09/08/99

TIP PROJECT: BP11-R020

CONTRACT: DK00451

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP11-R020	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP11.R020.1		PE
BP11.R020.2		ROW/UTIL
BP11.R020.3		CONST.

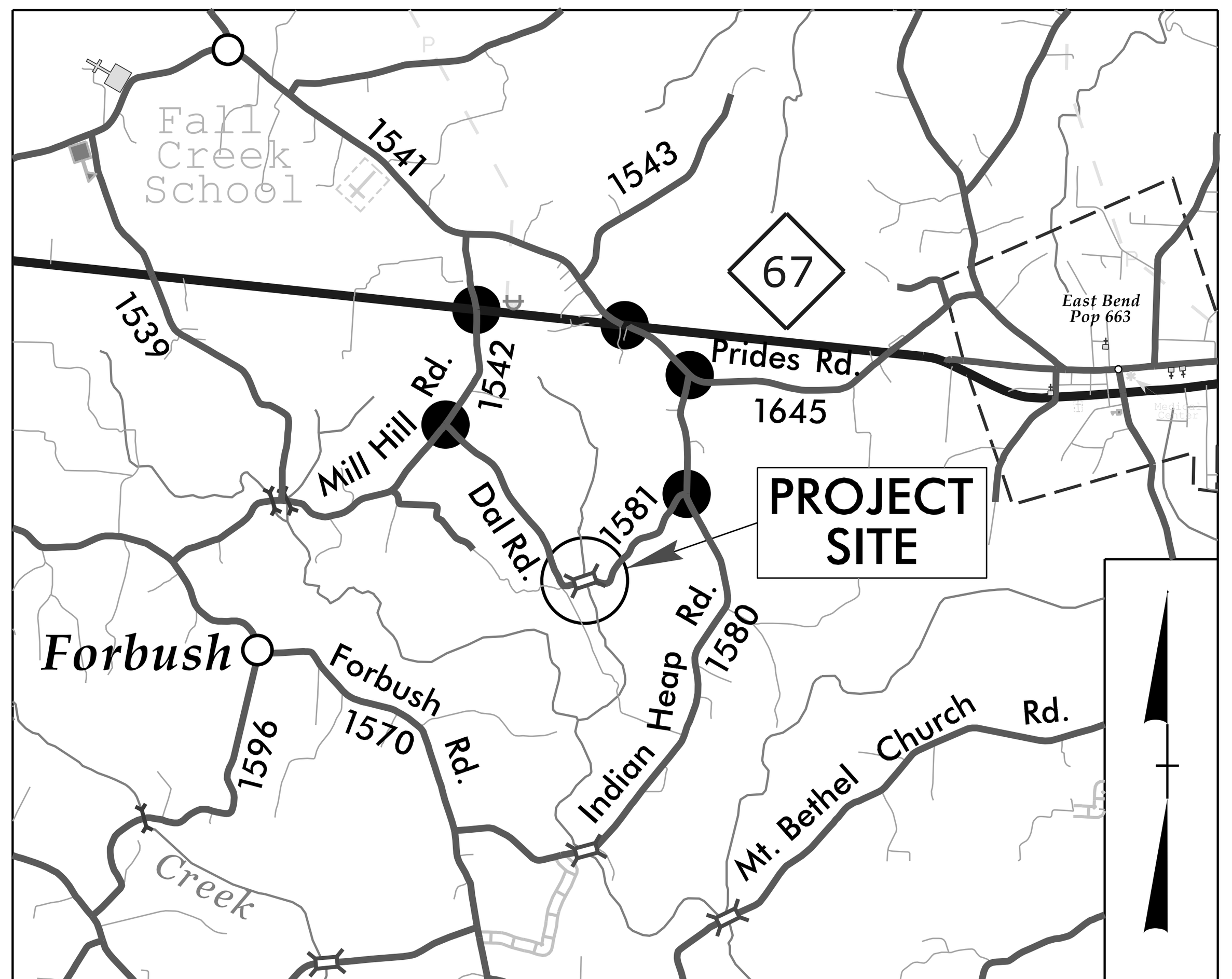
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

YADKIN COUNTY

LOCATION: REPLACE BRIDGE NO. 980147 ON SR 1581 (DAL ROAD) OVER UT OF LOGAN CREEK

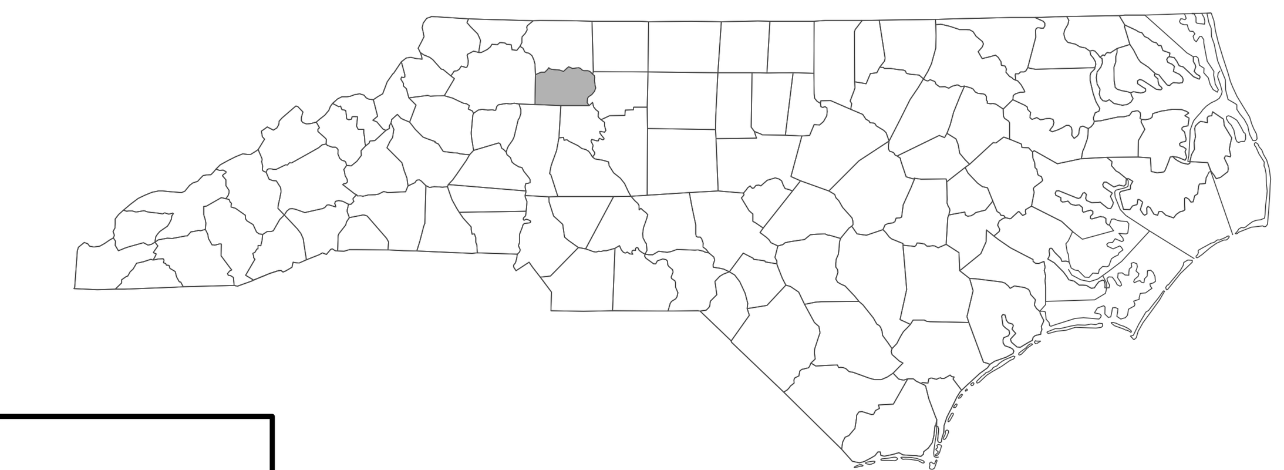
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURES

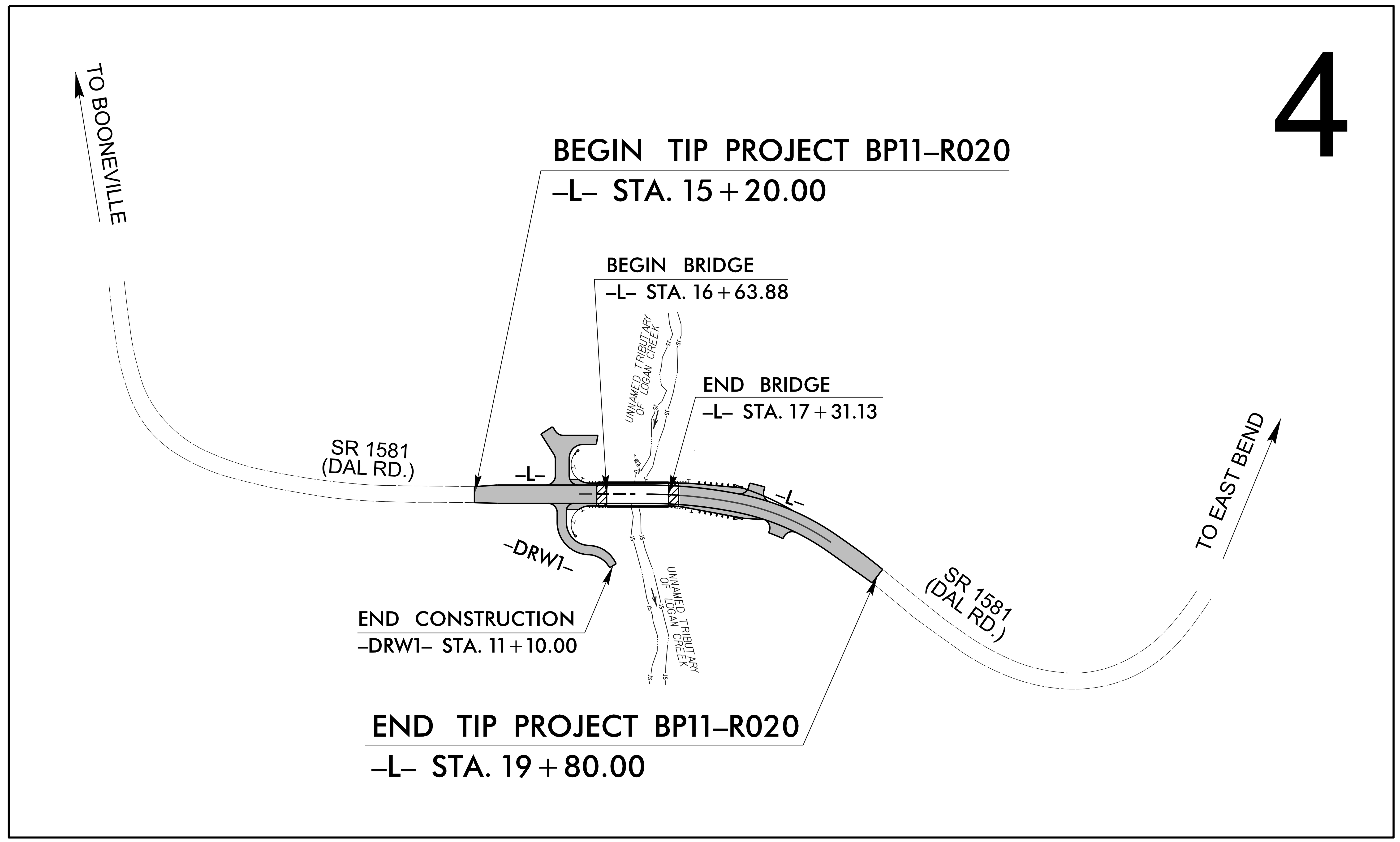
See Sheet 1B For Conventional Plan Sheet Symbols



VICINITY MAP

DETOUR ROUTE — NOT TO SCALE





NAD 83/ 2011

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 2025 = 105
ADT 2045 = 160
K = 10 %
D = 50 %
T = 6 % *
V = 50 MPH
* TTST = 2% DUAL 4%
FUNC CLASS = LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT BP11-R020 = 0.074 MILES
LENGTH OF STRUCTURE TIP PROJECT BP11-R020 = 0.013 MILES
TOTAL LENGTH OF TIP PROJECT BP11-R020 = 0.087 MILES

Prepared for the North Carolina Department of Transportation in the Office of:

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 31, 2024

LETTING DATE:
AUGUST 21, 2025

THAD DUNCAN, PE
PROJECT ENGINEER

LANG PHOMMACHANH, PE
PROJECT DESIGN ENGINEER

NCDOT CONTACT: ROB WEISZ, PE
DIVISION 11 BRIDGE PROGRAM MANAGER

HYDRAULICS ENGINEER
6/18/2025
DocuSigned by:
SIGNATURE 53E1902B574842A...
P.E.
SEAL 56413

ROADWAY DESIGN ENGINEER
6/18/2025
DocuSigned by:
SIGNATURE ...0BE8117E2435
P.E.
SEAL 25477

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS

STRUCTURE STANDARD NOTES

EFF. 01-16-2024

REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit - N. C. Department of Transportation - Raleigh, N. C., Dated January 16, 2024 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

DIVISION 3 - PIPE CULVERTS

300.01 Method of Pipe Installation (Use Details in Lieu of Standards for Sheets 1 and 2 of 2)
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 8 - INCIDENTALS

815.02 Subsurface Drain
840.14 Concrete Drop Inlet - 12" thru 30" Pipe
840.15 Brick Drop Inlet - 12" thru 30" Pipe
840.16 Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.18 Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29 Frames and Narrow Slot Flat Grates
840.35 Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46 Traffic Bearing Precast Drainage Structure
846.04 Drop Inlet Installation in Shoulder Berm Gutter
862.01 Guardrail Placement (Use Details in Lieu of Standards for Sheets 4, 6, 12, and 14 of 15)
862.02 Guardrail Installation
862.03 Structure Anchor Units (Use Detail in Lieu of Standard for Sheet 8 of 9)
876.02 Guide for Rip Rap at Pipe Outlets

GENERAL NOTES: 2024 SPECIFICATIONS
EFFECTIVE: 01-16-2024
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.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01

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.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

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.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

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

Surry-Yadkin Electric

RIGHT-OF-WAY MARKERS:

RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS AND BY CONTRACT IN ACCORDANCE WITH DESIGNATED SYMBOLS.

BP11-R020

4RD1 | 1A

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

PREPARED BY

vhb
VHB Engineering NC, P.C. (C-3705)
5140 Main Campus Drive, Suite 300
Raleigh, NC 27606

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BP11-R020
4RD1 | 1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP)
- Computed Property Corner
- Existing Concrete Monument (ECM)
- Parcel / Sequence Number
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary
- Proposed Wetland Boundary
- Existing Endangered Animal Boundary
- Existing Endangered Plant Boundary
- Existing Historic Property Boundary
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line
- Existing Control of Access Line
- Proposed Control of Access Line
- Proposed ROW and CA Line
- Existing Easement Line
- Proposed Temporary Construction Easement
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage/Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- 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:

** SUE - Subsurface Utility Engineering*
LOS - Level of Service - A,B,C or D (Accuracy)

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 — HH
- H-Frame Pole
- U/G Power Line Test Hole (SUE - LOS A)*
- U/G Power Line (SUE - LOS B)* — P
- U/G Power Line (SUE - LOS C)* — P
- U/G Power Line (SUE - LOS D)* — P

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line Test Hole (SUE - LOS A)*
- U/G Water Line (SUE - LOS B)*
- U/G Water Line (SUE - LOS C)*
- U/G Water Line (SUE - LOS D)*
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Test Hole (SUE - LOS A)*
- U/G TV Cable (SUE - LOS B)* — TV
- U/G TV Cable (SUE - LOS C)* — TV
- U/G TV Cable (SUE - LOS D)* — TV
- U/G Fiber Optic Cable (SUE - LOS B)* — TV FO
- U/G Fiber Optic Cable (SUE - LOS C)* — TV FO
- U/G Fiber Optic Cable (SUE - LOS D)* — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE - LOS A)*
- U/G Gas Line (SUE - LOS B)* — G
- U/G Gas Line (SUE - LOS C)* — G
- U/G Gas Line (SUE - LOS D)* — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole — S
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Force Main Line Test Hole (SUE - LOS A)*
- SS Force Main Line (SUE - LOS B)* — FSS
- SS Force Main Line (SUE - LOS C)* — FSS
- SS Force Main Line (SUE - LOS D)* — FSS

MISCELLANEOUS:

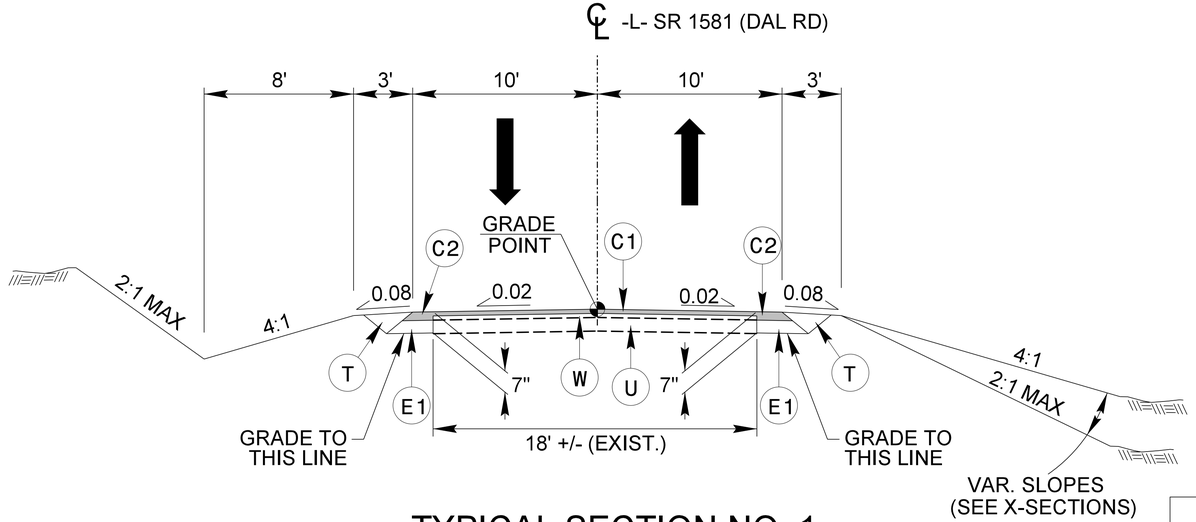
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line (SUE - LOS B)* — 2UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

5/26/20

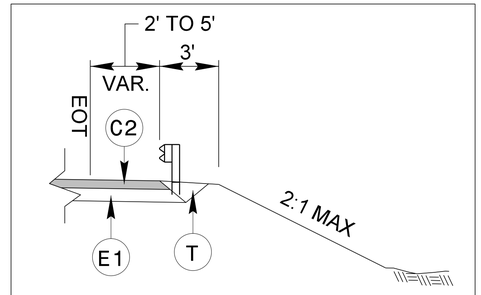
FINAL PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN: JULY 10, 2023)

C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
J	PROP. 6" AGGREGATE BASE COURSE
R1	PROP. CONC. SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	INCIDENTAL MILLING
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

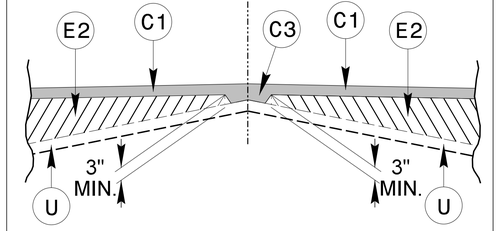
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



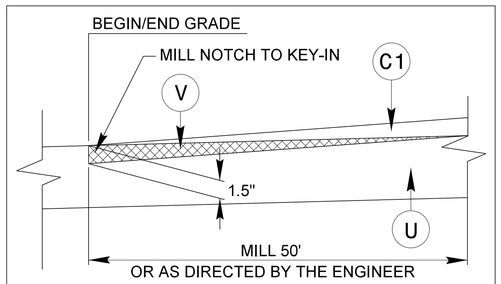
TYPICAL SECTION NO. 1
-L- STA. 15+20.00 TO 16+00.00
-L- STA. 18+00.00 TO 19+80.00



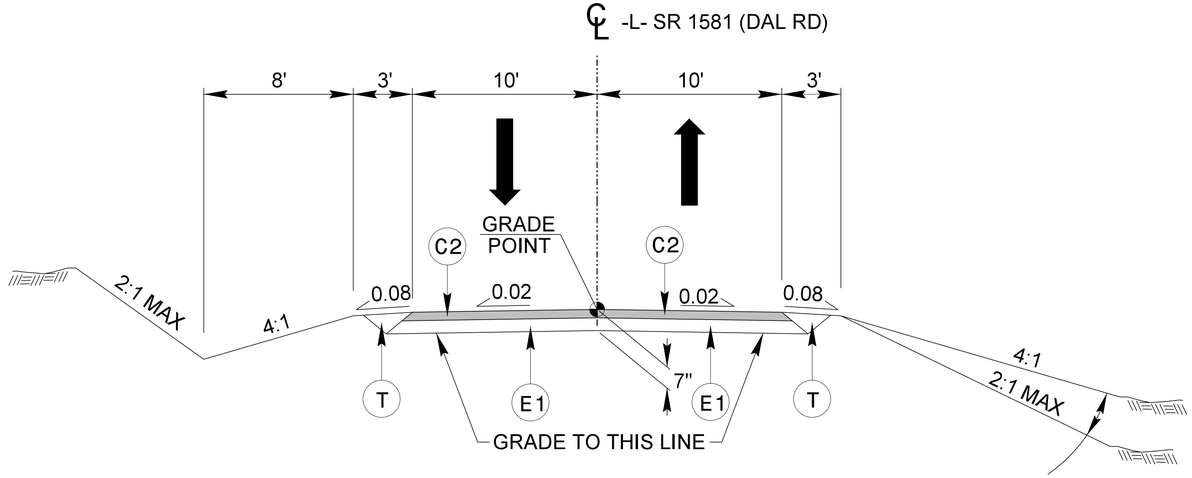
DETAIL OF GUARDRAIL PLACEMENT
(SEE PLAN FOR GUARDRAIL LOCATIONS)



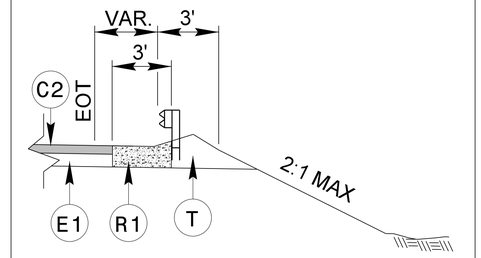
DETAIL SHOWING METHOD OF WEDGING



INCIDENTAL MILLING DETAIL
-L- STA. 15+20.00 TO 15+70.00
-L- STA. 19+30.00 TO 19+80.00



TYPICAL SECTION NO. 2
-L- STA. 16+00.00 TO 16+63.88 (BEGIN BRIDGE)
-L- STA. 17+31.13 (END BRIDGE) TO 18+00.00



INSET - TYPICAL SECTION 2
SHOULDER BERM GUTTER PLACEMENT
(-L- STA. 17+31.13 TO 17+57.00 RT)

BP11-R020
4RD1 | 2A-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 25477 ENGINEER TRAD F. DUNCAN
6/4/2025

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 49851 ENGINEER RAMIE A. SHAW
6/5/2025

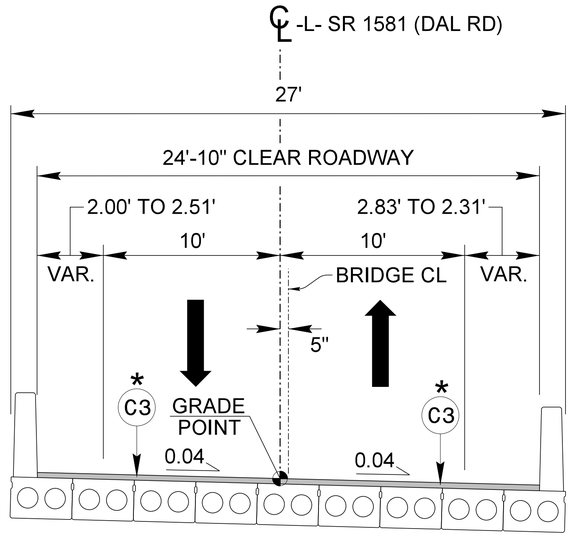
PREPARED BY
vhb
VHB Engineering NC, P.C. (C-2705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/26/20

FINAL PAVEMENT SCHEDULE	
C3	VAR. DEPTH TYPE S9.5B,
J	6" ABC
T	EARTH MATERIAL

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



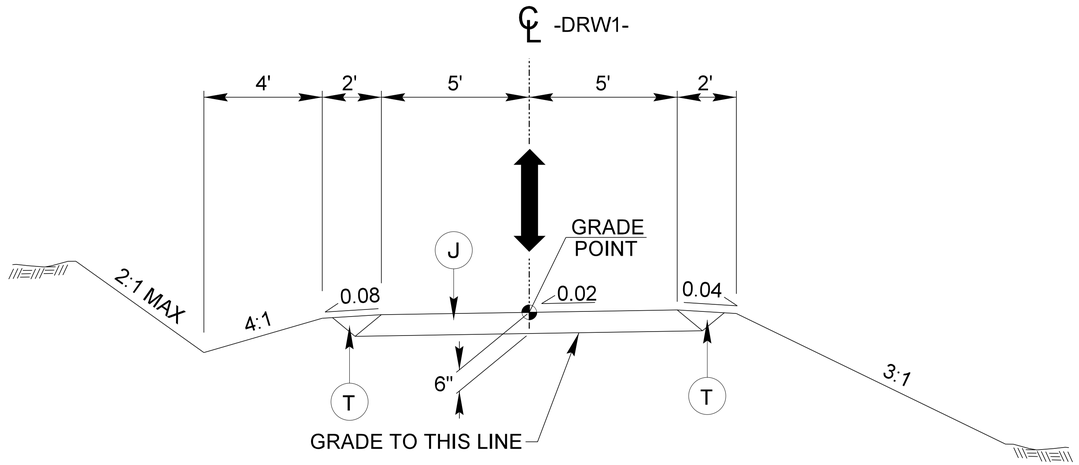
9 UNITS @ 3' EACH, 24" CORED SLAB

TYPICAL SECTION ON STRUCTURE

-L- STA. 16+63.88 (BEGIN BRIDGE) TO STA. 17+31.13 (END BRIDGE)

* 3.5" ASPHALT WEARING SURFACE

(SEE STRUCTURE PLANS FOR STRUCTURE CONSTRUCTION DETAILS)



TYPICAL SECTION NO. 3

-DRW1- STA. 10+10.00 TO 11+10.00

BP11-R020

4RD1	2A-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25477 ENGINEER TRAD F. DUNCAN

6/4/2025

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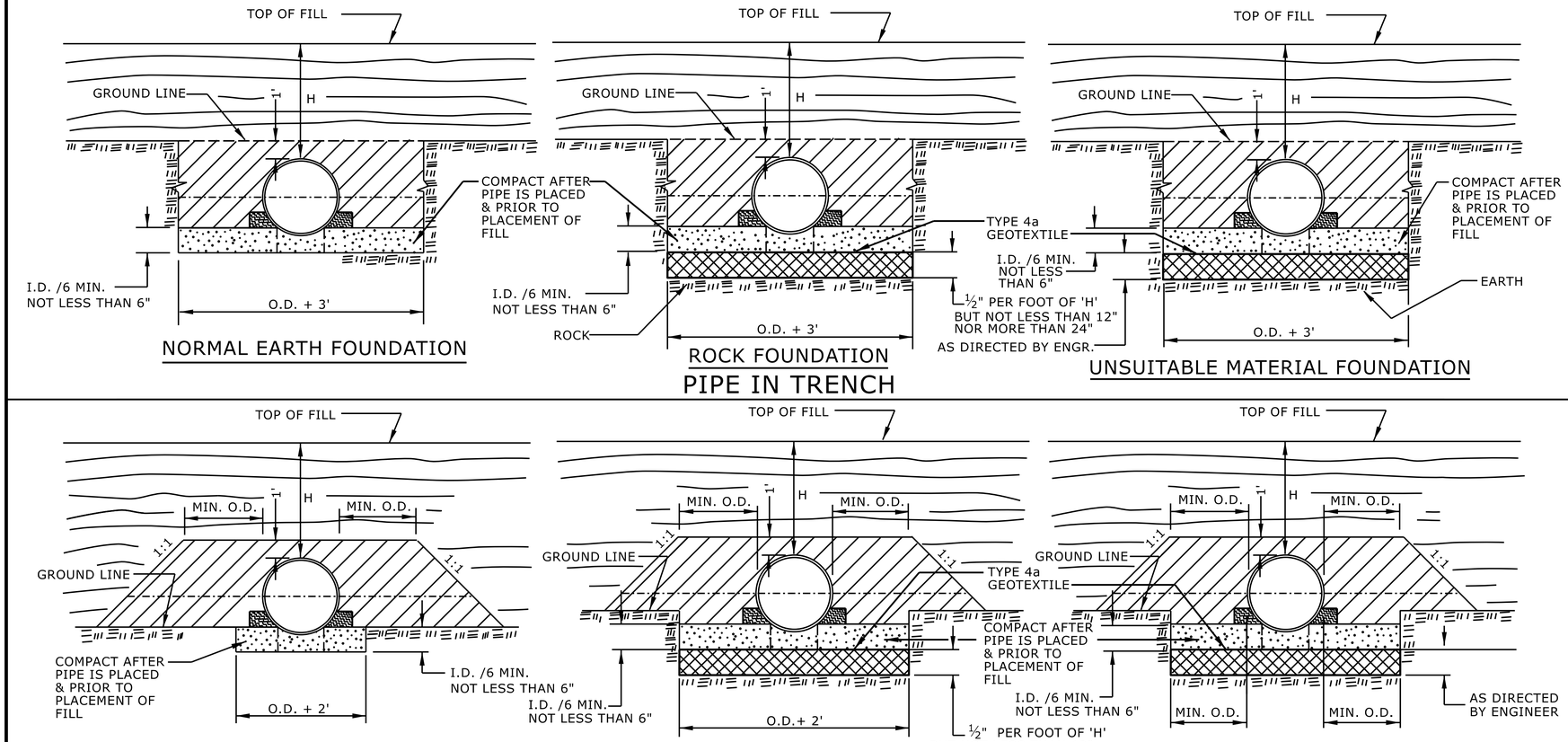
PROJECT REFERENCE NO.	SHEET NO.
BP11-R020	2C-1



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE

SHEET 1 OF 2

300.01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKER

Signed by: Nicole M. Hacker 5884323D3416405...

