Spot Safety Project Evaluation

Project Log # 200611078

Spot Safety Project # 09-01-212

Spot Safety Project Evaluation of the Center Turn Lane Installation on NC-67 From Muddy Creek to 0.07 mile West of SR 1434 (Grandview Club Rd) Forsyth County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ 2-15-2007
Jason B. Schronce Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 09-01-212 – The center turn lane installation on NC 67 from Muddy Creek to 0.07 mile west of SR 1434 (Grandview Club Rd) in Forsyth county. Project scope milepost range on NC-67 includes 5.97 to 6.43.

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 center turn lane on NC 67 from the Muddy Creek Bridge to 0.07 mile west of SR 1434 (Grandview Club Rd). NC 67 is a two-lane facility with limited sight distance due to terrain elevation change in this segment. Residential driveways are prevalent throughout the subject section. NC 67 has a speed limit of 55 mph with an advisory speed of 45 mph at the intersection of SR 3985 (North Causeway Rd). The countermeasure also provided exclusive left-turn lanes for SR 1434 and SR 3985 on NC-67 and their individual approaches.

The original statement of problem was the rear-end left turn crash pattern related to motorists turning left from a thru-lane of a high-speed roadway. The initial crash analysis was conducted from September 1, 1998 through September 1, 2001 and resulted in 14 total crashes. There were 9 crashes that were deemed correctable by the proposed improvements, which resulted in 2 Class-A, 1 Class-B, and 11 Class-C injuries.

During the field visit to this study segment, sight distance was observed to be an issue for left turning traffic onto SR 1434 (Grandview Club Rd) and some private driveways along NC-67.

The final completion date for the improvement at the subject location was on August 1, 2002 at a cost of $162,000.

Naïve 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 April 1, 2002 through November 30, 2002. The before period consisted of reported crashes from July 1, 1998 through March 31, 2002 (3 Years, 9 Months) and the after period consisted of reported crashes from December 1, 2002 through August 31, 2006 (3 Years, 9 Months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed. The treatment data consisted of all crashes on NC 67 from MP 5.97 to MP 6.43. A 0 feet Y-line was used in the analysis. Please see attached *Location Map* for further detail.

The following data Table 1 depicts the Naive Before and After Analysis for the Total Crashes and Target Crashes at the treatment location. Table 2 provides an in depth examination of the Naïve Before and After Analysis of the Total Crashes and Table 3 provides an in depth examination of the Naïve Before and After Analysis for the Target “Correctable” crashes. Please note that the Target

crashes for the center turn lane installation include the following crash types: Rear End - Slow or Stop, Rear End - Turn, Left Turn – Same Roadway and Left Turn – Different Roadway.

Table 1. Treatment Information	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	18	5	- 72.22
Total Severity Index	16.92	2.48	- 85.34
Total Target Crashes	14	4	- 71.43
Target Severity Index	20.94	2.85	- 86.39
Volume	11,200	10,300	- 8.04

Table 2. Total Crashes Information	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	18	5	- 72.22
Fatal Crashes	0	0	N/A
Non Fatal Injury Crashes	11	1	- 90.91
Total Injury Crashes	11	1	- 90.91
PDO Crashes	7	4	- 42.86
Fatal Injuries	0	0	N/A
Non-Fatal Injuries	20	1	- 95.00
Total Injuries	20	1	- 95.00
Night Crashes	2	1	- 50.00
Wet Crashes	2	1	- 50.00

Table 3. Target Crashes Information	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Target Crashes	14	4	- 71.43
Fatal Crashes	0	0	N/A
Non Fatal Injury Crashes	10	1	- 90.00
Total Injury Crashes	10	1	- 90.00
PDO Crashes	4	3	- 25.00
Fatal Injuries	0	0	N/A
Non-Fatal Injuries	19	1	- 94.74
Total Injuries	19	1	- 94.74
Night Crashes	2	1	- 50.00
Wet Crashes	2	1	- 50.00

The naive before and after analysis at the treatment location resulted in a 72 percent decrease in Total Crashes, an 85 percent decrease in the Total Severity Index, and an 8 percent increase in Average Daily Traffic (ADT). There was also a 71 percent decrease in Target Crashes and 86 percent decrease in the Severity Index for Target Crashes. The before period ADT year was 2000 and the after period ADT year was 2004.

