

# American River Basin

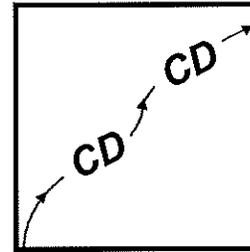
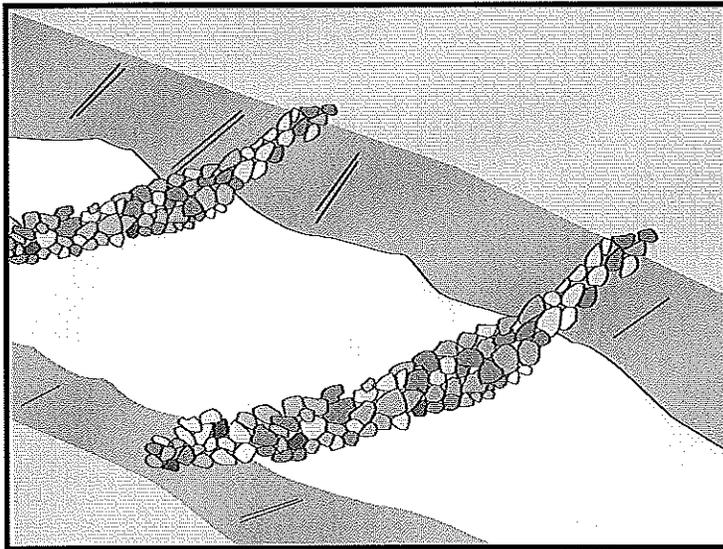
## Attachment 3: Work Plan

### Supporting Documents

Att3\_IG1\_ARB\_Workplan\_4of10 includes the following:

Project No.	Project Name	Supporting Documentation Included	Notes
5	Antelope Creek Water Efficiency and Flood Control Improvement Project	Caltrans "Construction Site Best Management Practices Manual: standards SC4, SS-10 and SS-11 (2003)"	The proposed project will utilize Caltrans's BMP Manual standards for Check Dams and Velocity Dissipation Devices
		PCWA "Natural Resource Management Training Manual" BMP 1b	The proposed project will follow PCWA's BMP standards for bank stability and sediment traps
		PCWA Canal Gunite Specifications	The proposed project will follow PCWA's Canal Gunite Specifications
		Miner's Ravine Specs & Bid Schedule	The proposed project is similar to Miner's Ravine Off-Channel Detention Basin Project. The specifications, bid schedule, and mitigation monitoring program for the Miner's Ravine project have therefore been included.
		Miner's Ravine Mitigation Monitoring Program	
6	Regional Water Meter Retrofit Acceleration Project	Sacramento County Standard Meter Detail Drawing	Meter retrofits will follow the standard meter detail drawings of the appropriate agency.
		City of Sacramento Standard Meter Detail Drawing	
		Sacramento Suburban Water District Standard Meter Detail Drawing	
7	Regional Indoor and Outdoor Water Efficiency Project	California Urban Water Conservation Council's Memorandum of Understanding Regarding Urban Water Conservation in California	The proposed project will follow the requirements and guidelines presented in the MOU.

Caltrans "Construction Site Best Management Practices Manual:  
standards SC4, SS-10 and SS-11 (2003)"



Standard Symbol

### BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

**Definition and Purpose** Check dams reduce scour and channel erosion by reducing flow velocity and encouraging sediment settlement. A check dam is a small device constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary product placed across a natural or man-made channel or drainage ditch.

### Appropriate Applications

- Check dams may be installed:
  - In small open channels that drain 4 ha (10 ac) or less.
  - In steep channels where storm water runoff velocities exceed 1.5 m/s (4.9 ft/sec).
  - During the establishment of grass linings in drainage ditches or channels.
  - In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.
- This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the Resident Engineer (RE).

### Limitations

- Not to be used in live streams.
- Not appropriate in channels that drain areas greater than 4 ha (10 ac).
- Not to be placed in channels that are already grass lined unless erosion is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping, which can be re-suspended during subsequent storms or removal of the check dam.

## Standards and Specifications

- Not to be constructed from straw bales or silt fence.
- Check dams shall be placed at a distance and height to allow small pools to form behind them. Install the first check dam approximately 5 meters (16 ft) from the outfall device and at regular intervals based on slope gradient and soil type.
- For multiple check dam installation, backwater from downstream check dam shall reach the toe of the upstream dam.
- High flows (typically a 2-year storm or larger) shall safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams shall be removed when grass has matured sufficiently to protect the ditch or swale.
- Rock shall be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Fiber rolls may be used as check dams if approved by the RE or the Construction NPDES Coordinator. Refer to SC-5 "Fiber Rolls."
- Gravel bags may be used as check dams with the following specifications:

### **Materials**

- **Bag Material:** Bags shall be either polypropylene, polyethylene or polyamide woven fabric, minimum unit weight 135 g/m<sup>2</sup> (four ounces per square yard), mullen burst strength exceeding 2,070 kPa (300 psi) in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.
- **Bag Size:** Each gravel-filled bag shall have a length of 450 mm (18 in), width of 300 mm (12 in), thickness of 75 mm (3 in), and mass of approximately 15 kg (33 lb). Bag dimensions are nominal, and may vary based on locally available materials. Alternative bag sizes shall be submitted to the RE for approval prior to deployment.
- **Fill Material:** Fill material shall be between 10 mm and 20 mm (0.4 and 0.8 inch) in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be secured such that gravel does not escape. Gravel-filled bags shall be between 13 kg and 22 kg (28 and 48 lb) in mass. Fill material is subject to approval by the RE.

### **Installation**

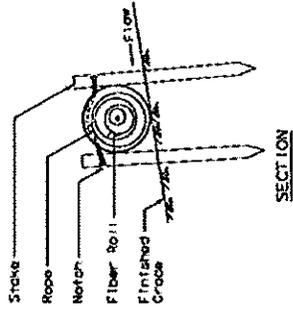
- Install along a level contour.
- Tightly abut bags and stack gravel bags using a pyramid approach.

Gravel bags shall not be stacked any higher than 1 meter (3.2 ft).

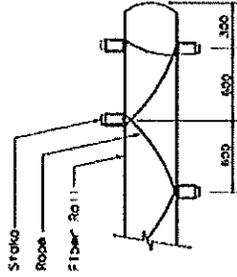
- Maintenance and Inspection
- Upper rows of gravel bags shall overlap joints in lower rows.
  - Inspect check dams after each significant rainfall event. Repair damage as needed or as required by the RE.
  - Remove sediment when depth reaches one-third of the check dam height.
  - Remove accumulated sediment prior to permanent seeding or soil stabilization.
  - Remove check dam and accumulated sediment when check dams are no longer needed or when required by the RE.
  - Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications.

# Check Dams

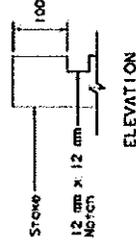
**SC-4**



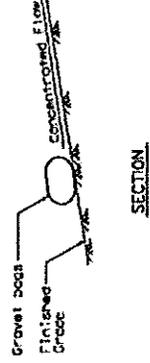
SECTION



PLAN



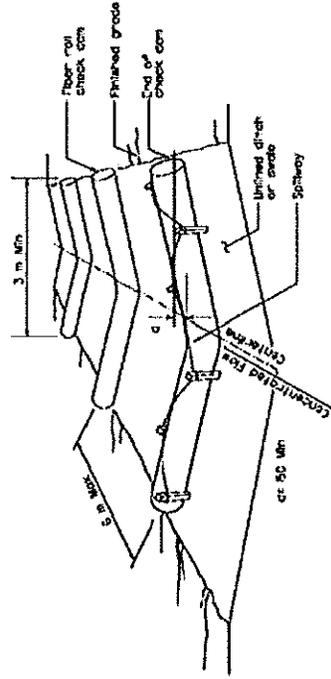
ELEVATION DETAIL



SECTION

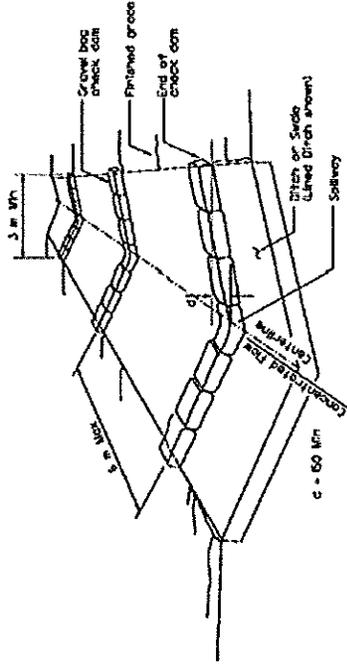
**NOTE**  
 1. Gravel bags should be maintained to prevent backing of concentrated flow around the ends of check dam.

STAKING AND LASHING DETAIL



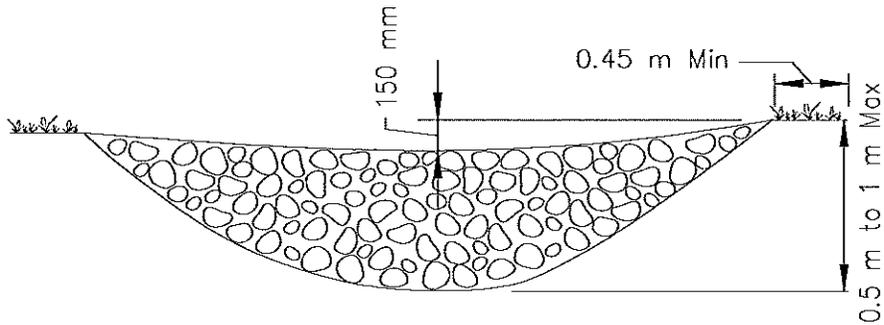
PERSPECTIVE  
 TEMPORARY CHECK DAM (TYPE 1)

TEMPORARY CHECK DAM (TYPE 2)

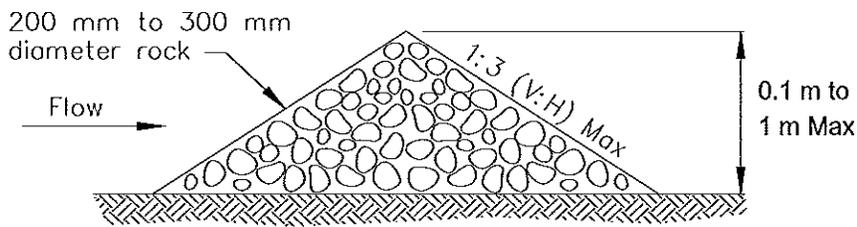


PERSPECTIVE  
 TEMPORARY CHECK DAM (TYPE 2)





ELEVATION

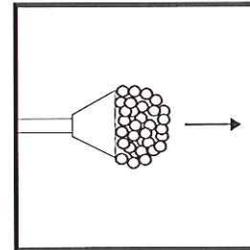
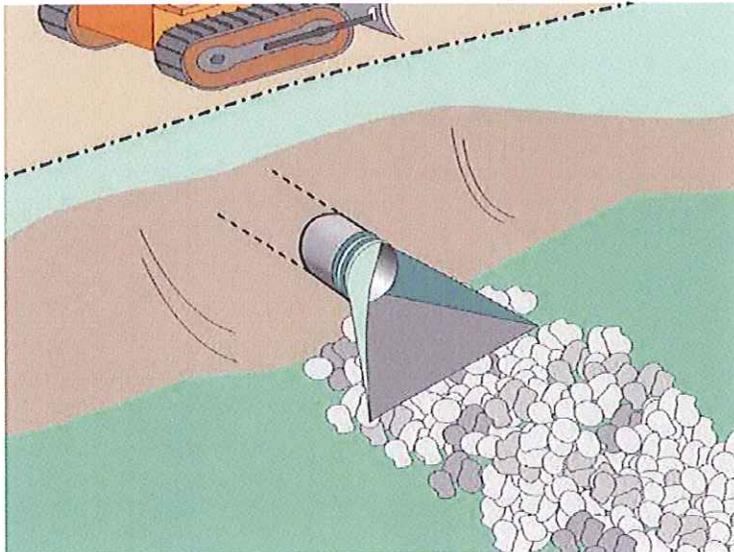


TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM  
NOT TO SCALE

# Outlet Protection/Velocity Dissipation Devices

SS-10



Standard Symbol

### BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

**Definition and Purpose** These devices are placed at pipe outlets to prevent scour and reduce the velocity and/or energy of storm water flows.

### Appropriate Applications

- These devices may be used at the following locations:
  - Outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits or channels.
  - Outlets located at the bottom of mild to steep slopes.
  - Discharge outlets that carry continuous flows of water.
  - Outlets subject to short, intense flows of water, such as flash floods.
  - Points where lined conveyances discharge to unlined conveyances.
- This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the Resident Engineer (RE).

### Limitations

- Loose rock may have stones washed away during high flows.
- Grouted riprap may break up in areas of freeze and thaw.
- If there is not adequate drainage, and water builds up behind grouted riprap, it may cause the grouted riprap to break up due to the resulting hydrostatic pressure.

# Outlet Protection/Velocity Dissipation Devices

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**SS-10**

## Standards and Specifications

- There are many types of energy dissipaters, with rock being the one that is represented in the figure on Page 3. Please note that this is only one example and the RE may approve other types of devices proposed by the contractor.
- Install riprap, grouted riprap, or concrete apron at selected outlet. Riprap aprons are best suited for temporary use during construction.
- Carefully place riprap to avoid damaging the filter fabric.
- For proper operation of apron:
  - Align apron with receiving stream and keep straight throughout its length. If a curve is needed to fit site conditions, place it in upper section of apron.
  - If size of apron riprap is large, protect underlying filter fabric with a gravel blanket.
- Outlets on slopes steeper than 10% shall have additional protection.

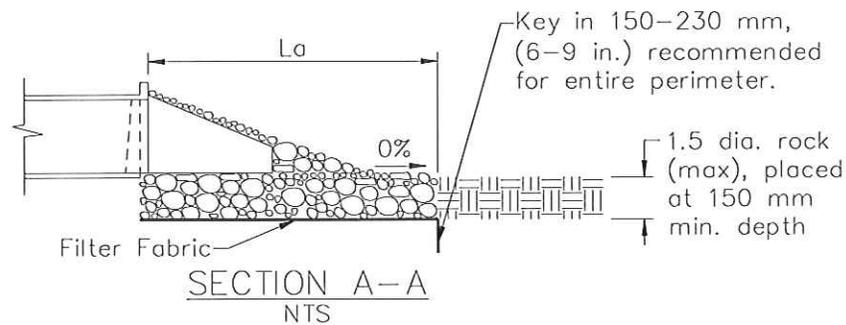
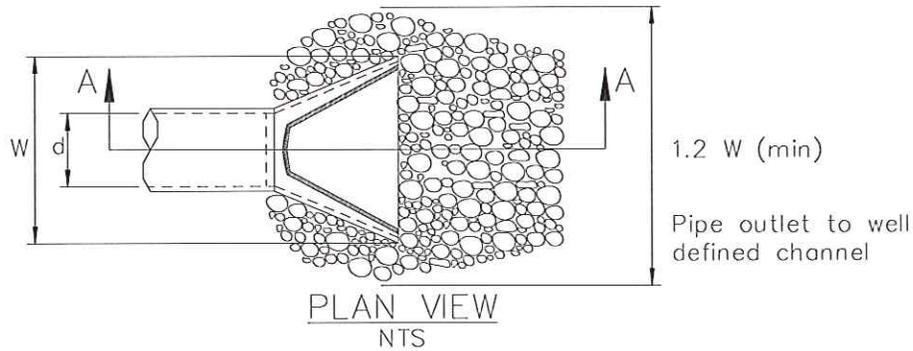
## Maintenance and Inspection

- Inspect temporary measures prior to the rainy season, after rainfall events, and regularly (approximately once per week) during the rainy season.
- Inspect apron for displacement of the riprap and/or damage to the underlying fabric. Repair fabric and replace riprap that has washed away.
- Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric immediately.
- Temporary devices shall be completely removed as soon as the surrounding drainage area has been stabilized, or at the completion of construction.



# Outlet Protection/Velocity Dissipation Devices

**SS-10**

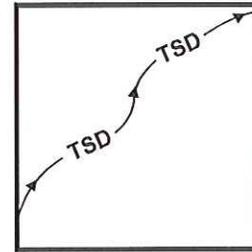
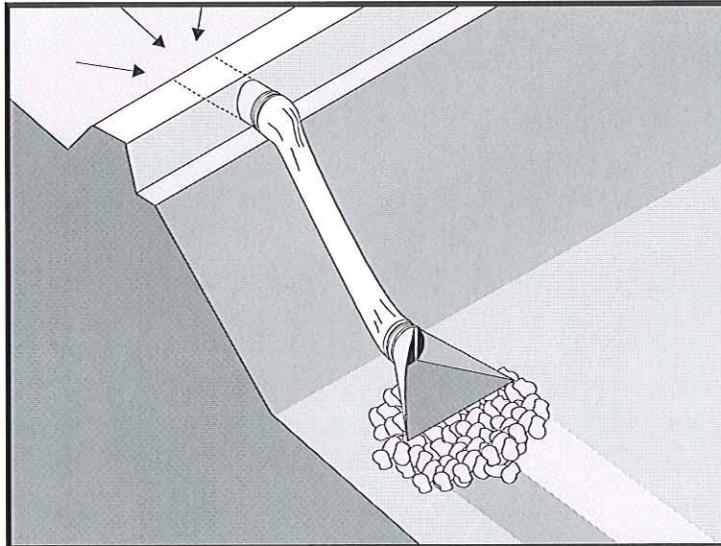


Pipe Diameter mm	Discharge m <sup>3</sup> /s	Apron Length, La m	Rip Rap D <sub>50</sub> Diameter Min mm
300	0.14	3	100
	0.28	4	150
450	0.28	3	150
	0.57	5	200
	0.85	7	300
	1.13	8	400
600	0.85	5	200
	1.13	8	200
	1.42	8	300
	1.70	9	400

**For larger or higher flows, consult a Registered Civil Engineer**

Source: USDA – SCS





Standard Symbol

### BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

**Definition and Purpose** A slope drain is a pipe used to intercept and direct surface runoff or groundwater into a stabilized watercourse, trapping device or stabilized area. Slope drains are used with lined ditches to intercept and direct surface flow away from slope areas to protect cut or fill slopes.

**Appropriate Applications**

- Slope drains may be used on construction sites where slopes may be eroded by surface runoff.
- This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the Resident Engineer (RE).

**Limitations**

- Severe erosion may result when slope drains fail by overtopping, piping, or pipe separation.

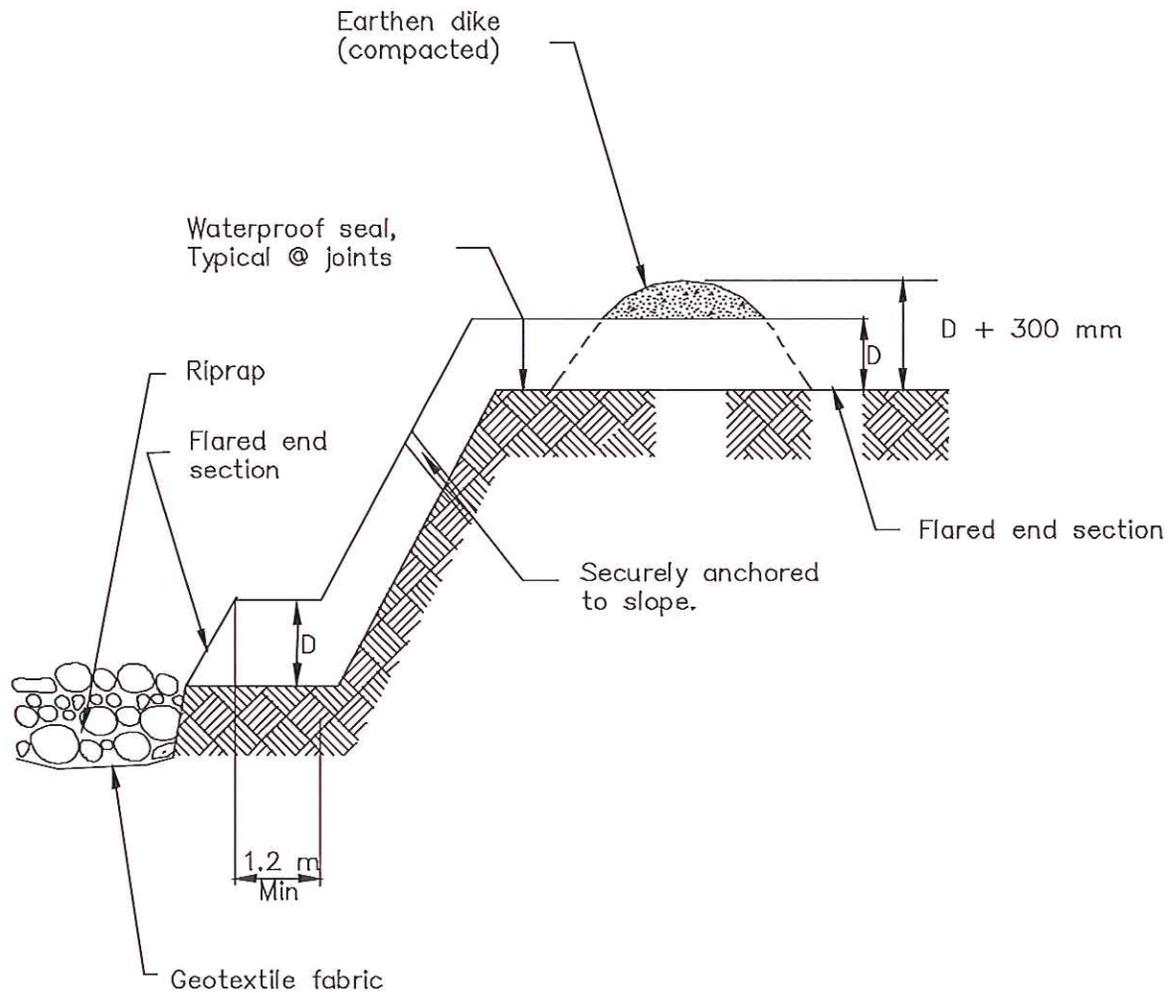
**Standards and Specifications**

- When using slope drains, limit drainage area to 4 ha (10 ac) per pipe. For larger areas, use a rock-lined channel or a series of pipes.
- Maximum slope generally limited to 1:2 (V:H), as energy dissipation below steeper slopes is difficult.
- Direct surface runoff to slope drains with interceptor dikes. See BMP SS-8, "Earth Dikes/Drainage Swales, and Lined Ditches."
- Slope drains can be placed on or buried underneath the slope surface.
- Recommended materials are PVC, ABS, or comparable pipe.
- When installing slope drains:
  - Install slope drains perpendicular to slope contours.

- Compact soil around and under entrance, outlet, and along length of pipe.
- Securely anchor and stabilize pipe and appurtenances into soil.
- Check to ensure that pipe connections are water tight.
- Protect area around inlet with filter cloth. Protect outlet with riprap or other energy dissipation device. For high energy discharges, reinforce riprap with concrete or use reinforced concrete device.
- Protect inlet and outlet of slope drains; use standard flared end section at entrance and exit for pipe slope drains 300 mm (12in) and larger.

## Maintenance and Inspection

- Inspect before and after each rain storm, and twice monthly until the tributary drainage area has been stabilized. Follow routine inspection procedures for inlets thereafter.
- Inspect outlet for erosion and downstream scour. If eroded, repair damage and install additional energy dissipation measures. If downstream scour is occurring, it may be necessary to reduce flows being discharged into the channel unless other preventative measures are implemented.
- Inspect slope drainage for accumulations of debris and sediment.
- Remove built-up sediment from entrances, outlets, and within drains as required.
- Make sure water is not ponding onto inappropriate areas (e.g., active traffic lanes, material storage areas, etc.).



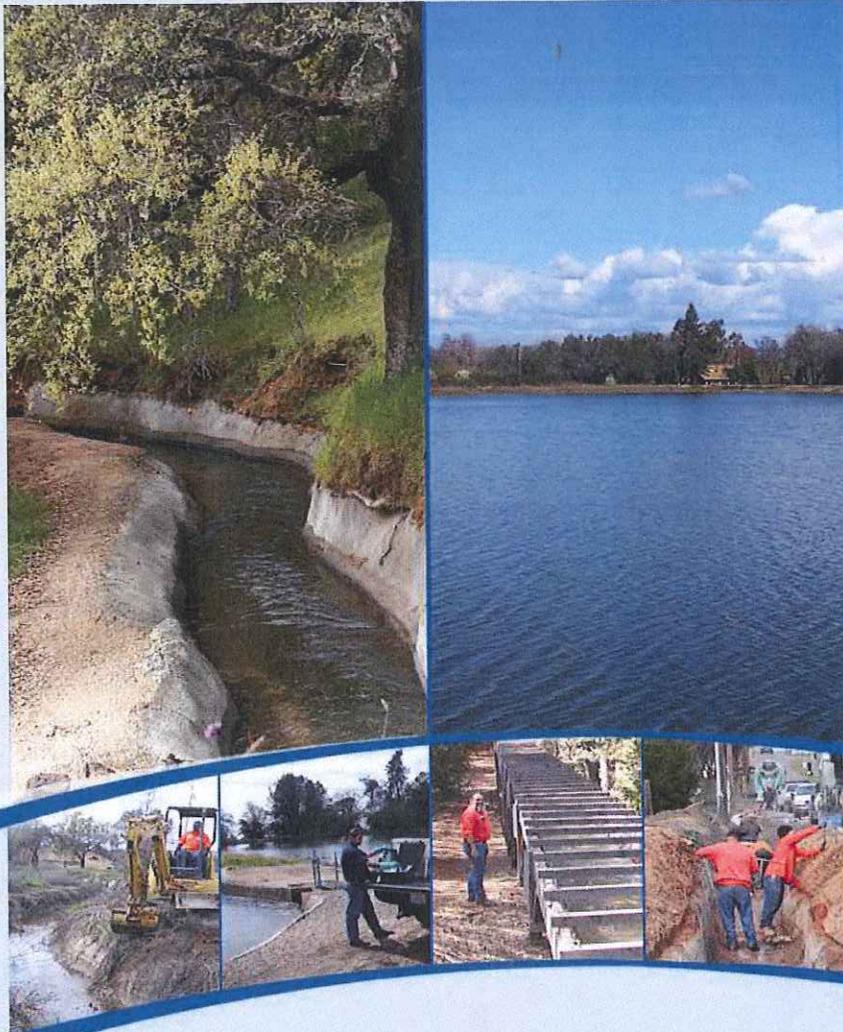
TYPICAL SLOPE DRAIN  
NOT TO SCALE

## **PCWA "Natural Resource Management Training Manual" BMP 1b**

# Natural Resources Management Training Manual

for Raw Water Distribution System  
Operations and Maintenance Activities

April 2009



prepared by



# BEST MANAGEMENT PRACTICES

**Best management practices (BMPs) are measures designed to reduce or prevent potential effects of a particular activity on the surrounding environment. The term originated from rules and regulations in Section 208 of the Clean Water Act. The “best” practice is cost effective and site specific. BMPs can be both structural controls and nonstructural practices. Structural BMPs include facilities constructed to prevent or minimize effects, and nonstructural BMPs usually involve changes in activities or operation management, and often focus more on controlling pollutants at the source.**

BMPs to address potential effects of PCWA operations can be applied during three different stages: (1) Pre-implementation, (2) Implementation, and (3) Ongoing/Post-Implementation. Pre-implementation BMPs are those that are applied in preparation for the activity because they may take more time to develop before they become effective or because they involve complex setup procedures. Implementation BMPs are management measures applied while the activity is implemented. Ongoing or post-implementation BMPs are typically management and preventative measures. These BMPs are listed in **Table 1** and described below. While some BMPs are specific to an O&M activity, several can be applied to more than one O&M activity. This list of BMP options is not comprehensive; instead it provides examples of BMPs that may be implemented to minimize particular potential effects of PCWA raw water distribution system O&M activities. As part of these BMP recommendations, BMP monitoring and evaluation are recommended for determining BMP effectiveness.



TABLE 1: POTENTIAL BEST MANAGEMENT PRACTICES FOR PCWA O&M ACTIVITIES

BMP ID	Best Management Practice	Implementation										
		Yearly Outages	Delivery Schedule Changes	Flood Management Practices	Routine Operations	Canal Cleaning	Physical Removal of Vegetation	Algaecide Application	Herbicide Application	Canal Lining	Canal Repair	Pipe Repair
<b>BMP1</b>		<b>Improve Canal Bank Stability and Install Sediment Traps at Canal Outlets</b>										
BMP1a	Install velocity dissipaters at canal outlets	✓				✓				✓	✓	✓
BMP1b	Line banks below canal outlets in areas of soil disturbance	✓		✓					✓			
BMP1c	Install erosion-control blankets					✓			✓	✓	✓	✓
BMP1d	Install temporary fiber rolls							✓				
BMP1e	Apply spray-on soil binders								✓	✓	✓	✓
<b>BMP2</b>		<b>Protect Sensitive Species Habitat</b>										
BMP2a	Provide staff with species identification training		✓		✓	✓	✓	✓	✓	✓	✓	✓
BMP2b	Evaluate sites with sensitive species and mark/protect sensitive species habitat		✓		✓	✓	✓	✓	✓	✓	✓	✓
BMP2c	Stockpile materials away from sensitive species habitat areas					✓	✓	✓	✓	✓	✓	✓

## BMP1: Improve Canal Bank Stability and Install Sediment Traps at Canal Outlets

Canal bank erosion along unlined canals, which may occur after canal flows are restored following dewatering activities and by PCWA flood management practices, may be minimized through implementation of BMPs to improve canal bank stability. Stabilizing vulnerable or disturbed areas along unlined canal banks can decrease erosion and associated sediment transport and deposition. Areas vulnerable to erosion may be those with steep slopes, little to no vegetation, and loose soil. Sediment-control measures may be installed at canal outlets, where possible, to reduce sediment and associated constituents loading to receiving waters during PCWA operations activities. The following sections describe potential BMPs to improve canal bank stability and reduce sediment loading to receiving waters.

### BMP1a: Install velocity dissipaters at canal outlets

Velocity dissipaters are strategically placed rock along the flow line in a watercourse to dissipate energy and slow the flow of concentrated water releases, thus reducing the potential for erosion and sediment loading downstream. Velocity dissipaters can be applied at canal outlets where discharge velocities are sufficient to erode banks downstream. Other types of velocity dissipaters include solid concrete structures, grouted riprap, baffles, pipe junctions, and drop boxes. Riprap aprons are best suited for temporary use during construction. Grouted or wired tied rock riprap can minimize maintenance requirements. The following steps can be taken to install and maintain a velocity dissipater at a canal outlet location:

1. When designing the velocity dissipater, consider the depth of flow, bed roughness, gradient, side slopes, discharge rate, and maximum outlet flow velocity. Use the estimated discharge rate for selecting the apron length and rock size. Design the dissipaters to interrupt water passage and spread concentrated flows over and through protruding rock. For example, rocks can be set in a step pool formation based on natural channel design concepts.
2. To reduce the potential for underlying soil to erode, underlay dissipaters with geotextile fabric.
3. Set rocks in mortar or grout to secure rock formation while ensuring to avoid damaging filter fabric. **Table 1** describes rock placement techniques for different rock sizes:

TABLE 1: ROCK PLACEMENT TECHNIQUES BY ROCK SIZE

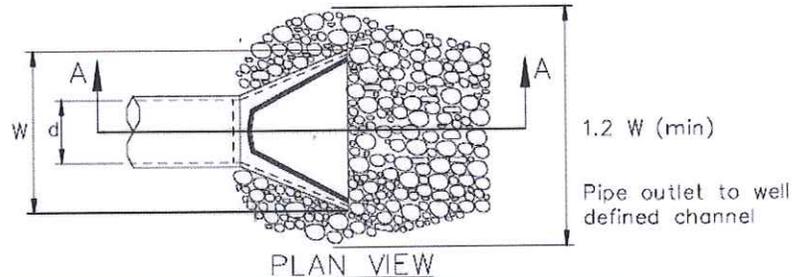
Rock Size (Inches)	Placement Technique
4-6	Carefully dumped onto filter fabric from a height not to exceed 12 inches
8-12	Hand placed onto filter fabric, or the filter fabric may be covered with 4 inches of gravel and the rock may be dumped from a height not to exceed 16 inches
>12	Dumped onto filter fabric protected with a layer of gravel with a thickness equal to one-half the D50 rock size, and the dump height limited to twice the depth of the gravel protection layer thickness.

Key:

BMP=Best Management Practice

- Align the apron with the receiving stream and keep it straight throughout its length. If a curve is needed to fit the stream shape, place it in the upper section of apron. **Figure 1** shows a plan view design of a velocity dissipater at a piped outlet.

FIGURE 1: EXAMPLE DESIGN OF VELOCITY DISSIPATER



Copyright © 2003 California Stormwater Quality Association

- Inspect velocity dissipaters before a forecasted precipitation event, after large precipitation events or after high discharges at canal outlets, at biweekly intervals during the wet season, and at monthly intervals during the dry season. Large precipitation events can wash away or break up rocks. Grouted riprap may break up in areas of freeze and thaw. If water builds up behind grouted riprap from inadequate drainage, it may break up due to high pressure buildup. If rocks have been washed away, replace it or consider using larger, heavier material.
- The underlying filter fabric should be inspected periodically as well. If scour occurs beneath the rocks, the filter fabric can become damaged. Repair damage to slopes or the filter fabric immediately.
- Temporary dissipaters should be completely removed as soon as the surrounding drainage area has been stabilized or at project completion.

#### BMP1b: Line banks below canal outlets

Lining is considered an effective way to control canal bank erosion along unstable channels. PCWA is already implementing this BMP by lining canal outlets with gunite, where appropriate. The steps to line canal outlets are similar to typical PCWA canal lining procedures. However, the lining area may be smaller and located at the head of an unlined water drainage. The following are some steps that should be taken during canal lining activities at canal outlets.

- Prioritize canal lining at canal outlets with visible erosion or soils vulnerable to erosion.
- Remove woody vegetation from adjacent areas before lining.
- Perform PCWA canal lining procedures.
- Implement erosion-control practices during canal lining work.
- Lined canal outlets should be periodically relined to reinforce gunite and repair cracks and weathered areas.

## **PCWA Canal Guniting Specifications**

## **SECTION 9 GUNITING**

### **General**

Work under this section includes furnishing, preparation, mixing, and placing of gunite as specified herein. Gunite shall be applied by the dry-mix process.

Shotcrete will not be allowed as a substitute for gunite.

### **References**

The standards referenced below will be utilized in this application.

ASTM C33, Specification for Concrete Aggregates

ASTM C150, Specification for Portland Cement

ASTM 494, Specification for Chemical Admixtures for Concrete

### **Materials**

#### **Cement**

Cement shall be clean, fresh, Type II Portland cement and shall conform to ASTM C150. Type III (High Early Strength) cement is also acceptable when authorized by the Agency.

#### **Water**

Water shall be clean and free from deleterious amounts of silt, oil, acids, alkali, salts, organic substances and shall contain no chlorides, calculated as Cl, in excess of 1000 ppm, or sulfates in excess of 1000 ppm. Water pressure shall be at least 15 psi above the air pressure at the nozzle.

#### **Sand**

Sand shall be washed, clean, sound and free of deleterious coatings, clay balls, wood, or other extraneous material and, at the time of batching, shall conform to ASTM C33, C88, and C131. Sand shall be furnished in the primary sizes specified in ASTM C33. Sand shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine. Gradation shall be adjusted for best performance as approved by the Agency. Sand shall have a moisture content between 3-6 percent.

#### **Accelerator**

No admixtures shall be added to the gunite mix except a liquid or powdered set accelerator. The accelerator shall meet the requirements of ASTM Designation C494, Type C, except for the restrictions on the time of initial set, and the percent of minimum compressive strength of control specimens over 7 days of age. The proposed set accelerator shall be tested for compatibility with the gunite mix and submitted for Agency approval. The maximum initial set time shall be 3 minutes, and the maximum final set time shall be 12 minutes. Use of calcium chloride will not be permitted.

#### **Fibers**

Polypropylene fibers shall be used when specified at a rate of 1.5 lbs per cubic yard.

**Wire Reinforcement**

Reinforce gunite with 6x6 10 gage welded wire fabric.

**Execution****Proportioning and Mixing**

Use a minimum of 7 sacks and a maximum of 8 sacks of cement per cubic yard of gunite. The basic proportions of the gunite shall consist of 1 part cement to 4 parts sand by weight. Contractor shall submit the proposed mix design, including admixtures, to the Agency for approval before beginning placement. Batch weight of the sand shall be on a saturated, surface-dry basis. Mix proportions shall be such that core-drilled, nominal three-inch-diameter cylindrical specimens of the gunite will pass a minimum unconfined compressive strength test of 4,000 psi at 28 days.

Use the dry-mix process for guniting. Thoroughly and uniformly mix the material in a dry state in an approved mixer for at least 90 seconds for 1 cubic yard of gunite, with an additional 30 seconds for each additional cubic yard of gunite. The mixture shall be uniform and shall be continuously supplied to the delivery equipment to assure uninterrupted operation. Dispose of mixes allowed to stand for more than one hour. Dispose of off site.

The equipment proposed for use shall be capable of mixing and delivering a high-quality, well-mixed gunite mixture with reliability. Provide sufficient quantity of compressed air at proper pressure to maintain a clean airflow adequate for sufficient nozzle velocity and for operation of a blow pipe for clearing away rebound. Maintain communication between the mixer operator and the delivery equipment operator at all times.

**Preparation of Foundation**

The foundation for areas to receive gunite shall be evenly graded before the mortar is applied and no point on the graded slope shall be above the slope of the plane shown on the Plans or directed by the Agency.

The areas shall be thoroughly compacted, with sufficient moisture to provide a firm foundation and to prevent absorption of water from the mortar, but shall contain no free surface water.

Existing facilities to receive gunite shall be trimmed to create smooth transitions and flows, cleaned and cleared of all vegetative growth, rocks, sediment and all other objectionable material to one foot beyond the limits of the gunite application. When shown on the Plans, joints, side forms and shooting strips shall be provided for backing or paneling. Ground or gauging wires shall be used where necessary to establish thicknesses, surface planes and finish lines.

**Placement of Gunite**

All gunite layers shall be built up to their specified thicknesses in passes so that no sloughing of freshly placed material occurs. Place each layer in one continuous operation except where there is evidence of sagging, excess moisture, or other defects. Cut out defective areas and replace them with fresh with satisfactory gunite. Final gunite thickness for each area will be specified by the Agency.

**Thickness**

Where repairing an existing gunite slab, match the existing thickness or 3" whichever is greater.

New work shall be placed a minimum of 6 inches thick or as shown on Drawings.

**Reinforcement**

Secure wire fabric to remain embedded at half the thickness of the final gunite slab during preparation and application. Overlap adjacent sheets of fabric by at least six inches in both directions. Loose mill scale, oil, or rust on the fabric will not be permitted.

**Equipment and Crews**

Foremen, machine operators, and nozzlemen employed in guniting operations shall be experienced on comparable projects and meeting the requirements of ACI 506. Generally, foremen must have 2 years of applicable experience and machine operators and nozzlemen must have 6 months of applicable experience. Nozzlemen who demonstrate adequate skill at gunite application may be approved by the Agency even if they do not have 6 months of experience. All equipment used for the guniting operations must be approved by the Agency. All batching equipment must be capable of performing accurate measurement to produce a uniform material. Weighing and flow meter devices shall be maintained within +/- one percent of the correct weight, volume, or flow rate throughout the range of use. Submit documentation of equipment testing and accuracy and receive Agency approval before guniting begins.

The gunite batching and mixing equipment as well as equipment required to deliver material to the nozzle shall be approved by the Agency.

Any personnel or equipment not approved for this type of guniting work according to the above requirements, shall immediately be removed by Contractor upon written notification by the Agency.

**Batching and Mixing Temperatures**

At the time of batching and mixing, the temperature of the mixture, prior to adding water, shall be above 38°F. The water temperature shall be adjusted by cooling, heating, or adding ice to obtain a gunite temperature of at least 45°F as discharged and less than 80° F as discharged. Temperature of the gunite as discharged, shall always fall between 45°F and 80°F.

**Operation of Pneumatic Equipment**

The nozzleman shall have complete and safe freedom of movement. A nozzleman's helper equipped with an air blow pipe shall attend the nozzleman in order to keep the work area free from rebound.

The nozzle shall be kept 2.5 to 3.5 feet from the application surface so that the material shall impinge as nearly as possible at right angles to the surface, except at interior corners. Loose sand or rebound shall be removed prior to placing a succeeding layer of gunite.

Rebound shall be kept to a minimum. Do not reuse rebound material.

Nozzle velocity shall be 275 to 500 feet per second for 3/4 to 1 inch nozzles, and 425 to 500 feet per second for 1.25-inch nozzles.

## **Work Stoppages**

Placement shall be interrupted in case of sagging, excessive moisture, rebound pockets, or other defects. Before placement may be resumed, the bonding surface shall be processed in compliance with one of the following:

### **Alternate 1**

Before initial set, all defective gunite shall be cut out, and all laitance shall be removed by carefully performed light brooming.

### **Alternate 2**

After final set, loose rebound shall be brushed off, rebound pockets and other defective gunite shall be cut out, and all laitance shall be removed by dry sandblasting or high-pressure water jetting.

## **Construction Joints**

Construction joints caused by work stoppages shall have tapered edges forming an angle of 30 degrees or less with the flat surface of the joint. In no case will square shoulders be allowed.

## **Clean-up and Disposal**

Cleanup and disposal of waste gunite is the responsibility of the Contractor.

## **Repairs to Gunite**

The surface of previously placed gunite shall be thoroughly sounded with a hammer to determine the location of any rebound pockets, lack of bond, or other subsurface defects. All such areas, sags or other defects shall be cut out and replaced with suitable gunite. All gunite which, in the opinion of the Agency, fails to comply with the provisions of this Section shall be chipped out and replaced with acceptable gunite by the Contractor at the Contractor's expense. Replacement wire fabric shall overlap existing wire a minimum of 1 square. If the wire fabric is left in place, it shall not be damaged.

## **Quality Control**

### **Testing, Control, and Inspection**

Sampling and quality control shall be the responsibility of Contractor. The Agency may carry out compression and other tests on the samples taken. The Agency will inspect, from time to time, all aspects of the work and may carry out tests on the gunite in place and on the batch weights, grading and moisture content of the aggregates. Contractor shall be required to remove gunite in those locations where representative test specimens fail to comply with these Specifications.

### **Fabrication of Test Panels**

Test panels shall be used to demonstrate the strength of the gunite mix and the qualification of the nozzleman. Construct test panels at Agency request.

A test panel measuring 2 feet by 2 feet minimum or as directed by the Agency shall be constructed by application of gunite to a smooth wood or steel surface using the same equipment, air quantity and pressure, water content, materials and angles of material approach as will be employed for the Work. The test panels shall be fabricated by the nozzleman who will be employed for the Work. Application shall be not less than 3.5 inches in

thickness. One test panel must be shot prior to the start of work, and must be clearly marked with a number and date.

The test panels shall be protected against being disturbed for a period of 6 hours or as directed by the Agency, after which the panels may be tested by the Agency.

## **Miner's Ravine Specs & Bid Schedule**

# SPECIAL PROVISIONS

## MINERS RAVINE OFF-CHANNEL DETENTION BASIN PROJECT

CONTRACT NO. 73242

### SECTION 1 SPECIFICATIONS AND PLANS

**1-1.01**        **GENERAL:** The work embraced herein shall be done in accordance with the Project Plans, Standard Specifications dated July, 2002, the Standard Plans dated July, 2002, of the Department of Transportation, and the Placer County General Specifications dated October, 1996, insofar as the same may apply and in accordance with the following Special Provisions.

Amendments to the Standard Specifications set forth in these Special Provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specification are amended" is used in the Special Provisions, the text following said term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

In case of conflict between the Placer County General Specifications, Standard Specifications and these Special Provisions, the Special Provisions shall govern, take precedence over, and be used in lieu of such conflicting portions. The Standard Specifications and Standard Plans shall govern over the Placer County General Specifications.

#### **1-1.02**        **DEFINITIONS AND TERMS:**

As used herein, unless the context otherwise requires, the following terms have the following meaning:

**County:** The Placer County Flood Control and Water Conservation District.

**Department:** The Board of the Placer County Flood Control and Water Conservation District of the County of Placer, State of California, except when referring to documents, laws or departments of the State of California. Any reference in questions shall be as designated by the Engineer.

**Department of Transportation:** The Placer County Flood Control and Water Conservation District, except when referring to documents, laws or departments of the State of California. Any reference in questions shall be as designated by the Engineer.

**Director of Transportation:** The District Engineer of the Placer County Flood Control and Water Conservation District.

**District:** The Placer County Flood Control and Water Conservation District.

**District Director of the District:** Executive Director of the Placer County Flood Control and Water Conservation District.

**Engineer:** The District Engineer of the Placer County Flood Control and Water Conservation District, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

**Executive Director:** The Director of Public Works of the County of Placer, State of California, who also serves as the Executive Director of the Placer County Flood Control and Water Conservation District.

**Laboratory:** The established laboratory of the Materials and Research Department of the Department of Transportation of the State of California or laboratories authorized by the Engineer to test materials and work involved in the Contract, except when referring to documents, laws or departments of the State of California. Any reference in question shall be as designated by the Engineer.

**Placer County:** The Placer County Flood Control and Water Conservation District, except when referring to documents, laws or departments of the State of California. Any reference in question shall be as designated by the Engineer.

**Standard Plans:** The July 2002 edition of the Standard Plans of the State of California, Department of Transportation. Any reference therein to the State of California or a State agency, office, or officer shall be interpreted to refer to the County or its corresponding agency, office, or officer acting under this contract.

**Standard Specifications:** The July 2002 edition of the Standard Specifications of the State of California, Department of Transportation. Any reference therein to the State of California or a State agency, office, or officer shall be interpreted to refer to the County or its corresponding agency, office, or officer acting under this contract.

**State:** The Placer County Flood Control and Water Conservation District, except when referring to documents, laws or departments of the State of California. Any reference in question shall be as designated by the Engineer.

**State Highway Engineer:** The District Engineer of the Placer County Flood Control and Water Conservation District.

**Transportation Building, Sacramento:** The Placer County Flood Control and Water Conservation District office, except when referring to documents, laws or departments of the State of California. Any reference in question shall be as designated by the Engineer.

**1-1.03      UPDATED AMENDMENTS TO JULY 2002 STANDARD SPECIFICATIONS**

# AMENDMENTS TO JULY 2002 STANDARD SPECIFICATIONS

UPDATED NOVEMBER 18, 2005

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the text or table following the term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

## SECTION 1: DEFINITIONS AND TERMS

Issue Date: January 28, 2005

Section 1-1.265, "Manual of Traffic Controls," of the Standard Specifications is amended to read:

### **1-1.265 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES**

- The Manual on Uniform Traffic Control Devices for Streets and Highways, 2003 Edition (MUTCD) is administered by the Federal Highway Administration.

Section 1, "Definitions and Terms," of the Standard Specifications is amended by adding the following section:

### **1-1.266 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES CALIFORNIA SUPPLEMENT**

- The MUTCD 2003 California Supplement (MUTCD California Supplement) is issued by the Department of Transportation to provide amendments to the MUTCD. The MUTCD and MUTCD California Supplement supersede the Department's Manual of Traffic Controls.

## SECTION 2: PROPOSAL REQUIREMENTS AND CONDITIONS

Issue Date: June 19, 2003

Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," of the Standard Specifications is amended to read:

### **2-1.03 Examination of Plans, Specifications, Contract, and Site of Work**

- The bidder shall examine carefully the site of the work contemplated, the plans and specifications, and the proposal and contract forms therefor. The submission of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the general and local

conditions to be encountered, as to the character, quality and scope of work to be performed, the quantities of materials to be furnished and as to the requirements of the proposal, plans, specifications and the contract.

- The submission of a bid shall also be conclusive evidence that the bidder is satisfied as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information was reasonably ascertainable from an inspection of the site and the records of exploratory work done by the Department as shown in the bid documents, as well as from the plans and specifications made a part of the contract.

- Where the Department has made investigations of site conditions including subsurface conditions in areas where work is to be performed under the contract, or in other areas, some of which may constitute possible local material sources, bidders or contractors may, upon written request, inspect the records of the Department as to those investigations subject to and upon the conditions hereinafter set forth.

- Where there has been prior construction by the Department or other public agencies within the project limits, records of the prior construction that are currently in the possession of the Department and which have been used by, or are known to, the designers and administrators of the project will be made available for inspection by bidders or contractors, upon written request, subject to the conditions hereinafter set forth. The records may include, but are not limited to, as-built drawings, design calculations, foundation and site studies, project reports and other data assembled in connection with the investigation, design, construction and maintenance of the prior projects.

- Inspection of the records of investigations and project records may be made at the office of the district in which the work is situated, or in the case of records of investigations related to structure work, at the Transportation Laboratory in Sacramento, California.

- When a log of test borings or other record of geotechnical data obtained by the Department's investigation of surface and subsurface conditions is included with the contract plans, it is furnished for the bidders' or Contractor's information and its use shall be subject to the conditions and limitations set forth in this Section 2-1.03.

- In some instances, information considered by the Department to be of possible interest to bidders or contractors has been compiled as "Materials Information." The use of the "Materials Information" shall be subject to the conditions and limitations set forth in this Section 2-1.03 and Section 6-2, "Local Materials."

- When cross sections are not included with the plans, but are available, bidders or contractors may inspect the cross sections and obtain copies for their use, at their expense.

- When cross sections are included with the contract plans, it is expressly understood and agreed that the cross sections do not constitute part of the contract, do not necessarily represent actual site conditions or show location, character, dimensions and details of work to be performed, and are included in the plans only for the convenience of bidders and their use is subject to the conditions and limitations set forth in this Section 2-1.03.

- When contour maps were used in the design of the project, the bidders may inspect those maps, and if available, they may obtain copies for their use.

- The availability or use of information described in this Section 2-1.03 is not to be construed in any way as a waiver of the provisions of the first paragraph in this Section 2-1.03 and bidders and contractors are cautioned to make independent investigations and examinations as they deem necessary to be satisfied as to conditions to be encountered in the performance of the work and, with respect to possible local material sources, the quality and quantity of material available from the property and the type and extent of processing that may be required in order to produce material conforming to the requirements of the specifications.

- The Department assumes no responsibility for conclusions or interpretations made by a bidder or contractor based on the information or data made available by the Department. The Department does not assume responsibility for representation made by its officers or agents before the execution of the contract concerning surface or subsurface conditions, unless that representation is expressly stated in the contract.
- No conclusions or interpretations made by a bidder or contractor from the information and data made available by the Department will relieve a bidder or contractor from properly fulfilling the terms of the contract.

## **SECTION 5: CONTROL OF WORK**

Issue Date: December 31, 2001

Section 5-1.02A, "Trench Excavation Safety Plans," of the Standard Specifications is amended to read:

### **5-1.02A Excavation Safety Plans**

- The Construction Safety Orders of the Division of Occupational Safety and Health shall apply to all excavations. For all excavations 5 feet or more in depth, the Contractor shall submit to the Engineer a detailed plan showing the design and details of the protective systems to be provided for worker protection from the hazard of caving ground during excavation. The detailed plan shall include any tabulated data and any design calculations used in the preparation of the plan. Excavation shall not begin until the detailed plan has been reviewed and approved by the Engineer.
- Detailed plans of protective systems for which the Construction Safety Orders require design by a registered professional engineer shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California, and shall include the soil classification, soil properties, soil design calculations that demonstrate adequate stability of the protective system, and any other design calculations used in the preparation of the plan.
- No plan shall allow the use of a protective system less effective than that required by the Construction Safety Orders.
- If the detailed plan includes designs of protective systems developed only from the allowable configurations and slopes, or Appendices, contained in the Construction Safety Orders, the plan shall be submitted at least 5 days before the Contractor intends to begin excavation. If the detailed plan includes designs of protective systems developed from tabulated data, or designs for which design by a registered professional engineer is required, the plan shall be submitted at least 3 weeks before the Contractor intends to begin excavation.
- Attention is directed to Section 7-1.01E, "Trench Safety."

## **SECTION 7: LEGAL RELATIONS AND RESPONSIBILITY**

Issue Date: January 28, 2005

The eighth paragraph of Section 7-1.09, "Public Safety" of the Standard Specifications is amended to read:

- Signs, lights, flags, and other warning and safety devices and their use shall conform to the requirements set forth in Part 6 of the MUTCD and of the MUTCD California Supplement.

Signs or other protective devices furnished and erected by the Contractor, at the Contractor's expense, as above provided, shall not obscure the visibility of, nor conflict in intent, meaning and function of either existing signs, lights and traffic control devices or any construction area signs and traffic control devices for which furnishing of, or payment for, is provided elsewhere in the specifications. Signs furnished and erected by the Contractor, at the Contractor's expense, shall be approved by the Engineer as to size, wording and location.

The fourteenth paragraph of Section 7-1.09, "Public Safety," of the Standard Specifications is amended to read:

- The Contractor shall notify the Engineer not less than 18 days and no more than 90 days prior to the anticipated start of an operation that will change the vertical or horizontal clearance available to public traffic (including shoulders).

The sixteenth paragraph of Section 7-1.09, "Public Safety," of the Standard Specifications is amended to read:

- When vertical clearance is temporarily reduced to 15.5 feet or less, low clearance warning signs shall be placed in accordance with Part 2 of the MUTCD and the MUTCD California Supplement, and as directed by the Engineer. Signs shall conform to the dimensions, color, and legend requirements of the MUTCD, the MUTCD California Supplement, and these specifications except that the signs shall have black letters and numbers on an orange retroreflective background. W12-2P signs shall be illuminated so that the signs are clearly visible.

## **SECTION 9: MEASUREMENT AND PAYMENT**

Issue Date: November 17, 2004

Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications is amended to read:

### **9-1.04 NOTICE OF POTENTIAL CLAIM**

- It is the intention of this section that disputes between the parties arising under and by virtue of the contract be brought to the attention of the Engineer at the earliest possible time in order that the matters may be resolved, if possible, or other appropriate action promptly taken.
- Disputes will not be considered unless the Contractor has first complied with specified notice or protest requirements, including Section 4-1.03, "Changes," Section 5-1.116, "Differing Site Conditions," Section 8-1.06, "Time of Completion," Section 8-1.07, "Liquidated Damages," and Section 8-1.10, "Utility and Non-Highway Facilities."
- For disputes arising under and by virtue of the contract, including an act or failure to act by the Engineer, the Contractor shall provide a signed written initial notice of potential claim to the Engineer within 5 days from the date the dispute first arose. The initial notice of potential claim shall provide the nature and circumstances involved in the dispute which shall remain consistent through the dispute. The initial notice of potential claim shall be submitted on Form CEM-6201A furnished by the Department and shall be certified with reference to the California False Claims Act, Government Code Sections 12650-12655. The Contractor shall assign an exclusive identification number for each dispute, determined by chronological sequencing, based on the date of the dispute.

- The exclusive identification number for each dispute shall be used on the following corresponding documents:

- A. Initial notice of potential claim.
- B. Supplemental notice of potential claim.
- C. Full and final documentation of potential claim.
- D. Corresponding claim included in the Contractor's written statement of claims.

- The Contractor shall provide the Engineer the opportunity to examine the site of work within 5 days from the date of the initial notice of potential claim. The Contractor shall proceed with the performance of contract work unless otherwise specified or directed by the Engineer.

- Throughout the disputed work, the Contractor shall maintain records that provide a clear distinction between the incurred direct costs of disputed work and that of undisputed work. The Contractor shall allow the Engineer access to the Contractor's project records deemed necessary by the Engineer to evaluate the potential claim within 20 days of the date of the Engineer's written request.

- Within 15 days of submitting the initial notice of potential claim, the Contractor shall provide a signed supplemental notice of potential claim to the Engineer that provides the following information:

- A. The complete nature and circumstances of the dispute which caused the potential claim.
- B. The contract provisions that provide the basis of claim.
- C. The estimated cost of the potential claim, including an itemized breakdown of individual costs and how the estimate was determined.
- D. A time impact analysis of the project schedule that illustrates the effect on the scheduled completion date due to schedule changes or disruptions where a request for adjustment of contract time is made.

- The information provided in items A and B above shall provide the Contractor's complete reasoning for additional compensation or adjustments.

- The supplemental notice of potential claim shall be submitted on Form CEM-6201B furnished by the Department and shall be certified with reference to the California False Claims Act, Government Code Sections 12650-12655. The Engineer will evaluate the information presented in the supplemental notice of potential claim and provide a written response to the Contractor within 20 days of its receipt. If the estimated cost or effect on the scheduled completion date changes, the Contractor shall update information in items C and D above as soon as the change is recognized and submit this information to the Engineer.

- Within 30 days of the completion of work related to the potential claim, the Contractor shall provide the full and final documentation of potential claim to the Engineer that provides the following information:

- A. A detailed factual narration of events fully describing the nature and circumstances that caused the dispute, including, but not limited to, necessary dates, locations, and items of work affected by the dispute.
- B. The specific provisions of the contract that support the potential claim and a statement of the reasons these provisions support and provide a basis for entitlement of the potential claim.
- C. When additional monetary compensation is requested, the exact amount requested calculated in conformance with Section 9-1.03, "Force Account Payment," or Section

8-1.09, "Right of Way Delays," including an itemized breakdown of individual costs. These costs shall be segregated into the following cost categories:

1. Labor – A listing of individuals, classifications, regular hours and overtime hours worked, dates worked, and other pertinent information related to the requested reimbursement of labor costs.
2. Materials – Invoices, purchase orders, location of materials either stored or incorporated into the work, dates materials were transported to the project or incorporated into the work, and other pertinent information related to the requested reimbursement of material costs.
3. Equipment – Listing of detailed description (make, model, and serial number), hours of use, dates of use and equipment rates. Equipment rates shall be at the applicable State rental rate as listed in the Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates," in effect when the affected work related to the dispute was performed.
4. Other categories as specified by the Contractor or the Engineer.

