

Spot Safety Project Evaluation

Order # 41000025912

Spot Safety Project # 12-07-200

**Spot Safety Project Evaluation of the Guardrail Installation on Both Approaches to
Bridge #182 on SR 2171 (Jane Sowers Rd) over I-77
Iredell County**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Transportation Mobility and Safety Division
North Carolina Department of Transportation

Principal Investigator



Justin Green

11-6-2013

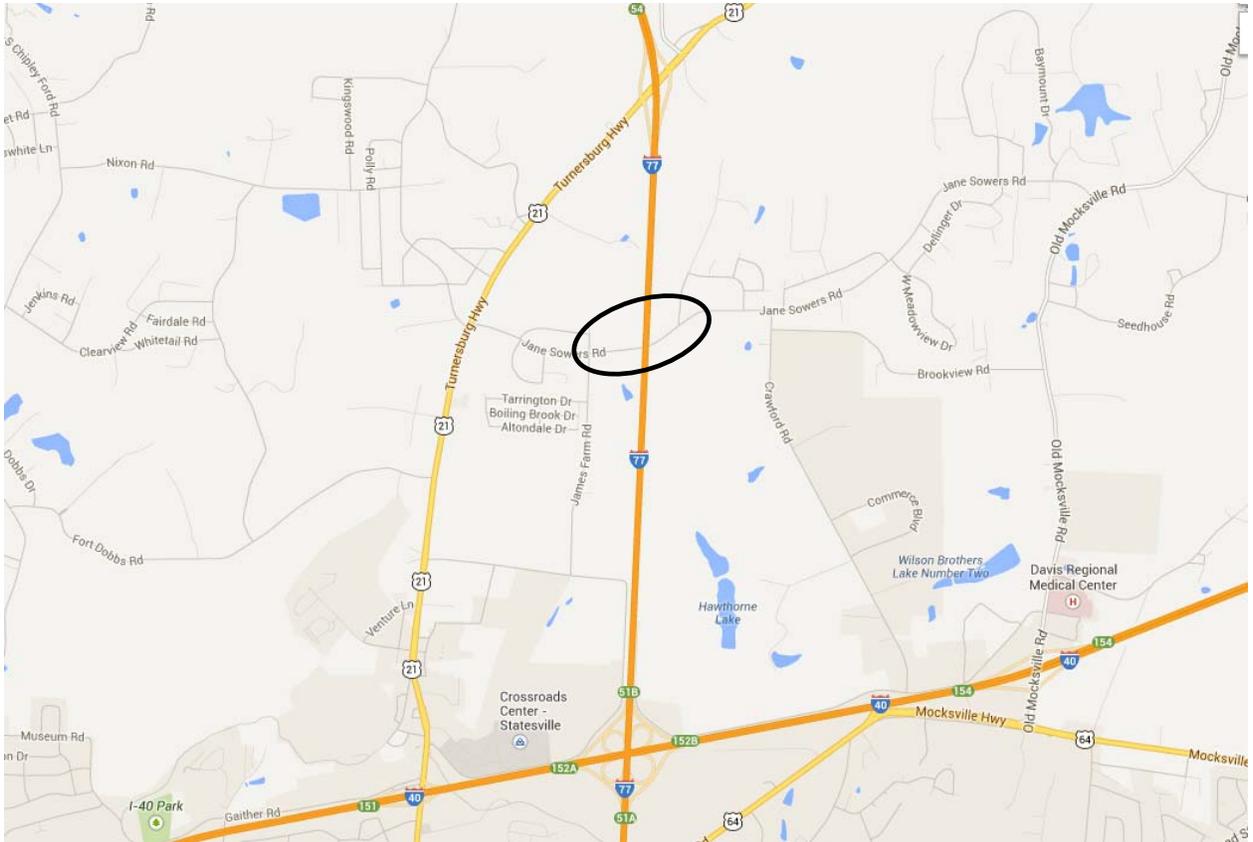
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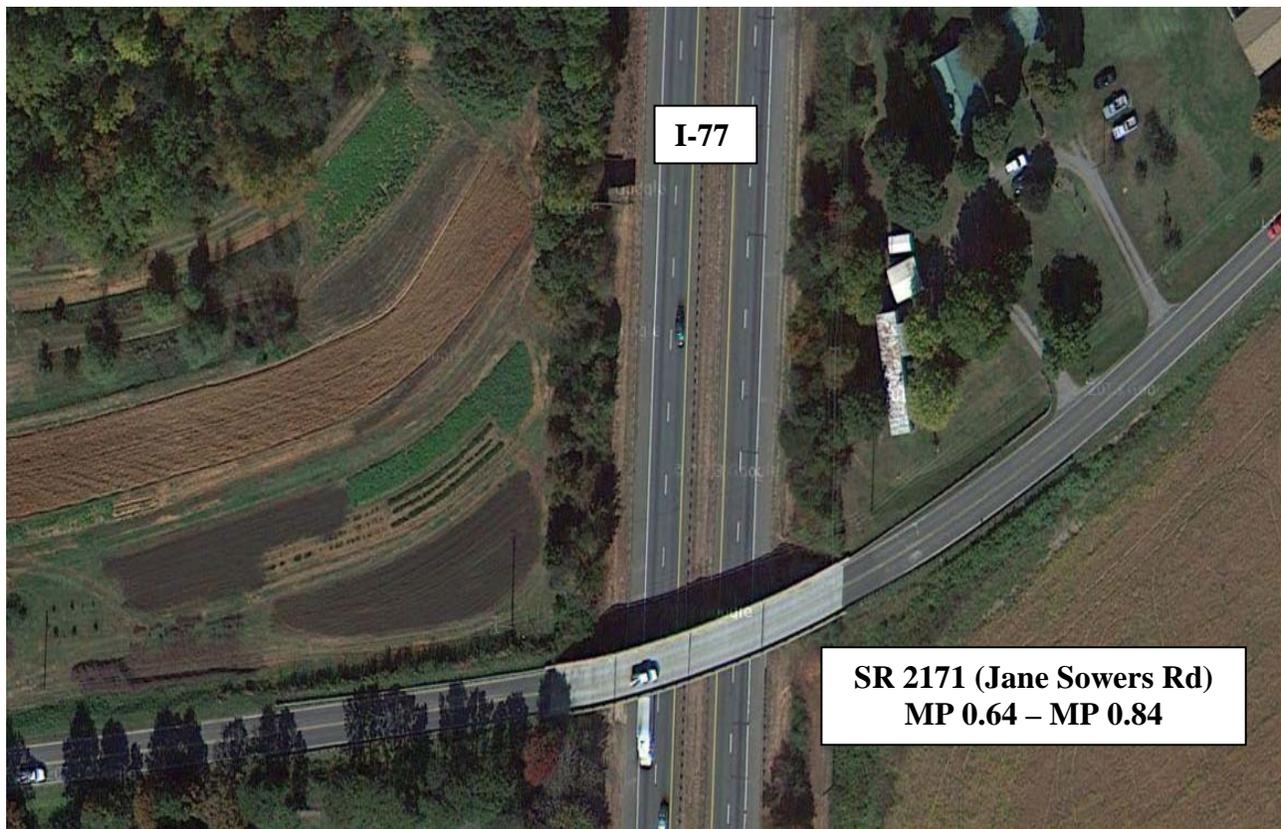
Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 12-07-200 located at the approaches to Bridge #182 on SR 2171 (Jane Sowers Rd) over I-77 in Iredell County. The project study limits are from MP 0.64 to MP 0.84.





Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject segment was to upgrade the existing guardrail to current design standards. These improvements were completed on both bridge approaches. SR 2171 is a two-lane facility with a 45-mph posted speed limit. The study area range is from milepost 0.64 to 0.84.

The original statement of problem stated that this project will upgrade existing guardrail to current standards and provide new guardrail for other approaches. This location was listed on the 2005 HSIP with PH# 48B00015 and the 2006 TIP as I-2514.

The initial crash analysis was completed from August 1, 1996 to July 31, 2006 with seventeen (17) reported crashes. The final completion date for the improvement at the subject intersection was on February 28, 2008 with a total cost of \$14,000.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period were the months of January 2008 through March 2008. The before period consisted of reported crashes from October 1, 2002 through December 31, 2007 (5 years and 3 months); and the after period consisted of reported crashes from April 1, 2008 through June 30, 2013 (5 years and 3 months). The ending date for this analysis was determined by the date of available crash data at the time of analysis.

The treatment data consisted of all crashes eastbound and westbound with a 0 foot y-line of the subject roadway segment. *Please see attached location map, aerial map, and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Lane Departure Crashes were the target crashes for the applied countermeasure. The Lane Departure Crash types considered are as follows: Ran-Off Road (right, left, straight); Jackknife; Overturn/Rollover; Fixed Object; Moveable Object; Parked Motor Vehicle; Head-On; and Sideswipe (opposite and same direction). The Lane Departure crashes shown in this evaluation were independently reviewed and selected based from the crash report diagram and information.

