

Spot Safety Project Evaluation

Order # 41000005270

Spot Safety Project # 07-01-208

**Spot Safety Project Evaluation of the
Channelization Island Installation with Dual Posted / Oversized Stop Signs
SR 2705 (Osceola-Ossipee Rd) at SR 2719 (High Rock Rd)
Guilford County**

Documents Prepared By:

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

Principal Investigator



Jason B. Schronce

3-29-2010

Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 07-01-208 located at the Intersection of SR 2705 (Osceola-Ossipee Road) and SR 2719 (High Rock Road) in rural Guilford County.



Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of raised median channelization islands on the SR 2719 (High Rock Rd) approaches. Also, an oversized stop sign was installed for southbound SR 2719 and another raised concrete island was installed at the corner of the store parking lot. SR 2705 (Osceola-Ossipee Rd) and SR 2719 are both two-lane facilities at the subject intersection with speed limits of 55 mph on all approaches. The subject location is a four-leg crossroads intersection, which is controlled by dual posted stop signs on the SR 2719 approaches.

The original statement of problem was the concern for vehicles running the stop sign on SR 2719. The intended purpose of the channelization and additional signage was to alleviate the accident potential of severe angle collisions at this location.

The initial crash analysis was completed from March 1, 1998 to February 28, 2001 with four (4) reported crashes, one (1) of which was deemed correctable resulting in an A-injury. The final completion date for the improvement at the subject intersection was on January 6, 2004 with a total cost of \$60,000.

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 was the months of December 2003 through January 2004. The before period consisted of reported crashes from December 1, 1997 through November 30, 2003 (6 years); and the after period consisted of reported crashes from February 1, 2004 through January 31, 2010 (6 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. *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 Stop Sign Run (Angle) Crashes were the target crashes for the applied countermeasure.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	8	4	- 50.0 %
Total Severity Index	14.18	4.70	- 66.9 %
Target Crashes	3	1	- 66.7 %
Target Crash Severity Index	31.20	8.40	- 73.1 %
Volume	2,900	3,100	6.9 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	- 100.0 %
Class B injury Crashes	1	1	0.0 %
Class C Injury Crashes	3	1	- 66.7 %
Total Injury Crashes	5	2	- 60.0 %

The naive before and after analysis at the treatment location resulted in a 50 percent decrease in Total Crashes, a 67 percent decrease in Target Crashes, and a 67 percent decrease in the Total Severity Index. The before period ADT year was 2001 and the after period ADT year was 2007.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 50 percent decrease in Total Crashes and a 67 percent decrease in Target Crashes. The summary results above demonstrate that both Total and Target Crashes appear to have decreased at the treatment location from the before to the after period.

Referencing the *Collision Diagrams*, the before period presented a pattern of five (5) angle collisions in the intersection. Three (3) higher impact speed angle crashes resulted from vehicles on SR 2719 (High Rock Road) running the stop sign; including one (1) A-injury collision. After the intersection improvements, angle collisions were reduced to two (2) crashes with only one (1) collision resulting from the failure to stop at the southbound SR 2719 stop sign. There was one crash in each time period from a vehicle improperly accessing the store parking lot in the southeast quadrant of the intersection. The channelization and signage appear to have successfully brought more awareness and attention to this location.

The calculated benefit to cost ratio for this project is **7.93 considering total crashes**. The benefit to cost ratio **considering only target crashes is 7.61**. 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



Traveling South on SR 2719 (High Rock Road)
Notice the Raised Median Island and Oversized Stop Sign



Looking South onto Northbound SR 2719 (High Rock Road)
Center Median Island and Additional Island to define Store Parking Lot



Traveling East / Southeast on SR 2705 (Osceola-Ossipee Road)



Traveling West on SR 2705 (Osceola-Ossipee Road)

