

Hydraulics Unit Pre-Design Report (Pre-Scoping) for Structure #: 020142

PDR

Date: 07/20/2016

County: Allegheny Stream: POTATOE CREEK
Road #: SR 1319 Road Name: PINEY POST OFFICE RD
Division: 11 Location: 0.5 M S JCT SR 1317
Latitude: 36.55043 Longitude: 81.26395 Decimal degrees, a min of 5 decimal points

Assigned to:
Prepared By: NAS/wsh
Hydro Mgr: PFF Hydro Reviewer: MTS
Project Type: 17BP.11.R.134

Existing Structure

Structure Type: RC Deck/ Timber Joists Yr Built: 1960
Span Arrangement: 1 @ 23' 8" OAL (ft): 24.0 Skew: Abutment Type: Vertical -Timber
Number of Barrels: @ Span (ft): x Rise (ft):
Bed to Crown (ft): 6.0 Clear Roadway (ft): Water Depth (ft): 1.0 Superstructure Depth:
ADT: 30 Year ADT: 2000 Scour Code (item113): Prior Survey Completed: Survey Date: 08/18/2015
Drainage Area: 5.4 Sq. Mi. Drainage Area Source: USGS Stream Stats Roadway Overtops at Q100:
Discharge Method: USGS Regression Equations USGS Region: 2- Mountain Stream Gage Number(if applicable):
Q10 (cfs): Q25 (cfs): 1,900 Q50 (cfs): 2,400 Q100 (cfs): 2,900 QBFE (cfs):
Structure in Flood Hazard Zone Panel #: 3022 Panel Date: 09/02/2009 Type of FIS: NO STUDY Date of FIS:

Environmental

Quad Map: MOUTH OF WILSON, VA River Basin: New Buffer Rule:
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: 0.3 M N JCT NC 93
Structure #: 020223 Route: SR 1319
Latitude: 36.54767 Longitude: 81.26219
Prior Survey Completed: Survey Date: Bed to Crown (ft): 6.0 Year Built: 1965
Structure Type: Timber Deck/ I Beams
Span Arrangement: 1 @ 23' 8" OAL (ft): 24.0
Number of Barrels: @ Span (ft): x Rise (ft):
Downstream Feature: Bridge
Location: 0.3 M S JCT SR 1317
Structure #: 020164 Route: SR 1319
Latitude: 36.55206 Longitude: 81.26620
Prior Survey Completed: Survey Date: Bed to Crown (ft): 6.0 Year Built: 1960
Structure Type: Timber Deck/ I Beams
Span Arrangement: 1 @ 25' 6" OAL (ft): 26.00
Number of Barrels: @ Span (ft): x Rise (ft):

Preliminary Structure Estimate [Office Estimate]

Structure Type: Skew:
Dimensions/Spans:

Notes

Stream# 05-07-01

OFFICE ESTIMATE:

PREDESIGN-SCOPING REPORT

Project# 17BP.11.R.134
 TIP# _____
 Let Date _____
 WBS# _____

County ALLEGHANY (DIV. 11)

Bridge# 020142
 Road# SR 1319 (PINEY POST OFFICE RD.)
 Stream POTATO CREEK

Type Of Request: POC Force Account TIP NCMA

Date 7/19/16 Name NAS

Assigned To PFF/MTS

Checked By Wsh 7-20-16

BRN: N/A Co. FILE YES - ATTACHED

Prior Survey Date 8/15 (attach copy of prior survey)

Study By Scour Section N/A

Flood Zone N/A Detail Study N/A Date 9/2/09 Panel# 3022 ☒

B.M. Info N/A (ESM DA = 5.03 SQ M.)

Quad Map MOUTH OF WILSON Drainage Area 5.41 SQ M From STREAMSTATS USGS

Q25 1900 CFS Q50 2400 CFS Q100 2900 CFS Method

LONG: 81.263948

LAT: 36.550428

NEW REG. EQU.
REGION 2 IA=0.24

EXISTING BRIDGE INFORMATION

Location 0.5 MI S. JCT. SR1317

Average Daily Traffic 30 (2000) (0% TRK) YEAR BUILT: 1960

Length L=24' Bed-To Crown 6' Water Depth 1'

Type Structure TIMBER FLOOR ON I-BEAMS

Type Spans 1 @ 23'-8" (E.BTS. TIMBER CAPS/TIMBER POST & SILLS @ VAR. CENTERS)

Upstream Structure 020223 (0.3 MI. N. JCT. NC93) YR. BUILT: 1965

Location ON PINEY POST OFFICE RD (SR 1319) (1 @ 21'-2") LONG: 81.262192

Bed-To Crown 6' (TIMBER FLOOR ON I-BEAMS) EY N/A LAT: 36.547672

Downstream Structure 020164 (0.3 MI. S. JCT. SR 1317) YR. BUILT: 1960

Location ON PINEY POST OFFICE RD (SR 1319) (1 @ 25'-6")

Bed-To Crown 6' (TIMBER FLOOR ON SAV. I-B) EY N/A LONG: 81.266197

LAT: 36.552069

ENVIRONMENTAL

TVA: NO

Trout Stream

YES

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 TR:+

STREAM #:

05-07-01

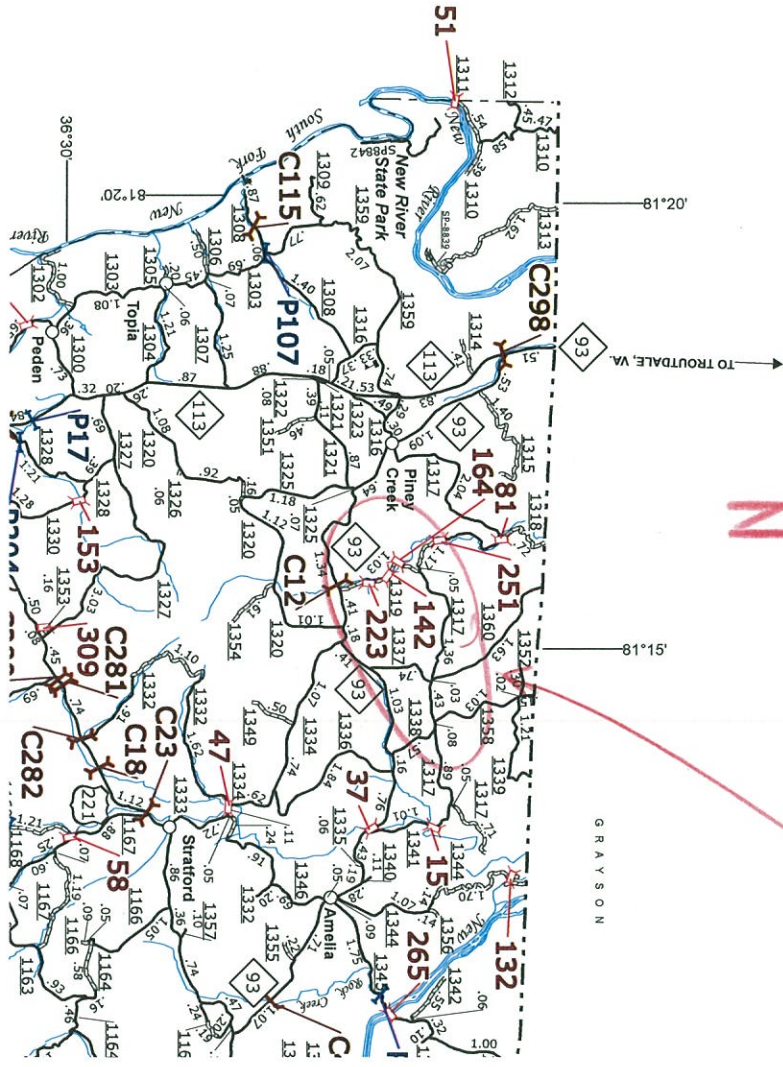
DENR River Basin Info.

NEW

1,3,20,28,26

#142

020142
(2 of 2)

