

Portable Changeable Message Signs will be paid for at the contract bid price per Unit-Day. Payment will be made at the unit bid price for any portion of a day during which these devices were actually used on the project.

**850.82 Payment Items.**

|         |   |              |
|---------|---|--------------|
| 851.    | Safety Controls for Construction Operations   | Lump Sum     |
| 852.    | Safety Signing for Construction Operations  | Square Meter |
| 853.    | Portable Barricade Type III   | Each         |
| 853.1   | Portable Breakaway Barricade Type III   | Each         |
| 853.2   | Temporary Precast Concrete Median Barrier   | Meter        |
| 853.21  | Temporary Precast Concrete Median Barrier, Removed and Reset                            | Meter        |
| 853.41  | Temporary Impact Attenuator for Shoulder, Incapable of Redirection                      | Each         |
| 853.411 | Temporary Impact Attenuator for Shoulder,<br>Incapable of Redirection, Remove and Reset | Each         |
| 853.42  | Temporary Impact Attenuator for Shoulder, Capable of Redirection                        | Each         |
| 853.421 | Temporary Impact Attenuator for Shoulder,<br>Capable of Redirection, Removed and Reset  | Each         |
| 853.43  | Temporary Impact Attenuator for Median, Incapable of Redirection                        | Each         |
| 853.431 | Temporary Impact Attenuator for Median,<br>Incapable of Redirection, Removed and Reset  | Each         |
| 853.44  | Temporary Impact Attenuator for Median, Capable of Redirection                          | Each         |
| 853.441 | Temporary Impact Attenuator for Median,<br>Capable of Redirection, Removed and Reset    | Each         |
| 853.5   | Temporary Anti-Glare Screen (Paddle Type)   | Meter        |
| 853.6   | Temporary Anti-Glare Screen, Removed and Reset  | Meter        |
| 853.7   | Temporary Anti-Glare Screen, Removed and Stacked  | Meter        |
| 854.    | Temporary Raised Pavement Markers   | Each         |
| 854.014 | Temporary Pavement Markings - 100 mm (Painted)  | Meter        |
| 854.016 | Temporary Pavement Markings - 150 mm (Painted)  | Meter        |
| 854.024 | Temporary Pavement Markings - 100 mm (Non-Removable Tape)                               | Meter        |
| 854.026 | Temporary Pavement Markings - 150 mm (Non-Removable Tape)                               | Meter        |
| 854.034 | Temporary Pavement Markings - 100 mm (Removable Tape)                                   | Meter        |
| 854.036 | Temporary Pavement Markings - 150 mm (Removable Tape)                                   | Meter        |
| 854.1   | Pavement Marking Removal - Paint  | Square Meter |
| 854.2   | Pavement Marking Removal - Thermoplastic  | Square Meter |
| 854.3   | Pavement Marking Removal - Tape   | Square Meter |
| 854.4   | Pavement Marking Masking (Removable Tape)   | Square Meter |
| 855.1   | Hazard Identification Beacon Type B   | Each         |
| 855.2   | Hazard Identification Beacon Type D   | Each         |
| 856.    | Special Lighting Unit (Flashing Arrow)  | Unit-Day     |
| 856.12  | Portable Changeable Message Sign  | Unit-Day     |
| 859.    | Reflectorized Drum  | Drum-Day     |
| 859.1   | Reflectorized Drum with Flasher (Type A)  | Drum-Day     |
| 859.2   | Reflectorized Drum with Light (Type C)  | Drum-Day     |
| 151.    | Gravel Borrow   | Cubic Meter  |

**SECTION 860**

**REFLECTORIZED PAVEMENT MARKINGS**

**DESCRIPTION**

**860.20 General.**

This item of work consists of furnishing materials and the application of Reflectorized Pavement Markings in accordance with the “Manual on Uniform Traffic Control Devices,” current edition.

