

14' offset left/DS
12.40 12.50 90' Brg
No 10' offset
Low Debris

Project Number 45622.1.1
TIP Number B-5667
Let Date _____

PREDESIGN-PRESURVEY REPORT

Bridge Number 500231
Road Number SR 2159 - Bay Valley Road
Stream Little Buffalo Creek

County JOHNSTON

Type Of Request: POC Force Account TIP
Date 2-3-16 Name S J Sykes Assigned To _____
Checked By _____

Prior Survey Date None (attach copy of prior survey)

Study By Scour Section _____

Flood Zone AE Detail Study Limited Date 12/2/2005 (attach copy of flood map) Panel 2648

B.M. Info _____

Quad Map Stancils Chapel Drainage Area 4.46 sq mi From Stream Stats
Q25 600 Q50 750 Q100 900 Method VSGS SD Report 2009-558

EXISTING BRIDGE INFORMATION

Location 0.3 mi SE of JCT SR 2110

Average Daily Traffic 250 (yr 2012)

Length 60' Bed- To Crown 11' Water Depth 6'

Type Structure PPC channels, PPC cap + timber piles

Type Spans 2 @ 30'

Upstream Structure #232 (SR 2110)

Location 0.2 mi S of JCT NC 222

Bed- To Crown 16' Prior Survey 1-40 (1 @ 30')

Downstream Structure #230 (SR 2148)

Location 0.3 mi S of JCT SR 2159

Bed- To Crown 16' Prior Survey 7-47 (1 @ 40')

SCS Watershed _____

ENVIRONMENTAL

Trout Stream No Anadromous Fish No Primary Nursery Area No

High Quality Waters No Nutrient Sensitive Waters Yes

Near Water Supply Intake No CAMA County No

Stream Classification C, NSW

DENR River Basin Info. Neuse

office estimated min. brg length = 95'



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE MANAGEMENT UNIT

ATTENTION:

Structure Safety Report

Routine Element Inspection

COUNTY: JOHNSTON STRUCTURE NUMBER: 500231 FREQUENCY: 24 MONTHS

FACILITY CARRIED: SR2159 MILE POST:

LOCATION: 0.3 MI SE JCT SR2110

FEATURE INTERSECTED: LITTLE BUFFALO CREEK

LATITUDE: 35° 38' 51.97" LONGITUDE: 78° 10' 41.48"

SUPERSTRUCTURE: PPC CHANNELS (BMD-13)

SUBSTRUCTURE: EBTS&IBT:PPC CAP/TIM.PILES @ 5'9 CTS.

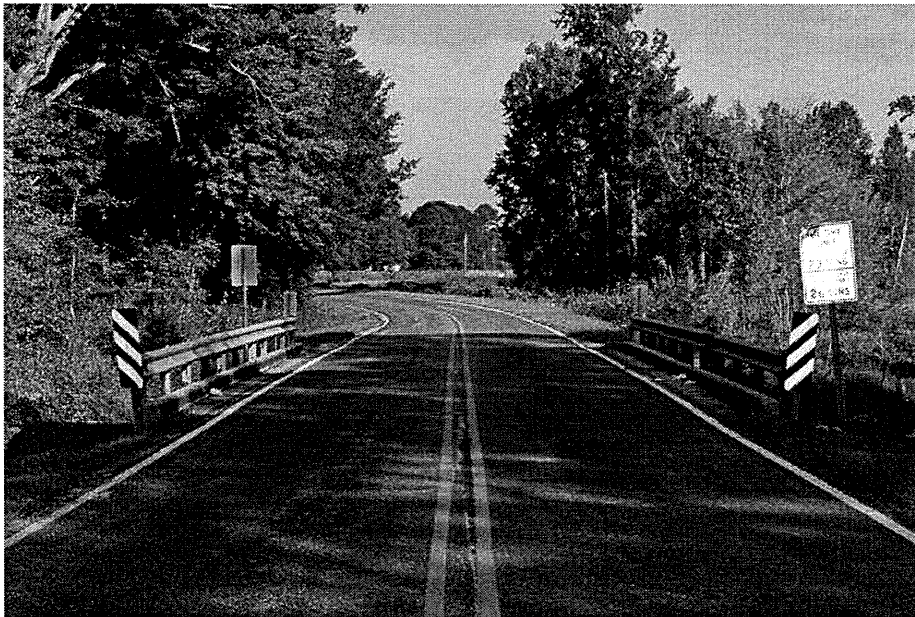
SPANS: 2@30"

☐ FRACTURE CRITICAL ☐ TEMPORARY SHORING ☐ SCOUR CRITICAL ☐ SCOUR PLAN OF ACTION

PRESENT CONDITION: Fair INSPECTION DATE: 09/11/2014

POSTED SV: 23 POSTED TTST: 26

OTHER SIGNS PRESENT: 4 Delineators



LOOKING NORTH

Sign noticed issued for		Number Required
<u>NO</u>	WEIGHT LIMIT	<u>0</u>
<u>NO</u>	DELINEATORS	<u>0</u>
<u>NO</u>	NARROW BRIDGE	<u>0</u>
<u>NO</u>	ONE LANE BRIDGE	<u>0</u>
<u>NO</u>	LOW CLEARANCE	<u>0</u>

