DIVISION I GENERAL PROVISIONS

1 GENERAL

Add to section 1-1.01:

Bid Items and Applicable Sections

Item code	Item description	Applicable section
066105A	RESIDENT ENGINEERS OFFICE	5

Add to section 1-1.09:

This project is in a freeze-thaw area.

^^

2 BIDDING

Replace section 2-1.03 with:

2-1.03 MANDATORY PREBID MEETING

The Department will conduct a mandatory prebid meeting for this contract. The purpose of the meeting is to provide small businesses the opportunity to meet and interact with prospective bidders and increase their participation in the performance of contracts.

Each bidder must attend the mandatory prebid meeting. The bidder's representative must be a company officer, project superintendent, or project estimator. For a joint venture, one of the parties must attend the mandatory prebid meeting. The Department does not accept a bid from a bidder who did not attend the meeting.

A sign-up sheet is used to identify each prospective bidder. Each bidder is required to include the name and title of the company representative attending the mandatory prebid meeting. The Department may hold a single prebid meeting for more than 1 contract. Sign the sign-up sheet for the contract you intend to bid on. If you are bidding on multiple contracts, sign each sign-up sheet for each contract you intend to bid on.

The successful bidder is required to report each small business hired to work on this Contract as a result of the mandatory prebid meeting.

Add to section 2-1.06B:

The County makes the following supplemental project information available:

Supplemental Project Information

Means	Description
County of Riverside website during advertisement period	1. Geotechnical Design Report 2. Materials Report 3. Storm Water Data Report 4. Bridge as-built drawings 5. Cross sections 6. The Department Revised and New Standard Plans 7. Guidelines for Design and Construction near Kinder Morgan Hazardous Liquid Operated Facilities (L-OM200-29) 8. Aerially Deposited Lead Site Investigation Report 9. Environmental Commitments Record 10. Railroad relations and insurance requirements

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5 CONTROL OF WORK

Add to section 5-1.09A:

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

For certain disputes, a facilitated partnering session or facilitated dispute resolution session may be appropriate and effective in clarifying issues and resolving all or part of a dispute.

To afford the project team enough time to plan and hold the session, a maximum of 20 days may be added to the DRB referral time following the Engineer's response to a *Supplemental Potential Claim Record.*

To allow this additional referral time, the project team must document its agreement and intention in the dispute resolution plan of the partnering charter. The team may further document agreement of any associated criteria to be met for use of the additional referral time.

If the session is not held, the DRB referral time remains in effect as specified in section 5-1.43.

Replace section 5-1.34 with:

5-1.34 RESIDENT ENGINEERS OFFICE

The Contractor must furnish and maintain a resident engineer's office for the exclusive use of the Engineer and Engineer's staff. Resident engineer's office consists of:

1. The resident engineer's office must be maintained in a clean, neat, and sanitary manner at all times. All sanitary paper products required for the restroom must be supplied by the Contractor.
2. A 1000 square feet, or larger, office facility with required utility hook up including electricity, potable water, 2 telephone lines, multi-line speaker phones, heating, and air conditioning. The facility will have 1 restroom and partitions creating 3 interior rooms. The Contractor will pay monthly rental fees and must obtain all rights of entry necessary.
3. The Contractor must provide all utility hook-ups for the resident engineer's office, including electrical power, telephone, potable water and sewage disposal. The Contractor must obtain all necessary permits and pay all fees.
4. The resident engineer's office must include a facsimile machine with a separate phone line and a copying machine capable of photocopying and scanning 11" x 17" size paper for the exclusive use of the Engineer and Engineer's staff for the entire duration of the project. The copy machine must be

connected to a DSL line and it must also be connected with all computers in the resident engineer's office via wireless connection.

5. Theft and vandalism at the job site may be a problem. Contractor shall be responsible for the security of the resident engineer's office. If for any reason, the phone, copier, facsimile machine, any office furniture, and/or sanitary facility is vandalized, stolen, or in need of repair, the Contractor, upon receipt of written notice by Engineer, shall have a maximum of five (5) working days to replace or repair the items to full working order. If Contractor fails to comply with the five (5) working days specified, the County may at its option withhold monthly progress payments until the resident engineer's office is returned to full and complete working order.
6. Meet with the Engineer prior to construction, and at any other time circumstances warrant, and mutually agree on a location for the resident engineer's office. Approval by the Engineer must be obtained prior to implementation.
7. Furnish and supply for the duration of the contract:
   - 7.1. Furnish, service, and maintain resident engineer's office.
     - 7.1.1. The following office furniture, in new or near-new condition, shall be furnished, at a minimum:
       - 7.1.1.1. Two 30" x 60" desks with lockable drawers
       - 7.1.1.2. Two task swivel chairs
       - 7.1.1.3. One conference table to accommodate 8 conference chairs
       - 7.1.1.4 Eight conference chairs
       - 7.1.1.5 One 60"H x 40"W x 16"D book shelf
       - 7.1.1.6 One 60" x 36" drafting table and chair
   - 7.2 Supply utilities for resident engineer's office, including electricity, phone (2 lines), potable water, and DSL internet service for the duration of the contract, including fees.
   - 7.3 Supply, service and maintain sanitary facility.
   - 7.4 Facsimile machine (separate phone line).
   - 7.5 Furnish two current model personal computers for the duration of the contract, suitable and capable for office use, internet connected utilizing DSL service, and complete with necessary software including Microsoft Office, latest version.
   - 7.6 Two color laser printers, HP Color Laserjet Model 2605DN (also known as Q7822A) or approved alternate. One color flatbed scanner, HP Scanjet 5590 or approved alternate. All supplies and necessary maintenance for the use of the above equipment by the Engineer shall be furnished and supplied by the Contractor for the duration of the contract.
   - 7.7 Copying and scanning machine (capable for size up to 11" x 17").
   - 7.8 Installation of 4 designated public parking spaces.
   - 7.9 Installation of appropriate number of designated parking spaces for the construction manager, inspectors, general contractors, workers, material suppliers, subcontractors and other support personnel.
   - 7.10 Installation of 1 large sized unit commercial trash bin with cover and regularly scheduled pick up.
   - 7.11 Resident engineer's office shall have a 24" x 36" sign, white color, affixed near the door. The sign text shall read "COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT" and shall have County seals affixed to it. Contractor will be supplied the seals by the County.
   - 7.12 Remove resident engineer's office from the job site at the completion of the project.
   - 7.13 Security.
   - 7.14 If office is located on private property, all property rental costs and right of entry.
8. No monthly progress payments will be due to the Contractor until all provisions and requirements of "Resident Engineer's Office" are complete and in place.
9. Furnish and maintain resident engineer's office as described in this section for the duration of the contract work plus two months after contract acceptance and written permission from the Engineer. The lump sum price will be paid on equal monthly increments over the duration of the project.

Add to section 5-1.36D:

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

Utility Relocation and Date of the Relocation

Utility	Location	Date
City Of Banning Electric Department (COBED) overhead electric lines	Parallel to and south of Union Pacific Railroad tracks and along Sunset Avenue between Union Pacific Railroad and Lincoln Street. At the intersection of Sunset Avenue and Ramsey Street.	prior to start of construction
Time Warner Cable overhead cable lines	At the intersection of Sunset Avenue and Ramsey Street.	prior to start of construction
Verizon Business (MCI) underground fiber optic	Parallel to and south of Union Pacific Railroad tracks	prior to start of construction
AT&T California (SBC – PAC BELL) underground fiber optic	Along Ramsey Street	prior to start of construction
Verizon – telecom overhead telecom lines	At the intersection of Sunset Avenue and Ramsey Street.	prior to start of construction
Southern Calif. Edison (SCE) overhead fiber optic	Along Lincoln Street and to the south along Sunset Avenue	prior to start of construction

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

1. Verified by a representative of the utility company
2. Allowing at least the time shown for the utility owner to complete its work

Utility Relocation and Contractor-Arranged Time for the Relocation

Utility	Utility address	Location	Days
Southern Calif Gas – Distribution (SCG-D) 6-inch gas low pressure	1981 W. Lugonia Ave. P.O. Box 3003 Redlands, CA 92374 Attn: Larry Thomas (909) 335-7883	Along Sunset Avenue	15

Add to section 5-1.36:

5-1.36E Southern California Gas Company Facilities

Southern California Gas Company (SoCalGas) operates and maintains one 30-Inch high pressure natural gas pipeline within the limits of the project. Pipeline is to be protected in place and the following parameters strictly adhered to:

- Consideration must be given to the safety of the pipeline during all project stages.
- U.S.A. (Underground Service Alert) must be called at least 2 working days prior to construction.
- A representative of SoCalGas must observe excavation around and near the pipeline to ensure protection and to record pertinent data necessary for SoCalGas operations.
- The SoCalGas Representative shall be notified prior to any work within 20 feet of the pipeline.
- No heavy equipment shall cross the pipeline without SoCalGas' approval. Additional protective measures may be required where heavy equipment is expected to cross the pipeline.
- No vibratory compaction over the pipeline.
- No mechanical equipment shall operate within three (3) horizontal feet of the pipeline. Any closer work must be done by hand.
- No mechanical equipment shall operate within two (2) vertical feet of the pipeline. Any closer work must be performed by hand.
- No buried pipeline may be left exposed, nor may an exposed pipeline be left buried, without prior inspection and approval of SoCalGas.
- Vertical clearance of at least 18 inches must be maintained between our pipeline and any substructure crossing. All substructures must cross perpendicular to the pipeline, or as close to perpendicular as possible.

Upon request, at least two (2) working days prior to the start of construction, SoCalGas will locate and mark their active underground facilities for the contractor at no cost. Please call Underground Service Alert (USA) at 811.

Arrangements for someone to stand-by and observe can be made by calling 951-845-0712 two (2) working days prior to the start of construction.

^^

6 CONTROL OF MATERIALS

Add to section 6-2.03:

The Department furnishes you with:

- Disks for survey monuments
- Loop detector sensor units
- Model 170 controller assembly, including controller unit, completely wired controller cabinet, and detector sensor units
- Model 2070 controller assembly, including controller unit, completely wired controller cabinet, and detector sensor units
- Modems
- Components of battery backup system as follows:
  - Inverter/charger unit
  - Power transfer relay
  - Manually-operated bypass switch
  - Battery harness
  - Utility interconnect wires
  - Battery temperature probe
  - Relay contact wires

The Department furnishes you with completely wired controller cabinets with auxiliary equipment but without controller unit at 175 Cluster St. San Bernardino, CA 92408. At least 48 hours before you pick up the materials, inform the Engineer of what you will pick up and when you will pick it up.

You must furnish replacement plants. The Department does not pay you for the replacement plants.

^^

8 PROSECUTION AND PROGRESS

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

Section 8-1.04B does not apply.

Start job site activities within 55 days after receiving notice that the Contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department.

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

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

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

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

1. *Notice of Materials To Be Used.*
2. Contingency plan for reopening closures to public traffic.

You may start job site activities before the 55th day after Contract approval if you:

1. Obtain specified authorization or acceptance for each submittal before the 55th day
2. Receive authorization to start

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

If the Contract is approved, work already performed that complies with the Contract is authorized.

If the Contract is not approved, leave the job site in a neat condition. If a facility has been changed, restore it to its former condition or an equivalent condition. The Department does not pay for the restoration.

The Department grants a time extension if a delay is beyond your control and prevents you from starting work at the job site on the 1st working day.

^^

9 PAYMENT

Add to section 9-1.16C:

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

1. Bar reinforcing steel (retaining wall)
2. Sound wall (Masonry Block)
3. Furnish Single Sheet Aluminum Sign
4. Miscellaneous Iron and Steel
5. Chain Link Fence (Type CL-6)
6. Decorative Railing
7. Control and Neutral Conductors
8. 1" Electric Remote Control Valve
9. Ground Anchors (Subhorizontal)
10. Soldier Piles (HP 12x63) & (HP 10x57)
11. Timber Lagging

^^^

DIVISION II GENERAL CONSTRUCTION

10 GENERAL

Add to section 10-1.02 of the RSS for section 10-1:

Do not place the uppermost layer of new pavement until all underlying conduits and loop detectors are installed.

Before starting the traffic signal functional test at any location, all items of work related to signal control must be completed and all roadside signs, pavement delineation, and pavement markings must be in place at that location.

^^

12 TEMPORARY TRAFFIC CONTROL

Replace section 12-2 with:

12-2 CONSTRUCTION PROJECT FUNDING SIGNS

12-2.01 GENERAL

Section 12-2 includes specifications for installing construction project funding signs.

Construction project funding signs must comply with the details shown on the Department's Traffic Operations Web site.

Keep construction project funding signs clean and in good repair at all times.

12-2.02 MATERIALS

Construction project funding signs must be wood post signs complying with section 56-4.

Sign panels for construction project funding signs must be framed, single sheet aluminum panels complying with section 56-2.

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

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

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

HIGHWAY CONSTRUCTION

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

FEDERAL HIGHWAY TRUST FUNDS

STATE HIGHWAY FUNDS

RIVERSIDE COUNTY TRANSPORTATION FUNDS

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

YEAR OF COMPLETION 2014

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

12-2.03 CONSTRUCTION

Install 2 Type 1 and 2 Type 2 construction project funding signs at the locations designated by the Engineer before starting major work activities visible to highway users.

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

12-2.04 PAYMENT

Not Used

Add to section 12-3.12C:

Start displaying the message on the portable changeable message sign 30 minutes before closing the lane.

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

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

For 5 days, starting on the day of signal activation, place 1 portable changeable message sign in each direction of travel and display the following message: "SIGNAL AHEAD -- PREPARE TO STOP."

Add to section 12-4.02A:

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

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

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

Designated holidays are as shown in the following table:

Designated Holidays

Holiday	Date observed
New Year's Day	January 1st
MLK Jr.'s Birthday	3rd Monday in January
Lincoln's Birthday	February 12 th
Washington's Birthday	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4th
Labor Day	1st Monday in September
Columbus Day	2nd Monday in October
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 January 1st, February 12th, July 4th, November 11th, or December 25th fall on a Saturday, the preceding Friday is a designated holiday.

Special days are: Morongo Thunder and Lightning Powwow (September), Bob Hope/Chrysler Classic (January), and Kraft Nabisco Championship (March). See event website for exact days.

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

If work vehicles or equipment are parked within 6 feet of a traffic lane, close the shoulder area as shown.

Precast concrete members must not be cast within the right-of-way of Route 10.

Replace "Reserved" in section 12-4.04 with:

Lane Closure Restriction for Designated Holidays and Special Days

Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
x	**H** xx	xx	xx							
	SD xx									
x	xx	**H** xx	xx							
		SD xx								
	x	xx	**H** xx	xx						
			SD xx							
	x	xx	xx	**H** xx	xxx					
	x	xx	xx	**SD** xx	xxx					
				x	**H** xx					
				x	**SD** xx					
					x	**H** xx				
						SD xx				
						x	**H** xx	xx	xx	xx
							SD xx			

Legend:

	Refer to lane requirement charts no. 1 and 2
x	The full width of the traveled way must be open for use by traffic after 0400.
xx	The full width of the traveled way must be open for use by traffic.
xxx	The full width of the traveled way must be open for use by traffic until 2400.
H	Designated holiday
SD	Special day

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

EA#: 334711 [08 0002 0174]
Chart no. 1
Freeway/Expressway Lane Requirements

County:Riverside	Route/Direction:10/EB	PM:11.1/11.6

Closure limits:

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	2	3																2	2	2	1	
Fridays	1	1	1	2	3																		2	2	
Saturdays	1	1	1	1	2	2																	2	2	
Sundays	1	1	1	1	1	2	2														2	2	2	1	

Legend:

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

REMARKS:

Date: 9/07/2012 Developed by: John H. Lee Validity: 24 months

EA#: 334711 [08 0002 0174]
Chart no. 2
Freeway/Expressway Lane Requirements

County:Riverside	Route/Direction:10/WB	PM:11.1/11.6

Closure limits:

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	2	2																2	2	2	1	
Fridays	1	1	1	2	2																		2	2	
Saturdays	2	1	1	1	2	2																	2	2	
Sundays	2	1	1	1	1	2	2														3	2	2	1	

Legend:

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

REMARKS:

Date: 9/07/2012 Developed by: John H. Lee Validity: 24 months

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

EA: 334711 [08 0002 0174]
Chart no. 3
Complete Ramp Closure Hours

County:Riverside	Route/Direction:10/EB	PM:11.1/11.6

Closure limits:

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																C	C	C	C	
Fridays	C	C	C	C	C																		C	C	
Saturdays	C	C	C	C	C	C																	C	C	
Sundays	C	C	C	C	C	C	C														C	C	C	C	

Legend:

C	Ramp may be closed completely
	Work allowed within the highway where shoulder or lane closure is not required

REMARKS:

Date: 9/07/2012 Developed by: John H. Lee Validity: 24 months

EA: 334711 [08 0002 0174]
Chart no. 4
Complete Ramp Closure Hours

County:Riverside	Route/Direction:10/WB	PM:11.1/11.6

Closure limits:

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																C	C	C	C	
Fridays	C	C	C	C	C																		C	C	
Saturdays	C	C	C	C	C	C																	C	C	
Sundays	C	C	C	C	C	C	C														C	C	C	C	

Legend:

C Ramp may be closed completely

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

REMARKS:

Date: 9/07/2012 Developed by: John H. Lee Validity: 24 months

EA: 334711 [08 0002 0174]
Chart no. 5
Complete Ramp Closure Hours

County:Riverside	Route/Direction:10/WB	PM:11.1 &11.6

Closure limits:

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

Legend:

C Ramp may be closed completely

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

REMARKS: The ramp closure is allowed for a period not to exceed 4 weeks.

Date:9/07/2012 Developed by: John H. Lee Validity: 24 months

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

Chart no. 6
Complete Conventional Highway Closure Hours

County:Riverside	Route/Direction:Sunset Ave./ NB & SB	PM:R11.3

Closure limits: WB ramps up to Westward Street

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

Legend:

C	Conventional highway may be closed completely
	No complete conventional highway closure is allowed

REMARKS: The city street closure is allowed for a period not to exceed 4 weeks.

Date:9/7/2012 Developed by: John H. Lee Validity: 36 months

Chart no. 7
Complete Conventional Highway Closure Hours

County:Riverside	Route/Direction:Sunset Ave./ NB & SB	PM:R11.3

Closure limits: EB ramps up to Linclon Street

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

Legend:

C	Conventional highway may be closed completely
	No complete conventional highway closure is allowed

REMARKS: The city street closure is allowed for a period not to exceed 12 months.

Date:9/7/2012 Developed by: John H. Lee Validity: 36 months

Replace section 12-8 with:

12-8 TEMPORARY PAVEMENT DELINEATION

12-8.01 GENERAL

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

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

Temporary painted traffic stripes and painted pavement markings used for temporary delineation must comply with section 84-3.

12-8.02 MATERIALS

12-8.02A General

Not Used

12-8.02B Temporary Lane Line and Centerline Delineation

Temporary pavement markers must be the same color as the lane line or centerline markers being replaced. Temporary pavement markers must be temporary pavement markers on the Authorized Material List for short-term day/night use, 14 days or less, or long-term day/night use, 180 days or less. Place temporary pavement markers under the manufacturer's instructions.

12-8.02C Temporary Edge Line Delineation

On multilane roadways, freeways, and expressways 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 (1) a solid 4-inch wide traffic stripe tape of the same color as the stripe being replaced, (2) traffic cones, or (3) portable delineators or channelizers placed longitudinally at intervals not exceeding 100 feet
2. Left edge lines consisting of (1) solid 4-inch wide traffic stripe tape of the same color as the stripe being replaced, (2) traffic cones, (3) portable delineators or channelizers placed longitudinally at intervals not exceeding 100 feet, or (4) temporary pavement markers placed longitudinally at intervals not exceeding 6 feet

12-8.02D Temporary Traffic Stripe Tape

Temporary traffic stripe tape must be one of the types of temporary, removable striping tape on the Authorized Material List.

12-8.02E Temporary Traffic Stripe Paint

Not Used

12-8.02F Temporary Pavement Marking Tape

Temporary pavement marking tape must be one of the types of temporary, removable pavement marking tape on the Authorized Material List and must be applied and removed as specified for applying and removing temporary, removable traffic stripe tape.

12-8.02G Temporary Pavement Marking Paint

You may use one of the types of temporary removable pavement marking tape or permanent pavement marking tape on the Authorized Material List instead of temporary pavement marking paint.

12- 8.02H Temporary Pavement Markers

Temporary pavement markers must be one of the temporary pavement markers on the Authorized Material List for long term day/night use, 180 days or less.

12-8.03 CONSTRUCTION

12-8.03A General

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

Establish the alignment for the temporary pavement delineation including required lines or markers. Surfaces to receive an application of paint or removable traffic tape must be dry and free of dirt and loose material. Do not apply temporary pavement delineation over existing pavement delineation or other

temporary pavement delineation. Maintain temporary pavement delineation until it is superseded or you replace it with a new pattern of temporary pavement delineation 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 markers, underlying adhesive, and removable traffic tape from the final layer of surfacing and from the existing pavement to remain in place. Remove temporary pavement delineation that conflicts with any subsequent or new traffic pattern for the area.

12-8.03B Temporary Lane line and Centerline Delineation

Whenever lane lines or centerlines are obliterated 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 intervals not exceeding 24 feet. For temporary pavement markers on the Authorized Material List for long-term day/night use, 180 days or less, cement the markers to the surfacing with the adhesive recommended by the manufacturer except do not use epoxy adhesive to place the pavement markers in areas where removal of the markers will be required.

For temporary lane line or centerline delineation consisting entirely of temporary pavement markers on the Authorized Material List for short-term day/night use, 14 days or less, place the markers longitudinally at intervals not exceeding 24 feet. 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 the 14 days, replace the temporary pavement markers with additional temporary pavement delineation equivalent to the pattern specified or shown for the permanent pavement delineation for the area. The Department does not pay for the additional temporary pavement delineation.

12-8.03C Temporary Edge Line Delineation

You may apply temporary painted traffic stripe where removal of a 4-inch wide 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 pavement delineation for edge lines, maintain the cones or delineators during hours of the day when the cones or delineators are being used for temporary edge line delineation.

Channelizers used for temporary edge line delineation must be an orange surface-mounted type. Cement channelizer bases to the pavement under section 85 for cementing pavement markers to pavement except do not use epoxy adhesive to place channelizers on the top layer of the pavement. Channelizers must be one of the 36-inch, surface-mounted types on the Authorized Material List.

Remove the temporary edge line delineation when the Engineer determines it is no longer required for the direction of traffic.

12-8.03D Temporary Traffic Stripe Tape

Apply temporary traffic stripe tape under the manufacturer's instructions. Slowly roll the tape with a rubber-tired vehicle or roller to ensure complete contact with the pavement surface. Apply the tape straight on a tangent alignment and on a true arc on a curved alignment. Do not apply the tape when the air or pavement temperature is less than 50 degrees F unless the installation procedures are authorized beforehand.

The temporary traffic stripe tape must be complete in place at the location shown before opening the traveled way to traffic.

12-8.03E Temporary Traffic Stripe Paint

Apply 1 or 2 coats of temporary traffic stripe paint for new or existing pavement.

The painted temporary traffic stripe must be complete in place at the location shown before opening the traveled way to traffic. Removal of painted temporary traffic stripe is not required.

12-8.03F Temporary Pavement Marking Tape

Apply temporary pavement marking tape at the locations shown. The tape must be complete in place at the location shown before opening the traveled way to traffic.

12-8.03G Temporary Pavement Marking Paint

Apply and maintain temporary pavement markings consisting of painted pavement markings at the locations shown. The painted temporary pavement marking must be complete in place at the location shown before opening the traveled way to traffic. Removal of painted temporary pavement marking is not required.

Apply 1 or 2 coats of temporary pavement marking paint for new or existing pavement.

12- 8.03H Temporary Pavement Markers

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

You may use retroreflective pavement markers specified in section 85 instead of temporary pavement markers for long term day/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 85, except the waiting period before placing pavement markers on new HMA surfacing as specified in section 85-1.03 does not apply. Do not use epoxy adhesive to place pavement markers in areas where removal of the pavement markers is required.

Temporary pavement markers must be complete in place before opening the traveled way to traffic.

12-8.04 PAYMENT

Not Used

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13 WATER POLLUTION CONTROL

Add to section 13-1.01A:

Throughout the term of this contract, the total land disturbance area of the project site is more than 1 acre. This project is a Risk Level 2. County will submit a Notice of Intent (NOI) to the California State Water Resources Control Board –pursuant to the General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (hereafter referred to as the Construction General Permit) (2009-0009-DWQ, No. CAS000002) , which is available at:

(http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml).

The Area-Wide Municipal Stormwater Permit (R7-2008-001, NPDES No. CAS617002), hereafter referred to in this section as the "Municipal Permit", issued by the California Regional Water Quality Control Board (CRWQCB) – Colorado River Basin Region. This permit regulates both stormwater and non-stormwater discharges associated with Contractor's construction activities. A copy of the Permit may be obtained at the office of the County of Riverside Transportation Department, 14th Street Transportation Annex, 3525 14th Street, Riverside, California, (951) 955-6780, or may be obtained on the internet at:

http://www.waterboards.ca.gov/coloradoriver/.

The Contractor shall comply with the requirements of the Construction General Permit (NPDES No. CAS000002), the Municipal Permit, and the De Minimus Permit.

Contractor's Stormwater Pollution Prevention Plan and Monitoring Program (SWPPP/MP) shall be prepared by a Qualified SWPPP Developer in accordance with the Construction General Permit Section I.M.77.

This project is a Risk Level 2 project under the Construction General Permit. Therefore, Contractor's SWPPP shall also conform to Attachment D, Risk Level 2 Requirements of the Construction General Permit.

Replace 1st paragraph of section 13-6.03C with:

Provide temporary drainage inlet protection around drainage inlets as changing conditions require. Drainage inlet protection must be other than Type 2, and as appropriate for conditions around the drainage inlet.

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14 ENVIRONMENTAL STEWARDSHIP

Replace section 14-6.02 with:

14-6.02 SPECIES PROTECTION

14-6.02A General

Section 14-6.02 includes specifications for protecting regulated species or their habitat.

This project is within or near habitat for regulated species shown in the following table:

Species Name
Burrowing Owl

The Department anticipates nesting or attempted nesting by migratory and nongame birds from February 15 to September 1.

14-6.02B Material

Not Used

14-6.02C Construction

14-6.02C(1) General

Not Used

14-6.02C(2) Protective Radius

Upon discovery of a regulated species, stop construction activities within a 300 foot radius of the discovery. Immediately notify the Engineer. Do not resume activities until receiving notification from the Engineer.

14-6.02C(3) Protocols

Not Used

14-6.02C(4) Biological Resource Information

Not used

14-6.02C(5) Protection Measures

The Contractor must request a pre-construction survey by biologist from the Engineer at least 10 days prior to the initial performance of work activities. The Riverside County Transportation Department (RCTD) will provide the biologist.

14-6.02C(6) Monitoring Schedule

Not Used

14-6.02D Payment

Not Used

Replace 3rd paragraph of section 14-6.03A with:

The Department anticipates nesting or attempted nesting by migratory and nongame birds from February 15 to August 15.

Replace item 1 in the list in the 7th paragraph of section 14-6.03A with:

Stop all work within a 100-foot radius of the discovery except as shown in the following table:

Radius Exceptions

Species	Work stoppage radius (feet)
passerines	25
non-raptors	25
raptors	300

Replace section 14-7.03 with:

14-7.03 PALEONTOLOGICAL MONITORING

Comply with California Public Resources Code Section 5097.5, which protects vertebrate paleontological sites or other paleontological features situated on public lands. In compliance with the California Environmental Quality Act (CEQA) requirements a paleontologist provided by the County of Riverside will monitor the excavation within the project limits to salvage fossil specimens as necessary during construction.

The Contractor must provide the Engineer with a schedule of excavation operations within the project limits in writing at least 15 working days prior to construction and update the schedule as needed. The Contractor must notify the Engineer 15 days in advance of the start of excavation operations.

All employees, subcontractors, and Contractor's representatives on the project site involved in excavation activities must receive a one-hour paleontological resource awareness training program provided by the Paleontologist prior to performing on-site work. The Contractor must submit a written request to the Engineer 10 days prior to the performance of any work requesting the paleontological resource awareness training.

If fossils are discovered, the Engineer may temporarily divert or suspend the excavation operations until the paleontologist completes the salvage and removal of the fossil specimens.

All fossil specimens salvaged from within Department right of way shall remain Department property.

A delay due to paleontological monitoring or the salvage and removal of fossil specimens, when ordered by the Engineer, will be considered a temporary suspension of work under Section 8-1.06, "Suspensions".

Additional excavation required due to the discovery of paleontological remains, when ordered by the Engineer, is change order work.

Replace the 1st paragraph of section 14-8.02 with:

Do not exceed 50 dBA LMax for more than 15 minutes in any hour at the nearest residential property line from 10:00 p.m. to 7:00 a.m.

Do not exceed 55 dBA LMax for more than 5 minutes in any hour at the nearest residential property line from 10:00 p.m. to 7:00 a.m.

