

Spot Safety Project Evaluation

Spot Safety Project # 05-00-220

Spot Safety Project Evaluation for Installation of Railroad Preemption and Left-Turn Lane

**SR 1011 (North Salem Street/Old Apex Road) and SR 1308 (Laura Duncan Road)
Wake County**

Documents Prepared By:

AECOM Technical Services of North Carolina, Inc.

For:

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

Principal Investigator

Heath Gore, PE

Heath Gore
AECOM

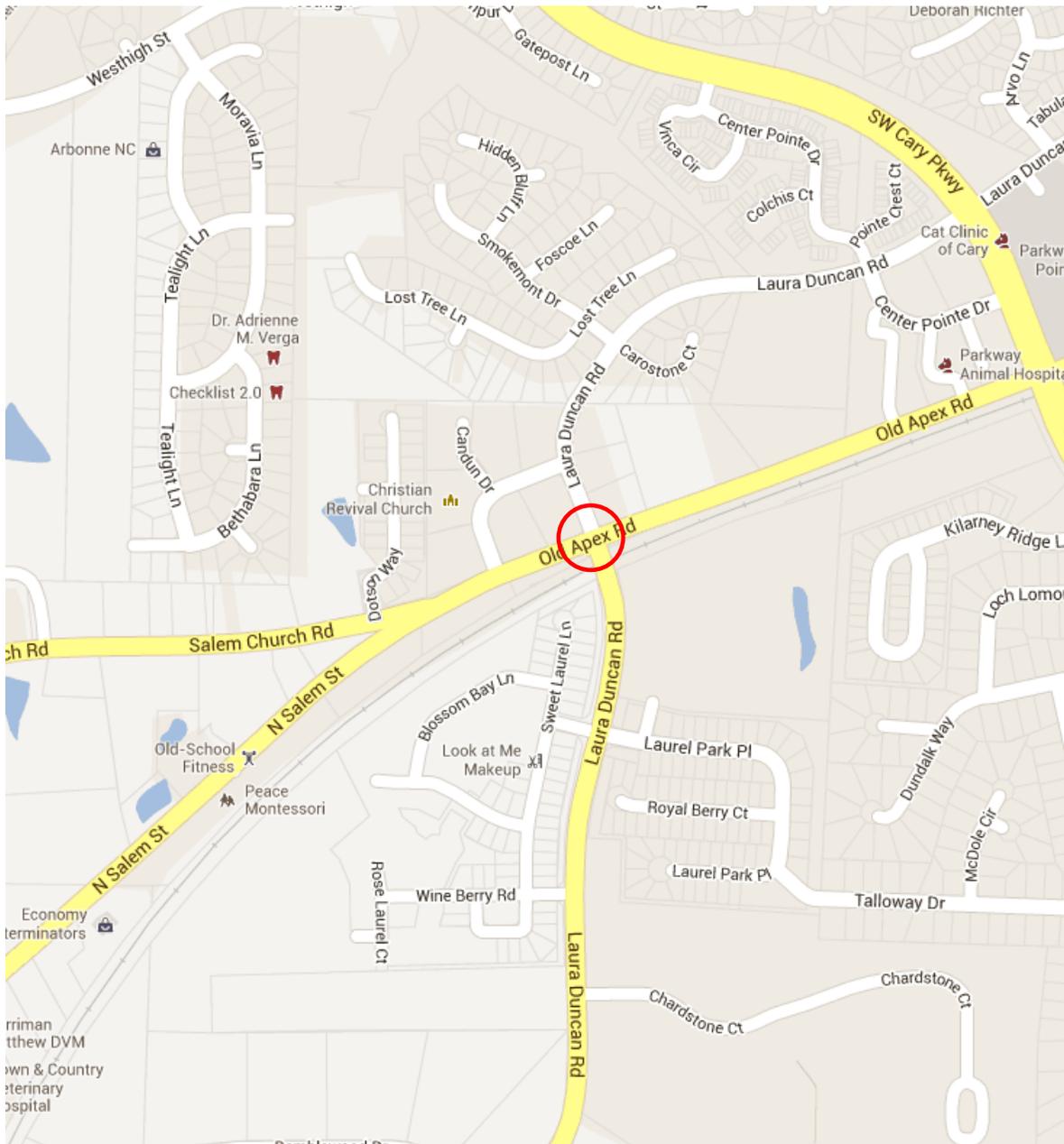
6-19-2013
Date

Spot Safety Project Evaluation Documentation

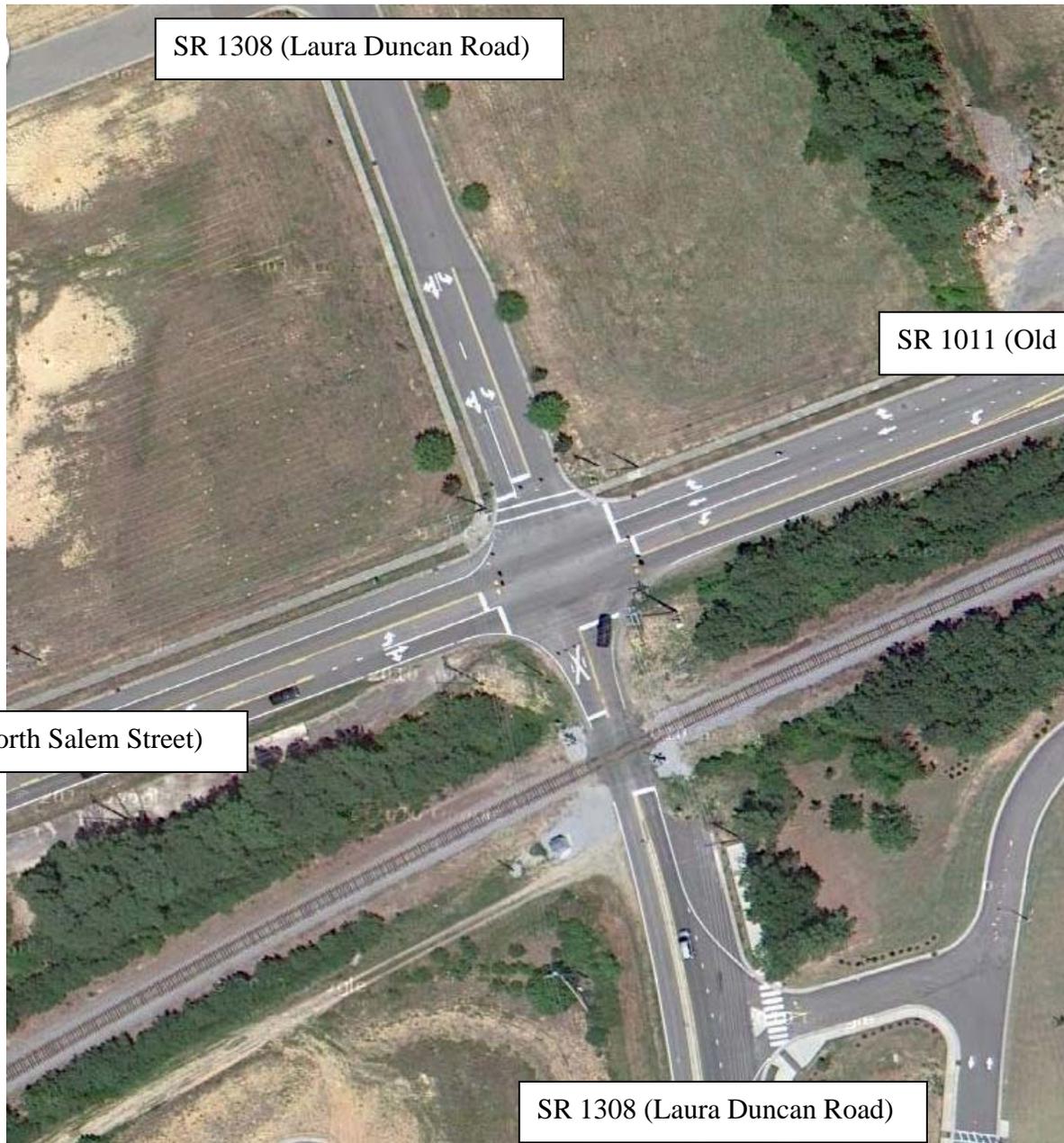
Subject Location

Evaluation of Spot Safety Project Number 05-00-220 located at the intersection of SR 1011 (North Salem Street/Old Apex Road) and SR 1308 (Laura Duncan Road) in Apex in Wake County.

The Sig ID is 05-1487 for this 3-Phase Fully Actuated with Railroad Preemption Traffic Signal.



Location Map Provided from Google Maps



Aerial Map 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 installation of a traffic signal with railroad preemption and construction of a westbound left-turn lane. It should be noted that a westbound left-turn lane appears to be already in place in the before period and a right-turn lane was installed in the winter of 2004.

SR 1011 (North Salem Street/Old Apex Road) is a two-lane facility with turn lanes on both approaches of the intersection and a speed limit of 45 mph. SR 1308 (Laura Duncan Road) is a