INSPECTED BY
Willis C May

SIGNATURE

Willis C May

ASSISTED BY Wayne T Wilkinson

NATIONAL BRIDGE INVENTORY----- STRUCTURE INVENTORY AND APPRAISAL

Run Date: 01/12/2015

IDENTIFICATION

(1) STATE NAME -NORTH CAROLINA BRIDGE 500231
 (8) STRUCTURE NUMBER(FEDERAL) 00000001010231
 (5) INVENTORY ROUTE (ON/UNDER) - ON 31021590
 (2) STATE HIGHWAY DEPARTMENT DISTRICT 3
 (3) COUNTY CODE 101 (4) PLACE CODE 0
 (6) FEATURE INTERSECTED - LITTLE BUFFALO CREEK
 (7) FACILITY CARRIED SR2159
 (9) LOCATION 0.3 MI SE JCT SR2110
 (11) MILEPOINT 0
 (16) LAT 35° 38' 51.97" (17) LONG 78° 10' 41.48"
 (98) BORDER BRIDGE STATE CODE PCT SHARE
 (99) BORDER BRIDGE STRUCTURE NO

SUFFICIENCY RATING = 36.47
 STATUS = Functionally Obsolete

CLASSIFICATION

CODE

(112) NBIS BRIDGE SYSTEM - YES
 (104) HIGHWAY SYSTEM Is not on NHS 0
 (26) FUNCTIONAL CLASS - Local 09
 (100) STRAHNET HIGHWAY - Not a STRAHNET Route 0
 (101) PARALLEL STRUCTURE - No Parallel Structure N
 (102) DIRECTION OF TRAFFIC - 2-way Traffic 2
 (103) TEMPORARY STRUCTURE -
 (110) DESIGNATED NATIONAL NETWORK - Not on the National Network 0
 (20) TOLL On Free Road 3
 (31) MAINTAIN - State Highway Agency 01
 (22) OWNER - State Highway Agency 01
 (37) HISTORICAL SIGNIFICANCE - Not Eligible 5

STRUCTURE TYPE AND MATERIAL

(43) STRUCTURE TYPE MAIN: Prestressed Concrete
 TYPE - Channel Beam CODE 522
 (44) STRUCTURE TYPE APPR :
 TYPE - CODE 000
 (45) NUMBER OF SPANS IN MAIN UNIT 2
 (46) NUMBER OF APPROACH SPANS
 (107) DECK STRUCTURE TYPE - 1 CODE
 (108) WEARING SURFACE / PROTECTIVE SYSTEM :
 (A) TYPE OF WEARING SURFACE - CODE
 (B) TYPE OF MEMBRANE - CODE
 (C) TYPE OF DECK PROTECTION - CODE

CONDITION

CODE

(58) DECK 6
 (59) SUPERSTRUCTURE 6
 (60) SUBSTRUCTURE 5
 (61) CHANNEL & CHANNEL PROTECTION 7
 (62) CULVERTS N

LOAD RATING AND POSTING

CODE

(31) DESIGN LOAD HS 15 3
 (63) OPERATING RATING METHOD - Allowable Stress 2
 (64) OPERATING RATING - HS-16 28
 (65) INVENTORY RATING METHOD - Allowable Stress 2
 (66) INVENTORY RATING - HS-4 7
 (70) BRIDGE POSTING - Posting Required 2
 (41) STRUCTURE OPEN, POSTED ,OR CLOSED P
 DESCRIPTION - Posted for Load

AGE AND SERVICE

(27) YEAR BUILT 1972
 (106) YEAR RECONSTRUCTED
 (42) TYPE OF SERVICE : ON - Highway
 UNDER - Waterway CODE 15
 (28) LANES: ON STRUCTURE 2 UNDER STRUCTURE 0
 (29) AVERAGE DAILY TRAFFIC 250
 (30) YEAR OF ADT 2012 (109) TRUCK ADT PCT 6%
 (19) BYPASS OR DETOUR LENGTH 2 MI

APPRAISAL

CODE

(67) STRUCTURAL EVALUATION 3
 (68) DECK GEOMETRY 5
 (69) UNDERCLEARANCES, VERTI & HORIZ N
 (71) WATERWAY ADEQUACY 7
 (72) APPROACH ROADWAY ALIGNMENT 8
 (36) TRAFFIC SAFETY FEATURES 0000
 (113) SCOUR CRITICAL BRIDGES U

GEOMETRIC DATA

(48) LENGTH OF MAXIMUM SPAN 30 FT
 (49) STRUCTURE LENGTH 60 FT
 (50) CURB OR SIDEWALK: LEFT .4585 FT RIGHT .4585 FT
 (51) BRIDGE ROADWAY WIDTH CURB TO CURB 24 FT
 (52) DECK WIDTH OUT TO OUT 25.25 FT
 (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 20 FT
 (33) BRIDGE MEDIAN - No Median CODE 0
 (34) SKEW 0° (35) STRUCTURE FLARED 0
 (10) INVENTORY ROUTE MIN VERT CLEAR 999.9 FT
 (47) INVENTORY ROUTE TOTAL HORIZ CLEAR 24 FT
 (53) MIN VERT CLEAR OVER BRIDGE RDWY 999.9 FT
 (54) MIN VERT UNDERCLEAR REF Not a Highway or Railroad 0 FT
 (55) MIN LAT UNDERCLEAR RT REF Not a Highway or Railroad 000 FT
 (56) MIN LAT UNDERCLEAR LT REF - 000 FT

PROPOSED IMPROVEMENTS

CODE

(75) TYPE OF WORK -
 (76) LENGTH OF STRUCTURE IMPROVEMENT
 (94) BRIDGE IMPROVEMENT COST
 (95) ROADWAY IMPROVEMENT COST
 (96) TOTAL PROJECT COST
 (97) YEAR OF IMPROVEMENT COST ESTIMATE
 (114) FUTURE ADT 500 (115) YEAR FUTURE ADT 2025

