

Spot Safety Project Evaluation

Spot Safety Project # 12-05-204

Spot Safety Project Evaluation for Constructing an Eastbound Left-Turn Lane on NC 150

NC 150 (College Ave) and SR 1253 (Charles Rd)
Cleveland 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



Austin Bell
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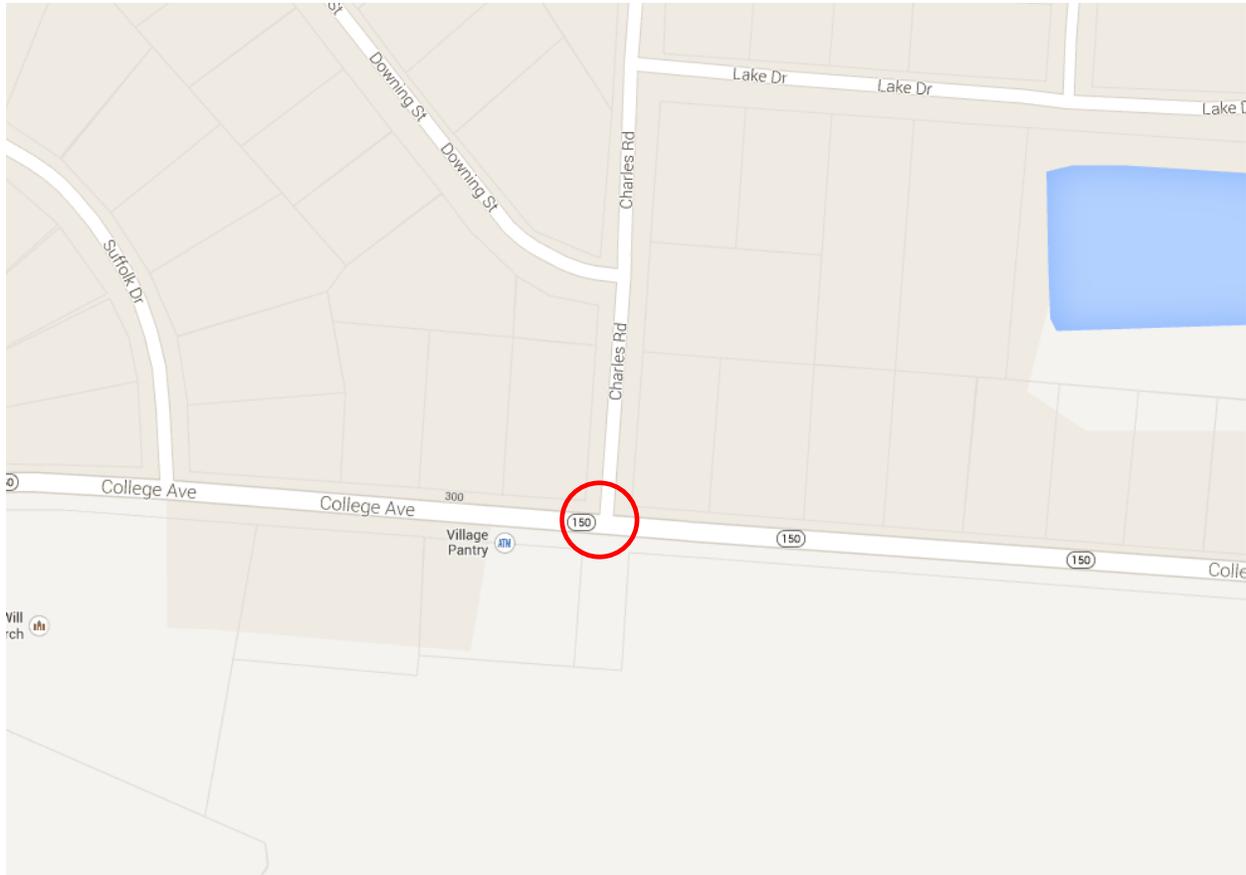
7-24-2013

Date

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 12-05-204 located at the unsignalized intersection of NC 150 (College Ave) and SR 1253 (Charles Rd) in Shelby in Cleveland County.



Location Map Provided from Google Maps



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 construction of an eastbound left-turn lane on NC 150 (College Avenue).