two-lane facility with a speed limit of 45 mph on the northbound approach and 25 mph on the southbound approach. There is also a left-turn lane on the southbound approach.

The original statement of problem was that traffic volumes at the intersection have increased to where motorists cannot maneuver safely through the intersection. The initial crash analysis was completed from August 1, 1997 to July 31, 2000 with eighteen (18) total reported crashes, of which there were nine (9) angle crashes. The final completion date for the improvement at the subject intersection was on July 25, 2008 with a total cost of \$117,600.00.

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 June through August 2008. The before period consisted of reported crashes from October 1, 2003 through May 31, 2008 (4 years 8 months); and the after period consisted of reported crashes from September 1, 2008 through April 30, 2013 (4 years 8 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 1011 (North Salem Street/Old Apex Road) and SR 1308 (Laura Duncan Road) 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 Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash Types considered are as follows: Left-turn, same roadway; Left-turn, different roadways; Right-turn, same roadway; Right-turn, different roadways; Head-on; and Angle.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	29	9	- 68.9 %
Total Severity Index	3.55	3.47	- 0.8 %
Target Crashes	16	5	- 68.8 %
Target Crash Severity Index	4.24	3.96	- 6.6%
Volume (2006, 2010)	15,600	14,480	-7.2 %

<u>Injury Crash Summary</u>	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	3	3	0.0 %
Class C Injury Crashes	7	0	-100.0 %
Property Damage Only	19	6	- 68.4 %

The naive before and after analysis at the treatment location resulted in a 69 percent reduction in Total Crashes, a 69 percent reduction in Target Frontal Impact Crashes and a 5 percent reduction in the Total Severity Index. The before period ADT year was 2006 and the after period ADT year was 2010.

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

<u>Additional Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Angle	11	4	-63.6 %
Rear End Slow or Stop	6	3	- 50.0 %

Results and Discussion

Referencing the *Collision Diagrams*, target crashes (Frontal Impact Crashes) experienced a reduction from 16 crashes in the before period to 5 crashes in the after period. The installation of the signal was beneficial in reducing the target crashes at this location during the after period.

Angle crashes decreased from 11 crashes in the before period to 4 crashes in the after period. Also, rear end crashes decreased from 6 crashes in the before period to 3 in the after period.

