

Hazard Elimination Project Evaluation

Project Log # 200705256

Hazard Elimination Project W-3305

**Evaluation of the Construction of an Eastbound Left-Turn Lane and a Westbound Right-Turn Lane
on US 70 at its Intersection with SR 1957 (Old US 70)
Rowan 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

Brad Robinson

Traffic Safety Project Engineer

3/6/2008
Date

Hazard Elimination Project Evaluation Documentation

Subject Location

Evaluation of Hazard Elimination Project W-3305 – US 70 (Statesville) at SR 1957 (Old US 70) in Rowan County.

Project Information and Background from the Project File Folder

The safety countermeasures chosen for the subject location was the construction of an eastbound left-turn lane and a westbound right-turn lane on US 70 (Statesville) at its intersection with SR 1957 (Old US 70).

Prior to the project, SR 1957 had two intersections with US 70 within 500 feet of each other. One intersection was a “Y” type intersection and the other formed an approximate 90 degree angle with US 70. According to crash reports it appears that the portion of SR 1957 that formed the “Y” type intersection was partially obliterated and was dead-ended about the same time as the project was completed. Please see attached *Aerial Photos* for further details.

In the before period all approaches to the intersection were single lane. Currently the treatment section of US 70 is undergoing construction into a four-lane divided roadway. The attached Treatment Site Photos show all three approaches to the intersection, although the US 70 shown in the photos is currently closed to thru traffic

The final completion date for the improvement at the subject intersection was on June 30, 1996 with a total cost of \$15,000.

Naive Before and After Analysis

After reviewing the hazard elimination 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 May 1, 1996 through August 31, 1996. The before period consisted of reported crashes from January 1, 1990 through April 30, 1996 (6 years, 4 months) and the after period consisted of reported crashes from September 1, 1996 through December 31, 2002 (6 years, 4 months). The beginning date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data includes all crashes within 150 feet of the subject intersection.

The following data tables depict the Naive Before and After Analysis for the treatment location. Please note that Rear-End Crashes on both approaches of US 70 are the Target Crashes for the applied countermeasures

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	6	6	0.0
Total Severity Index	3.47	3.47	0.0
Target Crashes	0	0	N/A
Target Crashes Severity Index	0	0	N/A
Volume	9,500	11,600	22.1

<u>Injury Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Injury Crashes	2	2	0.0
Fatal Crashes	0	0	N/A
Class A Crashes	0	0	N/A
Class B Crashes	2	0	-100.0
Class C Crashes	0	2	N/A
Property Damage Only (PDO) Crashes	4	4	0.0

The naive before and after analysis at the subject intersection resulted in no change in either Total Crashes or Target Crashes and a 22 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1993 and the after period ADT year was 1999.

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 no change in either Total Crashes or Target Crashes. The Total Severity Index also remained constant. The summary results above demonstrate that both Total and Target Crashes appear to have remained relatively unchanged at the treatment location from the before to the after period

The calculated benefit to cost ratio for this project is 0.00 considering total crashes. The benefit to cost ratio considering only target crashes is 0.00. 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 costs.

There were no Target Crashes in either the before or the after periods. There were also not any noticeable crash patterns in either the before or the after periods. There was a 22 percent increase in ADT, so it is possible that turn lane construction prevented Rear-End Crashes. Please note that the naïve before and after analysis shows only the safety benefit and does not take into account any operational benefits to the intersection as a result of the project.

As the Safety Evaluation Group completes additional reviews for this type of countermeasure, we will be able to provide more objective and definite information regarding actual crash reduction factors.

