

# 800's – Permanent Traffic Safety and Guidance Devices

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## Section 00810 – Metal Guardrail

This work consists of constructing metal guardrail and metal median barrier.

### Quality

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that the Contractor is aware of those requirements and furnishes quality documentation before the material is incorporated.

Inspect the delivered materials for damage or defects. Also ensure that the finished installation exhibits the specified line and grade, and that the posts have firm foundations to prevent settlement and loss of structural capacity.

Gather and submit required quality documentation.

### Construction

Guardrail provides an important safety feature on roadways and must be properly constructed.

Ensure that:

- Guardrail locations have been located and marked, and both the Contractor and Inspector understand the markings. Review the marked locations to ensure that the guardrail installation will protect traffic and structures.
- The installation locations have been reviewed for conflicts with buried facilities and utilities have located buried facilities, as appropriate.
- When guardrail is installed after final surfacing, the edge of pavement extends to the specified location related to the guardrail and does not protrude beyond the front face of posts. Prior planning will prevent the cutting or patching of surfacing.
- When surfacing is constructed after the guardrail is constructed, the surfacing is constructed to the limits shown in the contract documents.
- Wood posts do not have excessive seasoning checks. No individual check can exceed ½ inch, whether or not other seasoning checks are evident.

- Posts and anchors are installed and damaged material is repaired or replaced, as specified.
- The material around each post or anchor is compacted as specified to ensure performance of the guardrail installation.
- The height of the installation is as specified.
- The specified end treatments and anchors are used.
- All damage to coatings has been repaired as specified.
- Rail members are lapped so that exposed ends do not face approaching traffic, except as allowed by specification.
- All fasteners and elements are tightened as specified.
- If required, delineators are installed as specified.
- The Contractor cleans up and disposes of unwanted material.
- Affected areas are smoothed and finished as specified.

### **Measurement**

Unless specified otherwise, measurement is by length. Measure and record the length of guardrail by either the count or length method, as specified. As work is performed, sketch and total the length of guardrail installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

### **Section 00811 – Cable Barrier**

This work consists of furnishing and installing cable barrier.

### **Quality**

Quality requirements are specified and in the [Qualified Products List](#).

Check that the Contractor is aware of those requirements and furnishes quality documentation before the material is incorporated.

Inspect the delivered materials for damage or defects. Also ensure that the finished installation exhibits the specified line and grade, and that the posts/terminals have firm foundations to prevent settlement and loss of structural capacity.

Gather and submit required quality documentation.

## Construction

Cable barrier provides an important safety feature on roadways and must be properly constructed.

Ensure that:

- Barrier locations have been located and marked, and both the Contractor and Inspector understand the markings.
- The installation locations have been reviewed for conflicts with buried facilities and utilities have located buried facilities, as appropriate.
- The posts/post bases, cable, terminals, and fittings are installed per manufacturer's instructions to ensure performance of the barrier installation.
- The height of the installation is as specified.
- The specified terminals are used.
- All damage to coatings and components have been repaired as specified.
- All fasteners and elements are tightened as specified.
- The specified tension log is kept and submitted.
- If required, delineators are installed as specified.
- The Contractor cleans up and disposes of unwanted material.
- Affected areas are smoothed and finished as specified.

## Measurement

Unless specified otherwise, measurement is by length. Measure and record the length of barrier as specified. As work is performed, sketch and total the length of barrier installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00812 – Adjusting Guardrail

This work consists of adjusting existing guardrail by raising it to the proper height.

## Quality

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Ensure that the Contractor is aware of those requirements and furnishes quality documentation before the material is incorporated.

Gather and submit required quality documentation.

## Construction

Ensure that:

- Locations of the adjustment work are located and marked and both the Contractor and Inspector understand the markings.
- If the Contractor removes guardrail components to accomplish the adjustment, it reinstalls all components during the same day they are removed or uses concrete barrier as a temporary guardrail installation.
- If existing materials are not approved by the Project Manager for reinstallation or adjustment, work with the Project Manager to establish requirements for replacement materials.
- The Contractor uses a specified method to raise the elevation of the installation.
- Material is placed and compacted under the bottom of the adjusted post to prevent settlement.
- Material is placed and compacted around the adjusted post to keep the installation vertical and provide required lateral support.
- The height, line, and grade of the adjusted installation are as specified.
- All fasteners and elements are tightened as specified.
- If required, delineators are reinstalled on the guardrail as specified.
- The Contractor cleans up and disposes of unwanted material.
- Affected areas are smoothed and finished.

## Measurement

Unless specified otherwise, measurement is by length. Measure and record the length of guardrail by either the count or length method. As work is performed, sketch and total the length of guardrail installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00820 – Concrete Barrier

This work consists of constructing concrete barrier, either precast or cast in place.

