

Spot Safety Project Evaluation

Work Order #41000017766

Spot Safety Project # 01-06-205

Spot Safety Project Evaluation of the Traffic Signal Upgrade and Splitting of The Side Street Phasing at the Intersection of US 158 (Main St) and NC 35 (Church St) Northampton County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Transportation Mobility and Safety Division
North Carolina Department of Transportation

Principal Investigator



Brad Robinson, PE

2/21/2012

Date

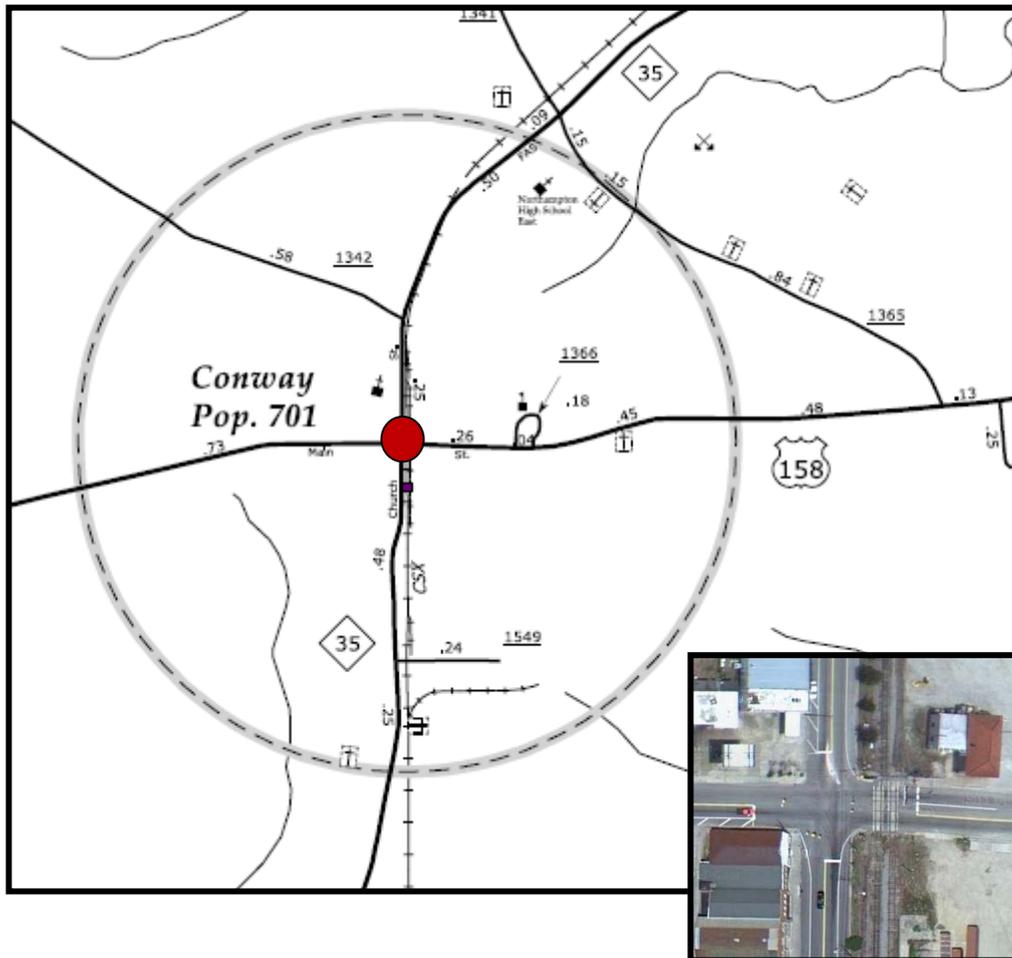
Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 01-06-205 – The intersection of US 158 (Main St) and NC 35 (Church St) in Northampton County.

The signal number for this location is 01-0120.



Project Information and Background from the Project File Folder

The spot safety project improvement countermeasures chosen for the subject location was to upgrade the signal and to split the side street phasing.

