

Appendix C: Turn Lane Analysis



TURN LANE ANALYSIS

The major intersections throughout Garfield County (presented in Chapter VII) were evaluated in order to determine if turning lanes were needed at the intersections.

Turn Lane Analysis Methodology

The *Colorado State Highway Access Code* contains the State of Colorado requirements for regional highways classified as R-A. LSC used the *Colorado State Highway Access Code* to evaluate vehicle movements and determine which intersections would need turn lanes in the future based on the projected growth in Garfield County. The turn lane requirements were then used to determine which of the intersections presented in Chapter VII would be deficient in the year 2025.

According to the *Colorado State Highway Access Code* (Subsection 3.8), auxiliary turn lanes should be installed according to following criteria:

- (a) “A left-turn deceleration lane with taper and storage length is required for any access with a projected peak-hour left ingress turning volume greater than 10 vph. The taper length will be included within the required deceleration length.
- (b) A right-turn deceleration lane with taper and storage length is required for any access with a projected peak-hour right ingress turning volume greater than 25 vph. The taper length will be included within the required deceleration length.
- (c) A right-turn acceleration lane and taper length is required for any access with a projected peak-hour right-turning volume greater than 50 vph when the posted speed on the highway is greater than 40 mph.
- (d) Right-turn deceleration and acceleration lanes are generally not required on roadways with three or more travel lanes in the direction of the right turn except as provided in subsection 3.5.
- (e) A left-turn acceleration lane may be required if it would be a benefit to the safety and operation of the roadway or as determined by subsection 3.5. A left-turn acceleration lane is generally not required where the posted speed is less than 45 mph, or the intersection is signalized, or the acceleration lane would interfere with the left-turn ingress movements to any other access.”

According to the *Colorado State Highway Access Code* (Subsection 3.5), “The auxiliary lanes required in the category design standards may be waived when the 20th year predicted roadway volumes conflicting with the turning vehicle are below the following minimum volume thresholds. The right-turn deceleration lane may be dropped if the volume in the travel lane is predicted to be below 150 DHV. The left-turn deceleration lane may be dropped if the opposing traffic is predicted to be below 100 DHV. The right-turn acceleration lane may be dropped if the adjacent traveled lane is predicted to be below 120 DHV. The left-turn acceleration lane may be dropped if the volume in the inside lane in the direction of travel is predicted to be below 120 DHV.”

Tables 4-5 through 4-9 in the *Colorado State Highway Access Code* detail the design lengths for auxiliary lanes and taper rates for various posted speed limits.

Turn Lane Analysis Results

Table C-1 presents the turn lane analysis results for the intersections from Chapter VII based on the *Colorado State Highway Access Code* requirements. As shown in the table, 11 intersections would have to be improved with turn lanes based on the above methodology.

LSC assumed that a right-turn lane costs \$50,000 to \$100,000 including the cost for the corresponding acceleration and deceleration lanes. LSC assumed that a left-turn lane costs \$100,000 for each intersection. It was also noted that two of the intersections need both left- and right-turn lanes. The total future cost of the turn lane improvements at the 11 intersections is estimated at \$1.2 million.

Table C-1

Intersection	Existing Condition								Future Condition							
	Eastbound		Westbound		Northbound		Southbound		Eastbound		Westbound		Northbound		Southbound	
	Left Turn	Right Turn	Left Turn	Right Turn	Left Turn	Right Turn	Left Turn	Right Turn	Left Turn	Right Turn	Left Turn	Right Turn	Left Turn	Right Turn	Left Turn	Right Turn
Airport/Mamm Creek	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
Colorado River / Alkali Creek	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Colorado River / Bruce	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	Y
Colorado River / Divide Creek	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
Dry Hollow / Rifle-Silt	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Colorado River / Garfield Creek	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Rifle-Rulison / Airport	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Rifle-Rulison / Hunter Mesa	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Rifle-Rulison / Mamm Creek	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y
Rifle-Rulison / Village	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Rifle-Rulison / West Mamm Creek	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N
Thompson Creek / Hardwick Bridge	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
West Bank / Hardwick Bridge	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	Y

Source: LSC, 2005

The improvement costs for each intersections are shown in Table C-2. In addition to these improvements, cost have been included for signalization of one intersection and grade separation at CMC Road and SH 82 for a total cost of \$6.6 million.

Table C-2		
Intersection	Turn Lane	Cost
Airport/Mamm Creek	WL	\$89,000
Colorado River / Alkali Creek	WR	\$89,000
Colorado River / Bruce	SR	\$89,000
Colorado River / Divide Creek	WL	\$89,000
Dry Hollow / Rifle-Silt	WR	\$89,000
Rifle-Rulison / Hunter Mesa	WR	\$89,000
Rifle-Rulison / Mamm Creek	NL, SR	\$200,000
Rifle-Rulison / Village	WR	\$89,000
Rifle-Rulison / West Mamm Creek	ER-L,	\$200,000
Thompson Creek / Hardwick Bridge	WR	\$89,000
West Bank / Hardwick Bridge	SR	\$89,000
Total Cost		\$1,201,000
<i>Source: LSC, 2005</i>		