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**REVISED STANDARD SPECIFICATIONS DATED  
10-18-19**

**ORGANIZATION**

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 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*.

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**DIVISION I GENERAL PROVISIONS**

**1 GENERAL**

04-19-19

**Add between the 1st and 2nd paragraphs of section 1-1.01:**

10-19-18

Global revisions are changes to contract documents not specific to a section of the Standard Specifications. In each contract document at each occurrence, interpret the following terms as shown:

Term	Interpretation	Conditions
Fed-Std-595	AMS Std 595	--

**Add to the table in the 1st paragraph of section 1-1.06:**

04-19-19

CSC	conductor signal cable	
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Replace the 9th row in the table of section 1-1.11 with:

04-19-19

Department of Conservation, Division of Mine Reclamation	<a href="http://www.conservation.ca.gov/dmr">http://www.conservation.ca.gov/dmr</a>	--	--
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Add to the table in section 1-1.11:

04-19-19

Data Interchange for Materials Engineering	<a href="https://dime.dot.ca.gov">https://dime.dot.ca.gov</a>	MATERIALS ENGINEERING AND TESTING SERVICES DEPARTMENT OF TRANSPORTATION 5900 FOLSOM BLVD SACRAMENTO CA 95819-4612	(916) 227-5238
SWRCB, Land Disposal Program	<a href="https://www.waterboards.ca.gov/water_issues/programs/land_disposal/walist.html">https://www.waterboards.ca.gov/water_issues/programs/land_disposal/walist.html</a>	--	--

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**2 BIDDING**

10-19-18

Replace the 5th paragraph of section 2-1.12B(1) with:

10-19-18

You are responsible to verify at bid opening the DBE firm is certified as a DBE by the California Unified Certification Program and possesses the most specific available NAICS codes or work codes applicable to the type of work the firm will perform on the Contract.

Replace section 2-1.12B(2) with:

10-19-18

**2-1.12B(2) DBE Commitment Submittal**

Submit DBE information under section 2-1.33.

Submit a copy of the quote from each DBE shown on the DBE Commitment form that describes the type and dollar amount of work shown on the form no later than 4 p.m. on the 5th day after bid opening. If the last day for submitting the quote falls on a Saturday or holiday, it may be submitted on the next business day with the same effect as if it had been submitted on the 5th day.

Submit a DBE Confirmation form for each DBE shown on the DBE Commitment form to establish that it will be participating in the Contract in the type and dollar amount of work shown on the form. If a DBE is participating as a joint venture partner, submit a copy of the joint venture agreement.

Failure to submit a completed DBE Confirmation form and a copy of the quote from each DBE will result in disallowance of the DBE's participation.

**Add between the 4th and 5th paragraphs of section 2-1.15B:**

10-19-18

Submit a copy of the quote from each DVBE listed on the Certified DVBE Summary form that describes the type and dollar amount of work shown on the form no later than 4 p.m. on the 4th business day after bid opening.

**Add between the 3rd and 4th paragraphs of section 2-1.15C(1):**

10-19-18

Submit a copy of the quote from each DVBE listed on the Certified DVBE Summary form that describes the type and dollar amount of work shown on the form no later than 4 p.m. on the 4th business day after bid opening.

**Add between the 1st and 2nd paragraphs of section 2-1.18C:**

10-19-18

Failure to submit a completed Certified Small Business Listing for the Non-Small Business Preference form by 4 p.m. on the 2nd business day after bid opening will result in a nonresponsive bid.

**Replace section 2-1.33B with:**

10-19-18

**2-1.33B Bid Form Submittal Schedules**

**2-1.33B(1) General**

The *Bid* book includes forms specific to the Contract. The deadlines for the submittal of the forms vary depending on the requirements of each Contract. Determine the requirements of the Contract and submit the forms based on the applicable schedule specified in section 2-1.33B.

Bid forms and information on the form that are due after the time of bid may be submitted at the time of bid.

**2-1.33B(2) Federal-Aid Contracts**

**2-1.33B(2)(a) General**

Section 2-1.33B(2) applies to a federal-aid contract.

**2-1.33B(2)(b) Contracts with a DBE Goal**

**2-1.33B(2)(b)(i) General**

Section 2-1.33B(2)(b) applies if a DBE goal is shown on the *Notice to Bidders*.

**2-1.33B(2)(b)(ii) Bid Form Submittal**

Submit the bid forms according to the schedule shown in the following table:

**Bid Form Submittal Schedule for a  
Federal-Aid Contract with a DBE Goal**

Form	Submittal deadline
Bid to the Department of Transportation	Time of bid except for the public works contractor registration number
Copy of the Bid to the Department of Transportation as submitted at the time of bid with the public works contractor registration number	10 days after bid opening
Subcontractor List	Time of bid except for the public works contractor registration number
Copy of the Subcontractor List as submitted at the time of bid with the public works contractor registration number	10 days after bid opening
Small Business Status	Time of bid
Opt Out of Payment Adjustments for Price Index Fluctuations <sup>a</sup>	Time of bid
DBE Commitment	No later than 4 p.m. on the 5th day after bid opening <sup>b</sup>
DBE Confirmation	No later than 4 p.m. on the 5th day after bid opening <sup>b</sup>
DBE Good Faith Efforts Documentation	No later than 4 p.m. on the 5th day after bid opening <sup>b</sup>

<sup>a</sup>Submit only if you choose the option.

<sup>b</sup>If the last day for submitting the bid form falls on a Saturday or holiday, it may be submitted on the next business day with the same effect as if it had been submitted on the day specified.

**2-1.33B(2)(b)(iii) Reserved**

**2-1.33B(2)(c) Contracts without a DBE Goal**

**2-1.33B(2)(c)(i) General**

Section 2-1.33B(2)(c) applies if a DBE goal is not shown on the *Notice to Bidders*.

**2-1.33B(2)(c)(ii) Bid Form Schedule**

Submit the bid forms according to the schedule shown in the following table:

**Bid Form Submittal Schedule for a  
Federal-Aid Contract without a DBE Goal**

Form	Submittal deadline
Bid to the Department of Transportation	Time of bid except for the public works contractor registration number
Copy of the Bid to the Department of Transportation as submitted at the time of bid with the public works contractor registration number	10 days after bid opening
Subcontractor List	Time of bid except for the public works contractor registration number
Copy of the Subcontractor List as submitted at the time of bid with the public works contractor registration numbers	10 days after bid opening
Small Business Status	Time of bid
Opt Out of Payment Adjustments for Price Index Fluctuations <sup>a</sup>	Time of bid

<sup>a</sup>Submit only if you choose the option.

**2-1.33B(2)(c)(iii) Reserved**

**2-1.33B(2)(d)–2-1.33B(2)(h) Reserved**

**2-1.33B(3) Non-Federal-Aid Contracts**

**2-1.33B(3)(a) General**

Section 2-1.33B(3) applies to non-federal-aid contracts.

**2-1.33B(3)(b) Contracts with a DVBE Goal**

**2-1.33B(3)(b)(i) General**

Section 2-1.33B(3)(b) applies if a DVBE goal is shown on the *Notice to Bidders*.

**2-1.33B(3)(b)(ii) Bid Form Submittal**

Submit the bid forms according to the schedule shown in the following table:

**Bid Form Submittal Schedule for a  
Non-Federal-Aid Contract with a DVBE Goal**

Form	Submittal deadline
Bid to the Department of Transportation	Time of bid except for the public works contractor registration number for a joint-venture contract
For a joint-venture contract, copy of the Bid to the Department of Transportation as submitted at the time of bid with the public works contractor registration number	10 days after bid opening
Subcontractor List	Time of bid
Opt Out of Payment Adjustments for Price Index Fluctuations <sup>a</sup>	Time of bid
Certified DVBE Summary	No later than 4 p.m. on the 4th business day after bid opening
California Company Preference	Time of bid
Request for Small Business Preference or Non-Small Business Preference <sup>a</sup>	Time of bid
Certified Small Business Listing for the Non-Small Business Preference <sup>a</sup>	No later than 4 p.m. on the 2nd business day after bid opening

<sup>a</sup>Submit only if you choose the option or preference.

**2-1.33B(3)(b)(iii) Reserved**

**2-1.33B(3)(c) Contracts without a DVBE Goal**

**2-1.33B(3)(c)(i) General**

Section 2-1.33B(3)(c) applies if a DVBE goal is not shown on the *Notice to Bidders*.

**2-1.33B(3)(c)(ii) Bid Form Submittal**

Submit the bid forms according to the schedule shown in the following table:

**Bid Form Submittal Schedule for a  
Non-Federal-Aid Contract without a DVBE Goal**

Form	Submittal deadline
Bid to the Department of Transportation	Time of bid except for the public works contractor registration number for a joint-venture contract
For a joint-venture contract, copy of the Bid to the Department of Transportation as submitted at the time of bid with the public works contractor registration number	10 days after bid opening
Subcontractor List	Time of bid
Opt Out of Payment Adjustments for Price Index Fluctuations <sup>a</sup>	Time of bid
California Company Preference	Time of bid
Certified DVBE Summary <sup>b</sup>	No later than 4 p.m. on the 4th business day after bid opening
Request for Small Business Preference or Non-Small Business Preference <sup>a</sup>	Time of bid
Certified Small Business Listing for the Non-Small Business Preference <sup>a</sup>	No later than 4 p.m. on the 2nd business day after bid opening

<sup>a</sup>Submit only if you choose the option or preference.

<sup>b</sup>Submit only if you obtain DVBE participation or you are the apparent low bidder, 2nd low bidder, or 3rd low bidder and you choose to receive the specified incentive.

**2-1.33B(3)(c)(iii) Reserved**

**2-1.33B(3)(d)–2-1.33B(3)(h) Reserved**

**2-1.33B(4)–2-1.33B(9) Reserved**

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**4 SCOPE OF WORK**

10-18-19

**Replace the 7th and 8th paragraphs of section 4-1.07B with:**

The Department decides whether to accept a VECP and the estimated net construction-cost savings from adopting the VECP or parts of it. The Department may require you to accept a share of the investigation cost as a condition of reviewing a VECP. In determining the estimated net construction-cost savings, the Department excludes your VECP preparation cost and the Department's VECP investigation costs, including parts paid by you. After written acceptance, the Department considers the VECP and deducts the agreed cost of the investigation.

10-18-19

**Replace item 4 in the list in the 9th paragraph of section 4-1.07B with:**

4. Adjusts the payment so that the Change Order results in a credit to the Department of 50 percent of the estimated net construction-cost savings, except if the VECP provides a reduction in traffic congestion or avoids traffic congestion

10-18-19

**Replace the 10th paragraph of section 4-1.07B with:**

If a VECP providing for a reduction in traffic congestion or avoiding traffic congestion is accepted by the Department, the Department adjusts the payment that results in a credit to the Department of 40 percent of the estimated net construction-cost savings attributable to the VECP. Submit detailed traffic handling comparisons between the existing Contract and the proposed change, including estimates of the traffic volumes and congestion.

10-18-19

**Delete the 12th paragraph of section 4-1.07B**

AA

**5 CONTROL OF WORK**

10-18-19

**Replace the 6th paragraph of section 5-1.13B(2) with:**

10-19-18

If the Department authorizes the termination or substitution of a listed DBE, make good faith efforts to find another DBE. The substitute DBE must (1) perform at least the same dollar amount of work as the original DBE under the Contract to the extent needed to meet the DBE goal and (2) be certified as a DBE with the most specific available NAICS or work code applicable to the type of work the DBE will perform on the Contract at the time of your request for substitution. Submit your documentation of good faith efforts within 7 days of your request for authorization of the substitution. The Department may authorize a 7-day extension of this submittal period at your request. Refer to 49 CFR 26 app A for guidance regarding evaluation of good faith efforts to meet the DBE goal.

**Replace the 2nd sentence in the 2nd paragraph of section 5-1.13C with:**

10-19-18

The substitute must be another DVBE, unless DVBEs are not available. The substitute must perform the work originally stated.

**Replace the 6th paragraph of section 5-1.13C with:**

10-19-18

If a DVBE substitute is not available, requests for substitutions of a listed DVBE must include:

1. Contact with the DVBE advocate from the Department and the Department of Veteran Affairs
2. Search results from the Department of General Services' website of available DVBEs
3. Communication with a DVBE community organization nearest the job site, if applicable
4. Documented communication with DVBEs describing the work to be performed, the percentage of the total bid, the corresponding dollar amount, and the responses to the communication

**Replace section 5-1.24 with:**

10-19-18

**5-1.24 CONSTRUCTION SURVEYS**

**5-1.24A General**

The Department places stakes and marks under chapter 12, "Construction Surveys," of the Department's *Surveys Manual*.

Submit your request for Department-furnished stakes:

1. Once staking area is ready for stakes
2. On a Request for Construction Staking form

After your submittal, the Department starts staking within 2 business days.

Preserve stakes and marks placed by the Department. If the stakes or marks are destroyed, the Department replaces them at the Department's earliest convenience and deducts the cost.





## 7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

10-18-19

**Replace item 1.3 in the list in the 2nd paragraph of section 7-1.02K(3) with:**

10-18-19

- 1.3. Last four digits of social security number pursuant to Labor Code § 226(a)

**Replace the 6th through 10th paragraphs of section 7-1.02K(3) with:**

04-19-19

You may submit certified payroll records electronically using the Department's secure file transfer protocol site. For information on electronic submission of certified payroll records, go to the Department's Division of Construction website.

Submit payroll records electronically in a nonmodifiable PDF file, using the following file-naming convention:

TT-EA-WE-DOCTYPE.PDF

where:

TT = district, leading zero

EA = Contract number, excluding the district identification number, expressed as 6 characters

WE = week ending date entered as month, leading zero; day of month, leading zero; year, last 2 digits

DOCTYPE = labor payroll document type, CP for Certified Payroll, FB for Fringe Benefit Statement, or SC for Statement of Compliance

Before submitting the payroll records electronically, you and your subcontractors must each complete and sign the Request for Electronic Submission of Certified Payroll Records and e-mail it in PDF format to the district Labor Compliance Office. The Department provides you and your subcontractors' assigned representatives the accounts and user identifications by e-mail after each Request for Electronic Submission of Certified Payroll Records is received.

Each electronic submission must:

1. Include certified payroll records in a nonmodifiable PDF file
2. Include a signed Statement of Compliance form with each weekly record as a nonmodifiable PDF file
3. Be received by the Department by close of business on the 15th day of the month for the prior month's work

**Replace the 12th paragraph of section 7-1.02K(3) with:**

10-18-19

Make all payroll records, including employee's complete social security number, available for inspection and copying or furnish a copy upon request of a representative of the:

1. Department
2. Division of Labor Standards Enforcement of the Department of Industrial Relations
3. Division of Apprenticeship Standards of the Department of Industrial Relations

**Replace the 1st sentence in the 5th paragraph of section 7-1.02K(6)(a) with:**

10-19-18

Submit copies of your Injury and Illness Prevention Program, Code of Safe Practices, and permits required by Cal/OSHA as informational submittals.

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

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

10-18-19

Reserved

**Replace *Reserved* in section 7-1.02M(2) with:**

10-18-19

Submit the names and emergency telephone numbers of the nearest fire suppression agencies before the start of job site activities as an informational submittal. Post the names and phone numbers at a prominent place at the job site.

Submit a copy of your fire prevention plan required by Cal/OSHA as an informational submittal before the start of job site activities.

04-19-19

Cooperate with fire prevention authorities in performance of the work.

Immediately report fires occurring within and near the project limits by dialing 911 and to the nearest fire suppression agency by using the emergency phone numbers retained at the job site.

Prevent project personnel from setting open fires that are not part of the work.

Prevent the escape of and extinguish fires caused directly or indirectly by job site activities.

**Replace the 2nd paragraph of section 7-1.02M(3) with:**

04-19-19

For the list of permitted sites, go to the Department of Conservation, Division of Mine Reclamation website.

**Replace the 13th paragraph of section 7-1.03 with:**

10-18-19

For a taper on a bridge deck or approach slab, construct the taper with rapid setting concrete under section 60-3.02B(2) or polyester concrete under section 60-3.04B(2). Prepare the surface to receive the taper under section 60-3.02C(7). For tapers with aggregate fillers, rake conform edges to ensure smooth transitions. Cure the taper for at least 3 hours or the minimum time recommended by the manufacturer before opening to traffic.

**Replace the 4th sentence in the 16th paragraph of section 7-1.03 with:**

10-18-19

When not shown and if ordered, providing flaggers is change order work.

**Replace the 3rd sentence in the 7th paragraph of section 7-1.04 with:**

10-18-19

When not shown and if ordered, providing flaggers is change order work.

**Replace the 13th paragraph of section 7-1.04 with:**

10-18-19

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

leaving a work area and entering a roadway carrying traffic, your vehicles and equipment must yield to traffic. Compensation for flaggers, used for all movement of workers and construction vehicles and equipment on or across lanes open to traffic, is included in the bid items of work involved.

AA

**8 PROSECUTION AND PROGRESS**

10-18-19

**Replace the row for Safety in the table in the 2nd paragraph of section 8-1.03 with:**

Safety	Injury and Illness Prevention Program, Code of Safe Practices, and job site posters
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10-19-18

**Replace item 3 in the list in the 3rd paragraph of section 8-1.07C with:**

- 3. Delay days exclude Saturdays and holidays.

04-19-19

**Replace section 8-1.14E with:**

10-18-19

**8-1.14E Payment Adjustment for Termination**

If the Department issues a termination notice, the Engineer determines the payment for termination during the performance period, from contract approval date to contract acceptance date, based on the following:

- 1. Direct cost for the work performed:
  - 1.1. Including:
    - 1.1.1. Mobilization
    - 1.1.2. Demobilization
    - 1.1.3. Securing the job site for termination
    - 1.1.4. Losses from the sale of materials
  - 1.2. Not including:
    - 1.2.1. Cost of materials you keep
    - 1.2.2. Profit realized from the sale of materials
    - 1.2.3. Cost of material damaged by:
      - 1.2.3.1. Act of God
      - 1.2.3.2. Act of a public enemy
      - 1.2.3.3. Fire
      - 1.2.3.4. Flood.
      - 1.2.3.5. Governor-declared state of emergency
      - 1.2.3.6. Landslide
      - 1.2.3.7. Tsunami
    - 1.2.4. Other credits
- 2. Cost of remedial work, as estimated by the Engineer, is not reimbursed.
- 3. Allowance for profit not to exceed 4 percent of the cost of the work performed where a likelihood of having made a profit had the Contract not been terminated is shown.
- 4. Material handling costs for material returned to the vendor or disposed of as ordered.
- 5. Costs in determining the payment adjustment due to the termination, excluding attorney fees and litigation costs.
- 6. Overhead costs.

Termination of the Contract does not relieve the surety of its obligation for any just claims arising out of the work performed.

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## 9 PAYMENT

10-18-19

Replace section 9-1.07B(5) with:

10-19-18

### 9-1.07B(5) Hot Mix Asphalt Containing Reclaimed Asphalt Pavement

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

$$Qrap = HMARTT \times Xaa$$

where:

$$Xaa = Xta - [(Xrap \times Xra \times (Xta - 100)) / (100 \times (Xra - 100))]$$

and:

*Qrap* = quantity in tons of asphalt used in HMA containing RAP

*HMARTT* = HMA containing RAP, total tons placed

*Xaa* = asphalt content of HMA containing RAP adjusted to exclude the asphalt content in RAP, expressed as a percentage of the total weight of HMA containing RAP

*Xta* = total theoretical asphalt content in HMA containing RAP from the job mix formula, expressed as a percentage of the total weight of HMA containing RAP

*Xrap* = RAP percentage in HMA containing RAP from the job mix formula, expressed as a percentage of the total dry weight of aggregate in HMA containing RAP

*Xra* = average asphalt content of RAP from the job mix formula, expressed as percentage of total weight of RAP

Replace the 2nd sentence in the 7th paragraph of section 9-1.11E with:

04-19-19

The cost is determined under section 9-1.05 except no markup is allowed.

Replace section 9-1.16C with:

10-19-18

### 9-1.16C Materials On Hand

A material on hand but not incorporated into the work is eligible for a progress payment if:

1. Compliant with other Contract parts
2. Material cost exceeds either of the following:
  - 2.1. \$50,000
  - 2.2. \$25,000 if the requestor is certified as one or more of the following:
    - 2.2.1. DVBE
    - 2.2.2. DBE
    - 2.2.3. Small business as certified by Department of General Services, Office of Small Business and Disabled Veteran Business Enterprise Services
3. Purchased
4. Invoice is submitted
5. Stored within the State and you submit evidence that the stored material is subject to the Department's control
6. Protected from weather and contamination
7. Water pollution control measures are established and maintained
8. Requested on the Department-furnished form



## 11 WELDING

04-19-19

Replace the table in the 3rd paragraph of section 11-1.01 with:

04-19-19

AWS code	Year of adoption
D1.1	2015
D1.3	2018
D1.4	2018
D1.5	2015
D1.6	2017
D1.8	2016

Replace the introductory clause in the 1st paragraph of section 11-1.03 with:

04-19-19

Replace clause 6.1.3 of AWS D1.1, the 1st paragraph of clause 9.1.2 of AWS D1.4, and clause 6.1.2 of AWS D1.5 with:

Replace the introductory clause of the 2nd paragraph of section 11-1.04 with:

04-19-19

Replace clause 6.14.6.1 of AWS D1.1, clause 9.8.1 of AWS D1.4, and clause 6.1.3.4 of AWS D1.5 with:

Add before the 1st paragraph of section 11-1.05:

04-19-19

Replace the first sentence of clause 5.21.1.1 of AWS D1.1 with the following:

5.21.1.1. The separation between surfaces of plug and slot welds, and of joints landing on a backing, shall not exceed 1/16 in [2 mm].

Replace clause 3.3.1.1 of AWS D1.5 with the following:

3.3.1.1. The separation between surfaces of plug and slot welds, and of joints landing on a backing, shall not exceed 2 mm [1/16 in].

Replace item 2 in the list in the 2nd paragraph of section 11-1.05 with:

04-19-19

2. Be mechanically and radiographically tested. Mechanical and radiographic testing and acceptance criteria must comply with the applicable AWS codes. The type of mechanical testing must be authorized.

Replace the 1st paragraph of 11-1.06 with:

04-19-19

Replace item 3 of clause 6.26.3.2 of AWS D1.5 with:

3. If indications that exhibit these planar characteristics are present at scanning sensitivity, or other evidence exists to suggest the presence of transverse cracks, a more detailed evaluation of the discontinuity by other means must be performed (e.g., alternate UT techniques, RT, grinding, or gouging for visual inspection or MT of the excavated areas.)

Replace the scanning angle in clause 6.24.2.2 of AWS D1.5 with:



Replace section 12 with:

10-18-19

## 12 TEMPORARY TRAFFIC CONTROL

### 12-1 GENERAL

#### 12-1.01 GENERAL

Section 12-1 includes general specifications for providing temporary traffic control.

Temporary traffic control, including flagging, apparel, temporary traffic control devices, and equipment for flaggers, must comply with the *California MUTCD*, Part 6, "Temporary Traffic Control."

#### 12-1.02 MATERIALS

Not Used

#### 12-1.03 CONSTRUCTION

Assign flaggers to:

1. Control traffic
2. Warn the public of any dangerous conditions resulting from the work activities
3. Provide for the passage of traffic through the work as specified for the passage of traffic for public convenience and public safety

Maintain flagging apparel, traffic control devices, and equipment for flaggers in good repair.

#### 12-1.04 PAYMENT

Not Used

### 12-2 RESERVED

### 12-3 TEMPORARY TRAFFIC CONTROL DEVICES

#### 12-3.01 GENERAL

##### 12-3.01A General

##### 12-3.01A(1) Summary

Section 12-3.01 includes general specifications for providing temporary traffic control devices.

Providing temporary traffic control devices includes installing, placing, maintaining, repairing, replacing, and removing temporary traffic control devices.

Do not use different types of channelizing devices on the same alignment. The types include plastic drums, portable delineators, channelizers, tubular markers, traffic cones, and Type I and Type II barricades.

##### 12-3.01A(2) Definitions

**Category 1 temporary traffic control devices:** Small devices weighing less than 100 lb certified as crashworthy by crash testing or crash testing of similar devices. Category 1 temporary traffic control devices include traffic cones, plastic traffic drums, portable delineators, and channelizers.

**Category 2 temporary traffic control devices:** Small devices weighing less than 100 lb that are not expected to produce significant changes in vehicular velocity but could cause harm to impacting vehicles. Category 2 temporary traffic control devices include barricades and portable sign supports.

**Category 3 temporary traffic control devices:** Devices weighing 100 lb or more that are expected to produce significant changes in the vehicular velocity of impacting vehicles. Category 3 temporary traffic control devices include crash cushions, impact attenuator vehicles, temporary railing, temporary barrier, and end treatments for temporary railings and barriers.

**orange:** Orange, red-orange, fluorescent orange, or fluorescent red-orange.

**useable shoulder area:** Any longitudinal paved or unpaved contiguous surface adjacent to the traveled way with:



1. Enough weight-bearing capacity to support temporary traffic control devices, such as flashing arrow signs, PCMSs, and impact attenuator vehicles
2. Slope not greater than 6:1 (horizontal:vertical)

#### **12-3.01A(3) Submittals**

At least 5 business days before starting any work using the devices or within 2 business days after the request if the devices are already in use, submit as informational submittals:

1. Self-certification for crashworthiness of Category 1 temporary traffic control devices. Either you or the manufacturer must perform the self-certification. Include:
  - 1.1. Date
  - 1.2. Federal aid number for a federal-aid contract
  - 1.3. Contract number, district, county, route, and post miles of the project limits
  - 1.4. Company name, street address, city, state, and zip code of the certifying vendor
  - 1.5. Printed name, signature, and title of the certifying person
  - 1.6. Types of Category 1 temporary traffic control devices
2. List of proposed Category 2 temporary traffic control devices

Obtain a standard form for self-certification from the Engineer.

Submit a sample of the type of portable delineator that you will be using before placing the delineators on the job site.

#### **12-3.01A(4) Quality Assurance**

Reserved

#### **12-3.01B Materials**

The condition of temporary traffic control devices must comply with the most current edition of the American Traffic Safety Services Association publication *Quality Guidelines for Temporary Traffic Control Devices and Features*.

Category 2 temporary traffic control devices must be on FHWA's list of acceptable crashworthy Category 2 hardware for work zones. For this list, go to FHWA's Safety Program website.

Category 2 temporary traffic control devices must be labeled with the FHWA acceptance letter code and the name of the manufacturer. The label must be legible and permanently affixed to the temporary traffic control device by the manufacturer.

Category 3 temporary traffic control devices must be on the Authorized Material List for highway safety features.

Retroreflectivity for the following materials must comply with Table 2A-3, "Minimum Maintained Retroreflectivity Levels," of the *California MUTCD* and be on the Authorized Material List for signing and delineation materials:

1. Retroreflective sheeting for barricades
2. Retroreflective bands for portable delineators
3. Retroreflective sheeting for construction area signs
4. Retroreflective sheeting for channelizers
5. Reflectors for Type K temporary railing
6. Retroreflective cone sleeves
7. White and orange retroreflective stripes for plastic traffic drums

The following temporary traffic control devices must be visible from 1,000 feet during the hours of darkness under an illumination of legal high-beam headlights by persons with 20/20 vision or vision corrected to 20/20:

1. Retroreflective bands on portable delineators
2. Retroreflective sheeting on channelizers
3. Retroreflective cone sleeves on traffic cones

### **12-3.01C Construction**

Perform all layout work necessary to place channelizing devices:

1. On the proper alignment
2. Uniformly at the location and spacing described
3. Straight on a tangent alignment
4. On a true arc in a curved alignment

If temporary traffic control devices are damaged, displaced, or stop operating or functioning as described from any cause during the progress of the work, immediately repair, repaint, or replace the components and restore them to their original locations and positions.

If ordered, furnish and place additional temporary traffic control devices. This work is change order work unless the temporary traffic control devices are being furnished and placed for public safety or public convenience.

Level and plumb a portable system.

Delineate the location of a trailer mounted system with a taper consisting of 9 traffic cones placed 25 feet apart, except where the system is placed within a lane closure or behind a barrier or guardrail.

When a portable system is not in use, remove it from the job site, place it behind a barrier or guardrail, or move it to an area at least 15 feet from the edge of the traveled way.

### **12-3.01D Payment**

Not Used

## **12-3.02 TRAFFIC CONES**

### **12-3.02A General**

Section 12-3.02 includes specifications for placing traffic cones.

### **12-3.02B Materials**

A traffic cone must be flexible, orange, and manufactured from commercial-quality material designed for the intended purpose.

The outer section of the portion above the base of the traffic cone must be translucent and fabricated of a highly pigmented, orange, PV compound. The overall height of a traffic cone must be at least 28 inches and the bottom inside diameter of the traffic cone must be at least 10.5 inches.

During the hours of darkness, a traffic cone must have a retroreflective cone sleeve.

Retroreflective cone sleeves must be permanently affixed, double-band, sleeves consisting of 2 white retroreflective bands. The top band must be 6 inches wide and placed a maximum of 4 inches from the top of the cone. The lower band must be 4 inches wide and placed 2 inches below the bottom of the top band. You may use traffic cones with double-band retroreflective cone sleeves during daylight hours.

### **12-3.02C Construction**

Use the same type of retroreflective cone sleeve for all cones used on the project.

Anchor the base of a traffic cone if it does not have enough size and weight to keep the cone in an upright position.

### **12-3.02D Payment**

Not Used

## **12-3.03 PLASTIC TRAFFIC DRUMS**

### **12-3.03A General**

#### **12-3.03A(1) Summary**

Section 12-3.03 includes specifications for placing plastic traffic drums.

### **12-3.03A(2) Definitions**

Reserved

### **12-3.03A(3) Submittals**

Submit a certificate of compliance for plastic traffic drums.

### **12-3.03A(4) Quality Assurance**

Reserved

### **12-3.03B Materials**

A plastic traffic drum must comply with the manufacturer's instructions for weight and ballast.

A plastic traffic drum must:

1. Be orange LDPE
2. Be flexible and collapsible upon vehicle impact
3. Have a weighted base to maintain an upright position and prevent displacement by passing traffic
4. Have a height such that the top of the drum is at least 36 inches above the traveled way

The weighted base must:

1. Be detachable
2. Be shaped to prevent rolling upon impact
3. Have a 38-inch maximum outside diameter
4. Have a 4-inch maximum height above the ground surface

### **12-3.03C Construction**

Use 1 type of plastic traffic drum on the project.

Use the same type and brand of retroreflective sheeting for all plastic traffic drums used on the project.

Do not use sandbags or comparable ballast.

Moving plastic traffic drums from location to location if ordered after initial placement is change order work.

### **12-3.03D Payment**

Not Used

## **12-3.04 PORTABLE DELINEATORS**

### **12-3.04A General**

Section 12-3.04 includes specifications for placing portable delineators.

### **12-3.04B Materials**

A portable delineator, including its base, must be made of a material that has enough rigidity to remain upright when unattended and must be flexible or collapsible upon impact by a vehicle. The base must be (1) shaped to prevent rolling after impact and (2) anchored or weigh enough to keep the delineator in an upright position. Ballast for a portable delineator must comply with the manufacturer's instructions.

A portable delineator must be a minimum of 36 inches in height. The vertical portion of a portable delineator must be predominantly orange. The post must be not less than 3 inches in width or diameter. Retroreflectorization of a portable delineator that has a height of less than 42 inches must be provided by two 3-inch-wide white bands placed a maximum of 2 inches from the top with a maximum of 6 inches between the bands. Retroreflectorization of a portable delineator that has a height of 42 inches or more must be provided by four 4- to 6-inch-wide alternating orange and white stripes with the top stripe being orange.

### **12-3.04C Construction**

Use only 1 type of portable delineator on the project.

#### **12-3.04D Payment**

Not Used

#### **12-3.05 CHANNELIZERS**

##### **12-3.05A General**

Section 12-3.05 includes specifications for placing channelizers.

##### **12-3.05B Materials**

A channelizer must be on the Authorized Material List for signing and delineation materials.

Its post must be orange.

A channelizer must be affixed with 3-by-12-inch, retroreflective, white sheeting.

##### **12-3.05C Construction**

Install channelizers on clean, dry surfaces.

Cement the channelizer bases to the pavement as specified for cementing pavement markers to the pavement in section 81-3.

When no longer required for the work, remove the channelizers and the underlying adhesive used to cement the channelizer bases to the pavement.

Do not remove channelizers that are shown to be left in place at the time of work completion.

##### **12-3.05D Payment**

Not Used

#### **12-3.06–12-3.09 RESERVED**

#### **12-3.10 BARRICADES**

##### **12-3.10A General**

Section 12-3.10 includes specifications for placing barricades.

##### **12-3.10B Materials**

Markings for barricade rails must be alternating orange and white retroreflective stripes.

Orange retroreflective sheeting must match color PR no. 6, Highway Orange, of the FHWA Color Tolerance Chart.

The interface between the rail surface and the retroreflective sheeting must be free of air bubbles or voids.

The predominant color of barricade components other than the rails must be white or unpainted galvanized metal or aluminum.

You may use a Type III barricade as a sign support if the barricade has been successfully crash tested under *NCHRP Report 350* criteria or the Manual for Assessing Safety Hardware (MASH) crash testing guidelines as a single unit with an attached sign panel of the size and type to be used.

A sign panel for a construction area sign or marker panel to be mounted on a barricade must comply with section 12-3.11B(2).

Do not imprint an owner identification on the retroreflective face of any rail.

##### **12-3.10C Construction**

Place each barricade such that the stripes slope downward in the direction road users are to pass.

Place each sand-filled bag near the ground level on the lower parts of the frame or stays to serve as ballast for the barricades. Do not place ballast on top of barricades or over any retroreflective barricade rail face that is facing traffic.

Do not remove barricades that are shown to be left in place at the time of work completion.

Moving a barricade from location to location is change order work if ordered after initial placement of the barricade.

#### **12-3.10D Payment**

Not Used

### **12-3.11 CONSTRUCTION AREA SIGNS**

#### **12-3.11A General**

##### **12-3.11A(1) Summary**

Section 12-3.11 includes specifications for placing construction area signs.

Construction area signs include all temporary signs and object markers required for the direction of traffic through or within the project limits and general information signs.

##### **12-3.11A(2) Definitions**

**background:** Dominant sign color.

**legend:** Letters, numerals, tildes, bars, arrows, route shields, symbols, logos, borders, artwork, and miscellaneous characters that are intended to convey specific meanings on traffic signs.

##### **12-3.11A(3) Submittals**

Reserved

##### **12-3.11A(4) Quality Assurance**

Reserved

#### **12-3.11B Materials**

##### **12-3.11B(1) General**

A construction area sign must be the product of a commercial sign manufacturer and have Type III or higher grade retroreflective sheeting.

The style, font, size, and spacing of the legend must comply with the *Standard Alphabets* published in the FHWA's Standard Highway Signs Book.

The sign must be visible from 500 feet and legible from 300 feet at noon on a cloudless day and during the hours of darkness under an illumination of legal low-beam headlights by persons with 20/20 vision or vision corrected to 20/20. A fabric sign panel on a portable sign is not subject to the visibility and legibility requirements for headlight illumination during the hours of darkness.

A construction area warning or guide sign must have a black legend on a retroreflective, orange background. A W10-1 advance warning sign for highway-rail grade crossings must have a black legend on a retroreflective yellow background.

##### **12-3.11B(2) Stationary-Mounted Signs**

Materials for a stationary-mounted sign must comply with section 82-2 for the type of panel involved.

A temporary sign support of any type placed within 15 feet from the edge of the traveled way must comply with the specifications for a Category 2 temporary traffic control device.

The sign post must be good, sound wood posts with the breakaway feature as shown for a roadside sign.

Fastening hardware and back braces must be commercial-quality materials.

##### **12-3.11B(3) Portable Signs**

Each portable sign must consist of a base, standard or framework, and a sign panel. Units delivered to the job site must be capable of being placed into immediate operation.

A sign panel for a portable sign must comply with the specifications for a stationary-mounted sign panel or be fabricated from one of the following materials:

1. Type VI, retroreflective, elastomeric roll-up fabric
2. Nonretroreflective, cotton, drill fabric

3. Nonretroreflective, flexible, industrial, nylon fabric
4. Another type of fabric if authorized

Do not use nonretroreflective portable signs during the hours of darkness.

The bottom of the portable sign panel must be at least 1 foot above the edge of the traveled way.

#### **12-3.11B(4) Temporary Object Markers**

A temporary object marker must be mounted on a stationary wood or metal post and must comply with section 82.

A marker panel for a Type N (CA), Type P (CA), or Type R (CA) object marker must comply with the specifications for a marker panel for a stationary sign panel in section 12-3.11B(2).

A target plate, post, and the hardware for a Type K (CA) and Type L (CA) temporary object marker must comply with the specifications for these items in section 82.

#### **12-3.11B(5) General Information Signs**

Reserved

#### **12-3.11C Construction**

##### **12-3.11C(1) General**

Place all construction area signs outside of the traveled way. Do not block a bicycle or pedestrian pathway with a construction area sign.

Place, install, maintain, and remove temporary object markers shown as construction area signs as specified for construction area signs.

Maintain accurate information on construction area signs. Immediately replace or correct signs that convey inaccurate information.

During the progress of work, immediately cover or remove unneeded signs.

Cover each unneeded sign such that the message cannot be seen. Securely fasten the cover to prevent movement from wind.

Check each covered sign daily for damage to the cover and immediately replace any cover if needed.

Clean each construction area sign panel at the time of installation and at least once every 4 months thereafter.

Be prepared to furnish additional construction area sign panels, posts, and mounting hardware or portable sign mounts on short notice due to changing traffic conditions or damage caused by traffic or other conditions. Maintain an inventory of commonly required items at the job site or make arrangements with a supplier who is able to furnish the items daily on short notice.

Replace any damaged construction area sign or repair the sign if authorized.

Remove any sign panel that exhibits irregular luminance, shadowing, or dark blotches at nighttime under vehicular headlight illumination.

##### **12-3.11C(2) Stationary-Mounted Signs**

Install stationary-mounted signs as described for the installation of roadside signs except:

1. Back braces and blocks for sign panels are not required for signs 48 inches or smaller in width and diamond-shaped signs 48 by 48 inches or smaller.
2. Bottom of the sign panel must be at least 7 feet above the edge of the traveled way.
3. You may install a construction area sign on an above-ground, temporary platform sign support or on an existing lighting standard or other support if authorized. Do not make holes in a standard to support the sign if it is installed on an existing lighting standard.
4. Post embedment must be at least 2.5 feet if the post hole is backfilled around the post with commercial-quality concrete. The concrete must contain at least 295 pounds of cementitious material per cubic yard.

The Engineer determines the post size and number of posts if the type of sign installation is not shown.

Excavate each post hole by hand methods without the use of power equipment. You may use power equipment where you determine that subsurface utilities are not present in the area of the proposed post hole if authorized. The post-hole diameter must be at least 4 inches greater than the longest cross-sectional dimension of the post if it is backfilled with commercial-quality concrete.

Furnishing, installing, maintaining, moving, and removing any additional construction area signs if ordered is change order work.

**12-3.11C(3) General Information Signs**

Reserved

**12-3.11D Payment**

Not Used

**12-3.12 TELESCOPING FLAG TREES**

**12-3.12A General**

Section 12-3.12 includes specifications for placing telescoping flag trees.

**12-3.12B Materials**

Telescoping flag trees must be manufactured from commercial-quality material designed for the intended purpose and capable of maintaining an upright position at all times while in use.

**12-3.12C Construction**

Not Used

**12-3.12D Payment**

Not Used

**12-3.13–12-3.19 RESERVED**

**12-3.20 TYPE K TEMPORARY RAILING**

**12-3.20A General**

**12-3.20A(1) Summary**

Section 12-3.20 includes specifications for placing Type K temporary railing and Type K temporary terminal sections.

Type K temporary railing must consist of interconnected PC concrete barrier panels.

You may have your name or logo on each panel of Type K temporary railing. The name or logo must not be more than 4 inches in height and must be located not more than 12 inches above the bottom of the rail panel.

Reinforcing steel must comply with section 52.

**12-3.20A(2) Definitions**

Reserved

**12-3.20A(3) Submittals**

Submit a certificate of compliance for Type K temporary railing not cast at the job site.

**12-3.20A(4) Quality Assurance**

Reserved

**12-3.20B Materials**

**12-3.20B(1) General**

Concrete must comply with the specifications for minor concrete except load tickets and a certificate of compliance are not required.

Steel bars to receive bolts at the ends of the concrete panels must comply with ASTM A36/A36M. The bolts must comply with ASTM A307.

You may substitute a round bar of the same diameter for the end-connecting bolt shown. If a round bar is used, the round bar must:

1. Comply with ASTM A36/A36M
2. Have a minimum length of 26 inches
3. Have a 3-inch-diameter, 3/8-inch-thick plate welded on the upper end using a 3/16-inch fillet weld

The final surface finish of the railing must comply with section 51-1.03F(2).

Cure the exposed surfaces of the railing by the water method, the forms-in-place method, or the curing compound method using curing compound no. 1.

### **12-3.20B(2) Type K Temporary Terminal Section**

The closure plate for a Type K temporary terminal section must be a white, commercial-quality steel plate shaped to conform to the cross section of the barrier. The mechanical expansion anchors for connecting the closure plate to the railings must comply with section 75-3 for concrete anchorage devices.