D. When an adjustment of contract time is requested the following information shall be provided:

1. The specific dates for which contract time is being requested.
2. The specific reasons for entitlement to a contract time adjustment.
3. The specific provisions of the contract that provide the basis for the requested contract time adjustment.
4. A detailed time impact analysis of the project schedule. The time impact analysis shall show the effect of changes or disruptions on the scheduled completion date to demonstrate entitlement to a contract time adjustment.

E. The identification and copies of the Contractor's documents and the substance of oral communications that support the potential claim.

- The full and final documentation of the potential claim shall be submitted on Form CEM-6201C furnished by the Department and shall be certified with reference to the California False Claims Act, Government Code Sections 12650-12655.

- Pertinent information, references, arguments, and data to support the potential claim shall be included in the full and final documentation of potential claim. Information submitted subsequent to the full and final documentation submittal will not be considered. Information required in the full and final documentation of potential claim, as listed in items A to E above, that is not applicable to the dispute may be exempted as determined by the Engineer. No full and final documentation of potential claim will be considered that does not have the same nature and circumstances, and basis of claim as those specified on the initial and supplemental notices of potential claim.

- The Engineer will evaluate the information presented in the full and final documentation of potential claim and provide a written response to the Contractor within 30 days of its receipt unless otherwise specified. The Engineer's receipt of the full and final documentation of potential claim shall be evidenced by postal receipt or the Engineer's written receipt if delivered by hand. If the full and final documentation of potential claim is submitted by the Contractor after acceptance of the work by the Director, the Engineer need not provide a written response.

- Provisions in this section shall not apply to those claims for overhead costs and administrative disputes that occur after issuance of the proposed final estimate. Administrative disputes are disputes of administrative deductions or retentions, contract item quantities, contract item adjustments, interest payments, protests of contract change orders as provided in Section 4-1.03A, "Procedure and Protest," and protests of the weekly statement of working days as provided in Section 8-1.06, "Time of Completion." Administrative disputes that occur prior to issuance of the proposed final estimate shall follow applicable requirements of this section. Information listed in the supplemental notice and full and final documentation of potential claim that is not applicable to the administrative dispute may be exempted as determined by the Engineer.

- Unless otherwise specified in the special provisions, the Contractor may pursue the administrative claim process pursuant to Section 9-1.07B, "Final Payment and Claims," for any potential claim found by the Engineer to be without merit.

- Failure of the Contractor to conform to specified dispute procedures shall constitute a failure to pursue diligently and exhaust the administrative procedures in the contract, and is deemed as the Contractor's waiver of the potential claim and a waiver of the right to a corresponding claim for the disputed work in the administrative claim process in conformance with Section 9-1.07B, "Final Payment of Claims," and shall operate as a bar to arbitration pursuant to Section 10240.2 of the California Public Contract Code.

Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications is amended to read:

#### **9-1.07B Final Payment and Claims**

- After acceptance by the Director, the Engineer will make a proposed final estimate in writing of the total amount payable to the Contractor, including an itemization of the total amount, segregated by contract item quantities, extra work and other bases for payment, and shall also show each deduction made or to be made for prior payments and amounts to be kept or retained under the provisions of the contract. Prior estimates and payments shall be subject to correction in the proposed final estimate. The Contractor shall submit written approval of the proposed final estimate or a written statement of claims arising under or by virtue of the contract so that the Engineer receives the written approval or statement of claims no later than close of business of the thirtieth day after receiving the proposed final estimate. If the thirtieth day falls on a Saturday, Sunday or legal holiday, then receipt of the written approval or statement of claims by the Engineer shall not be later than close of business of the next business day. The Contractor's receipt of the proposed final estimate shall be evidenced by postal receipt. The Engineer's receipt of the Contractor's written approval or statement of claims shall be evidenced by postal receipt or the Engineer's written receipt if delivered by hand.

- On the Contractor's approval, or if the Contractor files no claim within the specified period of 30 days, the Engineer will issue a final estimate in writing in conformance with the proposed final estimate submitted to the Contractor, and within 30 days thereafter the State will pay the entire sum so found to be due. That final estimate and payment thereon shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

- If the Contractor within the specified period of 30 days files claims, the Engineer will issue a semifinal estimate in conformance with the proposed final estimate submitted to the Contractor and within 30 days thereafter the State will pay the sum found to be due. The semifinal estimate and corresponding payment shall be conclusive and binding against both

parties to the contract on each question relating to the amount of work done and the compensation payable therefor, except insofar as affected by the claims filed within the time and in the manner required hereunder and except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

- Except for claims for overhead costs and administrative disputes that occur after issuance of the proposed final estimate, the Contractor shall only provide the following two items of information for each claim:

- A. The exclusive identification number that corresponds to the supporting full and final documentation of potential claim.
- B. The final amount of requested additional compensation.

- If the final amount of requested additional compensation is different than the amount of requested compensation included in the full and final documentation of potential claim, the Contractor shall provide in the written statement of claims the reasons for the changed amount, the specific provisions of the contract which support the changed amount, and a statement of the reasons the provisions support and provide a basis for the changed amount. If the Contractor's claim fails to provide an exclusive identification number or if there is a disparity in the provided exclusive identification number, the Engineer will notify the Contractor of the omission or disparity. The Contractor shall have 15 days after receiving notification from the Engineer to correct the omission or disparity. If after the 15 days has elapsed, there is still an omission or disparity of the exclusive identification number assigned to the claim, the Engineer will assign the number. No claim will be considered that has any of the following deficiencies:

- A. The claim does not have the same nature, circumstances, and basis as the corresponding full and final documentation of potential claim.
- B. The claim does not have a corresponding full and final documentation of potential claim.
- C. The claim was not included in the written statement of claims.
- D. The Contractor did not comply with applicable notice or protest requirements of Sections 4-1.03, "Changes," 5-1.116, "Differing Site Condition," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," 8-1.10, "Utility and Non-Highway Facilities," and 9-1.04, "Notice of Potential Claim."

- Administrative disputes that occur after issuance of the proposed final estimate shall be included in the Contractor's written statement of claims in sufficient detail to enable the Engineer to ascertain the basis and amounts of those claims.

- The Contractor shall keep full and complete records of the costs and additional time incurred for work for which a claim for additional compensation is made. The Engineer or designated claim investigators or auditors shall have access to those records and any other records as may be required by the Engineer to determine the facts or contentions involved in the claims. Failure to permit access to those records shall be sufficient cause for denying the claims.

- The written statement of claims submitted by the Contractor shall be accompanied by a notarized certificate containing the following language:

Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code Section 12650 et. seq., the undersigned,

\_\_\_\_\_  
*(name)* \_\_\_\_\_ of  
 \_\_\_\_\_  
*(title)* \_\_\_\_\_  
 \_\_\_\_\_  
*(company)* \_\_\_\_\_

hereby certifies that the claim for the additional compensation and time, if any, made herein for the work on this contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the contract between parties.

Dated \_\_\_\_\_  
 /s/ \_\_\_\_\_  
 Subscribed and sworn before me this \_\_\_\_\_ day  
 of \_\_\_\_\_

\_\_\_\_\_  
*(Notary Public)*  
 My Commission  
 Expires \_\_\_\_\_

- Failure to submit the notarized certificate will be sufficient cause for denying the claim.
- Claims for overhead type expenses or costs, in addition to being certified as stated above, shall be supported and accompanied by an audit report of an independent Certified Public Accountant. Omission of a supporting audit report of an independent Certified Public Accountant shall result in denial of the claim and shall operate as a bar to arbitration, as to the claim, in conformance with the requirements in Section 10240.2 of the California Public Contract Code. Claims for overhead type expenses or costs shall be subject to audit by the State at its discretion. The costs of performing an audit examination and submitting the report shall be borne by the Contractor. The Certified Public Accountant's audit examination shall be performed in conformance with the requirements of the American Institute of Certified Public Accountants Attestation Standards. The audit examination and report shall depict the Contractor's project and company-wide financial records and shall specify the actual overall average daily rates for both field and home office overhead for the entire duration of the project, and whether the costs have been properly allocated. The rates of field and home office overhead shall exclude unallowable costs as determined in Title 48 of the Federal Acquisition Regulations, Chapter 1, Part 31. The audit examination and report shall determine if the rates of field and home office overhead are:

- A. Allowable in conformance with the requirements in Title 48 of the Federal Acquisition Regulations, Chapter 1, Part 31.
- B. Adequately supported by reliable documentation.
- C. Related solely to the project under examination.

- Costs or expenses incurred by the State in reviewing or auditing claims that are not supported by the Contractor's cost accounting or other records shall be deemed to be damages incurred by the State within the meaning of the California False Claims Act.

- If the Engineer determines that a claim requires additional analysis, the Engineer will schedule a board of review meeting. The Contractor shall meet with the review board or person and make a presentation in support of the claim. Attendance by the Contractor at the board of review meeting shall be mandatory.

- The District Director of the District that administered the contract will make the final determination of any claims which remain in dispute after completion of claim review by the Engineer or board of review meeting.

The final determination of claims will be sent to the Contractor by hand delivery or deposit in the U.S. mail. The Engineer will then make and issue the Engineer's final estimate in writing and within 30 days thereafter the State will pay the entire sum, if any, found due thereon. That final estimate shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

- Failure of the Contractor to conform to the specified dispute procedures shall constitute a failure to pursue diligently and exhaust the administrative procedures in the contract and shall operate as a bar to arbitration in conformance with the requirements in Section 10240.2 of the California Public Contract Code.

## **SECTION 12: CONSTRUCTION AREA TRAFFIC CONTROL DEVICES**

Issue Date: November 2, 2004

The second paragraph of Section 12-1.01, "Description," of the Standard Specifications is amended to read:

- Attention is directed to Part 6 of the MUTCD and of the MUTCD California Supplement. Nothing in this Section 12 is to be construed as to reduce the minimum standards in these manuals.

Section 12-2.01, "Flaggers," of the Standard Specifications is amended to read:

- Flaggers while on duty and assigned to traffic control or to give warning to the public that the highway is under construction and of any dangerous conditions to be encountered as a result thereof, shall perform their duties and shall be provided with the necessary equipment in conformance with Part 6 of the MUTCD and of the MUTCD California Supplement. The equipment shall be furnished and kept clean and in good repair by the Contractor at the Contractor's expense.

The first paragraph of Section 12-3.01, "General," of the Standard Specifications is amended to read:

- In addition to the requirements in Part 6 of the MUTCD and of the MUTCD California Supplement, all devices used by the Contractor in the performance of the work shall conform to the provisions in this Section 12-3.

The first paragraph of Section 12-3.06, "Construction Area Signs," of the Standard Specifications is amended to read:

- The term "Construction Area Signs" shall include all temporary signs required for the direction of public traffic through or around the work during construction. Construction area signs are shown in or referred to in Part 6 of the MUTCD and of the MUTCD California Supplement.

The fourth paragraph of Section 12-3.06, "Construction Area Signs," of the Standard Specifications is amended to read:

- All construction area signs shall conform to the dimensions, color and legend requirements of the plans, Part 6 of the MUTCD, Part 6 of the MUTCD California Supplement, and these specifications. All sign panels shall be the product of a commercial sign manufacturer, and shall be as specified in these specifications.

The eighth paragraph of Section 12-3.06, "Construction Area Signs," of the Standard Specifications is amended to read:

- Used signs with the specified sheeting material will be considered satisfactory if they conform to the requirements for visibility and legibility and the colors conform to the requirements in Part 6 of the MUTCD and of the MUTCD California Supplement. A significant difference between day and nighttime retroreflective color will be grounds for rejecting signs.

Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications is amended by deleting the third, fourth, fifth, and sixth paragraphs.

## **SECTION 15: EXISTING HIGHWAY FACILITIES**

Issue Date: November 2, 2004

The sixth paragraph of Section 15-2.07, "Payment," of the Standard Specifications is amended to read:

- Full compensation for removing, salvaging, reconstructing, relocating or resetting end caps, return caps, terminal sections, and buried post anchors, for metal beam guard railings and three beam barriers, and for connecting reconstructed, relocated or reset railings and barriers to new and existing facilities, including connections to concrete, shall be considered as included in the contract price paid per meter for the type of railing or barrier work involved and no additional compensation will be allowed therefor.

## **SECTION 19: EARTHWORK**

Issue Date: December 31, 2001

The third paragraph of Section 19-1.02, "Preservation of Property," of the Standard Specifications is amended to read:

- In addition to the provisions in Sections 5-1.02, "Plans and Working Drawings," and 5-1.02A, "Excavation Safety Plans," detailed plans of the protective systems for excavations on or affecting railroad property will be reviewed for adequacy of protection provided for railroad facilities, property, and traffic. These plans shall be submitted at least 9 weeks before the Contractor intends to begin excavation requiring the protective systems. Approval by the Engineer of the detailed plans for the protective systems will be contingent upon the plans being satisfactory to the railroad company involved.

## **SECTION 20: EROSION CONTROL AND HIGHWAY PLANTING**

Issue Date: November 18, 2005

Section 20-2.25, "Backflow Preventers," of the Standard Specifications is amended to read:

### **20-2.25 BACKFLOW PREVENTERS**

- Backflow preventers shall be one of the reduced pressure principle devices as specified in these specifications and the special provisions.
- Backflow preventers shall be factory assembled and shall include 2 check valves, one pressure differential relief valve, 2 shut-off valves and 4 test cocks. Backflow preventer and valves shall be the same size as the pipeline in which they are installed, unless otherwise shown on the plans.
- Backflow preventer shut-off valves shall be manufactured from iron or bronze and shall be either resilient wedged gate valves, resilient seated and fully ported ball valves, or resilient seated butterfly valves. Threaded type shut-off valves shall be provided with a union on one side of each valve. Unions shall be brass or malleable iron.

Section 20-5.03J, "Check and Test Backflow Preventers," of the Standard Specifications is amended to read:

### **20-5.03J Check and Test Backflow Preventers**

- Backflow preventers shall be checked and tested for proper operation by a certified Backflow Preventer Tester. The tester shall hold a valid certification as a Backflow Preventer Tester from the local governing authority in which the device to be tested is located. The local governing authority shall be the county, city or water purveyor having the governing authority over testing of backflow preventers involved. If the local governing authority does not have a certification program for Backflow Preventer Testers, the tester shall have a certificate from one of the following:

- A. The American Water Works Association.
- B. A county which has a certification program for Backflow Preventer Testers.

- Tests for proper operation shall conform to the requirements of the governing authority.
- The Engineer shall be notified at least 5 days prior to testing backflow preventers.
- One copy of the test results for each backflow preventer tested shall be furnished to the Engineer.
- Backflow preventers, installed by the Contractor, failing required tests shall be repaired at the Contractor's expense.

## **SECTION 29: TREATED PERMEABLE BASES**

Issue Date: November 18, 2005

The fourth paragraph of Section 29-1.02A, "Asphalt Treated Permeable Base," of the Standard Specifications is amended to read:

- The type and grade of asphalt binder to be mixed with aggregate will be specified in the special provisions.

## **SECTION 39: ASPHALT CONCRETE**

Issue Date: November 18, 2005

The fifth paragraph of Section 39-2.01, "Asphalts," of the Standard Specifications is amended to read:

- Paving asphalt to be used as a binder for pavement reinforcing fabric shall be a steam-refined paving asphalt conforming to the provisions in Section 92, "Asphalts," and shall be Grade PG 70-10.

## **SECTION 42: GROOVE AND GRIND PAVEMENT**

Issue Date: December 31, 2001

The last sentence of the first subparagraph of the third paragraph in Section 42-2.02, "Construction," of the Standard Specifications is amended to read:

- After grinding has been completed, the pavement shall conform to the straightedge and profile requirements specified in Section 40-1.10, "Final Finishing."

## **SECTION 51: CONCRETE STRUCTURES**

Issue Date: January 28, 2005

The eleventh paragraph in Section 51-1.05, "Forms," of the Standard Specifications is amended to read:

- Form panels for exposed surfaces shall be furnished and placed in uniform widths of not less than 3 feet and in uniform lengths of not less than 6 feet, except at the end of continuously formed surfaces where the final panel length required is less than 6 feet. Where the width of the member formed is less than 3 feet, the width of the panels shall be not less than the width of the member. Panels shall be arranged in symmetrical patterns conforming to the general lines of the structure. Except when otherwise provided herein or shown on the plans, panels for vertical surfaces shall be placed with the long dimension horizontal and with horizontal joints level and continuous. Form panels for curved surfaces of columns shall be continuous for a minimum of one quarter of the circumference, or 6 feet. For walls with sloping footings which do not abut

other walls, panels may be placed with the long dimension parallel to the footing. Form panels on each side of the panel joint shall be precisely aligned, by means of supports or fasteners common to both panels, to result in a continuous unbroken concrete plane surface. When prefabricated soffit panels are used, form filler panels joining prefabricated panels shall have a uniform minimum width of 1 foot and shall produce a smooth uniform surface with consistent longitudinal joint lines between the prefabricated panels.

The first and second paragraph in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications are amended to read:

- The Contractor shall submit to the Engineer working drawings and design calculations for falsework proposed for use at bridges. For bridges where the height of any portion of the falsework, as measured from the ground line to the soffit of the superstructure, exceeds 14 feet; or where any individual falsework clear span length exceeds 16 feet; or where provision for vehicular, pedestrian, or railroad traffic through the falsework is made; the drawings shall be signed by an engineer who is registered as a Civil Engineer in the State of California. Six sets of the working drawings and 2 copies of the design calculations shall be furnished. Additional working drawings and design calculations shall be submitted to the Engineer when specified in "Railroad Relations and Insurance" of the special provisions.
- The falsework drawings shall include details of the falsework erection and removal operations showing the methods and sequences of erection and removal and the equipment to be used. The details of the falsework erection and removal operations shall demonstrate the stability of all or any portions of the falsework during all stages of the erection and removal operations.

The seventh paragraph in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications is amended to read:

- In the event that several falsework plans are submitted simultaneously, or an additional plan is submitted for review before the review of a previously submitted plan has been completed, the Contractor shall designate the sequence in which the plans are to be reviewed. In such event, the time to be provided for the review of any plan in the sequence shall be not less than the review time specified above for that plan, plus 2 weeks for each plan of higher priority which is still under review. A falsework plan submittal shall consist of plans for a single bridge or portion thereof. For multi-frame bridges, each frame shall require a separate falsework plan submittal.

Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications is amended by adding the following paragraphs:

- If structural composite lumber is proposed for use, the falsework drawings shall clearly identify the structural composite lumber members by grade (E value), species, and type. The Contractor shall provide technical data from the manufacturer showing the tabulated working stress values of the composite lumber. The Contractor shall furnish a certificate of compliance as specified in Section 6-1.07, "Certificates of Compliance," for each delivery of structural composite lumber to the project site.
- For falsework piles with a calculated loading capacity greater than 100 tons, the falsework piles shall be designed by an engineer who is registered as either a Civil Engineer or a

Geotechnical Engineer in the State of California, and the calculations shall be submitted to the Engineer.

The first paragraph in Section 51-1.06A(1), "Design Loads," of the Standard Specifications is amended to read:

- The design load for falsework shall consist of the sum of dead and live vertical loads, and an assumed horizontal load. The minimum total design load for any falsework, including members that support walkways, shall be not less than 100 pounds per square foot for the combined live and dead load regardless of slab thickness.

The eighth paragraph in Section 51-1.06A(1), "Design Loads," of the Standard Specifications is amended to read:

- In addition to the minimum requirements specified in this Section 51-1.06A, falsework for box girder structures with internal falsework bracing systems using flexible members capable of withstanding tensile forces only, shall be designed to include the vertical effects caused by the elongation of the flexible member and the design horizontal load combined with the dead and live loads imposed by concrete placement for the girder stems and connected bottom slabs. Falsework comprised of individual steel towers with bracing systems using flexible members capable of withstanding tensile forces only to resist overturning, shall be exempt from these additional requirements.

The third paragraph in Section 51-1.06B, "Falsework Construction," of the Standard Specifications is amended to read:

- When falsework is supported on piles, the piles shall be driven and the actual nominal resistance assessed in conformance with the provisions in Section 49, "Piling."

Section 51-1.06B, "Falsework Construction," of the Standard Specifications is amended by adding the following paragraphs:

- For falsework piles with a calculated nominal resistance greater than 200 tons, the Contractor shall conduct dynamic monitoring of pile driving and generate field acceptance criteria based on a wave equation analysis. These analyses shall be signed by an engineer who is registered as a Civil Engineer in the State of California and submitted to the Engineer prior to completion of falsework erection.
- Prior to the placement of falsework members above the stringers, the final bracing system for the falsework shall be installed.

Section 51-1.06C, "Removing Falsework," of the Standard Specifications is amended by adding the following paragraph:

- The falsework removal operation shall be conducted in such a manner that any portion of the falsework not yet removed remains in a stable condition at all times.

The sixth paragraph in Section 51-1.09, "Placing Concrete," of the Standard Specifications is amended to read:

- Vibrators used to consolidate concrete containing epoxy-coated bar reinforcement or epoxy-coated prestressing steel shall have a resilient covering to prevent damage to the epoxy-coating on the reinforcement or prestressing steel.

The third sentence of the fourth paragraph in Section 51-1.12D, "Sheet Packing, Preformed Pads and Board Fillers," of the Standard Specifications is amended to read:

Surfaces of expanded polystyrene against which concrete is placed shall be faced with hardboard.

Section 51-1.12F, "Sealed Joints," of the Standard Specifications is amended by adding the following paragraph:

- The opening of the joints at the time of placing shall be that shown on the plans adjusted for temperature. Care shall be taken to avoid impairment of the clearance in any manner.

The first paragraph in Section 51-1.12F, "Sealed Joints," of the Standard Specifications is amended to read:

- Where shown on the plans, joints in structures shall be sealed with joint seals, joint seal assemblies, or seismic joints in conformance with the details shown on the plans, the provisions in these specifications, and the special provisions.

The fourth paragraph in Section 51-1.12F, "Sealed Joints," of the Standard Specifications is amended to read:

- Joint seal assemblies and seismic joints shall consist of metal or metal and elastomeric assemblies which are anchored or cast into a recess in the concrete over the joint. Strip seal joint seal assemblies consist of only one joint cell. Modular unit joint seal assemblies consist of more than one joint cell.

The fifth paragraph in Section 51-1.12F, "Sealed Joints," of the Standard Specifications is amended to read:

- The Movement Rating (MR) shall be measured normal to the longitudinal axis of the joint. The type of seal to be used for the MR shown on the plans shall be as follows:

Movement Rating (MR)	Seal Type
MR ≤ ½ inch	Type A or Type B
½ inch < MR ≤ 1 inch	Type A (silicone only) or Type B
1 inch < MR ≤ 2 inches	Type B
2 inches < MR ≤ 4 inches	Joint Seal Assembly (Strip Seal)
MR > 4 inches	Joint Seal Assembly (Modular Unit) or Seismic Joint

The second paragraph in Section 51-1.12F(3)(b), "Type B Seal," of the Standard Specifications is amended to read:

- The preformed elastomeric joint seal shall conform to the requirements in ASTM Designation: D 2628 and the following:

- A. The seal shall consist of a multi-channel, nonporous, homogeneous material furnished in a finished extruded form.
- B. The minimum depth of the seal, measured at the contact surface, shall be at least 95 percent of the minimum uncompressed width of the seal as designated by the manufacturer.
- C. When tested in conformance with the requirements in California Test 673 for Type B seals, joint seals shall provide a Movement Rating (MR) of not less than that shown on the plans.
- D. The top and bottom edges of the joint seal shall maintain continuous contact with the sides of the groove over the entire range of joint movement.
- E. The seal shall be furnished full length for each joint with no more than one shop splice in any 60-foot length of seal.
- F. The Contractor shall demonstrate the adequacy of the procedures to be used in the work before installing seals in the joints.
- G. Shop splices and field splices shall have no visible offset of exterior surfaces, and shall show no evidence of bond failure.
- H. At all open ends of the seal that would admit water or debris, each cell shall be filled to a depth of 3 inches with commercial quality open cell polyurethane foam, or closed by other means subject to approval by the Engineer.

Section 51-1.12F(3)(c), "Joint Seal Assemblies," of the Standard Specifications is amended to read:

**(c) Joint Seal Assemblies and Seismic Joints**

- Joint seal assemblies and seismic joints shall be furnished and installed in joints in bridge decks as shown on the plans and as specified in the special provisions.

The eighth paragraph in Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearing Pads," of the Standard Specifications is amended to read:

- The elastomer, as determined from test specimens, shall conform to the following:

Test	ASTM Designation	Requirement
Tensile strength, MPa	D 412	15.5 Min.
Elongation at break, percent	D 412	350 Min.
Compression set, 22 h at 70°C, percent	D 395 (Method B)	25 Max.
Tear strength, kN/m	D 624 (Die C)	31.5 Min.
Hardness (Type A)	D 2240 with 2 kg. mass	55 ±5
Ozone resistance 20% strain, 100 h at 40°C ±2°C	D 1149 (except 100 ±20 parts per 100 000 000)	No cracks
Instantaneous thermal stiffening at -40°C	D 1043	Shall not exceed 4 times the stiffness measured at 23°C
Low temperature brittleness at -40°C	D 746 (Procedure B)	Pass

The table in the ninth paragraph of Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearing Pads," of the Standard Specifications is amended to read:

Tensile strength, percent	-15
Elongation at break, percent	-40; but not less than 300% total elongation of the material
Hardness, points	+10

The first paragraph in Section 51-1.12H(2), "Steel Reinforced Elastomeric Bearings," of the Standard Specifications is amended to read:

- Steel reinforced elastomeric bearings shall conform to the requirements for steel-laminated elastomeric bearings in ASTM Designation: D 4014 and the following:

- A. The bearings shall consist of alternating steel laminates and internal elastomer laminates with top and bottom elastomer covers. Steel laminates shall have a nominal thickness of 1.9 mm (14 gage). Internal elastomer laminates shall have a thickness of 12 mm, and top and bottom elastomer covers shall each have a thickness of 6 mm. The combined thickness of internal elastomer laminates and top and bottom elastomer covers shall be equal to the bearing pad thickness shown on the plans. The elastomer cover to the steel laminates at the sides of the bearing shall be 3 mm. If guide pins or other devices are used to control the side cover over the steel laminates, any exposed portions of the steel laminates shall be sealed by vulcanized patching. The length, width, or diameter of the bearings shall be as shown on the plans.
- B. The total thickness of the bearings shall be equal to the thickness of elastomer laminates and covers plus the thickness of the steel laminates.
- C. Elastomer for steel reinforced elastomeric bearings shall conform to the provisions for elastomer in Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearing Pads."
- D. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer certifying that the bearings to be furnished conform to all of the above provisions. The Certificate of Compliance shall be supported by a certified copy of the results of tests performed by the manufacturer on the bearings.
- E. One sample bearing shall be furnished to the Engineer from each lot of bearings to be furnished for the contract. Samples shall be available at least 3 weeks in advance of intended use. The sample bearing shall be one of the following:

Bearing Pad Thickness as Shown on the Plans	Sample Bearing
≤ 50 mm	Smallest complete bearing shown on the plans
> 50 mm	* 57 ± 3 mm thick sample not less than 200 mm x 305 mm in plan and cut by the manufacturer from the center of one of the thickest complete bearings

\* The sample bearing plus remnant parts of the complete bearing shall be furnished to the Engineer.

- F. A test specimen taken from the sample furnished to the Engineer will be tested in conformance with the requirements in California Test 663. Specimens tested shall show no indication of loss of bond between the elastomer and steel laminates.

The fourth paragraph in Section 51-1.14, "Waterstops," of the Standard Specifications is amended to read:

- Neoprene shall be manufactured from a vulcanized elastomeric compound containing neoprene as the sole elastomer and shall conform to the following:

Test	ASTM Designation	Requirement
Tensile strength, MPa	D 412	13.8 Min.
Elongation at break, percent	D 412	300 Min.
Compression set, 22 h at 70°C, percent	D 395 (Method B)	30 Max.
Tear strength, kN/m	D 624 (Die C)	26.3 Min.
Hardness (Type A)	D 2240	55±5
Ozone resistance 20% strain, 100 h at 38°C ±1°C	D 1149 (except 100±20 parts per 100 000 000)	No cracks
Low temperature brittleness at -40°C	D 746 (Procedure B)	Pass
Flame resistance	C 542	Must not propagate flame
Oil Swell, ASTM Oil #3, 70 h at 100°C, volume change, percent	D 471	80 Max.
Water absorption, immersed 7 days at 70°C, change in mass, percent	D 471	15 Max.

The first sentence of the fourth paragraph in Section 51-1.17, "Finish Bridge Decks," of the Standard Specifications is amended to read:

- The smoothness of completed roadway surfaces of structures, approach slabs and the adjacent 50 feet of approach pavement, and the top surfaces of concrete decks which are to be covered with another material, will be tested by the Engineer with a bridge profilograph in conformance with the requirements in California Test 547 and the requirements herein.

Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications is amended by deleting the seventh, thirteenth and fourteenth paragraphs.

The fourteenth paragraph in Section 51-1.23, "Payment," of the Standard Specifications is amended by deleting "and injecting epoxy in cracks".

## SECTION 52: REINFORCEMENT

Issue Date: November 2, 2004

The first paragraph in Section 52-1.02A, "Bar Reinforcement," of the Standard Specifications is amended to read:

- Reinforcing bars shall be low-alloy steel deformed bars conforming to the requirements in ASTM Designation: A 706/A 706M, except that deformed or plain billet-steel bars conforming to the requirements in ASTM Designation: A 615/A 615M, Grade 280 or 420, may be used as reinforcement in the following 5 categories:

- A. Slope and channel paving,
- B. Minor structures,
- C. Sign and signal foundations (pile and spread footing types),
- D. Roadside rest facilities, and
- E. Concrete barrier Type 50 and Type 60 series and temporary railing.

The third paragraph in Section 52-1.04, "Inspection," of the Standard Specifications is amended to read:

- A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall also be furnished for each shipment of epoxy-coated bar reinforcement or wire reinforcement certifying that the coated reinforcement conforms to the requirements in ASTM Designation: A 775/A 775M or A 884/A 884M respectively, and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement." The Certificate of Compliance shall include all of the certifications specified in ASTM Designation: A 775/A 775M or A 884/A 884M respectively.

Section 52-1.07 "Placing," of the Standard Specifications is amended by deleting item C of the third paragraph.

The eleventh paragraph in Section 52-1.07, "Placing," of the Standard Specifications is amended to read:

- Attention is directed to the provisions in Section 7-1.09, "Public Safety." Whenever a portion of an assemblage of bar reinforcing steel that is not encased in concrete exceeds 20 feet in height, the Contractor shall submit to the Engineer for approval, in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," working drawings and design calculations for the temporary support system to be used. The working drawings and design calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The temporary support system shall be designed to resist all expected loads and shall be adequate to prevent collapse or overturning of the assemblage. If the installation of forms or other work requires revisions to or temporary release of any portion of the temporary support system, the working drawings shall show the support system to be used during each phase of construction. The minimum horizontal wind load to be applied to the bar reinforcing steel assemblage, or to a combined assemblage of reinforcing steel and forms, shall be the sum of the products of the wind impact area and the applicable wind pressure value for each height zone. The wind impact area is the total projected area of the cage normal to the direction of the applied wind. Wind pressure values shall be determined from the following table:

Height Zone (Meters above ground)	Wind Pressure Value (Pa)
0-9.0	960
9.1-15.0	1200
15.1-30.0	1440
Over 30	1675

Section 52-1.08 "Splicing," of the Standard Specifications is amended to read:

## 52-1.08 SPLICING

- Splices of reinforcing bars shall consist of lap splices, service splices, or ultimate butt splices.
- Splicing of reinforcing bars will not be permitted at a location designated on the plans as a "No-Splice Zone." At the option of the Contractor, reinforcing bars may be continuous at locations where splices are shown on the plans. The location of splices, except where shown on the plans, shall be determined by the Contractor using available commercial lengths where practicable.
- Unless otherwise shown on the plans, splices in adjacent reinforcing bars at any particular section shall be staggered. The minimum distance between staggered lap splices or mechanical lap splices shall be the same as the length required for a lap splice in the largest bar. The minimum distance between staggered butt splices shall be 2 feet, measured between the midpoints of the splices along a line which is centered between the axes of the adjacent bars.

### 52-1.08A Lap Splicing Requirements

- Splices made by lapping shall consist of placing reinforcing bars in contact and wiring them together, maintaining the alignment of the bars and the minimum clearances. Should the Contractor elect to use a butt welded or mechanical splice at a location not designated on the plans as requiring a service or ultimate butt splice, this splice shall conform to the testing requirements for service splice.
- Reinforcing bars shall not be spliced by lapping at locations where the concrete section is not sufficient to provide a minimum clear distance of 2 inches between the splice and the nearest adjacent bar. The clearance to the surface of the concrete specified in Section 52-1.07, "Placing," shall not be reduced.
- Reinforcing bars Nos. 43 and 57 shall not be spliced by lapping.
- Where ASTM Designations: A 615/A 615M, Grade 420 or A 706/A 706M reinforcing bars are required, the length of lap splices shall be as follows: Reinforcing bars No. 25 or smaller shall be lapped at least 45 diameters of the smaller bar joined; and reinforcing bars Nos. 29, 32, and 36 shall be lapped at least 60 diameters of the smaller bar joined, except when otherwise shown on the plans.
- Where ASTM Designation: A 615/A 615M, Grade 280 reinforcing bars are permitted, the length of lap splices shall be as follows: Reinforcing bars No. 25 or smaller shall be lapped at least 30 diameters of the smaller bar joined; and reinforcing bars Nos. 29, 32, and 36 shall be lapped at least 45 diameters of the smaller bar joined, except when otherwise shown on the plans.
- Splices in bundled bars shall conform to the following:
  - A In bundles of 2 bars, the length of the lap splice shall be the same as the length of a single bar lap splice.
  - B. In bundles of 3 bars, the length of the lap splice shall be 1.2 times the length of a single bar lap splice.
- Welded wire fabric shall be lapped such that the overlap between the outermost cross wires is not less than the larger of:
  - A. 6 inches,
  - B. The spacing of the cross wires plus 2 inches, or
  - C. The numerical value of the longitudinal wire size (MW-Size Number) times 370 divided by the spacing of the longitudinal wires in millimeters.

### 52-1.08B Service Splicing and Ultimate Butt Splicing Requirements

- Service splices and ultimate butt splices shall be either butt welded or mechanical splices, shall be used at the locations shown on the plans, and shall conform to the requirements of these specifications and the special provisions.

#### 52-1.08B(1) Mechanical Splices

- Mechanical splices to be used in the work shall be on the Department's current prequalified list before use. The prequalified list can be obtained from the Department's internet site listed in the special provisions or by contacting the Transportation Laboratory directly.
- When tested in conformance with the requirements in California Test 670, the total slip shall not exceed the values listed in the following table:

Reinforcing Bar Number	Total Slip µm {inch}
13 {4}	250 {0.010}
16 {5}	250 {0.010}
19 {6}	250 {0.010}
22 {7}	350 {0.014}
25 {8}	350 {0.014}
29 {9}	350 {0.014}
32 {10}	450 {0.018}
36 {11}	450 {0.018}
43 {14}	600 {0.024}
57 {18}	750 {0.030}

- Slip requirements shall not apply to mechanical lap splices, splices that are welded, or splices that are used on hoops.
- Splicing procedures shall be in conformance with the manufacturer's recommendations, except as modified in this section. Splices shall be made using the manufacturer's standard equipment, jigs, clamps, and other required accessories.
- Splice devices shall have a clear coverage of not less than 1.5 inches measured from the surface of the concrete to the outside of the splice device. Stirrups, ties, and other reinforcement shall be adjusted or relocated, and additional reinforcement shall be placed, if necessary, to provide the specified clear coverage to reinforcement.
- The Contractor shall furnish the following information for each shipment of splice material in conformance with the provisions in Section 6-1.07, "Certificates of Compliance:"
  - A. The type or series identification of the splice material including tracking information for traceability.
  - B. The bar grade and size number to be spliced.
  - C. A copy of the manufacturer's product literature giving complete data on the splice material and installation procedures.
  - D. A statement that the splicing systems and materials used in conformance with the manufacturer's installation procedures will develop the required tensile strengths, based on the nominal bar area, and will conform to the total slip requirements and the other requirements in these specifications.
  - E. A statement that the splice material conforms to the type of mechanical splice in the Department's current prequalified list.

#### 52-1.08B(2) Butt Welded Splices

- Except for resistance butt welds, butt welded splices of reinforcing bars shall be complete joint penetration butt welds conforming to the requirements in AWS D 1.4, and these specifications.
  - Welders and welding procedures shall be qualified in conformance with the requirements in AWS D 1.4.
    - Only the joint details and dimensions as shown in Figure 3.2, "Direct Butt Joints," of AWS D 1.4, shall be used for making complete joint penetration butt welds of bar reinforcement. Split pipe backing shall not be used.
      - Butt welds shall be made with multiple weld passes using a stringer bead without an appreciable weaving motion. The maximum stringer bead width shall be 2.5 times the diameter of the electrode and slagging shall be performed between each weld pass. Weld reinforcement shall not exceed 5/32 inch in convexity.
        - Electrodes used for welding shall meet the minimum Charpy V-notch impact requirement of 27°J at -20°C.
          - For welding of bars conforming to the requirements of ASTM Designation: A 615/A 615M, Grade 280 or Grade 420, the requirements of Table 5.2, "Minimum Preheat and Interpass Temperatures," of AWS D 1.4 are superseded by the following:

The minimum preheat and interpass temperatures shall be 200°C for Grade 280 bars and 300°C for Grade 420 bars. Immediately after completing the welding, at least 6 inches of the bar on each side of the splice shall be covered by an insulated wrapping to control the rate of cooling. The insulated wrapping shall remain in place until the bar has cooled below 90°C.

- When welding different grades of reinforcing bars, the electrode shall conform to Grade 280 bar requirements and the preheat shall conform to the Grade 420 bar requirements.
  - In the event that any of the specified preheat, interpass, and post weld cooling temperatures are not met, all weld and heat affected zone metal shall be removed and the splice rewelded.
    - Welding shall be protected from air currents, drafts, and precipitation to prevent loss of heat or loss of arc shielding. The method of protecting the welding area from loss of heat or loss of arc shielding shall be subject to approval by the Engineer.
      - Reinforcing bars shall not be direct butt spliced by thermite welding.
      - Procedures to be used in making welded splices in reinforcing bars, and welders employed to make splices in reinforcing bars, shall be qualified by tests performed by the Contractor on sample splices of the type to be used, before making splices to be used in the work.

### **52-1.08B(3) Resistance Butt Welds**

- Shop produced resistance butt welds shall be produced by a fabricator who is approved by the Transportation Laboratory. The list of approved fabricators can be obtained from the Department's internet site or by contacting the Transportation Laboratory directly.
  - Before manufacturing hoops using resistance butt welding, the Contractor shall submit to the Engineer the manufacturer's Quality Control (QC) manual for the fabrication of hoops. As a minimum, the QC manual shall include the following:
    - A. The pre-production procedures for the qualification of material and equipment.
    - B. The methods and frequencies for performing QC procedures during production.
    - C. The calibration procedures and calibration frequency for all equipment.
    - D. The welding procedure specification (WPS) for resistance welding.

E. The method for identifying and tracking lots.

### **52-1.08C Service Splice and Ultimate Butt Splice Testing Requirements**

- The Contractor shall designate in writing a splicing Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for 1) the quality of all service and ultimate butt splicing including the inspection of materials and workmanship performed by the Contractor and all subcontractors; and 2) submitting, receiving, and approving all correspondence, required submittals, and reports regarding service and ultimate splicing to and from the Engineer.

- The QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

- Testing on prequalification and production sample splices shall be performed at the Contractor's expense, at an independent qualified testing laboratory. The laboratory shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors who will provide other services or materials for the project, and shall have the following:

- A. Proper facilities, including a tensile testing machine capable of breaking the largest size of reinforcing bar to be tested with minimum lengths as shown in this section.
- B. A device for measuring the total slip of the reinforcing bars across the splice to the nearest 25  $\mu$ m, that, when placed parallel to the longitudinal axis of the bar is able to simultaneously measure movement across the splice at 2 locations 180 degrees apart.
- C. Operators who have received formal training for performing the testing requirements of ASTM Designation: A 370 and California Test 670.
- D. A record of annual calibration of testing equipment performed by an independent third party that has 1) standards that are traceable to the National Institute of Standards and Technology, and 2) a formal reporting procedure, including published test forms.

- The Contractor shall provide samples for quality assurance testing in conformance with the provisions in these specifications and the special provisions.

- Prequalification and production sample splices shall be 1) a minimum length of 59 inches for reinforcing bars No. 25 or smaller, and 79 inches for reinforcing bars No. 29 or larger, with the splice located at mid-point; and 2) suitably identified before shipment with weatherproof markings that do not interfere with the Engineer's tamper-proof markings or seals. Splices that show signs of tampering will be rejected.

- Shorter length sample splice bars may be furnished if approved in writing by the Engineer.

- The Contractor shall ensure that sample splices are properly secured and transported to the testing laboratory in such a manner that no alterations to the physical conditions occur during transportation. Sample splices shall be tested in the same condition as received. No modifications to the sample splices shall be made before testing.

- Each set or sample splice, as defined herein, shall be identified as representing either a prequalification or production test sample splice.

- For the purpose of production testing, a lot of either service splices or ultimate butt splices is defined as 1) 150, or fraction thereof, of the same type of mechanical splices used for each bar size and each bar deformation pattern that is used in the work, or 2) 150, or fraction thereof, of complete joint penetration butt welded splices or resistance butt welded splices for

each bar size used in the work. If different diameters of hoop reinforcement are shown on the plans, separate lots shall be used for each different hoop diameter.

- Whenever a lot of splices is rejected, the rejected lot and subsequent lots of splices shall not be used in the work until 1) the QCM performs a complete review of the Contractor's quality control process for these splices, 2) a written report is submitted to the Engineer describing the cause of failure for the splices in this lot and provisions for preventing similar failures in future lots, and 3) the Engineer has provided the Contractor with written notification that the report is acceptable. The Engineer shall have 3 working days after receipt of the report to provide notification to the Contractor. In the event the Engineer fails to provide notification within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in providing notification, the Contractor will be compensated for any resulting loss, and an extension of time will be granted in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

#### **52-1.08C(1) Splice Prequalification Report**

- Before using any service splices or ultimate butt splices in the work, the Contractor shall submit a Splice Prequalification Report. The report shall include splice material information, names of the operators who will be performing the splicing, and descriptions of the positions, locations, equipment, and procedures that will be used in the work.

- The Splice Prequalification Report shall also include certifications from the fabricator for prequalifications of operators and procedures based on sample tests performed no more than 2 years before submitting the report. Each operator shall be certified by performing 2 sample splices for each bar size of each splice type that the operator will be performing in the work. For deformation-dependent types of splice devices, each operator shall be certified by performing 2 additional samples for each bar size and deformation pattern that will be used in the work.

- Prequalification sample splices shall be tested by an independent qualified testing laboratory and shall conform to the appropriate production test criteria and slip requirements specified herein. When epoxy-coated reinforcement is required, resistance butt welded sample splices shall have the weld flash removed by the same procedure as will be used in the work, before coating and testing. The Splice Prequalification Report shall include the certified test results for all prequalification sample splices.

- The QCM shall review and approve the Splice Prequalification Report before submitting it to the Engineer for approval. The Contractor shall allow 2 weeks for the review and approval of a complete report before performing any service splicing or ultimate butt splicing in the work. In the event the Engineer fails to complete the review within the time allowed, and in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

#### **52-1.08C(2) Service Splice Test Criteria**

- Service production and quality assurance sample splices shall be tensile tested in conformance with the requirements in ASTM Designation: A 370 and California Test 670 and shall develop a minimum tensile strength of not less than 550 MPa.

#### **52-1.08C(2)(a) Production Test Requirements for Service Splices**

- Production tests shall be performed by the Contractor's independent laboratory for all service splices used in the work. A production test shall consist of testing 4 sample splices prepared for each lot of completed splices. The samples shall be prepared by the Contractor

using the same splice material, position, operators, location, and equipment, and following the same procedure as used in the work.

- At least one week before testing, the Contractor shall notify the Engineer in writing of the date when and the location where the testing of the samples will be performed.
- The 4 samples from each production test shall be securely bundled together and identified with a completed sample identification card before shipment to the independent laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 samples of splices shall not be tested.
- Before performing any tensile tests on production test sample splices, one of the 4 samples shall be tested for, and shall conform to, the requirements for total slip. Should this sample not meet the total slip requirements, one retest, in which the 3 remaining samples are tested for total slip, will be allowed. Should any of the 3 remaining samples not conform to the total slip requirements, all splices in the lot represented by this production test will be rejected.
- If 3 or more sample splices from a production test conform to the provisions in this Section 52-1.08C(2), "Service Splice Test Criteria," all splices in the lot represented by this production test will be considered acceptable, provided each of the 4 samples develop a minimum tensile strength of not less than 420 MPa.
- Should only 2 sample splices from a production test conform to the provisions in this Section 52-1.08C(2), "Service Splice Test Criteria," one additional production test shall be performed on the same lot of splices. This additional production test shall consist of testing 4 sample splices that have been randomly selected by the Engineer and removed by the Contractor from the actual completed lot of splices. Should any of the 4 splices from this additional test fail to conform to these provisions, all splices in the lot represented by these production tests will be rejected.
- If only one sample splice from a production test conforms to the provisions in this Section 52-1.08C(2), "Service Splice Test Criteria," all splices in the lot represented by this production test will be rejected.
- If a production test for a lot fails, the Contractor shall repair or replace all reinforcing bars from which sample splices were removed before the Engineer selects additional splices from this lot for further testing.

#### **52-1.08C(2)(b) Quality Assurance Test Requirements for Service Splices**

- For the first production test performed, and for at least one, randomly selected by the Engineer, of every 5 subsequent production tests, or portion thereof, the Contractor shall concurrently prepare 4 additional service quality assurance sample splices. These service quality assurance sample splices shall be prepared in the same manner as specified herein for service production sample splices.
- These 4 additional quality assurance sample splices shall be shipped to the Transportation Laboratory for quality assurance testing. The 4 sample splices shall be securely bundled together and identified by location and contract number with weatherproof markings before shipment. Bundles containing fewer than 4 samples of splices will not be tested. Sample splices not accompanied by the supporting documentation required in Section 52-1.08B(1), for mechanical splices, or in Section 52-1.08B(3), for resistance butt welds, will not be tested.
- Quality assurance testing will be performed in conformance with the requirements for service production sample splices in Section 52-1.08C(2)(a), "Production Test Requirements for Service Splices."

#### **52-1.08C(3) Ultimate Butt Splice Test Criteria**

- Ultimate production and quality assurance sample splices shall be tensile tested in conformance with the requirements described in ASTM Designation: A 370 and California Test 670.
- A minimum of one control bar shall be removed from the same bar as, and adjacent to, all ultimate production, and quality assurance sample splices. Control bars shall be 1) a minimum length of 39 inches for reinforcing bars No. 25 or smaller and 59 inches for reinforcing bars No. 29 or larger, and 2) suitably identified before shipment with weatherproof markings that do not interfere with the Engineer's tamper-proof markings or seals. The portion of adjacent bar remaining in the work shall also be identified with weatherproof markings that correspond to its adjacent control bar.
- Each sample splice and its associated control bar shall be identified and marked as a set. Each set shall be identified as representing a prequalification, production, or quality assurance sample splice.
- The portion of hoop reinforcing bar, removed to obtain a sample splice and control bar, shall be replaced using a prequalified ultimate mechanical butt splice, or the hoop shall be replaced in kind.
- Reinforcing bars, other than hoops, from which sample splices are removed, shall be repaired using ultimate mechanical butt splices conforming to the provisions in Section 52-1.08C(1), "Splice Prequalification Report," or the bars shall be replaced in kind. These bars shall be repaired or replaced such that no splices are located in any "No Splice Zone" shown on the plans.
- Ultimate production and quality assurance sample splices shall rupture in the reinforcing bar either: 1) outside of the affected zone or 2) within the affected zone, provided that the sample splice has achieved at least 95 percent of the ultimate tensile strength of the control bar associated with the sample splice. In addition, necking of the bar, as defined in California Test 670, shall be evident at rupture regardless of whether the bar breaks inside or outside the affected zone.
- The affected zone is the portion of the reinforcing bar where any properties of the bar, including the physical, metallurgical, or material characteristics, have been altered by fabrication or installation of the splice.
- The ultimate tensile strength shall be determined for all control bars by tensile testing the bars to rupture, regardless of where each sample splice ruptures. If 2 control bars are tested for one sample splice, the bar with the lower ultimate tensile strength shall be considered the control bar.

#### **52-1.08C(3)(a) Production Test Requirements for Ultimate Butt Splices**

- Production tests shall be performed for all ultimate butt splices used in the work. A production test shall consist of testing 4 sets of sample splices and control bars removed from each lot of completed splices, except when quality assurance tests are performed.
- After the splices in a lot have been completed, and the bars have been epoxy-coated when required, the QCM shall notify the Engineer in writing that the splices in this lot conform to the specifications and are ready for testing. Except for hoops, sample splices will be selected by the Engineer at the job site. Sample splices for hoops will be selected by the Engineer either at the job site or a fabrication facility.
- After notification has been received, the Engineer will randomly select the 4 sample splices to be removed from the lot and place tamper-proof markings or seals on them. The Contractor shall select the adjacent control bar for each sample splice bar, and the Engineer will place tamper-proof markings or seals on them. These ultimate production sample splices and

control bars shall be removed by the Contractor, and tested by an independent qualified testing laboratory.

- At least one week before testing, the Contractor shall notify the Engineer in writing of the date when and the location where the testing of the samples will be performed.

- A sample splice or control bar from any set will be rejected if a tamper-proof marking or seal is disturbed before testing.

- The 4 sets from each production test shall be securely bundled together and identified with a completed sample identification card before shipment to the independent laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 sets of splices shall not be tested.

- Before performing any tensile tests on production test sample splices, one of the 4 sample splices shall be tested for, and shall conform to, the requirements for total slip. Should this sample splice not meet these requirements, one retest, in which the 3 remaining sample splices are tested for total slip, will be allowed. Should any of the 3 remaining sample splices not conform to these requirements, all splices in the lot represented by this production test will be rejected.

- If 3 or more sample splices from a production test conform to the provisions in Section 52-1.08C(3), "Ultimate Butt Splice Test Criteria," all splices in the lot represented by this production test will be considered acceptable.

- Should only 2 sample splices from a production test conform to the provisions in Section 52-1.08C(3), "Ultimate Butt Splice Test Criteria," one additional production test shall be performed on the same lot of splices. Should any of the 4 sample splices from this additional test fail to conform to these provisions, all splices in the lot represented by these production tests will be rejected.

- If only one sample splice from a production test conforms to the provisions in Section 52-1.08C(3), "Ultimate Butt Splice Test Criteria," all splices in the lot represented by this production test will be rejected.

- If a production test for a lot fails, the Contractor shall repair or replace all reinforcing bars from which sample splices were removed, complete in place, before the Engineer selects additional splices from this lot for further testing.

- Production tests will not be required on repaired splices from a lot, regardless of the type of prequalified ultimate mechanical butt splice used to make the repair. However, should an additional production test be required, the Engineer may select any repaired splice for the additional production test.

#### **52-1.08C(3)(b) Quality Assurance Test Requirements for Ultimate Butt Splices**

- For the first production test performed, and for at least one, randomly selected by the Engineer, of every 5 subsequent production tests, or portion thereof, the Contractor shall concurrently prepare 4 additional ultimate quality assurance sample splices along with associated control bars.

- Each time 4 additional ultimate quality assurance sample splices are prepared, 2 of these quality assurance sample splice and associated control bar sets and 2 of the production sample splice and associated control bar sets, together, shall conform to the requirements for ultimate production sample splices in Section 52-1.08C(3)(a), "Production Test Requirements for Ultimate Butt Splices."

- The 2 remaining quality assurance sample splice and associated control bar sets, along with the 2 remaining production sample splice and associated control bar sets shall be shipped to the Transportation Laboratory for quality assurance testing. The 4 sets shall be securely bundled

together and identified by location and contract number with weatherproof markings before shipment. Bundles containing fewer than 4 sets will not be tested.

- Quality assurance testing will be performed in conformance with the requirements for ultimate production sample splices in Section 52-1.08C(3)(a), "Production Test Requirements for Ultimate Butt Splices."

#### **52-1.08C(3)(c) Nondestructive Splice Tests**

- When the specifications allow for welded sample splices to be taken from other than the completed lot of splices, the Contractor shall meet the following additional requirements.

- Except for resistance butt welded splices, radiographic examinations shall be performed on 25 percent of all complete joint penetration butt welded splices from a production lot. The size of a production lot will be a maximum of 150 splices. The Engineer will select the splices which will compose the production lot and also the splices within each production lot to be radiographically examined.

- All required radiographic examinations of complete joint penetration butt welded splices shall be performed by the Contractor in conformance with the requirements in AWS D 1.4 and these specifications.

- Before radiographic examination, welds shall conform to the requirements in Section 4.4, "Quality of Welds," of AWS D 1.4.

- Should more than 12 percent of the splices which have been radiographically examined in any production lot be defective, an additional 25 percent of the splices, selected by the Engineer from the same production lot, shall be radiographically examined. Should more than 12 percent of the cumulative total of splices tested from the same production lot be defective, all remaining splices in the lot shall be radiographically examined.

- Additional radiographic examinations performed due to the identification of defective splices shall be at the Contractor's expense.

- All defects shall be repaired in conformance with the requirements in AWS D 1.4.

- The Contractor shall notify the Engineer in writing 48 hours before performing any radiographic examinations.

- The radiographic procedure used shall conform to the requirements in AWS D1.1, AWS D1.4, and the following:

Two exposures shall be made for each complete joint penetration butt welded splice. For each of the 2 exposures, the radiation source shall be centered on each bar to be radiographed. The first exposure shall be made with the radiation source placed at zero degrees from the top of the weld and perpendicular to the weld root and identified with a station mark of "0." The second exposure shall be at 90 degrees to the "0" station mark and shall be identified with a station mark of "90." When obstructions prevent a 90 degree placement of the radiation source for the second exposure, and when approved in writing by the Engineer, the source may be rotated, around the centerline of the reinforcing bar, a maximum of 25 degrees.

For field produced complete joint penetration butt welds, no more than one weld shall be radiographed during one exposure. For shop produced complete joint penetration butt welds, if more than one weld is to be radiographed during one exposure, the angle between the root line of each weld and the direction to the radiation source shall be not less than 65 degrees.

Radiographs shall be made by either X-ray or gamma ray. Radiographs made by X-ray or gamma rays shall have densities of not less than 2.3 nor more than 3.5 in the area of interest. A tolerance of 0.05 in density is allowed for densitometer variations. Gamma rays

shall be from the iridium 192 isotope and the emitting specimen shall not exceed 4.45 mm in the greatest diagonal dimension.

The radiographic film shall be placed perpendicular to the radiation source at all times; parallel to the root line of the weld unless source placement determines that the film must be turned; and as close to the root of the weld as possible.

The minimum source to film distance shall be maintained so as to ensure that all radiographs maintain a maximum geometric unsharpness of 0.020 at all times, regardless of the size of the reinforcing bars.

Penetrators shall be placed on the source side of the bar and perpendicular to the radiation source at all times. One penetrator shall be placed in the center of each bar to be radiographed, perpendicular to the weld root, and adjacent to the weld. Penetrator images shall not appear in the weld area.

When radiography of more than one weld is being performed per exposure, each exposure shall have a minimum of one penetrator per bar, or 3 penetrators per exposure. When 3 penetrators per exposure are used, one penetrator shall be placed on each of the 2 outermost bars of the exposure, and the remaining penetrator shall be placed on a centrally located bar.

An allowable weld buildup of 4 mm may be added to the total material thickness when determining the proper penetrator selection. No image quality indicator equivalency will be accepted. Wire penetrators or penetrator blocks shall not be used.

Penetrators shall be sufficiently shimmed using a radiographically identical material. Penetrator image densities shall be a minimum of 2.0 and a maximum of 3.6.

Radiographic film shall be Class 1, regardless of the size of reinforcing bars.

Radiographs shall be free of film artifacts and processing defects, including, but not limited to, streaks, scratches, pressure marks or marks made for the purpose of identifying film or welding indications.

Each splice shall be clearly identified on each radiograph and the radiograph identification and marking system shall be established between the Contractor and the Engineer before radiographic inspection begins. Film shall be identified by lead numbers only; etching, flashing or writing in identifications of any type will not be permitted. Each piece of film identification information shall be legible and shall include, as a minimum, the following information: Contractor's name, date, name of nondestructive testing firm, initials of radiographer, contract number, part number and weld number. The letter "R" and repair number shall be placed directly after the weld number to designate a radiograph of a repaired weld.

Radiographic film shall be developed within a time range of one minute less to one minute more than the film manufacturer's recommended maximum development time. Sight development will not be allowed.

Processing chemistry shall be done with a consistent mixture and quality, and processing rinses and tanks shall be clean to ensure proper results. Records of all developing processes and any chemical changes to the developing processes shall be kept and furnished to the Engineer upon request. The Engineer may request, at any time, that a sheet of unexposed film be processed in the presence of the Engineer to verify processing chemical and rinse quality.

