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This file or an individual page shall not be considered a certified document.

09/08/99

TIP PROJECT: 17BP.12.R.93

CONTRACT: DL00186

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.93	1	

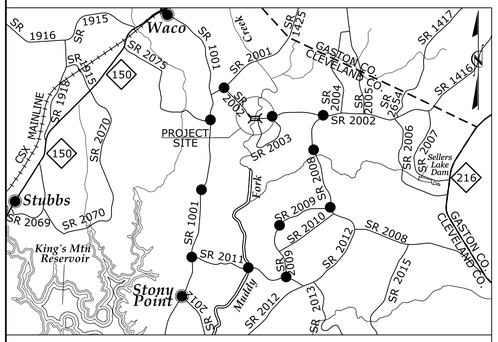
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46105.1.1	BRSTP-2002(1)	PE
46105.2.1		R/W, UTIL
17BP.12.R.93		CONST.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

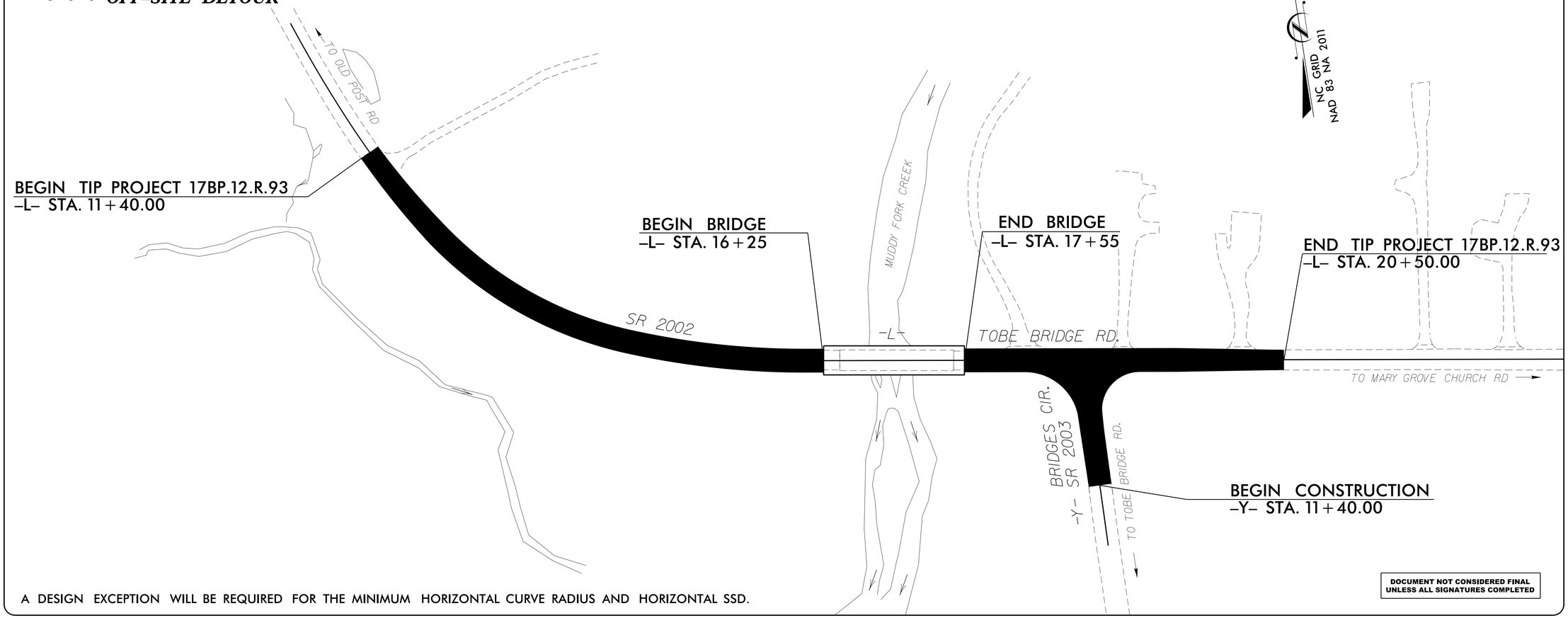
CLEVELAND COUNTY

LOCATION: BRIDGE 31 OVER MUDDY FORK CREEK ON SR 2002

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



VICINITY MAP
OFF-SITE DETOUR



A DESIGN EXCEPTION WILL BE REQUIRED FOR THE MINIMUM HORIZONTAL CURVE RADIUS AND HORIZONTAL SSD.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2018 = 1214
ADT 2038 = 1668
K = 10 %
D = 60 %
T = 5 % *
V = 50 MPH
* TTST =1% DUAL =4%
FUNC CLASS =
RURAL COLLECTOR
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT 17BP.12.R.93 = 0.147 MI.
LENGTH OF STRUCTURES TIP PROJECT 17BP.12.R.93 = 0.025 MI.
TOTAL LENGTH OF TIP PROJECT 17BP.12.R.93 = 0.172 MI.

Prepared in the Office of:
DIVISION OF HIGHWAYS
1710 East Marion St., Shelby NC, 28150

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 21, 2017

LETTING DATE:
OCTOBER 23, 2018

STEVEN D. RACKLEY, PE
PROJECT ENGINEER

BRYAN K. SOWELL, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 034349 ENGINEER PAUL A. JORDAN
DocuSigned by: Paul A. Jordan 9B4554370F1E46C... P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026964 ENGINEER BRYAN K. SOWELL
DocuSigned by: 10/10/2018 50D3B4A4F124FC... P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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bksowell AT DIVI2-297505

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026964 ENGINEER Bryan C. Key

DocuSigned by: 32BC39A9AF124FC...

10/2/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEETS
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1 THRU 2C-2	SPECIAL DETAILS (STRUCTURE ANCHOR UNIT TYPE III & W BEAM RAIL SECTION)
3B-1	ROADWAY SUMMARIES
3D-1	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
4 THRU 5	PLAN AND PROFILE SHEET
TMP-1 THRU TMP-3	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-3	SIGNING PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1A THRU X-1	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-6	CROSS-SECTIONS
S-1 THRU S-24	STRUCTURE PLANS

GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3 FOOT RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE CLEVELAND COUNTY WATER.

RUTHERFORD EMC, AT&T, CHARTER CABLE

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

EFF. 01-16-2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
840.72	Pipe Collar
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

8/17/99

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12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

***S.U.E. = Subsurface Utility Engineering**

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*)
- U/G Water Line LOS C (S.U.E*)
- U/G Water Line LOS D (S.U.E*)
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	1C-1
Location and Surveys	

SURVEY CONTROL SHEET

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "B5390-1"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 586694.1650(ft) EASTING: 1281411.6250(ft)
ELEVATION: 778.92(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999841517
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B5390-1" TO -L- STATION 10+00.00 IS
N 47°56'21.4" W 592.563'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
4	BL-4	587433.5510	1280833.3640	826.14	OUTSIDE PROJECT LIMITS	
3	BL-3	586868.7733	1281062.4487	784.59	12+37.92	15.59 RT
1	B5390-1	586694.1650	1281411.6250	778.92	16+28.79	12.53 RT
2	B5390-2	586535.3320	1282598.2620	841.93	OUTSIDE PROJECT LIMITS	

.....
BM1 ELEVATION = 778.20
N 586491 E 1281682
Y STATION 10+78 39 RIGHT
R/R SPIKE IN NE ROOT OF 18" MAPLE
.....
.....
BM2 ELEVATION = 839.89
N 586450 E 1282580
L STATION 20+64
S 75°31'39.30" E DIST 760.49
R/R SPIKE IN NE BASE OF 12" CEDAR
.....

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/

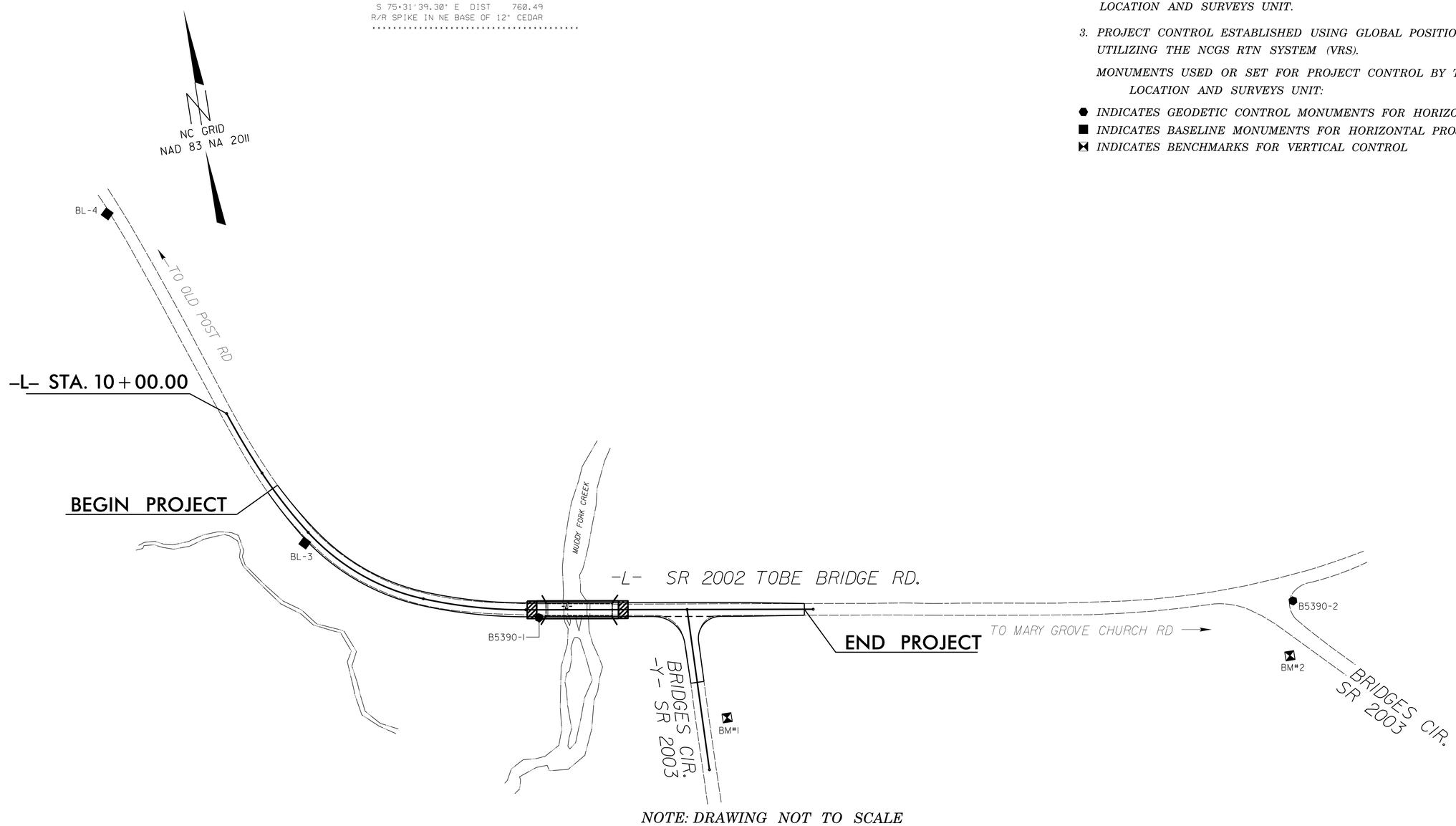
   THE FILES TO BE FOUND ARE AS FOLLOWS:
   B5390_LS_CONTROL.TXT
   B5390_LS_LOCAL.TXT

2. SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

3. PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM, UTILIZING THE NCGS RTN SYSTEM (VRS).

   MONUMENTS USED OR SET FOR PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT:

● INDICATES GEODETIC CONTROL MONUMENTS FOR HORIZONTAL CONTROL
■ INDICATES BASELINE MONUMENTS FOR HORIZONTAL PROJECT CONTROL
⧓ INDICATES BENCHMARKS FOR VERTICAL CONTROL



NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
B-5390	2A-1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026964 ENGINEER Bryan C. Kerr
DocuSigned by: 10/2/2018

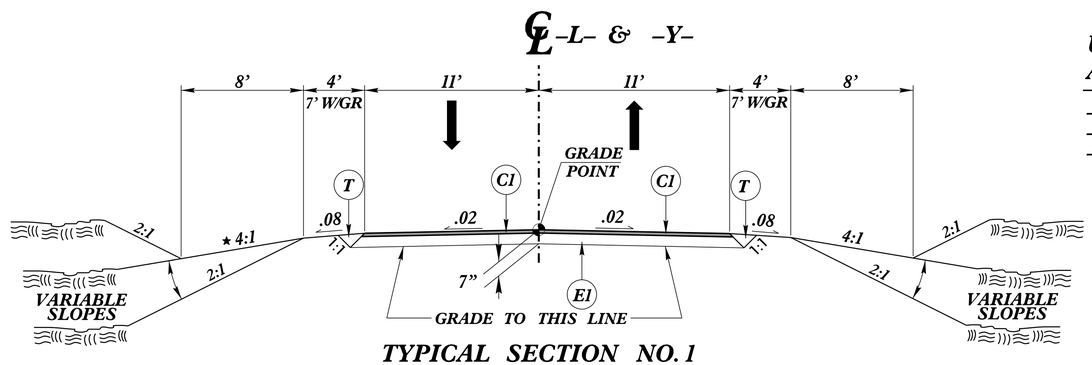
PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022896 ENGINEER CLARK S. MORRISON
DocuSigned by: Clark Morrison 10/2/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT SCHEDULE

C1	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137½ LBS. PER SQ. YD. IN EACH OF TWO LAYERS
E1	PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
T	EARTH MATERIAL.

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

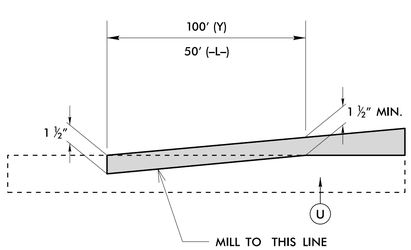


TYPICAL SECTION NO. 1

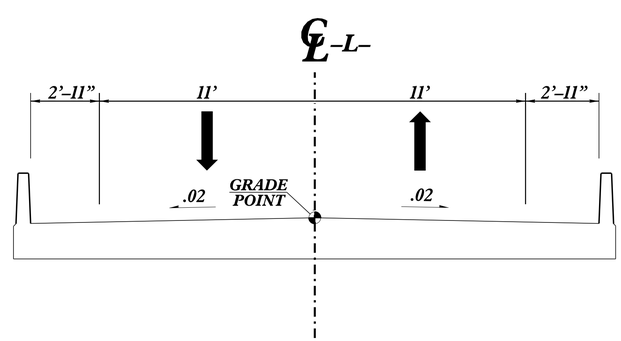
★ 6:1 FILL SLOPES -L- STA. 17+90.00 TO STA. 20+50.00 LT.

USE TYPICAL SECTION NO. 1 AT THE FOLLOWING LOCATIONS:

-L- STA. 11+40.00 TO STA. 16+25.00 (BEGIN BRIDGE)
-L- STA. 17+55.00 (END BRIDGE) TO STA. 20+50.00
-Y- STA. 11+40.00 TO STA. 12+45.66



DETAIL SHOWING INCIDENTAL MILLED PAVEMENT TIE-IN



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AT THE FOLLOWING LOCATION:

-L- STA. 16+25.00 (BEGIN BRIDGE) TO STA. 17+55.00 (END BRIDGE)

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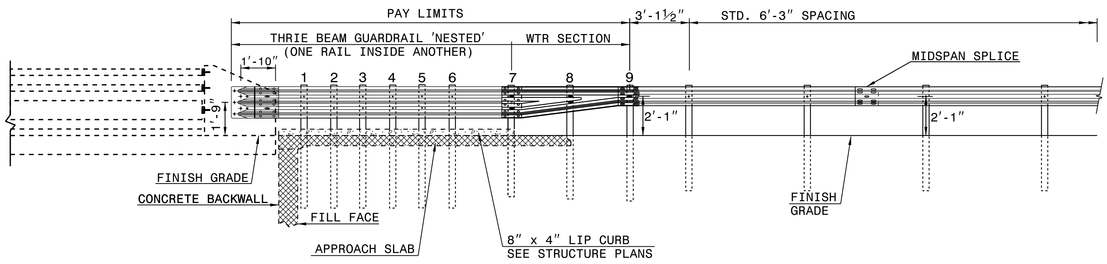
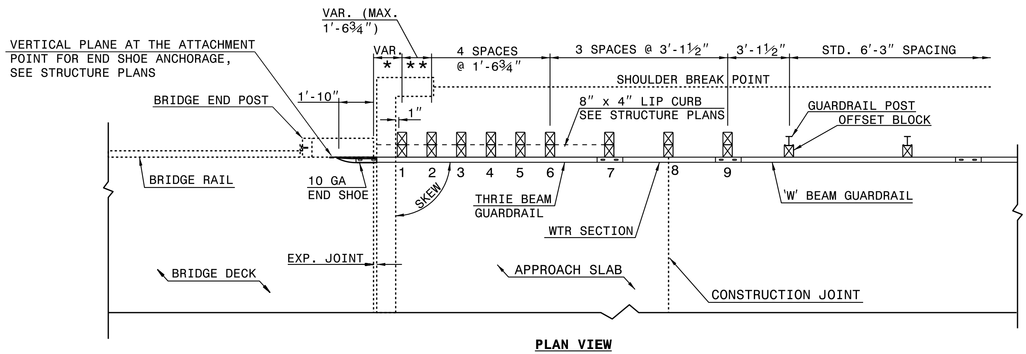
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE



ELEVATION

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03

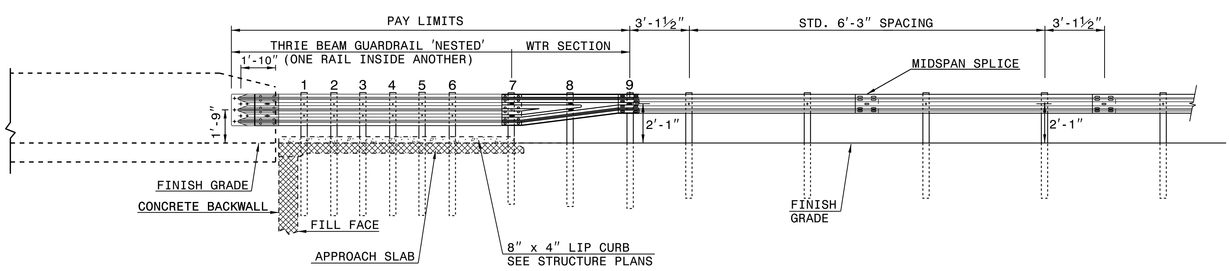
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03

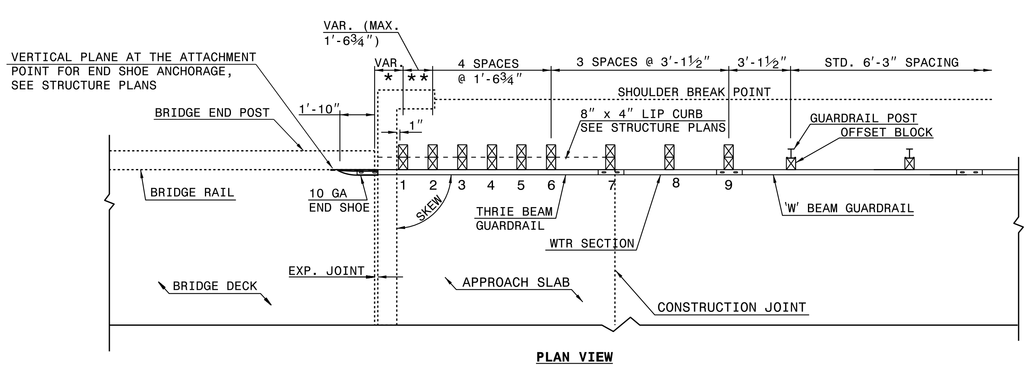
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER



ELEVATION

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03

SEE TITLE BLOCK

ORIGINAL BY: J. HOWERTON DATE: 06-22-12
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by: J. Howerton 8/8/2018 | 3:29:33 PM EDT | 0C0C0A0F-0A0A-0A0A-0A0A-0A0A0A0A0A0A

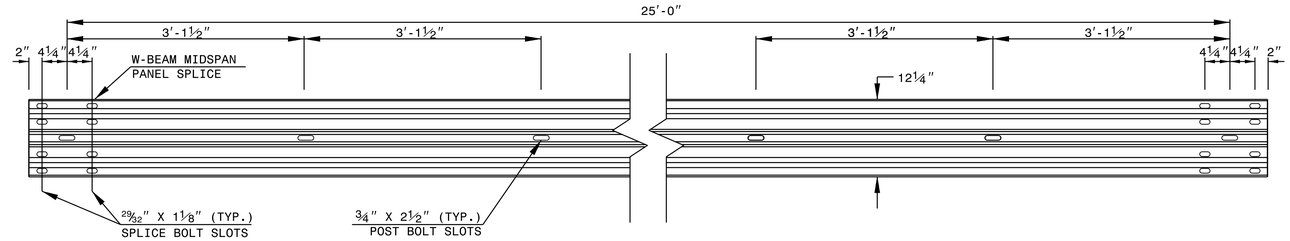
NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER J. Howerton

PROJECT REFERENCE NO. 17BP.12.R.93
SHEET NO. 2C-1

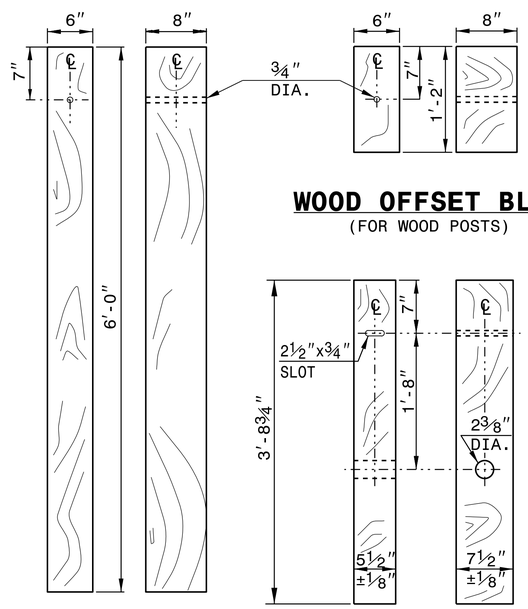
PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	2C-2
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION



STANDARD W-BEAM GUARDRAIL

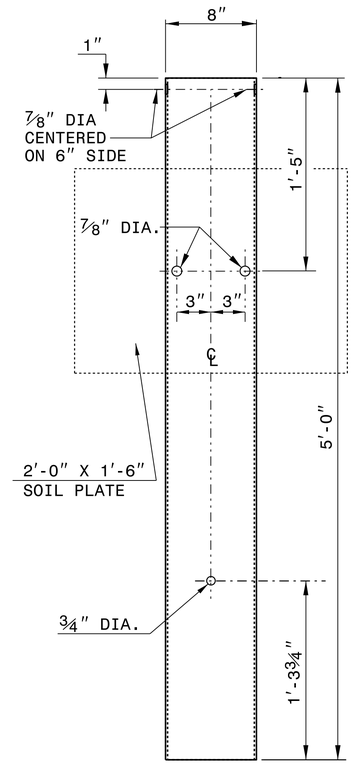


STANDARD LINE POST

SHORT WOOD BREAKAWAY POST

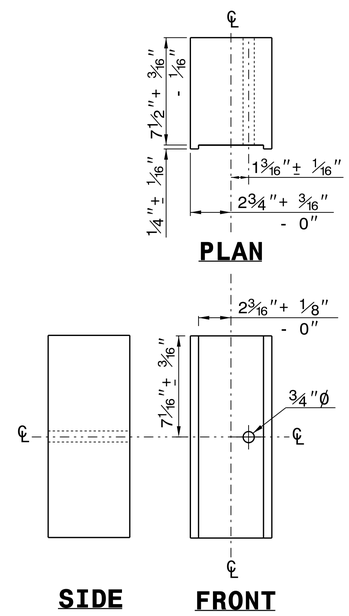
WOOD OFFSET BLOCK

(FOR WOOD POSTS)

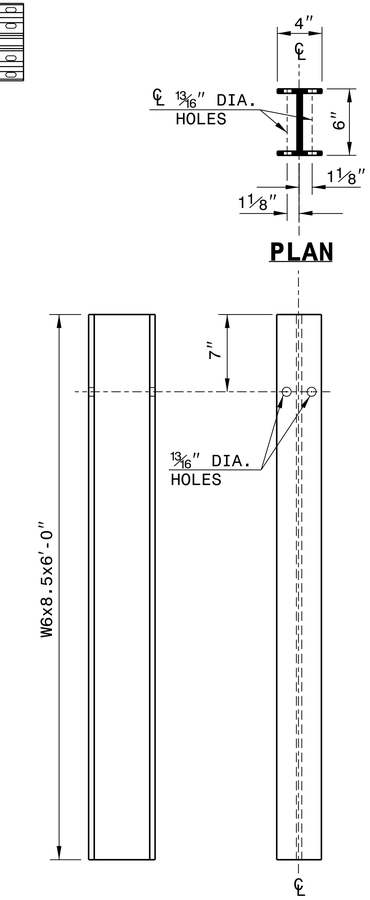


STEEL TUBE

TS 6"x8"x0.1875"



ROUTED OFFSET BLOCK



"W6" STEEL POST

SYSTEM PARTS

SHEET 6 OF 8
862D02

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON

DocuSigned by: Joel Howerton, PE 10/2/2018
873F3D17DCDC45F...

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: J.HOWERTON DATE: 3-7-2018
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

COMPUTED BY: BKS DATE: 9/28/18
CHECKED BY: SDR DATE: 9/28/18

PROJECT NO.	SHEET NO.
17.BP.12.R.93	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SHOULDER BERM GUTTER SUMMARY

LINE	Station	Station	LENGTH
-L- LT	15+95.00	16+25.00	30
-L- RT	15+95.00	16+25.00	30
		TOTAL:	60
		SAY:	60

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L-	11+40	16+40	CL	1828			
-L-	17+45	20+50	CL	637			
-Y-	11+40	12+46	CL	318			
		TOTAL:		1983			
		SAY:		2000			

COMPUTED BY: DATE:
CHECKED BY: DATE:

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	3B-1

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

GUARDRAIL SUMMARY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	TL-3	M-350	TYPE III	CAT-1	VI MOD	AT-1		G	NG				
L	15+50	16+25	LT	75.00					2.5	7		50		1.5			1		1										
L	15+50	16+25	RT	75.00					2.5	7	50		1.5				1		1										
L	17+55	17+95	LT		50				2.5	7	50								1	1									
L	17+55	18+56.50	RT	62.5	50				2.5	7		37		1.5					1	1									

COMPUTED BY: BKS DATE: 8/26/2017

CHECKED BY: SDR DATE: 9/25/2018

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
17BP. 12.R.93	3D-1

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

| STATION | LOCATION (LT, RT, OR CL)' | STRUCTURE NO. FROM | STRUCTURE NO. TO | TOP ELEVATION | INVERT ELEVATION | INVERT ELEVATION | SLOPE CRITICAL | DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) SIZE 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | C.S. PIPE SIZE 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | R.C. PIPE CLASS III SIZE 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | R.C. PIPE CLASS IV SIZE 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | *" R.C. PIPE (CLASS V) | **" RC PIPE CULVERTS, CONTRACTOR DESIGN | **" RC PIPE CULVERTS, CONTRACTOR DESIGN | 15" SIDE DRAIN PIPE | 18" SIDE DRAIN PIPE | ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P. | C.S.P. | QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0') | LIN. FT. A 5.0' THRU 10.0' | LIN. FT. B 10.0' AND ABOVE | *TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. A' + (1.3 X COL. B') | C.B. STD. 840.01 OR STD. 840.02 | FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E | F | G | CONCRETE TRANSITIONAL SECTION DROP INLET | CATCH BASIN | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME WITH TWO GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR 840.26 | G.D.I. TYPE "B" STD. 840.18 OR 840.27 | G.D.I. TYPE "D" STD. 840.19 OR 840.28 | G.D.I. FRAME WITH GRATE STD. 840.20 | G.D.I. FRAME WITH TWO GRATES STD. 840.22 | G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24 | G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29 | J.B. STD. 840.31 OR 840.32 | T.B.D.I. STD. 840.35 | DRAINAGE PIPE ELBOWS NO. & SIZE | CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71 | CONC. COLLARS CL. "B" C.Y. STD. 840.72 | PIPE REMOVAL LIN. FT. | REMARKS |
|---|---|---

COMPUTED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

(4-21-15)

PROJECT NO.	SHEET NO.
17.BP.12.R.93	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY					200
				TOTAL LF:	200

***UD = Underdrain**
***BD = Blind Drain**
***SD = Subsurface Drain**

SUMMARY OF REINFORCED SOIL SLOPES (RSS)

LINE	Beginning Slope	Approx. Station	Ending Slope	Approx. Station	Location LT/RT	SY
CONTINGENCY						600
					TOTAL SY:	600

SUMMARY OF GEOTEXTILE FOR PAVEMENT STABILIZATION

LINE	Station	Station	SY
CONTINGENCY			
		TOTAL SY:	0

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY						200	600		
				TOTAL CY/TONS/SY:	0	200	600*	0	0

ASU = Aggregate Subgrade, AST = Aggregate Stabilization
***Total square yards of Geotextile for Soil Stabilization is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.**

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026964 ENGINEER Bryan C. Kee — DocuSigned by: 10/2/2018

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 034349 ENGINEER PAUL A. JORDAN — DocuSigned by: Paul A. Jordan 10/3/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NC GRID NAD83/NA2011

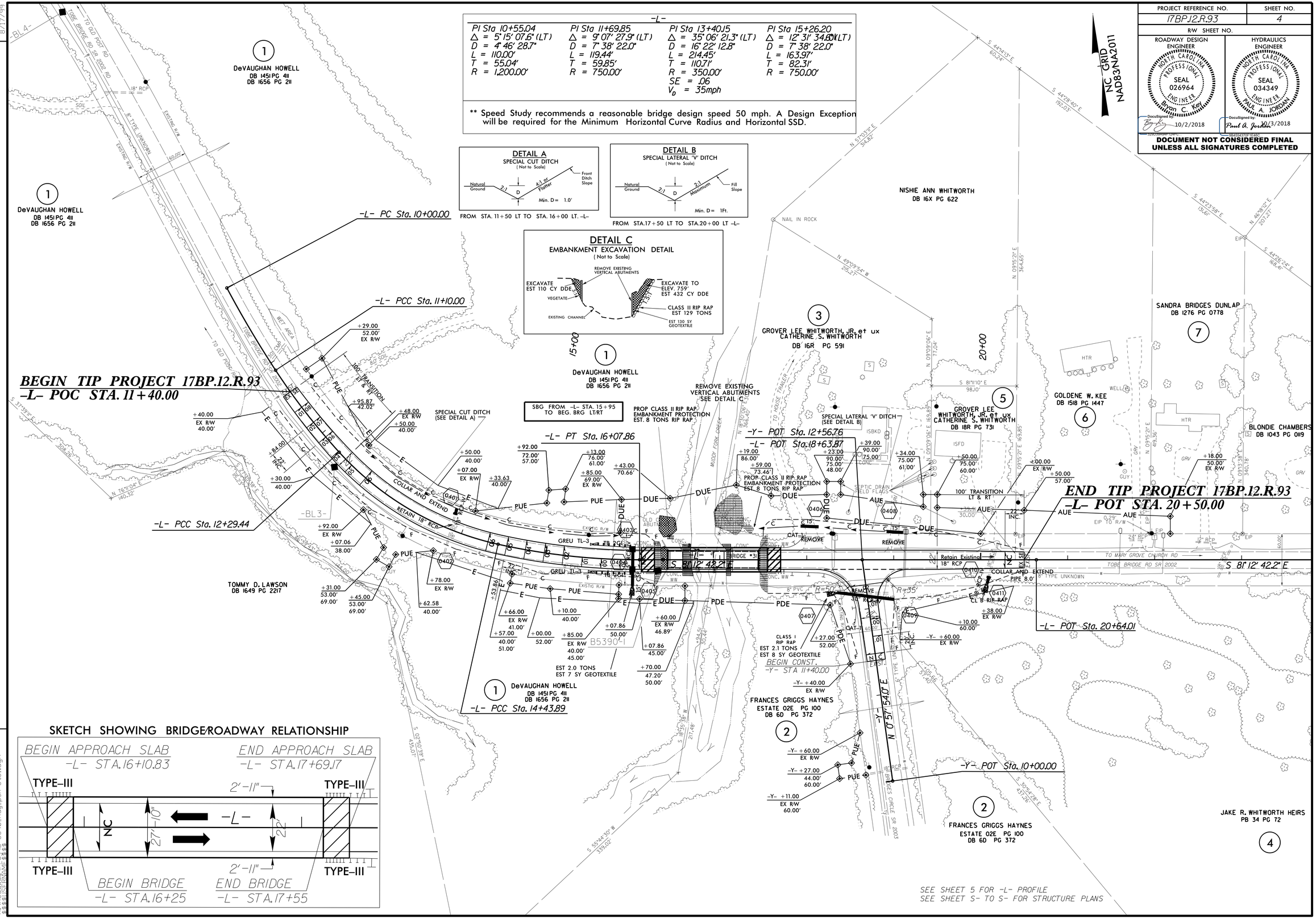
REVISIONS

8/17/99

-L-

PI Sta 10+55.04	PI Sta 11+69.85	PI Sta 13+40.15	PI Sta 15+26.20
Δ = 5° 15' 07.6" (LT)	Δ = 9° 07' 27.9" (LT)	Δ = 35° 06' 21.3" (LT)	Δ = 12° 31' 34.6" (LT)
D = 4° 46' 28.7"	D = 7° 38' 22.0"	D = 16° 22' 12.8"	D = 7° 38' 22.0"
L = 110.00'	L = 119.44'	L = 214.45'	L = 163.97'
T = 55.04'	T = 59.85'	T = 110.71'	T = 82.31'
R = 1,200.00'	R = 750.00'	R = 350.00'	R = 750.00'
		SE = .06	
		V_D = 35mph	

** Speed Study recommends a reasonable bridge design speed 50 mph. A Design Exception will be required for the Minimum Horizontal Curve Radius and Horizontal SSD.



