

2023 Standard Specifications Structures Updates

05 APR 2024

Structure Specifications Research & Development

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Introduction

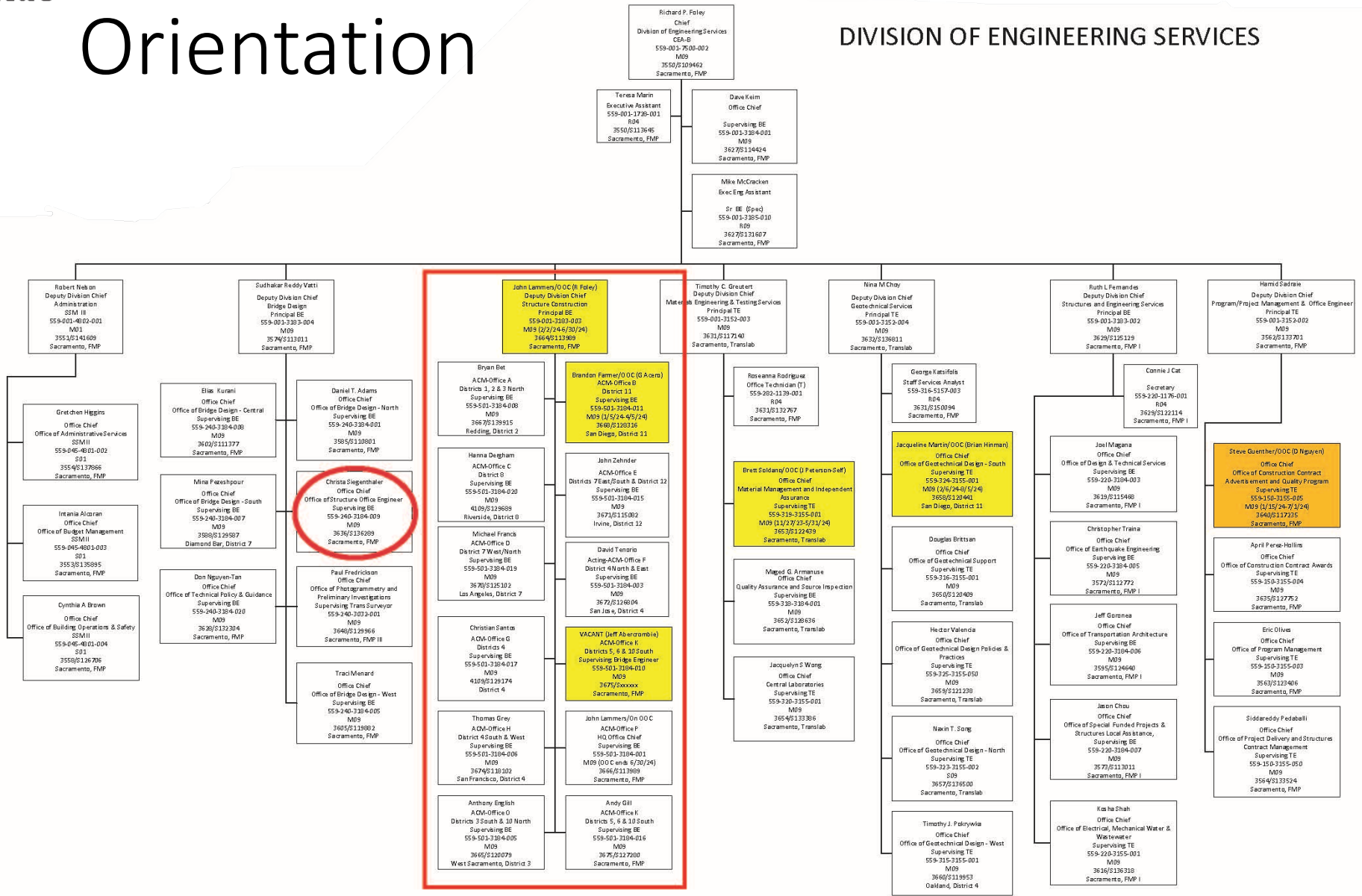


- Joined Caltrans in 2020
 - Senior Bridge Engineer with Structure Specifications Research & Development Branch in Structure Office Engineer
 - Specification engineer with the Structure Specifications Branch South (D6-12) in Structure Office Engineer
 - Project engineer with Branch 6 in Office of Bridge Design North
 - Assistance Structure Representative at D4 Novato in Structure Construction Office F
- Prior to Caltrans, worked at Granite Construction, Clark Pacific, CH2M Hill, and NAVFAC
- Served active duty as a US Naval Officer with the Civil Engineer Corps leading the Pacific Seabees
- Continues military service as a US Naval Reservist
- 19 years of combined experience delivering projects in the private, military, Federal, and State sectors



Orientation

DIVISION OF ENGINEERING SERVICES



Mission

- Structure Specifications Research and Development (SSRD) Branch is responsible for the development and maintenance of the structures portion of the Caltrans Standard Specifications and Standard Special Provisions.
- SSRD participates in technical committees and provides specification support.

Specifications Owned by Structure

Division	Section	Section Title	Subject
I General Provisions	5	CONTROL OF WORK	Submittals Load Limits
	7	LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC	Confined space safety and scaffolding
	11	WELDING	All
II General Construction	12	TEMPORARY TRAFFIC CONTROL	Falsework openings and lighting, maintain useable waterway traffic, maintaining traffic related to precast girder and falsework erection, and construction area signs for bridge cleaning and painting
	16	TEMPORARY FACILITIES	Temporary pedestrian facilities
	19	EARTHWORK	Structure earthwork
III Earthwork & Landscape	20	LANDSCAPE	On or attached to structures
	39	ASPHALT CONCRETE	On bridges
V Surfacings & Pavements			
VI Structures	45	STRUCTURES: GENERAL	All
	46	GROUND ANCHORS AND SOIL NAILS	All
	47	EARTH RETAINING SYSTEMS	All
	48	TEMPORARY STRUCTURES	All except falsework lighting
	49	PILING	All
	50	PRESTRESSING CONCRETE	All
	51	CONCRETE STRUCTURES	All
	52	REINFORCEMENT	All
	53	SHOTCRETE	All
	54	WATERPROOFING	All
	55	STEEL STRUCTURES	All
	56	OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES	All
	57	WOOD AND PLASTIC LUMBER STRUCTURES	All except wood preservatives
	58	SOUND WALLS	All
59	STRUCTURAL STEEL COATINGS	All	
60	EXISTING STRUCTURES	All	
VII Drainage Facilities	68	SUBSURFACE DRAINS	Underdrains for bridges, structure approach drainage system
	69	OVERSIDE DRAINS	Overaside drains involved with slope paving
	70	MISCELLANEOUS DRAINAGE FACILITIES	Welded steel pipe casing for bridges
VIII Miscellaneous Construction	72	SLOPE PROTECTION	Slope paving
	74	PUMPING EQUIPMENT AND CONTROLS	All
	75	MISCELLANEOUS METAL	All except roadway drains and cattle guards
	76	WELLS	All
	78	INCIDENTAL CONSTRUCTION	Miscellaneous coatings
IX Traffic Control Devices	83	RAILINGS AND BARRIERS	On bridges
XI Materials	90	CONCRETE	All except rapid strength concrete

Standard Specifications Digest

2023 STANDARD SPECIFICATIONS DIGEST

July 24, 2023

The 2023 edition of the California Department of Transportation Standard Specifications is based on U.S. Customary units.

The 2023 edition of the Department's Standard Plans is to be used in conjunction with the 2023 edition of the Department's Standard Specifications.

The 2023 edition of the Department's Standard Specifications was developed by incorporating the following revisions:

Standard Specification Revisions		
Standard Specs	A07-24-23	<p>Section 1-1.01. Replaced the 8th paragraph to remove reference to bid item code 999990 Mobilization.</p> <p>Section 1-1.06. Removed LDTS and its definition from the abbreviation table.</p> <p>Section 1-1.06. Revised to add TMDL (total maximum daily load) to the abbreviations table.</p> <p>Section 1-1.11. Add Office of Electrical Systems Regional Transportation Management Center to table of websites, addresses, and phone numbers.</p> <p>Section 1-1.11. Deleted the row for Offices of Structure Design, Document Unit from the table.</p> <p>Section 5-1.18. Replaced section 5-1.18 RESERVED with 5-1.18 WORKPLACE VIOLENCE AND HARASSMENT PREVENTION and added content for the section.</p> <p>Section 5-1.23B. Added general railroad review time. Revised existing shop drawing submittal requirements and added new electronic shop drawing submittal requirements.</p> <p>Section 5-1.27E. Revised the 2nd paragraph of section 5-1.27E to include additional requirements for submitting change order bills.</p>

Standard Specification Revisions

- Section 5-1.23B. Added general railroad review time. Revised existing shop drawing submittal requirements and added new electronic shop drawing submittal requirements.