### **12-3.20C Construction**

#### **12-3.20C(1) General**

Before placing Type K temporary railing on the job site, paint the exposed surfaces of the railing with white paint complying with the specifications for acrylic emulsion paint for exterior masonry. The repainting of the units is change order work if it is ordered after the units are in place.

Place Type K temporary railing on a firm, stable foundation. Grade the foundation to provide a uniform bearing surface throughout the entire length of the railing.

Structure excavation and backfill must comply with section 19-3 except compaction of earth fill placed behind Type K temporary railing in a curved layout is not required.

Place and maintain the abutting ends of PC concrete units in alignment without substantial offset from each other.

The drilling of holes and bonding of threaded rods or dowels must comply with the specifications for drilling and bonding dowels in section 51-1.

Install a reflector on the top or face of the rail of each rail unit placed within 10 feet of a traffic lane. Apply adhesive for mounting the reflector under the reflector manufacturer's instructions.

Install a Type P marker panel at each end of railing placed adjacent to a 2-lane, two-way highway and at the end facing traffic for railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, install the marker at the end of the skew nearest the traveled way. Type P marker panels must comply with section 82 except you must furnish the marker panels.

After removing Type K temporary railing:

1. Restore the area to its previous condition or construct it to its planned condition if temporary excavation or embankment was used to accommodate the railing.
2. Remove all threaded rods or dowels to a depth of at least 1 inch below the surface of the concrete. Fill the resulting holes with mortar under section 51-1 except cure the mortar by the water method or by the curing compound method using curing compound no. 6.

If the Engineer orders a lateral move of Type K temporary railing and repositioning is not shown, the lateral move is change order work and the railing is not measured in the new position.

#### **12-3.20C(2) Type K Temporary Terminal Section**

When the Type K temporary terminal section is no longer required, remove the anchor bolts connecting the closure plate to the concrete barrier or cut the bolts flush with the face of the barrier. If the anchor bolts are removed, fill the holes with grout.



### **12-3.20D Payment**

The payment quantity for temporary railing (Type K) is the length measured along the top of the railing.

### **12-3.21 TEMPORARY TRAFFIC SCREENS**

#### **12-3.21A General**

Section 12-3.21 includes specifications for installing temporary traffic screens.

#### **12-3.21B Materials**

Temporary traffic screen panels must be one of the following:

1. CDX grade or better plywood
2. Weather-resistant strand board
3. Plastic

Plastic temporary traffic screen panels must be on the Authorized Material List for temporary traffic screen.

Wale boards for use with plywood or strand board must be Douglas fir, rough sawn, construction grade or better.

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

Nuts, bolts, and washers must be cadmium plated.

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

Temporary traffic screen panels must be CDX grade or better, plywood or weather-resistant strand board.

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

Pipe screen supports must be 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.

#### **12-3.21C Construction**

Install and anchor temporary traffic screens to the top of the Type K temporary railing. The temporary traffic screen must have 3-foot-long openings spaced at 200-foot intervals.

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

#### **12-3.21D Payment**

The payment quantity for temporary traffic screen is the length measured along the line of the screen with no deductions for openings in the temporary traffic screen.

### **12-3.22 TEMPORARY CRASH CUSHION MODULES**

#### **12-3.22A General**

Section 12-3.22 includes specifications for placing sand-filled temporary crash cushion modules in groupings or arrays.

If activities expose traffic to a fixed obstacle, protect the traffic from the obstacle with a sand-filled temporary crash cushion. The crash cushion must be in place before opening traffic lanes adjacent to the obstacle.

#### **12-3.22B Materials**

Each sand-filled temporary crash cushion module must be manufactured after March 31, 1997 and be on the Authorized Material List for highway safety features.

The color of each module must be standard yellow with black lids as furnished by the manufacturer. Each module must be free from structural flaws and objectionable surface defects.

For a module requiring a seal, the top edge of the seal must be securely fastened to the wall of the module by a continuous strip of heavy-duty tape.

Fill each module with sand under the manufacturer's instructions and to the sand capacity in pounds for each module shown. Sand for filling the modules must be clean, commercial-quality, washed concrete sand. When sand is placed in a module, the sand must contain no more than 7 percent water when tested under California Test 226.

### **12-3.22C Construction**

Use the same type of crash cushion module for a single grouping or array.

Temporary crash cushion arrays must not encroach on the traveled way.

Secure the sand-filled modules in place before starting an activity requiring a temporary crash cushion.

Maintain sand-filled temporary crash cushions in place at each location, including times when work is not actively in progress. You may remove the crash cushions during the work shift for access to the work if the exposed fixed obstacle is 15 feet or more from the nearest lane carrying traffic. Reset the crash cushion before the end of the work shift.

Immediately repair sand-filled temporary crash cushion modules damaged due to your activities. Remove and replace any module damaged beyond repair. Repair and replacement of temporary crash cushion modules damaged by traffic are change order work.

You may place sand-filled temporary crash cushion modules on movable pallets or frames complying with the dimensions shown. The pallets or frames must provide a full-bearing base beneath the modules. Do not move the modules and supporting pallets or frames by sliding or skidding along the pavement or bridge deck.

Attach a Type R or Type P marker panel to the front of the temporary crash cushion if the closest point of the crash cushion array 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. Attach the Type R marker panel such that the top of the panel is 1 inch below the module lid. Attach the Type P marker panel such that the bottom of the panel rests upon the pallet or roadway surface if pallets are not used.

A lateral move of a temporary crash cushion module is change order work if ordered and the repositioning is not shown.

Remove sand-filled temporary crash cushion modules, including sand, pallets or frames, and marker panels, at Contract acceptance. Do not install sand-filled temporary crash cushion modules in the permanent work.

### **12-3.22D Payment**

The payment quantity for temporary crash cushion module does not include:

1. Modules placed for public safety
2. Modules placed in excess of the number described
3. Repositioned modules

## **12-3.23 IMPACT ATTENUATOR VEHICLES**

### **12-3.23A General**

#### **12-3.23A(1) Summary**

Section 12-3.23 includes specifications for using impact attenuator vehicles.

#### **12-3.23A(2) Definitions**

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

#### **12-3.23A(3) Submittals**

Submit a certificate of compliance for each attenuator.

### **12-3.23A(4) Quality Assurance**

Before using an impact attenuator vehicle, conduct a 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 a stationary traffic control system.

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

### **12-3.23B Materials**

An impact attenuator vehicle must be on the Authorized Material List for highway safety features. The vehicle must comply with Veh Code Div 12.

Each attenuator must be individually identified with the manufacturer's name, address, attenuator model number, and a specific serial number. The name and number must be a minimum 1/2 inch high and located on the left, street side, lower front corner.

An impact attenuator vehicle must comply with the following test levels as specified in the National Cooperative Highway Research Program Report 350:

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

The impact attenuator vehicle must comply with the attenuator manufacturer's instructions for:

1. Support truck except the weight of the support truck must be within the allowable vehicle weight limits shown on the Authorized Material List for highway safety features and the manufacturer's instructions
2. Trailer-mounted attenuator
3. Truck-mounted attenuator

A flashing arrow sign must comply with section 12-3.30 except you may use a PCMS instead of a flashing arrow sign. A PCMS used as a flashing arrow sign must comply with the specifications for an arrow board in the *California MUTCD*.

Each impact attenuator vehicle must have:

1. 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
2. Type II flashing arrow sign
3. Flashing or rotating amber light
4. Operable 2-way communication system for maintaining contact with workers

### **12-3.23C Construction**

Do not use an impact attenuator vehicle until authorized.

Monitor the placement and use of the attenuator vehicle on a regular basis and adjust the use of the attenuator to match changing field conditions as construction progresses.

After placing the 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 their 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.

### **12-3.23D Payment**

Not Used

**12-3.24–12-3.29 RESERVED**

**12-3.30 FLASHING ARROW SIGNS**

**12-3.30A General**

Section 12-3.30 includes specifications for placing flashing arrow signs.

**12-3.30B Materials**

A flashing arrow sign must comply with the requirements shown in the following table:

**Flashing Arrow Sign Requirements**

Type	Panel size (min, inches)	Number of panel lights (min)	Legibility distance <sup>a</sup> (min, miles)
I	48 x 96	15	1
II	36 x 72	13	3/4

<sup>a</sup>The legibility distance is the distance that a flashing arrow sign must be legible at noon on a cloudless day and during the hours of darkness by persons with 20/20 vision or vision corrected to 20/20.

A flashing arrow sign must be finished with commercial-quality nonreflective black enamel and must be equipped with yellow or amber lamps that form arrows or arrowheads. Each lamp must be equipped with a visor and the lamps must be controlled by an electronic circuit that provides from 30 to 45 complete operating cycles per minute for each of the displays and modes specified. The control must be capable of dimming the lamps by reducing the voltage to  $50 \pm 5$  percent for nighttime use. Type I signs must have both manual and automatic photoelectric-dimming controls. Dimming in both modes must be continuously variable over the entire dimming range.

A flashing arrow sign must be capable of operating in the following display modes:

1. Pass left display
2. Pass right display
3. Simultaneous display
4. Caution display or alternating diamond

A flashing arrow sign must be capable of operating in the flashing arrow mode or the sequential mode.

In the flashing arrow mode, all lamps forming the arrowhead and shaft must flash on and off simultaneously.

In the sequential mode, either arrowheads or arrows must flash sequentially in the direction indicated.

In the simultaneous display mode, the lamps forming both the right and left arrowheads and the lamps forming the arrow shaft or center 3 lamps for Type I signs must flash simultaneously. For Type II signs, the lamps forming the right and left arrowhead, but not the center lamp, may be illuminated continuously; the lamps forming the shaft and the center lamp of the arrowheads must flash on and off simultaneously.

In the caution display mode, a combination of lamps not resembling any other display or mode must flash.

Each flashing arrow sign must be:

1. Mounted on a truck or trailer
2. Capable of operating when the vehicle is moving
3. Capable of being placed and maintained in operation at locations described

A Type II flashing arrow sign must be controllable by the operator of the vehicle while the vehicle is in motion.

The bottom of the flashing arrow sign must be a minimum of 7 feet above the roadway when mounted.

The trailer for a flashing arrow sign must be equipped with (1) devices to level and plumb the sign and (2) a supply of electrical energy capable of operating the sign.

### **12-3.30C Construction**

Not Used

### **12-3.30D Payment**

Not Used

## **12-3.31 PORTABLE FLASHING BEACONS**

### **12-3.31A General**

Section 12-3.31 includes specifications for placing, maintaining, and removing portable flashing beacons.

### **12-3.31B Materials**

Each portable flashing beacon must have:

1. Standard and base
2. Signal section
3. Flasher unit
4. Battery power source

The components must be assembled to form a complete, self-contained, portable flashing beacon that can be delivered to the job site and placed into immediate operation.

The portable flashing beacon must be weatherproof and operate a minimum of 150 hours between battery recharging and routine maintenance.

The signal section must be yellow and comply with section 86-1.02R(4)(a), except it must be rated for 25 W at 12 V.

The flash rate for the flashing unit must comply with chapter 4L, "Flashing Beacons," of the *California MUTCD*.

The standard must be adjustable to allow variable mounting of the signal section from 6 to 10 feet, from the bottom of the base to the center of the lens, and be capable of being secured at the desired height. The standard must be securely attached to the base and have a length of multiconductor, neoprene-jacketed cable long enough for the full vertical height.

The base must be (1) large enough to accommodate at least two 12 V automotive-type storage batteries and (2) a shape and weight such that the beacon will not roll if struck by a vehicle or pushed over.

### **12-3.31C Construction**

Remove portable flashing beacons from the traveled way at the end of each night's work. You may store the flashing beacon at selected central locations within the highway where designated by the Engineer.

Moving portable flashing beacons from location to location if ordered after initial placement is change order work.

### **12-3.31D Payment**

The payment quantity for flashing beacon (portable) is the number of portable flashing beacon locations with each location counting as 1 measurement unit.

## **12-3.32 PORTABLE CHANGEABLE MESSAGE SIGNS**

### **12-3.32A General**

#### **12-3.32A(1) Summary**

Section 12-3.32A includes specifications for placing, maintaining, and removing portable changeable message signs.

#### **12-3.32A(2) Definitions**

Reserved

#### **12-3.32A(3) Submittals**

If requested, submit a certificate of compliance for each PCMS.

Submit your cell phone number before starting the first activity that requires a PCMS.

#### **12-3.32A(4) Quality Assurance**

Reserved

#### **12-3.32B Materials**

Each PCMS consists of a sign panel, a controller unit, a power supply, and a structural support system.

The PCMS must:

1. Be assembled to form a complete self-contained unit that can be delivered to the job site and placed into immediate operation.
2. Operate at an ambient air temperature from -4 to 158 degrees F.
3. Not be affected by mobile radio transmissions other than those required to control the PCMS.
4. Be capable of displaying a 3-line message with at least 7 characters per line.
5. Provide a complete alphanumeric selection.
6. Be internally or externally illuminated during the hours of darkness, when non-illuminated pixels are used.
7. Have a dimming control that automatically adjusts the character light intensity to provide optimum character visibility and legibility under all ambient lighting conditions. The dimming control must have a minimum 3 manual dimming modes of different intensities.

A message with 18-inch high characters or 15-inch high characters must be visible from a distance of 1,500 feet and legible from a distance of at least 750 feet at noon on a cloudless day and during the night by persons with 20/20 vision or vision corrected to 20/20.

A message with 10-inch high characters must be legible from a distance of at least 650 feet at noon on a cloudless day and during the night by persons with 20/20 vision or vision corrected to 20/20.

The controller must:

1. Be an all solid-state unit.
2. Include at least 5 preprogrammed messages.
3. Have a user adjustable display rate.
4. Have a user adjustable flashing-off time.
5. Include a screen to review the messages before being displayed on the sign.
6. Include a keyboard message entry system. The keyboard must be equipped with a security lockout feature.
7. Have nonvolatile memory to store an infinite number of user created messages.
8. Be installed at a location that allows the user to perform all the functions from a single position.

#### **12-3.32C Construction**

Use a PCMS with characters:

1. At least 18 inches in height where the useable shoulder area is 15 feet wide or more
2. At least 12 inches in height where the useable shoulder area is less than 15 feet wide
3. At least 10 inches in height if the PCMS is:
  - 3.1. Mounted on a service patrol truck or incident response vehicle
  - 3.2. Used for traffic control where the posted speed limit is less than 40 mph

Place a PCMS as far from the traveled way as practicable where it is legible to approaching traffic without encroaching on the traveled way. Where the vertical roadway curvature restricts the sight distance of approaching traffic, place the sign on or before the crest of the curvature where it is most visible to the approaching traffic. Where the horizontal roadway curvature restricts the sight distance of approaching traffic, place the sign at or before the curve where it is most visible to approaching traffic. Where practicable, place the sign behind guardrail or Type K temporary railing.

If multiple signs are needed, place each sign on the same side of the road at least 1,000 feet apart on freeways and expressways and at least 500 feet apart on other types of highways.

Operate the PCMS under the manufacturer's instructions.

When in operation, place the bottom of a PCMS at least 7 feet above the roadway in areas where pedestrians are anticipated and 5 feet above the roadway elsewhere. Place the top of the PCMS no more than 14.5 feet above the roadway.

If more than one PCMS is simultaneously visible to traffic, only one sign may display a sequential message at any time. Do not use dynamic message displays, such as animation, rapid flashing, dissolving, exploding, scrolling, horizontal movement, or vertical movement of messages. The message must be centered within each line of the display.

You may use an additional PCMS if more than 2 phases are needed to display a message.

Display only messages shown or ordered.

Repeat the entire message continuously in not more than 2 phases of at least 3 seconds per phase. The sum of the display times for both of the phases must be a maximum of 8 seconds. If more than 2 phases are needed to display a message, use an additional PCMS.

You must be available by cell phone during activities that require a sign. Be prepared to immediately change the displayed message if ordered. You may operate the sign with a 24-hour timer control or remote control if authorized.

Keep the PCMS clean to provide maximum visibility.

After the initial placement, move a sign from location to location as ordered.

#### **12-3.32D Payment**

Not Used

### **12-3.33 PORTABLE SIGNAL SYSTEMS**

#### **12-3.33A General**

Section 12-3.33 includes specifications for installing, maintaining, and removing portable signal systems, including installing lighting and flashing beacons for traffic control.

A portable signal system must comply with section 87-20, except it must be trailer mounted.

#### **12-3.33B Materials**

Not Used

#### **12-3.33C Construction**

If the portable signal system is out of operation, provide flaggers to control the traffic until the traffic signals are in operation.

#### **12-3.33D Payment**

Not Used

### **12-3.34 TEMPORARY FLASHING BEACON SYSTEMS**

#### **12-3.34A General**

Section 12-3.34 includes specifications for installing, maintaining, and removing temporary flashing beacon systems.

A temporary flashing beacon system must comply with section 87-20.

#### **12-3.34B Materials**

The sign panels installed on a temporary flashing beacon system must comply with section 12-3.11.

#### **12-3.34C Construction**

Not Used

#### **12-3.34D Payment**

Not Used

## **12-3.35 AUTOMATED WORK ZONE INFORMATION SYSTEMS**

### **12-3.35A General**

#### **12-3.35A(1) Summary**

Section 12-3.35 includes specifications for installing automated work zone information systems.

#### **12-3.35A(2) Definitions**

Reserved

#### **12-3.35A(3) Submittals**

Reserved

#### **12-3.35A(4) Quality Assurance**

Assign an on-site system coordinator. The coordinator must be available locally to service, maintain, and relocate system components as necessary. The coordinator must be accessible 24–7 while the system is deployed. If the system fails to perform as specified, perform any necessary remedial work and replace any failed components within 24 hours of notification of a system or component failure.

### **12-3.35B Materials**

#### **12-3.35B(1) General**

The AWIS must be a proven system that has been successfully deployed and operated in actual work zones or congested areas.

The system must acquire traffic data throughout the work zone and automatically display predetermined information to motorists without operator intervention after system initialization.

Real-time information must be displayed to motorists using a PCMS. The sign must comply with section 12-3.32.

The system must be controlled either locally or remotely by a dedicated controller or computer.

Authorized users must be able to both locally and remotely override motorist information messages.

Traffic sensors must not require adjustments after the initial deployment.

#### **12-3.35B(2) General System Function Requirements**

The general system functions of the AWIS must be capable of:

1. Preventing any unauthorized users or systems from gaining access to the PCMSs through an industry authentication and encryption standard level of security.
2. Providing current operational status locally and remotely. Operational status must include current traffic data and messages, communications system, and power status.
3. Delivering notifications either by telephone, voice, or text messages to alert support staff of trouble conditions.
4. Generating trouble alerts for conditions such as (1) low roadside equipment power or voltage, (2) system communications failure, (3) low speed traffic detected, and (4) excessive delay detected.
5. Adjusting the thresholds of reduced speed and congestion-induced delay at which the system initiates a trouble alert.
6. Allowing programming of the hours during which the trouble condition alerting subsystem initiates notification to authorized users.
7. Measuring periodically and automatically the power levels of all equipment. Alert support staff, locally and remotely via a telephone message, in time to provide supplemental power before the system ceases to operate.
8. Displaying preprogrammed messages based on the time of day and day of week.

#### **12-3.35B(3) Motorist Information Message Requirements**

The AWIS must be capable of:

1. Displaying predetermined speed, delay, diversion, and closure messages to motorists when user-adjustable thresholds are exceeded.



2. Updating its speed and delay advisory messages at least once per minute. The actual message updates must be consistent with traffic conditions.
3. Selecting messages for each PCMS independently, based on the traffic conditions downstream of the sign.
4. Recording motorist information messages in a comma-separated values file with time and date stamps, including message overrides with user ID.
5. Displaying default messages when traffic conditions, system algorithms, and user parameters do not dictate that an advisory message should be displayed.
6. Displaying separate, independent, default messages on each PCMS.
7. Analyzing traffic parameters in work zones in which there are multiple speed limits.

The following parameters for the selection and presentation of information messages must be adjustable by the user:

1. Message update frequency
2. Minimum delay necessary to trigger a delay advisory message
3. Persistence of delay before a delay message is displayed
4. Level of delay required to trigger a diversion message
5. Change in delay needed to cause a delay advisory message update
6. Change in downstream speed at which a speed advisory message update occurs

#### **12-3.35B(4) System Communication Requirements**

The wireless communications subsystem of the AWIS must:

1. Operate independently of the public cellular phone system for receiving data to ensure reliable communications
2. Communicate independent of the line of sight or distance
3. Incorporate an error detection and correction mechanism to ensure the integrity of all traffic condition data and motorist information messages
4. Configure automatically during system initialization

#### **12-3.35B(5) Traffic Data Acquisition Requirements**

The AWIS must collect accurate traffic data using a speed measurement technique with an accuracy of  $\pm 5$  mph, allowing specific information messages. The system must collect data during reduced visibility conditions, including precipitation, fog, darkness, excessive dust, and road debris.

The system must (1) archive the data with time and date stamps and (2) aggregate the data in operator-definable time increments, accessible 24–7 to the Engineer in a comma-separated values file.

#### **12-3.35B(6) User Interface**

The system must have a user interface to control the AWIS PCMS communications. The interface must be (1) software compatible with a Windows environment or (2) a web service accessed by a web browser.

Provide any software on a CD or other Engineer-authorized data-storage device for installation at the Department's Transportation Management Center.

The user interface must, at a minimum, provide the user with a list of AWIS PCMSs in the field, location information for each AWIS PCMS, and a real-time on-board display of the message in the field. Control options must, at a minimum, provide the user the ability to change the on-board messages and flash rate.

#### **12-3.35C Construction**

Obtain authorization for the message content and the threshold used for triggering the message before displaying any message on a PCMS.

Provide complete setup and support for the AWIS PCMS communications.

#### **12-3.35D Payment**

Not Used

### **12-3.36 PORTABLE TRANSVERSE RUMBLE STRIPS**

Reserved

### **12-3.37 PORTABLE RADAR SPEED FEEDBACK SIGN SYSTEMS**

#### **12-3.37A General**

Section 12-3.37 includes specifications for placing, maintaining, and removing portable radar speed feedback sign systems.

#### **12-3.37B Materials**

A portable radar speed feedback sign system consists of a radar speed feedback sign system and a power source.

The system must comply with section 87-14, except:

1. System must be mounted on a trailer
2. LED character display must remain blank when no vehicles are detected or when the detected vehicle speed is 10 miles less than the pre-set speed

#### **12-3.37C Construction**

Place the portable radar speed feedback sign:

1. As far from the traveled way as practicable where it is visible and legible to approaching traffic. Where practicable, place the sign behind a barrier or guardrail.
2. At or before the crest of roadway vertical curvatures that restrict sight distance.
3. At or before the curve of horizontal roadway curvatures that restrict sight distance.

#### **12-3.37D Payment**

Not Used

### **12-3.38 AUTOMATED FLAGGER ASSISTANCE DEVICES**

#### **12-3.38A General**

##### **12-3.38A(1) Summary**

Section 12-3.38 includes specifications for placing, maintaining, and removing automated flagger assistance devices (AFADs).

##### **12-3.38A(2) Definitions**

**automated flagger assistance devices:** Devices that enable a flagger to be positioned out of the lane of traffic and are used to control motorists through work zones. They are designed to be remotely operated either by a single flagger at one end of the work zone or at a central location, or by separate flaggers near the devices.

##### **12-3.38A(3) Submittals**

Submit a copy of the manufacturer's operating instructions for the automated flagger assistance devices.

##### **12-3.38A(4) Quality Assurance**

Reserved

#### **12-3.38B Materials**

The automated flagger resistance device must comply with the *California MUTCD*, Section 6E.04, and Section 6E.06, "Red/Yellow Lens Automated Flagger Assistance Devices."

The device must:

1. Be equipped with a gate arm, which must not extend into the opposing lane
2. Alternately display a steadily illuminated circular red lens and a flashing circular yellow lens to control traffic
3. Have a fail-safe device that prevents the operator from inadvertently actuating a simultaneous flashing circular yellow lens at both ends of the work zone
4. Have a device that monitors for malfunctions and prevents the display of conflicting indication

5. Have a 24-by-30-inch R10-6 STOP HERE ON RED sign mounted on the trailer

The device must continuously monitor the wireless communication links and verify transmission and reception of data between the devices. If communication is lost, the devices must immediately display the circular red/stop indication and lower the gate arms.

### **12-3.38C Construction**

The devices must:

1. Be placed where a flagger station is shown with an unobstructed view from the operator
2. Be placed outside of the traveled lane
3. Be attended by the operator when in use
4. Have a minimum of 9 cones placed on a taper in advance of the device and along the edge of shoulder or edge of the traveled way at 25-foot intervals to a point not less than 25 feet past the device
5. Be clearly visible to approaching traffic and illuminated during the hours of darkness

If any device unit becomes inoperative, do one of the following:

1. Replace the unit with the same type and model.
2. Revert to human flagging operations.
3. Terminate all construction activities requiring the use of the devices.

Incorporate the devices into the traffic control using one of the following methods:

1. Method 1: Place one device at each end of the closure.
2. Method 2: Place one device at one end of the closure and a flagger at the opposite end of the closure.

Use two operators for both methods, except you may use a single operator if:

1. Operator has an unobstructed view of the devices
2. Operator has an unobstructed view of approaching traffic in both directions
3. Second flagger is on-site to assist with manual flagging should the device malfunction, or to direct traffic when drivers fail to comply with the devices

When AFADs are in operation:

1. Use portable transverse rumble strips at your discretion
2. Do not use the 48-inch-by-48-inch C9A (CA) sign
3. Do not use the gate cones

### **12-3.38D Payment**

If automated flagger assistance devices bid item is not shown on the Bid Item List, providing AFADS is change order work.

### **12-3.39–12-3.40 RESERVED**

## **12-4 MAINTAINING TRAFFIC**

### **12-4.01 GENERAL**

#### **12-4.01A General**

Section 12-4.01 includes general specifications for maintaining traffic through construction work zones.

If local authorities regulate traffic, notify them at least 5 business days before the start of job site activities. Cooperate with the local authorities to handle traffic through the work zone and to make arrangements to keep the work zone clear of parked vehicles.

#### **12-4.01B Materials**

Not Used

**12-4.01C Construction**

Not Used

**12-4.01D Payment**

Not Used

**12-4.02 TRAFFIC CONTROL SYSTEMS**

**12-4.02A General**

**12-4.02A(1) Summary**

Section 12-4.02 includes specifications for providing a traffic control system to close traffic lanes, shoulders, ramps, and connectors.

A traffic control system for a closure includes flagging and the temporary traffic control devices described as part of the traffic control system. Temporary traffic control devices must comply with section 12-3.

**12-4.02A(2) Definitions**

**Construction Zone Enhanced Enforcement Program (COZEEP):** Program that provides California Highway Patrol officers to monitor the movement of traffic within the work zone.

**designated holidays:** Designated holidays are 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.

**12-4.02A(3) Submittals**

**12-4.02A(3)(a) General**

Submit a request for a minor deviation from the specified work hours. For a project in District 7, submit the request at least 15 days before the proposed closure date. Your request may be authorized if (1) the Department does not accrue a significant cost increase and (2) the work can be expedited and better serve the traffic.

If a closure is not opened to traffic by the specified time, submit a work plan that ensures that future closures will be opened to traffic by the specified time. Allow 2 business days for review.

Submit closure schedule requests and closure schedule amendments using LCS to show the locations and times of the requested closures.

Submit a traffic break request using LCS to show the location and time of the requested traffic break.

**12-4.02A(3)(b) Closure Schedules**

Every Monday by noon, submit a closure schedule request for planned closures for the next week.

Except for a project in District 7, the next week is defined as Sunday at noon through the following Sunday at noon.

For a project in District 7, the next week is defined as Friday at noon through the following Friday at noon.

Submit a closure schedule request from 25 days to 125 days before the anticipated start of any job site activity that reduces:

1. Horizontal clearances of traveled ways, including shoulders, to 2 lanes or fewer due to activities such as temporary barrier placement and paving
2. Vertical clearances of traveled ways, including shoulders, due to activities such as pavement overlays, overhead sign installation, or falsework girder erection

Submit closure schedule changes, including additional closures, by noon at least 3 business days before a planned closure.

Cancel closure requests using LCS at least 48 hours before the start time of the closure.

The Department notifies you through LCS of authorized and unauthorized closures and closures that require coordination with other parties as a condition for authorization.

#### **12-4.02A(3)(c) Contingency Plans for Closures**

Submit a contingency plan for an activity that could affect a closure if a contingency plan is specified in the special provisions or if a contingency plan is requested.

If a contingency plan is requested, submit the contingency plan within 1 business day of the request.

The contingency plan must identify the activities, equipment, processes, and materials that may cause a delay in the opening of a closure to traffic. The plan must include:

1. List of additional or alternate equipment, materials, or workers necessary to ensure continuing activities and on-time opening of closures if a problem occurs. If the additional or alternate equipment, materials, or workers are not on the job site, specify their location, the method for mobilizing these items, and the required time to complete mobilization.
2. General time-scaled logic diagram displaying the major activities and sequence of the planned activities. For each activity, identify the critical event that will activate the contingency plan.

Submit revisions to a contingency plan at least 3 business days before starting the activity requiring the contingency plan. Allow 2 business days for review.

#### **12-4.02A(3)(d) Traffic Break Schedule**

Every Monday by noon, submit a traffic break request for the next week. Support for a traffic break is based on local California Highway Patrol staffing levels and may not be available for the date or time requested.

Traffic break requests are limited to the hours when a shoulder or lane closure is allowed.

Cancel a traffic break request using LCS at least 48 hours before the start time of the traffic break.

The Department notifies you through LCS of authorized and unauthorized traffic breaks.

The Department does not adjust time or payment if (1) a California Highway Patrol officer is unavailable for the requested date or time or (2) your request is not authorized.

#### **12-4.02A(4) Quality Assurance**

Reserved

#### **12-4.02B Materials**

Not Used

#### **12-4.02C Construction**

##### **12-4.02C(1) General**

Work that interferes with traffic is limited to the hours when closures are allowed.

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

Do not simultaneously close consecutive ramps in the same direction of travel servicing 2 consecutive local streets unless authorized.

Notify the Engineer of delays in your activities caused by the denial of either (1) an authorized closure or (2) a closure schedule request for the specified time frame allowed for closures.

Discuss the contingency plan for any activity that could affect the closure schedule with the Engineer at least 5 business days before starting the activity requiring the plan.

If you do not open a closure to traffic by the specified time, suspend work and submit a work plan. No further closures are allowed until your work plan has been authorized.

If the Engineer orders you to remove a closure before the time designated in the authorized closure schedule, any delay caused by this order is an excusable delay.

The Engineer may reschedule a closure that was canceled due to unsuitable weather.

You may use automated flagger assistance devices to enhance the traffic control system for a lane closure on a two-lane convention highway, except if a bid item for automated flagger assistance devices is shown in the Bid Item List, the use of AFADs is required.

Do not use automated flagger assistance devices:

1. On multi-lane highways
2. As a substitute or a replacement for a temporary traffic control signal
3. If the devices impair access for pedestrians and bicycles, unless alternate access is provided
4. If the usable shoulder area is not wide enough to place a trailer mounted device
5. If the distance between the devices is more than 800 feet, except when each device is controlled by a separate operator and radio communication is available between the AFAD operators

#### **12-4.02C(2) Lane Closure System**

##### **12-4.02C(2)(a) General**

The Department provides LCS training. Request the LCS training at least 30 days before submitting the 1st closure request. The Department provides the training within 15 days after your request.

LCS training is web-based or held at a time and location agreed upon by you and the Engineer. For web-based training, the Engineer provides you the website address to access the training.

Within 5 business days after completion of the training, the Department provides LCS accounts and user IDs to your assigned, trained representatives.

Each representative must maintain a unique password and current user information in the LCS.

The project is not accessible in LCS after Contract acceptance.

##### **12-4.02C(2)(b) Status Updates for Authorized Closures**

Update the status of authorized closures using the LCS Mobile web page.

For a stationary closure on a traffic lane, use code:

1. 10-97 immediately before you place the 1st cone on the traffic lane
2. 10-98 immediately after you remove all of the cones from the traffic lane

For a stationary closure on the shoulder, use code:

1. 10-97 immediately before you place the 1st cone after the last advance warning sign
2. 10-98 immediately after you remove the last cone before the advance warning signs

For a moving closure, use code:

1. 10-97 immediately before the actual start time of the closure
2. 10-98 immediately after the actual end time of the closure

For closures not needed on the authorized date, use code 10-22 within 2 hours after the authorized start time.

If you are unable to access the LCS Mobile web page, immediately notify the Engineer of the closure's status.

**12-4.02C(3) Closure Requirements and Charts**

**12-4.02C(3)(a) General**

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

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

Closure of the adjacent traffic lane is not required during any of the following activities:

1. Work behind a barrier
2. Paving, grinding, or grooving
3. Installation, maintenance, or removal of traffic control devices except for temporary railing

**12-4.02C(3)(b) Complete Freeway or Expressway Closure Requirements**

Reserved

**12-4.02C(3)(c) HOV, Express, and Bus Lane Closure Requirements**

Reserved

**12-4.02C(3)(d) City Street Closure Requirements**

Reserved

**12-4.02C(3)(e) Closure Restrictions for Special Events and Venues**

Reserved

**12-4.02C(3)(f) Closure Restrictions for Designated Holidays and Special Days**

Reserved

**12-4.02C(3)(g) Freeway or Expressway Lane Requirement Charts**

Reserved

**12-4.02C(3)(h) Complete Freeway or Expressway Closure Hour Charts**

Reserved

**12-4.02C(3)(i) Complete Connector Closure Hour Charts and Connector Lane Requirement Charts**

Reserved

**12-4.02C(3)(j) Complete Ramp Closure Hour Charts and Ramp Lane Requirement Charts**

Reserved

**12-4.02C(3)(k) Conventional Highway Lane Requirement Charts**

Reserved

**12-4.02C(3)(l) Complete Conventional Highway Closure Hour Charts**

Reserved

**12-4.02C(3)(m) City Street Closure Hour Charts and City Street Lane Requirement Charts**

Reserved

**12-4.02C(3)(n) Concrete Slab and Approach Slab Replacement Closure Hours Table**

Reserved

**12-4.02C(3)(o)–12-4.02C(3)(s) Reserved**

**12-4.02C(4)–12.4.02C(6) Reserved**

**12-4.02C(7) Traffic Control System Requirements**

**12-4.02C(7)(a) General**

Control traffic using stationary closures.

If components of the traffic control system are displaced or cease to operate or function as specified, immediately repair them to their original condition or replace them and place them back in their original locations.

Vehicles equipped with attenuators must comply with section 12-3.23.

Each vehicle used to place, maintain, and remove components of a traffic control system on a multilane highway must have a Type II flashing arrow sign that must operate whenever the vehicle is used for placing, maintaining, or removing the components. For a stationary closure, vehicles with a Type II flashing arrow sign not involved in placing, maintaining, or removing the components must display only the caution display mode. If a flashing arrow sign is required for a closure, activate the sign before the closure is in place.

**12-4.02C(7)(b) Stationary Closures**

Except for channelizing devices placed along open trenches or excavations adjacent to the traveled way, remove the components of the traffic control system for a stationary closure from the traveled way and shoulders at the end of each work period. You may store the components at authorized locations within the limits of the highway.

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

**12-4.02C(7)(c) Moving Closures**

For a moving closure, use a PCMS that complies with section 12-3.32 except the sign must be truck mounted. The full operational height to the bottom of the sign may be less than 7 feet above the ground but must be as high as practicable.

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

**12-4.02C(7)(d) Traffic Breaks**

You may request a traffic break for special operations such as:

1. Installation, removal, or replacement of an overhead power line or other utility cable across the highway
2. Installation or removal of traffic control devices in areas without a standard-width shoulder
3. Transportation of large equipment across the highway
4. Access to median areas for workers or equipment

If the Department authorizes the traffic break, the Engineer notifies you and arranges the traffic break with the California Highway Patrol through COZEEP. The duration of a traffic break must not exceed 5 minutes or as authorized.

Two California Highway Patrol officers per vehicle are required for traffic breaks occurring any time from 2200 to 0600 hours.

A minimum of 2 California Highway Patrol vehicles will be assigned to conduct a traffic break.

Place a PCMS approximately 2,000 feet upstream of the work area or as agreed upon by the Engineer. The PCMS must comply with section 12-3.32 except the PCMS must not be trailer mounted. Monitor the traffic during the traffic break. If a queue develops, reposition the PCMS truck far enough upstream of the traffic break to provide real-time notification to motorists before they approach the traffic queue.



## **12-4.02C(8) Traffic Control System Signs**

### **12-4.02C(8)(a) General**

Traffic control system signs must comply with section 12-3.11.

### **12-4.02C(8)(b) Connector and Ramp Closure Signs**

Inform motorists of a temporary closing of a (1) connector or a (2) freeway or expressway entrance or exit ramp using:

1. SC6-3(CA) (Ramp Closed) sign for closures of 1 day or less
2. SC6-4(CA) (Ramp Closed) sign for closures of more than 1 day

SC6-3(CA) and SC6-4(CA) signs must be stationary mounted at the locations shown and must remain in place and visible to motorists during the connector or ramp closure.

Notify the Engineer at least 2 business days before installing the sign and install the sign from 7 to 15 days before the closure.

## **12-4.02C(9) Flagging**

### **12-4.02C(9)(a) General**

#### **12-4.02C(9)(a)(i) Summary**

Section 12-4.02C(9) includes specifications for flaggers, AFAD operators, additional flaggers, advance flaggers and flagger stations.

#### **12-4.02C(9)(a)(ii) Definitions**

**AFAD operator:** Qualified flagger trained and approved by the manufacturer to operate the specific automated flagger assistance device (AFAD).

**additional flagger:** Flagger that controls the flow of traffic at intermediate locations within the limits of a closure with reversible control, at intersections, driveways and other traffic merging points.

**advance flagger:** Flagger positioned upstream of the traffic control system, who warns approaching traffic of road work ahead and potentially stopped traffic within the advance warning signs.

#### **12-4.02C(9)(a)(iii) Submittals**

Submit training qualifications for flaggers.

Submit training qualifications for the AFAD operators. The submittal must include the names of the manufacturer's authorized trainer and the trainees, description of device type and model for which training was provided, and the date when the training was provided.

#### **12-4.02C(9)(a)(iv) Quality Assurance**

Flaggers must be trained under 8 CA Code of Regs § 1599.

In addition, an AFAD operator must be trained by the manufacturer on:

1. Device type and model to be used on the project
2. Installation procedures
3. Local and remote-controlled operation
4. Maintenance of the device

### **12-4.02C(9)(b) Materials**

Not Used

### **12-4.02C(9)(c) Construction**

#### **12-4.02C(9)(c)(i) General**

Not Used

#### **12-4.02C(9)(c)(ii) Flaggers**

##### **12-4.02C(9)(c)(ii)(A) General**

Flaggers should stand in a conspicuous place and be visible to approaching vehicles.

#### **12-4.02C(9)(c)(ii)(B) Automated Flagger Assistance Device Operators**

When AFADs are in operation, the AFAD operators must:

1. Be positioned away from the traveled way
2. Be positioned where they have an unobstructed line of sight to approaching vehicles and to the devices
3. Keep a backup hand held AFAD remote control readily available

A pilot car driver must not operate a device and must not be considered as one of the flaggers present on-site available to operate a device.

#### **12-4.02C(9)(c)(ii)(C) Additional Flaggers**

Provide additional flaggers at any of the following locations:

1. At high-volume intersections and driveways between the two flagger stations as shown
2. At Multi-lane and circular intersections

Additional flaggers use the STOP/SLOW sign paddle to control vehicles merging into the closure with reversible control.

If additional flaggers are not shown, providing additional flaggers is change order work.

#### **12-4.02C(9)(c)(ii)(D) Advance Flaggers**

Provide advance flaggers when any of the following conditions exist:

1. Queued traffic reaches the W20-4 (One Lane Road Ahead) sign.
2. When the horizontal roadway curvature restricts the sight distance of approaching traffic.
3. When the vertical roadway curvature restricts the sight distance of approaching traffic.

Advance flaggers use the SLOW sign paddle to warn approaching vehicles of the flagging operation ahead and signals the drivers to slow down. If the STOP/SLOW paddle is used, the STOP side must be covered.

If advance flaggers are not shown, providing advance flaggers is change order work.

#### **12-4.02C(9)(c)(iii) Flagger Stations**

Place flagger stations such that approaching vehicles have sufficient distance to react and follow the flagger's instructions.

Place a minimum of four cones at 50 feet intervals in advance of flagger stations.

During the hours of darkness, illuminate flagger stations under 8 CA Regs § 1523. Do not start flagging until flagger stations are illuminated.

Place advance warning signs W20-1, C9A(CA), and W3-4 upstream of the additional flagger station at intersections as shown.

Place advance warning signs W20-1, C9A(CA), and W3-4 upstream of the advance flagger station.

You may use a PCMS in place of an advance flagger. The PCMS must alternately display the messages "Prepare to Stop" and "Flagger Ahead". If the PCMS must be placed outside the project limits before the W20-1 construction area sign, place a portable W20-1 sign 500 feet in advance of the PCMS.