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 from Google Street View



Google Maps (Image Date: 10/07) - Looking North on SR 1308 (Laura Duncan Rd) Approach



Google Maps (Image Date: 10/07) - Looking South on SR 1308 (Laura Duncan Rd) Approach



Google Maps (Image Date: 5/12) – Looking East from SR 1011 (North Salem Street) Approach



Google Maps (Image Date: 5/12) – Looking West from SR 1011 (Old Apex Road) Approach

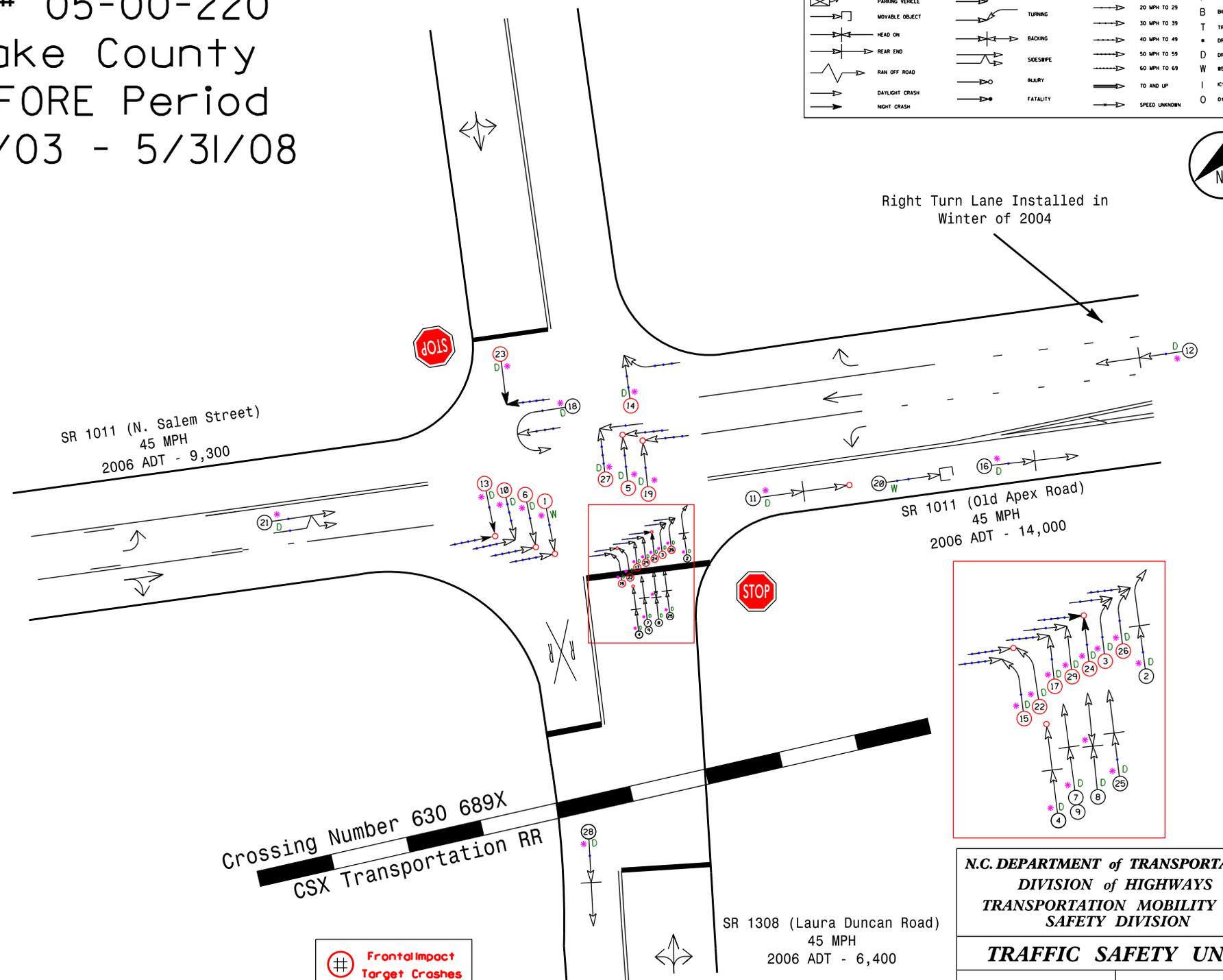
SS# 05-00-220
 Wake County
 BEFORE Period
 10/1/03 - 5/31/08

