



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**NOTICE TO BIDDERS  
AND  
SPECIAL PROVISIONS**

FOR CONSTRUCTION ON STATE HIGHWAY IN SAN JOAQUIN COUNTY IN  
STOCKTON AT VARIOUS LOCATIONS

In District 10 On Route 4,5

Under

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*Bid book dated August 19, 2013*

*Standard Specifications dated 2010*

*Project plans approved May 20, 2013*

*Standard Plans dated 2010*

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Identified by

Contract No. 10-0S1104

10-SJ-4,5-Var

Project ID 1000000229

**Electronic Advertising Contract**

XS

Bids open Wednesday, October 16, 2013

Dated August 19, 2013

OSD

IH



# CONTRACT NO. 10-0S1104

DESIGN OVERSIGHT APPROVAL	REGISTRATION NO.	DATE	
Printed Name JES PADDA	Signature <i>Jes Padda</i>	59153	06/30/13

Approved as to impact on State facilities and conformance with applicable State standards and practices and that technical oversight was performed as described in the California Department of Transportation A & E Consultant Services Manual.

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

## STRUCTURES

*K. Harir*  
REGISTERED CIVIL ENGINEER



## HIGHWAYS

*M. Dadala*  
REGISTERED CIVIL ENGINEER



## TRAFFIC

*Ng Chi-ling*  
REGISTERED CIVIL ENGINEER



# CONTRACT NO. 10-0S1104

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

ELECTRICAL

*David W. Clow*

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REGISTERED ELECTRICAL ENGINEER

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# STANDARD PLANS LIST

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

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## **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 Wednesday, October 16, 2013

Dated August 19, 2013

General work description: Construct roadway, viaduct, retaining walls, and MSE walls.

The Department will receive sealed bids for CONSTRUCTION ON STATE HIGHWAY IN SAN JOAQUIN COUNTY IN STOCKTON AT VARIOUS LOCATIONS.

District-County-Route-Post Mile: 10-SJ-4,5-Var

Contract No. 10-0S1104

The Contractor must have either a Class A license or one of the following Class C licenses: C-8.

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

For the Federal training program, the number of trainees or apprentices is 42.

Bids must be on a unit price basis.

Complete the work within 825 working days.

The estimated cost of the project is \$64,000,000.

No prebid meeting is scheduled for this project.

The Department will receive bids until 2:00 p.m. on the bid open date at 1727 30th Street, Bidders' Exchange, MS 26, Sacramento, CA 95816. Bids received after this time will not be accepted. Department staff will direct the bidders to the bid opening.

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](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](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

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### 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	825
4	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM
5	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM
6	120120	TYPE III BARRICADE	EA	30
7	120165	CHANNELIZER (SURFACE MOUNTED)	EA	410
8	128652	PORTABLE CHANGEABLE MESSAGE SIGN (LS)	LS	LUMP SUM
9	129000	TEMPORARY RAILING (TYPE K)	LF	17,900
10	129100	TEMPORARY CRASH CUSHION MODULE	EA	140
11	025948	TEMPORARY CRASH CUSHION ABSORB 350	EA	22
12	129150	TEMPORARY TRAFFIC SCREEN	LF	17,900
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	93
16	130320	STORM WATER SAMPLING AND ANALYSIS DAY	EA	50
17	130330	STORM WATER ANNUAL REPORT	EA	3
18	130505	MOVE-IN/MOVE-OUT (TEMPORARY EROSION CONTROL)	EA	12
19	130520	TEMPORARY HYDRAULIC MULCH	SQYD	85,800
20	130560	TEMPORARY SOIL BINDER	SQYD	15,000

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
21	130570	TEMPORARY COVER	SQYD	83,400
22	130610	TEMPORARY CHECK DAM	LF	260
23	130620	TEMPORARY DRAINAGE INLET PROTECTION	EA	94
24	130640	TEMPORARY FIBER ROLL	LF	6,140
25	130650	TEMPORARY GRAVEL BAG BERM	LF	2,010
26	130670	TEMPORARY REINFORCED SILT FENCE	LF	470
27	130680	TEMPORARY SILT FENCE	LF	11,400
28	130710	TEMPORARY CONSTRUCTION ENTRANCE	EA	8
29	130720	TEMPORARY CONSTRUCTION ROADWAY	SQYD	5,170
30	130730	STREET SWEEPING	LS	LUMP SUM
31	130900	TEMPORARY CONCRETE WASHOUT	LS	LUMP SUM
32	141000	TEMPORARY FENCE (TYPE ESA)	LF	420
33	141103	REMOVE YELLOW THERMOPLASTIC TRAFFIC STRIPE (HAZARDOUS WASTE)	LF	10,600
34	141120	TREATED WOOD WASTE	LB	3,100
35	150305	OBLITERATE SURFACING	SQYD	9,610
36	150608	REMOVE CHAIN LINK FENCE	LF	4,480
37	150620	REMOVE GATE	EA	13
38	150662	REMOVE METAL BEAM GUARD RAILING	LF	72
39	150711	REMOVE PAINTED TRAFFIC STRIPE	LF	25,300
40	150712	REMOVE PAINTED PAVEMENT MARKING	SQFT	270

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
41	150714	REMOVE THERMOPLASTIC TRAFFIC STRIPE	LF	14,100
42	150715	REMOVE THERMOPLASTIC PAVEMENT MARKING	SQFT	160
43	150722	REMOVE PAVEMENT MARKER	EA	1,320
44	150742	REMOVE ROADSIDE SIGN	EA	21
45	150757	REMOVE SIGN STRUCTURE (EA)	EA	3
46	150809	REMOVE CULVERT (LF)	LF	160
47	150820	REMOVE INLET	EA	7
48	152370	RELOCATE MAILBOX	EA	1
49	152390	RELOCATE ROADSIDE SIGN	EA	5
50	152430	ADJUST INLET	EA	4
51	153130	REMOVE CONCRETE CURB (LF)	LF	30
52	155003	CAP INLET	EA	1
53	160102	CLEARING AND GRUBBING (LS)	LS	LUMP SUM
54	190101	ROADWAY EXCAVATION	CY	61,000
55	025949	ROADWAY EXCAVATION (TYPE DC MATERIAL)	CY	30,900
56 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	332
57	192037	STRUCTURE EXCAVATION (RETAINING WALL)	CY	1,280
58 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	220
59	193013	STRUCTURE BACKFILL (RETAINING WALL)	CY	1,820
60 (F)	193031	PERVIOUS BACKFILL MATERIAL (RETAINING WALL)	CY	166

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
61	194001	DITCH EXCAVATION	CY	1,470
62	198010	IMPORTED BORROW (CY)	CY	38,900
63	198206	SUBGRADE ENHANCEMENT GEOTEXTILE, CLASS A1	SQYD	27,500
64	205220	GRAVEL MULCH (SQFT)	SQFT	230,000
65	208808	8" WELDED STEEL PIPE CONDUIT (.250" THICK)	LF	570
66	210010	MOVE-IN/MOVE-OUT (EROSION CONTROL)	EA	7
67	210270	ROLLED EROSION CONTROL PRODUCT (NETTING)	SQFT	532,000
68	210300	HYDROMULCH	SQFT	632,000
69	210350	FIBER ROLLS	LF	7,350
70	210420	STRAW	SQFT	147,000
71	210430	HYDROSEED	SQFT	623,000
72	210600	COMPOST	SQFT	623,000
73	210630	INCORPORATE MATERIALS	SQFT	147,000
74	250201	CLASS 2 AGGREGATE SUBBASE	CY	12,100
75	260203	CLASS 2 AGGREGATE BASE (CY)	CY	13,300
76	280000	LEAN CONCRETE BASE	CY	4,840
77	390132	HOT MIX ASPHALT (TYPE A)	TON	9,960
78	394060	DATA CORE	LS	LUMP SUM
79	394074	PLACE HOT MIX ASPHALT DIKE (TYPE C)	LF	250
80	394076	PLACE HOT MIX ASPHALT DIKE (TYPE E)	LF	2,350

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
81	394077	PLACE HOT MIX ASPHALT DIKE (TYPE F)	LF	130
82	395000	LIQUID ASPHALT (PRIME COAT)	TON	21
83	397005	TACK COAT	TON	10
84	400050	CONTINUOUSLY REINFORCED CONCRETE PAVEMENT	CY	3,370
85	400065	CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (TERMINAL JOINT, TYPE E)	LF	160
86	400080	CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (WIDE FLANGE BEAM TERMINAL)	LF	160
87	400092	CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (EXPANSION JOINT, TYPE WF)	LF	160
88	401050	JOINTED PLAIN CONCRETE PAVEMENT	CY	15,700
89	401083	SHOULDER RUMBLE STRIP (CONCRETE PAVEMENT, GROUND-IN INDENTATIONS)	STA	27
90	404092	SEAL PAVEMENT JOINT	LF	55,700
91	404093	SEAL ISOLATION JOINT	LF	1,310
92 (F)	477021	MECHANICALLY STABILIZED EMBANKMENT, LOCATION A	SQFT	16,080
93 (F)	477022	MECHANICALLY STABILIZED EMBANKMENT, LOCATION B	SQFT	21,860
94 (F)	477023	MECHANICALLY STABILIZED EMBANKMENT, LOCATION C	SQFT	2,370
95	490601	16" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	200
96	490611	72" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	3,474
97	490618	96" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	2,858
98	490620	108" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	1,205
99	498050	54" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	35
100	498052	60" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	25

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
101	500001	PRESTRESSING CAST-IN-PLACE CONCRETE	LS	LUMP SUM
102 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	77
103 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	14,500
104 (F)	510060	STRUCTURAL CONCRETE, RETAINING WALL	CY	721
105 (F)	510072	STRUCTURAL CONCRETE, BARRIER SLAB	CY	535
106 (F)	510086	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N)	CY	185
107 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	35
108 (F)	044347	ARCHITECTURAL TEXTURE (COLUMN)	SQFT	2,940
109	044348	ARCHITECTURAL MEDALLION	EA	64
110	044349	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (100'-110')	EA	17
111	044350	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (110'-120')	EA	23
112	044351	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (120'-130')	EA	24
113	044352	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (130'-140')	EA	40
114	044353	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (140'-150')	EA	40
115	044354	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (150'-160')	EA	39
116	512500	ERECT PRECAST PRESTRESSED CONCRETE GIRDER	EA	183
117	519091	JOINT SEAL (MR 1 1/2")	LF	242
118	519092	JOINT SEAL ASSEMBLY (MR 2 1/2")	LF	88
119	519094	JOINT SEAL ASSEMBLY (MR 3 1/2")	LF	248
120	519095	JOINT SEAL ASSEMBLY (MR 4")	LF	168

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
121	519100	JOINT SEAL (MR 2")	LF	84		
122	519101	JOINT SEAL (TYPE A)	LF	160		
123 (F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	6,730,000		
124 (F)	520103	BAR REINFORCING STEEL (RETAINING WALL)	LB	77,526		
125	520120	HEADED BAR REINFORCEMENT	EA	1,508		
126 (F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	41,866		
127 (F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	41,866		
128	560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	1,870		
129	560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	600		
130	560249	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-UNFRAMED)	SQFT	200		
131	560251	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-FRAMED)	SQFT	23		
132	560252	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-FRAMED)	SQFT	670		
133	562004	METAL (RAIL MOUNTED SIGN)	LB	1,300		
134	566011	ROADSIDE SIGN - ONE POST	EA	53		
135	566012	ROADSIDE SIGN - TWO POST	EA	6		
136	620100	18" ALTERNATIVE PIPE CULVERT	LF	2,260		
137	620140	24" ALTERNATIVE PIPE CULVERT	LF	950		
138	025950	TEMPORARY BASIN IMPROVEMENTS	LS	LUMP SUM	LUMP SUM	
139	705311	18" ALTERNATIVE FLARED END SECTION	EA	6		
140	705315	24" ALTERNATIVE FLARED END SECTION	EA	5		

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
141	707117	36" PRECAST CONCRETE PIPE INLET	LF	32		
142	721028	ROCK SLOPE PROTECTION (NO. 2, METHOD B) (CY)	CY	120		
143	721810	SLOPE PAVING (CONCRETE)	CY	42		
144	729011	ROCK SLOPE PROTECTION FABRIC (CLASS 8)	SQYD	390		
145	730040	MINOR CONCRETE (GUTTER) (LF)	LF	224		
146	730070	DETECTABLE WARNING SURFACE	SQFT	90		
147	731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	1,530		
148	731519	MINOR CONCRETE (STAMPED CONCRETE)	SQFT	6,680		
149 (F)	750001	MISCELLANEOUS IRON AND STEEL	LB	10,364		
150 (F)	750041	ISOLATION CASING	LB	12,740		
151 (F)	750497	MISCELLANEOUS METAL (RESTRAINER - BAR TYPE)	LB	5,200		
152 (F)	750505	BRIDGE DECK DRAINAGE SYSTEM	LB	52,200		
153	025951	SANITARY SEWER MANHOLE (CITY TYPE 1)	EA	3		
154	025952	SANITARY SEWER MANHOLE (CITY TYPE 3)	EA	5		
155	026003	RELOCATE HYDRANT (CITY)	EA	3		
156	026004	ADJUST FIRE HYDRANT (CITY)	EA	2		
157	026005	12" REINFORCED CONCRETE PIPE (CITY)	LF	1,450		
158	026006	18" REINFORCED CONCRETE PIPE (CITY)	LF	810		
159	026007	24" REINFORCED CONCRETE PIPE (CITY)	LF	650		
160	026008	30" REINFORCED CONCRETE PIPE (CITY)	LF	710		

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
161	026009	12" CONCRETE FLARED END SECTION (CITY)	EA	2		
162	026010	24" CONCRETE FLARED END SECTION (CITY)	EA	1		
163	026011	30" CONCRETE FLARED END SECTION (CITY)	EA	3		
164	025953	CITY OF STOCKTON MANHOLE TYPE 1	EA	20		
165 (F)	025954	MISCELLANEOUS IRON AND STEEL (CITY)	LB	14,860		
166	025955	8" POLYVINYL CHLORIDE PIPE	LF	140		
167	025956	36" PROFILE WALL POLYVINYL CHLORIDE PIPE	LF	250		
168	025957	ABANDON SEWER MANHOLE	EA	1		
169	025958	ABANDON SEWER PIPE	LF	280		
170	026012	REMOVE SEWER PIPE (CITY)	LF	460		
171	025959	REMOVE CULVERT (LF) (CITY)	LF	700		
172	025960	REMOVE INLET (CITY)	EA	6		
173	025961	ADJUST INLET (CITY)	EA	3		
174	025962	ADJUST MANHOLE TO GRADE (CITY)	EA	4		
175	025963	ADJUST SEWER MANHOLE TO GRADE	EA	27		
176	026013	SAND BACKFILL (CITY)	CY	4		
177 (F)	025964	MINOR CONCRETE (MINOR STRUCTURE) (CITY)	CY	108		
178	025965	ROCK SLOPE PROTECTION (NO. 2, METHOD B) (CY) (CITY)	CY	16		
179	025966	ROCK SLOPE PROTECTION FABRIC (CLASS 8) (CITY)	SQYD	54		
180	026441	DRAINAGE INLET MARKER (CITY)	EA	23		

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
181	025967	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION) (CITY)	CY	6
182	026014	LIGHTING (CITY OF STOCKTON)	LS	LUMP SUM
183	025968	FIBER OPTIC SYSTEM	LS	LUMP SUM
184	026015	SIGNAL AND LIGHTING (CITY OF STOCKTON)	LS	LUMP SUM
185	800103	TEMPORARY FENCE (TYPE CL-6)	LF	3,670
186	025969	TEMPORARY FENCE (ELECTRIC)	LF	930
187	025970	TEMPORARY GATE	EA	4
188	800360	CHAIN LINK FENCE (TYPE CL-6)	LF	7,050
189	025971	CHAIN LINK FENCE (TYPE CL-6, BW)	LF	3,030
190	025972	10' CHAIN LINK GATE (TYPE CL-6, BW)	EA	2
191	025973	12' CHAIN LINK GATE (TYPE CL-6, BW)	EA	2
192	025974	16' CHAIN LINK GATE (TYPE CL-6, BW)	EA	6
193	025975	24' CHAIN LINK GATE (TYPE CL-6, BW)	EA	6
194	802580	12' CHAIN LINK GATE (TYPE CL-6)	EA	8
195	802620	16' CHAIN LINK GATE (TYPE CL-6)	EA	7
196	025976	20' CHAIN LINK SLIDING GATE (TYPE CL-6)	EA	1
197	820107	DELINEATOR (CLASS 1)	EA	42
198	820132	OBJECT MARKER (TYPE L)	EA	4
199	820134	OBJECT MARKER (TYPE P)	EA	2
200	832003	METAL BEAM GUARD RAILING (WOOD POST)	LF	100

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
201 (F)	833032	CHAIN LINK RAILING (TYPE 7)	LF	833
202	839220	DOUBLE METAL BEAM GUARD RAILING (WOOD POST)	LF	140
203 (F)	839521	CABLE RAILING	LF	974
204	839541	TRANSITION RAILING (TYPE WB)	EA	3
205	839561	RAIL TENSIONING ASSEMBLY	EA	1
206	839581	END ANCHOR ASSEMBLY (TYPE SFT)	EA	2
207	839585	ALTERNATIVE FLARED TERMINAL SYSTEM	EA	4
208	839591	CRASH CUSHION, SAND FILLED	EA	2
209	839701	CONCRETE BARRIER (TYPE 60)	LF	370
210	839702	CONCRETE BARRIER (TYPE 60A)	LF	503
211	839726	CONCRETE BARRIER (TYPE 736A)	LF	310
212 (F)	839727	CONCRETE BARRIER (TYPE 736 MODIFIED)	LF	11,562
213	839731	CONCRETE BARRIER (TYPE 736B)	LF	20
214	840501	THERMOPLASTIC TRAFFIC STRIPE	LF	43,700
215	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	3,870
216	840560	THERMOPLASTIC TRAFFIC STRIPE (SPRAYABLE)	LF	22,200
217	840656	PAINT TRAFFIC STRIPE (2-COAT)	LF	64,500
218	840666	PAINT PAVEMENT MARKING (2-COAT)	SQFT	740
219	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	3,260
220	860090	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	LUMP SUM

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity
221	025977	SIGNAL AND LIGHTING (STAGE CONSTRUCTION)	LS	LUMP SUM
222	860251	SIGNAL AND LIGHTING (LOCATION 1)	LS	LUMP SUM
223	860252	SIGNAL AND LIGHTING (LOCATION 2)	LS	LUMP SUM
224	025978	LIGHTING (COUNTY)	LS	LUMP SUM
225	860460	LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM
226	860771	COMMUNICATION CONDUIT (LS)	LS	LUMP SUM
227	860930	TRAFFIC MONITORING STATION	LS	LUMP SUM
228	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
025948	TEMPORARY CRASH CUSHION ABSORB 350	12
025949	ROADWAY EXCAVATION (TYPE DC MATERIAL)	19
044347	ARCHITECTURAL TEXTURE (COLUMN)	51
044348	ARCHITECTURAL MEDALLION	51
044349	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (100'-110')	51
044350	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (110'-120')	51
044351	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (120'-130')	51
044352	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (130'-140')	51
044353	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (140'-150')	51
044354	FURNISH PRECAST PRESTRESSED CONCRETE WIDE-FLANGE GIRDER (150'-160')	51
025950	TEMPORARY BASIN IMPROVEMENTS	70
025951	SANITARY SEWER MANHOLE (CITY TYPE 1)	77
025952	SANITARY SEWER MANHOLE (CITY TYPE 3)	77
026003	RELOCATE HYDRANT (CITY)	77
026004	ADJUST FIRE HYDRANT (CITY)	77
026005	12" REINFORCED CONCRETE PIPE (CITY)	77
026006	18" REINFORCED CONCRETE PIPE (CITY)	77
026007	24" REINFORCED CONCRETE PIPE (CITY)	77
026008	30" REINFORCED CONCRETE PIPE (CITY)	77
026009	12" CONCRETE FLARED END SECTION (CITY)	77
026010	24" CONCRETE FLARED END SECTION (CITY)	77

026011	30" CONCRETE FLARED END SECTION (CITY)	77
025953	CITY OF STOCKTON MANHOLE TYPE 1	77
025954	MISCELLANEOUS IRON AND STEEL (CITY)	77
025955	8" POLYVINYL CHLORIDE PIPE	77
025956	36" PROFILE WALL POLYVINYL CHLORIDE PIPE	77
025957	ABANDON SEWER MANHOLE	77
025958	ABANDON SEWER PIPE	77
026012	REMOVE SEWER PIPE (CITY)	77
025959	REMOVE CULVERT (LF) (CITY)	77
025960	REMOVE INLET (CITY)	77
025961	ADJUST INLET (CITY)	77
025962	ADJUST MANHOLE TO GRADE (CITY)	77
025963	ADJUST SEWER MANHOLE TO GRADE	77
026013	SAND BACKFILL (CITY)	77
025964	MINOR CONCRETE (MINOR STRUCTURE) (CITY)	77
025965	ROCK SLOPE PROTECTION (No. 2, METHOD B) (CY) (CITY)	77
025966	ROCK SLOPE PROTECTION FABRIC (CLASS 8) (CITY)	77
026441	DRAINAGE INLET MARKER (CITY)	77
025967	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION) (CITY)	77
026014	LIGHTING (CITY OF STOCKTON)	77
025968	FIBER OPTIC SYSTEM	77
026015	SIGNAL AND LIGHTING (CITY OF STOCKTON)	77
025969	TEMPORARY FENCE (ELECTRIC)	80
025970	TEMPORARY GATE	80
025971	CHAIN LINK FENCE (TYPE CL-6, BW)	80
025972	10' CHAIN LINK GATE (TYPE CL-6, BW)	80
025973	12' CHAIN LINK GATE (TYPE CL-6, BW)	80
025974	16' CHAIN LINK GATE (TYPE CL-6, BW)	80
025975	24' CHAIN LINK GATE (TYPE CL-6, BW)	80
025976	20' CHAIN LINK SLIDING GATE (TYPE CL-6)	80
025977	SIGNAL AND LIGHTING (STAGE CONSTRUCTION)	86
025978	LIGHTING (COUNTY)	86

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## 2 BIDDING

### 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>	Foundation Report, Dated December 20, 2012 Geotechnical Design Report, Dated May 4, 2012 Installation Details for battery backup system Manufacturer drawing for temporary crash cushion Absorb 350 Railroad relations and insurance requirements
Available as specified in the <i>Standard Specifications</i>	Cross Sections Original Ground Data Horizontal Geometric Alignment Vertical Geometric Alignment

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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
10-0G4704	SJ-5-28.5/35.6	Stockton	Freeway Widening
10-0M7804	SJ-5-25.1/28.6	Stockton	Roadway Rehabilitation
10-3A1004	SJ-99-18.0/18.6	Stockton	Freeway Widening
10-0E4904	SJ-5-22.1/26.1	Stockton	Interchange Improvements
10-0W1104	SJ-4-R16.2	Stockton	High Friction Surface Treatment, Flashing Beacons, Upgrade Guardrail.

**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:

Parcel No.	Construction Stage	Type	Date Available to Contractor	Reason for Work-Around
16420	1	Fee	12/31/2013	Pending Demolition and Clearance
16421	1	Fee	12/31/2013	Pending Demolition and Clearance
16422	1	Fee	12/31/2013	Pending Demolition and Clearance
16423	1	Fee	12/31/2013	Pending Demolition and Clearance
16424-1, -2	1	Fee and Temporary Construction Easement (TCE) TCE Expires 12-1-2016	12/31/2013	Pending Demolition and Clearance
16425-1, -2	1	Fee and TCE TCE Expires 12-1-2016	12/31/2013	Pending Demolition and Clearance
16426-1, -2	1	Fee and TCE TCE Expires 12-1-2016	12/31/2013	Pending Demolition and Clearance
16428-1, -2	1	Fee and TCE TCE Expires 12-1-2016	12/31/2013	Pending Demolition and Clearance
16430	1	Fee	12/31/2013	Pending Demolition and Clearance
16432	1	Fee	12/31/2013	Pending Demolition and Clearance
16433-1, -2	1	Fee and TCE TCE Expires 12-1-2016	12/31/2013	Pending Demolition and Clearance
16436-1, -2	1	Fee and TCE TCE Expires 12-1-2016	12/31/2013	Pending Demolition and Clearance
16437-1, -2	1	Fee and TCE TCE Expires 12-1-2016	12/31/2013	Pending Demolition and Clearance
16445-1, -2	1	Fee and TCE TCE Exp 12-1-2016	12/31/2013	Pending Demolition and Clearance
16451	1	Fee	12/31/2013	Pending Demolition and Clearance
16452	1	Fee	12/31/2013	Pending Demolition and Clearance
16453	1	Fee	12/31/2013	Pending Demolition and Clearance
16454	1	Fee	12/31/2013	Pending Demolition and Clearance
16456	2	Fee	12/30/2014	Pending Effective Order of Possession (OP)

				Business Relocation Assistance Program (RAP) and Demolition and Clearance
16457	2	Fee	03/05/2014	Pending Effective OP Business and 2 Resident (Res), RAP and Demolition and Clearance
16460	1	Fee	12/31/2013	Pending Clearance and Demolition
16464-1, -2	1	Fee and TCE TCE Expires 12-1-2016	1/15/2014	Pending Effective OP
16467	2	Fee	12/30/2014	Pending Demolition and Clearance and pending Business RAP
16469-2, 3, 4	2	Easement and two TCEs. TCEs Expires 12-1-2016	06/02/2014	Pending Effective OP Pending RAP of Personal Property
16471-2, 3, 6	3	Easement and 2 TCEs. TCEs Expires 12-1-2016	04/15/2014	Pending Effective OP
16472-1, -2	3	Easement and TCE TCE Expires 12-1-16	10/02/2013	RAP of Business Personal Property
16473-1, -2	3	Easement and TCE; TCE Expires 12-1-2016	10/02/2013	RAP of Business Personal Property
16474-4, 5, 6, 8	2	Easement and TCE; TCE Expires 12-1-2016	06/02/2014	Pending Effective OP and RAP of Business Personal Property
16476-1, -2, -3	2	Aerial Easement and 2 TCEs	06/01/2014	Pending Construction and Maintenance Agreement
16485	2	Fee	12/30/2014	Pending Business RAP and Demolition and Clearance
16487	1	Fee	12/31/2013	Pending Clearance and Demolition
16488	1	Fee	12/31/2013	Pending Clearance and Demolition
16579	4	Access Rights Only	06/30/2016	Pending Effective OP

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 5-1.36D:**

The utility owner will relocate a utility shown in the following table before the corresponding date shown:





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## 8 PROSECUTION AND PROGRESS

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

Section 8-1.04B does not apply.

Start job site activities within 55 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 55th day after Contract approval if you:

1. Obtain specified authorization or acceptance for each submittal before the 55th 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.

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## 9 PAYMENT

### Add to section 9-1.16C:

The following items are eligible for progress payment even if they are not incorporated into the work:

1. Earth Retaining System
2. Welded Steel Pipe Conduit
3. Piling (except CIDH Piling)
4. Precast Concrete Members
5. Bar Reinforcing Steel
6. Structural Steel
7. Column Casings





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

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

Comply with the attenuator manufacturer's instructions for:

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

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

### **12-3.13A(2) Definitions**

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

### **12-3.13A(3) Submittals**

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

### **12-3.13A(4) Quality Control and Assurance**

Do not start impact attenuator vehicle activities until authorized.

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

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

### **12-3.13B Materials**

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

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

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

Each impact attenuator vehicle must have:

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

### **12-3.13C Construction**

Except where prohibited, use an impact attenuator vehicle:

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

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

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

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

#### **12-3.13D Payment**

Not Used

### **Replace section 12-3.14 with:**

#### **12-3.14 TEMPORARY TRAFFIC SCREEN**

##### **12-3.14A General**

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

##### **12-3.14B Materials**

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

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

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

Nuts, bolts, and washers must be cadmium plated.

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

##### **12-3.14C Construction**

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

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

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

##### **12-3.14D Payment**

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

### **Add to section 12-3:**

#### **12-3.18 Temporary Crash Cushion Absorb 350**

##### **12-3.18A General**

##### **12-3.18A(1) Summary**

This work includes furnishing and installing temporary crash cushion Absorb 350 Test Level 2 (TL2).

Temporary crash cushion Absorb 350 (TL2) must be a 5-element system as manufactured by Barrier Systems Incorporated and must include the items shown for the crash cushion.

You can obtain the crash cushion from the distributor, Statewide Safety and Signs, 130 Grobic Court, Fairfield, California 94533, Telephone (800) 770-2644, FAX (707) 864-9956.

The price quoted by the distributor for the crash cushion, FOB Fairfield, California is \$6,077, not including sales tax.

The above price will be firm for orders placed on or before December 31, 2013, provided delivery is accepted within 90 days after the order is placed.

**12-3.18A(2) Submittals**

Submit a copy of the manufacturer's plan and parts list as an informational submittal.

Submit a certificate of compliance for the temporary crash cushion Absorb 350.

**12-3.18A(3) Construction**

Install the temporary crash cushion under the manufacturer's installation instructions. The two end panels of temporary railing (type K) connected to the temporary crash cushion must be unanchored. The temporary crash cushion must be installed more than 2 feet from the edge of traveled way.

Attach a Type R or Type P marker panel to the front of the temporary crash cushion Absorb 350 (TL2) when the closest point of the crash cushion is within 12 feet of the traveled way. Firmly fasten the marker panel to the crash cushion with commercial quality hardware or by other authorized methods.

Maintain temporary crash cushion Absorb 350 (TL2) in place at location, including times when work is not actively in progress.

Immediately repair temporary crash cushion Absorb 350 (TL2) damaged due to your activities. Remove and replace if damaged beyond repair. Repair of temporary crash cushion Absorb 350 (TL2) damaged by traffic is change order work.

Upon completion of work, temporary crash cushion Absorb 350 (TL2) becomes your property and must be removed from the job site. Do not install temporary crash cushion Absorb 350 (TL2) in the permanent work.

**12-3.18A(4) 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.

Special days are: Mother's Day, Easter weekend including Friday, Asparagus Festival, Caesar Chavez Day, and the day after Thanksgiving Day.

Under a 1-way reversing traffic control operation, traffic may be stopped in 1 direction for periods not to exceed 10 minutes. After each stoppage, all accumulated traffic for that direction must pass through the work zone before another stoppage is made.

The maximum length of a single stationary lane closure is 2 miles.

Not more than 1 stationary lane closures will be allowed in each direction of travel at one time.

Freeway closure charts are for the erection and removal of falsework, placement and removal of overhead sign structures, and other authorized work.

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.

Precast concrete members must not be cast within the right-of-way of Route 4.

Erect precast girders over Route , Scotts Avenue, Ventura, Fresno Avenue, and Los Angeles Street 1 span at a time. During girder erection, traffic in the lanes over which girders are being placed must be detoured or stopped as specified in section 12-4.02A.

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

Replace "Reserved" in section 12-4.04 with:

Lane Closure Restriction for Designated Holidays and Special Days										
Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
x	<b>H</b> xx	xx	xx							
	<b>SD</b> xx									
x	xx	<b>H</b> xx	xx							
		<b>SD</b> xx								
	x	xx	<b>H</b> xx	xx						
			<b>SD</b> xx							
	x	xx	xx	<b>H</b> xx	xxx					
	x	xx	xx	<b>SD</b> xx	xxx					
				x	<b>H</b> xx	xxx				
				x	<b>SD</b> xx					
					x	<b>H</b> xx	xxx			
						<b>SD</b> xx				
						x	<b>H</b> xx	xx	xx	xx
							<b>SD</b> xx			
Legend:										
	Refer to lane requirement charts									
x	The full width of the traveled way must be open for use by traffic after 6:00 a.m.									
xx	The full width of the traveled way must be open for use by traffic.									
xxx	The full width of the traveled way must be open for use by traffic until 9:00 a.m.									
<b>H</b>	Designated holiday									
<b>SD</b>	Special day									

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

<b>Chart no. 1 Freeway Lane Requirements</b>																												
County: San Joaquin	Route/Direction: 4/Eastbound- Westbound												PM: T15.32/R17.5															
Closure limits: Between Fresno Avenue and Route 5 Interchange																												
From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
Mondays through Thursdays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Fridays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1													
Saturdays																												
Sundays																						1	1	1	1			
<p>Legend:</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 5%; border: 1px solid black; text-align: center;">1</td> <td>Provide at least 1 through freeway lane open in direction of travel</td> </tr> <tr> <td style="width: 5%; border: 1px solid black;"></td> <td>Work allowed within the highway where shoulder or lane closure is not required</td> </tr> </table>																									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
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																											
<p>REMARKS:</p> <ol style="list-style-type: none"> <li>1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.</li> <li>2. Seven day advance notice required.</li> <li>3. Closures of local roads will require City/County concurrence.</li> </ol>																												

**Chart no. 2  
Freeway Lane Requirements**

County: San Joaquin	Route/Direction:5/Northbound	PM: 25.2/27.3																							
Closure limits: From Monte Diablo Avenue to Country Club Boulevard																									
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	2	3															3	3	3	2	2
Fridays	1	1	1	1	2	3																			
Saturdays																									
Sundays																						3	3	2	2

**Legend:**

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

**REMARKS:**

1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.
2. Seven day advance notice required.
3. Closures of local roads will require City/County concurrence.

**Chart no. 3  
Freeway Lane Requirements**

County: San Joaquin	Route/Direction: 5/Southbound	PM: 25.2/27.3																							
Closure limits: From Monte Diablo Avenue to Country Club Boulevard																									
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	2	3																3	3	2	2	1
Fridays	1	1	1	2	3																				
Saturdays																									
Sundays																							3	2	2

**Legend:**

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

**REMARKS:**

1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.
2. Seven day advance notice required.
3. Closures of local roads will require City/County concurrence.

Chart no. 4 Freeway Lane Requirements																										
County: San Joaquin					Route/Direction: 5/Northbound										PM: 25.2/27.3											
Closure limits: From Country Club Boulevard to March Lane																										
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	2																		2	2	2
Fridays	1	1	1	1	1	2																				
Saturdays																										
Sundays																									2	2
Legend:																										
1 Provide at least 1 through freeway lane open in direction of travel																										
2 Provide at least 2 adjacent through freeway lanes open in direction of travel																										
Work allowed within the highway where shoulder or lane closure is not required																										
REMARKS:																										
1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.																										
2. Seven day advance notice required.																										
3. Closures of local roads will require City/County concurrence.																										

Chart no. 5 Freeway Lane Requirements																											
County: San Joaquin					Route/Direction: 5/Southbound										PM: 25.2/27.3												
Closure limits: From Country Club Boulevard to March Lane																											
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	2	2																		2	2	2	1
Fridays	1	1	1	1	2	2																					
Saturdays																											
Sundays																									2	2	1
Legend:																											
1 Provide at least 1 through freeway lane open in direction of travel																											
2 Provide at least 2 adjacent through freeway lanes open in direction of travel																											
Work allowed within the highway where shoulder or lane closure is not required																											
REMARKS:																											
1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.																											
2. Seven day advance notice required.																											
3. Closures of local roads will require City/County concurrence.																											

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

<b>Chart no. 6 Complete Freeway Closure Hours</b>																												
County: San Joaquin	Route/Direction: 4/Eastbound- Westbound										PM: T15.3/15.7																	
Closure limits: Between Fresno Avenue and Route 5 Interchange																												
From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
Mondays through Thursdays	C	C	C	C	C																				C			
Fridays	C	C	C	C	C																							
Saturdays																												
Sundays																									C			
<p>Legend:</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 20px; text-align: center;">C</td> <td>Freeway or expressway may be closed completely</td> </tr> <tr> <td style="border: 1px solid black; width: 20px; height: 15px;"></td> <td>No complete freeway or expressway closure is allowed</td> </tr> </table>																									C	Freeway or expressway may be closed completely		No complete freeway or expressway closure is allowed
C	Freeway or expressway may be closed completely																											
	No complete freeway or expressway closure is allowed																											
<p>REMARKS:</p> <ol style="list-style-type: none"> <li>1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.</li> <li>2. Seven day advance notice required.</li> <li>3. Detour required.</li> <li>4. Closures of local roads will require City/County concurrence.</li> </ol>																												

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

<b>Chart no. 7 Complete Connector Closure Hours Requirements</b>																									
County: San Joaquin						Route/Direction: 4/Westbound						PM: T15.3/R15.7													
Closure limits: Northbound and Southbound Route 5 connectors to Westbound Route 4																									
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
<b>Legend:</b>																									
<input type="checkbox"/> C Connector may be closed completely <input type="checkbox"/> Work allowed within the highway where shoulder or lane closure is not required																									
<b>REMARKS:</b>																									
1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions. 2. Seven day advance notice required. 3. Detour required. 4. Closures of local roads will require City/County concurrence.																									

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

<b>Chart no. 8 Ramp Lane Requirements</b>																										
County: San Joaquin						Route/Direction: 4/Eastbound- Westbound						PM: T15.32/T15.6														
Closure limits: At Fresno Avenue Termini																										
From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Fridays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1											
Saturdays																										
Sundays																							1	1	1	1
<b>Legend:</b>																										
<input type="checkbox"/> 1 Provide at least 1 ramp lane, not less than 11 feet in width, open in direction of travel <input type="checkbox"/> Work allowed within the highway where shoulder or lane closure is not required																										
<b>REMARKS:</b>																										
1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions. 2. Seven day advance notice required. 3. Closures of local roads will require City/County concurrence.																										

