

Footprint Design Manual *for* Local Roads



THE LOCAL ROADS AND STREETS COMMITTEE OF THE
TRANSPORTATION AND DEVELOPMENT INSTITUTE

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Acknowledgements

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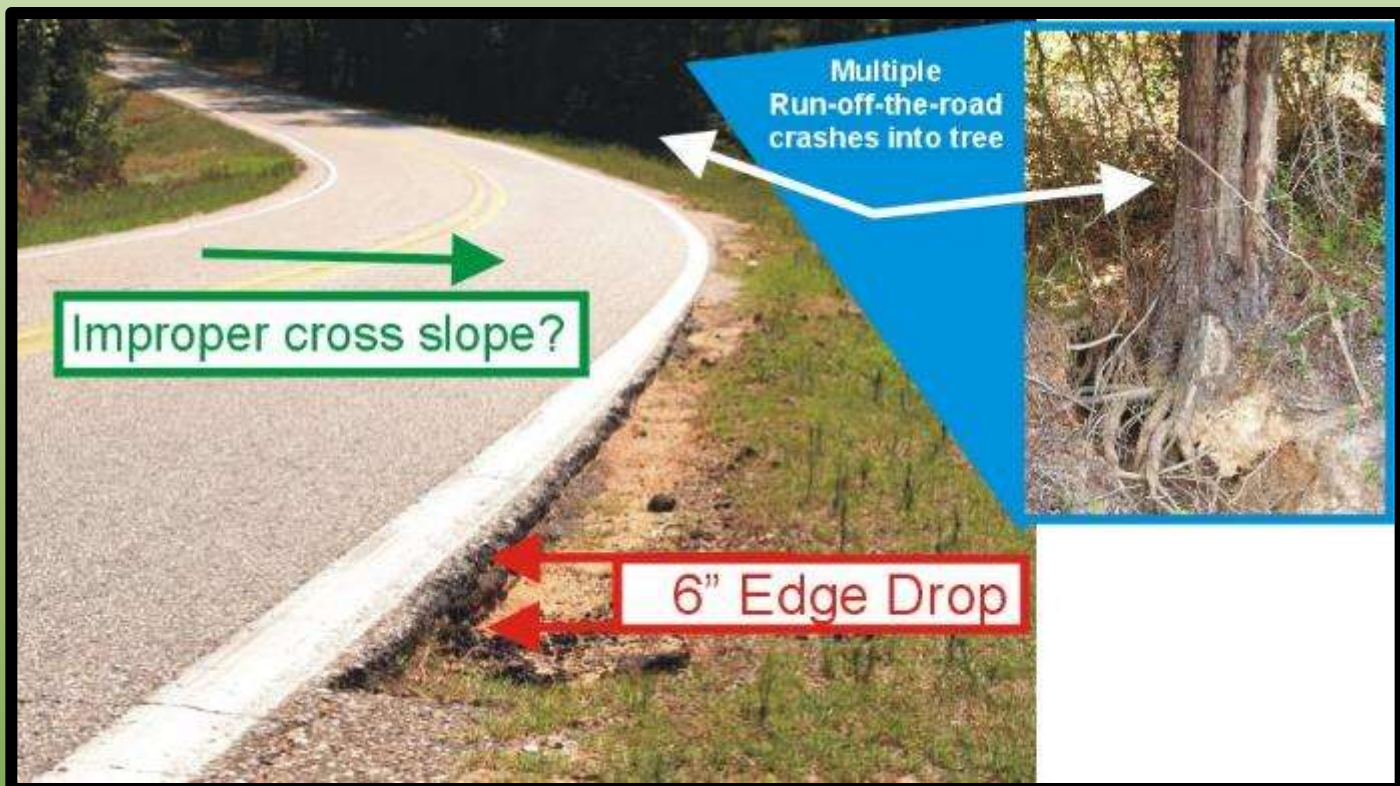
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Design Criteria Recommendations

