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Mississippi Department of Transportation / P.O. Box 1850 / Jackson, Mississippi 39215-1850 / FAX (601) 359-1807

ROADWAY DESIGN

INTEROFFICE MEMORANDUM

TO: J. Richard Young  
Asst. Chief Engineer - Preconstruction

DATE: September 24, 1997

FROM: Wendel T. Ruff  
Roadway Design Division Engineer

SUBJECT: 3R Criteria

COPY: Larry Kastner, FHWA  
Roger McWilliams, FHWA

The attached criteria tables for urban 3R projects are for your review and comments. Please note particularly the minimum lane width.

We consider this criteria to be reasonable and seek your concurrence.

WTR

Attachment

83-01  
I agree  
[Signature]



**J**JORGENSEN  
Roy Jorgensen Associates, Inc.

*J.P.*

*Corporate Offices*

3735 Buckeystown Pike  
Post Office Box 70  
Buckeystown, MD 21717-0070

Telephone: 1-301-831-1000  
Facsimile: 1-301-874-2876

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ROADWAY DESIGN

September 17, 1997

Mr. Wendel Ruff  
Roadway Design Division Engineer  
Mississippi Department of Transportation  
P. O. Box 1850  
Jackson, Mississippi 39215-1850

Dear Wendel:

As we discussed last week, I have revised the 3R lane width criteria for Tables 14-3B and 14-3C in Section 14-3.0 "Urban Streets (3R Projects)" for Chapter XIV "Geometric Design of Urban Streets." This will allow you to discuss the issue with FHWA. Please note that, for this submission, I have not made any other changes which will eventually be needed (e.g., deletion of the footnote for high-volume change soil).

If you have any questions, please do not hesitate to contact me.