Results and Discussion

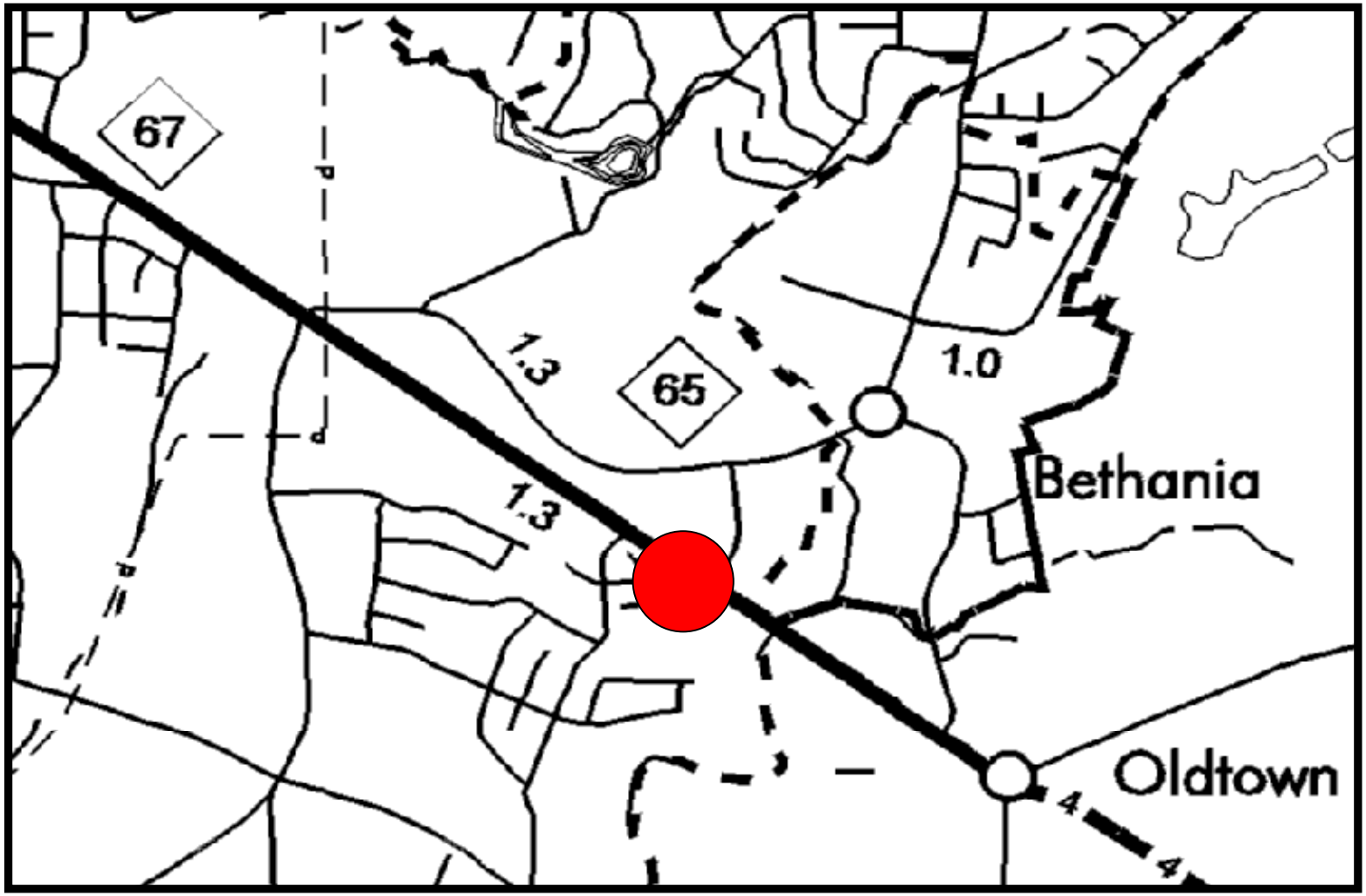
The naive before and after analysis involving the comparison of the treatment actual before data versus the treatment actual after data resulted in a 72 percent decrease in Total Crashes and a 71 percent decrease in Target Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in both Total and Target crashes from the before to the after period.

