



# TECHNICAL SPECIFICATIONS No. 3600

## TRAFFIC STRIPING AND PAVEMENT MARKINGS

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### ENGINEERING SERVICES DEPARTMENT

#### **DESCRIPTION OF WORK**

- 3601 The work to be done consists of supplying all labor, methods, tools, machinery, equipment and materials necessary to apply and/or remove traffic paint, perform traffic striping, apply pavement markings and markers.
- 3602 All striping installed shall include raised markers as per the 2018 Standard Plans and Specifications, latest edition of the "California Manual on Uniform Traffic Control Devices" (Ca MUTCD), these technical specifications, approved project plans, and as directed by the City Engineer or their authorized representative.

#### **MAINTAINING TRAFFIC**

- 3603 Public traffic shall be permitted to pass through the work underway at all times, under the specific control of the Contractor. The Contractor shall perform traffic control, and payment for this work as such shall be considered included in the unit bid prices for the various contract items of work and no further allowances shall be made therefore. The Contractor is hereby notified that all lights, barricades, flagmen, or other devices necessary to provide for public safety and convenience, shall be furnished by and maintained at the Contractor's expense. Whenever the Contractor's operation creates a condition potentially hazardous to traffic or to the public, the Contractor shall take the necessary precautions and provide adequate protection for those who must pass through the work area. If the Contractor should appear to be neglectful or negligent in providing such warning or protective measures, the City Engineer or their authorized representative may direct attention to the existence of a hazard, and any barricades, signs, lights, flagman, or other devices required to protect the public shall be installed by the Contractor and the entire cost of such protective measures will be considered as being included in the price paid for various contract items of work, and no additional allowance will be made therefore. The City Engineer or their authorized representative may point out the inadequacy of protective devices or measures, but such action on the part of the City Engineer or their authorized representative shall not relieve the Contractor from responsibility for public safety or abolish the Contractor's obligation to furnish and pay for these devices.
- 3604 The Contractor shall be responsible for maintaining temporary delineation at all times during construction. Such delineation can be accomplished by the use of slurry tabs. However, if the duration between placement of the asphalt base course and the final asphalt cap exceeds five (5) days, the contractor shall be responsible to provide temporary striping and pavement markings to delineate path of travel and ensure public safety throughout the project. Temporary striping and pavement markings shall be one-coat paint and/or pavement marking tape subject to the approval of the City Engineer or their authorized representative. At minimum, the temporary striping and pavement markings will include the following channelization: double yellow line (Detail 21), left turn lanes (Detail 38A), edge line (Detail 27B), 12" limit lines, and "STOP" pavement legends. Locations and limits (lengths) of temporary delineation, and lane widths, shall

be consistent with the final striping as shown on the Signing and Striping Plan unless otherwise directed by the City Engineer or their authorized representative. The remaining portion of the crosswalk lines not marked as 12" limit lines may be delineated with the use of slurry tabs, spaced every 3' maximum. Slurry tabs must be maintained on a daily basis and replaced if missing. Bike lane striping, pavement arrows and legends (non "STOP" related) will not be required during the temporary condition, unless directed by the City Engineer or their authorized representative to ensure public safety.

- 3605 Permanent striping and pavement markings shall not be placed on fresh asphalt concrete until after a seven (7) day curing time has elapsed to allow excess oil to bleed out of the pavement.
- 3606 Traffic signals are to be set to fixed-time operation when construction work obliterates the traffic signal loop detectors. Alternatively, traffic signals may be placed in flashing red operation if approved by the City Engineer or their representative. The Contractor shall coordinate with the City of Tulare five (5) working days in advance of such work.

**MATERIALS**

- 3607 Attention is directed to Section 6 "Control of Materials," of the General Provisions and 2018 Standard Specifications regarding control of materials.
- 3608 The Contractor shall furnish all materials required to complete the work under the attached contract.
- 3609 Thermoplastic shall be used for all stencils and pavement markings. Stencils and pavement markings include, but are not limited to: crosswalks, stop bars, limit lines, arrows, symbols, numbers, and words. The alternative use of paint for stencils and pavement markings requires written approval from the City Engineer or their authorized representative prior to the start of construction.
- 3610 Paint shall be used for all traffic lines. Traffic lines include, but are not limited to: centerlines, lanelines, no passing lines, edgelines, median island striping lines, turn lane lines, channelizing lines, and bike lane lines,. The use of thermoplastic for traffic lines requires written approval from the City Engineer or their authorized representative prior to the start of construction.

