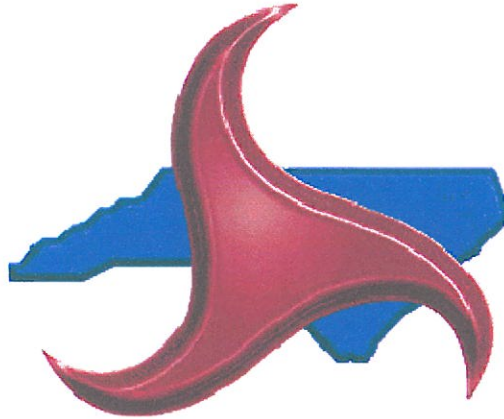


17BP.9.R.62 Bridge Design Speed Study

Bridge #280410 on SR 1844 (Greensboro St Ext) north of Lexington

Davidson County

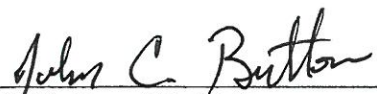


Document Prepared By:

Regional Traffic Office – Triad Region
Traffic Safety Unit
Transportation Mobility and Safety Division
North Carolina Department of Transportation

December 9, 2014

Principal Investigator:



John C. Button, PE, PLS
Triad/Regional Traffic Safety Engineer



Bridge and Approach Investigation Checklist

Project 17BP.9.R.62
Description Bridge #280410 over Leonard Creek
Route SR 1844 (Greensboro Street Extension)
Division 9
County Davidson

Existing Speed Limit 45 ☒ Posted ☒ Statutory

Reasonable & Comfortable
Passenger Car Speed 50 to 55 mph

Speed Data 25 speed data points collected: Mean = 49 mph
Range = 39 mph to 63 mph; Mode = 47 mph
85th percentile speed = 54 mph

Ball Bank Speed Study Not performed, bridge is in a tangent section.

Warning Signs at Bridge (4) W10-23 signs delineating bridge ends
40 SV/43 TTST signs located on each approach to the bridge.
W5-2a (Narrow Bridge) signs on each approach to the bridge.

Roadside Development Light residential development

ADT History 2013 AADT = 1200 vpd per NCDOT Traffic Map.
2003 AADT = 1500 vpd per NCDOT Traffic Map.

Pedestrian/Bicycle Traffic SR 1844 is not listed as a bicycle route or pedestrian route on the
Davidson County Comprehensive Plan Maps.

Bridge and Approach
Digital Photos See attached photos.

Approach Lane Width 23'-2" overall pavement width; 9'-6"/9'-3" lane widths.

Approach Shoulder Width: 8' to 10' +/-
Shoulder Type Grass

Lane Width (existing bridge) 20'-3" overall pavement width; 8'-5"/8'-5" lane widths.

Shoulder width (existing bridge) 7"/8"

Strategic Corridor / Thoroughfare
Designation and Recommended
Cross Section According to NCDOT Functional Class Map, SR 1844 is a major collector.
Recommend the 3R Guideline of 11' lane widths and 4' shoulder
(2' paved + 2' grass) widths (7' shoulder widths where guardrail is installed) as a minimum cross

Crash History and
Safety Considerations Nine crashes reported in the vicinity of the bridge from
10/01/2004 to 9/30/2014. Five of the crashes involved the vehicle hitting the bridge
rail.

