Spot Safety Project Evaluation

Project Log # 200806139

Spot Safety Project # 02-01-006

Spot Safety Project Evaluation of the Median Channelization
At the Intersection of US 70 and SR 1129 (Tom Mann Rd)
City of Newport, 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

_____ 8-13-2008
Jason B. Schronce Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 02-01-006 located at the Intersection of US 70 and SR 1129 (Tom Mann Rd) 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 channelization median to allow lefts only onto northbound US 70 and westbound SR 1129 (Tom Mann Road). In the before period, US 70 was a four lane divided facility that provided exclusive left and right turn lanes on both approaches to SR 1129. After the improvements, US 70 exchanged the southbound left turn lane for a northbound acceleration lane for left turning motorists from eastbound SR 1129. Tom Mann Road is a two lane facility with concrete medians at the intersection on both approaches that include dual posted stop signs. All four approaches have a 55 mph speed limit and clear visibility.

The original statement of problem was that the vehicles attempting to cross US 70 were being struck by vehicles, resulting in angle collisions, after accessing the median safely. The goal was to reduce the number of severe crashes at this intersection.

The initial crash analysis was completed from September 1, 1998 to August 31, 2001 with ten (10) reported crashes, eight (8) of which were deemed correctable including one fatal collision. The final completion date for the improvement at the subject intersection was on September 4, 2003 with a total cost of $136,000.00.

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 January 1, 2003 to April 30, 2003. The police crash reports indicated that the median channelization was installed and was effective in use during the first quarter of 2003. The before period consisted of reported crashes from January 1, 1998 through December 31, 2002 (5 years); and the after period consisted of reported crashes from May 1, 2003 through April 30, 2008 (5 years). 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 (Median Crossing) Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway (northbound only) and Angle.

Treatment Information			
	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Total crashes	16	9	- 43.75 %
Total Severity Index	14.64	3.47	- 76.30 %
Target Crashes	14	1	- 92.86 %
Target Crash Severity Index	16.59	1.00	- 93.97 %
Volume	22,700	25,500	12.33 %
Injury Crash Summary			
Fatal injury Crashes	1	0	- 100.00 %
Class A injury Crashes	1	0	- 100.00 %
Class B injury Crashes	4	1	- 75.00 %
Class C Injury Crashes	5	2	- 60.00 %
Total Injury Crashes	11	3	- 72.73 %

The naive before and after analysis at the treatment location resulted in a 44 percent decrease in Total Crashes, a 93 percent decrease in Target Crashes, and a 76 percent decrease in the Total Severity Index. The before period ADT year was 2000 and the after period ADT year was 2005.