5-1.23B Action Submittals

5-1.23B(1) General

Maintain a sequential list of action submittals except for samples, test samples, and material sources. With each individual submittal, submit a copy of the updated list.

Submit an action submittal before the start of the affected work to allow for review and corrections without work delays.

Except for test samples, obtain the Department's authorization for action submittals before you perform work based on them.

Except for shop drawings and test samples, allow 15 days for review.

[For action submittals requiring railroad review, allow 65 days for review unless otherwise specified.](#)

For a revised action submittal, allow the same number of days for review as for the original submittal.

The time allowed for the review of an action submittal starts when the Department receives the submittal.

Do not change the scope of work on revised submittals.

The Department's authorization of an action submittal does not void any Contract part.

Standard Specification Revisions

- Section 5-1.23B. Added general railroad review time. Revised existing shop drawing submittal requirements and added new electronic shop drawing submittal requirements

5-1.23B(2) Shop Drawings

5-1.23B(2)(a) General

Submit shop drawings as specified and as otherwise required to control the work.

Each drawing and calculation sheet must be in black ink and sequentially numbered.

Each drawing sheet, if not submitted electronically, must:

1. Be 11 by 17 inches
2. Be on a minimum of 20-lb paper
3. Have text of a minimum nominal height of 5/32 inch

Each calculation sheet, if not submitted electronically must:

1. Be 8-1/2 by 11 inches
2. Have text of a minimum 12-point font

~~Text~~ Paper submittals text and graphics must be legible for photocopying and reduction.

Standard Specification Revisions

- Section 5-1.23B. Added general railroad review time. Revised existing shop drawing submittal requirements and added new electronic shop drawing submittal requirements

5-1.23B(2)(b) Electronic Shop Drawings

If specified, email electronic shop drawing and calculation sheet submittals to: sc.office.associates@dot.ca.gov.

Submit a PDF file in a resolution of at least 300 dpi. Each PDF email attachment must not exceed 25 MB in size. The email message must not exceed 50 MB in size.

The subject line of the email must contain:

1. The words "Shop Drawing Submittal"
2. Contract number
3. Bid item number

In the email for each PDF file, list the number of pages

If separate emails are needed to accommodate large files, indicate the total number of e-mails included in the submittal.

For each PDF file, use the following naming convention:

1. For shop drawings:

SD_Contract number_Bridge number_Bid item number_Submittal e-mail number

Example: SD_12-345678_54-0001_123_1_of_<<Total Number>>.PDF

2. For calculations:

CALC_Contract number_Bridge number_Bid item_number_Submittal e-mail number

Example: CALC_12-345678_54-0001_123_1_of_<<Total Number>>.PDF

After submitting the electronic files, send a notification of the electronic submittal to the Engineer. Include the names of the submitted files.

Upon completion of review, the Department returns 1 electronic copy with the date of authorization.

Standard Specification Revisions

- Section 5-1.27E. Revised the 2nd paragraph of section 5-1.27E to include additional requirements for submitting change order bills.

5-1.27E Change Order Bills

Maintain separate records for change order work costs.

Submit change order bills using the Department's Internet change order billing system. [Change order bills, including those for subcontracted work, must be submitted by the 15th to be eligible for inclusion on the monthly progress payment. Avoid undue delay in submitting change order bills.](#)

The Contractor submitting and the Engineer authorizing a change-order bill using the Internet change-order billing system is the same as each party signing the bill.

The Department provides billing system:

1. Training within 30 days of your request
2. Accounts and user identification to your assigned representatives after a representative has received training

Each representative must maintain a unique password.

Standard Specification Revisions

- Section 5-1.36B. In the 2nd paragraph, deleted the sentence for review time which is now covered in section 5-1.23B.

5-1.36B Railroad Property

If working on or adjacent to railroad property, do not interfere with railroad operations.

For an excavation on or affecting railroad property, submit work plans showing the system to be used to protect the railroad facilities. ~~Instead of the 15 days specified in section 5-1.23B, allow 65 days for the review of the plans.~~

If the Contract does not include an agreement with a railroad company, do not allow personnel or equipment on railroad property.

Prevent material, equipment, and debris from falling onto railroad property.

Standard Specification Revisions

- Section 19-3.03B(6). Section 19-3.03K was deleted and the specifications moved to a new section, section 19-3.03B(6).

19-3.03B(6) Ground Anchor and Soil Nail Walls

For ground anchor and soil nail walls excavate in lifts from the top down.

Clean the excavated face of loose materials, mud, rebound, and other materials that prevent or reduce the shotcrete from bonding to soil nails and the receiving surface.

Remove cobbles, boulders, portions of boulders, and debris at the final wall alignment that protrude more than 2 inches from the excavated face.

If stability testing is not performed, apply the shotcrete facing during the same work shift that the excavation is performed. You may delay placing the shotcrete facing up to 24 hours if you demonstrate the integrity of the excavated face is maintained.

Notify the Engineer immediately if raveling or instability of the excavated face occurs or the wall face moves horizontally more than 0.4 percent of the excavated wall height.

Immediately stabilize unstable areas by buttressing the excavated face with an earth berm or other authorized methods. Stop construction in unstable areas. Take authorized remedial measures to stabilize the areas.

Reset anchor if soil ravel, sloughs, or shows measurable displacement. Do not remove ground anchor excess tendon length until all lift-off tests for the ground anchor are complete.

Replace any damaged soil nails and ground anchors.

If your excavation and installation methods result in a discontinuous wall along any soil nail row, the ends of the structurally completed wall section must extend beyond the ends of the next lower excavation lift by a distance equal to twice the lift height. Maintain temporary slopes at the ends of each wall section to ensure slope stability.

Do not excavate to the next underlying excavation lift until the following conditions have been met for the portion of the soil nail or ground anchor wall in the current excavation lift:

1. Soil nails or ground anchors are installed and grouted.
2. Reinforced concrete facing if shown is constructed.
3. Grout and concrete facing if shown have cured for at least 72 hours.
4. Soil nail facing anchorages are attached or ground anchors are locked off.

Do not excavate beyond the horizontal limits of the overlying completed wall section. At the end of each excavation lift, maintain temporary slopes flatter than 2:1 (horizontal: vertical) to ensure slope stability.

Standard Specification Revisions

- Section 19-3.03K. This section was removed and the specifications added to section 19-3.03B(6).

~~**19-3.03K Ground Anchor and Soil Nail Walls**~~

~~For ground anchor and soil nail walls excavate in lifts from the top down.~~

~~Clean the excavated face of loose materials, mud, rebound, and other materials that prevent or reduce the shotcrete from bonding to soil nails and the receiving surface.~~

~~Remove cobbles, boulders, portions of boulders, and debris at the final wall alignment that protrude more than 2 inches from the excavated face.~~

~~If stability testing is not performed, apply the shotcrete facing during the same work shift that the excavation is performed. You may delay placing the shotcrete facing up to 24 hours if you demonstrate the integrity of the excavated face is maintained.~~

~~Notify the Engineer immediately if raveling or instability of the excavated face occurs or the wall face moves horizontally more than 0.4 percent of the excavated wall height.~~

~~Immediately stabilize unstable areas by buttressing the excavated face with an earth berm or other authorized methods. Stop construction in unstable areas. Take authorized remedial measures to stabilize the areas.~~

~~Reset anchor if soil ravel, sloughs, or shows measurable displacement. Do not remove ground anchor excess tendon length until all lift-off tests for the ground anchor are complete.~~

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~~Do not excavate to the next underlying excavation lift until the following conditions have been met for the portion of the soil nail or ground anchor wall in the current excavation lift:~~

- ~~1. Soil nails or ground anchors are installed and grouted.~~
- ~~2. Reinforced concrete facing if shown is constructed.~~
- ~~3. Grout and concrete facing if shown have cured for at least 72 hours.~~
- ~~4. Soil nail facing anchorages are attached or ground anchors are locked off.~~

~~Do not excavate beyond the horizontal limits of the overlying completed wall section. At the end of each excavation lift, maintain temporary slopes flatter than 2:1 (horizontal: vertical) to ensure slope stability.~~

Standard Specification Revisions

- Section 20-2.13C(1)(c). Deleted reference to the Documents Unit.

