

# Spot Safety Project Evaluation

Order # 41000014103

Spot Safety Project # 08-05-207

**Spot Safety Project Evaluation of the Overhead Flasher Installation  
SR 1323 (Highland Road) at SR 1425 (Lees Mill Road)  
Scotland County, City of Laurinburg**

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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Jason B. Schronce

10-3-2011

Date

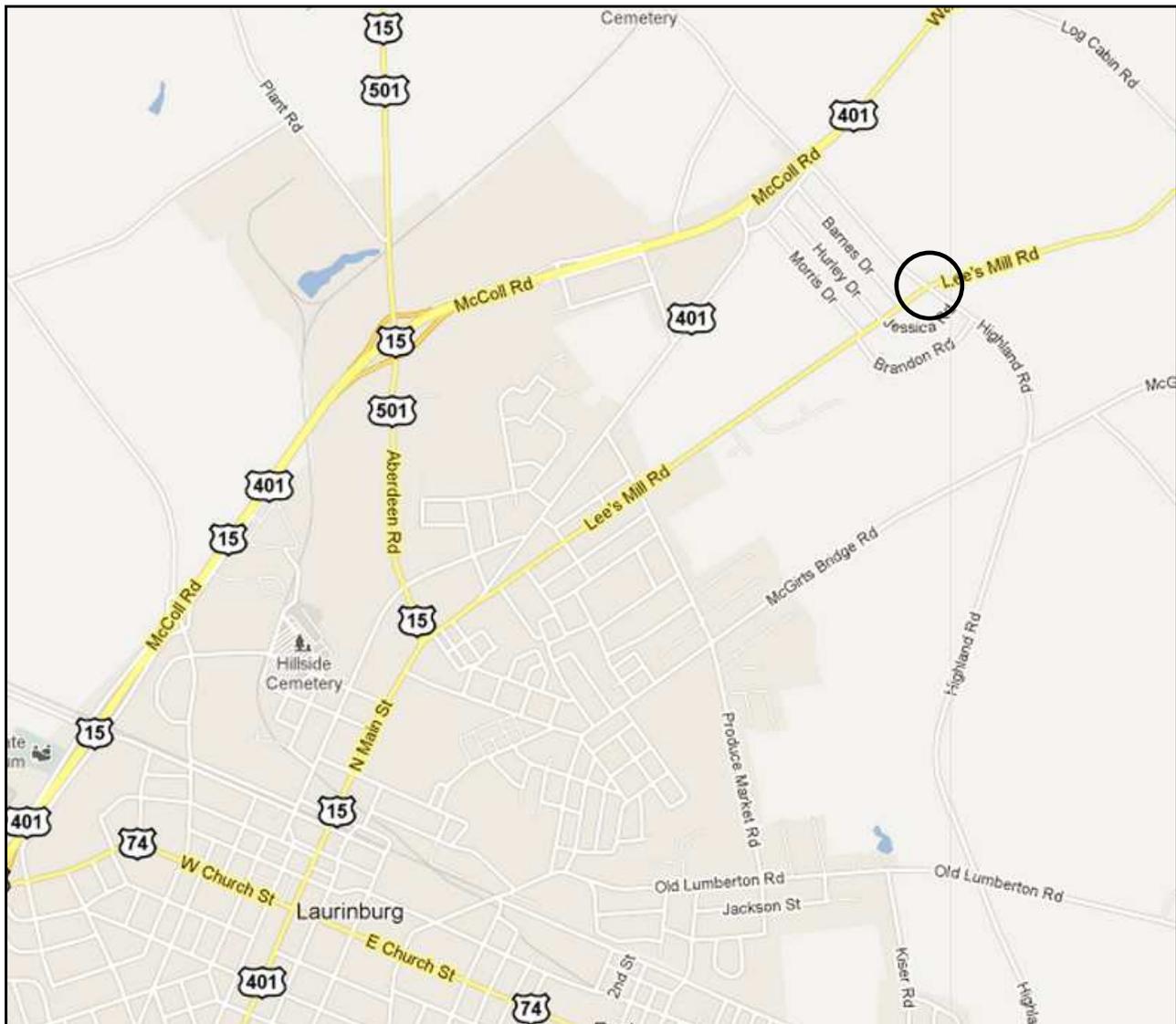
Traffic Safety Project Engineer

# Spot Safety Project Evaluation Documentation

## Subject Location

Evaluation of Spot Safety Project Number 08-05-207 located at the Intersection of SR 1323 (Highland Road) and SR 1425 (Lees Mill Road) in Scotland County, City of Laurinburg.