The results of all radiographic interpretations shall be recorded on a signed certification and a copy kept with the film packet.

Technique sheets prepared in conformance with the requirements in ASME Boiler and Pressure Vessels Code, Section V, Article 2 Section T-291 shall also contain the developer temperature, developing time, fixing duration and all rinse times.

#### **52-1.08D Reporting Test Results**

- A Production Test Report for all testing performed on each lot shall be prepared by the independent testing laboratory performing the testing and submitted to the QCM for review and approval. The report shall be signed by an engineer who represents the laboratory and is registered as a Civil Engineer in the State of California. The report shall include, as a minimum, the following information for each test: contract number, bridge number, lot number and location, bar size, type of splice, length of mechanical splice, length of test specimen, physical condition of test sample splice and any associated control bar, any notable defects, total measured slip, ultimate tensile strength of each splice, and for ultimate butt splices, limits of affected zone, location of visible necking area, ultimate tensile strength and 95 percent of this ultimate tensile strength for each control bar, and a comparison between 95 percent of the ultimate tensile strength of each control bar and the ultimate tensile strength of its associated splice.

- The QCM must review, approve, and forward each Production Test Report to the Engineer for review before the splices represented by the report are encased in concrete. The Engineer will have 3 working days to review each Production Test Report and respond in writing after a complete report has been received. Should the Contractor elect to encase any splices before receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase splices pending notification by the Engineer, and in the event the Engineer fails to complete the review and provide notification within the time allowed, and if, in the opinion of the Engineer, the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

- Quality assurance test results for each bundle of 4 sets or 4 samples of splices will be reported in writing to the Contractor within 3 working days after receipt of the bundle by the Transportation Laboratory. In the event that more than one bundle is received on the same day, 2 additional working days shall be allowed for providing test results for each additional bundle received. A test report will be made for each bundle received. Should the Contractor elect to encase splices before receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase splices pending notification by the Engineer, and in the event the Engineer fails to complete the review within the time allowed, and in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

Section 52-1.11, "Payment," of the Standard Specifications is amended by adding the following paragraph after the seventh paragraph:

- If a portion or all of the reinforcing steel is epoxy-coated more than 480 air line kilometers from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impracticable and extremely difficult to ascertain and determine the actual increase in these expenses, it is agreed that payment to the

Contractor for furnishing the epoxy-coated reinforcement will be reduced \$5000 for each epoxy-coating facility located more than 480 air line kilometers from both Sacramento and Los Angeles and an additional \$3000 (\$8000 total) for each epoxy-coating facility located more than 4800 air line kilometers from both Sacramento and Los Angeles.

## **SECTION 55: STEEL STRUCTURES**

Issue Date: December 31, 2001

Section 55-3.14, "Bolted Connections," of the Standard Specifications is amended by adding the following after the ninth paragraph:

- If a torque multiplier is used in conjunction with a calibrated wrench as a method for tightening fastener assemblies to the required tension, both the multiplier and the wrench shall be calibrated together as a system. The same length input and output sockets and extensions that will be used in the work shall also be included in the calibration of the system. The manufacturer's torque multiplication ratio shall be adjusted during calibration of the system, such that when this adjusted ratio is multiplied by the actual input calibrated wrench reading, the product is a calculated output torque that is within 2 percent of the true output torque. When this system is used in the work to perform any installation tension testing, rotational capacity testing, fastener tightening, or tension verification, it shall be used, intact as calibrated.

The sixth paragraph of Section 55-4.02, "Payment," of the Standard Specifications is amended to read:

- If a portion or all of the structural steel is fabricated more than 480 air line kilometers from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impracticable and extremely difficult to ascertain and determine the actual increase in these expenses, it is agreed that payment to the Contractor for furnishing the structural steel from each fabrication site located more than 480 air line kilometers from both Sacramento and Los Angeles will be reduced \$5000 or by an amount computed at \$0.044 per kilogram of structural steel fabricated, whichever is greater, or in the case of each fabrication site located more than 4800 air line kilometers from both Sacramento and Los Angeles, payment will be reduced \$8000 or by \$0.079 per kilogram of structural steel fabricated, whichever is greater.

## **SECTION 56: SIGNS**

Issue Date: November 2, 2004

Section 56-1.01, "Description," of the Standard Specifications is amended by deleting the third paragraph.

Section 56-1.02A, "Bars, Plates and Shapes," of the Standard Specifications is amended to read:

### **56-1.02A Bars, Plates, Shapes, and Structural Tubing**

- Bars, plates, and shapes shall be structural steel conforming to the requirements in ASTM Designation: A 36/A 36M, except, at the option of the Contractor, the light fixture mounting channel shall be continuous-slot steel channel conforming to the requirements in ASTM Designation: A 1011/A 1011M, Designation SS, Grade 33[230], or aluminum Alloy 6063-T6 extruded aluminum conforming to the requirements in ASTM Designation: B 221 or B 221M.
- Structural tubing shall be structural steel conforming to the requirements in ASTM Designation: A 500, Grade B.
- Removable sign panel frames shall be constructed of structural steel conforming to the requirements in ASTM Designation: A 36/A 36M.

Section 56-1.02B, "Sheets," of the Standard Specifications is amended to read:

### **56-1.02B Sheets**

- Sheets shall be carbon-steel sheets conforming to the requirements in ASTM Designation: A 1011/A 1011M, Designation SS, Grade 33[230].
- Ribbed sheet metal for box beam-closed truss sign structures shall be fabricated from galvanized sheet steel conforming to the requirements in ASTM Designation: A 653/A 653M, Designation SS, Grade 33[230]. Sheet metal panels shall be G 165 coating designation in conformance with the requirements in ASTM Designation: A 653/A 653M.

Section 56-1.02F, "Steel Walkway Gratings," of the Standard Specifications is amended to read:

### **56-1.02F Steel Walkway Gratings**

- Steel walkway gratings shall be furnished and installed in conformance with the details shown on the plans and the following provisions:
  - A. Gratings shall be the standard product of an established grating manufacturer.
  - B. Material for gratings shall be structural steel conforming to the requirements in ASTM Designation: A 1011/A 1011M, Designation CS, Type B.
  - C. For welded type gratings, each joint shall be full resistance welded under pressure, to provide a sound, completely beaded joint.
  - D. For mechanically locked gratings, the method of fabrication and interlocking of the members shall be approved by the Engineer, and the fabricated grating shall be equal in strength to the welded type.
  - E. Gratings shall be accurately fabricated and free from warps, twists, or other defects affecting their appearance or serviceability. Ends of all rectangular panels shall be square. The tops of the bearing bars and cross members shall be in the same plane. Gratings distorted by the galvanizing process shall be straightened.

The sixth through the thirteenth paragraphs in Section 56-1.03, "Fabrication," of the Standard Specifications are amended to read:

- High-strength bolted connections, where shown on the plans, shall conform to the provisions in Section 55-3.14, "Bolted Connections," except that only fastener assemblies consisting of a high-strength bolt, nut, hardened washer, and direct tension indicator shall be used.

- High-strength fastener assemblies, and any other bolts, nuts, and washers attached to sign structures shall be zinc-coated by the mechanical deposition process.
- Nuts for high-strength bolts designated as snug-tight shall not be lubricated.
- An alternating snugging and tensioning pattern for anchor bolts and high-strength bolted splices shall be used. Once tensioned, high-strength fastener components and direct tension indicators shall not be reused.
- For bolt diameters less than 3/8 inch, the diameter of the bolt hole shall be not more than 1/32 inch larger than the nominal bolt diameter. For bolt diameters greater than or equal to 3/8 inch, the diameter of the bolt hole shall be not more than 1/6 inch larger than the nominal bolt diameter.
- Sign structures shall be fabricated into the largest practical sections prior to galvanizing.
- Ribbed sheet metal panels for box beam closed truss sign structures shall be fastened to the truss members by cap screws or bolts as shown on the plans, or by 3/16 inch stainless steel blind rivets conforming to Industrial Fasteners Institute, Standard IFI-114, Grade 51. The outside diameter of the large flange rivet head shall be not less than 5/8 inch in diameter. Web splices in ribbed sheet metal panels may be made with similar type blind rivets of a size suitable for the thickness of material being connected.
- Spalling or chipping of concrete structures shall be repaired by the Contractor at the Contractor's expense.
- Overhead sign supports shall have an aluminum identification plate permanently attached near the base, adjacent to the traffic side on one of the vertical posts, using either stainless steel rivets or stainless steel screws. As a minimum, the information on the plate shall include the name of the manufacturer, the date of manufacture and the contract number.

The fifth paragraph of Section 56-2.02B, "Wood Posts," of the Standard Specifications is amended to read:

- Douglas fir and Hem-Fir posts shall be treated in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," and in conformance with AWWA Use Category System: UC4A, Commodity Specification A. Posts shall be incised and the minimum retention of preservative shall be as specified in AWWA Standards.

## **SECTION 57: TIMBER STRUCTURES**

Issue Date: October 12, 2004

The second paragraph of Section 57-1.02A, "Structural Timber and Lumber," of the Standard Specifications is amended to read:

- When preservative treatment of timber and lumber is required, the treatment shall conform to the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," and AWWA's Use Category 4B. The type of treatment to be used will be shown on the plans or specified in the special provisions.

## **SECTION 58: PRESERVATIVE TREATMENT OF LUMBER, TIMBER AND PILING**

Issue Date: November 18, 2005

The first paragraph of Section 58-1.02, "Treatment and Retention," of the Standard Specifications is amended to read:

- Timber, lumber, and piling shall be pressure treated after millwork is completed. Preservatives, treatment, and results of treatment shall conform to the requirements in AWPA Standards U1 and T1. Treatment of lumber and timber shall conform to the specified AWPA Use Category cited in the special provisions, on the plans, or elsewhere in these specifications.

The second paragraph of Section 58-1.02, "Treatment and Retention," of the Standard Specifications is deleted.

## **SECTION 59: PAINTING**

Issue Date: December 31, 2001

Section 59-2.01, "General," of the Standard Specifications is amended by adding the following paragraphs after the first paragraph:

- Unless otherwise specified, no painting Contractors or subcontractors will be permitted to commence work without having the following current "SSPC: The Society for Protective Coatings" (formerly the Steel Structures Painting Council) certifications in good standing:
  - A. For cleaning and painting structural steel in the field, certification in conformance with the requirements in Qualification Procedure No. 1, "Standard Procedure For Evaluating Painting Contractors (Field Application to Complex Industrial Structures)" (SSPC-QP 1).
  - B. For removing paint from structural steel, certification in conformance with the requirements in Qualification Procedure No. 2, "Standard Procedure For Evaluating Painting Contractors (Field Removal of Hazardous Coatings from Complex Structures)" (SSPC-QP 2).
  - C. For cleaning and painting structural steel in a permanent painting facility, certification in conformance with the requirements in Qualification Procedure No. 3, "Standard Procedure For Evaluating Qualifications of Shop Painting Applicators" (SSPC-QP 3). The AISC's Sophisticated Paint Endorsement (SPE) quality program will be considered equivalent to SSPC-QP 3.

The third paragraph of Section 59-2.03, "Blast Cleaning," of the Standard Specifications is amended to read:

- Exposed steel or other metal surfaces to be blast cleaned shall be cleaned in conformance with the requirements in Surface Preparation Specification No. 6, "Commercial Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave all surfaces with a dense, uniform, angular anchor pattern of not less than 35  $\mu\text{m}$  as measured in conformance with the requirements in ASTM Designation: D 4417.

The first paragraph of Section 59-2.06, "Hand Cleaning," of the Standard Specifications is amended to read:

- Dirt, loose rust and mill scale, or paint which is not firmly bonded to the surfaces shall be removed in conformance with the requirements in Surface Preparation Specification No. 2,

"Hand Tool Cleaning," of the "SSPC: The Society for Protective Coatings." Edges of old remaining paint shall be feathered.

The fourth paragraph of Section 59-2.12, "Painting," of the Standard Specifications is amended to read:

- The dry film thickness of the paint will be measured in place with a calibrated Type 2 magnetic film thickness gage in conformance with the requirements of specification SSPC-PA2 of the "SSPC: The Society for Protective Coatings."

## **SECTION 72: SLOPE PROTECTION**

Issue Date: November 18, 2005

The sixth paragraph of Section 72-4.04, "Construction," of the Standard Specifications is amended to read:

- Pervious backfill material, if required by the plans, shall be placed as shown. A securely tied sack containing 1-ft<sup>3</sup> of pervious backfill material shall be placed at each weep hole and drain hole. The sack material shall conform to the provisions in Section 88-1.03, "Filter Fabric."

## **SECTION 75: MISCELLANEOUS METAL**

Issue Date: November 2, 2004

The table in the tenth paragraph of Section 75-1.02, "Miscellaneous Iron and Steel," of the Standard Specifications is amended to read:

Material	Specification
Steel bars, plates and shapes	ASTM Designation: A 36/A 36M or A 575, A 576 (AISI or M Grades 1016 through 1030)
Steel fastener components for general applications:	
Bolts and studs	ASTM Designation: A 307
Headed anchor bolts	ASTM Designation: A 307, Grade B, including S1 supplementary requirements
Nonheaded anchor bolts	ASTM Designation: A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation: M 314 supplementary requirements or AASHTO Designation: M 314, Grade 36 or 55, including S1 supplementary requirements
High-strength bolts and studs, threaded rods, and nonheaded anchor bolts	ASTM Designation: A 449, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1*
Washers	ASTM Designation: F 844
Components of high-strength steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM Designation: A 325, Type 1
Tension control bolts	ASTM Designation: F 1852, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1*
Hardened washers	ASTM Designation: F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM Designation: F 959, Type 325, zinc-coated
Stainless steel fasteners (Alloys 304 & 316) for general applications:	
Bolts, screws, studs, threaded rods, and nonheaded anchor bolts	ASTM Designation: F 593 or F 738M
Nuts	ASTM Designation: F 594 or F 836M
Washers	ASTM Designation: A 240/A 240M and ANSI B 18.22M
Carbon-steel castings	ASTM Designation: A 27/A 27M, Grade 65-35 [450-240], Class 1
Malleable iron castings	ASTM Designation: A 47, Grade 32510 or A 47M, Grade 22010
Gray iron castings	ASTM Designation: A 48, Class 30B
Ductile iron castings	ASTM Designation: A 536, Grade 65-45-12
Cast iron pipe	Commercial quality
Steel pipe	Commercial quality, welded or extruded
Other parts for general applications	Commercial quality

\* Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dyed dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.

The second paragraph in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

- Miscellaneous bridge metal shall consist of the following, except as further provided in Section 51-1.19, "Utility Facilities," and in the special provisions:

- A. Bearing assemblies, equalizing bolts and expansion joint armor in concrete structures.
- B. Expansion joint armor in steel structures.
- C. Manhole frames and covers, frames and grates, ladder rungs, guard posts and access door assemblies.
- D. Deck drains, area drains, retaining wall drains, and drainage piping, except drainage items identified as "Bridge Deck Drainage System" in the special provisions.

The table in the eighteenth paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Stud Diameter (millimeters) {inches}	Sustained Tension Test Load (kilonewtons) {pounds}
29.01-33.00 {1 ¼}	137.9 {31,000}
23.01-29.00 {1}	79.6 {17,900}
21.01-23.00 {7/8}	64.1 {14,400}
* 18.01-21.00 {3/4}	22.2 {5,000}
15.01-18.00 {5/8}	18.2 {4,100}
12.01-15.00 {1/2}	14.2 {3,200}
9.01-12.00 {3/8}	9.34 {2,100}
6.00-9.00 {1/4}	4.23 {1,000}

\* Maximum stud diameter permitted for mechanical expansion anchors.

The table in the nineteenth paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Stud Diameter (millimeters) {inches}	Ultimate Tensile Load (kilonewtons) {pounds}
30.01-33.00 {1 ¼}	112.1
27.01-30.00 {1 1/8}	88.1
23.01-27.00 {1}	71.2
20.01-23.00	51.6
16.01-20.00	32.0
14.01-16.00	29.4
12.00-14.00	18.7

The table in the twenty-second paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Installation Torque Values, (newton meters)

Stud Diameter (millimeters)	Shell Type Mechanical Expansion Anchors	Integral Stud Type Mechanical Expansion Anchors	Resin Capsule Anchors and Cast-in-Place Inserts
29.01-33.00	—	—	540
23.01-29.00	—	—	315
21.01-23.00	—	—	235
18.01-21.00	110	235	200
15.01-18.00	45	120	100
12.01-15.00	30	65	40
9.01-12.00	15	35	24
6.00-9.00	5	10	—

The third paragraph in Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications is amended to read:

- Cables shall be 19 mm preformed, 6 x 19, wire strand core or independent wire rope core (IWRC), galvanized, and in conformance with the requirements in Federal Specification RR-W-410D, right regular lay, manufactured of improved plow steel with a minimum breaking strength of 200 kN. Two certified copies of mill test reports of each manufactured length of cable used shall be furnished to the Engineer.

The second paragraph in Section 75-1.05, "Galvanizing," of the Standard Specifications is amended to read:

At the option of the Contractor, material thinner than 3.2 mm shall be galvanized either before fabrication in conformance with the requirements of ASTM Designation: A 653/A 653M, Coating Designation Z600, or after fabrication in conformance with the requirements of ASTM Designation: A 123, except that the weight of zinc coating shall average not less than 365 g per square meter of actual surface area with no individual specimen having a coating weight of less than 305 g per square meter.

## **SECTION 80: FENCES**

Issue Date: October 12, 2004

The second paragraph of Section 80-3.01B(2), "Treated Wood Posts and Braces," of the Standard Specifications is amended to read:

- Posts and braces to be treated shall be pressure treated in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," and AWPA Use Category System: UC4A, Commodity Specification A or B.

## **SECTION 83: RAILINGS AND BARRIERS**

Issue Date: January 28, 2005

The first paragraph of Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications is amended to read:

- The rail elements, backup plates, terminal sections, end and return caps, bolts, nuts and other fittings shall conform to the requirements in AASHTO Designation: M 180, except as modified in this Section 83-1.02B and as specified in Section 83-1.02. The rail elements, backup plates, terminal sections, end and return caps shall conform to Class A, Type 1 W-Beam guard railing as shown in AASHTO Designation: M 180. The edges and center of the rail element shall contact each post block. Rail element joints shall be lapped not less than 316 mm and bolted. The rail metal, in addition to conforming to the requirements in AASHTO Designation: M 180, shall withstand a cold bend, without cracking, of 180 degrees around a mandrel of a diameter equal to 2.5 times the thickness of the plate.

The ninth paragraph in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications is amended to read:

- The grades and species of wood posts and blocks shall be No. 1 timbers (also known as No. 1 structural) Douglas fir or No. 1 timbers Southern yellow pine. Wood posts and blocks shall be graded in conformance with the provisions in Section 57-2, "Structural Timber," of the Standard Specifications, except allowances for shrinkage after mill cutting shall in no case exceed 5 percent of the American Lumber Standards minimum sizes, at the time of installation.

The eleventh paragraph in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications is amended to read:

- After fabrication, wood posts and blocks shall be pressure treated in conformance with Section 58, "Preservative Treatment of Lumber, Timber and Piling," and AWWA Use Category System: UC4A, Commodity Specification A.

The twelfth paragraph in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications is amended to read:

- If copper naphthenate, ammoniacal copper arsenate, chromated copper arsenate, ammoniacal copper zinc arsenate, ammoniacal copper quat or copper azole is used to treat the wood posts and blocks, the bolt holes shall be treated as follows:

A. Before the bolts are inserted, bolt holes shall be filled with a grease, recommended by the manufacturer for corrosion protection, which will not melt or run at a temperature of 65°C.

The twenty-fourth paragraph of Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications is amended to read:

- End anchor assemblies and rail tensioning assemblies for metal beam guard railing shall be constructed as shown on the plans and shall conform to the following provisions:

An end anchor assembly (Type SFT) for metal beam guard railing shall consist of an anchor cable, an anchor plate, a wood post, a steel foundation tube, a steel soil plate and hardware.

An end anchor assembly (Type CA) for metal beam guard railing shall consist of an anchor cable, an anchor plate, a single anchor rod or double anchor rods, hardware and one concrete anchor.

A rail tensioning assembly for metal beam guard railing shall consist of an anchor cable, an anchor plate, and hardware.

The anchor plate, metal plates, steel foundation tubes and steel soil plate shall be fabricated of steel conforming to the requirements in ASTM Designation: A 36/A 36M.

The anchor rods shall be fabricated of steel conforming to the requirements in ASTM Designation: A 36/A 36M, A 441 or A 572, or ASTM Designation: A 576, Grades 1018, 1019, 1021 or 1026. The eyes shall be hot forged or formed with full penetration welds. After fabrication, anchor rods with eyes that have been formed with any part of the eye below 870°C during the forming operation or with eyes that have been closed by welding shall be thermally stress relieved prior to galvanizing. The completed anchor rod, after galvanizing, shall develop a strength of 220 kN.

In lieu of built-up fabrication of anchor plates as shown on the plans, anchor plates may be press-formed from steel plate, with or without welded seams.

All bolts and nuts shall conform to the requirements in ASTM Designation: A 307, unless otherwise specified in the special provisions or shown on the plans.

Anchor cable shall be 19-mm preformed, 6 x 19, wire strand core or independent wire rope core (IWRC), galvanized in conformance with the requirements in Federal Specification RR-W-410D, right regular lay, manufactured of improved plow steel with a minimum breaking strength of 200 kN. Two certified copies of mill test reports of each manufactured length of cable used shall be furnished to the Engineer. The overall length of each cable anchor assembly shall be as shown on the plans, but shall be a minimum of 2 m.

Where shown on the plans, cable clips and a cable thimble shall be used to attach cable to the anchor rod. Thimbles shall be commercial quality, galvanized steel. Cable clips shall be commercial quality drop forged galvanized steel.

The swaged fitting shall be machined from hot-rolled bars of steel conforming to AISI Designation: C 1035, and shall be annealed suitable for cold swaging. The swaged fitting shall be galvanized before swaging. A lock pin hole to accommodate a 6-mm, plated, spring steel pin shall be drilled through the head of the swage fitting to retain the stud in proper position. The manufacturer's identifying mark shall be stamped on the body of the swage fitting.

The 25-mm nominal diameter stud shall conform to the requirements in ASTM Designation: A 449 after galvanizing. Prior to galvanizing, a 10-mm slot for the locking pin shall be milled in the stud end.

The swaged fittings, stud and nut assembly shall develop the specified breaking strength of the cable.

The cable assemblies shall be shipped as a complete unit including stud and nut.

Clevises shall be drop forged galvanized steel and shall develop the specified breaking strength of the cable.

One sample of cable properly fitted with swaged fitting and right hand thread stud at both ends as specified above, including a clevis when shown on the plans, one meter in total length, shall be furnished the Engineer for testing.

The portion of the anchor rod to be buried in earth shall be coated with a minimum 0.5-mm thickness of coal tar enamel conforming to AWWA Standard: C203 or a coal tar epoxy conforming to the requirements in Steel Structures Painting Council Paint

Specification No. 16, Coal-Tar Epoxy-Polyimide Black Paint or Corps of Engineers Specification, Formula C-200a, Coal-Tar Epoxy Paint.

Metal components of the anchor assembly shall be fabricated in conformance with good shop practice and shall be hot-dip galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing."

Anchor cables shall be tightened after the concrete anchor has cured for at least 5 days.

Concrete used to construct anchors for end anchor assemblies shall be Class 3 or minor concrete conforming to the provisions in Section 90, "Portland Cement Concrete."

Concrete shall be placed against undisturbed material of the excavated holes for end anchors. The top 300 mm of holes shall be formed, if required by the Engineer.

Reinforcing steel in concrete anchors for end anchor assemblies shall conform to the provisions in Section 52, "Reinforcement."

The second paragraph in Section 83-1.02D, "Steel Bridge Railing," of the Standard Specifications is amended to read:

- Structural shapes, tubing, plates, bars, bolts, nuts, and washers shall be structural steel conforming to the provisions in Section 55-2, "Materials." Other fittings shall be commercial quality.

The second and third paragraphs in Section 83-1.02E, "Cable Railing," of the Standard Specifications are replaced with the following paragraph:

- Pipe for posts and braces shall be standard steel pipe or pipe that conforms to the provisions in Section 80-4.01A, "Posts and Braces."

The fourteenth paragraph in Section 83-1.02I, "Chain Link Railing," of the Standard Specifications is amended to read:

- Chain link fabric shall be either 11-gage Type I zinc coated fabric conforming to the requirements in AASHTO Designation: M 181 or 11-gage Type IV polyvinyl chloride (PVC) coated fabric conforming to the requirements in Federal Specification RR-F-191/1D.

The second paragraph of Section 83-1.03, "Measurement," of the Standard Specifications is amended to read:

- Except for metal beam guard railing within the pay limits of a terminal system end treatment or transition railing (Type WB), metal beam guard railing will be measured by the meter along the face of the rail element from end post to end post of the completed railing at each installation. The point of measurement at each end post will be the center of the bolt attaching the rail element to the end post.

The seventh paragraph of Section 83-1.03, "Measurement," of the Standard Specifications is amended to read:

- The quantities of end anchor assemblies (Type SFT or Type CA) and rail tensioning assemblies will be measured as units determined from actual count. An end anchor assembly

(Type CA) with 2 cables attached to one concrete anchor will be counted as one terminal anchor assembly (Type CA) for measurement and payment.

The eighth paragraph of Section 83-1.03, "Measurement," of the Standard Specifications is amended to read:

- The quantities of return and end caps and the various types of terminal sections for metal beam guard railing will be determined as units from actual count.

The third paragraph of Section 83-1.04, "Payment," of the Standard Specifications is amended to read:

- The contract unit prices paid for end anchor assembly (Type SFT), end anchor assembly (Type CA), and rail tensioning assembly shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in constructing the end anchor assemblies, complete in place, including drilling anchor plate bolt holes in rail elements, driving steel foundation tubes, excavating for concrete anchor holes and disposing of surplus material, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The fourth paragraph of Section 83-1.04, "Payment," of the Standard Specifications is amended to read:

- The contract unit prices paid for return caps, end caps, and the various types of terminal sections for metal beam guard railing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing terminal sections, return and end caps, complete in place, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The second paragraph of Section 83-2.02B, "Thrie Beam Barrier," of the Standard Specifications is amended to read:

- Rail elements, backup plates, terminal connectors, terminal sections, and return caps shall conform to Class A, Type 1 thrie beam guard railing as shown in AASHTO Designation: M 180.

The fourteenth paragraph of Section 83-2.02B, "Thrie Beam Barrier," of the Standard Specifications is amended to read:

- All metal work shall be fabricated in the shop, and no punching, cutting or welding will be permitted in the field. Rail elements shall be lapped so that the exposed ends will not face approaching traffic. Terminal sections and return caps shall be installed in conformance with the manufacturer's recommendation.

The first paragraph in Section 83-2.02D(2), "Materials," of the Standard Specifications is amended to read:

- Type 50 and 60 series concrete barriers shall be constructed of minor concrete conforming to the provisions in Section 90-10, "Minor Concrete," except as follows:

- a. The maximum size of aggregate used for extruded or slip-formed concrete barriers shall be at the option of the Contractor, but in no case shall the maximum size be larger than 37.5-mm or smaller than 9.5-mm.
- b. If the 9.5-mm maximum size aggregate grading is used to construct extruded or slip-formed concrete barriers, the cementitious material content of the minor concrete shall be not less than 400 kg/m<sup>3</sup>.

The third paragraph in Section 83-2.02D(2), "Materials," of the Standard Specifications is amended to read:

- The concrete paving between the tops of the 2 walls of concrete barrier (Types 50E, 60E, 60GE, and 60SE) and the optional concrete slab at the base between the 2 walls of concrete barrier (Types 50E, 60E, 60GE, and 60SE) shall be constructed of minor concrete conforming to the provisions of Section 90-10, except that the minor concrete shall contain not less than 300 kg of cementitious material per cubic meter.

The first paragraph of Section 83-2.03, "Measurement," of the Standard Specifications is amended to read:

- Except for single thrie beam barrier within the pay limits of transition railing (Type STB), single thrie beam barrier will be measured by the meter from end post to end post along the face of the rail element of the installed barrier. Single thrie beam barriers constructed on each side of piers under structures or other obstructions will be measured for payment along each line of the installed barrier.

The second paragraph of Section 83-2.03, "Measurement," of the Standard Specifications is amended to read:

- Except for double thrie beam barrier within the pay limits of transition railing (Type DTB), double thrie beam barrier will be measured by the meter from end post to end post along the center line of the installed barrier.

The fifth paragraph of Section 83-2.03, "Measurement," of the Standard Specifications is amended to read:

- The quantity of return caps, terminal connectors and the various types of terminal sections for single and double thrie beam barriers will be determined as units from actual count.

The sixth paragraph of Section 83-2.03, "Measurement," of the Standard Specifications is amended to read:

- The quantity of end anchor assemblies will be paid for as units determined from actual count.

The first paragraph of Section 83-2.04, "Payment," of the Standard Specifications is amended to read:

- The various types of thrie beam barrier, measured as specified in Section 83-2.03, "Measurement," will be paid for at the contract price per meter for single or double thrie beam barrier, whichever applies, and the contract unit price or prices for end anchor assemblies, return caps, terminal connectors and the various types of terminal sections.

The second paragraph of Section 83-2.04, "Payment," of the Standard Specifications is amended to read:

- The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the barrier, complete in place, including drilling holes for wood posts, driving posts, backfilling the space around posts, excavating and backfilling end anchor assembly holes, connecting thrie beam barrier to concrete surfaces and disposing of surplus excavated material, and for furnishing, placing, removing and disposing of the temporary railing for closing the gap between existing barrier and the barrier being constructed as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.

The fourth paragraph in Section 83-2.04, "Payments," of the Standard Specifications is amended to read:

- Steel plate barrier attached to concrete barrier at overhead sign foundations, electroliers, drainage structures, and other locations shown on the plans will be measured and paid for as the type of concrete barrier attached thereto.

## **SECTION 85: PAVEMENT MARKERS**

Issue Date: May 16, 2003

The second through fifth paragraphs in Section 85-1.03, "Sampling, Tolerances and Packaging," of the Standard Specifications are amended to read:

### **Sampling**

- Twenty markers selected at random will constitute a representative sample for each lot of markers.
- The lot size shall not exceed 25000 markers.

### **Tolerances**

- Three test specimens will be randomly selected from the sample for each test and tested in conformance with these specifications. Should any one of the 3 specimens fail to conform with the requirements in these specifications, 6 additional specimens will be tested. The failure of any one of these 6 specimens shall be cause for rejection of the entire lot or shipment represented by the sample.
- The entire sample of retroreflective pavement markers will be tested for reflectance. The failure of 10 percent or more of the original sampling shall be cause for rejection.

Section 85-1.04, "Non-Reflective Pavement Markers," of the Standard Specifications is amended to read:

#### 85-1.04 Non-Reflective Pavement Markers

- Non-reflective pavement markers (Types A and AY) shall be, at the option of the Contractor, either ceramic or plastic conforming to these specifications.
- The top surface of the marker shall be convex with a gradual change in curvature. The top, bottom and sides shall be free of objectionable marks or discoloration that will affect adhesion or appearance.
- The bottom of markers shall have areas of integrally formed protrusions or indentations, which will increase the effective bonding surface area of adhesive. The bottom surface of the marker shall not deviate more than 1.5 mm from a flat surface. The areas of protrusion shall have faces parallel to the bottom of the marker and shall project approximately one mm from the bottom.

The second through fourth paragraphs of Section 85-1.04A, "Non-Reflective Pavement Markers (Ceramic)," of the Standard Specifications are deleted.

The table in the fifth paragraph in Section 85-1.04A, "Non-Reflective Pavement Markers (Ceramic)," of the Standard Specifications is amended to read:

#### Testing

- Tests shall be performed in conformance with the requirements in California Test 669.

Test	Test Description	Requirement
a	Bond strength	4.8 MPa, min.
b	Glaze thickness	180 µm, min.
c	Hardness	6 Moh, min.
d	Luminance factor, Type A, white markers only, glazed surface	75, min.
e	Yellowness index, Type A, white markers only, glazed surface	7, max.
f	Color-yellow, Type AY, yellow markers only. The chromaticity coordinates shall be within a color box defined in CTM 669	Pass
g	Compressive strength	6700 N, min.
h	Water absorption	2.0 %, max.
i	Artificial weathering, 500 hours exposure, yellowness index	20, max.

Section 85-1.04B, "Non-Reflective Pavement Markers (Plastic)," of the Standard Specifications is amended to read:

#### 85-1.04B Non-Reflective Pavement Markers (Plastic)

- Plastic non-reflective pavement markers Types A and AY shall be, at the option of the Contractor, either polypropylene or acrylonitrile-butadiene-styrene (ABS) plastic type.
- Plastic markers shall conform to the testing requirements specified in Section 85-1.04A, "Non-Reflective Pavement Markers (Ceramic)," except that Tests a, b, c, and h shall not apply. The plastic markers shall not be coated with substances that interfere with the ability of the adhesive bonding to the marker.

The sixth and seventh paragraphs in Section 85-1.05, "Retroreflective Pavement Markers," of the Standard Specifications are amended to read:

**Testing**

- Tests shall be performed in conformance with the requirements in California Test 669.

Test Description	Requirement		
Bond strength <sup>a</sup>	3.4 MPa, min.		
Compressive strength <sup>b</sup>	8900 N, min.		
Abrasion resistance, marker must meet the respective specific intensity minimum requirements after abrasion.	Pass		
Water Soak Resistance	No delamination of the body or lens system of the marker nor loss of reflectance		
Reflectance	Specific Intensity		
	Clear	Yellow	Red
0° Incidence Angle, min.	3.0	1.5	0.75
20° Incidence Angle, min.	1.2	0.60	0.30
After one year field evaluation	0.30	0.15	0.08
<sup>a</sup> Failure of the marker body or filler material prior to reaching 3.4 MPa shall constitute a failing bond strength test. <sup>b</sup> Deformation of the marker of more than 3 mm at a load of less than 8900 N or delamination of the shell and the filler material of more than 3 mm regardless of the load required to break the marker shall be cause for rejection of the markers as specified in Section 85-1.03, "Sampling, Tolerances and Packaging."			

- Pavement markers to be placed in pavement recesses shall conform to the above requirements for retroreflective pavement markers except that the minimum compressive strength requirement shall be 5338 N.

The eighth paragraph of Section 85-1.05, "Retroreflective Pavement Markers" of the Standard Specifications is deleted.

The eighth paragraph in Section 85-1.06, "Replacement," of the Standard Specifications is amended to read:

- Epoxy adhesive shall not be used to apply non-reflective plastic pavement markers.

**SECTION 86: SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS**

Issue Date: January 28, 2005

The first paragraph of Section 86-2.03, "Foundations," of the Standard Specifications is amended to read:

- Except for concrete for cast-in-drilled-hole concrete pile foundations, portland cement concrete shall conform to Section 90-10, "Minor Concrete."

The fifth paragraph of Section 86-2.03, "Foundations," of the Standard Specifications is amended to read:

- Reinforced cast-in-drilled-hole concrete pile foundations for traffic signal and lighting standards shall conform to the provisions in Section 49, "Piling," with the following exceptions: 1) Material resulting from drilling holes shall be disposed of in conformance with the provisions in Section 86-2.01, "Excavating and Backfilling," and 2) Concrete filling for cast-in-drilled-hole concrete piles will not be considered as designated by compressive strength.

The seventh paragraph of Section 86-2.03, "Foundations," of the Standard Specifications is amended to read:

- Forms shall be true to line and grade. Tops of foundations for posts and standards, except special foundations, shall be finished to curb or sidewalk grade or as directed by the Engineer. Forms shall be rigid and securely braced in place. Conduit ends and anchor bolts shall be placed in proper position and to proper height, and anchor bolts shall be held in place by means of rigid top and bottom templates. The bottom template shall be made of steel. The bottom template shall provide proper spacing and alignment of the anchor bolts near their bottom embedded end. The bottom template shall be installed before placing footing concrete. Anchor bolts shall not be installed more than 1:40 from vertical.

Section 86-2.03, "Foundations," of the Standard Specifications is amended by deleting the eighth paragraph.

The twelfth paragraph of Section 86-2.03, "Foundations," of the Standard Specifications is amended to read:

- Plumbing of the standards shall be accomplished by adjusting the leveling nuts before placing the mortar or before the foundation is finished to final grade. Shims or other similar devices shall not be used for plumbing or raking of posts, standards, or pedestals. After final adjustments of both top nuts and leveling nuts on anchorage assemblies have been made, firm contact shall exist between all bearing surfaces of the anchor bolt nuts, washers, and the base plates.

The first paragraph of Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications is amended to read:

#### **86-2.04 STANDARDS, STEEL PEDESTALS, AND POSTS**

- Standards for traffic signals and lighting, and steel pedestals for cabinets and other similar equipment, shall be located as shown on the plans. Bolts, nuts and washers, and anchor bolts for use in signal and lighting support structures shall conform to the provisions in Section 55-2, "Materials." Except when bearing-type connections or slipbases are specified, high-strength bolted connections shall conform to the provisions in Section 55-3.14, "Bolted Connections." Welding, nondestructive testing (NDT) of welds, and acceptance and repair criteria for NDT of steel members shall conform to the requirements of AWS D1.1 and the contract special provisions.

The second paragraph of Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications is amended to read:

- On each lighting standard except Type 1, one rectangular corrosion resistant metal identification tag shall be permanently attached above the hand hole, near the base of the

standard, using stainless steel rivets. On each signal pole support, two corrosion resistant metal identification tags shall be attached, one above the hand hole near the base of the vertical standard and one on the underside of the signal mast arm near the arm plate. As a minimum, the information on each identification tag shall include the name of the manufacturer, the date of manufacture, the identification number as shown on the plans, the contract number, and a unique identification code assigned by the fabricator. This number shall be traceable to a particular contract and the welds on that component, and shall be readable after the support structure is coated and installed. The lettering shall be a minimum of 7 mm high. The information may be either depressed or raised, and shall be legible.

The fourth paragraph of Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications is amended to read:

- Ferrous metal parts of standards, with shaft length of 4.6 m and longer, shall conform to the details shown on the plans, the provisions in Section 55-2, "Materials," except as otherwise noted, and the following requirements:

Except as otherwise specified, standards shall be fabricated from sheet steel of weldable grade having a minimum yield strength, after fabrication, of 276 MPa.

Certified test reports which verify conformance to the minimum yield strength requirements shall be submitted to the Engineer. The test reports may be the mill test reports for the as-received steel or, when the as-received steel has a lower yield strength than required, the Contractor shall provide supportive test data which provides assurance that the Contractor's method of cold forming will consistently increase the tensile properties of the steel to meet the specified minimum yield strength. The supportive test data shall include tensile properties of the steel after cold forming for specific heats and thicknesses.

When a single-ply 8-mm thick pole is specified, a 2-ply pole with equivalent section modulus may be substituted.

Standards may be fabricated of full-length sheets or shorter sections. Each section shall be fabricated from not more than 2 pieces of sheet steel. Where 2 pieces are used, the longitudinal welded seams shall be directly opposite one another. When the sections are butt-welded together, the longitudinal welded seams on adjacent sections shall be placed to form continuous straight seams from base to top of standard.

Butt-welded circumferential joints of tubular sections requiring CJP groove welds shall be made using a metal sleeve backing ring inside each joint. The sleeve shall be 3-mm nominal thickness, or thicker, and manufactured from steel having the same chemical composition as the steel in the tubular sections to be joined. When the sections to be joined have different specified minimum yield strengths, the steel in the sleeve shall have the same chemical composition as the tubular section having the higher minimum yield strength. The width of the metal sleeve shall be consistent with the type of NDT chosen and shall be a minimum width of 25 mm. The sleeve shall be centered at the joint and be in contact with the tubular section at the point of the weld at time of fit-up.

Welds shall be continuous.

The weld metal at the transverse joint shall extend to the sleeve, making the sleeve an integral part of the joint.

During fabrication, longitudinal seams on vertical tubular members of cantilevered support structures shall be centered on and along the side of the pole that the pole plate is located. Longitudinal seams on horizontal tubular members, including signal and luminaire arms, shall be within +/-45 degrees of the bottom of the arm.

The longitudinal seam welds in steel tubular sections may be made by the electric resistance welding process.

Longitudinal seam welds shall have 60 percent minimum penetration, except that within 150 mm of circumferential welds, longitudinal seam welds shall be CJP groove welds. In addition, longitudinal seam welds on lighting support structures having telescopic pole segment splices shall be CJP groove welds on the female end for a length on each end equal to the designated slip fit splice length plus 150 mm.

Exposed circumferential welds, except fillet and fatigue-resistant welds, shall be ground flush (-0, +2mm) with the base metal prior to galvanizing or painting.

Circumferential welds and base plate-to-pole welds may be repaired only one time without written permission from the Engineer.

Exposed edges of the plates that make up the base assembly shall be finished smooth and exposed corners of the plates shall be broken unless otherwise shown on the plans. Shafts shall be provided with slip-fitter shaft caps.

Flatness of surfaces of 1) base plates that are to come in contact with concrete, grout, or washers and leveling nuts; 2) plates in high-strength bolted connections; 3) plates in joints where cap screws are used to secure luminaire and signal arms; and 4) plates used for breakaway slip base assemblies shall conform to the requirements in ASTM A6.

Standards shall be straight, with a permissive variation not to exceed 25 mm measured at the midpoint of a 9-m or 11-m standard and not to exceed 20 mm measured at the midpoint of a 5-m through 6-m standard. Variation shall not exceed 25 mm at a point 4.5 m above the base plate for Type 35 and Type 36 standards.

Zinc-coated nuts used on fastener assemblies having a specified preload (obtained by specifying a prescribed tension, torque value, or degree of turn) shall be provided with a colored lubricant that is clean and dry to the touch. The color of the lubricant shall be in contrast to the zinc coating on the nut so that the presence of the lubricant is visually obvious. In addition, either the lubricant shall be insoluble in water, or fastener components shall be shipped to the job site in a sealed container.

No holes shall be made in structural members unless the holes are shown on the plans or are approved in writing by the Engineer.

Standards with an outside diameter of 300 mm or less shall be round. Standards with an outside diameter greater than 300 mm shall be round or multisided. Multisided standards shall have a minimum of 12 sides which shall be convex and shall have a minimum bend radius of 100 mm.

Mast arms for standards shall be fabricated from material as specified for standards, and shall conform to the dimensions shown on the plans.

The cast steel option for slip bases shall be fabricated from material conforming to the requirements in ASTM Designation: A 27/A 27M, Grade 70-40. Other comparable material may be used if written permission is given by the Engineer. The casting tolerances shall be in conformance with the Steel Founder's Society of America recommendations (green sand molding).

One casting from each lot of 50 castings or less shall be subject to radiographic inspection, in conformance with the requirements in ASTM Designation: E 94. The castings shall comply with the acceptance criteria severity level 3 or better for the types and categories of discontinuities in conformance with the requirements in ASTM Designations: E 186 and E 446. If the one casting fails to pass the inspection, 2 additional castings shall be radiographed. Both of these castings shall pass the inspection, or the entire lot of 50 will be rejected.

Material certifications, consisting of physical and chemical properties, and radiographic films of the castings shall be filed at the manufacturer's office. These certifications and films shall be available for inspection upon request.

High-strength bolts, nuts, and flat washers used to connect slip base plates shall conform to the requirements in ASTM Designation: A 325 or A 325M and shall be galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing."

Plate washers shall be fabricated by saw cutting and drilling steel plate conforming to the requirements in AISI Designation: 1018, and be galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing." Prior to galvanizing, burrs and sharp edges shall be removed and holes shall be chamfered sufficiently on each side to allow the bolt head to make full contact with the washer without tension on the bolt.

High-strength cap screws shown on the plans for attaching arms to standards shall conform to the requirements in ASTM Designation: A 325, A 325M, or A 449, and shall comply with the mechanical requirements in ASTM Designation: A 325 or A 325M after galvanizing. The cap screws shall be galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing." The threads of the cap screws shall be coated with a colored lubricant that is clean and dry to the touch. The color of the lubricant shall be in contrast to the color of the zinc coating on the cap screw so that presence of the lubricant is visually obvious. In addition, either the lubricant shall be insoluble in water, or fastener components shall be shipped to the job site in a sealed container.

Unless otherwise specified, bolted connections attaching signal or luminaire arms to poles shall be considered slip critical. Galvanized faying surfaces on plates on luminaire and signal arms and matching plate surfaces on poles shall be roughened by hand using a wire brush prior to assembly and shall conform to the requirements for Class C surface conditions for slip-critical connections in "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts," a specification approved by the Research Council on Structural Connections (RCSC) of the Engineering Foundation. For faying surfaces required to be painted, the paint shall be an approved type, brand, and thickness that has been tested and approved according to the RCSC Specification as a Class B coating.

Samples of fastener components will be randomly taken from each production lot by the Engineer and submitted, along with test reports required by appropriate ASTM fastener specifications, for QA testing and evaluation. Sample sizes for each fastener component shall be as determined by the Engineer.

The seventh paragraph of Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications is amended to read:

- To avoid interference of arm plate-to-tube welds with cap screw heads, and to ensure cap screw heads can be turned using conventional installation tools, fabricators shall make necessary adjustments to details prior to fabrication and properly locate the position of arm tubes on arm plates during fabrication.

The sixth and seventh paragraphs of 86-2.12, "Wood Poles," of the Standard Specifications are amended to read:

- After fabrication, wood poles shall be pressure treated in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," and AWPA Use Category System: UC4B, Commodity Specification D.

- Wood poles, when specified in the special provisions to be painted, shall be treated with waterborne wood preservatives.

The first paragraph of Section 86-2.15, "Galvanizing," of the Standard Specifications is amended to read:

- Galvanizing shall be in conformance with the provisions in Section 75-1.05, "Galvanizing," except that cabinets may be constructed of material galvanized prior to fabrication in conformance with the requirements in ASTM Designation: A 653/653M, Coating Designation G 90, in which case all cut or damaged edges shall be painted with at least 2 applications of approved unthinned zinc-rich primer (organic vehicle type) conforming to the provisions in Section 91, "Paint." Aerosol cans shall not be used. Other types of protective coating must be approved by the Engineer prior to installation.

The first paragraph of Section 86-4.06, "Pedestrian Signal Faces" of the Standard Specifications is amended to read:

- Message symbols for pedestrian signal faces shall be white WALKING PERSON and Portland orange UPRAISED HAND conforming to the requirements in the Institute of Transportation Engineers Standards: "Pedestrian Traffic Control Signal Indications," "Manual on Uniform Traffic Control Devices," and "MUTCD California Supplement." The height of each symbol shall be not less than 250 mm and the width of each symbol shall be not less than 165 mm.

The tenth paragraph of Section 86-4.07, "Light Emitting Diode Pedestrian Signal Face 'Upraised Hand' Module" of the Standard Specifications is amended to read:

- The luminance of the "UPRAISED HAND" symbol shall be 3750 cd/m<sup>2</sup> minimum. The color of "UPRAISED HAND" shall be Portland orange conforming to the requirements of the Institute of Transportation Engineers Standards: "Pedestrian Traffic Control Signal Indications," "Manual on Uniform Traffic Control Devices," and "MUTCD California Supplement." The height of each symbol shall be not less than 250 mm and the width of each symbol shall be not less than 165 mm.

Section 86-8.01, "Payment," of the Standard Specifications is amended by adding the following paragraph after the first paragraph:

- If a portion or all of the poles for signal, lighting and electrical systems pursuant to Standard Specification Section 86, "Signals, Lighting and Electrical Systems," is fabricated more than 480 air line kilometers from both-Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impracticable and extremely difficult to ascertain and determine the actual increase in such expenses, it is agreed that payment to the Contractor for furnishing such items from each fabrication site located more than 480 air line kilometers from both Sacramento and Los Angeles will be reduced \$5000; in addition, in the case where a fabrication site is located more than 4800 air line kilometers from both Sacramento and Los Angeles, payment will be reduced an additional \$3000 per each fabrication site (\$8000 total per site).

## SECTION 88: ENGINEERING FABRIC

Issue Date: January 15, 2002

Section 88-1.02, "Pavement Reinforcing Fabric," of the Standard Specifications is amended to read:

- Pavement reinforcing fabric shall be 100 percent polypropylene staple fiber fabric material, needle-punched, thermally bonded on one side, and conform to the following:

Specification	Requirement
Weight, grams per square meter ASTM Designation: D 5261	140
Grab tensile strength (25-mm grip), kilonewtons, min. in each direction ASTM Designation: D 4632	0.45
Elongation at break, percent min. ASTM Designation: D 4632	50
Asphalt retention by fabric, grams per square meter. (Residual Minimum) ASTM Designation: D 6140	900

Note: Weight, grab, elongation and asphalt retention are based on Minimum Average Roll Value (MARV)

## SECTION 90: PORTLAND CEMENT CONCRETE

Issue Date: November 2, 2004

Section 90, "Portland Cement Concrete," of the Standard Specifications is amended to read:

### SECTION 90: PORTLAND CEMENT CONCRETE

#### 90-1 GENERAL

##### 90-1.01 DESCRIPTION

- Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

- The Contractor shall determine the mix proportions for concrete in conformance with these specifications. Unless otherwise specified, cementitious material shall be a combination of cement and mineral admixture. Cementitious material shall be either:

1. "Type IP (MS) Modified" cement; or
2. A combination of "Type II Modified" portland cement and mineral admixture; or
3. A combination of Type V portland cement and mineral admixture.

- Type III portland cement shall be used only as allowed in the special provisions or with the approval of the Engineer.

- Class 1 concrete shall contain not less than 400 kg of cementitious material per cubic meter.

- Class 2 concrete shall contain not less than 350 kg of cementitious material per cubic meter.

- Class 3 concrete shall contain not less than 300 kg of cementitious material per cubic meter.
- Class 4 concrete shall contain not less than 250 kg of cementitious material per cubic meter.
- Minor concrete shall contain not less than 325 kg of cementitious material per cubic meter unless otherwise specified in these specifications or the special provisions.
- Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic meter of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content (kg/m <sup>3</sup> )
Concrete designated by compressive strength:	
Deck slabs and slab spans of bridges	400 min., 475 max.
Roof sections of exposed top box culverts	400 min., 475 max.
Other portions of structures	350 min., 475 max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	400 min.
Roof sections of exposed top box culverts	400 min.
Prestressed members	400 min.
Seal courses	400 min.
Other portions of structures	350 min.
Concrete for precast members	350 min., 550 max.

- Whenever the 28-day compressive strength shown on the plans is greater than 25 MPa, the concrete shall be designated by compressive strength. If the plans show a 28-day compressive strength that is 28 MPa or greater, an additional 14 days will be allowed to obtain the specified strength. The 28-day compressive strengths shown on the plans that are 25 MPa or less are shown for design information only and are not a requirement for acceptance of the concrete.
  - Concrete designated by compressive strength shall be proportioned such that the concrete will attain the strength shown on the plans or specified in the special provisions.
  - Before using concrete for which the mix proportions have been determined by the Contractor, or in advance of revising those mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.
  - Compliance with cementitious material content requirements will be verified in conformance with procedures described in California Test 518 for cement content. For testing purposes, mineral admixture shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.
  - If any concrete has a cementitious material, portland cement, or mineral admixture content that is less than the minimum required, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to the State \$0.55 for each kilogram of cementitious material, portland cement, or mineral admixture that is less than the minimum required. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions will be made based on the results of California Test 518.
  - The requirements of the preceding paragraph shall not apply to minor concrete or commercial quality concrete.

## 90-2 MATERIALS

### 90-2.01 CEMENT

- Unless otherwise specified, cement shall be either "Type IP (MS) Modified" cement, "Type II Modified" portland cement or Type V portland cement.

- "Type IP (MS) Modified" cement shall conform to the requirements for Type IP (MS) cement in ASTM Designation: C 595, and shall be comprised of an intimate and uniform blend of Type II cement and not more than 35 percent by mass of mineral admixture. The type and minimum amount of mineral admixture used in the manufacture of "Type IP (MS) Modified" cement shall be in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

- "Type II Modified" portland cement shall conform to the requirements for Type II portland cement in ASTM Designation: C 150-02a.

- In addition, "Type IP (MS) Modified" cement and "Type II Modified" portland cement shall conform to the following requirements:

A. The cement shall not contain more than 0.60-percent by mass of alkalis, calculated as the percentage of  $\text{Na}_2\text{O}$  plus 0.658 times the percentage of  $\text{K}_2\text{O}$ , when determined by either direct intensity flame photometry or by the atomic absorption method. The instrument and procedure used shall be qualified as to precision and accuracy in conformance with the requirements in ASTM Designation: C 114;

B. The autoclave expansion shall not exceed 0.50-percent; and

C. Mortar, containing the cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not expand in water more than 0.010 percent and shall not contract in air more than 0.048 percent, except that when cement is to be used for precast prestressed concrete piling, precast prestressed concrete members, or steam cured concrete products, the mortar shall not contract in air more than 0.053 percent.

- Type III and Type V portland cements shall conform to the requirements in ASTM Designation: C 150-02a and the additional requirements listed above for "Type II Modified" portland cement, except that when tested in conformance with California Test 527, mortar containing Type III portland cement shall not contract in air more than 0.075 percent.

- Cement used in the manufacture of cast-in-place concrete for exposed surfaces of like elements of a structure shall be from the same cement mill.

- Cement shall be protected from exposure to moisture until used. Sacked cement shall be piled to permit access for tally, inspection, and identification of each shipment.

- Adequate facilities shall be provided to assure that cement meeting the provisions specified in this Section 90-2.01 shall be kept separate from other cement in order to prevent any but the specified cement from entering the work. Safe and suitable facilities for sampling cement shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper, in conformance with California Test 125.

- If cement is used prior to sampling and testing as provided in Section 6-1.07, "Certificates of Compliance," and the cement is delivered directly to the site of the work, the Certificate of Compliance shall be signed by the cement manufacturer or supplier of the cement. If the cement is used in ready-mixed concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product.

- Cement furnished without a Certificate of Compliance shall not be used in the work until the Engineer has had sufficient time to make appropriate tests and has approved the cement for use.

## **90-2.02 AGGREGATES**

- Aggregates shall be free from deleterious coatings, clay balls, roots, bark, sticks, rags, and other extraneous material.

- Natural aggregates shall be thoroughly and uniformly washed before use.

- The Contractor, at the Contractor's expense, shall provide safe and suitable facilities, including necessary splitting devices for obtaining samples of aggregates, in conformance with California Test 125.

- Aggregates shall be of such character that it will be possible to produce workable concrete within the limits of water content provided in Section 90-6.06, "Amount of Water and Penetration."

- Aggregates shall have not more than 10 percent loss when tested for soundness in conformance with the requirements in California Test 214. The soundness requirement for fine aggregate will be waived, provided that the durability index,  $D_f$ , of the fine aggregate is 60, or greater, when tested for durability in conformance with California Test 229.

- If the results of any one or more of the Cleanness Value, Sand Equivalent, or aggregate grading tests do not meet the requirements specified for "Operating Range" but all meet the "Contract Compliance" requirements, the placement of concrete shall be suspended at the completion of the current pour until tests or other information indicate that the next material to be used in the work will comply with the requirements specified for "Operating Range."

- If the results of either or both the Cleanness Value and coarse aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete that is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State \$4.60 per cubic meter for paving concrete and \$7.20 per cubic meter for all other concrete for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.

- If the results of either or both the Sand Equivalent and fine aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete which is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State \$4.60 per cubic meter for paving concrete and \$7.20 per cubic meter for all other concrete for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.

- The 2 preceding paragraphs apply individually to the "Contract Compliance" requirements for coarse aggregate and fine aggregate. When both coarse aggregate and fine aggregate do not conform to the "Contract Compliance" requirements, both paragraphs shall apply. The payments specified in those paragraphs shall be in addition to any payments made in conformance with the provisions in Section 90-1.01, "Description."

- No single Cleanness Value, Sand Equivalent or aggregate grading test shall represent more than 250 m<sup>3</sup> of concrete or one day's pour, whichever is smaller.

- When the source of an aggregate is changed, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using the aggregates.

**90-2.02A Coarse Aggregate**

- Coarse aggregate shall consist of gravel, crushed gravel, crushed rock, crushed air-cooled iron blast furnace slag or combinations thereof. Crushed air-cooled blast furnace slag shall not be used in reinforced or prestressed concrete.

- Coarse aggregate shall conform to the following quality requirements:

Tests	California Test	Requirements
Loss in Los Angeles Rattler (after 500 revolutions)	211	45% max.
Cleanness Value		
Operating Range	227	75 min.
Contract Compliance	227	71 min.

- In lieu of the above Cleanness Value requirements, a Cleanness Value "Operating Range" limit of 71, minimum, and a Cleanness Value "Contract Compliance" limit of 68, minimum, will be used to determine the acceptability of the coarse aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

1. coarse aggregate sampled at the completion of processing at the aggregate production plant had a Cleanness Value of not less than 82 when tested by California Test 227; and
2. prequalification tests performed in conformance with the requirements in California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

**90-2.02B Fine Aggregate**

- Fine aggregate shall consist of natural sand, manufactured sand produced from larger aggregate or a combination thereof. Manufactured sand shall be well graded.

- Fine aggregate shall conform to the following quality requirements:

Test	California Test	Requirements
Organic Impurities	213	Satisfactory <sup>a</sup>
Mortar Strengths Relative to Ottawa Sand	515	95%, min.
Sand Equivalent:		
Operating Range	217	75, min.
Contract Compliance	217	71, min.

<sup>a</sup> Fine aggregate developing a color darker than the reference standard color solution may be accepted if it is determined by the Engineer, from mortar strength tests, that a darker color is acceptable.

