable
2. Copper sulfate reference electrodes
3. Test stations
4. Conduit
5. Exothermic weld molds and charges
6. Wax tape system
7. Plastic warning tape
8. Sacrificial anodes

A corrosion technician must submit a written report certifying the cathodic protection system is in compliance with the specifications. The report must indicate each measurement made and its recorded value. Submit a report of the theoretical resistance and measured pipe resistance, including all calculations, within 7 days of completing the tests.

77-2.01C(5) Supercritical Flow Shop Drawing

A shop drawing must be prepared when the change in grade of the inlet and outlet pipes is greater than 10 percent, or the potential for a hydraulic jump, at a manhole. The shop drawings must then be submitted. The shop drawing must show the use of vertical curves upstream of a manhole before it reaches the manhole to provide a gradual transition from supercritical flow to sub-critical flow. The minimum horizontal length of vertical curves must be no less than 40 feet and may be computed by using the following formula:

$$L = (S1 - S2)/R$$

Where:

L = Minimum horizontal length of vertical curve (not less than 40 feet)

S1 & S2 = Slopes of beginning and ending tangents to the vertical curve expressed in feet per foot

R = Minimum rate of change of slope (feet/foot), as determined by the pipe manufacturer's specifications

77-2.01C(6) Sewage Spill Prevention and Response Plan

A sewage spill prevention and response plan must be developed and submitted before starting construction. Allow 30-days for review. Comply with the City of San Diego policy of "Zero Spills". The plan will apply to any construction related sewage spill. The plan must include the following:

1. Identify any nearby environmentally sensitive area including waterways, channels, catch basins, and entrance to existing underground storm drains.
2. Make arrangements for an emergency response unit stationed at or near the site comprised of emergency response equipment and trained personnel to be immediately dispatched in case of a sewage spill. This includes field biologist, archaeologist, or both in an environmentally sensitive area such.
3. Develop an emergency notification procedure, which includes an emergency response team with telephone numbers and arrangements for backup personnel and equipment. The emergency response unit must be able to dispatch to the site 24 hours a day 7 days a week. Designate primary and secondary representatives, their respective phone numbers, pager numbers, and mobile phone numbers. These representatives must be accessible and available at all times to respond immediately to any sewer spill event.
4. Identify any property owners who may be affected including County and City of San Diego Parks and Recreation Department.

77-2.01C(7) Sewer Flow Diversion Plan

Submit a sewer flow diversion plan at least 15 days before beginning flow diversion. No deviation from the diversion plan will be allowed without authorization. Flow diversion must comply with City of San Diego "Zero Spills" policy. The diversion plan must indicate the sequence of diversion operations and other activities that will maintain wastewater service during construction. Include an emergency response plan indicating the procedures, equipment, and activities to be implemented if an emergency shutdown or failure of the flow diversion equipment occurs.

Submit maintenance procedures and schedule with your flow diversion plan.

Submit your monitoring procedure as part of the flow diversion plan. Include frequency for continuously monitoring flow levels downstream and upstream of the flow diversion to detect any possible failure that may cause a sewage backup and spill.

77-2.01C(8) CCTV Inspection Plan

Submit a CCTV inspection plan including equipment used.

77-2.01D Quality Control and Assurance

77-2.01D(1) General

Field and shop welders must be certified and comply with AWS D1.1. Welders must be qualified under the AWS standard qualification procedures. A currently certified AWS welding inspector must be responsible for quality control acceptance of materials and workmanship.

Corrosion technician must be certified by the National Association of Corrosion Engineers.

Installation of epoxy protective lining system must be by personnel trained and qualified by the lining system manufacturer. You must provide manufacturer's certifications.

Fusion technician must be qualified by the pipe supplier to install fusible PVC pipes. Qualifications must be current as of the actual date of fusion performance.

77-2.01D(2) Leakage Test

Use an air test to test for leakage after laying, backfilling and compacting sewer line.

The test section must be pressurized to 3.5 psi and must be held above 3.0 psi for not less than 5 minutes. Add air as needed to keep pressure above 3.0 psi.

If groundwater is above the pipe being tested, increase the air pressure to 0.43 psi for each foot the water table is above the invert of the pipe.

Use a pressure gauge with minimum divisions of 0.10 psi and an accuracy of 0.04 psi. Testing reports must certify accuracy and show annual calibration of the gauge.

At the end of the 5 minute saturation period, the pressure must be 3.0 psi minimum and begin the same lapse required for air pressure drop. A section of pipe has failed the test if the pressure drops more than 0.5 psi in less than the time shown in the following

1. Minimum time allowed is 283 seconds for pipe diameter of 10-inch. Time is calculated as L (feet) x 1.187.
2. Minimum time allowed is 340 seconds for pipe diameter of 12-inch. Time is calculated as L (feet) x 1.709.
3. Minimum time allowed is 425 seconds for pipe diameter of 15-inch. Time is calculated as L (feet) x 2.671.

Test each section of pipe between manholes, including the manholes. Guard against sudden expulsion of a poorly installed plug or a plug that is partially deflated.

77-2.01D(3) Alignment, Grade and Deflection Test

Grade and alignment must comply with Standard Specifications for Public Works Construction (SSPWC) § 306-1.2.2 and 306-1.2.12.

Perform deflection tests 30 days or more after backfill is placed and compacted. Inspect the pipe for offsets and clear obstructions before testing.

Mandrel for field testing must be a rigid, nonadjustable, odd-numbering-leg (nine legs minimum) mandrel having an effective length not less than shown in the table:

Nominal Pipe Size (in)	Pipe Material	Minimum Mandrel Diameter (in)
10	PVC-ASTM D3034 (SDR 35)	9.405
12	PVC-ASTM D3034 (SDR 26)	10.961
15	PVC-ASTM D3034 (SDR 35)	13.849

77-2.01D(4) Manhole Epoxy Lining Test

Spark test cured manhole epoxy lining for pinholes under SSPWC §500-2.4.2. Pinhole repair must comply with SSPWC §500-2.4.5.

77-2.01D(5) Cathodic Protection Test

The cathodic protection system must be tested by a corrosion engineer.

In the presence of the Engineer, measure the resistance of sections of pipe that have been installed.

Measure resistance by the linear resistance method. Impress a direct current from one end of the test section to the other, of test station to test station. A voltage drop is measured for several different current levels.

The measured resistance is calculated using the equation:

$$R = dV / I$$

where
 R = measured Resistance (mV)
 dV = voltage drop between the test span
 I = Corresponding current

Measure the resistance for at least 3 different current levels.

Acceptance is a comparison between the measured resistance from the field test data and the theoretical resistance. The theoretical resistance must consider the pipe length and wall thickness and the resistance of the bond wires. The measured resistance must not exceed the theoretical resistance by more than 130 percent to determine electrical continuity.

Cathodic protection system tests include:

1. Isolation of protected metal from electrical conduit, piping for water and sewage, fuel island vents, steel buildings, or other metals. If the same potential is measured from a stationary copper-copper sulphate half cell to any foreign structure as to the protected structure, the protected structure must be deemed to be metallically connected to the foreign structure and the installation must be deemed unacceptable.
2. Anode current.
3. Polarized potential: An instant-off potential of less than 850 millivolts must be deemed to indicate an unacceptable installation. The instant-off potential must be the voltage between the protected structure and a copper-copper sulphate half cell measured after the immediate shift that occurs when anode current is interrupted, but before any further current decay.
4. Anode potential: The anode open-circuit potential must be at least 95 percent of the value listed in the manufacturer's published data for the type of anode furnished.
5. Measurement of all native potentials.
6. Measurement of all anode open circuit anode potentials.
7. Measurement of all on and instant off potentials.

77-2.02 MATERIALS

77-2.02A General

For materials not specified on the "Approved Materials List for Wastewater" in the Information Handout, requirements are specified in section 77.

Additional requirements for materials on the "Approved Materials List for Wastewater" in the Information Handout, may be described in section 77.

77-2.02B Welded Steel Pipe Casing

77-2.02B(1) General

Welded steel pipe casing must comply with section 70-3.02A

77-2.02B(2) Backfill

Structure backfill must meet the following requirements:

1. Use imported granular material with maximum sand equivalent value of 30 per ASTM D2419
2. Have a coefficient of uniformity of at least 3
3. Have no more than 10 percent by volume of clay
4. Have the following gradation:

Sieve size	Percentage passing
1"	100
3/4"	90-100
No. 4	50-95
No. 30	25-45
No. 200	3-9

77-2.02B(3) Sand Bedding

Sand bedding must comply with section 19-3.02E(2) and have a pH within the range of 6.0–8.5, a resistivity of 2,000 ohm-cm, or greater, and a soluble sulfate content of 500 ppm or less.

Bedding material must have a sand equivalent of not less than 50 and an expansion coefficient of not more than 0.5 of 1 percent if saturated with water.

77-2.02B(4) Warning Tape

Warning tape must be an inert, non-metallic plastic film formulated for prolonged underground use that will not degrade if exposed to alkalis, acids, and other destructive substances commonly found in soil. It must be puncture-resistant and must have an elongation of 2 times its original length before parting.

Warning tape must be colored to identify the type of utility intended for clarification. For sewer lines, the printed message must read "CAUTION: SEWERLINE BURIED BELOW" and tape color must be green.

Ink used to print messages must be permanently fixed to tape and must be black in color with message printed continuously throughout, at approximately 12-inch intervals.

Warning tape must be a minimum of 6 inches wide and 0.004-foot thick pressure sensitive adhesive.

77-2.02B(5) Filter Fabric

Filter fabric must comply with section 88-1.02B.

77-2.02B(6) Casing Spacers and Seals

Use bolt-on style with shell made in 2 sections of Type 304 stainless steel. Connecting flanges must be ribbed. Line shell with PVC liner 0.090-inch thick with 85-90 durometer. Use 18-8 stainless steel nuts and bolts.

Runners must be constructed of ultra high molecular weight polymer. Runners must be supported by risers made of Type 304 stainless steel. Weld supports to shell and passivate the welds.

Casing spacers must be one of the following:

1. Cascade Waterworks Mfg. Co
2. Pipeline Seal and Insulator Inc
3. Advanced Products and Systems

Use snug fitting 1/8-inch thick synthetic rubber casing seals. Casing seals must be 1 piece with no field seams. Pipe attachment bands and hardware and casing outside diameter must be minimum Type 304 stainless steel.

77-2.02C PVC Sewer Pipe

77-2.02C(1) General

PVC sewer pipe must be push-on type elastomeric gasket joint and comply with ASTM D3212.

The gasket must be polyurethane or synthetic rubber with equal or greater resistance to solvency, chemicals or biological attack and must comply with ASTM standards. Fittings for 12-inch sewer line must comply with ASTM D3034, SDR-26; or ASTM F789. Fittings for 10-inch sewer line must comply with ASTM D3034, SDR-35; or ASTM F789. Fitting for 15-inch sewer pipe must comply with ASTM D3034, SDR-35; or ASTM F789.

77-2.02C(2) Backfill

Structure backfill for sewer line must comply with section 19-3.02B except the gradation of pipe zone backfill must be 3/4-inch crushed rock.

77-2.02C(3) Sand Bedding

Sand bedding must comply with section 77-2.02B(4).

77-2.02C(4) Warning Tape

Warning tape must comply with section 77-2.02B(5).

77-2.02C(5) Filter Fabric

Filter fabric must comply with section 77-2.02B(6).

77-2.02D Sewer Manhole

77-2.02D(1) General

Sewer manhole must comply with the following:

1. Shaft sections must be manufactured in accordance with ASTM C478-95a and be 1300 pounds per vertical foot.
2. Reinforcing steel must be in accordance with ASTM A82, ASTM A185, ASTM A496 and ASTM A615.
3. Total circumferential reinforcement steel area must be at least 0.0025 times the inside diameter in inches.
4. Steel cage must be placed in the center third of manhole wall thickness.
5. Loading criteria must conform with AASHTO H20.
6. Concrete compressive strength must be 4500 PSI at 28 days.
7. Steel reinforcing yield strength must be 60,000 psi in accordance with ASTM A615.

