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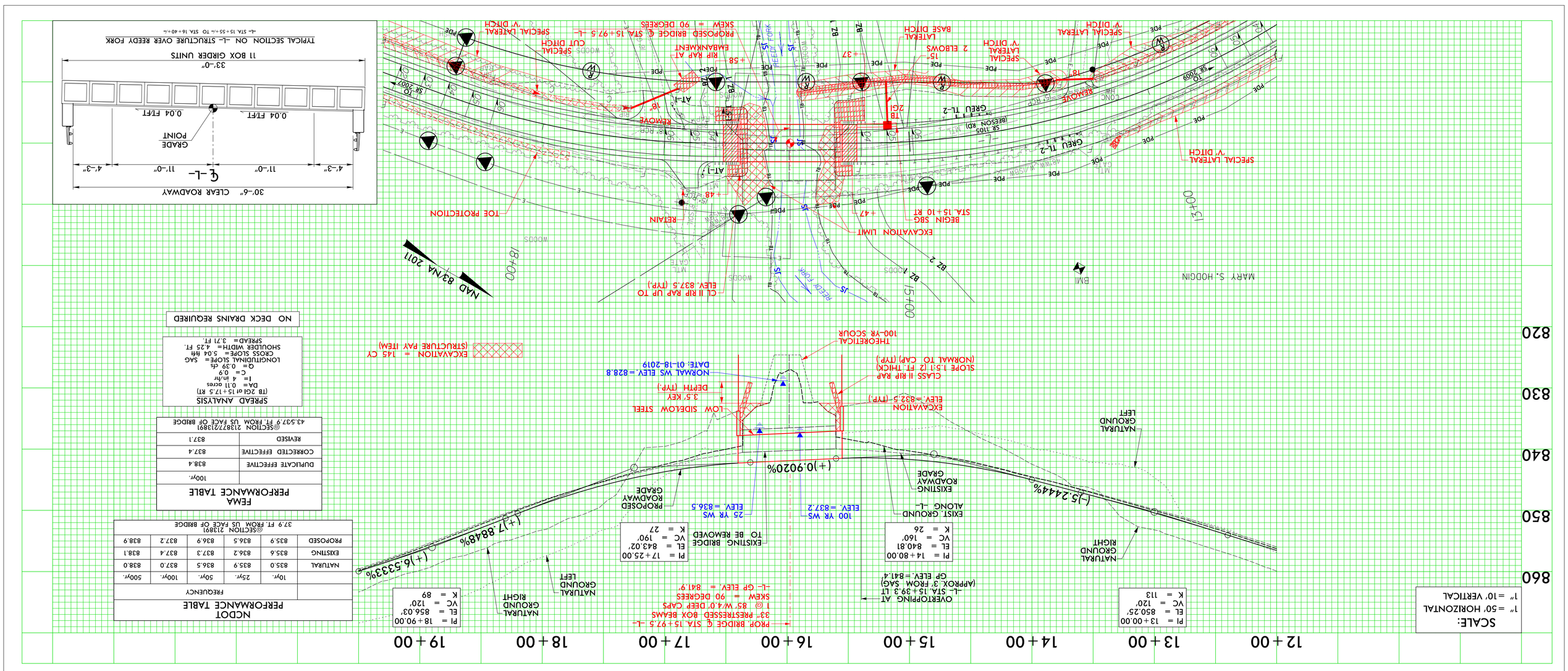

INFORMATION TO BE SHOWN ON PLANS

WS EL. Taken @ River Station 213891

Design: Discharge 1,700 c.f.s. Frequency 25 yr. Elev. 836.5 ft.

Base Flood: Discharge 2,300 c.f.s. Frequency 100 yr. Elev. 837.2 ft.

Overtopping: Discharge 6,600 c.f.s. Frequency 500+ yr. Elev. *842.0 ft.

*OT OCCURS AT -L- STA. 15+39.3 LT (APPROX. 3' FROM SAG LOCATION) DUE TO SUPERELEVATION ROLLOVER

ADDITIONAL INFORMATION AND COMPUTATIONS

USGS URBAN REGRESSION EQUATIONS FROM SCIENTIFIC INVESTIGATIONS REPORT 2014–5030

DA = 4.58 SQ. MI. DA AT GAGED LOCATION = 20.6 SQ. MI.

