

## SECTION 15 PAVEMENT STRIPING, MARKERS AND DELINEATION

**15-1 GENERAL** - The Contractor shall apply all traffic striping, markings and all other directional information or pavement delineation on the surfaces of streets, detour roads, parking lots, median strips and curbing in accordance with the Contract Plans, Special Provisions and as specified herein

Where no plans for pavement delineation have been provided and the existing delineation is to be covered or obliterated by the Contractor's work, the existing delineation shall be restored. Restoration shall conform to the requirements specified herein. When part of a pavement marking has been removed or obliterated, the entire marking shall be restored.

Unless otherwise specified in the Special Provisions or Contract Plans, all pavement striping and legends including restoration (except temporary), shall be thermoplastic.

**15-2 LAYOUT, ALIGNMENT AND SPOTTING** - All layouts, spotting and tracking required shall be performed by and at the expense of the Contractor, and approved by the Engineer prior to placement of pavement striping or markings.

Contractor shall notify the Engineer at least twenty-four (24) hours in advance of beginning said layout work. Contractor shall provide the name and contact information, including mobile telephone number, of the person supervising the striping work, and the location and time of any planned work. Said supervisor shall meet with the Engineer each day prior to starting any work related to striping and marking.

Permanent stripes and markings shall be placed on new asphalt concrete surfaces not less than seven (7) days and not more than fourteen (14) days after the final paving has been completed.

The Contractor shall furnish all equipment, materials, labor and supervision necessary for installing pavement striping and markings in accordance with the Contract Plans, including traffic controls and temporary detours required for the safe control of traffic through and/or around the project. Contractor is responsible for completed work until it is safe to open the area to public traffic. Contractor shall repair all damages, or replace damaged work, at his sole expense, for failure to protect completed work.

**15-3 PAVEMENT MARKERS** - Pavement markers shall be installed in accordance with Section 85, "Pavement Markers," of the State Standard Specifications, and as specified herein and in the Special Provisions.

Standard word markings, letters, numerals and symbols shall be as shown on the Contract Plans. In the absence of such information, all stencils and templates shall conform to the State of California Department of Transportation Standard Plans, latest edition.

Non-reflective pavement markers shall be ceramic. Adhesive shall be hot-melt bituminous adhesive conforming to the State Specifications. A blue reflective marker shall be installed in the center of the traffic lane adjacent to each fire hydrant on all streets within the limits of Work, regardless whether it is shown on the plans. Contractor shall be responsible for locating fire hydrants.

**15-4 REMOVAL OF EXISTING AND TEMPORARY TRAFFIC STRIPES AND PAVEMENT MARKINGS** - Existing and temporary striping and pavement markings that conflict with the final traffic striping and pavement marking plans, or as designated for removal, shall be removed to the fullest extent possible as approved by the Engineer. Any grinding of pavement marking shall be done to a square or rectangular block shape. The method of removal shall not materially damage the surface or texture of the pavement or surfacing. Any pavement or surfacing, in the opinion of the Engineer, that has been unreasonably damaged, shall be repaired to the Engineer's satisfaction at no expense to the City.

Sand or other material deposited on the pavement as a result of removing traffic stripes and markings shall be removed as the work progresses. Accumulations of sand or other debris that might interfere with drainage or might constitute a hazard to traffic shall not be permitted.

Traffic stripes shall be removed, and either temporary or new permanent stripes and markings shall be in place, before any change in the traffic pattern or opening of the roadway to public traffic.

**15-5 THERMOPLASTIC STRIPING AND PAVEMENT MARKINGS** - The installation of thermoplastic striping and marking shall conform to Section 84-2, "Thermoplastic Traffic Stripes and Pavement Markings," of the State Standard Specifications.

**15-6 PAINTED STRIPING AND PAVEMENT MARKINGS** - Paint for pavement striping and markings, if such are required, shall conform to Section 84-3, "Painted Striping and Pavement Markings," of the State Standard Specifications.

**15-7 CURB PAINTING** - Curb painting shall be applied as shown on the Contract Plans and as approved by the Engineer. Curb painting shall include the application of two coats of traffic paint with glass beads incorporated in the second coat. Top and face of curb shall be painted.