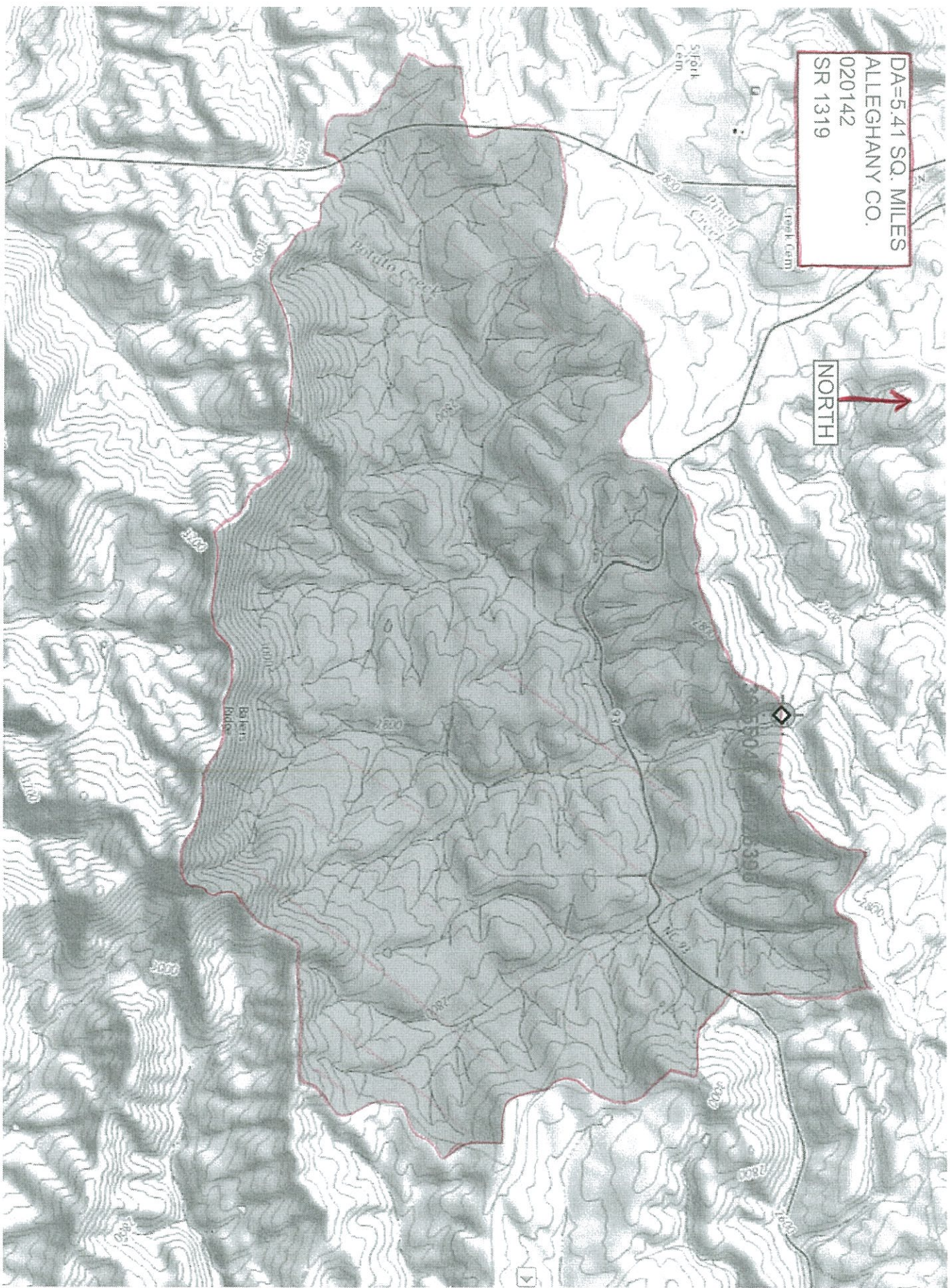


142

020142

DA=5.41 SQ. MILES
ALLEGHANY CO.
020142
SR 1319

NORTH



StreamStats Version 3.0

020142
(1 of 2)

Flow Statistics Ungaged Site Report

Date: Tues July 19, 2016 11:03:25 AM GMT-4

Study Area: North Carolina

NAD 1983 Latitude: 36.5504 (36 33 01)

NAD 1983 Longitude: -81.2639 (-81 15 50)

Drainage Area: 5.41 mi²

Peak Flows Region Grid Basin Characteristics			
100% Peak Southeast US over 1 sqmi 2009 5158 (5.41 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	5.41	1	9000
Percent Area in Region 1 (percent)	0.000	0	100
Percent Area in Region 2 (percent)	100.000	0	100
Percent Area in Region 3 (percent)	0.000	0	100
Percent Area in Region 4 (percent)	0.000	0	100
Percent Area in Region 5 (percent)	0.000	0	100

Urban Flows Region Grid Basin Characteristics			
Area in square miles=5.41			
Percent imperviousness of basin area 2006 NLCD=0.25			
Percentage of impervious area determined from NLCD 2011 impervious dataset=0.26			
100% Region 2 Urban Blue Ridge FS007-00 (5.41 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	5.41	0.04	41
Percent Impervious NLCD2011 (percent)	0.26 (below min value 2)	2	54.6

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	408	ft ³ /s	35		233	715
PK5	740	ft ³ /s	34		425	1290
PK10	999	ft ³ /s	35		564	1770
PK25	1350	ft ³ /s	38		736	2480
PK50	1610	ft ³ /s	40		847	3050
PK100	1920	ft ³ /s	42		976	3770
PK200	2190	ft ³ /s	44		1070	4460
PK500	2610	ft ³ /s	48		1220	5590

<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	46	ft ³ /s				

020142 (1 of 5)



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION

PMN'S ISSUED FOR SUBSTRUCTURE, TIMBER DECK
& NAILERS...

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY ALLEGHANY BRIDGE NUMBER 020142 INSPECTION CYCLE 2 YRS
ROUTE SR1319 ACROSS CREEK M.P. 0

LOCATION .5 MI.S.JCT.SR1317SUPERSTRUCTURE TIMBER FLOOR ON I-BEAMSSUBSTRUCTURE E.BTS:TIMBER CAPS/TIMBER POST&SILLS @ VAR. CENTERSSPANS 1 @ 23'-8LONGITUDE 81° 15' 50.21"LATITUDE 36° 33' 1.52"INSPECTION DATE 08/25/2014PRESENT CONDITION POORPRESENT POSTING Y SV 13, TTST 19 PROPOSED POSTING _____OTHER SIGNS PRESENT 4 DELINEATORS

SOUTH TO NORTH

Fracture Critical	<u>No</u>
Temporary Shoring	<u>No</u>
Scour Critical	<u>No</u>
Scour POA	<u>No</u>

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

020142 (2 of 5)

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 10/13/2014

COUNTY : ALLEGHANY DIVISION : 11 DISTRICT : 1 STRUCTURE NUMBER : 020142 LENGTH : 24 FEET

ROUTE CARRIED : SR1319 FEATURE INTERSECTED : POTATO CREEK

LOCATED : .5 MI.S.JCT.SR1317 BRIDGE NAME : CITY :

FUNC. CLASS : 09 SYST.ON : NFA SYST.UNDER : NFA ADT & YR : 30 2000 RAIL TYPE : LT 227 RT 227

BUILT : 1960 BY : BMU PROJ : FED.AID PROJ : DESIGN LOAD : Unknown

REHAB : BY : PROJ : ALIGNMENT : TAN SKEW : 87 LANES : ON 2 UNDER 0

NAVIGATION : VC 0 FT HC 0 FT HT. CRN. TO BED : 6 FT WATER DEPTH : 1 FT

SUPERSTRUCTURE : TIMBER FLOOR ON I-BEAMS

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

SPANS : 1 @ 23'-8

BEAMS OR GIRDERS : 9 LINES 10 I-BEAMS @ 2'-4 CENTERS

FLOOR : 4X8 TIM/.25 AWS ENCROACHMENT : DECK (OUT TO OUT) : 20.083 FT

CLEAR ROADWAY : 19.083 FT BETWEEN RAILS : 19.833 FT SIDEWALK OR CURB : LT .3 FT RT .3 FT

VERT.CL.OVER : 999.9 FT

INV.RTG. : HS-8 OPE.RTG. : HS-13 CONTR.MEMBER : Int.bms POSTED : SV 13 TTST 19 DATE 12/16/2008

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

UNDER ROUTES AND CLEARANCES

REMARKS :