Do not exceed 60 dBA LMax for more than 1 minute in any hour at the nearest residential property line from 10:00 p.m. to 7:00 a.m.

Do not exceed 65 dBA LMax at the nearest residential property line from 10:00 p.m. to 7:00 a.m.

Do not exceed 60 dBA LMax for more than 15 minutes in any hour at the nearest residential property line from 6:00 p.m. to 10:00 p.m.

Do not exceed 65 dBA LMax for more than 5 minutes in any hour at the nearest residential property line from 6:00 p.m. to 10:00 p.m.

Do not exceed 70 dBA LMax for more than 1 minute in any hour at the nearest residential property line from 6:00 p.m. to 10:00 p.m.

Do not exceed 75 dBA LMax at the nearest residential property line from 6:00 p.m. to 10:00 p.m.

Do not exceed 75 dBA LMax at the nearest nonresidential property line from 6:00 p.m. to 7:00 a.m.

Do not exceed 55 dBA LMax at any time for intervals of more than 15 minutes per hour as measured in the interior of the nearest occupied residence or school.

Replace section 14-11.03 with:

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

14-11.03A General

14-11.03A(1) Summary

Section 14-11.03 includes specifications for hazardous waste management while excavating, stockpiling, transporting, placing, and disposing of material containing hazardous waste concentrations of Aerially Deposited Lead (ADL).

ADL is present within the project limits.

The Department has received from the DTSC a variance regarding the use of material containing ADL. The variance applies if Type Y-1 or Y-2 material are shown. The variance is available for inspection at the Department of Transportation, District 8, Environmental Engineering, 464 W. 4th Street, San Bernardino, CA 92401.

14-11.03A(2) Definitions

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

Type Y-2: Material that contains ADL in average concentrations (using the 90 percent Upper Confidence Limit) that exceed either 1.5 mg/L extractable lead (based on a modified waste extraction test using deionized water as the extractant) or 1,411 mg/kg total lead but are less than 150 mg/L extractable lead (based on a modified waste extraction test using deionized water as the extractant) and less than 3,397 mg/kg of total lead. This material is a California hazardous waste that may be reused as permitted under the variance of DTSC provided that the lead contaminated soil is placed a minimum

of 5 feet above the maximum historic water table elevation and protected from infiltration by a pavement structure which will be maintained by the Department.

Type Z-2: Material that contains ADL in average concentrations (using the 95 percent Upper Confidence Limit) greater than or equal to 1,000 mg/kg total lead, greater than or equal to 5.0 mg/L soluble lead (as tested using the California Waste Extraction Test), and the material is surplus; or material that contains ADL in average concentrations greater than 150 mg/L extractable lead (based on a modified waste extraction test using deionized water as the extractant) or greater than 3,397 mg/kg total lead. This material is a Department-generated CA hazardous waste and must be transported to and disposed of at a CA Class I disposal site.

Type Z-3: Material that contains ADL in average concentrations (using the 95 percent Upper Confidence Limit) greater than 5.0 mg/L soluble lead, (as tested using the Toxicity Characteristic Leaching Procedure). This material is a Department-generated federal hazardous waste and must be transported to and disposed of at a CA Class I disposal site.

14-11.03A(3) Site Conditions

Portions of the site investigation report are included in the "Material Information" handout. The complete report, entitled "Aerially Deposited Lead Site Investigation Report, Sunset Avenue Grade Separation Interstate 10 Freeway, City of Banning, California," is available on the Riverside County Transportation Department website as supplemental project information.

Type Y-1 material exists as shown.

14-11.03A(4) Submittals

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

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

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

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

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

1. Excavation schedule by location and date
2. Temporary locations of stockpiled material
3. Sampling and analysis plans for areas after removal of a stockpile. Include the following:
   - 3.1. Location and number of samples
   - 3.2. Name and address of the CDPH Environmental Laboratory Accreditation Program (ELAP) certified laboratory where the analysis was performed
4. Survey methods for Type Y-1 material burial locations
5. Sampling and analysis plan for soil cover
6. Dust control measures
7. Air monitoring. Include the following information:
   - 7.1. Location and type of equipment
   - 7.2. Sampling frequency
   - 7.3. Name and address of the accredited laboratory where the analysis was performed
8. Transportation equipment and routes
9. Method for preventing spills and tracking material onto public roads

10. Truck waiting and staging areas

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

Within 5 business days of completing placement of Type Y-1 material at a burial location, submit a report for that burial location, including "Burial Location of Soil Containing Aerial Deposited Lead" form and electronic geospatial vector data shapefiles of the top and bottom perimeters of the burial location. Submit to the Engineer and to:

ADL@dot.ca.gov

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

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

Copies of the bills of lading must be provided to the Engineer upon placement of Type Y-1 material in its final location.

14-11.03A(5) Quality Control and Assurance

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

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

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

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

14-11.03B Materials

Not Used

14-11.03C Construction

14-11.03C(1) General

Not Used

14-11.03C(2) Material Management

Place Type Y–1 material as shown and cover with a minimum 1 foot layer of nonhazardous soil or the pavement structure. Temporary surplus material may be generated on this project due to the requirements of stage construction. Do not transport temporary surplus outside the job site. It may be necessary to:

1. Stockpile material for subsequent stages.
2. Construct some embankments out of stage.
3. Handle temporary surplus material more than once.

14-11.03C(3) Dust Control

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

14-11.03C(4) Surveying Type Y–1 or Y–2 Material Burial Locations

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

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

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

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

14-11.03C(5) Material Transportation

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

14-11.03C(6) Disposal

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

14-11.03D Payment

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

No payment for stockpiling of material containing ADL will be made, unless the stockpiling is ordered. No payment for sampling and analysis will be made unless it is ordered. You are responsible for all additional sampling and analysis costs required by the receiving landfill.

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

Replace section 14-11.07 with:

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

14-11.07A General

14-11.07A(1) Summary

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

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

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

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

14-11.07A(2) Submittals

14-11.07A(2)(a) General

Reserved

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

14-11.07B Materials

Not Used

14-11.07C Construction

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

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

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

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

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

If less than 220 pounds of hazardous waste residue and dust is generated in total, dispose of it within 90 days after the start of accumulation of the residue and dust.

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

14-11.07D Payment

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

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

Replace section 14-11.09 with:

14-11.09 TREATED WOOD WASTE

14-11.09A General

14-11.09A(1) Summary

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

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

14-11.09A(2) Submittals

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

14-11.09B Materials

Not Used

14-11.09C Construction

14-11.09C(1) General

14-11.09C(2) Training

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

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

Maintain records of personnel training for 3 years.

14-11.09C(3) Storage

Store TWW before disposal using the following methods:

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

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

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

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

1. Caltrans, District number, Construction, Construction Contract number

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

14-11.09C(4) Transporting and Disposal

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

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

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

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

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

Dispose of TWW within:

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

14-11.09D Payment

Not Used

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15 EXISTING FACILITIES

Replace section 15-1.03B with:

15-1.03B Residue Containing Lead from Paint and Thermoplastic

Residue from grinding or cold planing contains lead from paint and thermoplastic. The average lead concentrations are less than 1,000 mg/kg total lead and 5 mg/L soluble lead. This residue:

1. Is a nonhazardous waste
2. Does not contain heavy metals in concentrations that exceed thresholds established by the Health and Safety Code and 22 CA Code of Regs

3. Is not regulated under the Federal Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 et seq.
5. Is generated by cold planing at:
   5.1. Sunset Avenue at Ramsey Street
   5.2. Sunset Avenue at Lincoln Street

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

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

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

Replace section 15-2.02B(3) with:

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

15-2.02B(3)(a) General

Schedule cold planing activities so that not more than 7 days elapses between the time the pavement is cold planed and the HMA is placed.

15-2.02B(3)(b) Materials

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

15-2.02B(3)(c) Construction

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

Do not use a heating device to soften the pavement.

The cold planing machine must be:

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

Replace broken, missing, or worn machine teeth.

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

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

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

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

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

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

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

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

Completely remove temporary tapers before placing permanent surfacing.

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

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

15-2.02B(3)(d) Payment

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

Replace section 15-2.02C(2) with:

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

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

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

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

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

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

Replace section 15-2.02F with:

15-2.02F Remove Asphalt Concrete Dikes

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

You may dispose of the dike by burial in an embankment in the same manner as specified for burying concrete in an embankment in section 15-3.01.

Add to Section 15-2.02:

15-2.02S Remove Pipe

The gas pipe to be removed may contain asbestos. All work regarding the handling of the hazardous materials must comply with section 14-11

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

Salvage the following:

1. sign panels

Replace section 15-2.03A(2)(b) with:

15-2.03A(2)(b) Department Salvage Location

A minimum of 2 business days before hauling salvaged material to the Department salvage storage location, notify:

1. Engineer
2. District Recycle coordinator at telephone number (909) 383-4385

The salvage storage location is:

Caltrans Riverside Maintenance Station
1091 Everton Pl
Riverside, CA, 92507

Replace section 15-2.03A(4) with:

15-2.03A(4) Payment

Payment for salvaging sign panels is included in the payment for remove roadside sign.

Add to section 15-3.01:

Delete the 6th paragraph of section 15-3.01.

Add to Section 15:

15-7 KINDER MORGAN PIPELINE PROTECTION

15-7.01 General

Section 15-7 includes specifications for protecting Kinder Morgan's pipeline during construction.

Kinder Morgan has an active 20-inch high pressure refined petroleum products pipeline along Westward Avenue, and also a 12-inch pipeline which is currently being leased by Level 3 as a fiber optic cable conduit along Westward Avenue.

Notify Kinder Morgan senior right-of-way specialist Mr. Thom Larkin (909) 873-5162 at least 2 weeks prior to commencement of work near Kinder Morgan's pipeline easement.

Exact pipeline location must be determined by pothole. Pothole work must be performed by hand excavation in the presence of a Kinder Morgan onsite pipeline representative.

Adhere to the provisions of *L-OM200-29 Guidelines for Design and Construction near Kinder Morgan Hazardous Liquid Operated Facilities.*

A Kinder Morgan pipeline representative must be maintained on site during construction activities over and adjacent to its high pressure pipeline easement.

15-7.02 Materials

Not Used

15-7.03 Construction

Contractor must meet with Kinder Morgan representatives prior to construction near Kinder Morgan's pipeline easement to provide and receive notification listings for appropriate area operations and

emergency personnel. Kinder Morgan's on site representative will require discontinuation of any work that, in his/her opinion, endangers the operations or safety of personnel, pipelines, or facilities.

Contractor must expose all Kinder Morgan pipelines prior to crossing to determine the exact alignment and depth of the lines. A Kinder Morgan representative must be present. In the event of parallel lines, only one pipeline can be exposed at a time.

Kinder Morgan will not allow pipelines to remain exposed overnight without consent of a Kinder Morgan designated representative. Contractor may be required to backfill pipelines at the end of each day.

A Kinder Morgan representative shall do all line locating. A Kinder Morgan representative shall be present for hydraulic excavation. The use of probing rods for pipeline locating shall be performed by Kinder Morgan representatives only, to prevent unnecessary damage to the pipeline coating.

Notification shall be given to Kinder Morgan at least 72 hours before the start of construction near Kinder Morgan's pipeline easement. A schedule of activities for the duration of the project must be made available at that time to facilitate the scheduling of Kinder Morgan's work site representative. Any Contractor schedule changes shall be provided to Kinder Morgan immediately.

Heavy equipment will not be allowed to operate directly over Kinder Morgan pipe lines or in Kinder Morgan right-of-way unless written approval is obtained. Heavy equipment shall only be allowed to cross Kinder Morgan pipelines at locations designated by Kinder Morgan. Contractor must comply with all precautionary measures required by Kinder Morgan to protect its pipelines. When inclement weather exists, provisions must be made to compensate for soil displacement due to subsidence of tires. Equipment excavating within 10 feet of Kinder Morgan pipelines will have a plate guard installed over the teeth to protect the pipeline.

Excavating or grading which might result in erosion or which could render the Kinder Morgan right-of-way inaccessible shall not be permitted unless the Contractor agrees to restore the area to its original condition and provide protection to Kinder Morgan's facility.

A Kinder Morgan representative shall be on site to observe any construction activities within 10 feet of a Kinder Morgan pipeline or aboveground appurtenance. The Contractor must not work within this distance without a Kinder Morgan representative being on site. Only hand excavation shall be permitted within 2 feet of Kinder Morgan pipelines, valves, and fittings unless State requirements are more stringent. However, proceed with extreme caution when within 3 feet of the pipe.

A Kinder Morgan representative will monitor construction activity within 25 feet of Kinder Morgan facilities during and after the activities to verify the integrity of the pipeline and to ensure the scope and conditions agreed to have not changed. Monitoring means to conduct site inspections on a pre-determined frequency based on items such as: scope of work, duration of expected excavator work, type of equipment, potential impact on pipeline, complexity of work and/or number of excavators involved.

Ripping is only allowed when the position of the pipe is known and not within 10 feet of a Kinder Morgan facility unless a company representative is present.

Temporary support of any exposed Kinder Morgan pipeline by Contractor may be necessary if required by Kinder Morgan's on site representative. Backfill below the exposed lines and 12 inches above the lines shall be replaced with sand or other selected material as approved by Kinder Morgan's on site representative and thoroughly compacted in 12 inch lifts to 95% of standard proctor dry density minimum or as approved by Kinder Morgan's on site representative.

Any contact with any Kinder Morgan facility, pipeline, valve set, etc. shall be reported immediately to Kinder Morgan. If repairs to the pipe are necessary, they will be made and inspected before the section is re-coated and the line is back-filled.

Kinder Morgan personnel shall install all test leads on Kinder Morgan facilities.

Burning of trash, brush, etc. is not permitted within the Kinder Morgan right-of-way.

15-7.04 Insurance Requirements

All contractors, and their subcontractors, working on Kinder Morgan easements must maintain the following types of insurance policies and minimum limits of coverage. All insurance certificates carried by

Contractor and Grantee shall include the following statement: "Kinder Morgan and its affiliated or subsidiary companies are named as additional insured on all above policies (except worker's compensation) and waiver of subrogation in favor of Kinder Morgan and its affiliated or subsidiary companies, their respective directors, officers, agents, and employees applies as required by written contract." Contractor must furnish certificates of insurance evidencing insurance coverage prior to commencement of work and shall provide 30 days notice prior to the termination or cancellation of any policy.

1. Statutory coverage workers' compensation insurance in accordance with the laws of the states where the work is to be performed. If Contractor performs work on adjacent navigable waterways Contractor must furnish a certificate of insurance showing compliance with the provisions of the Federal Longshoreman's and Harbor Workers' Compensation Law.
2. Employer's liability insurance, with limits of not less than $1,000,000 per occurrence and $1,000,000 disease each employee.
3. Commercial general liability insurance with a combined single limit of not less than $2,000,000 per occurrence and in the aggregate. All policies must include coverage for blanket contractual liability assumed.
4. Comprehensive automobile liability insurance with a combined single limit of not less than $1,000,000. If necessary, the policy must be endorsed to provide contractual liability coverage.
5. If necessary comprehensive aircraft liability insurance with combined bodily injury, including passengers, and property damage liability single limits of not less than $5,000,000 each occurrence.
6. Contractor's pollution liability insurance this coverage must be maintained in force for the full period of this agreement with available limits of not less than $2,000,000 per occurrence.
7. Pollution legal liability insurance this coverage must be maintained in a minimum amount of $5,000,000 per occurrence.

15-7.05 Payment

Not Used

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DIVISION III GRADING

19 EARTHWORK

Replace the 2nd, 3rd, and 4th paragraphs of section 19-2.03B with:

Dispose of surplus material. Ensure enough material is available to complete the embankments before disposing of it.

Pervious backfill material placed within the limits of payment for bridges is paid for as structure backfill (bridge).

Add to section 19-7.02C:

The portion of imported borrow placed within 4 feet of the finished grade must have a resistance (R-Value) of at least 20.

^^

20 LANDSCAPE

Add to section 20-1.02B:

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

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

Add to section 20-1.02B:

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

1. Oxadiazon

Add to section 20-1.03C:

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

Add to section 20-1.03B:

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

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

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

Growth regulators must not be applied within 6 feet of plants.

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

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

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

3. A work plan for maintain existing planted areas.

Add to section 20-2.03D:

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

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

Replace section 20-3.01C(3) with:

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

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

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

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

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

Schedule of Values for Control and Neutral Conductors

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

Total _____

Add to section 20-3.02H(1):

Irrigation controller includes irrigation controller, GPRS radio modem, radio remote units, remote control components, GPRS antenna, and data access service.

Irrigation controller must be Hunter I-Core Model HS16-IC36S/HS-XLPRR/HS-XLTR/HS-HFS-208-2, or equal. The unit will be a 36-station base unit, with stainless steel top entry pedestal, permanent mount remote control receiver, hand held transmitter, and 1 1/2" flow sensing. The irrigation controller may be obtained from Hydro-Scape Products, , 5805 Kearny Villa Rd., San Diego, CA 92123, (858)522-1124. The retail price is $3,970.00, not including sales tax or delivery. Pricing is valid through 12/7/2013.

Add to section 20-3.02I:

Irrigation controller enclosure cabinet/pedestal must be Hunter I-Core Stainless Steel top entry pedestal. The irrigation controller enclosure cabinet may be obtained from Hydro-Scape Products, 5805 Kearny Villa Rd., San Diego, CA 92123. (858)522-1124. The retail price is $2,000.00, not including sales tax or delivery. Pricing is valid through 12/7/2013.

Irrigation controller enclosure cabinet dimensions for a single irrigation controller must be 38 inches high by 14 inches wide by 12 inches deep.

Irrigation controller enclosure cabinets must be fabricated of stainless steel.

The finish color of the irrigation controller enclosure cabinets must match color no. 20450 of FED-STD-595.

Fabricate mounting panels with stainless steel metal sheets with a minimum thickness of 0.157 inch.

Add to section 20-3.02M(4):

The irrigation facilities are designed for future recycled water supply.

Add to section 20-3.02R(1):

Ball valves must be PVC or chlorinated PVC ball valves.

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

Remote control valves must be glass filled nylon.

Add to paragraph 2 of section 20-3.02R(3)(b):

8. Valves must be equipped with a self-flushing feature manufactured to be used with recycled water. Valves must not have external tubing.

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

Valves must be angle pattern or straight pattern as shown.

Add to section 20-3.02(R)(7):

Pressure relief valves must be preset at the factory for relief at 150 psi.

Replace section 20-3.02V with:

20-3.02V Water Meters

Water meters for the irrigation systems are furnished and installed by the servicing utility at the locations shown.

Make the arrangements and pay the costs and fees required by the servicing utility.

The Banning Water Division has established a fee of $5,000 for furnishing and installing a water meter. If, at the time of installation, this fee has changed, the Department takes a credit for the reduction in the fee, or the Department pays the difference for the increase in the fee. The credit or payment is taken or paid on the 1st monthly progress payment made after the meter is installed. Submit a copy of the invoice for the installation fee.

Make arrangements for furnishing and applying water until the water meters have been installed by the servicing utility.

Add to section 20-3.02:

20-3.02X Flow Sensor

Flow sensor consists of flow sensor, valve box with wire mesh and gravel or crushed rock, fittings, pipe, flow sensor cable, and all appurtenances required to complete the installation.

Flow sensor must be Hunter model 1 1/2" schedule 80 flow sensor tee, or equal. The flow sensor may be obtained from Hydro-Scape Products, 5805 Kearny Villa Rd., San Diego, CA 92123. (858)522-1124. The retail price is $250.00, not including sales tax or delivery. Pricing is valid through 12/7/2013.

Replace section 20-3.03C(1)(c) with:

20-3.03C(1)(c) Directional Boring

Notify the Engineer 2 working days before starting directional bore operations. Perform directional bore operations in the presence of the Engineer.

Conduits installed by the directional bore method must be PVC Schedule 40 and comply with section 20-3.02M(3)(a).

The diameter of the boring tool for directional boring must be only as large as necessary to install conduit. Only use mineral slurry or wetting solution to lubricate the boring tool and to stabilize the soil surrounding the boring path. Mineral slurry or wetting solution must be water based and environmentally safe.

Dispose of residue from directional boring operations.

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

You must have direct charge and control of the directional bore operation at all times.

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

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

Weeds must be killed within ground cover areas and within the area extending beyond the outer limits of the ground cover areas to the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, existing

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

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

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

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

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

Weeds must be killed and removed under guard rails, from within areas where asphalt concrete surfacing, concrete surfacing, rock blankets, gravel mulch or decomposed granite areas are to be placed, and from within unpaved gore areas between the edge of pavement and planting areas as shown.

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

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

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

Dispose of weeds killed during the initial roadside clearing.

Add to section 20-7.03C:

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

Replace "Reserved" in section 20-7.03G with:

Do not perform planting work in weed germination areas for a period of 14 days after:

1. Irrigation systems have been installed
2. Plant holes have been excavated and backfilled

For weed germination areas, keep the soil sufficiently moist to germinate weeds. Weeds that germinate must be killed.

Add to section 20-7.03I(1):

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

Add to section 20-9.01A:

The plant establishment period must be Type 2.

Add to section 20-9.03D:

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

Control weeds by:

1. Hand pulling:
   1.1. In plant basins and on basin walls
   1.2. In ground cover planting areas without plant basins
2. Killing:
   2.1. In mulched areas and ground cover planting areas outside of plant basins
   2.2. In planting areas without ground cover plantings or located outside of ground cover areas
   2.3. In ground cover planting areas without plant basins
   2.4. Within medians, pavement, curbs, sidewalks, and other surfaced areas
3. Mowing:
   3.1. Outside of mulched areas
   3.2. Outside of plant basins
   3.3. Outside of ground cover areas
   3.4. Outside of median and paved areas

Where planting areas are 12 feet or more from the edges of existing plantings to remain and from shoulders, dikes, curbs, sidewalks, fences and walls, the mowing limit must be 6 feet beyond the outer limits of the planting area.

Dispose of mowed weeds.

Replace the paragraph in section 20-10.02D with:

Aggregate base is not required.

Replace "Reserved" in section 20-10.02G with:

Decomposed granite must be crushed granite rock screenings graded from 3/8 inch particles to dust and comply with the following grading requirements:

Grading Requirements

Sieve size	Percent passing
3/8 inch	100
No. 4	95–100
No. 8	75–80
No. 16	55–65
No. 30	40–50
No. 50	25–35
No. 100	20–25
No. 200	5–15

Note:
Grading based upon AASHTO T11-82 and T27-82

The decomposed granite must be tan and come from the same source. The color must be uniform.

Replace "Reserved" in section 20-10.03A with:

Before performing decomposed granite work, remove weeds to the ground level.

Replace the paragraphs in section 20-10.03B with:

Excavation is not required.

After clearing, grade areas to receive decomposed granite to a smooth, uniform surface, and compact to not less than 90 percent relative compaction. Place decomposed granite on compacted original ground.

Replace "Reserved" in section 20-12.02D with:

Rock must be clean, smooth, and obtained from a single source and must comply with the following grading requirements:

Grading Requirements

Screen size (inches)	Percentage passing
8	100
6	50-85
4	0

Replace "Reserved" in section 20-12.03A with:

Before performing rock blanket work, remove weeds to the ground level.

Add to section 20:

20-16 BOULDERS

20-16.01 GENERAL

20-16.01A Summary

Section 20-16 includes specifications for placing boulders as shown.

20-16.01B Submittals

Submit a sample of the various sizes of boulders.

20-16.02 MATERIALS

Boulders must be irregularly shaped, and must vary in size from 2 feet to 6 feet. Approximately 70 percent must vary in size from 2 feet to 4 feet, and approximately 30 percent must vary in size from 4 feet to 6 feet.

The color of boulders must be tan.

20-16.03 CONSTRUCTION

Before placing boulders, remove weeds to the ground level.

After clearing, grade areas to receive boulders to a smooth, uniform surface, and compact to not less than 90 percent relative compaction. Place boulders on compacted ground.

20-16.04 PAYMENT

Not Used.

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DIVISION V SURFACINGS AND PAVEMENTS
39 HOT MIX ASPHALT

Add to section 39-1.01:

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

Add to section 39-1.02C:

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

Add to section 39-1.02E:

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

Add to section 39-1.03B:

Determine the quantity of asphalt rubber binder to be mixed with the aggregate for RHMA-G under California Test 367 except:

1. Specific gravity used in California Test 367, Section B, "Void Content of Specimen," must be determined under California Test 308, Method A.
2. California Test 367, section C, "Optimum Bitumen Content," is revised as follows:
   - 2.1. Base the calculations on the average of 3 briquettes produced at each asphalt rubber binder content.
   - 2.2. Use California Test 309 to determine theoretical maximum specific gravity and density of the RHMA-G.
   - 2.3. Plot asphalt rubber binder content versus average air voids content based on California Test 309 for each set of three specimens on Form TL-306 (Figure 3), and connect adjacent points with a best-fit curve.
   - 2.4. Plot asphalt rubber binder content versus average Hveem stability for each set of three specimens and connect adjacent points with a best-fit curve.
   - 2.5. Calculate voids in mineral aggregate (VMA) and voids filled with asphalt (VFA) for each specimen, average each set, and plot the average versus asphalt rubber binder content.
   - 2.6. Calculate the dust proportion and plot versus asphalt rubber binder content.
   - 2.7. From the curve plotted in Step 2.3, select the theoretical asphalt rubber binder content that has 5.0 percent air voids.
   - 2.8. At the selected asphalt rubber binder content, evaluate corresponding voids in mineral aggregate, voids filled with asphalt, and dust proportion to verify compliance with requirements. If necessary, develop an alternate composite aggregate gradation to conform to the RHMA-G requirements.
   - 2.9. Record the asphalt rubber binder content in Step 2.7 as the Optimum Bitumen Content (OBC).
   - 2.10. OBC must be greater than or equal to 7.5 based on total weight of mix.
3. Laboratory mixing and compaction must comply with California Test 304, except the mixing temperature of the aggregate must be from 300 to 325 degrees F. The mixing temperature of the asphalt-rubber binder must be from 375 to 425 degrees F. The compaction temperature of the combined mixture must be from 290 to 300 degrees F.

Add to section 39-1.11:

Before opening a lane to traffic, pave shoulders and median borders adjacent to the lane.

Do not leave a vertical joint more than 0.15 foot high between adjacent lanes open to traffic or within lanes open to traffic.

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

Add to section 39-1.13:

HMA placed on the bridge deck must be Type A.

Asphalt binder must be Grade PG 64-16.

Replace section 39-1.18 with:

39-1.18 HOT MIX ASPHALT AGGREGATE LIME TREATMENT—DRY LIME METHOD

39-1.18A General

39-1.18A(1) Summary

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

39-1.18A(2) Submittals

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

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

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

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

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

39-1.18A(3) Quality Control and Assurance

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

Aggregate Quality Control During Lime Treatment

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

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

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

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

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

39-1.18B Materials

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

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

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

Treated aggregate must not have lime balls or clods.

39-1.18C Construction

39-1.18C(1) General

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

Do not treat RAP.

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

If marination is required:

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

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

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

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

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

Proportion dry lime by weight with a continuous operation.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

39-1.18D Payment

Payment for dry lime treating the aggregate, including marination, is included in payment for the HMA involved.

Replace section 39-1.19 with:

39-1.19 HOT MIX ASPHALT AGGREGATE LIME TREATMENT—SLURRY METHOD

39-1.19A General

39-1.19A(1) Summary

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

39-1.19A(2) Submittals

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

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

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

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

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

39-1.19A(3) Quality Control and Assurance

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

Aggregate Quality Control During Lime Treatment

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

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

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

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

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

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

39-1.19B Materials

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

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

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

Treated aggregate must not have lime balls or clods.

39-1.19C Construction

39-1.19C(1) General

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

Treat aggregate separate from HMA production.

Do not treat RAP.

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

Lime treat and marinate coarse and fine aggregates separately.

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

Treat the aggregate and stockpile for marination only once.

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

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

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

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

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

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

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

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

39-1.19C(2) Lime Slurry Proportioning

Proportion lime and water with a continuous or batch operation.

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

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

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

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

39-1.19D Payment

Payment for treating aggregates with lime slurry is included in payment for the HMA involved.

Replace section 39-1.20 with:

39-1.20 LIQUID ANTISTRIP TREATMENT

39-1.20A General

39-1.20A(1) Summary

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

39-1.20A(2) Submittals

For LAS, submit with the proposed JMF submittal:

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

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

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

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

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

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

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

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

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

2.8. Asphalt binder content as percentage of total weight of mix calculated from:
  2.8.1. Aggregate weigh belt output
  2.8.2. Aggregate moisture input
  2.8.3. Asphalt binder meter output
2.9. LAS content as percentage of the asphalt binder weight calculated from:
  2.9.1. Asphalt binder meter output
  2.9.2. LAS meter output

39-1.20A(3) Quality Control and Assurance

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

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

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

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

39-1.20B Materials

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

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

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

Store and mix LAS under the manufacturer's instruction.

39-1.20C Construction

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

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

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

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

39-1.20D Payment

Payment for treating asphalt binder with LAS is included in payment for the HMA involved.

Replace section 39-1.22 with:

39-1.22 LIQUID ASPHALT PRIME COAT

39-1.22A General

The Engineer designates areas receiving liquid asphalt prime coat.

