

# Spot Safety Project Evaluation

Spot Safety Project # 03-06-214

**Spot Safety Project Evaluation for Installation of Traffic Signal at 8<sup>th</sup> Street and  
a Half Pork Chop Concrete Island at 6<sup>th</sup> Street**

**US 76 WB (Wooster Street) at 8<sup>th</sup> Street and US 76 WB (Wooster Street) at 6<sup>th</sup> Street  
New Hanover County**

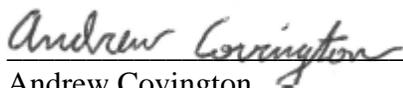
Documents Prepared By:

AECOM Technical Services of North Carolina, Inc.

For:

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

**Principal Investigator**

  
\_\_\_\_\_  
Andrew Covington

AECOM

8-12-2013

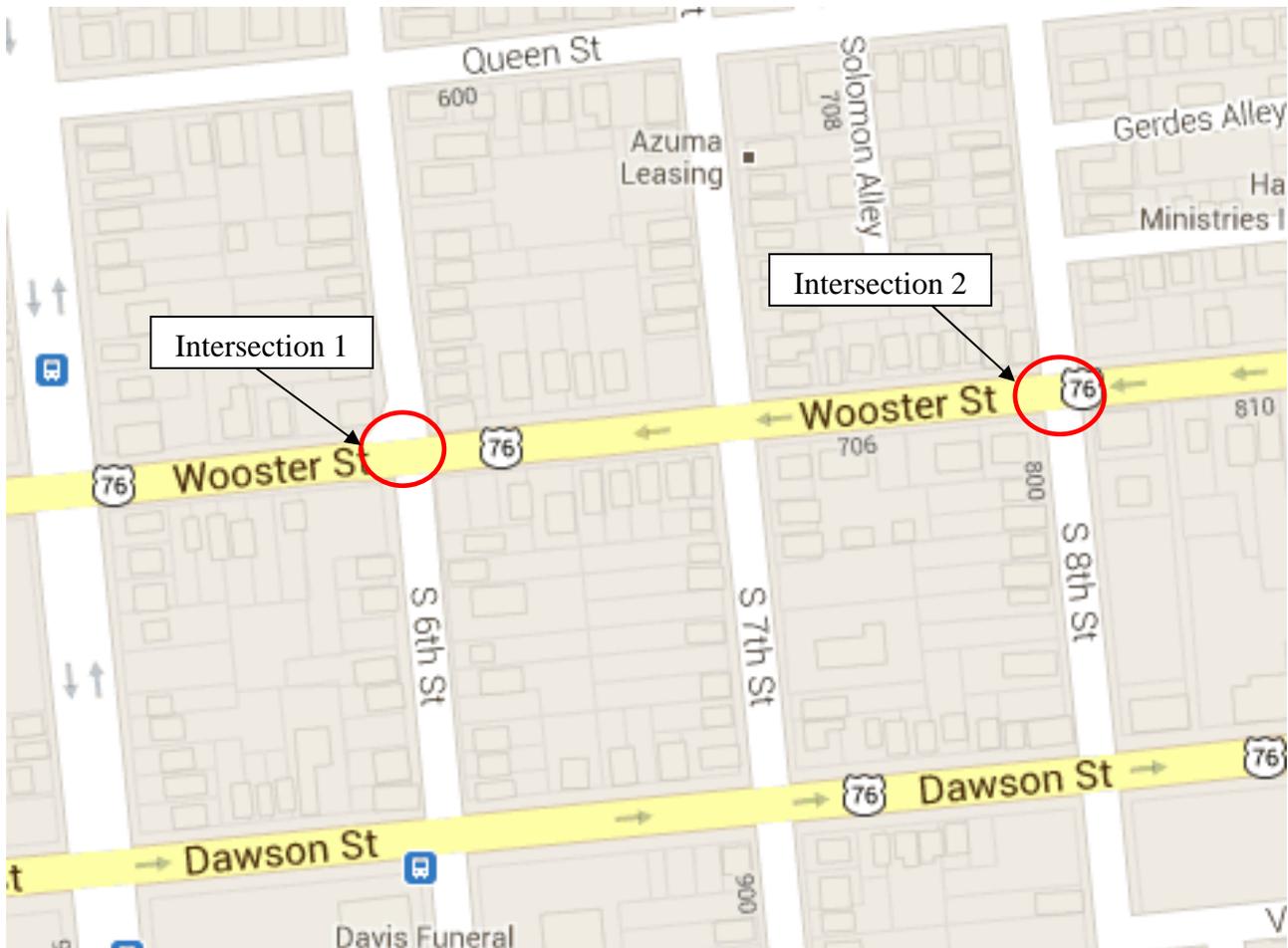
Date

## *Spot Safety Project Evaluation Documentation*

### **Subject Location**

Evaluation of Spot Safety Project Number 03-06-214 located at the intersections of US 76 WB (Wooster Street) at 6<sup>th</sup> Street and US 76 WB (Wooster Street) at 8<sup>th</sup> Street in Wilmington in New Hanover County.

The Sig ID at US 76 WB (Wooster Street) and 8<sup>th</sup> Street is 03-0999 for this 2-Phase Fully Actuated Traffic Signal.



**Location Map Provided from Google Maps**



Aerial Map Provided from Google Maps

### **Project Information and Background from the Project File Folder**

The spot safety project improvement countermeasure chosen for the subject locations were installation of a two phase traffic signal at US 76 WB (Wooster Street) and 8<sup>th</sup> Street and a longhorn concrete island at US 76 WB (Wooster Street) and 6<sup>th</sup> Street.

US 76 WB (Wooster Street) is a three-lane, one directional facility heading westbound with a speed limit of 35 mph. 6<sup>th</sup> and 8<sup>th</sup> Streets are both two-lane, two-way streets that form crossroads intersections with US 76 WB (Wooster Street).

The original statement of problem was that there were a high number of angle crashes involving vehicles entering or crossing US 76 WB (Wooster Street) from the side street approaches. The initial crash analysis was completed from June 30, 2001 to June 30, 2006 with eighty-two (82) total reported crashes, of which there were sixty-nine (69) angle, eleven (11) rear-ends, one (1) left-turn different roadway, and one (1) left-turn same roadway. The final completion date for the improvements at the subject intersections was on September 17, 2008 with a total cost of \$86,000.00.

## Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject locations, the crash data omitted from these analyses to consider for an adequate construction period were the months of April through June 2008 for Intersection 1 (US 76 WB (Wooster Street) at 6<sup>th</sup> Street) and March through May 2007 for Intersection 2 (US 76 WB (Wooster Street) at 8<sup>th</sup> Street). The before period for Intersection 1 consisted of reported crashes from May 1, 2004 through March 31, 2008 (4 years 11 months); and the after period consisted of reported crashes from July 1, 2008 through May 31, 2013 (4 years 11 months). The before period for Intersection 2 consisted of reported crashes from March 1, 2001 through February 28, 2007 (6 years); and the after period consisted of reported crashes from June 1, 2007 through May 31, 2013 (6 years). The construction period for the intersections was determined by the earliest crash report showing the implemented safety countermeasure. The ending date for this analysis was determined by the date of available crash data at the time of analysis.

The treatment data at Intersection 1 consisted of all crashes within 150 feet of the subject intersection for the US 76 WB (Wooster Street) and 6<sup>th</sup> Street approaches. The treatment data at Intersection 2 consisted of all crashes within 150 feet of the subject intersection for the US 76 WB (Wooster Street) and 8<sup>th</sup> Street approaches. *Please see attached location map and aerial map for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that the target crashes at Intersection 1 were Southbound Angle and Left-turn, same roadways. Also note that Frontal Impact Crashes were the target crashes for the applied countermeasure at Intersection 2. 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><u>Intersection 1</u></b> <b><u>Treatment Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)</b> <b>Percent Increase (+)</b>
Total Crashes	36	7	- 80.6 %
Total Severity Index	4.49	4.17	- 7.1 %
Target Crashes	23	0	-100.0 %
Target Crash Severity Index	4.86	0.00	-100.0 %
Volume (2005, 2010)	18,500	16,000	-13.5 %

<b><u>Intersection 1</u></b> <b><u>Injury Crash Summary</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)</b> <b>Percent Increase (+)</b>
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	3	0	- 100.0 %
Class C Injury Crashes	14	3	- 78.6 %
Property Damage Only	19	4	- 78.9 %

The naive before and after analysis at Intersection 1 (US 76 WB (Wooster Street at 6<sup>th</sup> Street) resulted in a 81 percent reduction in Total Crashes, a 100 percent reduction of Target Crashes and a 7 percent increase in the Total Severity Index. The before period ADT year was 2005 and the after period ADT year was 2010.

