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536 GUARDRAIL. (REV 04-09-12) (FA 4-18-12) (1-13)

SUBARTICLE 536-2.1 (Page 673) is deleted and the following substituted:

536-2.1 Guardrail: Construct guardrail of the standard W-beam or thrie beam type. Use steel materials for the rail and rail elements meeting the steel requirements of 967-1.

SUBARTICLE 536-2.2.3 (Page 673) is deleted and the following substituted:

536-2.2.3 Steel Posts: Use steel posts meeting the requirements of ASTM A36 steel. Galvanize the steel posts in accordance with the requirements of ASTM A 123, with 2 oz/ft² of zinc coating. Drill the steel posts prior to galvanizing.

The Contractor may use steel guardrail posts of either a rolled section or a welded structural shape with nominal dimensions as shown in the Design Standards.

For welded structural shapes, meet the following requirements:

(1) Ensure that the design properties of the shape meet or exceed the design properties for a W 6 x 9 shape as contained in the AISC Manual of Steel Construction.

(2) Weld in accordance with the requirements of ASTM A 769.

(3) After cutting steel posts to length, place a weld to seal the spaces between the web plate and flange plates.

(4) Galvanize as specified above after completing all drilling and welding.

SUBARTICLE 536-2.4 (Page 674)) is deleted and the following substituted:

536-2.4 Offset Blocks: Use guardrail offset blocks of either timber, steel, recycled plastic, or rubber, and of the sizes specified in the Design Standards.

Treat timber blocks in accordance with the requirements for posts in 955-5.3. Ensure that penetration of preservative is in accordance with requirements for round piles and fence posts in 955-6.2. For timber offset blocks, meet the requirements of the latest edition of the Southern Pine Inspection Bureau's Standard Grading Rules for Southern Pine Lumber, for No.1 grade timber. Dress all timber offset blocks on all four sides (S4S). Ensure that timber offset blocks do not vary more than 0.25 inch from the specified length.

Use rubber or recycled plastic blocks that have a minimum Durometer hardness of 50 (ASTM D 2240), show no cracking at the end of an ozone exposure of 100 plus or minus 10 pphm for 15 hours at 100°F (ASTM D 1149 mounting type A), do not exceed 15 points change in Durometer hardness in oven ageing for 70 hours at 158°F (ASTM D 573), and show no cutting or tearing under a 6,500 lb load applied through a guardrail section. Ensure that the blocks present a neat appearance and have plane surfaces. Provide rubber or recycled plastic blocks that are 6 inches wide, 8 inches deep and 14 inches high. Allow dimensional tolerances of

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plus or minus 5/8 inch in height, plus or minus 3/8 inch in width, and plus or minus 3/8 inch in depth.

Use recycled plastic offset blocks that meet the requirements of Section 972 and are listed on the Qualified Products List (QPL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6 and include certified test reports from an approved independent test laboratory that shows the material meets all the requirements of this Section and Section 972.

Use steel offset blocks that meet the requirements of 536-2.2.3.

SUBARTICLE 536-2.6 (Page 674) is deleted and the following substituted:

536-2.6 Certification: Provide the Engineer a certification from the manufacturer confirming that all materials (timber posts, anchor and offset blocks, reflector elements, and all other accessories) meet the requirements of this Section, Section 6 and the Design Standards. Provide the Engineer a copy of the certification at least ten days prior to guardrail construction.

For steel rail and rail elements, provide the Engineer with a certified mill analysis from the manufacturer meeting the requirements of Section 967.

For steel posts and steel offset blocks furnish the Engineer a certified mill analysis from the manufacturer showing the physical and chemical properties of each heat meeting the requirements of ASTM A-36, the amount of spelter coating, and galvanization meeting the requirements of ASTM A-123.

Also furnish the Engineer a Certificate of Compliance certifying that the guardrail system, materials and construction practices comply with applicable Design Standards and Specifications.

Acceptance of furnished material will be based on the Certificate of Compliance, material certification and visual inspection by the Engineer.

ARTICLE 536-7 (Pages 676 - 677) is deleted and the following substituted:

536-7 Basis of Payment.

536-7.1 Guardrail: Price and payment will be full compensation for all work specified under this Section, including furnishing and installing acrylic plastic reflectors, posts, all panels, and all other materials as specified. Payment will be made under the items as follows:

a. Where the Contractor furnishes all materials for the guardrail, and the Engineer does not require shop-bent rails, payment will be made under the basic item of Guardrail.

b. Where the radius of the guardrail installation is such as to require shop bending of the guardrail panels, payment will be made under the item of Guardrail (Shop-bent Panels).

536-7.2 End Anchorage Assembly: Price and payment will include furnishing and installing all components specified on the plans and Design Standards.

536-7.3 Special Guardrail Post: Price and payment will include all costs for furnishing and installing the special posts that are over and above the costs for the normal posts, which are replaced by such special posts.

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536-7.4 Bridge Anchorage Assembly: Price and payment will include furnishing and installing the special End Shoes, Wood Blocks or Retrofit Wing Posts, Concrete Anchor Posts, Thrie-Beam Terminal Connectors, Backup Plates, Filler Plates, and other necessary hardware.

536-7.5 Concrete Barrier Wall Anchorage Assembly: Price and payment will include furnishing and installing connections to concrete barrier walls, as shown on the Design Standards, Index Nos. 400 and 410.

536-7.6 Guardrail Post Replacement: Price and payment will include all labor, materials, and equipment required for removal and disposal of existing posts in areas provided by the Contractor, backfilling and compacting existing holes, and replacement with new posts.

536-7.7 Removal of Existing Guardrail: Price and payment will include all labor and equipment required for removal and disposition of the existing guardrail, as specified in the plans. No additional payment will be made for the removal of the back rail on double face guardrail, thrie beam guardrail, nested rail, safety pipe rail, rub rail or end anchorages.

536-7.8 Other Rail:

536-7.8.1 Rub Rail: Price and payment will include all components specified on the plans and Design Standards, Index No. 400.

536-7.8.2 Pipe Rail: Price and payment will include all components specified on the plans and Design Standards, Index No. 400.

536-7.9 Payment Items: Payment will be made under:

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| Item No. 536- 1- | Guardrail - per foot. |
| Item No. 536- 2- | Guardrail (Shop-Bent Panels) - per foot. |
| Item No. 536- 5- | Rub Rail - per foot. |
| Item No. 536- 6- | Pipe Rail - per foot. |
| Item No. 536- 7- | Special Guardrail Post - each. |
| Item No. 536- 8- | Bridge Anchorage Assembly - each. |
| Item No. 536- 73- | Removal of Existing Guardrail - per foot. |
| Item No. 536- 76- | Special Length Guardrail Post - each. |
| Item No. 536- 82- | Concrete Barrier Wall Anchorage Assembly - each. |
| Item No. 536- 83- | Guardrail Post Replacement- each. |
| Item No. 536- 85- | End Anchorage Assembly - each. |