

# Spot Safety Project Evaluation

Spot Safety Project # 07-06-206

## Spot Safety Project Evaluation of the Installation of a Left Turn Lane on NC 54 NC 54 at SR 1945 (Neville Road) Orange County

Documents Prepared By:  
Stantec Consulting Ltd.  
for  
Safety Evaluation Group  
Traffic Safety Systems Management Section  
Transportation Mobility and Safety Division  
North Carolina Department of Transportation

**Principal Investigator**



---

Elizabeth S. Scott  
Transportation Designer

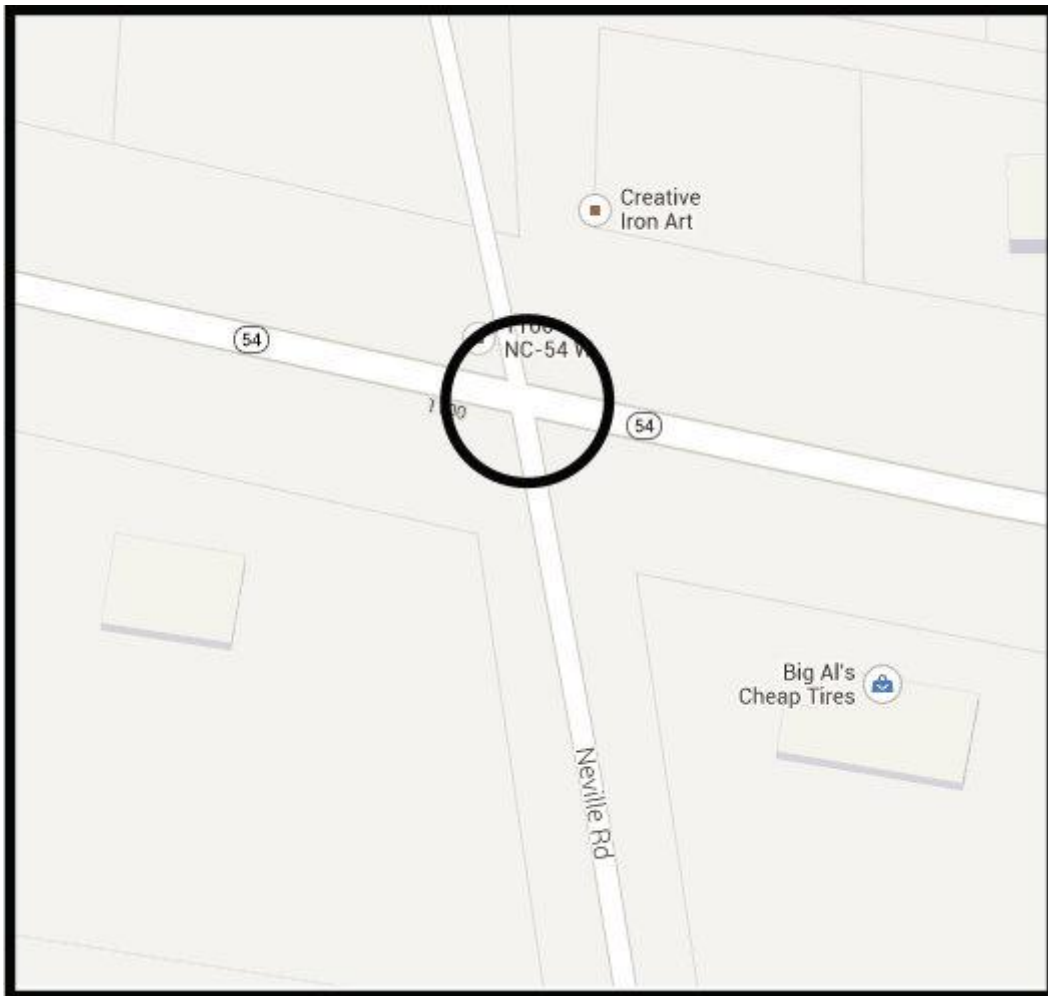
9-11-2013  
Date

## *Spot Safety Project Evaluation Documentation*

### **Subject Location**

Evaluation of Spot Safety Project Number 07-06-206 located at intersection of NC 54 at SR 1945 (Neville Road) in Orange County.

This intersection is stop-controlled.





Aerial Provided from Google Maps

### **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 left turning lane on westbound NC 54, which includes 100 feet of storage with 50 feet full storage for deceleration.