#### **12-4.02C(9)(d) Payment**

Not Used

#### **12-4.02C(10)–12-4.02C(12) Reserved**

#### **12-4.02D Payment**

The Department pays for change order work for a traffic control system by force account for increased traffic control and uses a force account analysis for decreased traffic control.

The Department does not pay for furnishing, placing, relocating, and removing PCMSs used for a traffic break.

The Department deducts the full cost of COZEEP support provided for the traffic break.

The hourly rate for each California Highway Patrol officer providing COZEEP support is \$115. This rate includes full compensation for each hour or portion thereof that the officer provides the support. Markups are not added to any expenses associated with COZEEP support.

The minimum number of hours for an officer is 4 hours, except if a closure is already in place and the Engineer authorizes your request for an on-duty officer to conduct a traffic break, the minimum number of hours for an officer is 1 hour.

For a cancellation less than 48 hours before the scheduled start time of COZEEP support, except for a cancellation due to adverse weather or extenuating circumstances, the Department deducts:

1. Minimum of \$50 per California Highway Patrol officer if the officer is notified before the start time
2. Maximum of 4 hours of pay per officer if the officer is not notified before the start time

### **12-4.03 FALSEWORK OPENINGS**

Reserved

### **12-4.04 TEMPORARY PEDESTRIAN ACCESS ROUTES**

#### **12-4.04A General**

#### **12-4.04A(1) Summary**

Section 12-4.04 includes specifications for providing, maintaining, and removing temporary pedestrian access routes.

A temporary pedestrian access route includes temporary traffic control devices as shown except for Type K temporary railing and temporary crash cushions.

#### **12-4.04A(2) Definitions**

Reserved

#### **12-4.04A(3) Submittals**

If work activities require the closure of a pedestrian route and a temporary pedestrian access route is not shown, submit a work plan for a temporary pedestrian access route. The work plan must:

1. Describe the activities, processes, equipment, and materials that will be used to provide the temporary access route
2. Show the locations of the routes and the placement of traffic control devices for each stage of work
3. Include a time-scaled logic diagram displaying the sequence and duration of the planned activities for each stage of work
4. Be sealed and signed by an engineer who is registered as a civil engineer in the State

Submit "Temporary Pedestrian Access Route Contractor Compliance Report," within 2 business days after construction of a temporary pedestrian access route.

Submit "Temporary Pedestrian Access Route Contractor Weekly Report," within 2 business days of completing a weekly inspection.

#### **12-4.04A(4) Quality Assurance**

#### **12-4.04A(4)(a) General**

Reserved

#### **12-4.04A(4)(b) Quality Control**

Perform a review of the temporary pedestrian access route after it is constructed and document compliance on the "Temporary Pedestrian Access Route Contractor Compliance Report."

The Department will conduct a verification inspection after receiving the compliance report.

For a temporary pedestrian access route in use perform a weekly review and document compliance on the "Temporary Pedestrian Access Route Contractor Weekly Report."

#### **12-4.04B Materials**

The walkway surface must be slip resistant and surfaced with minor HMA or commercial-quality, bituminous material, commercial-quality concrete, or wood.

A handrail with a circular cross section must have an outer diameter from 1-1/4 to 2 inches. A handrail with a noncircular cross section must have a perimeter from 4 to 6-1/4 inches and a maximum cross-section dimension of 2-1/4 inches.

Fasteners must be rounded to prevent injury to a pedestrian's fingers, hands, and arms and to eliminate sharp edges that could catch on clothing.

A detectable warning surface must be on the Authorized Material List for detectable warning surfaces and match yellow color no. 33538 of AMS.Std.595.

Temporary traffic control devices used to channelize pedestrians must:

1. Be free of sharp or rough edges
2. Have a continuous detectable edging at least 6 inches high and at no more than 2 inches above the walkway surface
3. Be at least 32 inches in height
4. Have smooth connection points between devices to allow for a handrail
5. Have a top and bottom surface in the same vertical plane

#### **12-4.04C Construction**

Notify the Engineer 5 business days before closing an existing pedestrian route. Do not close the route until authorized.

If work activities require the closure of a pedestrian route and a temporary pedestrian access route is not shown, provide a temporary pedestrian access route near the traveled way. You may route pedestrians using the existing sidewalk or by constructing a temporary access route.

If a bid item for a temporary pedestrian access route is not shown on the Bid Item List, then constructing a temporary pedestrian access route is change order work, except when the closure is a result of your means and methods.

Construct a temporary pedestrian access route such that:

1. Walkway surface is firm and stable and free of irregularities
2. Cross slope of the pedestrian route is at most 50:1 (horizontal:vertical)
3. Longitudinal slope of the pedestrian route is at most 20:1 (horizontal:vertical)
4. Walkway, landings, blended transitions, and curb ramps are at least 60 inches wide except where not feasible, the width must be at least 48 inches wide with a 60-by-60-inch passing space at least every 200 feet
5. Lateral joints or gaps between surfaces are less than 1/2 inch wide
6. Discontinuities in surface heights are less than 1/2 inch and beveled if greater than 1/4 inch with a slope no greater than 2:1 (horizontal:vertical)
7. Ramps have:
  - 7.1. Longitudinal slope of at most 12:1 (horizontal:vertical)
  - 7.2. Rise less than 30 inches
  - 7.3. Protective edging at least 2 inches high on each side and handrails at a height from 34 to 38 inches above the walkway surface if the rise is greater than 6 inches
8. Curb ramps have:
  - 8.1. Longitudinal slope of at most 12:1 (horizontal:vertical)
  - 8.2. Protective edging at least 2 inches high on each side if the curb ramp does not have flares and the rise is greater than 6 inches
9. Pedestrians are channelized when routed off existing pedestrian routes

Construct handrails such that they are continuous, smooth and free of sharp or rough edges.

Provide an overhead covering to protect pedestrians from falling objects and drippings from overhead structures.

If the temporary access route is next to traffic or work activities, place a temporary barrier to separate the route from vehicles and equipment.

Install a detectable warning surface at locations where a curb ramp, landing, or blended transition connects to a street. Install the warning surface such that it extends a minimum of 36 inches in the direction of travel and for the full width of the landing, blended transition, or curb ramp, excluding the flares.

Maintain the temporary pedestrian access route clear of obstructions. Do not allow traffic control devices, equipment, or construction materials to protrude into the walkway. Maintain a continuous unobstructed path connecting all pedestrian routes, parking lots, and bus stops located within the project limits.

Remove the temporary pedestrian access route when the Engineer determines it is no longer needed.

Provide a temporary pedestrian access route through falsework under section 16-2.02.

#### **12-4.04D Payment**

Not Used

#### **12-4.05 BRIDGE CLEANING AND PAINTING ACTIVITIES**

##### **12-4.05A General**

Section 12-4.05 includes specifications for maintaining traffic during bridge cleaning and painting activities.

Signs must comply with section 12-3.11.

##### **12-4.05B Materials**

Not Used

##### **12-4.05C Construction**

For bridge cleaning and painting activities, place the signs as shown in the following table in addition to those shown on the plans:

Sign no.	Sign description	Requirement
W20-1	Road Work Ahead	Place portable 30-by-30-inch signs at locations where traffic approaches a bridge with work underway. If the approach speed is greater than 50 mph, the sign must be 48 by 48 inches. The sign panel base material must not be plywood. Attach 2 orange, 16 sq in flags to each sign.
--	Cleaning and Painting Operations	Place a 48-by-48-inch sign near each W20-1 sign. Use 4-inch-high black lettering and include your name, address, and telephone number on an orange background.

The Engineer determines the exact locations of the signs. Do not use signs until needed. Maintain the signs in place during bridge cleaning and painting activities. Remove the signs at the end of each work shift.

After each day's bridge cleaning and painting activities, remove obstructions from the roadway to allow for free passage for traffic. Remove blast cleaning residue from the traveled way before opening the area to traffic.

You may lay supply lines along the top of curbs adjacent to railing posts if the lines do not interfere with traffic. Remove the lines when work is not in progress.

##### **12-4.05D Payment**

Not Used

## **12-4.06 TOLL BRIDGES**

Reserved

## **12-4.07–12-4.10 RESERVED**

## **12-5 RESERVED**

## **12-6 TEMPORARY PAVEMENT DELINEATION**

### **12-6.01 GENERAL**

Section 12-6 includes specifications for placing temporary pavement delineation except for delineation on a seal coat project.

Temporary painted traffic stripes and painted pavement markings used for temporary delineation must comply with section 84-2.

Temporary signs for no-passing zones must comply with section 12-3.11.

### **12-6.02 MATERIALS**

#### **12-6.02A General**

The following types of temporary pavement delineation must be on the Authorized Material List for signing and delineation materials:

1. Temporary pavement markers for long term day/night use (180 days or less)
2. Temporary pavement markers for short term day/night use (14 days or less)
3. Temporary (removable) striping and pavement marking tape (180 days or less)
4. Permanent traffic striping and pavement marking tape
5. Channelizers

#### **12-6.02B Temporary Pavement Markers**

Temporary pavement markers must be the same color as the lane line or centerline markers being replaced.

Temporary pavement markers must be for long-term day or night use, 180 days or less, except you may use temporary pavement markers for short-term day or night use, 14 days or less, if you place the permanent pavement delineation before the end of the 14 days.

#### **12-6.02C Channelizers**

Channelizers used for temporary edge line delineation must be orange and surface mounted.

### **12-6.03 CONSTRUCTION**

#### **12-6.03A General**

If work activities obliterate pavement delineation, place temporary or permanent pavement delineation before opening the traveled way to traffic. The temporary pavement delineation must consist of a lane line and centerline pavement delineation for traveled ways open to traffic. On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width, the temporary pavement delineation must also include edge line delineation for traveled ways open to traffic.

Establish the alignment for temporary pavement delineation, including the required lines or markers. Surfaces to receive an application of paint or removable traffic tape must be dry and free from dirt and loose material. Do not apply temporary pavement delineation over existing pavement delineation or any other temporary pavement delineation. Maintain temporary pavement delineation until no longer needed or replace it with a new striping detail of temporary or permanent pavement delineation.

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

### **12-6.03B Temporary Lane Line and Centerline Delineation**

If lane lines or centerlines are obliterated and temporary pavement delineation to replace the lines is not shown, the minimum lane line and centerline delineation must consist of temporary pavement markers placed longitudinally at 24-foot maximum intervals.

For temporary lane line or centerline delineation consisting entirely of temporary pavement markers for short-term day or night use, 14 days or less, do not use the markers for more than 14 days on lanes opened to traffic. Place the permanent pavement delineation before the end of the 14 days. If the permanent pavement delineation is not placed within 14 days, replace the temporary pavement markers with additional temporary pavement delineation equivalent to the pattern described for the permanent pavement delineation for the area.

If no-passing centerline pavement delineation is obliterated, install the following temporary no-passing zone signs before opening lanes to traffic:

1. W20-1 (Road Work Ahead) sign from 1,000 to 2,000 feet in advance of the no-passing zone
2. R4-1 (Do Not Pass) sign at the beginning of the no-passing zone and at 2,000-foot maximum intervals within the no-passing zone
3. W7-3a (Next \_\_\_ Miles) plaque beneath the W20-1 sign for continuous zones longer than 2 miles
4. R4-2 (Pass With Care) sign at the end of the no-passing zone

The Engineer determines the exact location of temporary no-passing zone signs. Maintain the temporary no-passing zone signs in place until you place the permanent no-passing centerline pavement delineation.

Remove the temporary no-passing zone signs when the Engineer determines they are no longer required for the direction of traffic.

### **12-6.03C Temporary Edge Line Delineation**

On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width open to traffic where edge lines are obliterated and temporary pavement delineation to replace those edge lines is not shown, provide temporary pavement delineation for:

1. Right edge lines consisting of any of the following:
  - 1.1. Solid 6-inch-wide traffic stripe tape of the same color as the stripe being replaced.
  - 1.2. Traffic cones placed longitudinally at 100-foot maximum intervals.
  - 1.3. Portable delineators or channelizers placed longitudinally at 100-foot maximum intervals.
2. Left edge lines consisting of any of the following:
  - 2.1. Solid 6-inch-wide traffic stripe tape of the same color as the stripe being replaced.
  - 2.2. Traffic cones placed longitudinally at 100-foot maximum intervals.
  - 2.3. Portable delineators or channelizers placed longitudinally at 100-foot maximum intervals.
  - 2.4. Temporary pavement markers placed longitudinally at 6-foot maximum intervals.

You may apply temporary traffic stripe paint of the same color as the stripe being replaced instead of solid 6-inch-wide temporary traffic stripe tape where the removal of the temporary traffic stripe is not required.

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

Cement the bases of channelizers used for temporary edge line delineation to the pavement with hot melt bituminous adhesive as specified in section 81-3 for cementing pavement markers to pavement.

### **12-6.03D Temporary Traffic Stripe, Pavement Marking, and Pavement Markers**

#### **12-6.03D(1) General**

Reserved

#### **12-6.03D(2) Temporary Traffic Stripe Tape**

Except where the temporary traffic stripe is used for 14 days or less, apply temporary removable traffic stripe tape under the manufacturer's instructions and as follows:

1. Slowly roll the tape with a rubber-tired vehicle or roller to ensure complete contact with the pavement surface.
2. Apply the tape straight on a tangent alignment and on a true arc on a curved alignment.
3. Do not apply the tape when the ambient air or pavement temperature is less than 50 degrees F unless otherwise authorized.

For temporary traffic stripe tape used for 14 days or less, apply the temporary removable traffic stripe tape under the manufacturer's instructions.

#### **12-6.03D(3) Temporary Traffic Stripe Paint**

Apply temporary traffic stripe paint under section 84-2.03, except you may apply 1 or 2 coats of the temporary traffic stripe paint for new or existing pavement.

You are not required to remove painted temporary traffic stripe that will be covered by paving work.

#### **12-6.03D(4) Temporary Pavement Marking Tape**

Apply temporary removable pavement marking tape as specified for applying temporary removable traffic stripe tape in section 12-6.03D(2).

#### **12-6.03D(5) Temporary Pavement Marking Paint**

Apply temporary pavement marking paint under section 84-2.03, except you may apply 1 or 2 coats of the temporary pavement marking paint.

You are not required to remove of painted temporary pavement markings that will be covered by paving work.

You may use permanent or temporary removable pavement marking tape instead of temporary pavement marking paint.

#### **12-6.03D(6) Temporary Pavement Markers**

Place temporary pavement markers under the manufacturer's instructions. Cement temporary markers to the surfacing with the manufacturer's recommended adhesive except do not use epoxy adhesive in areas where the removal of the pavement markers is required.

You may use retroreflective pavement markers instead of temporary pavement markers for long-term day or night use, 180 days or less, except to simulate patterns of broken traffic stripe. Retroreflective pavement markers used for temporary pavement markers must comply with section 81-3, except the waiting period before placing pavement markers on new asphalt concrete surfacing as specified in section 81-3.03 does not apply. Do not use epoxy adhesive to place pavement markers in areas where the removal of the pavement markers is required.

#### **12-6.04 PAYMENT**

The Department does not pay for additional temporary pavement delineation used to replace temporary pavement markers.

Temporary traffic stripe is measured as specified for traffic stripe in section 84.

Temporary pavement marking is measured as specified for pavement marking in section 84.

### **12-7 TEMPORARY PAVEMENT DELINEATION FOR SEAL COATS**

#### **12-7.01 GENERAL**

Section 12-7 includes specifications for placing temporary pavement delineation for a seal coat project.

Temporary signs for no-passing zones must comply with section 12-3.11.

#### **12-7.02 MATERIALS**

Temporary raised pavement markers for seal coat applications must be temporary pavement markers for short-term day or night use, 14 days or less, on the Authorized Material List for signing and delineation materials.



**12-7.03 CONSTRUCTION**

Before applying binder that will obliterate existing traffic stripes, place temporary raised pavement markers on the existing traffic stripes except for right edge lines at 24-foot maximum intervals. Place 2 markers side by side on double traffic stripes with 1 marker placed on each stripe longitudinally at 24-foot maximum intervals. Place temporary raised pavement markers under the manufacturer's instructions. Before opening the lanes to uncontrolled traffic, remove the covers from the temporary raised pavement markers.

If you obliterate no-passing centerline pavement delineation, install the following temporary no-passing zone signs before opening lanes to traffic:

1. W20-1 (Road Work Ahead) sign from 1,000 to 2,000 feet in advance of the no-passing zone
2. R4-1 (Do Not Pass) sign at the beginning of the no-passing zone and at 2,000-foot maximum intervals within the no-passing zone
3. W7-3a (Next \_\_\_ Miles) plaque beneath the W20-1 sign for continuous zones longer than 2 miles
4. R4-2 (Pass With Care) sign at the end of the no-passing zone

The Engineer determines the exact location of the temporary no-passing zone signs. Maintain the temporary no-passing zone signs in place until you place the permanent no-passing centerline pavement delineation. Remove the temporary no-passing zone signs when the Engineer determines they are no longer required for the direction of traffic.

Maintain temporary pavement delineation until you replace it with the permanent pavement delineation.

**12-7.04 PAYMENT**

Not Used

**12-8-12-10 RESERVED**

AA

**13 WATER POLLUTION CONTROL**

04-19-19

**Add after the 2nd paragraph of section 13-1.01C(5):**

For partial listing of disposal facilities and their waste acceptance list, go to SWRCB website.

04-19-19

**Delete item 2.6.3 in the list of section 13-1.01D(4)(c).**

04-19-19

**Replace the 1st paragraph of section 13-2.01C with:**

Within 7 days after Contract approval, submit one printed copy and an electronic copy on a read-only CD, DVD, or other authorized data-storage device of your WPCP unless different quantities are ordered at the preconstruction conference. You may assign a QSP other than the WPC manager to develop the WPCP.

04-19-19

**Replace item 4 in the list in the 2nd paragraph of section 13-2.01C with:**

4. Show the locations and types of temporary WPC practices that will be used in the work for whichever has the longest duration in the first:
  - 4.1. 60 days
  - 4.2. Construction phase

04-19-19

**Replace the 4th paragraph of section 13-2.01C with:**

04-19-19

After the Engineer authorizes the WPCP, submit one printed copy and an electronic copy on a read-only CD, DVD, or other Engineer-authorized data-storage device of the authorized WPCP.

**Delete the row for Annual Certification in the table in section 13-3.01C(1).**

04-19-19

**Replace the 1st paragraph of section 13-3.01C(2)(a) with:**

04-19-19

Within 15 days of Contract approval, submit one printed copy and an electronic copy on a read-only CD, DVD, or other authorized data-storage device of your SWPPP unless different quantities are ordered at the preconstruction conference. You may assign a QSD other than the WPC manager to develop the SWPPP.

**Replace item 4 in the list in the 2nd paragraph of section 13-3.01C(2)(a) with:**

04-19-19

4. Include a schedule showing when:
  - 4.1. Work activities that could cause the discharge of pollutants into stormwater will be performed
  - 4.2. WPC practices, including soil stabilization and sediment control, that will be used in the work for whichever has the longest duration in the first:
    - 4.2.1. 60 days
    - 4.2.2. Construction phase

**Replace the 4th paragraph of section 13-3.01C(2)(a) with:**

04-19-19

Submit an electronic copy on a read-only CD, DVD, or other Engineer-authorized data-storage device and 4 printed copies of the authorized SWPPP unless fewer quantities are authorized at the preconstruction conference.

**Replace the introductory clause in the 7th paragraph of section 13-3.01C(2)(a) with:**

04-19-19

Submit a revised SWPPP annually before September 15th and any time:

**Add after the 7th paragraph of section 13-3.01C(2)(a):**

04-19-19

Revise the SWPPP through amendment. The annual SWPPP amendment must include an annual winterization plan.

The annual winterization plan must describe the preparation for the upcoming rainy season including:

1. Updated schedule
2. Materials and labor
3. Management of stormwater through the job site including:
  - 3.1. Run-on
  - 3.2. Run-off
  - 3.3. Conveyance downslope
4. Management of areas within the job site including:



**DIVISION III EARTHWORK AND LANDSCAPE**

**19 EARTHWORK**

10-19-18

**Replace the 1st paragraph of section 19-3.03E(1) with:**

10-19-18

Place structure backfill in uniform layers. Bring backfill up uniformly on all sides of structures or drainage facilities. Backfill layer thickness must not exceed 0.67 foot before compacting. If you perform compaction by ponding and jetting, the thickness of the backfill layer must not exceed 4 feet.

**Replace the 1st sentence in the 3rd paragraph of section 19-3.03E(1) with:**

10-19-18

Do not place structure backfill until footings or other parts of structures or drainage facilities are authorized.

AA

**20 LANDSCAPE**

10-18-19

**Replace item 2 in the list in the 1st paragraph of section 20-1.03C(1) with:**

10-18-19

- 2. Controlling weeds and pests

**Replace the 2nd paragraph of section 20-2.01A(4)(d) with:**

10-19-18

In the presence of the Engineer, perform a functional test for each system that demonstrates:

- 1. Components of the system are functioning and integrated with one another. 10-18-19
- 2. Controller programming is complete including external weather, learned flow, and other system data inputs required to operate the system in the automatic mode. 10-19-18
- 3. Watering schedule is appropriate for the plants, current weather, season, and site conditions.
- 4. System has complete sprinkler coverage of the site.

Perform the test for each system:

- 1. Before planting the plants
- 2. After irrigation system repair work
- 3. Annually during plant establishment work
- 4. Not more than 30 days prior to contract acceptance
- 5. When ordered

10-19-18

**Delete section 20-2.01A(4)(e).**

**Replace the 1st paragraph of section 20-2.01B(5) with:**

10-19-18

Pull boxes must comply with section 86-1.02C and be no. 5 or larger. Pull boxes for low voltage conductors must not have side openings.

**Replace the 2nd paragraph of section 20-2.01B(5) with:**

04-19-19

Pull box covers used for control and neutral conductors for irrigation equipment operated by the irrigation controller must be marked *SPRINKLER CONTROL*.

**Add to section 20-2.01B:**

04-19-19

**20-2.01B(9) Woven Wire Cloth and Gravel**

Woven wire cloth must be galvanized and manufactured with a minimum diameter of 19-gauge wire and have square openings from 1/4 to 1/2 inches.

Gravel must be 3/4-inch gravel or crushed rock. Gravel or crushed rock must be clean, washed, dry, and free from clay or organic material.

**Replace the 1st paragraph of section 20-2.01C(2) with:**

10-19-18

Perform trenching and backfilling under section 87-1.03E(2).

**Replace the introductory clause to the list in the 1st paragraph of section 20-2.01C(3) with:**

10-19-18

Install pull boxes under section 87-1.03C at the following locations:

**Add to section 20-2.01C(4):**

04-19-19

Install valve boxes on woven wire cloth and gravel or crushed rock.

**Replace the 1st paragraph of section 20-2.04A(4) with:**

10-19-18

Perform field tests on control and neutral conductors. Field tests must comply with the specifications in section 87-1.01D(2)(a).

**Replace the 1st and 2nd paragraphs of section 20-2.04B with:**

10-19-18

Control and neutral conductors must comply with the provisions for conductors and cables in section 86-1.02F.

Electrical conduit and fittings must comply with section 86-1.02(B).

**Replace the 1st paragraph of section 20-2.04C(4) with:**

04-19-19

Splice conductors with a UL-listed connector manufactured for copper wire, direct burial irrigation systems. Connector must be prefilled with a moisture sealing compound that encapsulates and protects the splice in a waterproof housing. Connector must be sized for the number and gauge of the conductors at the splice.

**Add to the end of the 4th paragraph of section 20-2.06B(2)(a):**

10-18-19

Notify the Engineer at least 10 business days before accessing the network communications to integrate new irrigation controllers into the network.

**Replace the introductory clause of the 1st paragraph of section 20-2.06B(3) with:**

10-19-18

The irrigation controller enclosure cabinet must comply with section 86-1.02Q and must:

**Add to the beginning of section 20-2.06C:**

10-19-18

Install the irrigation controller enclosure cabinet under 87-1.03Q(1).

**Replace the paragraph of section 20-2.07B(3) with:**

10-18-19

Corrugated HDPE pipe must comply with ASTM F667 or be Type S complying with AASHTO M252 or AASHTO M294. Couplings and fitting must be as recommended by the pipe manufacturer.

**Replace the 3rd paragraph of section 20-2.09B(1) with:**

04-19-19

Threaded nipples for swing joints and risers must be schedule 80, PVC 1120 or PVC 1220 pipe, and comply with ASTM D1785.

**Add to the end of section 20-2.10B(6):**

10-18-19

Flanged adapters used to connect pipe to gate valves must be metal.

**Replace the table in the 3rd paragraph of section 20-3.01B(2)(a) with:**

10-19-18

Plant group designation	Description	Container size (cu in)
A	No. 1 container	152-251
B	No. 5 container	785-1242
C	Balled and burlapped	--
E	Bulb	--
F	In flats	--
H	Cutting	--
I	Pot	--
K	24-inch box	5775-6861
M	Liner <sup>a</sup>	--
O	Acorn	--
P	Plugs <sup>a, b</sup>	--
S	Seedling <sup>c</sup>	--
U	No. 15 container	2768-3696
Z	Palm Tree	--

<sup>a</sup>Do not use containers made of biodegradable material.

<sup>b</sup>Grown in individual container cells.

<sup>c</sup>Bare root.

**Replace the introductory clause of the 1st paragraph of section 20-3.01B(4)(b) with:**

10-19-18

Slow-release fertilizer must be a pelleted or granular form with a nutrient release over a 3 to 4 month period and be within the chemical analysis ranges shown in the following table:

**Replace section 20-3.01C(3) with:**

10-19-18

Water plants as needed to keep the plants in a healthy growing condition.

**Replace item 3 in the list in the 2nd paragraph of section 20-4.01A with:**

10-18-19

3. Controlling weeds and pests

**Replace the 1st paragraph of section 20-4.03G with:**

10-18-19

Operate the electric irrigation systems utilizing external weather, learned flow, and other system data inputs required to operate the system in the automatic mode, unless otherwise authorized.

**Delete the 3rd paragraph of section 20-4.03G.**

10-19-18

**Replace the 1st paragraph of section 20-5.03A(2) with:**

10-18-19

Preemergent must be granular oxadiazon.

**Replace the paragraph of section 20-5.03A(3)(c) with:**

10-18-19

After compaction, apply preemergent at the maximum label rate. Do not apply preemergent more than 12 inches beyond the inert ground cover limits. Complete the preemergent application and inert ground cover placement within the same day.

**Add to the end of section 20-5.03B(3):**

10-19-18

If you are ordered to remove existing concrete below ground within the limits of the rock blanket, saw cut the concrete before removal. This work is change order work.

**Replace item 1 in the list in the 1st paragraph of section 20-10.03A(3) with:**

10-19-18

- 1. Transplanting trees. The work plan must include methods of lifting, transporting, storing, planting, guying, watering and maintaining each tree to be transplanted. Include the root ball size, method of root ball containment, and a maintenance program for each tree.

**Replace item 2 in the list in the 1st paragraph of section 20-10.03A(3) with:**

10-18-19

- 2. Maintain existing planted areas. The work plan must include controlling the weeds, fertilizing, mowing and trimming of turf areas, watering, and controlling pests.

**Replace item 6 in the list in the 2nd paragraph of section 20-10.03A(4) with:**

10-18-19

- 6. Pests

**Add to the end of section 20-10.03C(3):**

10-19-18

Water transplanted trees immediately after planting and as needed to keep it in a healthy growing condition until contract acceptance.

**Add to the end of section 20-10.03C(4):**

10-19-18

Water existing plants as needed to keep them in a healthy growing condition until contract acceptance.

AA

**21 EROSION CONTROL**

10-18-19

**Replace section 21-2.01C(3) with:**

10-18-19

At least 60 days before seed application, submit proof that the purchase order for seed required for the Contract has been placed and accepted by the seed vendor. Include the seed's botanical names, quantity ordered, and the anticipated date of delivery on the purchase order.





## **DIVISION IV SUBBASES AND BASES**

### **28 CONCRETE BASES**

04-19-19

**Replace the 1st paragraph of section 28-2.01D(1)(a) with:**

The cylinders for compressive strength testing under ASTM C31 or ASTM C192 must be 6 by 12 inches. 04-19-19

**Replace the 1st paragraph of section 28-2.02B with:**

The SCM content requirements in the 4th paragraph of section 90-1.02B(3) do not apply to LCB. 04-19-19

AA

## **DIVISION V SURFACINGS AND PAVEMENTS**

### **39 ASPHALT CONCRETE**

10-18-19

**Replace the 1st and 2nd paragraphs of section 39-2.01A(3)(d) with:**

If ordered, submit QC test results within 3 business days of a request. 04-19-19

**Add to section 39-2.01A(4)(h)(v):**

AASHTO T 324 (modified) and AASHTO T 283 are not required if production start-up evaluation is within 45 days of the date the Hot Mix Asphalt Verification form is signed. 04-19-19

If production stops for more than 60 days, perform a production start-up evaluation. If production stops for more than 30 days but less 60 days, perform a reduced production start-up evaluation. Reduced production start-up evaluation is production start-up evaluation without AASHTO T 324 and AASHTO T 283.

If production start-up evaluation fails, do not begin production.

**Add between the 3rd and 4th paragraphs of section 39-2.01A(4)(i)(i):**

You must assist in collecting Engineer acceptance samples. Sample in the presence of the Engineer. Split the Engineer acceptance samples into at least 4 parts. Engineer retains 3 parts and you keep 1 part. 04-19-19

**Replace the 1st through 3rd paragraphs of section 39-2.01A(4)(i)(iv) with:**

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. You and the Engineer may only dispute each other's test results if one party's test results pass and the other party's test results fail. 04-19-19

If there is a dispute, submit your test results and copies of paperwork including worksheets used to determine the disputed test results within 3 business day of receiving Engineer's test results. An independent third party performs referee testing. Before the third party participates in a dispute resolution, it must be qualified under AASHTO re:source program and the Department's Independent Assurance

Program. The independent third party must have no prior direct involvement with this Contract. By mutual agreement, the independent third party is chosen from:

1. Department laboratory in a district or region not in the district or region the project is located
2. Transportation Laboratory
3. Laboratory not currently employed by you or your HMA producer

If the Department's portion of the split acceptance samples are not available, the independent third party uses any available material agreed by you and the Engineer as representing the disputed HMA for evaluation.

**Replace the 2nd paragraph of section 39-2.02A(4)(b)(iii) with:**

10-18-19

When tested under AASHTO T 308, the uncorrected binder content of the combined RAP sample must be within  $\pm 2.00$  percent of the average uncorrected asphalt binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form. If a new processed RAP stockpile is required, the average uncorrected binder content of the new processed RAP stockpile tested under AASHTO T 308 must be within  $\pm 2.00$  percent of the average uncorrected binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form. You must use the same ignition oven used to determine the uncorrected asphalt binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form.

**Replace item 2 in the 4th paragraph of section 39-2.02A(4)(b)(iii) with:**

10-18-19

2. Moisture content at least once a day

**Replace footnote a in the table in item 1 in the list in the paragraph of section 39-2.02A(4)(e) with:**

10-18-19

<sup>a</sup>The Engineer determines combined aggregate gradations containing RAP under California Test 384. The Engineer uses the correlation factor from Contractor Hot Mix Asphalt Design Data form and mathematically combines the virgin and corrected RAP aggregate gradations at the correct proportions to obtain the combined gradation.

**Replace the table in item 2 in the list in the paragraph of section 39-2.02A(4)(e) with:**

10-18-19

**Reclaimed Asphalt Pavement Quality**

Quality characteristic	Test method	Requirement
Uncorrected binder content (% within the average value reported <sup>a</sup> )	AASHTO T 308	$\pm 2.00$
Specific gravity (within the average value reported <sup>b</sup> )	AASHTO T 209	$\pm 0.06$

<sup>a</sup>Average uncorrected binder content of three ignition oven tests performed at JMF verification. Engineer must use the same ignition oven used to determine the average uncorrected binder content at JMF verification.

<sup>b</sup>Average maximum specific gravity reported on page 4 of Contractor Hot Mix Asphalt Design Data form.

**Replace the row for *Moisture susceptibility (min, psi, dry strength)* in the table in item 3 in the list in the paragraph of section 39-2.02A(4)(e) with:**

04-19-19

For RAP substitution equal to or less than 15% moisture susceptibility (min, psi, dry strength)	AASHTO T 283	100
For RAP substitution greater than 15% moisture susceptibility (psi, dry strength)	AASHTO T 283	100-300 <sup>h</sup>

**Add a footnote to the table in item 3 in the list in the paragraph of section 39-2.02A(4)(e):**

04-19-19

<sup>h</sup>Not required in the following areas:

1. Southern San Luis Obispo or Santa Barbara County in District 5.
2. Kern County in District 6.
3. Kings County in District 6: route 5, post mile 0 to 17; route 33, post mile 0 to 19; route 41, post mile 0 to 16.
4. Tulare County in District 6: route 65, post mile 0 to 10; route 99, post mile 0 to 10; route 43, post mile 0 to 15.

**Replace the row for *Moisture susceptibility, dry strength* in the table in the 1st paragraph of section 39-2.02B(2) with:**

04-19-19

For RAP substitution equal to or less than 15% moisture susceptibility (min, psi, dry strength)	AASHTO T 283	100
For RAP substitution greater than 15% moisture susceptibility (psi, dry strength)	AASHTO T 283	100-300 <sup>e</sup>

**Add a footnote to the table in the 1st paragraph of section 39-2.02B(2):**

04-19-19

<sup>e</sup>Not required in the following areas:

1. Southern San Luis Obispo or Santa Barbara County in District 5.
2. Kern County in District 6.
3. Kings County in District 6: route 5, post mile 0 to 17; route 33, post mile 0 to 19; route 41, post mile 0 to 16.
4. Tulare County in District 6: route 65, post mile 0 to 10; route 99, post mile 0 to 10; route 43, post mile 0 to 15.

**Replace the 3rd and 4th paragraphs of section 39-2.02B(2) with:**

04-19-19

For RAP substitution of 15 percent or less, the grade of the virgin binder must be the specified grade of asphalt binder for Type A HMA.

For RAP substitution greater than 15 percent and not exceeding 25 percent, the grade of the virgin binder must be the specified grade of asphalt binder for Type A HMA with the upper and lower temperature classification reduced by 6 degrees C. Hamburg wheel track requirements are based on the grade of asphalt binder specified for Type A HMA.

**Replace the 2nd sentence in the 2nd paragraph of section 39-2.02B(11) with:**

04-19-19

For RAP substitution of 15 percent or less, RAP must be within  $\pm 3$  of RAP percentage shown in your Contractor Job Mix Formula Proposal form without exceeding 15 percent. For RAP substitution of greater than 15 percent, RAP must be within  $\pm 3$  of RAP percentage shown in your Contractor Job Mix Formula Proposal form without exceeding 25 percent.

**Replace the 8th and 9th paragraphs of section 39-2.04C with:**

04-19-19

For RHMA-O and RHMA-O produced with WMA water injection technology, and RHMA-O-HB and RHMA-O-HB produced with WMA water injection technology:

1. Spread and compact if the ambient air temperature is at least 55 degrees F and the surface temperature is at least 60 degrees F
2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 280 degrees F
3. Complete compaction before the surface temperature drops below 250 degrees F

For RHMA-O produced with WMA additive technology and RHMA-O-HB produced with WMA additives technology:

1. Spread and compact if the ambient air temperature is at least 45 degrees F and the surface temperature is at least 50 degrees F
2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 270 degrees F
3. Complete compaction before the surface temperature drops below 240 degrees F

Spread sand at a rate from 1 to 2 lb/sq yd on RHMA-O and RHMA-O-HB with or without WMA technology pavement after finish rolling activities are complete. Keep traffic off the pavement until spreading of the sand is complete.

AA

**40 CONCRETE PAVEMENT**

10-18-19

**Replace the 2nd paragraph of section 40-1.01C(9) with:**

Submit your coefficient of thermal expansion test data at:

10-19-18

<https://dime.dot.ca.gov/>

**Replace section 40-2 with:**

10-18-19

**40-2 CONTINUOUSLY REINFORCED CONCRETE PAVEMENT**

**40-2.01 GENERAL**

**40-2.01A Summary**

Section 40-2 includes specifications for constructing continuously reinforced concrete pavement.

Constructing continuously reinforced concrete pavement includes terminal joints and expansion joints.

**40-2.01B Definitions**

Reserved

**40-2.01C Submittals**

For field qualification, submit the test data for the coefficient of thermal expansion of the concrete.

If you request to use plastic chairs to support the transverse bars, submit a sample of the plastic chair, including:

1. Manufacturer's instructions for the applicable use and load capacity
2. Chair spacing
3. Your calculation for the load on a chair for the area of bar reinforcement it supports

During production, submit the test data for the coefficient of thermal expansion as an informational submittal.

#### **40-2.01D Quality Assurance**

For field qualification, test the coefficient of thermal expansion of the concrete under AASHTO T 336. The coefficient of thermal expansion must not exceed 6.0 microstrain/degree F.

During the evaluation of the test strip, the Engineer visually checks the reinforcement and dowel and tie bar placement.

During production, test the coefficient of thermal expansion of the concrete at a frequency of 1 test for each 5,000 cu yd of paving but not less than 1 test for a project with less than 5,000 cu yd of concrete.

### **40-2.02 MATERIALS**

#### **40-2.02A General**

Reserved

#### **40-2.02B Transverse Bar Assembly**

Transverse bar assemblies may be used to support longitudinal bars instead of transverse bars and other support devices.

#### **40-2.02C Intermediate Transverse Bars**

Intermediate transverse bars do not need to be epoxy-coated for a project not shown to be in a high desert or any mountain climate region.

#### **40-2.02D Joints**

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

Geosynthetic bond breaker for expansion joint support slabs must comply with section 36-2.

### **40-2.03 CONSTRUCTION**

#### **40-2.03A General**

Reserved

#### **40-2.03B Bar Reinforcement**

Place bar reinforcement under section 52-1.03D except you may request to use plastic chairs. Plastic chairs will be considered only for support directly under the transverse bars. You must demonstrate the vertical and lateral stability of the bar reinforcement and plastic chairs during the construction of the test strip.

For a transverse bar 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 as shown.

Lap splice bar reinforcement under section 52-6. For low carbon, chromium-steel bar reinforcement, the length of lap splice must be at least 30 inches.

#### **40-2.03C Construction Joints**

Transverse construction joints must be perpendicular to the lane line. Construct the joints so that the nearest longitudinal bar splice is at least 42 inches away from each side of the joint.

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

#### **40-2.03D Correcting Noncompliant Pavement Work**

##### **40-2.03D(1) General**

The specifications for repairing cracks in section 40-1.03N do not apply to CRCP. Do not apply high-molecular-weight methacrylate to cracks in CRCP.

CRCP that develops raveling areas of 6 by 6 inches or greater requires partial depth repair.

**40-2.03D(2) Partial Depth Repair**

Partial depth repair must comply with section 41-4 except:

1. Determine a rectangular boundary which extends 6 inches beyond the damaged area. The depth of the saw cut must be between 2 inches from the surface to 1/2 inch above the longitudinal bars.
2. Provide additional reinforcement if each length of the repair boundaries is equal to or greater than 3 feet.

**40-2.03D(3) Full-Depth Repair**

**40-2.03D(3)(a) General**

Remove the full-depth of CRCP except for the portion of reinforcement to remain in place. Provide continuity of the reinforcement. For low carbon, chromium-steel bar reinforcement, the length of lap splice must be at least 30 inches. Splicing must comply with section 52-6. Do not damage the base, concrete, and reinforcement to remain in place. Place concrete in the area where you removed CRCP.

**40-2.03D(3)(b) Transverse Cracks**

Make initial full-depth transverse saw cuts normal to the lane line a distance of 3 feet on each side of the transverse crack.

**40-2.03D(3)(c) Longitudinal Cracks**

Remove the cracked area normal to the lane line for the full width of the lane a distance of 1 foot beyond each end of the crack. You may propose alternate limits with your repair plan.

**40-2.03E Reserved**

**40-2.04 PAYMENT**

Not Used

\*\*\*\*\*

**DIVISION VI STRUCTURES  
46 GROUND ANCHORS AND SOIL NAILS**

04-19-19

**Add to the list in the 1st paragraph of section 46-1.01C(3):**

12. Digital photo logs of extracted test soil nails

10-19-18

**Replace the 2nd paragraph of section 46-1.01C(3) with:**

10-19-18

Submit the test data in electronic and hard copy format within 1 business day after testing is complete. Upon completion of the wall, send an email of the soil nail test results as a tabulated spreadsheet to the Engineer and Geotechnical.Data@dot.ca.gov. Include the contract number and Department's structure number of the wall in the subject line of the email.

**Replace *Not Used* in section 46-1.01D(1) with:**

10-19-18

Welding must comply with AWS D1.1.

**Add to the end of section 46-1.03A:**

10-19-18

Shotcrete must comply with section 53-2.

10-19-18

**Delete the 3rd paragraph of section 46-1.03B.**

**Replace the 1st sentence in the 2nd paragraph of section 46-2.02B with:**

10-19-18

The anchorage enclosure and the steel tube and bearing plate of the anchorage assembly must be galvanized steel and comply with sections 55-1.02D(1) and 55-1.02E(1).