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

Chart no. 9 Conventional Highway Lane Requirements																														
County: San Joaquin					Route/Direction: 4/Eastbound- Westbound										PM: 14.4/15.08															
Closure limits: Between Army Court and Fresno Avenue																														
From hour to hour																														
	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
Mondays through Thursdays	R	R	R	R	R					S	S	S	S	S	S	S								R	R	R	R			
Fridays	R	R	R	R	R					S	S	S	S	S	S	S														
Saturdays																														
Sundays																										R	R	R	R	
Legend:																														
<table border="0"> <tr> <td style="border: 1px solid black; padding: 2px;">R</td> <td>Provide at least 1 through traffic lane, not less than 10 feet in width, for use by both directions of travel (Reversing Control)</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">S</td> <td>Shoulder closure allowed</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;"></td> <td>Work allowed within the highway where shoulder or lane closure is not required</td> </tr> </table>																									R	Provide at least 1 through traffic lane, not less than 10 feet in width, for use by both directions of travel (Reversing Control)	S	Shoulder closure allowed		Work allowed within the highway where shoulder or lane closure is not required
R	Provide at least 1 through traffic lane, not less than 10 feet in width, for use by both directions of travel (Reversing Control)																													
S	Shoulder closure allowed																													
	Work allowed within the highway where shoulder or lane closure is not required																													
REMARKS:																														
<ol style="list-style-type: none"> <li>1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.</li> <li>2. Seven day advance notice required.</li> <li>3. Closures of local roads will require City/County concurrence.</li> </ol>																														

**Replace section 12-4.05H with:**

**12-4.05H City Street Closures**

<b>Chart no. 10 City Street Requirements and Hours of Work</b>																												
Location: Fresno Avenue and Navy Drive	Direction: NB/SB, EB/WB																											
Closure Limits: Fresno Avenue between Navy Drive and Washington Street/Navy Drive between Washington Street and Fresno Avenue																												
From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
Mondays through Thursdays	R	R	R	R	R	R															R	R	R	R	R			
Fridays	R	R	R	R	R	R																						
Saturdays																												
Sundays																						R	R	R	R			
<p>Legend:</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 5%; border: 1px solid black; text-align: center;">R</td> <td>Provide at least 1 through city street lane, not less than 10 feet in width, for use by both directions of travel (Reversing Control)</td> </tr> <tr> <td style="width: 5%; border: 1px solid black; text-align: center;"> </td> <td>Work allowed within the city street where shoulder or lane closure is not required</td> </tr> </table>																									R	Provide at least 1 through city street lane, not less than 10 feet in width, for use by both directions of travel (Reversing Control)		Work allowed within the city street where shoulder or lane closure is not required
R	Provide at least 1 through city street lane, not less than 10 feet in width, for use by both directions of travel (Reversing Control)																											
	Work allowed within the city street where shoulder or lane closure is not required																											
<p>REMARKS:</p> <ol style="list-style-type: none"> <li>1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.</li> <li>2. Seven day advance notice required.</li> <li>3. Closures of local roads will require City/County concurrence.</li> </ol>																												

**Chart no. 11  
City Street Requirements and Hours of Work**

Location: Tillie Lewis Drive, Del Norte Street, Ventura Street, Los Angeles Avenue, Church Street, Scotts Avenue, Hazelton Avenue,	Direction: NB/SB, NB/SB, NB/SB, NB/SB, NB/SB, EB/WB, EB/WB	
Closure Limits: For Tillie Lewis Drive, Del Norte Street, Ventura Street, Los Angeles Avenue, and Church Street limits are between Washington Street and Charter Way (Route 4) For Scotts Avenue and Hazelton Avenue limits are from Ventura Street and Fresno Avenue.		
From hour to hour	24	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Mondays through Thursdays		R R R R R R R R R R R R R R R R R R
Fridays		R R R R R R R R R
Saturdays		
Sundays		

**Legend:**

- R Provide at least 1 through city street lane, not less than 10 feet in width, for use by both directions of travel (Reversing Control)
- Work allowed within the city street where shoulder or lane closure is not required

**REMARKS:**

1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.
2. Seven day advance notice required.
3. Closures of local roads will require City/County concurrence.

**Chart no. 12  
Complete City Street Closure Hours**

Location: Tillie Lewis Drive, Del Norte Street, Ventura Street, Los Angeles Avenue, Church Street, Scotts Avenue, Hazelton Avenue,	Direction: NB/SB, NB/SB, NB/SB, NB/SB, NB/SB, EB/WB, EB/WB	
Closure Limits: For Tillie Lewis Drive, Del Norte Street, Ventura Street, Los Angeles Avenue, and Church Street limits are between Washington Street and Charter Way (Route 4) For Scotts Avenue and Hazelton Avenue limits are from Ventura Street and Fresno Avenue.		
From hour to hour	24	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Mondays through Thursdays	C	C C C C C C
Fridays	C	C C C C C C
Saturdays		
Sundays		C C C C
<p>Legend:</p> <p><input type="checkbox"/> C Street may be closed</p> <p><input type="checkbox"/> No complete city street closure is allowed</p>		
<p>REMARKS:</p> <ol style="list-style-type: none"> <li>1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.</li> <li>2. Seven day advance notice required.</li> <li>3. Detour required.</li> <li>4. Closures of local roads will require City/County concurrence.</li> </ol>		

Chart no. 13 Complete City Street Closure Hours																									
Location: Fresno Avenue					Direction: NB/SB																				
Closure Limits: Between Washington Street and Scotts Avenue																									
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
Fridays	C	C	C	C	C																				
Saturdays																									
Sundays																									
<p>Legend:</p> <p><input type="checkbox"/> C Street may be closed</p> <p><input type="checkbox"/> No complete city street closure is allowed</p>																									
<p>REMARKS:</p> <ol style="list-style-type: none"> <li>1. See Lane Closure Restriction for Designated Legal Holidays and Special Days table in Maintain Traffic of these special provisions for additional closure restrictions.</li> <li>2. Seven day advance notice required.</li> <li>3. Detour required.</li> <li>4. Closures of local roads will require City/County concurrence.</li> </ol>																									

**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 with stationary and moving lane closures on 2-lane, 2-way highways. The traffic control system for a lane 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.

**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 made only for the work period, remove 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.



Replace Reserved in section 14-9.05 with:

**14-9.05 AIR QUALITY CONTROL DISTRICT REQUIREMENTS**

**14-9.05A General**

**14-9.05A(1) Summary**

Section 14-9.05 includes specifications for managing dust including preparing and implementing a dust control plan.

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

**14-9.05A(2) Notifications**

Notify SJVUAPCD in writing at least 48 hours before starting any earth moving activities. Submit proof of notification. Keep a copy at the job site.

**14-9.05A(3) Submittals**

**14-9.05A(3)a General**

Not Used

**14-9.05A(3)b Dust Control Plan**

A dust control plan meeting the requirements of SJVUAPCD Regulation VIII must be submitted for approval. After approval from the Engineer, submit the dust control plan to SJVUAPCD for their approval. The complete dust control plan approved by the SJVUAPCD must be submitted within 45 days after contract approval.

Additional information on processing the dust control plan may be obtained at:

<http://www.valleyair.org>

Approval of the dust control plan cannot be obtained from SJVUAPCD until all requirements of Rule 9510 have been satisfied.

**14-9.05A(4) Quality Control and Assurance**

This project is subject to Rule 9510 "Indirect Source Review" regulated by the SJVUAPCD.

Additional information on satisfying Rule 9510 "Indirect Source Review" may be obtained at:

<http://www.valleyair.org>

**14-9.05B Materials**

Not Used

**14-9.05C Construction**

Not Used

**14-9.05D Payment**

Not Used

**Replace section 14-11.06 with:**

**14-11.06 DEPARTMENT GENERATED CONTAMINATED SOIL**

**14-11.06A General**

**14-11.06A(1) Summary**

Section 14-11.06 includes specifications for handling petroleum and metal impacted soil, and handling and disposal of petroleum impacted groundwater generated during excavation activities and from general construction operations. Impacted soil may be encountered through general excavation activities, retention basin excavation, and construction of CIDH concrete piling piles. Impacted groundwater may be encountered during CIDH concrete piling pile construction, basin construction and retention modification.

Comply with 14-11.02D.

Petroleum impacted soil and related constituents and soil containing heavy metals exist throughout the job site.

**14-11.06A(2) Definitions**

**Type DC Material:** Petroleum and metal impacted soil to be stockpiled.

**14-11.06A(3) Site Conditions**

Expected groundwater depth ranges from approximately 9–12 feet below ground surface. Perched groundwater conditions may exist at shallower depths.

Concentration ranges for metals and petroleum compounds are shown in the following tables:

*Concentrations CAM 17 Metals Constituents of Concern (COC) in Soil*

Metal	Lead		Chromium		Copper		Mercury		Nickel		Zinc	
	Total (mg/kg)	WET (mg/l)										
Concentration Ranges Detected												
Minimum	3.2	3.2	17	1.3	19	0.53	0.085	<0.025	15	0.61	39	33
Maximum	380	39	330	11	960	14	4.3	<0.025	310	0.61	3300	33
TCLP/Detected	**	Yes/No	**	Yes/No	**	No TCLP						

**Notes:**

- WET waste extraction test
- TCLP Toxic Characteristic Leaching Procedure
- mg/kg milligrams per kilogram (parts per million)
- mg/l milligrams per liter (parts per million)
- \*\* not applicable

*Concentrations of Petroleum Compounds in Soil*

Petroleum	TPHd	TPHk	TPHho	TPHmino	TPHmo	TPHg
Concentration Ranges Detected	Total (mg/kg)					
Minimum	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Maximum	290	430	650	ND	25,000	160

Notes:

mg/kg milligrams per kilogram (parts per million)

mg/l milligrams per liter (parts per million)

*Concentrations of Petroleum Compounds (COC) SVOCs and VOCs in Groundwater*

Petroleum	TPHmo	TPHg	Benzene (VOC)	Xylenes (VOC)	Vinyl Chloride (VOC)	Methyl tert-Butyl Ether	Ethylene Glycol
Concentration Ranges Detected	Total (mg/l)	Total (mg/l)	Total (µg/l)	Total (µg/l)	Total (µg/l)	Total (µg/l)	Total (mg/l)
Minimum	<0.050	<50	<0.50	<0.50	<1.0	<0.50	9.2
Maximum	0.30	220	2.5	57	2.3	27,000	58

Notes:

µg/l Micrograms per liter (parts per billion)

mg/l milligrams per liter (parts per million)

**14-11.06A(4) Submittals**

**14-11.06A(4)(a) Health and Safety Plan**

Submit a site specific health and safety plan, signed by a CIH, for site personnel. Identify potential health and safety hazards associated with work involving petroleum and metals impacted soil and petroleum impacted groundwater that will be used to protect workers from those hazards in conformance with Title 8 and 22 of the CA Code of Regs. The health and safety plan must:

1. Identify key site safety personnel
2. Describe risks associated with the work
3. Specify training requirements
4. Specify appropriate personal protective equipment
5. Specify site-specific medical surveillance requirements
6. Specify air monitoring requirements
7. Define appropriate site work zones
8. Specify decontamination requirements

**14-11.06A(4)(b) Safety Training Certification**

Provide a certification of completion of the safety training program to personnel and submit copies as an informational submittal.

**14-11.06A(4)(c) Excavation and Dewatering Plan**

Submit an excavation and dewatering plan for the excavation and stockpiling of Type DC soil, and the dewatering and disposal of petroleum impacted water.

The plan must comply with Cal/OSHA regulations. The excavation and dewatering plan must include the following elements:

1. Excavation and stockpile schedule by locations and date and estimates of quantity to be stockpiled
2. Temporary locations of stockpiled material and stockpile management and procedures
3. Storage containers
4. Dust control measures
5. Dewatering methods and procedures
6. Dewatering equipment and containers
7. Name and address of the California permitted facility where the petroleum impacted water will be taken.

**14-11.06A(4)(d) Groundwater Laboratory Analytical Results**

Submit analytical test results of the petroleum-impacted groundwater, including chain of custody documentation, before removing the water from the job site.

**14-11.06A(4)(e) Disposal Documentation**

Submit documentation of proper disposal from the receiving disposal facility within 5 business days of petroleum-impacted groundwater transport from the job site.

**14-11.06A(5) Notifications**

Notify that a stockpile of Type DC soil is complete and ready for sampling. Notify no later than 24 hours after completion.

**14-11.06A(6) Quality Control and Assurance**

Laboratories used to perform groundwater analyses must be certified by the CDPH Environmental Laboratory Accreditation Program (ELAP) for all analyses to be performed.

Excavation, handling, and management of Type DC material and management and disposal of petroleum-impacted groundwater must comply with the requirements of the following agencies:

1. Central Valley RWQCB
2. San Joaquin County Air Pollution Control District (SJCAPCD)
3. CAL/OSHA
4. San Joaquin County Environmental Health Department (SJC/EHD)
5. DTSC

Laws and regulations that govern this work include:

1. Water Code, Division 7
2. Title 8, CA Code of Regs
3. Title 22, CA Code of Regs

**14-11.06B Materials**

Not Used

**14-11.06C Construction**

**14-11.06C(1)General**

Not Used

**14-11.06C(2) Health and Safety Training Program**

Before starting any activity that presents the potential for petroleum and metals exposure to employees including Department employees, provide a safety training program to these employees that communicates potential health and safety hazards associated with work involving petroleum impacted soil and instructs personnel in procedures for doing the work safely. Provide subsequent training required until completion of work. The level of training provided must be consistent with the person's job function and must conform to OSHA and CAL/OSHA regulations.

Supply training, personnel protective equipment, and medical surveillance required by the health and safety plan to 12 Department employees.

Continuously monitor the excavation site as it is excavated, using appropriate air monitoring devices consistent with the health and safety plan.

#### **14-11.06C(3) Excavation**

Type DC soil must be segregated and not mixed with material not suspected of contamination.

Transfer Type DC soil directly from the excavation to an approved stockpile location on the job site. Prevent the flow of surface runoff from entering the excavation area.

Notify the Engineer after the Type DC soil is excavated to the depths shown and stockpiled. The stockpile will be sampled and removed by other forces. Maintain adequate access for sampling and removal by other forces at all times.

If the soil analysis of Type DC soil is such that the material can be reused on the jobsite, you may submit a VECP.

Confirmation soil sampling results will be performed by others and could result in additional excavation and stockpiling. This work is change order work..

Continuously monitor the excavation site and excavated Type DC material as it is excavated, using appropriate air monitoring devices consistent with your health and safety plan. Prevent the flow of surface runoff from entering any excavated area.

#### **14-11.06C(3) CIDH Concrete Piling Drilling Activities**

Type DC drill cuttings must be segregated and not mixed with drill cuttings not suspected of contamination.

Transfer Type DC drill cuttings directly to a stockpile.

Notify the Engineer after the Type DC soil drilling is complete. The stockpile will be sampled and removed by other forces.

Continuously monitor the drilling site and Type DC drill cuttings, using appropriate air monitoring devices consistent with your health and safety plan.

#### **14-11.06C(6) Dewatering**

You are responsible for dewatering activities and management of the petroleum-impacted groundwater generated. If groundwater or perched groundwater is encountered during excavation activities immediately notify the Engineer.

Pump and store groundwater, encountered during excavation and drillings activities into a holding tank. Displaced groundwater must not be allowed to flow from the immediate work area.

Conduct a daily inspection of the dewatering equipment, when in use, to ensure that all components are functional and routinely maintained to prevent leakage. Should any component of the dewatering equipment be damaged or affect the performance of the equipment, immediately discontinue the dewatering operation and repair the component or replace it with substitute equipment.

Comply with the provisions of the NPDES General Permit for *Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002)*. You are responsible for penalties assessed or levied on you or the Department as a result of your failure to comply with the provisions in this section and as specified in section 7-1 and section 19-3.

You are responsible for sampling and analyzing groundwater within 5 days after completing dewatering activities or filling a holding tank in compliance with disposal facility requirements.

#### **14-11.06C(9) Disposal**

Dispose of the dewatered groundwater at an appropriate California permitted facility after laboratory analysis results are accepted.

Collect and dispose of used non-reusable protective equipment at an appropriately permitted disposal facility.

#### **14-11.06D Payment**

Additional Structure Excavation of CIDH concrete piling petroleum-impacted soil directed by the Engineer, is change order work.

#### **Replace section 14-11.07 with:**

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

##### **14-11.07A General**

##### **14-11.07A(1) Summary**

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

Residue from removal of yellow thermoplastic and yellow painted traffic stripe and pavement marking contains lead chromate. The average lead concentration is at least 1,000 mg/kg total lead or 5 mg/l soluble lead. When applied to the roadway, the yellow thermoplastic and yellow painted traffic stripe and pavement marking contained as much as 2.6 percent lead. Residue produced from the removal of this yellow thermoplastic and yellow painted traffic stripe and pavement marking contains heavy metals in concentrations that exceed thresholds established by the Health & Safety Code and 22 CA Code of Regs. For bidding purposes, assume the residue is not regulated under the Federal Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 et seq.

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

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

##### **14-11.07A(2) Submittals**

##### **14-11.07A(2)(a) General**

Reserved

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### **14-11.07B Materials**

Not Used

#### **14-11.07C Construction**

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

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

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

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

After the Engineer accepts the analytical test results, dispose of yellow thermoplastic and yellow paint hazardous waste residue at a Class 1 disposal facility located in California under the requirements of the disposal facility operator within 60 days after accumulating 220 pounds of residue and dust.

If less than 220 pounds of hazardous waste residue and dust is generated in total, dispose of it within 60 days after the start of accumulation of the residue and dust.

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

#### **14-11.07D Payment**

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

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

### **Replace section 14-11.09 with:**

#### **14-11.09 TREATED WOOD WASTE**

##### **14-11.09A General**

##### **14-11.09A(1) Summary**

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

Wood removed from metal beam guard railing and roadside 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. Engineer's name, address, and telephone number
4. Contractor's contact name, address and telephone number
5. Date placed in storage

#### **14-11.09C(4) Transporting and Disposal**

Before transporting TWW, obtain an agreement from the receiving facility that the TWW will be accepted. Protect shipments of TWW from loss and exposure to precipitation. For projects with 10,000 lb or more of TWW, request a generator's EPA Identification Number at least 5 business days before the 1st shipment. Each shipment must be accompanied by a shipping record such as a bill of lading or invoice that includes:

1. Caltrans with district number
2. Construction Contract number
3. District office address
4. Engineer's name, address, and telephone number
5. Contractor's contact name and telephone number
6. Receiving facility name and address
7. Waste description: Treated Wood Waste with preservative type if known or unknown/mixture
8. Project location
9. Estimated quantity of shipment by weight or volume
10. Date of transport
11. Date of receipt by the receiving TWW facility
12. Weight of shipment as measured by the receiving TWW facility
13. Generator's EPA Identification Number for projects with 10,000 lb or more of TWW

The shipping record must be at least a 4-part carbon or carbonless 8-1/2-by-11-inch form to allow retention of copies by the Engineer, transporter, and disposal facility.

Dispose of TWW at an approved TWW facility. A list of currently approved TWW facilities is available at:

<http://www.dtsc.ca.gov/HazardousWaste/upload/lanfillapr11pdated1.pdf>

Dispose of TWW within:

1. 90 days of generation if stored on blocks
2. 180 days of generation if stored on a containment surface or pad
3. 1 year of generation if stored in a water-resistant container or within 90 days after the container is full, whichever is shorter
4. 1 year of generation if storing in a storage building as defined in 22 CA Code of Regs, Div. 4.5, Chp. 34, § 67386.6(a)(2)(C)

#### **14-11.09D Payment**

Not Used

## 15 EXISTING FACILITIES

**Replace section 15-2.02C(2) with:**

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

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

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

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

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

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

**Replace section 15-2.02I with:**

### **15-2.02I Remove Sign Structures**

Removing overhead sign structures includes removal of:

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

Concrete foundations may be abandoned in place except that the top portion, including anchor bolts, reinforcing steel, and conduits, must be removed to a depth of not less than 3 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.

**Add the following to section 15-2.03A(1):**

Salvage the following:

1. Overhead Sign Panels
2. Roadside Sign Panels
3. Chain Link Fence
4. Chain Link Gates
5. Frame and Grates



**Replace the 2nd sentence in the 8th paragraph of section 19-3.04 with:**

If the structure excavation depth is more than 1 foot from the depth shown, the Department makes a payment adjustment under section 4-1.05B if you request an adjustment or the Engineer orders an adjustment.

**Replace section 19-6.03B with:**

**19-6.03B Subsidence**

You may compact the ground surface on which an embankment is to be constructed before placing embankment material.

If the compaction results in an average subsidence exceeding 0.25 foot, the Engineer measures the ground surface after compaction. Allow time for the Engineer to measure the area before placing embankment material.

A quantity of 2,933 cubic yards of embankment will be added to the computed imported borrow quantity for the anticipated effect of subsidence.

If you do not agree with this specified quantity, you may submit a plan for measuring subsidence. The plan must include complete details of the measuring devices and their installation.

If the your plan for measuring subsidence is authorized, install and maintain the subsidence-measuring devices.

The Engineer takes readings as needed to determine the progress of subsidence. Provide assistance as needed.

If the Engineer finds that a device has been damaged, that device will not be used for determining subsidence in the area the device represents. The subsidence for that area is considered as zero regardless of the subsidence measured at other areas.

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
2. 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 and surcharges are required for bridge approach embankments as shown in the following table:

Bridge name or number	Abutment number	Bent number	Surcharge height (feet)	Settlement period (days)
29-0350	Abutment 1	-	32.5	120

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

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



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**DIVISION IV SUBBASES AND BASES**  
**25 AGGREGATE SUBBASES**

**Add to section 25-1.02A:**

Aggregate for Class 2 AS may include processed glass. Place AS with glass only where the AS will be permanently covered.

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**28 CONCRETE BASES**

**Replace the 4th paragraph of section 28-2.02 with:**

The portland cement content of concrete base must be at least 340 lb/cu yd except, after testing samples from the proposed aggregate supply an increase in the cement content may be ordered. Compensation for an ordered increase is specified in section 28-2.04.

**Add to section 28-2.02:**

At your option, aggregate for concrete base must comply to either the provisions specified for LCB in section 28-2.02 or the provisions specified for concrete in section 90-1.02C and section 90-1.02C(4).

**Add to section 28-2.02:**

The combined aggregate grading used in concrete base must be the 1-inch maximum grading.

**Add to section 28-2.03E:**

Spread and shape concrete base using suitable powered finishing machines and supplement with hand work as necessary. Consolidate concrete base using high-frequency internal vibrators within 15 minutes after the base is deposited on the subgrade. Vibrate with care such that adequate consolidation occurs across the full paving width. Do not use vibrators for extensive weight shifting of the concrete base. Use methods of spreading, shaping, and compacting that produce a dense homogenous base conforming to the required cross section. Methods that result in segregation, voids, or rock pockets must be discontinued.

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**DIVISION V SURFACINGS AND PAVEMENTS**  
**39 HOT MIX ASPHALT**

**Add to section 39-1.01:**

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

**Add to section 39-1.02C:**

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

**Add to section 39-1.02E:**

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

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

Place HMA on adjacent traveled way lanes so that at the end of each work shift the distance between the ends of HMA layers on adjacent lanes is from 5 to 10 feet. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. You may place Kraft paper or another authorized bond breaker under the conform tapers to facilitate the taper removal when paving operations resume.

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

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

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

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

**Replace "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.

Treat aggregate for HMA Type A with dry lime.

**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  $\pm 0.2$  percent of the lime ratio in the accepted JMF. The lime ratio must be within  $\pm 0.2$  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.

Treat aggregate for HMA Type A with lime slurry.

##### **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  $\pm 0.2$  percent of the lime ratio in the accepted JMF. The lime ratio must be within  $\pm 0.2$  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  $\pm 1$  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  $\pm 2$  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 39-1.22 with:**

#### **39-1.22 LIQUID ASPHALT PRIME COAT**

##### **39-1.22A General**

The Engineer designates areas receiving liquid asphalt prime coat.

Prime coat must comply with the specifications for liquid asphalt.

##### **39-1.22B Materials**

Liquid asphalt for prime coat must be Grade SC-70.

##### **39-1.22C Construction**

Apply at least 0.20 gal of prime coat per square yard of designated area. Do not apply more prime coat than can be absorbed completely by the aggregate base in 24 hours.

If you request and if authorized, you may modify prime coat application rates.

Before paving, prime coat must cure for 48 hours.

Close traffic to areas receiving prime coat. Do not track prime coat onto pavement surfaces beyond the job site.

##### **39-1.22D Payment**

The Engineer determines prime coat quantities under the specifications for liquid asphalt.

If there is no bid item for liquid asphalt (prime coat), payment is included in the payment for the HMA involved.

#### **Replace section 39-1.31 with:**

#### **39-1.31 WARM MIX ASPHALT TECHNOLOGY OPTION**

##### **39-1.31A GENERAL**

##### **39-1.31A(1) Summary**

You may produce HMA Type A, Type B, or RHMA-G using an authorized warm mix asphalt (WMA) technology. For Department-authorized WMA technologies, go to the METS Web site.

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

1. Target air void content is  $7 \pm 1$  percent
2. 4 test specimens
3. 6-inch gyratory compacted test specimen
4. Test temperature is  $122 \pm 2$  degrees F
5. Impression measurements at every 100 passes
6. Inflection point as the number of wheel passes at the intersection of the creep slope and the stripping slope

7. Testing shut off after 25,000 passes
8. For RHMA test specimens:
  - 8.1. Superpave Gyratory Compactor ram pressure may be increased to a maximum 825 kPa
  - 8.2. Specimens may be held at a constant height for a maximum 90 minutes

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

### **39-1.31A(2) Definitions**

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

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

### **39-1.31A(3) Submittals**

#### **39-1.31A(3)(a) General**

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

1. For WMA water injection foam technology:
  - 1.1. Name of technology
  - 1.2. Laboratory Procedure LP-12 test result for foamed bitumen expansion ratio dated within 12 months of submittal
  - 1.3. Laboratory Procedure LP-12 test result for foamed bitumen half-life dated within 12 months of submittal
  - 1.4. Optimum foaming water content
  - 1.5. Proposed HMA production temperature range
2. For WMA additive technology:
  - 2.1. Name of technology
  - 2.2. Percent admixture by weight of binder and percent admixture by total weight of HMA as recommended by the manufacturer
  - 2.3. Methodology for inclusion of admixture in laboratory-produced HMA
  - 2.4. Proposed HMA production temperature range

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

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

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

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

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

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

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

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

Moisture\_Tests@dot.ca.gov

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

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

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

**39-1.31A(4) Quality Control and Assurance**

**39-1.31A(4)(a) General**

Not Used

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

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

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

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

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

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

The following personnel must attend the prepaving conference:

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

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

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

**Minimum Quality Control**

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

<sup>a</sup> Submit test data and 1 tested sample set.

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

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

**HMA Acceptance**

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

<sup>a</sup>The Department does not use California Test 371 tensile strength ratio test results from production to determine specification compliance.

**39-1.31B MATERIALS**

**39-1.31B(1) General**

Not Used

**39-1.31B(2) Foaming Bitumen**

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

**Quality Requirements for Foaming Bitumen**

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

For Laboratory Procedure LP-12, go to the METS Web site.

**39-1.31B(3) Hot Mix Asphalt**

**39-1.31B(3)(a) General**

Not Used

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

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

HMA mix design must comply with the following quality characteristics:

**Hot Mix Asphalt Mix Design Requirements**

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

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

**Hot Mix Asphalt Antistrip Treatment Options**

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

<sup>a</sup> If the plasticity index is greater than 10, do not use that aggregate blend.

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

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

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

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

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

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

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

### **39-1.31B(4) Production**

#### **39-1.31B(4)(a) General**

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

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

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

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

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

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

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

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

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

Calibrate the loss-in-weight meter by:

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

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

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

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

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

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

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

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

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

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

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

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

#### **39-1.31C CONSTRUCTION**

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

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

**39-1.31D PAYMENT**

Not Used

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

**40 CONCRETE PAVEMENT**

**Replace section 40-1.01C(13) with:**

**40-1.01C(13) Profile Data and Straightedge Measurements**

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

1. Inertial profiler (IP) certification issued by the Texas Transportation Institute (TTI). The certification must not be 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 not be 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. ProVAL is FHWA's software. Submit the certification analysis report to the Engineer and to the electronic mailbox address:

[smoothness@dot.ca.gov](mailto: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](mailto:smoothness@dot.ca.gov)

Within 2 business days of performing straightedge testing, submit a report on areas requiring smoothness correction.

**Replace section 40-1.01C(14) with:**

**40-1.01C(14) Coefficient of Thermal Expansion**

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

<http://169.237.179.13/cte/>

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

Provide a QC manager under section 11.

**Replace "Reserved" in section 40-1.01D(2) with:**

Your personnel required to attend the prepaving conference must also complete Just-In-Time-Training (JITT) for JPCP and CRCP.

At least 5 business days before JITT, submit:

1. Instructor's name and listed experience
2. JITT facility's location
3. One copy each of the following:
  - 3.1. Course syllabus
  - 3.2. Handouts
  - 3.3. Presentation materials

The Engineer provides training evaluation forms, and each attendee must complete them 5 business days after JITT, submit completed training evaluation forms to the Engineer and the electronic mailbox address:

Construction\_Engineering\_HQ@dot.ca.gov

JITT may be an extension of the prepaving conference and must be:

1. At least 4 hours long
2. Conducted at a mutually agreed place
3. Completed at least 20 days before you start paving activities
4. Conducted during normal working hours

Provide a JITT instructor who is experienced with the specified pavement construction methods, materials, and tests. The instructor must be neither your employee nor a Department field staff member. Upon JITT completion, the instructor must issue a certificate of completion to each participant.

The Engineer may waive training for personnel who have completed equivalent training within the 12 months preceding JITT. Submit certificates of completion for the equivalent training.

The Department reimburses you for 1/2 of the cost for providing the JITT. The Engineer determines the costs under section 9-1.04 except no markups are added. Costs include training materials; class site; and the JITT instructor's wages, including the instructor's travel, lodging, meals and presentation materials. The Department does not pay your costs for attending JITT.

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

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

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

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

**Replace section 40-1.01D(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 contraction joints must be silicone.

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

**Add to the RSS for section 40-1.02I(4):**

Use preformed compression seal for longitudinal contraction joint.

**Replace the 1st paragraph of the RSS for section 40-1.03E(6)(c) with:**

Install preformed compression seal in isolation joints.

**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  $\pm 5$  degrees from the angle shown. Measure the angle from the plane of the adjacent finished pavement surface.

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

Do not start corrective work until:

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

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

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

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

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

**Replace "Reserved" in section 40-2 with:  
40-2 JOINTED PLAIN CONCRETE PAVEMENT**

**40-2.01 GENERAL**

**40-2.01A Summary**

Section 40-2 includes specifications for constructing JPCP.

**40-2.01B Submittals**

**40-2.01B(1) General**

Not Used

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

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

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

**40-2.01C Quality Control and Assurance**

**40-2.01C(1) General**

Not Used

**40-2.01C(2) Quality Control Plan**

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

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

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

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

**40-2.02 MATERIALS**

Not Used

**40-2.03 CONSTRUCTION**

**40-2.03A General**

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

**40-2.03B Tie Bar Placement**

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

#### **40-2.03C Ramp Termini**

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

#### **40-2.03D Removal and Replacement**

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

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

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

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

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

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

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

#### **40-2.04 PAYMENT**

Not Used

### **Replace "Reserved" in section 40-3 with:**

#### **40-3.01 GENERAL**

##### **40-3.01A Summary**

Section 40-3 includes specifications for constructing CRCP.

Terminal joints include saw cutting, dowel bars, drill and bond dowel bars, support slab, support slab reinforcement, tack coat, and temporary hot mix asphalt.

Expansion joints include polystyrene, support slab, support slab reinforcement, dowel bars, drill and bond dowel bars, and bond breaker.

Pavement anchors include cross drains, anchor reinforcement, filter fabric, and permeable material.

Wide flange beam terminals include polyethylene foam, support slab, and support slab reinforcement.

##### **40-3.01B Quality Control and Assurance**

###### **40-3.01B(1) General**

Not Used

###### **40-3.01B(2) Testing for Coefficient of Thermal Expansion**

For field qualification, perform coefficient of thermal expansion testing under AASHTO T 336. The coefficient of thermal expansion must not exceed 6.0 microstrain/degree Fahrenheit.

### 40-3.01B(3) Acceptance Criteria

Concrete pavement is accepted based on the Department's testing for the concrete pavement quality characteristics shown in the following table:

**Concrete Pavement Acceptance Testing**

Quality characteristic	Quantity <sup>b</sup>	Test method
28-day modulus of rupture for PCC	1,000 cy	California Test 523
Thickness	1,200 sq yd for primary area measurements	California Test 531
Dowel bar placement	700 sq yd	Visual inspection
Tie bar placement	4,000 sq yd	Visual inspection
Coefficient of friction	One day's paving	California Test 342
Air content (freeze-thaw) <sup>a</sup>	One day's paving	California Test 504

<sup>a</sup> If air entrainment is specified, air content tests must be performed.

<sup>b</sup> A single test represents no more than the quantity specified.

### 40-3.02 MATERIALS

#### 40-3.02A General

Not Used

#### 40-3.02B Concrete

Concrete for terminal joints, support slabs, and pavement anchors must comply with section 40-1.02

#### 40-3.02C Transverse Bar Assembly

You may use transverse bar assemblies to support longitudinal reinforcement instead of transverse reinforcement and other support devices.

Wire for transverse bar assemblies must comply with Section 7.4 of ASTM A 185/A 185M. Welded wire must comply with ASTM A 82/A 82M. Use at least the size of wire shown.

Bar reinforcement for transverse bar assemblies must comply with section 40-1.02D.

#### 40-3.02D Wide Flange Beam Terminals

Wide flange beams and studs must be either rolled structural steel shapes under ASTM A 36/A 36M or structural steel under ASTM A 572/A 572M.

#### 40-3.02E Joint Seals

##### 40-3.02E(1) General

Not Used

##### 40-3.02E(2) Wide Flange Beam Terminals

Joint seals for wide flange beam terminals must comply with section 51-2.02.

##### 40-3.02E(3) Expansion Joints

Joint seals for transverse expansion joints must comply with section 51-2.02.

Expanded polystyrene for transverse expansion joints must comply with section 51-2.01B(1).

##### 40-3.02E(4) Terminal Joints

For Type D and Type E terminal joints, joint seals must be Type C.

### **40-3.03 CONSTRUCTION**

#### **40-3.03A General**

Not Used

#### **40-3.03B Test Strips**

Comply with section 40-1.03G except:

1. Engineer selects from 3 to 6 core locations per test strip
2. During the 3 day evaluation, the Engineer checks placement tolerances for reinforcement instead of dowel and tie bars
3. You may start paving without a test strip if you have completed a Department CRCP project within the preceding 12 months

#### **40-3.03C Wide Flange Beams**

Weld stud ends with an electric arc welder completely fusing the studs to the wide flange beam. Replace studs dislodged in shipping or that can be dislodged with a hammer.

#### **40-3.03D Anchorages**

Class 1 permeable material, filter fabric, and slotted plastic pipe crossdrain for pavement anchors must comply with section 68-3.

#### **40-3.03E Bar Reinforcement**

Place bar reinforcement under section 52-1.03D, except you may request to use plastic chairs. Plastic chairs will only be considered for support directly under the transverse bars. Your request to use plastic chairs must include a sample of the plastic chair, the manufacturer's written recommendations for the applicable use and load capacity, chair spacing, and your calculation for the load on a chair for the area of bar reinforcement sitting on it. Vertical and lateral stability of the bar reinforcement and plastic chairs must be demonstrated during construction of the test strip. Obtain authorization before using the proposed plastic chairs for work after the test strip is accepted.

For transverse bar reinforcement in a curve with a radius under 2,500 feet, place the reinforcement in a single continuous straight line across the lanes and aligned with the radius point. Place tie bars on the same alignment as the transverse bar reinforcement. If the curve does not allow the specified spacing between transverse bar reinforcement and tie bars, space them a distance that is between 1/2 the specified spacing and the specified spacing.

#### **40-3.03F Construction Joints**

Transverse construction joints must be perpendicular to the lane line. Construct joints to allow for lap splices of the longitudinal bar reinforcement. Comply with the lap splice lengths shown for CRCP.

Clean construction joint surfaces before placing fresh concrete against the joint surfaces. Remove surface laitance, curing compound, and other foreign materials.

#### **40-3.03G Removal and Replacement**

Requirements for repair of cracks under section 40-1.03Q do not apply to CRCP. High molecular weight methacrylate is not to be applied to any cracks in CRCP.

Removal of CRCP must be full depth. Cut transverse saw cuts normal to the lane line. Fill saw cuts extending beyond the removal limits with grout. Make a partial second saw cut just above the longitudinal bar reinforcement 2 feet from the full depth saw cut. The remaining pavement below the bar reinforcement must be removed by chipping the pavement manually. Do not damage the bar reinforcement. Leave the pavement face inclined no more than 1:12 (horizontal:vertical) into the removal area. Place additional bars and tie them to the longitudinal bar reinforcement. Fill the removed CRCP with concrete.

Replace unconsolidated concrete.

If you damage existing bar reinforcement during removal, lengthen the removal area as needed for the lap splice lengths. Below the reinforcement at a partial depth, saw cut and leave the face of the concrete pavement inclined no more than 1:12 (horizontal:vertical) into the removal area.





Pile location		Conditions
Bridge no.	Support location	
SR 4 Crosstown Viaduct (East and West)	Abut 1E, Abut 1W, Bent 2E, Bent 2W, Bent 3E, Bent 3W, Bent 4E, Bent 4W, Bent 5E, Bent 5W, Bent 10E, Bent 10W, Bent 11E, Bent 11W Bent 12E, Bent 12W Bent 13E, Bent 13W Bent 14E, Bent 14W Bent 15E, Bent 15W Bent 16E, Bent 16W Bent 17E, Bent 17W Bent 18E, Bent 18W Bent 19E, Bent 19W Bent 20E, Bent 20W Bent 21E, Bent 21W Abut 22E, Abut 22W	<p>Although most of the subsurface soils are characterized as fine grained, cohesive, and stiff with “good” stand up potential, some layers of potentially caving sandy soils were encountered during our field explorations. Groundwater depth at the project site is anticipated to be relatively shallow at a depth of about 10 to 15 feet below existing grade.</p> <p>If temporary casing is used to maintain the integrity of the hole, the outside diameter of the casing should not be less than the diameter of the piles, with the temporary casing vibrated into place. If slurry assisted drilling is used, steel reinforcement and concrete should be placed immediately upon drilling completion of each CIDH excavation to reduce the quantity of suspended soil particles that may settle to the bottom of the hole. The depth of all CIDH excavations should be checked several times before concrete placement to assure excessive sedimentation has not occurred.</p>
SR 4 Crosstown Viaduct (East and West)	Bents 6, 7, 8, and 9	<p>Although most of the subsurface soils are characterized as fine grained, cohesive, and stiff with “good” stand up potential, some layers of potentially caving sandy soils were encountered during our field explorations. Groundwater depth at the project site is anticipated to be relatively shallow at a depth of about 10 to 15 feet below existing grade.</p> <p>BNSF has expressed their concern about the effects of construction of CIDH pile on the performance of its tracks. To address this concern it is recommended that the top 60 feet of holes advanced for CIDH foundations use temporary casing, with the top 20 feet being permanent casing. The outside diameter of the casing should not be less than the diameter of the piles, with the temporary casing vibrated into place. The use of impact hammers to install (drive) the temporary casing into place should be prohibited in order</p>

		<p>to prevent potential BNSF rail track displacement. During removal, the casing should be pulled from the excavation as concrete is being placed, and the bottom of the casing should be kept at least 5 feet below the top of the concrete where possible.</p> <p>An approved drilling fluid will be required to maintain the sidewall integrity of the CIDH below the cased portions. If slurry assisted drilling is used, steel reinforcement and concrete should be placed immediately upon drilling completion of each CIDH excavation to reduce the quantity of suspended soil particles that may settle to the bottom of the hole. The depth of all CIDH excavations should be checked several times before concrete placement to assure excessive sedimentation has not occurred.</p>
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**Add to section 49-3.02A(1):**

Handling of petroleum and metal impacted soil generated during excavation activities for CIDH concrete piling must comply with section 14-11.06.