The Sig ID is 08-1080 for this newly installed Overhead Continuous Flasher.





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

The spot safety project improvement countermeasure chosen for the subject location was the installation of a continuous standard overhead flasher system on wooden polls. SR 1323 and SR 1425 are both two-lane facilities at the subject intersection with speed limits of 55 mph on all approaches except for the south leg of SR 1425 (Lees Mill Road) which begins a city speed limit of 35 mph. The subject location is a four-leg crossroads intersection, which is controlled by stop signs on the SR 1323 (Highland Rd) approaches.

The original statement of problem was the existence of angle crashes from vehicles on SR 1323 failing to yield and/or stop for motorists on SR 1425. The intersection was listed on the 2005 Highway Safety Improvement Project under HSIP # 82I00023.

The initial crash analysis was completed from August 1, 2000 to July 31, 2005 with twenty-four (24) angle crashes. The final completion date for the improvement at the subject intersection was on December 4, 2007 with a total cost of \$14,500.

## 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 October through December 2007. The before period consisted of reported crashes from April 1, 2004 through September 30, 2007 (3 years and 6 months); and the after period consisted of reported crashes from January 1, 2008 through June 30, 2011 (3 years and 6 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 150 feet of the subject intersection. *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 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.

<u>Treatment Information</u>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	13	6	- 53.8 %
Total Severity Index	6.12	7.17	17.2 %
Target Crashes	11	5	- 54.5 %
Target Crash Severity Index	7.05	6.92	- 1.8 %
Volume (2005, 2009)	4,900	4,000	- 18.4 %

<u>Injury Crash Summary</u>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	4	2	- 50.0 %
Class C Injury Crashes	5	3	- 40.0 %
Total Injury Crashes	9	5	- 44.4 %

The naive before and after analysis at the treatment location resulted in a 54 percent decrease in Total Crashes, an 55 percent decrease in Target Crashes, but a 17 percent increase in the Total Severity Index. The before period ADT year was 2005 and the after period ADT year was 2009.

## Results and Discussion

Referencing the *Collision Diagrams*, the before period presented a strong pattern of eleven (11) frontal impact crashes, ten (10) of which were angle collisions from SR 1323 vehicles pulling out into oncoming SR 1425 traffic. During our before period, there appears to be zero (0) crashes from vehicles running the stop sign at a high rate of speed. After the overhead flasher installation, the

pattern was reduced by half to five (5) angle collisions all from westbound SR 1323 (Highland Road) motorists. There does appear to be one (1) after period vehicle that ran through the stop sign with a 30-mph crash speed. Overall, the countermeasure appears to have helped to bring additional awareness to the intersection and increase intersection safety.

The calculated benefit to cost ratio for this project is **9.12 considering total crashes**. The benefit to cost ratio **considering only target crashes is 10.24**. The benefits are calculated using the change in annual crash costs from the before to the after period. Operational and other benefits related to the project are not considered in this analysis. The costs of the project include the actual construction costs as well as the increase in annual maintenance and utility costs.