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PROJECT REFERENCE NO.	SHEET NO.
B-5390	5

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026964 ENGINEER Bryan C. Kerr
DocuSigned by: 10/2/2018

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 034349 ENGINEER PAUL A. JORDAN
DocuSigned by: Paul A. Jordan 10/3/2018

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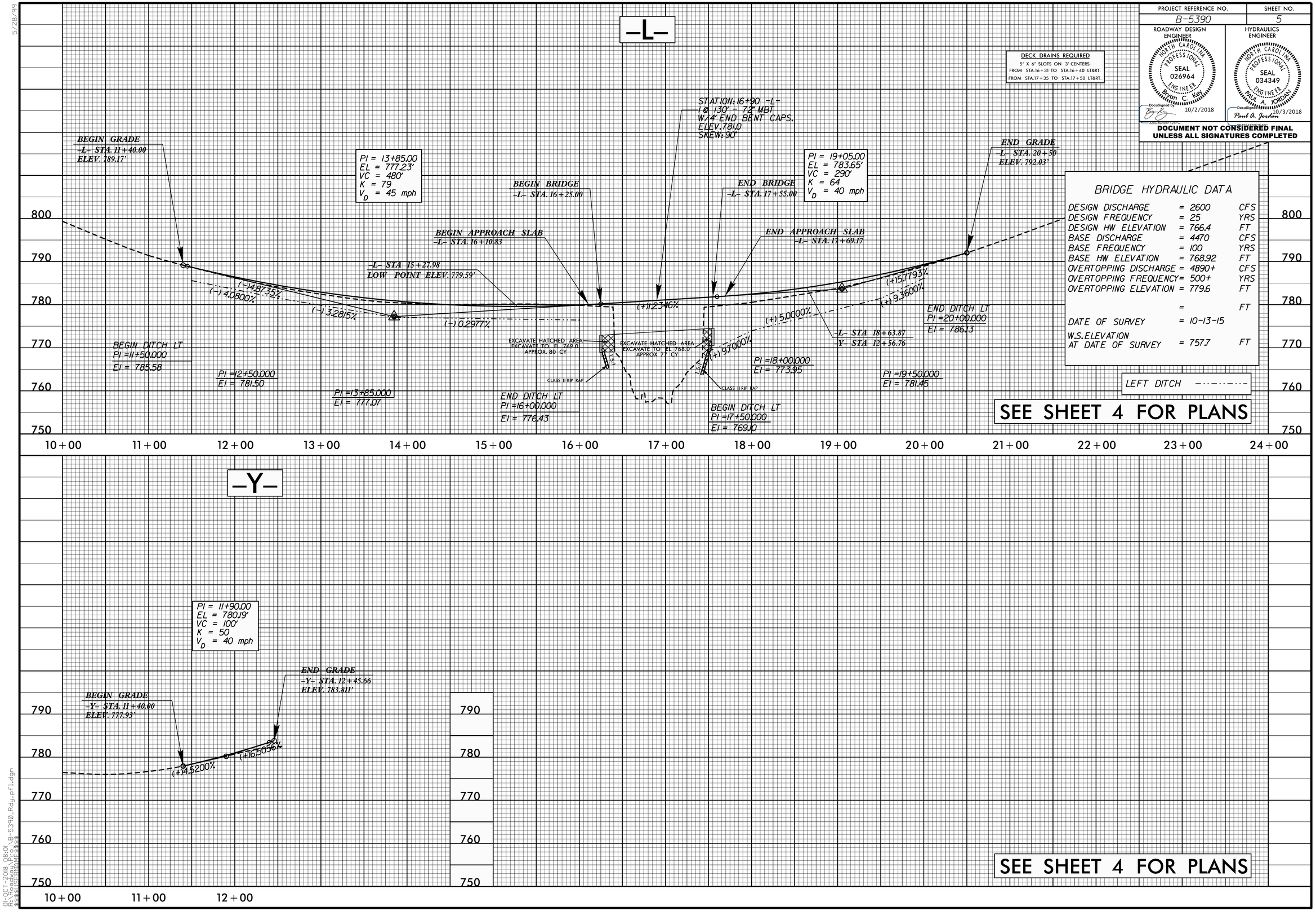
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



5/28/99

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CROSS SECTION INDEX

LINE	STATION	TO STATION	SHEET NO.
-L-	11+40.00	20+50.00	X-1 - X-5
-Y-	-11+40.00-	-12+56.76-	X-6

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PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.93	X-1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

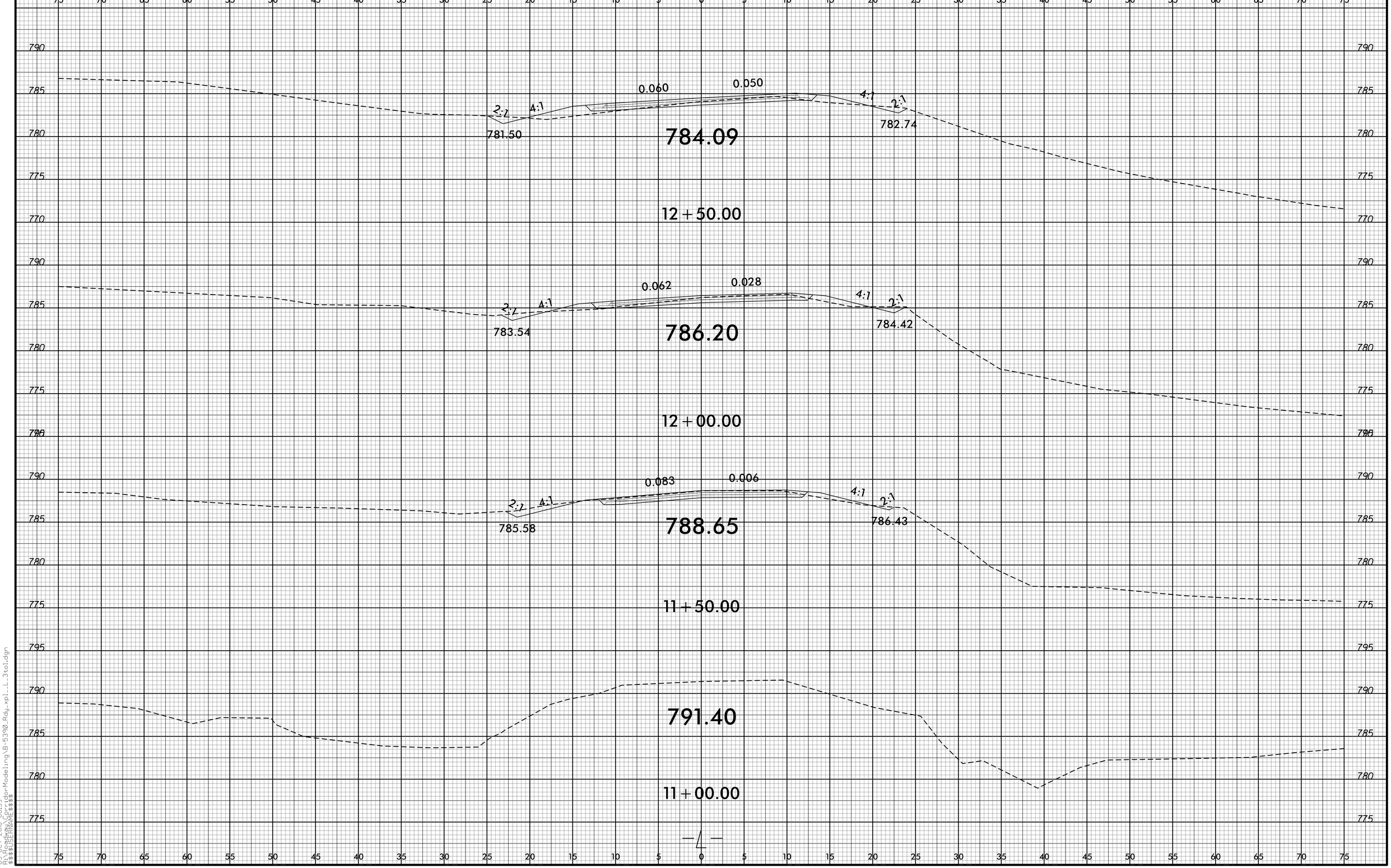
CROSS-SECTION SUMMARY

Approximate quantities only. Unclassified excavation, borrow excavation, shoulder borrow, fine grading, clearing and grubbing, breaking of existing pavement and removal of existing pavement will be paid for at the lump sum price for "Grading".

NOTE: EMBANKMENT COLUMN INCLUDES BACKFILL FOR UNDERCUT

Station	Uncl. Exc.	Embt	Station	Uncl. Exc.	Embt
L	(cu. yd.)	(cu. yd.)	Y	(cu. yd.)	(cu. yd.)
11+00.00	0	0	11+40.00	0	0
11+50.00	4	3	11+50.00	21	9
12+00.00	4	7	12+00.00	13	37
12+50.00	3	11	12+25.00	0	81
13+00.00	4	12			
13+50.00	2	18			
14+00.00	3	17			
14+50.00	4	7			
15+00.00	44	5			
15+50.00	30	5			
16+00.00	17	15			
16+50.00	0	0			
17+00.00	0	0			
17+50.00	0	0			
18+00.00	48	101			
18+50.00	23	37			
19+00.00	31	85			
19+50.00	5	59			
20+00.00	4	21			
20+50.00	18	0			

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.12.R.93	X-1



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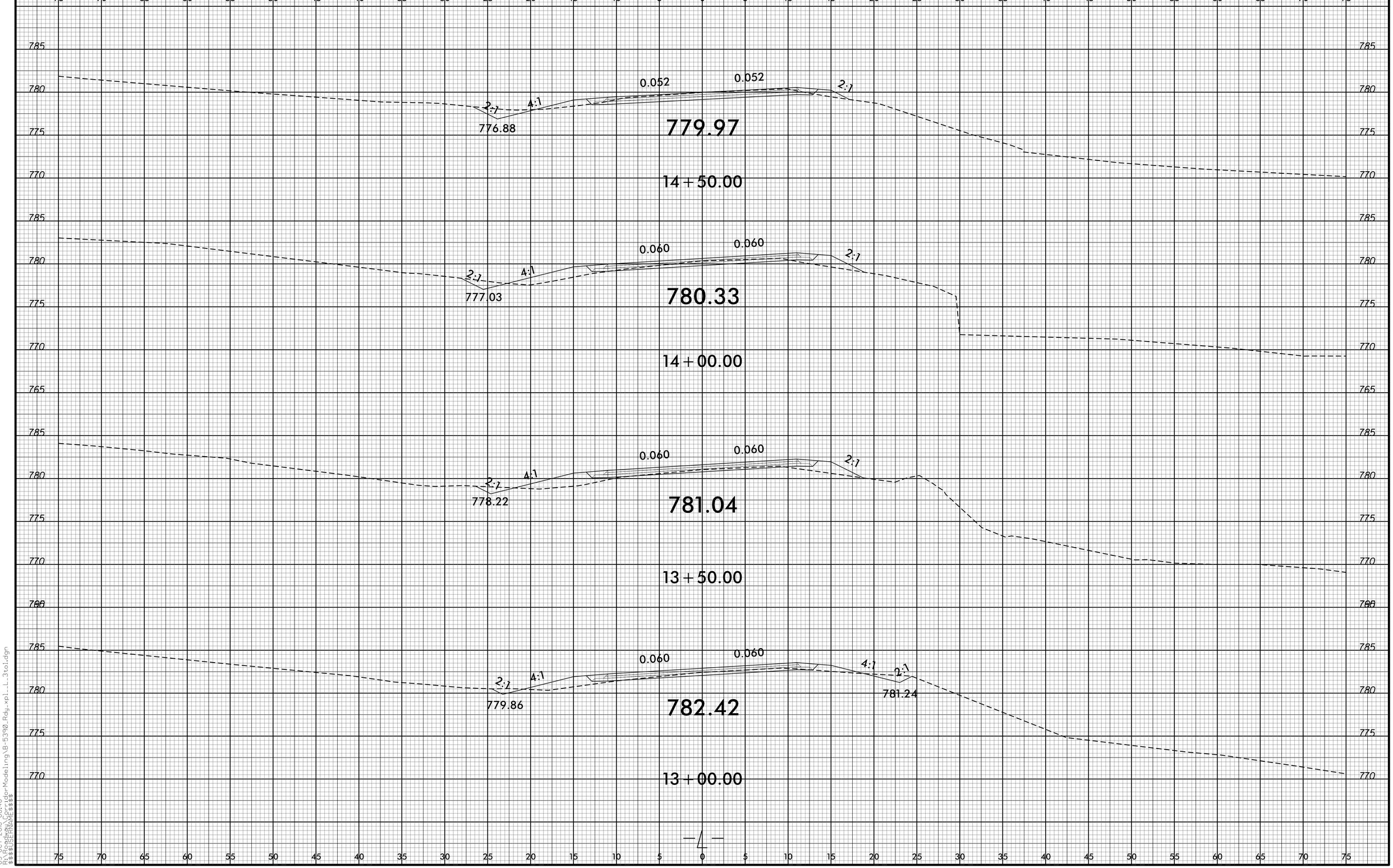

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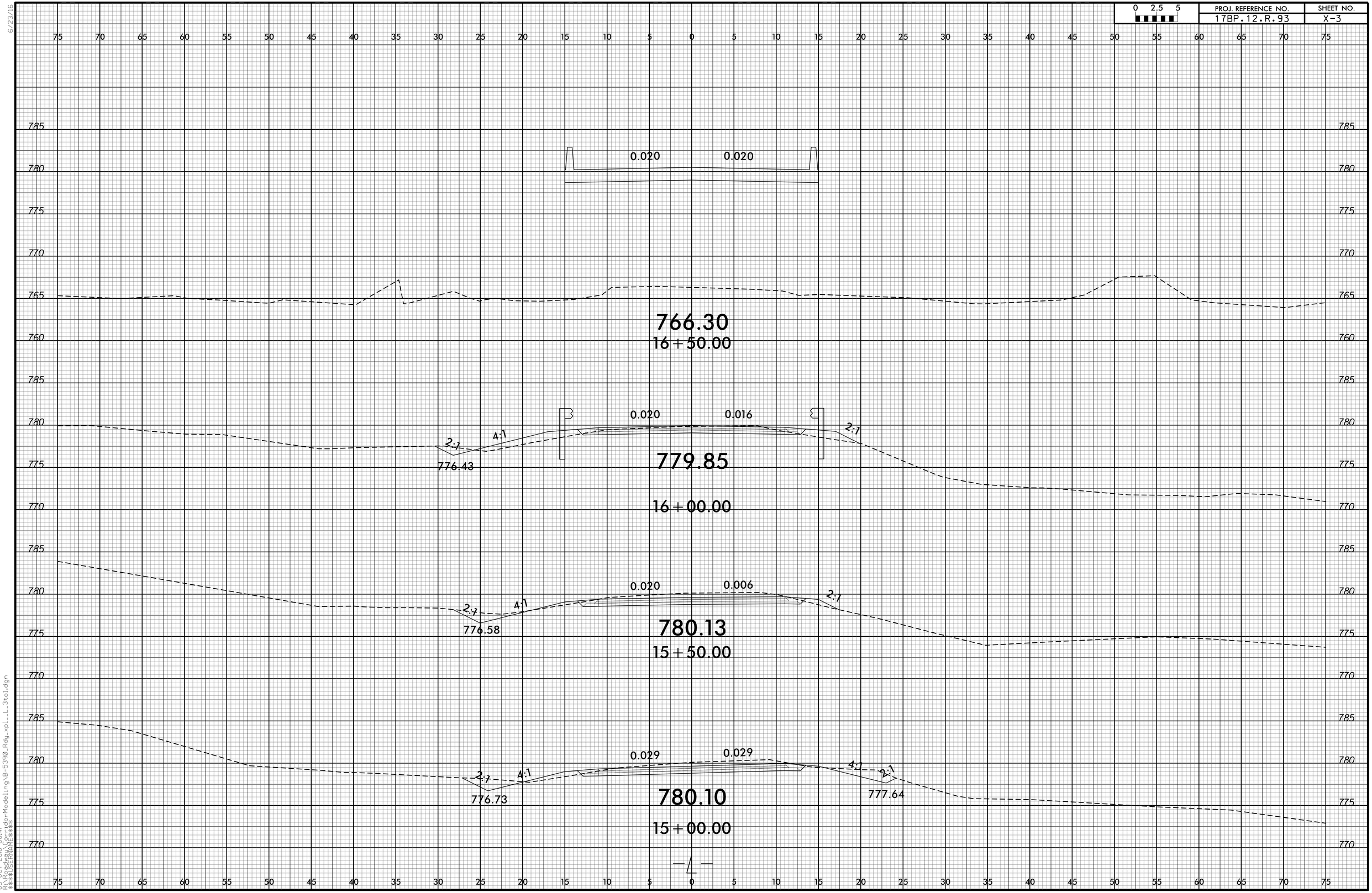

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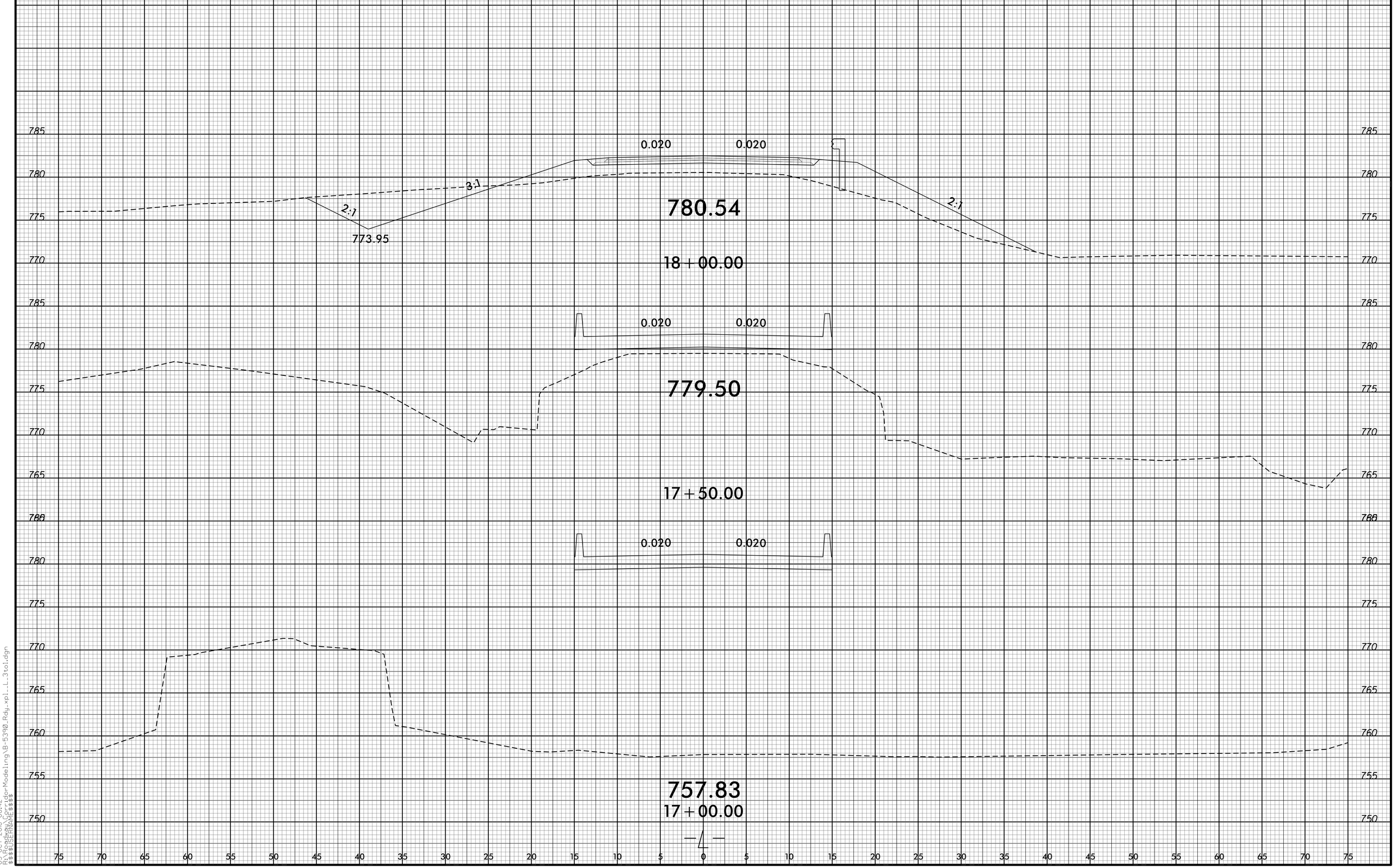

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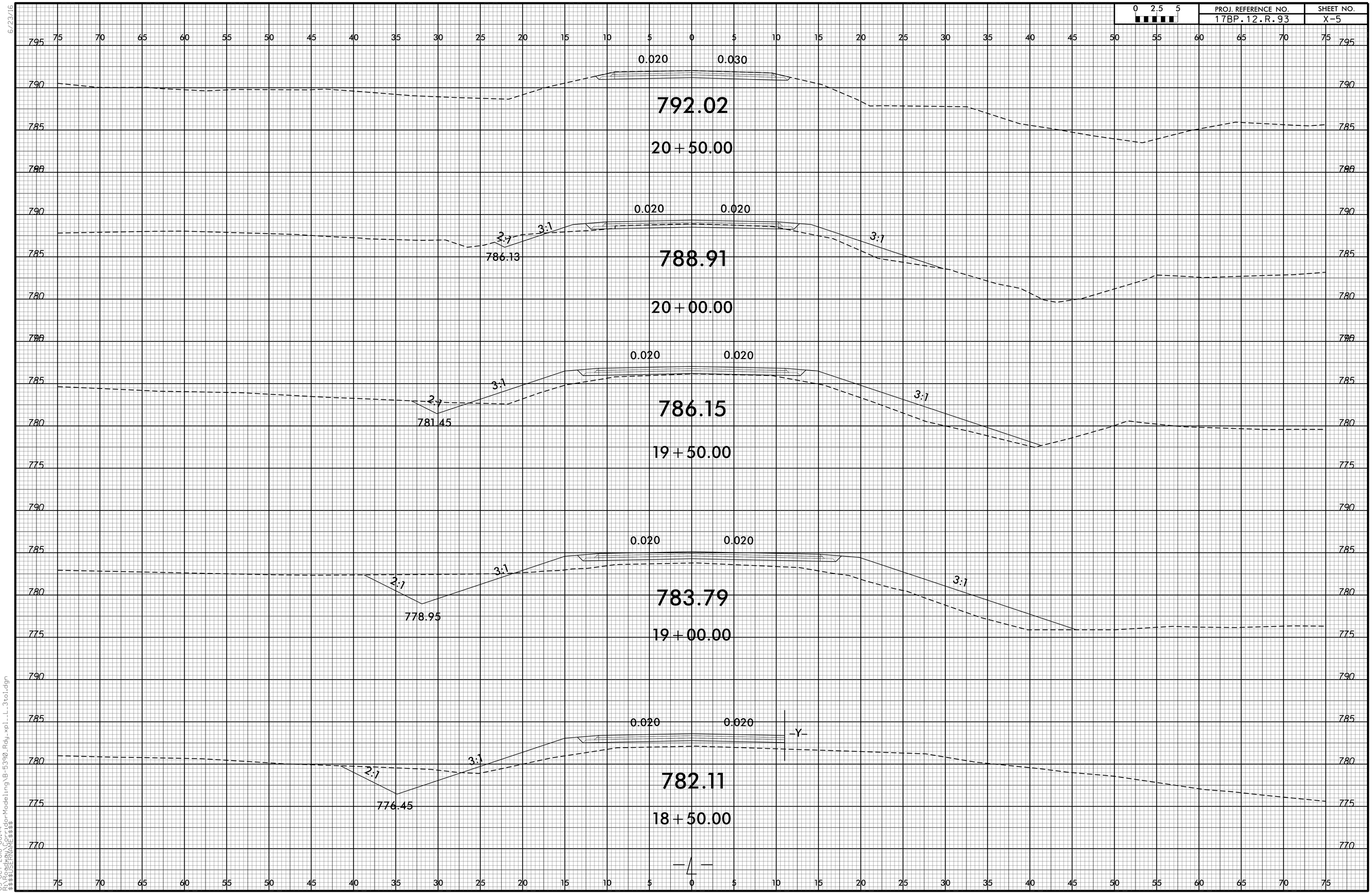

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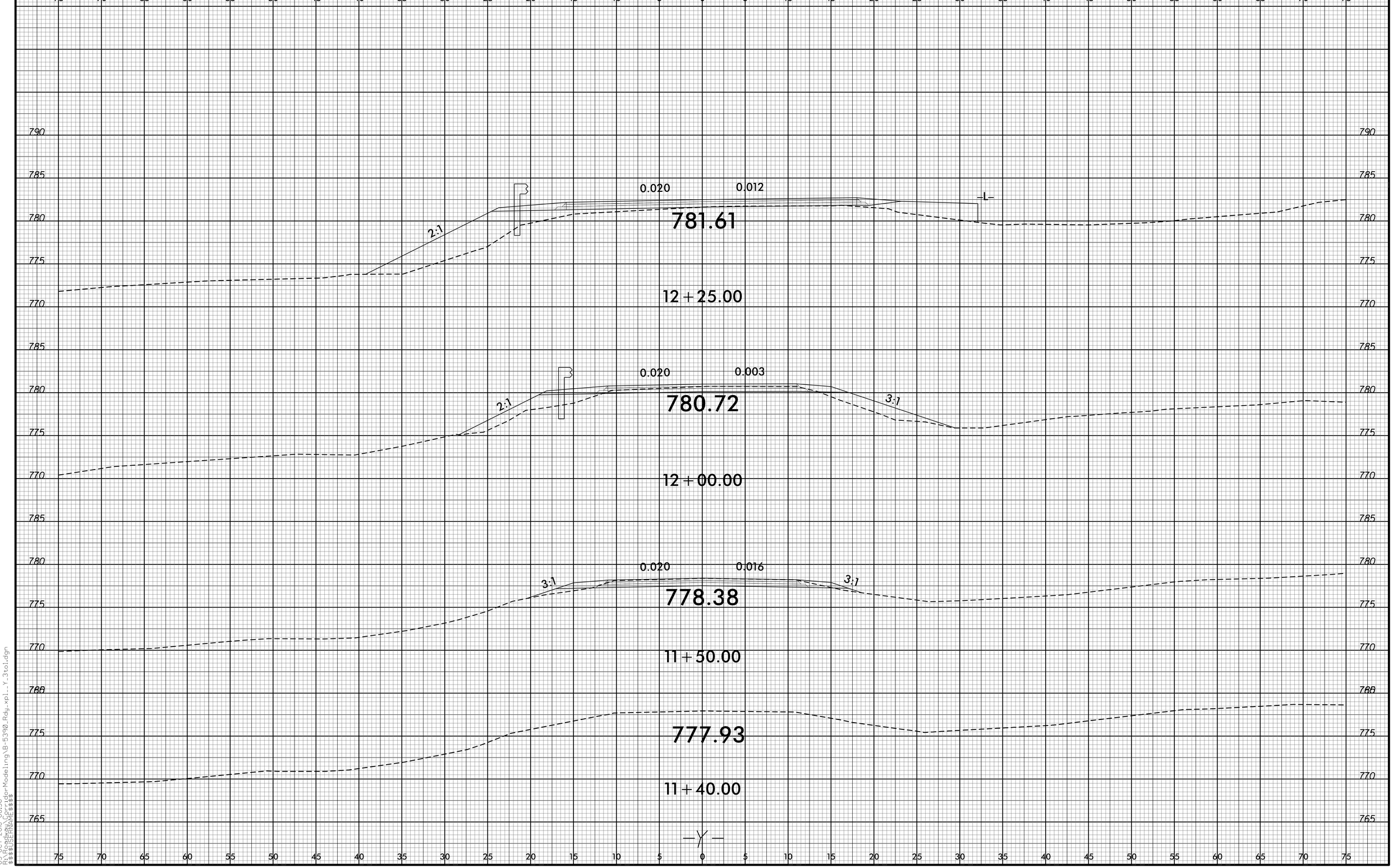
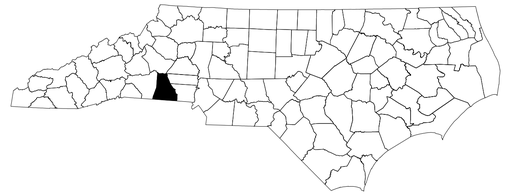


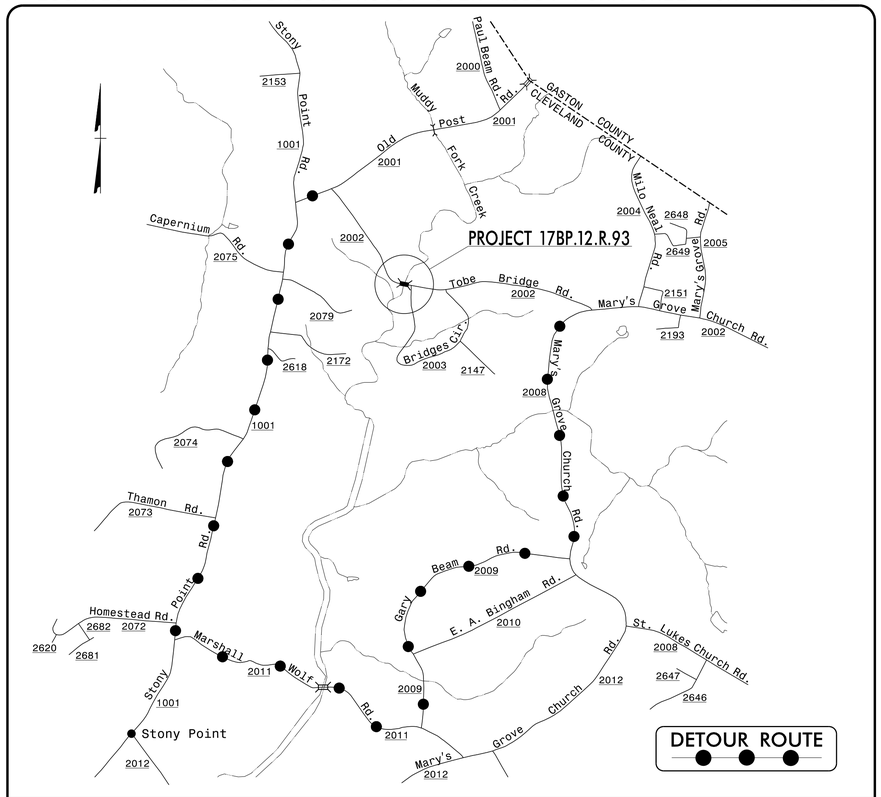
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

CLEVELAND COUNTY



LOCATION: REPLACE BRIDGE NO.31 OVER MUDDY FORK CREEK ON SR 2002



VICINITY MAP

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

J. E. HUMMER, P.E.	STATE TRAFFIC MANAGEMENT ENGINEER
D. A. PARKER, P.E.	TRAFFIC CONTROL PROJECT ENGINEER
K. C. THORNEWELL, JR., P.E.	TRAFFIC CONTROL PROJECT DESIGN ENGINEER
S. B. COATS	TRAFFIC CONTROL DESIGN ENGINEER

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, LEGEND, AND TEMPORARY PAVEMENT MARKINGS
TMP-1B	TRANSPORTATION OPERATIONS PLAN: (GENERAL NOTES)
TMP-2	SPECIAL SIGN DESIGN - TOBE BRIDGE ROAD
TMP-3	TEMPORARY TRAFFIC CONTROL PHASING AND OFF-SITE DETOUR - TOBE BRIDGE ROAD - SR 2002

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: DocuSigned by: Kenneth C. Thornewell Jr., P.E. 1E991EF27373405...