<b><u>Intersection 2</u></b> <b><u>Treatment Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)</b> <b>Percent Increase (+)</b>
Total Crashes	57	16	- 71.9 %
Total Severity Index	6.35	3.78	- 40.5 %
Target Crashes	51	7	- 86.3 %
Target Crash Severity Index	6.69	5.23	- 21.8%
Volume (2004, 2010)	18,500	16,000	- 13.5 %

<b><u>Intersection 2</u></b> <b><u>Injury Crash Summary</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)</b> <b>Percent Increase (+)</b>
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	- 100.0 %
Class B injury Crashes	6	3	- 50.0 %
Class C Injury Crashes	25	3	- 88.0 %
Property Damage Only	25	10	- 150.0 %

The naive before and after analysis at Intersection 2 (US 76 WB (Wooster Street) at 8<sup>th</sup> Street) resulted in a 72 percent reduction in Total Crashes Per Year, a 86 percent reduction in Target Crashes Per Year, and a 41 percent reduction in the Total Severity Index. The before period ADT year was 2004 and the after period ADT year was 2010.

To further analyze the intersection crash patterns, the following chart shows different traffic movements and the change in crash totals through the study:

<b><u>Intersection 1</u></b> <b><u>Additional Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)</b> <b>Percent Increase (+)</b>
Rear End Slow or Stop	4	1	- 75.0 %
Sideswipe	4	2	- 50.0 %

<b><u>Intersection 2</u></b> <b><u>Additional Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)</b> <b>Percent Increase (+)</b>
Rear End Slow or Stop	3	3	0.0 %
Sideswipe	1	3	+ 200.0 %

## **Results and Discussion**

Referencing the *Collision Diagrams*, target crashes (Angle/Left-turn, same roadway) at Intersection 1 experienced a reduction from 23 crashes in the before period to 0 crashes in the after period. After the median installation all target crashes were eliminated by the removal of the through movement from the SB approach.

At intersection 1 rear end crashes decreased from 4 crashes in the before period to 1 crash in the after period. Sideswipe crashes decreased from 4 crash in the before period to 2 crashes in the after period

Referencing the *Collision Diagrams*, target crashes (Frontal Impact Crashes) at Intersection 2 experienced a reduction from 51 crashes in the before period to 7 crashes in the after period. The installation of the signal was beneficial in reducing the number of target crashes.

At intersection 2 rear end crashes remained the same with 3 crashes in the before period and 3 crashes in the after period. Sideswipe crashes increased from 1 crash in the before period to 3 crashes in the after period.

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all four 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

### Intersection 1



Google Maps (Image Date: 8/11) - Looking East on US 76 WB (Wooster Street) Approach



Google Maps (Image Date: 8/11) - Looking West on 76 WB (Wooster Street) Approach



**Google Maps (Image Date: 7/12) - Looking North on 6<sup>th</sup> Street Approach**



**Google Maps (Image Date: 7/12) - Looking South on 6<sup>th</sup> Street Approach**

## Intersection 2



Google Maps (Image Date: 8/11) - Looking East on US 76 WB (Wooster Street) Approach



Google Maps (Image Date: 8/11) - Looking West on US 76 WB (Wooster Street) Approach



**Google Maps (Image Date: 7/12) - Looking North on 8<sup>th</sup> Street Approach**



**Google Maps (Image Date: 7/12) - Looking South on 8<sup>th</sup> Street Approach**

SS# 03-06-214  
 New Hanover County  
 Intersection I  
 BEFORE Period  
 5/1/03 - 3/31/08

