

Spot Safety Project Evaluation

Order # 41000023508

Spot Safety Project # 06-05-208

**Spot Safety Project Evaluation of the Left Turn Lane Installation
NC 71 and SR 1752 (Rennert Road)
Robeson 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

3-6-2013

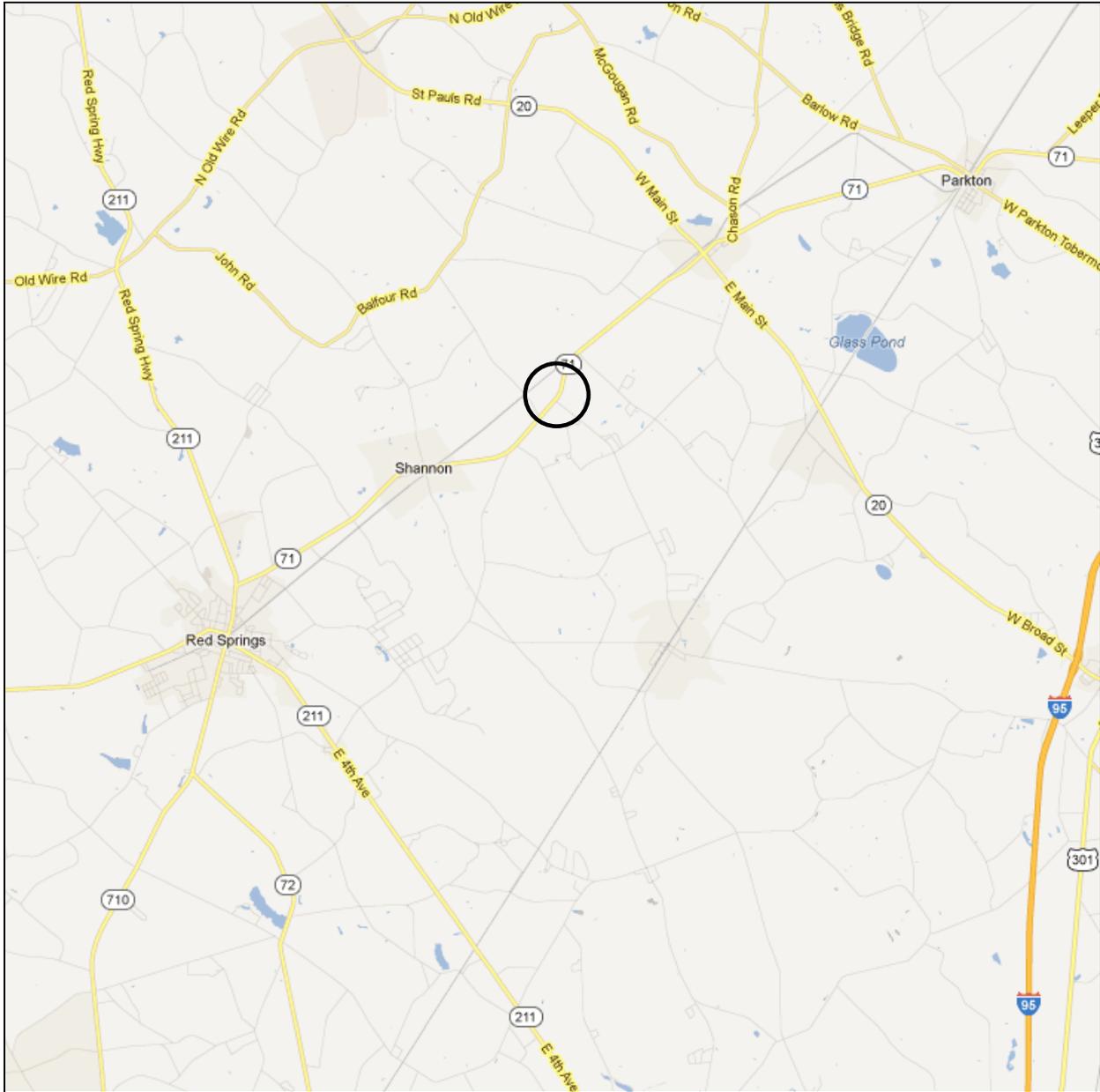
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 06-05-208 located at the Intersection of NC 71 and SR 1752 (Rennert Road) in Robeson County, between the Communities of Shannon and Lumber Bridge.





Aerial Map from BING 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 NC 71 southbound left turn lane. NC 71 and SR 1752 are both two-lane facilities at the subject intersection with speed limits of 55 mph on all approaches. The subject location is a three-leg intersection, which is controlled by dual posted stop signs on SR 1752 (Rennert Road).