Prime coat must comply with the specifications for liquid asphalt.

39-1.22B Materials

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

39-1.22C Construction

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

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

Before paving, prime coat must cure for 48 hours.

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

39-1.22D Payment

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

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

Replace section 39-1.23 with:

39-1.23 HOT MIX ASPHALT TYPE C

39-1.23A General

39-1.23A(1) Summary

Except if specified for Type C, the specifications for HMA Type A apply to HMA Type C.

Produce and place HMA Type C under the QC/QA construction process.

39-1.23A(2) Submittals

Submit with the JMF submittal:

1. California Test 204 plasticity index results
2. California Test 371 tensile strength ratio results for untreated HMA Type C
3. California Test 371 tensile strength ratio results for treated HMA Type C if untreated HMA Type C tensile strength ratio is below 70

At JMF submittal, production start-up, and every 5,000 tons, submit the California Test 371 test results to the Engineer and to:

Moisture_Tests@dot.ca.gov

At production start-up and once during production, submit samples split from your HMA Type C production sample for California Test 371 to the Engineer and METS, Attention: Moisture Test.

39-1.23A(3) Quality Control and Assurance

For the mix design, determine the plasticity index of the aggregate blend under California Test 204. Choose an antistrip treatment and use the corresponding laboratory procedure for the mix design as shown in the following table:

Antistrip Treatment Laboratory Procedures for Mix Design

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

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

For the mix design, determine tensile strength ratio under California Test 371 on untreated HMA Type C. If the tensile strength ratio is less than 70:

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

On the 1st production day and every 5,000 tons, sample and test under California Test 371.

The Department does not use California Test 371 test results for JMF verification or to determine specification compliance.

For the mix design, determine the OBC at 5.0 percent air void content.

Determine the proposed JMF for HMA Type C from a mix design that has the values for the quality characteristics shown in the following table:

HMA Type C Mix Design Requirements

Quality characteristic	Test method	Value	
Design air void content (%)		4.0	5.0
Air void content (%)[a]	California Test 367	4.0	5.0
Voids in mineral aggregate (% min)[b]	California Test 367		
1/2" grading		14.0	15.0
3/4" grading		13.0	14.0
1" grading			
with NMAS = 1"		12.0	13.0
with NMAS = 3/4"		13.0	14.0
Voids filled with asphalt (%)	California Test 367		
1/2" grading		65.0–75.0	60.0–70.0
3/4" grading		65.0–75.0	60.0–70.0
1" grading		65.0–75.0	60.0–70.0
Dust proportion [c] (P200/Pbe)	California Test 367	0.6–1.2	0.6–1.2
Stabilometer value (min) [d]	California Test 366	37 [e] (Modified) 35 [f]	37 [e] (Modified) 35 [f]

[a] Calculate the air void content of each specimen using California Test 309 and 367. Modify California Test 367, Paragraph C5, to use the exact air void content specified in the selection of OBC.

[b] Minimum voids in the mineral aggregate (VMA) is dependent upon the nominal maximum aggregate size (NMAS) of JMF. NMAS is defined as 1 sieve size larger than the 1st sieve to retain more than 10 percent.

[c] Asphalt content based on total weight of mix.

[d] California Test 304, Part 2C.12.

[e] Comply with California Test 366: 150 tamps at 500 psi tamping pressure and 230 °F compaction temperature; cool specimens to 140 °F; apply 12,600 lb leveling load; and perform stabilometer test at 140 °F.

[f] Modify California Test 366: 150 tamps at 500 psi tamping pressure and 230 °F compaction temperature; cool specimens to 140 °F; apply additional 500 tamps at 500 psi; apply 12,600 lb leveling load; and perform stabilometer test at 140 °F.

With the minimum quality control testing for the specified construction process, perform sampling and testing at the specified minimum frequency for the quality characteristics shown in the following table:

HMA Type C Minimum Quality Control

Quality characteristic	Test method	Minimum sampling and testing frequency	Requirement	
Asphalt binder content (%)	California Test 379 or 382	1 per 750 tons and any remaining part	JMF ± 0.30	
Stabilometer Value(min) [a, b]	California Test 366	1 per 4,000 tons or 1 per 2 business days, whichever is more	37 [c] (Modified) 35 [d]	
Air void content (%) [a, e]	California Test 367		Design ± 2	
Percent of crushed particles [f] Coarse aggregate (% min) Two fractured faces Fine aggregate (Passing No. 4 sieve and retained on No. 8 sieve) (% min) One fractured face	California Test 205	1 per 5,000 tons or 1 per 5 business days, whichever is more	95 90	
Fine aggregate angularity (% min) [f, g]	California Test 234		45	
Los Angeles Rattler [f] Loss at 100 rev. (% max) Loss at 500 rev. (% max)	California Test 211	As necessary and designated in the QC plan. At least once per project	12 40	
Flat and elongated particles [f] (% max by weight @ 5:1)	California Test 235		10	
		Design air void content	4.0	5.0
Field compaction (% of max. theoretical density) [h, i, j]	California Test 375	1 per 750 tons or any single location, whichever is less	92–97	91–96
Voids in mineral aggregate (% min) 1/2" gradation 3/4" gradation 1" gradation [k] with NMAS = 1" with NMAS = 3/4"	California Test 367	1 per 4,000 tons or 1 per 2 business days, whichever is more	 14.0 13.0 12.0 13.0	 15.0 14.0 13.0 14.0
Voids filled with asphalt (%) 1/2" gradation 3/4" gradation 1" gradation	California Test 367		 65.0–75.0 65.0–75.0 65.0–75.0	 60.0–70.0 60.0–70.0 60.0–70.0
Dust proportion [l] (P200/Pbe)	California Test 367	1 per 4,000 tons or 1 per 2 business days, whichever is more (Report Only)	0.6–1.2	0.6–1.2

[a] Report the average of 3 tests from a single split sample.
[b] If the stability range is more than 8 points, prepare and test new briquettes.
[c] Comply with California Test 366: 150 tamps at 500 psi tamping pressure and 230 °F compaction temperature; cool specimens to 140 °F; apply 12,600 lb leveling load; and perform stabilometer test at 140 °F.
[d] Modify California Test 366: 150 tamps at 500 psi tamping pressure and 230 °F compaction temperature; cool specimens to 140 °F; apply additional 500 tamps at 500 psi tamping pressure and 140 °F compaction temperature; apply 12,600 lb leveling load; and perform stabilometer test at 140 °F.
[e] Determine the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A. Determine theoretical maximum specific gravity under California Test 309. Calculate the air void content of each specimen using California Test 309 and 367. Modify California Test 367, Paragraph C5, to use the design air void content specified.
[f] Aggregate must comply with the quality specifications before it is treated with lime. During lime treatment except for dry lime on damp aggregate treatment at continuous mixing plants, sample coarse and fine aggregate from individual stockpiles. Combine aggregate in the JMF proportions. Prepare and test 3 samples from a single split sample for aggregate quality at the frequency specified during lime treatment and report test results as the average of the 3 tests.
[g] The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.
[h] Determine field compaction for any of the following conditions:

1. 1/2-inch aggregate grading is used and the specified total paved thickness is at least 0.15 foot.
2. 3/4-inch or 1-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.

[i] To determine field compaction use:

1. In-place density measurements using the method specified in your QC plan.
2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.

[j] For Standard construction process, take and average 3 cores per 250 tons of HMA placed.
[k] Minimum VMA dependent upon NMAS of JMF. NMAS is defined as 1 sieve size larger than the 1st sieve to retain more than 10 percent.
[l] Asphalt content based on total weight of mix.

With the acceptance testing for the specified construction process, the Engineer samples and tests the quality characteristics for the values shown in the following table:

HMA Type C Acceptance

Quality characteristic	Test method	Value	
Asphalt binder content (%)	California Test 379 or 382	JMF ± 0.30	
Stabilometer Value (min) [a, b]	California Test 366	37 [c] (Modified) 35 [d]	
Air void content (%) [a, e]	California Test 367	Design ± 2	
Percent of crushed particles [f] Coarse aggregate (% min) Two fractured faces Fine aggregate (Passing No. 4 sieve and retained on No. 8 sieve) (% min) One fractured face	California Test 205	 95 90	
Fine aggregate angularity (% min) [f, g]	California Test 234	45	
Los Angeles Rattler [f] Loss at 100 rev. (% max) Loss at 500 rev. (% max)	California Test 211	 12 40	
Flat and elongated particles [f] (% max by weight @ 5:1)	California Test 235	 10	
	Design air void content	4.0	5.0
Field compaction (% of max. theoretical density) [h, i, j]	California Test 375	92–97	91–96
Voids in mineral aggregate (% min) 1/2" gradation 3/4" gradation 1" gradation [k] with NMAS = 1" with NMAS = 3/4"	California Test 367	 14.0 13.0 12.0 13.0	 15.0 14.0 13.0 14.0
Voids filled with asphalt (%) 1/2" gradation 3/4" gradation 1" gradation	California Test 367	 65.0–75.0 65.0–75.0 65.0–75.0	 60.0–70.0 60.0–70.0 60.0–70.0
Dust proportion [l] (P200/Pbe)	California Test 367	0.6–1.2 Report Only	

[a] The Engineer reports the average of 3 tests from a single split sample.

[b] If the stability range is more than 8 points, the Engineer prepares and tests new briquettes.

[c] The Engineer follows California Test 366: 150 tamps at 500 psi tamping pressure and 230 °F compaction temperature; cool specimens to 140 °F; apply 12,600 lb leveling load; and perform stabilometer test at 140 °F.

[d] Modify California Test 366: 150 tamps at 500 psi tamping pressure and 230 °F compaction temperature; cool specimens to 140 °F; apply additional 500 tamps at 500 psi tamping pressure and 140 °F compaction temperature; apply 12,600 lb leveling load; and perform stabilometer test at 140 °F.

[e] The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A. The Engineer determines theoretical maximum specific gravity under California Test 309. The Engineer calculates the air void content of each specimen using California Test 309 and 367. The Engineer modifies California Test 367, Paragraph C5, to use the design air void content specified.

[f] Aggregate must comply with the quality specifications before it is treated with lime. During lime treatment, except for dry lime on damp aggregate treatment at continuous mixing plants; the Engineer samples coarse and fine aggregate from individual stockpiles, combines aggregate in the JMF proportions, and prepares and tests 3 samples from a single split sample for aggregate quality at the frequency specified during lime treatment and report test results as the average of the 3 tests.

[g] The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing

rock or gravel.

[h] The Engineer determines field compaction for any of the following conditions:

1. 1/2-inch aggregate grading is used and the specified total paved thickness is at least 0.15 foot.
2. 3/4-inch or 1-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.

[i] To determine field compaction, the Engineer uses:

1. California Test 308, Method A, to determine in-place density of each density core.
2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.

[j] For Standard construction process, take and average 3 cores per 250 tons of HMA placed.

[k] Minimum VMA dependent upon NMAS of JMF. NMAS is defined as 1 sieve size larger than the 1st sieve to retain more than 10 percent.

[l] Asphalt content based on total weight of mix.

The Department determines the percent of maximum theoretical density from density cores taken from the final layer measured the full depth of the total paved HMA thickness if any of the following applies:

1. 1/2-inch aggregate grading is used and the specified total paved thickness is at least 0.15 foot and any layer is less than 0.15.
2. 3/4-inch or 1-inch aggregate grading is specified and used and the specified total paved thickness is at least 0.20 foot and any layer is less than 0.20 foot.

39-1.23B Materials

Asphalt binder used in HMA Type C must be PG 64-28 PM.

Aggregate used in HMA Type C must comply with the 1-inch HMA Type C gradation.

Choose a sieve size target value (TV) within each target value limit shown in the following table:

Aggregate Gradation
(Percentage Passing)
HMA Type C

1-inch HMA Type C

Sieve sizes	Target value limits	Allowable tolerance
1"	100	--
3/4"	88–93	TV ± 5
1/2"	72–85	TV ± 6
3/8"	55–70	TV ± 6
No. 4	35–52	TV ± 7
No. 8	22–40	TV ± 5
No. 30	8–24	TV ± 4
No. 50	5–18	TV ± 4
No. 200	3.0–7.0	TV ± 2

3/4-inch HMA Type C

Sieve sizes	Target value limits	Allowable tolerance
1"	100	--
3/4"	90–95	TV ± 5
1/2"	60–75	TV ± 6
No. 4	35–52	TV ± 7
No. 8	22–36	TV ± 5
No. 30	8–18	TV ± 4
No. 200	3.0–7.0	TV ± 2

1/2-inch HMA Type C

Sieve sizes	Target value limits	Allowable tolerance
3/4"	100	--
1/2"	90–98	TV ± 6
3/8"	64–84	TV ± 6
No. 4	42–57	TV ± 7
No. 8	29–39	TV ± 5
No. 30	13–19	TV ± 4
No. 200	3.0–7.0	TV ± 2

Before the addition of asphalt binder and lime treatment, aggregate for HMA Type C must have the values for the quality characteristics shown in the following table:

HMA Type C Aggregate Quality

Quality characteristic	Test method	Value
Percent of crushed particles Coarse aggregate (% min) Two fractured faces Fine aggregate (Passing No. 4 sieve and retained on No. 8 sieve.) (% min) One fractured face	California Test 205	 95 90
Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.	California Test 211	 12 40
Sand equivalent [a] (min)	California Test 217	47
Fine aggregate angularity [b] (% min)	California Test 234	45
Flat and elongated particles (% max by weight @ 5:1)	California Test 235	10

[a] Reported value must be the average of 3 tests from a single sample.

[b] The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock and gravel.

If lime treatment is required, sample coarse and fine aggregate from individual stockpiles during lime treatment except for dry lime on damp aggregate at continuous mixing plants. Combine aggregate in the JMF proportions.

39-1.23C Construction

The 15th and 16th paragraphs of section 39-1.11 do not apply to HMA Type C.

Pave HMA Type C in maximum 0.45-foot-thick compacted layers.

Add to section 39-1:

39-1.41 HOT MIX ASPHALT TYPE A—BOND BREAKER

39-1.41A General

39-1.41A(1) Summary

This work includes producing and placing Hot Mix Asphalt Type A (Bond Breaker) using the Method process.

Hot Mix Asphalt Type A (Bond Breaker) must comply with the requirements for Hot Mix Asphalt Type A of Section 39, "Hot Mix Asphalt," of the Standard Specifications.

39-1.41A(2) Quality Control and Assurance

Perform sampling and testing at the specified frequency for the following quality characteristics:

Minimum Quality Control

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Requirement
Asphalt binder content (%)	CT 379 or 382	1 per 750 tons and any remaining part	JMF ± 0.45
Aggregate gradation [a]	CT 202		JMF ± Tolerance [b]
Sand equivalent (min.) [c]	CT 217		47
HMA moisture content (max.)	CT 370	1 per 2500 tons but not less than 1 per paving day	1.0%
Percent of maximum theoretical density [d, e]	Quality control plan	2 per business day (min.)	> 98%
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants [f]	CT 226 or CT 370	2 per day during production	--
Percent of crushed particles Coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (Passing No. 4 sieve and retained on No. 8 sieve) (% min) One fractured face	CT 205	As necessary and designated in the QCP. At least once per project	 90 75 70
Los Angeles Rattler Loss at 500 rev. (% max.)	CT 211		45

Notes:

[a] Determine combined aggregate gradation containing RAP under Laboratory Procedure LP-9.

[b] The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

[c] Report the average of 3 tests from a single split sample.

[d] Required if the total paved thickness is at least 0.15 foot.

[e] Determine maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

[f] For adjusting the plant controller at the HMA plant.

Apply white pigmented curing compound to the finished surface of the Hot Mix Asphalt Type A (Bond Breaker) prior to placement of the portland cement concrete pavement. Pigmented curing compound must conform to the requirements of ASTM C 309, Type 2, Class A. Curing compound must be applied in 2 separate applications to the area to be surfaced with portland cement concrete pavement. Apply curing compound at the rate of one gallon per 150 square feet.

The Engineer samples for acceptance testing and tests for:

HMA Acceptance

Quality Characteristic	Test Method	Requirement
Asphalt binder content (%)	CT 379 or 382	JMF ± 0.45
Aggregate gradation [a]	CT 202	JMF ± Tolerance [b]
Sand equivalent (min.) [c]	CT 217	47
HMA moisture content (max.)	CT 370	1.0%
Percent of maximum theoretical density [d, e]	Quality control plan	> 98%
Percent of crushed particles Coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (Passing No. 4 sieve and retained on No. 8 sieve) (% min) One fractured face	CT 205	 90 75 70
Los Angeles Rattler Loss at 500 rev. (% max.)	CT 211	 45

Notes:
[a] The Engineer determines combined aggregate gradation containing RAP under Laboratory Procedure LP-9.
[b] The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."
[c] The Engineer reports the average of 3 tests from a single split sample.
[d] Required if the total paved thickness is at least 0.15 foot.
[e] The Engineer determines maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

39-1.41A(3) Job Mix Formula and Hot Mix Asphalt Type A (Bond Breaker) Evaluation

Prior to the addition of the additional 1 percent of asphalt binder, Hot Mix Asphalt Type A (Bond Breaker) will conform to the requirements of Hot Mix Asphalt for Job Mix Formula. The JMF for Hot Mix Asphalt Type A (Bond Breaker) will not be verified. Hot Mix Asphalt Type A (Bond Breaker) will be evaluated in the first day of production during the startup evaluation.

39-1.41B Materials

39-1.41B(1) Asphalt Binder

The grade of asphalt binder mixed with aggregate for Hot Mix Asphalt Type A (Bond Breaker) must be PG 64-16.

The amount of asphalt binder mixed with aggregate for Hot Mix Asphalt Type A (Bond Breaker) shall be increased by one percent by weight of the dry aggregate over the amount of asphalt binder determined for use in Hot Mix Asphalt Type A under California Test 367.

39-1.41B(2) Aggregate

The aggregate for Hot Mix Asphalt Type A (Bond Breaker) must comply with the 3/8-inch grading.

39-1.41C Construction

Not Used

39-1.41D Payment

Hot Mix Asphalt Type A (Bond Breaker) will be paid for in the same manner specified for Hot Mix Asphalt in conformance with the requirements of Section 39-6, "Payment," of the Standard Specifications.

Full compensation for the additional one percent of asphalt binder used in Hot Mix Asphalt Type A (Bond Breaker) and for furnishing and applying white pigmented curing compound to the surface of the Hot Mix Asphalt Type A (Bond Breaker) shall be considered as included in the contract price paid per ton for Hot Mix Asphalt Type A (Bond Breaker).

^^

40 CONCRETE PAVEMENT

Replace section 40-1.01C(14) with:

40-1.01C(14) Coefficient of Thermal Expansion

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

For all coefficient of thermal expansion testing, submit your test data at the Web site:

http://169.237.179.13/cte/

Replace section 40-1.01D(2) with:

40-1.01D(2) Just-In-Time Training

Your personnel required to attend the prepaving conference must also complete Just-In-Time-Training (JITT) for jointed plain concrete pavement.

At least 7 business days before JITT, submit:

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

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

Construction_Engineering_HQ@dot.ca.gov

JITT must be:

1. At least 4 hours long
2. At your option, an extension of the prepaving conference
3. Conducted at a mutually agreed place
4. Completed at least 20 days before you start paving activities
5. Conducted during normal working hours

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

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

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

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

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

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

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

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

Liquid joint sealant for isolation joints must be silicone.

Longitudinal contraction joint must be Type A2. Transverse contraction joint must be Type A1.

Add to section 40-1.02I(4):

Use preformed compression seal for transverse and longitudinal contraction joints.

Replace "Reserved" in section 40-1.03L(1):

Construct edge treatments as shown. This work includes grading when required for the preparation of safety edge areas.

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

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

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

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

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

Replace section 40-2 with:

40-2 JOINTED PLAIN CONCRETE PAVEMENT

40-2.01 GENERAL

40-2.01A Summary

Section 40-2 includes specifications for constructing JPCP.

40-2.01B Submittals

40-2.01B(1) General

Not Used

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

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

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

40-2.01C Quality Control and Assurance

40-2.01C(1) General

Not Used

40-2.01C(2) Quality Control Plan

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

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

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

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

40-2.02 MATERIALS

Not Used

40-2.03 CONSTRUCTION

40-2.03A General

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

40-2.03B Tie Bar Placement

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

40-2.03C Ramp Termini

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

40-2.03D Removal and Replacement

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

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

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

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

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

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

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

40-2.04 PAYMENT

Not Used

^^

DIVISION VI STRUCTURES

46 GROUND ANCHORS AND SOIL NAILS

Add to section 46-1.01A:

Only one ground anchor is to be installed per footing step at one time. The limit of the soil removal at the abutment location of the ground anchor is to be sufficient to allow for the work required for the installation of the ground anchor only. Once each footing step has a ground anchor fully installed the contractor may move to the next anchor location on the same footing step.

Add to section 46-2.01D(2)(a):

Performance test a minimum of 50% of ground anchors at each footing step. The Engineer determines which anchors are to be performance tested.

^^

49 PILING

Add to section 49-1.01D(4):

The Department performs dynamic monitoring of driven piling at the corresponding support locations or control zones shown in the following table:

Bridge no.	Support location or control zone
	Abutment #1
	Bent #2
	Abutment #3

Add to section 49-1.03:

Expect difficult pile installation due to the conditions shown in the following table:

Pile location		Conditions
Bridge no.	Support location	
	Abutment #1	Dense to very dense and hard layers below a depth of 40 feet
	Bent #2	Dense to very dense and hard layers below a depth of 40 feet
	Abutment #3	Dense to very dense and hard layers below a depth of 40 feet

Add to section 49-2.01A(3)(b):

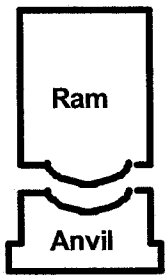
Before installing driven piles, submit a driving system submittal for each pile type for each of the support locations or control zones shown in the following table:

Bridge no.	Pile type	Support location or control zone
	HP 14x89	Abutment #1
	HP 14x117	Bent #2
	HP 14x89	Abutment #3

CALIFORNIA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION LABORATORY

PILE AND DRIVING DATA FORM

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



Hammer

Manufacturer:_____ Model:_____
Type:_____ Serial No.:_____
Rated Energy:_____ at _____ Length of Stroke

Modifications: _____
_____
_____
_____
_____

Capblock (Hammer Cushion)

Material:_____
Thickness:_____in Area:_____in^2
Modulus of Elasticity - E:_____ksi
Coefficient of Restitution - e:_____

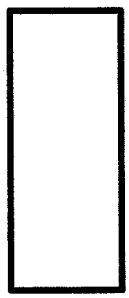
Pile Cap

Helmet
Bonnet
Anvil Block
Drivehead

Weight: kips

Pile Cushion

Material:_____
Thickness:_____in Area:_____in^2
Modulus of Elasticity - E:_____ksi
Coefficient of Restitution - e:_____



Pile

Pile Type:_____
Length (In Leads):_____ft
Lb/ft.:_____Taper:_____
Wall Thickness:_____in
Cross Sectional Area:_____in^2
Design Pile Capacity:_____kips
Description of Splice:_____
_____
Tip Treatment Description:_____
_____

DISTRIBUTE:

- ☐ Translab, Foundation Testing
- ☐ Translab, Geotechnical Design
- ☐ Resident Engineer

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

Submitted By:_____
Date:_____Phone No.:_____

Replace section 49-2.01C(3) with:

49-2.01C(3) Drilling

Do not use drilling to attain the specified tip elevation shown for driven piles.

^^

50 PRESTRESSING CONCRETE

Replace the 2nd paragraph of section 50-1.01C(3) with:

For initial review, submit:

1. 8 sets for railroad bridges
2. 10 sets for railroad bridges if the project includes a BNSF Railway underpass
3. 6 sets for other structures

^^

51 CONCRETE STRUCTURES

Add to section 51-1.03G(1):

Form liner finish 'A' must conform to the details shown in the plans.

Form liner finish 'B' must conform to the details shown in the plans.

Form liner finish 'C' must conform to the details shown in the plans.

Form liner finish 'D' must conform to the details shown in the plans.

Form liner finish 'E' must conform to the details shown in the plans.

Add to section 51-3.02B(1):

Elastomeric bearing pads for Sunset Avenue railway underpass must comply with the specifications for elastomeric bearings in Chapter 15, Parts 10 and 11, of the AREMA *Manual for Railway Engineering.*

Replace "Reserved" in section 51-4.02B(1) with:

The concrete curbing shown on the plans must be installed at the precast facility prior to delivery to the job site.

Replace the 6th paragraph of section 51-4.03B with:

Grout keyways after precast members are in final position. Grout must comply with ASTM C1107. Before grouting, abrasive blast clean the keyways to expose clean aggregate and flush with water. Allow to dry to a surface dry condition immediately before placing the grout.

Replace "Reserved" in section 51-7.02 with:

51-7.02A General

51-7.02A(1) Summary

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

51-7.02A(2) Definitions

Reserved

51-7.02A(3) Submittals

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

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

51-7.02A(4) Quality Control and Assurance

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

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

51-7.02B Materials

51-7.02B(1) General

Nonshrink grout must be a dry, packaged type complying with ASTM C 1107.

Concrete for basin or inlet floors placed in the field must comply with the specifications for minor concrete.

Joint sealant must be butyl-rubber complying with ASTM C 990. Joint primer must be recommended by the joint seal manufacturer.

Resilient connectors must comply with ASTM C 923.

Sand bedding must comply with section 19-3.02E.

Bonding agents must comply with ASTM C 1059, Type II.

51-7.02B(1) Fabrication

If oval or circular shape cross-sections are furnished, they must comply with *AASHTO LRFD Bridge Design Specifications, Fourth Edition with California Amendments*.

Wall and slab thicknesses may be less than the dimensions shown by at most 5 percent or 3/16 inch, whichever is greater.

Reinforcement placement must not vary more than 1/2 inch from the positions shown.

Cure PC drainage inlets under section 90-4.03.

51-7.02C Construction

Repair PC drainage inlet sections to correct damage from handling or manufacturing imperfections before installation.

Center pipes in openings to provide a uniform gap. Seal gaps between the pipe and the inlet opening with nonshrink grout under the grout manufacturer's instructions. For systems designated as watertight, seal these gaps with resilient connectors.

Match fit keyed joints to ensure uniform alignment of walls and lids. Keys are not required at the inlet floor level if the floor is precast integrally with the inlet wall. Seal keyed joint locations with preformed butyl rubber joint sealant. You may seal the upper lid and wall joint with grout.

Clean keyed joint surfaces before installing sealant. Joint surfaces must be free of imperfections that may affect the joint. Use a primer if surface moisture is present. Use a sealant size recommended by the sealant manufacturer. Set joints using sealant to create a uniform bearing surface.

Flat drainage inlet floors must have a field-cast topping layer at least 2 inches thick with a slope of 4:1 (horizontal:vertical) toward the outlet. Use a bonding agent when placing the topping layer. Apply the bonding agent under the manufacturer's instructions.

51-7.02D Payment

Not Used

^^

52 REINFORCEMENT

Add to the list in the 2nd paragraph of section 52-2.02A(1):

7. To connect driven piles to abutment, bent and retaining wall footings.

^^

54 WATERPROOFING

Replace Section 54 Waterproofing with:

54 WATERPROOFING

Materials for and installation of the Waterproofing of the Sunset Avenue Railway Underpass for the precast prestressed box beams and concrete curbing shown on the project plans must comply with the specifications for waterproofing in Chapter 8 Part 29 of the AREMA *Manual for Railway Engineering.*

^^

58 SOUND WALLS

Add to section 58-2.02B:

The color of the CMUs must comply with color no. 30233 of FED-STD-595.

Add to section 58-2.03A:

The angle of internal friction (ϕ) to be used with the plans for the soil at sound wall SW-157 is 32.

^^

Replace section 60 with:

60 TRACK WORK

60-1 GENERAL PROVISIONS

60-1.01 GENERAL

Section 60 includes Special Provisions that are to be used in conjunction with the AREMA Manual for Railway Engineering and shall be followed for all construction on Union Pacific Railroad (UP) right of way and for all tracks operated over by UP. In the case of conflicts between these Special Provisions and the AREMA Manual, these Special Provisions shall govern.

When there is a contract item for a specific item of work included in this section, the contract unit or lump sum price shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the contract item, complete in place, as shown on the plans and as specified in these special provisions, and as directed by the Engineer.

Temporary shoring and drainage appurtenances will be necessary for the construction of the shoofly. Prior to the installation of the shoring, the contractor shall submit a temporary shoring plan to the engineer for review and acceptance. The shoring plan shall identify the methods and materials to be used in the construction of the temporary shoring. Six sets of the shoring plans shall be furnished to the Engineer. The Contractor shall allow three weeks after submittal of a complete temporary shoring plan and supporting data for the review of the shoring plan.

When there are no separate contract items for materials or activities necessary to complete the work as specified in this section, the materials shall be furnished and installed and the activities completed. Full compensation for furnishing and installing the materials and completing the activities, and for the development of the shoring plan, and the installation of the temporary shoring and drainage appurtenances, shall be considered as included in the contract price or prices paid for the track work requiring the materials or activities and no additional compensation will be allowed therefor.