- In lieu of the above Sand Equivalent requirements, a Sand Equivalent "Operating Range" limit of 71 minimum and a Sand Equivalent "Contract Compliance" limit of 68 minimum will be used to determine the acceptability of the fine aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

1. fine aggregate sampled at the completion of processing at the aggregate production plant had a Sand Equivalent value of not less than 82 when tested by California Test 217; and

2. prequalification tests performed in conformance with California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

### **90-2.03 WATER**

- In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1300 parts per million of sulfates as SO<sub>4</sub>, when tested in conformance with California Test 417. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1300 parts per million of sulfates as SO<sub>4</sub>, when tested in conformance with California Test 417. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with the requirements in ASTM Designation: C 191 or ASTM Designation: C 266 or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in conformance with the requirements in ASTM Designation: C 109, when compared to the results obtained with distilled water or deionized water, tested in conformance with the requirements in ASTM Designation: C 109.

- In non-reinforced concrete work, the water for curing, for washing aggregates and for mixing shall be free from oil and shall not contain more than 2000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, or more than 1500 parts per million of sulfates as SO<sub>4</sub>, when tested in conformance with California Test 417.

- In addition to the above provisions, water for curing concrete shall not contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

- Water reclaimed from mixer wash-out operations may be used in mixing concrete. The water shall not contain coloring agents or more than 300 parts per million of alkalis (Na<sub>2</sub>O + 0.658 K<sub>2</sub>O) as determined on the filtrate. The specific gravity of the water shall not exceed 1.03 and shall not vary more than ±0.010 during a day's operations.

### **90-2.04 ADMIXTURE MATERIALS**

- Admixture materials shall conform to the requirements in the following ASTM Designations:

A. Chemical Admixtures—ASTM Designation: C 494.

B. Air-entraining Admixtures—ASTM Designation: C 260.

C. Calcium Chloride—ASTM Designation: D 98.

D. Mineral Admixtures—Coal fly ash; raw or calcined natural pozzolan as specified in ASTM Designation: C 618; silica fume conforming to the requirements in ASTM Designation: C 1240, with reduction of mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.

- Unless otherwise specified in the special provisions, mineral admixtures shall be used in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

## **90-3 AGGREGATE GRADINGS**

**90-3.01 GENERAL**

- Before beginning concrete work, the Contractor shall submit in writing to the Engineer the gradation of the primary aggregate nominal sizes that the Contractor proposes to furnish. If a primary coarse aggregate or the fine aggregate is separated into 2 or more sizes, the proposed gradation shall consist of the gradation for each individual size, and the proposed proportions of each individual size, combined mathematically to indicate one proposed gradation. The proposed gradation shall meet the grading requirements shown in the table in this section, and shall show the percentage passing each of the sieve sizes used in determining the end result.
- The Engineer may waive, in writing, the gradation requirements in this Section 90-3.01 and in Sections 90-3.02, "Coarse Aggregate Grading," 90-3.03, "Fine Aggregate Grading," and 90-3.04, "Combined Aggregate Gradings," if, in the Engineer's opinion, furnishing the gradation is not necessary for the type or amount of concrete work to be constructed.
- Gradations proposed by the Contractor shall be within the following percentage passing limits:

Primary Aggregate Nominal Size	Sieve Size	Limits of Proposed Gradation
37.5-mm x 19-mm	25-mm	19 - 41
25-mm x 4.75-mm	19-mm	52 - 85
25-mm x 4.75-mm	9.5-mm	15 - 38
12.5-mm x 4.75-mm	9.5-mm	40 - 78
9.5-mm x 2.36-mm	9.5-mm	50 - 85
Fine Aggregate	1.18-mm	55 - 75
Fine Aggregate	600-µm	34 - 46
Fine Aggregate	300-µm	16 - 29

- Should the Contractor change the source of supply, the Contractor shall submit in writing to the Engineer the new gradations before their intended use.

**90-3.02 COARSE AGGREGATE GRADING**

- The grading requirements for coarse aggregates are shown in the following table for each size of coarse aggregate:

Sieve Sizes	Percentage Passing Primary Aggregate Nominal Sizes							
	37.5-mm x 19-mm		25-mm x 4.75-mm		12.5-mm x 4.75-mm		9.5-mm x 2.36-mm	
	Operating Range	Contract Compliance	Operating Range	Contract Compliance	Operating Range	Contract Compliance	Operating Range	Contract Compliance
50-mm	100	100	—	—	—	—	—	—
37.5-mm	88-100	85-100	100	100	—	—	—	—
25-mm	x ± 18	X ± 25	88-100	86-100	—	—	—	—
19-mm	0-17	0-20	X ± 15	X ± 22	100	100	—	—
12.5-mm	—	—	—	—	82-100	80-100	100	100
9.5-mm	0-7	0-9	X ± 15	X ± 22	X ± 15	X ± 22	X ± 15	X ± 20
4.75-mm	—	—	0-16	0-18	0-15	0-18	0-25	0-28
2.36-mm	—	—	0-6	0-7	0-6	0-7	0-6	0-7

- In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."
- Coarse aggregate for the 37.5-mm, maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," shall be furnished in 2 or more primary

aggregate nominal sizes. Each primary aggregate nominal size may be separated into 2 sizes and stored separately, provided that the combined material conforms to the grading requirements for that particular primary aggregate nominal size.

- When the 25-mm, maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," is to be used, the coarse aggregate may be separated into 2 sizes and stored separately, provided that the combined material shall conform to the grading requirements for the 25-mm x 4.75-mm primary aggregate nominal size.

### 90-3.03 FINE AGGREGATE GRADING

- Fine aggregate shall be graded within the following limits:

Sieve Sizes	Percentage Passing	
	Operating Range	Contract Compliance
9.5-mm	100	100
4.75-mm	95-100	93-100
2.36-mm	65-95	61-99
1.18-mm	X ± 10	X ± 13
600-µm	X ± 9	X ± 12
300-µm	X ± 6	X ± 9
150-µm	2-12	1-15
75-µm	0-8	0-10

- In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."
- In addition to the above required grading analysis, the distribution of the fine aggregate sizes shall be such that the difference between the total percentage passing the 1.18-mm sieve and the total percentage passing the 600-µm sieve shall be between 10 and 40, and the difference between the percentage passing the 600-µm and 300-µm sieves shall be between 10 and 40.
- Fine aggregate may be separated into 2 or more sizes and stored separately, provided that the combined material conforms to the grading requirements specified in this Section 90-3.03.

### 90-3.04 COMBINED AGGREGATE GRADINGS

- Combined aggregate grading limits shall be used only for the design of concrete mixes. Concrete mixes shall be designed so that aggregates are combined in proportions that shall produce a mixture within the grading limits for combined aggregates as specified herein.
- The combined aggregate grading, except when otherwise specified in these specifications or the special provisions, shall be either the 37.5-mm, maximum grading, or the 25-mm, maximum grading, at the option of the Contractor.

Grading Limits of Combined Aggregates

Sieve Sizes	Percentage Passing			
	37.5-mm Max.	25-mm Max.	12.5-mm Max.	9.5-mm Max.
50-mm	100	—	—	—
37.5-mm	90-100	100	—	—
25-mm	50-86	90-100	—	—
19-mm	45-75	55-100	100	—
12.5-mm	—	—	90-100	100
9.5-mm	38-55	45-75	55-86	50 - 100
4.75-mm	30-45	35-60	45-63	45 - 63
2.36-mm	23-38	27-45	35-49	35 - 49
1.18-mm	17-33	20-35	25-37	25 - 37
600-µm	10-22	12-25	15-25	15 - 25
300-µm	4-10	5-15	5-15	5 - 15
150-µm	1-6	1-8	1-8	1 - 8
75-µm	0-3	0-4	0-4	0 - 4

- Changes from one grading to another shall not be made during the progress of the work unless permitted by the Engineer.

## 90-4 ADMIXTURES

### 90-4.01 GENERAL

- Admixtures used in portland cement concrete shall conform to and be used in conformance with the provisions in this Section 90-4 and the special provisions. Admixtures shall be used when specified or ordered by the Engineer and may be used at the Contractor's option as provided herein.
  - Chemical admixtures and air-entraining admixtures containing chlorides as Cl in excess of one percent by mass of admixture, as determined by California Test 415, shall not be used in prestressed or reinforced concrete.
    - Calcium chloride shall not be used in concrete except when otherwise specified.
    - Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be from the same source and of the same percentage.
    - Admixtures shall be uniform in properties throughout their use in the work. Should it be found that an admixture as furnished is not uniform in properties, its use shall be discontinued.
    - If more than one admixture is used, the admixtures shall be compatible with each other so that the desirable effects of all admixtures used will be realized.

### 90-4.02 MATERIALS

- Admixture materials shall conform to the provisions in Section 90-2.04, "Admixture Materials."

### 90-4.03 ADMIXTURE APPROVAL

- No admixture brand shall be used in the work unless it is on the Department's current list of approved brands for the type of admixture involved.
  - Admixture brands will be considered for addition to the approved list if the manufacturer of the admixture submits to the Transportation Laboratory a sample of the admixture accompanied by certified test results demonstrating that the admixture complies with the requirements in the appropriate ASTM Designation and these specifications. The sample shall be sufficient to permit performance of all required tests. Approval of admixture brands will be

dependent upon a determination as to compliance with the requirements, based on the certified test results submitted, together with tests the Department may elect to perform.

- When the Contractor proposes to use an admixture of a brand and type on the current list of approved admixture brands, the Contractor shall furnish a Certificate of Compliance from the manufacturer, as provided in Section 6-1.07, "Certificates of Compliance," certifying that the admixture furnished is the same as that previously approved. If a previously approved admixture is not accompanied by a Certificate of Compliance, the admixture shall not be used in the work until the Engineer has had sufficient time to make the appropriate tests and has approved the admixture for use. The Engineer may take samples for testing at any time, whether or not the admixture has been accompanied by a Certificate of Compliance.

- If a mineral admixture is delivered directly to the site of the work, the Certificate of Compliance shall be signed by the manufacturer or supplier of the mineral admixture. If the mineral admixture is used in ready-mix concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product.

#### **90-4.04 REQUIRED USE OF CHEMICAL ADMIXTURES AND CALCIUM CHLORIDE**

- When the use of a chemical admixture or calcium chloride is specified, the admixture shall be used at the dosage specified, except that if no dosage is specified, the admixture shall be used at the dosage normally recommended by the manufacturer of the admixture.

- Calcium chloride shall be dispensed in liquid, flake, or pellet form. Calcium chloride dispensed in liquid form shall conform to the provisions for dispensing liquid admixtures in Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures."

#### **90-4.05 OPTIONAL USE OF CHEMICAL ADMIXTURES**

- The Contractor will be permitted to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM Designation: C 494 to conserve cementitious material or to facilitate any concrete construction application subject to the following conditions:

- A. When a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by mass, except that the resultant cementitious material content shall be not less than 300 kilograms per cubic meter; and

- B. When a reduction in cementitious material content is made, the dosage of admixture used shall be the dosage used in determining approval of the admixture.

- Unless otherwise specified, a Type C accelerating chemical admixture conforming to the requirements in ASTM Designation: C 494, may be used in portland cement concrete. Inclusion in the mix design submitted for approval will not be required provided that the admixture is added to counteract changing conditions that contribute to delayed setting of the portland cement concrete, and the use or change in dosage of the admixture is approved in writing by the Engineer.

#### **90-4.06 REQUIRED USE OF AIR-ENTRAINING ADMIXTURES**

- When air-entrainment is specified or ordered by the Engineer, the air-entraining admixture shall be used in amounts to produce a concrete having the specified air content as determined by California Test 504.

#### **90-4.07 OPTIONAL USE OF AIR-ENTRAINING ADMIXTURES**

- When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent, and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate as provided in Section 40-1.015, "Cement Content."

#### **90-4.08 REQUIRED USE OF MINERAL ADMIXTURES**

- Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material.

- The calcium oxide content shall not exceed 10 percent when determined in conformance with the requirements in ASTM Designation: C 114. The available alkali content (as sodium oxide equivalent) shall not exceed 1.5 percent when determined in conformance with the requirements in ASTM Designation: C 311, or the total alkali content (as sodium oxide equivalent) shall not exceed 5.0 percent when determined in conformance with the requirements in ASTM Designation: D 4326.

- The amounts of cement and mineral admixture used in cementitious material shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:

- A. The minimum amount of cement shall not be less than 75 percent by mass of the specified minimum cementitious material content;
- B. The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:
  1. When the calcium oxide content of a mineral admixture is equal to or less than 2 percent by mass, the amount of mineral admixture shall not be less than 15 percent by mass of the total amount of cementitious material to be used in the mix;
  2. When the calcium oxide content of a mineral admixture is greater than 2 percent, the amount of mineral admixture shall not be less than 25 percent by mass of the total amount of cementitious material to be used in the mix;
  3. When a mineral admixture that conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," is used, the amount of mineral admixture shall not be less than 10 percent by mass of the total amount of cementitious material to be used in the mix
- C. The total amount of mineral admixture shall not exceed 35 percent by mass of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in kilograms per cubic meter,

the total mass of cement and mineral admixture per cubic meter shall not exceed the specified maximum cementitious material content.

#### **90-4.09 BLANK**

#### **90-4.10 PROPORTIONING AND DISPENSING LIQUID ADMIXTURES**

- Chemical admixtures and air-entraining admixtures shall be dispensed in liquid form. Dispensers for liquid admixtures shall have sufficient capacity to measure at one time the prescribed quantity required for each batch of concrete. Each dispenser shall include a graduated measuring unit into which liquid admixtures are measured to within  $\pm 5$  percent of the prescribed quantity for each batch. Dispensers shall be located and maintained so that the graduations can be accurately read from the point at which proportioning operations are controlled to permit a visual check of batching accuracy prior to discharge. Each measuring unit shall be clearly marked for the type and quantity of admixture.

- Each liquid admixture dispensing system shall be equipped with a sampling device consisting of a valve located in a safe and readily accessible position such that a sample of the admixture may be withdrawn slowly by the Engineer.

- If more than one liquid admixture is used in the concrete mix, each liquid admixture shall have a separate measuring unit and shall be dispensed by injecting equipment located in such a manner that the admixtures are not mixed at high concentrations and do not interfere with the effectiveness of each other. When air-entraining admixtures are used in conjunction with other liquid admixtures, the air-entraining admixture shall be the first to be incorporated into the mix.

- When automatic proportioning devices are required for concrete pavement, dispensers for liquid admixtures shall operate automatically with the batching control equipment. The dispensers shall be equipped with an automatic warning system in good operating condition that will provide a visible or audible signal at the point at which proportioning operations are controlled when the quantity of admixture measured for each batch of concrete varies from the preselected dosage by more than 5 percent, or when the entire contents of the measuring unit are not emptied from the dispenser into each batch of concrete.

- Unless liquid admixtures are added to premeasured water for the batch, their discharge into the batch shall be arranged to flow into the stream of water so that the admixtures are well dispersed throughout the batch, except that air-entraining admixtures may be dispensed directly into moist sand in the batching bins provided that adequate control of the air content of the concrete can be maintained.

- Liquid admixtures requiring dosages greater than  $2.5 \text{ L/m}^3$  shall be considered to be water when determining the total amount of free water as specified in Section 90-6.06, "Amount of Water and Penetration."

- Special admixtures, such as "high range" water reducers that may contribute to a high rate of slump loss, shall be measured and dispensed as recommended by the admixture manufacturer and as approved by the Engineer.

#### **90-4.11 STORAGE, PROPORTIONING, AND DISPENSING OF MINERAL ADMIXTURES**

- Mineral admixtures shall be protected from exposure to moisture until used. Sacked material shall be piled to permit access for tally, inspection and identification for each shipment.

- Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for

sampling mineral admixtures shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper.

- Mineral admixtures shall be incorporated into concrete using equipment conforming to the requirements for cement weigh hoppers, and charging and discharging mechanisms in ASTM Designation: C 94, in Section 90-5.03, "Proportioning," and in this Section 90-4.11.

- When concrete is completely mixed in stationary paving mixers, the mineral admixture shall be weighed in a separate weigh hopper conforming to the provisions for cement weigh hoppers and charging and discharging mechanisms in Section 90-5.03A, "Proportioning for Pavement," and the mineral admixture and cement shall be introduced simultaneously into the mixer proportionately with the aggregate. If the mineral admixture is not weighed in a separate weigh hopper, the Contractor shall provide certification that the stationary mixer is capable of mixing the cement, admixture, aggregates and water uniformly prior to discharge. Certification shall contain the following:

- A. Test results for 2 compressive strength test cylinders of concrete taken within the first one-third and 2 compressive strength test cylinders of concrete taken within the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;"
- B. Calculations demonstrating that the difference in the averages of 2 compressive strengths taken in the first one-third is no greater than 7.5 percent different than the averages of 2 compressive strengths taken in the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;" and
- C. The mixer rotation speed and time of mixing prior to discharge that are required to produce a mix that meets the requirements above.

## **90-5 PROPORTIONING**

### **90-5.01 STORAGE OF AGGREGATES**

- Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size shall be avoided and also that the various sizes shall not become intermixed before proportioning.

- Aggregates shall be stored or stockpiled and handled in a manner that shall prevent contamination by foreign materials. In addition, storage of aggregates at batching or mixing facilities that are erected subsequent to the award of the contract and that furnish concrete to the project shall conform to the following:

- A. Intermingling of the different sizes of aggregates shall be positively prevented. The Contractor shall take the necessary measures to prevent intermingling. The preventive measures may include, but are not necessarily limited to, physical separation of stockpiles or construction of bulkheads of adequate length and height; and
- B. Contamination of aggregates by contact with the ground shall be positively prevented. The Contractor shall take the necessary measures to prevent contamination. The preventive measures shall include, but are not necessarily limited to, placing aggregates on wooden platforms or on hardened surfaces consisting of portland cement concrete, asphalt concrete, or cement treated material.

- In placing aggregates in storage or in moving the aggregates from storage to the weigh hopper of the batching plant, any method that may cause segregation, degradation, or the combining of materials of different gradings that will result in any size of aggregate at the weigh hopper failing to meet the grading requirements, shall be discontinued. Any method of handling aggregates that results in excessive breakage of particles shall be discontinued. The use of suitable devices to reduce impact of falling aggregates may be required by the Engineer.

## **90-5.02 PROPORTIONING DEVICES**

- Weighing, measuring, or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, automatic weighing systems shall comply with the requirements for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." Automatic devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and mineral admixture for one batch of concrete is a single operation of a switch or starter.

- Proportioning devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to ensure their accuracy.

- Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the mass of each batch of material shall not vary from the mass designated by the Engineer by more than the tolerances specified herein.

- Equipment for cumulative weighing of aggregate shall have a zero tolerance of  $\pm 0.5$  percent of the designated total batch mass of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be  $\pm 0.5$  percent of the individual batch mass designated for each size of aggregate. Equipment for cumulative weighing of cement and mineral admixtures shall have a zero tolerance of  $\pm 0.5$  percent of the designated total batch mass of the cement and mineral admixture. Equipment for weighing cement or mineral admixture separately shall have a zero tolerance of  $\pm 0.5$  percent of their designated individual batch masses. Equipment for measuring water shall have a zero tolerance of  $\pm 0.5$  percent of its designated mass or volume.

- The mass indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

- A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch mass of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch masses; and

- B. Cement shall be within 1.0 percent of its designated batch mass. When weighed individually, mineral admixture shall be within 1.0 percent of its designated batch mass. When mineral admixture and cement are permitted to be weighed cumulatively, cement shall be weighed first to within 1.0 percent of its designated batch mass, and the total for cement and mineral admixture shall be within 1.0 percent of the sum of their designated batch masses; and

- C. Water shall be within 1.5 percent of its designated mass or volume.

- Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, mineral admixture, or cement plus mineral admixture and aggregates shall not exceed that of commercially available scales having single graduations indicating a mass not exceeding the maximum permissible mass variation above, except that no scale shall be required having a capacity of less than 500 kg, with 0.5-kg graduations.

### **90-5.03 PROPORTIONING**

- Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cement, mineral admixture, and water as provided in these specifications. Aggregates shall be proportioned by mass.

- At the time of batching, aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry mass.

- Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.

- Bulk "Type IP (MS) Modified" cement shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer.

- Bulk cement and mineral admixture may be weighed in separate, individual weigh hoppers or may be weighed in the same weigh hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. If the cement and mineral admixture are weighed cumulatively, the cement shall be weighed first.

- When cement and mineral admixtures are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the mineral admixture shall be individual and distinct from all other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and an indicator to constitute an individual and independent material weighing device. The cement and the mineral admixture shall be discharged into the mixer simultaneously with the aggregate.

- The scales and weigh hoppers for bulk weighing cement, mineral admixture, or cement plus mineral admixture shall be separate and distinct from the aggregate weighing equipment.

- For batches with a volume of one cubic meter or more, the batching equipment shall conform to one of the following combinations:

- A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
- B. Single box and scale indicator for all aggregates.
- C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

- In order to check the accuracy of batch masses, the gross mass and tare mass of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed at the Contractor's expense on scales designated by the Engineer.

#### **90-5.03A Proportioning for Pavement**

- Aggregates and bulk cement, mineral admixture, and cement plus mineral admixture for use in pavement shall be proportioned by mass by means of automatic proportioning devices of approved type conforming to these specifications.

- The Contractor shall install and maintain in operating condition an electronically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by mass of the fine aggregate.

- The batching of cement, mineral admixture, or cement plus mineral admixture and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and mineral admixture hoppers or the cement plus mineral admixture hopper are charged with masses that are within the tolerances specified in Section 90-5.02, "Proportioning Devices."

- When interlocks are required for cement and mineral admixture charging mechanisms and cement and mineral admixtures are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the mass of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."

- The discharge gate on the cement and mineral admixture hoppers or the cement plus mineral admixture hopper shall be designed to permit regulating the flow of cement, mineral admixture, or cement plus mineral admixture into the aggregate as directed by the Engineer.

- When separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.

- Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and so that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.

- When the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required mass is discharged into the weigh box, after which the gate shall automatically close and lock.

- The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

## **90-6 MIXING AND TRANSPORTING**

### **90-6.01 GENERAL**

- Concrete shall be mixed in mechanically operated mixers, except that when permitted by the Engineer, batches not exceeding 0.25 m<sup>3</sup> may be mixed by hand methods in conformance with the provisions in Section 90-6.05, "Hand-Mixing."

- Equipment having components made of aluminum or magnesium alloys that would have contact with plastic concrete during mixing, transporting, or pumping of portland cement concrete shall not be used.

- Concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement, mineral admixture, or cement plus mineral admixture.

- Uniformity of concrete mixtures will be determined by differences in penetration as determined by California Test 533, or slump as determined by ASTM Designation: C 143, and by variations in the proportion of coarse aggregate as determined by California Test 529.

- When the mix design specifies a penetration value, the difference in penetration, determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed 10 mm. When the mix design specifies a slump value, the difference in slump, determined by comparing slump tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed the values given in the table below. Variation in the proportion of coarse aggregate will be determined by comparing the results of

tests of 2 samples of mixed concrete from the same batch or truck mixer load and the difference between the 2 results shall not exceed 100 kg per cubic meter of concrete.

Average Slump	Maximum Permissible Difference
Less than 100-mm	25-mm
100-mm to 150-mm	38-mm
Greater than 150-mm to 225-mm	50-mm

- The Contractor, at the Contractor's expense, shall furnish samples of the freshly mixed concrete and provide satisfactory facilities for obtaining the samples.

**90-6.02 MACHINE MIXING**

- Concrete mixers may be of the revolving drum or the revolving blade type, and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. Mixers and agitators that have an accumulation of hard concrete or mortar shall not be used.

- The temperature of mixed concrete, immediately before placing, shall be not less than 10°C or more than 32°C. Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits. Neither aggregates nor mixing water shall be heated to exceed 65°C. If ice is used to cool the concrete, discharge of the mixer will not be permitted until all ice is melted.

- The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one-fourth of the specified mixing time.

- Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions that reduce or vary the required quantity of cementitious material in the concrete mixture.

- Paving and stationary mixers shall be operated with an automatic timing device. The timing device and discharge mechanism shall be interlocked so that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.

- The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

- The size of batch shall not exceed the manufacturer's guaranteed capacity.

- When producing concrete for pavement or base, suitable batch counters shall be installed and maintained in good operating condition at jobsite batching plants and stationary mixers. The batch counters shall indicate the exact number of batches proportioned and mixed.

- Concrete shall be mixed and delivered to the jobsite by means of one of the following combinations of operations:

- A. Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in truck agitators or in non-agitating hauling equipment (central-mixed concrete).
- B. Mixed partially in a stationary mixer, and the mixing completed in a truck mixer (shrink-mixed concrete).
- C. Mixed completely in a truck mixer (transit-mixed concrete).
- D. Mixed completely in a paving mixer.

- Agitators may be truck mixers operating at agitating speed or truck agitators. Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates on which is plainly marked the various uses for which the equipment is designed, the manufacturer's guaranteed capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum or blades.
- Truck mixers shall be equipped with electrically or mechanically actuated revolution counters by which the number of revolutions of the drum or blades may readily be verified.
- When shrink-mixed concrete is furnished, concrete that has been partially mixed at a central plant shall be transferred to a truck mixer and all requirements for transit-mixed concrete shall apply. No credit in the number of revolutions at mixing speed shall be allowed for partial mixing in a central plant.

### **90-6.03 TRANSPORTING MIXED CONCRETE**

- Mixed concrete may be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturer of the equipment as agitating speed, or in non-agitating hauling equipment, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable for adequate placement and consolidation in place, and provided the mixed concrete after hauling to the delivery point conforms to the provisions in Section 90-6.01, "General."
- Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity and shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.
- Bodies of non-agitating hauling equipment shall be constructed so that leakage of the concrete mix, or any part thereof, will not occur at any time.
- Concrete hauled in open-top vehicles shall be protected during hauling against rain or against exposure to the sun for more than 20 minutes when the ambient temperature exceeds 24°C.
- No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer. If the Engineer authorizes additional water to be incorporated into the concrete, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharge is commenced.
- The rate of discharge of mixed concrete from truck mixer-agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.
- When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours or before 250 revolutions of the drum or blades, whichever occurs first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30°C or above, the time allowed may be less than 1.5 hours.
- When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30°C or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.
- Each load of concrete delivered at the jobsite shall be accompanied by a weighmaster certificate showing the mix identification number, non-repeating load number, date and time at which the materials were batched, the total amount of water added to the load, and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This weighmaster certificate shall also show the actual scale masses (kilograms) for the ingredients batched. Theoretical or target batch masses shall not be used as a substitute for actual scale masses.

- Weighmaster certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on a 90 mm diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be "line feed, carriage return" (LFCR) and "one line, separate record" with allowances for sufficient fields to satisfy the amount of data required by these specifications.

- The Contractor may furnish a weighmaster certificate accompanied by a separate certificate that lists the actual batch masses or measurements for a load of concrete provided that both certificates are imprinted with the same non-repeating load number that is unique to the contract and delivered to the jobsite with the load.

- Weighmaster certificates furnished by the Contractor shall conform to the provisions in Section 9-1.01, "Measurement of Quantities."

#### **90-6.04 TIME OR AMOUNT OF MIXING**

- Mixing of concrete in paving or stationary mixers shall continue for the required mixing time after all ingredients, except water and admixture, if added with the water, are in the mixing compartment of the mixer before any part of the batch is released. Transfer time in multiple drum mixers shall not be counted as part of the required mixing time.

- The required mixing time, in paving or stationary mixers, of concrete used for concrete structures, except minor structures, shall be not less than 90 seconds or more than 5 minutes, except that when directed by the Engineer in writing, the requirements of the following paragraph shall apply.

- The required mixing time, in paving or stationary mixers, except as provided in the preceding paragraph, shall be not less than 50 seconds or more than 5 minutes.

- The minimum required revolutions at the mixing speed for transit-mixed concrete shall not be less than that recommended by the mixer manufacturer, but in no case shall the number of revolutions be less than that required to consistently produce concrete conforming to the provisions for uniformity in Section 90-6.01, "General."

#### **90-6.05 HAND-MIXING**

- Hand-mixed concrete shall be made in batches of not more than 0.3 cubic yards and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than 1 foot in total depth. On this mixture shall be spread the dry cement and mineral admixture and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

#### **90-6.06 AMOUNT OF WATER AND PENETRATION**

- The amount of water used in concrete mixes shall be regulated so that the penetration of the concrete as determined by California Test 533 or the slump of the concrete as determined by ASTM Designation: C 143 is within the "Nominal" values shown in the following table. When the penetration or slump of the concrete is found to exceed the nominal values listed, the mixture of subsequent batches shall be adjusted to reduce the penetration or slump to a value within the nominal range shown. Batches of concrete with a penetration or slump exceeding the maximum values listed shall not be used in the work. When Type F or Type G chemical admixtures are added to the mix, the penetration requirements shall not apply and the slump shall not exceed 225 mm after the chemical admixtures are added.

Type of Work	Nominal		Maximum	
	Penetration (mm)	Slump (mm)	Penetration (mm)	Slump (mm)
Concrete Pavement	0-25	—	40	—
Non-reinforced concrete facilities	0-35	—	50	—
Reinforced concrete structures				
Sections over 300-mm thick	0-35	—	65	—
Sections 300-mm thick or less	0-50	—	75	—
Concrete placed under water	—	150-200	—	225
Cast-in-place concrete piles	65-90	130-180	100	200

- The amount of free water used in concrete shall not exceed  $183 \text{ kg/m}^3$ , plus 20 kg for each required 100 kg of cementitious material in excess of  $325 \text{ kg/m}^3$ .
- The term free water is defined as the total water in the mixture minus the water absorbed by the aggregates in reaching a saturated surface-dry condition.
- Where there are adverse or difficult conditions that affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic meter of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 kg of water per added 100 kg of cementitious material per cubic meter. The cost of additional cementitious material and water added under these conditions shall be at the Contractor's expense and no additional compensation will be allowed therefor.
- The equipment for supplying water to the mixer shall be constructed and arranged so that the amount of water added can be measured accurately. Any method of discharging water into the mixer for a batch shall be accurate within 1.5 percent of the quantity of water required to be added to the mix for any position of the mixer. Tanks used to measure water shall be designed so that water cannot enter while water is being discharged into the mixer and discharge into the mixer shall be made rapidly in one operation without dribbling. All equipment shall be arranged so as to permit checking the amount of water delivered by discharging into measured containers.

## **90-7 CURING CONCRETE**

### **90-7.01 METHODS OF CURING**

- Newly placed concrete shall be cured by the methods specified in this Section 90-7.01 and the special provisions.

#### **90-7.01A Water Method**

- The concrete shall be kept continuously wet by the application of water for a minimum curing period of 7 days after the concrete has been placed.
  - When a curing medium consisting of cotton mats, rugs, carpets, or earth or sand blankets is to be used to retain the moisture, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface. At the expiration of the curing period, the concrete surfaces shall be cleared of all curing mediums.
  - At the option of the Contractor, a curing medium consisting of white opaque polyethylene sheeting extruded onto burlap may be used to cure concrete structures. The

polyethylene sheeting shall have a minimum thickness of 100 µm, and shall be extruded onto 283.5 gram burlap.

- At the option of the Contractor, a curing medium consisting of polyethylene sheeting may be used to cure concrete columns. The polyethylene sheeting shall have a minimum thickness of 250 µm achieved in a single layer of material.

- If the Contractor chooses to use polyethylene sheeting or polyethylene sheeting on burlap as a curing medium as specified above, these mediums and any joints therein shall be secured as necessary to provide moisture retention and shall be within 75 mm of the concrete at all points along the surface being cured. When these mediums are used, the temperature of the concrete shall be monitored during curing. If the temperature of the concrete cannot be maintained below 60°C, this method of curing shall be discontinued, and one of the other curing methods allowed for the concrete shall be used.

- When concrete bridge decks and flat slabs are to be cured without the use of a curing medium, the entire surface of the bridge deck or slab shall be kept damp by the application of water with an atomizing nozzle as specified in the preceding paragraph, until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for a period of not less than 7 days.

#### **90-7.01B Curing Compound Method**

- Surfaces of the concrete that are exposed to the air shall be sprayed uniformly with a curing compound.

- Curing compounds to be used shall be as follows:

1. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B, except the resin type shall be poly-alpha-methylstyrene.
2. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B.
3. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class A.
4. Non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class B.
5. Non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class A.
6. Non-pigmented curing compound with fugitive dye conforming to the requirements in ASTM Designation: C 309, Type 1-D, Class A.

- The infrared scan for the dried vehicle from curing compound (1) shall match the infrared scan on file at the Transportation Laboratory.

- The loss of water for each type of curing compound, when tested in conformance with the requirements in California Test 534, shall not be more than 0.15-kg/m<sup>2</sup> in 24 hours.

- The curing compound to be used will be specified elsewhere in these specifications or in the special provisions.

- When the use of curing compound is required or permitted elsewhere in these specifications or in the special provisions and no specific kind is specified, any of the curing compounds listed above may be used.

- Curing compound shall be applied at a nominal rate of 3.7 m<sup>2</sup>/L, unless otherwise specified.

- At any point, the application rate shall be within ±1.2 m<sup>2</sup>/L of the nominal rate specified, and the average application rate shall be within ±0.5 m<sup>2</sup>/L of the nominal rate specified when

tested in conformance with the requirements in California Test 535. Runs, sags, thin areas, skips, or holidays in the applied curing compound shall be evidence that the application is not satisfactory.

- Curing compounds shall be applied using power operated spray equipment. The power operated spraying equipment shall be equipped with an operational pressure gage and a means of controlling the pressure. Hand spraying of small and irregular areas that are not reasonably accessible to mechanical spraying equipment, in the opinion of the Engineer, may be permitted.

- The curing compound shall be applied to the concrete following the surface finishing operation, immediately before the moisture sheen disappears from the surface, but before any drying shrinkage or craze cracks begin to appear. In the event of any drying or cracking of the surface, application of water with an atomizing nozzle as specified in Section 90-7.01A, "Water Method," shall be started immediately and shall be continued until application of the compound is resumed or started; however, the compound shall not be applied over any resulting freestanding water. Should the film of compound be damaged from any cause before the expiration of 7 days after the concrete is placed in the case of structures and 72 hours in the case of pavement, the damaged portion shall be repaired immediately with additional compound.

- At the time of use, compounds containing pigments shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. A paddle shall be used to loosen all settled pigment from the bottom of the container, and a power driven agitator shall be used to disperse the pigment uniformly throughout the vehicle.

- Agitation shall not introduce air or other foreign substance into the curing compound.

- The manufacturer shall include in the curing compound the necessary additives for control of sagging, pigment settling, leveling, de-emulsification, or other requisite qualities of a satisfactory working material. Pigmented curing compounds shall be manufactured so that the pigment does not settle badly, does not cake or thicken in the container, and does not become granular or curdled. Settlement of pigment shall be a thoroughly wetted, soft, mushy mass permitting the complete and easy vertical penetration of a paddle. Settled pigment shall be easily redispersed, with minimum resistance to the sideways manual motion of the paddle across the bottom of the container, to form a smooth uniform product of the proper consistency.

- Curing compounds shall remain sprayable at temperatures above 4°C and shall not be diluted or altered after manufacture.

- The curing compound shall be packaged in clean 1040-L totes, 210-L barrels

- or 19-L pails shall be supplied from a suitable storage tank located at the jobsite. The containers shall comply with "Title 49, Code of Federal Regulations, Hazardous Materials Regulations." The 1040-L totes and the 210-L barrels shall have removable lids and airtight fasteners. The 19-L pails shall be round and have standard full open head and bail. Lids with bungholes shall not be permitted. Settling or separation of solids in containers, except tanks, must be completely redispersed with low speed mixing prior to use, in conformance with these specifications and the manufacturer's recommendations. Mixing shall be accomplished either manually by use of a paddle or by use of a mixing blade driven by a drill motor, at low speed. Mixing blades shall be the type used for mixing paint. On site storage tanks shall be kept clean and free of contaminants. Each tank shall have a permanent system designed to completely redisperse settled material without introducing air or other foreign substances.

- Steel containers and lids shall be lined with a coating that will prevent destructive action by the compound or chemical agents in the air space above the compound. The coating shall not come off the container or lid as skins. Containers shall be filled in a manner that will prevent skinning. Plastic containers shall not react with the compound.

- Each container shall be labeled with the manufacturer's name, kind of curing compound, batch number, volume, date of manufacture, and volatile organic compound (VOC) content. The

label shall also warn that the curing compound containing pigment shall be well stirred before use. Precautions concerning the handling and the application of curing compound shall be shown on the label of the curing compound containers in conformance with the Construction Safety Orders and General Industry Safety Orders of the State of California.

- Containers of curing compound shall be labeled to indicate that the contents fully comply with the rules and regulations concerning air pollution control in the State of California.
- When the curing compound is shipped in tanks or tank trucks, a shipping invoice shall accompany each load. The invoice shall contain the same information as that required herein for container labels.
- Curing compound will be sampled by the Engineer at the source of supply or at the jobsite or at both locations.
- Curing compound shall be formulated so as to maintain the specified properties for a minimum of one year. The Engineer may require additional testing before use to determine compliance with these specifications if the compound has not been used within one year or whenever the Engineer has reason to believe the compound is no longer satisfactory.
- Tests will be conducted in conformance with the latest ASTM test methods and methods in use by the Transportation Laboratory.

#### **90-7.01C Waterproof Membrane Method**

- The exposed finished surfaces of concrete shall be sprayed with water, using a nozzle that so atomizes the flow that a mist and not a spray is formed, until the concrete has set, after which the curing membrane shall be placed. The curing membrane shall remain in place for a period of not less than 72 hours.
- Sheeting material for curing concrete shall conform to the requirements in AASHTO Designation: M 171 for white reflective materials.
- The sheeting material shall be fabricated into sheets of such width as to provide a complete cover for the entire concrete surface. Joints in the sheets shall be securely cemented together in such a manner as to provide a waterproof joint. The joint seams shall have a minimum lap of 100 mm.
- The sheets shall be securely weighted down by placing a bank of earth on the edges of the sheets or by other means satisfactory to the Engineer.
- Should any portion of the sheets be broken or damaged before the expiration of 72 hours after being placed, the broken or damaged portions shall be immediately repaired with new sheets properly cemented into place.
- Sections of membrane that have lost their waterproof qualities or have been damaged to such an extent as to render them unfit for curing the concrete shall not be used.

#### **90-7.01D Forms-In-Place Method**

- Formed surfaces of concrete may be cured by retaining the forms in place. The forms shall remain in place for a minimum period of 7 days after the concrete has been placed, except that for members over 0.5-m in least dimension the forms shall remain in place for a minimum period of 5 days.
- Joints in the forms and the joints between the end of forms and concrete shall be kept moisture tight during the curing period. Cracks in the forms and cracks between the forms and the concrete shall be resealed by methods subject to the approval of the Engineer.

## **90-7.02 CURING PAVEMENT**

- The entire exposed area of the pavement, including edges, shall be cured by the waterproof membrane method, or curing compound method using curing compound (1) or (2) as the Contractor may elect. Should the side forms be removed before the expiration of 72 hours following the start of curing, the exposed pavement edges shall also be cured. If the pavement is cured by means of the curing compound method, the sawcut and all portions of the curing compound that have been disturbed by sawing operations shall be restored by spraying with additional curing compound.

- Curing shall commence as soon as the finishing process provided in Section 40-1.10, "Final Finishing," has been completed. The method selected shall conform to the provisions in Section 90-7.01, "Methods of Curing."

- When the curing compound method is used, the compound shall be applied to the entire pavement surface by mechanical sprayers. Spraying equipment shall be of the fully atomizing type equipped with a tank agitator that provides for continual agitation of the curing compound during the time of application. The spray shall be adequately protected against wind, and the nozzles shall be so oriented or moved mechanically transversely as to result in the minimum specified rate of coverage being applied uniformly on exposed faces. Hand spraying of small and irregular areas, and areas inaccessible to mechanical spraying equipment, in the opinion of the Engineer, will be permitted. When the ambient air temperature is above 15°C, the Contractor shall fog the surface of the concrete with a fine spray of water as specified in Section 90-7.01A, "Water Method." The surface of the pavement shall be kept moist between the hours of 10:00 a.m. and 4:30 p.m. on the day the concrete is placed. However, the fogging done after the curing compound has been applied shall not begin until the compound has set sufficiently to prevent displacement. Fogging shall be discontinued if ordered in writing by the Engineer.

## **90-7.03 CURING STRUCTURES**

- Newly placed concrete for cast-in-place structures, other than highway bridge decks, shall be cured by the water method, the forms-in-place method, or, as permitted herein, by the curing compound method, in conformance with the provisions in Section 90-7.01, "Methods of Curing."

- The curing compound method using a pigmented curing compound may be used on concrete surfaces of construction joints, surfaces that are to be buried underground, and surfaces where only Ordinary Surface Finish is to be applied and on which a uniform color is not required and that will not be visible from a public traveled way. If the Contractor elects to use the curing compound method on the bottom slab of box girder spans, the curing compound shall be curing compound (1).

- The top surface of highway bridge decks shall be cured by both the curing compound method and the water method. The curing compound shall be curing compound (1).

- Concrete surfaces of minor structures, as defined in Section 51-1.02, "Minor Structures," shall be cured by the water method, the forms-in-place method or the curing compound method.

- When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surfaces being cured by the curing compound method or by the forms-in-place method, until the Engineer determines that a cooling effect is no longer required. Application of water for this purpose will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

#### **90-7.04 CURING PRECAST CONCRETE MEMBERS**

- Precast concrete members shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing." Curing shall be provided for the minimum time specified for each method or until the concrete reaches its design strength, whichever is less. Steam curing may also be used for precast members and shall conform to the following provisions:

- A. After placement of the concrete, members shall be held for a minimum 4-hour presteaming period. If the ambient air temperature is below 10°C, steam shall be applied during the presteaming period to hold the air surrounding the member at a temperature between 10°C and 32°C.
- B. To prevent moisture loss on exposed surfaces during the presteaming period, members shall be covered as soon as possible after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.
- C. Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner as to prevent the loss of steam and moisture.
- D. Steam at the jets shall be at low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure shall not exceed 22°C per hour. The curing temperature throughout the enclosure shall not exceed 65°C and shall be maintained at a constant level for a sufficient time necessary to develop the required transfer strength. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.
- E. Temperature recording devices that will provide an accurate, continuous, permanent record of the curing temperature shall be provided. A minimum of one temperature recording device per 60 m of continuous bed length will be required for checking temperature.
- F. Members in pretension beds shall be detensioned immediately after the termination of steam curing while the concrete and forms are still warm, or the temperature under the enclosure shall be maintained above 15°C until the stress is transferred to the concrete.
- G. Curing of precast concrete will be considered completed after termination of the steam curing cycle.

#### **90-7.05 CURING PRECAST PRESTRESSED CONCRETE PILES**

- Newly placed concrete for precast prestressed concrete piles shall be cured in conformance with the provisions in Section 90-7.04, "Curing Precast Concrete Members," except that piles in a corrosive environment shall be cured as follows:

- A. Piles shall be either steam cured or water cured. If water curing is used, the piles shall be kept continuously wet by the application of water in conformance with the provisions in Section 90-7.01A, "Water Method."
- B. If steam curing is used, the steam curing provisions in Section 90-7.04, "Curing Precast Concrete Members," shall apply except that the piles shall be kept continuously wet for their entire length for a period of not less than 3 days, including the holding and steam curing periods.

### **90-7.06 CURING SLOPE PROTECTION**

- Concrete slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."
- Concreted-rock slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing," or with a blanket of earth kept wet for 72 hours, or by sprinkling with a fine spray of water every 2 hours during the daytime for a period of 3 days.

### **90-7.07 CURING MISCELLANEOUS CONCRETE WORK**

- Exposed surfaces of curbs shall be cured by pigmented curing compounds as specified in Section 90-7.01B, "Curing Compound Method."
- Concrete sidewalks, gutter depressions, island paving, curb ramps, driveways, and other miscellaneous concrete areas shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."
  - Shotcrete shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."
  - Mortar and grout shall be cured by keeping the surface damp for 3 days.
  - After placing, the exposed surfaces of sign structure foundations, including pedestal portions, if constructed, shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."

## **90-8 PROTECTING CONCRETE**

### **90-8.01 GENERAL**

- In addition to the provisions in Section 7-1.16, "Contractor's Responsibility for the Work and Materials," the Contractor shall protect concrete as provided in this Section 90-8.
- Concrete shall not be placed on frozen or ice-coated ground or subgrade nor on ice-coated forms, reinforcing steel, structural steel, conduits, precast members, or construction joints.
  - Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to damage surface mortar or cause a flow or wash of the concrete surface, unless the Contractor provides adequate protection against damage.
  - Concrete that has been frozen or damaged by other causes, as determined by the Engineer, shall be removed and replaced by the Contractor at the Contractor's expense.

### **90-8.02 PROTECTING CONCRETE STRUCTURES**

- Structure concrete and shotcrete used as structure concrete shall be maintained at a temperature of not less than 7°C for 72 hours after placing and at not less than 4°C for an additional 4 days. When required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.

### **90-8.03 PROTECTING CONCRETE PAVEMENT**

- Pavement concrete shall be maintained at a temperature of not less than 4°C for 72 hours. When required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.
  - Except as provided in Section 7-1.08, "Public Convenience," the Contractor shall protect concrete pavement against construction and other activities that abrade, scar, discolor, reduce texture depth, lower coefficient of friction, or otherwise damage the surface. Stockpiling,

drifting, or excessive spillage of soil, gravel, petroleum products, and concrete or asphalt mixes on the surface of concrete pavement is prohibited unless otherwise specified in these specifications, the special provisions or permitted by the Engineer.

- When ordered by the Engineer or shown on the plans or specified in the special provisions, pavement crossings shall be constructed for the convenience of public traffic. The material and work necessary for the construction of the crossings, and their subsequent removal and disposal, will be paid for at the contract unit prices for the items of work involved and if there are no contract items for the work involved, payment for pavement crossings will be made by extra work as provided in Section 4-1.03D, "Extra Work.". Where public traffic will be required to cross over the new pavement, Type III portland cement may be used in concrete, if permitted in writing by the Engineer. The pavement may be opened to traffic as soon as the concrete has developed a modulus of rupture of 3.8 MPa. The modulus of rupture will be determined by California Test 523.

- No traffic or Contractor's equipment, except as hereinafter provided, will be permitted on the pavement before a period of 10 days has elapsed after the concrete has been placed, nor before the concrete has developed a modulus of rupture of at least 3.8 MPa. Concrete that fails to attain a modulus of rupture of 3.8 MPa within 10 days shall not be opened to traffic until directed by the Engineer.

- Equipment for sawing weakened plane joints will be permitted on the pavement as specified in Section 40-1.08B, "Weakened Plane Joints."

- When requested in writing by the Contractor, the tracks on one side of paving equipment will be permitted on the pavement after a modulus of rupture of 2.4 MPa has been attained, provided that:

- A. Unit pressure exerted on the pavement by the paver shall not exceed 135 kPa;
- B. Tracks with cleats, grousers, or similar protuberances shall be modified or shall travel on planks or equivalent protective material, so that the pavement is not damaged; and
- C. No part of the track shall be closer than 0.3-m from the edge of pavement.

- In case of visible cracking of, or other damage to the pavement, operation of the paving equipment on the pavement shall be immediately discontinued.

- Damage to the pavement resulting from early use of pavement by the Contractor's equipment as provided above shall be repaired by the Contractor at the Contractor's expense.

- The State will furnish the molds and machines for testing the concrete for modulus of rupture, and the Contractor, at the Contractor's expense, shall furnish the material and whatever labor the Engineer may require.

## **90-9 COMPRESSIVE STRENGTH**

### **90-9.01 GENERAL**

- Concrete compressive strength requirements consist of a minimum strength that shall be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified in these specifications or the special provisions or are shown on the plans.

- The compressive strength of concrete will be determined from test cylinders that have been fabricated from concrete sampled in conformance with the requirements of California Test 539. Test cylinders will be molded and initially field cured in conformance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in

conformance with the requirements of California Test 521. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

- When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in conformance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

- When concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall, at the Contractor's expense, make corrective changes, subject to approval of the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State \$14 for each in-place cubic meter of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to the State \$20 for each in place cubic meter of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. Concrete represented by a single test that indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials."

- If the test result indicates that the compressive strength at the maximum curing age specified or allowed is below the specified strength, but is 85 percent or more of the specified strength, payments to the State as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the requirements in ASTM Designation: C 42.

- No single compressive strength test shall represent more than 250 m<sup>3</sup>.

- When a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders that have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. When the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

- When concrete is specified by compressive strength, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use will be required prior to

placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.

- Certified test data, in order to be acceptable, shall indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of cure days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

- Trial batch test reports, in order to be acceptable, shall indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 4 MPa greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches that were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

- Tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. Equipment employed in testing shall be in good condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

- The certified test data and trial batch test reports shall include the following information:

- A. Date of mixing.
- B. Mixing equipment and procedures used.
- C. The size of batch in cubic yards and the mass, type, and source of all ingredients used.
- D. Penetration of the concrete.
- E. The air content of the concrete if an air-entraining admixture is used.
- F. The age at time of testing and strength of all concrete cylinders tested.

- Certified test data and trial batch test reports shall be signed by an official of the firm that performed the tests.

- When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class of concrete required at that location.

- After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making changes that, in the judgment of the Engineer, could result in a strength of concrete below that specified.

- The Contractor's attention is directed to the time required to test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

- When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

## **90-10 MINOR CONCRETE**

### **90-10.01 GENERAL**

- Concrete for minor structures, slope paving, curbs, sidewalks and other concrete work, when designated as minor concrete on the plans, in the specifications, or in the contract item, shall conform to the provisions specified herein.
- The Engineer, at the Engineer's discretion, will inspect and test the facilities, materials and methods for producing the concrete to ensure that minor concrete of the quality suitable for use in the work is obtained.

### **90-10.02 MATERIALS**

- Minor concrete shall conform to the following requirements:

#### **90-10.02A Cementitious Material**

- Cementitious material shall conform to the provisions in Section 90-1.01, "Description."

#### **90-10.02B Aggregate**

- Aggregate shall be clean and free from deleterious coatings, clay balls, roots, and other extraneous materials.
- The Contractor shall submit to the Engineer for approval, a grading of the combined aggregate proposed for use in the minor concrete. After acceptance of the grading, aggregate furnished for minor concrete shall conform to that grading, unless a change is authorized in writing by the Engineer.
- The Engineer may require the Contractor to furnish periodic test reports of the aggregate grading furnished. The maximum size of aggregate used shall be at the option of the Contractor, but in no case shall the maximum size be larger than 37.5 mm or smaller than 19 mm.
- The Engineer may waive, in writing, the gradation requirements in this Section 90-10.02B, if, in the Engineer's opinion, the furnishing of the gradation is not necessary for the type or amount of concrete work to be constructed.

#### **90-10.02C Water**

- Water used for washing, mixing, and curing shall be free from oil, salts, and other impurities that would discolor or etch the surface or have an adverse affect on the quality of the concrete.

#### **90-10.02D Admixtures**

- The use of admixtures shall conform to the provisions in Section 90-4, "Admixtures."

### **90-10.03 PRODUCTION**

- Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice that will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and that conforms to requirements specified herein. Recognized standards of good practice are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or the Department.

- The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."
- The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.
- Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 32°C will be considered conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.
- The required mixing time in stationary mixers shall be not less than 50 seconds or more than 5 minutes.
- The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.
- Each load of ready-mixed concrete shall be accompanied by a weighmaster certificate that shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The weighmaster certificate shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.
- A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets contract requirements, including minimum cementitious material content specified.

#### **90-10.04 CURING MINOR CONCRETE**

- Curing minor concrete shall conform to the provisions in Section 90-7, "Curing Concrete."

#### **90-10.05 PROTECTING MINOR CONCRETE**

- Protecting minor concrete shall conform to the provisions in Section 90-8, "Protecting Concrete," except the concrete shall be maintained at a temperature of not less than 4°C for 72 hours after placing.

#### **90-10.06 MEASUREMENT AND PAYMENT**

- Minor concrete will be measured and paid for in conformance with the provisions specified in the various sections of these specifications covering concrete construction when minor concrete is specified in the specifications, shown on the plans, or indicated by contract item in the Engineer's Estimate.

### **90-11 MEASUREMENT AND PAYMENT**

#### **90-11.01 MEASUREMENT**

- Portland cement concrete will be measured in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.

- When it is provided that concrete will be measured at the mixer, the volume in cubic yards shall be computed as the total mass of the batch in kilograms divided by the density of the concrete in pounds per cubic yard. The total mass of the batch shall be calculated as the sum of all materials, including water, entering the batch. The density of the concrete will be determined in conformance with the requirements in California Test 518.

## **90-11.02 PAYMENT**

- Portland cement concrete will be paid for in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.
- Full compensation for furnishing and incorporating admixtures required by these specifications or the special provisions will be considered as included in the contract prices paid for the concrete involved and no additional compensation will be allowed therefor.
- Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."
- Should the Contractor use admixtures in conformance with the provisions in Section 90-4.05, "Optional Use of Chemical Admixtures," or Section 90-4.07, "Optional Use of Air-entraining Admixtures," or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them into the concrete at the Contractor's expense and no additional compensation will be allowed therefor.

## **SECTION 91: PAINT**

Issue Date: November 18, 2005

Section 91-3, "Paints for Timber," of the Standard Specifications is amended to read:

### **91-3 PAINTS FOR TIMBER**

#### **91-3.01 WOOD PRIMER, LATEX-BASE**

##### **Classification:**

- This specification covers a ready-mixed priming paint for use on unpainted wood or exterior woodwork. It shall conform with the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for exterior wood primers, and be listed on the Exterior Latex Wood Primer MPI List Number 6.

#### **91-3.02 PAINT; LATEX-BASE FOR EXTERIOR WOOD, WHITE AND TINTS**

##### **Classification:**

- This specification covers a ready-mixed paint for use on wood surfaces subject to outside exposures. This paint shall conform to the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for Paint, Latex, Exterior, and shall be listed on the following MPI Approved Products List:

- A. Exterior Latex, Flat MPI Gloss Level 1, MPI List Number 10.
- B. Exterior Latex, Semi-Gloss, MPI Gloss Level 5, MPI List Number 11.
- C. Exterior Latex, Gloss, MPI Gloss Level 6, MPI List Number 119.

- Unpainted wood shall first be primed with wood primer conforming to the provisions in Section 91-3.01, "Wood Primer, Latex-Base."

Section 91-4, "Miscellaneous Paints," of the Standard Specifications is amended to read:

#### **91-4 MISCELLANEOUS PAINTS**

##### **91-4.01 THROUGH 91-4.04 (BLANK)**

##### **91-4.05 PAINT; ACRYLIC EMULSION, EXTERIOR WHITE AND LIGHT AND MEDIUM TINTS**

###### **Classification:**

• This specification covers an acrylic emulsion paint designed for use on exterior masonry. This paint shall conform to the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for Paint, Latex, Exterior, and shall be listed on the following MPI Approved Products Lists:

- A. Exterior Latex, Flat MPI Gloss Level 1, MPI List Number 10.
- B. Exterior Latex, Semi-Gloss, MPI Gloss Level 5, MPI List Number 11.
- C. Exterior Latex, Gloss, MPI Gloss Level 6, MPI List Number 119.

- This paint may be tinted by using "universal" or "all purpose" concentrates.

#### **SECTION 92: ASPHALTS**

Issue Date: November 18, 2005

Section 92, "Asphalts," of the Standard Specifications is amended to read:

##### **92-1.01 DESCRIPTION**

• Asphalt shall consist of refined petroleum or a mixture of refined liquid asphalt and refined solid asphalt, prepared from crude petroleum. Asphalt shall be:

- A. Free from residues caused by the artificial distillation of coal, coal tar, or paraffin.
- B. Free from water.
- C. Homogeneous.

##### **92-1.02 MATERIALS**

###### **92-1.02(A) General**

• The Contractor shall furnish asphalt under the Department's "Certification Program for Suppliers of Asphalt." The Department maintains the program requirements, procedures, and a list of approved suppliers at:

<http://www.dot.ca.gov/hq/esc/Translab/fpmcoc.htm>

- The Contractor shall ensure the safe transportation, storage, use, and disposal of asphalt.
- The Contractor shall prevent the formation of carbonized particles caused by overheating asphalt during manufacturing or construction.

## 92-1.02(B) Grades

- Performance graded (PG) asphalt binder shall conform to the following:

Performance Graded Asphalt Binder						
Property	AASHTO Test Method	Specification				
		Grade				
		PG 58-22 <sup>a</sup>	PG 64-10	PG 64-16	PG 64-28	PG 70-10
<b>Original Binder</b>						
Flash Point, Minimum °C	T48	230	230	230	230	230
Solubility, Minimum % <sup>b</sup>	T44	99	99	99	99	99
Viscosity at 135°C, <sup>c</sup> Maximum, Pa·s	T316	3.0	3.0	3.0	3.0	3.0
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T315	58 1.00	64 1.00	64 1.00	64 1.00	70 1.00
RTFO Test, <sup>e</sup> Mass Loss, Maximum, %	T240	1.00	1.00	1.00	1.00	1.00
<b>RTFO Test Aged Binder</b>						
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T315	58 2.20	64 2.20	64 2.20	64 2.20	70 2.20
Ductility at 25°C Minimum, cm	T51	75	75	75	75	75
PAV <sup>f</sup> Aging, Temperature, °C	R28	100	100	100	100	110
<b>RTFO Test and PAV Aged Binder</b>						
Dynamic Shear, Test Temp. at 10 rad/s, °C Maximum G*/sin(delta), kPa	T315	22 <sup>d</sup> 5000	31 <sup>d</sup> 5000	28 <sup>d</sup> 5000	22 <sup>d</sup> 5000	34 <sup>d</sup> 5000
Creep Stiffness, Test Temperature, °C Maximum S-value, Mpa Minimum M-value	T313	-12 300 0.300	0 300 0.300	-6 300 0.300	-18 300 0.300	0 300 0.300

Notes:

- For use as asphalt rubber base stock for high mountain and high desert area.
- The Engineer will waive this specification if the supplier is a Quality Supplier as defined by the Department's "Certification Program for Suppliers of Asphalt."
- The Engineer will waive this specification if the supplier certifies the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.
- Test the sample at 3°C higher if it fails at the specified test temperature. G\*/sin(delta) shall remain 5000 kPa maximum.
- "RTFO Test" means the asphaltic residue obtained using the Rolling Thin Film Oven Test, AASHTO Test Method T240 or ASTM Designation: D 2872.
- "PAV" means Pressurized Aging Vessel.

