

# Spot Safety Project Evaluation

Work Order #41000015526

Spot Safety Project # 11-06-202

**Spot Safety Project Evaluation of the Traffic Signal Installation  
At the Intersection of SR 1001 (Connely Springs Rd) and SR 1115 (Dry Ponds/Premier Rd)  
Caldwell 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

11/16/2011

Date

Traffic Safety Project Engineer



The final completion date for the improvements at the subject intersection was on December 3, 2007 with a total cost of \$99,180.00.

### 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 November 1, 2007 to December 31, 2007. The before period consisted of reported crashes from March 1, 2004 through October 31, 2007 (3 years and 8 months) and the after period consisted of reported crashes from January 1, 2008 through August 31, 2011 (3 years and 8 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 were the Target Crashes for the applied countermeasure. These crash types are considered as follows: Left Turn, same roadway; Left Turn, different roadway; Right Turn, different roadway; Head On and Angle. 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	6	7	16.7
Total Severity Index	3.47	3.11	-10.4
Target Crashes	6	7	16.7
Target Severity Index	3.47	3.11	-10.4
Volume	13,400	12,200	-9.0
<b><u>Target Crash Severity Summary</u></b>			
Fatal Crashes	0	0	N/A
Class A Crashes	0	0	N/A
Class B Crashes	2	1	-50.0
Class C Crashes	0	1	N/A
PDO Crashes	4	5	25.0

The naive before and after analysis at the treatment location resulted in a 17 percent increase in total crashes, a 17 percent increase in target crashes, and an 9 percent decrease in average daily traffic (ADT). The before period ADT year was 2005 and the after period ADT year was 2009.

## **Results and Discussion**

All reported crashes in both the before and the after periods were target crash types. In the after period two crashes involved a southbound vehicle running the signal, one crash involved an eastbound vehicle running the signal, and one crash involved a westbound vehicle running the signal. The other three crashes were left turn, same roadway crash types were the left turning vehicle failed to yield to the thru vehicle.

The calculated benefit to cost ratio for this project is -0.07 considering total crashes. The benefit to cost ratio considering only target crashes is -0.07. 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 1001 at SR 1115		BY: bdr						
COUNTY: Caldwell		DATE: 11/7/2011						
FILE NO.: SS 11-06-202								
DETAILED COST:	TYPE IMPROVEMENT - Signal							
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$0	0	0.000	\$0			
		\$99,180	10	0.149	\$14,781			
	Right-of-Way	\$0	0	0.000	\$0			
	TOTALS	\$99,180	10	0.149	\$14,781			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$2,000			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$900			
	TOTAL ANNUAL COST=				\$17,681			
	TOTAL COST OF PROJECT=				\$99,180			
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	3.67	0	0.00	2	0.54	4	1.09	\$15,586
AFTER	3.67	0	0.00	2	0.54	5	1.36	\$16,757
						Annual Benefits from Crash Cost Savings		(\$1,172)
	NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST				=	(\$18,852)		
	BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST				=	-0.07		
	TOTAL COST OF PROJECT	-	\$99,180	COMPREHENSIVE B/C RATIO	-	-0.07		

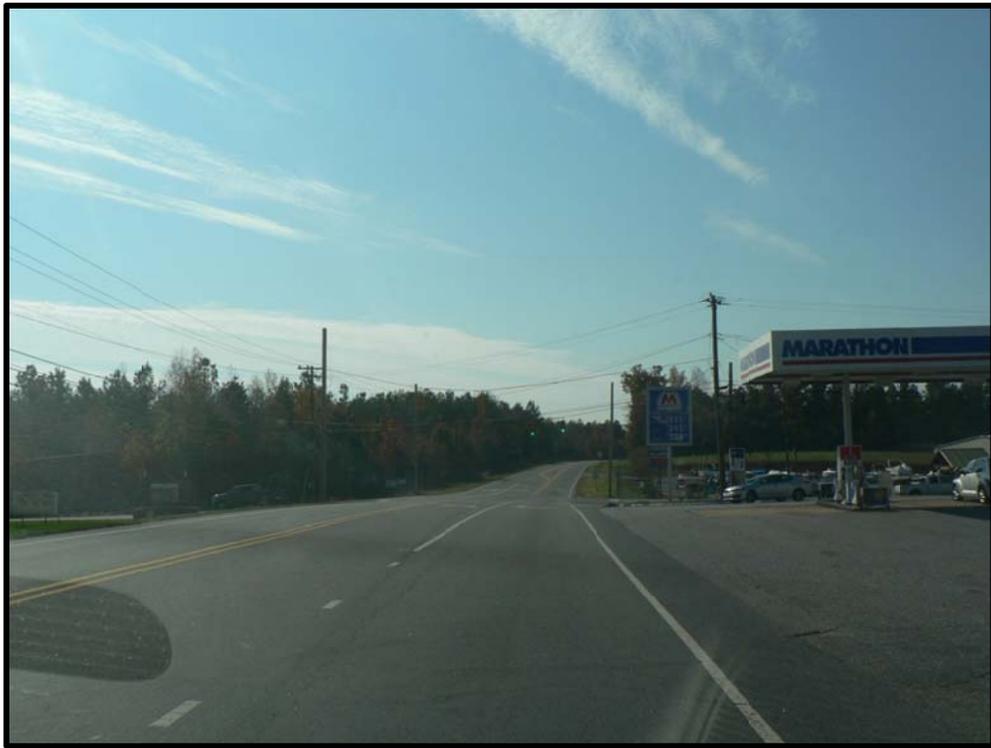
**BENEFIT-COST ANALYSIS WORKSHEET - TARGET**

