

# Spot Safety Project Evaluation

Order # 41000025103

Spot Safety Project # 12-07-205

**Spot Safety Project Evaluation of the Overhead Flasher Installation  
SR 1006 (Oxford School Rd) at SR 1709 (Rockbarn Rd)  
Catawba County**

Documents Prepared By:

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

**Principal Investigator**



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Justin Green

6-26-2013  
Date

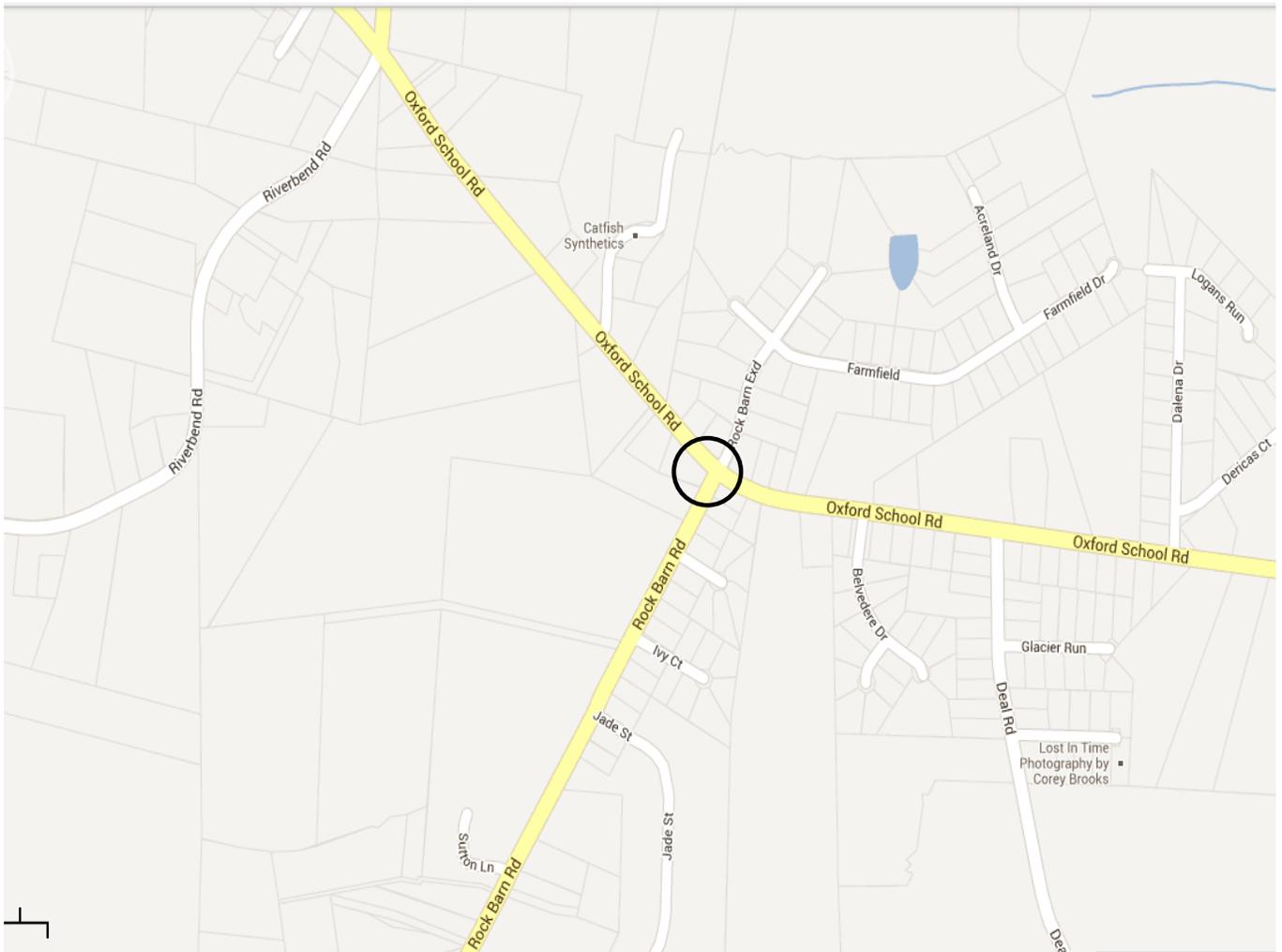
Traffic Safety Project Engineer

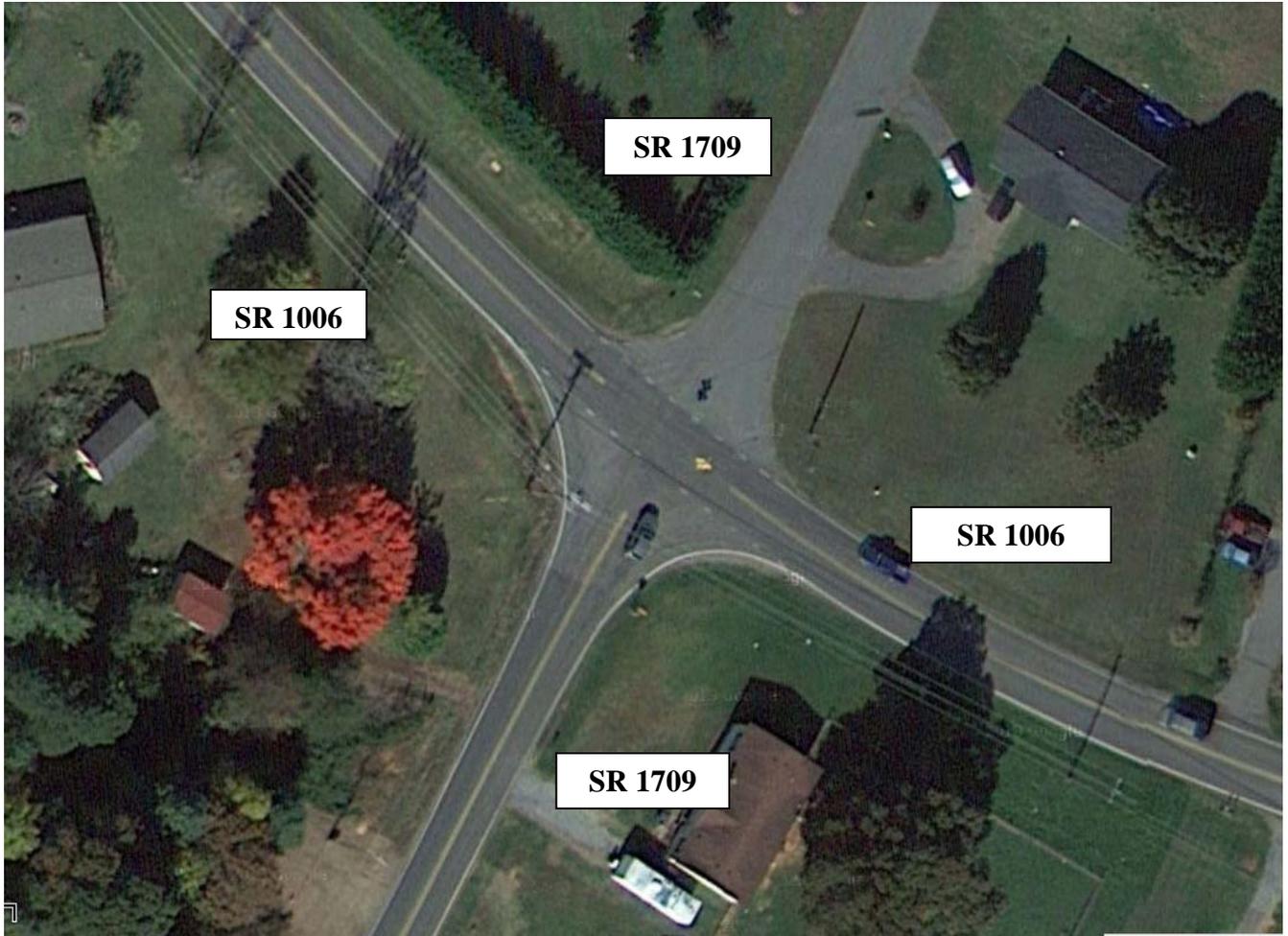
# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 12-07-205 located at the Intersection SR 1006 (Oxford School Rd) at SR 1709 (Rockbarn Rd) in Catawba County.