6/3/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

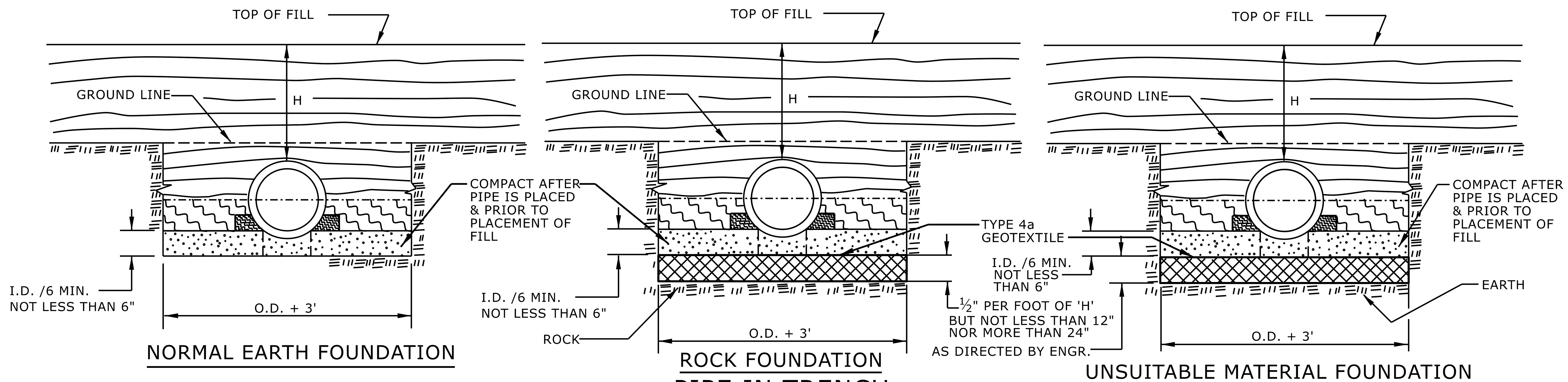
CONTRACTS STANDARDS AND DEVELOPMENT UNIT

Office 919-707-6950 FAX 919-250-4119

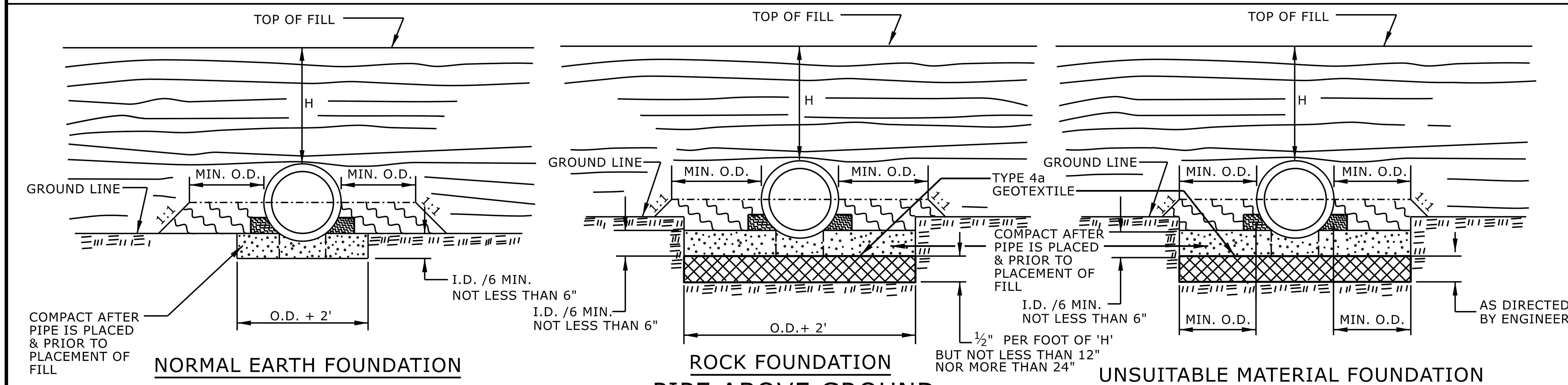
SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

PROJECT REFERENCE NO.	SHEET NO.
BP11-R020	2C-2



PIPE IN TRENCH



PIPE ABOVE GROUND

GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

ROADWAY DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 2
300.01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER

Signed by: Nicole M. Hackler

6/3/2025

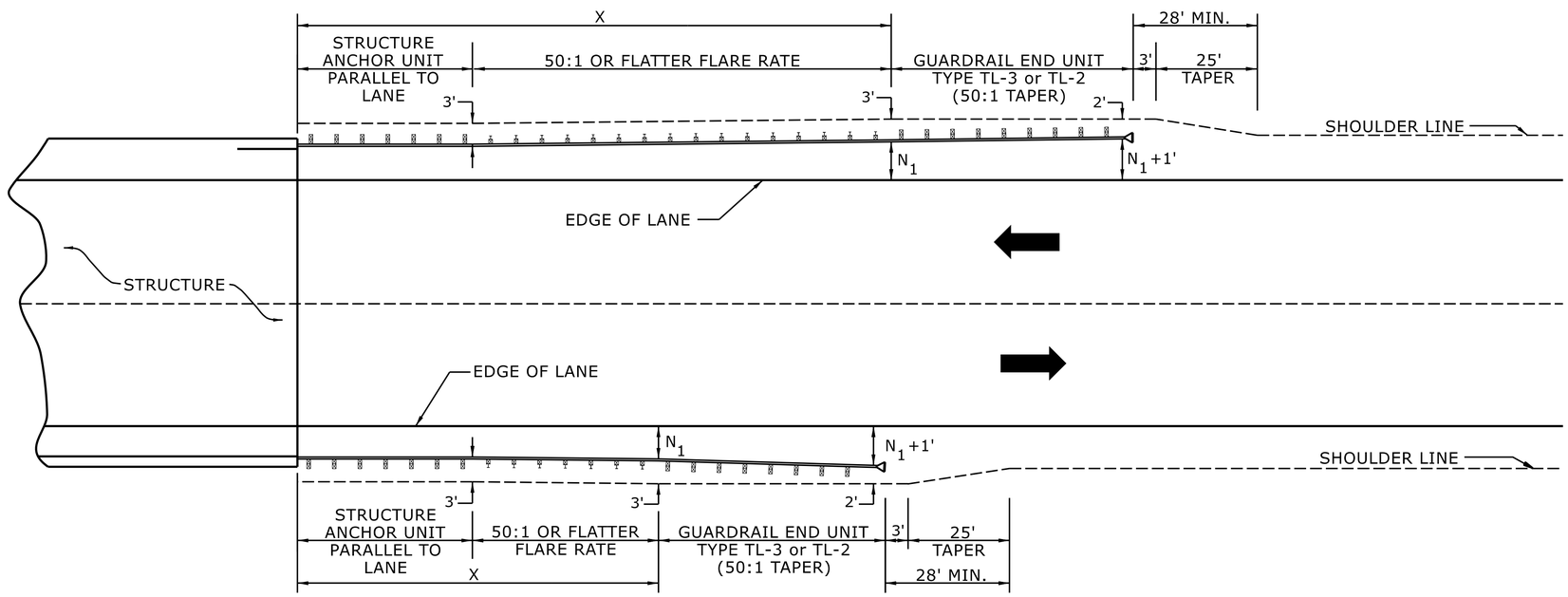
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
BP11-R020	2C-3



USE FLARE RATE AS THE CONTROL IF THE "N_1" DISTANCE IS NOT OBTAINED.
("N_1" IS BASED ON SHOULDER WIDTHS IN THE ROADWAY DESIGN MANUAL)

SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

FOR POSTED SPEEDS ≥ 45MPH USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45MPH USE GREU TYPE TL-2

GUARDRAIL LENGTH OF NEED (X) IS CALCULATED BASED ON THE AASHTO ROADSIDE DESIGN GUIDE.

LENGTHS AND OFFSETS FOR PROPOSED GUARDRAIL AT TWO LANE - TWO WAY LOCATIONS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 15

862D01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER

Signed by:
Nicole M. Hackler
5884323D3416405...

6/3/2025

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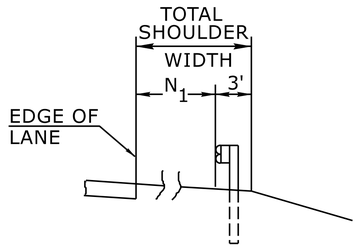
AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

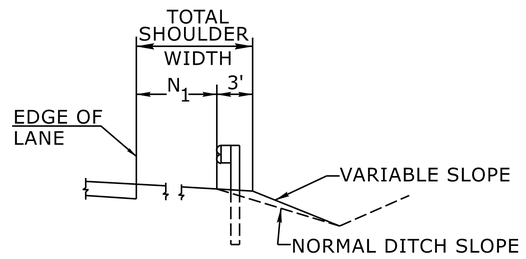
SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

PROJECT REFERENCE NO.	SHEET NO.
BP11-R020	2C-4

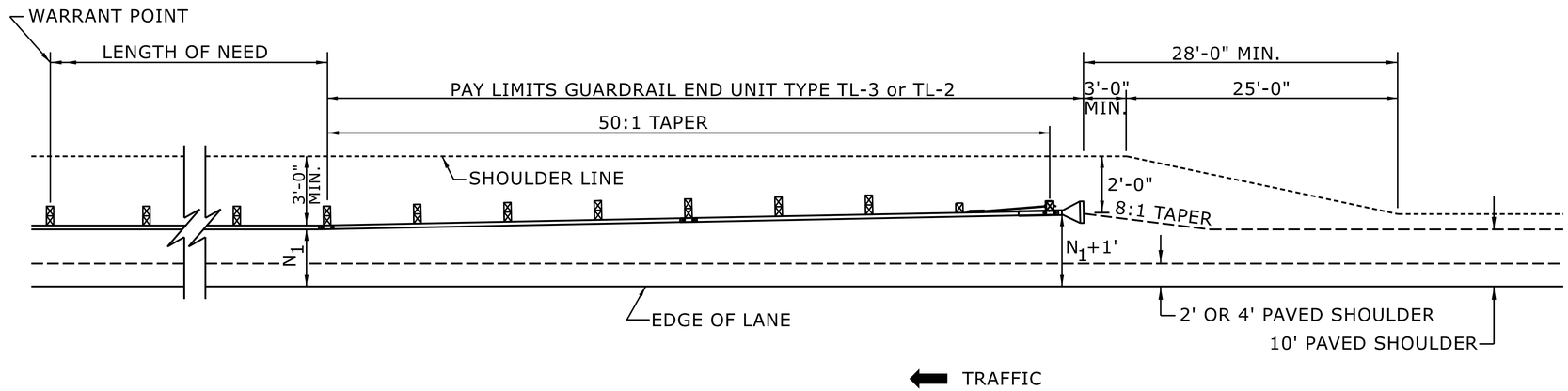


FILL SECTION



CUT SECTION

"N_1"= DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.



FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 15

862D01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER

Signed by:
Nicole M. Hackler
-5884323D3416AC5...
6/3/2025

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

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MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BP11-R020	2C-5

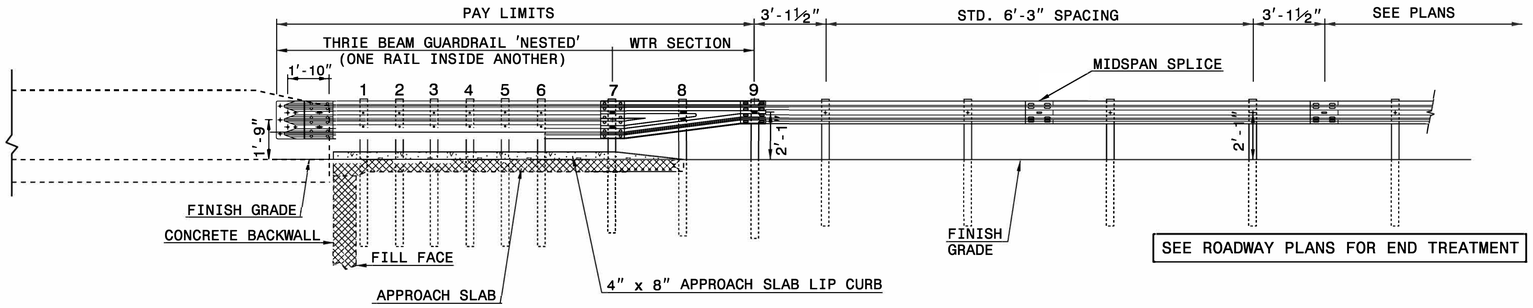
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

TYPE III - SHOP CURVED STRUCTURE ANCHOR UNIT

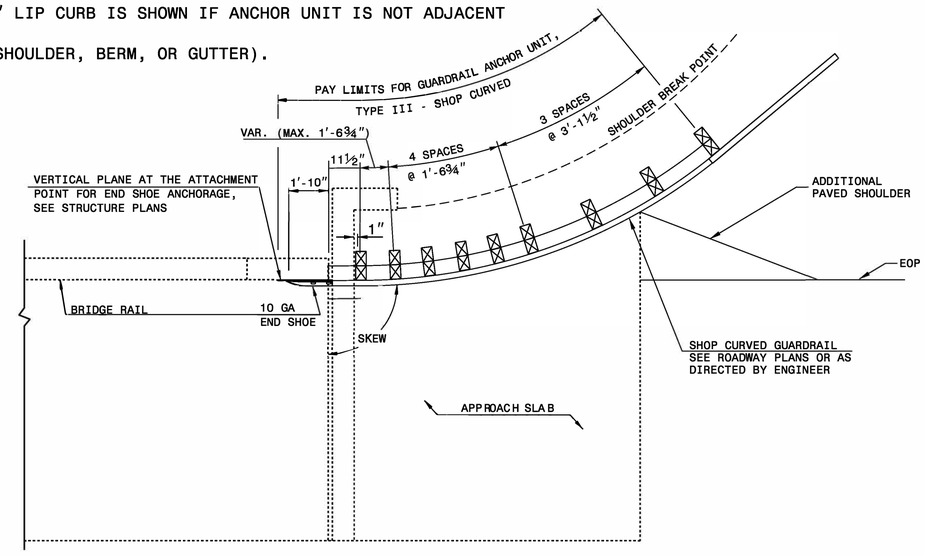
SHEET 1 OF 1

TYPE III SC



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).
  -USE NO STEEL POSTS WITHIN THE GUARDRAIL ANCHOR UNIT LIMITS.
  -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
  -SEE STANDARD 862.03 SHEET 4 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

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

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

ENGLISH DETAIL DRAWING FOR

TYPE III - SHOP CURVED STRUCTURE ANCHOR UNIT

SHEET 1 OF 1

TYPE III SC

NORTH CAROLINA PROFESSIONAL SEAL 33144 ENGINEER NICOLE M. HUCKLER

Signed by:
Nicole M. Huckler
5884323D34164C5...

6/3/2025

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

SEE PLATE FOR TITLE

ORIGINAL BY: E.E.Ward DATE: 4-4-02
MODIFIED BY: T.S.Spell DATE: 2-01-18
CHECKED BY: DATE:
FILE SPEC.: \ihowerton\guardrail\31inguardrail\typeiiisc.dgn

01-FEB-2018 09:49
S:\Contracts\Contracts\Special Details\jhowerton\Guardrail\31 inch Guardrail\type_iii_sc.dgn
jhowerton AT CSD-292695

5/26/20

SUMMARY OF EARTHWORK

IN CUBIC YARDS

STATION	STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT +%	BORROW	WASTE
-L- 15+20.00	16+63.88	18		33	15	
	BEGIN BRIDGE					
-L- 17+31.10	19+80.00	5		156	151	
END BRIDGE						
-L-	**SUBTOTAL**	**23**		**189**	**166**	
-DRW1- 10+10.00	11+10.00	152		2		150
-DRWY1-	**SUBTOTAL**	**152**		**2**		**150**
	TOTAL	**175**		**191**	**166**	**150**
CONTINGENCY UNDERCUT EXCAVATION			450			450
WASTE IN LIEU OF BORROW					-150	-150
PROJECT TOTAL		**175**	**450**	**191**	**16**	**450**
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					**1**	
GRAND TOTAL		**175**	**450**		**17**	
SAY		**180**	**450**		**25**	

EST. DDE = 8 CUBIC YARDS
EST. SHALLOW UNDERCUT CONT. = 100 CY
EST. CLASS IV SUBGRADE STABILIZATION CONT. = 200 TONS
EST. UNDERCUT CONT. = 200 CY
EST. UNDERCUT FOR SUBGRADE STABILITY CONT. = 200 CY
EST. GRADE POINT UNDERCUT = 50 CY
EST. SELECT GRANULAR MATERIAL CONT. = 400 CY

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Asphalt Pavement will be paid for at the contract lump sum price for Grading.

Note: Earthwork quantities are calculated by the Roadway Designer. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

SHOULDER BERM GUTTER SUMMARY

LINE	Station	Station	LENGTH
-L- (RT)	17+31.13	17+57.00	26
		TOTAL:	26
		SAY:	30

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L-	16+00.00	16+63.88	CL	142			
-L-	17+31.13	18+00.00	CL	153			
		TOTAL:		295			
		SAY:		300			

BP11-R020

4RD1	3B-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

PREPARED BY

vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DOCUMENT NOT CONSIDERED FINAL
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"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

GUARDRAIL SUMMARY

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

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH (LF)			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS						IMPACT ATTENUATOR		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	Type III	Type III (SC)	B-77	GREU TL-3	GREU TL-2	AT-1	G	NG				
-L-	16+31	16+64	LT	18.75	50		16+29	BRIDGE	2'	5'					1					1						RADIUS = 20'
-L-	17+31	18+08	LT	81.25			BRIDGE	17+60	VAR.	VAR.		62.5'			1			1								
-L-	16+29	16+64	RT	18.75	43.75		16+27	BRIDGE	2.833'	5.833'					1					1						RADIUS = 20'
-L-	17+32	18+15	RT	62.5	18.75		BRIDGE	17+64	VAR.	VAR.		72'				1		1								RADIUS = 100'
			TOTAL	181.25	112.50										3	1	0	2	0	2						

DEDUCTIONS FOR ANCHORS:

TYPE	QTY	LT/EA		
Type III	3	18.75	-56.25	
Type III SC	1	18.75		-18.75
GREU, TL-3	2	50.00	-100.00	
GREU, TL-2	0	25.00	0.00	
AT-1	2	6.25		-12.50

PROJECT TOTAL	25.00	81.25
SAY	25.00	87.50
ADDITIONAL GUARDRAIL POSTS	5 EACH	per RDM

BP11-R020
4R01 | 3B-2

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

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5/26/20

5/26/20

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION	OFFSET		STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Alternate Pipe (RCP, CSP, CAAP, HDPE, or PVC)														R. C. PIPE CLASS IV								ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE)	REINFORCED ENDWALLS	DRAINAGE STRUCTURE	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)			C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03				CONCRETE TRANSITIONAL SECTION		OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	C.B. MIN DEPTH STD. (SPECIAL DETAIL)	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54		FLOWABLE FILL	CONCRETE COLLARS CL. "B" STD. 840.72	CONCRETE AND BRICK PIPE PLUG STD. 840.71	PIPE REMOVAL	REMARKS
SIZE THICKNESS OR GAUGE			FROM	TO	FT.	FT.	FT.	%	12	15	18	24	30	36	42	48		DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PPP	DO NOT USE PVC	12	15	18	24	30	36	42	48	CY	CY	MASONRY CY	0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.		GRATE TYPE E	F	G		D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05																													CY	CY	CY	LIN. FT.	
L 16+19	26	LT	0401							44																																																																			
L 16+23	22	RT	0402							56																																																																				
L 17+52	12	RT	0403		889.1																														1																									1						1											
			0403	0404		885.8	885.0			12																																																																				
L 18+22	22	LT	0405							32																																																																			
L 18+60	24	RT	0406							20																																																																				
L 16+18	17	LT																																																																									21	15-inches. Proposed pipe at different locaiton.
L 16+54	18	LT																																																																									20	18-inches. Pipe removal adjacent to proposed ditch.
SHEET TOTALS (48" or Less)										164																									1																									1						1										41	
PROJECT TOTALS (48" or Less)										164																									1																									1						1										41	

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	**TRAFFIC BEARING DROP INLET**
T.B.J.B.	**TRAFFIC BEARING JUNCTION BOX**
W.S.	**WIDE SLOT**

BP11-R020
4RD1
3D-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

PREPARED BY

vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

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COMPUTED BY: DM MULLEN, PE DATE: 7/8/2024 CHECKED BY: SC CLAKR, PE DATE: 7/8/2024	(2-3-23)	PROJECT NO. BP11.R020	SHEET NO. 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				SD	200
				TOTAL LF:	200

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

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU (1)	12	100	200	200		
			TOTAL CY/TONS/SY:		100	200**	200**	0	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
*AST = Aggregate Stabilization
**Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Subgrade Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

CUR DATA -L-	CUR DATA -L-	CUR DATA -L-	CUR DATA -DRW1-	CUR DATA -DRW1-
PI = 17+57.59	PI = 18+63.68	PI = 19+76.81	PI = 10+59.91	PI = 10+93.01
Δc = 11°18'12.5" (RT)	Δc = 23°22'24.6" (RT)	Δc = 05°23'22.1" (RT)	Δc = 88°17'59.8" (LT)	Δc = 56°05'50.5" (RT)
D = 11°12'44.9"	D = 21°13'14.4"	D = 04°35'01.2"	D = 190°59'09.4"	D = 190°59'09.4"
Lc = 100.81	Lc = 110.15	Lc = 117.58	Lc = 46.23	Lc = 29.37
Tc = 50.57	Tc = 55.85	Tc = 58.83	Tc = 29.12	Tc = 15.98
R = 511	R = 270	R = 1,250	R = 30	R = 30
SE = 0.04	SE = 0.05	SE = 0.025	SE = 0.000NC	SE = NC
RO = 56'	RO = 70'	RO = 35'		
DS = 25 MPH	DS = 20 MPH	DS = 25 MPH		

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 25477 ENGINEER CHAD F. DUNCAN
6/4/2025

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 56413 ENGINEER IVY B. HUANG
6/5/2025

PREPARED BY
vhb
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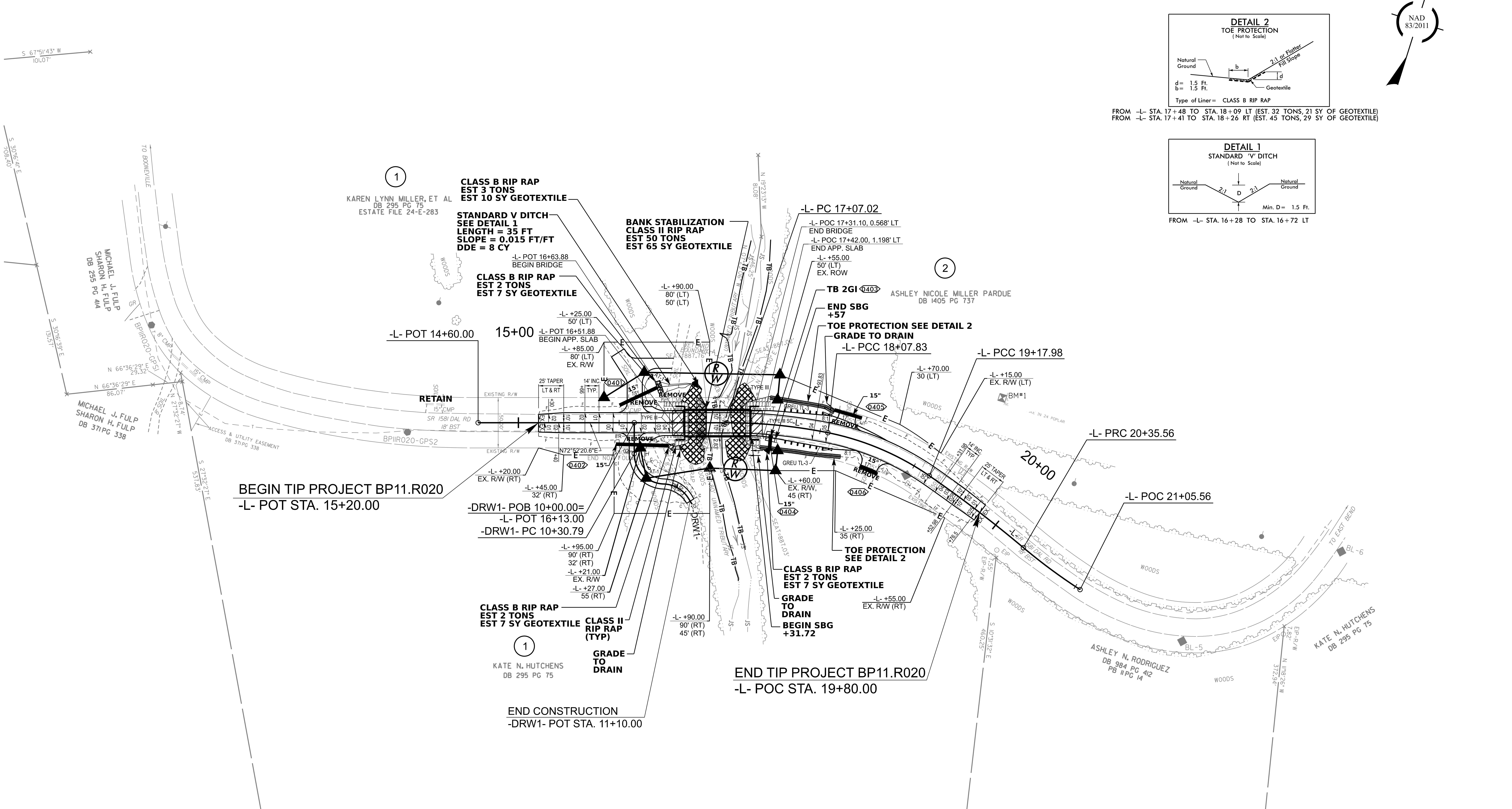

NAD 83/2011
DETAIL 2
TOE PROTECTION
(Not to Scale)
Natural Ground
2:1 or Flatter Fill Slope
Geotextile
d = 1.5 Ft.
b = 1.5 Ft.
Type of Liner = CLASS B RIP RAP
FROM -L- STA. 17+48 TO STA. 18+09 LT (EST. 32 TONS, 21 SY OF GEOTEXTILE)
FROM -L- STA. 17+41 TO STA. 18+26 RT (EST. 45 TONS, 29 SY OF GEOTEXTILE)
DETAIL 1
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground
Min. D = 1.5 Ft.
FROM -L- STA. 16+28 TO STA. 16+72 LT
KAREN LYNN MILLER, ET AL
DB 295 PG 75
ESTATE FILE 24-E-283
MICHAEL J. FULP
SHARON H. FULP
DB 255 PG 414
DB 371 PG 338
ASHLEY NICOLE MILLER PARDUE
DB 1405 PG 737
KATE N. HUTCHENS
DB 295 PG 75
ASHLEY N. RODRIGUEZ
DB 984 PG 412
PB 11 PG 14
CLASS B RIP RAP
EST 3 TONS
EST 10 SY GEOTEXTILE
STANDARD V DITCH
SEE DETAIL 1
LENGTH = 35 FT
SLOPE = 0.015 FT/FT
DDE = 8 CY
BANK STABILIZATION
CLASS II RIP RAP
EST 50 TONS
EST 65 SY GEOTEXTILE
CLASS B RIP RAP
EST 2 TONS
EST 7 SY GEOTEXTILE
-L- PC 17+07.02
-L- POC 17+31.10, 0.568' LT
END BRIDGE
-L- POC 17+42.00, 1.198' LT
END APP. SLAB
-L- POT 16+63.88
BEGIN BRIDGE
-L- POT 16+51.88
BEGIN APP. SLAB
TB 2GI
END SBG +57
TOE PROTECTION SEE DETAIL 2
GRADE TO DRAIN
-L- PCC 18+07.83
-L- PCC 19+17.98
-L- PRC 20+35.56
-L- POC 21+05.56
-L- POT 14+60.00
15+00
20+00
RETAIN
BEGIN TIP PROJECT BP11.R020
-L- POT STA. 15+20.00
-DRW1- POB 10+00.00=
-L- POT 16+13.00
-DRW1- PC 10+30.79
END TIP PROJECT BP11.R020
-L- POC STA. 19+80.00
END CONSTRUCTION
-DRW1- POT STA. 11+10.00
CLASS II RIP RAP (TYP)
GRADE TO DRAIN
BEGIN SBG +31.72
TOE PROTECTION SEE DETAIL 2
WOODS
SR 1581 DAL RD
-DRW1-

GRAPHIC SCALE

50 25 0 50 100

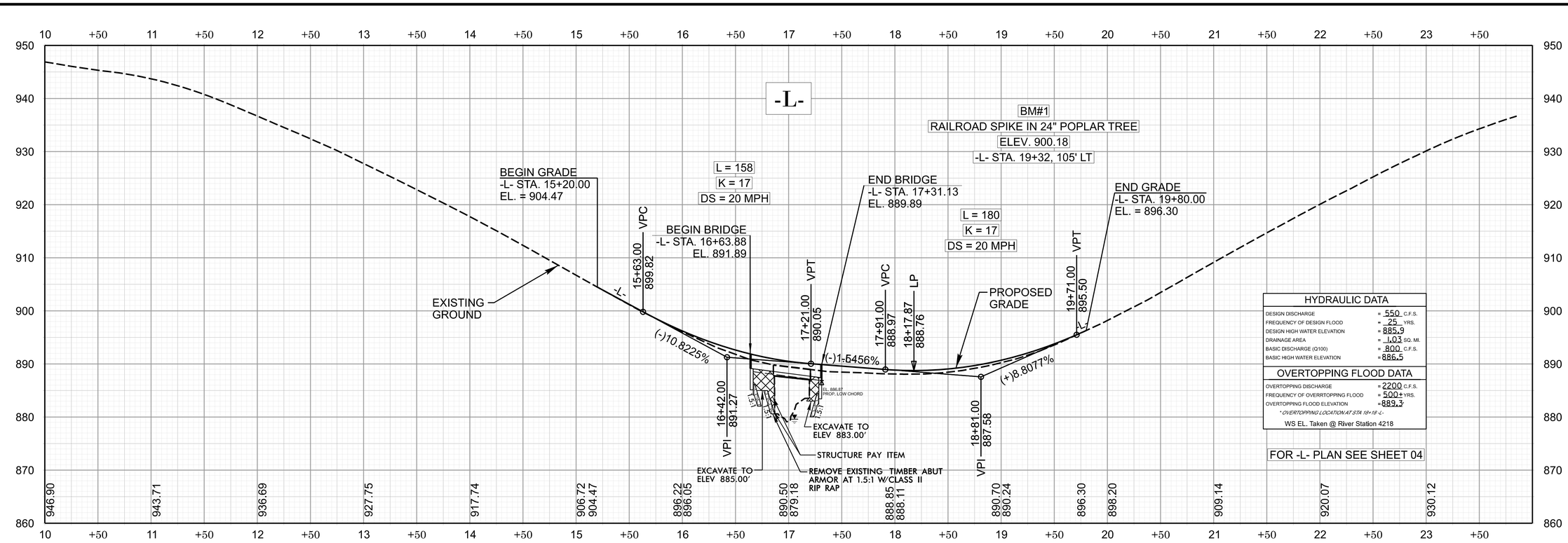
PLANS

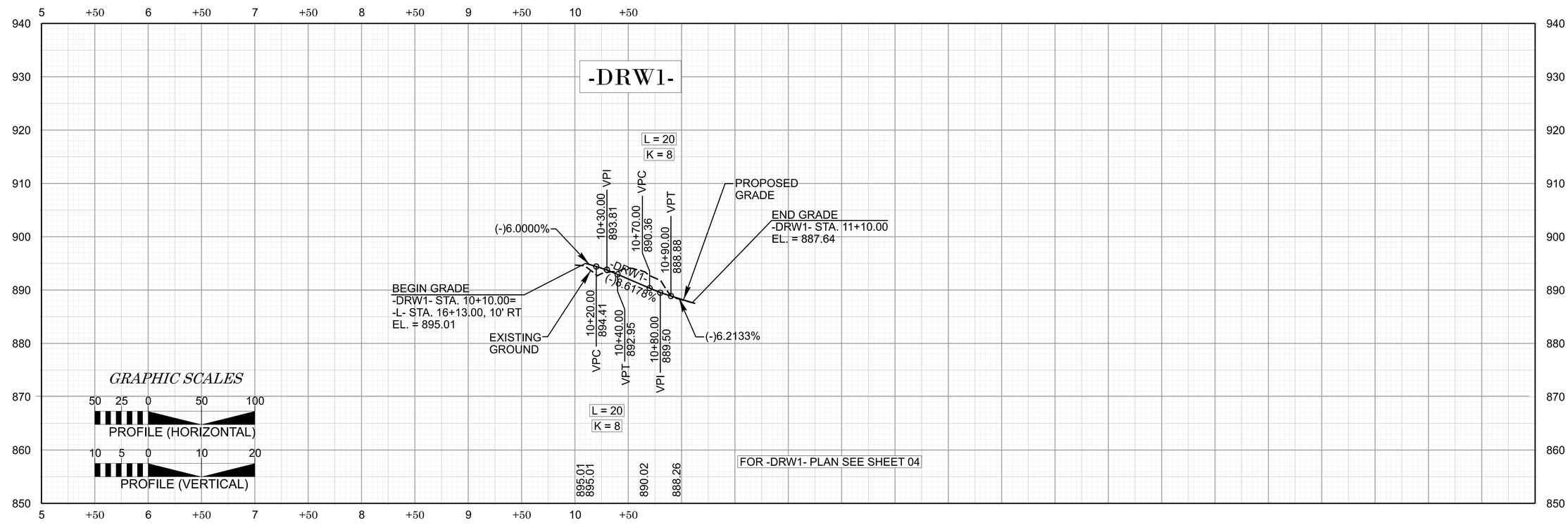
NOTE: ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE LABELED.

NOTE: REMOVE ALL EXISTING 15" RCP AT DRIVEWAYS WITHIN PROJECT LIMITS.
INSTALL PROPOSED 15" RCP WHERE NOTED.