**Replace item 9 in the list in the 3rd paragraph of section 46-2.02D with:**

10-19-18

9. Have the physical properties shown in Table 4.1 of *Recommendations for Prestressed Rock and Soil Anchors* published by the Post-Tensioning Institute

**Replace the 4th paragraph of section 46-2.03D with:**

10-19-18

Immediately after lock-off, perform a lift-off test to verify that the lock-off load has been attained. The lift-off load must be within 10 percent of the specified lock-off load. If necessary adjust the shim thickness to achieve the lock-off load. If the load is not within 10 percent of the specified lock-off load, the anchorage must be reset and another lift-off load reading must be made. Repeat the process until the specified lock-off load is obtained.

**Replace the 2nd paragraph of section 46-3.01A with:**

10-19-18

A soil nail consists of a solid steel bar with an anchorage assembly that is placed in a drilled hole and then grouted.

**Replace section 46-3.01D(2)(b)(ii)(1) with:**

10-19-18

**46-3.01D(2)(b)(ii)(1) General**

Determine the test load using the following equation:

$$T = L_b \times Q_b$$

where:

T = test load, pounds

L<sub>b</sub> = soil nail bonded length, feet, 10 feet minimum

Q<sub>b</sub> = test load per unit length of bond, pounds/foot

**Replace the 8th paragraph of section 46-3.01D(2)(b)(ii)(2) with:**

04-19-19

If the Engineer revises soil nail lengths or test load per unit length of bond values, any additional verification test soil nails are change order work.



**Replace section 46-3.02A with:**

04-19-19

**46-3.02A General**

Each production soil nail must be either a solid steel bar encapsulated full length in a grouted corrugated plastic sheathing or an epoxy-coated prefabricated solid steel bar partially encapsulated in a grouted corrugated plastic sheathing as shown.

Epoxy-coated prefabricated solid steel bars must comply with the specifications for epoxy-coated prefabricated reinforcement in section 52-2.03, except the average coating thickness after curing must be from 10 to 15 mils.

Solid steel bar for test soil nails is not required to be epoxy coated or encapsulated in grouted plastic sheathing.

**Replace the heading of section 46-3.02B with:**

10-19-18

**Anchorage Assemblies**

**Replace section 46-3.02C with:**

10-19-18

**46-3.02C Solid Steel Bars**

Solid steel bars must be either:

1. Threaded bars with spirally-deformed, ribbed threads continuous along the entire length of the bar.
2. Deformed reinforcing bars with at least a 6-inch length of thread cut into the bar on the anchorage end. Use coarse threading and the next larger reinforcing bar size.

Solid steel bars must comply with ASTM A615/A615M or A706/A706M, Grade 60 or ASTM A615/A615M, Grade 75.

Splicing must be authorized.

Epoxy coating at the anchorage end of epoxy-coated bars may be omitted for a maximum of 6 inches. Metal surfaces of assembled splices of epoxy-coated bars must be epoxy coated.

Choose the solid steel bar size and grade for test soil nails. Test soil nail bars must not be smaller than the production soil nails they represent.

**Replace the 1st paragraph of section 46-3.03A with:**

10-19-18

Determine the drilled-hole diameter and installation method required to achieve the test load per unit length of bond values shown.

**Replace the introductory clause to the list in the 3rd paragraph of section 46-3.03B with:**

10-19-18

Install verification test soil nails by any of the following means:

**Replace the 7th and 8th paragraphs of section 46-3.03B with:**

10-19-18

Remove each verification and proof test soil nail to 6 inches behind the front face of the shotcrete after testing is complete. Fill the voids with grout.

If ordered, extract verification and proof test soil nails selected by the Engineer. Fill the voids with grout. Photograph the extracted test nails in 5-foot section intervals.

**Replace the 3rd paragraph of section 46-3.03C with:**

10-19-18

Splice the solid steel bar only where shown on the authorized shop drawings or at the end of a soil nail that is ordered to be lengthened.

**Replace the 1st sentence in the 7th paragraph of section 46-3.03C with:**

10-19-18

Hand tighten the nut on the end of the production soil nail bar before shotcrete hardening begins. Ensure the bearing plate is fully seated on the shotcrete.

AA

**48 TEMPORARY STRUCTURES**

10-19-18

**Add to the end of section 48-1.01:**

10-19-18

Falsework, temporary supports and jacking support systems must comply with any additional requirements of the railroad company involved.

**Add to section 48-2.01B:**

10-19-18

**Falsework release:** Lowering of falsework to the point that it no longer supports the loads imposed by the permanent structure, or any element, that the falsework was designed to support during construction.

**Falsework removal:** Releasing, lowering, and disposing of the falsework.

10-19-18

**Delete the 7th paragraph of section 48-2.01C(2).**

**Replace the 4th paragraph of section 48-2.02B(2) with:**

10-19-18

The assumed horizontal load the falsework bracing system must resist must be the sum of the actual horizontal loads due to equipment, construction sequence or other causes, and a wind loading. The assumed horizontal load in any direction must be at least 2 percent of the total dead load.

**Replace the table in the 2nd paragraph of section 48-2.02B(3)(b) with:**

10-19-18

Quality characteristic	Requirement
Compression perpendicular to the grain (psi)	450
Compression parallel to the grain (psi)	480,000/(L/d) <sup>2</sup> ; 1,600 maximum
Flexural stress	1,800 psi; 1,500 psi maximum for members with a nominal depth of 8 inches or less.
Horizontal shear (psi)	140
Axial tension (psi)	1,200
Deflection due to concrete loading only	1/240 of span length
Modulus of elasticity (E) (psi)	1.6 x 10 <sup>6</sup>
Timber piles (tons)	45

**NOTES:**

L = unsupported length, inches

d = least dimension of a square or rectangular column or the width of a square of equivalent cross-sectional area for round columns, inches

**Replace the table in the 3rd paragraph of section 48-2.02B(3)(c) with:**

10-19-18

Quality characteristic	Requirement
Compression, flexural (psi)	12,000,000/[L x d]/(b x t)] <sup>a</sup>
Deflection due to concrete loading only	1/240 of the span
Modulus of elasticity (E) (psi)	30 x 10 <sup>6</sup>

**NOTES:**

L = unsupported length, inches

d = least dimension of rectangular columns or the width of a square of equivalent cross-sectional area for round columns, or the depth of beams, inches

b = width of the compression flange, inches

t = thickness of the compression flange, inches

F<sub>y</sub> = specified minimum yield stress in psi

<sup>a</sup>Not to exceed (1) 22,000 psi for unidentified steel, (2) 22,000 psi for steel complying with ASTM A36/A36M, or (3) 0.6F<sub>y</sub> for other identified steel

**Add to section 48-2.02:**

10-19-18

**48-2.02C Falsework Lighting**

**48-2.02C(1) General**

Reserved

**48-2.02C(2) Pavement Illumination**

Pavement illumination fixture must:

1. Have commercial-type flood lamp holder with protective covers.
2. Be fully adjustable with brackets and locking screws.
3. Mount directly to a standard metal junction box.
4. Have a medium-base PAR-38 quartz-halogen flood lamp or an equivalent energy efficient alternative emitting 1,700 to 2,200 lumens with a correlated color temperature of 3,000 kelvin or less.

**48-2.02C(3) Portal Illumination**

Portal illumination includes plywood sheet clearance guides 4 feet wide by 8 feet high and fixtures with a PAR reflector floodlamp or equivalent energy efficient alternatives emitting 1,500 to 1,700 lumens with a correlated color temperature of 3,000 kelvin or less.

#### **48-2.02C(4) Pedestrian Walkway Illumination**

Pedestrian walkway illumination fixtures must be the flush mounted type equipped with a damage-resistant, clear, polycarbonate diffuser lens, an overhead protection shield, and a standard incandescent lamp or equivalent energy efficient alternatives emitting 1,500 to 2,000 lumens with a correlated color temperature of 3,000 kelvin or less.

#### **Add to section 48-2.03A:**

Traffic must be detoured, from the lanes over which falsework is being erected, released, or removed.

10-19-18

#### **Replace the 3rd paragraph of section 48-2.03B with:**

Falsework piles must be driven and assessed under section 49. The actual nominal pile resistance must be at least twice the falsework pile design load. For pile acceptance, the required number of hammer blows in the last foot of driving is determined using the formula in 49-2.01A(4)(c).

10-19-18

#### **Add between the 2nd and 3rd paragraphs of section 48-2.03C:**

Falsework erection includes adjustments or removal of components that contribute to the horizontal stability of the falsework system.

10-19-18

#### **Replace section 48-2.03D with:**

##### **48-2.03D Removal**

Remove falsework such that portions of falsework not yet removed remain stable at all times.

Falsework release includes blowing sand from sand jacks, turning screws on screw jacks, and removing wedges.

Except for concrete above the deck, do not release falsework supporting any span of a:

1. Simple span bridge before 10 days after the last concrete has been placed
2. Continuous or rigid frame bridge before 10 days after the last concrete has been placed:
  - 2.1. In that span
  - 2.2. In adjacent portions of each adjoining span for a length equal to one-half of the span where falsework is to be released
3. Simple span, continuous, or rigid frame bridge until the supported concrete has attained a compressive strength of 2,880 psi or 80 percent of the specified strength, whichever is greater

Do not release falsework for prestressed portions of structures until prestressing steel has been tensioned.

Do not release falsework supporting any span of a continuous or rigid frame bridge until all required prestressing is complete (1) in that span and (2) in adjacent portions of each adjoining span for a length equal to at least one half of the span where falsework is to be released.

Release falsework supporting spans of CIP girders, slab bridges, or culverts before constructing or installing railings or barriers on the spans unless authorized.

Release falsework for arch bridges uniformly and gradually. Start at the crown and work toward the springing. Release falsework for adjacent arch spans concurrently.

Do not release falsework that supports overhangs, deck slabs between girders, or girder stems that slope 45 degrees or more from vertical before 7 days after deck concrete has been placed.

10-19-18

You may release falsework supporting the sides of girder stems that slope less than 45 degrees from vertical before placing deck concrete if you install lateral supports. Lateral supports must be:

1. Designed to resist rotational forces on the girder stem, including forces due to concrete deck placement
2. Installed immediately after each form panel is removed
3. Installed before releasing supports for the adjacent form panel

Do not release falsework for bent caps supporting steel or PC concrete girders before 7 days after placing bent cap concrete.

Release falsework for structural members subject to bending as specified for simple span bridges.

Do not release falsework for box culverts and other structures with decks lower than the roadway pavement and span lengths of 14 feet or less until the last placed concrete has attained a compressive strength of 1,600 psi. Curing of the concrete must not be interrupted. Falsework release for other box culverts must comply with the specifications for the release of bridge falsework.

Do not release falsework for arch culverts sooner than 40 hours after concrete has been placed.

Remove falsework piling to at least 2 feet below the original ground or streambed. Remove falsework piling driven within ditch or channel excavation limits to at least 2 feet below the bottom and side slopes of the excavated areas.

Dispose of falsework materials and work debris.

Falsework removal systems employing methods of holding falsework by winches, hydraulic jacks with prestressing steel, HS rods, or cranes must also be supported by an independent support system when the falsework removal system is not actively lowering the falsework at vehicular, pedestrian, or railroad traffic openings.

Bridge deck openings used to facilitate falsework removal activities must be formed with a 6-inch maximum diameter opening. The opening must be located away from the wheel paths.

Clean and roughen openings made in the bridge deck. Fill the deck openings with rapid setting concrete complying with section 60-3.02B(2).

Bridge soffit openings used to facilitate falsework removal activities must be formed with a 5-inch maximum diameter.

Anchor 10-inch-square aluminum or galvanized steel wire, 1/4-inch-mesh hardware cloth with a 0.025-inch minimum wire diameter firmly to the inside of the soffit openings. Construct a 1/2-inch drip groove to the outside of soffit openings.

Falsework removal over roadways with a vertical traffic opening of less than 20 feet must start within 14 days after the falsework is eligible to be released and must be completed within 45 days after it is eligible to be released.

### **Replace section 48-2.03E with:**

10-19-18

#### **48-2.03E Falsework Lighting**

##### **48-2.03E(1) General**

Provide lighting to illuminate the pavement, portals, and pedestrian walkways at or under openings in the falsework required for traffic.

Install lighting for pedestrian walkway illumination at all pedestrian openings through or under the falsework.

Design falsework lighting such that required maintenance can be performed with a minimum of inconvenience to traffic. Closing of traffic lanes for routine maintenance is not allowed on roadways with posted speed limits greater than 25 mph.

During the hours of darkness, illuminate:

1. Falsework portals
2. Pavement under falsework with portals less than 150 feet apart

Use photoelectric switches to control falsework lighting systems. Pavement under falsework with portals 150 feet or more apart and all pedestrian openings through falsework must be illuminated 24 hours per day.

Aim the lighting fixtures to avoid glare to motorists.

Fasten a Type NMC cable with no. 12 minimum conductors with ground wire to the supporting structure at sufficient intervals to adequately support the cable and within 12 inches from every box or fitting. Use 1/2-inch or larger Type 1 conduit for conductors within 8 feet of ground.

Provide a maximum 20 A fuse for each branch circuit for illumination systems at each bridge location.

Arrange with the service utility to complete service connections for falsework lighting. You pay for energy, line extension, service, and service hookup costs.

#### **48-2.03E(2) Pavement Illumination**

Install a continuous row of fixtures beneath falsework structure with the end fixtures not further than 10 feet inside portal faces. Energize the fixtures immediately after the members supporting them have been erected.

Place the fixtures along the sides of the opening not more than 4 feet behind or 2 feet in front of the roadway face of the temporary railing. Mount the fixtures from 12 to 16 feet above the roadway surface without obstructing the light pattern on the pavement.

#### **48-2.03E(3) Portal Illumination**

Provide falsework portal illumination on the side facing traffic. Mount fixtures on the structure directly over each vertical support adjacent to the traveled way, as needed, to uniformly illuminate the exterior falsework beam, the clearance guides, and the overhead clearance sign. Each fixture must be supported approximately 16 feet above the pavement and 6 feet in front of the portal face.

Portal illumination clearance guides must:

1. Be fastened vertically, facing traffic, with the bottom of the panel from 3 to 4 feet above the roadway
2. Have the center of the panel located approximately 3 feet horizontally behind the roadway face of the railing
3. Be freshly painted panels for each installation with not less than 2 applications of flat white paint.

Paint testing of painted panels not required.

Portal lighting and clearance guides must be installed on the day the vertical members are erected.

If ordered, repaint the designated areas to improve the general appearance of the painted surfaces. Repainting is change order work.

#### **48-2.03E(4) Pedestrian Walkway Illumination**

Provide pedestrian walkway illumination immediately after the overhead protection shield is erected.

Flush mount the fixtures in the overhead protection shield and center them over the passageway at intervals of not more than 15 feet with the end fixtures not more than 7 feet inside the end of the pedestrian openings.

**Delete the 4th paragraph of section 48-3.01C(2).**

**Add between the 9th and 10th paragraphs of section 48-3.02B:**

10-19-18

For bridge removal, the temporary support system must resist the design loads and forces shown. As a minimum, the horizontal load to be resisted in any direction for temporary support shoring and temporary bracing must be (1) the sum of actual horizontal loads due to equipment, construction sequence, or other causes plus an allowance for wind and (2) not less than 5 percent of the total dead load of the structure being removed.

**Delete the 2nd and 3rd paragraphs of section 48-4.01A.**

10-19-18

**Replace section 48-4.01C with:**

10-19-18

**48-4.01C Submittals**

Submit shop drawings for temporary decking. Include the following:

1. Description, location, and value of all loads if temporary decking is not shown
2. Details of the connection between the temporary decking and the existing or new structure if temporary decking is not shown
3. Storage location of equipment and materials that allows for 1 shift of work and placement of temporary decking within the time allowed
4. Construction sequence and schedule details
5. Cure time for concrete to be placed under a steel plate system
6. Details for removing temporary decking and restoring the existing structure

If temporary decking is not shown, shop drawings must be signed by an engineer who is registered as a civil engineer in the State.

**Replace section 48-4.01D with:**

10-19-18

**48-4.01D Quality Assurance**

If temporary decking is not shown, the temporary decking design must comply with:

1. The unfactored permit loads, braking force, and HL93 loads except lane load from *AASHTO LRFD Bridge Specifications with California Amendments*.
2. Section 48-2.02B(3)
3. Live load deflection must not exceed 1/300 of the temporary decking span for the design load.
4. Temporary decking must have a uniform surface with a coefficient of friction of at least 0.35 when measured under California Test 342.
5. Steel plate systems must be mechanically connected to the existing structure and adjacent approaches. If a steel plate spans a joint, the mechanical connection must accommodate at least 50 percent of the movement rating shown for that joint.
6. Must not overstress, induce permanent forces into, or produce cracking in the existing structure.

**Replace section 48-4.03 with:**

10-19-18

**48-4.03 CONSTRUCTION**

Temporary decking must consist of one of the following:

1. Steel plate system that spans the incomplete work.
2. Falsework with an asphalt concrete surface that spans the incomplete work. Do not use falsework with an asphalt concrete surface to cover deck concrete that has not cured or to cover partially installed joint materials.

Construct temporary decking under the specifications for falsework in section 48-2 except the first paragraph of section 48-2.03D does not apply.

If there is an elevation difference of more than 1/2 inch between the temporary decking and the adjacent deck, install temporary tapers up to and away from the temporary decking. Construct tapers under section 7-1.03. If the temporary decking does not extend the entire width of the roadway, taper the sides of the temporary decking at a 12:1 (horizontal: vertical) ratio.

Material for temporary tapers must comply with section 60-3.02B(2) or 60-3.04B(2). Cure temporary tapers at least 3 hours before allowing traffic on the temporary decking.

If unanticipated displacements, cracking, or other damage occurs to the existing structure or to any new components installed in or adjacent to the deck, stop work on the deck and perform corrective measures.

Edges of steel plate systems must be in full contact with the existing deck and the adjacent approach slab. If used, shims must be securely attached to the plate.

For falsework with an asphalt concrete cover, asphalt concrete must be at least 3 inches thick and compacted in place.

Do not allow traffic on deck concrete until it has attained the design compressive strength shown.

When temporary decking is no longer needed, remove temporary decking materials and connections from the existing structure as soon as possible. Remove modifications to the existing structure except where permanent alterations are shown.

10-19-18

**Delete the 4th paragraph of section 48-5.01C.**

**Replace the 1st paragraph of section 48-5.02B with:**

10-19-18

The jacking support system must resist the structure dead load and lateral design forces shown, plus any additional loads from jacking equipment and activities. As a minimum, the horizontal load to be resisted in any direction for the jacking support system and temporary bracing must be (1) the sum of actual horizontal loads due to equipment, construction sequence, or other causes plus an allowance for wind as specified in Section 48-2.02B(2) and (2) not less than 2 percent of the total dead load of the structure being jacked. You must determine soil bearing values for support footings. If the jacking support stiffness exceeds the described minimum stiffness, increase the lateral design forces to be compatible with the jacking support lateral stiffness.

**Replace the 1st paragraph of section 48-5.03 with:**

10-19-18

Construct the jacking support system under the specifications for falsework in section 48-2.03.

AA

## **49 PILING**

04-19-19

**Replace the 6th paragraph of section 49-1.01D(4) with:**

10-19-18

Except for load test piles and anchor piles, drive the 1st production pile in the control zone. Do not install any additional production piles until dynamic monitoring has been performed, and the Engineer provides



you with the bearing acceptance criteria curves for any piles represented by the dynamically monitored piles.

**Replace the 3rd paragraph of section 49-2.01D with:**

10-19-18

The payment quantity for furnish piling is the length measured along the longest side of the pile from the specified tip elevation shown to the plane of pile cutoff, except for dynamically monitored piles. For dynamically monitored piles, the payment quantity for furnish piling includes an additional length of 2 times the largest cross-sectional dimension of the pile plus 2 feet.

**Add to the end of section 49-2.02A(2):**

10-19-18

**longitudinal weld length:** The length of a continuous longitudinal weld.

**circumferential weld length:** The length of a continuous weld around the circumference of the pipe pile.

**spiral weld length:** The length of one full 360-degree spiral weld revolution around the circumference of the pipe pile.

**Replace the 3rd paragraph of section 49-2.02A(4)(b)(iii)(B) with:**

10-19-18

For welding performed under AWS D1.1:

1. Perform NDT on 25 percent of each longitudinal, circumferential, or spiral weld length using RT or UT.
2. If repairs are required in a portion of the tested weld:
  - 2.1. Perform additional NDT on untested areas on each end of the initial portion tested. The length of additional NDT on each end must equal 10 percent of the weld length. If it is not possible to perform 10 percent of the weld length on one end, perform the remaining percentage on the other end.
  - 2.2. After this additional 20 percent of NDT is performed, determine and record the total cumulative repair lengths from all NDT for each weld length. If the cumulative weld repair length is equal to or more than 10 percent of the weld length, then perform NDT on the entire weld length.
  - 2.3. Perform NDT on the repaired portion plus 2 inches on each end of the repaired weld excavation.

**Replace the 2nd paragraph of section 49-2.02A(4)(b)(iii)(C) with:**

10-19-18

Perform NDT on 25 percent of the weld length performed by each welder, using RT or UT at locations selected by the Engineer. The Engineer may select several locations on a given splice. The cover pass must be ground smooth at locations to be tested.

**Replace the 4th paragraph of section 49-2.02A(4)(b)(iii)(C) with:**

10-19-18

If repairs are required in a portion of the tested weld:

1. Perform additional NDT on untested areas on each end of the initial portion tested. The length of additional NDT on each end must equal 10 percent of the pipe's outside circumference. If it is not possible to perform 10 percent of the weld length on one end, perform the remaining percentage on the other end.

2. After this additional 20 percent of NDT is performed, determine and record the total cumulative repair lengths from all NDT for each weld length. If the cumulative weld repair length is equal to or more than 10 percent of the pipe's outside circumference, then perform NDT on the entire weld length.
3. Perform NDT on the repaired portion plus 2 inches on each end of the repaired weld excavation.

**Replace the 5th paragraph of section 49-2.02B(1)(b) with:**

04-19-19

If splicing steel pipe piles using a circumferential weld, the piles must comply with the fit-up requirements of clause 9.24.1 of AWS D1.1.

**Replace section 49-3.01B(2) with:**

04-19-19

**49-3.01B(2) Mass Concrete**

Section 49-3.01B(2) applies to CIP concrete piles with a diameter greater than 8 feet.

For piles with a diameter greater than 8 feet and less than or equal to 14 feet:

1. The specifications for SCM content in the 4th paragraph of section 90-1.02B(3) do not apply.
2. The SCM content of the concrete must comply with the following:
  - 2.1. Any combination of portland cement and fly ash satisfying:

Equation 1:

$$(12 \times FM)/MC \geq X$$

where:

*FM* = fly ash complying with AASHTO M 295, Class F, with a CaO content of up to 10 percent, including the quantity in blended cement, lb/cu yd

*MC* = minimum quantity of cementitious material specified, lb/cu yd

*X* = 3.0 for  $8 < D \leq 10$ , where *D* = pile diameter in feet

*X* = 4.0 for  $10 < D \leq 14$ , where *D* = pile diameter in feet

Equation 2:

$$MC - MSCM - PC \geq 0$$

where:

*MC* = minimum quantity of cementitious material specified, lb/cu yd

*MSCM* = minimum sum of SCMs that satisfies equation 1, lb/cu yd

*PC* = quantity of portland cement, including the quantity in blended cement, lb/cu yd

- 2.2. You may replace any portion of the portland cement with any SCM complying with section 90-1.02B(3) if equations 1 and 2 are satisfied as specified above.

For piles with a diameter greater than 14 feet, the concrete must comply with the specifications for mass concrete in section 51-6.

**Add to the end of section 49-3.02C(1):**

04-19-19

You may construct CIDH concrete piles 24 inches in diameter or larger by excavating and depositing concrete under slurry.

**Delete the 2nd paragraph of section 49-3.02C(8).**

04-19-19

**Replace section 49-4.01 with:**

04-19-19

**49-4.01 GENERAL**

**49-4.01A Summary**

Section 49-4 includes specifications for drilling holes and installing steel soldier piles in the holes.

Steel soldier piles must comply with section 49-2.03.

**49-4.01B Definitions**

Reserved

**49-4.01C Submittals**

Reserved

**49-4.01D Quality Assurance**

Reserved

AA

**51 CONCRETE STRUCTURES**

10-18-19

**Add to the beginning of section 51-1.01C(1):**

04-19-19

If ordered, submit concrete form design and materials data for each forming system.

**Add to the end of section 51-1.02B:**

10-18-19

Concrete for concrete bridge decks or PCC deck overlays must contain:

1. Polymer fibers. Each cubic yard of concrete must contain at least 1 pound of microfibers and at least 3 pounds of macrofibers.
2. Shrinkage reducing admixture. Each cubic yard of concrete must contain at least 3/4 gallon of a shrinkage reducing admixture. If you use the maximum dosage rate shown on the Authorized Material List for the shrinkage reducing admixture, your submitted shrinkage test data does not need to meet the shrinkage limitation specified in section 90-1.02A.

**Add between the 1st and 2nd paragraphs of section 51-1.02D:**

10-18-19

For bridge decks, if your RSC shrinkage test results are 0.024 percent or less without the use of a shrinkage reducing admixture:

1. Use of shrinkage reducing chemical admixture is not required
2. Fibers are not required

For bridge decks, if you use the maximum dosage rate shown on the Authorized Material List for shrinkage reducing admixture, your shrinkage test results must be 0.032 percent or less.

10-18-19

**Delete the 5th paragraph of section 51-1.03C(2)(b).**

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

10-18-19

Cure the top surface of bridge decks by (1) misting and (2) the water method using a curing medium under section 90-1.03B(2). After strike-off, immediately and continuously mist the deck with an atomizing nozzle that forms a mist and not a spray. Continue misting until the curing medium has been placed and the application of water for the water method has started. At the end of the curing period, remove the curing medium and apply curing compound on the top surface of the bridge deck during the same work shift under section 90-1.03B(3). The curing compound must be curing compound no. 1.

10-18-19

**Delete the 4th paragraph of section 51-1.03H.**

**Add to section 51-1.03:**

10-19-18

**51-1.03J Temporary Decking**

If you are unable to complete bridge reconstruction activities before the bridge is to be opened to traffic, furnish and maintain temporary decking under section 48-4 until that portion of the work is complete.

**Add to the end of section 51-2.01A(1):**

10-18-19

The specifications for (1) shrinkage in section 90-1.02A, (2) shrinkage reducing chemical admixture in section 51-1.02B, and (3) polymer fibers in section 51-1.02B do not apply to concrete used to fill blocked-out recesses for joint seal assemblies.

**Replace the 2nd paragraph of section 51-4.01C(1) with:**

04-19-19

For PC PS concrete girders and deck panels, submit an erection work plan. The work plan must be signed by an engineer who is registered as a civil engineer in the State and include procedures, details, and sequences for:

1. Unloading
2. Lifting
3. Erecting
4. Temporary bracing installation

**Replace the 1st paragraph of section 51-4.01C(2)(a) with:**

04-19-19

Submit shop drawings for PC concrete members to the OSD Documents Unit unless otherwise specified.

**Replace *Reserved* in section 51-4.01C(2)(e) with:**

04-19-19

For PC deck panels, shop drawings must include:

1. Panel materials, shapes, and dimensions.
2. Deck panel layout identifying the locations of each panel.
3. Reinforcing, joint, and connection details.

4. Complete details of the methods, materials, and equipment used in prestressing and precasting work.
5. Type of texture and method of forming the textured finish.
6. Methods and details for lifting, bracing, and erection.
7. Method of support and grade adjustment.
8. Methods of sealing against concrete leaks.

**Replace the 2nd paragraph of section 51-4.02B with:**

04-19-19

Handle, store, transport, and erect PC members in a position such that the points of support and directions of the reactions with respect to the member are approximately the same as when the member is in its final position.

**Replace *Reserved* in section 51-4.02D(7) with:**

04-19-19

Clearly label the top surface of each panel with the word *TOP* as shown on the deck panel layout using waterproof paint or other authorized means.

Apply a coarse texture to at least 90 percent of the deck panel top surface area by brooming with a stiff bristled broom or by other suitable devices that results in uniform scoring parallel with the prestressing strands. The top surface texture must have a maximum 1/8-inch texture.

Each camber strip must:

1. Consist of high density expanded polystyrene with a minimum compressive strength of 55 psi.
2. Consist of a single layer and extend continuously under each deck panel.
3. Achieve a height that accounts for roadway profile, cross slope, and girder camber.
4. Have 1/4-inch v-notches or 1/2 by 1/2-inch slots cut into the top surface on 4-foot centers.

Camber strip dimensions must comply with the following table:

**Polystyrene Camber Strip Dimensions**

Height (H) (inches)	Width (W) (inches)
1 to 2.5	1.5
Greater than 2.5 and less than or equal to 3.5	1.75
Greater than 3.5 and less than or equal to 4	2

Chemical adhesive must be suitable for use with concrete and polystyrene.

For the concrete deck pour, the aggregate must comply with the 1/2-inch maximum or the 3/8-inch maximum combined aggregate gradation specified in section 90-1.02C(4)(d).

**Add between the 5th and 6th paragraphs of section 51-4.03B:**

10-19-18

Erect steel or PC girders onto the supporting concrete, such as bent caps or abutments, after the concrete attains a compressive strength of 2,880 psi or 80 percent of the specified strength, whichever is greater.

**Replace *Reserved* in section 51-4.03G with:**

04-19-19

Construct the deck panel system in the following sequence:



**Replace *Reserved* in section 53-1.01D with:**

10-18-19

Air pressure and shotcrete supply at the nozzle must be uniform and provide a steady, continuous flow of shotcrete. Inspect nozzles and nozzle body components before each work shift. Replace nozzles and components under the manufacturer's instructions.

**Replace the introductory clause to the list in the 2nd paragraph of section 53-1.02 with:**

10-18-19

For dry-mix shotcrete:

**Replace the introductory clause to the list in the 3rd paragraph of section 53-1.02 with:**

10-18-19

For wet-mix shotcrete:

**Replace the 1st sentence in item 2 in the list in the 3rd paragraph of section 53-1.02 with:**

10-18-19

2. You may substitute a maximum of 40 percent coarse aggregate for the fine aggregate.

**Replace section 53-1.03B with:**

10-18-19

**53-1.03B Preparing Receiving Surfaces**

Evenly grade the receiving surface before applying shotcrete. No point on the graded slope may be above the slope plane shown.

Thoroughly compact the receiving surface. The receiving surface must contain enough moisture to provide a firm foundation and prevent excess absorption of water from the shotcrete. The receiving surface must be free of surface water.

Forms must comply with section 51-1.03C(2). Reinforce, secure, and brace forms to maintain form alignment against distortion from shotcrete operations. Install and maintain alignment control means at corners or offsets not established by forms or shotcrete operations.

Use ground wires to establish thickness, surface planes, and finish lines. Use temporary coverings to protect adjacent surfaces from the nozzle stream.

**Replace section 53-1.03C with:**

10-18-19

**53-1.03C Applying Shotcrete**

Dry-mix or wet-mix shotcrete must be applied by the nozzle.

Apply shotcrete using small circular motions of the nozzle while building the required thickness. Direct the nozzle perpendicular to the receiving surface with the nozzle held at such a distance to produce maximum consolidation and full encapsulation of the reinforcement. Shotcrete must completely encase reinforcement and other obstructions.

Apply shotcrete first in corners, voids, and areas where rebound or overspray cannot easily escape. Do not incorporate rebound or overspray in the work.

Before applying subsequent layers of shotcrete:

1. Allow shotcrete to stiffen sufficiently. Remove hardened overspray and rebound from adjacent surfaces, including exposed reinforcement.

2. Use a cutting rod, compressed air blowpipe, or other authorized methods to remove all loose material, overspray, laitance, or other deleterious materials that may compromise the bond of the subsequent layers of shotcrete.
3. Bring the receiving surface to a saturated surface-dry condition immediately before applying subsequent layer.

For dry-mix shotcrete:

1. Adjust air volume, material feed volume, and distance of the nozzle from the work as necessary to encase reinforcement.
2. Maintain uniform water pressure at the nozzle of at least 15 psi greater than the air pressure at the machine.
3. Do not use aggregate and cementitious materials that have been mixed for more than 45 minutes.

For wet-mix shotcrete:

1. Transport shotcrete under section 90-1.02G(3).
2. Apply ground wires at approximately 7-foot centers.
3. Select a slump range that will effectively encapsulate reinforcement within the work but not cause shotcrete to sag or slough during application.

**Replace section 53-1.03D with:**

10-18-19

**53-1.03D Finishing Shotcrete**

Apply shotcrete to the line and grade shown. Leave finished shotcrete surface as gun finish unless otherwise described.

Do not initiate cutting or finishing until the shotcrete has set sufficiently to avoid sloughing or sagging. The finished surface must be smooth and uniform for the type of work involved.

Remove and replace loose areas of shotcrete.

Cure shotcrete for at least 7 days by any of the methods specified in section 90-1.03B. If the curing compound method is used for a gun or roughened surface, apply the curing compound at twice the specified rate. If you add a coloring agent to the shotcrete and you use the curing compound method for curing the shotcrete, use curing compound no. 6.

Protect shotcrete under section 90-1.03C.

**Replace the 2nd paragraph of section 53-1.04 with:**

10-18-19

The Department does not pay for shotcrete applied outside the dimensions shown or to fill low areas of receiving surfaces.

**Replace the paragraph of section 53-2.01A with:**

10-18-19

Section 53-2 includes specifications for applying structural shotcrete. Structural shotcrete must be applied using wet-mix shotcrete.

**Replace *qualifications* in item 1.1 in the list in the 1st paragraph of section 53-2.01C with:**

10-18-19

certifications



**Replace the paragraph of section 53-2.01D(2) with:**

10-18-19

Nozzlemen performing the work must hold current ACI CPP 660.1-17 certification as a nozzleman for wet-mix shotcrete. Nozzlemen performing overhead shotcrete work must hold current qualifying ACI CPP 660.1-17 certification in the overhead shooting orientation for wet-mix shotcrete.

**Replace the 2nd paragraph of section 53-2.01D(3) with:**

10-18-19

Each nozzleman performing the work must construct 1 unreinforced test panel and 1 reinforced test panel for each proposed mix design. The test panel orientation must match the orientation of the work.

**Replace the 1st sentence in the 1st paragraph of section 53-2.01D(4)(b) with:**

10-18-19

Obtain at least four 3-inch-diameter test cores from each 50 cu yd, or portion thereof, of shotcrete applied.

**Add between the 1st and 2nd paragraphs of section 53-2.01D(4)(b):**

10-19-18

For soil nail walls, do not core through waler bars.

**Replace section 53-2.02 with:**

10-18-19

**53-2.02 MATERIALS**

Shotcrete must comply with the specifications for concrete in section 90-1.

Shotcrete must have a minimum compressive strength of 3,600 psi, unless otherwise described.

Mortar and alternative filler material must comply with section 60-3.05B(2).

**Delete the 2nd paragraph of section 53-2.03.**

10-18-19

**Add between the 3rd and 4th paragraphs of section 53-2.03:**

10-18-19

Before applying shotcrete, reinforcement must be:

1. Free from loose rust, oil, curing compound, overspray, or other material deleterious to the bond between concrete and steel.
2. Lapped separated by one of the following:
  - 2.1. Three times the diameter of the largest reinforcing bar.
  - 2.2. Three times the maximum size aggregate.
  - 2.3. Two inches, whichever is least, unless otherwise specified. Lapped bars must be in the same plane and parallel to the shooting direction.
3. Securely tied to minimize movement or vibration.

The temperature of reinforcement and receiving surfaces must be below 90 degrees F before applying shotcrete.

Apply the wet-mix shotcrete continuously removing accumulations of rebound and overspray using a compressed air blowpipe. Ensure the nozzleman and the blowpipe operator work together and the nozzleman does not get ahead of the blowpipe operator.

10-18-19

**Delete the 4th paragraph of section 53-2.03.**

**Replace the 7th paragraph of section 53-2.03 with:**

10-18-19

If a finish coat is used, clean the surface before applying the finish coat. Wash receiving surface with an air-water blast to remove all loose material, laitance, overspray, or other material that may compromise the bond of subsequent layers of shotcrete.

10-18-19

**Delete the 8th paragraph of section 53-2.03.**

**Replace the 12th paragraph of section 53-2.03 with:**

10-18-19

After removing field QC test cores, fill the holes with mortar or alternative filler material. If using mortar, apply mortar under section 51-1.03E(2). If using an alternative filler material, apply a bonding epoxy before placing the filler material. Apply the alternative filler material under the manufacturer's instructions.

AA

## **55 STEEL STRUCTURES**

04-19-19

**Replace the 3rd paragraph of section 55-1.02E(7)(a) with:**

04-19-19

Dimensional details and workmanship for welded joints in tubular and pipe connections must comply with clause 9 of AWS D1.1.

AA

## **56 OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES**

04-19-19

**Replace section 56-1.01D(2)(b)(i) with:**

04-19-19

**56-1.01D(2)(b)(i) General**

Perform NDT of steel members under AWS D1.1 and the requirements shown in the following tables:

### Nondestructive Testing for Steel Standards and Poles

Weld location	Weld type	Minimum required NDT
Circumferential splices around the perimeter of tubular sections, poles, and arms	CJP groove weld with backing ring	100% UT or RT
Longitudinal seam	CJP or PJP groove weld	Random 25% MT
Longitudinal seam within 6 inches of a circumferential weld	CJP groove weld	100% UT or RT
Welds attaching base plates, flange plates, pole plates, or mast arm plates to poles or arm tubes	CJP groove weld with backing ring and reinforcing fillet	$t \geq 1/4$ inch: 100% UT and 100% MT $t < 1/4$ inch: 100% MT after final weld pass
	External (top) fillet weld for socket-type connections	100% MT
Hand holes and other appurtenances	Fillet and PJP welds	MT full length on random 25% of all standards and poles
Longitudinal seam on the telescopic female end, designated slip-fit length plus 6 inches	CJP groove weld	100% UT or RT

NOTE: t = pole or arm thickness

**Nondestructive Testing for Overhead Sign Structures**

Weld location	Weld type	Minimum required NDT
Base plate to post	CJP groove weld with backing ring and reinforcing fillet	100% UT and 100% MT
Base plate to gusset plate	CJP groove weld	100% UT
Circumferential splices of pipe or tubular sections	CJP groove weld with backing ring	100% UT or RT
Split post filler plate welds	CJP groove weld with backing bar	100% UT or RT
Longitudinal seam weld for pipe posts	CJP groove weld	t < 1/4 inch: 25% MT t ≥ 1/4 inch: 25% UT or RT
	PJP groove weld	Random 25% MT
Chord angle splice weld	CJP groove weld with backing bar	100% UT or RT
Truss vertical, diagonal, and wind angles to chord angles	Fillet weld	Random 25% MT
Upper junction plate to chord (cantilever type truss)	Fillet weld	Random 25% MT
Bolted field splice plates (tubular frame type)	CJP groove weld	100% UT and 100% MT
Cross beam connection plates (lightweight extinguishable message sign)	Fillet weld	Random 25% MT
Arm connection angles (lightweight extinguishable message sign)	Fillet weld	100% MT
Mast arm to arm plate (lightweight extinguishable message sign)	CJP groove weld with backing ring	t ≥ 1/4 inch: 100% UT and 100% MT t < 1/4 inch: 100% MT after final weld pass
Post angle to post (lightweight extinguishable message sign)	Fillet weld	100% MT
Hand holes and other appurtenances	Fillet and PJP welds	MT full length on random 25% of all sign structures

NOTE: t = pole or arm thickness

**Replace section 56-1.01D(2)(b)(ii) with:**

04-19-19

**56-1.01D(2)(b)(ii) Ultrasonic Testing**

For UT of welded joints with any members less than 5/16-inch thick or tubular sections less than 24 inches in diameter, the acceptance and repair criteria must comply with Clause 9.27.1.1 of AWS D1.1.

When performing UT, use an authorized procedure under AWS D1.1, Annex S.

For UT of other welded joints, the acceptance and repair criteria must comply with Table 6.3 of AWS D1.1 for cyclically loaded nontubular connections.

After galvanization, perform additional inspection for toe cracks along the full length of all CJP groove welds at tube-to-transverse base plate connections using UT.

\*\*\*\*\*

## 57 WOOD AND PLASTIC LUMBER STRUCTURES

10-18-19

Add to section 57-2.02B:

04-19-19

HDPE shims must be commercial quality.

Replace section 57-2.02C with:

10-18-19

### 57-2.02C Construction

Install lagging members 4 inches thick or less with a 3/8-inch gap between members. Install lagging members greater than 4 inches thick with a 1/2-inch gap between members.

Replace the table in the 4th paragraph of section 57-3.02C with:

10-19-18

Quality characteristic	Test method	Requirement
Density of concrete core (kg/m <sup>3</sup> , min)	ASTM D792	1,762
28-day compressive strength of concrete core (psi, min)	ASTM C579	5,000
Structural strength of shell: Tensile strength, tensile modulus (percent loss) Flexural strength, flexural modulus (percent loss)	ASTM D638 ASTM D790	Less than 10 after UV deterioration test specified for plastic lumber
Dry film thickness of coating (mils, min)	--	15
Color change of coating	ASTM D4587, Test Cycle 2	No visible color change when tested for 800 hours
Initial adhesion of coating (psi, min)	ASTM D4541, Test Method D, E, or F and Protocol 2	150
Decrease in initial adhesion of coating, decrease (percent)	ASTM D4541, Test Method D, E, or F and Protocol 2 ASTM D1183, Test Condition D <sup>a</sup>	No more than 10 following 2 exposure cycles

<sup>a</sup>Use a low temperature phase at  $4 \pm 5$  °F and high temperature phase at  $140 \pm 5$  °F.