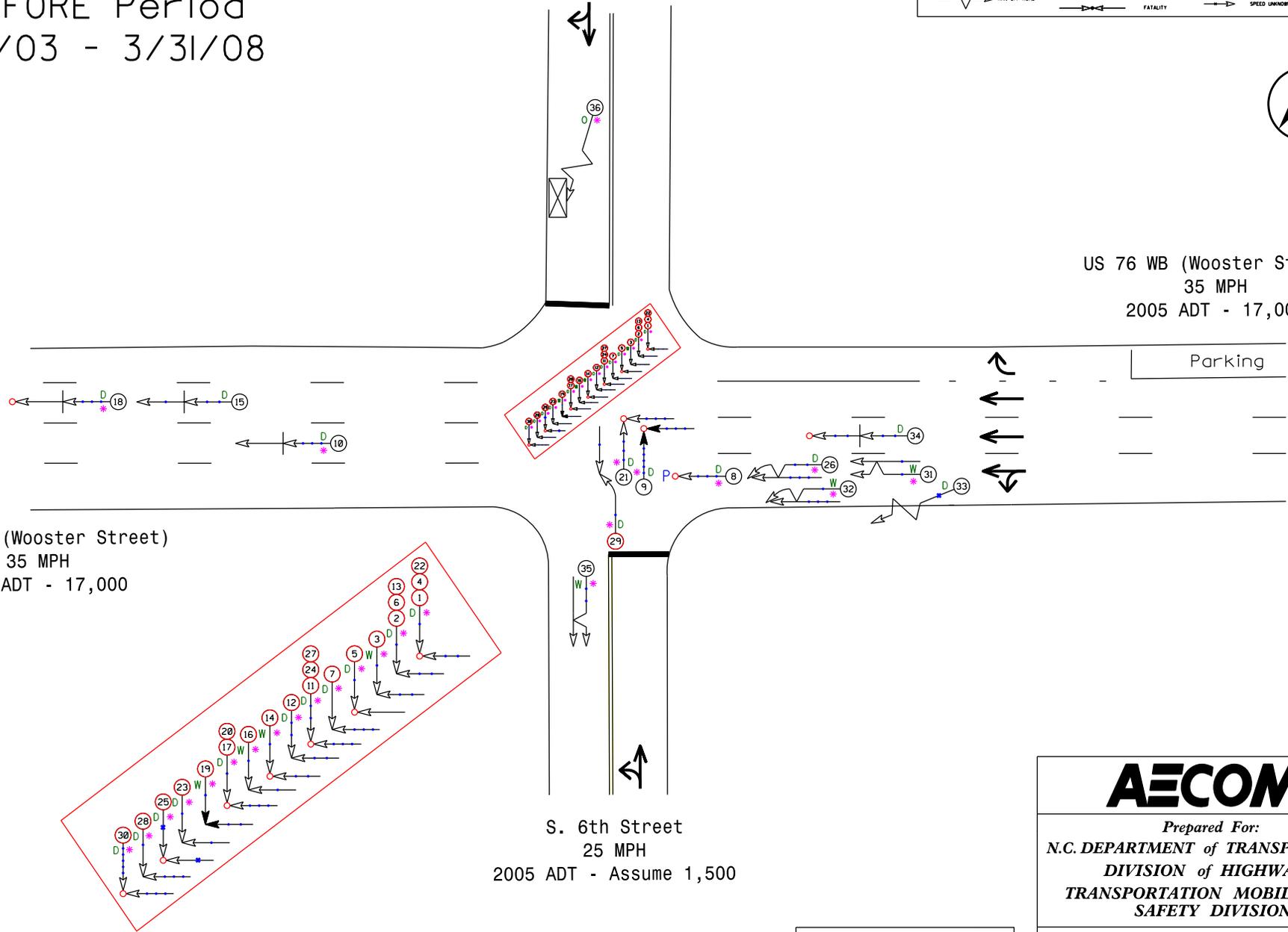
S. 6th Street  
 25 MPH  
 2005 ADT - Assume 1,500

**LEGEND**

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PAKED VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		HURRY		50 MPH TO 59		ICY OR SNOW
	REAR END		FATALITY		60 MPH TO 69		TO AND UP
	RAN OFF ROAD		SPEED UNKNOWN		TO AND UP		ONLY



