APPENDIX B

GUARDRAIL USE GUIDELINES FOR BENEFIT/COST = 3

Table B1: Guardrail Use Guidelines for Freeway, Benefit-Cost Greater Than 3

Severe Slo				Range of Traffic Volumes Where Barrier is Optimal					
Hazard			Offset to					_	
Offset	Curvature	Grade %	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5	
7	0	0	8				10-46	46-100	
7	0	-2	8				10-37	37-100	
7	2L	0	8				10-37	37-100	
7	2L	-2	8			10-19	19-46	46-100	
12	0	0	8				10-28	28-100	
12	0	0	12				10-28	28-100	
12	0	-2	8				10-28	28-100	
12	0	-2	12			10-19	19-28	28-100	
12	2L	0	8			10-19	19-28	28-100	
12	2L	0	12			10-19	19-28	28-100	
12	2L	-2	8				10-28	28-100	
12	2L	-2	12			10-19	19-28	28-100	
18	0	0	8			10-19	19-37	37-100	
18	0	0	12			10-19	19-37	37-100	
18	0	0	20			10-19	19-37	37-100	
18	0	-2	8			10-19	19-37	37-100	
18	0	-2	12			10-19	19-37	37-100	
18	0	-2	20			10-19	19-37	37-100	
18	2L	0	8			10-28	28-37	37-100	
18	2L	0	12			10-19	19-37	37-100	
18	2L	0	20			10-19	19-37	37-100	
18	2L	-2	8			10-19	19-37	37-100	
18	2L	-2	12			10-19	19-37	37-100	
18	2L	-2	20			10-19	19-37	37-100	
26	0	0	8			10-37		37-100	
26	0	0	12			10-28	28-37	37-100	
26	0	0	20			10-19	19-37	37-100	
26	0	-2	8			10-37		37-100	
26	0	-2	12			10-28	28-37	37-100	
26	0 2L	-2 0	20			10-28	28-46	46-100	
26	2L 2L		8 12			10-37		37-100	
26 26	2L 2L	0	20	 		10-37	20.40	37-100	
26	2L 2L	-2	8	 		10-28	28-46	46-100 46-100	
26	2L	-2	12			10-46			
26	2L 2L	-2	20	 		10-37 10-37	37-46	37-100 46-100	
32	0	0	8	 			37-40	37-100 37-100	
32	0	0	12			10-37 10-37		37-100 37-100	
32	0	0	20	+		10-37	28-46	46-100	
32	0	-2	8	 		10-28	∠0-40	46-100	
32	0	-2	12	 		10-46		37-100	
32	0	-2	20	 		10-37	28-46	46-100	
32	2L	0	8			10-26	20-40	46-100	
32	2L	0	12	 		10-46		46-100	
32	2L	0	20	 		10-46		46-100	
32	2L	-2	8	 		10-46		46-100	
32	2L	-2	12			10-46		46-100	
32	2L	-2	20	 		10-46	37-55	55-100	
			20			10-3/	31-00	55-100	

Table B2: Guardrail Use Guidelines for Freeway, Benefit-Cost Greater Than 3

Moderately	Severe Haz		TOSC GAIGCIIII	Range of Traffic Volumes Where Barrier is Optimal						
Hazard			Offset to	No						
Offset	Curvature	Grade %	Slope	Treatment	TL-2	TL-3	TL-4	TL-5		
7	0	0	8			10-28	28-37	37-100		
7	0	-2	8			10-37		37-100		
7	2L	0	8			10-37		37-100		
7	2L	-2	8			10-37		37-100		
12	0	0	8			10-37		37-100		
12	0	0	12			10-37		37-100		
12	0	-2	8			10-37		37-100		
12	0	-2	12			10-37		37-100		
12	2L	0	8			10-37		37-100		
12	2L	0	12			10-46		46-100		
12	2L	-2	8			10-37		37-100		
12	2L	-2	12			10-46		46-100		
18	0	0	8			10-55		55-100		
18	0	0	12			10-46		46-100		
18	0	0	20			10-46		46-100		
18	0	-2	8			10-55		55-100		
18	0	-2	12			10-46		46-100		
18	0	-2	20			10-46		46-100		
18	2L	0	8			10-55		55-100		
18	2L	0	12			10-55		55-100		
18	2L	0	20			10-55		55-100		
18	2L	-2	8			10-55		55-100		
18	2L	-2	12			10-46		46-100		
18	2L	-2	20		1	10-46	46-55	55-100		
26	0	0	8			10-73		73-100		
26	0	0	12			10-64		64-100		
26	0	0	20			10-64		64-100		
26	0	-2	8			10-82		82-100		
26	0	-2	12			10-64		64-100		
26	0	-2	20			10-64		64-100		
26	2L	0	8			10-73		73-100		
26	2L	0	12			10-82		82-100		
26	2L	0	20			10-64		64-100		
26	2L	-2	8			10-73		73-100		
26	2L	-2	12			10-73		73-100		
26	2L	-2	20			10-64		64-100		
32	0	0	8 12			10-91		91-100		
32 32	0	0				10-91		91-100		
	_		20			10-64		64-100		
32 32	0	-2 -2	8 12			10-82		82-100		
32	0	-2	20			10-82		82-100		
32	2L	0	8	 		10-73		73-100		
32	2L 2L	0	12	 		10-100		92 400		
32	2L 2L	0	20			10-82		82-100		
32	2L 2L	-2	8			10-73		73-100		
32	2L 2L		12	_		10-91		91-100		
32	2L 2L	-2 -2	20	-		10-100		72 400		
3 <u>Z</u>		-2	20			10-73		73-100		

Table B3: Guardrail Use Guidelines for Freeway, Benefit-Cost Greater Than 3

			USE Guideli	ines for Freeway, Benefit-Cost Greater Than 3						
Moderate S	Slope Hazard	d		Range of Traffic Volumes Where Barrier is Optimal						
Hazard Offset	Curvature	Grade %	Offset to Slope	No Treatment	TL-2	TL-3	TL-4	TL-5		
7	0	0	8	Treatment	10-100					
7	ŏ	-2	8		10-100					
7	ŽL	0	8		10-100					
7	2L	-2	8		10-100					
12	0	0	8		10-100					
12	Ö	0	12		10-100					
12	Ö	-2	8		10-100					
12	Ō	-2	12		10-100			1		
12	2L	0	8		10-100					
12	2L	0	12		10-100					
12	2L	-2	8		10-100					
12	2L	-2	12		10-100					
18	0	0	8		10-100		i	1		
18	0	0	12		10-100					
18	0	Ō	20		10-100		i			
18	Ō	-2	8		10-100					
18	0	-2	12		10-100					
18	0	-2	20		10-100					
18	2L	0	8		10-100					
18	2L	0	12		10-100					
18	2L	0	20		10-100					
18	2L	-2	8		10-100					
18	2L	-2	12		10-100					
18	2L	-2	20		10-100					
26	0	0	8		10-100					
26	0	0	12		10-100					
26	0	0	20		10-100					
26	0	-2	8		10-100					
26	0	-2	12		10-100					
26	0	-2	20		10-100					
26	2L	0	8		10-100					
26	2L	0	12		10-100					
26	2L	0	20		10-100					
26	2L	-2	8		10-100					
26	2L	-2	12		10-100					
26	2L	-2	20		10-100					
32	0	0	8		10-100			ļ		
32	0	0	12		10-100					
32	0	0	20		10-100			-		
32	0	-2	8 12		10-100			-		
32 32	0	-2	20		10-100			-		
32	2L	-2 0	8		10-100					
32	2L 2L	0	12		10-100		<u> </u>			
32	2L 2L	0	20		10-100			1		
32	2L 2L	-2	8		10-100			-		
32	2L 2L	-2	12		10-100		<u> </u>	1		
32	2L 2L	- <u>2</u> -2	20		10-100					
32	ZL.	-2	20		10-100					

Table B4: Guardrail Use Guidelines for Freeway, Benefit-Cost Greater Than 3

Severe Point Hazard Range of Traffic Volumes Where Barrier is Optimal										
Hazard	Curvature	Grade	Offset to	No Treatment	TL-2	TL-3	TL-4	TL-5		
Offset 7	0	% 0	Slope 8	110 Treatment		10-100	12.7			
7	0	0	12			28-64, 82-91	10-28, 64-82, 91-100			
7	ŏ	0	20			10-100	10-28, 04-82, 91-100			
7	ŏ	-2	8			10-64, 82-100		64-82		
7	0	-2	12			10-55, 73-100	55-73	0.02		
7	0	-2	20			10-82		82-100		
7	2L	0	8			10-100				
7	2L	0	12			10-100				
7	2L	0	20			10-100				
7	2L	-2	8			10-100				
7	2L	-2	12			10-100				
7	2L	-2	20			10-100	10.00	00.400		
12	0	0	8 12			10-19	19-28	28-100		
12 12	0	0	20			10-100				
12	0	-2	8			10-100	10-28	28-100		
12	0	-2	12			10-100	10-20	20-100		
12	0	-2	20			10-100	+			
12	2L	0	8			10-100	+			
12	2L	0	12			10-100	+			
12	2L	0	20		10-19	19-100				
12	2L	-2	8			10-100				
12	2L	-2	12			10-91		91-100		
12	2L	-2	20			28-91	10-28	91-100		
18	0	0	8		10-19	37-55	19-37, 55-91	91-100		
18	0	0	12			10-19	19-100			
18	0	0	20			10-100				
18	0	-2	8			10-46, 73-82	82-100	46-73		
18	0	-2	12			28-46	10-28, 91-100	46-91		
18 18	0 2L	-2 0	20 8		40.00	10-100	-			
18	2L 2L	0	12		10-28 10-28	28-100 28-100				
18	2L	0	20		10-28	19-100				
18	2L	-2	8		10-19	37-100				
18	2L	-2	12		10-37	28-100	 			
18	2L	-2	20		10-19	19-100	1			
26	0	0	8		10-19	19-100				
26	0	0	12		10-28	28-100				
26	0	0	20		10-19	19-100				
26	0	-2	8		10-28	28-100				
26	0	-2	12		10-28	28-100				
26	0	-2	20	40.400	10-19	19-100				
26	2L 2L	0	8 12	10-100	27.55	64.04				
26 26	2L 2L	0	20	10-37, 55-64, 91-100 10-19	37-55 19-46	64-91 46-100				
26	2L	-2	8	10-19	19-40	40-100	+			
26	2L	-2	12	10-46, 64-73	46-64, 91-100	73-91				
26	2L	-2	20	10-46, 64-73	19-73	73-100	 			
32	0	0	8	10-46, 73-100	46-55	55-73				
32	Ö	0	12		10-19	19-100				
32	0	0	20	Acres 1000 - 00000-00	10-19	19-100				
32	0	-2	8	10-19, 46-73	19-28	28-46, 73-100				
32	0	-2	12		10-37	37-100				
32	0	-2	20		10-28	28-100				
32	2L	0	8	10-100						
32	2L	0	12	10-100						
32	2L	0	20	10-100						
32	2L	-2	8	10-100						
32 32	2L 2L	-2 -2	12 20	10-100 10-73	91-100	73-91				
32	ZL	-2		10-73	91-100	13-31				

Table B5: Guardrail Use Guidelines for Freeway, Benefit-Cost Greater Than 3

Moderate	ly Severe P	oint Haza		Cuararan osc o	uidelines for Freeway Range of Tr	affic Volumes Where B		
Hazard		Grade	Offset to	The second second				
Offset	Curvature	%	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5
7	0	0	8			10-100		
7	Ö	Ö	12			10-100		
7	0	0	20			10-73, 91-100		73-91
7	0	-2	8			10-100		
7	0	-2	12			10-100		
7	0	-2	20			10-100		
7	2L	0	8			10-100		
7	2L	0	12			10-100		
7	2L	0	20			10-100		
7	2L	-2	8			10-100		
7	2L	-2	12			10-100		
7	2L	-2	20			10-100		
12	0	0	8			10-64, 82-100		64-82
12 12	0	0	12 20			10-100		
12	0	-2	8			10-100 10-100		
12	0	- <u>2</u> -2	12			10-100 10-100		
12	0	-2	20			10-100	 	
12	2L	0	8			10-100		
12	2L	0	12			10-100	+	
12	2L	Ö	20		10-19	19-100		
12	2L	-2	8		10-19	19-100		
12	2L	-2	12		10 10	10-100		
12	2L	-2	20			10-100		
18	0	0	8			10-28	28-46, 73-100	46-73
18	0	0	12			10-100	, i	
18	0	0	20			10-100		
18	0	-2	8			10-28, 46-64	64-100	28-46
18	0	-2	12			10-100		
18	0	-2	20			10-100		
18	2L	0	8	46-55	10-28	28-46, 55-100		
18	2L	0	12		28-37	10-28, 37-100		
18	2L	0	20		10-37	37-100		
18	2L 2L	-2	8 12	10-28, 46-55	28-46, 55-64	64-100		
18 18	2L 2L	-2 -2	20		10-28	28-100		
26	0	0	8		10-28	10-100 28-100		
26	0	0	12		10-28	28-46, 64-100		46-64
26	Ö	Ö	20		10-28	28-100		40-04
26	0	-2	8		10-20	10-100	+	
26	ő	-2	12			10-100		
26	Ö	-2	20		10-19	19-100		
26	2L	0	8	10-100	1.5 .5			
26	2L	0	12	10-73, 91-100		73-91		
26	2L	0	20	10-19	19-64	64-100		
26	2L	-2	8	10-100				
26	2L	-2	12	10-100				
26	2L	-2	20		10-37, 55-64, 91-100	37-55, 64-91		
32	0	0	8	10-28, 46-100		28-46		
32	0	0	12	10-28	28-37	37-100		
32	0	0	20 8	10.100	10-28	28-100		
32 32	0	-2 -2	12	10-100	10-28, 37-55, 73-82	EE 72 92 100		
32	0	- <u>2</u> -2	20	28-37	10-28, 37-55, 73-82	55-73, 82-100 28-82	82-91	91-100
32	2L	- <u>-</u> 2	8	10-100	10-20	20-02	02-91	91-100
32	2L	0	12	10-100			 	
32	2L	0	20	10-100			+	
32	2L	-2	8	10-100			+	
32	2L	-2	12	10-100				
32	2L	-2	20	10-100				

