

VIRGINIA DEPARTMENT OF TRANSPORTATION

# LOCATION AND DESIGN DIVISION

## INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: GUARDRAIL CRITERIA	NUMBER: IIM-LD-104.9
SPECIFIC SUBJECT: GENERAL GUARDRAIL GUIDELINES	DATE: APRIL 7, 1995
	SUPERSEDES: LD-94 (D) 104.8
DIVISION ADMINISTRATOR APPROVAL: <i>E. C. Cochran, Jr.</i>	

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### CURRENT REVISION

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- All previous revisions and errata have been incorporated into this memorandum.
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### EFFECTIVE DATE

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- This memorandum will be effective on projects that have not been submitted for advertisement. Also, for projects that have already been submitted to the Construction Division for April or subsequent advertisement, contact the Construction Division for appropriate timing of plan revisions.
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### POLICY

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- Standard GR-8 Weak Post System Guardrail is to be used **only** when the design speed is 70 km/h (45 m.p.h.) or less. The insertable sheet has been revised accordingly.
  - The insertable sheet for Standard GR-7 Breakaway Cable Terminal has been revised to add a note pertaining to an acceptable alternative terminal.
  - Standard Guardrail GR-10, Type I or II, is the preferred method of installing guardrail over culverts in fills less than 1090 mm (3'7") above top slab.

- Type I is adaptable to culverts with a perpendicular width of 3.2 m (10'6") or less. Length = 7.6 m (25'0") with rail doubled and one post omitted.
- Type II is adaptable to culverts with a perpendicular width of 3.5 m to 5.1 m (11'3" to 16'9"). Length = 11.4 m (37'6") with rail doubled and two posts omitted.
- In situations where the use of Standard GR-10 is not feasible, an allowable alternative may be the TEXAS T-6 (BGR-01).
- Turndown terminals are no longer approved for approach ends of Standard GR-8 or MB-5.
- Standard GR-8 Type III Terminal anchored in the cut slope is the preferred terminal for GR-8 (weak post) installations.
- Standard GR-6, which buries the end of the guardrail into a cut slope, is the preferred run-on terminal treatment for GR-2 (strong post) installations.
- On undivided highways, strong post terminals (GR-6, 7 or 9) that are subject to being hit by opposing vehicles must include a transition between the strong post terminal and weak post guardrail.

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#### ALTERNATE BREAKAWAY CABLE TERMINAL (NO FLARE)

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- Alternate BCT (GR-9) shall only be used after an analysis indicates it is more cost effective than providing the flare for a St'd. GR-7 or extending the guardrail to provide a St'd. GR-6 terminal. The estimated cost of the terminal as shown (ET-2000) is \$2,000.
- The GR-9 terminal is intended solely for use on the end of a W-beam installation with no flare. The guardrail is anchored in a manner similar to the standard breakaway cable terminal and redirects side-impacting vehicles. For an "end-on" hit, the terminal essentially flattens and slides backward, absorbing crash energy.
- The total length of the terminal as shown is 15.2 m (50'). The length of need begins 3.8 m (12.5') from the first post (as indicated on the insertable sheets). The maximum deflection for the terminal along the length of need is 1.2 m (4').
- An additional 15.2 m (50') section of strong post guardrail (GR-2 using wooden posts only) is required when used with GR-8 (weak post) guardrail installations.

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## INSERTABLE SHEETS

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The following insertable sheets are available on Falcon DMS, under the PPMS# eng-ser, Division of insert and insert for insertion into applicable plan assemblies:

- Standard GR-9, Alternate Breakaway Cable Terminal (No Flare). Draw. No. [msd2390](#),
- GR-FOA-3 W-Beam Guardrail Install. Criteria, Dr. No. MA-47 (Metric) and [A-47](#) (Eng.)
- W-Beam Guardrail – Fixed Object Attachment (GR-FOA-1), Drawing Number MA-65-1 (Metric) and [A-65-1](#) (English).
- W-Beam Guardrail – Fixed Object Attachment (GR-FOA-1), Draw. No. [A-65-2](#) (English).
- W-Beam Guardrail – Fixed Object Attachment (GR-FOA-2), Drawing Number MA-66-1 (Metric) and [A-66-1](#) (English).
- W-Beam Guardrail – Fixed Object Attachment (GR-FOA-2), Drawing Number MA-66-2 (Metric) and [A-66-2](#) (English).
- GR-FOA-4 Block-out W-Beam Median Barrier Fixed Object Attachment, Drawing Number [MA-67](#) (Metric).
- Standard Blocked-out W-Beam Guardrail (Strong Post System) Post and Block out Details, Standard GR-2, 2A, Drawing Number [MA-87](#) (Metric).
- Guardrail at Low-Fill Culverts, Standard GR-10, Type I or II, Draw. No. [MA-88](#) (Metric).
- Breakaway Cable Terminal, Standard GR-7, Drawing Number [MA-89](#) (Metric).
- Standard W-Beam Guardrail (Weak Post System), Standard GR-8, 8A, 8B, 8C, Drawing Number MA-91 (Metric) and [A-91](#) (English).
- W-Beam Guardrail Installation Criteria, Standard GR-INS, Draw. No. [MA-92](#) (Metric).
- W-Beam Guardrail and Median Barrier Installation Criteria, Standard GR-INS., Drawing Number MA-93 (Metric) and [A-93](#) (English).
- Blocked-Out W-Beam Median Barrier, Standard MB-3, Drawing No. [MA-94](#) (Metric).
- Standard W-Beam Median Barrier (Weak Post System), Standard MB-5, Insertable Sheet No. MA-95 (Metric) and [A-95](#) (English).
- Terminal Treatment for W-Beam Guardrail (GR-6), Drawing Number MA-132 (Metric) and [A-132](#) (English).
- Standard GR-3 Cable Guardrail, Drawing Number [MA-133](#) (Metric).

## PAY ITEMS

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<u>Pay Item</u>	<u>Pay Unit</u>	<u>Item Code</u>
Alternate Breakaway Cable Terminal (GR-9)	Each	13345
Guardrail GR-10	meters (L. F.)	13355
Guardrail Terminal GR-8 Type III	Each	13360
Standard GR-6 (NCHRP 350)	meters/(L.F.)	13310
Standard GR-7 (NCHRP 350)	Each	13312