020142 (S&S)

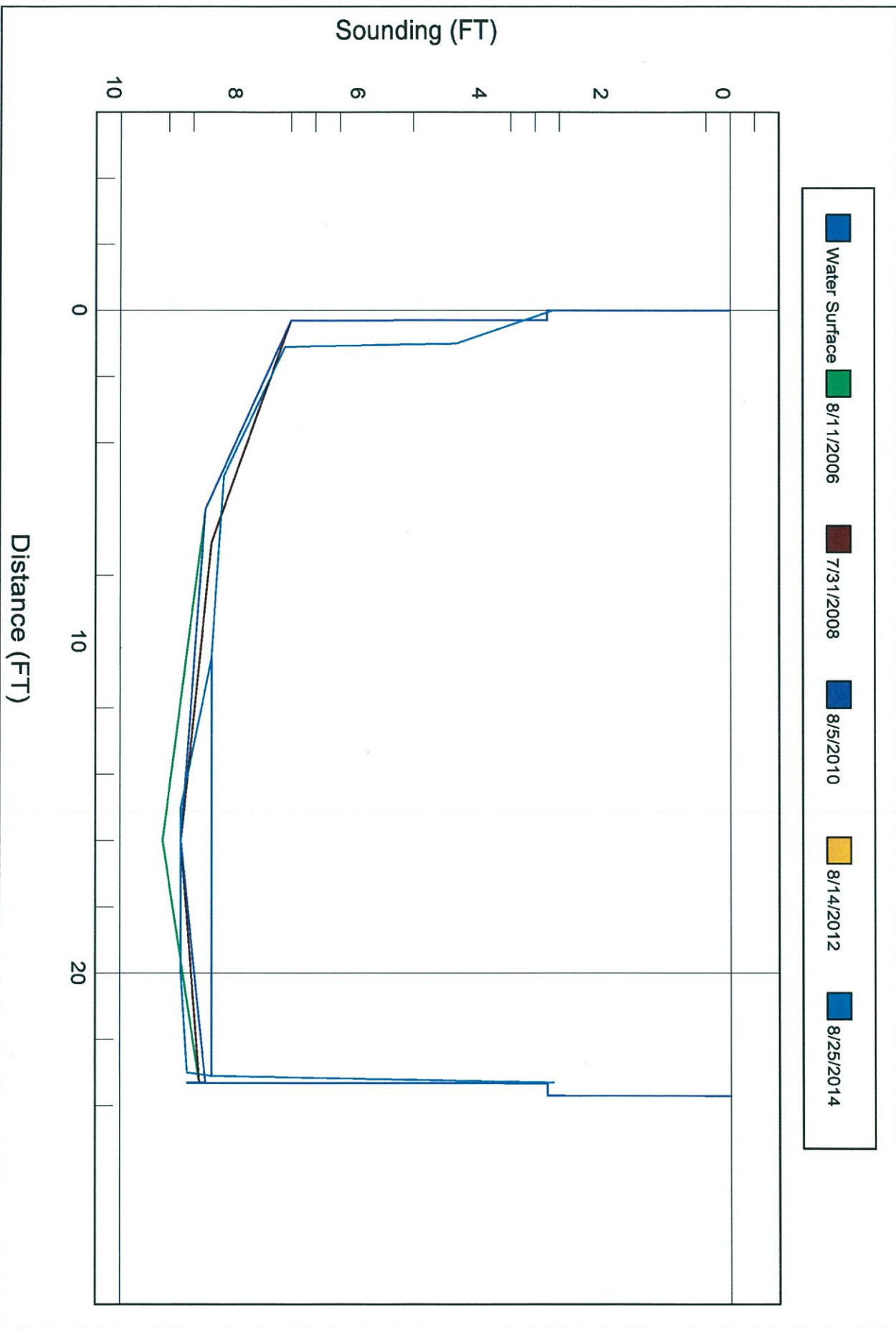
Bridge: 020142

County ALLEGHANY

Date: 08/25/2014

Top of Rail = 0 FT (Sounding)

STREAMBED PROFILE (Downstream)





DOWNSTREAM



EAST PROFILE

020142
(6 of 5)
Structure Photos

Structure 020142

County ALLEGHANY

Date: 08/25/2014



WEST PROFILE

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

Stream _____ Struct. Inv. No. 57...J.D. No SF-020057 Project No. J7BP.LR.U6...PDF FileCREEK_SR_1193.PDF 02 0057 2015 SF-020057 WATERFALLS WATERFALLS



RK&K ENGINEERS, LLP
900 RIDGEFIELD DRIVE, STE. 350
RALEIGH, NC 27609, LICENSE NO- F-0112

Date _____

Project Engineer : DOUG KELLER, P.E.

A circular professional engineer seal for Douglas M. Keller, North Carolina. The seal features the text "NORTH CAROLINA" at the top, "PROFESSIONAL" on the left, "ENGINEER" on the right, and "DOUGLAS M. KELLER" at the bottom. In the center, it reads "SEAL" and "038644". The seal is surrounded by a decorative border of small dots.