- Performance based asphalt (PBA) binder shall conform to the following:

**Performance Based Asphalt Binder**

Property	AASHTO Test Method	Specification			
		Grade			
		PBA 6a	PBA 6a(mod)	PBA 6b	PBA 7
Absolute Viscosity (60°C), Pa·s(x10 <sup>-1</sup> ) <sup>a</sup> Original Binder, Minimum RTFO Aged Residue <sup>b</sup> , Minimum	T202	2000 5000	2000 5000	2000 5000	1100 3000
Kinematic Viscosity (135°C), m <sup>2</sup> /s(x10 <sup>-6</sup> ) Original Binder, Maximum RTFO Aged Residue, Minimum	T201	2000 275	2000 275	2000 275	2000 275
Absolute Viscosity Ratio (60°C), Maximum RTFO Test Visc./Orig. Visc.	—	4.0	4.0	4.0	4.0
Flash Point, Cleveland Open Cup, °C, <sup>d</sup> Original Binder, Minimum	T48	232	232	232	232
Mass Loss After RTFO Test, %	T240	0.60	0.60	0.60	0.60
Solubility in Trichloroethylene, % <sup>c</sup> Original Binder, Minimum	T44	Report	Report	Report	Report
Ductility (25°C, 5 cm/min), cm RTFO Test Aged Residue <sup>b</sup> , Minimum	T51	60	60	60	75
On RTFO Test Aged Residue, °C: 1 to 10 rad/sec: SSD ≥ 0 and Phase Angle (at 1 rad/sec) < 72°	†	—	35	—	—
On Residue from PAV <sup>g</sup> at temp., °C Or Residue from Tilt Oven <sup>f</sup> (@113°C), hours	R28	100 36	100 36	100 36	110 72
<sup>e</sup> SSD ≥ -115(SSV)-50.6, °C	†	—	—	—	25
Stiffness, Test Temperature, °C Maximum S-value, MPa Minimum M-value	T313	-24 300 0.300	-24 300 0.300	-30 300 0.300	-6 300 0.300

Notes:

- a. Absolute viscosity (60°C) will be determined at one sec<sup>-1</sup> using ASTM Designation: D 4957 with Asphalt Institute vacuum capillary viscometers.
- b. "RTFO Aged Residue" means the asphaltic residue obtained using the Rolling Thin Film Oven Test (RTFO Test), AASHTO Test Method T240 or ASTM Designation: D 2872.
- c. There is no requirement; however results of the test shall be part of the certified copy of test results furnished with the Certificate of Compliance.
- d. "Residue from Tilt Oven " means the asphalt obtained using California Test 374, Method B, "Method for Determining Asphalt Durability Using the California Tilt-Oven Durability Test."
- e. "SSD" means Shear Susceptibility of Delta; "SSV" means Shear Susceptibility of Viscosity.
- f. California Test 381.
- g. "PAV" means Pressurized Aging Vessel.

**92-1.02(C) Sampling**

- The Contractor shall provide a sampling device in the asphalt feed line connecting the plant storage tanks to the asphalt weighing system or spray bar. The sampling device shall be accessible between 600 mm and 750 mm above the platform. The Contractor shall provide a receptacle for flushing the sampling device.
  - The sampling device shall include a valve:
    - A. With a diameter between 10 mm and 20 mm.

- B. Manufactured in a manner that a one-liter sample may be taken slowly at any time during plant operations.
  - C. Maintained in good condition.
- The Contractor shall replace failed valves.
  - In the presence of the Engineer, the Contractor will take 2 one-liter samples per operating day. The Contractor shall provide round, friction top, one-liter containers for storing samples.

### **92-1.03 APPLYING ASPHALT**

- Unless otherwise specified, the Contractor shall heat and apply asphalt in conformance with the provisions in Section 93, "Liquid Asphalts."
- The Contractor shall apply paving asphalt at a temperature between 120°C and 190°C. The Engineer will determine the exact temperature of paving asphalt.

### **92-1.04 MEASUREMENT**

- If asphalt is paid as a contract work item on a mass basis, the Department will measure asphalt by the tonne under the provisions for determining the mass for payment of liquid asphalt in Section 93, "Liquid Asphalt."
- The Engineer will determine the mass of asphalt from volumetric measurements if the Contractor:

- A. Uses partial loads of asphalt.
- B. Uses asphalt at locations other than a mixing plant and no suitable scales are available within 35 km.
- C. Delivers asphalt meeting either of the following:
  1. In calibrated trucks and each tank is accompanied by its measuring stick and calibration card.
  2. In trucks equipped with a calibrated thermometer that determines the asphalt temperature at the time of delivery and equipped with a vehicle tank meter meeting Section 9-1.01, "Measurement of Quantities," for weighing, measuring, and metering devices.

- If the Contractor furnishes asphalt concrete from a mixing plant producing material for only one project, the Department will determine the amount of asphalt from volumetric measurements by measuring the amount in the tank at the start and the end of the project provided the tank is calibrated and equipped with its measuring stick and calibration card. The Engineer will determine pay quantities in conformance with the following:

- A. Before converting the volume to mass, the Engineer will reduce the volume measured to that which the asphalt would occupy at 15°C.
- B. The Engineer will use 981 L/tonne and 1020 g/L for the average weight and volume for both PG and PBA grades of asphalt at 15°C.
- C. The Engineer will use the Conversion Table in Section 93, "Liquid Asphalts."

## **SECTION 93: LIQUID ASPHALTS**

Issue Date: November 18, 2005

The ninth paragraph of Section 93-1.04, "Measurement," of the Standard Specifications is amended to read:

## **END OF AMENDMENTS**

### **SECTION 2 PROPOSAL REQUIREMENTS AND CONDITIONS**

**2-1.01**        **GENERAL:** The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these Special Provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

Each proposal shall include unit costs, and total costs for the base bid.

Bidders are required to specify a physical business street address to receive certified mail in accordance with the Proposal. The County shall be notified in writing a minimum of thirty (30) days in advance of any changes of address.

The first sentence of the second paragraph in Section 2-1.05, "Proposal Forms," of the Standard Specifications is amended to read:

The Proposal form is bound together with the Contract and the Special Provisions.

In addition to the subcontractors required to be listed in conformance with Section 2-1.054, "Required Listing of Proposed Subcontractor," of these Special Provision, each proposal shall have listed therein the portion of work that will be done by each subcontractor listed. Each Proposal shall have listed therein the name and address of each DBE subcontractor to be used for credit in meeting the goals and to whom the bidder proposes to directly subcontract portion of the work. The listing subcontractor shall also set forth the portion of work that will be done by each subcontractor listed. A sheet for listing the subcontractors is included in the Proposal.

The form of Bidder's Bond mentioned in the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications will be found following the signature page of the Proposal annexed hereto.

The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of Department of Transportation assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate. Each subcontract signed by the bidder must include this assurance.

**2-1.02 REQUIRED LISTING OF PROPOSED PRODUCTS “OR EQUALS” WITH BID PROPOSAL:** On the sheet provided herein, to be submitted as part of the proposal, the bidder shall list each proposed substitution of an “equal” product. The bidder shall identify the proposed substitution by the section of the specifications that specifies the product, the name of the product proposed to be substituted out, and the name and manufacturer of the product proposed to be substituted. Prior to the award of the Contract and upon the request of the Engineer, the bidder shall submit the written request for substitution within three (3) days. The request shall be accompanied by evidence satisfactory to the Engineer that the materials and products proposed for use are equal to or better than the materials and products specified or detailed on the plans. The burden of proof as to the quality and suitability of substitutions shall be upon the bidder. Failure to submit the information as requested by the Engineer shall be deemed a voluntary withdrawal of the proposed substitution.

No requests for any substitution shall be allowed unless listed on the sheet provided. No requests for substitution shall be allowed after the opening of the bid. Requests for substitution shall be reviewed and considered by the Engineer promptly after the award of the contract to the lowest responsible Bidder. In its sole discretion, the Engineer may request additional information about the proposed substitution.

The decision by the Engineer as to whether a proposed substitution is an “Equal” product shall be made by the Engineer based upon the information submitted and will be final.

The Engineer will be the sole judge as to whether a proposed substitution is an “Equal” product. The Engineer’s decision will be made based upon the information submitted and will be final.

A sheet for listing the proposed substitutions of an “Equal” product, as required herein, is included in the Proposal.

**2-1.03 DBE GOAL FOR THIS PROJECT:** It is the policy of the County that Disadvantaged Business Enterprises (DBEs), as defined in Part 26, Title 49 CFR, shall be encouraged to participate in the performance of County contracts. The Contractor should ensure that DBEs, as defined in Part 26, Title 49 CFR, have the opportunity to participate in the performance of this contract and shall take all necessary and reasonable steps, as set forth in Part 26, Title 49 CFR, for this assurance. The Contractor shall not discriminate on the basis of race, color, national origin, or gender in the award and performance of subcontracts. Failure to carry out the requirements of this paragraph shall constitute a breach of contract and may result in termination of this contract or other remedy the County may deem appropriate.

Bidders shall be fully informed respecting the requirements of the Regulations and are urged to obtain DBE participation in this project, although there is no specific goal for DBE participation.

**2-1.04**            **REQUIRED LISTING OF PROPOSED SUBCONTRACTORS:** Section 2-1.054, “Required Listing of Proposed Subcontractors” of the Standard Specifications is amended in its entirety to read:

Each proposal shall have listed therein the name and address, Contractor's license classification and license number of each Subcontractor the bidder proposes to subcontract portions of the work in the amount in excess of \$5000, and designate portion and percentage of the work to be performed by the Subcontractor. The Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code is otherwise fully applicable to this Contract. The bidder's attention is directed to other provisions of said Act related to the imposition of penalties for a failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

In addition to the Subcontractors required to be listed, each proposal shall have listed herein the **name and address**, and **license designation number** of each Subcontractor to whom the bidders proposes to directly subcontract portions of the work. The list of Subcontractors shall also set forth the portion of work that will be done by each Subcontractor listed.

A sheet for listing the subcontractors, as required herein, is included in the Proposal.

**2-1.05**            **PROPOSAL GUARANTY:** The form of Bidder’s Bond mentioned in the last paragraph in Section 2-1.07, “Proposal Guaranty,” of the Standard Specifications will be found following the signature page of the Proposal annexed hereto.

**2-1.06**            **NON-COLLUSION AFFIDAVIT:** In accordance with Public Contract Code 7106, a Non-Collusion is included in the proposal. Signing the proposal shall also constitute signature of the Non-Collusion Affidavit.

### **SECTION 3**

#### **AWARD AND EXECUTION OF CONTRACT**

**3-1.01**            **GENERAL:** The bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract," of the Standard Specifications and these Special Provisions for the requirements and conditions concerning award, submittal of DBE information, and execution of contract.

**3-1.02**            **AWARD OF CONTRACT:** Section 3-1.01, “Award of Contract” of the Standard Specifications is amended to read:

**3-1.01 Award of Contract** — The right is reserved to reject any and all proposals. The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. Such award, if made, will be made within 60 days after the opening of the proposals. This period will be subject to extension for such further period as may be agreed upon in writing between the Department and the bidder concerned. All bids will be compared on the basis of the Engineer's Estimate of the quantities of work to be done.

**3-1.03**        **CONTRACT BONDS:** Contractor shall provide, at the time of the execution of the agreement or contract for work, and at his own expense, a surety bond ("Performance Bond") in an amount equal to at least 100 percent (100%) of the contract price as security for the faithful performance of said agreement within the time prescribed, in a manner satisfactory to the Engineer, and that all materials and workmanship will be free from original or developed defects. This Performance Bond must remain in effect until the end of all warranty periods set forth in the Special Provisions. Contractor shall also provide, at the time of the execution of the agreement or contract for the work, and at his own expense, a separate surety bond ("Payment Bond") in an amount equal to at least 100 percent (100%) of the contract price as security for the payment of all persons performing labor and furnishing materials in connection with said agreement. This Payment Bond shall be maintained by the Contractor in full force and effect until the work is accepted by the County and until all claims for materials and labor are paid, and shall otherwise comply with Civil Code. Sureties on each of said bonds shall be satisfactory to the County Attorney.

Should any bond become insufficient, the Contractor shall renew the bond within ten (10) working days after receiving notice from the Engineer.

Should any Surety at any time be unsatisfactory to the County, notice will be given the Contractor to that effect. No further payments shall be deemed due or will be made under said agreement until a new Surety shall qualify and be accepted by the County.

Changes in said agreement of extensions of time, made pursuant to the agreement, shall in no way release the Contractor or Surety from its obligations. Notice of such changes or extensions shall be waived by the Surety.

#### **SECTION 4 BEGINNING OF WORK, TIME OF COMPLETION, AND LIQUIDATED DAMAGES**

**4-1.01**        **GENERAL:** Attention is directed to the provisions in Section 8-1.03, "Beginning of Work," in Section 8-1.06, "Time of Completion," and in Section 8-1.07, "Liquidated Damages," of the Standard Specifications, Section 10-1.01, "Order of Work," of these Special Provisions, and these Special Provisions.

The Contractor shall begin work within 5 calendar days after being instructed in writing by Placer County to proceed with the work and shall diligently prosecute the same before the expiration of

## 150 CALENDAR DAYS

beginning on the first day of work or the fifth day after the date stated in the Notice to Proceed, whichever comes first.

The Contractor shall pay to Placer County the sum of \$1000.00 per day, as liquidated damages, for each and every calendar day's delay in finishing the work in excess of the 150 calendar days prescribed above. At the Engineer's option, said sum may be deducted from any payments due to or to become due the Contractor.

**4-1.02 WINTERIZATION:** The contractor shall, at his sole expense, winterize the project if construction activities are not completed by October 15. An acceptable winterization plan shall be submitted to the Engineer no later than October 1<sup>st</sup> for his review and acceptance.

The contractor's winterization plan is required for all construction activities that take place between October 15<sup>th</sup> and May 1<sup>st</sup> and shall be in conformance with the requirements of Section 10-1.03, "Water Pollution Control," of these Special Provisions.

The intent of winterization is as follows:

1. To assure that erosion of earthen materials is prevented to greatest extent practicable.
2. To assure that storm waters are allowed to pass through the site without substantial damage to the project site.

After the acceptance of a winterization plan and the installation of all required temporary winterization measures, work may proceed after October 15<sup>th</sup>, if approval is obtained in writing from the California Regional Water Quality Control Board and the Engineer. All work done after October 15<sup>th</sup> must be able to be winterized within 24-hour notice.

**Winter Suspension:** The County may, at its option, suspend work between October 15 and May 1 of the following year. If this occurs, the entire site shall be winterized including areas not yet seeded or planted.

Full compensation for conforming to the provisions of this section, not otherwise provided for in other sections of these special provisions, shall be considered as included in prices paid for the various Contract items of work involved and no additional compensation will be allowed therefor.

**4-1.03 PRECONSTRUCTION CONFERENCE:** A pre-construction conference will be held at the office of the Director of Public Works for the purpose of discussing with the Contractor the scope of work, contract drawings, specifications, existing conditions, materials to be ordered, equipment to be used, and all essential matters pertaining to the prosecution and the satisfactory completion of the project as required. The Contractor's representative at this conference shall include all major superintendents for the work and may include major subcontractors. A "Key Personnel and Emergency Phone Numbers" list (for which these key personnel could be contacted 24 hours per day, 7 days a week) shall be submitted to the County. Attendance by the Contractor or the Contractor's authorized representative is mandatory.

Full compensation for conforming to the provisions of this section, not otherwise provided for in other sections of these special provisions, shall be considered as included in prices paid for the various Contract items of work involved and no additional compensation will be allowed therefor.

**4-1.04**        **ARCHAEOLOGICAL FINDS:** All articles or archaeological interest, which may be uncovered by the Contractor during the progress of the work, shall be reported immediately to the Engineer. The further operations of the Contractor with respect to the find will be decided under the direction of the Engineer.

**4-1.05**        **EXTRA WORK:** Section 4-1.03D, "Extra Work," of the Standard Specifications is amended by adding the following between the second and third paragraphs:

If in the opinion of the Engineer, such work cannot reasonably be performed concurrently with other items of work, and if a controlling item of work is delayed thereby, an adjustment of contract time will be made.

**4-1.06**        **SCOPE OF WORK:** Shall conform to the provisions of Section 4, "Scope of Work," of the Standard Specifications and these Special Provisions.

**4-1.07**        **ELIMINATION OF ITEMS OF WORK:** The Contractor's attention is directed to Section 4-1.03B(3), "Eliminated Items," of these Standard Specifications concerning the elimination of items of work, and these Special Provisions.

## **SECTION 5 GENERAL**

### **SECTION 5-1. MISCELLANEOUS**

**THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL COMPLY WITH CALIFORNIA LABOR CODE SECTIONS 1774 AND 1775, AND RELATED CODES.**

**5-1.01**        **LABOR NONDISCRIMINATION:** Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

#### **NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOV. CODE, SECTION 12990)**

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination", of the Standard Specifications, which is applicable to all nonexempt State contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The specifications are applicable to all nonexempt State construction contracts and subcontracts of \$5000 or more.

**5-1.02**        **LABOR CODE REQUIREMENTS:** Attention is directed to the provisions in Section 7-1.01A(1), "Hours of Labor", Section 7-1.01A(2), "Prevailing Wage", Section 7-1.01A(2)(a), "Travel and Subsistence Payments", and Section 7-1.01A(3), "Payroll Records" of the Standard Specifications.

The general prevailing wage rates and any applicable changes to these wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is located. General prevailing wage rates are also available from the California Department of Industrial Relation's Internet Web Site at: <http://www.dir.ca.gov>.

**5-1.03**        **CONTRACTOR'S LICENSING LAWS:** Attention is directed to the requirements specified in Section 7-1.01C, "Contractor's Licensing Laws", of the Standard Specifications. The Contractor shall possess a valid California Class A contractor's license, or a combination of the following classes: C-12 Earthwork and Paving Contractor, C-32 Parking and Highway Improvement Contractor, D-49 Tree Service, D-59 Hydroseed Spraying Contractor, D-63 Construction Cleanup, and all other classes required by the categories and types of work included in this contract at the time of the bid award. All licenses shall remain in effect throughout the term of this contract.

**5-1.04**        **ARBITRATION:** Section 9-1.10, "Arbitration," of the Standard Specifications is amended in its entirety to read as follows:

**Section 9-1.10, "Dispute Resolution"**

9-1.10 All claims filed with the County must be in writing and include the documents necessary to substantiate the claim. Claims must be filed within the time limits set forth in this contract. In no circumstances, however, may a claim be filed after the day of final payment. Nothing in this subsection is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth elsewhere in this contract.

1)        **Claims of \$50,000.00 or Less**

- (a)        The County will respond in writing to all written claims less than or equal to fifty thousand dollars (\$50,000.00) within forty-five (45) days of receipt of the claim. Within thirty (30) days of receipt of the claim, the County may request any additional documentation supporting the claim or relating to defenses or claims the County may have against the claimant.
- (b)        If additional information is thereafter required, it shall be requested and provided pursuant to this subsection, upon mutual agreement of the County and the claimant.
- (c)        The County's written response to the claim, as further documented, shall be submitted to the claimant within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

2)        **Claims Between \$50,000.01 and \$375,000.00**

- (a)        The County will respond in writing to all written claims between fifty thousand dollars and one cent (\$50,000.01) and less than or equal to three hundred seventy-five thousand dollars (\$375,000.00), within sixty (60) days of receipt of the claim. Within thirty (30) days of receipt of the claim, the County may request, in writing,

any additional documentation supporting the claim or relating to defense to the claim the County may have against the claimant.

- (b) If additional information is thereafter required, it shall be requested and provided pursuant to this Subdivision, upon mutual agreement of the County and the claimant.
  - (c) The County's written response to the claim, as further documented, shall be submitted to the claimant with in thirty (30) days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information or requested documents, whichever is greater.
- 3) Claims in Excess of \$375,000.00 The County shall, within a reasonable time after the presentation of any claim in excess of \$375,000.00, make a decision in writing on such claim.
- 4) Meet and Confer Conference
- (a) If the claimant disputes the County's written response, or the County fails to respond within the time prescribed, the claimant may so notify the County, in writing, either within fifteen (15) days of receipt of the County's response or within fifteen (15) days of the County's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the County shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.
  - (b) If, following the meet and confer conference, the claim or any portion thereof remains in dispute, the claimant may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the California Government Code. For the purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to this Section until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.
- 5) Contractor's Duty During Claim Resolution: The Contractor shall proceed with the Work in accordance with the plans and specifications and determinations and instructions of the County Engineer during the resolution of any claims disputes.
- 6) Certification. The Contractor shall certify in writing, at the time of submission of any claim, as follows:

I certify under penalty of perjury under the laws of the State of California, that the claim is made in good faith, that the supporting data are accurate and complete, and that the amount requested accurately reflects the monies due for work performed under the Contract for which the County of Placer is liable.

By: \_\_\_\_\_  
(Contractor's signature)

- 7) County Remedies. In the event the Contractor refuses or neglects to make good any loss or damage for which the Contractor is responsible under this Contract, the County may itself, or by the employment of others, make good any such loss or damage, and the cost and expense of doing so, including any reasonable engineering, legal and other consultant fees, and any costs of administrative and managerial services, shall be charged to the Contractor. Such costs and expenses may be deducted by the County from claims for payment made by the Contractor for work completed or remaining to be completed.
- 8) Assignment. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to this contract, the Contractor and all subcontractors shall offer and agree to assign to the County all rights, title, and interest in and to all causes of action it may have under section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to the public works contract or subcontract. This assignment shall be made and become effective at the time the County tenders final payment to the Contractor, without further acknowledgment by the parties.
- 9) Contractor Waiver and Limitation. The Contractor agrees that it can be adequately compensated by money damages for any breach of this Contract which may be committed by the County and hereby agrees that no default, act, or omission of the County or the Engineer, shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of this Contract or (unless the County shall so consent or direct in writing) to suspend or abandon performance of all or any part of the work. The Contractor hereby waives any and all rights and remedies to which it might otherwise be or become entitled, save only its right to money damages.
- 10) **Venue. Any litigation arising out of this Contract shall be brought in the Superior Court of Placer County, and the Contractor hereby waives the removal provisions of Code of Civil Procedure Section 394.**

**5-1.05** **NOTICE OF POTENTIAL CLAIM:** Attention is directed to the requirements specified in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications.

**5-1.06** **FINAL PAYMENT AND CLAIMS:** Attention is directed to Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications.

If the Contractor files a timely written statement of claims in response to the proposed final estimate, the County will submit a claim position letter to the Contractor by hand delivery or deposit in the U.S. mail. The claim position letter will delineate the County's position on the Contractor's claims. If the Contractor disagrees with the claim position letter, the Contractor shall submit a written notification of its disagreement to be received by the County not later than 15 days after the Contractor's receipt of the claim position letter. The written notification of disagreement shall set forth the basis for the Contractor's disagreement and be submitted to the

office designated in the claim position letter. The Contractor's failure to provide a timely, written notification of disagreement shall constitute the Contractor's acceptance and agreement with the determinations provided in the claim position letter and with final payment pursuant to the claim position letter.

If the Contractor files a timely notification of disagreement with the County claim position letter, the County Director of Public Works or a board of review appointed by the County Director of Public Works shall review claims that remain in dispute and may meet with the Contractor within 45 days after receipt by the County of the notification of disagreement. Attendance by the Contractor at the County meeting concerning the notification of disagreement shall be mandatory.

If the County fails to submit a claim position letter to the Contractor within 135 days after the acceptance of the contract and the Contractor has claims that remain in dispute, the Contractor may request a meeting with the County Director of Public Works or a board of review appointed by the County Director of Public Works to review claims that remain in dispute. The Contractor's request for a meeting shall identify the claims that remain in dispute. If the Contractor files a request for a meeting, the County Director of Public Works or a board of review appointed by the County Director of Public Works will meet with the Contractor within 45 days after the County receives the request for the meeting. Attendance by the Contractor at this review meeting shall be mandatory.

Failure of the Contractor to file a timely written statement of claims in response to the proposed final estimate, or to file a timely notification of disagreement with the County's claim position letter, or to attend the County's review meeting shall constitute a failure to pursue diligently and exhaust the administrative remedies in the contract and shall be a bar to future legal proceedings by Contractor.

**5-1.07**        **PAYMENT OF WITHHELD FUNDS:** Attention is directed to the requirements specified in Section 9-1.065, "Payment of Withheld Funds," of the Standard Specifications and these Special Provisions.

Funds withheld from progress payments to ensure performance of the contract that are eligible for payment into escrow or to an escrow agent pursuant to Section 10263 of the California Public Contract Code do not include funds withheld or deducted from payment due to failure of the Contractor to fulfill a contract requirement.

**5-1.08**        **INTEREST ON PAYMENTS:** Interest shall be payable on progress payments, payments after acceptance, final payments, extra work payments, and claim payments as follows:

- A. Unpaid progress payments, payment after acceptance, and final payments shall begin to accrue interest 30 days after the Engineer prepares the payment estimate.
- B. Unpaid extra work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following receipt of a properly submitted and undisputed extra work bill. To be properly submitted, the bill must be submitted within 7 days of the performance of the extra work and in conformance with the provisions in Section 9-1.03C, "Records," and Section 9-1.06, "Partial Payments," of the Standard Specifications. An undisputed extra work bill not submitted within 7

days of performance of the extra work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.

- C. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments, and extra work payments shall be 10 percent per annum.
- D. The rate of interest payable on a claim, protest or dispute ultimately allowed under this contract shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to ascertain the basis and amount of said claim, protest or dispute.

The rate of interest payable on any legal judgment shall be 6 percent per annum if allowed under the provisions of Civil Code Section 3289.

**5-1.09**        **PUBLIC SAFETY:** The Contractor shall provide for the safety of traffic and the public in accordance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these Special Provisions.

The Contractor shall install temporary railing (Type K) between any lane carrying public traffic and any excavation, obstacle, or storage area when the following conditions exist:

- (1) Excavations. -Any excavation, the near edge of which is 12 feet or less from the edge of the lane, except:
  - (a) Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
  - (b) Excavations less than 1 foot deep.
  - (c) Trenches less than 1 foot wide for irrigation pipe or electrical conduit, or excavations less than 1 foot in diameter.
  - (d) Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
  - (e) Excavations in side slopes, where the slope is steeper than 4:1, (horizontal:vertical).
  - (f) Excavations protected by existing barrier or railing.
- (2) Temporarily Unprotected Permanent Obstacles. -Whenever the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or whenever the Contractor, for his convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.
- (3) Storage Areas. -Whenever material or equipment is stored within 12 feet of the lane and such storage is not otherwise prohibited by provisions of the Standard Specifications and these Special Provisions.

The approach end of temporary railing (Type K), installed in accordance with the requirements in this Section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications shall be offset a minimum of 15 feet from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than 1 foot transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15 feet minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)" of the Standard Specifications. Temporary railing (Type K) conforming to the details shown on the 1999 Standard Plan T3 may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to the 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," of these Special Provisions.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" located elsewhere in these Special Provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas the Contractor shall close the adjacent traffic lane unless otherwise provided in the specifications:

<b>Approach speed of public traffic(Posted Limit) (Kilometers Per Hour)</b>	<b>Work Areas</b>
72 KPH (45 MPH) or greater	Within 6 feet of a traffic lane but not on a traffic lane.
Less than 72 KPH (45 MPH)	Within 3 feet of a traffic lane but not on a traffic lane.

The lane closure provisions of this section shall not apply if permanent or temporary railing or barrier protects the work area.

When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators shall be considered to be the edge of traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 10 feet without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

## **Special Requirements:**

The Contractor attention is directed to Section 10-1.37, "Special Requirements," of these Special Provisions. The Contractor shall notify the Sheriff's Office, Fire Departments, Ambulance Service, Schools, CHP, Caltrans, and the Engineer forty-eight (48) hours prior to any lane closure. Notification may be in conjunction with the scheduling requirements of the "Scheduling" portion of the Standard Specifications and these Special Provisions. The Contractor shall coordinate traffic control with the Sheriff's Department with respect to any special events that may be affected by construction activities. Particular attention shall be given to the construction of adequate facilities on any street to permit the passing of emergency vehicles.

In Lieu of conflicting with the provisions of Section 12-2.02, "Flagging Costs," of the Standard Specifications, all flagging costs shall be included in the Traffic Control System bid item and no additional compensation will be allowed.

Full compensation for conforming to the requirements in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**5-1.09B EXAMINATION OF PLANS, SPECIFICATIONS, CONTRACT, AND SITE OF WORK: The second paragraph of Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," of the Standard Specifications is amended to read:**

- Where the Department has made investigations of site conditions, including subsurface conditions in areas where work is to be performed under the contract, or in other areas, some of which may constitute possible local material sources, bidders or Contractors may, upon written request, inspect the records of the Department as to those investigations subject to and upon the conditions hereinafter set forth.

Attention is directed to Section 5-1.09C, "Differing Site Conditions," of these special provisions regarding physical conditions at the site, which may differ from, those indicated in "Materials Information," log of test borings or other geotechnical information obtained by the Department's investigation of site conditions.

**5-1.09C DIFFERING SITE CONDITIONS: Attention is directed to Section 5-1.116, "Differing Site Conditions," of the Standard Specifications and Section 10-1.28, "Earthwork" of these Special Provisions.**

During the progress of the work, if subsurface or latent conditions are encountered at the site differing materially from those indicated in the "Materials Information," log of test borings, other geotechnical data obtained by the Department's investigation of subsurface conditions, or an examination of the conditions above ground at the site, the party discovering those conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

The Contractor will be allowed 15 days from the notification of the Engineer's determination of whether or not an adjustment of the contract is warranted, in which to file a notice of potential claim in conformance with the provisions of Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications and as specified herein; otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The notice of potential claim shall set forth in what respects the Contractor's position differs from the Engineer's determination and provide any additional information obtained by the Contractor, including but is not limited to additional geotechnical data. The notice of potential claim shall be accompanied by the Contractor's certification that the following were made in preparation of the bid: a review of the contract, a review of the "Materials Information," a review of the log of test borings and other records of geotechnical data to the extent they were made available to bidders prior to the opening of bids, and an examination of the conditions above ground at the site. A copy of the geotechnical report will be made available for review at the **Placer County Department of Public Works Office located at 11444 B Avenue**, Auburn, CA. Supplementary information, obtained by the Contractor subsequent to the filing of the notice of potential claim, shall be submitted to the Engineer in an expeditious manner.

**5-1.10 SURFACE MINING AND RECLAMATION ACT:** Attention is directed to the Surface Mining and Reclamation Act of 1975, commencing in Public Resources Code, Mining and Geology, Section 2710, which establishes regulations pertinent to surface mining operations, and to California Public Contract Code Section 10295.5.

Material from mining operations furnished for this project shall only come from permitted sites in compliance with California Public Contract Code Section 10295.5.

The requirements of this section shall apply to all materials furnished for the project, except for acquisition of materials in conformance with the provisions in Section 4-1.05, "Use of Materials Found on the Work," of the Standard Specifications.

**5-1.10B EXCAVATION SAFETY PLANS:** The Contractor's attention is directed to requirements of Section 10-1.28, "Earthwork," of the Special Provisions concerning Temporary Shoring Plan. Section 5-1.02A, "Trench Excavation Safety Plans," of the Standard Specifications is amended in accordance with Section 1-1.03 "Updated Amendments of July 2002 Standard Specifications," of these Special Provisions.

- Attention is directed to Section 7-1.01E, "Trench Safety."

The third paragraph of Section 19-1.02, "Preservation of Property," of the Standard Specifications is amended to read:

- In addition to the provisions in Sections 5-1.02, "Plans and Working Drawings," and 5-1.02A, "Excavation Safety Plans," detailed plans of the protective systems for excavations on or affecting railroad property will be reviewed for adequacy of protection provided for railroad facilities, property, and traffic. These plans shall be submitted at least 9 weeks before the Contractor intends to begin excavation requiring the protective systems. Approval by the Engineer of the detailed plans for the protective systems will be contingent upon the plans being satisfactory to the railroad company involved.

The Contractor shall submit a Temporary Shoring Safety System Plan to the Engineer prior to the start of the work in accordance with Section 10-1.28, "Earthwork," of these Special Provisions. The Contractor's attention is directed to the requirements specified in Section 10-1.28, "Earthwork," of these Special Provisions.

Full compensation for conforming to the provisions of this section, not otherwise provided for in other sections of these special provisions, shall be considered as included in prices paid for the various Contract items of work involved and no additional compensation will be allowed therefor.

**5-1.11**        **REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES:** When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe, and shall immediately cease work in the affected area and report the condition to the Engineer in writing. If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for such delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

In accordance with Section 25914.1 of the Health and Safety Code, all such removal of asbestos or hazardous substances including any exploratory work to identify and determine the extent of such asbestos or hazardous substance will be performed by separate contract or negotiated contract change order with the work to be performed by a contractor licensed in the State of California to perform such work

If work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for such delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

**5-1.12**        **SOUND CONTROL REQUIREMENTS:** Sound control shall conform to the provisions in Section 7-1.01I, "Sound Control Requirements," of the Standard Specifications and these Special Provisions.

The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dbA at a distance of 50 feet. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise level.

All equipment shall have sound-control devices no less effective than those provided on the original equipment. No equipment shall have an unmuffled exhaust. As directed by the Engineer, the Contractor shall implement the appropriate additional noise mitigation measures including, but not limited to, shutting off idling equipment, or additional notifications of adjacent residents than already specified in these special provisions

Said noise level requirement shall apply to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

**5-1.13**         **SUBCONTRACTING:** Attention is directed to the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, and Section 2, "Proposal Requirements and Conditions," and Section 3, "Award and Execution of Contract," of these special provisions.

All Subcontractors doing work shall possess an appropriate valid California Contractor's License for the type of work the Subcontractor will perform at the time of the bid submittal, and the license shall remain in effect throughout the duration of employment on the job.

All applicable license designations and numbers for Subcontractors doing work in excess of \$5,000.00 shall be included on the LIST OF SUBCONTRACTORS within the proposal.

Pursuant to the provisions of Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations web site at:

<http://www.dir.ca.gov/DLSE/Debar.html>.

**5-1.14**         **PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS:** Attention is directed to the provisions in Sections 10262 and 10262.5 of the Public Contract Code and Section 7108.5 of the Business and Profession Code concerning prompt payment to subcontractors.

**5-1.14B**        **PROMPT PAYMENT OF WITHHELD FUNDS TO SUBCONTRACTORS:**  
The Contractor shall return all moneys withheld in retention from the subcontractor within 30 days after receiving payment for work satisfactorily completed, even if the other contract work is not completed and has not been accepted in conformance with Section 7-1.17, "Acceptance of Contract," of the Standard Specifications. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or noncompliance by a subcontractor.

**5-1.15**         **AREAS FOR CONTRACTOR'S USE:** Attention is directed to the requirements specified in Section 7-1.19, "Rights in Land and Improvements," of the Standard Specifications and these Special Provisions.

The Contractor is limited to perform all activities within the project limits of work. The Contractor is required to coordinate work within, and adjacent to, the Sierra College Boulevard rights-of-way with the contractor performing the road widening project such that the Miners Ravine Off-Channel Detention Basin Facility Project does not interfere with the road widening project.

The Contractor shall obtain encroachment permits prior to occupying County-owned parcels and/or right of way outside the contract limits. The required encroachment permits may be obtained from the Placer County Department of Public Works located at: 11444 B Avenue, Auburn, CA.

The Contractor shall take all necessary precautions to protect the staging area from chemical contamination due to oil or fuel spills or any other contaminants. If contamination occurs, the site shall be decontaminated to the satisfaction of the Engineer prior to further improvement to the contaminated area or to further construction activities in general, whichever is applicable as determined by the Engineer. Methods of decontamination shall include any method deemed appropriate by the Engineer including removal and disposition of the contaminated soils in conformance with CEQA and regulatory agency requirements.

Full compensation for conforming to the provisions of this section, including furnishing all labor, materials, grading, tools, equipment and incidentals, and for doing all work associated with this section shall be considered as included in prices paid for the various Contract items of work involved and no additional compensation will be allowed therefor.

**5-1.16**            **PAYMENTS:** Attention is directed to Section 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these Special Provisions.

No partial payment will be made for any materials on hand which are furnished but not incorporated in the work.

**5-1.17**            **WARRANTY:** Should any failure of the work occur within a period of one year from the acceptance of the project by the Board of Supervisors due to faulty materials, poor workmanship, or defective equipment, the Contractor shall promptly make the needed repairs at his or her expense in accordance with the Special Provisions and to the satisfaction of the Engineer.

Security for this warranty shall be in the form of the Performance Bond, required elsewhere in these specifications, which shall remain in effect for a period of one (1) year after acceptance of the project by the Placer County Board of Supervisors. The Performance Bond will not be reduced to an amount less than the bid amount of the project prior to the expiration of the one (1) year warranty period.

The County is hereby authorized to make such repairs, or to have such repairs made by others, if the Contractor fails to make such repairs, or to have such repairs made by others, if the Contractor fails to make or undertake with due diligence the aforesaid repairs within ten (10) days after receiving written notice of such failure or within a time specified in the notice if different; provided, however, that in case of an emergency where, in the opinion of the Engineer, that delay would cause serious loss or damages, or a serious hazard to the public, and a reasonable attempt has been made to notify the Contractor, the repairs may be made without prior notice to the Contractor; and the Contractor's sureties shall be liable for the entire cost thereof.

**5-1.18**            **AIR POLLUTION CONTROL:** Air pollution control shall conform to the provisions of Section 7-1.01F, "Air Pollution Control," of the Standard Specifications and these Special Provisions.

No burning of materials to be disposed of will be permitted for this project.

The Contractor shall contact the Placer County Air Pollution Control District engineer prior to the start of construction to determine if any of the equipment to be used on the construction site requires a stationary source or Authority to Construct Permit.

The Contractor shall be responsible for implementing Air Quality Pollution Controls including, but not limited to, the following measures during project construction:

1. Water site and clean equipment prior to the start each workday and at the end of each workday to prevent tracking of soil around the project site
2. Re-vegetate the construction site in accordance with the requirements specified in these Special Provisions.
3. Contractor shall be responsible to maintain construction equipment in good running condition according to manufacturers specifications.
4. Maintain a construction vehicle maximum speed of 24 kph (15mph) per hour on unpaved areas.
5. Suspend all grading operations when wind gusts exceed 40 kph (25 mph)
6. No burning of construction debris or removed vegetation
7. Construction equipment exhaust shall not exceed Air Quality Management District Rule 202 Visible Emission limitations.

Full compensation for conforming to the provisions of this section, not otherwise provided for, shall be considered as included in prices paid for the various Contract items of work involved and no additional compensation will be allowed therefore.

**5-1.19**            **PROJECT APPEARANCE:** The Contractor shall maintain a neat appearance to the work and shall cleanup all tracked material and debris on a daily basis.

In any area visible to the public, the following shall apply:

Broken concrete and debris developed during clearing and grubbing shall be disposed of concurrently with its removal. Mud, dirt, soil, and any debris resulted in trail from equipment and construction will be cleaned and cleared from the roadway and away from traffic.

The Contractor shall furnish trash bins for all debris from construction. All debris shall be placed in trash bins daily.

Full compensation for conforming to the provisions of this section, not otherwise provided for, shall be considered as included in prices paid for the various Contract items of work involved and no additional compensation will be allowed therefor.

**5-1.20**            **INSURANCE:** Contractor shall file with County a certificate(s) of Insurance, in companies acceptable to County, with a Best's Rating of no less than A:VII showing, in a form acceptable to County.

Throughout the period of this agreement, the Contractor shall provide the following minimum insurance coverage as listed below. Contractor shall file with County a certificate(s) of Insurance, in a form acceptable to County, at the time of execution of this agreement. The insurance company must be acceptable to County, with a Best's Rating of no less than A:VII.

Documentation of such rating acceptable to the County shall be provided at the time Insurance Certificates are submitted.

In the event any of the following policies are canceled prior to the completion of the project and the Contractor does not furnish a new certificate(s) of insurance prior to cancellation, the County may obtain the required insurance and deduct the premium(s) from Contract monies due the Contractor.

**Worker's Compensation and Employers Liability Insurance:**

The Contractor shall maintain adequate Workers' Compensation Insurance under the Laws of the State of California.

Contractor shall fully comply with the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code, before commencing the performance of the work.

By the Contractor's signature hereunder, Contractor certifies that he/she is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code, and he/she will comply with such provisions before commencing the performance of this Contract.

If such insurance is underwritten by any agency other than State Compensation Fund, such agency shall be a company authorized to do business in the State of California.

The Contractor shall require all Subcontractors to maintain adequate Workers' Compensation Insurance. Certificates of such Workers' Compensation shall be filed forthwith with the County upon demand.

Worker's Compensation Insurance shall be provided as required by any applicable law or regulation. Employer's liability insurance shall be provided in amounts not less than the following:

- One Million dollars (\$1,000,000) each accident for bodily injury by accident
- One Million dollars (\$1,000,000) policy limit for bodily injury by disease
- One Million dollars (\$1,000,000) each employee for bodily injury by disease

If there is an exposure of injury to Contractor's employees under the U.S. Longshoremen's and Harbor Worker's Compensation Act, the Jones Act, or under laws, regulations, or statutes applicable to maritime employees, coverage shall be included for such injuries or claims.

Each Worker's Compensation policy shall be endorsed with the following specific language:

**Cancellation Notice:** "This policy shall not be canceled or materially changed without first giving thirty (30) days prior written notice to the County of Placer."

Contractor shall require all Subcontractors to maintain adequate Worker's Compensation insurance. Certificates of Workers' Compensation shall be filed forthwith with the County upon demand.

**General Liability Insurance:**

Comprehensive General Liability or Commercial General Liability insurance covering all operations by or on behalf of Contractor, providing insurance for bodily injury liability and property damage liability for the limits of liability indicated below and including coverage for:

- (1) Premises and operations;
- (2) Products and completed operations;
- (3) Contractual liability insuring the obligations assumed by Contractor in this Agreement;
- (4) Broad form property damage (including completed operations);
- (5) Explosion, collapse, and underground hazards;
- (6) Personal injury liability; and

Except with respect to bodily injury and property damage included within the products and completed operations hazards, the aggregate limits, where applicable, shall apply separately to Contractor's work under the Contract.

One of the following forms is required:

- (1) Comprehensive General Liability;
- (2) Commercial General Liability (Occurrence); or
- (3) Commercial General Liability (Claims Made).

If Contractor carries a Comprehensive General Liability policy, the limits of liability shall not be less than a Combined Single Limit for Bodily Injury, Property Damage, and Personal Injury Liability of:

- Two million dollars (\$2,000,000) each occurrence
- Two million dollars (\$2,000,000) aggregate

If Contractor carries a Commercial General Liability (Occurrence) policy:

- (1) The limits of liability shall not be less than:
  - Two million dollars (\$2,000,000) each occurrence (combined single limit for bodily injury and property damage)
  - Two million dollars (\$2,000,000) for Personal Injury Liability
  - Two million dollars (\$2,000,000) for Products-Completed Operations
  - Two million dollars (\$2,000,000) General Aggregate
- (2) If the policy does not have an endorsement providing that the General Aggregate Limit applies separately, or if defense costs are included in the aggregate limits, then the required aggregate limits shall be three million dollars (\$3,000,000).

**Special Claims Made Policy Form Provisions:**

Contractor shall not provide a Commercial General Liability (Claims Made) policy without the express prior written consent of County, which consent, if given, shall be subject to the following conditions:

- (1) The limits of liability shall not be less than:
  - Two million dollars (\$2,000,000) each occurrence (combined single limit for bodily injury and property damage)
  - Two million dollars (\$2,000,000) for Personal Injury Liability
  - Two million dollars (\$2,000,000) aggregate for Products Completed Operations
  - Two million dollars (\$2,000,000) General Aggregate
- (2) The insurance coverage provided by Contractor shall contain language providing coverage up to six (6) months following the completion of the Contract in order to provide insurance coverage for the hold harmless provisions herein if the policy is a Claims Made Policy.

#### **Conformity of Coverage's:**

If more than one policy is used to meet the required coverage's, such as a separate umbrella policy, such policies shall be consistent with all other applicable policies used to meet these minimum requirements. For example, all policies shall be Occurrence Liability policies, or all shall be Claims Made Liability policies if approved by the County as noted above. In no case shall the types of coverages be different.

#### **Additional Requirements:**

**Premium Payments:** The insurance companies shall have no recourse against the County and Funding Agencies, its officers and employees or any of them for payment of any premiums or assessments under any policy issued by a mutual insurance company.

**Policy Deductibles:** The Contractor shall be responsible for all deductibles in all of Contractor's insurance policies. The amount of deductibles for an insurance coverage required herein should be reasonable and subject to the County's approval.

**Contractor Obligations:** Contractor's indemnity and other obligations shall not be limited by the foregoing insurance requirements and shall survive the expiration of this agreement.

**Material Breach:** Failure of the Contractor to maintain the insurance required by these Special Provisions, or to comply with any of the requirements of these Special Provisions, shall constitute a material breach of the entire agreement.

#### **Endorsements:**

Each Comprehensive or Commercial General Liability policy shall be endorsed with the following specific language:

"The County of Placer, and additional insureds (including, State of California, California Regional Water Quality Control Board), and their officers, agents, outside parties hired to inspect and/or design the work, employees, and volunteers are to be covered as insured for all liability arising out of the operations by or on behalf of the named insured in the performance of this Agreement."

"The insurance provided by the Contractor, including any excess liability or umbrella form coverage, is primary coverage to the County of Placer and additional insureds, with respect to any insurance or self-insurance programs maintained by the County of Placer and additional insureds, and no insurance held or owned by the County of Placer and additional insureds shall be called upon to contribute to a loss."

"This policy shall not be canceled or materially changed without first giving thirty (30) days prior written notice to the County of Placer."

**Automobile Liability Insurance:**

Contractor shall provide Automobile Liability insurance covering bodily injury and property damage in an amount no less than two million dollars (\$2,000,000) combined single limit for each occurrence.

Covered vehicles shall include owned, non-owned, and hired automobiles/trucks.

**5-1.21 COST REDUCTION INCENTIVE:** Attention is directed to Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications.

Prior to preparing a cost reduction proposal, the Contractor shall request a meeting with the Engineer to discuss the proposal in concept and to determine the merit of the cost reduction proposal. Items of discussion will also include permit issues, impact on other projects, impact on the project schedule, peer reviews, and review times required by the Department and other agencies.

**5-1.22 PERMITS:** Attention is directed to the provisions in Sections 7-1.04, "Permits and Licenses," of the Standard Specifications and these Special Provisions.

Full compensation for conforming to the provisions in this Section and to the requirements in the permit, not otherwise provided for in other sections of these Special Provisions, shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will allowed therefore.

**5-1.23 RECORDS:** The Contractor shall maintain cost accounting records for the contract pertaining to, and in such a manner as to provide a clear distinction between, the following six categories of costs of work during the life of the contract:

- A. Direct costs of contract item work.
- B. Direct costs of changes in character in conformance with Section 4-1.03C, "Changes in Character of Work," of the Standard Specifications.

- C. Direct costs of extra work in conformance with Section 4-1.03D, "Extra Work," of the Standard Specifications.
- D. Direct costs of work not required by the contract and performed for others.
- E. Direct costs of work performed under a notice of potential claim in conformance with the provisions in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications.
- F. Indirect costs of overhead.

Cost accounting records shall include the information specified for daily extra work reports in Section 9-1.03C, "Records," of the Standard Specifications. The requirements for furnishing the Engineer completed daily extra work reports shall only apply to work paid for on a force account basis.

The cost accounting records for the contract shall be maintained separately from other contracts, during the life of the contract, and for a period of not less than 3 years after the date of acceptance of the contract. If the Contractor intends to file claims against the Department, the Contractor shall keep the cost accounting records specified above until complete resolution of all claims has been reached.

## **SECTION 6(BLANK)**

## **SECTION 7(BLANK)**

## **SECTION 8 MATERIALS**

### **SECTION 8-1. MISCELLANEOUS**

**8-1.01**        **MEASUREMENT OF QUANTITIES:** Attention is directed to the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications and these Special Provisions.

Full compensation for conforming to the provisions of this section, not otherwise provided for, shall be considered as included in prices paid for the various Contract items of work involved and no additional compensation will be allowed therefor.

### **SECTION 8-2. CONCRETE**

**8-2.01**        **PORTLAND CEMENT CONCRETE:** Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

References to Section 90-2.01, "Portland Cement," of the Standard Specifications shall mean Section 90-2.01, "Cement," of the Standard Specifications.

Mineral admixture shall be combined with cement in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures," of the Standard Specifications for the concrete materials specified in Section 56-2, "Roadside Signs," of the Standard Specifications.

The requirements of Section 90-4.08, "Required Use of Mineral Admixture," of the Standard Specifications shall not apply to Section 19-3.025C, "Soil Cement Bedding," of the Standard Specifications.

The Department maintains a list of sources of fine and coarse aggregate that have been approved for use with a reduced amount of mineral admixture in the total amount of cementitious material to be used. A source of aggregate will be considered for addition to the approved list if the producer of the aggregate submits to the Transportation Laboratory certified test results from a qualified testing laboratory that verify the aggregate complies with the requirements. Prior to starting the testing, the aggregate test shall be registered with the Department. A registration number can be obtained by calling (916) 227-7228. The registration number shall be used as the identification for the aggregate sample in correspondence with the Department. Upon request, a split of the tested sample shall be provided to the Department. Approval of aggregate will depend upon compliance with the specifications, based on the certified test results submitted, together with any replicate testing the Department may elect to perform. Approval will expire 3 years from the date the most recent registered and evaluated sample was collected from the aggregate source.

Qualified testing laboratories shall conform to the following requirements:

- A. Laboratories performing ASTM Designation: C 1293 shall participate in the Cement and Concrete Reference Laboratory (CCRL) Concrete Proficiency Sample Program and shall have received a score of 3 or better on all tests of the previous 2 sets of concrete samples.
- B. Laboratories performing ASTM Designation: C 1260 shall participate in the Cement and Concrete Reference Laboratory (CCRL) Pozzolan Proficiency Sample Program and shall have received a score of 3 or better on the shrinkage and soundness tests of the previous 2 sets of pozzolan samples.

Aggregates on the list shall conform to one of the following requirements:

- A. When the aggregate is tested in conformance with the requirements in California Test 554 and ASTM Designation: C 1293, the average expansion at one year shall be less than or equal to 0.040 percent; or
- B. When the aggregate is tested in conformance with the requirements in California Test 554 and ASTM Designation: C 1260, the average of the expansion at 16 days shall be less than or equal to 0.15 percent.

The amounts of cement and mineral admixture used in cementitious material shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," of the Standard Specifications and shall conform to the following:

- A. The minimum amount of cement shall not be less than 75 percent by mass of the specified minimum cementitious material content.
- B. The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:

1. When the calcium oxide content of a mineral admixture is equal to or less than 2 percent by mass, the amount of mineral admixture shall not be less than 15 percent by mass of the total amount of cementitious material to be used in the mix.
  2. When the calcium oxide content of a mineral admixture is greater than 2 percent by mass, and any of the aggregates used are not listed on the approved list as specified in these special provisions, then the amount of mineral admixture shall not be less than 25 percent by mass of the total amount of cementitious material to be used in the mix.
  3. When the calcium oxide content of a mineral admixture is greater than 2 percent by mass and the fine and coarse aggregates are listed on the approved list as specified in these special provisions, then the amount of mineral admixture shall not be less than 15 percent by mass of the total amount of cementitious material to be used in the mix.
  4. When a mineral admixture that conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," of the Standard Specifications is used, the amount of mineral admixture shall not be less than 10 percent by mass of the total amount of cementitious material to be used in the mix.
  5. When a mineral admixture that conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," of the Standard Specifications is used and the fine and coarse aggregates are listed on the approved list as specified in these special provisions, then the amount of mineral admixture shall not be less than 7 percent by mass of the total amount of cementitious material to be used in the mix.
- C. The total amount of mineral admixture shall not exceed 35 percent by mass of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," of the Standard Specifications specifies a maximum cementitious content in pounds per cubic yard, the total mass of cement and mineral admixture per cubic yard shall not exceed the specified maximum cementitious material content.

The Contractor will be permitted to use Type III portland cement for concrete used in the manufacture of precast concrete members.

## **SECTION 9. DESCRIPTION OF WORK**

The scope of work, in general, includes: embankment, culverts, bike trail and parking area construction and floodplain and stream restoration. The project shall also involve excavating, grading, paving, clearing and grubbing, grading ditches, installing a subsurface drain system, constructing concrete inlet/outlet structure with flap gates and automatically controlled slide gate, installing temporary fences, irrigation lines, stream restoration, restoration and landscape planting, and traffic control. Other items and details, not mentioned above, that are required by the plans, specifications, or these special provisions shall be performed, placed, constructed, and/or installed.

## **Miner's Ravine Mitigation Monitoring Program**

# Mitigation Monitoring Program

**Project Title:** Miners Ravine Off-Channel Detention Basin Facility

**Lead Agency Name and Address:** Placer County Flood Control and Water Conservation District  
11444 B Avenue  
Auburn, CA 95603

**Contact Person and Phone Number:** E. Brian Keating, District Engineer  
530-889-7592

**Project Location:** The project site is located along Miners Ravine on the west and east sides of Sierra College Boulevard in the City of Roseville and Placer County. The western portion of the site is within the Roseville City limits; the eastern portion is on unincorporated Placer County lands. The project site is located in Section 32, Township 11 north, Range 7 east on the Rocklin 7.5-minute quadrangle.

**Project Sponsor's Name and Address:** Placer County Flood Control and Water Conservation District  
11444 B Avenue  
Auburn, CA 95603

**Description of Project:** The District is proposing to construct a multi-objective flood control and creek restoration project that will provide regional flood control benefits through off-channel detention, as well as habitat restoration and enhancement and a recreational trail system. The purpose of the project is to provide flood damage reduction in the 101-square-mile Dry Creek watershed by increasing the off-channel storage capacity available at the project site while providing environmental and recreational enhancements in the corridor. The project is intended to achieve the following objectives.

- Reduce flood flows through off-channel detention and increase floodplain capacity immediately adjacent to the creek.
- Reduce the likelihood of Sierra College Boulevard (a major thoroughfare) being overtopped during flooding events.
- Maintain the existing 100-year floodplain footprint.
- Minimize the potential for fish stranding in the floodplain and detention pond.
- Enhance rearing habitat for anadromous fish in Miners Ravine.
- Restore and enhance wetland habitat at the project site (in the eastern basin).
- Restore riparian habitat and oak woodland at the project site (on the floodplain adjacent to Miners Ravine)
- Provide a multi-use recreation trail and trailhead parking.
- Provide improved public access to recreational and educational opportunities along Miners Ravine.

**Introduction:** The District prepared an Initial Study/Proposed Mitigated Negative Declaration (IS/ Proposed MND) (December 2005) for the proposed project that identifies potential impacts and mitigation measures to reduce significant impacts to a less-than-significant level. Seven mitigation measures were identified as a result of the impact analysis conducted for the project. The IS/Proposed MND concluded that implementation of these mitigation measures would reduce all potentially significant impacts to a less-than-significant level.

This mitigation monitoring and reporting program has been prepared to comply with Section 21081.6(a)(1) of the Public Resources Code which requires the following:

The public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation.

**Mitigation Monitoring Program:** This Mitigation Monitoring Program (summarized in Table 1) lists all the mitigation measures identified in the District's IS/Proposed MND. In general, monitoring becomes effective at the time the action is taken on the project. Timing of monitoring is organized as follows:

1. *Prior to Construction:* The monitoring activity consists of insuring that a particular mitigation action has taken place prior to the beginning of any construction or grading activities.
2. *During Construction:* The monitoring activity consists of active monitoring while grading or construction is occurring on the project site.
3. *Ongoing:* The monitoring activity consists of monitoring after the grading and construction phase of the project has been completed and relates to ongoing operation of the project.