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

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

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

The purpose of this meeting is to:

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

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

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

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

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

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

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

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

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

**SLURRYPRO CDP**

Property	Test	Value
Density During drilling	Mud Weight (density), API 13B-1, section 1	$\leq 67.0$ pcf <sup>a</sup>
Before final cleaning and immediately before placing concrete		$\leq 64.0$ pcf <sup>a</sup>
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		$\leq 70$ 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	$\leq 0.5$ percent

<sup>a</sup>If authorized, you may use slurry in salt water. The allowable density of slurry in salt water may be increased by 2 pcf.

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

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

**SUPER MUD**

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

<sup>a</sup>If authorized, you may use slurry in salt water. The allowable density of slurry in salt water may be increased by 2 pcf.

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

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

**SHORE PAC GCV**

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

<sup>a</sup>If 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.

Terragel or Novagel Polymer synthetic slurry must comply with the requirements shown in the following table:

**TERRAGEL OR NOVAGEL POLYMER**

Property	Test	Value
Density During drilling	Mud Weight (Density), API 13B-1, section 1	≤ 67.0 pcf <sup>a</sup>
Before final cleaning and immediately before placing concrete		≤ 64.0 pcf <sup>a</sup>
Viscosity During drilling	Marsh Funnel and Cup. API 13B-1, section 2.2	45–104 sec/qt
Before final cleaning and immediately before placing concrete		≤ 104 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

<sup>a</sup>If 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.

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**51 CONCRETE STRUCTURES**

**Add to section 51-1.01A:**

The portions of the bridges shown in the following table must be constructed of mass concrete under section 51-6:

Bridge name and number	Portion of bridge
SR4 Crosstown Viaduct	Bent cap at all bents

**Add to the list in the 6th paragraph of the RSS for section 51-1.01A:**

**Add to the end of the 2nd paragraph of section 51-1.01C(1):**

Placement plan must show method of keeping the concrete bridge deck damp by misting immediately after finishing the concrete surface.

**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.

**Replace cementitious material content for deck slabs and slab spans of bridges in the table of section 51-1.02B with:**

Deck slabs and slab spans of bridges	590 min, 800 max
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**Add to section 51-1.03C(2)(c)(i):**

You may use permanent steel deck forms for the deck slabs between the girders of SR4 Crosstown Viaduct.

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

Concrete must comply with specifications for minor concrete except:

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

You may use structural shotcrete complying with section 53-2 to construct diaphragm bolsters.

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

Fill holes cored in bridge decks with the same concrete specified for the bolsters or with magnesium phosphate concrete. Unless authorized, do not allow traffic on the new concrete until 1 hour after final set.

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

**Add to the list in the 3rd paragraph of section 51-1.03F(5)(a):**

4. Demonstrate that your method for misting the concrete bridge deck will keep the entire surface damp

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

Except for bridge widenings, texture the bridge deck surfaces longitudinally by grinding and grooving.

**Add to section 51-1.03G(1):**

Construct and install architectural texture, column and architectural medallion as shown.

**Replace the 1st sentence of the 2nd paragraph of section 51-1.03H with:**

Cure the top surface of the bridge deck using the water method under section 90-1.03B(2) immediately after finishing the concrete surface. At the end of the curing period, remove the curing medium and place curing compound on the top surface of the bridge deck under section 90-1.03B(3).

**Add between the 5th and 6th paragraphs of section 51-1.04:**

Payment for bar reinforcing steel, structure excavation and structure backfill used in constructing structural concrete for concrete barrier slab is included in the payment for structural concrete, barrier slab.

**Replace the 6th paragraph in section 51-2.02D(2)(b) with:**

Size the recess such that the primary reinforcement for structural members is outside the recess. The maximum depth at abutments and hinges is 10 inches. The maximum width on each side of the expansion joint is 12 inches.



**Replace section 57-2.04 with:**

**57-2.04 BENT LUMBER BLOCKING**

**57-2.04A General**

**57-2.04A(1) Summary**

Section 57-2.04 includes specifications for installing lumber blocking at bents.

**57-2.04A(2) Definitions**

Not Used

**57-2.04A(3) Submittals**

Submit shop drawings showing the proposed bent lumber blocking sizes, arrangements, and method of joining.

**57-2.04A(4) Quality Control and Assurance**

Not Used

**57-2.04B Materials**

Bent lumber blocking must be preservative-treated wood.

The blocking must consist of solid timbers, dimension lumber, or a combination of both. The finished thickness of any lumber must be at least 1-1/2 inches.

The blocking must have an allowable stress of at least 300 psi for compression perpendicular to the grain.

**57-2.04C Construction**

Maintain the minimum gap between the bent lumber blocking and the concrete or steel surfaces regardless of the arrangement of lumber sizes used. The bent lumber blocking must be of a stable configuration and may include joining together the individual pieces of lumber.

Where the bent lumber blocking is exposed and accessible to the public, securely join the blocking to prevent a person from removing it without tools.

Bent lumber blocking must be full width of bottom flange.

Before blocking placement, remove existing forms and debris that interfere with the bent lumber blocking. Removing existing forms and debris is change order work.

Any metal component used for bent lumber blocking that is not structural metal or hardware must comply with section 75-1.03.

**57-2.04D Payment**

Not Used

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**DIVISION VII DRAINAGE**  
**64 PLASTIC PIPE**

**Replace item 1 of the 5th paragraph of section 64-1.03C with:**

Install double gaskets on pipe spigots after the pipe is placed into the trench and ready for joint connection. Place the double gasket on the spigot end under the pipe manufacturer's installation instructions. The leading edge of the gasket must point in the direction of the spigot end. Both the spigot and bell ends must be free of debris before connection. Apply the pipe manufacturer's recommended lubricant to the inside of the bell and over the gasket. Insert the spigot end of the pipe into the bell end until the factory provided insertion line on the spigot end lines up with bell edge.

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**70 MISCELLANEOUS DRAINAGE FACILITIES**

**Add to section 70:**

**70-8 Temporary Basin Improvements**

**70-8.01 GENERAL**

This work consists of temporary improvements including installation of rock slope protection (RSP), RSP fabric, temporary 18" reinforced concrete pipe, temporary embankment including removal of excess water to maintain one-foot of freeboard at all times in LKQ basin, located at 2041 Navy Drive, Stockton CA 95219. You must maintain the basin until no longer needed as directed by the Engineer.

**70-8.02 MATERIALS**

You must obtain a relative compaction of 90 percent for temporary embankment and comply with section 19 of standard specifications for earthwork. Temporary reinforced concrete pipe must comply with section 65 of standard specifications. Temporary RSP and RSP fabric must comply with section 72 of standard specifications for slope protection.

**70-8.03 CONSTRUCTION**

You must monitor and remove excess water in the LKQ basin during the construction period as needed to maintain not less than one-foot of freeboard at all times. You must dispose the excess water off-site. Do not allow the existing discharge pump to operate during the construction period. This may require you to remove up to an estimated 15,000 gallons of surface water in a single event so that the discharge pump does not activate. The actual discharge may vary based on the actual rainfall amounts. The excess water will need to be hauled and discharged off-site.

You must remove the temporary improvements for the basin and restore the basin to the original lines and grades after completion of the construction work across LKQ property.

**70-8.03 PAYMENT**

Full compensation for all the work involved in temporary basin improvements include temporary embankment, temporary RSP, temporary RSP fabric, temporary 18" reinforced concrete pipe, removal of excess water, grading, removal of all improvements and restoration to the original condition is included in



## 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 under section 5-1.23C.

For work on the City of Stockton infrastructure, also notify by calling the City at (209) 993-2177.

Notify at least 10 days before starting utility work.

Notify 72 hours before starting work at each location.

##### 77-1.01B Sewage Spill Response

Call the City of Stockton 24 hour emergency notification number at (209) 937-8341 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 Stockton, and County of San Joaquin 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 Stockton, 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.

##### 77-1.01C Submittals

###### 77-1.01C(1) General

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

###### 77-1.01C(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

## **77-1.02 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.

No diversion work is allowed for sanitary sewer system No. 6 from October 15th to April 15th.

Unless specified, references to sanitary sewers also references storm sewers (storm drains).

All existing sewer system connections, including laterals, must be maintained for the duration of work for the sanitary sewer systems.

#### **77-2.01B Definitions**

**Bedding:** The material supporting, surrounding, and extending to 1 foot above the top of the pipe.

#### **77-2.01C Submittals**

##### **77-2.01C(1) General**

Submit the type, size, workmanship and other descriptive data for plastic lining. You must obtain authorization of this submittal before delivering material to the job site.

Submit a certificate of compliance signed by an assigned agent of the manufacturer or supplier for sanitary sewer manhole (SSMH) frames and covers in accordance with ASTM A 48 and AASHTO HS-20.

Each certificate for SSMH frame and covers furnished must be accompanied by a copy of test results stating the material was sampled, tested, and inspected under the specifications of the latest issue of ASTM A-48, Gray Iron Castings. Test bars must be cast and tested for the first lot of casting and every 4 months thereafter. If production is interrupted for longer than four months, test bars must be cast and tested from the initial lot after production is resumed and every 4 months thereafter. The first lot is defined as the first castings produced after January 1st of each year. The tension tests specified must be performed and the results certified by an independent testing laboratory located in the United States of America.

Furnish current certified test reports for testing of SSMH frame and covers under AASHTO HS-20 loading. Identify units furnished for the above tests.

##### **77-2.01C(2) PVC Pipe**

Submit a certificate of compliance for the PVC pipe.

##### **77-2.01C(3) Sewer Flow Diversion Plan**

You must submit a sewer bypass that meets the capacity for existing sewers and obtain authorization before installation of the bypass pumping system.

Submit the sewer flow diversion plan at least 15 days before beginning flow diversion. No deviation from the diversion plan will be allowed without authorization. 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.

Include at a minimum:

1. The personnel responsible for monitoring the system.
2. Plans to maintain operation of pumping system if there is a mechanical or electrical failure.
3. Drawings illustrating the proposed intake/suction locations and sizes of pumps (if used), temporary bulkheads, plugs, pump staging areas, pipeline routes, pipeline sizes, and discharge locations. Provide an elevation schematic showing elevation, on/off levels for each temporary pump, and static head.
4. A job site plan of each bypass pump system, including proper protection of both existing and temporary systems. Include submittals on fuel containment systems.
5. Provide information on generator backup power and automatic transfer switch. Include a job site plan showing the proposed location of the generator.
6. Provide information on the temporary alarm systems for bypass pumping systems. Include with this information a list of names and telephone numbers of your personnel who the alarm will notify.
7. Provide a plan detailing the plans for maintaining operation of the temporary pumping system if there is a mechanical or electrical failure.
8. Submit a system outage request form for each bypass/outage plan. Unless otherwise specified, submit the plan not less than 14 days before the scheduled outage to the City of Stockton.
7. Odor Control:
  - 7.1. You are required to minimize the odor associated with this work to the extent possible. The Engineer may request additional odor reducing measures if complaints about odor are received.

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.

Before submitting your sewer flow diversion plan to the Engineer, you are required to obtain approval of the diversion plan by the City of Stockton. Diversion plan must be stamped as "Approved" by the City of Stockton. Submit your diversion plan to the following address:

City of Stockton  
Attention Ann Okubo  
2500 Navy Drive  
Stockton, CA 95206

Allow 30 days for initial review and seven days for subsequent reviews. Notify the Engineer when you submit the diversion plan to the City of Stockton.

#### **77-2.01C(4) 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. 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 and archaeologist in an environmentally sensitive area.
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, and their respective phone numbers. These representatives must be accessible and available at all times to respond in 15 minutes to any sewer spill event from time they are dispatched.
4. Identify any property owners who may be affected including County and City.

**77-2.01D Notifications**

Notify 3 business days before performing the water exfiltration test.

Notify 5 business days before performing the air pressure test.

**77-2.01E Quality Control and Assurance****77-2.01E(1) General**

Not used.

**77-2.01E(2) PVC Pipe**

Tests for compliance must be made according to the applicable ASTM specifications during manufacturing. The Engineer may station a representative or third party inspector at the site of manufacture to monitor the manufacturing process continuously, and to test the pipe independently to verify conformance. The Engineer must determine pipe tests and frequency.

**77-2.01E(3) Cleaning**

Before performing tests, thoroughly clean the pipe installation.

You must perform cleaning with an inflatable rubber ball. The ball must inflate to fit snugly into the pipe to be tested. Control the ball with a tag line. Place the ball in the last SSMH on the pipe to be cleaned, and introduce water behind it. The ball must pass through the pipe with only the pressure of the water impelling it. Remove debris flushed out ahead of the ball at the 1st SSMH where its presence is noted.

If cement or wedged debris or a damaged pipe stops the ball, you must remove the obstruction.

**77-2.01E(4) Deflection Test for PVC Sanitary Sewer Pipe**

Conduct a short-term deflection test no sooner than 30 days after the placement and densification of backfill. Furnish the equipment needed to complete this test.

For PVC pipe, the allowable short-term deflection is 5 percent. The pipe manufacturer must establish the minimum allowable inside diameter (I.D) [(outside diameter (O.D). of the mandrel)].

Furnish properly sized mandrels for size and type of pipe installed.

Certification of proper mandrel size is required and mandrels must be identified in a way to identify with certification.

**77-2.01E(5) Leakage Test**

Leakage tests must be completed and accepted after the placement and densification of the backfill, but before placing of permanent surfacing.

If leakage or infiltration exceeds the quantity allowed, locate the leaks and make the necessary repairs or replacements to reduce the leakage or infiltration to the specified limits. Repair individually detectable leaks, regardless of the results of the tests. Administer leakage tests on completed pipelines as follows:

Pipe type	Pipe size diameter	Elevation difference between inverts of adjacent maintenance hole	Test
Gravity sanitary sewer (SS)	≤ 24 in.	≤10 ft	Water exfiltration or water infiltration
Gravity SS	≤ 24 in.	<10 ft	Air pressure
Gravity SS	< 24 in.	N/A	Air pressure or water infiltration
Pressure SS force main	N/A	N/A	Water pressure at 50 psi over pipe pressure designation

### 77-2.01E(6) Water Exfiltration Test

Administer tests in the presence of the Engineer and the City of Stockton Engineer.

Furnish the water, materials, and labor for making the required test

Test each section of sewer between successive SSMH by closing the lower end of the sewer to be tested and the inlet sewer of the upper maintenance hole with stoppers. Fill the pipe and maintenance hole with water to a point 4 feet above the invert of the sewer at the center of the upper maintenance hole; or if ground water is present, 4 feet above the average adjacent ground water level.

The allowable leakage is computed by the formula:

$$E = 0.0001 \times L \times D \times H^{0.5} \text{ for mortared joints.}$$

$$E = 0.00002 \times L \times D \times H^{0.5} \text{ for all other joints.}$$

where:

*L* is the length of sewer and house connections tested, in feet.

*E* is the allowable leakage in gallon per minute of sewer tested.

*D* is the internal diameter of the pipe in inches.

*H* is the difference in elevation between the water surface in the upper SSMH and the invert of the pipe at the lower SSMH; or if ground water is present above the invert of the pipe in the lower SSMH, the difference in elevation between the water surface in the upper maintenance hole and the ground water at the lower SSMH.

However, the maximum must not exceed 200 gallons per inch of internal diameter per mile per day.

### 77-2.01E(7) Water Infiltration Test

If, in the opinion of the Engineer, ground water is encountered in the construction of a section of the sewer, the Engineer may require the pipe be tested by the water infiltration test as follows:

1. Close the end of the sewer at the upper structure enough to prevent the entrance of water, and discontinue pumping of ground water for at least 3 days, or until the ground water has recovered its normal status level, after which you must test the section for infiltration.
2. The infiltration into each individual reach of sewer between adjoining SSMH must not exceed that allowed by the formula in section 77-1.01C(4), where *H* is the difference in the elevation between the ground water surface and the invert of the sewer at the downstream SSMH.

Unless otherwise specified, infiltration will be measured by the Engineer.

You must repair visible leaks regardless of volume involved.

**77-2.01E(8) Air Pressure Test**

Furnish the materials, equipment, and labor for making an air test. Air test equipment must be authorized by the Engineer before the start of the test.

Test each section of sewer between successive SSMH by plugging and bracing the openings in the main sewer line and the upper ends of sewer connections.

Before air pressure testing, you must check pipe plugs with a soap solution to detect air leakage. If you find leaks, you must release the air pressure, eliminate the leaks, and start the test procedure again.

Conduct the final leakage test of the sewer main line and branching sewer connections in the presence of the Engineer and the City of Stockton Engineer as follows:

1. Clean pipe to be tested by propelling snug fitting inflated rubber ball through the pipe with water.
2. Plug pipe outlets with suitable test plugs. Brace each plug securely.
3. If the pipe to be tested is submerged in ground water, insert a pipe probe by boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. Increase gauge pressures in the test by this quantity.
4. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig.
5. After an internal pressure of 4.0 psig is obtained, allow at least 2 minutes for air temperature to stabilize, adding only the quantity of air required to maintain pressure.
6. When the pressure decreases to 3.5 psig, start stop watch.
7. The following applies to all pipes other than PVC with diameters 15-inch or less.

- 7.1. Determine the time in seconds required for the internal air pressure to reach 2.5 psig. Determine minimum permissible pressure holding times from the following formula and table in seconds:

$$t = k \times (d/g)$$

where:

*t* = minimum required time in seconds

*k* = constant 0.022

*d* is the nominal pipe diameter in inches.

*g* = allowable air loss rate per unit area, 0.003 cu ft/min/sq ft of internal/surface area

psig = pounds per square inch gage

- 7.2. Use the following table to determine minimum holding time in seconds required for pressure drop from 3-1/2 to 2-1/2 psig.

Length of line feet	Pipe diameter inches													
	4	6	8	10	12	15	18	21	24	27	30	33	36	39
25	4	10	18	28	40	62	89	121	158	200	248	299	356	418
50	9	20	35	55	79	124	178	243	317	401	495	599	713	837
75	13	30	53	83	119	186	267	364	475	601	743	898	1020	1105
100	18	40	70	110	158	248	256	485	634	765	851	935	--	--
125	22	50	88	138	198	309	446	595	680	--	--	--	--	--
150	26	59	106	165	238	371	510	--	--	--	--	--	--	--
175	31	69	123	193	277	425	--	--	--	--	--	--	--	--
200	35	79	141	220	317	--	--	--	--	--	--	--	--	--
225	40	89	158	248	340	--	--	--	--	--	--	--	--	--
250	44	99	176	275	--	--	--	--	--	--	--	--	--	--
275	48	109	194	283	--	--	--	--	--	--	--	--	--	--
300	53	119	211	--	--	--	--	--	--	--	--	--	--	--
350	62	139	227	--	--	--	--	--	--	--	--	--	--	--
400	70	158	--	--	--	--	--	--	--	--	--	--	--	--
450	79	170	--	--	--	--	--	--	--	--	--	--	--	--
500	88	--	--	--	--	--	--	--	--	--	--	--	--	--
550	97	--	--	--	--	--	--	--	--	--	--	--	--	--
600	106	--	--	--	--	--	--	--	--	--	--	--	--	--
650	113	170	227	283	340	425	510	595	680	765	851	935	1020	1105
650	113	170	227	283	340	425	510	595	680	765	851	935	1020	1105

NOTES:

1. To be used if testing 1 diameter only.

2. The above air pressure test procedure is based on ASTM C828.

7.3. For PVC lines with diameters 15 inches or less, the following table lists the minimum times allowed for a pressure drop from 3.5 psi to 3.0 psi in excess of the ground water pressure at the top of the pipe.

Pipe diameter inches	Minimum time minutes: seconds	Length for minimum Time feet	Time for longer length seconds	Specification time for length L shown minutes: seconds							
4	1:53		0.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50		0.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47		0.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43		1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40		1.709L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05		2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02

**Safety Note:**

The air test is dangerous. It is extremely important that the various plugs are installed and braced to prevent blowouts. Inasmuch as a force of 250 lbs. is exerted on an 8-inch plug by an internal pipe pressure of 5 psi, you must realize that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.

As a safety precaution, pressurizing equipment must include a regulator set at 10 psi to avoid over-pressurizing and damaging an otherwise acceptable line. No one is allowed in the SSMH during testing. If the time lapse is less than that shown in the table, you must make the necessary corrections to reduce the leakage to acceptable limits.

**77-2.01E(9) Deformation Testing**

After the placement and compaction of backfill and before placement of permanent pavement, perform a deflection test on the pipe. If the pipe fails the deflection test, you must uncover the pipe and make necessary adjustments in the bedding, backfill, or both, to achieve a passing test. Backfill the trench, recompact the street subgrade, and retest the pipe.

**77-2.01E(10) Coating Testing for Sewer Structures**

You must perform testing in the presence of the Engineer. High-voltage spark test lining and coating work at a minimum 125 volts per mil film thickness of coating. You must verify to the Engineer that the test equipment is in proper working condition before spark testing. Use Tinker-Razor AP-W test equipment or equal.

Corrective work you propose must be authorized.

**77-2.02 MATERIALS**

**77-2.02A General**

Not Used

**77-2.02B Reinforced Concrete Pipe**

Reinforced concrete pipe must comply with ASTM Designation C76 for the size and classes shown. RCP must be Class IV RCP.

Rubber gasket joints must comply with ASTM C443 and must be flexible and able to withstand expansion, contraction, and settlement.

**77-2.02C Plastic Lining for RCP Pipes**

Plastic lining must be a polyvinyl chloride resin. Copolymer resins are not allowed. Only sanitary sewers must be lined. Storm sewers may be unlined.

The plastic lining must be impermeable to sewage gases and liquids and must be nonconductive to bacterial or fungus growth. The lining must be impact resistant, flexible, and must have enough elongation to bridge up to 1/8-inch settling cracks which may take place in the pipe or in the joint after installation without damage to the lining.

### 77-2.02D Plastic Coating for Maintenance Holes

The coating must be resistant to attack from: bleaches; sulfuric, acetic, hydrochloric, phosphoric, nitric, chromic, oleic, and stearic acids; sodium and calcium hydroxides; ammonium, sodium, calcium, magnesium, and ferric chlorides; ferric sulfate, hydrogen sulfides, petroleum oils and greases, vegetable and animal oils, fats, greases, soaps and detergents. The coating must be impermeable to sewage gases and liquids and must be non-conductive to bacterial or fungus growth.

Acceptable coatings are as follows:

Material Name	Material Type	Manufacturer
120 Vinester	Vinylester mortar	Tnemic Company, Inc.
Chesterton 798	Epoxy mortar	A.W. Chesterton Company
Concresive 1305	Epoxy	Adhesive Engineering Company
Hydro-pox	Epoxy	Con-Tech
I.E.T. System 3	Polyester mortar	Integrated Environmental Technologies
I.P.I. Crystal Quartz	Epoxy mortar	Integrated Polymer Industries, Inc.
Lining No. 210	Epoxy	Sauereisen Cements
Maga Quartz	Epoxy mortar	Belzona Molecular, Inc.
Mainstay DS-4	Epoxy mortar	Mainstay Corporation
Quantum	Polyester mortar	Polymorphic Polymer's Corporation
Semstone 140S	Epoxy mortar	Sentry Polymers

The Engineer may determine a material is not suitable for specific applications. Additionally, this list may be reviewed annually by the Materials Review Committee and materials may be determined not suitable for specific applications.

### 77-2.02E Polyvinyl Chloride Pipe

Solid wall pipe and fitting must be the following:

1. 4–15-inch diameter must be type PSM SDR-35 PVC, ASTM 3034
2. 18–21-inch diameter must be type PS 46 PVC, ASTM F679
3. 21–48-inch diameter must be profile wall PVC

Mark pipe and fittings per ASTM specifications.

Reducing wyes for service laterals must be in line bell and spigot type, factory molded.

Solvent welded saddle fittings for lateral connection are allowed.

PVC Joints must be integral wall bell and spigot configuration, factory formed under ASTM D 3212. Rubber rings must comply with ASTM F 477.

Use profile wall PVC manufactured from a PVC compound having a minimum cell classification of 12364A as defined in ASTM D 1784. Gasket must comply with the ASTM F 477.

Use closed profile wall PVC compliant with ASTM F 1803-97 for 21 through 48 inch diameters with a bell and spigot gasketed joint. The joint must comply with the ASTM D 3212 specifications. The pipe must have a minimum pipe stiffness as specified under ASTM D 2412.

**Profile Wall PVC Nominal  
Dimensions**

Nominal diameter inches	Outside diameter inches	Inside diameter inches
21	22.110	20.75
24	25.040	23.50
27	28.232	26.50
30	31.430	29.50
36	37.800	35.50
42	44.200	41.50
48	50.57	47.50

**77-2.02F Bedding**

Bedding material must be sand, gravel, crushed aggregate, native free-draining granular material having a sand equivalent of not less than 20.

Pea gravel is not acceptable. No aggregate can exceed 1 inch.

**77-2.02G Miscellaneous Iron and Steel**

Miscellaneous iron and steel items must comply with section 75.

**77-2.02H SSMH Frames and Covers:**

Gray iron castings must comply with ASTM A48-76, Class 30, and test bar size must be as stated in Table I in ASTM A48-76.

Machined surface tolerances must produce true, uniform bearing surfaces.

Frames and lids must be interchangeable with like seat design. Dimensional fit tolerances must not exceed those described.

Wire brush SSMH frame and covers and catch basin frames and covers to remove dirt and loose mill scale and rust and coat with coal tar pitch at 180 degrees F.

**77-2.02I Identifying Castings for Manhole Covers**

Mark gray iron castings on the top surface with the English name of the country of origin; manufacturer's name, lot number, and initials or logo type. In addition, cast the month and year of manufacture on the frame and cover adjacent to the name of the manufacturer. Make the marking by means of stamping, cast-in-mold lettering, etching, or engraving.

**77-2.02J Reinforcement**

Reinforcement must comply with section 52.

**77-2.02K Concrete**

Portland cement used in the production of concrete materials must be Type II Modified cement and must comply with section 90.

Concrete must comply with section 51 and section 90.

**77-2.02L Rock Slope Protection**

Rock slope protection must comply with section 72.

**77-2.03 CONSTRUCTION**

**77-2.03A General**

Not Used

**77-2.03B Excavation and Backfill**

Lay the pipe in a trench excavated to the lines and grades shown. Grade and prepare the bottom of the trench to provide a firm and uniform bearing throughout the entire length of the pipe barrel.

Excavate the trench to receive the bell of the pipe suitably so the joint does not bear on the bottom of the trench. Make adjustments to line and grade by scraping away or filling in with sand, gravel, or granular material under the body of the pipe, and not by wedging or blocking.

Do not leave trenches open farther than 100 feet in advance of pipe laying activities or 100 feet to the rear thereof.

Support the excavation so it is safe, the ground alongside the excavation will not slide or settle, and existing improvements are fully protected from damage, on both public and private property.

Remove supports after construction is completed and withdraw them so you prevent caving of the sides of the excavation. Fill openings caused by the removal of supports with properly compacted suitable material.

Place initial backfill to protect the pipe from dropping of large rocks, large mechanical compaction equipment, or other impact loads potentially occurring during final backfill.

### **77-2.03C Bedding**

If it becomes necessary to remove boulders or other interfering objects at subgrade for bedding, fill the void below the subgrade with the bedding material shown. If concrete is specified to cover the pipe, the top of the concrete is the top of the bedding.

If you encounter soft, spongy, unstable, or other similar material on which to place the bedding material or pipe, remove this unsuitable material. Removal is change order work.

Place bedding material first so the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of 0.5 times the outside diameter of the barrel. Compact the bedding for pipe after the sheeting or shoring is removed from the bedding zone. You may use alternate methods of pipe laying recommended by the pipe manufacturer if authorized. Mechanically compact the bedding zone for PVC pipe before the remainder of trench is compacted.

Carefully place and compact the pipe bedding in the haunching. The haunching area extends from the bottom of the pipe to the springline of the pipe. Place bedding in 6-inch loose lifts on alternate sides of the pipe. Use a tamping bar or shovel to facilitate bedding consolidation on the lower quadrant of the pipe. Mechanically compact the bedding using hand operated equipment under the manufacturer's recommendations.

If native material is suitable for use as bedding, excavate the trench to point above the invert grade and hand-shape the trench bottom so the bottom segment of the pipe is firmly supported on undisturbed material.

### **77-2.03D Pipe Laying**

Unload pipe in the original packaging using a forklift with fork arms long enough to reach beyond the last pipe bundle unless otherwise authorized. Do not roll the pipe off of the truck. Do not handle or secure pipe using chains or cables; a nylon or textile strap is recommended.

Protect pipe during handling against impact shocks and free fall.

Carefully inspect pipe in the field before and after laying. Corrective work must be reviewed and must be at no cost.

If you cannot determine the elevation or position of an existing pipe, conduit, or other appurtenances that you must connect to without excavation, you must excavate and expose the existing pipe improvement before laying pipe or conduit. The Engineer will inspect the existing pipe or conduit before the connection is made. If the new facilities interfere with the existing flow of sewage, you must provide satisfactory bypass facilities at your expense.

Lay the pipe without break upgrade from structure to structure, with bell end upgrade, unless otherwise authorized.

Clean and then seal joints with the type of materials specified or required. In the absence of these requirements, joint the pipe with materials recommended by the pipe manufacturer for the purpose intended, and authorized, to obtain a watertight joint against leakage and infiltration under conditions of expansion, contraction, and settlement.

If the work ceases, securely close the end of the pipe with a tight fitting plug or cover.

If pipes are to be cut or abandoned, securely close the open ends of said pipes with a tight fitting plug or wall of concrete not less than 0.5 foot thick, or by a tight brick wall 0.67 foot thick with cement mortar joints.

Pipe removed from within the City of Stockton Right of Way must be disposed of each day.

Where ground water occurs, keep the bottom of the trench entirely free of water during the pipe laying, filling the joints, and as long thereafter as ordered.

Carefully clean joints on the inside.

Make stoppers for pipes and branches left unconnected of the same material as the pipe or of an authorized durable, high-quality, resilient joint material designed to perform the intended function. The material must be neoprene expanded rubber or sheet rubber gaskets, "O" ring rubber gaskets, butyl rubber base joint sealant, or other authorized resilient material. If you use resilient joint materials, submit the resilient joint materials for testing and authorization.

After placing the stopper, cover it with a layer of sealant. The sealant must be fluid enough to insure free flow around the stopper.

Lay concrete pipe with elliptical reinforcement with the minor axis of the reinforcement cage in a vertical position.

Lay the pipe true to line and grade. You must take up and re-lay pipe which is not in true alignment or shows undue settlement after lying at your expense.

You must lay and join pipe sections so the offset of the inside of the pipe at the joint is held to a minimum at the invert. The maximum offset at the invert of pipe must be 1 percent of the inside diameter of the pipe or 3/8 inch whichever is smaller.

In joining socket and spigot pipe, seat the spigot of each pipe in the socket of the adjacent pipe as to have a minimum of 3/8 inch annular space around the pipe in the socket. Distribute unavoidable offsets around the circumference of the pipe so the minimum offset occurs at the invert.

Lay the pipe true to line and grade. You must take up and re-lay pipes which deviate from the engineering alignment by 1/2 inch or grade by 1/4 inch, or result in a reverse slope, or show undue settlement after laying.

After the joints are made, do not disturb the pipe.

During installation, keep linear expansion and contraction below the manufacturer's recommendations. Strutting is mandatory for size 36 inch and larger. Have a strutting detail authorized before installation. Pre-deflecting the pipe is only allowed after receiving authorization.

### **77-2.03E Sanitary Sewer Bypass**

You must furnish, install, operate, and maintain machinery, appliances, and equipment to bypass the SS flows around the area of work so as not to cause injury to public or private property, or to cause a nuisance or menace to the public. Provide suitable erosion protection during the sewer bypass.

Install pumps, if used, in parallel and activate them by float to maintain an appropriate level.

Sewer bypass for the existing 36-inch sewer entering a single existing manhole must have a reliable capacity not less than 14,000 GPM.

Sewer bypass for the existing 8-inch sewers entering a single existing manhole (two locations) must have a reliable capacity not less than 700 GPM.

Sanitary sewer bypass must comply to the following:

1. Stand-By Electric Power:
  - 1.1. Provide a back-up electric power supply to ensure the pumping system is continually operational.
  - 1.2. Supply an automatic transfer switch with the back-up generator.
  - 1.3. Equip generator with a sound attenuating enclosure capable of meeting the local noise ordinances.
  - 1.4. Size stand-by electric power system with enough capacity to operate the required pumps to comply with the peak pumping rates. The emergency power system controls must allow the operation of the lead and the lag pumps, but not allow the operation of multiple pumps beyond the emergency power generator's output rating.
  - 1.5. Keep generators fueled.
2. Temporary Piping:
  - 2.1. Size piping for a maximum velocity of 10 feet per second and must have restrained joints.
  - 2.2. Acceptable pipe materials are steel, ductile iron, PVC, EPDM rubber hose, and polyethylene.
  - 2.3. Pipe must be capable of carrying internal and external loads.
  - 2.4. Pipe must be pressure tested before being placed in service.
  - 2.5. Piping and joints must not leak or show signs of deterioration or rust. You must repair drips or leaks immediately.
  - 2.6. Provide isolation valving on the discharge side of each bypass pump.
3. Monitoring and Supervision of Bypass Pumping System:
  - 3.1. You must take the necessary precautions including constant monitoring (requires 24 hours per day, 7 days per week continuous monitoring by your on-site personnel while bypass pumping system is in place) of sewage flow control pump and diversion plug(s) or bulkhead(s) to insure there are no sewage spills and private properties are not subjected to a sewage backup. The person responsible for system monitoring must have no other job or responsibility except for the monitoring and maintaining of the bypass system.
  - 3.2. You must not shut down sewage flow control systems between shifts, on holidays or weekends, or during work stoppages without written permission from the Resident Engineer, except during emergency situations to prevent or remedy sewage spills or overflows.
  - 3.3. You must inspect exposed bypass pipeline a minimum of once per hour.
  - 3.4. If fuel is required, provide a fueling schedule. It is your responsibility to provide fuel necessary to maintain continuous operation of the temporary bypass pumping system.
  - 3.5. You are fully responsible and liable for damages resulting from failure of the bypass pumping system.
4. Noise Control:
  - 4.1. Pumps and generators must be sound attenuated to reduce noise level.
  - 4.2. You are required to minimize to the extent possible the noise associated with this work.
  - 4.3. You must be aware that additional noise barriers, which could include a plywood shield, must be erected to enclose the pumps and generators on request and at no additional cost.
5. Testing:
  - 5.1. You must set up and test the sewage flow bypassing system for a minimum of 24 hours or as ordered by the Engineer, not more than 24-hours before removing the sewer from service for the start of the rehabilitation work. Test for proper operation of the overall system and test controls and alarms. Notify Engineer 24 hours before testing. You must correct deficiencies in the system as required to provide a leak-free bypassing that does not cause overflows, back-ups, or spills.
6. Sewage Flow Control:
  - 6.1. Dumping or free flow of sewage into gutters, streets, storm sewers, creeks, canals or flood control channels is prohibited. No bypassing to ground surface, receiving waters, or which results in groundwater contamination or potential health hazards.
  - 6.2. You are liable for clean up damages and resultant fines if there is a spill, including:
    - 6.2.1. Permit violation fines imposed by State and Federal agencies, courts, and third party suits.
    - 6.2.2. Costs incurred resulting from the spill including fines, labor, equipment, and materials used to contain and/or clean up spill.
  - 6.3. After the work is completed, flush the temporary connections and piping you installed with clean water before dismantling. You must completely dewater pipe and provide barrier measures to prevent spilling of flushing water to adjacent ground surface, storm drains, creeks, canals, and/or channels.

## **77-2.03F Pipe Joints**

### **77-2.03F(1) Reinforced Concrete Pipe**

Join reinforced concrete sanitary sewer pipe with rubber gasket joints.

Store rubber gaskets in as cool a place as practicable, preferably at 70 degrees or less. Do not expose rubber gaskets to the direct rays of the sun for more than 72 hours.

Lubricate rubber gaskets, of the type requiring lubrication, with the lubricant recommended and supplied by the manufacturer of the pipe.

Form the ends of the pipe so they make a continuous and uniform line of pipe with a smooth and regular surface when the pipes are laid together and joined.

Joints must be water-tight and flexible. Each joint must contain a solid gasket of rubber or other material authorized, which must be the sole element responsible for water-tightness of the joint. This gasket must be of circular cross section unless otherwise authorized. The length and cross sectional diameter of the gasket, the annular space provided for the gasket, and other joint details must produce a watertight joint. The slope of the longitudinal gasket contact surfaces of the joint with respect to the longitudinal axis of the pipe must not exceed 2 degrees.

Under ordinary laying conditions, schedule the work so the socket end of the pipe faces in the direction of laying. Before placing the spigot into the socket of the pipe previously laid, the spigot groove, thoroughly clean the gasket and the inside of the socket. Then lubricate the spigot groove, the gasket and the first 2 inches of the inside surface of the socket with a soft vegetable soap compound.

Uniformly stretch the gasket when placing it on the spigot so the gasket is distributed evenly around the circumference. Lubricate the gasket per manufacturer's recommendations.

To point the inside pipe joints, place suitable spacers against the inside shoulder of the socket to provide the proper space between abutting ends of the pipe.

After the joint is assembled, insert a thin metal feeler gage between the socket and the spigot, and check the positions of the gasket around the complete circumference of the pipe. If the gasket is not in the proper positions, withdraw the pipe, check the gasket to see that it is not cut or damaged, re-lay the pipe, and check the gasket position again.

### **77-2.03F(2) PVC Pipe**

SSMH connections must be by rubber ring water stop installed on pipe and cast in center of SSMH wall or 4 inches from outside face of SSMH base. Pipe section on water stop at maintenance hole must have bell flush with outside of SSMH or no more than 10 inches outside SSMH.

### **77-2.03G Lining for RCP Pipe**

Line RCP used in sanitary sewer applications with plastic lining. RCP used in storm sewer applications may be unlined. Seal and protect the full 360 degrees of the interior circumference of the RCP.

Permanently and physically embed the lining into the concrete pipe wall by the T-lock mechanism; do not rely on an adhesive bond between the lining and pipe wall. Continuously heat weld the lining at pipe joints, and at joints between individual sheets or sections of lines by the use of welding strips of the same kind and equivalent thickness of the material as the lines.

### **77-2.03H Existing Sanitary Sewer Manhole**

Existing SSMH must be adjusted to grade, remodeled, or abandoned as shown and must comply with section 15.

If shown you must reset existing SSMH frames and covers on new structures. Upon completion of the adjustment of SSMH to grade, the SSMH cover must conform to the planned surface for the completed hot mix asphalt.

Salvage SSMH frames and covers.

Inlets removed from within the City of Stockton Right of Way must be removed from the job site at the end of each day. Do not reuse frames, grates, and covers within the City of Stockton Right of Way.