US 76 WB (Wooster Street)  
 35 MPH  
 2005 ADT - 17,000



US 76 WB (Wooster Street)  
 35 MPH  
 2005 ADT - 17,000

S. 6th Street  
 25 MPH  
 2005 ADT - Assume 1,500

Angle and Left-Turn  
 (#) Same Roadway  
 Crashes

**AECOM**

Prepared For:  
 N.C. DEPARTMENT of TRANSPORTATION  
 DIVISION of HIGHWAYS  
 TRANSPORTATION MOBILITY and  
 SAFETY DIVISION

**TRAFFIC SAFETY UNIT**

Date: 8-12-2013      Prepared By: Andrew Covington

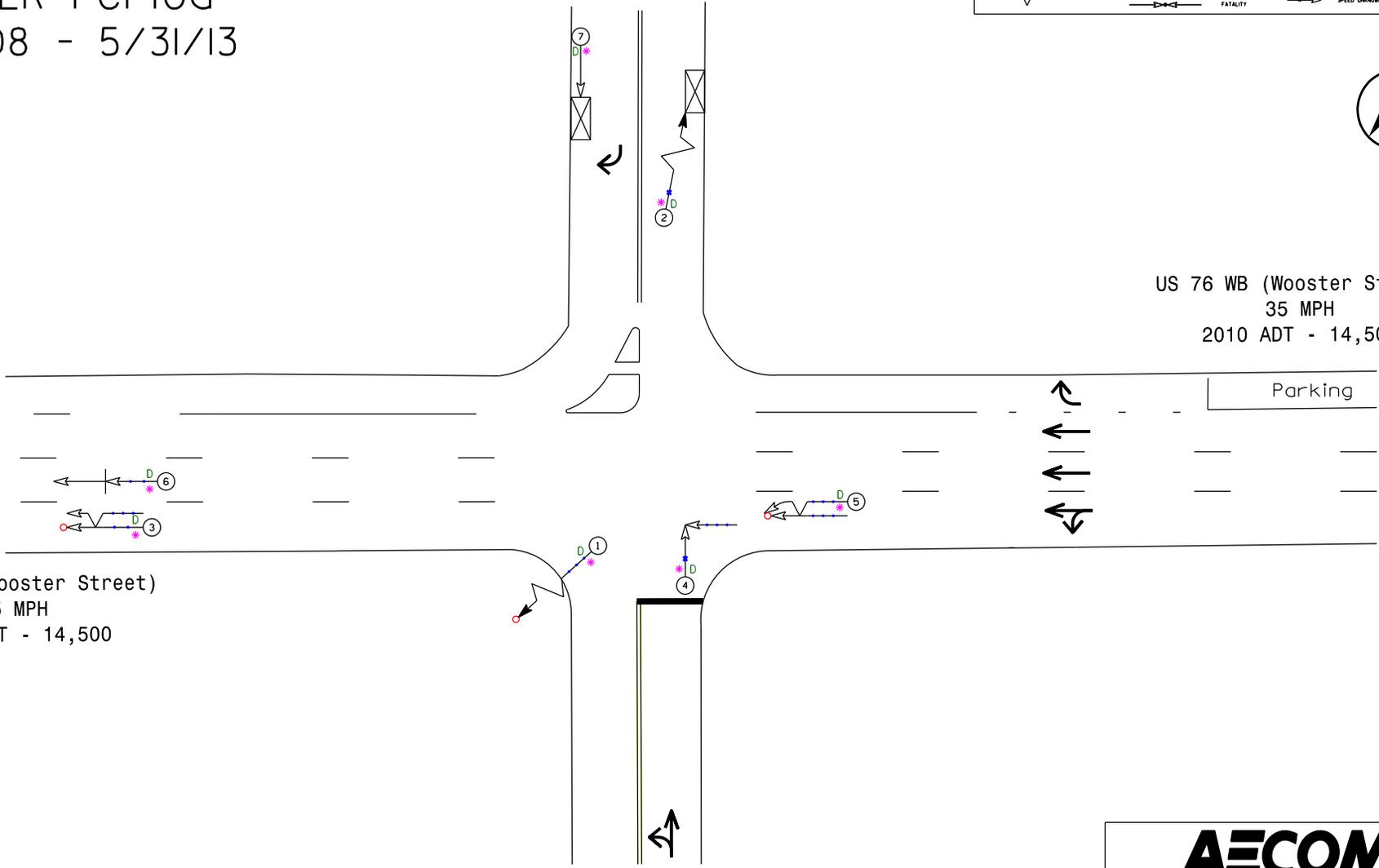
SS# 03-06-214  
 New Hanover County  
 Intersection I  
 AFTER Period  
 7/1/08 - 5/31/13

