

# **Spot Safety Project Evaluation**

Project Log # 200704315

Spot Safety Project # 04-01-227

**Spot Safety Project Evaluation of the  
Traffic Signal Installation at the Intersection of US 13 and  
SR 1006 (Grantham School Rd / Falling Creek Church Rd)  
Wayne County**

Documents Prepared By:

Safety Evaluation Group  
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**Principal Investigator**

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Traffic Safety Project Engineer

7-16-07  
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Date

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

## **Subject Location**

Evaluation of Spot Safety Project Number 04-01-227 – The Intersection of US 13 and SR 1006 (Grantham School Rd / Falling Creek Church Road) in Wayne 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 an actuated traffic signal. In the before period, US 13 and SR 1006 were both two-lane facilities at the subject intersection with no turn lanes and speed limits of 45 mph and 35 mph, respectively. The subject location was a four-leg crossroads type intersection, which was controlled by a stop control with flashers on SR 1006. Flashers were installed in 1988.

With the installation of the signal, the geometry of the intersection was altered. The raised channelization medians on SR 1006 were removed for the installation of left turn lanes. US 13 was also widened to provide exclusive left turn lanes. The southbound approach of SR 1006 (Falling Creek Road) was additionally equipped with an exclusive right turn lane.

The original statement of problem was the growing increase in school traffic volume on SR 1006 and traffic on US 13 in general, as well as the angle crash problem due to poor sight distance.

The initial crash analysis was completed from December 1, 1997 to November 30, 2000 with nine (9) reported crashes, seven (7) of which were Angle Crashes. These crashes resulted in 6 “C” class injuries. The final completion date for the improvement at the subject intersection was on December 2, 2002 with a total cost of \$40,000.00.

## **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 September 1, 2002 to February 28, 2003. The before period consisted of reported crashes from October 1, 1998 through August 31, 2002 (3 years and 11 months) and the after period consisted of reported crashes from March 1, 2003 through January 31, 2007 (3 years and 11 months). The ending date for this analysis was determined by 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 maps 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 within the intersection 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.

<b>Treatment Information</b>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total crashes	8	3	- 62.50 %
Total Severity Index	2.85	3.47	21.75 %
Target Crashes	4	2	- 50.00 %
Target Crash Severity Index	4.70	4.70	0.00 %
Volume	5,640	6,370	12.94 %
<b>Injury Crash Summary</b>			
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	0	0	N/A
Class C Injury Crashes	2	1	- 50.00 %
Total Injury Crashes	2	1	- 50.00 %

The naive before and after analysis at the treatment location resulted in a 62.50 percent decrease in Total Crashes, a 50 percent decrease in Target Crashes, but a 21.75 percent increase in the Total Severity Index. The before period ADT year was 2000 and the after period ADT year was 2005.

## 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 62.5 percent decrease in Total Crashes and a 50 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*, the only pattern of target crashes at the intersection in the before period were the result of a vehicle attempting to cross US 13 on SR 1006. After the signal installation, this angle crash pattern was reduced by half. The after period angle collisions were the result of a vehicle running the red indication signal.

The *Before Period Collision Diagram* also identifies a cluster of crashes at the channelization ramp from vehicles exiting the PVA of Grantham Supply in an unsafe manner. The signal was not installed to particularly eliminate this pattern although we can conclude that enhanced traffic control has made this maneuver more manageable and safer. This is evident by no crashes in the after period at this location.

No other crash patterns apparently developed in the after period. The only non-target after period crash resulted when a vehicle randomly struck a Coca-Cola Machine in the roadway.

The calculated benefit to cost ratio for this project is 0.97 considering total crashes. The benefit to cost ratio considering only target crashes is 0.63. 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 and a view from the Grantham Supply PVA across to the southbound channelization entrance ramp to SR 1006.

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.





SR 1006  
Falling Creek  
Church Road

US 13

SR 1006  
Grantham  
School Rd.

