

Design Element		Manual Section	Design Values (By Type of Area)				
			Suburban	Intermediate	Built-up		
Design Controls	Design Forecast Period		55-4.01	20 Years (1)	20 Years (1)	20 Years (1)	
	*Design Speed (mph) (2)		55-4.01	Posted Speed Limit	Posted Speed Limit	Posted Speed Limit	
	Access Control		40-5.01	Partial Control / None	None	None	
	Level of Service		40-2.0	Des: B; Min: D	Des: C; Min: D	Des: C; Min: D	
	On-Street Parking		45-1.0	None	Optional (3)	Optional (3)	
Cross Section Elements	Travel Lane	*Width (4)	55-4.05	Curbed: Des: 12 ft; Min: 11 ft Uncurbed: Des: 12 ft; Min: 11 ft	Curbed: Des: 12 ft; Min: 11 ft Uncurbed: Des: 12 ft; Min: 11 ft	Curbed Des: 12 ft Curbed Min: 10 ft	
		Typical Surface Type (5)	Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete	
	*Curb Offset (6)		55-4.05	Des: 2 ft; Min: 1 ft	Des: 2 ft; Min: 1 ft	Des: 2 ft; Min: 1 ft	
	Shoulder	*Paved Width (7)	55-4.05	Curbed Des: 10 ft; Min: 1 ft Uncurbed: Des: 10 ft; Min: 6 ft	Curbed: Des: 8 ft; Min: 1 ft Uncurbed: Des: 8 ft; Min: 4 ft	Des: 6 ft; Min: 2 ft	
		Typical Surface Type (5)	Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete	
	Cross Slope	*Travel Lane (8)	55-4.05	2%-3%	2%-3%	2%-3%	
		Shoulder (9)	55-4.05	4%-6%	Paved Width ≤ 4 ft: 2%-3%; Paved Width > 4 ft: 4%-6%	Paved Width ≤ 4 ft: 2%-3%; Paved Width > 4 ft: 4%-6%	
	Auxiliary Lane	Lane Width	55-4.05	Des: 12 ft; Min: 11 ft	Des: 12 ft; Min: 11 ft	Des: 12 ft; Min: 10 ft	
		Curb Offset		Des: 1 ft; Min: 0 ft	Des: 1 ft; Min: 0 ft	Des: 1 ft; Min: 0 ft	
		Shoulder Width		Des: 10 ft; Min: 2 ft	Des: 8 ft; Min: 2 ft	Des: 6 ft; Min: 2 ft	
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	TWLTL-Lane Width		46-5.0	Des: 16 ft; Min: 14 ft	Des: 16 ft; Min: 12 ft	Des: 16 ft; Min: 11 ft	
	Parking-Lane Width		45-1.04	N/A	Des: 10 ft; Min: 8 ft (10)	Des: 10 ft; Min: 8 ft (10)	
	Sidewalk Width (11)		45-1.06	4 ft with 5 ft Buffer (Des)	Des: 6 ft; Min: 4 ft	Des: 6 ft; Min: 4 ft	
	Bicycle-Lane Width (12)		51-7.0	Curbed: 5 ft Uncurbed: Shld. Width +4 ft	Curbed: 5 ft Uncurbed: Shld. Width +4 ft	Curbed: 5 ft	
	Obstruction-Free Zone		55-5.02	See Section 55-5.02	See Section 55-5.02	See Section 55-5.02	
	Typical Curbing Type (where used) (13)		55-5.0	Vertical / Sloping	Vertical / Sloping	Vertical / Sloping	
	Side Slopes (Uncurbed)	Cut	Foreslope	55-5.0	2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
			Ditch Width		(14)	(14)	N/A
			Backslope		2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
		Fill	2:1 or Flatter (14)		2:1 or Flatter (14)	N/A	
	Side Slopes (Curbed)	Cut (Backslope)	55-4.05	(15)	(15)	(15)	
		Fill		2:1 or Flatter (14)	2:1 or Flatter (14)	2:1 or Flatter (14)	

Des: Desirable; Min: Minimum.

