

Hydraulics Unit Pre-Design Report (Pre-Scoping) for Structure #: 770028

Date: 04/19/2017

County: Robeson Stream: Leach Creek (FEMA Leith Creek)

Road #: NC 83 Road Name: N/A

Division: 6 Location: 0.5 Mi. S of JCT SR 1101

Latitude: 34.62556 Longitude: 79.44028 Decimal degrees, a min of 5 decimal points

Assigned to: In-House

Prepared By: LDC

Hydro Reviewer:

Project Type:

Existing Structure

Structure Type: Bridge Yr Built: 1947

Span Arrangement: 1@21, 4@20, 1@21 OAL (ft): 122.0 Skew: 90 Abutment Type: Vertical -Timber

Number of Barrels: @ Span (ft): x Rise (ft):

Bed to Crown (ft): 15.0 Clear Roadway (ft): 20.0 Water Depth (ft): 8.0 Superstructure Depth: 1.7

ADT: 430 Year ADT: 2013 Scour Code (item113): 8 Prior Survey Completed: Yes Survey Date: 1947

Drainage Area: 60.3 Sq. Mi. Drainage Area Source: USGS Stream Stats Roadway Overtops at Q100:

Discharge Method: USGS Regression Equations USGS Region: 4- Coastal Stream Gage Number(if applicable):

Q10 (cfs): 2,140.0 Q25 (cfs): 2,990.0 Q50 (cfs): 3,690.0 Q100 (cfs): 4,450.0 QBFE (cfs): 3,710.0

Structure in Flood Hazard Zone Panel #: 8360 Panel Date: 01/09/2005 Type of FIS: LIMITED Date of FIS: 01/09/2005

Enviromental

Quad Map: JOHNS, NC River Basin: Lumbar Buffer Rule: N/A

Primary Stream Classification

☐ Class B ☒ Class C ☐ SA ☐ SB

☐ SC ☐ SWL ☐ WL ☐ WS I

☐ WS II ☐ WS III ☐ WS IV ☐ WS V

Supplemental Stream Classification

☐ FWS ☐ HQW ☐ NSW ☐ ORW

☒ Sw ☐ Tr ☐ UWL ☐ w/in 0.5mi. of CA

Other Stream Classification

☐ Anadromous Fish ☐ Area of Environmental Concern

☐ CAMA County ☐ Federal Wild & Scenic Rivers

☐ HSB Required ☐ NC Natural & Scenic Rivers

☐ Impaired [303d] ☐ Primary Nursery Area

☐ TVA ☐ Designated Shellfish Harvesting Area

☐ Designated Public Mountain Trout Waters

Up/Down Stream Features

Upstream Feature: Bridge

Location: 0.4 Mi. E. of JCT SR1969

Structure #: 770050 Route: SR1004

Latitude: 34.42460 Longitude: -78.49500

Prior Survey Completed: No Survey Date:

Bed to Crown (ft): 10.0 Year Built: 1959

Downstream Feature: Confluence w/ Stream(s)

Location:

Structure #: Route:

Latitude: Longitude:

Prior Survey Completed: Survey Date: Bed to Crown (ft) Year Built:

Structure Type:

Span Arrangement: 6@2 OAL (ft): 134.0

Number of Barrels: @ Span (ft): x Rise (ft):

Preliminary Structure Estimate [Office Estimate]

Structure Type: Skew:

Dimensions/Spans:

Notes

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
FIELD SCOPING MEETING WORKSHEET
Design Build Process

WBS No.: 17BP.6.R.82

Field Scoping Meeting Date: May 8, 2017

Division: 6

Location: **On-site**

Route (US/NC/SR): NC 83

County: **Robeson**

Project Description: **Bridge No. 770028 over Leith Creek on NC 83**

Tier: **Regional – Major Collector**

Funding: **State**

Municipality: **N/A**

Attendees

	Name	Phone No.	E-mail
Division Bridge Program Manager	Christy Huff	910-364-0600	chuff@ncdot.gov
Division Environmental Officer	Jim Rerko	910-364-0580	jjrerko@ncdot.gov
Resident Engineer	Mike Parker	910-618-5689	jmparkerjr@ncdot.gov
Div. 6 Construction Engineer	Randy Wise	919-364-0600	rwise@ncdot.gov
Div. 6 Locating Engineer	John Kaukola	910-486-1338	jkaukola@ncdot.gov
Div. 6 Maintenance Engineer	Ken Murphy	910-364-0600	rkmurphy@ncdot.gov
Div. 6 Bridge Engineer	Darren Pittman	910-364-0670	dpittman@ncdot.gov
Div. 6 Dist. 1 Engineer	Charles Miller, Jr	910-618-5546	csmiller@ncdot.gov
Hydraulics Engineer	Galen Cail	919-707-6711	gcail@ncdot.gov
Hydraulics Engineer	Jon Moore	919-707-6738	Jlmoore6@ncdot.gov
DENR-DWR	Joanne Steenhuis	910-796-7306	Joanne.steenhuis@ncdenr.gov
USACE	Liz Hair	910-251-4049	sarah.e.hair@usace.army.mil
PPU	Jamie Lancaster	919-707-6620	jlancaster@ncdot.gov
PPU	Pam Williams	919-707-6608	prwilliams@ncdot.gov
USFWS	Gary Jordan	919-856-4520 ext 32	gary_jordan@fws.gov
NCWRC	Travis Wilson	919-707-0370	travis.wilson@ncwildlife.org