As previously stated the main reason for the improvement was to alleviate a pattern of rear end crashes. From the Crash Analysis it can be seen that "Rear End" crashes in particular were reduced by 67 percent from the before to the after period (12 crashes in the before period, 4 crashes in the after period). The severity index for this type of crash was also reduced by 86 percent from the before to the after period. From the above analysis it can be said that the improvement was extremely effective in eliminating injury crashes along this segment of roadway.

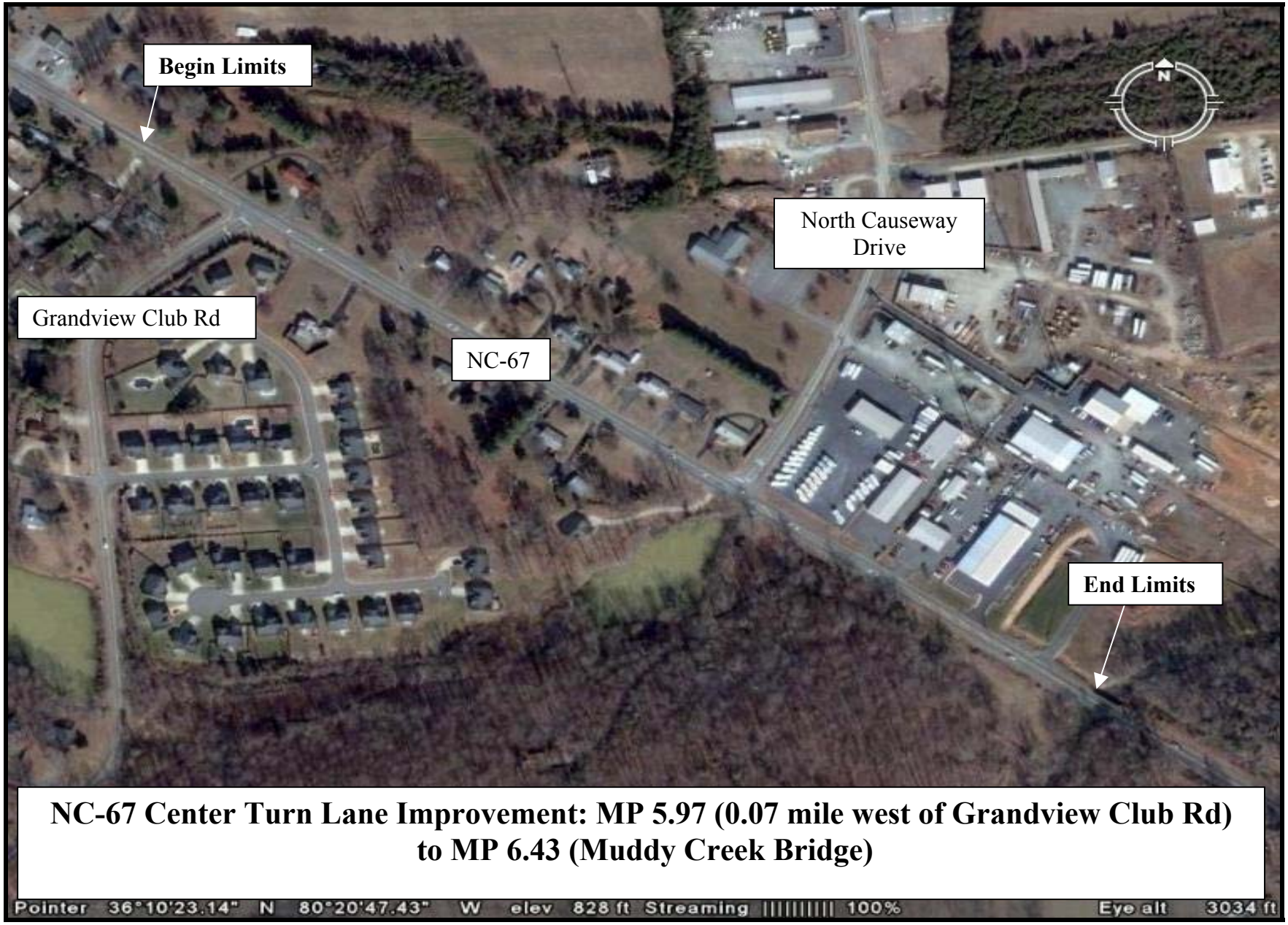
By giving vehicles storage location for left turning movements, free flowing traffic can proceed without hard braking or rear-ending the turning vehicle. With the center turn lane installed, the sight distance issue of the hilly terrain becomes less of a concern.