FOR -L- PROFILE SEE SHEET 05
FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-14

5/26/20





BPII-R020

4R01	05

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

DocuSigned by:
NORTH CAROLINA PROFESSIONAL
SEAL 25477
ENGINEER
THAD F. DUNCAN
6/4/2025

HYDRAULICS ENGINEER

DocuSigned by:
NORTH CAROLINA PROFESSIONAL
SEAL 56413
ENGINEER
IVY B. HUANG
6/5/2025

PREPARED BY

vhb
VHB Engineering NC, P.C. (C-2705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

09/08/99

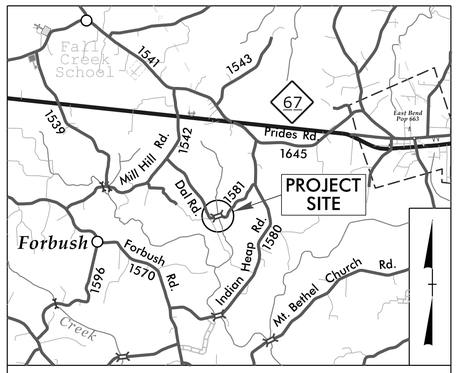
TIP PROJECT: *BP11-R020*

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP11-R020	RW01	04

SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENTS AND PROPERTY TIES

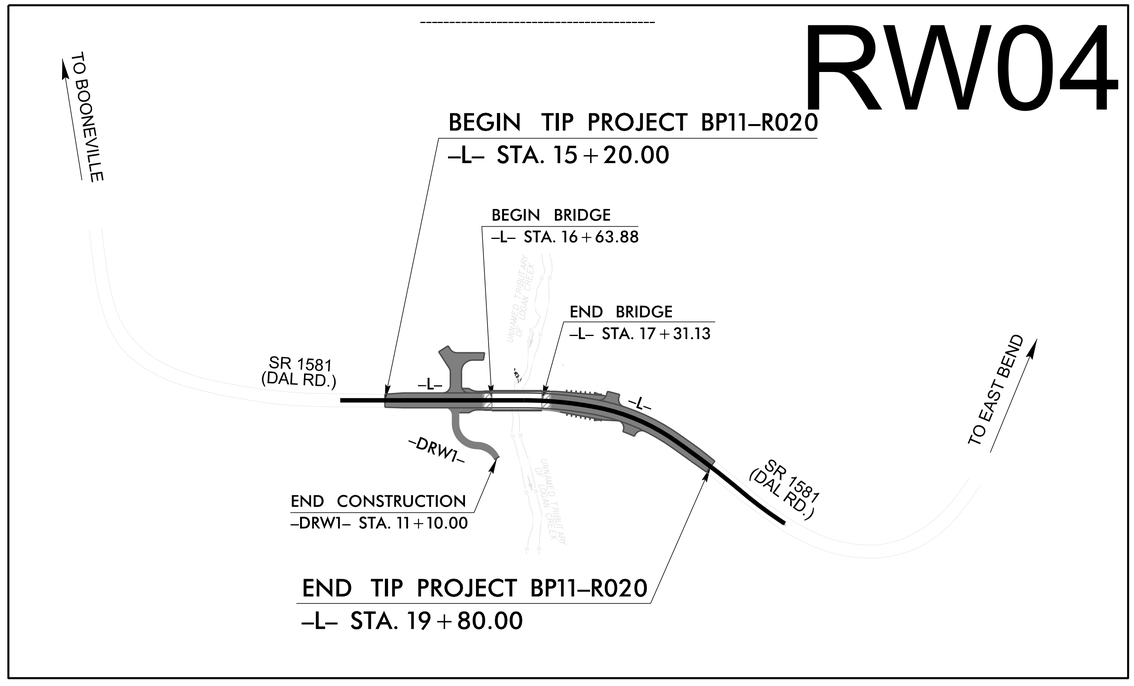
YADKIN COUNTY



VICINITY MAP

NOT TO SCALE

RW04



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "BP11R020-GPS1"
WITH NAD83/2011 STATE PLANE GRID COORDINATES OF
NORTHING: 896198.8989(FT) EASTING: 1542455.6126(FT)
ELEVATION: 943.288(FT)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99997034
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared in the Office of:

Stantec
ONE WEST FOURTH ST., SUITE 820
WINSTON SALEM, N.C. 27101
LICENSE NO.: F-0672
www.stantec.com

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 31, 2024

LETTING DATE: AUGUST 21, 2025

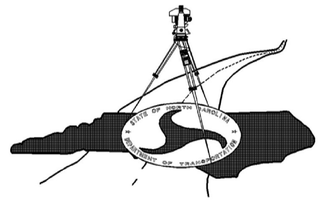
PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR SEAL L-3834 CLINTON B. OSBORNE

DocuSigned by: Clinton B. Osborne 0A6F6B085F6449B...

12/02/2024

SIGNATURE: *DATE:*



5/26/20

PROPOSED ALIGNMENT CONTROL SHEET

PROPOSED ALIGNMENT: L												
POINT	STATION	NORTHING	EASTING	BEARING	DIST	DELTA	D	L	T	R	LT	ST
START	10+00.00	896319.3211	1542413.9608	S24°48'55.7"E	60.73							
PC	10+60.73	896264.2011	1542439.4479	S32°54'34.9"E	63.36	16°11'18.4"	25°27'53.2"	63.57	32.00	225.00		
PCC	11+24.30	896211.0081	1542473.8728	S52°43'24.6"E	44.69	23°26'21.1"	52°05'13.5"	45.00	22.82	110.00		
PCC	11+69.30	896183.9429	1542509.4311	S77°04'54.8"E	74.39	25°16'39.2"	33°42'12.2"	75.00	38.12	170.00		
PCC	12+44.30	896167.3117	1542581.9415	N87°24'52.4"E	54.98	05°43'46.5"	10°25'02.7"	55.00	27.52	550.00		
PCC	12+99.30	896169.7917	1542636.8627	N78°42'39.9"E	154.63	11°40'38.6"	07°32'20.1"	154.89	77.72	760.00		
PT	14+54.19	896200.0609	1542788.4978	N72°52'20.6"E	252.83							
PC	17+07.02	896274.5192	1543030.1139	N78°31'26.8"E	100.65	11°18'12.5"	11°12'44.9"	100.81	50.57	511.00		
PCC	18+07.83	896294.5437	1543128.7498	S84°08'14.7"E	109.38	23°22'24.6"	21°13'14.4"	110.15	55.85	270.00		
PCC	19+17.98	896283.3710	1543237.5605	S69°45'21.3"E	117.54	05°23'22.1"	04°35'01.2"	117.58	58.83	1250.00		
PRC	20+35.56	896242.7009	1543347.8366	S70°38'31.8"E	69.95	07°09'43.1"	10°13'53.0"	70.00	35.05	560.00		
PCC	21+05.56	896219.5133	1543413.8363	S80°28'25.0"E	59.88	12°30'03.2"	20°50'05.4"	60.00	30.12	275.00		
PCC	21+65.56	896209.6029	1543472.8916	N81°49'00.5"E	69.53	22°55'05.9"	32°44'25.6"	70.00	35.47	175.00		
PCC	22+35.56	896219.5003	1543541.7179	N58°53'54.5"E	49.67	22°55'05.9"	45°50'11.8"	50.00	25.34	125.00		
PCC	22+85.56	896245.1563	1543584.2457	N31°07'54.3"E	98.28	32°36'54.6"	32°44'25.6"	99.62	51.20	175.00		

I, CLINTON B. OSBORNE, PLS, CERTIFY THAT THE DATA COMPILED CAME FROM AVAILABLE SURVEYS/MAPPING PERFORMED BY OTHERS AND PROVIDED TO ME BY NCDOT AND DO NOT CERTIFY TO THE ACCURACY OR QUALITY OF THE INDIVIDUAL DATA SOURCES.

THIS 2ND DAY OF DECEMBER, 2024.

DocuSigned by:
Clinton B. Osborne
0A6F6B085F6449B...

PROFESSIONAL LAND SURVEYOR L-3834

NOTES:

1. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

BP11-R020

R/W | D2D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

SEAL 3834

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: BP11-R020

County: YADKIN

PREPARED FOR

LOCATION AND SURVEYS UNIT

PREPARED BY

Stantec
ONE WEST FOURTH ST., SUITE 820
WINSTON SALEM, N.C. 27101
LICENSE NO.: F-0672
www.stantec.com

5/26/20

RIGHT OF WAY CONTROL SHEET

PERMANENT ROW MARKER IRON PIN AND CAP: L			
STATION	OFFSET	NORTH	EAST
15+85.00	-25.00	896262.4777	1542906.1393
16+21.00	25.00	896225.2972	1542955.2678
16+25.00	-50.00	896298.1460	1542937.0037
16+27.00	55.00	896198.3946	1542969.8367
16+90.00	45.00	896226.5017	1543027.0987
17+55.00	-50.00	896335.4296	1543066.3784
17+55.00	-25.00	896310.9533	1543071.4687
17+60.00	25.00	896262.9462	1543086.3096
17+60.00	45.00	896243.3262	1543090.1900

I , CLINTON B. OSBORNE , PLS, CERTIFY THAT THE RIGHT OF WAY AND PERMANENT EASEMENT MONUMENTATION FOR THIS PROJECT SHOWN HEREIN WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT ALL HORIZONTAL CLOSURES HAD A MINIMUM RATIO OF PRECISION OF 1:10,000 (CLASS A). FIELD WORK WAS PERFORMED FROM 11-19-2024 TO 11-19-2024, AND ALL COORDINATES ARE BASED ON NAD83/NA 2011; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS OF 21NCAC 56.1600 AS APPLICABLE.

THIS 2ND DAY OF DECEMBER, 2024.

DocuSigned by:
Clinton B. Osborne
0A6F6B085F6449B...

PROFESSIONAL LAND SURVEYOR L-3834

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

BP11-R020

R/W | 03E-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL 3834 LAND SURVEYOR CLINTON B. OSBORNE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

2024 STANDARD SPECIFICATIONS

TIP PROJECT: BP11-R020

County: YADKIN

PREPARED FOR

LOCATION AND SURVEYS UNIT

PREPARED BY

Stantec
ONE WEST FOURTH ST., SUITE 820
WINSTON SALEM, N.C. 27101
LICENSE NO.: F-0672
www.stantec.com

5/26/20

CUR DATA -L-
PIc 10+92.73
Δc = 16°11'18.4" (LT)
D = 25°27'53.2"
Lc = L
Tc = 32.00
R = 225

CUR DATA -L-
PIc 11+47.12
Δc = 23°26'21.1" (LT)
D = 52°05'13.5"
Lc = L
Tc = 22.82
R = 110

CUR DATA -L-
PIc 12+07.42
Δc = 25°16'39.2" (LT)
D = 33°42'12.2"
Lc = L
Tc = 38.12
R = 170

CUR DATA -L-
PIc 12+71.82
Δc = 05°43'46.5" (LT)
D = 10°25'02.7"
Lc = L
Tc = 27.52
R = 550

CUR DATA -L-
PIc 13+77.02
Δc = 11°40'38.6" (LT)
D = 07°32'20.1"
Lc = L
Tc = 77.72
R = 760

CUR DATA -L-
PIc 17+57.59
Δc = 11°18'12.5" (RT)
D = 11°12'44.9"
Lc = 100.81
Tc = 50.57
R = 511
SE = 0.04
RO = 56'
DS = 25 MPH

CUR DATA -L-
PIc 18+63.68
Δc = 23°22'24.6" (RT)
D = 21°13'14.4"
Lc = 110.15
Tc = 55.85
R = 270
SE = 0.05
RO = 70'
DS = 20 MPH

CUR DATA -L-
PIc 19+76.81
Δc = 05°23'22.1" (RT)
D = 04°35'01.2"
Lc = 117.58
Tc = 58.83
R = 1,250
SE = 0.025
RO = 35'
DS = 25 MPH

CUR DATA -DRW1-
PIc 10+59.91
Δc = 88°17'59.8" (LT)
D = 190°59'09.4"
Lc = 46.23
Tc = 29.12
R = 30
SE = 0.000NC

CUR DATA -DRW1-
PIc 10+93.01
Δc = 56°05'50.5" (RT)
D = 190°59'09.4"
Lc = 29.37
Tc = 15.98
R = 30
SE = NC

CUR DATA -L-
PIc 20+70.60
Δc = 07°09'43.1" (LT)
D = 10°13'53.0"
Lc = L
Tc = 35.05
R = 560

CUR DATA -L-
PIc 21+35.68
Δc = 12°30'03.2" (LT)
D = 20°50'05.4"
Lc = L
Tc = 30.12
R = 275

CUR DATA -L-
PIc 22+01.03
Δc = 22°55'05.9" (LT)
D = 32°44'25.6"
Lc = L
Tc = 35.47
R = 175

CUR DATA -L-
PIc 22+60.90
Δc = 22°55'05.9" (RT)
D = 45°50'11.8"
Lc = L
Tc = 25.34
R = 125

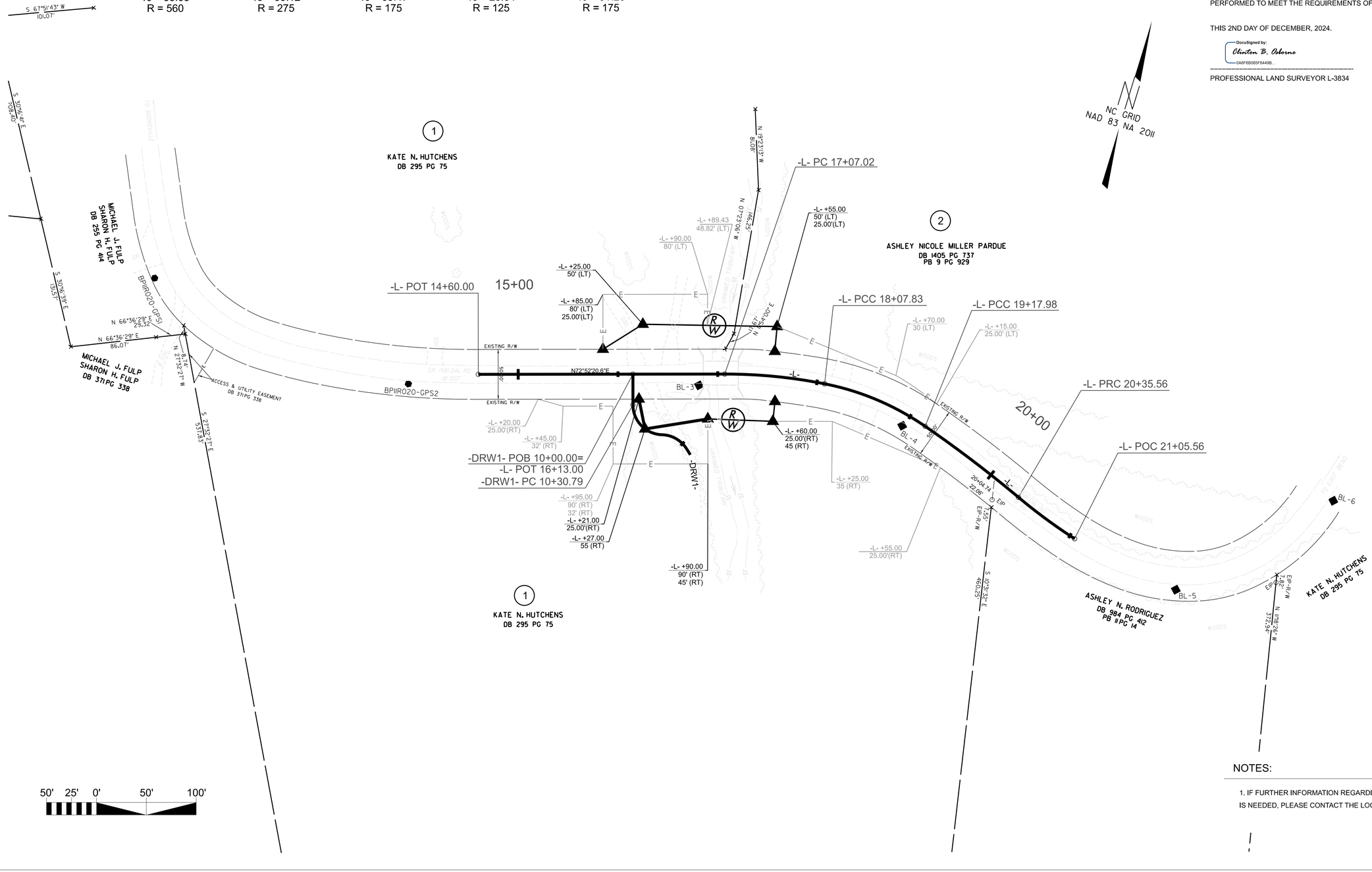
CUR DATA -L-
PIc 23+36.76
Δc = 32°36'54.6" (LT)
D = 32°44'25.6"
Lc = L
Tc = 51.20
R = 175

I , CLINTON B. OSBORNE , PLS, CERTIFY THAT THE RIGHT OF WAY AND PERMANENT EASEMENT MONUMENTATION FOR THIS PROJECT SHOWN HEREIN WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT ALL HORIZONTAL CLOSURES HAD A MINIMUM RATIO OF PRECISION OF 1:10,000 (CLASS A). FIELD WORK WAS PERFORMED FROM 11-19-2024 TO 11-19-2024, AND ALL COORDINATES ARE BASED ON NAD83/NA 2011; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS OF 21NCAC 56.1600 AS APPLICABLE.

THIS 2ND DAY OF DECEMBER, 2024.

DocuSigned by:
Clinton B. Osborne
0A6FEB085F6449B...

PROFESSIONAL LAND SURVEYOR L-3834



NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

BP11-R020
R/W | 04

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROFESSIONAL LAND SURVEYOR
NORTH CAROLINA PROFESSIONAL SEAL L-3834 LAND SURVEYOR CLINTON B. OSBORNE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

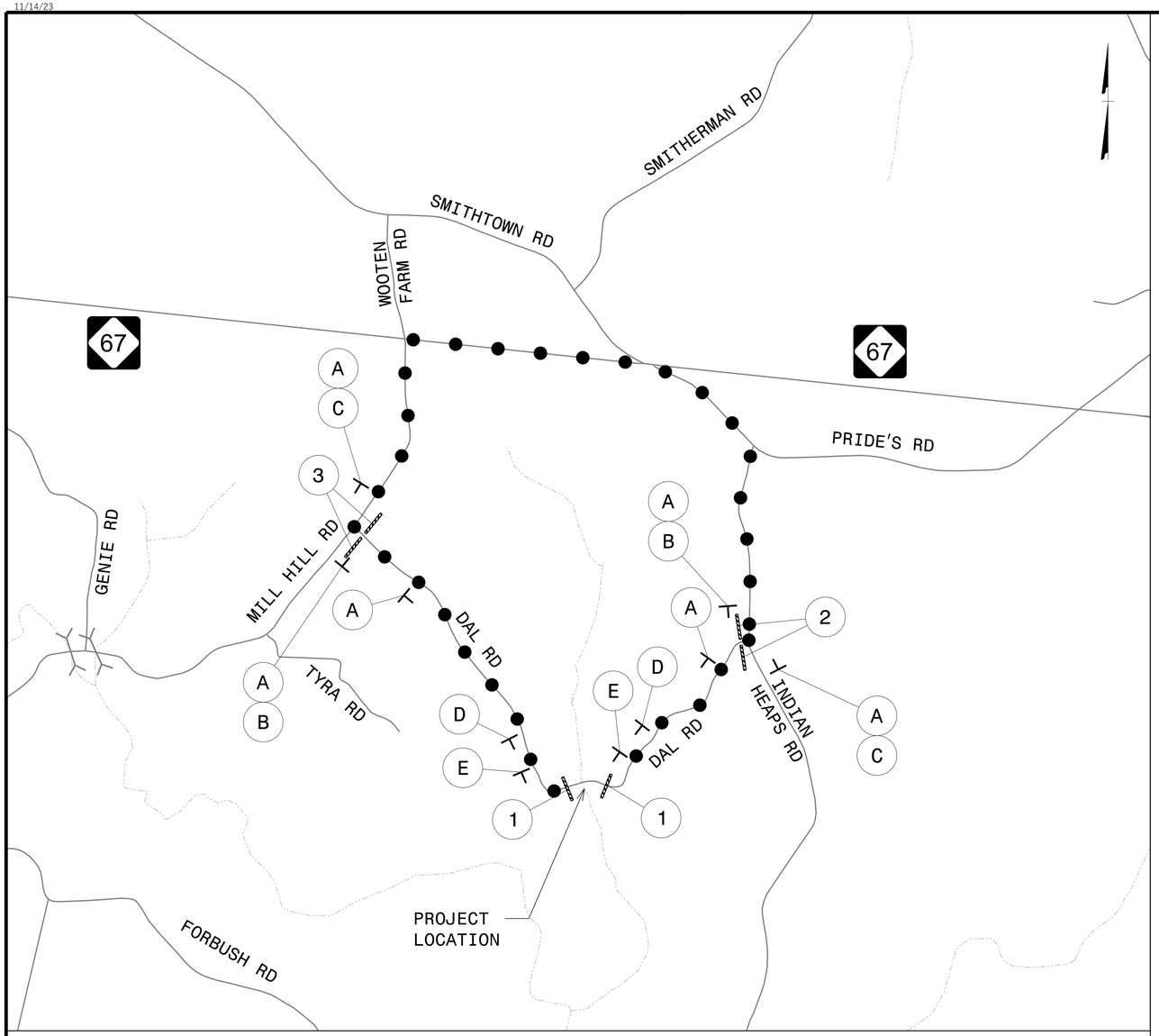
2024 STANDARD SPECIFICATIONS

TIP PROJECT: BP11-R020
County: YADKIN

PREPARED FOR
LOCATION AND SURVEYS UNIT

PREPARED BY
Stantec
ONE WEST FOURTH ST., SUITE 820
WINSTON SALEM, N.C., 27101
LICENSE NO.: F-0672
www.stantec.com

11/14/23



VICINITY MAP
(NOT TO SCALE)

● ● ● DETOUR ROUTE

DETOUR ROUTE (APPROX. LENGTH = 3.7 MILES)

┤ STATIONARY SIGN

REFER TO RSD 1103.01 SHEET 1 AND 2 OF 9 FOR ADDITIONAL DETAIL.

W20-3
48″ x 48″

A

SP-4R
42″ x 12″

B

SP-4L
42″ x 12″

C

W20-3
48″ x 48″

D

W20-3
48″ x 48″

E

GENERAL NOTES

1- INSTALLATION OF DETOUR ROUTING PANELS, TEMPORARY ROUTE MARKERS, DESTINATION SIGNS, AND ANY NECESSARY MODIFICATIONS TO EXISTING OR PROPOSED REGULATORY OR WARNING SIGNS WILL BE MADE BY OTHERS (STATE OR CITY FORCES) UNLESS OTHERWISE DESIGNATED IN THE PLANS. PROVIDE A MINIMUM 30 CALENDAR DAY NOTICE TO STATE FORCES BEFORE A ROADWAY IS CLOSED TO TRAFFIC SUCH THAT THE NECESSARY PROVISIONS CAN BE MADE TO INSTALL DETOUR ROUTE SIGNS, INFORM LOCAL EMERGENCY AND LAW ENFORCEMENT PERSONNEL, SCHOOLS, OR ANY OTHER PARTIES AFFECTED BY THE ROAD CLOSURE.

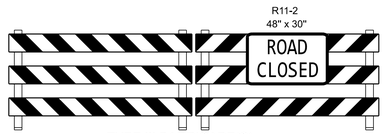
2- INSTALL SIGNS BEFORE THE BARRICADES WHEN CLOSING THE ROADWAY TO TRAFFIC. REMOVE BARRICADES BEFORE SIGNS WHEN OPENING THE ROADWAY TO TRAFFIC. INSTALL/REMOVE SIGNS AND BARRICADES WITHIN THE SAME CALENDAR DAY.

3- USE ADDITIONAL TYPE III BARRICADES IN STAGGERED LOCATIONS SUPPLEMENTED WITH SIGN R11-3 IN THE EVENT THAT TRAFFIC MUST BE MAINTAINED BEYOND THE DETOUR POINT.

4- POSITION WING BARRICADES ON THE SHOULDERS AND SLOPE THE STRIPES DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING.

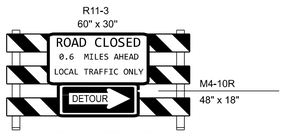
5- USE PORTABLE SIGNS IF ROAD CLOSURE IS TO BE IMPLEMENTED FOR LESS THAN THREE DAYS, OR FOR EMERGENCIES.

1



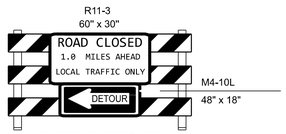
TYPE III BARRICADE(S)

2



TYPE III BARRICADE

3



TYPE III BARRICADE

BP11-R020

TMP | 001

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

WORK ZONE TRAFFIC CONTROL UNIT

NORTH CAROLINA PROFESSIONAL SEAL 031533 ENGINEER JOHN G. TOWNSEND
6/12/2025

PREPARED BY

vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

TEMPORARY TRAFFIC CONTROL
DAL ROAD DETOUR

PROJECT: BP11-R020

CONTRACT: DK00451

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN
YADKIN COUNTY

LOCATION: REPLACE BRIDGE NO. 980147 ON SR 1581 (DAL ROAD) OVER UT OF LOGAN CREEK

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 2024 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 MULTI-LANE ROADWAYS
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

PAVEMENT MARKING SCHEDULE

PAINT PAVEMENT MARKINGS

SYMBOL	DESCRIPTION
P1	WHITE EDGELINE (4")
P13	YELLOW DOUBLE CENTER (4")

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
-L- DAL RD	PAINT	NONE

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

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

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

INDEX

BP11-R020

PMP | 001

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

SIGNING AND DELINEATION UNIT

6/12/2025

PREPARED BY

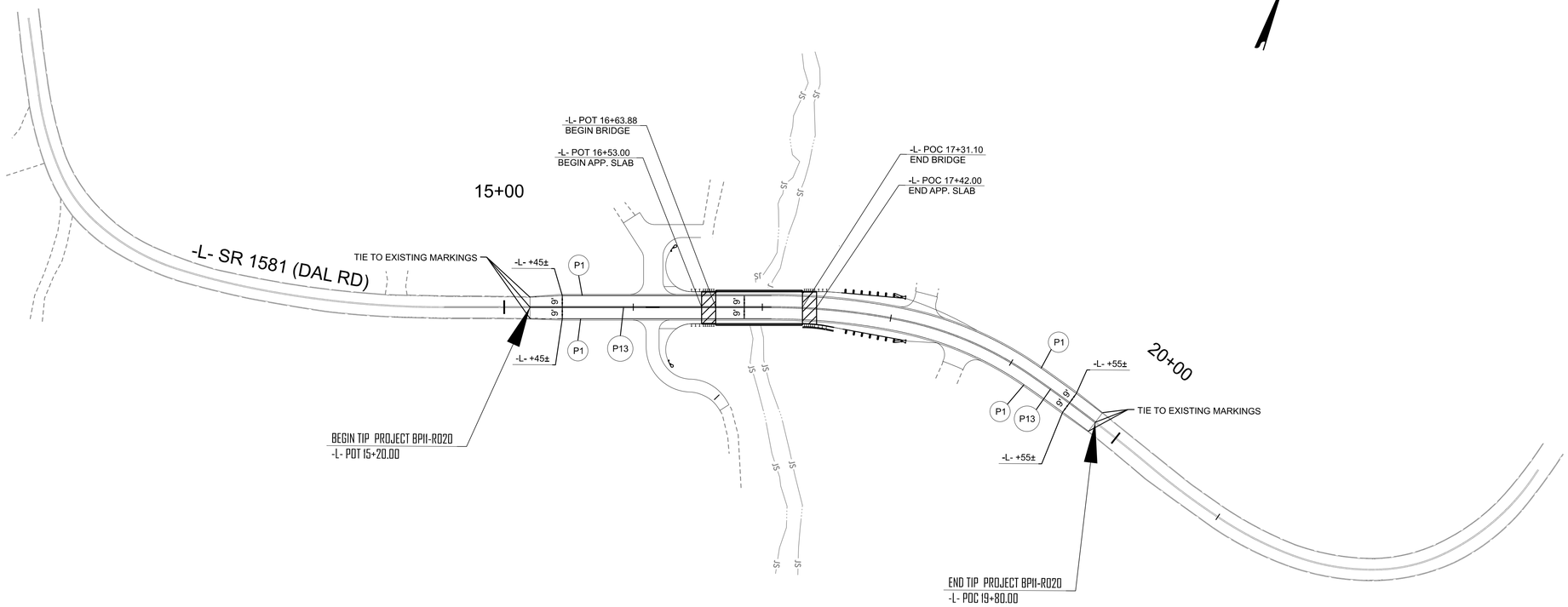
vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

PAVEMENT MARKING TITLE SHEET

PROJECT: BP11-R020

CONTRACT: DK00451

11/14/23



PAVEMENT MARKING SCHEDULE

PAINT PAVEMENT MARKINGS

SYMBOL	DESCRIPTION
P1	WHITE EDGELINE (4")
P13	YELLOW DOUBLE CENTER (4")

BPII-R020

PMP | 002

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

SIGNING AND DELINEATION UNIT

NORTH CAROLINA PROFESSIONAL SEAL 031533 ENGINEER JOHN G. TOWNSEND
6/12/2025

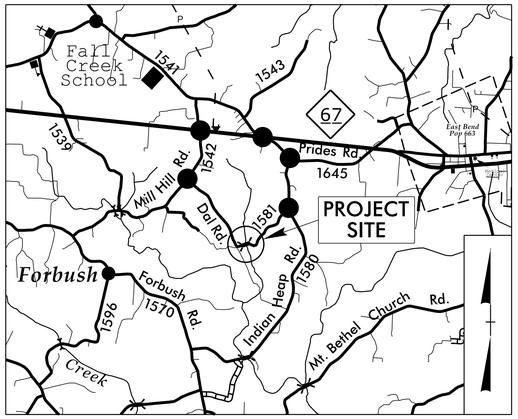
PREPARED BY

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

PAVEMENT MARKING DETAIL SHEET

PROJECT: BP11-R020

TIP PROJECT: BP11–R020



VICINITY MAP
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

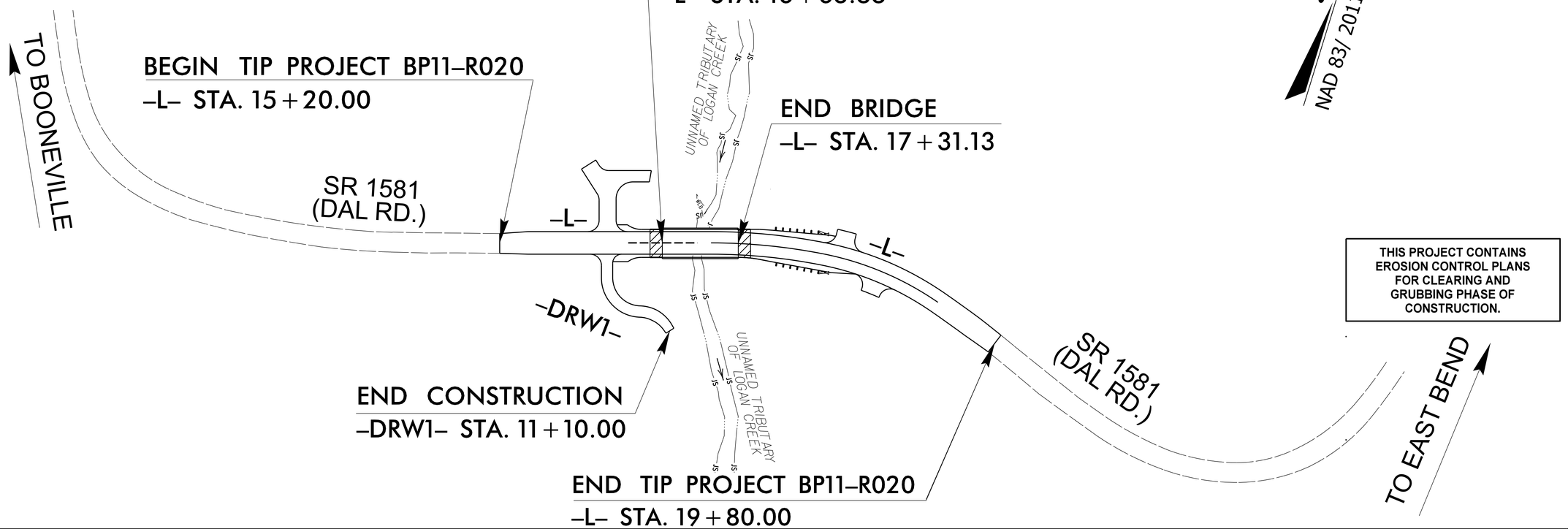
YADKIN COUNTY

REPLACE BRIDGE NO. 980147 ON SR 1581 (DAL ROAD)
OVER UT OF LOGAN CREEK
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP11-R020	EC-1	