NC 150 (College Ave) is a two-lane facility with turn lanes on both approaches of the intersection and a speed limit of 45 mph. SR 1253 (Charles Rd) is a two-lane roadway with a speed limit of 45 mph. It should be noted the left turn lanes on NC 150 (College Avenue) were not installed at the same time. The crash diagrams showed the eastbound left-turn lane in June 2008 and the westbound left-turn lane in August 2009. Therefore, to keep the before and after periods equal the construction period was adjusted to begin in June 2008 and end in August 2009.

The original statement of problem was that the eastbound direction was experiencing excessive rear end crashes. The initial crash analysis was completed from December 1, 1999 to November 30, 2004 with thirty seven (37) total reported crashes, of which twenty seven (27) were rear end, slow or stop crashes. The final completion date for the improvement at the subject intersection was on October 29, 2008 with a total cost of \$110,000.00.

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 June 2008 through August 2009. The before period consisted of reported crashes from September 1, 2004 through May 31, 2008 (3 years 9 months); and the after period consisted of reported crashes from September 1, 2009 through May 31, 2013 (3 years 9 months). The ending date for this analysis was determined by the date of available crash data at the time of analysis.

It should be noted that in addition to the intersection treatment analysis, the BP Gas Station was included in the study. The driveway is approximately 175' west of the study intersection on NC 150 (College Ave). The treatment data consisted of all crashes within 200 feet of the subject intersection for the NC 150 (College Ave) and SR 1235 (Charles Rd) approaches to include the gas station driveway. *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 Eastbound Rear End, Slow or Stop Crashes were the target crash for the applied countermeasure.

Table 1: Treatment Information – Countermeasure Signal Phase Upgrades			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	25	10	- 60.0 %
Total Severity Index	3.37	3.96	+ 17.5 %
Target Crashes	12	1	- 91.7 %
Target Crash Severity Index	4.08	1.00	- 75.5%
Volume (2006, 2011)	11,000	11,500	+ 4.5%
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	0	2	+ 100.0 %
Class C Injury Crashes	8	2	- 75.0%
Property Damage Only	17	6	- 64.7%

The naive before and after analysis at the treatment location resulted in a 60 percent decrease in Total Crashes, a 92 percent reduction in target rear end, slow or stop crashes, and a 76 percent decrease 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:

<u>Additional Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Angle	1	4	+ 300.0%
Westbound Rear End, Slow or Stop	9	2	- 77.8%

Results and Discussion

Referencing the *Collision Diagrams*, the total target crashes (Eastbound Rear End, Slow or Stop) experienced a decrease from 12 crashes in the before period to 1 crash in the after period. The installation of the eastbound left-turn lane was beneficial in reducing the target crash at this location during the after period.

Westbound rear end, slow or stop crashes decreased from 9 crashes in the before period to 2 crashes in the after period. It should be noted that 6 rear end, slow or stop crashes occurred at or near the westbound BP gas station driveway in the before period and 1 occurred in the after period. Also, angle crashes increased from 1 crash in the before period to 4 crashes in the after 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 Street View



