| To SUPERSEDED BY EB 10-021 EFFECTIVE 1/6/11 | | New York State Department of Transportation ENGINEERING INSTRUCTION | EI 08-016 |
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Title: **OPTIONS FOR REPLACEMENT OF DECOMMISSIONED A588 GUIDE RAIL**

Distribution:
- ☒ Manufacturers (18)
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- ☐ Surveyors (33)
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Approved:

R. A. Dennison, P.E., Chief Engineer — Date 4/16/08

**ADMINISTRATIVE INFORMATION:**

- Effective Date: This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of September 4, 2008.
- Superseded Issuances and Disposition of Issued Materials: These changes supersede specific related portions of, and will eventually be reflected in the Highway Design Manual's Chapter 10 – *Roadside Design, Guide Rail, and Appurtenances*, and the *Guidelines for the Adirondack Park*. This Engineering Instruction supersedes EI 07-029, "Elimination of A588 Steel for Guide Rail Design Projects".

**PURPOSE:** This Engineering Instruction provides implementation guidance on galvanized guide rail and its recommended potential alternatives in environmentally sensitive areas to be used to replace runs made from A588 (Corten, self-weathering, rustic) steel.

**TECHNICAL INFORMATION:**

The project objective of this rustic rail program is to remove or potentially eliminate or replace rustic rail with the accepted standards of today as they apply. Rustic rail has been deemed as no longer satisfactory in the certainty of their safety performance over time. The remaining service life can not be adequately determined and the rail could potentially pose a safety liability and threat to the traveling public despite its satisfactory appearance. Prioritization will be established by considering the rating of the rail, the volume of traffic along that segment of road and the accident history pertaining to that section of highway. Ultimately within a ten year period consisting of fiscal years 08-09 to 17-18, all the rustic rail statewide will be removed and/or replaced. According to the Project Development Manual appendix 7, section 2.2 this work can be considered element specific work and is therefore eligible for Federal funding. The work is concentrated on the specific existing runs of rustic guide rail and unless there are obvious new hazards that require protection, only the rustic rail runs are intended to be addressed. The new replacement guide rail , where warranted shall meet current standards.

When determining the scope of work for highways that have A588 (rustic steel) guide rail, designers should very early identify the involved agencies (APA, DEC, SHPO, etc.) ,local community or local park agencies that need to be contacted over pending and necessary guide rail replacements and coordinate with their environmental group. A list of contact agencies for most highways is appended to this EI. The appropriate involved agencies should be consulted and a corridor agreement on guide rail and potential special areas established, if not previously developed for the corridor, during the course of the design of the project. The environmental group should file the corridor agreement and have it available for future work on that corridor. Copies should also be sent to the neighboring Regions in which the corridor extends. Should a corridor extend between Regions, the Region progressing the first project on that corridor should

seek involvement from the other Region(s) in developing the corridor concept and agreement with the involved agency(ies). This will help ensure consistency in installation of the guide rail and any special area alternative guiderail treatment. Areas or villages where rustic rail was used in the context sensitive solutions application have to be addressed as well and the concerned village or local community has to be advised of the Department's decommissioning of the rustic rail and the reasons behind the change.

Project designers shall coordinate the decisions on what guide rail to use when replacing A588 systems with appropriate agencies and Regional Groups. For W-beam rail, designers should consult the governing guidelines for each project to ensure that W-beam is an accepted option in that area. The form of any replacement should be consistent with the latest guidance on rail use. Specifically, designers should not simply replace an A588 guide rail with its galvanized equivalent without verifying that the equivalent rail is appropriate for the setting. In parks, it is generally desirable to use guide rail that is less visually obtrusive, provided the rail meets the safety requirements of the specific run location. In the Adirondack Park, for instance, galvanized cable would be preferred over galvanized box beam rail, if the deflection distance available behind the rail is adequate, the slopes are not steeper than 1:2, and repairs can be made reasonably quickly if the rail becomes damaged.

The selection of which type of guide rail to use, and where, is based on Department guidance which weighs, naturally, on the safety of the traveling public. The designer assesses and analyzes the roadside hazards using field reconnaissance as the primary means of verification of actual conditions and assumptions, the Department's photographic records of its highway system, (Visidata), and using record plans from past construction projects.. The Designer determines the appropriate type of guide rail to be used to safely protect non-traversable slopes, fixed objects, the clear zone, taking into account the features of the road itself, including horizontal and vertical curves, superelevation, traffic volumes and speeds. All of this is covered in Chapter 10 of the Highway Design Manual (HDM) and sections 10.2.1 Clear Zones and particularly subsections 10.2.1.1 Identification of Potential Hazards and 10.2.1.2 Treatment Options.

