

Spot Safety Project Evaluation

Order # 41000023509

Spot Safety Project # 13-03-210

**Spot Safety Project Evaluation of the Right Turn Lane Installation
US-64 (Burkemont Avenue) at US-70 (Fleming Drive)
City of Morganton, Burke County**

Documents Prepared By:

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

Principal Investigator



Jason B. Schronce

5-13-2013

Date

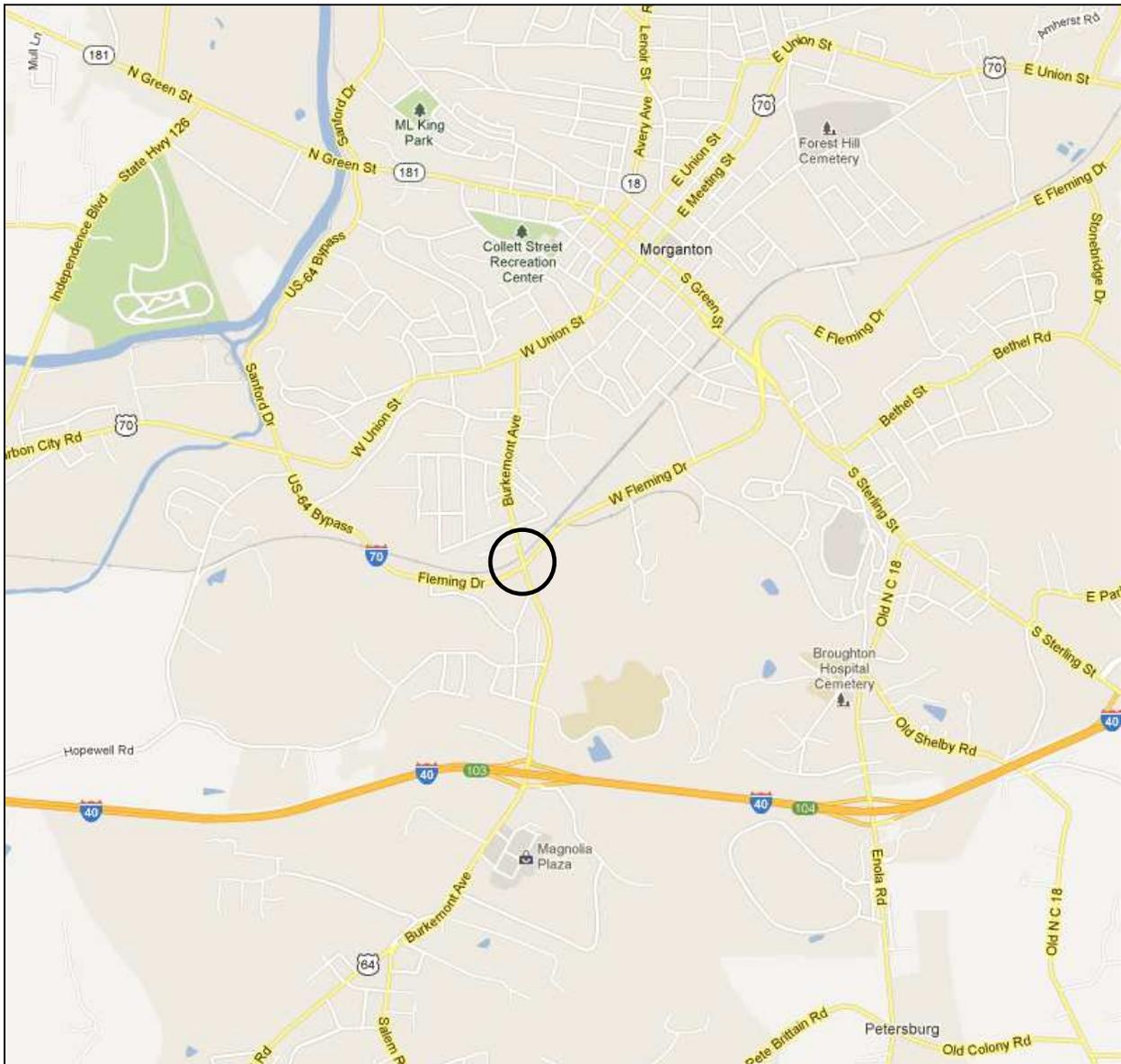
Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 13-03-210 located at the Intersection of US-64/US-64 Business (Burkemont Avenue) and US-70 / US-64 Bypass (Fleming Drive) in Burke County, City of Morganton.