60-1.02 CONSTRUCTION GUIDELINES

Prior to performing any track construction on Union Pacific property, the following must occur

a) A fully executed Track Agreement is in effect.

b) The designated Railroad representative must be notified in writing at least fifteen working days prior to start of construction so that appropriate safety precautions may be taken. Any flagging protection provided by Union Pacific will be at the Contractor's expense.

c) Union Pacific's Telecommunications Operation Center must be contacted at 1-800-336-9193 for fiber optic information prior to track construction on Union Pacific's property. The Contractor is also responsible for securing dig permits for any other utility work within the work limits from the appropriate call before you dig service.

The track(s) must be constructed per approved plans; written approval for any changes must be obtained prior to construction. The rail contractor must abide by the Minimum Safety Requirements for Contractors Entering Railroad Property set forth in Section 60-2. Upon completion of the entire rail project, the MIPP must be contacted for inspection and final approval of all grading and track work. On the rare occasion that the actual track construction differs from the originally approved design, the Railroad may request "as built" drawings of the track. The "as built" drawings will show the corrected stationing, geometry, structures, and clearances. The Track Agreement will then be amended, if necessary.

60-1.03 DESCRIPTION OF RAILROAD RELATED WORK

The following work will be constructed by the Contractor, as delineated and described in the project plans, Standard Specifications and Special Provisions:

1.) Railroad excavation, embankment, and sub-ballast as described in the project plans.

2.) Construction of a shoofly and appurtenant facilities as described on the project plans.

3.) Maintenance of said temporary detour facilities during construction.

4.) Construction of underpass structure and appurtenant facilities as described on the project plans.

5.) Demolition and removal off site of said temporary detour facilities and materials at the conclusion of their use.

The following work will be constructed by the Railroad as delineated and described in the project plans, Standard Specifications and Special Provisions:

1.) Construct shoofly transitions.

2.) Remove grade crossing.

3.) Remove and reconstruct mainline tracks, set-out track, turnout and appurtenant facilities.

4.) Resurface mainline.

After removal of Railroad facilities has been completed, the Contractor shall remove any remaining grade crossing signing along the highway and obliterate pavement markings related to the grade crossing.

The Contractor shall also construct or install temporary right-of-way fencing and/or traffic barriers as may be needed to isolate the State right-of-way from the adjacent Railroad property where gaps in the continuous fence line may exist after removal of the railroad crossing.

At the conclusion of Railroad demolition work, the Contractor shall obtain from the Railroad representative a written release from the Railroad indicating that any remnant Railroad materials are thereby abandoned to State and Contractor ownership.

Construction of the temporary facilities for temporary detour route shall be undertaken in accordance with the terms and provisions as described hereinbefore for work to take place on Railroad property. The Contractor shall coordinate with the Railroad, via the Engineer, to establish an agreed-upon schedule for these temporary facilities.

The Contractor shall construct all the appurtenant facilities including all signing and related facilities as shown on the plans. The Railroad will provide flaggers for all train operations across the detour, and the Contractor shall execute a Right-of-Entry Agreement with the Railroad to bear the cost of said flagging.

At the conclusion of the work the contractor shall restore the ground surface to its original condition to the satisfaction of the Railroad and the Engineer, and shall remove all construction materials and debris from Railroad property.

60-1.04 MATERIALS FOR TRACK CONSTRUCTION

All materials used for the construction of the proposed track must meet Union Pacific standards as outlined in Section 60-9. Union Pacific prefers that the rail contractor furnish Union Pacific's track material. Once Union Pacific has approved the track design, any required track materials can be purchased from one of Union Pacific's approved vendors. The terms associated with the assembly and installation of this material will be outlined in the Track Agreement. Use of this option may be restricted depending on the location of the project and is subject to Union Pacific approval.

60-2 MINIMUM SAFETY REQUIREMENTS FOR CONTRACTORS ENTERING UNION PACIFIC RAILROAD PROPERTY

60-2.01 GENERAL SAFETY

Safety of personnel, property, rail operations and the public is of paramount importance in the prosecution of the work pursuant to the project. As reinforcement and in furtherance of overall safety measures to be observed (and not by way of limitation), the following special safety rules shall be followed. The Contractor shall keep the job site free from safety and health hazards and ensure that its employees are competent and adequately trained in all safety and health aspects of the job. The Contractor shall have proper first aid supplies available on the job site so that prompt first aid services can be provided to any person that may be injured on the job site. The Contractor shall promptly notify the Union Pacific Railroad (UP) of any U.S. Occupational Safety and Health Administration reportable injuries occurring to any person that may arise during the work performed on the job site. The Contractor shall have a non-delegable duty to control its employees, while they are on the job site or any other property of the UP, to be certain they do not use, be under the influence of, or have in their possession any alcoholic beverage or illegally obtained drug, narcotic or other substance that may inhibit the safe performance of work by an employee.

60-2.02 ATTIRE AND PERSONAL PROTECTIVE EQUIPMENT

The employees of the Contractor shall be suitably dressed to perform their duties safely and in a manner that will not interfere with their vision, hearing or free use of their hands or feet. Only waist length shirts with sleeves and trousers that cover the entire leg are to be worn. If flare-legged trousers are worn, the trouser bottoms must be tied to prevent catching. The employees should wear sturdy and protective footwear. Employees shall not wear boots (other than work boots), sandals, canvas-type shoes or other shoes that have thin soles or heels that are higher than normal. In addition, the Contractor shall require its employees to wear personal protective equipment as specified by UP rules, regulations or UP officials overlooking the work at the job site. In particular, the protective equipment to be worn shall be:

a) Protective headgear that meets American National Standard-Z89.1-latest revision, it is suggested that all hardhats be affixed with Contractor's company logo or name.

b) Eye protection that meets American National Standard for occupational and educational eye and face protection, Z87.1-latest revision. Additional eye protection must be provided to meet specific job situations such as welding, grinding, burning, etc.

c) Hearing protection which affords enough attenuation to give protection from noise levels that will be occurring on the job site.

60-2.03 EQUIPMENT

All heavy equipment provided or leased by the Contractor shall be equipped with audible backup warning devices. If in the opinion of the UP representative any of the Contractor's, or any of its subcontractors equipment, is unsafe for use on the UP's right-of-way, the Contractor, at the request of the UP representative, shall remove such equipment from the UP's right-of-way.

60-3 TRACK ROADBED CONSTRUCTION

60-3.01 SAFETY AND HEALTH

At all times during the performance of the work, the Contractor shall exercise precaution for the protection of persons and property. The safety provisions of applicable laws, building, and construction codes shall be observed. Machinery, equipment, and other hazards shall be guarded in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America; to the extent such provisions are not inconsistent with applicable law or regulations.

60-3.02 FIRE PROTECTION

Only work procedures which minimize fire hazards to the extent practicable shall be used. Combustible debris and waste materials shall be collected and removed from the site each day. Fuels, solvents, and other volatile or flammable materials shall be stored in separate areas in well-marked, safe containers.

Good housekeeping is essential to fire prevention and shall be practiced by the Contractor throughout the construction period. The Contractor shall follow the recommendations of the Associated General Contractors of America's "Manual of Accident Prevention in Construction" regarding fire hazards and prevention.

60-3.03 SECURITY

The Contractor shall be responsible for all materials and equipment in its custody or placed in construction by it. Security methods shall be employed as required to ensure the protection of UP Property, of all materials, equipment, and construction work from theft, vandalism, fire, and all other damage and loss.

60-3.04 UTILITIES

The Contractor has the responsibility to locate and protect all utilities on UP property within the limits of construction. Please note that fiber optic cable systems may be buried on UP Property within the limits of this project. UP's Telecommunications Operation Center must be contacted at 1-800-336-9193 prior to construction.

60-3.05 CROSSINGS

Except as authorized by the Engineer, the Contractor will not construct crossings over any track at any location on UP property. Where crossings are needed or desired, the Contractor shall make arrangements directly with the Engineer

60-3.06 ACCESS ROADS

Contractor shall ensure that any access roads used by the Contractor on UP property are maintained during construction and left in pre-construction condition when project is complete. Access roads and parking areas which the Contractor needs to construct on the UP's Right of Way or property, which the UP has easement or interest in, shall be approved by the Engineer before such roads or parking areas are built. All access roads and parking areas constructed by the Contractor that the Engineer deems unsuitable for future UP use shall be removed at Contractor expense upon completion of the work. The areas shall be stabilized with gravel or put back to preexisting conditions where required.

60-3.07 DUST CONTROL

Contractor shall provide equipment for dust control during construction to provide for the safety of UP personnel and UP operations.

60-3.08 CLEAN UP

Upon completion of work, the Contractor shall clean the location of the work and all ground on UP property occupied by him in connection with the work. The Contractor shall remove all rubbish; excess materials, temporary structures, and equipment, leaving the location of the work cleaned to the satisfaction of the Engineer.

60-3.09 ROADBED WIDTH

Roadbeds shall be constructed per approved plans. On UP owned or maintained tracks, a twenty four foot minimum roadbed will be required. Additional roadbed width will be required along all turnouts to provide adequate room for placement of walkways in accordance with California Public Utilities Commission (CPUC) General Order No. 118-A.

60-3.10 CONSTRUCTION PAD

Contractor shall provide a construction pad adjacent to the location where a turnout will be installed in UPRR track. The pad should be sufficiently sized to facilitate the assembly and installation of the turnout. At the direction of the Engineer, the pad may have to be removed to facilitate proper drainage after the switch is installed. Construction Pad details should be included with the Construction Plans (see UP Exhibit 'T.O.PAD Drawing).

60-3.11 CLEARING AND GRUBBING

Areas required for embankment or excavation shall be cleared and grubbed. On areas required for excavation, all stumps, roots, etc., shall be removed to a minimum depth of two feet (2') below the sub-grade elevation. On areas required for embankment, all stumps, roots, etc., shall be removed to a minimum of two feet (2') below the existing ground. All holes remaining after clearing and grubbing shall

be backfilled and compacted and the entire area bladed to provide drainage, except, in areas to be immediately excavated, the Engineer may direct that the holes not be backfilled. On areas required for borrow sites and material sources, all stumps and roots, (except for designated trees and shrubs) shall be removed to prevent such objectionable matter becoming mixed with the material to be used in construction.

Areas requiring minimal grubbing, as designated by the Engineer, shall have a minimum of six inches (6") of vegetation and topsoil removed from the construction area.

All cleared and grubbed material shall be either:

a) Stockpiled to be used as topsoil after grading is complete, if the Engineer has approved the material for this use.

b) Properly disposed of in a manner satisfactory to the Engineer and in compliance with Federal, State and Local regulations.

Some existing UP embankment slopes are very steep (1.5': 1' or less). These slopes can not be cleared and grubbed along with the foundation of embankment areas. These slopes must be cleared in steps (see Section 60-3.14, last paragraph) immediately ahead of placing embankment lifts and the cleared material wasted over the side of the new embankment. No steps will be left uncovered overnight.

60-3.12 UNSUITABLE MATERIALS

If unsuitable materials are encountered below the foundation of embankments, below subgrade elevation in excavation areas, or in excavated material to be used in embankments, such materials shall be disposed of properly.

Unsuitable material removed from below subgrade elevation in excavation areas and from under embankment foundations shall be replaced to proposed grade elevation with suitable materials, compacted to specification.

The Engineer shall identify such unstable materials, the limits of removal, and shall approve the replacement material.

60-3.13 EXCAVATION

Before excavation begins, the area shall be cleared and grubbed (see Section 60-3.11). The Contractor shall perform all excavation to the elevations and grades shown on the Drawings and as staked in the field. This work shall consist of excavating the material from roadbed areas, or the borrow areas, and placing the material as embankment, shaping and sloping necessary for the construction, preparation and completion of roadbeds and other earthwork.

The Contractor shall excavate all materials including rock and common materials that must be removed to accomplish the excavation as shown on the Drawings. All excavated materials will be used in the formation of embankments, roadbeds, and other earthwork so long as such excavation material is satisfactory for such use. Materials must be tested by an independent testing laboratory and/or approved by the Engineer prior to placement.

Where excess excavation materials or unsatisfactory material exists, such materials will be disposed of in areas on the Right of Way, approved by the Engineer, or off the Right of Way in a legal and proper manner. Contractor shall provide the Engineer with a copy of agreements made with any landowner.

Excavation shall be done in a manner and sequence that will provide proper drainage at all times.

No blasting will be allowed without sufficient advanced notice given to the Engineer. This time will permit the safe and continuous operation of the UP.

The Contractor shall construct intercepting ditches above the cut slopes where natural ground slopes toward the track.

After cut has been completed, the Contractor shall scarify the top six inches (6") of material below the top of proposed subgrade, adjust moisture content, and compact such scarified material (see Section 60-3.15).

In cut sections where the material to be excavated is solid rock, the Contractor shall excavate twelve inches (12") below the subgrade elevations as shown on the Drawings and shall replace such excavated twelve inches (12") of solid rock with embankment material approved by the Engineer. This twelve inches (12") of embankment shall have the moisture content adjusted and be compacted to specifications (see Section 60-3.15).

60-3.14 EMBANKMENT

Embankments shall be constructed and compacted to the elevations and grades set forth in the Drawings and as staked in the field.

After the required clearing and grubbing, the foundations for embankments shall be prepared by scarifying the top six inch (6") layer of existing ground, adjusting moisture content, and compacting such scarified material (see Section 60-3.15).

If the quantity of materials required for construction of embankments exceeds the quantity of materials removed from excavation necessary to complete the project, additional embankment material will be obtained by:

a) Widening cuts in the grading area. The Contractor shall consult with the Engineer before widening any cuts. Cuts shall be cleared and grubbed and widened in such a manner as to:

    1) Be at least as stable as the original cut

    2) Provide adequate drainage for the roadbed

    3) Retain the same, or lesser degree of, slope lines as original cut

b) Establishing borrow areas within the right-of-way, if available, or from areas outside of the right-of-way, provided by the Contractor, to obtain the additional embankment materials. All borrow areas shall be cleared and grubbed. All imported materials shall be clean and free of any contaminated and hazardous materials. Materials are to be tested at the source by the Contractor and approved by the Engineer prior to placement. Copies of laboratory tests are to be given to the Engineer.

The Contractor shall not place any material that is to be used in the construction of an embankment on top of a frozen surface. With the prior approval of the Engineer, the Contractor shall remove all layers of frozen ground and frozen materials in order to prepare a proper foundation for construction of embankments. Furthermore, the material being placed for embankment shall contain no frozen material.

Wherever an embankment is placed on or against an existing embankment, the existing embankment side slope will be cut in steps to tie the new embankment into the existing side slope. These steps should not be over one foot (1') vertically and cannot be cut until embankment material will be placed immediately following the cutting of these steps. No steps will be left uncovered overnight.

60-3.15 MOISTURE AND DENSITY REQUIREMENTS

In cut sections, after cut has been completed, the Contractor shall scarify the six inches (6") of material below the top of proposed subgrade, adjust moisture content and compact the scarified material to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. After cut sections are excavated to subgrade, scarified and recompacted the Engineer shall observe and approve (by proof rolling or other methods) these areas before any subballast is placed.

In cut sections where the material to be excavated is solid rock the Contractor shall excavate twelve inches (12") below the Subgrade elevations as shown on the Drawings. The Contractor shall replace such excavated twelve inches (12") of solid rock with embankment material approved by the Engineer, adjust the moisture content of this material and compact to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density.

After the required clearing and grubbing, the foundations for embankments shall be prepared by scarifying the top six inch (6") layer of existing ground, adjusting moisture content, and compacting such scarified material to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. After the foundation areas are scarified and recompacted the Engineer shall observe

and approve (by proof rolling or other methods) these foundation areas before any embankment material is placed.

Embankments and backfills of less than three foot (3') of fill shall be compacted to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density.

When embankments and backfills are composed of more than three foot (3') of fill, the materials within three feet (3') of the established subgrade (top of fill) elevation shall be compacted to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. Material below said three foot (3') from subgrade (top of fill) elevation shall be compacted to not less than 90% of maximum density.

Unless otherwise directed by the Engineer, the moisture content of the soil at the time of compaction shall be at the optimum moisture content or within minus four percentage points (4%) of the optimum moisture content as stated in ASTM D 1557 Modified and as determined by tests taken by the Engineer in accordance with ASTM standards. Each embankment lift shall be tested for compaction compliance before the next lift is placed.

All compaction shall be determined using ASTM D 1556 for field tests and ASTM D 1557 for moisture and density.

Copies of all soils tests and observations shall be provided to the Engineer, the Engineer will not approve placing subballast before these tests are received.

60-3.16 FINISH GRADING

The Roadbed shall be finished to the lines and grades shown on the Drawings and as staked. The Contractor shall protect finished roadbeds from damage, from all causes, until accepted by the UP.

Blue Tops (finished grade stakes) are required at one hundred foot (100') intervals and are to be set at the shoulders and at the centerline. If the distance between the shoulder stake and the centerline stake is over one hundred foot (100'), an intermediate Blue Top will be required.

60-3.17 TOPSOIL

A minimum of six inches (6") of topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy or stiff clay, stones larger than two inches (2") in greatest dimension, noxious weeds, sticks, brush, litter and other deleterious matter will be placed on all excavation and embankment slopes and any disturbed soils that will not support plant life and/or will cause or allow soil erosion. After placement of topsoil, all slopes over three foot (3') high shall be cat walked.

60-3.18 SLOPE PROTECTION AND EROSION CONTROL

This work shall consist of installing silt fence and ditch checks for controlling storm water erosion during construction. A copy of the Contractor's Storm Water Pollution Prevention Plan will be given to the Engineer before the beginning of construction.

60-3.19 SEEDING

This work shall consist of the preparing and seeding roadbed slopes, disturbed areas and areas designated by the Engineer. The areas involved will be comprised of cut and fill slopes and other areas disturbed by the construction, exclusive of rock slopes. Seedbed preparation, seeding rates and mixtures, fertilizer rates and mulching requirements shall conform to the state DOT specification for the region.

60-3.20 RIGHT OF WAY FENCES AND GATES

The extent of the Standard Right of Way fence and gates is as indicated on the project plans or as designated by the Engineer and in accordance with typical details shown on UP Engineering Standard Drawing No. 0075.

60-3.20.01 MATERIALS

Hog tight, woven wire - A twenty six inch (26") woven wire galvanized steel fabric is to be used with seven horizontal bars of No. 9 galvanized wire and stays on six inch (6") centers. Weight is approximately 266 pounds per 20 rod roll.

Line Posts - Use painted studded tee steel fence posts seven foot (7') long, with anchor plate, spaced as shown on UP Standard Drawing NO. 0075. Approximate weight 9.98 pounds each.

Corner Post - Use five percent (5%) solution penta treated wood posts, six inches (6") in diameter by nine foot (9') long or 7" x 9" second hand wood ties.

Brace Panel Posts - Use five percent (5%) solution penta treated wood posts, six inches (6") in diameter by nine foot (9') long or 7" x 9" second hand wood ties.

Horizontal Brace Posts - Use five percent (5%) solution penta treated wood posts, four inches (4") in diameter or 4" x 4" by nine foot (8') long.

Gate Posts - Use 7" x 9" x 9' second hand ties. Each side of gate shall have a brace panel constructed to support gate.

Barbed Wire - Shall be two-strand 12.5 galvanized wire, twisted, with 14-gauge 4-point barbs spaced not more than 5 inches center to center. Metal and finish to match fabric (galvanized).

Diagonal Tie Wire - Use double number 8 galvanized steel wire twisted.

Wire Clips - Use 12 gauge galvanized wire clips.

Wire Staples - Use 1.5 inch 9 gauge galvanized steel wire stapes.

Gates - Gate frames shall be constructed of 1.625 in. diameter steel tube with .066 wall. Rails shall be high strength 16 gauge S-bend shape. Stays shall be roll-formed 12 gauge welded in pairs. Latch shall be double pin 1/2" x 1" steel with lock and saddle horse type handle. Hinge shall be full wrap omega style 1/4' steel with bottom in fixed position and top will adjust vertically 5" between rails.

60-3.20.02 INSTALLATION

Do not begin installation and erection until timely notice has been given to the Engineer. The area along with the fence line shall be cleared enough to permit proper construction. Fence shall be installed per the project plans or as shown on UP Standard Drawing No. 0075.

60-4 RAILROAD EXCAVATION

This work consists of excavating to construct the mainline tracks in accordance with the details shown on the project plans and these special provisions. This work shall comply with Section 60-3. The contract unit or lump sum price for railroad excavation shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in excavating to the described or authorized grade as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-5 SHOOFLY EXCAVATION

This work consists of excavating to construct the shoofly tracks in accordance with the details shown on the project plans and these special provisions and shall include, at the conclusion of the work, replacing the excavated material in order to restore the ground surface to its original condition to the satisfaction of the Railroad and the Engineer. This work shall comply with Sections 60-3. The contract unit or lump sum price for shoofly excavation shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in excavating to the described or authorized grade, and restoring the ground surface to its original conditions as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-6 RAILROAD EMBANKMENT

This work consists of obtaining local and imported borrow material, and placing and compacting the embankment for the mainline tracks in accordance with the details shown on the project plans and these special provisions. This work shall comply with Section 60-3 and Section 19-7, "BORROW MATERIAL" of the Caltrans 2010 Standard Specifications. The contract unit or lump sum price for railroad embankment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing an embankment to the described or authorized grade as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-7 SHOOFLY EMBANKMENT

This work consists of obtaining local and imported borrow material, and placing and compacting the embankment for the shoofly tracks in accordance with the details shown on the project plans and these special provisions and shall include removal of the shoofly tracks at the conclusion their use, and removing the embankment material in order to restore the ground surface to its original condition to the satisfaction of the Railroad and the Engineer. This work shall comply with Section 60-3, 60-20, and Section 19-7, "BORROW MATERIAL" of the Caltrans 2010 Standard Specifications. The contract unit or lump sum price for shoofly embankment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing an embankment to the described or authorized grade, the removal and disposal of shoofly components, and restoring the ground surface to its original conditions as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-8 RAILROAD SUBBALLAST (12")

60-8.01 SUBBALLAST

This item shall consist of a foundation course for Union Pacific Railroad (UP) ballast and shall be constructed in one or more courses in conformity with the typical sections shown on plans.

60-8.02 MATERIAL REQUIREMENTS

Materials shall be 100% crushed stone produced from oversized quarried aggregate, sized by crushing and produced from a naturally occurring single source. Aggregate retained on a No. 10 sieve shall consist of hard, durable particles or fragments of stone. The subballast material shall have:

a) No more than approximately 10% freeze-thaw loss when tested in accordance with ASTM C 811-90, Standard Test Method for Soundness of Aggregate by Use of Sodium Sulfate (under 5 cycles of freeze-thaw with sodium sulfate solution)

b) No more than 50% loss when tested in accordance with ASTM C 131-89, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

Contractor shall provide certification that the subballast/base material meets UP's Specifications.

60-8.03 GRADATION

Subballast shall consist of gradations as set forth in UP Standard Drawing No. 0010.

60-8.04 DESIGN REQUIREMENTS

Subballast and its minimum depth is set forth in the typical sections shown on plans.

60-9 TRACK MATERIAL

60-9.01 RAIL

112 lb. to 141 lb. relay rail is required. Rail must meet or exceed AREMA Class I Specifications if greater than three hundred (300) per year are anticipated. If less than three hundred (300) cars per year are anticipated Class II rail can be used.

Class I		
Rail Weight Max.	**Vert. Wear Max.**	**Max. Hor. Wear**
141	5/16"	1/8"
133-136	1/4"	1/8"
131-132	3/16"	1/8"
119	5/32"	1/16"
111-515	1/8"	1/16"
Corrugation up to .010 allowed		
Class 2		
Rail Weight Max.	**Vert. Wear Max.**	**Max. Hor. Wear**
141	7/16"	1/4"
133-136	3/8"	1/4"
131-132	1/4"	1/4"
119	1/4"	1/8"
111-515	3/16"	1/8"
Two dime sized engine burns per 39' corrugation up to .020 and 1/4" field size lip allowed		

60-9.02 FASTENINGS

a) Angle or Joint Bars, new or certified, to match rail section used. Contractor to provide compromise joint bars or compromise welds to match Union Pacific's (UP) rail section at 13- foot clearance point or location designated by UP representative (See UP Standard Drawing No. 0904 and 0948).

b) Tie Plates, new or secondhand, and double shouldered plates no smaller than 2 times the base of the rail. Track to be fully plated. The use of single shoulder tie plates is prohibited.

c) Track Bolts, new or secondhand, appropriately sized for the bolt holes in the rail section with length sufficient for a full nut and heavy-duty spring washers (new) (See UP Standard Drawing No. 0438, 0439, 0440, 0441 & 0442).

d) Track Spikes, new 5/8" x 6" or 5/8" x 6 1/4" installed per UP Standard Drawing No. 130005 and 0453.

e) Rail Anchors, new or reformed, box anchored every other tie. All switch ties will be completely box anchored. For crossties that use elastic fasteners, rail anchors are not required (See UP Standard Drawing No. 0460).

f) Compromise Joint Bars or Compromise Field Welds shall be utilized when rails of dissimilar rail sections are connected. Turnouts will use the same rail section on the running rail, closure rails, and turnout components through the body of the turnout. It is the Contractor's responsibility to furnish, install and maintain compromise joint bars connecting to UP owned track. All rail joints and welds should be kept out of grade crossings, where possible (See UP Standard Drawing No. 0948).

g) Insulated Joints/I Bonds to be furnished by Contractor and shall be all new material. Insulated joints/I bonds will be installed by Contractor at locations designated by UP's authorized representative (See UP Standard Drawing No. 0960).

h) Field Welding will be done in accordance with current UPRR or AREMA procedures (See Section 60-13).

60-9.03 TIMBER TIES (SEE UP STANDARD DRAWING NO. 0210)

Light Traffic	<1000 cars per year	7" x 9" x 8' Ties @ 20 Ties per 39 ft. rail

		(24" on center)
Medium Traffic	>1000 & <2000 cars per year	7" x 9" x 8'6" Ties @ 22 Ties per 39 ft. rail (21.25" on center)
Heavy Traffic	>2000 cars per year	7" x 9" x 8'6"' Ties @ 24 Ties per 39 ft. rail (19.5" on center)

a) New creosoted Oak or Douglas fir ties only for new construction.

b) Only new creosoted Oak or Douglas fir switch ties will be used to accommodate turnout pattern.

60-9.04 CONCRETE TIES

Light Traffic	<1500 cars per year	8' 3", 600 lb. tie at 26" centers 8' 6", 525 lb. tie at 24" centers 8' 6", 720 lb. tie at 28" centers
Medium/Heavy Traffic	>1500 cars per year	8' 3", 600 lb. tie at 24" centers 8' 6", 720 lb. tie at 26" centers

a) Continuous Welded Rail is recommended for use with Concrete Ties.

b) Concrete switch ties may be used where concrete standard ties are used.

c) Concrete ties must be new ties produced in accordance with UP's Concrete Tie Specifications for Construction.

d) See UP Standard Drawing No. 0204 as an example of a 720 lb. Tie.

60-10 BALLAST REQUIREMENTS

Under light traffic, crushed rock ballast or equivalent material, per AREMA Standard 5 gradation must be utilized. Under heavy traffic, crushed rock ballast, main line quality, AREMA Standard 4A gradation must be utilized. Refer to Union Pacific Railroad (UP) Standard Drawing No. 0010. The allowable wear based on the Los Angeles Abrasion Test, not greater than 35%, per ASTM C-535. Minimum depth is 15" between top of subballast and top of timber or concrete ties. The full ballast section extends 9" beyond ends of tie for jointed rail and 12" for welded rail and thence to subgrade on not less than 3:1 slope. Ballast shall be quarried rock, crushed to proper gradation, with fully fractured faces. Contractor shall provide certification that the ballast meet UP's Specifications.

60-11 TRACK CONSTRUCTION

60-11.01

Experienced personnel skilled in railroad track construction shall supervise track laying and surfacing.

60-11.02

Ties shall be uniformly spaced center to center of tie. Ties shall be laid at right angles to the rail and at least one will be located at the joint location as required in the FRA track standards for Class 4 track.

60-11.03

When handling or spacing ties, care shall be taken not to damage them with picks or hammers. Tie tongs shall be used for this purpose.

60-11.04

The pulling of spikes, once driven, shall be avoided insofar as possible. When spikes are pulled, the holes shall be immediately plugged with creosoted tie plugs of the proper size to completely fill the hole, or an approved form of plugging compound must be used.

60-11.05

The bottom of the rail, the tie plate and the wearing surface of the tie shall be cleaned before the rail is laid.

60-11.06

Tie plates shall be applied at the time the rail is laid to avoid unnecessary spiking. Plate shoulder shall bear against the outside base of the rail.

60-11.07

Rails shall be unloaded, stored or distributed along the roadbed in such a manner as to prevent damage.

60-11.08

For jointed track rails should be laid with a 12-foot staggered joint arrangement.

60-11.09

If a determination is made to stagger rail, then rails of miscellaneous lengths less than 39 feet shall be used at suitable intervals for maintaining the proper stagger of joints on curves.

