

# Spot Safety Project Evaluation

Work Order #41000014925

Spot Safety Project # 07-04-204

**Spot Safety Project Evaluation of the Flasher Installation at the Intersection of  
SR 1914 (Oregon Hill Rd) and SR 1980/1925 (Mt. Carmel Church/Worsham Mill)  
Rockingham County**

Documents Prepared By:

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

**Principal Investigator**



Brad Robinson, PE

12/5/2011

Date

Traffic Safety Project Engineer



The original statement of problem was that motorists on SR 1925/1980 were failing to stop at the intersection, resulting in angle collisions.

The initial crash analysis was conducted from April 1, 2000 to May 31, 2003 with a total of eight reported crashes, one of which was considered correctable and resulted in a fatality. The final completion date for the improvements at the subject location was on April 2, 2007 with a total cost of \$50,000.00.

### 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 was from February 1, 2007 to April 30, 2007. The before period consisted of reported crashes from November 1, 2002 through January 31, 2007 (4 years and 3 months) and the after period consisted of reported crashes from May 1, 2007 through July 31, 2011 (4 years and 3 months). The ending date for this analysis was limited by the available crash data at the time the analysis was conducted.

The treatment data consisted of all reported crashes within 150 feet of the subject intersection. The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that frontal impact crashes involving vehicles running the stop signs are the Target Crashes for the applied countermeasure. Vehicles were considered to have run the stop sign if explicitly stated on the crash report or if the vehicle was estimated to have been traveling 25 mph or greater at the time of impact. The target crashes are clearly identified in the before and after period collision diagrams.

<b><u>Treatment Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	3	3	0.0
Total Severity Index	54	5.93	-89.0
Target Crashes	1	0	-100.0
Target Crash Severity Index	76.8	0	-100.0
Volume	3,000	3,000	0.0
<b><u>Target Crash Severity Summary</u></b>			
Fatal Crashes	1	0	-100.0
Class A Crashes	0	0	N/A
Class B Crashes	0	0	N/A
Class C Crashes	0	0	N/A
PDO Crashes	0	0	N/A

The naive before and after analysis at the treatment location resulted no change in total crashes and a 100 percent decrease in target crashes. The ADT years were 2004 and 2009.

## Results and Discussion

In the before period there were a total of three crashes. Two were angle crashes in the intersection and the third was at a nearby driveway. One of the angle crashes involved a westbound vehicle failing to stop at a stop sign and resulted in a fatality. There were also a total of three crashes in the after period. Like in the before period, two of the crashes were angle crashes in the intersection and the third was at a nearby driveway. Both of the after period angle crashes involved vehicles first stopping at the stop sign before pulling out into the intersection.

The calculated benefit to cost ratio for this project is 35.89 considering total crashes. The benefit to cost ratio considering only target crashes is 14.32. 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*. 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.

**BENEFIT-COST ANALYSIS WORKSHEET - TOTAL**

LOCATION: SR 1914 at SR 1980/1925		BY: bdr						
COUNTY: Rockingham		DATE: 12/5/2011						
FILE NO.: SS 07-04-204								
DETAILED COST:	TYPE IMPROVEMENT -	Flasher						
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$0	0	0.000	\$0			
		\$50,000	10	0.149	\$7,451			
	Right-of-Way	\$0	0	0.000	\$0			
	TOTALS	\$50,000	10	0.149	\$7,451			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$300			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$350			
	TOTAL ANNUAL COST=				\$8,101			
	TOTAL COST OF PROJECT=				\$50,000			
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	4.25	2	0.47	1	0.24	0	0.00	\$301,176
AFTER	4.25	0	0.00	2	0.47	1	0.24	\$10,424
							Annual Benefits from Crash Cost Savings	\$290,753
	NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST				=	\$282,651		
	BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST				=	35.89		
	TOTAL COST OF PROJECT	-	\$50,000	COMPREHENSIVE B/C RATIO	-			35.89

**BENEFIT-COST ANALYSIS WORKSHEET - TARGET**

LOCATION: SR 1914 at SR 1980/1925		BY: bdr						
COUNTY: Rockingham		DATE: 12/5/2011						
FILE NO.: SS 07-04-204								
DETAILED COST:	TYPE IMPROVEMENT -	flasher						
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$0	0	0.000	\$0			
		\$50,000	10	0.149	\$7,451			
	Right-of-Way	\$0	0	0.000	\$0			
	TOTALS	\$50,000	10	0.149	\$7,451			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$2,000			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$900			
	TOTAL ANNUAL COST=				\$10,351			
	TOTAL COST OF PROJECT=				\$50,000			
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	4.25	1	0.24	0	0.00	0	0.00	\$148,235
AFTER	4.25	0	0.00	0	0.00	0	0.00	\$0
							Annual Benefits from Crash Cost Savings	\$148,235
	NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST				=	\$137,884		
	BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST				=	14.32		
	TOTAL COST OF PROJECT	-	\$50,000	COMPREHENSIVE B/C RATIO	-			14.32

