

Office Estimate 60' Bridge
MOA Required Yes

PREDESIGN-PRESURVEY REPORT

Project#
TIP#
Let Date
WBS# 17BP.13.R.50

County McDowell

Bridge# 580052
Road# SR 1105
Name Bethel Church

Stream Little Crooked Creek

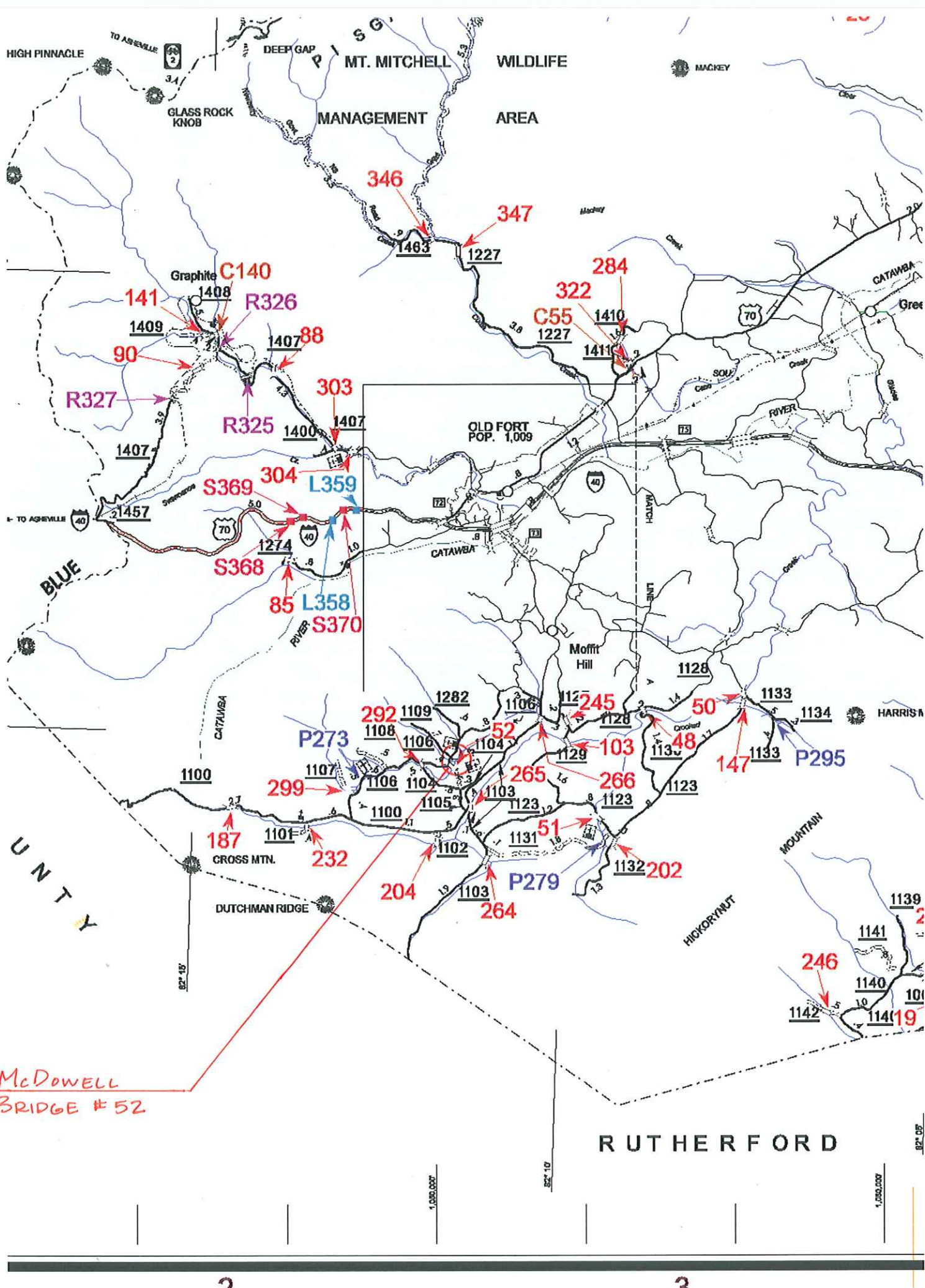
Type Of Request: POC Force Account TIP NCMA
Date 8/12/11 Name MLH (Mulkey, Inc.) Assigned To Mulkey, Inc.
Checked By KBA (Mulkey, Inc.)
Prior Survey Date August 2003 (attach copy of prior survey)
Study By Scour Section S; 7/8/2010
Flood Zone Yes Detail Study Limited Date October 2, 2008 Panel# 0658
B.M. Info N/A
Quad Map Moffitt Hill Drainage Area 2.7 Sq. Mi. From USGS Quad Map
Q25 800 cfs Q50 1000 cfs Q100 1200 cfs Method USGS Regression

EXISTING BRIDGE INFORMATION

Location 0.5 Mi. S. Jct. SR 1106
Average Daily Traffic 70 - Yr. 1998
Length 21 Ft. Bed- To Crown 7 Ft. Water Depth 1 Ft.
Type Structure Timber Floor On I-Beams; E.BTS: Timber Caps/Timber Post & Sills
Type Spans 1@20'-6
Upstream Structure 580292/12'-4x8'-4 Aluminum Pipe Arch
Location 0.02 Mi. E. Jct. SR 1106
Bed- To Crown 13 Ft. Prior Survey Aug 1982
Downstream Structure N/A
Location
Bed- To Crown Prior Survey
SCS Watershed N/A

ENVIRONMENTAL

Trout Stream No Anadromous Fish No Primary Nursery Area No
High Quality Waters No Nutrient Sensitive Waters No
Near Water Supply Intake No CAMA County No
Stream Classification C
DENR River Basin Info. Catawba
State Stormwater Permit Required No





