

Spot Safety Project Evaluation

Order # 41000023401

Spot Safety Project # 07-07-202

**Spot Safety Project Evaluation of the
Raised Concrete Median Channelization for Sight Distance
NC-770 at SR 1533 / SR 1604
Rockingham County**

Documents Prepared By:

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

Principal Investigator



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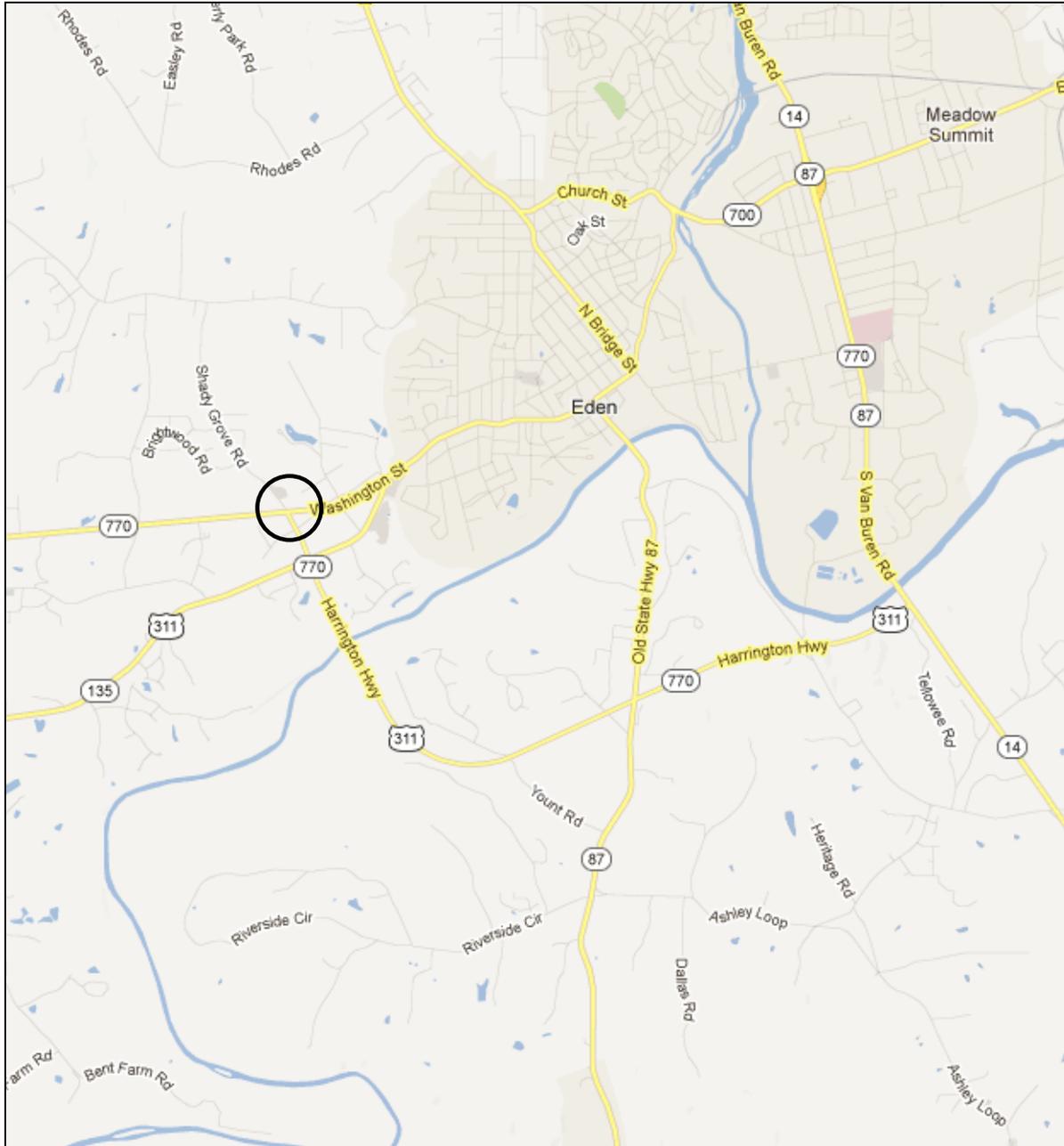
3-7-2013
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 07-07-202 located at the Intersection of NC-770 (Harrington Highway) and SR 1533 (Shady Grove Road) / SR 1604 (Washington Street) in Rockingham County, near the City of Eden.





After Period Intersection – Google Maps

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the revision of the existing raised concrete median islands on the stop approaches in order to bring vehicles from Shady Grove Road and Harrington Highway into the intersection at a 90-degree angle; which should improve sight distance visibility. NC 770, SR 1533, and SR 1604 are all two-lane facilities at the subject intersection with speed limits ranging from 35-mph to 45-mph. The subject location is a four-leg crossroads intersection, which is controlled by a dual posted stop signs on NC 770 (Harrington Highway) and SR 1533 (Shady Grove Road).

The original statement of problem was the presence of collisions due to vehicles on the side streets approaching the intersection at a skew angle which limits their sight distance capabilities. The intended purpose of the revised channelization is to alleviate the frontal impact crashes at the intersection by increasing the crossing vehicle's sight distance which should improve the motorist's gap decision making process.

The initial crash analysis was completed from April 1, 2002 to March 31, 2007 with ten (10) reported angle crashes, including one fatality crash. The final completion date for the improvement at the subject intersection was on September 17, 2008 with a total cost of \$33,000.