Results and Discussion

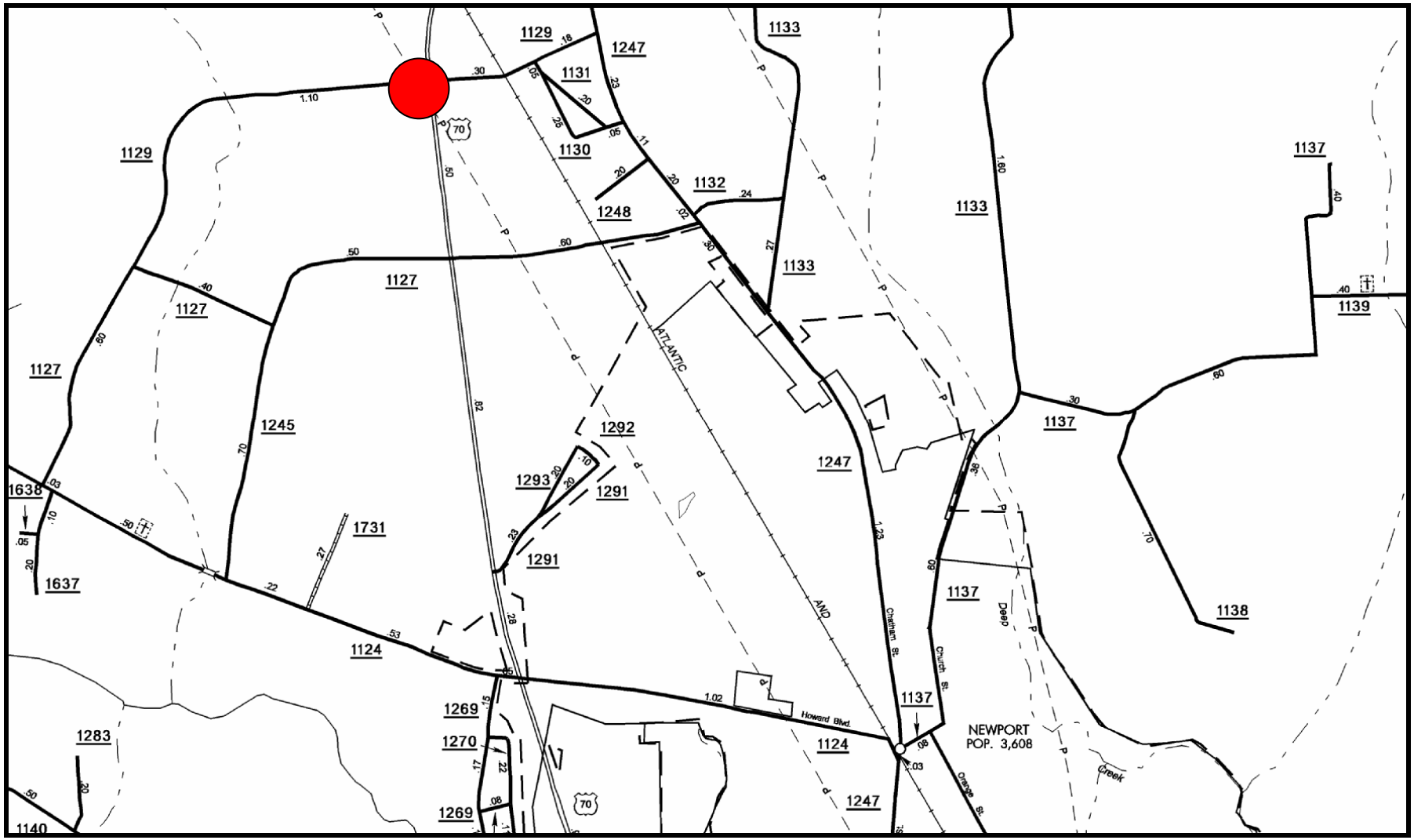
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 44 percent decrease in Total Crashes and a 93 percent decrease in Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes 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 (13 of 16) were the result of a vehicle improperly crossing US 70 from SR 1129 resulting in an angle collision. After the channelization installation, this pattern was significantly reduced to just one (1), which was the result of a westbound vehicle "going around" the barrier. A small left turn; same roadway pattern of three crashes still exists but the severity has been drastically reduced.

The calculated benefit to cost ratio for this project is 10.48 considering total crashes. The benefit to cost ratio considering only target crashes is 11.10. 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
City of Newport, Carteret County
Evaluation of Spot Safety Project # 02-01-006



Treatment Location: US 70 at SR 1129 (Tom Mann Road)

TREATMENT SITE PHOTOS TAKEN 8/6/2008

Traveling North on US-70

Traveling North on US-70 – left turn onto SR 1129

Traveling South on US-70 – Prevented Left Turn

Traveling South on US-70 at intersection

Traveling East on SR 1129 (Tom Mann Road)

Extra Asphalt in Southwest quadrant – for u-turn movements

Traveling West on SR 1129 (Tom Mann Road) – No Permitted Left Turn

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: US 70 at SR 1129 BY: JBS
COUNTY: Carteret DATE: 8/12/2008
FILE NO.: SS 02-01-006 NOTES: Total Crashes

DETAILED COST: TYPE IMPROVEMENT - Median Channelization

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	$136,000	10	0.149	$20,268
	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$136,000	10	0.149	$20,268

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $800
ESTIMATED INCREASE IN ANNUAL UTILITY COST = $0

TOTAL ANNUAL COST= $21,068
TOTAL COST OF PROJECT= $136,000

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	5.00	2	0.40	9	1.80	5	1.00	$236,300
AFTER	5.00	0	0.00	3	0.60	6	1.20	$15,480

Annual Benefits from Crash Cost Savings $220,820

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = $199,752

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 10.48

TOTAL COST OF PROJECT - $136,000 COMPREHENSIVE B/C RATIO - 10.48

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: US 70 at SR 1129 | BY: JBS
COUNTY: Carteret | DATE: 8/12/2008
FILE NO.: SS 02-01-006 | NOTES: Target Crashes - Crossing US-70 Movement

DETAILED COST: TYPE IMPROVEMENT - Median Channelization

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	$136,000	10	0.149	$20,268
	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$136,000	10	0.149	$20,268

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $800
ESTIMATED INCREASE IN ANNUAL UTILITY COST = $0

TOTAL ANNUAL COST= $21,068
TOTAL COST OF PROJECT= $136,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