- 1: Review Current**
- 2: Determine Project Scope**
- 3: Determine Lane and Shoulder Width**
- 4: Determine Normal Pavement Crown**
- 5: Determine Horizontal Curvature and Superelevation**
- 6: Determine Vertical Curvature and Stopping Sight Distance**
- 7: Determine Bridge Width**
- 8: Determine Side Slopes and Clear Zones**
- 9: Guardrail Need for Embankments and Culverts**
- 10: Pavement Edge Drop and Shoulder Type**
- 11: Intersection Improvements**
- 12: Document the Design Process**

1: Review Current Conditions



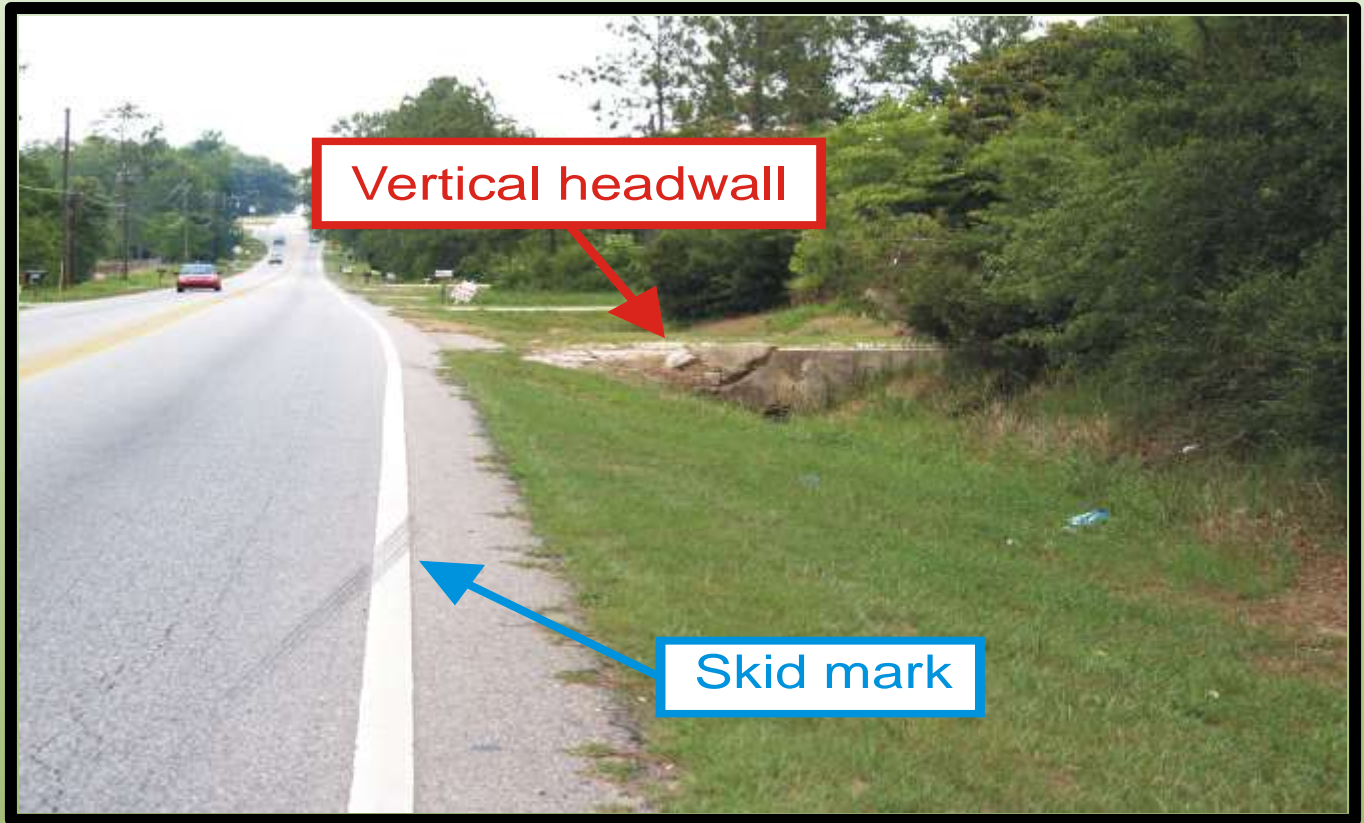
A combination of different elements may contribute to possible reasons for a crash location.

