

PREDESIGN/PRESURVEY REPORT

County: Rowan

Project No.:

TIP No.:

Let Date:

WBS No.: 17BP.9.R.38

Bridge No.: 790149

Road No.: SR2132 (Union Church Rd)

Stream: North Prong of Church

Type of Request:

Date: 7/1/2013

Name:

Assigned to: EMT

Checked by:

Prior Survey Date (attach copy of prior survey):

Study by Scour Section:

Flood Zone: A

Detail Study: LDS

Date: 06/16/09

Panel No.: 5688

BM Info:

Quad Map: Salisbury Rockwell

Drainage Area: 2.12 sq.mi

From: Quad/Stream Stats

Q25: 850cfs

Q50: 1000cfs

Q100: 1200cfs

Method: USGS Rural Regression: Region 1

EXISTING BRIDGE INFORMATION

Location: 0.2 Miles North of JCT SR1004

Average Daily Traffic: 2010 - 650

Length: 61'

Bed-to-Crown: 13'

Water Depth: 1'

Type of Structure: Steel Plank Deck on I-Beams; End/Int Bts: Tim Caps&Piles, BT. Piles Conc. Enc, Tim Bulkheads

Type of Span(s): 1@17'10 , 1@25'0 , 1@18'4

Upstream Structure: N/A

Location:

Bed-to-Crown:

Prior Survey:

Downstream Structure: N/A

Location:

Bed-to-Crown:

Prior Survey:

SCS Watershed:

ENVIRONMENTAL

Trout Stream: No

Anadromous Fish: No

Primary Nursery Area: No

High Quality Waters: No

Nutrient Sensitive Waters: No

Near Water Supply Intake:

CAMA County: No

Stream Classification:

Notes: None

DENR River Basin Info: Yadkin/Pee-Dee

MAINTENANCE COORDINATION

Bridge Maintenance – Contact Superintendent and Supervisor.

High Water:

Relocation:New Alignment Staked:BM Information:

Road Maintenance – Contact District Engineer and County Maintenance Engineer.

High Water:

Road to be Paved:Relocation of Vicinity of Bridge:

New Alignment Staked:BM Information:

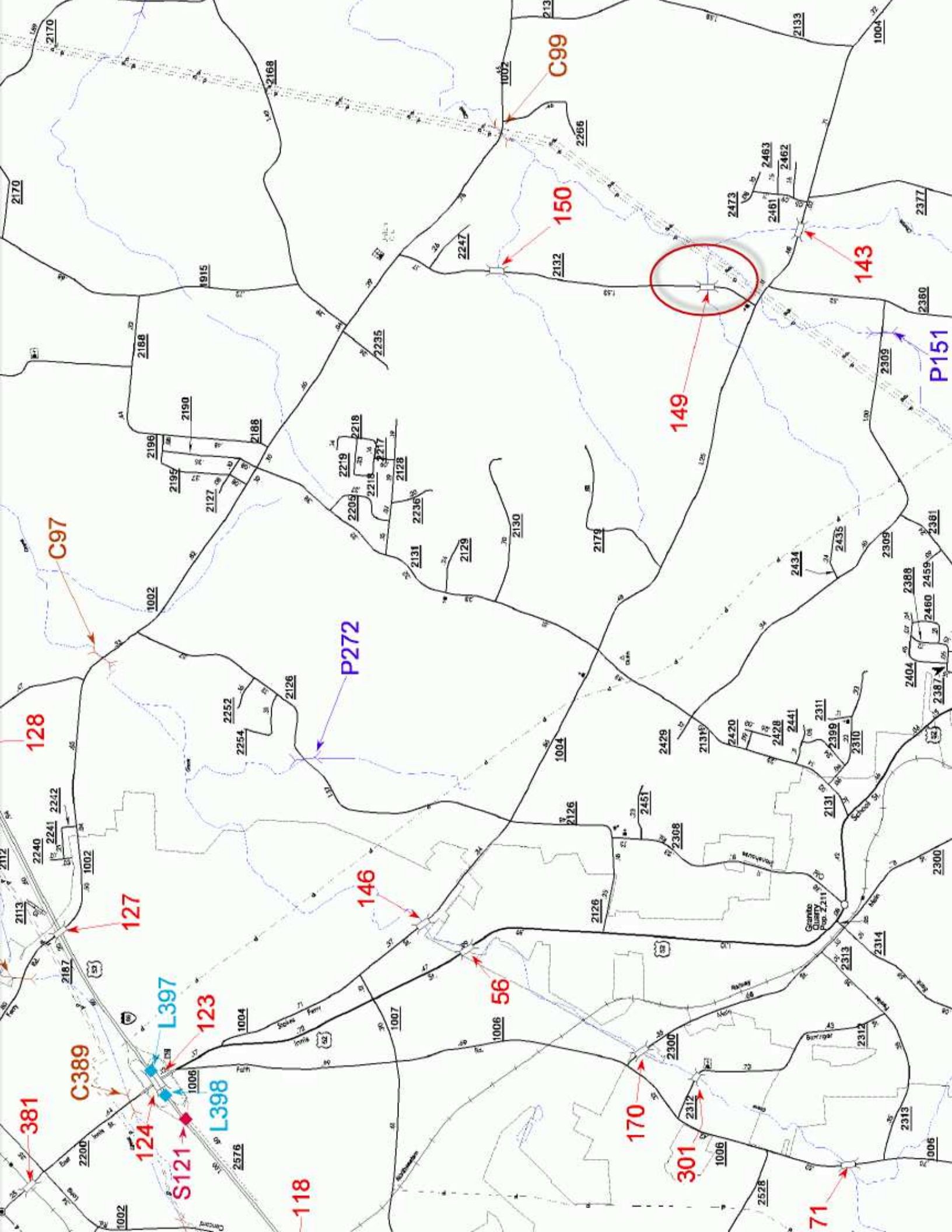
Initiated as:Date Initiated:

Man-days Estimated:

Date Surveyed:Date Completed:

PersonnelHoursPay Period

Comments:





NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION

TEMPORARY REPAIRS.

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY ROWAN BRIDGE NUMBER 790149 INSPECTION CYCLE 2 YRS
SR2132 UNION CH. RD.
ROUTE SR2132 ACROSS N.PRONG OF CHURCH M.P. 0

LOCATION 0.2 MI. N. JCT. SR1004

SUPERSTRUCTURE STEEL PLANK DECK ON I-BEAMS

SUBSTRUCTURE END&INTBTS:TIMBER CAPS&PILES,BT.PILES CONC.ENC,TIM.BULKHEADS

SPANS 1@17'10 ,1@25'0 ,1@18'4

LONGITUDE 80° 23' 45.35"

LATITUDE 35° 37' 21.43"

PRESENT CONDITION FAIR

INVENTORY RATING

INSPECTION DATE 06/18/2012

OPERATING RATING

PRESENT POSTING SV 19 TTST 28 SV 19 TTST 28

PROPOSED POSTING

COMPUTER UPDATE

ANALYSIS DATE

POSTING LETTER DATE

SUFFICIENCY RATING

OTHER SIGNS PRESENT 4 DELINEATORS



LOOKING NORTH

SIGN NOTICE ISSUED FOR		NUMBERED REQUIRED
<u>No</u>	WEIGHT LIMIT	<u></u>
<u>No</u>	DELINEATORS	<u></u>
<u>No</u>	NARROW BRIDGE	<u></u>
<u>No</u>	ONE LANE BRIDGE	<u></u>
<u>No</u>	LOW CLEARANCE	<u></u>