Total Treatment Information	Before 5 Years 3 Mos	After 5 Years 3 Mos	Percent Reduction (-) Percent Increase (+)
Total Crashes	9	4	- 55.6 %
Total Severity Index	5.11	4.70	- 8.02 %
Target Crashes – Lane Departure	8	4	- 50.0 %
Lane Departure Crash Severity Index	5.62	4.70	- 16.4 %
Volume (2005, 2010)	2,700	2,600	-3.7 %

<u>Crash Severity Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal Crashes	0	0	N/A
Class A Crashes	0	0	N/A
Class B Crashes	2	0	- 100.0 %
Class C Crashes	3	2	- 33.3%
Property Damage Only	4	2	- 50.0 %
Total Crashes	9	4	- 55.6 %

The naive before and after analysis at the treatment location resulted in a 56 percent decrease in Total Crashes, a 50 percent decrease in Target Crashes, and an 8 percent reduction in the Total Severity Index. The target Lane Departure Crash Severity Index experienced a 16 percent reduction. The before period ADT year was 2005 and the after period ADT year was 2010.

The original study showed a significant number of collisions involving wet/icy roadways. A further breakdown of wet/ice related crashes are displayed below.

Road Condition Crash Information	Before 5 Years 3 Mos	After 5 Years 3 Mos	Percent Reduction (-) Percent Increase (+)
Total Wet/Ice Roadway Crashes	3	1	-66.7 %
Total Dry Roadway Crashes	6	3	-50.0 %

Results and Discussion

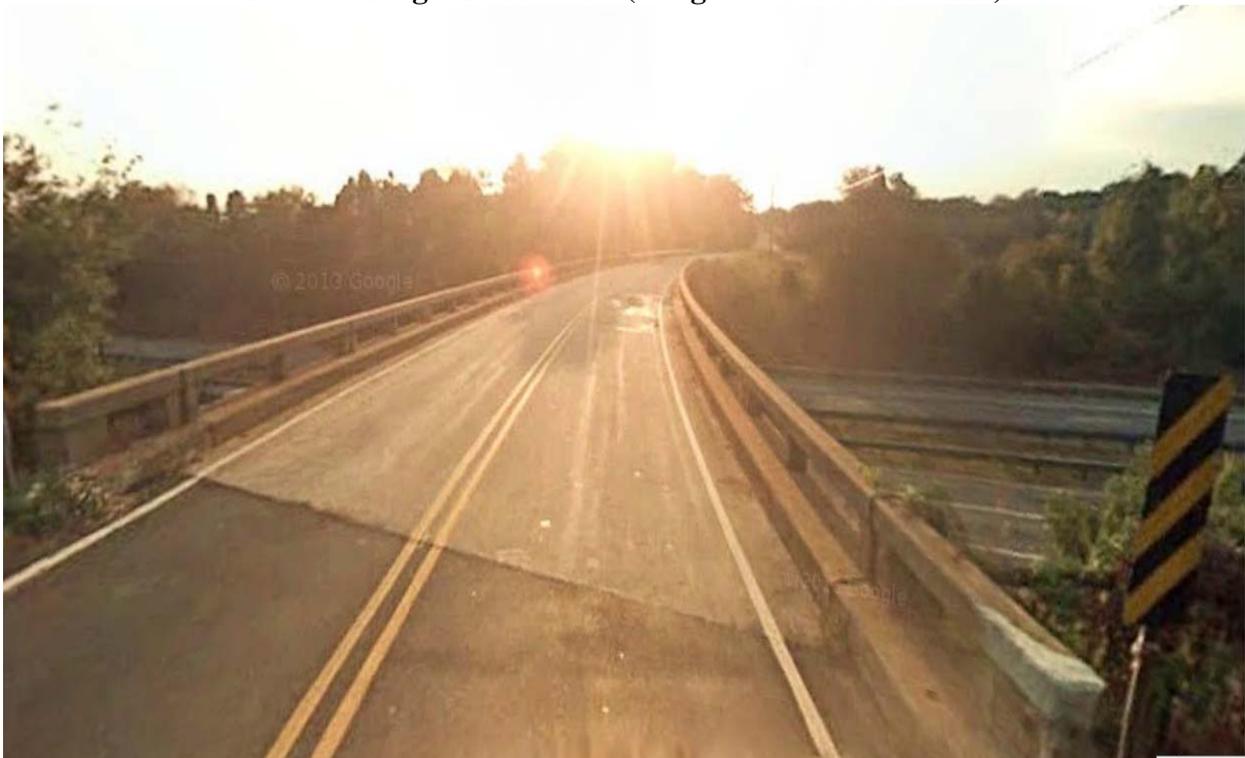
Referencing the *Collision Diagrams*, the before period presented a pattern of lane departure crashes located in close vicinity of the bridge and bridge approaches. The crash reports indicate a majority of the vehicles are running off the road to the left or right striking the guardrail and/or the bridge rail. The collision diagrams and the tables both indicated an overall reduction in lane departure crashes along this bridge and its approaches in the after period.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of countermeasure.