Existing Features

Feature Bridged: **770028 over Leith Creek on NC 83**

Ex. Bridge Clear Deck Width: **29.17 (Ft.)**

Roadway width: **26 (Ft.)**

(Bridge / Culvert) Length: **122 (Ft.)**

Deck Width (Out To Out): **31.3 (Ft.)**

Water Depth: **8 (Ft.)**

Height Bed-To-Crown: **15 (Ft.)**

Year Built: **1947**

Posted: **SV Not Posted**

TTST: **Not Posted**

Superstructure: **RC Deck on I-Beams**

Abutment: **RC caps on Timber piles**

Pier Type:

Temp. Shored: **Yes**

Historic High Water (Elev. To The Existing Structure): **(Ft)**

PRI: **26.15**

DP: **3.5**

SR: **70.39**

School Bussing crossings per day:

Posted Speed Limit Vicinity: **55 (mph)**

Detour

Off-Site ☒

Stage Construction ☐

New Alignment ☐

On-site ☐

If Off-Site, Description Of Detour Route: **SR 1100 (Robeson Co)/SR 1623 (Scotland Co.) to SR1624 (Scotland Co.) to SR 1615 (Scotland Co.)/SR 1103 (Robeson County) to SR 1104 to SR 1101**

Approximate Length Of Detour?

7.2 Miles

Improvements Needed To Road(s) On Detour?

No

Div. Traffic Eng. Recommend Off-site detour signing?

Trailblazing with Street/Road names

Improvements Needed To Bridges On Detour?

No

Are future plans for upgrading this roadway either at or in the vicinity of this project?

Are Bridges On Detour Currently Programmed?

Need to check Scotland Bridge 50

Are There EMS Or Business Access Issues?

Are There Any Railroad Crossings On Detour?

No

Should Work Zone Pedestrian Access Be Maintained During Construction?

No

Overhead Utility Lines

In Conflict

Power Transmission Lines

In Conflict

Telephone

In Conflict

Cable Lines

In Conflict

Fiber Optic

In Conflict

Water

In Conflict

Sewer

In Conflict

Natural Gas

In Conflict

Other

In Conflict

Is There Any Future Utility Construction Anticipated In The Project Area:

No

Is A FEMA Buy-Out Property Being Impacted:

No

Environmental

Wetlands At Site: **Yes** Comments:

Endangered Species In County: **American Alligator, Red-cockaded woodpecker, Michaux's sumac**

T&E species effect:

Trout County: **No** TVA County: **No**

CAMA County: **No** Primary Nursery Area: **No**

Moratoria: Which species: Duration:

Permits discussion:

Water Quality Classification: **C; SW (14-33) Leith Creek (Johns Pond)** 303d: **No**

Coast Guard Permit? **No** Drainage Basin: **Lumber** Riparian Buffer Rules: **No**

Is The Project Site In Or Near Any Of The Following:

National Forest:	No	Wildlife Refuge:	No
State, County, Or Local Park:	No	Wild And Scenic River:	No
Airport:	No	Recreation or Power Generation:	No
Water Supply Reservoir:	No	Nutrient Sensitive Waters:	No
Public Use Boat Ramp:	No	Cemeteries:	No
VAD/Farmland Protection:	No	Game Lands:	

Known Or Potential Historic Properties In The Area:

Architecture: **Archaeology:**

Is The Bridge Structure Itself, Or Any Part Thereof, Considered Historic:

Impacts to a Church, Community Center, Or Other Public Facility?

Is this a Statewide Bicycle Route or a Local Non-Marked Bicycle Route: **No**

Comments:

Geotechnical

Are There Any Historical and/or Vibration Sensitive Structures Near By? -----

Comments:

Are There Any Known Landfills and/or Geo-environmental Hazard Sites at/or Within Close Proximity To The Project Site? -----

Comments:

Are Any Impacts Anticipated To Natural Springs Or Artesian Wells? -----

Comments:

Possible Foundation Type:

End Bents:

Interior Bents:

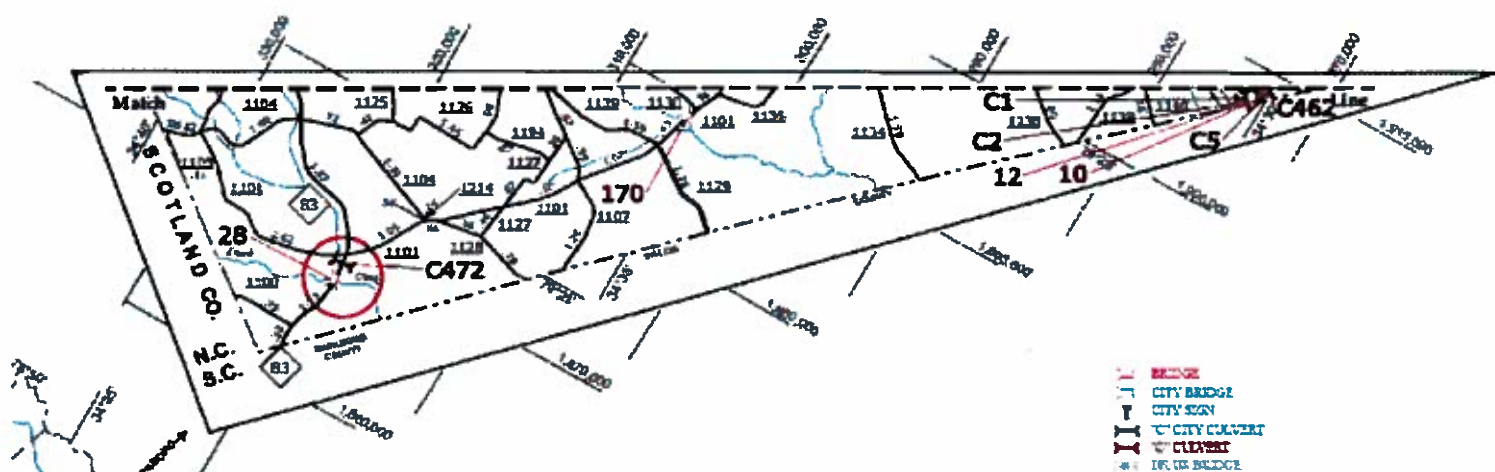
Hydraulics

FEMA Approval? (MOA) *Yes. Limited*
Is There Unusual Scour Potential? *No* Is Protection Needed? *Standard*
Are Banks Stable? *Yes* Is Protection Needed?
Appreciable Amount Of Large Debris? *Moderate*
Placement Of Bents In The Water Be Allowed: *Yes* Where: *5' from TOB*
Structure Type: **Bridge** If Bridge: **CS** or **BB** If girder, why?
Length Of Structure: *135'* Min. Number Of Spans: *3* Span Arrangement: *2@40, 1@55'*
Waive offset: *Yes, as close to 10' as possible* EB Cap: *2'-6" or 4'-0"* Skewed: *90°*
33' out to out may need to be 36' for spread # no deck drains over water

Items To Be Discussed / Resolved At FSM By Attendees

Off-Site ☒ Stage Construction ☐ New Alignment ☐ On-site ☐
Clear roadway width: Temp. Signals: Alignment: N, E, W, S
Clear roadway width: one lane w/ signals: or two lanes CRW: Alignment: N, E, W, S
Environmental Document Prepared by DBE:
Low Impact Data Spreadsheet ☐ Minimum Criteria Checklist ☐
ADT: **500 per BIR** NHS: **No** Tier: **Regional** Func. Class: **Major Collector**
Bridge Min. Clear Deck Width Recommended by Div.:
Roadway lane width: **22'** with **5'** shoulders, including _____' paved shoulders
Extension of Paved shoulders: end of **construction limits** and taper down to 2' and blunt end???
Pave to face of guardrail and taper 8:1 to travel lane/paved shoulder? **Yes**
Min. Pavement Surface Course: **3"** Existing Roadway: **20'**
Pavement Marking: **Thermoplastic or Paint** Pavement Markers: **Raised/Snowplowable/None**
Will Railroad Involvement Be Required: **No** Method of Clearing: **II modified**
Truck Percentage: **7 % per BIR** Reasonable Safe Speed per SIR: **mph**
Liquidated damages: will be imposed after _____ days of closure/construction. Amt: \$ _____ per day
CEI by? **NCDOT** R/W by? **DBT** R/W monuments? **Pin and Caps**
Salvageable materials:
Contact Person/number:
Deliver to:
Removal of previous structure remnant abutments/piers:
Sequencing priority in construction?
Comments:

Prefer no vertical curve on bridge. But may have to. - Joe Bailey Division





NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE MANAGEMENT UNIT

ATTENTION: PM ISSUED , SHORED STRUCTURE, TEMPORARY
REPAIRS, STRUCTURE DATA CHANGES

Structure Safety Report

Routine Element Inspection

COUNTY: ROBESON STRUCTURE NUMBER: 770028 FREQUENCY: 24 MONTHS

FACILITY CARRIED: NC83 MILE POST:

LOCATION: 0.5 M.I.S.JCT. SR1101

FEATURE INTERSECTED: LEACH CREEK

LATITUDE: 34° 37' 31.49" LONGITUDE: 79° 26' 24.42"

