

Spot Safety Project Evaluation

Project Log # 200901031

Spot Safety Project # 08-95-202

**Spot Safety Project Evaluation of the Traffic Signal Installation
At the Intersection of NC 62 (Trindale Rd) and
SR 1596 (Darr Airport Rd / Sealy Drive)
Randolph County, Town of Trinity**

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

4-28-2009

Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 08-95-202 located at the Intersection of NC 62 (Trindale Rd) and SR 1596 (Darr Airport Rd / Sealy Drive) in Randolph County.

The Sig ID is 08-0539 for this newly installed traffic signal.

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 2-phase, actuated traffic signal. NC 62 and SR 1596 are both two-lane facilities at the subject intersection with no turn lanes and speed limits of 35 mph on all approaches. The subject location is a three-leg intersection, which was controlled by a stop sign on SR 1596 (Sealy Drive). Railroad tracks with an at-grade crossing are also located adjacent to the intersection and the new signal includes a railroad pre-emption design.

The original statement of problem was that a new furniture company had been built on SR 1596 adding to delay issues and a possible increase in accident potential. The intersection met signal warrants 1, 9, and 11.

The initial crash analysis was completed from January 1, 1991 to December 31, 1994 with twelve (12) reported crashes. The final completion date for the improvement at the subject intersection was on August 6, 2003 with a total cost of \$22,000.00.

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 July and August 2003. The before period consisted of reported crashes from March 1, 1998 through June 30, 2003 (5 years and 4 months); and the after period consisted of reported crashes from September 1, 2003 through December 31, 2008 (5 years and 4 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, aerial map, and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Intersection 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.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	9	11	22.2 %
Total Severity Index	9.42	4.36	- 53.7 %
Target Crashes	0	4	200.0+ %
Target Crash Severity Index	0.00	6.55	200.0+ %
Volume	11,400	10,800	- 5.3 %
<u>Injury Crash Summary</u>			
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	- 100.0 %
Class B injury Crashes	0	1	100.0 %
Class C Injury Crashes	0	4	200.0+ %
Total Injury Crashes	1	5	200.0+ %

The naive before and after analysis at the treatment location resulted in a 22 percent increase in Total Crashes, over 200 percent increase in Target Crashes, but a 54 percent increase in the Total Severity Index. The before period ADT year was 2000 and the after period ADT year was 2006.

Results and Discussion

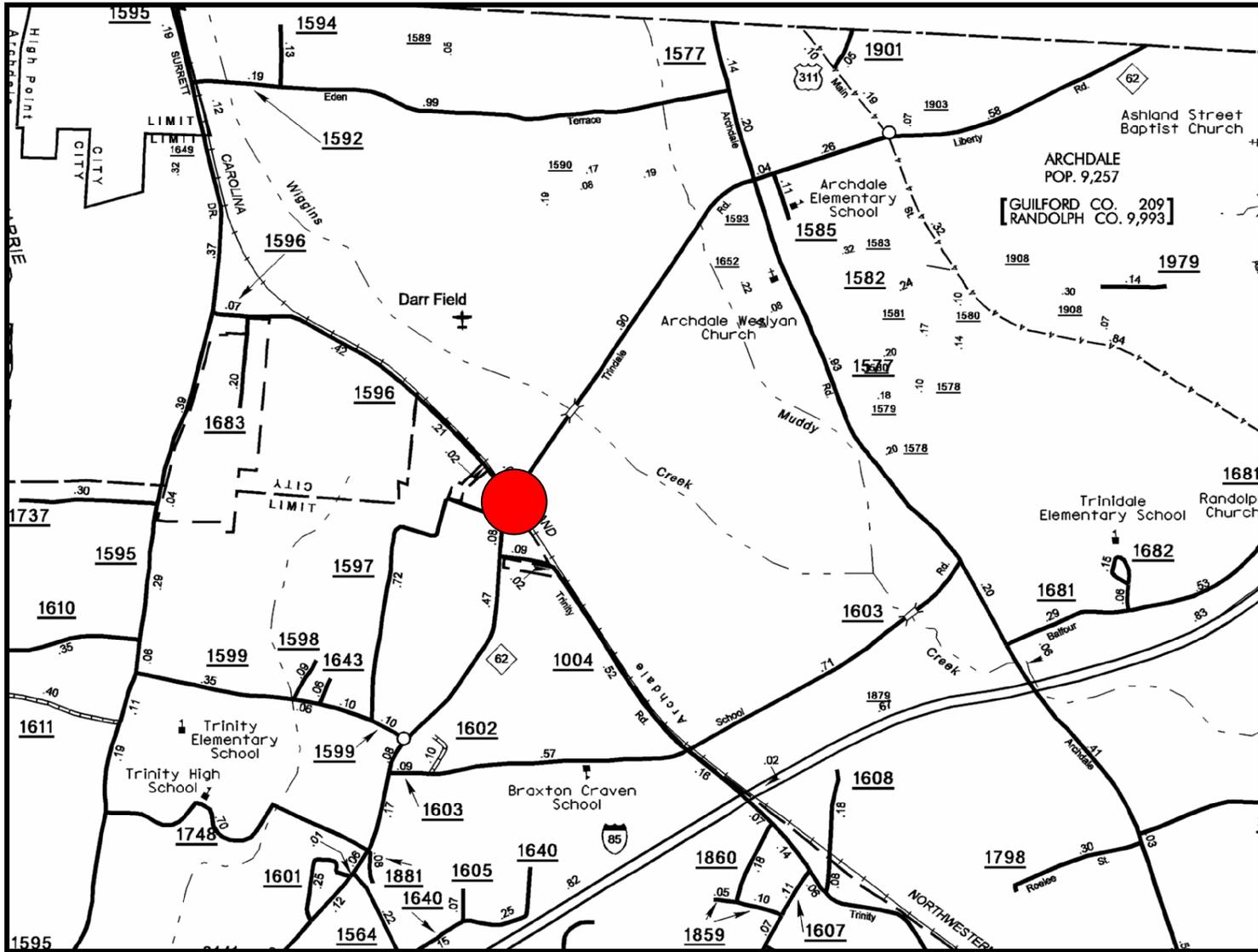
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 22 percent increase in Total Crashes and over 200 percent increase in Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have increased at the treatment location from the before to the after period.