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: US 70 at SR 1957
 COUNTY: Rowan
 FILE NO.: W-3305

BY: Brad Robinson
 DATE: 2/27/2008

DETAILED COST: TYPE IMPROVEMENT - Left and Right Turn Lanes

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$15,000	10	0.149	\$2,235
	\$0	0	0.000	\$0
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$15,000	10	0.149	\$2,235

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$400
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$2,635
 TOTAL COST OF PROJECT= \$15,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

TIME PERIOD	YEARS	ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES				PDO		ANNUAL COSTS
		K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	CRASHES	CRASHES PER YR	
BEFORE	6.33	0	0.00	2	0.32	4	0.63	\$8,594
AFTER	6.33	0	0.00	2	0.32	4	0.63	\$8,594

Annual Benefits from Crash Cost Savings \$0

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = (\$2,635)
 BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 0.00

TOTAL COST OF PROJECT - \$15,000 COMPREHENSIVE B/C RATIO - 0.00

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: US 70 at SR 1957
 COUNTY: Rowan
 FILE NO.: W-3305 Target Crashes

BY: Brad Robinson
 DATE: 2/27/2008

DETAILED COST: TYPE IMPROVEMENT - Left and Right Turn Lanes

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$15,000	10	0.149	\$2,235
	\$0	0	0.000	\$0
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$15,000	10	0.149	\$2,235

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$400
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$2,635
 TOTAL COST OF PROJECT= \$15,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

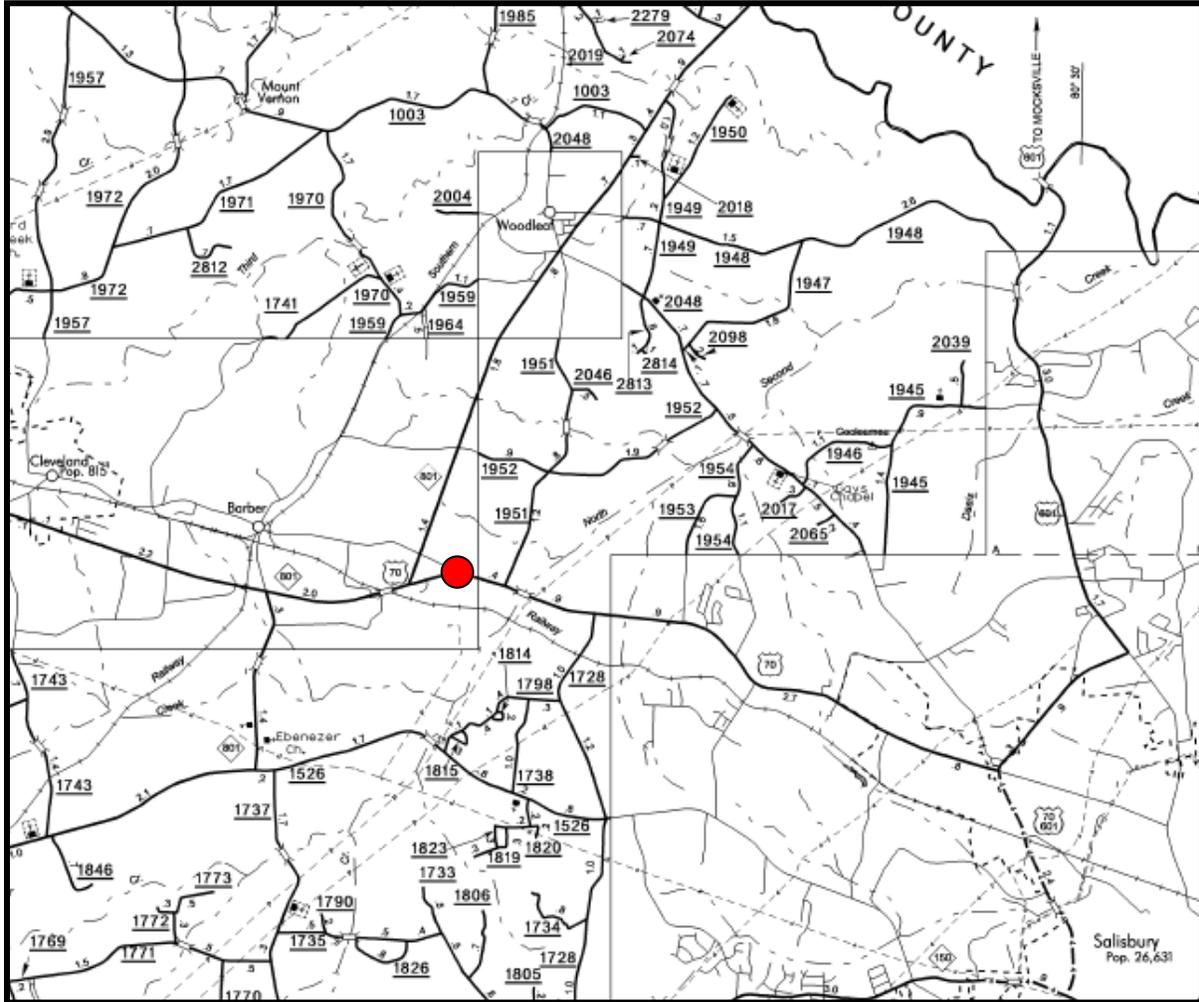
TIME PERIOD	YEARS	ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES				PDO		ANNUAL COSTS
		K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	CRASHES	CRASHES PER YR	
BEFORE	6.33	0	0.00	0	0.00	0	0.00	\$0
AFTER	6.33	0	0.00	0	0.00	0	0.00	\$0