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.

Location Map
Forsyth County
Evaluation of Spot Safety Project # 09-01-212



Treatment Location: NC-67 from Muddy Creek Bridge to 0.07 mile West of SR 1434 (Grandview Club Rd)



NC-67 Center Turn Lane Improvement: MP 5.97 (0.07 mile west of Grandview Club Rd) to MP 6.43 (Muddy Creek Bridge)

TREATMENT SITE PHOTOS TAKEN 12/19/2006

Traveling West on NC-67 from Muddy Creek

Traveling West on NC-67 at Grandview Club Rd.

Traveling East on NC-67 at Grandview Club Rd

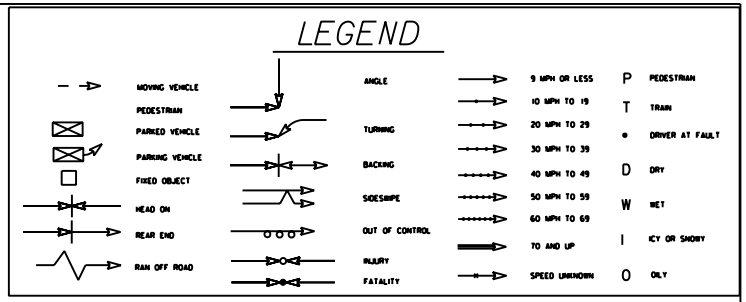
Traveling East on NC-67

Traveling East on NC-67 at SR 3985 (N. Causeway Rd)

Traveling North on SR 1434 (Grandview Club Rd)

Traveling South on SR 3985 (North Causeway Rd)