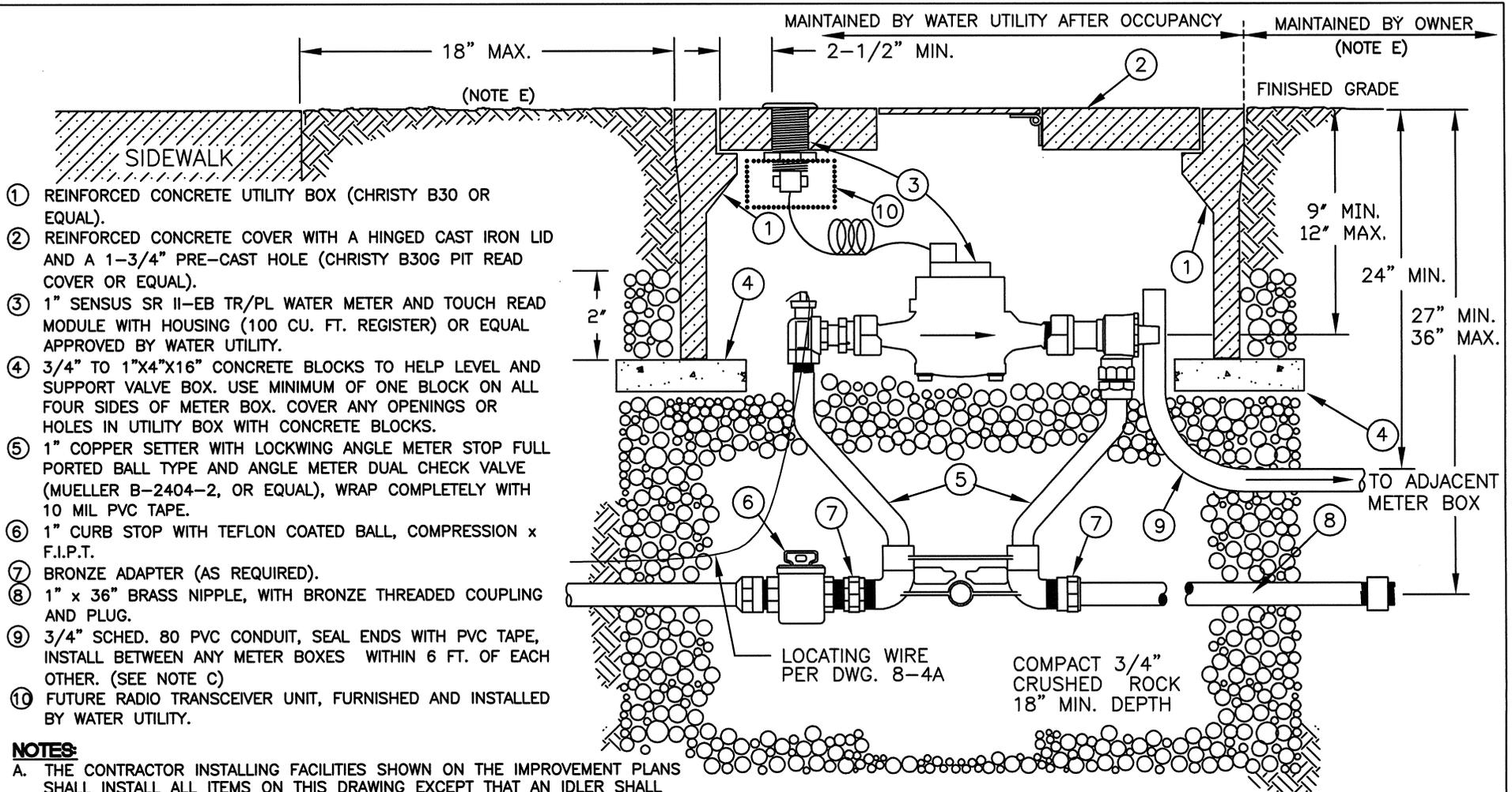
**Table 1. Mitigation Monitoring Program**

Mitigation Measure	Funding Source	Monitoring Agency	Timing	Monitoring Program	Standards for Success
Mitigation Measure B-1: Install Construction Barrier Fencing to Protect Sensitive Biological Resources Adjacent to the Construction Zone:	District	District	Prior to construction	Construction contractor, project engineer, and resource specialist will identify locations for fencing and stake around sensitive resource sites	Avoidance of designated sensitive biological resources adjacent to the construction zone
Mitigation Measure B-2: Retain a Biologist to Monitor Construction Activities	District	District	Weekly during construction	Biological monitor will assist construction crew in compliance with project implementation restrictions and guidelines and be responsible for ensuring that contractor maintains marked perimeter of the construction and staging areas adjacent to sensitive biological resources	Adherence by construction contractor to construction restrictions and guidelines and avoidance of specified sensitive biological resources
Mitigation Measure B-3: Conduct a Preconstruction Survey for Northwestern Pond Turtles Preconstruction surveys	District	District	Within 48 hours prior to the initiation of ground disturbance	Qualified wildlife biologist to be retained by the District	Avoidance of active pond turtle nest
Mitigation Measure B-4: Conduct Preconstruction Surveys for Swainson's Hawk Nests and Implement Appropriate Restrictions and Compensation	District	District	Prior to construction	Qualified wildlife biologist will conduct surveys of suitable habitat within 0.25 mile of the project area during the breeding season before project activities begin	Avoidance of impacts on nesting Swainson's Hawk and minimization of disturbance on their foraging habitat

Mitigation Measure	Funding Source	Monitoring Agency	Timing	Monitoring Program	Standards for Success
Mitigation Measure B-5: Conduct Preconstruction Nesting Bird and Raptor Surveys and Implement Appropriate Restrictions	District	District	Prior to construction	<p>Tree removal will occur prior to February 28 to avoid the breeding season and discourage birds from nesting near construction area</p> <p>All trees within 350 feet of potential construction activity will be surveyed</p> <p>No construction vehicles will be permitted within restricted areas unless directly related to management or protection of legally protected species</p>	Avoidance of nesting migratory birds and raptors
Mitigation Measure CR-1: Implement a Plan to Address the Discovery of Unanticipated Cultural and Paleontological Resources	District	District	During construction	<p>If the contractor unearths buried cultural or paleontological resources during construction, work will stop in that area and within 100 ft. of the find until a qualified archaeologist or paleontologist can assess significance of the find, and if necessary, develop appropriate treatment measures in consultation with the District and any other appropriate agencies</p>	Avoidance of buried cultural or paleontological resources

Mitigation Measure	Funding Source	Monitoring Agency	Timing	Monitoring Program	Standards for Success
Mitigation Measure CR-2: Implement a Plan to Address the Discovery of Human Remains	District	District	During construction	<p>If any human remains are discovered or recognized in any location other than a dedicated cemetery, no further excavation or disturbance of the site or nearby area will occur until:</p> <ol style="list-style-type: none"> <li>1. the Placer County coroner is informed and has determined that investigation of the cause of death is not required; and</li> <li>2. if the remains are of Native American origin, the descendants of the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC 5097.98; or</li> </ol> <p>the NAHC has been unable to identify a descendant or the descendant failed to make a recommendation within 24 hours after being notified by the commission</p>	Avoidance of human remains

## **Sacramento County Standard Meter Detail Drawing**



**NOTES:**

- A. THE CONTRACTOR INSTALLING FACILITIES SHOWN ON THE IMPROVEMENT PLANS SHALL INSTALL ALL ITEMS ON THIS DRAWING EXCEPT THAT AN IDLER SHALL BE INSTALLED IN PLACE OF THE METER. (SEE NOTE B)
- B. THE HOME BUILDER SHALL INSTALL THE METER AND TOUCH READ MODULE. AS AN OPTION, THE IMPROVEMENT PLAN CONTRACTOR MAY INSTALL THE METER AND TOUCH READ MODULE.
- C. AFTER INSTALLATION AND FINISH GRADING, PULL A 1/2"- 5/8" SOLID MANDREL THROUGH CONDUIT AND SEAL ENDS, WITNESSED BY INSPECTOR.
- D. ALL BURIED METAL SHALL BE ENCASED WITH 8 MIL POLYETHYLENE SO THAT NO SOIL IS IN CONTACT WITH METAL.
- E. NO TREES PERMITTED WITHIN 8FT. OF BOX. NO PLANTINGS PERMITTED WITHIN 30" OF BOX EXCEPT TURF.

**METER BOX SHALL NOT BE LOCATED IN A DRIVEWAY UNDER ANY CIRCUMSTANCES**

*David DeWine*  
DIRECTOR, DEPARTMENT OF WATER RESOURCES

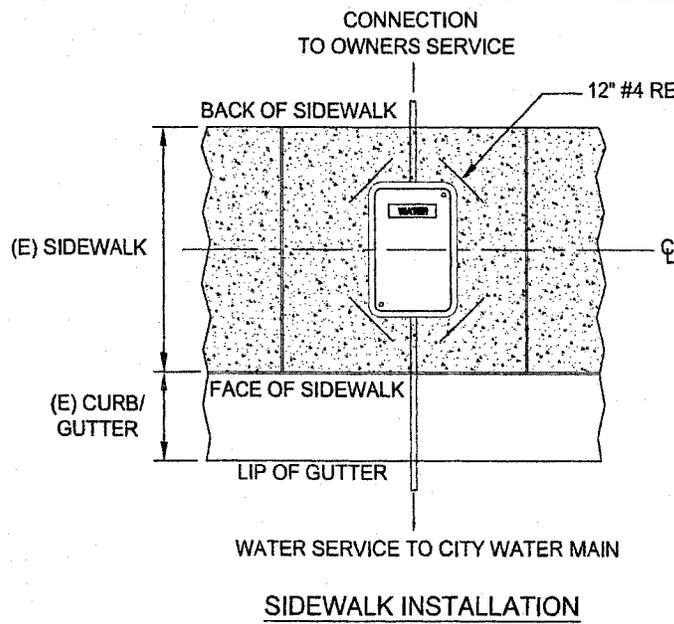
SACRAMENTO COUNTY MUNICIPAL SERVICES AGENCY

**1" RESIDENTIAL METERED WATER SERVICE**

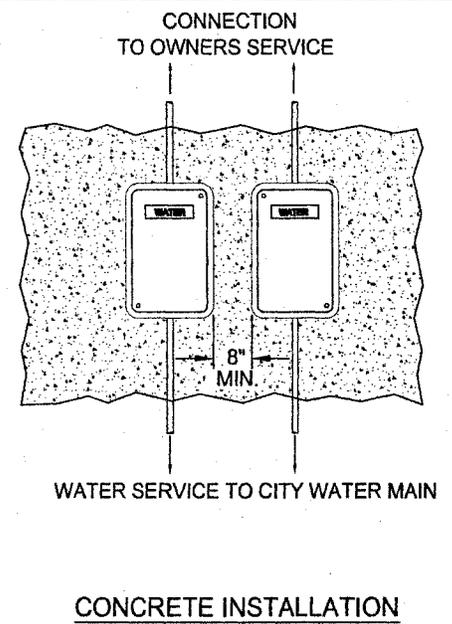
SCALE: NONE  
DATE: 7/10

**8-6A**

## **City of Sacramento Standard Meter Detail Drawing**

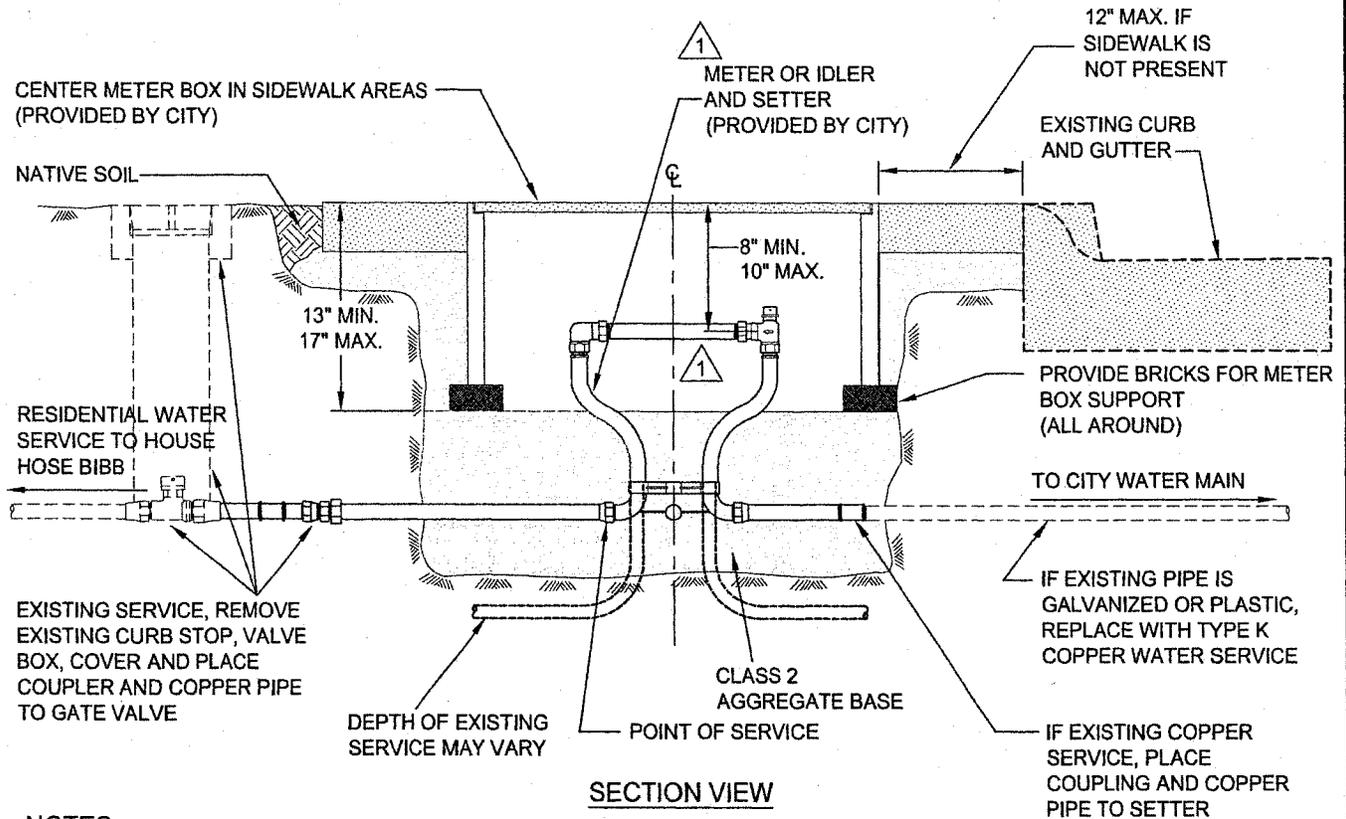


**SIDEWALK INSTALLATION**



**CONCRETE INSTALLATION**

**PLAN VIEW**



**SECTION VIEW**

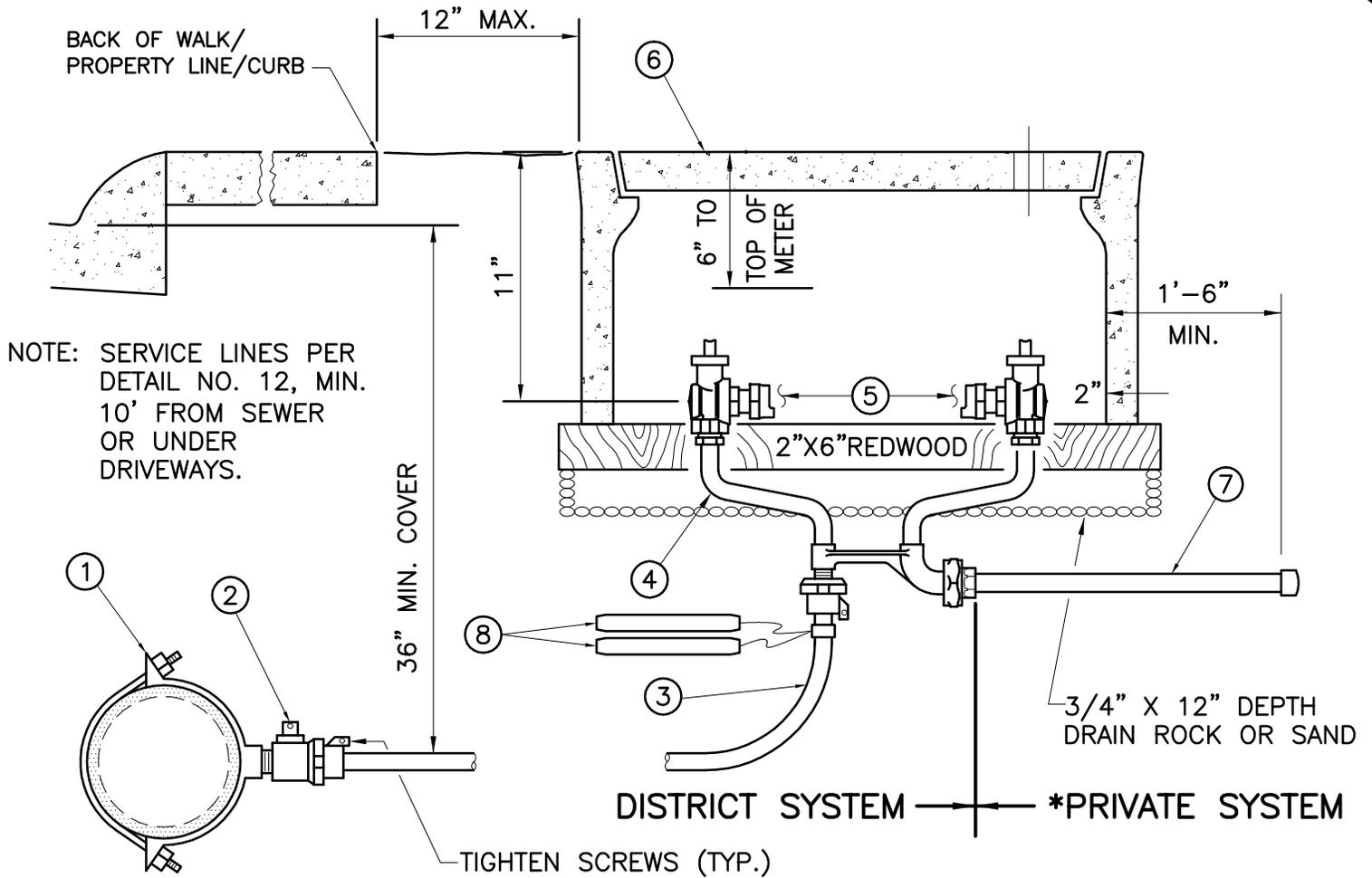
**NOTES:**

1. METER SPUDS MAY BE USED IN LIEU OF METER SETTER ON SERVICES WITH 20" OR LESS OF COVER.
2. ALL CURB STOPS THAT ARE LESS THAN 3 FEET FROM THE BACK OF WALK SHALL BE REPLACED WITH COPPER REGARDLESS OF EXISTING MATERIAL. IF EXISTING SERVICE IS PLASTIC OR GALVANIZED, REPLACE SERVICE WITH COPPER SERVICE MATERIAL TO EXISTING CURB STOP.

**RETRO-FIT INSTALLATION  
OF 1-INCH RESIDENTIAL WATER  
METER SETTER AND METER BOX  
WITHIN EXISTING SIDEWALK**

REV.	DATE	DESCRIPTION
1	6-11-08	Idler in Place of Meter

**Sacramento Suburban Water District Standard Meter Detail Drawing**



NOTE: SERVICE LINES PER  
DETAIL NO. 12, MIN.  
10' FROM SEWER  
OR UNDER  
DRIVEWAYS.

1. 1" SERVICE SADDLE, FIP AS PER SEC. 2-1.08 (a), STD. SPECS.
2. 1" CORP. COCK, MIP X COMP., AS PER SECTION 2-1.08 (b), STD. SPECS.
3. 1" TYPE K POLYETHYLENE-COATED COPPER TUBING, AS PER SEC. 2-1.08 (c) STD. SPECS.
4. 1" COPPER SETTER: W/CT PACK JOINT INLET AND FIP OUTLET AS PER SECTION 2-1.08 (d), STD. SPECS.
5. WATER METER INSTALLED BY CONTRACTOR, PAID FOR BY DEVELOPER AT FURNISH ONLY FEE.
6. 1" CONCRETE METER BOX (MARKED "WATER"): AS PER SECTION 2-1.08 (d).
7. BRASS NIPPLE - 18" LONG, FIP CAP (1" MINIMUM)
8. 2 - 4# HIGH PURITY COPPER SERVICE LINE ANODES WITH INSULATED SOLID CORE COPPER WIRE 10 FEET LONG AND BRASS CABLE TO PIPE CLAMP. ANODES TO BE USED ONLY ON EXISTING COPPER SERVICE LINES, AS PER SECTION 2-2.11 STD. SPECS.

### NOTES:

POLYETHYLENE ENCASEMENT WILL BE REQUIRED FOR ALL COPPER PIPE INSTALLATION. ENCASEMENT MATERIAL AND INSTALLATION METHODS SHALL CONFORM TO AWWA STANDARD C-105.

\*PRIVATE SYSTEM TO CONFORM WITH SACRAMENTO CO. STANDARDS  
DISTRICT SYSTEM SHALL INCLUDE METER BOX



PHONE (916) 972-7171  
3701 MARCONI AVENUE  
SUITE 100  
SACRAMENTO, CA  
95821-5346

STANDARD DETAIL

TYPICAL 3/4" & 1" NON-RESIDENTIAL  
METERED WATER SERVICE

DATE: DECEMBER 2009 STD. DET. NO. 14

**California Urban Water Conservation Council's Memorandum of  
Understanding Regarding Urban Water Conservation in California**

MEMORANDUM OF UNDERSTANDING  
REGARDING  
URBAN WATER CONSERVATION  
IN CALIFORNIA

*As Amended June 9, 2010*

**MEMORANDUM OF UNDERSTANDING REGARDING  
URBAN WATER CONSERVATION IN CALIFORNIA**

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**MEMORANDUM OF UNDERSTANDING  
REGARDING  
URBAN WATER CONSERVATION  
IN CALIFORNIA**

The **Memorandum of Understanding Regarding Urban Water Conservation in California** (MOU) is made and entered into on the dates set forth below among the undersigned parties (signatories). The signatories represent urban water suppliers, public advocacy organizations and other interested groups as defined in Section 1.3 of this MOU.

ADOPTED  
September 1991

AMENDED  
February 10, 1993  
March 9, 1994  
September 30, 1997  
April 8, 1998  
December 9, 1998  
September 16, 1999  
September 21, 2000  
March 14, 2001  
December 11, 2002  
March 10, 2004  
March 9, 2005  
March 14, 2007  
June 13, 2007  
December 10, 2008  
June 11, 2009  
September 16, 2009  
June 9, 2010

Note: *The MOU was substantially revised on September 30, 1997 and again on December 10, 2008. Subsequent revisions are indicated accordingly throughout the MOU.*

## RECITALS

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- A. The signatories to this MOU recognize that California's economy, quality of life and environment depend in large part upon the water resources of the State. The signatories also recognize the need to provide reliable urban water supplies and to protect the environment. Increasing demands for urban, agricultural and environmental water uses call for conservation and the elimination of waste as important elements in the overall management of water resources. Many organizations and groups in California have an interest in urban water conservation, and this MOU is intended to gain much needed consensus on a complex issue.
- B. The urban water conservation practices included in this MOU (referred to as "Best Management Practices" or "BMPs") are intended to reduce long-term urban demands from what they would have been without implementation of these practices and are in addition to programs which may be instituted during occasional water supply shortages.
- C. The combination of BMPs and urban growth, unless properly accounted for in water management planning, could make reductions in urban demands during short-term emergencies such as droughts or earthquakes more difficult to achieve. However, notwithstanding such difficulties, the signatory water suppliers will carry out the urban water conservation BMP process as described in this MOU.
- D. The signatories recognize that means other than urban water conservation may be needed to provide long-term reliability for urban water suppliers and long-term protection of the environment. However, the signatories may have differing views on what additional measures might be appropriate to provide for these needs. Accordingly, this MOU is not intended to address these issues.
- E. A major benefit of this MOU is to conserve water which could be used for the protection of streams, wetlands and estuaries and/or urban water supply reliability. This MOU leaves to other forums the issue of how conserved water will be used.
- F. It is the intent of this MOU that individual signatory water suppliers (1) develop comprehensive conservation BMP programs using sound economic criteria and (2) consider water conservation on an equal basis with other water management options.
- G. It is recognized that present urban water use throughout the State varies according to many factors including, but not limited to, climate, types of housing and landscaping, amounts and kinds of commercial, industrial and recreational development, and the extent to which conservation measures have already been implemented. It is further recognized that many of the BMPs identified in Exhibit 1 to this MOU have already been implemented in some areas and that even with broader employment of BMPs, future urban water use will continue to vary from area to area. Therefore, this MOU is not intended to establish uniform per capita water use allotments throughout the urban areas of the State. This MOU is also not intended to limit the amount or types of conservation a water supplier can pursue or to limit a water supplier's more rapid implementation of BMPs.
- H. It is recognized that projections of future water demand should include estimates of anticipated demand reductions due to changes in the real price of water.

# TERMS

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*Amended December 10, 2008; Amended March 9, 2005; Amended April 8, 1998*

## **SECTION 1. DEFINITIONS**

For purposes of this MOU, the following definitions apply:

1.1 **Best Management Practices.** A Best Management Practice ("BMP") means a policy, program, practice, rule, regulation or ordinance or the use of devices, equipment or facilities which meets either of the following criteria:

- (a) An established and generally accepted practice among water suppliers that results in more efficient use or conservation of water;
- (b) A practice for which sufficient data are available from existing water conservation projects to indicate that significant conservation or conservation related benefits can be achieved; that the practice is technically and economically reasonable and not environmentally or socially unacceptable; and that the practice is not otherwise unreasonable for most water suppliers to carry out.

Although the term "Best Management Practices" has been used in various statutes and regulations, the definitions and interpretations of that term in those statutes and regulations do not apply to this MOU. The term "Best Management Practices" or "BMPs" has an independent and special meaning in this MOU and is to be applied for purposes of this MOU only as defined above.

1.2 **Implementation.** "Implementation" means achieving and maintaining the staffing, funding, and in general, the priority levels necessary to achieve the level of activity called for in the descriptions of the various BMPs and to satisfy the commitment by the signatories to use good faith efforts to optimize savings from implementing BMPs as described in Section 4.4 of this MOU. Section B of Exhibit 1 to this MOU establishes the schedule for initial implementation of BMPs.

1.3 **Signatory Groups.** For purposes of this MOU, signatories will be divided into three groups as follows:

- (a) Group 1 will consist of water suppliers. A "water supplier" is defined as any entity, including a city, which delivers or supplies water for urban use at the wholesale or retail level.
- (b) Group 2 will consist of public advocacy organizations. A "public advocacy organization" is defined as a non profit organization:
  - (i) whose primary function is not the representation of trade, industrial, or utility entities, and
  - (ii) whose prime mission is the protection of the environment or who has a clear interest in advancing the BMP process.
- (c) Group 3 will consist of other interested groups. "Other interested groups" is defined as any other group which does not fall into one of the two groups above.

## **TERMS**

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- 1.4 **California Urban Water Conservation Council.** The California Urban Water Conservation Council or "Council" will have responsibility for monitoring the implementation of this MOU and will be comprised of signatories to this MOU grouped according to the definitions in Section 1.3 above. The duties of the Council are set forth in Section 6 and in Exhibit 2 to this MOU.

### **SECTION 2. PURPOSES**

2.1 **This MOU has Two Primary Purposes:**

- (1) to expedite implementation of reasonable water conservation measures in urban areas; and
- (2) pursuant to Section 5 of this MOU, to establish assumptions for use in calculating estimates of reliable future water conservation savings resulting from proven and reasonable conservation measures. Estimates of reliable savings are the water conservation savings which can be achieved with a high degree of confidence in a given service area. The signatories have agreed upon the initial assumptions to be used in calculating estimates of reliable savings. These assumptions are included in Exhibit 1 to this MOU. It is probable that average savings achieved by water suppliers will exceed the estimates of reliable savings.

### **SECTION 3. LIMITS TO APPLICABILITY OF MOU**

- 3.1 **Relationship Between Water Suppliers.** No rights, obligations or authorities between wholesale suppliers, retail agencies, cities or other water suppliers are created or expanded by this MOU. Moreover, wholesale water suppliers are not obligated to implement BMPs at the retail customer level except within their own retail service area, if any.
- 3.2 **Agriculture.** This MOU is intended to apply only to the delivery of water for domestic, municipal and industrial uses. This MOU is not intended to apply directly or indirectly to the use of water for irrigated agriculture with one exception. A signatory water supplier that serves agricultural customers may decide to include agricultural water deliveries in its calculation of water demand and compliance using the GPCD metric. If such agricultural deliveries are included, the supplier shall include relevant agricultural water demand in its Water Supply & Reuse and Accounts & Water Use standard reports.
- 3.3 **Reclamation.** The signatory water suppliers support the reclamation and reuse of wastewater wherever technically and economically reasonable and not environmentally or socially unacceptable, and agree to prepare feasibility studies on water reclamation for their respective service areas. However, this MOU does not apply to that aspect of water management, except where the use of reclaimed water may otherwise qualify as a BMP as defined above.
- 3.4 **Land Use Planning.** This MOU does not deal with the question of growth management. However, each signatory water supplier will inform all relevant land planning agencies at least annually of the impacts that planning decisions involving projected growth would have

## **TERMS**

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upon the reliability of its water supplies for the water supplier's service area and other areas being considered for annexation.

- 3.5 **Use of Conserved Water.** A major benefit of this MOU is to conserve water which could be used for the protection of streams, wetlands and estuaries and/or urban water supply reliability. This MOU leaves to other forums the issue of how conserved water will be used.

### **SECTION 4. IMPLEMENTATION OF BEST MANAGEMENT PRACTICES**

- 4.1 **The Best Management Practices List, Schedule of Implementation and Assumptions.** Exhibit 1 to this MOU contains:

- (a) In Section A: A list identifying those practices which the signatories believe presently meet the definition of a BMP as set forth in Section 1.1 of this MOU.
- (b) In Section B: A schedule for implementing the BMPs to be followed by signatory water suppliers unless exempted under Section 4.5 of this MOU or an alternative schedule is prepared pursuant to Section 4.6 of this MOU.
- (c) In Section C: Coverage requirements for implementing BMPs. Coverage requirements are the expected level of implementation necessary to achieve full implementation of BMPs. Coverage requirements may be expressed either in terms of activity levels by water suppliers or as water savings achieved.
- (d) In Section D: Reporting Requirements for Documenting BMP Implementation. These requirements vary by BMP, are considered the minimum record keeping and reporting requirements for water suppliers to document BMP implementation levels, and will provide the basic data used evaluate BMP implementation progress by water suppliers.
- (e) In Section E: Criteria to determine BMP implementation status of water suppliers. These criteria will be used to evaluate BMP implementation progress. Evaluation criteria vary by BMP, and are derived from the implementation guidelines and schedules presented in Sections A, B, and C.
- (f) In Section F: Assumptions for use in developing estimates of reliable savings from the implementation of BMPs. Estimates of reliable savings are the water conservation savings which can be achieved with a high degree of confidence in a given service area. The estimate of reliable savings for each BMP depends upon the nature of the BMP and upon the amount of data available to evaluate potential savings. For some BMPs (e.g., public information) estimates of reliable savings may never be generated. For others, additional data may lead to significant changes in the estimate of reliable savings. It is probable that average savings achieved by water suppliers will exceed the estimates of reliable savings.
- (g) In Section G: In the programmatic BMPs, the Flex Tack Menu, a list of potential alternative water savings measures is available for agencies which wish to promote new initiatives in water conservation. In order to qualify as in compliance with the BMP requirements, a utility using this menu, or a part of it, shall show water savings equal to or greater than of those which would have been achieved by following the BMP list.

## TERMS

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There is no section G in the Foundational BMPs.

- 4.2 **Initial BMPs, PBMPs, Schedules, and Estimates of Reliable Savings.** The initial position of conservation practices on the BMP and PBMP lists, the initial schedule of implementation and study for the BMP list, the initial schedule of study for the PBMP list, and the initial estimates of reliable savings represent compromises by the signatories to move the process

forward both for purposes of the present Bay/Delta proceedings as defined in Section 5 and to promote water conservation generally. The signatories agree that as more and better data are collected in the future, the lists, the schedules, and the estimates of reliable savings will be refined and revised based upon the most objective criteria available. However, the signatories agree that the measures included as initial BMPs in Section A of Exhibit 1 are economically justified on a statewide basis.

- 4.3 **Future Revision of BMPs, PBMPs, Schedules, and Estimates of Reliable Savings.** After the beginning of the initial term of the MOU as provided in Section 7.1, the California Urban Water Conservation Council ("Council") will, pursuant to Section 6 of this MOU and Exhibit 2, alter the composition of the BMP and PBMP lists, redefine individual BMPs, alter the schedules of implementation, and update the assumptions of reliable savings as more data becomes available. This dynamic BMP assessment process includes the following specific commitments:

- (a) The assumptions of reliable savings will be updated at least every 3 years.
- (b) The economic reasonableness of a BMP or PBMP will be assessed by the Council using the economic principles in Sections 3 and 4 of Exhibit 3.
- (c) A BMP will be removed from the BMP list if, after review of data developed during implementation, the Council determines that the BMP cannot be made economically reasonable or determines that the BMP otherwise fails to conform to the definition of BMPs in Section 1.1.
- (d) A PBMP will be moved to the BMP list and assigned a schedule of implementation if, after review of data developed during research, and/or demonstration projects, the Council determines that the PBMP is economically reasonable and otherwise conforms to the definition of BMPs in Section 1.1.

[Note: In 1997, the Council substantially revised the BMP list, definitions, and schedules contained in Exhibit 1. These revisions were adopted by the Council September 30, 1997.]

- 4.4 **Good Faith Effort.** While specific BMPs and results may differ because of varying local conditions among the areas served by the signatory water suppliers, a good faith effort to implement BMPs will be required of all signatory water suppliers. The following are included within the meaning of "good faith effort to implement BMPs":

- (a) The proactive use by a signatory water supplier of legal authorities and administrative prerogatives available to the water supplier as necessary and reasonable for the implementation of BMPs.

## TERMS

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- (b) Where implementation of a particular BMP is not within the legal authority of a signatory water supplier, encouraging timely implementation of the BMP by other entities that have the legal authority to carry out the BMP within that water supplier's service area pursuant to existing legal authority. This encouragement may include, but is not limited to, financial incentives as appropriate.
- (c) Cooperating with and encouraging cooperation between other water suppliers and other relevant entities whenever possible and within existing legal authority to promote the implementation of BMPS.
- (d) Optimizing savings from implementing BMPs.
- (e) For each signatory water supplier and all signatory public advocacy organizations, encouraging the removal of institutional barriers to the implementation of BMPs within that water supplier's service area. Examples of good faith efforts to remove institutional barriers include formal presentations and/or written requests to entities requesting approval of, or amendment to, local ordinances, administrative policies or legislation which will promote BMP implementation.

4.5 **Exemptions.** *As Amended on March 9, 2005.* A signatory water supplier will be exempt from the implementation of specific BMPs for as long as the supplier substantiates each reporting period that based upon then prevailing local conditions, one or more of the following findings applies:

- (a) A full cost-benefit analysis, performed in accordance with the principles set forth in Exhibit 3, demonstrates that either the program (i) would not be cost-effective overall when total program benefits and costs are considered; OR (ii) would not be cost-effective to the individual water supplier even after the water supplier has made a good faith effort to share costs with other program beneficiaries.
- (b) Adequate funds are not and cannot reasonably be made available from sources accessible to the water supplier including funds from other entities. However, this exemption cannot be used if a new, less cost-effective water management option would be implemented instead of the BMP for which the water supplier is seeking this exemption.
- (c) Implementation of the BMP is (i) not within the legal authority of the water supplier; and (ii) the water supplier has made a good faith effort to work with other entities that have the legal authority to carry out the BMP; and (iii) the water supplier has made a good faith effort to work with other relevant entities to encourage the removal of institutional barriers to the implementation of BMPs within its service area.

4.6 **Schedule of Implementation.** *As Amended on March 9, 2005.* The schedule of implementation for BMPs is set forth in Section B of Exhibit 1 to this MOU. However, it is recognized by the signatories that deviations from this schedule by water suppliers may be necessary. Therefore, a water supplier may modify, to the minimum extent necessary, the schedule for implementation of BMPs if the water supplier substantiates one or more of the following findings:

## **TERMS**

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- (a) That after a good faith effort to implement the BMP within the time prescribed, implementation is not feasible pursuant to the schedule. However, implementation of this BMP is still required as soon as feasible within the initial term of this MOU as defined in Section 7.1.
- (b) That implementation of one or more BMPs prior to other BMPs will have a more positive effect on conservation or water supplies than will adherence to the schedule.
- (c) That implementation of one or more Potential BMPs or other conservation measures prior to one or more BMPs will have a more positive effect on conservation or water supplies than will adherence to the schedule.
- (d) That the BMP was not implemented previously because the water supplier was exempt from its implementation as provided for in Section 4.5 above during prior years of required activity. When a water supplier has been exempt from implementing a BMP in the past, but is subsequently no longer exempt, the water supplier shall receive an extension of time to implement the BMP. The extension of time shall be equal to 100% of the time period for which fully documented exemptions were submitted to the Council, not to exceed the time allotted for completing the activities set forth within the BMP itself.

## **SECTION 5. CONSERVATION GOALS**

[Note: The original section 5. BAY/DELTA PROCEEDINGS was adopted with the initial MOU and referred to the State Water Resources Control Board water rights process underway in late 1980s and early 1990s to implement new Bay-Delta flow and export standards. Subsequent to those proceedings, further work under different auspices has proceeded with the same goals, in addition, Council membership has expanded to include agencies whose focus is on other watersheds and broader support for water use efficiency and conservation. Therefore, while including the original intent of this section, in December 2008 it has been amended to reflect these new circumstances.]

- 5.1 **Use of MOU to address Bay/Delta protection and water use efficiency.** The BMPs, the estimates of reliable savings and the processes established by this MOU are agreed to by the signatories for purposes of protection of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary ("Bay/Delta"); in order to move the water conservation process forward; and/or to develop a cost effective alternative to new water supplies. The willingness of the signatories to enter into this MOU for purposes of the protection of the Bay/Delta in no way limits the signatories' ability to propose different conservation practices, different estimates of savings, or different processes, or for non-urban water suppliers or for other water management issues. The signatories may present other assumptions of reliable conservation savings, provided that such assumptions could not have adverse impacts upon the water supplies of any signatory water supplier. Furthermore, the signatories retain the right to advocate any particular level of protection for the Bay/Delta Estuary, including levels of freshwater flows, and do not necessarily agree on population projections for California. This MOU is not intended to address any authority or obligation of the State Board to establish freshwater flow protections or set water quality objectives for the Estuary, or to address any authority of the Department of Water Resources or United States Bureau of Reclamation.

## **TERMS**

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- 5.2 **Recommendations for Water Conservation.** The signatories will make the following recommendations to the State Board, Department of Water Resources or US Bureau of Reclamation to support BMPs and the advancement of water conservation practices:
- (a) That implementation of the BMP process set forth in this MOU represents a sufficient long-term water conservation program by the signatory water suppliers, recognizing that additional programs may be required during occasional water supply shortages;
  - (b) That the State Board should include a policy statement in the water rights considerations of the Bay/Delta protection supporting the BMP process described in this MOU and that the BMP process should be considered in any documents prepared by the State Board pursuant to the California Environmental Quality Act as part of the Bay/Delta proceedings.
  - (c) That the Department of Water Resources and Bureau of Reclamation consider an agency's implementation of the BMPs set for the in the MOU as evidence of good faith efforts by the signatory agency to achieve water use efficiency and conservation.
- 5.3 **Letter to State or Federal Water Agencies.** Within 30 days of signing this MOU, each signatory will jointly or individually convey the principles set forth in Sections 5.1 and 5.2 above by sending a letter to the State Board, Department of Water Resources and/or Bureau of Reclamation copied to the California Urban Water Conservation Council.
- 5.4 **Withdrawal from MOU.** If the State Board or EPA uses future urban water conservation savings that are inconsistent with the use of BMPs as provided in this MOU, any signatory shall have the right to withdraw from the MOU by providing written notice to the Council as described in Section 7.4(a)(I) below.

## **SECTION 6. CALIFORNIA URBAN WATER CONSERVATION COUNCIL**

- 6.1 **Organization.** The California Urban Water Conservation Council ("Council") will be comprised of all signatories to this MOU grouped according to the definition in Section 1. The signatories agree to the necessary organization and duties of the Council as specified in Exhibit 2 to this MOU. Within 30 days of the effective date of this MOU, the Council will hold its first meeting.
- 6.2 **BMP Implementation Reports.** The signatory water suppliers will submit standardized reports every other year to the Council providing sufficient information to inform the Council on the progress being made towards implementing the BMP process. The Council will make annual reports to the State Board. An outline for the Council's annual report to the State Board is attached as Exhibit 5 to this MOU.

## **SECTION 7. GENERAL PROVISIONS**

- 7.1 **Initial Term of MOU.** The initial term of this MOU shall be for a period of 10 years. This initial term shall commence on September 1, 1991.

## TERMS

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- 7.2 **Signatories.** Signatories shall consist of three groups: water suppliers, public advocacy organizations and other interested groups, arranged according to the definition in Section 1.3. Such arrangement will be made by a Council membership committee comprised of three representatives from the water suppliers' group and three representatives from the public advocacy organizations' group.
- 7.3 **Renewal of MOU.** The MOU shall be automatically renewed after the initial term of 10 years on an annual basis as to all signatories unless a signatory withdraws as described below in Section 7.4.
- 7.4 **Withdrawal from MOU.** Signatories to the MOU may withdraw from the MOU in three separate ways as described in sections (a), (b) and 8 below.
- (a) **Withdrawal prior to expiration of initial term.** Before the expiration of the initial term of 10 years, a signatory may withdraw by providing written notice to the Council declaring its intent to withdraw. This written notice must include a substantiated finding that one of the two provisions (i) or (ii) below applies:
- (i) During the present Bay/Delta proceedings, the State Board or EPA used future urban water conservation savings that are inconsistent with the use of BMPs as provided in this MOU; OR
  - (ii) After a period of 5 years from the commencement of the initial term of the MOU:
    - (1) Specific signatory water suppliers representing more than 10 percent of the population included within the combined service areas of the signatory water suppliers have failed to act in good faith pursuant to Section 4.4 of the MOU; and
    - (2) The signatory wishing to withdraw has attached findings to its past two annual reports to the Council beginning no earlier than the fourth annual report identifying these same signatory water suppliers and giving evidence based upon the information required to be submitted in the annual reports to the Council to support the allegations of failure to act in good faith; and
    - (3) The State Board has failed to require conservation efforts by the specific water suppliers adequate to satisfy the requirements of this MOU; and
    - (4) Discussions between the signatory wishing to withdraw and the specific signatories named have failed to satisfy the objections of the signatory wishing to withdraw.

After a signatory declares intent to withdraw under Section 7.4(a), the MOU shall remain in effect as to that signatory for 180 days.

- (b) **Withdrawal after expiration of initial term.** After the initial term of 10 years, any signatory may declare its intent to withdraw from the MOU unconditionally by providing written notice to the Council. After a signatory has declared its intent to

## TERMS

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withdraw as provided in this section, the MOU will remain in effect as to that signatory for 180 days.

- (c) **Immediate withdrawal.** Any signatory who does not sign a modification to the MOU requiring a 2/3 vote as described in Exhibit 2 of this MOU may withdraw from the MOU by providing written notice to the Council. The withdrawing signatory's duties under this MOU will be terminated effective immediately upon providing such written notice.

If a signatory withdraws from the MOU under any of the above methods, the MOU shall remain in effect as to all other signatories.

- 7.5 **Additional Parties.** Additional parties may sign the MOU after September 1, 1991 by providing written notice to and upon approval by the Council. Additional parties will be assigned by the Council to one of the three signatory groups defined in Section 1.3 before entry into the Council. All additional signatory water suppliers shall be subject to the schedule of implementation provided in Exhibit 1.
- 7.6 **Legal Authority.** Nothing in this MOU is intended to give any signatory, agency, entity or organization expansion of any existing authority. No organization formed pursuant to this MOU has authority beyond that specified in this MOU.
- 7.7 **Non-Contractual Agreement.** This MOU is intended to embody general principles agreed upon between and among the signatories and is not intended to create contractual relationships, rights, obligations, duties or remedies in a court of law between or among the signatories.
- 7.8 **Modifications.** The signatories agree that this writing constitutes the entire understanding between and among the signatories. The general manager, chief executive officer or executive director of each signatory or their designee shall have the authority to vote on any modifications to this MOU and its exhibits. Any modifications to the MOU itself and to its exhibits shall be made by the Council as described in Exhibit 2.

## **EXHIBIT 1. BMP DEFINITIONS, SCHEDULES AND REQUIREMENTS**

*As Amended December 10, 2008; As Formatted March 9, 2005; As Amended re: Base Year on September 21, 2000*

This Exhibit contains Best Management Practices (BMPs) that signatory water suppliers commit to implementing. Suppliers' water needs estimates will be adjusted to reflect estimates of reliable savings from these BMPs. For some BMPs, no estimate of savings is made.

It is recognized by all parties that a single implementation method for a BMP would not be appropriate for all water suppliers. In fact, it is likely that in the future, water suppliers will find new implementation methods even more effective than those described. Any implementation method used should be at least as effective as the methods described below.

The Council's 14 BMPs are now organized into five categories. Two categories, Utility Operations and Education, are "Foundational BMPs", because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories. The minimal activities required of each signatory are encompassed within each list, except for activities from which a utility is exempt from completing under section 4.5 of the MOU and for which the utility has filed an exemption with the Council.

### **BMP Naming Changes**

<b>Old BMP Number &amp; Name</b>	<b>New BMP category</b>
1. Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Programmatic: Residential
2. Residential Plumbing Retrofit	Programmatic: Residential
3. System Water Audits, Leak Detection and Repair	Foundational: Utility Operations – Water Loss Control
4. Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	Foundational: Utility Operations – Metering
5. Large Landscape Conservation Programs and Incentives	Programmatic: Landscape
6. High-Efficiency Clothes Washing Machine Financial Incentive Programs	Programmatic: Residential

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7. Public Information Programs	Foundational: Education – Public Information Programs
8. School Education Programs	Foundational: Education – School Education Programs
9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Programmatic: Commercial, Industrial, and Institutional
10. Wholesale Agency Assistance Programs	Foundational: Utility Operations – Operations
11. Retail Conservation Pricing	Foundational: Utility Operations – Pricing
12. Conservation Coordinator	Foundational: Utility Operations – Operations
13. Water Waste Prohibition	Foundational: Utility Operations – Operations
14. Residential ULFT Replacement Programs	Programmatic: Residential

Compliance with the BMP water savings goals can be accomplished in one of three ways including: accomplishing the specific measures as listed in Section A of each BMP; accomplishing a set of measures which achieves equal or greater water savings, referred to in this document as the Flex Track Menu; and accomplishing set water savings goals as measured in gallons per capita per day consumption.

A signatory may elect to adopt additional or alternative measures, in part or in any combination, as described in the Flex Track Menus, provided that the demonstrated water savings in the Flex Track Menu activities are equal to or greater than the water savings that would be achieved by the BMP measures.

“Demonstrated water savings” represent unit water savings for individual BMP or Flex Track Menu conservation technologies and activities as established by either: (a) a water utility; (b) independent research studies; or (c) CUWCC- adopted savings as reviewed by the Research and Evaluation Committee and approved by the Board of Directors.

Another alternative method to satisfying the BMP requirements is “GPCD (gallons per capita per day) Compliance”. Agencies which choose a GPCD Compliance approach will be counting overall water savings of the quantifiable measures from the BMP list or Flex Track Menu plus additional savings achieved through implementation of the Foundational BMPs. [The actual targets and methodology associated with the GPCD Compliance approach will be adopted by the Council Plenary in accord with the MOU; and is intended for adoption by the spring Plenary of 2009 but will be no later than the summer 2009

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Plenary.] Savings goals and methodology will be updated in the MOU Compliance Policies from time to time based upon data and studies.

The BMP definitions below are divided into the following sections:

## **Section A: Implementation**

“Implementation” means achieving and maintaining the staffing, funding and, in general, the priority levels necessary to achieve the level of water savings or activity called for in the implementation section of each definition, and to satisfy the commitment by the signatories to use good faith efforts to optimize savings from implementing BMPs as described in Section 4.4 of the MOU.

## **Section B: Implementation Schedule**

Signatory water suppliers will implement the Best Management Practices according to the schedules in each definition. These schedules state the latest dates by which implementation of BMPs must be underway. It is recognized that some signatories are already implementing some BMPs and that these schedules do not prohibit signatories from implementing BMPs sooner than required.

## **Section C: Coverage Requirements**

This section specifies the minimum level of coverage required by the BMPs.

## **Section D: Requirements for Documenting BMP Implementation**

Section D of each definition contains the minimum record keeping and reporting requirements for agencies to document BMP and Flex Track Menu implementation levels and efforts, and will be used to guide Council development of the BMP implementation report forms and database.

## **Section E: Water Savings Assumptions**

Section E of each definition contains the assumptions of reliable water savings to be used in accordance with Sections 5.1 and 5.2 of the MOU. These will be updated from time by the Research and Evaluation Committee and published in the MOU Compliance Policy and BMP Guidebook.

## **Section F: Flex Track Option**

This section is included in the Programmatic BMP definitions. The approach is defined in this Exhibit, and the Menu is contained in the MOU Compliance Policy and BMP Guidebook, where it can be updated from time to time with approval of the Research and Evaluation Committee.

In this Exhibit, a measure is intended to be an individual activity and a practice is a set of measures.

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## **FOUNDATIONAL BMPs**

### **1. UTILITY OPERATIONS PROGRAMS**

Water utilities throughout California are implementing water conservation programs and providing services to the customers they serve. There are four subcategories that comprise signatory utility operation program responsibilities.

#### **1.1 OPERATIONS PRACTICES**

This practice will outline several key actions that utilities shall take to better enable conservation program implementation, to supplement conservation incentives with regulations where appropriate, and to assist one another through the wholesaler-retailer relationship.

##### **A. Implementation**

Implementation shall consist of at least the following actions:

1) Conservation Coordinator (*formerly BMP 12*)

Designate a person as the agency's responsible conservation coordinator for program management, tracking, planning, and reporting on BMP implementation.

2) Water waste prevention (*formerly BMP 13*)

a) New development

Enact, enforce, or support legislation, regulations, ordinances, or terms of service that (1) prohibit water waste such as, but not limited to: single-pass cooling systems; conveyer and in-bay vehicle wash and commercial laundry systems which do not reuse water; non-recirculating decorative water fountains and (2) address irrigation, landscape, and industrial, commercial, and other design inefficiencies.

b) Existing users

Enact, enforce, or support legislation, regulations, ordinances, or terms of service that prohibit water waste such as, but not limited to: landscape and irrigation inefficiencies, commercial or industrial inefficiencies, and other misuses of water.

c) Water shortage measures

Enact, enforce, or support legislation, regulations, ordinances, or terms of service that facilitate implementation of water shortage response measures.

3) Wholesale agency assistance programs (*formerly BMP 10*)

This section addresses assistance relationships between regional wholesale agencies and intermediate wholesale agencies as well as between wholesale agencies and retail agencies.

a) Financial investments and building partnerships

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When mutually agreeable and beneficial to a wholesaler and its retail agencies, a wholesaler will provide financial assistance and help build partnerships to accomplish conservation. Wholesale water suppliers will consider avoided capital costs when making financial investments and build regional partnerships to advance water conservation efforts and effectiveness. Where applicable, intermediate wholesale water suppliers that receive conservation-related financial incentives from regional wholesalers will pass through eligible financial incentives to retail agencies operating programs at the retail level.

b) Technical support

When requested, wholesale water agencies will provide conservation-related technical support and information to retail agencies they serve. Support and information will include, but will not be limited to: workshops and support advice addressing conservation program planning, design, implementation, and evaluation.

c) Program management

When mutually advantageous, wholesale and retail water agencies will join together to plan, design, implement, manage, and evaluate regional conservation programs.

When mutually agreeable and beneficial, the wholesale agency or another lead regional agency will operate all or part of the conservation program; if the wholesale agency or other lead regional agency operates all or part of a program, then it may, by mutual consent with the retail agency, assume responsibility for CUWCC reporting for funded BMPs; under this arrangement, a wholesale agency or other lead regional agency may aggregate all or portions of the reporting and coverage requirements of all retail agencies joining into the mutual consent.

d) Water shortage allocations

Wholesale agencies shall pursue water shortage allocation policies or plans which minimize disincentives to long-term water conservation, and encourage and reward investments in long-term conservation shown to advance regional water supply reliability and sufficiency.

e) Non-signatory reporting

To the extent possible, wholesale water agencies will provide reports on BMP implementation within their service area by retail water agencies that are not signatories to the MOU.

f) Encourage CUWCC membership

Wholesale agencies will encourage all of their retail agencies to become MOU signatories, provide information to assist the CUWCC in recruitment targeting, and may assist in paying CUWCC dues for their retail agencies.

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## **B. Implementation Schedule**

Implementation shall commence no later than July 1 of the first year following the latter of either: 1) the year the agency signed or became subject to the MOU, or 2) the year this Exhibit is amended.

## **C. Coverage Requirements**

Coverage shall consist of:

### 1) Conservation Coordinator

Staff and maintain the position of trained conservation coordinator, or equivalent consulting support, and provide that function with the necessary resources to implement BMPs.

### 2) Water waste prevention

Water Agency shall do one or more of the following:

- a. Enact and enforce an ordinance or establish terms of service that prohibit water waste
- b. Enact and enforce an ordinance or establish terms of service for water efficient design in new development
- c. Support legislation or regulations that prohibit water waste
- d. Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures
- e. Support local ordinances that prohibit water waste
- f. Support local ordinances that establish permits requirements for water efficient design in new development.

### 3) Wholesale agency programs

#### a) Financial investments and building partnerships

When mutually agreeable and beneficial to a wholesaler and its retail agencies cost-effectiveness assessments, including avoided cost per acre-foot, will be completed for each BMP the wholesale agency is potentially obligated to support. The methodology used will conform to the Council standards and procedures, and the information reported will be sufficient to permit independent verification of the calculations and of any exemptions claimed on the cost-effectiveness grounds.

#### b) Technical support

*When requested* provide technical support, incentives, staff or consultant support, and equivalent resources to retail members to assist, or to otherwise support, the implementation of BMPs.

#### c) Program management

When mutually agreeable and beneficial to a wholesaler and its retail agencies offer program management and BMP reporting assistance to its retailers and the results of the offer will be documented. It is recognized that wholesale agencies have limited control over retail

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agencies that they serve and must act in cooperation with those retail agencies on implementation of BMPs. Thus, wholesale agencies cannot be held responsible for levels of implementation by individual retailers in their wholesale service areas.

d) Water shortage allocation

Water shortage allocations plans or policies will encourage and reward investments in long-term conservation.

e) Non-signatory reporting

Wholesale water agencies will report on non-signatory BMP implementation, when possible.

4) Encourage CUWCC membership

Wholesale agencies will encourage CUWCC membership and offer recruitment assistance.

## **D. Requirements for Documenting BMP Implementation**

1) Conservation coordinator

Provide the contact information for the conservation coordinator, or consultant assigned, and verification that the position is responsible for implementing the tasks identified in Section A.1).

2) Water waste prevention

Provide the following:

a) A description of, or electronic link to, any ordinances or terms of service adopted by water agency to meet the requirements of this BMP.

b) A description of, or electronic link to, any ordinances or requirements adopted by local jurisdictions or regulatory agencies with the water agency's service area.

c) A description of any water agency efforts to cooperate with other entities in the adoption or enforcement of local requirement consistent with this BMP.

d) A description of agency support positions with respect to adoption of legislation or regulations consistent with this BMP.

3) Wholesale agency assistance programs

a) Financial investments and building partnerships

List the total monetary amount of financial incentives and equivalent resources provided to retail members to assist with, or to otherwise support, implementation of BMPs, subtotaled by BMP. List regional partnerships developed to encourage resource conservation and maximize economies of scale benefits.

b) Technical support

Supply a summary of types of technical support provided to retail agencies.

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c) Program management

If the wholesale agency has assumed reporting responsibility, list the programs managed on behalf of its retail agencies.

d) Water shortage allocation

If a water shortage allocation plan or policy has been developed, provide the date of adoption and electronic link to the document or hardcopy.

e) Non-signatory reporting

Receipt of reports

4) Encourage CUWCC membership

List of efforts to recruit retailers and amount of dues paid on behalf of retail agencies.

## **E. Water Savings Assumptions**

Not quantified. However, water savings may be realized in the following ways:

1) Wholesalers may use the Council's Cost and Savings document to assess the total amount of water savings achieved by each wholesaler-supported BMP. Other statistically validated sources may be also used to demonstrate water savings.

2) Water savings from enforcement of legislation and regulations will be projections developed based on anticipated savings from device(s) applied to the population subject to the regulation(s).

3) Water savings from implementation of water waste prevention measures.

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## **1.2 Water Loss Control** (formerly BMP 3) as amended September 16, 2009

The goals of modern water loss control methods include both an increase in water use efficiency in the utility operations and proper economic valuation of water losses to support water loss control activities. In May 2009 the American Water Works Association (AWWA) published the 3<sup>rd</sup> Edition M36 Manual *Water Audits and Loss Control Programs*. BMP 1.2 will incorporate these new water loss management procedures and apply them in California. Agencies are expected to use the AWWA Free Water Audit Software (“AWWA Software”) to complete their standard water audit and water balance.

### **A. Implementation**

Implementation shall consist of at least the following actions:

- 1) Standard Water Audit and Water Balance. All agencies shall quantify their current volume of apparent and real water loss. Agencies shall complete the standard water audit and balance using the AWWA Water Loss software to determine their current volume of apparent and real water loss and the cost impact of these losses on utility operations at no less than annual intervals.
- 2) Validation. Agencies may use up to four years to develop a validated data set for all entries of their water audit and balance. Data validation shall follow the methods suggested by the AWWA Software to improve the accuracy of the quantities for real and apparent losses.
- 3) Economic Values. For purposes of this BMP, the economic value of real loss recovery is based upon the agency’s avoided cost of water as calculated by the Council’s adopted Avoided Cost Model or other agency model consistent with the Council’s Avoided Cost Model.
- 4) Component Analysis. A component analysis is required at least once every four years and is defined as a means to analyze apparent and real losses and their causes by quantity and type. The goal is to identify volumes of water loss, the cause of the water loss and the value of the water loss for each component. The component analysis model then provides information needed to support the economic analysis and selection of intervention tools. An example is the Breaks and Background Estimates Model (BABE) which segregates leakage into three components: background losses, reported leaks and unreported leaks.
- 5) Interventions. Agencies shall reduce real losses to the extent cost-effective. Agencies are encouraged to refer to the AWWA’s 3<sup>rd</sup> Edition M36 Publication, *Water Audits and Loss Control Programs* (2009) for specific methods to reduce system losses.
- 6) Customer Leaks. Agencies shall advise customers whenever it appears possible that leaks exist on the customer’s side of the meter.