As with any guide rail treatment, the Department's first evaluation shall include whether there are other more cost effective options available to eliminate the guide rail altogether, either by laying back slopes or improving the clear zone. However, environmental effects must be taken into account, including impacts to wetlands, trees, environmental sensitive habitat, etc. If elimination of the guide rail is not reasonable to accomplish then the designer should evaluate the use of cable guide rail (galvanized) as the next option as it is less visually obtrusive.

- Special Areas – Special areas, as identified and agreed to between NYSDOT and the involved partnering agency, are likely candidates for use of one of the alternatives mentioned below. If an agreement is reached to use an alternative to galvanized rail, consider the location and the context of the involved agency's special/visually sensitive areas when selecting the alternative. The following are examples of locations (potential special areas) where the use of Alternative Guide Rail Options may be considered, in consultation with the involved agencies:

  - Rest Areas, Parking Areas, Scenic Overlooks or vistas, Trail heads, other visually significant resources and hamlets. – In areas that have previously had rustic rail, Steel-Timber Guide Rail should be considered an acceptable alternative, with the

use of proper termination of rail runs. For example, adjacent to deceleration and acceleration ramps for rest areas where warranted, terminals should be (a) flared back into an adjacent back slope, (b) ramped down at a point close to, at, or beyond the clear zone, or (c) provided with an acceptable terminal for the anticipated speed. Where the rail is being used merely to define the limits of parking locations, no terminals are required.

The following sections describe the guide rail alternatives that may be used in special areas. It is in these sections, in consultation with your involved agency partners, that an understanding is reached on suitable replacement alternatives that are in line with the context of that area.

- Coated Guide Rail – This alternative consists of either painting or applying a powder coating over galvanized steel. The Regional Maintenance group must be consulted prior to including this guide rail. In the case of box beam rail, or W-beam rail, galvanizing is a requirement. With box beam, the inside of the box is the critical location where corrosion can develop. For W-beam rail, all surfaces should initially be galvanized, and then painted or powder coated to provide for better adhesion and for corrosion protection. The critical location for corrosion occurs where segments overlap in W-beam rail. Coated options are vulnerable on mainline shoulders, as the high-speed traffic tends to scour the posts and rail with flying road grit and debris. Snow plows and thrown snow are also more likely to damage the coating. For these reasons, use of plain galvanized guide rail at the roadside is preferred and coated guide rail is recommended only for special areas. Maintenance repainting in the field will become a necessity and should be considered for cost and resource reasons and relative to appearance and upkeep. It is not advisable to repaint runs in the field without disassembling the W-beam rail. Similar to other special area alternatives, the coated options have an initial higher cost. Adding the repainting effort results in a higher life cycle cost (at least 2 times that of galvanized rail).

Steel-Timber Combination Rail – Both the generic steel-backed timber guide rail and the Ironwood guide rail are acceptable for use on high-speed installations. However, there is currently no acceptable terminal for use with the generic system on high-speed highways (highways in excess of 45 mph). Even at low speeds, the terminal ends can produce a ramping effect, so it is best to use this application in areas where the rail run can be carried out beyond the clear zone or the terminal ends can be buried in the back slope. The proprietary Ironwood system has a high-speed terminal option, but it consists of a significant length of steel transition and a Type III terminal that detracts from the aesthetic value of the system. Where steel-timber systems can have their leading ends carried into a back slope or terminated beyond the clear zone, use of those options is an acceptable alternative. The steel-timber alternative requires a much higher initial investment, roughly 3 times that of galvanized rail. Consideration of the availability of replacement parts should be part of the discussion when investigating this option.

**IMPLEMENTATION:**

- While this EI is effective for projects let on or after September 4, 2008, designers should strive to incorporate its guidance into projects with earlier letting dates.

- The Regions will need to develop action plans (prioritized lists) for the decommissioning of existing runs of rustic guide rail. The objective will be to remove all runs of rustic guide rail within ten years beginning with fiscal year 08-09. The sequencing of work should generally address the greatest risks first. Risk will be a combination of factors, such as the degree of deterioration of the rustic rail, the traffic volume, and, potentially, the accident history. While rustic rail is to be eliminated, maintenance replacement of crash-damaged pieces should be of the same type of rail as the damaged run, for as long as suitable A588 rail and posts are available in stock.

**TRANSMITTED MATERIALS:**
A list of contact agencies, historic parkways and scenic byways is attached.

**BACKGROUND:** Engineering Instruction 07-029 announced the Department's decision to cease using A588 (rustic, Corten, "self-oxidizing", or "self-weathering") steel for highway guide railing and barriers. That decision remains in effect. Unfortunately, no comparably priced alternative has been found that can provide acceptable guide rails with a similar brown appearance. Galvanized guide rail has historically proven to have, by far, the best life expectancy, the lowest initial costs, minimal maintenance costs, and is the preferred alternative from a safety perspective. However, alternative systems, such as galvanized cable rail, Ironwood, steel backed wood, and painted or powder coated guide rail can be used, with limitations, in aesthetically sensitive areas and when the involved agency is requesting the use of the alternatives and NYSDOT is in agreement.