S. 6th Street  
 25 MPH  
 2010 ADT - Assume 1,500

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
	PARKED VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		HIT AND UP		50 MPH TO 59		ICE OR SNOW
	REAR END		HURRY		60 MPH TO 69		ONLY
	RAN OFF ROAD		FATALITY		TO AND UP		
			SPEED UNKNOWN				



US 76 WB (Wooster Street)  
 35 MPH  
 2010 ADT - 14,500



US 76 WB (Wooster Street)  
 35 MPH  
 2010 ADT - 14,500

S. 6th Street  
 25 MPH  
 2010 ADT - Assume 1,500

Angle and Left-Turn  
 (#) Same Roadway  
 Crashes

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Date: 8-12-2013	Prepared By: Andrew Covington
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SS# 03-06-214  
 New Hanover County  
 Intersection 2  
 BEFORE Period  
 3/1/01 - 2/28/07

S. 8th Street  
 25 MPH  
 2004 ADT - Assume 1,500

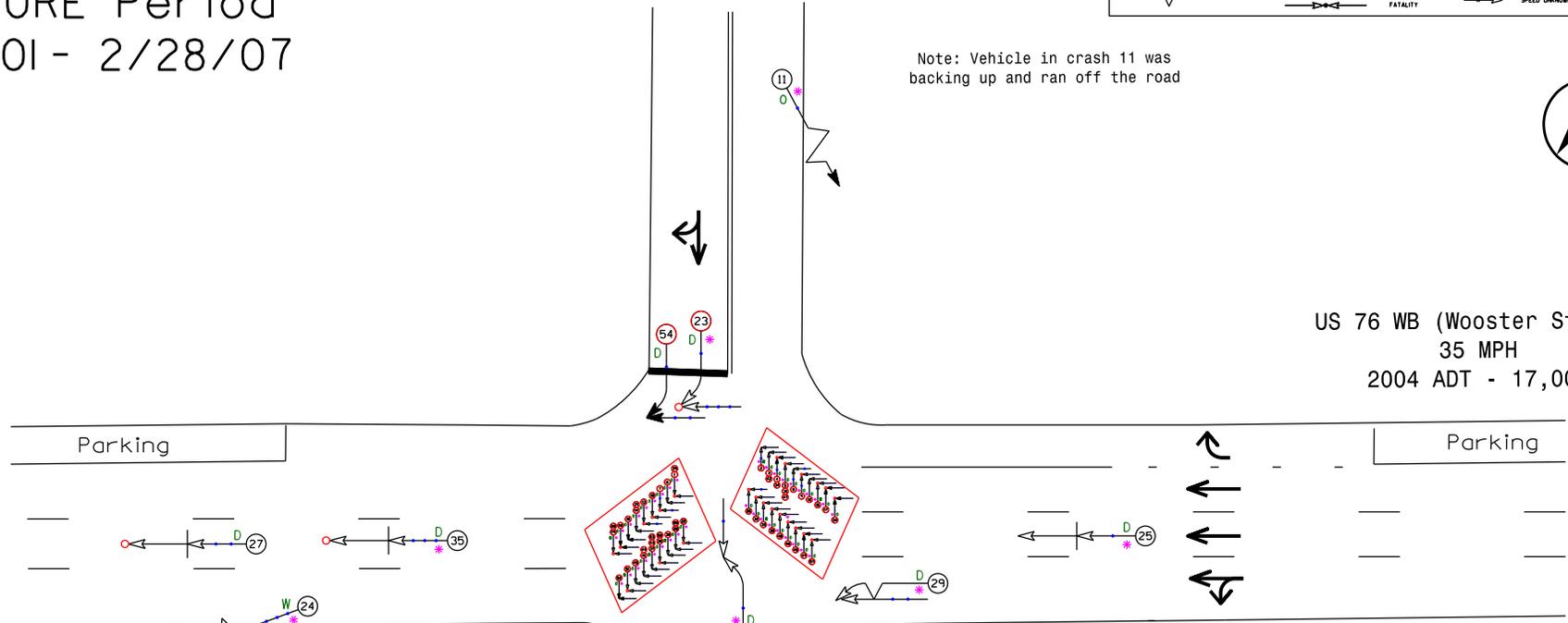
**LEGEND**

	MOVING VEHICLE		ANGLE		1 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	FIXED OBJECT		SIDESWIPE		30 MPH TO 39		DRY
	HEAD ON		OUT OF CONTROL		40 MPH TO 49		WET
	REAR END		HURRY		50 MPH TO 59		ICE OR SNOW
	RAN OFF ROAD		FATALITY		60 MPH TO 69		TO AND UP
			SPEED UNKNOWN		ONLY		

Note: Vehicle in crash 11 was backing up and ran off the road

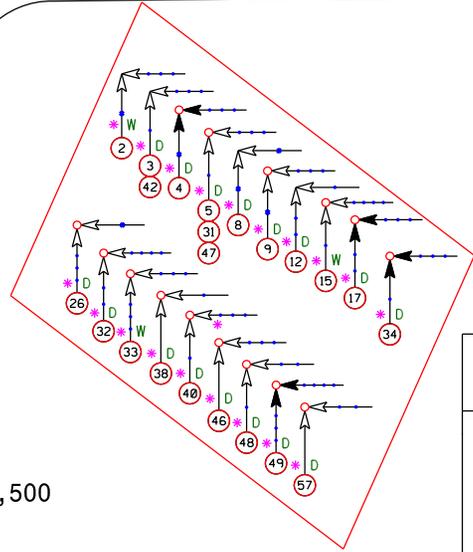
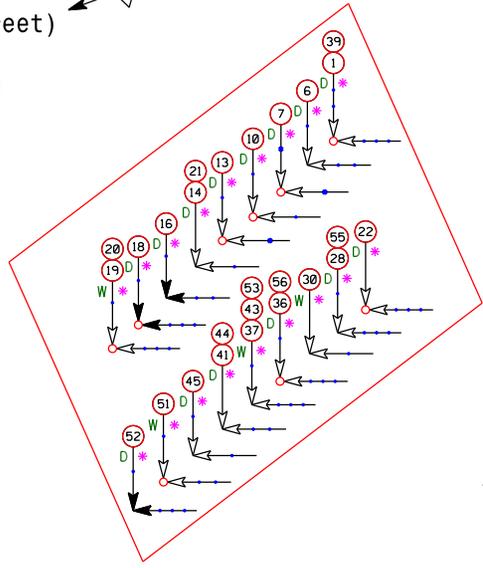


US 76 WB (Wooster Street)  
 35 MPH  
 2004 ADT - 17,000



US 76 WB (Wooster Street)  
 35 MPH  
 2004 ADT - 17,000

S. 8th Street  
 25 MPH  
 2004 ADT - Assume 1,500



Frontal Impact Crashes

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SS# 03-06-214  
 New Hanover County  
 Intersection 2  
 AFTER Period  
 6/1/07 - 5/31/13