20-2.13C Supply Line on Structures, 4 Inches and Larger

20-2.13C(1) General

20-2.13C(1)(a) Summary

Section 20-2.13C includes specifications for installing 4-inch and larger water supply lines on structures.

20-2.13C(1)(b) Definitions

Reserved

20-2.13C(1)(c) Submittals

Product data for materials includes catalog cuts, performance data, and installation instructions.

Submit product data for:

1. Water supply line
2. Expansion assemblies
3. Flange insulating gaskets
4. Casing insulators
5. Seismic expansion assemblies
6. Lateral restraint assemblies
7. Air release valve assemblies
8. Casings
9. Pipe hangers
10. Epoxy adhesives
11. Concrete pipe supports

Submit the maximum range and preset dimension for each expansion assembly or seismic expansion assembly as an informational submittal.

Submit at least 5 sets of product data ~~to OSD, Documents Unit.~~ Each set must be bound together and include an index stating equipment names, manufacturers, and model numbers. Two sets will be returned. Notify the Engineer of the submittal. Include in the notification the date and contents of the submittal.

Standard Specification Revisions

- Section 46-1.01C(2)(a). Revised the section to specify the submittal of shop drawings and supporting documents electronically to Office of Structures Construction instead of OSD, Documents Unit.

46-1.01C(2) Shop Drawings

46-1.01C(2)(a) General

Submit shop drawings and supporting calculations ~~to OSD, Documents Unit for initial review. Notify the Engineer of the submittal. Include in the notification the date and contents of the submittal~~ electronically to sc.office.associates@dot.ca.gov.

~~Submit 6 copies of the general~~ Shop drawings include:

1. General project information, ~~5 copies of the fabricators~~ plan, ~~and 3 copies of the construction~~
2. Fabrication plan-
3. Construction plan

Shop drawings and calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Allow 30 days for the Department's review.

~~After review, submit from 6 to 12 copies of final shop drawings and supporting calculations, as requested, for authorization and use during construction.~~

Standard Specification Revisions

- Section 46-3.01D(2)(b)(ii). Revised items in the 3rd and 4th pars. for soil nail test reading schedules to match ground anchor test reading schedules. This provides more frequent test reading schedules to better assist in generating semi-log plots for creep evaluation.

46-3.01D(2)(b)(ii)(B) Verification Test

Perform verification testing in the Engineer's presence.

Install and test 2 verification test soil nails (1) for each wall zone, or (2) when you change equipment or method of drilling or grouting. You may install and test the nails during stability testing.

Conduct the verification test as follows:

- Incrementally load the test soil nail as shown in the following table:

Verification Test Loading Schedule	
Load increment	Hold time (minutes)
AL	Until stable
0.20T	1-2
0.40T	1-2
0.60T	1-2
0.80T ^a	60
1.00T ^{b,c}	10
AL	Until stable

NOTES:

T = Test load

AL = Alignment load = 0.10T

^aCreep test.

^bAcceptance test load for verification test.

^cMaximum test load for verification test.

- Apply each load increment in less than 1 minute and hold it for the length of time shown in the table titled "Verification Test Loading Schedule."
- Measure and record the applied test load and the nail head movement at each load increment.
- During the creep test:
 - Hold the load constant for 60 minutes
 - Start the observation period for the load hold when the pump starts to apply the load increment from 0.60T to 0.80T
 - Measure and record the nail head movement at 1, 2, 3, 4, 5, 6, 10, ~~15, 20, 25, 30, 40, 50, 45~~, and 60 minutes
 - Plot a creep curve as a function of the logarithm of time, showing the nail head movement from 6 to 60 minutes
- If the movement measured from 6 to 60 minutes is less than 0.08 inch:
 - Increase the load incrementally to 1.00T
 - Hold the load constant for 10 minutes
 - Start the observation period for the load hold when the pump starts to apply the load increment from 0.80T to 1.00T
 - Measure and record the nail head movement at 1, 2, 3, 4, 5, 6, and 10 minutes
 - Reduce the load to the ending alignment load and record the residual movement
- If the movement measured from 6 to 60 minutes is 0.08 inch or greater, reduce the load to the ending alignment load.

Standard Specification Revisions

- Section 46-3.01D(2)(b)(ii). Revised items in the 3rd and 4th pars. for soil nail test reading schedules to match ground anchor test reading schedules. This provides more frequent test reading schedules to better assist in generating semi-log plots for creep evaluation.

46-3.01D(2)(b)(ii)(C) Proof Test

Perform proof testing in the Engineer's presence at the locations shown.

Production soil nails will be authorized when all the proof test soil nails within the same wall zone are authorized.

Test against a temporary yoke that bears directly on the shotcrete facing. Test loads transmitted through the temporary yoke must not fracture the shotcrete or cause displacement or sloughing of the soil surrounding the drilled hole.

Conduct the proof test as follows:

- Incrementally load the test soil nail as shown in the following table:

Proof Test Loading Schedule

Load increment	Hold time (minutes)
AL	Until stable
0.20T	1-2
0.40T	1-2
0.60T	1-2
0.80T ^a	10 or 60
1.00T ^{b,c}	1-2
AL	Until stable

NOTES:

T = Test load

AL = Alignment load = 0.10T

^aCreep test.

^bAcceptance test load for proof test.

^cMaximum test load for proof test.

- Apply each load increment in less than 1 minute and hold it for the length of time shown in the table titled "Proof Test Loading Schedule."
- Measure and record the applied test load and the nail head movement at each load increment.
- During the creep test:
 - Hold the load constant for 10 minutes
 - Start the observation period for the load hold when the pump starts to apply the load increment from 0.80T to 1.00T
 - Measure and record the nail head movement at 1, 2, 3, 4, 5, 6, and 10 minutes
- If the movement measured from 1 to 10 minutes is greater than 0.08 inch:
 - Hold the load constant for an additional 50 minutes
 - Measure and record the nail head movement at 15, 20, 25, 30, 40, 50, 55, and 60 minutes
 - Plot a creep curve as a function of the logarithm of time, showing the nail head movement from 6 to 60 minutes
- Reduce the load to the ending alignment load and record the residual movement.

Standard Specification Revisions

- Section 47-6.01C(2). Revised the section to specify the submittal of shop drawings and calculations electronically to Office of Structures Construction instead of OSD, Documents Unit. The OSD Doc. unit no longer exists.

47-6 ALTERNATIVE EARTH RETAINING SYSTEMS

47-6.01 GENERAL

47-6.01A Summary

Section 47-6 includes specifications for constructing alternative earth retaining systems.

You may use an alternative earth retaining system when specified in the special provisions.

Use only one type of system at any one location.

The alternative earth retaining system must comply with the specifications for the type of wall being constructed.

47-6.01B Definitions

Reserved

47-6.01C Submittals

47-6.01C(1) General

For as-built drawings common to more than one structure, submit the as-built drawings for each structure.

47-6.01C(2) Shop Drawings

Submit shop drawings [and calculations](#) for the alternative system [electronically](#) to ~~OSD, Documents Unit~~. ~~Submit 5 copies for initial review. Submit from 6 to 12 copies, as requested, of final shop drawings for final authorization.~~ sc.office.associates@dot.ca.gov. Include the following:

1. All information required for construction of the system at each location
2. Existing ground line at the wall face
3. Design parameters, material notes, and wall construction procedures

Verify existing ground elevations before submitting drawings.

Shop drawings and calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Allow 30 days for the Department's review.

Standard Specification Revisions

- Section 49-1.01C(2). Replace entire section for test borings as OSD doc. unit no longer exists and log of test borings to be submitted electronically.

49-1.01C Submittals

49-1.01C(1) General

Before handling or installing piles at a location closer than the length of the pile being handled or installed to the edge of a traveled way open to public use, submit a work plan of the measures to be used to provide for the safety of traffic and the public.

Submit a VECP for revisions to specified tip elevations shown or installation methods.

49-1.01C(2) Test Borings

If test borings are specified in the special provisions, submit the log of test borings and the test boring report upon completion of all test borings. Submit ~~4 copies of~~ the test boring report and ~~the~~ log of test borings electronically to ~~OSD, Documents Unit~~ sc.office.associates@dot.ca.gov. The submittal must comply with the specifications for shop drawings. ~~Notify the Engineer of the submittal. Include in the notification the date and contents of the submittal.~~

If corrections to the submittal are required, submit ~~1 copy of~~ the corrected test boring report and ~~the~~ log of test borings electronically to ~~OSD, Documents Unit~~ sc.office.associates@dot.ca.gov.