DRAINAGE AREA RATIO IS NOT BETWEEN 0.5 AND 1.5 SO FLOW CALCULATIONS WERE NOT ADJUSTED DUE TO THE GAGED LOCATION

IMPERVIOUS AREA % = 12.1% (FUTURE IMPERVIOUS FROM GUILFORD COUNTY ZONING DATA)

REGION 1 – PIEDMONT

REGION 1, 3 SQ. MI. ≤ DA ≤ 436 SQ. MI.		SAY	PRELIMINARY HEC–RAS DISCHARGE
Q_{10} =	$484\ (4.58)^{0.5539}\ 10^{0.0060*12.1}$ = 1,329 cfs	1,300 cfs	1,159 cfs
Q_{25} =	$657\ (4.58)^{0.5470}\ 10^{0.0046*12.1}$ = 1,717 cfs	1,700 cfs	1,671 cfs
Q_{50} =	$794\ (4.58)^{0.5428}\ 10^{0.0037*12.1}$ = 2,011 cfs	2,000 cfs	1,941 cfs
Q_{100} =	$941\ (4.58)^{0.5386}\ 10^{0.0028*12.1}$ = 2,309 cfs	2,300 cfs	2,205 cfs
Q_{500} =	$1319\ (4.58)^{0.5305}\ 10^{0.0011*12.1}$ = 3,049 cfs	3,000 cfs	2,956 cfs

AFTER COMPARISON, THE 100–YR DISCHARGE FROM THE PRELIMINARY HEC–RAS MODEL SHOULD BE USED FOR FEMA COMPLIANCE AND USGS DISCHARGES SHOULD BE USED FOR DESIGN.

LIVE–BED CONTRACTION SCOUR: (HEC–18, 5TH ED., APRIL 2012)

$Y_2 = Y_1 [Q_2/Q_1]^{6/7} [W_1/W_2]^{K1}$

Ys = Y_2–Yo Yo = 8.41

RS 214026: W_1 = 29.33 Q_1 = 1273.03 Y_1 = 8.32 K1 = 0.69

RS 213820 BR: W_2 = 28.25 Q_2 = 1678.41

$Y_2 = 8.32\ [1678.41/1273.03]^{6/7}\ [29.33/28.25]^{0.69} = 10.82$

Ys_{100-YR} = 10.82 – 8.41 = **2.41 ft.**

NOTES:

1. NO UPSTREAM OR DOWNSTREAM STRUCTURES THAT WERE IN PLACE AT THE TIME THIS PROJECT WAS DESIGNED WILL BE ADVERSELY AFFECTED BY THE PROPOSED BRIDGE.
2. STREAM BED MATERIAL IS SAND WITH SMALL COBBLES.

SITE DATA

Drainage Area 4.58 SQ. MI. Source USGS STREAM STATS/USGS QUAD MAP

River Basin CAPE FEAR Character REGION 1–PIEDMONT

Stream Classification (Such as Trout, High Quality Water, etc.) WS–III; NSW

Data on Existing Structure 2 SPANS, 2@38'–2" STEEL DECK ON I–BEAMS W/STEEL CAPS ON PILES, 25'–11" OUT TO OUT WIDTH, 12' CROWN TO BED Total Waterway Opening 363.1 s.f. Waterway Opening Below 100yr. WS EL. 363.1 s.f.

Debris Potential: Low Moderate X High

Data on Structures Up and Down Stream UPSTREAM STR. NO. 400341 ON SR 2001, 1.0 MILE UPSTREAM; ONE BARREL, 1 @ 34.4' X 13.1' ALUM. BC; 15' BED TO CROWN. DOWNSTREAM STR. NO. 400088 ON SR 2007, 1.0 MILE DOWNSTREAM; 3 SPANS, 1@36'–1", 1@35'–1", 1@36'–1"; CORED SLAB; 18' BED TO CROWN

Design Control Elev. 837.4 ft. (CORRECTED EFFECTIVE @ RS 213891 – FEMA 100–YR)

Gage Station No. 02093800 Period of Records 1955 – 2019 yrs.