### **77-2.03I Sewer Structures**

Construct SSMH for sewers under the details as shown and specified. Precast SSMH or pipe SSMH must comply with the details as shown and specified.

Sanitary sewer house laterals relocated as a component of new sanitary sewer main installation shall have a maximum slope of 45 degrees from horizontal.

Secure SSMH frames to the maintenance hole cover and riser barrels with full mortar bed or full circle concrete collar securing the frame to the SSMH structure effectively and provide a uniform bearing for the frame.

Concrete for sewer structures must be Class A and must comply with section 90-1.01. Concrete for sewer maintenance bases must be Class B and must comply with section 90-1.01.

If the SSMH is located in the pavement area, do not construct it to final grade until pavement is complete.

If new work is jointed to the surface of incomplete work, thoroughly clean the incomplete work.

Neatly strike and point joints on the inside of structures and sewers if plastering is not specified on the plans.

You must shape the inside bottoms of SSMH at new connections to provide channels conforming to the size and shape of the lower portion of the inlets and outlets of the SSMH. The channels must vary uniformly in size and shape from inlet to outlet.

Pipes must project less than 0.17 foot into a SSMH. Do not build the bell of a pipe into the wall of a SSMH or structure.

Cure concrete for 10 or more days after placement and protect it from damage.

### **77-2.03J Sanitary Sewer Manhole Interior Linings and Coatings**

Line or coat the interior of new maintenance holes along sanitary sewer lines 24-inch and larger which will be maintained by the City of Stockton. In addition, line or coat the interior of existing City of Stockton maintenance holes downstream from a new sanitary sewer system determined to be adversely affected by the additional sewage by the Engineer. The coating of existing City of Stockton maintenance holes downstream from the new sanitary sewer system is change order work.

#### **77-2.03J(1) Surface Preparation**

The application surface for coatings must be clean and dry. Clean surfaces to achieve an ASTM D-4259 Standard by abrasive blast cleaning methods. Clean surfaces to remove dirt, dust, corrosion, loose concrete, debris, grease, oils, growths, and foreign matter. On new concrete and metal surfaces, use sandblasting to remove laitance. Apply coatings only to a sound clean surface profile consistent with the manufacturer's published recommendation.

Age new concrete no less than 30 days before application.

Seal cracks, joints, eroded and damaged areas with a compatible grout/putty as recommended by the coating manufacturer before applying the coating material.

#### **77-2.03J(2) Application**

Apply coating materials in a way and thickness consistent with the manufacturer's published recommendation.

Apply coatings in a way consistent with applicable environmental and health and safety regulations. At a minimum, during application, the applicators must use protective clothing, eye protection, chemical resistant gloves, and air respirators.

The coating must be free of blisters, pinholes, holidays, or discontinuities.

### **77-2.03J(3) Inspection**

Perform coating work in the presence of the Engineer and the City of Stockton Engineer. Coating work done in the absence of the Engineer will be rejected unless specifically allowed by the Engineer.

### **77-2.03J(4) Repairs of Holidays or Pinholes**

Repair areas requiring repair, as determined by inspection and testing, under the material manufacturer's recommendations.

### **77-2.03K Trench Resurfacing**

Resurface trenches in existing streets that will not be closed or abandoned with the type and thickness of bases, surfacing, or pavement, as shown in the City of Stockton Standard Specifications and Plans. You must proceed immediately to resurface part of an excavation upon notice without waiting for completion of the full length of the sewer. Backfill or cover trenches at the end of each working day. Temporary trench patching must be authorized.

### **77-2.03L Abandon Sewer**

Abandon sanitary sewer laterals at the property line.

Provide bell end or collar with air tight plug, as specified in the Uniform Plumbing Code, at the end of the line.

### **77-2.03M Storm Drain Inlet Marker**

The storm drain inlet marker must comply with the latest revision City of Stockton Stormwater Quality Control Criteria Plan (SQCCP), which governs if there is a discrepancy between the SQCCP and as shown or specified.

Permanently place the message and symbol on or in new surfaces by using bomanite, stamping into the concrete, or other method authorized by the Engineer. Place the message and symbol on existing surfaces using thermoplastic pavement markings. Painting is allowed only in existing areas for community awareness activities. Letters must be 1-1/2 inches in height. Outside dimension of public notice background must fit back of inlet or be placed in sidewalk immediately behind inlet, 8 by 24 inches minimum. Lettering and graphic must be black with gray background unless authorized by the Engineer.

### **77-2.03N Video of Sanitary Sewers**

After the placement and compaction of backfill and completion of other required testing, but before the placing of pavement, you must video sewer lines for conformance. Deliver a DVD and log of the video to the Engineer within a week of televising.

### **77-2.04 PAYMENT**

Pay for the lengths of the various types of sewer pipe by the linear foot; measured from centerline of maintenance hole to center line of maintenance hole between structures or to end of line not ended at a structure.

Pipe bends, wyes, tees and other branches are measured by the linear foot for the sizes of pipes involved. Bends are measured along centerlines. Wyes, tees, and other branches are measured along centerlines to the point of intersections.

Quantities of precast concrete pipe SSMH are determined as units from actual count.

The quantities of permanent trench resurfacing to be paid for must be the quantities placed within limits up to a maximum width of 3 feet greater than the outside diameter of the pipe or structure. You must pay for temporary trench resurfacing.

Trench quantities in excess of the above are at your expense unless authorized otherwise.

## **77-3 RELOCATE HYDRANT**

### **77-3.01 GENERAL**

#### **77-3.01A Summary**

Section 77-3 includes specifications for relocating fire hydrants as shown.

Comply with City of Stockton Standard Specifications and Drawings No. 101 for removal and relocation of fire hydrant assemblies complete with connections.

### **77-3.02 MATERIALS**

#### **77-3.02A Pipe**

The 6-inch lateral must be Class 200 PVC conforming to AWWA C900 and extend for the gate valve to the cast iron bury. The in-line tee, valve and bury pipe must have a thrust block.

#### **77-3.02B Concrete**

Concrete must comply with minor concrete.

### **77-3.03 CONSTRUCTION**

Remove and relocate the existing fire hydrants to the locations shown.

Do not close (water turned off) the water valves in the water distribution system without the consent of the Engineer.

### **77-3.04 PAYMENT**

Not used.

## **77-4 ADJUST FIRE HYDRANT**

### **77-4.01 GENERAL**

#### **77-4.01A Summary**

Section 77-4 includes specifications for adjusting fire hydrants shown.

Comply with City of Stockton Standard Specifications and Drawings No. 101 for adjusting fire hydrant assemblies complete with connections.

### **77-4.02 MATERIALS**

#### **77-4.02A General**

Not Used

#### **77-4.02B Pipe**

The 6-inch lateral must be Class 200 PVC conforming to AWWA C900 and extend for the gate valve to the cast iron bury. The in-line tee, valve and bury pipe must have a thrust block.

#### **77-4.02C Concrete**

Concrete must comply with minor concrete.

### **77-4.03 CONSTRUCTION**

Adjust the existing fire hydrants at the locations as shown.

Adjust fire hydrants by raising after paving or surfacing where paving work is shown. Do not adjust to final grade until the adjacent pavement or surfacing is complete.

Do not close (water turned off) the water valves in the water distribution system without authorization.

### **77-4.04 PAYMENT**

Not used.

## **77-5 ELECTRICAL SYSTEMS**

### **77-5.01 GENERAL**

#### **77-5.01A Summary**

Section 77-5 includes specifications for constructing City of Stockton signals, lighting, closed circuit television, and fiber optic systems.

Electrical equipment, materials, and workmanship must comply with section 86-1.02.

Equipment list and drawings must comply with section 86.

### **77-5.01B Submittals**

#### **77-5.01B(1) Certificate of Insurance**

Submit a certificate of product liability insurance protection for \$5,000,000 for the infrared priority control system assuring the priority control user that the manufacturer is insured against civil damages if proven to be at fault for an accident due to equipment failure within the system of matched priority control components. This certificate, however, need not, and is not meant to, provide liability insurance protection to the priority control system dealer, installer or user.

#### **77-5.01B(2) Fiber Optic Testing and Documentation**

Submit test results (factory and field tests) and fiber run as-built drawings within 2 days after completing the tests.

After delivery to the project site but before installation, submit copies of OTDR traces and test results.

After installation but before connection to any other portion of the system, submit copies of traces and test results.

Submit the manufacturer's recommended procedure for pulling fiber optic cable as an informational submittal at least 20 days before installing cable.

The cable must be tested in accordance with EIA-455-3A (FOTP-3), "Procedure to Measure Temperature Cycling Effect on Optical Fiber, Optical Cable, and Passive Fiber Optic Components". Copies of the test results must be submitted.

#### **77-5.01B(3) Street Sign Design**

Submit a street name sign design.

#### **77-5.01B(4) Close-out Submittals**

Submit as-built drawings.

One copy of circuit diagrams for each piece of control equipment, operation manual and external solid-state logic circuits must be provided for each cabinet.

#### **77-5.01B(4) Notifications**

Notify a minimum of 2 business days before all field tests. The notification must include the exact location of the system to be tested.

Notify AT&T at least 7 days in advance to arrange any work by AT&T.

Notify the Engineer of the impending turn on or activation of any traffic signal included in this contract 72 hours in advance of the turn on.

### **77-5.01C Quality Control and Assurance**

#### **77-5.01C(1) Warranties, Guarantees and Instruction Sheets**

All equipment furnished must be guaranteed by the manufacturers for a period of not less than 1 year following the date of acceptance of the installation of such equipment, unless otherwise noted. If any part is found to be defective in materials or workmanship within the 1 year period and it is determined by the Engineer that said part cannot be repaired on the site, the manufacturer must provide a replacement part of equal kind and/or type during the repair period and must be responsible for the removal, handling, repair or replacement, and reinstallation of the parts until such time as the traffic signal equipment is functioning as specified and as intended herein; the repair period must in no event exceed 72 hours, including acquisition of parts.

The 1 year guarantee on the repaired or replaced parts must again commence with the date of reassemble of the system.

For the pedestrian rectangular rapid flashing beacon (RRFB) provide manufacturer's warranty in material and workmanship for a period of 24 months after acceptance.

### **77-5.01C(2) Light Emitting Diode Signal, Pedestrian, and Countdown Pedestrian Signal Module**

You must repair or replace the light emitting diode signal, pedestrian, and countdown pedestrian signal module if it exhibits a failure due to workmanship or material defect within the first 60 months of delivery.

You must repair or replace the light emitting diode signal, pedestrian, and countdown pedestrian signal module if the intensity level falls below 50 percent of the original values within 60 months of delivery.

### **77-5.01C(3) Priority Control System**

The manufacturer of the required infrared priority control system must warrant that, provided the priority control system has been properly installed, operated and maintained, component parts of a matched component system that prove to be defective in workmanship and/or material during the 1st 5 years from the date of shipment from the manufacturer must be covered in a documented system-protection plan, plus provide an added 5 year maintenance coverage for repair or replacement at a fixed deductible charge for a total of 10 years of product coverage.

The manufacturer must substantiate its financial ability to respond to warranty claims. The guarantee must be determined in reference to the manufacturer's business assets and financial experience over the preceding 5 year period.

In addition, upon request, the manufacturer must provide documentation proving ability to financially support the 10 year provisions of the warranty/maintenance period. Documentation must include appropriate financial reports for the previous five business years.

The protection plan must warrant that component parts of a matched component system that are not subject to coverage limitations and prove to be defective in workmanship and/or material during the first 5 years from the date of shipment from manufacturer must be repaired at no charge, and that extended coverage with a fixed repair deductible must be available for an additional 5 years.

In total, the warranty/maintenance coverage must assure that system components must be available to allow system operation during the 10 year warranty/maintenance coverage.

A copy of the manufacturer's written warranty outlining the conditions stated above must be supplied. Coverage and coverage limitations are to be administered as detailed in the manufacturer's Warranty/Maintenance document.

### **77-5.01C(4) Fiber Optic Testing and Documentation**

A Building Industry Consulting Services, International (BICSI) certified contractor must verify and certify all fiber tests and connections. Testing must include the tests on elements of the passive fiber optic components.

Testing at the factory includes:

1. The Manufacturer with the appropriate documentation must supply verification of the fiber specifications as listed in the Fiber Characteristics Table. After cabling, before shipment but while on the shipping reel, 100 percent of all fibers must be tested for attenuation. Copies of the results must be (1) maintained on file at the Contractor's, Manufacturer's and Owner's place of business with a file identification number for a minimum of 10 years and (2) attached to the cable reel in a waterproof pouch.

After delivery to the project site but before installation:

1. You must physically inspect the cable and reel on delivery and 100 percent of the fibers must be tested with the OTDR for attenuation to confirm that the cable meets requirements.
2. OTDR testing must be done at the following points in the system construction:
  - 2.1. At cable delivery (reel test).
  - 2.2. Following cable installation before connectorization, termination or splicing.
  - 2.3. End to end following installation of all pigtails, connectors, and termination devices.
  - 2.4. In addition, the final test (post-connectorization test) must be completed with an optical power meter and light source.

3. Test results must be recorded, dated, compared with the manufacturer factory test results and filed with the factory manufacturer test results accompanying the shipping reel in a weatherproof envelope. Attenuation deviations from the shipping records greater than 5 percent must be brought to the attention of the Engineer in writing. The cable must not be installed until completion of this test sequence and the Engineer authorizes. If the OTDR 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. The unsatisfactory reels of cable must be replaced with new reels of cable at your expense. The new reels of cable must then be tested to demonstrate acceptability. Copies of the test results must be submitted to the Engineer for approval.

After installation but before connection to any other portion of the system:

1. After the fiber optic cable has been pulled but before breakout and termination 100 percent of all the fibers must be tested with the OTDR for attenuation. Test results must be recorded, dated, compared, and filed with the previous copies of the tests. If the OTDR test results are unsatisfactory, the fiber optic cable segment will be unacceptable. The unsatisfactory segment of cable must be replaced with a new segment, without additional splices, at your expense. The new segment of cable must then be tested to demonstrate acceptability. Perform end to end attenuation test, utilizing a power meter in field, after installing the cable to establish the integrity and performance of the system and its components. The end-to-end attenuation must not exceed the sum of the maximum allowable attenuation for the component cable segments, splices, and typical loss for connectors. Nor must the attenuation from an individual connector exceed the maximum allowable losses. If the fibers in the cable exceed the allowable loss, you must take corrective measures to bring the cable's total attenuation below the allowable limit, including replacement of the cable at your expense.
2. Perform all OTDR testing in the presence of the Engineer. Testing performed and not witnessed by the Engineer must not be accepted, re-testing will be required.
3. You must verify that the attenuation and optical continuity of each active and spare optical fiber in the cable plant satisfies the specified requirements.
4. Attenuation and continuity must be measured at the operational wavelength of the equipment being used on the link. If the operational wavelength is unknown, the attenuation must be measured at both 1310 nm and 1550 nm.
5. Testing of fiber links must be completed in such way, to show the loss of each connector, in the OTDR trace. The tests must be conducted in both directions. The test must be performed at both wavelengths (1310 and 1550 nm).

During the final system testing:

1. The active components must be tested after installation. Provide all personnel, equipment, instrumentation and materials necessary to perform all testing.
2. The fiber optic must be in 1 continuous length without factory splices in the fiber. Installation procedures and technical support information must be furnished at the time of delivery. The change in attenuation at extreme operational temperature for single mode fiber must not be greater than 0.20dB/km, with 80 percent of the measured values no greater than 0.10dB/km. The single mode fiber measurement is made at 1550 nm.

You must also follow the following guidelines for efficient and accurate test results:

1. Ensure that the test jumpers (end-to-end attenuation) or test fiber box (OTDR) are of the same fiber core size and connector type as the cable system, e.g., 50/125  $\mu\text{m}$  core test jumpers must be used for testing a 50/125  $\mu\text{m}$  multimode cable.
2. Ensure that optical sources are stabilized and have center wavelengths within  $\pm 20$  nm of the 850/1300 nm multimode and 1310/1550 nm single-mode nominal wavelengths. In accordance with TIA/EIA-526-14-A, multimode LED sources must have spectral widths from 30–60 nm at 850 nm and 100-140 nm at 1300 nm.
3. Ensure that the power meter is calibrated at each of the nominal test wavelengths and traceable to the National Institute of Standards and Technology (NIST) calibration standard.
4. Ensure that the power meter and the light source are set to the same wavelength.
5. Ensure that all system connectors, adapters, and jumpers are properly cleaned prior to and during measurement.

### **77-5.01C(5) Controller cabinets**

The cabinets will be visually inspected and tested on the job site. Notify the Engineer upon delivery 15 days before installation.

## **77-5.02 MATERIALS**

### **77-5.02A Foundations**

Foundations must comply with section 86-2.03.

Certification of the concrete must be received from the vendor and delivered to the Engineer at the time the concrete is poured. Concrete foundations must be constructed on undisturbed ground, or in material that has been compacted to 95 percent relative density before excavating for foundation. The foundation must be cast monolithically up to the top 2 inches which must be placed after the standards have been plumbed. Construction of concrete foundations includes placement of reinforcement.

### **77-5.02B Standard, Steel pedestals and Posts**

Standards, steel pedestals and posts must comply with section 86-2.04. Type 1-B must have 4 bolt foundation, utilizing a cast iron pipe flange with 8 holes, with ornamental bolt cover. On Type 1-B poles, the ornamental cover must rest on grouted surface.

The Engineer must locate the position of mast arm poles to determine if mast arms will be in conflict with existing overhead utilities. If relocation of utilities is required, immediate notification must be given to the Engineer and appropriate utility company.

All traffic signal mast arms must be 1 piece and unsleeved. All unused signal head tenons must be capped.

Grout height under poles must be the height of the leveling nut plus a washer as a minimum and the height of the leveling nut, washer and 1/2 inch as a maximum. This height must be measured from the highest point of grade under the pole.

All nuts used to attach standards to foundations and all bolts and nuts used to attach mast arms to standards must be tightened with the correct size socket or box wrenches.

### **77-5.02C Conduit**

Conduit must comply with section 86-2.05.

#### **77-5.02C(1) Conduit for signal and lighting**

All conduits must be PVC, schedule 80 with rigid steel sweeps. IMC conduit must not be accepted. With the exception for bends to and from pull boxes and foundations the conduit must run straight and true so that cable pulling forces are minimized.

Insulated bonding bushings are required on metal conduit. All nonmetallic conduits must have a no.8 stranded with green insulation, copper bonded/grounding wire. These bonding and grounding wires must be connected in the pull box with cable connectors using Burndy-Servit, no. KS-15, 3M, Tessco or equal.

Conduits into pull boxes and pole foundations must be rigid metal and have 90-degree sweeps. Plastic pulling bells must be installed on all conduit ends before conductors are pulled through the conduits.

#### **77-5.02C(2) Conduit for fiber optic system**

The location of existing underground utilities must be positively identified and the location of the fiber optic trench must be accepted by the Engineer before excavation.

Conduit for fiber optic system must be PVC schedule 80, with rigid steel sweeps.

The 2 inch rigid metal conduit between no. 6 (E) pull box and the controller cabinet (for fiber optic system) must have 90-degree sweep and large radius bend. Conduit sweeps into no. 6 pull boxes on fiber optic runs must enter, with rigid sweeps, at 45 degrees (in vertical plane). Sweeps must be at least 24 inches below finished grade unless accepted by the Engineer. A pulling bell must be installed at the end of each conduit.

All fiber optic conduits must include one 1250 lbf detectable pull tape with 22 AWG wire. The detectable pull tape must be installed after the placement of fiber optic cable for future detection.

#### **77-5.02C(3) Fiber Optic Conduit Under BNSF Railway**

Conduit must be schedule 80 PVC with detectable pull tape.

#### **77-5.02D Colored Controlled Density Fill**

The controlled density fill (CDF) for the installation of all conduits must be a red color to distinguish the concrete backfill from other concrete and soil. The concrete must be pigmented by the addition of commercial quality cement pigment to the concrete mix.

The red concrete pigment must be LM Scofield Company; Orange Chromix Colorant; or Davis Colors; or equal. A minimum of 5 lbs of red tint pigment must be used per yard of the CDF mix.

#### **77-5.02E Pull Boxes**

Pull boxes must comply with section 86-2.06.

Recesses for suspension of ballasts are not required.

All pull boxes must include copper grounding rods.

All pull boxes on fiber optic interconnect runs must be no. 6 unless otherwise noted on the plans.

A no. 6 (E) must be installed adjacent to the traffic controller cabinet for fiber optic cable. The seam between pull box and extension must be grouted. The optional base slab of the 6 (T) pull box must not be used.

#### **77-5.02F Conductors**

Conductors must comply with section 86-2.08.

#### **77-5.02G Wiring**

Wiring must comply with section 86-2.09.

#### **77-5.02H Fused Splice Connectors**

Fused splice connectors must comply with section 86-2.09F.

#### **77-5.02I Bonding and Grounding**

Bonding and grounding must comply with section 86-2.10.

**77-5.02J Service**  
Service must comply with section 86-2.11. Each service must be suitable for the short circuit current available at its supply terminal.

#### **77-5.02J(1) Service Cabinet Fabrication**

Service cabinet must be a maximum width of 12 inches, height of 60–63 inches with a maximum depth of 9 inches. Minimum opening to control section 8.25 x 39.25 inches.

Cabinet must be fabricated with anodized aluminum.

Internal part must be fabricated from 14-gauge cold steel.

Cabinet must be welded construction with welding materials specifically designed for material used.

All fasteners, hinges, latches, and hardware must be of stainless steel and hinges must be continuous piano style.

There must be no exposed nuts, bolts, screws, rivets, or other fasteners on the exterior.

Cabinet must have enclosed swept pull section with removable step.

Cabinet must have fully framed ride hinged outer door with swaged close tolerance sides for flush fit with top drip lip and closed cell neoprene flange compressed gaskets.

Cabinet door must have 2,000 pound stress rated stainless hasp, welded to cabinet door.

Base mounting detail must be identical to existing cabinets for emergency Dead-front Safety Door.

Distribution and control panel must have separate hinged dead-front panels with 1/4 turn latch and knotted knobs.

Breaker compartment must be safety barriered from the control compartment.

Dead front must be hinged on the same side as the front door and must open a minimum of 120 degrees.

Removable back-pan must be mounted on 4 welded 1/4 inch studs.

#### **77-5.02J(2) Power Distribution Panel**

All circuit breakers must be installed in a vertical position, handle up for "On," handle down for "Off".

Circuit breaker must be industrial grade, Cutler Hammer Quicklag C or equal to match existing.

There must be no plug-in circuit breakers.

All bushing must be UL approved copper THHN cable bussing, fully rated 125 Amps.

#### **77-5.02J(3) Control Compartment**

There must be a minimum 25 inches from base to circuit breakers.

All components must match existing components in use for maintenance of spare parts and known reliability.

Contactors must be Cutler Hammer Class A202 or other to match existing.

The cabinet must be wired to include a spare contactor for street lighting.

The cabinet must be completely pre-wired in the factory.

Wiring must comply with NEMA IIB standards showing external connections and external equipment.

All control wiring must be 19 strand #14 AWG THHN.

All control wires must be permanently labeled with matching engraved clip-sleeve nylon markers.

All terminals must be permanently labeled.

#### **77-5.02J(4) Nameplates and Drawings**

The function of all circuit breakers, switches and other components as required must be identified by laminated engraved plastic nameplates with minimum 1/4 inch letters fastened with minimum of two 1/4-inch, #4-40 machine screws.

Wiring schematics must be computer aided drafted and include all external equipment and connections to comply with NEMA IIB.

As-built factory drawings must be enclosed in clear plastic and held inside the outer door by weld hooks.

#### **77-5.02J(5) Photoelectric Controls**

Photoelectric controls must comply with section 86-6.11 and be Type V, 3-prong twist-lock, housed inside the service cabinet.

A secondary photoelectric control system must be wired from the mast arm street light to the service cabinet. After testing the secondary, the wire must be disconnected, coiled, and secured in the service cabinet until needed at a future date. The mast arm PEU must have a north orientation. The photoelectric unit must be a multi-voltage, instant on/ delay (5 sec) off, and locking type unit.

#### **77-5.02K Signal Faces and Signal Heads**

Signal faces, signal heads and auxiliary equipment must comply with section 86-4.01, 86-4.03, 86-4.01E, and 86-4.04. Terminal compartments with hinged doors will not be accepted.

Backplate must be fastened with stainless steel self-tapping screws.

All backplates must be vented, colored satin black and 1 piece.

Visors on mast arm hung signals must be "tunnel" type and colored satin black with open slot at bottom.

All other visors must be full circle and colored satin black.

All signal face indications must have 12-inch sections.

Polycarbonate traffic signal heads will not be accepted.

All signal lenses must be glass. Lens doors must be a type with a single wing nut/fastening bolt assembly, colored satin black and made of stainless steel.

TV-1 mountings on Type 1-B standards will not be accepted.

#### **77-5.02K(1) Light Emitting Diode (LED) Signal Modules**

LED signal modules must comply with section 86-4.01D.

#### **77-5.02L Pedestrian Signals–Light Emitting Diode (LED) Pedestrian and Countdown Signal Module**

Pedestrian signals must comply with section 86-4.03.

#### **77-5.02L(1) General**

Pedestrian and countdown LED traffic signals must be:

1. 16 by 18 inches
2. full hand/full man overlay type plus countdown

The framework for pedestrian signal indicators must be colored traffic signal green.

The message-bearing surface of the module must be supplied with an overlapping, full "HAND" and "MAN" symbol that comply with Institute of Traffic Engineers standard "Pedestrian Traffic Control Signal Indications" for these symbols for a message-bearing surface of the size specified. The numbers 00 to 99 on the numerical display must have 2 rows of LEDs and a minimum height of 9 inches.

LED pedestrian and countdown signal modules must not require special tools for installation.

LED pedestrian and countdown signal modules must be weather tight, and fit securely in the housing.

#### **77-5.02L(2) Signal Lens**

The lens of the LED pedestrian and countdown signal modules must be polycarbonate UV stabilized and a minimum of 1/4 inch thick.

The exterior of the lens of the LED pedestrian and countdown signal module must be smooth and frosted to prevent sun phantom.

#### **77-5.02L(3) LED Pedestrian and Countdown Signal Module**

The LED pedestrian and countdown signal module must be a single, self-contained device, not requiring on-site assembly and include an installed gasket.

All Portland Orange LEDs must be "AlInGaP" technology or equal, and rated for 100,000 hours or more at 25 degrees C and 20 mA. White LEDs must be InGaN technology.

All internal LED and electronic components must be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

The signal module must be made of UL94VO flame-retardant materials. The lens is excluded from this requirement.

Each individual LED traffic module must be identified for warranty purposes with the manufacturer's trade name, serial number and operating characteristics, i.e., rated voltage, power consumption, and volt-ampere.

#### **77-5.02L(4) Environmental Requirements**

The LED pedestrian and countdown signal modules must be rated for use in the ambient operating temperature range of -40–140 degrees F.

The LED pedestrian and countdown signal modules, when properly installed with gasket, must be protected against dust and moisture intrusion to comply with NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for type 4 enclosures to protect all internal LED, electronic, and electrical components.

#### **77-5.02L(5) Luminous Intensity**

Pedestrian and countdown LED signal modules must be designed to operate over the specified ambient temperature and voltage range, attract the attention of, and be readable by, a viewer both day and night at all distances from 9 feet to the full width of the area to be crossed.

The luminous intensity of the LED pedestrian and countdown signal module must not vary more than  $\pm 10$  percent for voltage range of 80–135 V(ac).

#### **77-5.02L(6) Chromaticity**

The measured chromaticity coordinates of the LED signal modules must comply with the chromaticity requirements as follows:

The "hand" must be Portland orange and comply with the following chromaticity requirements:

Not greater than 0.390, nor less than 0.331, nor less than 0.997 – x.

Walking person must be lunar white and comply with the following chromaticity requirements:

1. x: not less than 0.290, nor greater than 0.330
2. y: not less than  $1.5x-0.175$ , nor greater than  $1.5x-0.130$

#### **77-5.02L(7) Electrical**

Color coded, 36 inch long, 600V, 20 AWG minimum, jacketed wires, rated for service at +2210 degrees F, must be provided for electrical connections.

The LED pedestrian and countdown signal module must operate from a  $60\pm 3$  Hz AC line over a voltage range of 80–135 V(ac). Rated voltage for all measurements must be  $120\pm 3$  volts rms.

The LED circuitry must prevent perceptible flicker over the voltage range specified above.

The LED pedestrian and countdown signal module circuitry must include voltage surge protection against high-repetition noise transients and low-repetition noise transients as stated in section 2.1.6, NEMA Standard TS-2, 1992.

Catastrophic failure of 1 LED light source must not result in the loss of more than the light from that 1 LED.

The LED pedestrian and countdown module must be operationally compatible with the currently used controller assemblies. The LED pedestrian and countdown module must be operationally compatible with conflict monitors.

The LED pedestrian and countdown module including its circuitry must meet Federal Communications Commission (FCC) Title 47, Subpart B, section 15 regulations concerning the emission of noise.

The LED pedestrian and countdown module must provide a power factor of .90 or greater over the operating voltage range and temperature range specified above for modules with 6 watts or more.

Total harmonic distortion (current and voltage) induced into an AC power line by an LED pedestrian and countdown module must not exceed 20 percent over the operating voltage range and temperature range specified above.

#### **77-5.02L(8) Functions**

The control and regulation module must be of the "smart" type in order for the countdown displays to be automatically adjusted with the programmed intervals of the traffic controller.

Operating Modes must include the following:

1. Full Cycle Countdown Mode: The module will start counting when the walk signal is energized. It will countdown the full walk and flashing clearance signal to reach "0" and turn off when the steady "Don't Walk" signal turns on.
2. Clearance Cycle Countdown Mode: The module will start counting when the flashing clearance signal turns on and will countdown to "0" and turn off when the steady "Don't Walk" signal turns on.
3. The units must be set on the clearance cycle countdown mode at the factory. The units must be easily changed to either mode by a "jumper wire" on the back of the unit.

The equipment must maintain a consistent countdown during short power failures (<1 second). A longer failure or an absence of signal superior to 1 second must turn off display and trigger a restart system remembering the last sequence, as it is done for the NEMA traffic controller.

#### **77-5.02M Pedestrian Push Buttons**

Pedestrian pushbuttons (PPB) must be the 4 wire "navigator" type as manufactured by Polara Engineering, Inc. or equal.

#### **77-5.02N Detectors**

Detectors must comply with section 86-5.01.

Sensor units must be rack mounted. Lead-in cable must be Canoga (3M) detector loop lead-in cable #30003 and consist of 4 number 18 stranded copper conductors with each conductor insulated with polyethylene. The conductors must be twisted together with a minimum of 5 turns per foot and the twisted pair must be protected with a shield of aluminum polyester jacket with a thickness of 27 mils, minimum, at any point, and must be UL listed, Style 2106. The diameter of the cable must be 0.25 inch maximum. The diagonal pairs must comply with White/Black and Red/Green color-coding.

For dual left or where there are multiple lanes with presence loops adjacent to each other and are 11 feet wide and narrower, inductive loops must be 5 feet square/diameter. For lanes wider than 11 feet, inductive loops must be 6 feet square/diameter. All advance loops and sampler loops must be 6 feet square/diameter, regardless of lane width.

Type A or B traffic rated detector hand holes may be used for loop installations (Per Brooks Product No. 4-TT or equal). Metal triangular lids with metal rings must be used. The point of the triangle must face in the direction of traffic. Conduit from detector hand hole to nearest pull box must be 2 inch diameter or as shown. If the hand hole is located at the lip of the gutter, 4 inch deep concrete is required around the hand hole.

Sealant must be asphaltic emulsion Induction Loop Sealant, State Spec. No. 8040-41A-15.

Detector loop conductors must be type 2 loop conductors.

#### **77-5.02O Solid state Traffic Actuated Controllers**

Solid-state traffic actuated controller units, cabinets, and auxiliary equipment must comply with section 86-3.

Type 2070 NEMA controller, with auxiliary equipment and cabinet must be furnished and installed. The controller must be in a 16-phase frame assembly with auxiliary equipment housed in a type P cabinet, TS-2 Type 2

The Type 2070 controller must meet the most current Caltrans Transportation Electrical Equipment Specifications (TEES). Controller must not have VME chassis. Controller must have an 8 by 40 display. Controller must have NEMA module with "A", "B", "C" connectors and standard 63-pin "D" connector. Controller must have 2070-1B CPU module, 2070-2B field I/O module, and 2070-7B modules. The Type 2070N controller must be supplied with Siemens Sepac 3.4 firmware and communicating with a central traffic control server running TACTICS software, and a 3 feet Cat5e cable. The controller must be provided with the following items:

1. QC test sheet
2. Vendor's test report
3. All the accessories, including 1B, 2B, 7B
4. One copy of the latest version of SEPAC 3.4 user manual.
5. D connector plug Special Function panel must be able to be used with either 2070N controller or NEMA ATC controller without having to do any rewiring to the connector or special function panels. "D" connector assembly must be plug-and-play for all three types of traffic signal controllers. The adapter cable must be at least 12 inches in length.

#### **77-5.020(1) Solid-State Switching Devices**

Signal light circuits must be controlled externally to each controller unit by 3-circuit solid-state switching devices, which must be plug-in mounted to a base. Each circuit must have a minimum rating of 1,000 watts for tungsten lamp or gas tubing transformer load at 120 volts, AC. Solid-state switching devices must be unaffected by transient voltages when tested in accordance with California Test 667. The switching devices must meet the requirements of section 5, "Solid-State Load Switches" of NEMA Standards Publication No. TS1.

Solid-state switching devices must be provided with an indicator light for each lamp circuit input. The light must be visible when viewing the installed switching device. No other equipment within the controller cabinet must use a socket, which will accept a switching device.

#### **77-5.020(2) Eagle (Siemens) 2070N Controllers**

Each Siemens 2070N controller must be manufactured by Siemens ITS.

Arrangements have been made to ensure that you can obtain the Siemens 2070N controllers from Jam Services, Inc., 958 E. Airway Boulevard, Livermore, CA 94551, telephone (925) 455-5267.

The price quoted by the supplier for each controller is \$7,850, not including sales tax or shipping.

The above price will be firm for orders placed on or before April 25, 2014, provided delivery is accepted within 90 days after the order is placed.

Controller must be capable of operating under NTCIP protocol as an optional firmware. Controller must be capable of being downloaded directly from a PC computer or PDA device. Controller must use Type 2070 technology, using a flash drive for software and data files and must not need PROM chips for this purpose.

When connected in City of Stockton traffic signal controller cabinet, with fiber optic interconnect system, controller must be capable of operating at a minimum of 19.2k baud rate or under Ethernet.

Controller must be capable of operating under background timed-based-coordination with both adjacent intersections until communication is established in the future. Controller software must be consistent for all intersections within this group. Controller must have 16 available phases and software must be able to operate and coordinate 2 intersections with 1 controller.

2070N controllers must be supplied with Siemens SEPAC 3.4 firmware and communicating with a central traffic control server running Siemens TACTICS software.

Controller software, at a minimum, must be capable of 4 cycle lengths, each with 4 splits and 3 offsets. Local timed-based coordination must be available with special day and special function programs available. Controller must be capable of operating quick response, and traffic responsive, using system detectors to determine coordination patterns based on volume, occupancy, directionality or queue variables. The controller software must be compatible with the traffic control software that is currently being used for nearby signals.

Controller software must include a minimum of 6 coordination modes, one of which is fully-actuated coordination. A minimum of 6 emergency vehicle preempt sequences and 6 low priority preemption routines, and capable of operating under a transit priority where transit phases are accommodated without phase skipping, but having coordination operating in the background.

Manufacturer must prove it has applications of their controller and software in a minimum of 2 or more agencies with populations over 500,000.

### **77-5.02P Traffic Signal Controller Cabinet**

Type 2070N Eagle controller with auxiliary equipment and cabinet must be furnished and installed. The controller cabinet must be capable of operating 16 phases (NEMA TS-2, Type 2). Solid-state switching devices must comply with section 77-5.02O(1) and the following:

1. NEMA TS-2, TYPE 2 traffic signal controller cabinet must be constructed of anodized aluminum to comply with section 86-3.04A. Submit alternative design details for review and approval before manufacturing a cabinet. Use metal shelves or brackets that will support controller unit and auxiliary equipment. Machine screws and bolts must not protrude outside the cabinet wall.
2. The cabinet must incorporate an interface panel to accommodate the hardwire routing of any detector output to any of the controller's first 16 detector inputs. When a TS2 controller is installed and operating in the cabinet, it must not be necessary to hardwire any detector output to any of the controller's detector inputs.
3. Loadbay must be silk screened on front and back, showing all alpha numeric positions. Loadbay must accommodate all terminations of four controller connectors (A, B, C, and D connectors).

No other equipment within the controller cabinet must use a socket that will accept a flasher or a flash transfer relay. Only mechanical relay-type flash transfer relays with DPST 15 amp contacts and 120 V coil will be allowed. If relays are required other than the flash transfer relay, they must be octal relays.

With respect to TS2 color output channel assignments, default channel, load switch, and maintenance malfunction unit (MMU) wiring, assignments on the loadbay must be as follows:

1. Channels 1 through 8 must be assigned to vehicle phases 1 through 8 respectively
2. Channels 9 through 12 must be assigned to pedestrian phases 2, 4, 6, and 8 respectively
3. Channels 13 through 16 must be assigned to overlaps A through D respectively

Traffic signal cabinets must also comply with NEMA specifications where applicable.

Equipment drawings must comply with section 86-1.04 with the following changes:

1. All information must be contained on 1 sheet. The cabinet print must be laid out to show the 3 interior walls of the cabinet folded out to show three panels.
2. The left panel must show the location of the two detectors and pedestrian termination panels, spare termination panel.
3. The center panel must show the load bay, detector rack, power supply, MMU, controller, and connector wiring.
4. The right panel must show cabinet power panel, controller termination panel, flash panel, power supply panel, special function panel, and emergency vehicle/railroad pre-empt module (if specified) and a service equipment electrical outlet (not on GFI) with six outlet power strip that is suppress for noise and has over-voltage protection.

A separate 24 V(ac)center-tapped (100VA) transformer must be provided. The 24 V(ac)transformer must be capable of handling 4-ampere minimum and be wired into the auxiliary breaker on the auxiliary power panel. Two 12 by 12 inch aluminum plates, 0.080 inch thick, must be mounted on the right side: 1 above the power panel, for future installation of fiber optic data and video modem and video equipment and 1 between the top and bottom shelves, for fiber optic cable housing. The center tapped 24 V(ac) transformer (described above) must be mounted below or to the right of the 12 by 12 inch fiber optic video and data plate as follows:

1. A 12 inch long "din" rail must be installed with the 24 V transformer.
2. The "din" rail must have a minimum of 1 each "din" grounding terminal block, 3 each "din" terminal blocks capable of accommodating 3 each size #18 wires in each hole, and 4 each "din" terminal blocks capable of accommodating 4 each size #14 wires in each hole.

