

Design Element			Manual Section	2-Lane					
Design Controls	Design-Year AADT		40-2.01	< 400	400 ≤ AADT < 1000	1000 ≤ AADT < 3000	3000 ≤ AADT < 5000	≥ 5000	
	Design Forecast Period		55-4.01	20 Years (2)					
	*Design Speed (km/h)		55-4.01	See Section 55-4.01 (3)					
	Access Control		40-5.0	None					
	Level of Service		40-2.0	Desirable: B; Minimum: D					
Cross Section Elements	Travel Lane	*Width (4)	55-4.05	Des: 3.0 m Min: 2.7 m (4a)	Des: 3.3 m Min: 3.0 m (4b)	Des: 3.3 m Min: 3.0 m (4b)	Des: 3.6 m Min: 3.3 m	Des: 3.6 m Min: 3.3 m (4c)	
		Typical Surface Type	Ch. 52	Asphalt / Concrete					
	Shoulder (5)	*Width Usable	55-4.05	Des: 1.2 m Min: 0.6 m	Des: 1.8 m Min: 0.6 m	Des: 1.8 m Min: 0.9 m	Des: 2.4 m Min: 1.8 m	Des: 3.0 m Min: 2.4 m	
		*Width Paved	55-4.05	Des: 0.6 m Min: 0.0 m	Des: 0.6 m Min: 0.0 m	Des: 1.2 m Min: 0.6 m	Des: 1.8 m Min: 0.6 m	Des: 2.4 m Min: 0.6 m	
		Typical Surface Type	Ch. 52	Asphalt / Aggregate / Earth					
	Cross Slope	*Travel Lane (6)	55-4.05	2%-3%					
		Shoulder (7)	55-4.05	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2 m: 4%-6% Asphalt; 6%-8% Aggregate; 8% Earth					
	Auxiliary Lane	Lane Width	55-4.06	Des: 3.0 m; Min: 2.7 m		Des: 3.3 m; Min: 3.0 m		Des: 3.6 m Min: 3.0 m	
		Shoulder Width		Des: Same as Next to Travel Lane; Min: 0.6 m					
	Obstruction-Free Zone		55-5.02	See Section 55-5.02					
	Side Slopes	Cut	Foreslope	55-4.05	2:1 or Flatter (8)				
			Ditch Width		(8)				
			Backslope		2:1 or Flatter (8)				
Fill		55-4.05	2:1 or Flatter (8)						
Bridges**	New or Reconstructed Bridge	*Structural Capacity	Ch. 60	HL-93 (8A)					
		*Clear-Roadway Width (9)	55-6.03	Travelway +1.2 m	Travelway +1.8 m	Travelway +1.8 m	Travelway +2.4 m	Full Paved Appr. Width	
	Existing Bridge to Remain in Place	*Structural Capacity	Ch. 72	HS-15 (10)					
		*Clear-Roadway Width (11)	55-6.02	6.6 m	6.6 m	7.2 m	8.4 m	8.4 m	
	*Vertical Clearance (Collector Under)	New or Replaced Overpassing Bridge (12)	55-6.0	4.45 m					
		Existing Overpassing Bridge		4.30 m					
Vertical Clearance (Collector Over Railroad) (13)		Ch. 69	7.00 m						

Des: Desirable; Min: Minimum.

\* Controlling design criterion. \*\* Selection of cross section and bridge elements is based on design-year traffic volume irrespective of design speed.

### GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, LOCAL-AGENCY ROUTE, 3R PROJECT

Figure 55-3C

Design Element		Manual Section	2-Lane					
Alignment Elements	Design Speed	---	50 km/h	60 km/h	70 km/h	80 km/h	90 km/h	
	*Stopping Sight Distance	55-4.02	65 m	85 m	105 m	130 m	160 m	
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	145 m	170 m	200 m	230 m	270 m
		Stop Maneuver		70 m	95 m	115 m	140 m	170 m
	Passing Sight Distance	42-3.0	Existing	Existing	Existing	Existing	Existing	
	Intersection Sight Distance, -3% to +3% (15)	55-4.06	P: 105 m SU: 135 m	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 190 m SU: 235 m	P: 230 m SU: 280 m	
	*Minimum Radius	55-4.03	See Section 55-4.03					
	*Superelevation Rate	55-4.03	See Section 55-4.03					
	*Horizontal Sight Distance	55-4.03	See Section 55-4.03					
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04				
		Sag		See Section 55-4.04				
	*Maximum Grade (14)	Level	55-4.04	9%	9%	8%	8%	7%
		Rolling		11%	10%	9%	9%	8%
Minimum Grade	44-1.03	Desirable: 0.5%; Minimum: 0.0%						

\* Controlling design criterion. A deviation from such is a design exception, and is subject to approval. See Section 40-8.0.

