

Hazard Elimination Project Evaluation

Project Log #'s 200502103 & 200502105

Hazard Elimination Projects W-2926 & W-2943

**Evaluation of Shoulder Guardrail Installation on US 64 from Macon County Line to Transylvania
County Line, Jackson County**

Documents Prepared By:

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Date

Hazard Elimination Project Evaluation Documentation

Subject Location

Evaluation of Hazard Elimination Projects W-2926 and W-2943 – Installation of shoulder guardrail on US 64 from Macon County Line to Transylvania County Line in Jackson County

Project Information and Background from the Project File Folder

The safety countermeasure chosen for the subject location was the installation of approximately 36,500 linear feet of shoulder guardrail. US 64 is a two-lane highway with shoulder widths of 3 feet and speed limit of 55 miles per hour. According to the project file, the alignment of the road is poor due to the mountainous terrain and a general deficiency in guardrail exists.

The initial crash analysis for this location was completed from January 1, 1989 through December 31, 1991 with a total of 124 reported crashes. The most prevalent crash pattern at the location was ran off road crashes, which make up 46 percent of the total crashes. The guardrail was installed to reduce the severity of the pattern of ran off road crashes. W-2926 was let in November of 1996 and was closed out in April of 1997 at an estimated cost of \$312,000. W-2943 was let in October of 1996 and was closed out in April of 1997 at an estimated cost of \$114,000.

Naïve Before and After Analysis

After reviewing the hazard elimination project file folder along with all the crashes at the subject locations, the crash data omitted from this analysis to consider for an adequate construction period was from October 1, 1996 through May 31, 1997. The before period consisted of reported crashes from January 1, 1990 through September 30, 1996 (6 Years, 9 Months) and the after period consisted of reported crashes from June 1, 1997 through February 28, 2004 (6 Years, 9 Months). The ending date for this analysis was determined by the available before period crash data.

The treatment data consisted of all crashes on the 11.97 strip of US 64 from Macon County Line to Transylvania County Line with a 0 foot y-line. Please see the attached *Location Map* for further detail.

The following table depicts the Naïve Before and After Analysis for the Total Crashes and Target Crashes at the treatment location. Please note that Ran Off Road crash types were the target crashes for the applied countermeasure. Ran Off Road crash types considered are as follows: Ran Off Road – Left, Ran Off Road – Right, Ran Off Road – Straight, Fixed Object, Head-on, Sideswipe – Same Direction, Sideswipe – Opposite Direction, and Overturn / Rollover.

<u>Treatment Information</u>	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	278	305	9.7%
Total Severity Index	7.44	5.2	-30.1%
Total Target Crashes	187	170	-9.1%
Target Severity Index	9.3	5.81	-37.5%
Volume	3,500	5,900	68.6%

<u>Target Crash Information</u>	Before	After	Percent Reduction (-)/ Percent Increase (+)
<i>Target Crashes - Injuries</i>			
Fatal Injury Crashes	3	0	-100.0%
Non-Fatal Injury Crashes	68	55	-19.1%
Total Injury Crashes	71	55	-22.5%
<i>Target Crashes - Contributing Factors</i>			
Night Crashes	72	52	-27.8%
Wet Crashes	63	51	-19.0%
<i>Target Crashes - Crash Types</i>			
Ran Off Road	132	45	-65.9%
Fixed Object	4	52	1200.0%
Sideswipe, Total	37	56	51.4%
Sideswipe, Same Direction	37	20	-45.9%
Sideswipe, Opposite Direction	0	36	N/A
Head On	13	1	-92.3%
Overturn / Rollover	1	16	1500.0%

The naïve before and after analysis at the treatment location resulted in a 10 percent increase in Total Crashes, a 9 percent decrease in Target Crashes, a 23 percent decrease in Target Injury Crashes, and a 69 percent increase in Average Daily Traffic (ADT). Further investigation shows there was a 30 percent decrease in Severity Index for Total Crashes and a 38 percent decrease in the Severity Index for Target Crashes. The before period ADT year was 1993 and the after period ADT year was 2000.

Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 10 percent increase in Total Crashes and a 9 percent decrease in Target Crashes. Further investigation shows that the Severity Index of Total Crashes and Target Crashes appear to have decreased 30 and 38 percent respectively using naïve methodologies. The summary results above demonstrate that the treatment location appears to have had a slight increase in Total Crashes, a slight decrease in Target Crashes and a significant decrease in the Severity Index from the before to the after period.