77-2.02D(2) Plastic Liner

PVC liner for manhole must comply with SSPWC section 210-2 and:

1. Must be white.
2. Material used in joint strips and plain sheets of plastic liner must be identical to material used in sheets with locking extensions.
3. PVC liner must be impermeable to sewage gasses and liquids and nonconductive to bacterial or fungus growth.

77-2.02D(3) Manhole Riser Joints

Polymer mortar products must be one of the following:

Material	Manufacturer
490 Epoxy Putty	Engard Coatings, Huntington Beach, CA
Sikadur 31 Hi-Mod Gel	Sika Corporation, Santa Fe Springs, CA
Sikadur 32 Hi-Mod Gel	Sika Corporation, Santa Fe Springs, CA
CS-102 Butyl Gaskets (rope form)	Concrete Sealants, New Carlisle, OH

77-2.02D(4) Polyurethane And Epoxy Protective Lining System

Apply polyurethane and epoxy protective lining system to manhole numbers 1–3.

Lining system must comply with SSPWC section 500-2.7. Coating must be cream colored.

The manhole base must be primed with epoxy and lined with a 100-mil dry film thickness of 100 percent solids elastomeric polyurethane with a minimum Shore D hardness of 55.

Furnish a minimum of 2 plugs per manhole for applied thickness verification.

77-2.02D(5) Epoxy Protective Lining System

Apply epoxy protective lining system to manhole numbers 4–9.

Epoxy protective lining system must comply with SSWPC section 500-2.8 except it must have a shore D hardness of 88.

The lining must be 100 percent solids, moisture tolerant epoxy, capable of spray application to 5 mils thickness, in 1 continuous coat.

The lining must completely bond to the concrete. Color must be light blue.

77-2.02D(6) Exterior Waterproofing

Waterproof exterior walls of manholes with a coal-tar emulsion water proofing agent. The coal-tar emulsion must be applied in at least 2 coats for a total dry film thickness of 25–35 mils.

77-2.02E Locking Cast Iron Manhole Cover

Cast iron manhole frame and cover must comply with the SSWPC section 206-3.3. Include a locking device.

77-2.02F Locking Composite Manhole Cover

Composite manhole frame and cover must be fabricated from fiber reinforced polymer containing 45–70 percent of fiber reinforcement bonded with thermoset resin matrix.

The 36-inch cover must weigh no more than 90 pounds and frame no more than 70 pounds. Load carrying capacity must meet AASHTO M306-05 H-20 & H-25 traffic requirements of 50,000 pounds, with 100,000 pounds ultimate load bearing. Composite material must resist corrosion in aggressive environments. Manhole cover must have locking mechanism and security bolt. Cover must be marked "COUNTY OF SAN DIEGO" and "SEWER", "AASHTO M306-05" and country of origin.

77-2.02G Cathodic Protection

77-2.02G(1) General

Not Used

77-2.02G(2) Cold Applied Fast-Drying Mastic

Cold applied-fast drying mastic must be one of the following:

1. Koppers bitumastic 50 or 505
2. Tnemec 40-h-413, tape-coat TC mastic
3. 3M Scotch Clad 244

The minimum coating thickness must be 0.025 inch.

77-2.03 CONSTRUCTION

77-2.03A General

Compaction must comply with section 19-3.03E(1).

When backfilling the trench for the sewer pipe:

1. Hand dig and use hand directional mechanical tampers for compaction within 3-feet of a public facility.
2. Provide at least 1 foot of backfill on the top of the sewer pipe before using a hydro hammer
3. Provide at least 3 feet of backfill on the tip of the sewer pipe before allowing wheel loads on the trench

Immediately discontinue backfilling if pipe settlement occurs. Correct settled portions of the trench and backfill as directed by the Engineer.

Do not damage existing improvements, interrupt existing services and/or facility operations which may cause a sewage spill. Any utility and/or improvement which is damaged must be immediately repaired at your expense.

Sewer system is to be cleaned by a sewer scrubbing "ball" from manhole to manhole after leakage test, backfilling, manholes raised to final grade, paving, and construction activities have been completed.

77-2.03B Sewer Flow Diversion

Inspect and maintain the diversion system daily, including the back-up system. Maintain a log of all inspection, maintenance and repair records and provide copies to the Engineer upon request.

Maintain a log of the monitoring and provide daily copies to the Engineer.

Size the flow diversion system to handle peak flow and include a 100 percent backup in the flow diversion system. Provide temporary means to maintain and handle the sewage flow in the existing system during construction. Utilize the flow diversion system to mitigate any additional wet weather flows, perform maintenance and repairs on the flow diversion system as needed, and maintain the backup system in working order.

If the diversion system requires pumping, each pump, including the backup pumps, must be a complete unit with its own suction and discharge piping. Operate the backup flow diversion system for a minimum of 25 percent of the total diversion time on a weekly basis. The backup flow diversion system must be fully installed, operational, and ready for immediate use. Hydraulically test the diversion system with clean

water before wastewater flow diversion. Demonstrate to the Engineer that both the primary and backup flow diversion systems are fully functional and adequate, and certify the same, in writing.

Provide 1 dedicated fuel tank for every single pump/generator, when fuel/generator driven pumps are used. Provide an emergency standby power generator, when electric power driven pumps are used. Provide a fuel level indicator outside each fuel tank. Continuously monitor while in use, the fuel level in the tanks and ensure that the fuel level does not drop below a level equivalent of 2 hours of continuous flow diversion system operation. Protect the fuel supply from contamination. This includes fuel line water traps, fuel line filters, and protecting fuel stores from precipitation. Monitor all hoses and repair leaks immediately.

77-2.03C Remove Sewer Manhole

Remove manhole where shown under section 15-2.02 and SSPWC section 306-5.

77-2.03D Welded Steel Pipe Casings

Steel casing sections must be jointed by full-circumference butt welding in the field and have banding straps on end seals. All joints must be full penetration butt welds in accordance with AWWA C206, AWS D1.1.

Carrier pipe must be pushed into the casing using casing spacers.

Upstream and downstream elevations of the carrier pipe must be verified before installing the end seals.

Install spacers as shown.

Line and coat steel casing for trench installation with liquid epoxy paint complying with AWWA C210. Apply 3 coats to a minimum thickness of 16 mils. Repair damaged coatings.

77-2.03E PVC Sewer Line

77-2.03E(1) General

The tolerance of each sewer line must be plus or minus 1-inch in line, and plus or minus 1/4-inch in grade from the location and elevation shown.

Lay sewer line without break upgrade from structure to structure, with the socket ends of the pipe upgrade. Use 3/4-inch gradation crushed rock for bedding material. Bring the backfill material up to the pipe spring line after joint assembly. Place the backfill material on each side of the pipe and extend a minimum of 1-foot above the top of the pipe.

Compaction for pipes must be accomplished after the sheeting or shoring has been removed from the bedding zone. Alternate methods of pipe bedding which are recommended by the pipe manufacturer may be used if authorized by the Engineer.

Pipe must be off-loaded, loaded, installed, handled, stored and stacked according to the pipe manufacturer's recommendations. Comply with minimum recommended bend radius and maximum safe pull force for the pipe.

Pipe must be homogeneous throughout and free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

Joints for PVC sewer pipe must be Bell & Spigot configuration as shown. The joint assembly must be a push-on assembly in which the lubricated spigot end is inserted under the rubber gasket.

Connections to existing pipe must use a transition coupling and have zero differential settlement.

Warning tape must be used on all underground piping including cathodic protection wiring systems and tracer wire brought into and out of access ports.

Warning tape must be placed at the top of the pipe zone 12-inch above and centered over the utility intended for identification.

Plug sewer main stub by installing water tight PVC sewer plug at location shown.

77-2.03E(2) Fusible PVC Sewer line

Fusible PVC pipe lengths must be assembled in the field with butt-fused joints at the location shown. The fusion technician must follow the pipe supplier's recommendations.

Use only appropriately sized and outfitted fusion machines approved by the pipe supplier for the fusion process. This includes requirements for safety, maintenance, and operation with modifications for PVC. Where fusible PVC pipe is installed by pulling in tension, do not exceed the recommended maximum safe pulling force established by the pipe supplier. Pipe supplier's procedures must be followed at all times during fusion operations.

Each fusion joint must be recorded and logged by an approved electronic monitoring device (data logger), connected to the fusion machine, using a current version of the pipe supplier's recommended and compatible software.

77-2.03E(3) Tracer Wire

Install tracer wire on all buried sewer lines except where steel casing is used.

Place wire on the top centerline of the pipe and run continuously along the entire length of pipe prior to placement of trench backfill. Wire must be mechanically and electrically continuous throughout the pipeline.

Secure tracer wire to the pipe at 6-foot intervals with plastic adhesive tape, duct tape or plastic tie straps. The wire may alternately be secured to the pipe by looping the tracer wire around itself such that tracer wire remains continuous atop the pipe during back fill operations.

Install tracer wire access ports as shown. In addition, tracer wire may terminate within CP test boxes or at intervals of not more than 1,000-feet.

Extend tracer wire into the access ports and terminate with a coiled 24-inch length of wire. All tracer wire not attached to piping must be installed, without splices, within a conduit at a minimum depth of 24 inches.

Avoid splices in tracer wire. If necessary, splices must be made using wire connectors.

You must test tracer wire for electrical continuity in the presence of the Engineer before the installation of any paving over pipelines or appurtenances. Testing must be accomplished using a device capable of detecting improper connections or ground fault interruptions.

77-2.03F Sewer Manhole

77-2.03F(1) General

Construct new sewer manhole, cleanout, and connections as follows:

1. All joints must be sealed using flexible gasket material.
2. Cure all concrete for 10 days and protect from damage. If manhole is located in pavement area, do not adjust to final grade until pavement is complete.
3. Apply polyurethane and epoxy protective lining systems.
4. Construct PVC liner.
5. Shape the inside of the manhole base where new connection is made and the new manhole to conform to the size and shape of the lower portion of the manhole inlets and outlets. Cover concrete base with epoxy coating.
6. No carrier pipe can project more than 2-inches into a manhole. Do not build the bell of a pipe into the manhole base.
7. Test installed pipe to ensure that vertical deflection of plastic pipe does not exceed maximum allowable deflection. Maximum allowable deflection is governed by stated mandrel requirements and are nominally 5 percent.
8. Uncover any over-deflected pipe and reinstall. Remove damaged pipe from site and install new pipe.

77-2.03F(2) Epoxy Lining Coating

Installers must be trained by the manufacturer.

When a PVC liner plate is within a structure and the epoxy lining coating is required to interface with the PVC liner plate, coating tie-in procedures according to the manufacturer's recommendations.

77-2.03F(3) Polyurethane Coating

Installers must be trained by the manufacturer.

Protect all exposed concrete mortar surface inside new sewer manholes with polyurethane coating. Coating thickness must be 100 mils minimum for new concrete and 125 mils for existing or repair concrete. Installed coating must be free from porosity.

77-2.03F(4) Manhole Riser Joints

Install polymer mortar at all manhole riser joints to create water tight joints to resist infiltration.

Mortar must be mixed to comply with manufacturer's recommendations and must not exceed 5 parts sand to 1 part polymer.

Surface must be free from dust, loose aggregate, oil, grease, or other contaminants.

77-2.03F(5) Connect Sewer line to Manhole

Place a 2-foot PVC length of pipe of the same inside diameter as the adjoining pipe at the inlet and outlet to each manhole or structure. Use one of the following methods, as shown:

1. Directly cast a manhole coupling into the manhole base. Provide rubber-O-ring gasket in the coupling.
2. Stretch a rubber-O-ring gasket around the pipe to serve as a water stop when cast into the structure wall.