AA

## 59 STRUCTURAL STEEL COATINGS

10-19-18

Replace the 2nd paragraph in section 59-1.01D with:

10-19-18

Measure coating adhesion strength with a self-aligning adhesion tester under ASTM D4541, Test Method D, E, or F and Protocol 2.

**Replace the 2nd paragraph of section 59-1.02C with:**

10-19-18

Coatings selected for use must comply with the volatile organic compound concentration limits specified for the air quality district where the coating is applied. The undercoats and finish or final coats selected for use must be compatible with each other.

**Add after the paragraph of section 59-2.01 A(3)(a):**

10-19-18

If requested by the Engineer, submit documentation from the coating manufacturer verifying the compatibility of the undercoats and finish or final coats selected for use.

AA

**60 EXISTING STRUCTURES**

10-18-19

**Replace section 60-2.02B with:**

04-19-19

**60-2.02B Materials**

Design criteria for temporary support shoring and temporary bracing must comply with section 48-3.02B.

**Add to section 60-3.01A:**

10-19-18

If you are unable to complete bridge reconstruction activities before the bridge is to be opened to traffic, furnish and maintain temporary decking under section 48-4 until that portion of the work is complete.

**Replace the 3rd and 4th paragraphs of section 60-3.02C(3) with:**

04-19-19

Remove asphalt concrete surfacing by cold milling under the following conditions:

1. If a membrane seal is shown:
  - 1.1. Remove the seal by cold milling
  - 1.2. Do not remove more than 1/2 inch of the existing concrete slab
2. If a membrane seal is not shown:
  - 2.1. Remove asphalt concrete surfacing until a 1/2-inch minimum of surfacing remains on top of existing concrete slab
  - 2.2. Use other authorized means to remove the remaining asphalt concrete without damage to the concrete slab

**Add to section 60-3.02C(3):**

04-19-19

Where a portion of the asphalt concrete surfacing is to remain, saw cut a 2-inch-deep true line along the edge to remain in place before removing asphalt concrete. Remove the asphalt concrete without damaging the surfacing to remain in place.

**Delete the 3rd paragraph of section 60-3.04B(3)(a).**

**Replace the 9th paragraph of section 60-3.04B(3)(c) with:**

04-19-19

Protect the overlay from moisture and do not allow traffic or equipment on the overlay (1) for a minimum of 4 hours cure time after final finishing and (2) until each rebound test result for the final finish shows a reading of at least 28 when tested under ASTM C805. The cure time must be extended if ordered. The rebound test may not be used to reduce the 4-hour cure time of the overlay.

**Replace the 10th paragraph of section 60-4.09B(2)(a) with:**

10-19-18

Steel parts must comply with ASTM A36/A36M or A576, Grade 1030 and must not be rimmed or capped steel.

**Replace section 60-4.10 with:**

10-18-19

#### **60-4.10 BRIDGE SEAT EXTENDERS FOR RETROFITS**

##### **60-4.10A General**

##### **60-4.10A(1) Summary**

Section 60-4.10 includes specifications for fabricating and installing bridge seat extenders.

Bridge seat extenders must comply with the specifications for miscellaneous bridge metal in section 75-3.

##### **60-4.10A(2) Definitions**

Reserved

##### **60-4.10A(3) Submittals**

Submit a work plan showing the method of grouting pipe seat extenders to prevent grout from entering the hinge area.

##### **60-4.10A(4) Quality Assurance**

Inspect bridge seat extender materials at the fabrication site.

Notify the Engineer:

1. When materials have been delivered to the fabrication site
2. At least 10 days before starting fabrication

##### **60-4.10B Materials**

##### **60-4.10B(1) General**

Reserved

##### **60-4.10B(2) Pipe Seat Extenders**

Pipe seat extenders must consist of double extra-strong steel pipes, HS threaded rods, nuts, and washers.

Double-extra strong steel pipe must comply with ASTM A53/A53M, Grade B. HS threaded rods, nuts, and washers must comply with section 55-1.02D(1).

Galvanize double-extra strong steel pipe under section 75-1.02B. After galvanizing, any alterations resulting in new exposed surfaces, including holes or cut ends, must be coated as specified for repairing damaged galvanized surfaces under section 75-1.02B.

Grout for bonding the pipe to the cored hole must comply with section 60-4.06B(2). Any filler materials or seals must not restrict joint movement.

**60-4.09B(3) Slab Bridge Seat Extenders**

Slab bridge seat extenders must consist of steel plates, support tubes, bolts, bars, nuts, washers, pins, and elastomeric bearing pads.

Slab bridge seat extender must comply with section 55. Elastomeric bearing pads must comply with section 51-3.02. The support tubes must comply with ASTM A500/A500M, Grade B.

Galvanize seat extender under section 75-1.02B. After galvanizing, any alterations resulting in new exposed surfaces, including holes or cut ends, must be coated as specified for repairing damaged galvanized surfaces under section 75-1.02B.

Epoxy mortar must consist of a mixture of epoxy binder and aggregate. The epoxy mortar must comply with section 95-1.02C. The mix proportions of epoxy mortar must be 1-part binder to 1-part aggregate by volume. Aggregate must consist of a combination of 1-part material passing the no. 30 sieve and 3-parts material passing the no. 20 sieve.

**60-4.10C Construction**

**60-4.10C(1) General**

Reserved.

**60-4.10C(2) Pipe Seat Extenders**

Reserved

**60-4.10C(3) Slab Bridge Seat Extenders**

Place epoxy mortar under section 95-1.03.

Place elastomeric bearing pads under section 51-3.02C. Bond elastomeric bearing pads to steel support tubes with adhesive complying with Federal Specification MMM-A-121.

**60-4.10D Payment**

The payment quantity for seat extender does not include the weight of nonmetallic materials used in constructing the seat extenders.

AA

**DIVISION VII DRAINAGE FACILITIES**

**66 CORRUGATED METAL PIPE**

10-19-18

**Replace the 1st paragraph in section 66-1.02D with:**

Coupling bands for corrugated metal pipe must comply with either section 66-1.02D or section 61-2.01D(2)(b).

10-19-18

**Replace the 6th paragraph in section 66-1.02D with:**

Joints for siphons and joints for pipes shown as watertight must be watertight under pressure and all conditions of expansion, contraction, and settlement, and must comply with section 61-2.01D(2)(a) for watertightness.

10-19-18



**Replace the 4th paragraph of section 66-2.03 with:**

Place cement treated structure backfill for slotted corrugated steel pipe as shown and under section 19-3.02F(3) for soil cement beddings. Cover the completed cement treated structure backfill with a curing seal of asphaltic emulsion, Grade SS1 or CSS1. 10-19-18

AA

## **DIVISION VIII MISCELLANEOUS CONSTRUCTION**

### **75 MISCELLANEOUS METAL**

10-18-19

**Replace the last paragraph in section 75-3.02B with:**

Thread-locking systems must (1) consist of a cleaner, primer, and anaerobic thread-locking adhesive and (2) be on the Authorized Material List for anaerobic thread-locking systems. Apply all components of the system under the manufacturer's instructions. 10-18-19

### **78 INCIDENTAL CONSTRUCTION**

04-19-19

**Replace section 78-4.03 with:**

#### **78-4.03 PAINTING CONCRETE**

04-19-19

##### **78-4.03A General**

##### **78-4.03A(1) Summary**

Section 78-4.03 includes specifications for preparing and painting concrete surfaces.

##### **78-4.03A(2) Definitions**

Reserved

##### **78-4.03A(3) Submittals**

Submit the coating manufacturer's application instructions at least 7 days before use.

##### **78-4.03A(4) Quality Assurance**

Reserved

##### **78-4.03B Materials**

Coatings for concrete must comply with the specifications for acrylic emulsion paint for exterior masonry in section 91-4.02B.

Coatings must be white.

##### **78-4.03C Construction**

##### **78-4.03C(1) General**

Reserved

##### **78-4.03C(2) Surface Preparation**

Before painting, surfaces must be:

1. At least 28 days old.
2. Prepared under SSPC-SP 13/NACE no. 6. Pressure rinse the prepared surfaces before applying the paint.
3. Thoroughly dry. You may use artificial drying methods if authorized.

### **78-4.03C(3) Application**

Apply at least 2 coats under the manufacturer's instructions and SSPC-PA 7. Protect adjacent surfaces during painting using an authorized method.

### **78-4.03D Payment**

Not Used

## **Replace section 78-4.04 with:**

04-19-19

### **78-4.04 STAINING CONCRETE AND SHOTCRETE**

#### **78-4.04A General**

##### **78-4.04A(1) Summary**

Section 78-4.04 includes specifications for preparing and staining concrete and shotcrete surfaces.

##### **78-4.04A(2) Definitions**

**acid stain:** non-tintable, transparent stain that contains dilute acid.

**water-based stain:** semi-transparent or solid water-based coating in an acrylic emulsion vehicle, that can be tinted to match an AMS-STD-595 color.

##### **78-4.04A(3) Submittals**

###### **78-4.04A(3)(a) General**

Submit the stain and sealer manufacturer's product data and application instructions at least 7 days before starting staining activities.

###### **78-4.04A(3)(b) Contractor Qualifications**

Submit the following documentation at least 10 days before the prestaining meeting:

1. Summary of the staining contractor's experience that demonstrates compliance with section 78-4.04A(4)(c).
2. List of at least 3 projects completed in the last 5 years that demonstrate the staining contractor's ability to stain surfaces similar to the surfaces for this project. For each project include:
  - 2.1. Project description
  - 2.2. Name and phone number of the owner
  - 2.3. Staining completion date
  - 2.4. Color photos of the completed stained surface

###### **78-4.04A(3)(c) Staining Quality Work Plan**

Submit a staining quality work plan at least 10 days before the prestaining meeting. The work plan must include details for preparing and staining the surfaces to achieve the required color, and for sealing the surfaces, including:

1. Number of applications that will be used to apply the stain
2. For each application of the stain, a description of:
  - 2.1. Manufacturer, color, finish, and percentage strength mixture of the stain that will be applied
  - 2.2. Proposed methods and tools for applying the stain
3. Proposed methods for protecting adjacent surfaces during staining
4. Proposed methods and tools for applying the sealer

For acid stains, the work plan must also include a rinse water collection plan for containing all liquid, effluent, and residue resulting from preparing and staining the surfaces.

###### **78-4.04A(4) Quality Assurance**

###### **78-4.04A(4)(a) General**

Reserved

#### **78-4.04A(4)(b) Test Panels**

Stain the authorized test panel complying with section 51-1.01D(2)(c) or section 53-3.01D(3).

The test panel must be:

1. Stained using the same personnel, materials, equipment, and methods to be used in the work
2. Accessible for viewing
3. Displayed in an upright position near the work
4. Authorized for staining before starting the staining work

If ordered, construct additional test panels until a satisfactory color is attained. The preparing and staining of additional test panels is change order work.

The Engineer uses the authorized stained test panel to determine the acceptability of the stained surface.

Dispose of the test panels after the staining work is complete and authorized. Notify the Engineer before disposing of the test panels.

#### **78-4.04A(4)(c) Contractor Qualifications**

The staining contractor must have experience staining surfaces to simulate the appearance of natural rock formations or stone masonry, and must have completed at least 3 projects in the past 5 years involving staining of surfaces similar to the surfaces for this project.

#### **78-4.04A(4)(d) Prestaining Meeting**

Before starting staining activities, conduct a meeting to discuss the staining quality work plan. Meeting attendees must include the Engineer and all staining contractors.

#### **78-4.04B Materials**

##### **78-4.04B(1) General**

Reserved

##### **78-4.04B(2) Stain**

###### **78-4.04B(2)(a) General**

The stain must be:

1. Commercially available product designed specifically for exterior applications
2. Specifically manufactured for staining concrete surfaces

###### **78-4.04B(2)(b) Acid Stain**

Acid stain must:

1. Contain dilute acid that penetrates and etches the surfaces
2. Be a water-based solution of inorganic metallic salts
3. Produce abrasion-resistant color deposits

###### **78-4.04B(2)(c) Water-based Stain**

Water-based stain must be:

1. Acrylic emulsion
2. Non-fading and UV resistant
3. Capable of producing irregular, mottled tones

##### **78-4.04B(3) Sealer**

The sealer must be as recommended by the stain manufacturer, clear and colorless, and have a matte finish when dry.

##### **78-4.04B(4) Joint Sealing Compound**

Reserved

**78-4.04C Construction**

**78-4.04C(1) General**

At locations where there is exposed metal adjacent to the surfaces to be stained, seal the joint between the surfaces to be stained and the exposed metal with a joint sealing compound before applying the stain.

**78-4.04C(2) Surface Preparation**

Test surfaces for acceptance of the stain before applying the stain. Clean surfaces that resist accepting the stain and retest until passing.

Before staining, the surfaces must be:

- 1. At least 28 days old
- 2. Prepared under SSPC-SP 13/NACE no. 6
- 3. Thoroughly dry

**78-4.04C(3) Application**

**78-4.04C(3)(a) General**

Apply the stain under the manufacturer's instructions. Protect adjacent surfaces during staining. Drips, puddles, or other irregularities must be worked into the surface.

Apply the sealer under the manufacturer's instructions.

**78-4.04C(3)(b) Acid Stain**

Work the acid stain into the concrete using a nylon bristle brush in a circular motion.

After the last coat of stain has dried, rinse the stained surfaces with water and wet scrub them with a stiff-bristle nylon brush until the rinse water runs clear. Collect all rinse water.

**78-4.04D Payment**

Not Used

AA

**80 FENCES**

10-18-19

**Replace the 1st paragraph of section 80-2.02B with:**

10-18-19

Line posts must comply with ASTM A702 except packaging of posts is not required. You may omit the anchor plate if the post is set in a concrete footing with a minimum cross-sectional dimension of 6 inches and a depth equal to the full penetration of the post.

**Replace item 3 in the list in the 1st paragraph of section 80-2.02D with:**

10-18-19

- 3. Be one of the following:
  - 3.1. 12-1/2 gauge, Class 3
  - 3.2. 13-1/2 gauge, Class 3
  - 3.3. 14 gauge, Class 3
  - 3.4. 15-1/2 gauge, Class 3

**Replace the 2nd paragraph of section 80-3.02B with:**

10-19-18

Posts and braces must comply with the strength requirements in ASTM F1043 for one of the following:





## 84 MARKINGS

10-18-19

Replace section 84-2 with:

10-19-18

### 84-2 TRAFFIC STRIPES AND PAVEMENT MARKINGS

#### 84-2.01 GENERAL

##### 84-2.01A Summary

Section 84-2 includes specifications for applying traffic stripes and pavement markings.

Traffic stripes and pavement markings must comply with ASTM D6628 for daytime and nighttime color.

Retroreflectivity must be measured under ASTM E1710 and the sampling protocol specified in ASTM D7585.

##### 84-2.01B Definitions

10-18-19

**pavement marking:** Transverse marking which includes shoulder or gore marking, traffic island marking, word or numeral or symbol marking, arrow, limit line, stop line, yield line, crosswalk marking, speed measurement marking, speed reduction marking, speed hump marking, parking space marking, and route shield marking.

10-19-18

**traffic stripe:** Longitudinal centerline or lane line used for separating traffic lanes in the same direction of travel or in the opposing direction of travel or a longitudinal edge line marking the edge of the traveled way or the edge of a lane at a gore area separating traffic at an exit or entrance ramp. A traffic stripe is shown as a traffic line.

##### 84-2.01C Submittals

For each lot or batch of traffic stripe material, primer, and glass beads, submit:

1. Certificate of compliance, including the material name, lot or batch number, and manufacture date
2. METS notification letter stating that the material is authorized for use, except for thermoplastic and primer
3. SDS
4. Manufacturer's Instructions

For each lot or batch of thermoplastic, submit a manufacturer's certificate of compliance and the following test results from the California Test 423:

1. Brookfield Thermosel viscosity
2. Hardness
3. Yellowness index, white only
4. Daytime luminance factor
5. Yellow color, yellow only
6. Glass bead content
7. Binder content

The date of the test must be within 1 year of use.

Submit test results for each lot of beads specifying the EPA test methods used and tracing the lot to the specific test sample. The testing for lead and arsenic content must be performed by an independent testing laboratory.

Submit the thermoplastic test stripe to the Engineer.

Submit the retroreflectivity test result within 5 days of testing the traffic stripes and pavement markings. The data must include the retroreflectivity, time, date, and GPS coordinates for each measurement.

## 84-2.01D Quality Assurance

### 84-2.01D(1) General

Reserved

### 84-2.01D(2) Quality Control

Before starting permanent application of methyl methacrylate and two component paint traffic stripes and pavement markings, apply a test stripe on roofing felt or other suitable material in the presence of the Engineer. The test stripe section must be at least 50 feet in length.

Upon request, apply a thermoplastic test stripe on suitable material in the presence of the Engineer during the application of thermoplastic traffic stripes or markings. The test stripe must be at least 1 foot in length.

Remove loose glass beads before measuring the retroreflectivity. Obtain authorization to proceed with the application of traffic stripes and pavement markings.

Within 30 days of application, test the traffic stripes and pavement markings under the test methods and frequencies shown in the following table:

**Traffic Stripe Testing Frequency**

Quality characteristic	Test method	Minimum sampling and testing frequency
Initial retroreflectivity (min, $\text{mcd}\cdot\text{m}^{-2}\cdot\text{lx}^{-1}$ )	ASTM E1710	ASTM D7585 <sup>a</sup>
White		
Yellow		

<sup>a</sup>Use the referee evaluation protocol for project length less than 10 miles. For project lengths greater than or equal to 10 miles, add one evaluation for every additional mile.

Verify the glass bead application rate by stabbing the glass bead tank with a calibrated rod.

### 84-2.01D(3) Department Acceptance

The Engineer will perform a nighttime, drive-through, visual inspection of the retroreflectivity of the traffic stripes and pavement markings and notify you of any locations with deficient retroreflectivity. Test the retroreflectivity of the deficient areas to confirm striping and pavement markings meets the requirements.

The thermoplastic test stripe will be tested for yellow color, daytime luminance factor, and yellowness index requirements by METS.

## 84-2.02 MATERIALS

### 84-2.02A General

Reserved

### 84-2.02B Glass Beads

Each lot of glass beads must comply with EPA Test Method 3052 and 6010B or 6010C. Glass beads must contain less than 200 ppm each of arsenic and lead.

Type 1 glass beads must comply with AASHTO M 247.

Type 2 glass beads must comply with AASHTO M 247. At least 75 percent of the beads by count must be true spheres that are colorless and do not exhibit dark spots, air inclusions, or surface scratches when viewed under 20X magnification.

High-performance glass beads must be on the Authorized Material List for high-performance glass beads.

Large-gradation glass beads must be on the Authorized Material List for two component traffic paint.

Glass beads for methyl methacrylate must be on the Authorized Material List for methyl methacrylate traffic striping and pavement marking.

Glass beads for paint must comply with State Specification 8010-004.



Glass beads must be surface treated, according to the bead and the material manufacturer's instructions, to promote adhesion with the specified material.

**84-2.02C Thermoplastic**

Thermoplastic must comply with State Specification PTH-02HYDRO, or PTH-02ALKYD.

Sprayable thermoplastic must comply with State Specification PTH-02SPRAY.

Each lot or batch of thermoplastic must be tested under California Test 423.

**84-2.02D Methyl Methacrylate**

Methyl methacrylate traffic paint must:

1. Be on the Authorized Material List for methyl methacrylate traffic striping and pavement marking
2. Be Category 2

**84-2.02E Traffic Striping and Pavement Marking Tape**

Traffic striping and pavement marking tape must be on the Authorized Material List for signing and delineation materials.

04-19-19

White tape must have an initial retroreflectivity of a minimum 700 mcd/m2.

Yellow tape must have an initial retroreflectivity of a minimum 500 mcd/m2.

10-19-18

When contrast is required for traffic striping and pavement marking tape, the tape must be pre-formed and retroreflective, consisting of a white film with retroreflective beads and a contrasting black film border. The contrasting black border must be a nonreflective film bonded on each side of the white film to form a continuous roll. Each black border must be a minimum of 2 inches wide. The width of the tape must be at least 4 inches wider than the stripe width.

**84-2.02F Two-Component Paint**

Two-component traffic paint must be on the Authorized Material List for two component traffic paint.

**84-2.02G Paint**

Paint must comply with the requirements shown in following table:

Paint Specifications		
Paint type	Color	Specification
Waterborne traffic line	White, yellow, and black	State Specification PTWB-01R2
Waterborne traffic line for the international symbol of accessibility and other curb markings	Blue, red, and green	Federal Specification TT-P-1952E

**84-2.02H–84-2.02L Reserved**

**84-2.03 CONSTRUCTION**

**84-2.03A General**

Establish the alignment for traffic stripes and the layouts for pavement markings with a device or method that will not conflict with other traffic control devices.

Protect existing retroreflective pavement markers during work activities.

Remove existing pavement markers that are coated or damaged by work activities and replace with an equivalent marker on the Authorized Material List for signing and delineation materials.

A completed traffic stripe or pavement marking must:

1. Have well defined edges
2. Be uniform

3. Be free from runs, bubbles, craters, drag marks, stretch marks, and debris

A completed traffic stripe must:

1. Be straight on a tangent alignment
2. Be a true arc on a curved alignment
3. Not deviate from the width shown by more than:
  - 3.1. 1/4 inch on a tangent alignment
  - 3.2. 1/2 inch on a curved alignment

The length of the gaps and individual stripes that form a broken traffic stripe must not deviate by more than 2 inches from the lengths shown. The gaps and stripes must be uniform throughout the entire length of the traffic stripe.

Protect newly placed traffic stripes and pavement markings from traffic and work activities until the traffic stripes and pavement markings are dry or hard enough to bear traffic.

Use mechanical methods to remove dirt, contaminants, and loose material from the pavement surface before applying the traffic stripe or pavement marking.

Use abrasive blast cleaning to remove laitance and curing compound from the surface of new concrete pavement before applying the traffic stripe or pavement marking.

Construct recesses as shown in the following table:

Material	Requirement	
	Depth (mils)	Depth (in)
Thermoplastic	375	3/8
Two component traffic paint	250	1/4
Methyl methacrylate traffic paint	250	1/4

Construct recesses for double traffic stripes in a single pass.

Before applying the traffic stripes and pavement markings:

1. Allow wet ground recesses to dry a minimum of 24 hours
2. Remove all powdery residue from dry recess
3. Keep the recesses dry and free from debris

Apply traffic stripes and pavement markings before the end of the same work shift.

#### **84-2.03B Application of Traffic Stripes and Pavement Markings**

##### **84-2.03B(1) General**

Apply material for a pavement marking with a stencil or a preformed marking.

Immediately remove drips, overspray, improper markings, or material tracked by traffic, using an authorized method.

Apply a traffic stripe or a pavement marking only to a clean, dry surface during a period when the pavement surface temperature is above 50 degrees F.

Apply traffic stripe or pavement marking and glass beads in a single pass. You may apply the glass beads by hand on pavement markings.

Embed glass beads to a depth of 1/2 their diameters.

Distribute glass beads uniformly on traffic stripe and pavement markings.

Glass beads with integral color must match the color of the stripe or pavement marking.

Apply glass beads with two separate applicator guns when two gradations are specified.

Allow enough overlap distance between new and existing striping patterns to ensure continuity at the start and end of the transition.

The retroreflectivity of applied traffic stripes and pavement markings must comply with the requirements shown in the following table:

Traffic stripe material	White (min, $\text{mcd}\cdot\text{m}^{-2}\cdot\text{lx}^{-1}$ )	Yellow (min, $\text{mcd}\cdot\text{m}^{-2}\cdot\text{lx}^{-1}$ )
Paint	250	125
Thermoplastic	250	125
Thermoplastic with wet night enhanced visibility	700	500
Two component	250	125
Methyl methacrylate	500	300
Tape	700	500

#### **84-2.03B(2) Thermoplastic**

##### **84-2.03B(2)(a) General**

Apply primer or surface preparation adhesive under the manufacturer's instructions:

1. To all roadway surfaces except for asphaltic surfaces less than 6 months old
2. At a minimum rate of 1 gallon per 300 square feet
3. To allow time for the thermoplastic primer to dry and become tacky before application of the thermoplastic

Do not thin the primer.

Preheat thermoplastic using preheaters with mixers having a 360-degree rotation.

Apply thermoplastic in a single uniform layer by spray or extrusion methods.

Completely coat and fill voids in the pavement surface with the thermoplastic.

Apply recessed thermoplastic at a thickness so that the top is 0 to 1/16 inch below the pavement surface.

##### **84-2.03B(2)(b) Extruded Thermoplastic**

Apply extruded thermoplastic at a temperature of 400 to 425 degrees F or as recommended by the manufacturer.

Apply extruded thermoplastic for a traffic stripe at a rate of at least 0.36 lb of thermoplastic per foot of 6-inch-wide solid stripe. The applied traffic stripe must be at least 0.060 inch thick.

Apply extruded thermoplastic pavement markings at a thickness from 0.100 to 0.150 inch.

Apply Type 2 glass beads to the surface of the molten thermoplastic at a rate of at least 8 lb of beads per 100 sq ft.

##### **84-2.03B(2)(c) Sprayable Thermoplastic**

Apply sprayable thermoplastic at a temperature of 350 to 400 degrees F.

Apply sprayable thermoplastic for a traffic stripe at a rate of at least 0.24 lb of thermoplastic per foot of 6-inch-wide solid stripe. The applied stripe must be at least 0.040 inch thick.

##### **84-2.03B(2)(d) Thermoplastic with Enhanced Wet-Night Visibility**

Apply a thermoplastic traffic stripe or pavement marking with enhanced wet-night visibility in a single pass and in the following order:

1. Uniform layer of extruded thermoplastic
2. Layer of high-performance glass beads
3. Layer of Type 2 glass beads

Apply thermoplastic with enhanced wet-night visibility at a maximum speed of 8 mph.

Apply thermoplastic with enhanced wet-night visibility for a traffic stripe at a rate of at least 0.47 lb of thermoplastic per foot of 6-inch-wide solid stripe. The applied stripe must be at least 0.090 inch thick.

Apply thermoplastic with enhanced wet-night visibility for a pavement marking at a rate of at least 1.06 lb of thermoplastic per square foot of marking. The applied pavement marking must be at least 0.100 inch thick.

Apply high-performance glass beads at a rate of at least 6 lb of glass beads per 100 sq ft of stripe or marking. Apply Type 2, glass beads at a rate of at least 8 lb of glass beads per 100 sq ft of stripe or marking.

#### **84-2.03B(3) Methyl Methacrylate**

Apply the methyl methacrylate when the pavement surface and atmospheric temperatures are from 40 to 104 degrees F.

Apply methyl methacrylate paint at a minimum thickness of 0.090 inch.

Apply recessed methyl methacrylate paint at a minimum thickness of 0.200 inch.

Apply the glass beads recommended by the methyl methacrylate manufacturer.

#### **84-2.03B(4) Traffic Striping and Pavement Marking Tape**

Do not use traffic stripe and pavement marking tape on existing open graded friction course or chip seal.

Prepare pavement surface and use primer under the traffic tape manufacturer's written instructions. Apply tape to clean and dry pavement surface. Roll or tamp the traffic tape in place.

#### **84-2.03B(5) Two-Component Paint**

Apply a two-component painted traffic stripe or pavement marking in a single pass and in the following order:

1. Coat of two-component paint
2. Application of large gradation glass beads recommended by the two-component paint manufacturer
3. Application of Type 1 glass beads

Apply two-component paint when the pavement surface temperature is above 39 degrees F and the atmospheric temperature is above 36 degrees F. The temperature of the paint must comply with the paint manufacturer's instructions.

Apply two-component paint and glass beads at a maximum speed of 10 mph.

Apply large-gradation glass beads at a minimum rate of 11.7 lb of beads per gallon of paint.

Apply Type 1 glass beads at a minimum rate of 8.3 lb of beads per gallon of paint.

Apply two-component paint for the traffic stripes and pavement markings at the thickness and application rates shown in the following table:

Type of pavement	Stripe thickness (min, inch)	Application rate (min, sq ft/gal)
HMA open graded/chip seal	0.025	64
HMA dense graded	0.020	80
Concrete	0.020	80

Apply recessed two-component paint at a thickness between 0.020 and 0.025 inch.

#### **84-2.03B(6) Paint**

Do not apply paint if:

1. Fresh paint could become damaged by rain, fog, or condensation

2. Atmospheric temperature could drop below 50 degrees F during the drying period

Do not thin paint.

Use mechanical means to paint traffic stripes and pavement markings and to apply glass beads for traffic stripes.

The striping machine must be capable of superimposing successive coats of paint on the 1st coat and on existing stripes at a minimum speed of 5 mph.

Where the configuration or location of a traffic stripe is such that the use of a striping machine is not practicable, you may apply the traffic paint and glass beads by other methods and equipment if authorized.

Apply traffic stripes and pavement markings in 1 coat on existing pavement surfaces, at an approximate rate of 107 sq ft/gal.

Apply traffic stripes and pavement markings in 2 coats on a new pavement surface. The 1st coat of paint must be dry before applying the 2nd coat.

Apply 2-coat paint at the approximate rate of 215 sq ft/gal for each coat.

Paint a 1-coat, 3-inch-wide black stripe between the two 6-inch-wide yellow stripes of a double traffic stripe. If the two 6-inch-wide yellow stripes are applied in 2 coats, apply the black stripe concurrently with the 2nd coat of the yellow stripes.

On 2-lane highways:

1. If the 1st coat of the centerline stripe is applied in the same direction as increasing post miles, use the right-hand spray gun of the 3 spray guns to apply a single yellow stripe
2. If the 1st coat of the centerline stripe is applied in the same direction as decreasing post miles, use the left-hand spray gun of the 3 spray guns to apply a single yellow stripe
3. Apply the 2nd coat of centerline striping in the opposite direction of the 1st coat

Apply glass beads at an approximate rate of 5 lb of beads per gallon of paint.

Verify the application rate of paint by stabbing the paint tank with a calibrated rod. If the striping machine has paint gauges, the Engineer may measure the volume of paint using the gauges instead of stabbing the paint tank with a calibrated rod.

#### **84-2.03B(7) Contrast Striping**

04-19-19

Contrast striping consists of black striping placed on each side of a white stripe.

10-19-18

You may use permanent tape instead of paint or thermoplastic.

Apply contrast stripe paint in one coat.

Do not use glass beads or other reflective elements in contrast striping material.

04-19-19

#### **84-2.03B(8)–84-2.03B(10) Reserved**

10-19-18

#### **84-2.04 PAYMENT**

The payment quantity for a traffic stripe is the length measured along the line of the traffic stripe without deductions for gaps in the broken traffic stripe.

The payment quantity for a pavement marking is the area covered.

A double traffic stripe consisting of two-6-inch-wide yellow stripes are measured as 2 traffic stripes except for painted traffic stripes and sprayable thermoplastic traffic stripes.

A double sprayable thermoplastic traffic stripe consisting of two 6-inch-wide yellow stripes are measured as single traffic stripe.

A double painted traffic stripe consisting of two 6-inch-wide yellow stripes separated by a 3-inch-wide black stripe is measured as a single traffic stripe.

The payment quantity for contrast striping is the length measured along the line of the traffic stripe without deductions for gaps in the broken traffic stripe.

**Replace section 84-9 with:**

10-19-18

**84-9 EXISTING MARKINGS**

**84-9.01 GENERAL**

**84-9.01A Summary**

Section 84-9 includes specifications for removing existing markings.

Work performed on existing markings must comply with section 15.

**84-9.01B Definitions**

Reserved

04-19-19

**84-9.01C Submittals**

10-19-18

Submit your proposed method for removing traffic stripes and pavement markings at least 7 days before starting the removal work. Allow 2 business days for the review.

**84-9.02 MATERIALS**

Not Used

**84-9.03 CONSTRUCTION**

**84-9.03A General**

Remove existing traffic stripes before making any changes to the traffic pattern.

Remove existing traffic stripes and pavement markings before applying the following materials:

1. Traffic stripe and pavement marking tape
2. Two component traffic stripes and pavement markings
3. Methyl methacrylate traffic stripes and pavement markings

04-19-19

Remove contrast stripes, traffic stripes and pavement markings, including any paint in the gaps, by methods that do not remove pavement to a depth of more than 1/8 inch.

10-19-18

Remove pavement markings such that the old message cannot be identified. Make any area removed by grinding rectangular. Water must not puddle in the ground areas. Fog seal ground areas on asphalt concrete pavement.

Sweep up or vacuum any residue before it can (1) be blown by traffic or wind, (2) migrate across lanes or shoulders, or (3) enter a drainage facility.

**84-9.03B Remove Traffic Stripes and Pavement Markings Containing Lead**

Reserved

**84-9.03C–84-9.03J Reserved**

**84-9.04 PAYMENT**

The payment quantity for remove traffic stripe is the measured length multiplied by:

1. 0.67 for a single 4-inch-wide traffic stripe
2. 1.34 for a single 8-inch-wide traffic stripe
3. 2 for a double traffic stripe

The payment quantity for remove traffic stripe does not include the gaps in broken traffic stripes. Payment for removal of paint evident in a gap is included in the payment for remove traffic stripe of the type involved.

If no bid item is shown on the Bid Item List for remove pavement marking, remove pavement marking is paid for as remove traffic stripe of the types shown in the Bid Item List and the payment quantity for 1 square foot of pavement marking is 2 linear feet.

10-18-19

AA

## DIVISION X ELECTRICAL WORK

### 86 GENERAL

10-18-19

**Replace section 86-1.01B with:**

10-19-18

**86-1.01B Definitions**

**accessible pedestrian signal:** Accessible pedestrian signal as defined in the *California MUTCD*.

**accessible walk indication:** Activated audible and vibrotactile action during the walk interval.

**actuation:** Actuation as defined in the *California MUTCD*.

**ambient sound level:** 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 accessible pedestrian signal speaker's volume.

**audible speech walk message:** Audible prerecorded message that communicates to pedestrians which street has the walk interval.

**CALiPER:** Commercially Available LED Product Evaluation and Reporting. A U.S. Department of Energy program that individually tests and provides unbiased information on the performance of commercially available LED luminaires and lights.

**controller assembly:** Assembly for controlling a system's operations, consisting of a controller unit and auxiliary equipment housed in a waterproof cabinet.

**controller unit:** Part of the controller assembly performing the basic timing and logic functions.

**correlated color temperature:** Absolute temperature in kelvin of a blackbody whose chromaticity most nearly resembles that of the light source.

**detector:** Detector as defined in the *California MUTCD*.

**electrolier:** Assembly of a lighting standard and luminaire.

**flasher:** Device for opening and closing signal circuits at a repetitive rate.

**illuminance gradient:** Ratio of the minimum illuminance on a 1-foot square of sign panel to that on an adjacent 1-foot square of sign panel.

**inductive loop detector:** Detector capable of being actuated by an inductance change caused by a vehicle passing or standing over the loop. An inductive loop detector includes a loop or group of loops installed in the roadway and a lead-in cable installed and connected inside a controller cabinet.

**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 the initial values.

**lighting standard:** Pole and mast arm supporting the luminaire.

**link:** Part of a system which provides a data connection between a transmitter and receiver.

**LM-79:** Test method from the Illumination Engineering Society of North America specifying the test conditions, measurements, and report format for testing solid state lighting devices, including LED luminaires.

**LM-80:** Test method from the Illumination Engineering Society of North America specifying the test conditions, measurements, and report format for testing and estimating the long-term performance of LEDs for general lighting purposes.

**luminaire:** Assembly that houses the light source and controls the light emitted from the light source.

**mid-span access method:** Procedure in which fibers from a single buffer tube are accessed and spliced to a multi buffer tube cable without cutting the unused fibers in the buffer tube, or disturbing the remaining buffer tubes in the cable.

**National Voluntary Laboratory Accreditation Program:** U.S. Department of Energy program that accredits independent testing laboratories.

**optical time domain reflectometer:** Fiber optic test equipment that is used to measure the total amount of power loss between two points and over the corresponding distance. It provides a visual and printed display of the relative location of system components such as fiber sections, splices and connectors as well as the losses that are attributed to each component and or defects in the fiber.

**pedestrian change interval:** Pedestrian change interval as defined in the *California MUTCD*.

**powder coating:** Coating applied electrostatically using exterior-grade, UV-stable, polymer powder.

**power factor:** Ratio of the real power component to the complex power component.

**power meter:** Portable fiber optic test equipment that, when coupled with a light source, is used to perform end-to-end attenuation testing. Its display indicates the amount of power injected by the light source at the designed wavelength of the system under testing that arrives at the receiving end of the link.

**pretimed controller assembly:** Assembly operating traffic signals under a predetermined cycle length.

**programming mechanism:** Device to program the accessible pedestrian signal operation.

**pull box:** Box with a cover that is installed in an accessible place in a conduit run to facilitate the pulling in of wires or cables.

**push button information message:** Push button information message as defined in the *California MUTCD*.

**push button locator tone:** Push button locator tone as defined in the *California MUTCD*.

**segment:** Continuous cable terminated by 2 splices, 2 connectors or 1 splice and 1 connector.

**signal face:** Signal face as defined in the *California MUTCD*.

**signal head:** Signal head as defined in the *California MUTCD*.

**signal indication:** Signal indication as defined in the *California MUTCD*.

**signal section:** Signal section as defined in the *California MUTCD*.



**signal standard:** Pole with or without mast arms carrying 1 or more signal faces.

**street side lumens:** Lumens from a luminaire directed to light up areas between the fixture and the roadway, such as traveled ways and freeway lanes.

**surge protection device:** Subsystem or component that protects equipment against short-duration voltage transients in power line.

**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.

**traffic-actuated controller assembly:** Assembly for operating traffic signals under the varying demands of traffic as registered by detector actuation.

**traffic phase:** Traffic phase as defined in the *California MUTCD*.

**vehicle:** Vehicle as defined in the *California Vehicle Code*.

**vibrotactile pedestrian device:** Vibrotactile pedestrian device as defined in the *California MUTCD*.

**Delete the 9th and 10th paragraphs of section 86-1.01C(1).**

10-19-18

**Replace section 86-1.01C(3) with:**

**86-1.01C(3) Luminaires**

10-19-18

Submit for a luminaire:

1. Maximum power in watts
2. Maximum designed junction temperature
3. Heat sink area in square inches
4. Designed junction-to-ambient thermal resistance calculation with thermal resistance components clearly defined
5. L70 in hours when extrapolated for the average nighttime operating temperature
6. Life expectancy based on the junction temperature
7. Manufacturer's data sheet for the power supply, including the rated life

Submit the manufacturer's QC test data for luminaires as an informational submittal.

**Replace section 86-1.01C(4) with:**

**86-1.01C(4) Reserved**

10-19-18

**Replace the 3rd paragraph of section 86-1.02B(1) with:**

Conduit used for horizontal directional drilling must be high density polyethylene Type IPS, SDR 9 and comply with ASTM F2160.

04-19-19

**Replace the 8th paragraph of section 86-1.02B(1) with:**

High density polyethylene for innerduct must:

10-19-18

1. Comply with ASTM D3485, D3035, D2239, and D2447, and NEMA TC7 and TC2
2. Have a minimum tensile yield strength of 3300 psi under ASTM D638

3. Have a density of  $59.6187 \text{ lb/ft}^3 \pm 0.3121 \text{ lb/ft}^3$  under ASTM D1505

**Replace the 9th paragraph of section 86-1.02B(1) with:**

04-19-19

Tracer wire must be a minimum no. 12 solid copper conductor with orange insulation Type TW, THW, RHW, or USE. For direct burial, the tracer wire insulation must be Type UF.

**Replace section 86-1.02C with:**

10-18-19

**86-1.02C Pull Boxes**

**86-1.02C(1) General**

A pull box cover must have a marking on the top that is:

1. Clearly defined
2. Uniform in depth
3. Parallel to the longer side
4. From 1 to 3 inches in height

The cover marking must include *CALTRANS* and one of the following:

1. *SERVICE* for service circuits from a service equipment enclosure to a subpanel
2. *SERVICE IRRIGATION* for circuits from a service equipment enclosure to an irrigation controller
3. *SERVICE BOOSTER PUMP* for circuits from a service equipment enclosure to the booster pump
4. *TDC POWER* for circuits from a service equipment enclosure to telephone demarcation cabinet
5. *LIGHTING* for a lighting system
6. *SIGN ILLUMINATION* for a sign illumination system
7. *SIGNAL AND LIGHTING* for a signal and lighting system
8. *RAMP METER* for a ramp metering system
9. *TMS* for a traffic monitoring station
10. *FLASHING BEACON* for a flashing beacon system
11. *CMS* for a changeable message sign system
12. *INTERCONNECT* for an interconnect conduit and cable system
13. *FIBER OPTIC* for fiber optic cable system
14. *ELECTRICAL SYSTEMS* if more than one system is shared in the same pull box

The cover marking must not include *CALTRANS*, only the following:

1. *ELECTRICAL SERVICE* for circuits from an electrical utility to a service equipment enclosure
2. *TELEPHONE SERVICE* for circuits from a telephone utility to a telephone demarcation cabinet

A metal pull box cover must include a fitting for a bonding conductor.