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

Run Date: 07/24/2012

IDENTIFICATION				CLASSIFICATION			
(1) STATE NAME -NORTH CAROLINA	BRIDGE	790149		SUFFICIENCY RATING =		28.41	
(8) STRUCTURE NUMBER(FEDERAL)		000000001590149		STATUS =	Functionally Obsolete		
(5) INVENTORY ROUTE (ON/UNDER) - ON		31021320					
(2) STATE HIGHWAY DEPARTMENT DISTRICT		1					
(3) COUNTY CODE	159	(4) PLACE CODE	0	(112)NBIS BRIDGE SYSTEM -		YES	
(6) FEATURE INTERSECTED -	N.PRONG OF CHURCH			(104)HIGHWAY SYSTEM	Is not on NHS	0	
(7) FACILITY CARRIED	SR2132			(26) FUNCTIONAL CLASS -	Local	09	
(9) LOCATION	0.2 MI. N. JCT. SR1004			(100)STRAHNET HIGHWAY -	Not a STRAHNET Route	0	
(11)MILEPOINT		0		(101)PARALLEL STRUCTURE -	No Parallel Structure	N	
(16)LAT	35° 37' 21.43"	(17)LONG	80° 23' 45.35"	(102)DIRECTION OF TRAFFIC -	2-way Traffic	2	
(98)BORDER BRIDGE STATE CODE		PCT SHARE		(103)TEMPORARY STRUCTURE -	Temporary Structure/Conditions	T	
(99)BORDER BRIDGE STRUCTURE NO				(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				CONDITION			
(43) STRUCTURE TYPE MAIN:	Steel			(58) DECK		7	
TYPE -	Stringer Multibeam or Girder	CODE	302	(59) SUPERSTRUCTURE		7	
(44) STRUCTURE TYPE APPR :				(60) SUBSTRUCTURE		5	
TYPE -		CODE	000	(61) CHANNEL & CHANNEL PROTECTION		7	
(45) NUMBER OF SPANS IN MAIN UNIT			3	(62) CULVERTS		N	
(46) NUMBER OF APPROACH SPANS							
(107)DECK STRUCTURE TYPE -	6	CODE		LOAD RATING AND POSTING			
(108)WEARING SURFACE / PROTECTIVE SYSTEM :				(31) DESIGN LOAD	Unknown	0	
(A) TYPE OF WEARING SURFACE -		CODE		(63) OPERATING RATING METHOD -	Load Factor		
(B) TYPE OF MEMBRANE -		CODE		(64) OPERATING RATING -	HS-1	101	
(C) TYPE OF DECK PROTECTION -		CODE		(65) INVENTORY RATING METHOD -	Load Factor		
				(66) INVENTORY RATING -	HS-1	101	
				(70) BRIDGE POSTING -	Posting Required	1	
				(41) STRUCTURE OPEN, POSTED, OR CLOSED		P	
				DESCRIPTION -	Posted for Load		
AGE AND SERVICE				APPRAISAL			
(27) YEAR BUILT			1974	(67) STRUCTURAL EVALUATION		4	
(106)YEAR RECONSTRUCTED				(68) DECK GEOMETRY		4	
(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		(72) APPROACH ROADWAY ALIGNMENT		7	
(29) AVERAGE DAILY TRAFFIC			650	(36) TRAFFIC SAFETY FEATURES		0000	
(30) YEAR OF ADT	2010	(109) TRUCK ADT PCT	6%	(113)SCOUR CRITICAL BRIDGES		U	
(19) BYPASS OR DETOUR LENGTH			2 MI				
GEOMETRIC DATA				PROPOSED IMPROVEMENTS			
(48) LENGTH OF MAXIMUM SPAN			25 FT	(75) TYPE OF WORK -		CODE	
(49) STRUCTURE LENGTH			61 FT	(76) LENGTH OF STRUCTURE IMPROVEMENT			
(50)CURB OR SIDEWALK: LEFT	.3 FT	RIGHT	.3 FT	(94) BRIDGE IMPROVEMENT COST			
(51) BRIDGE ROADWAY WIDTH CURB TO CURB			24 FT	(95) ROADWAY IMPROVEMENT COST			
(52) DECK WIDTH OUT TO OUT			24.1 FT	(96) TOTAL PROJECT COST			
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS)			18 FT	(97) YEAR OF IMPROVEMENT COST ESTIMATE			
(33) BRIDGE MEDIAN -	No Median	CODE	0	(114)FUTURE ADT	1520	(115) YEAR FUTURE ADT	2025
(34) SKEW	0°	(35) STRUCTURE FLARED	0				
(10) INVENTORY ROUTE MIN VERT CLEAR			999.9 FT	INSPECTIONS			
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR			24 FT	(90) INSPECTION DATE		06/18/2012	
(53) MIN VERT CLEAR OVER BRIDGE RDWY			999.9 FT	(92) CRITICAL FEATURE INSPECTION :		(93) CFI DATE	
(54) MIN VERT UNDERCLEAR REF	Not a Highway or Railroad		0 FT	A) FRACTURE CRIT DETAIL -	NO	A)	
(55) MIN LAT UNDERCLEAR RT REF	Not a Highway or Railroad		000 FT	B) UNDERWATER INSP -	NO	B)	
(56) MIN LAT UNDERCLEAR LT REF -			000 FT	C) OTHER SPECIAL INSP	NO	C)	
				SCOUR			
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				

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 07/24/2012

COUNTY :	DIVISION :	DISTRICT :	STRUCTURE NUMBER :	LENGTH :	
ROWAN	9	1	790149	61	FEET

ROUTE CARRIED :	FEATURE INTERSECTED :
SR2132	N.PRONG OF CHURCH

LOCATED :	BRIDGE NAME :	CITY :
0.2 MI. N. JCT. SR1004		

FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
09	NFA	NFA	650 2010	LT 233 RT 233

BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
1974	BMU	6.632168		Unknown

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

NAVIGATION :	HT. CRN. TO BED :	WATER DEPTH :
VC 0 FT HC 0 FT	13 FT	1 FT

SUPERSTRUCTURE :	STEEL PLANK DECK ON I-BEAMS
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SUBSTRUCTURE :	END&INTBTS:TIMBER CAPS&PILES,BT.PILES CONC.ENC,TIM.BULKHEADS
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SPANS :	1@17'10 ,1@25'0 ,1@18'4
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BEAMS OR GIRDERS :	13 LINES OF W12X27 I-BEAMS @ 1'11 CENTERS
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FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) :
STL.DK,4 "AWS		24.1 FT

CLEAR ROADWAY :	BETWEEN RAILS :	SIDEWALK OR CURB :
24 FT	24.5 FT	LT .3 FT RT .3 FT

VERT.CL.OVER :
999.9 FT

INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :	TTST	DATE
HS-1	HS-1	IntBeam.1	SV 19	28	11/05/2008

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

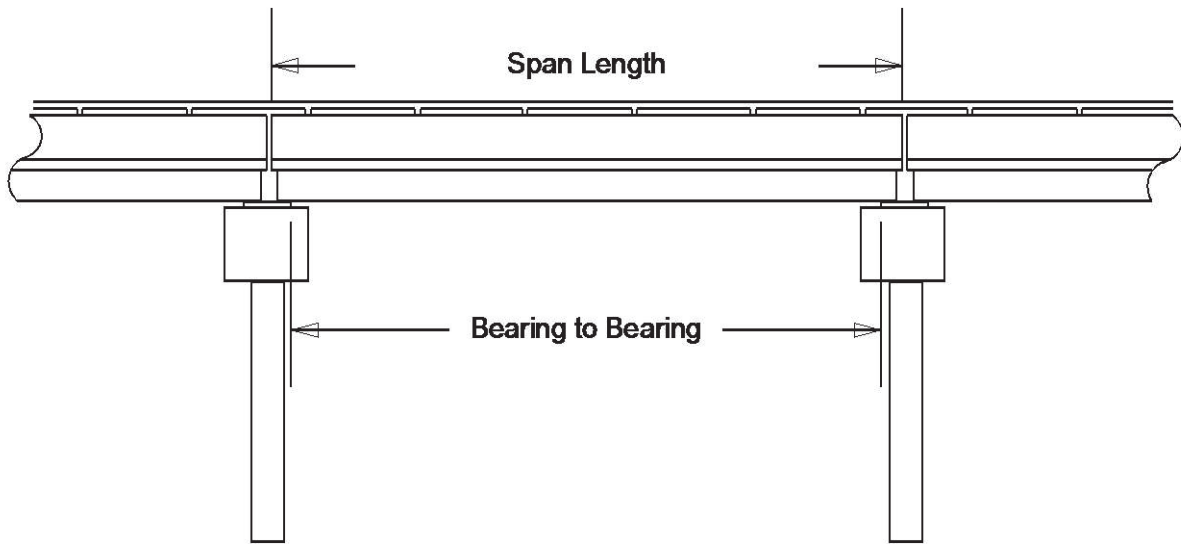
UNDER ROUTES AND CLEARANCES

REMARKS :

Structure Data Worksheet

Spans

County: ROWAN Structure No: 790149 Date: 06/18/2012 Inspected By: TFM



Span No	Span Length	Bearing to Bearing	Comments
1	17.833	17.333	NBIS BL 59.167
2	25.0	24.667	
3	18.333	17.667	