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Image © 2007 DigitalGlobe

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Pointer 35°17'49.74" N 78°09'48.99" W elev 155 ft Streaming ||||| 100%

Eye alt 1006 ft

**TREATMENT SITE PHOTO TAKEN 7/2/2007**



Traveling North on SR 1006 (Grantham School Rd)



Traveling South on SR 1006 (Falling Creek Church Rd)



Traveling South on SR 1006 (Falling Creek Church Rd)



Traveling East on US 13 (Notice Channelization Ramp to right)



Traveling West on US 13



Traveling West on US 13



View from Grantham Supply PVA across US 13



**BENEFIT-COST ANALYSIS WORKSHEET**

LOCATION: US 13 at SR 1006  
 COUNTY: Wayne  
 FILE NO.: SS 04-01-227

BY: JBS  
 DATE: 6/21/2007  
 NOTES: Target Crashes

DETAILED COST: TYPE IMPROVEMENT - New Signal

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$40,000	10	0.149	\$5,961
	\$0	0	0.000	\$0
Right-of-Way	\$0	0	0.000	\$0
<b>TOTALS</b>	<b>\$40,000</b>	<b>10</b>	<b>0.149</b>	<b>\$5,961</b>

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$2,000  
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$900  
 TOTAL ANNUAL COST= \$8,861  
 TOTAL COST OF PROJECT= \$40,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

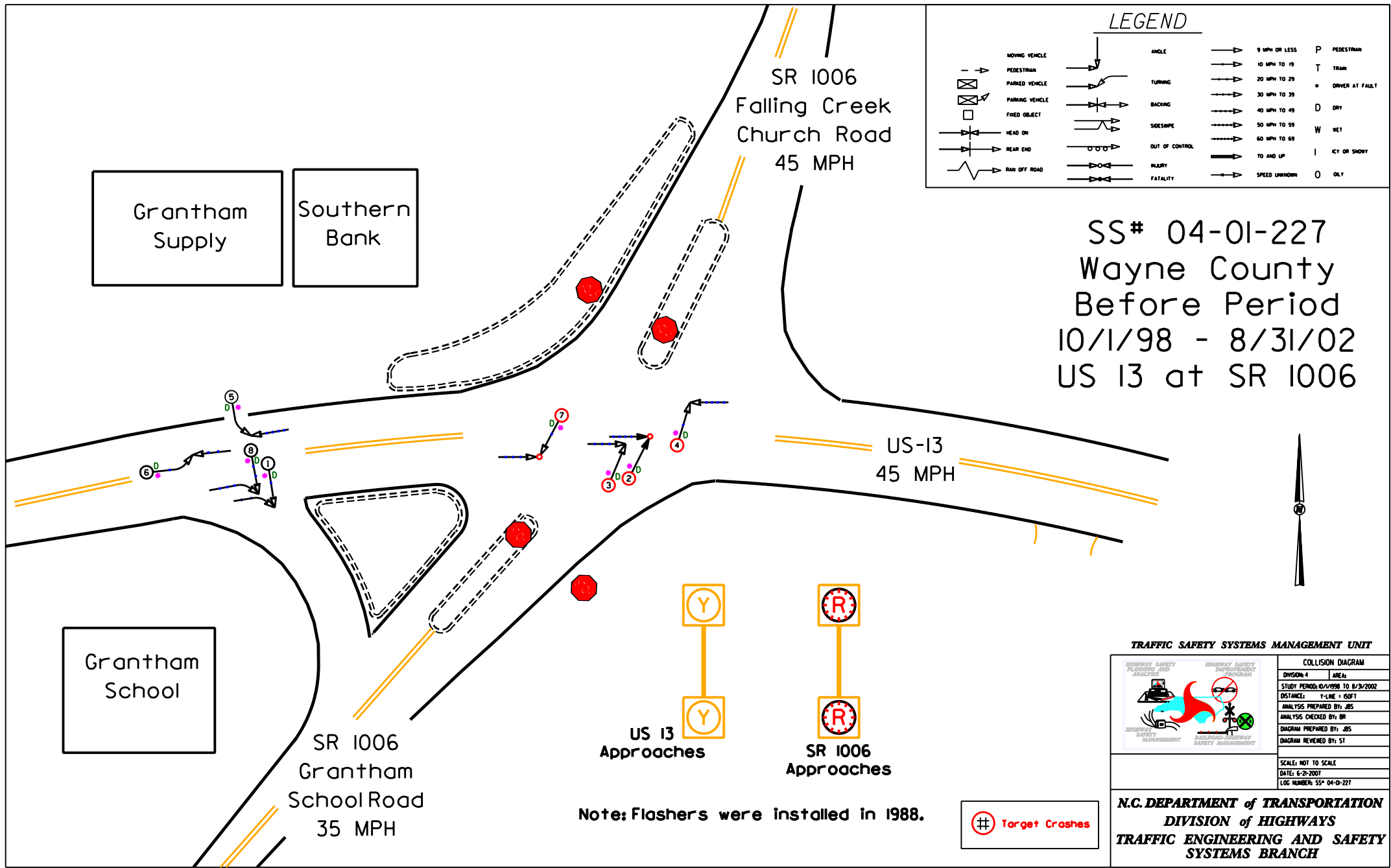
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	3.92	0	0.00	2	0.51	2	0.51	\$11,173
AFTER	3.92	0	0.00	1	0.26	1	0.26	\$5,587

