Spot Safety Project Evaluation

Order # 41000009243

Spot Safety Project # 06-04-212

Spot Safety Project Evaluation of the Stop Sign Mounted Flasher Installation
Intersection of NC 27 and SR 1006 (Old Stage Road) / SR 2084 (Leslie Campbell Avenue)
East of Buies Creek, In Harnett County

Documents Prepared By:

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

Principal Investigator

_____ 10/29/2010

Chad J. Neilson Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 06-04-212 located at the intersection of NC 27 and SR 1006 (Old Stage Road) / SR 2084 (Leslie Campbell Avenue) east of Buies Creek, Harnett County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject intersection was the installation of stop sign mounted flashers for the northbound and southbound approaches. NC 27 and SR 1006 (Old Stage Road) / SR 2084 (Leslie Campbell Avenue) are two-lane facilities at the subject intersection with speed limits of 55 mph for all approaches. The subject location is a four-leg intersection with the northbound and southbound approaches encountering stop signs.

The original statement of problem was vehicles traveling on Eastbound NC 27 are failing to stop and / or yield to vehicles on the through legs of the intersection.

The initial crash analysis was completed from September 1, 2001 to August 31, 2004 with six (6) reported crashes, of which four (4) were deemed correctable. The final completion date for the improvement at the subject intersection was on May 24, 2006 with a total cost of $7,200.00.

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 April 2006 through June 2006. The before period consisted of reported crashes from February 1, 2002 through March 31, 2006 (4 years and 2 months); and the after period consisted of reported crashes from July 1, 2006 through August 31, 2010 (4 years and 2 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, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information	**Before**	**After**	**Percent Reduction (-) Percent Increase (+)**
Total Crashes	8	4	- 50.00 %
Total Crash Severity Index	14.18	1.00	- 92.95 %
Target Crashes	6	4	- 33.33 %
Target Crash Severity Index	17.33	1.00	- 94.23 %
Volume (2004, 2008)	5,500	6,900	25.45 %

Injury Crash Summary	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	1	0	- 100.00 %
Class A injury Crashes	0	0	N/A
Class B injury Crashes	0	0	N/A
Class C Injury Crashes	4	0	- 100.00 %
Total Injury Crashes	5	0	- 100.00 %

The naive before and after analysis at the treatment location resulted in a fifty (50) percent decrease in Total Crashes, thirty-three (33) percent decrease of Target Crashes, and a ninety-two (92) percent decrease in the Total Severity Index. The before period ADT year was 2004 and the after period ADT year was 2008.

Results and Discussion

Referencing the *Collision Diagrams*, the before period presented six (6) target crashes. Of these Target Crashes, three (3) fall in the correctable category from the original project description. These motorists were traveling eastbound on NC 27 and disregarded the stop sign. After the flashers installation at the existing stop sign locations, there were four (4) Target Crashes. Of the Target Crashes in the after period, one (1) is deemed as a ran stop sign where the "at-fault" driver was traveling eastbound on NC 27 and disregarded the stop sign.

For the purpose of this evaluation, stop sign running crashes are considered when the "at fault" vehicle is traveling a rate of twenty (20) MPH or higher on either stop sign controlled approach.

The calculated benefit to cost ratio for this project is **118.93 considering total crashes**. The benefit to cost ratio **considering only target crashes is 114.83**. 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.

