

Spot Safety Project Evaluation

Project Log # 200811217

Spot Safety Project # 07-00-209

**Spot Safety Project Evaluation of the Traffic Island and
Dual Posted Stop Sign Installations at the Intersection of
SR 1120 (Simpson Rd) and SR 1129 (Gideon Grove Church Rd)
Rockingham 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

2-5-2009

Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 07-00-209 located at the Intersection of SR 1120 (Simpson Rd) and SR 1129 (Gideon Grove Church Rd) near Gold Hill in Rockingham County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasures chosen for the subject location were the installation of concrete medians and dual posted stop signs on both stop approaches. SR 1120 and SR 1129 (Gideon Grove Church Road) are both two-lane facilities at the subject intersection with no turn lanes and posted speed limits of 55 mph. The subject location is a four-leg crossroads intersection, which is controlled by a stop condition on SR 1120 (Simpson Rd).

The original statement of problem was that vehicles on SR 1120 (Simpson Road) were running the stop sign causing angle type collisions. The desired outcome was to eliminate the severe injury crash potential.

The initial crash analysis was completed from February 1, 1997 to January 31, 2000 with five (5) reported crashes, four (4) of which were deemed correctable with this countermeasure. The final completion date for the improvement at the subject intersection was on September 30, 2003 with a total cost of \$50,000.00.

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 August to September 2003. The before period consisted of reported crashes from June 1, 1998 through July 31, 2003 (5 years and 2 months); and the after period consisted of reported crashes from October 1, 2003 through November 30, 2008 (5 years and 2 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 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	8	5	- 37.5 %
Total Severity Index	32.20	5.44	- 83.1 %
Target Crashes	6	2	- 66.7 %
Target Crash Severity Index	41.37	8.40	- 79.7 %
Volume	1,240	1,400	12.9 %
<u>Injury Crash Summary - Total</u>			
Fatal injury Crashes	1	0	- 100.0 %
Class A injury Crashes	2	0	- 100.0 %
Class B injury Crashes	1	2	100.0 %
Class C Injury Crashes	2	1	- 50.0 %
Total Injury Crashes	6	3	- 50.0 %

The naive before and after analysis at the treatment location resulted in a 38 percent decrease in Total Crashes, a 67 percent decrease in Target Crashes, and an 83 percent decrease 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 38 percent decrease in Total Crashes and a 67 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*, high speed angle collisions at this location reduced from six (6) in the before period to one (1) in the after period. The significant benefit of this countermeasure improvement was the elimination of severe injury collisions, both fatalities and A-injury crashes. The total and target severity indexes were reduced by nearly 80 percent which have yielded very significant benefit-cost ratios as seen below.

The calculated benefit to cost ratio for this project is **43.35 considering total crashes**. The benefit to cost ratio **considering only target crashes is 43.46**. 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.

**SS# 07-00-209 Aerial Map
Rockingham County**



**SR 1120
Simpson Road**

**SR 1129
Gideon Grove Church Rd**

TREATMENT SITE PHOTOS TAKEN 1-26-2009



Traveling East on SR 1120 (Simpson Rd)



Traveling East on SR 1120



Traveling North on SR 1129 (Gideon Grove Church Road)



Traveling North on SR 1129



Traveling South on SR 1129 (Gideon Grove Church Road)