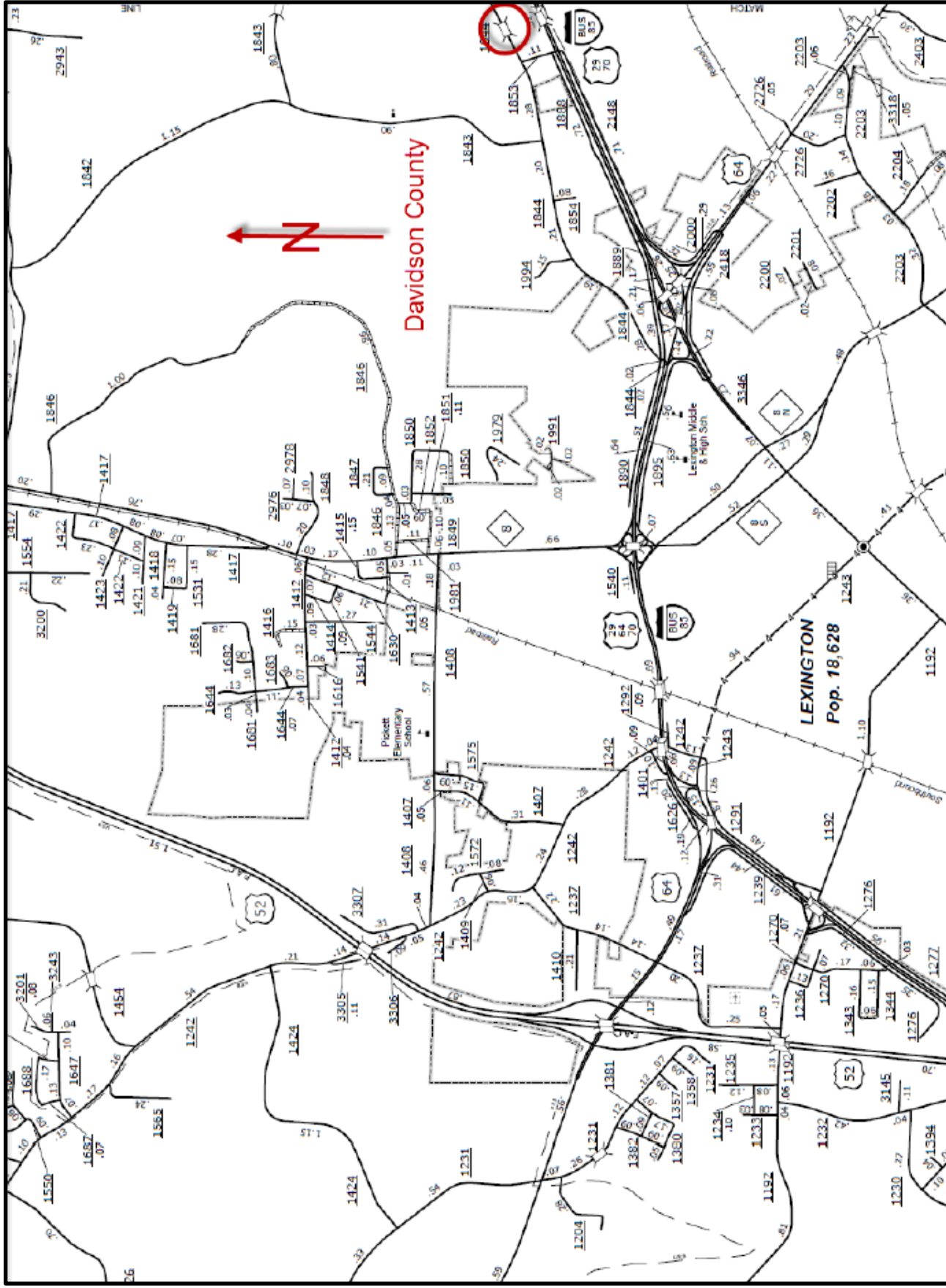
Comments _____

Reasonable Bridge Speed 55 MPH

Investigated by: John Button 11/12/2014

Reviewed by: _____

Bridge #280410 Location Map















**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Study Criteria Summary

County: DAVIDSON **City:** All and Rural
Date: 10/1/2004 **to** 9/30/2014 **Study:** 41000032333
Location: 500 feet on Both Sides of Bridge Number 410 on Secondary Route 1844 (Greensboro St Ext) over Leonard Creek

Report Details

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
1	102499069	1.230	12/25/2008 17:03	ANIMAL	\$ 1000	0	0	0	0	1	2	1		0		
Unit	1 : 5	Alchl/Drgs:	0	Speed:	0 MPH Dir: SW	Veh Mnvr/Ped Actn:				16	Obj Strk:		17			
2	103675024	1.249	02/09/2013 16:52	LEFT TURN, DIFFERENT ROADWAYS	\$ 9000	0	0	2	0	1	1	1	3	0	1	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	10 MPH Dir: N	Veh Mnvr/Ped Actn:				8	Obj Strk:					
Unit	2 : 10	Alchl/Drgs:	0	Speed:	45 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:					
3	101475292	1.336	05/13/2005 16:15	FIXED OBJECT	\$ 4000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:		50			
4	102178978	1.336	10/31/2007 00:16	FIXED OBJECT	\$ 1000	0	0	0	0	1	5	1	3	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	45 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:		49			
5	102245987	1.336	01/22/2008 09:36	FIXED OBJECT	\$ 2000	0	0	0	0	4	1	2	1	1	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	20 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:		33			
6	104034524	1.336	04/10/2014 12:25	FIXED OBJECT	\$ 1500	0	0	0	0	1	1	1	4	0	13	1
Unit	1 : 5	Alchl/Drgs:	3	Speed:	45 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:		49			
7	102073930	1.360	06/26/2007 09:38	FIXED OBJECT	\$ 15100	0	0	0	0	1	1	1	3	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:		38			
8	103201875	1.360	07/16/2011 15:30	FIXED OBJECT	\$ 7000	0	0	1	0	1	1	1	4	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:		49			
9	103583070	1.400	10/27/2012 12:33	ANIMAL	\$ 900	0	0	0	0	1	1	2	3	0	13	1
Unit	1 : 5	Alchl/Drgs:	0	Speed:	45 MPH Dir: NE	Veh Mnvr/Ped Actn:				4	Obj Strk:		17			

