

## SECTION 633 DELINEATORS AND MARKERS

### 633.1 Description

- (1) This section describes providing roadway delineators and markers including culvert markers and right of way markers.

### 633.2 Materials

#### 633.2.1 Steel Posts

- (1) Furnish a flanged channel section post weighing 1.12 pounds per linear foot or more before zinc coating, and made of steel with the following properties:
  - Minimum tensile strength..... 50 ksi
  - Minimum tensile yield strength ..... 36 ksi
  - Minimum elongation.....5.0 percent in 2 inches
- (2) Furnish posts the length, and with mounting holes the size and spacing the plans show. Ensure the posts are symmetrical, well rolled, and free from defects that impair their strength or appearance.
- (3) Hot-dip zinc coat the posts after completing all forming, cutting, punching or drilling. Perform zinc coating according to ASTM A123.

#### 633.2.2 Flexible Delineators and Markers

- (1) Furnish flexible delineators or markers from the department's approved products list for the application the bid item indicates. If the contract requires reflective sheeting, furnish posts with shop-applied reflective sheeting conforming to [637.2.2.1](#) and of the size plan details show.

#### 633.2.3 Hardware

- (1) Furnish galvanized steel soil anchors, nuts, bolts, washers, and other metal parts unless the contract specifies otherwise.

#### 633.2.4 Delineator Brackets

- (1) Provide either structural steel or aluminum brackets for mounting reflectors on concrete barriers or other structures. For structural steel brackets, conform to [506.2.2](#) and zinc coat the finished bracket as specified in [633.2.1](#). For aluminum brackets, conform to ASTM B221, alloy 6061-T6. Provide stainless steel stud bolts, self-locking nuts, and washers conforming to [513.2.2.5](#).

#### 633.2.5 Delineator Reflectors

- (1) Fabricate reflectors as the plans show using sheet aluminum conforming to [637.2.1.3](#) covered with type SH reflective sheeting conforming to [637.2.2.3](#).

#### 633.2.6 Right of Way Marker Plaques

- (1) Use department-furnished R/W marker plaques and survey marker informative plaques.

### 633.3 Construction

#### 633.3.1 General

- (1) Erect posts to a true vertical position and at the locations the plans show.
- (2) Install flexible delineators and markers conforming to manufacturer's recommendations for the application the bid item indicates unless the plans show otherwise. Ensure that the curved side of single curvature posts has the required marking and faces traffic.
- (3) Install steel posts by driving using equipment that does not damage the post. Replace posts bent or otherwise damaged by contractor operations.

#### 633.3.2 Delineators

- (1) Install steel delineator posts to support delineator reflectors. Use galvanized steel or aluminum delineator brackets to support delineator reflectors mounted on concrete barriers or other structures. Set posts and brackets in the locations and at the offsets the plans show or the engineer directs.
- (2) Attach each reflector securely to the supporting steel post. If placing on structures, mount brackets to locate the center of the top reflector unit at the height the plan details show.

### 633.3.3 Temporary Delineators

- (1) Provide temporary delineators conforming to the requirements for permanent installations except, if the engineer approves, the contractor may furnish serviceable used posts. Maintain during construction by replacing damaged materials. Remove and dispose of temporary delineators when no longer needed.
- (2) Upon contract completion, all temporary delineator components become the contractor's property.

### 633.3.4 Right of Way Markers

- (1) Provide right of way markers at the locations the plans show. Drive galvanized steel posts to the minimum depth the plans show, or to the depth required to provide adequate support, whichever is greater. If encountering rock above the minimum embedment depth, install as the plans show unless the engineer allows otherwise.
- (2) The contractor may splice posts above grade. Provide the overlap the plans show or more.
- (3) Attach R/W and survey marker informative plaques to the posts oriented as the plans show.

### 633.3.5 Culvert End Markers

- (1) Provide flexible culvert end markers at the locations the plans show. Use white posts and apply black non-reflective sign tape to both sides of the top nine inches.
- (2) Install posts in front of the object being marked as referenced from the direction of travel by the approaching highway traffic. Use only one marker where two or more apron endwalls are adjacent to each other.

### 633.3.6 Salvaging Material

- (1) Remove the delineator or marker the salvaged bid item indicates from the locations the contract designates. Take care to minimize damage to reusable materials. Restore the site, and dispose of unusable and surplus materials.
- (2) Sort by delineator or marker type and load reusable materials onto separate pallets. The contractor may place hardware and smaller parts in clearly labeled crates or plastic buckets. Stockpile reusable components in engineer-approved locations on the project.
- (3) The contractor may use salvaged materials for temporary installations under the contract.

### 633.4 Measurement

- (1) The department will measure bid items under this section with EACH as the unit of measure as each individual post, bracket, marker, or reflector acceptably completed except as follows:
  - The department will measure the Salvaged bid items as each individual installation including the post or bracket and associated reflector, sheeting, marking, or plaque.

### 633.5 Payment

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
633.0100	Delineator Posts Steel	EACH
633.0200	Delineators Flexible	EACH
633.0500	Delineator Reflectors	EACH
633.1000	Delineator Brackets	EACH
633.1100	Delineators Temporary	EACH
633.5100	Markers ROW	EACH
633.5200	Markers Culvert End	EACH
633.9000 - 9100	Salvaged (type)	EACH

- (2) Payment for Delineator Posts Steel and Delineators Flexible is full compensation for providing and erecting the posts; and for removing and disposing of surplus materials, contractor-damaged posts, and debris. Reflectors for use on steel delineator posts are paid for separately under the Delineator Reflectors bid item while reflective sheeting for flexible delineators is incidental to the Delineators Flexible bid item.
- (3) Payment for Delineator Reflectors is full compensation for providing reflectors, including bolts, nuts, washers, screw-nails, or other connectors required for installation.
- (4) Payment for Delineator Brackets is full compensation for providing brackets, including anchors, bolts, and gaskets. Reflectors are paid for separately under the Delineator Reflectors bid item.

- (5) Payment for Delineators Temporary is full compensation for providing, maintaining, and removing delineators. The department will not pay for replacement of temporary delineators damaged during construction.
- (6) Payment for Markers ROW is full compensation for providing markers; for excavation including rock, grout, and backfill; and for splicing.
- (7) Payment for Markers Culvert End is full compensation for providing the marker including non-reflective tape and soil anchor.
- (8) Payment for the salvaged bid items is full compensation for removing and stockpiling reusable delineators or markers; for restoring the site; and for disposing of damaged and surplus material.