Max. Discharge 3,950 c.f.s. Date OCT. 10, 1959 Frequency 500+

Historical Flood Information:

Date 9/2018 Elev. 841.5 ft. Est. Freq. 500+ yr. Source JEFFREY BROWN (NCDOT DIV. 7 TRANSPORTATION SUPERVISOR) Period of Knowledge N/A yrs.

Date 1/2019 Elev. 836.5 ft. Est. Freq. 50 yr. Source RECENT HIGH WATER (SURVEYED ON 1/18/2019) Period of Knowledge N/A yrs.

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

Historical Scour Info. : General N/A ft. Contraction 5'–8' ft. Local 2' ft.

Channel Slope 0.0005 ft/ft Source FIELD SURVEY Normal Water Surface Elev. 828.8 ft.

Manning's n: Left O.B. 0.08–0.14 Channel 0.04–0.043 Right O.B. 0.10–0.14 Source FIELD SURVEY

Flood Study /Status FEMA PRELIMINARY DETAILED STUDY – ZONE AE, PANEL #7806 Floodway Established? YES

Flood Study 100yr. Discharge 2,205 c.f.s. WS Elev.: With Floodway 838.4 ft. Without Floodway 838.4 ft. @ River Station 213877

DESIGN DATA

Hydrological Method USGS URBAN REGRESSION EQUATIONS (SIR 2014–5030)

Hydraulic Design Method HEC–RAS 5.0.6 FILENAME: Reedy Fork US.prj

Floods Evaluated:

@ River Station 213891	Freq. (yr.)	Q (c.f.s)	Elev. (ft.)	Backwater (ft.)	Bridge Opening	Velocity (f.p.s.)
	10–YR	1,300	835.9	0.9		4.1
	25–YR	1,700	836.5	0.6		4.5
	50–YR	2,000	836.9	0.4		4.9
	100–YR	2,300	837.2	0.2		5.2
	500–YR	3,000	838.9	0.9		5.4

Waterway Opening Provided Below: Design W.S. Elev. 378.4 s.f., 100yr W.S. Elev. 450.0 s.f., Total 554.4 s.f., LT = 1.1 RT = 0.8

Average Channel Velocity (Design) 5.0 f.p.s. Average Overbank Velocity (Design) f.p.s.

Computed Scour : General N/A ft. Contraction 2.4 ft. Local N/A ft.

Is a Floodway Revision Required? MOA TYPE 2A (MAXIMUM DECREASE = 0.3')

BRIDGE SURVEY & HYDRAULIC DESIGN REPORT

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

I.D. No. SF–400085 Project No. 17BP.7.R.131 Proj. Station 15+97.5 –L–

County GUILFORD Bridge Over REEDY FORK Bridge Inv. No. 0085

On Highway SR 1858 (BEESON RD) Between SR 2009 (COUNTY LINE RD) and SR 2007 (N BUNKER HILL RD)

Recommended Structure 1 SPAN, 33" PRESTRESSED BOX BEAMS, 1@85' w/4' DEEP CAPS

Recommended Width of Roadway 30'–6" CLEAR ROADWAY Skew 90°

Recommended Location is (Up, ~~At, Down) Stream from Existing Crossing.~~ 19.4' UPSTREAM

Latitude 36.13355 Longitude –80.01423

Statewide Tier ☐ Regional Tier ☐ Sub–Regional Tier ☒

Bench Mark is BM1, –L– STA. 13+88.63, 123.27' LT, RAILROAD SPIKE SET IN 15" WALNUT TREE

Northing 869292 Easting 1700456 Elev. 837.83 ft. Datum: NAVD 88

Temporary Crossing NOT REQUIRED, OFFSITE DETOUR PROVIDED

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www.mottmac.com
NC LICENSE NO. F–0669

Designed by: DocuSigned by: 3286E7A2ED1E...
Assisted by: TJC
Project Engineer : ELENI M. RIGGS, PE
Reviewed by: DocuSigned by: Erik Seiler 914DF6C33CF245D...
Date

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036893 ELENI M. RIGGS
DocuSigned by: 4/16/2019

Stream REEDY FORK Struc. Inv. No. 0085 I.D. No. SF–400085 Project No. 17BP.7.R.131 PDF File 40 0085 2019 SF–400085 REEDY FORK SR 1858.PDF