

# **Hazard Elimination Project Evaluation**

Project Log # 200502082

Hazard Elimination Project W-2909

## **Evaluation of the Installation of Left Turn Lanes at Nine Median Crossovers on US 29 from Heathway Drive to SR 2679 (US 29 Access Road) In Mecklenburg County**

Documents Prepared By:

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6/29/2006  
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Date

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

### **Subject Location**

Evaluation of Hazard Elimination Project W-2909 –  
Nine Crossovers on US 29 from Heathway Dr (MP 15.71) to SR 2679/ US 29 Access Rd (MP 20.09)

The original project contained the following crossovers:

- Location 1: Heathway Drive, Three-Leg Intersection, MP 15.71  
NB Left Turn Lane Added
- Location 2: Owen Blvd, Three-Leg Intersection, MP 15.81  
NB and SB Left Turn Lanes Added
- Location 3: Kemp Street, Four-Leg Intersection, MP 16.46  
NB and SB Left Turn Lanes Added
- Location 4: Stetson Drive, Three-Leg Intersection, MP 16.90  
SB Left Turn Lane Added
- Location 5: Rocky River Road, Three-Leg Intersection, MP 16.98  
NB Left Turn Lane Added  
CROSSOVER CLOSED
- Location 6: J. W. Clay Blvd, Three-Leg Intersection, MP 18.82  
SB Left Turn Lane Added  
SIGNALIZED
- Location 7: Park Drive-In Crossover, MP 19.40  
SB Left Turn Lane  
COUNTERMEASURE NOT COMPLETED
- Location 8: Wilco Gas Station Crossover, MP 20.00  
SB Left Turn Lane  
COUNTERMEASURE NOT COMPLETED
- Location 9: SR 2679 (US 29 Access Road), Three-Leg Intersection, MP 20.09  
SB Left Turn Lane Added  
CONVERTED TO DIRECTIONAL CROSSOVER

Note that only Locations 1-4 were evaluated for this project. Locations 5-9 were not evaluated because either the countermeasure was never completed or the crossover was altered after the countermeasure was installed.

Please see the attached *Location Map* for further detail.

## Project Information and Background from the Project File Folder

The safety countermeasure chosen for the subject location was to construct left turn lanes at existing median openings on US 29. US 29 is a four-lane divided facility with a variable width grass median. The surrounding development is commercial, industrial, and institutional. The speed limit along US 29 is 45 mph at this location.

No initial crash analysis for this location was documented in the Project File Folder. The Project Report states that there was a problem of vehicles making left-turns from the through lanes on the high-speed, high-volume divided roadway. The project was completed on June 20, 1997 at a cost of \$316,000.

## 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 was from January 1, 1997 through December 31, 1997. The before period consisted of reported crashes from January 1, 1994 through December 31, 1996 (3 Years) and the after period consisted of reported crashes from January 1, 1998 through December 31, 2000 (3 Years).

The treatment data for all locations consisted of all crashes on US 29 within 150 feet of each crossover. A 0° Y-line was used on all cross streets.

Target Crashes for the applied countermeasure occurred on US 29 in advance of each median crossover in the direction of the installed left turn lane and include the following crash types:

- Rear End Crashes involving a left turning / u-turning vehicle OR
- Sideswipe Crashes involving a left turning / u-turning vehicle

Please see the attached Collision Diagrams for a visual representation of Total and Target Crashes. Note that the crash numbers for Target Crashes are circled in red on the diagrams.

The following tables depict the Naïve Before and After Analysis for the Total Crashes and Target Crashes at Locations 1 through 4.