It should be noted that there was no specific information in the project file as to exactly where each run of guardrail was placed in this project. Therefore specific crash information for each run of

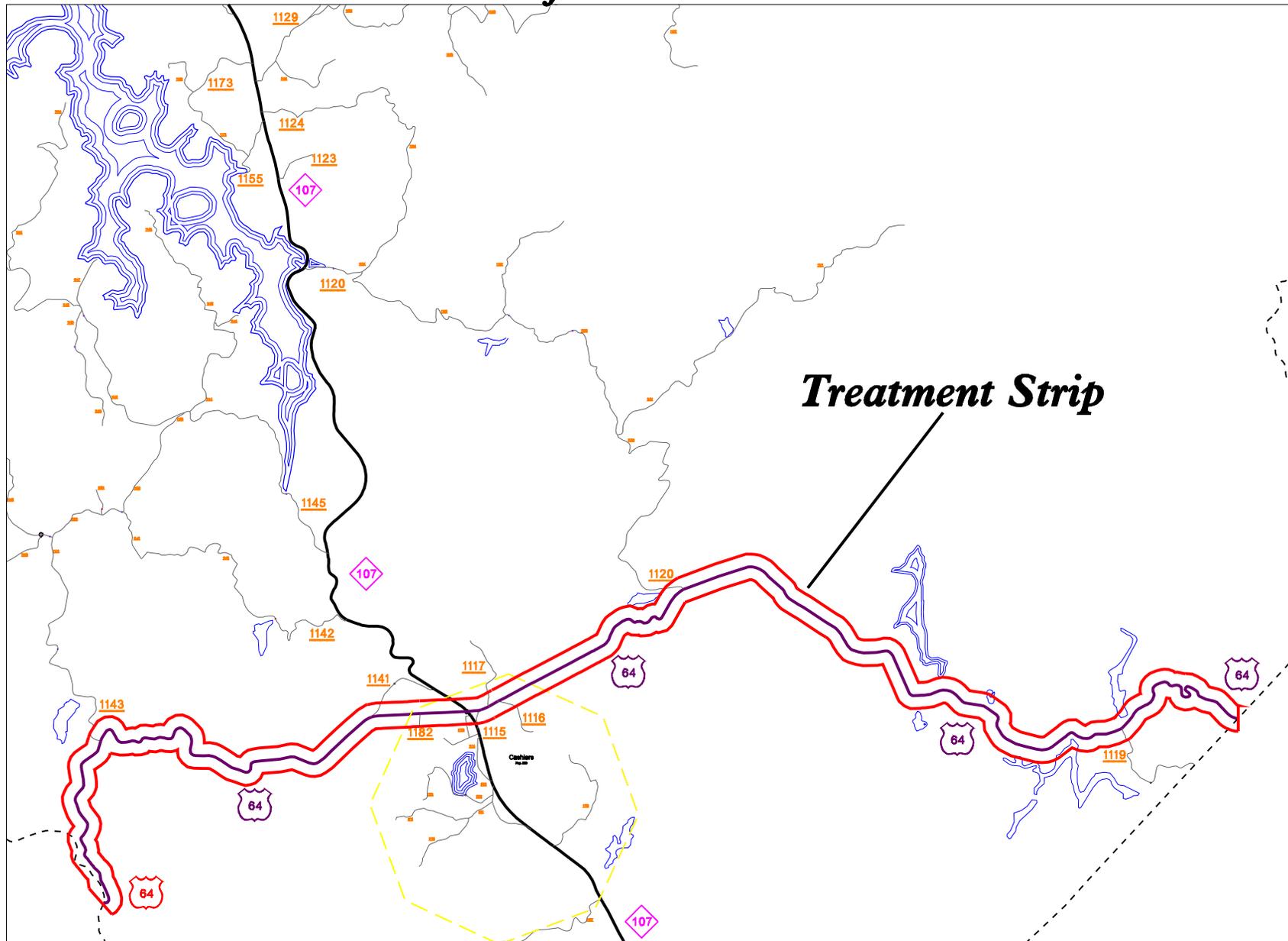
guardrail could not be analyzed. The site visit confirmed where guardrail exists along the segment today, but there was no way to determine where guardrail existed before the project.