Google Maps (Image Date: 4/12) – Looking East from NC 150 Approach



Google Maps (Image Date: 4/12) – Looking West from NC 150 Approach



Google Maps (Image Date: 4/12) - Looking South on SR 1253 (Charles Rd) Approach

SS# 12-05-204
 Cleveland County
 BEFORE Period
 9/1/04 - 5/31/08

SR 1253 (Charles Road)
 45 MPH
 2006 ADT-2,500

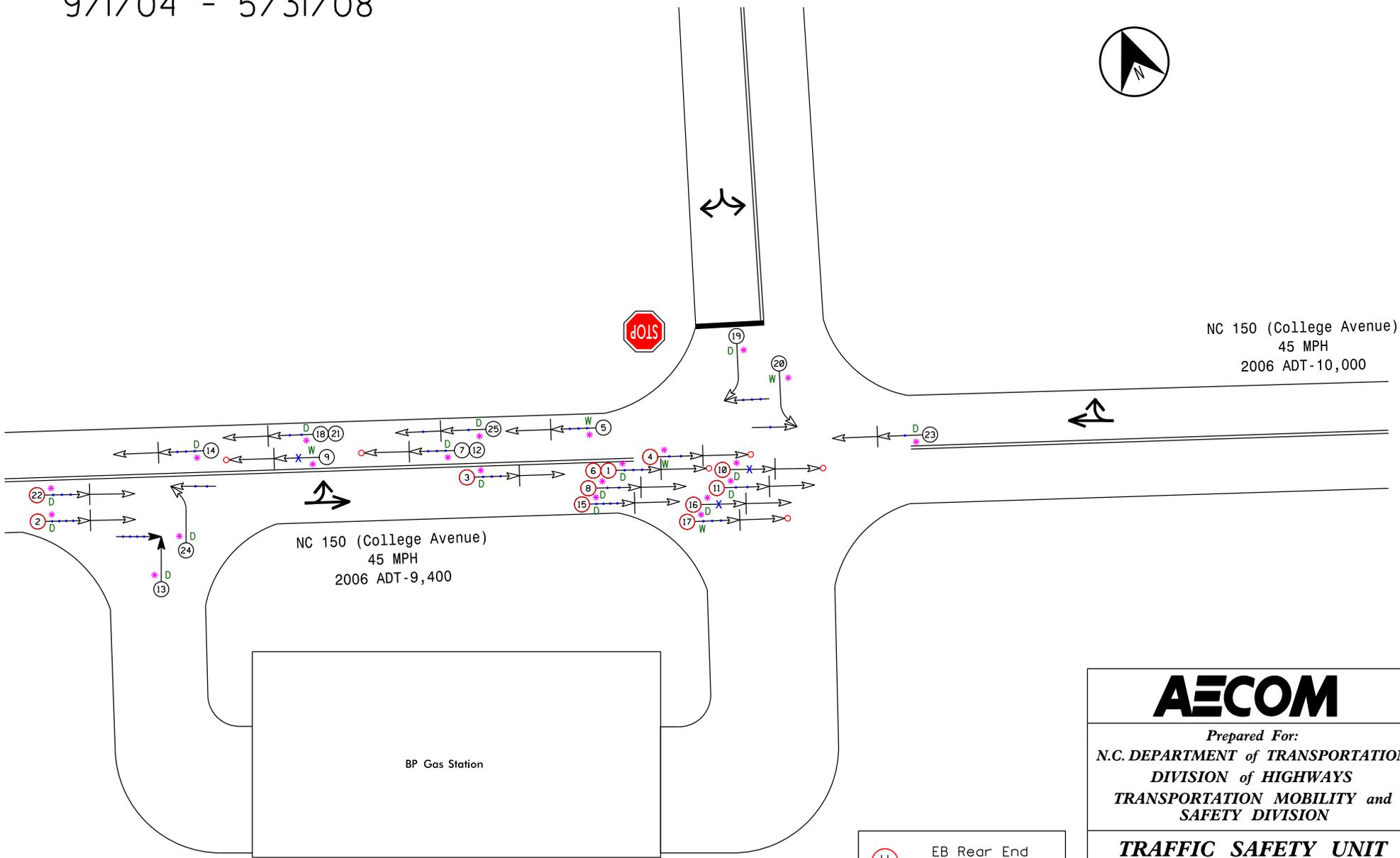
NC 150 (College Avenue)
 45 MPH
 2006 ADT-10,000

NC 150 (College Avenue)
 45 MPH
 2006 ADT-9,400

BP Gas Station

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKED VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		HURRY		50 MPH TO 59		ICE OR SNOW
	REAR END		FATALITY		60 MPH TO 69		SPEED UNINFORMED
	RAN OFF ROAD				TO AND UP		ONLY