**Treatment Site Photos Taken October 2, 2011**



**Traveling eastbound on SR 1980 (Mt. Carmel Church Rd)**



**Traveling westbound on SR 1925 (Warsham Mill Rd)**



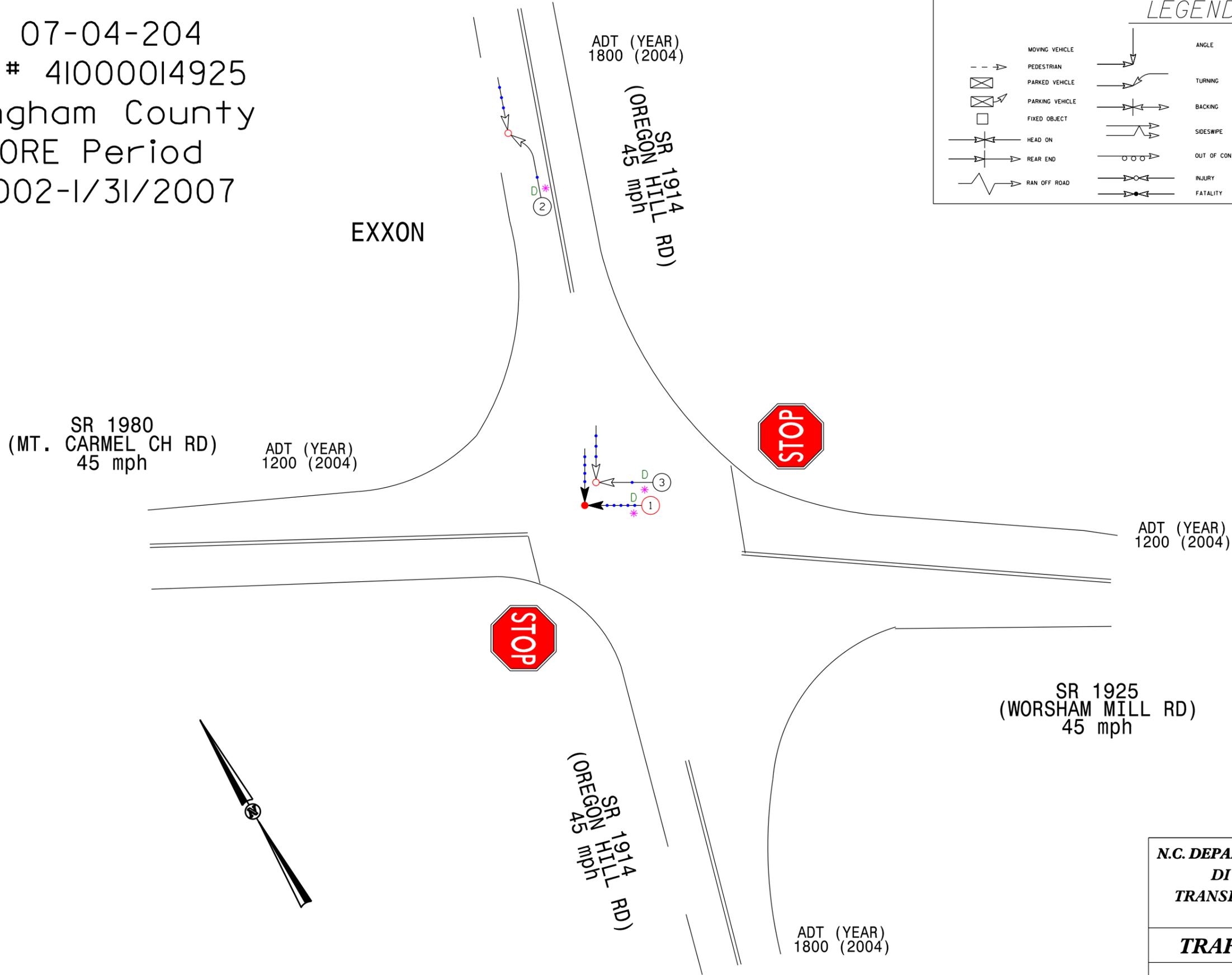
Traveling northbound on SR 1925 (Oregon Mill Rd)



Traveling southbound on SR 1925 (Oregon Mill Rd)

SS# 07-04-204  
 Order# 41000014925  
 Rockingham County  
 BEFORE Period  
 11/1/2002-1/31/2007

LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		INJURY		50 MPH TO 59		ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69		SPEED UNKNOWN
	RAN OFF ROAD				70 AND UP		OILY



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

**TRAFFIC SAFETY UNIT**

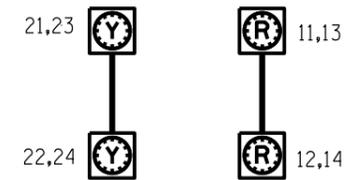
Date: September 2011

Prepared By: BDR

SS# 07-04-204  
 Order# 41000014925  
 Rockingham County  
 AFTER Period  
 5/1/2007-7/31/2011

LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		TURNING
	PARKED VEHICLE		BACKING
	PARKING VEHICLE		SIDESWIPE
	FIXED OBJECT		OUT OF CONTROL
	HEAD ON		INJURY
	REAR END		FATALITY
	RAN OFF ROAD		9 MPH OR LESS
			10 MPH TO 19
			20 MPH TO 29
			30 MPH TO 39
			40 MPH TO 49
			50 MPH TO 59
			60 MPH TO 69
			70 AND UP
			SPEED UNKNOWN
			P PEDESTRIAN
			T TRAIN
			* DRIVER AT FAULT
			D DRY
			W WET
			I ICY OR SNOWY
			O OILY

SIGNAL FACE I.D.



ADT (YEAR)  
1200 (2009)

SR 1925  
(WORSHAM MILL RD)  
45 mph

ADT (YEAR)  
1800 (2009)

ADT (YEAR)  
1800 (2009)

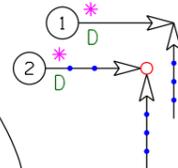
SR 1914  
(OREGON HILL RD)  
45 mph

ADT (YEAR)  
1200 (2009)

SR 1980  
(MT. CARMEL CH RD)  
45 mph

EXXON

SR 1914  
(OREGON HILL RD)  
45 mph



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

**TRAFFIC SAFETY UNIT**

Date: September 2011

Prepared By: BDR