2: Determine Project Scope

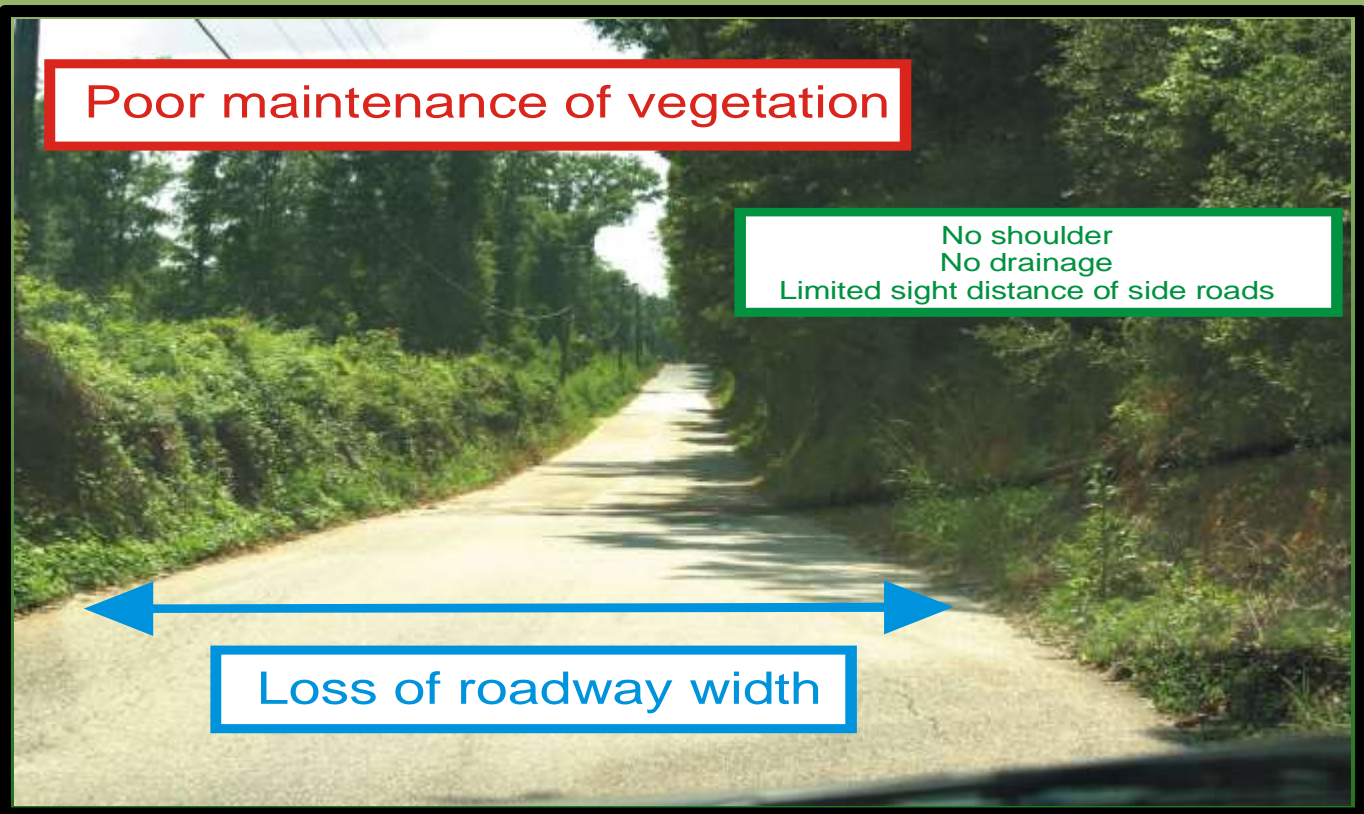
Poorly maintained sign
doesn't help the driver's
awareness of curve ahead



In addition to pavement repairs, the designers should incorporate; intersection, roadside, and traffic control improvements that may enhance safety.



Paved shoulder (reducing pavement edge drop) and gentle sloping frontslope
However, the vertical headwall can cause serious injuries when struck.



Poor maintenance of vegetation

No shoulder
No drainage
Limited sight distance of side roads

Loss of roadway width

High speed arterial roadway

Rip-rap ditch checks,
a safety hazard?