Location Photographs



SR 2171 (Jane Sowers Rd) Eastbound Bridge Approach
Source: Google Street View (Image Date: October 2007)



SR 2171 (Jane Sowers Rd) Westbound Bridge Approach
Source: Google Street View (Image Date: October 2007)

SS# 12-07-200
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 Iredell County
 BEFORE Period
 10/1/2002 - 12/31/2007



LEGEND

I-77

SR 2171
 (Jane Sowers Rd)

Bridge

ADT (2005)
 2,700

Guardrail

Begin
 Study
 MP 0.64

End
 Study
 MP 0.84

Note Crash #6: Vehicle hit patch of ice and spun in a circle. Vehicle went off roadway to the right.

Lane Departure
 Target Crashes

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRANSPORTATION MOBILITY and SAFETY DIVISION

TRAFFIC SAFETY UNIT

Date: 8-26-2013

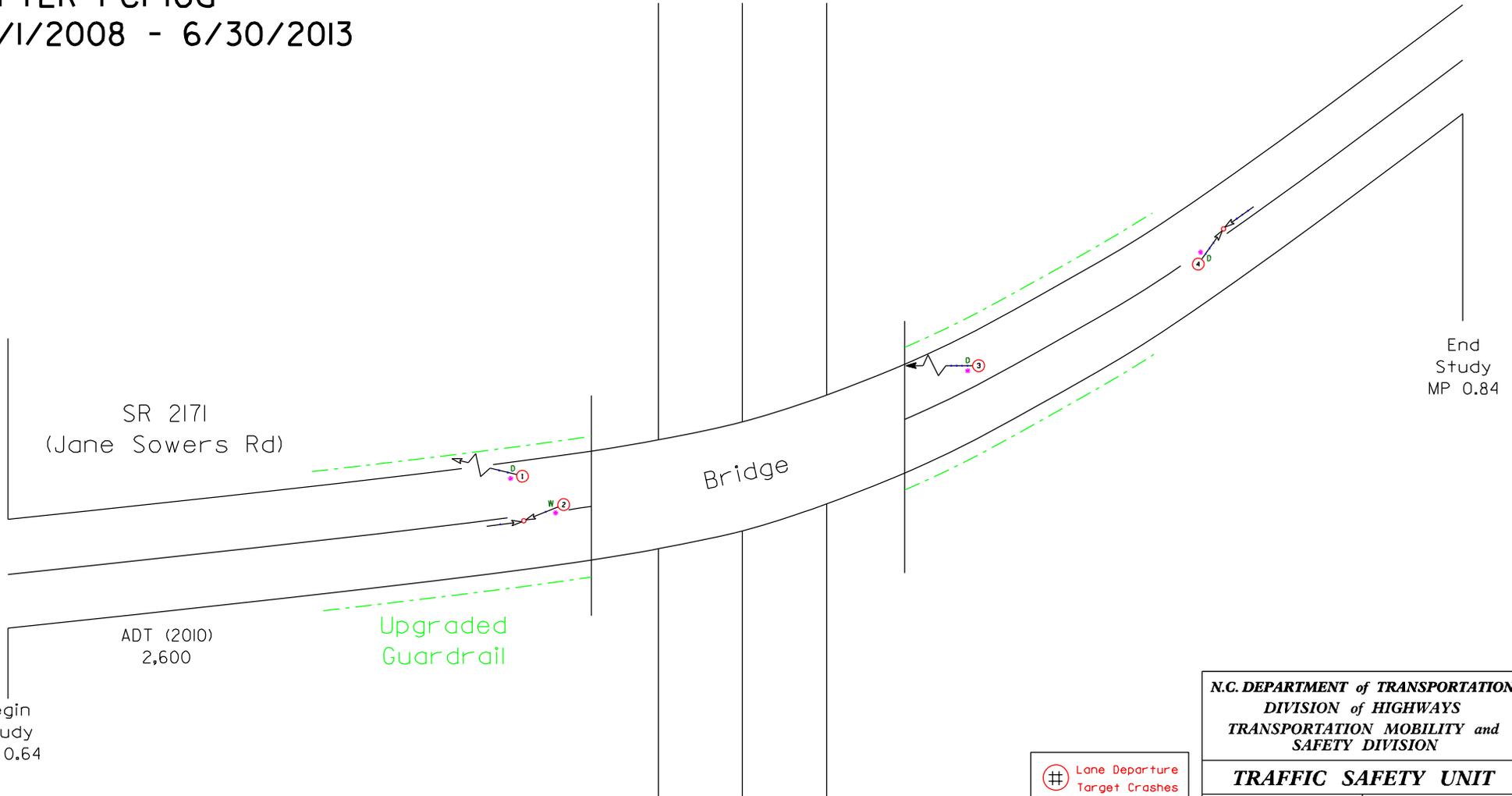
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SS# 12-07-200
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 Iredell County
 AFTER Period
 4/1/2008 - 6/30/2013

I-77



LEGEND			



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Lane Departure
 Target Crashes