LOCATION: SR 1001 at SR 1115		BY: bdr						
COUNTY: Caldwell		DATE: 11/7/2011						
FILE NO.: SS 11-06-202								
DETAILED COST:	TYPE IMPROVEMENT - Signal							
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$0	0	0.000	\$0			
		\$99,180	10	0.149	\$14,781			
	Right-of-Way	\$0	0	0.000	\$0			
	TOTALS	\$99,180	10	0.149	\$14,781			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$2,000			
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	TOTAL ANNUAL COST=				\$17,681			
	TOTAL COST OF PROJECT=				\$99,180			
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	3.67	0	0.00	2	0.54	4	1.09	\$15,586
AFTER	3.67	0	0.00	2	0.54	5	1.36	\$16,757
						Annual Benefits from Crash Cost Savings		(\$1,172)
	NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST				=	(\$18,852)		
	BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST				=	-0.07		
	TOTAL COST OF PROJECT	-	\$99,180	COMPREHENSIVE B/C RATIO	-	-0.07		

Treatment Site Photos Taken October 31, 2011



Traveling north on SR 1001 (Connely Springs)



Traveling south on SR 1001 (Connely Springs)



Traveling west on SR 1115 (Dry Ponds)



Traveling east on SR 1115 (Premier)

SS# II-06-202  
 Order# 4100015526  
 Caldwell County  
 BEFORE Period  
 3/1/2004-10/31/2007

SR 1001  
 (Connely Springs)

ADT (YEAR)  
 11,000 (2005)

SR 1115  
 (Premier)

ADT (YEAR)  
 2,900 (2005)

SR 1115  
 (Dry Ponds)

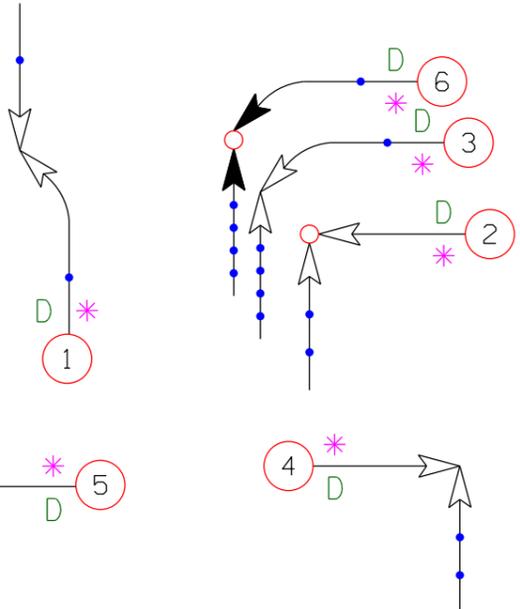
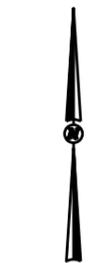
ADT (YEAR)  
 2,900 (2005)

SR 1001  
 (Connely Springs)

ADT (YEAR)  
 11,000 (2005)

**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		70 AND UP
	RAN OFF ROAD		SPEED UNKNOWN		9 MPH OR LESS		OILY



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

**TRAFFIC SAFETY UNIT**

Date: October 2011

Prepared By: bdr

SS# II-06-202  
 Order# 4100015526  
 Caldwell County  
 AFTER Period  
 1/1/2008-8/31/2011

SR 1001  
 (Connely Springs)

ADT (YEAR)  
 8,900 (2009)

SR 1115  
 (Premier)