The Sig ID is 13-0338 for this existing traffic signal.





**Aerial Photograph from Google Maps
Shows EB Right Turn Lane After Period Addition**

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a US-64 Bypass/US-70 (Fleming Drive) exclusive eastbound right turn lane by roadway widening. US-64 (Burkemont) and US-70 are both multi-lane facilities with dedicated left turn lanes and speed limits ranging from 35-mph to 45-mph on all approaches. The subject location is a four-leg crossroads intersection, which is controlled by an existing 4-phase traffic signal. This intersection is the main thoroughfare connecting downtown Morganton to Interstate 40.

The original statement of problem explained that of the 7,000 plus vehicles that use the eastbound Fleming Drive approach every day, 57% make the right turn movement. The absence of a right turn lane causes undue driver delay, crash potential, and less than desirable signal operation. The intended purpose of the new right turn lane is to alleviate the accident potential and increase mobility through this intersection.

In addition, the Safety Evaluation Group was informed that at the time of this report a new Wal-Mart Shopping Center was under construction directly west of this intersection. There are potential lane configuration changes pending for this location. The updated signal diagram indicates the

changes will include dual right turn lanes for eastbound Fleming Drive and dual left turn lanes for northbound Burkemont Avenue. The existing traffic signal is also being upgraded from a 4-phase design to having 8-phases. However, these changes have occurred post the evaluation time periods established in this study.

The initial crash analysis was completed from September 1, 1999 to August 31, 2004 with twenty-one (21) reported rear-end crashes on the eastbound approach. The final completion date for the improvement at the subject intersection was on July 17, 2008 with a total cost of \$230,000.

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 May through July 2008. The before period consisted of reported crashes from December 1, 2003 through April 30, 2008 (4 years and 5 months); and the after period consisted of reported crashes from August 1, 2008 through December 31, 2012 (4 years and 5 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 Eastbound Fleming Drive Right Turn Related Crashes were the target crashes for the applied countermeasure. The crash types considered are as follows: Rear-end Slow or Stop; Rear-End Turn; and Right turn, different roadways.

| <u>Treatment Information</u> | Before | After | Percent Reduction (-) Percent Increase (+) |
|--|---------------|--------------|---|
| Total Crashes | 54 | 50 | - 7.4 % |
| Total Severity Index | 4.87 | 5.03 | 3.3 % |
| | | | |
| Target Crashes – EB Right Turn Related | 7 | 12 | 71.4 % |
| Target Crash Severity Index | 4.17 | 2.23 | - 46.5 % |
| | | | |
| Volume (2006, 2010) | 27,200 | 27,200 | 0.0 % |

| <u>Injury Crash Summary</u> | Before | After | Percent Reduction (-) Percent Increase (+) |
|------------------------------------|---------------|--------------|---|
| Fatal injury Crashes | 0 | 0 | N/A |
| Class A injury Crashes | 1 | 1 | 0.0 % |
| Class B injury Crashes | 4 | 4 | 0.0 % |
| Class C Injury Crashes | 14 | 13 | - 7.1 % |
| Property Damage Only | 35 | 32 | - 8.6 % |

The naive before and after analysis at the treatment location resulted in a 7 percent reduction in Total Crashes, a 71 percent increase in Target Crashes, and a 3 percent increase 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 presented a pattern of six (6) rear-end target collisions in the thru-right turn lane of eastbound US-70 (Fleming Drive). Also included as a target crash, was one (1) right turn different roadway where a motorist failed to yield the right-of-way while making a right turn on red movement. With the after period designated right turn lane for this approach with the slip ramp, rear-end crashes increased to twelve (12). All the after period crashes on this approach were at low speeds (29 mph or less) and included one B-injury, one C-injury, and ten property damage only collisions.