NC DEPARTMENT OF TRANSPORTATION ATTENTION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY MCDOWELL BRIDGE NUMBER 580052 INSPECTION CYCLE 2 YRS
ROUTE SR1105 ACROSS CREEK M.P. 0

LOCATION .05 MI.S.JCT.SR1106

SUPERSTRUCTURE TIMBER FLOOR ON I-BEAMS

SUBSTRUCTURE E.BTS:TIMBER CAPS/TIMBER POST&SILLS @ VAR.CENTERS

SPANS 1 @ 20'-6

LONGITUDE 82° 11' 24.7"

LATITUDE 35° 34' 44.0"

PRESENT CONDITION FAIR

INVENTORY RATING

INSPECTION DATE 05/19/2010

OPERATING RATING

PRESENT POSTING SV 12 TTST 19

PROPOSED POSTING

COMPUTER UPDATE

ANALYSIS DATE

POSTING LETTER DATE

SUFFICIENCY RATING

OTHER SIGNS PRESENT



LOOKING SOUTH AT APPROACH

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>

BRIDGE MANAGEMENT UNIT
DATA ON EXISTING STRUCTURE

Run Date: 06/22/2010

COUNTY : MCDOWELL		DIV : 13		DIST : 1		STRUCTURE NUMBER : 580052		LENGTH : 21 FEET	
ROUTE CARRIED : SR1105				FEATURE INTERSECTED : CREEK					
LOCATED : .05 MI.S.JCT.SR1106				BRIDGE NAME :				CITY :	
FUNC. CLASS : 09		SYST.ON : NFA		SYST.UNDER : NFA		ADT & YR : 70 1998		RAIL TYPE : LT 227 RT 227	
BUILT : 1958		BY : BMU		PROJ :		FED.AID PROJ :		DESIGN LOAD : Other or Unknown	
REHAB :		BY : BMU		PROJ :		ALIGNMENT : TAN		SKEW : 84	
								LANES : ON 1 UNDER	
NAVIGATION : VC 0.0 FT HC 0.0 FT				HT. CRN. TO BED : 7 FT				WATER DEPTH : 1 FT	
SUPERSTRUCTURE : TIMBER FLOOR ON I-BEAMS									
SUBSTRUCTURE : E.BTS:TIMBER CAPS/TIMBER POST&SILLS @ VAR.CENTERS									
SPANS : 1 @ 20'-6									
BEAMS OR GIRDERS : 10 LINES 9 I-BEAMS @ VAR. CENTERS									
FLOOR : 4X8 TIM/3.5 AWS		ENCROACHMENT :				DECK (OUT TO OUT) : 18.2 FT			
CLEAR ROADWAY : 15.9 FT		BETWEEN RAILS : 17.8 FT				SIDEWALK OR CURB : LT 1.0 FT RT 1.0 FT			
VERT.CL.OVER : 99 FT 99 IN		VERT.CL.UNDER : 00 FT 00 IN				HOR.CL.UNDER : 0.0 FT			
INV.RTG. : HS-1		OPE.RTG. : HS-1		CONTR.MEMBER : intbm		POSTED : SV 9		TTST 14 DATE 06/22/2010	
SYSTEM : Secondary S.R. Route						GREEN LINE ROUTE : N			
2ND OPENING :		3RD OPENING :		4TH OPENING :		5TH OPENING :			
REMARKS :									

Stream Bed Soundings

(See next sheet for profile sketch)

Bridge No: 580052 County: MCDOWELL Date: 05/19/2010 By: JCH

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	F.F.END BENT 1			
0.2	3				
1	4.4	RAIL TO CAP			
1.1	8	S.F.	1.1	9.1	
2.9	9	Water Surface/Water Edge (WSWE)			
4	9.7				
6	9.7				
9	9.1				
15	9.4				
18.7	9.1	Water Surface/Water Edge (WSWE)			
18.9	8.4				
19.3	9.3	WS/WE			
19.4	8.2	S.F.	19.4	7.4	
19.5	4.4	RAIL TO CAP			
20.3	3				
20.5	3	F.F.END BENT 2			