3. The 3 smaller "din" rail terminal blocks must be marked "12 V, Center Tap, 12 V," respectively. The terminal block must contain the outputs from the 24 V(ac). transformer and provide a landing for the optical modem power.
4. The 4 larger "din" rail terminal blocks must be labeled "120 A.C. +, 120 A.C. neutral, 120 A.C. +, 120 A.C. neutral," respectively. The 1st two terminal blocks must land the 120 A.C. wires from the auxiliary power panel. The output from this terminal block will power the 24 V(ac) transformer and the 2nd two larger terminal blocks. The 2nd two larger terminal blocks must output 120 V(ac) power to the video camera equipment. The holes in the block must accommodate 4 size 14 wires.

An intersection drawing must be included on plan. A cabinet equipment drawing must also be included on the plan showing the location of each panel assembly, fans, light, and door equipment. Entire cabinet schematic wiring diagram must be on 1 standard "E" size sheet drawing. Three blue-line prints of this cabinet wiring diagram must be provided for each cabinet. Plans must always designate "north" to the top of the plan.

### **77-5.02P(1) Controller Cabinets**

All City of Stockton traffic signal cabinets must be constructed of 5052-H32 anodized aluminum with minimum 0.125 inch thickness and comply with ASTM B 209 or B 209 M. Base cabinet must be prepared to comply with 86-3.04A. The cabinet must have no visible exterior seams. All cabinets must be supplied with pleated dirt filters (ECO/AIR E-35-S) or equivalent, capable of filtering peat dirt. The filters must be supplied in the 12 by 16 by inch Type P cabinet. The cabinet must have the following features:

1. Louvers must be located in the lower one-half of the front door.
2. The door latching mechanism must be a roller type 3-point draw. The center catch and push rods must be cadmium plated. Push rods must be turned edgewise at outward supports and must be 0.25 by 0.75 inch minimum with U-shaped supports and D slots of 12-gauge steel or equivalent. Rollers must be 0.875-inch minimum plate steel. The cabinet door frame must be double flanged out on all 4 sides and must provide strikers for nylon rollers.
3. The door lock must be set to the right of the door handle when facing the cabinet. At no time must the handle conflict with key during operation of the handle. When the handle is in the locked position, the handle must be vertical with the fulcrum at the top. The handle must swing to the left. The latching handle must have provisions for padlocking in the latched position. The operating handle must be 7-1/2 inch long stainless steel.
4. An intersection display panel must be mounted on the inside of the cabinet door. The display must be 14 inch W by 9 inch H. The display indicators must be placed in the display to reflect a typical 8-phase intersection. The indicator lights must be LED, with appropriate colors for each indication represented. The panel must have 3-position detector switches oriented with each vehicle and pedestrian phase indicator light. The switches must operate as fixed, normal, and momentary, top to bottom. They must be labeled for each phase. Pushbuttons must be provided to test the preempt inputs. Six preempt pushbuttons must be provided and labeled "Prmpt 1/RR, (blank), Prmpt 3, Prmpt 4, Prmpt 5, Prmpt 6." There must be a door switch to turn on power to the display when the door is open. When the door is closed, a switch must remove all power to the indications. The display must be driven by the output side of the load switches. If a separate power supply is required to power the intersection display, then the display must be powered by a separate, fused DC power supply. Intersection display must be show north at the top of the display. Phase 2 must be northbound if the major movement is north/south. Phase 2 must be eastbound if the major movement is east/west. All other phases must be labeled with counterclockwise rotation. (Phase 4 to the right of Phase 2)

Each controller cabinet must be equipped with 2 electric fans with ball or roller bearings and a capacity of at least 100 cubic feet per minute each. The fans must be thermostatically controlled and separately fused and must comply with section 86-3.04B.

All circuits appearing at the controller plugs must be wired to a terminal board.

The cabinet must incorporate a series/shunt surge protection device for all 120 V(ac) powered electronic equipment within the cabinet that does not drive any (ac) electrical signals outside of the cabinet. The surge protection device must protect both the (ac)+ and the (ac)- sides of the incoming 120 V(ac) power.

The signal controller, TS2 power supply, any other auxiliary power supplies, detector power, etc. must be protected by the surge protector.

Power to drive any signal, i.e. signal colors, etc., external to the controller cabinet must not pass through the protection device. Power for the cabinet GFI, lamp, and fans must not pass through the protection device. Because the MMU is electrically connected to other "unprotected" signals, power to the MMU also must not pass through the protection device.

The surge protection and GFI device must be comply with section 86-3.04D.

The auxiliary field wire and control terminal blocks must be barrier type with marker strips and must be provided with 8/32 by 5/16 inch minimum nickel or cadmium plated brass binder head screw and metal inserts. The field terminal blocks for the signal indications, the detector terminal blocks, the power distribution assembly and the required unused blocks must be as specified above, except that screws must be 10-32 minimum.

Each controller cabinet must be provided with enough shelves to house the controller (high enough to accommodate the 2070 NEMA controller), rack mounted detectors and any other equipment supplied, or mentioned in the specifications and/or shown on the plans. In any case no less than 2 shelves must be supplied. The top shelf must contain all detector amplifiers. A pull-out laptop computer shelf must be incorporated below and attached to the controller shelf. This pull-out shelf must be 10 inch wide by 12-1/2 inch long and provide an opening under the controller shelf lip of 1-1/2 to 2-1/2 inch.

All connecting cable leads must terminate at terminal blocks. The lead-in cables must not be taped.

The field connection terminals must be located along the bottom back of the cabinet with minimum clearance of 11 inches from cabinet floor.

All identification must be by means of silk screening or engraved labels only, no KROY type tape will be accepted. Silk screening must be of a color contrasting to the cabinet door. Engraved labels must be engraved into the panel or must be made from multi-layer color contrasting plastic and must be secured with chrome-plated or stainless steel machine screws. Function and cabinet drawing reference number must be silk screened on the load bay (front and back) for field wiring terminals and controller termination panel for each controller connector. Each panel or shelf must be painted white. Each channel on detector shelf must be labeled for phase and lane where applicable. BIU racks must be labeled "TF-1", "TF-2", etc. and "DET 1", "DET 2", etc. where applicable.

Machine screws used for mounting equipment on door or walls of the cabinet must have inside nuts.

Cabinet door switch override must be provided which will allow the MMU device to be removed without causing the intersection to go into flashing operation provided the cabinet door is open. The switch must be normally "Off" and must have flip-up switch cover. With the cover up, and the switch in the "Open" position, the switch must remain open until it is manually switched off with the switch cover. This override circuit must cause the intersection to go into flashing operation if the cabinet door is closed and the monitoring device is removed. The cabinet must contain a conspicuous warning against operation without the MMU device being installed. Warning label must designate the following:

Procedure for MMU replacement for periodic maintenance:

1. Go to Unit Data (4) on the controller front panel. Choose Port 1 Data (7) and scroll down to item no. 16 MMU. Move the cursor right to "Pres" (Y/N).
2. Lift switch cover for interlock circuit and place switch to "On" position, then immediately hit "0" under Y/N for the MMU. This turns off communication to the MMU from the controller.
3. Remove MMU and replace with pre-tested unit.
4. Go back to Unit Data (4) on the controller front panel and choose Port 1 Data (7). In reverse, push down switch cover which will close interlock circuit and immediately hit "1" under "Pres." (Y/N) on Item No. 16 MMU. This reinstates communication.
5. Interlock circuit switch must always remain in the off position except when replacing MMU unit for period maintenance.

With MMU device disconnected, and controller power off, the intersections must go into flashing operation and remain in flashing operation until controller power is turned on.

Sixteen red fail jumpers must be supplied with each cabinet. Red fail jumpers must be made of 0.080 inches thick aluminum, 2 by 3/4 inch. The U-shaped cut-out must be exposed aluminum with the rest of the jumper covered with red, heat-shrink tubing insulation.

For the detector termination panel, the bottom 6 terminal positions on the last terminal block must be allocated for pedestrian push button and pedestrian common (return) wires. The rest of the terminal positions must be allocated to detector cable input wires. There must be sufficient terminal positions for 4 pedestrian inputs, 2 pedestrian returns and 64 loop inputs (32 channels).

The detector rack must accommodate a minimum of 8 model E Reno A&E 4-channel detector amplifiers with LCD display.

Ground fault interrupter utility outlets must be mounted on the right cabinet panel.

Flasher unit must be rated 25 amperes minimum.

A MMU must be supplied with each cabinet unless specified otherwise. A signed and dated test sheet for the unit, performed at the factory, must be included with each MMU supplied. MMU must meet NEMA Standards Publication TS-2-1998 and containing the following features as a minimum:

1. Dual Indication Monitoring: simultaneously active inputs of Green (Walk), Yellow, or Red (Don't Walk) on the same channel.
2. GY-Dual Indication Monitoring: detects simultaneously active inputs of Green and Yellow field signal inputs on the same channel.
3. Field Check Monitoring: This function combines information about active field inputs with information received through the Port 1 communications between the Controller Unit and the MMU in a TS2 Cabinet.
4. External Watchdog Monitoring: this detects an optional external watchdog output from a controller unit or other external cabinet device.
5. Program Card Absent Monitoring: this function causes a fault should the MMU be absent a program card or a poorly seated card.
6. Display LED Test.
7. 12 Volt DC Monitoring.
8. Modified CVM Latch.

MMU and controller cables, when not connected to controller or monitor, must not be long enough for connectors to touch AC field wiring terminals (potential shorting problems).

Cabinet must be a swing-down type loadbay with the pivot point on the front of the loadbay must be utilized. Signal cabinet must be supplied without communication equipment. A separate 24 V(ac) center-tapped 100 VA transformer must be installed for fiber optic data and video modem. The 24 V(ac)transformer supply must be wired into the auxiliary breaker on the auxiliary power panel.

The vehicle pre-empt must comply with section 77-5.02V "Priority Control System." The optical detection phase selector must include the ability to directly sense the green traffic controller signal indications through the use of dedicated sensing circuits and wires connected directly the field wire termination points in the traffic controller cabinet. The phase selector must be a plug-in, 4-channel, multiple-priority device intended to be installed directly into a card rack located within the controller cabinet. The harness wire, which connects to the phase selector, must be installed in the cabinet before shipping the cabinet to the City of Stockton Corporation Yard for testing. Two directions with the same phasing (like; 2-6 and 4-8) must have separate wiring from cabinet to the proper signal poles. The cabinet must be wired such that the 2 phases do not turn green, at the same time, during vehicle pre-emption in only 1 direction. The following configuration must be used for detection:

Channel	Phase	2070/M50
A	2 and 5	3
B	4 and 7	4
C	6 and 1	5
D	8 and 3	6

A communication cable must be furnished to enable the phase selector to communicate with a PC or the Siemens's Eagle type 2070N controller must be provided with the following items:

1. QC test sheet
2. Vendor's test report
3. All the accessories, including 1B, 2B, 7B
4. Running Siemens SEPAC 3.4 firmware and must communicate with a central traffic control server running Siemens TACTICS software.
5. D connector plug Special Function panel must be able to be used with either 2070N controller, Eagle M50 controller or NEMA ATC controller without having to do any rewiring to the connector or special function panels. "D" connector assembly must be plug-and-play for all 3 types of traffic signal controllers. The adapter cable must be at least 12 inches in length.

Type P cabinet TS2 with Eagle type 2070N controllers must be provided with 2 redundant SDLC cables. One must be standard 15-pin connector and the other must be 25-pin connector to accommodate either NEMA TS-2 or 2070 TS-2 Type 2 controllers.

All field wiring terminating in the traffic signal controller cabinet or service cabinet must be fastened to the termination panels with one piece copper solderless/crimple wire lugs. Solderless/crimple lug must have offset shank and have a maximum wire size capacity of 6.

#### **77-5.02Q Pedestrian Rectangular Rapid Flashing Beacon**

Each pedestrian rectangular rapid flashing beacon (RRFB) must be manufactured by Spot Devices, Inc / Carmanah Technologies.

Arrangements have been made to ensure that you can obtain the RRFB from Jam Services, Inc., 958 E. Airway Boulevard, Livermore, CA 94551, telephone (925) 455-5267.

The price quoted by the supplier for each RRFB, model SB435 with model SC315 is \$7,450, not including sales tax or shipping.

The above price will be firm for orders placed on or before April 25, 2014, provided delivery is accepted within 90 days after the order is placed.

The RRFB must be tested and demonstrated to the Engineer that it is operating as intended.

RRFB must include 2 rectangular-shaped yellow indications, each with an LED-array based light source. Each rectangular rapid flashing beacon indication must be a minimum of approximately 7 inches wide by approximately 3 inches high. RRFB must be Spot Device model SB435 HP or equal.

The actuation device must be a "talking" pedestrian pushbutton with instruction plate that provides an audible warning message when activated as provided by Spot Devices.

The RRFB controller powers and controls the rectangular rapid flashing beacons. The controller must be housed in a vandal-resistant, aluminum, NEMA 3R, pole-mounted cabinet with a lockable, hinged door. The controller must be Spot Devices model SC315 or equal.

#### **77-5.02Q(1) Operation**

When activated, the 2 yellow indications in each RRFB must flash in a rapidly alternating "wig-wag" flashing sequence (left light on, then right light on).

Each of the 2 yellow indications of an RRFB must have 70 to 80 periods of flashing per minute and must have alternating but approximately equal periods of rapid pulsing light emissions and dark operation.

During each of its 70 to 80 flashing periods per minute, 1 of the yellow indications must emit 2 rapid pulses of light and the other yellow indication must emit 3 rapid pulses of light.

The flash rate of each individual yellow indication, as applied over the full on-off sequence of a flashing period of the indication, must not be between 5 and 30 flashes per second, to avoid frequencies that might cause seizures.

The light intensity of the yellow indications must meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005.

The rectangular rapid flashing beacon must be normally dark, must initiate operation only upon pedestrian actuation, and must cease operation at a predetermined time after the pedestrian actuation or, with passive detection, after the pedestrian clears the crosswalk.

All rectangular rapid flashing beacons associated with a given crosswalk (including those with an advance crossing sign, if used) must, when activated, simultaneously commence operation of their alternating rapid flashing indications and must cease operation simultaneously.

If pedestrian pushbuttons (rather than passive detection) are used to actuate the rectangular rapid flashing beacons, a pedestrian instruction sign with the legend PUSH BUTTON TO TURN ON WARNING LIGHTS should be mounted adjacent to or integral with each pedestrian pushbutton.

The duration of a predetermined period of operation of the rectangular rapid flashing beacons following each actuation must be based on the procedures for timing of pedestrian clearance times for pedestrian signals.

Except as otherwise provided above, all other provisions applicable to warning beacons must apply to rectangular rapid flashing beacons.

#### **77-5.02R Luminaires**

Each luminaire must be manufactured by General Electric.

Arrangements have been made to ensure that you can obtain the luminaires from Jam Services, Inc., 958 E. Airway Boulevard, Livermore, CA 94551, telephone (925) 455-5267.

The price quoted by the supplier for each luminaire, model GE MSCL200S0A22FMC31 is \$470, not including sales tax or shipping.

The above price will be firm for orders placed on or before April 25, 2014, provided delivery is accepted within 90 days after the order is placed.

For the traffic signal mast arm luminaires a 200 W high-pressure sodium (HPS) vapor luminaires with integral ballast must be provided. Lights must be full cut-off. GE MSCL200S0A22FMC31 or equal.

A single photoelectric unit must be used to control all traffic signal luminaires (and adjacent street lights, which are part of this project). This photoelectric unit must be Type V 3-prong twist-locking type unit installed in the service cabinet. Photoelectric control must have an instant on/delay (5 second) off incorporated, to prevent cycling if struck by vehicle headlights. The photoelectric cell must be solid-state unit and the photocell sensitivity must comply with PG&E LS rate requirements.

A 2nd backup photoelectric unit must be fully wired and installed on the top of the mast arm pole nearest the service cabinet. The unit must be field tested and then disconnected at the service cabinet.

Each photoelectric cell and shunt cap provided with each luminaire must be manufactured by Sunrise Technologies.

Arrangements have been made to ensure that you can obtain the photoelectric cells and shunt caps from Jam Services, Inc., 958 E. Airway Boulevard, Livermore, CA 94551, telephone (925) 455-5267.

The price quoted by the supplier for each photoelectric cell, part No. S124-1.5-ST is \$18, not including sales tax or shipping. The price quoted by the supplier for each shunt cap, part No. 6005 is \$18, not including sales tax or shipping.

The above price will be firm for orders placed on or before April 25, 2014, provided delivery is accepted within 90 days after the order is placed.

Photoelectric cells provided with each luminaire must be Sunrise Technologies Part No. S124-1.5-ST or equal. "SHUNT Caps" must be Sunrise Technologies part # 6005 or equal.

Luminaires must be Multi-volt (120/208/240/277).

## **77-5.02S Fiber Optic Cabling**

### **77-5.02S(1) General**

Coordinate connection of new fiber optic system with AT&T facilities for Charter Way/Tillie Lewis Drive location. Contact AT&T at 209-474-4364.

BICSI certified experienced personnel must do the installation, connection and testing of any fiber optic cable.

The fiber cable must be all-dielectric, gel-free, with stranded loose-tube design with dry water blocking for outdoor duct and aerial installations. Fiber optic cable must be comprised of water-swellable yarns and/or tapes, dielectric strength members, ripcord and a medium density polyethylene (MDPE) jacket containing carbon black to provide ultraviolet light protection while inhibiting the growth of fungus. The cable must be fully water blocked using craft-friendly water-swellable yarns and tapes, making cable access simple and requiring no clean up. Cables must contain at least 12 single-mode (SM) dual operating window (1310 nm and 1550 nm) for drop cable and at least 24 single-mode(SM) for the fiber optic main run dual operating window (1310 nm and 1550 nm) fibers. Each fiber must be distinguishable by means of color-coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." The fiber must be colored with ultraviolet (UV) curable inks. You must provide manufacturer's certification that the cable is meeting the functional requirement of Rural Utilities Service (RUS) 7 CFR 1755.900 and fully compliant with ICEA S-87-640, Standard for Optical Fiber Outside Plant (OSP) Communications Cable. Manufacturer must be ISO9001 and TL9000 registered. Cable must have storage temperature range of -40–158 degrees F, an installation temperature range of -30–70 degrees C and an operating temperature range of -40–158 degrees F. The cable must have a short-term tensile rating of 2700N. Cable and fiber manufacturer must be the same company with minimum of 20 years in manufacturing optical fiber cable to demonstrate cable long-term reliable field performance and to ensure the availability of fully integrated technical support.

The fiber cable installed in the traffic signal cabinet, must be composed of at least 12 factory pre-connectorized fiber optic SC pigtails and must be terminated in the LIU wall mount box with a 12 port coupler panel SC compatible connector.

The fiber optic cable includes the following components:

1. Buffer tube
2. Dielectric central member
3. Water-swellable yarn
4. Fiber and water-swellable yarns (at least 12 fiber per tube)
5. Water-swellable tape
6. Dielectric strength members
7. Ripcord
8. Outer jacket

### **77-5.02S(1)(a) Buffer Tube**

The buffer tube must be gel free. The optical fibers must be contained within loose buffer tubes. The loose buffer tubes must be stranded around a dielectric central member using the reverse oscillation stranding process. The buffer tubes must be made of polyethylene (PE). Each buffer tube must contain a water swellable yarn for water blocking protection. The buffer tube must be manufactured to a standard 0.12 inches in size, Regardless of fiber count, to reduce the number of required installation and termination tools. Each buffer tubes must be distinguishable from other buffer tubes in the cable by means of color-coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding."

### **77-5.02S(1)(b) Dielectric Central Member**

The central member which functions as an anti-buckling element to resist temperature and induced stresses, must be a glass reinforced plastic rod with similar expansion and contraction characteristics as the optical fiber and buffer tubes. The loose buffer tubes must be stranded around a dielectric central member using the reverse oscillation stranding process.

#### **77-5.02S(1)(c) Water Swellable Yarn and Tapes**

The water-swellable yarn must be non-nutritive to fungus, electrically non-conductive, and homogeneous. It must also be free from dirt or foreign matters. Water swellable yarn must be applied longitudinally along the central member during stranding.

The water swellable tape must be applied longitudinally over both the inner and outer layer. The tape must be non-nutritive to fungus, electrically non-conductive, and homogenous. It must also be free from dirt and foreign matters. Two polyester yarn binders must be applied contra-helically with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes.

#### **77-5.02S(1)(d) Dielectric Strength Members**

Tensile strength must be provided by high tensile strength yarns and/or fiberglass which must be helically stranded evenly around the cable core and must not adhere to other cable components.

#### **77-5.02S(1)(e) Ripcord**

The cable must contain at least 1 ripcord under the jacket for easy sheath removal.

#### **77-5.02S(1)(f) Outer Jacket**

The cable jacket must be marked with the manufacturer's name, the number of fiber "SM", month and year of manufacture, sequential meter or foot markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code (NESC), fiber count, and fiber type. The print color must be in a contrasting color to the cable jacket. The height of the marking must be approximately 0.1 inches. The cable jacket must be medium density polyethylene (MDPE) jacket containing carbon black to provide ultraviolet light protection while inhibiting the growth of fungus.

#### **77-5.02S(2) Fiber Connectors ST, SC**

Connector must comply with industry standard ANSI/TIA/EIA-568-B.3. The connector must comply with TIA/EIA Fiber Optic Connector Intermateability Standard (FOCIS) document, TIA/EIA 604-2. The connector must have a ceramic ferrule and metal bayonet.

The connector installation must require the use of an anaerobic adhesive, which is a 2-part epoxy process. First the adhesive is injected into the connector ferrule, and then the fiber is dipped into the primer and inserted into the connector. When these chemicals come into contact the connector will be cured to the fiber in less than one minute. The connector must not require a curing device or special holding tools during the installation process, such as an oven. The connector is then hand polished without the need of a polishing machine while consistently capable of insertion losses of 0.2 dB (typical). The maximum insertion loss must be 0.75 dB (maximum) when installed in accordance with the manufacturer's recommended procedure and tested in accordance with FOTP-171. Connector reflectance must be less than or equal to -40 dB when installed in accordance with the manufacturer's recommended procedure. Manufacturer must be ISO 9001 and TL 9000 registered. The manufacturer must have an in-depth knowledge, and more than 10 year history, of manufacturing.

The single-mode anaerobic-cure connector must have a blue boot and be supplied with all boots and crimps bands for installation on 3mm, 2mm, and 900µm fiber for ST and SC.

The connectorized fibers must be clearly labeled.

### **77-5.02S(3) Splice Tray 12-Fiber**

Splice tray must securely organize and provide physical protection without stress on the fibers for both single-mode and multimode individual and ribbonized fiber splices. Splice Trays must not induce attenuation of signal at operational wavelengths up to 1550 nm. The metal tray must consist of a rugged aluminum base and aluminum cover with crimpable metal tabs that provide buffer tube strain-relief on both ends of the tray. A clear polymer compound tray cover must be available and allow visibility of the fibers for inspection without opening the tray. Additional strain-relief points must tie-wrap buffer tubes or pigtails to the metal tray. Metal trays must feature black powder coating for ease of fiber identification and protection. Splice trays must contain organizers for various splicing methods to include fusion splice, fusion splice with heat-shrink sleeve or mechanical sleeve, and mechanical splice part. Trays must hold up to 24 single-fiber splices and up to six mass fusion splices. The room temperature vulcanizing (RTV) fusion splice organizer must be of high-precision molded construction that holds and protects the actual splice thus eliminating the need for extra splice protection parts. Each mechanical splice organizer must provide a positive holding action for maximum splice protection during installation and operation. Splice Trays must be fully compatible with hardware connector/splice housings and splice enclosures to include various lengths and depths for a variety of splicing methods.

### **77-5.02S(4) Advanced Splice Closure (SCF)**

The SCF splice closures must be available in canister (butt) and in-line styles to fit most applications. All end-caps feature two express ports for uncut feeder cables. QUICK-SEAL™ Mechanical Seal drop ports allow for rapid and easy installation during initial build or future expansions.

The Splice Closure Housing must be non-metallic. It must be resistant to solvents, stress cracking and creep. The housing materials must also be compatible with chemicals and other materials to which they might be exposed in normal applications. The optical fiber closure must be capable of accepting any optical fiber cable commonly used in interoffice, outside plant and building entrance facilities. As an option, the ability to double the cable capacity of an installed canister splice closure by use of a kit must be available. Such a conversion must not disturb existing cables or splices.

Encapsulation must not be required to resist water penetration. The splice closure must be re-enterable. The closure end-cap must be capable of accepting additional cables without removal of the sheath retention or strength-member-clamping hardware on previously installed cables or disturbing existing splices. The optical fiber splice closure must provide a clamping mechanism to prevent pistoning of the central member or strength members and to prevent cable sheath slip or pullout. The splice closure must have appropriate hardware and installation procedures to facilitate the bonding and grounding of metal components in the closure and the armored cable sheath. The cable bonding hardware must be able to accommodate a copper conductor equal to or larger than 6 AWG.

The closure must accommodate splice trays suitable for single-fiber, single fiber heat-shrink, mechanical or ribbon heat-shrink splices. The small splice closure must accommodate up to 72 single-fiber splices or 144 ribbon fibers splices using 12-fiber ribbons. The installation of the splice closure must not require specialized tools or equipment, other than those normally carried by installation crews.

The SCF splice closure must be according to the required fiber capacity.

### **77-5.02S(5) Small Line Interface Units (LIU) Wall Mount Box in the Traffic Signal Cabinet**

The Single Panel housings must be available for cross-connecting or interconnecting purposes. Two single panel units must be provided. The units must provide the means for direct connections for up to 2-12 fibers or as indicated on the plans. The units also must provide means for pigtail splicing within the housing for at least 12 fibers or as indicated on the plans. The Single Panel housings must accommodate a single LANscape Solutions panel. The housings must have a small footprint and low profile to minimize the amount of occupied space. The dimensions must not exceed the 6.3 inch (height) 5.5 inch (width), and 2 inch (depth).

Manufacturer must be ISO 9001 and TL 9000 registered. Housings must be manufactured using 16-gauge aluminum or equivalent for structural integrity and must be finished with a wrinkled black powder coat for durability. Assembly hardware and equipment-attaching-machine screws must be included and must be black in color. Housing must include a 0.4 inch splice holder, which will support up to 12 heat shrink splices. Top and bottom removable cable entry grommets must be provided to allow for mid-span access and environmental sealing. The housings must be supplied with pre-drilled holes for surface mounting on the plate in the traffic signal cabinet, but must have an optional ledge mount bracket available. Each CCH housing must be labeled with Machine labels identifying to/ from destinations and fiber counts.

#### **77-5.02S(6) Single Mode Fiber Patch Cables SC-SC, ST-SC**

Patch Cord connectors must be measured for insertion loss with the following values for each connector: typical of 0.1 dB and maximum of 0.5 dB and guaranteed reflectance of  $\leq -55$  dB for UPC. Manufacturer must be ISO 9001 and TL 9000 registered. Available connectors must be single-mode SC, ST@ Compatible Connector. Patch cord must contain standard single-mode fiber and must comply with TIA/EIA-568-B.3 and applicable TIA/EIA-604 document. Patch Cord jacket color must be yellow. Patch Cord must be available in different lengths. The manufacturer must have an in-depth knowledge, and more than 10-year history, of manufacturing optical fiber patch cords. Manufacturer must manufacture both cable, fiber, and the connectors. The SC-ST must be provided for connecting the video modem to LIU and SC-SC must be provided for connecting data modem to LIU.

At each signalized intersection, in the Traffic Signal Cabinet, provide the following:

1. Two 3 feet patch cables SC /SC (simplex) jumpers to connect from fiber housing to the switch connection.
2. Two 3 feet patch cable ST/SC (simplex) jumpers for video connections to the fiber housing.

#### **77-5.02S(7) Warning Tape**

Warning tape must be provided and placed in the trench over conduits containing fiber optic cable as shown. The warning tape must be 4 inches wide with bold printed black letters of approximately 75 inches on bright orange color background, and contain the printed warning "CAUTION BURIED FIBER OPTIC CABLE" repeated at approximately 30 inches intervals.

The printed warning must be non-erasable and must be rated to last with the tape for a minimum of 40 years.

The construction of the warning tape must be such that it will not delaminate when it is wet. It must be resistant to insects, acid, alkaline and other corrosive elements in the soil. It must have a minimum of 120 lb tensile strength per 4 inch wide strip and must have a minimum of 700 percent elongation before breakage. The warning tape must be the detectable type with a contiguous conductor in the form of a copper wire or aluminized foil, encased in a protective plastic jacket. The aluminized foil must be approximately 0.01 inch thick. Separate rolls of the warning tape must be electrically connected by corrosion resistant clips or soldering. The ends of warning tape must extend into pull boxes and splice vaults a minimum of 24 inches for future connection to a warning signal device. The continuity and detestability of the warning tape, for the entire conduit run, must be demonstrated before and after backfilling each trench to the satisfaction of the Engineer.

#### **77-5.02T Street Name Signs**

Provide and install street name signs as shown. Supply sign brackets and all necessary hardware to install signs.

Street name sign block numbers must be installed on the lower right hand side of each street name sign. The street name sign bracket must be double banded on mast arm.

The street sign must say "R3-4 (No U-Turn) mast arm sign must be 36 by 36 inches

#### **77-5.02U Traffic Signal Controller Communications and CCTV System**

##### **77-5.02U(1) Fiber Optic Ethernet Switches for Traffic Signal Controller at Signalized Locations**

Supply and install field devices to establish communication between traffic signal controllers and City of Stockton Central Control Center (CCC). Furnish to the Engineer, the following equipment for the CCC.

1. Four Comnet CNGE8US environmentally hardened 1 fiber Ethernet 8 port unmanaged switch, supports 10/100/1000 Mbps, or equal (3 for field and 1 for CCC).
2. Three Comnet SFP-22A Single Mode, 1000fx, 1310nm, 60 km, 1 Fiber, SC Small Form-Factor Pluggable module, or equal.
3. Three Comnet SFP-22B Single Mode, 1000fx, 1550nm, 60 km, 1 Fiber, SC Small Form-Factor Pluggable module, or equal.
4. Four Comnet SFP-1 Copper 10/100/1000 Mbps RJ45 Small Form-Factor Pluggable modules, or equal.
5. One Comnet C1US Card-Cage Rack with 90-264 VAC 50/60hz Power Supply, or equal (for CCC).
6. Other accessories as required by the manufacturer.

**77-5.02U(2) Fiber Optic Video Modems-Four port at Tillie Lewis Dr/Charter Way Intersection**

Install video modem to be installed in the field. Furnish to the Engineer, the following equipment for the CCC.

1. Video/Data Modem: GE (IFS) VR7430-R3-2DRDT Receiver single mode fiber rack mounted or equal (for CCC).
2. Video/Data Modem: GE (IFS) VT7430-2DRDT video transmitter single mode fiber shelf mounted or equal (for the field).
3. Various modem mounting hardware, power supply, and cables.
4. Other accessories as required.

**77-5.02U(3) Fiber Optic Video Modems at Navy Drive/Off/On Ramps and Navy Drive/Tillie Lewis Drive Intersections**

Install video receiver or transmitter data transceivers in the field at each intersection. Furnish to the Engineer, the following equipment for the CCC.

1. Two Central Video/Data Modem: GE (IFS) VR4930 WDM FM video receiver/data transceiver: 1300/1550 nm, one single mode fiber (shelf mount), or equal (for CCC)
2. Two Field Video/Data Modem: GE (IFS) VT4930 WDM FM video transmitter/data transceiver: 1300/1550 nm, one single mode fiber, shelf mounted or equal (for field)
3. Various modem mounting hardware, power supply, and cables
4. Other accessories as required

**77-5.02U(4) Video and Data Digital Networking for Each Camera Location**

Install a Rhino power supply, 1 at each signal location. Furnish to the Engineer Verint Systems Encoder for each signal location. Furnish to the Engineer Cisco 100 base LX fiber module for CCC.

1. Verint Single-Port Encoder (MPEG4 Model S1900E-T-AS-XT (6W@12 V(dc))), or equal (for field)
2. Rhino 12 V(dc) Power Supply (Model PSM12-156 with max input 2.5A@120 V(ac) or equal (for field cabinet)
3. Cisco 100 base LX fiber module, Model GLC\_FE\_100LX or equal (one for CCC)
4. Three year warranty coverage (hardware & labor)
5. Various mounting hardware, power-supply and cables
6. Other accessories as required

**77-5.02U(5) Managed Ethernet Switch Transceiver, for Navy Drive / Tillie Lewis Traffic Signal Cabinet**

Furnish to the Engineer a Cisco Systems Managed Ethernet Switch (Catalyst 2955, Model Switch/WS-2955S-12) or equal and a Naztec transformer model No. 2955PS or equal.

**77-5.02U(6) Traffic Monitoring Camera Cabling**

Power cable must be A11403-BWG (water and sun resistant, 3-#14 AWG, white/green/black, UL Type TC 600V, NEC type TFN Conductors, IEEE 1202/CSA FT4, IEEE 383, UL Subject 1277, and OSHA acceptable) or equal.

Composite Data and Coaxial cable for PTZ control must be UL approved, water and sun resistant, 3C18AWG, 75C, E108998, Max operating Voltage 300 V RMS, and CM C(UL) 3098 15:44 ROHS., or accepted equivalents.

All coaxial BNC connectors must be 75 ohm. All cables must be continuous with no splices between the controller cabinet and the cameras.

#### **77-5.02U(7) High Speed Dome Pan/Tilt/Zoom Traffic Monitoring Camera**

Equipment must consist of a single Pan/Tilt/Zoom (PTZ) camera capable of providing a 360 degrees viewing field. Equipment must include all mounting hardware (pole top), camera unit, coaxial video and data cable, power cable, field modem, and central office modem to make the installation complete and operational with the existing City of Stockton traffic management's video system.

The camera must be fully compatible with and be able to communicate with the City of Stockton's existing Philips' Allegiant Microprocessor Based Switcher/Control System TC 8800, version 6.70. Following components are integral part of the system.

Bosch AutoDome 600 Series Intelligent PTZ Camera System VG5-624-ECS 36X Day/Night camera.

VG4-A-PA1-Pendant Arm Mount with 120 V(ac) Transformer.

VG4-A-9541 pole mount adaptor.

Install, test, and troubleshoot the camera system at each location, when the project includes multiple new traffic signal installations or modification of the existing traffic signals.

#### **77-5.02V Priority Control System**

Installing, test, and troubleshoot the vehicle pre-emption system at each location, when the project includes new traffic signal installations or modification of the existing traffic signals. The priority system must receive and store all information in a processor at each traffic signal controller cabinet. The priority control system must match the existing system at other traffic signals.

#### **77-5.02V(1) System Description**

A priority control system must operate in a manner that allows infrared as well as other signal control technologies to interoperate and activate one another in a consistent manner. The priority control system must consist of a matched system of vehicle equipment and intersection equipment capable of employing both data-encoded radio communications to identify the presence of designated priority vehicles, as well as data-encoded infrared signaling communications. In preemption mode, the data-encoded communication must request the traffic signal controller to advance to and/or hold a desired traffic signal display selected from phases normally available. A record of system usage by agency identification number, vehicle classification and vehicle identification number must be created. The system software must support call history analysis and reporting across any subset of intersections and/or vehicles independent of activation method. System software must also support both onsite and remote programming and monitoring of the priority control system.

Intersection detection equipment must consist of an infrared detector at or near the intersection that is connected to a phase selector located in the intersection controller cabinet. The infrared detector, mounted on signal pole mast arms or vehicle signal head, receives the data-encoded infrared signal from the infrared equipped vehicle and transmits information through detector cable designed to convert infrared light energy at the proper wavelength into analog voltage signals that can be evaluated and decoded by the phase selector.

The phase selector must be capable of receiving data encoded signals from infrared and other signals and combine the detection signals into a single set of tracked vehicles requesting priority activation. The phase selector will process the vehicle information to ensure that the vehicle is (1) in a predefined approach corridor, (2) heading toward the intersection, (3) requesting priority, and (4) within user-settable range. The phase selector must treat the combined, single set of tracked calls with first come first served priority methodology within a given priority level. Arbitration between infrared signal intensity and other signal distance/ETA must be first come first served methodology based on time of detection as each equipped vehicle reaches its programmed threshold.

When these conditions are met, the phase selector must generate a priority control request to the traffic controller for the approaching priority vehicle. The system must offer compatibility with most signal controllers, e.g. NEMA (National Electrical Manufacturers Association) 170/2070 controllers. The system can be interfaced with most globally available controllers using the controller's preemption inputs. RS-232, USB and Ethernet interfaces must be provided to allow management by on-site interface software and central software. The required priority control system must be vehicle ID compatible with neighboring jurisdictions using optical emergency vehicle preemption.

### **77-5.02V(2) Matched System Components**

The required priority control, data-encoded, infrared communications system must be comprised of 5 basic matched components: data-encoded emitter, infrared detector, detector cable, phase selector and system software. This system must be installed, with all five basic components, at each signalized location. In addition, a card rack and an electromechanical interface card must be available if required. To ensure system integrity, operation and compatibility, all components must be from the same manufacturer. The system must offer compatibility with most signal controllers, e.g., electromechanical, NEMA (National Electrical Manufacturers Association), 170. Interfacing to an electromechanical controller may require the use of an interface card.

The data-encoded LED emitter must trigger the system. It must send the encoded infrared signal to the detector. It must be located on the priority or probe vehicle. A remote coding unit must be purchased and delivered with each LED Emitter.

The detector must change the infrared signal to an electrical signal. It must be located at or near the intersection. It must send the electrical signal, via the detector cable, to the phase selector.

The detector cable must carry the electrical signal from the detector to the phase selector. The cable must be made by the same manufacturer as the rest of the priority control system.

The phase selector must recognize inputs from both infrared and other signal activation methods at the intersection and supply coordinated inputs to the controller. The phase selector must process the data in order to validate that all parameters required for granting a priority request are met. It must be located within the controller cabinet at the intersection. It must request the controller to provide priority to a valid priority vehicle by connecting its outputs to the traffic controller's preemption inputs.

The card rack must provide simplified installation of a phase selector into controller cabinets that do not already have a suitable card rack.

The auxiliary panel must provide additional preemption outputs if needed. It must also provide a connection point for the phase selector to monitor the status of the intersection's green lights (green sense). Additional RS-232 communication ports may also be accessed via this panel. If additional outputs are not required, an auxiliary harness must be used to monitor the status of the intersection's green lights.

The system software must be a Windows XP and Window 7 operating system for system. It supports system configuration and gathering of operational information.

### **77-5.02V(3) System Component Specifications**

#### **77-5.02V(3)(a) Data encoded LED Infrared Emitter and Programming Software**

The required data-encoded emitter must be LED and generate the infrared signal, which serves as the trigger to the rest of the priority control system. The infrared signal generated by the data encoded emitter must be a series of intense flashes from a single light source with integral power supply. The flash signal must consist of a fixed frequency base signal and a coded overlay signal that can be used to transmit information.

