

SECTION 02841

W-BEAM GUARDRAIL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. W- Beam guardrail, post and blocks, W-Beam guardrail transition element, W-Beam guardrail anchors, W-beam buried in back slope terminals, W-Beam curved guardrail elements, W-Beam nested guardrail, W-Beam guardrail delineation and certification requirements for installation of W-Beam guardrail systems.

1.2 RELATED SECTIONS

- A. Section 01554: Traffic Control
- B. Section 02324: Compaction
- C. Section 02842: Delineators
- D. Section 03055: Portland Cement Concrete
- E. Section 03211: Reinforcing Steel and welded Wire
- F. Section 06055: Timber and Timber Treatment

1.3 REFERENCES

- A. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. AASHTO M 160: General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling
- C. AASHTO M 180: Corrugated Sheet Steel Beams for Highway Guardrail
- D. AASHTO M 232: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

- E. AASHTO M 270: Carbon and High Strength Low Alloy Structural Steel, Shapes, Plates and Bars and Quenched-and Tempered Alloy Structural Steel Plates for Bridges
- F. AASHTO M 298: Coatings of Zinc Mechanically Deposited on Iron and Steel
- G. ASTM A 500: Cold Formed Welded and Seamless Carbon Steel Structure tubing in Rounds and Shapes

PART 2 PRODUCTS

2.1 W-BEAM GUARDRAIL AND HARDWARE

- A. W-Beam Rail:
 - 1. Meet AASHTO M 180, Type 1, Class A
- B. Bottom W-Beam rail or steel rub rail:
 - 1. W-Beam: meet requirements, of this section.
 - 2. Channel rub rail: meet AASHTO M 160 and AASHTO M 270
 - a. Meet AASHTO M 111 after all punching and cutting is complete.
- C. Hardware:
 - 1. Manufacturer: meet AASHTO M 180
 - 2. Coatings: meet AASHTO M 232 or M 298

2.2 W-BEAM GUARDRAIL POSTS AND OFFSET BLOCKS

- A. All elements as per BA Series Standard Drawings.
 - 1. Steel post: meet AASHTO M 270 and AASHTO M 160.
 - a. Meet AASHTO M 111 after all punching and cutting is complete
 - 2. Wood Post and wood blocks: Refer to Section 06055
 - 3. Composite or plastic offset blocks for steel post installations
 - a. Certify as to meeting NCHRP 350 test requirements
 - 4. Visually inspected and accepted by the Engineer

2.3 TRANSITION ELEMENTS

- A. All elements as per BA Series Standard Drawings.
 - 1. Meet the requirements of this section for W-Beam guardrail, posts, blocks, and hardware.

- B. Chose appropriate curb section per plan requirement and BA Series Standard Drawings.

2.4 ANCHOR ELEMENTS

- A. All elements as per BA Series Standard Drawings.
 - 1. Meet the requirements of this section for W-Beam guardrail, posts, blocks, and hardware.
 - 2. Anchor Plate: meet AASHTO M 270.
 - a. Meet AASHTO M 111 after all punching, drilling and cutting is complete.
 - 3. Bearing Plate: Meet AASHTO M 270
 - a. Meet AASHTO M 111 after all punching drilling and cutting is complete.
 - 4. Anchor Post Foundation Tube and Plate:
 - a. Tube: Meet ASTM A 500
 - b. Plate: Meet AASHTO M 270
 - c. Meet AASHTO M 111 after all punching, drilling, cutting and welding is complete.

2.5 W-BEAM BURIED-IN-BACKSLOPE TERMINALS

- A. All elements as per BA Series Standard Drawings.
 - 1. See plan set for terminal requirement.
 - 2. See BA Series Standard Drawings for Buried-In-Backslope Terminal Anchor options.
 - a. Steel Post with plate: meet AASHTO M 270 and AASHTO M 160. Meet AASHTO M 111 after all punching, drilling, cutting and welding is complete.
 - b. Concrete Block: Use Class A (AE) concrete, Refer to Section 03055. Refer to Section 03211 for reinforcement bar requirement.

2.6 W-BEAM CURVED GUARDRAIL

- A. All elements as per BA Series Standard Drawings.
 - 1. See plan set for radius requirements
 - 2. Shop bend all curves.
 - 3. Meet of this section for w-beam guardrail and anchor system.
 - 4. CTR Post: meet wood post and blocks requirements of this section.
 - a. Drill two 3½-inch holes center of post, 29 inches and 45 inches from top of post.

2.7 W-BEAM NESTED GUARDRAIL

- A. All elements as per BA Series Standard Drawings.
 - 1. W-Beam: meet requirements of this section
 - 2. CTR Post: meet wood post and blocks requirements of this section.
 - a. Drill two 3½-inch holes center of post, 29 inches and 45 inches from top of post.

2.8 W-BEAM MEDIAN BARRIER

- A. All elements as per BA Series Standard Drawings.
 - 1. Meet of this section for W-Beam guardrail, posts, blocks and hardware.

2.9 TRAINING REQUIREMENT

- A. Attended the Utah Department of Transportation Guardrail Installation Training Course (GRIT) and pass the UDOT Guardrail Installer Training Final Examination.
 - 1. Alternative to UDOT Grit Course is the American Traffic Safety Services Association (ATSSA) Guardrail Installation Training.

2.10 BARRIER DELINEATION

- A. Sheeting: Refer to Section 02842.
- B. Hardware: Refer to GW Series Standard Drawings.

PART 3 EXECUTION

3.1 TRAINING REQUIREMENT

- A. Supply Guardrail & Crash Cushion Training Certificate to the Engineer prior to starting installation.
 - 1. Submit original, copy, and have copies made for project files.
- B. Have an installer who has attended one of the approved training courses on the job site at all times when guardrail or elements of a w-beam guardrail system are being installed.

3.2 PREPARATION

- A. Site considerations:
 - 1. Complete grading requirements prior to installation of guardrail and crash cushions.
 - 2. Protect work area when removing traffic barriers and crash cushions until the barriers and crash cushion are reconstructed or the hazard is mitigated. Refer to Section 01554.

3.3 POSTS AND BLOCKS

- A. Drill all required holes in posts and blocks as per BA series Standard Drawings prior to installation.
 - 1. Field drilling post is acceptable when installing the bottom rail.
 - a. Coat all field drilled steel post with a field-applied cold zinc material.
- B. Drive post if satisfactory results are obtained without damaging the post.
 - 1. Do not drive posts through asphalt.
- C. Excavate postholes when not driven.
 - 1. If hole is over excavated, compact approved backfill material into bottom of hole.
 - 2. Compact backfill material around post to a minimum of 96 percent of maximum laboratory density and dispose of excess material. Refer Section 02324.

3.4 RAIL ELEMENTS

- A. Drill or punch all required holes as per BA Series Standard Drawings prior to installation.
 - 1. Field drilled holes in rail element permitted when required.
 - a. Coat all field drilled rail elements with a field-applied cold zinc material.
- B. Shop bend all curved sections as required in BA Series Standard Drawings.

3.5 DELINEATION HARDWARE

- A. Supply Barrier Reflectors: Refer to Section 02842 and GW Series Standard Drawings.

- B. Attach Barrier Reflectors: Refer to BA Series Standard Drawings.
- C. Application: Refer to GW Series Standard Drawings.

END OF SECTION