### Quality

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation and/or test results before the material is incorporated.
- ODOT inspects the casting work, as required.
- ODOT performs verification testing as required.

Ensure that:

- Barriers are marked, as required, so that quality documentation can be matched and related to the applicable barriers.
- The barrier conforms to contract requirements, especially if it was salvaged (free of visible cracks, chips, spalls, or corroded loops, of uniform surface texture and appearance, free of markings, other than those specified, and given 2 coats of water-based coating after installation).
- All Contractor caused damage is repaired.
- The Contractor measures the top and face surfaces with a straightedge, as specified, to ensure specified smoothness and corrects all deficiencies in surface tolerance.

Gather and submit required quality documentation.

### Construction

Ensure that:

- Barrier locations have been located and marked, and both the Contractor and Inspector understand the markings.
- Line and grade of the surfacing at the barrier locations are as specified, and require correction of the surfacing if not as specified.

- For cast in place barrier:
  - The underlying surface is cleaned.
  - Specified line and grade is established.
- Forms or equipment for construction are effective and functional.
- Reinforcement size, grade, lap, ties, depth, spacing, and minimum clearance are as specified.
- Construction, contraction and expansion joints are located and constructed as specified.
- Appurtenances are placed and secured as specified.
- The concrete is mixed, placed, cured, finished, and protected as specified.
- Concrete is not placed, without prior approval of the Project Manager, if the air temperature is below 35° F.
- Concrete is placed within 90 minutes of batching and mixing.
- If temperature is expected to drop below 35° F during the first 5 days after placement, the Contractor has a process and devices on site to protect the concrete. The exposed surfaces of the concrete mixture are protected immediately after final floating, surface finishing and edging for at least 7 calendar days to prevent moisture loss either by:
  - Application of an approved curing membrane-forming compound is as specified.
  - Placement of other materials, as specified, to prevent loss of moisture from the concrete mixture and to prevent damage to the concrete surfaces.
- **THE INSPECTOR MUST REMAIN ON-SITE UNTIL THE CURE IS COMPLETELY IN PLACE.**
- Surface finishing is as specified.
- If the structural integrity of any barrier is reduced by damage, etc., the barrier is not incorporated into the work.
- The specified end treatments or sections are used or constructed.
- All damage is repaired as specified.
- Reflector devices are installed when specified.
- The barriers are cleaned and painted as specified.
- The Contractor cleans up and disposes of unwanted materials.

## Measurement

Unless specified otherwise, measurement is by length. Measure or count the barrier sections and record the length of barrier as specified. As work is performed, sketch and total the length of barrier installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00822 – Glare Shields

This work consists of installing glare shields on concrete median barrier.

### Quality

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that the Contractor is aware of those requirements and furnishes acceptable quality documentation before the material is incorporated.

Gather and submit required quality documentation.

### Construction

Ensure that:

- The locations for the work are identified and marked, and both the Contractor and Inspector understand the markings.
- The Contractor understands and follows the manufacturer's instructions for installing the glare shields.
- The Contractor does not cause detrimental damage when drilling holes or installing anchor devices in the barrier.
- The glare shields are installed at the specified angle to traffic.
- The glare shields are installed vertical and in-line, as specified.
- All elements in a continuous run are of the same manufacture and like appearance.
- The Contractor repairs all damage from the work.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement is by length. Measure and record the length of shield as specified. As work is performed, sketch and total the length of shield installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00830 – Impact Attenuators

This work consists of furnishing and installing impact attenuators.

### Quality

Quality requirements are specified, in the [Qualified Products List](#), and the [Non-Field Tested Materials Acceptance Guide](#).

Check that the Contractor is aware of those requirements, performs testing when required, and provides acceptable quality documentation before the material is incorporated.

Gather and submit required quality documentation.

### Construction

Ensure that:

- The installation has been located and marked, and both the Contractor and Inspector understand the markings.
- Concrete elements are of the dimensions and are constructed as specified.
- The installation is constructed according to manufacturer directions and recommendations.
- The Contractor cleans up and disposes of unwanted materials.
- Affected areas are smoothed, restored, and repaired if needed.

### Measurement

Unless specified otherwise, measurement is by the unit (each) basis. Count each location where the attenuator is constructed. Sketch and calculate the number of attenuators completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00840 – Delineators and Milepost Markers

This work consists of furnishing and installing delineators or milepost markers.

### Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that the Contractor is aware of those requirements and submits acceptable quality documentation before the material is incorporated.

Gather and submit required quality documentation.