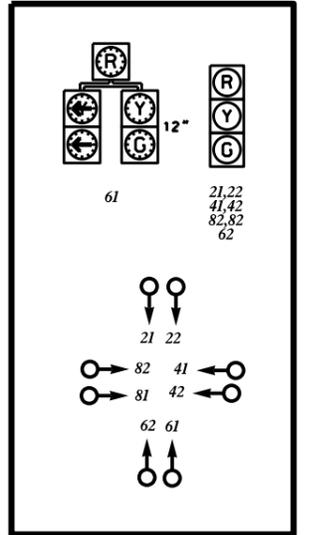
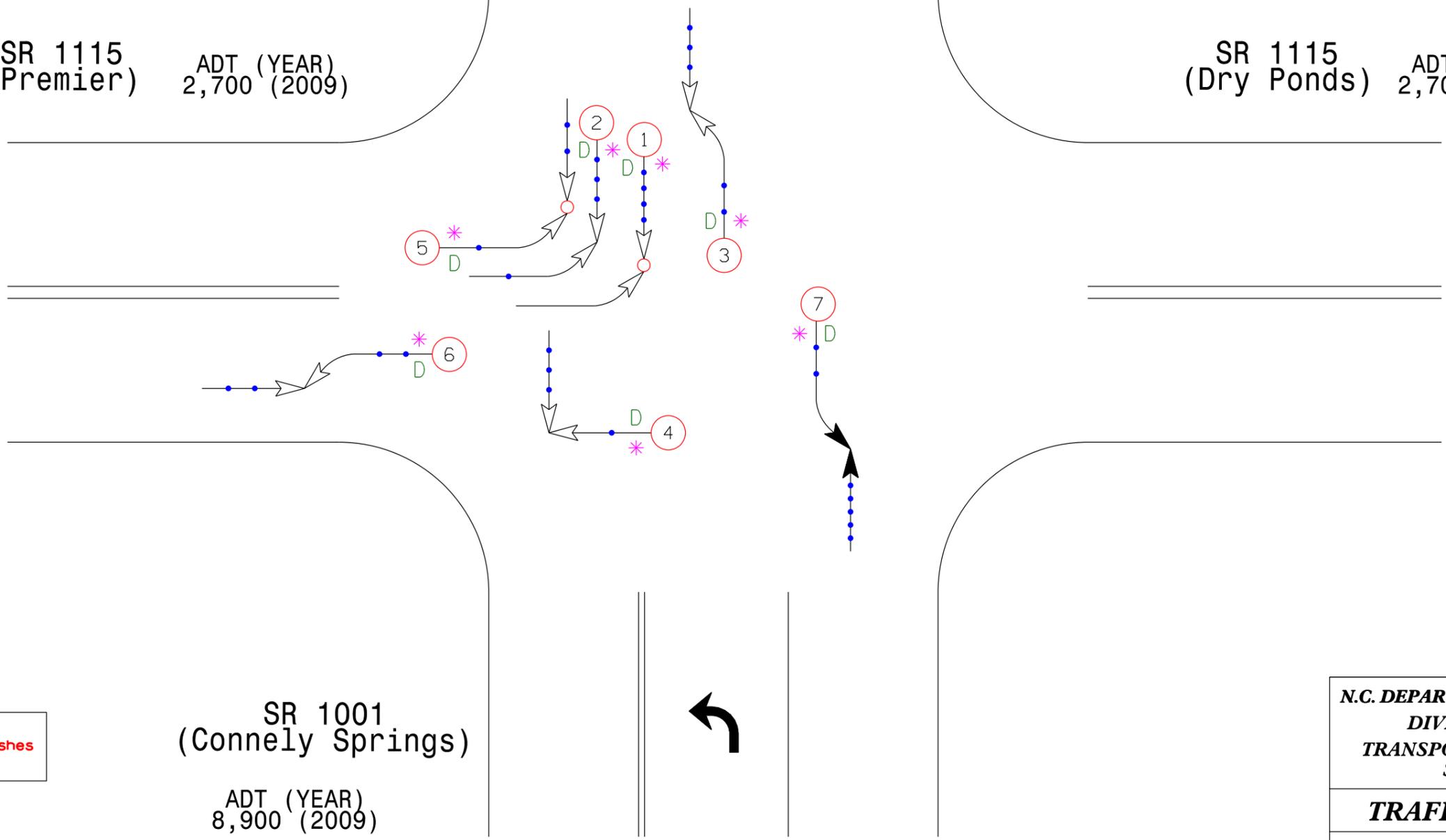
ADT (YEAR)  
 2,700 (2009)

SR 1115  
 (Dry Ponds)

ADT (YEAR)  
 2,700 (2005)

**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		D DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		W WET
	HEAD ON		INJURY		50 MPH TO 59		I ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69		O ONLY
	RAN OFF ROAD				70 AND UP		



Target Crashes

SR 1001  
 (Connely Springs)

ADT (YEAR)  
 8,900 (2009)

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Date: October 2011

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