8/18/2015

SITE DATA

020172 (2 OF 6)

Drainage Area 3.9 SQ. MI. Source USGS QUAD - WHITEHEAD

River Basin NEW Character RURAL - BLUE RIDGE

Stream Classification (Such as Trout, High Quality Water, etc.) CLASS C, TROUT

Data on Existing Structure SINGLE SPAN, 1 @ 40'-6". TIMBER FLOOR ON I-BEAMS, TIMBER CAPS
ON POST AND SILLS, 9' BED TO CROWN Total Waterway Opening 152.6 s.f.
Waterway Opening Below 100yr. WS EL. 152.6 s.f.

Debris Potential: Low ☒ Moderate High

Data on Structures Up and Down Stream U/S: STR. NO. 020250 LOCATED ON SR 1132, 1 @ 18' SPAN
6' INV. TO CROWN, 19' OUT TO OUT

D/S: STR. NO. 020039 LOCATED ON SR 1193, 1 @ 28' SPAN, 14' INV. TO CROWN, 31' OUT TO OUT

Design Control Elev. 2955.2 (25-YEAR EXISTING @ RS 211) ft.

Gage Station No. N/A Period of Records N/A yrs.

Max. Discharge N/A c.f.s. Date N/A Frequency N/A

Historical Flood Information:

Date N/A Elev. NEVER ft. Est. Freq. N/A yr. Source DWAYNE LOVE, LOCAL Period of Knowledge 60+ yrs.
OT, HUGO HIT LC (APPROX. 2953.9') PROPERTY OWNER

Date N/A Elev. 2956.2 ft. Est. Freq. 25 yr. Source CHAD COX, NCDOT Period of Knowledge 20+ yrs.

Date Elev. ft. Est. Freq. yr. Source Period of Knowledge yrs.

Historical Scour Info. : General N/A ft. Contraction N/A ft. Local N/A ft.

Channel Slope 0.007 f/ft Source FIELD SURVEY Normal Water Surface Elev. 2950.0 ft.

Manning's n: Left 0.80, 0.04/0.10 Channel 0.04 Right 0.80, 0.04/0.10 Source FIELD OBSERVATION

Flood Study /Status N/A Floodway Established? N/A

Flood Study 100yr. Discharge N/A c.f.s. WS Elev.: Floodway With N/A ft. Without N/A ft.
@ River Station N/A

DESIGN DATA

Hydrological Method USGS RURAL REGRESSION EQUATIONS (SIR 2009-5158)

Hydraulic Design Method HEC-RAS 4.1.0 (020057_Waterfalls_Creek_SR1193.prj)

Floods Evaluated:	Freq. (yr.)	Q (c.f.s.)	Elev. (ft.)	Backwater (ft.)	Bridge Opening Velocity (f.p.s.)
@ River Station 211	10-YR	800	2953.2	0.5	5.5
	25-YR	1100	2954.0	0.6	6.0
	50-YR	1300	2954.3	0.6	6.5
	100-YR	1500	2954.64	0.7	7.0
	500-YR	2100	2956.9	2.5	7.0

Waterway Opening Provided Below: Design W.S. Elev. 202.9 s.f., 100yr W.S. Elev. 238.7 s.f., Total 301.7 s.f.,

Average Channel Velocity (Design) 5.1 f.p.s. Average Overbank Velocity (Design) 1.6/1.2 f.p.s.
@ APPROACH RS 290.1

Computed Scour: General N/A ft. Contraction 2.1 ft. Local N/A ft.

Is a Floodway Revision Required? NO

020142 (3 of 6)

INFORMATION TO BE SHOWN ON PLANS

WS EL. Taken @ River Station 211

Design: Discharge 1100 c.f.s. Frequency 25 yr. Elev. 2954.0 ft.
Base Flood: Discharge 1500 c.f.s. Frequency 100 yr. Elev. 2954.64 ft.
Overtopping: Discharge 2100 c.f.s. Frequency 500+/- yr. Elev. 2956.9 ft.

*OVERTOPPING ELEVATION IS AT -L- 12+23.19 AT THE SUPERELEVATION TRANSITION

ADDITIONAL INFORMATION AND COMPUTATIONS

DRAINAGE AREA= 3.9 SQ. MI.

100% HYDROLOGIC REGION 2

RURAL BLUE RIDGE

SIR 2009-5158

$Q_{10} = 288 \text{ (DA)}^{0.736} = 788 \text{ C.F.S.}$ SAY 800 C.F.S.

$Q_{25} = 398 \text{ (DA)}^{0.724} = 1070 \text{ C.F.S.}$ SAY 1100 C.F.S.

$Q_{50} = 479 \text{ (DA)}^{0.718} = 1280 \text{ C.F.S.}$ SAY 1300 C.F.S.

$Q_{100} = 575 \text{ (DA)}^{0.713} = 1520 \text{ C.F.S.}$ SAY 1500 C.F.S.

$Q_{500} = 794 \text{ (DA)}^{0.704} = 2080 \text{ C.F.S.}$ SAY 2100 C.F.S.