DATE: 8/21/2018

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 044089 ENGINEER KENNETH C. THORNEWELL JR.

SHEET NO. TMP-1

17BP.12.R.93

PROJECT:

8/20/2018
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User:scoats

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.93	TMP-1A

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUM
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL
- USER DEFINED (IF NEEDED)
- USER DEFINED (IF NEEDED)

SIGNALS

- EXISTING
- PROPOSED
- TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM
- SKINNY DRUM
- TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

TEMPORARY PAVEMENT MARKING

N/A

APPROVED: DocuSigned by: Kenneth C. Thornewell Jr., P.E. 1E991EF2737340D...

DATE: 8/21/2018

NORTH CAROLINA PROFESSIONAL SEAL 044089 ENGINEER KENNETH C. THORNEWELL JR.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS & LEGEND

8/20/2018
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User:scoats

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.93	TMP-1B

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TRAFFIC PATTERN ALTERATIONS

A) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

B) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

C) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

D) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

E) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

F) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS SHOWN IN FINAL PAVEMENT MARKING PLAN.

G) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

APPROVED: DocuSigned by: Kenneth C. Thornwell Jr., P.E. 1E991EF2737340...

DATE: 8/21/2018

NORTH CAROLINA PROFESSIONAL SEAL 044089 ENGINEER KENNETH C. THORNWELL JR.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSPORTATION OPERATIONS PLAN

8/20/2018
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User:scoats

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.93	TMP-2

SIGN NUMBER: SP16134
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3′-6″
HEIGHT: 2′-0″
TOTAL AREA: 7.0 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.38″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT′L: 0.080″ (2.0 mm) ALUMINUM

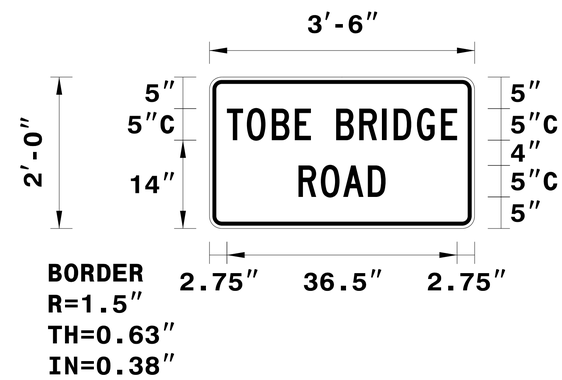
DESIGN BY: D. BEARD
PROJECT ID: 17BP.12.R.93

CHECKED BY: K. JORDAN
LOCATION: CLEVELAND CO.

May 02, 2016
DIV: 12

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

																										Series/Size Text Length
		T	O	B	E		B	R	I	D	G	E														C 2000
	2.8	3.1	3.9	3.6	2.6	4	3.6	3.6	1.8	3.7	3.8	2.6	2.8													36.5
		R	O	A	D																					C 2000
	14.1	3.5	3.6	3.9	2.8	14.1																				13.8

FILENAME: Guidsign_English

NORTH CAROLINA D.O.T. SIGN DETAIL

APPROVED: DocuSigned by: Renee Roach 3EB4360BD316431...
DATE: 8/20/2018

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

SPECIAL SIGN DESIGN
TOBE BRIDGE ROAD

8/20/2018
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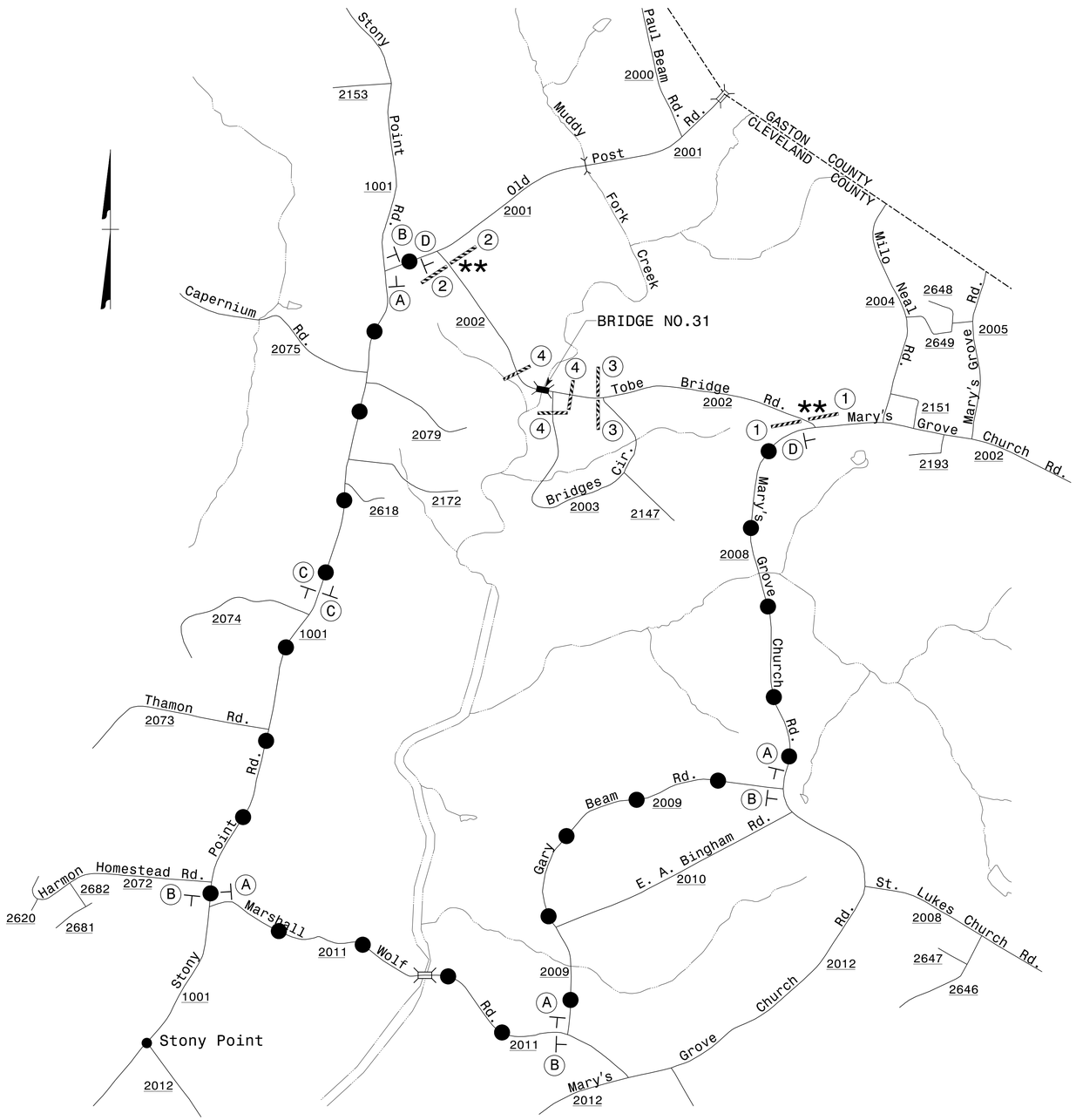
User:scoats

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.93	TMP-3

TEMPORARY TRAFFIC CONTROL PHASING



** SEE RSD 1101.03, SHEET 1 OF 9, FOR ADDITIONAL WORK ZONE SIGNS AND LOCATIONS

DETOUR ROUTE

PHASE I

STEP 1. INSTALL ALL OFF-SITE DETOUR SIGNING (SEE TMP-3).

- USING RSD 1101.03 (SHEET 1 OF 9), CLOSE SR 2002 (TOBE BRIDGE ROAD) FROM STA. 11+40+/- -L- TO STA. 20+50+/- -L- AND SR 2003 (BRIDGES CIRCLE) FROM STA. 11+40+/- -Y- TO STA. 12+45+/- -Y-.

PHASE II

STEP 1. AWAY FROM TRAFFIC AND USING FLAGGERS, REMOVE EXISTING BRIDGE, CONSTRUCT NEW BRIDGE AND ROADWAY APPROACHES, DRAINAGE, GUARDRAIL, AND PAVE UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE AS FOLLOWS (SEE CONSTRUCTION PLANS):

- STA. 11+40+/- -L- TO STA. 20+50+/- -L-
- STA. 11+40+/- -Y- TO STA. 12+45+/- -Y-

- CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES.

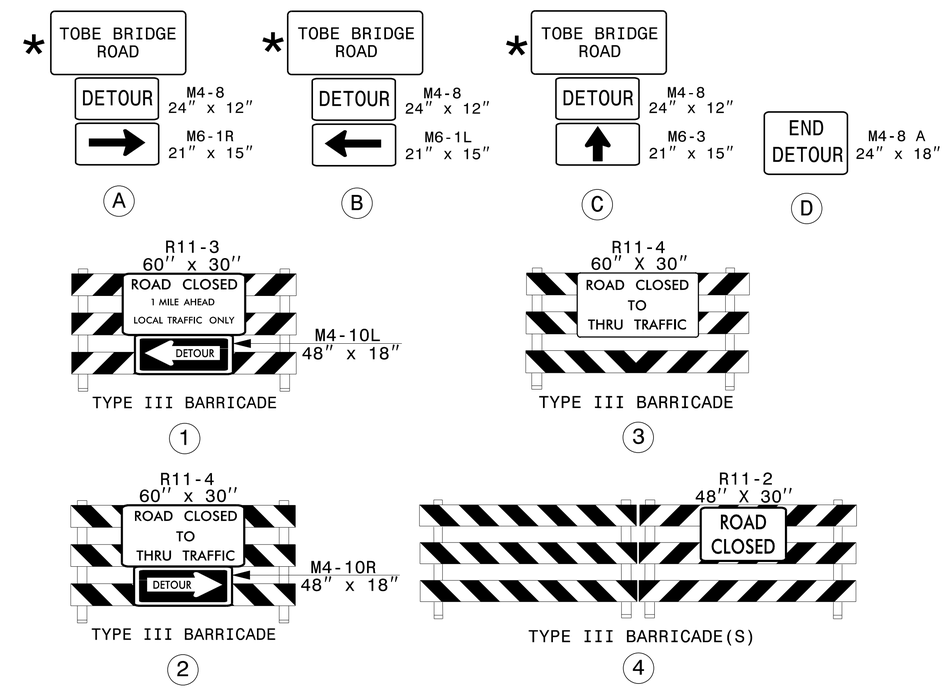
STEP 2. AWAY FROM TRAFFIC AND USING FLAGGERS, PAVE THE FINAL LAYER OF SURFACE COURSE AS FOLLOWS (SEE CONSTRUCTION PLANS):

- STA. 11+40+/- -L- TO STA. 20+50+/- -L-
- STA. 11+40+/- -Y- TO STA. 12+45+/- -Y-

- PLACE FINAL PAVEMENT MARKINGS AND MARKERS (SEE FINAL PAVEMENT MARKING PLAN).

STEP 3. REMOVE ALL TYPE III BARRICADES AND DETOUR SIGNING. REOPEN SR 2002 (TOBE BRIDGE ROAD) TO A 2-LANE, 2-WAY TRAFFIC PATTERN.

* SEE SHEET TMP-2 FOR SIGN DESIGN



APPROVED: Docusigned by: Kenneth C. Thornewell Jr., P.E. 1E991EF2737340S...

DATE: 8/21/2018

NORTH CAROLINA PROFESSIONAL SEAL 044089 ENGINEER KENNETH C. THORNEWELL JR.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TEMPORARY TRAFFIC CONTROL PHASING AND OFF-SITE DETOUR TOBE BRIDGE ROAD SR 2002

8/20/2018
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PROJECT: 17BP.12.R.93

PROJECT NO.	SHEET NO.
17BP.12.R.93	PMP-1

APPROVED: DocuSigned by: Renee B. Roach 3E84360BD316431... 8/22/2018

DATE:

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN
CLEVELAND COUNTY
LOCATION: BRIDGE 31 OVER MUDDY FORK CREEK ON SR 2002

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
ALL ROADS	PAINT	NONE
BRIDGE	PAINT	NONE

B) PLACE TWO APPLICATIONS OF PAINT PAVEMENT MARKINGS ON THE FINAL WEARING SURFACE. PLACE THE SECOND APPLICATION OF PAINT UPON SUFFICIENT DRYING TIME OF THE FIRST.

C) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

D) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

E) PASSING ZONES WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

F) STOP BAR LOCATION AT NON-SIGNALIZED INTERSECTIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

G) REMOVE ALL RESIDUE AND SURFACE LAITANCE BY ACCEPTABLE METHODS ON CONCRETE BRIDGE DECKS PRIOR TO PLACING PAINT PAVEMENT MARKING MATERIAL.

PAVEMENT MARKING SCHEDULE

SYMB	DESCRIPTION
	FINAL PAVEMENT MARKINGS
	PAINT (24")
P2	WHITE STOPBAR
	PAINT (4")
P8	2 FT. - 6 FT./SP WHITE MINISKIP
PA	WHITE EDGELINE
PI	YELLOW DOUBLE CENTER

INDEX

SHEET NO.	DESCRIPTION
PMP-1	PAVEMENT MARKING PLAN TITLE AND SCHEDULE SHEET
PMP-2	PAVEMENT MARKING DETAIL

PLAN PREPARED BY: N.C.D.O.T. SIGNING AND DELINEATION UNIT

KELVIN JORDAN — SIGNING & DELINEATION REGIONAL ENGINEER

DERRICK BEARD — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

08/22/18
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User:dlbeard

PROJECT NO.	SHEET NO.
17BP.12.R.93	PMP-2

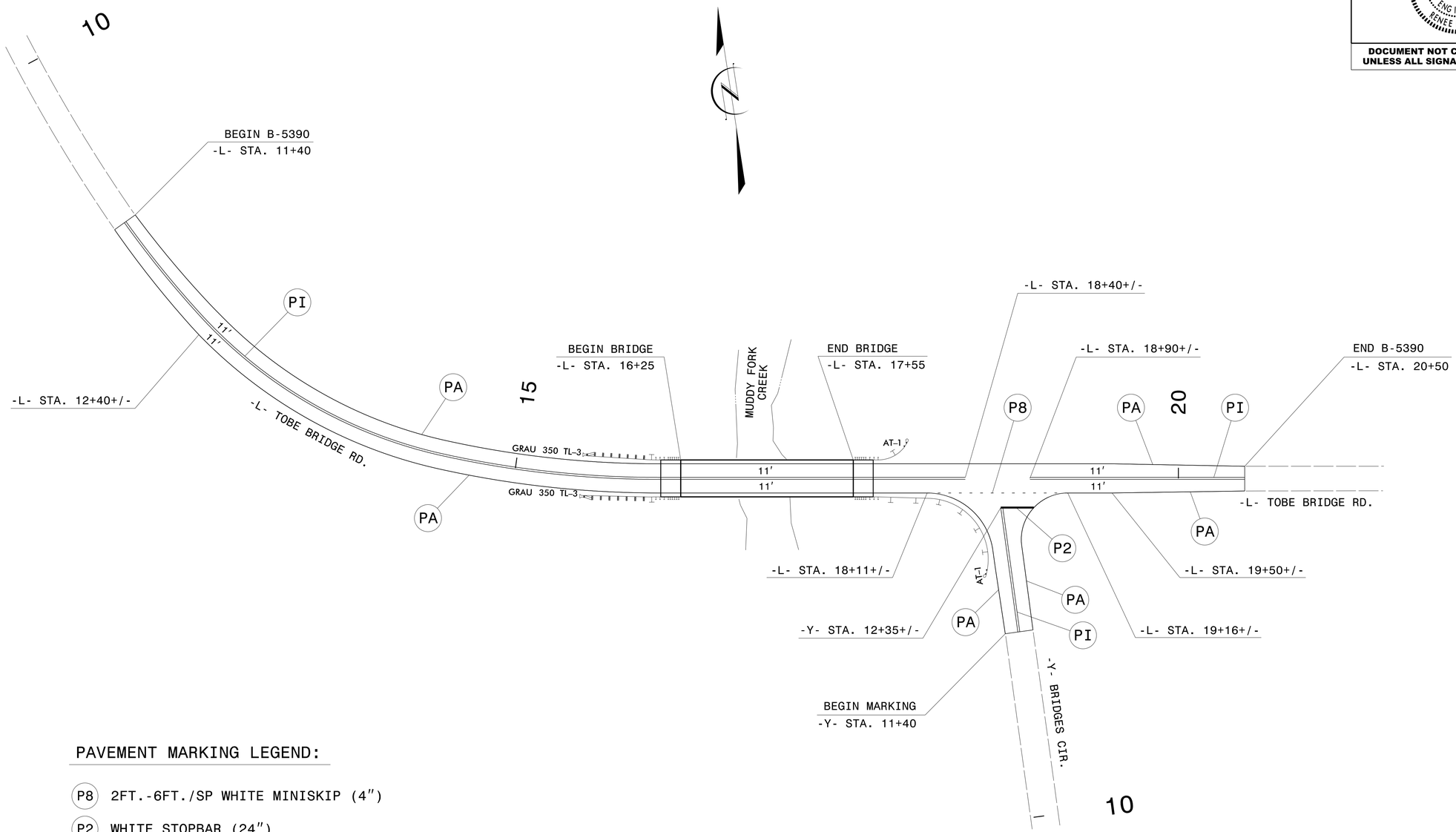
APPROVED: DocuSigned by: Renee B. Roach 3E8A90BD315431... 8/22/2018

DATE:

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PAVEMENT MARKING LEGEND:

- (P8) 2FT.-6FT./SP WHITE MINISKIP (4")
- (P2) WHITE STOPBAR (24")
- (PA) WHITE EDGELINE (4")
- (PI) YELLOW DOUBLE CENTER (4")

PAVEMENT MARKING DETAIL

08/22/18
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User:dhbeard

PROJECT: 17BP.12.R.93

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	SIGN-1

APPROVED: DocuSigned by: Renee B. Roach 3EB4308BD316431... 8/22/2018

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIGNING PLAN
CLEVELAND COUNTY

LOCATION: BRIDGE 31 OVER MUDDY FORK CREEK ON SR 2002

SUMMARY OF QUANTITIES

ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	180	L.F.
4102000000	904	SIGN ERECTION, TYPE E	16	EA.
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	17	EA.

GENERAL NOTES

- SIGNS FURNISHED BY STATE
- CONFIRM IN WRITING AT LEAST 4 MONTHS IN ADVANCE, THE ACTUAL DATE THE DEPARTMENT FURNISHED SIGNS WILL BE REQUIRED.
- WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER
- ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
- THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
- SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

INDEX

SHEET NO.	DESCRIPTION
SIGN-1	TITLE SHEET
SIGN-2	EXISTING SIGNS
SIGN-3	PROPOSED SIGNS AND TYPE E SIGNS

PLAN PREPARED BY: N.C.D.O.T. SIGNING AND DELINEATION UNIT

KELVIN JORDAN — SIGNING & DELINEATION REGIONAL ENGINEER

DERRICK BEARD — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

08/22/18
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PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	SIGN-2

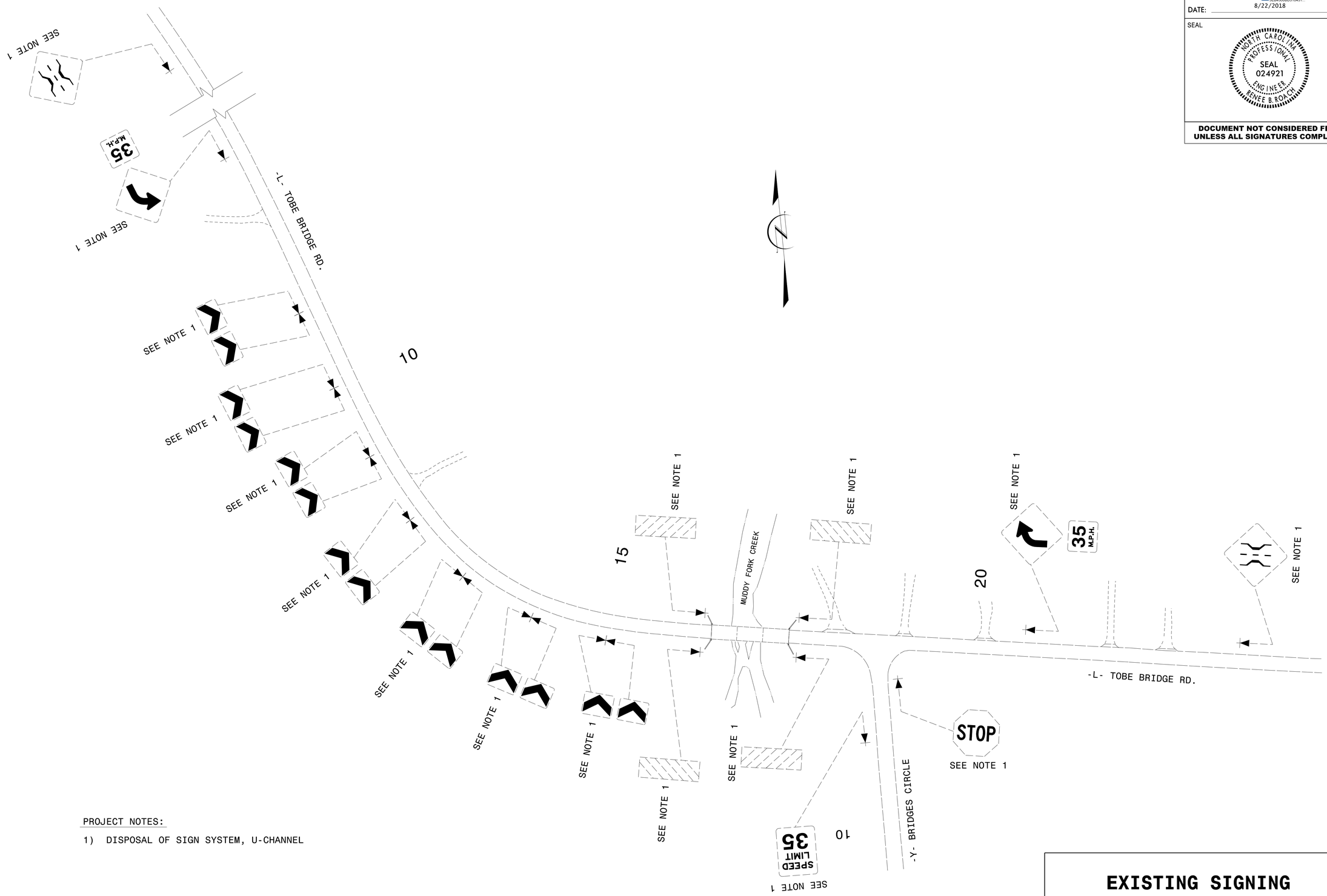
APPROVED: DocuSigned by: Renee B. Roach —3EB436BD316431...

DATE: 8/22/2018

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NOTES:

1) DISPOSAL OF SIGN SYSTEM, U-CHANNEL

EXISTING SIGNING

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PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	SIGN-3

APPROVED: DocuSigned by: Renee B. Roach —3EB4368D316431... 8/22/2018

DATE:

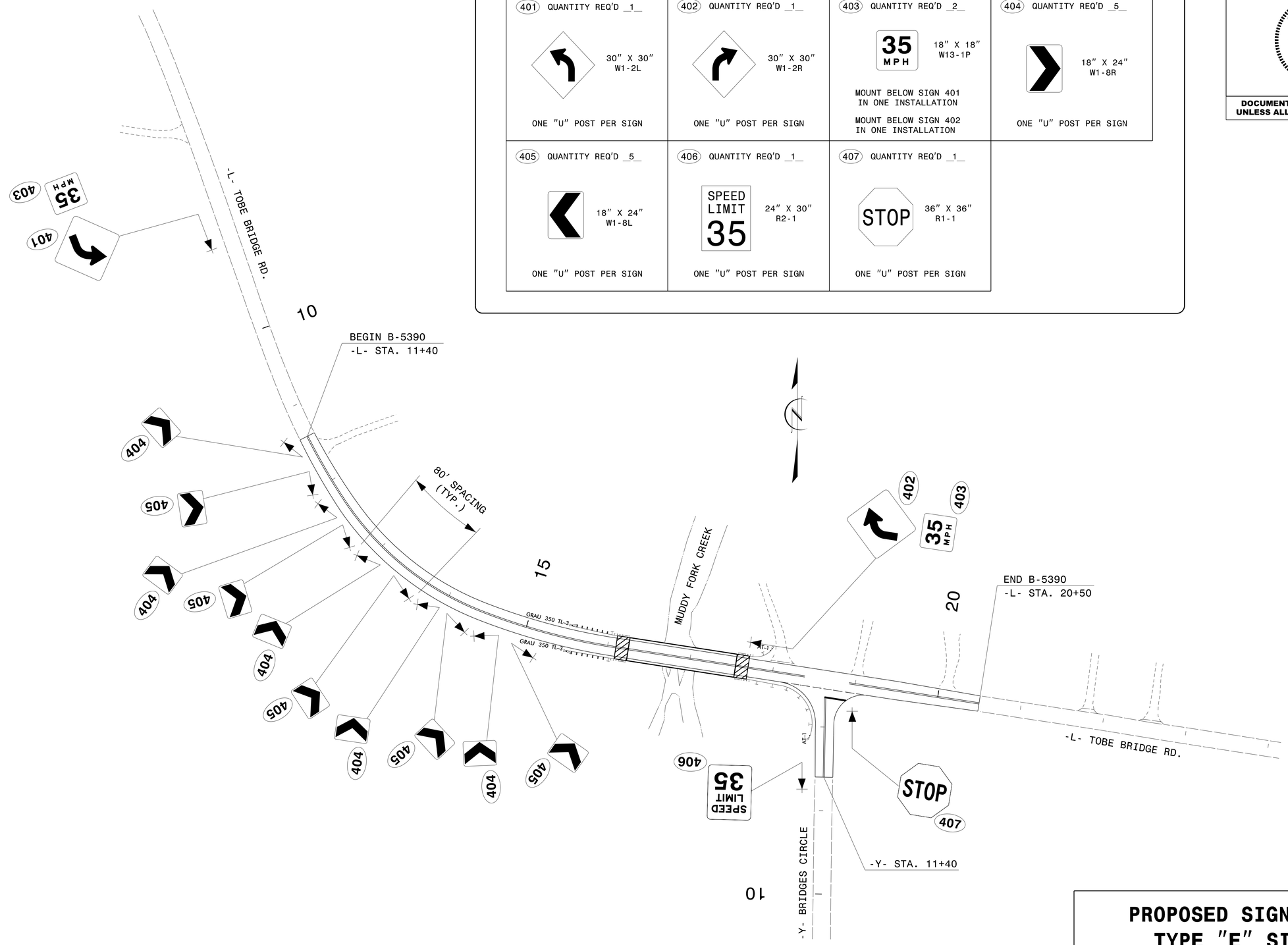
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TYPE E SIGNS

401 QUANTITY REQ'D _1_ 30″ X 30″ W1-2L ONE "U" POST PER SIGN	402 QUANTITY REQ'D _1_ 30″ X 30″ W1-2R ONE "U" POST PER SIGN	403 QUANTITY REQ'D _2_ 18″ X 18″ W13-1P MOUNT BELOW SIGN 401 IN ONE INSTALLATION MOUNT BELOW SIGN 402 IN ONE INSTALLATION	404 QUANTITY REQ'D _5_ 18″ X 24″ W1-8R ONE "U" POST PER SIGN
405 QUANTITY REQ'D _5_ 18″ X 24″ W1-8L ONE "U" POST PER SIGN	406 QUANTITY REQ'D _1_ 24″ X 30″ R2-1 ONE "U" POST PER SIGN	407 QUANTITY REQ'D _1_ 36″ X 36″ R1-1 ONE "U" POST PER SIGN	



PROPOSED SIGNING & TYPE "E" SIGNS

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.93	EC-1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

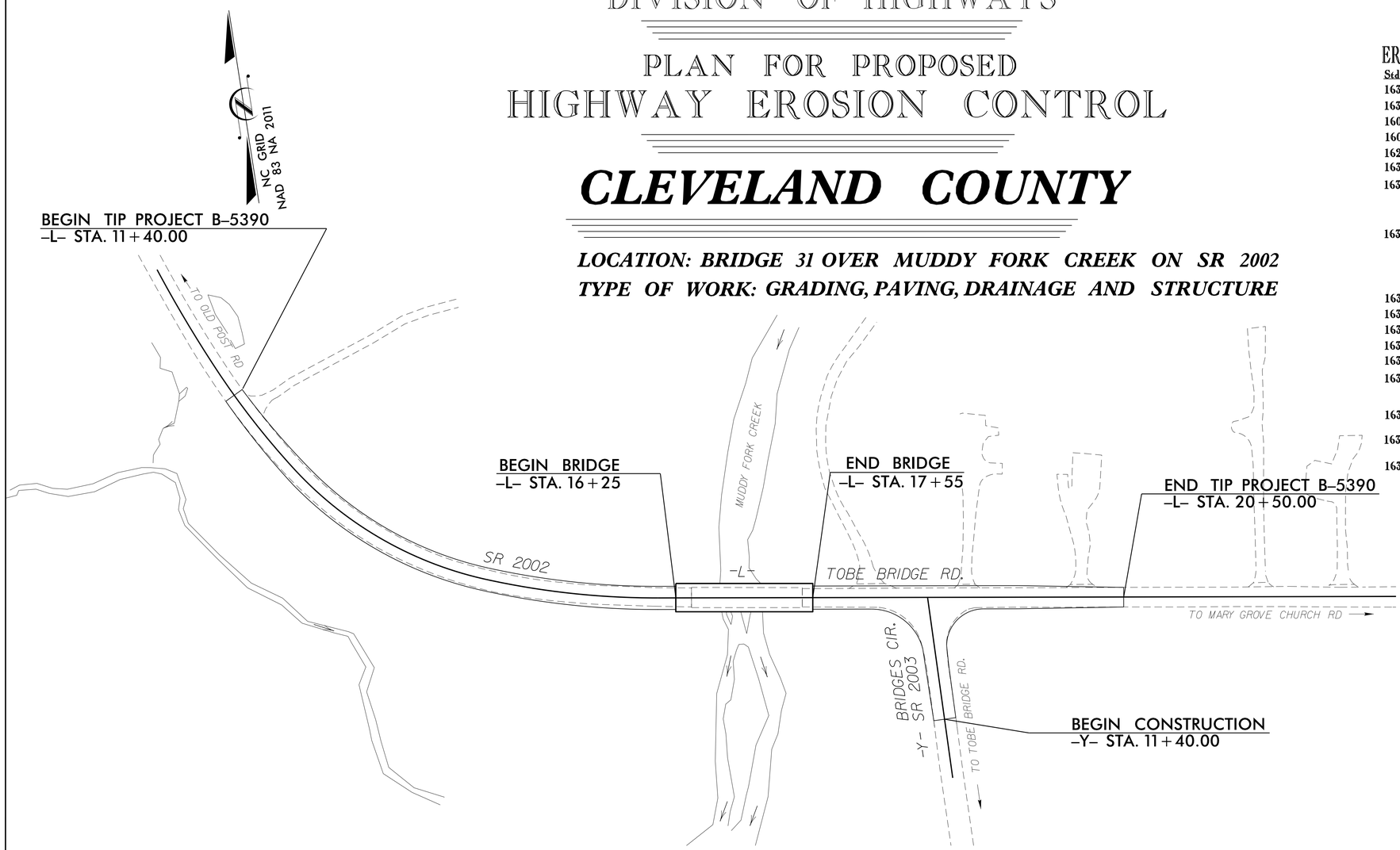
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