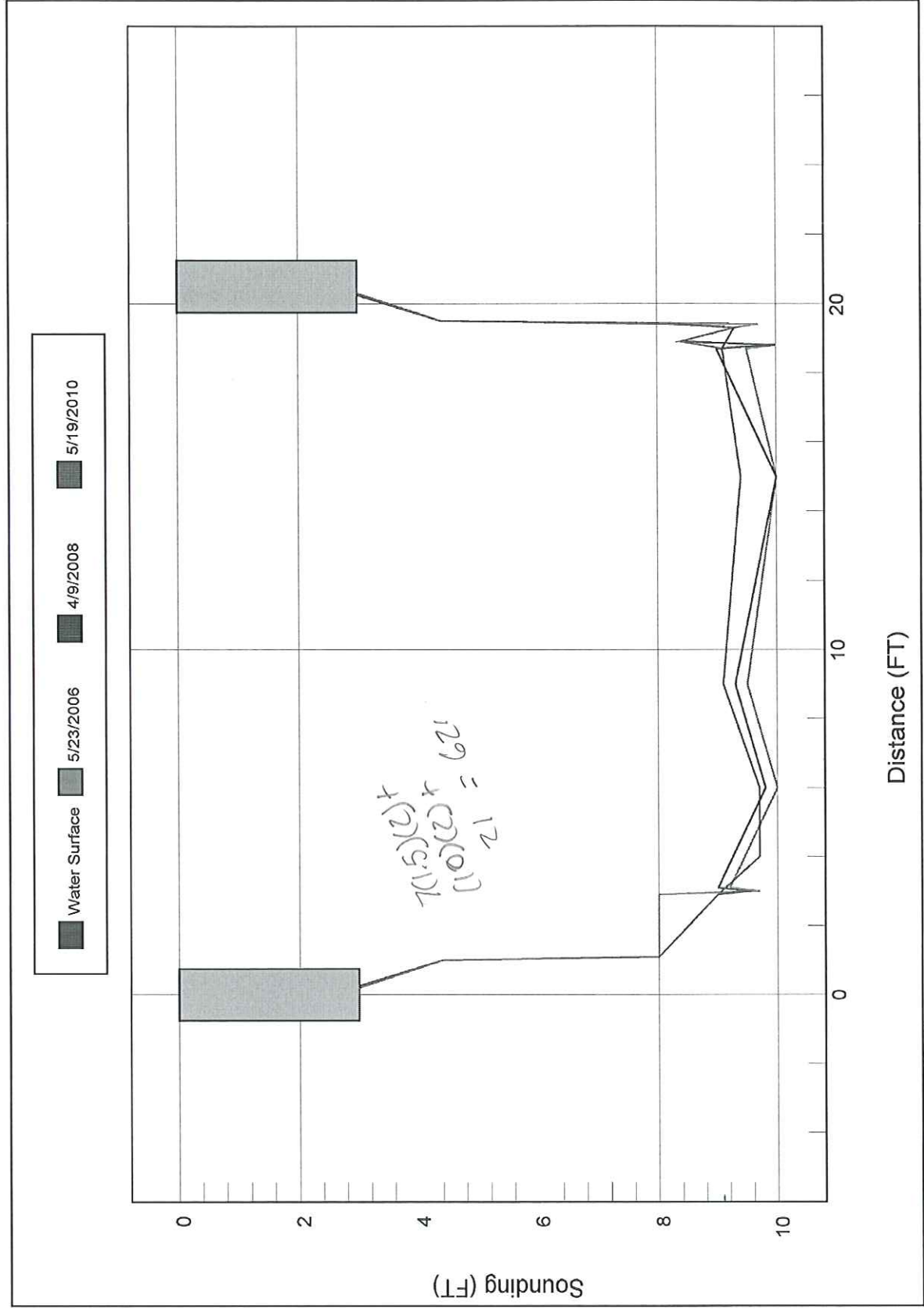
Bridge: 580052

County MCDOWELL

Date: 05/19/2010

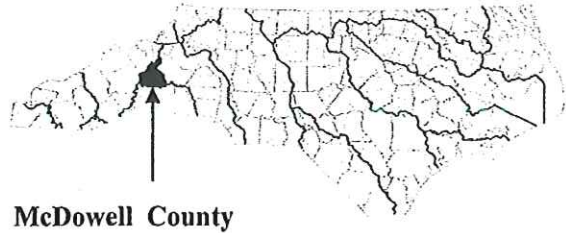
STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



FLOOD INSURANCE STUDY

A Report of Flood Hazards in
MCDOWELL COUNTY,
NORTH CAROLINA
AND INCORPORATED AREAS



Community Name	Community Number	River Basin
Marion, City of	370266	Catawba
McDowell County (Unincorporated Areas)	370148	Broad and Catawba
Old Fort, Town of	370149	Catawba



October 2, 2008

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

**Flood Insurance Study Number
37111CV000A**

www.fema.gov and www.ncfloodmaps.com



Section 5.0 – Engineering Methods

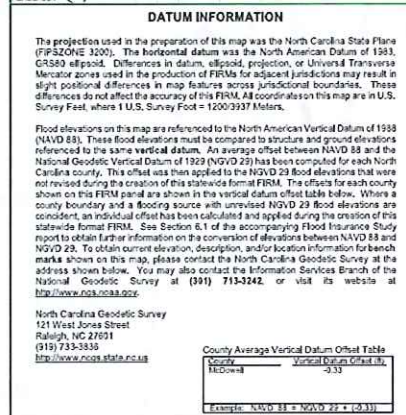
Table 7—Summary of Discharges

Flooding Source	Location	Drainage Area (square miles)	Discharges (cfs)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Licklog Creek	At the confluence of Sugar Cove Creek	1.9	*	*	1,360	*
Little Buck Creek	At the confluence with Buck Creek	6.0	*	*	2,770	*
	Approximately 1.0 mile upstream of the confluence with Buck Creek	5.2	*	*	2,530	*
Little Crooked Creek	At the confluence with Crooked Creek	6.9	*	*	2,960	*
	Approximately 0.3 miles upstream of SR 1103	5.6	*	*	2,650	*
	At the confluence with Little Crooked Creek Tributary 1	4.4	*	*	2,280	*
	At the confluence of Clarks Branch	3.1	*	*	1,840	*
	At SR 1105	2.7	*	*	1,680	*
	Approximately 0.3 mile upstream of SR 1104	2.3	*	*	1,530	*
	Approximately 0.4 mile upstream of SR 1104	1.9	*	*	1,330	*
Little Crooked Creek Tributary 1	At the confluence with Little Crooked Creek	1.1	*	*	950	*
Little Toe River	At the confluence with Crooked Creek	1.7	*	*	1,230	*
	Approximately 0.5 mile upstream of the confluence with Crooked Creek	1.2	*	*	1,030	*
	Approximately 1.2 miles upstream of the confluence with Crooked Creek	0.9	*	*	850	*
Long Branch	At the confluence with Mill Creek	1.0	*	*	780	*
Lonon Branch	At the confluence with Pepper Creek	2.6	*	*	1,640	*
Loom Branch	At the confluence with Crooked Creek	3.0	*	*	1,790	*
	Just upstream of the confluence of Bradley Creek	1.2	*	*	1,020	*