SUPERSTRUCTURE: REINFORCED CONCRETE FLOOR/CONT.I-BEAMS

SUBSTRUCTURE: E.BTS&BTS:RC CAPS/TIMBER PILES;BTS:TIM.CRUTCH

SPANS: 1@ 21";4@ 20";1@ 21"; 2 SPAN CONTINUOUS

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

PRESENT CONDITION: Poor INSPECTION DATE: 04/13/2015

POSTED SV: Not Posted POSTED TTST: Not Posted

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
R.D. HEATH

SIGNATURE

R.D. Heath

ASSISTED BY R.L. KISNER

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

Update Date: 08/27/2015

IDENTIFICATION				CLASSIFICATION		CODE
(1) STATE NAME - NORTH CAROLINA	BRIDGE	770028		SUFFICIENCY RATING =		54.33
(8) STRUCTURE NUMBER(FEDERAL)		000000001550028		STATUS =	Structurally Deficient	
(5) INVENTORY ROUTE (ON/UNDER) - ON		31000830				
(2) STATE HIGHWAY DEPARTMENT DISTRICT		1				
(3) COUNTY CODE	155	(4) PLACE CODE	0	(112)NBIS BRIDGE SYSTEM -		YES
(6) FEATURE INTERSECTED -	LEITH CREEK			(104)HIGHWAY SYSTEM	Is not on NHS	0
(7) FACILITY CARRIED	NC83			(26) FUNCTIONAL CLASS -	Major Collector	07
(9) LOCATION	0.5 MI.S.JCT. SR1101			(100)STRAHNET HIGHWAY -	Not a STRAHNET Route	0
(11)MILEPOINT		0		(101)PARALLEL STRUCTURE -	No Parallel Structure	N
(16)LAT	34° 37' 31.49"	(17)LONG	79° 28' 24.42"	(102)DIRECTION OF TRAFFIC -	2-way Traffic	2
(98)BORDER BRIDGE STATE CODE		PCT SHARE		(103)TEMPORARY STRUCTURE -		
(99)BORDER BRIDGE STRUCTURE NO				(110)DESIGNATED NATIONAL NETWORK -	On the National Network	1
				(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				CONDITION		CODE
(43) STRUCTURE TYPE MAIN:	Steel Continuous			(58) DECK		4
TYPE -	Stringer Multibeam or Girder	CODE	402	(59) SUPERSTRUCTURE		5
(44) STRUCTURE TYPE APPR :				(60) SUBSTRUCTURE		4
TYPE -		CODE	000	(61) CHANNEL & CHANNEL PROTECTION		5
(45) NUMBER OF SPANS IN MAIN UNIT			6	(62) CULVERTS		N
(46) NUMBER OF APPROACH SPANS						
(107)DECK STRUCTURE TYPE -	1	CODE		LOAD RATING AND POSTING		CODE
(108)WEARING SURFACE / PROTECTIVE SYSTEM :				(31) DESIGN LOAD	H 15	2
(A) TYPE OF WEARING SURFACE -		CODE		(63) OPERATING RATING METHOD -	Load Factor	1
(B) TYPE OF MEMBRANE -		CODE		(64) OPERATING RATING -	HS-27	48
(C) TYPE OF DECK PROTECTION -		CODE		(65) INVENTORY RATING METHOD -	Load Factor	1
				(66) INVENTORY RATING -	HS-18	28
				(70) BRIDGE POSTING -	No Posting Required	5
				(41) STRUCTURE OPEN, POSTED, OR CLOSED		A
				DESCRIPTION -	Open, No Restriction	
AGE AND SERVICE				APPRAISAL		CODE
(27) YEAR BUILT			1947	(67) STRUCTURAL EVALUATION		4
(106)YEAR RECONSTRUCTED				(68) DECK GEOMETRY		5
(42) TYPE OF SERVICE : ON -	Highway			(69) UNDERCLEARANCES,VERTI & HORIZ		N
UNDER -	Waterway	CODE	15	(71) WATERWAY ADEQUACY		7
(28) LANES: ON STRUCTURE	2	UNDER STRUCTURE	0	(72) APPROACH ROADWAY ALIGNMENT		8
(29) AVERAGE DAILY TRAFFIC			430	(36) TRAFFIC SAFETY FEATURES		0000
(30) YEAR OF ADT	2013	(109) TRUCK ADT PCT	7%	(113)SCOUR CRITICAL BRIDGES		B
(19) BYPASS OR DETOUR LENGTH			6 MI			
GEOMETRIC DATA						
(48) LENGTH OF MAXIMUM SPAN			20 FT			
(49) STRUCTURE LENGTH			122 FT			
(50)CURB OR SIDEWALK: LEFT	1.58335 FT	RIGHT	1.58335 FT			
(51) BRIDGE ROADWAY WIDTH CURB TO CURB			28 FT			
(52) DECK WIDTH OUT TO OUT			31.333 FT			
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS)			28 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			28 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			
NAVIGATION DATA				PROPOSED IMPROVEMENTS		
(38) NAVIGATION CONTROL -	No Navigational Control	CODE	0	(75) TYPE OF WORK -		CODE
(111)PIER PROTECTION -		CODE		(76) LENGTH OF STRUCTURE IMPROVEMENT		
(39) NAVIGATION VERTICAL CLEARANCE			0	(94) BRIDGE IMPROVEMENT COST		
(118)VERT - LIFT BRIDGE NAV MIN VERT CLEAR			FT	(95) ROADWAY IMPROVEMENT COST		
(40) NAVIGATION HORIZONTAL CLEARANCE			0 FT	(96) TOTAL PROJECT COST		
				(97) YEAR OF IMPROVEMENT COST ESTIMATE		
				(114)FUTURE ADT	880	(115) YEAR FUTURE ADT
						2025
				INSPECTIONS		
				(90) INSPECTION DATE		04/13/2015
				(92) CRITICAL FEATURE INSPECTION :		(93) CFI DATE
				A) FRACTURE CRIT DETAIL -	NO	A)
				B) UNDERWATER INSP -	YES 48Mo	B) 12/08/2011
				C) OTHER SPECIAL INSP	NO	C)
				SCOUR		