CLEVELAND COUNTY

LOCATION: BRIDGE 31 OVER MUDDY FORK CREEK ON SR 2002
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

TIP PROJECT: 17BP.12.R.93



EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	EW / CFW
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

GRAPHIC SCALE

0
PLANS

0
PROFILE (HORIZONTAL)

0
PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

Prepared in the Office of:

ROADSIDE ENVIRONMENTAL UNIT
1 South Wilmington St.
Raleigh, NC 27611

2018 STANDARD SPECIFICATIONS

Designed by:

Noelle Ring — ***3456***
NAME — *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2018 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

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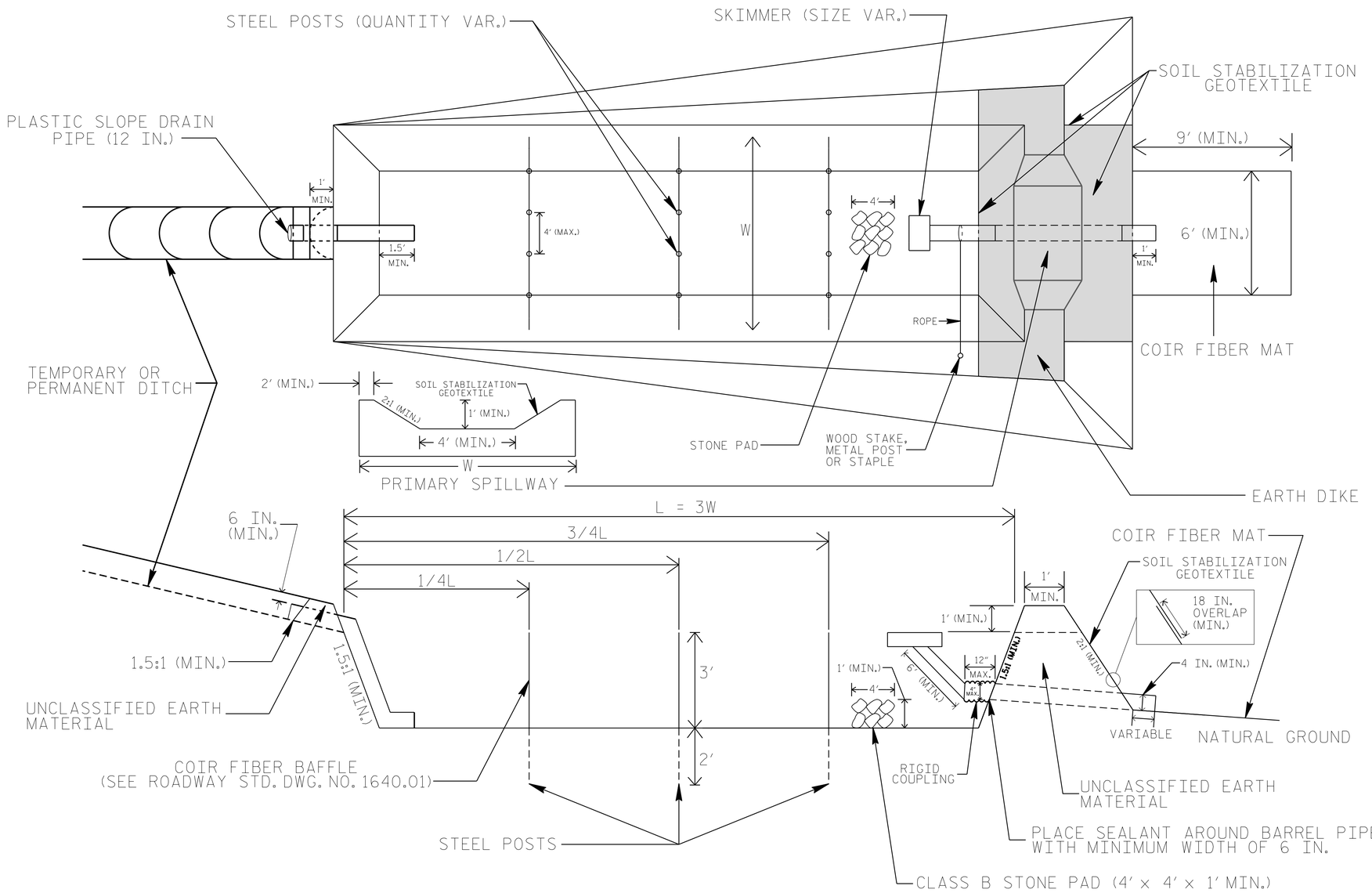
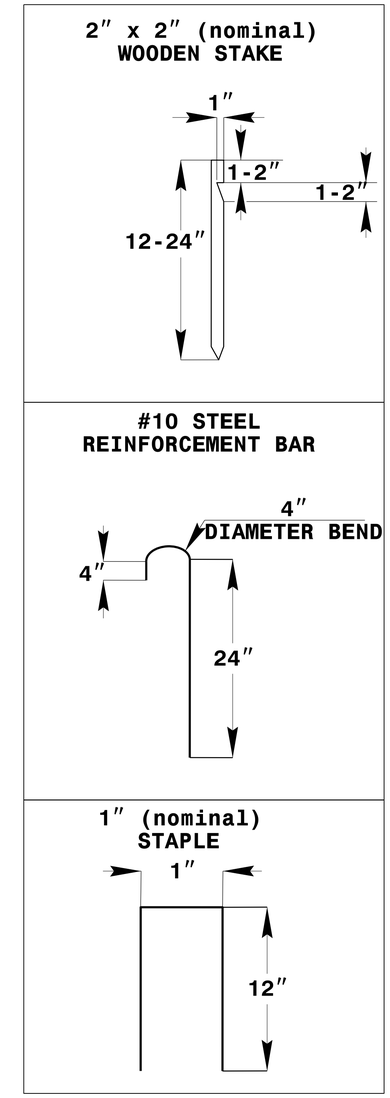
alhenrie RT REV: 29.7KB

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	EC-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

SKIMMER BASIN WITH BAFFLES DETAIL





COIR FIBER MAT ANCHOR OPTIONS

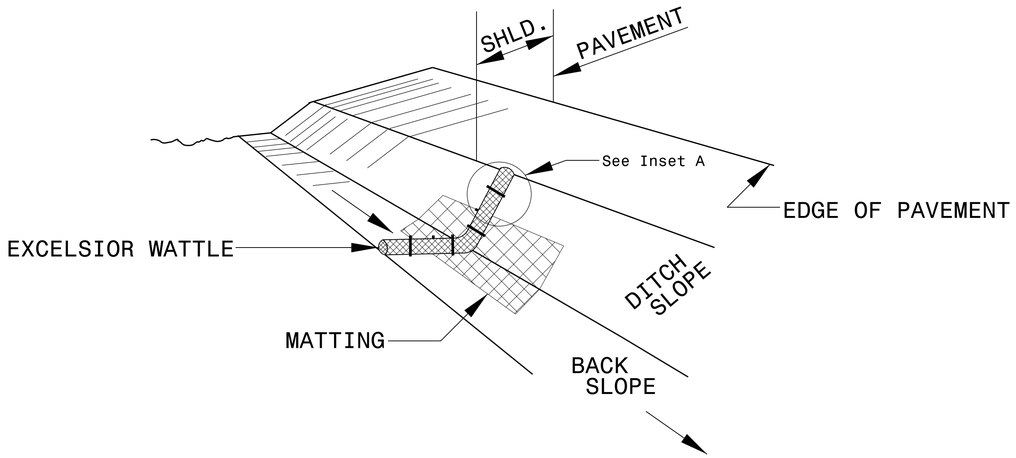
NOTES

1. SEED AND PLACE MATTING FOR EROSION CONTROL ON INTERIOR AND EXTERIOR SIDESLOPES.
2. LIMIT EARTH DIKE HEIGHT TO 5 FT.
3. FOR BASIN DEPTH OF 3 FT., THE MINIMUM BASIN WIDTH SHALL BE 9 FT.
4. DETERMINE PRIMARY SPILLWAY WEIR LENGTH (FT.) USING Q/0.8, WHERE Q IS FLOW RATE (CFS) INTO BASIN.
5. PLASTIC SLOPE DRAIN PIPE AT INLET OF BASIN MAY BE REPLACED BY FILTRATION GEOTEXTILE OR TARP AS DIRECTED.
6. SOIL STABILIZATION GEOTEXTILE FOR PRIMARY SPILLWAY SHALL BE ONE CONTINUOUS PIECE OF MATERIAL OR OVERLAPPED 18 IN. (MIN.).

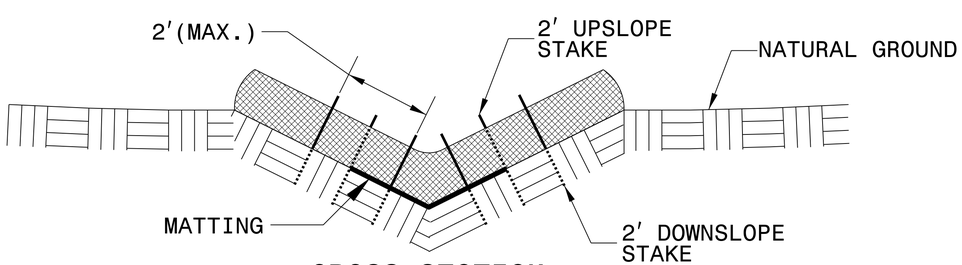
NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

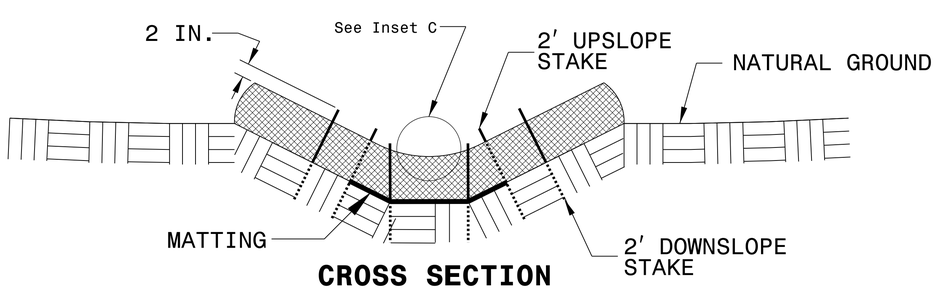
WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

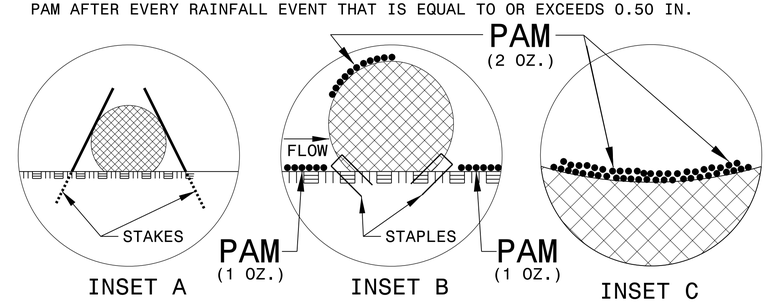
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

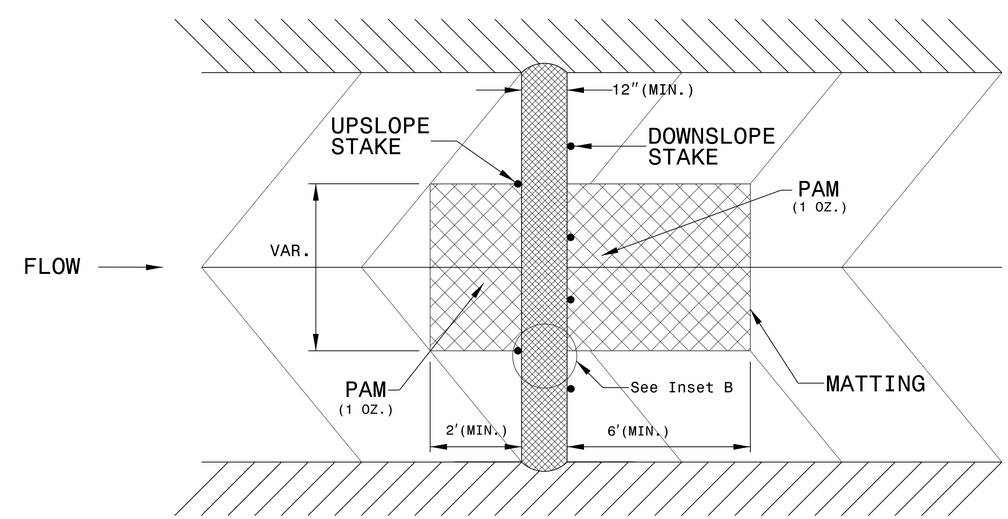
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.

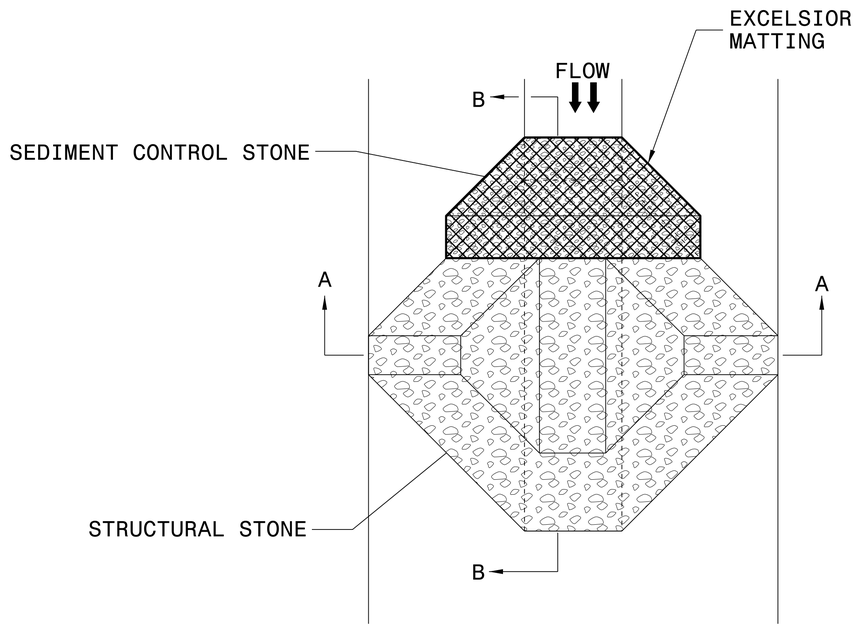




TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
17.BP.12.R.93	EC-2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN

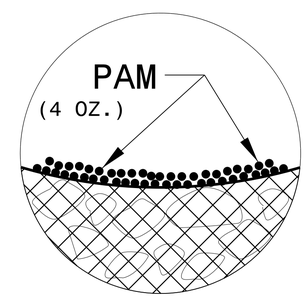
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

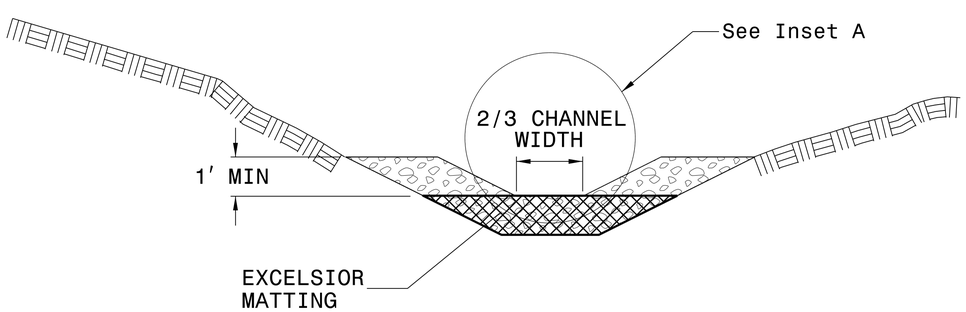
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

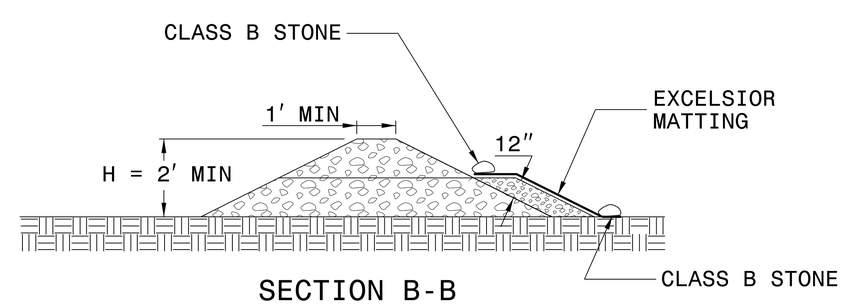
INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION A-A



SECTION B-B

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	EC-3A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	12+50	16+00	LT	325
4	-L-	11+50	13+00	RT	80
				SUBTOTAL	405
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					6160
				TOTAL	6565
				SAY	6600

PERMANENT SOIL REINFORCEMENT MAT

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	11+50	12+50	LT	50
4	-L-	18+00	20+00	LT	390
				SUBTOTAL	440
		ADDITIONAL PSRM TO BE INSTALLED			0
				TOTAL	440
				SAY	450

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	EC-4/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NC GRID NAD83NA2011

REVISIONS

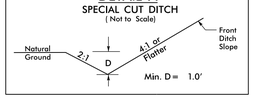
8/17/99

-L-

PI Sta 10+55.04	PI Sta 11+69.85	PI Sta 13+40.15	PI Sta 15+26.20
Δ = 5° 15' 07.6" (LT)	Δ = 9° 07' 27.9" (LT)	Δ = 35° 06' 21.3" (LT)	Δ = 12° 31' 34.0" (LT)
D = 4° 46' 28.7"	D = 7° 38' 22.0"	D = 16° 22' 12.8"	D = 7° 38' 22.0"
L = 110.00'	L = 119.44'	L = 214.45'	L = 163.97'
T = 55.04'	T = 59.85'	T = 110.71'	T = 82.31'
R = 1,200.00'	R = 750.00'	R = 350.00'	R = 750.00'
		SE = .06	
		V_D = 35mph	

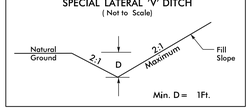
** Speed Study recommends a reasonable bridge design speed 50 mph. A Design Exception will be required for the Minimum Horizontal Curve Radius and Horizontal SSD.

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 11+50 LT TO STA. 16+00 LT. -L-

DETAIL B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM STA.17+50 LT TO STA.20+00 LT -L-

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 4

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.

29 x 14 x 3
1.5 inch Skimmer
with 0.375 inch
Orifice Diameter
4 ft. weir
ID 4.1

28 x 14 x 3
1.5 inch Skimmer
with 0.375 inch
Orifice Diameter
4 ft. weir
ID 4.2

12 x 25 x 3
1.5 inch Skimmer
with 0.375 inch
Orifice Diameter
4 ft. weir
ID 4.3

NOTE:
UTILIZE TEMPORARY SEDIMENT BASIN OR SPECIAL STILLING BASIN(S) AS STILLING BASIN WHERE APPLICABLE.

SEE SHEET 5 FOR -L- PROFILE
SEE SHEET S- TO S- FOR STRUCTURE PLANS

BEGIN TIP PROJECT B-5390
-L- POC STA. 11+40.00

END TIP PROJECT B-5390
-L- POT STA. 20+50.00

-L- PC Sta. 10+00.00
-L- PCC Sta. 11+10.00
-L- PT Sta. 16+07.86
-L- PCC Sta. 12+29.44
-L- PCC Sta. 14+43.89
-Y- POT Sta. 12+56.76
-L- POT Sta. 18+63.87
-L- POT Sta. 20+64.01
-Y- POT Sta. 10+00.00

DeVAUGHAN HOWELL
DB 1451 PG 411
DB 1656 PG 211

GROVER LEE WHITWORTH, JR. et ux
CATHERINE S. WHITWORTH
DB 16R PG 591

NISHIE ANN WHITWORTH
DB 16X PG 622

SANDRA BRIDGES DUNLAP
DB 1276 PG 0778

GOLDENE W. KEE
DB 1518 PG 1447

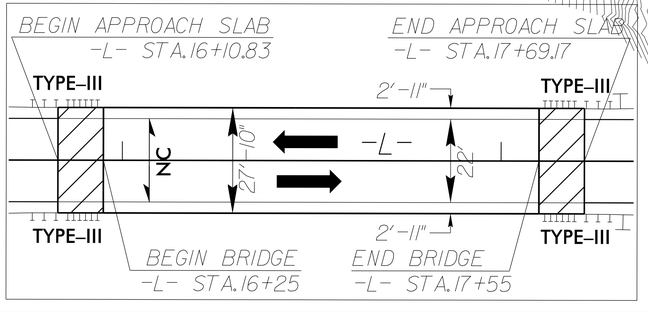
BLONDIE CHAMBERS
DB 1043 PG 019

FRANCES GRIGGS HAYNES
ESTATE 02E PG 100
DB 6D PG 372

JAKE R. WHITWORTH HEIRS
PB 34 PG 72

SPECIAL CUT DITCH (SEE DETAIL A)
SPECIAL LATERAL 'V' DITCH (SEE DETAIL B)
REMOVE EXISTING VERTICAL ABUTMENTS (SEE DETAIL C)
PROP. CLASS II RIP RAP EMBANKMENT PROTECTION EST. 8 TONS RIP RAP
CLASS I RIP RAP EST 2.1 TONS EST 8 SY GEOTEXTILE
EST 2.0 TONS EST 7 SY GEOTEXTILE
BEGIN CONST. -Y- STA 11+40.00
100' TRANSITION LT & RT
SBG FROM -L- STA. 15+95 TO BEG BRG CTRL

SKETCH SHOWING BRIDGE/ROADWAY RELATIONSHIP



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Alberto Alvarez AT&T RNV-2374486

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	EC-5/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NC GRID NAD83NA2011

REVISIONS

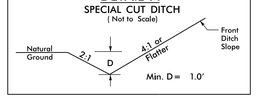
8/17/99

-L-

PI Sta 10+55.04	PI Sta 11+69.85	PI Sta 13+40.15	PI Sta 15+26.20
Δ = 5° 15' 07.6" (LT)	Δ = 9° 07' 27.9" (LT)	Δ = 35° 06' 21.3" (LT)	Δ = 12° 31' 34.0" (LT)
D = 4° 46' 28.7"	D = 7° 38' 22.0"	D = 16° 22' 12.8"	D = 7° 38' 22.0"
L = 110.00'	L = 119.44'	L = 214.45'	L = 163.97'
T = 55.04'	T = 59.85'	T = 110.71'	T = 82.31'
R = 1,200.00'	R = 750.00'	R = 350.00'	R = 750.00'
		SE = .06	
		V_D = 35mph	

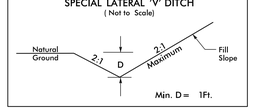
** Speed Study recommends a reasonable bridge design speed 50 mph. A Design Exception will be required for the Minimum Horizontal Curve Radius and Horizontal SSD.

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 11+50 LT TO STA. 16+00 LT. -L-

DETAIL B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM STA.17+50 LT TO STA.20+00 LT -L-

29 x 14 x 3
1.5 inch Skimmer
with 0.375 inch
Orifice Diameter
4 ft. weir
ID 4.1

28 x 14 x 3
1.5 inch Skimmer
with 0.375 inch
Orifice Diameter
4 ft. weir
ID 4.2

12 x 25 x 3
1.5 inch Skimmer
with 0.375 inch
Orifice Diameter
4 ft. weir
ID 4.3

BEGIN TIP PROJECT B-5390
-L- POC STA. 11+40.00

END TIP PROJECT B-5390
-L- POT STA. 20+50.00

-L- PC Sta. 10+00.00
-L- PCC Sta. 11+10.00
-L- PCC Sta. 12+29.44
-L- PCC Sta. 14+43.89
-L- PT Sta. 16+07.86
-Y- POT Sta. 12+56.76
-L- POT Sta. 18+63.87
-L- POT Sta. 20+64.01
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SANDRA BRIDGES DUNLAP
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DB 1518 PG 1447

BLONDIE CHAMBERS
DB 1043 PG 0119

FRANCES GRIGGS HAYNES
ESTATE 02E PG 100
DB 6D PG 372

JAKE R. WHITWORTH HEIRS
PB 34 PG 72

REMOVE EXISTING VERTICAL ABUTMENTS SEE DETAIL C

PROP CLASS II RIP RAP EMBANKMENT PROTECTION EST. 8 TONS RIP RAP

SBG FROM -L- STA. 15+95 TO BEG. BRG LT/RT

SPECIAL CUT DITCH (SEE DETAIL A)

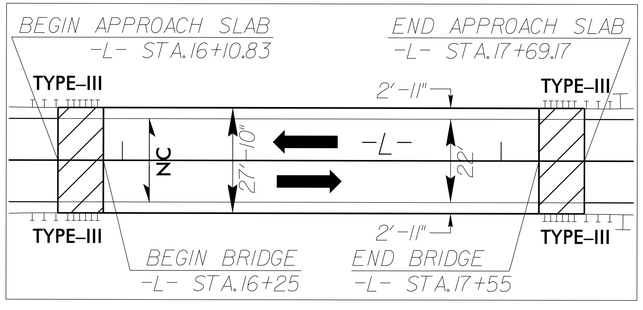
SPECIAL LATERAL 'V' DITCH (SEE DETAIL B)

CLASS I RIP RAP
EST 2.1 TONS
EST 8 SY GEOTEXTILE

EST 2.0 TONS
EST 7 SY GEOTEXTILE

B5390-1

SKETCH SHOWING BRIDGE/ROADWAY RELATIONSHIP



Place Matting for Erosion Control on Slope as Work Allows. Sta. 17+50 to Sta. 20+00

NOTE:
UTILIZE TEMPORARY SEDIMENT BASIN OR SPECIAL STILLING BASIN(S) AS STILLING BASIN WHERE APPLICABLE.

SEE SHEET 5 FOR -L- PROFILE
SEE SHEET S- TO S- FOR STRUCTURE PLANS

R:\JUL-2018 14:41
R:\Hydraulics\Hydraulics\Design\B-5390_EC.psh-3col.dgn
Alberto Ortiz-Ayala
PLANE: 297486

TIP PROJECT: 17BP.12.R.93

T.I.P. NO.	SHEET NO.
17BP.12.R.93	UO–1

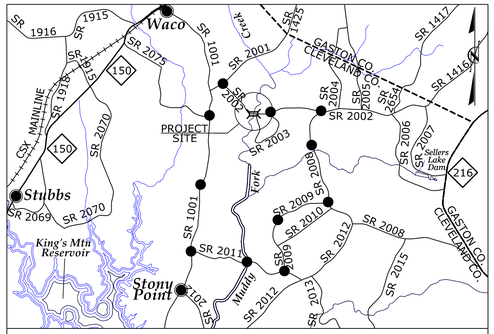
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
CLEVELAND COUNTY

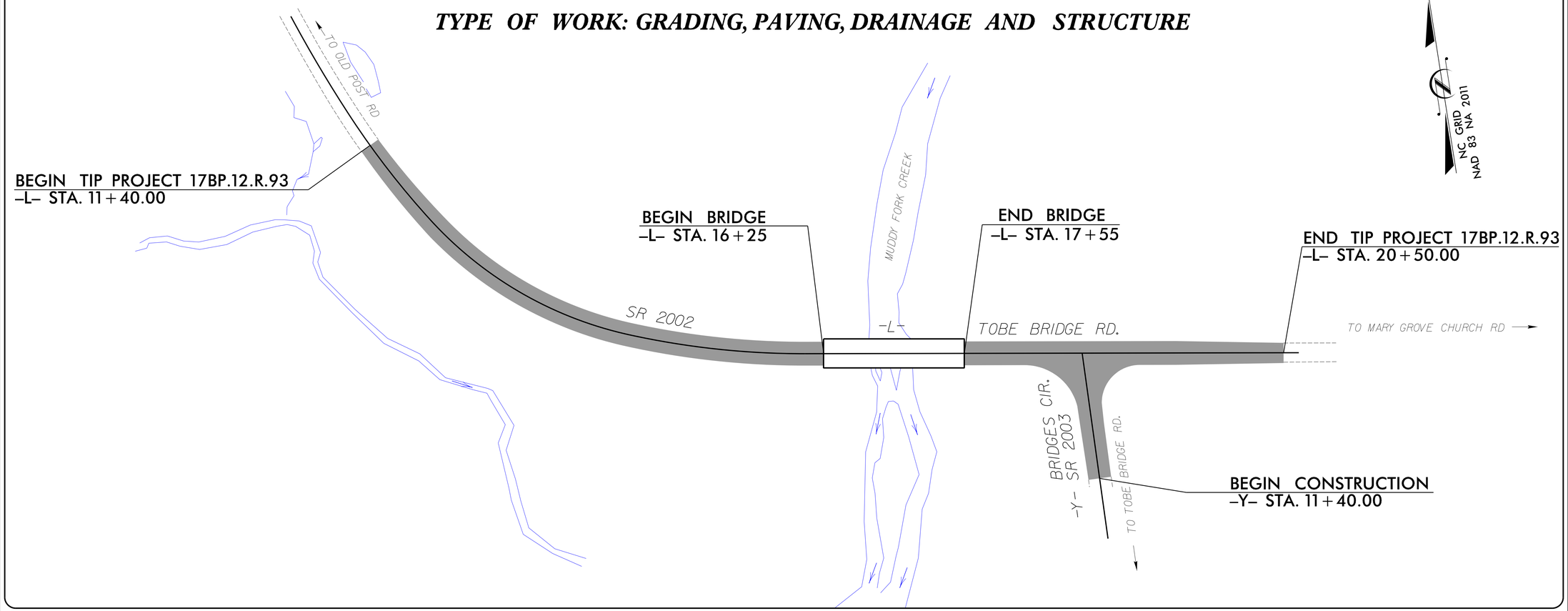
LOCATION: BRIDGE 31 OVER MUDDY FORK CREEK ON SR 2002

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.