The data-encoded emitter must be LED type and powered by the DC voltage supplied from the vehicle's battery, 10 to 32 V(dc). The unit must be equipped with a weatherproof in-line fuse holder and a weatherproof quick-disconnect plug.

The unit, including all electronics, must be miniaturized to a size no greater than 5.9 inches wide by 3.8 inches high by 3.5 inches deep to accommodate standalone and internal light-bar installation.

The data-encoded emitter must come with a 25 foot installation cable.

The flash sequence generated by the data-encoded emitter must carry three types of information as listed:

1. Must be one of 3 distinctly different base frequencies of either 10 Hz for a low priority emitter, or 14 Hz for a high priority emitter or 12 Hz for probe frequency.
2. Must be a vehicle classification and identification code that is interleaved into the base frequency flashes. Setting the vehicle classification and identification code must be accomplished through emitter programming software. Each data-encoded emitter must be capable of setting 10 different classifications with 1,000 different identification numbers per class for a total of 10,000 codes per base frequency.
3. Must be reserved for setting the intersection detection range. The system must enable the traffic engineer to activate the range code from his/her vehicle using a specially equipped emitter control module with a range setting command switch. The system must accommodate setting a separate range from 200 to 2,500 feet for both high and low priority signals.

The emitter must include a multi-purpose port compliant with the SAE J1708 communication standard. This port enables unit configuration to be set into the emitter and read from the emitter.

While operating, the data-encoded emitter must conduct self-diagnostics designed to monitor data transmission integrity by checking for missing pulses. Any failures of the self-diagnostic tests must be displayed by flashing of the ON/OFF switch indicator light.

An ON/OFF switch available for each data-encoded emitter must be equipped with an indicator light providing internal diagnostics to assist in troubleshooting. The indicator light must operate as follows:

1. Steady on when the emitter is operating
2. Flash at a 0.5 Hz rate when the emitter is intentionally disabled
3. Flash at a 2 Hz rate when the emitter is inoperative

The LED emitter must contain visible light LEDs which may be user configured as follows:

1. Flash at emitter flash rate during normal operation. Flash at diagnostic rate when unit has failed or is in disable mode. The visible LEDs will flash at the same rate as the infrared LEDs during normal operation. When the emitter is in disable mode; the LEDs will flash once every 2 seconds. When the emitter has failed, the LEDs will flash 2 times per second.
2. Off during normal operation, flash at diagnostic rate when unit has failed or is in disable mode. The visible LEDs will be off during normal operation. When the emitter is in Disable Mode; the LEDs will flash once every 2 seconds. When the emitter has failed the LEDs will flash 2 times per second.
3. Flash once per second for 10 seconds at power up. The visible LEDs will flash once per second for 10 seconds after initial power up. After that, the visible LEDs will shut off.
4. Always Off: The visible LEDs will remain off at all times.

The data-encoded emitter must be equipped with a disable input that, when activated, must cease unit operation, thereby eliminating the possibility of inadvertent signal transmission after the priority vehicle has arrived at its destination. Operation of the disable input must be programmable using software.

The data encoded infrared LED based emitters use angle of half intensity  $0 = \pm 10$  degrees LEDs to provide precise directionality control.

The data-encoded emitter must operate over a temperature range of -30–165 degrees F.

The data-encoded emitter must operate over a relative humidity range of 5–95 percent.

Windows™ based software must be available for programming the emitter through its J1708 compatible multi-purpose port. The communication protocol will be made available upon request for creating software to implement real-time communication.

The emitter will provide operating modes that allow it to be powered on with the strobe/LEDs active or inactive.

The remote coding unit must be capable of remotely programming and reading the following parameters from the data-encoded LED emitter without the use of a computer:

1. Vehicle Class and Vehicle ID
2. Disable operation mode
3. Visible LED behavior

The unit must be able to reset the emitter to factory defaults.

The unit including all electronics must be 6.3 inches long, 3.7 inches wide and 1 inch thick. The unit must have an LCD display and a keypad.

The unit must operate on 4 AAA batteries.

#### **77-5.02V(3)(b) Infrared Detector**

The required detector must be a lightweight, weatherproof device capable of sensing and transforming pulsed infrared energy into electrical signals for use by the phase selection equipment.

The infrared detector must be designed for mounting at or near an intersection on mast arms, pedestals, signal heads, signal head framings, pipes or span wires. All infrared detectors must be mounted vertically.

Each infrared detector must be supplied with mounting hardware to accommodate installation of all types of installation; on mast arms, on signal heads, and on signal head framing. Additional hardware must also be available, if span wire installations are required.

The infrared detector design must include adjustable tubes to enable their reorientation for span wire mounting without disassembly of the unit.

The detector must accept infrared signals from 1 or 2 directions and must provide single or dual electrical output signals.

The infrared detector must be bi-directional with 1 output channel. Where the conduit's capacity, at the intersection, does not allow multiple wires to be installed, the bi-directional with 2 output channels can be installed as directed by the engineer.

The detector must allow aiming of the 2 infrared sensing inputs for skewed approaches or slight curves.

The infrared detector must have a built-in terminal block to simplify wiring connections.

The infrared detector must receive power from the phase selector and must have internal voltage regulation to operate from at 24 V(dc).

The infrared detector must respond to a clear lens data-encoded emitter with 0.84 ( $\pm 10$  percent) Joules of energy output per flash at a distance of 2,500 feet under clear atmospheric conditions. If the emitter is configured with a visible light filter, the detector must respond at a distance of 1800 feet under clear atmospheric conditions. The noted distances must be comparable day and night.

The infrared detector must deliver the necessary electrical signal to the phase selector via a detector cable up to 1,000 feet in length.

Each optical detector must not have less than two telescopic sights that are rotational from 180 to 5 degrees. Each optical detector must be aimed and mounted for maximum line of sight for each direction.

#### **77-5.02V(3)(c) Detector cable**

The detector cable must deliver sufficient power from the phase selector to the infrared detector and must deliver the necessary quality signal from the detector to the phase selector over a non-spliced distance of 1,000 feet.

The cable must be of durable construction to satisfy the following installation methods:

1. Direct burial.
2. Conduit and mast arm pull.
3. Exposed overhead (supported by messenger wire).

The outside diameter of the detector cable must not exceed 0.3 inches.

The insulation rating of the detector cable must be 600 volts minimum.

The temperature rating of the detector cable must be +158 degrees F minimum.

The conductors must be shielded with aluminized polyester and have an AWG #20 (7 x 28) stranded and individually tinned drain wire to provide signal integrity and transient protection.

The shield wrapping must have a 20 percent overlap to ensure shield integrity following conduit and mast arm pulls.

The detector cable must have 4 conductors of AWG #20 (7 x 28). The capacitance will not exceed 48 pF per foot at 1 Khz. The detector cable wires will be stranded, individually tinned copper, color-coded insulation as follows:

1. Orange for delivery of detector power (+)
2. Drain wire for detector power return (-)
3. Yellow for detector signal #1
4. Blue for detector signal #2 or ground, depending on model

The characteristic impedance of the detector cable must be:

1. 0.6ohms/1000 feet
2. 14.3uF/1000 feet

### **77-5.02V(3)(d) Phase selector**

The phase selector recognizes inputs from infrared and other signal activation methods at the intersection and supplies coordinated inputs to the controller.

The selector is designed to be installed in the traffic controller cabinet and is intended for use directly with numerous controllers. These include California/New York Type 170 controllers with compatible software, NEMA controllers, or other controllers along with the system card rack and suitable interface equipment and controller software.

The selector will be a plug-in, 4 channel, multiple-priority, multi-modal device intended to be installed directly into a card rack located within the controller cabinet. The multi-mode phase selector must be capable of using existing infrared or other signal system card racks.

The selector may be powered from either +24 V(dc) or 120 V(ac).

The selector must support front-panel RS-232, USB and Ethernet interfaces to allow management by on-site interface software and central software. An RS-232 port must be provided on the rear card edge of the unit. Additional RS-232 communication ports must be available using the auxiliary interface panel.

The selector must include the ability to directly sense the green traffic controller signal indications through the use of dedicated sensing circuits and wires connected directly to field wire termination points in the traffic controller cabinet. This connection must be made using the auxiliary interface panel.

The selector must have the capability of storing a minimum of 10,000 priority control calls. When the log is full, the selector must drop the oldest entry to accommodate the new entry. The selector must store each call record in non-volatile memory and must retain the record if power terminates. Each preemption record entry must include the following points of information about the priority call:

- 1 Agency: Indicates the operating agency of the vehicle
- 2 Classification: Indicates the class type of vehicle
- 3 Identification number: Indicates the unique ID number of the vehicle
- 4 Priority level: Indicates the vehicle's priority level (high, low or probe)
- 5 Direction: Channel A, B, C, or D; indicates the vehicle's direction of travel
- 6 Call duration: Indicates the total time in seconds the priority status is active
- 7 Final greens at end of call: Indicates which phases are green at the end of the call
- 8 Duration of the final greens: Indicates the total time final greens were active at the end of call
- 9 Time and date call started and ended: Indicates the time a priority call started and ended, provided in seconds, minutes, hours, day, month, and year
- 10 Turn signal status: Indicates the status of the turn signal during the call
- 11 Priority output active: Indicates if the phase selector requested priority from the controller for the call

- 12 Historical no preempt cause: Indicates a history of conditions, which may have prevented a call or caused a call to terminate
- 13 Speed of vehicle: entry speed, exit speed, average speed through call
- 14 Relative priority: relative priority of vehicle class logged at time of call
- 15 Directional priority: directional priority logged at time of call

15.1 Preempt output used

15.2 Signal intensity: maximum and minimum infrared signal intensity during call

The selector must support a minimum of 5000 code pairs (agency ID, vehicle ID) providing unique vehicle identification and system security implementation at the vehicle level.

The selector must include several programmable control timers that will limit or modify the duration of a priority control condition, by channel. The control timers will be as follows:

- 1 Max call time: Sets the maximum time that a channel is allowed to be held active by a specific vehicle. It must be settable from 60 to 65,535 seconds in one-second increments. The factory default must be 360 seconds.
- 2 Off approach call hold time: Sets the amount of time a call is held on a channel after the vehicle has left the approach. It must be settable from 4–255 seconds in 1-second increments. The factory default must be 6 seconds.
- 3 Lost signal call hold time: Sets the amount of time that a call is held on a channel after the intersection has lost contact with the vehicle. It must be settable from 1–255 seconds in 1-second increments. The factory default must be 6 seconds.

The selector must have the ability to enable or disable all calls of both priority levels. This must be independently settable by channel.

A unique intersection name, which must be broadcasted, must be settable for each phase selector.

Up to 25 different radio channels must be available to be assigned to the phase selector.

The selector must operate in a mode that must vary the output based on the status of the approaching vehicles turn signal. Additional outputs available on an auxiliary interface panel may be needed. Settings must be available for this mode as follows:

- 1 Output mappings for each channel.
- 2 Separate setting for each of the four channels.
- 3 Separate settings for each left turn, right turn or straight signal status for each of the above 4 channels.

The selector's default values must be programmable by the operator on-site or at a remote location.

The selector must be capable of 3 levels of signal discrimination, as follows:

- 1 Verification of the presence of the signal of either high priority or low priority
- 2 Verification that the vehicle is approaching the intersection within a prescribed estimate time of arrival (ETA)
- 3 Determination of when the vehicle is within the prescribed range, either by intensity level or distance from the intersection

The selector must include 1 opto-isolated NPN output per channel that provides the following electrical signal to the appropriate pin on the card edge connector:

- 1 6.25 Hz  $\pm$  0.1 Hz 50 percent on/duty square wave in response to a low priority call.
- 2 A steady ON in response to a high priority call.
- 3 The selector will also have the option of providing separate outputs for high and low priority calls for controllers that do not recognize a 6.25 Hz pulsed low priority request.
- 4 Additional outputs or output modes must also be available on the auxiliary interface panel.

The selector must accommodate 3 methods for setting range thresholds for high and low priority signals:

- 1 Based on the approaching vehicle's estimated time of arrival (ETA). This must be settable between 0 and 255 seconds in 1 second increments. The factory default must be 30 seconds. The ETA threshold must be independently settable by each of the following parameters: vehicle class, approach channel and priority level.
- 2 Based on the approaching vehicle's distance from the intersection. This must be settable between 0 and 5,000 feet in 1 foot increments. The factory default must be 1000 feet. The distance threshold must be independently settable by each of the following parameters: vehicle class, channel and priority level.
- 3 Based on infrared emitter intensity the system must accommodate setting a separate range from 200 to 2,500 feet with 1,200 range set points for both high and low priority signals.

The selector must support 3 types of green sense logging as follows:

- 1 Preemption impact logging which measures and records the impact of an individual signal preemption upon a measured green cycle time
- 2 TSP impact logging which measures and records whether a TSP advantage was gained during a request and the amount of early or extended green applied
- 3 Green cycle logging records changes in the average green cycle time. When the average time is measured to have changed, a new log entry is made

The selector must have the following indicators:

- 1 A status indicator that illuminates steadily to indicate proper operation
- 2 LED indicators (1 for high priority, 1 for low priority) for each channel display active calls as steady ON and pulse to indicate pending preemption requests

The selector must have a test switch for each channel to test proper operation of high or low priority. If additional detectors are installed, an auxiliary interface panel must be available to facilitate interconnections between the phase selector and traffic cabinet wiring as well as provide additional outputs.

The selector must provide the user with call play-back logs for the last 100 priority activation requests. Each log must contain up to the last 250 seconds of a call. The call play-back logs must include:

- 1 Infrared based calls must record intensity, coded ID, green sense state, call status (active, pending, disabled), approach channel and priority information
- 2 Data must be recorded once per second. Recording terminates at call end

The following diagnostic tests are incorporated in the multimode selector:

- 1 Power up built in test
- 2 Communications port tests
- 3 Preemption output test call
- 4 Detector response test

The selector must be capable of the following:

1. Call bridging
2. Directional priority
3. Utilizing time plans

Call bridging enables the treatment of 2 vehicles requesting priority activation to have their calls linked together to hold a call to the controller so that they may traverse the approach together.

Directional priority for calls may be assigned to individual approach channels such that calls in a particular direction will be given priority over calls in competing directions within the same priority level.

Utilizing time plans allow users to vary priority activation by time of day, or for a specific time period such as special events. Time plans must be configured via system software.

The phase selector must support evacuation mode for low priority calls. Upon activation of this mode from the central management software, low priority vehicle calls must be recognized by the phase selector as if they were high priority vehicle calls for a temporary period of time as defined by the user. This mode must be supported for both infrared and other signal emitters. Vehicles transmitting high priority signals must continue to maintain priority over the evacuation mode priority vehicles.

The phase selector must allow relative priority. Relative priority allows emitter classes to be used as an additional level of prioritization within priority levels (i.e. high and low priority levels have different sets of relative priorities). Relative priority must support up to 15 unique classes in each priority level (high and low). Relative priority class level 15 will have the highest weight and one the lowest weight in each. If relative priority is enabled, a priority call will be granted to the caller with the higher class level within high and low priority levels. A vehicle with a call granted, must be able to have its call taken away by a higher level class vehicle. The system must provide a lockout threshold that once met, must disallow higher relative priority calls from taking away a call. Separate thresholds for infrared and other signal calls must be provided. Infrared call thresholds must be specified as intensity with a default value of 1,000. Other signal call thresholds must be specified as an ETA in seconds. The default is ETA must be 12 seconds. Threshold values for both types of calls must be settable via system software. High priority calls will always be served over low priority calls regardless of either's relative class. Preemption for vehicles with the same base priority (high, low) and the same relative priority is done using the default first come, first served mechanism. Relative priority is capable of being enabled or disabled using system software. Relative priority for high and low can be separately enabled or disabled using system software. The default settings for all relative priority (high and low) values will be 15. Relative priority must be disabled by default for both high and low priority.

The selector must be a plug-in, 4 channel, multiple-priority device intended to be installed directly into a card rack located within the controller cabinet.

The phase selector must be able to detect encoded infrared as well as other signals.

The following configuration must be used for detection:

Channel	Phase	2070/M50
A	2 and 5	3
B	4 and 7	4
C	6 and 1	5
D	8 and 3	6

#### **77-5.02V(3)(e) Card Rack**

The required card rack must provide simplified installation of a phase selector into controller cabinets that do not already have a suitable card rack. The card rack must be factory wired to one connector, located behind the card slot, and a terminal block, located next to the phase selector slot, on the front of the card rack. The card rack connector on the front, must provide for all connections to the traffic controller. The card rack must provide labeled terminal blocks for connecting the primary infrared detectors to a phase selector.

#### **77-5.02V(3)(f) Auxiliary Interface Panel**

If additional detectors are installed, the auxiliary panel must provide additional preemption outputs if needed. It must also provide a connection point for the phase selector to monitor the status of the intersection's green lights (green sense). Additional RS-232 communication ports may also be accessed via this panel. If additional outputs are not required, an auxiliary harness must be used to monitor the status of the intersection's green lights.

#### **77-5.02V(3)(g) Interface Software**

The priority control interface software must be provided on a single CD-ROM or via download to interface with the phase selector. The software must be provided to manage the phase selector while on-site at the intersection. It must be supported on Windows™ XP and Windows™ 7.

The priority control interface software must accommodate:

1. Setting up and presenting user-determined system parameters
2. Viewing and changing settings
3. Viewing activity screens and other signal channel
4. Displaying and/or downloading records of previous activity showing class, code, priority, direction, call duration, final greens at end of call, duration of final greens, time call ended in real time plus maximum signal intensity (vehicle location information)
5. Agency ID, vehicle class, and vehicle ID
6. Priority level
7. Turn signal status
8. No priority cause
9. Source of the call
10. Active preemption/priority output

The priority control interface software must accommodate operation via a mouse or via the keyboard, or in combination.

The priority control interface software must provide menu displays to enable:

1. Setting of valid vehicle ID and class codes
2. Establishing signal intensity thresholds (detection ranges), modem initialization, intersection name and timing parameters
3. Setting of desired green signal indications during priority control operation and upload and download capability to view
4. Resetting and/or retrieving logged data and priority vehicle activity
5. Addressing for each card in a multi-drop connected system
6. Confirmation light configuration
7. Manual control parameters

The interface software will provide readout of noise levels detected by the detectors. This noise level will serve as a troubleshooting tool.

The interface software must provide a real-time activity screen which will provide the following information.

1. Call intensity value even if below threshold
2. Emitter priority level
3. Indication of detection on primary or auxiliary detector
4. Indication if call is being serviced or is pending
5. Indication if vehicle is in range
6. Provides readout for 4 separate vehicles per channel
7. Detector noise level readout
8. Green phase monitoring with information on the current greens

The on-site software must allow the user to:

1. Provide intersection name and approach names for each of the 4 channels and store these as part of the phase selector configuration
2. Save the configuration from the phase selector to a file
3. Restore the configuration for a phase selector from a saved configuration file
4. Print the phase selector configuration
5. View the activity log from the phase selector
6. Save the activity log to a file
7. Print the activity log
8. Update firmware for all upgradeable modules of the phase selector

#### **77-5.02V(4) Reliability**

All equipment supplied as part of the infrared priority control system intended for use in the controller cabinet must meet the following electrical and environmental specifications spelled out in the NEMA Standards Publication TS2 1992, Part 2:

1. Line voltage variations per NEMA TS2 1992, para 2.1.2.
2. Power source frequency per NEMA TS2 1992, para 2.1.3.
3. Power source noise transients per NEMA TS2 1992, Para 2.1.6.1.
4. Temperature range per NEMA TS2 1992, para 2.1.5.1.
5. Humidity per NEMA TS2 1992, para 2.1.5.2.
6. Shock test per NEMA TS2 1992, Paragraph 3.13.9.
7. Vibration per NEMA TS2 1992, para 3.13.8.

Each piece of equipment supplied as part of the priority control system intended for use in or on priority vehicles must operate properly across the entire spectrum of combinations of environmental conditions (temperature range, relative humidity, vehicle battery voltage) per the individual component specifications.

#### **77-5.03 CONSTRUCTION**

##### **77-5.03A Conduit for Signal and Lighting**

After conductors have been installed, the ends of conduits terminating in pull boxes and/or controller cabinets must be sealed with an approved type of sealing compound.

All conduits must be installed below the existing AC pavement regardless of the depth of the existing AC pavement. All conduits must be installed at a minimum depth of 24 inches from top of conduit to the finish grade.

All excavated areas in the street or sidewalk must be completely backfilled or covered at the end of each working day and accepted by the Engineer.

##### **77-5.03B Fiber Optic Conduit under BNSF Railway**

Install conduit using directional drilling method at a minimum depth of 4 feet below natural grade for a minimum of 50 feet on each side of the railway. The bore pit must be a minimum of 50 feet from the railway.

##### **77-5.03C Pull Boxes**

Pull boxes must be placed at same elevation as adjacent standard base, service cabinet base or signal controller cabinet base if in existing or future sidewalk area and elevation is not shown on plans. Pull boxes must be 5 feet from base or as shown. Pull boxes in existing or future sidewalk areas must be placed at sidewalk elevation. The pull box elevation for pull boxes installed in median areas must match the slope of the 2 adjacent curbs. The pull box elevation for pull boxes installed in planting areas adjacent to sidewalk or sidewalk area must be at sidewalk grade. Pull boxes must not be located within the limits of wheelchair ramps.

When pull boxes are placed in dirt and planting areas, a concrete collar must be constructed around the pull box. The top of the pull box must match slope of the adjacent top of curb. The surface elevation of the collar must match the surface elevation of the pull box and slope away from the pull box at a rate of 1:50 (2 percent) slope. The width of the collar must be 12 inches wide and 4 inches depth.

Clean all pull boxes entered for installation of conduit or wire of all dirt and debris. All pull box lids damaged by your operations must be replaced at your expense. The wiring in these pull boxes must be neatly bundled, recoiled and reinstalled in the box. Where existing pull boxes are removed and replaced with new larger boxes the existing conduits must be cut back. When the conduits are cut, the existing conductors must either be removed or well protected. The ends of the cut conduits must have bushings placed on them.

Grout in bottom of pull boxes will not be required. Pull boxes must be set on 6 inches of crushed rock for drainage. The conduits in the pull boxes must be placed 2 inches above the crushed rock.

### **77-5.03D Conductors**

You must install individual conductors type THW PVC (600 volt). Signal wires, Street light wires, and white neutral wires must be 14 AWG, 10AWG, 12AWG, respectively. Signal cable must not be used. Inert lubricant must be used in placing conductors in the conduit.

### **77-5.03E Wiring**

All conductors that are to be spliced together must be twisted a minimum of 5-turns and soldered. Then, the joint must be held by mechanical means before insulating in accordance with Method "B."

All field wiring terminating in the traffic signal controller cabinet or service cabinet must be fastened to the termination panels with one piece copper solderless, crimpless wire lugs. Solderless lug must have offset shank and have a maximum wire size capacity of 6.

### **77-5.03F Fused splice connectors**

Fused splice connectors must be installed in the base of the poles, next to the inspection plate. No pigtail is allowed on the fuse holders.

### **77-5.03G Bonding and Grounding**

Grounding jumper must be attached by a 3/16 inch or larger brass bolt in the signal standard or controller pedestal and must be run to the conduit, ground rod or bonding wire in adjacent pull box.

In addition, because of past conflict, monitor electronic problems associated with grounding, and install a total of 4 conductors between the service pedestal and the controller cabinet. These conductors must be installed as follows:

1. Green conductor: No. 8 stranded conductor from Ground Bus #2 in controller cabinet to ground bus in service pedestal.
2. White conductor: No. 8 stranded conductor from Ground Bus #1 terminal in the controller cabinet to the neutral bus in the service pedestal.
3. Black conductor: No. 8 stranded conductor from the power terminal in the controller cabinet (312B) to service breaker.
4. Bare copper Conductor: No. 10 solid conductor from Ground Bus #2 in controller cabinet to conduit grounding bushing in pull box.

Grounding jumper must be visible after cap has been poured on foundation.

### **77-5.03H Pedestrian Pushbuttons**

Pedestrian pushbuttons (PPB) must be the 4 wire "Navigator" type as manufactured by Polara Engineering, Inc. or equal.

The housing for the unit must be 9 by 12 inch and made of 356 aluminum heat-treated to meet Spec. T-6. It must be of a telescoping, vandal-proof design. The color must be olive green. Adaptors may be required to install the navigator pushbutton housing and the sign plate. Where pedestrian pushbutton posts (PPP) are required, the 9 by 12 inch housing must be installed on a 4 inch PPP with adaptors. The PPB be installed right side up.

The system includes a control unit (CU) inside each pedestrian signal indications housing powered by 120 VAC WALK/DON'T WALK pedestrian head lamp indications, an interface panel, a configurator to program all the functions (green), and up to 8 push button stations(PBS). Each PPB must connect to a control unit located inside its associated pedestrian signal housing. The PBS must provide information and cues via both a vibrating arrow button and audible message indicating the "walk sign is on", during walk interval making the intersection accessible for all pedestrians. All sounds must emanate from the back of the unit. The weather-proof speaker must be protected by a vandal resistant screen. A sunlight visible red LED latches "on" to confirm the button has been pushed. PBS must include frame, sign, ADA compliant push button, and mounting hardware.

By interfacing with the control unit that is installed in the pedestrian signal housing, the PBS must provide the following standard features.

1. Confirmation of button push via latching LED, sound, and vibrotactile bounce
2. Direction of travel (with extended button push)
3. Standard locating tone during Don't Walk (and clearance if desired)
4. Standard voice messaging during walk
5. Vibrating button during walk
6. Standard locating tone or verbal countdown during PED clearance
7. All sounds automatically adjust to ambient over 60 dB range
8. All sounds must be synchronized

Extended button push must turn on, boost volumes, and/or mute all sounds except those on activated crosswalk.

Mounting Height and Location: Controls must be located as close as practicable to the public sidewalk curb, at a height of 40 inches above the finished surface of the public sidewalk.

Pedestrian pushbutton front cover plates must be international symbol (R10-3b MUTCD sign) and installed with security screws. The security screws must be stainless steel, button head socket cap screws #8 diameter, 3/8 inch in length and 32 threads per inch. The socket must be 3/32 inch Allen.

Where a traffic signal cabinet is required, all wiring and equipment related to the system that needs to be installed in the controller cabinet must be included in the controller cabinet prior to delivery for testing.

Verify with the Engineer, the types of verbal message to be programmed in each PPB.

#### **77-5.03I Detectors**

Loop lead-ins must be individually identified as shown. Identification must be by means of bands placed on the lead-in near the first splice.

The loops must be installed in Type A configuration. Front loops must be Type D as shown. The spacing between all loops must be 10 feet. All loops must be wrapped in the slots in the same clockwise direction. The loop wire ends must be marked START and FINISH with loop lane/phase identification number. Splices between the loop conductors and the lead-in cable must be made in the pull box adjacent to the loops. The loops must be joined in the pull box in series but alternating the wire ends of adjacent loops to alternate polarity to achieve optimum sensitivity at the sensor unit. Series loops must be marked and connected as follows. First loop - "start" end to lead-in cable. "Finish" end to "finish" wire of second loop. "Start" wire of second loop to "start" end of 3rd loop. The alternating sequence will continue for any series of loops.

Slots cut in the pavement must be immediately cleaned by washing with water to remove all sawing residue and blown out and dried before installation of conductors.

After conductors are installed in the slots, the slots must be filled with sealant. The sealant must be at least one inch thick above the top conductor in the saw cut. Each loop must be checked and filled with sealant after a minimum elapsed time of 1 hour. This is due to trapped air pockets and/or settling of the sealant.

All inductive loops and lead-in shown in areas paved with OGAC must be installed a minimum of 2 inch deeper, as measured from the pavement surface, than shown on the drawings.

Loop detector sealant must be used at air temperatures above 40 degrees F. Sealant must be placed 1/8 inch below pavement surface. At no time must the sealant be installed if the ground is wet.

One inch minimum diameter holes must be core drilled at the loop corner before slots are saw cut. Diagonal corner cuts must not be permitted. Homerun cut must be at a 45-degree angle from any corner of the loop. If round loops are used, homerun must be cut perpendicular to the loop slot. This prohibits the loop wire from being bent more than 90 degrees.

Conductors of all loops to be operated by each sensor unit must be run continuous to the nearest detector hand hole up to the nearest pull box. The loop wires between the loop and adjacent pull box must be twisted per State specifications. All loop wires must have 3 feet of slack in the pull box.

Splices between loops and lead-in cable must not be made until the operation of the loops under actual traffic conditions is accepted by the Engineer. If there is more than a 24 hour lag time between the time the loops are installed and connected to the lead-in cable, both the loop conductors and the lead-in cable ends must be water proofed until the actual splice is made (to prevent capillary action of water into the conductor insulation). The conductors and lead-in cable ends must be waterproofed by completely covering the conductor and lead-in cable ends with an electrical insulating coating and allowed to dry. Apply 1 layer of high voltage tape half-lapped then apply 1 layer of PVC tape half-lapped. Apply electrical insulating coating over PVC tape and at least 4 inches of conductor insulation above the cut ends.

All loops must be marked with phase tape in the pull box as well as in the controller cabinet.

Lead-in cable for traffic signal and traffic counting installations must be identified and banded by lane in the detector hand hole and near the termination of the conduit in the controller or traffic count station cabinet. Bands must comply with section 86-2.09.

You must test the detectors with a motor-driven cycle, as defined in the Veh Code, which is licensed for street use by the DMV. The anodyne weight of the vehicle must not exceed 220 pounds and engine displacement must not exceed 100 cubic centimeters. Special features, components or vehicles designed to activate the detector will not be permitted. Provide an operator who must drive the motor-driven cycle through the response or detection area of the detector at not less than 3 miles per hour nor more than 7 miles per hour. The detector must provide an indication in response to this test.

#### **77-5.03J Controller Cabinets**

Type P traffic signal controller foundations must be 18 inch above finished grade. All edges and corners of foundations must be rounded or chamfered to 1.5 inch radii to prevent chipping. Top surface of foundation must have smooth or polished surface. No broom finish allowed.

Anchor bolts for the controller cabinet must extend 1-1/2 inches (plus or minus 1/8 inch) above the top of the foundation. When installing cabinet foundation bolts, install bottom set of nut and washer threaded on the foundation bolts so the nut is embedded in the concrete foundation. The bottom washer must rest on the top of the concrete foundation. The cabinet then is placed on the washer to prevent direct contact on the concrete foundation. Mastix or plumber's tape must be all along the base of the cabinet between the washers. After the cabinet is installed on the foundation, silicon sealant must be used along the outside and inside of the cabinet base to ensure waterproofing.

The 1 inch foundation drain pipe in the back of the cabinet must be fitted with a union fitting, with the union fitting set just below the top of the foundation grade. A 4 inch piece of 1 inch pipe must be placed in the fitting until the concrete is cured. Then the 1 inch pipe is removed to ensure the drain is the lowest point of the foundation and will drain properly if it becomes necessary.

Six to 8 feet of field wiring, in 2 to 3 coils must be placed in the bottom of the cabinet. These coils must be neatly bound using tie wraps. Each set of vehicle, pedestrian, ped push button, DLC, common, camera wiring must be incrementally brought out by the coiled bundle depending on its connection point in the cabinet. All conductors or groups of conductors must be labeled appropriately and only long enough to neatly connect to the load bay or terminal inside the cabinet. The fiber optic cable must be securely attached to the right side of the cabinet. The connecting ends must be long enough to be neatly placed along the back right corner of the cabinet and brought up to the camera modem or Ethernet switch. Labeling of field conductors must use plastic labeling tie wrap, using permanent black marker compatible with nylon or plastic tie-wrap style.

#### **77-5.03K Traffic Monitoring Camera Cabling**

The installation of the wiring will require that a hole be drilled into the camera supporting structure for all the camera installations. Before drilling this hole the existing wiring inside the pole or mast arm must be removed or protected such that it is not damage by the drilling operation. The edges of the drilled hole must be smoothed. You must install a watertight gland nut (or grommet) in this hole that securely holds the wiring. All cables must be:

1. Installed without damaging the conductors or insulation
2. Installed without kinks
3. Handled in accordance with manufacturers specifications and recommended bending radius
4. Run continuously between terminations without splices
5. Installed with sufficient slack for equipment movement
6. Neatly tagged at the cabinet to indicate which camera it serves
7. Rated for outdoor use and resistant to water and UV radiation
8. Have a watertight, strain relieved plug type connection to the camera housing

You must make all connections of this wiring to the camera assembly, the video transmission device, and power.

#### **77-5.03L High Speed Dome Pan/Tilt/Zoom Traffic Monitoring Camera**

Install and fully adjust the camera with the associated lens, communication addressing, power supplies, housings, and all-necessary cabling, etc., to make the assembly operational. Firmly attach the dome system to the assigned poles as shown. Exercise care to tighten the camera mount within the torque limits specified by the camera manufacturer.

You must properly terminate all of the electrical cables to the camera and firmly attach them. You must dress and secure the electrical cables inside the dome enclosure and traffic signal cabinet so that they do not interfere with the closing of the cabinet, with the fan, or with any other moving part.

Cameras and other video sources where possible, must use the electrical power supply 60 Hz signal for synchronization. When cameras are initially installed, the camera must be in a position where its view of the roadway will not be obstructed by the pole it is mounted on. At a 4-leg intersection, the camera must be capable of seeing all four legs without its view being blocked by the signal pole.

After all cameras are installed and central equipment is operational, you must arrange an interactive session with the Engineer to fine-tune any adjustments to the camera that require a technician in the field. This session must enable the Engineer to observe the image at the control room while being in verbal communication with you at the camera.

#### **77-5.03M Priority Control System**

You must demonstrate that all of the components of each system are compatible and will perform satisfactorily as a system.

Operating sequence must be initiated when the detector receives optical energy of the required identification code and sequential flash rate from an emitter.

Detector must transform the optical energy signals into electrical signals and transmit the electrical signals to the phase selector module for processing.

The phase selector module must place a logical true call (high priority) or a pulsing logical true call (6.25 Hz square wave for 2nd priority) into the signal controller to advance to and hold the green display, which grants right-of-way to the authorized vehicle displaying the optical energy pulses.

When a preemption call is registered while the controller is serving a vehicular phase or phase combination other than the preemption phase called for, a clearance interval for the phase in conflict must be displayed immediately after the minimum green period. If a preemption call is registered while the controller is servicing the preemption phase or phase combination called for, the controller must remain in that phase or phase combination at least 4 seconds after the call drops out. If a preemption call is registered while the controller is servicing a pedestrian call, the controller must immediately terminate the WALK indication and time a separately programmable flashing DONT WALK indication before serving the preemption phase called for.

Phase selector module must obtain and hold the desired green display for a minimum of 4 seconds, even if the optical energy signals cease before entering the preempt green display.

Phase selector module must allow the signal controller to resume normal operation 6 to 10 seconds after optical energy signals are lost, if the optical energy signals are lost after entering the pre-empt green display.

Preemption equipment must be installed in such a manner that the internal wiring of the controller, as normally furnished by the manufacturer, is not altered.

Phase selector module must provide for assigning right-of-way to one of priority levels on either of 2 channels. Priority is given on a first-detected, first- served basis, except that a high priority optical transmission must have precedence over a low priority optical transmission when both are detected concurrently.

**77-5.03N Traffic Signal Turn On**

You must coordinate the turn on of any traffic signal operation. No traffic signal turn on may occur on Monday, Friday, Saturday or Sunday. Upon turn on of any traffic signal, you must demonstrate satisfactory compliance with all requirements necessary for the operation of the traffic signal, including, but not limited to, appropriate detection, controller response, pedestrian countdown and Navigator pedestrian system sound features operating, and the traffic signal response to the various calls. In no case may the traffic signal be left in operation if any of the design features of the operation are found to be inoperable. All signal and pedestrian heads must be covered by signal head jackets.

The intersection must be protected with portable "Stop" signs and certified flaggers during any traffic signal turn on. Flaggers and stop signs must remain on site until all attendees to the turn on are satisfied that the traffic signal is functioning appropriately.

Mounted "Stop" signs on barricades must be maintained on site for immediate application to any intersection with traffic signal under construction. You must respond to any interruption of normal functioning of a traffic signal within 2 hours.

You must be responsible for the coordination of all of the necessary work for a successful turn on of a traffic signal, and to determine that all of the appropriate remedies are in place to return a traffic signal to its prior operation mode should a failure of any of the components necessary for successful operation occur.

**77-5.04 PAYMENT**

Not used

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**80 FENCES**

**Add to section 80-3.04:**

Barbed wire supporting arms is included in the payment for 20' chain link fence (type CL-6, BW).

**Add to section 80-10.02:**

For barbed wire on chain link gate, comply with section 80.2.02D

**Add to section 80-10.03:**

If barbed wire supporting arms are shown, extend each upwards from the top of the fence at an angle of about 45 degrees. Fit it with clips or other means for attaching 3 lines of barbed wire. Attach the top outside wire to the supporting arm at a point about 12 inches above the top of the chain link fabric and 12 inches out from the fence line. Attach the other wires to the arm spaced evenly between the top of the fence and the top outside wire.

**Add to section 80-10.04:**

Barbed wire supporting arms is included in the payment for chain link gate (type CL-6, BW).

**Add to section 80:**  
**80-11 TEMPORARY ELECTRIC FENCE**

**80-11.01 GENERAL**

**80-11.01A Summary**

Section 80-11 includes specifications for constructing chain link fence (Type CL-6) with barbed wire post top and an electric grid attached.

The area of work is located at LKQ Auto Parts at 2041 Navy Drive, Stockton, CA 95219.

**80-11.01B Submittals**

Provide manufacturer's warranty in material and workmanship for the electric grid for a period of 24 months after acceptance.

Within 15 days of Contract approval submit for review product information for electric fencing including the following.

1. 12.5 gauge galvanized steel wire
2. Porcelain doughnut insulators
3. 10' fiberglass posts
4. 10',3 1/2" dia steel corner posts
5. In-line strainers

**80-11.01C Quality Control And Assurance**

The temporary electric fence must be tested and demonstrated to the Engineer that it is operating as intended. Repair, replacement, and retesting of any electric fence equipment due to failure or damage must be at your expense.

**80-11.02 MATERIALS**

Chain link fence must comply with section 80-3. Barbed wire must comply with section 80-2.

The electric grid must be 10 feet high with 15 high tensile wires mounted parallel to the fence line with fiberglass posts every second fence post at approximately 16 feet and 10',3 1/2" dia. steel corner posts with porcelain doughnut insulators every 8" wherever the fence changes direction.

Electric grid wires must be 12.5 gauge high - tensile steel, 170,000 psi, with class3 galvanizing.

Porcelain insulators must be the doughnut type approximately 1 1/2" in diameter.

Caution signs with black letters on yellow background must be placed on the fence every 80 feet as shown.

Temporary electric fence must be constructed as shown, conform to manufacturer's recommendations, and operate as part of the existing electric fence.

