

Spot Safety Project Evaluation

Order # 41000023023

Spot Safety Project # 12-06-205

Spot Safety Project Evaluation of the 2-Foot Paved Shoulder Installation NC 274 (Union Road) from the South Carolina Line to SR 2435 Gaston County

Documents Prepared By:

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7-31-2013

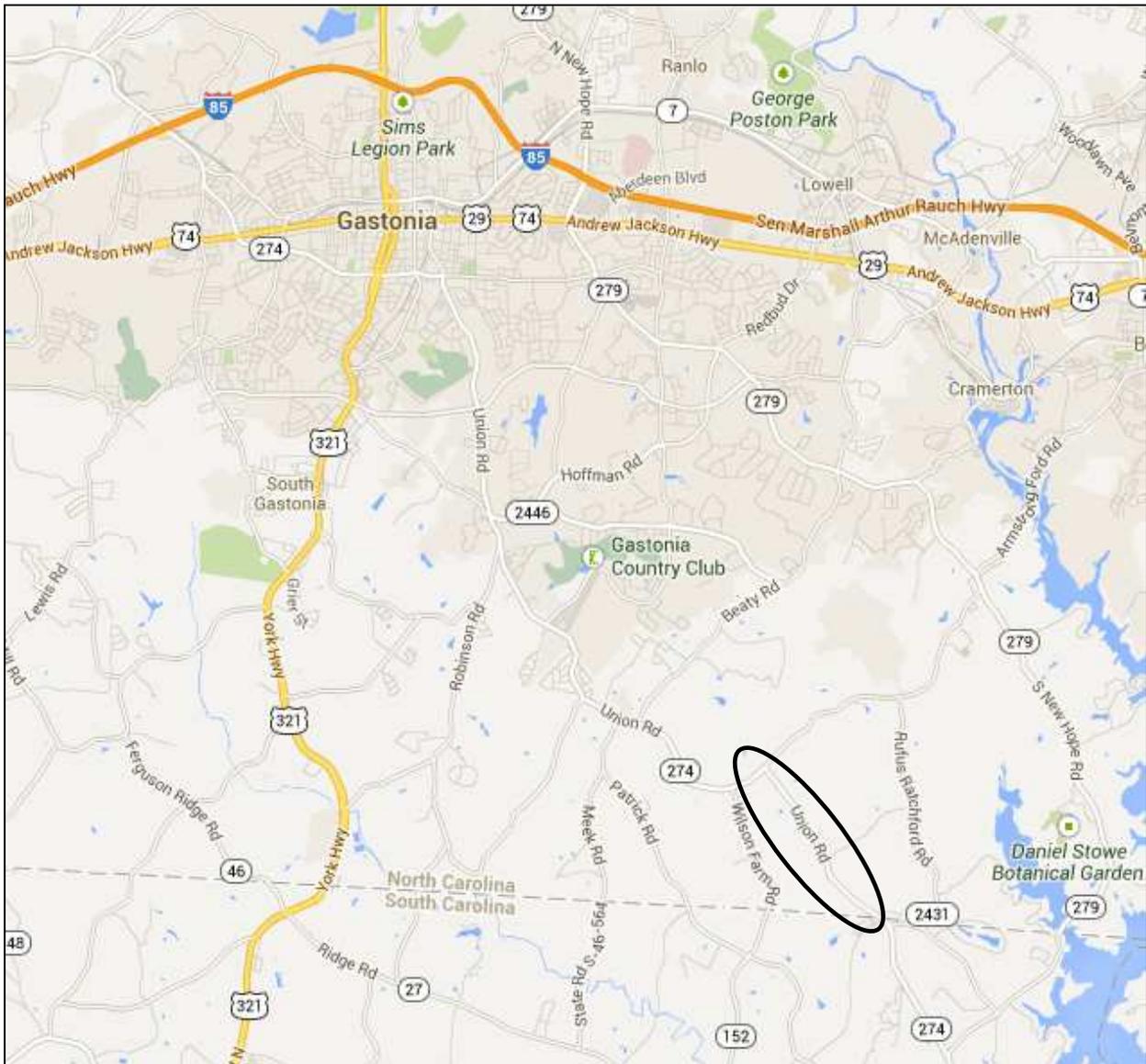
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 12-06-205 located along the route of NC 274 (Union Road) from the South Carolina State Line to SR 2435 (Union-New Hope Road) in Gaston County, south of the City of Gastonia. The limits of the study are from NC 274 Milepost 0.00 (SC State Line) to Milepost 2.107 (SR 2435).