SCOUR (HEC-18, 5th ED. APRIL 2012)

LIVE BED

CONTRACTION SCOUR (100 YR):

$Y_2 = Y_1 [Q_2/Q_1]^{67} [W_1/W_2]^{KT}$ $Y_s = Y_2 - Y_o$

$K_1 = 0.69$ $Y_1 = 6.4 \text{ ft}$ $Q_2 = 789.5 \text{ cfs}$ $Q_1 = 700.0 \text{ cfs}$ $W_1 = 20.5 \text{ ft}$ $W_2 = 17.0 \text{ ft}$

$Y_2 = 6.4 [789.5 / 700.0]^{67} [20.5 / 17.0]^{0.69} = 8.1 \text{ ft}$

$Y_s = 8.1 - 6.0 = 2.1 \text{ ft}$

ADDITIONAL NOTES

DESIGN FOLLOWS SUBREGIONAL TIER GUIDELINES

2,990

10+00

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

2,980

2,970

2,960

2,950

2,940

EXISTING GRADE

PROPOSED
GRADE

NATURAL GROUND

10+00

SPRING

EXISTING R/W PER ABSTRACT

TO MEADOWFORK RD

SR-1193 CLEARY ROAD

NC GRID
NAD 83/2011

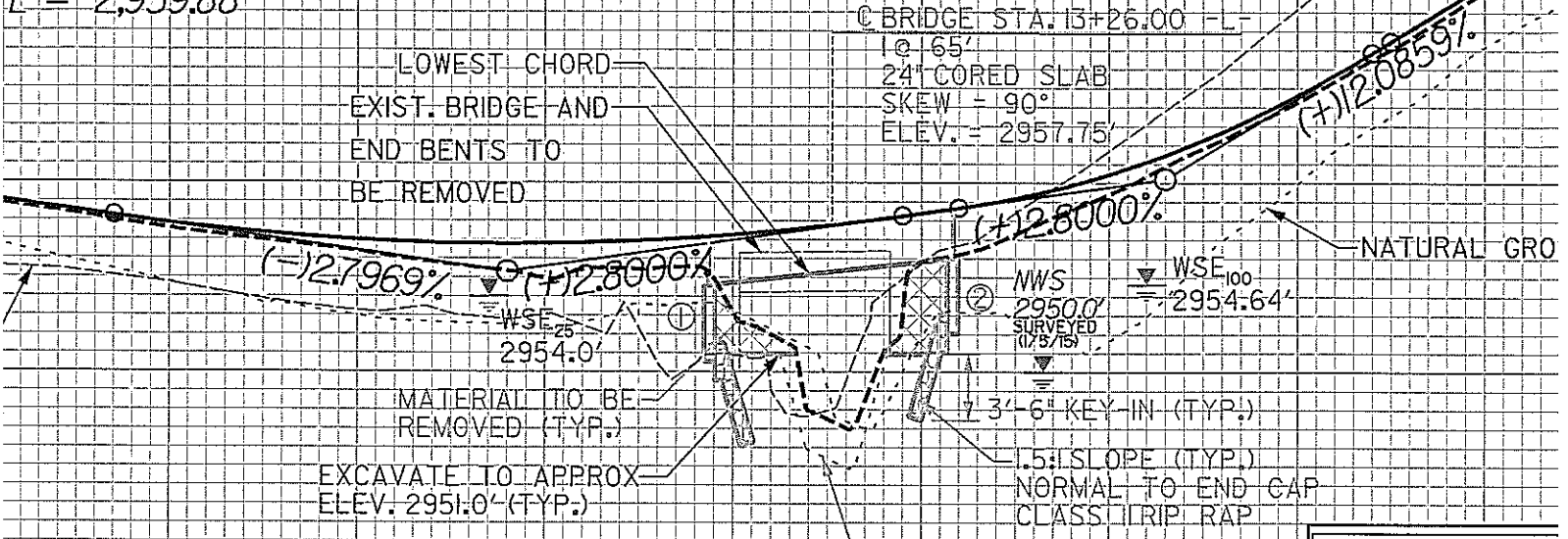
00 12+00 13+00 14+00 15+00

PI = 15+25.1
EL = 2,973.0
VC = 100'
K = 52
V = 35MPH

PI = 12+40.00
EL = 2,955.30'
VC = 210'
K = 38
V = 30MPH

PI = 14+15.00
EL = 2,960.20'
VC = 110'
K = 12
V = 15MPH
K(exist) = 9

BEGIN PROJECT
L- STA. 10+76.00
