

Bridge Design Speed Investigation

Bridge #12 on SR 1607 (Bear Creek Rd) over Turkey Creek
Buncombe County



Document Prepared By:

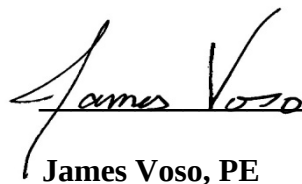
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Consulting Engineers - Surveyors
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Commission No: 3350

June 21, 2013



Investigating Engineer


James Voso, PE

Bridge and Approach Investigation Checklist

Project 17BP.13.PE.1
Description Replace Bridge #12 on SR 1607 (Bear Creek Rd) over Turkey Creek
Route SR 1607 (Bear Creek Road)
Division 13
County Buncombe

Existing Speed Limit 45 mph ☒ Posted ☐ Statutory

Reasonable & Comfortable
Passenger Car Speed 45 mph

Speed Data N/A

Ball Bank Speed Study Curve north of Bridge #12 had a ball bank indication of 9 at 35 mph.

Warning Signs at Bridge 4 Bridge End Delineators, Weight Limit (15 tons - single vehicle,
18 tons - truck tractor semitrailer)

Roadside Development Farm land in all quadrants of bridge.

ADT History 960 (2002)

Pedestrian/Bicycle Traffic Low

Bridge and Approach
Digital Photos (attached)

Approach Lane Width 9.3'

Approach Shoulder Width: 7'
Shoulder Type grass

Lane Width (existing bridge) 9.6'

Shoulder width (existing bridge) 1'

Strategic Corridor / Thoroughfare
Designation and Recommended
Cross Section Not a Strategic Corridor/Thoroughfare. Two lane cross section at 45
mph based on 3R guidelines.

Crash History and
Safety Considerations Five crashes (one "Fixed Object" type, one "Parked Motor Vehicle", one
"Sideswipe, Opposite Direction", one "Angle", one "Overturn/Rollover")
reported near bridge (4/1/2003 - 3/31/2013, 10 years).

Comments Driveways at northeast and southeast corners of bridge. Bridge number
posted on bridge.

