
Bridge Design Speed Investigation

980091

Structure #91 on SR 1599 (Mt Carmel Church Road) over Forbush Creek

Yadkin County



Document Prepared By:

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Project Manager

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Regional Manager

Principal Investigator

Andrew Eagle, PE, PTOE
Traffic Engineer



Bridge and Approach Investigation Checklist

Project 13191

Description Bridge # 91 over Forbush Creek

Route SR 1599 (Mt Carmel Church Road)

Division 11

County Yadkin

Existing Speed Limit 55 ☐ Posted ☒ Statutory

Reasonable & Comfortable Passenger Car Speed 20

Speed Data 20-35 mph

Ball Bank Speed Study 20 mph: NB - 15, SB - 12 - Readings for curve north of bridge
25 mph: NB - 20, SB - 20 - Bridge speed good at 20 mph per BBI

Warning Signs at Bridge 3x Bridge End Delineators, 2x Weight Limit (23 ton SV, 26 ton TTST),
1x One Lane Bridge, 1x Road Subject to Flooding, 1x Curve Ahead

Roadside Development Residential

ADT History 300 vpd (From NCDOT TEAAS); 300 vpd (2011)

Pedestrian/Bicycle Traffic Minimal Expected

Bridge and Approach Digital Photos Attached

Approach Lane Width 9.5 ft

Approach Shoulder Width: 6 ft
Shoulder Type grass

Lane Width (existing bridge) 12 ft (one lane only)

Shoulder width (existing bridge) 2-3 ft (~17 ft total width)

Strategic Corridor / Thoroughfare Designation and Recommended Cross Section SR 1599 is classified as a rural local facility in the Statewide Functional Classification System. 2-lane cross-section recommended.

Crash History and Safety Considerations Crash analysis completed for 7/1/2003 to 6/30/2013. Four collisions reported. Three fixed object collisions resulted in a vehicle striking: a bridge rail end, a tree, and another fixed object. Another collision involved a vehicle striking an animal.

Comments Two school buses were observed crossing the bridge. Reasonable bridge speed 20 mph due to curve north of bridge.

Reasonable Bridge Speed 20

Investigated by: J. Andrew Eagle, PE, PTOE

Reviewed by: 

County: Yadkin

Bridge and Route: 980091 – SR 1599 Mt Carmel Church Rd.