INSPECTIONS

NAVIGATION DATA

(38) NAVIGATION CONTROL - No Navigational Control CODE 0
 (111) PIER PROTECTION - CODE
 (39) NAVIGATION VERTICAL CLEARANCE 0
 (116) VERT - LIFT BRIDGE NAV MIN VERT CLEAR FT
 (40) NAVIGATION HORIZONTAL CLEARANCE 0 FT

(90) INSPECTION DATE 09/11/2014

(92) CRITICAL FEATURE INSPECTION :

(93) CFI DATE

A) FRACTURE CRIT DETAIL - NO

A)

B) UNDERWATER INSP - YES 48Mo

B) 09/01/2011

C) OTHER SPECIAL INSP NO

C)

SCOUR

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 01/12/2015

COUNTY :	DIVISION :	DISTRICT :	STRUCTURE NUMBER :	LENGTH :	
JOHNSTON	4	3	500231	60	FEET

ROUTE CARRIED :	FEATURE INTERSECTED :
SR2159	LITTLE BUFFALO CREEK

LOCATED :	BRIDGE NAME :	CITY :
0.3 MI SE JCT SR2110		

FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
09	NFA	NFA	250 2012	LT 233 RT 233

BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
1972	BMU			HS 15

REHAB :	BY :	PROJ :	ALIGNMENT :	SKEW :	LANES :
			TAN.	90	ON 2 UNDER 0

NAVIGATION :			HT. CRN. TO BED :		WATER DEPTH :
VC 0 FT	HC 0 FT		11 FT		6 FT

SUPERSTRUCTURE : PPC CHANNELS (BMD-13)

SUBSTRUCTURE : EBTS&IBT:PPC CAP/TIM.PILES @ 5'9 CTS.

SPANS : 2@30'

BEAMS OR GIRDERS : 10 LNS 30" PPC CHANNEL SECTIONS

FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) :
PPC CH/4 AWS		25.25 FT

CLEAR ROADWAY :	BETWEEN RAILS :	SIDEWALK OR CURB :
24 FT	24.917 FT	LT .4585 FT RT .4585 FT

VERT.CL.OVER :
999.9 FT

INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :		
HS-4	HS-16	Timber Pile	SV 23 TTST 26	DATE	09/05/2008

SYSTEM :	GREEN LINE ROUTE :
Secondary S.R. Route	N

UNDER ROUTES AND CLEARANCES

REMARKS :

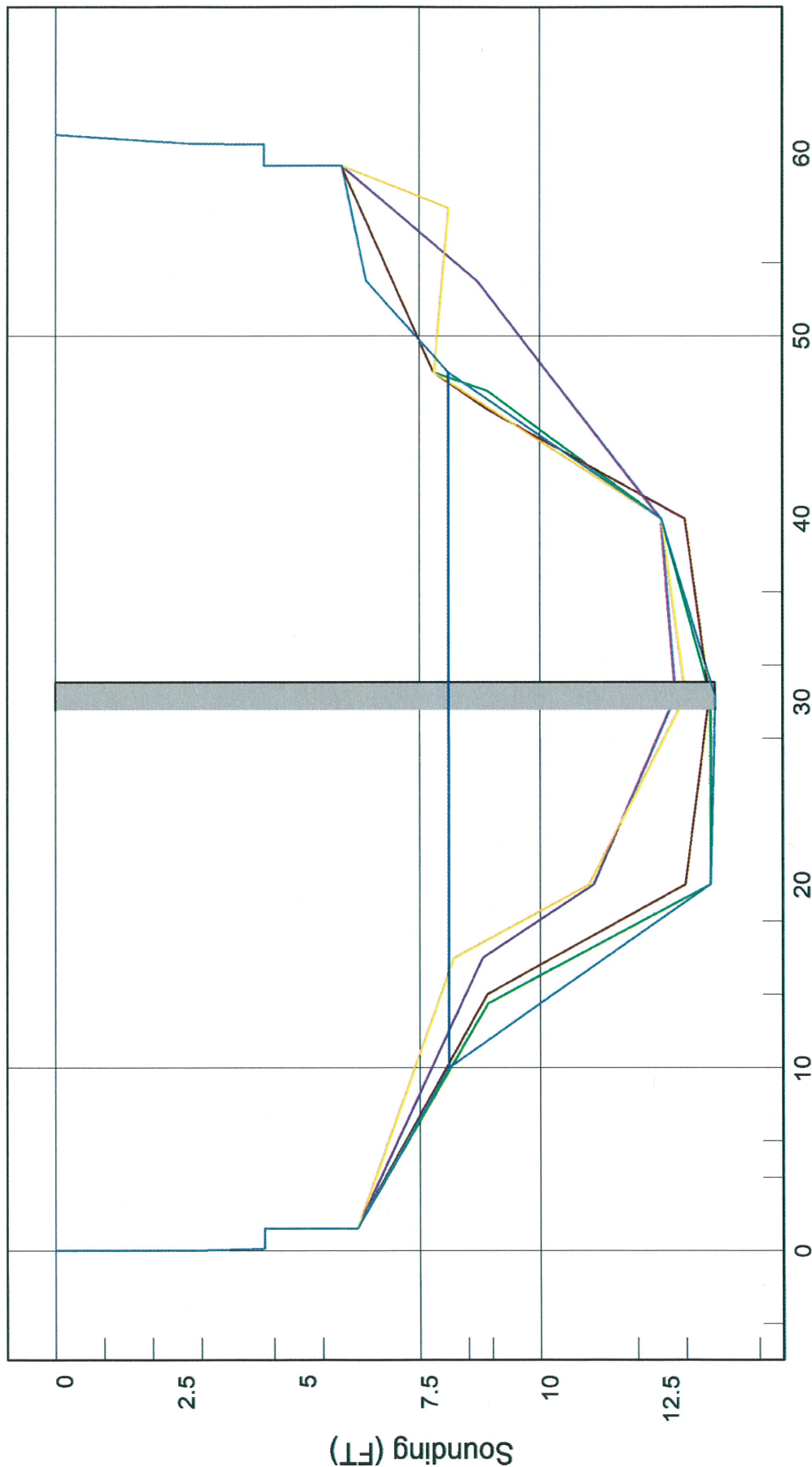
Bridge: 500231

County JOHNSTON

Date:

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



$$11 \times 1.5 = 17 \times 2 = 34 + 38 + 20 = 92$$

Distance (FT)

Section 5.0 – Engineering Methods

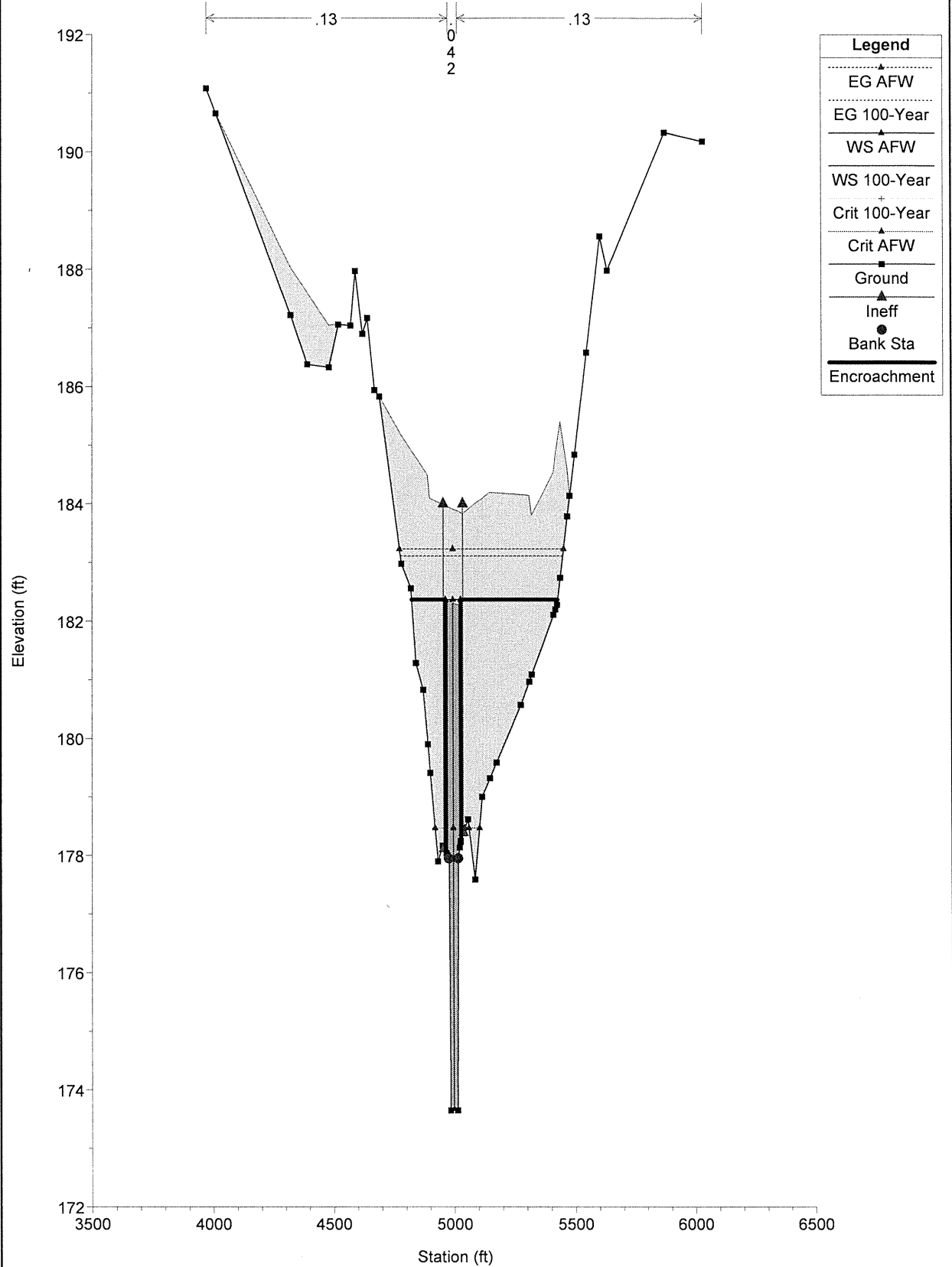
Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (square miles)	Discharges (cfs)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Little Black Creek (continued)	Approximately 0.8 mile upstream of Jackson King Road	11.1	*	*	1,824	*
	Approximately 1.0 mile downstream of Old Stage Road	9.2	*	*	1,647	*
	Approximately 0.7 mile downstream of Old Stage Road	7.4	*	*	1,455	*
	Approximately 0.3 mile downstream of Old Stage Road	7.1	*	*	1,420	*
	At the Johnston/Wake County boundary	6.4	*	*	1,334	*
Little Buffalo Creek	Approximately 0.4 mile downstream of Old Route 22	24.3	*	*	5,480	*
	Just upstream of Old Route 22	23.4	*	*	5,350	*
	Just downstream of Glendale Road	22.4	*	*	5,200	*
	Just upstream of Glendale Road	21.5	*	*	5,060	*
	Approximately 0.1 mi upstream of Glendale Road	10.3	*	*	3,200	*
	Just upstream of the confluence with Little Buffalo Creek Tributary	10.0	*	*	3,140	*
	Approximately 0.8 mile upstream of Beulah town Road	8.5	*	*	2,840	*
	Approximately 0.7 mile upstream of Beulah town Road	8.1	*	*	2,760	*
	Approximately 1.1 mile Little Buffalo Creek downstream of Bay Valley Road	7.2	*	*	2,560	*
	Approximately 0.2 mile downstream of Bay Valley Road	6.6	*	*	2,430	*
	Approximately 0.2 mile downstream of Bay Valley Road	4.5	*	*	1,900	*
	Approximately 0.5 mile downstream of Glendale Road	3.8	*	*	1,720	*