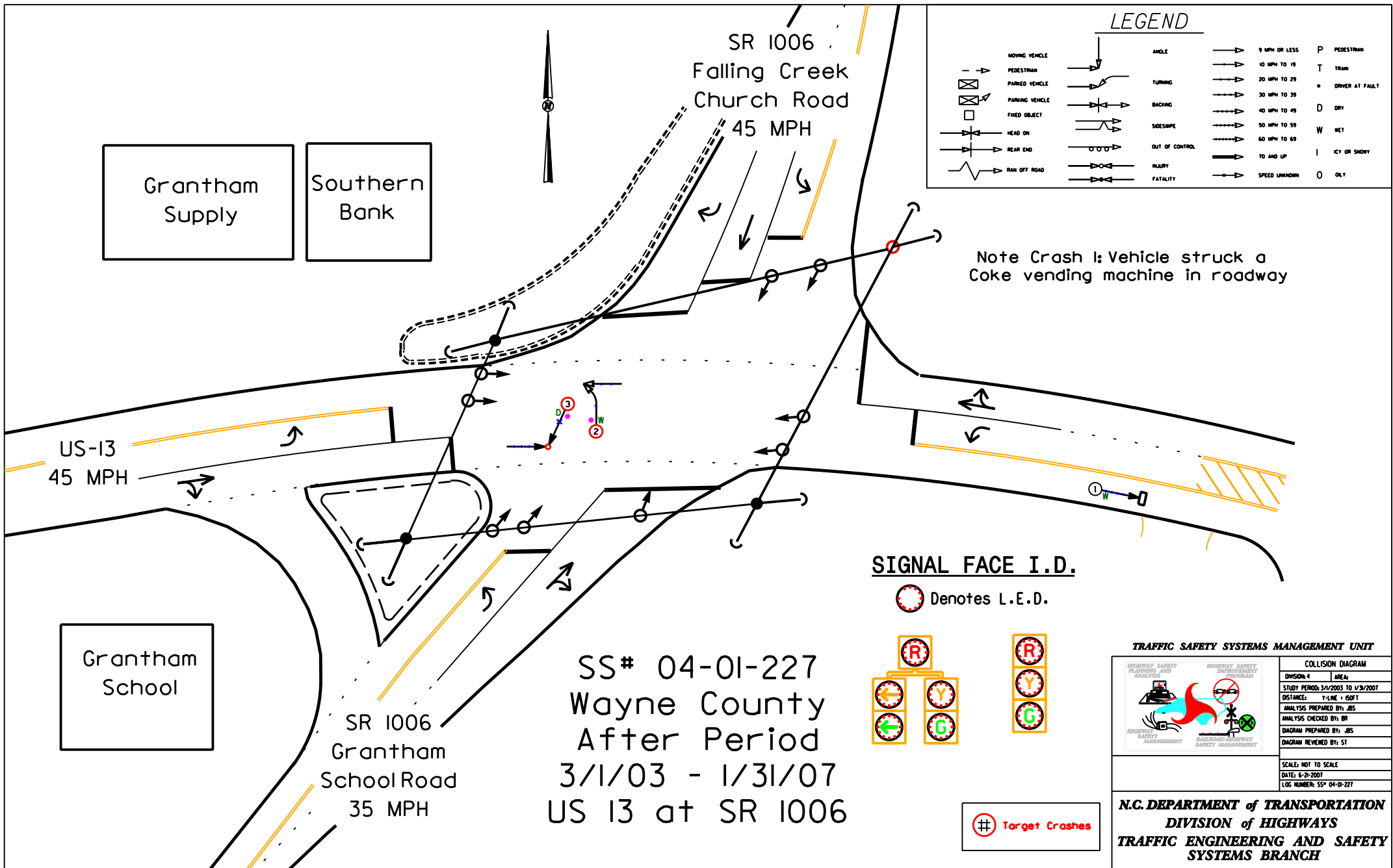
Annual Benefits from Crash Cost Savings \$5,587

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = (\$3,274)

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 0.63

TOTAL COST OF PROJECT - \$40,000 COMPREHENSIVE B/C RATIO - 0.63





Grantham Supply      Southern Bank

Grantham School

SR 1006  
Grantham School Road  
35 MPH

SS# 04-01-227  
Wayne County  
After Period  
3/1/03 - 1/31/07  
US 13 at SR 1006

Note Crash 1: Vehicle struck a Coke vending machine in roadway