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

NAD 83/ 2011



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

GRAPHIC SCALE

50 25 0 50 100
PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE APPLICABLE REGULATIONS SET FORTH BY THE NCG–010000 GENERAL CONSTRUCTION PERMIT AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

Prepared in the Office of:

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

Designed by:

IVY B. HUANG, PE — ***4313***
NAME — *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

The "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2024 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

$$$$USER NAME$$$$ $$$$DGN$$$$ $$$$SYSTIME$$$$

PROJECT REFERENCE NO.	SHEET NO.
BP11-R020	EC-02
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

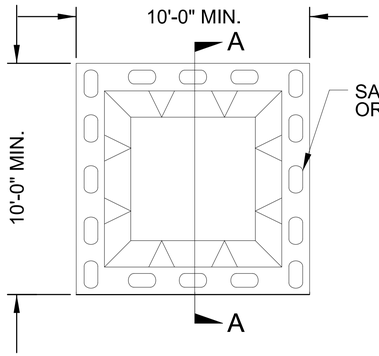
EROSION & SEDIMENT CONTROL LEGEND

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1630.03	Temporary Silt Ditch	TSD
1630.04	Stilling Basin	
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1630.07	Skimmer Basin	
1630.08	Tiered Skimmer Basin	
1630.09	Earthen Dam with Skimmer	
	Infiltration Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C

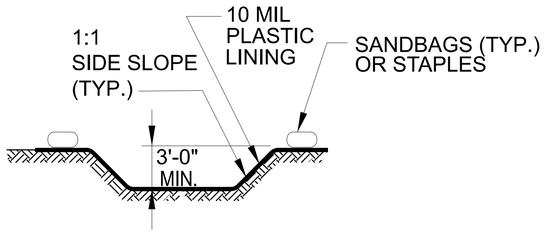
Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet Sediment Trap Type A	A
1635.02	Rock Pipe Inlet Sediment Trap Type B	B
1636.01	Excelsior Wattle Check	
1636.01	Excelsior Wattle Check with Flocculant	
1636.01	Coir Fiber Wattle Check	
1636.01	Coir Fiber Wattle Check with Flocculant	
1636.02	Silt Fence Excelsior Wattle Break	EW
	Silt Fence Coir Fiber Wattle Break	CFW
1636.03	Excelsior Wattle Barrier	EW EW EW
1636.03	Coir Fiber Wattle Barrier	CFW CFW CFW

PROJECT REFERENCE NO.	SHEET NO.
BPII-R020	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A

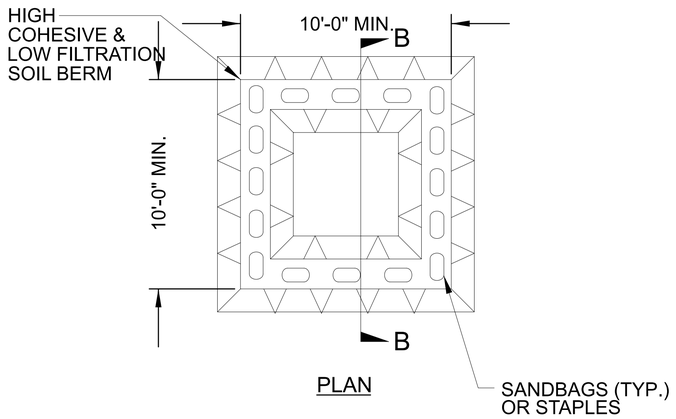
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



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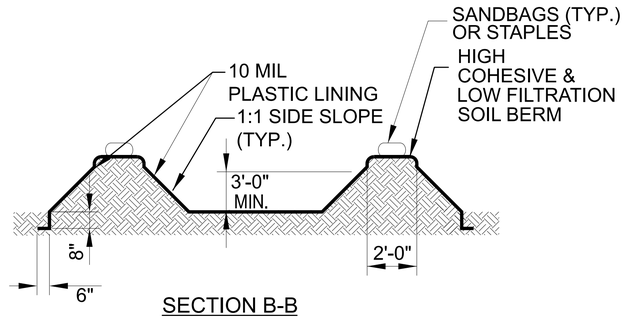

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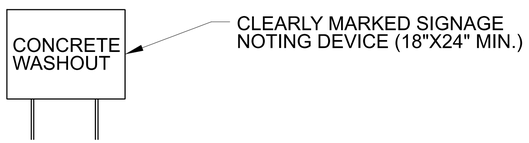


NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

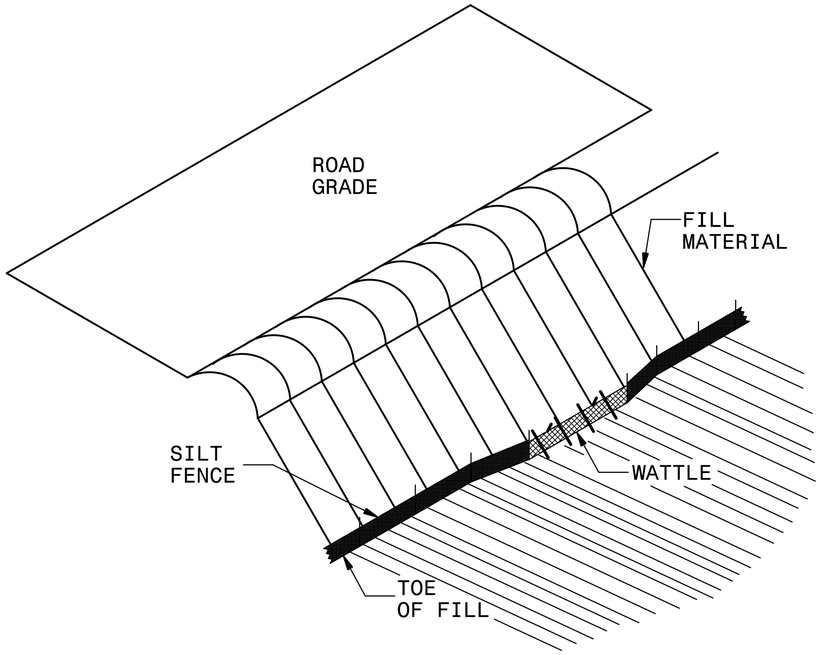
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

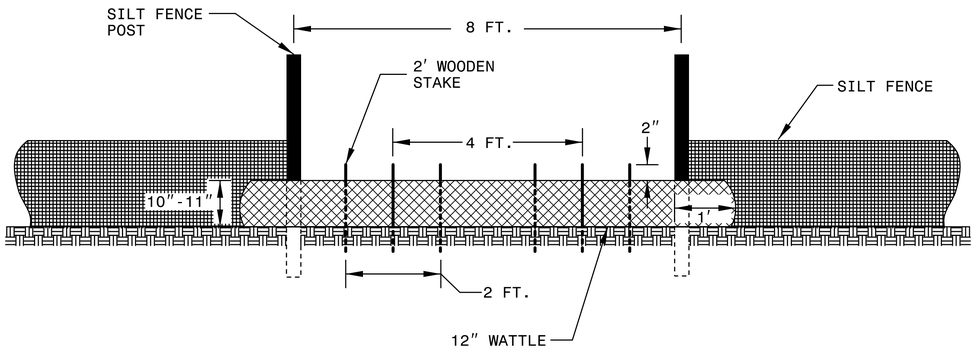
NOT TO SCALE

SILT FENCE COIR FIBER WATTLE BREAK DETAIL

PROJECT REFERENCE NO.	SHEET NO.
BPII-R020	EC-2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



ISOMETRIC VIEW



VIEW FROM SLOPE

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLE ON TOE OF SLOPE.

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

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

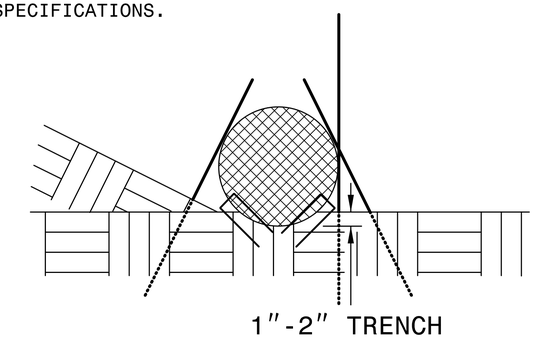
PROVIDE STAPLES MADE OF 11 GUAGE STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 6" IN LENGTH.

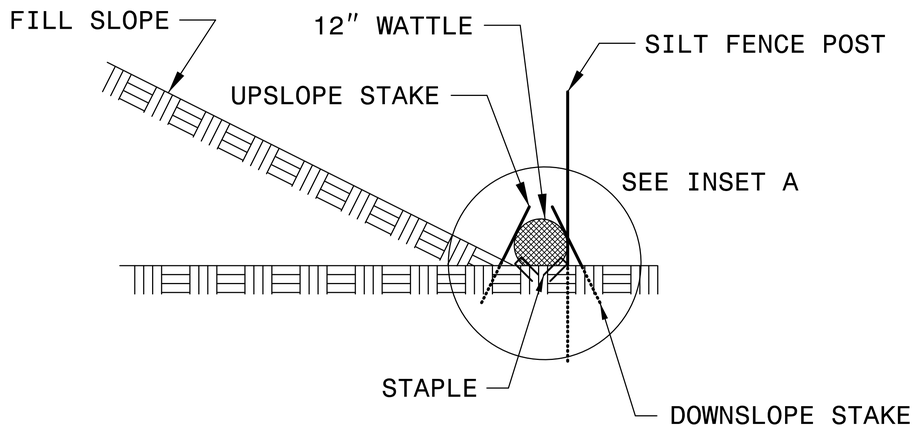
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.

INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.

INSET A





SIDE VIEW

PROJECT REFERENCE NO.	SHEET NO.
BPII-R020	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

STRAW MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	16+38	16+72	LT	30
4	-DRW1-	10+44	11+10	LT	55
			SUBTOTAL		85
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					1055
				TOTAL	1200
				SAY	1200

EXCELSIOR MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-DRW1-	10+31	11+06	RT	60
			SUBTOTAL		60

PROJECT REFERENCE NO.	SHEET NO.
BPII-R020	EC-3A
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 TO 4:1	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH WITH SLOPES STEEPER THAN 4:1. 7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES

11/14/23

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.

NAD 83 NC GRID NA 2011

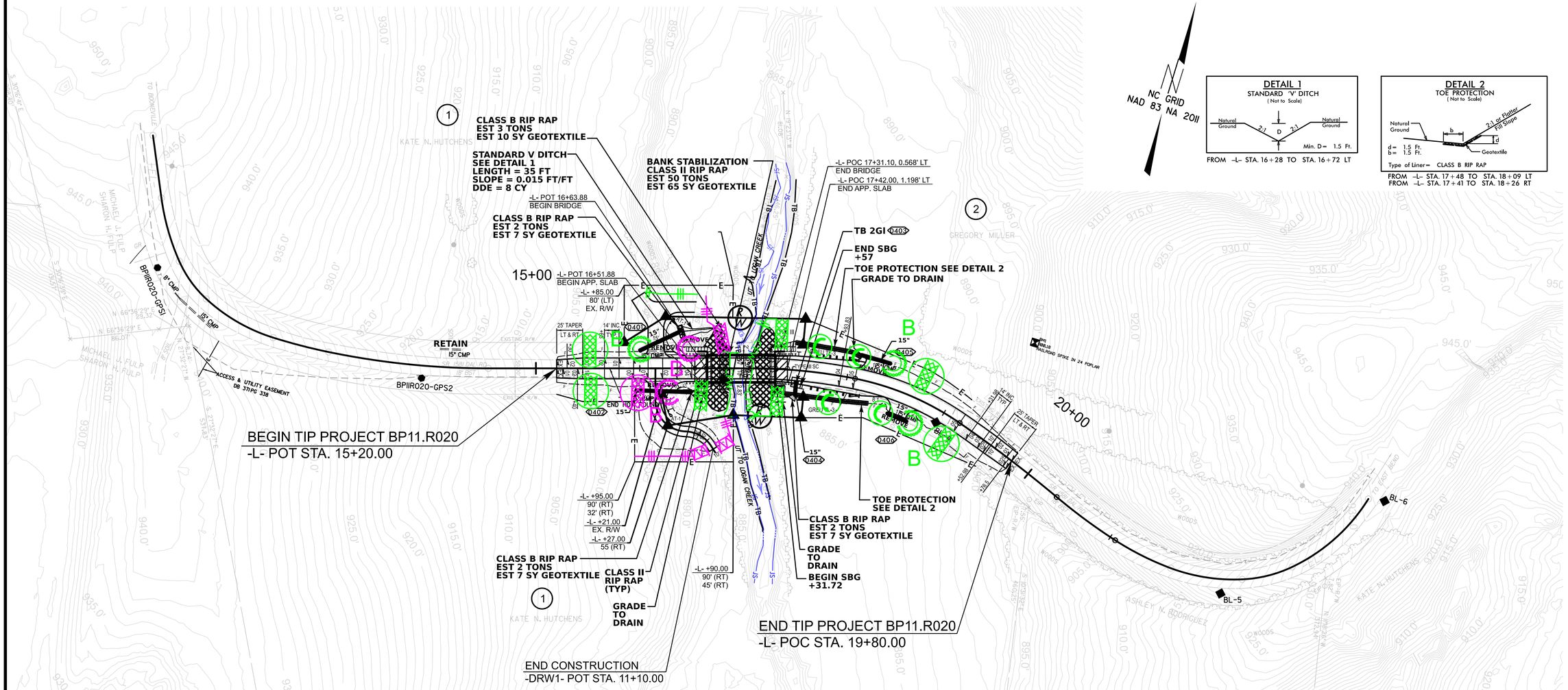
DETAIL 1
STANDARD "V" DITCH
(Not to Scale)

FROM –L– STA. 16+28 TO STA. 16+72 LT

DETAIL 2
TOE PROTECTION
(Not to Scale)

Type of Liner = CLASS B RIP RAP

FROM –L– STA. 17+48 TO STA. 18+09 LT
FROM –L– STA. 17+41 TO STA. 18+26 RT



NOTE: ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE LABELED.
NOTE: REMOVE ALL EXISTING 15" RCP AT DRIVEWAYS WITHIN PROJECT LIMITS.
INSTALL PROPOSED 15" RCP WHERE NOTED.

BP11-R020
EC-04/CONST.04

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

PREPARED BY

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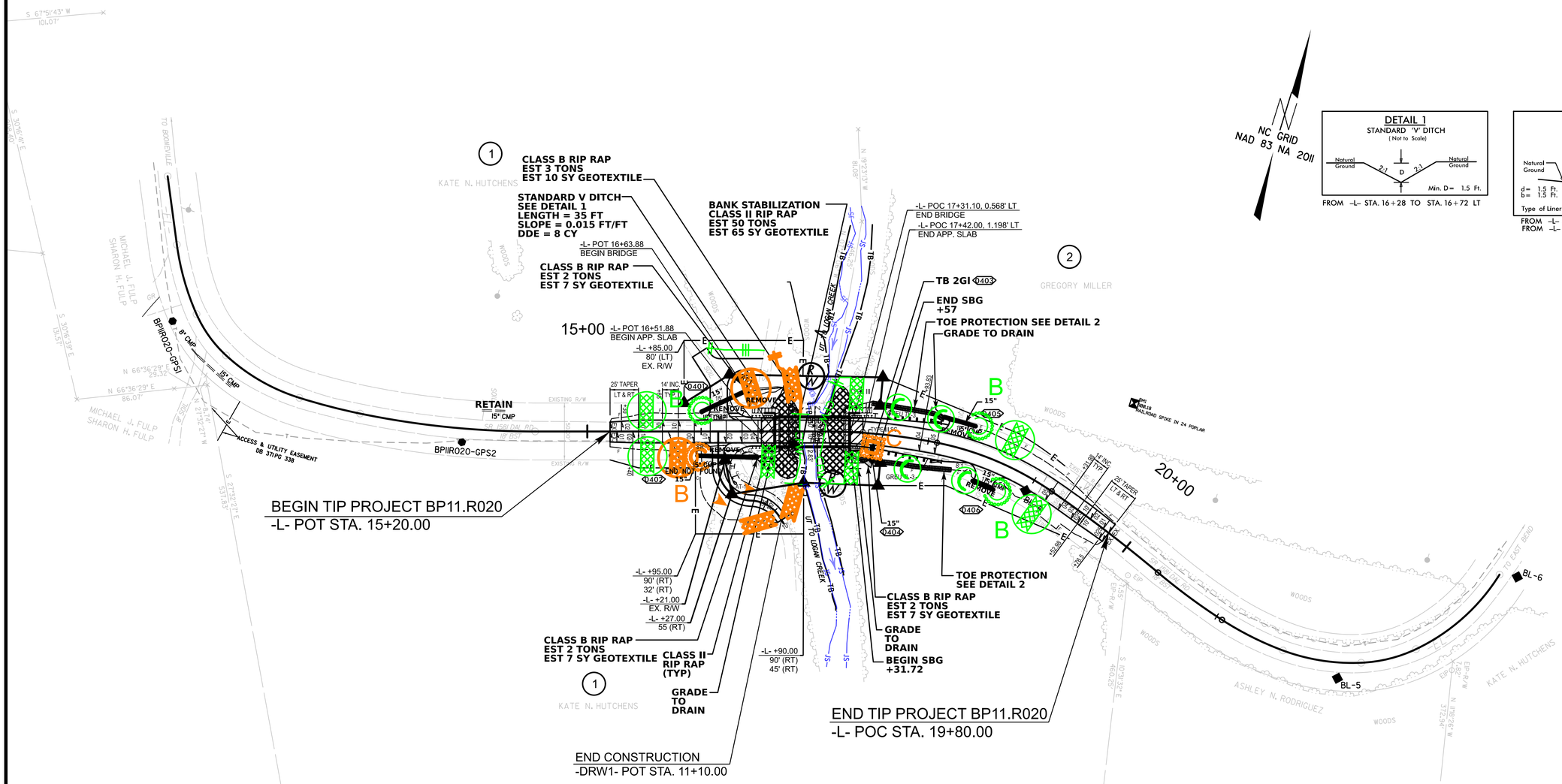
Raleigh, NC 27606



BEGIN TIP PROJECT BP11.R020
-L- POT STA. 15+20.00

END TIP PROJECT BP11.R020
-L- POC STA. 19+80.00

END CONSTRUCTION
-DRW1- POT STA. 11+10.00

NOTE: ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE LABELED.
NOTE: REMOVE ALL EXISTING 15" RCP AT DRIVEWAYS WITHIN PROJECT LIMITS.
INSTALL PROPOSED 15" RCP WHERE NOTED.

BP11-R020
EC-05/CONST.04

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN
ENGINEER

PAVEMENT DESIGN
ENGINEER

PREPARED BY

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SIGNING PLAN
YADKIN COUNTY

LOCATION: REPLACE BRIDGE NO. 980147 ON SR 1581 (DAL ROAD) OVER UT OF LOGAN CREEK

SUMMARY OF QUANTITIES

ITEM NO.		ITEM DESCRIPTION	QUANTITY	UNIT
DESC. NO.	SECT. NO.			
4155000000	903	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	4	EA.

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E', AND 'F' SIGNS ON U-CHANNEL POSTS

GENERAL NOTES

- SIGNS WILL BE FURNISHED BY CONTRACTOR
- IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
- 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 WITIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
- WHEN EXISTING SIGNS ARE REMOVED AND INSTALLED ON NEW SUPPORTS, THE RE-ERECTION SHALL IMMEDIATELY FOLLOW THE REMOVAL.
- THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
- SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

INDEX

BP11-R020

SIGN | 001

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

SIGNING AND DELINEATION UNIT

6/12/2025

PREPARED BY

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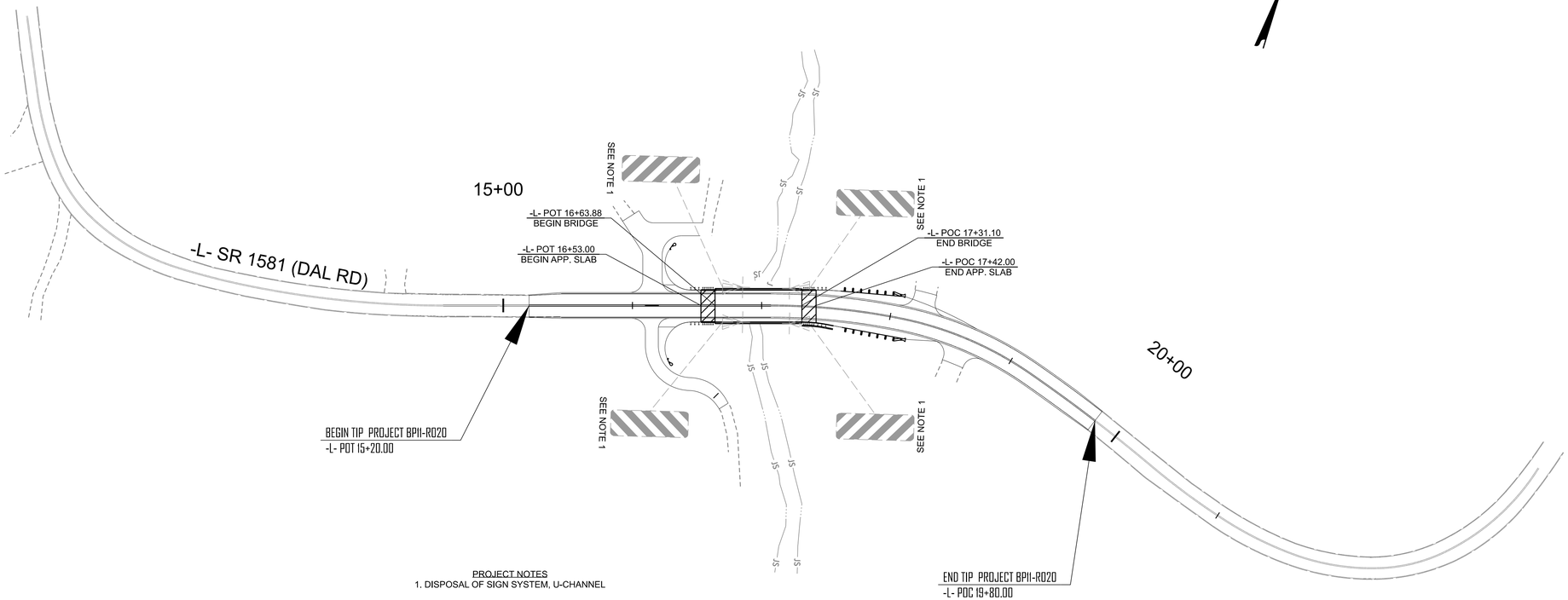
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

SIGNING PLAN
TITLE SHEET

PROJECT: BP11-R020

CONTRACT: DK00451

11/14/23



PROJECT NOTES
1. DISPOSAL OF SIGN SYSTEM, U-CHANNEL

BP11-R020

SIGN	002

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

SIGNING AND DELINEATION UNIT

NORTH CAROLINA PROFESSIONAL SEAL 031533 ENGINEER JOHN G. TOWNSEND
6/12/2025

PREPARED BY

VHB Engineering NC, P.C. (C-3705)
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Raleigh, NC 27606

EXISTING AND PROPOSED SIGNS

PROJECT: BP11-R020

5/26/20

BP11-R020
4R01 | X-001

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT

PREPARED BY

vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CROSS SECTION INDEX SHEET

CHAIN	STATION	STATION	SHEET NO.
-L-	15+20.00	19+80.00	X-002 THRU X-006
-DRW1-	10+25.00	10+66.00	X-007

Note: Quantities are approximate only. The Resident Engineer will use methods including but not limited to recross-sectioning, truck measurements, and aerial surveys to compute final quantities which the contractor will be paid.

5/26/20

BP11-R020
4RD1 | X-001A
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
YADKIN COUNTY

ROADWAY DESIGN UNIT
PREPARED BY
vhb
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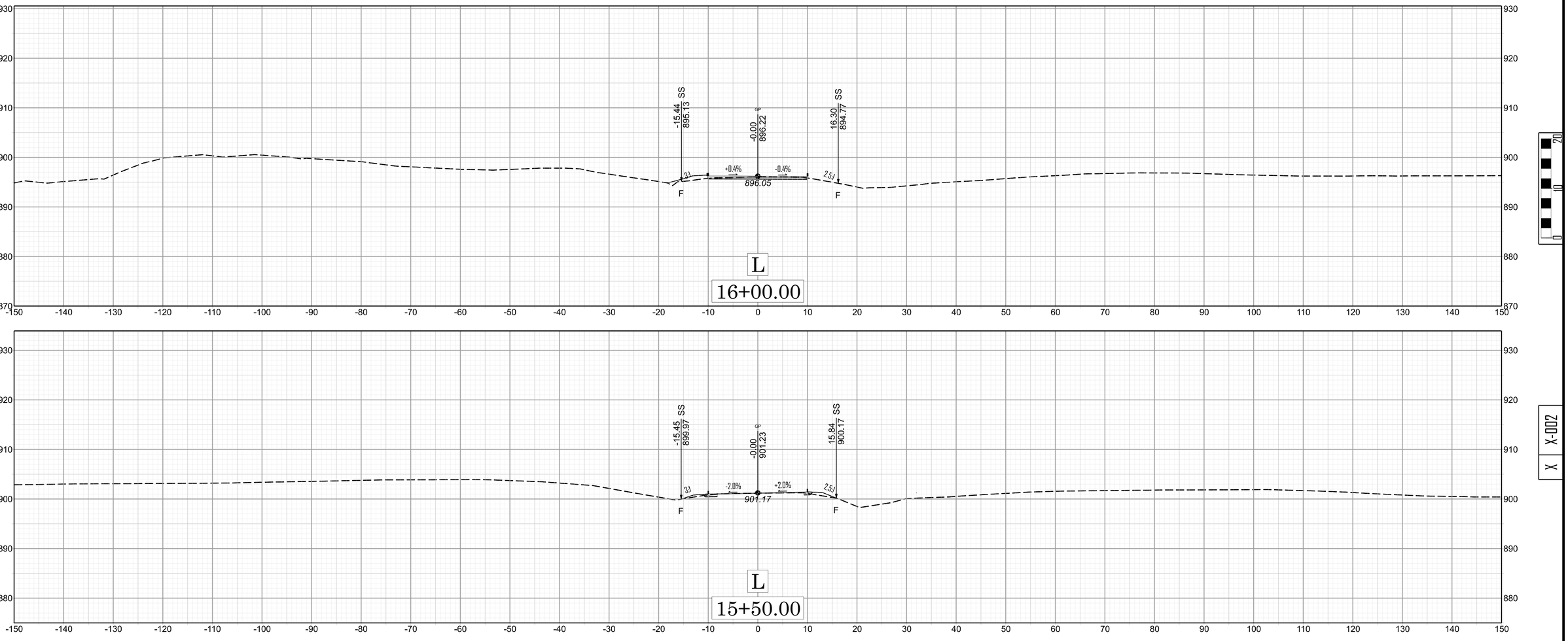
Raleigh, NC 27606

CROSS SECTION SUMMARY

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

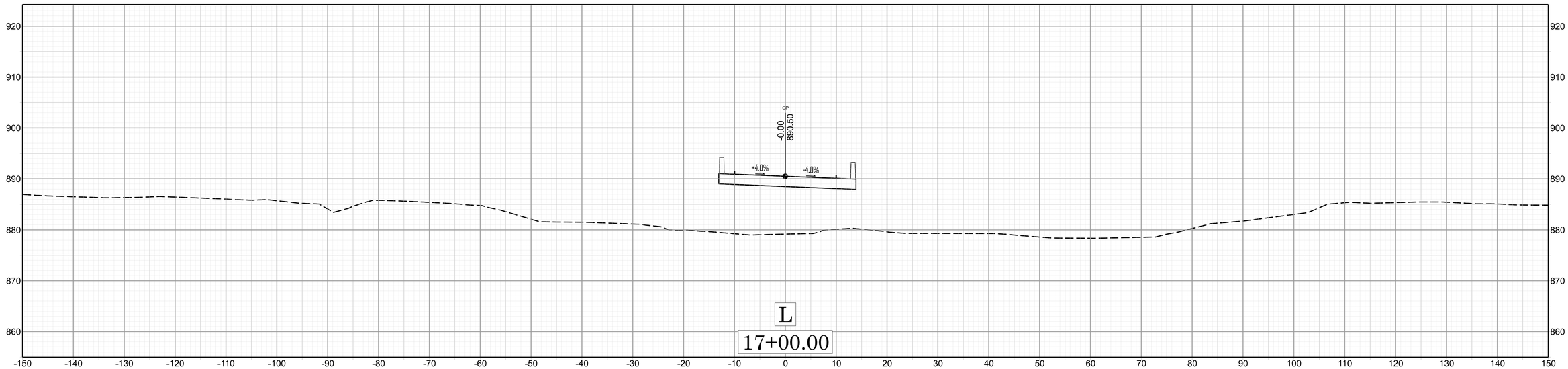
Station -L-	Uncl. Exc. (cu.yd.)	Embt. (cu. yd.)
15+20.00	0	0
15+50.00	3	2
16+00.00	8	3
16+50.00	7	19
16+63.88	0	5
Station -L-	**Uncl. Exc. (cu.yd.)**	**Embt. (cu. yd.)**
17+31.10	0	0
17+50.00	1	17
18+00.00	1	60
18+50.00	0	24
19+00.00	0	18
19+50.00	1	14
19+80.00	2	3
Station -DRW1-	**Uncl. Exc. (cu.yd.)**	**Embt. (cu. yd.)**
10+10.00	0	0
10+50.00	60	2
11+00.00	88	0
11+10.00	4	0

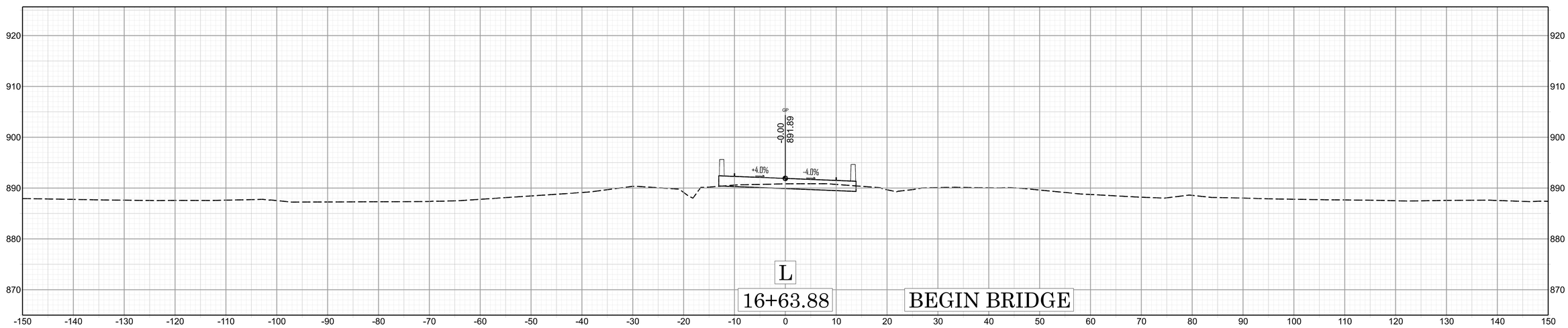
Note: Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the contract lump sum price for Grading."