Brick mailboxes
can cause severe
injuries at high speeds

3" wide openings

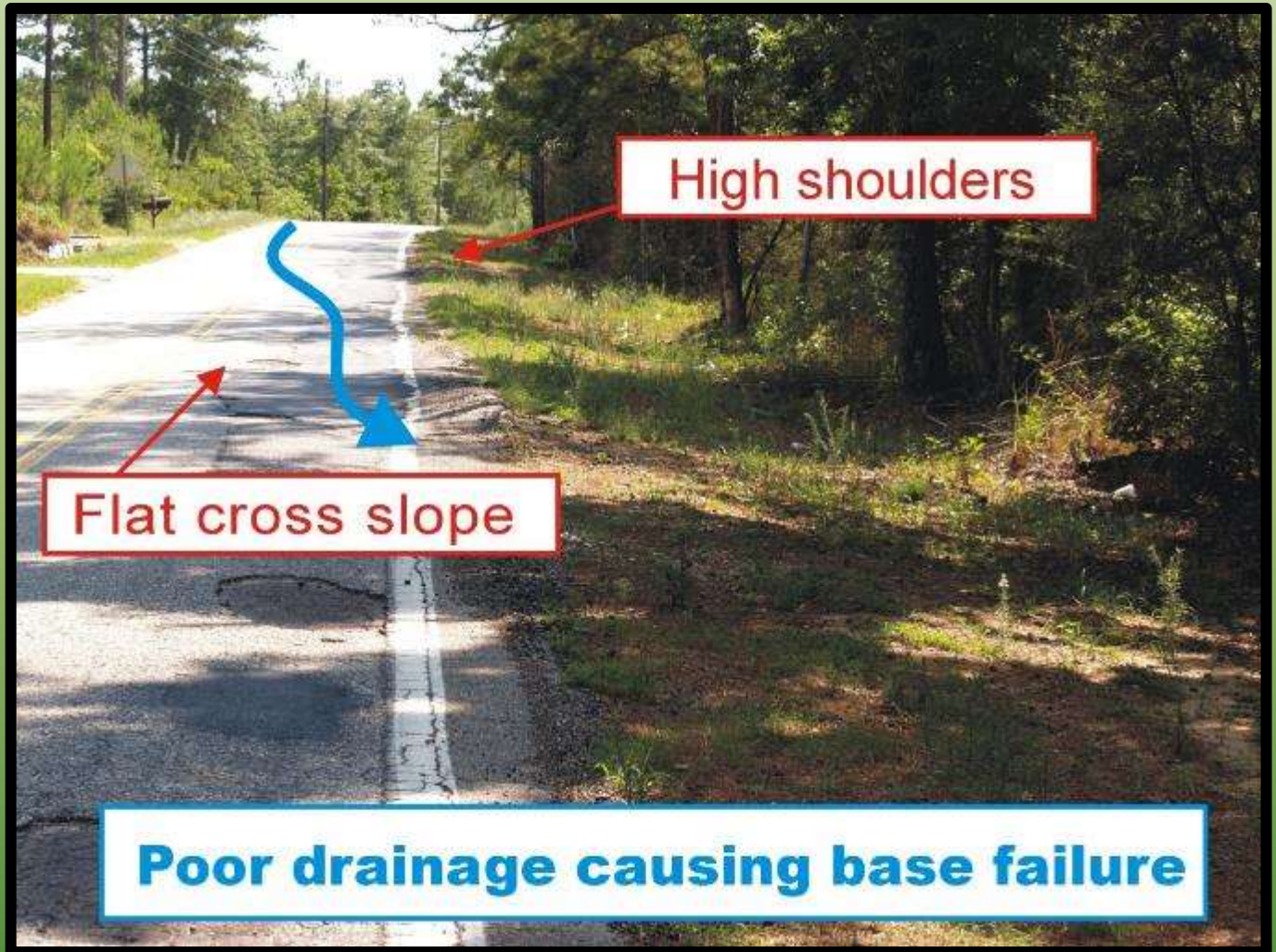
18" long!