VICINITY MAP
●—●—● OFF–SITE DETOUR



GRAPHIC SCALES

50 25 0 50 100
PLANS

INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UO–1	TITLE SHEET
UO–2	UBO PLAN SHEET

UTILITY OWNERS WITH CONFLICTS

(A) RUTHERFORD EMC – POWER
(B) CLEVELAND COUNTY WATER – WATER
(C) AT&T – TELEPHONE
(D) TWC/ CHARTER COMMUNICATIONS – CABLE

PREPARED IN THE OFFICE OF:

PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F–0112
1–888–521–4455 OR 919–878–9560

HOWARD WOODALL, PE	UTILITY PROJECT MANAGER
NATE HARRIS	PROJECT UTILITY COORDINATOR
NATE HARRIS	PROJECT UTILITY CADD

DIVISION OF HIGHWAYS
DIVISION 12
PO BOX 47
SHELBY, NC 28151–0047
LOCATION: 1710 E. MARION ST.
(US 74 BUSINESS)

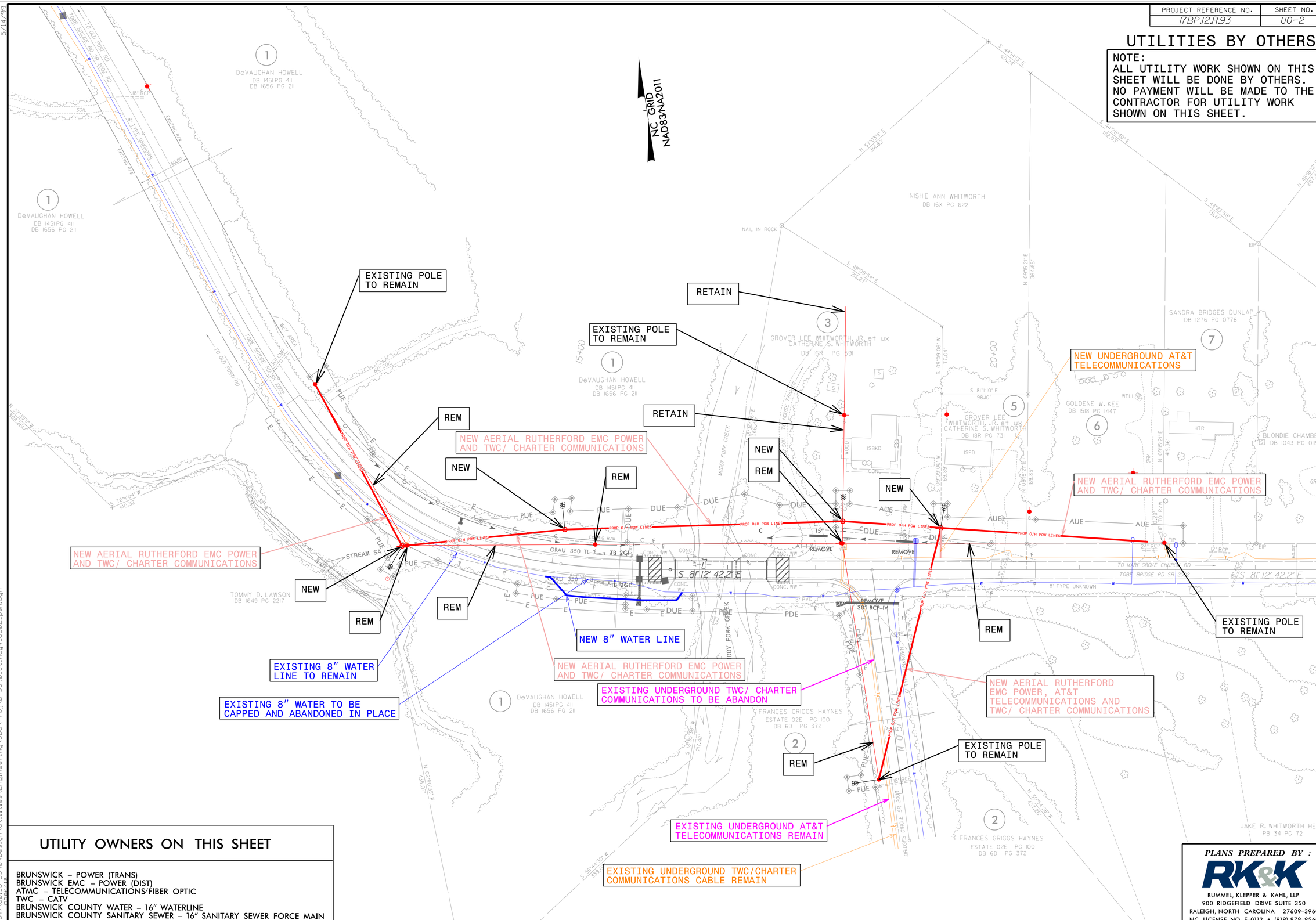
WARREN ANDERSON	DIVISION CONTACT #1
CHAD DREWERY	DIVISION CONTACT #2
LARRY CARPENTER, PE	DIVISION CONTACT #3

09/08/99
8/30/2018
M:\Projects\2013\13II_Utility_Coordination_(NCDOT)\60LB-5390\Design\Utilities\Engineering\UBO\Proj\B-5390_ut_tsh_U001_psh.dgn
nharris

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.93	U0-2

UTILITIES BY OTHERS

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.



UTILITY OWNERS ON THIS SHEET

BRUNSWICK – POWER (TRANS)
BRUNSWICK EMC – POWER (DIST)
ATMC – TELECOMMUNICATIONS/FIBER OPTIC
TWC – CATV
BRUNSWICK COUNTY WATER – 16" WATERLINE
BRUNSWICK COUNTY SANITARY SEWER – 16" SANITARY SEWER FORCE MAIN

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

5/14/99
8/20/2018
on_NCDOT\17BP.12.R.93\Design\Utilities\Engineering\UBO\Proj\B-5390_ut_Rdy4_U002_psh.dgn

TIP PROJECT: 17BP.12.R.93

CONTRACT: DL00186

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

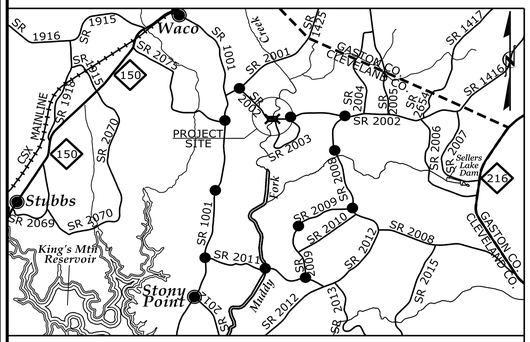
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.93		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.12.R.93	BRSTP-2002(1)	PE
17BP.12.R.93		R/W, UTIL
17BP.12.R.93		CONST.

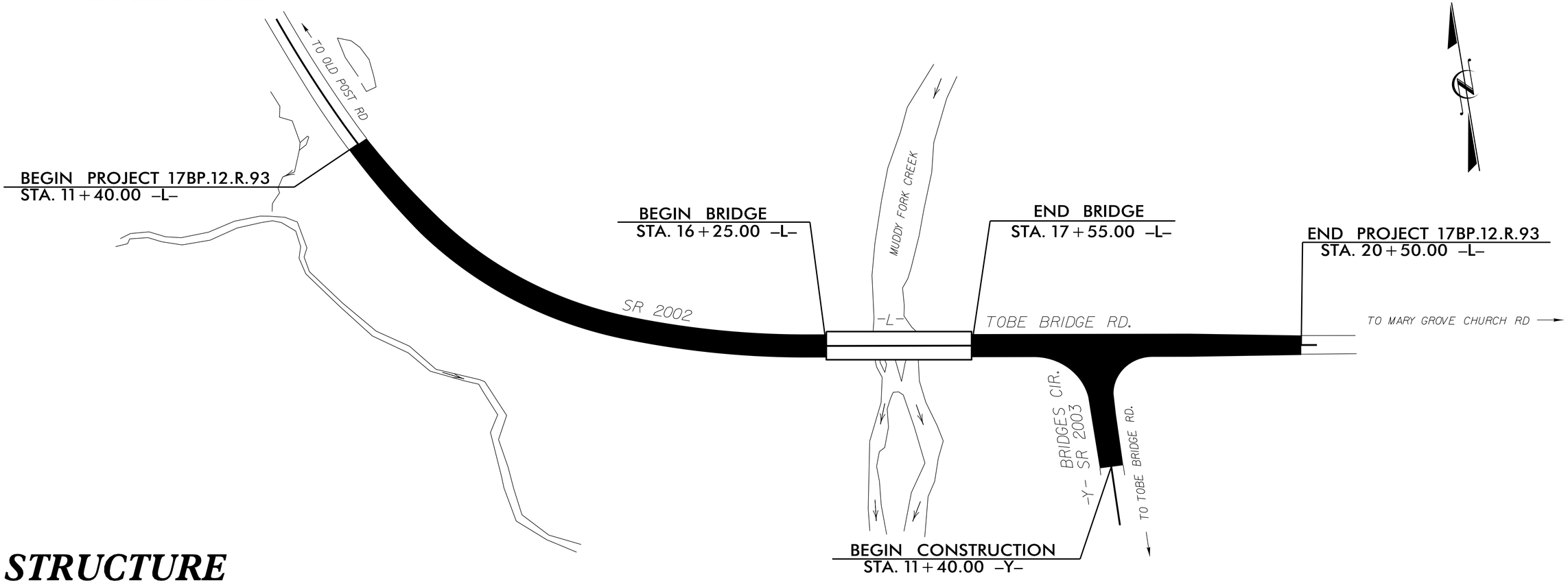
CLEVELAND COUNTY

LOCATION: BRIDGE 31 OVER MUDDY FORK CREEK ON SR 2002

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



VICINITY MAP
OFF-SITE DETOUR



STRUCTURE

DESIGN DATA

ADT 2018 = 1214
ADT 2035 = 1600
K = 10 %
D = 60 %
T = 5 % *
V = 50 MPH
* TTST =1% DUAL =4%
FUNC CLASS =
RURAL COLLECTOR
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT 17BP.12.R.93 =	0.147 MI.
LENGTH OF STRUCTURES PROJECT 17BP.12.R.93 =	0.025 MI.
TOTAL LENGTH OF PROJECT 17BP.12.R.93 =	0.172 MI.

Prepared In the Office of:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2018 STANDARD SPECIFICATIONS

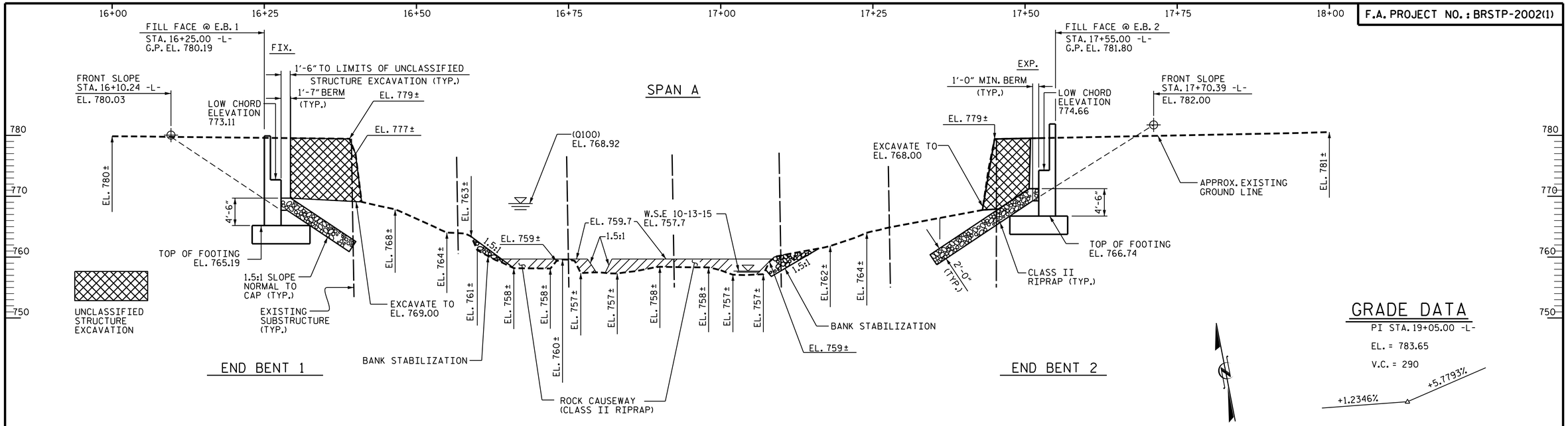
LETTING DATE:
OCTOBER 23, 2018

A. KEITH PASCHAL, PE
PROJECT ENGINEER

K.P. SEDAI, PE
PROJECT DESIGN ENGINEER

24-SEP-2018 16:02
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
ksedai

F.A. PROJECT NO. : BRSTP-2002(1)



SECTION ALONG -L-

GRADE DATA

PI STA. 19+05.00 -L-

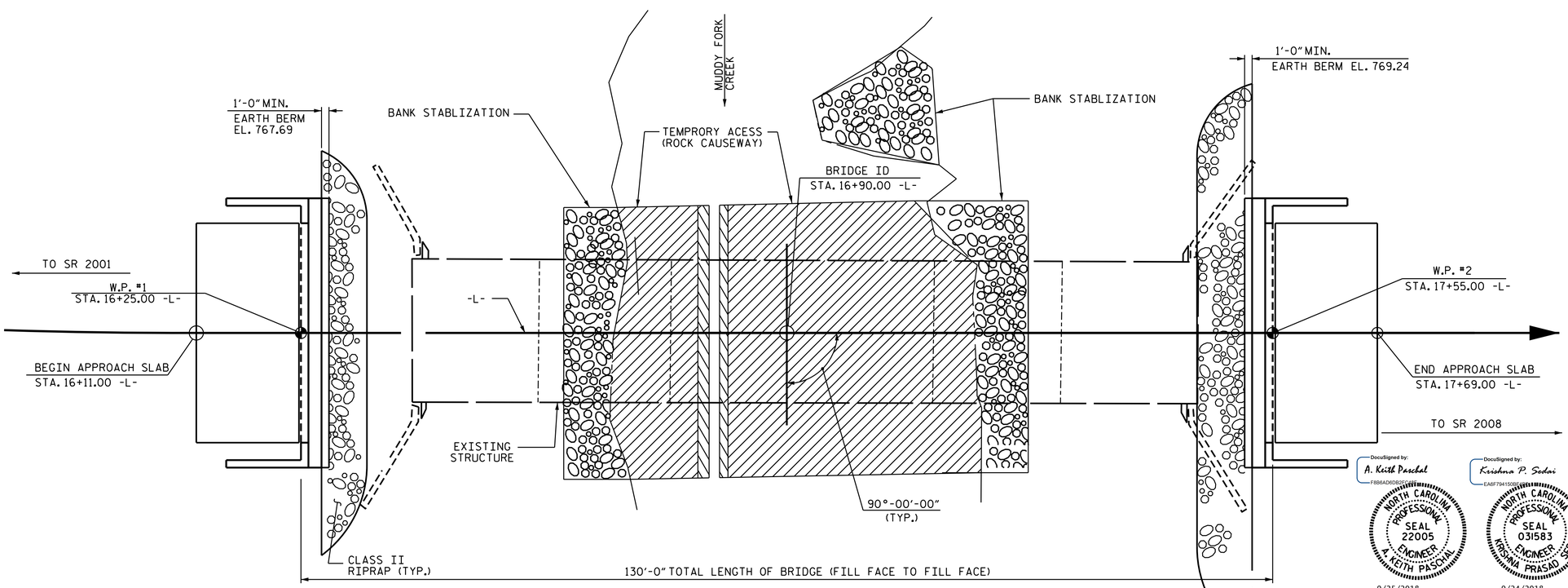
EL. = 783.65

V.C. = 290

+1.2346%

+5.7793%

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



CAUSEWAY CONSTRUCTION MUST BE PHASED IN ORDER TO NOT BLOCK MORE THAN 50% OF THE STREAM CHANNEL

PLAN

(FOOTING NOT SHOWN FOR CLARITY)

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE #31

DocuSigned by: A. Keith Paschal F8B6AD6DE5E7... 9/25/2018

DocuSigned by: Krishna P. Sedai EA6F7941... 9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 2002
(TOBE BRIDGE RD)
OVER MUDDY FORK CREEK
BETWEEN SR 2001
AND SR 2008

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-01
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : GHOLAMREZA KOUCHEKI DATE : 8-18
CHECKED BY : E.K. POPE DATE : 8-18
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 9-18

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

24-SEP-2018 16:02
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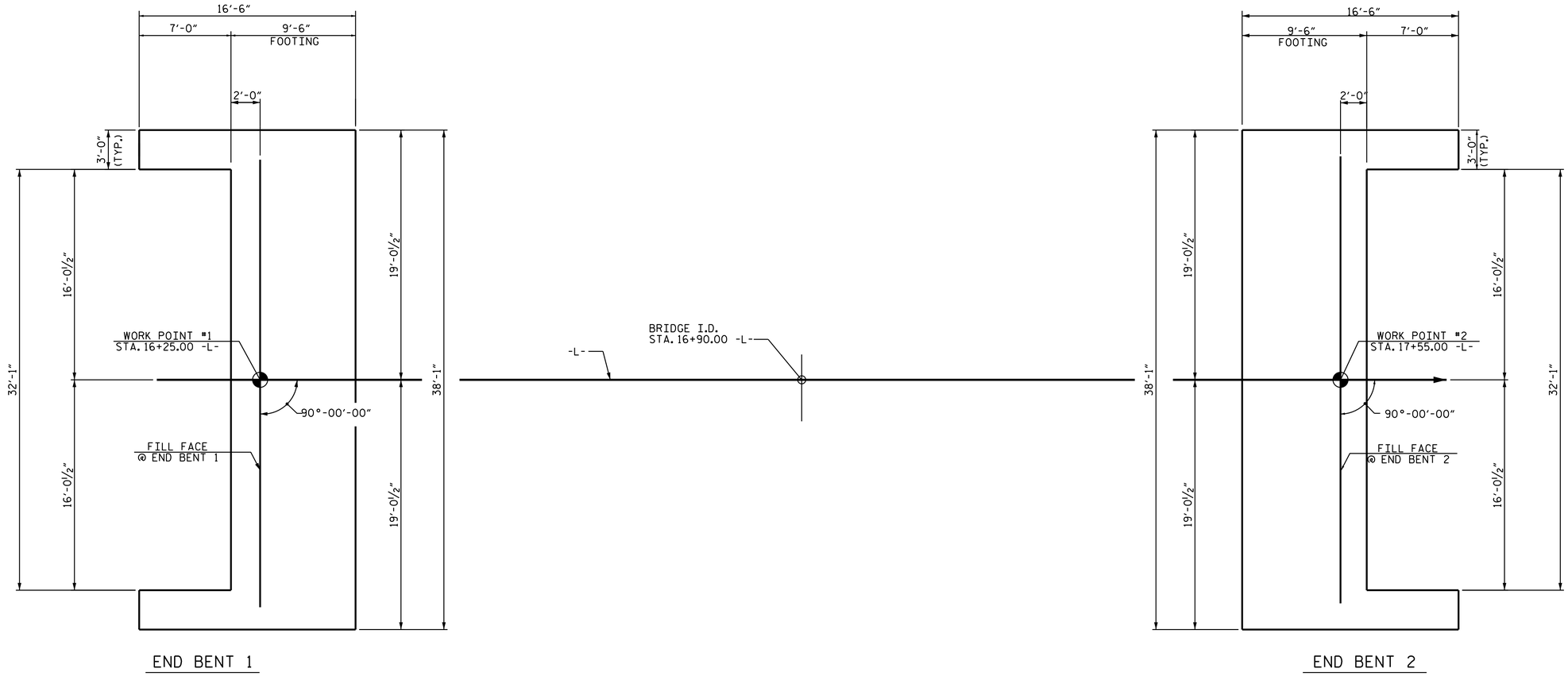
ksedai



FOUNDATION LAYOUT

NOTES

THE SPREAD FOOTING AT END BENT 1 IS DESIGNED FOR A FACTORED RESISTANCE OF 6 TSF. CHECK FIELD CONDITIONS FOR THE REQUIRED RESISTANCE OF 13.5 TSF JUST BEFORE PLACING CONCRETE.

CARRY IN SPREAD FOOTING AT END BENT 1 AT LEAST 6" INTO ROCK WITH MINIMUM THICKNESS AS SHOWN ON THE PLANS.

THE SPREAD FOOTING AT END BENT 2 IS DESIGNED FOR A FACTORED RESISTANCE OF 6 TSF. CHECK FIELD CONDITIONS FOR THE REQUIRED RESISTANCE OF 13.5 TSF JUST BEFORE PLACING CONCRETE.

CARRY IN SPREAD FOOTING AT END BENT 2 AT LEAST 12" INTO WEATHERED ROCK WITH MINIMUM THICKNESS AS SHOWN ON THE PLANS.

FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE ARTICLE 410-9 OF THE STANDARD SPECIFICATION.

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

SHEET 2 OF 3

DocuSigned by:
Krishna P. Sedai
EA6F7941508E4...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 2002
(TOBE BRIDGE RD.)
OVER MUDDY FORK CREEK
BETWEEN SR 2001 &
SR 2008

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-02
1			3				TOTAL SHEETS
2			4				24

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DRAWN BY : GHOLAMREZA KOUCHEKI DATE : 8-18
CHECKED BY : E.K. POPE DATE : 8-18
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 9-18

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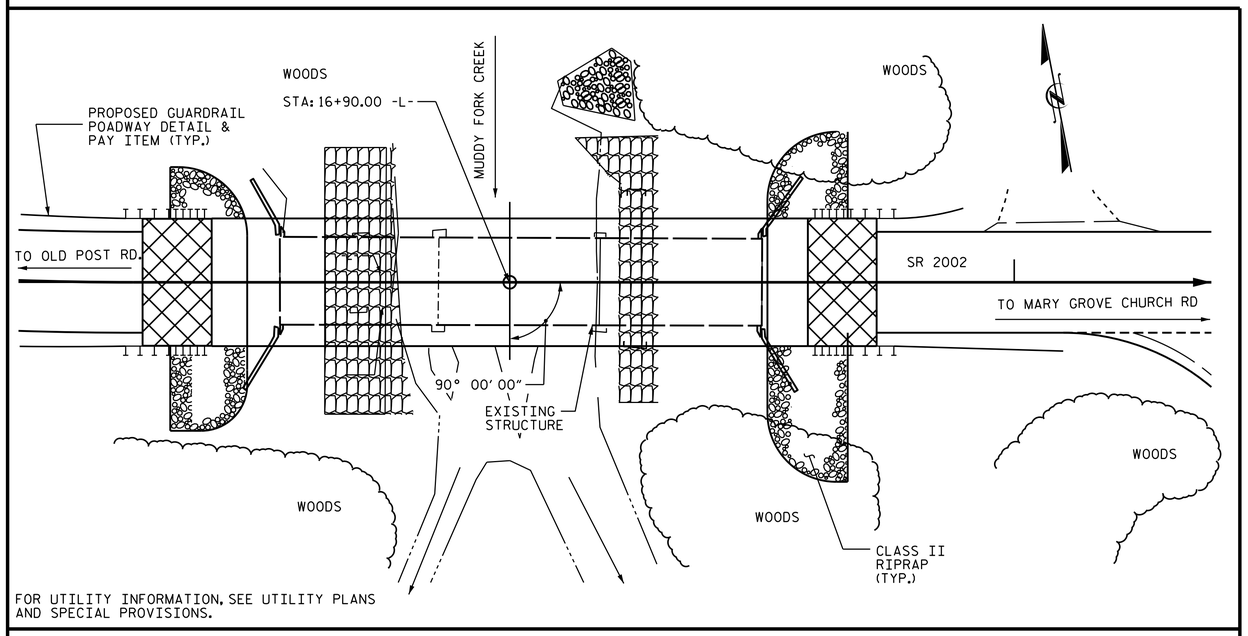
ksedai

BENCHMARK: RAILROAD SPIKE SET IN ROOT OF 12" CEDAR TREE, 149' RT. OF STA. 26+90.00 -L-, EL. = 778.20



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 16+90.00 -L-.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+90.00 -L-."

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE SCOUR CRITICAL ELEVATION FOR END BENT NO. 1 AND END BENT NO. 2 IS THE BOTTOM OF FOOTING ELEVATION. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON S-01 SHALL BE EXCAVATED FOR A DISTANCE OF 20' LEFT AND 25' RIGHT OF CENTERLINE ROADWAY AT END BENT 1 AND 15 FT EACH SIDE OF CENTERLINE ROADWAY AT END BENT 2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 6 SPANS, 1 @ 17'-3", 1 @ 18'-1", 1 @ 17'-4", 1 @ 17'-7", 1 @ 17'-11", AND 1 @ 17'-5" ON I BEAMS ON 4" X 8" TIMBER FLOOR; WITH A CLEAR ROADWAY WIDTH OF 19.25 FT. ON END BENTS AND BENTS WITH TIMBER CAP, PILES AND SILLS WITH CONCRETE FOOTINGS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT. FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION FOR END BENT	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE					3848	3866				4	509.00	255.67				
END BENT 1			LUMP SUM	LUMP SUM			90.7		13,050				113	128		
END BENT 2			LUMP SUM	LUMP SUM			90.7		13,050				212	237		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	3848	3866	181.4	LUMP SUM	26,100	4	509.00	255.67	325	365	LUMP SUM	LUMP SUM

HYDRAULIC DATA

DESIGN DISCHARGE _____ = 2,600 C.F.S.
FREQUENCY OF DESIGN FLOOD _____ = 25 YRS.
DESIGN HIGH WATER ELEVATION _____ = 766.4
DRAINAGE AREA _____ = 13.5 SQ. MI
BASE DISCHARGE (Q100) _____ = 4,470 C.F.S
BASE HIGH WATER ELEVATION _____ = 768.92

OVERTOPPING FLOOD DATA

OVERTOPPING DISCAHRGE _____ = 4890 C.F.S +
FREQUENCY OF OVERTOPPING FLOOD _____ = 500 YRS. +
OVERTOPPING FLOOD ELEVATION _____ = 779.6

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

SHEET 3 OF 3

DocuSigned by: Krishna P. Sedai
EA6F7941598E4...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 2002
(TOBE BRIDGE RD)
OVER MUDDY FORK CREEK
BETWEEN SR 2001 & SR 2008

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-03
1			3			TOTAL SHEETS
2			4			24

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DRAWN BY : GHOLAMREZA KOUCHEKI DATE : 8-18
CHECKED BY : E.K. POPE DATE : 8-18
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 9-18

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ksedai

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	MOMENT					
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.002	0.000	1.75	0.781	1.184	A	1	62.92	0.781	1.075	A	1	37.75	0.80	0.781	1.002	A	1	62.92	
		HL-93 (OPERATING)	N/A	--	1.002	0.000	1.35	0.781	1.535	A	1	62.92	0.781	1.393	A	1	37.75	N/A	0.781	1.002	A	1	62.92	
		HS-20 (INVENTORY)	36	2	1.432	51.544	1.75	0.781	1.752	A	1	62.92	0.781	1.432	A	1	37.75	0.80	0.781	1.483	A	1	62.92	
		HS-20 (OPERATING)	36	--	1.483	53.389	1.35	0.781	2.272	A	1	62.92	0.781	1.856	A	1	37.75	N/A	0.781	1.483	A	1	62.92	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.615	48.800	1.40	0.781	5.339	A	1	62.92	0.781	4.396	A	1	37.75	0.80	0.781	3.615	A	1	62.92	
		SNGARBS2	20.000	--	2.576	51.518	1.40	0.781	3.804	A	1	62.92	0.781	3.082	A	1	37.75	0.80	0.781	2.576	A	1	62.92	
		SNAGRIS2	22.000	--	2.393	52.646	1.40	0.781	3.534	A	1	62.92	0.781	2.844	A	1	37.75	0.80	0.781	2.393	A	1	62.92	
		SNCOTTS3	27.250	--	1.795	48.922	1.40	0.781	2.652	A	1	62.92	0.781	2.190	A	1	37.75	0.80	0.781	1.795	A	1	62.92	
		SNAGGRS4	34.925	--	1.455	50.805	1.40	0.781	2.149	A	1	62.92	0.781	1.787	A	1	37.75	0.80	0.781	1.455	A	1	62.92	
		SNS5A	35.550	--	1.426	50.678	1.40	0.781	2.105	A	1	62.92	0.781	1.795	A	1	37.75	0.80	0.781	1.426	A	1	62.92	
		SNS6A	39.950	--	1.290	51.521	1.40	0.781	1.905	A	1	62.92	0.781	1.626	A	1	37.75	0.80	0.781	1.290	A	1	62.92	
		SNS7B	42.000	--	1.227	51.553	1.40	0.781	1.813	A	1	62.92	0.781	1.582	A	1	37.75	0.80	0.781	1.227	A	1	62.92	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.567	51.721	1.40	0.781	2.315	A	1	62.92	0.781	1.944	A	1	37.75	0.80	0.781	1.567	A	1	62.92	
		TNT4A	33.075	--	1.569	51.905	1.40	0.781	2.318	A	1	62.92	0.781	1.908	A	1	37.75	0.80	0.781	1.569	A	1	62.92	
		TNT6A	41.600	--	1.266	52.678	1.40	0.781	1.870	A	1	62.92	0.781	1.658	A	1	37.75	0.80	0.781	1.266	A	1	62.92	
		TNT7A	42.000	--	1.264	53.080	1.40	0.781	1.867	A	1	62.92	0.781	1.630	A	1	37.75	0.80	0.781	1.264	A	1	62.92	
		TNT7B	42.000	--	1.286	54.019	1.40	0.781	1.900	A	1	62.92	0.781	1.556	A	1	37.75	0.80	0.781	1.286	A	1	62.92	
		TNAGRIT4	43.000	--	1.239	53.289	1.40	0.781	1.830	A	1	62.92	0.781	1.510	A	1	37.75	0.80	0.781	1.239	A	1	62.92	
		TNAGRT5A	45.000	--	1.176	52.920	1.40	0.781	1.737	A	1	62.92	0.781	1.483	A	1	37.75	0.80	0.781	1.176	A	1	62.92	
		TNAGRT5B	45.000	3	1.169	52.584	1.40	0.781	1.726	A	1	62.92	0.781	1.483	A	1	37.75	0.80	0.781	1.169	A	1	62.92	

LOAD FACTORS:

	LIMIT STATE	γ_{DC}	γ_{DW}
DESIGN LOAD RATING FACTORS	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

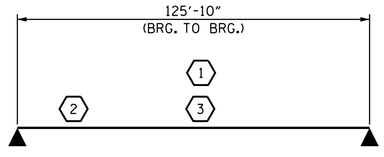
(#) CONTROLLING LOAD RATING

1. DESIGN LOAD RATING (HL-93)
2. DESIGN LOAD RATING (HS-20)
3. LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

DocuSigned by: Krishna P. Sedai
EA6F794150BE4...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-04
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : M. POOLE DATE : 9/18
CHECKED BY : E. K. POPE DATE : 9/18
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 9/18

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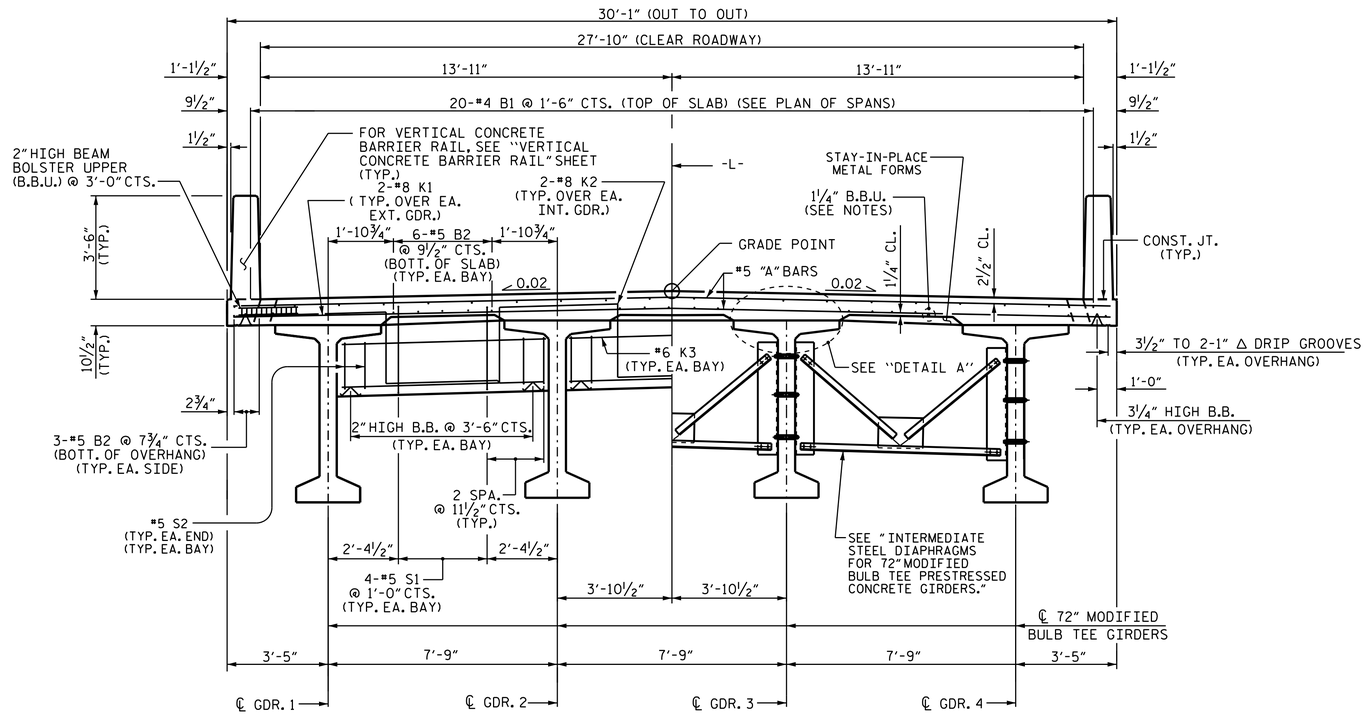
ksedai

STD. NO. LRFR1

NOTES

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

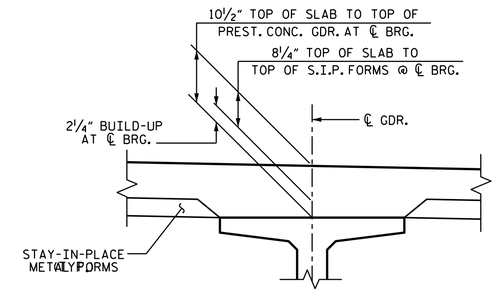
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.