NC 54 and SR 1945 (Neville Road) are both two-lane roadways and NC 54 widens at the intersection to include a right-turn lane on the eastbound leg. The speed limits on NC 54 and SR 1945 (Neville Rd) are 55 mph. The subject location is a three leg stop-controlled intersection, which is stop controlled on SR 1945 (Neville Road).

The original statement of problem was vehicles attempting to turn left onto SR 1945 (Neville Rd) from NC 54 were being rear ended while waiting for a gap to turn. The initial crash analysis was completed from December 1, 2000 to November 30, 2005 with twelve (12) reported crashes. The final completion date for the improvement at the subject intersection was on December 17, 2008 with a total cost of \$187,000.00.

## 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 were the months of September 2008 through December 2008. The before period consisted of reported crashes from March 1, 2004 through August 31, 2008 (4 years, 6 months); and the after period consisted of reported crashes from January 1, 2009 through June 30, 2013 (4 years, 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 for the NC 54 and SR 1945 (Neville Road) approaches. *Please see attached location map and aerial map for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Rear End Crashes were the target crashes for the applied countermeasure.

<u>Treatment Information</u>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	5	3	- 40.0 %
Total Severity Index	3.96	5.93	+ 49.7 %
Target Crashes	3	0	- 300.0 %
Target Crash Severity Index	2.8	0	- 100.0 %
Volume (2006, 2011)	11,800	12,300	+ 4.2 %

<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	1	2	+ 100.0 %
Class C Injury Crashes	1	0	- 100.0 %
Property Damage Only	3	1	- 66.7 %

The naive before and after analysis at the treatment location resulted in a 40 percent decrease in Total Crashes, and a 49.7 percent increase in the Total Severity Index. The before period ADT year was 2006 and the after period ADT year was 2011.

To further analyze the intersection crash patterns, the following chart shows different traffic movements and the change in crash totals through the study:

<b><u>Additional Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Rear End Crashes	3	0	- 300.0 %
Left Turn, Different Roadway Crashes	1	1	0.0 %
Left Turn, Same Roadway Crashes	0	1	+ 100.0 %
Ran off Road Crashes	1	1	0.0 %

## **Results and Discussion**

Referencing the *Collision Diagrams*, there were three (3) target crashes in the before period. There were no target crashes in the after period. The target crash severity index was reduced from 2.8 to 0 from the before to the after period.

From the additional information chart above, the number of left turn, different roadway crashes in stay the same with one (1) crash the before period and the after period. In the after period, there was one left turn, same roadway crash. In both study periods, there was one (1) ran off road crash.

In the after period the total severity increased by 49.7%. There were two (2) Injury B crashes in the after period, and one (1) Injury B crash in the before period. However, neither Injury B crashes in the after period were target crashes.

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all three 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 from Google Street View**



**Google Maps (May 2012) – Looking West from NC 54 Approach**



**Google Maps (May 2012) – Looking East from NC 54 Approach**



**Google Maps (May 2012) – Looking South from SR 1945 (Neville Rd) Approach**

SS# 07-06-206  
 Orange County  
 Before Period  
 3/1/2004 - 8/31/2008



LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		ANIMAL
	PARKED VEHICLE				10 MPH TO 19		PEDESTRIAN
	PARKING VEHICLE				20 MPH TO 29		BICYCLE
	MOVABLE OBJECT				30 MPH TO 39		TRAIN
	HEAD ON				40 MPH TO 49		DRIVER AT FAULT
	REAR END				50 MPH TO 59		DRY
	RAN OFF ROAD				60 MPH TO 69		WET
	DAYLIGHT CRASH				70 AND UP		ICY OR SNOWY
	NIGHT CRASH		INJURY		SPEED UNKNOWN		Other

ADT (Year)  
 11,500 (2006)

55 mph

NC 54

55 mph

ADT (Year)  
 11,500 (2006)

ADT (Year)  
 680 (2006)

SR 1945 (Neville Rd)