3: Determine Lane and Shoulder Width

Design Year ADT ^a	Speed ^b	< 10% Trucks/ Machinery ^c		> 10% Trucks/ Machinery ^c	
	(Mph)	Lane ^e Width	Shoulder ^d Width	Lane ^e Width	Shoulder ^d Width
1 – 750	≤45	9 ft	2 ft	10 ft	2 ft
751 – 2000	≤45	10 ft	2 ft	10 ft	2 ft
2000 >	≤45	11 ft	3 ft	12 ft	3 ft

Design Year ADT ^a	Speed ^b	< 10% Trucks/ Machinery ^c		> 10% Trucks/ Machinery ^c	
	(Mph)	Lane ^e Width	Shoulder Width	Lane ^e Width	Shoulder Width
1 – 750	>45	10 ft	2 ft	10 ft	2 ft
751 – 2000	>45	10 ft	3 ft	11 ft	3 ft
2000 >	>45	11 ft	4 ft	12 ft	4 ft

4: Determine Pavement Crown



5: Determine Horizontal Curvature and Superelevation



High average vehicle speeds, **45 mph and higher**, should consider reconstruction when the nominal design speed of the **existing curve is more than 15 mph below the average vehicle speeds**, and the projected traffic volume is **greater than 1000 ADT**, or if there is a site-specific safety problem associated with the curve.

6: Determine Vertical Curvature and Stopping Sight Distance

High average vehicle speeds, **45 mph and higher**, should consider reconstruction when the design speed of the **existing curve is more than 20 mph below the average vehicle speeds**, and the projected traffic volume is **greater than 1000 ADT**, or there is a site-specific safety problem associated with the curve.

7: Determine Bridge Width

The designer should evaluate bridge replacement or widening if the bridge is less than 100 ft. long and the usable width of the bridge is less than:

Design Year ADT ^a	Speed (Mph)	Usable Bridge Width ^{b, c, d}
1 - 1000	All Speeds	Width of approach lanes
1001 - 4000	≤45	Width of approach lanes plus 2 ft
1001 - 4000	>45	Width of approach lanes plus 3 ft
4000 >	≤45	Width of approach lanes plus 3 ft
4000 >	>45	Width of approach lanes plus 4 ft



Is one 12' section of guardrail
enough to help in a crash?
How about the end-treatment?



8" drop off

8: Determine Side Slopes and Clear Zones

The designer should develop consistent procedures for evaluating and improving roadside features with the following objectives:

A clear zone of any width should provide some contribution to safety. Thus, where clear zones can be provided at little or no additional cost, their incorporation in design should be considered. **A 2 - 3 ft. shoulder is recommended for speeds ≤ 45 , and 2 – 4 ft. for speeds greater than 45.**

Retain current slopes (without increasing front slopes) when widening lane and shoulders, unless warranted by special circumstances.

Flatten side slopes steeper than 3:1 at site-specific locations where there is evidence of a crash or available crash data.



Do the headwalls need to be this tall?

If so, should a reflector of some type be installed to indicate its presence?

Should the pipe under the driveway be this size?

A drainage study may determine a smaller diameter.