Table B6: Guardrail Use Guidelines for Freeway, Benefit-Cost Greater Than 3

Moderate	Point Haza			Range of Traffic Volumes Where Barrier is Optimal							
Hazard		Grade	Offset to					TI E			
Offset	Curvature	%	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5			
7	0	0	8			10-100					
7	0	0	12			10-100					
7	0	0	20			10-100					
7	0	-2	8			10-100					
7	0	-2	12			10-100					
7	0	-2	20			10-100					
7	2L	0	8	10-37, 55-91		37-55, 91-100					
7	2L	0	12	10-64		64-100					
7	2L	0	20	10-46, 64-73, 91-100		46-64, 73-91					
7	2L	-2	8	10-46, 91-100		46-91					
7	2L	-2	12 20	10-46, 64-82		46-64, 82-100	-				
7 12	2L 0	-2 0	8	10-28, 46-100	40.40	28-46	-				
12	0	0	12		10-19	19-100					
12	0	0	20		10-19 10-19	19-100 19-100	+				
12	0	-2	8		10-19	10-100	+				
12	0	-2	12		10-19	19-100					
12	0	-2	20		10-18	10-100	+				
12	2L	0	8	10-64, 82-100	64-82	10-100	 	 			
12	2L	0	12	10-82	O+-02	82-100	+	 			
12	2L	Ö	20	10-28, 46-91	28-46, 91-100	02 100	 				
12	2L	-2	8	10-100	20 10, 01 100		 				
12	2L	-2	12	10-37, 73-100		37-73	 				
12	2L	-2	20	10-82		82-100	†				
18	0	0	8	10-19, 37-64		19-37, 64-100					
18	0	0	12		10-28	28-100	1				
18	0	0	20		10-28	28-100					
18	0	-2	8	10-64, 91-100		64-91		l			
18	0	-2	12		10-28	28-100					
18	0	-2	20		10-28	28-100					
18	2L	0	8	10-100							
18	2L	0	12	10-100							
18	2L	0	20	10-100							
18	2L	-2	8	10-100							
18	2L	-2	12	10-100			1				
18 26	2L	-2	20	10-100							
	0	0	8 12	10-100			-				
26 26	0	0	20	10-100							
26	0	-2	8	10-100 10-100			+				
26	0	-2	12	10-100			+				
26	0	-2	20	10-100	10-46	46-100	+	-			
26	2L	0	8	10-100	10.40	1 0-100	 	 			
26	2L	0	12	10-100			<u> </u>				
26	2L	0	20	10-100							
26	2L	-2	8	10-100			1				
26	2L	-2	12	10-100							
26	2L	-2	20	10-100							
32	0	0	8	10-100							
32	0	0	12	10-100							
32	0	0	20	10-91	91-100						
32	0	-2	8	10-100							
32	0	-2	12	10-100							
32	0	-2	20	10-100							
32	2L	0	8	10-100							
32	2L	0	12	10-100							
32	2L	0	20	10-100							
32	2L	-2	8	10-100							
32 32	2L 2L	-2 -2	12 20	10-100 10-100			-				
32	∠L	-2		10-100			1	L			

Table B7: Guardrail Use Guidelines for Rural Arterial, Benefit-Cost Greater Than 3

Savara Slav		ne Br. Oddi	Gran Oce Ca	Range of Traffic Volumes Where Barrier is Optimal						
Severe Slo	JE MAZAIU		Offset to	No	Range or Tran	lic volumes where Barri	er is Optimal			
Hazard Offset	Curvature	Grade %	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5		
7	0	0	8			2.5-50				
7	0	-3	8			2.5-50				
7	4L	0	8			2.5-50				
7	4L	-3	8			2.5-50				
12	0	0	8			2.5-50				
12	0	0	12			2.5-50				
12	0	-3	8			2.5-50				
12	0	-3	12			2.5-50				
12	4L	0	8			2.5-50		3		
12	4L	0	12			2.5-50				
12	4L	-3	8			2.5-50				
12	4L	-3	12			2.5-50				
18	0	0	8			2.5-50				
18	0	0	12			2.5-50				
18	0	0	20			2.5-50				
18	0	-3	8			2.5-50				
18	0	-3	12			2.5-50				
18	0	-3	20			2.5-50				
18	4L	0	8			2.5-50				
18	4L	0	12			2.5-50				
18	4L	0	20			2.5-50				
18	4L	-3	8			2.5-50	1			
18	4L	-3	12			2.5-50	1			
18	4L	-3	20			2.5-50				
26	0	0	8			2.5-50	 			
26	0	0	12			2.5-50				
26	0	0	20			2.5-50				
26	0	-3	8			2.5-50	 			
26	0	-3	12			2.5-50				
26	0	-3	20			2.5-50				
26	4L	0	8			2.5-50				
26	4L	0	12			2.5-50				
26	4L	Ö	20			2.5-50	 			
26	4L	-3	8			2.5-50	 			
26	4L	-3	12			2.5-50	 			
26	4L	-3	20			2.5-50				
32	0	0	8		2.5-50		 			
32	0	Ö	12		2.5-35.75	35.75-50	 			
32	0	0	20		2.5-50	555 55	 			
32	0	-3	8		2.5-50		 			
32	Ö	-3	12		2.5-31	31-50	 			
32	0	-3	20		2.5-21.5	21.5-50	 			
32	4L	0	8		2.5-50	21.0-00	 			
32	4L	Ö	12		2.5-31	31-50	 			
32	4L	0	20		2.5-7.25	7.25-50	 			
32	4L	-3	8		2.5-50	1.25-50	 			
32	4L	-3	12		2.5-45.25	45.25-50	 			
32	4L	-3	20		2.0-40.20	2.5-50	 			
J2	71	->	20			2.5-50				

Table B8: Guardrail Use Guidelines for Rural Arterial, Benefit-Cost Greater Than 3

Class	I Moderately	Severe Slo	pe Functional	Ran		Volumes Where E		otimal
Hazard Offset	Curvature	Grade %	Offset to Slope	No Treatment	TL-2	TL-3	TL-4	TL-5
7	0	0	8			2.5-50		
7	0	-3	8			2.5-50		
7	4L	0	8			2.5-50		
7	4L	-3	8			2.5-50	11	
12	0	0	8			2.5-50		
12	0	0	12			2.5-50		
12	0	-3	8			2.5-50		
12	0	-3	12			2.5-50		
12	4L	0	8			2.5-50		
12	4L	0	12			2.5-50		
12	4L	-3	8			2.5-50		
12	4L	-3	12			2.5-50		
18	0	0	8		2.5-35.75	35.75-50		
18	0	0	12		2.5-21.5	21.5-50		
18	0	0	20		2.5-16.75	16.75-50		
18	0	-3	8		2.5-26.25	26.25-50		
18	0	-3	12		2.5-16.75	16.75-50		
18	0	-3	20		2.5-12	12-50		
18	4L	0	8		2.5-50	12 00		
18	4L	0	12		2.5-12	12-50		
18	4L	Ö	20		2.0 12	2.5-50		
18	4L	-3	8		2.5-50	2.0 00		
18	4L	-3	12		7.25-12	2.5-7.25, 12-50		
18	4L	-3	20		7.20 12	2.5-50		
26	0	ō	8		2.5-50	2.0 00		
26	Ö	Ö	12		2.5-50			
26	0	Ō	20		2.5-50			
26	0	-3	8		2.5-50			
26	Ö	-3	12		2.5-50			
26	Ō	-3	20		2.5-50			
26	4L	0	8		2.5-50			
26	4L	0	12		2.5-50			
26	4L	Ö	20		2.5-50			
26	4L	-3	8		2.5-50			
26	4L	-3	12		2.5-50			
26	4L	-3	20		2.5-50			
32	0	0	8		2.5-50			
32	0	Ō	12		2.5-50			
32	Ö	Ö	20		2.5-50			
32	Ö	-3	8		2.5-50			
32	0	-3	12		2.5-50			
32	Ö	-3	20		2.5-50			
32	4L	0	8		2.5-50			
32	4L	Ō	12		2.5-50		1/	
32	4L	Ö	20		2.5-50			
32	4L	-3	8		2.5-50			
32	4L	-3	12		2.5-50			
32	4L	-3	20		2.5-50			

Table B9: Guardrail Use Guidelines for Rural Arterial, Benefit-Cost Greater Than 3

	Tuble	Do. Guarara	ii Ose Guideiines	7 TOT TRUTAL 7	rteriai, Delient e	ost Greater	indii v		
Rural Arter	rial Moderate	Slope Func	tional Class	Range of Traffic Volumes Where Barrier is Optimal					
Hazard Offset	Curvature	Grade %	Offset to Slope	No Treatment	TL-2	TL-3	TL-4	TL-5	
7	0	0	8		2.5-5				
7	0	-3	8		2.5-5				
7	4L	0	8		2.5-5				
7	4L	-3	8		2.5-5				
12	0	0	8		2.5-5				
12	0	0	12		2.5-5				
12	0	-3	8		2.5-5				
12	0	-3	12		2.5-5				
12	4L	0	8		2.5-5				
12	4L	0	12		2.5-5				
12	4L	-3	8		2.5-5				
12	4L	-3	12		2.5-5				
18	0	0	8		2.5-5				
18	0	0	12		2.5-5				
18	0	0	20		2.5-5				
18	0	-3	8		2.5-5				
18	0	-3	12		2.5-5				
18	0	-3	20		2.5-5				
18	4L	0	8		2.5-5				
18	4L	0	12		2.5-5				
18	4L	0	20		2.5-5				
18	4L	-3	8		2.5-5				
18	4L	-3	12		2.5-5				
18	4L	-3	20		2.5-5				
26	0	0	8		2.5-5				
26	0	0	12		2.5-5				
26	0	0	20		2.5-5				
26	0	-3	8		2.5-5				
26	0	-3	12		2.5-5				
26	0	-3	20		2.5-5				
26	4L	0	8		2.5-50				
26	4L	0	12		2.5-50				
26	4L	0	20		2.5-50				
26	4L	-3	8		2.5-50				
26	4L	-3	12		2.5-50		ļ		
26	4L	-3	20		2.5-50		ļ		
32	0	0	8	2.5-16.75	16.75-50				
32	0	0	12	2.5-50					
32	0	0	20	2.5-12	12-50				
32	0	-3	8	2.5-12	12-50				
32	0	-3	12	2.5-50					
32	0	-3	20		2.5-50				
32	4L	0	8	2.5-50					
32	4L	0	12	2.5-50					
32	4L	0	20	2.5-16.75	16.75-50				
32	4L	-3	8	2.5-50					
32	4L	-3	12	2.5-50					
32	4L	-3	20	2.5-12	12-50		<u> </u>	<u> </u>	

Table B10: Guardrail Use Guidelines for Rural Arterial, Benefit-Cost Greater Than 3