The test boring report must include:

1. Summary of drilling methods, drilling equipment, drill platforms, and drilling difficulties encountered
2. Location map of the surveyed position of the test borings relative to the new pile locations in the California Coordinate System and bridge stationing
3. Bore hole surveying notes
4. Photographs of rock cores
5. Copies of original daily drilling notes

Standard Specification Revisions

- Section 49-3.02B(6)(b). Revised the section references for API RP 13B-1 (for mud weight (density), marsh funnel and cup, and sand) in the table in the 6th paragraph.

49-3.02B(6)(b) Mineral Slurry

Mineral slurry must be mixed and thoroughly hydrated in slurry tanks. Sample and test slurry from the slurry tanks before placement in the drilled hole.

Recirculate or continuously agitate slurry in the drilled hole.

For recirculated slurry:

1. Remove drill cuttings from the slurry before discharging the slurry back into the drilled hole.
2. Sample and test slurry at least every 2 hours after starting its use until tests show that the samples taken from the slurry tank and from within 2 feet of the bottom of the hole have consistent specified properties. Once consistent properties have been achieved, sample slurry at least every 4 hours as long as the specified properties remain consistent.

For nonrecirculated slurry:

1. Sample and test slurry from the drilled hole at least every 2 hours after starting its use. Sample the slurry at mid-height and near the bottom of the hole.
2. Recirculate slurry if tests show samples taken from mid-height and within 2 feet of the bottom of the hole do not have consistent specified properties.

Sample and test slurry before final cleaning of the bottom of the hole and again just before placing concrete. Sample the slurry at mid-height and within 2 feet of the bottom of the hole. Do not start cleaning the bottom of the hole or placing the concrete until tests show that the samples have consistent specified properties.

Mineral slurry must comply with the requirements shown in the following table:

Mineral Slurry Requirements^a

Quality characteristic	Test method	Requirement
Density _z Before placement in the drilled hole and during drilling (pcf) Before final cleaning and immediately before placing concrete (pcf)	Mud weight (density), API RP 13B-1, section 45	64.3–69.1 ^b 64.3–75.0 ^b
Viscosity _z Bentonite (sec/qt) Attapulgate (sec/qt)	Marsh funnel and cup _z , API RP 13B-1, section 67.2	28–50 28–40
pH	Glass electrode pH meter or pH paper	8–10.5
Sand content _z Before final cleaning and immediately before placing concrete (%)	Sand, API RP 13B-1, section 910	≤ 4.0

^aSlurry temperature must be at least 40 °F when tested.

^bIf authorized, you may use slurry in salt water. The allowable density of slurry in salt water may be increased up to 2 pcf.

Standard Specification Revisions

- Section 49-4.02B. Revised the section references for API RP 13B-1 (for mud weight (density) and sand) in the table in the 2nd paragraph.

49-4.02 MATERIALS

49-4.02A General

Steel soldier piles must comply with section 49-2.03.

Concrete anchors must comply with the specifications for studs in clause 9 of AWS D1.1.

49-4.02B Slurry

Mineral slurry and synthetic slurry must comply with section 49-3.02B(6).

You may use water slurry. Water slurry must comply with the requirements shown in the following table:

Water Slurry Requirements

Quality characteristic	Test method	Requirement
Density: Before final cleaning and immediately before placing concrete (pcf)	Mud weight (density), API RP 13B-1 Section 4, section 5	≤64 ^a
Sand content: Before final cleaning and immediately before placing concrete (%)	Sand, API RP 13B-1, section 9 10	≤1.0

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

Standard Specification Revisions

- Section 50-1.01C(3). Revised the section to specify the submittal of shop drawings electronically to Office of Structures Construction instead of OSD, Documents Unit.

50-1.01C(3) Shop Drawings

Submit shop drawings for the proposed prestressing system ~~to OSD, Documents Unit. Notify the Engineer of the submittal. Include in the notification the date and list of contents of the submittal.~~ electronically to sc.office.associates@dot.ca.gov.

~~For initial review, submit:~~

- ~~1. 6 copies for railroad bridges unless the project includes a BNSF Railway underpass~~
- ~~2. 8 copies for railroad bridges if the project includes a BNSF Railway underpass~~
- ~~3. 4 copies for structures other than railroad bridges~~

~~After initial review, submit from 6 to 12 copies to OSD, Documents Unit, if requested.~~

The shop drawings must show complete details and substantiating calculations of the method and materials proposed for use in the prestressing activities, including the addition or rearrangement of reinforcing steel.

The details must outline the method and sequence of stressing and include:

1. Complete specifications and details of the prestressing steel and anchorage system.
2. Jacking stresses.
3. Type of ducts.
4. Proposed arrangement of the prestressing steel in the members.
5. Exact location of anchorage system components, ducts, and other related elements. Show duct location data, including elevations, at least every 1/8th point of the span for each span.
6. Elongation calculations.
7. All other data pertaining to the prestressing.

Each shop drawing submittal must consist of drawings for a single bridge or portion of a bridge. For multi-frame bridges, each frame must have a separate shop drawing submittal.

Allow 45 days for the ~~following time for~~ review of ~~the~~ shop drawings:

- ~~1. 60 days for railroad bridges~~
- ~~2. 45 days for~~ of structures other than railroad bridges.

For railroad bridges, comply with the requirements of the railroad company involved.

Include a grouting plan with your shop drawing submittal. If you propose an alternative prestressing system for a CIP PS box girder bridge, submit shop drawings, including all details and checked calculations.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:
 - 1) The abbreviation MR will stand for "movement range."
 - 2) Replaced "Polyethylene" with "glass fiber reinforced acetal copolymer." Table for polyethylene requirements updated for glass fiber reinforced acetal copolymer.
 - 3) Deleted MR table.
 - 4) Added definition for 'Lot'.
 - 5) Added galvanizing in cleaning and painting metal surfaces.
 - 6) Added and deleted language under strip joint seal assemblies and alternative strip joint seal assemblies.
 - 7) Updated requirements for sealing, splicing, joint manufacturer certifications, and metal component.
 - 8) Added thermal equation requirement to shop drawings submittal.
 - 9) Added design requirements and construction language under Modular plate joint seal assemblies.
 - 10) Various language inserted, deleted, edited throughout.
- Section 51-2.02D(1)(c)(ii). Revised the section to specify the submittal of shop drawings electronically to Office of Structures Construction instead of OSD, Documents Unit.
- Section 51-2.02E(1)(c)(ii). Revised the section to specify the submittal of shop drawings electronically to Office of Structures Construction instead of OSD, Documents Unit.
- Section 51-2.02F(1)(c)(ii). Revised the section to specify the submittal of shop drawings electronically to Office of Structures Construction instead of OSD, Documents Unit.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2 JOINTS

51-2.01 GENERAL

51-2.01A General

51-2.01A(1) Summary

Section 51-2.01 includes general specifications for constructing, sealing, and protecting joints in concrete structures.

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.

51-2.01A(2) Definitions

Reserved

51-2.01A(3) Submittals

Submit a certificate of compliance for ~~polyethylene~~ glass fiber reinforced acetal copolymer material for snowplow deflectors.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.01B Materials

51-2.01B(1) General

Premolded expansion joint filler must comply with ASTM D1751.

Expanded polystyrene must be commercially available polystyrene board with (1) a flexural strength of at least 35 psi when tested under ASTM C203 and (2) a compressive yield strength from 16 to 40 psi at 5 percent compression. Face the surfaces of expanded polystyrene that concrete is placed against with 1/8-inch-thick hardboard complying with ANSI A135.4. You may use other facing materials that provide equivalent protection. Secure the hardboard using nails, waterproof adhesive, or other authorized means.

51-2.01B(2) Snowplow Deflectors

Snowplow deflectors must consist of ~~ultra-high-molecular-weight polyethylene~~ glass fiber reinforced acetal copolymer plates with anchorage devices, silicone sealant, bonding materials, and threaded inserts.

Anchorage devices must comply with ASTM A276, UNS designation S32205 or S31803.