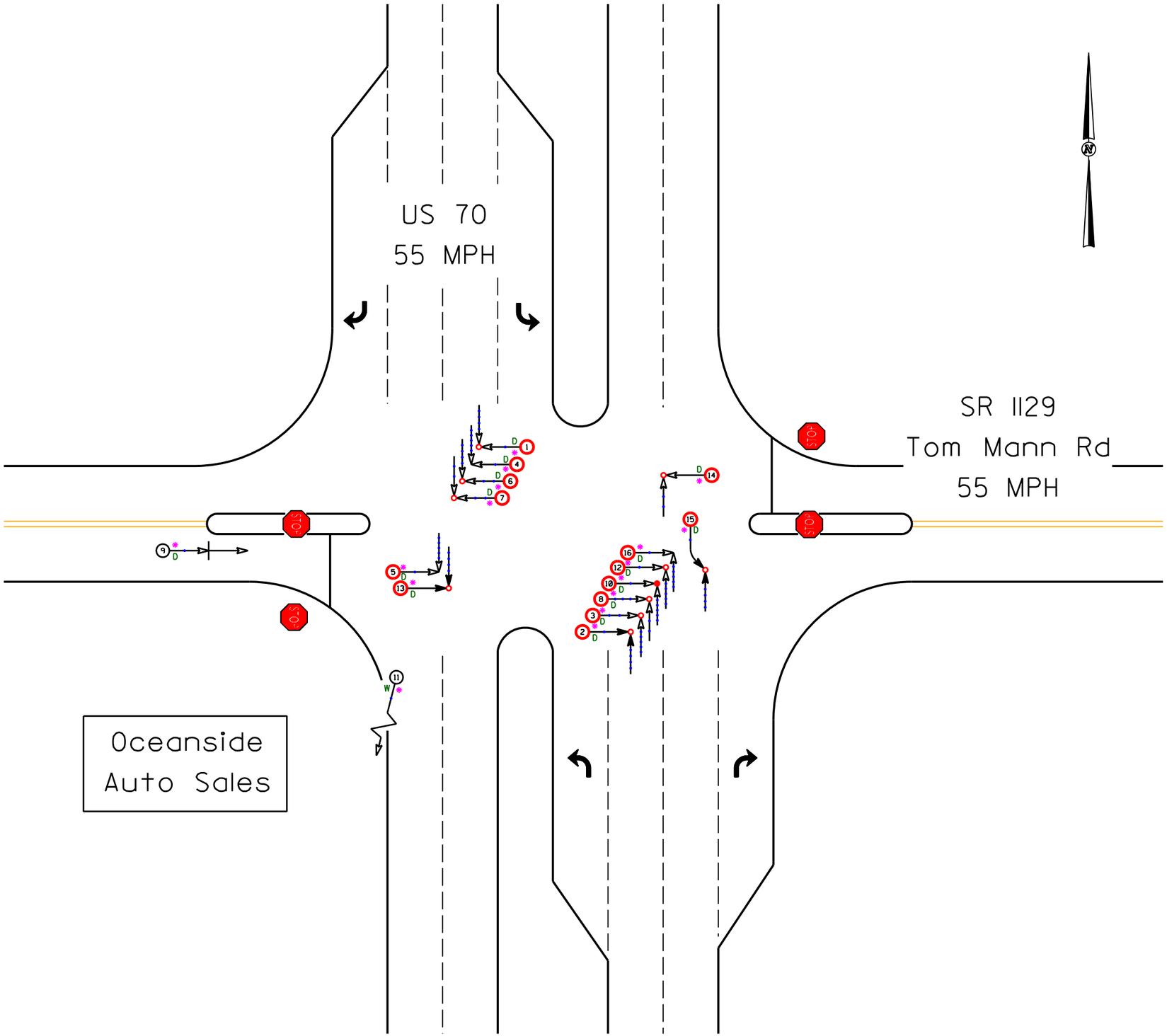
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	5.00	2	0.40	9	1.80	3	0.60	$234,740
AFTER	5.00	0	0.00	0	0.00	1	0.20	$780

Annual Benefits from Crash Cost Savings $233,960

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = $212,892

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 11.10

TOTAL COST OF PROJECT - $136,000 COMPREHENSIVE B/C RATIO - 11.10



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN

P PEDESTRIAN
T TRAIN
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
O OILY

