

# **Spot Safety Project Evaluation**

Project Log # 200702015

Spot Safety Project # 03-99-206

**Spot Safety Project Evaluation of the Traffic Signal and  
a Southbound Left Turn Lane Installation at the Intersection of  
SR 1308 (Gum Branch Road) and SR 1324 (Ramsey Road)  
Onslow County, Town of Half Moon**

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

12-18-2007

Date

Traffic Safety Project Engineer

# ***Spot Safety Project Evaluation Documentation***

## **Subject Location**

Evaluation of Spot Safety Project Number 03-99-206 – The Intersection of SR 1308 (Gum Branch Road) and SR 1324 (Ramsey Road) in Onslow 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 2-phase, actuated traffic signal and a southbound left turn lane on SR 1308 (Gum Branch Road). In the study period, SR 1308 and SR 1324 were both two-lane facilities at the subject intersection with no turn lanes and speed limits of 45 mph on all approaches. The subject location is a three-leg intersection, which was controlled by a stop sign on SR 1324 (Ramsey Road). In the first half of 2007, through the NC Moving Ahead Program, SR 1308 was resurfaced and widened to include a center turn lane that kept the dedicated left turn lane through the intersection.

The original statement of problem was that there was excessive delay on SR 1324 and the pattern of rear-end collisions. The intersection met signal warrants 2, 8, 9, and 11.

The initial crash analysis was completed from January 1, 1996 to December 31, 1998 with ten (10) reported crashes, nine (9) of which were deemed correctable which resulted in twenty-three (23) injuries. The final completion date for the improvement at the subject intersection was on March 31, 2002 with a total cost of \$140,000.00.

## **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, 2002 to June 30, 2002. The before period consisted of reported crashes from August 1, 1997 through December 31, 2001 (4 years and 5 months) and the after period consisted of reported crashes from July 1, 2002 through November 30, 2006 (4 years and 5 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 and Southbound SR 1308 Rear-End 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>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total crashes	18	18	0.00 %
Total Severity Index	5.11	3.88	- 24.07 %
Target Crashes	14	4	- 71.43 %
Target Crash Severity Index	6.29	2.85	- 54.69 %
Volume	16,400	20,700	26.22 %
<u>Injury Crash Summary</u>			
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	2	3	50.00 %
Class C Injury Crashes	8	4	- 50.00 %
Total Injury Crashes	10	7	- 30.00 %

The naive before and after analysis at the treatment location resulted in no change in Total Crashes, a 71 percent decrease in Target Crashes, and a 24 percent decrease in the Total Severity Index. The before period ADT year was 2000 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 no change in Total Crashes and a 71 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 Diagram*, a large portion of crashes at the intersection in the before period (8 of 18) were rear-end collisions involving southbound SR 1308 vehicles. It was suspected that the leading cause of this pattern was insufficient gaps for left turning motorists. After the left turn lane was installed, this pattern was completely eliminated. Frontal Impact crashes at the intersection also reduced from six (6) to four (4). Three of the after period frontal impact collisions were the result of a vehicle running the red indication signal.

There was a new crash pattern that developed in the after period. Rear-End Collisions involving northbound vehicles on SR 1308 increased at the intersection from zero to six (6).

The calculated benefit to cost ratio for this project is 0.40 considering total crashes. The benefit to cost ratio considering only target crashes is 1.57. 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.

