

Spot Safety Project Evaluation

Project Log # 200704323

Spot Safety Project # 12-00-008

**Spot Safety Project Evaluation of the Actuated Flasher Installation
At the Intersection of NC 10 and SR 1727 (Boggs Rd) / SR 1810 (Balls Creek Rd)
Catawba County**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

Jason B. Schronce

9-26-2007
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 12-00-008 – The Intersection of NC 10 and SR 1727 (Boggs Road) / SR 1810 (Balls Creek Road) in Catawba County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of an actuated flasher; continuous yellow on mainline, single continuous red on side street stop signs, and also “Vehicle Entering” red for stop condition routes. NC 10 and SR 1727 / 1810 are both two-lane facilities at the subject intersection with no turn lanes and speed limits of 55 mph. The subject location is a crossroads type intersection, which is controlled by a stop signs on SR 1727 (Boggs Rd) / SR 1810 (Balls Creek Rd). A channelization island with dual posted stop signs also exists for the northbound SR 1810 approach.

The original statement of problem was the limited sight distance provided at the intersection. The sight distance from the side streets is restricted to approximately 475 feet westbound and 650 feet eastbound. This factor has yielded a frontal impact crash problem at the intersection. A request for a traffic signal was denied at this location due to low volumes but the actuated flasher was installed to counteract the crash problem.

The initial crash analysis was completed from June 1, 1997 to May 31, 2000 with sixteen (16) reported crashes, seven (7) of which were deemed correctable using this countermeasure. The final completion date for the improvement at the subject intersection was on February 5, 2002 with a total cost of \$15,000.00.

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 was from November 1, 2001 to April 30, 2002. The before period consisted of reported crashes from February 1, 1997 through October 31, 2001 (4 years and 9 months) and the after period consisted of reported crashes from May 1, 2002 through January 31, 2007 (4 years and 9 months). The ending date for this analysis was determined by the 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 photos 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.

Treatment Information			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	20	8	- 60.00 %
Total Severity Index	12.28	3.78	- 69.22 %
Target Crashes	15	3	- 80.00 %
Target Crash Severity Index	9.51	3.47	- 63.51 %
Volume	10,300	9,900	- 3.88 %
<u>Injury Crash Summary</u>			
Fatal injury Crashes	1	0	- 100.00 %
Class A injury Crashes	1	0	- 100.00 %
Class B injury Crashes	3	1	- 66.67 %
Class C Injury Crashes	7	2	- 71.43 %
Total Injury Crashes	12	3	- 75.00 %

The naive before and after analysis at the treatment location resulted in a 60 percent decrease in Total Crashes, an 80 percent decrease in Target Crashes, and a 69 percent decrease in the Total Severity Index. The before period ADT year was 1999 and the after period ADT year was 2004.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 60 percent decrease in Total Crashes and an 80 percent decrease in Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period. The flasher installation was very effective to increasing driver awareness and reducing crashes.

