Spot Safety Project Evaluation

Spot Safety Project # 06-04-200

Spot Safety Project Evaluation of the Installation of a Left-Turn Lane on SR 1104
SR 1106 (Bailey Lake Road) at SR 1104 (Strickland Bridge Road)
Cumberland County

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

Principal Investigator

_____ 9-23-2013

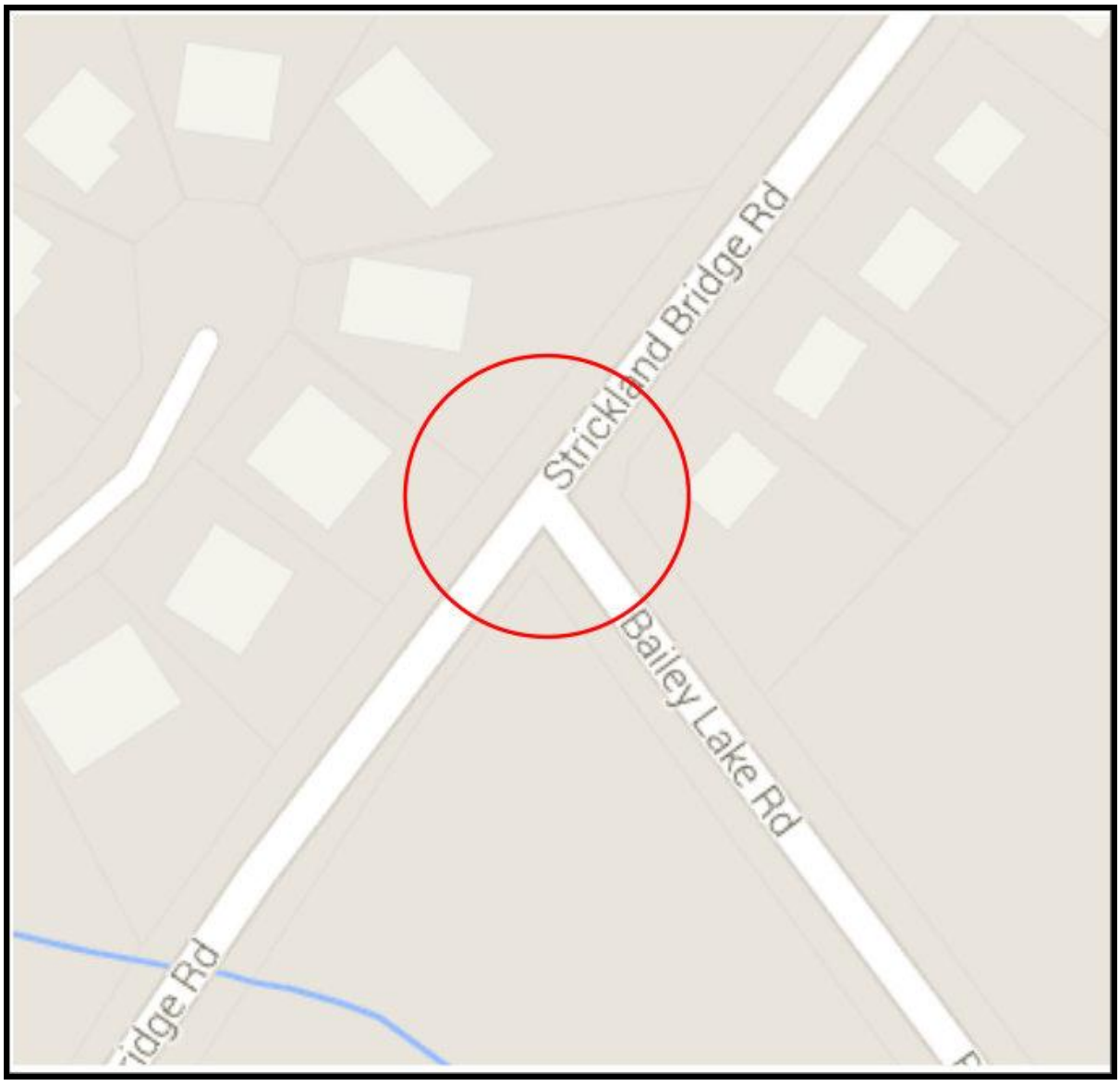
Elizabeth S. Scott — Date
Transportation Designer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 06-04-200 located at the Intersection of SR 1106 (Bailey Lake Road) at SR 1104 (Strickland Bridge Road) in Cumberland 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 addition of a left turn lane on SR 1104 (Strickland Bridge Road).