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Update Date: 08/27/2015

COUNTY : ROBESON DIVISION : 6 DISTRICT : 1 STRUCTURE NUMBER : 770028 LENGTH : 122 FEET

ROUTE CARRIED : NC83 FEATURE INTERSECTED : LEITH CREEK

LOCATED : 0.5 MI.S.JCT. SR1101 BRIDGE NAME : CITY :

FUNC. CLASS : 07 SYST.ON : FA SYST.UNDER : NFA ADT & YR : 430 2013 RAIL TYPE : LT 111 RT 111

BUILT : 1947 BY : SHPWC PROJ : 3976 FED.AID PROJ : 3-237(1) DESIGN LOAD : H 15

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

NAVIGATION : VC 0 FT HC 0 FT HT. CRN. TO BED : 15 FT WATER DEPTH : 8 FT

SUPERSTRUCTURE : REINFORCED CONCRETE DECK ON I-BEAMS (CONTINUOUS)

SUBSTRUCTURE : END & INT. BENTS:RC CAPS ON TIMBER PILES, INT. BENTS WITH TIMBER & STEEL CRUTCHES

SPANS : 1@21'0", 1@20'0" CONTINUOUS, 2@20'0" CONTINUOUS, 1@20'0", 1@21'0" CONTINUOUS

BEAMS OR GIRDERS : 7 LINES OF W14X34 I-BEAMS (CONTINUOUS) @ 4'4" CENTERS

FLOOR : 6" RC, NO AWS ENCROACHMENT : DECK (OUT TO OUT) : 31.333 FT

CLEAR ROADWAY : 26 FT BETWEEN RAILS : 29.1667 FT SIDEWALK OR CURB : LT 1.58335 FT RT 1.58335 FT

VERT.CL.OVER : 999.9 FT

INV.RTG. : HS-16 OPE.RTG. : HS-27 CONTR.MEMBER : cont beam POSTED : SV TTST DATE 10/29/2008

SYSTEM : Primary N.C. Route GREEN LINE ROUTE : N

UNDER ROUTES AND CLEARANCES

REMARKS :