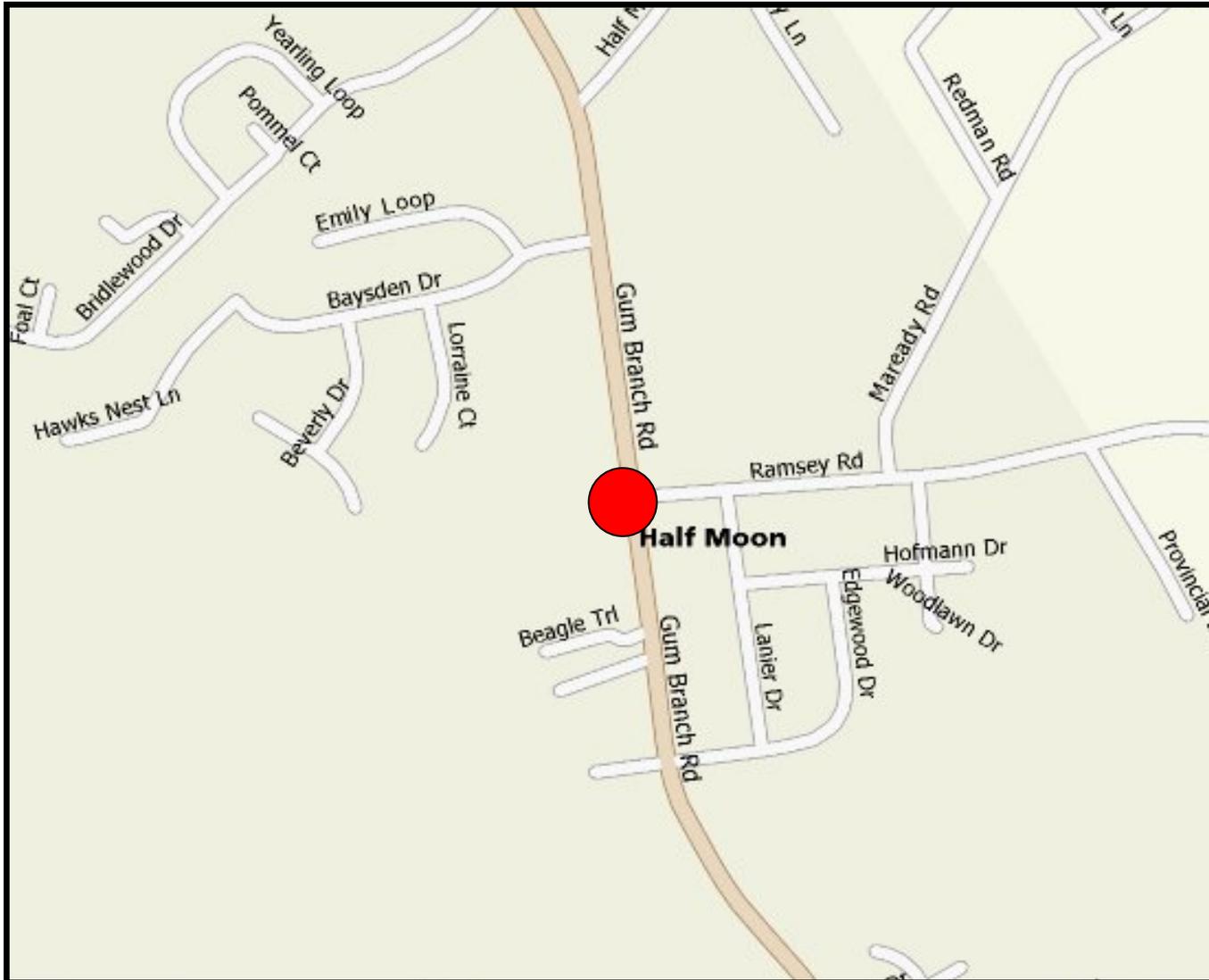
Per discussed in the Project Background Section, this segment of roadway was upgraded in the first half of 2007 through the NC Moving Ahead Program. During our field investigation in April of

2007, the project appeared to be approximately 80 percent complete. The crash analysis of this evaluation was not affected by the new upgrades including resurfacing of SR 1308 and the installation of the 3-lane roadway segment.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection. Photos are also provided showing the limited sight distance facing south when approaching the intersection on SR 1324 (Ramsey Road). Line of sight was limited due to a Storage Unit Business and a fence.