The Sig ID is 12-1751 for this installed Overhead Flasher.





**Aerial Provided from Google Maps**

### **Project Information and Background from the Project File Folder**

The spot safety project improvement countermeasure chosen for the subject location was the installation of an overhead flasher traffic signal.

SR 1006 and SR 1709 are both two-lane facilities. The posted speed limit for SR 1006 is 45 mph. The southern leg of SR 1709 has a posted speed limit of 45 mph and the northern leg is 35 mph with no outlet 1150 feet north of studied intersection. The subject location is a four-leg crossroads intersection, which is controlled by dual mounted stop signs on the SR 1709 approaches.

The original statement of problem was the existence of a significant angle crash pattern. The initial crash analysis was completed from July 1, 2001 to June 30, 2006 with nineteen (19) reported crashes. The final completion date for the improvement at the subject intersection was on September 3, 2008 with a total cost of \$27,000.00.

## 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 March and April 2008. These dates were determined due to crash reports reflecting the countermeasure being operational prior to final inspection date of September 3, 2008. The before period consisted of reported crashes from March 1, 2003 through February 28, 2008 (5 years); and the after period consisted of reported crashes from May 1, 2008 through April 30, 2013 (5 years). 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 150 feet of the subject intersection for the SR 1006 and SR 1709 approaches. *Please see attached location map and aerial map for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash Types considered are as follows: Left-turn, same roadway; left-turn, different roadways; Right-turn, same roadway; Right-turn, different roadways; Head-on; and Angle.

<b><u>Treatment Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	19	6	- 68.4 %
Total Severity Index	9.66	3.47	- 64.1 %
Target Crashes	13	5	- 61.5 %
Target Crash Severity Index	11.38	3.96	- 65.2 %
Volume (2005, 2010)	5,800	5,900	+ 1.7 %

<b><u>Injury Crash Summary</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	- 100.0 %
Class B injury Crashes	3	0	- 300.0 %
Class C Injury Crashes	9	2	- 77.8 %
Property Damage Only	6	4	- 33.3 %

The naive before and after analysis at the treatment location resulted in a 68 percent reduction in Total Crashes and a 64 percent reduction in the Total Severity Index. The before period ADT year was 2005 and the after period ADT year was 2010. It should be noted that the Northern leg of SR 1709 was estimated to be 390 based on the number of houses this leg serves.

To further analyze the intersection crash patterns, the following chart shows different traffic movements and the change in crash totals through the study:

<u>Additional Information</u>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Northbound SR 1709 Angle (Target)	9	1	- 88.9 %
Southbound SR 1709 Angle (Target)	1	2	+ 100.0 %
Northbound SR 1709 Left Turn (Target)	2	0	- 200.0 %
Total Intersection Angle (Target)	10	3	- 70.0 %
Total Intersection Left & Right Turn (Target)	3	2	- 33.3 %

## **Results and Discussion**

Referencing the *Collision Diagrams*, the Northbound SR 1709 target crashes experienced an 89 percent reduction in angle type roadway collisions. From the additional information chart above, the Southbound SR 1709 target crashes experienced an increase of 100 percent, with two crashes in the after period and one crash in the before period. The Northbound SR 1709 Left Turn crash type shows a 200 percent reduction in crashes. There were two crashes in the before period and none in the after period.

Overall target frontal impact crashes were reduced from thirteen (13) total crashes during the before period to five (5) total crashes in the after period. This evaluation displays a 62 percent reduction in total target frontal impact crashes at the intersection of SR 1006 at SR 1709 in Catawba County.

The Angle frontal impact crash type reflects a 70 percent reduction in the after period. The Left and Right Turn frontal impact crash type reflects a 33 percent reduction in the after period.

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all four approaches to the treatment intersection. 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 intersection.