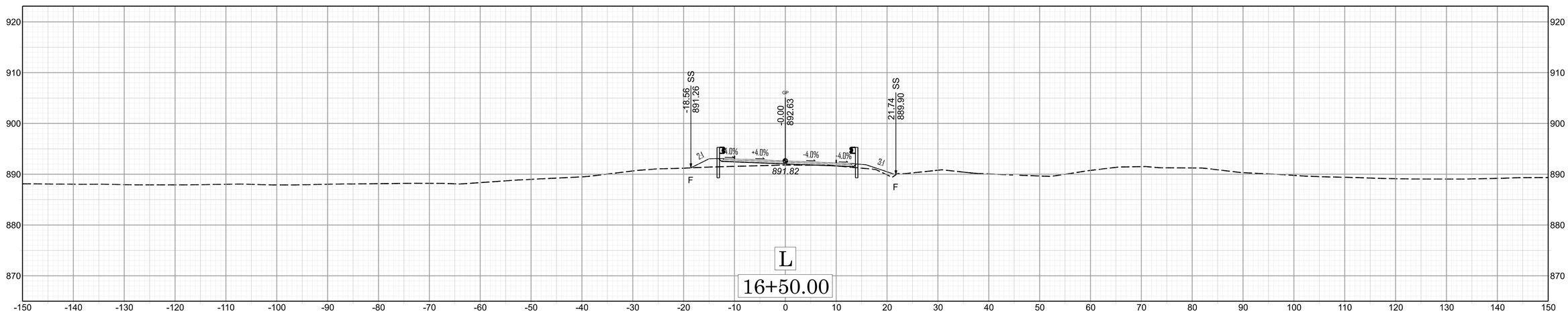


X-002

BPII-R020





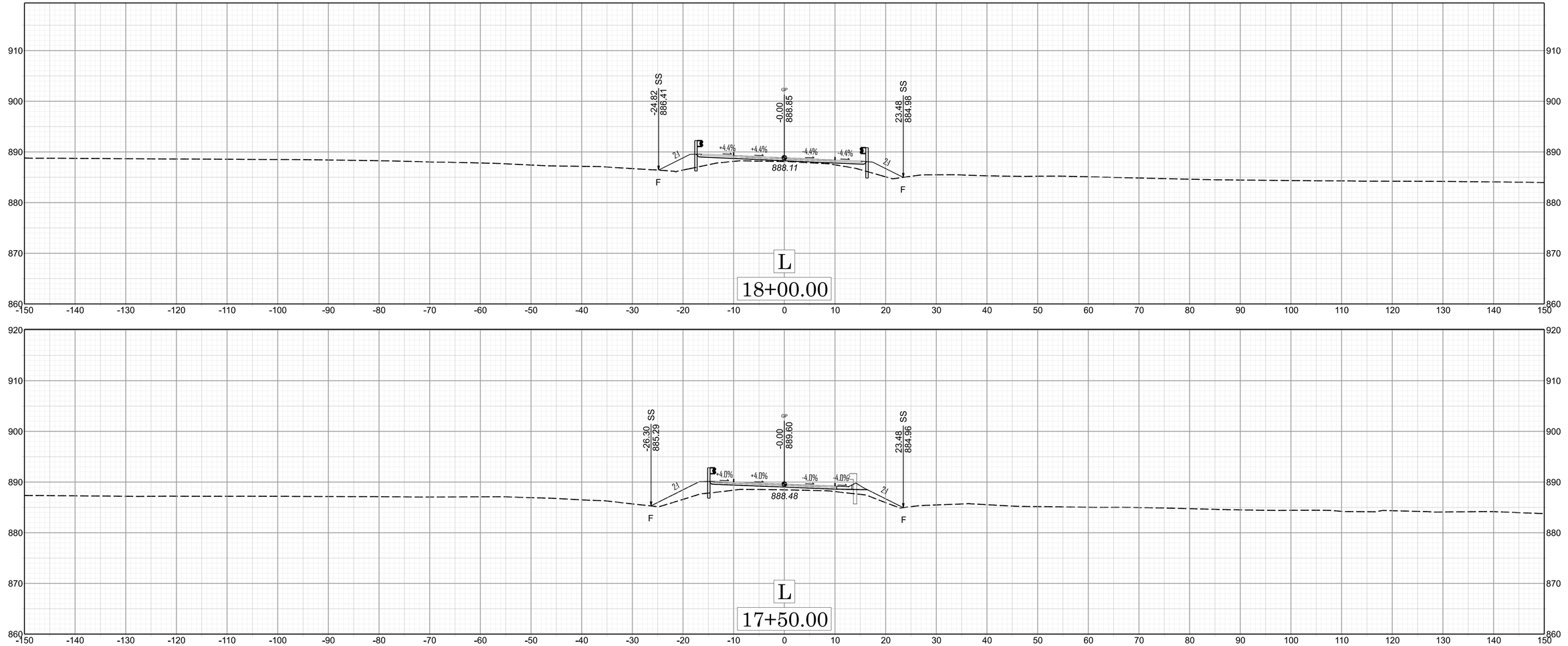


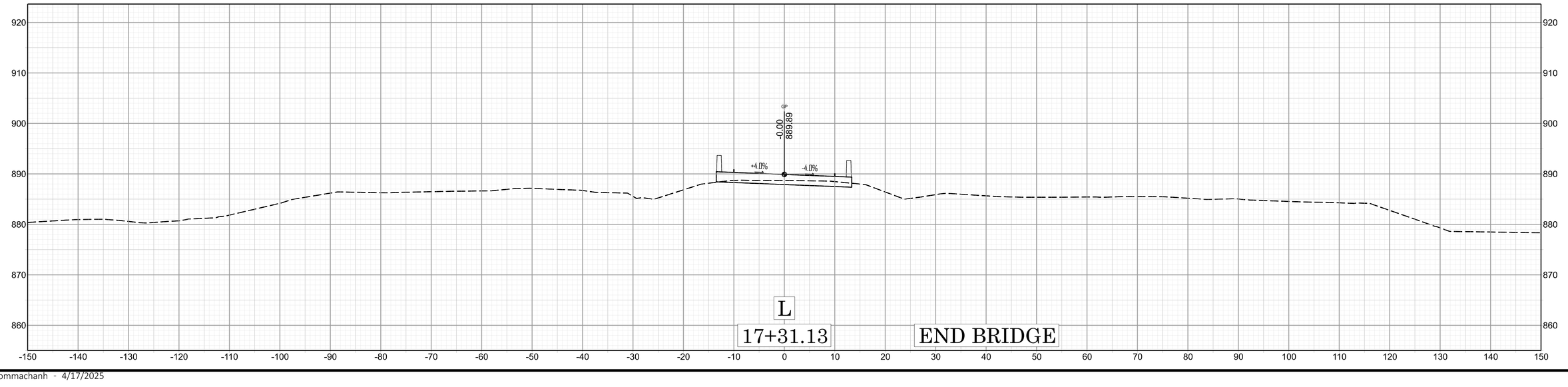
0 10 20

X

X-003

BPH-RD20





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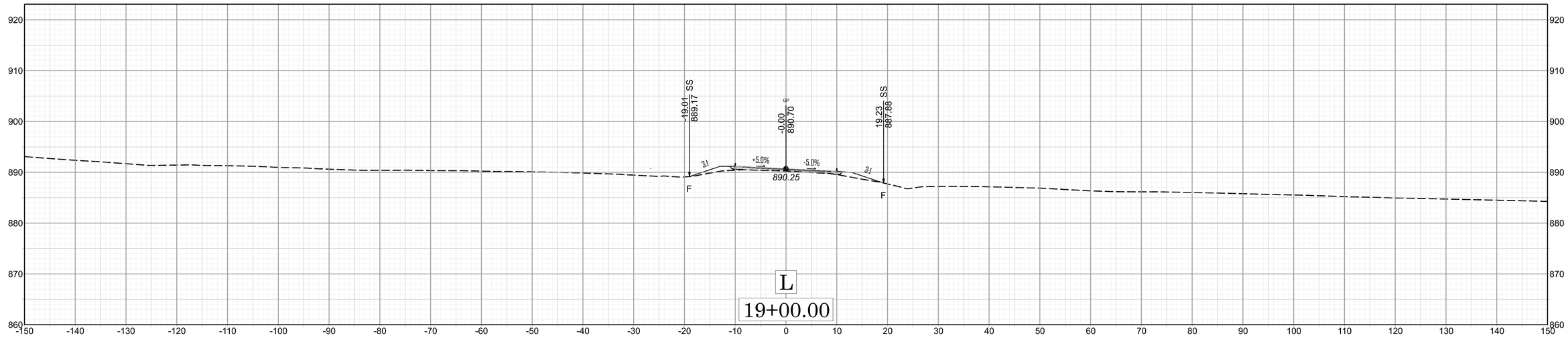
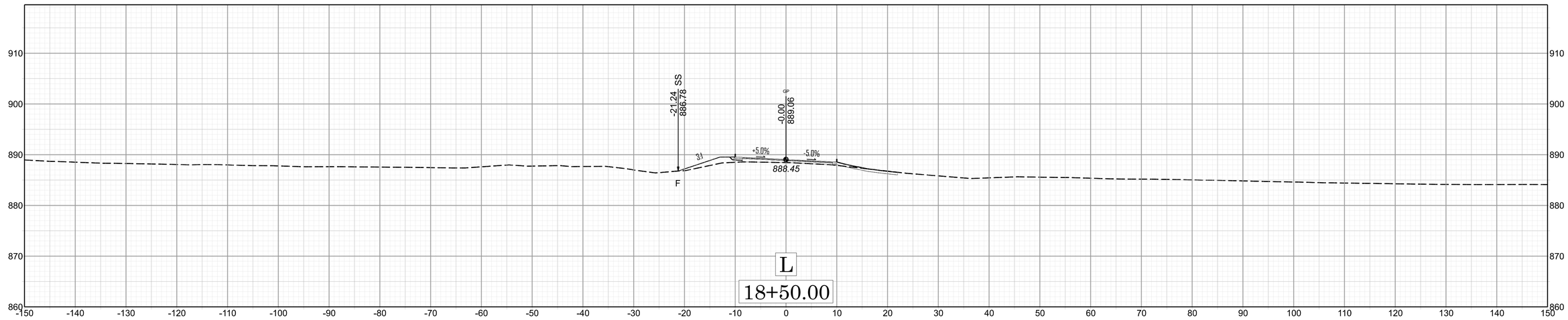
BPII-RD20

VHB/lphommachanh - 4/17/2025





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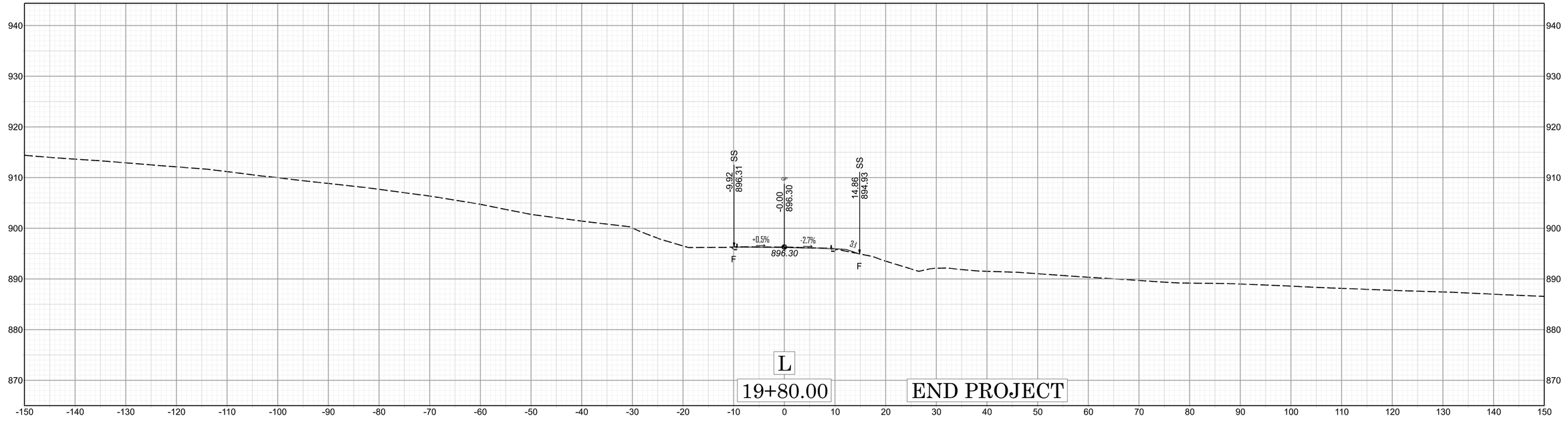
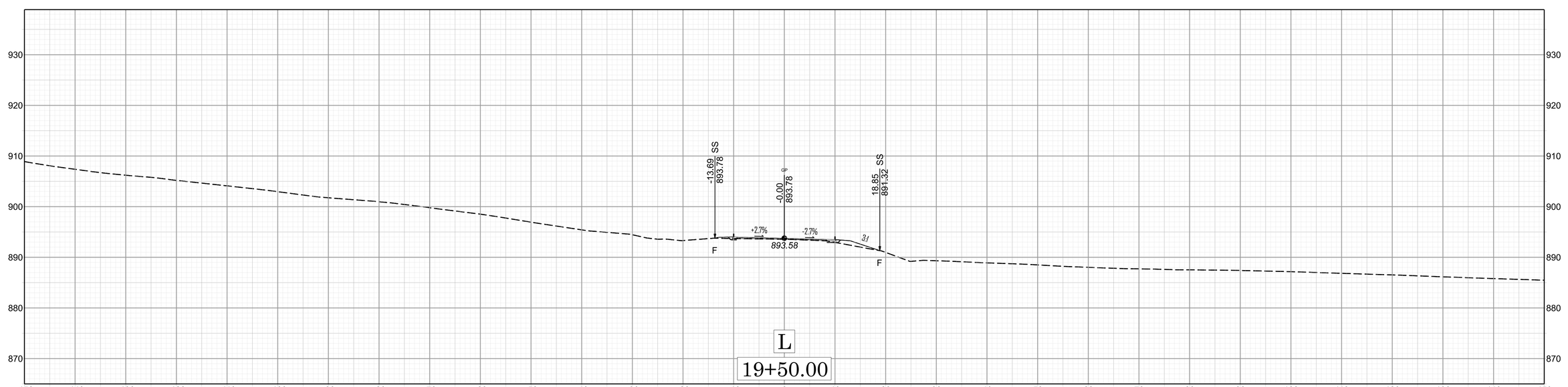
X

X-005

BPII-R020





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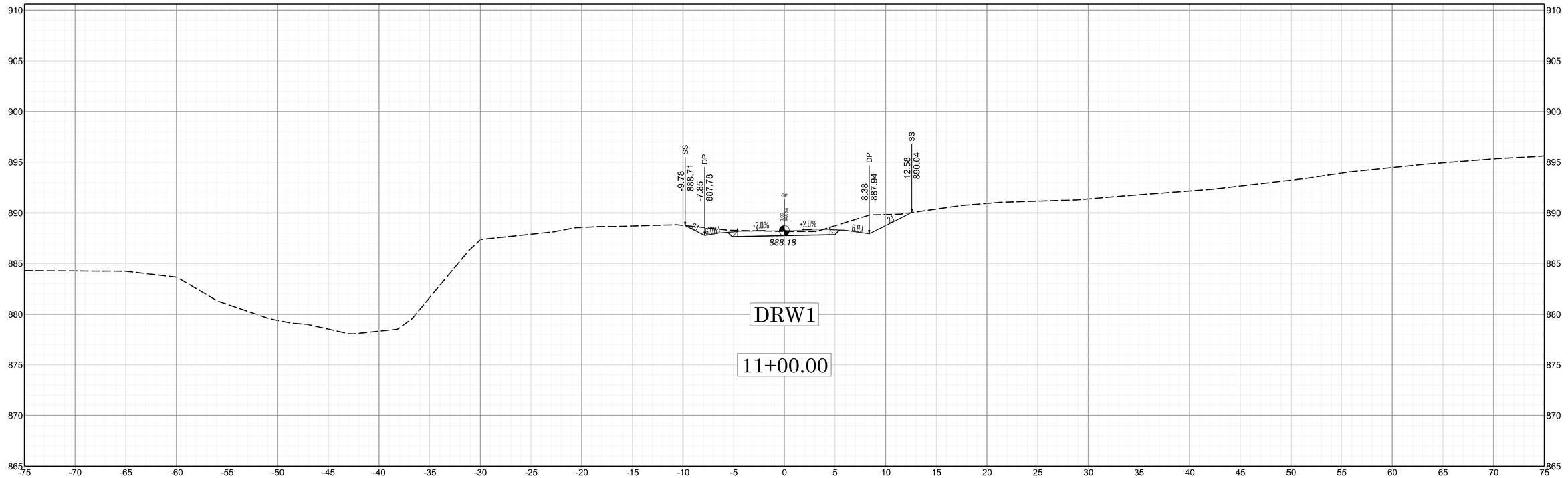
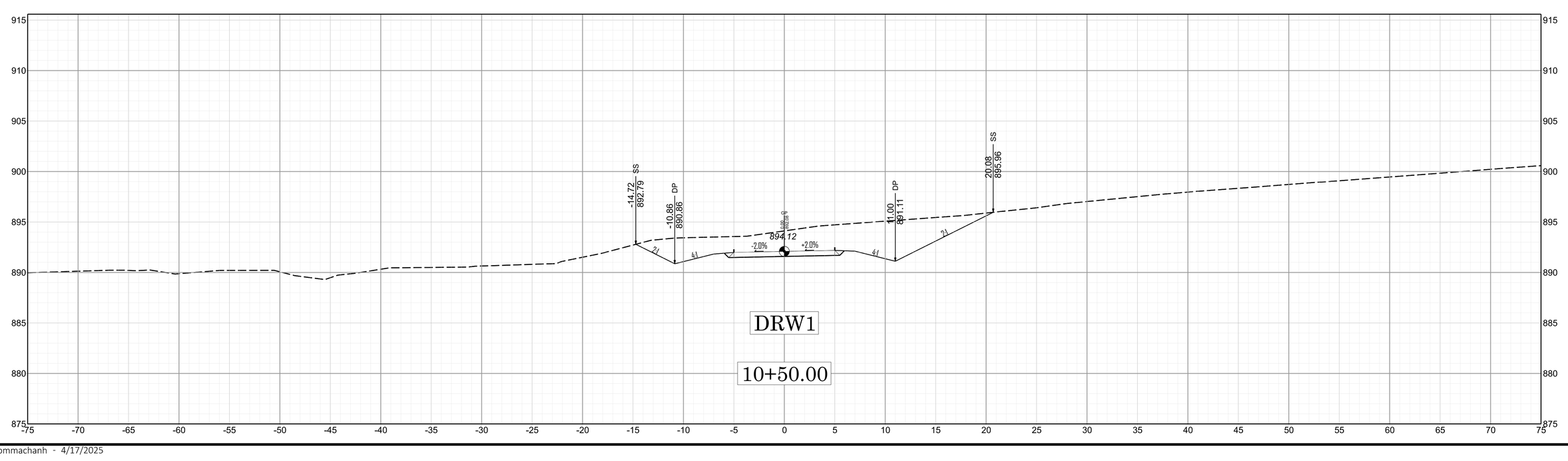
X-006

BPH-R020

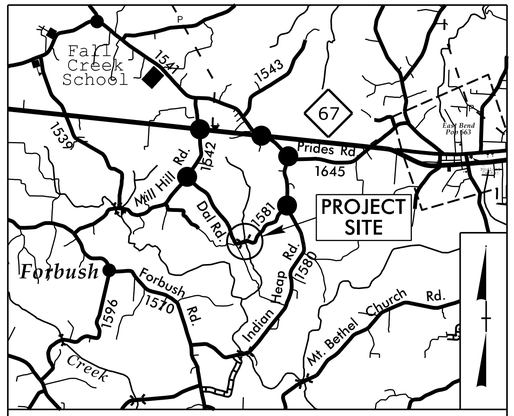




X 007

BPH-RD20

TIP PROJECT: BP11.R020



VICINITY MAP

DETOUR ROUTE *NOT TO SCALE*

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

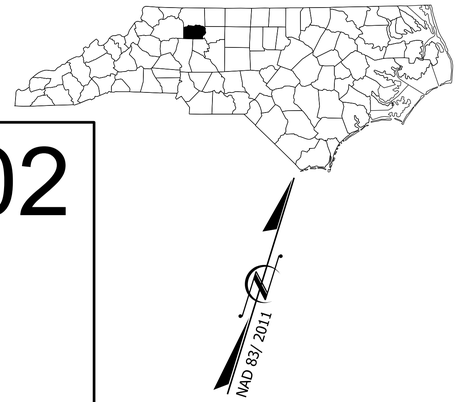
UTILITIES BY OTHERS PLANS
YADKIN COUNTY

LOCATION: REPLACE BRIDGE NO. 980147 ON SR 1581 (DAL ROAD) OVER UT OF LOGAN CREEK

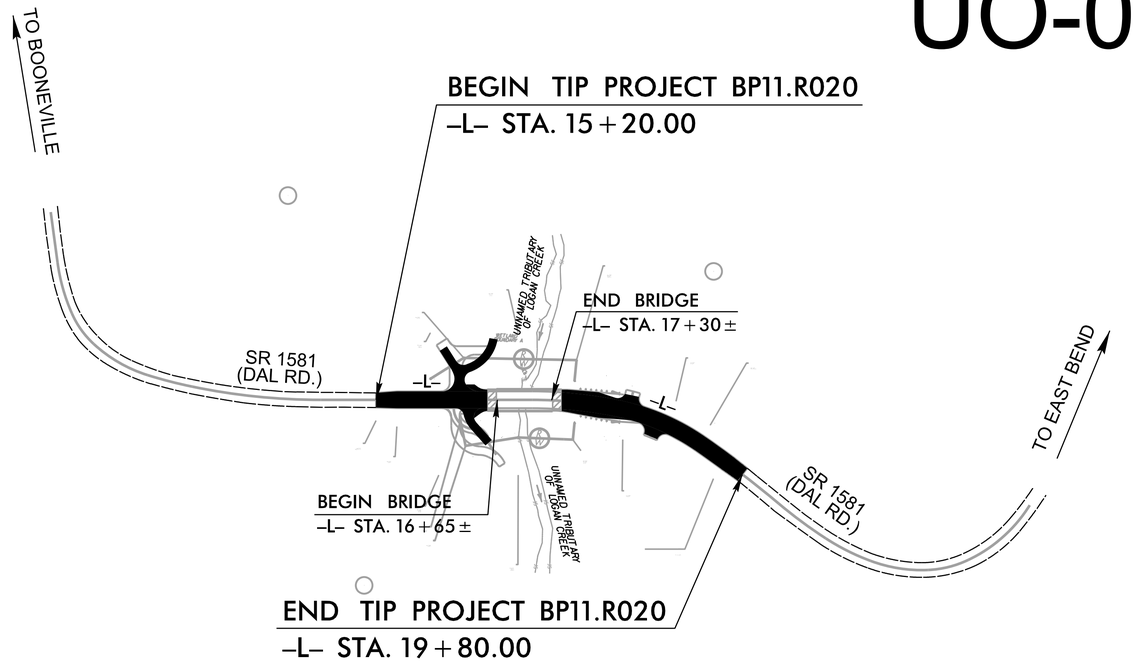
TYPE OF WORK: POWER (DISTRIBUTION) & COMMUNICATIONS

T.I.P. NO.	SHEET NO.
BP11.R020	UO–1

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.



UO-02



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

UTILITY OWNERS WITH CONFLICTS

(A) POWER DISTRIBUTION–SURRY YADKIN ELECTRIC
(B) COMMUNICATIONS–ZIRRUS

PREPARED IN THE OFFICE OF:

SAM™
2641 SUMNER BOULEVARD
SUITE 116
RALEIGH, NC 27616
(919) 878-7466

PATRICK JONES *UTILITY PROJECT MANAGER*
WILLIAM PACE *PROJECT UTILITY COORDINATOR*

DIVISION OF HIGHWAYS
DIVISION 11
801 STATESVILLE RD
NORTH WILKESBORO, 28659

BRANDON GREER *DIVISION UTILITY ENGINEER*
ROB WEISZ, PE *DIVISION BRIDGE PROGRAM MANAGER*

10/9/2024
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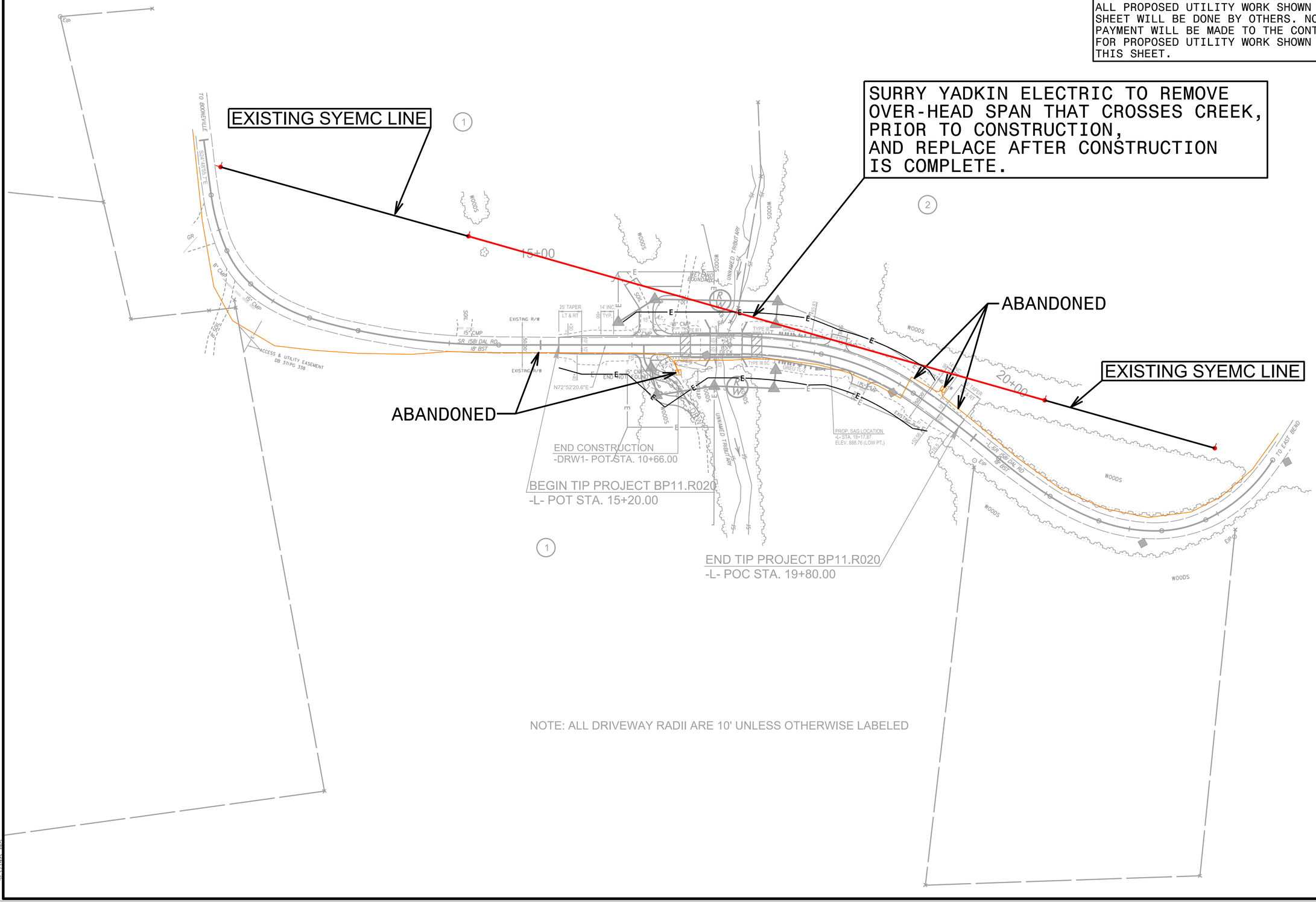
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
BP11.R020	U0-02
THIS SHEET CORRESPONDS TO RDY-	4

UTILITIES BY OTHERS

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



10/8/2015
BP11.R020_RDY_ut_ueput.dgn
9:37:40 AM

09/08/99

TIP PROJECT: BP11–R020

CONTRACT: TBD

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

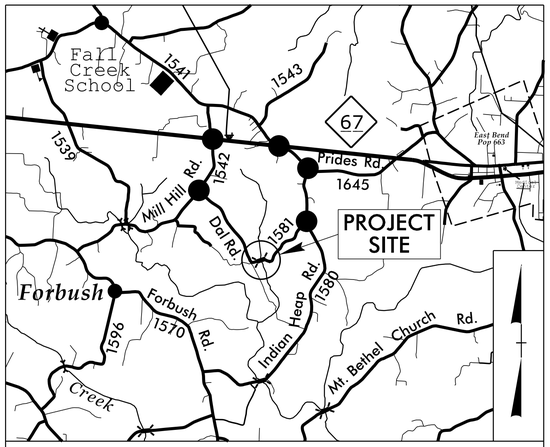
YADKIN COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP11–R020	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP11.R020.1		PE
BP11.R020.2		ROW/UTIL
BP11.R020.3		CONST.

