

Design Element			Manual Section	2-Lane				
Design Controls	Design Year Traffic	AADT	40-2.01	< 400	400 ≤ AADT < 1500	1500 ≤ AADT < 2000	> 2000	
	Design Forecast Year		40-2.02	20 Years				
	*Design Speed (km/h) (2)	Level	40-3.0	60 - 90	80 - 90	80 - 90	100	
		Rolling		60 - 90	60 - 90	60 - 90	80 - 90	
	Access Control		40-5.0	None				
Level of Service		40-2.0	Desirable.: B; Minimum: C					
Cross Section Elements**	Travel Lane	*Width	45-1.01	D: 3.6 m; M: 3.3 m	D: 3.6 m; M: 3.3 m	D: 3.6 m; M: 3.3 m (20)	3.6 m	
		Typical Surface Type (3)	Ch. 52	Asphalt / Concrete				
	Shoulder (4)	*Width Usable	45-1.02	1.2 m	1.8 m	2.4 m	3.0 m	
		*Width Paved	45-1.02	0.6 m	1.2 m	1.8 m	2.4 m	
	Cross Slope	Typical Surface Type (3)	Ch. 52	Asphalt / Concrete				
		*Travel Lane (5)	45-1.01	2%				
	Auxiliary Lane	Shoulder (5A)	45-1.02	Paved Width ≤ 1.2 m: 2%; Paved Width > 1.2 m: 4%				
		Lane Width	45-1.03	Des: Same as Through Lanes; Min: 3.3 m				Desirable: 3.6 m Minimum: 3.3 m
	Clear Zone	Shoulder Width (6)		Same as Next to Travel Lane				
			49-2.0	(7)				
	Side Slopes (8)	Cut	Foreslope	45-3.0	Des: 6:1; Max: 4:1 (9)			
			Ditch Width		1.2 m (10)			
			Backslope		4:1 for 6.0 m; 3:1 Max. to Top (11)			
	Fill	45-3.0	Des: 6:1 to Clear Zone; Max: 3:1 to Toe					
Bridges**	New or Reconstructed Bridge	*Structural Capacity	Ch. 60	HS-25 (12)				
		*Clear Roadway Width (13)	45-4.01	Full Paved Approach Width				
	Existing Bridge to Remain in Place	*Structural Capacity	Ch. 72	HS-15				
		*Clear Roadway Width (14)	45-4.01	6.6 m	6.6 m	7.2 m	8.4 m	
	*Vertical Clearance (Collector Under)	New or Replaced Overpassing Bridge (15)	44-4.0	4.45 m				
		Existing Overpassing Bridge		4.30 m				
Vertical Clearance (Collector Over Railroad) (16)		Ch. 69	7.00 m					

\* Controlling design criteria (see Section 40-8.0).

D or Des: Desirable; M or Min: Minimum

\*\* Selection of the cross section and bridge elements is based on the design-year traffic volumes irrespective of the design speed.

## GEOMETRIC DESIGN CRITERIA FOR STATE RURAL COLLECTOR (New Construction or Reconstruction)

Table 53-3

n Element		Manual Section	2-Lane					
Alignment Elements	Design Speed		60 km/h	70 km/h	80 km/h	90 km/h	100 km/h	
	*Stopping Sight Distance	42-1.0	85 m	105 m	130 m	160 m	185 m	
	Decision Sight Distance	Speed / path / direction change	42-2.0	170 m	200 m	230 m	270 m	315 m
		Stop Maneuver		95 m	115 m	140 m	170 m	200 m
	Passing Sight Distance	42-3.0	410 m	485 m	540 m	615 m	670 m	
	Intersection Sight Distance, -3% to +3% (21)	46-10.0	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 190 m SU: 235 m	P: 230 m SU: 280 m	P: 265 m SU: 320 m	
	*Minimum Radii (e=8%)	43-2.0	125 m	180 m	230 m	305 m	395 m	
	*Superelevation Rate	43-3.0	e <sub>max</sub> = 8% (17)					
	*Horizontal Sight Distance	43-4.0	(18)					
	*Vertical Curvature (K-values)	Crest	44-3.0	11	17	26	39	52
		Sag		18	23	30	38	45
	*Maximum Grade (19)	Level	44-1.02	7%	6.5%	6%	5.5%	5%
		Rolling		8%	7.5%	7%	6.5%	6%
Minimum Grade	44-1.03	Desirable: 0.5% Minimum: 0.0%						

\* Controlling design criteria (see Section 40-8.0).