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  
Onslow County  
Evaluation of Spot Safety Project # 03-99-206**



**Treatment Location: SR 1308 (Gum Branch Road) at SR 1324 (Ramsey Road)**

**TREATMENT SITE PHOTOS TAKEN 4-12-2007**



Traveling North on SR 1308 (Gum Branch Rd)



Traveling South on SR 1308 (Gum Branch Rd)



Traveling West on SR 1324 (Ramsey Road)



Looking South for Sight Distance from SR 1324

**BENEFIT-COST ANALYSIS WORKSHEET**

LOCATION: SR 1308 at SR 1324  
 COUNTY: Onslow  
 FILE NO.: SS 03-99-206

BY: JBS  
 DATE: 12/5/2007  
 NOTES: Total Crashes

DETAILED COST: TYPE IMPROVEMENT - **New Signal and Left Turn Lane on SR 1308**

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$140,000	10	0.149	\$20,864
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$140,000	10	0.149	\$20,864

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$2,200  
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$900  
 TOTAL ANNUAL COST= \$23,964  
 TOTAL COST OF PROJECT= \$140,000

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	4.42	0	0.00	10	2.26	8	1.81	\$47,783
AFTER	4.42	0	0.00	7	1.58	11	2.49	\$38,213

Annual Benefits from Crash Cost Savings \$9,570

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = (\$14,394)

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 0.40

TOTAL COST OF PROJECT - \$140,000 COMPREHENSIVE B/C RATIO - 0.40

**BENEFIT-COST ANALYSIS WORKSHEET**

LOCATION: SR 1308 at SR 1324  
 COUNTY: Onslow  
 FILE NO.: SS 03-99-206

BY: JBS  
 DATE: 12/5/2007  
 NOTES: Target Crashes - Frontal Impact, SB Rear-ends

DETAILED COST: TYPE IMPROVEMENT - New Signal, Left Turn Lane on SR 1308

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$140,000	10	0.149	\$20,864
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$140,000	10	0.149	\$20,864

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$2,200  
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$900  
 TOTAL ANNUAL COST= \$23,964  
 TOTAL COST OF PROJECT= \$140,000

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	4.42	0	0.00	10	2.26	4	0.90	\$44,253
AFTER	4.42	0	0.00	1	0.23	3	0.68	\$6,719