The original statement of problem stated the intersection was experiencing a pattern of rear-end and left turn same road type crashes due to southbound vehicles stopped on NC 71 while waiting to turn left onto SR 1752. The intersection is located right after a horizontal curve on NC 71, which may have limited the sight distance.

The initial crash analysis was completed from April 18, 2000 to April 19, 2005 with three (3) rear-end crashes and two (2) left turn same roadway including one fatality crash. The final completion date for the improvement at the subject intersection was on February 19, 2008 with a total cost of \$235,000.

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 were the months of December 2007 through February 2008. The before period consisted of reported crashes from February 1, 2003 through November 30, 2007 (4 years and 10 months); and the after period consisted of reported crashes from March 1, 2008 through December 31, 2012 (4 years and 10 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 and aerial map for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Left Turn Lane Related Crashes were the target crashes for the applied countermeasure. The Left Turn Crash types considered are as follows: Left turn, same roadway and Rear-End (Turn or Slow/Stop) on the southbound NC 71 approach.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	14	7	- 50.0 %
Total Severity Index	10.11	5.23	- 48.3 %
Target Crashes – Left Turn	12	1	- 91.7 %
Target Crash Severity Index	11.02	8.40	- 23.8 %
Volume (2005, 2010)	9,900	9,400	- 5.1 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	1	0	- 100.0 %
Class A injury Crashes	0	0	N/A
Class B injury Crashes	2	2	0.0 %
Class C Injury Crashes	5	2	- 60.0 %
Property Damage Only	6	3	- 50.0 %

The naive before and after analysis at the treatment location resulted in a 50 percent reduction in Total Crashes, an 92 percent reduction in Left Turn Target Crashes, and a 48 percent reduction in the Total Severity Index. The before period ADT year was 2005 and the after period ADT year was 2010.

Results and Discussion

Referencing the *Collision Diagrams*, the before period presented a significant crash pattern of nine (9) southbound NC 71 rear-end collisions and three (3) left turn same roadway crashes where the left turn motorist chose an insufficient gap. One of the left turn crashes involved a tractor-trailer and resulted in a fatality. After the left turn lane installation, the rear-end crash pattern was completely eliminated and the left turn same road pattern was reduced to just one (1) crash. The left turn lane successfully removed the stopped vehicle from the southbound travel lane and allowed drivers to make wiser decisions.

Also, the before period intersection had one (1) intersection run through from SR 1752 which resulted in an angle crash with a southbound NC 71 vehicle. The after period had two (2) SR 1752 run through crashes; resulting in an angle crash and a run-off roadway straight collision. Additionally, rear-end crashes on the SR 1752 increased from zero (0) in the before period to two (2) in the after period.

Typically, Treatment Site Photos are provided from Google Street View. However, this location only had street view capabilities with the before period roadway and did not show the turn lane countermeasure present. Please see the Aerial Map from BING and *Collision Diagrams* which show the completed after period roadway characteristics.