Stream Bed Soundings

(See next sheet for profile sketch)

Bridge No: 790149 County: ROWAN Date: 06/18/2012 By: TFM

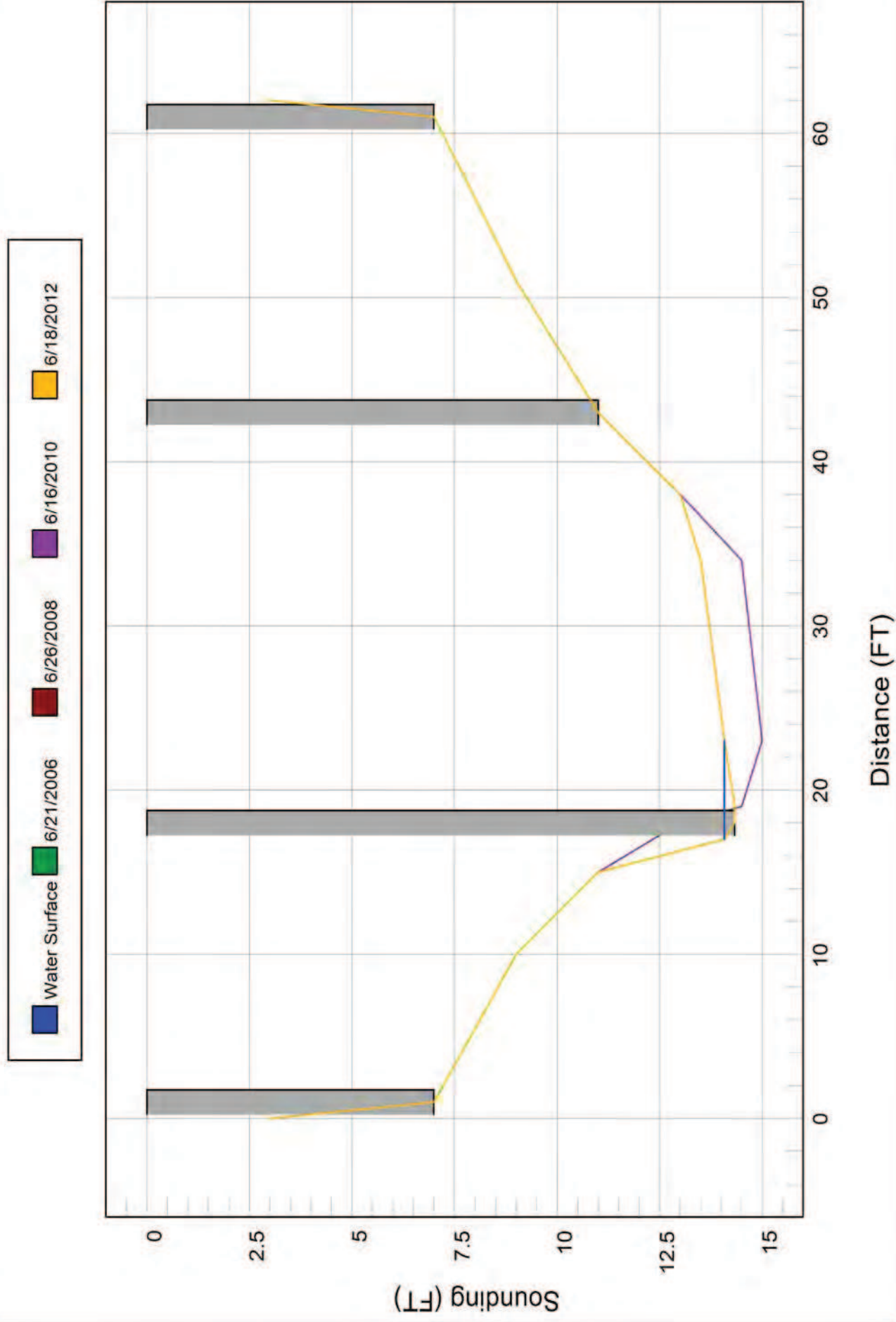
Record sounding from top of rail. Other location if needed: _____

Distance from Highwater Mark to top of rail: _____ Location of Highwater Mark: _____

DOWNSTREAM			UPSTREAM		
Distance (Station) (ft)	Sounding (ft)	Description	Distance (Station) (ft)	Sounding (ft)	Description
0	3				
1	7	END BENT 1	1	6	END BENT 1
10	9				
15	11				
17	14.08	Water Surface/Water Edge (WSWE)			
18	14.33	PIER 1	18	12	PIER 1
19	14.33				
23	14.08	Water Surface/Water Edge (WSWE)			
34	13.5				
38	13				
43	11	PIER 2	43	13	PIER 2
51	9				
61	7	END BENT 2	61	7	END BENT 2
62	3				

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



Bridge Inspection Field Sketch



Roadway	18ft Wide	2 Paved Lanes	Looking North
Left Shoulder	6ft Wide		6ft Unpaved
Right Shoulder	6ft Wide		6ft Unpaved

MEASUREMENTS VERIFIED BY DH 6/18/2012

Title

APPROACH ROADWAY SKETCH

Description

APPROACH ROADWAY SKETCH

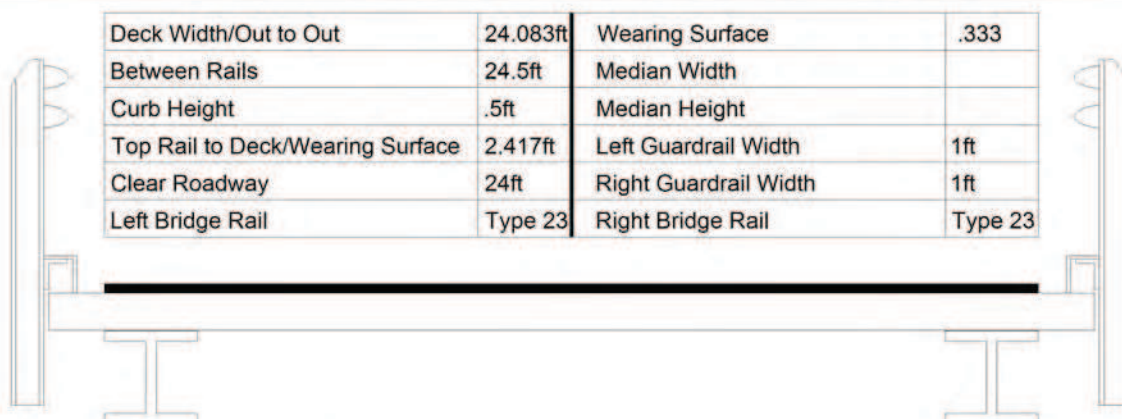
Bridge No: 790149

Drawn By: GDP

Date: 06/26/08

File Name: S0066001396

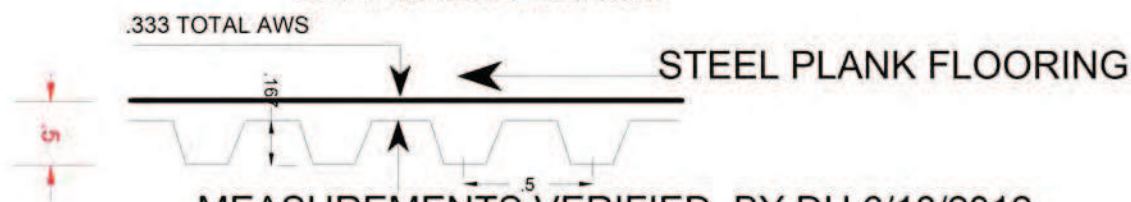
Bridge Inspection Field Sketch



Measurements for Span #	1		
Deck Thickness	.123	Left Overhang	.542
Top of Rail to Bottom of Beam	3.917	Right Overhang	.542

Beam No	Beam Type	Spacing	Comments
1	Steel I Beam	1.917ft	OTHER SPANS SIMILAR
2	Steel I Beam	1.917ft	
3	Steel I Beam	1.917ft	
4	Steel I Beam	1.917ft	
5	Steel I Beam	1.917ft	
6	Steel I Beam	1.917ft	
7	Steel I Beam	1.917ft	
8	Steel I Beam	1.917ft	
9	Steel I Beam	1.917ft	
10	Steel I Beam	1.917ft	
11	Steel I Beam	1.917ft	
12	Steel I Beam	1.917ft	
13	Steel I Beam		