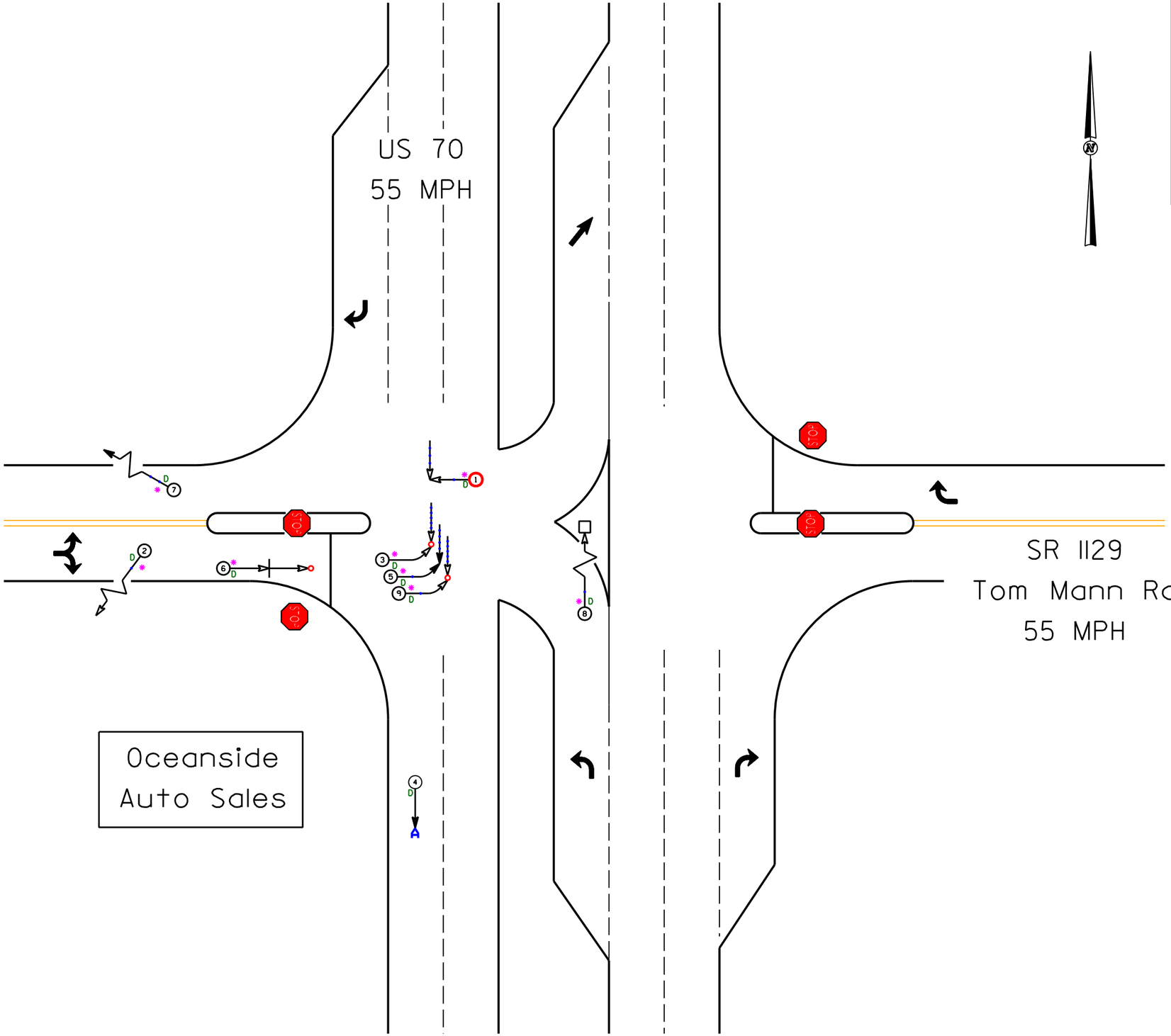
SS# 02-01-006
Carteret County
City of Newport
BEFORE Period
1/1/98 - 12/31/02
US 70 at SR 1129

Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM	
DIVISION: 2	AREA:
STUDY PERIOD: 1/1/1998 - 12/31/2002	
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: 7-9-2008	
LOG NUMBER: SS# 02-01-006	

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



LEGEND

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SS# 02-01-006
Carteret County
City of Newport
AFTER Period
5/1/03 - 4/30/08
US 70 at SR 1129

Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM	
DIVISION: 2	AREA:
STUDY PERIOD: 5/1/2003 - 4/30/2008	
DISTANCE: Y-LINE = 150FT	
ANALYSIS PREPARED BY: JBS	
ANALYSIS CHECKED BY: BR	
DIAGRAM PREPARED BY: JBS	
DIAGRAM REVIEWED BY: ST	
SCALE: NOT TO SCALE	
DATE: 7-9-2008	
LOG NUMBER: SS# 02-01-006	

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