SR 1106 (Bailey Lake Road) and SR 1104 (Strickland Bridge Road) are both two-lane roadways. SR 1106 (Bailey Lake Road) intersects SR 1104 (Strickland Bridge Road) to form a T-intersection. The intersection is stop-controlled on SR 1106 (Bailey Lake Road). The speed limit on SR 1104 (Strickland Bridge Road) is 45-mph, and the speed limit on SR 1106 (Bailey Lake Road) is 50-mph.

The original statement of problem was the apparent pattern of rear-end type crashes at this location due to southbound vehicles stopped on SR 1104 (Strickland Bridge Road), waiting to turn left onto

SR 1106 (Bailey Lake Road). The initial crash analysis was completed from September 1, 1999 to August 31, 2004 with thirty-nine (39) reported crashes. The final completion date for the improvement at the subject intersection was on September 16, 2008 with a total cost of $150,000.00.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with the crash at the subject location, the crash data omitted from this analysis to consider for an adequate construction period were the months of June through September 2008. The before period consisted of reported crashes from August 1, 2003 through May 31, 2008 (4 years, 10 months); and the after period consisted of reported crashes from October 1, 2008 through July 31, 2013 (4 years, 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 for the SR 1106 (Bailey Lake Road) and SR 1104 (Strickland Bridge 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 Southbound Rear End Crashes were the target crashes for the applied countermeasure.

Treatment Information	**Before**	**After**	**Percent Reduction (-) Percent Increase (+)**
Total Crashes	24	12	- 50.0 %
Total Severity Index	3.77	4.7	+ 24.7 %
Target Crashes	8	2	- 75.0%
Target Crash Severity Index	2.85	4.7	+ 64.9 %
Volume (2005, 2011)	14,100	13,200	+ 6.4 %

Injury Crash Summary	**Before**	**After**	**Percent Reduction (-) Percent Increase (+)**
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	2	1	- 50.0 %
Class C Injury Crashes	7	5	- 28.6 %
Property Damage Only	15	6	- 60.0 %

The naive before and after analysis at the treatment location resulted in a 50 percent decrease in Total Crashes and a 24.7 percent increase in the Total Severity Index. The before period ADT year was 2005 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:

Additional Information	**Before**	**After**	**Percent Reduction (-) Percent Increase (+)**
Southbound Rear End Crashes	8	2	- 75.0%
Westbound Rear End Crashes	1	3	+ 200.0 %
Angle Crashes	5	0	- 100.0%
Left Turn, Different Roadway Crashes	6	3	- 50.0%
Ran Off Road Crashes	4	3	- 25.0 %

Results and Discussion

Referencing the *Collision Diagrams*, there were eight (8) target crashes in the before and two (2) target crashes in the after period. The target severity index increased by 64.9 percent in the after period. The Injury B crashes reduced from two (2) to one (1) and the Injury C crashes were reduced from seven (7) to five (5).

Angle and left turn, different roadway crashes also saw a decrease in the after period. There were five (5) angle crashes in the before period and zero (0) in the after. Left turn, different roadway crashes were decreased by 50 percent. However, westbound rear end crashes on SR 1106 increased from one (1) to three (3) crashes in the after time period.

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.