Connect sewer casing to manhole as shown.

77-2.03F(6) Sewer Manhole PVC Liner

PVC liner field welded joints must comply with SSPWC section 210-2.3.5.

Permanently attach liner to the concrete by T-lock mechanism. Do not use adhesive bond except where shown.

Continuously heat weld joints between individual sheets or sections of PVC liner using welding strips of the same kind and equivalent thickness as the liner material except for integral extension ribs.

77-2.03G Cast Iron Manhole Cover

Install locking cast iron manhole cover at manhole numbers 1–3.

77-2.03H Composite Manhole Cover

Install locking composite manhole cover at manhole numbers 4–9.

77-2.03I Cathodic Protection System

Remove the impervious wrapping around the cloth bag of packaged anode immediately before installing the anode.

Install the anode using the following sequence:

1. After the anode hole is drilled, 20 gallons of water must be added and allowed to sit for 1 hour.
2. The anode will be soaked in water for 30 minutes before it is lowered into the hole.
3. Care shall be taken to ensure that the anode is never lifted, supported, transported, or handled by the Lead wire.
4. All anodes must be lowered into hole by using a sling or rope.
5. Add an additional 15 gallons of water to cover the top of the anode before filling the hole.
6. The open circuit potential of the high potential magnesium anode must measure between 1.65–1.75 volts.
7. Notify the Engineer 3 business days in advance, to witness the installation and testing of the anodes.

The packaged anode must be wetted thoroughly before backfilling. Backfill material placed to 12 inches above the anode must be native soil, free from aggregate larger than 1/2-inch in size.

Conductors must be connected to pipes by fusion welding. Connection to the lift post must be located to remain visible. All other connections must be insulated watertight after inspection.

Fusion weld connection to steel surface must be made of molten copper produced by exothermic reaction following ignition of a mixture of copper oxide and aluminum flowing into weld cavity of a properly fitting graphite mold.

Each pipe conductor must connect only 1 pipe to a terminal on the terminal board in the anode test box except where otherwise shown.

Pipe conductors must have 12 inches slack at pipe connections and 24 inches slack at the anode test box.

Conductors must be direct buried and located safely from construction activities.

All metals connected to the cathodic protection system, except plastic-coated pipes, must be tape-wrapped. Cathodically protected metals must be isolated from all other metals.

Wire-to-metal connections must be made by the exothermic "Cadweld" welding process. Weld alloy must be used for steel pipe. You are responsible for determining the manufacturer's recommended weld charge size for metallic surfaces and type of lining.

Weld caps must be primed and capped.

Do not deform cable. Remove only enough insulation from the cable to allow for the exothermic weld. The wire is to be held at a 30-degree angle to the surface during welding. Only 1 wire can be attached with each weld.

Remove all coating, dirt, grime and grease from the metal structure by wire brushing. Clean the structure to a bright, shiny surface free of all serious pits and flaws by using a file. The surface area of the structure must be absolutely dry.

After the weld has cooled, test the weld with a 2-pound hammer while pulling firmly on the wire. Clean, re-weld and re-test all unsound welds. Remove all weld slag.

Apply cold applied fast-drying mastic under Mil. Spec. Mil-C-18480B. The area to be coated must be clean and completely dry. Apply a primer specifically intended for use with an elastomeric weld cap. Apply the weld cap and a bituminous mastic coating material to all exposed areas around the cap per the manufacturer's recommendations. Overlap the structure coating by a minimum of 3 inches.

Repair coatings in the field per the coating manufacturer's recommendations. All coating repairs must be authorized by the Engineer.

77-2.01K Closed Circuit Television Inspection

Closed Circuit Television Inspection must comply with City of San Diego Standard Specifications for Public Works Contracts section 306-9.

77-2.03L Abandon Sewer Manhole

Abandon manhole where shown under section 15-2.05 and SSPWC section 306-5.

The upper portion of the manhole must be removed to a depth of at least 3.5-feet below grade and the bottom must be perforated or broken. The remaining portion must be backfilled with controlled low strength material per SSPWC, section 201-6.

77-2.03M Abandon Sewer Line

Abandon sewer line where shown under section 15-2.05 and SSPWC section 306-5.

The entire pipe segment must be fully grouted with saturated sand for the entire length. Pipe segments greater than 100-feet must be grouted using a temporary vertical sleeve bored from ground surface. The downstream end must be exposed and allowed to expel water. The last 12 inches of the end must be plugged with slurry cement backfill after 3 days.

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 soil 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 soil tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the soil 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 soil tubes.

For Type X-tension terminal system, the steel post and soil anchor must be, at the Contractor's option, driven with or without pilot holes, or placed in drilled holes. Space around the steel post and soil anchors must be backfilled with selected earth, free of rock, placed in layers approximately 4 inches and each layer must be moistened and thoroughly compacted. Wood terminal posts must be inserted by hand and backfilled in the same manner as the steel post and soil anchor. Wood terminal posts must not be driven.

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 manufacturer 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 manufacturer 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 manufacturer 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.
3. TYPE X-TENSION TERMINAL SYSTEM - Type X-tension terminal system must be a Flared Energy Absorbing Non-Gating Terminal manufactured by Barrier Systems Inc, located in Vacaville, California, and must include items detailed for X-Tension guardrail end terminal shown on the manufacturer plans and installation instructions. The Flared Energy Absorbing Non-Gating Terminal can be obtained from the distributor, Statewide Traffic Safety & Signs, 13755 Blaisdell PI, Poway, CA 92064, telephone (800) 547-9683.

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

Traffic monitoring station must be performed at the following locations:

1. Route 11 at station 60+00
2. Route 11 at station 37+10

Add to section 86-1.03:

Submit a schedule of values within 15 days after Contract approval.

Add to the 4th paragraph of section 86-1.03:

13. Closed Circuit television camera assembly
14. Serial to Ethernet conversion
15. Fiber optic vault
16. Fiber distribution unit
17. TMS Cabinet
18. CCTV cabinet
19. Video encoder
20. Splice closure
21. Media convertor

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 86-2.05A:

Conduit installed underground must be Type 3.

Add to section 86-2.05B:

The conduit in a foundation and between a foundation and the nearest pull box must be Type 3.

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 must be sealed with an authorized type of sealing compound.

At those locations where conduit is required to be installed under pavement and underground facilities designated as high priority subsurface installation under Govt Code § 4216 et seq. exist, conduit must be placed by the trenching in pavement method under section 86-2.05C.

The final 2 feet of conduit entering a pull box in a reinforced concrete structure may be Type 4.

Add to section 86-2.05:

86-2.05E DIRECTIONAL BORING METHOD

86-2.05E(1) General

This work applies when the directional boring method is shown.

86-2.05E(1)(a) Summary

This work includes installing conduit by directional boring method.

Where jacking and drilling is shown as the required installation method, conduits may be installed by the directional boring method. Do not use the directional boring method at other locations unless approved by the Engineer. Pull box and vault locations must be as shown.

At your option, conduits shown to be installed at underground locations may be installed by the directional boring method. Pull box and vault locations must be as shown on the plans.

86-2.05E(1)(b) Submittals

Submit a listing of materials (composition and strength) and methods used in directional boring method for the Engineer's review.

Allow 7 days for the Engineer to review each 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 document (with approved revisions incorporated) to the Engineer.

86-2.05E(2) Materials

The directional boring equipment must have directional control of the boring tool and have an electronic boring tool location detection system. During operation, the directional boring equipment must be able to determine the location of the boring tool both horizontally and vertically.

The directional boring equipment must be equipped with a tension measuring device that indicates the amount of tension exerted on conduit during conduit pulling operations.

The diameter of the boring tool must not exceed 1.5 times the outside diameter of the conduit. Mineral slurry or wetting solution must only be used to lubricate the boring tool and to stabilize the soil surrounding the boring path. Mineral slurry or wetting solution must be water based and environmentally safe.

86-2.05E(3) Construction

Notify the Engineer in writing 2 working days in advance of starting directional boring operations. Include the location and equipment to be used in the directional boring operation in the advance notice to the Engineer.

You or your representative must be in direct charge and control of the directional boring operation at all times.

Perform directional boring in the presence of the Engineer unless otherwise notified in writing by the Engineer.

Residue from directional boring operations must be handled in the same manner as residue from slot cutting operations described in section 86-5.01A(4).

Minimum depth of conduit below finished grade in pavement areas must be 8 feet.

Slurry cement backfill and warning tape are not required where the directional boring method is used.

Attach tracer wire to the uppermost conduit prior to conduit installation.

86-2.05E(4) Payment

Not used

Add to section 86-2.05:

86-2.05F MULTIDUCT CONDUIT SYSTEM

86-2.05F(1) General

86-2.05F(1)(a) Summary

This work applies when multiduct conduit system (MDCS) is shown.

Multiduct conduit system must use high density polyethylene conduits at underground installations and fiberglass conduit at structure installations.

The size and quantity of conduits are shown.

Multiduct conduit system trench and backfill requirements must be as shown and as specified in the special provisions.

86-2.05F(1)(b) Submittals

Not used

86-2.05F(2) Materials

86-2.05F(2)(a) General

86-2.05F(2)(a)(1) High Density Polyethylene Conduit

86-2.05F(2)(a)(1)(i) General

High density polyethylene conduit must be suitable for the "Air Blown Method" described in the special provisions.

On arrival at the site, conduit with damage in excess of 10 percent of the conduit wall thickness may be rejected by the Engineer. Conduit with damage outside the manufacturer's recommendations for usable conduit may also be rejected by the Engineer. Conduit sections may be repaired if approved by the Engineer. Replacement or repair of rejected conduit is at your expense.

86-2.05F(2)(a)(1)(ii) Materials

High density polyethylene (HDPE) conduit must be a minimum of Schedule 40 and comply with ASTM F2160.

High density polyethylene conduit color must be consistent for this project: solid orange or black with orange colored stripe. Orange colored stripe must consist of not less than 2 stripes, with longitudinal orientation, evenly spaced.

Ultraviolet stabilizer must be Cb (for black conduit) and E (per ASTM F2160, for orange conduit).

86-2.05F(2)(a)(1)(iii) Construction

Conduit must be joined by heat fusion (includes electrofusion) methods recommended by the conduit manufacturer, and with equipment approved for the purpose. Heat fusion must be performed by conduit manufacturer certified or authorized personnel. Demonstrate a minimum of 2 test fusions, by each fusion operator, to the Engineer prior to performing fusion operations on conduit to be installed.

In addition to the conduit installation methods for Type 3 Conduit, as described in section 86 and in the special provisions, high density polyethylene conduit may be installed by Horizontal Directional Drilling (HDD) (per ASTM F1962 "Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacle, Including River Crossings") or "Directional Boring Method" as described in the special provisions. Where there is a difference or conflict between requirements, the special provisions for "Directional Boring Method" applies.

86-2.05F(2)(a)(2) Fiberglass Communication Conduit

86-2.05F(2)(a)(2)(i) General

Use fiberglass conduit where communication conduit is shown installed on bridges.

Purchase all fiberglass conduit and other fiberglass conduit system components from the same manufacturer to ensure component to component compatibility.

86-2.05F(2)(a)(2)(ii) Materials

Conduit must be continuously marked with clear, distinctive and permanent markings at intervals not greater than 10 feet. The marking must be in a contrasting color to the conduit color. The height of the marking must be approximately 0.1 inch or larger. Conduit marking information must include, as a minimum, the following information:

1. Nominal Size
2. Schedule
3. Manufacturer Name and Product/Model Number
4. Material Code
5. Plant Identification
6. Production Date
7. Cell Classification

All fiberglass conduit components must be free of defects including delaminations, foreign inclusions, etc. All fiberglass conduit components must be nominally uniform in color, density, and physical properties. Fiberglass conduit must be straight and the ends must be cut square and true.

Fiberglass conduit must be manufactured in nominal 20-foot minimum lengths.