60-11.10

Rails less than 15 feet long shall not be used except for temporary closures.

60-11.11

Expansion shims of hardwood or fiber shall be used to control expansion. The following table prescribes the correct thickness for the expansion shim for various ambient temperatures:

RAIL TEMPERATURE	33 FT. RAIL OPENING	39 FT. RAIL OPENING	78 FT. RAIL OPENING
Below 25° F.	1/4"	1/4"	1/2"
25° to 50° F.	1/8"	3/8" every other joint	3/8"
51° to 75° F.	1/8" every other joint	1/8"	1/4"
76° to 100° F.	1/8" every third joint	1/8" every other joint	1/8"
Above 100° F.			1/8" every other joint

60-11.12

Rails shall be laid to ensure good alignment, and the rail ends must be brought squarely together against expansion shims and shall be bolted before spiking.

60-11.13

Rails shall be cut square and clean by means of rail saws. Holes for complete bolting of cut rails shall be drilled according to Union Pacific Railroad's (UP) Specifications. Under no circumstances shall new holes be drilled between two holes already drilled. Cutting rails or drilling holes in cut rails by means of acetylene or electric torch will not be permitted.

60-11.14

The appropriate number of bolts shall be applied according to the rail joint used. The nuts of all bolts shall alternate uniformly inside and outside of each joint. Each bolt shall be equipped with a spring washer of size required to fit the diameter of the bolts used.

60-11.15

The right-hand rail going away from the switch points or the outside rail on curves shall first be spiked in position in its proper relation to the lined end of ties. The opposite rail shall then be spiked to true gage (4'-8 1/2"). Curved track shall be gauged as follows:

a) Lay track to standard gauge on tangents and curves of less than 6 degrees.

b) Lay track to a gauge of 56-3/4" on curves of 6 degrees or greater.

60-11.16

On tangent track and on curves up to 4 degrees, two spikes (one inside and one outside the base of rail) shall be used to fasten each rail to each tie. On curves at least 4 degrees and less than 8 degrees, two spikes inside and two spikes outside, shall be used on each rail. On curves of 8 degrees or more, use three spikes inside and two spikes outside shall be used on each rail (See UP Standard Drawing No. 0453).

60-11.17

Spikes shall be staggered so that the outside spikes shall be on the same side of the tie and the inside spikes on the opposite side (See UP Standard Drawing No. 0453).

60-11.18

Rail shall not be struck with maul or heavy tool when spiking, gauging or lining.

60-11.19

Spikes shall be started vertically and square and be driven straight with full bearing against the base of the rail. Straightening with maul or spikes started crooked will not be permitted. Spikes started crooked shall be pulled, the holes plugged and spikes redriven. Immediately after completion of track surfacing, spikes shall be settled in place with the underside of the head of the spike contacting the top of base with a minimum of pressure (See UP Standard Drawing No. 0453).

60-11.20

Rail anchors control longitudinal rail movement on ties from temperature variations, traffic, grade, and train braking. Anchors are not required on ties with elastic fastening systems unless additional restraint is necessary to control undesired rail movement. Anchors should be new or reformed. On all tracks, apply rail anchors out-of-face along each rail, directly across from each other on the same tie. Use Standard Box Pattern (every other tie) or Solid Box Pattern (See UP Standard Drawing No. 0460).

60-11.21

When the track has been raised to within 4 inches of final grade and properly compacted, the final lift shall be made by jacking the track up to the exact elevation provided by the grade stakes. The ballast shall then be tamped under the ties. The space extending from 15 inches inside either rail to the ends of the ties shall be thoroughly tamped. The tie centers shall be left untamped. Unless otherwise authorized, this final lift shall be tamped with tamping bars, tamping picks or by approved tamping machines. In making the finishing lift, the spot board and level board shall be used with care and the track brought to a true surface and required elevation.

60-11.22

After track has been brought to true surface, elevation and grade, it shall be given a final lining and placed in true alignment.

60-11.23

Turnouts shall be constructed of all new or certified reconditioned rail and other track material. Unless otherwise approved by the Engineer, all turnouts must be fabricated to UP standards. Turnouts in UP owned or maintained track will be constructed with all new rail and other track material supplied by a UP approved vendor.

60-12 WALKWAY REQUIREMENTS

60-12.01 SAFETY

Walkways shall be constructed and maintained to provide a reasonable regular surface and shall be maintained in a safe condition clear of vegetation, debris, standing water, and other obstruction, which constitute a hazard.

60-12.02 GRADES AND SLOPES

Walkways shall not have a grade and slope in excess of approximately 1 inch of elevation per each 8 inches of horizontal length in any direction. Excess slope is permissible where the proximity of adjacent tracks so long as the slope between tracks is constant.

60-12.03 CONSTRUCTION

For walkway standards refer to Union Pacific Railroad (UP) Exhibit 'E' Drawing. Walkways shall be constructed to a minimum width of 8' 6", as measured from the centerline of track. Walkways shall be constructed and maintained in such a manner that the elevation of its surface is at least level with the top of ties, but not higher than the top of rail. Walkways are to be constructed per AREMA Standard 57 ballast unless prior approval by UP's Chief Engineer is granted for alternate size material.

60-12.04 REQUIREMENTS

Walkways shall be located along both sides of the track for a minimum distance of 125 feet on each side of every switch stand or other trackside switch-throwing mechanism. Walkways are required around all derail switch stands, in accordance with CPUC General Order No. 118-A.

60-12.05 MINIMUM DISTANCES

Walkways shall be continuous and maintained from the switch stand through the switch frog and along the diverging track. An additional 3 feet of walkway width shall extend for a minimum distance of 4 feet in each direction from the switch stand or other trackside switch-throwing mechanism on the side of the track where said mechanism is located. This additional 3 feet of width shall be gradually tapered back to the 8' 6" minimum width, as measured from the centerline of track, a distance of not less than 20 feet.

60-12.06 GUIDELINE

These specifications are provided only as a guideline for design and should not be taken as authority to construct walkways. All walkway construction must conform to the UP specifications or the federal, state or local specifications whichever is the most protective from the standpoint of public safety. All walkway construction shall comply with current and applicable federal, state and local laws. Contractor shall be responsible for the proper construction of all walkways. In some areas, the Contractor will be required to stockpile sufficient walkway ballast at a location designated by UP's authorized representative, for installation by UP forces.

60-13 FIELD WELDING

Union Pacific Railroad (UP) approved welds must be installed. The welds currently approved are Railtech Boutet one shot kits and Orgo-Thermit single use kits. The Contractor and the individual installing the welds must be qualified by the manufacturer of the kits being used and have documentation to support such qualification. All welds must conform at a minimum, to meet the latest edition of the American Railway Engineering and Maintenance of Way Association (AREMA) Manual. The link to the AREMA site is www.arema.org.

It is UP's policy that Field Welds made on UP owned or maintained track be inspected by the Director of Track Maintenance or his designated representative.

60-14 RAILROAD TRACK: BALLASTED (MAINLINE)

This work consists of constructing the mainline tracks in accordance with the details shown on the project plans and these special provisions. This work shall comply with Sections 60-9, 60-10, 60-11, 60-12, and 60-13. The contract unit or lump sum price for railroad track: ballasted (mainline) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the mainline tracks as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-15 RAILROAD TRACK: BALLASTED (SHOOFLY)

This work consists of constructing the shoofly tracks up to the 13-foot clearance point with the mainline tracks and in accordance with the details shown on the project plans and these special provisions. This work shall comply with Sections 60-9, 60-10, 60-11, 60-12, and 60-13. The contract unit or lump sum price for railroad track: ballasted (shoofly) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the mainline tracks as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-16 TRACK SHIFTING, RELOCATION, AND RESURFACING

60-16.01 GENERAL

Resurfacing shall include shifting of track up to one (1) foot, and involves resurfacing indicated track and all special trackwork, including lining, raising, tamping, and regulating track in conformance provisions of this specification and to the lines and grades shown on the Contract Drawings. The ballast required to fill cribs and provide adequate shoulders shall be provided by the Contractor.

Rough and final surfacing of the entire track section shall be performed as required to provide minimal profile smoothing and adjustment. This surfacing may include placing, tamping, consolidating and regulating ballast.

60-16.02 EXECUTION

60-16.02.01 GENERAL

Contractor shall perform work under this Section in accordance with these specifications and consistent with track resurfacing standard industry practice.

Shifted, relocated and resurfaced track shall meet the following tolerances as well as the standards for FRA class 4 track.

1. Except for pre-existing gauge corner rail wear, deviation from correct gage of 56-1/2" shall not exceed + or - 1/4" at any point. Deviation measured in any section of 20 consecutive crossties shall not exceed 1/8" at 75% of the crossties, and 1/4" at the remaining 25%.

2. Track Surface

	Tolerance
Runoff in any 31 feet of rail at the end of a raise may not be more than	1/4 inch
Deviation from uniform profile on either rail at the mid-ordinate of a 62-foot chord may not be more than	3/8 inch
Deviation from designated elevation on spirals may not be more than	1/4 inch
Variations in cross levels on spirals in any 31 feet may not be more than	5/8 inch
Deviation from zero cross level at point on tangent or from designated elevation on curves between spirals may not be more than	3/16 inch
Difference in cross level between two points less than 62 feet apart on tangents and curves between spirals may not be more than	3/8 inch

3. Alignment - maximum deviation from uniformity measured in conformance FRA Safety Standards Section, 213.55. Tangent Track 1/4 inch - at mid offset on a 62-foot chord. Curved Track 1/4 inch - from correct mid-ordinate on a 62-foot chord.

Elastic clips, rail anchors, and/or spikes shall be loosened prior to shifting track to prevent skewed ties. Rail, fasteners, or crossties damaged during track shifting will be replaced by the Contractor at Contractor's expense.

60-16.02.02 RESURFACING, ALIGNMENT AND DRESS

A. Contractor shall perform all shifting and/or resurfacing within the stated project limit station areas as specified to bring the line and surface into compliance within the track geometry tolerances specified.

B. Contractor shall resurface the track to zero crosslevel on tangent track and to the proper crosslevel elevation, with spirals, for the curves as shown on the project plans.

C. Ballast shall be spread and track raised in a series of lifts. No single lift shall be higher than 2 inches except in crossings and turnouts. In raising the track, jacks or equipment shall be regulated to avoid bending of angle bars or straining of joints. When jacks are used they shall be simultaneously used and properly spaced at not more than quarter points of the rail to avoid breaks or bends in the rail when the track is raised. Both rails shall be raised simultaneously and to proper crosslevel by utilizing automatic tampers or standard track level boards with each set of track raising jacks. Each tie shall be tamped from 15 inches inside the rail to the end of the tie. Tamping shall not be permitted at the middle of a tie. Both ends of a tie shall be tamped simultaneously and tamping inside and outside the rail shall be done at the same time. Equipment used for surfacing track shall be laser guided, have the ability to line and surface switches, and is subject to approval by the Engineer.

D. Ties that become loose during track raising shall be placed in proper position, properly tie-plated, plugged and spiked before tamping. During each track raise, track is to be uniformly tamped.

E. After ballasting is completed and the track is resurfaced and lined, according to the tolerances, ballast shall be consolidated using a track stabilizer and ballast shall be trimmed neatly and surplus material shall be spread evenly along the ballast shoulder.

F. Contractor shall perform the necessary operations to assure that all ties are at right angles to the track as practical with standard railroad procedures. Cribs between ties shall be fully ballasted and dressed.

G. Contractor shall perform two tamping squeezes per tie up to 2 inches of raise with one additional insertion and squeeze for each additional 1 inch of raise. Joint ties shall be given one additional squeeze than other ties. The Contractor shall not cause center-bound track condition.

H. In locations where squeeze tampers cannot fill and compact ballast, such as at frogs, guard rails, switch portions of turnouts and headblocks, etc., mechanically tamp with approved hand-held air tools or other power tamping tools. Hand tamping shall be done simultaneously from both sides of the tie.

I. On curves, the high rail shall be used as the line rail and the low rail shall be used as the grade rail.

J. When surfacing turnouts, the straight side of the turnout shall be used as the line rail.

K. After ballast regulating in turnouts, cribs for switch points, switch rods, and guardrails must be pocketed 3" and cleared of ballast to permit free operation of the switch and signal rods.

L. After the ballast is regulated, dressed and consolidated using a track stabilizer, Contractor shall ensure that track bolts and rail anchors, or elastic track fasteners are tight and in proper alignment.

M. For track resurfacing the total track raise will be the minimum amount necessary to smooth the track profile. It shall be the responsibility of the contractor to provide smooth transitions that meet FRA Track Class 4 Standards to grade crossings and turnouts, using the ballast stockpiled near the worksite. In addition, the Contractor shall maintain vertical overhead clearances under structures by limiting the amount of track raise. Adjustment of turnouts and connecting tracks to match profile and alignment adjustments on adjacent track will be provided by contractor at no additional expense.

N. Ballast regulating equipment shall be configured to avoid damage to elastic track fastening system components.

60-17 CUTOVER TRACK

This work consists of shifting mainline track at the 13-foot clearance point to the shoofly and reverse in accordance with the details shown on the project plans and these special provisions. This work shall comply with Sections 60-3, 60-13 and 60-16. The contract unit or lump sum price for cutover track shall include full compensation for furnishing all labor, tools, equipment, and incidentals, and for doing all the work involved in shifting the mainline track as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-18 RESURFACING TRACK

This work consists of resurfacing mainline track in accordance with the details shown on the project plans and these special provisions. This work shall comply with Section 60-16. The contract unit or lump sum price for resurfacing track shall include full compensation for furnishing all labor, tools, equipment, and incidentals, and for doing all the work involved in resurfacing mainline track as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-19 RE-INSTALL TURNOUT 14

A. Installation of frog plates, switch plates, and plates under the closure rails shall conform to Union Pacific Railroad standards and AREMA trackwork standards. All plates are to be fully secured by screw spikes except rehabilitation of existing turnouts with cut spikes, which shall be fully spiked.

B. Following the installation of turnouts on the initial layer of ballast, the turnouts shall be lifted, aligned and supported prior to placement of final ballast.

C. Ballast shall be uniformly placed and spread. The turnout shall then be raised and the ballast tamped under both sides of each tie for the full length of the tie. Tamp ballast thoroughly throughout the length of all ties in the turnout or other special trackwork. Final top of ballast shall conform to the ballast section as indicated except in cribs wherein switch operating rods, locking rods or connecting rods are located, and between point of switch and heel of switch where it shall be 3 inches below the base of the rail.

D. When installing the various components of the turnout, particular attention shall be given to the following:

   1. Check that alignment, gage, and surface meet specifications.
   2. See that bolts, nuts, cotter pins, and other fastenings are in place, in good condition, and properly tightened.
   3. See that switch points fit tightly against rail when switch is thrown in either position.
   4. See that connecting rod and switch rod bolts are equipped with cotter pins properly spread.
   5. Test-operate the switches for lost motion, difficult throw, or loose connections and adjust as necessary.

6. Examine the rod and fastenings that connect the switch point to the switch box to see that they are in place and in good condition.

E. Joints within turnouts shall be welded.

F. Switch stands shall be so installed as to hold the switch point tightly against the stock rail when stand is in normal position, per the manufacturer's instructions. Switch rods shall be adjusted to hold the opposite point tightly against the rail when stand is in reverse position. Switch stands, for both switches and derails, shall be mounted on two 16'-0" ties, unless low hub stands are installed, then 13'-0' ties will be used.

G. Switch stands shall be kept securely spiked to the head block. The headblock ties shall be set square with the track and kept firmly tamped.

H. Switch stand target colors shall conform to Union Pacific Railroad standards.

I. At the time of Installation, all sliding surfaces of special trackwork assemblies shall be lubricated with a dry film graphite lubricant in accordance with the manufacturer's recommendations.

J. Insulated joints for non-interlocked switches shall be installed as shown on the project plans and in accordance with AREMA (Former AAR) Signal Manual. Install joint using manufacturer's recommended procedure.

K. Each insulated joint installed by the Contractor shall be tested with an insulated joint tester, either the Harmon 1501A1JC or equal approved by the Engineer. Test shall measure no less than 100 ohms across the joint. Test results shall be uniquely identified with a specific joint and submitted to the Engineer.

L. No switch point shall be installed in the main track unless it has the proper signal system point protection in place and tested. No switch protection shall be removed from any normally closed signaled switch point unless the switch point is replaced by a straight rail and signal circuits have been corrected and tested. All rail bonding and fouling circuit protection must be intact at all times on all signaled switches.

60-20 REMOVALS

This work consists of dismantling, removing, and disposing of portions of the existing railroad track and related equipment in accordance with the details shown on the project plans and these special provisions. This work shall comply with Section 14-10, "SOLID WASTE DISPOSAL AND RECYCLING," and Section 14-11, "HAZARDOUS WASTE AND CONTAMINATION," of the Caltrans 2010 Standard Specifications. The contract unit or lump sum price for removal of railroad track and related equipment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in the removal and disposal of railroad components including, but not limited to rails, ties, ballast, PCC track panels, tie plates, spikes, anchors, joints, warning devices, utility boxes, cantilevers, gates, signals, and associated equipment, complete in place, including excavation and backfill, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-21 REMOVE RAILROAD TRACK

This work consists of removing mainline track in accordance with the details shown on the project plans and these special provisions. This work shall comply with Section 60-20. The contract unit or lump sum price for remove railroad track shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing mainline track as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-22 REMOVE RAILROAD CROSSING

This work consists of removing the mainline grade crossing in accordance with the details shown on the project plans and these special provisions. This work shall comply with Section 60-20. The contract unit or lump sum price for remove railroad crossing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing the mainline grade crossing as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

60-23 REMOVE TURNOUT 14

This work consists of removing turnout 14 in accordance with the details shown on the project plans and these special provisions. Exercise care in removing so it will not be damaged or destroyed. The contract unit or lump sum price for removing turnout 14 shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing turnout 14 as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

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DIVISION VII DRAINAGE

65 CONCRETE PIPE

Add to section 65-2.03B:

If you encounter solid rock or other unyielding material at the planned elevation of the bottom of the bedding shown, remove the material below the bottom of the bedding to a depth of 1/50 of the height of the embankment over the top of the culvert, but not less than 6 inches or more than 12 inches. Backfill the resulting trench below the bottom of the bedding with structure backfill material under section 19-3.03E. Do not compact the outer bedding before pipe placement.

The excavation and backfill below the planned elevation of the bottom of the bedding shown is change order work.

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68 SUBSURFACE DRAINS

Add to section 68:

68-8 WALL DRAINS

68-8.01 GENERAL

Section 68-8 includes specifications for constructing plastic pipe wall drains.

Plastic pipe wall drains include all necessary elbows, wyes, tees, other branches, fittings, and coupling systems.

68-8.02 MATERIALS

68-8.02A General

Not used

68-8.02B Plastic Pipe

Plastic pipe must comply with the specifications for pipe for edge drains in section 68-4.

68-8.03 CONSTRUCTION

Not Used

68-8.04 PAYMENT

Plastic pipe wall drains are measured along the centerline of the pipe and parallel with the slope line. The payment quantity includes the length of pipe domes, elbows, wyes, tees, and other branches to the point of intersection. The payment quantity is the length designated by the Engineer. If the pipe is cut to fit a structure or slope, the payment quantity is the length of pipe necessary to be placed before cutting, measured in 2-foot increments.

^^

Replace section 71 with:

71 UTILITIES

71-1 GENERAL

71-1.01 GENERAL

Section 71 in conjunction with the APWA Standard Specifications for Public Works Construction, 2012 Edition, and its revisions to date, shall be followed for all utility construction for the City of Banning's Water and Wastewater Departments.

When there is a contract item for a specific item of work included in this section, the contract unit or lump sum price shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the contract item, complete in place, as shown on the plans and as specified in these specifications and the special provisions, and as directed by the Engineer.

When there are no separate contract items for materials or activities necessary to complete the work as specified in this section, the materials shall be furnished and installed and the activities completed. Full compensation for furnishing and installing the materials and completing the activities shall be considered as included in the contract price or prices paid for the utility work requiring the materials or activities and no additional compensation will be allowed therefor.

71-2 SUPPLEMENTAL STANDARD SPECIFICATIONS

71-2.01 GENERAL

Section 71-2 includes Supplemental Standard Specifications to the APWA Standard Specifications for Public Works Construction, 2012 Edition, and its revisions to date.

Revisions described under Section 71-2 refer to main section headings of the APWA Standard Specifications for Public Works Construction, 2012 Edition, and its revisions to date.

71-2.02 INSTALLATION OF PIPE

71-2.02.01 BEDDING

Add to section 306-1.2.1:

The cost of providing and installing said bedding material shall be included in the price bid for pipe and no additional allowance will be made therefor. In any case where rock bedding under the pipe is required by the City Engineer for stabilizing unstable subgrade due to existing ground conditions (not attributable to contractors' operations or methods), such rock bedding material shall be paid for at the job site delivered price.

71-2.02.02 PIPE LAYING

Add to section 306-1.2.2:

After completion of all work, except the street or trench resurfacing, an approved type sewer ball (not a free floating ball) equal to the diameter of the pipe shall be sent through sewers from the uppermost structure. The Contractor shall, at his own expense, furnish all materials including water for carrying out the operation and removing any obstructions that prevent the ball from traveling through the pipe.

All exposed piping shall be adequately supported with devices of appropriate design.

All joints shall be installed in strict accordance with manufacturer's recommendation and shall be provided with a protective coating at least equal to the protective coat on the pipe being joined.

71-2.02.03 FIELD JOINTING OF CLAY PIPE

Add to section 306-1.2.3:

Only Types "D" or "G" joints are acceptable for vitrified clay pipe. All other provisions of this section apply.

71-3 ADDENDUM TO STANDARD SPECIFICATIONS

71-3.01 GENERAL

Section 71-3 includes an Addendum to the APWA Standard Specifications for Public Works Construction, 2012 Edition, and its revisions to date.

It is not the intent of this Addendum to prevent the use of any material not specifically prescribed by these Special Provisions. However, the City of Banning's Water or Wastewater Department must determine that substitutes are equivalent to those materials specified and approve any substitution therefor. All materials shall be new and of the best quality for their intended use and shall be of one manufacturer. All materials shall be approved by the appropriate department prior to purchase and only those materials approved shall be installed.

In the case of conflicts between this Addendum and the APWA Standard Specifications for Public Works Construction, 2012 Edition, and its revisions to date. This Addendum shall govern.

All elevations shown to be existing shall be verified by the Contractor prior to construction.

71-3.02 BASIC PIPELINE SPECIFICATIONS

71-3.02.01 SCOPE

Contractor shall furnish all pipe and appurtenances together with all material, equipment, labor and perform all operations necessary to construct water mains, appurtenances, and sanitary sewer as specified.

71-3.02.02 EXCAVATION

71-3.02.02.01 TRENCHES

Excavation for pipeline and appurtenances shall be open trench to the depth and in the direction necessary for proper installation of same as shown on project plans or as otherwise directed by the City. Excavation for trenches shall include removal of all material of any nature for installation

of the pipe or appurtenance and shall include the construction of trench shoring and timbering and all necessary installations for dewatering.

71-3.02.02.02 LIMIT OF EXCAVATION

Trenches shall be excavated not more than 1,000 feet in advance of pipe laying, unless otherwise permitted in writing by the City. Trenches shall be adequately shored and braced so that the earth will not slide or settle, and so that all existing improvements of any kind will be fully protected from damage. Any damage resulting from lack of adequate shoring and bracing shall be the responsibility of the Contractor. Contractor shall effect all necessary repairs or reconstruction at his own expense, as directed by the City and shall bear all other expense resulting from such damage.

71-3.02.02.03 WIDTH OF TRENCH

Unless otherwise shown, all pipeline trenches shall, whenever possible, have vertical sides and a minimum and maximum allowable width as shown on the project plans. Sloping of trench walls will be permitted under certain conditions.

71-3.02.02.04 EXCESS EXCAVATION

Should the excavation for the pipeline be carried below grade without instruction from the City, it shall be refilled to proper grade, at the Contractor's expense for all labor and material, with clean sand or sand and gravel tamped in place to 90% minimum compaction.

71-3.02.02.05 EXCAVATION IN GOOD SOIL

The trench shall have a flat or semi-circular bottom conforming to the grade to which the pipe is to be laid. The bottom for all weld steel cylinder pipe shall be graded and prepared to provide firm and uniform bearing throughout the entire length of each joint of pipe. Welded steel cylinder pipe shall not be laid on earth mounds and bell holes shall be excavated in the sides and bottom of the trench, at pipe joints, of such size that the process of making joints and inspection can be carried on satisfactorily, and so that the pipe barrel will bear evenly on the bottom of the trench.

71-3.02.02.06 EXCAVATION IN POOR SOIL

All soft, spongy, or unstable material shall be removed from the bottom of the trench to a depth as determined in the field by the City and shall be refilled to proper grade, at Contractor's expense to a depth of 2 feet below grade, with clean sand or sand and gravel or other suitable material as approved by the City. Material shall be tamped to 90% minimum compaction, graded and prepared to provide a firm and uniform trench bottom.

71-3.02.02.07 EXCAVATION IN ROCK

Where rock is encountered it shall be removed below grade and the trench backfilled with suitable material to provide a compacted earth cushion with a thickness under the pipe of no less than 1 1/2" per inch of nominal diameter of pipe to be installed with a minimum allowable thickness of 6 inches.

71-3.02.02.08 DISPOSAL OF EXCAVATED MATERIALS

All materials excavated from the trench shall be so placed as to offer a minimum of obstruction to traffic. Excess material and material that is not approved by the City for use as backfill shall be disposed of elsewhere by Contractor entirely at his own expense and on his own responsibility.

If pipe or other material belonging to City is uncovered or removed from the excavation, all pipe or other material which is salvageable in the opinion of the City shall be disposed of as directed by the City. Material not considered to be salvageable shall be disposed of with other excess excavated material.

71-3.02.03 BACKFILLING

71-3.02.03.01 BASIC REQUIREMENTS

In addition to meeting backfill requirements specified herein, Contractor shall also comply with backfill requirements established through permits issued by jurisdictions (State, County, City) having control over rights-of-way in which construction is taking place. Wherever the separate requirements conflict with one another, the more stringent shall apply.

Backfill material shall be either select excavated material, screened or washed if necessary, or commercially processed material. Backfill material shall meet separate specific requirements for backfill within pipe zone and backfill above pipe zone. Backfill material meeting pipe zone requirements may be used for above pipe zone backfill material but not the reverse.

After sheeting, shoring, or shields have been removed, all backfill material including pipe zone backfill material shall be compacted to 90 percent relative compaction minimum except that the upper 12 inches of backfill material shall be compacted to 95 percent relative compaction minimum, as verified by field compaction tests. Relative compaction shall be based on maximum dry density determined in accordance with ASTM D-1557, latest.

Unless determined otherwise, compaction tests will be taken along the pipeline, in the pipe zone, above the pipe zone, and at ground surface or subgrade at 200 foot intervals maximum and along all service runs and fire hydrant runs. Contractor shall furnish all equipment (including shoring), labor, and materials needed for compaction testing. Compaction testing shall be completed and accepted by the Water Department prior to hydrostatic and leakage testing of pipelines and appurtenances.

71-3.02.03.02 BACKFILL WITHIN PIPE ZONE

Unless specified otherwise, plant manufactured sand with an SE of 30 or greater shall be used in the pipe zone.

Initial backfilling shall be performed as soon as possible after pipe has been laid. Loose, moist backfill material shall be placed in trench simultaneously on each side of pipe to a depth not greater than pipe centerline (springline) or 12 inches (loose measurement), whichever is less, and it shall then be tamped under pipe so that all voids are eliminated and material is compacted to 90 percent relative compaction minimum.

Subsequent backfilling shall be performed immediately following initial backfilling. Loose, moist backfill material shall continue to be placed in trench simultaneously on each side of pipe in lifts not exceeding 12 inches in thickness (loose measurement), with each lift being tamped, until the pipe has been covered by at least 12 inches of well compacted material. Alternatively, backfill material may be densified by water settlement until the pipe has been covered by at least 12 inches of well densified material. Backfilled material shall be tamped or settled to 90 percent relative compaction minimum.

Regardless of compaction or densification technique, care in backfilling shall be exercised to avoid any damage to pipe, fittings, and appurtenances, to avoid any damage to persons or property, and to achieve relative compaction of backfilled material of at least 90 percent minimum

71-3.02.03.03 BACKFILL ABOVE PIPE ZONE

Backfill material shall consist of moist clean loose earth, sand, gravel, or rock free of clay and silt as well as brush, roots, and organic substances. From the top of the selected backfill in the pipe zone to within 1 foot of ground surface or pavement subgrade, the material for backfill shall be free from stones or lumps of material exceeding 3" in greatest dimension, in quantity not exceeding 40% of the volume when said coarse materials are well distributed throughout the finer material and the specified compaction can be obtained. All backfill material shall be compacted to a density of 90% relative compaction minimum. Within 1 foot of ground surface or pavement subgrade, backfill material shall be free of material exceeding 2 inches in greatest dimension and it shall be compacted to 95 percent relative compaction minimum. Compaction shall be obtained by means of water settlement or tamping, depending on the nature of the material. Sandy, granular soils, may be compacted by means of water settlement. Trench to be backfilled by water settlement shall be diked at suitable intervals no tot exceed 300 feet. Impounded water shall be of sufficient depth so that earth pushed or shoveled into trench will, at all times, be falling into water and will be completely saturated. Soils not having a sandy or granular nature shall be backfilled and compacted by either of the following methods:

1. All material shall be placed in layers not exceeding 8" in thickness, loose measurement, and each layer compacted to a density of 90% or more, as specified above, by means of hand or pneumatic tampers.