BENEFIT-COST ANALYSIS WORKSHEET - Total Crashes

LOCATION: SR 2705 at SR 2719		BY: JBS							
COUNTY: Guilford		DATE: 3/26/2010							
FILE NO.: SS 07-01-208		NOTES: Total Crashes							
DETAILED COST:	TYPE IMPROVEMENT -	Channelization & Stop Signs							
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST				
	Construction	\$60,000	10	0.149	\$8,942				
		\$0	0	0.000	\$0				
	Right-of-Way	\$0	0	0.000	\$0				
	TOTALS	\$60,000	10	0.149	\$8,942				
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$2,400				
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$0				
	TOTAL ANNUAL COST=				\$11,342				
	TOTAL COST OF PROJECT=				\$60,000				
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	6.00	1	0.17	4	0.67	3	0.50	\$97,283	
AFTER	6.00	0	0.00	2	0.33	2	0.33	\$7,300	
								Annual Benefits from Crash Cost Savings	\$89,983
	NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST							=	\$78,642
	BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST							=	7.93
	TOTAL COST OF PROJECT	-	\$60,000		COMPREHENSIVE B/C RATIO	-			7.93

BENEFIT-COST ANALYSIS WORKSHEET - Target Crashes

LOCATION: SR 2705 at SR 2719		BY: JBS							
COUNTY: Guilford		DATE: 3/26/2010							
FILE NO.: SS 07-01-208		NOTES: Target Crashes - Stop Sign Run Crashes							
DETAILED COST:	TYPE IMPROVEMENT -	Channelization & Stop Signs							
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST				
	Construction	\$60,000	10	0.149	\$8,942				
		\$0	0	0.000	\$0				
	Right-of-Way	\$0	0	0.000	\$0				
	TOTALS	\$60,000	10	0.149	\$8,942				
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$2,400				
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$0				
	TOTAL ANNUAL COST=				\$11,342				
	TOTAL COST OF PROJECT=				\$60,000				
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	6.00	1	0.17	2	0.33	0	0.00	\$89,333	
AFTER	6.00	0	0.00	1	0.17	0	0.00	\$3,000	
								Annual Benefits from Crash Cost Savings	\$86,333
	NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST							=	\$74,992
	BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST							=	7.61
	TOTAL COST OF PROJECT	-	\$60,000		COMPREHENSIVE B/C RATIO	-			7.61