BEAMS: SPAN "A" - 1ft HIGH X .333ft WIDE X .02ft FLANGE & WEB
 SPAN "B" - 1ft HIGH X .542ft WIDE X .031ft FLANGE & WEB
 SPAN "C" - 1ft HIGH X .417ft WIDE X .031ft FLANGE & WEB WITH
 TAPPERED FLANGE



Title		Description	
STRUCTURE DATA SKETCH		STRUCTURE DATA SKETCH	
Bridge No:	790149	Drawn By:	GDP
Date:	06/26/08	File Name:	S0066001397

Bridge Inspection Field Sketch



Cap Information			Material Timber							
Length	Width	Height	Left Overhang	Right Overhang	Left Beam to End of Cap.	Right Beam to End of Cap.				
24 ft.	1.01 ft.	.99 ft.	1.583 ft.	1.5 ft.	.5 ft.	.5 ft.				
Subcap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Pile to Splice.					
Sill Information			Material							
Length	Width	Height	MEASUREMENTS VERIFIED BY DH 6/18/2012							
Pile #	Material	Spacing	Width/Dia.	Height	Length	Orientation	Driven?	Replacement?	Removed?	Collar?
1	Timber	5.23 ft.	1 ft.				No	No	No	No
2	Timber	5.23 ft.	1 ft.				No	No	No	No
3	Timber	5.23 ft.	1 ft.				No	No	No	No
4	Timber	5.23 ft.	1 ft.				No	No	No	No
5	Timber		1 ft.				No	No	No	No
Bent/Abutment #: 1			Similar Bents:							

Title

PILE DIAGRAM END BENT # 1

Description

PILE DIAGRAM END BENT # 1

Bridge No: 790149

Drawn By: GDP

Date: 06/26/08

File Name: S0066001398

Bridge Inspection Field Sketch



Cap Information			Material Timber							
Length	Width	Height	Left Overhang	Right Overhang	Left Beam to End of Cap.	Right Beam to End of Cap.				
24 ft.	1.01 ft.	.99 ft.	1.417 ft.	1.417 ft.	.5 ft.	.5 ft.				
Subcap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Pile to Splice.					
Sill Information			Material							
Length	Width	Height	MEASUREMENTS VERIFIED BY DH 6/18/2012							
Pile #	Material	Spacing	Width/Dia.	Height	Length	Orientation	Driven?	Replacement?	Removed?	Collar?
1	Timber	5.291 ft.	1 ft.			Vertical	No	No	No	No
2	Timber	5.291 ft.	1 ft.			Vertical	No	No	No	No
3	Timber	5.291 ft.	1 ft.			Vertical	No	No	No	No
4	Timber	5.291 ft.	1 ft.			Vertical	No	No	No	No
5	Timber		1 ft.			Vertical	No	No	No	No
Bent/Abutment #: 1			Similar Bents:							

Title		Description	
PILE DIAGRAM PIER # 1		PILE DIAGRAM PIER # 1	
Bridge No: 790149	Drawn By: GDP	Date: 06/26/08	File Name: S0066001399

Bridge Inspection Field Sketch

Cap Information			Material Timber							
Length	Width	Height	Left Overhang	Right Overhang	Left Beam to End of Cap.	Right Beam to End of Cap.				
24.000 ft.	1.010 ft.	.990 ft.	1.667 ft.	1.500 ft.	.500 ft.	.500 ft.				
Subcap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Pile to Splice.					
Sill Information			Material							
Length	Width	Height	MEASUREMENTS VERIFIED BY DH 6/18/2012							
Pile #	Material	Spacing	Width/Dia.	Height	Length	Orientation	Driven?	Replacement?	Removed?	Collar?
1	Timber		1 ft.	0 ft.		Vertical	No	No	No	No
2	Timber	5.208 ft.	1 ft.	0 ft.		Vertical	No	No	No	No
3	Timber	5.208 ft.	1 ft.	0 ft.		Vertical	No	No	No	No
4	Timber	5.208 ft.	1 ft.	0 ft.		Vertical	No	No	No	No
5	Timber	1 ft.	1 ft.			Vertical	No	No	No	No
6	Timber	4.208 ft.	1 ft.			Vertical	No	No	No	No
Bent/Abutment #: 2 Similar Bents:										

Title		Description	
PILE DIAGRAM PIER # 2		PILE DIAGRAM PIER # 2	
Bridge No: 790149	Drawn By: GDP	Date: 06/26/08	File Name: S0066001400

Bridge Inspection Field Sketch



Cap Information			Material Timber							
Length	Width	Height	Left Overhang	Right Overhang	Left Beam to End of Cap.	Right Beam to End of Cap.				
24 ft.	1.01 ft.	.99 ft.	1.625 ft.	1.167 ft.	.5 ft.	.5 ft.				
Subcap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Pile to Splice.					
Sill Information			Material							
Length	Width	Height	MEASUREMENTS VERIFIED BY DH 6/18/2012							
Pile #	Material	Spacing	Width/Dia.	Height	Length	Orientation	Driven?	Replacement?	Removed?	Collar?
1	Timber	5.302 ft.	1 ft.				No	No	No	No
2	Timber	5.302 ft.	1 ft.				No	No	No	No
3	Timber	5.302 ft.	1 ft.				No	No	No	No
4	Timber	5.302 ft.	1 ft.				No	No	No	No
5	Timber		1 ft.				No	No	No	No
Bent/Abutment #: 2			Similar Bents:							

Title		Description	
PILE DIAGRAM END BENT # 2		PILE DIAGRAM END BENT # 2	
Bridge No: 790149	Drawn By: GDP	Date: 06/26/08	File Name: S0066001401



WEAR SURFACE AT END BENT 1



LOOKING DOWNSTREAM



LOOKING UPSTREAM



LOOKING NORTH FROM DECK



PIER 1



LOOKING DOWNSTREAM



PIER 2



LOOKING AT EAST SIDE

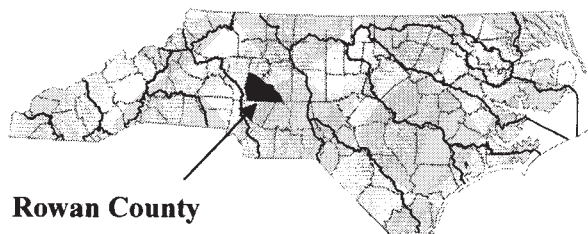
Drainage Area - 2.12 sq

FLOOD INSURANCE STUDY

A Report of Flood Hazards in

ROWAN COUNTY, NORTH CAROLINA

AND INCORPORATED AREAS



Community Name	Community Number	River Basin
China Grove, Town of	370210	Yadkin
Cleveland, Town of	370097	Yadkin
East Spencer, Town of	370211	Yadkin
Faith, Town of	370352	Yadkin
Granite Quarry, Town of	370212	Yadkin
Landis, Town of	370213	Yadkin
Rockwell, Town of	370214	Yadkin
Rowan County (Unincorporated Areas)	370351	Yadkin
Salisbury, City of	370215	Yadkin
Spencer, Town of	370216	Yadkin