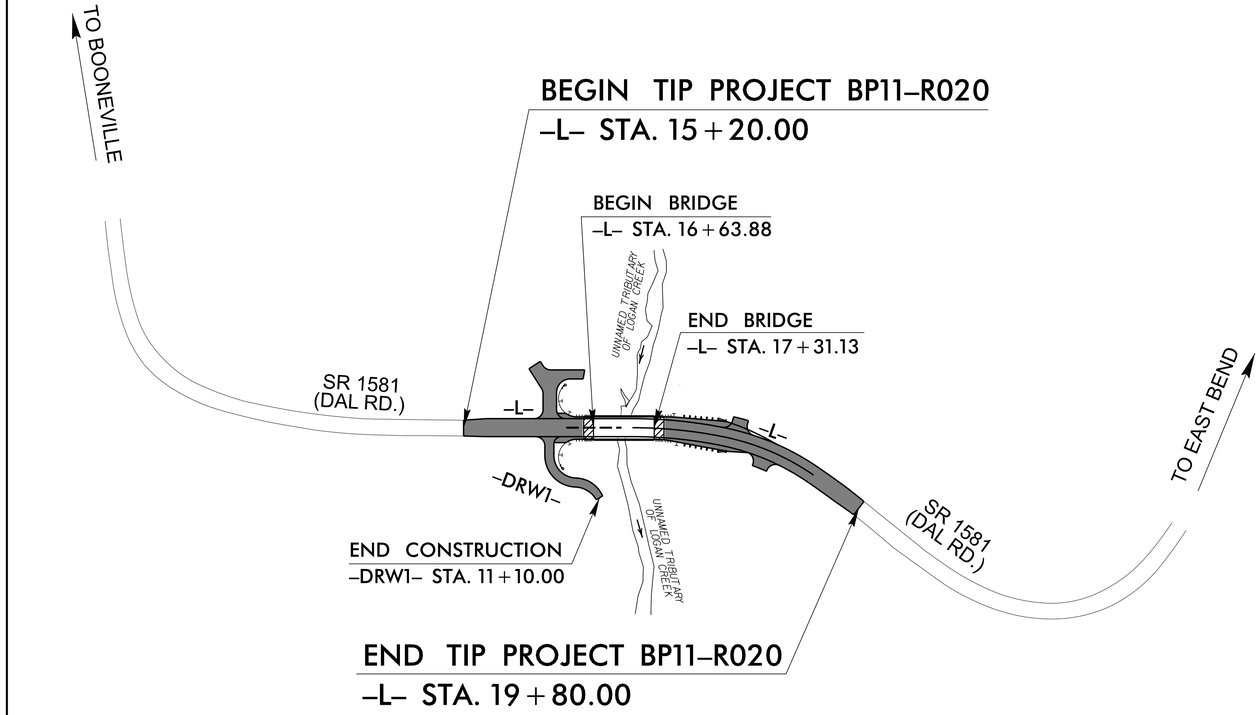
LOCATION: *REPLACE BRIDGE NO. 980147 ON SR 1581 (DAL ROAD) OVER UT OF LOGAN CREEK*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, AND STRUCTURES*



VICINITY MAP

DETOUR ROUTE ***NOT TO SCALE***



STRUCTURES

DESIGN DATA

ADT 2025 = 105
ADT 2045 = 160
K = 10 %
D = 50 %
T = 6 % *
V = 50 MPH
* TTST = 2% DUAL 4%
FUNC CLASS = LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT BP11–R020 = 0.074 MILES
LENGTH OF STRUCTURE TIP PROJECT BP11–R020 = 0.013 MILES
TOTAL LENGTH OF TIP PROJECT BP11–R020 = 0.087 MILES

Prepared for the North Carolina Department of Transportation in the Office of:

vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 19, 2023

LETTING DATE: SEPTEMBER 23, 2025

ELIZABETH PHELPS, PE
PROJECT ENGINEER

NCDOT CONTACT: RACHEL EVANS, PE
DIVISION PROJECT ENGINEER

STRUCTURES ENGINEER

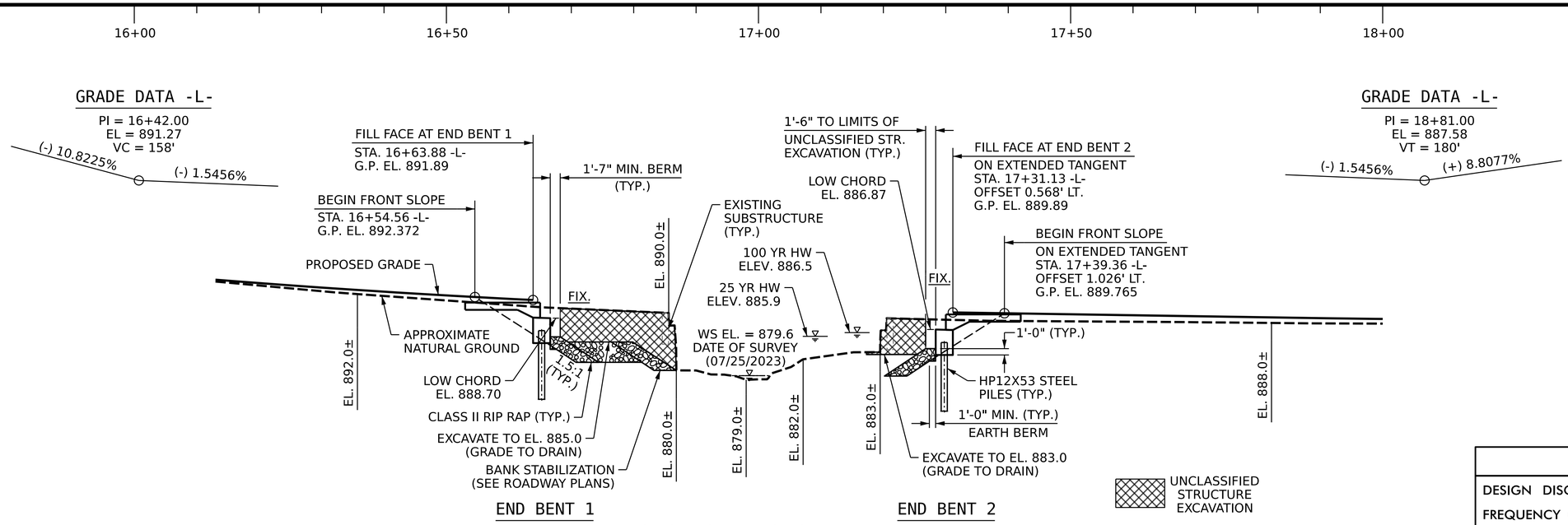
NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS
DocuSigned by: Elizabeth Phelps A304598A0627455...
6/9/2025

SIGNATURE: *P.E.*

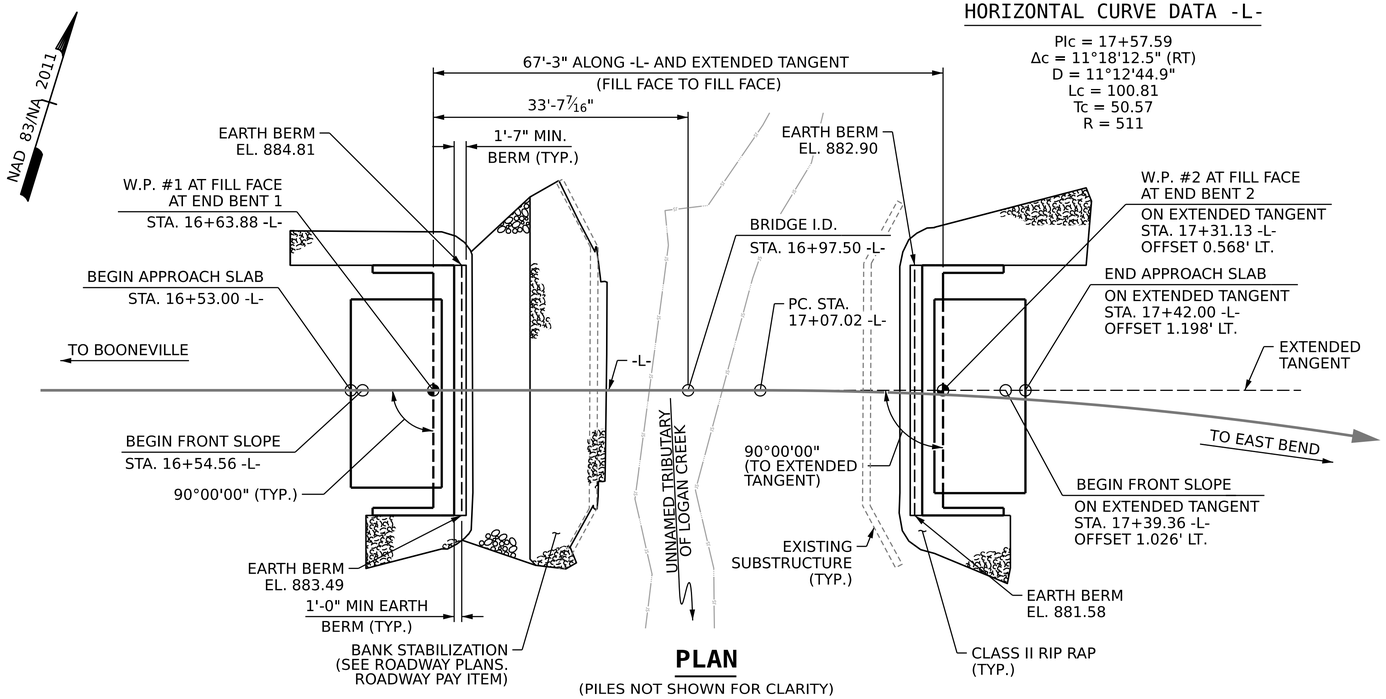
DEPARTMENT OF TRANSPORTATION • STATE OF NORTH CAROLINA •

8/26/21

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



SECTION ALONG -L-



PLAN

(PILES NOT SHOWN FOR CLARITY)

HYDRAULIC DATA

DESIGN DISCHARGE	= 550 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 885.9 FT
DRAINAGE AREA	= 1.03 SQ. MI.
BASIC DISCHARGE (Q100)	= 800 C.F.S.
BASIC HIGH WATER ELEVATION	= 886.5 FT

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 2,200 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 889.3 FT*

*OVERTOPPING LOCATION A STA. 18+18 –L–

WS EL. Taken @ River Station 4218

PROJECT NO. BP11-R020

YADKIN COUNTY

STATION: 16+97.50 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 980147

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER
UNNAMED TRIBUTARY OF LOGAN CREEK
ON SR 1581 (DAL RD)
BETWEEN SR 1542 (MILL HILL RD)
AND SR 1580 (INDIAN HEAP RD)

NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS

DocuSigned by: Elizabeth Phelps A304598A0627455... 6/9/2025

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

vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DRAWN BY : D.M. SAULS DATE : 04/2025
CHECKED BY : E.C. PHELPS DATE : 04/2025
DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

6/9/2025
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ephelps

8/26/21

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent No. 1, Piles 1-5	90		35			150							
End Bent No. 2, Piles 1-5	90		35			150							

*Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

$$^{**}RDR = \frac{Factored\ Resistance + Factored\ Downdrag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Downdrag\ Resistance + \frac{Nominal\ Scour\ Resistance}{Scour\ Resistance\ Factor}$$

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent No. 1, Piles 1-5	90			0.60			
End Bent No. 2, Piles 1-5	90			0.60			

*Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF DPT/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing (DPT)				Pile Order Lengths	
End Bent/ Bent No	DPT Testing Required? YES or MAYBE	DPT Test Pile Length FT	Total DPT Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA

*EST = Pile order lengths from estimated pile lengths; DPT = Pile order lengths based on DPT testing. For groups of end bents/bents with pile order lengths based on DPT testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the DPT.

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
End Bent No. 1, Piles 1-5				YES	
End Bent No. 2, Piles 1-5				YES	
TOTAL QTY:				10	

NOTES:

1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (W. Scott Hunsberger, 36283) on 05-08-2024.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for DPT Testing when these items may be required.

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NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C PHELPS

DocuSigned by: Elizabeth Phelps 6/9/2025
A304598A0627455...

DRAWN BY : D.M. SAULS DATE : 04/2025
CHECKED BY : E.C. PHELPS DATE : 04/2025
DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

6/5/2025
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PROJECT NO. BP11-R020
YADKIN COUNTY
STATION: 16+97.50 -L-

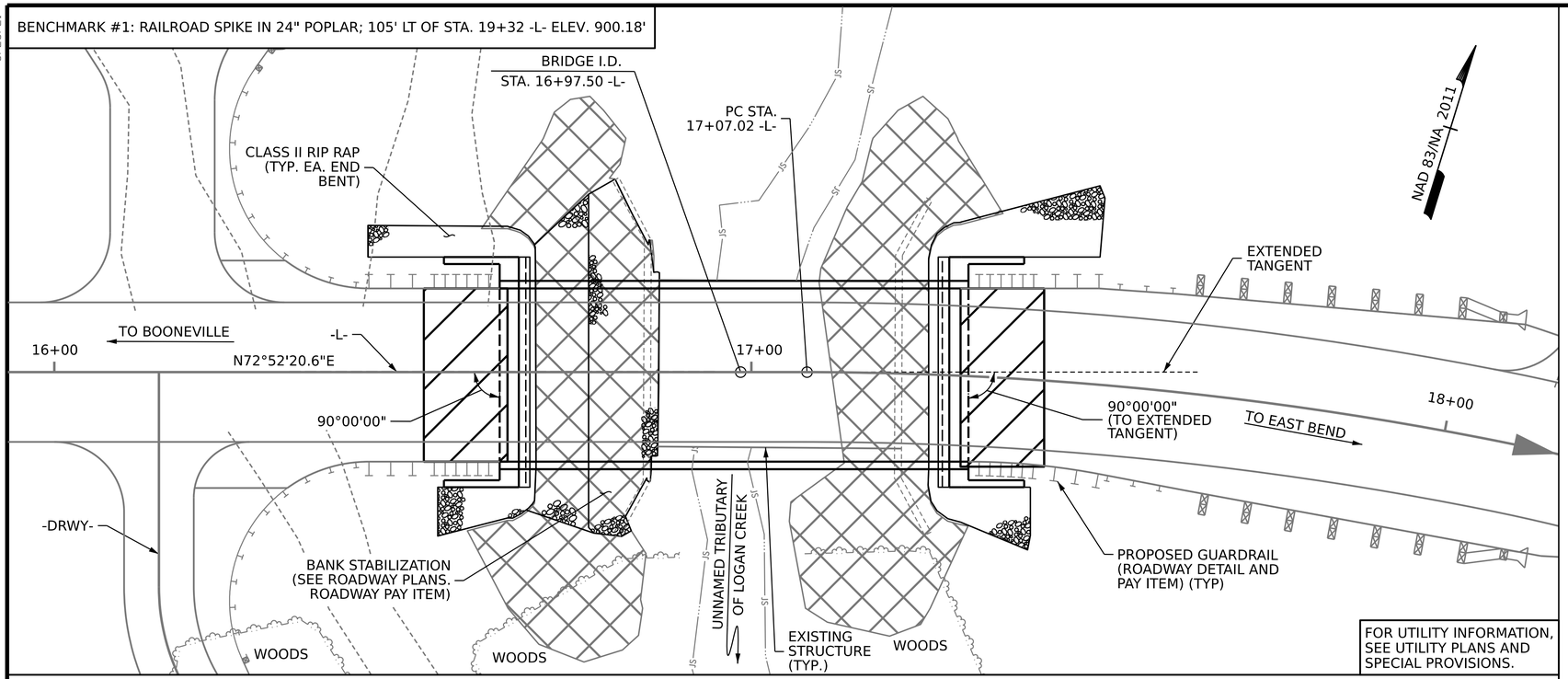
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE FOUNDATION TABLES

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

8/26/21



- LOCATION SKETCH -

NOTES

1. ASSUME LIVE LOAD = HL-93 OR ALTERNATE LOADING.
2. THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
3. BRIDGE IS LOCATED IN SEISMIC ZONE 1.
4. FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
5. FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
6. 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 THE DIFFERENCE BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
7. 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 BRIDGE IN ACCORDANCE TO ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
8. THE EXISTING STRUCTURE #980147 CONSISTING OF ONE (1) STEEL GIRDER SPAN @ 35'-6", WITH A CLEAR ROADWAY WIDTH OF 24'-1", WITH AN ASPHALT WEARING SURFACE AND STEEL PLANK DECK, WITH SUBSTRUCTURES CONSISTING OF TIMBER CAPS ON TIMBER PILES LOCATED AT THE PROPOSED BRIDGE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR A 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.
9. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
10. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
11. FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
12. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
13. THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES."
14. 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."
15. THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 40 FT ± (LEFT) AND 41 FT ± (RIGHT) AT END BENT No. 1 AND 40 FT ± (LEFT) AND 38 FT ± (RIGHT) AT END BENT No. 2 OF THE CENTERLINE ROADWAY 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.
16. ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
17. FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS	
	LUMP SUM	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YD.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE					LUMP SUM						130.25			LUMP SUM	9	585
END BENT NO.1			LUMP SUM	19.3		2302	5	5	175	5		125	140			
END BENT NO.2			LUMP SUM	19.3		2299	5	5	175	5		45	50			
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	38.6	LUMP SUM	4601	10	10	350	10	130.25	170	190	LUMP SUM	9	585

FOUNDATION NOTES

1. FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

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Raleigh, NC 27606

NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C PHELPS
DocuSigned by: Elizabeth Phelps 6/9/2025
A304598A0627455...

PROJECT NO. BP11-R020
YADKIN COUNTY
STATION: 16+97.50 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER
UNNAMED TRIBUTARY OF LOGAN CREEK
ON SR 1581 (DAL RD)
BETWEEN SR 1542 (MILL HILL RD)
AND SR 1580 (INDIAN HEAP RD)

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

DRAWN BY : D.M. SAULS DATE : 04/2025
CHECKED BY : E.C. PHELPS DATE : 04/2025
DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

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ephelps

8/26/21

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

LOAD TYPE		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
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ LL)	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)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.018	--	1.75	0.274	1.05	65'	EL	32	0.513	1.20	65'	EL	6.4	0.80	0.274	1.02	65'	EL	32	
		HL-93 (OPERATING)	N/A		1.358	--	1.35	0.274	1.36	65'	EL	32	0.513	1.56	65'	EL	6.4	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.306	47.014	1.75	0.274	1.34	65'	EL	32	0.513	1.48	65'	EL	6.4	0.80	0.274	1.31	65'	EL	32	
		HS-20 (OPERATING)	36.000		1.742	62.706	1.35	0.274	1.74	65'	EL	32	0.513	1.92	65'	EL	6.4	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		2.868	38.725	1.4	0.274	3.69	65'	EL	32	0.513	4.33	65'	EL	6.4	0.80	0.274	2.87	65'	EL	32	
		SNGARBS2	20.000		2.171	43.424	1.4	0.274	2.79	65'	EL	32	0.513	3.11	65'	EL	6.4	0.80	0.274	2.17	65'	EL	32	
		SNAGRIS2	22.000		2.071	45.552	1.4	0.274	2.66	65'	EL	32	0.513	2.89	65'	EL	6.4	0.80	0.274	2.07	65'	EL	32	
		SNCOTTS3	27.250		1.428	38.924	1.4	0.274	1.84	65'	EL	32	0.513	2.17	65'	EL	6.4	0.80	0.274	1.43	65'	EL	32	
		SNAGGRS4	34.925		1.206	42.136	1.4	0.274	1.55	65'	EL	32	0.513	1.81	65'	EL	6.4	0.80	0.274	1.21	65'	EL	32	
		SNS5A	35.550		1.179	41.911	1.4	0.274	1.52	65'	EL	32	0.513	1.85	65'	EL	6.4	0.80	0.274	1.18	65'	EL	32	
		SNS6A	39.950		1.087	43.43	1.4	0.274	1.40	65'	EL	32	0.513	1.69	65'	EL	6.4	0.80	0.274	1.09	65'	EL	32	
		SNS7B	42.000		1.035	43.489	1.4	0.274	1.33	65'	EL	32	0.513	1.67	65'	EL	6.4	0.80	0.274	1.04	65'	EL	32	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.327	43.80	1.4	0.274	1.71	65'	EL	32	0.513	2.01	65'	EL	6.4	0.80	0.274	1.33	65'	EL	32	
		TNT4A	33.075		1.335	44.142	1.4	0.274	1.72	65'	EL	32	0.513	1.95	65'	EL	6.4	0.80	0.274	1.33	65'	EL	32	
		TNT6A	41.600		1.096	45.613	1.4	0.274	1.41	65'	EL	32	0.513	1.80	65'	EL	6.4	0.80	0.274	1.10	65'	EL	32	
		TNT7A	42.000		1.105	46.40	1.4	0.274	1.42	65'	EL	32	0.513	1.74	65'	EL	6.4	0.80	0.274	1.10	65'	EL	32	
		TNT7B	42.000		1.150	48.298	1.4	0.274	1.48	65'	EL	32	0.513	1.62	65'	EL	6.4	0.80	0.274	1.15	65'	EL	32	
		TNAGRIT4	43.000		1.089	46.815	1.4	0.274	1.40	65'	EL	32	0.513	1.57	65'	EL	6.4	0.80	0.274	1.09	65'	EL	32	
		TNAGT5A	45.000		1.024	46.084	1.4	0.274	1.32	65'	EL	32	0.513	1.57	65'	EL	6.4	0.80	0.274	1.02	65'	EL	32	
		TNAGT5B	45.000	3	1.010	45.431	1.4	0.274	1.30	65'	EL	32	0.513	1.49	65'	EL	6.4	0.80	0.274	1.01	65'	EL	32	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.700	48.880	1.3	0.274	2.12	65'	EL	32	0.513	2.33	65'	EL	6.4	0.80	0.274	1.70	65'	EL	32	
		EV3	43.000	4	1.109	47.706	1.3	0.274	1.38	65'	EL	32	0.513	1.57	65'	EL	6.4	0.80	0.274	1.11	65'	EL	32	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	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.

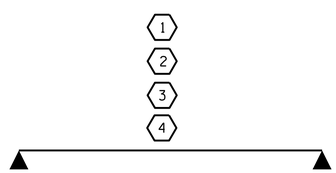
(#) CONTROLLING LOAD RATING

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

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. BP11-R020

YADKIN COUNTY

STATION: 16+97.50 -L-

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS
DocuSigned by: Elizabeth Phelps A304598A0627455... 6/9/2025

DRAWN BY : D.M. SAULS DATE : 04/2025
CHECKED BY : E.C. PHELPS DATE : 04/2025
DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

6/5/2025
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

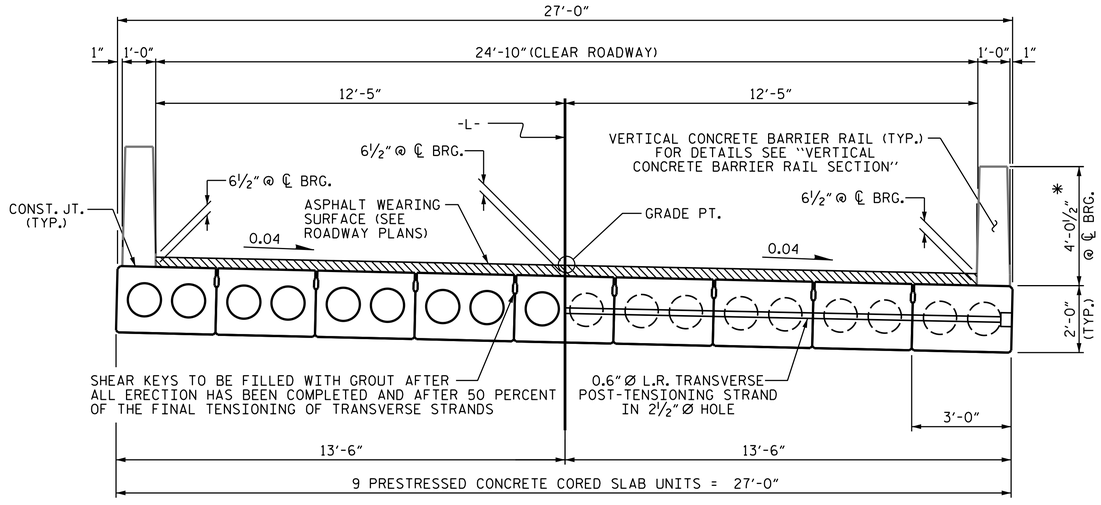
LRFR SUMMARY FOR 65' CORED SLAB UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

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

STD. NO. 24LRFR1_90S_65L

8/26/21

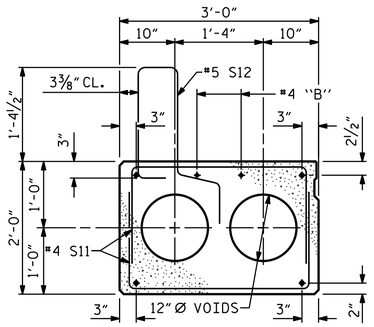


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

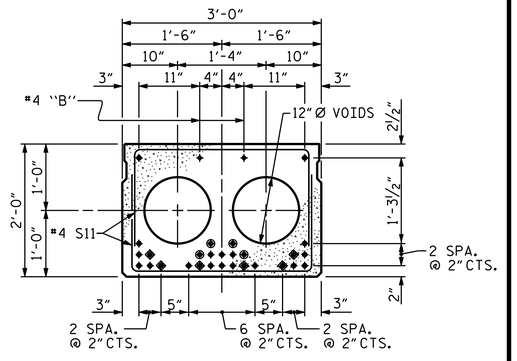
TYPICAL SECTION

* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.



EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



INTERIOR SLAB SECTION (65' UNIT)

(24 STRANDS REQUIRED)

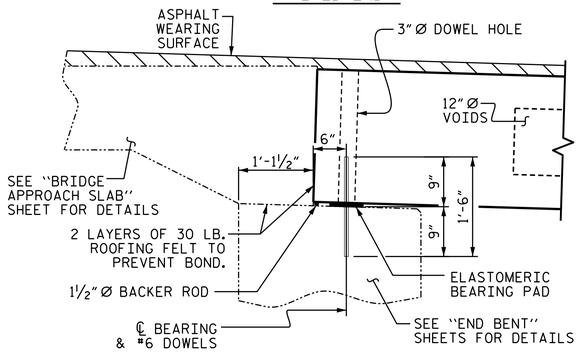
0.6" Ø LOW RELAXATION STRAND LAYOUT

◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

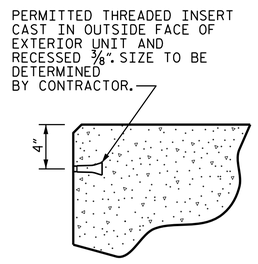
◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

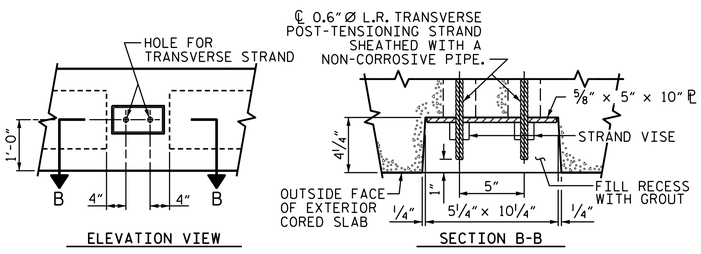
FIXED END



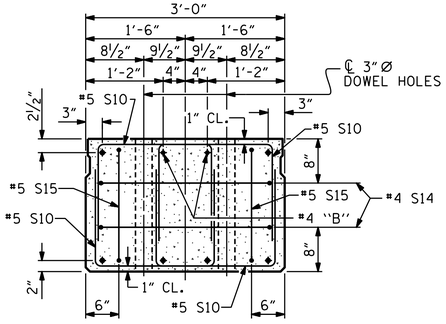
SECTION AT END BENT



THREADED INSERT DETAIL

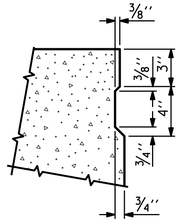


GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS



END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

PROJECT NO. **BP11-R020**

YADKIN COUNTY

STATION: **16+97.50 -L-**

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 048992 ELIZABETH C. PHELPS
DocuSigned by: Elizabeth Phelps A304598A0627455...
6/9/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			15

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VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
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DRAWN BY : D.M. SAULS DATE : 04/2025
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DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

6/9/2025
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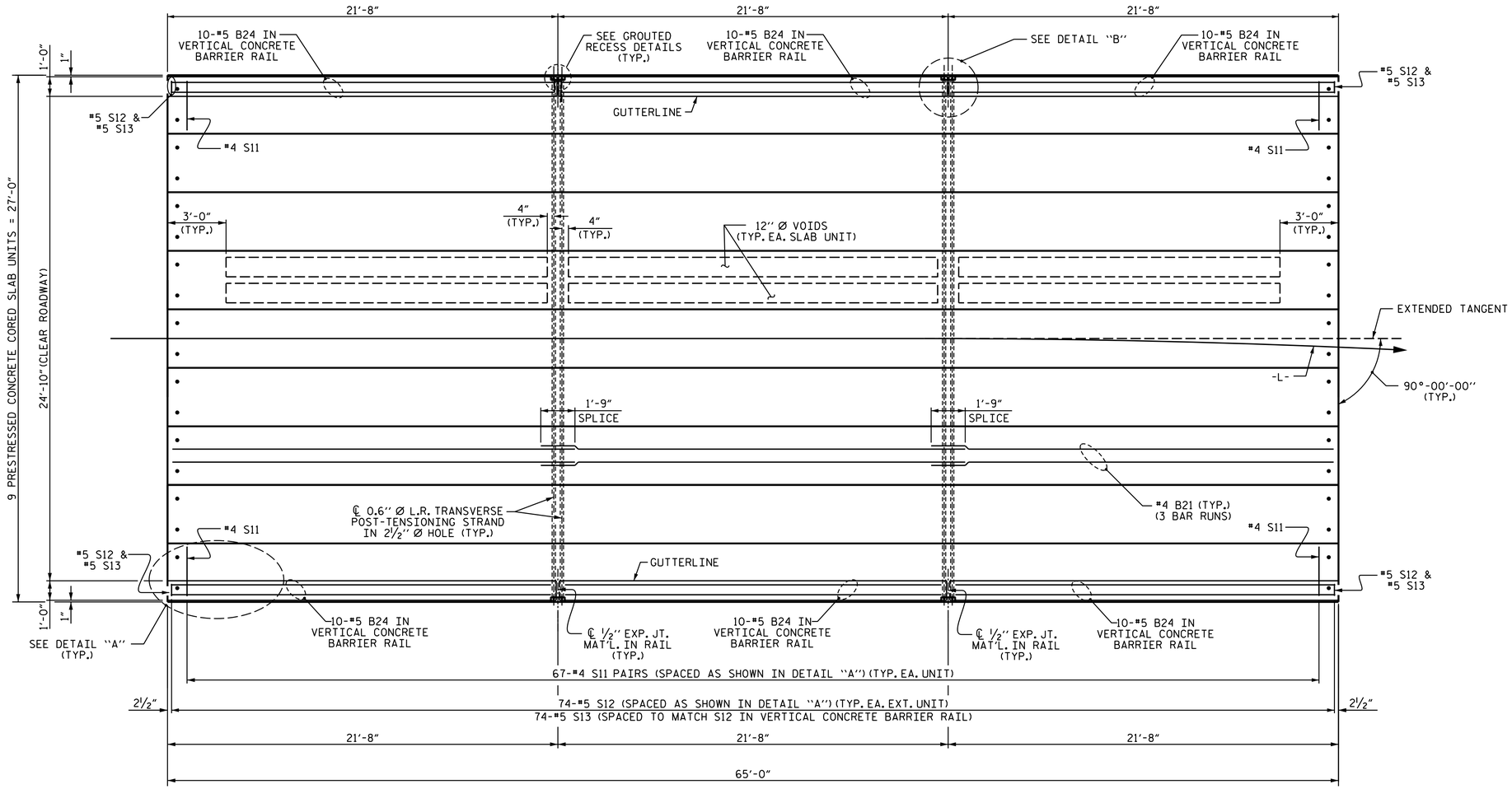
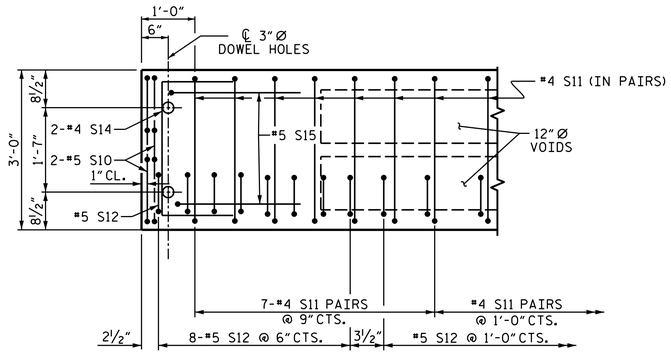
STD. NO. 24PCS4_27_90S