Photos were provided for this location by Google Street View for all four approaches of this 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

Looking North on NC 27

Looking East on SR 2084 (Leslie Campbell Avenue)

Looking West on NC 27

UNAVAILABLE

Looking South on SR 1006 (Old Stage Road)

BENEFIT-COST ANALYSIS WORKSHEET - TOTAL

LOCATION: NC 27 at SR 1006 (Old Stage Rd) / SR 2084 (Leslie Campbell Ave) BY: C Neilson
COUNTY: Harnett DATE: 10/26/2010
FILE NO.: SS 06-04-212

DETAILED COST: TYPE IMPROVEMENT - Stop Sign Mounted Flashers

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	$7,200	10	0.149	$1,073
	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$7,200	10	0.149	$1,073

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $350
ESTIMATED INCREASE IN ANNUAL UTILITY COST = $0

TOTAL ANNUAL COST= $1,423
TOTAL COST OF PROJECT= $7,200

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	4.17	1	0.24	4	0.96	3	0.72	$173,357
AFTER	4.17	0	0.00	0	0.00	4	0.96	$4,125

Annual Benefits from Crash Cost Savings $169,233

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = $167,810

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 118.93

TOTAL COST OF PROJECT - $7,200 COMPREHENSIVE B/C RATIO - 118.93

BENEFIT-COST ANALYSIS WORKSHEET - TARGET

LOCATION: NC 27 at SR 1006 (Old Stage Rd) / SR 2084 (Leslie Campbell Ave) BY: C Neilson
COUNTY: Harnett DATE: 10/26/2010
FILE NO.: SS 06-04-212

DETAILED COST: TYPE IMPROVEMENT - Stop Sign Mounted Flashers

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
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	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$7,200	10	0.149	$1,073

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $350
ESTIMATED INCREASE IN ANNUAL UTILITY COST = $0

TOTAL ANNUAL COST= $1,423
TOTAL COST OF PROJECT= $7,200

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	4.17	1	0.24	3	0.72	2	0.48	$167,530
AFTER	4.17	0	0.00	0	0.00	4	0.96	$4,125

