

ITEM 606 GUARDRAIL

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606.01 Description. This work consists of constructing or reconstructing guardrail, guardrail posts, bridge terminal assemblies, end terminals, and impact attenuators, including the furnishing, assembling, and erecting of all component parts and materials.

Guardrail shall be deep beam rail Type 5, 5A, or 8. Appurtenances shall include bridge terminal assemblies, end terminals, and impact attenuators. Construction of the various types of guardrail include the furnishing, assembling, and erecting of all component parts and materials, complete in place, at the location shown on the plans or as directed, and according to the manufacturer's recommendations where applicable.

606.02 Materials. Furnish materials conforming to:

Concrete, Class C, F, or S.....	499 and 511
Reinforcing steel	509.02
Deep beam rail and hardware	710.06
Pressure treated guardrail posts and blockouts.....	710.14
Steel guardrail posts.....	710.15
Guardrail posts.....	710.16
Galvanizing	711.02

Use galvanized steel posts, rails, bolts, fittings, and other accessories.

For guardrail, use deep beam rail Type 5, 5A, or 8.

606.03 Setting Posts. Set or drive posts plumb in a manner that prevents battering or distorting of posts. Trim posts that are set or driven more than 1-inch (25 mm) above grade. Treat trimmed posts with a preservative material specified in 712.06. Backfill post holes with acceptable material, placed in layers, and thoroughly compacted.

Space Type 5 guardrail posts 6 feet, 3 inches (1.905 m) on center measured along the centerline of the rail and construct with blockouts. Construct each end of Type 5 guardrail barricades without blockouts and with a flared end section.

Space Type 5A guardrail posts 3 feet, 1 1/2 inches (953 mm) on center measured along the centerline of the rail and construct with blockouts. Construct each end of Type 5A guardrail barricades without blockouts and with a flared end section.

Space Type 8 guardrail posts 6 feet, 3 inches (1.905 m) on center measured along the centerline of the rail and construct with blockouts.

606.04 Erecting Rail Elements. Erect standard design (single-faced) guardrail of the type shown on the plans. Erect barrier design (double-faced) guardrail as shown on the plans.

Erect rail elements in a manner resulting in a smooth, continuous installation. Use shop-curved rail on curves with radii from 5 to 70 feet (1.5 to 22.4 m).

Except where otherwise required, such as expansion joint bolts, draw bolts tight. Tighten bolts through expansion joints as tight as possible without preventing the rail elements from sliding past one another longitudinally. Provide bolts long enough to extend at least 1/4 inch (6 mm) beyond the nuts.

Do not use splice bolts that extend more than 1/2 inch (13 mm) beyond the nuts. For double-faced guardrail, provide bolts that extend from 1/4 to 1 inch (6 to 25 mm) beyond the nuts.

Fabricate all metal in the shop. Do not perform burning or welding in the field. The Engineer may approve making holes in the field, but only for special details in exceptional cases. The Engineer may approve field punching, cutting, and drilling if the Contractor demonstrates that its methods do not damage the surrounding metal.

Repair galvanized surfaces that have been abraded such that the base metal is exposed, including threaded portions of all fittings and fasteners, and cut ends of bolts as specified by ASTM A 780.

Erect guardrail so that the bolts at expansion joints are located at the centers of the slotted holes. Splice the rail elements by lapping in the direction of traffic. Ensure that the plates at each splice make contact throughout the area of the splice.

606.05 Guardrail Rebuilt. As shown on the plans, rebuild existing guardrails. Unless otherwise shown on the plans, rebuild units of the same type and spacing of members as the existing guardrail.

For re-erecting, obtain the rail element from specified salvage sources. Furnish the following new materials: posts, blockouts, bolts, washers, and incidental hardware as necessary to complete the guardrail, except: (1) existing steel posts and blockouts that are not damaged and have a good galvanized coating may be reused, and (2) reuse guardrail splice bolts that are undamaged and were not removed during salvage may be reused.

606.06 Impact Attenuators. Before installing the attenuator, make all corresponding shop drawings from the manufacturer available for the Engineer's inspection. Include installation drawings and instructions with the shop drawings that completely describe the attenuator system.

Grade the top of each foundation at the same elevation as the adjacent travel lane and/or paved shoulder.

Adjust the location of the anchors to avoid pavement joints.

606.07 Method of Measurement. The City will measure Guardrail, new or rebuilt, of the type specified by the number of feet (meters) from center-to-center of end posts, excluding anchor assemblies. If, however, end connections are made to masonry or steel structures, the City will measure to the center of the normal post bolt slot. If rail element is used across a bridge, the City will measure to the first post off the bridge.

606.08

The City will measure Anchor Assembly of the type specified by the number each assembly furnished and erected complete.

The City will measure Bridge Terminal Assembly of the type specified by the number of each assembly furnished and erected complete.

The City will measure Impact Attenuator of the type specified by the number of each furnished and erected complete.

The City will measure Guardrail Post of the kind specified by the number of each furnished and erected.

606.08 Basis of Payment. The additional costs associated with furnishing and installing extra-length posts instead of standard-length guardrail posts are incidental to Guardrail Post, 8-foot (2.44 m) or Guardrail Post, 9-foot (2.75 m).

For the extra costs associated with furnishing and installing extra-length posts in lieu of standard-length guardrail posts, payment for 8-foot (2.44m) or 9-foot (2.75 m) guardrail posts is considered full compensation.

The City will pay for accepted quantities at the contract prices as follows:

Item	Unit	Description
606	Foot (Meter)	Guardrail, Type ____
606	Foot (Meter)	Guardrail, Barrier Design, Type ____
606	Foot (Meter)	Guardrail, Rebuilt, Type ____
606	Each	Anchor Assembly, Type ____
606	Each	Anchor Assembly, Type ____, Barrier Design
606	Each	Bridge Terminal Assembly, Type ____
606	Each	Impact Attenuator, Type ____
606	Each	Guardrail Post
606	Each	Guardrail Post, 8-foot (2.44 m)
606	Each	Guardrail Post, 9-foot (2.75 m)