Referencing the *Collision Diagrams*, there were no intersection frontal impact collisions in the before period. After the signal installation, target crashes increased to four (4), including one westbound NC 62 vehicle running the red light and three left turn-same roadway motorists attempting access SR 1596. Rear-end collisions approaching the intersection did reduce from four (4) in the before period to one (1) in the after period.

The calculated benefit to cost ratio for this project is **12.66 considering total crashes**. The benefit to cost ratio **considering only target crashes is (-1.75)**. 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. The significant positive total crash benefit-cost ratio is derived by the elimination of severe injury crashes in the after period.

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
Randolph County, Town of Trinity
Evaluation of Spot Safety Project # 08-95-202



Treatment Location: NC 62 (Trindale Rd) at SR 1596 (Darr Airport Rd / Sealy Drive)

**SS# 08-95-202 Aerial Map
Randolph County**



SR 1596
Darr Airport Rd
Sealy Drive

NC 62
Trindale Rd

TREATMENT SITE PHOTOS TAKEN 4/19/2009



Traveling Northeast on NC 62 (Trindale Road)



Traveling Northeast on NC 62



Traveling Southwest on NC 62 (Trindale Road)



Traveling Southwest on NC 62



Traveling South on SR 1596 (Sealy Drive)



Traveling South on SR 1596

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: NC 62 at SR 1596
 COUNTY: Randolph
 FILE NO.: SS 08-95-202

BY: JBS
 DATE: 4/22/2009
 NOTES: Total Crashes

DETAILED COST: TYPE IMPROVEMENT - New Signal

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$22,000	10	0.149	\$3,279
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$22,000	10	0.149	\$3,279

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$2,000
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$900
 TOTAL ANNUAL COST= \$6,179
 TOTAL COST OF PROJECT= \$22,000

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	5.34	1	0.19	0	0.00	8	1.50	\$99,476
AFTER	5.34	0	0.00	5	0.94	6	1.12	\$21,236

Annual Benefits from Crash Cost Savings \$78,240

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = \$72,061

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 12.66

TOTAL COST OF PROJECT - \$22,000 COMPREHENSIVE B/C RATIO - 12.66

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: NC 62 at SR 1596
 COUNTY: Randolph
 FILE NO.: SS 08-95-202

BY: JBS
 DATE: 4/22/2009
 NOTES: Target Crashes - Frontal Impact

DETAILED COST: TYPE IMPROVEMENT - New Signal

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$22,000	10	0.149	\$3,279
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$22,000	10	0.149	\$3,279

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$2,000
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$900
 TOTAL ANNUAL COST= \$6,179
 TOTAL COST OF PROJECT= \$22,000

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	5.34	0	0.00	0	0.00	0	0.00	\$0
AFTER	5.34	0	0.00	3	0.56	1	0.19	\$10,843

Annual Benefits from Crash Cost Savings (\$10,843)