~~Ultra-high-molecular-weight polyethylene~~ Glass fiber reinforced acetal copolymer plates must ~~be UV stabilized and~~ comply with ASTM ~~D4020~~ D6778 and the requirements shown in the following table:

Quality characteristic	Test method	Requirement
<u>Glass fiber (% min)</u>	—	<u>25</u>
Density (pcf, min)	ASTM D792	5894
Tensile strength, ultimate (psi, min)	ASTM D638	5,800 <u>15,000</u>
<u>Elongation at break (% max)</u>	<u>ASTM D638</u>	<u>3</u>
Tensile strength, yield <u>modulus</u> (psi, min)	ASTM D638	2,750 <u>1.00 x 10⁶</u>
Elongation at break (%) <u>Flexural strength (psi, min)</u>	ASTM D638 <u>D790</u>	290 <u>20,000</u>
Hardness (Shore D) <u>Flexural modulus (psi, min)</u>	ASTM D2240 <u>D790</u>	60 <u>0.90 x 10⁶</u>

51-2.01C Construction

51-2.01C(1) General

Construct open joints using a suitable material that you subsequently remove. Do not chip or break concrete corners when removing the material. Reinforcement must not extend across an open joint.

For filled joints, place premolded or expanded polystyrene joint filler in position before placing concrete. Fill holes and joints with mastic to prevent the passage of mortar or concrete.

Finish concrete edges at joints using an edger.

51-2.01C(2) Snowplow Deflectors

Drilling and bonding anchorage devices must comply with the specifications for drilling and bonding dowels in section 51-1.03E(3).

~~Where shown, apply~~ Apply a thread-~~locking~~ system to the anchorage devices under section 75-3.02B.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02 SEALED JOINTS

51-2.02A General

51-2.02A(1) General

51-2.02A(1)(a) Summary

Section 51-2.02 includes general specifications for fabricating and installing sealed joints.

Sealed joints must:

1. Be in planned position
2. Resist the intrusion of foreign material and water
3. Provide bump-free passage of traffic

~~MR is measured normal to the longitudinal joint axis.~~

Use the seal type shown in the following table for the MR shown:

Movement range	Seal type
MR ≤ 1 inch	Type A or B
1 inch < MR ≤ 2 inches	Type B
2 inches < MR ≤ 4 inches	Strip seal joint seal assembly
MR > 4 inches	Modular unit joint seal assembly or seismic joint

51-2.02A(1)(b) Definitions

Lot: Elastomer from the same batch.

~~Reserved~~

51-2.02A(1)(c) Submittals

Submit a work plan for cleaning expansion joints. Include details for preventing material, equipment, or debris from falling onto traffic or railroad property.

51-2.02A(1)(d) Quality Assurance

~~Reserved~~

51-2.02A(2) Materials

~~You may clean~~ For metal surfaces in joint seal assemblies, except for stainless steel, you must either:

1. Clean and paint metal surfaces ~~of joint seal assemblies instead of galvanizing including anchorages embedded in concrete.~~ Cleaning and painting must comply with the specifications for new structural steel in section 59-2 except SSPC-QP 1, SSPC-QP 2, and AISC-420-10/SSPC-QP 3 certifications are not required. Finish coats are not required. ~~Do not paint stainless steel or~~
2. Galvanize metal surfaces including anchorages embedded in concrete. ~~for joint seal assemblies under section 75-1.02B.~~

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02A(3) Construction

The Engineer may order you to install a joint seal larger than required by the MR. This work is change order work.

The joint opening at the time of placement must be that shown adjusted for temperature. Do not impair the joint clearance.

Cover or otherwise protect joints at all times before joint seals are installed. Do not allow debris or foreign material to enter joints.

Clean expansion joints at existing bridges before installing joint seals. Remove all existing seal material, dirt, debris, damaged waterstops, and joint filler. Use methods that do not damage existing sound concrete.

Verify the joint size after cleaning.

Clean existing joints with undamaged waterstops to the top of the waterstop unless the waterstop is to be removed.

Clean existing joints without waterstops and joints with damaged waterstops down to the hinge or bearing seat.

Repair joint damage as ordered.

Cleaning joints below existing waterstops that are damaged and repairing existing joint damage is change order work.

[After concrete reaches initial set, the Engineer determines when to release the temporary joint supports.](#)

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02B(3) Construction

51-2.02B(3)(a) General

Do not use sealant or adhesive that has skinned over ~~or cannot be redispersed by hand stirring.~~

Do not use liquid components that have been exposed to air ~~for more than 24 hours.~~

Apply sealant or adhesive when concrete surface temperature is at least 40 degrees F.

Abrasive blast clean joints and remove foreign material with high-pressure air immediately before installing seals. Protect waterstops during cleaning.

Joint surfaces must be surface dry when seals are installed.

Place the sealant using equipment that mixes and extrudes the sealant into the joint. The equipment and the sealant placement must be as recommended by the sealant manufacturer. Do not hand mix sealant.
Do not expose sealant to air prior to mixing.

51-2.02B(3)(b) Type A Seal Preparation

~~For Type A joint seals, do~~ Do not start cutting grooves until joint material is delivered to the job site.

Concrete saws for cutting grooves in the concrete must have diamond blades with a minimum thickness of 3/16 inch. Cut both sides of the groove simultaneously for a minimum 1st pass depth of 2 inches. The completed groove must have:

1. Top width within 1/8 inch of the width shown or ordered
2. Bottom width not varying from the top width by more than 1/16 inch for each 2 inches of depth
3. Uniform width and depth

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02C(1)(d)(ii) Quality Control

The Engineer selects test samples of joint seal material and lubricant-adhesive at random from each lot of material. Test samples are selected from stock at the job site or at a location acceptable to the Engineer and the manufacturer. Joint seal test samples must be at least 3 feet long. If samples are selected at the job site, submit test samples to METS and notify the Engineer.

Demonstrate the adequacy of installation procedures for Type B seals before starting installation activities.

51-2.02C(1)(d)(iii) Department Acceptance

Reserved

51-2.02C(2) Materials

Preformed elastomeric joint seals must:

1. Comply with ASTM D2628
2. Consist of a multi-channel, nonporous, homogeneous material furnished in a finished, extruded form
3. Have a minimum seal depth at the contact surface of at least 95 percent of the minimum uncompressed seal width designated by the manufacturer
4. Provide an MR of at least that shown when tested under California Test 673
5. Have the top and bottom edges in continuous contact with the sides of the groove throughout the entire range of joint movement
6. Be furnished full length ~~for~~with each joint ~~with (1) shop spliced~~ at most ~~1 shop splice once~~ in any 60-foot length and (2) spliced together with only joint seals manufactured from the same lot

For seals that would admit water or debris, fill each cell to a depth of 3 inches at the open ends with open-cell polyurethane foam or close the cells by other authorized means.

~~You may make 1 field splice per joint if authorized. Splice location and method must be authorized. Seals must be manufactured full length and then cut at the splice location and rematched before splicing.~~

~~Shop and field splices must have no visible offset of exterior surfaces and no evidence of bond failure.~~

Combination lubricant-adhesive must comply with ASTM D4070.

51-2.02C(3) Construction

Prepare joints under section 51-2.02B(3)(b) except remove all material from the deck joint to the top of the waterstop or to the depth of the seal to be installed plus 3 inches.

Thoroughly clean contact surfaces and the top surface of the seal to within 1/2 inch from either edge immediately before applying the lubricant-adhesive. Liberally apply the lubricant-adhesive to vertical groove surfaces and the sides of the joint seal under the manufacturer's instructions.

Install joint seals full length for each joint using equipment that does not distort or damage the seal or the concrete. The top edges of the installed seal must be in a plane normal to the sides of the groove.

If authorized, you may make 1 field splice per joint using an authorized splicing method. Joint seals must be manufactured full length and cut for the splice. The cut must be re-matched in the field before splicing.

All splices must have no visible offset of exterior surfaces and no evidence of bond failure.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02D(1)(a) Summary

Section 51-2.02D includes specifications for fabricating and installing strip joint seal assemblies with an MR of 4 inches or less.

~~Joint~~Strip joint seal assemblies with an MR of 4 inches or less ~~must~~ consist of metal or metal and elastomeric assemblies placed in recesses over joints. Strip ~~seal~~ joint seal assemblies consist of a 1 joint cell.

~~If authorized, you~~You may use an alternative joint seal assembly if:

1. Quality of the alternative assembly and its suitability for the intended application are at least equal to that of the joint seal assembly shown. The factors to be considered include the ability of the assembly to resist the intrusion of foreign material and water throughout the full range of movement for the application and the ability to function without distress to any component.
2. Alternative joint seal assembly has had at least ~~4-year~~3 years of proven satisfactory service under conditions similar to those described.

51-2.02D(1)(b) Definitions

Reserved

51-2.02D(1)(c) Submittals

51-2.02D(1)(c)(i) General

For alternative joint seal assemblies, submit a certificate of compliance for each shipment of joint seal materials. The certificate must state that the materials and fabrication involved comply with the specifications and the data submitted in obtaining the authorization for the alternative joint seal assembly.