LEGEND

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

SR 2705
Osceola-Ossipee Rd
55 MPH

SR 2719
High Rock Road
55 MPH

SS# 07-01-208
Guilford County
BEFORE Period
12/1/97 - 11/30/03

STORE

Run Stop Sign
Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

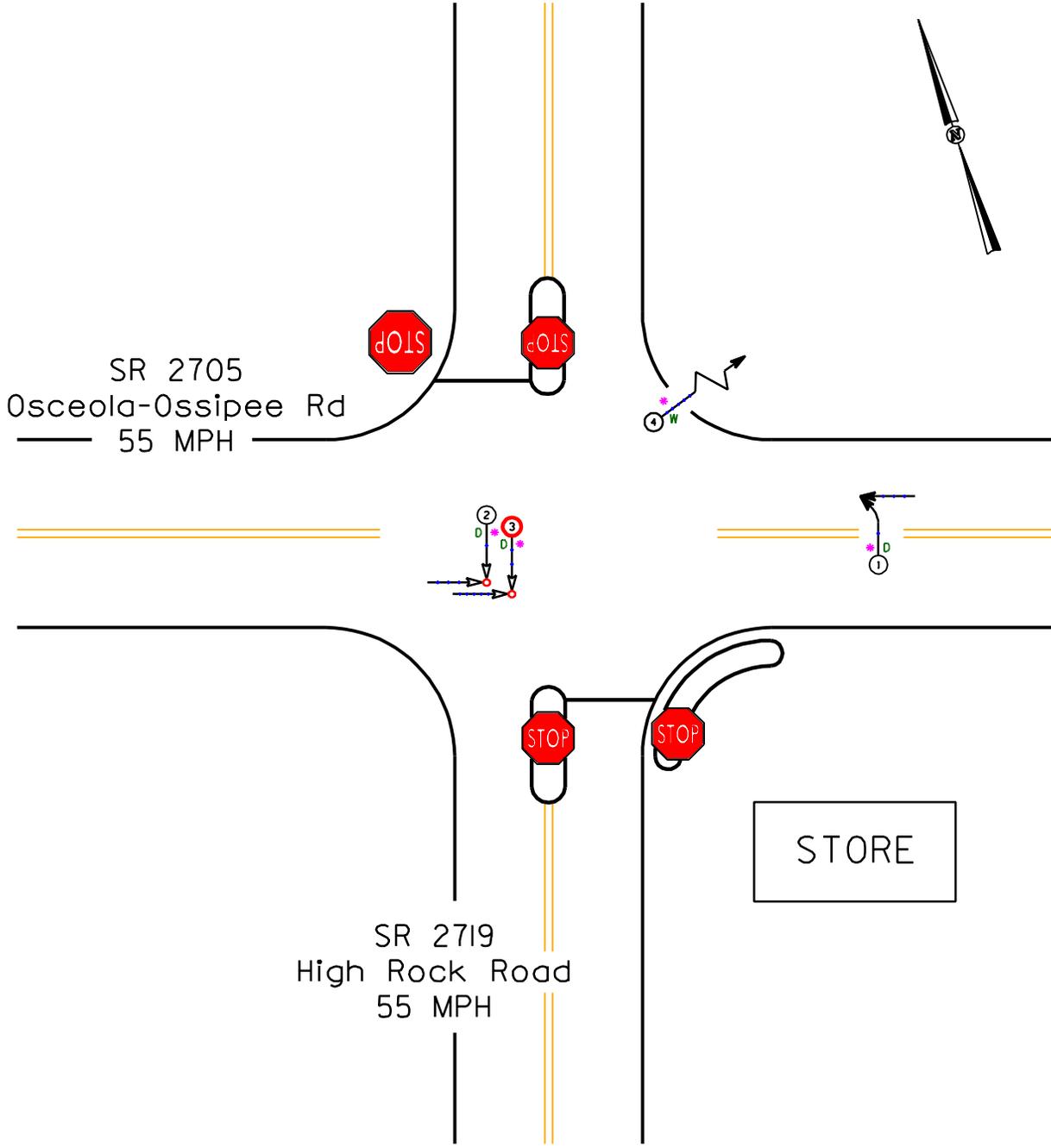
	COLLISION DIAGRAM	
	DIVISION: 7	AREA:
	STUDY PERIOD: 2/1/1997 - 11/30/2003	
	DISTANCE: Y-LINE + 150 FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: N/A		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 3-26-2008		
LOG NUMBER: SS* 07-01-208 BEFORE		

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

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAM
	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		HIT AND RUN		50 MPH TO 59		ICY OR SNOW
	REAR END		INJURY		60 MPH TO 69		SPEED UNKNOWN
	RAN OFF ROAD		FATALITY		70 AND UP		ONLY

SS# 07-01-208
 Guilford County
 AFTER Period
 2/1/04 - 1/31/10



Countermeasures:
 1 - Three Channelization Islands
 2 - SB High Rock Oversize Stop Sign

Run Stop Sign
 Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 7	AREA:
	STUDY PERIOD: 2/1/2004 - 1/31/2010	
	DISTANCE: Y-LINE + 150 FT	
	ANALYSIS PREPARED BY: JBS	
	ANALYSIS CHECKED BY: N/A	
DIAGRAM PREPARED BY: JBS		DIAGRAM REVIEWED BY: ST
SCALE: NOT TO SCALE		
DATE: 3-26-2010		
LOG NUMBER: SS* 07-01-208 AFTER		

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