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## **B. Implementation Schedule**

- 1) For agencies signing the MOU prior to December 31, 2008, implementation shall commence no later than July 1, 2009.
  - a) July 1, 2009 through June 30, 2010 will be the first year of implementation;
  - b) Agencies shall provide its first full BMP 1.2 report by December 1, 2010 for years 2008-2009 and 2009-2010;
- 2) Agencies signing the MOU after December 31, 2008, implementation shall commence no later than July 1 of the year following the year the agency signed the MOU.
  - a) Agencies shall provide a full BMP 1.2 report for the first reporting period after implementation and for each reporting year thereafter.
- 3) A benchmark for the performance indicator in terms of water loss standards will be determined after the first 4 years data collected based upon the data reported by agencies. The performance indicator and benchmark; will be voted upon by the Council by year 6 of this revision. Ongoing data collection and data reporting requirements will be established as part of this process.

## **C. Coverage Requirements**

- 1) Agencies to compile the standard water audit and balance annually using the AWWA Software. Beginning in the 2<sup>nd</sup> year of implementation agencies to test source, import, and production meters annually.
- 2) Agencies shall improve the data accuracy and data completeness of the standard water balance during the first four years of implementation. Agencies shall achieve a Water Audit Data Validity score of 66 or higher using the AWWA software no later than the end of the first four year period; and shall achieve data validity Level IV no later than the end of the 5th year of implementation. Estimations for data that are not directly measured should be improved using the methods outlined by the AWWA.
- 3) Agencies shall seek training in the AWWA water audit method and component analysis process (offered by CUWCC or AWWA) during the first four years of BMP implementation. They shall complete a component analysis of real losses by the end of the fourth year, and update this analysis no less frequently than every four years.
- 4) Beginning in the fifth year of implementation, through the tenth year of implementation, agencies shall demonstrate progress in water loss control performance as measured by the AWWA software real loss performance indicator "gallons per service connection per day;" "gallons per mile of mains per day;" or other appropriate indicator by one of the following:

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- a) Achieving a performance indicator score less than the agency's score the previous year;
  - b) Achieving a performance indicator score less than the average of the agency's scores for the previous three years; or
  - c) Achieving a performance indicator score in the top quintile (20%) of all signatory agencies reporting such performance indicator with a Data Validity Level IV; or ;
  - d) In year 6 and beyond reducing real losses to or below the benchmark value determined in the Council's process referenced in section B3.
- 5) Agencies shall repair all reported leaks and breaks to the extent cost effective. By the end of the second year, agencies shall establish and maintain a record-keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair. By the end of the fourth year, agencies shall include estimated leakage volume from report to repair, and cost of repair (including pavement restoration costs and paid-out damage claims, if any).
- 6) Agencies shall locate and repair unreported leaks to the extent cost effective.

## **D. Requirements for Documenting BMP Implementation**

- 1) Agency shall submit the completed AWWA Standard Water Audit and Water Balance worksheets in the BMP 1.2 report form every reporting period.
- 2) For each reporting period, agency shall keep and make available validation for any data reported.
- 3) Agency shall maintain in-house records of audit results, methodologies, and worksheets for each completed audit period.
- 4) Agency keeps records of each component analysis performed, and incorporates results into future annual standard water balances.
- 5) Agency, for the purpose of setting the Benchmark:
  - a) keeps records of intervention(s) performed, including standardized reports on leak repairs, the economic value assigned to apparent losses and to real losses, miles of system surveyed for leaks, pressure reduction undertaken for loss reduction, infrastructure rehabilitation and renewal, volumes of water saved, and costs of intervention(s); and
  - b) prepares a yearly summary of this information for submission to the Council, during years two through five of implementation, unless extended by the Council.

## **E. Water Savings Assumptions**

To Be Determined

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*As Amended September 16, 2009*

## **1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS**

*(formerly BMP 4) As Amended March 14, 2007*

### **A. Implementation**

For consistency with California Water Code (Section 525b), this BMP refers to potable water systems. A water meter is defined as a device that measures the actual volume of water delivered to an account in conformance with the guidelines of the American Water Works Association. Implementation shall consist of at least the following actions:

- 1) Require meters for all new service connections.
- 2) Establish a program for retrofitting existing unmetered service connections.
- 3) Read meters and bill customers by volume of use.
  - a) Establish and maintain billing intervals that are no greater than bi-monthly (every two months) for all customers.
  - b) For each metered connection, perform at least five actual meter readings (including remotely sensed) per twelve month period.
- 4) Prepare a written plan, policy or program that includes:
  - a) A census of all meters, by size, type, year installed, customer class served and manufacturer's warranty accuracy when new;
  - b) A currently approved schedule of meter testing and repair, by size, type and customer class;
  - c) A currently approved schedule of meter replacement, by size, type, and customer class; and
- 5) Identifying intra- and inter-agency disincentives or barriers to retrofitting mixed use commercial accounts with dedicated landscape meters, and conducting a feasibility study(s) to assess the merits of a program to provide incentives to switch mixed use accounts to dedicated landscape meters.

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*As Amended September 16, 2009*

## **B. Implementation Schedule**

- 1) Agencies signing the MOU prior to December 31, 1997, shall:
  - a) Initiate volumetric billing for all metered customers no later than July 1, 2008; and
  - b) Complete meter installation for all connections no later than July 1, 2009.
- 2) Agencies signing the MOU after December 31, 1997, shall:
  - a) Initiate volumetric billing for all metered customers no later than July 1, 2008 or within one year of signing the MOU if later than July 1, 2008; and
  - b) Complete meter installation for all service connections no later than July 1, 2012 or within six years of signing MOU, but in no case later than one year prior to the requirements of state law.
- 3) For unmetered service areas newly acquired or newly operated by otherwise metered agencies, meter installation shall be completed in these service areas within six years of the acquisition or operational agreement.
- 4) A feasibility study examining incentive programs to move landscape water uses on mixed-use meters to dedicated landscape meters to be completed by the end of Year Four following the date implementation was to commence.
- 5) A written plan, policy or program to test, repair and replace meters [see Section A(4) above] shall be completed and submitted electronically by July 1, 2008 or within one year of signing the MOU if later than July 1, 2008, whichever is later.

## **C. Coverage Requirements**

100% of existing unmetered accounts to be metered and billed by volume of use within above specified time periods. Service lines dedicated to fire suppression systems are exempt from this requirement.

## **D. Requirements for Documenting BMP Implementation**

- 1) Confirmation that all new service connections are metered and are being billed by volume of use and provide:
  - a) Number of metered accounts;
  - b) Number of metered accounts read;
  - c) Number of metered accounts billed by volume of use;

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- d) Frequency of billing (i.e. six or twelve times per year) by type of metered customer (e.g. single family residential, multiple family residential, commercial, industrial, and landscape irrigation); and
  - e) Number of estimated bills per year by type of metered customer (e.g. single family residential, multiple family residential, commercial, industrial, and landscape irrigation) vs. actual meter readings.
- 2) Number of unmetered accounts in the service area. For the purposes of evaluation, this shall be defined as the baseline meter retrofit target, and shall be used to calculate the agency's minimum annual retrofit requirement.
  - 3) Number of unmetered service connections retrofitted during the reporting period.
  - 4) Estimated number of CII accounts with mixed-use meters.
  - 5) Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.

## **E. Criteria to Determine BMP Implementation Status**

- 1) Agency with existing unmetered service connections has completed a meter retrofit plan by the end of Year Two following the date implementation was to commence.
- 2) Agency has completed a feasibility study examining incentive programs to move landscape water uses on mixed-use meters to dedicated landscape meters by the end of Year Two following the date implementation was to commence.
- 3) Agency with existing unmetered service connections is on track to meter these connections during the schedule shown in Section B. An agency will be considered on track if the percent of unmetered accounts retrofitted with meters equals or exceeds the following:

<b>Target Dates for "On Track" Compliance with BMP 4</b>	
<b>Percent of unmetered accounts retrofitted</b>	<b>Agency signed the MOU prior to December 31, 1997</b>
10 percent	December 31, 2000
24 percent	December 31, 2002
42 percent	December 31, 2004
64 percent	December 31, 2006
90 percent	December 31, 2008

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100 percent	July 1, 2009
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Target Dates for "On Track" Compliance with BMP 4	
Percent of unmetered accounts retrofitted	All agencies signing the MOU after 1997
20 percent	December 31, 2004
40 percent	December 31, 2006
60 percent	December 31, 2008
80 percent	December 31, 2010
100 percent	July 1, 2012

- 4) Agency bills metered customers at least as often as bimonthly within four years.
- 5) Agency reads meters and bills metered customers using volumetric rates.
- 6) Agency has completed a written plan, policy or program to test, repair and replace meters.

## F. Water Savings Assumptions

Assume meter retrofits and volumetric rates combined will result in a 20% reduction in demand for retrofitted accounts.

## G. Commitment to Further Review

Within three years from the date this BMP revision is adopted, the CUWCC will complete an evaluation of the potential water use efficiency impacts and cost-effectiveness of the following for consideration as future BMP revision(s):

- 1) Criteria for meter testing, repair, replacement and accuracy;
- 2) Transition to installing automated meter reading (AMR) technologies; and
- 3) Transition to monthly billing schedules for all accounts.

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*As Amended September 16, 2009*

## **1.4 Retail Conservation Pricing** *(formerly BMP 11)* *As Amended June 13, 2007*

### **Part I - Retail Water Service Rates**

#### **A. Implementation**

BMP 11 promotes water conserving retail water rate structures. BMP 11 recognizes that each agency or water enterprise fund has a unique rate setting system and history. When creating a rate case, professional judgments are made to determine whether costs are accounted to a variable or fixed cost center by the staff of the agency. The final water rate case is an accumulation of all the decisions and judgments made by staff and supplemented by the financial projections leading an agency to establish its final water rate recommendation. BMP 11 is not intended to supplant this process, but rather to reinforce the need for Water Agencies to establish a strong nexus between volume-related system costs and volumetric commodity rates.

In *Bighorn-Desert View Water Agency v. Virgil* the California Supreme Court applied Proposition 218's\* provisions embodied in Articles XIII C and D of the California Constitution to ongoing water service. In addition, Article XIII D, Section 6 imposes procedural and substantive requirements on new or increased fees or charges for on-going water service. The Council considers the conservation principles of BMP 11 to be compatible with the cost of service requirements of Proposition 218. However, should a case arise in which a Water Agency's good faith efforts were unable to meet BMP 11's requirements due to legal constraints (e.g. Proposition 218), this would be grounds for exemption, as specified in MOU Section 4.5.

**Definition:** Conservation pricing provides economic incentives (a price signal) to customers to use water efficiently. Because conservation pricing requires a volumetric rate, metered water service is a necessary condition of conservation pricing. Unmetered water service is inconsistent with the definition of conservation pricing.

Conservation pricing requires volumetric rate(s). While this BMP defines a minimum percentage of water sales revenue from volumetric rates, the goal of this BMP is to recover the maximum amount of water sales revenue from volumetric rates that is consistent with utility costs (which may include utility long-run marginal costs), financial stability, revenue sufficiency, and customer equity. In addition to volumetric rate(s), conservation pricing may also include one or more of the following other charges:

- 1) Service connection charges designed to recover the separable costs of adding new customers to the water distribution system.

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\* Proposition 218 was approved by California voters in November 1996.

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- 2) Monthly or bimonthly meter/service charges to recover costs unrelated to the volume of water delivered or new service connections and to ensure system revenue sufficiency.
- 3) Special rates and charges for temporary service, fire protection service, and other irregular services provided by the utility.

The following volumetric rate designs are potentially consistent with the above definition:

- 1) **Uniform rate** in which the volumetric rate is constant regardless of the quantity consumed.
- 2) **Seasonal rates** in which the volumetric rate reflects seasonal variation in water delivery costs.
- 3) **Tiered rates** in which the volumetric rate increases as the quantity used increases.
- 4) **Allocation-based rates** in which the consumption tiers and respective volumetric rates are based on water use norms and water delivery costs established by the utility.

**Adequacy of Volumetric Rate(s):** A retail agency's volumetric rate(s) shall be deemed sufficiently consistent with the definition of conservation pricing when it satisfies at least one of the following two options.

**Option 1:** Let V stand for the total annual revenue from the volumetric rate(s) and M stand for total annual revenue from customer meter/service (fixed) charges, then:

$$\frac{V}{V + M} \geq 70\%$$

This calculation shall only include utility revenues from volumetric rates and monthly or bimonthly meter/service charges. It shall not include utility revenues from new service connection charges; revenue from special rates and charges for temporary service, fire protection, or other irregular services; revenue from grants or contributions from external sources in aid of construction or program implementation; or revenue from property or other utility taxes.

**Option 2:** Use the rate design model included with the Municipal Water and Wastewater Rate Manual published by the Canadian Water & Wastewater Association with the signatory's water system and cost information to calculate V', the uniform volume rate based on the signatory's long-run incremental cost of service, and M', the associated meter charge. [Let HCF be annual water delivery (in hundred cubic feet).] A signatory's volumetric rate(s) shall be deemed sufficiently consistent with the definition of conservation pricing if:

$$\frac{V}{V + M} \geq \frac{V'}{V' + M'}$$

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The rate design model can be downloaded at <http://www.cuwcc.org/resource-center/technical-resources/bmp-tools.aspx>.

This calculation shall only include utility revenues from volumetric rates and monthly or bimonthly meter/service charges. It shall not include utility revenues from new service connection charges; revenue from special rates and charges for temporary service, fire protection, or other irregular services; revenue from grants or contributions from external sources in aid of construction or program implementation; or revenue from property or other utility taxes.

## **Exemptions and At Least As Effective As**

The exemption provisions in MOU Section 4.5 apply to BMP 11 in the same way they apply to other BMPs. Water supplier signatories meeting at least one of the three exemption conditions in MOU Section 4.5 may submit an exemption to the Council per the requirements of the MOU.

Water supplier signatories may pursue an "At Least As Effective As" implementation of BMP 11 per the Preamble to Exhibit 1 of the MOU. Water supplier signatories adopting an "At Least As Effective As" implementation of BMP 11 may adopt rates that do not meet the requirements of either Option 1 or Option 2 described in Section A provided the resulting water savings are at least as effective as those options.

## **BMP Refinement**

Within five years of the adoption of this BMP revision, the Council shall reconvene the BMP 11 Revision PAC to 1) assess rate of compliance with the revised BMP, 2) identify barriers to implementation, 3) assess its compatibility with Proposition 218 requirements, 4) initiate a water savings assessment appropriate to the data and project resources available to the Council, and 5) develop further refinements as needed to improve the BMP's effectiveness.

## **B. Implementation Schedule**

### **Agencies with fully metered service areas**

- 1) Agencies signing the MOU prior to June 13, 2007, implementation shall commence no later than July 1, 2007.
- 2) Agencies signing the MOU after June 13, 2007, implementation shall commence no later than July 1 of the year following the year the Agency signed the MOU.

### **Agencies with partially metered service areas<sup>1</sup>**

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<sup>1</sup> Agencies following this schedule must be on the Council's list of Agencies with partially metered service areas.

# EXHIBIT 1

*As Amended September 16, 2009*

- 1) Agencies signing the MOU prior to December 31, 1997, implementation shall commence no later than July 1, 2010. [One year after Agency is to complete meter installation per BMP 4.]
- 2) Agencies signing the MOU after December 31, 1997, implementation shall commence no later than July 1, 2013, or within seven years of signing the MOU, but in no case later than the metering deadline specified by state law. [One year after Agency is to complete meter installation per BMP 4.]

## **C. Coverage Requirements**

Agency shall maintain a rate structure that satisfies at least one of the options specified in Section A. Conformance to Option 1 or Option 2 will first be assessed using the revenue from the most recent year. If the most recent year does not satisfy the option, the average revenue from the three (3) most recent years will be used.

## **D. Requirements for Documenting BMP Implementation**

- 1) Report the rate structure in effect for each customer class for the reporting period.
- 2) Report the annual revenue derived from volume charges for each retail customer class, as defined in Section A.<sup>2</sup>
- 3) Report the annual revenue derived from monthly or bimonthly meter/service charges for each retail customer class, as defined in Section A.
- 4) If agency does not comply with Option 1 in Section A, report v' and m' as determined by the Canadian Water & Wastewater Association rate design model described in Section A.
- 5) If agency does not comply with Option 1 in Section A, submit to the Council the completed Canadian Water & Wastewater Association rate design model described in Section A.

## **E. Criteria to Determine BMP Implementation Status**

An agency shall be in compliance with BMP 11 provided the following is true for the Agency's total revenue from all retail customer classes within four years after [date of revision]:

For Option 1:  $V \geq 70\% \times 1.00$

For Option 2:  $V \geq V' \times 1.00$

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<sup>2</sup> Note: Compliance with BMP 11 will be determined based on the Agency's total revenue from all retail customer classes.

# EXHIBIT 1

As Amended September 16, 2009

The following schedule is intended to guide agencies in implementing this revision in phases:

YEARS AFTER START YEAR	FOR OPTION 1	FOR OPTION 2
1	$V \geq 70\% \times 0.70$	$V \geq V' \times 0.70$
2	$V \geq 70\% \times 0.80$	$V \geq V' \times 0.80$
3	$V \geq 70\% \times 0.90$	$V \geq V' \times 0.90$
4	$V \geq 70\% \times 1.00$	$V \geq V' \times 1.00$

An agency shall not be required to increase the volumetric component of the rate structure by more than 10% in any single year until the full implementation is achieved.

## F. Water Savings Assumptions

Not quantified.

## Part II – Retail Wastewater Rates

### A. Implementation

This section applies to Water Agencies that provide retail sewer service. Water Agencies that do not provide retail sewer service shall make good faith efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.

Conservation pricing of sewer service provides incentives to reduce average or peak use, or both. Such pricing includes: rates designed to recover the cost of providing service, and billing for sewer service based on metered water use. Conservation pricing of sewer service is also characterized by one or more of the following components: rates in which the unit rate is the same across all units of service (uniform rates); rates in which the unit rate increases as the quantity of units purchased increases (increasing block rates); rates in which the unit rate is based upon the long-run marginal cost or the cost of adding the next unit of capacity to the sewer system. Rates that charge customers a fixed amount per billing cycle for sewer service regardless of the units of service consumed do not satisfy the definition of conservation pricing of sewer service. Rates in which the typical bill is determined by high fixed charges and low commodity charges also do not satisfy the definition of conservation pricing of sewer service.

# EXHIBIT 1

*As Amended September 16, 2009*

## **B. Implementation Schedule**

- 1) Agencies signing the MOU prior to December 31, 1997, implementation shall commence no later than July 1, 1998.
- 2) Agencies signing the MOU or becoming subject to the MOU after December 31, 1997, implementation shall commence no later than July 1 of the first year following the year the agency signed or became subject to the MOU.

## **C. Coverage Requirements**

Agency shall maintain rate structure for sewer service consistent with definition of conservation pricing for sewer service in Part II, Section in A.

## **D. Requirements for Documenting BMP Implementation**

- 1) Report annual revenue requirement for sewer service by customer class for the reporting period.
- 2) Report annual revenue for sewer service from commodity charges by customer class for the reporting period.
- 3) Report rate structure by customer class for sewer service.

## **E. Criteria to Determine BMP Implementation Status**

Agency rate design for sewer service shall be consistent with definition of conservation pricing for sewer service in Section A.

## **F. Water Savings Assumptions**

Not quantified.

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As Amended September 16, 2009

## 2. EDUCATION PROGRAMS

California water agencies have played a major role in stressing the need for their customers to conserve water through both public information and school education programs. The specifics of how these programs are to be implemented are detailed below.

### **2.1 PUBLIC INFORMATION PROGRAMS** *(formerly BMP 7)*

This section addresses opportunities to use public information programs as an effective tool to inform customers about the need for water conservation and ways they can conserve, and to influence customer behavior to conserve.

#### **A. Implementation**

Implement a public information program to promote water conservation and water conservation-related benefits. Implementation shall consist of at least the following actions:

- 1) The program should include, when possible, but is not limited to, providing speakers to employees, community groups and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills showing use for the last billing period compared to the same period the year before; providing public information to promote water conservation measures; and coordinating with other government agencies, industry groups, public interest groups, and the media.
- 2) The program should include, when possible, social marketing elements which are designed to change attitudes to influence behavior. This includes seeking input from the public to shape the water conservation message; training stakeholders outside the utility staff in water conservation priorities and techniques; and developing partnerships with stakeholders who carry the conservation message to their target markets.
- 3) When mutually agreeable and beneficial, the wholesale agency or another lead regional agency may operate all or part of the public information program. If the wholesale agency operates the entire program, then it may, by mutual consent with the retail agency, assume responsibility for CUWCC reporting for this BMP. Under this arrangement, a wholesale agency may aggregate all or portions of the reporting and coverage requirements of the retail agencies joining into the mutual consent.

#### **B. Implementation Schedule**

Implementation shall commence no later than July 1 of the first year following the latter of either: 1) the year the agency signed or became subject to the MOU, or 2) the year this Exhibit is amended.

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*As Amended September 16, 2009*

## **C. Coverage Requirements**

Agencies shall maintain an active public information program to promote and educate customers about water conservation.

At minimum a public information program shall consist of the following components:

- 1) Contacts with the public (minimum = 4 times per year, i.e., at least quarterly).
- 2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).
- 3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).
- 4) Description of materials used to meet minimum requirement.
- 5) Annual budget for public outreach program.
- 6) Description of all other outreach programs (List follows in Section D).

## **D. Requirements for Documenting BMP Implementation**

Agencies may report on all of the following activities, although agencies are only expected to meet the minimum requirements in section C. Coverage Requirements.

### **Public Information Programs List**

- 1) Newsletter articles on conservation
- 2) Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets
- 3) Landscape water conservation media campaigns
- 4) General water conservation information
- 5) Website
- 6) Email messages
- 7) Website - provide link to or list of qualified landscape professionals (WaterSense, California Landscape Contractors Association, Irrigation Association, etc.) and other helpful sites
- 8) Direct mail - seasonal postcards noting irrigation requirement changes
- 9) Direct mail or other notification to customer if water use is significantly higher than neighbors with similarly-sized lots
- 10) Customer notification when neighbor reports runoff or runoff is noticed by employees or meter reads show rise in use of 20% or more from same time previous year
- 11) Dedicated phone line or "on hold" messages with recorded conservation information
- 12) Booths at local fairs/events
- 13) Monthly water use reports provided with comparison of water use to water budget
- 14) Presentations
- 15) Point of purchase pieces, including internet point of purchase by type: high efficiency clothes washers, weather based irrigation controller, high

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- efficiency toilets, plant palette information, other.
- 16) Media outreach: news releases, editorial board visits, written editorials, newspaper contacts, television contacts, radio contacts, articles or stories resulting from outreach. Provide names of local media markets: newspaper, TV stations, radio stations reached via media outreach program during the reporting period
  - 17) Adult Education/Training Programs: Topic(s) \_\_\_\_\_: number of presentations, number of attendees
  - 18) Water Conservation Gardens: involvement in a garden that promotes and educates the public about water-efficient landscaping and conservation techniques. May include "Corporate" or "business" sponsorship or membership.
  - 19) Sponsor or co-sponsor landscape workshops/training for homeowners and/or homeowners associations: number of presentations; number in attendance
  - 20) Landscape watering calculator and watering index to assist with weekly irrigation scheduling
  - 21) Additional program(s) supported by agency but not mentioned above
  - 22) Total reporting period budget expenditure for public outreach/training/adult education programs (include all agency costs)

## **Social Marketing Programs List**

Developing the Conservation Message:

- 1) Does your agency have a water conservation "brand," "theme" or mascot: If so briefly describe: \_\_\_\_\_
- 2) Have you sponsored or participated in market research to refine your message? If so topic: \_\_\_\_\_ Message of above brand? Mission Statement?
- 3) Do you have a community conservation committee?  
If yes, its focus is on:
  - a. Conservation in general;
  - b. Landscape;
  - c. Education;
  - d. Commercial/industrial/institutional;
  - e. Other: \_\_\_\_\_
- 4) Training for stakeholders who help support programs or educate others about conservation:
  - a. Professional landscapers: number of sessions/classes; number of attendees: on irrigation equipment; other
  - b. Plumbers: number of sessions/classes; number of attendees
  - c. Homeowners: number of sessions/classes; number of attendees: on irrigation equipment; other
- 5) Additional program(s) supported by agency but not mentioned above.
- 6) Total reporting period budget expenditure for social marketing programs (include all agency costs)

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## Partnering programs:

- 1) Master Gardeners; Type of program: \_\_\_\_\_
- 2) CLCA; Type of program: \_\_\_\_\_
- 3) Cooperative Extension; Type of program: \_\_\_\_\_
- 4) Retail and wholesale outlets  
Name(s): \_\_\_\_\_  
Type of program: \_\_\_\_\_
- 5) Local Colleges; Type of program: \_\_\_\_\_
- 6) Green Building Programs; Type of program: \_\_\_\_\_
- 7) Other \_\_\_\_\_
- 8) Newsletter articles published in other entities' newsletters:
  - a. HOAs: number per year to number of customers
  - b. City materials: number per year to number of customers
  - c. Non-profits: number per year to number of customers
  - d. Other: number per year to number of customers
- 9) Other utilities, including electric utilities
- 10) Water conservation gardens at utility or other high traffic areas or new homes
- 11) Water wise landscape contest or awards program

## E. Water Savings Assumptions

Not quantified.

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As Amended September 16, 2009

## **2.2 SCHOOL EDUCATION PROGRAMS (formerly BMP 8)**

School education programs have been implemented to reach the youngest water users at an early age and enforce the need to engage in water conservation as a life-long behavior. This section provides specifics on how school education programs are to be implemented.

### **A. Implementation**

Implementation shall consist of at least the following actions:

- 1) Implement a school education program to promote water conservation and water conservation-related benefits.
- 2) Programs shall include working with school districts and private schools in the water suppliers' service area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Educational materials shall meet the state education framework requirements and grade-appropriate materials shall be distributed.
- 3) When mutually agreeable and beneficial, the wholesale agency or another lead regional agency will operate all or part of the education program; if the wholesale agency operates all or part of the retail agency's school education program, then it may, by mutual consent with the retail agency, assume responsibility for CUWCC reporting of this BMP; under this arrangement, a wholesale agency may aggregate all or portions of the reporting and coverage requirements of the retail agencies joining into the mutual consent

### **B. Implementation Schedule**

Implementation shall commence no later than July 1 of the first year following the latter of either: 1) the year the agency signed or became subject to the MOU, or 2) the year this Exhibit is amended.

### **C. Coverage Requirements**

Agencies shall maintain an active school education program to educate students in the agency's service area about water conservation and efficient water use. An agency may participate in a mutual arrangement as described in Section A.

At minimum a school information program shall consist of the following:

- 1) Curriculum materials developed and/or provided by agency (including confirmation that materials meet state education framework requirements and are grade-level appropriate).
- 2) Materials distributed to K-6 students. When possible, school education programs will reach grades 7-12 as well.

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- 3) Description of materials used to meet minimum requirement.
- 4) Annual budget for school education program.
- 5) Description of all other water supplier education programs (Lists follow in Section D).

## **D. Requirements for Documenting BMP Implementation**

Agencies may report on all of the following activities, although they are only expected to meet the minimum requirements in section C. Coverage Requirements.

### **School Education Programs List**

- 1) Classroom presentations: number of presentations, number of attendees, topics covered: conservation, recycled water, water sources, pollution prevention, etc.
- 2) Large group assemblies: number of presentations, number of attendees
- 3) Children's water festivals or other events: number of presentations, number of attendees
- 4) Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up: number of presentations, number of attendees.
- 5) Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits) Description \_\_\_\_\_; number distributed
- 6) Staffing children's booths at events & festivals: number of booths, number of attendees
- 7) Water conservation contests such as poster and photo Description \_\_\_\_\_; number of participants.
- 8) Offer monetary awards/funding or scholarships to students: number offered; total funding
- 9) Teacher training workshops: number of presentations, number of attendees
- 10) Fund and/or staff student field trips to treatment facilities, recycling facilities, water conservation gardens, etc.: number of tours or field trips, number of participants.
- 11) College internships in water conservation offered: number of internships; total funding
- 12) Career fairs/workshops: number of presentations, number of attendees
- 13) Additional program(s) supported by agency but not mentioned above. Description: \_\_\_\_\_; number of events (if applicable); number of participants.
- 14) Total reporting period budget expenditures for school education programs (include all agency costs)

## **E. Water Savings Assumptions**

Not quantified.

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As Amended September 16, 2009

## **PROGRAMMATIC BMPs**

Signatories have the option of implementing each BMP as described below, or implementing measures identified in the Flex Track Menu alternative included in each Programmatic BMP.

### **3. RESIDENTIAL**

Residential water users throughout California depend on a reliable and safe supply of water for their homes. This BMP will define the best and most proven water conservation methods and measures those residents, working in conjunction with water agencies, can implement. By implementing these methods and measures homeowners, multi-family property owners, and tenants will increase water use efficiency and reliability. Credit for prior activities, as reported through the BMP database, will be given for documented water savings achieved through 2008.

#### **A. Implementation**

Retail water agencies shall implement a water use efficiency program that consists of either the coverage goals listed below or achieving the water savings goals by implementing measures on the Flex Track Menu in Section F below.

1) Residential assistance program (*formerly BMPs 1 & 2*)

Provide site-specific leak detection assistance that may include, but is not limited to, the following: a water conservation survey, water efficiency suggestions, and/or inspection. Provide showerheads and faucet-aerators that meet the current water efficiency standard as stipulated in the WaterSense Specifications (WSS) as needed.

2) Landscape water survey (*formerly BMP 1*)

Perform site-specific landscape water surveys that shall include, but are not limited to, the following: check irrigation system and timers for maintenance and repairs needed; estimate or measure landscaped area; develop customer irrigation schedule based on precipitation rate, local climate, irrigation system performance, and landscape conditions; review the scheduling with customer; provide information packet to customer; and provide customer with evaluation results and water savings recommendations.

3) High-efficiency clothes washers (HECWs) (*formerly BMP 6*)

Provide incentives or institute ordinances requiring the purchase of high-efficiency clothes washing machines (HECWs) that meet an average water factor value of 5.0. If the WaterSense Specification is less than 5.0, then the average water factor value will decrease to that amount.

4) WaterSense Specification (WSS) toilets (*formerly BMP 14*)

Provide incentives or ordinances requiring the replacement of existing toilets using 3.5 or more gpf (gallons per flush) with a toilet meeting WSS.

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## 5) WaterSense Specifications for residential development

Provide incentives such as, but not limited to, rebates, recognition programs, or reduced connection fees, or ordinances requiring residential construction meeting WSS for single-family and multi-family housing until a local, state or federal regulation is passed requiring water efficient fixtures.

## **B. Implementation Schedule**

Implementation shall commence no later than July 1 of the first year following the latter of either: 1) the year the agency signed or became subject to the MOU, or 2) the year this exhibit is amended.

## **C. Coverage Requirements**

Coverage shall consist of:

### 1) Residential Assistance

Provide leak detection assistance to an average of 1.5 percent per year of current single-family accounts and 1.5 percent per year of current multi-family units during the first ten years after signing the MOU. After completing the ten-year 15 percent target, agencies will maintain a program at the level of high-bill complaints or not less than 0.75 percent per year of current single-family accounts and 0.75 percent per year of current multi-family units. Showerhead distribution will be considered complete when 75 percent market saturation is achieved.

### 2) Landscape water survey

Provide landscape water surveys to an average of 1.5 percent per year of current single-family accounts during the first ten years after signing the MOU. After completing the ten-year 15 percent target, agencies will maintain a program at the level of high-bill complaints or no less than 0.75 percent per year of current single-family accounts.

### 3) High efficiency clothes washers

Provide financial incentives for the purchase of HECWs that meet an average water factor value of 5.0. If the WaterSense Specification is less than 5.0, then the water factor value will decrease to that amount. Incentives shall be provided to 0.9 percent of current single-family accounts during the first reporting period following BMP implementation, rising to 1.0 percent per year of current single-family accounts for the remainder of ten year period following signing of the MOU. An alternative method is to demonstrate 1.4 percent per year of the market penetration during the first ten years after signing the MOU.

### 4) WaterSense Specification (WSS) toilets

A financial incentive shall continue to be offered for toilets meeting the current WSS and updated standard whenever a more efficient toilet is identified by WSS. Compliance will entail demonstrating a number of toilet replacements of 3.5 gpf or greater toilets at or above the level achieved through a retrofit on resale

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*As Amended September 16, 2009*

ordinance until 2014, or a market saturation of 75% is demonstrated, whichever is sooner.

5) WSS for new residential development

An incentive shall continue to be offered until a water agency, or local, state or federal regulation is in effect meeting at a minimum, WSS for water efficient single-family homes. Multi-family housing shall also meet the WSS in all applicable criteria regardless of the total number of stories in the building.

**D. Requirements for Documenting BMP Implementation**

1) Residential assistance

Provide reports, disaggregated by single-family and multi-family units, identifying: the number of residential assistance/leak detection survey visits completed; number of WSS showerheads distributed; and number of WSS faucet aerators distributed during the reporting period.

2) Landscape water survey

Provide the number of single-family and multi-family account landscape water surveys completed during the reporting period.

3) High efficiency clothes washers

The number of installations credited to the agency's replacement program for HECWs with an average water factor value of 5.0. If the WaterSense Specification is less than 5.0, then the water factor value will decrease to that amount.

4) WaterSense Specification (WSS) toilets

A description of the program along with the number of WSS toilet installations credited to the agency's replacement program disaggregated by single-family or multi-family units.

5) WSS for new residential development

Provide a copy of the new development ordinance currently adopted by the reporting unit or provide the following incentive program details: number of new single-family and multi-family units built in service area during the reporting period; description of incentives offered; list of incentive amounts; number of WSS fixtures installed; and number of participating single-family home and multi-family units.

**E. Water Savings Assumptions**

Water savings assumptions will be based on the type and number of actions implemented.

**F. Flex Track Menu**

In addition to the measures above, the Flex Track Menu may be implemented in part or any combination to meet the savings goal for this BMP. Agencies

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choosing the Flex Track Menu are responsible for achieving water savings greater than or equal to that which they would have achieved using only the BMP list items. Water savings estimates for the Flex Track Menu will be maintained and regularly updated in the MOU Compliance Policies and BMP Guidebook.

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As Amended June 10, 2010

## 4. COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL (formerly BMP 9)

Commercial, industrial, and institutional (CII) water demands make up a large percentage of total demand for California. CII water use varies dramatically between business sectors as well as within a given water agency's territory. The goal of this BMP is to implement comprehensive yet flexible best management practices, allowing each water agency to tailor the implementation of each practice to fit local needs and opportunities. The end result is a practice that is successful and will produce the greatest amount of cost-effective water savings.

### A. Implementation

Implement measures to achieve the water savings goal for CII accounts of 10% of the baseline water use over a 10-year period. Baseline water use is defined as the water consumed by CII accounts in the agency's service area in 2008. Credit for prior activities, as reported through the BMP database, will be given for up to 50% of the goal; in this case, coverage will consist of reducing annual water use by CII accounts by an amount equal to the adjusted percentage goal within 10 years. Implementation shall consist of item 1) or 2) or both in order to reach the agency's water savings goals.

1) Implement measures on the CII list with well-documented savings that have been demonstrated for the purpose of documentation and reporting. The full list and their associated savings are included in the "Demonstrated Savings Measure List" in Section E below.

2) Implement unique conservation measures to achieve the agency's water savings goals. Sample measures include, but are not limited to: industrial process water use reduction, industrial laundry retrofits, car wash recycling systems, water-efficient commercial dishwashers, and wet cleaning. Water use reduction shall be calculated on a case-by-case basis. Agencies will be required to document how savings were realized and the method and calculations for estimating savings. See the CII Flex Track Menu list in the attachment to Exhibit 1, as updated in the MOU Compliance Policy and BMP Guidebook.

### B. Implementation Schedule

Implementation shall commence not later than July 1 of the first year following the latter of either: 1) the year the agency signed or became subject to the MOU, or 2) the year this Exhibit is amended.

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*As Amended June 10, 2010*

## **C. Coverage Requirements**

Coverage shall consist of meeting the annual water savings goal in Section A. Although it is not one of the criteria in meeting implementation, agencies will be considered on track if estimated savings as a percent of baseline water use equals or exceeds the following:

0.5% by the end of first reporting period (year two), 2.4% by the end of year four, 4.3% by the end of year six, 6.4% by the end of year eight, and 9% by the end of year ten. Percentages will be adjusted proportionally for up to 50% past credit referred to in the Implementation section.

## **D. Requirements for Documenting BMP Implementation**

Each reporting period agencies are required to report the estimated reduction in annual water use for all CII accounts.

### 1) CII Demonstrated Savings Measure List

For measures on the CII Demonstrated Savings Measure list with demonstrated savings, agencies shall report the measure type and quantity installed, as well as savings attributed to water shortage measures, intervention and actions.

### 2) Flex Track Menu

For measures on the Flex Track Menu, agencies shall use one of three methods of measurement listed below to track savings. Agencies shall report the type of measure implemented, the industry in which the measure was implemented, and estimated savings as well as the measure life. Agencies shall keep detailed usage data on file and report the annual and lifetime savings.

#### a) Point of Retrofit Metering

Usage data collected from meters installed at the point of retrofit.

#### b) Customer Bill Analysis

Pre- and post-program usage from utility bills from the appropriate meters related to the measures implemented. For mixed-use meters, a minimum of 12 months pre-retrofit and 12 months post-retrofit usage data shall be used to calculate savings. The data shall be normalized for weather. For dedicated meters, a minimum of 6 months pre-retrofit and 6 months post-retrofit data shall be used to calculate savings.

#### c) Agency-Provided Calculation

If an agency is unable to provide point of retrofit metering or customer bill analysis, the agency must document how savings were realized and the method and calculations for estimated savings. The calculation and assumptions are subject to approval by the Council on a case-by-case basis.

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*As Amended June 10, 2010*

## **E. Water Savings Assumptions**

The Demonstrated Savings Measure List is found in the MOU Compliance Policy. For assistance in calculating savings from unique measures used in the Flex Track Menu approach, see the BMP Guidebook.

## **F. Flex Track Menu**

In addition to the measures above, the Flex Track Menu options may be implemented in part or any combination for CII customers to meet the water savings goal of this BMP. Agencies may choose to implement any alternative with measurable water savings. Agencies choosing the Flex Track Menu option are responsible for achieving water savings greater than or equal to that which they would have achieved using only the BMP list items. Water savings estimates for the Flex Track Menu items will be maintained and regularly updated in the MOU Compliance Policies and BMP Guidebook.

Custom measures shall be calculated on a case-by-case basis. Agencies will be required to provide documentation on how savings were realized and the method and calculations for estimating savings.

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*As Amended on December 10, 2008*

## 5. LANDSCAPE (formerly BMP 5)

Irrigation accounts for a large portion of urban water use in California. Irrigation water use varies dramatically depending on water pricing and availability, plant choice, geographic locations, seasonal conditions, and the level of commitment to sound water efficiency practices. The goal of this BMP is that irrigators, with assistance from signatories, will achieve a higher level of water use efficiency consistent with the actual irrigation needs of the plant materials. Reaching this goal would reduce overall demands for water, reduce demands during the peak summer months, and still result in a healthy and vibrant landscape for California.

### A. Implementation

Agencies shall provide non-residential customers with support and incentives to improve their landscape water use efficiency. Credit for prior activities, as reported through the BMP database, will be given for documented water savings achieved through 2008. This support shall include, but not be limited to, the following:

#### 1) Accounts with Dedicated Irrigation Meters

a) Identify accounts with dedicated irrigation meters and assign ETo-based water use budgets equal to no more than an average of 70% of ETo (reference evapotranspiration) of annual average local ETo per square foot of landscape area in accordance with the schedule below.

Recreational areas (portions of parks, playgrounds, sports fields, golf courses, or school yards in public and private projects where turf provides a playing surface or serves other high-use recreational purposes) and areas permanently and solely dedicated to edible plants, such as orchards and vegetable gardens, may require water in addition to the water use budget. (These areas will be referred to as "recreational" below.) The water agency must provide a statement designating those portions of the landscape to be used for such purposes and specifying any additional water needed above the water use budget, which may not exceed 100% of ETo on an annual basis.

If the California Model Water Efficient Landscape Ordinance is revised to reduce the water allowance, this BMP will be revised automatically to reflect that change.

b) Provide notices each billing cycle to accounts with water use budgets showing the relationship between the budget and actual consumption.

c) Offer site-specific technical assistance to reduce water use to those accounts that are 20% over budget in accordance with the schedule given in Section B; agencies may choose not to notify customers whose use is less than their water use budget.

#### 2) Commercial/Industrial/Institutional (CII) Accounts without Meters or with Mixed-Use Meters

a) Develop and implement a strategy targeting and marketing large landscape water use surveys to commercial/industrial/institutional (CII) accounts with mixed-use meters.

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- b) In un-metered service areas, actively market landscape surveys to existing accounts with large landscapes, or accounts with landscapes which have been determined by the purveyor not to be water efficient.
- 3) Offer financial incentives to support 1) and 2) above.

### **B. Implementation Schedule**

- 1) Implementation shall commence not later than July 1 of the first year following the latter of either: 1) the year the agency signed or became subject to the MOU, or 2) the year this Exhibit is amended.
- 2) Per year at least 9% of accounts with dedicated meters and 1.5% of all mixed-use or non-metered accounts will receive the assistance detailed in Section A. 1) and 2) above. At least 90% of all dedicated meters and 15% of all mixed-use and non-metered accounts will receive the assistance over a ten year period.

### **C. Coverage Requirements**

Coverage shall consist of:

- 1) ETo-based water use budgets developed for 90% of CII accounts with dedicated irrigation meters at an average rate of 9% per year over 10 years.
- 2) Offer site-specific technical assistance annually to all accounts that are 20% over budget within six years of the date implementation was to commence.
- 3) Complete irrigation water use surveys for not less than 15% of CII accounts with mixed-use meters and un-metered accounts within 10 years of the date implementation is to commence. (Note: CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII BMPs.)

An agency will be considered on track if the percent of CII accounts with mixed-use meters receiving a landscape water use survey equals or exceeds the following: 1.5% by the end of the first reporting period (year two) following the date implementation is to commence; 3.6% by the end of year four; 6.3% by the end of year six; 9.6% by the end of year eight; and 13.5% by the end of year ten.

Agency may credit 100% of the number of landscape water use surveys for CII accounts with mixed-use meters completed prior to July 1, 2007 that have received a follow-up inspection against the coverage requirement; agency may credit 50% of surveys that have not received follow-up inspections. Agency may credit 100% of the number of landscape water use surveys completed for CII accounts with mixed-use meters after July 1, 2007 against the coverage requirement.

- 4) Agency will implement and maintain a customer incentive program(s) for irrigation equipment retrofits.

# EXHIBIT 1

*As Amended on December 10, 2008*

## **D. Requirements for Documenting BMP Implementation**

### 1) Dedicated Landscape Irrigation Accounts

Agencies shall preserve water use records and budgets for customers with dedicated landscape irrigation accounts for at least four years. This information may be used by the Council to verify the agency's reporting on this BMP.

- a) Number of dedicated irrigation meter accounts.
- b) Number of dedicated irrigation meter accounts with water budgets.
- c) Aggregate water use for dedicated non-recreational landscape accounts with budgets.
- d) Aggregate acreage assigned water budgets and average ET for dedicated non-recreational landscape accounts with budgets.
- e) Number of Accounts 20% over-budget.
- f) Number of accounts 20% over-budget offered technical assistance.
- g) Number of accounts 20% over-budget accepting technical assistance
- h) Aggregate acreage of recreational areas assigned water budgets and average ET for dedicated recreational landscape accounts with budgets.

### 2) CII Accounts without Meters or with Mixed-Use Meters

- a) Number of mixed use and un-metered accounts.
- b) Number, type, and dollar value of incentives, rebates, and no- or low-interest loans offered to, and received by, customers.
- c) Number of surveys offered.
- d) Number of surveys accepted.
- e) Estimated annual water savings by customers receiving surveys and implementing recommendations.

## **E. Water Savings Assumptions**

Assume landscape BMP will result in a 15%-20% reduction in demand for landscape irrigation by affected accounts, as defined in Section C: Coverage Requirements.

# EXHIBIT 1

*As Amended on December 10, 2008*

## **F. Flex Track Menu**

In addition to the measures above, the Flex Track Menu options may be implemented in part or any combination to meet the savings goal for this BMP. Agencies choosing the Flex Track Menu option are responsible for achieving water savings greater than or equal to that which they would have achieved using only the BMP list items. Water savings estimates for the Flex Track Menu items will be maintained and regularly updated in the MOU Compliance Policies and BMP Guidebook.

## **GPCD Compliance Option**

Gallons per capita daily (GPCD) is the third compliance approach for the MOU. The combined water savings from implementation of the Foundational and Programmatic BMPs should produce greater water savings than the Programmatic BMPs themselves. Since most Foundational BMPs are not quantified, the GPCD approach evaluates compliance by evaluating the overall reduction in per capita water demand over time. One measure of efficiency, GPCD, indicates the increase in efficiency in water demand over time, by dividing demand by population, which gives average water consumption value per person served. The GPCD Approach includes the following sections: Potable Water GPCD Equation; Baseline GPCD; GPCD Target; Biennial GPCD Targets; Compliance; Appeals and GPCD Calculation Refinement.

### **Potable Water GPCD Equation**

Potable Water GPCD = (PWI – PWS) / Pop / 365; where

1. PWI = Potable Water Into the retail water agency's service area distribution system.
2. PWS = Potable Water taken out of the retail water agency's service area distribution system and:
  - placed into storage and/or
  - delivered to an agricultural customer through a dedicated agricultural meter, at discretion of the retail water agency.
3. Pop = residential population of the retail water agency's service area.

### **Baseline GPCD**

The Baseline GPCD shall equal the average annual Potable Water GPCD for the years 1997 through 2006. Signatory Water Suppliers who signed the MOU prior to 1997 and can demonstrate significant investment in water conservation may propose a different Baseline period as outlined in the MOU Compliance Policy.

### **GPCD Target**

For purposes of compliance, the 2018 GPCD Target for all signatories as of July 1, 2009 shall equal Baseline GPCD multiplied by 0.82 (an 18% reduction).

### **Biennial GPCD Targets**

Using the Compliance Table below, for each "Year" in the table, a retail water agency's Biennial GPCD Target shall equal its Baseline GPCD multiplied by that year's Target (% Baseline). A retail water agency may choose a starting point as either its Baseline GPCD or its 2006 Potable Water GPCD.

# EXHIBIT 1

*As Amended on December 10, 2008*

## Compliance

For retail water agencies choosing the GPCD Option for compliance with the Programmatic BMPs, the retail water agency shall submit the following calculations along with supporting data as part of their first normal biennial report for that period:

- (1) Potable Water GPCD for each year in the baseline period;
- (2) 2018 GPCD Target and five Biennial GPCD Targets; and

A retail water agency shall be considered to be in compliance with the BMPs in any reporting period when it submits the following:

- (1) Complete “Water Supply & Reuse” and “Accounts & Water Use”
- (2) Supporting data necessary to calculate that reporting period’s Potable Water GPCD; and
- (3) Calculations showing the reporting period’s Potable Water GPCD is less than or equal to that period’s Biennial GPCD Target, or Highest Acceptable Bound when the period’s Potable Water GPCD has been weather-adjusted.

Compliance will be evaluated in relation to the Compliance Table below and relative progress toward the goal will be acknowledged in Council Compliance Reports. For signatory agencies signing the MOU after July 1, 2009, the compliance table will be read as five increments with reporting goals relative to their 1st through 5th Compliance reports.

## Compliance Table

Year	Compliance Report	Target (% Baseline)	Highest Acceptable Bound (%Baseline)
2010	1	96.4	100
2012	2	92.8	96.4
2014	3	89.2	92.8
2016	4	85.6	89.2
2018	5	82	82

## EXHIBIT 1

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*As Amended on December 10, 2008*

### **Appeals**

An appeals/ adjustment process will be available, as outlined in the MOU Compliance Policy, for substantiated exceptional impacts to GPCD such as exceptional use of potable water for wildfire suppression and significant changes to a signatory's economic or customer demographics.

Signatories that signed the MOU prior to 1997 (the beginning of the Baseline Period), and that can substantiate significant investments in conservation leading to declines in water consumption as measured by GPCD, may file an appeal to adjust the baseline period to reflect per capita water demands in the period prior to their signing the MOU.

### **GPCD Calculation Refinement**

CUWCC GPCD subcommittee shall provide, no later than December 31, 2009, acceptable methods retail water agencies may use when weather-normalizing data for compliance with this BMP. Additional methods or revisions to these methods may be approved by the Steering Committee from time-to-time.

## **EXHIBIT 2. CALIFORNIA URBAN WATER CONSERVATION COUNCIL**

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As Amended on December 10, 2008

1. The California Urban Water Conservation Council (the "Council") will be comprised of a representative of each of the signatories to the MOU.
2. The Council's responsibilities and authorities include:
  - a. Recommending study methodologies for Best Management Practices ("BMPs"), including procedures for assessing the effectiveness and reliability of urban water conservation measures.
  - b. Developing guidelines including discount rate to be used by all signatories in computing BMP benefits and costs pursuant to Exhibit 3.
  - c. Reviewing and modifying the economic principles set forth in Exhibit 3.
  - d. Collecting and summarizing information on implementation of BMPs and Potential Best Management Practices ("PBMPs").
  - e. Adopting or modifying BMPs and PBMPs lists.
  - f. Adopting or modifying reliable water conservation savings data for BMPs.
  - g. Adopting or modifying the schedules of implementation for existing and new BMPs.
  - h. Adopting or modifying the schedules for research and demonstration projects for BMPs and PBMPs.
  - i. Coordinating and/or making recommendations regarding BMPs study and demonstration projects.
  - j. Accepting or denying requests for additional parties to join the MOU and assigning additional parties to one of the three signatory groups as described in Section 1.3 of the MOU.
  - k. Reviewing and modifying report formats.
  - l. Making annual reports to the State Water Resources Control Board and the Council Members on the above items based on the format described in Exhibit 5.
  - m. Within two years of the initial signing of this MOU, developing and implementing procedures and a funding mechanism for independent evaluation of the MOU process at the Council and signatory levels.
  - n. Undertaking such additional responsibilities as the Members may agree upon.

## EXHIBIT 2

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3. The Council will make formal reports to the State Water Resources Control Board and to the governing bodies of all Council Members. Such reports shall include a formal annual written report. Other reports such as status reports and periodic updates may be prepared as deemed appropriate by the Council. Any Member of the Council will be entitled to review draft reports and comment on all reports. Such comments shall be included in any final report at the Member's request.
4. It is anticipated that the Council will develop a committee structure, which will include a Membership Committee as described in Section 7.2 of the MOU. A Board of Directors and one or more technical committees may also be needed.
5. For purposes of the Council, signatories will be divided into three groups: water suppliers ("Group 1"), public advocacy organizations ("Group 2") and other interested groups ("Group 3") as those terms are defined in Section 1 of the MOU. Members of Groups 1 and 2 shall be Signatory members of the Council and shall possess all voting rights. Members of Group 3 shall be Signatory members and shall not have voting rights, but shall act in an advisory capacity to the Council. Beginning January 1, 2004 members shall become Full Members of the Council upon payment of the annual assessment as invoiced by the Council according to Section 11.01 of the Council's Bylaws. Full members shall be eligible to receive all services and benefits available from the Council's resources. For Group 2 members, payment shall mean payment in cash and/or in kind services. Officers and members of the Council Board of Directors shall be Full Members in good standing.
6. Decisions by the Council to undertake additional responsibilities; to modify the MOU itself; or to modify Exhibits 2 or 3 require the following:
  - a. The Council will provide notice to all signatories giving the text of the proposed action or modification at least 60 days in advance of the vote by the Council.
  - b. To pass the action or modification, there must be a vote in favor of the action or modification by at least 2/3 of the members of Group 1 voting, including votes made in person or in writing, and a vote in favor of the action or modification by at least 2/3 of the members of Group 2 voting, including votes made in person or in writing.
7. All other modifications and Council actions shall be undertaken as follows: There must be a vote in favor of the modification or action by a simple majority of the members of Group 1 voting, including votes made in person or in writing, and a vote in favor of the modification or action by a simple majority of the members of Group 2 voting, including votes made in person or in writing.

### **EXHIBIT 3. PRINCIPLES TO GUIDE THE PERFORMANCE OF BMP ECONOMIC (COST-EFFECTIVENESS) ANALYSIS**

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*Amended April 8, 1998*

1. The total cost-effectiveness of a conservation measure will be measured by comparing the present value of the benefits of the measure listed in paragraph 3 below to the present value of the costs listed in paragraph 4. The measure will be cost-effective if the present value of the benefits exceeds the present value of the costs.
2. The cost-effectiveness of a conservation measure to the water supplier will be measured by comparing the present value of the benefits described in paragraph 5 to the present value of the costs described in paragraph 6. The measure will be cost-effective if the present value of the benefits exceeds the present value of the costs.
3. Total benefits exclude financial incentives received by water suppliers or by retail customers. These benefits include:
  - a. avoided capital costs of production, transport, storage, treatment, wastewater treatment and distribution capacity.
  - b. avoided operating costs, including but not limited to, energy and labor.
  - c. environmental benefits and avoided environmental costs.
  - d. avoided costs to other water suppliers, including those associated with making surplus water available to other suppliers.
  - e. benefits to retail customers, including benefits to customers of other suppliers associated with making surplus water available to these suppliers.
4. Total program costs are those costs associated with the planning, design, and implementation of the particular BMP, excluding financial incentives paid either to other water suppliers or to retail customers. These costs include:
  - a. capital expenditures for equipment or conservation devices.
  - b. operating expenses for staff or contractors to plan, design, or implement the program.
  - c. costs to other water suppliers.
  - d. costs to the environment.
  - e. costs to retail customers.
5. Program benefits to the water supplier include:
  - a. costs avoided by the water supplier of constructing production, transport, storage, treatment, distribution capacity, and wastewater treatment facilities, if any.

## EXHIBIT 3

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- b. operating costs avoided by the water supplier, including but not limited to, energy and labor associated with the water deliveries that no longer must be made.
  - c. avoided costs of water purchases by the water supplier.
  - d. environmental benefits and avoided environmental costs.
  - e. revenues from other entities, including but not limited to revenue from the sale of water made available by the conservation measure and financial incentives received from other entities.
6. Program costs to the water supplier include:
- a. capital expenditures incurred by the water supplier for equipment or conservation devices.
  - b. financial incentives to other water suppliers or retail customers.
  - c. operating expenses for staff or contractors to plan, design, or implement the program.
  - d. costs to the environment.
7. The California Urban Water Conservation Council ("Council") will be responsible for developing guidelines that will be used by all water suppliers in computing BMP benefits and costs. These guidelines will include, but will not be limited to, the following issues:
- a. analytical frameworks.
  - b. avoided environmental costs.
  - c. other impacts on the supply system that may be common to many water suppliers.
  - d. time horizons and discount rates.
  - e. avoided costs to non-water supply agencies.
  - f. benefits and costs to retail customers.
  - g. benefits of water made available to other entities as a result of conservation efforts.
- These guidelines will recognize the uniqueness of individual water suppliers and will therefore not impose excessive uniformity.
- [Note: In September 1996, the Council adopted "Guidelines for Preparing Cost-Effectiveness Analyses of Urban Water Conservation Best Management Practices"]
8. Within these guidelines, each water supplier will be responsible for analyses of the cost-effectiveness of particular BMPs on its system. These analyses will be reviewed by the Council.
9. The Council will also be responsible for periodically reviewing the overall framework set forth in this Exhibit.

## **EXHIBIT 4. SWRCB ANNUAL REPORT OUTLINE**

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*As Amended on December 10, 2008*

- I. Administration and Project Funding**
- II. Council Activity on Best Management Practices**

- BMP Reporting on Council Signatories
  - Revised BMP Reporting Forms
  - BMP Biannual Reporting Results
  - BMP Biannual Data Highlights
- BMP Exemption Policy
- BMP Modifications

- III. Technical Assistance**

- IV. General Outreach**

### **Tables**

- Table 1: Council MOU Urban Water Conservation Best Management Practices
- Table 2: Comparison of Retail and Wholesale BMP Reporting Requirements
- Table 3: Conservation Milestones
- Table 4: Technical Assistance Provided to Members

### **Figures**

- Figure 1: Number of Water Suppliers Filing BMP Reports per Annum
- Figure 2: Year-by-Year Council Signatory Growth
- Figure 3: CUWCC Signatory Member Water Use as a Percentage of California Urban Water Use
- Figure 4: Percentage of CUWCC Membership Submitting BMP Reports Historical Period to Date
- Figure 5: Percentage of Reporting Units in Compliance with BMPs Historical Period to Date

### **Attachments**

- Attachment A: Council Signatories as of End of Year
- Attachment B: Strategic Plan
- Attachment C: Council Budget
- Attachment D: Council Organization Chart
- Attachment E: Board of Directors Officers
- Attachment F: Signatory Agencies that Submitted Some or All BMP Reports during Reporting Period
- Attachment G: Signatory Agencies Not Submitting BMP Reports during Reporting Period

## EXHIBIT 5. BYLAWS

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*As Amended on December 10, 2008*

### ARTICLE I Recitals and Definitions

**Section 1.01. Name of Corporation.** The name of this corporation shall be California Urban Water Conservation Council. In the balance of these Bylaws the corporation shall be referred to as the "Council."