US 158 and NC 35 are both two lane roadways with speed limits of 20 mph on all approaches to the intersection. Westbound US 158 has a left turn lane and a railroad crossing on the approach. The original statement of problem was that motorists on NC 35 were having to wait through multiple cycles during peak periods due to the lack of split side street phasing.

The final completion date for the improvements at the subject intersection was on March 26, 2007 with a total cost of \$27,500.00.

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 February 1, 2007 to April 30, 2007. The before period consisted of reported crashes from June 1, 2002 through January 31, 2007 (4 years and 8 months) and the after period consisted of reported crashes from May 1, 2007 through December 31, 2011 (4 years and 8 months). The ending date for this analysis was limited by the available crash data at the time the analysis was conducted.

The treatment data consisted of all reported crashes within 150 feet of the subject intersection. The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Frontal Impact Crashes involving vehicles entering from the side street (NC 35) were the Target Crashes for the applied countermeasure.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	2	0	-100.0
Total Severity Index	1	0	-100.0
Target Crashes	0	0	N/A
Target Severity Index	0	0	N/A
Volume	8,100	7,200	-11.1
<u>Target Crash Severity Summary</u>			
Fatal Crashes	0	0	N/A
Class A Crashes	0	0	N/A
Class B Crashes	0	0	N/A
Class C Crashes	0	0	N/A
PDO Crashes	2	0	-100.0

The naive before and after analysis at the treatment location resulted in a 100 percent decrease in total crashes and a 11 percent decrease in average daily traffic (ADT). There were no target crashes in either the before or after periods. The before period ADT year was 2005 and the after period ADT year was 2009.

Results and Discussion

There were only two crashes at the subject intersection in the before period, neither being target crashes. One was a left turn-same roadway crash on US 158 and the other was a rear-end crash involving vehicles on westbound US 158. According to the project background the project was implemented more for mobility concerns than for any safety benefit.

The calculated benefit to cost ratio for this project is -4.63 considering total crashes. The benefit to cost ratio considering only target crashes is 0.0. 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*. 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.

BENEFIT-COST ANALYSIS WORKSHEET - TOTAL

LOCATION: US 158 at NC 35		BY: bdr						
COUNTY: Northampton		DATE: 2/21/2012						
FILE NO.: SS 01-06-205								
DETAILED COST:	TYPE IMPROVEMENT -	signal upgrade - split side streets						
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$0	0	0.000	\$0			
	Right-of-Way	\$27,500	10	0.149	\$4,098			
		\$0	0	0.000	\$0			
	TOTALS	\$27,500	10	0.149	\$4,098			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$2,000			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$900			
	TOTAL ANNUAL COST=				\$6,998			
	TOTAL COST OF PROJECT=				\$27,500			
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	4.67	0	0.00	0	0.00	2	0.43	\$1,842
AFTER	4.67	0	0.00	8	1.71	0	0.00	\$34,261
								Annual Benefits from Crash Cost Savings (\$32,420)
	NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST							(\$39,418)
	BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST							-4.63
	TOTAL COST OF PROJECT	-	\$27,500		COMPREHENSIVE B/C RATIO	-		-4.63

BENEFIT-COST ANALYSIS WORKSHEET - TARGET

LOCATION: US 158 at NC 35		BY: bdr						
COUNTY: Northampton		DATE: 2/21/2012						
FILE NO.: SS 01-06-205								
DETAILED COST:	TYPE IMPROVEMENT -	signal upgrade - split side streets						
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$0	0	0.000	\$0			
	Right-of-Way	\$27,500	10	0.149	\$4,098			
		\$0	0	0.000	\$0			
	TOTALS	\$27,500	10	0.149	\$4,098			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$2,000			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$900			
	TOTAL ANNUAL COST=				\$6,998			
	TOTAL COST OF PROJECT=				\$27,500			
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	4.67	0	0.00	0	0.00	0	0.00	\$0
AFTER	4.67	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							(\$6,998)
	BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST							0.00
	TOTAL COST OF PROJECT	-	\$27,500		COMPREHENSIVE B/C RATIO	-		0.00