Hazard Curvature Kisope No Treatment TL-2 TL-3 TL-4 TL-5	Severe P	oint Hazard			Range of Traffic Volumes Where Barrier is Optimal						
Simple			Grade	Offset to							
5 0 0 12 25-4525 4525-50 5 5 0 0 20 25-4525 4525-50 5 0 -3 8 25-35779 35775-50 5 0 -3 12 22-5405 405-50 0 -3 12 25-505 5 4L 0 8 25-557 35775-50 5 4L 0 8 25-50 5 4L 0 12 25-50 5 4L 0 12 25-50 5 4L -3 12 25-50 5 4 -3 12 25-50 5 4 -3 12 25-50 5 4 -3 12 25-50 405-50 405-50 405-50 405-50 405-50 405-50 405-50 405-50 405-50 405-50 405-50	Offset	Curvature	%		No I reatment	TL-2		IL-4	IL-5		
5 0 0 20 25-45/25 45/25/30 55/25/30 36/25/30 25-35/75 35/75/50 5 5 0 -3 12 25-40/5 40/50 36/50 5 6 0 -3 12 25-40/5 40/50 36/50 5 5 4L 0 12 25-80 36/50 37/50 36/5											
5 0 -3 12 25-3575 3575-50 5 0 -3 12 25-3575 3575-50 5 4L 0 8 25-50 3575-50 5 4L 0 12 25-50 5 4L -3 8 25-50 5 4L -3 12 25-50 5 4L -3 12 25-50 5 4L -3 12 25-50 6 0 0 8 25-5375 35.75-50 8 0 0 8 25-50.50 405-50 8 0 0 22 25-50.50 8 0 0 22 25-50.50 8 0 0 22 25-50.50 8 0 -3 12 25-50.50 8 0 -3 12 25-50.50 8 4L 0 32 2											
5 0 3 12 2.540.57 3.055.0 5 0 3 20 2.535.75 35.75.50 5 4L 0 12 2.550 5 4L 0 12 2.550 5 4L -3 8 2.550 5 4L -3 12 2.550 5 4L -3 20 2.550 5 4L -3 20 2.550 8 0 0 8 2.530.76 35.750 8 0 0 12 2.540.5 40.550 8 0 0 20 2.550 31.50 8 0 -3 12 2.530.75 35.7550 8 0 -3 20 2.550 38.7550 8 4L 0 8 2.2540.5 40.550 8	5										
5 0 -3 20 25-30.75 35.75-50 5 4L 0 12 25-50 1 5 4L 0 12 25-50 1 5 4L -3 20 25-50 1 5 4L -3 20 25-50 35.75-50 8 0 0 12 25-40.5 40.5-50 8 8 0 0 20 25-50 37.5-50 8 8 0 3.3 12 25-30.5 38.75-50 8 8 0 3.3 12 25-30.5 38.75-50 8 8 0 3.3 12 25-30.5 38.75-50 8 4 0 12 25-30.5 38.75-50 8 4 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>											
5 4L 0 8 25-50 5 4L 0 12 25-50 5 4L 0 20 25-50 5 4L -3 8 25-50 5 4L -3 12 25-50 5 4L -3 20 25-50 8 0 0 8 25-35.75 35.75-50 8 0 0 12 25-40.5 40.5-80 8 0 0 20 25-50 8 0 -3 8 25-50 8 0 -3 8 25-50 8 0 -3 20 25-50 8 4L 0 8 25-50 8 4L 0 8 25-50 8 4L 0 12 25-50 8 4L -3 25 35.75-50 8 4L -3											
5 4L 0 12 2.5-50 5 4L 0 20 2.5-50 5 4L -3 12 2.5-50 5 4L -3 12 2.5-50 6 0 0 8 2.5-550 35.75-50 8 0 0 12 2.5-40.5 40.5-50 8 0 0 20 2.5-50 8 0 -3 8 2.5-31 31.50 8 0 -3 12 2.5-35.75 35.75-50 8 0 -3 12 2.5-30.75 35.75-50 8 0 -3 12 2.5-30.75 35.75-50 8 4L 0 12 2.5-30.75 35.75-50 8 4L 0 12 2.5-30.75 35.75-50 8 4L -3 12 2.5-30.75 35.75-50 8 4L -3 12 2											
5 4L -3 8 2.5-50 5 4L -3 12 2.5-50 5 4L -3 20 2.5-50 8 0 0 8 2.5-30,75 35,75-50 8 0 0 12 2.5-40.5 40,5-50 8 0 0 20 2.5-50 8 0 0 20 2.5-50 8 0 0 3 8 2.5-31 8 0 -3 12 2.5-36,75 35,75-50 8 0 -3 12 2.5-36,75 35,75-50 8 4L 0 8 2.5-50 40,5-50 8 4L 0 12 2.5-40 40,5-50 8 4L 0 12 2.5-50 40,5-50 8 4L -3 12 2.5-50 40,5-50 8 4L -3 12 2.5-37 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>											
5 4L -3 8 2.5-50 5 4L -3 12 2.5-50 5 4L -3 12 2.5-50 5 4L -3 20 2.5-50 5 4L -3 20 2.5-50 8 0 0 8 2.5-35.75 35.75-50 8 0 0 12 2.5-40.5 40.5-50 8 0 -3 12 2.5-40.5 40.5-50 8 0 -3 12 2.5-36.76 35.75-50 8 0 -3 12 2.5-36.76 35.75-50 8 4L 0 8 2.5-50 8 4L 0 8 2.5-50 8 4L 0 12 2.5-40.5 40.5-50 8 4L 0 12 2.5-40.5 40.5-50 8 4L 0 12 2.5-40.5 40.5-50 8 4L -3 12 2.5-50 8 4L -3 12 2.5-50 8 4L -3 12	5	4L	0	12		2.5-50					
5 4L -3 12 2.5-50 5 4L -3 20 2.5-50 8 0 0 8 2.5-35.75 35.75-50 8 0 0 12 2.5-40.5 40.5-50 8 0 0 20 2.5-50 8 8 0 -3 12 2.5-36.75 31.75-50 8 0 -3 12 2.5-30.75 35.75-50 8 4L 0 8 2.5-50 8 8 4L 0 8 2.5-50 8 8 4L 0 12 2.5-30 40.5-50 8 4L 0 12 2.5-50 8 8 4L -3 12 2.5-50 8 8 4L -3 12 2.5-50 9 8 4L -3 12 2.5-31 31.50 12 0 0	5	4L	0	20		2.5-50					
5 4L -3 12 2.5-50 5 4L -3 20 2.5-50 8 0 0 8 2.5-35.75 35.75-50 8 0 0 12 2.5-40.5 40.5-50 8 0 0 20 2.5-50 8 8 0 -3 12 2.5-36.75 31.75-50 8 0 -3 12 2.5-30.75 35.75-50 8 4L 0 8 2.5-50 8 8 4L 0 8 2.5-50 8 8 4L 0 12 2.5-30 40.5-50 8 4L 0 12 2.5-50 8 8 4L -3 12 2.5-50 8 8 4L -3 12 2.5-50 9 8 4L -3 12 2.5-31 31.50 12 0 0		1		_		2 5-50					
5 4L -3 20 2.5-50 35.75-50 8 0 0 12 2.5-40.5 40.5-50 8 0 0 20 2.5-50 8 0 -3 8 2.5-31 31.50 8 0 -3 12 2.5-35.75 35.75-50 8 0 -3 12 2.5-30.75 35.75-50 8 4L 0 8 2.5-50 40.5-50 8 4L 0 8 2.5-50 40.5-50 8 4L 0 12 2.5-40.5 40.5-50 8 4L -3 8 2.5-36.75 35.75-50 8 4L -3 12 2.5-30 40.5-50 8 4L -3 20 2.5-35.75 35.75-50 12 0 0 12 2.5-12 16.75-50 12 0 -3 8 2.5-32.75 16.75-50											
8 0 0 8 2.5-35.75 35.75-50 8 0 0 12 25-40.5 40.5-50 8 0 0 20 2.5-50 38.0 3.25-50 38.0 3.25-50 38.0 3.25-50 38.0 3.20 2.5-50 38.75-50											
8 0 0 12 2.5-40.5 40.5-50 8 0 0 20 2.5-50 31.50 8 0 -3 12 2.5-35.75 31.50 35.75-50 8 0 -3 12 2.5-35.76 35.75-50 36.75-50 8 4L 0 8 2.5-50 40.5-50 25.50 8 4L 0 12 2.5-40.5 40.5-50 40.5-50 8 4L 0 12 2.5-50 35.75-50 35.75-50 35.75-50 35.75-50 35.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 37.75-50 36.75-50 36.75-50 36.75-50 36.75-50 37.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75-50 36.75							05.77.50				
8 0 0 0 12 20 2.550 3.75.50 8 0 -3 8 2.531 31.50 9 2.550 9 8 4L 0 8 2.550 9 9 8 4L 0 12 2 2.540.5 40.550 9 8 4L 0 12 2 2.540.5 40.550 9 8 4L 0 20 2.550 9 8 4L 0 20 2.550 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	- 8	0	0	8		2.5-35.75	35.75-50				
8 0 -3 12 2.5-35.75 35.75-50 8 0 -3 20 2.5-35.75 35.75-50 8 4L 0 8 2.5-50 40.550 8 4L 0 12 2.5-40.5 40.550 8 4L 0 20 2.5-50 8 4L 3 8 2.5-36.75 35.75-50 8 4L -3 12 2.5-31 31-50 8 4L -3 2.5-36.75 35.75-50 12 0 0 8 2.5-31 31-50 8 4L -3 20 2.5-36.75 35.75-50 12 0 0 8 2.5-31 31-50 12 0 0 12 2.5-30 16.75-50 12 0 0 12 2.5-50 12.50 12 0 -3 12 2.5-50 12.50 12						61 910 050 V	40.5-50				
8 0 -3 12 25-36.75 35.75-50 8 4L 0 8 25-50 40.5-50 8 4L 0 12 25-40.5 40.5-50 8 4L 0 20 25-50 8 4L -3 8 2.5-36.75 35.75-50 8 4L -3 12 25-31 31-50 8 4L -3 20 25-36.75 35.75-50 8 4L -3 20 25-36.75 35.75-50 12 0 0 8 2.5-31 31-50 12 0 0 8 2.5-31 31-50 12 0 -3 8 2.5-30 16.75-50 12 0 -3 12 2.5-12 12-50 12 0 -3 12 2.5-50 12-50 12 4L 0 8 2.5-50 2.25-50											
8 0 -3 20 2,5-50 8 4L 0 8 2,5-50 8 4L 0 12 2,5-50 8 4L 0 20 2,5-50 8 4L -3 8 2,5-50 8 4L -3 12 2,5-31 31-50 8 4L -3 12 2,5-31 31-50 8 4L -3 20 2,5-37 35.75-50 12 0 0 8 2,5-31 31-50 12 0 0 12 2,5-30 11-50 12 0 0 12 2,5-50 16.75-50 12 0 -3 12 2,5-50 16.75-50 16.75-50 12 0 -3 12 2,5-50 12 12 12 12 12 12 12 12 12 12 12 12 12 12											
8 4L 0 12 2.5-50 40.5-50 8 4L 0 20 2.5-80 40.5-50 8 4L -3 8 2.5-30.75 37.5-50 8 4L -3 12 2.5-31 31.50 8 4L -3 20 2.5-33.75 35.75-50 12 0 0 8 2.5-16.75 31.50 12 0 0 12 2.5-16.75 13.150 12 0 0 20 2.5-50 16.75-50 12 0 -3 8 2.5-26.25 26.25-50 12 0 -3 12 2.5-50 12-50 12 0 -3 20 2.5-50 12-50 12 4L 0 8 2.5-50 12-50 12 4L 0 12 2.5-50 12-50 12 4L -3 12 2.5-50 12-50							35./5-50				
8 4L 0 12 2.5-40.5 40.5-50 8 4L -3 8 2.5-50 35.75-50 8 4L -3 12 2.5-31 31.50 8 4L -3 20 2.5-337 31.50 12 0 0 8 2.5-31 31.50 12 0 0 12 2.5-16.75 16.75-50 12 0 0 12 2.5-60 16.75-50 12 0 -3 8 2.5-26.25 26.25-50 12 0 -3 12 2.5-50 12 0 -3 12 2.5-50 12 4L 0 8 2.5-50 12 4L 0 8 2.5-50 12 4L -3 12 2.5-50 12 4L -3 12 2.5-50 12 4L -3 12 2.5-50											
8 4L -3 8 2.5-50.5 35.75-50 35.75-50 8 4L -3 12 2.5-31 31.50 31.50 8 4L -3 20 2.5-36.75 35.75-50 12.50 12 0 0 8 2.5-31 31.50 16.75-50 12 0 0 12 2.5-16.75 16.75-50 12.50 12 0 -3 8 2.5-26.25 26.25-50 12.50 12 0 -3 12 2.5-50 12.50 12.50 12 0 -3 20 2.5-50 12.50 12.50 12 4L 0 8 2.5-50 12.50 12.50 12 4L 0 12 2.5-50 12.50 12.50 12 4L -3 12 2.5-50 12.50 12.50 12 4L -3 12 2.5-50 12.5-50 12.5-50 <							40.5-50				
8 4L -3 12 2.5-31 31.50 12 0 0 8 2.5-31.73 31.50 12.50 12 0 0 12 2.5-16.75 16.75-50 16.75-50 12 0 0 12 2.5-16.75 16.75-50 16.75-50 12 0 -3 8 2.5-26.25 26.25-50 12.50 12 0 -3 12 2.5-12 12.50 12.50 12 4L 0 8 2.5-50 12.55 12.50 12.50 12 4L 0 12 2.5-50 12.50							10.000				
8 4L -3 20 2.5-35.75 35.75-50 12 0 0 12 2.5-16.75 16.75-50 12 0 0 20 2.5-16.75 16.75-50 12 0 0 20 2.5-50 16.75-50 12 0 -3 8 2.5-50.25 26.25-50 12 0 -3 12 2.5-12 12.50 12 4L 0 8 2.5-50 12.50 12 4L 0 12 2.5-50 12.50 12 4L 0 12 2.5-50 12.55 12 4L -3 8 2.5-50 2.5-50 12 4L -3 12 2.5-50 2.5-50 12 4L -3 20 2.5-50 35.75-50 18 0 0 3 2.5-50 35.75-50 18 0 -3 8 2.5-50 40.5-5				8			35.75-50				
12 0 0 8 2.5-31 31-50 16.75-50 12 0 0 12 2.5-16.75 16.75-50 16.75-50 12 0 -3 8 2.5-26.25 26.25-50 12-50 12 0 -3 12 2.5-12 12-50 12-50 12 4L 0 8 2.5-50 12-50 12-50 12 4L 0 8 2.5-50 12-50 12-50 12 4L 0 12 2.5-50 12-											
12 0 0 12 2.5-16.75 16.75-50 12 0 0 20 2.5-50 12.5-50 12 0 -3 8 2.5-26.25 26.25-50 12 0 -3 12 2.5-50 12-50 12 4L 0 8 2.5-50 12-50 12 4L 0 12 2.5-50 12-50 12 4L 0 12 2.5-50 12-50 12 4L -3 8 2.5-50 12-50 12 4L -3 8 2.5-50 12-50 12 4L -3 12 2.5-50 18-50 18-50 18 0 0 8 2.5-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 18-50 1											
12 0 0 20 2.5-50 12 2.5-26.25 26.25-50 12-50 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>31-50</th> <th>16 75 50</th> <th></th>							31-50	16 75 50			
12 0 -3 8 2.5-26.25 26.25-50 12 0 -3 12 2.5-12 12-50 12 0 -3 12 2.5-50 12-50 12 4L 0 8 2.5-50 12-50 12 4L 0 12 2.5-50 12-50 12 4L -3 8 2.5-50 12-50 12 4L -3 8 2.5-50 12-50 12 4L -3 12 2.5-50 12-5-50 18 0 0 8 2.5-50 13-7-50 18 0 0 8 2.5-50 13-7-50 18 0 0 12 2.5-50 13-7-50 18 0 0 12 2.5-50 13-7-50 18 0 -3 8 2.5-50 13-7-50 18 0 -3 8 2.5-50 140-5-50 18 4L 0 8 2.5-50 140-5-50 18 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>10.73-30</th> <th></th>								10.73-30			
12 0 -3 12 25-50 12-50 12 4L 0 8 25-50 12 12 4L 0 12 25-50 12 12 4L 0 20 25-50 45.25-50 12 4L -3 8 25-50 25-50 12 4L -3 12 25-50 18 12 4L -3 12 25-50 18 18 0 0 8 2.5-50 25-50 18 0 0 12 25-50 18 18 0 0 20 25-50 18 18 0 -3 8 25-50 18 18 0 -3 12 25-40.5 40.5-50 18 4L 0 8 25-50 18 18 4L 0 20 25-50 18 18 4L 0 20 25-50 18 18 4L -3 20							26.25-50				
12 4L 0 12 2.5-50 12 4L 0 12 2.5-50 12 4L 0 20 2.5-45.25 45.25-50 12 4L -3 8 2.5-50 12 4L -3 20 2.5-35.75 35.75-50 18 0 0 8 2.5-50 2.5-50 18 0 0 12 2.5-50 35.75-50 18 0 0 12 2.5-50 35.75-50 18 0 0 12 2.5-50 35.75-50 18 0 0 12 2.5-50 35.75-50 36.			-3					12-50			
12 4L 0 20 25-50 45.25-50 12 4L -3 8 2.5-50 2.5-50 12 4L -3 12 2.5-50 2.5-50 12 4L -3 20 2.5-35.75 35.75-50 18 0 0 8 2.5-50 35.75-50 18 0 0 12 2.5-50 35.75-50 18 0 0 12 2.5-50 35.75-50 18 0 0 12 2.5-50 35.75-50 35.75-50 18 0 0 12 2.5-50 35.75-50											
12 4L 0 20 2.5.45.25 45.25-50 12 4L -3 8 2.5.50 12 4L -3 12 25.50 18 0 0 8 2.5.50 35.75-50 18 0 0 12 25.50 35.75-50 18 0 0 12 25.50 35.75-50 18 0 0 20 25.50 35.75-50 18 0 0 20 25.50 35.75-50 18 0 0 3 8 2.5-50 40.5-50 18 0 -3 12 25.50 40.5-50 40.5-50 18 4L 0 8 2.5-50 40.5-50<											
12 4L -3 8 2.5-50 12 4L -3 20 2.5-80 18 0 0 8 2.5-50 18 0 0 12 2.5-50 18 0 0 20 2.5-50 18 0 -3 8 2.5-50 18 0 -3 12 2.5-40.5 40.5-50 18 0 -3 12 2.5-50 40.5-50 18 0 -3 12 2.5-50 40.5-50 18 4L 0 8 2.5-50 40.5-50 18 4L 0 8 2.5-50 40.5-50 18 4L 0 12 2.5-50 40.5-50 18 4L 0 20 2.5-50 40.5-50 18 4L -3 8 2.5-50 40.5-50 40.5-50 18 4L -3 12 2.5-50 40.5-50 40.5-50 40.5-50 40.5-50 40.5-50 40.5-50 40.5-50							4E 0E E0				
12 4L -3 12 2.5-50 35.75-50 18 0 0 8 2.5-50 35.75-50 18 0 0 12 2.5-50 18 18 0 0 20 2.5-50 18 18 0 -3 8 2.5-50 18 18 0 -3 12 2.5-40.5 40.5-50 18 4L 0 8 2.5-50 18 18 4L 0 12 2.5-50 18 18 4L 0 12 2.5-50 18 18 4L -3 8 2.5-50 18 24 0 0 8 2.5-50 18 24 0 0 3							45.25-50				
12 4L -3 20 2.5-35.75 35.75-50 18 0 0 12 2.5-50 35.75-50 18 0 0 12 2.5-50 35.75-50 18 0 0 20 2.5-50 40.5-50 18 0 -3 12 2.5-40.5 40.5-50 18 0 -3 20 2.5-50 40.5-50 18 4L 0 8 2.5-50 40.5-50 18 4L 0 8 2.5-50 40.5-50 18 4L 0 20 2.5-50 40.5-50 18 4L 0 20 2.5-50 40.5-50	2000		200								
18 0 0 8 2.5-50 2.5-50 18 0 0 12 2.5-50 18 0 0 20 2.5-50 18 0 -3 8 2.5-50 2.5-50 18 0 -3 12 2.5-40.5 40.5-50 40.5-50 18 40.5-50 <th></th> <th></th> <th>-3</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>			-3								
18 0 0 12 2.5-50 18 0 0 20 2.5-50 18 0 -3 8 2.5-50 18 0 -3 12 2.5-40.5 40.5-50 18 0 -3 20 2.5-50 40.5-50 18 4L 0 8 2.5-50 40.5-50 18 4L 0 12 2.5-50 40.5-50 18 4L 0 20 2.5-50 40.5-50					0.5.50	2.5-35.75	35.75-50				
18 0 0 20 2.5-50 18 0 -3 8 2.5-50 18 0 -3 12 2.5-40.5 40.5-50 18 0 -3 20 2.5-50 2.5-50 18 4L 0 8 2.5-50 2.5-50 18 4L 0 20 2.5-50 2.5-50 18 4L -3 8 2.5-50 2.5-50 18 4L -3 12 2.5-50 2.5-50 18 4L -3 12 2.5-50 2.5-50 24 0 0 8 2.5-50					2.5-50	2.5.50					
18 0 -3 8 2.5-50 40.5-50 18 0 -3 12 2.5-40.5 40.5-50 18 0 -3 20 2.5-50 18 18 4L 0 8 2.5-50 18 18 4L 0 20 2.5-50 18 18 4L -3 8 2.5-50 18 18 4L -3 12 2.5-50 18 18 4L -3 12 2.5-50 19 24 0 0 8 2.5-50 19 24 0 0 12 2.5-50 19 24 0 0 12 2.5-50 19 24 0 -3 12 2.5-50 19 24 0 -3 12 2.5-50 19 24 0 -3 12 2.5-50 19 24 0 -3 12 2.5-50 19 24 4L 0 8 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>											
18 0 -3 12 2.5-40.5 40.5-50 18 0 -3 20 2.5-50 40.5-50 18 4L 0 8 2.5-50 40.5-50 18 4L 0 12 2.5-50 40.5-50 18 4L -3 8 2.5-50 40.5-50 4					2.5-50	2.0 00					
18 4L 0 8 2.5-50 18 4L 0 12 2.5-50 18 4L 0 20 2.5-50 18 4L -3 8 2.5-50 18 4L -3 12 2.5-50 18 4L -3 20 2.5-50 24 0 0 8 2.5-50 24 0 0 12 2.5-50 24 0 -3 8 2.5-50 24 0 -3 8 2.5-50 24 0 -3 8 2.5-50 24 0 -3 20 2.5-50 24 4L 0 8 2.5-50 24 4L 0 8 2.5-50 24 4L 0 20 2.5-50 24 4L 0 20 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 <th></th> <th></th> <th>-3</th> <th></th> <th></th> <th></th> <th>40.5-50</th> <th></th> <th></th>			-3				40.5-50				
18 4L 0 12 2.5-50 18 4L 0 20 2.5-50 18 4L -3 8 2.5-50 18 4L -3 12 2.5-50 18 4L -3 20 2.5-50 24 0 0 8 2.5-50 24 0 0 12 2.5-50 24 0 -3 8 2.5-50 24 0 -3 8 2.5-50 24 0 -3 12 2.5-50 24 0 -3 12 2.5-50 24 4L 0 8 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 </th <th></th> <th></th> <th></th> <th></th> <th>0.5</th> <th>2.5-50</th> <th></th> <th></th> <th></th>					0.5	2.5-50					
18 4L 0 20 2.5-50 18 4L -3 8 2.5-50 18 4L -3 12 2.5-50 18 4L -3 20 2.5-50 24 0 0 8 2.5-50 24 0 0 12 2.5-50 24 0 -3 8 2.5-50 24 0 -3 12 2.5-50 24 0 -3 12 2.5-50 24 0 -3 20 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24											
18 4L -3 8 2.5-50 18 4L -3 12 2.5-50 18 4L -3 20 2.5-50 24 0 0 8 2.5-50 24 0 0 12 2.5-50 24 0 -3 8 2.5-50 24 0 -3 12 2.5-50 24 0 -3 12 2.5-50 24 4L 0 8 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50											
18 4L -3 12 2.5-50 18 4L -3 20 2.5-50 24 0 0 8 2.5-50 24 0 0 12 2.5-50 24 0 -3 8 2.5-50 24 0 -3 8 2.5-50 24 0 -3 12 2.5-50 24 0 -3 20 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50											
18 4L -3 20 2.5-50 24 0 0 8 2.5-50 24 0 0 12 2.5-50 24 0 -3 8 2.5-50 24 0 -3 12 2.5-50 24 0 -3 12 2.5-50 24 0 -3 20 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50											
24 0 0 12 2.5-50 24 0 0 20 2.5-50 24 0 -3 8 2.5-50 24 0 -3 12 2.5-50 24 0 -3 20 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 8 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50		4L		20	2.5-50						
24 0 0 20 2.5-50 24 0 -3 8 2.5-50 24 0 -3 12 2.5-50 24 0 -3 20 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 8 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50											
24 0 0 20 20 25-50 24 0 -3 12 2.5-50 24 4L 0 8 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50 24 4L -3 12 2.5-50 24 4L -3 12 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50 24 4L -3 12 2.5-50 24 4L -3 12 2.5-50 25-50	24	U	U	12	2.5-50						
24 0 -3 12 2.5-50 24 0 -3 20 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50		0		20		2.5-50					
24 0 -3 20 2.5-50 24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50											
24 4L 0 8 2.5-50 24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50 24 4L -3 12 2.5-50					2.5-50						
24 4L 0 12 2.5-50 24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50					0.5.50	2.5-50					
24 4L 0 20 2.5-50 24 4L -3 8 2.5-50 24 4L -3 12 2.5-50											
24 4L -3 8 2.5-50 24 4L -3 12 2.5-50											
24 4L -3 12 2.5-50											
24 4 -3 20 25.50	24	4L	-3	12	2.5-50						
47 7L 70 40 2,0-00	24	4L	-3	20	2.5-50						