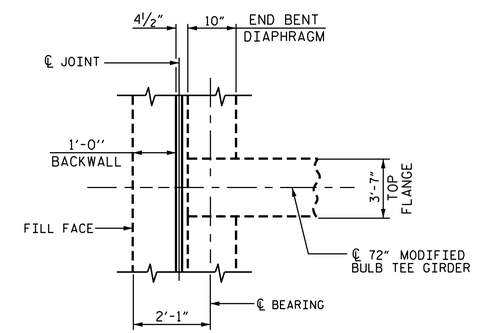
END BENT DIAPHRAGMS

INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

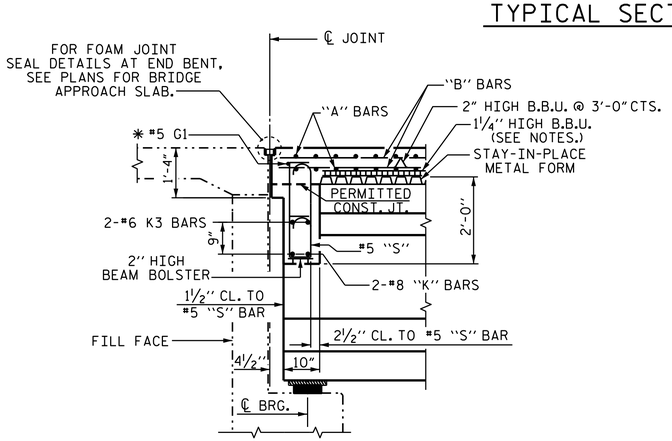


DETAIL A



END BENT DIAPHRAGM

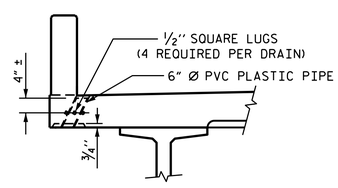
PLAN



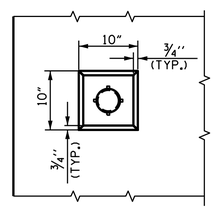
SECTION A-A

SECTION THRU DIAPHRAGM @ END BENTS

✱ #5 G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



ELEVATION



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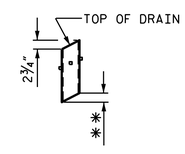

✱✱ TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (20 DRAINS REQUIRED)

PIPE DETAIL

TOP OF FLOOR DRAINS TO BE SET ⅜" BELOW SURFACE OF SLAB.

4 - ½" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

DRAIN DETAILS

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

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EA6F7041592...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI
9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-05
1			3				TOTAL SHEETS
2			4				24

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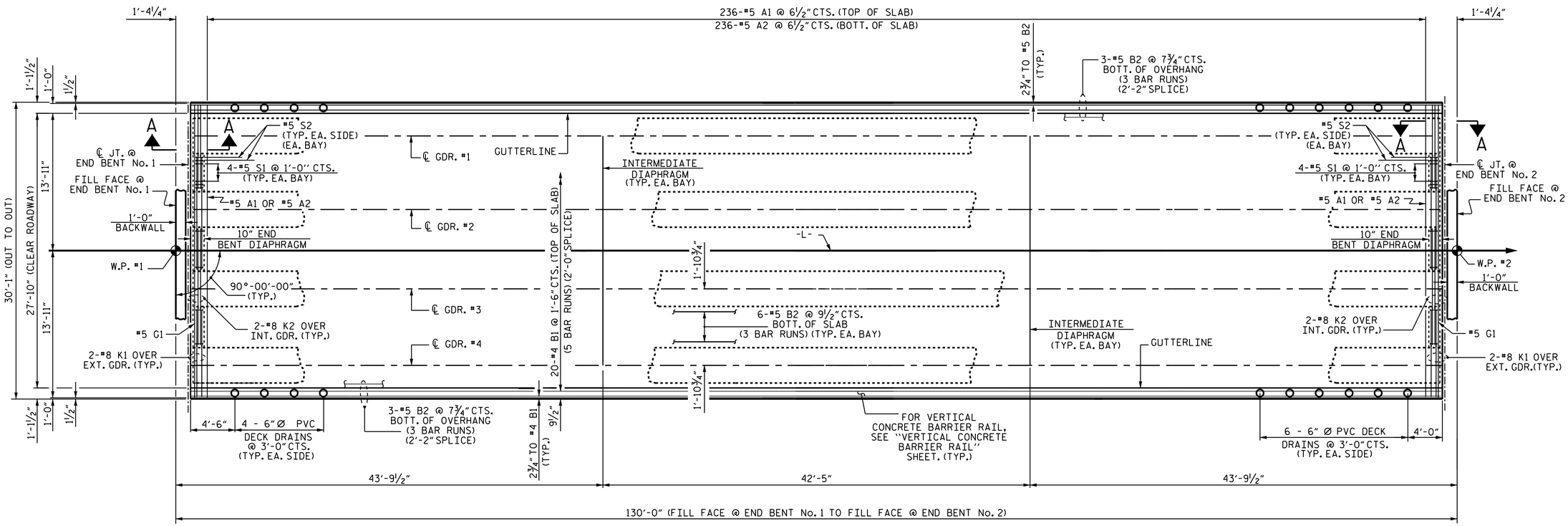

PLAN OF SPAN

FOR SECTION VIEW, SEE "TYPICAL SECTION" SHEET.

FOR DETAILS OF INTERMEDIATE DIAPHRAGM, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIERDERS", SHEET.

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION 16+90.00 -L-

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EA6F7041580

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN

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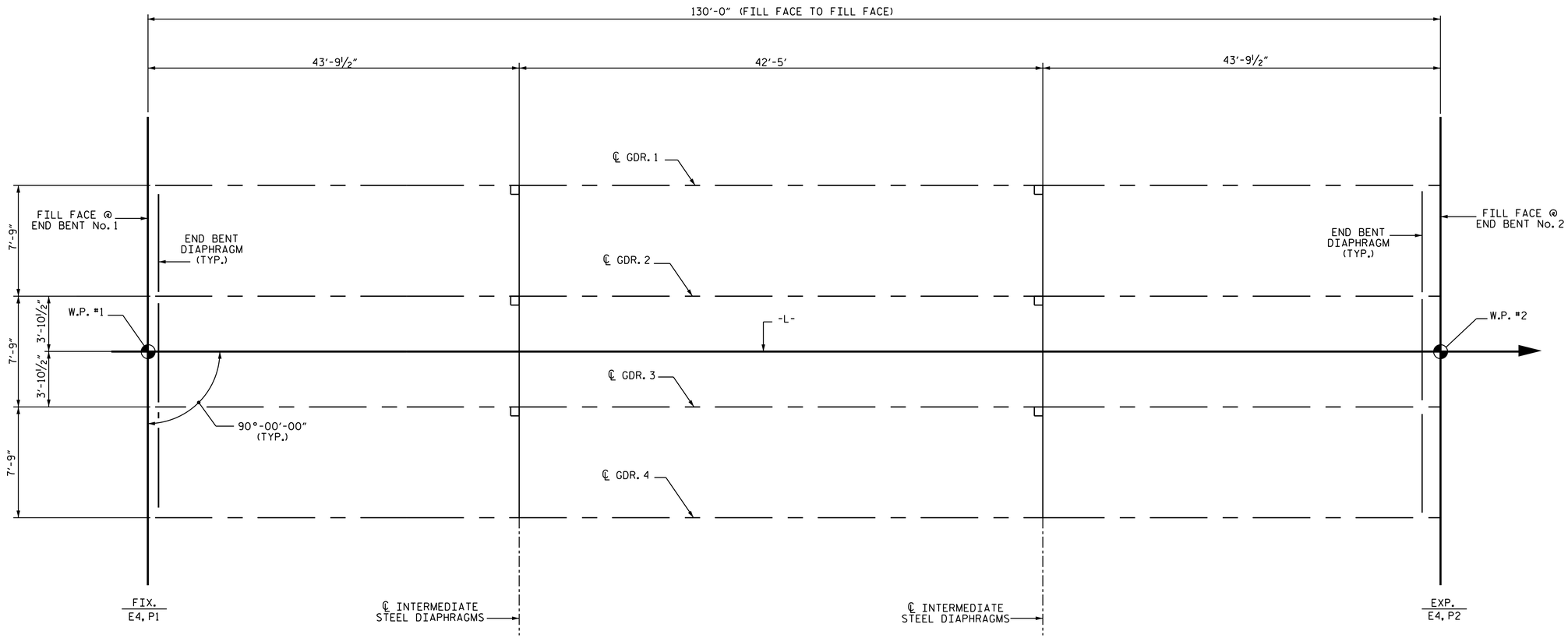

FRAMING PLAN

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION 16+90.00 -L-

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EA6F7941508E4...

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9/24/2018

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
FRAMING PLAN

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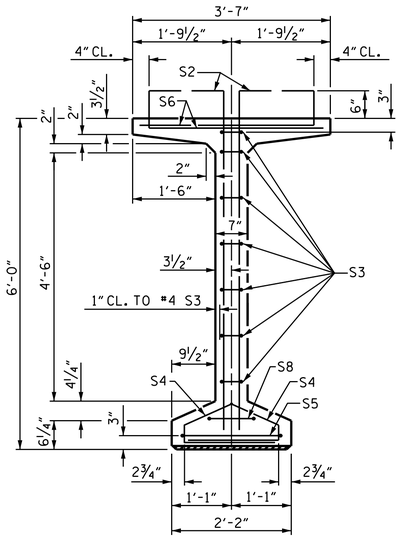
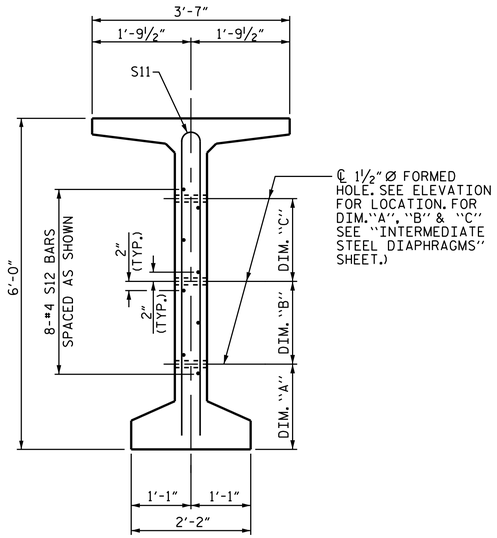
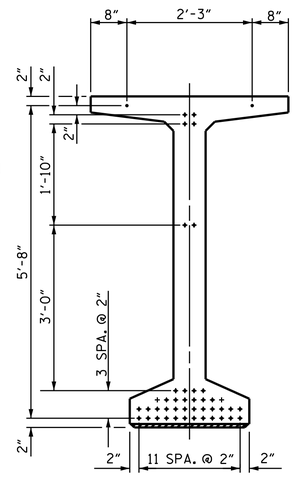


SECTION A-A

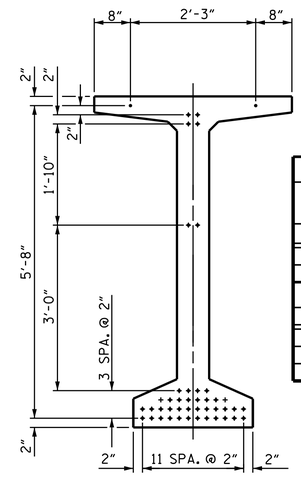


SECTION C-C

(S1, S6 AND S9 BARS NOT SHOWN)



AT END OF GIRDER



AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	9500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
2592	27.3	42

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	127'-3"	509'-0"

DEBONDING LEGEND

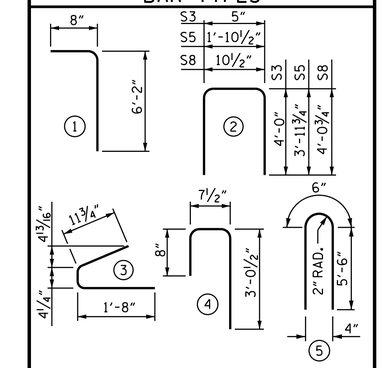
● FULLY BONDED STRANDS

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	186	#4	1	6'-10"	849
S2	20	#6	1	6'-10"	205
S3	14	#4	2	8'-5"	79
S4	80	#4	3	3'-0"	160
S5	2	#5	2	9'-10"	21
S6	206	#5	4	4'-4"	931
S8	2	#5	2	9'-0"	19
S9	43	#5	STR	3'-3"	146
S11	8	#5	5	11'-6"	96
S12	16	#4	STR	8'-0"	86

BAR TYPES



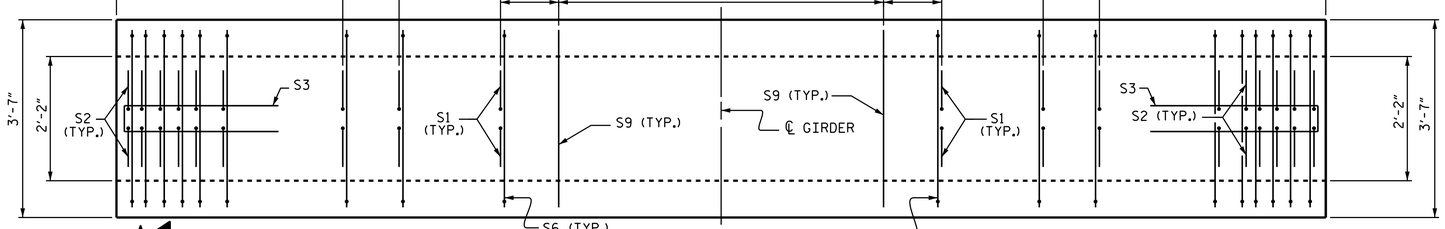
ALL BAR DIMENSIONS ARE OUT-TO-OUT

127'-3"

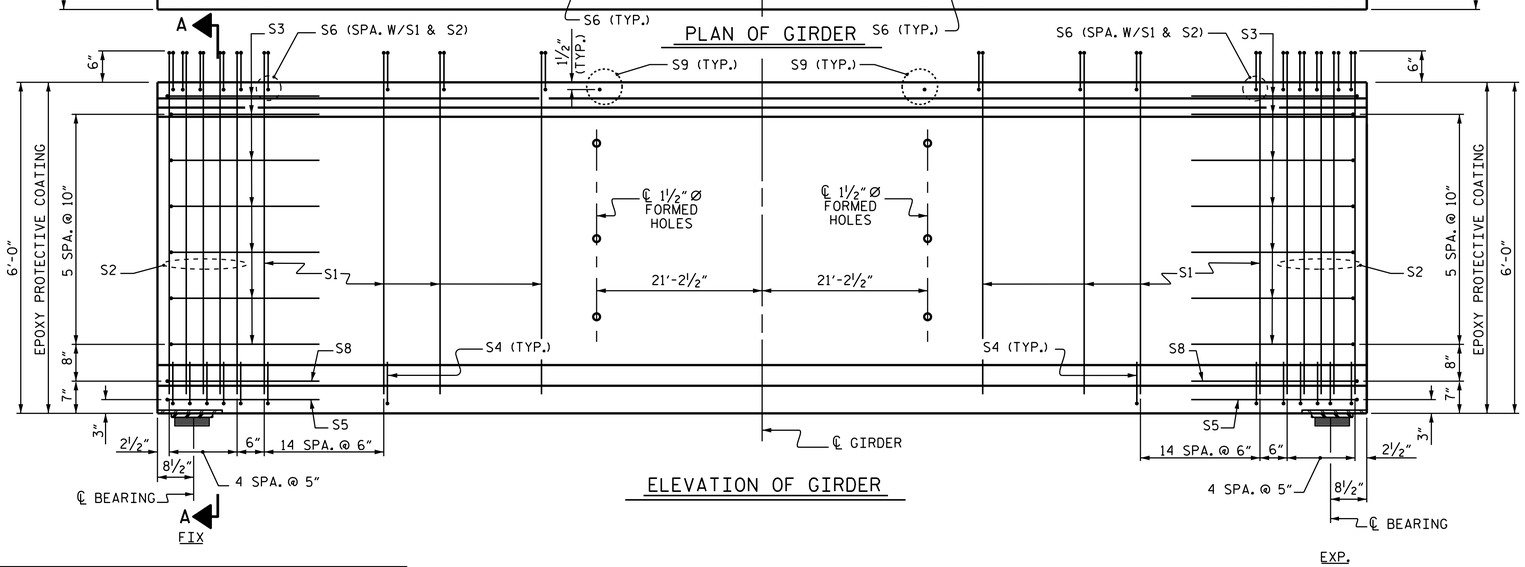
63'-7½" | 63'-7½"

9'-4½" | 9" | 9 SPA @ 1'-2" | 43 SPA @ 2'-0" | 9 SPA @ 1'-2" | 9" | 9'-4½"

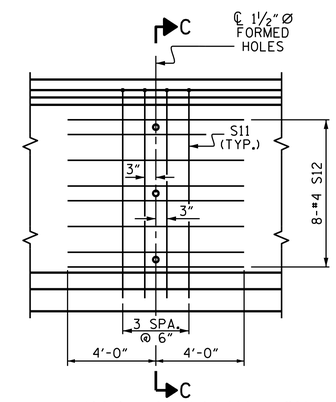
1'-0" | 43-#5 S9 @ 2'-0" CTS. | 1'-0"



PLAN OF GIRDER



ELEVATION OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL.

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION 16+90.00 -L-

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EA6F794150B6...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE

DRAWN BY :	M. POOLE	DATE : 11-16
CHECKED BY :	E. K. POPE	DATE : 11-17
DESIGN ENGINEER OF RECORD:	H. A. LOCKLEAR	DATE : 9-18

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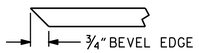
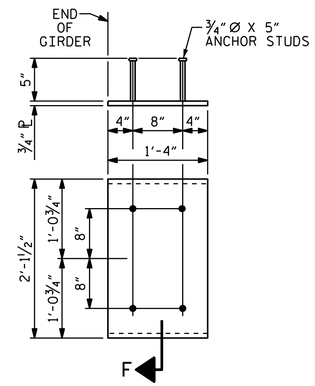


SECTION "F"

(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED BULB TEE

(2 REQ'D PER GIRDER)

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7300 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN A

0.6" Ø LOW RELAXATION	GIRDERS 1 & 4																				
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.037	0.072	0.106	0.137	0.164	0.188	0.206	0.220	0.228	0.231	0.228	0.220	0.206	0.188	0.164	0.137	0.106	0.072	0.037	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.027	0.053	0.078	0.101	0.121	0.138	0.152	0.162	0.168	0.170	0.168	0.162	0.152	0.138	0.121	0.101	0.078	0.053	0.027	0.0
FINAL CAMBER ↑	0.0	1/8"	1/4"	5/16"	7/16"	1/2"	5/8"	5/8"	11/16"	3/4"	3/4"	3/4"	11/16"	5/8"	5/8"	1/2"	7/16"	5/16"	1/4"	1/8"	0.0

0.6" Ø LOW RELAXATION	GIRDERS 2 & 3																				
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.037	0.072	0.106	0.136	0.164	0.187	0.205	0.219	0.227	0.230	0.227	0.219	0.205	0.187	0.164	0.136	0.106	0.072	0.037	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.028	0.056	0.082	0.106	0.127	0.145	0.159	0.170	0.176	0.178	0.176	0.170	0.159	0.145	0.127	0.106	0.082	0.056	0.028	0.0
FINAL CAMBER ↑	0.0	1/8"	3/16"	5/16"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	3/16"	1/8"	0.0

* INCLUDES FUTURE WEARING SURFACE

ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00. -L-

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EA6F7941508E4...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD PRESTRESS CONCRETE GIRDER

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1			3						TOTAL SHEETS
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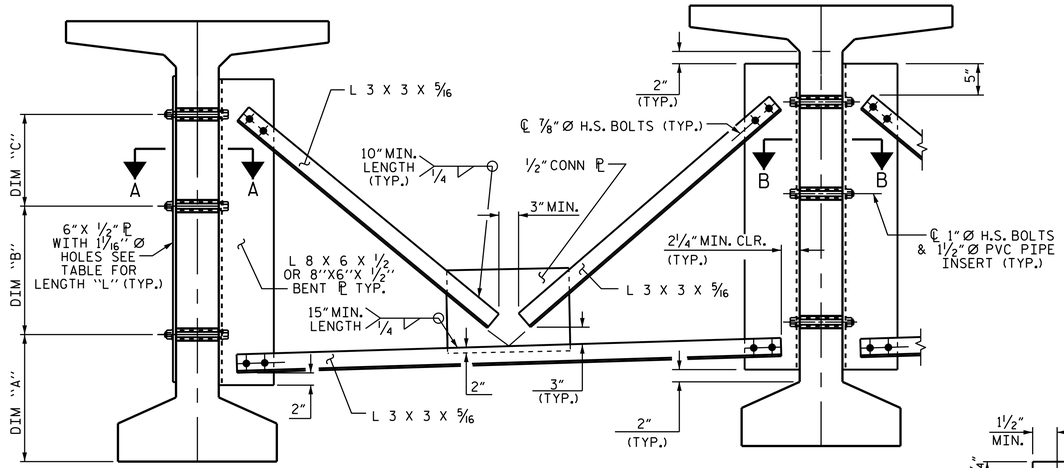
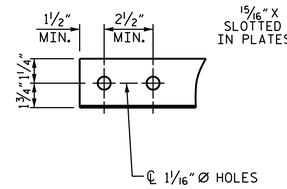


PART SECTION AT INTERMEDIATE DIAPHRAGM

(72" BULB TEE GIRDER SHOWN)



ANGLE END

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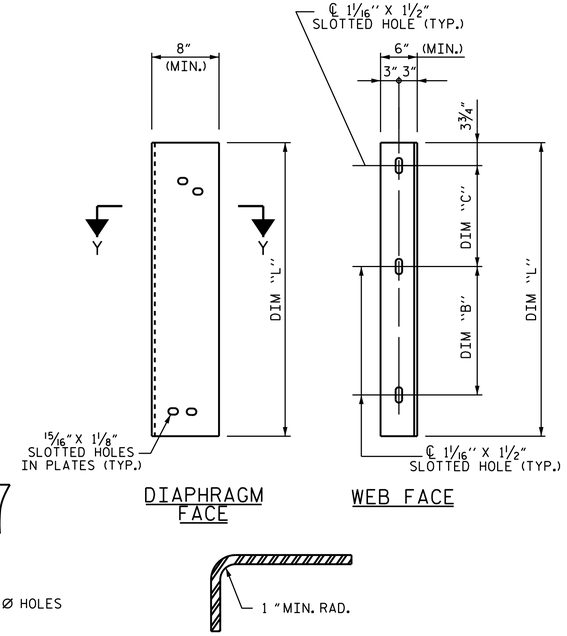


SECTION Y-Y

CONNECTOR PLATE DETAIL

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

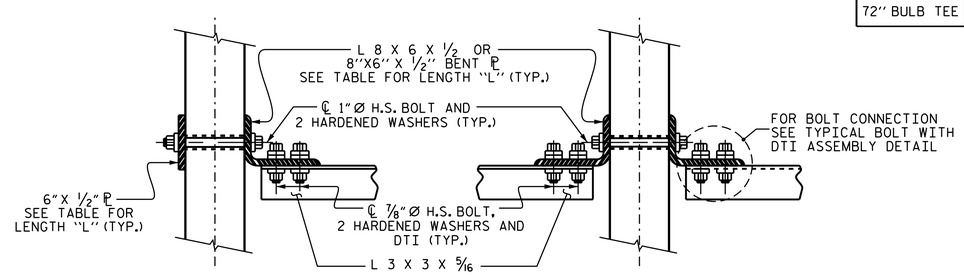
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

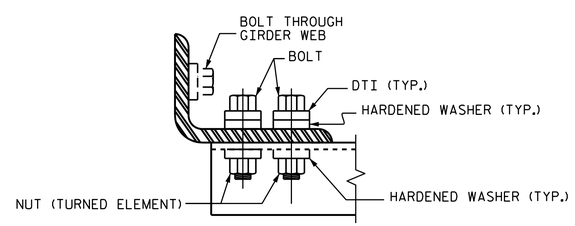
GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-9"	1'-5"	1'-8 3/4"	4'-2"



SECTION A-A

SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

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EA6F7941500F4B7...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			24

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DRAWN BY : M. POOLE DATE : 8-18
CHECKED BY : E. K. POPE DATE : 8-18
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 9-18

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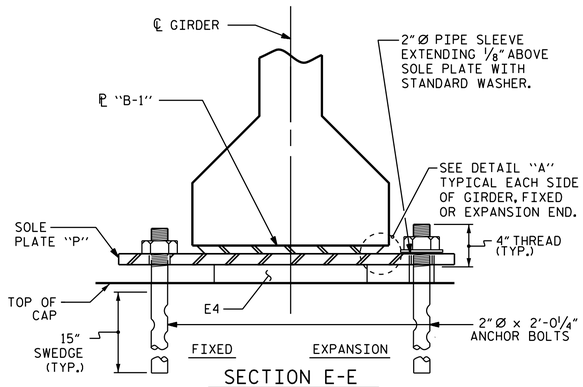
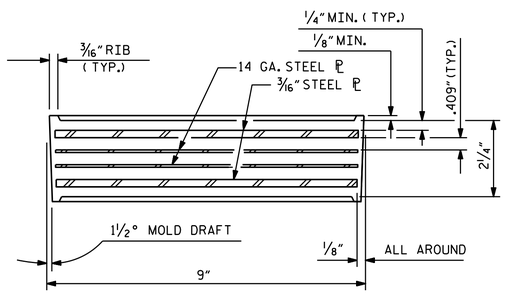
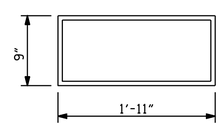
STD. NO. PCG11 (SHT 3)



SECTION E-E



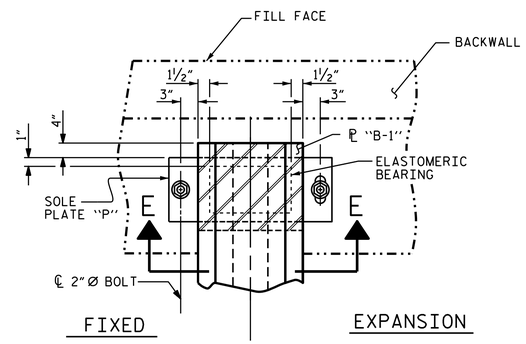
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

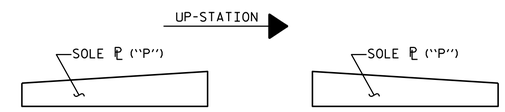
TYPE V



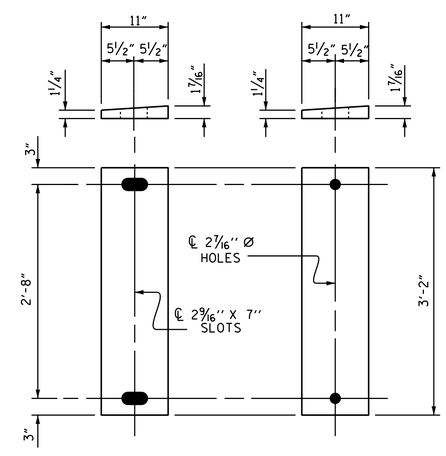
PLAN VIEW

(AT END BENT)

NOTE: END BENT No. 1 FIXED; END BENT No. 2 EXPANSION



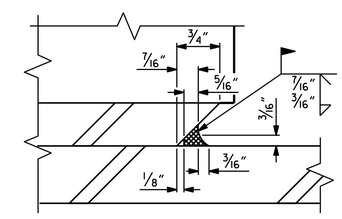
SOLE ℗ PLACEMENT DETAIL



P2 (EXPANSION) P2 (4 REQ'D)

P1 (FIXED) P1 (4 REQ'D)

SOLE PLATE DETAILS ("P")



DETAIL "A"

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2"Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

ASSEMBLED BY : M. POOLE	DATE : 8-18
CHECKED BY : E. K. POPE	DATE : 8-18
DRAWN BY : EEM 2/97	REV. 6/13 AAC/MAA
CHECKED BY : VAP 2/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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1			3					TOTAL SHEETS
2			4					24

STD. NO. EB4 (SHT 1)

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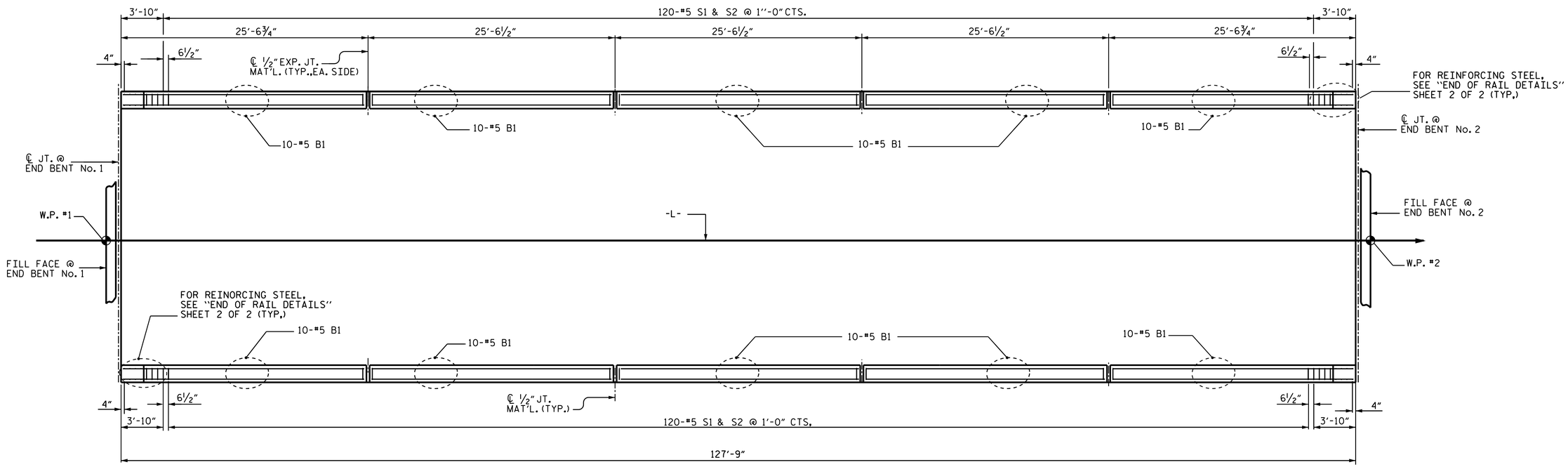

PLAN

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

SHEET 1 OF 2

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Krishna P. Sedai
EA6F704150BE4...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

VERTICAL CONCRETE BARRIER RAIL

DRAWN BY :	M. POOLE	DATE :	8-18
CHECKED BY :	E. K. POPE	DATE :	8-18
DESIGN ENGINEER OF RECORD:	H. A. LOCKLEAR	DATE :	8-18

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			24

NOTES

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

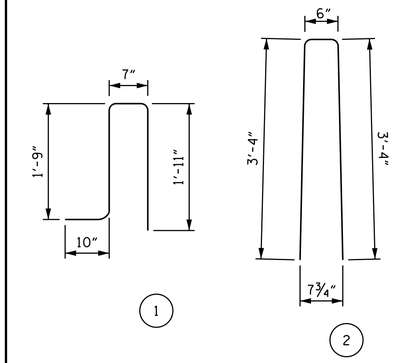
WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF VERTICAL CONCRETE BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 BAR SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 BAR IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR TYPES



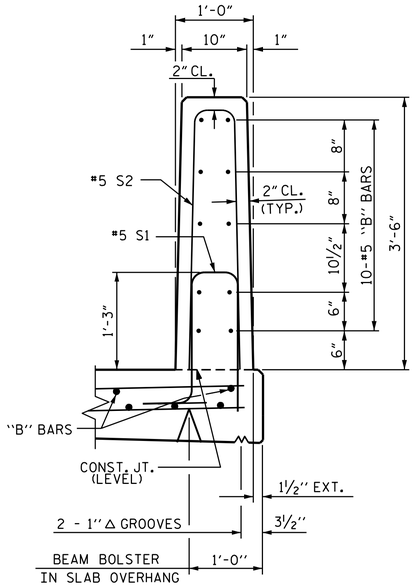
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

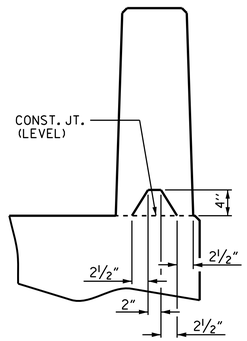
FOR VERTICAL CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	100	#5	STR	25'-2"	2625
✳ S1	256	#5	1	5'-1"	1357
✳ S2	256	#5	2	7'-2"	1914
✳ S3	32	#5	STR	3'-3"	108

✳ EPOXY COATED REINFORCING STEEL	6004 LBS.
CLASS AA CONCRETE	30.4 CU. YDS.
VERTICAL CONCRETE BARRIER RAIL	255.67 LIN. FT.