### Construction

Ensure that:

- Locations of installations are accurately marked, including the distance from the pavement, and both the Contractor and Inspector understand the markings.
- Delineator spacing is as specified.
- The portion installed in the ground is driven or installed to the depth specified or recommended by the manufacturer, whichever is greater.
- If the portion installed in the ground is installed in rock, the excavated hole is of the size and depth, and the hole is filled with grout after the device is set, as specified.
- Split, cracked, or otherwise damaged devices are not left in the final installation.
- If devices will be attached to guardrail or barrier, they are attached as specified.
- Target members are secured to the support as specified.
- Mileposts are installed at the proper location and in the proper sequence.
- If galvanized parts are used, all damage is repaired as specified.
- The Contractor cleans up and disposes of unwanted material.
- The affected area is cleaned and shaped.

### Measurement

Unless specified otherwise, measurement is by the unit (each) basis. Count each location where a delineator is installed and where a milepost marker is installed. Sketch and calculate the number each of delineators and milepost markers completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00850 – Common Provisions for Pavement Markings

This work consists of furnishing, preparing, and installing all forms of pavement markings.

### Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of the quality requirements and provides quality documentation before the material is incorporated

Ensure that:

- The Contractor is furnishing only a material that is allowed in the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

### Construction

Check that:

- Prior to starting striping work, appropriate Contractor and ODOT personnel meet for the required pre-striping conference.
- Control points and guidelines are laid out and approved by the Project Manager.
- For projects without striping plans, the existing striping is documented by survey and approved by the Project Manager. Striping is installed to match existing striping.
- If required by specification, a Project Manager approved manufacturer certified installer is utilized.
- For inlaid/grooved markings, the Project Manager and manufacturer have approved of the slot.

Ensure that:

- Climatic and surface conditions are as specified for the work.
- Locations are marked, and both the Contractor and Inspector understand the markings.
- Apply pavement markings as specified and in accordance with manufacturer's instructions.
- A manufacturer's representative is present during all placement of the pavement materials, when required by the specification.
- For inlaid/grooved markings, grind and clean the slot, and place marking material, as specified.
- Existing or conflicting markings are removed.
- The area of placement is cleaned, according to the specifications and the manufacturer's recommendations.
- Primer is applied as required and specified.
- Material is prepared and placed, as required by the specifications and the manufacturer's recommendations, including that liquid materials are placed to the specified thickness.
- If installation is not done as specified, or markings are not aesthetically acceptable, require the markings to be removed and replaced to result in acceptable markings.
- Markings are protected until hardened or cured as specified.
- The Contractor cleans up and disposes of unwanted material.
- The Contractor provides the warranty specified by contract.

## **Section 00851 – Pavement Marking Removal**

This work consists of removing markings from the pavement surface.

### **Quality**

There are no quality requirements for this work. The Inspector, should record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#) or project diary.

Check with the Regional Environmental Coordinator for proper handling and disposal of grindings.

## Construction

Ensure that:

- Markings to be removed are clearly identified.
- The removal equipment contains the removed material.
- Markings are removed without damage to the pavement.
- If new markings will be constructed, the new markings are placed on the same day as the existing markings are removed.
- The Contractor repairs any damage to the pavement surface.
- The Contractor cleans up and disposes of removed material or other unwanted material.

## Measurement

The quantities for pavement line removal will be measured on the length basis to the nearest foot. The quantities of pavement bars removed will be on the area basis, measured to the nearest square foot. The quantities of pavement legends to be removed will be on the unit basis, by actual count. Measure and record the length of line removed. As work is performed, sketch and total the length removed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00855 – Pavement Markers

This work consists of furnishing and installing reflective and non-reflective pavement markers.

## Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of the quality requirements and provides quality documentation before the material is incorporated.

Ensure that:

- The Contractor is furnishing only a material that is allowed by the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

## **Construction**

Ensure that:

- Locations are accurately located, including alignment of installations, as specified.
- Existing or conflicting markers are removed as needed or specified.
- Climatic and surface conditions are as specified for the work.
- The location for each marker is prepared by the specified treatment, sandblasting, etc., including grooving of the pavement for recessed markers, and the installation area is cleaned and dry.
- Markers do not span pavement joints or cracks.
- The adhesive is prepared and placed, according to the specifications and the manufacturer's recommendations.
- Markers are aligned on the adhesive and protected until the adhesive hardens.
- Excess adhesive is removed from the exposed surfaces of the markers and pavement.
- The Contractor cleans up and disposes of unwanted material.

## **Measurement**

Unless specified otherwise, measurement is by the unit (each) basis. Count each location where a marker is installed. Sketch and calculate the number of markers completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00856 – Surface Mounted Tubular Markers

This work consists of furnishing and installing permanent surface mounted tubular markers.

### Quality

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of the quality requirements and provides quality documentation before the material is incorporated.