8/26/21

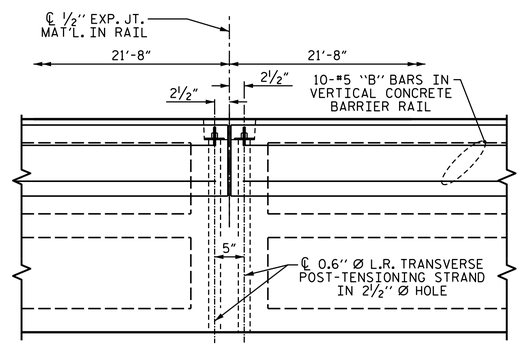


PLAN OF UNIT



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DRAWN BY : D.M. SAULS DATE : 04/2025
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6/5/2025
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NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS
DocuSigned by: Elizabeth Phelps A304598A0627455... 6/9/2025

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PROJECT NO. BP11-R020
YADKIN COUNTY
STATION: 16+97.50 -L-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 65' UNIT 24'-10" CLEAR ROADWAY 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			15

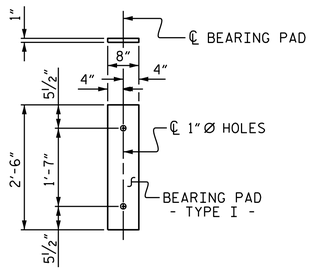
STD. NO. 24PCS_27_90S_65L

8/26/21

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
65' UNIT			
EXTERIOR C.S.	2	65'-0"	130'-0"
INTERIOR C.S.	7	65'-0"	455'-0"
TOTAL	9	-	585'-0"

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
65' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1⅞" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	½" ↓
FINAL CAMBER	1⅜" ↑

** INCLUDES FUTURE WEARING SURFACE



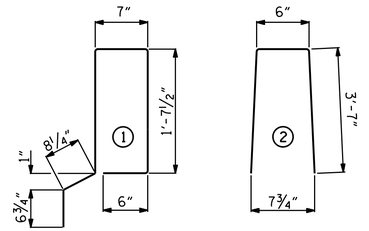
FIXED END
(TYPE I - 18 REQ'D)

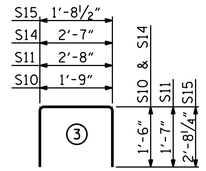
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

BILL OF MATERIAL FOR ONE 65' CORED SLAB UNIT							
				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B21	6	#4	STR	22'-10"	92	22'-10"	92
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	134	#4	3	5'-10"	522	5'-10"	522
✳S12	74	#5	1	5'-7"	431		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		699		699
✳EPOXY COATED REINFORCING STEEL			LBS.		431		
6000 P.S.I. CONCRETE			CU. YDS.		11.0		11.0
0.6" Ø L.R. STRANDS			No.		24		24

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

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 CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 3" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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. A 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.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

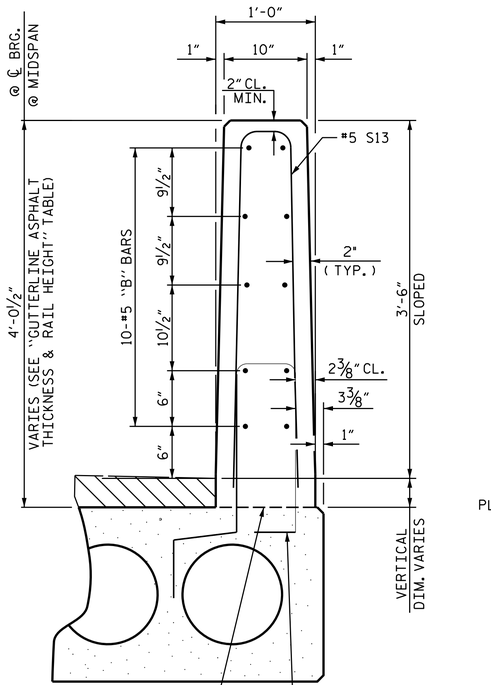
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

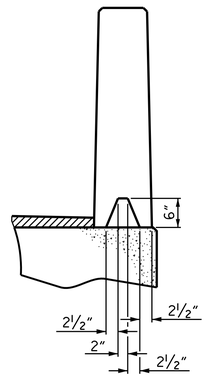
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

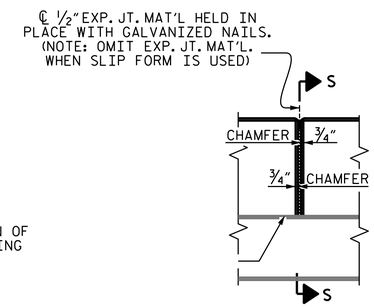
THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.



SECTION THRU RAIL



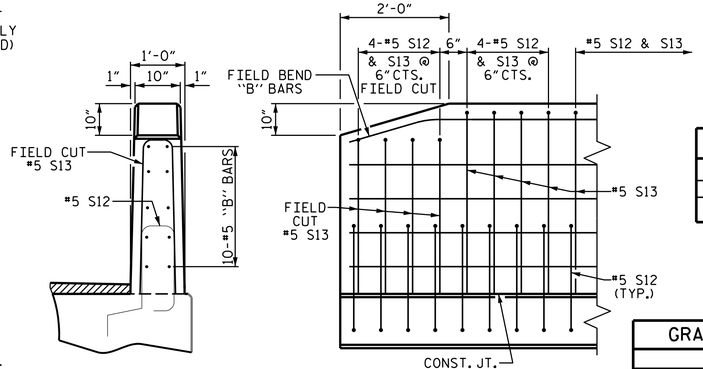
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	65' UNIT					
✳B24	60	60	#5	STR	21'-3"	1330
✳S13	148	148	#5	2	7'-8"	1183
✳EPOXY COATED REINFORCING STEEL				LBS.		2513
CLASS AA CONCRETE				CU.YDS.		18.0
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		130.25

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
65' UNITS	1⅝"	3'-7⅝"



END VIEW

SIDE VIEW

END OF RAIL DETAILS

CONCRETE RELEASE STRENGTH	
UNIT	PSI
65' UNITS	4800

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

NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS
DocuSigned by: Elizabeth Phelps A304508A0627455...
6/9/2025

PROJECT NO. BP11-R020
YADKIN COUNTY
STATION: 16+97.50 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			15

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VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

VERTICAL CONCRETE BARRIER RAIL DETAILS

DRAWN BY : D.M. SAULS DATE : 04/2025
CHECKED BY : E.C. PHELPS DATE : 04/2025
DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

6/9/2025
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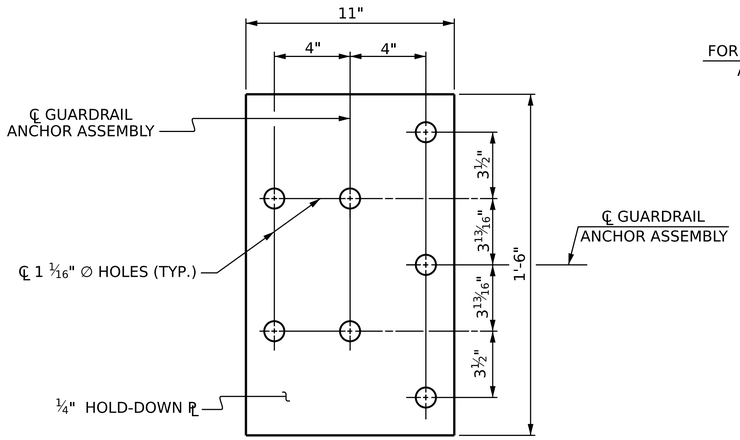
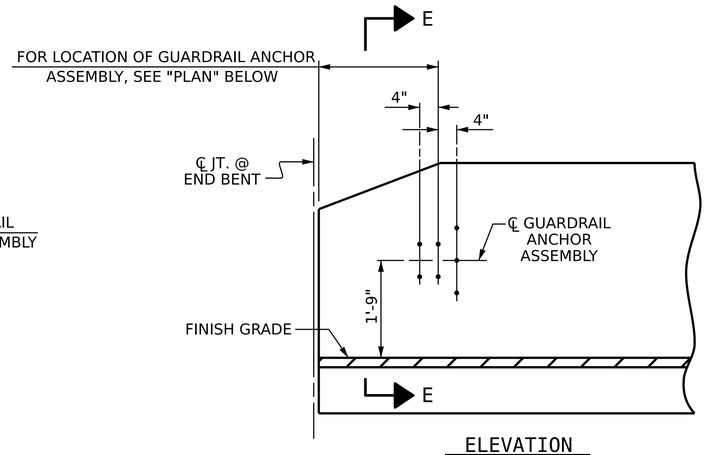
STD. NO. 24PCS3_27_90S

8/26/21



PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 7 - ⅞'' ∅ 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 ⅞'' ∅ 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.)

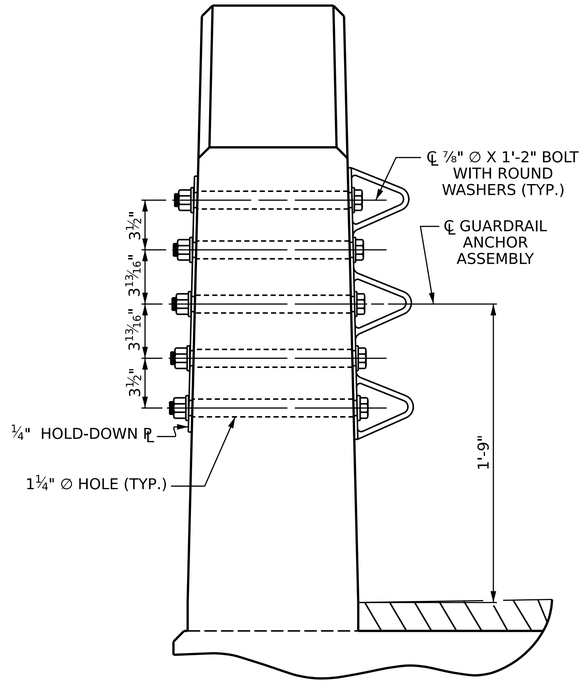
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

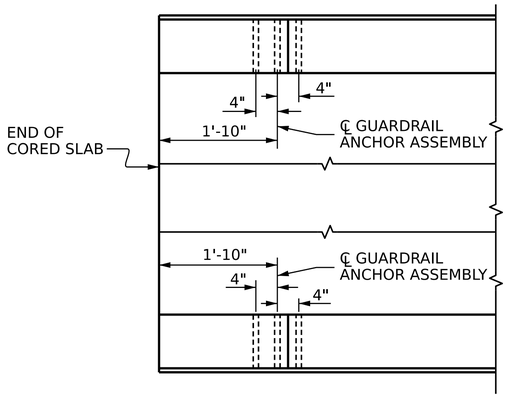
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 ¼'' ∅ 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.



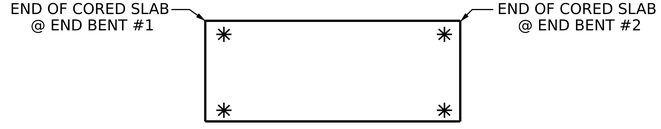
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BP11-R020

YADKIN COUNTY

STATION: 16+97.50 -L-

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VHB Engineering NC, P.C. (C-3705)
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DRAWN BY : D.M. SAULS DATE : 04/2025
CHECKED BY : E.C. PHELPS DATE : 04/2025
DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

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NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C PHELPS
DocuSigned by: Elizabeth Phelps 6/9/2025
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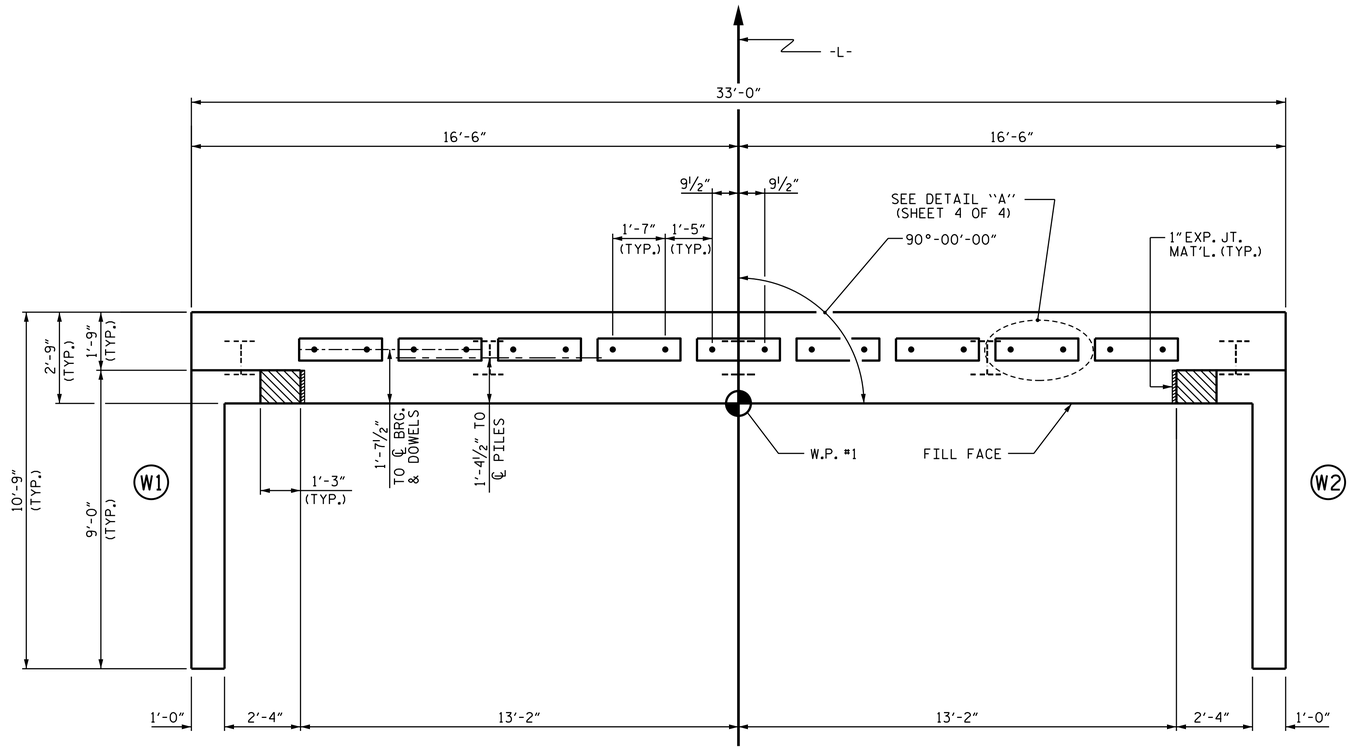
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

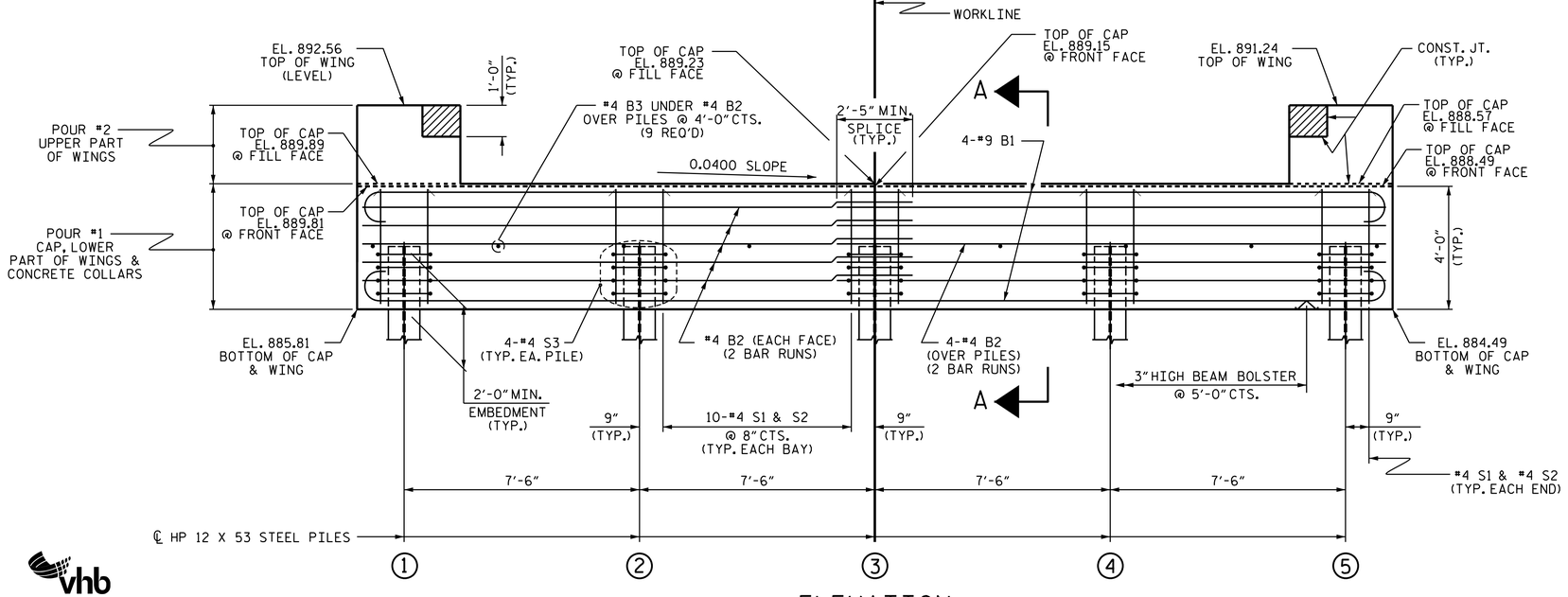
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			15

STD. GRA3 Sht. 1

8/26/21



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 5 OF 5.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 5 OF 5.

NOTES

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

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 5 OF 5.

FOR WING DETAILS, SEE SHEET 3 OF 5.

TOP OF PILE ELEVATIONS	
1	887.75
2	887.45
3	887.15
4	886.85
5	886.55

PROJECT NO. **BP11-R020**

YADKIN COUNTY

STATION: **16+97.50 -L-**

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS

DocuSigned by: Elizabeth Phelps 6/9/2025
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VHB Engineering NC, P.C. (C-3705)
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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			15

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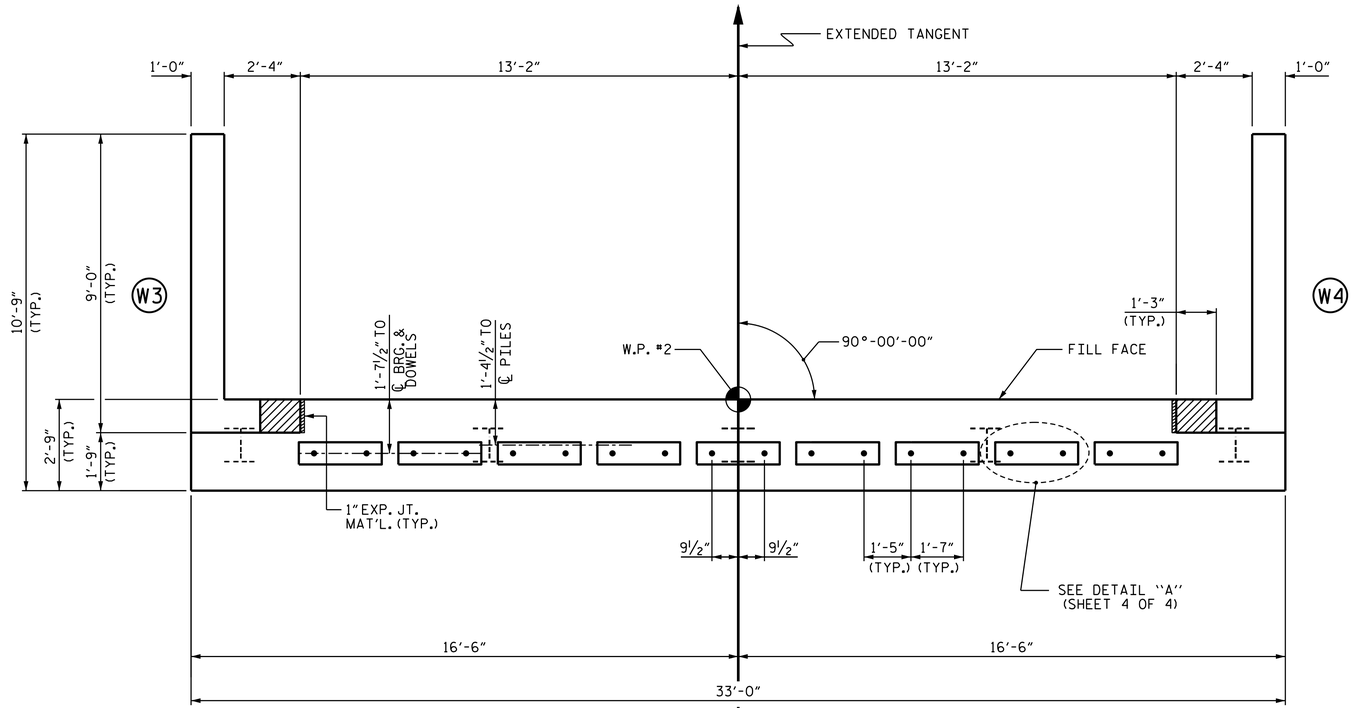
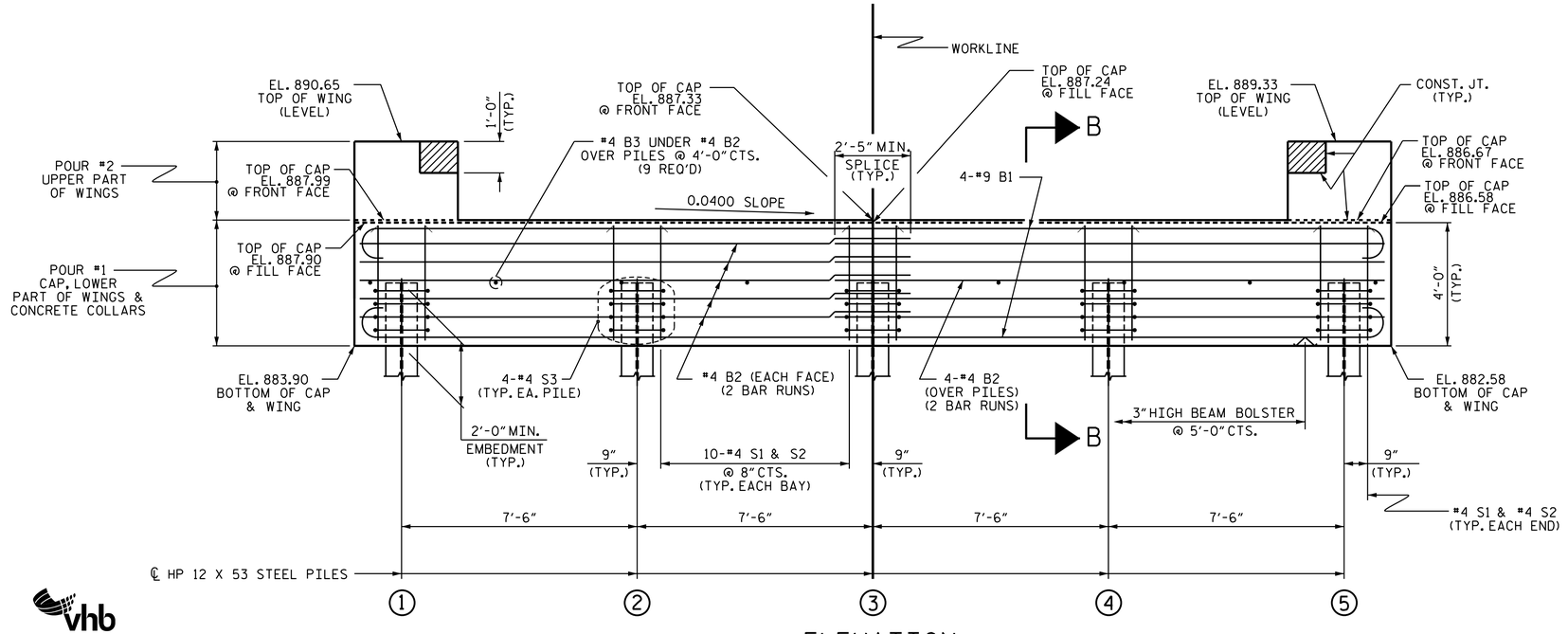


PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 5 OF 5.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 5 OF 5.

NOTES

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

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 5 OF 5.

FOR WING DETAILS, SEE SHEET 4 OF 5.

TOP OF PILE ELEVATIONS	
①	885.84
②	885.54
③	885.24
④	884.94
⑤	884.64

PROJECT NO. BP11-R020
YADKIN COUNTY
STATION: 16+97.50 -L-
SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS
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940 Main Campus Drive, Suite 500
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CHECKED BY : E.C. PHELPS DATE : 04/2025
DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			15

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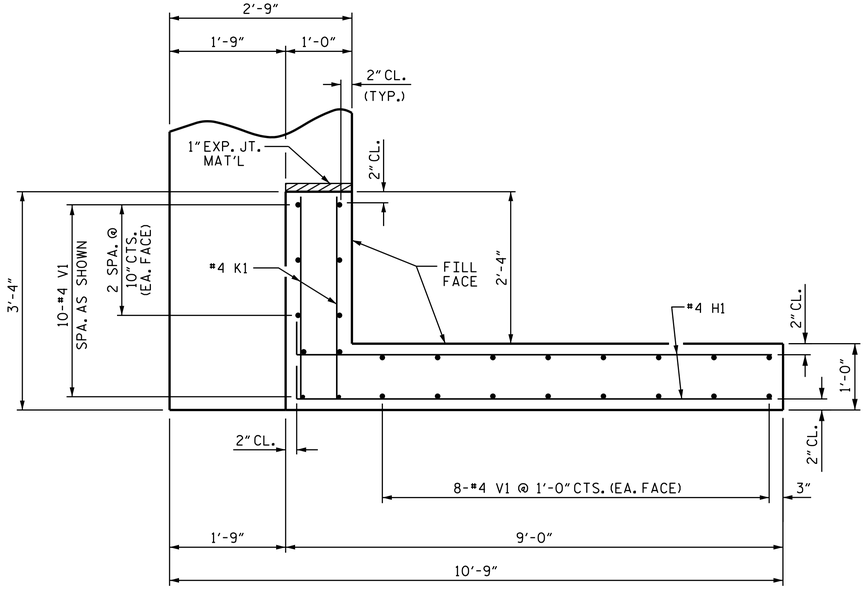
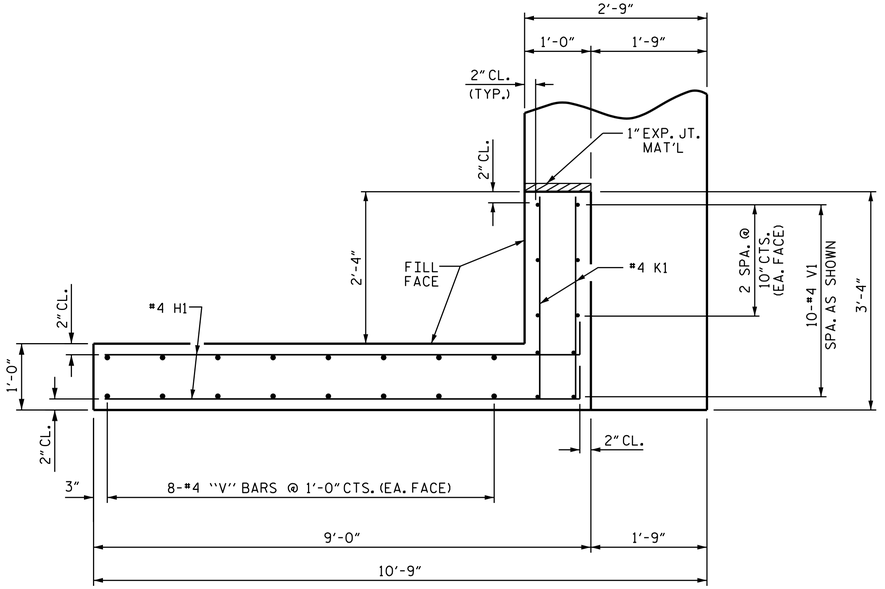
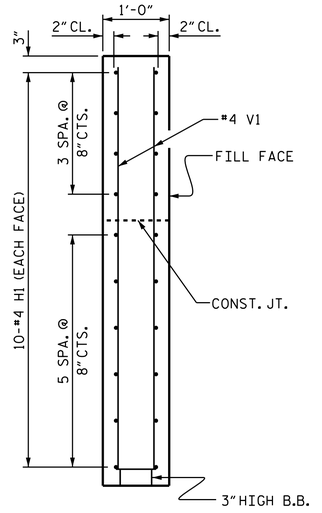


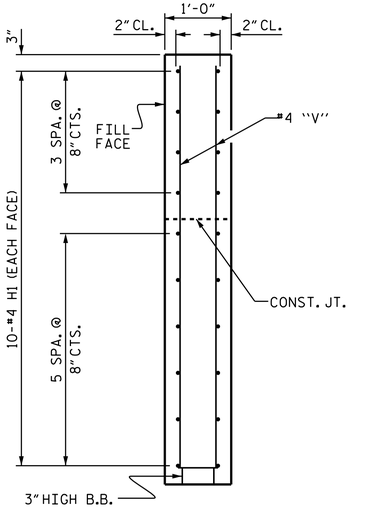
PLAN OF WING (W1)



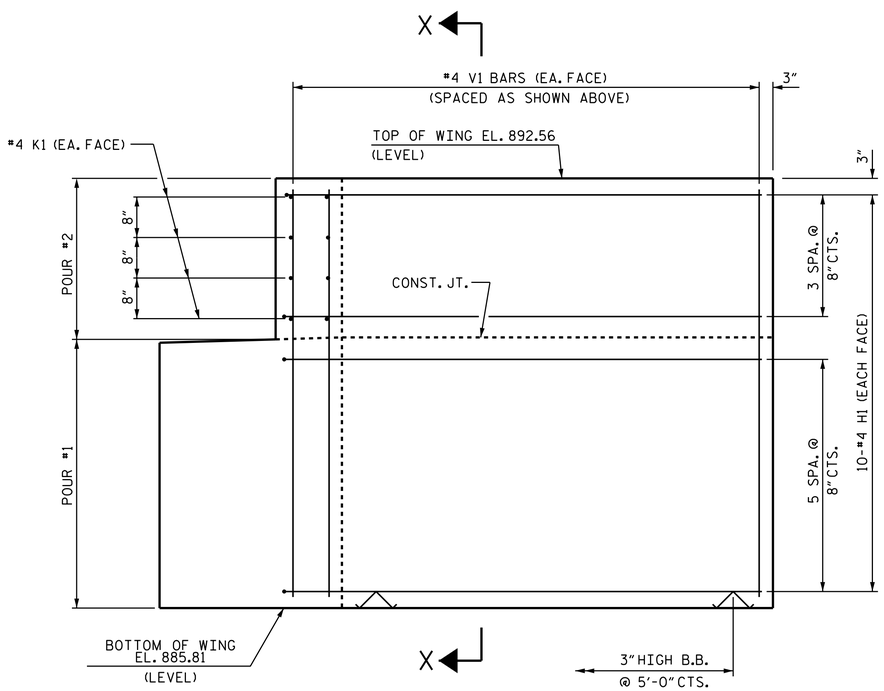
PLAN OF WING (W2)