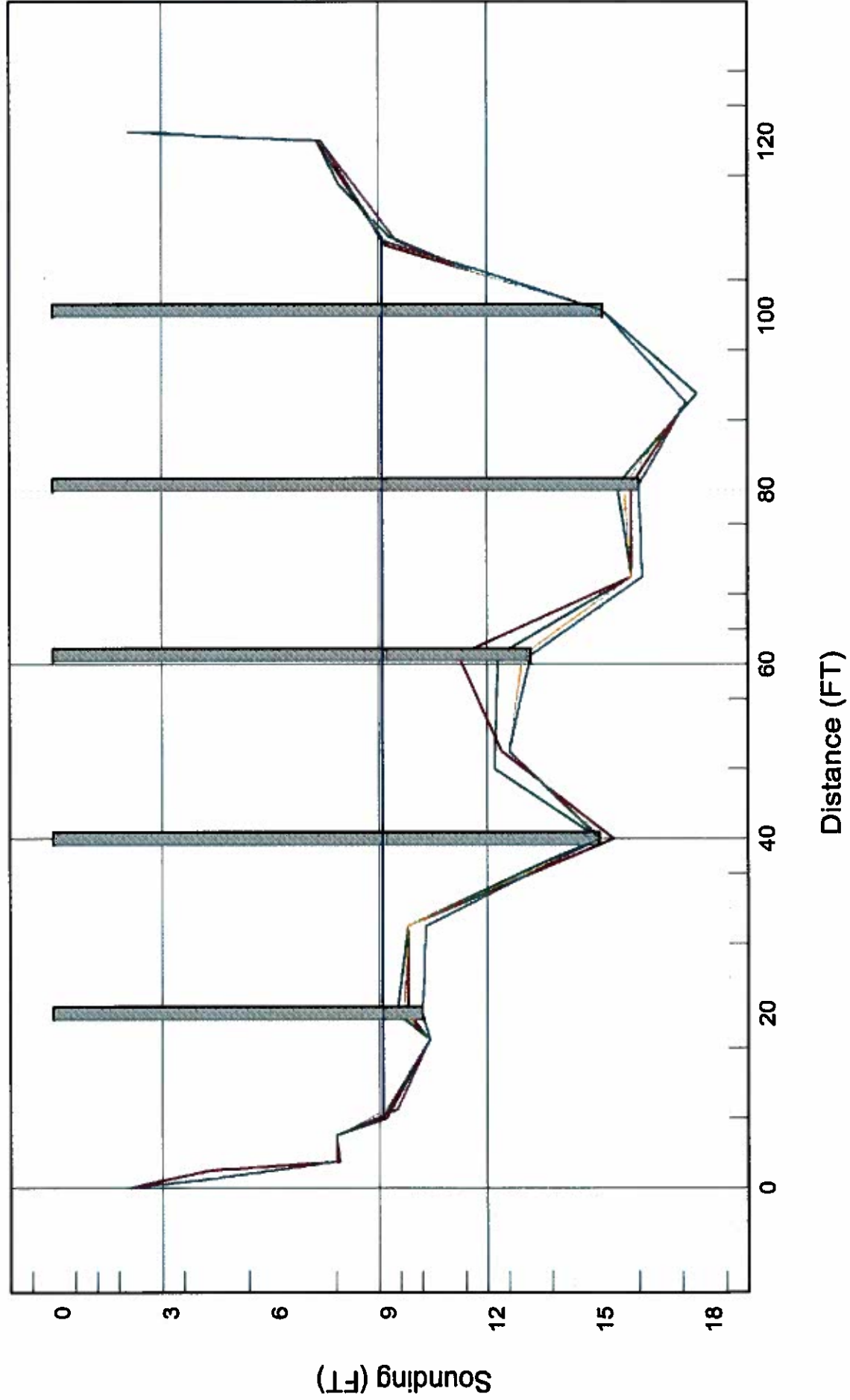
Bridge: 770028

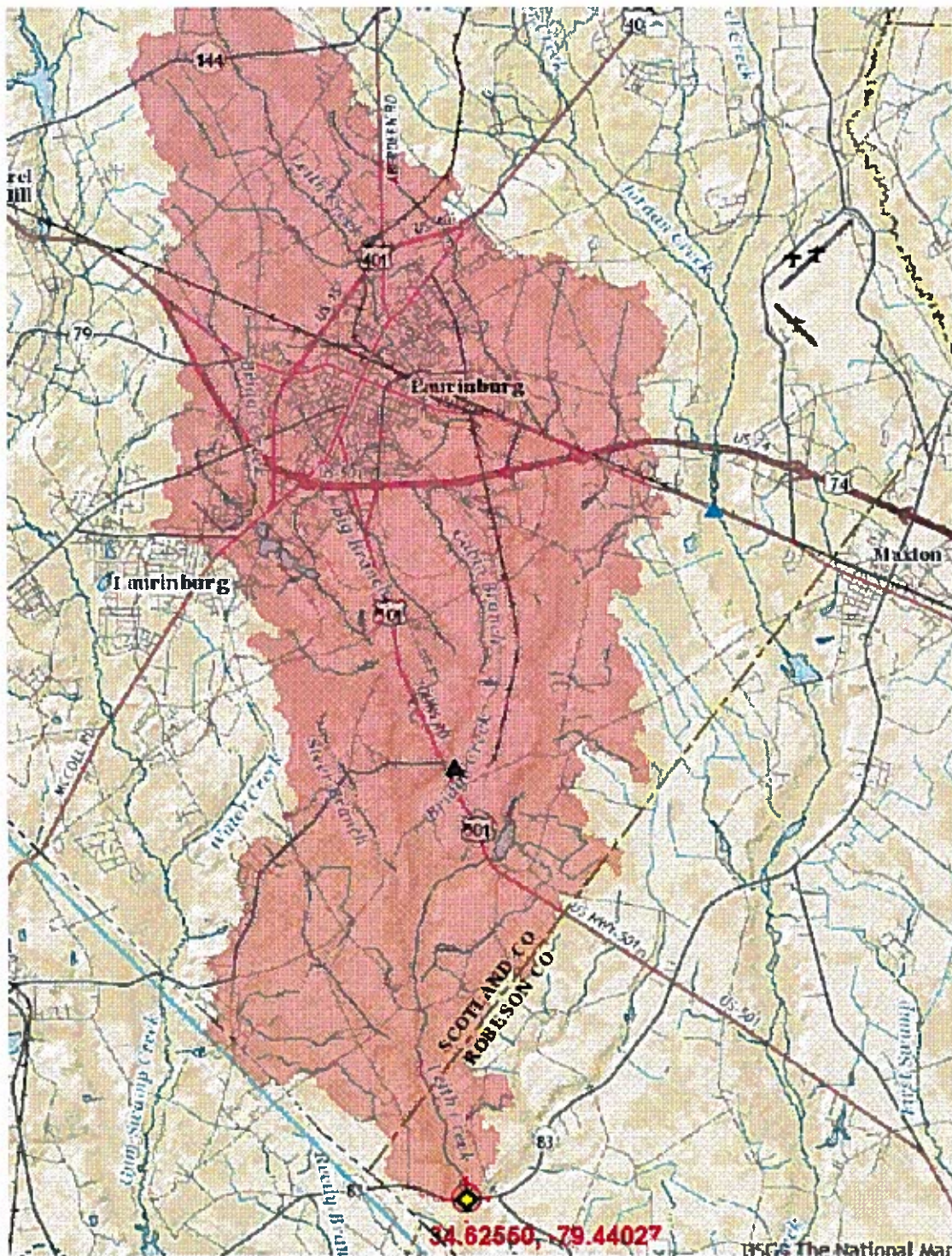
