

Spot Safety Project Evaluation

Order # 41000010231

Spot Safety Project # 12-04-203

Spot Safety Project Evaluation of the Guardrail Installation on four Bridge Approaches Bridge #37 on SR 2015 (Rollingbrook Rd) Cleveland County

Documents Prepared By:

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Traffic Safety Systems Management Section
Transportation Mobility and Safety Division
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Principal Investigator



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12-20-2010

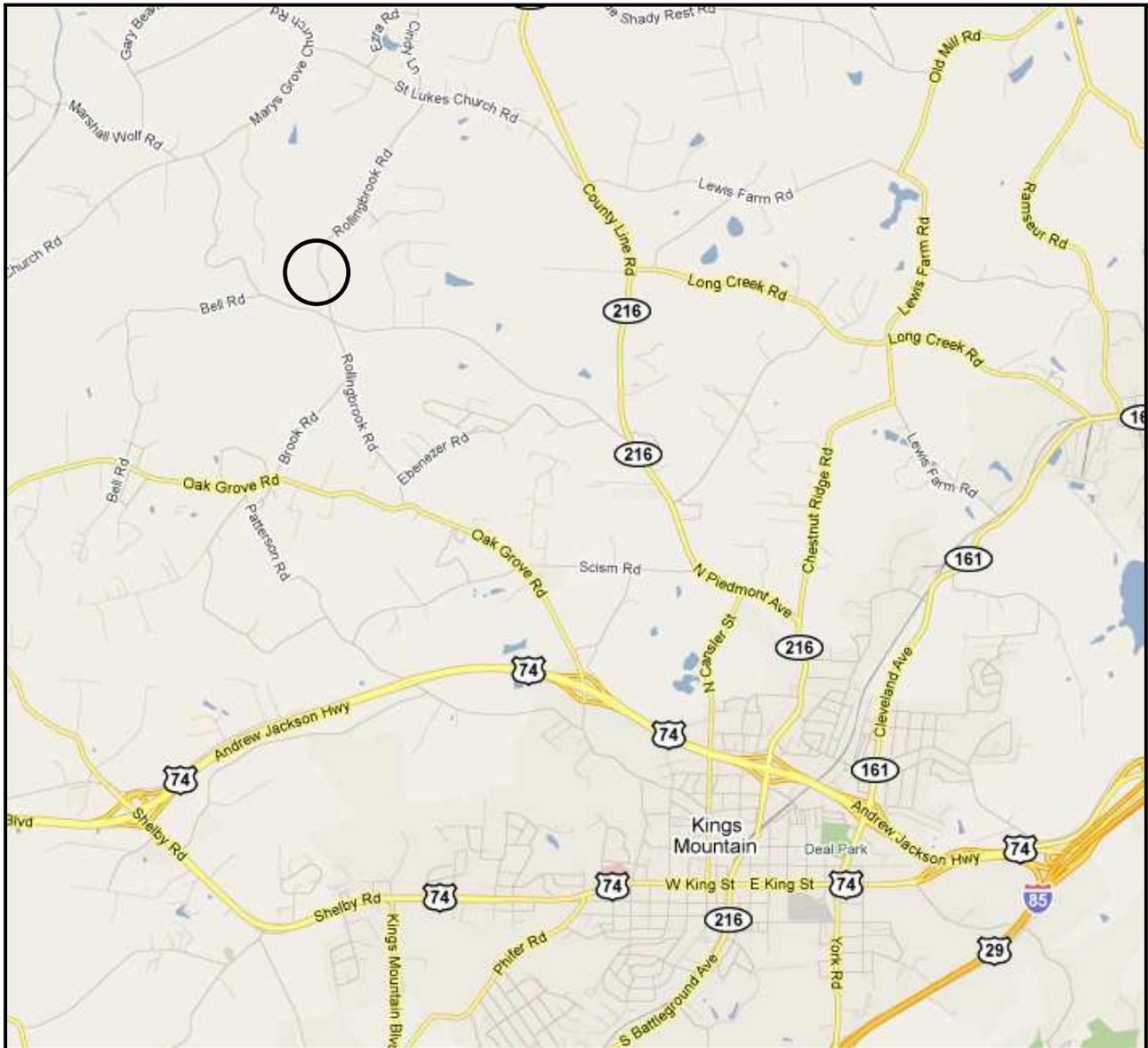
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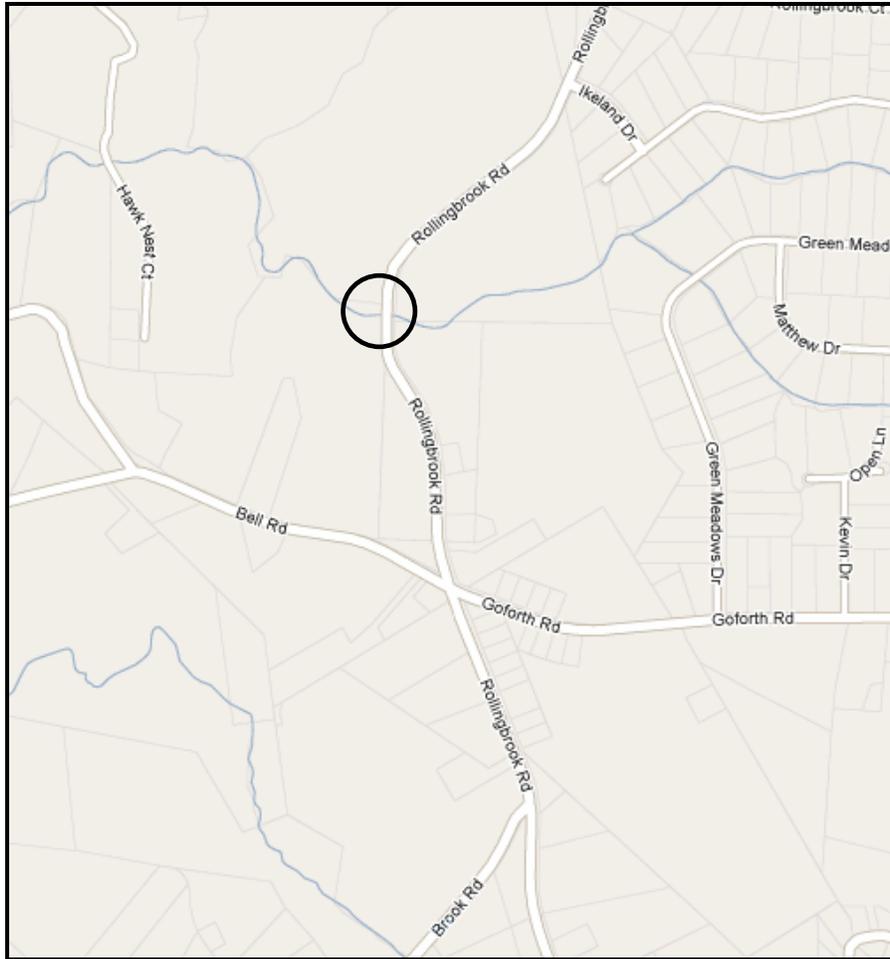
Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 12-04-203 located along SR 215 (Rollingbrook Road) at Bridge #37 (MP 1.62) in Cleveland County, northwest of the City of Kings Mountain. The bridge is located approximately 0.4 miles north of the SR 215 intersection with SR 2014 (Bell Road / Goforth Road).





Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of approach guardrail on all four sides of the subject bridge. SR 2015 is a rural two-lane facility at the subject location with a speed limit of 55 mph on both approaches. The roadway does present a 35 mph advisory speed leading into the horizontal curves approaching the bridge. The area surrounding the bridge is also heavily wooded with steep embankments leading to the creek.

The original statement of problem was the existence of single vehicle ran-off roadway collisions resulting from a winding road alignment that is causing motorists to lose control of their vehicles. The intended purpose of this improvement was to reduce crash severity by keeping vehicles from traveling down the steep embankments at the creek.

The initial crash analysis was completed from August 1, 1998 to March 16, 2004 with three (3) correctable crashes including two (2) fatality crashes. The final completion date for the improvement at the subject intersection was on June 12, 2006 with a total cost of \$16,000.

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 June 2006. The before period consisted of reported crashes from January 1, 2002 through April 30, 2006 (4 years and 4 months); and the after period consisted of reported crashes from July 1, 2006 through October 31, 2010 (4 years and 4 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 bridge location. The milepost range for the study limits were 1.592 to 1.648 on SR 2015. *Please see attached location map for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Ran-off Roadway / Fixed Object collisions were the target crashes for the applied countermeasure.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	5	1	- 80.0 %
Total Severity Index	34.28	1.00	- 97.1 %
Target Crashes – Ran-off Roadway	5	1	- 80.0 %
Target Crash Severity Index	34.28	1.00	- 97.1 %
Volume (2004, 2008)	480	410	- 14.6 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	2	0	- 100.0 %
Class A injury Crashes	0	0	N/A
Class B injury Crashes	2	0	- 100.0 %
Class C Injury Crashes	0	0	N/A
Total Injury Crashes	4	0	- 100.0 %

The naive before and after analysis at the treatment location resulted in a 67 percent decrease in Total Crashes, an 83 percent decrease in Target Crashes, but a 63 percent increase in the Total Severity Index. The before period ADT year was 1999 and the after period ADT year was 2005.

Results and Discussion

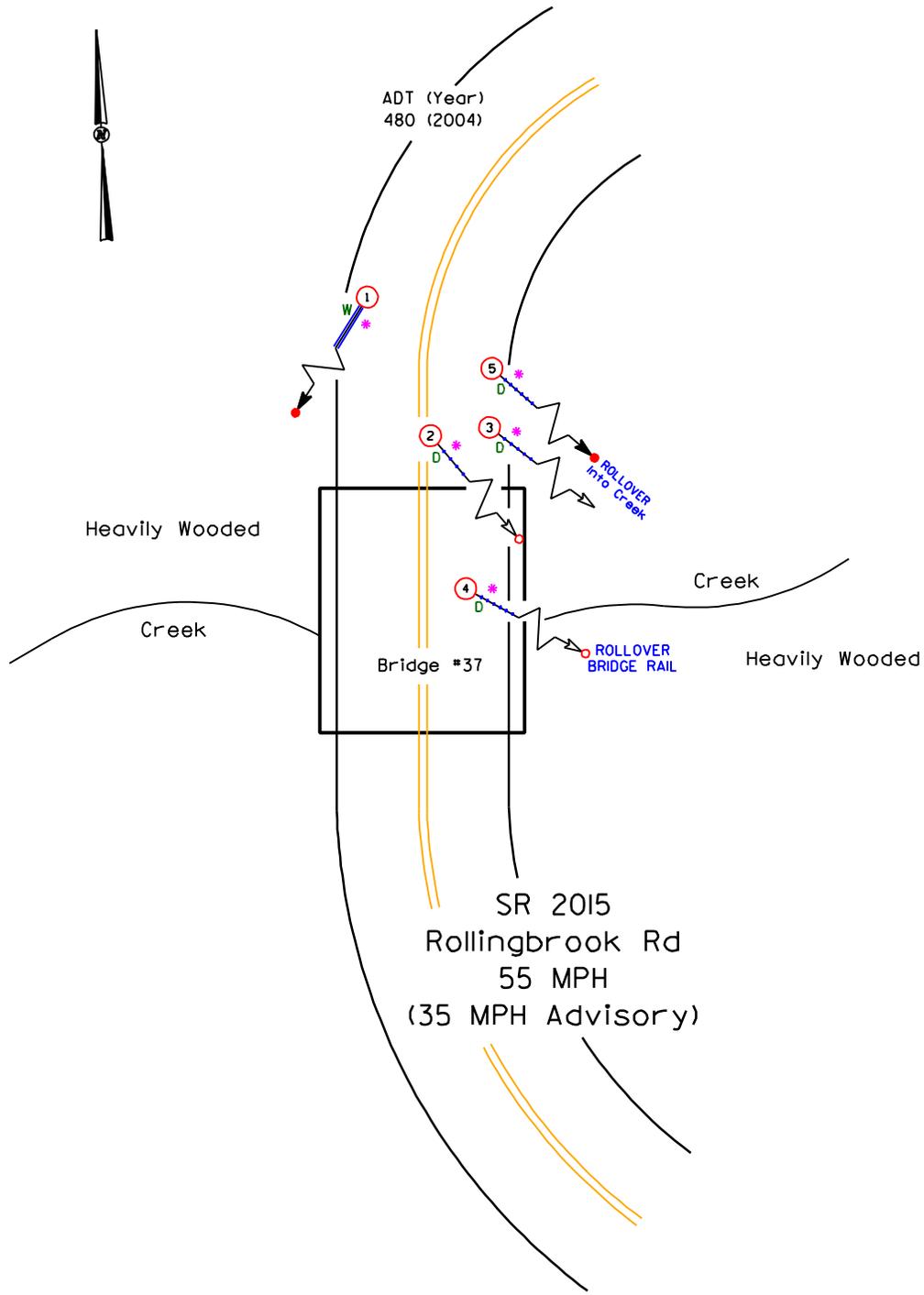
Referencing the *Collision Diagrams*, the before period presented a strong pattern of five (5) ran-off road crashes on or near the bridge that resulted in two (2) fatality crashes. There was also a collision that a vehicle struck the bridge and rolled over the rails into the creek resulting in B-class injuries. After the guardrail installations, the occurrence and severity of crashes were reduced to just one (1) crash with property damage only.