Table B11: Guardrail Use Guidelines for Rural Arterial, Benefit-Cost Greater Than 3

Modorato	ly Severe Po			Range of Traffic Volumes Where Barrier is Optimal						
Hazard	ly Severe P		Offset to	Range	Traffic Volum	ies villele Da	iner is Optin	IIai		
Offset	Curvature	Grade %	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5		
5	0	0	8		2.5-35.75	35.75-50				
5	0	Ŏ	12		2.5-40.5	40.5-50				
5	0	0	20		2.5-35.75	35.75-50				
5	0	-3	8		2.5-31	31-50				
5	0	-3	12		2.5-31	31-50				
5	0	-3	20		2.5-31	31-50				
5 5	4L	0	8 12		2.5-50					
5	4L 4L	0	20		2.5-50					
_ •	4L		20		2.5-50					
5	4L	-3	8		2.5-50					
5	4L	-3	12		2.5-50					
5	4L	-3	20		2.5-50					
8	0	0	8		2.5-50					
8	0	0	12		2.5-40.5	40.5-50				
8	0	0	20		2.5-35.75	35.75-50				
8	0	-3	8		2.5-35.75	35.75-50				
8	0	-3	12		2.5-40.5	40.5-50				
8	0	-3	20		2.5-31	31-50				
8	4L	0	8		2.5-50					
8	4L	0	12		2.5-50					
8	4L	0	20		2.5-50					
8	4L 4L	-3 -3	8 12		2.5-50	25.75.50				
8	4L	-3	20		2.5-35.75 2.5-40.5	35.75-50 40.5-50				
12	0	0	8		2.5-40.5	40.5-50				
12	ŏ	Ö	12		2.5-21.5	40.5-50	21.5-50			
12	0	ō	20		2.5-50		21.000			
12	0	-3	8		2.5-35.75	35.75-50				
12	0	-3	12		2.5-16.75		16.75-50			
12	0	-3	20		2.5-50					
12	4L	0	8	2.5-50						
12	4L	0	12	2.5-50						
12 12	4L 4L	-3	20 8	0.5.50	2.5-50					
12	4L 4L	-3	12	2.5-50 2.5-50						
12	4L	-3	20	2.5-50	2.5-50					
18	0	ō	8	2.5-50	2.5-50					
18	Ö	Ö	12	2.5-16.75	16.75-50					
18	0	0	20		2.5-50					
18	0	-3	8	2.5-50						
18	0	-3	12	2.5-12	12-35.75		35.75-50			
18	0	-3	20	0.5.50	2.5-50					
18 18	4L 4L	0	8 12	2.5-50 2.5-50						
18	4L 4L	0	20	2.5-50						
18	4L	-3	8	2.5-50						
18	4L	-3	12	2.5-50						
18	4L	-3	20	2.5-50						
24	0	0	8	2.5-50						
24	0	0	12	2.5-50						
24	0	0	20	2.5-16.75	16.75-50					
24	0	-3	8	2.5-50						
24 24	0	-3 -3	12 20	2.5-50 2.5-16.75	16.75.50					
24	4L	0	8	2.5-16.75 2.5-50	16.75-50					
24	4L	0	12	2.5-50						
24	4L	0	20	2.5-50						
24	4L	-3	8	2.5-50						
24	4L	-3	12	2.5-50						
24	4L	-3	20	2.5-50						

Table B12: Guardrail Use Guidelines for Rural Arterial, Benefit-Cost Greater Than 3

Moderate	Point Hazar			Range of Traffic Volumes Where Barrier is Optimal						
Hazard	Cumuntum	Grade	Offset to	and the second second						
Offset	Curvature	%	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5		
5	0	0	8		2.5-50					
5	0	0	12		2.5-50					
5	0	0	20		2.5-50					
5	0	-3	8		2.5-50					
5	0	-3	12		2.5-50					
5	0	-3	20		2.5-50					
5	4L	0	8	2.5-50						
5	4L	0	12	2.5-50						
5	4L	0	20	2.5-50						
5	4L	-3	8	2.5-50						
5	4L	-3	12	2.5-50						
5	4L	-3	20	2.5-50						
8	0	0	8		2.5-50					
8	0	0	12		2.5-50					
8	0	0	20		2.5-50					
8	0	-3 -3	8		2.5-50					
8	0	-3 -3	12 20		2.5-50					
8	4L	-3 0	8	25.50	2.5-50					
8	4L 4L	0	12	2.5-50						
8	4L 4L	0	20	2.5-50 2.5-50						
8	4L	-3	8							
8	4L	-3	12	2.5-50 2.5-50						
8	4L	-3	20	2.5-50						
12	0	0	8	2.5-50						
12	0	0	12	2.5-50						
12	0	0	20	2.3-30	2.5-50					
12	Ö	-3	8	2.5-50	2.5-50					
12	Ö	-3	12	2.5-50						
12	Ö	-3	20	2.0-00	2.5-50					
12	4L	0	8	2.5-50	2.0 00					
12	4L	0	12	2.5-50						
12	4L	0	20	2.5-50						
12	4L	-3	8	2.5-50						
12	4L	-3	12	2.5-50						
12	4L	-3	20	2.5-50						
18	0	0	8	2.5-50						
18	0	0	12	2.5-50						
18	0	0	20	7.25-12	2.5-7.25, 12-50					
18	0	-3	8	2.5-50	1991					
18	0	-3	12	2.5-50						
18	0	-3	20		2.5-7.25, 7.25-50					
18	4L	0	8	2.5-50						
18	4L	0	12	2.5-50						
18	4L	0	20	2.5-50						
18	4L	-3	8	2.5-50						
18	4L	-3 -3	12	2.5-50						
18	4L		20	2.5-50						
24 24	0	0	8	2.5-50						
24	0	0	12 20	2.5-50						
24	0	-3	20 8	2.5-50						
24	0	-3 -3	12	2.5-50						
24	0	-3 -3	20	2.5-50 2.5-50						
24	4L	-3 0	8	2.5-50						
24	4L 4L	0	12	2.5-50						
24	4L	0	20	2.5-50						
24	4L	-3	8	2.5-50						
24	4L	-3	12	2.5-50						
24	4L 4L	-3 -3	20	2.5-50						
				2.3-50						