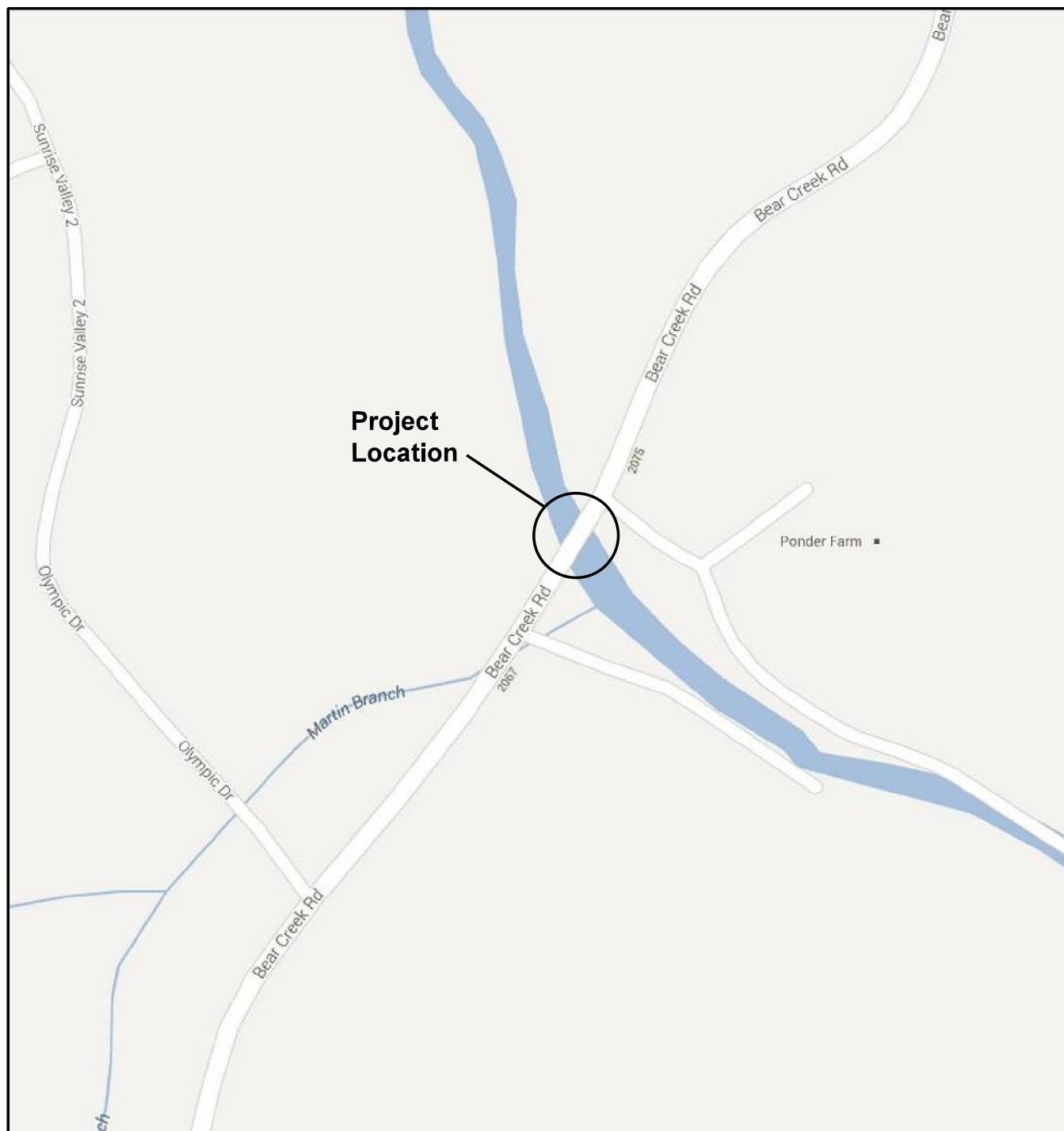
Reasonable Bridge Speed 45 mph

Investigated by: Mathew Bolden Reviewed by: James Voso

Bridge #12

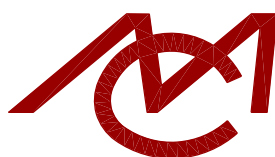
Buncombe County

Division 13



VICINITY MAP

Bridge #12 on SR 1607
(Bear Creek Road)
over Turkey Creek



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Bridge #12

Buncombe County

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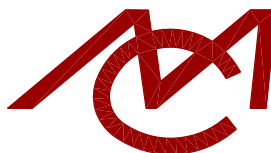


Northbound Approach



Northbound Approach at bridge

Bridge #12 on SR 1607
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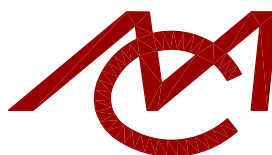


Southbound Approach



Southbound Approach at bridge

Bridge #12 on SR 1607
(Bear Creek Road)
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**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Study Criteria Summary

County: BUNCOMBE **City:** All and Rural
Date: 04/01/2003 to 03/31/2013 **Study:** BUNCOMBEBRIDGE12
Location: SR 1607 (Bear Creek Rd) from 500 feet west of Bridge 12 to 500 feet east of the bridge

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	103477010	5.028	06/14/2012 03:00	PARKED MOTOR VEHICLE	\$ 1400	0	0	0	0	1	5	2	1	0	13	1
Unit	1 : 32	Alchl/Drgs:	7	Speed: 30 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:			20		
Unit	2 : 4	Alchl/Drgs:	7	Speed: 0 MPH Dir: S		Veh Mnvr/Ped Actn:				2	Obj Strk:			20		
2	101840392	5.120	09/26/2006 02:43	SIDESWIPE, OPPOSITE DIRECTION	\$ 200	0	0	0	1	1	1	1	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
3	101416764	5.128	02/22/2005 12:55	FIXED OBJECT	\$ 7000	0	0	1	0	1	1	1	7	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: SE		Veh Mnvr/Ped Actn:				4	Obj Strk:			59		
4	101069723	5.148	12/15/2003 16:15	ANGLE	\$ 6000	0	0	3	0	1	1	2	7	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 48 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:			33		
Unit	2 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
5	102200387	5.170	11/25/2007 13:37	OVERTURN/ROLLOVER	\$ 4500	0	0	0	1	1	1	2	7	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					

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

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Traffic Engineering Accident Analysis System
Strip Analysis Report

Summary Statistics

High Level Crash Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	5	100.00
Fatal Crashes	0	0.00
Non-Fatal Injury Crashes	4	80.00
Total Injury Crashes	4	80.00
Property Damage Only Crashes	1	20.00
Night Crashes	1	20.00
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	5	100.00
Fatal Crashes	0	0.00
Class A Crashes	0	0.00
Class B Crashes	2	40.00
Class C Crashes	2	40.00
Property Damage Only Crashes	1	20.00

Vehicle Exposure Statistics

Annual ADT = 1550

Total Length = 0.208 (Miles) 0.335 (Kilometers)

Total Vehicle Exposure = 1.18 (MVMT) 1.9 (MVKMT)

Crash Rate	Crashes Per 100 Million Vehicle Miles	Crashes Per 100 Million Vehicle Kilometers
Total Crash Rate	424.55	263.80
Fatal Crash Rate	0.00	0.00
Non Fatal Crash Rate	339.64	211.04
Night Crash Rate	84.91	52.76
Wet Crash Rate	0.00	0.00
EPDO Rate	2937.86	1825.50

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Traffic Engineering Accident Analysis System
Strip Analysis Report**

Miscellaneous Statistics

Severity Index =	6.92
EPDO Crash Index =	34.60
Estimated Property Damage Total = \$	19100.00

Accident Type Summary

Accident Type	Number of Crashes	Percent of Total
ANGLE	1	20.00
FIXED OBJECT	1	20.00
OVERTURN/ROLLOVER	1	20.00
PARKED MOTOR VEHICLE	1	20.00
SIDESWIPE, OPPOSITE DIRECTION	1	20.00