VOLUME 1 OF 3

June 16, 2009

**Federal Emergency Management Agency
State of North Carolina**

**Flood Insurance Study Number
37159CV001A**

www.fema.gov and www.ncfloodmaps.com



Section 4.0 – Area Studied

Table 6—Flooding Sources Studied by Detailed Methods: Limited Detailed

Source	Riverine Sources		Affected Communities
	From	To	
Back Creek Tributary 1	The confluence with Back Creek	The Iredell/Rowan County boundary	Rowan County (Unincorporated Areas)
Beaverdam Creek (East)	The confluence with North Second Creek	Approximately 0.4 mile upstream of NC Highway 801	Rowan County (Unincorporated Areas)
Beaverdam Creek (West)	The confluence with Withrow Creek	The Iredell/Rowan County boundary	Rowan County (Unincorporated Areas)
Bell Branch	The confluence with South Yadkin River	Approximately 1,500 feet upstream of the confluence with South Yadkin River	Rowan County (Unincorporated Areas)
Bost Branch	The confluence with Second Creek	Approximately 0.3 mile upstream of the confluence with Second Creek	Town of Rockwell
Cedar Creek	The confluence with Yadkin River	Approximately 0.4 mile upstream of River Road (SR 2152)	Rowan County (Unincorporated Areas)
Church Creek Tributary 1	The confluence with Church Creek	Approximately 417 feet downstream of U.S. Highway 52	Town of Granite Quarry, Rowan County (Unincorporated Areas)
Church Creek Tributary 1A	The confluence with Church Creek Tributary 1	Approximately 0.5 mile upstream Fish Pond Road (SR 2309)	Rowan County (Unincorporated Areas)
Church Creek Tributary 2	The confluence with Church Creek	Approximately 0.8 mile upstream of Stone Road	Rowan County (Unincorporated Areas)
Cold Water Creek	Just upstream of Moose Road (SR 1308)	Approximately 0.5 mile upstream of Moose Road (SR 1308)	Rowan County (Unincorporated Areas)
Cold Water Creek Tributary 1	The confluence with Cold Water Creek	Approximately 0.3 mile upstream of Interstate 85	Rowan County (Unincorporated Areas)
Crane Creek (High Rock Lake)	The entire shoreline within Rowan County		Rowan County (Unincorporated Areas)
Crane Creek Tributary 1	The confluence with Crane Creek	Approximately 0.9 mile upstream of Lake Fork Road (SR 2170)	Rowan County (Unincorporated Areas)
Crane Creek Tributary 2	The confluence with Crane Creek	Approximately 220 feet upstream of Cemetery Drive	Rowan County (Unincorporated Areas), Town of Faith
Dutch Buffalo Creek	The Cabarrus/Rowan County boundary	The Cabarrus/Rowan County boundary	Rowan County (Unincorporated Areas)
Dutch Buffalo Creek Tributary 1	The Cabarrus/Rowan County boundary	Approximately 20 feet downstream of SR 2658	Rowan County (Unincorporated Areas)

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
Church Creek	Approximately 0.7 mile downstream of Bringle Ferry Road (SR 1002)	18.8	2,331	3,881	4,664	6,848
	Approximately 0.2 mile upstream of Bringle Ferry Road (SR 1002)	16.5	2,139	3,575	4,301	6,332
	Approximately 0.8 mile upstream of Bringle Ferry Road (SR 1002)	13.4	1,859	3,124	3,767	5,569
	Approximately 0.5 mile downstream of the confluence of Church Creek Tributary 1	12.5	1,781	2,998	3,618	5,356
	At the confluence of Church Creek Tributary 1	8.5	1,378	2,344	2,839	4,235
	Approximately 0.9 mile upstream of the confluence of Church Creek Tributary 1	7.7	1,288	2,198	2,665	3,983
	Approximately 1.2 miles upstream of the confluence of Church Creek Tributary 1	7.1	1,223	2,090	2,536	3,797
	Approximately 1.5 miles upstream of the confluence of Church Creek Tributary 1	6.9	1,199	2,052	2,491	3,731
	Approximately 2.1 miles upstream of the confluence of Church Creek Tributary 1	6.5	1,156	1,981	2,406	3,608
	Approximately 2.7 miles upstream of the confluence of Church Creek Tributary 1	5.4	1,013	1,745	2,124	3,198
	Approximately 1.0 mile downstream of the confluence of Church Creek Tributary 2	5.2	990	1,707	2,078	3,131
	Approximately 0.8 mile downstream of the confluence of Church Creek Tributary 2	4.7	926	1,602	1,952	2,947

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
Church Creek	Approximately 0.6 mile downstream of the confluence of Church Creek Tributary 2	4.4	884	1,532	1,868	2,824
	At the confluence of Church Creek Tributary 2	1.3	402	720	888	1,375
	Approximately 0.3 mile upstream of the confluence of Church Creek Tributary 2	1.0	340	612	758	1,179
	Approximately 0.6 mile upstream of the confluence of Church Creek Tributary 2	0.6	230	421	524	825
	Approximately 0.64 mile upstream of the confluence of Church Creek Tributary 2	0.6	225	412	513	809
	Approximately 0.8 mile upstream of the confluence of Church Creek Tributary 2	0.5	208	381	476	751
	Approximately 1.0 mile upstream of the confluence of Church Creek Tributary 2	0.2	112	211	265	427
	Approximately 1.2 miles upstream of the confluence of Church Creek Tributary 2	0.2	97	185	233	376
	Approximately 1.5 miles upstream of the confluence of Church Creek Tributary 2	0.1	74	142	180	294
Church Creek Tributary 1	At the confluence with Church Creek	1.5	*	*	962	*
	Approximately 330 feet upstream of Stokes Ferry Road (SR 1004)	1.4	*	*	927	*
	Approximately 0.3 mile downstream of Fish Pond Road (SR 2309)	1.3	*	*	887	*
	Approximately 260 feet upstream of Fish Pond Road (SR 2309)	1.2	*	*	842	*

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
Church Creek Tributary 1	Approximately 0.4 mile upstream of Fish Pond Road (SR 2309)	1.1	*	*	792	*
	Approximately 0.6 mile upstream of Fish Pond Road (SR 2309)	1.0	*	*	736	*
	Approximately 0.9 mile upstream of Fish Pond Road (SR 2309)	0.9	*	*	696	*
	Approximately 0.9 mile downstream of U.S. Highway 52 / Salisbury Avenue	0.8	*	*	645	*
	Approximately 0.8 mile downstream of U.S. Highway 52 / Salisbury Avenue	0.7	*	*	621	*
	Approximately 0.5 mile downstream of US Highway 52 / Salisbury Avenue	0.6	*	*	580	*
	Approximately 0.3 mile downstream of US Highway 52 / Salisbury Avenue	0.5	*	*	551	*
	Approximately 840 feet downstream of US Highway 52 / Salisbury Avenue	0.3	*	*	465	*
Church Creek Tributary 1A	At the confluence with Church Creek Tributary 1	2.1	*	*	1,192	*
	Approximately 520 feet upstream of Union Church Road (SR 2132)	2.0	*	*	1,160	*
	Approximately 450 feet upstream of Stokes Ferry Road (SR 1004)	1.8	*	*	1,086	*
	Approximately 0.5 mile upstream of Stokes Ferry Road (SR 1004)	1.6	*	*	989	*
	Approximately 0.3 mile downstream of Unnamed Road	1.3	*	*	866	*
	Approximately 330 feet upstream of Unnamed Road	1.2	*	*	826	*

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
Church Creek Tributary 1A	Approximately 540 feet downstream of Fish Pond Road (SR 2309)	0.7	*	*	579	*
	Approximately 110 feet downstream of Fish Pond Road (SR 2309)	0.6	*	*	556	*
	Approximately 0.2 mile upstream of Fish Pond Road (SR 2309)	0.6	*	*	535	*
	Approximately 0.3 mile upstream of Fish Pond Road (SR 2309)	0.5	*	*	479	*
	Approximately 0.5 mile upstream of Fish Pond Road (SR 2309)	0.3	*	*	314	*
Church Creek Tributary 2	At the confluence with Church Creek	2.7	*	*	1,403	*
	Approximately 0.2 mile downstream of Stone Road	2.2	*	*	1,238	*
	Approximately 400 feet upstream of Stone Road	2.0	*	*	1,188	*
	Approximately 0.5 mile upstream of Stone Road	1.2	*	*	906	*
	Approximately 0.2 mile downstream of Percy Lane	1.1	*	*	855	*
	Approximately 750 feet downstream of Percy Lane	0.9	*	*	815	*
	Approximately 545 feet downstream of Percy Lane	0.9	*	*	797	*
	Approximately 335 feet upstream of Percy Lane	0.8	*	*	780	*
Coddle Creek	At the Cabarrus/Iredell/Rowan County boundary	15.6	2,903	4,791	5,738	8,370
Cold Water Creek	Approximately 0.5 mile upstream of Moose Road (SR 1308)	12.8	2,300	3,630	4,170	5,480
	At Old Beatty Ford Road (SR 1211)	7.2	1,675	2,700	3,120	4,190

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
Cold Water Creek	At Daugherty Road (SR 1243)	4.2	1,230	2,040	2,400	3,220
	At Pine Ridge Road (SR 1232)	3.4	1,100	1,850	2,200	2,960
	Approximately 0.5 mile upstream of Lentz Road	3.2	600	1,350	1,700	2,460
Cold Water Creek Tributary	*	*	*	*	*	*
Cold Water Creek Tributary 1	At the confluence with Cold Water Creek	1.3	*	*	892	*
	Approximately 653 feet upstream of the confluence with Cold Water Creek	1.2	*	*	850	*
	Approximately 0.2 mile upstream of the confluence with Cold Water Creek	1.2	*	*	841	*
Concord Road Creek	*	*	*	*	*	*
Correll Creek	*	*	*	*	*	*
Crane Creek	Approximately 1.3 miles upstream of the confluence with Church Creek	46.9	9,238	12,040	12,860	14,966
	At the confluence of Town Creek	25.1	7,093	9,240	9,819	11,293
	Approximately 1.1 miles upstream of the confluence of Town Creek	24.0	7,026	9,131	9,693	11,121
	Approximately 2.4 miles upstream of the confluence of Town Creek	22.1	6,879	8,912	9,444	10,793
	Approximately 4.7 miles upstream of the confluence of Town Creek	19.7	6,710	8,647	9,139	10,382
	Approximately 1.1 miles downstream of US Highway 52 / East Innes Street	18.6	6,122	8,011	8,506	9,763
	Approximately 0.2 miles downstream of US Highway 52 / East Innes Street	18.3	6,077	7,952	8,442	9,687

Section 5.0 – Engineering Methods

channel geometry between bridges and culverts. Overbank cross section data for the backwater analyses were obtained from recently flown LIDAR data.