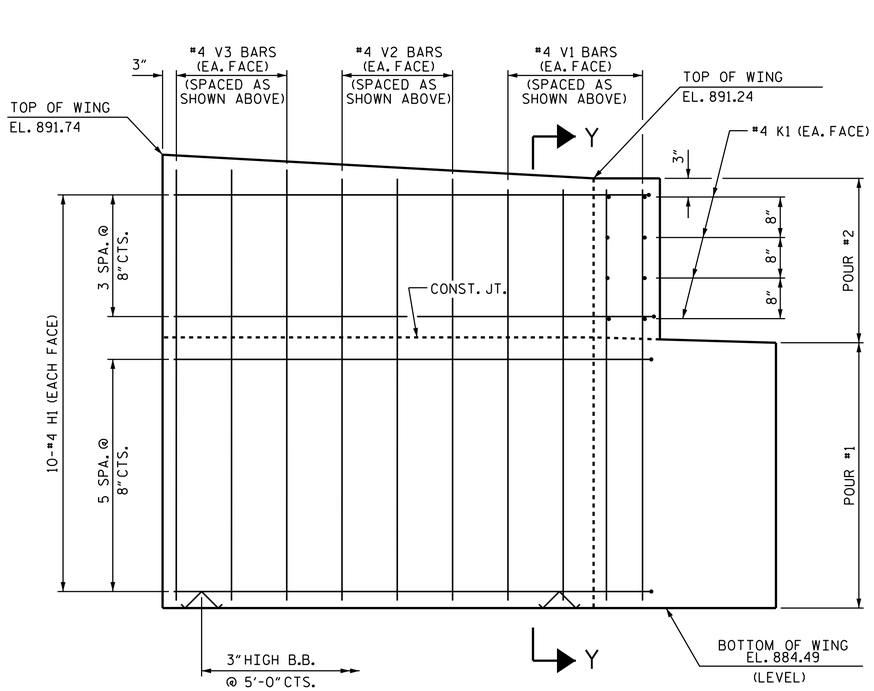
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

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PROJECT NO. BP11-R020
YADKIN COUNTY
STATION: 16+97.50 -L-
SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			15

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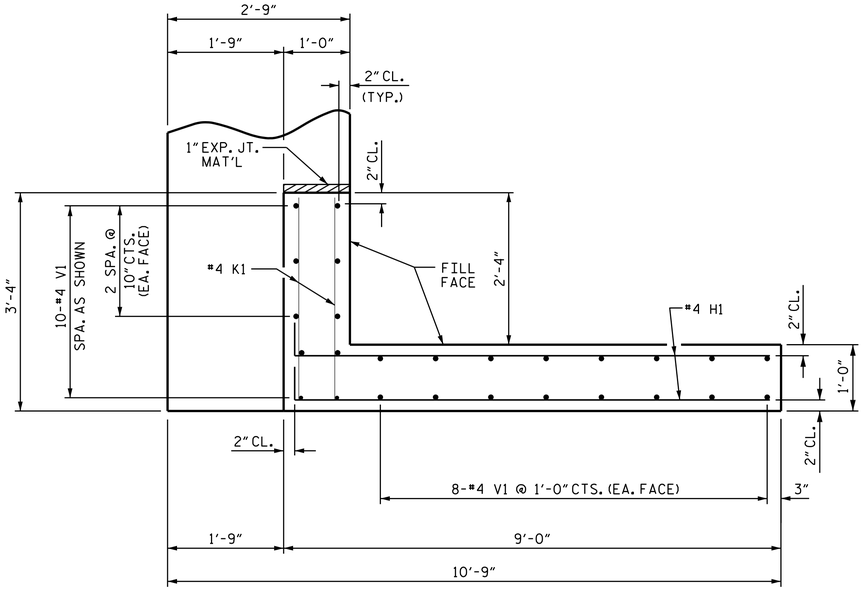
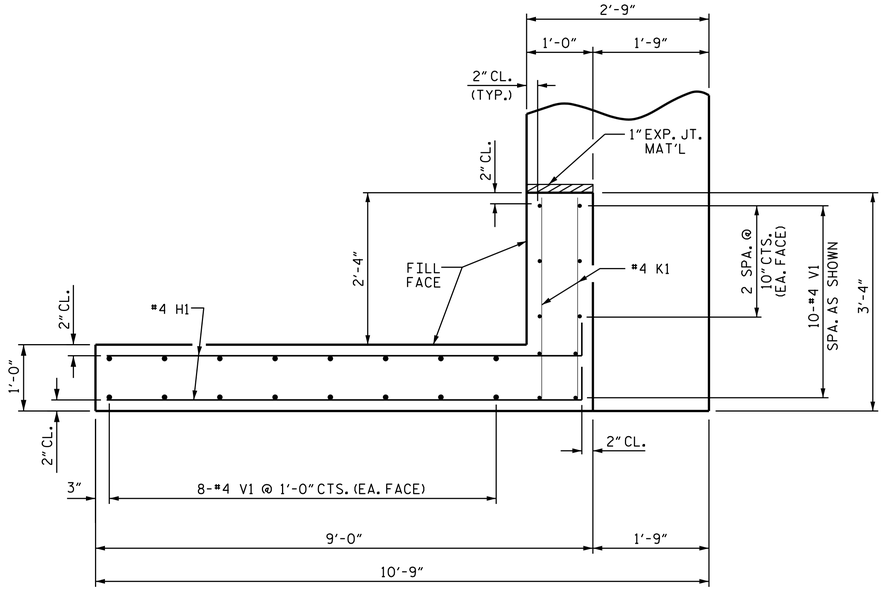
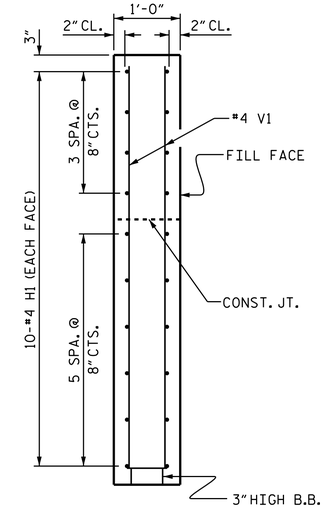


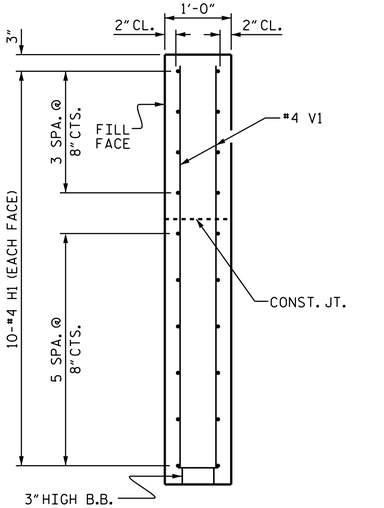
PLAN OF WING (W4)



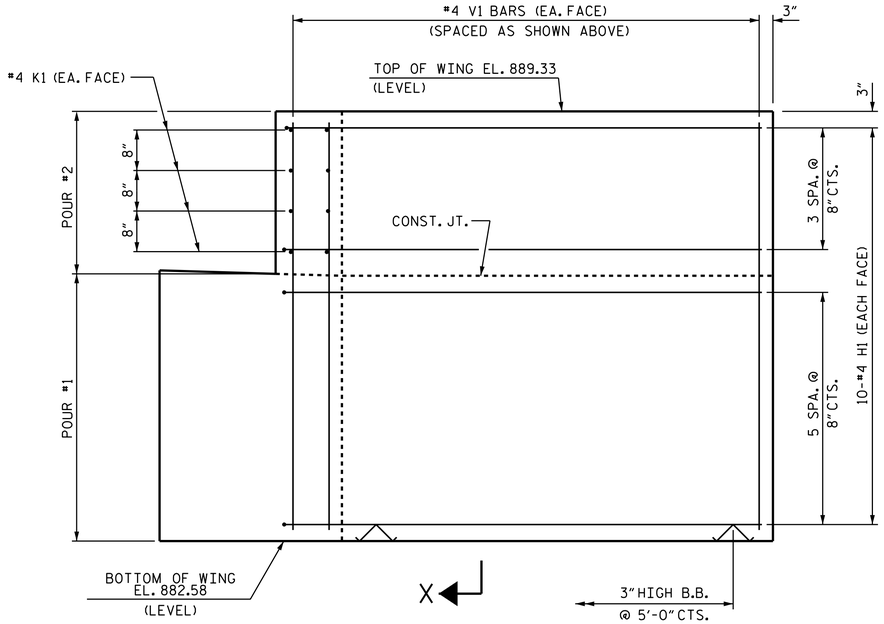
PLAN OF WING (W3)



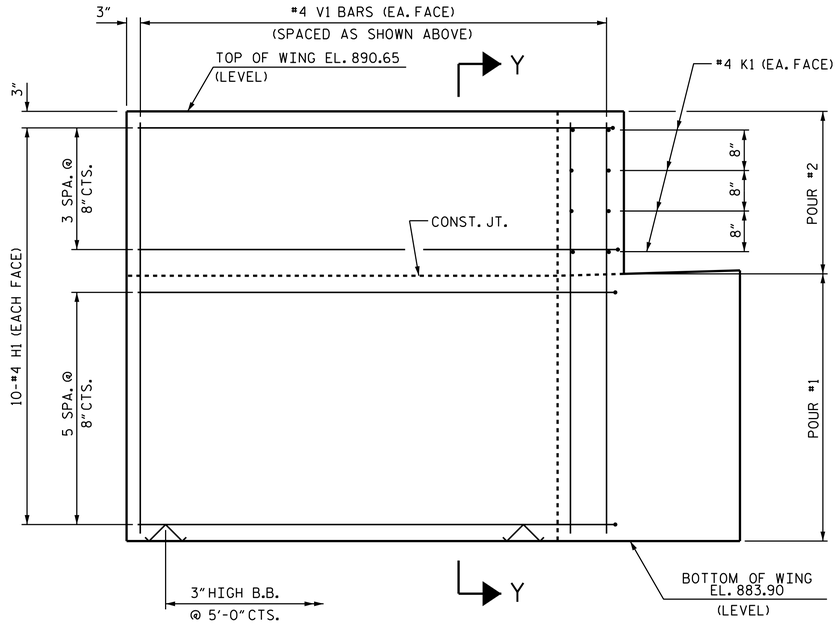
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W4)



ELEVATION OF WING (W3)

WING DETAILS

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940 Main Campus Drive, Suite 500
Raleigh, NC 27606

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PROJECT NO. BP11-R020
YADKIN COUNTY
STATION: 16+97.50 -L-

SHEET 4 OF 5

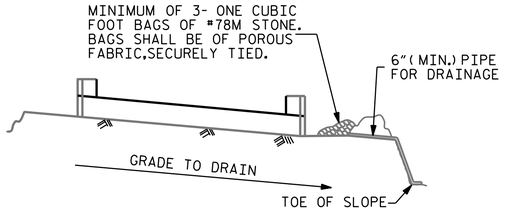
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			15

STD. NO. EB_27_90S4

8/26/21

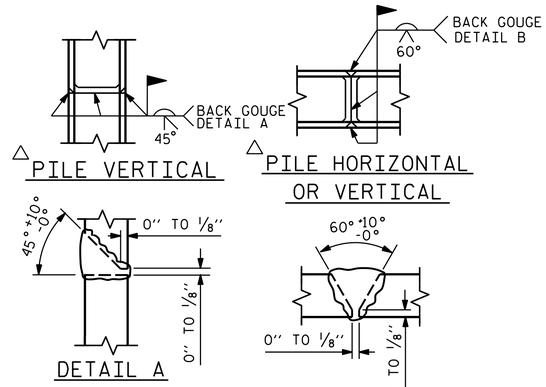


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

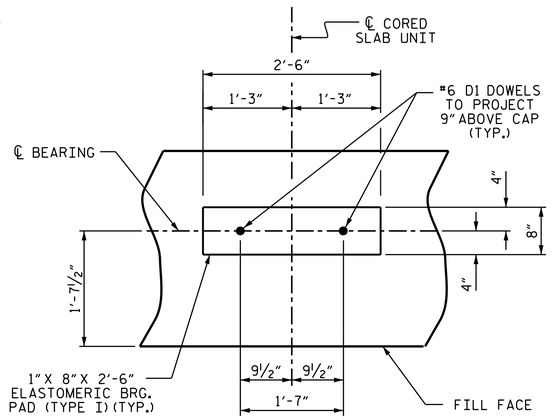
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



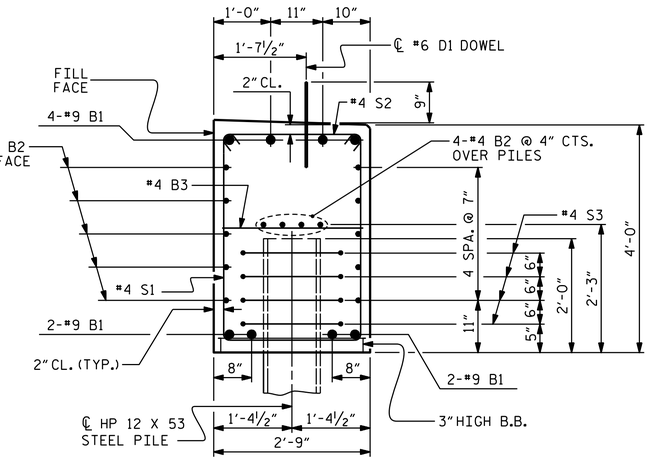
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



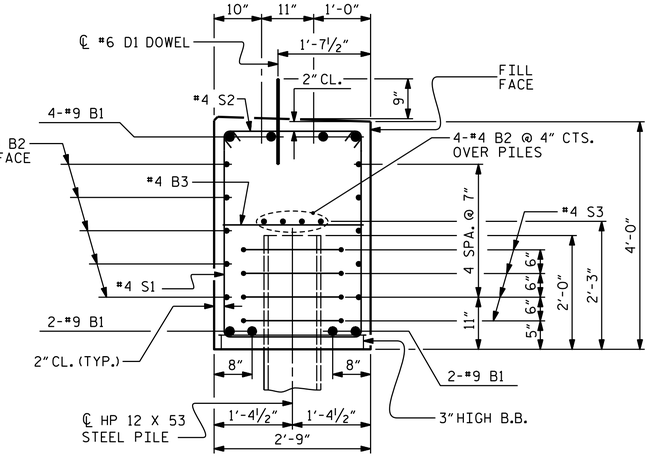
DETAIL "A"

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



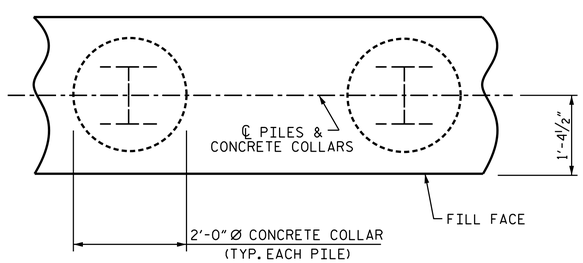
SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

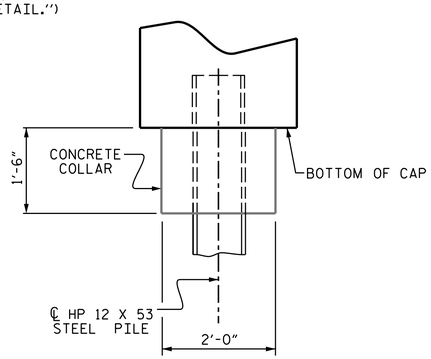


SECTION B-B

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

FOR END BENT NO. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	35'-0"	952
B2	28	#4	STR	17'-7"	329
B3	9	#4	STR	2'-5"	15
D1	18	#6	STR	1'-6"	41
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	42	#4	3	10'-5"	292
S2	42	#4	4	3'-2"	89
S3	20	#4	5	6'-6"	87
V1	52	#4	STR	6'-2"	214

REINFORCING STEEL (FOR END BENT No. 2) 2299 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

	CAP, LOWER PART OF WINGS & COLLARS	17.0 C.Y.
POUR #2	UPPER PART OF WINGS	2.3 C.Y.
	TOTAL CLASS A CONCRETE	19.3 C.Y.

HP 12 X 53 STEEL PILES
NO: 5 175 LIN. FT.

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES
NO: 5

BILL OF MATERIAL
FOR END BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	35'-0"	952
B2	28	#4	STR	17'-7"	329
B3	9	#4	STR	2'-5"	15
D1	18	#6	STR	1'-6"	41
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	42	#4	3	10'-5"	292
S2	42	#4	4	3'-2"	89
S3	20	#4	5	6'-6"	87
V1	40	#4	STR	6'-2"	165
V2	6	#4	STR	6'-5"	26
V3	6	#4	STR	6'-7"	26

REINFORCING STEEL (FOR END BENT No. 1) 2302 LBS.

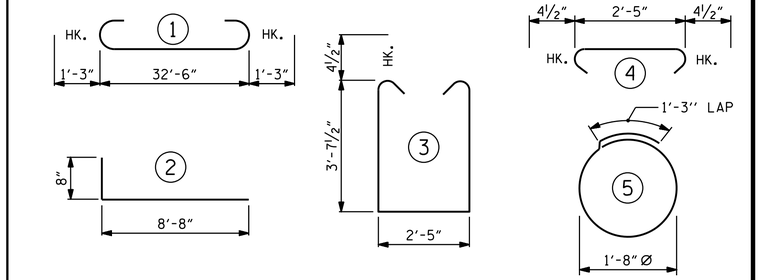
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

	CAP, LOWER PART OF WINGS & COLLARS	17.0 C.Y.
POUR #2	UPPER PART OF WINGS	2.3 C.Y.
	TOTAL CLASS A CONCRETE	19.3 C.Y.

HP 12 X 53 STEEL PILES
NO: 5 175 LIN. FT.

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES
NO: 5

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. BP11-R020
YADKIN COUNTY
STATION: 16+97.50 -L-
SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT No. 1 & 2 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS
DocuSigned by: Elizabeth Phelps 6/9/2025
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DRAWN BY : D.M. SAULS DATE : 04/2025
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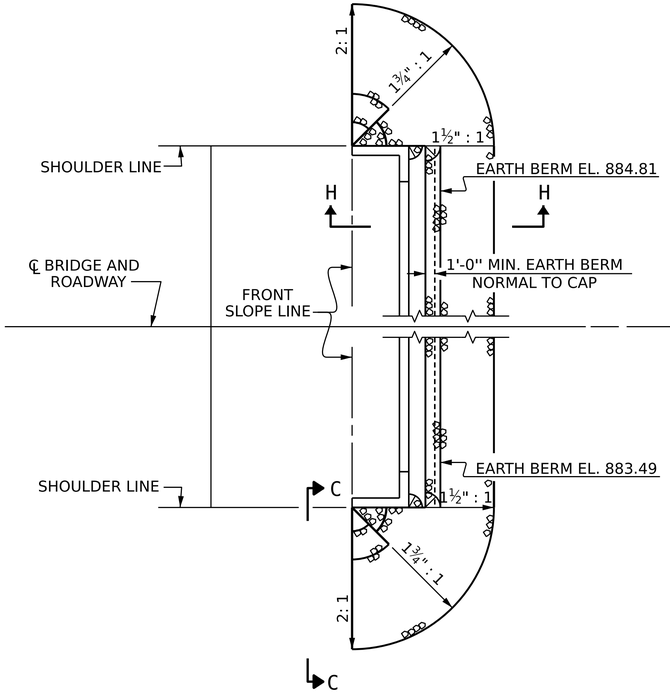
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			15

STD. NO. EB_27_90S4

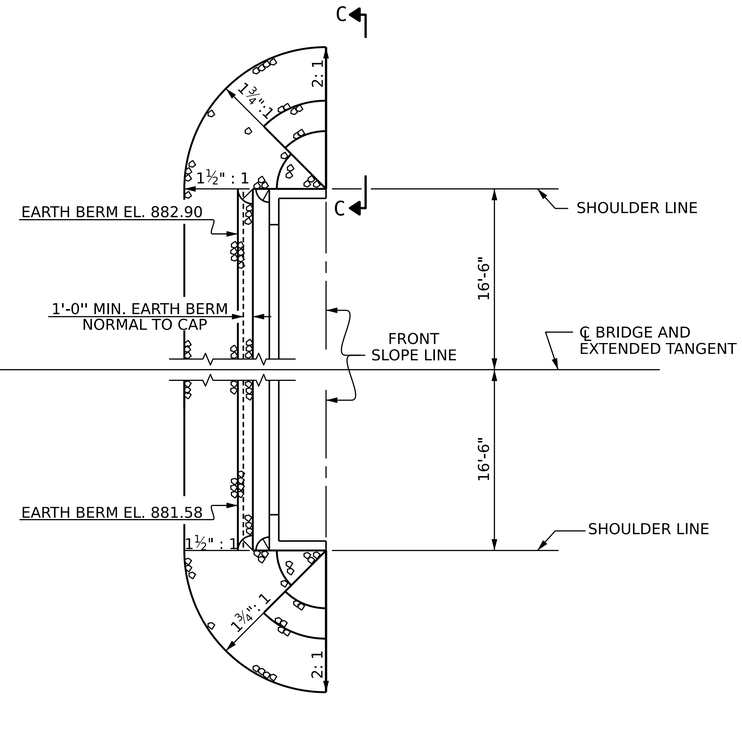
8/26/21

NOTES :

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



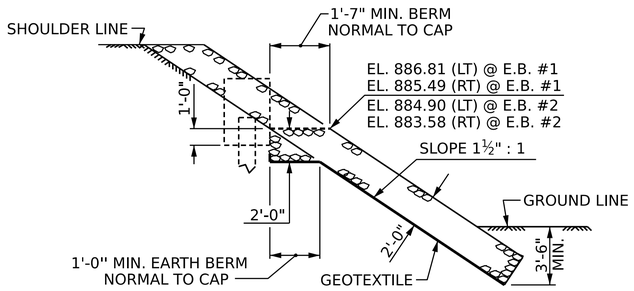
END BENT No. 1



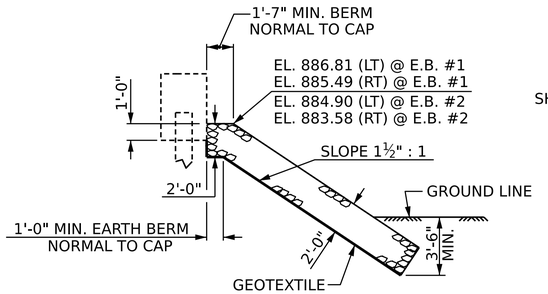
END BENT No. 2

PLAN

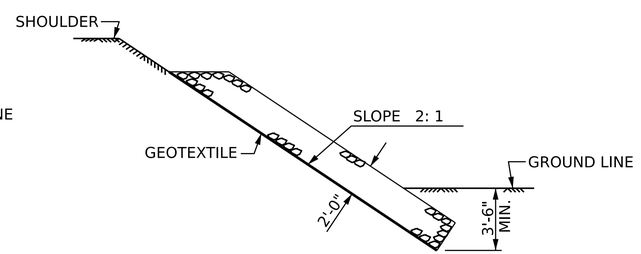
ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+97.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	125	140
END BENT 2	45	50



SECTION H-H



℄ SECTION



SECTION C-C

BERM RIP RAPPED

PROJECT NO. BP11-R020

YADKIN COUNTY

STATION: 16+97.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C PHELPS

DocuSigned by: Elizabeth Phelps 6/9/2025
A304598A0627455...

DRAWN BY : D.M. SAULS DATE : 04/2025
CHECKED BY : E.C. PHELPS DATE : 04/2025
DESIGN ENGINEER OF RECORD: E.C. PHELPS DATE : 04/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			15

6/5/2025
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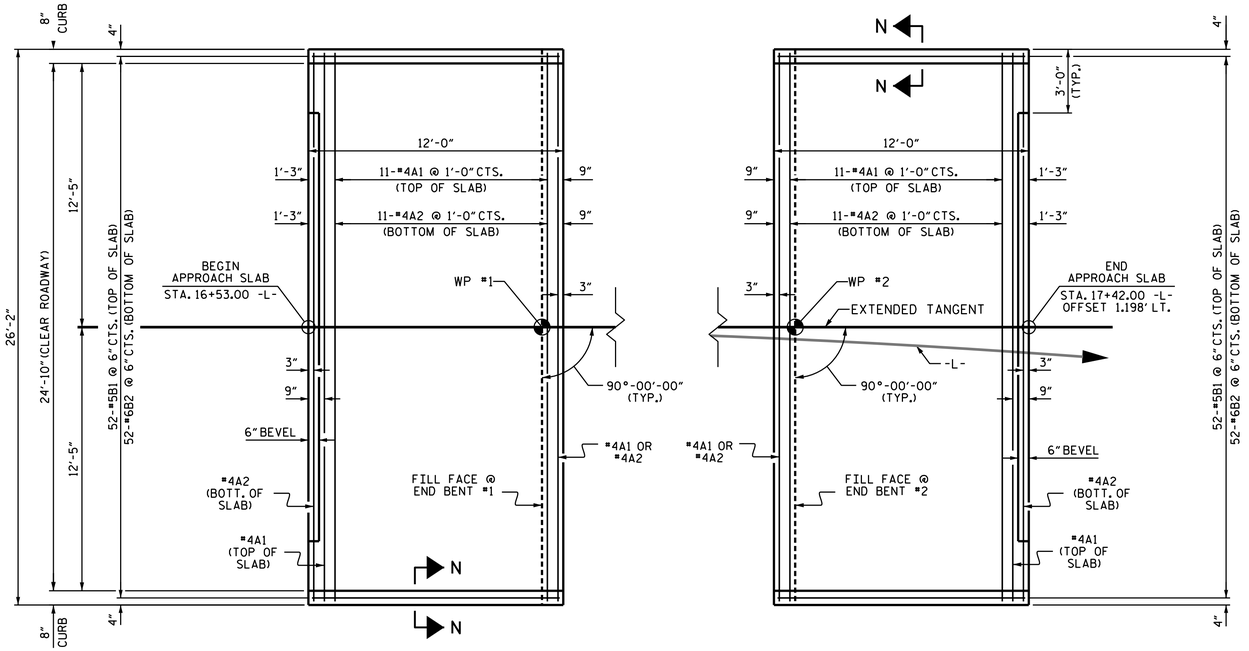
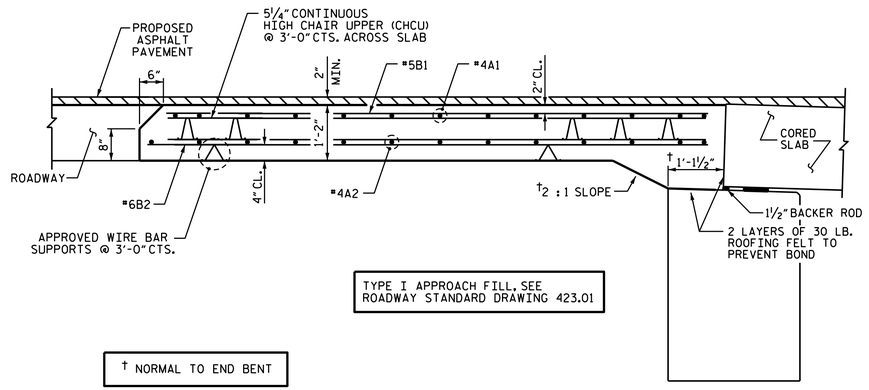


PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



TYPE I APPROACH FILL, SEE ROADWAY STANDARD DRAWING 423.01

† NORMAL TO END BENT

SECTION THRU SLAB

NOTES

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

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

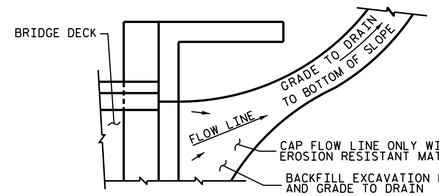
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

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

FOR DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

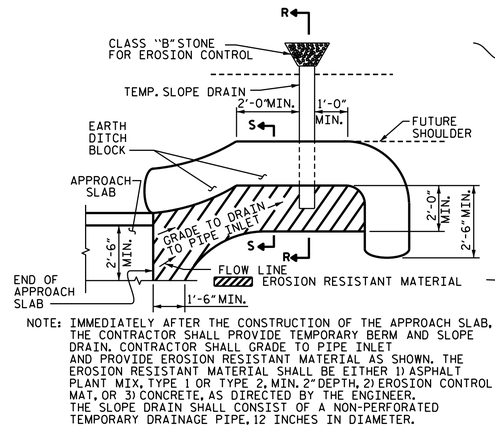
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



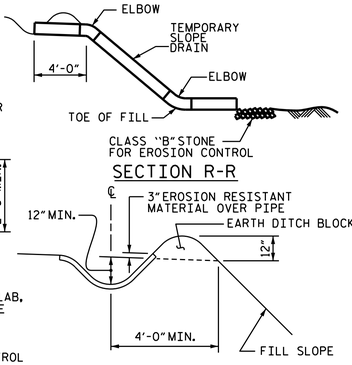
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



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.

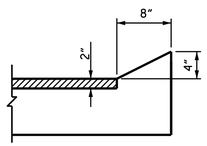
PLAN VIEW



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N

CURB DETAILS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	13	#4	STR	25'-10"	224
A2	13	#4	STR	25'-10"	224
✱ B1	52	#5	STR	11'-2"	606
B2	52	#6	STR	11'-8"	911
REINFORCING STEEL				LBS.	1135
✱ EPOXY COATED REINFORCING STEEL				LBS.	830
CLASS AA CONCRETE				C.Y.	15.9
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	13	#4	STR	25'-10"	224
A2	13	#4	STR	25'-10"	224
✱ B1	52	#5	STR	11'-2"	606
B2	52	#6	STR	11'-8"	911
REINFORCING STEEL				LBS.	1135
✱ EPOXY COATED REINFORCING STEEL				LBS.	830
CLASS AA CONCRETE				C.Y.	15.9

PROJECT NO. BP11-R020

YADKIN COUNTY

STATION: 16+97.50 -L-

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DRAWN BY : D.M. SAULS DATE : 04/2025
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NORTH CAROLINA PROFESSIONAL SEAL 048992 ENGINEER ELIZABETH C. PHELPS
DocuSigned by: Elizabeth Phelps A304598A0627455... 6/9/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

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

STD. NO. BAS_27_90S

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
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 AASHTO
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 2024 "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 ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" 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 ⅞" ∅ SHEAR STUDS FOR THE ¾" ∅ STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" ∅ STUDS FOR 4 - ¾" ∅ STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" ∅ STUDS ALONG THE BEAM AS SHOWN FOR ¾" ∅ STUDS BASED ON THE RATIO OF 3 - ⅞"∅ STUDS FOR 4 - ¾" ∅ 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" 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.