Annual Benefits from Crash Cost Savings \$37,534

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = \$13,570

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 1.57

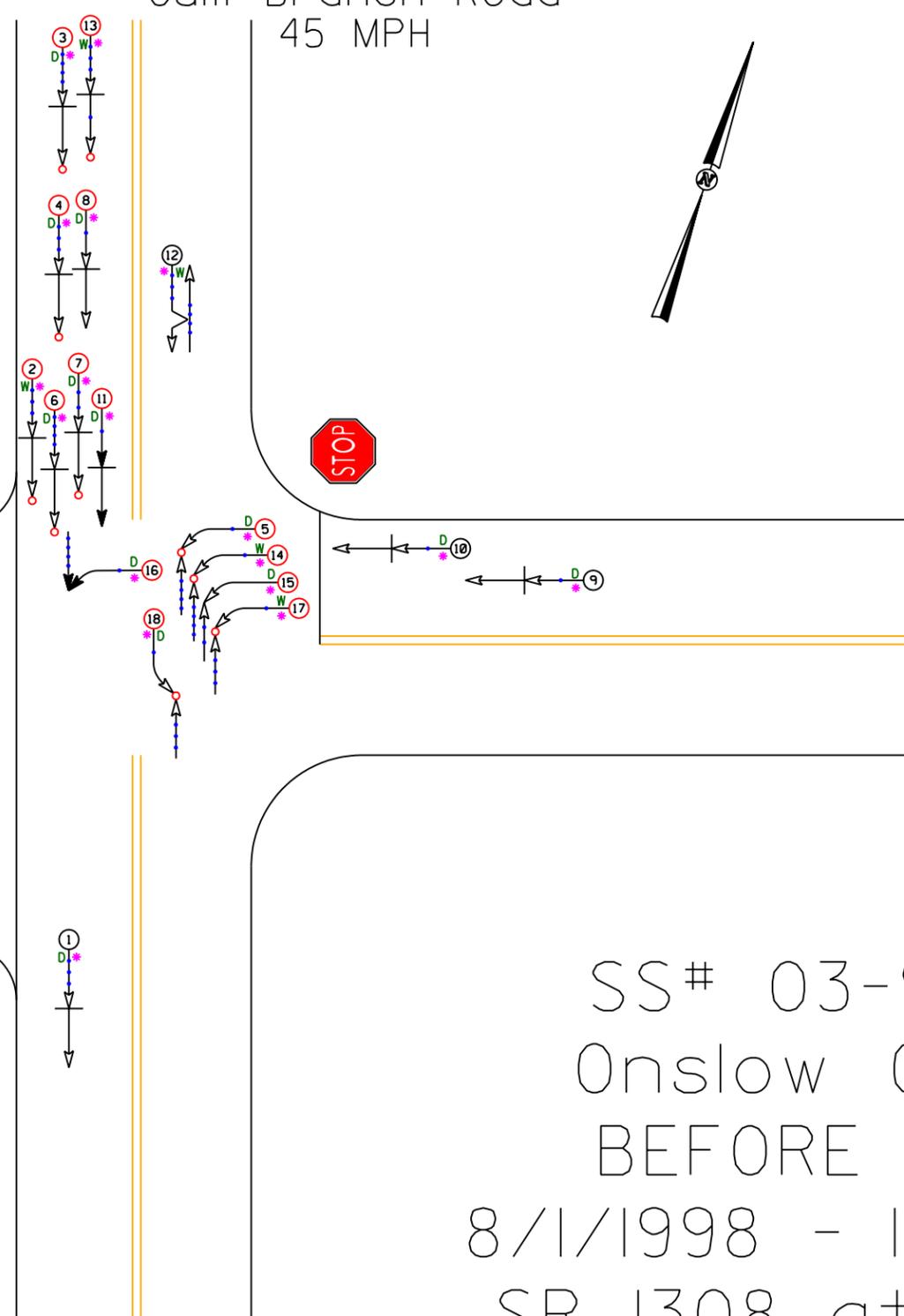
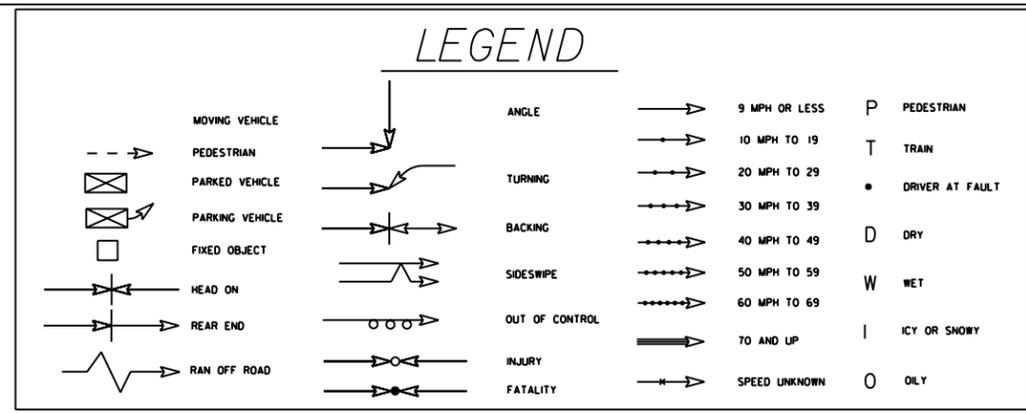
TOTAL COST OF PROJECT - \$140,000 COMPREHENSIVE B/C RATIO - 1.57

SR 1308  
Gum Branch Road  
45 MPH

Abundant Life  
Deliverance  
Church

SR 1324  
Ramsey Road  
45 MPH

SS# 03-99-206  
Onslow County  
BEFORE PERIOD  
8/1/1998 - 12/31/2002  
SR 1308 at SR 1324