There other noticeable pattern of crashes at this location in both timeframes are the left turn same roadway collisions occurring on a permissive green signal phase. The northbound Burkemont Ave onto westbound Fleming Drive movement presents a doghouse permitted-permissive left turn phase and experienced an increase in left turn crashes from seven (7) to eleven (11) through the evaluation. Red light run crashes at the intersection decreased from five (5) to four (4) from the before to 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



Google Maps (May 2008) - Travelling East on US-70 (Fleming Drive) – Countermeasure is Right Turn Lane



Google Maps (May 2008) - Looking North on US-64 (Burkemont Ave) – countermeasure to left of picture



Google Maps (April 2009) - Looking South on US-64 Business (Burkemont Avenue)



Google Maps (April 2009) - Looking West on US-70 (Fleming Drive) approaching intersection

SS# 13-03-210
 Order# 41000023509
 Burke County
 BEFORE Period
 12/1/06 - 4/30/08

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 | | RAN OFF ROAD | | 50 MPH TO 59 | | ICE OR SNOW |
| | REAR END | | NARROW FATALITY | | 60 MPH TO 69 | | SPEED UNKNOWN |
| | RAN OFF ROAD | | NARROW FATALITY | | 70 AND UP | | ONLY |

ADT (Year)
5,400 (2006)

US-64 Business
Burkemont Ave
35-MPH

US-70
Fleming Drive
45-MPH

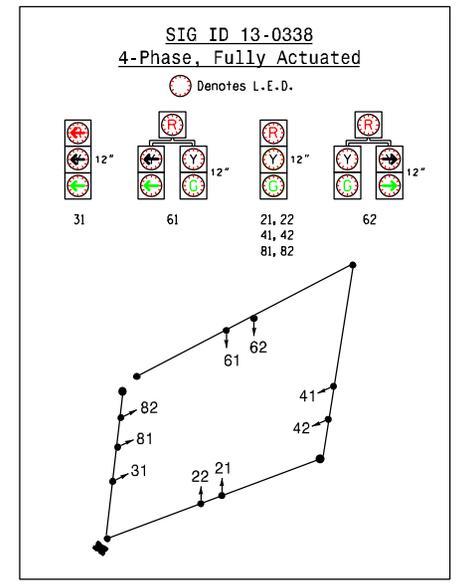
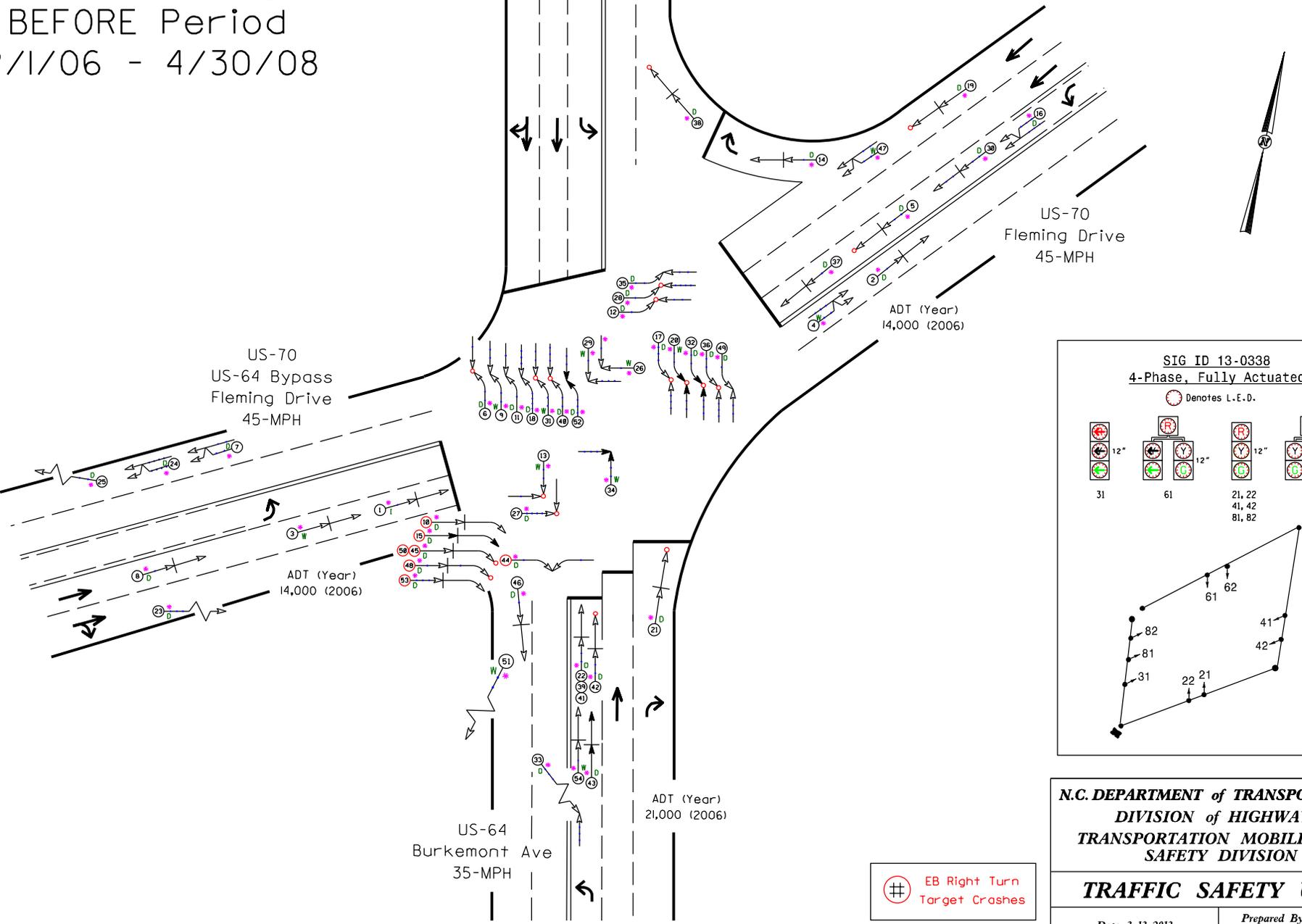
ADT (Year)
14,000 (2006)