HEC-RAS Plan: Plan01 River: Little Buffalo C Reach: Reach - 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach - 1	32206.5	100-Year	1904.00	174.61	184.50		184.63	0.001354	4.93	1647.71	542.02	0.28
Reach - 1	32206.5	AFW	1904.00	174.61	184.94		185.13	0.001601	5.52	1208.86	289.06	0.31
Reach - 1	31505.0	100-Year	1904.00	174.21	183.88		183.93	0.000717	3.53	2247.25	628.66	0.20
Reach - 1	31505.0	AFW	1904.00	174.21	184.19		184.26	0.000908	4.06	1623.59	339.67	0.23
Reach - 1	30944.4	100-Year	1904.00	173.90	183.52		183.56	0.000618	3.26	2417.77	662.27	0.19
Reach - 1	30944.4	AFW	1904.00	173.90	183.71		183.77	0.000830	3.83	1694.20	347.35	0.22
Reach - 1	30521.5	100-Year	1904.00	173.66	182.77	178.49	183.11	0.001228	4.94	532.83	637.31	0.30
Reach - 1	30521.5	AFW	1904.00	173.66	182.83	178.42	183.23	0.001356	5.21	455.05	63.00	0.31
Reach - 1	30500.0	Bridge										
Reach - 1	30478.5	100-Year	1904.00	173.39	181.68	178.22	182.12	0.001773	5.55	466.48	565.18	0.35
Reach - 1	30478.5	AFW	1904.00	173.39	182.64	178.15	183.03	0.001314	5.16	459.98	63.00	0.31
Reach - 1	30086.8	100-Year	1904.00	173.25	181.04		181.18	0.002317	5.46	1567.08	682.29	0.35
Reach - 1	30086.8	AFW	1904.00	173.25	181.64		182.12	0.004702	8.19	644.39	140.00	0.51
Reach - 1	29619.6	100-Year	1904.00	173.19	180.62		180.64	0.000611	2.71	2677.56	779.71	0.18
Reach - 1	29619.6	AFW	1904.00	173.19	181.35		181.37	0.000601	2.87	2217.25	474.68	0.18
Reach - 1	29000.0	100-Year	2430.00	172.56	179.89		179.98	0.001841	4.86	2172.52	825.34	0.32
Reach - 1	29000.0	AFW	2430.00	172.56	180.59		180.72	0.001840	5.17	1612.80	397.65	0.33

Little Buffalo Creek Plan: 100 Year Single 12/17/2002
 Bay Valley Rd2-TOR



BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 10/22/2015

COUNTY : JOHNSTON DIVISION : 4 DISTRICT : 3 STRUCTURE NUMBER : 500232 LENGTH : 37 FEET

ROUTE CARRIED : SR2110 FEATURE INTERSECTED : LITTLE BUFFALO CREEK

LOCATED : 0.2 MI S JCT NC222 BRIDGE NAME : CITY :

FUNC. CLASS : 09 SYST.ON : NFA SYST.UNDER : NFA ADT & YR : 560 2012 RAIL TYPE : LT 241 RT 241

BUILT : 1951 BY : BMU PROJ : FED.AID PROJ : DESIGN LOAD : Unknown

REHAB : BY : PROJ : ALIGNMENT : TAN SKEW : 90 LANES : ON 2 UNDER 0

NAVIGATION : VC 0 FT HC 0 FT HT. CRN. TO BED : 16 FT WATER DEPTH : 12 FT

SUPERSTRUCTURE : RC DECK ON I-BEAMS (BMD 6-2)

SUBSTRUCTURE : END & INTERIOR BENTS:RC CAPS ON TIMBER PILES, INTERIOR BENT W/STEEL CAP & PILE CRUTCHES

SPANS : 2@18' 7.5"

BEAMS OR GIRDERS : 12 LINES OF 12" I-BEAMS @ VARIOUS CENTERS

FLOOR : 5 RC/4.5 AWS ENCROACHMENT : DECK (OUT TO OUT) : 25.667 FT

CLEAR ROADWAY : 24.25 FT BETWEEN RAILS : 25.75 FT SIDEWALK OR CURB : LT .75 FT RT .75 FT

VERT.CL.OVER : 999.9 FT

INV.RTG. : HS-1 OPE.RTG. : HS-1 CONTR.MEMBER : Int Bm POSTED : SV 16 TTST 24 DATE : 09/08/2008

SYSTEM : Secondary S.R. Route GREEN LINE ROUTE : N

UNDER ROUTES AND CLEARANCES

UPSTREAM STRUCTURE

REMARKS :

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 03/23/2015

COUNTY : JOHNSTON DIVISION : 4 DISTRICT : 3 STRUCTURE NUMBER : 500230 LENGTH : 90 FEET

ROUTE CARRIED : SR2148 FEATURE INTERSECTED : LITTLE BUFFALO CREEK

LOCATED : 0.3 MI.S. OF JCT.SR2159 BRIDGE NAME : CITY :