Injury Summary

Injury Type	Number of Injuries	Percent of Total
Fatal Injuries	0	0.00
Class A Injuries	0	0.00
Class B Injuries	4	66.67
Class C Injuries	2	33.33
Total Non-Fatal Injuries	6	100.00
Total Injuries	6	100.00

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Monthly Summary

Month	Number of Crashes	Percent of Total
Jan	0	0.00
Feb	1	20.00
Mar	0	0.00
Apr	0	0.00
May	0	0.00
Jun	1	20.00
Jul	0	0.00
Aug	0	0.00
Sep	1	20.00
Oct	0	0.00
Nov	1	20.00
Dec	1	20.00

Daily Summary

Day	Number of Crashes	Percent of Total
Mon	1	20.00
Tue	2	40.00
Wed	0	0.00
Thu	1	20.00
Fri	0	0.00
Sat	0	0.00
Sun	1	20.00

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Hourly Summary

Hour	Number of Crashes	Percent of Total
0000-0059	0	0.00
0100-0159	0	0.00
0200-0259	1	20.00
0300-0359	1	20.00
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	0	0.00
1000-1059	0	0.00
1100-1159	0	0.00
1200-1259	1	20.00
1300-1359	1	20.00
1400-1459	0	0.00
1500-1559	0	0.00
1600-1659	1	20.00
1700-1759	0	0.00
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

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Light and Road Conditions Summary

Condition	Dry	Wet	Other	Total
Day	4	0	0	4
Dark	1	0	0	1
Other	0	0	0	0
Total	5	0	0	5

Object Struck Summary

Object Type	Times Struck	Percent of Total
EMBANKMENT	1	25.00
PARKED MOTOR VEHICLE	2	50.00
TREE	1	25.00

Vehicle Type Summary

Vehicle Type	Number Involved	Percent of Total
PASSENGER CAR	4	50.00
PICKUP	2	25.00
SPORT UTILITY	1	12.50
UNKNOWN	1	12.50

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Strip Analysis Report

Yearly Totals Summary

Accident Totals

Year	Total Accidents	Fatal Accidents	Injury Accidents	Property Damage Only Accidents
2003	1	0	1	0
2004	0	0	0	0
2005	1	0	1	0
2006	1	0	1	0
2007	1	0	1	0
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	1	0	0	1
2013	0	0	0	0
Total	5	0	4	1

Injury Totals

Year	Fatal Injuries	Class A, B, or C Injuries
2003	0	3
2004	0	0
2005	0	1
2006	0	1
2007	0	1
2008	0	0
2009	0	0
2010	0	0
2011	0	0
2012	0	0
2013	0	0
Total	0	6

Miscellaneous Totals

Year	Property Damage	EPDO Index
2003	\$ 6000	8.40
2004	\$ 0	0.00

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Strip Analysis Report**

Year	Property Damage	EPDO Index
2005	\$ 7000	8.40
2006	\$ 200	8.40
2007	\$ 4500	8.40
2008	\$ 0	0.00
2009	\$ 0	0.00
2010	\$ 0	0.00
2011	\$ 0	0.00
2012	\$ 1400	1.00
2013	\$ 0	0.00
Total	\$ 19100	34.60

Type of Accident Totals

Year	Left Turn	Right Turn	Rear End	Run Off Road & Fixed Object	Angle	Side Swipe	Other
2003	0	0	0	0	1	0	0
2004	0	0	0	0	0	0	0
2005	0	0	0	1	0	0	0
2006	0	0	0	0	0	1	0
2007	0	0	0	0	0	0	1
2008	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	1
2013	0	0	0	0	0	0	0
Total	0	0	0	1	1	1	2

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Strip Diagram

Features	Milepost	Crash IDs
Structure:100012	5.02	
	5.03	103477010
	5.04	
	5.05	
	5.06	
	5.07	
	5.08	
	5.09	
	5.10	
	5.11	
	5.12	101840392
	5.13	101416764
	5.14	
	5.15	101069723
	5.16	
	5.17	102200387
	5.18	
	5.19	
	5.20	
	5.21	
	5.22	

**North Carolina Department of Transportation
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Study Criteria

Study Name	Log No.	PH No.	TIP No.	K/A Cf.	B/C Cf.	ADT	ADT Route
BUNCOMBEBRIDGE12				76.8	8.4	1550	40001607

Request Date	Courier Service	Phone No.	Ext.	Fax No.
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County			Municipality					
Name	Code	Div.	Name	Code	Y-Line Ft.	Begin Date	End Date	Years
BUNCOMBE	10	13	All and Rural		0	04/01/2003	03/31/2013	10.00

Location Text	Requestor
SR 1607 (Bear Creek Rd) from 500 feet west of Bridge 12 to 500 feet east of the bridge	

Included Accidents	Old MP	New MP	Type
101840392	4.928	5.12	I
102200387	5.028	5.17	R

Fiche Roads

Name	Code
SR 1607	40001607
BEAR CREEK	50001997

Strip Road

Name	Code	Begin MP	End MP	Miles	Kilometers
SR 1607	40001607	5.016	5.224	0.208	0.335