SR 1308 (Laura Duncan Road)
 25 MPH
 2006 ADT - 1,500 (Assumed)

LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		A ANIMAL
	PARKED VEHICLE		TURNING		10 MPH TO 19		P PEDESTRIAN
	PARKING VEHICLE		BACKING		20 MPH TO 29		B BICYCLE
	MOVABLE OBJECT		SIDESWIPE		30 MPH TO 39		T TRAIN
	HEAD ON		INJURY		40 MPH TO 49		* DRIVER AT FAULT
	REAR END		FATALITY		50 MPH TO 59		D DRY
	RAN OFF ROAD		TO AND UP		60 MPH TO 69		W WET
	DAYLIGHT CRASH		SPEED UNKNOWN		9 MPH OR LESS		I ICY OR SNOWY
	NIGHT CRASH				10 MPH TO 19		O Other



Right Turn Lane Installed in Winter of 2004



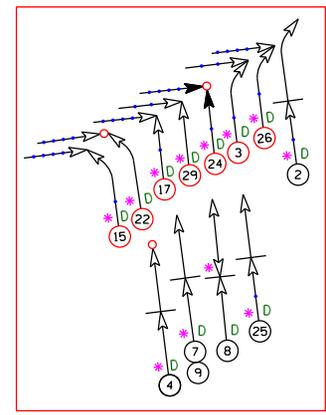
SR 1011 (N. Salem Street)
 45 MPH
 2006 ADT - 9,300

SR 1011 (Old Apex Road)
 45 MPH
 2006 ADT - 14,000

Crossing Number 630 689X
 CSX Transportation RR

SR 1308 (Laura Duncan Road)
 45 MPH
 2006 ADT - 6,400

Frontal Impact Target Crashes



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

TRAFFIC SAFETY UNIT

Date: 6-19-2013

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SS# 05-00-220
Wake County
AFTER Period
9/1/08 - 4/30/13

SR 1308 (Laura Duncan Road)
25 MPH
2010 ADT - 1,500 (Assumed)

LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		A ANIMAL
	PARKED VEHICLE		TURNING		10 MPH TO 19		P PEDESTRIAN
	PARKING VEHICLE		BACKING		20 MPH TO 29		B BICYCLE
	MOVABLE OBJECT		SIDESWIPE		30 MPH TO 39		T TRAIN
	HEAD ON		INJURY		40 MPH TO 49		* DRIVER AT FAULT
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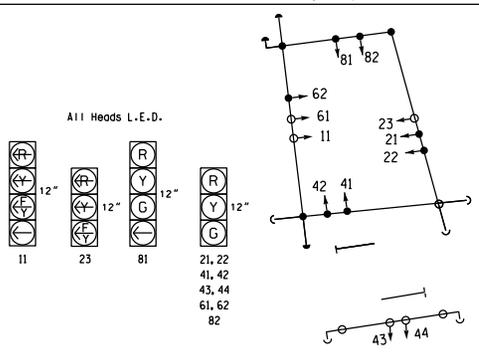
SR 1011 (N. Salem Street)
45 MPH
2010 ADT - 8,200

SR 1011 (Old Apex Road)
45 MPH
2010 ADT - 13,000

Crossing Number 630 689X
CSX Transportation RR

SR 1308 (Laura Duncan Road)
45 MPH
2010 ADT - 6,250

SIG ID 05-1487 (3 Phase Fully Actuated with Railroad Preemption)



Frontal Impact
Target Crashes

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SAFETY DIVISION

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