

# Spot Safety Project Evaluation

Spot Safety Project # 11-07-204

## Spot Safety Project Evaluation of the Signal Installation US-21 Northbound Ramp at NC 268 (CC Camp Rd) Surry 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



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Elizabeth S. Scott

4-22-2013  
Date

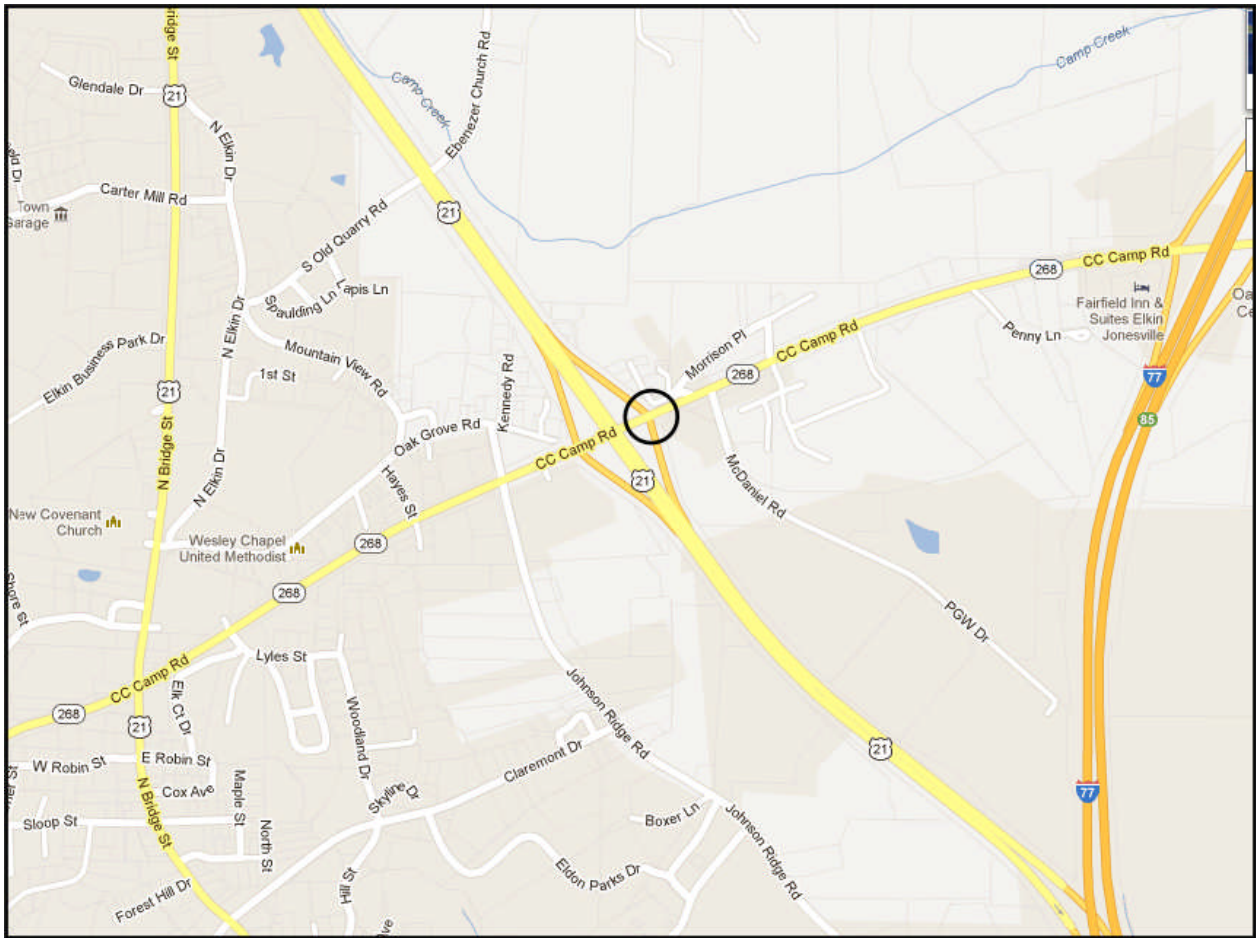
Transportation Designer

# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 11-07-204 located at the Intersection of US-21 NB ramps at NC 268 (CC Camp Road) in Surry County.