The hardware must be stainless steel containing 18 percent chromium and 8 percent nickel.

**86-1.02C(2) Roadway Pull Boxes**

**86-1.02C(2)(a) General**

A pull box cover must have a nonskid surface.

The pull boxes and covers must not have exposed fibers or reinforcement on the finish surfaces that are exposed.

The load rating must be:

1. Stenciled or stamped on the inside and outside of the pull box
2. Stamped on the outside of the cover

If a transformer or other device is to be placed in the pull box, include recesses for a hanger.

Hold-down bolts must:

1. Be a Penta Head 1/2-13UNC
2. Have a thread lock material
3. Withstand a torque from 55 to 60 ft-lb
4. Withstand a minimum pull-out strength of 750 lb

The opening in which the cover sets must have length and width dimensions 1/8 inch greater than the cover.

#### **86-1.02C(2)(b) Nontraffic Pull Boxes**

A nontraffic 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.

An extended pull box must be a minimum 22 inches deep and may be a single box or a box with an extension made of the same material as the pull box. The extension may be another pull box if the bottom edge of the pull box fits into the opening for the cover.

The hold down bolts, nuts, and washers must be a captive design.

The pull box must have a 1/2-13 coarse-thread insert with drainage hole, to secure the hold down bolts.

The cover must have a 1/2 inches by 4 inches pull slot with a 3/16-inch center pin.

The cover markings must be cast in the mold of the cover or be engraved on a metal or UV resistant ABS plate secured to the cover with stainless steel screws.

#### **86-1.02C(2)(c) Traffic Pull Boxes**

A traffic pull box and cover must comply with AASHTO HS20-44 and load tested under AASHTO M 306.

A traffic pull box must be reinforced with a galvanized steel Z bar welded frame. The frame must be anchored to the box with 2-1/4-inch-long concrete anchors with a 1/4-inch diameter. The pull box must have 4 concrete anchors, one in each corner, and two near the middle one on each of the longer sides, except for a no. 3-1/2(T) pull box.

The frame must have nuts fabricated with the frame or spot welded to the underside of the frame, to secure the hold down bolts.

The nuts must be zinc-plated carbon steel, vibration-resistant, and have a wedge ramp at the root of the thread.

The cover must:

1. Be steel, reinforced and galvanized post fabrication.
2. Be countersunk approximately 1/4 inch to accommodate the bolt head. When tightened, the hold down bolt head must be no more than 1/8 inch above the top of the cover.
3. Have a 1/2-inch by 2-inch pull slot with a guard under the cover to prevent entry of more than 3 inches below the bottom surface of the cover without deflection.

Before galvanizing a steel cover, the manufacturer must apply the cover marking by one of the following methods:

1. Use a cast iron strip at least 1/4-inch thick with letters raised a minimum of 1/16 inch. Fasten the strip to the cover with 1/4-inch, flathead, stainless steel machine bolts and nuts. Peen the bolts after tightening.
2. Use a sheet steel strip at least 0.027-inch thick with letters raised a minimum of 1/16 inch. Fasten the strip to the 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 the bolts after tightening.
3. Bead weld the letters on the cover such that the letters are raised a minimum of 3/32 inch.

### **86-1.02C(2)(d) Tamper Resistant Pull Boxes**

#### **86-1.02C(2)(d)(i) General**

Not Used

#### **86-1.02C(2)(d)(ii) Tamper-Resistant Nontraffic Pull Box**

##### **86-1.02C(2)(d)(ii)(A) General**

A tamper resistant nontraffic pull box must include a pull box with one of the following:

1. Anchored cover
2. Lockable cover
3. Pull box insert

##### **86-1.02C(2)(d)(ii)(B) Anchored Cover**

The anchored cover must:

1. Be of 1/2-inch-thick mild steel, hot dip galvanized, post fabrication.
2. Have spikes removed from the galvanized surfaces.
3. Have a center space for a top lock nut that must be torqued to 200 ft-lb.
4. Have a center opening for a stainless-steel threaded cap to cover the lock nut.
5. Weigh a minimum of 85 lb.
6. Include an all-around security skirt of 1/4-inch thick steel. The skirt must be sized to encase a nontraffic pull box or sized to fit within a traffic pull box.
7. Be welded to the skirt.

##### **86-1.02C(2)(d)(ii)(C) Lockable Cover**

The lockable cover must:

1. Be manufactured from minimum 3/16-inch-thick galvanized steel or a polymer of minimum strength equal to 3/16-inch steel.
2. Be secured to the pull box with a locking mechanism of equal or greater strength than the manufactured material.
3. Have 1/2-by-2-inch slot holes for lifting.
4. Have dimensions complying with one of the following:
  - 4.1. Department's standards for pull box covers as shown if the lockable cover is secured to the inside lip of the pull box.
  - 4.2. Department's standards for the length and width as shown for pull box covers if the lockable cover is secured to the top of the pull box.

##### **86-1.02C(2)(d)(ii)(D) Pull Box Insert**

The pull box insert must:

1. Be made of minimum 3/16-inch-thick or 10 gauge mild hot-dipped galvanized steel
2. Have a minimum of 2 mounting brackets that rest under the side or end wall
3. Be lockable with a padlock having a minimum 3/8-inch shackle
4. Have dimensions complying with the Department's standards for the length and width as shown for pull box covers

##### **86-1.02C(2)(d)(iii) Tamper Resistant Traffic Pull Box**

A tamper resistant traffic pull box must include a pull box with an anchored cover.

#### **86-1.02C(3) Structure Pull Boxes**

A no. 7 pull box must:

1. Be 12 by 12 by 12 inches.
2. Be manufactured with 0.075-inch sheet steel.
3. Have 3/4-inch flanges on the top and bottom.
4. Have one 1-inch and one 1-1/2-inch knockouts on each side, except for the covers
5. Have drilled and taped holes on the top and the bottom flanges for the cover screws. The hole pattern and spacing must be the same on the top and bottom.

6. Have covers that secure to the box with eight 1/4-inch diameter, 20NC brass machine screws.

A no. 8 pull box must:

1. Be 12 by 12 by 12 inches.
2. Be manufactured with 0.135-inch sheet steel.
3. Mount to the structure with three 3/8-inch diameter machine screws per side.
4. Have 1-1/2-inch knockouts on each side, except the cover.
5. Have drilled and taped holes on the sides and the bottom for the cover screws. The holes must be reinforced with a 1-by-1-by-0.135-inch bar inside the box.
6. Have a cover with 3/4-inch flanges on the sides and bottom with the corners welded at the bottom. The cover must secure to the box with, three 1/4-inch diameter by 1/2-inch long cadmium plated brass or stainless steel, machine screws.

A no. 9 pull box must:

1. Be 24 by 9-1/2 by 6-1/4 inches.
2. Be manufactured with 0.075-inch sheet steel.
3. Have a rain tight hood.
4. Have a 1-1/2-by-4-1/2-by-0.135-inch strap welded to the back of the box at each corner, parallel to the long side. The strap must have a 1/4-inch hole on the exposed end.
5. Have a 1-inch lip around the opening.
6. Have drilled and taped holes with a minimum 1/4-inch thread length, on the ends of the bottom lip for the cover screws.
7. Have a 3-inch knockout on each side at the bottom and at the center of the bottom.
8. Have a 2-inch knockout on each side at the top and at both ends of the bottom.
9. Have an L 5/8-by-7/8-by-0.075-inch formed angle spot welded to the inside of the top on both sides and on the bottom.
10. Have a cover manufactured with 0.125-inch steel, that secures to the box with two 3/8-inch diameter by 3/4-inch long stainless-steel flathead screws with 11/16-inch diameter countersink holes. The cover must include a 1/16-inch neoprene gasket.

A no. 9A pull box must:

1. Be 20 by 8 by 8-1/2 inches.
2. Be manufactured with 0.075-inch sheet steel.
3. Have 3/4-inch flanges on the top.
4. Have drilled holes on the short sides for the cover screws. The holes must have a stainless-steel hex nut or a 1/4-by-5/8-by-8-inch bar spot welded to the bottom of the flange.
5. Have a 3-inch knockout on each side at the top and at the center of the bottom.
6. Have a 2-inch knockout on each side at the bottom and at both ends of the bottom.
7. Have a cover manufactured with 0.105-inch steel, that secures to the box with four 3/8-inch diameter stainless steel hex head cap screws, two on each short side. The cover must have a rain tight hood and include a 1/16-inch neoprene gasket.

Pull box corner joints must be lapped and spot welded or riveted.

Concentric and eccentric multiple size knockouts are not be allowed.

**Replace section 86-1.02D(3) with:**

**86-1.02D(3) Warning Tape**

10-19-18

Warning tape must be orange color polyolefin film, minimum elongation of 500 percent before breakage, water and corrosion resistant, and comply with requirements shown in the following table:

**Warning Tape Requirements**

Quality characteristic	Requirement
Thickness (min, mil)	4
Width (in)	4
Tensile strength of material (min, psi)	2800
Message spacing intervals (ft)	3

The warning tape must have a printed message that reads: CAUTION: CALTRANS FACILITIES BELOW.

The printed text height and color must be 1 inch, black color text over bright orange background.

**Replace the 2nd paragraph of section 86-1.02E with:**

10-19-18

Each sensor must:

1. Have a dissipation factor less than 0.04 nF when measured in the 20 nF range
2. Have resistance greater than 20 Megohms
3. Be 1/4 inch wide by 6 feet long by 1/16 inch thick
4. Have a RG-58C/U coaxial screen transmission cable, jacketed with high-density polyethylene, rated for direct burial and resistant to nicks and cuts
5. Operate over a temperature range from -40 to 160 degrees F
6. Have a signal to noise ratio equal to or greater than 10 to 1
7. Have an output signal of a minimum 250 mV ± 20 percent for a wheel load of 400 lb at 55 mph and 70 degrees F
8. Have an insulation resistance greater than 500 MΩ
9. Have a life cycle of a minimum 25 million equivalent single axle loadings

**Replace section 86-1.02F(1) with:**

10-19-18

**86-1.02F(1) General**

Conductors and cables must be clearly and permanently marked the entire length of their outer surface with:

1. Manufacturer's name or trademark
2. Insulation-type letter designation
3. Conductor size
4. Voltage
5. Number of conductors for a cable

The minimum insulation thickness and color code requirements must comply with NEC.

**Replace the 2nd paragraph of section 86-1.02F(2)(a) with:**

10-19-18

Conductors must be identified as shown in the following table:

**Conductor Identification**

Circuit	Signal phase or function	Identification		Copper size	
		Insulation color			Band symbols
		Base	Stripe <sup>a</sup>		

Signals (vehicle) <sup>a,b</sup>	2, 6	Red, yellow, brown	Black	2, 6	14
	4, 8	Red, yellow, brown	Orange	4, 8	14
	1, 5	Red, yellow, brown	None	1, 5	14
	3, 7	Red, yellow, brown	Purple	3, 7	14
	Ramp meter 1	Red, yellow, brown	None	No band required	14
	Ramp meter 2	Red, yellow, brown	Black	No band required	14
Pedestrian signals	2p, 6p	Red, brown	Black	2p, 6p	14
	4p, 8p	Red, brown	Orange	4p, 8p	14
	1p, 5p	Red, brown	None	1p, 5p	14
	3p, 7p	Red, brown	Purple	3p, 7p	14
Push button assembly or accessible pedestrian signal	2p, 6p	Blue	Black	P-2, P-6	14
	4p, 8p	Blue	Orange	P-4, P-8	14
	1p, 5p	Blue	None	P-1, P-5	14
	3p, 7p	Blue	Purple	P-3, P-7	14
Traffic signal controller cabinet	Ungrounded circuit conductor	Black	None	CON-1	6
	Grounded circuit conductor	White	None	CON-2	6
Highway lighting pull box to luminaire	Ungrounded - line 1	Black	None	No band required	14
	Ungrounded - line 2	Red	None	No band required	14
	Grounded	White	None	No band required	14
Multiple highway lighting	Ungrounded - line 1	Black	None	ML1	10
	Ungrounded - line 2	Red	None	ML2	10
	Ungrounded - line 3	White	None	ML3	10
Lighting control	Ungrounded - Photoelectric unit	Black	None	C1	14
	Switching leg from Photoelectric unit or SM transformer	Red	None	C2	14
Service	Ungrounded - line 1 (signals)	Black	None	No band required	6
	Ungrounded - line 2 (lighting)	Red	None	No band required	8
Sign lighting	Ungrounded - line 1	Black	None	SL-1	10
	Ungrounded - line 2	Red	None	SL-2	10
Flashing beacons	Ungrounded between flasher and beacons	Red or yellow	None	FB-Location. <sup>c</sup>	14
Grounded circuit conductor	Push button assembly or accessible pedestrian signal	White	Black	No band required	14
	Signals and multiple lighting	White	None	No band required	10
	Flashing beacons and sign lighting	White	None	No band required	12
	Lighting control	White	None	C-3	14
	Service	White	None	No band required	14

Railroad preemption		Black	None	R	14
Spares		Black	None	No band required	14

Notes:

<sup>a</sup>On overlaps, the insulation is striped for the 1st phase in the designation, e.g., phase (2+3) conductor is striped as for phase 2.

<sup>b</sup>Band for overlap and special phases as required

<sup>c</sup>Flashing beacons having separate service do not require banding.

10-19-18

**Delete the 4th paragraph of section 86-1.02F(2)(a).**

**Replace the 2nd paragraph of section 86-1.02F(2)(c)(ii) with:**

10-19-18

An equipment grounding conductor must be insulated.

**Replace the 3rd paragraph of section 86-1.02F(3)(d)(ii) with:**

10-19-18

Cable must comply with the requirements shown in the following table:

Cable type	Conductor quantity and type	Cable jacket thickness (mils)		Maximum nominal outside diameter (inch)	Conductor color code
		Average	Minimum		



3CSC	3 no. 14	44	36	0.40	Blue/black stripe, blue/orange stripe, white/black stripe
5CSC	5 no. 14	44	36	0.50	Red, yellow, brown, black, white
9CSC	1 no. 12 8 no. 14	60	48	0.65	No. 12 - white, No. 14 - red, yellow, brown, black, red/black stripe, yellow/black stripe, brown/black stripe, white/black stripe
12CSC	1 no. 12 11 no. 14	60	48	0.80	No. 12 - white No. 14 - red, yellow, brown, black, red/black stripe, yellow/black stripe, brown/black stripe, black/red stripe, black/white stripe, red/white stripe, brown/white stripe
28CSC	1 no. 10 27 no. 14	80	64	0.90	No. 10 - white No. 14 - red/black stripe, yellow/black stripe, brown/black stripe, red/orange stripe, yellow/orange stripe, brown/orange stripe, red/silver stripe, yellow/silver stripe, brown/silver stripe, red/purple stripe, yellow/purple stripe, brown/purple stripe, red/2 black stripes, brown/2 black stripes, red/2 orange stripes, brown/2 orange stripes, red/2 silver stripes, brown/2 silver stripes, red/2 purple stripes, brown/2 purple stripes, blue/black stripe, blue/orange stripe, blue/silver stripe, blue/purple stripe, white/black stripe, black/red stripe, black

**Replace the 3rd paragraph of section 86-1.02G with:**

10-19-18

The self-adhesive reflective labels must:

1. Be from 3 to 5 mils thick
2. Have all black capital characters on a white background
3. Extend beyond the character by a minimum of 1/4 inch

**Replace the 4th paragraph of section 86-1.02H with:**

10-19-18

PVC electrical tape must have a minimum thickness of 6 mils.

**Replace section 86-1.02K with:**

10-19-18

**86-1.02K Luminaires**

**86-1.02K(1) General**

A luminaire must:

1. Be self-contained, not requiring assembly.
  2. Comply with UL 1598 for luminaires in wet locations.
  3. Have a power supply with ANSI/IEC rating of at least IP65.
  4. Weigh less than 35 lb.
  5. Have a minimum operating life of 100,000 hours when operated for an average time of 11.5 hours at an average temperature of 70 degrees F.
  6. Operate over a temperature range from -40 to 130 degrees F.
  7. Be operationally compatible with photoelectric controls.
- 10-18-19
8. Have a nominal correlated color temperature of 3000 K under ANSI C78.377 and a color rendering index of 70 or greater.
- 10-19-18
9. Have a maximum-effective projected area of 1.4 sq ft when viewed from either side or end.
  10. Comply with California Test 611.
  11. Have a power factor of 0.90 or greater. The total harmonic distortion, current, and voltage induced into a power line by a luminaire must not exceed 20 percent.
  12. Comply with the maximum power consumption and isofootcandle curves as shown.
  13. Be on the Authorized Material List for LED luminaires or must be submitted for testing and addition to the AML.

A luminaire must include a surge protection device to withstand high-repetition noise transients caused by utility line switching, nearby lightning strikes, and other interferences. The device 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 surge protection device must comply with UL 1449 and ANSI/IEEE C62.45 based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High.

The luminaire must operate over the entire voltage range from 120 to 480 V(ac), 60 ± 3 Hz or one of the following:

1. From 95 to 277 V(ac) for luminaires rated 120 V(ac) or 240 V(ac)
2. From 347 to 480 V(ac) for luminaires rated 480 V(ac)

The fluctuations of line voltage must have no visible effect on the luminous output.

The L70 of the luminaire must be the minimum operating life or greater. Illuminance measurements must be calibrated to standard photopic calibrations.

The luminaire's housing must withstand a 1008 hour cyclic salt fog spray/UV test under ASTM D5894 and an evaluation under ASTM D714 with a blister size of 8 or greater and no more than medium density.

The luminaire's housing must be marine-grade alloy with less than 0.2 percent copper or die cast aluminum. All exposed aluminum must be anodized. A chromate conversion undercoating must be used underneath a thermoplastic polyester powder coat.

External bolts, screws, hinges, hinge pins, and door closure devices must be corrosion resistant.

The housing must be designed to prevent the buildup of water on its top surface. Exposed heat sink fins must be oriented to allow water to run off 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 UL 60529 rating of IP66. The power supply enclosure must be protected to at least an UL 60529 rating of IP43.

If the components are mounted on a down-opening door, the door must be hinged and secured to the luminaire's housing separately from other components. The door must be secured to the housing to prevent accidental opening. A safety cable must mechanically connect the door to the housing.

A luminaire must have a barrier-type terminal block secured to the housing to connect field wires. The terminal screws must be captive and equipped with wire grips for conductors up to no. 6.

The conductors and terminals must be identified and marked.

If needed, each refractor or lens must be made of UV-inhibiting high-impact plastic, such as acrylic or polycarbonate, or heat and impact-resistant glass. The refractor or lens must be resistant to scratching. Polymeric materials, except for the lenses of enclosures containing either the power supply or electronic components of the luminaire, must be made of UL94 V-0 flame-retardant materials.

The luminaire must be permanently marked inside the unit and outside of its packaging box. Marking consists of:

1. Manufacturer's name or trademark
2. Month and year of manufacture
3. Model, serial, and lot numbers
4. Rated voltage, wattage, and power in VA

An LED luminaire must:

1. Comply with Class A emission limits under 47 CFR 15(B) for the emission of electronic noise.
2. Have a power supply with:
  - 2.1. 2 leads to accept standard 0-10 V(dc).
  - 2.2. Dimming control compatible with IEC 60929, Annex E. If the control leads are open or the analog control signal is lost, the circuit must default to 100-percent power.
  - 2.3. Case temperature self rise of 77 degrees F or less above ambient temperature in free air with no additional heat sinks.
3. Have passive thermal management with enough capacity to ensure proper heat dissipation and functioning of the luminaire over its minimum operating life. The maximum junction temperature for the minimum operating life must not exceed 221 degrees F.
4. Have a junction-to-ambient thermal resistance of 95 degrees F per watt or less.
5. Contain circuitry that automatically reduces the power to the LEDs so the maximum junction temperature is not exceeded when the ambient temperature is 100 degrees F or greater.
6. Have a heat sink made of aluminum or other material of equal or lower thermal resistance. The use of fans or other mechanical devices is not allowed for cooling the luminaire.

The catastrophic loss or failure of 1 LED must not result in the loss of more than 20 percent of the total luminous output of the LED luminaire.

### **86-1.02K(2) Roadway luminaires**

A roadway luminaire must:

1. Have a housing color that matches a color no. 26152 to 26440, 36231 to 36375, or 36440 of AMS-STD-595
2. Have an ANSI C136.41-compliant, locking-type, photocontrol receptacle with dimming connections and a watertight shorting cap
3. Not allow more than 2.5 percent of the rated lumens to project above 80 degrees measured up from the vertical plane in the direction of the roadway
4. Have equipment identification character labels outside the unit on the side that will face the road. Equipment identification characters consist of:
  - 4.1. R1 for Roadway 1, R2 for Roadway 2, R3 for Roadway 3, and R4 for Roadway 4
  - 4.2. Rated wattage

The luminaire's housing must have a slip fitter that must:

1. Fit on mast arms with outside diameters from 1-5/8 to 2-3/8 inches
2. Be adjustable to a minimum of  $\pm 5$  degrees from the axis of the tenon in a minimum of 5 steps: +5, +2.5, 0, -2.5, -5
3. Have clamping brackets that:
  - 3.1. Are made of corrosion-resistant materials or treated to prevent galvanic reactions
  - 3.2. Do not bottom out on the housing bosses when adjusted within the designed angular range
  - 3.3. Do not permanently set in excess of 1/32 inch when tightened

### 86-1.02K(3) Overhead Sign Luminaires

An overhead sign luminaire must:

1. Have a uniformity average to minimum ratio of 10:1 for the distribution of light reflected on a 16' wide by 10' high sign panel
2. Not allow more than 2.5 percent of the rated lumens to project above 65 degrees measured up from the horizontal plane in the direction of the sign panel
3. Mount at a maximum height of 12 inches above the top of the mounting rails
4. Mount directly to the sign structure as shown or with a mounting adapter that meets the material requirements of the luminaire's housing

**Replace section 86-1.02M with:**

10-19-18

### 86-1.02M Photoelectric Controls

Photoelectric control types are as shown in the following table:

**Photoelectric Control Types**

Control type	Description
I	Pole-mounted photoelectric unit. Test switch and a 15-A circuit breaker per ungrounded conductor, housed in an enclosure.
II	Pole-mounted photoelectric unit. Contactor, a 15-A circuit breaker per ungrounded conductor, and test switch located in a service equipment enclosure.
III	Pole-mounted photoelectric unit. Contactor, a 15-A circuit breaker per ungrounded conductor, and a test switch housed in an enclosure.
IV	A photoelectric unit that plugs into a NEMA twist-lock receptacle, integral with the luminaire.
V	A photoelectric unit, contactor, a 15-A circuit breaker per ungrounded conductor, and test switch located in a service equipment enclosure.

The pole-mounted adaptor for Type I, II, and III photoelectric controls must include a terminal block and cable supports or clamps to support the wires.

Photoelectric unit must:

1. Have a screen to prevent artificial light from causing cycling.
2. Have a rating of 60 Hz, 105-130 V(ac), 210-240 V(ac), or 105-240 V(ac).

3. Operate at a temperature range from -20 to 55 degrees C.
4. Consume less than 10 W.
5. Be a 3-prong, twist-lock type with a NEMA IP 65 rating, ANSI C136.10-compliant.
6. Have a fail-on state.
7. Fit into a NEMA-type receptacle.
8. Turn on from 1 to 5 footcandles and turn off from 1.5 to 5 times the turn-on level. Measurements must be made by procedures in *EEI-NEMA Standards for Physical and Electrical Interchangeability of Light-Sensitive Control Devices Used in the Control of Roadway Lighting*.

Type I, II, III, and V photoelectric controls must have a test switch to allow manual operation of the lighting circuit. Switch must be:

1. Single-hole mounting, toggle type
2. 15 A, single pole and single throw
3. Labeled *Auto-Test* on a nameplate

Photoelectric control's contactor must be:

1. Normally open
2. Mechanical-armature type with contacts of fine silver, silver alloy, or equal or better material
3. Installed to provide a minimum space of 2-1/2 inches between the contactor terminals and the enclosure's sides

The terminal blocks must be rated at 25 A, 600 V(ac), molded from phenolic or nylon material, and be the barrier type with plated-brass screw terminals and integral marking strips.

**Replace section 86-1.02N with:**

10-19-18

**86-1.02N Fused Splice Connectors**

The fused splice connector for 240 and 480 V(ac) circuits must simultaneously disconnect both ungrounded conductors. The connector must not have exposed metal parts except for the head of the stainless steel assembly screw. The head of the assembly screw must be recessed a minimum of 1/32 inch below the top of the plastic boss that surrounds the head.

The connector must protect the fuse from water or weather damage. Contact between the fuse and fuse holder must be spring loaded.

Fuses must:

1. Be standard, midget, ferrule type
2. Have a nontime-delay feature
3. Be 13/32 by 1-1/2 inches

Fuse ratings for luminaires are shown in the following table:

**Fuse Current Rating Requirements**

Circuit voltage	Fuse voltage rating	Soffit and roadway luminaires
120 V(ac)	250 V(ac)	5 A
240 V(ac)	250 V(ac)	5 A
480 V(ac)	500-600 V(ac)	5 A

Fuse ratings for transformers are shown in the following table:

**Fuse Current Rating Requirements**

Circuit voltage	Fuse voltage rating	Fuse current rating for Transformers (primary side)		
		Single phase (two wires)	1 kVA	2 kVA
120 V(ac)	250 V(ac)	10 A	20 A	30 A
240 V(ac)	250 V(ac)	6 A	10 A	20 A
480 V(ac)	500-600 V(ac)	3 A	6 A	10 A

**Replace section 86-1.02P(1) with:**

10-19-18

**86-1.02P(1) General**

The enclosures must be rated NEMA 3R and include a dead front panel and a hasp with a 7/16-inch-diameter hole for a padlock.

Except for a service equipment enclosure, an enclosure must:

1. Be manufactured from steel and either galvanized, cadmium plated, or powder coated
2. Mount to a standard, pole, post, or sign structural frame
3. Provide a minimum space of 2-1/2 inches between the internal components and the enclosure's sides

The enclosure's machine screws and bolts must not protrude outside the cabinet wall.

The fasteners on the exterior of an enclosure must be vandal resistant and not be removable. The exterior screws, nuts, bolts, and washers must be stainless steel.

**Replace the 1st paragraph of section 86-1.02P(2) with:**

04-19-19

Service equipment enclosure must:

1. Comply with the Electric Utility Service Equipment Requirements Committee
2. Meet the requirements of the service utility
3. Be watertight
4. Be factory wired and manufactured from steel and galvanized or have factory-applied, rust-resistant prime and finish coats, except Types II and III
5. Be marked as specified in NEC to warn of potential electric-arc flash hazards

04-19-19

**Delete the 5th paragraph of 86-1.02P(2).**

**Add between 6th and 7th paragraphs of section 86-1.02P(2):**

10-19-18

Service equipment enclosure must have the meter view windows located on the front side of the enclosure for Types III-AF, BF, CF and DF.

Service equipment enclosure must have the meter view windows located on the back side of the enclosure for Types III-AR, BR, CR and DR.

**Replace the 7th paragraph of section 86-1.02P(2) with:**

04-19-19

The meter area must have a sealable, lockable, weather-tight cover that can be removed without the use of tools.

**Delete the 2nd sentence of the 9th paragraph of section 86-1.02P(2).**

04-19-19

**Delete section 86-1.02P(3).**

10-19-18

**Replace section 86-1.02Q(4)(a) with:**

**86-1.02Q(4)(a) General**

10-19-18

The doors of a telephone demarcation cabinet must be attached using continuous aluminum steel piano hinges.

**Add between the 2nd and 3rd paragraphs of section 86-1.02R(2):**

Bracket arms must be long enough to allow proper alignment of signals and backplate installation.

10-19-18

**Replace item 2 in the list in the 5th paragraph of section 86-1.02R(4)(a)(iii) with:**

2. Be a black color throughout, including the door, matching color no. 17038, 27038, or 37038 of AMS-STD-595

10-19-18

**Add to the beginning of section 86-1.02T:**

Accessible pedestrian signal must be on the Authorized Material List for Accessible Pedestrian Signals.

04-19-19

**Replace the 5th and 6th paragraphs of section 86-1.02T with:**

The color of a metallic housing must match color no. 33538 of AMS-STD-595.

10-19-18

The color of a plastic housing must match color no. 17038, 27038, or 37038 of AMS-STD-595.

**Replace the 7th paragraph of section 86-1.02T with:**

Accessible pedestrian signal must:

04-19-19

1. Have controllable and programmable volume level and messaging
2. Be weatherproof and shockproof

**Replace the 11th paragraph of section 86-1.02T with:**

The cable between the accessible pedestrian signal assembly and the pedestrian signal head must be rated for outdoor use and have a:

10-19-18

1. Minimum four no. 18 stranded or larger tinned copper conductors with a minimum insulation thickness of 15 mils
2. Cable jacket with a minimum thickness of 20 mils and rated for a minimum:
  - 2.1. 300 V(ac)

- 2.2. 80 degrees C
- 3. Nominal outside diameter less than 350 mils
- 4. Conductor color code of black, white, red and green

**Replace the 1st paragraph of section 86-1.02U with:**

10-19-18

The housing for a push button assembly must be made of die-cast aluminum, permanent mold-cast aluminum, or UV-stabilized self-extinguishing structural plastic.

The housing must have a uniform color that matches color no. 17038, 27038, or 37038 of AMS-STD-595.

**Replace the 2nd paragraph of section 86-1.02W(4) with:**

10-19-18

The cured hot-melt rubberized asphalt sealant must comply with the requirements shown in the following table:

**Cured Hot-Melt Rubberized Asphalt Sealant Requirements**

Quality characteristic	Test method	Requirement
Cone penetration, 25 °C, 150 g, 5 s (max, 1/10 mm)	ASTM D5329	35
Flow, 60 °C, 5 hr (max, mm)		5
Resilience, 25 °C (min, %)		25
Softening point (min, °C)	ASTM D36	82
Ductility, 25 °C, 5 cm/min (min, cm)	ASTM D113	30
Flash point, Cleveland Open Cup (min, °C)	ASTM D92	288
Viscosity, no. 27 spindle, 20 rpm, 190 °C (Pa•s)	ASTM D4402	2.5–3.5

**Replace the 2nd paragraph of section 86-1.02Y with:**

10-19-18

A transformer must be a dry type designed for operation on a 60 Hz supply. The transformer must have a decal showing a connection diagram. The diagram must show either color coding or wire tagging with primary (H1, H2) or secondary (X1, X2) markers and the primary and secondary voltage and volt-ampere rating. A transformer must comply with the electrical requirements shown in the following table:

**Transformer Electrical Requirements**

Quality characteristic	Requirement
Rating (V(ac))	120/240, 120/480, 240/120, 240/480, 480/120, or 480/240
Efficiency (%)	> 95
Secondary voltage regulation and tolerance from half load to full load (%)	±3

AA

**87 ELECTRICAL SYSTEMS**

10-18-19

**Replace *Reserved* in section 87-1.01C with:**

10-19-18

Submit a digital file for geographic information system mapping for:



1. Conduit
2. Pull boxes
3. Cabinets
4. Service equipment enclosures
5. Standards

The digital file must consist of:

1. Longitudinal and latitude coordinates, under the WGS84 reference coordinate system. The coordinates must be in decimal format having 6 significant figures after the decimal point. Coordinates must be read at the center of pull boxes, cabinet, standards, and service equipment enclosures; and on top of conduit at 20-foot intervals before backfill.
2. Type, depth and size for conduits.
3. Type for pull boxes, standards, cabinets, and service equipment enclosures.

**Replace item 4 in the list in the 1st paragraph of section 87-1.01D(2)(a) with:**

4. Luminaires

10-19-18

**Replace the 2nd paragraph of section 87-1.01D(2)(a) with:**

Submit a sample size as shown in the following table:

10-18-19

**Electrical Material Sampling**

Contract quantity	Test sample size
1-8	1
9-15	2
16-25	3
26-90	5
91-150	8
151-280	13
281-500	20
501-1200	32

**Replace section 87-1.01D(2)(d) with:**

10-19-18

**87-1.01D(2)(d) Piezoelectric Axle Sensors**

Piezoelectric axle sensors test consists of:

1. Demonstrating for each sensor:
  - 1.1. Capacitance is within 20 percent of the value shown on the sensor's data sheet
  - 1.2. Dissipation factor is less than 0.04 nF when measured in the 20 nF range
  - 1.3. Resistance is greater than 20 Megaohms
2. Collecting a minimum of 100 vehicle records for each lane and demonstrating:
  - 2.1. Volume is within  $\pm 3$  percent accuracy
  - 2.2. Vehicle classification is within 95 percent accuracy by type

**Replace the 7th paragraph of section 87-1.03A with:**

Notify the Engineer immediately if an existing facility is damaged by your activities:

10-19-18

1. Damaged existing traffic signal systems must be repaired or replaced within 24 hours. If the system cannot be fixed within 24 hours or it is located on a structure, provide a temporary system until the system can be fixed.
2. Damaged existing lighting systems must be repaired or replaced by nightfall. If the system cannot be fixed by nightfall, provide a temporary system until the system can be fixed.

**Add to the end of section 87-1.03A:**

Collect the geographic information system mapping data.

10-19-18

**Replace the 12th paragraph of section 87-1.03B(1) with:**

For Type 1, 2, and 5 conduits, use threaded bushings and bond them using a jumper. For other types of conduit, use nonmetallic bushings or end bell.

10-19-18

**Replace the 3rd paragraph of section 87-1.03B(3)(a) with:**

Place a minimum of 2 inches of sand bedding in a trench before installing the conduit and 18 inches of slurry cement over the conduit before placing additional backfill material.

10-19-18

The slurry must be pigmented to match color no. 21105 of AMS-STD-595.

10-18-19

**Replace the 1st sentence in the 6th paragraph of section 87-1.03B(3)(c) with:**

Backfill trench with slurry concrete under section 19-3.02E.

10-19-18

**Replace the 9th paragraph of section 87-1.03B(3)(c) with:**

Install innerducts as one continuous unit between vaults. Innerducts may be interrupted inside pull boxes located between vaults and cabinets.

10-19-18

**Replace section 87-1.03C with:**

**87-1.03C Installation of Pull Boxes**

10-18-19

**87-1.03C(1) General**

Install pull boxes no more than 200 feet apart.

Place the cover on the box when not working in it.

**87-1.03C(2) Roadway Pull Boxes**

**87-1.03C(2)(a) General**

You may install larger pull boxes than specified or shown and additional pull boxes to facilitate the work except in structures.

Install a pull box on a minimum 6-inch deep bed of crushed rock and grout it before installing conductors. The grout must be from 0.5 to 1 inch thick and sloped toward the drain hole. Place a layer of roofing paper between the grout and the crushed rock sump. Make a 1-inch drain hole through the grout at the center of the pull box.

Set the pull box such that the top is 1-1/4 inches above the surrounding grade in unpaved areas and leveled with the finished grade in sidewalks and other paved areas.

Grout around conduits that are installed through the sides of the pull box.

Bond and ground the metallic conduit before installing conductors and cables in the conduit.

Bond metallic conduits in a nonmetallic pull box using bonding bushings and bonding jumpers.

Do not install pull boxes in concrete pads, curb ramps, or driveways.

Reconstruct the sump of a pull box if disturbed by your activities. If the sump was grouted, remove and replace the grout.

#### **87-1.03C(2)(b) Nontraffic Pull Boxes**

For a buried nontraffic pull box, install the electronic marker and set the box such that the top is from 6 to 8 inches below the surrounding grade. Place a 20-mil-thick plastic sheet made of HDPE or PVC virgin compounds to prevent water from entering the box.

When a pull box is in a structure, modify the base as required.

Place mortar between a nontraffic pull box and a pull box extension.

Where a nontraffic pull box is in the vicinity of a curb in an unpaved area, place the box adjacent to the back of the curb if practical.

Where a nontraffic pull box is adjacent to a post or standard, place the box within 5 feet downstream from traffic if practical.

If you replace the cover on a nontraffic pull box, anchor it to the box.

Perform the electronic marker test.

#### **87-1.03C(2)(c) Traffic Pull Boxes**

Place minor concrete around and under a traffic pull box as shown.

Bolt the steel cover to the box when not working in it.

Bond the steel cover to the conduit with a minimum 3-foot-long jumper and bolt it down after installing the conductors and cables.

#### **87-1.03C(2)(d) Tamper-Resistant Pull Boxes**

Install the tamper-resistant pull boxes under the manufacturer's instructions.

#### **87-1.03C(3) Structure Pull Boxes**

Install structure pull boxes parallel to the structure.

After removing the knockouts, flatten the surrounding area.

Bond conduit to a structure pull box using locknuts on the inside and outside of the box.

Cover pull boxes with a 1/4-inch plywood during pouring of PCC. For a no. 9 pull box, the upper edge of the plywood must fit against the lower edge of the rain tight hood.

Install no. 7 pull box with bottom flanges flush with the bottom of the box girder. Place top and bottom covers and seal the pull box during PCC pouring.

For no. 9 and 9A pull boxes:

1. Form a 1:1 chamfer around the cover
2. Use the drain hole in the center if the box is horizontal and the low end drain hole if the box is inclined
3. Mounted in a sloping parapet, drill a 1/2-inch elongated drain hole in the center if the box is horizontal or the low end if the box is inclined

**Replace section 87-1.03D with:**

10-19-18

**87-1.03D Reserved**

**Replace section 87-1.03E(2) with:**

04-19-19

Dig a trench for the electrical conduits or direct burial cables. Do not excavate until the installation of the conduit or direct burial cables.

Place excavated material in a location that will not interfere with traffic or surface drainage.

After placing the conduit or direct burial cable, backfill the trench.

Compact the backfill to a minimum relative compaction of:

1. 95 percent when placed within the hinge points and in areas where pavement is to be constructed
2. 90 percent when placed outside the hinge points and not under pavement

Restore the sidewalks, pavement, and landscaping at a location before starting excavation at another location.

**Replace section 87-1.03E(3) with:**

10-19-18

**87-1.03E(3) Concrete Pads, Foundations, and Pedestals**

Construct foundations for standards, poles, metal pedestals, and posts under section 56-3.

Construct concrete pads, foundations, and pedestals for controller cabinets, telephone demarcation cabinets, and service equipment enclosures on firm ground.

Install anchor bolts using a template to provide proper spacing and alignment. Moisten the forms and ground before placing the concrete. Keep the forms in place until the concrete sets for at least 24 hours to prevent damage to the surface.

Use minor concrete for pads, foundations, and pedestals.

Construct a pad in front of a Type III service equipment enclosure. The pad must be 24 inches in length, 4 inches in thickness, and must match the width of the foundation.

In unpaved areas, place the top of the foundation 6 inches above the surrounding grade, except place the top:

1. 1 foot 6 inches above the grade for 336L cabinets
2. 1 foot 8 inches above the grade for Type C telephone demarcation cabinets
3. 2 inches above the grade for Type III service equipment enclosures

The pad must be 2 inches above the surrounding grade in unpaved areas.

In and adjacent to the sidewalk and other paved areas, place the top of the foundation 4 inches above the surrounding grade, except place the top:

1. 1 foot 6 inches above the grade for 336L cabinets
2. 1 foot 8 inches above the grade for Type C telephone demarcation cabinets
3. Level with the finished grade for Type G and Type A cabinets and Type III service equipment enclosures

The pad must be level with the finished grade in paved areas.

Apply an ordinary surface finish under section 51-1.03F.

Allow the foundation to cure for at least 7 days before installing any equipment.

**Replace the last paragraph of section 87-1.03F(1) with:**

Install a tracer wire.

04-19-19

**Replace the 1st paragraph of section 87-1.03F(3)(c)(ii) with:**

Install a Type 1 or 2 inductive loop conductor except use Type 2 for Type E and F loop detectors.

10-19-18

**Delete the last paragraph of section 87-1.03G.**

10-19-18

**Replace the 4th paragraph of section 87-1.03H(2) with:**

Use Method B as follows:

10-19-18

1. Cover the splice area completely with an electrical insulating coating and allow it to dry.
2. Apply 3 layers of half-lapped, PVC electrical tape.
3. Apply 2 layers of butyl-rubber, stretchable tape with liner.
4. Apply 3 layers of half-lapped, PVC, pressure-sensitive, adhesive tape.
5. Cover the entire splice with an electrical insulating coating and allow it to dry.

**Replace section 87-1.03N with:**

10-19-18

**87-1.03N Fused Splice Connectors**

Install a fuse splice connector with a fuse in each ungrounded conductor for luminaires, except for overhead sign luminaires. The connector must be located in the pull box adjacent to the luminaires.

If the pull box for the roadway luminaire is tamper resistant, install a fuse splice connector with 10 A fuse in the pull box and an additional fuse splice connector with a 5 A fuse in the handhole.

Install a fuse splice connector with a fuse on primary side of transformer.

Crimp the connector terminals onto the ungrounded conductors using a tool under the manufacturer's instructions. Insulate the terminals and make them watertight.

**Add to the end of section 87-1.03T:**

10-19-18

When replacing an existing accessible pedestrian signal, the housing color must match the color of the existing housing.

**Add to the end of section 87-1.03U:**

10-19-18

When replacing an existing push button assembly, the housing color must match the color of the existing housing.

**Add between the 1st and 2nd paragraphs of section 87-1.03Y:**

Use a submersible type transformer inside pull boxes.