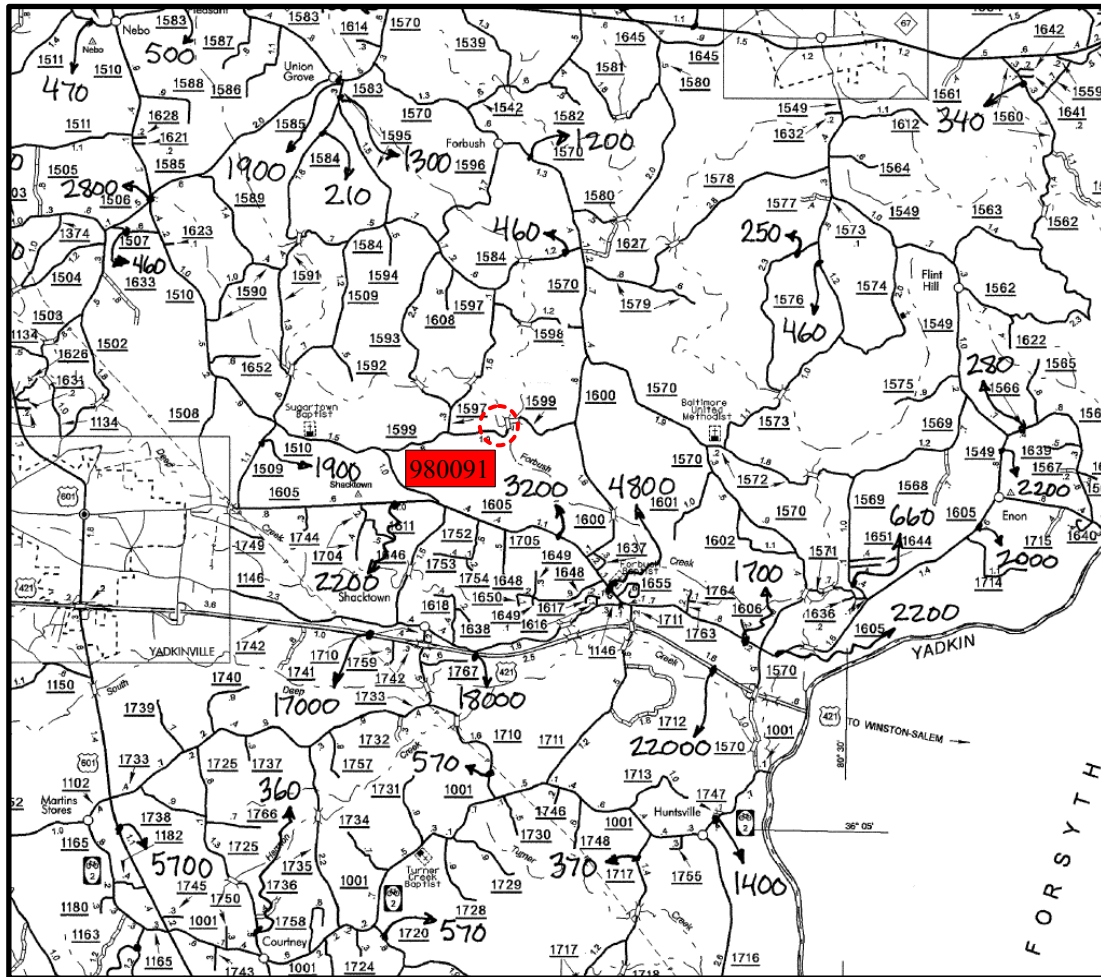
Date: 9/16/13

Northbound



Southbound





**RAMEY KEMP
&
ASSOCIATES**
TRANSPORTATION ENGINEERS

Bridge Location Map - Bridge #980091

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

Study Criteria Summary

County: YADKIN **City:** All and Rural
Date: 7/1/2003 **to** 6/30/2013 **Study:** YADKINBRIDGE91
Location: SR 1599 (Mills Rd - Mt Carmel Church Rd), from the intersection with Mt Carmel Church Rd to the east to 500 feet west of Bridge 91

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	102186861	0.909	11/08/2007 17:00	FIXED OBJECT	\$ 1500	0	0	0	0	1	1	1	8	0	0	
Unit	1 : 1	Alchl/Drugs:	0	Speed: 55 MPH Dir: W		Veh Mnvr/Ped Actn:				4			Obj Strk:		49	
2	102134260	0.923	09/09/2007 08:22	FIXED OBJECT	\$ 6000	0	0	0	0	1	1	1	5	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn:				4			Obj Strk:		64	
3	101356442	0.956	12/08/2004 23:00	ANIMAL	\$ 2500	0	0	0	0	1	5	1				
Unit	1 : 2	Alchl/Drugs:	0	Speed: 0 MPH Dir: W		Veh Mnvr/Ped Actn:				4			Obj Strk:		17	
4	103097203	1.000	02/22/2011 07:33	FIXED OBJECT	\$ 1500	0	0	0	1	1	1	1	7	0	0	
Unit	1 : 4	Alchl/Drugs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				4			Obj Strk:		33	

**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/Drugs - 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	4	100.00
Fatal Crashes	0	0.00
Non-Fatal Injury Crashes	1	25.00
Total Injury Crashes	1	25.00
Property Damage Only Crashes	3	75.00
Night Crashes	1	25.00
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	4	100.00
Fatal Crashes	0	0.00
Class A Crashes	0	0.00
Class B Crashes	0	0.00
Class C Crashes	1	25.00
Property Damage Only Crashes	3	75.00

Vehicle Exposure Statistics

Annual ADT = 300

Total Length = 0.136 (Miles) 0.219 (Kilometers)

Total Vehicle Exposure = 0.15 (MVMT) 0.24 (MVKMT)

Crash Rate	Crashes Per 100 Million Vehicle Miles	Crashes Per 100 Million Vehicle Kilometers
Total Crash Rate	2683.80	1667.64
Fatal Crash Rate	0.00	0.00
Non Fatal Crash Rate	670.95	416.91
Night Crash Rate	670.95	416.91
Wet Crash Rate	0.00	0.00
EPDO Rate	7648.83	4752.76

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Strip Analysis Report**

Miscellaneous Statistics

Severity Index =	2.85
EPDO Crash Index =	11.40
Estimated Property Damage Total = \$	11500.00

Accident Type Summary

Accident Type	Number of Crashes	Percent of Total
ANIMAL	1	25.00
FIXED OBJECT	3	75.00