The Sig ID is 11-1418 for this 2-Phase Actuated Traffic Signal.





**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 signal.

NC 268 (CC Camp Road) is a 4-lane facility that widens for a left turn lane at the intersection. The northbound US 21 ramps are single lane ramps. The off-ramp widens for a left and right turn lane at the intersection. The speed limit along NC 268 is 45-mph. There is no posted speed limit on the US 21 ramps. The subject location is a four-leg intersection, which was stop-controlled on the northbound US 21 off-ramp.

The original statement of problem was the existence of angle crash patterns. The initial crash analysis was completed from March 1, 2002 to February 28, 2007 with twelve (12) reported crashes. The final completion date for the improvement at the subject intersection was on July 9, 2008 with a total cost of \$60,000.00.

### 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 May through July 2008. The before period consisted of reported crashes from October 1, 2003 through April 30, 2008 (4 years, 7 months); and the after period consisted of reported crashes from August 1, 2008 through February 28, 2013 (4 years, 7 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 268 and US 21 NB ramp 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 Frontal Impact Crashes were the target crashes for the applied countermeasure. Frontal Impact crashes include: 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	14	7	- 50.0 %
Total Severity Index	9.59	1.00	- 89.6 %
Target Crashes	10	5	- 50.0 %
Target Crash Severity Index	13.02	1.00	- 92.3 %
Volume (2006, 2010)	12,600	18,400	+ 46.0 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	- 100.0 %
Class B injury Crashes	5	0	- 500.0 %
Class C Injury Crashes	1	0	- 100.0 %
Property Damage Only	7	7	0.0 %

The naive before and after analysis at the treatment location resulted in a 50.0 percent reduction in Total Crashes, a 50 percent reduction in Target Frontal Impact Crashes, and a 89.6 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 (+)
Eastbound NC 268 LTDR (Target)	9	4	- 55.6 %
Northbound Rear-end Crashes	2	0	- 200.0 %
Westbound Rear-end Crashes	0	2	+ 200.0 %

## Results and Discussion

Referencing the *Collision Diagrams*, the target crashes experienced a 60 percent reduction in frontal impact collisions. From the additional information chart above, the eastbound NC 268 pattern was reduced by 55.6 percent. There were four (4) left turn, different roadway crashes in the after period on the eastbound leg of NC 268. These were described in the crash reports as the eastbound travelling vehicles on the NC 268 being at fault by running the red light. In comparison, the before period left turn, different roadway crashes at the NC 268 eastbound leg and US 21 northbound off-ramp; the vehicles travelling on the off-ramp were all indicated as at fault. The target severity was also reduced from the before period to the after period. There were no injury target crashes in the after period.

The two (2) rear-end crashes occurring in the before period occurred on the stop-controlled US 21 northbound off-ramp. The two (2) rear-end crashes in the after period occurred on the signal-controlled westbound leg of NC 268.

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 (June 2009) – Looking South on US 21 Approach**