L = 2,959.88

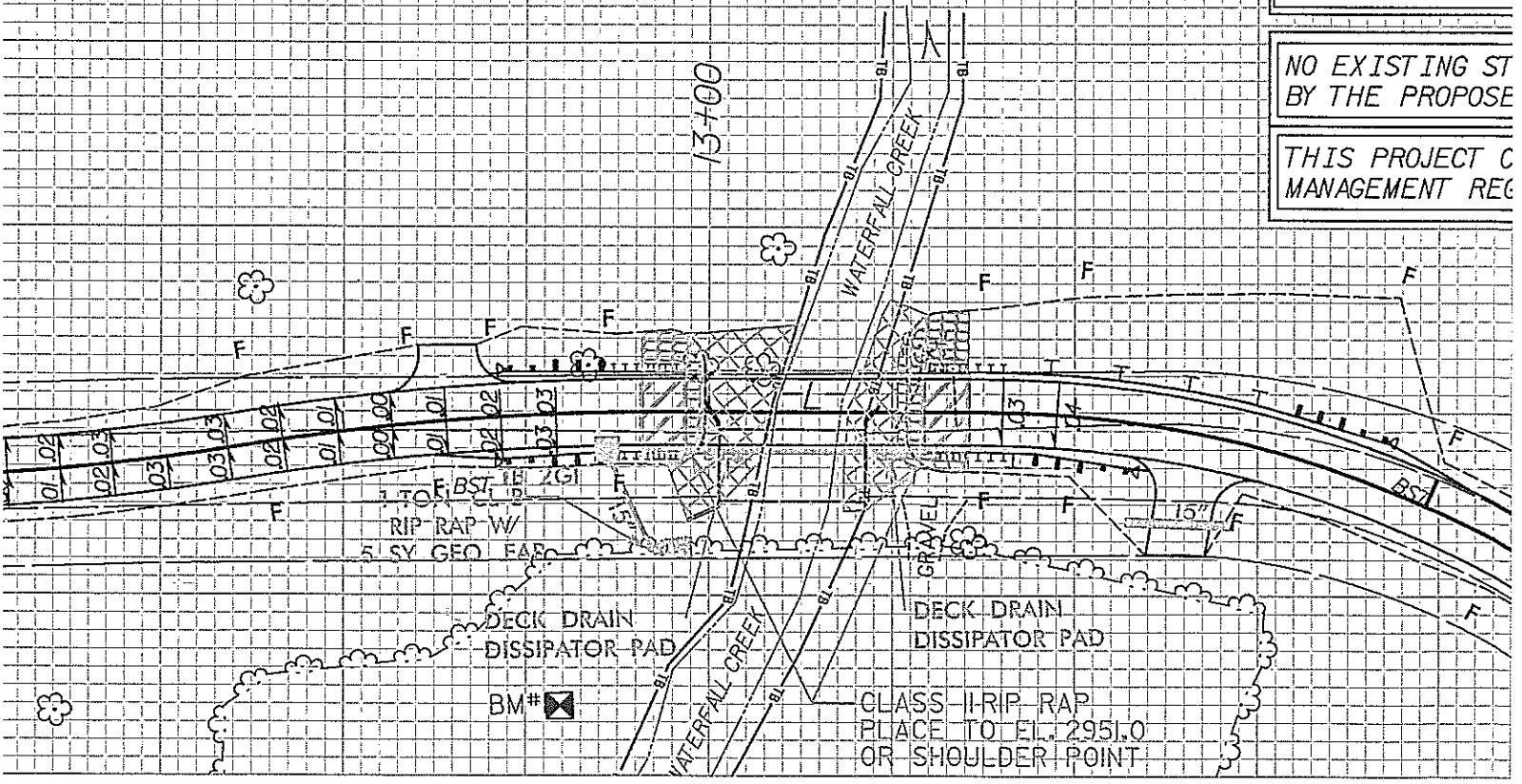


EXISTING LEVEL MAINTAINED.

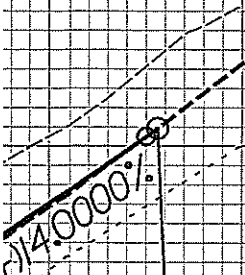
BED MATERIAL: G
FLOODPLAIN: HIGH

NO EXISTING ST
BY THE PROPOSE

THIS PROJECT C
MANAGEMENT REC



16+00



NCDOT PERFORMANCE TABLE					
	FREQUENCY				
	10yr.	25yr.	50yr.	100yr.	500yr.
NATURAL	2952.7	2953.4	2953.7	2953.94	2954.4
EXISTING	2954.5	2955.2	2956.4	2956.87	2957.7
PROPOSED	2953.2	2954.0	2954.3	2954.64	2956.9

@SECTION 211
18.5 FT. FROM US FACE OF BRIDGE

END PROJECT

-L- STA. 15+78.00

EL = 2,980.91

EXCAVATION

AREA 1 = 54 CY
AREA 2 = 95 CY
TOTAL = 149 CY

SPREAD ANALYSIS

(w/out Deck Drains)
DA = 0.05 acres
I = 4 in./hr.
C = 0.9
Q = 0.10 cfs
LONGITUDINAL SLOPE = 0.011 f/ft
CROSS SLOPE = 0.03 f/ft
SHOULDER WIDTH = 1.92 FT.
SPREAD = 2.73 FT.

SPREAD ANALYSIS

(w/Deck Drains)
DA = 0.01 acres
I = 4 in./hr.
C = 0.9
Q = 0.05 cfs
LONGITUDINAL SLOPE = 0.011 f/ft
CROSS SLOPE = 0.03 f/ft
SHOULDER WIDTH = 1.92 FT.
SPREAD = 1.80 FT.