Channel roughness factors (Manning's "n") used in the hydraulic computations were made in the field by an engineer where stream access was possible, with orthophotos used to supplement areas that could not be accessed. The channel and overbank "n" values for all of the streams studied by detailed methods are shown in Table 11, "Roughness Coefficients."

Table 11—Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Back Creek	0.042 – 0.048	0.050 – 0.130
Back Creek Tributary 1	0.050	0.080 – 0.150
Baker Branch	0.025 – 0.070	0.025 – 0.100
Beaver Creek	0.025 – 0.070	0.025 – 0.100
Beaver Creek Tributary	0.025 – 0.070	0.025 – 0.100
Beaverdam Creek (East)	0.042 – 0.052	0.080 – 0.140
Beaverdam Creek (West)	0.035 – 0.040	0.060 – 0.100
Bell Branch	0.025 – 0.070	0.025 – 0.100
Bost Branch	0.050	0.100 – 0.150
Bostian Heights Branch	0.050	0.080 – 0.140
Byrd Road Tributary	0.025 – 0.070	0.025 – 0.100
Cedar Creek	0.040	0.120 – 0.130
Cemetery Creek	0.025 – 0.070	0.025 – 0.100
Church Creek	0.035 – 0.050	0.080 – 0.150
Church Creek Tributary 1	0.050	0.080 – 0.130
Church Creek Tributary 1A	0.045	0.080 – 0.130
Church Creek Tributary 2	0.045	0.090 – 0.120
Coddle Creek	0.040 – 0.050	0.080 – 0.150
Cold Water Creek	0.025 – 0.070	0.025 – 0.100
Cold Water Creek Tributary	0.025 – 0.070	0.025 – 0.100
Cold Water Creek Tributary 1	0.050	0.080 – 0.140
Concord Road Creek	0.025 – 0.070	0.025 – 0.100
Correll Creek	0.025 – 0.040	0.025 – 0.060
Crane Creek	0.040 – 0.045	0.045 – 0.130
Crane Creek Tributary 1	0.040 – 0.045	0.080 – 0.120
Crane Creek Tributary 2	0.045	0.090 – 0.130
Draft Branch	0.025 – 0.070	0.025 – 0.100
Draft Branch Tributary	0.025 – 0.070	0.025 – 0.100
Dutch Buffalo Creek	0.035 – 0.045	0.080 – 0.140
Dutch Buffalo Creek Tributary	0.025 – 0.070	0.025 – 0.100
Dutch Buffalo Creek Tributary 1	0.045	0.080 – 0.150
East Centerview Branch	0.025 – 0.070	0.025 – 0.100
East Fork Creek	0.035 – 0.050	0.050 – 0.140

Section 5.0 – Engineering Methods

Table 12—Limited Detailed Flood Hazard Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width ³ (feet)
BEAVERDAM CREEK (WEST)				
362	36,244	737	816.1	12 / 45
364	36,401	737	818.1	12 / 59
366	36,580	737	822.3	12 / 25
367	36,735	737	825.0	12 / 25
369	36,883	737	826.8	15 / 46
370	37,019	737	829.5	11 / 25
372	37,171	737	833.3	9 / 11
373	37,324	737	836.1	12 / 9
375	37,500	737	838.2	7 / 7
377	37,659	737	841.0	11 / 7
379	37,923	737	847.6	18 / 18
381	38,092	737	850.7	12 / 21
BELL BRANCH				
005	545	2,635	697.3 ⁴	276 / 147
011	1,070	2,635	697.3 ⁴	177 / 231
015	1,500	2,635	697.3 ⁴	143 / 180
BOST BRANCH				
003	263	647	668.8 ⁴	26 / 142
007	656	647	668.8 ⁴	42 / 104
011	1,122	647	669.3	32 / 32
014	1,350	647	671.7	32 / 32
CEDAR CREEK				
006	579	2,030	577.6 ⁴	40 / 56
011	1,134	2,030	577.6 ⁴	35 / 50
017	1,683	2,030	577.6 ⁴	112 / 33
022	2,249	2,030	577.6 ⁴	36 / 52
028	2,791	2,030	577.6 ⁴	137 / 25
033	3,329	1,919	577.6 ⁴	139 / 16
038	3,798	1,919	577.6 ⁴	103 / 16
CHURCH CREEK TRIBUTARY 1				
006	561	962	659.8 ⁴	190 / 184
011	1,099	962	660.7	40 / 150
014	1,419	962	666.6	8 / 25
016	1,584	962	668.7	11 / 10
021	2,145	927	678.0	76 / 50
025	2,538	927	678.0	44 / 17
031	3,112	927	682.8	15 / 20
036	3,590	927	687.2	15 / 55
040	4,018	927	689.9	51 / 65
045	4,458	887	692.2	15 / 20
049	4,935	887	695.2	15 / 20
054	5,423	887	699.6	10 / 51
061	6,062	842	704.1	18 / 20

Section 5.0 – Engineering Methods

Table 12—Limited Detailed Flood Hazard Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width ³ (feet)
CHURCH CREEK TRIBUTARY 1				
064	6,385	842	706.6	30 / 33
066	6,634	842	709.0	48 / 59
072	7,163	842	713.4	12 / 31
075	7,481	842	715.9	26 / 58
079	7,870	792	718.3	12 / 28
082	8,206	792	720.9	55 / 24
088	8,831	792	725.3	50 / 14
094	9,382	736	729.0	12 / 108
097	9,719	736	730.2	12 / 109
101	10,123	696	732.3	12 / 96
108	10,802	696	736.8	84 / 12
114	11,395	645	740.9	17 / 12
119	11,946	621	744.6	24 / 21
125	12,540	621	747.9	19 / 12
129	12,931	580	750.9	40 / 35
136	13,552	580	753.8	63 / 12
142	14,169	580	757.5	27 / 12
146	14,630	551	760.9	39 / 12
153	15,258	551	765.2	66 / 22
157	15,729	465	769.6	20 / 12
CHURCH CREEK TRIBUTARY 1A				
002	169	1,192	659.6 ⁴	135 / 172
003	321	1,192	659.6 ⁴	106 / 62
007	699	1,192	663.0	27 / 58
012	1,183	1,192	666.8	43 / 73
018	1,818	1,160	670.9	85 / 17
024	2,359	1,160	674.4	257 / 11
026	2,599	1,160	677.4	30 / 8
032	3,208	1,086	686.9	185 / 64
034	3,433	1,086	688.5	28 / 13
040	4,025	1,086	694.0	13 / 106
045	4,477	1,086	697.7	13 / 17
049	4,902	1,086	701.8	21 / 96
054	5,407	1,086	704.2	44 / 34
059	5,868	866	706.9	74 / 12
064	6,407	866	709.5	54 / 12
070	6,973	866	714.0	26 / 30
074	7,413	826	716.6	49 / 12
076	7,599	826	717.5	27 / 55
078	7,809	826	720.0	30 / 35
082	8,159	826	722.8	30 / 57
088	8,827	579	728.9	55 / 14
094	9,403	556	733.4	47 / 12