Sincerely,

*R. Kenneth Shearin, Jr.*

R. Kenneth Shearin, Jr.  
Project Manager

Enclosures

**Table 14-3B  
GEOMETRIC DESIGN CRITERIA FOR URBAN ARTERIALS  
(3R Projects)**

	DESIGN ELEMENT	Manual Section	2-Lane		Multilane (1)			
			With Curb	Without Curb	With Curb	Without Curb		
			Desirable: 10 Years Minimum: Current		Desirable: 10 Years Minimum: Current			
Design Controls	Design Forecast Year	14-3.02	Desirable: 10 Years Minimum: Current		Desirable: 10 Years Minimum: Current			
	*Design Speed (2)	14-3.02	60 km/h - 80 km/h	70 km/h - 90 km/h	60 km/h - 90 km/h	70 km/h - 100 km/h		
	Control of Access	2-4.0	Control by Regulation (Type 3)					
	Level of Service	14-2.01	Desirable: B Minimum: D		Desirable: B Minimum: D			
Cross Section Elements	*Lane Width	14-3.03	NHS: 3.6 m / 12' Non-NHS: Desirable: 3.6 m; Minimum: 3.3 m		NHS: 3.6 m Non-NHS: Desirable: 3.6 m; Minimum: 3.3 m / 11'			
	Outside Shoulder Width	*Usable	14-3.03	Desirable: 2.4 m Minimum: 0.6 m	1.2 m	Desirable: 3.0 m / 10' Minimum: 0.3 m / 1'	Desirable: 3.0 m Minimum: 1.2 m / 4'	
		Surfaced		Same as Usable	(3)	Same as Usable	Desirable: 2.4 m Minimum: 0.6 m	
	Median Shoulder Width	*Usable	14-3.03	N/A		Desirable: 1.2 m Minimum: 0.3 m		
		Surfaced		N/A		Same as Usable		
	* Cross Slope	Travel Lane		2%		2%		
		Shoulder	14-3.03	Shoulder Width > 1.2 m: 4% Shoulder Width < 1.2 m: 2%	4%	Shoulder Width > 1.2 m: 4% Shoulder Width < 1.2 m: 2%	4%	
	Auxiliary Lanes	Lane Width	14-3.03	Desirable: Same as Travel Lane Minimum: 3.3 m		Desirable: Same as Travel Lane Minimum: 3.3 m		
		Usable Shoulder Width		Desirable: 1.2 m Minimum: 0.3 m	0.6 m	Desirable: 1.2 m Minimum: 0.3 m	1.2 m	
	CTWLT Lane Width		14-3.03	Desirable: 4.2 m Minimum: 3.3 m		Desirable: 4.2 m Minimum: 3.3 m		
	Parking Lane Width (4)		14-3.03	Desirable: 3.6 m Minimum: 2.4 m		Desirable: 3.6 m Minimum: 2.4 m		
	Sidewalk Width		14-2.06	1.525 m - 2.4 m		1.525 m - 2.4 m		
	Median Width		14-2.06	N/A		Existing		
	*Reconstructed/ Rehabilitated Bridges (6)	Structural Capacity	11-2.03	MS-18		MS-18		
		Minimum Width (5)		ADT < 4000: Traveled Way +1.2 m ADT > 4000: Traveled Way +1.8 m		ADT < 4000: Traveled Way +1.2 m ADT > 4000: Traveled Way +1.8 m		
	*Existing Bridges to Remain in Place	Structural Capacity	11-2.03	MS-18		MS-18		
		Minimum Width (6)		ADT < 2000: Traveled Way + 0.6 m ADT > 2000: Traveled Way +1.2 m		Traveled Way + 1.2 m (Each Roadway)		
	Minimum Right-of-Way Width		14-2.06; 10-1.02	(7)		(7)		
	Roadside Clear Zone	Guardrail	11-2.08	Usable Shoulder Width		Usable Shoulder Width		
		*Obstruction		500 mm (8a)	See Note (8b)	500 mm (8a)	See Note (8b)	
Slope Schedule (9)	Cut	14-2.06	Foreslope	+2%	1:4	+2%	1:4	
			Depth of Ditch	N/A	0.9 m	N/A	1.2 m	
			Backslope	Desirable: 1:3 Maximum: 1:2	1:3	Desirable: 1:3 Maximum: 1:2	1:3	
	Fill		Height ≤ 1.5 m	Desirable: 1:3 Maximum: 1:2	Desirable: 1:4 Maximum: 1:3	Desirable: 1:3 Maximum: 1:2	Desirable: 1:4 Maximum: 1:3	
			Height > 1.5 m		1:3		1:3	
Alignment Elements	DESIGN SPEED		60 km/h	70 km/h	80 km/h	90 km/h	100 km/h	
	*Minimum Stopping Sight Distance	14-2.03	75 m	95 m	115 m	135 m	160 m	
	*Minimum Radii	14-3.04	See Section 14-3.04					
	*Superelevation Rate	14-3.04	See Section 14-3.04					
	*Horizontal Sight Distance	3-5.0	(10)					
	*Maximum Grades	Level	11-2.05	9%	8%	8%	7%	7%
		Rolling		10%	9%	9%	8%	8%
	Minimum Grades		14-2.05	Desirable: 0.4% Minimum: 0.2% (With Curbs) 0.0% (Without Curbs)				
	*Vertical Curvature (K-values)		11-2.05	See Section 14-3.05				
	*Vertical Clearance (Arterial Under)	New/Reconstructed Bridges (11)	2-6.03	5.05 m				
Existing Bridges		4.3 m						
Sign Truss (11)		5.35 m						
Vertical Clearance (Arterial Over Railroad)		2-6.03	7.05 m					

\*Controlling design criteria. See Section 2-8.0.

**GEOMETRIC DESIGN CRITERIA FOR URBAN ARTERIALS  
(3R Projects)**

**Footnotes to Table 14-3B**

1. Multilane Facilities. The criteria in the table for 3R multilane facilities will apply to:
  - a. an existing multilane facility, or
  - b. an existing 2-lane facility which will become a divided highway.