04-19-19

**Replace the 2nd paragraph of section 87-2.03A with:**

Tighten the cap screws of the luminaire's clamping bracket to 10 ft-lb for roadway luminaires.

10-19-18

**Replace section 87-3 with:**

10-19-18

**87-3 SIGN ILLUMINATION SYSTEMS**

**87-3.01 GENERAL**

Section 87-3 includes specifications for constructing sign illumination systems.

Sign illumination system includes:

1. Foundations
2. Pull boxes
3. Conduit
4. Conductors
5. Overhead sign luminaires
6. Service equipment enclosure
7. Photoelectric control

The components of a sign illumination system are shown on the project plans.

**87-3.02 MATERIALS**

Reserved

**87-3.03 CONSTRUCTION**

Perform the conductor test.

Install overhead sign luminaires under the manufacturer's instructions.

Do not modify the sign structure or mounting channels.

Perform the operational tests for the system.

**87-3.04 PAYMENT**

Not Used

**Replace section 87-4.01D with:**

10-19-18

**87-4.01D Quality Assurance**

Reserved

**Replace section 87-4.02B with:**

10-19-18

**87-4.02B Battery Backup System**

A battery backup system includes the cabinet, batteries, and the Department-furnished electronics assembly.

The electronics assembly includes the inverter/charger unit, power transfer relay, manually-operated bypass switch, battery harness, utility interconnect wires, battery temperature probe, and relay contact wires.

**Replace the 2nd sentence in the 15th paragraph of section 87-4.02C with:**

The background must comply with color no. 14109 of AMS-STD-595.

10-19-18

**Replace section 87-4.03B with:**

**87-4.03B Battery Backup System Cabinets**

10-19-18

Install the battery backup system cabinet to the right of the controller cabinet.

If installation on the right side is not possible, obtain authorization for installation on the left side.

Provide access for power conductors between the cabinets using:

1. 2-inch nylon-insulated, steel chase nipple
2. 2-inch steel sealing locknut
3. 2-inch nylon-insulated, steel bushing

Remove the jumper between the terminals labeled *BBS-1* and *BBS-2* in the 5 position terminal block in the controller cabinet before connecting the Department-furnished electronics assembly.

**Replace section 87-7.02 with:**

**87-7.02 MATERIALS**

10-19-18

Flashing beacon control assembly includes:

1. Enclosure.
2. Barrier-type terminal blocks rated for 25 A, 600 V(ac), made of molded phenolic or nylon material and have plated-brass screw terminals and integral marking strips.
3. Solid state flasher complying with section 8 of NEMA standards publication no. TS 1 for 10 A, dual circuits.
4. 15-A, circuit breaker per ungrounded conductor.
5. Single-hole-mounting toggle type, single-pole, single-throw switches rated at 12-A, 120 V(ac). Switches must be furnished with an indicating nameplate reading *Auto - Test*. A 15-A circuit breaker may be used in place of the toggle switch.

**Replace 87-8 with:**

**87-8 PEDESTRIAN HYBRID BEACON SYSTEMS**

10-19-18

**87-8.01 GENERAL**

**87-8.01A Summary**

Section 87-8 includes specifications for constructing pedestrian hybrid beacon system.

A pedestrian hybrid beacon system includes:

1. Foundations
2. Pull boxes
3. Conduit
4. Conductors and cables
5. Standards

6. Pedestrian hybrid beacon face
7. Pedestrian signal heads
8. Service equipment enclosure
9. Department-furnished controller assembly
10. Accessible pedestrian signals
11. Push button assemblies
12. Luminaires
13. Fuse splice connectors
14. Battery backup system

The components of a pedestrian hybrid beacon system are shown on the project plans.

**87-8.01B Definitions**

Reserved

**87-8.01C Submittals**

Reserved

**87-8.01D Quality Assurance**

**87-8.01D(1) General**

Reserved

**87-8.01D(2) Quality Control**

Verify the sequence for the pedestrian hybrid beacon system per California Chapter 4F, Figure 3F-3 "Sequence for a Pedestrian Hybrid Beacon" during the operational test.

Test the battery backup system under section 87-1.01D(2)(c).

**87-8.02 MATERIALS**

**87-8.02A General**

The system must comply with California *MUTCD*, Chapter 4F.

The battery backup system must comply with section 87-4.02B.

**87-8.02B Pedestrian Hybrid Beacon Face**

A pedestrian hybrid beacon face consists of three 12-inch signal heads.

**87-8.03 CONSTRUCTION**

Install pedestrian hybrid beacon system under sections 87-4.03A and 87-4.03B.

**87-8.04 PAYMENT**

Not Used

**Replace the 1st paragraph of section 87-12.03 with:**

Install changeable message sign on sign structure under section 56-2.

10-19-18

**Replace section 87-14.02 with:**

**87-14.02 MATERIALS**

**87-14.02A General**

Vehicle speed feedback sign consists of a housing, display window, and radar unit.

Sign must:

1. Comply with the California *MUTCD*, Chapter 2B

10-19-18



2. Have an operating voltage of 120 V(ac) for permanent installations
3. Have a maximum weight of 45 lb
4. Have a wind load rating of 90 mph
5. Have an operating temperature range from -34 to 165 degrees F
6. Have a retroreflective white sheeting background

#### **87-14.02B Housings**

Housing must:

1. Be weatherproof (NEMA 3R or better) and vandal resistant
2. Be made of 0.09-inch-gauge welded aluminum with the outer surfaces being UV resistant
3. Have the manufacturer's name, model number, serial number, date of manufacture, rated voltage and rated current marked inside
4. Have the internal components easily accessible for field repair without removal of the sign

#### **87-14.02C Display Windows**

Display window consists of a cover, LED character display, and dimming control. Character display and cover must deflect together without damage to the internal electronics and speed detection components.

Cover must be:

1. Vandal resistant and shock absorbent
2. Field replaceable with the removal of external stainless-steel, tamper proof fasteners

Cover must be made of a minimum 0.25-inch-thick, shatter-resistant polycarbonate.

LED character display must:

1. Consist of two 7-segment, solid-state, numeric characters, which must:
  - 1.1. Be a minimum 15 inches in height
  - 1.2. Be visible and legible from a minimum distance of 1500 feet and legible from a minimum distance of 750 feet
  - 1.3. Consist of a minimum 16 LEDs, which must:
    - 1.3.1. Be amber and have a wavelength from 590 to 600 nm and rated for minimum 100,000 hours
    - 1.3.2. Must maintain a minimum 85 percent of the initial light output after 48 months of continuous use over the temperature range
2. Be capable of displaying the detected vehicle speed within 1 second
3. Remain blank when no vehicles are detected within the radar detection zone
4. Have the option to flash the pre-set speed limit when the detected vehicle speed is 5 miles higher than the pre-set speed
5. Be viewable only by the approaching traffic

Dimming control must:

1. Automatically adjust the character light intensity to provide optimum character visibility and legibility under all ambient lighting conditions
2. Have minimum 3 manual dimming modes of different intensities

#### **87-14.02D Radar Units**

Radar unit must:

1. Be able to detect up to 3 lanes of approaching traffic
2. Operate with an internal, low power, 24.159 GHz (K-band)
3. Be FCC approved Part 15 certified
4. Have a speed accuracy of  $\pm 1$  mph
5. Have a maximum 15 W power consumption

**Add to the list in the 2nd paragraph of section 87-18.01:**

4. 12 position terminal block

10-18-19

**Replace section 87-18.02 with:**

**87-18.02 MATERIALS**

Terminal block must comply with TEES, chapter 1, section 3.

10-18-19

**Replace the 2nd paragraph of section 87-18.03 with:**

Install the terminal block on the input panel in the controller cabinet.

Connect the signal interconnect cable to the terminal block as shown on the following table:

10-18-19

**Signal Interconnect Termination**

Terminal Block	Color
1	BLUE
2	BLACK
3	RED
4	BLACK
5	BROWN
6	BLACK
7	GREEN
8	BLACK
9	YELLOW
10	BLACK
11	WHITE
12	BLACK

**Replace 87-19 with:**

**87-19 FIBER OPTIC CABLE SYSTEMS**

10-19-18

**87-19.01 GENERAL**

**87-19.01A Summary**

Section 87-19 includes specifications for constructing fiber optic cable systems.

A fiber optic cable system includes:

1. Conduit and accessories
2. Vaults
3. Warning tape
4. Fiber optic cables
5. Fiber optic splice enclosures
6. Fiber distribution units
7. Fiber optic markers
8. Fiber optic connectors and couplers

The components of a fiber optic system are shown on the project plans.

**87-19.01B Definitions**

Reserved

### **87-19.01C Submittals**

At least 15 days before cable installation, submit:

1. Manufacturer's procedures for pulling fiber optic cable
2. Test reports from a laboratory accredited to International Standards Organization/International Electrotechnical Commission 17025 by the American Association for Laboratory Accreditation (A2LA) or the ANSI-ASQ National Accreditation Board (ANAB) for:
  - 2.1. Water penetration
  - 2.2. Cable temperature cycling
  - 2.3. Cable impact
  - 2.4. Cable tensile loading and fiber strain
  - 2.5. Cable compressive loading
  - 2.6. Compound flow
  - 2.7. Cyclic flexing
3. Proof of calibration for the test equipment including:
  - 3.1. Name of calibration facility
  - 3.2. Date of calibration
  - 3.3. Type of equipment, model number and serial number
  - 3.4. Calibration result

Submit optical time-domain reflectometer data files for each test in a Microsoft Excel format.

After performing the optical time-domain reflectometer test and the power meter and light source test, submit within 4 business days a hard copy and electronic format:

1. Cable Verification Worksheet
2. Segment Verification Worksheet
3. Link Loss Budget Worksheet

The worksheets are available at the Division of Construction website.

### **87-19.01D Quality Assurance**

#### **87-19.01D(1) General**

Reserved

#### **87-19.01D(2) Quality Control**

Notify the Engineer 4 business days before performing field tests. Include exact location of the system or components to be tested. Do not proceed with the testing until authorized. Perform each test in the presence of the Engineer.

The optical time-domain reflectometer test consists of:

1. Inspecting the cable segment for physical damage.
2. Measuring the attenuation levels for wavelengths of 1310 and 1550 nm in both directions for each fiber using the optical time-domain reflectometer.
3. Comparing the test results with the data sheet provided with the shipment. If there are attenuation deviations greater than 5 percent, the test will be considered unsatisfactory and the cable segment will be rejected. The failure of any single fiber is a cause for rejection of the entire segment. Replace any rejected cable segments and repeat the test.

The power meter and light source test consists of:

1. Testing each fiber in a link using a light source at one end of the link and a power meter at the other end
2. Measuring and recording the power loss for wavelengths of 1310 and 1550 nm in both directions

Index matching gel is not allowed.

Installation and splicing of the fiber optic cable system must be performed by a certified fiber optic installer.

The optical time-domain reflectometer test and the power meter and light source test must be performed by a certified fiber optic technician.

The certification for the fiber optic installer and fiber optic technician must be from an organization recognized by the International Certification Accreditations Council and must be current throughout the duration of the project.

## **87-19.02 MATERIALS**

### **87-19.02A General**

All metal components of the fiber optic cable system must be corrosion resistant.

All connectors must be factory-installed and tested.

Patch cords, pigtails, and connectors must comply with ANSI/TIA-568.

Pigtails must have a minimum 80 N pull out strength.

A splice cassette may be used in place of a pigtail and a splice tray.

Each cable reel must have a weatherproof label or tag with information specified in ANSI/ICEA S-87-640 including:

1. Contractor's name
2. Contract number
3. Number of fibers
4. Cable attenuation loss per fiber at 1310 and 1550 nm

The labeled or tagged information must also be in a shipping record in a weatherproof envelope. The envelope must be removed only by the Engineer.

### **87-19.02B Vaults**

A vault must:

1. Comply with section 86-1.02C and AASHTO HS 20-44, and load tested under AASHTO M 306.
2. Be a minimum:
  - 2.1. 4 feet wide by 4 feet high by 4 feet long nominal inside dimensions for box type.
  - 2.2. 4 feet high by 4 feet outside diameter for round type.
3. Have a minimum access of:
  - 3.1. 30 inches diameter for round type.
  - 3.2. 3 feet wide by 3 feet long for box type.
4. Be precast either modular or monolithic.
5. Have cable racks installed on the interior sides. A rack must:
  - 5.1. Be fabricated from ASTM A36 steel plate.
  - 5.2. Support a minimum of 100 pounds per rack arm.
  - 5.3. Support a minimum of 4 splice enclosures and a minimum of 4 cables with a minimum slack of 50 feet each.
  - 5.4. Be hot-dip galvanized after manufacturing.
  - 5.5. Be bonded and grounded.
6. Have a minimum:
  - 6.1. Two 4-inch diameter knockouts on each side for box type.
  - 6.2. Two 4-inch diameter knockouts placed every 90 degrees for round type.
7. Have a minimum 2-inch-diameter drain hole at the center of base.

Entry points for knockouts must not cause the cable to exceed its maximum bend radius.

The access cover must:

1. Be a two-piece torsion-assisted sections or a minimum 30-inch-diameter cast iron.
2. Have inset lifting pull slots.
3. Have markings *CALTRANS* and *FIBER OPTIC*.

### **87-19.02C Fiber Optic Cable**

The fiber optic cable must:

1. Comply with 7 CFR parts 1755.900, 1755.901, and 1755.902, and ANSI/ICEA S-87-640
2. Be a singlemode, zero-dispersion, and have non-gel loose type buffer tubes
3. Have no splices
4. Have a Type H or Type M outer jacket
5. Be shipped on a reel
6. Have 10 feet of length on each end of the cable accessible for testing

### **87-19.02D Fiber Optic Splice Enclosures**

A fiber optic splice enclosure must:

1. Not exceed 36 inches in length, 8 inches in width, and 8 inches in height
2. Be made of thermoplastic material, weather proof, chemical and UV resistant, and re-sealable
3. Accommodate a minimum of 8 internal splice trays
4. Have from 1/4 to 1 inch in diameter cable entry ports
5. Have brackets, clips and cable ties
6. Have means to anchor the dielectric member of the fiber optic cable
7. Include grounding hardware

### **87-19.02E Fiber Distribution Units**

The fiber distribution unit consists of a housing, a patch panel, a 12-multicolor pigtail, and a splice tray.

The fiber distribution unit must be self-contained and pre-assembled.

The housing must:

1. Be a 19-inch rack-mountable modular-metal enclosure
2. Be a one rack unit
3. Have cable clamps to secure buffer tube to the chassis
4. Have cable accesses with rubber grommets or similar material to prevent the cable from coming in contact with the bare metal
5. Be weatherproof
6. Have a hinged top door with a latch or thumbscrew to hold it in the closed position

A patch panel must have a minimum of 12-singlefiber type connector sleeves.

A pigtail must:

1. Be a simplex single mode fiber in a 900  $\mu\text{m}$  tight buffer with a 12-inch-outer-diameter PVC jacket
2. Have a fiber optic connector attached on one end and bare fiber on the other end
3. Be at least 3 feet in length
4. Have the manufacturer's part number on the jacket

Pigtails must be single-fiber or ribbon type.

### **87-19.02F Patch Cords**

Patch cords must:

1. Be a singlemode fiber in a 900  $\mu\text{m}$  tight buffer with a 0.12-inch-outer-diameter PVC jacket
2. Have fiber optic connectors attached on both ends
3. Be at least 6 feet in length
4. Have manufacturer's part number on the jacket

Duplex patch cords must be of round cable structure, and not have zip-cord structure.

### **87-19.02G Splice Trays**

Splice trays must:

1. Have brackets to spool incoming fibers a minimum of 2 turns.

2. Have means to secure and protect incoming buffer tubes, pigtailed, and a minimum of 12 heat shrink fusion splices.
3. Be stackable.
4. Have a snap-on or hinged cover. The cover may be transparent.

#### **87-19.02H Fiber Optic Markers**

Fiber optic markers must be:

1. Type K-2 (CA) object markers for vaults or pull boxes.
2. Disk markers for paved areas and transition points from unpaved to paved areas. The disk marker must be metallic, lead free and 4 inches in diameter, and must have a mounting stem at the center of the disk. The mounting stem must be a minimum 3 inches long and a minimum 0.70 inch in diameter.
3. Non-reflective Class 1, Type F, flexible post delineators for unpaved areas.

#### **87-19.02I Fiber Optic Connectors and Couplers**

Connectors must be:

1. 0.1-inch ceramic ferrule pre-radiused type
2. Capped when not used

Couplers must be made of the same material as the connector's housing and have ceramic sleeves.

Singlemode fiber optic connectors must have a yellow strain relief boot or a yellow base.

#### **87-19.03 CONSTRUCTION**

##### **87-19.03A General**

Perform the optical time-domain reflectometer test:

1. On the fiber optic cable upon its arrival to the job site and before its installation. Complete the Cable Verification Worksheet. Do not install the fiber optic cable until the Engineer's written approval is received.
2. After the fiber optic cable segments have been pulled, but before breakout and termination. Complete the Segment Verification Worksheet.
3. Once the passive cabling system has been installed and is ready for activation. If the measured individual fusion splice losses exceed -0.30 dB, re-splice and retest. At the conclusion of the optical time-domain reflectometer test, perform the power meter and light source test. If the measured link loss exceeds the calculated link loss, replace the unsatisfactory cable segments or splices and retest. Complete the Link Loss Budget Worksheet.

##### **87-19.03B Vaults Installation**

Install a vault as shown and with the side facing the roadway a minimum of 2 feet from the edge of pavement or back of dike, away from traffic.

Install the top of the vault flush with surrounding grade in paved areas and 2 inches above the surrounding grade in unpaved areas.

Place 6 inches of minor concrete around vaults. In unpaved areas, finish top of concrete at a 2 percent slope away from cover. In paved areas, finish top of concrete to match existing slope.

Bolt the steel cover to the vault when not working in it.

##### **87-19.03C Fiber Optic Cable Installation**

Install fiber optic cable by a certified installer or a representative from the fiber optic cable manufacturer during installation.

When using mechanical aids to install fiber optic cable:

1. Maintain a cable bend radius at least twenty times the outside diameter of the cable
2. Use cable grips having a ball bearing swivel

3. Use a pulling force on a cable not to exceed 500 pound-foot or manufacturer's recommended pulling tension, whichever is less

When installing the cable using the air blown method, the cable must withstand a static air pressure of 110 psi.

Lubricate the cable using a lubricant recommended by the cable manufacturer.

Install fiber optic cable without splices except where shown.

Provide a minimum of 65 feet of slack for each fiber optic cable at each vault. Divide the slack equally on each side of the splice enclosure.

Install tracer wires in the fiber optic conduits and innerducts as shown. Provide a minimum 5 feet of slack tracer wire in each pull box and vault from each direction. You may splice tracer wire at intervals of not less than 500 feet and only inside vaults or pull boxes.

If a fiber optic cable and tracer wire is installed in an innerduct, pulling a separate fiber optic cable into a spare duct to replace damaged fiber will not be allowed.

Apply a non-hygroscopic filling compound to fiber optic cable openings.

Seal the ends of conduit and innerducts after cables are installed.

Install strain relief for fiber optic cable entering a fiber optic enclosure.

Identify fibers and cables by direct labeling, metal tags, or bands fastened in such a way that they will not move. Use mechanical methods for labeling.

Provide identification on each fiber optic cable or each group of fiber optic cables in each vault and at the end of terminated fibers. Fiber optic cable must be identified as shown in the following table:

**Cable Identification<sup>a</sup>**

Sequence order	Description	Code	Numbers of characters
1	Fiber type	S: Singlemode	1
2	Fiber count	###: Example 048	3
3	Begin point	T: TMC H: Hub V: Video Node D: Data Node C: Cable Node TV: Camera CM: CMS E: Traffic Signal RM: Ramp Meter TM: Traffic Monitoring/ Count Station/Vehicle Count Station (VDS, TMS) HA: Highway Advisory Radio EM: Extinguishable Message Sign RW: Roadway Weather Information System WM: Weigh In Motion WS: Weigh-Station Bypass System SV: Vault SC: Splice Cabinet	1 or 2
4	Begin point county abbreviation	AA or AAA: Examples: Orange (ORA), San Mateo (SM)	2 or 3
5	Begin point route number	###: Examples: 005, 082, 114	3
6	Begin point post mile	#####: 02470 (example 024.70): Actual PM value to the 1/100 value	5
7	End Point	In the same way as for Begin Point	1 or 2
8	End point county abbreviation	In the same way as for Begin Point County Abbreviation	2 or 3
9	End point route number	In the same way as Begin Point Route Number	3
10	End point post mile	In the same way as Begin Point Post Mile	5

<sup>a</sup>Cable identification example: The cable code S 048 SV SM 084 02470 SV SC 082 02510 describes a singlemode, 48 strand, cable starting at a fiber optic vault in San Mateo County on Route 84 at post mile 24.70, and ending at another fiber optic vault in Santa Clara County on Route 82 at post mile 25.10.

Place labels on the cables at the following points:

1. Fiber optic vault and pull box entrances and exits
2. Splice enclosures entrance and exit
3. Fiber distribution unit entrance

Lace fiber optic cable inside controller cabinets and secure to the cage.

Support the fiber optic cable within 6 inches from a termination and every 2 feet.



Secure fiber optic cables to the cable racks. Store excess cable in a figure 8 fashion.

#### **87-19.03D Fiber Optic Cable Splices**

Use fusion splicing for fiber optic cables.

Splice single-buffer tube cable to multi-buffer tube cable using the mid-span access method under manufacturer's instructions. Any mid-span access splice or fiber distribution unit termination must involve only those fibers being spliced as shown.

Place fiber splices in the splice enclosures installed in the vaults.

#### **87-19.03E Splice Enclosures Installation**

Maintain an equal amount of slack on each side of the splice enclosure.

Secure the fiber optic splices in splice tray.

Secure the splice trays to the inner enclosure.

Label cables and buffer tubes.

Do not seal fiber splice enclosure until authorized and the power meter and light source test is performed. Seal the enclosure under manufacturer's instructions.

Flash test the outer enclosure under manufacturer's instructions in the presence of the Engineer. Visually inspect the enclosure. If bubbles are present, identify the locations where the bubbles are present, take corrective actions and repeat the flash test until no bubbles are present.

Attach the splice enclosure to the side wall of a vault or hub with a minimum 2 feet distance between the ground and the bottom of the enclosure.

Secure fiber optic cables to the chassis using cable clamps for fiber optic units.

Connect a minimum of one bonding conductor to a grounding electrode after mounting the fiber optic enclosure to the wall. If there are multiple bonding conductors, organize the conductors in a neat way.

#### **87-19.03F Fiber Optic Distribution Unit Installation**

Spool incoming buffer tubes 2 feet in the splice tray and expose 1 foot of individual fibers.

Maintain a minimum 2-inch-bend radius during and after installation in the splice tray.

Splice incoming fibers in the splice tray.

Restrain each fiber in the splice tray. Do not apply stress on the fiber when located in its final position.

Secure buffer tubes near the entrance of the splice tray.

Secure splice trays under manufacturer's instructions.

Label splice tray after splicing is completed.

Install patch cords in fiber distribution units and patch panels. Permanently label each cord and each connector in the panel with the system as shown.

#### **87-19.03G Fiber Optic Markers Installation**

Install fiber optic markers at 12-inch offset on the side furthest away from the edge of travel way:

1. For fiber optic cable at 500 feet apart in areas where the distance between vaults or pull boxes is greater than 500 feet
2. Adjacent to vaults and pull boxes
3. For fiber optic cable turns at:
  - 3.1. Beginning of the turn
  - 3.2. Middle of the arc
  - 3.3. End of the turn

When a fiber optic cable crosses a roadway or ramp, install a disk marker over the conduit trench on:

1. Every shoulder within 6 inches from the edge of pavement
2. Delineated median
3. Each side of a barrier

Install markers under section 81 except each retroreflective face must be parallel to the road centerline and facing away from traffic.

**87-19.04 PAYMENT**

Not Used

**Replace section 87-20 with:**

**87-20.01 GENERAL**

04-19-19

Section 87-20 includes specifications for providing, maintaining, and removing temporary electrical systems.

Temporary systems may be mounted on wood posts or trailers.

10-18-19

Obtain the Department's authorization for the type of temporary electrical system and its installation method.

04-19-19

A temporary system must operate on a continuous, 24-hour basis.

A temporary electrical system must have a primary power source and a back-up power source from:

1. Commercial power from a utility company
2. Generator system
3. Photovoltaic system

**87-20.02 MATERIALS**

**87-20.02A General**

Material and equipment may be new or used.

Temporary wood poles must comply with section 48-6.

The components of a temporary system are shown on the project plans.

If you use Type UF-B cable, the minimum conductor size must be no. 12.

A back-up power source must:

1. Have an automatic transfer switch
2. Start automatically and transfer the system load upon reaching the operating voltage in the event of a power source failure

10-18-19

A trailer must be equipped with devices to level and plumb the temporary system.

10-18-19

**87-20.02B Temporary Flashing Beacon Systems**

A temporary flashing beacon system consists of a flashing beacon system, wood pole, and a power source.

The system must comply with the specifications for flashing beacon systems in section 87-7.

04-19-19

**87-20.02C Temporary Lighting Systems**

A temporary lighting system consists of a lighting system, a power source, and wood poles.

The system must comply with the specifications for lighting systems in section 87-2.

10-18-19

### **87-20.02D Temporary Signal Systems**

04-19-19

A temporary signal system consists of a signal and lighting system, wood poles and posts, and a power source.

The system must comply with the specifications for signal and lighting systems in section 87-4, except signal heads may be mounted on a wood pole, mast arm, tether wire, or a trailer.

10-18-19

### **87-20.02E Generators**

04-19-19

A generator must:

1. Be 120 V(ac) or 120/240 V(ac), 60 Hz, 2.5 kW minimum, continuous-duty type
2. Be powered by a gasoline, LPG, or diesel engine operating at approximately 1,800 rpm with an automatic oil feed
3. Be equipped to provide automatic start-stop operation with a 12 V starting system
4. Have generator output circuits that have overcurrent protection with a maximum setting of 15 A
5. Have enough fuel storage to operate when it is unattended
6. Have a spark arrester complying with Pub Cont Code § 4442

### **87-20.02F Automatic Transfer Switches**

An automatic transfer switch must provide:

1. Line voltage monitoring in the event of a power outage that signals the back-up power source to start
2. Start delay, adjustable from 0 to 6 seconds, to prevent starting if the power outage is only momentary and a stop delay, adjustable from 0 to 8 minutes, to allow the back-up power source to unload
3. Transfer delay from 0 to 120 seconds to allow the back-up power source to stabilize before connecting to the load and retransfer delay from 0 to 32 minutes to allow the line voltage to stabilize
4. Mechanical interlock to prevent an application of power to the load from both sources and to prevent backfeeding from the back-up power source to the primary power source

## **87-20.03 CONSTRUCTION**

### **87-20.03A General**

Provide electrical and telecommunication services for temporary systems. Do not use existing services unless authorized.

Provide power for the temporary electrical systems.

Commercial power must be 120 V(ac) or 120/240 V(ac) single phase. Make arrangements with the utility company for providing service. Protect the power source in a locked enclosure. Provide keys to all locks to the Engineer.

Install conductors and cables in a conduit, suspended from wood poles at least 25 feet above the roadway, or use direct burial conductors and cables.

You may saw slots across paved areas for burial conductors and cables.

Install conduit outside the paved area at a minimum of 12 inches below grade for Type 1 and 2 conduit and at a minimum of 18 inches below grade for Type 3 conduit.

Install direct burial conductors and cables outside the paved area at a minimum depth of 24 inches below grade.

Place the portions of the conductors installed on the face of wood poles in either Type 1, 2, or 3 conduit between the point 10 feet above grade at the pole and the pull box. The conduit between the pole and the pull box must be buried at a depth of at least 18 inches below grade.

Place conductors across structures in a Type 1, 2, or 3 conduit. Attach the conduit to the outside face of the railing.

Mount the photoelectric unit at the top of the standard or wood post.

You may abandon in place conductors and cables in sawed slots or in conduit installed below the ground surface.

**87-20.03B Temporary Flashing Beacon Systems**

Protect each flashing beacon with a fused splice connector on the line side. Wherever conductors are run overhead, install the splice connector in the line side outside of the control assembly.

**87-20.03C Temporary Lighting Systems**

Protect each luminaire with a fused splice connector on the line side. Wherever conductors are run overhead, install the fuse splice connectors in the line side before entering the mast arm.

**87-20.03D Temporary Signal Systems**

You may splice conductors that run to a terminal compartment or a signal head on a pole to the through conductors of the same phase in a pull box adjacent to the pole. Do not splice conductors or cables except in a pull box or in a NEMA 3R enclosure.

The Department provides the timing for the temporary signal.

Maintain the temporary signal except for the Department-furnished controller assembly.

**87-20.04 PAYMENT**

Not Used

**Replace item 7 in the list in the 2nd paragraph of section 87-21.03B(2) with:**

7. Camera system

10-19-18

AA

**DIVISION XI MATERIALS**

**90 CONCRETE**

10-18-19

**Add to section 90-1.01B:**

10-18-19

**CIP structural concrete members:** CIP components of bridge structures, piling, retaining walls, sound walls, box culverts, drainage inlets, approach slabs, bridge railing, and bridge barriers.

**Replace section 90-1.01C(6) with:**

10-18-19

**90-1.01C(6) Mix Design**

**90-1.01C(6)(a) General**

Submit the concrete mix design before using the concrete in the work and before changing the mix proportions or an aggregate source.

**90-1.01C(6)(b) Cast-In-Place Structural Concrete Members**

For CIP structural concrete members, submit with your mix design results from the tests specified in 90-1.01D(10)(d) and the results from the tests shown in the following table:

Quality characteristic	Test method
Specific gravity and absorption of coarse aggregate	ASTM C127
Specific gravity and absorption of fine aggregate	ASTM C128
Durability index for fine aggregate	California Test 229
Soundness	California Test 214
Resistance to degradation	ASTM C131
Organic impurities	California Test 213
Chloride concentration of water for washing aggregates and mixing concrete	California Test 422
Sulfate concentration of water for washing aggregates and mixing concrete	California Test 417
Impurities in water for washing aggregates and mixing concrete	ASTM C191 or ASTM C266 and ASTM C109

**Replace section 90-1.01C(8) with:**

10-18-19

**90-1.01C(8) Testing**

**90-1.01C(8)(a) General**

If the concrete is tested for shrinkage, submit the test data with the mix design.

If prequalification is specified, submit certified test data or trial batch test reports under section 90-1.01D(5)(b).

If 56 days are allowed for the concrete to attain the compressive strength described, submit test results under section 90-1.01D(5)(a).

**90-1.01C(8)(b) Cast-In-Place Structural Concrete Members**

For CIP structural concrete members, submit test results within 3 business days after completing each QC test. For submittal of test results, go to:

<http://dime.dot.ca.gov/>

For CIP structural concrete members, include the following with the test results:

1. Contract number
2. Mix design number
3. Test sample identification number
4. Date and time of test
5. Batch plant
6. Batch number
7. Bridge number and description of element
8. Supporting data and calculations
9. Name, certification number, and signature of the QC tester

If additional compressive strength test results are needed for CIP structural concrete members to facilitate your schedule, submit a plot of the strength projection curve.

**Add to the end of section 90-1.01C:**

10-18-19

**90-1.01C(11) Quality Control Plan for Cast-In-Place Structural Concrete Members**

Section 90-1.01C(11) applies to CIP structural concrete members.

Submit 3 copies of the QC plan for review.

Submit an amended QC plan or an addendum to the QC plan when there are any changes to:

1. Concrete plants
2. Testing laboratories
3. Plant certification or laboratory accreditation status
4. Tester or inspector qualification status
5. QC personnel
6. Procedures and equipment
7. Material sources
8. Material testing

Allow the Department 5 business days to review an amended QC plan or an addendum to the QC plan.

**90-1.01C(12) Concrete Materials Quality Control Summary Report for Cast-In-Place Structural Concrete Members**

Section 90-1.01C(12) applies to CIP structural concrete members.

During concrete production for CIP structural concrete members, submit a concrete materials QC summary report at least once a month. The report must include:

1. Inspection reports.
2. Test results.
3. Documentation of:
  - 3.1. Test result evaluation by the QC manager
  - 3.2. Any discovered problems or deficiencies and the corrective actions taken
  - 3.3. Any testing of repair work performed
  - 3.4. Any deviations from the specifications or regular practices with explanation
4. Certificate of compliance for the structural concrete material signed by the QC manager. The certificate must state that the information contained in the report is accurate, the minimum testing frequencies specified in section 90-1.01D(10)(d) are met, and the materials comply with the Contract.

**90-1.01C(13) Polymer Fibers**

For concrete used in concrete bridge decks or PCC deck overlays, submit:

1. Fiber manufacturer's product data and application instructions
2. Certificate of compliance for each shipment and type of fiber

**Replace the 3rd paragraph of section 90-1.01D(5)(a) with:**

If the concrete is designated by compressive strength, the strength of concrete that is not steam cured is determined from cylinders cured under Method 1 of California Test 540.

10-18-19

**Add to the end of section 90-1.01D:**

**90-1.01D(7) Qualifications for Cast-In-Place Structural Concrete Members**

Section 90-1.01D(7) applies to CIP structural concrete members.

QC laboratory testing personnel must have an ACI Concrete Laboratory Testing Technician, Level 1 certification or an ACI Aggregate Testing Technician, Level 2 certification, whichever certification includes the test being performed.

QC field testing personnel and field and plant inspection personnel must have an ACI Concrete Field Testing Technician, Grade I certification.

**90-1.01D(8) Certifications for Cast-In-Place Structural Concrete Members**

Each concrete plant used for CIP structural concrete members must have a current:

10-18-19

1. Certification for ready mixed concrete production facilities from the National Ready Mixed Concrete Association. Plant Certification Checklist and supporting documentation must be available upon request.
2. Authorization under the Department's MPQP.

Each QC testing laboratory must be an authorized laboratory with current accreditation from the AASHTO Accreditation Program for the tests performed.

#### **90-1.01D(9) Preconstruction Meeting for Cast-In-Place Structural Concrete Members**

Section 90-1.01D(9) applies to CIP structural concrete members.

Before concrete placement, hold a meeting to discuss the requirements for structural concrete QC. The meeting attendees must include the Engineer, the QC manager, and at least 1 representative from each concrete plant performing CIP structural concrete activities for the Contract.

#### **90-1.01D(10) Quality Control**

##### **90-1.01D(10)(a) General**

Reserved

##### **90-1.01D(10)(b) Cast-In-Place Structural Concrete Members**

###### **90-1.01D(10)(b)(i) General**

Section 90-1.01D(10)(b) applies to CIP structural concrete members.

Develop, implement, and maintain a QC program that includes inspection, sampling, and testing of structural concrete materials for CIP structural concrete members.

Perform all sampling, testing, and inspecting required to control the process and to demonstrate compliance with the Contract and the authorized QC plan.

Provide a QC field inspector at the concrete delivery point while placement activities are in progress.

Provide a testing laboratory and the testing personnel for QC testing.

The QC inspector and the QC manager must be fully authorized by the Contractor to reject material.

QC testers and inspectors must be your employees or must be hired by a subcontractor providing only QC services. QC testers and inspectors must not be employed or compensated by a subcontractor or by other persons or entities hired by subcontractors who will provide other services or materials for the project.

If lightweight concrete, RSC, or SCC is used as structural concrete, you must also comply with the sampling and testing specifications of that section.

###### **90-1.01D(10)(b)(ii) Quality Control Plan**

The QC plan must detail the methods used to ensure the quality of the work and provide the controls to produce concrete. The QC plan must include:

1. Names and documentation of certification or accreditation of the concrete plants and testing laboratories to be used
2. Names, qualifications, and copies of certifications for the QC manager and all QC testing and inspection personnel to be used
3. Organization chart showing QC personnel and their assigned QC responsibilities
4. Example forms, including forms for certificates of compliance, hard copy test result submittals, and inspection reports
5. Methods and frequencies for performing QC procedures, including inspections and material testing
6. Procedures to control quality characteristics, including standard procedures to address properties outside of the specified operating range or limits, and example reports to document nonconformances and corrective actions taken
7. Procedures for verifying:
  - 7.1. Materials are properly stored during concrete batching operations

- 7.2. Batch plants have the ability to maintain the concrete consistency during periods of extreme heat and cold
- 7.3. Admixture dispensers deliver the correct dosage within the accuracy requirements specified
- 7.4. Delivery trucks have a valid National Ready Mixed Concrete Association certification card
- 8. Procedures for verifying that the weighmaster certificate for each load of concrete shows:
  - 8.1. Concrete as batched complies with the authorized concrete mix design weights
  - 8.2. Moisture corrections are being accurately applied to the aggregates
  - 8.3. Cementitious materials are from authorized sources
  - 8.4. Any water that is added after batching at the plant
- 9. Procedures for visually inspecting the concrete during discharge operations

Allow the Department 5 business days to review an amended QC plan or an addendum to the QC plan.

**90-1.01D(10)(b)(iii) Quality Control Manager**

Assign a QC manager. The QC manager must have one of the following qualifications:

- 1. Civil engineering license in the State
- 2. ACI Concrete Laboratory Testing Technician, Level 1 certification
- 3. NICET Level II concrete certification
- 4. ICC Reinforced Concrete Special Inspector certification
- 5. ASQ Certified Manager of Quality/Organizational Excellence with the qualifying 10 years of experience and body of knowledge in the field of concrete

During concrete placement, the QC manager must be at the plant or job site within 3 hours of receiving notification from the Engineer.

**90-1.01D(10)(b)(iv) Quality Control Testing Frequencies**

For each mix design used to produce CIP structural concrete, perform sampling and testing in compliance with the following tables:

**Aggregate QC Tests**

Quality characteristic	Test method	Minimum testing frequency
Aggregate gradation	California Test 202	Once per each day of pour
Sand equivalent	California Test 217	
Cleanness value	California Test 227	
Moisture content of fine aggregate	California Test 226	1-2 times per each day of pour, depending on conditions



### Concrete QC Tests

Quality characteristic	Test method	Minimum testing frequency
Slump	ASTM C143/C143M	Once per 100 cu yd or each day of pour, whichever is more frequent, and when requested by the Engineer
Uniformity <sup>a</sup>	ASTM C143/C143M, California Test 533, and California Test 529	When ordered by the Engineer
Air content, (freeze-thaw area)	California Test 504 <sup>b</sup>	If concrete is air entrained, once per 30 cu yd or each day of pour, whichever is more frequent
Air content, (non-freeze-thaw area)	California Test 504 <sup>b</sup>	If concrete is air entrained, once per 100 cu yd or each day of pour, whichever is more frequent
Temperature	California Test 557	Once per 100 cu yd or each day of pour, whichever is more frequent
Density	California Test 518	
Compressive strength <sup>c,d</sup>	California Test 521	

<sup>a</sup>As specified in section 90-1.01D(4).

<sup>b</sup>Use ASTM C173/C173M for lightweight concrete.

<sup>c</sup>Mark each cylinder with the Contract number, the date and time of sampling, and the weighmaster certificate number.

<sup>d</sup>You may need additional test samples to facilitate your schedule.

#### 90-1.01D(10)(b)(v) Inspection Reports

Document each inspection performed by a QC inspector in an inspection report that includes:

1. Contract number
2. Mix design number
3. Date and time of inspection
4. Plant location
5. Concrete placement location
6. Batch number
7. Reviewed copies of weighmaster certificates
8. Description of the inspection performed
9. Name, certification number, and signature of the QC inspector

#### 90-1.01D(10)(b)(vi) Rejection of Material

If any of the QC concrete test results fail to comply with the specified requirements, the batch of concrete must not be incorporated in the work. Notify the Engineer. Repeat the QC concrete tests on each subsequent batch until the test results comply with the specified requirements.

If 3 consecutive batches fail to comply with the specified requirements, (1) revise concrete operations as necessary to bring the concrete into compliance and (2) increase the frequency of QC testing. The revisions must be authorized before resuming production. After production resumes, you must receive authorization before returning to the QC testing frequency authorized in the QC plan.

#### 90-1.01D(11) Department Acceptance

##### 90-1.01D(11)(a) General

Reserved

##### 90-1.01D(11)(b) Cast-In-Place Structural Concrete Members

The Department accepts concrete incorporated into CIP structural concrete members based on only the Department's test results. QC test results will not be used for Department acceptance.

Replace the table in the 1st paragraph of section 90-1.02A with:

10-18-19

Type of work	Maximum length change of laboratory cast specimens at 28 days drying (average of 3) (percent)
Paving and approach slab concrete	0.050
Bridge deck concrete	0.032

Add to the end of section 90-1.02A:

10-18-19

For new bridge decks or PCC deck overlays, fibers must comply with ASTM D7508. Microfibers must be from 1/2 to 2 inches long. Macrofibers must be from 1 to 2-1/2 inches long.

Replace the introductory clause of the 6th paragraph of section 90-1.02H with:

04-19-19

For pavement, the total cementitious material must be composed of one of the following options, by weight:

Add after the 6th paragraph of section 90-1.02H:

04-19-19

For structures, the total cementitious material must be composed of one of the following options, by weight:

1. 25 percent natural pozzolan or fly ash with a CaO content of up to 10 percent and 75 percent portland cement.
2. 20 percent natural pozzolan or fly ash with a CaO content of up to 10 percent, 5 percent silica fume, and 75 percent portland cement.
3. 12 percent silica fume, metakaolin, or UFFA, and 88 percent portland cement.
4. 50 percent GGBFS and 50 percent portland cement.
5. 25 to 50 percent fly ash with a CaO content of up to 10 percent, and no natural pozzolan. The remaining portion of the cementitious material must be portland cement or a combination of portland cement and UFFA, metakaolin, GGBFS, or silica fume.