**MATERIALS**

**860.40 General.**

Materials shall be as specified under the particular payment item being used and shall meet the appropriate requirements specified in the following Subsections of Division III, Materials:

|  |          |
|--|----------|
| General Requirements for Paints and Protective Coatings  | M7.00.00 |
| White Thermoplastic Reflectorized Pavement Markings      | M7.01.03 |
| Yellow Thermoplastic Reflectorized Pavement Markings     | M7.01.04 |
| Glass Beads  | M7.01.07 |
| Preformed Permanent Plastic Pavement Markings or Legends | M7.01.18 |
| Thermoplastic Pavement Marking Compound, Alkyd           | M7.01.20 |
| Green Pavement Coatings                                  | M7.01.21 |
| Fast Drying White Water-borne Traffic Paint              | M7.01.23 |
| Fast Drying Yellow Water-borne Traffic Paint             | M7.01.24 |

**CONSTRUCTION METHODS**

**860.60 Equipment.**

All equipment used for the application of pavement markings shall be of standard commercial manufacture. All other equipment and devices necessary for the application of the pavement markings and protection thereof and for the protection to the traveling public shall be as usually required for work of this type and shall be furnished by the Contractor.

The pavement marking equipment shall be operated at the speed and in accordance with other requirements of the manufacturer, unless otherwise directed by the Engineer.

Truck mounted equipment is approved for the application of pavement markings except in such cases where in the Engineer’s judgment travel will be unreasonably delayed and/or the quality of the work performed by the machine is unsatisfactory.

**860.61 Layout of Work.**

A schedule of pavement marking operations shall be furnished by the Contractor for the approval of the Engineer prior to the application of any pavement markings. This schedule must be in the office of the Engineer seven days prior to the proposed date of application of any pavement markings.

The Engineer will provide at a convenient location on the roadway a line of reference for use by the Contractor in establishing the location of the markings. The line of reference shall be at a maximum of 15 meter intervals by means deemed satisfactory by the Engineer. All markings shall follow the line of reference without deviation. Any line deviating from the establishing control or of incorrect width shall be reapplied, as directed by the Engineer in accordance with Subsection 860.62.

**860.62 Application of Markings.**

Pavement markings shall be applied as follows:

|  |  |  |                    |
|--|--|--|--------------------|
|  | Material Application<br>Temperature (°C) |  | Reflectorized Bead |
|--|--|--|--------------------|

| Material |           | Line Thickness (mm) | Application                    |
|----------|-----------|---------------------|--------------------------------|
| M7.01.03 | 205 - 220 | 3.2 - 4.8           | 0.50 kg/m <sup>2</sup> drop on |
| M7.01.04 | 205 - 220 | 3.2 - 4.8           | 0.50 kg/m <sup>2</sup> drop on |
| M7.01.23 | 4 - 50    | 0.4                 | 0.75 kg/l                      |
| M7.01.24 | 4 - 50    | 0.4                 | 0.75 kg/l                      |

No thinners shall be used for the above listed pavement marking applications except in accordance with the manufacturer's specifications at the direction of the Engineer.

No paint or pavement marking material shall be heated above the temperature marked on the container.

Markings shall be applied only in seasonable weather and in accordance with good painting practices. The surface shall be dry and free of sand, grease, oil or other foreign substances prior to the application. The Contractor shall prepare the surface to accept the application as part of this item, with no additional compensation. The Engineer will make the final determination for all of the foregoing.

Bituminous concrete pavements shall have been in place for 48 hours prior to the applications of pavement markings except preformed permanent plastic pavement markings which can be applied immediately. When it is necessary to expedite the flow of traffic, the Engineer may reduce the waiting period as is deemed necessary.

If for any reason material is spilled or tracked on the highway, or any markings applied by the Contractor, in the Engineer's judgement, fail to conform to Subsection 860.61, because of a deviation from the desired pattern, the Contractor shall remove such material by a method that is not injurious to the roadway surface and is acceptable to the Engineer, and clean the roadway surface and prepare the surface for a reapplication of markings and reapply the markings as directed without additional compensation for any of the foregoing corrective operations.