2. All material shall be placed in layers not exceeding 3 feet in thickness, loose measurement, and each layer compacted to a density of 90% or more as specified above, by the use of a "Hydra-Hammer" tamper, or similar equipment.

On steep slopes and other locations where compaction by flooding is not practicable, the backfill shall be compacted by means of either of the above tamping methods.

In open terrain or wherever, in the opinion of the Water Department, settlement is not important, tamping or water settling may be omitted in the backfilling above the pipe. After filling to the top of the trench with material excavated from the trench, the backfill shall be rolled three times with the dual-wheels of a truck loaded to 5 tons or with other equivalent equipment. Surplus backfill material shall be mounded over the trench in sufficient quantity to allow settlement and as directed by the Water Department.

71-3.02.03.04 IMPORTED BACKFILL MATERIAL

Imported material shall be select earth, sand or gravel, free from clods, lumps, or stones over 3" in diameter and shall not contain over 10% by volume of clay or adobe.

71-3.03 WATER SYSTEM CONSTRUCTION

71-3.03.01 PIPE MATERIALS

71-3.03.01.01 SCOPE

Ductile iron pipe and fittings shall conform with applicable provisions of AWWA C104, C105, C110, C111, C115, C150, C151, and C153, latest, as modified herein, by the project plans, or by the Water Department.

All ductile iron pipe shall be manufactured by organizations which have had not less than ten years successful experience in the manufacture of the type of pipe specified.

A cathodic protection system shall be required as approved and directed by the City Engineer.

71-3.03.01.02 DATA TO BE SUBMITTED BY CONTRACTOR

Contractor shall furnish two copies of an Affidavit of Compliance in accordance with Section 51-5, AWWA C151, latest. Contractor shall also furnish certifications; two copies each, of the following:

1. Material Certification
   a. Grade of iron (chemical requirements)
   b. Flanges
   c. Nuts and Bolts
   d. Flange gaskets
   e. Rubber Gaskets
2. Manufacturing Certification
   a. Hydrostatic Test Reports
   b. Tensile Test Reports
   c. Impact Test Reports

Unless specified otherwise, all proportioning and detailing for the pipeline, including specials, manways, and connections to the pipe, shall be done by Contractor. Contractor shall prepare detailed shop fabrication drawings of the pipe, lining and coating, joints, cathodic protection design and installation details, details of reinforcement, fittings, appurtenances, and station and elevation for each outlet and fitting and each pipe joint where a change in pipe class, alignment or slope occur, and shall submit these to the Water Department for approval in all cases at a time sufficiently early to allow review and approval as hereinafter specified and to accommodate the rate of construction. These shop fabrication drawings shall be submitted in duplicate. The Water Department will, within 15 days, return one copy to Contractor, marked either "Returned for Revision", "Approved", or "approved as Revised". IN the last case, all revisions will be clearly shown on the returned copy which shall be considered as approved drawing, and only drawing or prints so correct shall be used for manufacture.

Revisions shown on the shop drawings shall be considered as changes necessary to meet the requirements of Specifications and shall not be taken as the basis of claims for extra charges.

Contractor shall accept such revisions or submit other for approval. When delay is caused by the resubmission of details, Contractor shall not be entitled to any damages or extension of time on account of such delay. The corrections on prints marked "Approved as Revised" shall be made as soon as practicable and new prints submitted. The Water Department approval shall be considered as applying only to the general arrangement and such approval or the criticism of detail shall not relieve contractor from entire responsibility for correctness of details and dimensions. Contractor shall correct any misfits due to any errors in the drawings. Any fabrication or other work performed in advance of the receipt of approved drawings shall be done entirely at Contractor's risk.

Contractor shall furnish the Water Department 2 copies of all approved drawings.

71-3.03.01.03 *24" DUCTILE IRON PIPE*

All pipe shall be ductile iron and shall conform with AWWA C151 (ANSI A21.5, and applicable portions of ASTM A536, Grade 60-42-10), latest, as modified herein, by the project plans, or by the Water Department.

Pipe, including standard, random, and special short lengths, shall be Class 200 and, unless specified otherwise, shall have push on joints. Minimum pipe wall thickness shall be as noted by the project plans or specified by the Water Department. Pipe wall thickness shall be increased if necessary to accommodate threads or grooves or if required for extremely shallow (less than 2.5 feet) or excessively deep (more than 14 feet) pipeline cover. 90 percent of all pipe of any specific class and size, excluding special short lengths, shall be furnished in standard lengths. The remaining 10 percent may be furnished in random lengths.

Standard lengths shall have nominal lengths of 18 feet plus or minus 1 inch. Random length of pipe may be up to 2 feet shorter than standard lengths. Special short lengths shall only be furnished where needed to accommodate specified fittings.

Pipe shall have an interior cement mortar lining in accordance with AWWA C104 (ANSI A21.4), latest. Said lining shall be full thickness throughout pipe except for bell which shall be cleaned and lightly sprayed or brushed with an asphaltic or bituminous coating in accordance with AWWA C151 (ANSI A21.51). The interior cement mortar lining shall be moisture cured for at least two days before shipment. To prevent moisture loss during the curing period, ends of pipe shall be kept closed with plastic caps or covers which shall remain in place until installation.

Steam curing may be substituted for moisture curing, provided one hour of steam curing is equivalent to six hours moisture curing and ambient vapor is maintained at relative humidity of 85 percent with temperature ranging between 110 degrees Fahrenheit and 150 degrees Fahrenheit for minimum steam curing period of six hours, after which exterior coating may be applied. The lining shall then be cured for another twelve hours before shipment. Other methods of curing the cement mortar lining may be used providing they are acceptable to the Water Department.

Temperature and shrinkage cracks in cement mortar lining less than 1/16 inch in width or 24 inches in length need not be repaired. Cracks wider than 1/16 inch or longer than 24 inches shall be repaired unless it can be demonstrated to the satisfaction of the Water Department that the cracks will heal autogenously under continuous soaking in water.

Pipe shall have an exterior asphaltic or bituminous coating in accordance with AWWA C151 (ANSI A21.51), latest.

All pipe shall be furnished with rubber gasketed push-on type joints unless mechanical joints or flanged joints are otherwise specified or permitted. Joint restraints may be required as specified by the Water Department. All joints shall comply with AWWA C111 (ANSI 121.11), latest, as approved by the Water Department.

Rubber gaskets shall conform to AWWA C111 (ANSI A 21.11) latest.

Each pipe shall be marked with the weight, class, or nominal thickness and casting period. The manufacturer's mark, year in which pipe was produced and the letters "DI" or "ductile" shall be cast or stamped on the pipe. All required markings shall be clear and legible and all cast marks shall be on or within 2 feet of bell ends.

71-3.03.01.04 FITTINGS

All fittings shall be ductile iron except where fabricated cement mortar lined and cement mortar coated welded steel fittings are specifically permitted or specified. Fabricated cement mortar lined and cement mortar coated fitting shall be flanged and shall conform with the cement mortar lined and cement mortar coated welded steel pipe fittings specified herein.

Ductile iron fittings shall conform with AWWA C111, and C153 (ANSI A21.11, and A21.53, respectively), latest. Unless specified otherwise, fittings shall be push-on joint and comply with AWWA C111 (ANSI A21.11).

Fittings shall have an asphaltic outside coating in accordance with AWWA C110 or C153 (ANSI A21.10 or A21.53), latest, and cement mortar lining in accordance with AWWA C104 (ANSI A21.4), latest. Fittings shall have standard lining thickness and shall be seal coated with asphaltic material or other approved material. The lining process must produce a dense, compacted lining that shall be bonded to the interior of the fitting and have a smooth surface.

71-3.03.01.04.01 RESTRAINT DEVICES FOR JOINTS

71-3.03.01.04.01.01 DESIGN

Restraint devices for nominal pipe sizes 3 inch through 48 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.

The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

71-3.03.01.04.01.02 MATERIAL

Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.

Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.

Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

71-3.03.01.04.01.03 INSTALLATION

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

71-3.03.01.04.01.04 MANUFACTURERS

Mechanical joint restraint shall be Megalug Series 1100 or an approved equal.

71-3.03.01.05 TESTING

All pipe, including standard, random, and special sort lengths, furnished shall be tested in the United States in accordance with AWWA C151, latest.

71-3.03.01.06 INSPECTION

The Water Department shall at all times have the right to inspect all work and materials during the course of manufacture. Manufacturer shall furnish the Water Department reasonable facility for obtaining such information as he may desire regarding the progress and manner of the work and the character and quality of materials used.

71-3.03.01.07 LOADING, TRANSPORTING, AND UNLOADING

After the pipe has been tested in accordance with Section 71-3.03.01.05 above, it shall be loaded on rubber-tired vehicles, and adequately supported and chocked to prevent any damage during transportation, and delivered to the work site. During loading, unloading, and stringing operations, pipe and fittings shall be moved with care to prevent damage thereto. Unloading shall be accomplished in a workmanlike manner as directed by the manufacturer. Under no circumstances are pipe and fittings to be dropped or bumped in handling.

71-3.03.01.08 DEFECTIVE OR DAMAGED MATERIAL

Pipe and fittings shall be carefully inspected for defects. Any pipe found to be defective in workmanship or materials or so damaged as to make repair and use impossible shall be rejected and removed from the work site.

In the event that pipe is damaged, damaged portions may be removed, as approved by the Water Department, and discarded. Remaining sound portions may be used with ductile iron fittings. Contractor shall be responsible for any and all damage to material and he shall stand the expense of repairing or replacing same. Contractor shall take proper precautions to assure that rubber gaskets are protected from oxidation or undue deterioration.

71-3.03.01.09 EXECUTION

71-3.03.01.09.01 GENERAL

71-3.03.01.09.01.01 PIPELINES AND APPURTENANCES

Pipelines and appurtenances shall be constructed in accordance with these Specifications, the project plans, and as specified by the Water Department.

71-3.03.01.09.01.02 VALVES AND APPURTENANCES

Pipeline valves at pipeline intersections shall be connected directly to pipeline intersection fittings (cross or tee) and, unless specified otherwise, all mainline or side outlet valves shall be located 3 feet minimum from any curb face. Pipeline valves shall not be placed under curb or gutter or in parkway unless approved by the Water Department.

All appurtenances, including but not limited to air valve installations, blowoff installations, and related facilities, such as fire hydrants, fire services, and water services, shall not be installed within 3 feet of curb returns, curb depressions, and driveway approaches, or in inaccessible locations or locations where interferences may restrict facility operation, unless permitted otherwise by the Water Department.

Unless specified otherwise, air valve installations shall be constructed at all pipeline high spots and blowoff installations shall be constructed at all pipeline low spots. Contractor shall construct, at his expense, air valve installations and blowoff installations in addition to those specified, if necessary to accommodate his work and schedule.

All valves shall be turned on or off by the Water Department only.

71-3.03.01.09.01.03 PIPELINE LENGTH

All pipeline lengths noted by the project plans or otherwise specified or referenced shall mean net horizontal construction lengths and said lengths shall extend through all fittings and appurtenances including bends, outlets, tees, flanges, and valves. Contractor shall provide all pipe necessary to accommodate any vertical alignment of the pipeline and said pipe shall be represented by the net horizontal constructed length.

71-3.03.01.09.01.04 PIPELINE ALIGNMENT

All pipelines shall be constructed with no basic variation in horizontal alignment as shown by the project plans or as specified by the Water Department. Pipelines shall be constructed parallel with centerlines of streets or rights-of-way and appurtenances shall be constructed perpendicular thereto unless the project plans specify otherwise. Pipelines may be constructed by the use of pulled joints, short joints, bevels, bends, and elbows, provided pipelines are constructed as specified.

All non-critical areas and subject to the Water Department's approval, pipelines may be constructed at variance with vertical alignment as shown by the project plans by the use of pulled joints, short, joints, bevels, bends, and elbows provided pipelines are constructed as specified at pipeline connections and underground interferences, and where pipeline cover is limited. The Water Department will not approve any variation in vertical alignment until it has determined that proposed alignment is proper and modifications are in order. The costs provided in the bidding schedule for the base pipeline installation shall include any costs associated with adjusting the pipeline vertical alignment up to 1 foot upwards or downwards.

71-3.03.01.09.01.05 PIPELINE TOLERANCES

With regard to vertical alignment, pipelines shall be constructed so that actual flow line elevations, measured at pipe joints, are within 0.1 foot of design flow line elevations. Pipelines, when installed shall have continuous slope upgrade or downgrade, corresponding with design slope without any high spots.

With regard to horizontal alignment, pipelines shall be constructed so that actual pipeline centerlines, measured at pipe joints, are within 0.1 foot of design pipeline centerlines. Pipelines, when installed, shall closely follow specified horizontal alignment.

Pipeline construction shall conform with the project plans and layout, shop, fabrication, installation, or laying drawings (design drawings which show flow line elevations and pipeline centerlines) in accordance with the above specified tolerances. Contractor shall make or assist the Water Department in making all necessary measurements, as determined by the Water Department, to confirm or verify compliance with construction tolerances.

71-3.03.01.09.01.06 PIPELINE COVER

Pipeline cover as shown by the project plans is hereby defined as design cover over pipeline. If field conditions determined during construction staking show that pipe grade changes are required to provide design cover, Contractor shall, at his expense, make required changes in pipeline grade and construct pipeline accordingly.

Pipeline cover from top of pipe to ground surface over pipeline shall not be less than 36 inches. Where future ground surface elevation over pipeline has been established and where actual ground surface is greater, pipeline cover shall be referenced to future (established) ground surface elevation, not actual ground surface elevation.

71-3.03.01.09.02 INSTALLATION

Pipe manufacturer, fitting manufacturer, and material supplier, in addition to the Water Department and the Water Department's representative, shall have access to the work during installation. Contractor shall use assistance provided by either manufacturer or supplier where required for proper installation of pipe, fittings, or materials; however, Contractor shall limit role of either manufacturer or supplier to advisory service.

All pipe shall be laid true to line and grade and at the locations shown by the project plans or as specified. Pipe shall be installed in accordance with applicable provisions of AWWA C600, latest, applicable provisions of Ductile Iron Pipe Research Association "Guide for the Installation of Ductile Iron Pipe", latest, and manufacturer's directions. Bell ends shall be placed uphill unless otherwise permitted.

After pipe has been set in trench, exterior of spigot and interior of bell shall be thoroughly cleaned. Lubricant recommended by pipe manufacturer and as approved by the Water Department shall be applied to rubber gasket. Lubricant shall be water soluble, nontoxic, shall impart no objectionable taste or odor to the water, shall have no deteriorating effects on the rubber gaskets, and shall not support growth of bacterial. Excess lubricant shall be removed. Pipe ends shall be aligned, and spigot shall be pulled into bell with come-along devices, or hoists with chains and slings, unless permitted otherwise. If either the pry bar or the backhoe bucket method is permitted, a timber header shall be placed between the pipe and the pry bar or backhoe bucket before the spigot is pushed onto the bell.

Curved alignment by use of pulled joints will be permitted. Maximum joint deflection shall be 3 degrees. For purposes of reducing angular deflections at pipe joints, Contractor may install pipe sections of less than standard length.

Whenever cutting of pipe is required, it shall be done with a special cutting tool specifically made for cutting and machining ductile iron pipe. Cut ends and rough edges shall be ground smooth and beveled for push-on joints.

Whenever specified, pipe shall be encased with 8 mil (0.2 mm) thick minimum polyethylene tube lapped 1 foot minimum, and valves and fittings shall be wrapped with polyethylene tube or with polyethylene sheets lapped 1 foot minimum. Polyethylene tube and polyethylene sheets shall be secured in place with suitable adhesive tape. All polyethylene tube and polyethylene sheet encasements shall be installed in accordance with AWWA C105, latest.

As work progresses, a pipe cleaning tool as approved by the Water Department shall be drawn though pipe to remove dirt, rocks, or other foreign material. At the end of each day's work, all openings in the pipeline shall be plugged with watertight expandable plugs or approved equal.

71-3.03.01.09.03 *36" STEEL CASING*

Wherever required, steel casings shall be installed. Said casings shall be comprised of welded steel pipe. Steel casings shall be bored and jacked into place unless open trench installations are permitted; steel casings shall not be sluiced or jetted into place. Steel casings shall be bored and jacked into place from one direction only.

Steel casings shall be installed to the lines, grades, and depths specified. Unless specified otherwise, Contractor will be permitted a tolerance from horizontal alignment and from vertical alignment of 0.5 percent of casing length but no more than 1 foot maximum regardless of casing length.

Unless specified otherwise, methods and equipment used shall be as selected by Contractor and approved by the Water Department. Said approval shall not relieve Contractor of any responsibility with regard to steel casing construction. Steel casings shall have minimum inside diameters at least 12 inches larger than maximum outside diameter of carrier pipes.

Prior to any boring and jacking operations, Contractor shall submit to the Water Department a construction plan consisting of a schedule of operations, details of methods of construction, types of equipment to be used, details of boring and jacking pit including lengths, widths and depths, and shoring and bracing. Said construction plan shall be approved as to sufficiency by the Water Department before any construction is commenced.

Boring and receiving pits shall be shored in accordance with OSHA standards. A 6 foot high chain link fence shall be erected around said pits and said pits shall be protected with Type K barriers. Barriers shall be placed to direct traffic around the pits.

Prior to constructing pits, Contractor shall excavate both sides of each crossing to determine exact locations of facilities to be crossed (horizontal and vertical). Contractor shall adjust casing locations to accommodate crossings based on Contractor's field measurements.

Contractor shall schedule his operation to prevent pits from being open on weekends or holidays. Contractor shall provide traffic control around the pits in accordance with Contractor's approved traffic control drawings

Contractor shall take all necessary precautions to prevent subsidence of or lifting of existing roadbeds, roadways, and pavements during or following installation of steel casings. Material excavated during boring and jacking operations shall be removed carefully so as to avoid caving. Voids created during boring and jacking shall be grouted with an approved grout from within the casing once the casing has been installed. Couplings shall be welded to steel casing to permit grouting. Following grouting, threaded plugs shall be inserted into said couplings.

After steel casing has been constructed, carrier pipe shall be equipped with approved plastic or steel casing insulator of uniform size and spacing and then installed in steel casing in accordance with aforementioned construction plan as approved by the Water Department. Annulus between steel casing and carrier pipe shall be filled with sand and the ends shall be capped with plastic or steel end seals or plugged with brick and mortar. Weepholes shall be placed in the bottoms of the end seals or brick and mortar plugs.

Contractor shall backfill boring and jacking pits with material specified for pipeline backfill. Said backfill material shall be compacted to the relative compaction specified which shall be not less than 90%. Contractor shall remove steel casing and carrier pipe remnants, shoring materials, asphalt, concrete and all other work related debris. Contractor shall restore paved surfaces.

71-3.03.02 VALVES

71-3.03.02.01 GATE VALVES

71-3.03.02.01.01 GENERAL

71-3.03.02.01.01.01 DESCRIPTION

Valves shall be of the iron-body, bronze-mounted, resilient-seated solid-wedge or dual disc type.

71-3.03.02.01.01.02 REFERENCES

This section references the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of listed documents, the requirements of this section shall prevail.

ANSI B16	Cast Iron Pipe Flanges and Flanged Fittings
ASTM A126	Gray Iron Castings for Valves, Flanges and Pipe Fittings
AWWA C509	Resilient-Seated Gate Valves for Water and Sewage Systems
AWWA C515	Resilient-Wedge, epoxy coated, Flanged ends.

71-3.03.02.01.01.03 QUALITY ASSURANCE

Gate valves 3 inches and larger in size up to and including 12-inches shall be resilient-seated and shall comply with AWWA C500 and AWWA C509, including applicable hydrostatic testing. Gate valves smaller than 3 inches shall be dual disc or solid wedge and shall comply with Fed. Spec. WW-V-54 Class A. Gate valves over 12-inches are not acceptable.

71-3.03.02.01.01.04 SUBMITTALS

Products data sheets shall be submitted to the Water Department prior to construction.

71-3.03.02.01.02 PRODUCTS

71-3.03.02.01.02.01 MATERIALS

Materials of construction shall be as follows:

Components	Material
Body	Ductile Iron
Wedge:	
4 inches and smaller	Bronze
4 inches thru 12-inch	Cast iron, ASTM A126, Class B
Mounting	Bronze
Stem	Bronze, AWWA C500, Section 3.12
Seat rings	Bronze, Grade A, AWWA C500, Section 3.8

71-3.03.02.01.02.02 CONSTRUCTION

71-3.03.02.01.02.02.01 GENERAL

Exposed gate valves shall be rising stem type. Buried or submerged gate valves shall be of the nonrising stem type. Rising stem valves shall be provide with a stem collar stuffing box and packing gland with Teflon braid packing. Nonrising stem valves shall be provided with O-ring stem seals. The body shall be provided with screwed-on seat rings.

71-3.03.02.01.02.02.02 END CONNECTIONS

Gate valves in buried pipelines 4-inches and larger shall be flanged. Gate valve end connections in exposed pipelines shall be flanged or threaded as specified. Threaded ends shall not be provided on gate valves with end connections larger than 4 inches. End flanges shall be integral with the gate valve body and be faced and drilled in accordance with ANSI B16.1.

71-3.03.02.01.02.02.03 MANUAL OPERATORS

Unless specified otherwise, valves less than 6-inch size shall be provided with handwheels, and valves 6-inches and larger shall be provided with geared operators.

71-3.03.02.01.02.03 MANUFACTURERS

Gate Valves shall be manufactured by Mueller Company or an approved equal.

71-3.03.02.01.03 INSTALLATION

Gate valves shall be installed in accordance with the manufacturers' recommendations, and in the closed position.

71-3.03.02.02 BUTTERFLY VALVES

71-3.03.02.02.01 GENERAL

71-3.03.02.02.01.01 DESCRIPTION

Valves shall be rubber seated and stub or through shaft type, with flanged or mechanical pipe couplings.

71-3.03.02.02.01.02 REFERENCES

This section references the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of listed documents, the requirements of this section shall prevail.

ASTM A276 Specification for Stainless and Resisting Steel Bars and Shapes

AWWA C504 Standard for Rubber-Seated Butterfly Valves

71-3.03.02.02.01.03 QUALITY ASSURANCE

Valves shall be provided at the locations and shall be of the sizes shown on the Plans. The valves shall be designed for the operating and testing pressure of the associated pipeline as specified. Buried valves shall be provided with AWWA operating nut.

71-3.03.02.02.01.04 SUBMITTALS

Products data sheets shall be submitted to the Water Department prior to construction.

71-3.03.02.02.02 PRODUCTS

71-3.03.02.02.02.01 MATERIALS

Unless otherwise specified, materials for components shall be as follows:

Components	Material
Shafts	ASTM Type 304 or 316 stainless steel
Discs	Ductile iron or alloy cast iron

Disc seating edge	ASTM A276, Type 304
Seats	Synthetic rubber
Bodies	Ductile iron
Bearings	Reinforced TFE or Nylon
Thrust bearings	ASTM A276, Type 304
Pins and interior threaded parts	ASTM A276, Type 304

71-3.03.02.02.02.02 DESIGN

A. Valves shall be the short-body type, designed in accordance with AWWA C504. Valves and valve components shall, as a minimum, conform to Class 150B.

B. Valve ends shall be flanged. Valve shafts shall be turned, ground, and polished. Valves shall have factory-set thrust bearings.

C. Seats shall be retained in the valve body by mechanical means without retaining rings, screws, segments, or hardware of any kind in the flow steam. Seats shall be a full 360-degree without interruption and have a plurality of grooves mating with the spherical edge of the disc. The seats shall be designed to permit angular misposition of the disc by as much as one degree off center without leaking.

71-3.03.02.02.02.03 OPERATORS

Valve operator shall be level and traveling nut or worm gear type. Unless otherwise shown or specified, the operator shall be provided with manual actuation mechanism. Buried valve operators shall be designed from submerged service and shall have no external moving parts except the operator input shaft, which shall be Type 316 stainless steel and enclosed in a valve box extension tube.

71-3.03.02.02.02.04 MANUFACTURERS

Butterfly valves shall be as manufactured by Henry Pratt Company, Mueller, or approved equal.

71-3.03.02.02.03 INSTALLATION

A. Exposed butterfly valves shall be installed to permit removal of the valve assembly without dismantling the valve or operator.

B. Installation shall be in accordance with the manufacturer's printed instructions.

71-3.03.03 *FIRE HYDRANTS*

71-3.03.03.01 GENERAL

71-3.03.03.01.01 DESCRIPTION

Fired hydrants shall be Barrel type.

71-3.03.03.01.02 REFERENCES

This section references the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of listed documents, the requirements of this section shall prevail.

AWWA C503 Wet Barrel Fired Hydrants

71-3.03.03.01.03 SUBMITTALS

Product data sheets shall be submitted to the Water Department prior to construction.

71-3.03.03.02 PRODUCTS

71-3.03.03.02.01 MATERIALS

Fire hydrants shall be of the break-off traffic type and shall conform to AWWA C502 with six inch (6") flanged inlet and five-and-a-quarter (5-1/4") inch valve opening. Nozzle threads shall

be American National Standard. Operating nut shall be one-and-a-half (1-1/2") inch National Standard pentagon. The main valve shall be equipped with O-ring seals and shall open when turned left or counter-clockwise. Fire hydrants shall be painted safety yellow, as determined by the Water Department and shall be equipped with two (2) two-and-a-half (2-1/2") inch hose nozzles and one (1) four (4") inch pumper nozzle. Wet barrel hydrants may be required where specified. A blue traffic reflector shall be installed with two-part epoxy adhesive.

71-3.03.03.02.02 MANUFACTURER

Fire hydrants shall be Model J-40600 as manufactured by Jones, or an approved equal.

71-3.03.03.03 INSTALLATION

Install hydrants in accordance with the manufacturer's recommendations.

71-3.03.04 AIR RELEASE AND VACUUM VALVES

71-3.03.04.01 GENERAL

71-3.03.04.01.01 DESCRIPTION

The work of this section includes providing combination air release and vacuum valves as indicated, complete and operable, including accessories and drain connections in accordance with the project plans.

71-3.03.04.01.02 QUALITY ASSURANCE

Valves shall be provided at the locations and shall be of the sizes shown in the project plans. The valves shall be designed for the operating and testing pressure of the associated pipeline as specified.

71-3.03.04.01.03 REFERENCES

This section references the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

ASTM A536	Standard Specifications for Ductile Iron Castings
AWWA C512	Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service

71-3.03.04.01.04 SUBMITTALS

Product data sheets shall be submitted to the Water Department prior to construction.

71-3.03.04.02 PRODUCTS

71-3.03.04.02.01 GENERAL

A. Air and Vacuum relief valves shall be hydrotested in conjunction with the connecting pipelines.

B. Combination air/vacuum assemblies shall be furnished and installed by the Contractor at the locations shown on the project plans, or as required by the Water Department.

C. The tap of an air and vacuum valve assembly on buried pipelines shall be no closer than 18-inches to the valve, coupling, joint or fitting.

71-3.03.04.02.02 AIR AND VACUUM VALVES

A. Air and vacuum valves shall be capable of venting sufficient quantities of air as determined by the manufacturer's approved sizing methods, while pipelines are being filled and allowing air to re-enter while pipelines are being drained.

B. Air and vacuum valves shall be of the size indicated, with flanged or screwed ends to match the piping.

C. Bodies shall be of high-strength cast iron or ductile iron.

D. The float, seat, and all moving parts shall be constructed of Type 316 stainless steel.

E. Seat washers and gaskets shall be of material insuring water tightness with a minimum of maintenance.

F. Valves shall be designed for minimum 250 psi working pressure, unless otherwise indicated.

71-3.03.04.02.03 COMBINATION AIR VALVES

A. Combination air valves shall combine the characteristics of air and vacuum valves and air release valves by exhausting accumulated air in systems under pressure and releasing or readmitting sufficient quantities of air, as determined by the manufacturer's approved sizing methods, while system is being filled or drained, respectively.

B. Combination air valves shall have the same general requirements as specified for air and vacuum valves.

71-3.03.04.02.04 MANUFACTURERS

Air release and vacuum valves shall be manufactured by Crispin, or approved equal.

71-3.03.04.03 INSTALLATION

A. All valves shall be installed in accordance with the manufacturer's printed recommendations.

B. Air release and vacuum valves shall be installed at high points in piping systems and where indicated.

C. Combination air/vacuum assemblies shall connect to underground pipes no closer than 18-inches from a bell, coupling, joint or fitting.

D. Air/vacuum assemblies and valve box assemblies shall be field painted in accordance with and as directed by the Water Department.

71-3.03.05 SERVICES

71-3.03.05.01 LOCATION AND SIZE

All services shall be located and sized as approved by the Water Department. Services will not be permitted in driveway areas.