Base Map Overview – Google Maps



Aerial Map – Google Maps (South of SR 2430-Ratchford Drive)

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation 2-foot paved shoulders on both roadway shoulders by roadway widening. NC 274 is a two-lane roadway with an average before period pavement width of 21-feet. The subject roadway section has approximately ten (10) intersections, many residential driveways, and a speed limit of 45-mph.

The original statement of problem concluded that this section was experiencing significant lane departure crashes involving serious injury and fatal injury crashes. The intended purpose of the countermeasure was to improve safety by providing motorists with additional pavement for corrective driving maneuvers.

The initial crash analysis was completed from July 1, 2001 to June 30, 2006 with forty-two (42) reported crashes, thirty (30) of which were deemed correctable including two (2) fatality crashes. The final completion date for the improvement at the subject intersection was on September 29, 2008 with a total cost of \$250,000.

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 July through September 2008. The before period consisted of reported crashes from December 1, 2003 through June 30, 2008 (4 years and 7 months); and the after period consisted of reported crashes from October 1, 2008 through April 30, 2013 (4 years and 7 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 within the NC-274 Milepost Range of 0.00 to 2.170 with a 0-foot y-line of the subject roadway. *Please see attached location map, aerial map, and photo 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 Roadway (Left, Right, and Straight); Sideswipe (Opposite Direction); Fixed Object; Overturn/Rollover; and Head-on.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	40	26	- 35.0 %
Total Severity Index	10.80	3.85	- 64.4 %
Target Crashes	21	9	- 57.1 %
Target Crash Severity Index	17.90	3.47	- 80.6 %
Volume (2006, 2011)	4,300	4,500	4.7 %
Total Crash Rate (100 Mil Vehicle Miles)	263.74	163.91	- 37.9 %
Fatal Crash Rate (100 Mil Vehicle Miles)	13.19	0.00	- 100.0 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	2	0	- 100.0 %
Class A injury Crashes	2	0	- 100.0 %
Class B injury Crashes	6	3	- 50.0 %
Class C Injury Crashes	6	7	16.7 %
Property Damage Only	24	16	- 33.3 %

The naive before and after analysis at the treatment location resulted in a 35 percent reduction in Total Crashes, a 57 percent reduction in Lane Departure Target Crashes, and a 65 percent reduction in the Total Severity Index. The before period ADT year was 2006 and the after period ADT year was 2011.

Results and Discussion

Referencing the *GIS Collision Diagrams*, the before period presented fourteen (14) lane departure crashes from the South Carolina State Line to SR 2430 (Ratchford Drive) including two fatalities and two A-injury crashes, which is a 0.93 mile segment. After the paved shoulders, this strip experienced four (4) lane departure collisions which were all PDO collisions.

The overall segment experienced a 57 percent reduction in target lane departure collisions and a significant 81 percent reduction in the target severity index. The roadway segment has benefited greatly in both the reduction of quantity and severity of crashes from the before to the after period.

Please see the attached *Treatment Site Photos*. A photo is provided from Google Street View for the after period of the treatment section showing the 2-foot paved shoulders. 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.