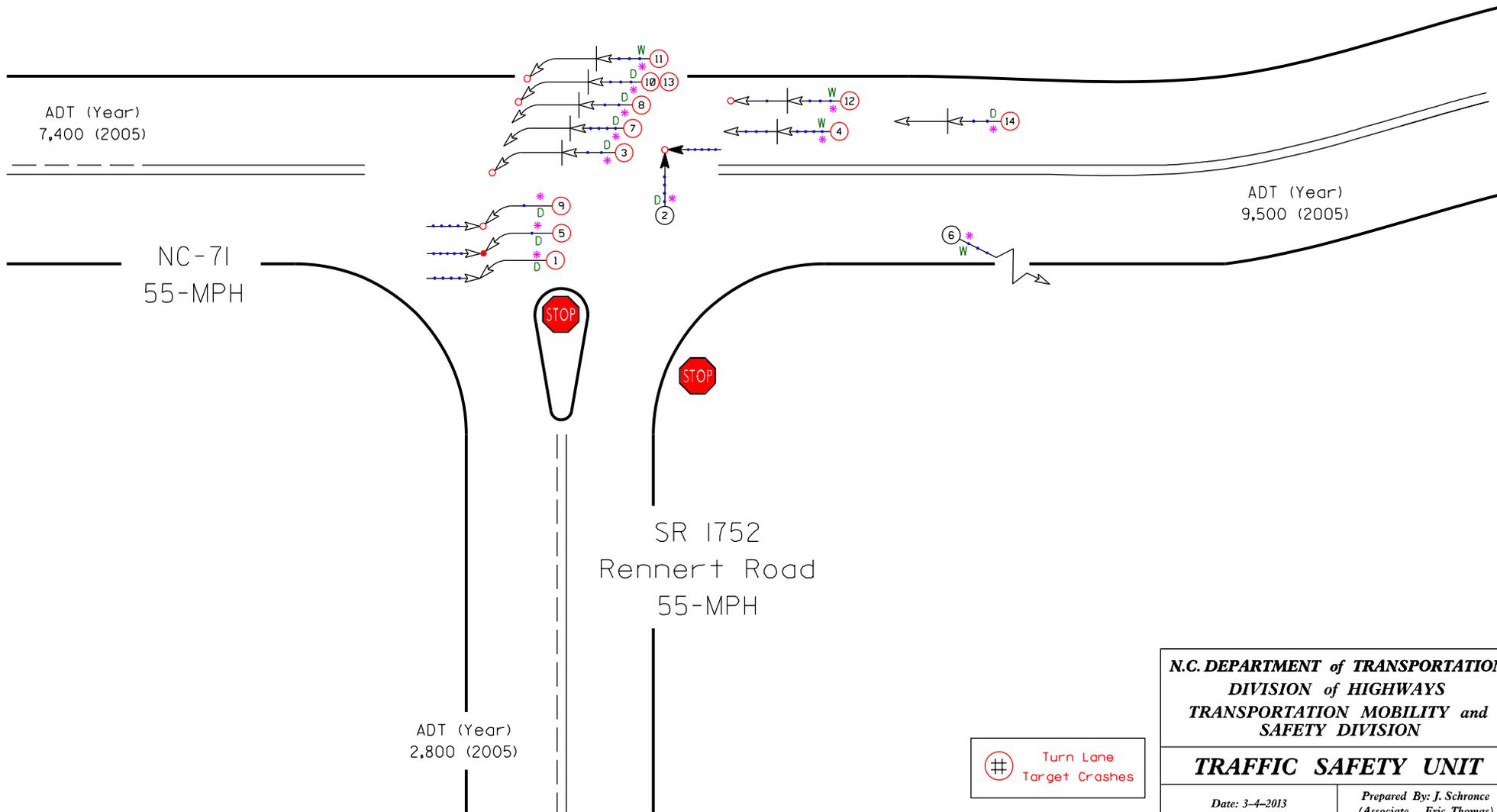
As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

SS# 06-05-208
 Order# 41000023508
 Robeson County
 BEFORE Period
 2/1/03 - 11/30/07



LEGEND

	MOVING VEHICLE		ANGLE		1 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	FIXED OBJECT		SIDESWIPE		30 MPH TO 39		DRY
	HEAD ON		OUT OF CONTROL		40 MPH TO 49		WET
	REAR END		OUT OF CONTROL		50 MPH TO 59		ICY OR SNOWY
	RAN OFF ROAD		BLURRY		60 MPH TO 69		TO AND UP
			FATALITY		70 MPH TO 79		ONLY
					80 MPH TO 89		
					90 MPH TO 99		
					100 MPH TO 109		
					110 MPH TO 119		
					120 MPH TO 129		
					130 MPH TO 139		
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					670 MPH TO 679		
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					910 MPH TO 919		
					920 MPH TO 929		
					930 MPH TO 939		
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					960 MPH TO 969		
					970 MPH TO 979		
					980 MPH TO 989		
					990 MPH TO 999		
					1000 MPH TO 1009		