Traveling South on SR 1129



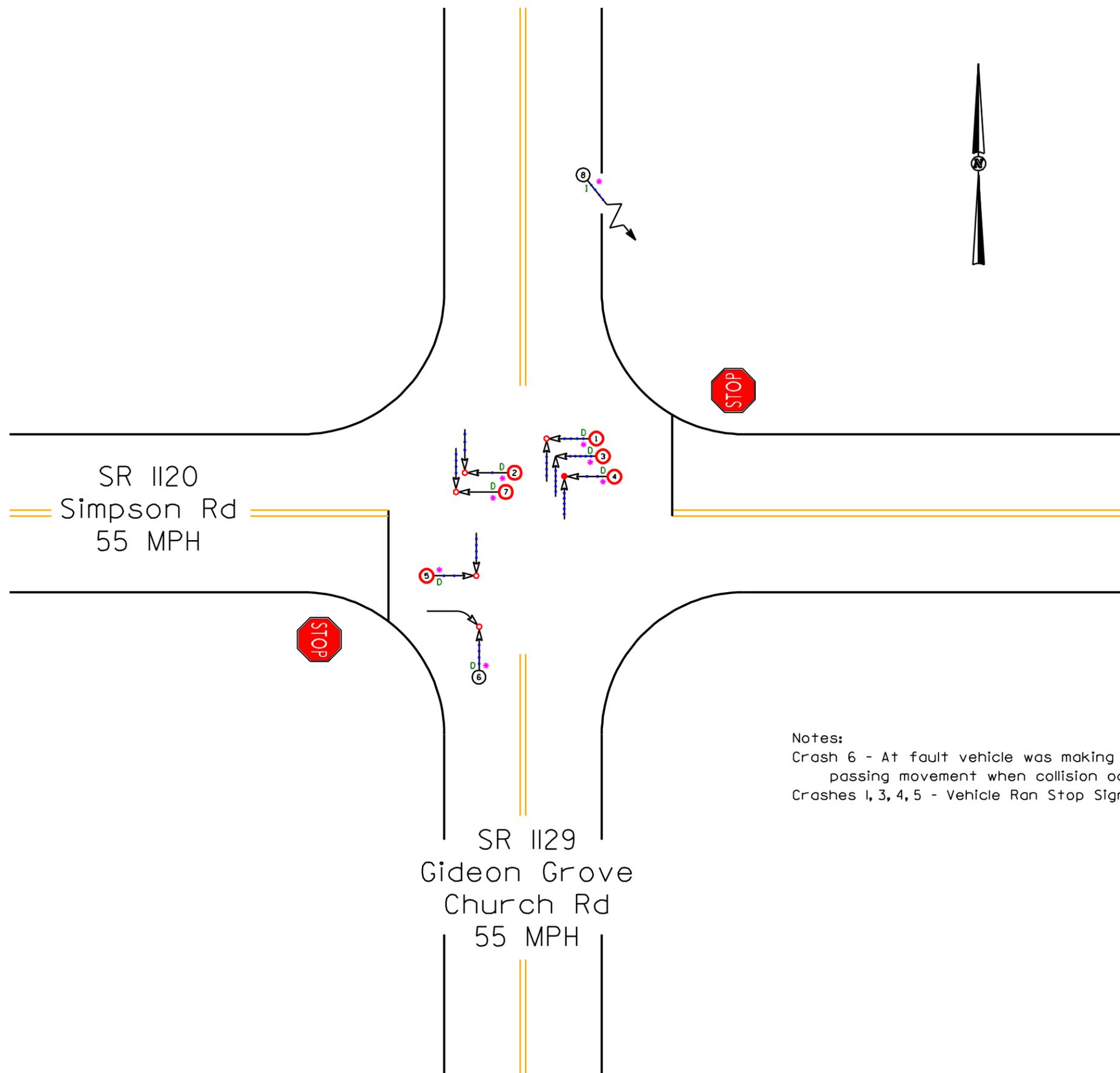
Traveling West on SR 1120 (Simpson Road)



Traveling West on SR 1120

LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		TURNING
	PARKED VEHICLE		BACKING
	PARKING VEHICLE		SIDESWIPE
	FIXED OBJECT		OUT OF CONTROL
	HEAD ON		INJURY
	REAR END		FATALITY
	RAN OFF ROAD		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# 07-00-209
 Rockingham County
 near Gold Hill
 BEFORE Period
 6/1/98 - 7/31/03
 SR 1120 at SR 1129



Notes:
 Crash 6 - At fault vehicle was making an illegal passing movement when collision occurred
 Crashes 1, 3, 4, 5 - Vehicle Ran Stop Sign

Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

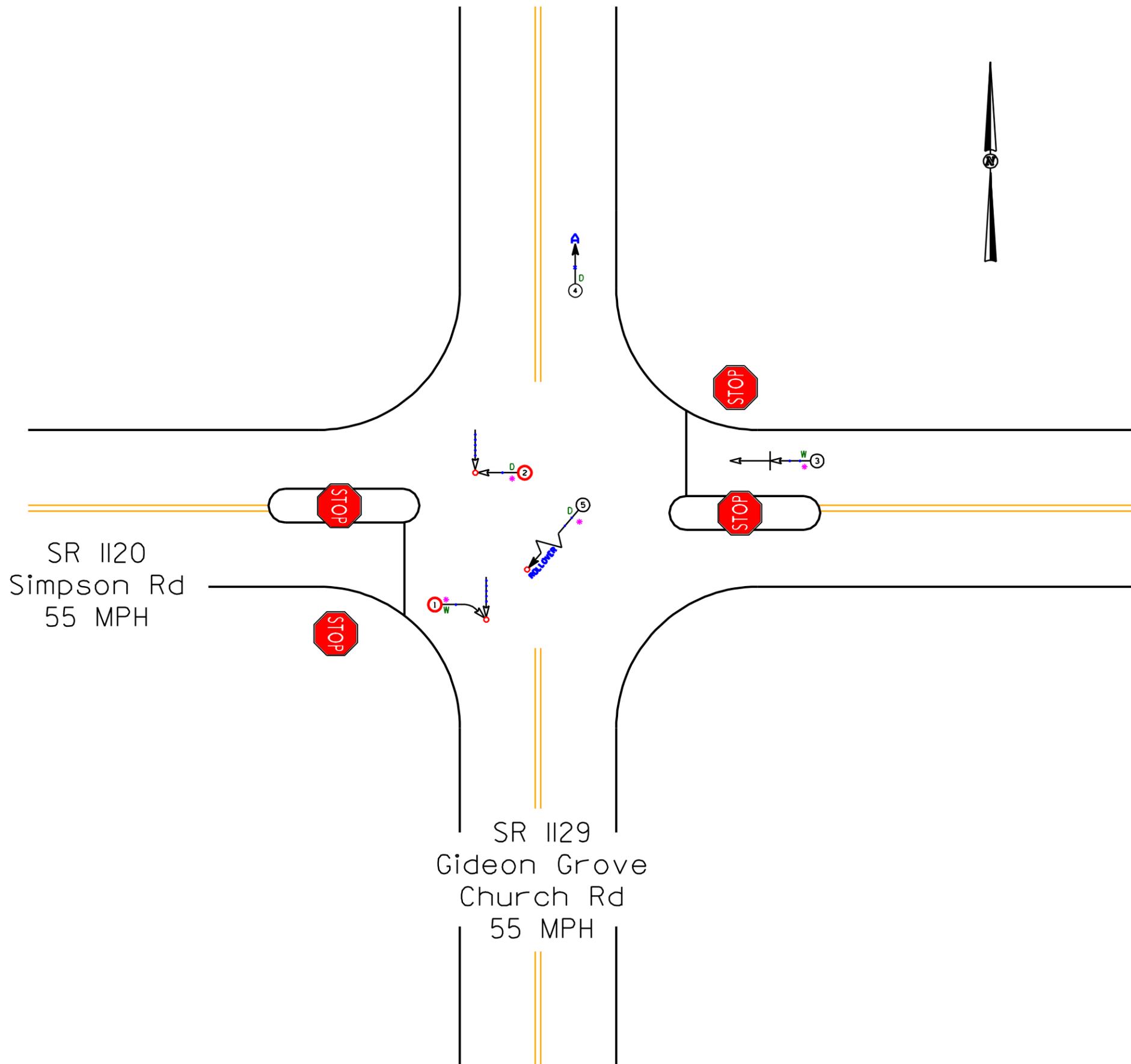
COLLISION DIAGRAM	
DIVISION: 7	AREA:
STUDY PERIOD: 6/1/1998 - 7/31/2003	
DISTANCE: Y-LINE = 150FT	
ANALYSIS PREPARED BY: JBS	
ANALYSIS CHECKED BY: N/A	
DIAGRAM PREPARED BY: JBS	
DIAGRAM REVIEWED BY: ST	
SCALE: NOT TO SCALE	
DATE: 1-14-2009	
LOG NUMBER: SS* 07-00-209 BEFORE	

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

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# 07-00-209
 Rockingham County
 near Gold Hill
 AFTER Period
 10/1/03 - 11/30/08
 SR 1120 at SR 1129



Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 7	AREA:
	STUDY PERIOD: 10/1/2003 - 11/30/2008	
	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: 1-14-2009		
LOG NUMBER: SS* 07-00-209 AFTER		

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