Table 1a. Treatment Information

	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)/ Percent Increase (+)</b>
Total Crashes: Locations 1-4	48	79	64.6%
Total Severity Index	8.97	6.67	-25.6%
Target Crashes: Locations 1-4	10	3	-70.0%
Target Severity Index	6.18	1.00	-83.8%
Volume	36,000	39,400	9.4%

Table 1b. Target Crash Information

<b>Locations 1-4</b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)/ Percent Increase (+)</b>
Fatal Injury Crashes	0	0	N/A
Non-Fatal Injury Crashes	7	0	-100.0%
Total Injury Crashes	7	0	-100.0%
Night Crashes	2	0	-100.0%
Wet Crashes	1	1	0.0%

Table 2. Crash Breakdown by Location

<b>Median Crossovers Summary</b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)/ Percent Increase (+)</b>
<b>Location 1</b>			
Total Crashes	13	24	84.6%
Target Crashes	1	0	-100.0%
<b>Location 2</b>			
Total Crashes	6	8	33.3%
Target Crashes	4	0	-100.0%
<b>Location 3</b>			
Total Crashes	8	13	62.5%
Target Crashes	3	1	-66.7%
<b>Location 4</b>			
Total Crashes	21	34	61.9%
Target Crashes	2	1	-50.0%

As shown in the previous tables, Locations 1-4 overall experienced a 64.6 percent increase in Total Crashes, a 70.0 percent decrease in Target Crashes, and a 9.4 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1995 and the after period ADT year was 1999.

## **Results and Discussion**

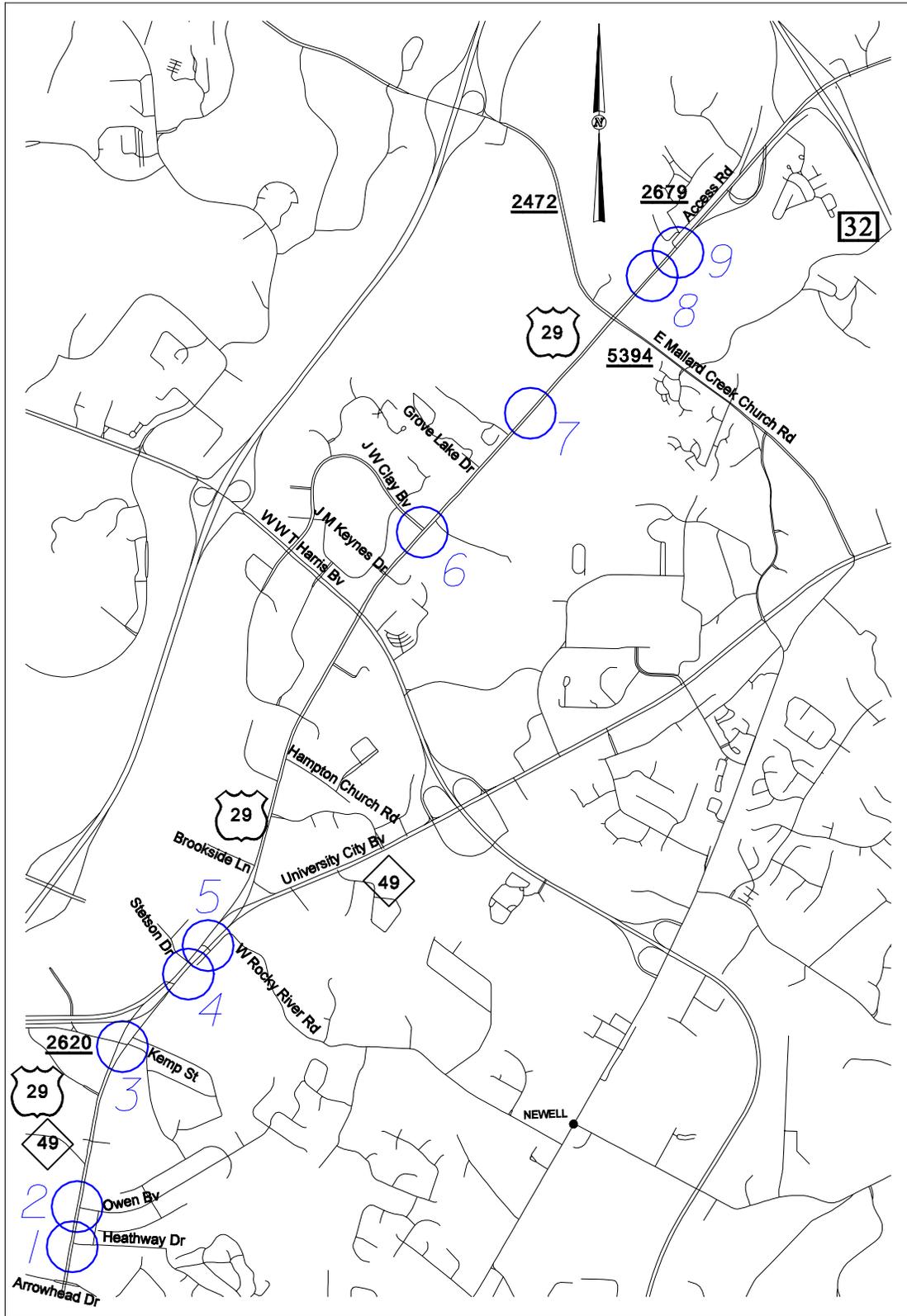
The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 65 percent increase in Total Crashes and a 70 percent decrease in Target Crashes. Further investigation shows there was a 26 percent decrease in the Severity Index for Total Crashes and an 84 percent decrease in the Severity Index for Target Crashes. The summary results above demonstrate that although the treatment locations experienced an increase in Total Crashes, there was a dramatic decrease in the number and severity of Target Crashes.