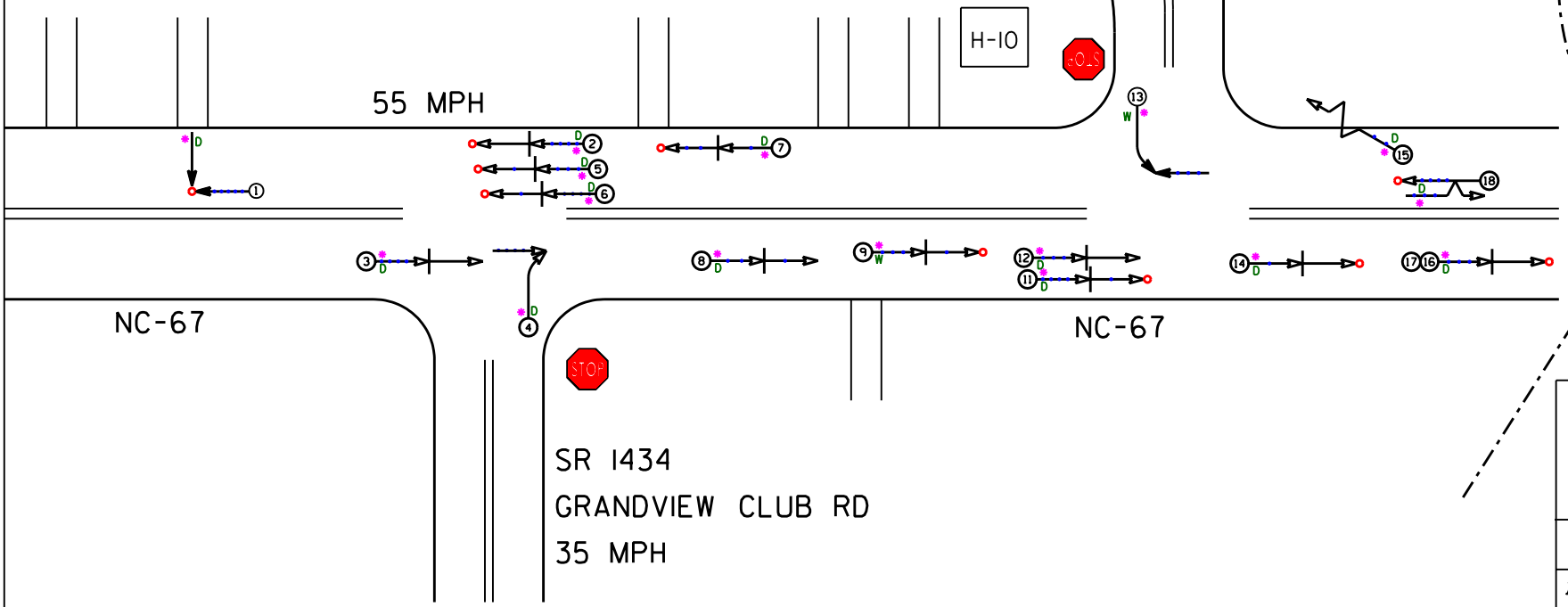
SS# 09-01-212
FORSYTH COUNTY
BEFORE PERIOD
7/1/1998 - 3/31/2002
NC-67 (MP 5.97 - 6.43)