**Treatment Site Photos from Google Street View**



**Google Maps (May 2009) – Looking North on SR 1709 Approach**



**Google Maps (May 2009) – Looking South on SR 1709 Approach**



**Google Maps (May 2009) – Looking East from SR 1006 Approach**



**Google Maps (May 2009) – Looking West from SR 1006 Approach**

SS# 12-07-205  
 Order# 41000025103  
 Catawba County  
 BEFORE Period  
 3/1/03 - 2/28/08

SR 1709 (Rockbarn Rd Ext.)  
 35 MPH  
 ADT (Year)  
 390 est. (2005)

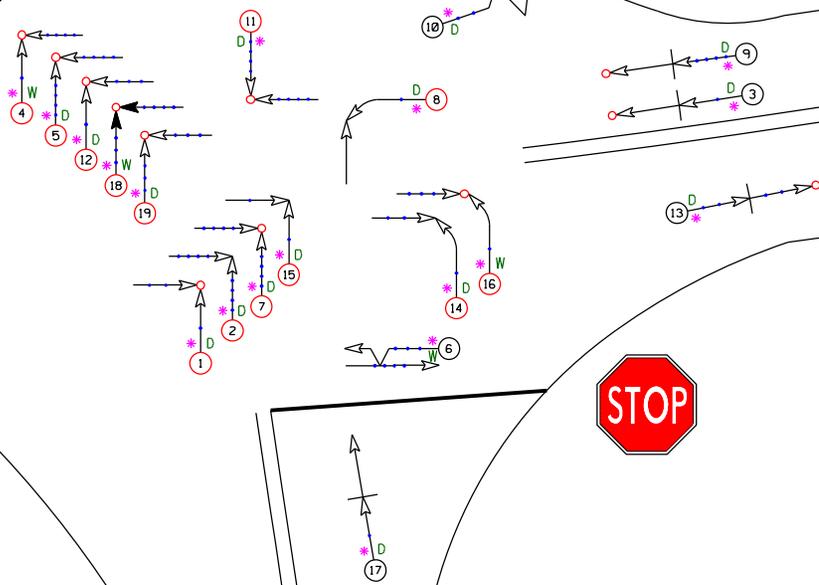
LEGEND							
	MOVING VEHICLE		ANGLE		5 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		TURNING		20 MPH TO 29		DRIVER AT FAULT
	PARKING VEHICLE		TURNING		30 MPH TO 39		DRY
	FIXED OBJECT		TURNING		40 MPH TO 49		WET
	HEAD ON		TURNING		50 MPH TO 59		ICY OR SNOWY
	REAR END		TURNING		60 MPH TO 69		ONLY
	RAN OFF ROAD		TURNING		TO AND UP		
			TURNING		70 MPH TO 79		
			TURNING		80 MPH TO 89		
			TURNING		90 MPH TO 99		
			TURNING		100 MPH TO 109		
			TURNING		110 MPH TO 119		
			TURNING		120 MPH TO 129		
			TURNING		130 MPH TO 139		
			TURNING		140 MPH TO 149		
			TURNING		150 MPH TO 159		
			TURNING		160 MPH TO 169		
			TURNING		170 MPH TO 179		
			TURNING		180 MPH TO 189		
			TURNING		190 MPH TO 199		
			TURNING		200 MPH TO 209		
			TURNING		210 MPH TO 219		
			TURNING		220 MPH TO 229		
			TURNING		230 MPH TO 239		
			TURNING		240 MPH TO 249		
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			TURNING		270 MPH TO 279		
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			TURNING		290 MPH TO 299		
			TURNING		300 MPH TO 309		
			TURNING		310 MPH TO 319		
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			TURNING		610 MPH TO 619		
			TURNING		620 MPH TO 629		
			TURNING		630 MPH TO 639		
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			TURNING		670 MPH TO 679		
			TURNING		680 MPH TO 689		
			TURNING		690 MPH TO 699		
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			TURNING		710 MPH TO 719		
			TURNING		720 MPH TO 729		
			TURNING		730 MPH TO 739		
			TURNING		740 MPH TO 749		
			TURNING		750 MPH TO 759		
			TURNING		760 MPH TO 769		
			TURNING		770 MPH TO 779		
			TURNING		780 MPH TO 789		
			TURNING		790 MPH TO 799		
			TURNING		800 MPH TO 809		
			TURNING		810 MPH TO 819		
			TURNING		820 MPH TO 829		
			TURNING		830 MPH TO 839		
			TURNING		840 MPH TO 849		
			TURNING		850 MPH TO 859		
			TURNING		860 MPH TO 869		
			TURNING		870 MPH TO 879		
			TURNING		880 MPH TO 889		
			TURNING		890 MPH TO 899		
			TURNING		900 MPH TO 909		
			TURNING		910 MPH TO 919		
			TURNING		920 MPH TO 929		
			TURNING		930 MPH TO 939		
			TURNING		940 MPH TO 949		
			TURNING		950 MPH TO 959		
			TURNING		960 MPH TO 969		
			TURNING		970 MPH TO 979		
			TURNING		980 MPH TO 989		
			TURNING		990 MPH TO 999		
			TURNING		1000 MPH TO 1009		