**Section 1.02. The Council Is Nonprofit.** The Council has been formed pursuant to the California Nonprofit Corporation Law as a public benefit corporation.

**Section 1.03. Specific Purpose.** The specific and primary purpose of the Council is to implement the MOU, as defined in Section 1.05(c), below, which has been executed by and among signatories comprised of the water suppliers, public advocacy organizations and other interested groups that are more particularly described in Section 3.01, below. Without limiting the foregoing, the Council shall make formal reports to the State Water Resources Control Board and to the governing bodies of all Council Members. Such reports shall include a formal annual written report. Other reports, such as status reports and periodic updates, may be prepared as deemed appropriate by the Council.

**Section 1.04. Restrictions.** All policies and activities of the Council shall be consistent with and limited by the MOU and shall also be consistent with: (a) applicable federal, state and local antitrust and trade regulation laws; (b) applicable tax-exemption requirements, including the requirement that no part of the Council's net earnings inure to the benefit of any private individual; and (c) all other legal requirements including the California Nonprofit Corporation Law under which the Council is incorporated and to which its operations are subject, as amended from time to time.

**Section 1.05. Defined Terms.** The following terms shall, when used in these Bylaws, have the following meanings:

(a) Chair and Vice Chair mean and refer to the persons who, from time to time, occupy those positions on the Board of Directors that are analogous to the positions of Chair and Vice Chair of a nonprofit corporate board. The Chair and Vice Chair shall have the duties and responsibilities more particularly defined in Section 9.05, below.

(b) Council means and refers to the California Urban Water Conservation Council.

(c) Full Member means a Signatory Member of the Council who has paid the current annual assessment in full.

(d) Member means and refers to an organization that is a signatory to the MOU. Council Members shall be assigned to one of the three group classifications of membership more particularly defined in Section 3.03, below. When used generally, Member means Signatory Member. A Full Member of the Council is a Signatory Member entitled to full Council privileges and benefits.

## EXHIBIT 5

*As Amended on September 16, 2009*

(e) MOU means and refers to the Memorandum of Understanding Regarding Urban Water Conservation in California dated September 1991, and as the MOU may be amended from time to time.

(f) Plenary, Session or Plenary Meeting means and refers to a meeting of the Council Members (see Article V, below).

(g) Signatory Member means an organization that is a signatory to the MOU.

(h) Signatory and Signatory Organization mean and refer to qualified organizations which have executed the MOU and which have been accepted for membership in the Council in accordance with Section 3.02, below.

(i) Board of Directors means the Committee constituted and empowered as set forth in Article VII, below. The Board of Directors shall have the duties and powers of the board of directors of a California nonprofit public benefit corporation (California Corporations Code section 5210) subject to the limitations imposed on the Board of Directors by the California Nonprofit Public Benefit Corporation Law, the MOU and these Bylaws (see particularly Article VI, below, entitled "Actions Requiring Council Member Approval"). Accordingly, the Board of Directors is not a committee as the word "committee" is defined in Article X, below, or in California Corporations Code section 5110 et seq.

### ARTICLE II Principal Office

**Section 2.01. Location of Principal Office.** The principal office of the Council will be located at such place within the State of California as the Board of Directors may from time to time designate by resolution. Currently, the address of the principal office is 455 Capitol Mall, Suite 703, Sacramento, California.

### ARTICLE III Council Membership

**Section 3.01. Members of the Council.** The membership of the Council shall be comprised of, and limited to, organizations that are signatories to MOU. Eligible signatories are: (1) water suppliers ("Group 1 Signatories"); (2) public advocacy organizations ("Group 2 Signatories"); and (3) other interested groups ("Group 3 Signatories"). Those three Groups are more particularly defined in Section 3.03, below.

**Section 3.02. Application for Membership.** As provided in Section 7.2 of the MOU, the Council shall have a Membership Committee which shall have the responsibility of evaluating new signatory applicants for Membership in the Council and recommending to the Council approval or disapproval of the applicant and the recommended category of membership for the applicant. The Council may adopt and use an application form to be completed by MOU Signatory Organizations in order to guide the Council's Membership Committee in making recommendations to the Council regarding the proper Group classification for new signatories.

## EXHIBIT 5

*As Amended on September 16, 2009*

The Membership Committee shall consider applications and decide on the appropriate classification of new Signatory Organizations. Following action by the Membership Committee, the Committee's action shall be ratified by the Council Members at the Plenary meeting next following admittance of the new member organization to the Council. As of the date of the adoption of these Bylaws, the Members of the Council and their respective Group classifications (which are ratified and affirmed by the Members' approval of these Bylaws) are as set forth in Exhibit "5A".

### **Section 3.03. Classifications of Membership; Definition of Signatory Groups.**

The Council has three classes of membership comprised of the signatory groups identified in subparagraphs (a) thorough (c) of this Section 3.03:

(a) Water Suppliers -- Group 1 Signatories. Group 1 Signatories include and are limited to "water suppliers". A water supplier is any entity, including a city, which delivers or supplies water for urban use at the wholesale or retail level.

(b) Public Advocacy Organizations -- Group 2 Signatories. Group 2 Signatories include and are limited to public advocacy organizations. A "public advocacy organization" is defined to mean a nonprofit organization exempt from tax and described in either Internal Revenue Code section 501(c)(3) or 501(c)(4); which has as one of its significant missions and exempt purposes, environmentally sound management and conservation of California's waterways and water resources and/or protection of the environment; and which has a clear, but non-vested, interest in advancing the Best Management Practices ("BMPs") of the MOU. No public advocacy organization may be admitted to the Council's membership if such organization has a primary function of representing trade, industrial or utility entities.

(c) Other Interested Groups -- Group 3 Signatories. Group 3 Signatories include other organizations, approved for membership as provided in Section 3.02, above, which have a strong interest in, and commitment to, the purposes of the Council, but which are not eligible for inclusion in either Group 1 or Group 2.

**Section 3.04. Representatives of Signatory Organizations.** Each MOU Signatory shall designate one representative to the Council. The Signatory Organization shall be responsible for informing the Council of the identity of its designated representative at all appropriate times. Signatories may also name substitute representatives to attend meetings in place of the designated representative. Substitute representatives have the same voting rights as the Signatory's designated representative, but may not serve as an officer of the Council. Only one representative from any Signatory Organization may vote on any matter presented to the Council Members, to the Board of Directors, or as the designated member of any committee appointed and constituted in accordance with Article X, below; provided, however, that the same person can be designated as the representative or as a substitute representative of more than one Signatory Organization within the same Group classification. Designated and substitute representatives of Council Members are referred to in these Bylaws as "Representatives."

**Section 3.05. Term of Membership.** Each organization that signs the MOU and is admitted to membership in the Council shall remain a Member until the organization no longer qualifies for membership under Section 3.01, above or wishes to withdraw. Organizations listed in Exhibit "5A" shall be deemed to meet the qualification requirements of Section 3.01.

## EXHIBIT 5

*As Amended on September 16, 2009*

### ARTICLE IV Membership Voting

#### **Section 4.01. Member Voting Rights.**

(a) Generally. Only Group 1 Signatory Members and Group 2 Signatory Members have voting rights with respect to matters requiring the approval of Council Members under the MOU and these Bylaws (see particularly Article VI, below). Collectively, those two Groups are referred to as the "Voting Members" whenever these Bylaws discuss the voting rights of Council Members. On each matter submitted to a vote of the Voting Members, whether at a meeting of the membership called and held pursuant to the provisions of these Bylaws or otherwise, each Voting Member shall be entitled to cast one vote. Group 3 Signatory Members have no voting rights.

(b) Required Vote for Valid Action. Unless these Bylaws specifically confer authority on Group 1 Signatory Members or Group 2 Signatory Members to take unilateral action with respect to a particular matter (such as caucus votes to fill Group vacancies on the Board of Directors), any action requiring the vote or approval of the Voting Members of the Council shall require the affirmative vote of a majority of each of Group 1 and Group 2 Signatory Members, as to those actions identified in Section 6.02 (b), below, and a two-thirds affirmative vote of each of Group 1 and Group 2 Signatory Members as to those actions identified in Section 6.02(a), below. As to any other action or approval of the Voting Members not specifically identified in Section 6.02, below, the required affirmative vote shall be a majority of each of Group 1 and Group 2 Signatory Members.

#### **Section 4.02. Manner of Casting Votes.**

(a) Voting at a Meeting or by Written Ballot. Voting by Group 1 and Group 2 Signatory Members may be by voice or by written ballot solicited in accordance with section 5513 of the California Corporations Code, and Section 4.03 below. The vote on any other issue properly before a Plenary meeting of the Council Members shall be conducted by secret ballot when determined by the chairman of the meeting, in his or her discretion, or when requested by 10 percent of the Voting Members present at the meeting.

(b) Proxy Voting. Proxy voting shall be permitted on any matter put to the vote of the Council Members subject to the following restrictions:

(i) If a Group 1 or Group 2 Signatory Organization cannot be represented at a Plenary meeting by the Group's designated Representative or substitute Representative, the Group can, by written proxy, authorize another Representative of a Signatory Organization within the same Group classification to appear and vote on behalf of the absent Signatory Organization.

(ii) The proxy shall only be valid for the Plenary meeting for which it is issued, and for any adjournment thereof.

(iii) The proxy shall be in the form of a limited proxy which is defined as a proxy which instructs the proxy holder how he or she is to vote with respect to each matter which is scheduled to be presented at the Plenary for action by the Council Members.

## EXHIBIT 5

*As Amended on September 16, 2009*

### **Section 4.03. Action by Written Ballot Without a Meeting.**

(a) Written Ballots, Generally. In addition to voting in person or by proxy at Council Plenaries, any matter or issue requiring the vote of the Council Members, other than the election of the Board of Directors, may be submitted to the Voting Members for a vote by use of a written ballot without the necessity of calling a Plenary of the Council Members, so long as the requirements for action by written ballot set forth in this Section 4.03 are met. The determination to seek Member approval by written ballot shall be made by a majority vote of each of Group 1 and Group 2 Representatives on the Board of Directors.

(b) Distribution of Written Ballots. In the event that any matter or issue is to be voted upon by written ballot, the Committee shall distribute the written ballot to every Voting Member at least 30 days prior to the final date the written ballots are to be received for counting.

(c) Content of Written Ballots. Any written ballot distributed to the Voting Members to vote on an issue other than the election of the Committee shall set forth the proposed action, and provide an opportunity to specify approval or disapproval of the proposal.

(d) Balloting Time Requirements. All written ballots shall also provide a reasonable time within which to return the written ballot to the Council's principal office and shall state on its face or in an accompanying notice the date by which the written ballot must be returned in order to be counted. The time fixed for the return of ballots may only be extended if the Committee notifies the Voting Members (in the balloting materials originally sent to Council Members) that the right to extend has been reserved and then for no more than two successive periods of 30 days each. The time stated for the return of written ballots can be scheduled to coincide with the date of a Plenary meeting.

(e) Requirements for Valid Action. Approval by written ballot shall be valid only when the number of votes cast by ballot within the time period specified equals or exceeds the quorum specified in Section 5.05, below, and the number of approvals equals or exceeds the number of votes that would be required to approve the action if approval was sought at a meeting of the Council Members.

(f) Solicitation Rules. Written ballots shall be solicited in a manner consistent with the requirements of Section 5.04, below, pertaining to the issuance of notice of Council Members' Plenary meetings. All solicitations of written ballots shall indicate the number of responses needed to meet the quorum requirement for valid action and shall state the percentage of affirmative votes necessary to approve the measure submitted for Council Member approval.

(g) Notification of Balloting Results. Upon tabulation of the written ballots, the Board of Directors shall notify the Council Members of the outcome of the vote immediately following the close of the balloting process and tabulation of the ballots. If the number of ballots cast is insufficient to constitute a quorum, the Board of Directors shall so notify the Council Members.

(h) Prohibition of Revocation. Once cast, a written ballot may not be revoked.

## EXHIBIT 5

*As Amended on September 16, 2009*

### ARTICLE V Plenary Meetings of the Council

**Section 5.01. Place of Meeting.** Plenary meetings of the Council Members may be conducted at any reasonable place within the State of California and at such time as may be designated by the Board of Directors in the notice of the Plenary.

**Section 5.02. Annual Plenary Meeting.** There shall be an annual Plenary meeting in December of each year. The date, time and location of the Plenary shall be set forth in the notice of meeting sent to the Council Members in accordance with Section 5.05, below.

**Section 5.03. Other Regular Meetings.** In addition to the annual Plenary meeting, there shall be three additional quarterly Plenary meetings of the Council Members on a day and at a time and place determined by the Board of Directors and communicated to all Council Members at the inception of each calendar year.

#### **Section 5.04. Special Meetings.**

(a) **Persons Entitled to Call Special Meetings.** A simple majority of the members of the Board of Directors, or the Chair, may call special meetings of the Council Members at any time to consider any lawful business of the Council. In addition, five percent or more of the Voting Members of the Council may request that a Plenary be convened.

(b) **Procedures for Calling Special Meetings Requested by Council Members.** If a special Plenary meeting is called by the Voting Members, the request shall be submitted by the requesting Council Members in writing, specifying the general nature of the business proposed to be transacted, and shall be delivered personally or sent by registered mail or by electronic transmission or by facsimile transmission to the Chair, the Vice Chair, or the secretary of the Council. The officer receiving the request shall cause notice to be promptly given to the Council Members entitled to vote, in accordance with the provisions of Section 5.05, below, that a special Plenary will be held, and the date, time and specific purpose for such meeting, which date shall be not less than 35 nor more than 90 days following the receipt of the request. If the notice calling for a special Plenary meeting is not given within the 20 days after receipt of the petitioner's request, the Council Members requesting the meeting may give the notice. Nothing contained in this subsection shall be construed as limiting, fixing, or affecting the time when a Plenary meeting of Council Members may be held when the meeting is called by action of the Board of Directors or the Chair.

#### **Section 5.05. Notice of Meetings of the Council's Members.**

(a) **Generally.** All notices of Plenary meetings of Council Member Meetings (whether regular or special) shall be sent or otherwise given in writing to each Member who, on the record date for notice of the meeting (as provided in Section 5.09, below) is entitled to vote thereat, in accordance with subparagraph (c) of this Section 5.05, not less than 10 nor more than 90 days before the date of the meeting. The notice shall specify the place, date, and hour of the Plenary and (i) in the case of a special Plenary meeting, the general nature of the business to be transacted, and no other business may in that case be transacted, or (ii) in the case of a regular Plenary meeting, those matters which the Board of Directors, at the time of giving the notice, intends to

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present for action by the Council Members; but any proper matter may be presented at the Plenary for action by the Council Members so long as a quorum is present.

(b) Mailing of Notice. Notice of any Plenary meeting of Council Members shall be given either personally or by first-class mail, or other written communication, charges prepaid, addressed to each Member either at the address of that Member appearing on the books of the Council or the address given by the Member to the Council for the purpose of notice. If for any reason notice is given by mail and the notice is not sent by first-class, registered or certified mail, the notice shall be given not less than 20 days (nor more than 90 days) before the meeting. Notice shall be deemed to have been given at that time when delivered personally or deposited in the mail or when sent by other means of written communication.

(c) Affidavit of Mailing; Effect Thereof. An affidavit of the mailing or other means of giving any notice of any Council Plenary meeting may be executed by the secretary or the assistant secretary of the Council, and if so executed, shall be filed and maintained in the minutes book of the Council. The secretary's affidavit shall constitute prima facie evidence of the giving of notice.

### **Section 5.06. Quorum Requirements.**

(a) A quorum of the Council Members for the purpose of conducting business at any Plenary Meeting shall be at least 30 Voting Members, provided at least 10 percent of the Group 1 Signatory Members and 10 percent of the Group 2 Signatory Members are present. In addition, when a Plenary is actually attended by less than one-third of the voting power of Council Members (but at which a quorum is present), the only matters upon which action can be validly taken are those matters the general nature of which was described in the notice of the Plenary meeting.

(b) The Council Members present at a duly held Plenary meeting at which a quorum is initially present may continue to transact business until adjournment, notwithstanding the withdrawal of enough Council Members to leave less than a quorum, if any action taken (other than adjournment) is approved by at least (i) a majority of the Council Members required to constitute a quorum; and (ii) if applicable, by such greater percentage or class vote as may be required by these Bylaws (see Section 6.02, below). For example, if a Plenary Meeting is called and is initially attended by 31 Voting Members and prior to adjournment two Voting Members leave the Plenary (thus leaving less than a quorum), a motion to approve the annual budget for the Council could nevertheless be entertained and valid action taken.

(c) When Council Member approval is sought by written ballot (rather than at a Plenary) the minimum quorum requirement is satisfied when written ballots are returned to the Council within the prescribed balloting period from both (i) 30 or more Voting Members of the Council, and (ii) at least ten percent (10%) of the Group 1 Signatory Members and ten percent (10%) of the Group 2 Signatory Members. In addition to satisfying the minimum quorum requirement for valid action, the vote by written ballot must also be approved by the requisite percentage of Group 1 and Group 2 Signatory Members (see Sections 4.01(b) and 6.02).

**Section 5.07. Adjourned Meeting.** Any Plenary meeting of the Council, annual or special, whether or not a quorum is present, may be adjourned to another time and/or place (but not for more than 45 days) by the vote of the majority of the Council Members represented at the Plenary, either in person or by proxy. Unless there is an absence of a quorum (in which case no

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other business may be transacted at that meeting except as provided in Section 5.06(b) above), the Voting Members attending the reconvened Plenary may take any action that might have been transacted at the original meeting. When a Plenary meeting of the Council's Members is adjourned to another time or place, notice need not be given of the new meeting if the time and place thereof are announced at the Plenary at which the adjournment is taken. Notwithstanding the foregoing, if after adjournment a new record date is fixed for notice or voting, a notice of the rescheduled meeting must be given to each Member who on the record date for notice of the meeting is entitled to vote thereat.

### **Section 5.08. Waiver of Notice or Consent by Absent Council Members.**

(a) Waiver and Consents, Generally. If decisions are made by the Council Members at a Plenary where a quorum is present, but for which proper notice was not given to all Council Members for whatever reason, the decisions made at that Plenary will be valid if, either before or after the meeting, each Member entitled to vote who was not present at the meeting consents to the meeting by signing a written (i) waiver of notice; (ii) a consent to holding the Plenary; or (iii) an approval of the minutes of the Plenary. The waiver of notice need not specify the purpose or general nature of business to be transacted at such meeting unless action is taken or proposed to be taken on matters specified in Section 5.05(b), above, in which case, the waiver of notice must state the general nature of the matter. All such waivers, consents or approvals shall be filed with the Council records or be made part of the minutes of the meeting.

(b) Effect of Attendance at Plenary. Attendance by a Council Member Representative at a Plenary meeting shall also constitute a waiver of notice of that Plenary with respect to that Member, except when a member Representative attends the Plenary for the sole purpose of objecting at the beginning of the Plenary to the transaction of any business due to the inadequacy or illegality of the notice.

## ARTICLE VI

### **Actions Requiring Council Member Approval**

**Section 6.01. Council Actions Requiring Member Approval.** In addition to those matters requiring approval of the Members under the California Nonprofit Public Benefit Corporation Law or other applicable laws, the following actions of the Council shall require approval of the Voting Members:

(a) Recommending to Signatory Organizations study methodologies for Best Management Practices ("BMPS"), including procedures for assessing cost effectiveness and reliability of urban water conservation measures.

(b) Development of guidelines, including discount rates, to be available to all signatories in computing BMP benefits and costs pursuant to Exhibit 3 of the MOU.

(c) Reviewing and modifying the economic principles set forth in Exhibit 3 of the MOU.

(d) Collecting and summarizing information on implementation of BMPs and Potential Best Management Practices ("PBMPs").

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- (e) Adopting or modifying BMP and PBMP lists.
- (f) Adopting or modifying reliable water conservation savings data for BMPs.
- (g) Adopting or modifying the schedules of implementation for existing and new BMPs.
- (h) Adopting or modifying the schedules for research and demonstration projects for BMPs and PBMPs.
- (i) Coordinating and/or making recommendations regarding BMP study and demonstration projects.
- (j) Approving or disapproving Membership Committee recommendations for the addition of parties as Signatory Organizations to the MOU and assigning additional parties to one of the three Signatory groups as described in Section 1.3 of the MOU, or as designated by the Members of the Council (see Section 3.02, above).
- (k) Reviewing and modifying report formats for agency implementation programs.
- (l) Making annual reports to the State Water Resources Control Board and the Council Members on the above items based on the format described in Exhibit 5 of the MOU.
- (m) Undertaking such additional responsibilities as the Members of the Council may agree upon.

**Section 6.02. Required Member Vote to Approve Various Actions.** The following Member approval requirements apply to particular actions of the Council, as listed in subparagraphs (a) and (b), of this Section 6.02:

(a) Actions Requiring Two-Thirds Vote. Any decision by the Council to (i) undertake additional responsibilities not currently described in the MOU and its Exhibits; (ii) modify or amend the MOU itself; (iii) modify Exhibits 2 or 3 of the MOU; or (iv) develop guidelines, including discount rates, to be available to all Signatories in computing BMP benefits and costs pursuant to Exhibit 3 of the MOU shall require both of the following:

(1) Written notification by the Council to all Members, giving the text of the proposed action or modification, at least 60 days in advance of the date of a regular or special meeting called by the Council to vote on the matter; and

(2) Approval of the proposed action or modification by the affirmative vote of at least two-thirds of each of the Group 1 and Group 2 Signatory Organizations actually voting on the matter.

Although a meeting shall be called to coincide with the final date for return of ballots, approval of the Voting Members shall be solicited by use of a written ballot in accordance with Section 4.04, above.

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(b) Actions Requiring Majority Member Approval. The following actions shall require the affirmative vote of at least a simple majority of each of the Group 1 and Group 2 Signatory Organizations actually voting on the matter:

(i) Approving the annual budget for the Council following presentation of the budget by the Board of Directors;

(ii) Adopting or modifying Best Management Practices and Potential Best Management Practices;

(iii) Approval and adoption of Council Strategic Plans;

(iv) Accepting or denying recommendations of the Membership Committee for the addition of parties as Signatory Organizations to the MOU and thereby the admission of the proposed Signatory Organization to one of the three classes of Council Membership, following review of the prospective applicant and recommendation of approval or denial by the Council Membership Committee;

(v) Adoption of Council policies, procedures and rules consistent with these Bylaws and the MOU; and

(vi) Approval of amendments to these Bylaws, other than any amendment to subparagraph (a), above.

**Section 6.03. Right of Members to Comment on Council Reports.** Any Member of the Council shall be entitled to review draft reports prepared by the Council (see Section 1.03, above) and to comment on all reports. Such comments shall be included in any final report at the request of the Member submitting the comments.

### ARTICLE VII Board of Directors of the Council

**Section 7.01. General Corporation Powers.** Subject to the requirement of Council Member approval of certain actions pursuant to these Bylaws or by State law, the business and affairs of the Council shall be vested in and exercised by the Council's Board of Directors which is referred to herein as the "Board of Directors". The Board of Directors may delegate the management of the activities of the Council to any person or persons, management company or committee, provided that notwithstanding any such delegation the activities and affairs of the Council shall continue to be managed and all corporate powers shall continue to be exercised under the ultimate direction of the Board of Directors. All elected members of the Board of Directors shall be Full Members of the Council in good standing as defined in Section 11.01 of these bylaws.

**Section 7.02. Composition, Selection and Term.**

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(a) Composition of the Board of Directors. The Board of Directors shall consist of the following persons: Group 1 Representatives shall select from among themselves up to eight MOU signatories whose Representatives shall serve as voting members of the Board of Directors. Group 2 Representatives shall select from among themselves up to eight MOU signatories whose Representatives shall serve as voting members of the Board of Directors. Advisory members of the Council representing Group 3 MOU signatories shall select, from among themselves, up to four MOU signatories, whose Representatives shall serve as non-voting members of the Board of Directors. In addition, all officers of the Council shall be members of the Board of Directors and have the same voting rights on the Board of Directors as their respective Groups. Finally, the following persons shall serve as non-voting ex-officio members of the Board of Directors: (i) the outgoing Chair shall be a Board of Directors member for the calendar year immediately following his or her term of office; and (ii) one designee from each of those State and Federal agencies selected by the Board of Directors as a result of the agencies' involvement in California water allotments, distribution, programs and/or policies shall serve as ex-officio members of the Board of Directors. Currently, the California Department of Water Resources and the U.S. Bureau of Reclamation have designees to the Board of Directors.

(b) Terms of Office. Board of Directors members shall hold office for a term of two years. The terms will be staggered with half of the positions of each group being elected each year. Unlimited consecutive terms may be served.

(c) Nominating and Election Process for Board of Directors Candidates. The Group 1 Signatory Members of the Council and the Group 2 Signatory Members of the Council shall nominate from among themselves candidates for election to the Board of Directors in person or in writing at the third Plenary of the year prior to the start of a new two-year term. Any nomination must be seconded by a Voting Member of the same Group, which second can be made in person or in writing, and accepted by the nominee in person or in writing to be included on the ballot. The ballots of Group 1 and 2 candidates for the Board of Directors shall be included in the Plenary Packet of the fourth and final Plenary of the year. All written nominations, seconds, and acceptances by candidates must be received by the Council prior to the start of the third Plenary.

The Voting Members of the Council shall vote on the ballot to elect Board of Directors members to represent their respective Groups at the final Plenary of each year. Cumulative voting (casting all four votes for one party) will not be permitted in any election of Board of Directors members. Absentee ballots are permitted so long as the absentee ballot is received by the Council prior to the start of the final Plenary at which the election is conducted. The successful candidates shall assume office starting January 1 of the following year. Votes may be made in person or in writing. Group 1 and 2 Council Members may vote for up to four candidates from their respective Groups. The top four candidates from Group 1 and the top four candidates from Group 2, as ranked by the number of votes received, shall be elected to the Board of Directors. If either Group 1 or Group 2 nominates less than four candidates, all candidates from that Group shall be elected to the Board of Directors.

### **Section 7.03. Resignation and Removal from Office; Filling of Vacancies**

(a) Resignation. Any member of the Board of Directors may resign at any time, effective upon giving written notice to the Executive Director or the Chair or Vice Chair, unless the resigning

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member's notice specifies a later time for the effectiveness of the resignation. If the resignation is to be effective at some future time, a successor may be elected or designated (as the case may be) to fill the vacancy when the resignation becomes effective.

(b) **Removal.** A sitting member of the Board of Directors may only be removed from office for cause. "Cause" shall be defined as failure of the Board of Directors member to attend at least two consecutive duly noticed meetings of the Board of Directors, and failure to adequately justify to the Committee the reason for the member's absence.

(c) **Filling of Vacancies on the Board of Directors.** If a vacancy occurs in any position on the Board of Directors other than Chair or Vice Chair by virtue of the death, resignation or removal of a Board of Directors member, the Signatory Organization whose Representative created the vacancy shall select a replacement Representative to serve on the Board of Directors for the unexpired term, subject to approval by the Board of Directors. If a vacancy occurs on the Board of Directors by virtue of a Signatory Organization's decision to withdraw from participation on the Board of Directors, the vacancy shall be filled from among Signatory Organizations that are of the same Group as the resigned Signatory Organization by a caucus of the withdrawing Signatory Organization's Council Member Group conducted either at the next Plenary or by telephone conference call, so long as all members of the Group are notified of the telephone conference and have an opportunity to participate. When a caucus is conducted by telephone conference, the actions taken shall be affirmed at the next Plenary. If a vacancy occurs for any reason in the position of Chair or Vice Chair, for reasons other than expiration of the holder's term of office, the vacancy shall be filled by nomination of the Signatory Group of which the resigned Chair/Vice Chair was a member. If a vacancy occurs in the ex-officio positions held by any State or Federal agency (see Section 7.02(a)), the vacancy shall be filled by the governmental agency with the power of designation.

**Section 7.04. Number and Place of Meetings.** The Chair of the Council, and any other persons designated by the Board of Directors, may call meetings of the Board of Directors. At the annual Plenary meeting, the Board of Directors shall adopt a schedule of regular meeting dates for the following year. Once approved, the scheduled dates may be modified, or meetings initially scheduled to be conducted in person may be changed to a meeting conducted by use of a conference telephone or other permitted electronic media by action of the Board of Directors. Except for meetings conducted in accordance with Section 7.05, below, regular and special meetings of the Board of Directors may be held at any place designated from time to time by resolution of the Board of Directors and stated in the notice of the meeting. In the absence of such designation, regular meetings shall be held at the principal office of the Council.

**Section 7.05. Meetings by Conference Telephone or Other Electronic Means.** Members of the Board of Directors may participate in a meeting through the use of conference telephone, electronic video screen communications, or other communications equipment. Participation in a meeting through use of a conference telephone pursuant to this subdivision constitutes presence in person at that meeting as long as all members participating in the meeting are able to hear one another. Participation in a meeting through use of electronic video screen communication or other communications equipment (other than conference telephone) constitutes presence in person at the meeting if all of the following conditions are satisfied:

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(a) Each member of the Board of Directors participating in the meeting can communicate with all of the other members concurrently;

(b) Each member of the Board of Directors is provided the means of participating in all matters before the Board of Directors including, without limitation, the capacity to propose, or to interpose an objection to a specific action to be taken by the Council; and

(c) The Council adopts and implements some means of verifying both of the following: (i) that a person participating in the meeting is a Board of Directors member or other person entitled to participate in the Board of Directors meeting; and (ii) that all actions of, or votes by, the Board of Directors are taken or cast only by the Board of Directors members and not by persons who are not Board of Directors members.

### **Section 7.06. Notice of Meetings.**

(a) Manner of Giving Notice. Notice of the time and place of the annual meeting and any special meetings of the Board of Directors shall be given to each Board of Directors member by one of the following methods: (i) by personal delivery of written notice; (ii) by first-class mail, postage prepaid; (iii) by telephone communication, either directly to the Board of Directors member or to a voice messaging system or other system or technology designed to record and communicate messages; or (iv) by facsimile, electronic mail or other electronic means; provided however that if notice is given by any means other than first-class mail or direct communication with a Board of Directors member, the notice shall also be confirmed in writing mailed or sent by facsimile or electronic transmission to the Board of Directors member's address, facsimile telephone number, or electronic mail address as shown on the records of the Council. Notice of a meeting need not be given to any Board of Directors member who signs a written waiver of notice or a written consent to holding the meeting or an approval of the minutes thereof, whether before or after the meeting, or to any Board of Directors member who attends the meeting without protesting, prior thereto or at commencement of the meeting, the lack of notice to such Board of Directors member. All such waivers, consents and approvals shall be filed with the Council records or made a part of the minutes.

(b) Time Requirements. Notices sent by first-class mail shall be deposited into a United States mailbox at least four days before the time set for the meeting. Notices given by other permitted means must be must be given at least 48 hours prior to the scheduled time of the meeting.

(c) Content of Notices. The notice shall state the date, time, place, and the general purpose of the meeting.

**Section 7.07. Quorum Requirements.** A quorum of the Board of Directors shall be at least fifty percent of each of Group 1 and Group 2 Board of Directors members.

**Section 7.08. Waiver of Notice.** The transaction of any meeting of the Board of Directors, however called and noticed or wherever held, shall be as valid as though taken at a meeting duly held after regular call and notice, if (a) a quorum is present; and (b) either before or after the meeting, each of the Board of Directors members not present, individually or collectively,

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signs a written waiver of notice, a consent to the holding of the meeting, or an approval of the minutes thereof. The waiver of notice or consent need not specify the purpose of the meeting. All waivers, consents, and approvals shall be filed with the Council records or made a part of the minutes of the meeting and shall have the same force and effect as a unanimous vote of the Board of Directors. The requirement of notice of a meeting shall also be deemed to have been waived by any Board of Directors member who attends the meeting without protesting before or at its commencement about the lack of notice.

**Section 7.09. Adjournment.** A majority of the Board of Directors members present, whether or not constituting a quorum, may adjourn any meeting to another time and place or may adjourn for purposes of reconvening in executive session to discuss and vote upon personnel matters, litigation in which the Council is or may become involved and orders of business of a similar nature. If the meeting is adjourned for more than 24 hours, notice of adjournment to any other time or place shall be given prior to the time of the adjourned meeting to the Board of Directors members who were not present at the time of the adjournment. Except as provided, above, notice of adjournment need not be given.

**Section 7.10. Action Without a Meeting.** Any action required or permitted to be taken by the Board of Directors may be taken without a meeting, if all members of the Board of Directors, individually or collectively, consent in writing to that action. Such action by written consent shall have the same force and effect as a unanimous vote of the Board of Directors. Such written consent or consents shall be filed with the minutes of the proceedings of the Board of Directors. For purposes of this Section, "all members of the Board of Directors" shall not include any "interested director" as defined in California Corporations Code section 5233. Section 5233 of the Code defines an interested director as a director who has a material financial interest in a transaction involving the corporation he or she is serving, unless the transaction is expressly excluded from the definition of a "self dealing transaction" by other provisions of the same Code Section. See also Article XII, below ("Conflicts of Interest").

**Section 7.11. No Compensation for Board of Directors Members.** Unless otherwise established by resolution of the Board of Directors, Members of the Board of Directors of the Council shall not be entitled to compensation for their services as such, although they may be reimbursed for such actual expenses as may be determined by resolution of the Board of Directors to be just and reasonable. Expenses shall be supported by an invoice or voucher acceptable to the Board of Directors.

**Section 7.12. Actions of the Board of Directors.** All Board of Directors actions require that a quorum be present, that a majority of the Board of Directors members voting from Group 1 vote in favor of the action, and that a majority of the Board of Directors Members voting from Group 2 vote in favor of the action. The Board of Directors may also act without meeting, provided that (a) the taking of the vote has previously been authorized by the Board of Directors; (b) the vote has received seven days' notice by first class mail or 48 hours notice delivered personally or by telephone or electronic media; and (c) the proposed action is approved by fifty percent or more of the Group 1 and fifty percent or more of the Group 2 members of the Board of Directors voting. The Board of Directors may take action without seeking Voting Member approval only where the Voting Members have delegated such authority to the Board of Directors and only to the extent that the action is consistent with the then current version of the MOU.

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### ARTICLE VIII

#### Duties and Powers of the Board of Directors and Limitations Thereon

**Section 8.01. Specific Powers.** Without prejudice to the general powers of the Board of Directors set forth in Section 7.01, above, the Board of Directors shall have the following responsibilities and powers:

(a) Exercise all powers vested in a board of directors of a nonprofit public benefit corporation under the laws of the State of California.

(b) Remove all officers of the Council, and other Council employees; prescribe any powers and duties for such persons that are consistent with law, the Articles of Incorporation and these Bylaws; and fix employee compensation. Any officer removed by action of the Board of Directors shall be filled by action of the Council Members at the next Plenary meeting in accordance with Section 9.03, below.

(c) Appoint such agents and employ such other employees, including attorneys and accountants, as it sees fit to assist in the operation of the Council, and to fix their duties and to establish their compensation.

(d) Contract for and pay premiums for insurance and bonds (including indemnity bonds) which may be required from time to time by the Council.

(e) Pay all taxes and charges incurred by or levied against the Council.

(f) Delegate its duties and powers hereunder to the Executive Director, to officers of the Council or to committees established by the Board of Directors, subject to the limitations expressed in Sections 7.01, above.

(g) Prepare or cause to be prepared budgets, and maintain a full set of books and records showing the financial condition of the affairs of the Council in a manner consistent with generally accepted accounting principles, and at no greater than annual intervals prepare a financial report, a copy of which shall be delivered to each Member of the Council as provided in Article XI, below.

(h) Appoint such committees as it deems necessary from time to time to implement the affairs of the Council in accordance with Article X, below.

(i) Open bank accounts and borrow money on behalf of the Council and designate the signatories to such bank accounts.

(j) Bring and defend actions on behalf of the Council so long as the action is pertinent to the operations of the Council.

#### **Section 8.02. Limitations on Powers.**

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(a) Actions Requiring the Consent or Approval of the Voting Members. The Board of Directors shall have no authority to act with respect to any matter identified in Section 6.01, above ("Council Actions Requiring Member Approval"), unless the Members of the Council have taken action at a Plenary to specifically confer on the Board of Directors authority to act with respect to a particular matter, and then only to the extent that the action is consistent with the then current version of the MOU. The responsibilities and powers described in Section 8.01, above, have been approved by the Council Members for exercise by the Board of Directors.

(b) Self-Dealing Transactions. Notwithstanding the powers conferred on the Board of Directors pursuant to Sections 7.01 and 8.01, above, the Council shall not engage in any transaction which meets the definition of a "self-dealing transaction" as defined in California Corporations Code section 5233 unless the transaction has been approved by one of the means specified in section 5233(d). Generally speaking, section 5233 of the Corporations Code defines a "self-dealing transaction" as any transaction to which the Council is a party and in which one or more of its directors (i.e., Board of Directors members) has a material financial interest. Certain transactions are excluded by that statute from being classified as self-dealing transactions.

(c) Transactions Between Corporations Having Common Directorships. Unless it is established that the contract or transaction is just and reasonable as to the Council at the time it is authorized, approved or ratified in accordance with the requirements imposed by California Corporations Code section 5233, the Council shall not enter into a contract or transaction with any other corporation, association or entity in which one or more of the Council's Board of Directors members are directors unless the material facts as to the transaction and the Board of Directors member's common directorship are fully known or disclosed to the Board of Directors. The Board of Directors must approve, authorize or ratify any such contract or transaction in good faith and by a vote sufficient without counting the vote of the Board of Directors member(s) having a common directorship in another corporation that is a party to the transaction.

(d) Loans to Members of the Board of Directors or Council Officers. The Council shall not make any loan of money or property to, or guarantee the obligation of, any Board of Directors member or officer, unless the transaction is first approved by the California Attorney General. This provision shall not apply to any reasonable advance on account of expenses anticipated to be incurred in the performance of the Board of Directors member's or officer's duties.

(e) Standards for Investment. Except as provided in California Corporations Code sections 5240(c) and 5241, in the investment, reinvestment, purchase, acquisition, exchange, sale and management of the Council's investments, the Board of Directors shall:

(i) Avoid speculation, looking instead to the permanent disposition of the funds, considering the probable income, as well as the probable safety of the Council's capital; and

(ii) Comply with additional standards, if any, imposed by the Articles of Incorporation, these Bylaws, any resolutions duly adopted by the Board of Directors, or the express terms of any instrument or agreement pursuant to which the invested assets were contributed to the Council.

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### ARTICLE IX Officers

**Section 9.01. Officers.** The officers of the Council shall be a Chair, a Vice Chair, a Secretary and a Treasurer. All elected Officers shall be Full Members of the Council in good standing as defined in Section 11.01 of these bylaws.

**Section 9.02. Qualifications.** The offices of Chair and Vice Chair may only be held by Board of Directors members representing Group 1 or Group 2 MOU signatories. No person may hold more than one office at the same time, except that one person may hold the offices of Secretary and Treasurer concurrently.

**Section 9.03. Selection and Term of Office.** The officers shall be selected at the annual (December) Plenary meeting of the Council and shall assume office starting January 1 of the following year for a term of one year. The offices of Chair and Vice Chair shall not be held by Representatives from the same Group. The office of Chair shall alternate between Group 1 and Group 2, with the Vice Chair assuming the office of Chair in the year immediately following completion of his or her term as Vice Chair. The Secretary and Treasurer shall be a Representative of a Group 3 Signatory Organization and shall thus be nominated by the Group 3 Members, subject to approval by the Board of Directors.

**Section 9.04. Election of Officers.** The Council Members shall nominate candidates for the offices of Chair, Vice Chair, Secretary and Treasurer in person or in writing at the third Plenary of each year not less than 60 days prior to the Plenary during which the nominations are slated for election. Written nominations must be received by the Council at its principal office prior to the start of the third Plenary, either by first class letter, facsimile, or electronic message. Any nomination must be seconded by a Voting Member Representative in person or in writing, and accepted by the nominee in person or in writing to be included on the ballot. For the offices of Chair and Vice Chair, Group 1 and 2 Council Members may only nominate candidates for the office their Group will hold in the coming term. The ballot for the offices of Chair, Vice Chair, Secretary and Treasurer shall be included in the Plenary Packet of the final Plenary of each year. The Voting Members of the Council shall vote on the ballot at the final Plenary of each year. Votes may be made in person or in writing. Any absentee ballots must be received prior to the start of the Plenary to be counted. For the offices of Chair and Vice Chair, Group 1 and 2 Members may only vote for candidates for the office their Group will hold in the coming term. For each office, the candidate receiving the most votes will be awarded the office.

**Section 9.05. Duties.** The officers perform those duties that are usual to their positions and that are assigned to them by the Board of Directors or by the Voting Members at a Plenary, including those duties that are set forth in the position descriptions for each officer as adopted by the Board of Directors from time to time. In addition, the Chair of the Council acts as Chair of the Board of Directors; the Vice Chair acts in place of the Chair when the Chair is not available; and the Treasurer is the chief financial officer of the Council.

**Section 9.06. Vacancies.** If a vacancy occurs among the officers of the Council, for any reason, the Board of Directors shall elect another Representative from the same Group for the

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unexpired portion of the term. Signatory Organizations whose Representative serves as an officer of the Council may not substitute another individual to serve in that office.

**Section 9.07. Removal of Officers.** Any officer may be removed, with cause, by the Board of Directors, at any regular or special meeting, so long as written notice of the proposed action is given to the subject officer and to all Signatory Organizations of the Group that appointed the officer to office at least 30 days prior to the Board of Directors meeting at which the action to remove will be entertained. The notice of the Board of Directors shall identify, with reasonable specificity, the grounds for removal which shall either be (a) failure of the officer to attend at least two consecutive duly noticed meetings without a justified excuse as approved by the Board of Directors; or (b) repeated and material failure to perform the responsibilities of his or her office.

**Section 9.08. Resignation of Officers.** Any officer may resign at any time by giving written notice to the Board or to the Chair or to the secretary. Any such resignation shall take effect at the date of the receipt of such notice or at any later time specified therein; and unless otherwise specified therein, the acceptance of such resignation shall not be necessary to make it effective.

### ARTICLE X

#### Standing and Other Committees of the Council

**Section 10.01. Standing Committees of the Council.** The Council has established the following Standing Committees:

(a) **The Membership Committee.** In accordance with Section 7.2 of the MOU, the Council shall have a Membership Committee comprised of three Representatives of the Group 1 Signatories and three Representatives of the Group 2 signatories. It shall be the duty of the Membership Committee to evaluate new signatory applicants as follows: (i) designate the category of membership, if any, for which an applicant is qualified; (ii) provisionally approve or disapprove an applicant for membership according to a process approved by the Plenary; and (iii) forward any such provisional membership approvals to the Plenary for ratification.

**Section 10.02. Other Committees.** The Board of Directors may, by resolution, establish other standing and ad hoc committees and such committees may include persons who are not members of the Board of Directors; however, all committee members must be Representatives of a Council Member or the Executive Director of the Council. The Board of Directors, as to matters within its jurisdiction, and the Members of the Council, as to matters within their jurisdiction, may delegate management of the Council's activities to any committee to the same extent that those powers could be delegated to agents, employees or independent contractors generally, and subject to the ultimate direction of the Board of Directors. In all other respects, committees shall be limited to making recommendations and reports to the Board of Directors or to the Members at a Plenary meeting of the Council (as to matters requiring Member action or approval) and to the Executive Director regarding matters that are within their respective missions as defined by the Board of Directors in the resolution establishing the advisory committee.

**Section 10.03. Limitations on Authority of Committees.** No committee appointed by the Board of Directors shall:

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- (a) Take any final action on any matter that, under the California Nonprofit Public Benefit Corporation Law, also requires approval of the members or approval of a majority of all members;
- (b) Fill vacancies on the Board of Directors or the Membership Committee;
- (c) Amend or repeal Bylaws or adopt new Bylaws; or
- (d) Amend or repeal any resolution of the Board of Directors or the Council.

**Section 10.04. Meetings and Actions of Committees.** Meetings and actions of committees of the Council may be conducted informally, provided that all members of a committee must receive at least 10 days' prior notice of committee meetings, with notice given by one of the means sanctioned for the issuance of notice of Board of Directors meetings pursuant to Section 7.06, above. The Board of Directors may adopt additional rules for the governance of any committee it establishes, provided such rules are consistent with these Bylaws or, in the absence of rules adopted by the Board of Directors, any committee may adopt such rules for the committee's governance.

**Section 10.05. Audit Committee.** The Council shall have an audit committee consisting of at least three members of the Board of Directors, and may include nonvoting advisors. No employee of the Council may serve on the audit committee. Board of Directors members who receive, directly or indirectly, any consulting, advisory, or other compensatory fees from the Council may not serve on the audit committee. The audit committee shall perform the duties and adhere to the guidelines set forth in the Council's audit committee charter as amended from time to time by the Board of Directors. Such duties include, but are not limited to:

- (a) Assisting the Board of Directors in choosing an independent auditor and recommending termination of the auditor, if necessary;
- (b) Negotiating the auditor's compensation;
- (c) Conferring with the auditor regarding the Council's financial affairs; and
- (d) Reviewing and accepting or rejecting the audit

Members of the audit committee shall not receive compensation for their service on the audit committee in excess of that provided to the directors, if any, for their service on the Board of Directors. If the Council has a finance committee, a majority of the members of the audit committee may not concurrently serve as members of the finance committee, and the chair of the audit committee may not serve on the finance committee.

**Section 10.06. Compensation Committee.** The Council shall have a compensation committee consisting of at least three Board of Directors members and no one who is not a Board of Directors member. No employee of the Council may serve on the compensation committee. Pursuant to California Government Code section 12586(g) and the applicable provisions of federal law, the compensation committee shall review the compensation of the executive director, president or chief executive officer and the chief financial officer annually and whenever a modification in

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compensation is proposed. The review shall include an evaluation of the performance of the executive director, president, and/or chief executive officer and the chief financial officer and an analysis of appropriate compensation comparability data. Based on the compensation committee's review, it shall recommend just and reasonable compensation amounts. At the request of the Chair or a majority of the Steering Council, the compensation committee shall review any issue involving staff compensation and benefits, including but limited to health and retirement plans.

### ARTICLE XI Finances of the Council

**Section 11.01. Assessments by the Council.** The Board of Directors shall recommend annual assessment amounts for Full Council Membership. The annual assessments shall be based upon an annual budget duly approved by the Plenary as required in Section 6.02 of these Bylaws and the Council's adopted Policies. The paying of annual assessments to the Council is voluntary for all Signatory Members, but is required for the benefits of Full Membership, which include access to Council technical assistance, publications, training, and written materials. For Group 2 members, payment shall mean payment in cash and/or in kind services, as defined in the Council's policies. Officers and members of the Council Board of Directors shall be Full Members in good standing.

**Section 11.02. Checks.** All checks or demands for money and notes of the Council shall be signed by the Executive Director and one or more officers of the Council; except that the Executive Director of the Council shall have authority to be the sole signatory on Council checks not to exceed such amount as may be designated from time to time by the Board of Directors.

**Section 11.03. Operating Account.** There shall be established and maintained a cash deposit account to be known as the "Operating Account" into which shall be deposited the operating portion of all Assessments as fixed and determined for all Members. Disbursements from such account shall be for the general need of the operation including, but not limited to, wages, repairs, betterments, maintenance, and other operating expenses of the Properties.

**Section 11.04. Other Accounts.** The Council shall maintain any other accounts it shall deem necessary to carry out its purposes.

**Section 11.05. Financial Statements.** The Board of Directors, through the audit committee, shall cause an audit of the financial affairs of the Council to be made at least every 12 months. Such audit shall reflect the financial condition of the Council as of the date of the audit and shall summarize the financial transactions in which the Council was involved during the period between the last of such audits and the date of the current audit. A copy of the audit shall be available for examination by each of the Board of Directors members of the Council. A copy of any annual financial statement and any income statement of the Council for each quarterly period of each fiscal year, and any accompanying balance sheet of the Council as of the end of such period, that has been prepared by the Council shall be kept on file in the principal office of the Council for 12 months.

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The income statements, statements of changes in financial position, and balance sheet referred to in this Section shall be accompanied by the report, if any, of any independent accountants engaged by the Council or the certificate of an authorized officer of the Council that the financial statements were prepared without audit from the books and records of the Council.

### ARTICLE XII Conflicts of Interest / Obligation of Recusal

#### **Section 12.01. Conflicts of Interest.**

(a) No Representative of a Signatory Organization of the Council, shall make, participate in making, or in any way attempt to use his or her position as a Member Representative, Board of Directors member, or officer of the Council to influence any decision or action of the Council at a Plenary or any decision or action of the Board of Directors with respect to contracts to provide services to the Council if the Member Representative is personally aware that the Signatory Organization he or she represents on the Council, or any constituent organization that is a member or affiliate of the Signatory Organization, has a direct or indirect material financial interest in the subject matter of the decision or action to which the vote of the Council pertains. For purposes of this Article XII, a material financial interest is defined as an interest satisfying each of the following three elements:

(i) the interest relates to a grant received by the Member Representative's Signatory Organization (or any member or affiliated organization) or originates from an agreement between the Member Representative's Signatory Organization (or any member or affiliated organization) and any other person;

(ii) the interest is or will be worth \$2000.00 or more in value provided to, received by, or promised to the Representative's Signatory Organization (or any member or affiliated organization) within twelve (12) months of the date when the Council vote is conducted; and

(iii) the outcome of the vote is, or is likely to have, a positive impact on the aforementioned interest which will enhance its value by a factor of ten percent or more during the term of the agreement or grant.

(b) If a Member Representative knows that a material financial interest of his or her Signatory Organization (or any organization that is a member or affiliate of the signatory organization) may be positively influenced by a Council vote on any of the matters described in subparagraph (a) above, then prior to any vote by the Council on the matter the Representative shall be obligated to disclose to the Council the fact that his or her Signatory Organization (or one or more of its member or affiliated organizations) has/have a conflict with respect to the matter which involves a material financial interest. As a result of that disclosure, the Representative must be recused from voting on behalf of the interested Signatory Organization.

(c) Prior to entertaining any discussion and vote on any matter described in subparagraph (a) above, the presiding Chair shall read a statement reminding all attending Voting

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Members of their obligations under this Article XII. That statement shall include a recital of the above definition of what constitutes a material financial interest.

**Section 12.02. Enforcement.** If any Member Representative or Signatory Organization is found by the Board of Directors to have willfully failed to disclose a conflict of interest, as defined in Section 12.01 above, said conduct shall be grounds for voiding the vote of the Signatory Organization. In addition, if it is determined that the Member Representative with the undisclosed conflict actively participated in any deliberations of the Board of Directors preceding the vote, it shall be presumed that the vote was adversely affected and thus rendered void and of no effect unless subsequently ratified by a proper vote which excludes the Member Representative with the conflict.

### ARTICLE XIII Miscellaneous

#### **Section 13.01. Inspection of Books and Records.**

(a) Inspection by Council Members. All accounting books and records, minutes of proceedings of the Council Members, the Board of Directors and committees appointed by the Board of Directors and membership lists and papers of the Council shall at all times, during reasonable business hours, be subject to the inspection of any Member or his or her duly appointed Representative at the offices of the Council for any purpose reasonably related to the Member's interest as such. Member's rights of inspection hereunder shall be exercisable on ten (10) days' written demand on the Corporation, which demand shall state the purpose for which the inspection rights are requested. Inspection rights shall be subject to the Corporation's right to offer a reasonable alternative to inspection within 10 days after receiving the Member's written demand (as more particularly set forth in section 6330 and following of the California Nonprofit Public Benefit Corporation Law).

(b) Inspection by Members of the Board of Directors. Every member of the Board of Directors shall have an absolute right at any reasonable time to inspect all books, records, documents and minutes of the Council and the physical properties owned by the Council. The right of inspection by a Board of Directors member includes the right to make extracts and copies of documents.

(c) Inspection by Members of the Public. Regular reports of Signatory Organizations concerning their water conservation activities and efforts shall be available for public inspection, as are any reports or filings of the Council with the State Water Resources Control Board.

(d) Rules Regarding Exercise of Inspection Rights. The Board of Directors may establish reasonable rules with respect to (i) notice of inspection, (ii) hours and days of the week when inspection may be made, and (iii) payment of the cost of reproducing copies of documents requested by the Member.

**Section 13.02. Executive Director.** The Council may, from time to time, employ the services of an Executive Director to manage the affairs of the Council. To the extent not inconsistent with the laws of the State of California, and upon such conditions as are otherwise deemed advisable by the Council, the Council, acting by and through its Board of Directors, may

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delegate to the Executive Director or to other employees or contractors any of its day-to-day management and maintenance duties and powers under these Bylaws, provided that the Executive Director shall at all times remain subject to the ultimate direction and control of the Board of Directors. Subject to those limitations, the Executive Director shall have sole responsibility for management, control and retention of other Council staff members.

**Section 13.03. Amendment or Repeal of Bylaws.** Except as otherwise expressly provided herein, these Bylaws may only be amended or repealed and new Bylaws adopted by the affirmative vote or written ballot of a majority of all the Voting Members of the Council (which majority must also include a majority of each Group of Voting Members). Notwithstanding the foregoing, any amendment of the Bylaws must be consistent with the then current version of the MOU and the percentage of the Voting Members necessary to amend a specific clause or provision of these Bylaws shall be not less than the percentage of affirmative votes, or votes by classes of Members, prescribed for action to be taken under that clause.

**Section 13.04. Notice Requirements.** Any notice or other document permitted or required to be delivered as provided herein shall be delivered as required under these bylaws and shall be sent to address(es) provided and updated from time to time by the Signatory Members to the Council.

**Section 13.05. Annual Statement of General Information.** As and when required by California Corporations Code section 6210, the Council shall file with the Secretary of State of the State of California, on the prescribed form, a statement setting forth the authorized number of directors (i.e., Board of Directors members), the names and complete business or residence addresses of all incumbent Board of Directors members, the names and complete business or residence addresses of the Chair, Vice Chair, Secretary and Treasurer, and the street address of its principal office in this state, together with a designation of the agent of the Council for the purpose of service of process.

**Section 13.06. Construction and Definitions.** Unless the context requires otherwise or a term is specifically defined herein, the general provisions, rules of construction, and definitions in the California Nonprofit Corporation Law shall govern the construction of these Bylaws. Without limiting the generality of the foregoing, the masculine gender includes the feminine and neuter, and singular number includes the plural and the plural number includes the singular.

### **Section 13.07. Indemnification of Corporate Agents.**

(a) Any person who was or is a Board of Directors member, officer, employee or other agent of the Council (collectively "Agents") may be indemnified by the Council for any claims, demands, causes of action, expenses or liabilities arising out of, or pertaining to, the Agent's service to or on behalf of the Council to the full extent permitted by California Corporations Code section 5238.

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(b) The Council shall have power to purchase and maintain insurance on behalf of any agent of the Council against any liability asserted against or incurred by the agent in such capacity or arising out of the agent's status as such whether or not the Council would have the power to indemnify the agent against such liability under section 5238 of the Corporations Code; provided, however, that the Council shall have no power to purchase and maintain such insurance to indemnify any agent of the Council for a violation of California Corporations Code section 5233.

**Section 13.08. Nonpaid Members of the Board of Directors; Alleged Failure to Discharge Duties; No Monetary Liability.** Except as provided in California Corporations Code sections 5233 or 5237, there is no monetary liability on the part of, and no cause of action for damages shall arise against, any nonpaid member of the Board of Directors, including any nonpaid Board of Directors member who is also a nonpaid officer of the Council based upon any alleged failure to discharge the person's duties as a Board member or officer if the duties are performed in a manner that meets all of the following criteria:

- (a) The duties are performed in good faith;
- (b) The duties are performed in a manner such Board of Directors member believes to be in the best interests of the Council; and
- (c) The duties are performed with such care, including reasonable inquiry, as an ordinarily prudent person in a like position would use under similar circumstances.

**Section 13.09. Personal Liability for Negligence.**

(a) Except as provided in subparagraph (c) below, there shall be no personal liability to a third party on the part of a volunteer member of the Board of Directors or officer of the Council caused by the Board of Directors member's or officer's negligent act or omission in the performance of that person's duties as a Board of Directors member or officer, if all of the following conditions are met:

- (i) The act or omission was within the scope of the Board of Directors member's or officer's duties;
- (ii) The act or omission was performed in good faith;
- (iii) The act or omission was not reckless, wanton, intentional, or grossly negligent; and
- (iv) Damages caused by the act or omission are covered pursuant to a liability insurance policy issued to the Council, either in the form of a general liability policy or a Board of Directors member's and officer's liability policy, or personally to the Board of Directors member or officer. In the event that the damages are not covered by a liability insurance policy, the volunteer Board of Directors member or volunteer officer shall not be personally liable for the damages if the Board of Directors and the person had made all reasonable efforts in good faith to obtain available liability insurance.

(b) For purposes of this Section 10.10, "volunteer" means the rendering of services without compensation. "Compensation" means remuneration whether by the way of salary, fee, or

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other consideration for services rendered. However, the payment of per diem, mileage, or other reimbursement expenses to a member of the Board of Directors or an officer does not affect that person's status as a volunteer within the meaning of this Section.

(c) This Section does not eliminate or limit the liability of a Board of Directors member or officer for (i) any liability with respect to self-dealing transactions as provided in California Corporations Code section 5233 or any liability with respect to certain prohibited distributions, loans or guarantees as provided in section 5237 of said law; or (ii) in any action or proceeding brought by the California Attorney General.