*DECK DRAINS ADDED TO REDUCE DISCHARGE SO
NO DRAINAGE STRUCTURE WOULD BE REQUIRED

DECK DRAINS REQUIRED

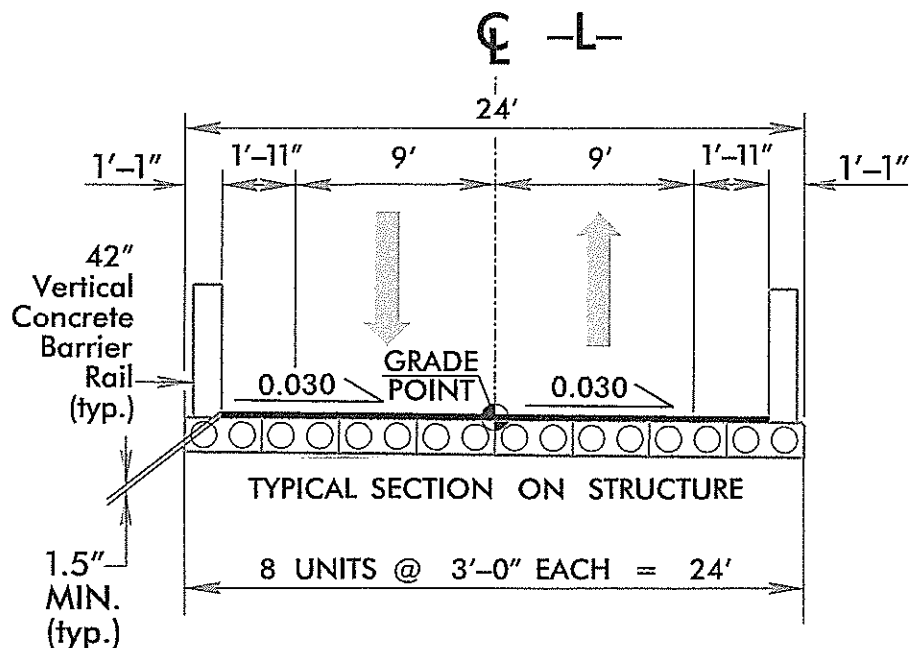
8" X 6" (4" ABOVE AWS)
SLOTS ON 3'-0" CENTERS
FROM STA. 13+47.56 RT. TO STA. 13+50.56 RT.
FROM STA. 13+00.69 RT. TO STA. 13+09.69 RT.

SERVICE IS BEING

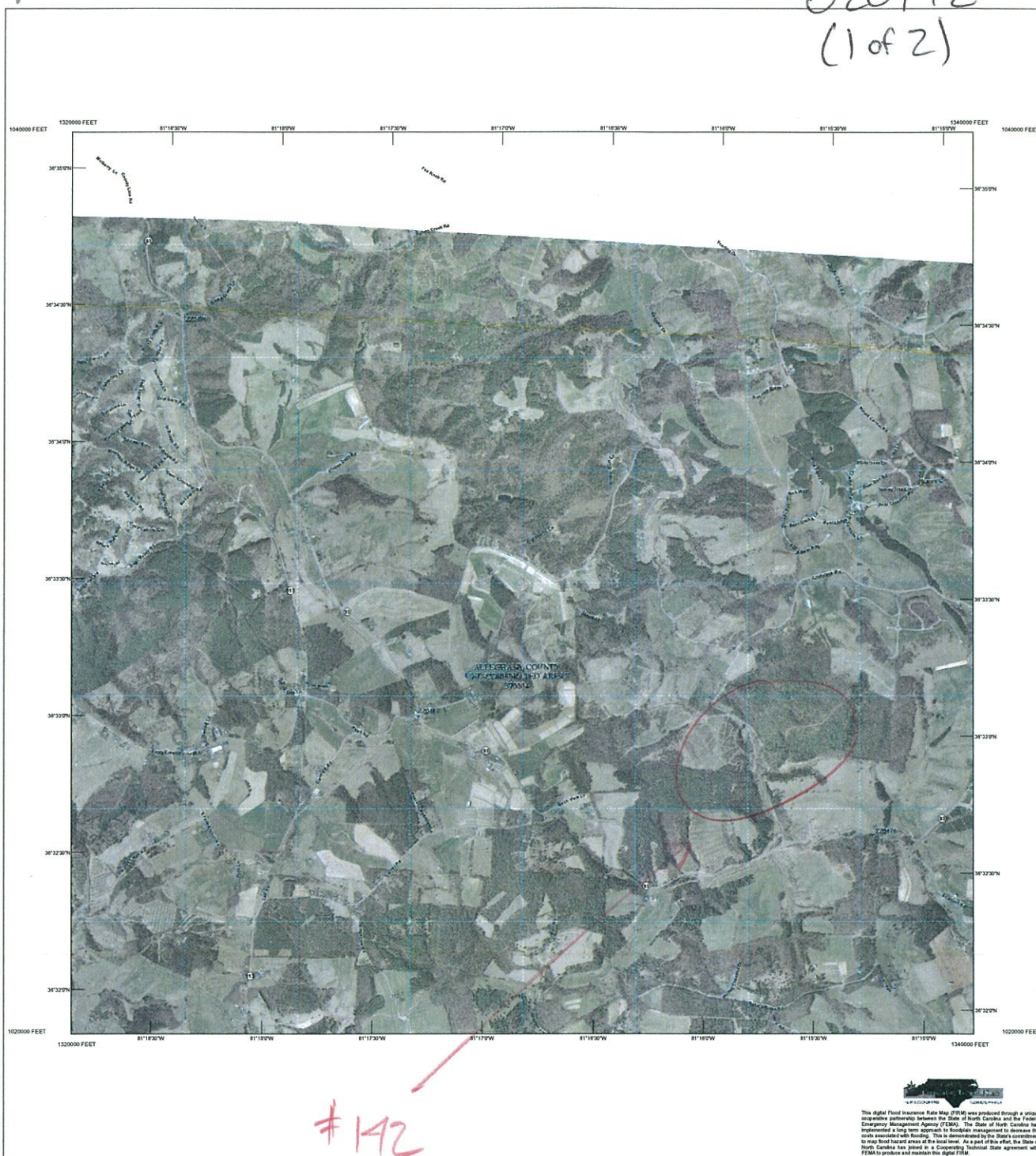
AND BOULDERS
DENSE BRUSH & TREES.

URES WILL BE IMPACTED
RIDGE.

IES WITH LOCAL FLOODPLAIN
IONS.



TYPICAL SECTION NO. 3



020142
(2 of 2)



#142

36°32'30"N

36°33'0"N