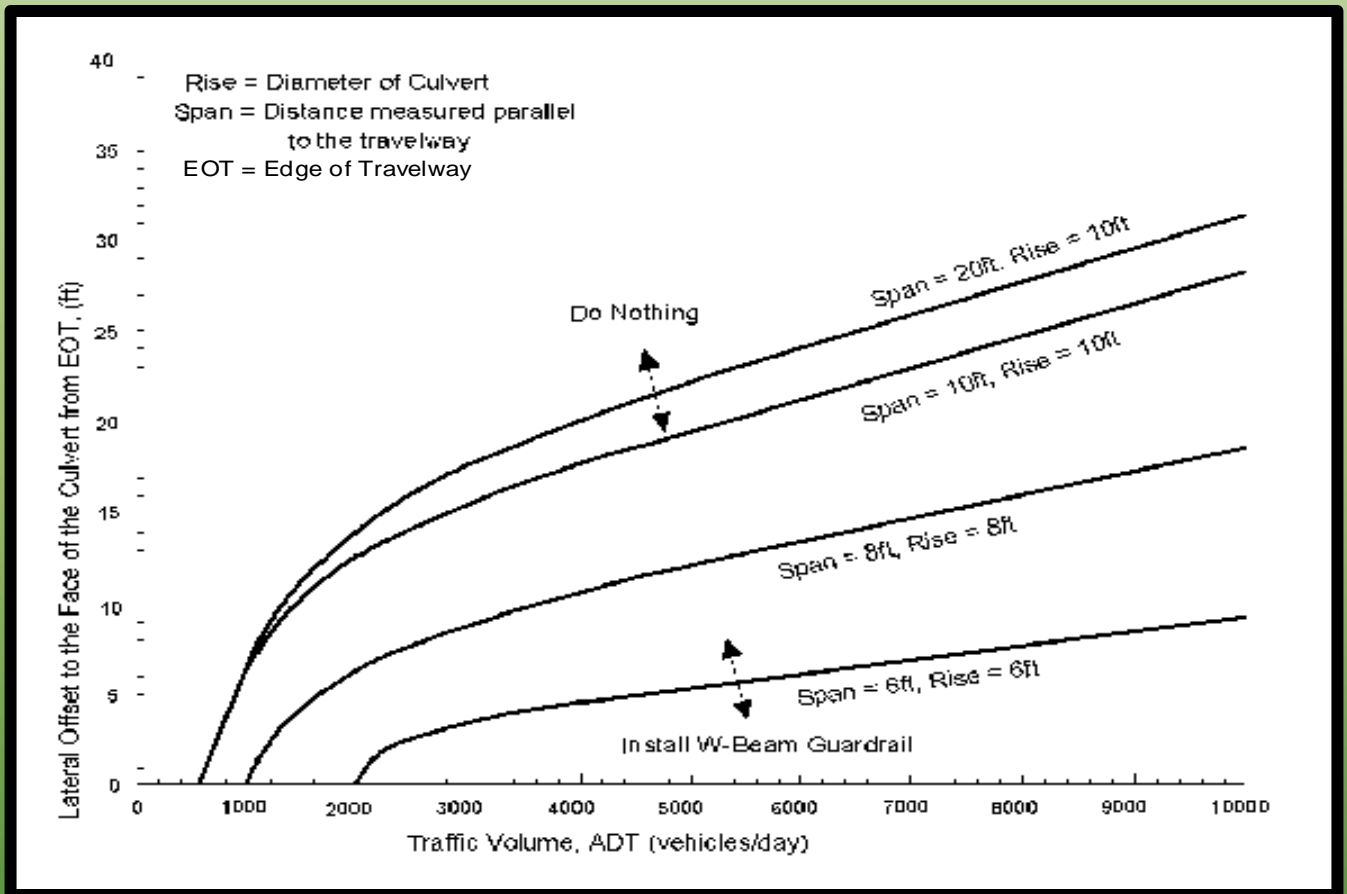


Does the driver have any idea that a major highway is at the top of the incline?