SR 1006 (Oxford School Rd)  
 45 MPH  
 ADT (Year)  
 4,400 (2005)



NOTE Crash 10:  
 Vehicle Traveled Off The Roadway  
 and Collided With A Utility Pole



SR 1006 (Oxford School Rd)  
 45 MPH  
 ADT (Year)  
 4,400 (2005)



SR 1709 (Rockbarn Rd)  
 45 MPH  
 ADT (Year)  
 2,500 (2005)

⊕ Frontal Impact Crashes

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

**TRAFFIC SAFETY UNIT**

Date: 6-26-2013 Prepared By: J. Green

SS# 12-07-205  
 Order# 41000025103  
 Catawba County  
 AFTER Period  
 5/1/08 - 4/30/13

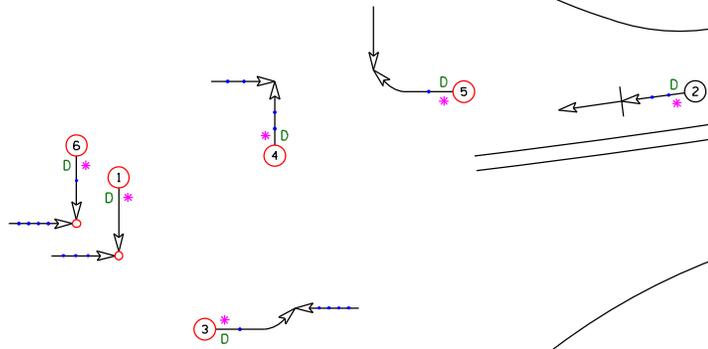
SR 1709 (Rockbarn Rd Ext.)  
 35 MPH  
 ADT (Year)  
 390 est. (2010)

**LEGEND**

	MOVING VEHICLE		ANGLE		5 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	FIXED OBJECT		SIDESWIPE		30 MPH TO 39		DRY
	HEAD ON		INJURY		40 MPH TO 49		WET
	REAR END		FATALITY		50 MPH TO 59		ICY OR SNOWY
	RAN OFF ROAD		SPEED UNKNOWN		60 MPH TO 69		ONLY



SR 1006 (Oxford School Rd)  
 45 MPH  
 ADT (Year)  
 4,450 (2010)



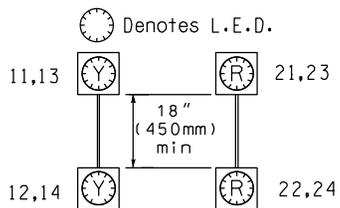
SR 1006 (Oxford School Rd)  
 45 MPH  
 ADT (Year)  
 4,450 (2010)



**TABLE OF OPERATION**

SIGNAL FACE	INTERVAL	
	1	2
11,13	ON	OFF
12,14	OFF	ON
21,23	ON	OFF
22,24	OFF	ON

**SIGNAL FACE I.D.**



SR 1709 (Rockbarn Rd)  
 45 MPH  
 ADT (Year)  
 2,450 (2010)

Frontal Impact Crashes

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

**TRAFFIC SAFETY UNIT**

Date: 6-26-2013

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