Section 5.0 – Engineering Methods

Table 9—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)
LITTLE ROCK CREEK				
025	2,477	2,770	1,407.2 ³	196 / 121
029	2,876	2,770	1,407.2 ³	120 / 122
034	3,376	2,770	1,408.4	63 / 70
037	3,717	2,770	1,412.9	47 / 29
038	3,780	2,770	1,416.3	117 / 37
041	4,074	2,770	1,417.1	41 / 22
045	4,515	2,770	1,425.1	35 / 41
049	4,876	2,770	1,435.1	20 / 24
054	5,376	2,530	1,443.5	30 / 19
059	5,876	2,530	1,451.4	16 / 17
064	6,447	2,530	1,460.6	27 / 25
065	6,478	2,530	1,462.1	29 / 27
069	6,876	2,530	1,467.6	16 / 31
074	7,387	2,530	1,480.7	51 / 37
079	7,889	2,530	1,491.5	28 / 27
084	8,389	2,530	1,498.6	20 / 37
089	8,889	2,530	1,512.0	15 / 69
LITTLE CROOKED CREEK				
002	174	2,960	1,450.4 ³	697 / 119
004	430	2,960	1,450.4 ³	342 / 43
007	698	2,960	1,451.0	77 / 67
009	858	2,960	1,452.2	82 / 37
016	1,637	2,650	1,454.8	225 / 74
023	2,302	2,650	1,457.0	25 / 150
031	3,120	2,650	1,459.6	165 / 90
038	3,844	2,280	1,461.4	27 / 47
043	4,346	2,280	1,463.0	60 / 26
047	4,747	2,280	1,464.4	27 / 27
050	4,957	2,280	1,465.5	81 / 173
050	5,025	2,280	1,465.8	123 / 209
053	5,328	2,280	1,466.3	21 / 95
056	5,616	2,280	1,468.1	83 / 143
059	5,876	2,280	1,468.9	91 / 299
059	5,939	2,280	1,470.0	104 / 310
063	6,252	2,280	1,470.5	39 / 61
068	6,816	2,280	1,471.6	51 / 79
073	7,260	2,280	1,475.0	194 / 25
079	7,935	1,835	1,477.8	78 / 40
085	8,543	1,835	1,479.6	208 / 36
091	9,056	1,835	1,481.2	11 / 155
091	9,116	1,835	1,483.3	21 / 200
095	9,467	1,835	1,484.4	73 / 97
102	10,249	1,680	1,489.2	15 / 216
109	10,885	1,680	1,494.4	83 / 22
117	11,713	1,680	1,499.9	50 / 22
121	12,138	1,680	1,503.3	18 / 23
122	12,226	1,680	1,506.7	22 / 27
124	12,359	1,680	1,509.4	50 / 13



map is a key to using and 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.

It contains 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, United States National Flood Hazard Data and/or Summary of Significant Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FRM. Users should be aware that BFEs shown on the FRM represent rounded floodable elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the source of flood elevation information. Accordingly, flood elevation data presented in the FRM should be utilized in conjunction with the FRM for purposes of construction and/or floodplain management.

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.

FEMA recommends that a flood insurance policy be purchased for structures in areas where levees are shown as providing protection from the 1% annual chance flood. Flooding is not covered by standard property/first/second insurance policies not it is covered by Homeowners Insurance, Renters Insurance, Condominium Owners Insurance, or Commercial Property Insurance. Contact your insurance agent and local floodplain administrator for further information. Visit <http://www.fema.gov/pdf/floodplain/05ash.pdf> for information on levees and the risk of flooding in areas shown as being protected by levees.

Base map information and geospatial data used to develop the 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 the State of North Carolina. 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

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 (1-877-335-2627) 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 Information Center at 1-800-425-6247.

Service Center at 1-800-358-9629 for information on all our products. Also call 1-800-358-9629 for information on our products. Map Service Center may also be reached by Fax at 1-800-358-9629 and its website at <http://www.map-farm.com>.

Refer to listing of Map Repositories on Map Index or visit <http://www.nationalmap.gov>

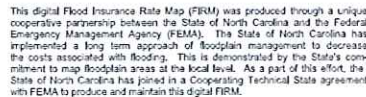
OCTOBER 2, 2008

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

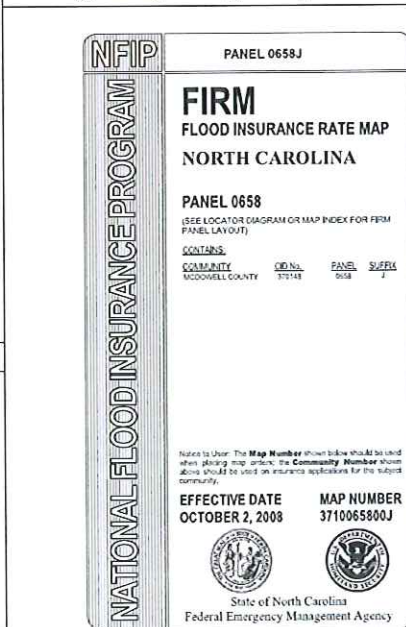
For community map revision history prior to statewide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the 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:

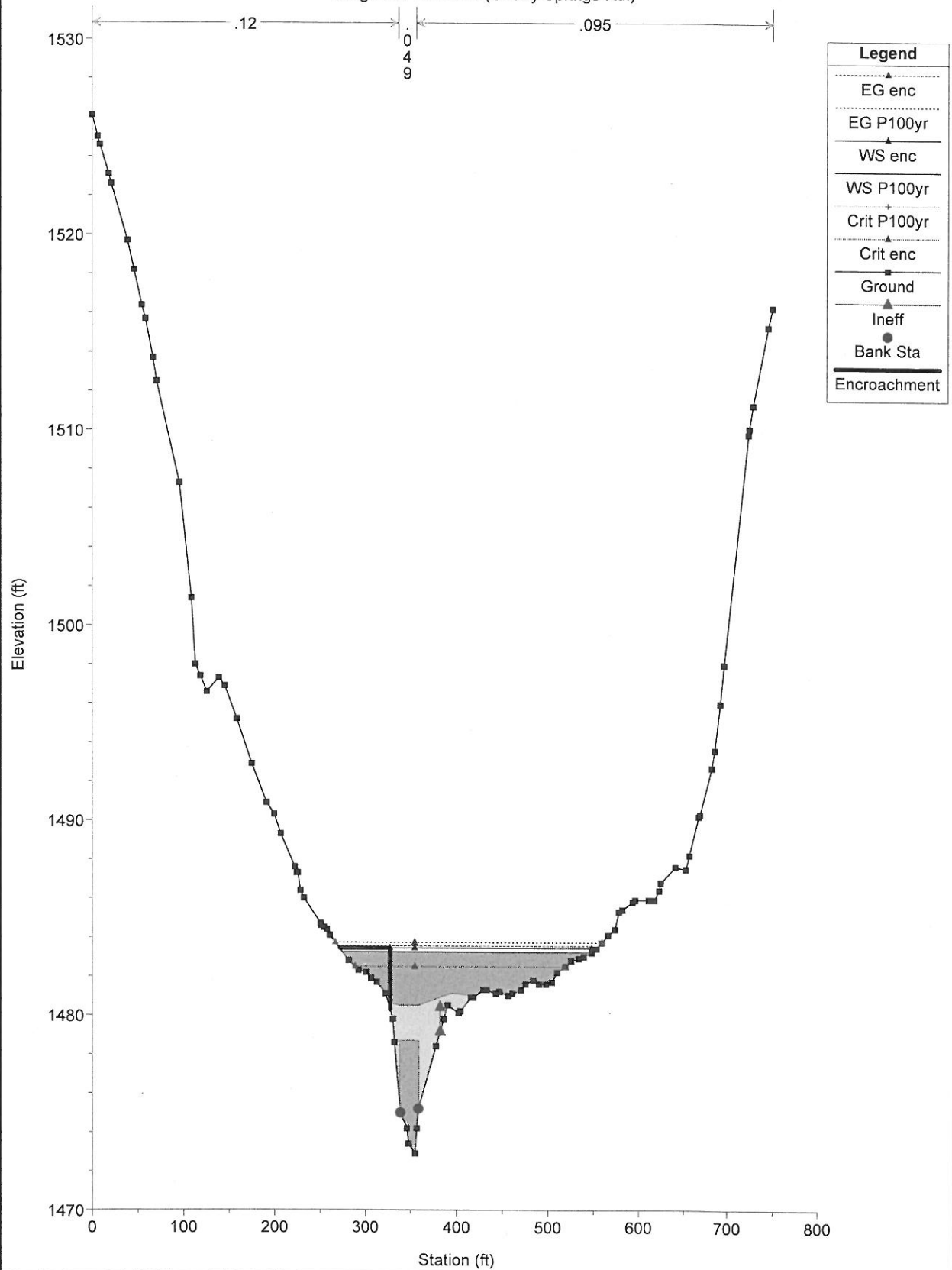
NC Division of Emergency Management (811) 211-46000 - http://www.ncemergency.com/info	National Flood Insurance Program 1-800-453-5230 - http://www.fema.gov/businessinfo
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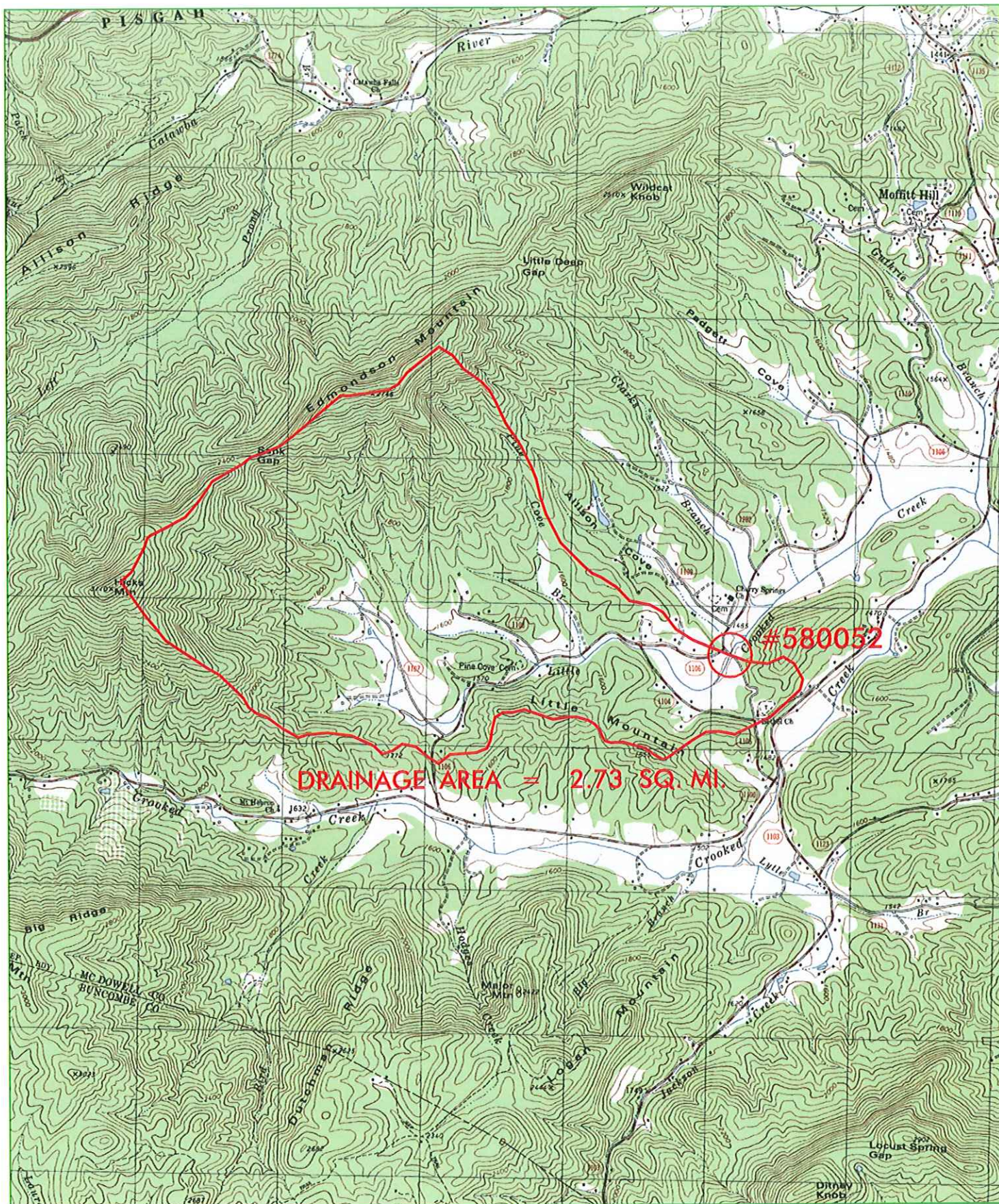