Table B13: Guardrail Use Guidelines for Rural LC, Benefit-Cost Greater Than 3

Rural LC	Severe Slop			Range	of Traffic Vol			
Hazard		Grade	Offset to	No				
	Curvature			Treatment	TL-2	TL-3	TL-4	TL-5
Offset	0	%	Slope	rreatment	0.5.5			
5	0	0	3		0.5-5			
	_		6		0.5-5			
5	0	-6	3		0.5-5			
5	0	-6	6		0.5-5			
5	10L	0	3		0.5-5			
5	10L	0	6		0.5-5			
5	10L	-6	3		0.5-5			
5	10L	-6	6		0.5-5			
8	0	0	3		0.5-5			
8	0	0	6		0.5-5			
8	0	0	12		0.5-5			
8	0	-6	3		0.5-5			
8	0	-6	6		0.5-5			
8	0	-6	12		0.5-5			
8	10L	0	3		0.5-5			
8	10L	0	6		0.5-5			1
8	10L	0	12		0.5-5			1
8	10L	-6	3		0.5-5			
8	10L	-6	6		0.5-5			
8	10L	-6	12		0.5-5			
12	0	ō	3		0.5-5			+
12	Ö	Ö	6		0.5-5			+
12	ŏ	0	12		0.5-5			+
12	Ö	-6	3		0.5-5			+
12	0	-6	6		0.5-5			+
12	0	-6	12					+
12	10L	0	3		0.5-5			
12		0	6		0.5-5			
12	10L	0	12		0.5-5			
	10L				0.5-5			
12	10L	-6	3		0.5-5			
12	10L	-6	6		0.5-5			
12	10L	-6	12		0.5-5			1
18	0	0	3		0.5-5			
18	0	0	6		0.5-5			
18	0	0	12		0.5-5			
18	0	-6	3		0.5-5			
18	0	-6	6		0.5-5			
18	0	-6	12		0.5-5			
18	10L	0	3		0.5-5			
18	10L	0	6		0.5-5			
18	10L	0	12		0.5-5			
18	10L	-6	3		0.5-5			
18	10L	-6	6		0.5-5			
18	10L	-6	12		0.5-5			
24	0	0	3		0.5-5			
24	0	0	6		0.5-5			
24	0	0	12		0.5-5			1
24	0	-6	3		0.5-5			1
24	0	-6	6		0.5-5			1
24	Ō	-6	12		0.5-5			
24	10L	ő	3		0.5-5			+
24	10L	Ö	6		0.5-5			+
24	10L	Ö	12		0.5-5			+
24	10L	-6	3		0.5-5			+
24	10L	-6	6		0.5-5			+
24	10L	-6	12					+
	LIVE	<u> </u>	14		0.5-5			

Table B14: Guardrail Use Guidelines forRural LC, Benefit-Cost Greater Than 3

Rural LC Mode Class	erately Seve	re Slope F			Traffic Volu	mes Where	Barrier is	Optimal
Hazard Offset	Curvature	Grade %	Offset to	No	TL-2	TL-3	TL-4	TL-5
5	0	0	Slope 3	Treatment	0.5-5			
5	0	 0	6		0.5-5			
5	Ö	-6	3		0.5-5			
5	Ö	-6	6		0.5-5			
5	10L	l ŏ l	3		0.5-5			
5	10L	l ŏ l	6		0.5-5			
5	10L	-6	3		0.5-5			
5	10L	-6	6		0.5-5			
8	0	0	3		0.5-5			
8	0	0	6		0.5-5			
8	0	0	12		0.5-5			
8	0	-6	3		0.5-5			
8	0	-6	6		0.5-5			
8	0	-6	12		0.5-5			
8	10L	0	3		0.5-5			i
8	10L	0	6		0.5-5			İ
8	10L	0	12		0.5-5			
8	10L	-6	3		0.5-5			
8	10L	-6	6		0.5-5			İ
8	10L	-6	12		0.5-5			
12	0	0	3		0.5-5			
12	0	0	6		0.5-5			
12	0	0	12		0.5-5			
12	0	-6	3		0.5-5			
12	0	-6	6		0.5-5			
12	0	-6	12		0.5-5			
12	10L	0	3		0.5-5			
12	10L	0	6		0.5-5			
12	10L	0	12		0.5-5			
12	10L	-6	3		0.5-5			
12	10L	-6	6		0.5-5			
12	10L	-6	12		0.5-5			
18	0	0	3		0.5-5			
18	0	0	6		0.5-5			
18	0	0	12		0.5-5			
18	0	-6	3		0.5-5			
18	0	-6	6		0.5-5			
18	0	-6	12		0.5-5			
18	10L	0	3		0.5-5			
18	10L	0	6		0.5-5			
18	10L	0	12		0.5-5			
18	10L	-6	3		0.5-5			
18	10L	-6	6		0.5-5			
18	10L	-6	12		0.5-5			
24	0	0	3		0.5-5			
24	0	0	6		0.5-5			
24	0	0	12		0.5-5			
24	0	-6	3		0.5-5			
24	0	-6	6		0.5-5			
24	0	-6	12		0.5-5			
24	10L	0	3		0.5-5			
24	10L	0	6		0.5-5			
24	10L	0	12		0.5-5			
24	10L	-6	3		0.5-5			
24	10L	-6	6		0.5-5			
24	10L	-6	12		0.5-5			

Table B15: Guardrail Use Guidelines for Rural LC, Benefit-Cost Greater Than 3

Rural LC M	loderate Slo	pe Funct	ional Class	Range	of Traffic Vo	olumes Who	ere Barrier i	s Optimal
Hazard	Curvature	Grade	Offset to	No Treatment	TL-2	TL-3	TL-4	TL-5
Offset		%	Slope					
5 5	0	0	3 6	0.5-0.95	0.95-5			
5	0	-6	3	0.5-1.4	1.4-5 0.5-5			
5	0	-6	6	0.5-0.95	0.5-5			
5	10L	0	3	0.5-5	0.95-5			
5	10L	0	6	0.5-5				
5	10L	-6	3	0.5-5				
5	10L	-6	6	0.5-5				
8	0	ō	3	0.5-1.4	1.4-5			
8	Ō	ō	6	0.5-1.4	1.4-5			
8	0	0	12	0.5-1.4	1.4-5			
8	0	-6	3	0.5-0.95	0.95-5			
8	0	-6	6	0.5-0.95	0.95-5			
8	0	-6	12	0.5-0.95	0.95-5			
8	10L	0	3	0.5-5				
8	10L	0	6	0.5-5				
8	10L	0	12	0.5-5				
8	10L	-6	3	0.5-5				
8	10L	-6	6	0.5-5				
8	10L	-6	12	0.5-5				
12	0	0	3	0.5-5				
12	0	0	6	0.5-5	1			
12	0	0	12	0.5-5				
12	0	-6	3	0.5-5				
12	0	-6	6	0.5-5				
12	0	-6	12	0.5-5				
12	10L	0	3	0.5-5				
12	10L	0	6	0.5-5				
12 12	10L 10L	-6	12 3	0.5-5				
12	10L	-6	6	0.5-5 0.5-5				
12	10L	-6	12	0.5-5				
18	0	0	3	0.5-5				
18	0	0	6	0.5-5				
18	Ö	Ö	12	0.5-5				
18	Ö	-6	3	0.5-5				
18	Ö	-6	6	0.5-5				
18	Ö	-6	12	0.5-5				
18	10L	ō	3	0.5-5				
18	10L	Ö	6	0.5-5				
18	10L	0	12	0.5-5				
18	10L	-6	3	0.5-5				
18	10L	-6	6	0.5-5				
18	10L	-6	12	0.5-5				
24	0	0	3	0.5-5				
24	0	0	6	0.5-5				
24	0	0	12	0.5-5				
24	0	-6	3	0.5-5				
24	0	-6	6	0.5-5				
24	0	-6	12	0.5-5				
24	10L	0	3	0.5-5				
24	10L	0	6	0.5-5				
24	10L	0	12	0.5-5				
24	10L	-6	3	0.5-5				
24	10L	-6	6	0.5-5				
24	10L	-6	12	0.5-5				

Table B16: Guardrail Use Guidelines for Rural LC, Benefit-Cost Greater Than 3

Severe Po	oint Hazard		50 6	Range o	f Traffic Volume	s Where Bar	rier is Optin	nal
Hazard	Company	Grade	Offset to	No Treatment	TL-2	TL-3	TL-4	71.6
Offset	Curvature	%	Slope	No Treatment	TL-2	IL-3	1L-4	TL-5
5	0	0	3	0.5-0.95	0.95-5			
5	0	0	6	0.5-0.95	0.95-5			
5	0	0	12	0.5-0.95	0.95-5			
5	0	-6	3		0.5-5			
5	0	-6	6		0.5-5			
5	0	-6	12	0.5.5	0.5-5			
5 5	10L 10L	0	3 6	0.5-5				
5	10L	0	12	0.5-5 0.5-5				-
5	10L	-6	3	0.5-5				
5	10L	-6	6	0.5-5				
5	10L	-6	12	0.5-5				
8	0	0	3	0.5-1.4	1.4-5			1
8	ŏ	Ö	6	0.5-1.4	1.4-5			
8	ŏ	Ö	12	0.5-1.4	1.4-5			
8	Ö	-6	3	0.5-0.95	0.95-5			
8	Ö	-6	6	2.2 0.00	0.5-0.95			
8	0	-6	12		0.5-5			
8	10L	0	3	0.5-5				
8	10L	0	6	0.5-5				
8	10L	0	12	0.5-5				
8	10L	-6	3	0.5-5				
8	10L	-6	6	0.5-5				
8	10L	-6	12	0.5-5				
12	0	0	3	0.8-2.3, 3.2-5	2.3-3.2			
12	0	0	6	0.5-2.3, 4.1-5	2.3-4.1			
12	0	0	12	0.5-1.85, 4.55-5	1.85-4.55			
12	0	-6	3	0.5-0.95	0.95-5			
12	0	-6	6	0.5-0.95	0.95-5			
12 12	10L	-6 0	12 3	0.5-0.95	0.95-5			
12	10L	0	6	0.5-5 0.5-5				
12	10L	0	12	0.5-5				
12	10L	-6	3	0.5-5				
12	10L	-6	6	0.5-5				
12	10L	-6	12	0.5-5				
18	0	0	3	0.5-5				
18	0	0	6	0.5-5				
18	0	0	12	0.5-5				
18	0	-6	3	0.5-5				
18	0	-6	6	0.5-5				
18	0	-6	12	0.5-2.3, 3.2-5	2.3-3.2			
18	10L	0	3	0.5-5				
18	10L	0	6	0.5-5				
18	10L	0	12	0.5-5				
18	10L	-6	3	0.5-5				
18	10L	-6	6	0.5-5				-
18 24	10L 0	-6 0	12 3	0.5-5				-
24	0	0	6	0.5-5 0.5-5				
24	0	0	12	0.5-5				
24	0	-6	3	0.5-5				
24	0	-6	6	0.5-5				
24	0	-6	12	0.5-5				
24	10L	0	3	0.5-5				
24	10L	0	6	0.5-5				
24	10L	Ö	12	0.5-5				1
24	10L	-6	3	0.5-5				
24	10L	-6	6	0.5-5				
24	10L	-6	12	0.5-5				

Table B17: Guardrail Use Guidelines for Rural LC, Benefit-Cost Greater Than 3

Moderate	ly Severe P	oint Haza		Ra	nge of Traffic Volumes	Where Barrier is	optimal .	
Hazard	Curvature	Grade	Offset to	No Treatment	TL-2	TL-3	TL-4	TL-5
Offset		%	Slope		10000000	12-5	112-4	112-5
5	0	0	3	0.5-0.95	0.95-5			
5	0	0	6	0.5-1.4	1.4-5			
5	0	0	12	0.5-0.95	0.95-5			
5	0	-6	3		0.5-5			
5	0	-6	6		0.5-5			
5	0	-6	12		0.5-5			
5	10L	0	3	0.5-5				
5	10L	0	6	0.5-5				
5 5	10L 10L	0 -6	12 3	0.5-5				
5	10L	-6 -6	6	0.5-5				
5	10L	-6	12	0.5-5 0.5-5				
8	0	0	3	0.5-1.4	1.4-5			
8	0	0	6	0.5-0.95	0.95-5			
8	0	0	12	0.5-1.4	1.4-5	+	 	
8	Ö	-6	3	0.0-1.4	0.5-5	+		
8	ŏ	-6	6	0.5-0.95	0.95-5	+	 	
8	Ö	-6	12	0.5-0.95	0.95-5	+	—	
8	10L	0	3	0.5-5	0.00-0	+	 	
8	10L	0	6	0.5-5		1	1	
8	10L	0	12	0.5-5				
8	10L	-6	3	0.5-5			İ	
8	10L	-6	6	0.5-5				
8	10L	-6	12	0.5-5				
12	0	0	3	0.5-5				
12	0	0	6	0.5-2.3, 3.2-5	2.3-3.2			
12	0	0	12	0.5-5				
12	0	-6	3	0.5-1.4	1.4-5			
12	0	-6	6	0.5-1.4	1.4-5			
12	0	-6	12	0.5-1.4	1.4-5			
12	10L	0	3	0.5-5				
12	10L	0	6	0.5-5				
12	10L	0	12	0.5-5				
12	10L	-6	3	0.5-5				
12	10L	-6	6	0.5-5				
12 18	10L	-6 0	12 3	0.5-5				
18	0	0	6	0.5-5				
18	0	0	12	0.5-5 0.5-5				
18	0	-6	3	0.5-5				
18	0	-6	6	0.5-5		+	 	
18	0	-6	12	0.5-5		+	-	
18	10L	Ö	3	0.5-5		1		
18	10L	0	6	0.5-5			<u> </u>	
18	10L	0	12	0.5-5			i	
18	10L	-6	3	0.5-5				
18	10L	-6	6	0.5-5				
18	10L	-6	12	0.5-5				
24	0	0	3	0.5-5				
24	0	0	6	0.5-5				
24	0	0	12	0.5-5				
24	0	-6	3	0.5-5				
24	0	-6	6	0.5-5				
24	0	-6	12	0.5-5				
24	10L	0	3	0.5-5				
24	10L	0	6	0.5-5			ļ	
24	10L	0	12	0.5-5				
24	10L	-6	3	0.5-5		+	ļ	
24	10L	-6	6	0.5-5		+		
24	10L	-6	12	0.5-5				