71-3.03.05.02 SERVICE TAPS

Any and all service taps shall be on line with the meter box and perpendicular to the main.

Service and other taps shall not be made closer than 2 feet to a bell, coupling, joint, fitting, or other service.

Service taps will be permitted only where complete services are to be installed. Under no circumstances will Contractor be allowed to tap existing mains which are in service. Contractor shall tap existing mains only when said mains are out of service and only when specifically permitted by the Water Department.

71-3.03.05.02.01 DUCTILE IRON PIPE MAINS

Service outlets on mains shall be accomplished with double strap bronze service saddles with iron pipe threads.

71-3.03.05.02.02 TESTING AND DISINFECTION

Service taps used for testing and disinfection shall comply with service tap requirements for ductile iron pipe. Unless specified otherwise, they shall be made at top of pipe. Once testing and disinfection have been completed, they shall be plugged. Plug threads shall be wrapped with Teflon tape and plugged tap shall then be coated with approved bitumastic material.

71-3.03.05.03 SERVICES EXTENSIONS

In addition to a service tap, each service shall include a corporation stop, service pipe, a meter stop, a meter box, and all other materials specified by the project plans. Unless specified otherwise, service piping shall be continuous from corporation stop to meter stop; it shall not be spliced.

71-3.03.05.04 METER BOXES

Meter boxes shall be equal to and interchangeable with those shown on the project plans and shall be installed as shown on the project plans. They shall be set true to line and grade and shall be flush with concrete curbs and sidewalks.

Meter boxes shall be installed whenever services are installed, even prior to construction of street improvements including concrete curbs and sidewalks. Meter boxes shall be brought to grade upon construction of concrete curbs and sidewalks.

71-3.03.06 FIELD HYDROSTATIC TEST AND LEAKAGE TEST

71-3.03.06.01 GENERAL REQUIREMENTS

1. Required test pressures shall be applied by pump connected to pipeline sections being tested. The Water Department shall approve pump connections to pipeline before testing begins. As part of the work, and unless specified otherwise, Contractor shall install, at his expense, top outlets (service taps) required for testing.

   Contractor shall provide calibrated meters for measurement of leakage, and all pumps, piping, fittings, bulkheads, plugs, valves, gages, power equipment, and manpower necessary for conducting all tests required, all at his expense. Contractor shall furnish the Water Department three copies of all records of all tests performed.

2. Unless specified otherwise, Contractor shall test against test plates for pipelines 12 inches and smaller. Contractor shall not remove said test plates until pipelines have been tested, disinfected, and accepted by the Water Department.

3. Contractor, at his expense, shall locate and repair leaks or other defects which may develop or become apparent during test. Contractor shall excavate, including removal of backfill already placed, and make all repairs necessary for required water tightness, and then replace all excavated material, after which Contractor shall retest repaired pipeline section. Pipeline sections shall be repeatedly repaired and tested until they meet requirements set forth herein.

4. Pipe manufacturer and fitting manufacturer shall have free access to the work during testing. Any improper act on the part of Contractor which the pipe and fitting manufacturer may observe shall be reported to the Water Department. Pipe and fitting manufacturer shall be free to observe and verify all tests.

5. After completed pipeline and appurtenances or test sections have successfully met test requirements to the satisfaction of the Water Department, the entire pipeline or each test section shall be filled or shall remain filled with water until completion of the work, unless otherwise ordered by the Water Department.

71-3.03.06.02 HYDROSTATIC TEST

Upon completion of pipeline construction and at least seven days after last concrete thrust device has been placed, pipelines and appurtenances constituting the work shall be filled with water for twenty-four hours minimum. During filling, Contractor shall see that all air valves are open and operating. After pipelines have been completely filled, they shall be allowed to stand for twelve hours minimum under slight pressure for sufficient time to permit all air to escape. During that same period, Contractor shall examine all fittings, flanges, handholes), and connections for leaks. If any leaks are found, they shall be eliminated.

Test pressures shall be 250 psi and maintained for four hours minimum. Test sections will be selected which give, as nearly as possible, constant pressure throughout section being tested. Normally test pressures will be measured at lowest elevations.

71-3.03.06.03 LEAKAGE TEST

After pressure test has been satisfactorily completed, pipelines and appurtenances shall be tested for leakage at pressure equal to the pressure class of pipe. Contractor shall test pipelines and appurtenances in test sections as designated by the Water Department and required pressures shall be maintained for two hours minimum during which time leakage shall be accurately measured.

Measured leakage shall not exceed the limits set by the following formula.

$$L = \frac{ND(P)^{1/2}}{5000}$$

L is the allowable leakage in gallons per hour for section of pipeline being tested; N is the number of joints (rubber gasket, flanged, or mechanical joints, not swedged or banded lap welded joints) where leakage could occur in the section of pipeline being tested; D is the nominal diameter (inches) of the pipeline being tested; and P is the weighted average test pressure (psi gauge) within the section of pipeline being tested during the leakage test.

71-3.03.07 DISINFECTION OF PIPING AND APPURTENANCES

71-3.03.07.01 GENERAL

71-3.03.07.01.01 DESCRIPTION

This section describes requirements for disinfection by chlorination of potable and recycled water mains, services, pipe appurtenances and connections.

Contractor shall furnish all equipment, labor and materials for the proper disinfection of the pipeline and appurtenances. Disinfection shall be accomplished by flushing and chlorination after the lines have been tested for leakage but before they have been connected to the existing system.

The method of disinfection and application of the chlorinating agent shall be as approved by the Water Department.

Chlorine residual tests shall be arranged and paid for by Contractor. The person or agency performing said tests shall not be engaged by Contractor until approval of said person or agency is given by the Water Department. All tests will be witnessed by the Water Department and Contractor shall obtain the Water Department's approval of the time, place, location and number of test points.

71-3.03.07.01.02 REFERENCED STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

American Water Works Association (AWWA)
- B300 Standard for Hypochlorites
- B301 Standard for Liquid Chlorine
- C651 Disinfecting Water Mains

71-3.03.07.01.03 SERVICE APPLICATION

A. All water mains and appurtenances taken out of service for inspection, repairs, or other activity that might lead to contamination shall be disinfected before they are returned to service.

B. All new water mains and temporary high lines shall be disinfected prior to connection to the Water Department's existing system.

C. All components incorporated into a connection to the Water Department's existing system shall be disinfected prior to installation.

71-3.03.07.01.04 SUBMITTALS

A. A written disinfection and dechlorination plan signed by a certified chlorinator shall be submitted to the Water Department for review and approval prior to starting disinfection or dechlorination operations. Plan for disinfection method and procedure shall include equipment used to inject the chlorine solution, gauges or scales to measure the rate at which chlorine is injected, qualifications of personnel, testing location and schedule, source of water and water disposal locations. Personnel performing the disinfection shall demonstrate a minimum of five years experience in the chlorination and dechlorination of pipelines.

B. Qualification of certified testing laboratory.

C. Three copies of an Affidavit of Compliance to the Water Department showing compliance with the requirements of this disinfection specification.

D. Three copies of bacteriological test results to the Water Department upon completion of each test.

E. Emergency Response Plan.

71-3.03.07.01.05 DELIVERY, STORAGE AND HANDLING

Chlorination and dechlorination shall be performed by competent individuals knowledgeable and experienced in the operation of the necessary application and safety equipment in accordance with applicable Federal, State and Local laws and regulations. The transport, storage and handling of these materials shall be performed in accordance with Code of Federal Regulations (CFR) 1910.120 Hazardous Waste Operations and Emergency Response, CFR 49.172 Hazardous Materials Regulations, and the General Industry Safety Orders of the California Code of Regulations, Title 8, Section 5194.

71-3.03.07.01.06 CONCURRENT DISINFECTION AND HYDROSTATIC TESTING

The specified disinfection of the pipelines may be performed concurrently with the hydrostatic testing. In the event repairs are necessary, as indicated by the hydrostatic test, additional disinfection may be required by the Water Department in accordance with this specification.

71-3.03.07.01.07 CONNECTION TO EXISTING MAINS

Prior to connection to existing mains, disinfection and bacteriological testing shall be performed in accordance with this specification, and hydrostatic testing shall be performed per Section 71-3.03.06. The Water Department shall make all connections to an existing system and shall be done only after receipt of acceptable hydrostatic, disinfection and bacteriological test results.

71-3.03.07.02 MATERIALS

71-3.03.07.02.01 CHLORINE (GAS)

A. Liquid chlorine contains 100-percent available chlorine and is packaged in steel containers in net weights of 68.1kg (150 lb.) or 907.2kg (1 ton).

B. Liquid chlorine shall be used with appropriate gas flow chlorinators, heaters, and injectors to provide a controlled, high-concentration solution feed to the water. The chlorinators and injectors shall be the vacuum-operated type.

71-3.03.07.02.02 SODIUM HYPOCHLORITE (LIQUID)

Sodium hypochlorite is available in liquid form in glass or plastic containers, ranging in size from 0.95 L (1 Qt.) to 18.93 L (5 Gal.). The solution contains approximately 10% to 15% available chlorine.

71-3.03.07.02.03 TABLET OR GRANULAR HYPOCHLORITE

Tablet or granular hypochlorite may be used if a solution container is utilized to provide a continuous feed method. This method of application shall not be used unless special permission is granted by the Water Department prior to construction.

71-3.03.07.03 EXECUTION

71-3.03.07.03.01 GENERAL

4. Disinfection of pipelines shall not proceed until all appurtenances and any necessary sample ports have been installed and the Water Department provides authorization.

5. Every effort shall be made to keep the water main and its appurtenances clean and dry during the installation process.

6. All piping, valves, fittings, and appurtenances which become contaminated during installation shall be cleaned, rinsed with potable water, and then sprayed or swabbed with a 5 percent sodium hypochlorite disinfecting solution prior to installation.

7. Water mains under construction that become flooded by storm water, runoff, or groundwater shall be cleaned by draining and flushing with metered potable water until clear water is evident. Upon completion, the entire main shall be disinfected using a method approved by the Water Department.

71-3.03.07.03.02 METHODS

71-3.03.07.03.02.01 CHLORINE (GAS)

1. Only vacuum-operated equipment shall be used. Direct-feed chlorinators, which operate solely from gas pressure in the chlorine cylinder, shall not be permitted. The equipment shall incorporate a backflow prevention device at the point of connection to the potable water source used to fill the line being tested.

2. The chlorinating agent shall be applied at the beginning of the system to be chlorinated and shall be injected through a corporation stop, a hydrant, or other approved connection to ensure treatment of the entire system being disinfected.

3. Only a certified, licensed chlorination and testing contractor shall perform gas chlorination work. The chlorination contractor must also possess a Grade II Treatment Plant Operator Certification from the State of California.

71-3.03.07.03.02.02 SODIUM HYPOCHLORITE (LIQUID)

1. Sodium hypochlorite solution shall be used for cleaning and swabbing piping and appurtenances immediately prior to installation and for disinfecting all components of connections to the Water Department's existing system.

2. Sodium hypochlorite solution may be used for the initial disinfection of newly installed water mains. The solution shall be applied at a terminus of the system to be chlorinated using an injector which can adjust the amount of solution being injected into the piping system. The solution shall be injected in the appropriate concentration to achieve the specified concentration range of chlorine throughout the entire piping system. Where pumping equipment is used in conjunction with an injector, an integral backflow prevention device shall be used and connected to the potable water supply.

3. Water trucks, pumping equipment, piping, appurtenances and all other equipment in contact with potable water shall be disinfected prior to use.

4. Sodium hypochlorite solution may also be used to increase the total chlorine residual if the concentration from the initial chlorination of the system is found to be low. The solution shall be added to the system in sufficient amounts at appropriate locations to ensure that the disinfecting solution is present at a concentration within the specified range throughout the piping system.

71-3.03.07.03.03 PROCEDURE FOR DISINFECTING WATER MAINS AND APPURTENANCES

A. The pipeline shall be filled at a rate not to exceed 1,135 liters per minute (300 GPM) or a velocity of 0.3m per second (1 foot per second), whichever is less.

B. Disinfection shall result in a total chlorine concentration of not less than 50-mg/l nor more than 100 mg/l. This concentration shall be evenly distributed throughout the system to be disinfected, using a continuous feed method of chlorination.

C. All valves shall be operated with the disinfection solution present in the pipeline. All appurtenances such as air-vacuum relief valves, blowoffs, hydrants, backflow prevention devices, and water service laterals shall be flushed with the treated water a sufficient length of time to ensure a chlorine concentration within the specified range in all components of each appurtenance. (Note the limitations for discharge of chlorinated water outlined below.)

D. The Water Department will verify the presence of the disinfection solution throughout the system by sampling and testing for acceptable chlorine concentrations at the various appurtenances and/or at the test ports provided by the Contractor. Areas of the system found to be below the specified chlorine concentration level shall receive additional flushing as noted above and/or additional disinfection solution as necessary. (Note the limitations for discharge of chlorinated water outlined below.) Addition of disinfection solution after the initial charging of the line shall be made by either the liquid chlorine (gas) method, or the sodium hypochlorite method as directed by the Water Department.

E. The chlorinated water shall be retained in the system for a minimum of 24 hours. The Water Department will test the total chlorine residual. The system shall contain a total chlorine residual of not less than 80% of the initial total chlorine residual before the 24-hour soaking period began. If the total chlorine residual has decreased more than 20%, the system shall be soaked for an additional 24-hour period. If the total chlorine residual has not deceased after this additional 24-hour period, the system shall be flushed in accordance with the procedure detailed herein. If the total chlorine residual has decreased, the system shall be flushed in accordance with the procedure detailed herein, and shall be re-disinfected.

F. Following a successful retention period as determined by the Water Department, the chlorinated water shall be flushed from the system at its extremities and at each appurtenance, using potable water from a source designated by the Water Department. If so directed by the Water Department, Contractor shall remove portions of certain appurtenances, such as blowoff installations and service installations, in order to accomplish complete flushing and replace same without adversely affecting disinfected pipelines and appurtenances. The minimum water velocity during flushing shall be 0.9 meters per second (3 feet per second) or as directed by the Water Department. Flushing shall continue until all chlorine, debris, and foreign materials have been removed from pipelines and appurtenances and the replacement water in the new system is equal in chlorine residual to the potable source of supply as verified by the Water Department. (Note the limitations for discharge of chlorinated water outlined below.). Should the initial treatment fail to produce satisfactory disinfection of the pipeline, as evidenced by the chlorine residual, the chlorination procedure shall be repeated until acceptable results are obtained.

G. The Contractor shall contract with a State certified sampling laboratory to perform sampling, transport samples and perform bacteriological sampling and testing as specified herein.

71-3.03.07.03.04 DISCHARGE OF CHLORINATED WATER

A. Indiscriminate onsite disposal or discharge to sewer systems, storm drains, drainage courses or surface waters of chlorinated water is prohibited.

B. All discharge of chlorinated water shall require the neutralizing of the chlorine residual by means of a reducing agent in accord with AWWA C651 and the requirements of this specification.

C. The reducing agent shall be applied to the water as it exits the piping system. The Contractor shall monitor the chlorine residual during the discharge operations. Total residual chlorine limits in these locations, and for the discharge of chlorinated water from the testing of pipelines to surface waters of the San Diego Region are as follows:

Total Residual Chlorine Effluent Limitations

30-Day Average	0.002 mg/l
Average Daily Maximum	0.008 mg/l
Instantaneous Maximum	0.02 mg/l

The various methods of dechlorination available can remove residual chlorine to concentrations below standard analytical methods of detection, 0.02 mg/l, which will assure compliance with the effluent limit. The Contractor will perform all necessary tests

and keep records to ensure that the total residual chlorine effluent limitations listed above are met.

D. In locations where no hazard to the environment is evident based on the joint examination described above, the chlorinated water may be broadcast for dust control on the surface of the immediate site. Care shall be exercised in broadcasting the water to prevent runoff.

71-3.03.07.03.05 BACTERIOLOGICAL TESTING

The Contractor shall employ a State certified laboratory to perform bacteriological sampling and testing of all new system installations. The testing methodology employed by the Water Department shall be as set forth in "Standard Methods for the Examination of Water and Waste Water" (current edition). Testing requirements are as set forth in the California Domestic Water Quality and Monitoring Regulations and commensurate with current requirements for surface water testing.

The testing laboratory will analyze the samples for the presence of coliform bacteria and heterotrophic-type bacteria (heterotrophic plate count). The evaluation criteria employed by the Water Department for a passing test sample is as follows:

A. Coliform bacteria: no positive sample, and

B. Heterotrophic plate count (HPC): 500 colony forming units/ml or less.

71-3.03.07.03.06 REDISINFECTION

If the initial disinfection fails to produce satisfactory bacteriological test results, the pipeline system shall be re-flushed and re-sampled. If the second set of samples does not produce satisfactory results, the pipeline system shall be re-chlorinated, flushed, and re-stamped. The chlorination, flushing, and sampling procedure shall continue until satisfactory results are obtained. Re-disinfection and retesting shall be at the Contractor's expense.

71-3.03.07.03.07 DISINFECTING TIE-INS AND CONNECTIONS

Pipes, fittings, valves and all other components incorporated into connections with the Water Department's existing system shall be spray disinfected or swabbed with a liquid chlorine solution in accordance with AWWA C651 and as specified herein. Upon connection to the main, the line shall be flushed as directed by the Water Department. Disinfection by this method is generally limited to assemblies of 20' or less in length. Alternate methods such as "predisinfection" prior to installation in accordance with AWWA C651 may be required at the discretion of the Water Department.

71-3.03.08 MISCELLANEOUS REQUIREMENTS

71-3.03.08.01 CONNECTIONS TO EXISTING WATERMAINS

All connections to existing watermains will be hot tapped and under the supervision of the Water Department. Where a gate valve is required but not specified, the Water Department will install gate valve but will not guarantee it against field hydrostatic and leakage test.

To safeguard against failure of the Water Department's valve, Contractor shall install a test plate for the aforementioned test and, after satisfactory test, remove said test plate and replace it with a 1/8 inch thick minimum ring gasket. The use of any other test appurtenances shall be approved by the Water Department.

71-3.03.08.02 FIELD WELDING OF PIPE

Whenever field welded joints or other field welding of steel pipe is required, Contractor shall not tack weld welders ground to pipe. Ground shall be attached to pipe with "C" clamps or in a manner approved by the Water Department so that no damage to pipe will result. All pipe joints within 120' of any special or standard fitting shall be tack welded. Each joint shall receive evenly spaced tack welds 3" in length for each 12" of pipe circumference, with three evenly spaced tack welds per joint minimum.

71-3.03.08.03 FIELD LOCATION OF VALVES

The contractor will be responsible to see that all valves are located and marked, as shown on the project plans.

71-3.03.08.04 USE OF WATER DURING CONSTRUCTION

All uses of water during construction will require an approved backflow device unless specified differently by the Water Department.

71-3.03.08.05 FIELD PAINTING

Contractor shall field paint all aboveground, bare, or exposed piping and appurtenances in accordance with and as directed by the Water Department.

71-3.03.09 RECLAIMED WATER REQUIREMENTS

The installation of the non-potable water system shall be accomplished under the approval, inspection and to the satisfaction of the Water Department.

Separation between potable and non-potable water lines shall conform to State of California Department of Health Services requirements.

There shall never be direct connections between the potable and non-potable water systems.

Non-potable water shall not be used for any purposed other than landscape irrigation and approved uses.

Hose bibs are prohibited on non-potable water systems.

Continuous blue warning tape shall be placed over the pipe in all trenches carrying potable water.

Continuous purple warning tape shall be placed over the pipe in all trenches carrying non-potable water. An alternate to installing warning tape is the use of purple colored pipe having the words "CAUTION NON-POTABLE WATER LINE" painted on the pipe with black letter a minimum of 1" in height.

Purple polyethylene tube or polyethylene sheets shall be used whenever polyethylene tube or polyethylene sheets are specified for pipe carrying non-potable water.

Non-potable water isolation and control valve boxes shall be weatherproof purple plastic and marked "NON-POTABLE WATER". All control valves shall be buried below grade automatic control valves operated by a programmable controller. Above ground anti-siphon control valves are not allowed.

All non-potable water irrigation system control valves, isolation valves, quick couplers, regulators, and appurtenances shall be tagged. Identification shall be weatherproof purple plastic, 3-inches by 4-inches and imprinted with "WARNING RECYCLED WATER DO NOT DRINK".

All areas where non-potable water is used shall be posted with approved signage. Each sign shall state "NON-POTABLE WATER - DO NOT DRINK" and display the international "DO NOT DRINK" symbol.

Before activation of the non-potable water service, a cross connection test and final inspection and approval of the irrigation system shall be performed. The Contractor shall arrange with the Water Department for an irrigation coverage test and make any modifications or adjustments deemed required before final approval.

71-3.04 SEWER SYSTEM CONSTRUCTION

Type of pipe shall be *15" VITRIFIED CLAY SEWER PIPE.*

Sewer Mains may be laid through *SEWER MANHOLES* and used as a form for the invert.

Final testing for pipeline leakage shall be made after backfill has been inspected and approved. The contractor shall provide all necessary samples and tests required by the City to assure that the quality of materials and workmanship are in accordance with the project plans and specifications.

Separation between water lines and sewers shall conform to State of California Department of Health Services requirements.

It shall be the Contractor's responsibility to set manhole covers to finish grade after paving in accordance with the project plans.

After installation of pipe, contractor shall provide CCTV inspection prior to final approval.

The contractor shall be responsible for all work and shall maintain all facilities completed and uncompleted, until accepted by the City.

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DIVISION VIII MISCELLANEOUS CONSTRUCTION

75 MISCELLANEOUS METAL

Replace section 75-1.02D with:

75-1.02D Architectural Feature (Metal Sheet)

Architectural feature (metal sheet) consists of fabricating and installing the architectural feature shown, including edging and the supports involved.

Sheet metal must be 1/16-inch-thick, Type 5052 aluminum.

Fasteners must be stainless steel and comply with the bracket detail shown.

The color of architectural feature (metal sheet) must comply with color no. 27041 of FED-STD-595.

Replace section 75-1.02E with:

75-1.02E Architectural Feature (Perforated Metal)

Architectural feature (perforated metal) consists of fabricating and installing the architectural feature shown, including edging and the supports involved.

Perforated metal must be 1/32-inch-thick, Type 5052 aluminum. Hole size must be 0.1875 inch diameter at 0.25 inch centers, staggered pattern with 50 percent open area.

Fasteners must be steel and comply with 55-1.02. Other fittings must be commercial quality.

Submit shop drawings under 5-1.23. Include layout and attachment details.

The color of architectural feature (perforated metal) must comply with the colors shown.

Add to the list in the 2nd paragraph of section 75-1.03A:

6. Anchor plates and restraining rods at Bent #2
7. Water proofing curb flashing at interior and exterior curbs and along back side of normalizing slab.

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DIVISION IX TRAFFIC CONTROL FACILITIES

83 RAILINGS AND BARRIERS

Replace section 83-1.02C(2) with:

83-1.02C(2) Alternative In-Line Terminal System

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

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

1. TYPE SKT TERMINAL SYSTEM - Type SKT terminal system must be a SKT 350 sequential kinking terminal manufactured by Road Systems, Inc., located in Big Spring, Texas, and must include items detailed for Type SKT terminal system shown on the plans. The SKT 350 sequential kinking terminal can be obtained from the distributor, Universal Industrial Sales, P.O. Box 699, Pleasant Grove, UT 84062, telephone (801) 785–0505 or from the distributor, Gregory Highway Products, 4100 13th Street, S.W., Canton, OH 44708, telephone (330) 477–4800.

2. TYPE ET TERMINAL SYSTEM - Type ET terminal system must be an ET-2000 PLUS (4-tube system) extruder terminal as manufactured by Trinity Highway Products, LLC, and must include items detailed for Type ET terminal system shown on the plans. The ET-2000 PLUS (4-tube system) extruder terminal can be obtained from the manufacturer, Trinity Highway Products, LLC, P.O. Box 99, Centerville, UT 84012, telephone (800) 772–7976.

Submit a certificate of compliance for terminal systems.

Terminal systems must be installed under the manufacturer's installation instructions and these specifications. Each terminal system installed must be identified by painting the type of terminal system in neat black letters and figures 2 inches high on the backside of the rail element between system posts numbers 4 and 5.

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

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

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

Add to section 83-1.02G:

83-1.02G(5) Decorative Railing

Decorative railing consists of tubular metal panels supported by metal posts, anchor bolts, hardware, and fittings.

Decorative railing must conform to the details shown on the plans.

Decorative railing must comply with the material specifications for tubular metal railing in section 83-1.02G(2).

The color of decorative railing must comply with color no. 27038 of FED-STD-595.

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86 ELECTRICAL SYSTEMS

Add to section 86-1.01:

Traffic signal work must be performed at the following locations:

1. Intersection of I-10 EB ramps with Sunset Ave.
2. Intersection of I-10 WB ramps with Sunset Ave.
3. Intersection of Sunset Ave. and Ramsey St.

Add to section 86-1.03:

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

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

13. Video Image Vehicle Detection System (VIVDS)
14. _____
15. _____

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

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

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

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

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

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

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

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

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

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

The Contractor must demonstrate that repaired or replaced elements operate in a manner equal to or better than the replaced equipment. If the Contractor fails to perform required repairs or replacement work, the Department may perform the repair or replacement work and the cost will be deducted from monies due to the Contractor.

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

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

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

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

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

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

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

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

Add to section 86-2.03B:

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

Add to section 86-2.04A:

Where the side tenon detail at the end of the signal mast arm is shown, you may substitute the applicable tip tenon detail.

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

Install non-illuminated street name signs on signal mast arms using a minimum 3/4 by 0.020-inch round edge stainless steel strap and saddle bracket. Wrap the strap at least twice around the mast arm, tighten, and secure with a 3/4-inch stainless strap seal. Level the sign panel and tighten the hardware securely.

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

Add to section 86-2.05A:

Conduit installed underground must be Type 3.

Add to section 86-2.05B:

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

Add to section 86-2.05C:

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

If Type 3 conduit is placed in a trench, not in the pavement or under concrete sidewalk, after the bedding material is placed and the conduit is installed, backfill the trench to not less than 4 inches above the conduit with minor concrete under section 90-2, except the concrete must contain not less than 421 pounds of cementitious material per cubic yard. Backfill the remaining trench to finished grade with backfill material.

After conductors have been installed, the ends of the conduits terminating in pull boxes, service equipment enclosures, and controller cabinets must be sealed with an authorized type of sealing compound.

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

At other locations where conduit is required to be installed under pavement and if a delay to vehicles will not exceed 5 minutes, conduit may be installed by the trenching in pavement method.

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

Replace "Reserved" in section 86-2.06B of the RSS for section 86-2.06 with:

86-2.06B(1) General

86-2.06B(1)(a) Summary

This work includes installing non-traffic-rated pull boxes.

86-2.06B(1)(b) Submittals

Before shipping pull boxes to the jobsite, submit a list of materials, Contract number, pull box manufacturer, manufacturer's instructions for pull box installation, and your contact information to METS.

Submit reports for pull box from an NRTL-accredited lab.

86-2.06B(1)(c) Quality Control and Assurance

86-2.06B(1)(c)(i) General

Pull boxes may be tested by the Department. Deliver pull boxes and covers to METS and allow 30 days for testing. When testing is complete, you will be notified. You must pick up the boxes and covers from the test site and deliver it to the job site.

Any failure of the pull box or the cover that renders the unit noncompliant with these specifications will be a cause for rejection. If the unit is rejected, you must allow 30 days for retesting. Retesting period starts when the replacement pull box is delivered to the test site. You must pay for all retesting costs. Delays resulting from the submittal of noncompliant materials does not relieve you from executing the Contract within the allotted time.

If the pull box submitted for testing does not comply with the specifications, remove the unit from the test site within 5 business days after notification that it is rejected. If the unit is not removed within that period, it may be shipped to you at your expense.

You must pay for all shipping, handling, and transportation costs related to the testing and retesting.

86-2.06B(1)(c)(ii) Functional Testing

The pull box and cover must be tested under ANSI/SCTE 77, "Specifications for Underground Enclosure Integrity."

86-2.06B(1)(c)(iii) Warranty

Provide a 2-year manufacturer replacement warranty for pull box and cover from the date of installation of the pull box and cover. All warranty documentation must be submitted before installation.

Replacement parts must be provided within 5 business days after receipt of failed pull box, cover, or both at no cost to the Department and must be delivered to the Department's Maintenance Electrical Shop at 175 Cluster Street, San Bernardino, CA 92402.

86-2.06B(2) Materials

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

Each pull box cover must have an electronic marker cast inside.

Extension for the pull box must be of the same material as the pull box and attached to the pull box to maintain the minimum combined depths as shown.

Include recesses for a hanger if a transformer or other device must be placed in a pull box.

The bolts, nuts, and washers must be a captive bolt design.

The captive bolt design must be capable of withstanding a torque range of 55 to 60 ft-lb and a minimum pull out strength of 750 lb. Perform the test with the cover in place and the bolts torqued. The pull box and cover must not be damaged while performing the test to the minimum pull out strength.

Stainless steel hardware must have an 18 percent chromium content and an 8 percent nickel content.