Fiberglass conduit components must include compatible fittings, adapters, expansion joints, and factory bends at nominal radii of 24-inches and 36-inches.

All materials must be manufactured for use at temperatures from -40 to 230°F. All fiberglass conduit components must be manufactured using a homogeneously dispersed UV inhibitor. When exposed to direct diurnal sunlight, the UV inhibitor must prevent the degradation of all physical material properties,

except for surface cosmetic appearance. Materials must contain no halogens above trace levels and must be fire resistant.

Fiberglass conduit and components must comply with the specifications in ANSI/NEMA Standards Publication TC 14.

The minimum impact resistance must meet UL 1684A or NEMA TC2002 when tested in accordance with ASTM D2444

For stiffness, the deflection of the inside diameter must not exceed 5 percent when tested per ASTM D 2412.

86-2.05F(2)(a)(2)(iii) Construction

Joints must be watertight and withstand a minimum 1000 lbs of pullout tension.

Wrapping tape must be applied to pipe in contact with the earth or concrete and must be a pressure sensitive polyvinyl chloride or polyethylene tape with a minimum thickness of 0.05 inches.

86-2.05F(2)(a)(3) Sealing Plug

86-2.05F(2)(a)(3)(i) General

Except as otherwise noted, multiduct conduit system must have their ends sealed with commercial preformed plugs which prevent the passage of gas, dust and water into the multiduct conduit system.

Plugs for sealing conduit, conductor or cable must be the split type that permits installation or removal without removing conductors or cables.

Sealing plugs must be removable and reusable.

86-2.05F(2)(a)(3)(ii) Materials

Sealing plugs that seal MDCS (4-inch) must seal the conduit and all enclosed conduits simultaneously with one self contained assembly having an adjustable resilient filler of neoprene or silicone rubber clamped between backing ends and compressed with stainless steel hardware.

Sealing plugs must be capable of withstanding a pressure of 5 psi.

A sealing plug that seals an empty conduit 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 rope so the pull rope will be easily accessible when the plug is removed.

86-2.05F(2)(a)(3)(iii) Construction

Sealing plugs that seal the 1-inch and 1 1/4 inch conduits of MDCS must seal each conduit individually with appropriate sizes and configuration to accommodate either empty conduit or those containing cable. Suitable sealing between the varying size cables and the plugs must be provided by inserting split neoprene or silicone adapting sleeves, used singularly or in multiples, within the body of the plugs, or an equivalent method approved by the Engineer.

86-2.05F(2)(a)(4) Tracer Wire

86-2.05F(2)(a)(4)(i) General

Tracer wire must be installed in communication conduits containing fiber optic cable inside a MDCS conduit, except when "Directional Boring Method" requires attaching tracer wire to conduit.

86-2.05F(2)(a)(4)(ii) Materials

Tracer wire must be No. 12 minimum solid copper conductor with yellow or orange Type TW, THW, RHW, or USE insulation. A minimum of 3 feet slack must be extended into each communication pull box and fiber optic vault from each direction.

86-2.05F(2)(a)(4)(iii) Construction

The tracer wire must 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.

Tracer wire may be spliced at intervals of not less than 500 feet and only in pull boxes or vaults. Splices must conform to Section 86-2.09, "Wiring," of the Standard Specifications.

Verify continuity of the tracer wire after installation. Provide the Engineer with a list of conduit installations where continuity has been verified. Include the following information: conduit identification or location, verification date, and who verified by.

86-2.05F(2)(a)(5) Warning Tape

86-2.05F(2)(a)(5)(i) General

Warning tape must be installed in the trench over new MDCS conduits as shown.

86-2.05F(2)(a)(5)(ii) Materials

Warning tape must not delaminate when it is wet. It must be resistant to insects, acid, alkaline and other corrosive elements in the soil.

The warning tape must have:

Description	Parameter
Thickness	Not less than 4 mil thick
Width	Not less than 3 inches or greater than 6 inches
Material	Pigmented polyolefin film
Tensile strength of material	Minimum of 2700 psi
Elongation	Minimum of 500 percent elongation before breakage
Black Printed Message Text height	0.75 inch to 1 inch
Message background color	Bright orange color background
Message durability	Rated to last the service life of the tape
Message statement	CAUTION: BURIED FIBER OPTIC CABLE - CALTRANS (619) 688-6670,
Message spacing intervals	Approximately 36 inch

86-2.05F(2)(a)(5)(iii) Construction

The printed warning must not be removed by the normal handling and burial of the tape.

86-2.05F(3) Construction

Clean new MDCS conduits with a mandrel or cylindrical soft bristled brush and blow out with compressed air until all foreign material is removed immediately prior to sealing empty conduits or installing cables. Clean conduits in the presence of the Engineer. Seal the ends of MDCS conduits with sealing plugs as specified in the special provisions.

86-2.05F(4) Payment

Not used

Replace the 3rd paragraph in section 86-2.06A(2) of the RSS for section 86-2.06 with:

In a ground or sidewalk area, embed the bottom of a pull box in crushed rock.

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

Section 86-2.06B includes specifications for 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, "Specification 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 the Caltrans Coronado Maintenance Station, 1700 Glorietta Plaza, Coronado, CA 92118, telephone (619) 522-6554,

86-2.06B(2) Materials

The pull box and cover must comply with ANSI/SCTE 77, "Specification for Underground Enclosure Integrity," for tier 22 load rating and must be gray or brown.

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 86-2.06:

86-2.065 FIBER OPTIC VAULT

86-2.065A General

This work applies when fiber optic vault is shown.

You must not install additional fiber optic vaults over those shown without the Engineer's written approval.

86-2.065A(1) Summary

Fiber optic vault, cover and extensions must be of the sizes and details shown.

Fiber optic vaults and covers must be rated for AASHTO HS 20-44 loads.

Hanger assemblies must consist of not less than 3 hangers evenly distributed. Hangers must be made of a non-corroding material and be free of any sharp edges. Hanger assembly must be provided for a minimum of eight fiber optic cables and be securely fastened to the side wall with the slack fiber optic cable neatly coiled.

86-2.065B Materials

Fiber optic vault must be precast of non-PCC material. Non-PCC material must be resistant to fire, chemicals and ultraviolet exposure. The non-PCC material must show no appreciable change in physical properties with exposure to the weather. Non-PCC material must be dense and free of voids or porosity.

Covers must be the non-skid type. Cover marking must be "CALTRANS FIBER OPTICS" on each cover. Each cover must have inset lifting pull slots. Cover hold down bolts or cap screws and nuts must be of brass, stainless steel, or other non-corroding metal material.

86-2.065C Construction

A reinforced concrete encasement ring must be poured around the collar of the fiber optic vault as shown. The concrete for encasement ring must contain not less than 548 pounds per cubic yard.

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 sentence of the 1st paragraph of section 86-2.08E with:

Signal interconnect cable must be the 6-pair type with stranded tinned copper no. 20 conductors.

Add to section 86-2.08:

86-2.08F CATEGORY 5E CABLE

86-2.08F(1) General

86-2.08F(1)(a) Summary

Category 5E cable must be the unshielded, outdoor rated, non-gel filled type, and must meet the requirements of TIA/EIA 568, Category 5E Cable.

86-2.08F(1)(b) Definitions

Not Used

86-2.08F(1)(c) Submittals

Not used

86-2.08F(1)(d) Quality Control and Assurance

Category 5E Certified installations are required for installed lengths of 328 feet or less of finished cable.

Installed lengths of Category 5E cable must not exceed 328 feet of finished cable. All installations must be certified installations.

86-2.08F(2) Materials

Category 5E cable must meet the following:

1. The cable must contain 8 conductors, each of which must be No. 24, minimum, solid bare copper conductors. Each conductor must be insulated with polyolefin, polyethylene, polyvinyl chloride or fluorinated ethylene propylene material.
2. The cable jacket must be rated for a minimum of 300 V and 140°F and must be polyvinyl chloride, polyethylene, polyolefin or fluorinated ethylene propylene. The jacket must be black, gray, or blue. The jacket must be marked as required by NEMA. The jacket must be marked at intervals of not more than 3 feet with the cable identification: manufacturer's name, product identification, number of conductors and conductor size, and voltage and temperature ratings. Cable length markings may be sequentially alternated with the cable identification markings at not more than every other interval.
3. The finished outside diameter of the cable must not exceed 1/2-inch.

86-2.08F(3) Construction

The cable run between components must be continuous without splices. A minimum of 3 feet of slack must be provided at each pull box, junction box or vault, and a minimum of 9 feet at each cabinet.

The ends of category 5E cable terminating at controller and telephone demarcation cabinets must be terminated with Type 110 punch down blocks.

86-2.08F(4) Payment

Not Used

Add to section 86-2.08:

86-2.08G AIR BLOWN METHOD

86-2.08G(1) General

You may install cable into conduit, ducts or subducts using an "Air Blown Method".

86-2.08G(1)(a) Summary

This work includes installing cable into conduit, ducts or subducts with a method that uses a mechanical device combined with a high speed flow of compressed air.

86-2.08G(1)(b) Definitions

Not Used

86-2.08G(1)(c) Submittals

Submit information on the proposed "Air Blown Method" to the Engineer.

Information submittals must include the following:

1. Project description.
2. List or plan sheet marked to identify the conduits and cables involved
3. Equipment description and specifications.
4. Manufacturer's test data covering the performance of the equipment and cable stress in a typical installation using cable equivalent to cable to be installed on this project.
5. User/Installer Manual for the equipment and installation procedures.

Within 30 days after the approval of the contract, submit 2 copies of the proposed "Air Blown Method" to the Engineer.

Allow 7 days for the Engineer to review the proposed "Air Blown Method".

If the Engineer requires revisions, submit a revised "Air Blown Method" 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 2 copies of the final document (with approved revisions incorporated) to the Engineer.

86-2.08G(1)(d) Quality Control and Assurance

86-2.08G(1)(d)(1) General

The submitted "Air Blown Method" must not be used until it has been approved in writing by the Engineer.

86-2.08G(2) Materials

86-2.08G(2)(a) General

86-2.08G(2)(a)(1) Physical and Mechanical Requirements

The cable installation equipment must also have, at minimum, the following features:

1. Controls to regulate the flow rate of compressed air entering the conduit, duct or subduct, and any hydraulic or pneumatic pressure applied to the cable.
2. Safety shutoff valves to disable the system in the event of sudden changes in pneumatic or hydraulic pressure.
3. Measuring device to determine the speed of the cable during installation and the length of the cable installed.

86-2.08G(3) Construction

Install cable without exceeding the cable manufacturers' tensile and compressive strength ratings.

Use the mechanical device to provide a pushing force on the cable into the conduit.

86-2.08G(4) Payment

Not Used

Add to section 86-2.08:

86-2.08H FIBER OPTIC COMMUNICATION CABLE PLANT

86-2.08H(1) General

This work applies when fiber optic communication cable plant is shown.

86-2.08H(1)(a) Summary

Fiber optic communication cable plant consists of installing and testing fiber optic outside plant cable, fiber optic splice enclosure, splice tray, passive cable assemblies and components, and system verification, as shown and in the special provisions

86-2.08H(1)(b) Definitions

Breakout. - The cable "breakout" is produced by; (1) removing the jacket just beyond the last tie-wrap point, (2) exposing 3 to 6 feet of the cable buffers, aramid strength yarn and central fiberglass strength member, and (3) cutting the aramid yarn, central strength member and the buffer tubes to expose the individual glass fibers for splicing or connection to the appropriate device.

Connector. - A mechanical device used to align and join two 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 FDFs mounted in panels. They may also be used unmounted, to join two simplex fiber runs.

Fiber Distribution Frame (FDF). - A rack mounted system that consists of a standard equipment rack, fiber routing guides, horizontal jumper troughs and Fiber Distribution Unit (FDU).

The FDF serves as the "home" for the passive fiber optic components from cable breakout, for connection by jumpers, to the equipment.