Target Crashes

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

Date: 8/16/2013

Prepared By: KLR



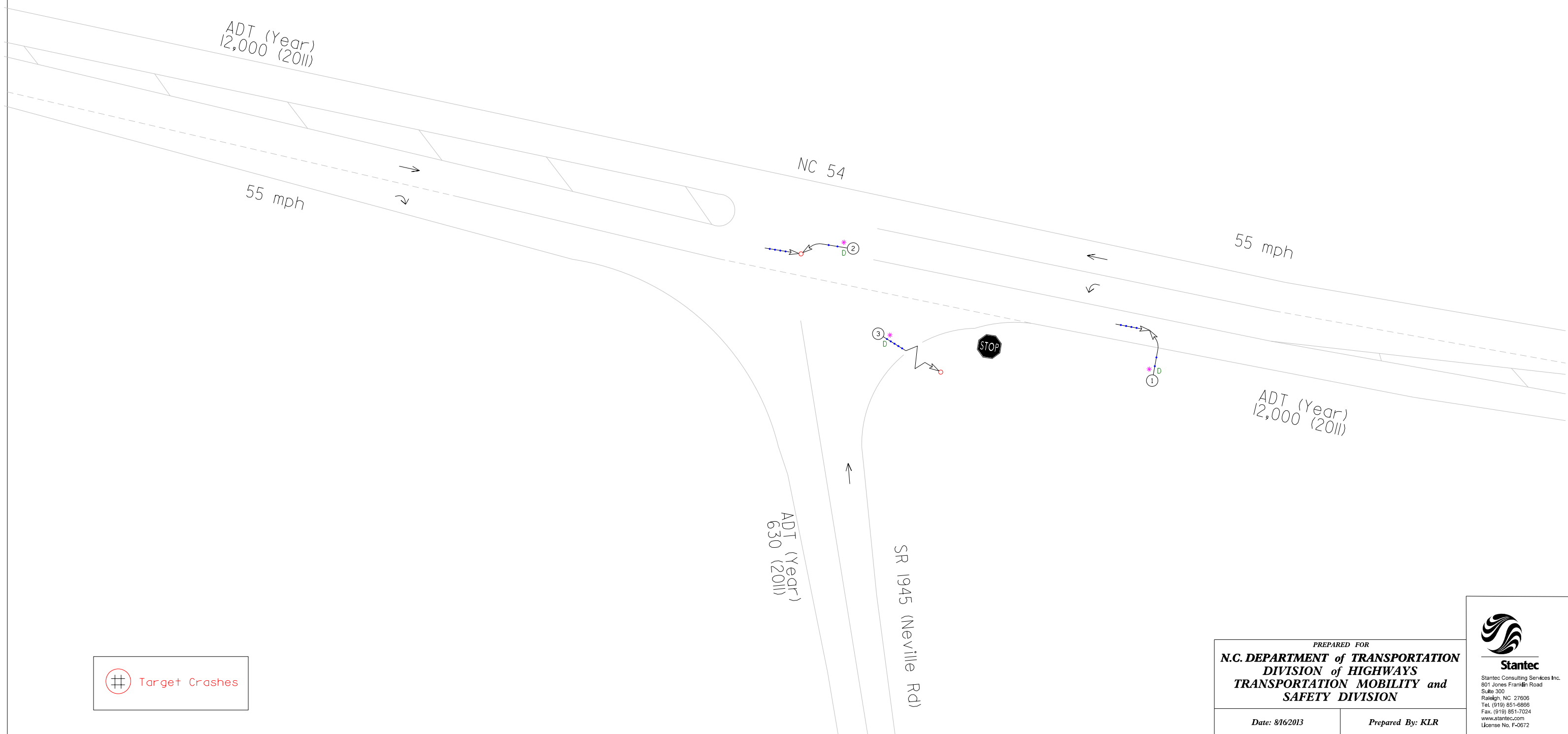
**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road  
 Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672



SS# 07-06-206  
 Orange County  
 After Period  
 1/1/2009 - 7/31/2013



LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		ANIMAL
	PARKED VEHICLE		10 MPH TO 19		PEDESTRIAN		BICYCLE
	PARKING VEHICLE		20 MPH TO 29		TRAIN		DRIVER AT FAULT
	MOVABLE OBJECT		30 MPH TO 39		DRY		WET
	HEAD ON		40 MPH TO 49		ICY OR SNOWY		Other
	REAR END		50 MPH TO 59		SPEED UNKNOWN		
	RAN OFF ROAD		60 MPH TO 69				
	DAYLIGHT CRASH		70 AND UP				
	NIGHT CRASH		SPEED UNKNOWN				



Target Crashes

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

Date: 8/16/2013  
 Prepared By: KLR

**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road  
 Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672