**Google Maps (June 2009) – Looking West on NC 268 Approach**



**Google Maps (June 2009) – Looking East from NC 268 Approach**

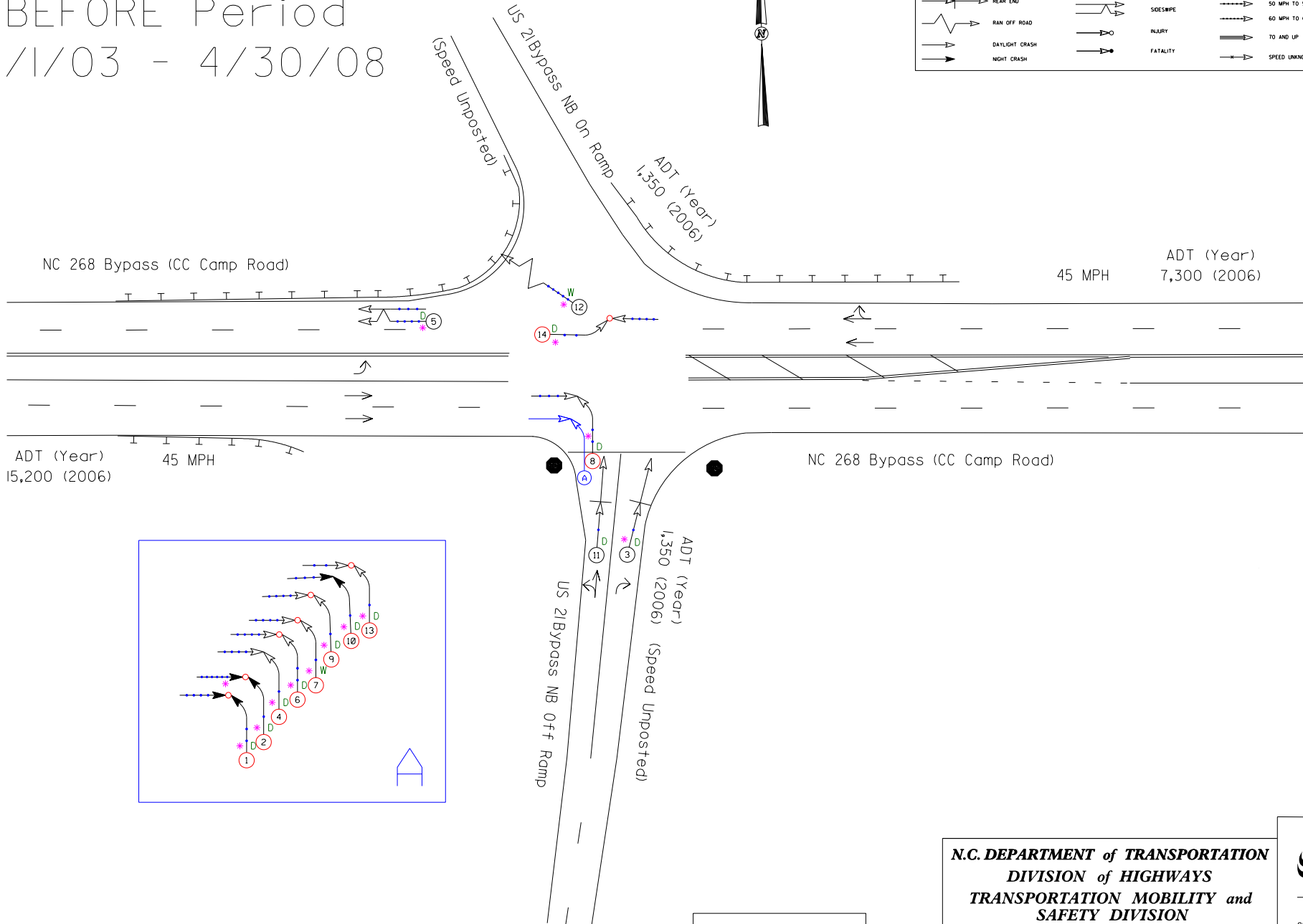


**Google Maps (June 2009) – Looking North US 21 Off-Ramp**

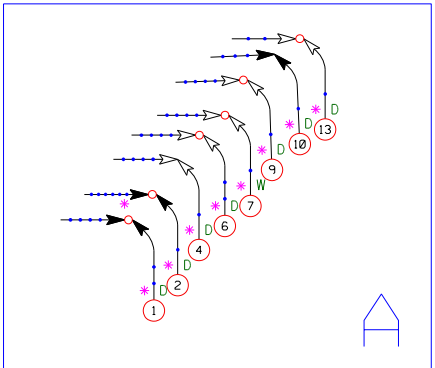
SS# 11-07-204  
 Surry County  
 BEFORE Period  
 10/1/03 - 4/30/08

**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 TRUCK
	HEAD ON		INJURY		40 MPH TO 49		* DRIVER AT FAULT
	REAR END		FATALITY		50 MPH TO 59		D DRY
	RAN OFF ROAD		WET		60 MPH TO 69		I ICY OR SNOWY
	DAYLIGHT CRASH		SPEED UNKNOWN		70 AND UP		O Other
	NIGHT CRASH				9 MPH OR LESS		



