FHWA LETTERHEAD

October 16, 1990

AASHTO Roadside Design Guide/
W-Beam Guardrail End Terminals
5040

Mr. Maurice Smith, Director
Arkansas State Highway and
Transportation Department
Little Rock, Arkansas

Dear Mr. Smith:

The final rule adopting the 1989 AASHTO Roadside Design Guide for use as a guide for Federal-aid highway projects was published in the June 25, 1990, Federal Register. It became Effective on July 25, 1990. It is the intent of the Federal Highway Administration (FHWA) that this document be used by each State highway agency to develop a roadside safety design policy for application within its State.

The more significant issues related to the application of the guide to Federal-aid projects are:

1. The FHWS will no longer consider the clear zone width as an element requiring a formal design exception.

2. Cross slopes (i.e., median crossovers, intersecting roads, or driveways) on freeways and other high speed facilities should be no steeper than 10:1 and preferably no steeper than 20:1.

3. Curbs higher than 4 inches should not be used in conjunction with a flexible or semi-rigid traffic barrier on high speed facilities.

4. Trees with diameters of 4 inches or more are considered hazardous.

5. Turned-down guardrail terminals are no longer acceptable on the approach ends of rigid or semi-rigid barriers on high speed facilities.

Because of changes in the vehicle fleet, (increasing number of smaller and lighter weight vehicles), using our highway system and the continuing introduction of new commercial high performance guardrail terminals have prompted questions as to the effectiveness and appropriate use of the turned-down W-beam guardrail terminal. The questions have focused on where the terminal can or cannot be safely used, and what are better alternatives.

As discussed in the AASHTO Roadside Design Guide, there are problems and limitations with the turned down W-beam guardrail terminals. The poorer designs will cause almost any size passenger car or pick-up truck to vault or roll over. Even the more improved design elements (flared or use of quick release mechanisms) have caused vaulting/rollover of mid-size vehicles during crash tests at high speed and end on impact conditions. Also, based on extensive operational experience and anecdotal accident information, there are significant safety problems with the turned-down end terminal when used under certain conditions. One of the problems most often noted occurs on high speed facilities where vehicles are vaulted by the guardrail terminals directly into a roadside fixed obstacle the guardrail installation was intended to shield.

There are a number of W-beam guardrail terminals currently available that provide a greater degree of safety then the turned-down terminal. Although most of these terminals are more costly than the turned-down terminal, they can be justified for use on high speed and high volume facilities.

Therefore, in order to provide the traveling public with the best safety features possible based on available information, the following guidance is provided relative to the use of turned-down W-beam guardrail terminal installations on Federal-aid projects:

- Turned-down terminal should not be used on new installations of guardrails for freeway, expressway, or other high speed, high volume facilities.

- Safety improvement projects, hazard elimination projects, or 3R/4R projects on high speed, high volume facilities should require replacement of turned-down end terminals with approved terminals.
- Use of turned-down terminals on projects involving high speed, but moderate traffic carrying facilities should be considered on a case-by-case basis or an approved State developed policy.
- Development of adequate recovery area behind the terminal and sufficient distance from protected piers, abutments or other fixed hazards is necessary to prevent tragic "vault into object" accidents from occurring.
- Use of turned-down terminals on low speed or any low traffic volume facility may be allowed based on reasonable risk management considerations.

To help in achieving consistent interpretation and application on Federal-aid projects, the FHWS is preparing information intended for use in conjunction with the guide to review and approve specific roadside safety design policies developed by each State. If a State does not develop a formal policy, then the information will be used to approve safety design elements on a project-by-project basis.

Our office would like to meet with you in the near future to discuss the above issues, specifically, the options available in lieu of turned-down terminals and acceptable cut-off dates for not accepting turned-down terminals on Federal-aid projects. Please contact Mr. Charles Boyd at 378-5355 at your earliest convenience to arrange a meeting date.

Sincerely yours,

H. C. Wieland
Division Administrator