The temporary electric fence must operate at 8,500 V(ac) and provide only non-harmful human electric shock pulses.

Existing electric grid is manufactured by LiveWire Products, Inc. and the model is Stafix 8500V.

Material incorporated into the work must be new, including the high tensile wire, fiberglass posts, insulators, warning signs, and mounting hardware. Material must be of equal or better quality than the existing components. The existing electric service and fence energizer may be reused since the temporary electric fence must be connected to the existing electric fence.

**80-11.03 CONSTRUCTION**

Coordinate all work with the Engineer. The temporary electric fence must be constructed by personnel who are skilled in the installation of electric fence components.



**Replace "Reserved" in section 83-1.02B(1) with:**

**83-1.02B(1)(a) General**

Section 83-1.02B(1) includes specifications for constructing vegetation control areas around metal beam guard railing posts with minor concrete.

Submit mix design for the minor concrete to be used for vegetation control. Include compressive strength test results with your mix design.

Submit the quantity in pounds of crumb rubber with your certificate of compliance for crumb rubber aggregate if used.

**83-1.02B(1)(b) Materials**

**83-1.02B(1)(b)(i) General**

Not Used

**83-1.02B(1)(b)(ii) Minor Concrete**

Minor concrete must include reinforcing fibers and may include crumb rubber aggregate.

Section 90-2.02B does not apply. Minor concrete must contain at least:

1. 505 pounds of cementitious material per cubic yard if crumb rubber aggregate is used
2. 400 pounds of cementitious material per cubic yard if crumb rubber aggregate is not used

The 3rd paragraph of section 90-2.02C does not apply. Minor concrete must have a maximum aggregate size of 3/8 inch.

You may use volumetric proportioning under ASTM C 685/C 685M or section 90-3.02B.

Minor concrete must have a 28-day compressive strength from 1,400 to 1,800 psi.

**83-1.02B(1)(b)(iii) Crumb Rubber Aggregate**

Crumb rubber must consist of ground or granulated scrap tire rubber from automobile and truck tires. Tire buffings are not allowed. Crumb rubber aggregate must be ground and granulated at ambient temperature.

The gradation of the crumb rubber aggregate must meet the requirements of the following table:

Sieve size	Percentage passing
1/2"	100
3/8"	90-100
1/4"	35-45
No. 4	5-15
No. 8	0-5
No. 16	0

Crumb rubber aggregate must not contain more than 0.01 percent of wire by mass of crumb rubber and must be free of oils and volatile organic compounds.

Comingling of crumb rubber from different sources is not allowed.

The crumb rubber aggregate must be  $3.5 \pm 0.5$  percent by weight of the concrete.

**83-1.02B(1)(b)(iv) Reinforcing Fibers**

Reinforcing fibers for minor concrete must be:

1. Polypropylene fibers with an engineered sinusoidal contoured profile manufactured specifically for use as concrete reinforcement.

2. Blended ratio of 4 parts by weight of coarse monofilament fibers with maximum individual fiber lengths of  $2 \pm 1/2$  inch and 1 part by weight of fine fibrillated polypropylene fibers of various lengths and thicknesses. If the coarse and fine reinforcing fibers are supplied by the same manufacturer, they may be premixed in a sealed 5-lb degradable bag.
3. From a commercial source.
4. Concrete ingredient as described in your mix design and as recommended by the manufacturer.

The reinforcing fiber content of minor concrete must be 5 lbs/cu yd.

#### **83-1.02B(1)(b)(v) Coloring Agent**

If a color for concrete is specified in section 83-1.02B(1)(b)(i), the coloring agent must be integral to the concrete mix and added at the concrete plant.

If the curing compound method is used, use curing compound no. 6.

#### **83-1.02B(1)(b)(vi) Block-Out Material**

Use a commercially available expanded polystyrene foam for the block-out material. The expanded polystyrene foam must have a compressive strength of  $13 \pm 5$  psi at 10 percent deformation when tested under ASTM D1621.

You may substitute any appropriate material that meets the compressive strength requirements of the expanded polystyrene foam if authorized.

#### **83-1.02B(1)(c) Construction**

##### **83-1.02B(1)(c)(i) General**

Areas to receive vegetation control must be cleared of vegetation, trash, and debris. Dispose of removed material.

##### **83-1.02B(1)(c)(ii) Earthwork**

Excavate areas to receive vegetation control. Where vegetation control abuts the existing surfacing, the edge of the existing surfacing must be on a neat line or must be cut on a neat line to a minimum depth of 2 inches before removing the surfacing. The finished elevation of the excavated area to receive vegetation control must maintain planned flow lines, slope gradients, and contours of the job site.

Grade areas to receive vegetation control to a smooth, uniform surface and compact to a relative compaction of not less than 95 percent.

Dispose of surplus excavated material uniformly along the adjacent roadway, except as specified in section 14-11.

##### **83-1.02B(1)(c)(iii) Block Out**

Install block-out material as shown.

If block-out material is supplied in more than 1 piece, tape the pieces together to make a smooth surface on the top and sides.

Ensure block-out material does not move during concrete placement.

##### **83-1.02B(1)(c)(iv) Placing Minor Concrete**

Place minor concrete for vegetation control by hand.

Strike off and compact minor concrete with a mechanical or vibratory screed device. Apply a broom finish. Match the finished grade to the adjacent section of vegetation control, pavement, shoulder, or existing grade.

##### **83-1.02B(1)(d) Payment**

Vegetation control (minor concrete) is measured from the actual areas placed. The Department does not pay for vegetation control (minor concrete) placed outside the dimensions shown.

**Replace section 83-1.02C(3) with:**

**83-1.02C(3) Alternative Flared Terminal System**

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

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

1. TYPE FLEAT TERMINAL SYSTEM - Type FLEAT terminal system must be a Flared Energy Absorbing Terminal 350 manufactured by Road Systems, Inc., located in Big Spring, Texas, and must include items detailed for Type FLEAT terminal system shown on the plans. The Flared Energy Absorbing Terminal 350 can be obtained from the distributor, Universal Industrial Sales, P.O. Box 699, Pleasant Grove, UT 84062, telephone (801) 785-0505 or from the distributor, Gregory Industries, Inc., 4100 13<sup>th</sup> Street, S.W., Canton, OH 44708, telephone (330) 477-4800.
2. TYPE SRT TERMINAL SYSTEM - Type SRT terminal system must be an SRT-350 Slotted Rail Terminal (8-post system) as manufactured by Trinity Highway Products, LLC, and must include items detailed for Type SRT terminal system shown on the plans. The SRT-350 Slotted Rail Terminal (8-post system) can be obtained from the manufacturer, Trinity Highway Products, LLC, P.O. Box 99, Centerville, UT 84012, telephone (800) 772-7976.

Submit a certificate of compliance for terminal systems.

Terminal systems must be installed under the manufacturer's installation instructions and these specifications. Each terminal system installed must be identified by painting the type of terminal system in neat black letters and figures 2 inches high on the backside of the rail element between system posts numbers 4 and 5.

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

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

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

**Replace the 14th paragraph of section 83-1.02I with:**

Chain link fabric must be 9 gage and comply with AASHTO M 181 for Type IV fabric with a Class B coating.

The bond strength between the coating material and steel of the bonded vinyl-coated chain link fabric must be equal to or greater than the cohesive strength of the PVC coating material.

**Replace section 83-2.02E(5) with:**

**83-2.02E(5) Sand-Filled Crash Cushions**

Install sand-filled crash cushions at the following locations:

1. Route 4 eastbound on-ramp at station "NA" 878+65.52.
2. Route 4 at station "A3" 913+40.13.

The modules must be one of the modules shown in the following table:

Module	Manufacturer	Distributors
Energite III and Fitch Inertial Modules	ENERGY ABSORPTION SYSTEMS, INC. 70 W MADISON ST, STE 2350 CHICAGO IL 60602	<p>TRAFFIC CONTROL SERVICE, INC. 8585 THYS CT SACRAMENTO CA 95828 Telephone: (916) 387-9733 Fax: (916) 387-9734</p> <p>TRAFFIC CONTROL SERVICE, INC. 1818 E ORANGETHORPE FULLERTON CA 92831-5324 Telephone: (714) 526-9500 Fax: (714) 526-9561</p>
Traffix Sand Barrels	TRAFFIX DEVICES, INC. 220 CALLE PINTORESCO SAN CLEMENTE CA 92672 Telephone: (949) 361-5663 Fax: (949) 361-9205	<p>UNITED RENTALS, INC. 1533 BERGER DR SAN JOSE CA 95112 Telephone: (408) 287-4303 Fax: (408) 287-1929</p> <p>STATEWIDE SAFETY &amp; SIGN P.O. BOX 1440 PISMO BEACH CA 93448 Telephone: (805) 929-5070 Fax: (805) 929-5786</p>
CrashGard Model CC-48 Sand Barrels	PLASTIC SAFETY SYSTEMS, INC. 2444 BALDWIN RD CLEVELAND, OH 44104	<p>CAPITOL BARRICADE, INC 6001 ELVAS AVE SACRAMENTO CA 95819 Telephone: (916) 451-5176 Fax: (916) 451-5388</p> <p>CAPITOL BARRICADE, INC 1661 EAST MINER AVE STOCKTON CA 95205 Telephone: (209) 469-2663 Fax: (916) 451-5388</p> <p>SIERRA SAFETY 9093 OLD STATE HWY NEWCASTLE CA 95658 Telephone: (916) 663-2026 Fax: (916) 663-1858</p> <p>ALERT O LITE 2020 N WINERY RD FRESNO CA 93703 Telephone: (559) 386-4570</p> <p>STEVENSON SUPPLY 3601 REGIONAL PKWY SANTA ROSA CA 95403 Telephone: (707) 575-3335</p> <p>HI WAY SAFETY, INC. 13310 5TH ST CHINO CA 91710 Telephone: (909) 591-1781 Fax: (909) 627-0999</p>

The modules must have been manufactured after March 31, 1997.



**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 86-2.04A:**

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

Install non-illuminated street name signs on signal mast arms using a minimum 3/4 by 0.020-inch round edge stainless steel strap and saddle bracket. Wrap the strap at least twice around the mast arm, tighten, and secure with a 3/4-inch stainless strap seal. Level the sign panel and tighten the hardware securely.

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

**Add to section 86-2.05A:**

Conduit installed underground must be Type 3.

Communication conduit must be SDR 13.5, coilable, smooth-wall, continuous length high density polyethylene (HDPE) conduit and must comply with UL 651A and ASTM F2160.

HDPE conduit color must be solid orange.

HDPE conduit must be joined by electrofusion. Electrofusion must be by 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. A minimum of 2 test fusions, by each fusion operator, must be demonstrated to the Engineer prior to performing fusion operations on any HDPE conduit to be installed.

**Add to section 86-2.05B:**

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

**Add to section 86-2.05C:**

If Type 3 conduit is placed in a trench, not in the pavement or under concrete sidewalk, after the bedding material is placed and the conduit is installed, backfill the trench to not less than 4 inches above the conduit with minor concrete under section 90-2, except the concrete must contain not less than 421 pounds of cementitious material per cubic yard. Backfill the remaining trench to finished grade with backfill material.

After conductors have been installed, the ends of the conduits terminating in pull boxes, service equipment enclosures, and controller cabinets must be sealed with an authorized type of sealing compound.

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.

At other locations where conduit is required to be installed under pavement and if a delay to vehicles will not exceed 5 minutes, conduit may be installed by the trenching in pavement method.

**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 1609 South B Street, Stockton, CA 95205.

**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 86-2.08A:**

Secure conductors and cables to the projecting end of the conduit in pull boxes.

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

Splices must be insulated by "Method B."

**Delete the 6th and 7th paragraphs of section 86-2.09E.**

**Add to section 86-2.11A:**

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.

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

Service equipment enclosures must be the aluminum type.

**86-2.18 NUMBERING ELECTRICAL EQUIPMENT**

**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 86-2.**

**86-2.19 WIRELESS MODEM**

**86-2.19A General**

**86-2.19A(1) Summary**

Section 86-2.19 includes specifications for installing wireless modem.

**86-2.19A(2) Submittal**

You must provide one installation, operation, and service manual for each wireless modem provided in the contract.

Provide a certificate of compliance from the manufacturer for all wireless modems.

Submit warranty documentation before installation.

**86-2.19A(3) Quality Control and Assurance**

**86-2.19A(3)(a) Acceptance testing**

You must configure and test the modem remotely. Demonstrate proper operation of the modem by successfully configuring the modem by modifying settings, checking the signal strength, and checking for status of the TCP/IP connection. The signal strength must be within the range of -50 to -80 dBm. Perform visual check of the LED status lights to see that the LED lights are functioning properly.

**86-2.19A(3)(b) Warranty**

Provide two year replacement warranty from the manufacturer of wireless modem from the date of installation against any defects or failures. Manufacturer must provide replacement of modem within five days after receipt of failed modem at no cost to the Department.

A completed form will be returned to you for each wireless modem certifying that the modem has been fully functional on the date specified.

Warranty's address and delivery of replacement equipment must use the following department maintenance electrical shop:

1283 North West Avenue, Fresno, CA 93728.

**86-2.19B Material**

**86-2.19B(1) General**

The wireless modem must provide wireless data transmission between the field units and the Transportation Management Center (TMC). The modem and antenna must not cause interference with other electrical equipment in the cabinet.

You must furnish, install, integrate, and test all equipment and components necessary to provide complete functionality of the wireless system. The wireless modem must consist of the modem, an external antenna, antenna cable, TIA-232 serial cable, and a power adapter.

The wireless modem must meet or exceed the minimum requirements as shown in the following table:

**Wireless Modem**

Communications	GPRS, TIA-485 and TIA-232 DTE
Wireless communications	GPRS/EDGE or 3G
Baud rate supported	1200 to 115200 bps
Serial connector	DB9M
Input voltage	10-30 V(dc)
Power consumption	1 Watt
Operating temperature	From -31 to 165 °F
Operating humidity range	From 5 to 95 %, non-condensing
Standards compliance	PCCA STD-101
Network protocols	TCP, UDP, HTTP, SNMP,FTP, Serial over IP
Persistent network connectivity	99. 2 % error free operation with auto reconnect
Status LED indicators	Power, receive, transmit, RSSI (signal strength)
Network port	RJ45

**86-2.19B(2) Software Requirements**

The wireless modem must have firmware, software, hardware, and protocol features that must be fully compatible with the existing network and with the service provider. The software configuration package must be supplied for the wireless system at no extra cost. The control software configuration package must have features to provide for remote programming, remote maintenance, and system diagnostics.

**86-2.19B(3) Antenna**

The external antenna must be of a low profile design with integrated ground plane for outdoor permanent mount on a metallic structure.

**86-2.19B(4) TIA-232 Serial Port**

The modems must be configurable remotely through the wireless network or through the modem serial port. The modem must have the DB9M pins shown in the following table:

Modem TIA-232 Signal	DB9M Plug Connector Pin
RD	2
TD	3
RTS	7
CTS	8
Signal GND	5
DCD	1
DTR	4
DSR	6

**86-2.19C Construction**

Mount the wireless modem in the cabinet as directed. You must use cable ties, wire mounting devices, and fixed diameter clamps in the controller cabinet and equipment rack to avoid physical interference between cables and adjacent equipment.

Before permanently installing the antenna, you must conduct signal strength measurements to verify signal strength per the manufacturer requirements. The antenna must be mounted at the top of the cabinet with antenna cable routed so as not to interfere with the fan assembly. Install the antenna and apply 100-percent-clear silicon-rubber sealant.

**86-2.19D Payment**

Not Used

**Add to section 86-3.02A(3):**

Batteries must have a written warranty against defects in materials and workmanship from the manufacturer prorated for a period of 60 months after installation. You must provide the Engineer with all warranty documentation before installation. Replacement batteries must be available within 5 business days after receipt of failed batteries. The Department pays to ship the failed batteries. Replacement batteries must be delivered to Caltrans Maintenance Electrical Shop at 1609 South B Street, Stockton, CA 95205.

**Add to section 86-3.02B:**

External cabinet must be capable of housing:

1. 4 batteries
2. Inverter/charger unit
3. Power transfer relay
4. Manually-operated bypass switch
5. Required control panels
6. Wiring and harnesses

**Replace "Reserved" in section 86-3.02D with:**

**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

Before shipping to the job site, submit each Model 334L cabinet to METS for acceptance testing.

Notify the Engineer when each Model 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. 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. 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. 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

**Replace section 86-4.01D(1)(c)(ii) with:**

**86-4.01D(1)(c)(ii) Warranty**

The manufacturer must provide a written warranty against defects in materials and workmanship for LED signal modules for a minimum period of 48 months after installation of LED signal modules. Replacement LED signal modules must be provided within 15 days after receipt of failed LED modules at your expense. The Department pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED signal modules must be delivered to State Maintenance Electrical Shop at 1604 South B Street, Stockton, CA 95205.

**Add to section 86-4.01D(2)(a):**

LED signal module must be manufactured for 12-inch circular and arrow sections.

**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 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.

**Replace "Reserved" in section 86-5.01D with:**

**86-5.01D(1) General**

Each traffic signal must have an emergency vehicle detector system that must comply with the details shown and the special provisions.

Each emergency vehicle detector system must consist of an optical emitter assembly or assemblies located on the appropriate vehicle and an optical detector/discriminator assembly or assemblies located at the traffic signal.

Emitter assemblies are not required for this project except units for testing purposes to demonstrate that the systems perform as specified. Tests must be conducted in the presence of the Engineer as described below under "System Operation" during the signal test period. The Engineer must be provided a minimum of 2 working days notice prior to performing the tests.

Each system must allow detection of 2 classes of authorized vehicles. Class I (mass transit) vehicles must be detected at ranges of up to 1,000 feet from the optical detector. Class II (emergency) vehicles must be detected at ranges up to 1,800 feet from the optical detector.

Class I signals (those emitted by Class I vehicles) must be distinguished from Class II signals (those emitted by Class II vehicles) on the basis of the modulation frequency of the light from the respective emitter. The modulation frequency for Class I signal emitters must be  $9.639 \text{ Hz} \pm 0.110 \text{ Hz}$ . The modulation frequency for Class II signal emitters must be  $14.035 \text{ Hz} \pm 0.250 \text{ Hz}$ .

A system must establish a priority of Class II vehicle signals over Class I vehicle signals and must comply with the requirements in section 25352 of the California Vehicle Code.

### **86-5.01D(2) Emitter Assembly**

Each emitter assembly, provided for testing purposes, must consist of an emitter unit, an emitter control unit, and connecting cables.

#### **86-5.01D(2)(a) General**

Each emitter assembly, including lamp, must operate over an ambient temperature range of -34 to +60 degrees C at both modulation frequencies and operate continuously at the higher frequency for a minimum of 3,000 hours at 25 degrees C ambient before failure of the lamp or other components.

Each emitter unit must be controlled by a single, maintained-contact switch on the respective emitter control unit. The switch must be located to be readily accessible to the vehicle driver. The control unit must contain a pilot light to indicate that the emitter power circuit is energized and must generate only 1 modulating code, either that for Class I vehicles or that for Class II vehicles.

#### **86-5.01D(2)(b) Functional**

Each emitter unit must transmit optical energy in 1 direction only.

The signal from each Class I signal emitter unit must be detectable at a distance of 1,000 feet when used with a standard optical detection/discriminator assembly and filter to eliminate visible light. Visible light must be considered eliminated when the output of the emitter unit with the filter is less than an average of 0.0003 candela per energy pulse in the wavelength range of 380 nm to 750 nm when measured at a distance of 10 feet. Submit a certificate of compliance for each Class I emitter unit.

The signal from each Class II signal emitter unit must be detectable at a distance of 1,800 feet when used with a standard optical detection/discriminator assembly.

The standard optical detection/discriminator assembly to be used in making the range tests must be available from the manufacturer of the system. A certified performance report must be furnished with each assembly.

#### **86-5.01D(2)(c) Electrical**

Each emitter assembly must provide full light output with input voltages of between 12.5 V(dc) and 17.5 V(dc). An emitter assembly must not be damaged by input voltages up to 7.5 V(dc) above supply voltage. The emitter assembly must not generate voltage transients, on the input supply, that exceed the supply voltage by more than 4 volts.

Each emitter assembly must consume not more than 100 W at 17.5 V(dc) and must have a power input circuit breaker rated at 10 A to 12 A, 12 V(dc).

The design and circuitry of each emitter must allow its use on vehicles with either negative or positive ground without disassembling or rewiring of the unit.

#### **86-5.01D(2)(d) Mechanical**

Each emitter unit must be housed in a weatherproof corrosion-resistant housing. The housing must be provided with facilities to allow mounting on various types of vehicles and must have provision for aligning the emitter unit properly and for locking the emitter unit into this alignment.

Each emitter control unit must be provided with hardware to allow the unit to be mounted in or on an emergency vehicle or mass transit vehicle. Where required for certain emergency vehicles, the emitter control unit and exposed controls must be weatherproof.

### **86-5.01D(3) Optical Detection/Discriminator Assembly**

#### **86-5.01D(3)(a) General**

Each optical detection/discriminator assembly must consist of 1 or more optical detectors, connecting cable and a discriminator module.

Each assembly, when used with standard emitters, must have a range of at least 1,000 feet for Class I signals and 1,800 feet for Class II signals. Standard emitters for both classes of signals must be available from the manufacturer of the system. Range measurements must be taken with all range adjustments on the discriminator module set to "maximum".

### **86-5.01D(3)(b) Optical Detector**

Each optical detector must be a waterproof unit capable of receiving optical energy from 2 separately aimable directions. The horizontal angle between the 2 directions must be variable from 180 degrees to 5 degrees.

The reception angle for each photocell assembly must be a maximum of 8 degrees in all directions about the aiming axis of the assembly. Measurements of reception angle will be taken at a range of 1,000 feet for a Type I emitter and at a range of 1,800 feet for a Type II emitter.

Internal circuitry must be solid state and electrical power must be provided by the associated discriminator module.

Each optical detector must be contained in a housing, which must include 2 rotatable photocell assemblies, an electronic assembly and a base. The base must have an opening to allow mounting on a mast arm or a vertical pipe nipple, or suspension from a span wire. The mounting opening must have female threads for 3/4 inch conduit. A cable entrance must be provided which must have male threads and gasketing to allow a waterproof cable connection. Each detector must have weight of less than 2.5 pounds and must present a maximum wind load area of 36 square inches. The housing must be provided with weep holes to allow drainage of condensed moisture.

Each optical detector must be installed, wired and aimed as specified by the manufacturer.

### **86-5.01D(3)(c) Cable**

Optical detector cable (EVC) must comply with the requirements of IPCEA-S-61-402/NEMA WC 5, section 7.4, 600-V (ac) control cable, 75 degrees C, Type B, and the following:

1. The cable must contain 3 conductors, each of which must be No. 20 (7 x 28) stranded, tinned copper with low-density polyethylene insulation. Minimum average insulation thickness must be 25 mils. Insulation of individual conductors must be color coded: 1-yellow, 1-blue, 1-orange.
2. The shield must be either tinned copper braid or aluminized polyester film with a nominal 20 percent overlap. Where film is used, a No. 20 (7 x 28) stranded, tinned, bare drain wire must be placed between the insulated conductors and the shield and in contact with the conductive surface of the shield.
3. The jacket must be black polyvinyl chloride with minimum ratings of 600 V (ac) and 80 degrees C and a minimum average thickness of 43 mils. The jacket must be marked as required by IPCEA/NEMA.
4. The finished outside diameter of the cable must not exceed 0.35-inch.
5. The capacitance, as measured between any conductor and the other conductors and the shield, must not exceed 48 pf per foot at 1000 Hz.
6. The cable run between each detector and the controller cabinet must be continuous without splices or must be spliced only as directed by the detector manufacturer.

### **86-5.01D(3)(d) Discriminator Module**

Each discriminator module must be designed to be compatible and usable with a Model 2070E controller unit and to be mounted in the input file of a Model 332L or Model 336L controller cabinet, and must comply with the requirements of chapter I of the State of California, Department of Transportation, "Traffic Signal Control Equipment Specifications."

Each discriminator module must be capable of operating 2 channels, each of which must provide an independent output for each separate input.

Each discriminator module, when used with its associated detectors, must perform the following:

1. Receive Class I signals at a range of up to 1,000 feet and Class II signals at a range of up to 1,800 feet.
2. Decode the signals, on the basis of frequency, at 9.639 Hz  $\pm$  0.119 Hz for Class I signals and 14.035 Hz  $\pm$  0.255 Hz for Class II signals.

3. Establish the validity of received signals on the basis of frequency and length of time received. A signal must be considered valid only when received for more than 0.50-second. No combination of Class I signals must be recognized as a Class II signal regardless of the number of signals being received, up to a maximum of 10 signals. Once a valid signal has been recognized, the effect must be held by the module in the event of temporary loss of the signal for a period adjustable from 4.5 seconds to 11 seconds in at least 2 steps at 5 seconds  $\pm$  0.5 second and 10 seconds  $\pm$  0.5 second.
4. Provide an output for each channel that will result in a "low" or grounded condition of the appropriate input of a Model 2070E controller unit. For Class I signals the output must be a 6.25 Hz  $\pm$  0.1 percent, rectangular waveform with a 50 percent duty cycle. For Class II signals the output must be steady.

Each discriminator module must receive electric power from the controller cabinet at either 24 V (dc) or 120 V (ac).

Each channel together with the channel's associated detectors must draw not more than 100 mA at 24 V (dc) or more than 100 mA at 120 V (ac). Electric power, 1 detector input for each channel and 1 output for each channel must terminate at the printed circuit board edge connector pins shown in the following table:

**Board Edge Connector Pin Assignment**

A	DC ground		
B	+24 V (dc)	P	(NC)
C	(NC)		
D	Detector input, Channel A	R	(NC)
E	+24V (dc) to detectors	S	(NC)
F	Channel A output (C)	T	(NC)
		U	(NC)
H	Channel A output (E)	V	(NC)
J	Detector input, Channel B	W	Channel B output (C)
K	DC ground to detectors	X	Channel B output (E)
L	Chassis ground	Y	(NC)
M	AC-	Z	(NC)
N	AC+		

(C) Collector, slotted for keying

(E) Emitter, slotted for keying

(NC) Not connected, cannot be used by manufacturer for any purpose.

Two auxiliary inputs for each channel must enter each module through the front panel connector. Pin assignment for the connector must be as follows:

1. Auxiliary detector 1 input, Channel A
2. Auxiliary detector 2 input, Channel A
3. Auxiliary detector 1 input, Channel B
4. Auxiliary detector 2 input, Channel B

Each channel output must be an optically isolated NPN open collector transistor capable of sinking 50 mA at 30 V (ac) and must be compatible with the Model 2070E controller unit inputs.

Each discriminator module must be provided with means of preventing transients received by the detector from affecting the Model 2070E controller assembly.

Each discriminator module must have a single connector board and must occupy 1 slot width of the input file. The front panel of each module must have a handle to facilitate withdrawal and the following controls and indicators for each channel:

1. Three separate range adjustments each for both Class I and Class II signals.
2. A 3-position, center-off, momentary contact switch, 1 position (down) labeled for test operation of Class I signals, and 1 position (up) labeled for test operation of Class II signals.

3. A "signal" indication and a "call" indication each for Class I and for Class II signals. The "signal" indication denotes that a signal above the threshold level has been received. A "call" indication denotes that a steady, validly coded signal has been received. These 2 indications may be accomplished with a single indication lamp; "signal" being denoted by a flashing indication and "call" with a steady indication.

In addition, the front panel must be provided with a single circular, bayonet-captured, multi-pin connector for 2 auxiliary detector inputs for each channel. Connector must be a mechanical configuration complying with the requirements in Military Specification MIL-C-26482 with 10-4 insert arrangement, such as Burndy Trim Trio Bantamate Series, consisting of the following:

1. Wall mounting receptacle, G0B10-4PNE with SM20M-1S6 gold plated pins.
2. Plug, G6L10-4SNE with SC20M-1S6 gold plated sockets, cable clamp and strain relief that must provide for a right angle turn within 2-1/2 inches maximum from the front panel surface of the discriminator module.

**86-5.01D(3)(e) Cabinet Wiring**

The Model 332L cabinet has provisions for connections between the optical detectors, the discriminator module and the Model 2070E controller unit.

Wiring for a Model 332L cabinet must comply with the following:

1. Slots 12 and 13 of input file "J" have each been wired to accept a 2-channel module.
2. Field wiring for the primary detectors, except 24-V (dc) power, must terminate on either terminal board TB-9 in the controller cabinet or on the rear of input file "J," depending on cabinet configuration. Where TB-9 is used, position assignments must be as shown in the following table:

Position	Assignment
4	Channel A detector input, 1st module (Slot J-12)
5	Channel B detector input, 1st module (Slot J-12)
7	Channel A detector input, 2nd module (Slot J-13)
8	Channel B detector input, 2nd module (Slot J-13)

The 24-V (dc) cabinet power will be available at Position 1 of terminal board TB-1 in the controller cabinet.

Field wiring for the auxiliary detectors must terminate on terminal board TB-O in the controller cabinet. Position assignments are as shown in the following table:

For module 1 (J-12)		For module 2 (J-13)	
Position	Assignment	Position	Assignment
1	+24V(dc) from (J-12E)	7	+24V(dc) from (J-13E)
2	Detector ground From (J-12K)	8	Detector ground from (J-13K)
3	Channel A auxiliary detector input 1	9	Channel A auxiliary detector input 1
4	Channel A auxiliary detector input 2	10	Channel A auxiliary detector input 2
5	Channel B auxiliary detector input 1	11	Channel B auxiliary detector input 1
6	Channel B auxiliary detector input 2	12	Channel B auxiliary detector input 2

**86-5.01D(4) System Operation**

The Contractor must demonstrate that the components of each system are compatible and will perform satisfactorily as a system. Satisfactory performance must be determined using the following test procedure during the functional test period:

1. Each system to be used for testing must consist of an optical emitter assembly, an optical detector, an optical detector cable and a discriminator module.
2. The discriminator modules must be installed in the proper input file slot of the Model 2070E controller assembly.

3. Two tests must be conducted; 1 using a Class I signal emitter and a distance of 1,000 feet between the emitter and the detector, the other using a Class II signal emitter and a distance of 1,800 feet between the emitter and the detector. Range adjustments on the module must be set to "Maximum" for each test.
4. Each test must be conducted for a period of 1 hour, during which the emitter must be operated for 30 cycles, each consisting of a 1 minute "on" interval and a 1 minute "off" interval. During the total test period the emitter signal must cause the proper response from the Model 2070E controller unit during each "on" interval and there must be no improper operation of either the Model 2070E controller unit or the monitor during each "off" interval.

### **86-5.03 ACCESSIBLE PEDESTRIAN SIGNALS**

#### **86-5.03 General**

##### **86-5.03A(1) Summary**

Section 86-5.03 includes specifications for installing accessible pedestrian signal (APS). Comply with TEES.

##### **86-5.03A(2) Definitions**

**APS:** As defined in the *California MUTCD*.

**accessible walk indication:** Activated audible and vibrotactile action during the walk interval.

**ambient sound:** Background sound level in dB at a given location.

**ambient sound sensing microphone:** Microphone that measures the ambient sound level in dB and automatically adjusts the APS speaker's volume, accordingly.

**APS assembly:** Assembly that must include a pushbutton to actuate the APS components.

**audible speech walk message:** Audible prerecorded message that communicates to user which street has the walk interval.

**programming mechanism:** Device to program the APS operation.

**pushbutton information message:** As defined in the *California MUTCD*

**pushbutton locator tone:** As defined in the *California MUTCD*.

**vibrotactile pedestrian device:** As defined in the *California MUTCD*.

##### **86-5.03A(3) Submittals**

Submit the APS wiring diagram and product data.

Submit 4 APS user and operator manuals for each signalized location as an informational submittal. Each manual must include a master item index that describes the purpose and a brief description to the directory. The index must include an overall description of the APS and its associated equipment and cables with illustrative block diagrams, manufacturer contact information, technical data specification, a parts list, part descriptions, and settings. The manuals must include fault diagnostic and repair procedures and procedures for preventative maintenance to maintain APS performance parameters.

Before shipping to the job site, submit all APSs with the following to METS:

1. Delivery form including Contract number and contact information
2. List containing all APS serial nos.
3. Manufacturer's name, trademark, model no., lot number, and month and year of manufacture
4. Programming mechanism if not integral to the APS

Submit a record of completed field tests, APS final configuration, audible sound levels and threshold, and a list of all parameter settings.

Submit warranty documentation before installing APSs.

## **86-5.03A(4) Quality Control and Assurance**

### **86-5.03A(4)(a) General**

The APS must be compatible with the Department-furnished Model 170E/2070L controller assembly.

The power to the APS must be connected to the pedestrian signal section terminal blocks.

The Department may test each APS. All functional and dimensional parameters specified in section 86-5.03 specifications may be tested on the APS.

Comply with section 86-2.14A.

### **86-5.03A(4)(b) Functional Testing**

Field tests must be completed twice, when traffic is noisy such as during peak traffic hours and when traffic is quiet such as during off peak hours. Notify the Engineer 15 days before testing the APS.

### **86-5.03A(4)(c) Warranty**

Furnish a 2-year replacement warranty from the manufacturer of the APS against any defects or failures. The effective date of the warranty is the date of acceptance of the installation. Furnish replacement parts within 10 days after receipt of the failed parts. The Department does not pay for the replacement. Deliver replacement parts to the following department maintenance electrical shop at:

District 10 Electrical Maintenance  
1609 South B Street  
Stockton, CA 95205

### **86-5.03A(4)(d) Training**

Provide a minimum of 4 hours of training by a certified manufacturer's representative for up to 8 Department employees selected by the Engineer. The content of the training must include instructions for installing, programming, adjusting, calibrating, and maintaining the APS.

Furnish materials and equipment for the training. Notify the Engineer 15 days before the training. The time and location of the training must be agreed upon by you and the Engineer. If no agreement can be reached, the Engineer determines the time and location.

### **86-5.03B Materials**

APS assembly housing must be of corrosion resistant material.

For metallic housing, the color must match color no. 33538 of FED-STD-595.

For plastic housing, the color must match color no. 17038, 27038, or 37038 of FED-STD-595 and colored throughout.

The APS assembly must be rainproof and shockproof in any weather condition.

The APS assembly must include:

1. Pushbutton with a minimum diameter of 2 inches. If a mechanical switch is used, comply with the following:
  - 1.1. Operating force of 3.5 lb
  - 1.2. Maximum pretravel of 5/64 inch
  - 1.3. Minimum overtravel of 1/32 inch
  - 1.4. Differential travel from 0.002 to 0.04 inch
2. Vibrotactile device on the pushbutton or on the arrow.
3. Enclosure with an ambient sound level sensing microphone and weatherproof speaker. The enclosure, must be less than 7 lb, be less than 16 by 6 by 5 inches, and fit the standard. Maximum diameter of the hole for passage of wiring must not exceed 1.125 inches. Attachment to the pole must be with 2 screws of a diameter from 1/4 to 3/8 inch suitable for use in tapped holes. Clear space between any 2 holes in the post must be at least twice the diameter of the larger hole.
4. Pushbutton sign.

The APS speakers and electronic equipment must be installed inside the APS assembly enclosure. The speaker grills must be located on the surface of assembly enclosure.

Speakers must not interfere with the housing or its mounting hardware.

The conductor cable between the APS assembly and the pedestrian signal head must be a nine-no. 20-conductor cable complying with MIL-W-16878D. The wiring must comply with section 13.02 of ITE publication, Equipment and Material Standards, chapter 2, "Vehicle Traffic Control Signal Heads" and the NEC rated for service at +105 degrees C.

Electronic switches, a potentiometer, or a handheld device must be used to control and program the volume level and the messaging for the APS. After successful installation of the APS, hand over the programming mechanism to the Engineer.

The APS must:

1. Include a provision to enable and disable the APS operation.
2. Have a failsafe operation. In the event of APS failure, the pedestrian button, when actuated, must activate the pedestrian "walk" signal timing.
3. Provide information using:
  - 3.1. Audible speech walk message that plays when the pushbutton is actuated. The message must include the name of the street to be crossed associated with that pushbutton. An example of the message is: "Peachtree, "walk" sign is on to cross Peachtree." The message must be repeated for the duration of the walk interval. The APS must include at least 5 sound options to be played during the walk interval. The Engineer may field select the "walk" sound option. The message must be activated for use from the beginning of the walk interval. The message must have a percussive tone consisting of multiple frequencies with a dominant component of 880 Hz. If the tone is selected as the message, it must repeat 8 to 10 ticks per second.
  - 3.2. Pushbutton information message that provides the name of the street to be crossed associated with that pushbutton. The message must play when the pushbutton is actuated. An example of the message is: "Wait to cross Howard at Grand. Wait."
  - 3.3. Pushbutton locator tone that clicks or beeps. The locator tone must come from the pushbutton and repeat at 1 tone per second interval. Each tone has a maximum duration of 0.15 second. The locator tone volume must adjust in response to ambient sound and be audible up to 12 feet from the pushbutton or to the building line, whichever is less.
4. Have a functional pushbutton that activates the pedestrian "walk" signal whenever actuated, even if the audible speech walk message, the pushbutton information message, the pushbutton locator tone, and the vibrating surface features are disabled.

### **86-5.03C Construction**

Arrange to have a manufacturer's representative at the job site when the APS is installed, modified, connected, or reconnected. The APS must not interfere with the Department-furnished controller assembly, the signal installation on signal standards, the pedestrian signal heads, or the terminal compartment blocks. The APS electronic control equipment must reside inside the APS assembly and the standard pedestrian signal head.

You are responsible for the compatibility of the components and for making the necessary calibration adjustments to deliver the performance specified. Furnish the equipment and hardware, then set up, calibrate, and verify the performance of the APS.

### **86-5.03D Payment**

Not Used

**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 $\Omega$ . The appropriate thermocouple wire must be used. The leads must be a minimum of 6 feet. Documentation must accompany the test unit that details the type of sensor used.

The sample luminaires must be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at a temperature of +70 degrees F before performing any testing.

The luminaire lighting performance must be depreciated for the minimum operating life by using the LED manufacturer's data or the data from the LM-80 test report, whichever results in a higher lumen depreciation.

Failure of the luminaire that renders the unit noncompliant with section 86-6.01 specifications is cause for rejection. If a unit is rejected, allow 30 days for retesting. The retesting period starts when the replacement luminaire is delivered to the test site.

If a luminaire submitted for testing does not comply with section 86-6.01, remove the unit from METS within 5 business days after notification the unit is rejected. If the unit is not removed within that period, the Department may ship the unit to you and deduct the cost.