Annual Benefits from Crash Cost Savings $163,405

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = $161,982

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 114.83

TOTAL COST OF PROJECT - $7,200 COMPREHENSIVE B/C RATIO - 114.83

SS# 06-04-212
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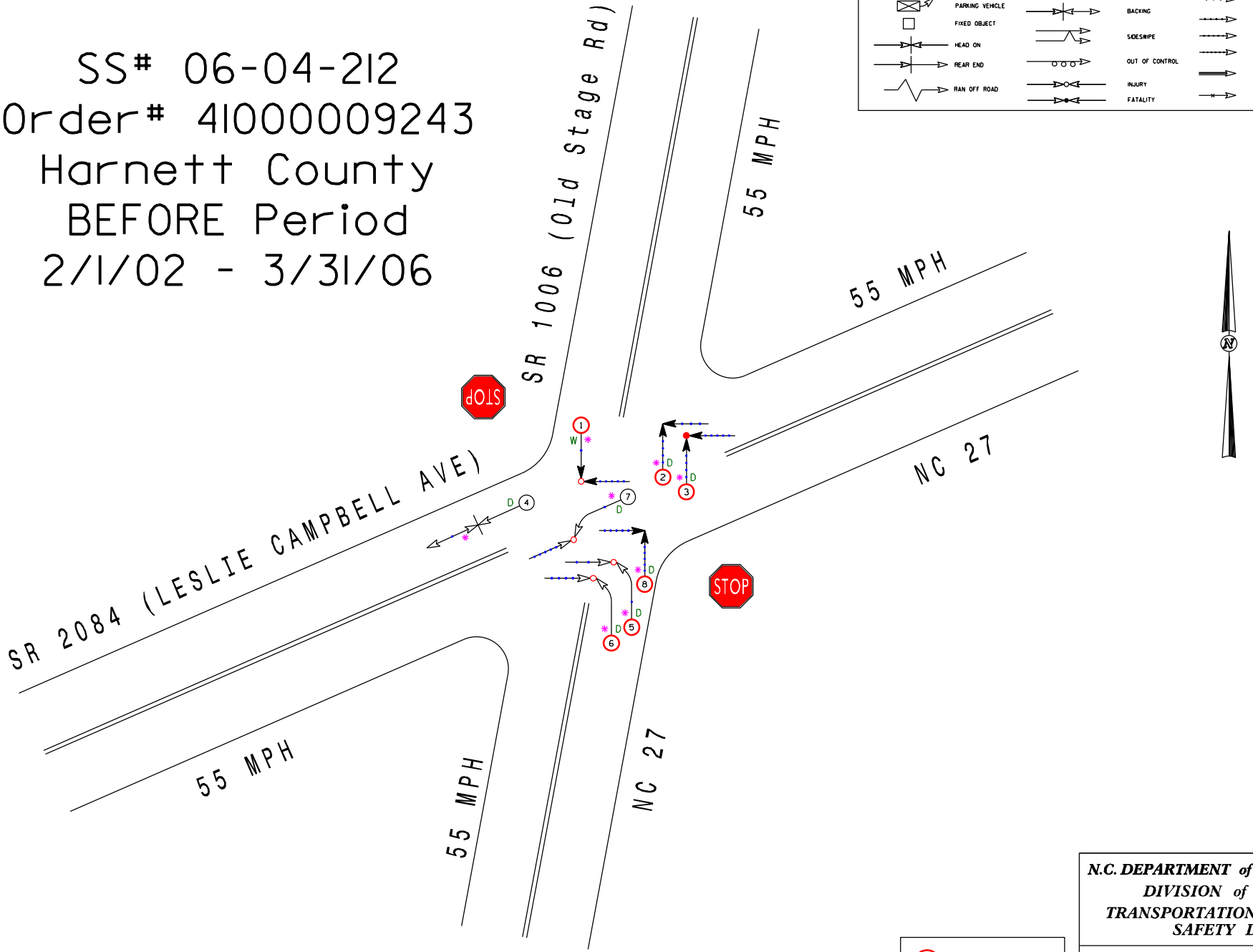
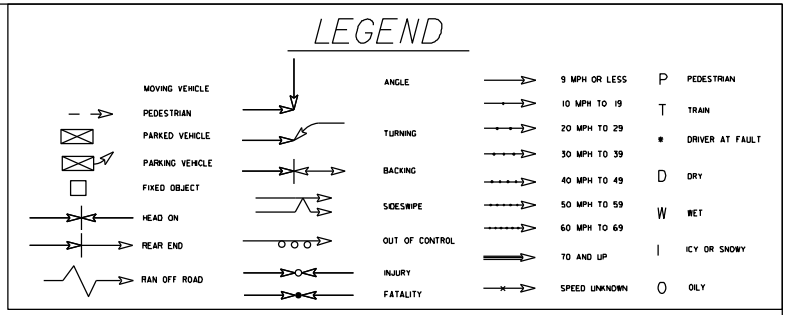
Harnett County
BEFORE Period
2/1/02 - 3/31/06