Section 5.0 – Engineering Methods

Table 12—Limited Detailed Flood Hazard Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width ³ (feet)
CHURCH CREEK TRIBUTARY 1A				
100	9,965	556	738.0	12 / 29
104	10,379	535	741.3	12 / 26
108	10,767	479	744.5	48 / 12
112	11,207	479	746.9	13 / 11
117	11,742	479	751.9	12 / 17
CHURCH CREEK TRIBUTARY 2				
007	726	1,403	732.9 ⁴	97 / 55
015	1,515	1,403	733.5	47 / 187
020	1,998	1,238	734.8	44 / 188
025	2,457	1,238	737.0	86 / 127
030	2,964	1,238	740.6	129 / 32
033	3,322	1,188	741.0	109 / 84
039	3,876	1,188	742.3	49 / 83
044	4,355	1,188	744.2	36 / 83
048	4,805	1,188	746.0	106 / 63
051	5,074	906	747.0	46 / 128
053	5,343	906	747.8	32 / 56
059	5,911	855	750.4	32 / 60
063	6,285	815	752.3	32 / 74
068	6,828	797	756.5	14 / 32
COLD WATER CREEK				
776	77,617	3,940	650.0	867 / 483
779	77,931	4,015	650.0	325 / 210
785	78,489	4,015	650.0	340 / 447
791	79,099	4,015	650.0	365 / 435
806	80,575	3,784	650.2	420 / 170
811	81,083	3,784	650.4	200 / 40
815	81,454	3,784	650.9	200 / 40
820	81,970	3,784	651.7	85 / 84
COLD WATER CREEK TRIBUTARY 1				
000	25	892	654.8 ⁴	160 / 45
007	696	892	660.7	110 / 8
009	900	850	660.7	50 / 90
014	1,370	841	662.5	72 / 50
017	1,679	841	662.5	90 / 20
CRANE CREEK TRIBUTARY 1				
005	475	1,837	625.7 ⁴	448 / 148
009	932	1,837	625.7 ⁴	121 / 148
014	1,409	1,776	625.7 ⁴	214 / 212
019	1,945	1,776	625.7 ⁴	254 / 182
022	2,246	1,776	625.7 ⁴	94 / 196
027	2,678	1,776	625.7 ⁴	162 / 189
032	3,218	1,755	625.7 ⁴	100 / 116
037	3,697	1,755	625.7 ⁴	153 / 150

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Bostian Heights Branch	1,085	130	254	7.7	707.6	707.6	707.6	0.0
	4,270	100	392	4.8	719.3	719.3	719.8	0.5
	4,491	100	344	5.4	720.7	720.7	720.8	0.1
	7,080	195	536	3.3	730.0	730.0	730.8	0.8
	9,765	115	195	7.4	739.7	739.7	739.7	0.0
	10,350	110	310	4.7	741.2	741.2	741.5	0.3
	10,976	205	847	2.2	743.9	743.9	744.9	1.0
	11,796	99	387	2.9	748.1	748.1	748.2	0.1
	12,941	50	182	2.4	751.2	751.2	752.2	1.0
	13,865	53	415	1.1	763.0	763.0	763.5	0.5
Church Creek	9,553	108	524	8.9	625.7	620.3 ²	621.0	0.7
	10,067	216	953	4.9	625.7	623.7 ²	623.7	0.0
	11,049	103	800	5.8	625.7	625.0 ²	625.1	0.1
	11,811	86	682	6.8	625.8	625.8	625.9	0.1
	13,708	182	1,235	3.8	628.9	628.9	629.6	0.7
	14,542	71	611	7.6	630.4	630.4	631.1	0.7
	15,724	107	656	7.1	633.0	633.0	633.8	0.8
	16,254	58	640	7.3	638.9	638.9	639.2	0.3
	16,888	125	955	4.9	640.4	640.4	640.8	0.4
	17,826	151	1,316	3.5	642.2	642.2	642.8	0.6

¹ Feet above mouth

²Elevation computed without consideration of backwater effects from Crane Creek (High Rock Lake)

FEDERAL EMERGENCY MANAGEMENT AGENCY

TABLE 14

FLOODWAY DATA

ROWAN COUNTY, NC
AND INCORPORATED AREAS

BOSTIAN HEIGHTS BRANCH – CHURCH
CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Church Creek								
187	18,711	137	1,116	4.2	642.9	642.9	643.7	0.8
198	19,824	62	710	6.1	644.4	644.4	645.3	0.9
214	21,387	187	1,320	3.3	646.9	646.9	647.8	0.9
230	23,043	124	1,003	4.3	649.1	649.1	649.9	0.8
240	24,031	172	1,570	2.7	651.5	651.5	652.4	0.9
253	25,281	237	1,909	2.0	652.3	652.3	653.2	0.9
269	26,948	251	1,760	2.1	654.7	654.7	655.7	1.0
282	28,205	165	1,066	3.4	656.0	656.0	656.9	0.9
297	29,667	480	3,335	1.1	659.4	659.4	660.3	0.9
307	30,747	310	1,872	1.5	659.9	659.9	660.9	1.0
319	31,938	87	560	5.1	661.9	661.9	662.8	0.9
335	33,549	202	1,041	2.7	667.2	667.2	667.9	0.7
345	34,464	139	969	2.9	667.8	667.8	668.6	0.8
352	35,204	190	1,168	2.4	668.7	668.7	669.7	1.0
361	36,136	173	944	2.8	669.9	669.9	670.8	0.9
371	37,098	133	651	4.1	673.1	673.1	674.0	0.9
380	38,002	84	505	5.0	681.1	681.1	682.0	0.9
389	38,850	115	757	3.4	689.0	689.0	690.0	1.0
403	40,303	105	660	3.8	694.8	694.8	695.6	0.8
416	41,598	116	680	3.7	698.2	698.2	699.0	0.8
426	42,584	147	1,019	2.4	701.9	701.9	702.6	0.7
435	43,508	130	726	3.3	703.3	703.3	704.1	0.8
442	44,221	110	593	4.1	705.2	705.2	706.0	0.8

¹ Feet above mouth

FEDERAL EMERGENCY MANAGEMENT AGENCY

**ROWAN COUNTY, NC
AND INCORPORATED AREAS**

TABLE 14

FLOODWAY DATA

CHURCH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Church Creek								
454	45,404	208	1,063	2.3	708.5	708.5	709.3	0.8
466	46,608	118	563	3.8	710.9	710.9	711.8	0.9
476	47,597	169	1,091	2.0	715.1	715.1	716.1	1.0
491	49,080	186	862	2.3	718.8	718.8	719.7	0.9
506	50,605	141	704	2.7	722.6	722.6	723.5	0.9
519	51,922	280	1,062	1.8	725.8	725.8	726.8	1.0
530	52,950	160	1,223	0.7	732.9	732.9	733.1	0.2
545	54,457	53	201	3.8	734.1	734.1	734.7	0.6
550	54,978	30	100	7.6	737.0	737.0	737.0	0.0
558	55,750	52	197	3.9	742.0	742.0	742.9	0.9
567	56,654	28	90	5.7	749.5	749.5	749.7	0.2
578	57,808	23	80	5.9	758.5	758.5	758.5	0.0
Coddle Creek								
1090	109,022	225	1,710	3.4	673.9	673.9	674.7	0.8