Annual Benefits from Crash Cost Savings \$0

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = (\$2,635)
 BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 0.00

TOTAL COST OF PROJECT - \$15,000 COMPREHENSIVE B/C RATIO - 0.00

Location Map
Rowan County
Evaluation of W-3305



Treatment Location: US 70 (Statesville) at SR 1957 (Old US 70)

Treatment Site Photos Taken February 4, 2008

Area is currently undergoing construction to 4-lane divided highway. US 70 shown in photos is currently closed down



Traveling East on US 70



Traveling East on US 70



Traveling West on US 70



Traveling West on US 70



Traveling Southeast on SR 1957 (Barber Junction)



Traveling Southeast on SR 1957 (Barber Junction)

SR 1957
(Old US 70)
55 mph

Note: Crash #4 involved
a tire falling off a trailer
and hitting waiting vehicle

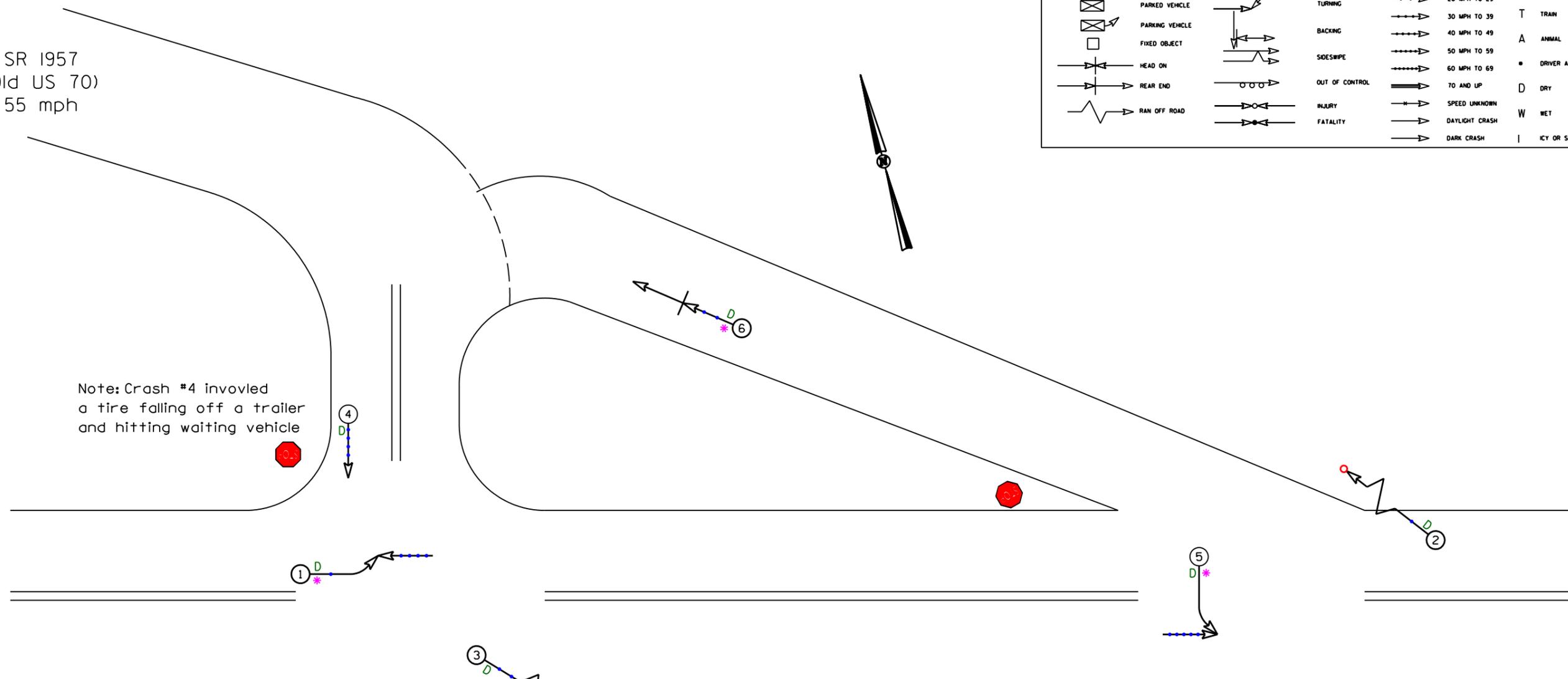
US 70
(Statesville)
55 mph

Rowan County
US 70 and SR 1957 (Old US 70)
Before Period From 1/1/90-4/30/96

⊕
Target Crashes

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		BICYCLE
	PARKED VEHICLE		BACKING		20 MPH TO 29		TRAIN
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		ANIMAL
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		DRIVER AT FAULT
	HEAD ON		INJURY		50 MPH TO 59		DRY
	REAR END		FATALITY		60 MPH TO 69		WET
	RAN OFF ROAD		FATALITY		70 AND UP		ICY OR SNOWY