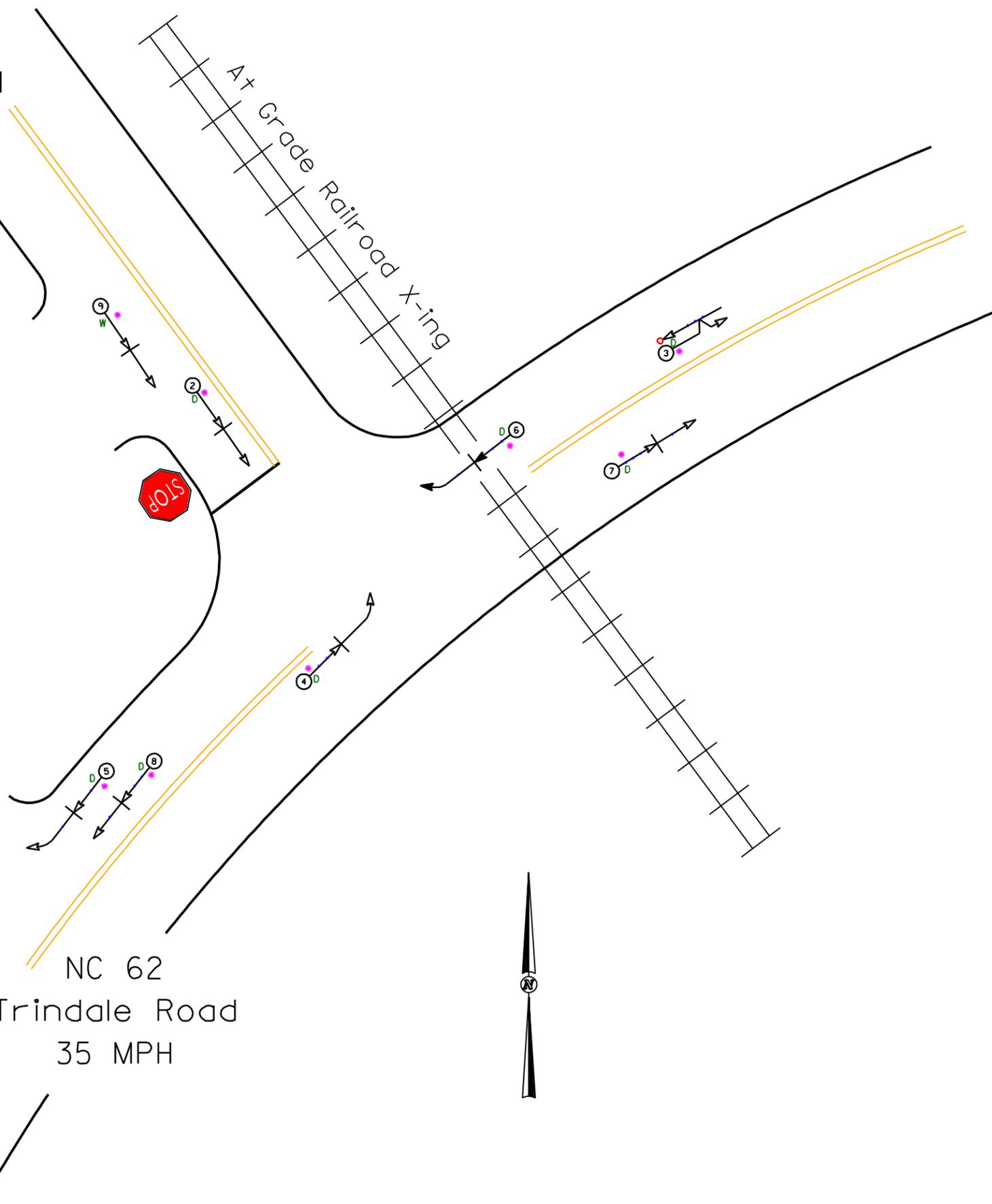
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = (\$17,021)

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = -1.75

TOTAL COST OF PROJECT - \$22,000 COMPREHENSIVE B/C RATIO - -1.75

SR 1596
Sealy Drive
Darr Airport Rd
35 MPH

Trindale
Mini Mart



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		OILY
	RAN OFF ROAD		70 AND UP		SPEED UNKNOWN		

SS# 08-95-202
Randolph County
BEFORE Period
3/1/98 - 6/30/03

NC 62
Trindale Road
35 MPH

Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM	
DIVISION: B	AREA:
STUDY PERIOD: 3/1/1998 - 6/30/2003	
DISTANCE: Y-LINE = 150 FT	
ANALYSIS PREPARED BY: JBS	
ANALYSIS CHECKED BY: N/A	
DIAGRAM PREPARED BY: JBS	
DIAGRAM REVIEWED BY: ST	
SCALE: NOT TO SCALE	
DATE: 4-22-2009	
LOG NUMBER: SS* 08-95-202 BEFORE	

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

SR 1596
Sealy Drive
Darr Airport Rd
35 MPH

NC 62
Trindale Road
35 MPH

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		OILY
	RAN OFF ROAD		SPEED UNKNOWN		70 AND UP		

SS# 08-95-202
Randolph County
AFTER Period
9/1/03 - 12/31/08

Trindale
Mini Mart



New Signalized
Intersection
SIG ID 08-0539

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: B	AREA:
	STUDY PERIOD: 9/1/2003 - 12/31/2008	
	DISTANCE: Y-LINE = 150FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: N/A		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 4-22-2009		
LOG NUMBER: SS# 08-95-202 AFTER		

Target Crashes

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