

Design Element			Manual Section	2-Lane					
Design Controls	Design Year Traffic	AADT	40-2.01	< 50	50 ≤ AADT < 250	250 ≤ AADT < 400	400 ≤ AADT < 1500	1500 ≤ AADT < 2000	≥ 2000
	Design Forecast Year		40-2.02	20 years					
	*Design Speed (mph) (3)	Level	40-3.0	30 - 55	30 - 55	35 - 55	50 - 55	50 - 55	50 - 55
		Rolling		30 - 55	30 - 55	30 - 55	35 - 55	35 - 55	35 - 55
	Access Control		40-5.0	None					
Level of Service		40-2.0	Desirable: B; Minimum: D						
Cross Section Elements**	Travel Lane	*Width	45-1.01	10 ft	10 ft	10 ft(4a)	11 ft	11 ft(4b)	12 ft
		Typical Surface Type	Chp. 52	Asphalt / Concrete / Aggregate					
	Shoulder	*Width Usable	45-1.02	2 ft	2 ft	2 ft	6 ft (5)	6 ft	8 ft
		Typical Surface Type	Chp. 52	Asphalt / Aggregate / Earth					
	Cross Slope	*Travel Lane (6)	45-1.01	2%-3% Asphalt / Concrete; 6% Aggregate					
		Shoulder (6A)	45-1.02	Paved Width ≤ 4 ft: 2% - 3%; Paved Width > 4 ft: 4% - 6% Asphalt/Concrete; 6%-8% Aggregate; 8% Earth					
	Auxiliary Lanes	Lane Width	45-1.03	Same as Travel Lane			Des: Same as Travel Lane; Min: 10 ft		
		Shoulder Width		Desirable: 4 ft; Minimum: 2 ft					
	Clear Zone		49-2.0	(7)					
	Side Slopes	Cut	Foreslope	45-3.0	4:1 (V > 60) (8); 3:1 (V # 60) (8)				
Ditch Width			Des: 4 ft; Min: 0.0 ft						
Backslope			4:1 (V > 60); 3:1 (V # 60) (9)						
Fill		0-30 ft Height	45-3.0	Desirable: 4:1; Maximum: 3:1					
	>30 ft Height	3:1							
Bridges**	New or Reconstructed Bridge	*Structural Capacity	Chp. 60	HS-25(9a)					
		*Clear Roadway Width (10)	45-4.01	Travelway + 4 ft			Travelway + 6 ft		Full Paved Approach Width
	Existing Bridge to Remain in Place	*Structural Capacity	Chp. 72	HS-10	HS-15				
		*Clear Roadway Width (11)	45-4.01	20 ft		22 ft		24 ft	28 ft
	*Vertical Clearance (Local Road Under)	New or Replaced Overpassing Bridge (12)	44-4.0	14.5 ft					
Existing Overpassing Bridge		14 ft							
Vertical Clearance (Local Road Over Railroad) (13)		Chp. 69	23 ft						

*Controlling design criteria (see Section 40-8.0). ** Selection of the cross section and bridge elements is based on the design year traffic volumes irrespective of the design speed.

Des: Desirable. Min: Minimum.

GEOMETRIC DESIGN CRITERIA FOR LOCAL RURAL ROAD ⁽¹⁾ (New Construction or Reconstruction)