EB Rear End Crashes

AECOM

Prepared For:
 N.C. DEPARTMENT of TRANSPORTATION
 DIVISION of HIGHWAYS
 TRANSPORTATION MOBILITY and SAFETY DIVISION

TRAFFIC SAFETY UNIT

Date: 7-24-2013 Prepared By: Austin Bell, EI

SS# 12-05-204
 Cleveland County
 AFTER Period
 9/1/09 - 5/31/13

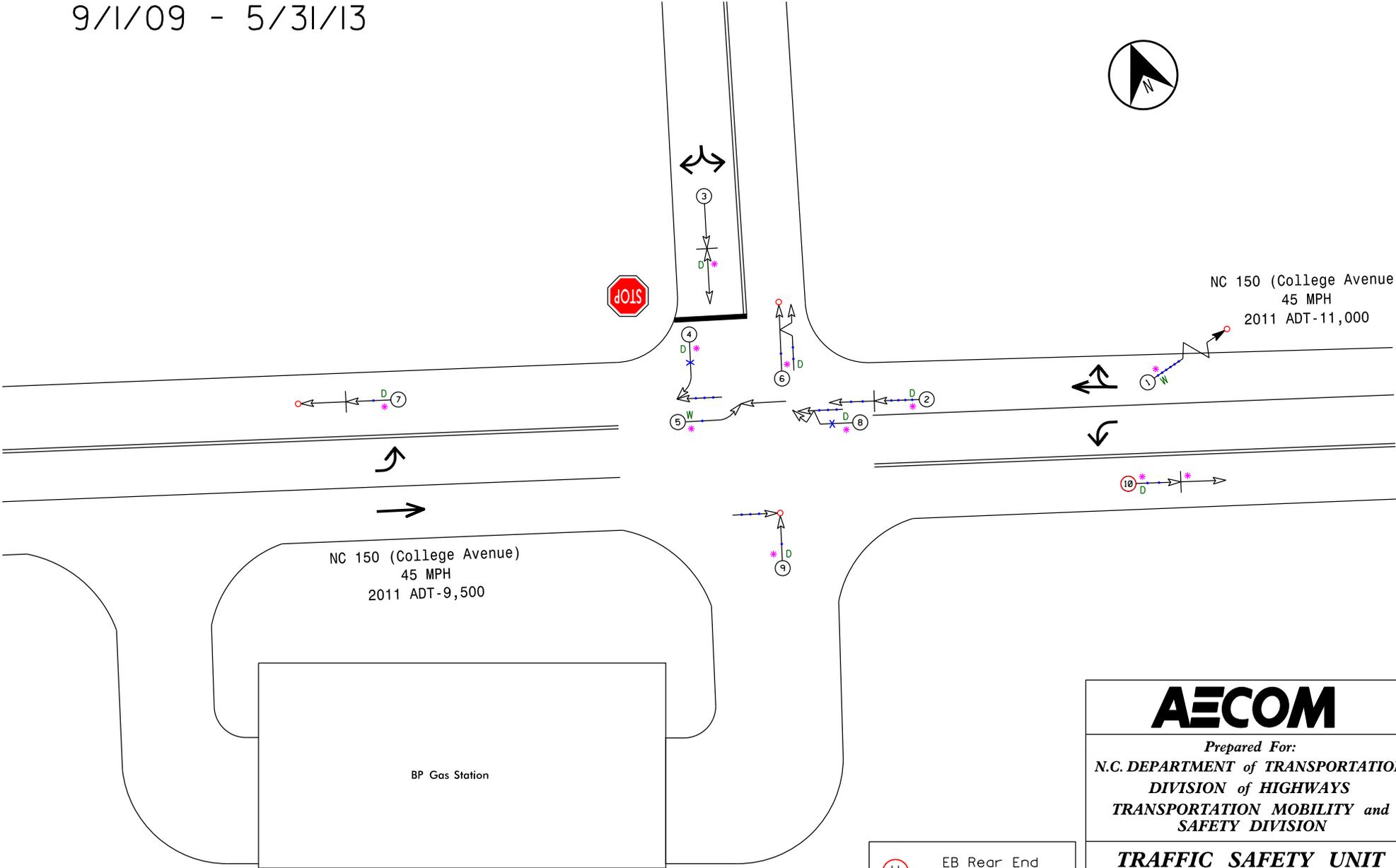
SR 1253 (Charles Road)
 45 MPH
 2011 ADT-2,400

NC 150 (College Avenue)
 45 MPH
 2011 ADT-11,000

NC 150 (College Avenue)
 45 MPH
 2011 ADT-9,500

BP Gas Station

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
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		HIT AND UP		50 MPH TO 59		ICE OR SNOW
	REAR END		HURRY		60 MPH TO 69		ONLY
	RAN OFF ROAD		FATALITY		TO AND UP		SPEED UNKNOWN



EB Rear End Crashes

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