Design Element				Manual Section	2 Lanes				
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 (1)				
	*Design Speed (km/h) (2)			55-4.01	Posted Speed Limit				
	Access Control			40-5.0	None				
	Level of Service			40-2.0	Desirable: B; Minimum: D				
Cross-Section Elemnts	Travel Lane	*Width		55-4.05	Des: 3.6 m Min: 3.0 m	Des: 3.6 m Min: 3.3 m	Des: 3.6 m Min: 3.3 m	3.6 m (3)	3.6 m (3)
		Typical Surface Type (4)		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: 2.4 m Min: 0.9 m	Des: 2.4 m Min: 1.8 m	Des: 3.0 m Min: 1.8 m
		*Width Paved		55-4.05	Des: 0.6 m Min: 0.0 m	Des: 1.2 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 (4)		Ch. 52	Asphalt / Concrete / Sealed Aggregate				
	Cross Slope	*Travel Lane (6)		55-4.05	2% Typical; 3% Maximum				
		Shoulder (7)		55-4.05	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2 m: 4%-6% Asphalt / Concrete; 6% Sealed Aggregate				
	Auxiliary Lane	Lane Width		55-4.05	Des: Same as Travel Lane Min: 3.0 m		Des: Same as Travel Lane Min: 3.3 m		
		Shoulder Width			Des: Same as That 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 (9)				
		*Clear-Roadway Width (10)		55-6.03	Full Paved Approach Width				
	Existing Bridge to Remain in Place	*Structural Capacity		Ch. 72	HS-15				
		*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 (13)			4.30 m				
	Vertical Clearance (Collector Over Railroad) (14)			Ch. 69	7.00 m				

Des: Desirable; Min: Minimum.

* Controlling design criterion.

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

GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, STATE ROUTE, 3R PROJECT

Figure 55-3B

Design Element			Manual Section	2 Lanes				
Alignment Elements	Design Speed		---	60 km/h	70 km/h	80 km/h	90 km/h	100 km/h
	*Stopping Sight Distance	Desirable	55-4.02	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	Existing	Existing	Existing	Existing	Existing
	Intersection Sight Distance, -3% to +3% (16)		55-4.06	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 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 (15)	Level	55-4.04	9%	8%	8%	7.5%	7%
		Rolling		10%	9%	9%	8.5%	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.

A deviation from a controlling design criterion should be addressed in an approved design exception. 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 design exceptions whether or not actual construction or reconstruction is involved.

These criteria apply to each project regardless of funding source.

GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, STATE ROUTE, 3R PROJECT

Figure 55-3B (Continued)

GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, STATE ROUTE, 3R PROJECT

Footnotes to Figure 55-3B

(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, 88 km/h (55 mph), on a non-posted highway.

(3) Travel Lane (Width). A minimum 3.3-m travel lane may be used where truck volume exceeds 200 trucks per day.

(4) Surface Type. The pavement-type selection will be determined by the Office of Pavement Engineering.

(5) Shoulder. The following will apply:

a. The shoulder should be paved to the front face of guardrail. The desirable guardrail offset is 0.3 m from the effective usable-shoulder width. In a restrictive situation, the guardrail offset may be 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 E.T.L. to the front face of guardrail should desirably be equal to the shy-line 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, STATE ROUTE, 3R PROJECT

Footnotes to Figure 55-3B (Continued)

(9) Structural Capacity (New or Reconstructed Bridge). The following will apply:

a. 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.
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.

(10) Width (New or Reconstructed Bridge). Width is the minimum for a 3R project. See Section 59-1.0 for additional information on bridge width. The minimum clear-roadway width should be 9.4 m.

(11) Width (Existing Bridge to Remain in Place). Clear-roadway width will be at least equal to the approach traveled way width or the value, whichever is greater.

(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 (Existing Bridge). See Section 55-6.02 for additional information on minimum allowable vertical clearance.

(14) Vertical Clearance (Collector Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(15) Maximum Grades. For a grade less than 150 m in length (PVT to PVC), the maximum grade may be up to 2% steeper than the value. For a road with AADT < 400, the maximum grade may also be 2% steeper.

(16) 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 combination truck.