The ambient (air) temperature for thermoplastic application is to be a minimum of 7 °C and rising at the time of marking operations. If work has started and air temperatures fall below 7 °C and continuous cooling is indicated, work shall be stopped. In cool weather conditions, temporary drops down to 4 °C will be tolerated, providing temperatures also vary upwards. Sustained striping (greater than one hour) at 4 °C shall not be allowed. Starting work at air temperatures lower than 7 °C shall not be allowed.

**860.63 Protection of Markings.**

Markings shall remain protected until sufficiently dry to bear traffic on highways that are open to traffic. Markings shall be protected by traffic cones of not less than 700 millimeters in height except in the case of markings which cure to a no track condition in 180 seconds or less in the latter case protection may be provided by a convoy of vehicles with suitable warning devices to warn overtaking or oncoming traffic that the pavement marking operation is in progress.

**A. Broken Lines.**

On tangents and on curves of 300 meter radius or greater at least 1 cone shall be placed on every other bar. On curves of less than 300 meter radius 1 cone shall be placed on every bar unless otherwise directed by the Engineer.

**B. Solid Lines.**

On tangents and on curves of 300 meter radius or greater, cones shall be spaced not over 25 meters apart and on curves of less than 300 meter radius the spacing shall be not over 15 meters unless otherwise directed by the Engineer. On edge line adjacent to the median wider spacing may be used at the direction of the Engineer. In order to control the proper positioning of the cones during the drying period, the Contractor shall assign sufficient personnel as determined by the Engineer. Such control is dependent on traffic density, cone widths, etc.

**860.64 Accommodation of Traffic.**

All warning signs and traffic control devices as required shall be in accordance with Section 850 of these Specifications.

No work shall be done on this item on roadways open to traffic on Saturdays, Sundays, the day before a holiday or on a holiday except when otherwise specifically directed by the Engineer.

Both lanes of two-lanes highways shall remain open to traffic at all times. On multi-lane highways only one lane shall be closed to traffic at any time.

Work under this item may be suspended, at the discretion of the Engineer, during peak traffic hours or at any other time when, in his/her judgment, traffic is being unduly hampered or delayed by the work, under this item.

### COMPENSATION

#### **860.80 Method of Measurement.**

Markings are to be paid for on the actual length of lines applied under the various items of the Contract.

The length of solid lines will be obtained by:

1. Calculation from established base line stations or
2. Use of a measuring wheel or
3. Vehicle odometer readings.

The length of broken lines (except for broken lines less than 3 meters, the actual length shall be used) will be obtained by using 1/4 of the results obtained above for solid lines. Patterns, other than lines, are to be paid for by the square meter area under the item in the Contract.

#### **860.81 Basis of Payment.**

The work under these items will be paid for at the contract unit price under each item of the Contract based on the measurements as determined by the Engineer.

The contract prices shall include all material, labor, and equipment required or incidental to the satisfactory completion of the work.

#### **860.82 Payment Items.**

|               |   |              |
|---------------|---|--------------|
| 860.10-860.30 | * ___ millimeter Reflectorized White Line (Painted)         | Meter        |
| 861.10-861.30 | * ___ millimeter Reflectorized Yellow Line (Painted)        | Meter        |
| 864.00        | Pavement Arrow Reflectorized White (Painted)                | Square Meter |
| 864.01        | Pavement Arrow and Legends Reflectorized White Tape (Inlay) | Square Meter |
| 864.02        | Pavement Arrow and Legends (Surface Applied Tape)           | Square Meter |
| 866.10-866.30 | * ___ millimeter Reflectorized White Line (Thermoplastic)   | Meter        |
| 867.10-867.30 | * ___ millimeter Reflectorized Yellow Line (Thermoplastic)  | Meter        |
| 870.100       | 100 millimeter White Reflective Tape (Inlay)                | Meter        |
| 871.100       | 100 millimeter Yellow Reflective Tape (Inlay)               | Meter        |
| 872.100       | 100 millimeter White Reflective Tape (Surface Applied)      | Meter        |
| 873.100       | 100 millimeter Yellow Reflective Tape (Surface Applied)     | Meter        |
|               | * ___ (100 millimeters - 300 millimeters)                   |              |