Replace section 90-1.03B(2) with:

04-19-19

#### 90-1.03B(2) Water Method

The water method must consist of keeping the concrete continuously wet by applying water for a curing period of at least 7 days after the concrete is placed.

Keep the concrete surface wet by applying water with an atomizing nozzle that forms a mist until the surface is covered with curing media. Do not allow the water to flow over or wash the concrete surface. At the end of the curing period, remove curing media.

Use any of the following curing media to retain moisture:

1. Mats, rugs, or carpets
2. Earth or sand blankets
3. Sheeting materials complying with the durability and water vapor transmission rate specified in section 5 of ASTM C171

To ensure proper coverage during curing:

1. Cover the entire concrete surface with the curing media
2. Secure the curing media joints to retain moisture
3. Keep the curing media within 3 inches of the concrete at all points along the surface being cured

Monitor concrete surface temperature during curing. Ensure that surface temperature is maintained at 140 degrees F or below. If the surface temperature exceeds 140 degrees F, determine cause and provide alternative curing methods to the Engineer for authorization.

10-19-18

**Delete the 2nd paragraph of section 90-3.02A.**

**Replace the 2nd paragraph of section 90-4.01A with:**

10-18-19

The specifications for (1) shrinkage in section 90-1.02A, (2) shrinkage reducing chemical admixture in section 51-1.02B, and (3) polymer fibers in section 51-1.02B do not apply to PC concrete members.

**Add to section 90-4.01C(1):**

04-19-19

Submit your QC test results for the tests performed under section 90-4.01D as an informational submittal. The QC test results must be submitted electronically through the Data Interchange for Materials Engineering website within 3 business days of completion of each QC test and must include the concrete mix design number.

AA

**96 GEOSYNTHETICS**

10-19-18

**Replace the 3rd table in the 3rd paragraph of section 96-1.02R with:**

10-19-18

**Cushion Fabric**

Quality characteristic	Test method	Requirement					
		Class 10	Class 12	Class 16	Class 24	Class 32	Class 60
Mass per unit area (oz/sq yd)	ASTM D5261	10	12	16	24	32	60
Grab tensile break strength (min, lb)	ASTM D4632	230	300	370	450	500	630
Grab tensile break elongation (min, %)	ASTM D4632	50					
Puncture strength (min, lb)	ASTM D6241	700	800	900	1100	1700	2400
Trapezoidal tear strength (min, lb)	ASTM D4533	95	115	145	200	215	290
UV resistance (min, %)	ASTM D7238	70					



Patricia Romo, P.E.  
Director of Transportation

# COUNTY OF RIVERSIDE

## TRANSPORTATION AND LAND MANAGEMENT AGENCY

Mojahed Salama, P.E.  
Deputy for Transportation/Capital Projects  
Richard Lantis, P.L.S.  
Deputy for Transportation/Planning and  
Development

### Transportation Department

#### ADDENDUM NUMBER 5

Dated December 6, 2019

to the  
Specifications and Contract Documents  
for the construction of

Avenue 66  
At SR-111 and Union Pacific Railroad  
Grade Separation Project  
Community of Mecca  
Project No. B8-0664  
Federal Aid No. – STPTCIFL-5956(221)

**Bids Due: Wednesday, December 11, 2019; 2:00 p.m.**  
14<sup>th</sup> Street Transportation Annex  
3525 14<sup>th</sup> Street; Riverside, CA 92501  
(951) 955-6780

This Addendum is issued pursuant to the Instructions to Bidders, Item No. 8, of the Contract Documents for the reference project. This Addendum is issued as a supplement to the specification and special provisions for the referenced project. The revisions to the specifications shall become a part of the Contract Documents, and each bidder shall acknowledge receipt thereof on the Bid (Proposal). Bidders are directed to sign this addendum as acknowledged, and attach the signed addendum to the contractor's submitted proposal.

Note: During the advertisement period of this project, this document and attachments (if any) are available upon request at the office of the Transportation Department, and are available as a free download at the Transportation Department's website:

<http://rctlma.org/trans/Contractors-Corner/Notices-Inviting-Bids>

#### MODIFICATIONS / CLARIFICATIONS TO SPECIAL PROVISIONS:

**Item 1: Revised Proposal.** Refer Attachment "A" "Proposal (Revised)" pages B2-B9 previously revised and issued by Addendum No. 4, Item 1. Delete and replace "Proposal" (pages B2-B9) with "Proposal (Revised)" attached herewith as **Attachment "A"**.

**a. The following bid item is deleted:**

Item# 187; Landscaping & Irrigation

**Item 2: Update - Federal Prevailing Wages Decision**

Refer to Attachment "B" of Addendum No. 4, "Federal Prevailing Wages Decision No. CA20190025 dated 11/29/2019, Modification No. 7, pages 1 through 20. Delete and replace these pages with the following:

Federal wage determination, General Decision No. **CA20190025** dated **12/06/2019**, Modification No. 8, attached herewith as **Attachment "B,"** shall apply to this project. This document is available upon request from the Transportation Department: (951) 955-6780, and also posted on following County website during project advertisement period:

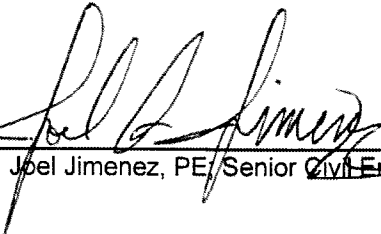
<http://rctlma.org/trans/Contractors-Corner/Notices-Inviting-Bids>

**ATTACHMENTS**

**A – Revised Proposal**

**B – Updated Federal Wages**

Prepared by: \_\_\_\_\_



Joel Jimenez, PE, Senior Civil Engineer; Contracts/Bidding Unit

Acknowledged: \_\_\_\_\_

Date: \_\_\_\_\_

(Contractor)

JRJ:sb

**Avenue 66**  
**At SR-111 and Union Pacific Railroad**  
**Grade Separation Project**  
**Community of Mecca**  
**Project No. B8-0664**  
**Federal Aid No. – STPTCIFL-5956(221)**

**PROPOSAL (REVISED)**

ITEM No.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	ITEM PRICE (IN FIGURES)	TOTAL (IN FIGURES)
1	019902	Course of Construction Insurance	LS	1		
2	066020	Relations with Railroad (Including Flagging)	LS	1		
3	066105	Resident Engineers Office	LS	1		
4	070030	Lead Compliance Plan	LS	1		
5	080050	Progress Schedule (Critical Path Method)	LS	1		
6	100100	Develop Water Supply	LS	1		
7	120090	Construction Area Signs	LS	1		
8	120091A	Retroreflective Sheeting (Type XI) For Construction Area Signs	SQFT	302		
9	120100	Traffic Control System	LS	1		
10	120120	Type III Barricade	EA	48		
11	120149	Temporary Pavement Marking (Paint)	SQFT	330		
12	120159	Temporary Traffic Stripe (Paint)	LF	11,700		
13	120165	Channelizer (Surface Mounted)	EA	450		
14	120198	Plastic Traffic Drums	EA	18		
15	120300	Temporary Pavement Marker	EA	420		
16	124000	Tempoary Pedestrian Access Route	LS	1		
17	128652	Portable Changeable Message Sign	LS	1		
18	129000	Temporary Railing (Type K)	LF	5,080		
19	129110A	Temporary Crash Cushion (ABSORB 350)	EA	19		
20	130100	Job Site Management	LS	1		
21	130300	Prepare Storm Water Pollution Prevention Plan	LS	1		
22	130330	Storm Water Annual Report	EA	2		
23	130505	Move-In/Move-Out (Temporary Erosion Control)	EA	12		
24	130520	Temporary Hydraulic Mulch	SQYD	115,000		
25	130610	Temporary Check Dam	LF	1,310		
26	130620	Temporary Drainage Inlet Protection	EA	52		
27	130640	Temporary Fiber Roll	LF	17,100		
28	130710	Temporary Construction Entrance	EA	15		

**PROPOSAL (REVISED)**

ITEM No.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	ITEM PRICE (IN FIGURES)	TOTAL (IN FIGURES)
29	130730	Street Sweeping	LS	1		
30	130900	Temporary Concrete Washout	LS	1		
31	131201	Temporary Creek Diversion Systems	LS	1		
32	141103	Remove Yellow Thermoplastic Traffic Stripe (Hazardous Waste)	LF	3,540		
33	141120	Treated Wood Waste	LB	1,890		
34	142000A	Native American Monitoring	LS	1		
35	160110	Temporary High-Visibility Fence	LF	5,465		
36	170103	Clearing and Grubbing	LS	1		
37	170110A	Remove Tree	EA	121		
38	190101(F)	Roadway Excavation	CY	117,000		
39	192003(F)	Structure Excavation (Bridge)	CY	5,799		
40	192020(F)	Structure Excavation (Type D)	CY	1,350		
41	192025(F)	Structure Excavation (Culvert)	CY	154		
42	193003(F)	Structure Backfill (Bridge)	CY	10,070		
43	193004(F)	Structure Backfill (Culvert)	CY	14		
44	193013(F)	Structure Backfill (Retaining Wall)	CY	526		
45	198010	Imported Borrow	CY	27,500		
46	198050(F)	Embankment	CY	53,400		
47	198215	Subgrade Enhancement Geogrid	SQYD	18,800		
48	_____	ITEM DELETED BY ADDENDUM	_____	_____	_____	_____
49	208610A	12" PVC Pipe-C900 (DR25)	LF	850		
50	210300	Hydromulch	SQFT	466,000		
51	210350	Fiber Rolls	LF	17,900		
52	211111	Permanent Erosion Control Establishment Work	LS	1		
53	250201	Class 2 Aggregate Subbase	CY	4,040		
54	260203	Class 2 Aggregate Base	CY	18,300		
55	377501	Slurry Seal	TON	150		
56	390100	Prime Coat	TON	75		
57	390132	Hot Mix Asphalt (Type A)	TON	25,700		
58	390137	Rubberized Hot Mix Asphalt (Gap Graded)	TON	2,540		
59	394076	Place Hot Mix Asphalt Dike (Type E)	LF	810		
60	394090	Place Hot Mix Asphalt (Miscellaneous Areas)	SQYD	40		

**PROPOSAL (REVISED)**

ITEM No.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	ITEM PRICE (IN FIGURES)	TOTAL (IN FIGURES)
61	397005	Tack Coat	TON	120		
62	398200	Cold Plane Asphalt Concrete Pavement	SQYD	2,680		
63	398300	Remove Base and Surfacing	CY	190		
64	477021(F)	Mechanically Stabilized Embankment, Location A	SQFT	5,314		
65	477022(F)	Mechanically Stabilized Embankment, Location B	SQFT	14,462		
66	477023(F)	Mechanically Stabilized Embankment, Location C	SQFT	11,189		
67	477024(F)	Mechanically Stabilized Embankment, Location D	SQFT	5,314		
68	477025(F)	Mechanically Stabilized Embankment, Location E	SQFT	4,673		
69	490538	Furnish Steel Piling (HP 14 x 117)	LF	27,370		
70	490539	Drive Steel Pile (HP 14 x 117)	EA	532		
71	500001	Prestressing Cast-In-Place Concrete	LS	1		
72	510051(F)	Structural Concrete, Bridge Footing	CY	1,557		
73	510053(F)	Structural Concrete, Bridge	CY	5,730		
74	510054(F)	Structural Concrete, Bridge (Polymer Fiber)	CY	2,035		
75	510060(F)	Structural Concrete, Retaining Wall	CY	311		
76	510072(F)	Structural Concrete, Barrier Slab	CY	1,028		
77	510086(F)	Structural Concrete, Approach Slab (Type N)	CY	420.0		
78	510090(F)	Structural Concrete, Box Culvert	CY	127		
79	510094(F)	Structural Concrete, Drainage Inlet	CY	39		
80	510502(F)	Minor Concrete (Minor Structure)	CY	265		
81	510526(F)	Minor Concrete (Backfill)	CY	560		
82	511035	Architectural Treatment [Silhouette A]	EA	2		
83	511035	Architectural Treatment [Silhouette B]	EA	1		
84	511035	Architectural Treatment [Silhouette C]	EA	1		
85	511035A	Recessed Concrete Logo	EA	4		
86	511035A(F)	Berkely Rib Texture	SQFT	5,304		
87	_____	ITEM DELETED BY ADDENDUM	_____	_____	_____	_____
88	518051(F)	PTFE Spherical Bearing	EA	6		
89	519099	Joint Seal Assembly (MR6")	LF	89		
90	519100	Joint Seal (Type B) (MR 2")	LF	166		
91	519118	Joint Seal Assembly (MR9")	LF	89		
92	520102(F)	Bar Reinforcing Steel (Bridge)	LB	2,015,057		



**PROPOSAL (REVISED)**

ITEM No.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	ITEM PRICE (IN FIGURES)	TOTAL (IN FIGURES)
93	520103(F)	Bar Reinforcing Steel (Retaining Wall)	LB	30,000		
94	520107(F)	Bar Reinforcing Steel (Box Culvert)	LB	45,885		
95	520110(F)	Bar Reinforcing Steel (Epoxy Coated) (Bridge)	LB	12,694		
96	520115(F)	Bar Reinforcing Steel (Galvanized) (Bridge)	LB	8,419		
97	560231A	Mecca Sign Panel	EA	4		
98	568062	Pedestrian Barricade (Type I)	EA	2		
99	582001(F)	Sound Wall (Masonry Block)	SQFT	1,550		
100	582002(F)	Access Gate (Sound Wall)	EA	1		
101	641107	18" Plastic Pipe	LF	1,066		
102	641113	24" Plastic Pipe	LF	158		
103	650026	36" Reinforced Concrete Pipe (Class III)	LF	22		
104	652311	18" Reinforced Concrete Pipe (Class III)	LF	1,276		
105	700617	Drainage Inlet Marker	EA	26		
106	703450	Welded Steel Pipe Casing (Bridge)	LF	174		
107	703450A	18" Welded Steel Pipe (Storm Drain) (Bridge)	LF	216		
108	703451A	Storm Drain Cradle Support	EA	16		
109	703452A	Double Ball Expansion Joint (Storm Drain)	EA	2		
110	703460	24" Welded Steel Pipe Casing [Irrigation]	LF	160		
111	705204	18" Concrete Flared End Section	EA	1		
112	705470A	18" Plastic Flared End Section	EA	6		
113	705471A	24" Plastic Flared End Section	EA	4		
114	710136	Remove Pipe (LF)	LF	911		
115	710150	Remove Inlet	EA	1		
116	721810	Slope Paving (Concrete)	CY	50		
117	723080	Rock Slope Protection (60 lb, Class II, Method B)	CY	6		
118	723095	Rock Slope Protection (20 lb, Class I, Method B)	CY	76		
119	729011	Rock Slope Protection Fabric (Class 8)	SQYD	167		
120	730020	Minor Concrete (Curb)	CY	36		
121	730070	Detectable Warning Surface	SQFT	260		
122	731504	Minor Concrete (Curb and Gutter)	CY	230		
123	731521	Minor Concrete (Sidewalk)	CY	440		
124	731623	Minor Concrete (Curb Ramp)	CY	20		

**PROPOSAL (REVISED)**

ITEM No.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	ITEM PRICE (IN FIGURES)	TOTAL (IN FIGURES)
125	731710	Remove Concrete Curb	LF	290		
126	731780	Remove Concrete Sidewalk	SQYD	620		
127	731840	Remove Concrete (Curb and Gutter)	LF	720		
128	017302	Minor Concrete (Cross Gutter)	CY	44		
129	017312	Minor Concrete (Commercial Driveway)	CY	19		
130	153210	Remove Concrete [Cross Gutter]	SQYD	220		
131	153210	Remove Concrete [Curb Ramp]	SQYD	130		
132	750001(F)	Miscellaneous Iron and Steel	LB	8,796		
133	750010	Manhole Frame and Cover	EA	15		
134	750501(F)	Miscellaneous Metal (Bridge)	LB	1,920		
135	750505(F)	Bridge Deck Drainage System	LB	47,065		
136	037700	8" PVC Pipe-SDR 26	LF	470		
137	719300	Manhole [48"]	EA	1		
138	780433	Paint Curb (2-Coat)	SQFT	200		
139	780440	Prepare and Stain Concrete	SQFT	700		
140	780460(F)	Anti-Graffiti Coating	SQFT	102,310		
141	780500	Parking Bumper (Precast Concrete)	EA	2		
142	782200	Obliterate Surfacing	SQYD	5,370		
143	803020	Remove Fence	LF	1,290		
144	803170	Relocate Fence	LF	150		
145	820250	Remove Roadside Sign	EA	19		
146	820300	Remove Roadside Sign (Strap and Saddle Bracket Method)	EA	1		
147	820610	Relocate Roadside Sign	EA	13		
148	820750	Furnish Single Sheet Aluminum Sign (0.063"-Unframed)	SQFT	280		
149	820760	Furnish Single Sheet Aluminum Sign (0.080"-Unframed)	SQFT	300		
150	820780	Furnish Single Sheet Aluminum Sign (0.063"-Framed)	SQFT	8		
151	820790	Furnish Single Sheet Aluminum Sign (0.080"-Framed)	SQFT	88		
152	820807A	Retroreflective Sheeting (Type XI)	SQFT	548		
153	820840	Roadside Sign - One Post	EA	49		
154	820850	Roadside Sign - Two Post	EA	1		
155	820860	Install Sign (Strap and Saddle Bracket Method)	EA	5		
156	820880	Install Sign (Mast-Arm Hanger Method)	EA	22		

**PROPOSAL (REVISED)**

ITEM No.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	ITEM PRICE (IN FIGURES)	TOTAL (IN FIGURES)
157	832005	Midwest Guardrail System	LF	660		
158	832070	Vegetation Control (Minor Concrete)	SQYD	440		
159	833033(F)	Chain Link Railing (Type 7 Modified)	LF	1,721		
160	833088(F)	Tubular Handrailing	LF	1,669		
161	833141A	Concrete Pedestrian Railing	LF	1,073		
162	839724A(F)	Concrete Barrier (Type 732SW Modified)	LF	1,093		
163	839719A(F)	Concrete Barrier (Type 836 Modified)	LF	1,898		
164	839741A(F)	Concrete Barrier (Type 842 Modified)	LF	1,066		
165	839741A(F)	Concrete Barrier (Type 842)	LF	33		
166	839543	Transition Railing (Type WB-31)	EA	2		
167	_____	ITEM DELETED BY ADDENDUM	_____	_____	_____	_____
168	839584	Alternative In-line Terminal System	EA	4		
169	839752	Remove Guardrail	LF	62		
170	840508	8" Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility) (Broken 12'-3')	LF	520		
171	840516	Thermoplastic Pavement Marking (Enhanced Wet Night Visibility)	SQFT	3,910		
172	840617	6" Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility) (Broken 6-1)	LF	90		
173	840623	6" Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility) (Broken 36-12)	LF	1,002		
174	840651	Painted Stall lines and Pavement Markings	SQFT	840		
175	846007	6" Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility)	LF	53,665		
176	846008	6" Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility) (Broken 8-4)	LF	190		
177	846009	8" Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility)	LF	6,317		
178	846030	Remove Thermoplastic Traffic Stripe	LF	4,630		
179	846035	Remove Thermoplastic Pavement Marking	SQFT	67		
180	846051	12" Rumble Strip (asphalt concrete pavement)	STA	15		
181	810230	Pavement Marker (Retroreflective)	EA	1,790		
182	870400A	Signal and Lighting System (Location 1)	LS	1		
183	870400B	Signal and Lighting System (Location 2)	LS	1		
184	870400C	Signal and Lighting System (Location 3)	LS	1		
185	870200	Lighting System	LS	1		
186	872130	Modifying Existing Electrical System	LS	1		
187	_____	ITEM DELETED BY ADDENDUM	_____	_____	_____	_____
188	760090	Mobilization, Demobilization, and Final Cleanup	LS	1		

**PROPOSAL (REVISED)**

ITEM No.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	ITEM PRICE (IN FIGURES)	TOTAL (IN FIGURES)
188a	511035	Architectural Treatment [Silhouette D]	EA	1		
188b	511035	Architectural Treatment [Silhouette E]	EA	1		
188c	511035	Architectural Treatment [Silhouette F]	EA	1		
188d	511035	Architectural Treatment [Silhouette G]	EA	1		
188e	511035	Architectural Treatment [Silhouette H]	EA	12		
188f	710112	Abandon Manhole	EA	2		
188g	710116A	Abandon Sewer	LF	558		
188h	710164	Remove Sewer Pipe	LF	217		
188i		ITEM DELETED BY ADDENDUM				
188j	510073A	Structural Concrete, Coping	CY	49		
188k	839515A(F)	Picket Railing	LF	669		
188l	200111	Decorative Boulders	EA	97		
188m	206005	Steel Edging	LF	1,110		
188n	200113	Rock Mulch	SF	44,700		
188o	202004	Iron Sulfate	LB	3		
188p	202006	Soil Amendment	CY	2		
188q	202038	Packet Fertilizer	EA	112		
188r	202039	Slow Release Fertilizer	LB	6		
188s	204425	1 1/2" Backflow Preventor Assembly	EA	1		
188t	206562	1" Remote Control Valve	EA	2		
188u	206564	1 1/2" Remote Control Valve	EA	1		
188v	206908	Irrigation controller (Pedestal Mounted)	EA	1		
188w	208442	Flow Sensor	EA	1		
188x	208445	Tree Well Sprinkler Assembly	EA	48		
188y	208574	1 1/2" Gate Valve	EA	1		
188z	208595	1" Plastic Pipe (Schedule 40 ) (Supply Line)	LF	450		
188aa	208596	1 1/4" Plastic Pipe (Schedule 40 ) (Supply Line)	LF	300		
188bb	208597	1 1/2" Plastic Pipe (Schedule 40 ) (Supply Line)	LF	250		
188cc	208649	Quick Coupling Valve	EA	1		
188dd	208683	Ball Valve	EA	2		
188ee	208739	10" Corrugated High Density Polyethylene Pipe Conduit	LF	90		
188ff	839607A	Alternative Crash Cushion	EA	2		

**PROPOSAL (REVISED)**

ITEM No.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	ITEM PRICE (IN FIGURES)	TOTAL (IN FIGURES)
188gg	198060A	Export	CY	14,300		
188hh	204099	Plant Establishment Work	LS	1		
188ii	192037(F)	Structure Excavation (Retaining Wall)	CY	578		
188jj	032013	Irrigation Water Meter and Electrical Service	LS	1		

BASE BID

SUB-TOTAL:

ITEMS 1-188jj

"WORDS"

\$

**ALTERNATIVE BID SCHEDULE - CVWD DOMESTIC WATER TRANSMISSION MAIN**

189	703450	Welded Steel Pipe Casing (Bridge)	LF	156		
190	703453A	Double Ball Expansion Joint (Waterline)	EA	4		
191	032000	30" Ductile Iron Pipe (Water Main)	LF	2,801		
192	032001	6" Ductile Iron Pipe Water Line	LF	37		
193	032002	30" Welded Steel Pipe (.250" Thick)	LF	1,091		
194	993002	Fire Hydrant	EA	2		
195	032003	4" Air Release and Air/Vacuum Valve	EA	1		
196	032004	6" Temporary Blow-Off	EA	1		
197	760090	Mobilization, Demobilization and Final Clean	LS	1		
198	032004	12" Ductile Iron Pipe Watermain	LF	109		
199	032005	2" Air Release and Air/Vacuum Valve	EA	2		
200	032006	6" Blow-Off	EA	2		
201	032008	30" Butterfly Valve	EA	8		
202	032009	30" Gate Valve	EA	1		
203	032010	6" Gate Valve	EA	1		
204	032011	12" Gate Valve	EA	1		
205	032012	Waterline Reducer (30" to 12")	EA	1		

ALT. BID SCH. 1

SUB-TOTAL:

ITEMS 189-205

"WORDS"

\$

PROJECT TOTAL:

ITEMS 1-205

"WORDS"

\$

**APPENDIX D  
Federal Prevailing Wage Decision**

"General Decision Number: CA20190025 12/06/2019

Superseded General Decision Number: CA20180036

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

County: Riverside County in California.

BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.60 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/04/2019
1	02/01/2019
2	02/15/2019
3	05/03/2019
4	07/26/2019
5	11/08/2019
6	11/15/2019
7	11/29/2019
8	12/06/2019

ASBE0005-002 07/01/2019

Rates Fringes

Asbestos Workers/Insulator

(Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....\$ 43.77 22.48  
 Fire Stop Technician  
 (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls).....\$ 27.92 18.31

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 ASBE0005-004 07/01/2019

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)....\$ 20.63	20.63	12.17

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 BOIL0092-003 03/01/2018

	Rates	Fringes
BOILERMAKER.....\$ 44.07	44.07	33.52

\* BRCA0004-011 05/01/2018

	Rates	Fringes
BRICKLAYER; MARBLE SETTER.....\$ 40.39	40.39	13.65

\*The wage scale for prevailing wage projects performed in Blythe, China lake, Death Valley, Fort Irwin, Twenty-Nine Palms, Needles and 1-15 corridor (Barstow to the Nevada State Line) will be Three Dollars (\$3.00) above the standard San Bernardino/Riverside County hourly wage rate

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 BRCA0018-004 06/01/2019

	Rates	Fringes
MARBLE FINISHER.....\$ 33.43	33.43	14.11
TILE FINISHER.....\$ 28.23	28.23	12.65
TILE LAYER.....\$ 40.07	40.07	18.36

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 BRCA0018-010 09/01/2018

	Rates	Fringes
TERRAZZO FINISHER.....\$ 31.25	31.25	13.41
TERRAZZO WORKER/SETTER.....\$ 38.39	38.39	14.18

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 CARP0409-001 07/01/2018

	Rates	Fringes
CARPENTER		
(1) Carpenter, Cabinet Installer, Insulation Installer, Hardwood Floor Worker and acoustical installer.....	\$ 41.84	19.17
(2) Millwright.....	\$ 42.91	19.17
(3) Piledrivermen/Derrick Bargeman, Bridge or Dock Carpenter, Heavy Framer, Rock Bargeman or Scowman, Rockslinger, Shingler (Commercial).....	\$ 42.54	19.17
(4) Pneumatic Nailer, Power Stapler.....	\$ 40.09	19.17
(5) Sawfiler.....	\$ 39.83	19.17
(6) Scaffold Builder.....	\$ 31.60	19.17
(7) Table Power Saw Operator.....	\$ 40.93	19.17

FOOTNOTE: Work of forming in the construction of open cut sewers or storm drains, on operations in which horizontal lagging is used in conjunction with steel H-Beams driven or placed in pre- drilled holes, for that portion of a lagged trench against which concrete is poured, namely, as a substitute for back forms (which work is performed by piledrivers): \$0.13 per hour additional.

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CARP0409-002 07/01/2016

	Rates	Fringes
Diver		
(1) Wet.....	\$ 712.48	17.03
(2) Standby.....	\$ 356.24	17.03
(3) Tender.....	\$ 348.24	17.03
(4) Assistant Tender.....	\$ 324.24	17.03

Amounts in "'Rates' column are per day

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CARP0409-005 07/01/2015

	Rates	Fringes
Drywall		
DRYWALL INSTALLER/LATHER....	\$ 37.35	11.08
STOCKER/SCRAPPER.....	\$ 10.00	7.17

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CARP0409-008 08/01/2010

	Rates	Fringes
Modular Furniture Installer.....	\$ 17.00	7.41

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ELEC0440-001 12/31/2018

	Rates	Fringes
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ELECTRICIAN

INSIDE ELECTRICIAN.....	\$ 40.89	24.16
INTELLIGENT TRANSPORTATION SYSTEMS		
Electrician.....	\$ 36.99	3%+23.18
Technician.....	\$ 27.75	3%+23.18

ZONE PAY: Zone A: Free travel zone for all contractors performing work in Zone A.  
 Zone B: Any work performed in Zone (B) shall add \$12.00 per hour to the current wage scale. Zone (B) shall be the area from the eastern perimeter of Zone (A) to a line which runs north and south beginning at Little Morongo Canyon (San Bernardino/Riverside County Line), Southeast along the Coachella Tunnels, Colorado River Aqueduct and Mecca Tunnels to Pinkham Wash then South to Box Canyon Road, then southwest along Box Canyon Road to Highway 195 west onto 195 south to Highway 86 to Riverside/Imperial County Line.

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 ELEC1245-001 01/01/2019

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	\$ 56.79	17.41
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 45.36	16.24
(3) Groundman.....	\$ 34.68	15.86
(4) Powderman.....	\$ 49.55	3%+17.65

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Day

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 ELEV0018-001 01/01/2019

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 55.58	34.125

FOOTNOTE:  
 PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.  
 PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

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 ENGI0012-003 07/01/2018

	Rates	Fringes
OPERATOR: Power Equipment		

(All Other Work)

GROUP 1.....	\$ 45.30	25.25
GROUP 2.....	\$ 46.08	25.25
GROUP 3.....	\$ 46.37	25.25
GROUP 4.....	\$ 47.86	25.25
GROUP 5.....	\$ 48.96	25.25
GROUP 6.....	\$ 48.08	25.25
GROUP 8.....	\$ 48.19	25.25
GROUP 9.....	\$ 49.29	25.25
GROUP 10.....	\$ 48.31	25.25
GROUP 11.....	\$ 49.41	25.25
GROUP 12.....	\$ 48.48	25.25
GROUP 13.....	\$ 48.58	25.25
GROUP 14.....	\$ 48.61	25.25
GROUP 15.....	\$ 48.69	25.25
GROUP 16.....	\$ 48.81	25.25
GROUP 17.....	\$ 48.98	25.25
GROUP 18.....	\$ 49.08	25.25
GROUP 19.....	\$ 49.19	25.25
GROUP 20.....	\$ 49.31	25.25
GROUP 21.....	\$ 49.48	25.25
GROUP 22.....	\$ 49.58	25.25
GROUP 23.....	\$ 49.69	25.25
GROUP 24.....	\$ 49.81	25.25
GROUP 25.....	\$ 49.98	25.25

OPERATOR: Power Equipment  
(Cranes, Piledriving & Hoisting)

GROUP 1.....	\$ 46.65	25.25
GROUP 2.....	\$ 47.43	25.25
GROUP 3.....	\$ 47.72	25.25
GROUP 4.....	\$ 47.86	25.25
GROUP 5.....	\$ 48.08	25.25
GROUP 6.....	\$ 48.19	25.25
GROUP 7.....	\$ 48.31	25.25
GROUP 8.....	\$ 48.48	25.25
GROUP 9.....	\$ 48.65	25.25
GROUP 10.....	\$ 49.65	25.25
GROUP 11.....	\$ 50.65	25.25
GROUP 12.....	\$ 51.65	25.25
GROUP 13.....	\$ 52.65	25.25

OPERATOR: Power Equipment  
(Tunnel Work)

GROUP 1.....	\$ 47.15	25.25
GROUP 2.....	\$ 47.93	25.25
GROUP 3.....	\$ 48.22	25.25
GROUP 4.....	\$ 48.39	25.25
GROUP 5.....	\$ 48.58	25.25
GROUP 6.....	\$ 48.69	25.25
GROUP 7.....	\$ 48.81	25.25

PREMIUM PAY:

\$3.75 per hour shall be paid on all Power Equipment Operator work on the following Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: \$2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified

as a concrete mobile mixer operator.

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter (concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system

(below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity); Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000

auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth- moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self- loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote- control earth-moving equipment operator (operating a second piece of equipment: \$1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in

tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

CRANES, PILEDIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

ENGINEERS ZONES

\$1.00 additional per hour for all of IMPERIAL County and the portions of KERN, RIVERSIDE & SAN BERNARDINO Counties as defined below:

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E,



MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SMB to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1s, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

\$1.00 additional per hour for portions of SAN LUIS OBISPO, KERN, SANTA BARBARA & VENTURA as defined below:

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW corner of T30S, R17E, MDM. Continue S to SW corner of T31S, R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa Barbara County and Ventura County boundary at that point which is the SW corner of Section 34. T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a think strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

\$2.00 additional per hour for INYO and MONO Counties and the Northern portion of SAN BERNARDINO County as defined below:

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the

California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

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 ENGI0012-004 08/01/2015

	Rates	Fringes
OPERATOR: Power Equipment		
(DREDGING)		
(1) Leverman.....	\$ 49.50	23.60
(2) Dredge dozer.....	\$ 43.53	23.60
(3) Deckmate.....	\$ 43.42	23.60
(4) Winch operator (stern winch on dredge).....	\$ 42.87	23.60
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.....	\$ 42.33	23.60
(6) Barge Mate.....	\$ 42.94	23.60

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 IRON0377-002 01/01/2019

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 32.58	23.41
Ornamental, Reinforcing and Structural.....	\$ 39.00	32.05

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland, Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island, Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base,  
 Naval Post Graduate School - Monterey, Yermo Marine Corps  
 Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

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 LABO0300-005 01/01/2018

	Rates	Fringes
Asbestos Removal Laborer.....	\$ 33.19	17.78

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos- containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

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 LABO0345-001 07/01/2018

	Rates	Fringes
LABORER (GUNITE)		
GROUP 1.....	\$ 42.18	18.27
GROUP 2.....	\$ 41.23	18.27
GROUP 3.....	\$ 37.69	18.27

FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0"" above base level and which work must be performed in whole or in part more than 75'-0"" above base level, that work performed above the 75'-0"" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen

GROUP 2: Gunmen

GROUP 3: Reboundmen

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 LABO1184-001 07/01/2019

Laborers: (HORIZONTAL DIRECTIONAL DRILLING)

(1) Drilling Crew Laborer...	\$ 36.70	15.05
(2) Vehicle Operator/Hauler.	\$ 36.87	15.05
(3) Horizontal Directional Drill Operator.....	\$ 38.72	15.05
(4) Electronic Tracking Locator.....	\$ 40.72	15.05

Laborers: (STRIPING/SLURRY SEAL)

GROUP 1.....	\$ 37.91	18.06
GROUP 2.....	\$ 39.21	18.06
GROUP 3.....	\$ 41.22	18.06
GROUP 4.....	\$ 42.96	18.06

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

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LABO1184-002 07/01/2019

	Rates	Fringes
LABORER (TUNNEL)		
GROUP 1.....	\$ 41.29	20.09
GROUP 2.....	\$ 41.61	20.09
GROUP 3.....	\$ 42.07	20.09
GROUP 4.....	\$ 42.76	20.09
LABORER		
GROUP 1.....	\$ 35.24	20.09

GROUP 2.....	\$ 35.79	20.09
GROUP 3.....	\$ 36.34	20.09
GROUP 4.....	\$ 37.89	20.09
GROUP 5.....	\$ 38.24	20.09

## LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader, piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete; Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations

GROUP 2: Asphalt shoveler; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster (pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellower

GROUP 3: Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials ("applying" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter;

Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled

GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt- rubber distributor boot person; Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast

GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller: All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

#### TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Changehouse person; Dump person; Dump person (outside); Swamper (brake person and switch person on tunnel work); Tunnel materials handling person; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.)

GROUP 2: Chucktender, cabledtender; Loading and unloading agitator cars; Vibrator person, jack hammer, pneumatic tools (except driller); Bull gang mucker, track person; Concrete crew, including rodder and spreader

GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher

GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

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LABO1184-004 07/01/2019

Rates

Fringes

Brick Tender.....\$ 33.06 19.17

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LAB01414-001 08/07/2019

Rates Fringes

LABORER

PLASTER CLEAN-UP LABORER....\$ 34.82 20.02  
PLASTER TENDER.....\$ 37.37 20.02

Work on a swing stage scaffold: \$1.00 per hour additional.

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PAIN0036-001 07/01/2018

Rates Fringes

Painters: (Including Lead  
Abatement)

(1) Repaint (excludes San  
Diego County).....\$ 27.59 14.92  
(2) All Other Work.....\$ 31.12 15.04

REPAINT of any previously painted structure. Exceptions:  
work involving the aerospace industry, breweries,  
commercial recreational facilities, hotels which operate  
commercial establishments as part of hotel service, and  
sports facilities.

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PAIN0036-008 10/01/2018

Rates Fringes

DRYWALL FINISHER/TAPER.....\$ 40.18 19.22

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PAIN0036-015 06/01/2018

Rates Fringes

GLAZIER.....\$ 42.20 25.50

FOOTNOTE: Additional \$1.25 per hour for work in a condor,  
from the third (3rd) floor and up Additional \$1.25 per  
hour for work on the outside of the building from a swing  
stage or any suspended contrivance, from the ground up

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PLAS0200-009 08/01/2018

Rates Fringes

PLASTERER.....\$ 36.86 18.00

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PLAS0500-002 07/01/2019

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 37.00 25.53

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PLUM0016-001 09/01/2018

Rates Fringes

PLUMBER/PIPEFITTER

Plumber and Pipefitter All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space and work on strip malls, light commercial, tenant improvement and remodel work.....	\$ 50.13	22.16
Work ONLY on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space.....	\$ 48.58	21.18
Work ONLY on strip malls, light commercial, tenant improvement and remodel work.....	\$ 37.10	19.51

\* PLUM0345-001 09/01/2019

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter.....	\$ 34.40	23.05
Sewer & Storm Drain Work....	\$ 34.40	23.05

ROOF0036-002 08/01/2019

	Rates	Fringes
ROOFER.....	\$ 39.52	17.47

FOOTNOTE: Pitch premium: Work on which employees are exposed to pitch fumes or required to handle pitch, pitch base or pitch impregnated products, or any material containing coal tar pitch, the entire roofing crew shall receive \$1.75 per hour "pitch premium" pay.

SFCA0669-002 04/01/2018

	Rates	Fringes
SPRINKLER FITTER.....	\$ 39.73	21.90

SHEE0105-003 01/01/2019

LOS ANGELES (South of a straight line drawn between Gorman and Big Pines) and Catalina Island, INYO, KERN (Northeast part, East of Hwy 395), MONO ORANGE, RIVERSIDE, AND SAN BERNARDINO COUNTIES

	Rates	Fringes
SHEET METAL WORKER		



(1) Commercial - New Construction and Remodel work.....	\$ 44.28	28.46
(2) Industrial work including air pollution control systems, noise abatement, hand rails, guard rails, excluding aritechtural sheet metal work, excluding A-C, heating, ventilating systems for human comfort...	\$ 44.28	28.46

TEAM0011-002 07/01/2019

	Rates	Fringes
TRUCK DRIVER		
GROUP 1.....	\$ 31.59	29.59
GROUP 2.....	\$ 31.74	29.59
GROUP 3.....	\$ 31.87	29.59
GROUP 4.....	\$ 32.06	29.59
GROUP 5.....	\$ 32.09	29.59
GROUP 6.....	\$ 32.12	29.59
GROUP 7.....	\$ 32.37	29.59
GROUP 8.....	\$ 32.62	29.59
GROUP 9.....	\$ 32.82	29.59
GROUP 10.....	\$ 33.12	29.59
GROUP 11.....	\$ 33.62	29.59
GROUP 12.....	\$ 34.05	29.59

WORK ON ALL MILITARY BASES:

PREMIUM PAY: \$3.00 per hour additional.

[29 palms Marine Base, Camp Roberts, China Lake, Edwards AFB,  
El Centro Naval Facility, Fort Irwin, Marine Corps  
Logistics Base at Nebo & Yermo, Mountain Warfare Training  
Center, Bridgeport, Point Arguello, Point Conception,  
Vandenberg AFB]

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Truck driver

GROUP 2: Driver of vehicle or combination of vehicles - 2  
axles; Traffic control pilot car excluding moving heavy  
equipment permit load; Truck mounted broom

GROUP 3: Driver of vehicle or combination of vehicles - 3  
axles; Boot person; Cement mason distribution truck; Fuel  
truck driver; Water truck - 2 axle; Dump truck, less than  
16 yds. water level; Erosion control driver

GROUP 4: Driver of transit mix truck, under 3 yds.; Dumpcrete  
truck, less than 6-1/2 yds. water level

GROUP 5: Water truck, 3 or more axles; Truck greaser and tire  
person (\$0.50 additional for tire person); Pipeline and  
utility working truck driver, including winch truck and  
plastic fusion, limited to pipeline and utility work;  
Slurry truck driver

GROUP 6: Transit mix truck, 3 yds. or more; Dumpcrete truck, 6-1/2 yds. water level and over; Vehicle or combination of vehicles - 4 or more axles; Oil spreader truck; Dump truck, 16 yds. to 25 yds. water level

GROUP 7: A Frame, Swedish crane or similar; Forklift driver; Ross carrier driver

GROUP 8: Dump truck, 25 yds. to 49 yds. water level; Truck repair person; Water pull - single engine; Welder

GROUP 9: Truck repair person/welder; Low bed driver, 9 axles or over

GROUP 10: Dump truck - 50 yds. or more water level; Water pull - single engine with attachment

GROUP 11: Water pull - twin engine; Water pull - twin engine with attachments; Winch truck driver - \$1.25 additional when operating winch or similar special attachments

GROUP 12: Boom Truck 17K and above

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical

order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

**ADDITIONAL ITEMS FILED  
WITH  
THE CLERK OF THE  
BOARD**