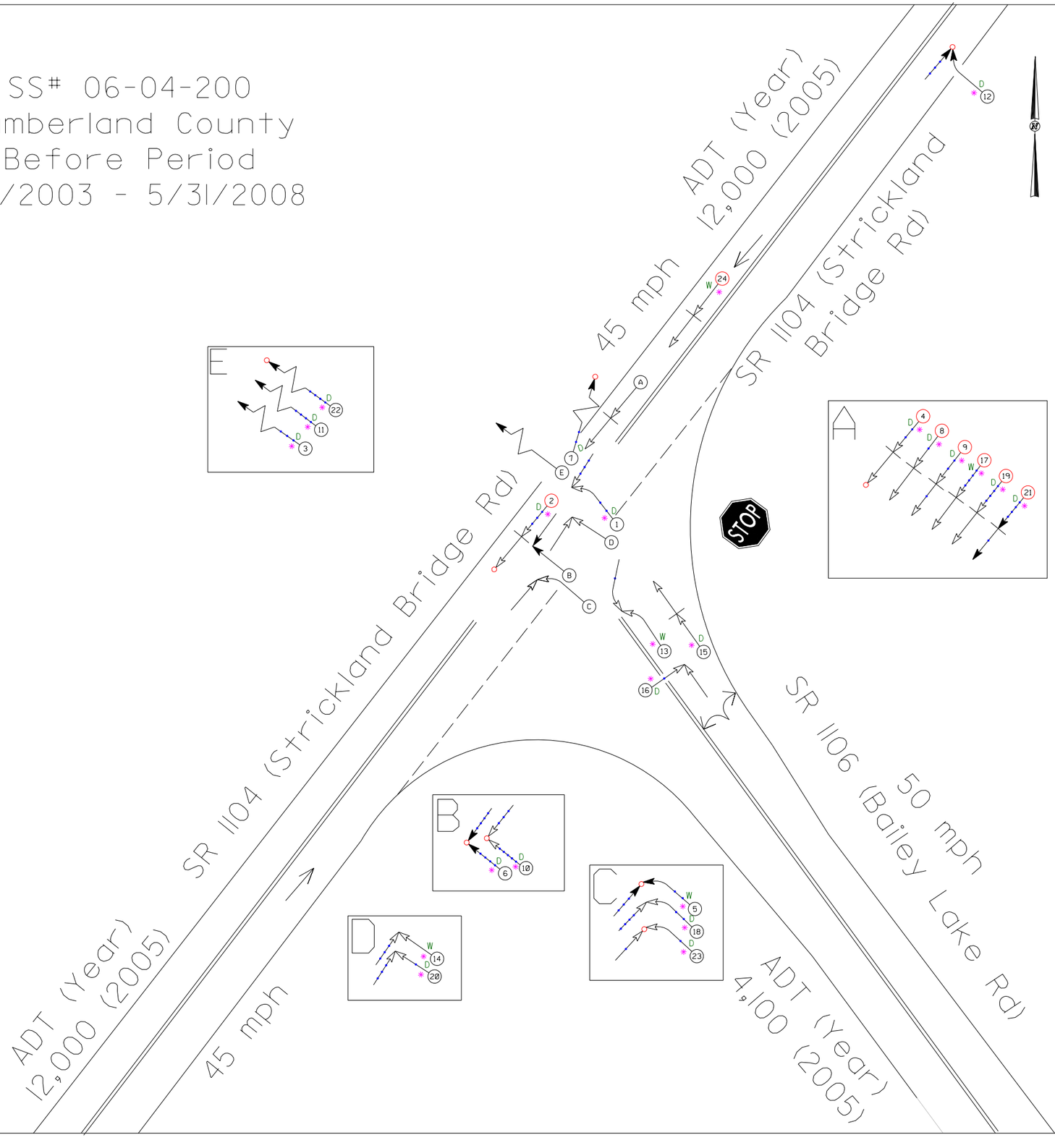
Treatment Site Photos from Google Earth

Google Maps (May 2012) – Looking North from SR 1104 (Strickland Bridge Road) Approach

Google Maps (May 2012) – Looking South from SR 1104 (Strickland Bridge Road) Approach

Google Maps (May 2012) – Looking East from SR 1106 (Bailey Lake Road) Approach

SS# 06-04-200
Cumberland County
Before Period
8/1/2003 - 5/31/2008



LEGEND

- MOVING VEHICLE
- PARKED VEHICLE
- PARKING VEHICLE
- MOVABLE OBJECT
- HEAD ON
- REAR END
- RAN OFF ROAD
- DAYLIGHT CRASH
- NIGHT CRASH
- ANGLE
- TURNING
- BACKING
- SIDESWIPE
- INJURY
- FATALITY
- 9 MPH OR LESS
- 10 MPH TO 19
- 20 MPH TO 29
- 30 MPH TO 39
- 40 MPH TO 49
- 50 MPH TO 59
- 60 MPH TO 69
- 70 AND UP
- SPEED UNKNOWN

A	ANIMAL
P	PEDESTRIAN
B	BICYCLE
T	TRAIN
*	DRIVER AT FAULT
D	DRY
W	WET
I	ICY OR SNOWY
O	Other

(#) Target Crashes

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

Date: 9/20/2013

Prepared By: KRG

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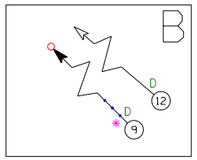
SS# 06-04-200
Cumberland County
After Period
10/1/2008 - 7/31/2013



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