Fiber Distribution Unit (FDU). - An enclosure or rack-mountable unit containing both a patch panel with couplers and a splice tray(s). The unit's patch panel and splice trays may be integrated or separated by a partition.

FO. - Fiber optic.

FOIP. - Fiber optic inside plant cable.

FOP. - Fiber optic outside plant cable.

FOTP. - Fiber optic test procedure(s) as defined by EIA/TIA standards.

Jumper. - A short fiber optic cable that has connectors installed on both ends, and is typically used to join two CMH couplers or a CMH to active electronic components.

Light Source. - Portable fiber optic test equipment that, in conjunction with a power meter, is used to perform end-to-end attenuation testing. It contains a stabilized light source operating at the designed wavelength of the system under test. It also couples light from the source into the fiber to be received at the far end by the receiver.

Link. - A passive section of the system, the ends of which are to be connected to active components. A link may include splices and couplers. For example, a video link from a FO transmitter to a video multiplexer (MUX).

Link Loss Budget. - A calculation of the overall permissible attenuation from the fiber optic transmitter (source) to the fiber optic receiver (detector).

Loose Tube Cable. - Type of cable construction in which fibers are placed in filled buffer tubes to isolate them from outside forces (stress). A flooding compound is applied to the interstitial cable core to prevent water migration and penetration. This type of cable is primarily for outdoor applications.

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 between two points and the corresponding distance. It provides a visual and printed display of the relative location of system components such as fiber sections, splices and connectors and the losses that are attributed to each component or defect in the fiber, splices and connectors.

Patchcord. - A short jumper used to join two Connector Module Housing (CMH) couplers and or a CMH and an active device (electronics).

Pigtail. - A short length of fiber optical cable permanently connectorized on only one end to a source, detector, or other fiber optic device. All pigtails must be tight buffer cable.

Power Meter. - Portable fiber optic test equipment that, in conjunction 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 power injected by the light source that arrives at the receiving end of the link.

Segment. - A section of F/O cable that is not connected to any active device and may or may not have splices per the design.

Splice. - The permanent joining of fiber ends to identical or similar fibers.

Splice Enclosure. - A environmentally sealed container used to organize and protect splice trays. The container allows splitting or routing of fiber cables from multiple locations. It is normally installed in a splice vault.

Splice Module Housing (SMH). - A unit that stores splice trays as well as pigtailed and short cable lengths. The unit allows splitting or routing of fiber cables to or from multiple locations.

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.

Storage Cabinet. - Designed for holding excess cable slack for protection. The storage cabinet allows the user flexibility in equipment location and the ability to pull cable back for resplicing.

Tight Buffered. - Type of non-breakout 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).

86-2.08H(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.

86-2.08H(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.

86-2.08H(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.

86-2.08H(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.

86-2.08H(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 F/O cable segment will be unacceptable. Replace the unsatisfactory segment of cable with a new segment, without additional splices, at 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.

86-2.08H(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 your expense. Test the new splice to demonstrate acceptability. Submit copies of the test results to the Engineer.

86-2.08H(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 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.

86-2.08H(1)(d)(vi) System Verification at Completion

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:	_____ dB	1A
Reverse Loss:	_____ dB	1B
Average Loss:	_____ dB	1C
Power Meter and Light Source Test Results:	_____ dB	2A
Forward Loss:	_____ dB	2B
Reverse Loss:	_____ dB	2C
Average Loss [(2A + 2B)/2]:		
Calculated Fiber Loss:		
Length of the link (from OTDR):	_____ km	3A
Allowed loss per km of fiber:	0.4 dB/km	3B
Total Allowed Loss due to the fiber (3A * 3B):	_____ dB	3C
Calculated Splice Loss:		
Number of Splices in the Link:	_____	4A
Allowed Link Loss per Splice:	0.07 dB	4B
Total Allowed Loss due to Splices (4A * 4B):	_____ dB	4C
Calculated Link Loss:		
Connector Loss:	0.9 dB	5A
Total Link Loss (5A + 3C + 4C):	_____ dB	5B
Cable Verification:		
Compare Power Meter Average Loss to Calculated Link Loss (2C - 5B):	_____ dB	6A
If the value of 6A is greater than zero, the link has failed the Test. See "Test Failures" in these special provisions.		

To Be Completed by Caltrans:

Resident Engineer's Signature: _____

Cable Link Accepted: _____

86-2.08H(2) Materials

86-2.08H(2)(a) Fiber Optic Outside Plant Cable

86-2.08H(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.

Quantity	Cable
12	SMFO
144	SMFO

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 (F/O) 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.

86-2.08H(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 ±1.0 μm
Core to Cladding Offset	≤1.0μm
Coating Diameter	250 μm ±15 μm
Cladding Non-circularity defined as: [1-(Min cladding Dia ÷Max cladding Dia.)]x100	≤2.0 percent
Proof/Tensile Test	
Attenuation: (-40 to +70 °C) @1310 nm @1550 nm	≤0.4 dB/km ≤0.3 dB/km
Attenuation at the Water Peak	≤2.1 dB/km @ 1383 ±3 nm
Chromatic Dispersion: Zero Dispersion Wavelength Zero Dispersion Slope	1301.5 to 1321.5 nm ≤0.092 ps/(nm ² *km)
Maximum Dispersion:	≤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 ±0.5 μm at 1300 nm 10.5 ±1.0 μm at 1550 nm

86-2.08H(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.

86-2.08H(2)(a)(iv) Cable Construction

86-2.08H(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. Tensile strength member
7. Ripcord
8. Outer jacket

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.

Tensile Strength Member. - Tensile strength must be provided by high tensile strength aramid yarns or fiberglass which must be helically stranded evenly around the cable core and must not adhere to 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.

86-2.08H(2)(a)(v) Functional Requirements

The F/O 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 F/O 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.

86-2.08H(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 F/O 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.

86-2.08H(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 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, 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. Cable splices must be located in splice enclosures, installed in splice vaults shown. A minimum of 65 feet of slack must be specified for each F/O 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 F/O splice enclosure.

Only one FO cable must be installed in each conduit unless shown or provided otherwise.

86-2.08H(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.

86-2.08H(2)(a)(viii)(a) Cable Identification

Identification used for labeling of the fiber optic cables must be as shown.

86-2.08H(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.

86-2.08H(2)(a)(viii) 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.

86-2.08H(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, 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.

86-2.08H(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.

86-2.08H(2)(d) Passive Cable Assemblies And Components

The F/O 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.

86-2.08H(3) Construction

86-2.08H(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 aramid yarn, 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 "Fiber Optic Splicing," in these special provisions

86-2.08H(4) Payment

Not Used

Replace the 1st paragraph of section 86-2.09E with:

Splices must be insulated by "Heat-shrink tubing."

Delete the 8th paragraph of section 86-2.09E.

Add to section 86-2.11A:

Continuous welding of exterior seams in service equipment enclosures is not required.

Circuit breakers must be the cable-in/cable-out type mounted on non-energized clips. All circuit breakers must be mounted vertically with the up position of the handle being the "ON" position.

Each service must be provided with up to 2 main circuit breakers that will disconnect ungrounded service entrance conductors. Where the "Main" circuit breaker consists of 2 circuit breakers as described, each of the circuit breakers must have a minimum interrupting capacity of 10,000 A, rms.

Replace item 9 in the list in the 5th paragraph of section 86-2.11A with:

Circuit breakers used as service disconnect equipment must have a minimum interrupting capacity of 42,000 A, rms, for 120/240 V(ac) services.

Replace 7th and 8th paragraphs of section 86-2.11A with:

Service equipment enclosures must be the aluminum type.

Replace "Reserved" in section 86-2.11B with:

Electric service (irrigation) must be from the service points to the irrigation controllers (IC) and to the spaces provided in the irrigation controller enclosure cabinets (CEC) for irrigation controllers as shown.

The inscription on the nameplates must be the letter designation used on the plans and in the special provisions.

Conductors to irrigation controller enclosure cabinets and irrigation controllers are included in the payment for electric service (irrigation). Conduit and pull boxes to the pull box adjacent to irrigation controller enclosure cabinets are included in the payment for electric service (irrigation).

Replace 1st paragraph of section 86-2.18 with:

Place numbers on the equipment as ordered.

Delete 2nd sentence of 3rd paragraph of section 86-2.18.

Add to section 86-3.04:

Cabinet must be Model 334L and consist of a housing (B), a mounting cage 1, and the following listed equipment. The equipment must comply with chapter 6 of TEES.

1. Service panel no. 1
2. Power distribution assembly no. 3
3. Input file (I file)
4. C1 harness
5. Controller and equipment shelves
6. Dual fan assembly with thermostatic control
7. Mechanical armature-type relays
8. Input panel

Notify the Engineer when each 334L cabinet is ready for functional testing. Functional testing will be conducted by the Department.

Each power distribution assembly must include the following equipment:

1. Two duplex NEMA 5-15R controller receptacle (rear mount)
2. One 30 A, 1-pole, 120 V(ac) main circuit breaker
3. Three 15 A, 1-pole, 120 V(ac) circuit breaker
4. One duplex GFCI NEMA 15 A, receptacle (front mount)

Furnish 3 shelves as shown. Each shelf must be attached to the tops of 2 supporting angles with 4 screws. Supporting angles must extend from the front to the back rails. The front of the shelf must abut the front member of the mounting cage. Arrange shelves as shown. The angles must be designed to

support a minimum of 50 pounds each. The horizontal side of each angle must be a minimum of 3 inches. The angles must be vertically adjustable.

Furnish 3 terminal blocks as shown. Terminal blocks must comply with Chapter 6 of TEES, except the screw size must be 8-32.

Furnish a maintenance manual or a combined maintenance and operation manual for all controller units, auxiliary equipment, vehicle detector sensor units, control units, and amplifiers. Submit manual when the controllers are delivered for testing or, if ordered by the Engineer, before purchasing. The manual must include the following:

1. Specifications
2. Design characteristics
3. General operation theory
4. Function of all controls
5. Troubleshooting procedure (diagnostic routine)
6. Block circuit diagram
7. Geographical layout of components
8. Schematic diagrams
9. List of replaceable component parts with stock numbers

Add to section 86-5.01A(1):

Loop wire must be Type 2.

Loop detector lead-in cable must be Type B .

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

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.

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

Add to section 86-5.01:

86-5.01E Closed Circuit Television (CCTV) System

86-5.01E(1) General

Closed circuit television (CCTV) system consists of installing conduit, pull boxes, conductors, cable, telephone demarcation cabinet, Category 5E cable, CCTV camera assembly, CCTV pole, CCTV cabinet, serial to Ethernet conversion unit, and video encoder, all as shown on the plans and specified in the special provisions.

86-5.01E(1)(a) Submittals

A minimum of 10 working days before the scheduled delivery of the closed circuit television camera assembly to the project site, submit:

1. A certificate of compliance certifying that the closed circuit television camera assembly complies with the requirements of the special provisions. The certificate must include a copy of all applicable test reports on the closed circuit television camera assembly.
2. Four sets of documentation containing complete specifications and operation details of each of the components of the CCTV camera assembly.
3. Four copies of the maintenance manuals for the pan and tilt unit.
4. Four sets of wiring diagrams showing wire colors, functions, and pin assignments for connecting these CCTV camera assembly components to each other and to the encoder.
5. Manufacturer's cut sheets or specifications data of CCTV camera cable assemblies, including connectors with strain relief backshells.

6. A copy of the CCTV camera cable assembly testing procedures and manufacturer's test results.

86-5.01E(2) Materials

86-5.01E(2)(a) Closed Circuit Television Camera Assembly

Prototype equipment will not be allowed. All equipment must be current standard production units.

The CCTV camera assembly must include these components:

1. Camera
2. Motorized zoom lens
3. Environmental enclosure with sun shield or shroud
4. Wiper
5. Pan and tilt unit

The CCTV camera assembly, including the pan and tilt unit must not exceed 8 inches wide x 18 inches high x 15 inches deep. Any external cables must not interfere with or limit the continuous pan and tilt operation.

The CCTV camera assembly must have all necessary wiring, cables, and connectors. All CCTV camera assemblies must be plug-compatible, interchangeable and suitable for use with the CCTV camera cable assembly described in the special provisions.

You must apply an approved weather-resistant spray to the inside of the connectors before engaging the connectors.

Closed circuit television camera assembly components must be rated for NEMA 4X, IP 66 or IP 67.

86-5.01E(2)(a)(i) Camera

86-5.01E(2)(a)(i)(1) Technical Requirements

All cameras supplied must meet the following:

Parameter	Specification
Optical Device	CCD, Color, interline transfer
Optical CCD Format Size	1/4 - inch format
Horizontal Resolution	460 television lines (minimum)
Sensitivity	1 lux at 1/60 s shutter speed (measured with f1.6 lens)
Scanning System	525 lines 2:1 interlace

The camera must be equipped with an electronic shutter with adjustable speeds ranging from 1/60 second to 1/30,000 second.

86-5.01E(2)(a)(i)(2) Electrical Requirements

All cameras supplied must meet the following:

Parameter	Specification
Operating Voltage	120 V(ac) \pm 10 percent (external adapter allowed)
Power Consumption	50 W (Maximum)
Video Output Signal	Standard NTSC color TV
Video Output Connector	Standard BNC bulkhead on rear of camera
Signal To Noise Ratio	>48 dB
Synchronization	Internal sync or phase adjustable line lock
Video Output Level	1.0 V p-p (75 Ω composite)
Gain Control	Automatic
Automatic Back Focus (Automatic White Balance)	Required

Programming must be stored non-volatile memory and the CCTV assembly firmware must be updateable via serial communication.

86-5.01E(2)(a)(i)(3) Environmental Requirements

All cameras supplied must meet the following:

Parameter	Specification
Operating Temperature	From 15 to 120°F
Storage Temperature	From -40 to 140°F
Operating Humidity	From 20 to 80 percent non-condensing
Storage Humidity	From 20 to 90 percent non-condensing

86-5.01E(2)(a)(ii) Motorized Zoom Lens

86-5.01E(2)(a)(ii)(1) General

The lens must have motors for zoom, focus and iris.

The lens must have capability for focus and zoom preset positions. A telescopic converter or extender must not be used to achieve required focal length range.

86-5.01E(2)(a)(ii)(2) Technical and Functional Requirements

The lens must meet the following:

Parameter	Specification
Format	1/4-inch format
Iris	Motorized , with automatic and manual adjust modes
Operating temperature	From 15 to 120°F
Focal Length	Maximum not less than 3.15 inch (Optical power not less than 21X)
Lens Aperture	From F1.6 to F3.6
Horizontal angle of view at Maximum Focal Length	Not less than 2.2 degrees for 1/4-inch format camera

When the camera is pointed at a very bright object and or when the camera and lens is first turned on, the image produced by the lens and camera combination must not optically "oscillate" (i.e., produce an image that alternates from too light to too dark) or otherwise be unstable.

Each lens must have an automatic, motor-driven iris with manual override.

The lens must include mechanical or electrical means to protect the motors from over running in the extreme position.

The iris must be controlled directly through the camera in automatic mode and from any keyboard connected into the camera system in the manual mode. The automatic iris must provide continuous aperture adjustments of the lens as determined by the amount of light reaching the camera imager. The power supply and electronics for iris motor must be contained within the environmental housing.

When the power is removed from the lens, the lens iris must automatically close.

The motorized-iris cable must be strain relieved or sufficiently rugged such that the cable will not fail at the point where it leaves the lens assembly.

86-5.01E(2)(b) Environmental Enclosure

86-5.01E(2)(b)(i) General

The environmental enclosure must be the sealed, pressurized type, designed to withstand exposure to sand, dust, fungus, and salt atmosphere, and house the assembled camera, motorized zoom lens and all internal wiring.

It must operate on a voltage range of 120 V(ac) ±10 percent power source.

The enclosure must include an internal thermostatically controlled heater assembly to minimize external faceplate condensation.

The housing must have a wiper for wiping clean the external face of the housing window in front of the camera lens.

The enclosure must include a sun shield or shroud to provide protection from direct solar radiation.

You have the option of providing a sealed, pressurized Integrated Optics Cartridge (IOC) housed in a NEMA 4X rated enclosure.

The enclosure or IOC must be pressurized with 5 psi dry nitrogen. The enclosure must have a valve for pressurizing. In addition, a pressure relief valve with a 20 psi rating must be provided to protect the enclosure from overcharging. The notation "CAUTION - PRESSURIZED" must be printed on the enclosure. The letter height must be at least 1/4 inch.

86-5.01E(2)(b)(ii) Wiper

The wiper must have a wiper assembly, which includes blade and arm, and any mechanical, electrical or communication interfaces required to perform the function specified. The wiper must be designed to operate under damp or wet conditions, such as fog or rain, which leave external moisture on the housing window. The wiper assembly must be designed for general maintenance that can be performed in the field.

86-5.01E(2)(b)(iii) Technical and Functional Requirements

The housing must meet the following:

Parameter	Specification
Construction	All aluminum
Finish	White, light beige or gray that is either baked enamel or polyester powder coat
Weight	Less than 47 lb excluding heater
Camera Mounting	Platform mount with adjustment fore and aft

The camera lens must be positioned in the center of the housing window.

The housing unit must have lens preset capabilities.

The housing must not interfere with the widest viewing angle of the motorized zoom lens.

The camera enclosure must not incur any physical damage after a shock, return to normal operation immediately and operate within the specified vibration (see Note 1 below table).

Parameter	Specification
Shock	Up to 5 G while in non-operation mode
Vibration	From 5 Hz to 60 Hz with 0.083 inch total excursion, and 5 G rms vibration from 60 Hz to 1000 Hz.

Note 1: Where the manufacturer's cut sheet or specification data does not contain shock and vibration data a listing of at least 2 project sites with identical equipment, with similar installation conditions and similar traffic patterns showing continuous functional performance of at least 2 years may be substituted.

Any enclosure supplied must include a sun shield or shroud to protect the housing from the direct rays of the sun. The sun shroud must be made specifically for the model of enclosure that is selected.

86-5.01E(2)(c) Pan And Tilt Unit

86-5.01E(2)(c)(i) General

The pan and tilt unit must consist of the pan and tilt unit itself along with any electrical or communication interfaces required to perform the functions specified.

The pan and tilt unit must be designed to operate under a full range of environmental conditions. The pan and tilt unit with camera assembly mounted must withstand a wind load of 80 mph. The cable connector must be fully weather protected. External body components must be manufactured from aluminum that have been anodized, painted or coated to prevent oxidation and corrosion.

Access into the pan and tilt unit for routine maintenance or adjustments must not require removal of the pan and tilt from the installation site, nor removal of the camera enclosure from the pan and tilt unit. Access cover must be readily removable regardless of the tilt position.

86-5.01E(2)(c)(ii) Technical Requirements

The housing must meet the following:

Parameter	Specification
Pan and Tilt Worms	Ground and polished Stainless Steel
Pan and Tilt Worm Gears	Non-metallic material
Mounting (Base)	7 inch \pm 0.013 inch diameter bolt circle Check Plans
Camera Mount	Compatible with camera housing
Bearings on Rotating Surfaces	Heavy duty roller type
Overload Protection	Provided - internal
Operating Temperature	From -10 to 140°F
Construction	Corrosion resistant steel or aluminum
Finish	Weather resistant paint or polyurethane
Seals	"O" ring or gaskets for all weather protection of pan and tilt unit and cables.

86-5.01E(2)(c)(iii) Functional Requirements

The housing must meet the following:

Parameter	Specification
Braking: Pan And Tilt	Mechanical or Electrical to limit coast
Overload Protection	Motors: Impedance protected
Angular Travel	Pan: From 0 to 355 degrees horizontal, Continuous Tilt: From +30 degrees up to -80 degrees down
Pan Speed	From 0.1 to 40 degrees/s variable-speed
Tilt Speed	From 0.1 to 20 degrees/s variable-speed
Pan And Tilt Position Preset	Positions camera to a predetermined azimuth, elevation and lens position (Minimum of 64 Presets)

86-5.01E(2)(c)(iv) Pan and Tilt Stops

The pan and tilt unit must have pan and tilt stops. The settings of these pan and tilt stops will be determined by the Engineer.

86-5.01E(2)(d) Software and Operational Requirements

The proposed camera protocol must be compatible with the existing system that uses Baxall's control which uses Pelco D protocol. The camera control protocol used by the camera assembly must be either an open public domain protocol, Pelco D, or other protocol convertible to Pelco D via translator. All functions described must be available using the described protocol. If a protocol other than Pelco D is proposed, you must provide a version of Baxall's camera control software "PC Control" or latest equivalent version that includes the new protocol as a choice for the new camera locations. The version of camera control software must not interfere with the operation of any other camera locations that use Pelco D. All camera control functions must be through the RS-422 communications interface.

Operator functions must be:

1. Pan Right
2. Pan Left
3. Tilt Up
4. Tilt Down
5. Zoom In
6. Zoom Out
7. Focus Near
8. Focus Far
9. Iris Open
10. Iris Close
11. Iris Manual
12. Iris Auto
13. Pan Stop
14. Tilt Stop
15. Zoom Stop
16. Focus Stop
17. Iris Stop

Administrative functions must be:

1. Status Query
2. Set Char. Display
3. Activate Char. Display
4. Blank Char. Display
5. Set Preset Position
6. Go to Preset Position
7. Set Relay
8. Reset Relay
9. Turn on Camera

10. Turn off Camera
11. Wiper on
12. Wiper off
13. Heater Control

86-5.01E(2(d)(i) Camera Control and Configuration

The existing system keyboard is a BAXALL Keyboard Part Number ZKX3-J. A copy of the keyboard manual is available for review upon request.

Pan and tilt position presets must be programmable via the system keyboard.

The system keyboard must control these operator basic functions:

1. Pan Left, Pan Right and Pan Stop controlled by Joystick.
2. Tilt Up, Tilt Down and Tilt Stop controlled by Joystick.
3. Zoom In, Zoom Out and Zoom Stop controlled by Zoom In and Zoom Out button.
4. Focus Near, Focus Far and Focus Stop controlled by Near Focus and Far Focus button.
5. Iris Open, Iris Close and Iris Stop controlled by Open Iris and Close Iris button.
6. Camera selections made by numeric keypad on system keyboard.
7. Monitor selections made by numeric keypad on system keyboard.

The stop actions for all Pan, Tilt, Zoom, Focus and Iris features will be issued once the Joystick, Zoom, Focus and Iris buttons are released.

The camera administrative functions must be accessible via system keyboard or by software installed on a personal computer. If the software method is used, the camera manufacturer's menu system may be used.

86-5.01E(2)(e) Closed Circuit Television Camera Cable Assembly

86-5.01E(2)(e)(i) General

The closed circuit television (CCTV) camera cable assembly must conform to the details shown on the plans and the special provisions.

The interconnect wiring between the CCTV camera assembly and the camera encoder unit (CEU) must be a composite cable that includes flexible 75-ohm coaxial cable, AC power and control cable.

86-5.01E(2)(e)(i)(1) Submittals

Not used.

86-5.01E(2)(e)(ii) Technical Requirements

The camera cable assembly connector assignments for C1, C2 and C3 connectors are shown on the plans. C1, C2 and C3 connectors must be the connectors specified or equal. C1, C2, C3 and C4 connectors are also referred to as Conn 1, Conn 2, Conn 3 and Conn 4, respectively, on the plans.

For Connector 1, the connector type must be compatible, either directly or via adapter, with male AMP 206044-1 of existing field cameras.