These standards are to be used for each project on a state rural collector that is classified as new construction or reconstruction regardless of funding source. Deviations from controlling Level One design criteria should be covered by a design exception approved by the Chief, Design Division.

**GEOMETRIC DESIGN CRITERIA FOR STATE RURAL COLLECTOR  
(New Construction or Reconstruction)**

**Table 53-3 (Continued)**

**GEOMETRIC DESIGN CRITERIA FOR STATE RURAL COLLECTOR  
(New Construction or Reconstruction)**

**Footnotes to Table 53-3**

- (1) (Note deleted.)
- (2) Design Speed. The minimum design speed should equal the minimum value from the table or the anticipated posted speed limit after construction, whichever is greater. The state legal limit is 55 mph on a non-posted highway.
- (3) Surface Type. The pavement type selection will be determined by the Materials and Tests Division's pavement design engineer.
- (4) Shoulder Width. The following will apply:
  - a. The shoulder is paved to the face of guardrail. The desirable guardrail offset is 0.6 m from the effective usable shoulder width. See Section 49-5.0 for more information.
  - b. Usable shoulder width is defined as the distance from the edge of the travel lane to the shoulder break point.
- (5) Cross Slope (Travel Lanes). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.
- (5A) Cross Slope (Shoulder). See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information.
- (6) Auxiliary Lane (Shoulder Width). At a minimum, a 0.6-m shoulder may be used adjacent to an auxiliary lane.
- (7) Clear Zone. The clear zone will vary according to design speed, traffic volumes, side slopes, and horizontal curvature. See Section 49-2.0.
- (8) Side Slopes. Values in the tables are for new construction. See Section 45-3.0 and Section 45-8.0 for more information. For a reconstruction project, see Section 49-3.0.
- (9) Foreslope. See Sections 49-2.0 and 49-3.0 for the lateral extent of the foreslope in a ditch section.
- (10) Ditch Widths. A V-ditch should be used in a rock cut. See Section 45-8.0.
- (11) Backslopes. The backslope for a rock cut will vary according to geotechnical factors and the height of the cut. See Section 45-8.0 for typical rock cut sections.

- (12) Structural Capacity (New or Reconstructed Bridge). The following will apply:
- a. Each bridge on a facility with greater than 600 trucks per day should be checked using the Alternate Military loading.
  - b. Each State highway bridge within 25 km of a Toll Road gate must be designed for Toll Road Loading.
  - c. Each bridge on an Extra Heavy Duty Highway must be designed for the Michigan Train truck loading configuration.
  - d. See Chapter Sixty for additional information on the loading configurations.
- (13) Width (New or Reconstructed Bridge). Minimum clear roadway width will be 9.4 m. See Section 59-1.0 for more information on bridge width.
- (14) Width (Existing Bridge to Remain in Place). Clear width will be at least equal to the approach traveled way width or the table values, whichever is greater.
- (15) Vertical Clearance (Collector Under). Table values include an additional 150 mm allowance for a future pavement overlay. Vertical clearances apply from usable edge to usable edge of shoulders.
- (16) Vertical Clearance (Collector Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.
- (17) Superelevation Rate. See Section 43-3.0 for values of superelevation based on design speed and radii.
- (18) Horizontal Sight Distance. For a given design speed, the necessary middle ordinate will be determined by the radius and the sight distance which applies at the site. See Section 43-4.0.
- (19) Maximum Grades. For a grade of less than 150 m in length (PVT to PVC), a one-way downgrade, or a grade on a road with AADT < 400, the maximum grade may be up to 2% steeper than the table value.
- (20) Use 3.6 m if  $V = 90$  km/h.
- (21) Intersection Sight Distance. For left turn onto a 2-lane road. P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.