Table 53-5

Design Element		Manual Section	2-Lane							
Alignment Elements	Design Speed		20 mph	25 mph	30 mph	35 mph	45 mph	50 mph	55 mph	
	*Stopping Sight Distance	42-1.0	110 ft	160 ft	210 ft	270 ft	340 ft	420 ft	520 ft	
	Decision Sight Distance	Speed / Path / Direction Chg. Stop Maneuver	42-2.0	290 ft	390 ft	470 ft	550 ft	650 ft	750 ft	880 ft
				130 ft	160 ft	220 ft	310 ft	370 ft	450 ft	550 ft
	Passing Sight Distance	42-3.0	650 ft	880 ft	1130 ft	1340 ft	1590 ft	1770 ft	2010 ft	
	Intersection Sight Distance	46-10.0	210 ft	270 ft	340 ft	490 ft	490 ft	550 ft	620 ft	
	*Minimum Radii (e=8%)	43-2.0	90 ft	180 ft	270 ft	590 ft	590 ft	750 ft	1000 ft	
	*Superelevation Rate	43-3.0	e _{max} =8% (14)							
	*Horizontal Sight Distance	43-4.0	(15)							
	*Vertical Curvature (K-values)	Crest	44-3.0	7	12	19	29	61	84	114
		Sag		17	26	37	49	79	96	115
	*Maximum Grade	Level	44-1.02	8%	7%	7%	7%	7%	6%	5.5%
		Rolling		11%	11%	10%	9%	9%	8%	7%
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 federal-aid funded project agency rural local road classified as new construction or reconstruction. Deviations from controlling Level One design criteria should be covered by a design exception approved by the Chief, Design Division.

GEOMETRIC DESIGN CRITERIA FOR RURAL LOCAL ROAD⁽¹⁾
(New Construction or Reconstruction)

Table 53-5 (Continued)

**GEOMETRIC DESIGN CRITERIA FOR RURAL LOCAL ROAD
(New Construction or Reconstruction)**

Footnotes to Table 53-5

- (1) Applicability. This table is only applicable to Federal-aid projects.
- (2) (Blank).
- (3) 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 non-posted highways.
- (4) Travel Lane Width. The following will apply:
 - a. Use 11 ft lanes where $V \geq 55$ mph.
 - b. Use 12 ft lanes where $V \geq 55$ mph.
- (5) Shoulder Width. The following will apply:
 - a. For $400 \leq \text{AADT} < 1500$, the shoulder width may be 4 ft.
 - b. Usable shoulder width is defined as the distance from the edge of the travel lane to the shoulder break point.
- (6) Cross Slope (Travel Lanes). Cross slopes of 1.5% are acceptable on existing bridges to remain in place.
- (6A) Cross Slope (Shoulder). See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information.
- (7) Clear Zone. The clear zone will vary according to design speed, traffic volumes, side slopes and horizontal curvature. See Section 49-2.0. For design speeds less than 50 mph, a 10 ft clear zone may be used.
- (8) Foreslope. See Sections 49-2.0 and 49-3.0 for the lateral extent of the foreslope in a ditch section.
- (9) Backslopes. Backslopes for rock cuts will vary according to the height of the cut and geotechnical factors.
- (9a) Structural Capacity (New or Reconstructed Bridge). A bridge with design year average daily truck traffic (ADTT) greater than 1,000 should be designed for HS 25 live loads. 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.
- (10) Width (New and Reconstructed Bridges). Widths of bridges more than 100 ft in length will be analyzed individually. At a minimum, the roadway width of these bridges will be the width of travel lanes plus a 3 ft right shoulder and 3 ft left shoulder for highways with $\text{AADT} > 2000$. Where shoulders are paved, it is desirable to provide the full approach roadway width. See Section 59-1.0 for more information on bridge widths.
- (11) Width (Existing Bridges to Remain in Place). Minimum clear widths that are 2 ft narrower may be used on roads with few trucks. The clear roadway width should be at least the same width as the approach travelway. For one-lane bridges, the width may be 18 ft. For bridges of more than 100 ft in length, the values in the table do

not apply. The acceptability of these bridges will be assessed individually.

- (12) Vertical Clearance (Local Road Under). Table values include an additional 6 in. allowance for future pavement overlays. Vertical clearances apply from usable edge to usable edge of shoulders.
- (13) Vertical Clearance (Local Road Over Railroad). See Chapter Sixty-nine for additional information on railroad clearances under highways.
- (14) Superelevation Rate. See Section 43-3.0 for values of superelevation based on design speed and radii.
- (15) 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.