3611 **Thermoplastics:**

- 3610.1 Thermoplastics shall comply with Section 84 of the Standard Specifications.

3611 **Paint:**

- 3611.1 All paint shall comply with the Section 84 of 2018 Standard Specifications for Waterborne Traffic Paint.
- 3611.2 All paint used to perform the work specified within this contract, other than pre-mix paint, shall be low volatile organic compound (Low VOC <100) or water-base paint

traffic line paint manufactured by Pervo Paint Company of Los Angeles, California, and identified by the following number codes:

CODE #PTWB-01 – WHITE, Waterborne Traffic Paint  
CODE #PTWB-01 – YELLOW, L/F, Waterborne Traffic Paint  
CODE #PTWB-01 – BLACK, Waterborne Traffic Paint 1000.1

- 3611.3 Paint substitutions will be allowed if a Certification of Compliance is provided by the Contractor and approved by the City Engineer or their authorized representative prior to the placement of striping.
- 3611.4 The paint shall be thinned as per manufacturer's recommendations.
- 3611.5 Glass beads shall conform to the requirements of Section 84 of the 2018 Standard Specifications for glass beads applied to paint.

## **EQUIPMENT**

### **3612 Thermoplastics:**

- 3612.1 Equipment used for the application of thermoplastics shall comply the requirements of Section 84 of the Standard Specifications.

### **3613 Paint:**

- 3613.1 The paint striping machine used for the work shall be approved by the City Engineer or their authorized representative, and shall meet or exceed following Specifications:
  - A. The machine shall have a minimum wheelbase of one hundred thirty inch (130").
  - B. The air compressor shall have a minimum capacity of one hundred fifty cubic feet (150 cu. ft.) per minute, or use airless equipment.
  - C. The machine shall be capable of three (3) spray gun applications consisting of one black and two yellow spray guns operating simultaneously or individually. The machine shall also be capable of painting a channelization line on one pass.
  - D. The paint machine shall have bead dispensers capable of uniformly applying beads immediately after application of the paint. Bead system must be pressurized to provide even flow of beads under all weather conditions.
  - E. The machine shall be equipped with an automatic on-off device to produce skip lines, with adjustment to match previous painting.
  - F. The machine shall be capable of installing shoulder lines.
  - G. The machine, with crew, organization and programming, shall be capable of producing not less than fifteen miles (15 miles) of acceptable work per hour when judged on average conditions, and the City Engineer or their authorized representative shall be the sole judge of such conditions.
  - H. When deemed necessary by the City Engineer or their authorized representative, the machine shall be equipped with a thermostatically controlled heating device to

maintain a paint tank temperature of not less than one hundred ten degrees (110°) Fahrenheit nor more than one hundred eighty degrees (180°) Fahrenheit.

- I. When deemed necessary by the City Engineer or their authorized representative, the machine shall be equipped with agitation devices in the paint containers.
- J. Night striping operations may be required due to traffic conditions, and as such, the striping vehicle and any necessary shadow vehicle must have proper and acceptable safety lighting, as well as lighting to illuminate the work area.
- K. The striping vehicle and any necessary shadow vehicle shall both be equipped with a lighted flashing arrow board to be used at all times while work is being performed. The arrow board shall be mounted securely and be of sufficient size to clearly display the message a distance of three hundred feet (300') to approaching motorists.

#### **APPLICATION**

##### **3614 Thermoplastics:**

3614.1 Thermoplastics shall be applied to pavement per the requirements of Section 84 of the Standard Specifications.

##### **3615 Paint:**

3615.1 Paint and beads shall be applied at the following rates and in conformance with the following requirements:

- A. All striping shall be six inches (6") in width, unless otherwise required by the City Engineer or their authorized representative, or as specified by the approved Plans and/or Specifications.
- B. Unless specified otherwise in the approved Plans and/or Specifications, all broken stripe shall have a pattern of seven feet (7'), seventeen feet (17'), seven feet (7'), in which the seven-foot (7') sections are painted and the seventeen-foot (17') sections are unpainted.
- C. The rate of application of paint and beads:
  - 1. 1-coat paint shall be applied at a minimum rate of 107 square feet per gallon.
  - 2. 2-coat paint, both the 1<sup>st</sup> and 2<sup>nd</sup> coats shall be applied at a minimum rate of 215 square feet per gallon.
  - 3. Six pounds (6 lbs) of beads per gallon of paint.
- D. Completed traffic stripes shall have clean and well-defined edges, shall be uniform, shall be straight on tangent alignment, and shall be on a true arc on curved alignments. The widths of completed traffic stripes shall not deviate more than one-quarter inch (1/4") on tangent nor more than two inches (2") on curves from

the widths shown on the plans. Broken traffic stripes shall also conform to the following requirements:

1. The lengths of the gaps and individual stripes that form broken traffic stripes shall not deviate more than two inches (2") from the lengths as specified above.
2. The length of the gaps and individual stripes shall be of such uniformity throughout the entire length of each broken traffic stripe that a standard striping machine will be able to repeat the pattern and superimpose additional coats of paint upon the traffic stripe being painted.
  - a. The finished product shall have an opaque, well painted appearance with no black or other discolorations showing through.
  - b. Glass beads shall be distributed uniformly throughout the finished product.
  - c. Drips, over-spray, improper markings, and paint tracked by traffic shall be immediately removed from the pavement surface by an approved method. All such removal work shall be at the Contractors expense.
  - d. The Contractor shall take all reasonable precaution to protect the paint during drying time and may be required to remove all objectionable tracking.
  - e. Double yellow centerlines shall be two solid six inch (6") yellow lines separated by a solid three inch (3") black line.
  - f. Traffic stripes and pavement markings shall be applied only on dry surfaces and only during periods of favorable weather. Painting shall not be performed when the atmospheric temperature is below forty degrees (40°) Fahrenheit; or when freshly painted surfaces may become damaged by rain, fog, or condensation; or when it can be anticipated that the atmospheric temperature will drop below forty degrees (40°) Fahrenheit, during the drying period. No work shall be done when fog restricts visibility to less than one mile.
  - g. Surfaces, which are to receive traffic stripes and pavement markings, shall be cleaned of all dirt and loose material.

### **CONFLICTS**

- 3616 Traffic stripes shall be painted to the lines established by the City Engineer or their authorized representative, and will consist of existing stripes of control points spaced at two hundred feet (200') on tangents and fifty feet (50') on curves. All work necessary to establish satisfactory lines for stripes, when required, shall be performed by the Contractor at Contractor's expense.
- 3617 Correction of minor irregularities shall be accomplished by the application of cat tracks or dribble lines, the use of laser guidance devices, or by a combination of these techniques.
- 3618 Cat tracking shall consist of stretching a rope on a straight line between control points on tangent alignment and on a true arc through control points on curved alignment, and placing spots of

paint along the rope. The spots shall be not more than three inches (3") in width and not more than five feet (5') apart on curves or ten feet (10') apart on tangents.

- 3619 Dribble lines shall consist of marking the pavement with a thin line of paint using a striping machine or other suitable device. Dribble lines shall be on a straight line between control points on tangent alignments, and on a true arc through control points on curved alignments.
- 3620 Paint for cat tracks and dribble lines shall be the same color as the traffic stripe for which they are placed.
- 3621 Abrupt breaks in alignment between broken segments will not be permitted.
- 3622 The City Engineer or their authorized representative shall be the sole judge of the accuracy and acceptability of the alignment of work performed by the Contractor.

#### **TRAFFIC LINE PAINT REMOVAL**

- 3623 Removal shall be accomplished by a grinding method acceptable to the City Engineer. Wet or dry sandblasting shall not be an acceptable alternative unless approved prior to the start of construction by the City Engineer or their authorized representative. Once ground, existing pavement shall be sealed per the requirements of the City Engineer or their authorized representative.

#### **CHANGE IN WORK**

- 3624 The City Engineer or their authorized representative shall inspect completed striping, pavement markings, and sealing of pavement grinding locations, and shall inform the Contractor of any faulty methods or unsatisfactory results.
- 3625 Striping and pavement markings considered unsatisfactory shall be repainted and reflectorized at the Contractor's expense, and the City Engineer or their authorized representative shall be the sole judge as to the acceptability of the completed work.
- 3626 Work performed to seal areas of existing pavement where traffic line paint was removed by grinding that is considered unsatisfactory shall be repainted and reflectorized at the Contractor's expense, and the City Engineer or their authorized representative shall be the sole judge as to the acceptability of the completed work.