The calculated benefit to cost ratio for this project is **107.82 considering total or target crashes (same ratio)**. 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.

Photos for this roadway were not provided by Google Street View. Since the countermeasure was deemed effective, the Safety Evaluation Group did not field visit this location. 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 location.



ADT (Year)
480 (2004)



LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		TURNING
	PARKEED VEHICLE		BACKING
	FIXED OBJECT		SHOULDER
	HEAD ON		OUT OF CONTROL
	REAR END		FLIPPY
	RAN OFF ROAD		FATALITY
	5 MPH OR LESS		PEDESTRIAN
	10 MPH TO 19		TRAIN
	20 MPH TO 29		OTHER AT FAULT
	30 MPH TO 39		DRY
	40 MPH TO 49		WET
	50 MPH TO 59		ICY OR SLIPY
	60 MPH TO 69		SPEED EXCEEDED
	70 MPH TO 79		
	80 MPH TO 89		
	90 MPH TO 99		
	TO AND UP		

SS# 12-04-203
 Order# 41000010231
 Cleveland County
 BEFORE Period
 1/1/02 - 4/30/06

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

TRAFFIC SAFETY UNIT

Ran-off Road
Target Crashes

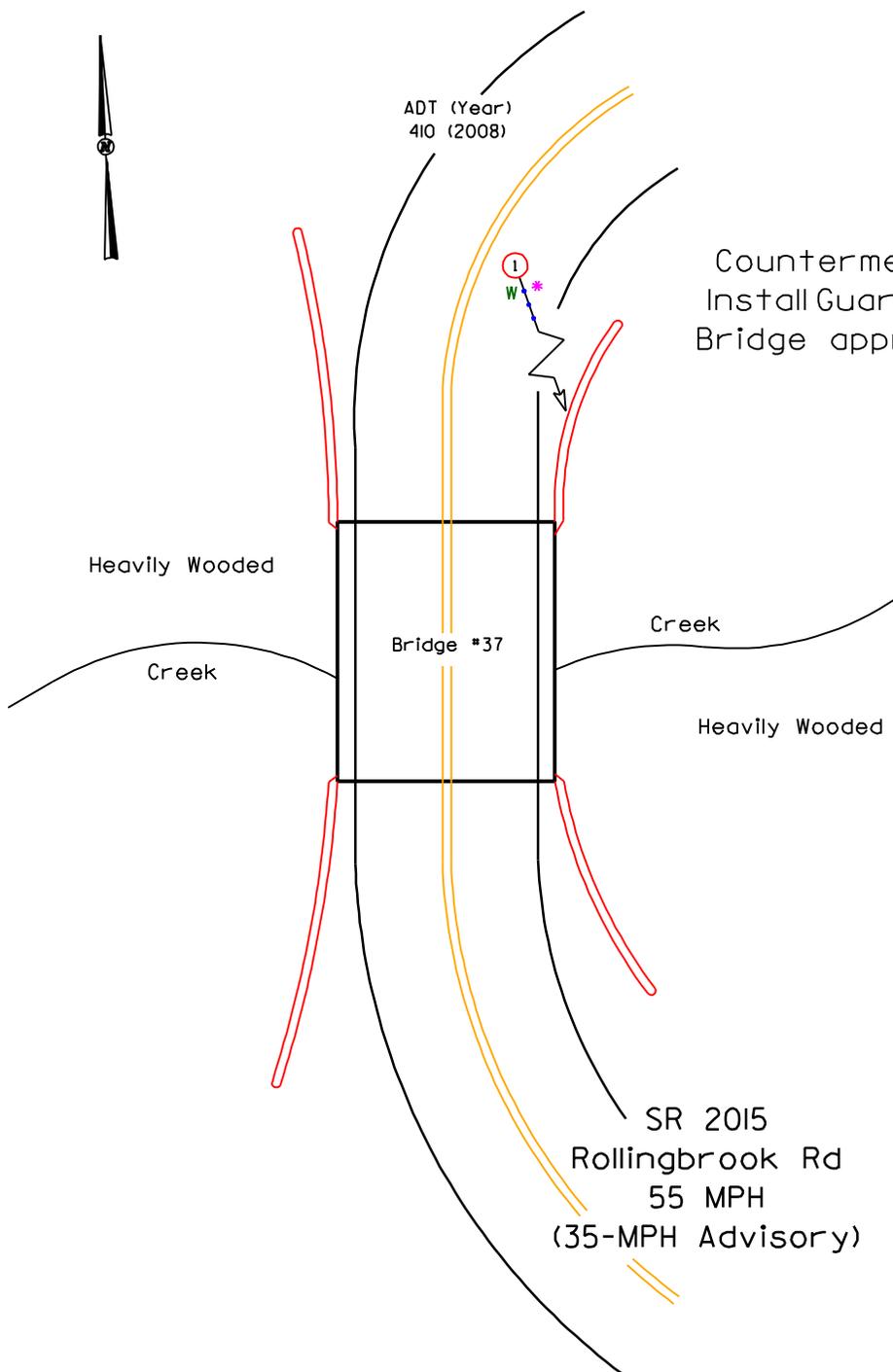
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ADT (Year)
410 (2008)

Countermeasure:
Install Guardrail on
Bridge approaches



LEGEND

	MOVING VEHICLE		ANGLE		5 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		40 MPH TO 49		TRAIN
	PAKED VEHICLE		BACKING		50 MPH TO 59		OTHER AT FAULT
	PAKED VEHICLE		SIDESWIPE		60 MPH TO 69		DRY
	FIXED OBJECT		OUT OF CONTROL		70 MPH TO 79		WET
	HEAD ON		RAN OFF ROAD		TO AND UP		CITY OR STREET
	HEAD ON		RAN OFF ROAD		SPEED UNKNOWN		ONLY
	HEAD ON		RAN OFF ROAD				

SS# 12-04-203
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 Cleveland County
 AFTER Period
 7/1/06 - 10/31/10

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

TRAFFIC SAFETY UNIT

Date: 12-10-2010

Prepared By: J. Schronce