Target Crashes

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

TRAFFIC SAFETY UNIT

Date: 10–26–2010

Prepared By: C Neilson

SS# 06-04-212
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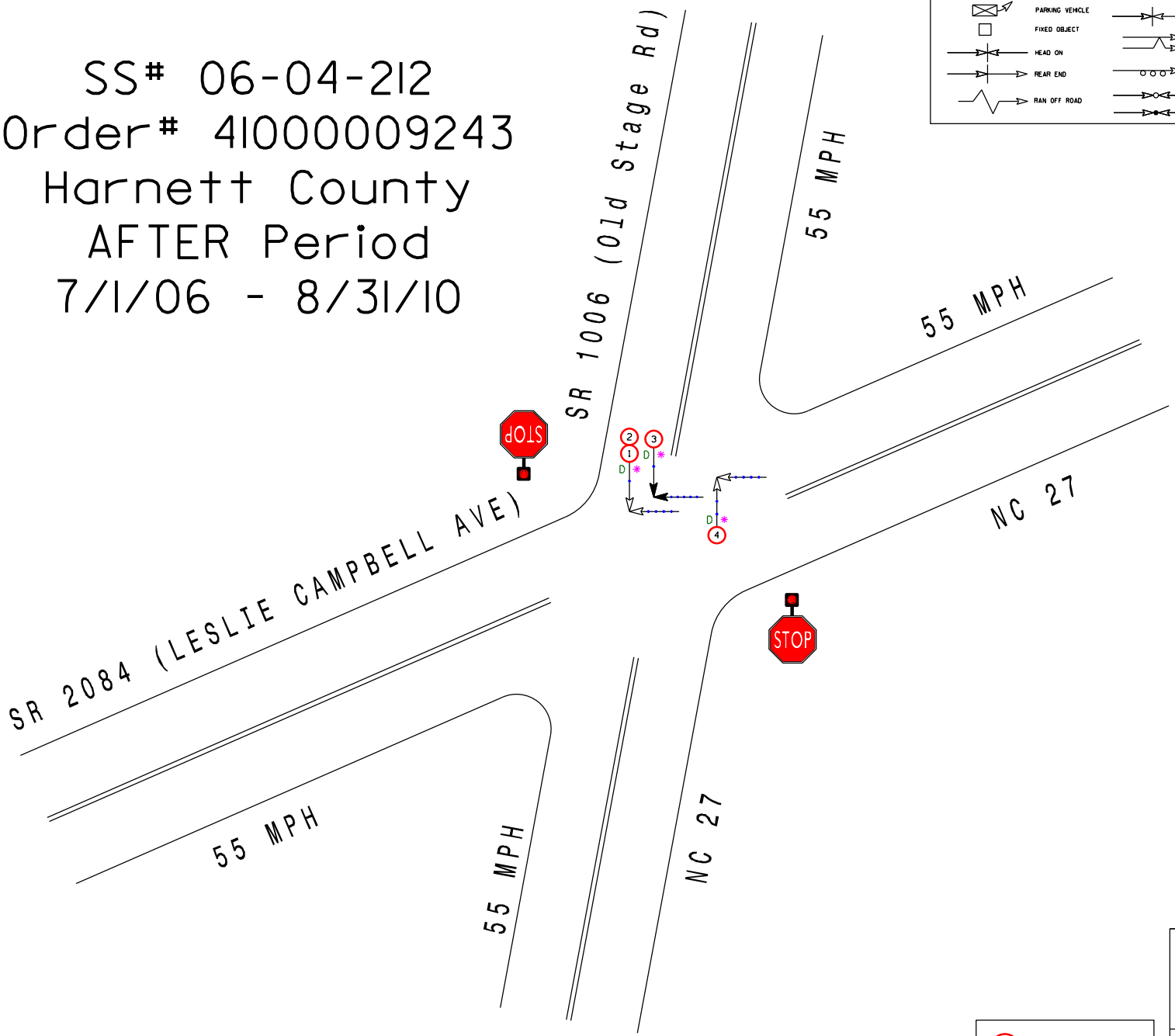
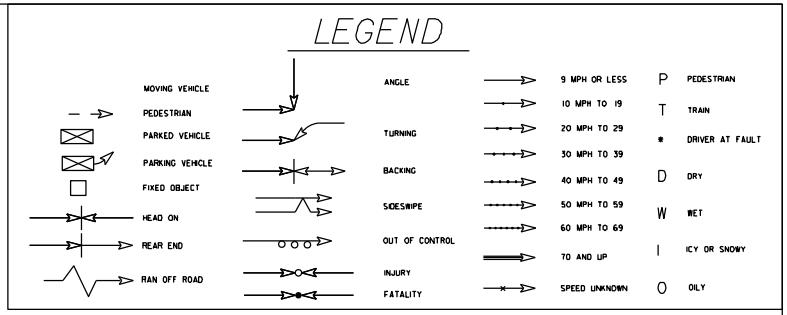
Harnett County
AFTER Period
7/1/06 - 8/31/10





Target Crashes

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