The Target Crashes at all four treatment locations in the before period resulted in seven injury crashes, which included two class B injury crashes and five class C injury crashes. In the after period, none of the Target Crashes resulted in an injury.

Although the left turn treatments appear to have addressed a portion of the Rear End crash pattern, other crash patterns appear to have increased in the after period. The number of Frontal Impact Crashes have increased dramatically from the before period to the after period. Specifically, at Locations 1, 2, and 3 there appears to be a concentration of Angle and Left Turn-Different Roadway crashes occurring between westbound cross street vehicles and northbound US 29 vehicles. These crash types have increased (by 250 percent) from 6 crashes in the before period to 21 crashes in the after period at these three locations. At Location 4, the number of Frontal Impact Crashes have increased (by 125 percent) from 8 crashes in the before period to 18 crashes in the after period. Please see the Before and After Collision Diagrams provided for Locations 1-4.

Please see the attached *Treatment Site Location Photos*. Photos are provided for Locations 1 through 9. 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.

*Location Map  
Hazard Elimination Project W-2909  
Mecklenburg County*



*Treatment Median Crossovers 1-9:  
Located on US 29*

*Treatment Site Photos (Taken on February 28, 2006)*



Driving southbound at Location 1



Driving northbound at Location 2

*Treatment Site Photos (Taken on February 28, 2006)*



Driving northbound at Location 3



Driving northbound at Location 4

*Treatment Site Photos (Taken on February 28, 2006)*



Driving northbound at Location 5



Driving southbound at Location 6

*Treatment Site Photos (Taken on February 28, 2006)*



Driving southbound at Location 7



Driving southbound at Location 8

*Treatment Site Photos (Taken on February 28, 2006)*



Driving southbound at Location 9

# Treatment Crossover Locations 1-4

## On US 29 from Heathway Drive to Stetson Drive In Charlotte, Mecklenburg Co.

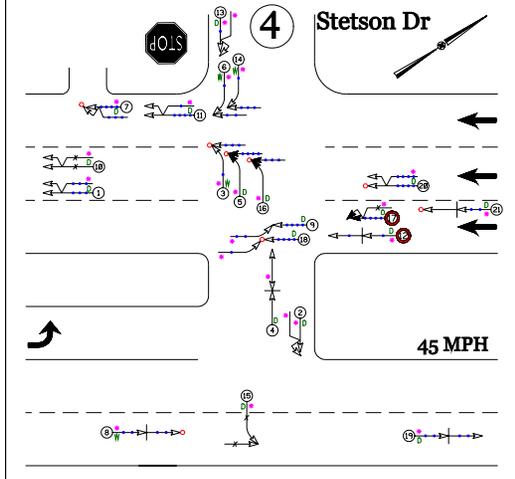
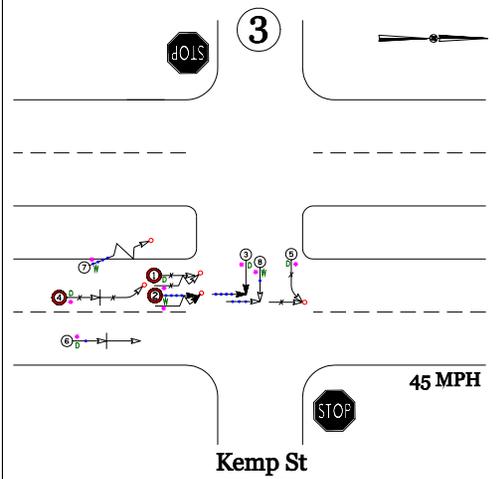
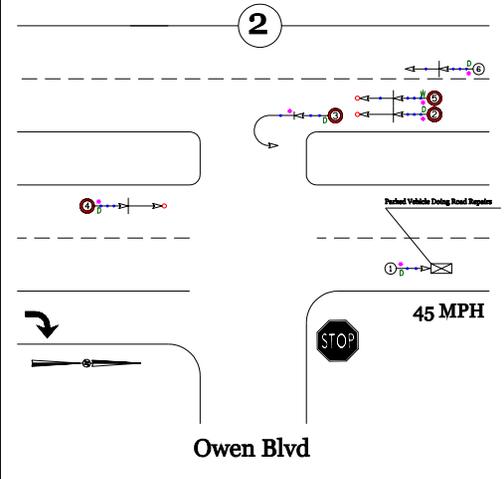
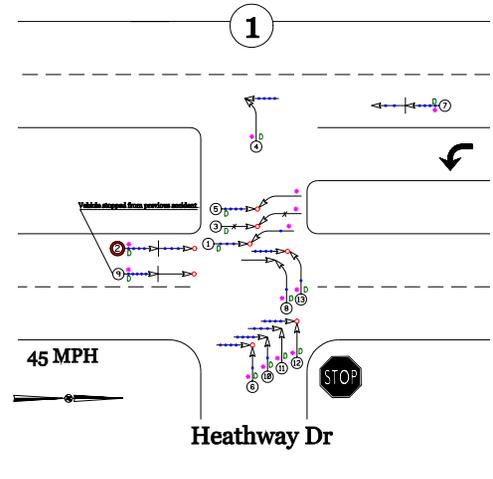


**LEGEND**

MOVING VEHICLE	ANGLE	9 MPH OR LESS	P PEDESTRIAN
PEDESTRIAN	TURNING	10 MPH TO 19	B BICYCLE
PARKEED VEHICLE	RAISING	20 MPH TO 29	T TRUCK
FIXED OBJECT	SCISSOR	30 MPH TO 39	A ANIMAL
HEAD ON	OUT OF CONTROL	40 MPH TO 49	V VEHICLE FIRE
REAR END	INJURY	50 MPH TO 59	* DRIVER AT FAULT
RAN OFF ROAD	FATALITY	60 MPH TO 69	D DAY
		70 AND UP	W WET
		SPEED UNKNOWN	I ICY OR SLIPY
		DAYLIGHT CRASH	
		DARK CRASH	

### BEFORE PERIOD - TOTAL CRASHES

### January 1, 1994 - December 31, 1996 (3 Yrs)



### AFTER PERIOD - TOTAL CRASHES

### January 1, 1998 - December 31, 2000 (3 Yrs)

