SECTION 21 – GUARDRAIL, END TREATMENTS, IMPACT ATTENUATORS, AND DELINEATORS

21.1 GUARDRAIL *(Rev. 03-26-21)*

When guardrail or delineators are used, they must be placed as shown on the plans and the material must comply with the Standard Specifications. The policy for the type and location of guardrail is subject to change and the PE/S must be cognizant of the provisions included as a part of the contract documents. Guardrail should never be placed where current policy does not dictate its use as the guardrail itself constitutes a hazard.

The height of guardrail is an important element of design. For the guardrail to function properly, the PE/S should make sure that guardrail is placed at the proper height. When existing guardrail is to remain in place, the PE/S should check to determine if minimum height standards are met.

21.2 GUARDRAIL END TREATMENTS AND IMPACT ATTENUATOR (*Add. 03-26-21)*

Guardrail end treatments (sometimes called end terminals) are energy-absorbing safety devices used to protect the exposed end at the beginning run of guardrail. One common treatment is designed to absorb the energy of an impact by having the impact head slide down the length of the guardrail. Treatments should be installed at the locations shown on the plans and selected from the Department's Qualified Material list.

Impact attenuators (often called crash cushions) are also energy-absorbing safety devices but are used to protect a significant structure, such as a bridge pier or concrete barrier wall end. A frequently used device is a sand-filled attenuator which consists of barrels filled with sand to absorb impact energy. Attenuators should be installed at the locations shown on the plans and selected from the Department's Qualified Material list.

Certification to assemble, repair, and install guardrail end treatments and impact attenuators is required by the Department for construction contracts and Contractor personnel must be certified prior to installation. Quality assurance inspection of the device by certified Department personnel is required after installation by the Contractor.

21.2.1 Certification Process

To become certified on a specific unit, personnel must attend and pass a certification training provided by the Manufacturer of the device. The Department will provide the Manufacturer's training resources, found on the Department's website, with either an on-demand video or redirecting to the manufacturers training website.

Once the trainee is certified and receives a form of certification from the Manufacturer, it is the responsibility of the trainee to provide the form of certification to Construction Management for recording. It is up to each District Office to determine which field personnel will be certified for each unit.

For more information, refer to the following Department website:
https://www.in.gov/indot/div/public/guardrail-impact-attenuator-training.htm

21.2.2 Quality Assurance Inspection Procedures

Confirming Certification. Construction personnel that have devices to be installed on their projects are required to verify on the Department's website above that at least one member of the crew, typically the foreman, is certified to install the device specified in the contract documents.

Request for Certified Inspector. Once a device is installed, replaced, or repaired, the PE/S should immediately notify their AE to request a certified inspector to visually inspect the device. The communication should include device type and location.

Device Inspection. The certified inspector shall perform a visual inspection to verify that the device was installed correctly. This quality assurance inspection shall be performed within 15 calendar days of the PE/S's request.

SiteManager Requirements. The following should be recorded within SiteManager Daily or Diary.

- Type of device installed, replaced, or repaired
- Location of device
- Name of Contractor's crew member who is certified to install device
- Name of Department's certified inspector who performed quality assurance inspection.

Follow up Corrections. If it is determined that there is a problem with the installation, the certified inspector shall notify the project PE/S and AE. The Contractor shall then be notified of any deficiencies found during the quality assurance inspection. The Contractor will be required to remobilize to the site, provide proper traffic controls, and fix all problems at no cost to the Department.

The following should aid the PE/S that is witnessing the installation of a specific device but are not certified. These are some basic items to be aware of when inspecting to ensure proper installation.

Guardrail End Treatments

- Cables taut with brackets properly engaged
- Blackouts and posts not damaged
- All bolts and nuts snug
- Ground under and in front of device free of damaging or disruptive debris
- Delineation panel securely attached and free of damage.

Gravel Barrels

- Barrels show no sign of cracks
- All lids locked down and secured
- Ground under and in front of device free of damaging or disruptive debris.

Impact Attenuators

- Cables taut and not sagging
- Diaphragms and bays aligned straight
- All rail panels tight and not damaged
- Cartridge/rip plates not damaged
- Cylinders show no signs of cracking
- All bolts and nuts snug
- Ground under and in front of device free of damaging or disruptive debris
- Delineation panel securely attached and free of damage.

21.3 DELINEATORS *(Rev. 10-01-09)*

Normally the construction plans will indicate where delineator posts are to be placed. Usually the locations will be at sub-surface drain outlets, shoulder edge delineation and at hazardous locations such as sharp curves, steep grades or lane reduction transitions. In determining whether delineators should be used, the location of the project and prevailing topography must be considered in determining what would constitute a sharp curve or a steep grade.

The spacing for delineators should match those shown in the *Manual on Uniform Traffic Control Devices*. Any spacing details requiring additional clarification should be referred to the District Traffic Engineer.

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