Sideswipe crashes from the before to the after periods have increased by 51 percent. This increase could be due to drivers shying away from the shoulder guardrail and drifting out of their lane. The existing shoulders on this section are approximately 3 feet according to the project file folder. This would require that the guardrail be placed fairly close to the travel lanes due to the existing design constraints. It should be noted that there was no crash type for “Sideswipe, Opposite Direction” on crash reports before year 2000. This would explain the dramatic increase shown for this particular crash type. The “Sideswipe, Total” category is more appropriate for before and after comparisons.

Typically, one would expect guardrail installation projects to result in an increased number of Ran Off Road Crashes and a decrease in the severity of Ran Off Road crashes. The increase in Ran Off Road Crashes is expected due to the placement of a fixed object (guardrail) near the travel way. The decrease in the severity of Ran Off Road Crashes is expected due to the guardrail being more forgiving than the object it is protecting. The results from this project seem to be in concurrence with the above-mentioned expectations except for the slight decrease in the number of Ran Off Road Crashes. It may be beneficial to explore the possibility of placing countermeasures such as centerline or shoulder rumble strips to prevent drivers from leaving the roadway. This may help to decrease further the substantial number of Ran Off Road Crashes.

Please see the attached Treatment Site Photos for additional visual information. As the Safety Evaluation Group completes additional reviews for this type of countermeasure, we will be able to provide more objective and definite information regarding actual crash reduction factors.

Location Map, Jackson County Evaluation of W-2926 and W-2943



Treatment Strip: US 64 From Macon County Line to Transylvania County Line

Treatment Site Photos (Taken on May 3, 2006)



Driving West on US 64



Driving West on US 64

Treatment Site Photos (Taken on May 3, 2006)



Driving West on US 64

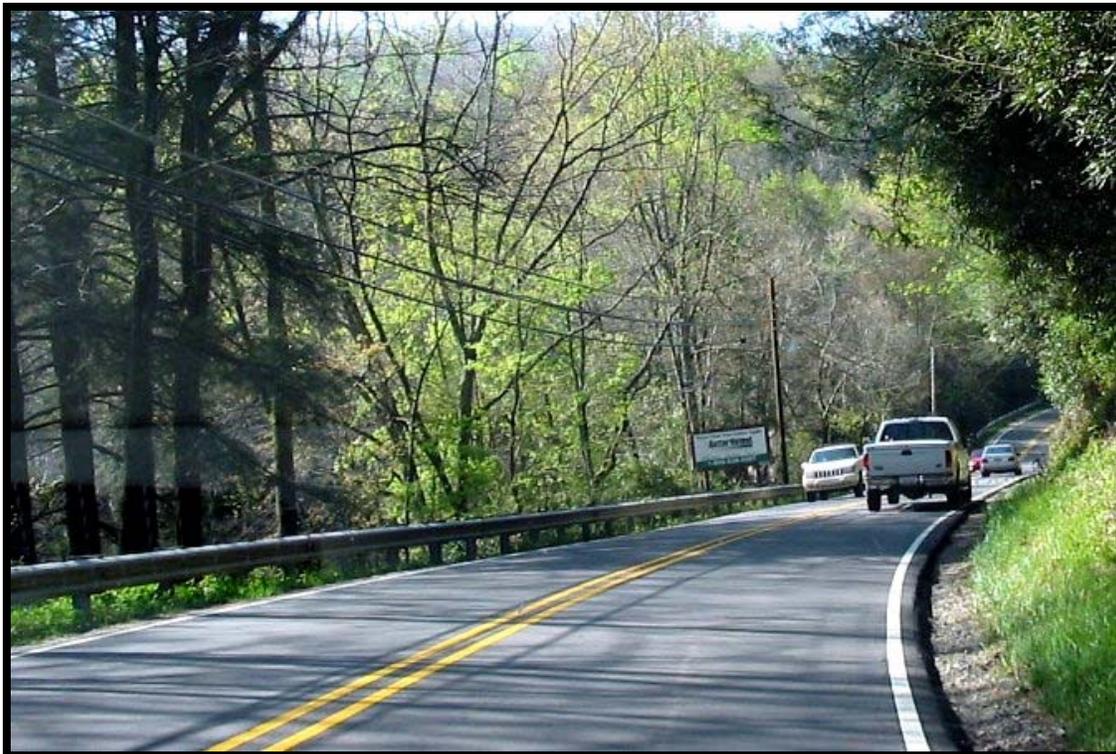


Driving West on US 64

Treatment Site Photos (Taken on May 3, 2006)



Driving West on US 64



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