In the case of "b," the new roadway will be designed according to the Department's new construction criteria. See Table 14-2G.
2. Design Speed. The design speed should equal or exceed the anticipated posted or regulatory speed limit after construction. See Table 14-3A for selection of a (metric) design speed based on an (English) posted speed.
3. Shoulder Surface Type (2-Lane Facilities). Generally, shoulders will not be surfaced except as approved in special conditions.
4. Parking Lanes. These widths only apply to parallel parking. See Section 14-2.06 for the design of angle parking.
5. Bridge Width (New Bridges). For new bridges within the limits of a 3R project, the minimum width will be the full approach roadway width according to the Department's criteria for new construction. However, bridges which are considered major structures (i.e., lengths greater than 60 m) are subject to individual economic, traffic and safety studies. See Section 11-4.0 for bridge projects performed as a spot improvement.
6. Bridge Width (Reconstructed Bridges/Rehabilitated Bridges/Existing Bridges to Remain in Place). Bridges which are considered major structures (i.e., lengths greater than 60 m) are subject to individual economic, traffic and safety studies. See Section 11-4.0 for bridge projects performed as a spot improvement.
7. Right-of-Way Width. The acquisition of significant amounts of right-of-way is typically outside the scope of a 3R project. Therefore, the existing right-of-way will typically be unchanged by the 3R project. However, the designer should, wherever practical, secure additional right-of-way to allow cost-effective geometric and roadside safety improvements.
8. Roadside Clear Zone. The following will apply:
  - a. With Curb. The 500 mm is measured from the face of the curb to the obstruction regardless of shoulder width.
  - b. Without Curb. See Section 11-2.08 for clear zones. All values are measured from the edge of traveled way.
9. Slopes. If high-volume change soil is present, see Section 12-2.04.
10. Horizontal Sight Distance. The necessary middle ordinate will be based on the design speed and minimum radii. See Section 3-5.0 for the applicable criteria.
11. Minimum Vertical Clearances. Table values include an additional 150-mm allowance for future resurfacing.

**Table 14-3C  
GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR STREETS  
(3R Projects)**

	DESIGN ELEMENT		Manual Section	2-Lane		Multilane (1)	
				With Curb	Without Curb	With Curb	Without Curb
				Desirable: 10 Years Minimum: Current		Desirable: 10 Years Minimum: Current	
Design Controls	Design Forecast Year		14-3.02	Desirable: 10 Years Minimum: Current		Desirable: 10 Years Minimum: Current	
	*Design Speed (2)		14-3.02	50 km/h - 80 km/h		50 km/h - 80 km/h	
	Control of Access		2-4.0	Control by Regulation (Type 3)		Control by Regulation (Type 3)	
	Level of Service		14-2.01	Desirable: B Minimum: D		Desirable: B Minimum: D	
Cross Section Elements	*Lane Width		14-3.03	NHS: 3.6 m Non-NHS: Desirable: 3.6 m; Minimum: 3.3 m		NHS: 3.6 m Non-NHS: Desirable: 3.6 m; Minimum: 3.3 m	
	Outside Shoulder Width	*Usable	14-3.03	Desirable: 2.4 m Minimum: 0.3 m		Desirable: 3.0 m Minimum: 0.3 m	
		Surfaced		Same as Usable		Same as Usable	
	Median Shoulder Width	*Usable	14-3.03	N/A		Desirable: 1.2 m Minimum: 0.3 m	
		Surfaced		N/A		Desirable: 2.4 m Minimum: 1.2 m	
	* Cross Slope	Travel Lane	14-3.03	2%		2%	
		Shoulder		Shoulder Width > 1.2 m: 4% Shoulder Width < 1.2 m: 2%		Shoulder Width > 1.2 m: 4% Shoulder Width < 1.2 m: 2%	
	Auxiliary Lanes	Lane Width	14-3.03	Desirable: Same as Travel Lane Minimum: 3.0 m		Desirable: Same as Travel Lane Minimum: 3.0 m	
		Usable Shoulder Width		Desirable: 1.2 m Minimum: 0.3 m		Desirable: 1.2 m Minimum: 0.3 m	
	CTWLT Lane Width		14-3.03	Desirable: 4.2 m Minimum: 3.3 m		Desirable: 4.2 m Minimum: 3.3 m	
	Parking Lane Width (4)		14-3.03	Desirable: 3.6 m Minimum: 2.1 m		Desirable: 3.6 m Minimum: 2.1 m	
	Sidewalk Width		14-2.06	1.525 m - 2.4 m		1.525 m - 2.4 m	
	Median Width		14-2.06	N/A		Existing	
	*New/Reconstructed/ Rehabilitated Bridges	Structural Capacity	11-2.03	MS-18		MS-18	
		Minimum Width		(5)		(5)	
	*Existing Bridges to Remain in Place	Structural Capacity	11-2.03	MS-18		MS-18	
		Minimum Width		(6)		(6)	
	Minimum Right-of-Way Width		14-2.06; 10-1.02	(7)		(7)	
	Roadside Clear Zone	Guardrail	11-2.08	Usable Shoulder Width		Usable Shoulder Width	
		*Obstruction		500 mm (8a)		500 mm (8a)	
Slope Schedule (9)	Cut	14-2.06	Foreslope		Foreslope		
			+2%		+2%		
			N/A		N/A		
	Depth of Ditch		0.9 m		1.2 m		
	Backslope		Desirable: 1:3 Maximum: 1:2		Desirable: 1:3 Maximum: 1:2		
	Height ≤ 1.5 m		Desirable: 1:3 Maximum: 1:2		Desirable: 1:3 Maximum: 1:2		
Fill	Height > 1.5 m		Desirable: 1:4 Maximum: 1:3		Desirable: 1:4 Maximum: 1:3		
			1:3		1:3		
Alignment Elements	DESIGN SPEED		14-2.03	50 km/h	60 km/h	70 km/h <i>45 mph</i>	80 km/h
	*Minimum Stopping Sight Distance		14-2.03	60 m	75 m	95 m	115 m
	*Minimum Radii		14-3.04	See Section 14-3.04			
	*Superelevation Rate		14-3.04	See Section 14-3.04			
	*Horizontal Sight Distance		3-5.0	(10)			
	*Maximum Grades	Level	11-2.05	11%		10%	
		Rolling		13%		11%	
	Minimum Grades		14-2.05	Desirable: 0.4% Minimum: 0.2% (With Curbs)		0.0% (Without Curbs)	
	*Vertical Curvature (K-values)		11-2.05	See Section 14-3.05			
	*Vertical Clearance (Collector Under)	New/Reconstructed Bridges (11)	2-6.03	5.05 m			
Existing Bridges		4.3 m					
Vertical Clearance (Collector Over Railroad)		2-6.03	7.05 m				