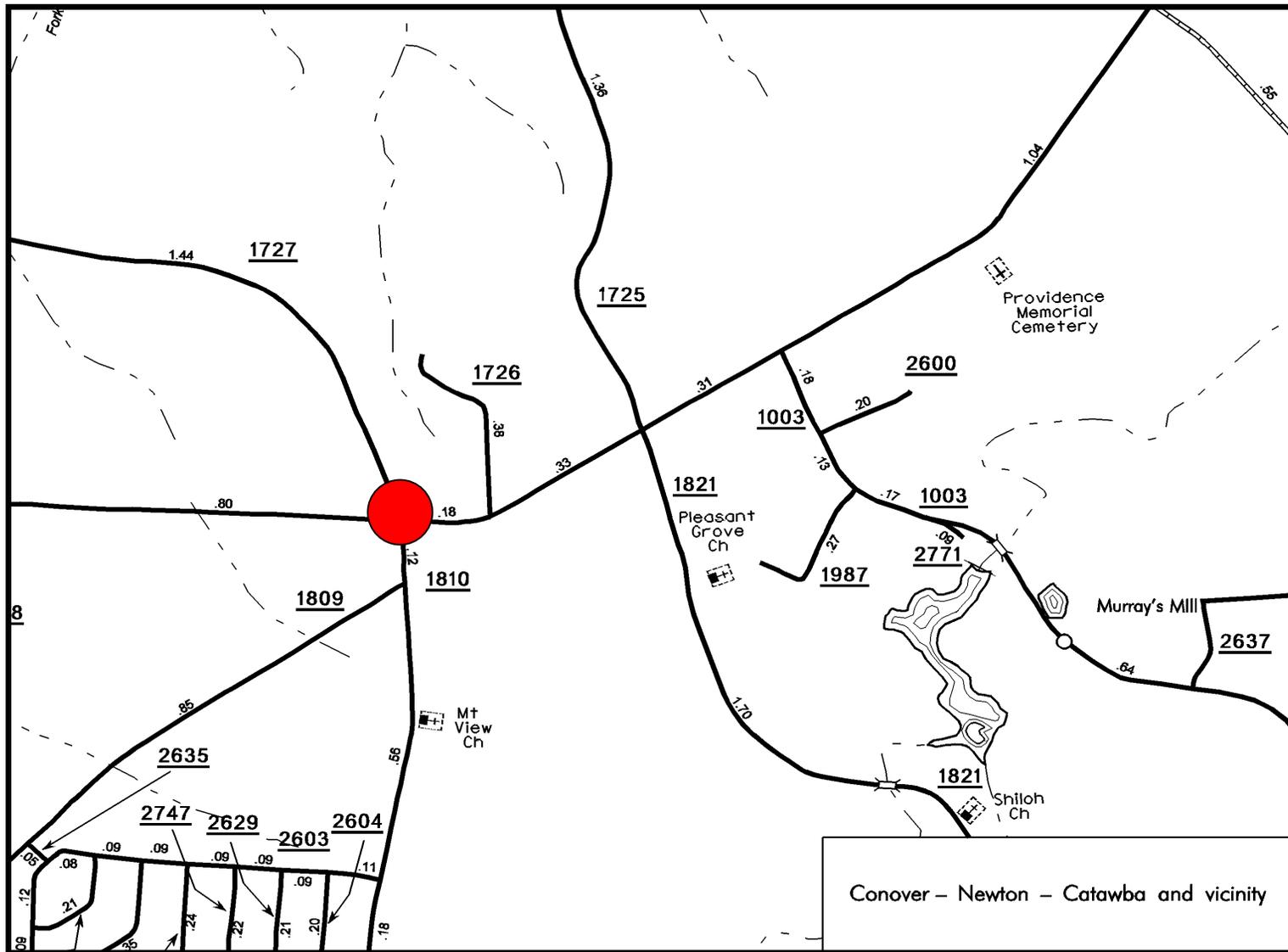
Referencing the *Collision Diagram*, a large portion of crashes at the intersection in the before period (11 of 20) were the result of a vehicle attempting to cross NC 10 resulting in an angle collision. After the flasher installation, this pattern was significantly reduced to just two (2).

The before period fatal at this intersection was a non-target incident where an intoxicated pedestrian stepped into the path of an approaching vehicle at night.

The calculated benefit to cost ratio for this project is 75.19 considering total crashes. The benefit to cost ratio considering only target crashes is 41.47. The benefits are calculated using the change in annual crash costs from the before to the after period. Operational and other benefits related to the project are not considered in this analysis. The costs of the project include the actual construction costs as well as the increase in annual maintenance and utility costs.

Please see the attached *Treatment Site Photos*. Photos are provided for all 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.

Location Map
Catawba County
Evaluation of Spot Safety Project # 12-00-008



Treatment Location: NC 10 at SR 1727 (Boggs Road) / SR 1810 (Balls Creek Road)

TREATMENT SITE PHOTOS TAKEN 8/27/2007



Traveling West on NC 10



Traveling East on NC 10



Traveling North on SR 1810 (Balls Creek Road)



Traveling North on SR 1810



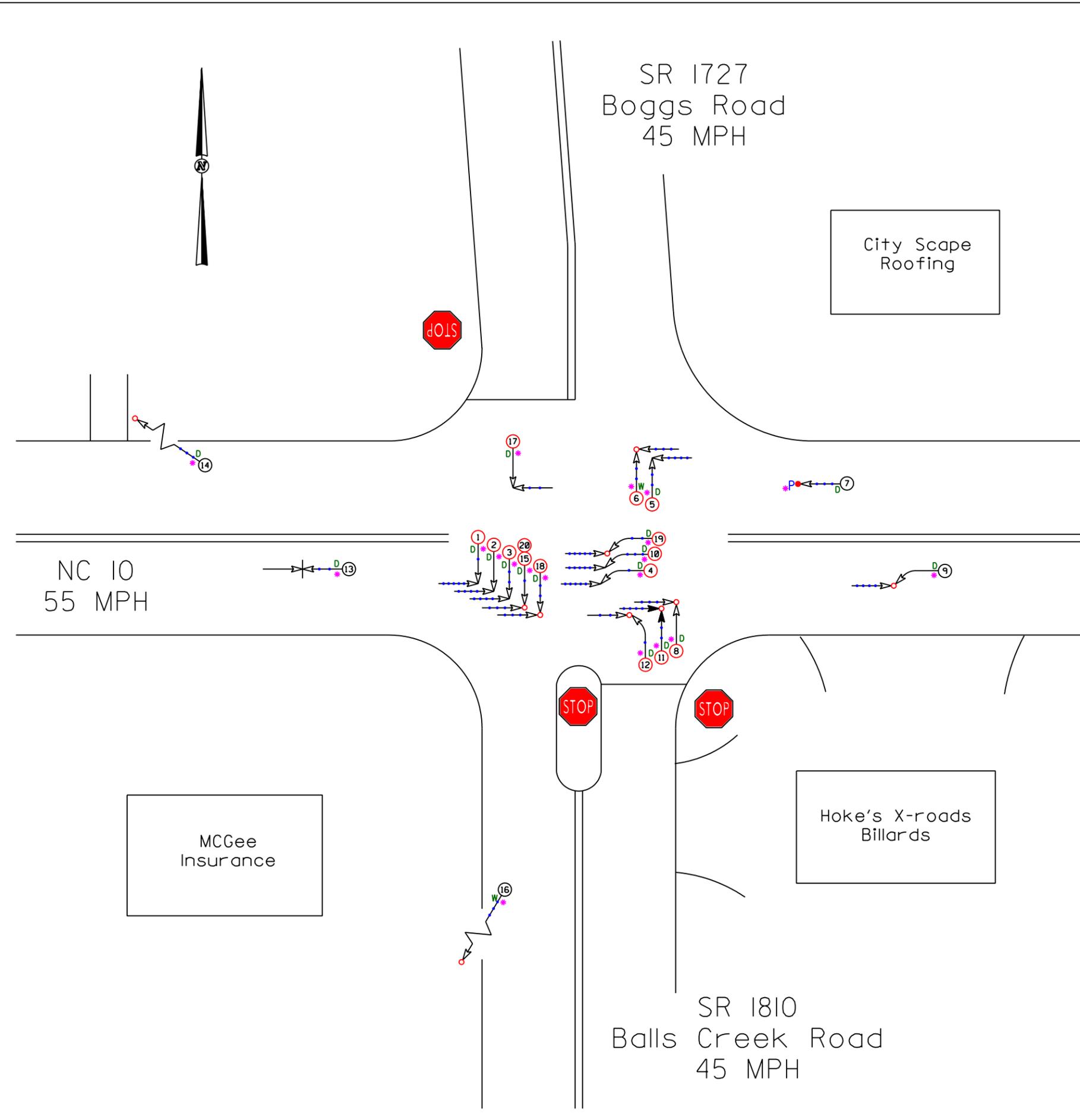
Traveling South on SR 1727 (Boggs Rd)



Traveling South on SR 1727 (Boggs Rd)



Sight Distance – Traveling South on SR 1727 looking Right onto NC 10



LEGEND

→	MOVING VEHICLE	↘	ANGLE	→	9 MPH OR LESS	P	PEDESTRIAN
- - -	PEDESTRIAN	↙	TURNING	→	10 MPH TO 19	T	TRAIN
⊠	PARKED VEHICLE	↔	BACKING	→	20 MPH TO 29	*	DRIVER AT FAULT
⊠	PARKING VEHICLE	↔	SIDESWIPE	→	30 MPH TO 39	D	DRY
□	FIXED OBJECT	↔	OUT OF CONTROL	→	40 MPH TO 49	W	WET
⊥	HEAD ON	↔	INJURY	→	50 MPH TO 59	I	ICY OR SNOWY
⊥	REAR END	↔	FATALITY	→	60 MPH TO 69		
↘	RAN OFF ROAD	→		→	70 AND UP		
		→		→	SPEED UNKNOWN	O	OILY

SS# 12-00-008
 Catawba County
 Before Period
 2/1/97 - 10/31/01
 NC 10 at SR 1727/1810

Crash 7: Ped was intoxicated and walked in front of vehicle

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

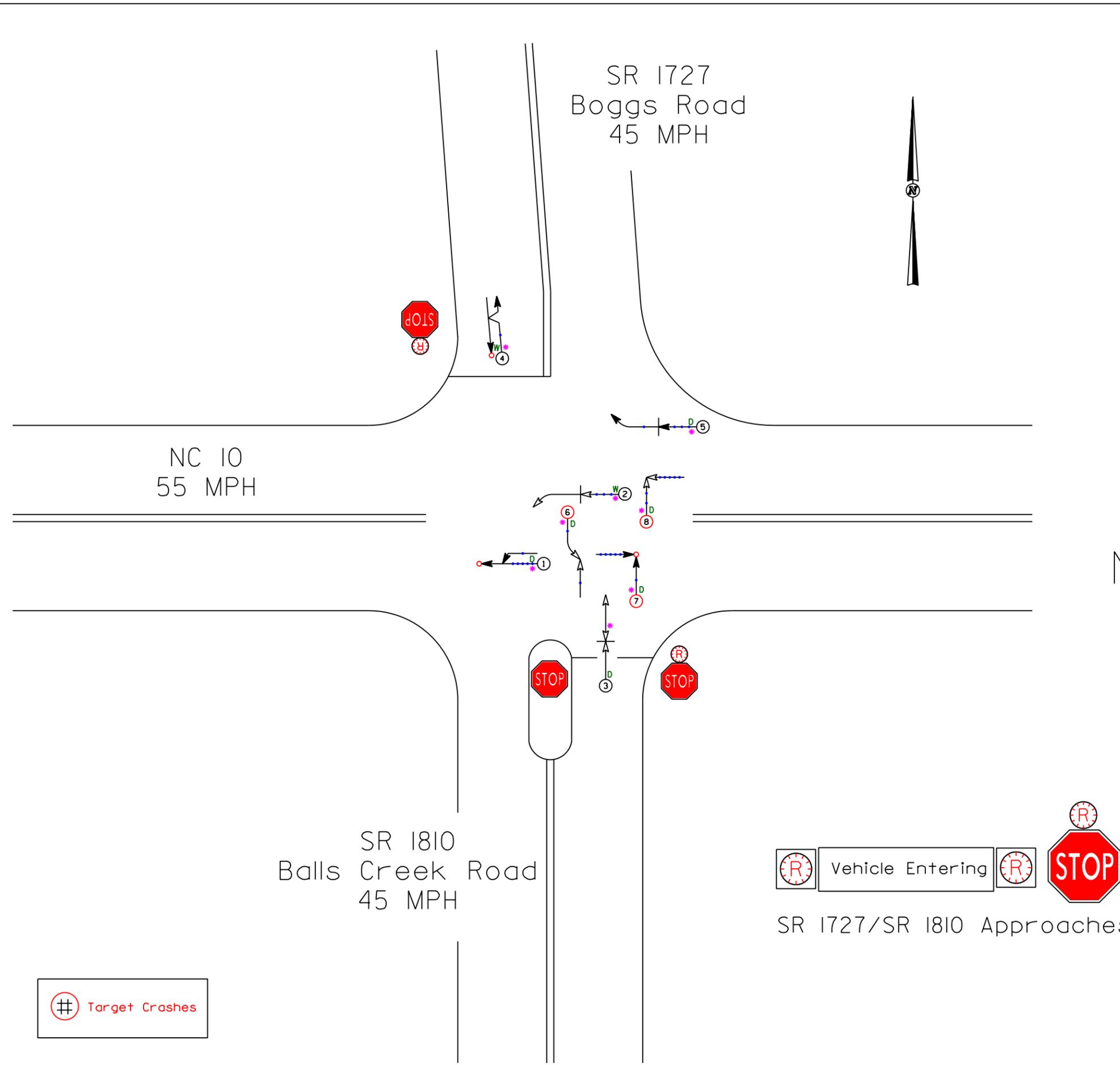
	COLLISION DIAGRAM	
	DIVISION: 12	AREA:
	STUDY PERIOD: 2/1/1997 TO 10/31/2001	
	DISTANCE: Y-LINE = 150FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: BR		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 5/25/2007		
LOG NUMBER: SS* 12-00-008		

(#) Target Crashes

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH

LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		9 MPH OR LESS
	PARKED VEHICLE		10 MPH TO 19
	PARKING VEHICLE		20 MPH TO 29
	FIXED OBJECT		30 MPH TO 39
	HEAD ON		40 MPH TO 49
	REAR END		50 MPH TO 59
	RAN OFF ROAD		60 MPH TO 69
	TURNING		70 AND UP
	BACKING		SPEED UNKNOWN
	SIDESWIPE		P PEDESTRIAN
	OUT OF CONTROL		T TRAIN
	INJURY		• DRIVER AT FAULT
	FATALITY		D DRY
			W WET
			I ICY OR SNOWY
			O OILY

SS# 12-00-008
 Catawba County
 After Period
 5/1/02 - 1/31/07
 NC 10 at SR 1727/1810



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM	
DIVISION: 12	AREA: 1
STUDY PERIOD: 5/1/2002 TO 1/31/2007	
DISTANCE: Y-LINE = 150FT	
ANALYSIS PREPARED BY: JBS	
ANALYSIS CHECKED BY: BR	
DIAGRAM PREPARED BY: JBS	
DIAGRAM REVIEWED BY: ST	
SCALE: NOT TO SCALE	
DATE: 5/25/2007	
LOG NUMBER: SS* 12-00-008	

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