

Spot Safety Project Evaluation

Project Log # 200806157

Spot Safety Project # 02-99-011

**Spot Safety Project Evaluation of the
Median Channelization Installation
At the Intersection of US 70 and SR 1148 / 1252
Carteret County**

Documents Prepared By:

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

Principal Investigator

Jason B. Schronce

8-22-2008
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 02-99-011 located at the intersection of US 70 and SR 1148 (Carl Garner Road) / SR 1252 (Training Ground Road) just south of the City of Newport in Carteret 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 a monolithic island in the median of US 70 to allow left turns onto and from SR 1148 accessing eastbound US 70. Also, the left turn lane on westbound US 70 was removed and replaced with an acceleration lane for vehicles accessing eastbound US 70. SR 1148 (Carl Garner Rd) and SR 1252 (Training Ground Road) are both two lane facilities under stop sign control. US 70 is a four lane divided highway at this location with dedicated left turn lanes and a westbound right turn lane for SR 1148. SR 1252 is a rarely used dead end road while SR 1148 (Carl Garner Road) is the only access for a robust flea market used by local citizens.

The original statement of problem was that motorists turning from SR 1148 on US 70 eastbound were having difficulty accessing the median safely and merging with the heavy traffic flow.

The initial crash analysis was completed from August 1, 1996 to July 31, 1999 with twelve (12) reported crashes, seven (7) of which were Angle Crashes and deemed correctable with the countermeasure. The final completion date for the improvement at the subject intersection was on September 4, 2003 with a total cost of \$75,000.00.

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 the months of August and September of 2003. The before period consisted of reported crashes from January 1, 1999 through July 31, 2003 (4 years and 7 months); and the after period consisted of reported crashes from October 1, 2003 through April 30, 2008 (4 years and 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. *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; Head on; and Angle.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	17	14	- 17.65 %
Total Severity Index	7.64	4.70	- 38.48 %
Target Crashes	11	3	- 72.73 %
Target Crash Severity Index	9.91	5.93	- 40.16 %
Volume	28,040	31,900	13.77 %
<u>Injury Crash Summary</u>			
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	- 100.00 %
Class B injury Crashes	0	1	100.00 %
Class C Injury Crashes	5	6	20.00 %
Total Injury Crashes	6	7	16.67 %

The naive before and after analysis at the treatment location resulted in a 18 percent decrease in Total Crashes, a 73 percent decrease in Target Crashes, and a 39 percent decrease in the Total Severity Index. The before period ADT year was 2001 and the after period ADT year was 2006.

Results and Discussion

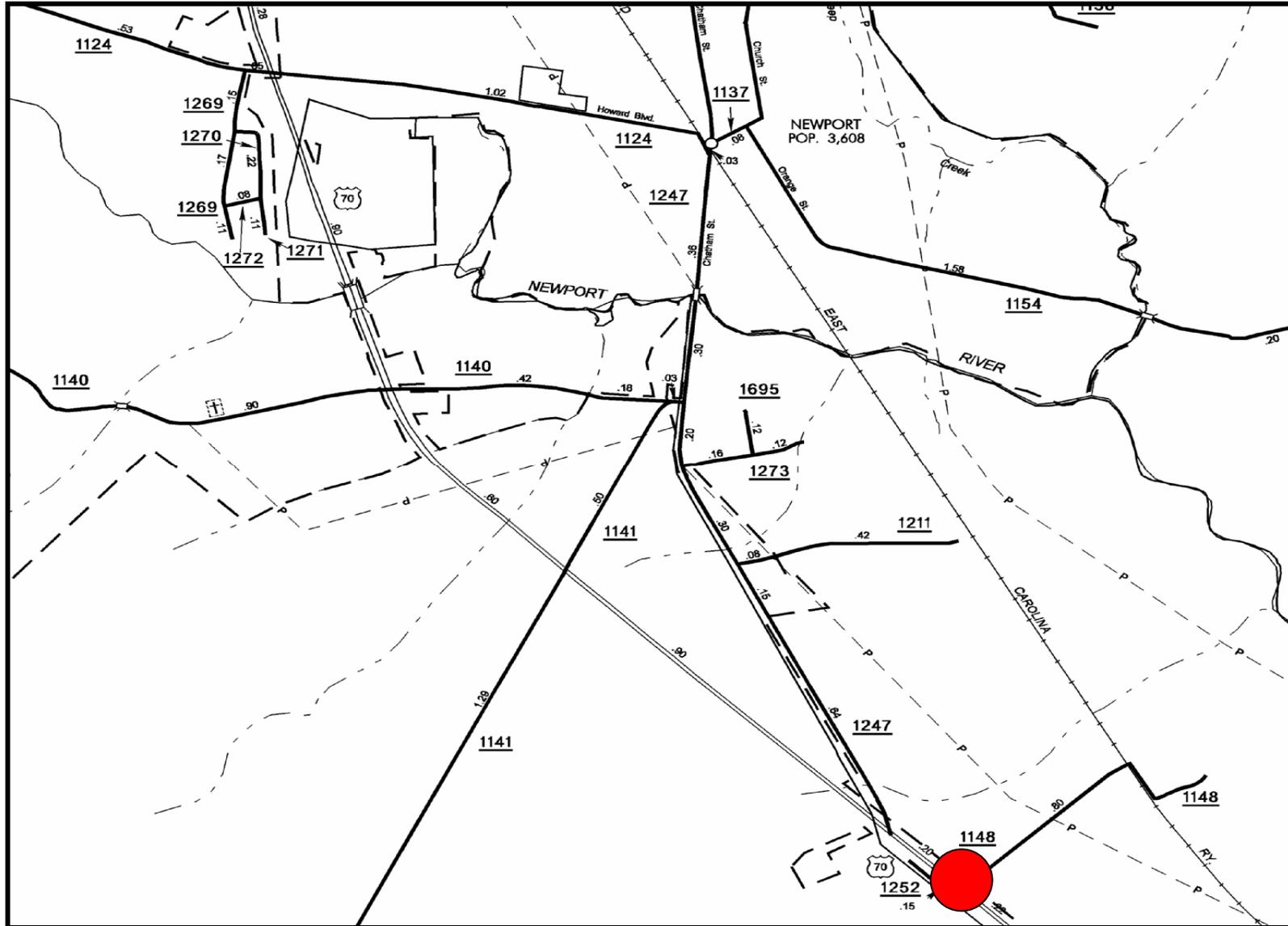
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in an 18 percent decrease in Total Crashes and a 73 percent decrease in Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period.

Referencing the *Collision Diagrams*, a large portion of crashes at the intersection in the before period (9 of 17) were the result of a vehicle turning left onto US 70 from SR 1148 resulting in angle and left turn type collisions. After the median installation, this pattern was significantly reduced to just three (3). The assumption made is that by continuing to allow the left turn movement from SR 1148 but providing an acceleration lane prior to merging with US 70 eastbound vehicles it increases safety by allowing motorists to only focus on making one crossing maneuver instead of two.

The calculated benefit to cost ratio for this project is **8.74 considering total crashes**. The benefit to cost ratio considering only **target crashes is 9.87**. 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
Carteret County
Evaluation of Spot Safety Project # 02-99-011**



Treatment Location: US 70 at SR 1148 (Carl Garner Rd) / SR 1252 (Training Ground Rd)

TREATMENT SITE PHOTOS TAKEN 8/6/2008



Traveling East on US 70



Traveling East on US 70 at new median



Traveling North on SR 1252 (Training Ground Road)



Traveling South on SR 1148 (Carl Garner Road)



Traveling West on US 70



Traveling West on US 70

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: US 70 at SR 1148
 COUNTY: Carteret
 FILE NO.: SS 02-99-011

BY: JBS
 DATE: 8/19/2008
 NOTES: Total Crashes

DETAILED COST: TYPE IMPROVEMENT - Raised Median Channelization

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$75,000	10	0.149	\$11,177
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$75,000	10	0.149	\$11,177

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$800
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$11,977
 TOTAL COST OF PROJECT= \$75,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

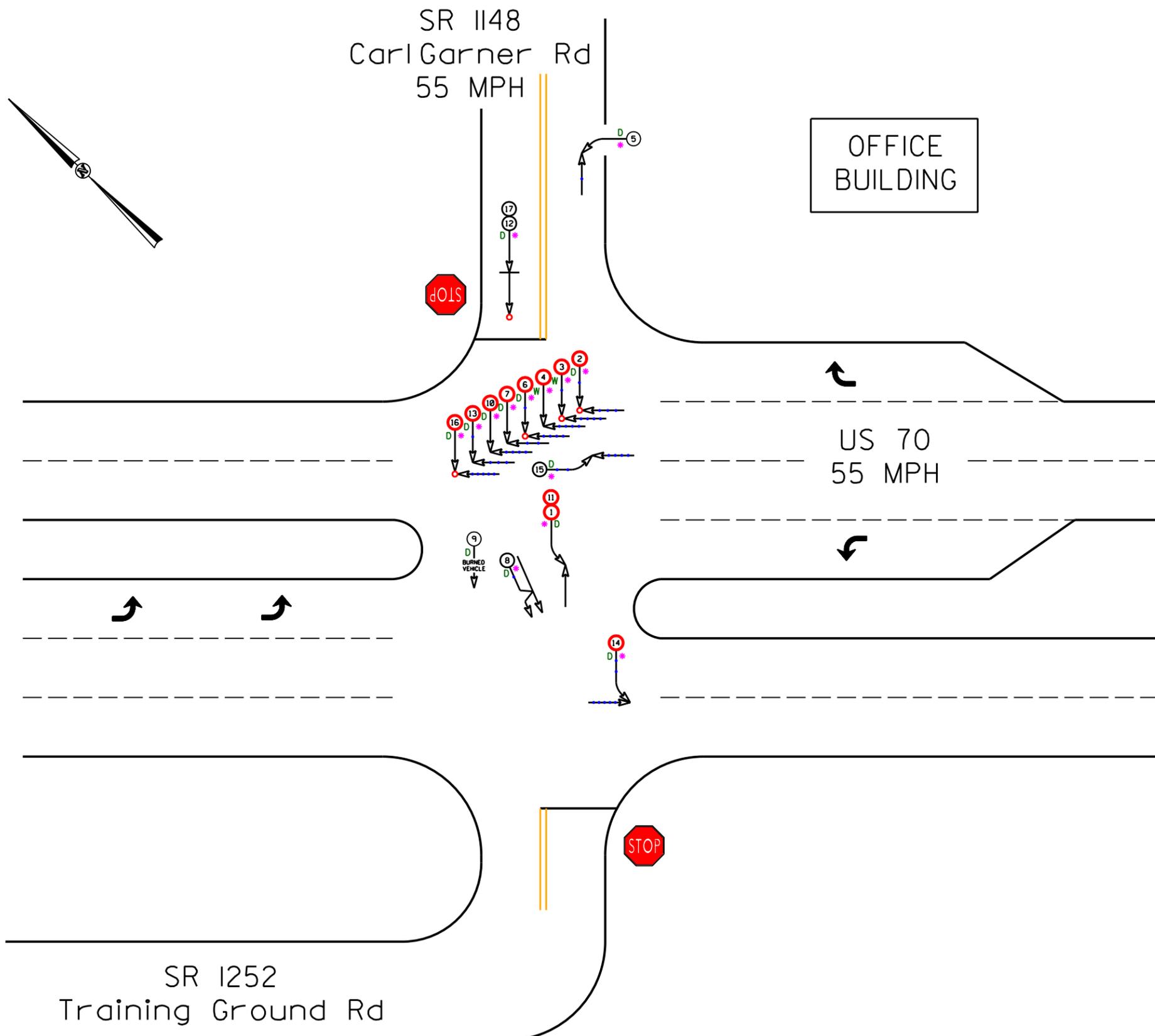
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	4.58	1	0.22	5	1.09	11	2.40	\$138,188
AFTER	4.58	0	0.00	7	1.53	7	1.53	\$33,472

Annual Benefits from Crash Cost Savings \$104,716

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = \$92,739

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 8.74

TOTAL COST OF PROJECT - \$75,000 COMPREHENSIVE B/C RATIO - 8.74



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
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		INJURY		50 MPH TO 59		ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69		SPEED UNKNOWN
	RAN OFF ROAD				70 AND UP		OILY

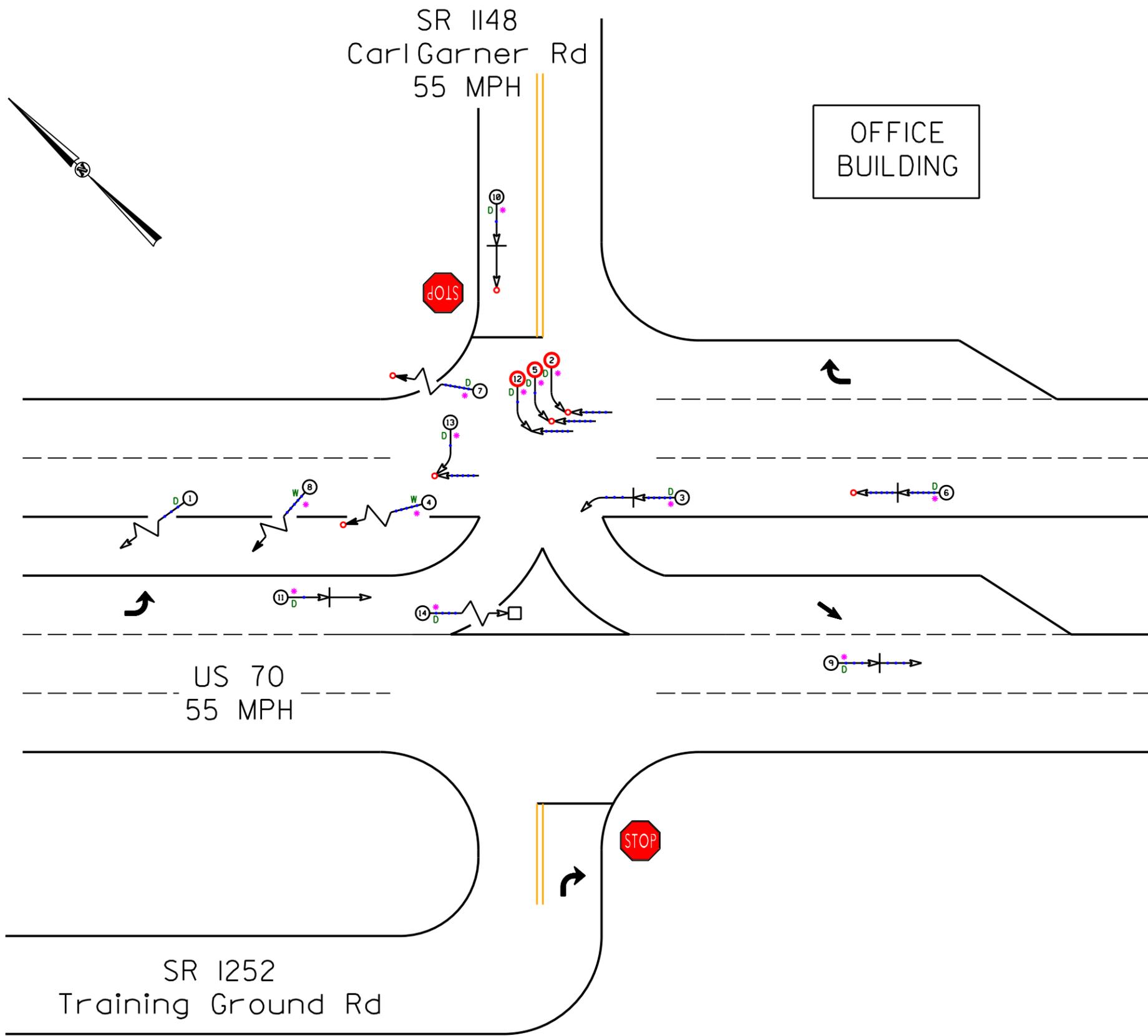
SS# 02-99-011
 Carteret County
 City of Newport
 BEFORE Period
 1/1/99 - 7/31/03
 US-70 at SR 1148

Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 2	AREA: 1
	STUDY PERIOD: 1/1/1999 - 7/31/2003	
	DISTANCE: Y-LINE = 150 FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: BR		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 7-9-2008		
LOG NUMBER: SS* 02-99-011		

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



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
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	HEAD ON		INJURY		50 MPH TO 59		ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69		SPEED UNKNOWN
	RAN OFF ROAD				70 AND UP		OILY

SS# 02-99-011
 Carteret County
 City of Newport
 AFTER Period
 10/1/03 - 4/30/08
 US-70 at SR 1148

Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 2	AREA: 1
	STUDY PERIOD: 10/1/2003 - 4/30/2008	
	DISTANCE: Y-LINE = 150FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: BR		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
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