Turn Lane
Target Crashes

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

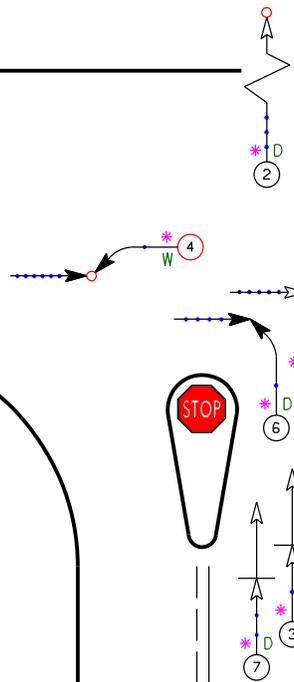
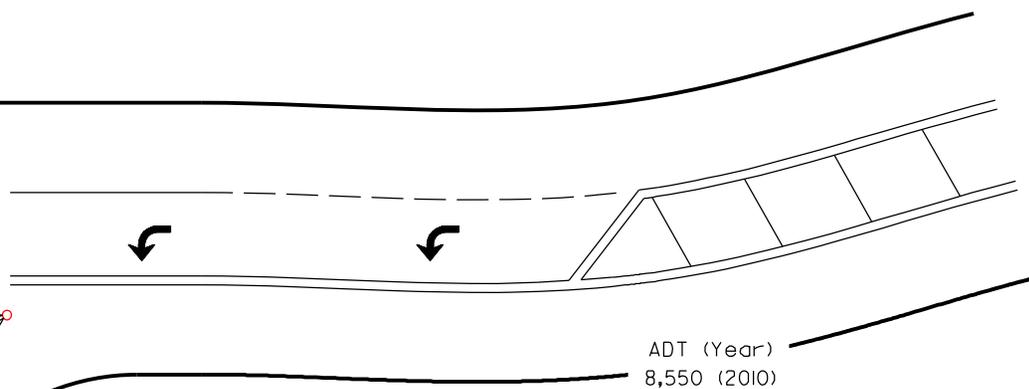
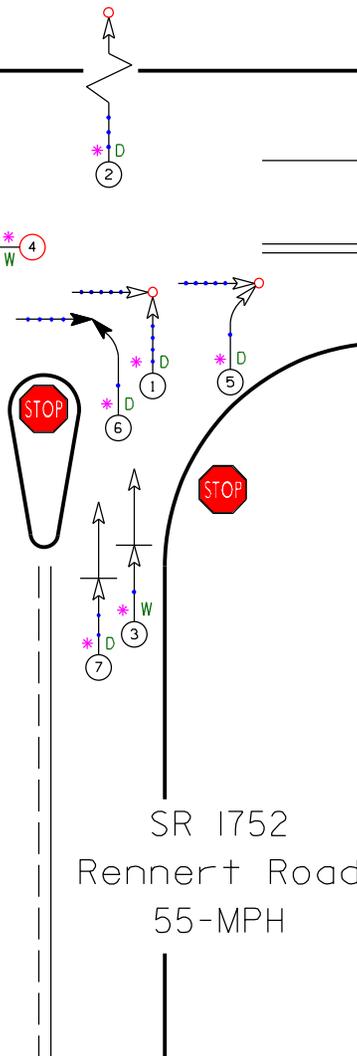
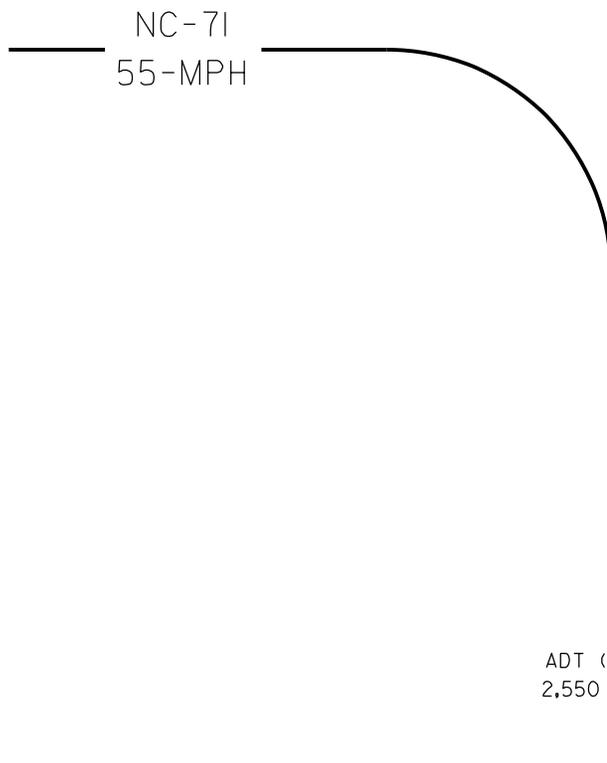
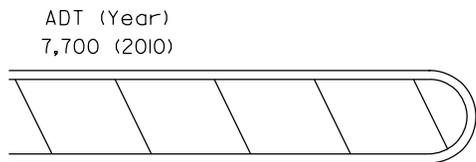
TRAFFIC SAFETY UNIT

Date: 3-4-2013
 Prepared By: J. Schronce
 (Associate - Eric Thomas)

SS# 06-05-208
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 Robeson County
 AFTER Period
 3/1/08 - 12/31/12



LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PAKED VEHICLE		SIDE SWIPE		40 MPH TO 49		DRY
	FIXED OBJECT		OUT OF CONTROL		50 MPH TO 59		WET
	HEAD ON		RAN OFF ROAD		60 MPH TO 69		ICY OR SNOWY
	REAR END		HURRY		TO AND UP		SPEED UNKNOWN
	RAN OFF ROAD		FATALITY		SPEED UNKNOWN		ONLY



Turn Lane
Target Crashes

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

TRAFFIC SAFETY UNIT

Date: 3-4-2013

Prepared By: J. Schronce
 (Associate - Eric Thomas)