**CONTACT:** For questions on coordination with external agencies, contact Kyle Williams at (518) 457-5566. For questions about roadside design and guide rail, contact Terry Hale at (518) 485-7009.

# Agency Coordination for Rustic Rail Replacement Projects

The Department is committed to addressing safety, capacity, and environmental issues in the design, construction, and maintenance of the State's highways. As part of this effort, Regions will comply with provisions of existing inter-agency agreements, e.g.

- The NYSDOT Guidelines for the Adirondack Park
- The Programmatic Agreement for Projects Affecting the Taconic State Parkway
- The Recommendations of the Parkway Standards Task Force
- Corridor Management Plans approved for Scenic Byways

Regions will discuss branding initiatives, including aesthetic guide rail treatments in special settings, on area and corridor-levels with the appropriate agency(s):

- Adirondack Park – Adirondack Park Agency
- Catskill Park – NYSDEC
- National-Register-Listed and -Eligible Parkways – State Historic Preservation Officer (OPRHP)
- Other Parkways – Office of Parks Recreation and Historic Preservation (OPRHP)
- Scenic Byways with Corridor Management Plan– Byway Management Organization

As part of this process, the following Department regional staff shall be consulted for branding initiatives, including aesthetic guide rail treatments in special settings, and they, in turn, shall ensure consultation with the appropriate agency:

- Adirondack and Catskill Park - Regional Environmental Unit Supervisor
- Parkways – Regional Cultural Resource Coordinator
- Scenic Byways – Regional Scenic Byways Coordinator

**National-Register-Listed Historic Parkways:**

Bronx River Parkway, Westchester County
Eastern Parkway (Grand Army Plaza to Ralph Avenue), Brooklyn, Queens County
Ocean Parkway (Church St. to Sea Breeze Avenue), Brooklyn, Queens County
Palisades Interstate Parkway, Orange and Rockland Counties
Albany Post Road, Putnam County
Bear Mountain Road, Westchester County
Susquehanna Turnpike, Greene County
Olmstead Parks and Parkways Thematic Resources, Erie County
Riverside Park and Drive (72nd Street to 129th Street), New York County
Storm King Highway, Orange County
Long Island Motor Parkway (Alley Park to Cunningham Park), Queens County
Watkins Glen Grand Prix Course, Watkins Glen, Schuyler County
Taconic State Parkway, Columbia, Dutchess, Putnam & Westchester Counties
Meadowbrook & Wantaugh Parkways (south of Southern State), Ocean, Loop Bay and Bethpage Parkways, Nassau County
Henry Hudson Parkway (72nd -129th Streets), New York County

**National-Register-Eligible Historic Parkways:**

Long Island Motor Parkway (Vanderbilt Motor Parkway), Nassau County
Robert Moses Parkway, St. Lawrence County
Henry Hudson Parkway (135th – 158th Streets), New York County

**Scenic Byways with Completed Corridor Management Plans:**

Adirondack Trail/Scenic Byway – ANCA (Counties: Franklin, St. Lawrence, Hamilton, Fulton and Montgomery)

Central Adirondack Trail/Scenic Byway – ANCA (Counties: Oneida, Herkimer, Hamilton and Warren)

Olympic Trail/Scenic Byway – ANCA (Counties: Jefferson, Lewis, St. Lawrence, Franklin and Essex)

Taconic State Parkway/Scenic Byway - Region 8 (Counties: Columbia, Dutchess, Putnam and Westchester)

High Peaks Byway (Rt 73) Scenic Road/Scenic Byway - APA/ANCA (Counties: Essex.)

Bronx River Parkway Scenic Byway - Westchester County Planning (Counties: Westchester)

Palisades Interstate Parkway/Scenic Byway (Counties: Rockland and Orange)

Route 20 Scenic Byway (Counties: Schenectady, Schoharie, Otsego, Herkimer, Madison, Oneida, Madison and Onondaga).

Upper Delaware Scenic Byway (Counties: Orange, Sullivan and Delaware)

Mohawk Towpath National/State Scenic Byway (Counties: Rensselaer, Saratoga, Schenectady and Albany)

Cayuga Lake Scenic Byway (Counties: Cayuga, Tompkins and Seneca)

Lakes to Locks Passage, All-America Road (Counties: Rensselaer, Washington, Essex and Clinton)

Great Lakes - Seaway Trail National Scenic Byway (Counties: Chautaugua, Erie, Niagara, Orleans, Monroe, Wayne, Cayuga, Oswego, Jefferson and St. Lawrence)

Shawangunk Mountains Scenic Byway (Counties: Ulster and Sullivan)