

SR 147 MP 7 TO MP 14 - Safety Evaluation

Project Number:	Unknown	Project Name:	SR 147	District:	1
Project Location: (Length)	SR 147 (Lake Mead Blvd) MP 7 to MP 14	County:	Clark	Design Stage:	Preliminary
Type of Analysis:	Pred. - IHSDM	Type of Facility:	2 Lane Rural – Major Collector	Analysis years:	2013-2033

SUMMARY

1.1 Project

The segment of SR 147 from MP 7 to MP 14 in Clark County has a particularly high level of fatalities for the annual average traffic volumes. Even with the low traffic volumes, there have been 35 crashes over the last five years of reported crashes. Out of the 35 crashes, six of these have been fatal. Four of the fatal crashes have occurred at the “hair pin” curve near MP 9.

1.2 Alternatives

The effect on traffic safety was analyzed for the following improvement alternatives:

1. Add a centerline rumble strip for the length of the project
2. Revise single curve at MP 9 per RSA recommendation (1,700-foot curve), includes shoulder and roadside improvements at location
3. Improving superelevation to bring into compliance with AASHTO recommendations, this work will only include curves that are out of superelevation compliance and improvement will require milling and replacement of pavement
4. Add a climbing lane for westbound traffic from Pabco Road (approx. MP 11.6) to the top of the hill (approx. MP 8.5), includes shoulder and roadside improvements along climbing lane
5. Revise both curves at MP 9 to meet a 60 mph design speed, includes shoulder and roadside improvements at location
6. Widen shoulders to 5-feet and improve roadside conditions for entire length of the project, includes adding shoulder rumble strips. No revision to horizontal and vertical roadway geometry were made.

1.3 Crash Prediction, Reduction and Benefit Cost Ratio

Using the Interactive Highway Safety Design Model (IHSDM) to complete the Highway Safety Model Predictive Method analysis, the safety improvements of each alternative were quantified and compared to the existing conditions of the highway for the 20-year evaluation period. Crash reduction table and corresponding Benefit Cost Ratio (BCR) table are provided below:

	2013 - 2033 Expected Total Number of Crashes						
	Existing Conditions	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
		CL Rumble Strip	RSA Curve at MP 9	Superelevation Improvements	Climbing Lane	New Reverse Curve at MP 9	Widen Shoulder to 5'
<i>Total</i>	90.17	84.76	85.59	89.11	75.93	84.38	65.43
<i>Reduction in Total Crashes over Existing Conditions</i>	N/A	5.41	4.58	1.06	14.24	5.79	24.74
<i>Crash Reduction Factor (CRF)</i>	N/A	6%	5%	1%	16%	6%	27%

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	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
	CL Rumble Strip	RSA Curve at MP 9	Superelevation Improvements	Climbing Lane	New Reverse Curve at MP 9	Widen Shoulder to 5'
<i>Total Alternative Cost</i>	\$65,693	\$1,474,704	\$945,031	\$5,696,473	\$2,357,871	\$12,126,998
<i>Total Annual Benefit including 2% Growth per year</i>	\$270,273	\$228,808	\$52,956	\$711,404	\$289,258	\$1,235,964
<i>Total Annualized Cost</i>	\$9,518	\$106,429	\$69,998	\$396,797	\$167,172	\$839,081
<i>Benefit-Cost Ratio</i>	28.40	2.15	0.76	1.79	1.73	1.47
<i>Average Annual Net Return</i>	\$260,755	\$122,380	(\$17,043)	\$314,607	\$122,086	\$396,883

1.4 Results

The BCRs above show that all but one alternative exceeds the general minimum BCR of 1.0. The IHSDM estimates approximately 90 crashes over 20-year period. The relatively low number of crashes has a high correlation with low AADT on SR 147. The AADT has decreased to approximately 1,500 vpd and 1,000 vpd for the two different count locations over the past few years. The growth of traffic on the corridor is calculated to increase at a 2.42% annually over the next 20 years. Due to the severity of the crashes, for this project, the benefits outweigh the costs. Alternative 1 has already been constructed. Alternatives 2, 4, 5, and 6 are all recommended for construction on SR 147 to improve safety. Selection of alternatives will be restricted to funds available for improvement.