US-70
US-64 Bypass
Fleming Drive
45-MPH

ADT (Year)
14,000 (2006)

ADT (Year)
21,000 (2006)

US-64
Burkemont Ave
35-MPH



EB Right Turn
Target Crashes

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

TRAFFIC SAFETY UNIT

Date: 3-13-2013
 Prepared By: J. Schronce
 (Associate Eric Thomas)

SS# 13-03-210
 Order# 41000023509
 Burke County
 AFTER Period
 8/1/08 - 12/31/12

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 |
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| | HEAD ON | | RAN OFF ROAD | | 50 MPH TO 59 | | ICE OR SNOW |
| | REAR END | | NARROW FIDELITY | | 60 MPH TO 69 | | SPEED UNKNOWN |
| | RAN OFF ROAD | | NARROW FIDELITY | | 70 AND UP | | ONLY |
| | RAN OFF ROAD | | NARROW FIDELITY | | NARROW FIDELITY | | ONLY |

US-64 Business
 Burkemont Ave
 35-MPH

ADT (Year)
 5,400 (2010)

US-70
 Fleming Drive
 45-MPH

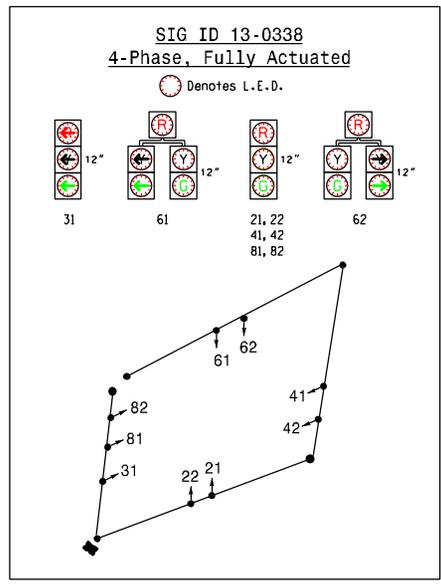
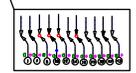
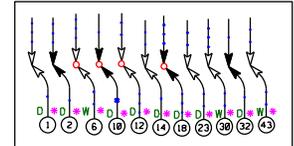
ADT (Year)
 14,000 (2010)

US-70
 US-64 Bypass
 Fleming Drive
 45-MPH

ADT (Year)
 14,000 (2010)

US-64
 Burkemont Ave
 35-MPH

ADT (Year)
 21,000 (2010)



⊕ EB Right Turn
 Target Crashes

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRANSPORTATION MOBILITY and SAFETY DIVISION
TRAFFIC SAFETY UNIT
 Date: 3-14-2013
 Prepared By: J. Schronce
 (Associate Eric Thomas)