The Connector C4 must conform to the following:

Connector C4 Assignment			
Pin	Function	Wire Color	Wire Gauge
Blade	Camera Power, AC Low	White	18 AWG
Blade	Camera Power, AC High	Black	18 AWG
Ground	Camera Power, Ground	Green	18 AWG

The CCTV camera cable assembly must conform to the following:

1. General

Overall Cable, Nom. weight/1,000 feet not to exceed:	291 lbs.
Overall Cable Minimum Bending Radius:	9 inches
All Materials, Temperature Rating, meet or exceed:	From -40 to +175°C
Overall Cable, Outside Diameter, not to exceed:	0.73 inches
Outside Jacket, Tinned Copper Braid Shield, minimum:	80 percent
Pulling tension, maximum:	500 lbs.
Overall Cable, Outside Jacket:	Black Thermoplastic Elastomer

2. Coax Cable

Coax Tinned Copper Braid Shield, minimum:	95 percent
Coax Insulation Material:	Solid Polyethylene
Coax Core Outside Diameter:	0.121 inch
Coax Outside Diameter:	0.178 inch
Coax Outside Jacket:	Cotton Braid

3. Single Cable - Shielded group of 3 No. 18 AWG and with a group of 4 No. 22 AWG inside cables. The individual conductors must be color coded with PVC insulation.

4. Drain wire must be provided for each group of cables.

86-5.01E(2)(e)(iii) Electrical Requirements

Coaxial Cable	
Nominal Impedance:	75 Ω
Nominal Capacitance:	70.54 pF/m
Nominal Velocity of Propagation:	66 percent
Nominal Delay:	5.05 ns/m
Attenuation	
at 1 MHz	0.0197 dB/m
at 5 MHz	0.0892 dB/m
at 10 MHz	0.0971 dB/m
at 50 MHz	0.1263 dB/m
at 100 MHz	0.1673 dB/m
Dielectric Strength:	1900 V(rms)
Nominal Shield DC Resistance at 20°C:	0.01378 Ω/m
Nominal Conductor DC Resistance at 20°C:	0.32808 Ω/m
Maximum Operating Voltage:	300 V (rms)

SHIELDED GROUP OF 3 No. 18 AWG CONDUCTORS	
Nominal Conductor DC Resistance at 20°C:	0.02133 Ω/m
Nominal Shield DC Resistance at 20°C:	0.03642 Ω/m
Nominal Capacitance (to Adj. conductors and Shield)	292 pF/m

SHIELDED GROUP OF 4 No. 22 AWG CONDUCTORS	
Nominal Conductor DC Resistance at 20°C:	0.05151 Ω/m
Nominal Shield DC Resistance at 20°C:	0.03675 Ω/m
Nominal Capacitance (to Adj. conductors and Shield)	230 pF/ m

86-5.01E(2)(e)(iv) Construction

Control cable must be routed from the CCTV camera assembly to the camera encoder and AC power inside the camera pole. Wiring must run continuous from source to destination without splices.

Cable slack of not less than 3 feet must be provided for equipment movement at pull boxes, vaults or cabinets. The cable must be secured and coiled neatly.

The cables and connectors must be installed to allow the camera and lens to be disconnected without removing the environmental camera housing.

Cable grip and J-hook must be as shown in the contract plans.

You are responsible for all testing and documentation required to establish approval and acceptance of the production, installation, and operation of these materials and equipment.

You must provide all materials necessary to make the connectors functional. All materials used to make the connectors must be compatible and must adhere to manufacturer's recommendations.

86-5.01E(2)(f) Closed Circuit Television Cabinet

Not used.

86-5.01E(2)(g) Fiber Distribution Unit

You must install all related equipment to interface the fiber distribution unit (FDU) to the incoming fiber optic communication cables.

The units must accommodate the fiber optic cable described in the special provisions.

Type A FDU must accommodate termination of not less than 144 individual fibers.

Type C FDU must accommodate termination of not less than 12 individual fibers.

The FDU must provide interconnect capability and must include the following:

1. A patch panel to terminate singlemode fiber with SC type connector feed through adapters.
2. Storage for splice trays.
3. A slide out metal shelf for the storage of 6 spare jumpers each measuring 36-inches long

The patch panel must be hinged to provide easy access and maintenance. Brackets must be provided to spool the incoming fiber a minimum of three turns, each turn of not less than 10 inches in length, before separating out individual fibers to the splice tray. Strain relief must be provided for the incoming fiber optic cable. All fibers must be terminated and identified in the FDU.

The FDU must be EIA 19-inch rack mountable.

86-5.01E(2)(h) Media Converter

Media converter must conform to the details shown on the plans and must be in conformance with the special provisions.

Media converter optical link range must be suitable for the operational distances shown on the plan sheets.

Media converter must have the following features:

Media Converter	
Feature	Parameter/Remarks
Ports	RJ-45,EIA/TIA 568A/B, Modular (10/100Base-TX) 100 Mbps duplex fiber port with SC-Type connector (singlemode required)
10/100Base-TX port	Automatically senses 10 Mbps or 100 Mbps connection speed, Auto-negotiates Half- or Full-Duplex mode, Auto-selects MDI/MDI-X media type
Fiber port	Half /Full-Duplex mode selector
Network media	100Base-TX and 100Base-FX: Singlemode fiber optic cable 8/125 μm or 9/125 μm, full-duplex to 20 km for SM Wavelength of 1310/1550nm
Serial Console Port	EIA 232
Protocol	SNMP manageable through SNMP-enabled networking management system via console or add-on module. SSL/SSH
Data Transfer Rate	100 Mbps (Half-Duplex), 200 Mbps (Full-Duplex)
Status LED indicators	power, copper link/activity, fiber optic link/activity, half/full duplex mode
Mounting	Standalone or Slot/Chassis Configuration as required
Power Supply	Supply voltage range 100 V(ac) to 135 V(ac) at 60 Hz. Standalone units: Internal power supply (maximum power consumption 6 W) or external power supply (maximum power consumption 14 W) Chassis units: only one power supply permitted
Power Adapter	Operating Temperature: From 0 to 35 °C Operating Humidity: Up to 85 percent (non-condensing)
Standards Compliance	IEEE 802.3i; 802.3u FCC: Class A or Class B, 10/100Base-TX, 100Base-FX
Warranty	Not less than 5 years for media and chassis (excludes power supplies, fans and lasers)

86-5.01E(2)(i) Media Converter Center

Media converter center must conform to the details shown on the plans and must be in conformance with the special provisions.

Media converter center optical link range must be suitable for the operational distances shown on the plan sheets.

Media converter center must have the following features:

Media Converter Center	
Feature	Parameter/Remarks
Ports	RJ-45,EIA/TIA 568A/B, Modular (10/100Base-TX) 100 Mbps duplex fiber port with SC-Type connector (singlemode required)
10/100Base-TX port	Automatically senses 10 Mbps or 100 Mbps connection speed, Auto-negotiates Half- or Full-Duplex mode, Auto-selects MDI/MDI-X media type
Fiber port	Half /Full-Duplex mode selector
Number of Fiber to Ethernet Conversion Ports	14 fiber to 14 Ethernet
Network media	100Base-TX and 100Base-FX: Singlemode fiber optic cable 8/125 μm or 9/125 μm, full-duplex to 20 km. for SM Wavelength of 1310/1550nm
Serial Console Port	EIA 232
Protocol	SNMP manageable through SNMP-enabled networking management system via console or add-on module. SSL/SSH
Data Transfer Rate	100 Mbps (Half-Duplex), 200 Mbps (Full-Duplex)
Status LED indicators	power, copper link/activity, fiber optic link/activity, half/full duplex mode
Mounting	Rack mounted or Slot/Chassis Configuration as required
Power Supply	Supply voltage range from 100 to 135 V(ac) at 60 Hz. Standalone units: Internal power supply (maximum power consumption 6 W) or external power supply (maximum power consumption 14 W) Chassis units: only one power supply permitted Operating Temperature: From 0 to 35 °C
Power Adapter	Operating Humidity: Up to 85 percent (non-condensing)
Standards Compliance	IEEE 802.3i;802.3u, FCC: Class A or Class B, 10/100Base-TX, 100Base-FX
Warranty	Not less than 5 years for media and chassis (excludes power supplies, fans and lasers)

86-5.01E(2)(j) Video Encoder

Video encoder must conform to the details shown on the plans and the special provisions.

Video encoder must have the following features:

Video Encoder	
Feature	Parameter/Remarks
Video Standard	SMPTE-170, 75 ohm
Video Input	75 ohm, BNC Connector
Video Compression	MPEG-4 Part 2 (ISO/IEC 14496-2) and Motion JPEG
Video Transmission	768kHz at 30fps
Network Interface	Auto sensing 10/100 BaseT port, IEEE 802.3
Protocol Support	TCP/IP, UDP/IP (unicast and multicast), Telnet
Frame Rate	Up to 30 fps at 2CIF
Serial Data Connector	DE-9
Serial Line Standard	Selectable between EIA-232, EIA-422, EIA-485
Serial Port Function	CCTV command and control
Serial Console Port	EIA-232
Encoder Software Updates	Via Serial port or network port
Encoder Configuration	Via Serial port or network port
Encoder Identification	IP addressable
Image quality and frame rate	configurable
Physical	1U height Rack Mountable, 12" Deep
Operating Temperature	From 41 to 120 degrees F
Operating Humidity	80 percent maximum relative humidity, non-condensing
Power Input	Power supply (24 V(dc) maximum) or 110 V(ac), 30 watts (maximum) consumption

86-5.01E(2)(k) Serial To Ethernet Conversion Unit

The serial to Ethernet conversion unit (SECU) must conform to the details shown on the plans and the special provisions.

The SECU must have the following features:

Serial to Ethernet Conversion Unit	
Feature	Parameter/Remarks
Support Protocols	ARP, UDP, TCP, Telnet, ICMP
Serial Device Support	Asynchronous, 7 or 8 bit with or without parity
Network Interface	Ethernet, 10/100BaseT
Network Connector	Modular
Serial Interface	EIA 232, DCE Configuration
Serial Interface Connector	170 Controller male 44-pin edge connector. The card edge connector must be fully compatible with the 170 Controller's modem card slot.
Data Rates	From 300 bps to 115 kbps, must transmit and receive 3600 bytes of serial data without interruption
Control Lines	RTS, CTS, DSR, DCD, DTR
Software Flow Control	XON, XOFF
Hardware Flow Control	CTS/RTS
Management	SNMP, Local console port log in, Telnet log in, Menu driven user selection and web based interface.
Console Port	EIA-232 with DE-9 Female connector
Indicators	Good Link, Network transmit/receive data, EIA-232, Transmit/Receive Data
Indicator Type	LED
Addressing	IP Addressable
Dimensions (nominal)	The unit must be a plug-in card for the 170 Controller. The form factor must conform to the mechanical requirements as shown in appendix A2-7, TEES, March 12, 2009
Operating Temperature	Must conform to TEES date 5/12/2009, Chapter 1, Section 1.8.4.
Power	12 V(dc), 3 watts maximum from the 170 Controller's edge connector
Warranty	Three Years

86-5.01E(3) Construction

86-5.01E(3)(a) Installation

You must make all the necessary adjustments on different components of the CCTV camera assembly. This includes the back-focus and tracking adjustments on the lens and color balancing of the camera.

You must ensure the back-focus adjustment on the camera is such that the lens focus is properly set and maintained when adjusting the focal length from zoom to wide angle. You must make this adjustment with the lens iris at full open position. This adjustment must be made such that when the zoom is adjusted from long range (telephoto) to wide angle, no refocusing is necessary.

The Engineer will notify you of the pan and tilt presets and stops for you to set prior to the CCTV camera assembly installation check. You must perform the installation check in the presence of the Engineer. At your option, the test of the operation (pan, tilt, zoom, iris and wiper) of the pan and tilt unit may be performed at the CCTV cabinet adjacent to the camera or by remote keyboard location. You must furnish a color video monitor, for testing only, to view the actual camera image. Upon completion of the installation check, the Engineer will verify operation of the pan and tilt unit. Any additional adjustments necessary to restore the presets and stops to acceptable parameters is at your expense.