SR 3985
NORTH CAUSEWAY RD
45 MPH

Muddy Creek

Note Crash 10: Tire came off vehicle and stuck the house labelled H10

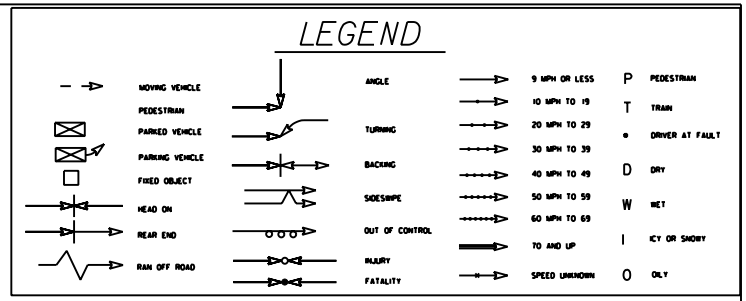


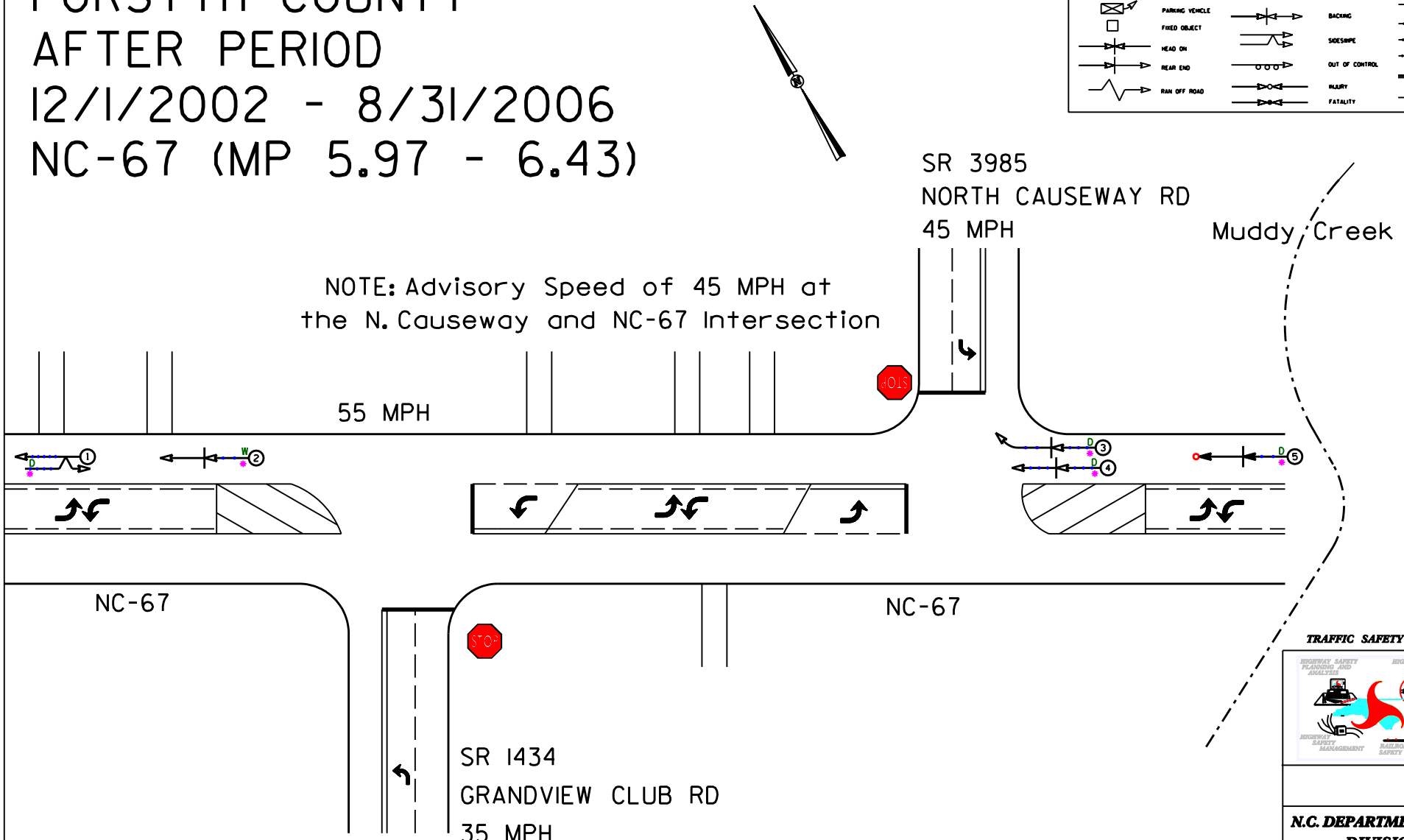
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM	
DIVISION: 9	AREA:
STUDY PERIOD: 7/1/1998 TO 3/31/2002	
DISTANCE: Y-LINE : OFT	
ANALYSIS PREPARED BY: JBS	
ANALYSIS CHECKED BY: CS	
DIAGRAM PREPARED BY: JBS	
DIAGRAM REVIEWED BY:	
SCALE:	NOT TO SCALE
DATE: 12-1-2006	
LOG NUMBER: SS# 09-01-212	

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

SS# 09-01-212
FORSYTH COUNTY
AFTER PERIOD
12/1/2002 - 8/31/2006
NC-67 (MP 5.97 - 6.43)





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM

DIVISION: 9	AREA:
STUDY PERIOD: 12/1/2002 TO 8/31/2006	
DISTANCE:	Y-LINE = OFF
ANALYSIS PREPARED BY: JBS	
ANALYSIS CHECKED BY: CS	
DIAGRAM PREPARED BY: JBS	
DIAGRAM REVIEWED BY:	
SCALE:	NOT TO SCALE
DATE: 12-1-2006	
LOG NUMBER: SS# 09-01-212	

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