FUNC. CLASS : 09 SYST.ON : NFA SYST.UNDER : NFA ADT & YR : 660 2013 RAIL TYPE : LT 41 RT 41

BUILT : 1998 BY : DOH PROJ : 8.2311801 FED.AID PROJ : BRZ21481 DESIGN LOAD : HS 20 + MOD

REHAB : BY : PROJ : ALIGNMENT : TAN. SKEW : 90 LANES : ON 2 UNDER 0

NAVIGATION : VC 0 FT HC 0 FT HT. CRN. TO BED : 16 FT WATER DEPTH : 6 FT

SUPERSTRUCTURE : PPC CORED SLAB

SUBSTRUCTURE : EBTS:RC CAPS/H-PILES;BT:RC CAP&COL./DRILLED SHAFT PIERS

SPANS : 2@45.002'(13.716M)

BEAMS OR GIRDERS : 11 LINES 36" PRESTRESSED CONCRETE CORED SLAB SECTIONS

FLOOR : PPCCS/3 AWS ENCROACHMENT : DECK (OUT TO OUT) : 33 FT

CLEAR ROADWAY : 30 FT BETWEEN RAILS : 30 FT SIDEWALK OR CURB : LT 0 FT RT 0 FT

VERT.CL.OVER : 999.9 FT

INV.RTG. : HS-30 OPE.RTG. : HS-51 CONTR.MEMBER : cored slab POSTED : SV TTST DATE 12/01/1998

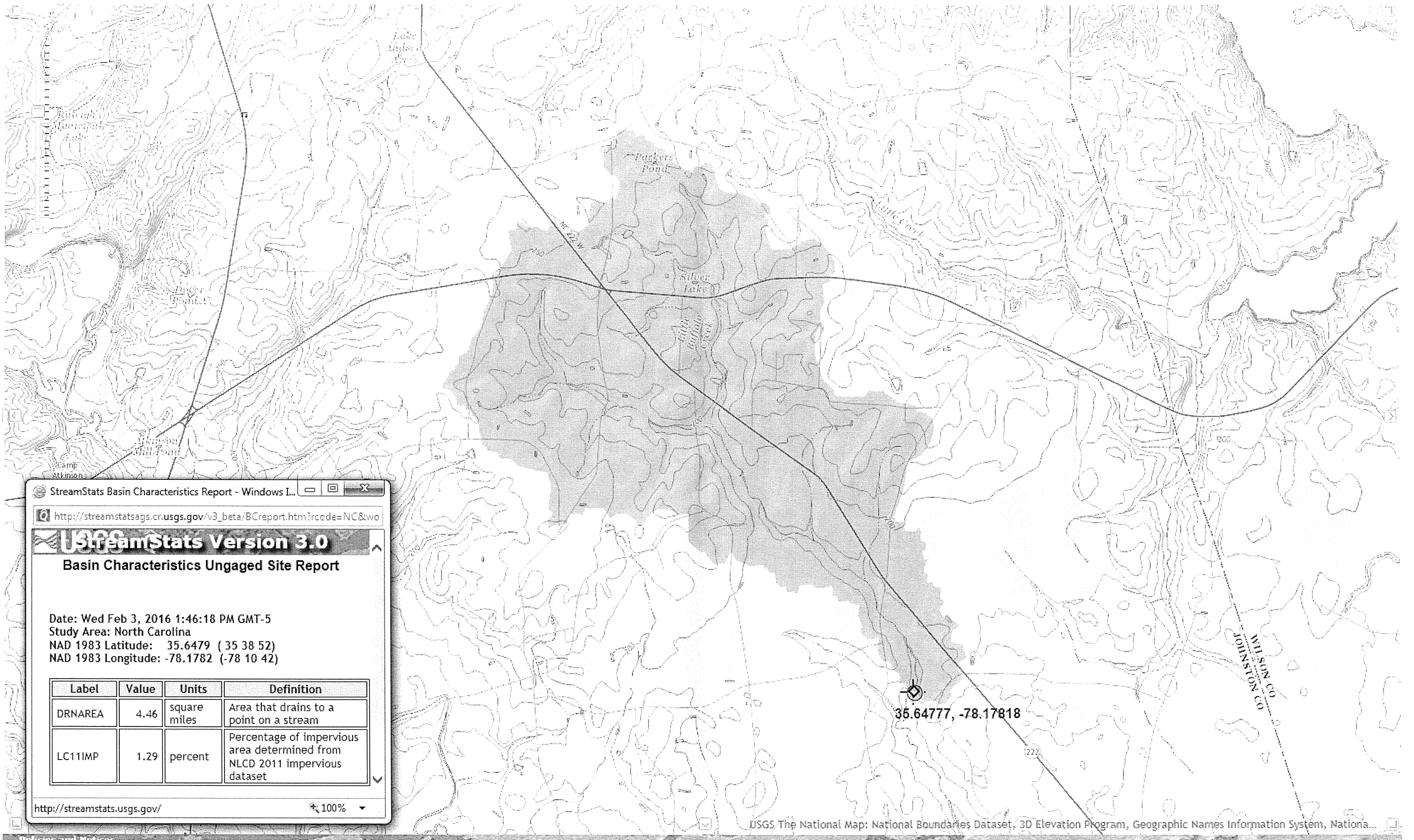
SYSTEM : Secondary S.R. Route GREEN LINE ROUTE : N

UNDER ROUTES AND CLEARANCES

DOWNSTREAM STRUCTURE

REMARKS :





StreamStats Basin Characteristics Report - Windows I...

http://streamstats.cr.usgs.gov/v3_beta/BCreport.htm?rcode=NC&wo

StreamStats Version 3.0

Basin Characteristics Ungaged Site Report

Date: Wed Feb 3, 2016 1:46:18 PM GMT-5
Study Area: North Carolina
NAD 1983 Latitude: 35.6479 (35 38 52)
NAD 1983 Longitude: -78.1782 (-78 10 42)

Label	Value	Units	Definition
DRNAREA	4.46	square miles	Area that drains to a point on a stream
LC11IMP	1.29	percent	Percentage of impervious area determined from NLCD 2011 impervious dataset

<http://streamstats.usgs.gov/> 100%



Flood Information

Click the map to view information.