www.ncfloodmaps.com



Lt_Crooked_Cr Plan: Lt_Crooked_Cr 10/19/2005
 Bridge : 37111-0254 (Cherry Springs Rd.)





QUAD MAP - BRIDGE #580052

1,500 0 1,500 3,000
SCALE:



NOTE: THIS SITE IS LOCATED
IN A FLOOD HAZARD ZONE.
NO STUDY
(MOFFIT HILL, NC QUAD)

D.A. = 3.0 SQ. MI.

$Q_{25} = 1000 \text{ cfs}$
 $Q_{100} = 1500 \text{ cfs}$ } USGS

HISTORIC HIGHWATER INFORMATION

LOCAL RESIDENT
OVERTOPS ANY TIME FAST, HARD RAIN FALL
OCCURS EVERY COUPLE OF YEARS

KEN ANDERSON: BRG. MAINT.
NEVER HAD DEBRIS PROBLEM. NO BRG. OT,
MAY CROSS AT LOW POINT, HAS NOT BEEN
REPORTED TO HIM

EXISTING BRIDGE INFORMATION

O.A.L. = 20.6'
CL. RDWY. = 16.1'

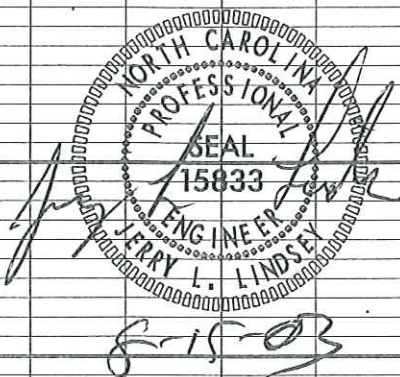
TIMBER DECK ON I-BEAMS
TIMBER ABUTMENTS AND WINGWALLS

BANKS ARE STABLE
BED MATERIAL = SAND & GRAVEL

DEBRIS POTENTIAL = MODERATE

EXISTING AREA = 95.3 sf
PROPOSED AREA = 226 sf

F.A. DESIGN FILE: BRG052.DSN



N.C.D.O.T.

DIVISION OF HIGHWAYS

McDOWELL COUNTY

BRG.#052 ON SR 1105
OVER CROOKED CR.

SCALE: 1" = 50' HORIZ.
1" = 10' VERT.

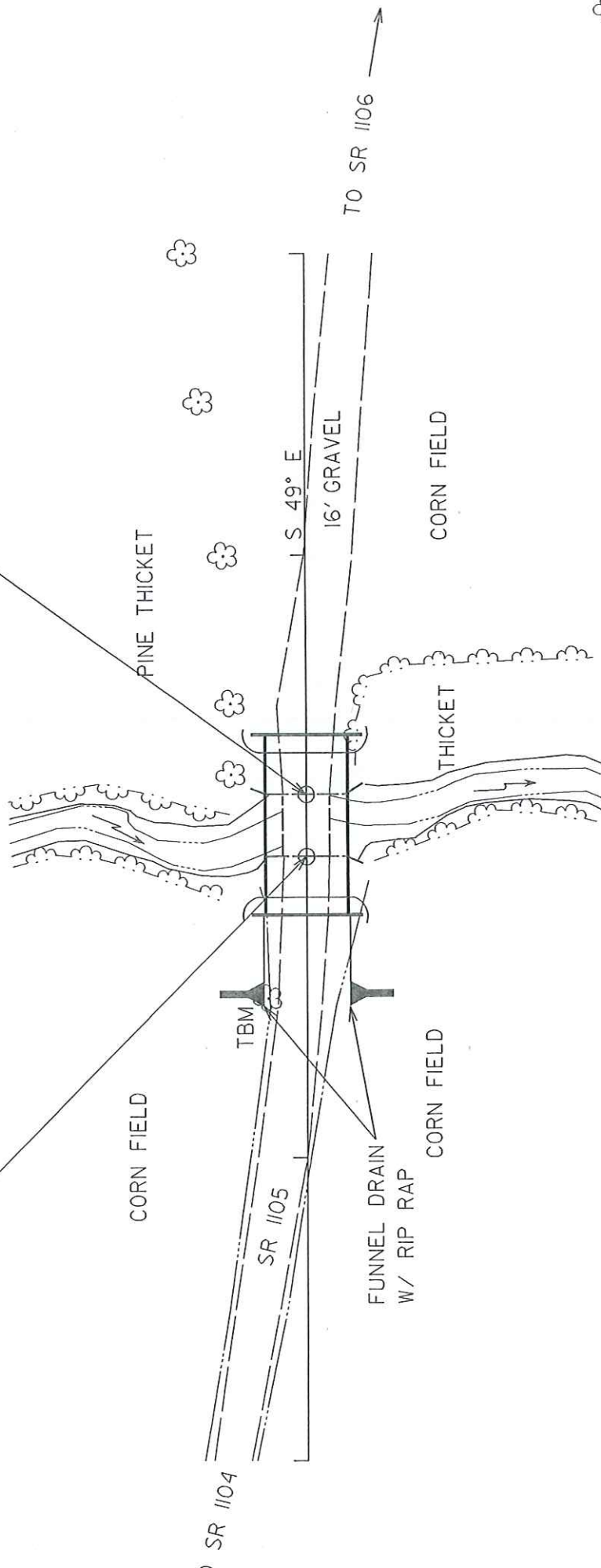
SURVEY BY: KJK, TGH, DS
DRAWN BY: KJK
DESIGN BY: KJK
CHECKED BY: RJD