An operational or maintenance change, permanent or temporary, exclusive of work-zone traffic control, that in fact creates substandard conditions such as by re-striping to obtain added lane(s) by reducing existing lane widths or shoulders, must be addressed in a design exception, whether or not actual construction or reconstruction is involved.

## GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, LOCAL-AGENCY ROUTE, 3R PROJECT

Figure 55-3C (Continued)

## GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, LOCAL-AGENCY ROUTE, 3R PROJECT

### Footnotes to Figure 55-3C

- (1) Applicability. This figure is applicable only to a federal-aid funded project.
- (2) Design Forecast Period. For a partial 3R project, the pavement should be designed for at least a 10-year design life.
- (3) Design Speed. The minimum design speed should equal the anticipated posted speed limit after construction or the legal speed limit, 88 km/h (55 mph), on a non-posted highway.
- (4) Travel Lane (Width). A 3.3-m travel lane width should be used where truck volume exceeds 200 trucks per day. In addition, the following will apply:
  - a. Where  $V \geq 80$  km/h, the minimum width is 3.0 m.
  - b. Where  $V \geq 80$  km/h, the minimum width is 3.3 m.
  - c. Where  $V \geq 80$  km/h, the minimum width is 3.6 m.
- (5) Shoulder Width. The following will apply:
  - a. The desirable guardrail offset is 0.3 m from the effective usable-shoulder width. See Section 49-5.0 for more information.
  - b. If guardrail is present, the minimum offset from the E.T.L. to face of guardrail should desirably be equal to the shy-line offset distance, but not less than 1.2 m (see Section 49-5.0 for shy-line offsets).
  - c. Usable-shoulder width is defined as the distance from the edge of the travel lane to the shoulder break point.
- (6) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.
- (7) Cross Slope (Shoulder). Value is for a tangent section. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information. See Figure 43-3M or Figure 43-3N for shoulder cross slope on a horizontal curve.
- (8) Side Slopes. Section 55-4.05 provides additional information for side-slope criteria.

## GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, LOCAL-AGENCY ROUTE, 3R PROJECT

### Footnotes to Figure 55-3C (Continued)

- (8A) Structural Capacity (New or Reconstructed Bridge). HS-25 loading with Alternate Military Loading should be applied for each project with notice to proceed with design beginning September 1, 2004, through December 31, 2005. A bridge with an ADTT less than or equal to 1,000 may be designed for HS 25 or HS 20, whichever the LPA elects.
- (9) Width (New or Reconstructed Bridge). The following will apply:
- Where the approach roadway width (travelway plus shoulders) is surfaced, such surfaced width should be carried across each structure.
  - The width of each bridge of more than 30 m in length will be analyzed individually. At a minimum, the roadway width of such a bridge should be the width of travel lanes plus a 0.9-m right shoulder and 0.9-m left shoulder.
  - See Section 59-1.0 for more information on bridge width.
- (10) Structural Capacity (Existing Bridge to Remain in Place). If the AADT  $\leq$  50, an HS-10 loading is acceptable.
- (11) Width (Existing Bridge to Remain in Place). Clear-roadway width should be at least equal to the approach traveled way width or the value, whichever is greater. For a bridge of more than 30 m in length, the value does not apply. The acceptability of such a bridge will be assessed individually.
- (12) Vertical Clearance (Collector Under). Value includes an additional 150-mm allowance for a future pavement overlay. Vertical clearance applies from usable edge to usable edge of shoulders.
- (13) Vertical Clearance (Collector Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.
- (14) Maximum Grade. For a grade of less than 150 m in length (PVT to PVC), the maximum grade may be 2% steeper than the value. For a road with AADT < 400, the maximum grade may also be 2% steeper.
- (15) Intersection Sight Distance. For left turn onto a 2-lane road. P = Passenger car; SU = single unit truck. See Figure 46-10G for value for a combination truck.