86-5.01E(3)(b) Pre-Acceptance Testing

For each CCTV system location perform the specific quality control requirements for testing and documentation described in the special provisions. Notify the Engineer in writing fifteen days prior to the scheduled testing. All testing must be performed by you, at a mutually agreed time and place, and in the presence of the Engineer. Demonstrate all the features of the CCTV system. Provide the necessary equipment required to access the CCTV equipment for testing. The Engineer will use the results from the pre-acceptance testing, and may discuss with the on-site technician, to determine settings used in final testing and documentation of the CCTV system.

86-5.01E(3)(c) Testing and Documentation

You are responsible for all testing and documentation required for approval and acceptance of the production, installation, and operation of these materials and equipment. The following identifies the specific quality control requirements for testing and documentation:

1. Test all cables, after installation with connectors attached, for continuity and shorts or grounds.
2. Adjust and set limit stops to the pan and tilt unit at each camera site to prevent the view of the areas outside of the roadway system. The final settings will be approved by the Engineer.
3. Perform a local functional test at each of the CCTV locations. At your option, the test may be performed directly at the CCTV cabinet or remotely via keyboard or keyboard and personal computer. Verify all the CCTV features. You must provide all test equipment.
4. Arrange to have a technician, qualified to work on the closed circuit television assembly and employed by the closed circuit television assembly manufacturer or the manufacturer's representative, present at the time the equipment is turned on.

86-5.01E(4) Payment

Not used.

Add to section 86-5.01:

86-5.01G TRAFFIC MONITORING STATION

86-5.01G PIEZOELECTRIC SENSOR SYSTEM

86-5.01G(1) General

86-5.01G(1)(a) Summary

Traffic monitoring station consists of cabinets, controller units, detector loops, pull boxes, conduits, conductors and cables, piezoelectric sensor units, and appurtenances.

Piezoelectric sensor system consists of pull boxes, conduits, conductors and cables, piezoelectric sensor units, and appurtenances.

86-5.01G(1)(b) Definitions

Piezoelectric Sensor Unit: A sensor element in a molded polyurethane elastomer with a transmission cable.

Transmission Cable: A cable, factory-attached to the piezoelectric sensor unit. The cable is similar or equal to type RG58 coaxial cable with a nominal outside diameter of 3/16-inch.

86-5.01G(1)(c) Submittals

Not used

86-5.01G(1)(d) Quality Control and Assurance

86-5.01G(1)(d)(1) General

Piezoelectric Sensor Unit Pre-Installation Testing: Department forces will perform pre-installation testing of piezoelectric sensor units prior to field installation. Methods and results of pre-installation testing will be available to the Contractor.

86-5.01G(1)(d)(1)(a) Training

Not used

86-5.01G(2) Materials

The following materials will be Department-furnished as provided under "Control of Materials" of these special provisions:

1. Piezoelectric sensor unit
2. Plastic standoffs
3. Epoxy sealant for piezoelectric sensor unit installation

The Contractor's responsibility is limited to that provided for in Section 6-2.03, "Department-Furnished Materials," of the Standard Specifications.

86-5.01G(3) Construction

Piezoelectric Sensor Installation:

1. Install piezoelectric sensor perpendicular to traffic.
2. Clean the piezoelectric sensor with isopropyl alcohol or other non-petroleum based solvent.
3. Cut slots cut in the pavement. Slots must be brushed on the bottom and sides with a wire brush, washed, then blown clean and dry with compressed air before installing the piezoelectric sensor. Residue resulting from slot cutting operations must not be permitted to flow across shoulders or lanes occupied by public traffic and must be removed from the pavement surface.

Installation Brackets - Use the installation brackets to suspend the piezoelectric sensor in the sawed slot. Installation brackets have a notch on the bottom side for receiving the sensor and holes for receiving cable ties. Use cable ties to secure the sensor to the installation bracket. Installation brackets must be installed as shown.

Plastic Standoffs - Use the plastic standoffs to suspend the piezoelectric sensor in the sawed slot. Plastic standoffs must be installed as shown.

Epoxy Sealant:

1. The mixing ratio must be in conformance with the manufacturer's recommendations. No more material must be mixed than can be used within the gel time from the time mixing operations are started. The gel time, maximum, is 30 minutes.
2. When automatic mixing equipment is used for mixing the sealant, the provisions in the second paragraph in Section 85-1.02E, "Epoxy Adhesive," of the Standard Specifications, for checking the ratio of the components, applies.

Fill slots for piezoelectric sensor with epoxy sealant as follows:

1. Atmospheric and surface temperature must be above 41 °F. Epoxy sealant must not be permitted to flow into the slot for the transmission cable. Protect the loop sealant from all traffic for at least 1 hour after installation when the pavement surface temperature is 41 °F or above.
2. Before setting the sensor and installation brackets, fill the slot with sealant to approximately 2/3 full. Set the sensor into the slot and add additional sealant, as needed, to fill the slot. Salvage the installation brackets. Cut off exposed portions of cable ties. Remove surplus sealant from the adjacent road surfaces without using solvents.
3. After setting the sensor and plastic standoffs into the slot, add sealant along one side of the sensor until the sealant has filled the space below the sensor. Care must be taken to not create voids within the sealant material. The slot must be filled with sealant to a height slightly above finished grade as determined by the Engineer. Before setting, surplus sealant must be removed from the adjacent road surfaces without the use of solvents.

Transmission Cable:

1. Transmission cable installation must conform to the provisions in Section 86-5.01A(4), "Installation Details," of the Standard Specifications.

2. Where sawed slots cross two different types of pavement material or two different panels of PCC pavement, install a conduit across the joint, as shown in "Curb Termination Details-Type B" on Standard Plan ES-5D, to contain the transmission cable and act as an expansion/deflection fitting.
3. Transmission cable must be installed in the slot with a minimum of twisting.
4. Slots for transmission cable must be filled with elastomeric sealant. Sealant must not be permitted to flow into the slot for the piezoelectric sensor.
5. No splices of transmission cable other than the factory splice or splice by Department forces are permitted. Install transmission cable continuous from the piezoelectric sensor to the controller cabinet without any additional splices.
6. Identification for cable banding purposes must use the description shown.
7. Coil a minimum of 6 feet of slack of transmission cable neatly in the bottom of the controller cabinet. Cable ends must be taped weatherproof.

86-5.01G(4) Functional Requirements

Department forces will perform acceptance tests on piezoelectric sensor units similar to the tests performed for pre-installation testing. Acceptable performance values must be equal to or better than the values yielded in piezoelectric sensor unit pre-installation testing. Repair or replacement of piezoelectric sensor units are at your expense.

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 electrical shop:

Coronado Maintenance Station
1700 Glorietta Plaza,
Coronado, CA 92118
Telephone (619) 522-6554,

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

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
5. Nonreinforced PCC component or structure for which a Class 1 surface finish under section 51-1.03F(3) is required

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.

The Department determines the HMA payment quantity by multiplying the quantity of HMA placed in the work by 2.40 and dividing the result by the sp gr of the compacted stabilometer test specimen. The Department applies this quantity reduction as often as necessary to ensure accurate results.

AA

90 CONCRETE

Add to section 90-1.02H:

Concrete that is in direct contact with native formational material, or fill material composed of the native formational material is in a corrosive environment.

For concrete that is in direct contact with native formational material, or fill material composed of the native formational material, the ratio of the quantity of free water to the quantity of cementitious material must not exceed 0.40.

Add to section 90-2.02B:

You may use rice hull ash as an SCM. Rice hull ash must comply with AASHTO M 321 and the chemical and physical requirements shown in the following tables:

Chemical property	Requirement (percent)
Silicon dioxide (SiO ₂) ^a	90 min
Loss on ignition	5.0 max
Total alkalies as Na ₂ O equivalent	3.0 max

Physical property	Requirement
Particle size distribution Less than 45 microns Less than 10 microns	95 percent 50 percent
Strength activity index with portland cement ^b 7 days 28 days	95 percent (min percent of control) 110 percent (min percent of control)
Expansion at 16 days when testing project materials under ASTM C 1567 ^c	0.10 percent max
Surface area when testing by nitrogen adsorption under ASTM D 5604	40.0 m ² /g min

^aSiO₂ in crystalline form must not exceed 1.0 percent.

^bWhen tested under AASHTO M 307 for strength activity testing of silica fume.

^cIn the test mix, Type II or V portland cement must be replaced with at least 12 percent rice hull ash by weight.

For the purpose of calculating the equations for the cementitious material specifications, consider rice hull ash to be represented by the variable *UF*.

**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

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

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).

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.

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.

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).

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.

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.

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.

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 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.

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.

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.

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:

$$Q_h = HMATT \times X_a$$

04-20-12

Replace "weight of dry aggregate" in the definition of the variable X_a in section 9-1.07B(2) with:

total weight of HMA

04-20-12

Replace the formula in section 9-1.07B(3) with:

$$Q_{rh} = RHMATT \times 0.80 \times X_{arb}$$

04-20-12

Replace "weight of dry aggregate" in the definition of the variable X_{arb} in section 9-1.07B(3) with:

total weight of rubberized HMA

04-20-12

Replace the heading of section 9-1.07B(4) with:

Hot Mix Asphalt with Modified Asphalt Binder

04-20-12

Add between "in" and "modified" in the introductory clause of section 9-1.07B(4):

HMA with

04-20-12

Replace the formula in section 9-1.07B(4) with:

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

04-20-12

Replace "weight of dry aggregate" in the definition of the variable X_{mab} in section 9-1.07B(4) with:

total weight of HMA

04-20-12

Replace the formula in section 9-1.07B(5) with:

$$Q_{rap} = HMATT \times X_{aa}$$

04-20-12

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.

Delete "and NELs are violated" in the 3rd paragraph of section 13-3.03C.

04-19-13

Replace "working days" at each occurrence in section 13-3.04 with.

original working days

10-19-12

Delete the 1st sentence in the 2nd paragraph of section 13-4.03C(3).

04-19-13

Add between the 2nd and 3rd paragraphs of section 13-4.03C(3):

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

04-19-13

Replace the paragraph in section 13-4.04 with:

Not Used

04-20-12

Delete "or stockpile" in the 3rd paragraph of section 13-5.02F.

10-19-12

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
			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							
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) ^g	California Test 366	30	30	--	--				
No. 4 and 3/8" gradings									
1/2" and 3/4" gradings									
Air void content (%) ^{d, g}	California Test 367	4 ± 2	4 ± 2	TV ± 2	--				
Percent of crushed particles	California Test 205								
Coarse aggregate (% min)									
One fractured face						90	25	--	90
Two fractured faces						75	--	90	75
Fine aggregate (% min)									
(Passing no. 4 sieve and retained on no. 8 sieve.)									
One fractured face	70	20	70	90					
Los Angeles Rattler (% max)	California Test 211	12	--	12	12				
Loss at 100 rev.									
Loss at 500 rev.		45	50	40	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	California Test 367	65.0–75.0	65.0–75.0	Report only	--				
No. 4 grading									
3/8" grading									
1/2" grading									
3/4" grading									
Voids in mineral aggregate (% min) ⁱ	California Test 367	17.0	17.0	--	--				
No. 4 grading									
3/8" grading									
1/2" grading						14.0	14.0	18.0–23.0	
3/4" grading						13.0	13.0	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 Pl ₀	12-foot straight-edge, must-grind, and Pl ₀	12-foot straight-edge, must-grind, and Pl 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 SO_4
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):

After seating, the maximum tensile stress in the prestressing steel must not exceed 75 percent of the minimum ultimate tensile strength shown.

01-20-12

Add to section 50-1.03B(2):

50-1.03B(2)(e) Debonding Prestressing Strands

09-16-11

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.

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:

