

SECTION 634 TRAFFIC CONTROL

634.1 DESCRIPTION

This work consists of furnishing, installing and maintaining required traffic control devices.

634.2 MATERIALS

Metallic barrels or drums will not be allowed.

Traffic control devices shall conform to the requirements of Section 984, the MUTCD, and Standard Highway Signs, issued by FHWA. Designated construction and maintenance work zone traffic control warning devices shall be sheeted with micro-cube corner prismatic fluorescent orange material. This shall include all black on orange construction and maintenance work zone traffic control warning signs (all W and G series signs), object markers, and delineators. There are exceptions for Type I, II, and III barricades, vertical panels, and detour signs which shall be sheeted with micro-cube corner prismatic nonfluorescent orange and white material or Type III high intensity sheeting meeting the requirements of ASTM D 4956.

Paint used for temporary pavement marking shall be a commercial grade traffic paint manufactured for use in marking pavements.

Glass beads shall be used to reflectorize the temporary traffic paint. The glass beads shall conform to the requirements of Section 981.

634.3 CONSTRUCTION REQUIREMENTS

- A. General:** The Contractor shall furnish, install and maintain required pavement marking material, barricades, lighting devices, flags, channelizing devices, signals, signs, markers, and delineators. The Contractor shall provide a sufficient number of flaggers and take necessary precautions for protection of the workers, work area and the safety of the traveling public.

Standards for flaggers and flagging practices shall conform to Part VI of the MUTCD. The Contractor shall provide each flagger with a copy of the "Traffic Flagging Handbook" booklet. These booklets are available from the Department.

The Contractor shall furnish certified flaggers to perform project traffic control. The minimum age for flaggers shall be 18 years old. Flagger training and certification is available at Department Area offices and from the Associated General Contractors (AGC). All flaggers shall complete a flagger training course and pass a written test to become certified. All flaggers shall be certified prior to flagging on the project. Flaggers shall carry proof of certification while flagging on Department projects.

All flaggers are required to wear a vest, shirt, or jacket that is yellow, orange, strong yellow green, or a fluorescent variation of these same colors. A strong yellow green, orange, or fluorescent strong yellow green hard hat, hard hat cover, or cap should be worn to increase visibility to approaching traffic.

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The vest, shirt, jacket, hard hat, hard hat cover, and cap shall be retroreflective when used after dark. Flagger work stations shall be illuminated after dark.

Flaggers shall be properly equipped with a STOP/SLOW sign for the control of traffic. The sign should be mounted on a staff from five to seven feet long, from the bottom of the sign to the ground. All devices and their use shall comply with Part VI of the current MUTCD, unless otherwise specified in this provision.

All traffic control devices shall be kept in proper position, clean, and legible at all times. Damaged devices shall be replaced without undue delay. The Contractor shall make inspections after dark to verify that the overall traffic control system is adequate and that all devices are legible at night.

Shadow vehicles shall be used for brooming operations unless otherwise directed. They shall be a four wheel motor vehicle with a flashing amber light and shall have a "ROAD MACHINERY AHEAD" sign mounted in a prominent position, visible to approaching traffic. The broom shall be equipped with a flashing amber light.

Barricades, delineators, vertical panels, cones, drums, and tubular markers used to separate opposing traffic shall be bi-directional.

Traffic control devices shall be promptly removed or covered when the need for such devices no longer exists.

Warning lights shall be six to eight inches (150 mm to 200 mm) in diameter and operate during hours when the hazard or regulation exists. Continuous operation 24 hours a day is required when the hazard or regulation is in existence throughout this period.

When used in conjunction with signs, the warning light shall not be located within the face of the sign, nor more than 12 inches (300 mm) above the top of the sign. When used with barriers and channelizing devices, the warning light shall be at least three feet (900 mm) and not more than six feet (1800 mm) above the pavement.

B. Temporary Pavement Marking:

Temporary pavement markings shall be maintained in good condition until the permanent striping is in place, or until final acceptance of the project.

- 1. Temporary Pavement Marking Tape Type 1** will generally be limited to temporary striping and temporary marking on pavement to be removed or covered with an additional lift or for other uses that do not require removal of the tape. It may also be used and subsequently removed on tangent sections along normal lane line locations.
- 2. Temporary Pavement Marking Tape Type 2** is required on all temporary lane transitions and tapers involving pavement that is the final driving surface.

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- 3. Temporary Centerline and No Passing Zones:** All roadways open to traffic (including newly paved and roto milled surfaces, asphalt surface treatment, seal, prime, and tack coats) shall have temporary dashed centerline markings, no passing zone markings, and applicable lane lines placed prior to nightfall. Interstate highways shall also be marked with edge lines. All markings shall be placed prior to nightfall.

Unless otherwise shown on the plans, centerline and the applicable lane lines may be temporarily marked by removable road markers, pavement marking tape, or traffic paint.

No passing zones may be temporarily marked by removable road markers, Do Not Pass/Pass With Care signs, pavement marking tape, or traffic paint. Do Not Pass/Pass With Care signs may only be used to delineate no-passing zones for 3 calendar days or less, or for longer periods on low volume roads (<750 ADT).

The material used to mark the no passing zone stripes shall be the same type of material used to mark the temporary dashed centerline.

The pavement marking paint shall be applied at a minimum wet thickness of 15 mils, equivalent to a dry thickness of 7 to 8 mils (0.381 mm, equivalent to a dry thickness of 0.178 mm to 0.203 mm). Glass beads shall be applied on the wet paint line at a minimum of six pounds of glass beads per gallon of paint (0.720 kg of glass beads per Liter of paint).

Restriping of temporary pavement markings to meet the intentions of this requirement and to provide a quality retroreflective line shall be at the expense of the Contractor with no additional cost to the Department. Sections to be restriped shall be determined by the Engineer.

The material used to mark the no passing zone stripes must be consistent with the material used to mark the temporary dashed centerline.

Roads with current traffic volumes of 750 ADT or more:

Do Not Pass/Pass With Care signs may be used to delineate no passing zones for three calendar days. After three calendar days no passing zones must be marked with temporary pavement marking tape, temporary road markers, or traffic paint.

Roads with current traffic volumes of less than 750 ADT:

Do Not Pass/Pass With Care signs may be used to delineate no passing zones for 14 calendar days. After 14 calendar days the no passing zones must be marked with temporary pavement marking tape, temporary road markers, or traffic paint.

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The Engineer will determine locations and limits of no passing zones in accordance with Part III of the MUTCD.

- C. **Materials for Temporary Pavement Marking:** Temporary pavement marking tape, temporary road markers, or commercial grade reflectorized pavement marking paint shall be of the type specified.

Temporary pavement markings shall be of the color specified.

1. **Temporary Pavement Marking Tape** shall be applied according to the manufacturer's recommendations. Tape used for dashed centerline marking shall be applied in four inches (100 mm) widths, four feet (1.2 meters) long at intervals of 40 feet (12 meters). A two foot (600 mm) stripe with a interval of 20 feet (six meters) may be used for roadways with severe curvature. Solid stripes shall consist of tape applied in four inch (100 mm) widths for the length specified.
2. **Temporary Road Markers** shall be applied according to the manufacturer's recommendations. Markers may be used in place of tape or paint and shall be retroreflectorized.

In broken line segments, a group of three markers, evenly spaced a maximum of three feet (one meter) apart, will represent the stripe. A solid stripe will be represented by a five foot (1.5 meter) spacing. The group spacing will be measured from center marker to center marker not exceeding 40 feet (12 meters).

On asphalt seal projects temporary road markers shall not be placed more than 24 hours prior to covering the inplace markings on the surface. The protective marker covers shall not be removed until after all oil within two feet (600 mm) of the markers has been applied and rolling has been completed.

3. **Painted temporary pavement marking** shall be applied as follows: Dashed centerline markings shall be applied in four inch (100 mm) widths four feet (1.2 meters) long at intervals of 40 feet (12 meters). A two foot (600 mm) stripe at intervals of 20 feet (six meters) may be used for roadways with severe curvature. Solid stripes shall be four inches (100 mm) wide for the length specified or required.

When painted temporary pavement marking is used to mark asphalt surface treatment or asphalt flush seal activities, to assure proper alignment, temporary road markers shall be placed at a 200 foot (60 meter) spacing prior to the start of work. The markers shall be placed accurately on the roadway centerline. The painted temporary pavement markings shall be accurately placed on the roadway centerline following completion of the surface treatment on both lanes of a two-lane roadway.

When only one lane of a two-lane roadway is complete at the end of a day the temporary marking shall be placed near centerline on the unsurfaced portion of the roadway.

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When painted temporary pavement markings are applied to the final surfacing lift the markings shall be placed with enough accuracy to ensure that the temporary markings will be covered by the permanent pavement markings. Misplaced markings shall be removed at the Contractors expense.

- D. Removal of Pavement Markings:** Pavement markings to be removed shall be designated by the Engineer.

Pavement markings shall be removed from the pavement by methods that do not damage the surface or texture of the pavement. Pavement markings shall be removed before the traffic pattern is changed.

Covering the markings is not acceptable removal.

Sand or other material used for removal shall be disposed of as the work progresses. Accumulations of sand or other material which interferes with drainage or constitutes a hazard to traffic will not be permitted.

When sand blasting is used for removal of pavement markings or objectionable material, and the removal operation is performed within 10 feet (three meters) of a lane occupied by the traveling public, the residue including dust shall be removed immediately by a vacuum attachment operating concurrently with the sand blasting operation.

Damage to the pavement surface caused by pavement marking removal shall be repaired at the expense of the Contractor.

634.4 METHOD OF MEASUREMENT

Traffic control will be inventoried throughout the duration of the project. A record of the number and type of signs, channelizing devices, the number of flagger hours, and pilot car hours will be kept. The total units of traffic control devices, hours of flagging, and pilot car hours shown in the contract is estimated and may be adjusted in accordance to the needs of the project.

634.5 BASIS OF PAYMENT

Payment for traffic control will be made following satisfactory installation and will be the assigned unit value of the device multiplied by the contract unit price per unit. The assigned unit value for each traffic control device will be obtained from the sign tabulation in the plans. Payment will be full compensation for installation, maintenance, relocation, and removal.

Additional payment will not be made for any traffic control device turned away, covered up, taken temporarily out of service, and returned to use. If a traffic control device is relocated because of an error in the plans or by the Engineer, an additional 50 percent of the designated sign rate will be paid. Failure to maintain, relocate, or remove traffic control devices as required will result in monies being deducted from future estimates.

The cost of shadow vehicles, Type I and Type II barricades, cones, tubular markers, vertical panels,

drums, lighting devices, flags, delineators, and other items noted on the plans shall be included in the lump sum contract unit price for traffic control, misc.

At locations shown on the plans to be paid for by the linear foot (0.1 meter), payment for temporary pavement markings will be made at the contract unit price per linear foot (meter).

Measurement and payment for temporary pavement marking will be by the mile (kilometer). Payment will be inclusive of all costs for the temporary dashed centerline, lane lines, no passing zone lines, and Do Not Pass and Pass with Care signing (if utilized).

Each surfacing lift or surfacing treatment receiving temporary pavement marking will be measured to the nearest tenth mile (100 meter) increment for payment. If a single set of temporary roadway markers is utilized on multiple surfacing courses, payment will be made as though each course was marked separately.

The cost of temporary pavement marking of sections of the roadway due to asphalt tack application will be incidental to other items of work. When only one lane of the final surface course or treatment on a two-lane roadway is complete at the end of a day the temporary marking placed near centerline on the unsurfaced portion of the roadway will not be paid for.

Hinged signs and signs with tabs, such as right and left signs will be paid for as one sign.

Flagging: The accepted number of flagging hours will be paid for at the rate specified in the Price Schedule for Miscellaneous Items.

Pilot Car: The accepted number of pilot car hours, including driver and auxiliary signs, will be paid at the rate specified in the Price Schedule for Miscellaneous Items.