Galvanize ferrous metal parts under section 75-1-.05.

Manufacturer's instructions must provide guidance on:

1. Quantity and size of entries that can be made without degrading the strength of the pull box below Tier 22 load rating
2. Where side entries cannot be made
3. Acceptable method to be used to create the entry

Tier 22 load rating must be labeled or stenciled by the manufacturer on the inside and outside of the pull box and on the underside of the cover.

86-2.06B(3) Construction

Do not install pull box in curb ramps or driveways.

A pull box for a post or a pole standard must be located within 5 feet of the standard. Place a pull box adjacent to the back of the curb or edge of the shoulder. If this is impractical, place the pull box in a suitable, protected, and accessible location.

If only the cover is to be replaced, anchor the cover to the pull box.

Add to section 86-2.08A:

Wrap conductors around the projecting end of conduit in pull boxes as shown. Secure conductors and cables to the projecting end of the conduit in pull boxes.

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

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

Add to section 86-2.11A:

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

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

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

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

Service equipment enclosures must be the aluminum type.

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

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

Irrigation Controller (IC) _____ : Electric service (irrigation) must be a metered 120/240 V(ac), single-phase service in a Type III service equipment enclosure.

Service disconnects in service equipment enclosures must be _____-pole, _____-A circuit breaker.

Nameplate inscriptions must be as follows:

Item	Inscription
Metering equipment enclosure	IC
Service disconnect	IC

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

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

Replace section 86-2.18 with:

86-2.18 NUMBERING ELECTRICAL EQUIPMENT

The placement of numbers on electrical equipment will be done by others.

Replace 1st paragraph of section 86-2.18 with:

Place numbers on the equipment as ordered.

Delete 2nd sentence of 3rd paragraph of section 86-2.18.

Add to section 86-3.02A(3):

Batteries must have a written warranty against defects in materials and workmanship from the manufacturer prorated for a period of 60 months after installation. You must provide the Engineer with all warranty documentation before installation. Replacement batteries must be available within 5 business days after receipt of failed batteries. The Department pays to ship the failed batteries. Replacement batteries must be delivered to Caltrans Maintenance Electrical Shop at 175 Cluster Street, San Bernardino, CA 92402.

Add to section 86-3.02B:

External cabinet must be capable of housing:

1. 8 batteries
2. Inverter/charger unit
3. Power transfer relay
4. Manually-operated bypass switch
5. Required control panels
6. Wiring and harnesses

Replace the 3rd, 5th, 7th, and 9th paragraphs of section 86-3.02B with:

Dimensions and details for the external cabinet, for attaching the external cabinet to the Model 332A cabinet, and for wiring the Department-furnished equipment will be available in an *Information Handout* as specified in section 2-1.06B or as shown.

The external cabinet must be ventilated by using louvered vents, a filter, and a thermostatically controlled fan. Fan must be AC-operated from the same line output as the Model 332A cabinet. A 2-position terminal block must be provided on the fan panel along with 10 feet of connected hookup wire.

The external cabinet must include all bolts, washers, nuts, and cabinet-to-cabinet coupler fittings necessary for mounting it to the Model 332A cabinet.

External cabinet to Model 332A cabinet couplings must include a conduit for power connections between the 2 cabinets. Couplings must include:

1. 2-inch nylon-insulated steel chase nipple, T & B 1947 or equivalent
2. 2-inch sealing, steel locknut, T & B 146SL or equivalent
3. 2-inch nylon-insulated steel bushing, T & B 1227 or equivalent

Replace the 1st paragraph of section 86-3.02C with:

Mount external cabinet to either the left or right side of the Model 332A cabinet. The typical side-mounting location of the external cabinet is flush with the bottom of the Model 332A cabinet and approximately equidistant from the front and rear door edges.

Replace "Reserved" in section 86-3.02D with:

.

Payment for assembling and installing battery backup system is included in the payment for signal and lighting.

Replace section 86-4.01D(1)(c)(ii) with:

86-4.01D(1)(c)(ii) Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED signal modules for a minimum period of 48 months after installation of LED signal modules. Replacement LED signal modules must be provided within 15 days after receipt of failed LED modules at your expense. The Department pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED signal modules must be delivered to State Maintenance Electrical Shop at 175 Cluster Street, San Bernardino, CA 92402.

Add to section 86-4.01D(2)(a):

LED signal module must be manufactured for 12-inch circular and arrow sections.

Replace section 86-4.03I(1)(c)(ii) with:

86-4.03I(1)(c)(ii) Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED PSF modules for a minimum period of 48 months after installation of LED PSF modules. Replacement LED PSF modules must be provided within 15 days after receipt of failed LED PSF modules at your

expense. The Department pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED PSF modules must be delivered to State Maintenance Electrical Shop at 175 Cluster Street, San Bernardino, CA 92402.

Add to section 86-5.01A(1):

Loop wire must be Type 1 Loop detector lead-in cable must be Type B .

Slots must be filled with hot-melt rubberized asphalt sealant.

For Type E detector loops, sides of the slot must be vertical and the minimum radius of the slot entering and leaving the circular part of the loop must be 1-1/2 inches. Slot width must be a maximum of 5/8 inch. Loop wire for circular loops must be Type 2. Slots of circular loops must be filled with elastomeric sealant or hot-melt rubberized asphalt sealant.

The depth of the loop sealant above the top of the uppermost loop wire in the sawed slots must be 2 inches, minimum.

Add to section 86-5:

86-5.50 VIDEO IMAGE VEHICLE DETECTION SYSTEM

86-5.50A General

86-5.50A(1) Summary

This work includes installing video image vehicle detection system (VIVDS) for traffic signals.

86-5.50A(2) Definitions

Video Detection Unit (VDU): Processor unit that converts the video image from the camera and provides vehicle detection in defined zones. Unit includes an image processor, extension module, and communication card.

Video Image Sensor Assembly (VIS): An enclosed and environmentally-protected camera assembly used to collect the video image.

Video Image Vehicle Detection System (VIVDS): A system that detects video images of vehicles in defined zones and provides video output.

86-5.50A(3) Submittals

Submit proposed list of materials before starting work:

Submittals

Item	Description
Certificate of compliance	For VIVDS as specified in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.
Site analysis report	Written analysis for each detection site, recommending the optimum video sensor placement approved by the manufacturer.
Lane configuration	Shop drawing showing detection zone setback, detection zone size, camera elevation, selected lens viewing angle, illustration of detection zone mapping to reporting contact output, and illustration of output connector pin or wire terminal for lane assignment.
Configuration record	Windows XP PC compatible CD containing the final zone designs and calibration settings to allow reinstallation.
Mounting and wiring information	Approved wiring and service connection diagrams wrapped in clear self-adhesive plastic, placed in a heavy duty plastic envelope, and secured to the inside of the cabinet door.
Communication protocol	Industry standard available in public domain. Document defining message structure organization, data packet length, message usability, and necessary information to operate a system from a remote Windows based personal computer.
Programming software	CD containing set up and calibration software that observes and detects the vehicular traffic, including bicycles, motorcycles, and sub-compact cars, with overlay of detection zones and allows adjustment of the detection sensitivity for a traffic signal application.
Detector performance DVD recordings and analysis	Performance analysis based on 24-hour DVD recording of contiguous activity for each approach. Include 2 contiguous hours of sunny condition, with visible shadows projected a minimum of 6 feet into the adjacent lanes, and two 1-hour night periods with vehicle headlights present.
Preventative maintenance parts documentation	Documentation containing equipment replacement parts list for preventative maintenance, including electrical parts, mechanical parts, and assemblies.
Acceptance testing schedule	Submit schedule for approval 15 days before acceptance testing of VIVDS. Acceptance testing is separate from detector performance and analysis.
Training	Submit training material for approval 30 days before training.
Warranty	Manufacturer's written warranty against defects in material and workmanship for VIS assemblies and VDU, for 24-month period after VIVDS installation.

86-5.50A(4) Warranty

After final acceptance of VIVDS, replacement VIS and VDU must be provided within 10 days of receipt of a failed unit at no cost to the State, except the cost of shipping failed VIS and VDU. Deliver replacement VIS and VDU to: 175 Cluster Street, San Bernardino, CA 92402.

86-5.50B Materials

VIVDS must include:

1. VIS and mounting hardware. Use a clamping device as mounting hardware on a pole or mast-arm.
2. VDU
3. Power supply
4. Surge suppression
5. Cables
6. Connectors
7. Wiring for connecting to the State-furnished Model 332A traffic controller cabinet.
8. Communication card

VIVDS must include necessary firmware, hardware, and software for designing the detection patterns or zones at the intersection or approach. Detection zones must be created with a graphic user interface

designed to allow to anyone trained in VIVDS system setup to configure and calibrate a lane in less than 15 minutes.

86-5.50B(1) Functional Requirements

VIVDS must support normal operation of existing detection zones while a zone is being added or modified. Zone must flash or change color on a viewing monitor when vehicular traffic is detected. Length and width of each detection zone for each lane must be approved by the Engineer.

Software and firmware must detect vehicular traffic presence, provide vehicle counts, set up detection zones, test VIVDS performance, and allow video scene and system operation viewing from the local traffic management center/office. VIVDS must support a minimum of 2 separate detection patterns or zones that can be enacted by a remote operator at the signal controller cabinet.

VIVDS detection zone must detect vehicles by providing an output for presence and pulse. At least one detection output must be provided for each detection zone. One spare detection output must be provided for each approach. Detection performance must be achieved for each detection zone with a maximum of 8 user-defined zones for every camera's field of view.

VIVDS must detect the presence of vehicles under all types of adverse weather and environmental conditions, including snow, hail, fog, dirt, dust or contaminant buildup on the lens or faceplate, minor camera motion due to winds, and vibration. Under low visibility conditions, the VIVDS must respond by selecting a fail-safe default pattern, placing a constant call mode for all approaches. VIVDS outputs must assume a fail-safe "on" or "call" pattern for presence detection if video signal or power is not available and must recover from a power failure by restoring normal operations within 3 minutes without manual intervention. If powered off for more than 90 days, system must maintain the configuration and calibration information in memory.

Detection algorithm must be designed to accommodate naturally occurring lighting and environment changes, specifically the slow moving shadows cast by buildings, trees, and other objects. These changes must not result in a false detection or mask a true detection. VIVDS must not require manual interventions for day-night transition or for reflections from poles, vehicles or pavement during rain and weather changes. VIVDS must suppress blooming effects from vehicle headlights and bright objects at night.

Vehicle detection must call service to a phase only if a demand exists and extend green service to the phase until the demand is taken care of or until the flow rates have reduced to levels for phase termination. VIVDS must detect the presence of vehicular traffic at the detection zone positions and provide the call contact outputs to the Model 170E or Model 2070 controller assembly with the following performance:

Detector Performance

Requirements	Performance during AMBER and RED interval	Performance during GREEN interval
Average response time after vehicle enters 3 feet into detection zone or after 3 feet past detection zone	≤ 1 s	≤ 100 ms
Maximum number of MISSED CALLS in 24-hour duration, where MISSED CALLS are greater than 5 s during AMBER and RED intervals and greater than 1 s during GREEN intervals (upon entering 3 feet of detection zone or after departing 3 feetpast detection zone).	0	10
Maximum number of FALSE CALLS in 24-hour duration (calls greater than 500ms without a vehicle present)	20	20

VIVDS must be able to locally store, for each lane, vehicle count data in 5, 15, 30, and 60 minute intervals for a minimum period of 7 days and be remotely retrievable. VIVDS must count vehicular traffic in detection zone with a 95 percent accuracy or better for every hour counted over a morning or an evening

peak hour. VIVDS detection zone tested must have a minimum range of 50 feet behind the limit line for each approach. Testing period will be pre-approved by the Engineer 48 hours in advance.

86-5.50B(2) Technical Requirements

System elements must comply with the manufacturer's recommendations and be designed to operate continuously in an outdoor environment.

All equipment, cables, and hardware must be part of an engineered system that is designed by the manufacturer to fully interoperate with all other system components. Mounting assemblies must be corrosion resistant. Connectors installed outside the cabinets and enclosures must be corrosion resistant, weather proof, and watertight. Exposed cables must be sunlight and weather resistant. Label cables with permanent cable labels at each end.

Camera and zoom lens assembly must be housed in an environmentally sealed enclosure that complies with NEMA 4 standards. Enclosure must be watertight and protected from dust. Enclosure must include a thermostat controlled heater to prevent condensation and to ensure proper lens operation at low temperatures. Adjustable sun shield that diverts water from the camera's field of view must be included. Connectors, cables and wiring must be enclosed and protected from weather.

Each camera and its mounting hardware must be less than 10 pounds and less than 1 square foot equivalent pressure area. Only one camera must be mounted on a traffic signal or luminaire arm. Top of camera must not be more than 12 inches above top of luminaire arm or 30 inches above top of traffic signal arm.

VIS must use a charge-coupled device (CCD) element, support National Television Standards Committee (NTSC) and RS170 video output formats, and have a horizontal resolution of at least 360 lines. VIS must include an auto gain control (AGC) circuit, have a minimum sensitivity to scene luminance from 0.1 lux to 10,000 lux, and produce a usable video image of vehicular traffic under all roadway lighting conditions regardless of the time of day. VIS must have a motorized lens with variable focus and zoom control with an aperture of f/1.4 or better. Focal length must allow ± 50 percent adjustment of the viewed detection scene.

A flat panel video display with a minimum 8-inch screen and that supports NTSC video output must be enclosed in the Model 332A cabinet for viewing video detector images and for performing diagnostic testing. Display must be viewable in direct sunlight. Each VIVDS must have video system connections that support the NTSC video output format, can be seen in each camera's field of view, and has a program to allow the user to switch to any video signal at an intersection. A metal shelf or pull-out document tray with metal top capable of supporting the VDU and monitor must be furnished and placed on an EIA 19 inch rack with 10-32 "Universal Spacing" threaded holes in the Model 332A cabinet. System must allow independent viewing of a scene while video recording other scenes without interfering with the operation of the system's output.

Mounting hardware must be powder-coated aluminum, stainless steel, or treated to withstand 250 hours of salt fog exposure as specified in ASTM B 117 without any visible corrosion damage.

VDU must operate between –37 to +74 °C and 0 to 95 percent relative humidity.

VDU front panel must have indicators for power, communication, presence of video input for each VIS, and a real time detector output operation. Hardware or software test switch must be included to allow the user to place either a constant or momentary call for each approach. Indicators must be visible in daylight from 5 feet away.

VDU must have a serial communication port, EIA 232/USB 2.0 that supports sensor unit setup, diagnostics, and operation from a local PC compatible laptop with Windows XP or later version operating system. VIVDS must have an Ethernet communication environment, including Ethernet communication card. VIVDS must include central and field software to support remote real-time viewing and diagnostics for operational capabilities through wide area network (WAN) or wireless. Wireless networking standard must be IEEE 802.11g/n.

VDU, image processors, extension modules, and video output assemblies must be inserted into the controller input file slots using the edge connector to obtain limited 24 V(dc) power and to provide contact closure outputs. Cabling the output file to a "D" connector on the front of the VDU is acceptable. No

rewiring to the standard Model 332A cabinet is allowed. Controller cabinet resident modules must comply with the requirements in Chapter 1 and Sections 5.2.8, 5.2.8.1, 5.2.8.2, 5.4.1, 5.4.5, 5.5.1, 5.5.5, and 5.5.6 of TEES.

VIVDS must operate between 90 to 135 V(ac) service as specified in NEMA TS-1. VIS, excluding the heater circuit, must draw less than 10 W of power. Power supply or transformer for the VIVDS must meet the following minimum requirements:

Minimum Requirements for Power Supply and Transformers

Item	Power Supply	Transformer
Power Cord	Standard 120 V(ac), 3 prong cord, 3 feet minimum length (may be added by Contractor)	Standard 120 V(ac), 3 prong cord, 3 feet minimum length (may be added by Contractor)
Type	Switching mode type	Class 2
Rated Power	Two times (2x) full system load	Two times (2x) full system load
Operating Temperature	-37 to 74 °C	-37 to 74 °C
Operating Humidity Range	From 5 percent to 95 percent	From 5 percent to 95 percent
Input Voltage	From 90 to 135 V(ac)	From 90 to 135 V(ac)
Input Frequency	60 Hz ± 3 Hz	60 Hz ± 3 Hz
Inrush Current	Cold start, 25 A max. at 115 V	N/A
Output Voltage	As required by VIVDS	As required by VIVDS
Overload Protection	From 105 percent to 150 percent in output pulsing mode	Power limited at >150 percent
Over Voltage Protection	From 115 percent to 135 percent of rated output voltage	N/A
Setup, Rise, Hold Up	800ms, 50ms,15ms at 115 V(ac)	N/A
Withstand Voltage	I/P-0/P:3kV, I/P-FG:1.5kV, for 60 sec.	I/P-0/P:3kV, I/P-FG:1.5kV, for 60 sec
Working Temperature	Not to exceed 70°C@30 percent load	Not to exceed 70 °C@ 30 percent load
Safety Standards	UL 1012, TUV EN60950	UL 1585
EMC Standards	EN55022 Class B, EN61000-4-2, 3, 4, 5	N/A

Field terminated circuits must include transient protection as specified in IEEE Standard 587-1980, Category C. Video connections must be isolated from ground.

Wiring must be routed through end caps or existing holes. New holes for mounting or wiring must be shop-drilled.

VIVDS and support equipment required for acceptance testing must be new and as specified in the manufacturer's recommendations. Date of manufacture, as shown by date codes or serial numbers of electronic circuit assemblies, must not be older than 12 months from the scheduled installation start date. Material substitutions must not deviate from the material list approved by the Engineer.

86-5.50C Construction

Install VDU in an existing City of Banning Model 170E or Model 2070 controller assembly. Install VIS power supply or transformer on a standard DIN rail using standard mounting hardware and power conductors wired to DIN rail mounted terminal blocks in the controller cabinet.

Wire each VIS to the controller cabinet with a wiring harness that includes all power, control wiring, and coaxial video cable. Attach harness with standard MIL type and rated plugs. Cable type and wire characteristics must comply with manufacturer's recommendations for the VIS to cabinet distance. Wiring and cables must be continuous, without splices, between the VIS and controller cabinet. Coil a minimum of 7 feet of slack in the bottom of the controller cabinet. For setup and diagnostic access, terminate serial data communication output conductors at TB-0 and continue for a minimum of 10 feet to a DB9F

connector. Tape ends of unused and spare conductors to prevent accidental contact to other circuits. Label conductors inside the cabinet for the functions depicted the approved detailed diagrams.

Adjust the lens to view 110 percent of the largest detection area dimension. Zones or elements must be logically combined into reporting contact outputs that are equivalent to the detection loops and with the detection accuracy required.

Verify the performance of each unit, individually, and submit the recorded average and necessary material at the conclusion of the performance test. Determine and document the accuracy of each unit, individually, so that each unit may be approved or rejected separately. Failure to submit necessary material at the conclusion of testing invalidates the test. The recorded media serves as acceptance evidence and must not be used for calibration. Calibration must have been completed before testing and verification.

Verify the detection accuracy by observing the VIVDS performance and recorded video images for a contiguous 24-hour period. The recorded video images must show the viewed detection scene, the detector call operation, the signal phase status for each approach, the vehicular traffic count, and time-stamp to 1/100 of a second, all overlaid on the recorded video. Transfer the 24-hour analysis to DVD.

VIVDS must meet the detection acceptance criterion specified in table titled "Detector Performance."

Calculate the VIVDS's vehicular traffic count accuracy as 100[1-(|TC-DC|/TC)], where DC is the detector's vehicular traffic count and TC is the observed media-recorded vehicular traffic count and where the resulting fraction is expressed as an absolute value.

The Engineer will review the data findings and accept or reject the results within 7 days. Vehicle anomalies or unusual occurrences will be decided by the Engineer. Data or counts not agreed by the Engineer will be considered errors and count against the unit's calibration. If the Engineer determines that the VIVDS does not meet the performance requirements, you must re-calibrate and retest the unit, and resubmit new test data within 7 days. After 3 failed attempts, you must replace the VIVDS with a new unit.

Notify the Engineer 20 days before the unit is ready for acceptance testing. Acceptance testing must be scheduled to be completed before the end of a normal work shift. You must demonstrate that all VIS and VDUs satisfy the functional requirements.

Repair, replacement, and retesting of VIVDS components due to failure or rejection are the Contractor's expense.

86-5.50D Payment

Full compensation for video image vehicle detection system shall be considered as included in the contract lump prices paid for signal and lighting (location 1), signal and lighting (location 2), and signal and lighting (location 3), and no separate payment will be made therefor.

Add to section 86-8.01:

Payment for highway lighting at intersections in connection with signals is included in the payment for signal and lighting.

For each item shown in the following table, the Department deducts the corresponding amount shown:

Source Inspection Expense Deductions

Item	Distance[a]	Deduction
Service equipment enclosures	> 300	$2,000

[a]Distance is air-line miles from both Sacramento and Los Angeles to the inspection source.

^^

DIVISION X MATERIALS
87 MATERIALS—GENERAL

Replace section 87-2 with:

87-2 AGGREGATE

87-2.01 GENERAL

87-2.01A Summary

Section 87-2 includes specifications for furnishing aggregate.

87-2.01B Definitions

stockpile lot: Stockpile or portion of a stockpile of steel slag aggregate used.

87-2.01C Submittals

Submit a certificate of compliance for:

1. Each stockpile lot
2. Steel slag

87-2.02 MATERIALS

87-2.02A General

Do not use air-cooled iron blast furnace slag to produce aggregate for:

1. Structure backfill material
2. Pervious backfill material
3. Permeable material
4. Reinforced or prestressed PCC component or structure

Do not use aggregate produced from slag resulting from a steel-making process except in:

1. Imported borrow
2. AS
3. Class 2 AB
4. HMA

Steel slag used to produce aggregate for AS and Class 2 AB must be crushed such that 100 percent of the material will pass a 3/4-inch sieve and then control aged for at least 3 months under conditions that will maintain all portions of the stockpiled material at a moisture content in excess of 6 percent of the dry weight of the aggregate.

For steel slag aggregate, provide separate stockpiles for controlled aging of the slag. An individual stockpile must not contain less than 10,000 tons or more than 50,000 tons of slag. The material in each individual stockpile must be assigned a unique lot number, and each stockpile must be identified with a permanent system of signs. Maintain a permanent record of:

1. Dates for:
   1.1. Completion of stockpile
   1.2. Start of controlled aging
   1.3. Completion of controlled aging
   1.4. Making of tests
2. Test results

For each stockplie of steel slag aggregate, moisture tests must be made at least once each week. The time covered by tests that show a moisture content of 6 percent or less is not included in the aging time.

Notify METS and the Engineer upon completion of each stockpile and the start of controlled aging and upon completion of controlled aging. Do not add aggregate to a stockpile unless a new aging period is started.

Steel slag used for imported borrow must be weathered for at least 3 months.

Each delivery of aggregate containing steel slag for AS or Class 2 AB must include a delivery tag for each load. The tag must identify the lot by the stockpile number, slag aging location, and stockpile completion and controlled aging start date.

You may blend air-cooled iron blast furnace slag or natural aggregate in proper combinations with steel slag aggregate to produce the specified gradings.

California Test 202 is modified by California Test 105 whenever the difference in sp gr between the coarse and fine portions of the aggregate or between the blends of different aggregates is 0.2 or more.

For slag used as aggregate in HMA, the Kc factor requirements in California Test 303 do not apply.

If steel slag aggregates are used to produce HMA, no other aggregates may be used in the mixture except that up to 50 percent of the material passing the no. 4 sieve may consist of iron blast furnace slag aggregates, natural aggregates, or a combination of these. If iron blast furnace aggregates, natural aggregates, or a combination of these are used in the mixture, each aggregate type must be fed to the drier at a uniform rate. Maintain the feed rate of each aggregate type within 10 percent of the amount set. Provide adequate means for controlling and checking the feeder accuracy.

Store steel slag aggregate separately from iron blast furnace slag aggregate. Store each slag aggregate type separately from natural aggregate.

For HMA produced from steel slag aggregates, iron blast furnace slag aggregates, natural aggregates, or any combination of these, the same aggregate must be used throughout any one layer. Once an aggregate type is selected, do not change it without authorization.

Aggregate containing slag must comply with the applicable quality requirements for the bid items in which the aggregate is used.

87-2.03 CONSTRUCTION

Do not place aggregate produced from slag within 1 foot of a non–cathodically protected pipe or structure unless the aggregate is incorporated in concrete pavement, in HMA, or in treated base.

Do not place slag aggregate used for embankments within 18 inches of finished slope lines measured normal to the plane of the slope.

Whenever slag aggregate is used for imported borrow, place a layer of topsoil at least 24 inches thick after compaction over the slag aggregate in highway planting areas.

87-2.04 PAYMENT

The Department reduces the payment quantity of HMA if:

1. Steel slag aggregates are used to produce HMA
2. The sp gr of a compacted stabilometer test specimen is in excess of 2.40

The Department prepares the stabilometer test specimen under California Test 304 and determines the sp gr of the specimen under Method C of California Test 308.

The Department determines the HMA payment quantity by multiplying the quantity of HMA placed in the work by 2.40 and dividing the result by the sp gr of the compacted stabilometer test specimen. The Department applies this quantity reduction as often as necessary to ensure accurate results.

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88 GEOSYNTHETICS

Add to section 88-1.02B:

Filter fabric for pervious backfill material must be Class B.

^^

90 CONCRETE

Add to section 90-1.02G(6):

For concrete at the railroad bridge foundation and abutments, retaining walls, soundwall footing, reinforced concrete pipe, junction structures, manholes, inlets, and headwalls, the ratio of the quantity of free water to the quantity of cementitious material must not exceed 0.45.

Add to section 90-1.02I(2)(a):

The mortar strength of the fine aggregate relative to the mortar strength of Ottawa sand must be a minimum of 100 percent under California Test 515.

Add to section 90-1.02I(2)(b):

Concrete for JPCP at exit ramp termini, concrete barrier along the I-10 EB edge of shoulder, and curb, gutter, sidewalk, driveways, curb ramps, and concrete barrier along Sunset Avenue is exposed to deicing chemicals.

Add to section 90-2.02B:

You may use rice hull ash as an SCM. Rice hull ash must comply with AASHTO M 321 and the chemical and physical requirements shown in the following tables:

Chemical property	Requirement (percent)
Silicon dioxide (SiO_2)[a]	90 min
Loss on ignition	5.0 max
Total alkalies as Na_2O equivalent	3.0 max

Physical property	Requirement
Particle size distribution Less than 45 microns Less than 10 microns	 95 percent 50 percent
Strength activity index with portland cement[b] 7 days 28 days	 95 percent (min percent of control) 110 percent (min percent of control)
Expansion at 16 days when testing project materials under ASTM C 1567[c]	0.10 percent max
Surface area when testing by nitrogen adsorption under ASTM D 5604	40.0 m^2/g min

[a]SiO_2 in crystalline form must not exceed 1.0 percent.
[b]When tested under AASHTO M 307 for strength activity testing of silica fume.
[c]In the test mix, Type II or V portland cement must be replaced with at least 12 percent rice hull ash by weight.

Appendix

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* Note: See the first page of this document description for a detailed Table of Contents.

Appendix

Table of Contents

* Note: See the first page of this document description for a detailed Table of Contents.

Appendix A

AQMD Recommendations

Dust Abatement Attachments
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AQMD SIGNAGE RECOMMENDATIONS

November, 2001

Plan holder shall post signage at specified locations on the subject property in accordance with the standards specified below. The exception to the standards is that all letters shall be 4 inches high, with the names and telephone numbers of appropriate contacts and services in bold print, as indicated in the standards. These signs shall also include the SCAQMD toll free complaint line 1-800-CUT-SMOG (1-800-288-7664) and the telephone number for the Environmental Observer. These signs shall be posted within 50 feet of the curb on all four (4) corners of the subject property.

For each Dust Control Plan aggregating less than, or equal to, ten (10) acres:

1. The applicant shall install a sign on such property which is visible to the public that meets the following requirements:

   (a) Such sign shall measure at least four (4) feet wide by four (4) feet high and conform to the specifications in 1 (a) below.

For each Dust Control Plan aggregating over ten (10) acres:

2. The applicant shall install a sign on such property which is visible to the public that meets the following requirements:

   (a) Such sign shall measure at least eight (8) feet wide by four (4) feet high and conform to the specifications in 1 (b) below.

THE SIGN SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

1. **The sign boards shall be constructed with materials capable of withstanding the environment in which they are placed.**

   (a) For 4' x 4' signs, the District recommends the following:

   I. ¾ " A/C laminated plywood board
   II. Two 4" x 4" posts
   III. The posts should be attached to the edges of the plywood board with at least 2 carriage bolts on each post.
   IV. The front surface of the sign board should be painted in the contrasting color of a white background with black lettering.

   (b) For 4' x 8' signs, the District recommends the following:

   I. 1" A/C laminated plywood board
   II. Two 5" x 6" posts
   III. The posts should be attached to the 4' edges of the plywood board with at least 2 carriage bolts on each post.
   IV. The front surface of the sign board should be painted in the contrasting color of a white background with black lettering.