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT <small>HIGHWAY SAFETY IMPROVEMENT PROGRAM</small>		COLLISION DIAGRAM <small>SAFETY INFORMATION MANAGEMENT AND SUPPORT</small>	
		DIVISION: 9	AREA: ..
		STUDY PERIOD: 1/1/90 TO 4/30/96	
		DISTANCE: Y-LINE: 150 FT	
		ANALYSIS PREPARED BY: B. Bobiosso	
DIAGRAM PREPARED BY: B. Bobiosso		DIAGRAM REVIEWED BY:	
SAFETY EVALUATION		TRAFFIC SAFETY	
BEFORE		AFTER	
SCALE: NOT TO SCALE		DATE: February 2008	
LOG NUMBER: 200705256			
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			

SR 1957
(Old US 70)
55 mph

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	→ DAYLIGHT CRASH	→ DARK CRASH	P PEDESTRIAN	B BICYCLE	T TRAIN	A ANIMAL	* DRIVER AT FAULT	D DRY	W WET	I ICY OR SNOWY
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Roadway abandoned.
No longer connects to US 70

Note: Crash #1 involved
a vehicle attempting to
elude a police officer

US 70
(Statesville)
55 mph

Rowan County
US 70 and SR 1957 (Old US 70)
After Period From 9/1/96-12/31/02

⊕
Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT <small>HIGHWAY SAFETY IMPROVEMENT PROGRAM SAFETY INFORMATION MANAGEMENT AND SUPPORT</small>		COLLISION DIAGRAM	
		DIVISION: 9	AREA: ..
		STUDY PERIOD: 9/1/96 TO 12/31/02	
		DISTANCE: Y-LINE: 150 FT	
		ANALYSIS PREPARED BY: B. Bobilosoo	
DIAGRAM PREPARED BY: B. Bobilosoo		DIAGRAM REVIEWED BY:	
SAFETY EVALUATION		TRAFFIC SAFETY	
AET/ER		SCALE: NOT TO SCALE	DATE: Eobucjcy_2008
		LOG NUMBER: 200105256	
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			