ADT (Year)  
15,200 (2006)  
45 MPH



Frontal Impact  
Target Crashes

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

**TRAFFIC SAFETY UNIT**

Date: 4-16-2013

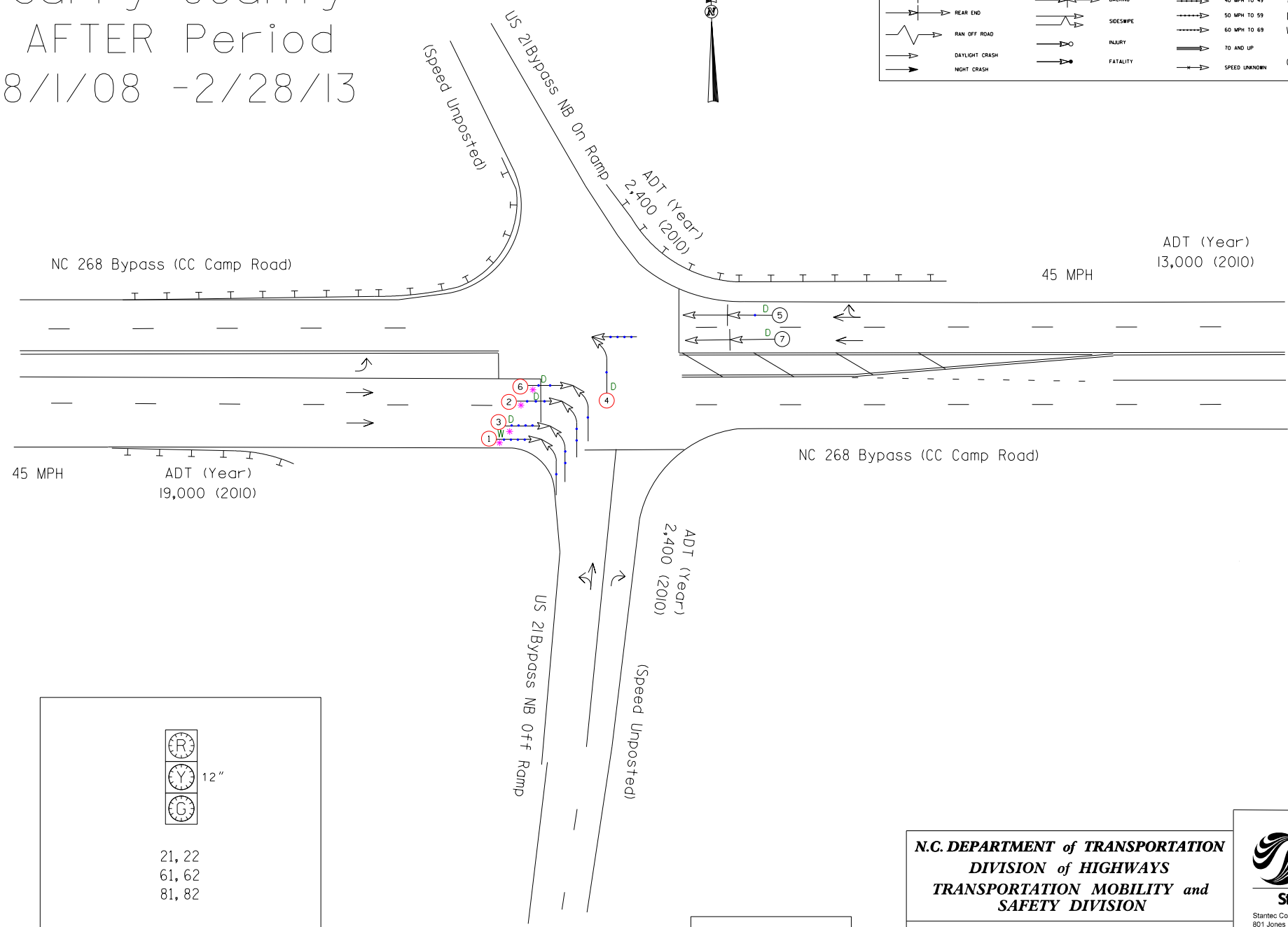
Prepared By: ESS

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SS# 11-07-204  
 Surry County  
 AFTER Period  
 8/1/08 - 2/28/13

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		WET		60 MPH TO 69		I ICY OR SNOWY
	DAYLIGHT CRASH		SPEED UNKNOWN		70 AND UP		O Other
	NIGHT CRASH						



	12"
21, 22	
61, 62	
81, 82	
SIG. INVENTORY NO. 11-1418	

Frontal Impact  
 Target Crashes

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