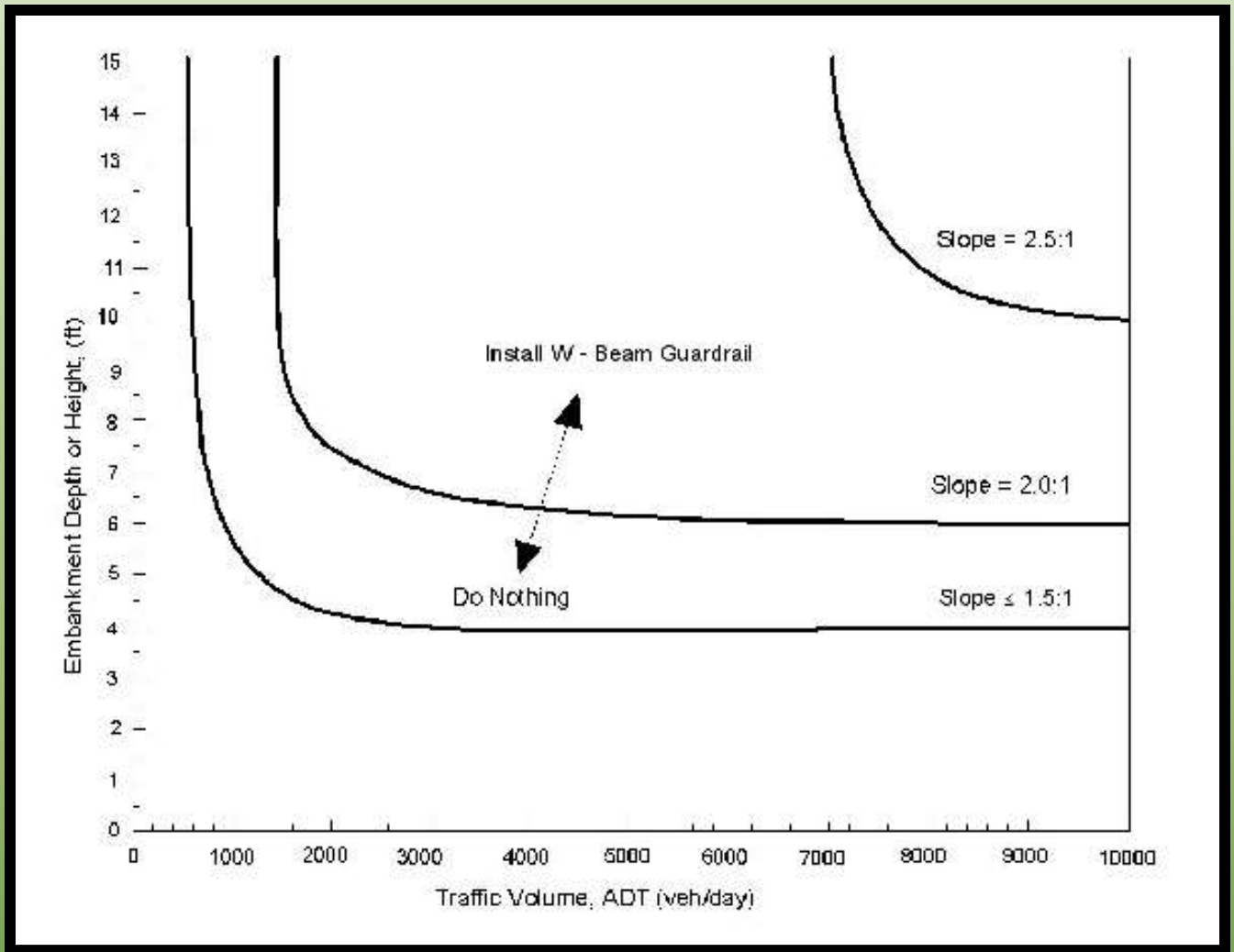
Just how difficult would it be a night?

A local driver may know this intersection, but a first time user?

9: Guardrail Need for Embankments and Culverts



What is the posted speed?



What is the posted speed?

10: Pavement Edge Drop and Shoulder Type

The designer should develop consistent procedures for evaluating pavement edge drop conditions and the type of shoulder construction, with the following objective:

- All shoulders should be re-established and **graded to a consistent slope**
- Edge of pavement drops should be repaired and **should match the shoulder slope**
- **Selectively pave shoulders** at points where there are site-specific safety problems (outside or inside of horizontal curves, across from intersecting roads, etc.)

11: Intersection Improvements

- Collision diagrams and Condition diagrams showing important physical features that affect traffic movements.

- Field review of the intersection

- Site-specific safety problem areas.

- Improvements may be organized on three primary design objectives:

Reduction of potential conflicts (traffic signals, turn lanes, roundabouts, etc.),

Improves driver decision-making (longer lines of sight, lane markings, etc.),

and **improves the braking capability of the vehicle** (warning signs, increased pavement skid resistance, etc.).

12: Document the Design Process

Before developing construction plans and specifications, designers should prepare a safety and design report based the above 11 recommendations.

Additional information regarding specific elements, not mentioned above, may be included in this report.

For some RRR projects, it may be necessary to have this document submitted to an appropriate agency.

Any waivers of the design criteria shall be submitted to and approved by the same agency or their governing authority having project approval.

Fully documented project information should be compiled and filed.

Thank You

Questions?

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