WYOMING DEPARTMENT OF TRANSPORTATION

ROAD DESIGN MEMORANDUM #05

DATE OF ISSUE: December 01, 2004

Approved by: Paul P. Bercich

Paul P. Bercich, P.E.
Highway Development Engineer

Issued by: Engineering Services, WYDOT, Cheyenne

GENERAL TOPIC: DESIGN CRITERIA
SUBJECT: INTERCHANGES

General

Design all interchanges in accordance with the 2001 AASHTO *Policy on Geometric Design of Highways and Streets* (2001 AASHTO Green Book). To insure a consistent use of AASHTO'S wide range of acceptable design criteria, use these guidelines for lane widths, taper lengths, and superelevation in gore areas.

Reference Document: *Task Force for Interchanges - Final Report*, dated May 18, 2004. Refer to this document for background information relative to these recommendations

Ramp Widths

The widths given below assume that the minimum curve radius on the ramps is greater that 500 ft [150 m]. Consider using the greater widths for ramps with relatively sharp curves, other alignment features, or both to provide vehicles with wider ramps on which to maneuver.

- **Use when:** All of the interchange ramps have a 20-year projected **ADT <= 400** and the crossroad is not a state highway.
  - Left shoulder width = 4 ft [1.2 m]
  - Traveled way width = 12 ft [3.6 m]
  - Right shoulder width = 4 ft [1.2 m]
  - Total top width = 20 ft [6.1 m]

- **Use when**: One or all of the interchange ramps have a 20-year projected **ADT > 400**, or if the crossroad is a state highway.
  - Left shoulder = 4 ft [1.2 m]
  - Traveled way width = 12 ft [3.6 m]
  - Right shoulder = 8 ft [2.4 m]
  - Total top width = 24 ft [7.3 m]

Acceleration and Deceleration Lanes

- **Lane and Shoulder Widths:**
  - Traveled way width = 12 ft [3.6 m]
  - Shoulder width = 4 ft [1.2 m] (for ramp ADT <= 400)
  - Shoulder width = 8 ft [2.4 m] (for ramp ADT >400)

  Note: The outside shoulder width used on the ramp, 4 ft.[1.2m] or 8 ft. [2.4m], should be carried through the entire length of the acceleration/deceleration lane, including tapers.

- **Length:** Design acceleration and deceleration lane lengths in accordance with values given in Exhibits 10-70 and 10-73 of the 2001 Green Book, adjusted for grade using the factors in Exhibit 10-71.

  The speed – distance curves given in Exhibit 3-60 of the 2001 AASHTO Green Book for a heavy truck of 200 lb/hp [120kg/kW] are not representative of the trucks currently using Wyoming's interstate highways. Under normal circumstances, do not base the length of entrance ramps on the acceleration characteristics of a heavy truck.

- **Superelevation and Gore Area**: The speed at which vehicles enter/exit the mainline is determined by the radius of the entrance/exit curve and the superelevation that is provided in the gore area. The entrance/exit design speed determines the acceleration/ deceleration length that must be provided on the mainline and is often the controlling factor in the design of the entire ramp. From a construction standpoint, it is easiest to use a superelevation rate of 1.56 percent to 2.0 percent in the gore area to match the mainline cross slope. An arbitrary reduction of super rate to match mainline cross slope will significantly lengthen acceleration and deceleration lanes and violate driver expectancy. When the required ramp super rate is greater than the mainline cross slope, ensure the maximum algebraic difference is in accordance with Exhibit 9-49.

- **Acceleration and Deceleration Lane Type:** When practicable the **preferred option** is to use a tapered design for exit ramps and a parallel design for entrance ramps. It is acceptable to deviate from using the preferred option when special conditions and engineering judgment deem necessary.

- **Parallel Lane Taper:** When practical, use a 600-foot [180 m] taper to end a parallel acceleration lane, rather than the 300-foot [90 m] length recommended in the 2001 Green Book.

Other Design Considerations

- Designers have a normal tendency to focus on providing adequate acceleration/ deceleration lengths appropriate for the design speed of the first curve on the ramp. However, adequate acceleration/ deceleration distances should be provided at all critical locations on interchange ramps, i.e., at all horizontal/vertical curves along the entire length of the ramp.

- When practical, design interchanges to minimize the number of tower lights. A single tower light will illuminate both the entrance/exit ramps of the interchange if the entrance gore area is located directly opposite from the exit gore area.