

**SUPPLEMENTAL SPECIFICATION
REVISIONS TO STANDARD SPECIFICATION 606 – GUARDRAIL**

606-1 DESCRIPTION

606-1.01 Scope

- a. This work shall consist of furnishing and erecting corrugated steel beam guardrail systems and other types of metal barriers, all named collectively as guardrail, in accordance with these specifications, the NCHRP Report 350, the standard drawings and in conformity with the lines, grades, types, details and locations shown on the plans or established by the Engineer.

- b. The work shall also include, when called for in the contract documents:
 - 1. The removal and resetting of existing guardrail as shown on the plans or as ordered by the Engineer.
 - 2. The removal, storage, and delivery to the Authority or to the Department, of existing guardrail to be salvaged as shown on the plans or as ordered by the Engineer.
 - 3. The furnishing and erecting of proprietary terminals and Crash Cushions at locations shown on the plans.
 - 4. The submittal of an installation schedule for all guardrail works.

- c. The construction of the guardrail system shall include the assembly and erection of all necessary component parts and materials as required by the manufacturer and standard drawings at the locations shown on the plans or as directed by the Engineer.

- d. This work shall also consist of furnishing and erecting corrugated steel beam guardrail transition systems to be installed on existing or new transition modules in accordance with these specifications, the standard drawings and in conformity with the lines, grades, types, details and locations shown on the plans or established by the Engineer.

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606-2 MATERIALS

606-2.01 Materials for corrugated galvanized steel beam guardrail, guardrail transition sections, guardrail posts, offset blockouts and any other necessary hardware to complete the proper guardrail system installation shall conform to the standard drawings or as shown on the plans. However, the use of different guardrail blockouts, individually approved by NCHRP350, in the same section of guardrail shall not be permitted.

606-2.02 Manufactured materials, including guardrail systems, metal barriers and proprietary terminals will be accepted on the basis of the Authority's inspection and submission of a notarized manufacturer's certificates of compliance with the specifications to be furnished by the Contractor in a form meeting the requirements of Section 106.06 of the General Provisions and the Buy America Special Provision. The certification shall clearly refer to the specific materials being delivered to the project site and shall be furnished prior to starting the erection of the guardrail. The Authority reserves the right to inspect the manufacturing plant, to test such samples of materials as it deems appropriate. Failure of the Contractor to comply with the above requirements will be cause for the rejection of the guardrail.

606-2.03 All materials shall be new. The use of reconditioned used materials will not be permitted except as provided under paragraph 606-1.01b (1) above.

606-3 CONSTRUCTION REQUIREMENTS

606-3.01 Posts

- a. Posts shall be driven unless otherwise specified on the plans or by the Engineer. The driving shall be accomplished with equipment and methods that will drive the posts plumb in their final position, free of any distortion, burring or damage.
- b. When driving is not possible, the posts shall be set in dug holes which shall be backfilled with acceptable material placed in layers and thoroughly compacted with mechanical tampers. Posts shall be attached to concrete slab as indicated in the standard drawings.
- c. When posts are driven on holes cut through concrete or treated material, the Contractor shall backfill and compact the area around the post with material similar in kind and depth to that damaged or removed.

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- d. All posts shall be aligned to a tolerance of 0.6 centimeters for plumb and grade line.
- e. When required and as approved by the Engineer, posts shall be cut with a saw to obtain a clean uniform finish. The cut surface shall be painted within six inches of the cut and prior to post installation, with two coats of zinc dust, zinc oxide paint meeting the requirements of Federal Specification TT-P-641. This shall be considered as a subsidiary obligation of the Contractor.

606-3.02 Rail Elements - Rail elements shall be erected in a manner resulting in a smooth, continuous installation. Washers shall be used at the rear of the posts. All bolts shall be drawn tight with adjustment bolts to be tightened after adjustments are completed. Bolts shall be of sufficient length to extend beyond the nuts. Rail plates shall be spliced by lapping in the direction of traffic.

606-3.03 Repair of Galvanized Surfaces - Galvanized surfaces which have been abraded during handling and erection so that the base metal is exposed, threaded portion of all fittings and fasteners, and cut ends of bolts shall be painted with two coats of zinc-dust, zinc-oxide paint conforming to Federal Specification TT-P-641. This shall be considered as a subsidiary obligation of the Contractor.

606-3.04 Removing and Resetting Guardrail -

- a. The Contractor shall carefully remove and store existing guardrail sections, including posts, from the locations shown on the plans. He shall reset the reusable components at the locations shown on the plans or ordered by the Engineer.
- b. The Engineer will determine which components are reusable. Existing concrete posts and wood blockouts shall not be reused. They shall be replaced by steel posts and blockouts in accordance with the Standard Drawings.
- c. The Contractor shall replace unusable or missing components with new materials for a complete system installation as a subsidiary obligation of the Contractor under this pay item.

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- d. Reusable components that have rusted portions shall be thoroughly sanded to remove the rust and these portions shall be painted with two coats of zinc-dust, zinc-oxide paint meeting the requirements of Federal Specification TT-P-641 prior to resetting, at no extra cost.
- e. Holes left when guardrail posts have been removed, shall be backfilled with suitable material and compacted in a manner approved by the Engineer.
- f. Resetting of guardrail shall be accomplished in the same manner specified in Article 3.01, 3.02 and 3.03 above for new guardrail installations.
- g. Unusable material shall be disposed of by the Contractor away from the project site.

606-3.05 Removing, Storing and Delivering Guardrail

- a. The Contractor shall carefully remove and store existing guardrail, including posts, from the locations shown on the plans or directed by the Engineer. The work shall be done in a neat and workmanlike manner so as to salvage all reusable parts.
- b. Unusable material, such as concrete posts and wood blockouts, as determined by the Engineer, shall be disposed by the Contractor outside the project site or buried at locations within the project as approved by the Engineer.
- c. Usable materials shall be delivered by the Contractor to the location indicated by the Engineer.
- d. All holes left from removal of guardrail shall be backfilled as indicated in paragraph 606-3.04e above.

606-3.06 Proprietary Terminals

- a. Proprietary terminals shall be installed following all manufacturers' recommendations.
- b. The Contractor shall submit a copy of manufacturer's installation manual and shop drawings to the Engineer prior to the guardrail installation activities.
- c. The Contractor shall conform to the required test level and transversable clear zone shown on plans.

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- d. A notarized certificate of installation indicating full compliance with the manufacturer's installation manual shall be furnished by the Contractor to the Authority for each proprietary terminal installed in the project.
- e. Acceptance of each proprietary terminals installed on the project will be based upon inspection by the Authority, submission of a notarized manufacturers certificate of compliance and a notarized certificate of installation.

606-3.07 Installation Schedule

- a. The Contractor shall submit an installation schedule with at least fifteen (15) days in advance the works begin. Acceptance or rejection of this schedule will be issued by the Engineer within ten (10) days after the submittal. If the schedule is rejected, the Contractor shall submit a revised installation schedule within the next three (3) days for approval.
- b. The Contractor shall not begin any activity related to the installation of guardrail, without the approval of the installation schedule.
- c. The installation schedule shall be updated every fifty six (56) calendar days or when the actual prosecution of the work differs from the accepted installation schedule. Approval of the updated installation schedule will be according to paragraph a. above. No time extensions will be issued because of modifications of the original installation schedule.
- d. The installation schedule shall include:
 - 1. Location in the project where each activity occurs.
 - 2. Procedures to keep the guardrail system operational during the project construction.
 - 3. Procedures for removal of guardrail in an orderly manner.
 - 4. Procedures to avoid untreated end of barriers or roadside obstacles within the clear zone.

606-4 METHOD OF MEASUREMENT

- 606-4.01** The quantity of new corrugated steel beam guardrail measured for payment will be the number of linear meters, to the nearest tenth of a meter, of guardrail erected and accepted, measured from center to center of end posts, except where end

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connections are made to structures in which case measurement will be to the face of such structures. Single and double faced guardrails will be measured individually as they are separate pay items.

- 606-4.02** Terminals, end sections, connections, transitions and anchorages will be included in the quantity of guardrail measured as provided in Article 606-4.01 above and will not be measured separately. Proprietary terminals will be measured and paid for each one properly installed.
- 606-4.03** The removal and resetting of guardrail will be measured by the linear meter to the nearest tenth, of guardrail installed and accepted. The measurement will be made along the face of the beam of guardrail. For the removal and resetting of double face guardrail measure will be along each face of the beam through the length of guardrail (i.e. twice the length of the guard rail) This work shall includes the replacement of unusable or missing components, the utilization of reusable components and any other requirement established on article 606-3.04 at no additional cost to the Authority.
- 606-4.04** The removal, storage and delivery of guardrail will be measured by the linear meter, to the nearest tenth of a meter, of guardrail removed and delivered or disposed of as per Article 606-3.05 above, measured from center to center of end posts or structure end connection. Anchorage, terminals and end sections will not be measured separately but will be considered as included in the quantity of guardrail removed and measured as indicated herein.
- 606-4.05** Excavation and backfill will not be measured for payment but shall be a subsidiary obligation of the Contractor under the items of guardrail.
- 606-4.06** The W-Beam Strong Post (SP) guardrail transition section will be measured by the unit, which price and payment shall constitute full compensation for furnishing and installing the guardrail transition section, two nested W-Beam rail elements, single W-Beam rail element for rubrail, block for rubrail, terminal connector bearing plate, hex bolts with hardened washers and nuts, bolts and recess nuts with plain round washers, steel washers, posts, and any other works or appurtenances necessary to complete the item.
- 606-4.07** The Thrie-Beam Strong Post (SP) guardrail transition section will be measured by the unit which price and payment shall constitute full compensation for furnishing and installing the thrie-beam to W-beam transition, W-beam splice, thrie-beam guardrail blackout thrie-beams, thrie-beam terminal connectors, thrie-beam terminal connector bearing plates, hex bolts with hardened washers and nuts, bolts and recess nuts with plain round washers, steel washers, posts, and any other works or appurtenances necessary to complete the item.

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606-5 BASIS OF PAYMENT

606-5.01 The accepted quantities of the various guardrail items included in the contract, measured as provided above, will be paid for at the corresponding unit price per unit of measurement. Such prices and payment shall constitute full compensation for furnishing and installing all materials, and for all equipment, tools, labor and incidentals necessary to complete each item as required by the plans, standard drawings and specifications.

606-5.02 Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Corrugated Steel Beam Guardrail (SP), Single Face.....	Linear Meter
Corrugated Steel Beam Guardrail (SP), Double Face.....	Linear Meter
Removal and Resetting of Existing Guardrail (SP).....	Linear Meter
Removal, Storage and Delivery of Existing Guardrail (any type).....	Linear Meter
Proprietary Terminal Type _____, Test Level _____	Each
W-Beam SP with Rubrail Transition Section	Each
Thrie-Beam SP Transition Section	Each