**15-8 GLASS BEADS** - All traffic stripes, except the black separation lines, shall be beaded. The application rate shall be 8 pounds per 100 square feet of marking, and 27 pounds per 1,000 linear feet of continuous 4-inch stripes.

Glass beads shall be applied directly and uniformly to the traffic line with a bead dispenser machine, placed at the proper distance behind the paint spray nozzle.

Glass beads shall be applied to pavement marking and crosswalks by a special paint spray gun developed for this purpose.

### **15-9 RAISED BARS**

**15-9.1 General** - These specifications apply to pre-cast, cast-in-place or extruded raised bars intended to be used as traffic delineators or bumper stops. This work consists of furnishing and installing pre-cast, cast-in-place or extruded raised bars at the locations shown on the Contract Plans or as directed by the Engineer, and to the requirements specified in these specifications and the Special Provisions.

Raised bars shall conform to the details and dimensions shown on the Contract Plans.

**15-9.2 Classification Types** - Raised bars are classified by type in accordance with the minimum supportive strength of the bar. The types are as follows:

**Type A** - 400 pounds minimum load

**Type B** - 150 pounds minimum load

The type of bar to be used shall be as shown on the Contract Plans or specified in the Special Provisions. If the type designation of the bar is not shown on the Contract Plans or specified in the Special Provisions, Type A shall be used.

Type A raised bars may be pre-cast, cast-in-place, or extruded, at the option of the Contractor. Type B raised bars shall be pre-cast.

### **15-9.3 Materials**

**Pre-cast Raised Bars** - Pre-cast raised bars shall be constructed of 560-D-3000 concrete. Other materials such as glass fiber and wood chips may be substituted for the aggregate in raised bars provided the Portland Cement content is adjusted to such materials and the Engineer approves such use of other materials.

**Cast-in-Place Raised Bars** - Concrete used in cast-in-place raised bars shall be 560-D-3000 concrete containing calcium chloride at the rate of 2 pounds per 100 pounds of cement. The slump of the concrete shall be not less than ½" and not greater than 1½" and within these limits the consistency shall be regulated as necessary to provide a dense bar having the shape shown on the Contract Plans.

Concrete used in forming bars by the extrusion process shall consist of a homogeneous mixture of Portland Cement, aggregate, and water in which an air-entraining agent may be incorporated.

Cast-in-Place, or extruded raised bars in place, represented by test bars that do not comply with the strength requirement at the end of 72 hours, shall be removed from the work and be replaced with acceptable bars at no additional expense to the City.

Each pre-cast bar shall be properly cured and, at the time of shipment, shall be capable of supporting the minimum load for each type as specified. Pre-cast bars shall be tested as described above.

Pre-cast bars shall be marked with the date of manufacture and the identifying mark of the manufacturer.

The manufacturer of pre-cast raised bars shall establish the necessary quality control and inspection practice to assure compliance with these specifications.

**15-9.4 Extruded Raised Bars Equipment** - The machine used for extrusion shall be capable of forming bars of the dimensions shown on the Contract Plans. Raised bars shall be extruded onto a previously placed adhesive.

The extrusion machine shall be so operated as to produce a well-compacted mass, free from large torn areas in the surface. If minor surface pits or small torn areas are formed, the surface of the bar shall be worked with a template type trowel until defects have been eliminated. The ends of the bars while plastic shall be formed to the shape and angle shown on the Contract Plans. When bars are placed over an open joint or crack, an open joint shall be formed through the bar at that point.

**15-10 MEASUREMENT** - The quantities of traffic striping , pavement markings and pavement delineators shall be measured by units as specified in the Bid Proposal. Measurement for stripes shall be taken along the line of the stripe without deduction for gaps in the standard details. Deductions will be made for gaps at cross streets and driveways. Measurement for markings and legends shall be per the areas shown on the State Standard Plans

**15-11 PAYMENT** - The contract lump sum or unit prices paid for the various types of pavement striping and markers shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals including but not necessarily limited to removals, establishing alignment and layout, complete and in place, as shown on the Contract Plans, as specified by the City Standard Specifications and the Special Provisions, and as directed by the Engineer, and no additional payment shall be made therefor.

Where the bid proposal contains no item for pavement delineation or restoration, full payment shall be considered as included in the various contract items of work and no additional payment shall be made therefor.