1/03



STA. 10+00 B.O.B. (P.K.)

STA. 10+20.6 E.O.B. (P.K.)



11+00

10+00

9+00

8+00

D/S



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY MCDOWELL BRIDGE NUMBER 580292 INSPECTION CYCLE 2 YRS
ROUTE SR1104 ACROSS LITTLE CROOKED CR M.P. 0

LOCATION .02 MI.E.JCT.SR1106

SUPERSTRUCTURE 2 LNS.12'-4 X8'-4 ALUMINUM STR.PLATE PIPE ARCH;60'-6 ALONG

SUBSTRUCTURE CENTERLINE PIPE

SPANS

LONGITUDE <u>82° 11' 50.0"</u>	LATITUDE <u>35° 34' 44.5"</u>
PRESENT CONDITION <u>FAIR</u>	INVENTORY RATING <u></u>
INSPECTION DATE <u>06/07/2010</u>	OPERATING RATING <u></u>
PRESENT POSTING <u>Not Posted</u>	PROPOSED POSTING <u></u>
COMPUTER UPDATE <u></u>	ANALYSIS DATE <u></u>
POSTING LETTER DATE <u></u>	SUFFICIENCY RATING <u></u>
OTHER SIGNS PRESENT <u>NONE</u>	



LOOKING EAST

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>

D/S

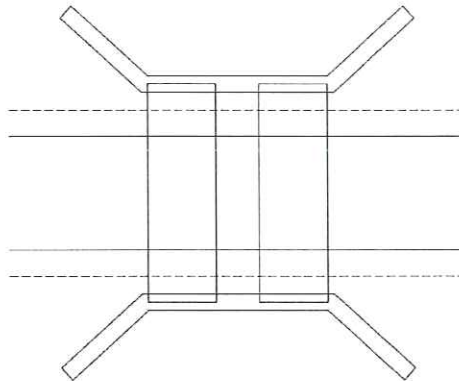
BRIDGE MANAGEMENT UNIT
DATA ON EXISTING STRUCTURE

Run Date: 07/27/2010

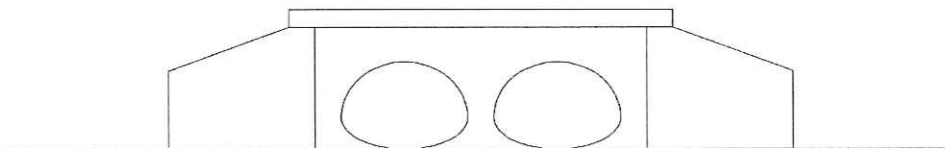
COUNTY :	DIV :	DIST :	STRUCTURE NUMBER :	LENGTH :
MCDOWELL	13	1	580292	30 FEET
ROUTE CARRIED :		FEATURE INTERSECTED :		
SR1104		LITTLE CROOKED CR		
LOCATED :		BRIDGE NAME :		CITY :
.02 MI.E.JCT.SR1106				
FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
09	NFA	NFA	100 1997	LT 000 RT 000
BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
1983	BMU	5.8751		HS 20+MOD
REHAB :	BY :	PROJ :	ALIGNMENT :	SKEW :
			TAN	90
			LANES :	ON 2 UNDER
NAVIGATION :			HT. CRN. TO BED :	WATER DEPTH :
VC	0.0	FT	HC	0.0
			FT	
			13	FT
				1
				FT
SUPERSTRUCTURE : 2 LNS.12'-4 X8'-4 ALUMINUM STR.PLATE PIPE ARCH;60'-6 ALONG				
SUBSTRUCTURE : CENTERLINE PIPE				
SPANS :				
BEAMS OR GIRDERS :				
FLOOR :		ENCROACHMENT :		DECK (OUT TO OUT) :
				0.0 FT
CLEAR ROADWAY :		BETWEEN RAILS :		SIDEWALK OR CURB :
0.0 FT		0.0 FT		LT 0.0 FT RT 0.0 FT
VERT.CL.OVER :		VERT.CL.UNDER :		HOR.CL.UNDER :
99 FT 99 IN		00 FT 00 IN		0.0 FT
INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :	
HS-20	HS-26		SV TTST DATE 02/11/1988	
SYSTEM :			GREEN LINE ROUTE :	
Secondary S.R. Route			N	
2ND OPENING :		3RD OPENING :		4TH OPENING :
				5TH OPENING :
REMARKS :				