Injury Summary

Injury Type	Number of Injuries	Percent of Total
Fatal Injuries	0	0.00
Class A Injuries	0	0.00
Class B Injuries	0	0.00
Class C Injuries	1	100.00
Total Non-Fatal Injuries	1	100.00
Total Injuries	1	100.00

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Traffic Engineering Accident Analysis System
Strip Analysis Report**

Monthly Summary

Month	Number of Crashes	Percent of Total
Jan	0	0.00
Feb	1	25.00
Mar	0	0.00
Apr	0	0.00
May	0	0.00
Jun	0	0.00
Jul	0	0.00
Aug	0	0.00
Sep	1	25.00
Oct	0	0.00
Nov	1	25.00
Dec	1	25.00

Daily Summary

Day	Number of Crashes	Percent of Total
Mon	0	0.00
Tue	1	25.00
Wed	1	25.00
Thu	1	25.00
Fri	0	0.00
Sat	0	0.00
Sun	1	25.00

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Traffic Engineering Accident Analysis System
Strip Analysis Report**

Hourly Summary

Hour	Number of Crashes	Percent of Total
0000-0059	0	0.00
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	1	25.00
0800-0859	1	25.00
0900-0959	0	0.00
1000-1059	0	0.00
1100-1159	0	0.00
1200-1259	0	0.00
1300-1359	0	0.00
1400-1459	0	0.00
1500-1559	0	0.00
1600-1659	0	0.00
1700-1759	1	25.00
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	1	25.00

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Traffic Engineering Accident Analysis System
Strip Analysis Report

Light and Road Conditions Summary

Condition	Dry	Wet	Other	Total
Day	3	0	0	3
Dark	1	0	0	1
Other	0	0	0	0
Total	4	0	0	4

Object Struck Summary

Object Type	Times Struck	Percent of Total
ANIMAL	1	25.00
BRIDGE RAIL END	1	25.00
OTHER FIXED OBJECT	1	25.00
TREE	1	25.00

Vehicle Type Summary

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

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Traffic Engineering Accident Analysis System
Strip Analysis Report

Yearly Totals Summary

Accident Totals

Year	Total Accidents	Fatal Accidents	Injury Accidents	Property Damage Only Accidents
2003	0	0	0	0
2004	1	0	0	1
2005	0	0	0	0
2006	0	0	0	0
2007	2	0	0	2
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	1	0	1	0
2012	0	0	0	0
2013	0	0	0	0
Total	4	0	1	3

Injury Totals

Year	Fatal Injuries	Class A, B, or C Injuries
2003	0	0
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	0
Total	0	1

Miscellaneous Totals

Year	Property Damage	EPDO Index
2003	\$ 0	0.00
2004	\$ 2500	1.00

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Traffic Engineering Accident Analysis System
Strip Analysis Report**

Year	Property Damage	EPDO Index
2005	\$ 0	0.00
2006	\$ 0	0.00
2007	\$ 7500	2.00
2008	\$ 0	0.00
2009	\$ 0	0.00
2010	\$ 0	0.00
2011	\$ 1500	8.40
2012	\$ 0	0.00
2013	\$ 0	0.00
Total	\$ 11500	11.40

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	0	0	0
2004	0	0	0	0	0	0	1
2005	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0
2007	0	0	0	2	0	0	0
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	1	0	0	0
2012	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0
Total	0	0	0	3	0	0	1

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Traffic Engineering Accident Analysis System
Strip Analysis Report

Strip Diagram

Features	Milepost	Crash IDs
Structure:980091	0.89	
	0.90	
	0.91	102186861
	0.92	102134260
	0.93	
	0.94	
	0.95	
	0.96	101356442
	0.97	
	0.98	
	0.99	
	1.00	103097203
	1.01	
	1.02	
	1.03	

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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
YADKINBRIDGE91				76.8	8.4	300	40001599

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
YADKIN	98	11	All and Rural		0	7/1/2003	6/30/2013	10.00

Location Text	Requestor
SR 1599 (Mills Rd - Mt Carmel Church Rd), from the intersection with Mt Carmel Church Rd to the east to 500 feet west of Bridge 91	

Included Accidents	Old MP	New MP	Type
102134260		0.923	I
102186861		0.909	I

Excluded Accidents
102055514

Fiche Roads	
Name	Code
SR 1599	40001599
MILLS	50020057
MT CARMEL CHURCH	50020795

Strip Road					
Name	Code	Begin MP	End MP	Miles	Kilometers
SR 1599	40001599	0.891	1.027	0.136	0.219