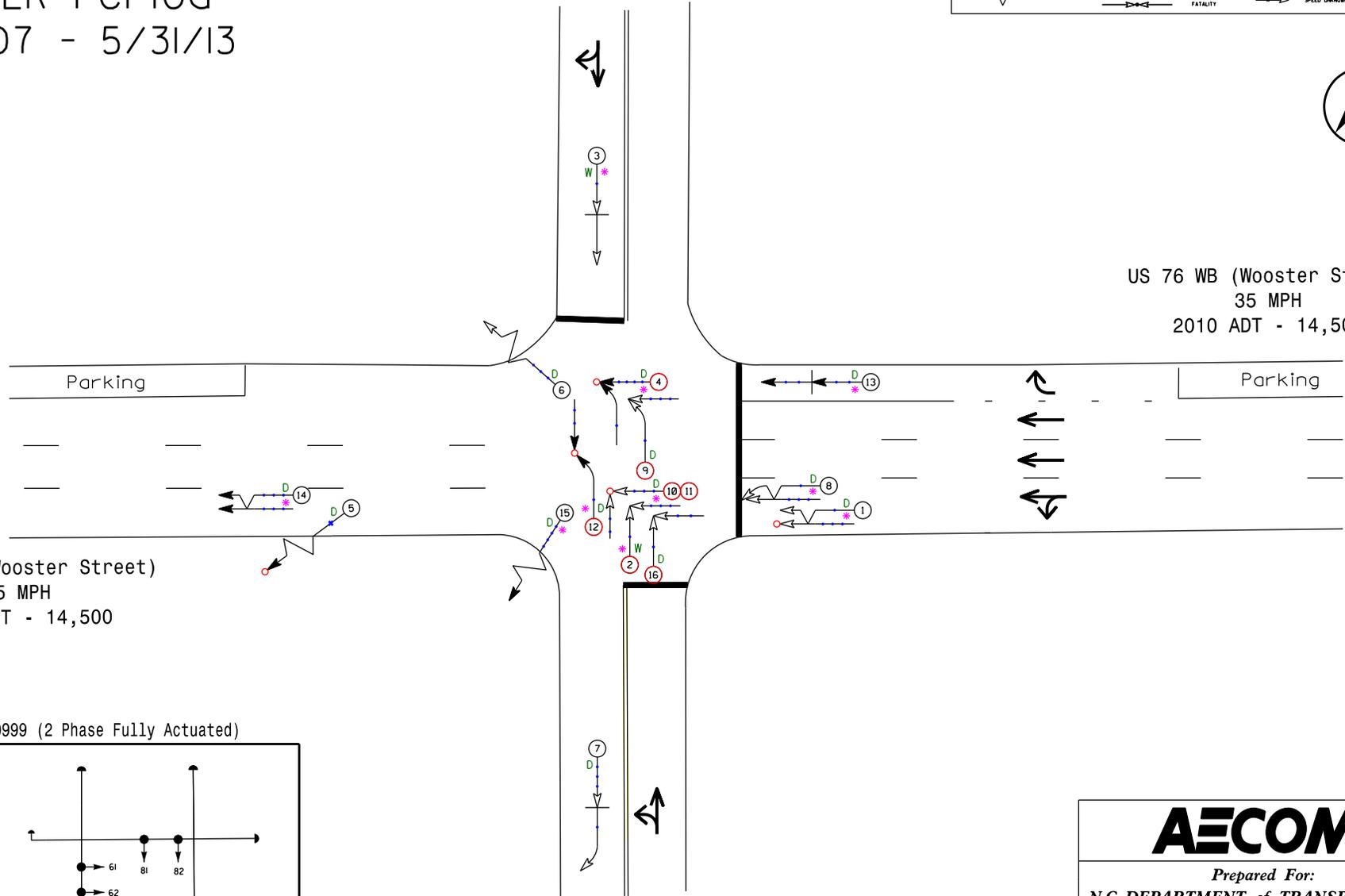
S. 8th Street  
 25 MPH  
 2010 ADT - Assume 1,500

**LEGEND**

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PAKED VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		HURRY		50 MPH TO 59		ICY OR SNOW
	REAR END		FATALITY		60 MPH TO 69		TO AND UP
	RAN OFF ROAD		SPEED UNKNOWN		TO AND UP		ONLY

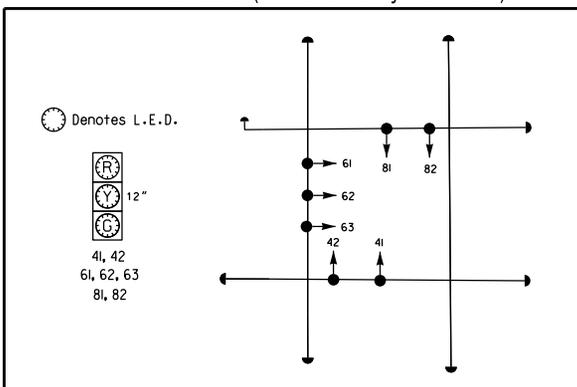


US 76 WB (Wooster Street)  
 35 MPH  
 2010 ADT - 14,500



US 76 WB (Wooster Street)  
 35 MPH  
 2010 ADT - 14,500

SIG ID 03-0999 (2 Phase Fully Actuated)



S. 8th Street  
 25 MPH  
 2010 ADT - Assume 1,500

Frontal Impact Crashes

**AECOM**

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