¹ Feet above mouth

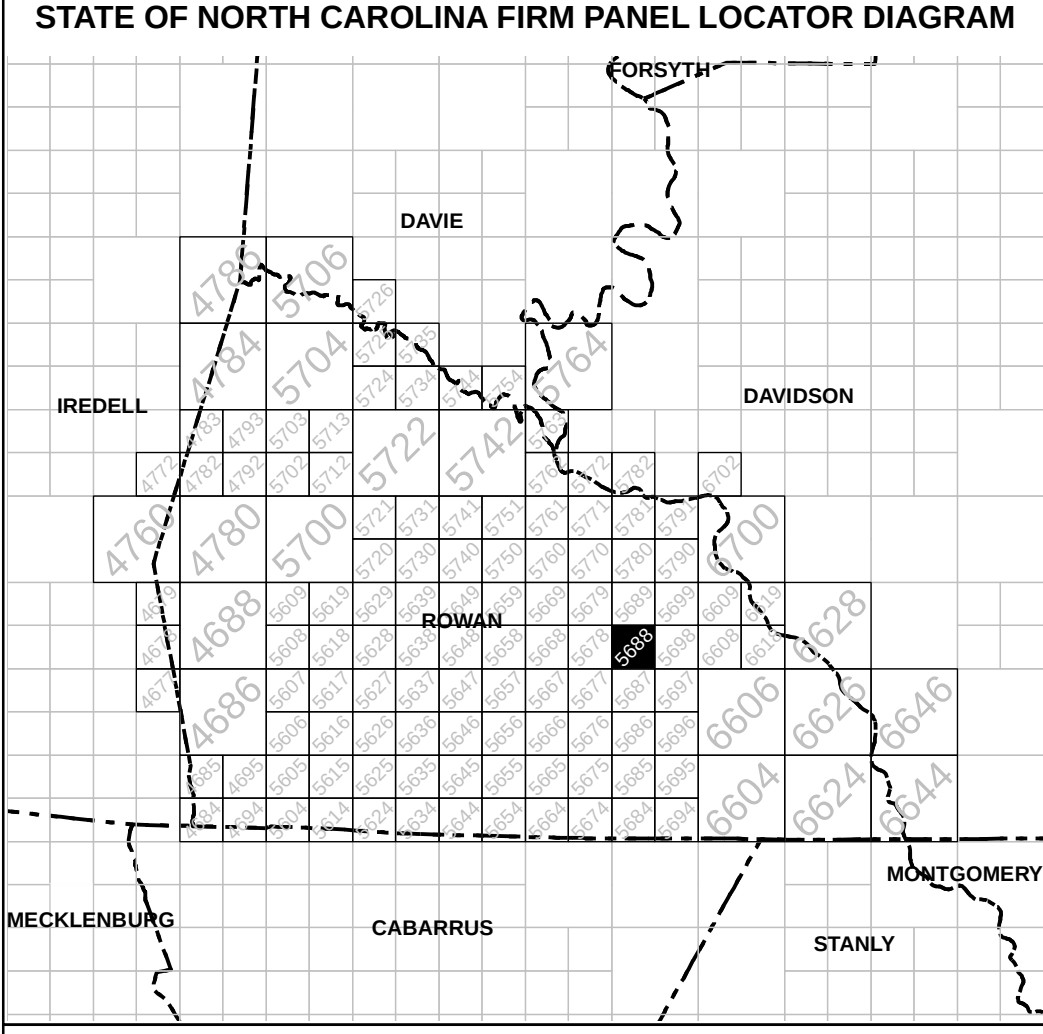
FEDERAL EMERGENCY MANAGEMENT AGENCY

**ROWAN COUNTY, NC
AND INCORPORATED AREAS**

TABLE 14

FLOODWAY DATA

CHURCH CREEK – CODDLE CREEK



DATUM INFORMATION

The **projection** used in the preparation of this map was the North Carolina State Plane (FIPSZONE 3200). The **horizontal datum** was the North American Datum of 1983, GRS80 ellipsoid. Differences in datum, ellipsoid, projection, or Universal Transverse Mercator zones used in the production of FIRMS for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. An average offset between NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) has been computed for each North Carolina county. This offset was then applied to the NGVD 29 flood elevations that were not revised during the creation of this statewide format FIRM. The offsets for each county shown on this FIRM panel are shown in the vertical datum offset table below. Where a county boundary and a flooding source with unrevised NGVD 29 flood elevations are coincident, an individual offset has been calculated and applied during the creation of this statewide format FIRM. See Section 6.1 of the accompanying Flood Insurance Study report to obtain further information on the conversion of elevations between NAVD 88 and NGVD 29. To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the North Carolina Geodetic Survey at the address shown below. You may also contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at <http://www.ngs.noaa.gov>.

North Carolina Geodetic Survey
121 West Jones Street
Raleigh, NC 27601
(919) 733-3636
<http://www.ncgs.state.nc.us>

County	Average Vertical Datum Offset (ft)
ROWAN	-0.75

Example: NAVD 88 = NGVD 29 + (-0.75)

All streams listed in the **Flood Hazard Data Table** below were studied by detailed methods using field survey. Other flood hazard data shown on this map may have been derived using either a coastal analysis or limited detailed Riverine analysis. More information on the flooding sources studied by these analyses is contained in the Flood Insurance Study report.

FLOOD HAZARD DATA TABLE				Floodway Width (feet)
Cross Section	Stream Station ¹	Flood Discharge (cfs)	1% Annual Chance (100-year) Water-Surface Elevation (feet NAVD88)	Left/Right Distance From the Center of Stream to Encroachment Boundary (Looking Down stream) or Total Floodway Width
CHURCH CREEK				
230	23,043	4,301	649.1	26 / 98
240	24,031	4,301	651.5	134 / 38
253	25,281	3,767	652.3	218 / 19
269	26,948	3,767	654.7	20 / 231
282	28,205	3,618	656.0	148 / 17
297	29,667	3,618	659.4	187 / 293
307	30,747	2,839	659.9	284 / 26
319	31,938	2,839	661.9	65 / 22
335	33,549	2,839	667.2	118 / 84
345	34,464	2,839	667.8	47 / 92
352	35,204	2,839	668.7	50 / 140

¹ Feet above mouth



Cooperating Technical State

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

TECHNICAL PARTNER

This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the state of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

www.ncfloodmaps.com

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data, Limited Detailed Flood Hazard Data, and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of **regulatory floodways** shown on the FIRM for flooding sources studied by detailed methods were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data for flooding sources studied by detailed methods as well as **non-encroachment widths** for flooding sources studied by limited detailed methods are provided in the Flood Insurance Study (FIS) report for this jurisdiction. The FIS report also provides instructions for determining a floodway using non-encroachment widths for flooding sources studied by limited detailed methods.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 4.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

Base map information and geospatial data used to develop this FIRM were obtained from various organizations, including the participating local community(ies), state and federal agencies, and/or other sources. The primary base for this FIRM is aerial imagery acquired by Rowan County. The time period of collection for the imagery is 2005. Information and geospatial data supplied by the local community(ies) that met FEMA base map specifications were considered the preferred source for development of the base map. See geospatial metadata for the associated digital FIRM for additional information about base map preparation.

Base map features shown on this map, such as **corporate limits**, are based on the most up-to-date data available at the time of publication. **Changes in the corporate limits may have occurred since this map was published.** Map users should consult the appropriate community official or website to verify current conditions of jurisdictional boundaries and base map features. This map may contain roads that were not considered in the hydraulic analysis of streams where no new hydraulic model was created during the production of this statewide format FIRM.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

If you have **questions about this map**, or questions concerning the National Flood Insurance Program in general, please call **1 - 877 - FEMA MAP** (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.

An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the **North Carolina Floodplain Mapping Program** website at <http://www.ncfloodmaps.com>, or contact the **FEMA Map Service Center** at 1-800-358-9616 for information on all related products associated with this FIRM. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov>.

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index or visit: <http://www.ncfloodmaps.com>

EFFECTIVE DATE OF FLOOD INSURANCE RATE MAP PANEL
JUNE 16, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to statewide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent, the North Carolina Division of Emergency Management or the National Flood Insurance Program at the following phone numbers or websites:

NC Division of Emergency Management
(919) 715-8000 <http://www.ncdcmcontrol.org>

National Flood Insurance Program
1-800-638-6620 <http://www.fema.gov/business/nfip/>

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A
No Base Flood Elevation determined.

ZONE AE
Base Flood Elevations determined.

ZONE AH
Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO
Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR
Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99
Areas to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE VE
Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS
ZONE X
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X
Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D
Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988

Cross section line
Transect line
Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
1000-meter Universal Transverse Mercator grid ticks, zone 17
2500-foot grid values: North Carolina State Plane coordinate system (FIPSZONE 3200, State Plane NAD 83 feet)
North Carolina Geodetic Survey bench mark (for more information visit <http://www.ncgs.state.nc.us>)
National Geodetic Survey bench mark (for more information visit <http://www.ngs.noaa.gov>)
NGS-58 GPS 2-5 cm Vertical Control Marks or Contractor-Established NCMP Bench Marks (for more information visit <http://www.ncgs.state.nc.us>)
River Mile

GRID NORTH
MAP SCALE 1" = 500' (1 : 6,000)

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 5688J

FIRM
FLOOD INSURANCE RATE MAP
NORTH CAROLINA

PANEL 5688
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	CID No.	PANEL SUFFIX
ROWAN COUNTY	370351	5688 J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

EFFECTIVE DATE
JUNE 16, 2009

MAP NUMBER
3710568800J

State of North Carolina
Federal Emergency Management Agency



Rowan County
Unincorporated Areas
370351