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 were the months of August through September 2008. The before period consisted of reported crashes from May 1, 2005 through July 31, 2008 (4 years and 3 months); and the after period consisted of reported crashes from October 1, 2008 through December 31, 2012 (4 years and 3 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; U-Turn; and Angle.

| <u>Treatment Information</u> | Before | After | Percent Reduction (-) Percent Increase (+) |
|-------------------------------------|---------------|--------------|---|
| Total Crashes | 8 | 6 | - 25.0 % |
| Total Severity Index | 14.18 | 4.70 | - 66.9 % |
| Target Crashes – Frontal Impact | 7 | 3 | - 57.1 % |
| Target Crash Severity Index | 16.06 | 8.40 | - 47.7 % |
| Volume (2006, 2010) | 6,700 | 6,800 | 1.5 % |

| <u>Injury Crash Summary</u> | Before | After | Percent Reduction (-) Percent Increase (+) |
|------------------------------------|---------------|--------------|---|
| Fatal injury Crashes | 1 | 0 | - 100.0 % |
| Class A injury Crashes | 0 | 0 | N/A |
| Class B injury Crashes | 2 | 1 | - 50.0 % |
| Class C Injury Crashes | 2 | 2 | 0.0 % |
| Property Damage Only | 3 | 3 | 0.0 % |

The naive before and after analysis at the treatment location resulted in a 25 percent reduction in Total Crashes, a 57 percent reduction in Target Crashes, and a 67 percent reduction in the Total Severity Index. The before period ADT year was 2006 and the after period ADT year was 2010.

Results and Discussion

Referencing the *Collision Diagrams*, the before period consisted of four (4) angle crashes as vehicles attempted to cross the mainline, two (2) left turn collisions including a motorcycle fatality, and one U-turn crash as a motorist failed to give enough room to make the turn around the concrete median island. The after period consisted of three (3) angle crashes as vehicles attempted to cross the mainline. None of the frontal impact crashes were caused by motorists running and disregarding the stop sign. There was also one (1) rear-end crash on westbound SR 1604 in both the before and the after periods.

Please see the attached Treatment Site Photos. Photos are provided from Google Street View for both mainline 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.

Treatment Site Photos (From Google Street View)



Looking East on NC-770



Looking West on SR 1604 (Washington Street)



Looking South onto NC-770 (Harrington Hwy) Approach

Note: Side Street Approaches do not show countermeasure on Street View



ADT (Year)
1,900 (2006)

SR 1533
Shady Grove Rd
35-MPH



7

D *

NC-770
45-MPH

ADT (Year)
4,500 (2006)

1

D *

5

D *

3

D *

6

D *

2

D *

4

D *

ADT (Year)
4,400 (2006)

SR 1604
Washington St
Old NC-770
45-MPH

8

D *



NC-770
Harrington Hwy
35-MPH

ADT (Year)
2,650 (2006)

LEGEND

| | | | | | | | |
|--|----------------|--|----------------|--|---------------|--|-----------------|
| | MOVING VEHICLE | | ANGLE | | 9 MPH OR LESS | | PEDESTRIAN |
| | PEDESTRIAN | | TURNING | | 10 MPH TO 19 | | TRAM |
| | PAKED VEHICLE | | BACKING | | 20 MPH TO 29 | | DRIVER AT FAULT |
| | PAKED VEHICLE | | SIDESWIPE | | 30 MPH TO 39 | | D DRY |
| | FIXED OBJECT | | OUT OF CONTROL | | 40 MPH TO 49 | | W WET |
| | HEAD ON | | INJURY | | 50 MPH TO 59 | | I ICY OR SNOWY |
| | REAR END | | FATALITY | | 60 MPH TO 69 | | S SPEED UNKNOWN |
| | RAN OFF ROAD | | | | 70 AND UP | | O ONLY |

SS# 07-07-202
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Rockingham County
BEFORE Period
5/1/2004 - 7/31/2008

Frontal Impact
Target Crashes

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

TRAFFIC SAFETY UNIT

Date: 2-26-2013

Prepared By: J. Schronce
(Associate Eric Thomas)



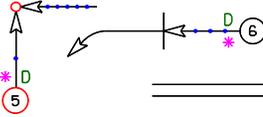
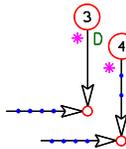
ADT (Year)
1,900 (2010)

SR 1533
Shady Grove Rd
35-MPH



NC-770
45-MPH

ADT (Year)
4,600 (2010)



ADT (Year)
4,500 (2010)

SR 1604
Washington St
Old NC-770
45-MPH



NC-770
Harrington Hwy
35-MPH

ADT (Year)
2,500 (2010)

LEGEND

| | | | | | | | |
|--|----------------|--|----------------|--|---------------|--|-----------------|
| | MOVING VEHICLE | | ANGLE | | 9 MPH OR LESS | | PEDESTRIAN |
| | PEDESTRIAN | | TURNING | | 10 MPH TO 19 | | TRAIN |
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| | FIXED OBJECT | | OUT OF CONTROL | | 50 MPH TO 59 | | WET |
| | HEAD ON | | ICY OR SNOWY | | 60 MPH TO 69 | | 70 AND UP |
| | REAR END | | HURRY | | SPEED UNKNOWN | | ONLY |
| | RAN OFF ROAD | | FATALITY | | | | |

SS# 07-07-202
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Rockingham County
AFTER Period
10/1/2008 - 12/31/2012



Frontal Impact
Target Crashes

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

TRAFFIC SAFETY UNIT

Date: 2-26-2013

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