Title: Guidance for Clear Zones and Roadside Protection for Bridge Projects

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This document provides guidance for determining whether roadside protection is needed or if designing for the "Clear Zone Concept" is acceptable on Bridge Design projects involving the replacement of short-span structures. As with all roadside safety decisions, each project should be evaluated on a case-by-case basis and should be designed in accordance with appropriate DelDOT, AASHTO, and FHWA design manuals. This document is strictly guidance to help designers evaluate the potential options available.

Note: The Clear Zone Concept is a design option where the clear zone is carried across the bridge in lieu of installing guardrail or barrier.

Background

The clear zone is an unobstructed, traversable area provided beyond the edge of the through traveled way for the recovery of errant vehicles. The provision of a clear zone is applicable to new construction and re-construction projects pursuant to guidance outlined in the AASHTO *Roadside Design Guide*. On existing roads, primarily those of an older or lower-order nature, a clear area has been established through maintenance activities. While this practice is strongly encouraged, these areas should not be construed as providing the same safety benefit as clear zones.

In general, the clear zone or forgiving roadside concept is the preferred method of achieving roadside safety. The four methods of establishing a clear zone are listed here in order of preference:

1. Eliminate obstacles.
2. Redesign obstacles so they can be safely traversed.
3. Relocate obstacles to a location where they're less likely to be struck.
4. Reduce the impact severity of obstacles by using appropriate breakaway devices.

Bridge Types

In general, only bridge types eligible to be coded as '19' (Culverts) for Item 43B in accordance with Report No. FHWA-PD-96-001 *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges* should be given consideration for designing according to the "Clear Zone Concept." These include crossroad pipes (single cell and multiple cells), box culverts, frames, and arches.

Bridge Lengths

All crossroad pipes (single cell and multiple cells) should be given consideration for designing for the "Clear Zone Concept," Regardless of total structure length All box, frame, and arch structures with a structure length less than 25 feet should be given consideration for designing for the "Clear Zone Concept." Structure length will be as per item 49 of Report No. FHWA-PD-96-001 *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges.*

Roadway AADT

Roadways with a design AADT of 400 vpd or less should be designed for the "Clear Zone Concept" where practical. Roadways with a design AADT of 1000 vpd or less should also be given consideration for designing for the "Clear Zone Concept."

Existing Conditions

Roadways with existing roadside protection should be designed to include roadside protection unless removal is warranted and documented through the design process. Designers should propose to meet existing conditions at a minimum if design standards cannot be achieved, but every attempt should be made to improve the safety of the existing conditions where practical.

Additional Considerations

The designer should also consider horizontal and vertical alignment (sight distance), accident data, and the surrounding terrain, including utilities, environmental impacts, and location of entrances, in determining whether the "Clear Zone Concept" is applicable for a specific site. The Horizontal Curve Adjustment Factors shown in Table 3-2 of the AASHTO *Roadside Design Guide* should be used in developing the roadside design for the project.

References

- DelDOT *Road Design Manual*
- DelDOT *Bridge Design Manual*
- AASHTO *Roadside Design Guide*
- FHWA-PD-96-001 *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*
- MnDOT Final Report 2005-39 *The Safety and Cost Effectiveness of Bridge-Approach Guardrail for County State-Aid (CSAH) Bridges in Minnesota*
- FHWA-CFL/TD-05-009 *Barrier Guide for Low Volume and Low Speed Roads*
- NCHRP Research Results Digest 220 *Strategies for Improving Roadside Safety*
- Iowa DOT Instructional Memorandum No. 3.215 *Clear Zone Guidelines* (http://www.iowadot.gov/local_systems/publications/im/3215.pdf)