\*Controlling design criteria. See Section 2-8.0.

**GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR STREETS  
(3R Projects)**

**Footnotes to Table 14-3C**

1. Multilane Facilities. The criteria in the table for 3R multilane facilities will apply to:
    - a. an existing multilane facility, or
    - b. an existing 2-lane facility which will become a divided highway.

In the case of "b," the new roadway will be designed according to the Department's new construction criteria. See Table 14-2G.
  2. Design Speed. The design speed should equal or exceed the anticipated posted or regulatory speed limit after construction. See Table 14-3A for selection of a (metric) design speed based on an (English) posted speed.
  3. Shoulder Surface Type (2-Lane Facilities). Generally, shoulders will not be surfaced except as approved in special conditions.
  4. Parking Lanes. These widths only apply to parallel parking. See Section 14-2.06 for the design of angle parking.
  5. Bridge Width (New Bridges). For new bridges within the limits of a 3R project where the approach roadway is curbed, the minimum width will be the full approach roadway width according to the Department's criteria for new construction. For new bridges within the limits of a 3R project where the approach roadway is uncurbed, the width will be as follows:
 

ADT < 400:	Traveled way + 0.6 m (each side)
400 ≤ ADT ≤ 1500:	Traveled way + 1.0 m (each side)
1500 < ADT ≤ 2000:	Traveled way + 1.2 m (each side)
ADT > 2000:	Approach roadway width
- For reconstructed/rehabilitated bridges, the following will apply:
- a. With Curb. The width of reconstructed/rehabilitated bridges will be:
 

ADT ≤ 2000:	Traveled way + 0.3 m (each side)
ADT > 2000:	Traveled way + 0.9 m (each side)
  - b. Without Curb. The width of reconstructed/rehabilitated bridges will be:
 

ADT < 750:	Traveled way width
750 ≤ ADT ≤ 2000:	Traveled way + 0.3 m (each side)
ADT > 2000:	Traveled way + 0.9 m (each side)
- Bridges which are considered major structures (i.e., lengths greater than 60 m) are subject to individual economic, traffic and safety studies. See Section 11-4.0 for bridge projects performed as a spot improvement.
6. Bridge Width (Existing Bridges to Remain in Place). The minimum width is the traveled way + 0.6 m (curbed approach roadway) and the traveled way width (uncurbed approach roadway). Bridges which are considered major structures (i.e., lengths greater than 60 m) are subject to individual economic, traffic and safety studies. See Section 11-4.0 for bridge projects performed as a spot improvement.
  7. Right-of-Way Width. The acquisition of significant amounts of right-of-way is typically outside the scope of a 3R project. Therefore, the existing right-of-way will typically be unchanged by the 3R project. However, the designer should, wherever practical, secure additional right-of-way to allow cost-effective geometric and roadside safety improvements.