Table B18: Guardrail Use Guidelines for Rural LC, Benefit-Cost Greater Than 3

Moderate	Point Haza			Rang	e of Traffic Volumes Wh			
Hazard		Grade	Offset to	Ĭ			·	T1 5
Offset	Curvature	%	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5
5	0	0	3	0.5-5				
5	0	0	6	0.5-5				
5	0	0	12	0.5-5				
5	0	-6	3	0.5-1.85, 4.1-4.55	1.85-4.1, 4.55-5			
5	0	-6	6	0.5-1.4, 3.2-5	1.4-3.2			
5	0 10L	-6	12	0.5-2.3, 4.1-5	2.3-4.1			
5 5	10L	0	3 6	0.5-5				
5	10L	0	12	0.5-5 0.5-5				
5	10L	-6	3	0.5-5				
5	10L	-6	6	0.5-5				
5	10L	-6	12	0.5-5				
8	0	0	3	0.5-5				
8	0	0	6	0.5-5				
8	0	0	12	0.5-1.4, 3.2-5	1.4-3.2			
8	0	-6	3	0.5-5				
8	0	-6	6	0.5-5				
8	0	-6	12	0.5-5				
8	10L	0	3	0.5-5				
8	10L	0	6	0.5-5	2222			
8 8	10L 10L	-6	12 3	0.5-2.3, 3.2-5	2.3-3.2			
8	10L 10L	-6	6	0.5-5 0.5-5				
8	10L	-6	12	0.5-1.4, 3.2-5	1.4-3.2			
12	0	0	3	0.5-1.4, 3.2-5	1.4-3.2			
12	Ö	0	6	0.5-5				
12	Ö	0	12	0.5-5				
12	0	-6	3	0.5-5				
12	0	-6	6	0.5-5				
12	0	-6	12	0.5-5				
12	10L	0	3	0.5-5				
12	10L	0	6	0.5-5				
12	10L	0	12	0.5-5				
12 12	10L 10L	-6 -6	3 6	0.5-5				
12	10L	-6	12	0.5-5 0.5-5				
18	0	0	3	0.5-5				
18	Ö	0	6	0.5-5				
18	0	0	12	0.5-5				
18	0	-6	3	0.5-5				
18	0	-6	6	0.5-5				
18	0	-6	12	0.5-5				
18	10L	0	3	0.5-5				
18	10L	0	6	0.5-5				
18 18	10L 10L	-6	12 3	0.5-5				
18	10L	-6	6	0.5-5 0.5-5				\vdash
18	10L	-6	12	0.5-5				
24	0	0	3	0.5-5				
24	Ö	0	6	0.5-5				
24	0	0	12	0.5-5				
24	0	-6	3	0.5-5				
24	0	-6	6	0.5-5				
24	0	-6	12	0.5-5				
24	10L	0	3	0.5-5				
24	10L	0	6	0.5-5				
24	10L	0	12	0.5-5				
24 24	10L 10L	-6 -6	3 6	0.5-5				
24	10L 10L	-6	12	0.5-5				
	IUL	-0	14	0.5-5				

Table B19: Guardrail Use Guidelines for Urban Arterial, Benefit-Cost Greater Than 3

Urban Arter	ial Severe Slo	pe Func	tional Class	O No				
Hazard	Curvature	Grade	Offset to	No	TL-2	TL-3	TL-4	TL-5
Offset		% 0	Slope	Treatment	12-2		12-4	12-5
5	0		3			5-80		7
5	0	0	6			5-80		
5	0	-3	3		l.	5-80		
5	0	-3	6			5-80		
5	6L	0	3			5-80		
5	6L	0	6			5-80		
5	6L	-3	3			5-80		
5	6L	-3	6			5-80		
8	0	0	3			5-80		
8	0	0	6			5-80		
8	0	0	12			5-80		
8	0	-3	3			5-80		
8	0	-3	6			5-80		
8	0	-3	12			5-80		
8	6L	0	3			5-80		
8	6L	0	6			5-80		
8	6L	0	12			5-80		
8	6L	-3	3			5-80		
8	6L	-3	6			5-80		
8	6L	-3	12			5-80		
12	0	0	3			5-80		
12	0	0	6			5-80		
12	0	0	12			5-80		
12	0	-3	3			5-80		
12	0	-3	6			5-80		
12	0	-3	12			5-80		
12	6L	0	3			5-80		
12	6L	0	6			5-80		
12	6L	0	12			5-80		
12	6L	-3	3			5-80		
12	6L	-3	6			5-80		
12	6L	-3	12			5-80		
18	0	0	3		5-12.5	12.5-80		
18	0	0	6		5-12.5	12.5-80		
18	0	0	12		5-12.5	12.5-80		
18	0	-3	3			5-80		
18	0	-3	6			5-80		
18	0	-3	12			5-80		
18	6L	0	3			5-80		ļ
18	6L	0	6			5-80		ļ
18	6L	0	12			5-80		
18	6L	-3	3			5-80		
18	6L	-3	6			5-80		
18	6L	-3	12			5-80		ļ
24	0	0	3			5-80		ļ
24	0	0	6			5-80		
24	0	0	12			5-80		
24	0	-3	3			5-80		
24	0	-3	6			5-80		ļ
24	0	-3	12			5-80		
24	6L	0	3		5-80			
24	6L	0	6		5-80			
24	6L	0	12			5-80		
24	6L	-3	3		5-80			
24	6L	-3	6		5-80			
24	6L	-3	12			5-80		

Table B20: Guardrail Use Guidelines for Urban Arterial, Benefit-Cost Greater Than 3

Urban Arteria Class			ope Functional		ge of Traffic Volu			nal
Hazard Offset	Curvature	Grade %	Offset to Slope	No Treatment	TL-2	TL-3	TL-4	TL-5
5	0	0	3			5-80		
5	0	0	6			5-80		
5	0	-3	3			5-80		
5	0	-3	6			5-80		
5	6L	0	3			5-80		
5	6L	0	6			5-80		
5	6L	-3	3			5-80		
5	6L	-3	6			5-80		
8	0	0	3			5-80		
8	0	0	6			5-80		
8	0	0	12			5-80		
8	0	-3	3			5-80		
8	0	-3	6			5-80		
8	0	-3	12			5-80		
8	6L	0	3		5-12.5	12.5-80		
8	6L	0	6			5-12.5		12.5-80
8	6L	0	12			5-80		
8	6L	-3	3			5-80		10 = 05
8	6L	-3	6			5-12.5		12.5-80
8	6L	-3	12			5-80		
12	0	0	3		5-42.5	42.5-80		
12	0	0	6		5-27.5	27.5-80		
12	0	0	12		5-20	20-80		
12	0	-3	3		5-35	35-80		
12	0	-3 -3	6 12		5-42.5, 57.5-80	42.5-57.5		
12 12	0 6L	-3			5.00	5-80		
12	6L	0	3 6		5-80			10 5 00
12	6L	0	12		5-12.5	5-80		12.5-80
12	6L	-3	3		5-80	5-60		
12	6L	-3	6		5-80			12.5-80
12	6L	-3	12		5-12.5	5-80		12.5-60
18	0	0	3		5-80	5-60	-	
18	0	0	6		5-80			
18	0	0	12		5-72.5	72.5-80		
18	0	-3	3		5-80	12.5-00		1
18	Ö	-3	6		5-80			
18	0	-3	12		5-72.5	72.5-80		
18	6L	0	3		5-80	, 2.5 00		
18	6L	Ö	6		5-80			
18	6L	Ö	12		5-80			
18	6L	-3	3		5-80			
18	6L	-3	6		5-80			
18	6L	-3	12		5-80			
24	0	0	3		5-80			
24	0	0	6		5-80			
24	0	0	12		5-80			
24	0	-3	3		5-80			
24	0	-3	6		5-80			
24	0	-3	12		5-80			
24	6L	0	3		5-80			
24	6L	0	6		5-80			
24	6L	0	12		5-80			
24	6L	-3	3		5-80			
24	6L	-3	6		5-80			
24	6L	-3	12		5-80			

Table B21: Guardrail Use Guidelines for Urban Arterial, Benefit-Cost Greater Than 3

Urban Arter Class	rial Moderate			Range of	raffic Volume			
Hazard	Curvature	Grade	Offset to	No Treatment	TL-2	TL-3	TL-4	TL-5
Offset	Curvature	%	Slope	No Treatment	TL-2	IL-3	TL-4	IL-5
5	0	0	3		5-80			
5	0	0	6		5-80			
5	0	-3	3		5-80			
5	0	-3	6		5-80			
5	6L	0	3		5-80			
5	6L	0	6		5-80			
5	6L	-3	3		5-80			
5	6L	-3	6		5-80			
8	0	0	3		5-80			
8	0	0	6		5-80			
8	0	-3	12		5-80			
8	0	-3 -3	3 6		5-80			
8	0	-3	12		5-80			
8	6L	0	3		5-80			
8	6L	0	6		5-80			
8	6L	0	12		5-80 5-80			
8	6L	-3	3		5-80			
8	6L	-3	6		5-80			
8	6L	-3	12		5-80			
12	0	0	3		5-80			
12	ŏ	Ö	6		5-80			
12	Ö	ō	12		5-80			
12	Ö	-3	3		5-80			
12	Ō	-3	6		5-80			
12	0	-3	12		5-80			
12	6L	0	3		5-80			
12	6L	0	6		5-80			
12	6L	0	12		5-80			
12	6L	-3	3		5-80			
12	6L	-3	6		5-80			
12	6L	-3	12		5-80			
18	0	0	3		5-80			
18	0	0	6		5-80			
18	0	0	12		5-80			
18	0	-3	3		5-80			
18	0	-3	6		5-80			
18	0	-3 0	12	F 00	5-80			
18 18	6L 6L	0	3 6	5-80	E 00			
18	6L	0	12		5-80 5-80			
18	6L	-3	3	5-35, 50-80	35-50			
18	6L	-3	6	J-33, 3U-6U	5-80			
18	6L	-3	12		5-80			
24	0	0	3		5-80			
24	ŏ	Ö	6		5-80			
24	ŏ	Ö	12		5-80			
24	ŏ	-3	3		5-80			
24	Ö	-3	6		5-80			
24	Ö	-3	12		5-80			
24	6L	0	3	5-80				
24	6L	0	6	5-80	İ			
24	6L	0	12	5-80				
24	6L	-3	3	5-80				
24	6L	-3	6	5-80				
24	6L	-3	12	5-35, 50-65	35-50, 65-80			

Table B22: Guardrail Use Guidelines for Urban Arterial, Benefit-Cost Greater Than 3

_	oint Hazard	ururur 00	- Guidelline	Range of Traffic Volumes Where Barrier is Optimal				
Hazard		Grade	Offset to	No				
Offset	Curvature	%	Slope	Treatment	TL-2	TL-3	TL-4	TL-5
5	0	0	3	. 1	5-27.5	27.5-80		
5	0	0	6		5-35	35-80		
5	0	0	12		5-35	35-80		
5	0	-3	3		5-20	20-80		
5 5	0	-3 -3	6 12		5-27.5	27.5-80		
5	6L	-3	3		5-27.5	27.5-80		
5	6L	0	6		5-80 5-80			
5	6L	0	12		5-80			
5	6L	-3	3		5-80			
5	6L	-3	6		5-80			
5	6L	-3	12		5-80			
8	0	0	3		5-35	35-80		
8	0	0	6		5-65	65-80		
8	0	0	12		5-72.5	72.5-80		
8	0	-3	3		5-27.5	27.5-80		
8	0	-3	6		5-57.5	57.5-80		
8	0	-3	12		5-65	65-80		
8	6L	0	3		5-80			
8	6L	0	6		5-80			
8	6L	0	12		5-80			
8	6L	-3	3		5-80			
8	6L	-3	6		5-80			
8 12	6L	-3 0	12 3		5-80			
12	0	0	6		5-80	70.5.00		
12	0	0	12		5-72.5	72.5-80		
12	0	-3	3		5-80 5-80			
12	0	-3	6		5-80			_
12	ŏ	-3	12		5-80			
12	6Ľ	0	3		5-80			
12	6L	0	6		5-80			
12	6L	0	12		5-80			
12	6L	-3	3		5-80			
12	6L	-3	6		5-80			
12	6L	-3	12		5-80			
18	0	0	3		5-80			
18	0	0	6		5-80			
18	0	0	12		5-80			
18	0	-3	3		5-80			
18 18	0	-3 -3	6 12	\vdash	5-80			
18	6L	-3 0	3	5.00	5-80			
18	6L	0	6	5-80 5-80				
18	6L	0	12	5-35	35-80			
18	6L	-3	3	5-80	55.00			
18	6L	-3	6	5-80				$\overline{}$
18	6L	-3	12	5-35	35-80			$\overline{}$
24	0	0	3	5-12.5	12.5-80			
24	0	0	6		5-80			
24	0	0	12		5-80			
24	0	-3	3		5-80			
24	0	-3	6		5-80			
24	0	-3	12		5-80			
24	6L	0	3	5-80				
24	6L	0	6	5-80				
24	6L	0	12	5-80				
24	6L	-3	3 6	5-80				
24 24	6L 6L	-3 -3	12	5-80				
	DL.	-ა	12	5-80				

Table B23: Guardrail Use Guidelines for Urban Arterial, Benefit-Cost Greater Than 3