Treatment Site Photos



**Looking North on NC 274 – South of SR 2430 (Ratchford Drive)
Showing After Period Paved Shoulders
Google Maps – May 2012 Photo**

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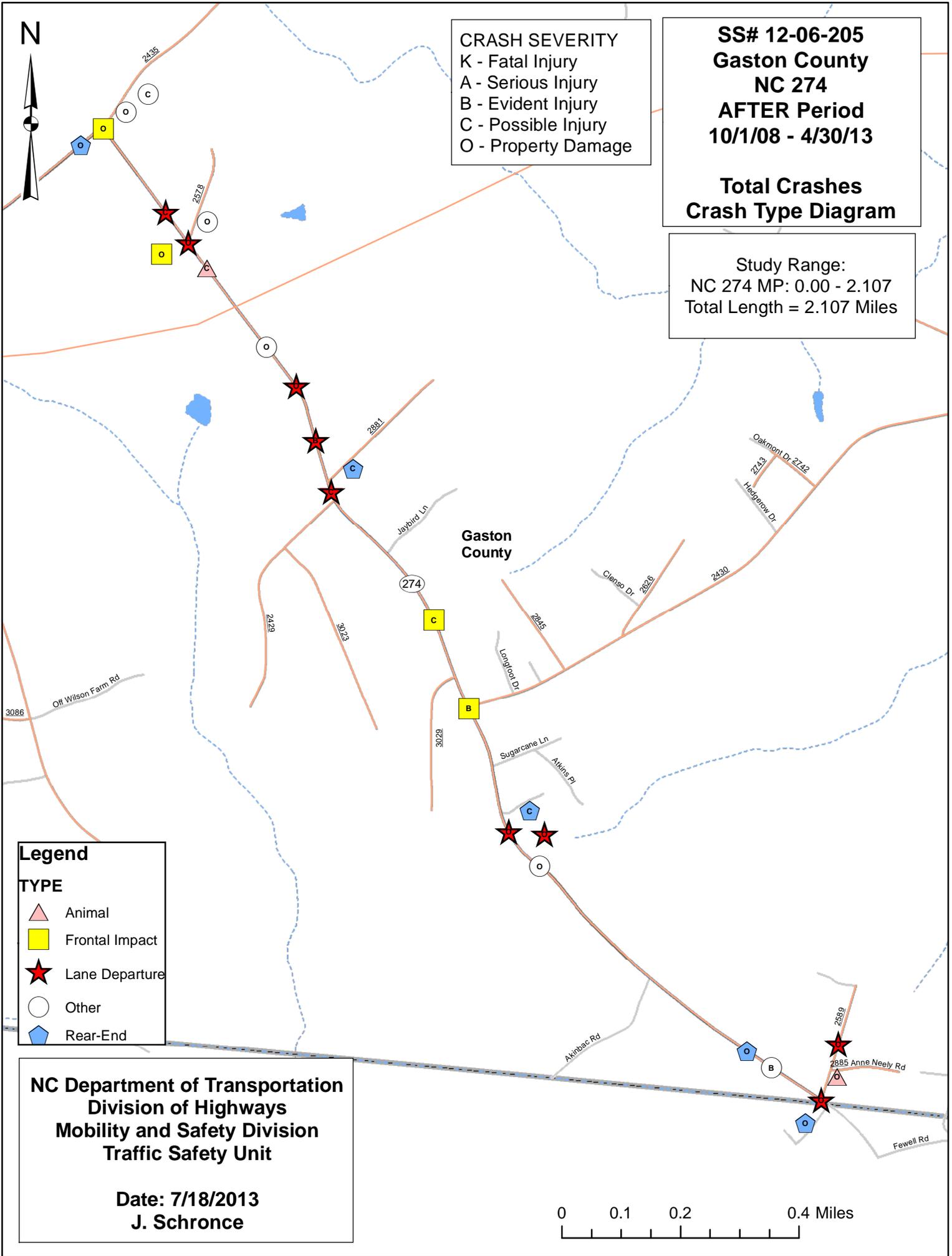
CRASH SEVERITY

- K - Fatal Injury
- A - Serious Injury
- B - Evident Injury
- C - Possible Injury
- O - Property Damage

SS# 12-06-205
Gaston County
NC 274
AFTER Period
10/1/08 - 4/30/13

Total Crashes
Crash Type Diagram

Study Range:
 NC 274 MP: 0.00 - 2.107
 Total Length = 2.107 Miles



Legend

TYPE

- Animal
- Frontal Impact
- Lane Departure
- Other
- Rear-End

NC Department of Transportation
Division of Highways
Mobility and Safety Division
Traffic Safety Unit

Date: 7/18/2013
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