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**



**Travelling East on SR 1323 (Highland Road)**



**Travelling West on SR 1323 (Highland Road)**



**Travelling South on SR 1425 (Lees Mill Road)**



**Travelling North on SR 1425 (Lees Mill Road)  
Tree Overhang Blocking View of Flasher**



**Travelling North on SR 1425 (Lees Mill Road)**

**BENEFIT-COST ANALYSIS WORKSHEET - Total Crashes**

LOCATION: SR 1425 at SR 1323		BY: JBS						
COUNTY: Scotland		DATE: 9/19/2011						
FILE NO.: SS 08-05-207								
DETAILED COST:	TYPE IMPROVEMENT -	Overhead Standard Flasher						
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$14,500	10	0.149	\$2,161			
	Right-of-Way	\$0	0	0.000	\$0			
	TOTALS	\$14,500	10	0.149	\$2,161			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$400			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$350			
	TOTAL ANNUAL COST=				\$2,911			
	TOTAL COST OF PROJECT=				\$14,500			
COMPREHENSIVE COST REDUCTION:								
	ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES							
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	3.50	0	0.00	9	2.57	4	1.14	\$56,343
AFTER	3.50	0	0.00	5	1.43	1	0.29	\$29,800
						Annual Benefits from Crash Cost Savings		\$26,543
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST						=	\$23,632	
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST						=	9.12	
TOTAL COST OF PROJECT		-	\$14,500	COMPREHENSIVE B/C RATIO		-	9.12	

**BENEFIT-COST ANALYSIS WORKSHEET - Target Crashes**

LOCATION: SR 1425 at SR 1323		BY: JBS						
COUNTY: Scotland		DATE: 9/19/2011						
FILE NO.: SS 08-05-207		Frontal Impact Target Crashes						
DETAILED COST:	TYPE IMPROVEMENT -	Overhead Standard Flasher						
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$14,500	10	0.149	\$2,161			
	Right-of-Way	\$0	0	0.000	\$0			
	TOTALS	\$14,500	10	0.149	\$2,161			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$400			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$350			
	TOTAL ANNUAL COST=				\$2,911			
	TOTAL COST OF PROJECT=				\$14,500			
COMPREHENSIVE COST REDUCTION:								
	ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES							
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	3.50	0	0.00	9	2.57	2	0.57	\$53,886
AFTER	3.50	0	0.00	4	1.14	1	0.29	\$24,086
						Annual Benefits from Crash Cost Savings		\$29,800
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST						=	\$26,889	
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST						=	10.24	
TOTAL COST OF PROJECT		-	\$14,500	COMPREHENSIVE B/C RATIO		-	10.24	





SR 1425  
Lee's Mill Rd  
55-mph

ADT (Year)  
1,236 (2009)

SR 1323  
Highland Rd  
55-mph

ADT (Year)  
1,900 (2009)

ADT (Year)  
2,300 (2009)

STORE

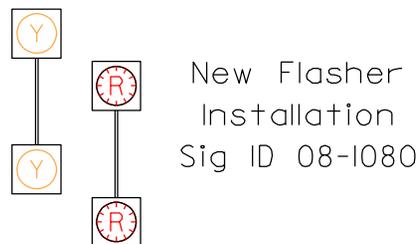
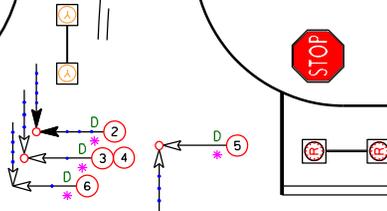
SR 1425  
Lee's Mill Rd  
35-mph

ADT (Year)  
2,500 (2009)

**LEGEND**

	MOVING VEHICLE		ANGLE		1-19 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		20 MPH TO 29		TRAIN
	PAKING VEHICLE		BACKING		30 MPH TO 39		DRIVER AT FAULT
	PAKING VEHICLE		SIDESWIPE		40 MPH TO 49		DRY
	FIXED OBJECT		OUT OF CONTROL		50 MPH TO 59		WET
	HEAD ON		OUT OF CONTROL		60 MPH TO 69		ICY OR SNOWY
	REAR END		RUNAWAY		TO AND UP		FATALITY
	RAN OFF ROAD		FATALITY		SPEED UNKNOWN		ONLY

SS# 08-05-207  
Order# 41000014103  
Scotland County  
City of Laurinburg  
AFTER Period  
1/1/08 - 6/30/11



New Flasher  
Installation  
Sig ID 08-1080

Frontal Impact  
Target Crashes

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

**TRAFFIC SAFETY UNIT**

Date: 8-18-2011      Prepared By: J. Schronce