D/S

Bridge Inspection Field Sketch



Crown of Roadway



Bed

Number of Barrels	Skew	Distance From Crown to Bed
2	90°	13ft
Length Along Center Line of Pipe		Length Along Center Line of Roadway
60.5ft		29.75ft

Barrel #	Width	Height	Distance From Previous Pipe	Scour at Inlet	Scour at Outlet	Type
1	12.333ft	8.333ft	3.000ft			Oblong
2	12.333ft	8.333ft				Oblong

VERIFIED 6/7/10 ME.RENFRO

Title			Description	
PIPES			PIPE DATA	
Bridge No:	580292	Drawn By:	MER	Date: 4/9/2008
			File Name: S0114001603	

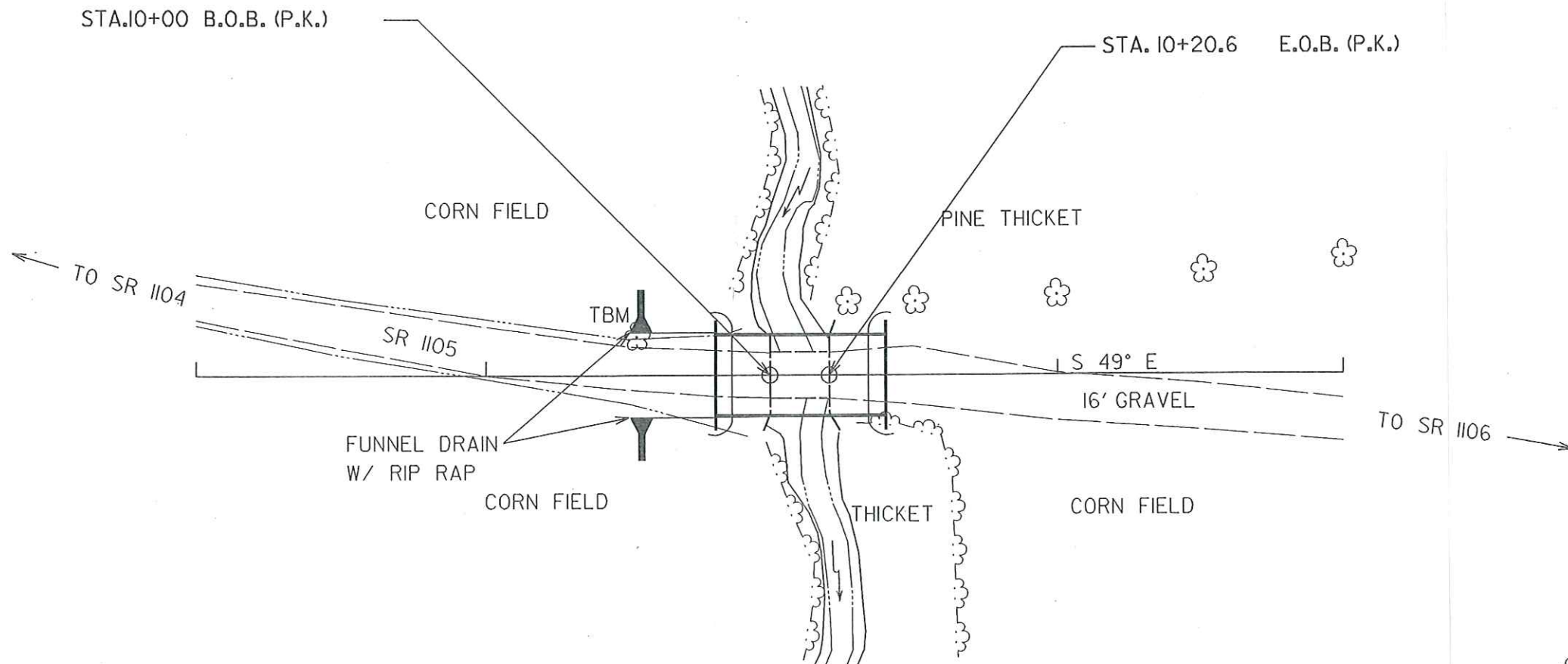
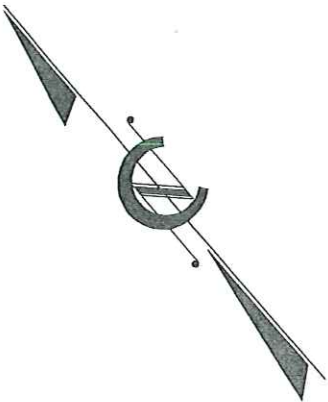
IS BRIDGE REPLACEMENT IS LOCATED
A 100YR FLOOD ZONE. THE PROPOSED
RUCTURE PROVIDES AS MUCH WATERWAY
ENING AS THE EXISTING STRUCTURE.

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
MC DOWELL COUNTY
SURVEY FOR REPLACEMENT OF
BR # 292 ON SR 1104 OVER LITTLE
CROOKED CREEK
SCALE: VERTICAL--1"=10'
HORIZONTAL--1"=50'
W.C. CALHOUN AUG. '82

CHECKED BY ALH.

RECOMMENDED STRUCTURE

1@ 60' PRE-STRESSED CONC.
CORED SLAB BRIDGE



10 DECK DRAINS
OVER OPEN WATER

(I.T.) CONTRACTION SCOUR

$$\left[\left(\frac{1386.7}{947.6} \right)^{.8571} - 1 \right] = 2.8'$$