**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op

**Legend for
Report Details:**

Acc No - Accident Number
 Injuries: F - Fatal, A - Class A, B - Class B, C - Class C
 Condition: R - Road Surface, L - Ambient Light, W - Weather
 Rd Ch - Road Character
 Rd Ci - Roadway Contributing Circumstances
 Trfc Ctl - Traffic Control: Dv - Device, Op - Operating
 Alchl/Drgs - Alcohol Drugs Suspected
 Veh Mnvr/Ped Actn - Vehicle Maneuver/Pedestrian Action
 Obj Strk - Object Struck

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report

Summary Statistics

High Level Crash Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	9	100.00
Fatal Crashes	0	0.00
Non-Fatal Injury Crashes	2	22.22
Total Injury Crashes	2	22.22
Property Damage Only Crashes	7	77.78
Night Crashes	1	11.11
Wet Crashes	0	0.00
Alcohol/Drugs Involvement Crashes	0	0.00

Crash Severity Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	9	100.00
Fatal Crashes	0	0.00
Class A Crashes	0	0.00
Class B Crashes	2	22.22
Class C Crashes	0	0.00
Property Damage Only Crashes	7	77.78

Vehicle Exposure Statistics

Annual ADT = 1450

Total Length = 0.22 (Miles) 0.354 (Kilometers)

Total Vehicle Exposure = 1.16 (MVMT) 1.87 (MVKMT)

Crash Rate	Crashes Per 100 Million Vehicle Miles	Crashes Per 100 Million Vehicle Kilometers
Total Crash Rate	772.54	480.03
Fatal Crash Rate	0.00	0.00
Non Fatal Crash Rate	171.68	106.67
Night Crash Rate	85.84	53.34
Wet Crash Rate	0.00	0.00
EPDO Rate	2042.94	1269.42

**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Miscellaneous Statistics

Severity Index =	2.64
EPDO Crash Index =	23.80
Estimated Property Damage Total = \$	41500.00

Accident Type Summary

Accident Type	Number of Crashes	Percent of Total
ANIMAL	2	22.22
FIXED OBJECT	6	66.67
LEFT TURN, DIFFERENT ROADWAYS	1	11.11

Injury Summary

Injury Type	Number of Injuries	Percent of Total
Fatal Injuries	0	0.00
Class A Injuries	0	0.00
Class B Injuries	3	100.00
Class C Injuries	0	0.00
Total Non-Fatal Injuries	3	100.00
Total Injuries	3	100.00

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report

Monthly Summary

Month	Number of Crashes	Percent of Total
Jan	1	11.11
Feb	1	11.11
Mar	0	0.00
Apr	1	11.11
May	1	11.11
Jun	1	11.11
Jul	1	11.11
Aug	0	0.00
Sep	0	0.00
Oct	2	22.22
Nov	0	0.00
Dec	1	11.11

Daily Summary

Day	Number of Crashes	Percent of Total
Mon	0	0.00
Tue	2	22.22
Wed	1	11.11
Thu	2	22.22
Fri	1	11.11
Sat	3	33.33
Sun	0	0.00

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report

Hourly Summary

Hour	Number of Crashes	Percent of Total
0000-0059	1	11.11
0100-0159	0	0.00
0200-0259	0	0.00
0300-0359	0	0.00
0400-0459	0	0.00
0500-0559	0	0.00
0600-0659	0	0.00
0700-0759	0	0.00
0800-0859	0	0.00
0900-0959	2	22.22
1000-1059	0	0.00
1100-1159	0	0.00
1200-1259	2	22.22
1300-1359	0	0.00
1400-1459	0	0.00
1500-1559	1	11.11
1600-1659	2	22.22
1700-1759	1	11.11
1800-1859	0	0.00
1900-1959	0	0.00
2000-2059	0	0.00
2100-2159	0	0.00
2200-2259	0	0.00
2300-2359	0	0.00