Map Location

Flood Zone: A2

Flood Source: Little Buffalo Creek

Base Flood Elevation: 182.8 ft

County: Johnston

Political Area: Johnston County

CID: 370138

Panel: 2648 Download

Map Number: 3720264800J

Panel Effective Date: 12/2/2005

Latitude: 35.64777

Longitude: -78.17819

Risk Information

Financial Vulnerability

FIS Reports

Map Export

Data Export



- Flood Information
- Risk Information
- Financial Vulnerability
- FIS Reports
- Flood Risk Management Plan

Engineering Models

Click a stream to view models.

Model Information

Stream: Little Buffalo Creek

Model: Little Buffalo Creek Model

Study: Limited Detailed Study

Start: The confluence with the Little River

End: Approximately 1.3 miles upstream of Meadow Road

[Download Model](#)

- Map Export
- Data Export

298

299

300

301

302

303

304

305

Note: Stationing determined by
Speedometer from Road
junction at Old Beulah
Church

Sta 301+13
10 30' T-Beam Span on P&S Bulkheads
90° Skew, 24' Roadway

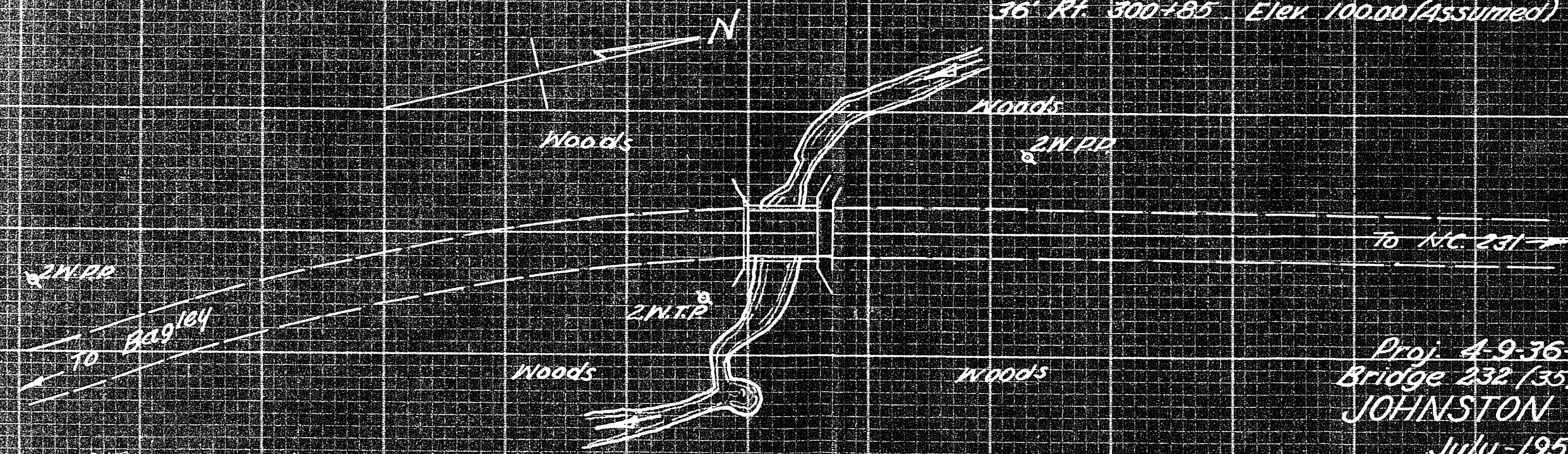
Crown Grade Elev 102.5

H.W. Elev. 101.0'

Present Bridge 232 (35)
O.A.L. 35.3' Cl. Rd. W. 172'
20 17' timber spans
on crea cut-off piles &
caps, Recently Reworked
Fair Cond.

Drain Area: 4 Sq. Mi.
Tal. C. = 0.35
Waterway Req'd: 125 Sq. Ft.

B.M. Nail in base 24" Water oak
36' Rt. 300+85 Elev. 100.00 (Assumed)



Proj. 4-9-36-200
Bridge 232 (35), Road 52
JOHNSTON CO.
July-1950
J.F.T.

UPSTREAM STRUCTURE

INFORMATION TO BE SHOWN ON PLANS

Design:	Discharge	56.6	m ³ /s	Frequency	25 YR	Elev.	47.3	m
Base Flood:	Discharge	84.9	m ³ /s	Frequency	100 YR	Elev.	47.83	m
Overtopping:	Discharge	118.80	m ³ /s	Frequency	500 YR	Elev.	48.55	m

ADDITIONAL INFORMATION AND COMPUTATIONS

Channel and Bank Stability: CHANNEL & BANKS UNDERWATER DUE TO BEAVER DAM.

Reservoirs, Water Resource Projects, Other Flood Control Projects

DISCHARGE CALCULATIONS

$Q_{25} = 709A^{.655} = 57.15 \text{ m}^3/\text{s}$

$Q_{50} = 8.86A^{.65} = 70.3 \text{ m}^3/\text{s}$

$Q_{100} = 11.03A^{.643} = 85.58 \text{ m}^3/\text{s}$

$Q_{500} = 18.01A^{.622} = 123.43 \text{ m}^3/\text{s}$

*DISCHARGES USED ROUNDED FOR WSPRO.