51-2.02D(1)(c)(ii) Shop Drawings

~~For alternative joint seal assemblies, submit 5 copies of~~Submit shop drawings for each alternative joint seal assembly electronically to OSD, Documents Unit. Notify the Engineer of your submittal. Include in the notification the date and contents of the submittalsc.office.associates@dot.ca.gov.

~~After review, submit 6 to 12 copies, as requested, for final authorization and use during construction.~~ Include details of the joint seal assembly and anchorage components, method of installation, blockout details, and additions or rearrangements of reinforcing steel.

If requested, submit supplemental calculations for each proposed alternative joint seal assembly electronically to sc.office.associates@dot.ca.gov.

~~Include in the shop~~Shop drawings must include the thermal equation used for setting the minimum joint opening at installation. The thermal equation must be based on the structure temperature.

Shop drawings and calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Allow 25 days for the Department's review.

~~Submit 1 corrected copy to OSD, Documents Unit, for each joint seal assembly within 20 days of final authorization.~~

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02D(2) Materials

51-2.02D(2)(a) General

Metal parts must comply with section ~~75-55-1.02D(3-~~

~~Bolts) or with ASTM A36/A36M, except bolts, nuts, and washers must comply with ASTM F3125, Grade A325 the specifications for components of HS steel fastener assemblies for use in HS joints in section 75-1. Stud connectors must comply with AWS D1.5, Type B.~~

Sheet neoprene must comply with the specifications for neoprene in section 51-2. ~~04B-02E(2)(a).~~
Fabricate sheet neoprene to fit the joint seal assembly accurately. ~~Neoprene gland must be continuous without field splices.~~

51-2.02D(2)(b) Alternative Strip Joint Seal Assemblies, Movement Range of 4 inches or Less

Alternative strip joint seal assemblies must have CIP anchorage components for casting into the deck.

The anchorage components must include anchor studs spaced at a maximum of 4-1/2 inches. The studs must be at least 5/8 inch in diameter and 8 inches long, except the studs may be 6 inches long in the overhang.

~~Instead of complying with section 75-3, metal parts may comply with ASTM A572/A572M.~~

Elastomer must be neoprene complying with the ~~requirements shown~~ specifications for neoprene in Table 1 of ASTM D2628, except recovery and compression-deflection tests are not required, and the requirements shown in the following table: section 51-2.02E(2)(a).

Quality characteristic	Test method	Requirement
Hardness (points, Type A durometer)	ASTM D2240 (modified)	55-70
Compression set (% max, 70 hours at 100 °C)	ASTM D395 (modified)	40

The design loading must be the AASHTO LRFD Bridge Design Specifications Design Truck with ~~100~~75 percent dynamic load allowance. The tire contact area must be 10 inches measured normal to the longitudinal assembly axis by 20 inches wide. The assembly must provide a smooth-riding joint without slapping of components or tire rumble.

~~The MR of~~ During installation, measure dimensions for positioning the assembly ~~must be measured~~ normal to the longitudinal axis of the assembly. ~~Dimensions for positioning the assembly within the MR during installation must be measured normal to the longitudinal axis. Do not consider skew of the deck expansion joint.~~

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

Horizontal angle points and vertical corners at curbs must be premolded sections or standard sections of the assembly that have been miter cut or bent to fit.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02E **Modular** Joint Seal Assemblies with a Movement Range Over 4 inches

51-2.02E(1) General

51-2.02E(1)(a) Summary

Section 51-2.02E includes specifications for fabricating and installing joint seal assemblies with an MR over 4 inches.

Joint seal assemblies ~~and seismic joints~~ consist of metal or metal and elastomeric assemblies anchored or cast into a recess in the concrete over the joint.

51-2.02E(1)(b) Definitions

Reserved

51-2.02E(1)(c) Submittals

51-2.02E(1)(c)(i) General

Reserved

51-2.02E(1)(c)(ii) Shop Drawings

Submit shop drawings for each joint seal assembly ~~to OSD, Documents Unit. Notify the Engineer of your submittal. Include in the notification the date and contents of the submittal~~ electronically to sc.office.associates@dot.ca.gov.

If requested, submit supplemental calculations for each proposed ~~alternative~~ **modular** joint seal assembly electronically to sc.office.associates@dot.ca.gov.

Shop drawings and calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Shop drawings must include the thermal equation used for setting the minimum joint opening at installation. The thermal equation must be based on the structure temperature.

Allow 30 days for the Department's review.

~~After review, submit 6 to 12 copies, as requested, for final authorization and use during construction.~~ Include details of the joint seal assembly and anchorage components, method of installation, blockout details, and additions or rearrangements of reinforcing steel.

~~Submit 1 corrected copy to OSD, Documents Unit, for each joint seal assembly within 20 days of authorization.~~

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02E(1)(d) Quality Assurance

51-2.02E(1)(d)(i) General

Vertical expansion joints in barriers must be accessible for inspection after recess concrete is placed.

~~Joint~~Modular joint seal assemblies will not be authorized without evidence of ~~1-year~~3 years of satisfactory service ~~under similar conditions in the United States.~~

51-2.02E(1)(d)(ii) Quality Control

A qualified representative of the assembly manufacturer must be present during the installation of the 1st assembly and available during remaining installations.

51-2.02E(1)(d)(iii) Department Acceptance

Reserved

51-2.02E(2) Materials

51-2.02E(2)(a) General

~~Metal parts must comply with section 55-1.02D(3) or with ASTM A36/A36M, except bolts, nuts, and washers must comply with the specifications for components of HS steel fastener assemblies for use in HS joints in section 75-1. Stud connectors must comply with AWS D1.5, Type B.~~

Joint seal assemblies must consist of a metal frame system, supporting rails, and support bars with intervening neoprene glands.

Neoprene glands must comply with ~~the requirements shown in Table 1 of ASTM D2628, except recovery and compression deflection tests are not required, and the requirements shown in the following table: specifications for neoprene in section 51-2.02E(2)(a).~~

Quality characteristic	Test method	Requirement
Hardness (points, Type A durometer)	ASTM D2240 (modified)	55-70
Compression set (% max, 70 hours at 100 °C)	ASTM D395 (modified)	40

~~Metal parts of the joint seal assembly must comply with section 75-3 or ASTM A572/A572M. Bolts, nuts, and washers must comply with the specifications for HS steel fastener assemblies in section 75-1.~~

Anchorage components must include anchor studs spaced at a maximum of 4-1/2 inches. Studs must be at least 5/8 inch in diameter and 8 inches long, except the studs may be 6 inches long in the overhang.

Anchorage components must be galvanized.

Assemblies must be assembled completely at the fabrication site.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02E(2)(b) Design Requirements

If the assembly consists of more than 1 component, design the assembly such that the external components can be removed and reinstalled at any position within the larger half of the MR to allow for inspection of the internal components.

~~Except for components in contact with the tires, the design loading must be the AASHTO LRFD Bridge Design Specifications Design Truck with 100 percent dynamic load allowance. Each component in contact with the tires must support a minimum of 80 percent of the AASHTO LRFD Bridge Design Specifications Design Truck with 100 percent dynamic load allowance. The tire contact area must be 10 inches measured normal to the longitudinal assembly axis by 20 inches wide. The assembly must provide a smooth riding joint without slapping of components or tire rumble.~~

Center beams, support bars, and other structural elements must be fatigue tested and designed under Chapter 14 of the AASHTO LRFD Bridge Design Specifications with California Amendments.

The maximum width of unsupported or yielding components or grooves in the roadway surface of the assembly must be 3 inches measured in the direction of ~~vehicular traffic~~travel.

Assemblies must be capable of adjustment to the "a" dimension shown.

The assembly must have CIP anchorage components that form a mechanical connection between the joint components and the concrete deck.

Welds in center beams, yokes, stirrups, and other structural elements must be:

1. Flux cored arc welded to achieve CJP
2. Completely ultrasonically tested under AASHTO/AWS D1.5 with acceptance criteria as tension members
3. Ground to provide smooth transitions

Use shop vulcanization to perform factory splicing.

Use CJP welds for shop splicing of center beams. CJP welds may be oversized for splicing center beams to support bars. PJP welds are allowed for edge beams and center beams at upturns for sidewalks and barriers. Bolting is not allowed for center beam splices.

Support boxes must:

1. Have minimum thickness of 3/8 inch.
2. Have desired minimum clearance underneath of 2.5 inches. If the clearance is more than 1 inch and less than 2.5 inches, non-shrink grout with minimum strength of 5 ksi is required.