* Controlling design criterion.

GEOMETRIC DESIGN CRITERIA FOR URBAN ARTERIAL, TWO LANES, 3R PROJECT

Figure 55-3F

Design Element			Manual Section	Design Values (By Type of Area)					
				Suburban	Intermediate	Built-up			
Bridges	New or Reconstructed Bridge	*Structural Capacity (16)	Ch. 60	HL-93	HL-93	HL-93			
		*Clear-Roadway Width(17)	55-6.03	Curbed: Full Approach Curb-to-Curb Width Uncurbed: Full Approach Paved Width					
	Existing Bridge to Re-main in Place	*Structural Capacity	Ch. 72	HS-20	HS-20	HS-20			
		*Clear-Roadway Width	55-6.02	Curbed: Full Approach Curb-to-Curb Width; Uncurbed: Travelway Plus 2 ft. on Each Side					
	*Vertical Clearance (Arterial Under)	New or Replaced Overpassing Bridge (18a & 18c)	44-4.0	16.5 ft	16.5 ft (18b)	16.5 ft (18b)			
		Existing Overpassing Bridge (19)		14 ft	14 ft	14 ft			
		Sign Truss / Pedestrian Bridge (18a & 18c)		New: 17.5 ft; Existing: 17.0 ft	New: 17.5 ft; Existing: 17.0 ft	New: 17.5 ft; Existing: 17.0 ft			
Vertical Clearance (Arterial over Railroad) (20)		Ch. 69	23.0 ft						
Alignment Elements	Design Speed		---	25 mph	30 mph	35 mph	45 mph	50 mph	55 mph
	*Stopping Sight Distance (Desirable)		55-4.02	155 ft	200 ft	250 ft	360 ft	425 ft	495 ft
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	U: 515 ft SU: 445 ft	U: 620 ft SU: 535 ft	U: 720 ft SU: 625 ft	U: 930 ft SU: 800 ft	U: 1030 ft SU: 890 ft	U: 1135 ft SU: 980 ft
		Stop Maneuver		425 ft	500 ft	650 ft	825 ft	875 ft	1075 ft
	Intersection Sight Distance (21)		55-4.06	P: 280 ft SUT: 350 ft	P: 330 ft SUT: 420 ft	P:390 ft SUT:490 ft	P: 500 ft SUT: 630 ft	P: 630 ft SUT: 780 ft	P: 730 ft SUT: 890 ft
	*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-value)	Crest	55-4.04	See Section 55-4.04					
		Sag		See Section 55-4.04					
*Maximum Grade	Level	55-4.04	11%	10%	9%	8.5%	8%	7%	
	Rolling		12%	11%	10%	9.5%	9%	8%	
Minimum Grade		44-1.03	Curbed Des: 0.5%; Curbed Min: 0.3% Uncurbed: 0.0%						

U: Urban; SU: Suburban. Des: Desirable; Min: Minimum.

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

GEOMETRIC DESIGN CRITERIA FOR URBAN ARTERIAL, TWO LANES, 3R PROJECT

Figure 55-3F (Continued)