SCOUR COMPUTATIONS

100 YR CONTRACTION SCOUR O.T. 500 YR CONTRACTION SCOUR

$YS = 3.05 \left[\left(\frac{4.2}{62.46} \right)^{1.057} - 1 \right]$ $YS = 3.78 \left[\left(\frac{113.20}{79.15} \right)^{.857} - 1 \right]$

$YS = 0.92 \text{ m}$ $YS = 1.6 \text{ m}$

100 YR LOCAL SCOUR

$YS = 3.08 \left[2.0 \cdot 1.1 \cdot \left(\frac{0.91}{3.08} \right)^{.65} \cdot \frac{0.43}{0.46} \right]$ $FC_1 = 2.53 / 17.8 (3.08)$

$YS = 3.08 \left[2.2 (0.453) 0.72 \right]$

$YS = 2.2$

O.T. 500 YR LOCAL SCOUR

$YS = 3.32 \left[2.2 \cdot \left(\frac{0.91}{3.32} \right)^{.65} \cdot \left(\frac{3.1}{19.8 (3.32)} \right)^{.437} \right]$

$YS = 3.32 \left[2.2 (0.43) 0.77 \right]$

$YS = 2.4$

COMP. SCOUR DEPTHS ARE GREATER THAN ROD BORING REFUSAL DEPTHS.

SITE DATA

Drainage Area 24.2 Sq. Km Source PARATED SELECTED SITES Character RURAL

Stream Classification (Such as Trout, High Quality Water, etc.) GENERAL QUALITY WATERS

Data on Existing Structure 12.524, 12.527, 12.524 R.C. DECK ON STEEL I-BEAMS

Data on Structures Up and Down Stream (3 @ 12.2 m; 4 @ 9.0 m CONC. SLAB & 2 @ 9.0 m CONC. GIRDER 2150m APART, TWO BRIDGES 4550m DOWNSTREAM -) (2 @ 9m CONC. GIRDER ON WOOD PIER, 2.1 m UPSTREAM)

Design Control Elev. OVERTOPPING 48.55

Gage Station No. 0208848.327 (20) Period of Records NONE

Max. Discharge m³/s Date Frequency

Historical Flood Information:

Date SEPT. 96 Elev. 47.8 m Est. Freq. 100 YR Source LOCAL RESIDENT Period of Knowledge UNKNOWN

Date 7-18-47 Elev. 46.7 m Est. Freq. 25 YR Source BKG. REPORT 4-7-36-14 Period of Knowledge UNKNOWN

Date SEPT. 96 Elev. 48.5 m Est. Freq. 100 YR Source DIVISION 4 MAINTENANCE OFFICE Knowledge 25 YRS

Historical Scour Info.: General Contraction Local

Channel Slope 0.0015 % Source U.S.G.S. QUAD SHT. Normal Water Surface Elev. 46.4 m (KENLY WEST)

Manning's n: Left O.B. 0.1 Channel 0.04 Right O.B. 0.1 Source FIELD OBSERV.

Flood Study / Status FLOOD HAZARD ZONE; NO DETAILS Floodway Established? 1995

Flood Study 100 yr. Discharge N/A m³/s; W.S. Elev.: With Floodway N/A m Without Floodway N/A m

DESIGN DATA

Hydrological Method REGIONAL REGRESSION EQUATIONS

Hydraulic Design Method WSPRO

Floods Evaluated:	Freq.	Q	Elev.	Backwater	Bridge Opening Velocity
DESIGN =	25 YR	56.6 m ³ /s	47.3 m	0.16	1.83 m/s
	50 YR	70.8 m ³ /s	47.58 m	0.23	2.1 m/s
	100 YR	84.9 m ³ /s	47.83 m	0.30	2.3 m/s
O.T.	500 YR	118.8 m ³ /s	48.55 m	0.7	2.5 m/s

Waterway Opening Provided 45.2 m

Average Channel Velocity (Design) 1.8 m/s Average Overbank Velocity (Design) 0.91 m/s

SEE NOTE #

Computed Scour: General Contraction 0.2 / 1.6 Local 2.2 / 2.4

Is a Floodway Revision Required? NO

*NOTE: SCOUR DEPTHS REDUCED TO ROD BORING REFUSAL POINTS.

DOWNSTREAM STRUCTURE

100330 1006 82933 STA 1102 LITTLE BUFFALO CR SR 2148 WD 8231801 PDF

LITTLE BUFFALO CREEK

Stream Bridge Inv. No. 230 ID. No. B-2993

REPORT 1 of 1

BRIDGE SURVEY & HYDRAULIC DESIGN REPORT

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HYDRAULICS UNIT
RALEIGH, N. C.

VPTV

ID. No. B-2993 Project No. 8-231180-1 Proj. Station 11+02.00 - 11+02.00

County JOHNSTON Bridge Over LITTLE BUFFALO CREEK Bridge Inv. No. 230

On Highway SR 2148 Between NC 222 and SR 2110

Recommended Structure 2 @ 13.716 m 533 mm PRESTRESSED CORED SLAB

Recommended Location Is Up (A) Down Stream from Existing Crossing Skew 90°

Recommended Width of Roadway 6.6 m

Nearest Shipping Point KENLY On CSX (SEABOARD) R.R., 5.3 km From Bridge

Bench Mark Is B-2993-1 NCDOT DISK ON REBAR 0.15 m BELOW GROUND Elev. 59.254 m Datum NAVD

Temporary Crossing N/A

OUTPUT WSPRO FILE: B-2993.LST

Designed by: P.P. SHEPARD

Assisted by: R.G. YOUNG (TRAINER)

Project Engineer: M.D. MANN, P.E.

Reviewed & Approved by: Date

SEAL 21115 ENGINEER MARVIN D. MANN

172-7