Ensure that:

- The Contractor is furnishing only a material that is allowed by the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

### Construction

Ensure that:

- Locations are accurately located, including alignment and spacing, as specified.
- Existing or conflicting markers are removed as needed or specified.
- Climatic and surface conditions are as specified for the work.
- The location for each marker is prepared by the specified treatment.
- The adhesive is prepared and placed, according to the specifications and the manufacturer's recommendations.
- Markers are aligned on the adhesive and protected until the adhesive hardens.
- Excess adhesive is removed from the exposed surfaces of the markers and pavement.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement is by the unit (each) basis. Count each location where a marker is installed. Sketch and calculate the number of markers completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00857 – Rumble Strips

This work consists of forming rumble strips by constructing indentations in the pavement surfacing.

## Quality

There are no quality requirements for this work. The Inspector, should record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#) or project diary.

## Construction

Ensure that:

- Locations are accurately located, including alignment, as specified.
- Climatic and surface conditions are as specified for the work.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement will be by length. Measure and record the length of rumble strip formed to the nearest 0.01 mile. As work is performed, sketch and total the length formed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00860 – Longitudinal Pavement Markings - Paint

This work consists of installing painted longitudinal pavement markings.

### Quality

Quality requirements are specified in the [Qualified Products List](#) and the [Non-Field Tested Materials Acceptance Guide](#).

Check that the Contractor is aware of those requirements and provides quality documentation before the material is incorporated.

Ensure that the Contractor is furnishing only a material that is allowed in the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

### Construction

Complete the Permanent Pavement Striping checklist for your information.

Check that:

- The locations for the painted lines will provide smooth flow and direction of traffic. If needed, ask the Region Traffic representative to review the layout.

Ensure that:

- The locations for the painted lines are marked; both the Contractor and Inspector understand the markings.
- Areas where paint is to be applied are cleaned as specified.
- Climatic and surface conditions are as specified for the work.
- Paint and beads are applied with the specified number of coats and at the specified rate. Periodically, compare the amount of stripe placed to the quantities of product used to verify minimum coverage.
- Lines are constructed within specified tolerances. If not, require the Contractor to remove and replace the unacceptable segments.
- Over open-graded HMA, a second application is made as specified.
- Dribbling or tracking of paint is cleaned up and striping is retraced as specified.
- If temporary flexible pavement markers had been installed, the Contractor removes and disposes of them.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement will be by length. Measure and record the length of marking applied. As work is performed, sketch and total the length applied daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00865 – Longitudinal Pavement Markings - Durable

## Section 00866 – Longitudinal Pavement Markings – High Performance

## Section 00867 – Transverse Pavement Markings – Legends and Bars

This work consists of applying durable and high performance longitudinal pavement marking materials, and pavement markings for legends and bars.

## Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that the Contractor is aware of those requirements and provides quality documentation before the material is incorporated.

Ensure that the Contractor is furnishing only a material that is allowed in the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

## Construction

Complete the Permanent Pavement Striping checklist for your information.

Check that:

- The locations of the permanent markings will provide smooth flow and direction of traffic. If needed, ask the Region Traffic representative to review the layout.

Ensure that:

- The locations of the permanent markings are marked; both the Contractor and Inspector understand the markings.

- A representative of the manufacturer is on the project site during this work, if required by the specification, and, among other things, approves of the application equipment and process.
- Climatic and surface conditions are as specified for the work.
- The surface on which the material is to be applied is clean and dry and has been prepared as required by specification or the manufacturer.
- The Contractor performs a test stripe, if specified.
- Do not place markings on longitudinal pavement joints.
- Application of the marking is done as required and results in the specified product. Periodically, compare the amount of line placed to the quantity of product used to verify minimum coverage.
- All applications are protected and all damage is repaired.
- The Contractor records specified measurements, including thickness of application.
- The markings are constructed to specified tolerances. If not, require the Contractor to remove and replace, or otherwise repair, the unacceptable portions.
- The retro-reflectivity is measured as specified.
- If temporary flexible markers were used, the Contractor removes and disposes of them.
- The Contractor cleans up and disposes of unwanted material.
- The Contractor provides the specified warranty.

## Measurement

Unless specified otherwise, measurement for longitudinal markings will be by length for a specified width. Measure and record the length of marking applied. If the width of marking applied is wider/narrower than specified, apply an appropriate conversion factor (e.g. double the length if the marking is twice as wide as specified). As work is performed, sketch and total the length applied daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Unless specified otherwise, measurement is by the unit (each) basis for legends. Count each location where a marking is installed. Sketch and calculate the number of markings completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Unless specified otherwise, measurement is by area basis for bars. Measure the bars to the nearest square foot. Sketch and calculate the number of markings completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.