Treatment Site Photos Taken February 13, 2012



Traveling westbound on US 158



Traveling eastbound on US 158



Traveling northbound on US 158



Traveling southbound on US 158

SS# 01-06-205
 Order# 4100017766
 Northampton County
 BEFORE Period
 6/1/2002-1/31/2007

NC 35
 (S. CHURCH STREET)
 20 mph

ADT (YEAR)
 3,300 (2004)

US 158
 (W. MAIN ST)
 20 mph ADT (YEAR)
 4,800 (2004)

US 158
 (E. MAIN STREET)
 20 mph

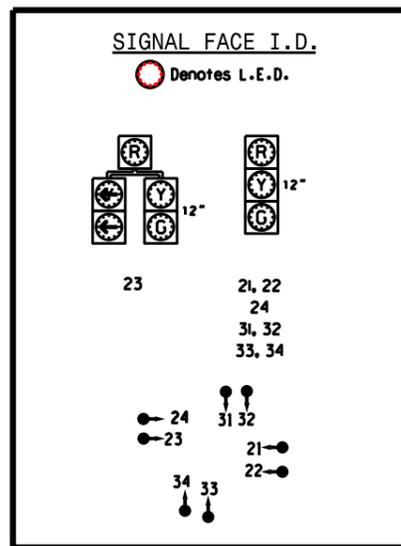
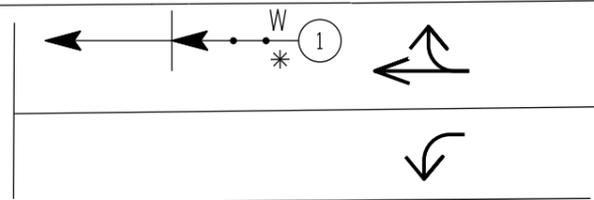
ADT (YEAR)
 4,900 (2004)

NC 35
 (S. CHURCH STREET)
 20 mph

ADT (YEAR)
 3,200 (2004)

NCVA CROSSING
 630 235Y

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 ONLY



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

TRAFFIC SAFETY UNIT

Date: February 2012 Prepared By: bdr

SS# 01-06-205
 Order# 4100017766
 Northampton County
 AFTER Period
 5/1/2007-12/31/2011

NC 35
 (S. CHURCH STREET)
 20 mph

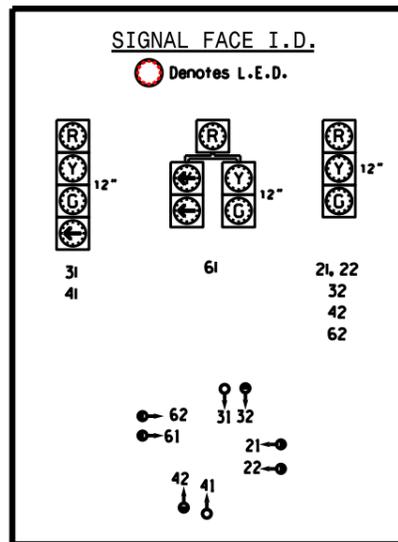
ADT (YEAR)
 2,600 (2009)

US 158
 (W. MAIN ST)
 20 mph

ADT (YEAR)
 4,100 (2009)

US 158
 (E. MAIN STREET)
 20 mph

No Reported Crashes



NC 35
 (S. CHURCH STREET)
 20 mph

ADT (YEAR)
 2,500 (2009)

NCVA CROSSING
 630 235Y

ADT (YEAR)
 5,200 (2009)

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		SPEED UNKNOWN
	RAN OFF ROAD				70 AND UP		ONLY

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 SAFETY DIVISION

TRAFFIC SAFETY UNIT

Date: February 2012

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