Expansion joint assemblies must be hot-dip galvanized or painted.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02E(3) Construction

Measure dimensions for positioning the assembly during installation normal to the longitudinal axis of the assembly, disregarding the skew of the deck expansion joint.

Deck surfaces must comply with section 51-1.03F(5) before placing joint seal assemblies and anchorages.

Place each assembly into a blocked-out recess in the concrete deck surface. The depth and width of the recess must allow the installation of the assembly anchorage components or anchorage bearing surface to the lines and grades shown.

Except for primary reinforcement, continue reinforcement through the recess construction joint into the recess and engage anchorage components of the assembly.

The Engineer may order you to install additional drill and bond dowel bar reinforcement. This work is change order work.

If authorized, you may make a maximum of 1 field splice per joint. The field splice must:

1. Be identified by location and the method must be authorized
2. Be defined and marked on shop drawings
3. Not be bolted
4. Not be neoprene

The span length between support boxes must be maximum of (1) 5 feet or (2) 30 inches at field splice locations.

Joint openings must:

1. Be thoroughly cleaned
2. Have all debris removed prior to and after joint installation

Do not allow excess concrete to leak into joint openings.

Support bar bearings in support boxes must have a minimum clearance of 2 inches from the face of the joint opening.

Standard Specification Revisions

- Section 51-2. Multiple changes to the section:

51-2.02F Asphaltic Plug Joint Seals

51-2.02F(1) General

51-2.02F(1)(a) Summary

Section 51-2.02F includes specifications for constructing asphaltic plug joint seals.

Asphaltic plug joint seals consist of an asphaltic binder and aggregate joint seal system.

51-2.02F(1)(b) Definitions

Reserved

51-2.02F(1)(c) Submittals

51-2.02F(1)(c)(i) General

Reserved

51-2.02F(1)(c)(ii) Shop Drawings

Submit ~~5 copies of~~ shop drawings for the ~~proposed~~ asphaltic plug joint seal system **electronically** to ~~OSD, Documents Unit. Notify the Engineer of your submittal. Include in the notification the date and contents of the submittal~~ sc.office.associates@dot.ca.gov.

Allow 30 days for the Department's review. ~~After review, submit 6 to 12 copies, as requested, for final authorization and use during construction.~~

Standard Specification Revisions

- Section 51-3.03A(3)(b). Revised the section to specify the submittal of shop drawings electronically to Office of Structures Construction instead of OSD, Documents Unit.

51-3.03A(3) Submittals

51-3.03A(3)(a) General

Submit proof that the bearing manufacturer has furnished PTFE spherical bearings that have had at least 3 years of satisfactory service for 2 projects with similar conditions to this project.

Submit certificates of compliance for the materials used in PTFE bearings.

Submit test reports for proof-tested bearings signed by the personnel conducting the testing. Include bearing numbers of the tested bearings and the names of the personnel interpreting the test results. If proof tests cannot be performed at the specified load, submit a testing plan listing additional physical tests to be performed.

51-3.03A(3)(b) Shop Drawings

Submit shop drawings electronically to ~~OSD, Documents Unit~~. ~~Notify the Engineer of your submittal.~~ ~~Include in the notification the date and list of contents of the submittal.~~ sc.office.associates@dot.ca.gov.

~~For initial review, submit 6 copies for railroad bridges and 4 copies for other structures. After review, submit 6 to 12 copies, as requested, for authorization and use during construction. Allow 55 days for the Department's~~ Allow 55 days for the Department's review for railway bridges and at least 45 days for all other structures.

Shop drawings must include a description of the method of mechanical interlocking of PTFE fabric to the metallic substrate.

At locations other than hinges, shop drawings must include temporary support details for the bearing sole plate during concrete placement.

Standard Specification Revisions

- Section 51-4.01C(2)(a). Revised the section to specify the submittal of shop drawings electronically to Office of Structures Construction instead of OSD, Documents Unit.

51-4.01C Submittals

51-4.01C(1) General

Submit a certificate of compliance signed by the manufacturer's QC representative for each PC concrete box culvert shipment.

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

For PC drainage inlets, submit field repair procedures and a patching material test sample before repairs are made. Allow 10 days for the Engineer's review.

51-4.01C(2) Shop Drawings

51-4.01C(2)(a) General

Submit shop drawings for PC concrete members ~~to the OSD Documents Unit unless otherwise specified.~~ [electronically to sc.office.associates@dot.ca.gov](mailto:sc.office.associates@dot.ca.gov).

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

Standard Specification Revisions

- Section 55-1.01C(2). Revised the section to specify the submittal of shop drawings electronically to Office of Structures Construction instead of OSD, Documents Unit.

55-1.01C(2) Shop Drawings

Submit shop drawings for steel structures ~~to OSD, Documents Unit. Notify the Engineer of the submittal. Include the submittal date and contents in the notification.~~ electronically to sc.office.associates@dot.ca.gov. Allow 45 days for the ~~Department's~~ Department's review for highway bridges and 60 days for railway bridges. ~~Submit 6 copies for highway bridges and 10 copies for railway bridges. Submit 6 to 12 copies, as requested by the Engineer, to OSD, Documents Unit after review for final authorization.~~

The shop drawings must include:

1. Sequence of shop and field assembly and erection. For continuous members, include proposed steel erection procedures with calculations that show girder capacity and geometry will be correct.
2. Welding sequences and procedures.
3. Layout drawing of the entire structure with locations of butt welded splices.
4. Locations of temporary supports and welds.
5. Vertical alignment of girders at each stage of erection.
6. Match-marking diagrams.
7. Details for connections not shown or dimensioned on the plans.
8. Details of allowed options incorporated into the work.
9. Direction of rolling of plates where orientation is specified.
10. Distortion control plan.
11. Dimensional tolerances. Include measures for controlling accumulated error to meet overall tolerances.
12. Material specification and grade listed on the bill of materials.
13. Identification of tension members and fracture critical members.
14. Proposed deviations from plans, specifications, or previously submitted shop drawings.
15. Contract plan sheet references for details.

Submit camber calculations with the shop drawings.

Standard Specification Revisions

- Section 55-1.02D(1). Replaced ASTM A108 with AWS D1.5, Type B in the row for stud connectors in the 3rd table.

Other Materials	
Material	Specification
Carbon steel for forgings, pins, and rollers	ASTM A668/A668M, Class D
Alloy steel for forgings	ASTM A668/A668M, Class G
Pin nuts	ASTM A709/A709M or ASTM A563, including appendix X1 ^a
Carbon-steel castings	ASTM A27/A27M, Grade 65-35, Class 1
Malleable iron castings	ASTM A47/A47M, Grade 32510
Gray iron castings	ASTM A48, Class 30B
Carbon steel structural tubing	ASTM A500/A500M, Grade B, ASTM A501, ASTM A847/A847M, or ASTM A1085
Steel pipe ^b	ASTM A53, Type E or S, Grade B; ASTM A106, Grade B; or ASTM A139, Grade B
Stud connectors	ASTM A108 AWS D1.5, Type B

^aZinc-coated nuts tightened beyond snug or wrench tight must be furnished with a dry lubricant complying with supplementary requirement S2 in ASTM A563.

^bHydrostatic testing will not apply.

Standard Specification Revisions

- Section 56-2.03B(1). Removed the reference to section 15.

56-2.03B Existing Sign Structures

56-2.03B(1) General

~~Work involving existing sign structures must comply with section 15.~~

Reserved

56-2.03B(2) Remove Sign Structure

Reserved

56-2.03B(3) Reconstruct Sign Structure

Reserved

56-2.03B(4) Modify Sign Structure

Reserved

56-2.03B(5) Relocate Sign Structure

Reserved

56-2.03B(6) Salvage Sign Structure

Reserved

Standard Specification Revisions

- Section 58-4.01C(2). Revised the section to specify the submittal of shop drawings electronically to Office of Structures Construction instead of OSD, Documents Unit.

58-4 ALTERNATIVE SOUND WALL SYSTEMS

58-4.01 GENERAL

58-4.01A Summary

Section 58-4 includes specifications for constructing alternative sound wall systems.

You may only use an alternative sound wall system where specified.

58-4.01B Definitions

Reserved

58-4.01C Submittals

58-4.01C(1) General

Reserved

58-4.01C(2) Shop Drawings

Submit project specific shop drawings electronically to ~~the OSD, Documents Unit. Notify the Engineer of your submittal. For initial review, submit 4 copies of shop drawings.~~ sc.office.associates@dot.ca.gov. Allow 25 days for the ~~Department's review. After review and correction, submit from 6 to 12 copies, as requested, to the OSD, Documents Unit, for authorization and use during construction~~ [Department's review](#).