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report

Light and Road Conditions Summary

Condition	Dry	Wet	Other	Total
Day	6	0	1	7
Dark	1	0	0	1
Other	1	0	0	1
Total	8	0	1	9

Object Struck Summary

Object Type	Times Struck	Percent of Total
ANIMAL	2	25.00
BRIDGE RAIL END	3	37.50
BRIDGE RAIL FACE	1	12.50
OFFICIAL HIGHWAY SIGN BREAKAWAY	1	12.50
TREE	1	12.50

Vehicle Type Summary

Vehicle Type	Number Involved	Percent of Total
PASSENGER CAR	3	30.00
PICKUP	2	20.00
SINGLE UNIT TRUCK (2-AXLE, 6-TIRE)	1	10.00
SPORT UTILITY	1	10.00
VAN	3	30.00

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report

Yearly Totals Summary

Accident Totals

Year	Total Accidents	Fatal Accidents	Injury Accidents	Property Damage Only Accidents
2004	0	0	0	0
2005	1	0	0	1
2006	0	0	0	0
2007	2	0	0	2
2008	2	0	0	2
2009	0	0	0	0
2010	0	0	0	0
2011	1	0	1	0
2012	1	0	0	1
2013	1	0	1	0
2014	1	0	0	1
Total	9	0	2	7

Injury Totals

Year	Fatal Injuries	Class A, B, or C Injuries
2004	0	0
2005	0	0
2006	0	0
2007	0	0
2008	0	0
2009	0	0
2010	0	0
2011	0	1
2012	0	0
2013	0	2
2014	0	0
Total	0	3

Miscellaneous Totals

Year	Property Damage	EPDO Index
2004	\$ 0	0.00
2005	\$ 4000	1.00
2006	\$ 0	0.00

**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Year	Property Damage	EPDO Index
2007	\$ 16100	2.00
2008	\$ 3000	2.00
2009	\$ 0	0.00
2010	\$ 0	0.00
2011	\$ 7000	8.40
2012	\$ 900	1.00
2013	\$ 9000	8.40
2014	\$ 1500	1.00
Total	\$ 41500	23.80

Type of Accident Totals

Year	Left Turn	Right Turn	Rear End	Run Off Road & Fixed Object	Angle	Side Swipe	Other
2004	0	0	0	0	0	0	0
2005	0	0	0	1	0	0	0
2006	0	0	0	0	0	0	0
2007	0	0	0	2	0	0	0
2008	0	0	0	1	0	0	1
2009	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0
2011	0	0	0	1	0	0	0
2012	0	0	0	0	0	0	1
2013	1	0	0	0	0	0	0
2014	0	0	0	1	0	0	0
Total	1	0	0	6	0	0	2

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report

Strip Diagram

Features	Milepost	Crash IDs
	1.23	102499069
	1.24	
	1.25	103675024
	1.26	
	1.27	
	1.28	
	1.29	
	1.30	
	1.31	
BEGIN BRIDGE STRUCTURE	1.32	
	1.33	
Structure:280410	1.34	101475292 102178978 102245987 104034524
	1.35	
END BRIDGE STRUCTURE	1.36	102073930 103201875
	1.37	
	1.38	
	1.39	
	1.40	103583070
	1.41	
	1.42	
	1.43	
	1.44	
	1.45	

**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Study Criteria

Study Name	Log No.	PH No.	TIP No.	K/A Cf.	B/C Cf.	ADT	ADT Route
41000032333	41000032333			76.8	8.4	1450	40001844

Request Date	Courier Service	Phone No.	Ext.	Fax No.
--------------	-----------------	-----------	------	---------

County			Municipality					
Name	Code	Div.	Name	Code	Y-Line Ft.	Begin Date	End Date	Years
DAVIDSON	28	9	All and Rural		0	10/1/2004	9/30/2014	10.00

Location Text	Requestor
500 feet on Both Sides of Bridge Number 410 on Secondary Route 1844 (Greensboro St Ext) over Leonard Creek	Brian C. Thomas, PE Triad Region

Included Accidents	Old MP	New MP	Type
102178978		1.336	I
104034524		1.336	I
103201875		1.36	I
102245987		1.336	I
102073930		1.36	I
101475292		1.336	I

Fiche Roads

Name	Code
SR 1844	40001844
ATLANTIC	50001196
OLD GREENSBORO	50022209

Strip Road

Name	Code	Begin MP	End MP	Miles	Kilometers
SR 1844	40001844	1.226	1.446	0.220	0.354