	Table B23: Guardrail Use Guidelines for Urban Arterial, Benefit-Cost Greater Than 3 Inderstely Severe Point Hazard Range of Traffic Volumes Where Barrier is Optimal									
	ly Severe Po				e of Traffic	Volumes Wh	ere Barrier is O	otimal		
Hazard	Curvature	Grade	Offset to	No	TL-2	TL-3	TL-4	TL-5		
Offset		%	Slope	Treatment			12-4	12-5		
5	0	0	3	4	5-42.5	42.5-80		- S		
5	0	0	6		5-35	35-80				
5 5	0	0	12		5-35	35-80				
5	0	-3 -3	3 6		5-35	35-80				
5	0	-3	12		5-27.5 5-27.5	27.5-80				
5	6L	0	3		5-80	27.5-80		-		
5	6L	0	6		5-80					
5	6L	Ö	12		5-80					
5	6L	-3	3		5-80					
5	6L	-3	6		5-80					
5	6L	-3	12		5-80					
8	0	0	3		5-72.5	72.5-80				
8	0	0	6		5-80					
8	0	0	12		5-80					
8	0	-3	3		5-65	65-80				
8	0	-3	6		5-65	65-80				
8	0	-3	12		5-65	65-80				
8	6L	0	3 6		5-80			\vdash		
8	6L 6L	0	12		5-80 5-80			\vdash		
8	6L	-3	3		5-80					
8	6L	-3	6		5-80			\vdash		
8	6L	-3	12		5-80			\vdash		
12	0	0	3		5-80					
12	ŏ	0	6		5-80					
12	Ö	Ō	12		5-80					
12	0	-3	3		5-80					
12	0	-3	6		5-80					
12	0	-3	12		5-80					
12	6L	0	3	5-27.5	27.5-80					
12	6L	0	6		5-80					
12	6L	0	12		5-80					
12	6L	-3	3	5-20	20-80					
12 12	6L	-3 -3	6 12		5-80					
18	6L 0	-3 0	3	E 40 E	5-80					
18	0	0	6	5-12.5	12.5-80 5-80					
18	0	0	12		5-80			-		
18	ŏ	-3	3		5-80					
18	Ö	-3	6		5-80					
18	0	-3	12		5-80					
18	6L	0	3	5-80						
18	6L	0	6	5-80						
18	6L	0	12	5-80						
18	6L	-3	3	5-80						
18	6L	-3	6	5-80						
18 24	6L 0	-3 0	12 3	5-80	07.5.00			\vdash		
24	0	0	6	5-27.5	27.5-80 12.5-80			\vdash		
24	0	0	12	5-12.5	12.5-80 5-80			\vdash		
24	0	-3	3	5-20	20-80			\vdash		
24	0	-3	6	5-12.5	12.5-80			\vdash		
24	0	-3	12	J-12.J	5-80			\vdash		
24	6Ľ	0	3	5-80	0.00					
24	6L	0	6	5-80						
24	6L	0	12	5-80						
24	6L	-3	3	5-80						
24	6L	-3	6	5-80						
24	6L	-3	12	5-80						

Table B24: Guardrail Use Guidelines for Urban Arterial, Benefit-Cost Greater Than 3

Hazard Offset Curvature Grade Offset to Slope Treatment TL-2 TL-3 TL-4	Optimal TL-5	lelines for Urban Arterial, Benefit-Cost Greater Than 3							
Offset Curvature % Slope Treatment 1L-2 1L-3 1L-4 5 0 0 3 5-12.5 12.5-80 5 5 0 0 12 5-12.5 12.5-80 5 5 0 -3 3 5-80 5-80 5 5 5 6 5-80 5 5-80 5 5 6 5-80 5 5 6 5-80 5 5 6 5-80 5 5 6 5-80 5 5 6 5-80 5 5 6 5-80 5 5 6 6 5-80 5 5 6 6 5-80 5 6 5-80 5 6 5-80 5 6 5-80 5 6 5-80 5 6 5-80 5 6 5-80 5 6 5-80 5 6 5-80 5 6 5-80 6 5-	TI -5	a parrier is	umes Wher	affic Vol	Range o			Point Hazai	
Siope Teatment Siope Teatment Siope Teatment Siope Teatment Siope Teatment Siope		TI 4	TI 2	TI 2		Offset to	Grade	Curveture	Hazard
5 0 0 6 5-12.5 12.5-80 5 0 0 12 5-12.5 12.5-80 5 0 -3 3 5-80 5 0 -3 12 5-12.5 12.5-80 5 0 -3 12 5-12.5 12.5-80 5 6L 0 3 5-80 80 8-80 5-80 80 8-80 8-80 8-80 8-80 8-80 8-80 8-80 8-80 <	12-5	IL-4	IL-3	IL-2	Treatment	Slope	%	Curvature	Offset
5 0 0 12 5-12.5 12.5-80 5 0 -3 3 5-80 5 0 -3 12 5-12.5 12.5-80 5 6L 0 3 5-80 5 6L 0 6 5-80 5 6L 0 12 5-80 5 6L -3 3 5-80 5 6L -3 3 5-80 5 6L -3 12 5-80 5 6L -3 12 5-80 5 6L -3 12 5-80 8 0 0 3 5-80 8 0 0 3 5-80 8 0 0 12 5-35 35-80 8 0 -3 3 5-80 35-80 8 0 -3 3 5-80 5-80 8 <th></th> <th></th> <th></th> <th>2.5-80</th> <th>5-12.5</th> <th>3</th> <th>0</th> <th>0</th> <th>5</th>				2.5-80	5-12.5	3	0	0	5
5 0 -3 3 5-80 5 0 -3 6 5-80 5 0 -3 12 5-12.5 12.5-80 5 6L 0 3 5-80 5-				2.5-80	5-12.5				
5 0 -3 6 5-80 5 0 -3 12 5-12.5 12.5-80 5 6L 0 3 5-80 5 6L 0 6 5-80 5 6L -3 3 5-80 5 6L -3 6 5-80 5 6L -3 12 5-80 5 6L -3 12 5-80 8 0 0 3 5-80 8 0 0 3 5-80 8 0 0 3 5-80 8 0 0 3 5-80 8 0 0 3 5-80 8 0 -3 3 5-80 8 0 -3 3 5-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80<				2.5-80	5-12.5				
5 0 -3 12 5-12.5 12.5-80 5 6L 0 3 5-80 5 6L 0 6 5-80 5 6L 0 12 5-80 5 6L -3 3 5-80 5 6L -3 12 5-80 5 6L -3 12 5-80 8 0 0 3 5-80 8 0 0 3 5-80 8 0 0 12 5-35 35-80 8 0 -3 3 5-80 5-80 8 0 -3 3 5-80 5-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 5-80 8 6L 0 6 5-80 6-80 8 6L 0 3 5-80				5-80					
5 6L 0 3 5-80 5 6L 0 6 5-80 5 6L 0 12 5-80 5 6L -3 3 5-80 5 6L -3 6 5-80 5 6L -3 12 5-80 8 0 0 3 5-80 8 0 0 6 5-20 20-80 8 0 0 12 5-35 35-80 8 0 -3 3 5-80 35-80 8 0 -3 3 5-80 35-80 8 0 -3 12 5-20 20-80 36-80 8 6L 0 3 5-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 36-80 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>									
5 6L 0 6 5-80 5 6L 0 12 5-80 5 6L -3 3 5-80 5 6L -3 12 5-80 8 0 0 3 5-80 8 0 0 6 5-20 20-80 8 0 0 12 5-35 35-80 8 0 -3 3 5-80 8 0 -3 3 5-80 8 0 -3 3 5-80 8 0 -3 12 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L -3 6 5-80 8 6L <td< th=""><th></th><th></th><th>· .</th><th>2.5-80</th><th></th><th></th><th></th><th></th><th></th></td<>			· .	2.5-80					
5 6L 0 12 5-80 5 6L -3 3 5-80 5 6L -3 6 5-80 5 6L -3 12 5-80 8 0 0 3 5-80 8 0 0 6 5-20 20-80 8 0 -3 3 5-80 8 0 -3 6 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 3 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 6 5-80 8 6L -3 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>									
5 6L -3 3 5-80 5 6L -3 6 5-80 5 6L -3 12 5-80 8 0 0 3 5-80 8 0 0 6 5-20 20-80 8 0 0 12 5-35 35-80 8 0 -3 3 5-80 35-80 8 0 -3 6 5-20 20-80 20-80 8 0 -3 12 5-20 20-80 30-80									
5 6L -3 6 5-80 5 6L -3 12 5-80 8 0 0 3 5-80 8 0 0 6 5-20 20-80 8 0 0 12 5-35 35-80 8 0 -3 3 5-80 8 0 -3 6 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 9 0 <									
5 6L -3 12 5-80 8 0 0 3 5-80 20-80 8 0 0 6 5-20 20-80 8 0 -3 3 5-80 8 0 -3 6 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80									
8 0 0 3 5-80 8 0 0 6 5-20 20-80 8 0 0 12 5-35 35-80 8 0 -3 3 5-80 5-80 8 0 -3 6 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 8 6L 0 6 5-80 8 8 6L 0 12 5-80 8 8 6L -3 3 5-80 8 8 6L -3 12 5-80 8 8 6L -3 12 5-80 8 8 6L -3 12 5-80 8 9 0 0 3 5-80 9 12 0 0 3 5-80									
8 0 0 6 5-20 20-80 8 0 0 12 5-35 35-80 8 0 -3 3 5-80 8 0 -3 6 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80					5-80				
8 0 0 12 5-35 35-80 8 0 -3 3 5-80 20-80 8 0 -3 6 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80									
8 0 -3 3 5-80 8 0 -3 6 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L -3 5-80 8 6L -3 6 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80									
8 0 -3 6 5-20 20-80 8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80				35-80					
8 0 -3 12 5-20 20-80 8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80							-3		
8 6L 0 3 5-80 8 6L 0 6 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80							-3		
8 6L 0 6 5-80 8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80				20-80					
8 6L 0 12 5-80 8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80				\rightarrow	5-80				
8 6L -3 3 5-80 8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80				\rightarrow					
8 6L -3 6 5-80 8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80				\rightarrow					
8 6L -3 12 5-80 12 0 0 3 5-80 12 0 0 6 5-80				\rightarrow					
12 0 0 3 5-80 12 0 0 6 5-80				\rightarrow					
12 0 0 6 5-80		$\overline{}$		$\overline{}$					
				$\overline{}$					
 				7 5 00					
12 0 -3 3 5-80				7.5-60					
12 0 -3 6 5-80 12 0 -3 6 5-80				$\overline{}$					
12 0 -3 12 5-27.5 27.5-80				7 5 90					
12 6L 0 3 5-80		-		7.5-60					
12 GL 0 6 5-80				$\overline{}$					
12 6L 0 12 5-80				-					
12 6L -3 3 5-80				$\overline{}$					
12 6L -3 6 5-80				$\overline{}$			-3		
12 6L -3 12 5-80				-					
18 0 0 3 5-80				$\overline{}$					
18 0 0 6 5-80				$\overline{}$					
18 0 0 12 5-80									
18 0 -3 3 5-80									
18 0 -3 6 5-80				$\overline{}$			-3		
18 0 -3 12 5-80									
18 6L 0 3 5-80				\neg					
18 6L 0 6 5-80				\neg					
18 6L 0 12 5-80									18
18 6L -3 3 5-80					5-80				
18 6L -3 6 5-80									
18 6L -3 12 5-80								6L	
24 0 0 3 5-80									
24 0 0 6 5-80									
24 0 0 12 5-80									
24 0 -3 3 5-80									
24 0 -3 6 5-80									
24 0 -3 12 5-80									
24 6L 0 3 5-80									
24 6L 0 6 5-80									
24 6L 0 12 5-80									
24 6L -3 3 5-80									
24 6L -3 6 5-80					5-80	6	-3	61	24
24 6L -3 12 5-80					0-00				

Table B25: Guardrail Use Guidelines for Urban LC, Benefit-Cost Greater Than 3

Urban LC Se	vere Slope Fu		Class	Rang	ge of Traffic Volu	1000000	4007 80 95 95 95 95	al
Hazard	Curvature	Grade %	Offset to	No	TL-2	TL-3	TL-4	TL-5
Offset 5	0	0	Slope 3	Treatment	0.5-5	100000		
5	0	0	6		0.5-5		_	
5	0	-6	3		0.5-5		+	_
5	0	-6	6		0.5-5		+	
5	10L	0	3		0.5-5		+	
5	10L	0	6		0.5-5		+	_
5	10L	-6	3		0.5-5			
5	10L	-6	6		0.5-5			
8	0	0	3		0.5-5			
8	0	0	6		0.5-5			
8	0	0	12		0.5-5			
8	0	-6	3		0.5-5			
8	0	-6	6		0.5-5			
8	0	-6	12		0.5-5			
8	10L	0	3		0.5-5			
8	10L	0	6		0.5-5			
8	10L	0	12		0.5-5			
8	10L	-6	3		0.5-5			
8	10L	-6	6		0.5-5			
8	10L	-6	12		0.5-5			
12	0	0	3		0.5-5			
12	0	0	6		0.5-5			
12	0	0	12		0.5-5			
12	0	-6	3		0.5-5			
12	0	-6	6		0.5-5			
12	0	-6	12		0.5-5			
12	10L	0	3		0.5-5			
12	10L	0	6		0.5-5			
12	10L	0	12		0.5-5			
12 12	10L	-6 -6	3 6		0.5-5			
12	10L	-6 -6	12		0.5-5			
18	10L 0	0	3		0.5-5 0.5-5			
18	0	0	6				+	
18	0	0	12		0.5-5 0.5-5		+	<u> </u>
18	0	-6	3		0.5-5		+	_
18	0	-6	6		0.5-5		+	+
18	0	-6	12		0.5-5		+	
18	10L	0	3		0.5-5		+	t
18	10L	Ö	6		0.5-5		+	
18	10L	Ö	12		0.5-5		1	1
18	10L	-6	3		0.5-5			†
18	10L	-6	6		0.5-5			
18	10L	-6	12		0.5-5			
24	0	0	3		0.5-5		1	T
24	0	0	6		0.5-5		1	T
24	0	0	12		0.5-5			
24	0	-6	3		0.5-5			
24	0	-6	6		0.5-5			
24	0	-6	12		0.5-5			
24	10L	0	3		0.5-5			
24	10L	0	6		0.5-5			
24	10L	0	12		0.5-5			
24	10L	-6	3		0.5-5			
24	10L	-6	6		0.5-5			
24	10L	-6	12		0.5-5			