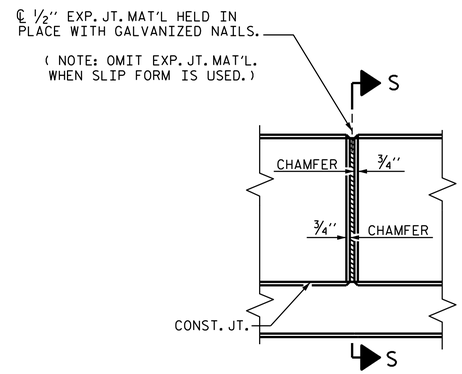


SECTION THRU RAIL



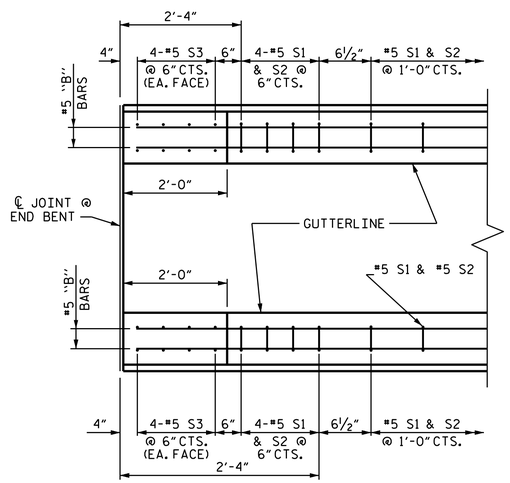
SECTION S-S

AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

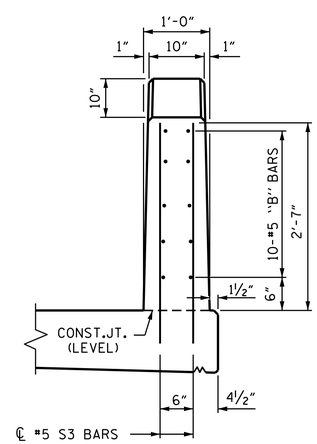


ELEVATION AT EXPANSION JOINTS

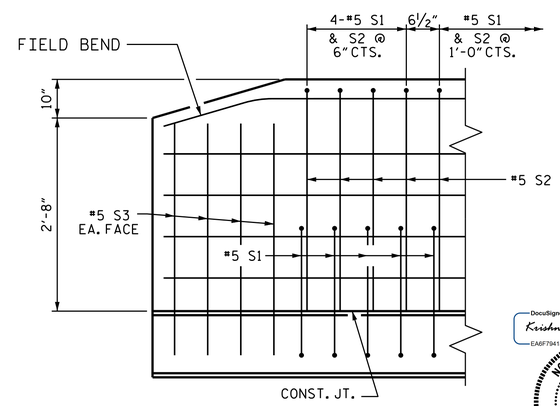
BARRIER RAIL DETAILS



PLAN



END VIEW



SIDE VIEW

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

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EA6F7941505E4...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

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CLEVELAND COUNTY
STATION: 16+90.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : M. POOLE		DATE : 8-18	
CHECKED BY : E.K. POPE		DATE : 8-18	
DRAWN BY : MAA 5/10	REV. 6/13	MAA/GM	
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

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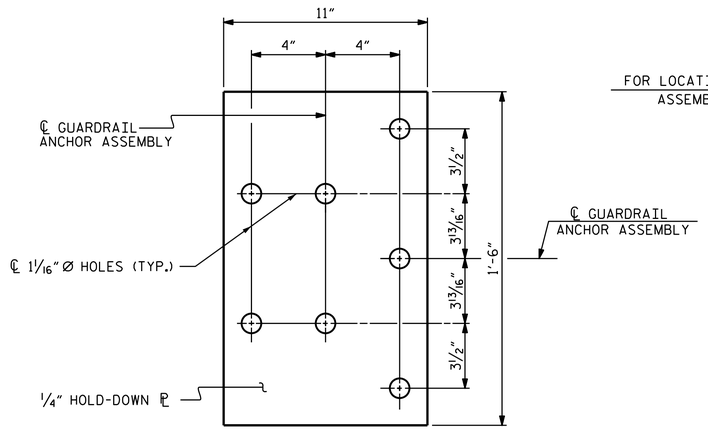
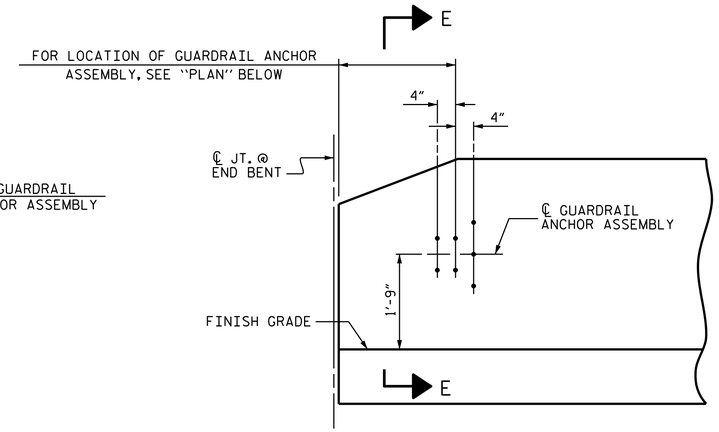
STD. NO. CBR2 (SHT 1)



PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

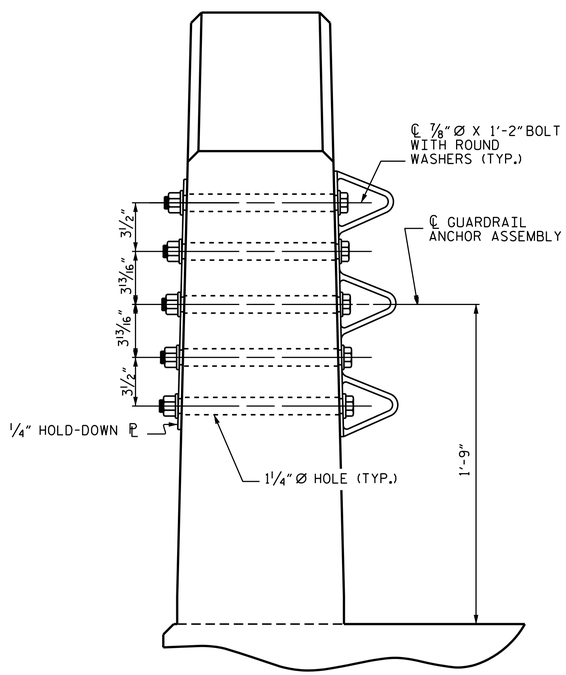
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

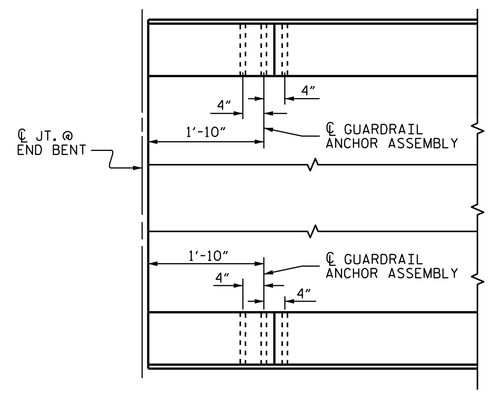
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SECTION E-E

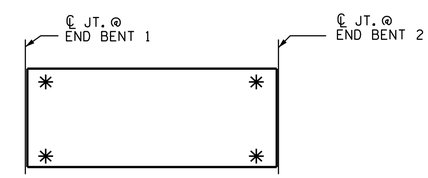
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI
9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			24

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ASSEMBLED BY : M. POOLE		DATE : 8-18	
CHECKED BY : E. K. POPE		DATE : 8-18	
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG	
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

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(SHT 1) STD. NO. GRA3

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

GROOVING BRIDGE FLOORS

APPROACH SLABS	702 SQ.FT.
BRIDGE DECK	3164 SQ.FT.
TOTAL	3866 SQ.FT.

REINFORCING BAR SCHEDULE

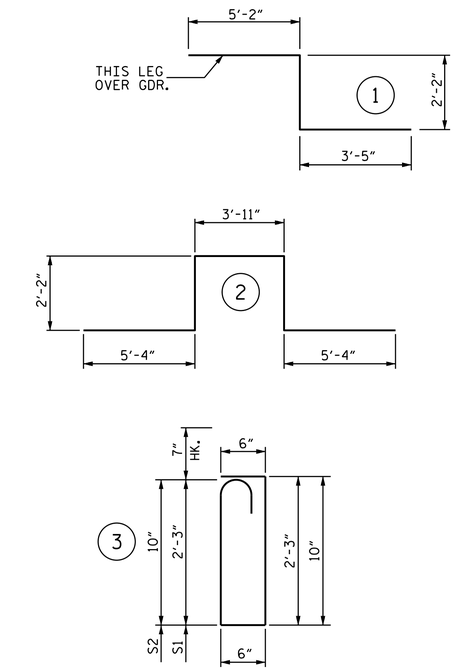
SPAN A

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	236	5	STR	29'-9"	7323
A2	236	5	STR	29'-9"	7323
✳ B1	110	4	STR	27'-2"	1996
B2	72	5	STR	44'-0"	3304
✳ G1	2	5	STR	29'-9"	62
✳ K1	8	8	1	10'-9"	230
✳ K2	8	8	2	18'-11"	404
K3	12	6	STR	6'-10"	123
✳ S1	24	5	3	6'-1"	152
S2	24	5	3	3'-3"	81

REINFORCING STEEL 10831 LBS.

✳ EPOXY COATED REINFORCING STEEL 10167 LBS.

BAR TYPES

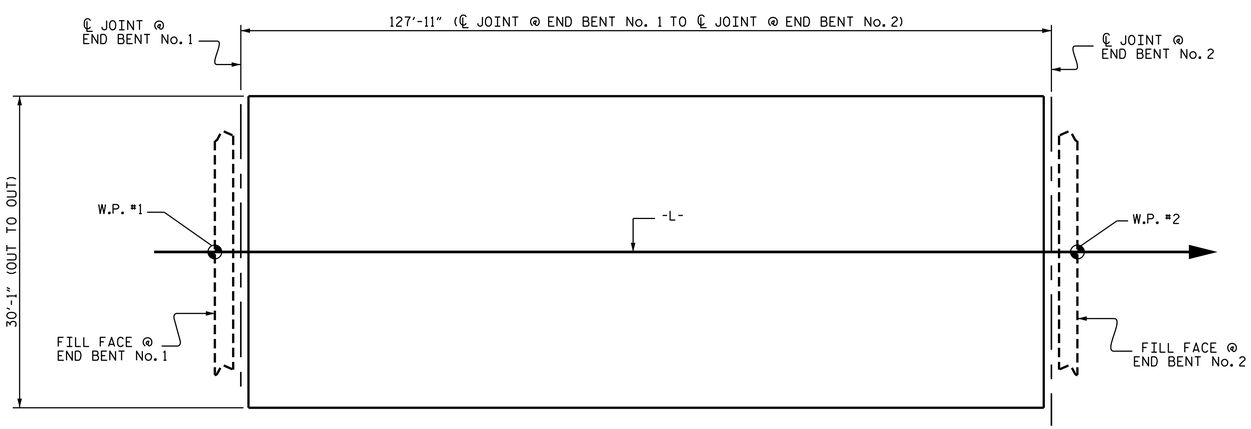


ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
SPAN "A"			
TOTALS ✳✳	122.8	10831	10167

✳✳ QUANTITIES FOR VERTICAL CONCRETE BARRIER RAILS ARE NOT INCLUDED.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 3,848)

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

DocuSigned by: Krishna P. Sedai
EA6F7941...
NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI
9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-15
1			3				TOTAL SHEETS
2			4				24

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DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 9-18

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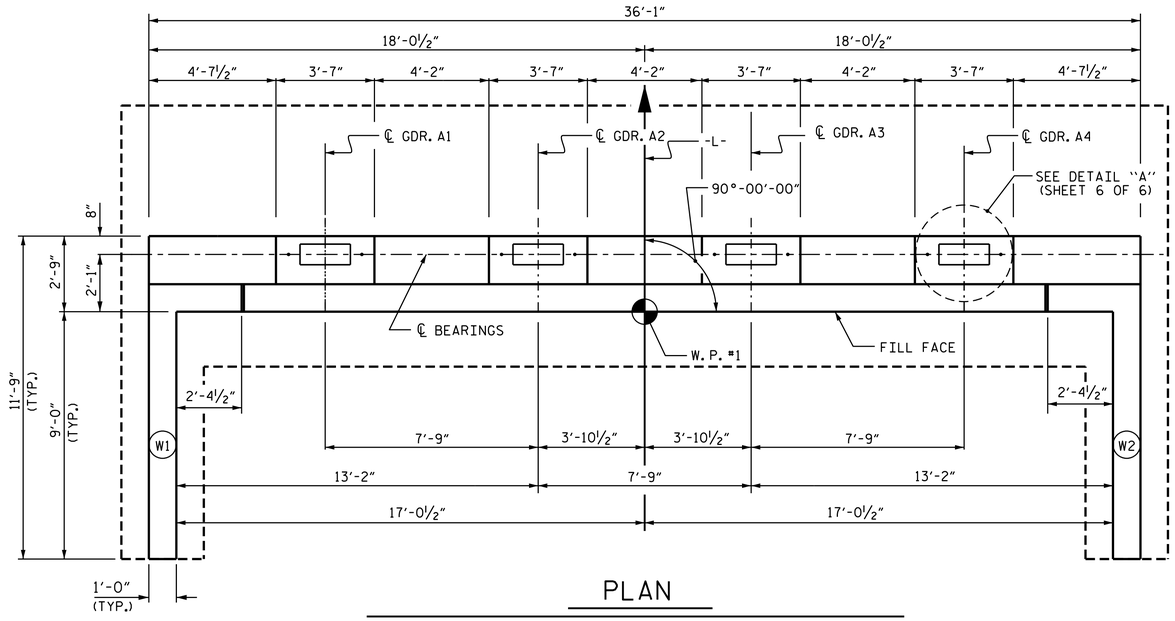
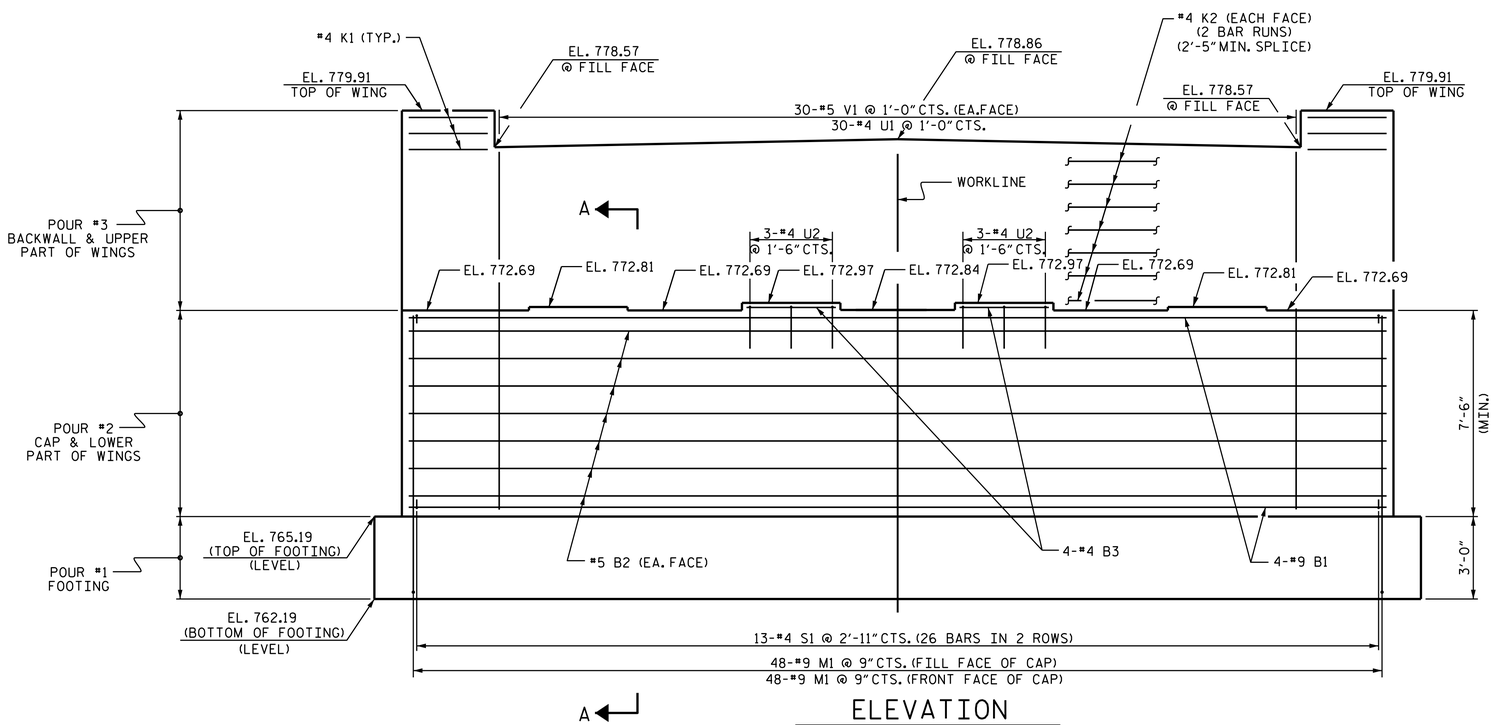


PLAN

FOR FOOTING DIMENSIONS AND REINFORCING STEEL, SEE SHEET 2 OF 6.



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 6 OF 6.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

FOR WING DETAILS, SEE SHEET 5 OF 6.

INSTALL THE 4"Ø DRAIN PIPE THROUGH WINGWALL AS REQUIRED FOR SUBREGIONAL TIER BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WINGWALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

SHEET 1 OF 6

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EA6F7941588...

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9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUBSTRUCTURE

END BENT 1

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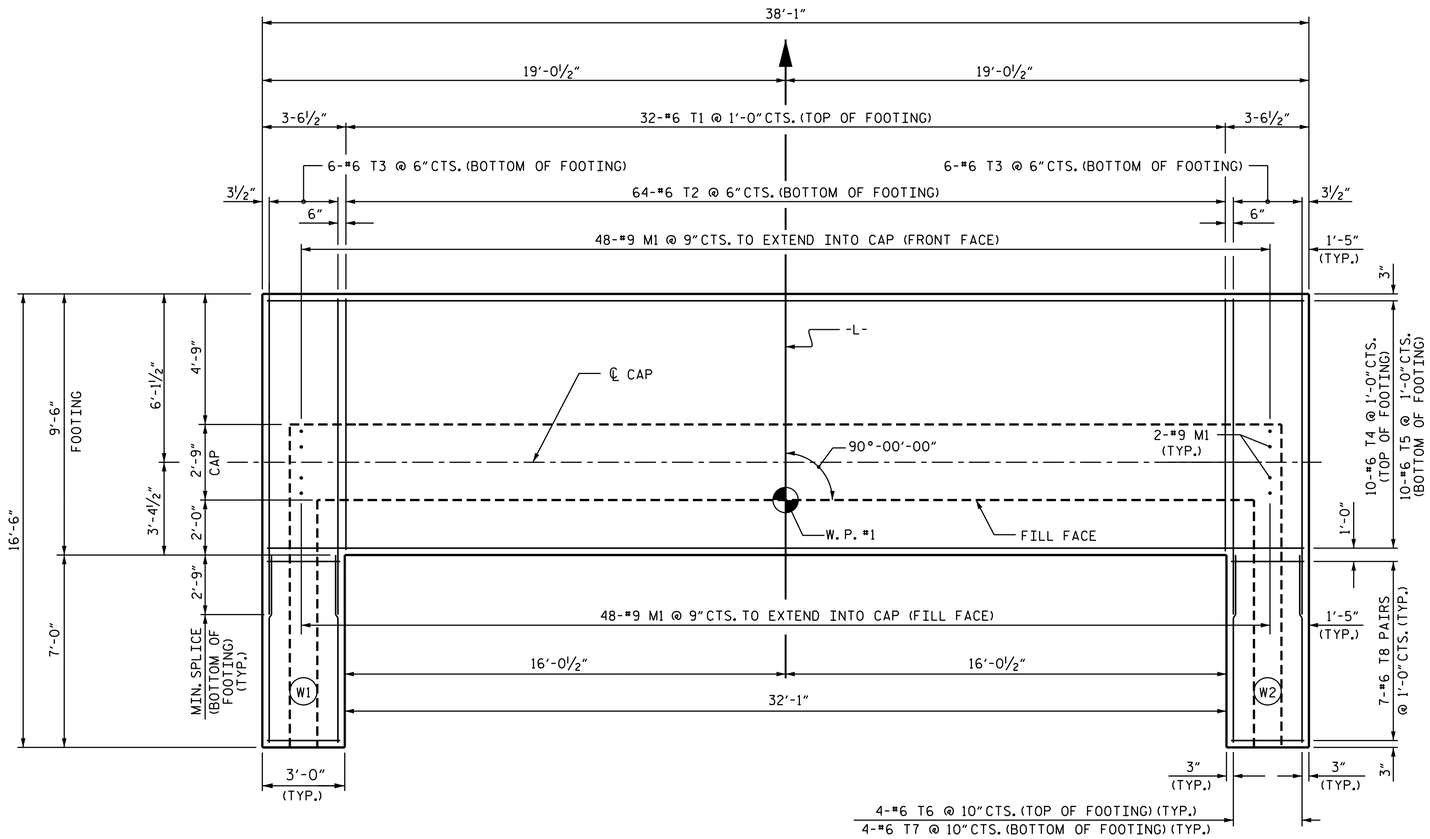
2			4				



PLAN OF FOOTING

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

SHEET 2 OF 6

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EA6F7941589E...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			24

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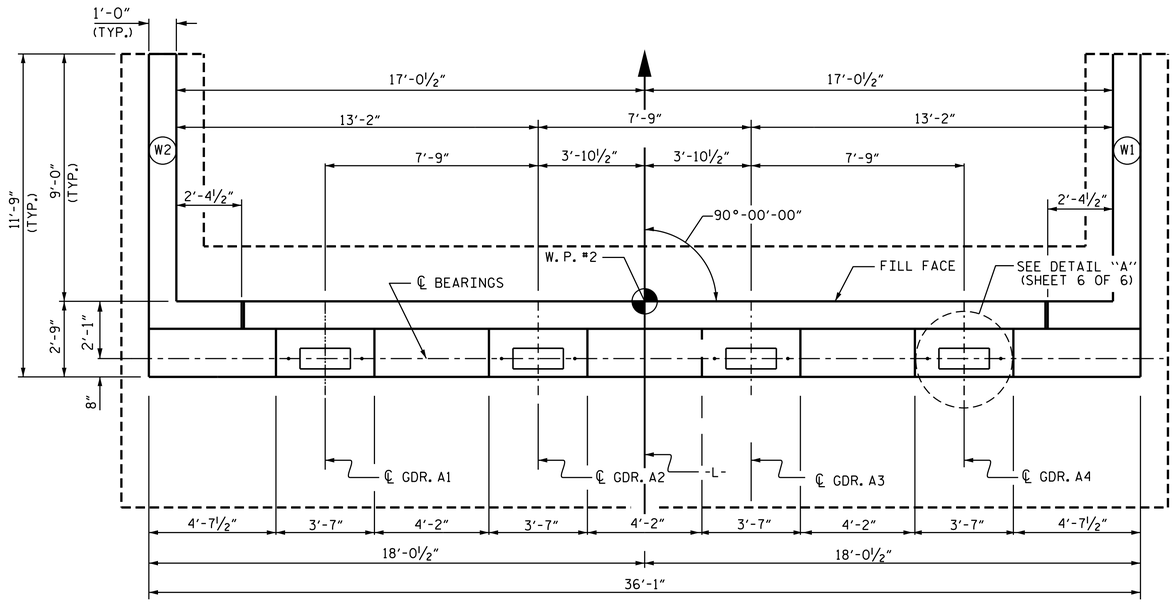
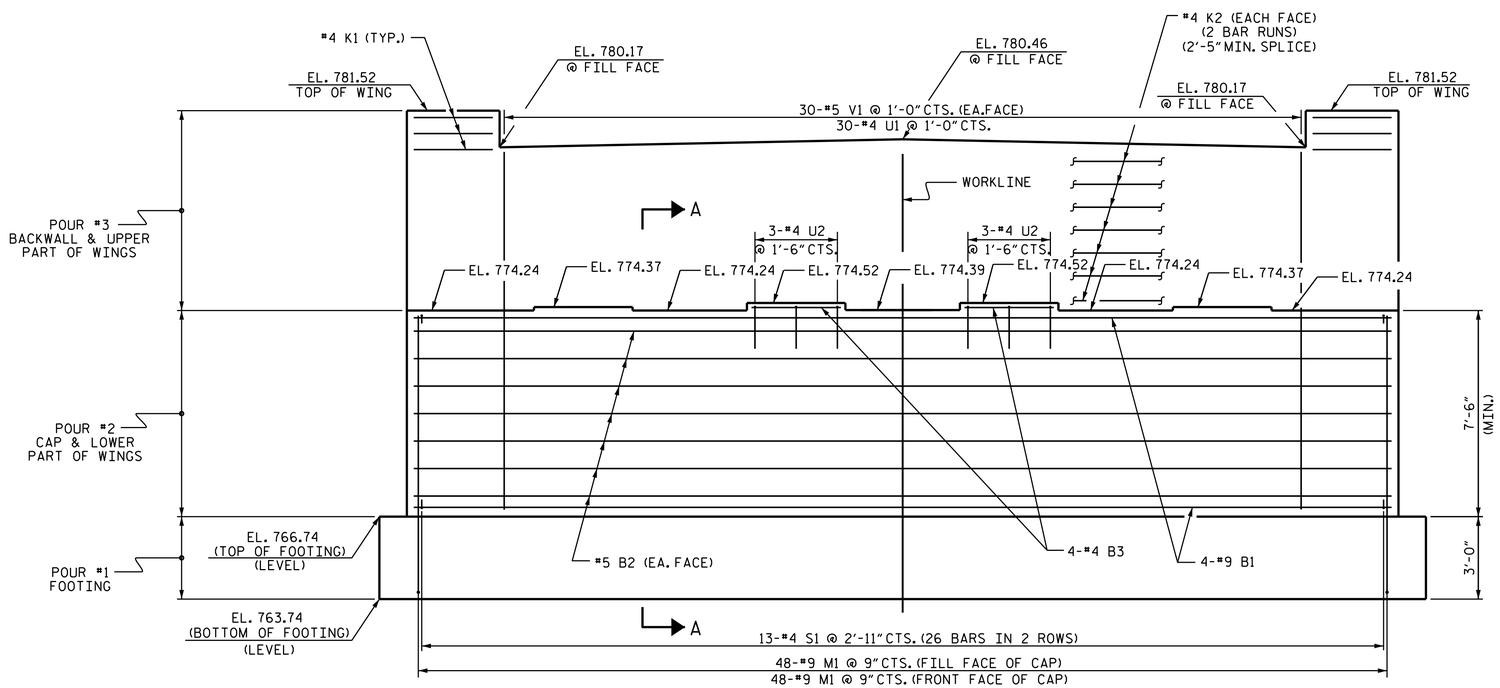


PLAN

FOR FOOTING DIMENSIONS AND REINFORCING STEEL, SEE SHEET 4 OF 6.



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 6 OF 6.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

FOR WING DETAILS, SEE SHEET 5 OF 6.

INSTALL THE 4"Ø DRAIN PIPE THROUGH WINGWALL AS REQUIRED FOR SUBREGIONAL TIER BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WINGWALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

SHEET 3 OF 6

DocuSigned by: Krishna P. Sedai
EA6F79415D6E4...
NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI
9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-18
1			3				TOTAL SHEETS
2			4				24

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CHECKED BY :	H. A. LOCKLEAR	DATE :	7/18
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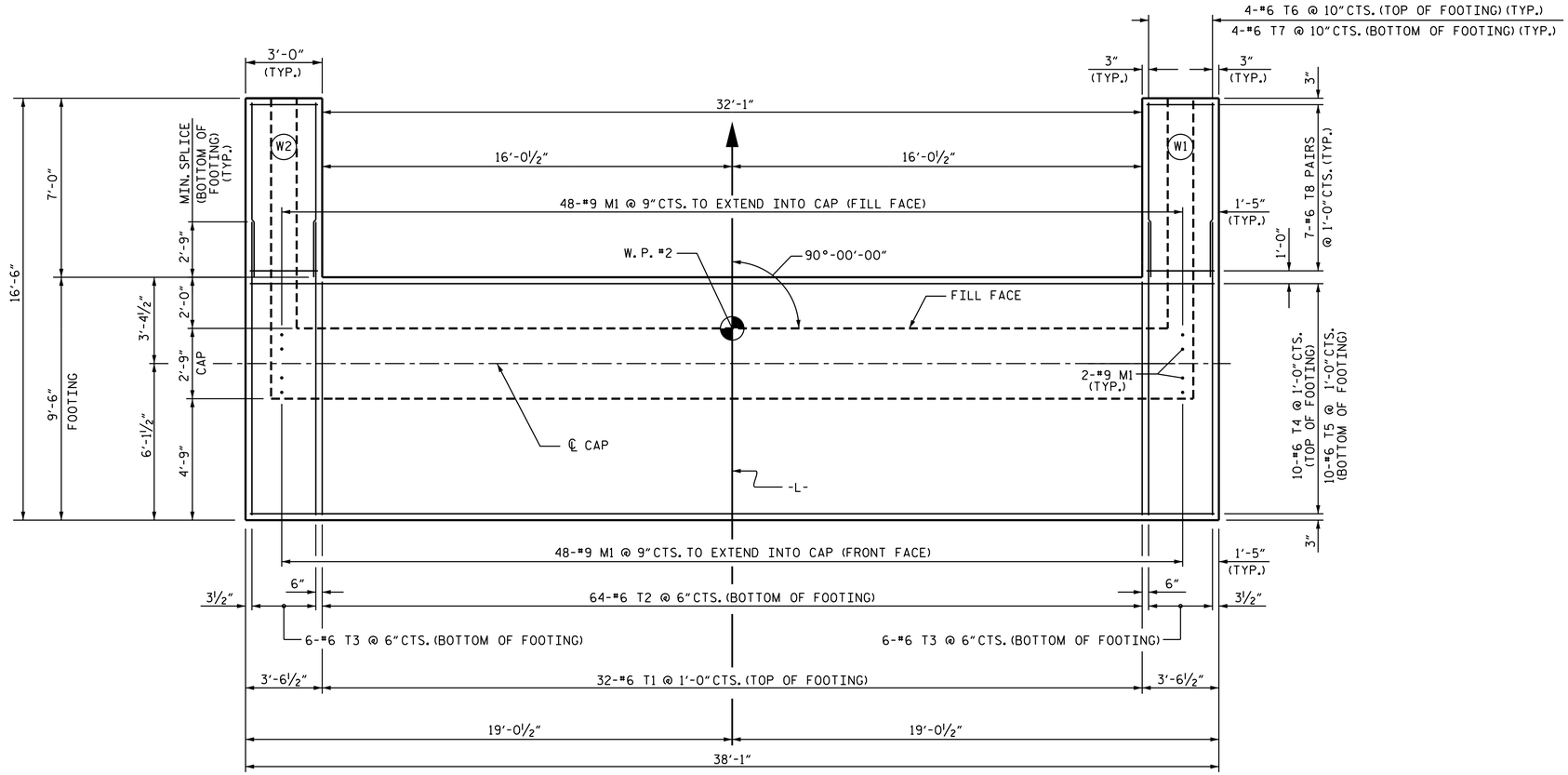

PLAN OF FOOTING

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

SHEET 4 OF 6

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EA6F79415D8E...
NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI
9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			24

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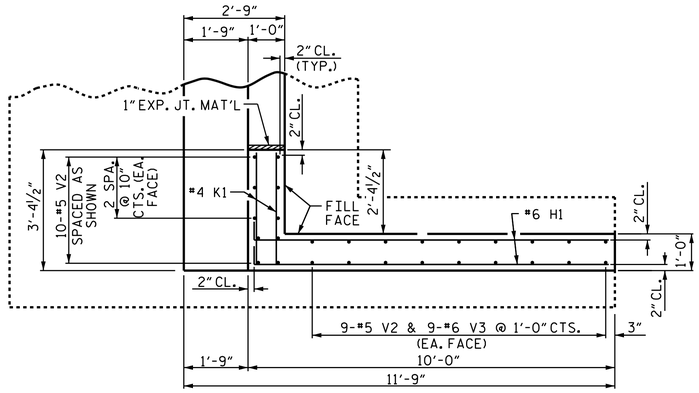
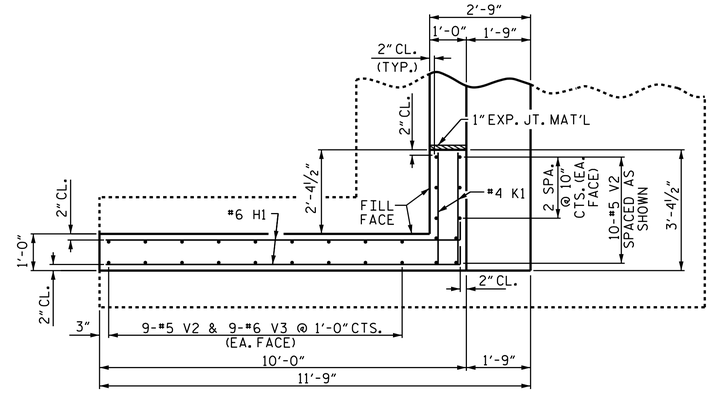
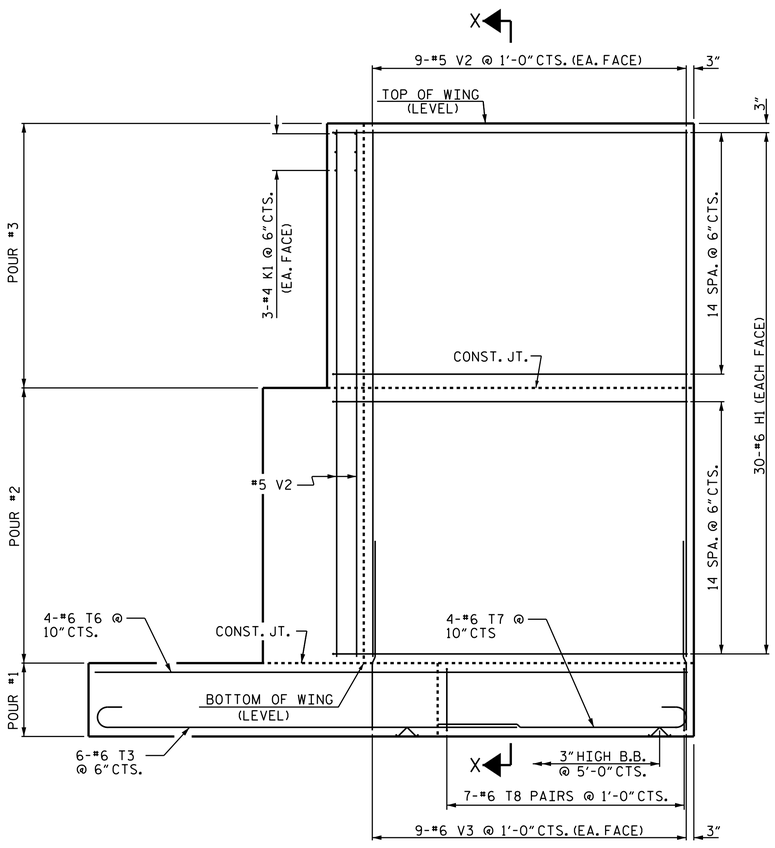


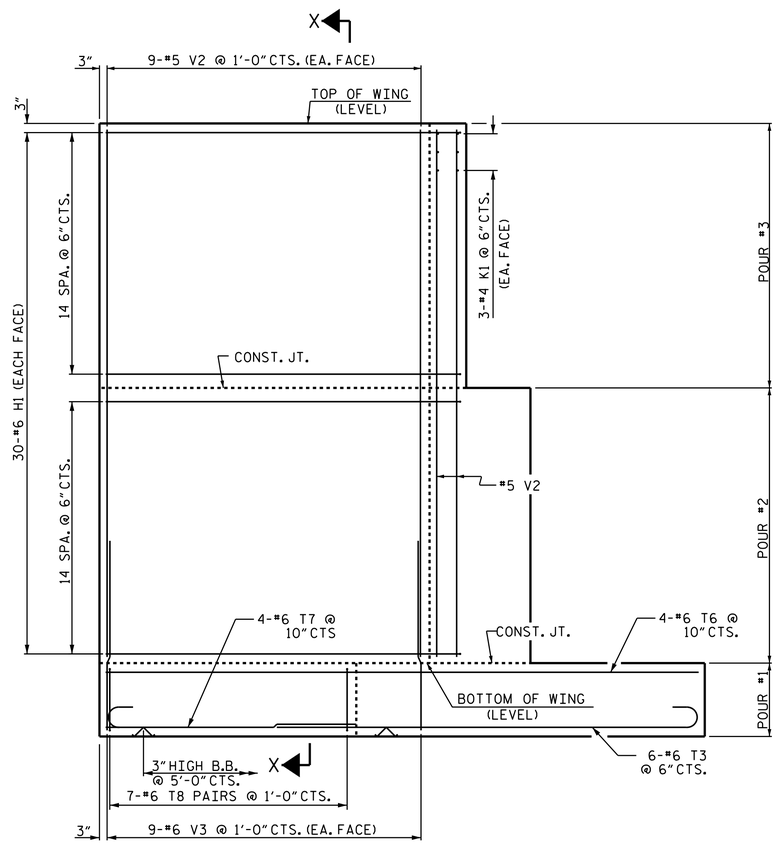
PLAN OF WING (W1)



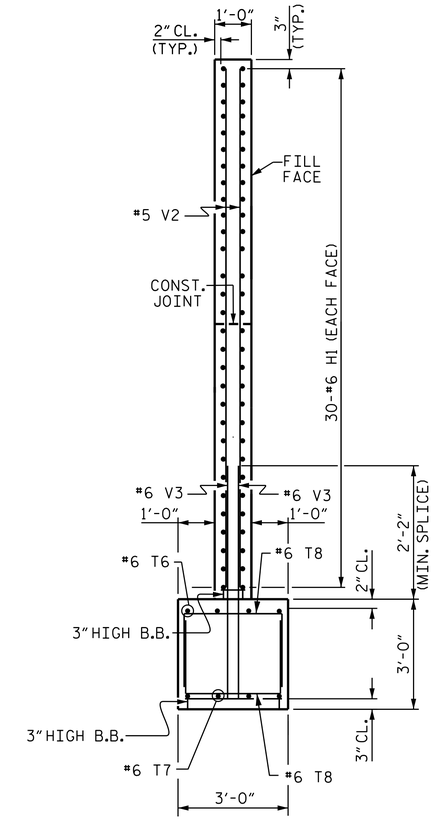
PLAN OF WING (W2)



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

SHEET 5 OF 6

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EA6F7941508E4...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT
WING DETAILS

REVISIONS									SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:				S-20
1			3						TOTAL SHEETS
2			4						24

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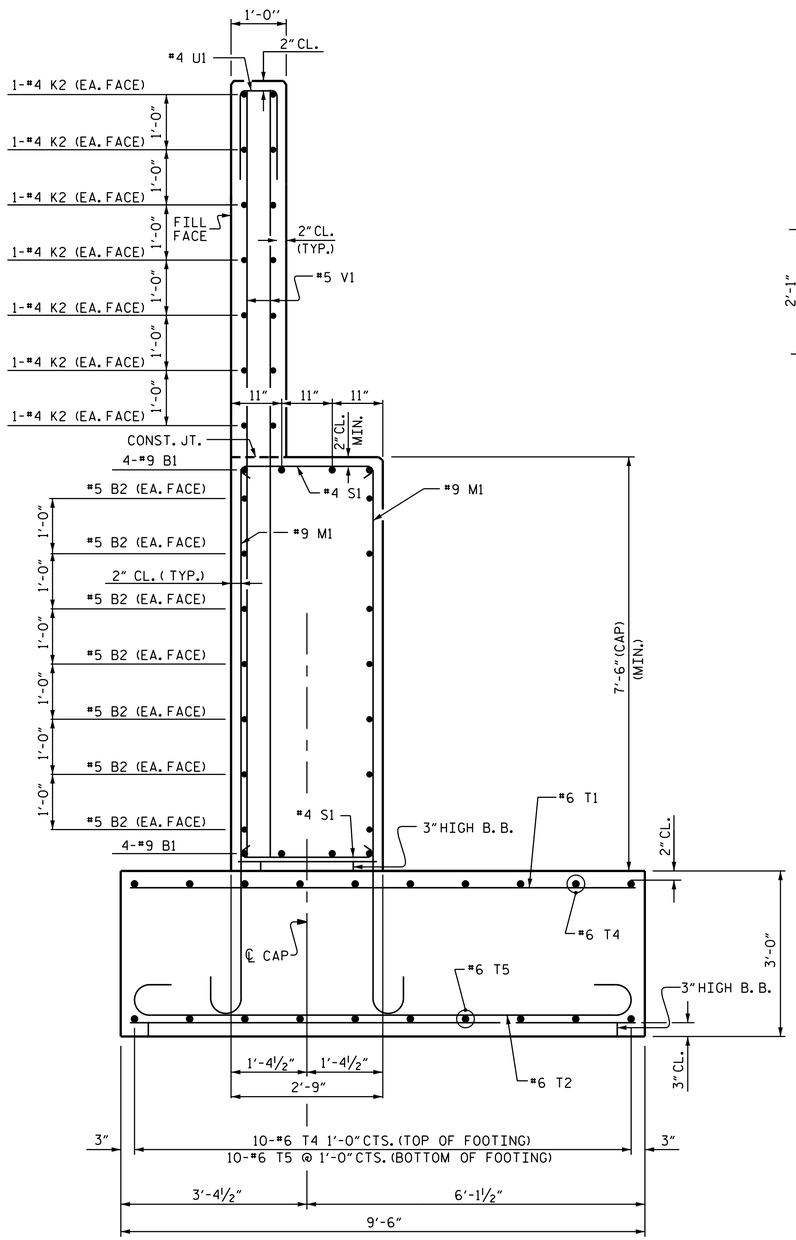
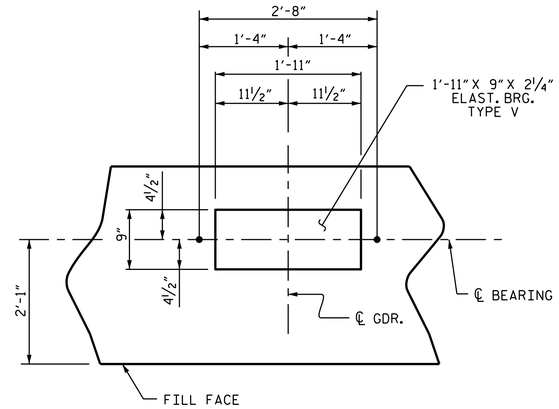
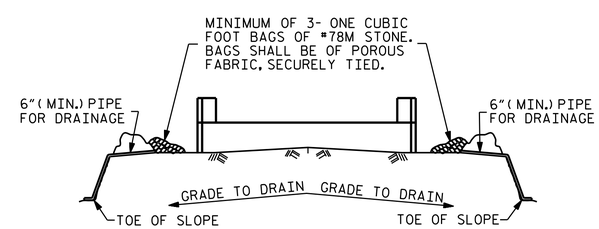


SECTION A-A



DETAIL "A"

END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION



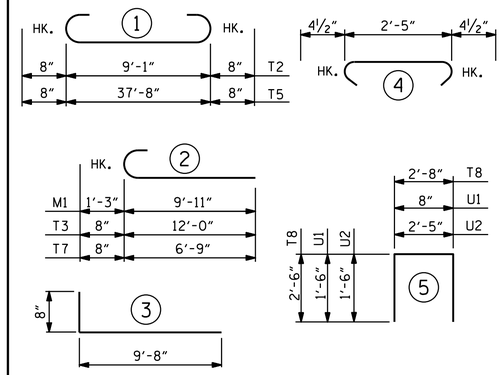
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	STR	35'-9"	972
B2	14	#5	STR	35'-9"	522
B3	8	#4	STR	3'-3"	17
H1	120	#6	3	10'-4"	1862
K1	12	#4	STR	3'-0"	24
K2	28	#4	STR	19'-1"	357
M1	100	#9	2	11'-2"	3797
S1	26	#4	4	3'-2"	55
T1	32	#6	STR	9'-2"	441
T2	64	#6	1	10'-5"	1001
T3	12	#6	2	12'-8"	228
T4	10	#6	STR	37'-9"	567
T5	10	#6	1	39'-0"	586
T6	8	#6	STR	16'-2"	194
T7	8	#6	2	7'-5"	89
T8	28	#6	5	7'-8"	322
U1	30	#4	5	3'-8"	73
U2	6	#4	5	5'-5"	22
V1	60	#5	STR	13'-0"	814
V2	56	#5	STR	14'-4"	837
V3	36	#6	STR	5'-0"	270

REINFORCING STEEL 13,050 LBS.

FOUNDATION EXCAVATION 157 C.Y.

CLASS A CONCRETE BREAKDOWN

POUR #1 FOOTING 44.9 C.Y.

POUR #2 CAP & LOWER PART OF WINGS 32.6 C.Y.

POUR #3 BACKWALL & UPPER PART OF WINGS 13.2 C.Y.

TOTAL CLASS A CONCRETE 90.7 C.Y.

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

SHEET 6 OF 6

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EA6F7941...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT DETAILS

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-21
1			3				TOTAL SHEETS
2			4				24

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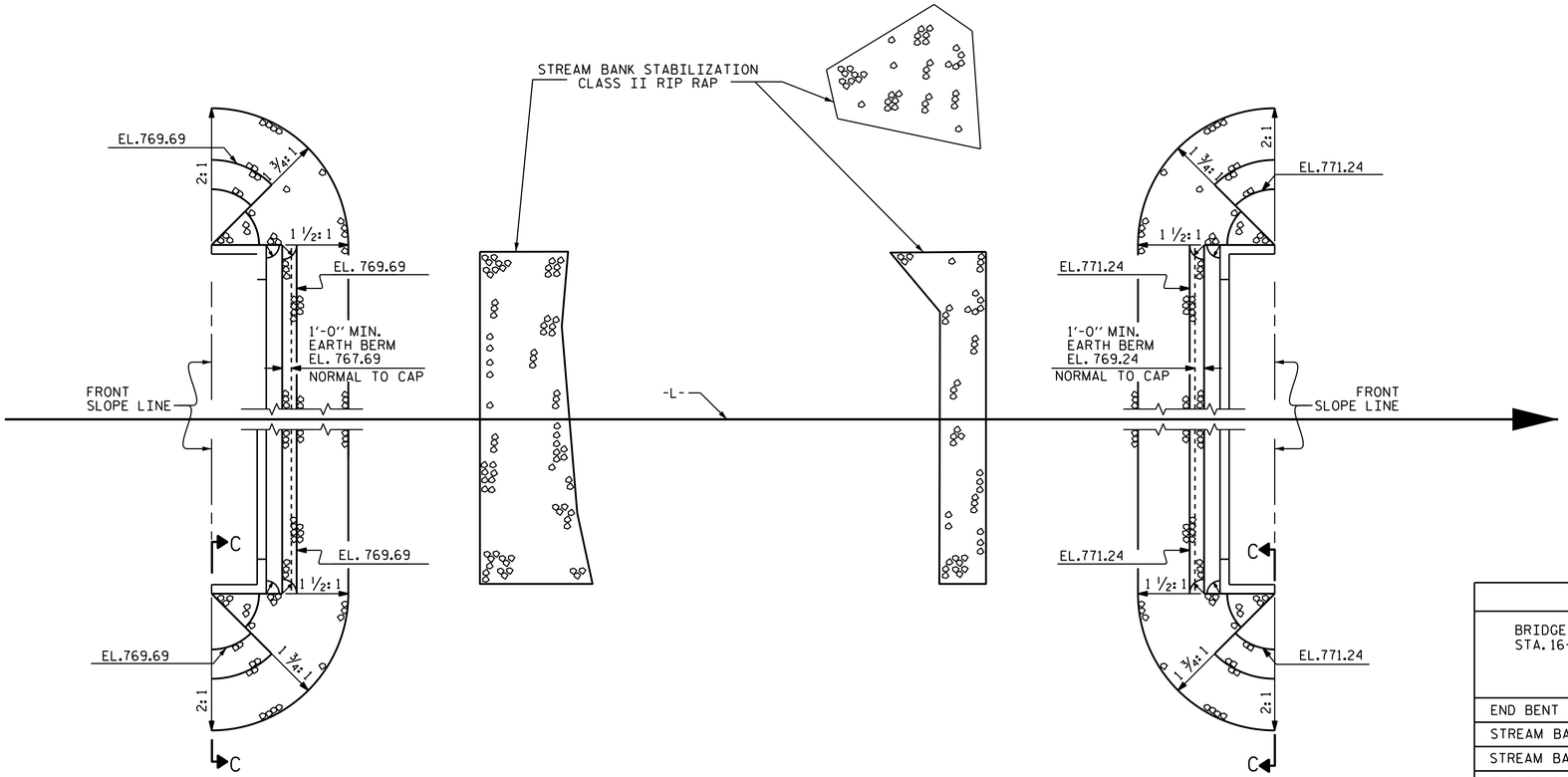
NOTES :

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

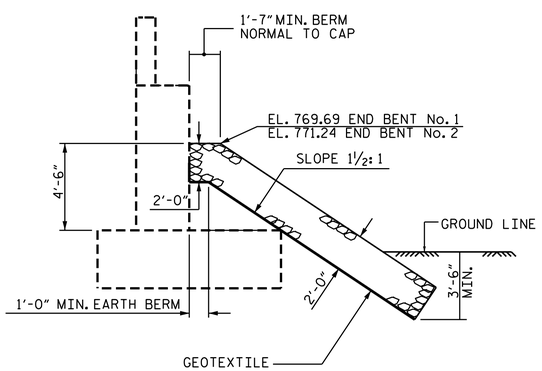


END BENT NO. 1

END BENT NO. 2

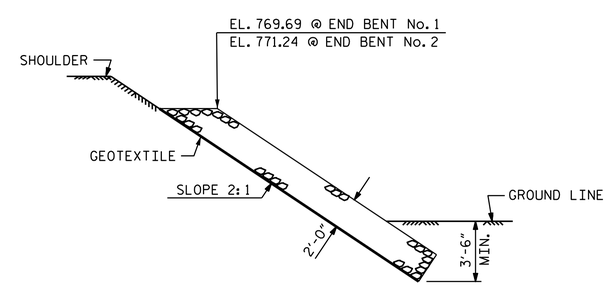
PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+90.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	70	80
STREAM BANK STABILIZATION 1	43	48
STREAM BANK STABILIZATION 2	52	57
END BENT 2	160	180
TOTAL	325	365



℄ SECTION

BERM RIP RAPPED



SECTION C-C

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

DocuSigned by: Krishna P. Sedai

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

SHEET NO. S-22

TOTAL SHEETS 24

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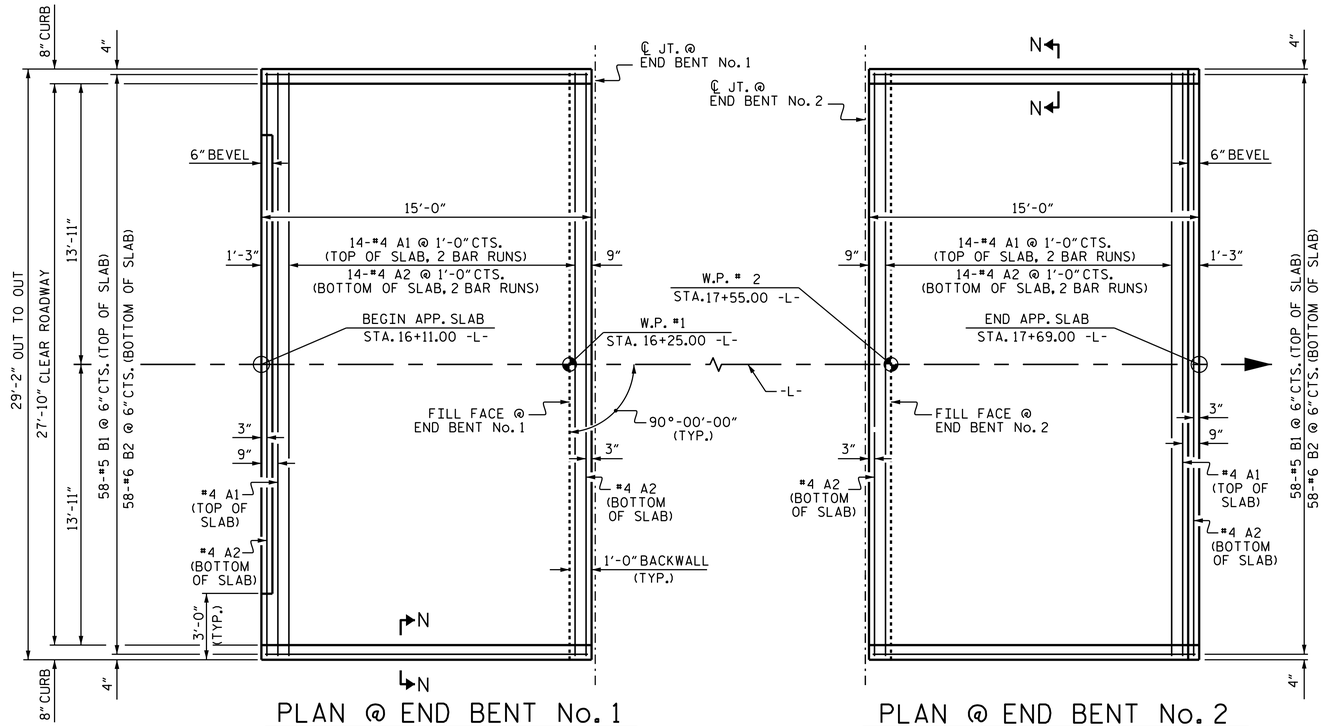
STD. NO. RR1 (Sht 2)



PLAN @ END BENT No. 1

PLAN @ END BENT No. 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

APPROACH SLAB AT EB No. 1

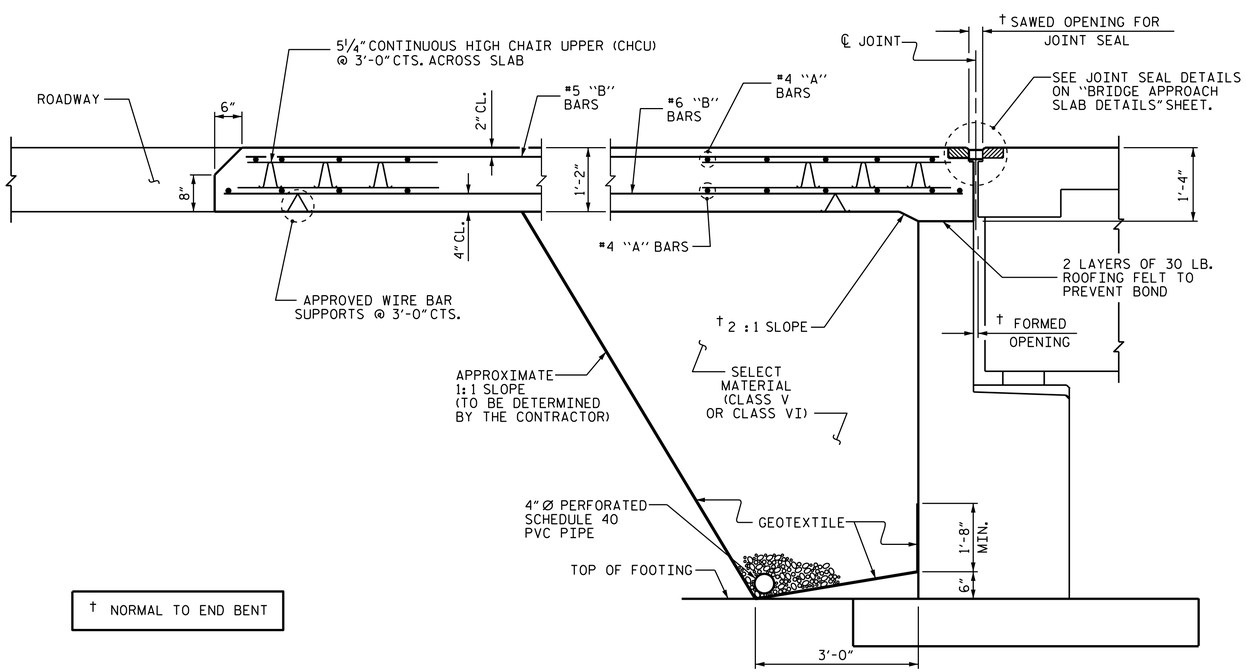
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	30	#4	STR	15'-5"	309
A2	32	#4	STR	15'-4"	328
* B1	58	#5	STR	13'-9"	832
B2	58	#6	STR	14'-8"	1278
REINFORCING STEEL				LBS.	1606
* EPOXY COATED REINFORCING STEEL				LBS.	1141
CLASS AA CONCRETE				C. Y.	19.0

APPROACH SLAB AT EB No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	30	#4	STR	15'-5"	309
A2	32	#4	STR	15'-4"	328
* B1	58	#5	STR	13'-9"	832
B2	58	#6	STR	14'-8"	1278
REINFORCING STEEL				LBS.	1606
* EPOXY COATED REINFORCING STEEL				LBS.	1141
CLASS AA CONCRETE				C. Y.	19.0

SPLICE LENGTHS

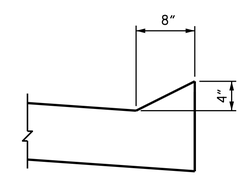
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



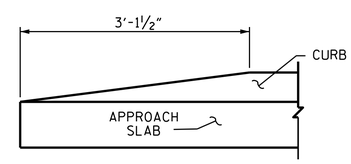
† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. 17BP.12.R.93

CLEVELAND COUNTY

STATION: 16+90.00 -L-

SHEET 1 OF 2

DocuSigned by: Krishna P. Sedai

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : K. HARRISON	DATE : 8-18		
CHECKED BY : E. K. POPE	DATE : 8-18		
DRAWN BY : EEM 3/95	REV. 12/21/11	MAA/GM	
CHECKED BY : VAP 3/95	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

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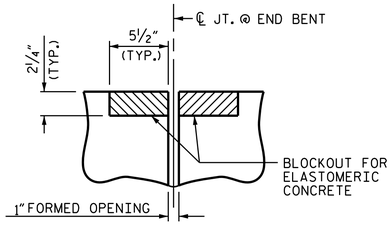
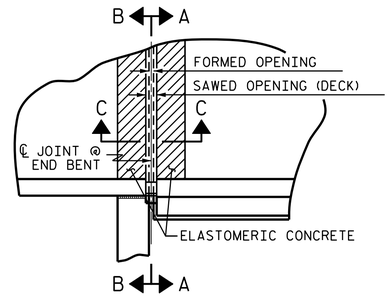
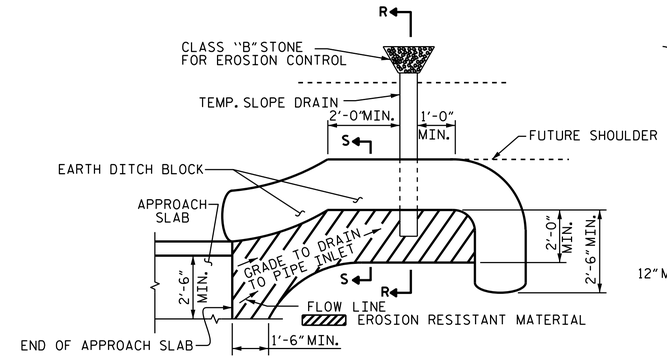
STD. NO. BAS2 (SHT 1)



SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)

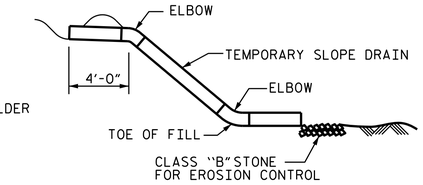


PLAN

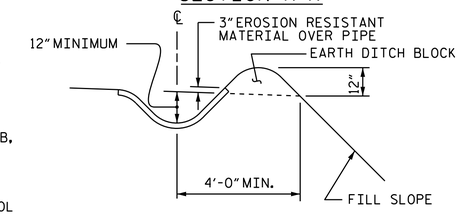


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



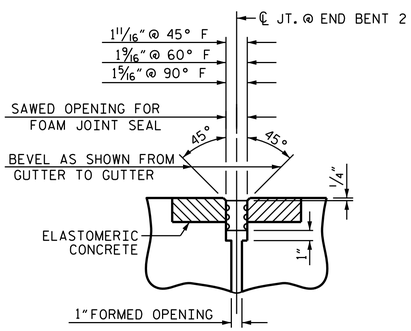
SECTION R-R



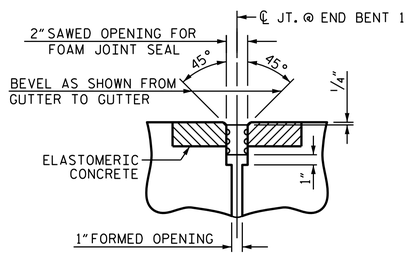
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

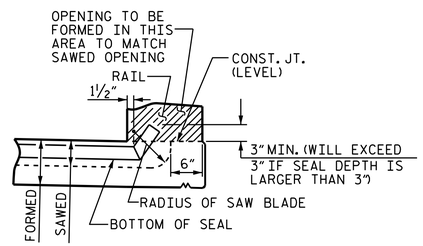
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



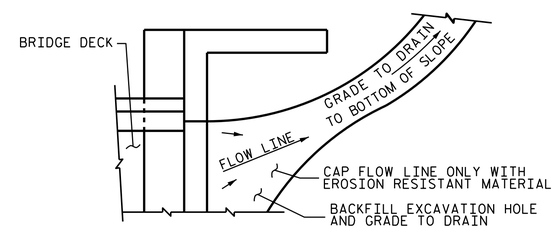
SECTION C-C
FOAM JOINT SEAL
(EXPANSION)



SECTION C-C
FOAM JOINT SEAL
(FIXED)



SECTION A-A

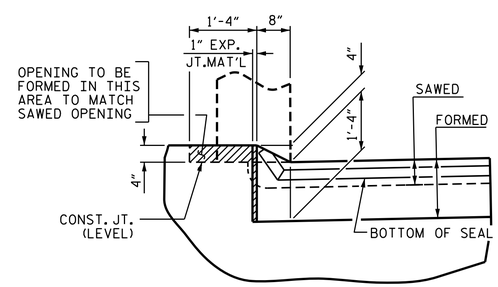


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	4.78
2	4.78
TOTAL	9.56

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



SECTION B-B

JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

PROJECT NO. 17BP.12.R.93
CLEVELAND COUNTY
STATION: 16+90.00 -L-

SHEET 2 OF 2

DocuSigned by:
Krishna P. Sedai
EA6F7941B5C...

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

9/24/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

SHEET NO. S-24
TOTAL SHEETS 24

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	K. HARRISON	DATE :	8-18
CHECKED BY :	E. K. POPE	DATE :	8-18
DESIGN ENGINEER OF RECORD:	H. A. LOCKLEAR	DATE :	9-18

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STD. NO. BAS4 (SHT 1)

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS - - - - - - - - - - - - - - - - - -	A.A.S.H.T.O. (CURRENT)
LIVE LOAD -	SEE PLANS
IMPACT ALLOWANCE - - - - - - - - - - - - - - - - -	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36 - -	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W - -	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50 - -	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60 - - -	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION - - - - - - - - - - - -	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR - - - - - - - - - - - - - - - - -	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS - - -	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER - - - - -	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH - - - - -	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN