SECTION 347113 - VEHICLE BARRIERS

This section includes formed steel guide rail on steel or timber posts, usually used for vehicular traffic control.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes:

Steel guide rail.

Wood posts.

Steel posts.

Excavating for post bases.

* + - 1. REFERENCES

List reference standards included within text of this section. Edit the following for project conditions.

* + - * 1. American Association of State Highway and Transportation Officials:

AASHTO M180 - Standard Specification for Corrugated Sheet Steel Beams for Highway Guardrail.

* + - * 1. US Department of Commerce

Timber: American Softwood Lumber Standard PS 20

* + - * 1. ASTM International:

ASTM A36 - Standard Specification for Carbon Structural Steel.

ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

ASTM A428 - Standard Test Method for Weight of Coating on Aluminum-Coated Iron or Steel Articles.

ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

ASTM C94 - Standard Specification for Ready-Mixed Concrete.

* + - * 1. American Wood-Preservers' Association:

AWPA C14 - Wood for Highway Construction - Preservative Treatment by Pressure Processes.

AWPA M4 – Standard for the Handling, Storage, Field Fabrication, and Field Treatment of Preservative-Treated Wood Products

* + - * 1. Forest Stewardship Council:

FSC Guidelines - Forest Stewardship Council Guidelines.

* + - 1. SYSTEM DESCRIPTION

Use this article carefully; restrict statements to describe components used to assemble system. Do not repeat statements made in summary article, "section includes" paragraph.

* + - * 1. Guide Rail Height: [**Top of rail <\_\_\_\_\_\_\_\_> inches above [finish grade] [top of median barrier] <\_\_\_\_\_\_\_\_>.**] [**As indicated on Drawings.**]
				2. Post Spacing: [**At intervals not exceeding [10] <\_\_\_\_\_\_\_\_> feet .**] [**As indicated.**]
				3. Post Foundation Depth: [**<\_\_\_\_\_\_\_\_> inch below [finish grade] [top of median barrier] <\_\_\_\_\_\_\_\_>.**] [**As indicated on Drawings.**]
				4. Post Foundation Diameter: <**\_\_\_\_\_\_\_\_**> inch.
			1. SUBMITTALS

Only request submittals needed to verify compliance with project requirements.

* + - * 1. Submittals in this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, anchorage, and schedule of components.
				5. Product Data:

Submit data on rail, [**posts,**] accessories, hardware and structural capabilities of rail section.

USE PARAGRAPH BELOW WITH EPD REQUIREMENT WHEN PROJECT ESTIMATE IS $1M OR MORE.

* + - * 1. Submit an Environmental Product Declaration (EPD) from the manufacturer for steel guide rail beam and steel posts within this specification section, if available. A statement of the contractor’s good faith effort to obtain the EPD shall be provided if not available.

Manufacturer-provided EPDs must be Product Specific Type III (Third-Party Reviewed), in adherence with ISO 14025 *Environmental labels and declarations*, ISO 14044 *Environmental management – Life cycle assessment*, and ISO 21930 *Core rules for environmental product declarations of construction products and services.*

* + - * 1. Manufacturer's Installation Instructions: Submit installation requirements[**, post foundation anchor bolt templates**] and <**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**>.
				2. Quality Control Submittals:

Preservative Treatment Certificates: Certification by treating plant stating chemicals and process used, net amount of chemical preservative retained, and conformance with specified standards.

* + - 1. SUSTAINABLE DESIGN SUBMITTALS
				1. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.

Edit material certifications list to suit products specified in this section and project sustainable design requirements.

Materials Resources Certificates:

Certify source and origin for [**salvaged**] [**and**] [**reused**] products.

Certify recycled material content for recycled content products.

Certify source for regional materials and distance from Project site.

Certify lumber is harvested from Forest Stewardship Council Certified well managed forest.

* + - * 1. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.

Provide cost data for the following products:

Edit list of material cost data to suit products specified in this section and project sustainable design requirements.

Salvaged, refurbished, and reused products.

Products with recycled material content.

Regional products.

Certified wood products.

* + - 1. QUALITY ASSURANCE
				1. Mill and Producers Mark: Each piece of timber shall be gradestamped indicating type, grade, mill, and grading agency certified by the Board of Review of the American Lumber Standards Committee. Mark shall appear on unfinished surface, or ends of pieces with finished surfaces.

Preservative Treated Material: AWPB quality mark on each piece of timber indicating treatment.

* + - 1. FIELD MEASUREMENTS
				1. Verify field measurements are as [**indicated [on shop drawings]**] [**instructed by manufacturer**].
1. PRODUCTS
	* + 1. MANUFACTURERS

In this article, list manufacturers acceptable for this project.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8845&mf=04&src=wd):

Old Castle Infrastructure.

Smith and Wesson Security Systems.

Approved equivalent.

* + - 1. SUSTAINABILITY CHARACTERISTICS

This paragraph should only be included upon request. Edit sustainable design requirements to suit content of this section and Project sustainable design requirements. Delete if there are no sustainable design requirements for the Project.

* + - * 1. Materials and Resources Characteristics:

Recycled Content Materials: Furnish materials with maximum available recycled content [**including:**] [**.**]

List materials specified in this section required to have recycled content.

<**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**>

Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site [**including:**] [**.**]

List materials specified in this section required to be regional materials.

<**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**>

Certified Wood Materials: Furnish wood materials certified in accordance with FSC Guidelines [**including:**] [**.**]

List materials specified in this section required to be certified wood.

<**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**>

* + - 1. MATERIALS

Edit guide rail beam type and shape for consistency with existing conditions at Project site.

* + - * 1. Guide Rail Beam: ASTM [**A501 Hot Formed**] [**A500/A500M Cold Formed**] structural steel box section, <**\_\_\_\_**>x<**\_\_\_\_**> inch size, <**\_\_\_\_\_\_\_\_**> inch wall thickness, punched or drilled holes for attachment to posts, steel spigot splice sections to fit inside dimensions of box beam for site joints, steel end closures.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Guide Rail Beam: ASTM A36 rolled steel sections, "W" profile, <**\_\_\_\_\_\_\_\_**> inch thick, <**\_\_\_\_\_\_\_\_**> inch high, die punched bolt holes for site assembly and attachment to posts, formed steel curved and flared termination sections.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In the following paragraph select AASHTO class and finish types; class designates base metal thickness; type designates metal finish.

Class A = 0.105 inch.

Class B = 0.135 inches.

Type 1 = zinc coated 1.8 oz/sq ft.

Type 2 = zinc coated 3.6 oz/sq ft.

Type 3 = to be painted.

Type 4 = corrosion resistant steel.

* + - * 1. Guide Rail Beam: AASHTO M180 Class [**A**] [**B**] Type [**1**] [**2**] [**3**] [**4**]; [**W**] profile; rolled steel sections, die punched bolt holes for site assembly and attachment to posts, formed steel [**curved**] [**tapered**] terminating sections.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Guide Rail Beam: Softwood timber, pressure preservative treated to AWPA C14 using [creosote] [water borne] preservatives, [**8 x 8**] <**\_\_\_\_\_\_**>inch nominal size.
				2. Steel Posts: ASTM A36 structural steel sections, <**\_\_\_\_**>x<**\_\_\_\_**> inch [**size**] [**diameter**], <**\_\_\_\_\_\_\_\_**> inch wall thickness.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Wood Posts: Softwood timber, pressure preservative treated to AWPA C14 using [creosote] [water borne] preservatives, [**8 x 8**] inch nominal size.
			1. ACCESSORIES

Select one of the following paragraphs when concrete post foundations are included in this section.

* + - * 1. Concrete: Type specified in Section [**033000.**]

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Concrete: [**ASTM C94, Option A;**] [**Normal**] [**Sulfate Resisting**] Portland Cement, [**2,500**] psi strength at 28 days.
				2. Hardware: Steel, bolts, nuts and washers to suit rail profile.
			1. FINISHES

ASTM A123 includes minimum coating thickness grade based on type of material and steel thickness of component.

* + - * 1. Galvanizing: ASTM A123; hot dip galvanize after fabrication.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Aluminum Coating: ASTM A428 **[0.40]** oz/sq ft.
				2. Galvanizing for Nuts, Bolts and Washers: ASTM A153, **[1.8] [2.0]** oz/sq ft coating.
1. EXECUTION
	* + 1. EXAMINATION
				1. Verify location of underground utilities and adjust location of posts to avoid damaging utilities.
			2. INSTALLATION
				1. Set posts plumb, in concrete footings with top of footing [**2 inches above**] [**6 inches below**] finish grade. Slope top of concrete for water run-off. Post Footing Depth Below Finish Grade: <**\_\_\_\_\_\_\_\_**> feet.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Drive posts plumb to correct elevations, properly spaced and to line and grade as indicated on Drawings.
				2. Attach rails securely to posts with anchoring hardware.
				3. Wood Posts: Where treated members must be cut during erection, apply a heavy brush coat of the same treatment solution to the cut surfaces in accordance with AWPA Standard M4.
			1. ERECTION TOLERANCES
				1. Posts - Maximum Variation From Plumb: [**1/2**] inch.
				2. Rail - Maximum Offset From Indicated Position: [**1**] inch.
				3. Rail - Maximum Variation From Indicated Height: [**1/2**] inch.
				4. Minimum distance from property line: [**6**] inches.
			2. SCHEDULES

Include schedule when several rail types or sizes are required.

Consider the following examples when developing project schedule.

* + - * 1. Access To Main Street: Box beam rail on steel posts, top of rail 18 inches above concrete median barrier.
				2. Dividers at Parking Areas: W-Beam steel rail on wood posts, top of rail 24 inches above pavement surface.

END OF SECTION 347113