Table B26: Guardrail Use Guidelines for Urban LC, Benefit-Cost Greater Than 3

				es for Urban LC, I	Sellelli-Cost G	reater Illa				
	Urban LC Moderately Severe Slope Functional									
Class				Range of Traffic Volumes Where Barrier is Optimal						
Hazard	Curvature	Grade	Offset to	No Treatment	TL-2	TL-3	TL-4	TL-5		
Offset		%	Slope	No Treatment		12.0	12.7	120		
5	0	0	3		0.5-5					
5	0	0	6		0.5-5	1				
5	0	-6	3		0.5-5	1				
5	0	-6	6		0.5-5	1				
5	10L	0	3	0.5-5						
5 5	10L	0	6 3	0.5-5		-				
5	10L 10L	-6 -6	6	0.5-5			-			
8	0	0	3	0.5-5	0.05.5	+		_		
8	0	0	6	0.5-0.95	0.95-5 0.5-5	+	<u> </u>			
8	0	0	12	0.5-0.95	0.95-5	+	 	_		
8	0	-6	3	0.5-0.95	0.5-5	+	 	_		
8	0	-6	6		0.5-5	+	 			
8	0	-6	12		0.5-5	+	 	 		
8	10L	0	3	0.5-5	0.0-0	+	 			
8	10L	Ö	6	0.5-5		 				
8	10L	Ö	12	0.5-5		t				
8	10L	-6	3	0.5-5		†				
8	10L	-6	6	0.5-5						
8	10L	-6	12	0.5-5						
12	0	0	3	0.5-1.4	1.4-5	1				
12	0	0	6	0.5-1.4	1.4-5					
12	0	0	12	0.5-1.4	1.4-5	1				
12	0	-6	3	0.5-0.95	0.95-5					
12	0	-6	6		0.5-5					
12	0	-6	12	0.5-5						
12	10L	0	3	0.5-5						
12	10L	0	6	0.5-5						
12	10L	0	12	0.5-5		1				
12	10L	-6	3	0.5-5						
12	10L	-6	6	0.5-5						
12	10L	-6	12	0.5-5						
18 18	0	0	3 6	0.5-5						
18	0	0	12	0.5-5		+				
18	0	-6	3	0.5-5						
18	0	-6 -6	6	0.5-5	275 4 55	+	-	-		
18	0	-6	12	0.5-2.75, 4.55-5 0.5-2.75	2.75-4.55 2.75-5	+	+			
18	10L	0	3	0.5-2.75	2.10-0	+	 			
18	10L	0	6	0.5-5		+	 			
18	10L	Ö	12	0.5-5		†				
18	10L	-6	3	0.5-5						
18	10L	-6	6	0.5-5		T				
18	10L	-6	12	0.5-5		1				
24	0	0	3	0.5-5						
24	0	0	6	0.5-5						
24	0	0	12	0.5-5						
24	0	-6	3	0.5-5						
24	0	-6	6	0.5-5						
24	0	-6	12	0.5-5						
24	10L	0	3	0.5-5						
24	10L	0	6	0.5-5						
24	10L	0	12	0.5-5						
24	10L	-6	3	0.5-5						
24	10L	-6	6	0.5-5						
24	10L	-6	12	0.5-5						

Table B27: Guardrail Use Guidelines for Urban LC, Benefit-Cost Greater Than 3

Urban LC Mo		unction			raffic Volun			Optimal
Hazard	Curvature	Grade	Offset to	No Treatment	TL-2	TL-3	TL-4	TL-5
Offset		%	Slope			120	15.7	
5	0	0	3	0.5-5				
5	0	0	6	0.5-5				
5	0	-6	3	0.5-5				
5	0	-6	6	0.5-5				
5	10L	0	3	0.5-5				
5	10L	0	6	0.5-5				
5	10L	-6	3	0.5-5				
5 8	10L	-6 0	6	0.5-5				
8	0	0	6	0.5-5				
8	0	0	12	0.5-5				
				0.5-5				
8 8	0	-6	3 6	0.5-5				
8	0	-6 -6	12	0.5-5				
				0.5-5				
8	10L	0	3 6	0.5-5				
8	10L	0	12	0.5-5				
8	10L 10L	-6	3	0.5-5				
8	10L 10L	-6 -6	6	0.5-5				
8	10L 10L	-6 -6	12	0.5-5				
12	10L 0	-6 0		0.5-5				
12	0	0	3 6	0.5-5				
12	0	0	12	0.5-5				
12	-	_		0.5-5				
12	0	-6 -6	3 6	0.5-5				
12	0	-6 -6	12	0.5-5				
12	10L	0	3	0.5-5				
12	10L	0	6	0.5-5				
12	10L	0	12	0.5-5 0.5-5				
12	10L	-6	3	0.5-5				
12	10L	-6	6	0.5-5				
12	10L	-6	12	0.5-5				
18	0	0	3	0.5-5				
18	Ö	Ö	6	0.5-5				
18	ŏ	Ö	12	0.5-5				
18	ŏ	-6	3	0.5-5				
18	ŏ	-6	6	0.5-5				
18	ŏ	-6	12	0.5-5				
18	10L	0	3	0.5-5				
18	10L	ō	6	0.5-5				
18	10L	0	12	0.5-5				
18	10L	-6	3	0.5-5				
18	10L	-6	6	0.5-5				
18	10L	-6	12	0.5-5				
24	0	0	3	0.5-5				
24	0	0	6	0.5-5				
24	0	0	12	0.5-5				
24	0	-6	3	0.5-5				
24	0	-6	6	0.5-5				
24	0	-6	12	0.5-5				
24	10L	0	3	0.5-5				
24	10L	0	6	0.5-5				
24	10L	0	12	0.5-5				
24	10L	-6	3	0.5-5				
24	10L	-6	6	0.5-5				
24	10L	-6	12	0.5-5				

Table B28: Guardrail Use Guidelines for Urban LC, Benefit-Cost Greater Than 3

Severe P	oint Hazard	DEU. (- auraran Ost	Range of Traffic Volumes Where Barrier is Optimal						
Hazard		Grade	Offset to	-						
Offset	Curvature	%	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5		
5	0	0	3	0.5-1.4	1.4-5					
5	Ö	0	6	0.5-1.4	1.4-5					
5	0	0	12		0.5-5					
5	0	-6	3	0.5-1.4	1.4-5					
5	0	-6	6		0.5-5					
5	0	-6	12		0.5-5					
5	10L	0	3	0.5-5						
5 5	10L 10L	0	6 12	0.5-5						
5	10L	-6	3	0.5-5						
5	10L	-6	6	0.5-5 0.5-1.4, 3.2-5	1.4-3.2	+				
5	10L	-6	12	0.5-1.4, 5.2-5	1.4-3.2					
8	0	0	3	0.5-2.3, 3.2-5	2.3-3.2					
8	Ö	ō	6	0.5-1.85, 4.55-5	1.85-4.55	+				
8	0	0	12	0.5-5						
8	0	-6	3	0.5-0.95	0.95-5					
8	0	-6	6	0.5-0.95	0.95-5					
8	0	-6	12	0.5-0.95	0.95-5					
8	10L	0	3	0.5-5						
8	10L	0	6	0.5-5						
8	10L	0	12	0.5-5						
8	10L 10L	-6 -6	3 6	0.5-5		-				
8	10L	-6	12	0.5-5 0.5-5		-				
12	0	0	3	0.5-5		+				
12	ŏ	Ö	6	0.5-5						
12	Ö	Ō	12	0.5-5						
12	0	-6	3	0.5-2.3, 3.2-5	2.3-3.2					
12	0	-6	6	0.5-2.75, 4.55-5	2.75-4.55					
12	0	-6	12	0.5-5						
12	10L	0	3	0.5-5						
12	10L	0	6	0.5-5						
12	10L	0	12	0.5-5						
12 12	10L 10L	-6 -6	3 6	0.5-5						
12	10L	- 6	12	0.5-5 0.5-5		-				
18	0	0	3	0.5-5						
18	ŏ	0	6	0.5-5						
18	Ö	0	12	0.5-5						
18	0	-6	3	0.5-5						
18	0	-6	6	0.5-5						
18	0	-6	12	0.5-5						
18	10L	0	3	0.5-5						
18	10L	0	6	0.5-5						
18	10L	0	12	0.5-5						
18	10L	-6 -6	3	0.5-5		_				
18 18	10L 10L	-6 -6	6 12	0.5-5		_				
24	0	-6	3	0.5-5 0.5-5		_				
24	0	0	6	0.5-5		+				
24	ŏ	Ö	12	0.5-5						
24	0	-6	3	0.5-5						
24	0	-6	6	0.5-5						
24	0	-6	12	0.5-5						
24	10L	0	3	0.5-5						
24	10L	0	6	0.5-5						
24	10L	0	12	0.5-5						
24	10L	-6	3	0.5-5						
24 24	10L 10L	-6 -6	6 12	0.5-5		-				
	IUL	-0	12	0.5-5		L				

Table B29: Guardrail Use Guidelines for Urban LC, Benefit-Cost Greater Than 3

Moderately Severe Point Hazard			ırd	Range of Traffic Volumes Where Barrier is Optimal					
Hazard	Curvature	Grade	Offset to	No Treatment	TL-2	TL-3	TL-4	TL-5	
Offset 5	0	% 0	Slope 3	0.5-0.95	0.95-5	1000000			
5	Ö	Ö	6	0.5-0.95	0.95-5	+			
5	Ö	Ö	12	0.5-0.95	0.95-5	+			
5	Ö	-6	3	0.5-0.95	0.5-5	+	-	-	
5	0	-6	6						
5	0	-6	12		0.5-5				
	10L	0		0.5.5	0.5-5				
5			3	0.5-5					
5	10L	0	6	0.5-5					
5	10L	0	12	0.5-5					
5	10L	-6	3	0.5-5					
5	10L	-6	6	0.5-0.95, 3.2-5	0.95-3.2				
5	10L	-6	12	0.5-5					
8	0	0	3	0.5-1.4	1.4-5				
8	0	0	6	0.5-0.95	0.95-5				
8	0	0	12	0.5-1.4	1.4-5				
8	0	4	3		0.5-5				
8	0	-6	6	0.5-0.95	0.95-5				
8	0	-6	12	0.5-0.95	0.95-5				
8	10L	0	3	0.5-5					
8	10L	0	6	0.5-5					
8	10L	0	12	0.5-5					
8	10L	-6	3	0.5-5		-			
8	10L	-6	6	0.5-5					
8	10L	-6	12	0.5-5					
12	0	0	3	0.5-5		+			
12	0	0	6	0.5-2.3, 3.2-5	2.3-3.2				
12	0	0	12		2.3-3.2	-			
12	0	-6	3	0.5-5	115	-			
				0.5-1.4	1.4-5				
12	0	-6	6	0.5-1.4	1.4-5				
12	0	-6	12	0.5-1.4	1.4-5				
12	10L	0	3	0.5-5					
12	10L	0	6	0.5-5					
12	10L	0	12	0.5-5					
12	10L	φ	3	0.5-5					
12	10L	-6	6	0.5-5					
12	10L	-6	12	0.5-5					
18	0	0	3	0.5-5					
18	0	0	6	0.5-5					
18	0	0	12	0.5-5					
18	0	-6	3	0.5-5					
18	0	-6	6	0.5-5					
18	0	-6	12	0.5-5					
18	10L	0	3	0.5-5					
18	10L	0	6	0.5-5		1			
18	10L	0	12	0.5-5					
18	10L	-6	3	0.5-5		1			
18	10L	-6	6	0.5-5					
18	10L	-6	12	0.5-5					
24	0	ō	3	0.5-5		†			
24	ŏ	Ö	6	0.5-5		+			
24	ŏ	ő	12	0.5-5		+	<u> </u>	 	
24	0	-6	3	0.5-5		+			
24	0	-6	6	0.5-5		+		-	
24	0	-6 -6	12			+		-	
24				0.5-5		+			
	10L	0	3	0.5-5					
24	10L	0	6	0.5-5		1			
24	10L	0	12	0.5-5					
24	10L	-6	3	0.5-5					
24	10L	-6	6	0.5-5					
24	10L	-6	12	0.5-5					

Table B30: Guardrail Use Guidelines for Urban LC, Benefit-Cost Greater Than 3

Moderate	Point Hazaı			Range of Traffic Volumes Where Barrier is Optimal					
Hazard		Grade	Offset to						
Offset	Curvature	%	Slope	No Treatment	TL-2	TL-3	TL-4	TL-5	
5	0	0	3	0.5-5					
5	0	0	6	0.5-5					
5	0	0	12	0.5-5					
5	0	-6	3	0.5-5					
5 5	0	-6 -6	6 12	0.5-5					
5	10L	-6 0	3	0.5-5					
5	10L	0	6	0.5-5 0.5-5					
5	10L	Ö	12	0.5-5					
5	10L	-6	3	0.5-5					
5	10L	-6	6	0.5-2.3, 3.2-5	2.3-3.2				
5	10L	-6	12	0.5-5					
8	0	0	3	0.5-5					
8	0	0	6	0.5-5					
8	0	0	12	0.5-1.85, 3.2-5	1.85-3.2				
8	0	-6	3	0.5-5					
8	0	-6 -6	6 12	0.5-5					
8	10L	-6 0	3	0.5-5 0.5-5		 		 	
8	10L	0	6	0.5-5		<u> </u>			
8	10L	Ö	12	0.5-5					
8	10L	-6	3	0.5-5					
8	10L	-6	6	0.5-5					
8	10L	-6	12	0.5-5					
12	0	0	3	0.5-5					
12	0	0	6	0.5-5					
12	0	0	12	0.5-5					
12	0	-6	3	0.5-5					
12 12	0	-6 -6	6 12	0.5-5					
12	10L	0	3	0.5-5 0.5-5					
12	10L	0	6	0.5-5					
12	10L	Ö	12	0.5-5		1			
12	10L	-6	3	0.5-5					
12	10L	-6	6	0.5-5					
12	10L	-6	12	0.5-5					
18	0	0	3	0.5-5					
18	0	0	6	0.5-5					
18	0	0	12	0.5-5					
18 18	0	-6 -6	3 6	0.5-5					
18	0	-6 -6	12	0.5-5 0.5-5					
18	10L	0	3	0.5-5					
18	10L	0	6	0.5-5					
18	10L	0	12	0.5-5					
18	10L	-6	3	0.5-5					
18	10L	-6	6	0.5-5					
18	10L	-6	12	0.5-5					
24	0	0	3	0.5-5					
24	0	0	6	0.5-5					
24 24	0	0 -6	12 3	0.5-5		_			
24	0	-6	6	0.5-5 0.5-5					
24	0	-6	12	0.5-5		 		 	
24	10L	0	3	0.5-5					
24	10L	0	6	0.5-5					
24	10L	0	12	0.5-5					
24	10L	-6	3	0.5-5					
24	10L	-6	6	0.5-5					
24	10L	-6	12	0.5-5					