GEOMETRIC DESIGN CRITERIA FOR URBAN ARTERIAL, TWO-LANES, 3R PROJECT

Footnotes to Figure 55-3F

- (1) Design Forecast Period. For a partial 3R project, the pavement should be designed for at least a 10-year design life.
- (2) Design Speed. The minimum design speed should equal the anticipated posted speed limit after construction or the legal speed limit on a non-posted highway. This is 30 mph, but with an engineering study it may be raised to a maximum of 55 mph.
- (3) On-Street Parking. In general, on-street parking is discouraged.
- (4) Travel Lane (Width). For an arterial on the National Truck Network, the right lane must be 12 ft in width. For a non-National-Truck-Network route, a minimum 11-ft travel lane should be used where truck volume exceeds 200 trucks per day. See Section 55-4.05.
- (5) Surface Type. The pavement-type selection will be determined by the Office of Pavement Engineering or by the local jurisdiction.
- (6) Curb Offset. The curb offset should be 2 ft. Vertical curbs which are either continuous or introduced intermittently may be offset 1 ft.
- (7) Shoulder Width. The value applies to paved-shoulder width. The following will also apply:
 - a. For an uncurbed section, the shoulder is paved to the face of guardrail. The desirable guardrail offset is 2 ft from the effective usable-shoulder width. See Section 49-5.0 for more information.
 - b. For an uncurbed section, a desirable additional 1 ft of compacted aggregate will be provided.
 - c. If guardrail is present, the minimum offset from E.T.L. to face of guardrail should desirably be equal to the shy-line offset distance, but not less than 4 ft (see Section 49-5.0 for shy-line offsets). In a restrictive situation, the guardrail offset may be 1 ft from the effective usable-shoulder width.
 - d. For a curbed section, the curb offset is included in the paved-shoulder width.
- (8) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.
- (9) 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.

GEOMETRIC DESIGN CRITERIA FOR URBAN ARTERIAL, TWO LANES, 3R PROJECT

Footnotes to Figure 55-3F (Continued)

- (10) Parking-Lane Width. The following will apply:
- Where the parking lane will be used as a travel lane during peak hours or may be converted to a travel lane in the future, the width should be equal to the travel lane width plus the curb offset width (if present).
 - A parking lane for residential usage may be 7 ft narrower.
 - The cross slope for a parking lane is typically 1% steeper than that for the adjacent travel lane. A buffer strip of 4 ft or wider is desirable.
- (11) Sidewalk Width. Value is for the installation of a new sidewalk. An existing sidewalk width of 3 ft or greater (with or without a buffer) may be retained. A buffer strip of 4 ft or wider is desirable.
- (12) Bicycle-Lane Width. The width is in addition to the width of parking lane, if present. See Section 51-7.0 for additional details.
- (13) Curbing Types. Vertical curbs may only be used with design speed lower than 50 mph.
- (14) Side Slopes. Section 55-4.05 provides additional information for side-slope criteria.
- (15) Side Slopes (Curbed) Cut. A shelf or sidewalk will be present immediately behind the curb before the toe of the backslope. The minimum width of a shelf desirably should be 6 ft. Where a sidewalk is present, the toe of the backslope will be 1 ft beyond the edge of sidewalk. See Section 45-3.0 for more information.
- (16) Structural Capacity (New or Reconstructed Bridge). The following will apply:
- 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.
 - Each State highway bridge within 15 mi of a Toll-Road gate must be designed for Toll-Road loading.
 - Each bridge on an Extra-Heavy-Duty Highway must be designed for the Michigan Train truck loading configuration.
 - See Chapter Sixty for additional information on the loading criteria.

GEOMETRIC DESIGN CRITERIA FOR URBAN ARTERIAL, TWO LANES, 3R PROJECT

Footnotes to Figure 55-3F (Continued)

- (17) Width (New or Reconstructed Bridge). Width is minimum for a 3R project. See Section 59-1.0 for additional information on bridge width.
- (18) Vertical Clearance (Arterial Under Railroad). The following will apply:
 - a. Value includes an additional 6-in. allowance for a future pavement overlay.
 - b. In a highly-urbanized area, a minimum clearance of 14.0 ft may be provided if there is at least one route with a 16.0-ft clearance.
 - c. Vertical clearance applies from usable edge to usable edge of shoulder.
- (19) Vertical Clearance (Existing Bridge). See Section 55-6.02 for additional information on minimum allowable vertical clearance.
- (20) Vertical Clearance (Arterial Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.
- (21) Intersection Sight Distance. For left turn onto a 2-lane road, P = Passenger car; SUT = single unit truck. See Figure 46-10G for value for a combination truck.