The shop drawings must include:

1. Design firm's name, address, and telephone and fax numbers
2. Information required for the proper construction of the system at each location
3. Design parameters, material notes, and wall construction procedures
4. Calculations for each installation of the system

Submit as-built drawings at the completion of each sound wall.

Standard Specification Revisions

- Section 60-1.01. Removed the reference to section 15.

60 EXISTING STRUCTURES

60-1 GENERAL

60-1.01 GENERAL

Section 60 includes specifications for performing work on existing structures.

~~Work performed on existing structures must comply with section 15.~~

60-1.02 MATERIALS

Not Used

60-1.03 CONSTRUCTION

Not Used

60-1.04 PAYMENT

Not Used

Standard Specification Revisions

- Section 74-2.01C(3). Revised storage devices requirements for certificates of compliance submittal.

74-2.01C(3) Certificates of Compliance

Submit certificates of compliance for factory certified impeller balancing and factory certified drainage pump tests. Certification documents must be in US customary units.

Submit the factory original hard copy and 2 copies as PDF files on 2 CDs ~~or DVDs. Send to OSD, Documents Unit, DVDs, or another authorized data-storage device.~~ The Department will not accept a facsimile copy. Notify the Engineer of the submittal. Include in the notification the date and contents of the submittal.

Factory-certified test documents for each drainage pump must include:

1. Generated pump curve from the cutoff head to the minimum dynamic head shown. Show on the pump curve:
 - 1.1. Identified test points used to generate the pump curve
 - 1.2. Plot of the design pump rates and dynamic heads shown on the pump curve
 - 1.3. Identified and plotted test point horsepower and efficiencies on the pump curve
2. Data that confirms the pump develops from 97 to 100 percent of the motor nameplate power at the point the pump requires maximum power.
3. Motor rpm.
4. Impeller final diameter.

Standard Specification Revisions

- Section 75-3.02D(3). Revised to remove the option of substituting metal pipe with fiberglass. New SSP 75-3.02D(3) was created to allow for this option.

75-3.02D(3) Fiberglass Pipes and Fittings

~~You may use fiberglass pipes and fittings with the same diameters and minimum bend radii as shown instead of welded pipe.~~

Fiberglass pipe and fittings must:

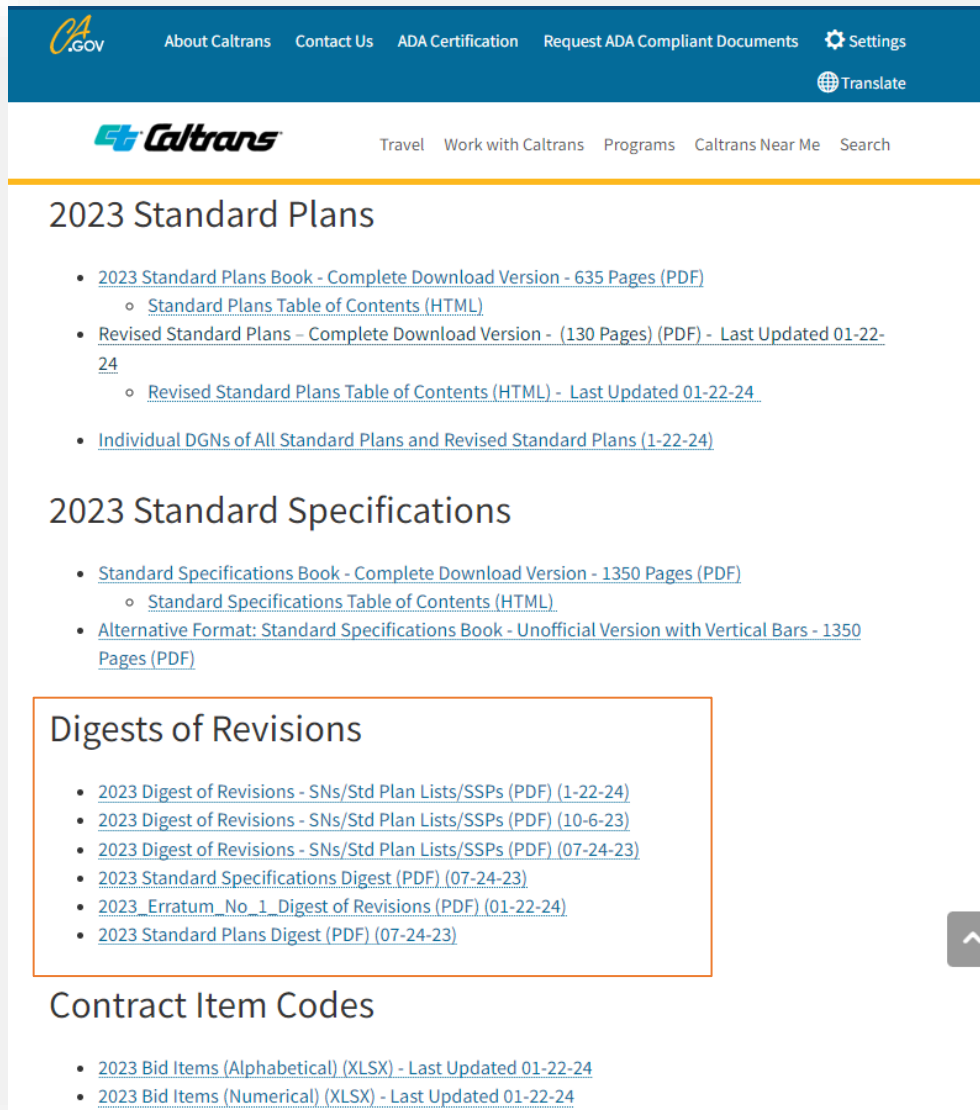
1. Comply with ASTM D2996
2. Have a minimum short-term rupture strength of 30,000 psi

For joining pipe and fittings, use the adhesive type recommended by the manufacturer.

Fiberglass pipe not enclosed in a box girder cell or encased in concrete must be made from UV-resistant resin pigmented with concrete-gray color or be coated with a concrete-gray resin-rich exterior coating. Do not use paint.

Fiberglass pipe with UV protection must withstand at least 2,500 hours of accelerated weathering when tested under ASTM G154 with UVB-313 lamps. The resting cycle must be 4 hours of UV exposure at 140 degrees F and then 4 hours of condensate exposure at 120 degrees F. After testing, the pipe surface must show no fiber exposure, crazing, or checking and only slight chalking or color change.

Construction Contract Standards



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2023 Standard Plans

- [2023 Standard Plans Book - Complete Download Version - 635 Pages \(PDF\)](#)
 - [Standard Plans Table of Contents \(HTML\)](#)
- [Revised Standard Plans - Complete Download Version - \(130 Pages\) \(PDF\) - Last Updated 01-22-24](#)
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- [Individual DGNs of All Standard Plans and Revised Standard Plans \(1-22-24\)](#)

2023 Standard Specifications

- [Standard Specifications Book - Complete Download Version - 1350 Pages \(PDF\)](#)
 - [Standard Specifications Table of Contents \(HTML\)](#)
- [Alternative Format: Standard Specifications Book - Unofficial Version with Vertical Bars - 1350 Pages \(PDF\)](#)

Digests of Revisions

- [2023 Digest of Revisions - SNs/Std Plan Lists/SSPs \(PDF\) \(1-22-24\)](#)
- [2023 Digest of Revisions - SNs/Std Plan Lists/SSPs \(PDF\) \(10-6-23\)](#)
- [2023 Digest of Revisions - SNs/Std Plan Lists/SSPs \(PDF\) \(07-24-23\)](#)
- [2023 Standard Specifications Digest \(PDF\) \(07-24-23\)](#)
- [2023 Erratum No. 1 Digest of Revisions \(PDF\) \(01-22-24\)](#)
- [2023 Standard Plans Digest \(PDF\) \(07-24-23\)](#)

Contract Item Codes

- [2023 Bid Items \(Alphabetical\) \(XLSX\) - Last Updated 01-22-24](#)
- [2023 Bid Items \(Numerical\) \(XLSX\) - Last Updated 01-22-24](#)

- Website: [Standard Plans, Standard Specifications and Contract Item Codes | Caltrans](#)
- <https://dot.ca.gov/programs/design/cs-standard-plans-and-standard-specifications>

Questions or Comments