County ROBESON

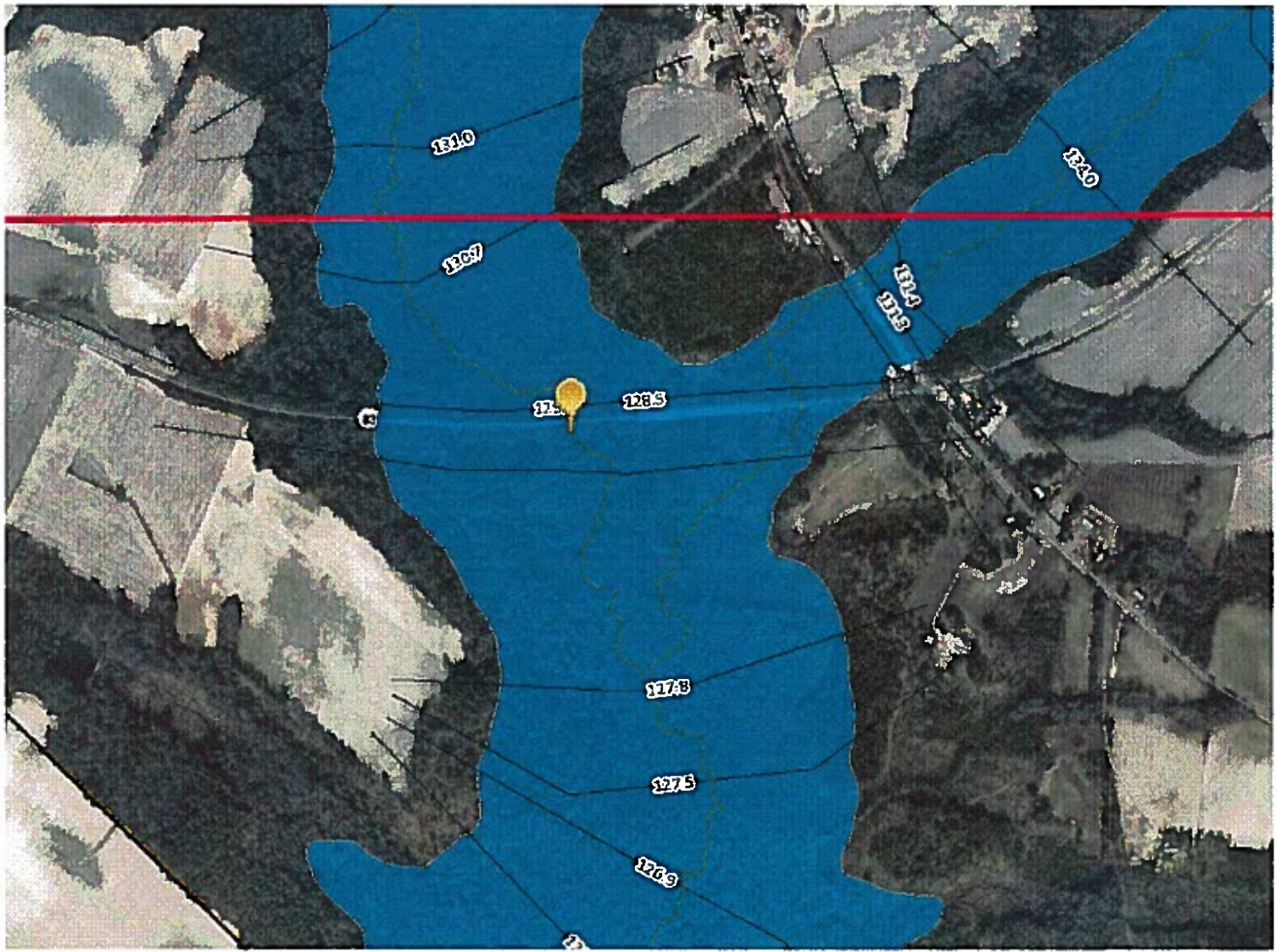
Date:

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)







StreamStats Version 3.0

Flow Statistics Ungaged Site Report

Date: Thurs Apr 20, 2017 2:44:09 PM GMT-4

Study Area: North Carolina

NAD 1983 Latitude: 34.6253 (34 37 31)

NAD 1983 Longitude: -79.44 (-79 26 24)

Drainage Area: 60.3 mi²

Peak Flows Region Grid Basin Characteristics			
100% Peak Southeast US over 1 sqmi 2009 5158 (60.3 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	60.3	1	9000
Percent Area in Region 1 (percent)	0.000	0	100
Percent Area in Region 2 (percent)	0.000	0	100
Percent Area in Region 3 (percent)	0.000	0	100
Percent Area in Region 4 (percent)	100.000	0	100
Percent Area in Region 5 (percent)	0.000	0	100

Urban Flows Region Grid Basin Characteristics			
Area in square miles=60.3			
Percent imperviousness of basin area 2006 NLCD=4.02			
100% Region 4 Urban 2014 5030 (60.3 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	60.3 (above max value 53.5)	0.1	53.5
Percent Impervious NLCD2006 (percent)	4.02	0.02	34.8
24 Hour 50 Year Precipitation (inches)	7.6	6.51	10.9

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Peak Flows Region Grid Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2	862	ft ³ /s	35		497	1500
PK5	1610	ft ³ /s	34		934	2770
PK10	2180	ft ³ /s	35		1240	3820
PK25	2940	ft ³ /s	38		1620	5340
PK50	3620	ft ³ /s	40		1930	6770
PK100	4340	ft ³ /s	42		2240	8400
PK200	5000	ft ³ /s	44		2490	10000
PK500	6000	ft ³ /s	48		2850	12600

<http://pubs.usgs.gov/sir/2009/5158/> (<http://pubs.usgs.gov/sir/2009/5158/>)

Weaver, J.C., Feaster, T.D., and Gotvald, A.J., 2009, Magnitude and frequency of rural floods in the Southeastern United States through 2006—Volume 2, North Carolina: U.S. Geological Survey Scientific Investigations Report 2009-5158, 111 p.

Urban Flows Region Grid Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2U	856	ft ³ /s				
PK5U	1560	ft ³ /s				
PK10U	2140	ft ³ /s				
PK25U	2990	ft ³ /s				
PK50U	3690	ft ³ /s				
PK100U	4450	ft ³ /s				
PK200U	5310	ft ³ /s				
PK500U	6500	ft ³ /s				

<http://pubs.usgs.gov/sir/2014/5030/> (<http://pubs.usgs.gov/sir/2014/5030/>)

Feaster, T.D., Gotvald, A.J., and Weaver, J.C., 2014, Methods for estimating the magnitude and frequency of floods for urban and small rural streams in Georgia, South Carolina, and North Carolina, 2011 (ver. 1.1, March 2014): U.S. Geological Survey Scientific Investigations Report 2014-5030, 104 p.

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U.S. Department of the Interior | U.S. Geological Survey

URL: http://streamstatsags.cr.usgs.gov/v3_beta/FTreport.htm

Page Contact Information: StreamStats Help

Page Last Modified: 08/09/2016 14:34:10 (Web1)

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[News](#)



A summary of the drainage area-peak discharge relationships for the flooding sources studied by detailed methods is shown in Table 13, Summary of Discharges.

Table 13 - Summary of Discharges

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Bull Branch					
At the confluence with Leith Creek	9.98	*	*	716	*
Leith Creek					
At the confluence with Bull Branch	60.81	*	*	3710	*

BRIDGE DEPARTMENT
N.C. STATE HIGHWAY & PUBLIC WORKS COMMISSION

RALEIGH, N. C.

BRIDGE SURVEY REPORT

PROJECT NO. 3374 ROBLESON COUNTY 11th STA. 54+50
BRIDGE OVER LELAND CREEK Span 20
On Route No. 92 Maxton and Clio, S.C.
Recommended Structure 16' x 16' arch
Recommended Width of Roadway 16' x 16' arch
Additional Information

Temporary Crossing 16' x 16' arch
Present Structure 16' x 16' arch
New Crossing 16' x 16' arch
Structure to be replaced 16' x 16' arch
Structure from Existing Point to Bridge Site 16' x 16' arch
Structure from A.M. to Existing Point 16' x 16' arch

USE THIS SPACE FOR PHOTOGRAPH
OF PROPOSED SITE, SHOWING EXIS-
TING LINE, DIRECTION OF FLOW,
AND OTHER IMPORTANT POINTS ON
PHOTOGRAPH.

Designed by Max Collins Audited by J. B. S. A. H.

Design Area 3374, 9th Sta. Observed from 2nd Map
Character of Drainage Area Level 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 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