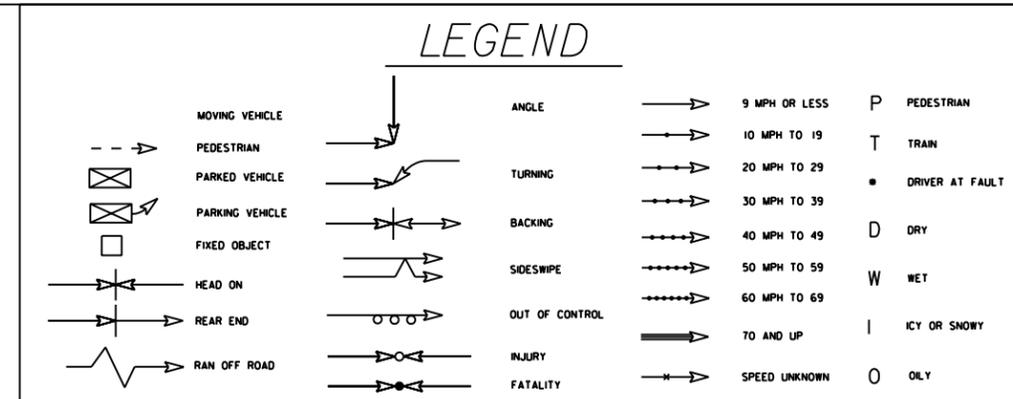


**TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT**

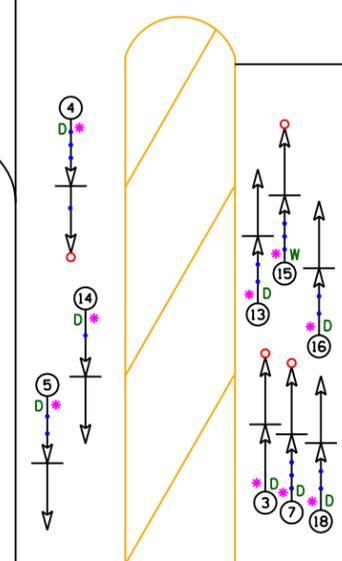
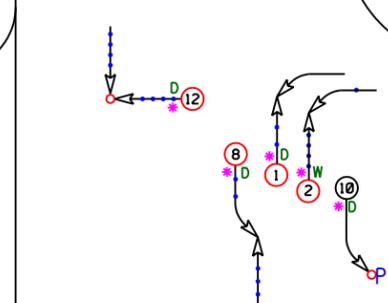
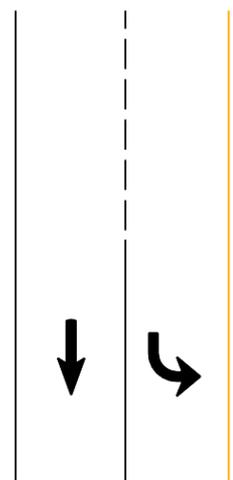
	COLLISION DIAGRAM	
	DIVISION: 3	AREA: 4
	STUDY PERIOD: 8/1/1998 TO 12/31/2002	
	DISTANCE: Y-LINE = 150FT	
	ANALYSIS PREPARED BY: JBS	
	ANALYSIS CHECKED BY: ST	
	DIAGRAM PREPARED BY: JBS	
	DIAGRAM REVIEWED BY: ST	
SCALE: NOT TO SCALE		
DATE: 12-5-2007		
LOG NUMBER: SS* 03-99-206		

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

SR 1308  
Gum Branch Road  
45 MPH

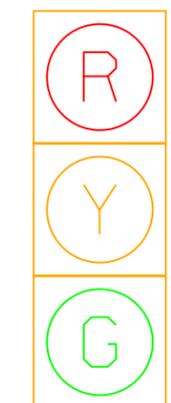


Abundant Life  
Deliverance  
Church



SR 1324  
Ramsey Road  
45 MPH

SS# 03-99-206  
Onslow County  
AFTER PERIOD  
7/1/2002 - 11/30/2006



NEW SIGNAL  
AT INTERSECTION

**TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT**

	COLLISION DIAGRAM	
	DIVISION: 3	AREA:
	STUDY PERIOD: 7/1/2002 TO 11/30/2006	
	DISTANCE: Y-LINE = 150FT	
	ANALYSIS PREPARED BY: JBS	
	ANALYSIS CHECKED BY: ST	
	DIAGRAM PREPARED BY: JBS	
	DIAGRAM REVIEWED BY: ST	
SCALE: NOT TO SCALE		
DATE: 12-5-2007		
LOG NUMBER: SS* 03-99-206		

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