##### **86-6.01A(4)(b) Warranty**

Furnish a 7-year replacement warranty from the manufacturer of the luminaires against any defects or failures. The effective date of the warranty is the date of installation. Furnish replacement luminaires within 10 days after receipt of the failed luminaire. The Department does not pay for the replacement. Deliver replacement luminaires to the following department maintenance electrical shop:

District 10 Electrical Maintenance  
1609 South B Street  
Stockton, CA 95205

#### **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  $60 \pm 3$  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 <math>y \geq 0</math> (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	Pattern defined by an ellipse with the equation: $\frac{x^2}{(92)^2} + \frac{(y - 23)^2}{(55)^2} = 1$ 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.
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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  $\pm 5$  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 <sup>a</sup>	Installed	1.5 g peak-to-peak sinusoidal loading (same as 0.75 g peak)

<sup>a</sup>Perpendicular to the direction of the mast arm

The housing must be designed to prevent the buildup of water on top of the housing. Exposed heat sink fins must be oriented to allow water to freely run off of the luminaire and carry dust and other accumulated debris away from the unit. The optical assembly of the luminaire must be protected against dust and moisture intrusion to at least an ANSI/IEC rating of IP66. The power supply enclosure must be protected to at least an ANSI/IEC rating of IP43.

Each mounted luminaire must be furnished with an ANSI C136.10-compliant, locking type photocontrol receptacle and a rain tight shorting cap. The receptacle must comply with section 86-6.11A.

When the components are mounted on a down-opening door, the door must be hinged and secured to the luminaire housing separately from the refractor or flat lens frame. The door must be secured to the housing such that accidental opening is prevented. A safety cable must mechanically connect the door to the housing.

Field wires connected to the luminaire must terminate on a barrier type terminal block secured to the housing. The terminal screws must be captive and equipped with wire grips for conductors up to no. 6. Each terminal position must be clearly identified.

The power supply must be rated for outdoor operation and have at least an ANSI/IEC rating of IP65.

The power supply must be rated for a minimum operational life equal to the minimum operational life of the luminaire or greater.

The power supply case temperature must have a self rise of 77 degrees F or less above ambient temperature in free air with no additional heat sinks.

The power supply must have 2 leads to accept standard 0-10 V(dc). The dimming control must be compatible with IEC 60929. If the control leads are open or the analog control signal is lost, the circuit must default to 100-percent power.

Conductors and terminals must be identified.

**Replace "Reserved" in section 86-6.10C with:**

**86-6.10C(1) General**

**86-6.10C(1)(a) Summary**

Section 86-6.10C includes specifications for installing extinguishable message sign.

**86-6.10C(1)(b) Submittals**

Submit shop drawings for review and authorization at least 30 days before ordering equipment.

Submit warranty documentation before installation.

**86-6.10C(1)(c) Quality Control and Assurance**

**86-6.10C(1)(c)(i) General**

The Department may test the sign operation.

**86-6.10A(1)(c)(ii) Warranty**

Furnish a 5-year repair or replacement warranty from the manufacturer of the EMS against any defects or failures. The effective date of the warranty is the date of acceptance of installation. The manufacturer must repair or replace a sign that exhibits light degradation greater than 50 percent or if more than 20 percent of the LEDs fail within the first 3 years of operation.

Furnish replacement parts within 10 days after receipt of the failed parts. The Department does not pay for the replacement. Deliver replacement parts to the following department maintenance electrical shop at:

District 10 Electrical Maintenance  
1609 South B Street  
Stockton, CA 95205

**86-6.10C(2) Materials**

**86-6.10C(2)(a) General**

The EMS must use LEDs to create pixels, with the pixels forming a module, and the module forming legends in nominal 10-inch size letters. The LED messages must automatically adjust its light output by means of photosensors installed in the EMS housing. Multiple EMSs may be controlled from the same photosensor. Light output must be proportional to the ambient light (more ambient light / more output and less ambient light / less output). The EMS must have a minimum of three adjustable levels of luminance: 100 percent, 60 percent, and 30 percent luminance. The signs must have a 30 percent luminance manual control as shown.

Use ultrabright type aluminum indium gallium phosphide (AlInGaP) LEDs rated for 100,000 hours of continuous operation from -37 to +74 degrees C. The LED pixels must be ultraviolet stabilized. Individual LEDs must be wired so that a failure of 1 LED will not result in the loss of more than 1/3 of a pixel.

The LED modules must consist of multiple pixels in a 5w x 7h configuration. Each pixel must consist of at least 12 high intensity LEDs. Each pixel must be 590 nanometers nominal amber in color having an initial nominal luminous intensity of 9.5 cd on the maximum setting. Each LED pixel must consume no more than 750 mW of power. Each pixel must be removable or replaceable on the module with a screwdriver and each module must be removable from the housing in the same manner.

**86-6.10C(3) Construction**

**86-6.10C(3)(a) General**

Construct the EMS so that an antiglare polycarbonate or hardened acrylic front face panel with antiglare film is contained within an extruded aluminum frame.

The extruded aluminum frame must be hinged to allow access to the interior of the sign and have fully-welded seams with a high gloss textured black finish powder coat paint matching color no. 17038 of FED-STD-595. Install a 0.4-inch nominal black anodized aluminum hex cell louver having 95 percent open area and providing 60-degree shielding between the LED pixels and the front face panel to enhance resistance to sun phantom. Secure the louvers in front of the LED pixels with captive type retainers.

The EMS must have a closed-cell neoprene gasket making the sign rain tight. Stainless steel latches must allow for quick access to the interior of the sign. The sign must include a device that allows the face panel to remain in a fully-open mode to assist in the servicing of the sign. The exterior hardware must be stainless steel or cadmium plated.

The EMS must be vented on the bottom and must have an interior temperature controlled ventilation fan to ensure the interior of the housing remains below 55 degrees C without compromising the rain tight integrity. Install an insect screen in the vents.

Solder the LEDs in place and do not shorten or remove the LED leads. The LEDs must be from the same manufacturer and from the same color bin.

#### **86-6.10C(3)(b) Operation**

The LED message must be steadily lit when activated. The EMS must have an internal power supply and dimming capability to fully operate the sign. The EMS power factor must be greater than 90 percent and the current total harmonic distortion must be less than 25 percent.

The EMS must operate at a frequency of  $60 \pm 3$  Hz over a voltage ranging from 90 to 135 V(ac). The LED circuitry must prevent perceptible flicker over the voltage range specified. Line voltage fluctuations must have no visible effect on the luminous intensity of the EMS. The rated voltage for measurements must be 120 V (ac).

The EMS must include a voltage surge protection to withstand high repetition noise transient. The voltage surge protection must comply with NEMA Standard TS2, section 2.1.6.

The EMS must comply with Class A emission limits provided in 47 CFR 15, subpart B concerning the emission of electronic noise..

#### **86-6.10C(3)(c) Photometric requirements**

The LED pixels must meet at least 85 percent of the minimum intensity specifications while operating throughout the operating range of -37 to +74 degrees C.

The minimum initial luminous intensity values for LED pixels must be  $650 \text{ cd/m}^2$  at 25 degrees C. Each pixel must have a viewing angle of 30 degrees to the sign.

The measured chromatic coordinates of the LED pixels must comply with the chromaticity specifications of ITE publication ST-017A, section 5.3.2.1. and Figure C.

Install terminal blocks in the interior bottom of the sign housing with sufficient number of terminals to accommodate the wiring. The wiring must be bundled, wrapped, and permanently labeled.

Wire the EMS Ethernet relay to control the solid state relay as shown. Mount the Ethernet relay on a DIN rail, 35mm by 7.55mm, in the 334 cabinet. Connect the Ethernet relay to the 5-Port Ethernet switch using a cat-5e cable. The Ethernet relay must comply with the following general specifications:



**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 <sub>2</sub> ) <sup>a</sup>	90 min
Loss on ignition	5.0 max
Total alkalies as Na <sub>2</sub> O equivalent	3.0 max

Physical property	Requirement
Particle size distribution	
Less than 45 microns	95 percent
Less than 10 microns	50 percent
Strength activity index with portland cement <sup>b</sup>	
7 days	95 percent (min percent of control)
28 days	110 percent (min percent of control)
Expansion at 16 days when testing project materials under ASTM C 1567 <sup>c</sup>	0.10 percent max
Surface area when testing by nitrogen adsorption under ASTM D 5604	40.0 m <sup>2</sup> /g min

<sup>a</sup>SiO<sub>2</sub> in crystalline form must not exceed 1.0 percent.

<sup>b</sup>When tested under AASHTO M 307 for strength activity testing of silica fume.

<sup>c</sup>In 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	<a href="http://www.dot.ca.gov/hq/esc/oe/weekly_ads/all_advertised.php">http://www.dot.ca.gov/hq/esc/oe/weekly_ads/all_advertised.php</a>	--	--
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**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

**Add to section 2-1.33C:**

10-19-12

On the *Subcontractor List*, you must either submit each subcontracted bid item number and corresponding percentage with your bid or fax these numbers and percentages to (916) 227-6282 within 24 hours after bid opening. Failure to do so results in a nonresponsive bid.

**Replace the paragraph in section 2-1.35 with:**

01-20-12

Submit proof of each required SSPC QP certification with your bid or fax it to (916) 227-6282 no later than 4:00 p.m. on the 2nd business day after bid opening. Failure to do so results in a nonresponsive bid.

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**3 CONTRACT AWARD AND EXECUTION**

10-19-12

**Add to the end of section 3-1.04:**

10-19-12

You may request to extend the award period by faxing a request to (916) 227-6282 before 4:00 p.m. on the last day of the award period. If you do not make this request, after the specified award period:

- 1. Your bid becomes invalid
- 2. You are not eligible for the award of the contract

**Replace the paragraph in section 3-1.11 with:**

10-19-12

Complete and deliver to the Office Engineer a *Payee Data Record* when requested by the Department.

**Replace section 3-1.13 with:**

07-27-12

**3-1.13 FORM FHWA-1273**

For a federal-aid contract, form FHWA-1273 is included with the Contract form in the documents sent to the successful bidder for execution. Comply with its provisions. Interpret the training and promotion section as specified in section 7-1.11A.

**Add to item 1 in the list in the 2nd paragraph of section 3-1.18:**

07-27-12

, including the attached form FHWA-1273

**Delete item 4 of the 2nd paragraph of section 3-1.18.**

10-19-12

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## 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.

**Add to section 5-1.36C:**

07-20-12

If the Contract does not include an agreement with a railroad company, do not allow personnel or equipment on railroad property.

Prevent material, equipment, and debris from falling onto railroad property.

**Add between the 1st and 2nd paragraphs of section 5-1.37A:**

10-19-12

Do not remove any padlock used to secure a portion of the work until the Engineer is present to replace it. Notify the Engineer at least 3 days before removing the lock.

**Replace the 1st sentence of the 1st paragraph of section 5-1.39C(2) with:**

10-19-12

Section 5-1.39C(2) applies if a plant establishment period of 3 years or more is shown on the *Notice to Bidders*.

**Replace "working days" in the 1st paragraph of section 5-1.43E(1)(a) with:**

10-19-12

original working days

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

**6 CONTROL OF MATERIALS**

04-19-13

**Replace section 6-2.05C with:**

04-19-13

**6-2.05C Steel and Iron Materials**

Steel and iron materials must be melted and manufactured in the United States except:

1. Foreign pig iron and processed, pelletized, and reduced iron ore may be used in the domestic production of the steel and iron materials
2. If the total combined cost of the materials does not exceed the greater of 0.1 percent of the total bid or \$2,500, materials produced outside the United States may be used if authorized

Furnish steel and iron materials to be incorporated into the work with certificates of compliance and certified mill test reports. Mill test reports must indicate where the steel and iron were melted and manufactured.

All melting and manufacturing processes for these materials, including an application of a coating, must occur in the United States. Coating includes all processes that protect or enhance the value of the material to which the coating is applied.

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## 7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

07-27-12

Replace "20 days" in the 14th paragraph of section 7-1.04 with:

25 days

09-16-11

Replace "90 days" in the 14th paragraph of section 7-1.04 with:

125 days

09-16-11

Add between the 18th and 19th paragraphs of section 7-1.04:

09-16-11

Temporary facilities that could be a hazard to public safety if improperly designed must comply with design requirements described in the Contract for those facilities or, if none are described, with standard design criteria or codes appropriate for the facility involved. Submit shop drawings and design calculations for the temporary facilities and show the standard design criteria or codes used. Shop drawings and supplemental calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Replace the 2nd paragraph of section 7-1.11A with:

07-27-12

A copy of form FHWA-1273 is included in section 7-1.11B. The training and promotion section of section II refers to training provisions as if they were included in the special provisions. The Department specifies the provisions in section 7-1.11D of the *Standard Specifications*. If a number of trainees or apprentices is required, the Department shows the number on the *Notice to Bidders*. Interpret each FHWA-1273 clause shown in the following table as having the same meaning as the corresponding Department clause:

**FHWA-1273 Nondiscrimination Clauses**

FHWA-1273 section	FHWA-1273 clause	Department clause
Training and Promotion	In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.	If section 7-1.11D applies, section 7-1.11D supersedes this subparagraph.
Records and Reports	If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.	If the Contract requires on-the-job training, collect and report training data.

Replace the form in section 7-1.11B with:

07-20-12

**REQUIRED CONTRACT PROVISIONS  
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

**ATTACHMENTS**

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

**II. NONDISCRIMINATION**

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

**I. GENERAL**

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

**1. Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

**2. EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

**6. Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

**8. Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

**9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

**10. Assurance Required by 49 CFR 26.13(b):**

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

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

**11. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

### III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

### IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

#### 1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

## 2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

## 3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### 4. Apprentices and trainees

##### a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

##### b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

**6. Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

**7. Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

**10. Certification of eligibility.**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

**V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

**2. Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

**3. Withholding for unpaid wages and liquidated damages.** The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

**4. Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

## VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

## VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

## VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

#### **IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

#### **X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

##### **1. Instructions for Certification – First Tier Participants:**

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

\*\*\*\*\*

## **2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

### **2. Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers to any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

\*\*\*\*\*

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

\*\*\*\*\*

**XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

**8 PROSECUTION AND PROGRESS**

10-19-12

**Replace "working days" in the 1st paragraph of section 8-1.02B(1) with:**

original working days

10-19-12

**Replace "working days" at each occurrence in the 1st paragraph of section 8-1.02C(1) with:**

original working days

10-19-12

**Delete the 4th paragraph of section 8-1.02C(1).**

04-20-12

**Replace "Contract" in the 9th paragraph of section 8-1.02C(1) with:**

work

10-19-12

**Replace the 1st paragraph of section 8-1.02C(3)(a) with:**

Submit a description of your proposed schedule software for authorization.

04-20-12

**Delete the last paragraph of section 8-1.02C(3)(a).**

04-20-12

**Replace section 8-1.02C(3)(b) with:**

**8-1.02C(3)(b) Reserved**

10-19-12

**Delete the 3rd paragraph of section 8-1.02C(5).**

04-20-12

**Replace "Contract" in the last paragraph of section 8-1.02C(5) with:**

original

10-19-12

**Replace "working days" in the 1st paragraph of section 8-1.02D(1) with:**

original working days

10-19-12

**Replace "8-1.02D(1)" in the 2nd paragraph of section 8-1.02D(1) with:**

8-1.02C(1)

01-20-12

**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:**

$$Qh = HMATT \times Xa$$

04-20-12

**Replace "weight of dry aggregate" in the definition of the variable *Xa* in section 9-1.07B(2) with:**

total weight of HMA

04-20-12

**Replace the formula in section 9-1.07B(3) with:**

$$Qrh = RHMATT \times 0.80 \times Xarb$$

04-20-12

**Replace "weight of dry aggregate" in the definition of the variable *Xarb* 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:**

$$Qmh = MHMATT \times [(100 - Xam) / 100] \times Xmab$$

04-20-12

**Replace "weight of dry aggregate" in the definition of the variable *Xmab* in section 9-1.07B(4) with:**

total weight of HMA

04-20-12

**Replace the formula in section 9-1.07B(5) with:**

$$Qrap = HMATT \times Xaa$$

04-20-12

**Replace "weight of dry aggregate" in the definitions of the variables *Xaa* and *Xta* 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:

04-19-13

1. Active stockpiles before a forecasted storm event
2. Inactive stockpiles according to the WPCP or SWPPP schedule

**Replace the paragraph in section 13-4.04 with:**

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:**

04-19-13

copies

**Add to section 19-3.01A(3)(b):**

01-20-12

For soil nail walls, wall zones are specified in the special provisions.

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:**

01-18-13

90-1

**Replace the heading of section 19-3.03C with:**

04-19-13

**19-3.03B(4) Cofferdams**

**Replace the heading of section 19-3.03D with:**

04-19-13

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

**Replace the 1st paragraph of section 19-3.03E(3) with:**

01-20-12

Compact structure backfill behind lagging of soldier pile walls by hand tamping, mechanical compaction, or other authorized means.

**Replace the 2nd paragraph of section 19-3.03F with:**

01-20-12

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.

**Add between the 2nd and 3rd paragraphs of section 19-3.03K:**

01-20-12

Before you excavate for the installation of ground anchors in a wall zone:

1. Complete stability testing
2. Obtain authorization of test data









- 2. Paving construction foreman
- 3. Traffic control foreman

Be prepared to discuss:

- 1. Quality control
- 2. Acceptance testing
- 3. Placement
- 4. Training on placement methods
- 5. Checklist of items for proper placement
- 6. Unique issues specific to the project, including:
  - 6.1. Weather
  - 6.2. Alignment and geometrics
  - 6.3. Traffic control issues
  - 6.4. Haul distances
  - 6.5. Presence and absence of shaded areas
  - 6.6. Any other local issues

**37-1.02 MATERIALS**

Not Used

**37-1.03 CONSTRUCTION**

Not Used

**37-1.04 PAYMENT**

Not Used

**Replace "Reserved" in section 37-2.01D(1) with:**

01-18-13

Aggregate suppliers, chip spreader operators, emulsion distributor, and for coated chips, the coated chips producer must attend the prepaving conference.

**Add to section 37-2.03A:**

04-20-12

If you fail to place the permanent traffic stripes and pavement markings within the specified time, the Department withholds 50 percent of the estimated value of the seal coat work completed that has not received permanent traffic stripes and pavement markings.

**Add to section 37-3.01D(1):**

01-18-13

Micro-surfacing spreader operators must attend the prepaving conference.

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

**39 HOT MIX ASPHALT**

02-22-13

**Add to section 39-1.01B:**

02-22-13

**processed RAP:** RAP that has been fractionated.

**substitution rate:** Amount of RAP aggregate substituted for virgin aggregate in percent.

**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  $7 \pm 1$  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  $140 \pm 2$  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  $\pm 2.0$  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  $\pm 2.0$  percent of the average binder content of the original processed RAP stockpile.

The maximum specific gravity for processed RAP must be within  $\pm 0.06$  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  $\pm 0.060$  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

<sup>a</sup> 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) <sup>a</sup>			
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) <sup>a</sup>			
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 <sup>a</sup>	120	120	--
Moisture susceptibility (tensile strength ration, %)	California Test 371 <sup>a</sup>	70	70	--

<sup>a</sup>Test 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  $\pm 2.0$  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  $\pm 2.0$  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  $\pm 5$  percent.

For RAP substitution greater than 15, you may adjust the RAP by  $\pm 3$  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 <sup>a</sup>	California Test 202	1 per 750 tons and any remaining part at the end of the project	JMF ± Tolerance <sup>b</sup>			
Sand equivalent (min) <sup>c</sup>	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) <sup>d,e</sup>	QC plan	2 per business day (min.)	91–97	91–97	91–97	--
Stabilometer value (min) <sup>c</sup> 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 (%) <sup>c,f</sup>	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 <sup>g</sup>	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		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) <sup>h</sup>	California Test 234		45	45	45	--
Voids filled with asphalt (%) <sup>i</sup> 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) <sup>i</sup> 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 <sup>l</sup> 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) <sup>j</sup> 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) <sup>j</sup> 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) <sup>j</sup>	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, %) <sup>j</sup>	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 <sub>0</sub>			
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

<sup>a</sup> Determine combined aggregate gradation containing RAP under California Test 367.

<sup>b</sup> The tolerances must comply with the allowable tolerances in section 39-1.02E.

<sup>c</sup> Report the average of 3 tests from a single split sample.

<sup>d</sup> 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.

<sup>e</sup> 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.

<sup>f</sup> Determine the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>g</sup> For adjusting the plant controller at the HMA plant.

<sup>h</sup> 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.

<sup>i</sup> Report only.

<sup>j</sup> 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 <sup>a</sup>	California Test 202	JMF ± tolerance <sup>c</sup>							
Sieve						3/4"	1/2"	3/8"	
1/2"						X <sup>b</sup>			
3/8"							X		
No. 4								X	
No. 8						X	X	X	
No. 200	X	X	X						
Sand equivalent (min) <sup>d</sup>	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) <sup>e, f</sup>	California Test 375	91–97	91–97	91–97	--				
Stabilometer value (min) <sup>d</sup>	California Test 366	30	30	--	--				
No. 4 and 3/8" gradings									
1/2" and 3/4" gradings		37	35	23	--				
Air void content (%) <sup>d, g</sup>	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) <sup>h</sup>	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 (%) <sup>i</sup>	California Test 367	65.0–75.0	65.0–75.0	Report only	--				
No. 4 grading									
3/8" grading						65.0–75.0	65.0–75.0		
1/2" grading						65.0–75.0	65.0–75.0		
3/4" grading		65.0–75.0	65.0–75.0						
Voids in mineral aggregate (% min) <sup>i</sup>	California Test 367								
No. 4 grading						17.0	17.0	--	--
3/8" grading						15.0	15.0	--	--
1/2" grading						14.0	14.0	18.0–23.0	
3/4" grading		13.0	13.0	18.0–23.0					
Dust proportion <sup>i</sup>	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) <sup>j</sup> 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) <sup>j</sup> 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) <sup>j</sup>	California Test 371	120	120	--	--
Moisture susceptibility (tensile strength ration, %) <sup>j</sup>	California Test 371	70	70	--	--
Smoothness	Section 39-1.12	12-foot straight- edge, must grind, and PI <sub>0</sub>	12-foot straight- edge, must grind, and PI <sub>0</sub>	12-foot straight- edge, must grind, and PI <sub>0</sub>	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

<sup>a</sup> The Engineer determines combined aggregate gradations containing RAP under California Test 367.

<sup>b</sup> "X" denotes the sieves the Engineer tests for the specified aggregate gradation.

<sup>c</sup> The tolerances must comply with the allowable tolerances in section 39-1.02E.

<sup>d</sup> The Engineer reports the average of 3 tests from a single split sample.

<sup>e</sup> 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.

<sup>f</sup> 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.

<sup>g</sup> The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>h</sup> 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.

<sup>i</sup> Report only.

<sup>j</sup> 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 <sup>a</sup>	California Test 202	JMF ± tolerance <sup>b</sup>			
Sand equivalent (min) <sup>c</sup>	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) <sup>c</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 366	30	30	--	--
		37	35	23	--
Percent of crushed particles Coarse aggregate (% min) One fractured face Two fractured faces Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve.) One fractured face	California Test 205	90	25	--	90
		75	--	90	75
		70	20	70	90
Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.	California Test 211	12	--	12	12
		45	50	40	40
Air void content (%) <sup>c, d</sup>	California Test 367	4 ± 2	4 ± 2	TV ± 2	--
Fine aggregate angularity (% min) <sup>e</sup>	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 (%) <sup>f</sup> No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	65.0–75.0	65.0–75.0	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		
Voids in mineral aggregate (% min) <sup>f</sup> 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 <sup>g</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367	0.6–1.2	0.6–1.2	Report only	--
		0.6–1.2	0.6–1.2		
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) <sup>g</sup> PG-58 PG-64	AASHTO T 324 (Modified)	10,000	10,000	--	--
		15,000	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) <sup>g</sup>	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) <sup>g</sup>	California Test 371	120	120	--	--
Moisture susceptibility (tensile strength ration, %) <sup>g</sup>	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

<sup>a</sup> The Engineer determines combined aggregate gradations containing RAP under California Test 367.

<sup>b</sup> The tolerances must comply with the allowable tolerances in section 39-1.02E.

<sup>c</sup> The Engineer reports the average of 3 tests from a single split sample.

<sup>d</sup> The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>e</sup> 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.

<sup>f</sup> Report only.

<sup>g</sup> 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 reporting time allowance
			A	B	RHMA-G		
Aggregate gradation <sup>a</sup>	California Test 202	1 per 750 tons	JMF ± tolerance <sup>b</sup>	JMF ± tolerance <sup>b</sup>	JMF ± tolerance <sup>b</sup>	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) <sup>c,d</sup>	QC plan		92–96	92–96	91–96	QC plan	
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants <sup>e</sup>	California Test 226 or 370	2 per day during production	--	--	--	Stock-piles or cold feed belts	--
Sand equivalent (min) <sup>f</sup>	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) <sup>f</sup>	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 (%) <sup>f,g</sup>	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) <sup>h</sup>	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 (%) <sup>i</sup>  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.) <sup>i</sup>  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 <sup>i</sup>  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) <sup>i</sup> 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) <sup>i</sup> 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) <sup>i</sup>	California Test 371	1 per 10,000 tons or 1 per project whichever is greater	120	120	--	--	
Moisture susceptibility (tensile strength ratio, %) <sup>j</sup>	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 <sub>0</sub>	12-foot straight-edge, must-grind, and Pl <sub>0</sub>	12-foot straight-edge, must-grind, and Pl <sub>0</sub>	--	
Asphalt rubber binder viscosity @ 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

- <sup>a</sup> Determine combined aggregate gradation containing RAP under California Test 367.
- <sup>b</sup> The tolerances must comply with the allowable tolerances in section 39-1.02E.
- <sup>c</sup> 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.
- <sup>d</sup> 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.
- <sup>e</sup> For adjusting the plant controller at the HMA plant.
- <sup>f</sup> Report the average of 3 tests from a single split sample.
- <sup>g</sup> Determine the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.
- <sup>h</sup> 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.
- <sup>i</sup> Report only.
- <sup>j</sup> 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 <sup>a</sup>				California Test 202	JMF ± Tolerance <sup>c</sup>		
	Sieve	3/4"	1/2"	3/8"					
1	1/2"	X <sup>b</sup>	--	--	0.05				
1	3/8"	--	X	--	0.05				
1	No. 4	--	--	X	0.05				
2	No. 8	X	X	X	0.10				
3	No. 200	X	X	X	0.15				
4	Asphalt binder content (%)				0.30	California Test 379 or 382	JMF±0.40	JMF±0.40	JMF ± 0.40
5	Field compaction (% max. theoretical density) <sup>d, e</sup>				0.40	California Test 375	92–96	92–96	91–96
	Sand equivalent (min) <sup>f</sup>					California Test 217	47	42	47
	Stabilometer value (min) <sup>f</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings					California Test 366	30 37	30 35	-- 23
	Air void content (%) <sup>f, g</sup>					California Test 367	4 ± 2	4 ± 2	TV ± 2
	Percent of crushed particles coarse aggregate (% min) One fractured face Two fractured faces Fine aggregate (% min) (Passing no. 4 sieve and retained on No. 8 sieve.) One fractured face					California Test 205	90 75 70	25 -- 20	-- 90 70
	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) <sup>h</sup>					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) <sup>i</sup> 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 (%) <sup>i</sup> 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 <sup>1</sup> 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) <sup>j</sup> 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) <sup>j</sup> 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) <sup>j</sup>		California Test 371	120	120	--
	Moisture susceptibility (tensile strength ratio %) <sup>j</sup>		California Test 371	70	70	70
	Smoothness		Section 39-1.12	12-foot straight- edge, must grind, and PI <sub>0</sub>	12-foot straight- edge, must grind, and PI <sub>0</sub>	12-foot straight- edge, must grind, and PI <sub>0</sub>
	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

- <sup>a</sup> The Engineer determines combined aggregate gradations containing RAP under California Test 367.
- <sup>b</sup> "X" denotes the sieves the Engineer tests for the specified aggregate gradation.
- <sup>c</sup> The tolerances must comply with the allowable tolerances in section 39-1.02E.
- <sup>d</sup> 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 and less than 0.20 foot.
  2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.
- <sup>e</sup> 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.
- <sup>f</sup> The Engineer reports the average of 3 tests from a single split sample.
- <sup>g</sup> The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.
- <sup>h</sup> 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.
- <sup>i</sup> Report only.
- <sup>j</sup> Applies to RAP substitution rate greater than 15 percent.

**Replace the 3rd paragraph of section 39-4.04A with:**

01-20-12

The Department 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 0.20 and any layer is less than 0.20 foot.

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

**40 CONCRETE PAVEMENT**

01-20-12

**Replace section 40-1.01C(4) with:**

01-20-12

**40-1.01C(4) Authorized Laboratory**

Submit for authorization the name of the laboratory you propose to use for testing the drilled core specimens for air content.

**Replace the paragraph in section 40-1.01C(8) with:**

01-20-12

Submit a plan for protecting concrete pavement during the initial 72 hours after paving when the forecasted minimum ambient temperature is below 40 degrees F.

01-20-12

**Delete "determined under California Test 559" in section 40-1.01C(9).**

**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:

<b>Tie Bar Tolerance</b>	
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  $20 \pm 5$  feet from the transverse construction joint formed at each day's start of paving and  $1 \pm 0.25$  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

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**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:**

04-20-12

cross-sectional area

**Add to section 50-1.02:**

09-16-11

**50-1.02G Sheathing**

Sheathing for debonding prestressing strand must:

1. Be split or un-split flexible polymer plastic tubing
2. Have a minimum wall thickness of 0.025 inch
3. Have an inside diameter exceeding the maximum outside diameter of the strand by 0.025 to 0.14 inch

Split sheathing must overlap at least 3/8 inch.

Waterproofing tape used to seal the ends of the sheathing must be flexible adhesive tape.

The sheathing and waterproof tape must not react with the concrete, coating, or steel.

**Add to section 50-1.03B(1):**

01-20-12

After seating, the maximum tensile stress in the prestressing steel must not exceed 75 percent of the minimum ultimate tensile strength shown.

**Add to section 50-1.03B(2):**

09-16-11

**50-1.03B(2)(e) Debonding Prestressing Strands**

Where shown, debond prestressing strands by encasing the strands in plastic sheathing along the entire length shown and sealing the ends of the sheathing with waterproof tape.

Distribute the debonded strands symmetrically about the vertical centerline of the girder. The debonded lengths of pairs of strands must be equal.

Do not terminate debonding at any one cross section of the member for more than 40 percent of the debonded strands or 4 strands, whichever is greater.

Thoroughly seal the ends with waterproof tape to prevent the intrusion of water or cement paste before placing the concrete.

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

## 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.







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### 58 SOUND WALLS

04-19-13

**Delete the 3rd paragraph of section 58-1.01.**

10-19-12

**Replace the 1st paragraph of section 58-2.01D(5)(a) with:**

08-05-11

You must employ a special inspector and an authorized laboratory to perform Level 1 inspections and structural tests of masonry to verify the masonry construction complies with section 1704, "Special Inspections," and section 2105, "Quality Assurance," of the 2007 CBC.

**Delete the 1st paragraph of section 58-2.02F.**

10-19-12

**Replace "sets" at each occurrence in the 1st paragraph of section 58-4.01C with:**

04-19-13

copies

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### 59 PAINTING

04-19-13

**Replace "SSPC-SP 10" at each occurrence in section 59 with:**

10-19-12

SSPC-SP 10/NACE no. 2

**Replace "SSPC-SP 6" at each occurrence in section 59 with:**

10-19-12

SSPC-SP 6/NACE no. 3

**Replace "SSPC-CS 23.00" at each occurrence in section 59 with:**

10-19-12

SSPC-CS 23.00/AWS C 2.23M/NACE no. 12

**Replace "SSPC-QP 3 or AISC SPE, Certification P-1 Enclosed" in item 3 in the list in the 1st paragraph of section 59-2.01D(1) with:**

10-19-12

AISC-420-10/SSPC-QP 3 (Enclosed Shop)

**Replace the paragraphs in section 59-2.03A with:**

10-19-12

Clean and paint all exposed structural steel and other metal surfaces.

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:

<b>Zinc Coating System</b>		
Description	Coating	Dry film thickness (mils)
<b>All new surfaces:</b>		
Undercoat	Inorganic zinc primer, AASHTO M 300 Type I or II	4–8
Finish coat <sup>a</sup>	Exterior grade latex <sup>b</sup> , 2 coats	2 minimum each coat, 4–8 total
Total thickness, all coats		8–14
<b>Connections to existing structural steel:<sup>c</sup></b>		
Undercoat	Inorganic zinc primer, AASHTO M 300 Type I or II	4–8
Finish coat <sup>a</sup>	Exterior grade latex <sup>b</sup> , 2 coats	2 minimum each coat, 4–8 total
Total thickness, all coats		8–14

<sup>a</sup>If no finish coats are described, a final coat of inorganic zinc primer is required.

<sup>b</sup>Exterior grade latex must comply with section 91-2.02 unless otherwise specified.

<sup>c</sup>Includes 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 <sup>a</sup> :	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

<sup>a</sup>Includes locations of spot blast cleaning

**59-2.03C(4)(b) Finish Coats**

Pressure rinse undercoated surfaces to receive finish coats. Perform pressure rinsing no sooner than 72 hours after the final application of undercoat.

The 1st finish coat must be applied within 48 hours of pressure rinsing.

Apply the 1st finish coat in 2 applications. The 1st application consists of a spray-applied mist application. Apply the 2nd application after the mist application has dried to a set-to-touch condition as determined using the procedure in section 7 of ASTM D 1640.

Apply the 2nd finish coat after the 1st finish coat has dried 12 hours unless authorized. You may apply the 2nd finish coat in a single application.

**Add to section 59-5.01:**

04-19-13

Where specified, prepare and paint sign structures under sections 59-2 and 59-3.

Instead of submitting proof of the certification complying with SSPC-QP 1, you may submit documentation with the painting quality work plan showing compliance with the requirements in section 3 of SSPC-QP 1.

Instead of submitting proof of the certification complying with SSPC-QP 2, you may submit documentation with the painting quality work plan showing compliance with the requirements in sections 4.2 through 4.4 of SSPC-QP 2, Category A.

Instead of submitting proof of the certification complying with AISC-420-10/SSPC-QP 3 (Enclosed Shop), you may submit documentation with the painting quality work plan showing compliance with the requirements in sections 5 through 18 of AISC-420-10/SSPC-QP3.













## 86 ELECTRICAL SYSTEMS

10-19-12

Replace section 86-2.06 with:

01-20-12

### 86-2.06 PULL BOXES

#### 86-2.06A General

##### 86-2.06A(1) Cover Marking

Marking must be clearly defined, uniform in depth, and parallel to either the long or short sides of the cover.

Marking letters must be 1 to 3 inches high.

Before galvanizing steel or cast iron cover, apply marking by one of the following methods:

1. Use cast iron strip at least 1/4 inch thick with letters raised a minimum of 1/16 inch. Fasten strip to cover with 1/4-inch flathead stainless steel machine bolts and nuts. Peen bolts after tightening.
2. Use sheet steel strip at least 0.027 inch thick with letters raised a minimum of 1/16 inch. Fasten strip to cover by spot welding, tack welding, or brazing, with 1/4-inch stainless steel rivets or 1/4-inch roundhead stainless steel machine bolts and nuts. Peen bolts after tightening.
3. Bead weld the letters on cover such that the letters are raised a minimum of 3/32 inch.

##### 86-2.06A(2) Installation and Use

Space pull boxes no more than 200 feet apart. You may install additional pull boxes to facilitate the work.

You may use a larger standard size pull box than that shown on the plans or specified.

A pull box in ground or sidewalk area must be installed as follows:

1. Embed bottom of the pull box in crushed rock.
2. Place a layer of roofing paper on the crushed rock.
3. Place grout over the layer of roofing paper. Grout must be 0.50 to 1 inch thick and sloped toward the drain hole.
4. Make a 1-inch drain hole in the center of the pull box through the grout and roofing paper.
5. Place grout between the pull box and the pull box extension, and around conduits.

The top of the pull box must be flush with the surrounding grade or the top of an adjacent curb, except in unpaved areas where the pull box is not immediately adjacent to and protected by a concrete foundation, pole, or other protective construction. Place the pull box 1-1/4 inches above the surrounding grade. Where practical, place a pull box shown in the vicinity of curbs or adjacent to a standard on the side of the foundation facing away from traffic. If a pull box is installed in a sidewalk area, adjust the depth of the pull box so that the top of the pull box is flush with the sidewalk.

Reconstruct the sump of an existing pull box if disturbed by your activities. Remove old grout and replace with new if the sump was grouted.

#### 86-2.06B Non-Traffic-Rated Pull Boxes

Reserved

#### 86-2.06C Traffic Pull Boxes

Traffic pull box and cover must comply with ASTM C857, "Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures," for HS20-44 loading. You must be able to place the load anywhere on the box and cover for 1 minute without causing cracks or permanent deformations.

Frame must be anchored to the box with 1/4 by 2-1/4 inch concrete anchors. Four concrete anchors must be included for No. 3-1/2(T) pull box; one placed in each corner. Six concrete anchors must be included for No. 5(T) and No. 6(T) pull boxes; one placed in each corner and one near the middle of each of the longer sides.

Nuts must be zinc-plated carbon steel, vibration resistant, and have a wedge ramp at the root of the thread.

After installation of traffic pull box, install the steel cover and keep it bolted down when your activities are not in progress at the pull box. When the steel cover is placed for the final time, the cover and Z bar frame must be cleaned of debris and tightened securely.

Steel cover must be countersunk approximately 1/4 inch to accommodate the bolt head. When tightened, the bolt head must not exceed more than 1/8 inch above the top of the cover.

Concrete placed around and under traffic pull boxes must be minor concrete.

**Replace "project" in the 3rd paragraph of section 86-2.11A with:**

10-19-12

work

**Replace "Contract" in item 2 in the list in the 11th paragraph of section 86-2.11A with:**

10-19-12

work

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### 88 GEOSYNTHETICS

01-18-13

**Replace the row for hydraulic bursting strength in the table in the 2nd paragraph of section 88-1.02B with:**

10-19-12

Puncture strength, lb min	ASTM D 6241	310
Trapezoid tearing strength, lb min	ASTM D 4533	56

**Replace the 3rd paragraph in section 88-1.02C with:**

10-19-12

Geocomposite wall drain must be from 0.25 to 2 inches thick.

**Replace the value for permittivity of woven fabric in the table in the 1st paragraph of section 88-1.02E with:**

01-20-12

0.05

**Replace the value for apparent size opening of nonwoven fabric in the table in the 1st paragraph of section 88-1.02E with:**

01-20-12

0.012

Replace the table in the 1st paragraph of section 88-1.02G with:

01-20-12

**Sediment Filter Bag**

Property	Test	Values	
		Woven	Nonwoven
Grab breaking load, lb, 1-inch grip min, in each direction	ASTM D 4632	200	250
Apparent elongation, percent min, in each direction	ASTM D 4632	10	50
Water flow rate, gal per minute/sq ft min and max average roll value	ASTM D 4491	100-200	75-200
Permittivity, sec <sup>-1</sup> 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 <sup>-1</sup> 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:



