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TIP PROJECT: BP6.R010

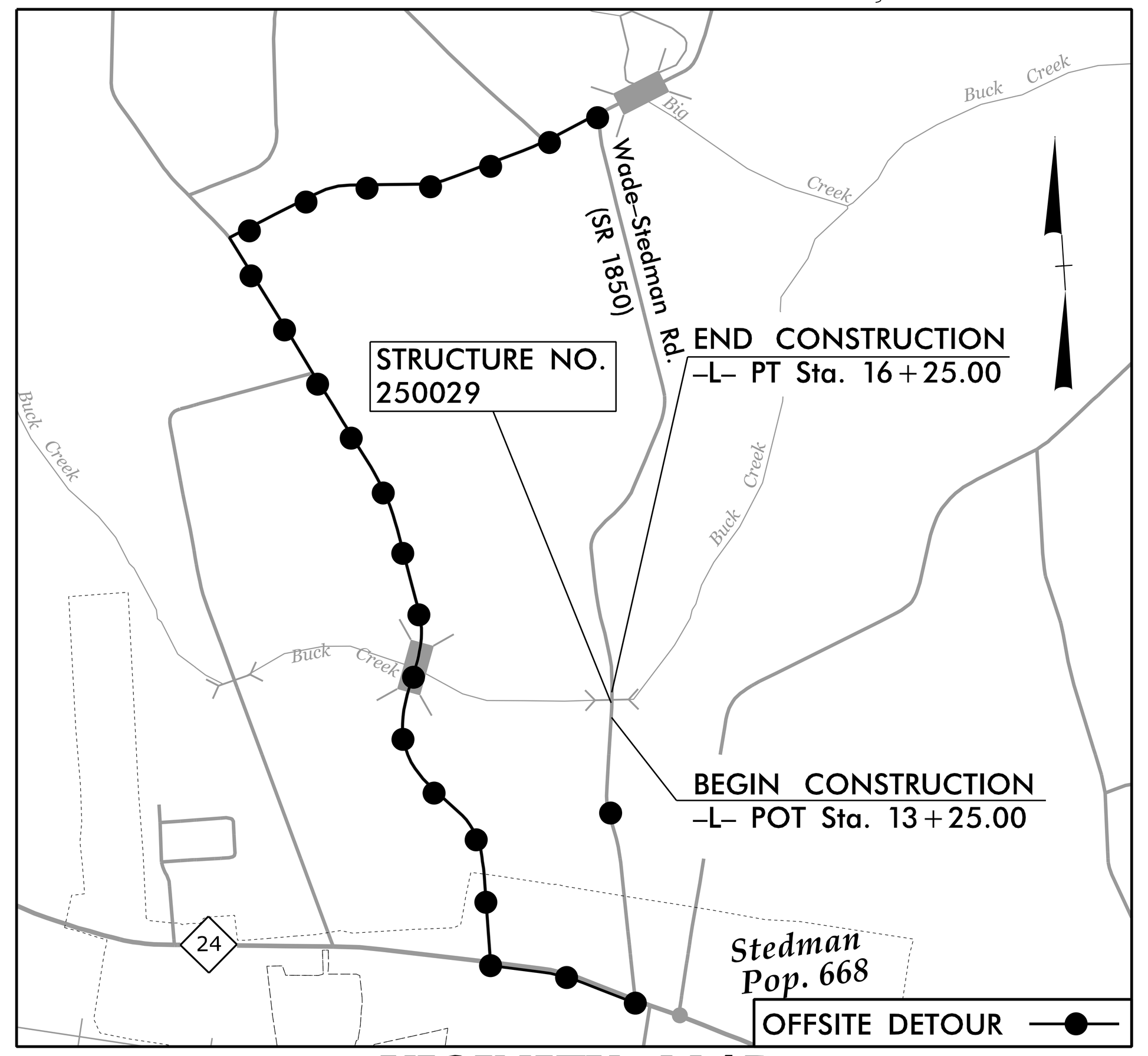
CONTRACT: DF00538

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP6.R010	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BR6.R010.1		PE
BR6.R010.2		R/W
BR6.R010.3		CONST.

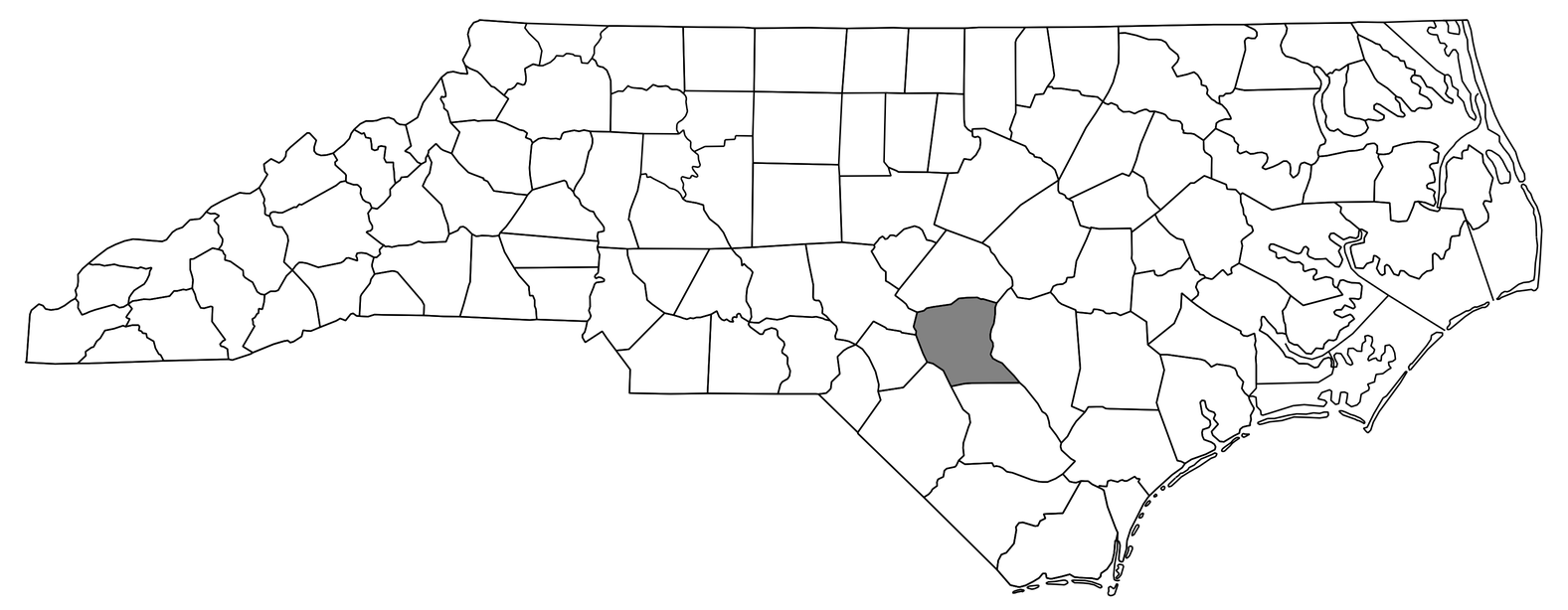


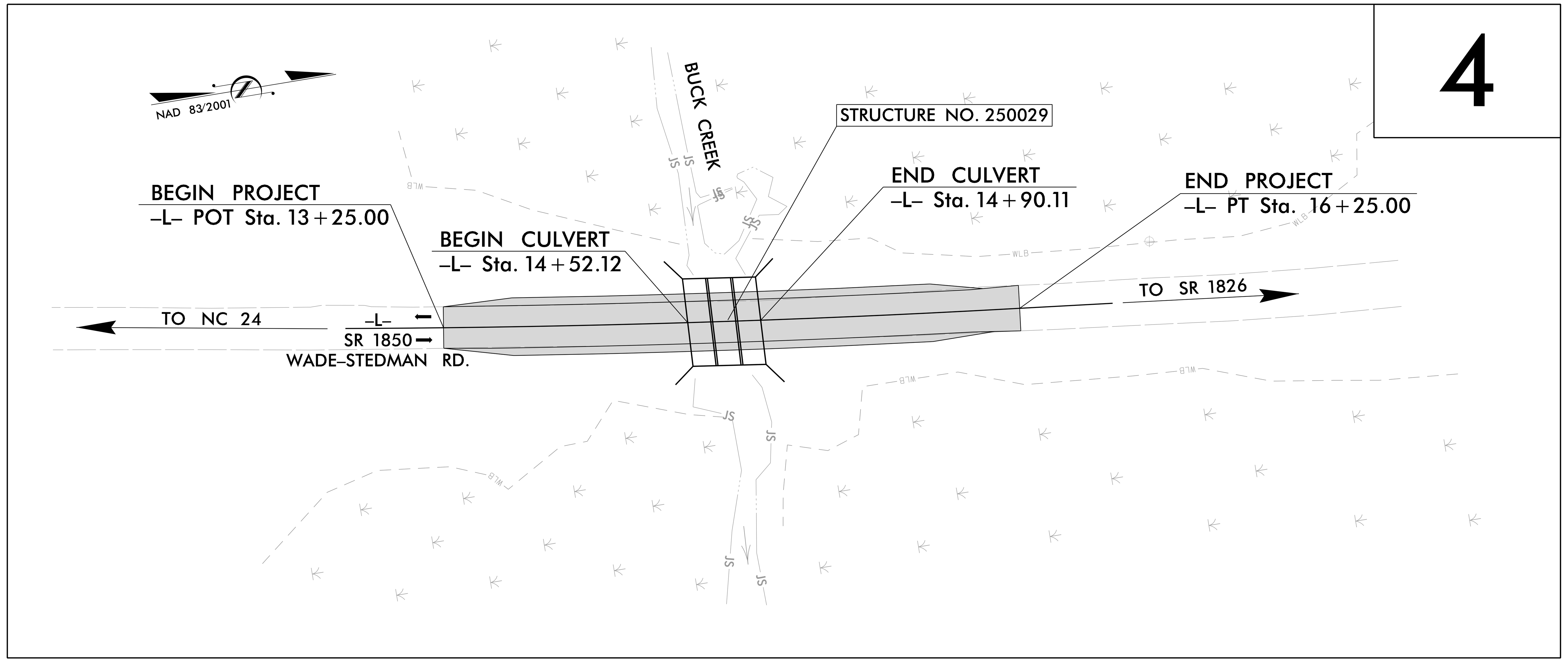
VICINITY MAP

CUMBERLAND COUNTY

LOCATION: CULVERT NO. 250029 FOR BUCK CREEK ON SR 1850 (WADE–STEDMAN RD)

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





FINAL ROADWAY PLANS
SUBMITTAL NO.S-018
DATE: 11-07-2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

20 10 0 20 40
PLANS

20 10 0 20 40
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2022 = 1100
K = NA
D = NA
T = 7 % *
V = 55 MPH
* TTST = DUAL
FUNC CLASS =
RURAL MAJOR COLLEC.
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT 250029 = 0.057 mi
TOTAL LENGTH PROJECT 250029 = 0.057 mi

RK&K
RUMMEL, KLEPPER & KAHL, LLP
8601 SIX FORKS ROAD, FORUM 1, SUITE 700
RALEIGH, NORTH CAROLINA 27615
NC LICENSE NO. F-0112
919-878-9560

FOR:
NCDOT DIVISION OF HIGHWAYS

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 2023

LETTING DATE:
JANUARY 21, 2026

Michael Merritt, P.E.
PROJECT ENGINEER

Andrew Hefler
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 035636 ENGINEER CHRISTOPHER L. SMITH
Christopher L. Smith 11/14/2025 P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT
MICHAEL T MERRITT 11/14/2025 P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

11/4/2025
R:\Roadway\Proj\250029_rdy_tsh.dgn
default

PROJECT REFERENCE NO.	SHEET NO.
BR6.R010	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER MICHAEL T. MERRITT

DocuSigned by: MICHAEL T. MERRITT

11/4/2025

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INDEX of SHEETS, GENERAL NOTES, and LIST of STANDARDS

INDEX OF SHEETS

LIST OF STANDARD DRAWINGS

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	
200.02	Method of Clearing - Method II MODIFIED
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I

LIST OF GENERAL NOTES

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 II MODIFIED.

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

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.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE: SPECTRUM AND BRIGHTSPEED

ANY RELOCATION OF EXISTING UTLITIES WILL BE ACCOMPLISHED BY OTHERS

RIGHT-OF-WAY MARKERS:

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

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P: (919) 878-9560
8601 Six Forks Road, Forum 1,Suite 700
Raleigh, North Carolina 27615-3960
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8/17/99
11/3/2025
R:\Roadway\Proj\250029_rdy_psh01A.dgn

9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	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
- 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)* — W
- U/G Water Line (SUE – LOS C)* — W
- U/G Water Line (SUE – LOS D)* — W
- 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
- 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:

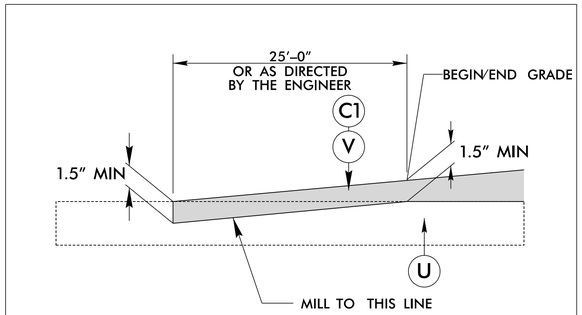
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line (SUE – LOS B)* — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned According to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

6/2/99

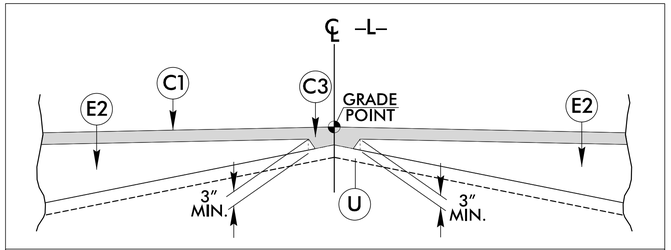
FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN ONE LAYER	T	EARTH MATERIAL
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.	U	EXISTING PAVEMENT
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.	V	INCIDENTAL MILLING
E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	W	WEDGING
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 4.0" IN DEPTH.		

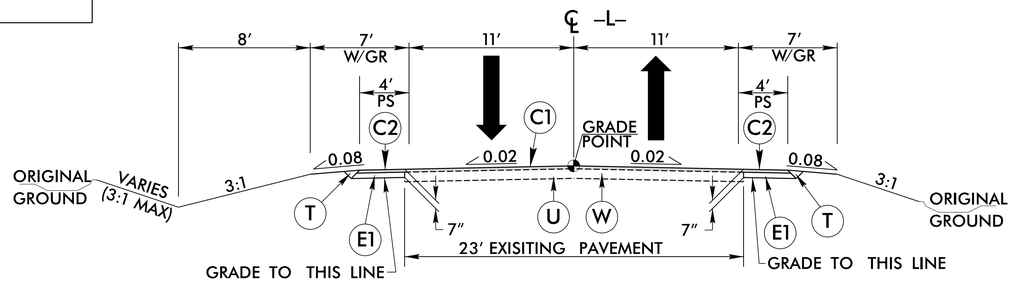
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE SHOWN.



DETAIL SHOWING MILLED PAVEMENT TIE–IN

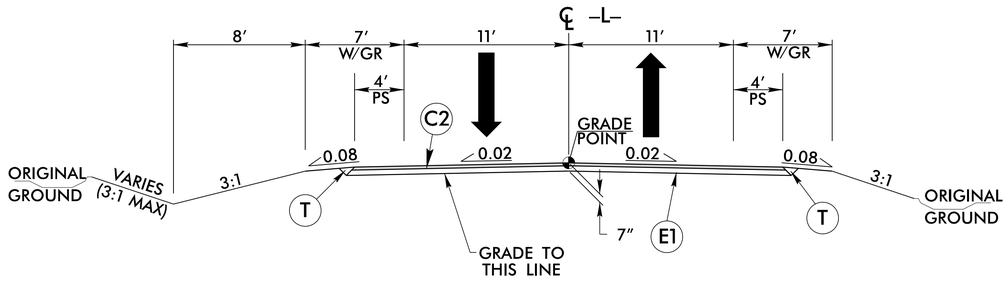


WEDGING DETAIL FOR RESURFACING



TYPICAL SECTION NO. 1

–L– STA. 13+25.00 TO 14+30.00
–L– STA. 15+10.00 TO 16+25.00



TYPICAL SECTION NO. 2

–L– STA. 14+30.00 TO 15+10.00

PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	2A-1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21823 ENGINEER MICHAEL T. MERRITT

DocuSigned by: SEAL MICHAEL T MERRITT

11/4/2025

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SIJIHAI ZHANG

DocuSigned by: SEAL Sijihai Zhang

11/4/2025

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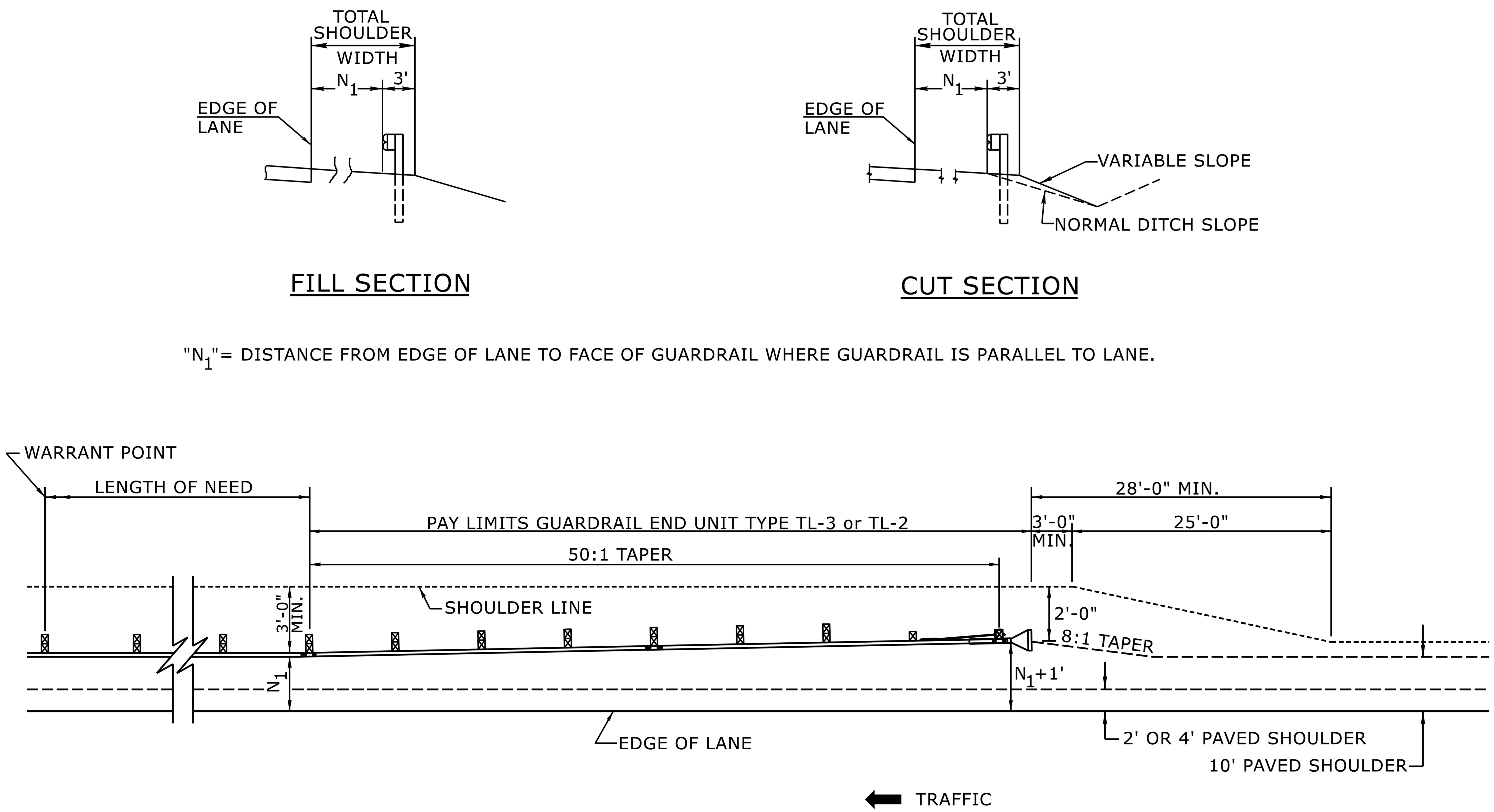

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
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
11/4/2025

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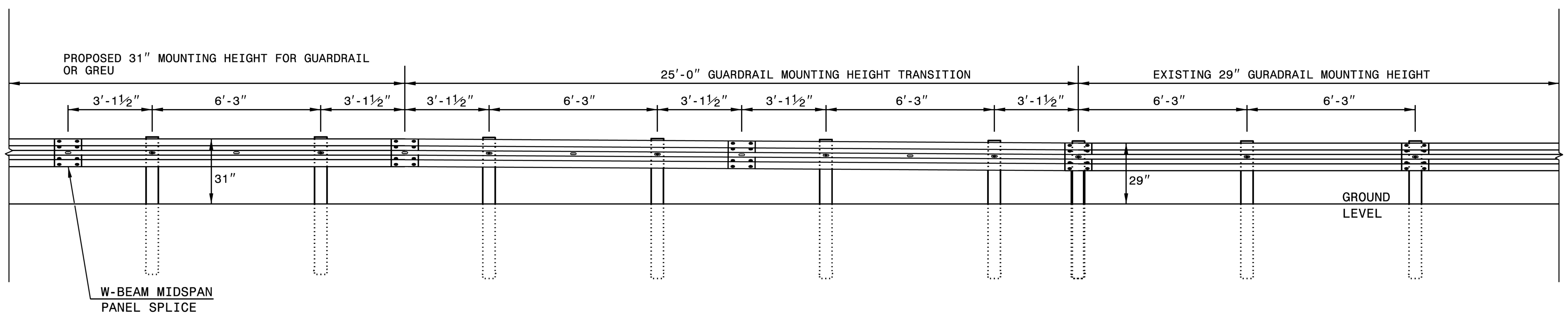
CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

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

NOTE: IF EXISTING GUARDRAIL IS LOWER THAN 29″, USE AN ADDITIONAL 12′-6″ LONG SECTION OF GUARDRAIL, FOR EVERY 1″ OF HEIGHT DIFFERENCE, TO TRANSITION FROM EXISTING GUARDRAIL TO PROPOSED 31″ GUARDRAIL.



ELEVATION VIEW

TRANSITION FROM 29″ TO 31″ W-BEAM GUARDRAIL MOUNTING HEIGHT

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 5 OF 9
862D02

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER
11/4/2025

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Office 919-707-8950 FAX 919-250-4119

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ORIGINAL BY: K. Aldridge DATE: 02-25
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

05-FEB-2025 07:53
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$$$$USERNAME$$$$

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

CHAIN	BEGINNING STATION	ENDING STATION	UNCL. EXCA. C.Y.	UNDERCUT C.Y.	EMBANK. +% C.Y.	BORROW C.Y.	WASTE C.Y.
SUMMARY 1							
-L-	13+25.00	16+25.00	104		134	30	
SUBTOTAL			**104**		**134**	**30**	
SHEET TOTALS			**104**		**134**	**30**	
MATERIAL FOR SHOULDER CONSTRUCTION					**49**	**49**	
PROJECT TOTAL			**104**		**183**	**79**	
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT						**4**	
GRAND TOTAL			**104**			**82**	
SAY			**110**			**90**	

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS							IMPACT ATTENUATOR TYPE 350			SAFETY RAIL	SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GREU TL-3	GREU TL-2	TYPE III	CAT-1	TES	IA MASH TL-3	AT-1	NG				
L	13+57.47	15+82.24	LT	225.00			14+88.20	14+50.05	4.00	7	50		1	1			2											
L	13+58.05	15+82.42	RT	225.00			14+54.17	14+92.06	4.00	7	50		1	1			2											
TOTAL				450.00	0.00	0									0	0	4	0	0	0	0	0	0	0	0.00	0.00	0.00	
	LESS ANCHOR DEDUCTIONS																											
	GREU TL-3	4	@50'=	200.00'																								
	CAT-1	0	@6.25'=	0.00'																								
	TYPE III	0	@22.875' =	0.00'																								
	GREU TL-2	0	@25' =	0.00'																								
	ATTEN. TYPE 350	0	@21' =	0.00'																								
	AT-1	0	@6.25' =	0.00'																								
	TES	0	@2.3' =	0.00'																								
		TOTAL GUARDRAIL =		250'	0'																							
		SAFETY RAIL =		0'																								
	SINGLE FACED CONCRETE BARRIER =			0'																								
	REMOVE EXISTING GUARDRAIL =			0'																								
	PROJECT TOTAL =			250'													4											
(5 ADDITIONAL GUARDRAIL POSTS)																												

ASPHALT PAVEMENT REMOVAL SUMMARY

LINE	STATION	STATION	LOCATION	LENGTH OR AREA	WIDTH	SQUARE YARDS
-L_MED-	14+30	15+10	LT/RT	1723.55		191.51
					TOTAL	191.51
					SAY	**200**

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Raleigh, North Carolina 27615-3960
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PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — MICHAEL T. MERRITT — 11/4/2025

HYDRAULICS ENGINEER — CHRISTOPHER L. SMITH — 11/4/2025

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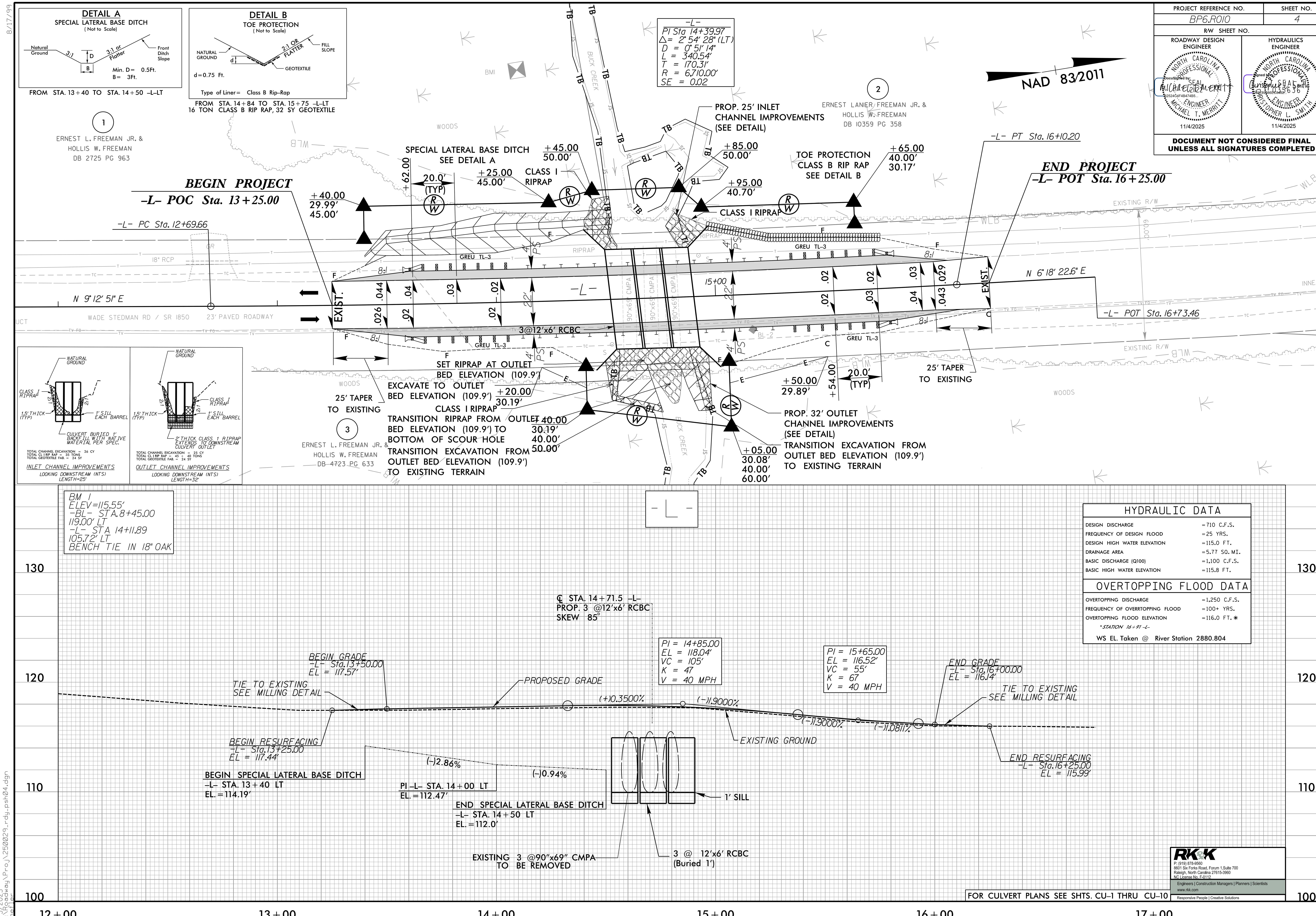

DETAIL A
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground
3:1
3:1 or Flatter
Front Ditch Slope
D
B
Min. D= 0.5Ft.
B= 3Ft.
FROM STA. 13+40 TO STA. 14+50 -L-LT
DETAIL B
TOE PROTECTION
(Not to Scale)
NATURAL GROUND
2:1 OR FLATTER
FILL SLOPE
GEOTEXTILE
d=0.75 Ft.
Type of Liner= Class B Rip-Rap
FROM STA. 14+84 TO STA. 15+75 -L-LT
16 TON CLASS B RIP RAP, 32 SY GEOTEXTILE
-L-
PI Sta 14+39.97
Δ= 2° 54' 28" (LT)
D = 0° 51' 14"
L = 340.54'
T = 170.31'
R = 6,710.00'
SE = 0.02
NAD 83/2011
1
ERNEST L. FREEMAN JR. &
HOLLIS W. FREEMAN
DB 2725 PG 963
2
ERNEST LANIER FREEMAN JR. &
HOLLIS W. FREEMAN
DB 10359 PG 358
3
ERNEST L. FREEMAN JR. &
HOLLIS W. FREEMAN
DB 4723 PG 633
BEGIN PROJECT
-L- POC Sta. 13+25.00
-L- PC Sta. 12+69.66
END PROJECT
-L- POT Sta. 16+25.00
-L- PT Sta. 16+10.20
-L- POT Sta. 16+73.46
N 9° 12' 51" E
N 6° 18' 22.6" E
WADE STEDMAN RD / SR 1850
23' PAVED ROADWAY
SPECIAL LATERAL BASE DITCH
SEE DETAIL A
PROP. 25' INLET
CHANNEL IMPROVEMENTS
(SEE DETAIL)
TOE PROTECTION
CLASS B RIP RAP
SEE DETAIL B
CLASS I RIPRAP
3@12'x6' RCBC
SET RIPRAP AT OUTLET
BED ELEVATION (109.9')
EXCAVATE TO OUTLET
BED ELEVATION (109.9')
CLASS I RIPRAP
TRANSITION RIPRAP FROM OUTLET
BED ELEVATION (109.9') TO
BOTTOM OF SCOUR HOLE
TRANSITION EXCAVATION FROM
OUTLET BED ELEVATION (109.9')
TO EXISTING TERRAIN
PROP. 32' OUTLET
CHANNEL IMPROVEMENTS
(SEE DETAIL)
TRANSITION EXCAVATION FROM
OUTLET BED ELEVATION (109.9')
TO EXISTING TERRAIN
25' TAPER TO EXISTING
20.0' (TYP)
GREU TL-3
BUCK CREEK
WOODS
EXISTING R/W
INLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH=25'
OUTLET CHANNEL IMPROVEMENTS
LOOKING DOWNSTREAM (NTS)
LENGTH=32'
CULVERT BURIED 1' BACKFILL WITH NATIVE MATERIAL PER SPEC.
2' THICK CLASS 1 RIPRAP EXTENDS TO DOWNSTREAM CULVERT OUTLET
1' SILL EACH BARREL
BM 1
ELEV=115.55'
-BL- STA.8+45.00
119.00' LT
-L- STA 14+11.89
105.72' LT
BENCH TIE IN 18" OAK
-L-
℄ STA. 14+71.5 -L-
PROP. 3 @12'x6' RCBC
SKEW 85°
BEGIN GRADE
-L- Sta.13+50.00
EL = 117.57'
PI = 14+85.00
EL = 118.04'
VC = 105'
K = 47
V = 40 MPH
PI = 15+65.00
EL = 116.52'
VC = 55'
K = 67
V = 40 MPH
END GRADE
-L- Sta.16+00.00
EL = 116.14'
TIE TO EXISTING
SEE MILLING DETAIL
PROPOSED GRADE
(+)0.3500%
(-)1.9000%
(-)1.0811%
EXISTING GROUND
BEGIN RESURFACING
-L- Sta.13+25.00
EL = 117.44'
END RESURFACING
-L- Sta.16+25.00
EL = 115.99'
BEGIN SPECIAL LATERAL BASE DITCH
-L- STA. 13+40 LT
EL.=114.19'
(-)2.86%
(-)0.94%
PI -L- STA. 14+00 LT
EL.=112.47'
END SPECIAL LATERAL BASE DITCH
-L- STA. 14+50 LT
EL.=112.0'
1' SILL
EXISTING 3 @90"x69" CMPA
TO BE REMOVED
3 @ 12'x6' RCBC
(Buried 1')
130
120
110
100
12+00
13+00
14+00
15+00
16+00
17+00

HYDRAULIC DATA	
DESIGN DISCHARGE	=710 C.F.S.
FREQUENCY OF DESIGN FLOOD	=25 YRS.
DESIGN HIGH WATER ELEVATION	=115.0 FT.
DRAINAGE AREA	=5.77 SQ. MI.
BASIC DISCHARGE (Q100)	=1,100 C.F.S.
BASIC HIGH WATER ELEVATION	=115.8 FT.

OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	=1,250 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	=100+ YRS.
OVERTOPPING FLOOD ELEVATION	=116.0 FT.*

*STATION 16+91 -L-

WS EL. Taken @ River Station 2880.804

FOR CULVERT PLANS SEE SHTS. CU-1 THRU CU-10

RK&K
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Raleigh, North Carolina 27615-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
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8/17/99

11/3/2025

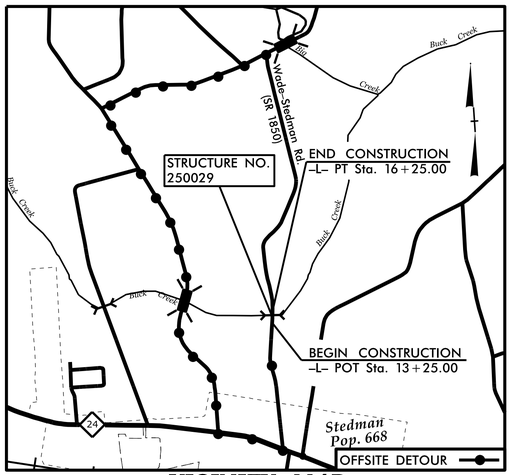
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP6-R010	RW01	6

TIP PROJECT: BP6–R010

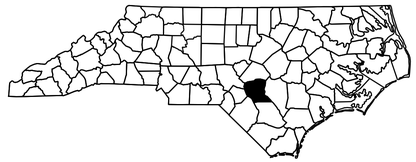
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

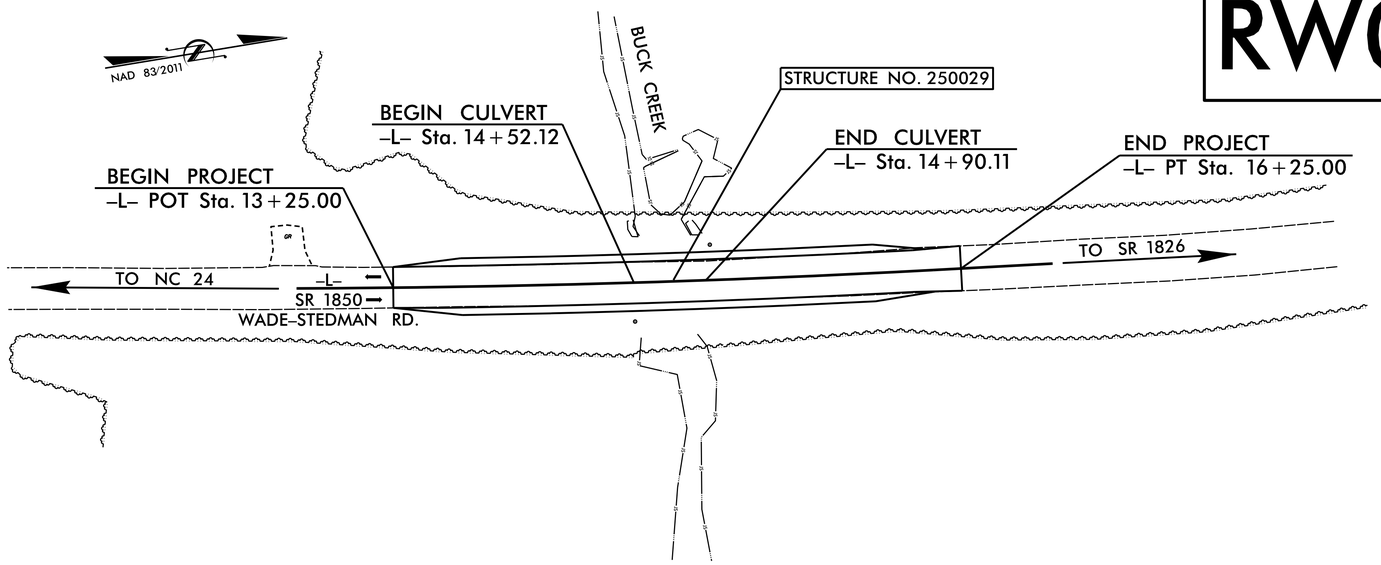
CUMBERLAND COUNTY



VICINITY MAP



RW04



GRAPHIC SCALE

40 20 0 40 80

PLANS

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCGS FOR MONUMENT "250029-101"
WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 464,315.699(ft) EASTING: 2,091,373.045(ft)
ELEVATION: 117.39(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99988007
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"250029-101" TO -L- STATION 16+73.46 IS
N 03°44'19" E 345.91(ft)
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Prepared In the Office of:

McKIM & CREED

4300 EDWARDS MILL RD., SUITE 200
RALEIGH, NC 27612
(P) 919-233-8091 (F) 919-233-8031
F-1222

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:	*LETTING DATE:*
3/15/2023	*1/21/2026*

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5060 LAND SURVEYOR RICHARD A. MITCHELL

Signed by: Richard Mitchell 10/15/2025
SIGNATURE: *Date:*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	RW02C–1

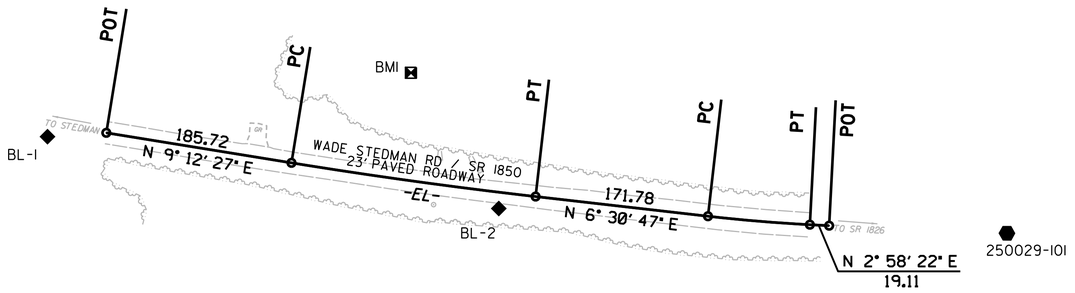
Location and Surveys

McKIM&CREED

NORTH CAROLINA PROFESSIONAL SEAL L–5060 LAND SURVEYOR RICHARD A. MITCHELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NC GRID NAD 83 NA 2011



250029-102

I, Richard A. Mitchell, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: ***AA***
Type of GPS field procedure: RTN
Dates of survey: 2/15/22
Datum/Epoch:NAD 1983/NA 2011
Published/Fixed-control use: N/A
Localized around: 250029-101
Northing: 464315.699
Easting: 2091373.045
Combined grid factor: 0.99988007
Geoid model: G18US
Units: USFT

I also certify that the Baseline Control for this project 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 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed on 2/15/22, and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 15th day of October, 2025.

Signed by:
Richard Mitchell
54617600584E49F...

Richard A. Mitchell
Professional Land Surveyor L-5060

SEE SHEET RW02C–2 FOR FURTHER ALIGNMENT DETAILS

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE SURVEY 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.

REVISIONS

REVISIONS

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	RW02C-2

Location and Surveys

McKIM&CREED

NORTH CAROLINA PROFESSIONAL SEAL L-5060 LAND SURVEYOR RICHARD A. MITCHELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, Richard A. Mitchell, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: AA
Type of GPS field procedure: RTN
Dates of survey: 2/15/22
Datum/Epoch:NAD 1983/NA 2011
Published/Fixed-control use: N/A
Localized around: 250029-101
Northing: 464315.699
Easting: 2091373.045
Combined grid factor: 0.99988007
Geoid model: G18US
Units: USFT

I also certify that the Baseline Control for this project 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 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed on 2/15/22, and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 15th day of October, 2025.

Signed by:
Richard Mitchell
-54617600584E49F...

Richard A. Mitchell
Professional Land Surveyor L-5060

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	463423.991	2091273.601							
LINE			N 09°12'27.3" E	185.72					
PC	463607.322	2091303.319							
CURVE			N 07°51'37.4" E	243.99	02°41'39.8"(LT)	01°06'15.1"	244.02	122.03	5188.93
PT	463849.022	2091336.687							
LINE			N 06°30'47.5" E	171.78					
PC	464019.691	2091356.172							
CURVE			N 04°44'34.9" E	101.22	03°32'25.1"(LT)	03°29'49.2"	101.24	50.64	1638.43
PT	464120.567	2091364.542							
LINE			N 02°58'22.3" E	19.11					
POT	464139.653	2091365.533							

BL

POINT	DESC.	NORTH	EAST	ELEVATION
1	BL-1	463365.7380	2091277.3750	119.80
2	BL-2	463812.5600	2091348.4840	115.94
101	250029-101	464315.6990	2091373.0450	117.39
102	250029-102	464854.1090	2091276.9800	124.61

BM1 ELEVATION = 115.552
N 463726 E 2091214
BL STATION 8+45.00 119 LEFT
BENCH TIE IN 18" OAK

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE SURVEY 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.

PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP6–R010	RW02D–1

Location and Surveys

McKIM&CREED
4300 EDWARDS MILL RD., SUITE 200
RALEIGH, NC 27612
(P) 919-233-8091 (F) 919-233-8031
F-1222

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5060 LAND SURVEYOR RICHARD A. MITCHELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, Richard A. Mitchell, 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 15th day of October, 2025.

Signed by:
Richard Mitchell
54617600584E49F...
Professional Land Surveyor L-5060

REVISIONS

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	463304.0858	2091254.3850
PC	12+69.66	463570.2693	2091297.5645
PT	16+10.20	463907.6518	2091343.5414
POT	16+73.46	463970.5269	2091350.4898

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. 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.

REVISIONS

RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
BP6-R010	RW03E-1

Location and Surveys

McKIM&CREED
4300 EDWARDS MILL RD., SUITE 200
RALEIGH, NC 27612
(P) 919-233-8091 (F) 919-233-8031
F-1222

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR SEAL L-5060 RICHARD A. MITCHELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I , Richard A. Mitchell , 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 on 10/6/2025, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 15th day of October, 2025.

Signed by:
Richard Mitchell
Professional Land Surveyor L-5060

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	13+40.00	-45.00	463646.4961	2091263.9706
L	13+40.00	-29.99	463644.2484	2091278.8092
L	14+25.00	-45.00	463730.0516	2091276.0865
L	14+40.00	30.19	463734.6599	2091352.6198
L	14+40.00	50.00	463731.9857	2091372.2447
L	14+45.00	-50.00	463750.4050	2091273.8286
L	14+85.00	-50.00	463789.7630	2091279.0425
L	14+95.00	-40.70	463798.4273	2091289.5341
L	15+05.00	60.00	463795.6582	2091390.6929
L	15+05.00	30.08	463799.4105	2091361.0093
L	15+65.00	-40.00	463867.4035	2091298.6977
L	15+65.00	-30.17	463866.2580	2091308.4602

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED OCTOBER 6TH, 2025.

PROJECT REFERENCE NO.	SHEET NO.
BP6-R010	RW04

Location and Surveys

McKIM & CREED
4300 EDWARDS MILL RD., SUITE 200
RALEIGH, NC 27612
(P) 919-233-8091 (F) 919-233-8031
F-1222

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-5060 LAND SURVEYOR RICHARD A. MITCHELL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I , Richard A. Mitchell , 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 10/6/2025, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 15th day of October, 2025.

Signed by:
Richard Mitchell
Professional Land Surveyor L-5060

REVISIONS

NAD 83 NA 2011 NC GRID

N 89°26'51" E 2841.81'

-L-
PI Sta 14+39.91
Δ= 2°54'28" (LT)
D = 0°51'14"
L = 340.54'
T = 170.31'
R = 6,710.00'
SE = 0.02

1
ERNEST L. FREEMAN JR. &
HOLLIS W. FREEMAN
DB 2725 PG 963

2
ERNEST LANIER FREEMAN JR. &
HOLLIS W. FREEMAN
DB 10359 PG 358

3
ERNEST L. FREEMAN JR. &
HOLLIS W. FREEMAN
DB 4723 PG 633

WOODS

BEGIN PROJECT
-L- POC Sta. 13+25.00

-L- PC Sta. 12+69.66

-L- PT Sta. 16+10.20

END PROJECT
-L- POT Sta. 16+25.00

-L- POT Sta. 16+73.46

+40.00 29.99' 45.00'
+25.00 45.00'
+45.00 50.00'
+85.00 50.00'
+95.00 40.70'
+65.00 40.00' 30.17'
+20.00 30.19'
+40.00 30.19' 40.00' 50.00'
+50.00 29.89'
+05.00 30.08' 40.00' 60.00'

+57.05 30.12'

15+00

+29.40 326.44'

N 9°12'51" E

N 6°18'22.6" E

N 12°01'13" E 582.67'

EXISTING R/W

60.00'

TO STEDMAN

WADE STEDMAN RD / SR 1850

TO SR 1826

20 10 0 20 40
GRAPHIC SCALE

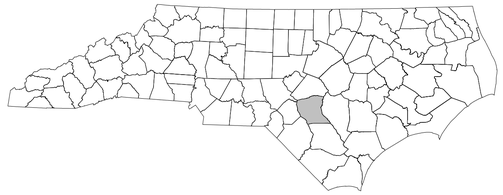
NOTES:

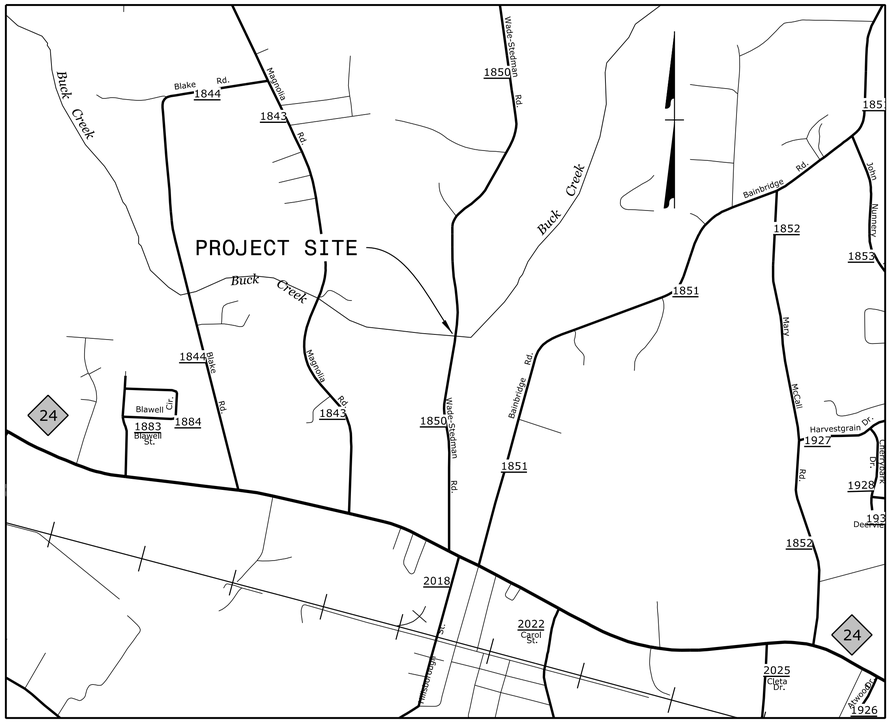
1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED OCTOBER 6TH, 2025.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

CUMBERLAND COUNTY





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

PLANS PREPARED BY:	NCDOT CONTACTS:
K. BISBY, PE TECHNICAL MANAGER	ADAM T. BRITT DIV 6 BRIDGE PROGRAM MANAGER
A. TUTT SENIOR DESIGNER	JASON R. HATFIELD DIV 6 ASSISTANT BRIDGE PROGRAM MANAGER

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

INDEX OF SHEETS

SHEET NO.
TMP-1

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Raleigh, North Carolina 27615-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

APPROVED: DocuSigned by: Kevin Bisby BDDBD2628912474...

DATE: 11/6/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21047 ENGINEER KEVIN W. BISBY

TIP PROJECT: 250029

11/6/2025
250029_TMP_PSH01.dgn
kbisby

PROJ. REFERENCE NO.	SHEET NO.
250029	TMP-1A

RK&K
P: (919) 878-8560
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Raleigh, North Carolina 27615-3960
NC License No. F-0112
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www.rkk.com
Responsive People | Creative Solutions

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - 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
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGERS

LEGEND

GENERAL

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

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM SKINNY DRUM TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN
- PORTABLE CONCRETE BARRIER
- PORTABLE CONCRETE BARRIER (EXISTING)
- PORTABLE CONCRETE BARRIER (SECTION VIEW)
- DRUM (SECTION VIEW)
- STATIONARY SIGN

APPROVED: DocuSigned by: Kevin Bisby BDD8D2628912474...

DATE: 11/6/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21047 ENGINEER KEVIN W. BISBY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ROADWAY STANDARD DRAWINGS & LEGEND

11/6/2025
250029_TMP_PSH01A.dgn
kbisby

RK&K
P: (919) 878-9560
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Raleigh, North Carolina 27615-3960
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Responsive People | Creative Solutions

GENERAL NOTES

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

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

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

B) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

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

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

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

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

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

TRAFFIC CONTROL DEVICES

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

PHASING

PHASE I

USING RDWY STD 1101.03, ERECT DETOUR SIGNS AND DEVICES, CLOSE WADE-STEDMAN RD TO TRAFFIC, AND CONSTRUCT PROPOSED CULVERT AND ROADWAY THROUGH THE FINAL SURFACE COURSE.

PHASE II

APPLY PAVEMENT MARKINGS, REMOVE THE OFFSITE DETOUR SIGNING AND DEVICES, AND OPEN ROADS TO TRAFFIC. USE RDWY STD 1101.02 SHEET 1 AS NEEDED TO FINALIZE CONSTRUCTION. (SEE PAVEMENT MARKING PLAN)

APPROVED: Kevin Bisby
DocuSigned by:
BDD8D2626912474...

DATE: 11/6/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21047 ENGINEER KEVIN W. BISBY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

GENERAL NOTES AND PHASING

11/6/2025
250029_TMP_PSH01B.dgn
kbisby

PROJ. REFERENCE NO.	SHEET NO.
250029	TMP - 2

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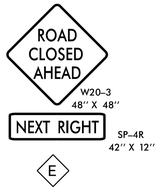

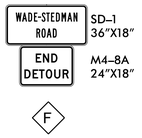

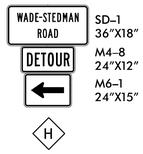

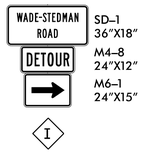

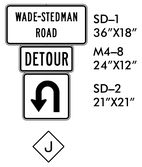

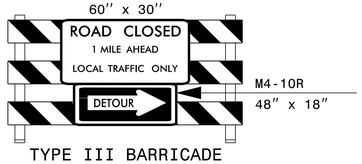

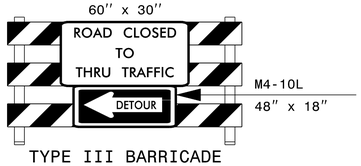

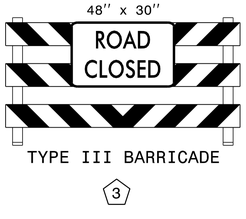

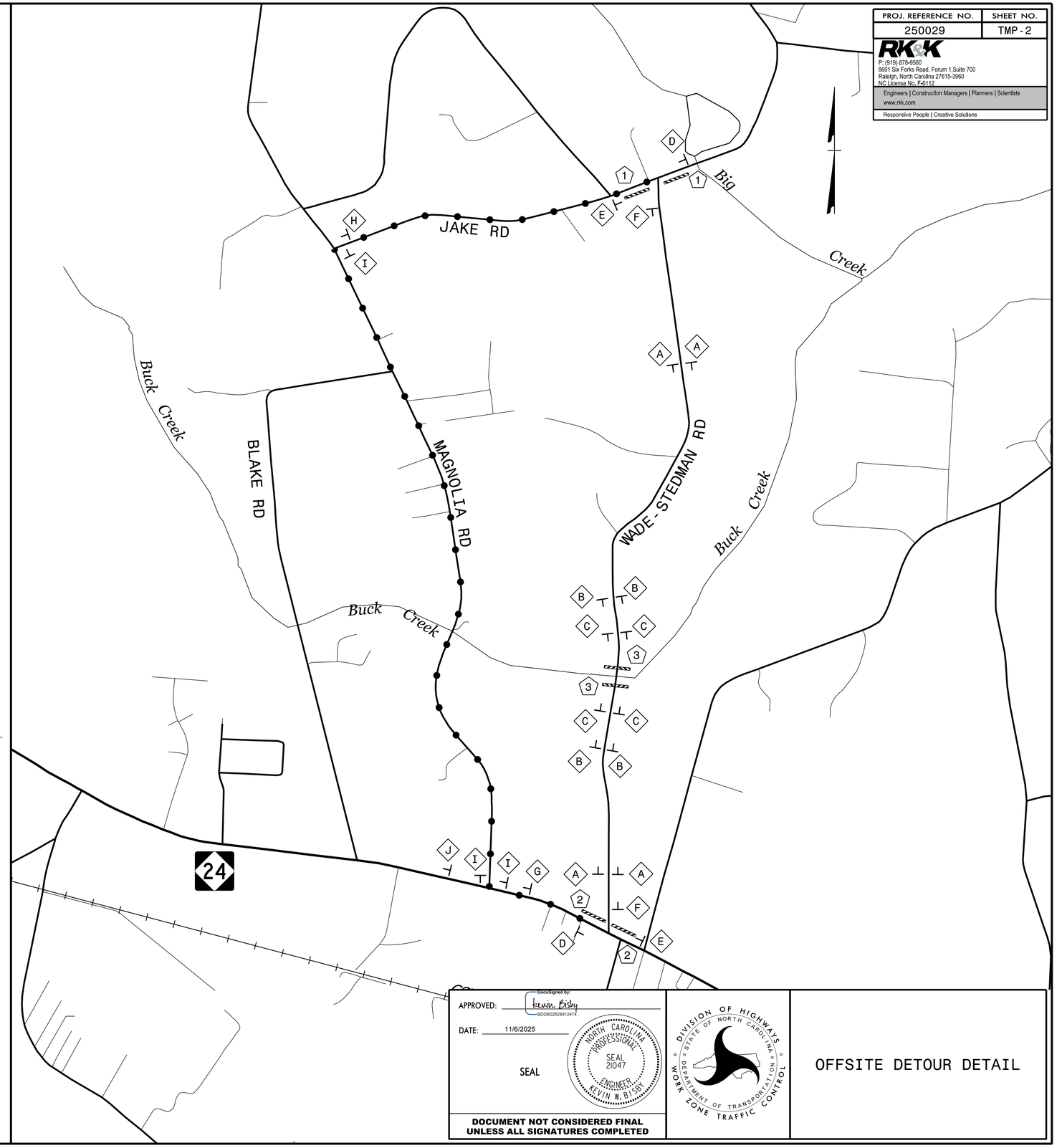

APPROVED: DocuSigned by: Kevin Bisby BDD8D2828912474...

DATE: 11/6/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21047 ENGINEER KEVIN W. BISBY

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

OFFSITE DETOUR DETAIL

11/6/2025
250029_TMP_psh02.dgn
kbisby

PROJ. REFERENCE NO.	SHEET NO.
250029	TMP-3

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SIGN NUMBER: SD-1
TYPE: STATIONARY
QUANTITY: SEE PLANS
SIGN WIDTH: 3'-0"
HEIGHT: 1'-6"
TOTAL AREA: 4.5 Sq.Ft.
BORDER TYPE: INSET
RECESS: 0.38"
WIDTH: 0.63"
RADII: 1.5"
NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: White

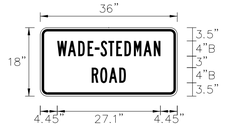
SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

USE NOTES: 1,2

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

DESIGN BY: A. TUTT
PROJECT ID: 202109
CHECKED BY: K. BISBY
LOCATION: SEE PLAN
Jun 14, 2023
DIV: 9



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

															Series/Size Text Length
	W	A	D	E	–	S	T	E	D	M	A	N			B 2000
4.4	2.8	2.7	2.5	1.8	1.6	2	2.1	2.2	2.5	2.5	2.7	1.7	4.4		27.1
	R	O	A	D											B 2000
13.5	2.2	2.3	2.7	1.7	13.5										9

FILENAME: 029_TMP_psh03

NORTH CAROLINA D.O.T. SIGN DETAIL

SIGN NUMR: SD-2
TYPE: F Ground
QUANTITY: 1
SIGN WIDTH: 1'-9"
HEIGHT: 1'-9"
TOTAL AREA: 3.1 Sq.Ft.
MAT'L: 0.063" ALUMINUM
BORDER TYPE: RECESSED
RECESS: 0.38"
WIDTH: 0.63"
RADII: 1.5"
NO. Z BARS:
LENGTH:

BACKG. COLOR: White
COPY COLOR: Black

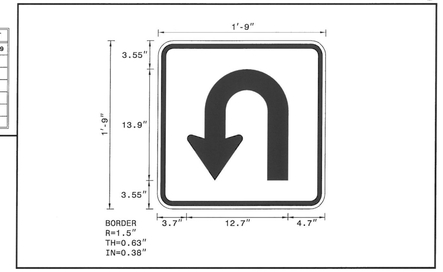
DESIGN BY:
PROJECT ID:
CHK BY:
DIV:
STD #:
DATE:

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY & SAFETY
SIGNING & DELINEATION UNIT

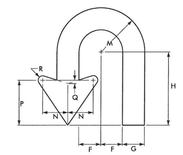
SYMBOL	X	Y	WID	HT
u arrow	3.7	3.5	12.7	13.9

NOTES:

1. Legend and border shall be direct applied Non-reflective sheeting.
2. Background shall be Grade C reflective sheeting.



Arrow Details



ARROW DIMENSIONS (INCHES)	F	G	H	M	N	P	Q	R
	2.625	2.625	8.659	5.25	3	5.25	0.375	0.5

Spacing Factor is 1 unless specified otherwise

FILENAME: GSENG

APPROVED: DocuSigned by: Kevin Bisby BDD8D2628912474...
DATE: 11/6/2025
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21047 ENGINEER KEVIN W. BISBY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SIGN DESIGN

11/6/2025
250029_TMP_psh03.dgn
kbisby

T.I.P.: BP6.R010

CONTRACT:

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PROJECT	SHEET NO.
BP6.R010	PMP-1

APPROVED: DocuSigned by: Kevin Bisby — 8DC80282B912474...

DATE: 11/2/2023

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21047 ENGINEER KEVIN W. BISBY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT MARKING PLAN

CUMBERLAND COUNTY

LOCATION: CULVERT NO. 250029 FOR BUCK CREEK ON SR 1850 (WADE–STEDMAN RD)

ROADWAY STANDARD DRAWING

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

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

GENERAL NOTES

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

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

ROAD NAME	MARKING	MARKER
SR 1850	THERMOPLASTIC	RAISED

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

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

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

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

INDEX

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

AYMAN ALQUDWAH P.E. SIGNING & DELINEATION REGIONAL ENGINEER

MITCH EATON, P.E. SIGNING & DELINEATION DESIGN ENGINEER III

RK&K

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11/2/2023
250029_PMP_PSH01.dgn
kbisby

PROJECT	SHEET NO.
BP6.R010	PMP-2

APPROVED: Kevin Bisby

DATE: 11/2/2023

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21047 ENGINEER KEVIN W. BISBY

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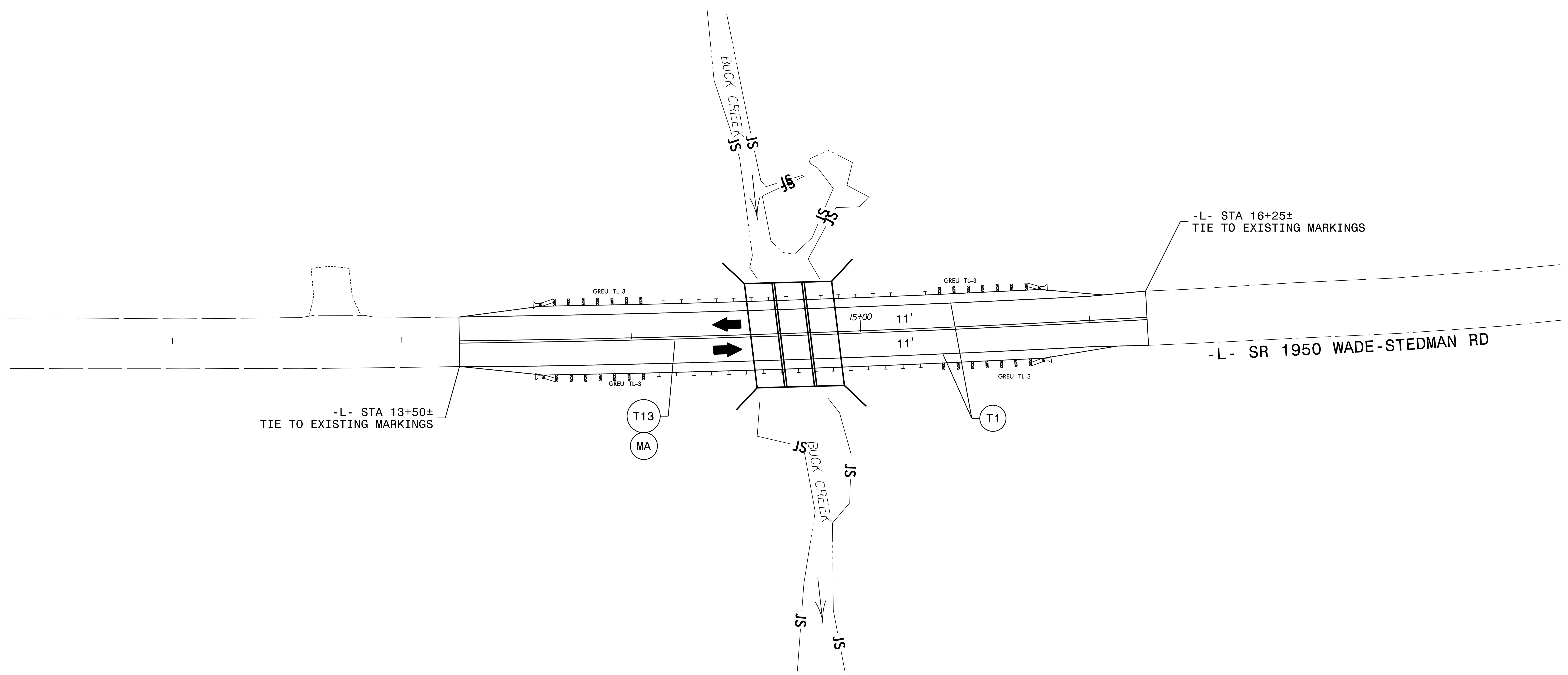

PAVEMENT MARKING SCHEDULE

T1 - 4" WHITE EDGE LINE

T13 - 4" DOUBLE YELLOW CENTERLINE

MA - RAISED PAVEMENT MARKER (YELLOW/YELLOW)

RK&K

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NC License No. F-0112

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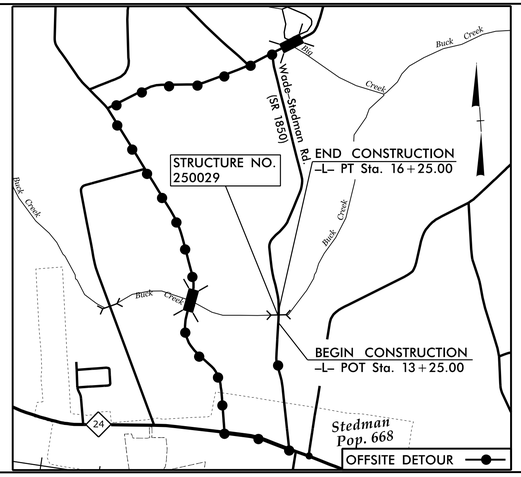
PAVEMENT MARKING DETAIL

11/2/2023
250021_PMP_PSH02.dgn
kbisby

TIP PROJECT: RP6.R010



VICINITY MAP
NOT TO SCALE

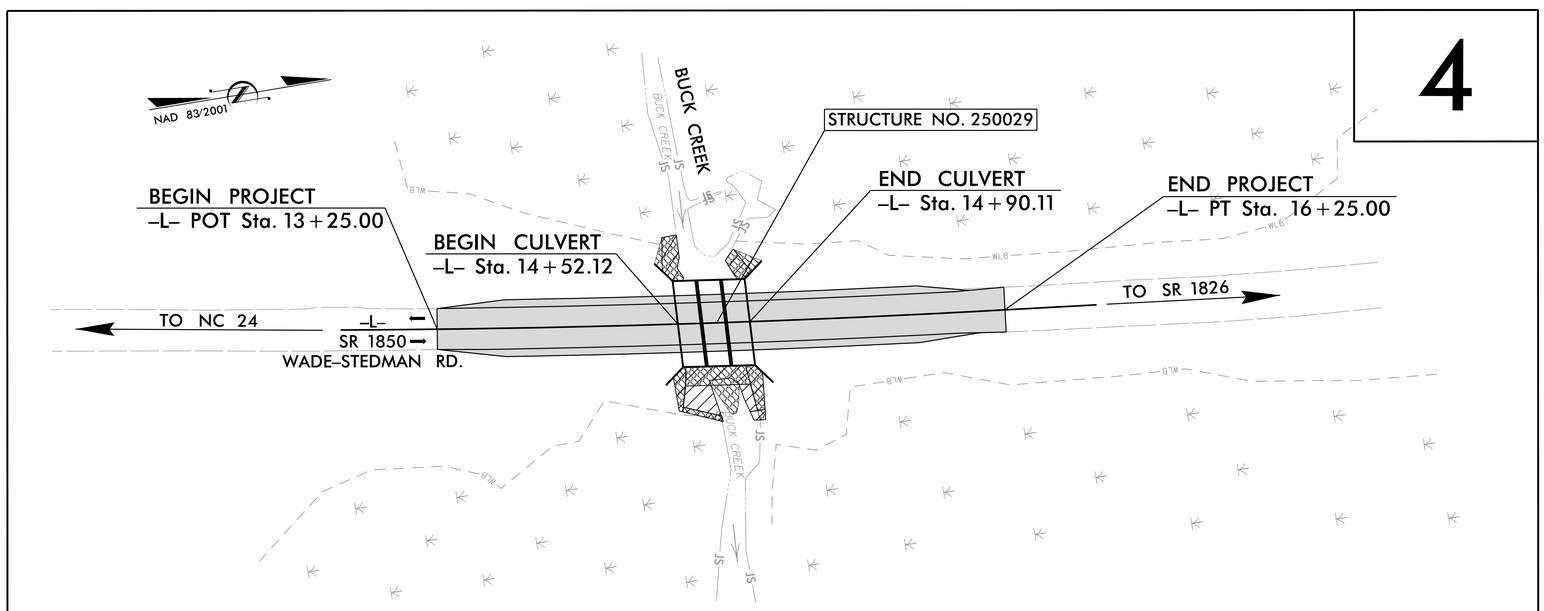
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

CUMBERLAND COUNTY

LOCATION: CULVERT NO. 250029 FOR BUCK CREEK ON SR 1850 (WADE–STEDMAN RD)

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



4

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	RP6.R010	EC-1	

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

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
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1632.03	Rock Inlet Sediment Trap Type C	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle	
	Wattle with Polyacrylamide (PAM)	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	

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

FINAL EROSION CONTROL PLANS
SUBMITTAL NO.S-018
DATE: 11-19-2025

GRAPHIC SCALE

20 10 0 20 40
PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG 010000 GENERAL STORMWATER CONSTRUCTION PERMIT ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES.

RK&K

Prepared in the Office of:

RUMMEL, KLEPPER & KAHL, LLP

8601 SIX FORKS ROAD, SUITE 700
RALEIGH, NORTH CAROLINA 27615
NC LICENSE NO. F-0112
1-888-521-4455 OR 919-878-9560

Designed by:

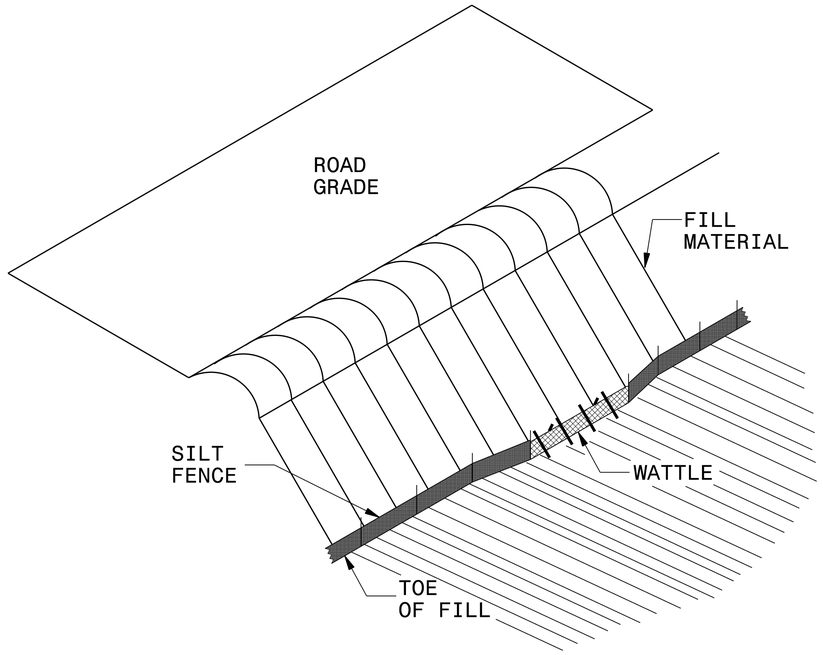
SETH JONES, EI ***4183***
NAME *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

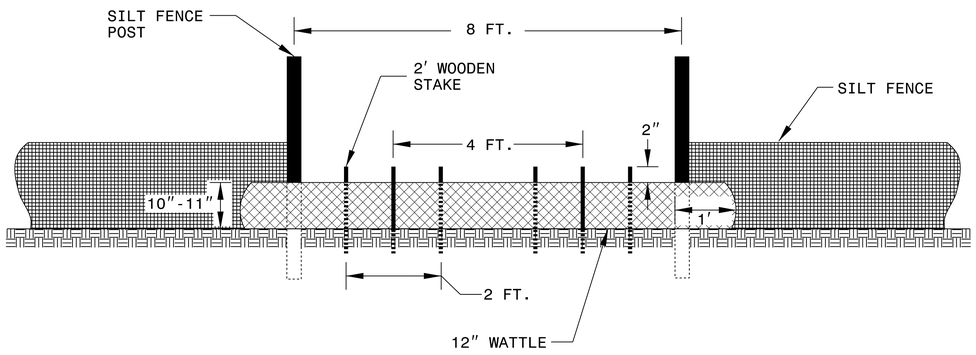
The "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2024 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

SILT FENCE COIR FIBER WATTLE BREAK DETAIL

PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	EC-02
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.

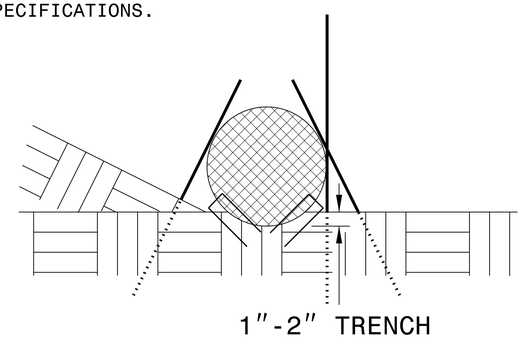
PROVIDE STAPLES MADE OF 11 GUAGE STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 6″ IN LENGTH.

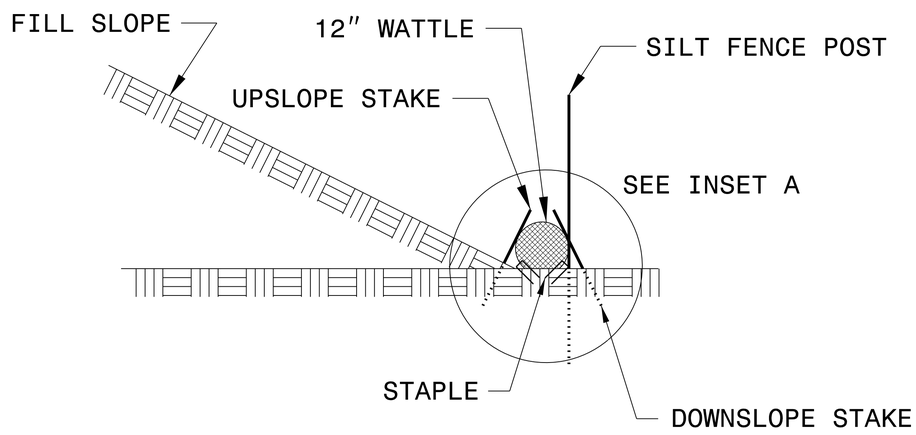
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

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

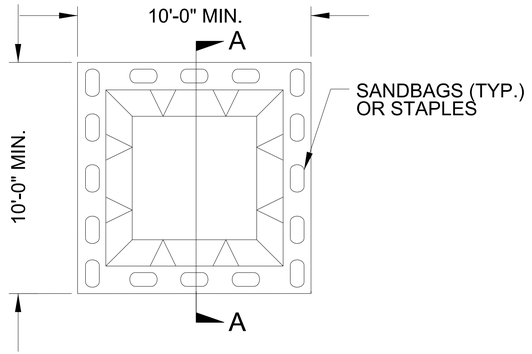




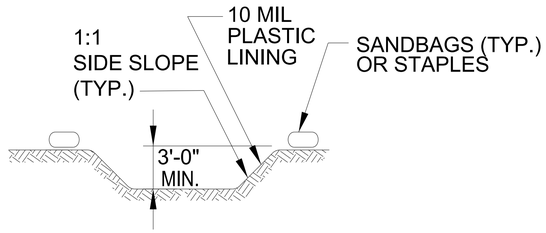
SIDE VIEW

PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A

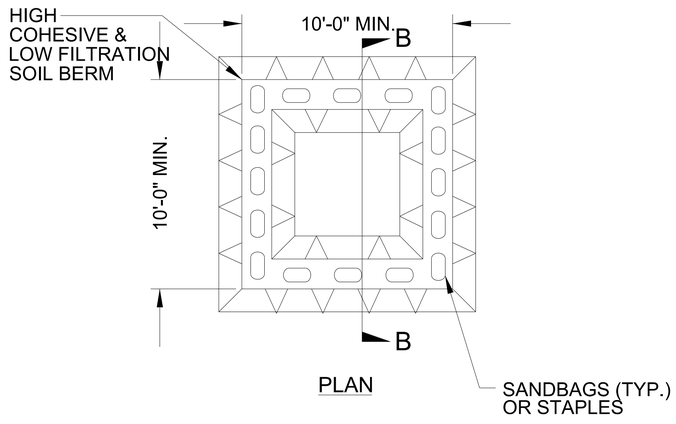
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

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.

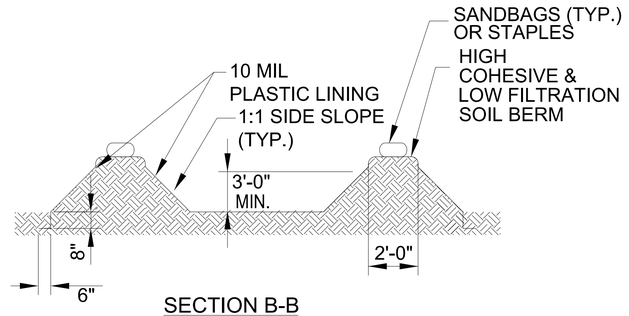
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



PLAN



SECTION B-B

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

PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	EC-03
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	13+50	14+50	LT	120
					EXCELSIOR
				SUBTOTAL	120
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					360
				TOTAL	480
				SAY	500

MATTING FOR EROSION CONTROL

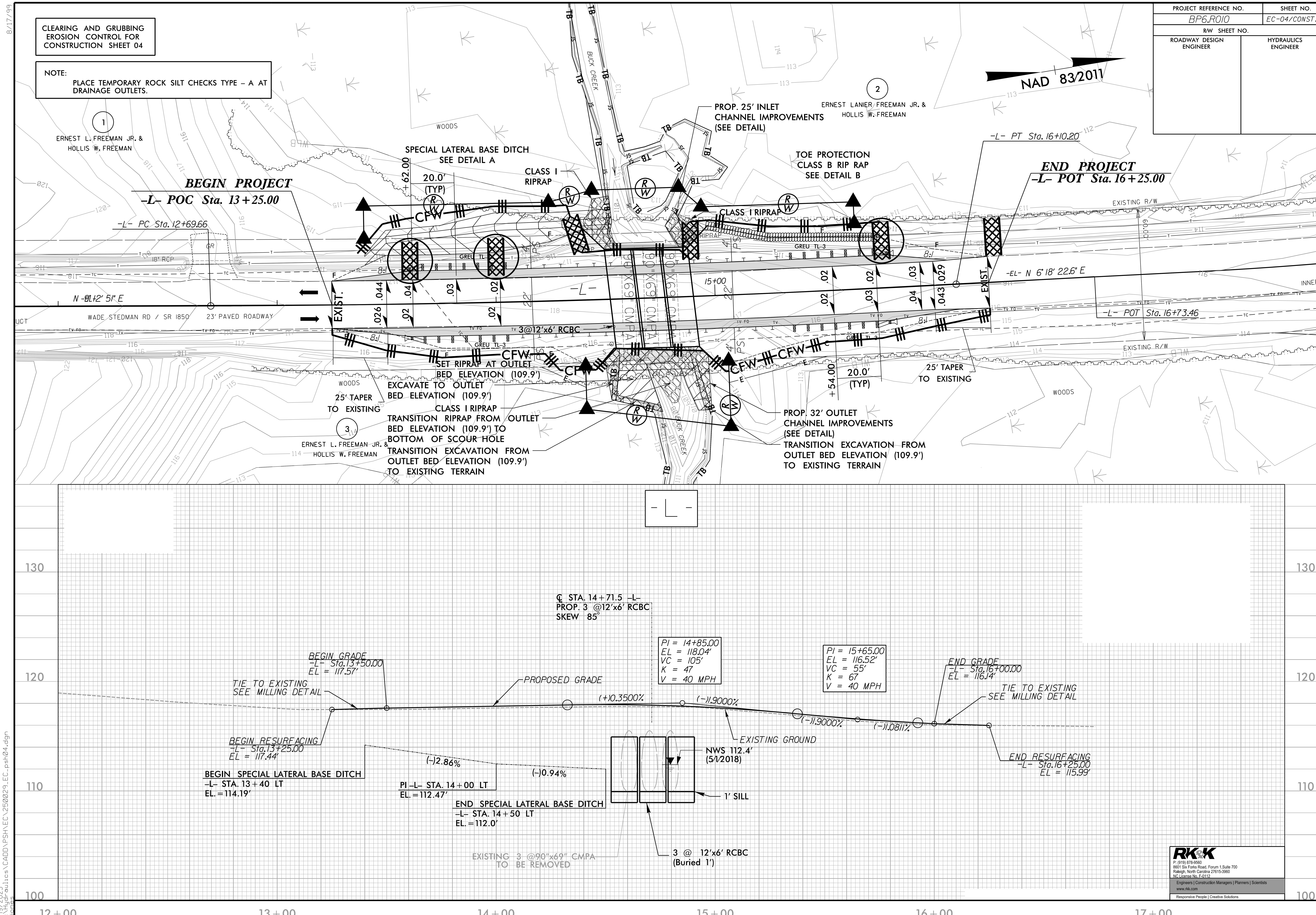
CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)

PROJECT REFERENCE NO.	SHEET NO.
BP6,R010	EC-03A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

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



PROJECT REFERENCE NO.
SHEET NO.
BP6.R010
EC-04/CONST.04
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 04
NOTE: PLACE TEMPORARY ROCK SILT CHECKS TYPE - A AT DRAINAGE OUTLETS.
NAD 83/2011
1
ERNEST L. FREEMAN JR. & HOLLIS W. FREEMAN
2
ERNEST LANIER FREEMAN JR. & HOLLIS W. FREEMAN
3
ERNEST L. FREEMAN JR. & HOLLIS W. FREEMAN
BEGIN PROJECT
-L- POC Sta. 13+25.00
-L- PC Sta. 12+69.66
END PROJECT
-L- POT Sta. 16+25.00
-L- PT Sta. 16+10.20
-L- POT Sta. 16+73.46
-EL- N 6° 18' 22.6" E
WADE STEDMAN RD / SR 1850
23' PAVED ROADWAY
BUCK CREEK
WOODS
SPECIAL LATERAL BASE DITCH SEE DETAIL A
20.0' (TYP)
CLASS I RIPRAP
PROP. 25' INLET CHANNEL IMPROVEMENTS (SEE DETAIL)
TOE PROTECTION CLASS B RIP RAP SEE DETAIL B
3@12'x6' RCBC
SET RIPRAP AT OUTLET BED ELEVATION (109.9')
EXCAVATE TO OUTLET BED ELEVATION (109.9')
25' TAPER TO EXISTING
CLASS I RIPRAP
TRANSITION RIPRAP FROM OUTLET BED ELEVATION (109.9') TO BOTTOM OF SCOUR HOLE
TRANSITION EXCAVATION FROM OUTLET BED ELEVATION (109.9') TO EXISTING TERRAIN
PROP. 32' OUTLET CHANNEL IMPROVEMENTS (SEE DETAIL)
TRANSITION EXCAVATION FROM OUTLET BED ELEVATION (109.9') TO EXISTING TERRAIN
EXISTING R/W
-L-
℄ STA. 14+71.5 -L- PROP. 3 @12'x6' RCBC SKEW 85°
PI = 14+85.00 EL = 118.04' VC = 105' K = 47 V = 40 MPH
PI = 15+65.00 EL = 116.52' VC = 55' K = 67 V = 40 MPH
BEGIN GRADE -L- Sta.13+50.00 EL = 117.57'
TIE TO EXISTING SEE MILLING DETAIL
PROPOSED GRADE
(+)0.3500%
(-)1.9000%
(-)1.9000%
(-)1.0811%
END GRADE -L- Sta.16+00.00 EL = 116.14'
TIE TO EXISTING SEE MILLING DETAIL
EXISTING GROUND
BEGIN RESURFACING -L- Sta.13+25.00 EL = 117.44'
END RESURFACING -L- Sta.16+25.00 EL = 115.99'
(-)2.86%
(-)0.94%
BEGIN SPECIAL LATERAL BASE DITCH -L- STA. 13+40 LT EL. = 114.19'
PI -L- STA. 14+00 LT EL. = 112.47'
END SPECIAL LATERAL BASE DITCH -L- STA. 14+50 LT EL. = 112.0'
NWS 112.4' (5/1/2018)
1' SILL
EXISTING 3 @90"x69" CMPA TO BE REMOVED
3 @ 12'x6' RCBC (Buried 1')
130
120
110
100
12+00
13+00
14+00
15+00
16+00
17+00
RK&K
Engineers | Construction Managers | Planners | Scientists
Responsive People | Creative Solutions

CULVERT CONSTRUCTION SEQUENCE STA. 14+73 –L–

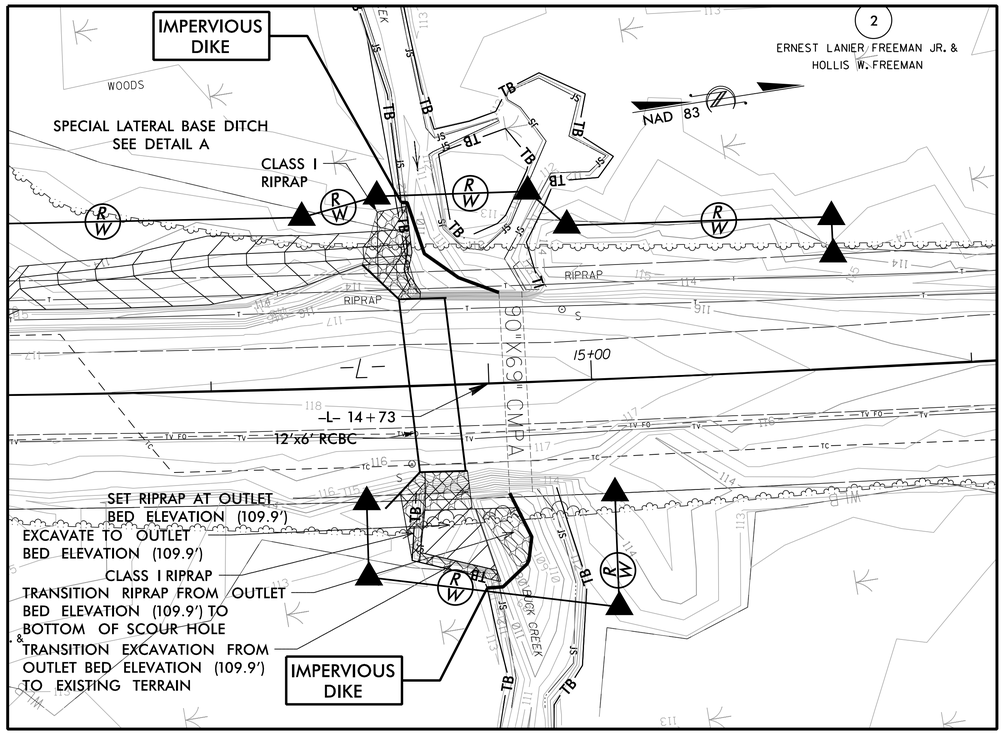
PROJECT REFERENCE NO.	SHEET NO.
BP6.R010	EC-04A/CONST.04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

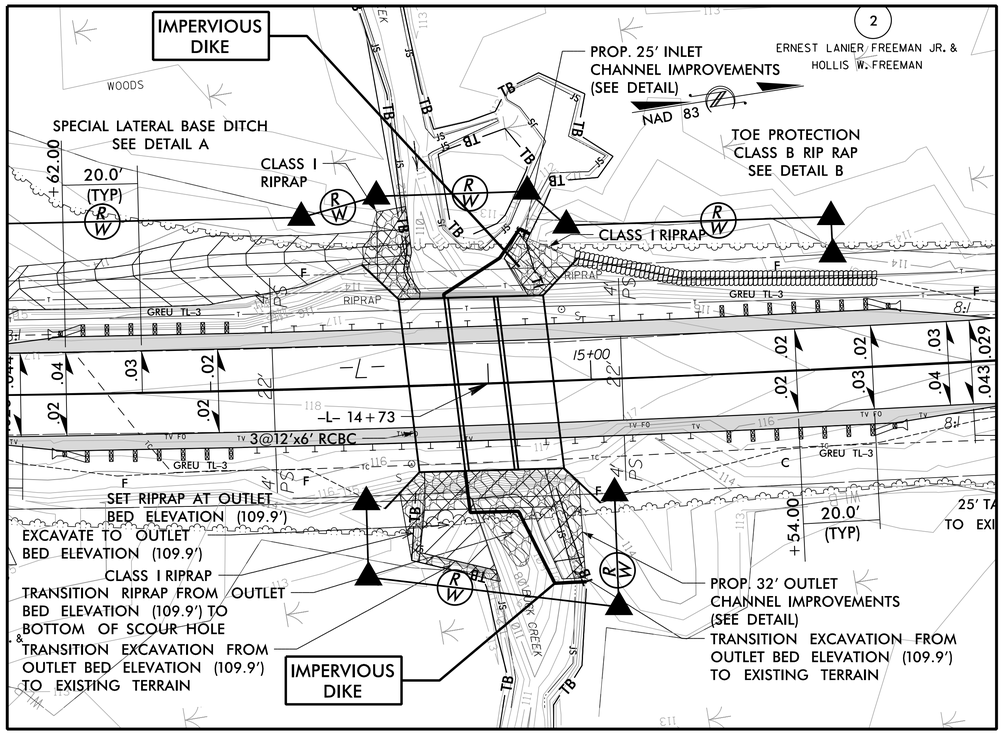
PHASE I

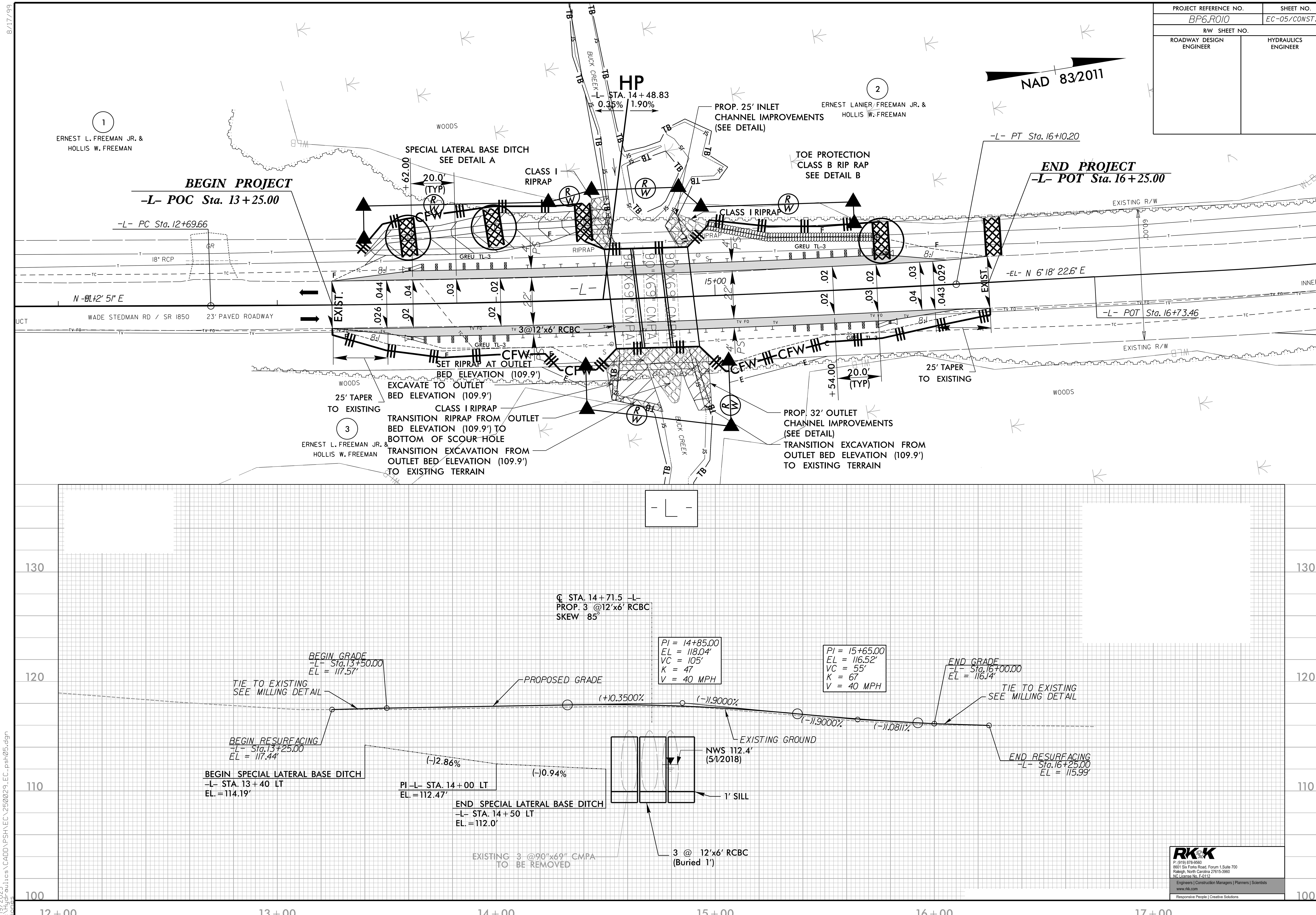
1. INSTALL IMPERVIOUS DIKES AS SHOWN TO ISOLATE THE TWO SOUTHERNMOST EXISTING CMPAS AND MAINTAIN FLOW THROUGH THE NORTHERN CMPA.
2. UTILIZE SPECIAL STILLING BASINS TO DEWATER WORK AREA.
3. REMOVE THE TWO SOUTHERNMOST CMPAS.
4. CONSTRUCT SOUTHERNMOST BARREL OF PROPOSED 3@12'X6' RCBC.
5. COMPLETE CHANNEL AND STABILIZATION WORK FOR FIRST BARREL.
6. BEGIN PHASE II.

PHASE II

1. ADJUST IMPERVIOUS DIKES AS SHOWN TO ROUTE FLOW THROUGH FIRST BARREL OF PROPOSED 3@12'X6' AND ISOLATE REMANING CMPA.
2. UTILIZE SPECIAL STILLING BASINS TO DEWATER WORK AREA.
3. REMOVE REMAINING CMPA.
4. CONSTRUCT REMAINING BARRELS OF PROPOSED 3@12'X6' RCBC.
5. COMPLETE REMAINING CHANNEL AND STABILIZATION WORK.
6. REMOVE IMPERVIOUS DIKES TO ALLOW FLOW THROUGH ALL BARRELS OF PROPOSED 3@12'X6' RCBC.
7. REMOVE REMAINING SPECIAL STILLING BASIN(S).
8. COMPLETE FINAL ROADWAY GRADING.






PROJECT REFERENCE NO.
SHEET NO.
BP6.R010
EC-05/CONST.04
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NAD 83/2011
HP
-L- STA. 14+48.83
0.35%
1.90%
BUCK CREEK
PROP. 25' INLET CHANNEL IMPROVEMENTS (SEE DETAIL)
ERNEST LANIER FREEMAN JR. & HOLLIS W. FREEMAN
ERNEST L. FREEMAN JR. & HOLLIS W. FREEMAN
WOODS
SPECIAL LATERAL BASE DITCH SEE DETAIL A
TOE PROTECTION CLASS B RIP RAP SEE DETAIL B
-L- PT Sta. 16+10.20
END PROJECT
-L- POT Sta. 16+25.00
BEGIN PROJECT
-L- POC Sta. 13+25.00
CLASS I RIPRAP
+62.00
20.0' (TYP)
-L- PC Sta. 12+69.66
18" RCP
EXISTING R/W
GREU TL-3
RIPRAP
-EL- N 6°18' 22.6" E
N 8°12' 51" E
WADE STEDMAN RD / SR 1850
23' PAVED ROADWAY
EXIST.
-L-
15+00
3@12'x6' RCBC
90"x69" CMPA
-L- POT Sta. 16+73.46
INNERDU
SET RIPRAP AT OUTLET BED ELEVATION (109.9')
EXCAVATE TO OUTLET BED ELEVATION (109.9')
25' TAPER TO EXISTING
CLASS I RIPRAP
TRANSITION RIPRAP FROM OUTLET BED ELEVATION (109.9') TO BOTTOM OF SCOUR HOLE
TRANSITION EXCAVATION FROM OUTLET BED ELEVATION (109.9') TO EXISTING TERRAIN
+54.00
20.0' (TYP)
25' TAPER TO EXISTING
PROP. 32' OUTLET CHANNEL IMPROVEMENTS (SEE DETAIL)
TRANSITION EXCAVATION FROM OUTLET BED ELEVATION (109.9') TO EXISTING TERRAIN
CFW
-L-
℄ STA. 14+71.5 -L-
PROP. 3 @12'x6' RCBC
SKEW 85°
PI = 14+85.00
EL = 118.04'
VC = 105'
K = 47
V = 40 MPH
PI = 15+65.00
EL = 116.52'
VC = 55'
K = 67
V = 40 MPH
BEGIN GRADE
-L- Sta.13+50.00
EL = 117.57'
TIE TO EXISTING SEE MILLING DETAIL
PROPOSED GRADE
(+)0.3500%
(-)1.9000%
(-)1.9000%
(-)1.0811%
END GRADE
-L- Sta.16+00.00
EL = 116.14'
TIE TO EXISTING SEE MILLING DETAIL
EXISTING GROUND
BEGIN RESURFACING
-L- Sta.13+25.00
EL = 117.44'
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(-)0.94%
NWS 112.4' (5/1/2018)
END RESURFACING
-L- Sta.16+25.00
EL = 115.99'
BEGIN SPECIAL LATERAL BASE DITCH
-L- STA. 13+40 LT
EL.=114.19'
PI -L- STA. 14+00 LT
EL.=112.47'
END SPECIAL LATERAL BASE DITCH
-L- STA. 14+50 LT
EL.=112.0'
1' SILL
EXISTING 3 @90"x69" CMPA TO BE REMOVED
3 @ 12'x6' RCBC (Buried 1')
130
120
110
100
12+00
13+00
14+00
15+00
16+00
17+00
RK&K
Engineers | Construction Managers | Planners | Scientists
Responsive People | Creative Solutions
8/17/99
11/19/2025

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	BR6.R010	X-1

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

125 120 115 110

0.020 0.020

3:1 3:1 3:1 3:1

117.65

112.24

14+25.00

0.020 0.020

3:1 3:1 3:1 3:1

117.58

112.47

14+00.00

4:1 3:1 3:1

117.50

113.19

13+75.00

4:1 3:1 3:1

117.44

113.90

13+50.00

117.44

13+25.00

—L—

11/3/2025
R:\Roadway\XSC\250029_rdy_XPLL.dgn
aheifer

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	BR6.R010	X-2

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125 120 115 110

3:1 0.025 0.031 3:1
116.65
15+50.00

125 120 115 110

3:1 0.020 0.020 3:1
117.10
15+25.00

125 120 115 110

3:1 0.020 0.020 3:1
117.51
15+00.00

125 120 115 110

3:1 0.020 0.020 3:1
117.69
14+75.00

125 120 115 110

3:1 0.020 0.020 3:1
117.71
3:1 112.00
14+50.00
—L—

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

11/3/2025
R:\Roadway\XSC\250029_rdy_XPL_L.dgn
aheller

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	BR6.R010	X-3

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

120
115
110
125

115.99
16+25.00

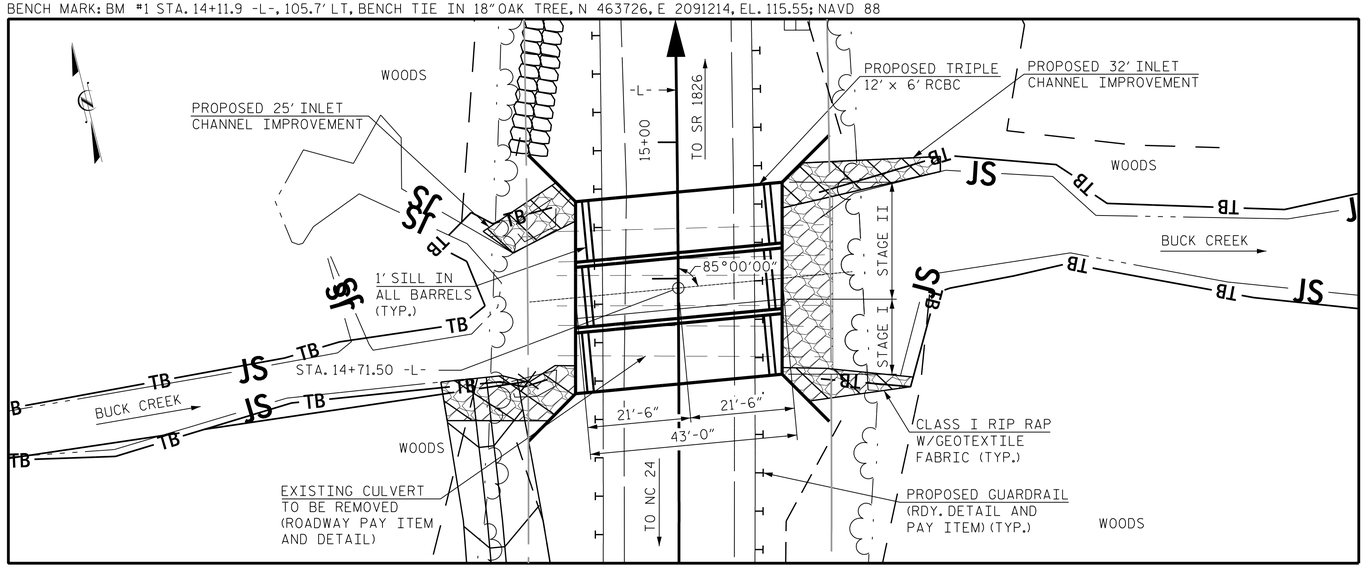
3:1 116.02 3:1
16+00.00

3:1 0.021 0.031 3:1
116.27
15+75.00
—℄—

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

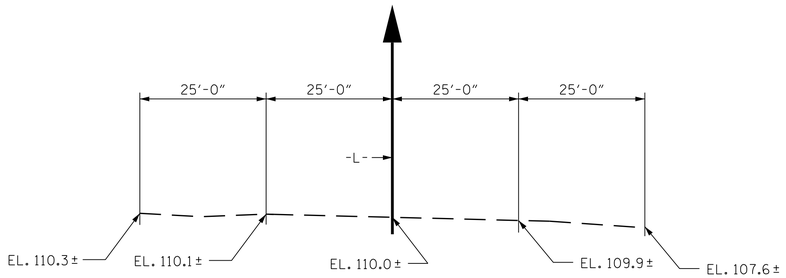
11/3/2025
R:\Roadway\XSC\250029_rdy_XPL_L.dgn
shelter

BENCH MARK: BM #1 STA. 14+11.9 -L-, 105.7' LT, BENCH TIE IN 18" OAK TREE, N 463726, E 2091214, EL. 115.55; NAVD 88



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS
BED ELEVATION AT STA. 14+71.5 -L- = 108.95
ROADWAY SLOPES = 3:1



PROFILE ALONG ℄ CULVERT

NOTES:

ASSUMED LIVE LOAD ---------- HL-93 OR ALTERNATE LOADING.

DESIGN FILL---------- 1.6 FT. (MAX.), 0.9 FT. (MIN.)

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTES SHEET.

CONCRETE IN STAGE I CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. STAGE I WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF STAGE I VERTICAL WALLS.
2. THE REMAINING PORTIONS OF STAGE I WALLS TO THE PERMITTED CONSTRUCTION JOINT AND STAGE I WINGS FOR FULL HEIGHT.

CONCRETE IN STAGE II CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. STAGE II WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4" OF STAGE II VERTICAL WALLS.
2. THE REMAINING PORTION OF STAGE II WALLS TO THE PERMITTED CONSTRUCTION JOINT AND STAGE II WINGS FOR FULL HEIGHT.
3. STAGE I AND II ROOF SLAB.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF THE EXTERIOR WALL ABOVE THE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WINGS COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

NO PRECAST BOX CULVERT OPTION WILL BE ALLOWED.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO SPLICES WILL BE PAID FOR BY THE CONTRACTOR.

EXCAVATE A MINIMUM OF 12 INCHES BELOW THE BOTTOM OF THE CULVERT AND WINGS BEARING ELEVATIONS AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS.

UNDERCUT SOFT/LOOSE ALLUVIAL SOIL THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREAS WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS.

CAMBER OF BOX CULVERT IS NOT REQUIRED.

HYDRAULIC DATA

DESIGN DISCHARGE----------710 C.F.S.
FREQUENCY OF DESIGN FLOOD----------25 YR.
DESIGN HIGH WATER ELEVATION----------115.0
DRAINAGE AREA----------5.77 SQ. MI.
BASE DISCHARGE (Q100)----------1,100 C.F.S.
BASE HIGH WATER ELEVATION----------115.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE----------1,250 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD-----100 YR. +
OVERTOPPING FLOOD ELEVATION---------116.0
OVERTOPPING----------@ STA. 16+91.00 -L-

STAGE I STRUCTURE QUANTITIES

CLASS A CONCRETE			
BARREL @	0.94	CY/FT 40.4	C.Y.
SILLS	0.9		C.Y.
WING ETC.	14.6		C.Y.
TOTAL	55.9		C.Y.
REINFORCING STEEL			
BARREL	13,628		LBS.
WINGS ETC.	726		LBS.
TOTAL	14,354		LBS.
CULVERT EXCAVATION	----------		LUMP SUM
FOUNDATION CONDITIONING MATERIAL	---		50.0 TONS

STAGE II STRUCTURE QUANTITIES

CLASS A CONCRETE			
BARREL @	3.20	CY/FT 137.6	C.Y.
SILLS	1.8		C.Y.
WING ETC.	14.6		C.Y.
TOTAL	154.0		C.Y.
REINFORCING STEEL			
BARREL	28,192		LBS.
WINGS ETC.	726		LBS.
TOTAL	28,918		LBS.
CULVERT EXCAVATION	----------		LUMP SUM
FOUNDATION CONDITIONING MATERIAL	---		80.4 TONS

PROJECT NO. BP6.R010
CUMBERLAND COUNTY
STATION: 14+71.50 -L-

SHEET 1 OF 10 REPLACES CULVERT NO. 250029

CULVERT NO. 29

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15825 BRUCE D. KLAPPENBACH
12/12/2023

RK&K
P: (919) 878-9560
8601 Six Forks Road, Forum 1 Suite 700
Raleigh, North Carolina 27615 | NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
85° SKEW

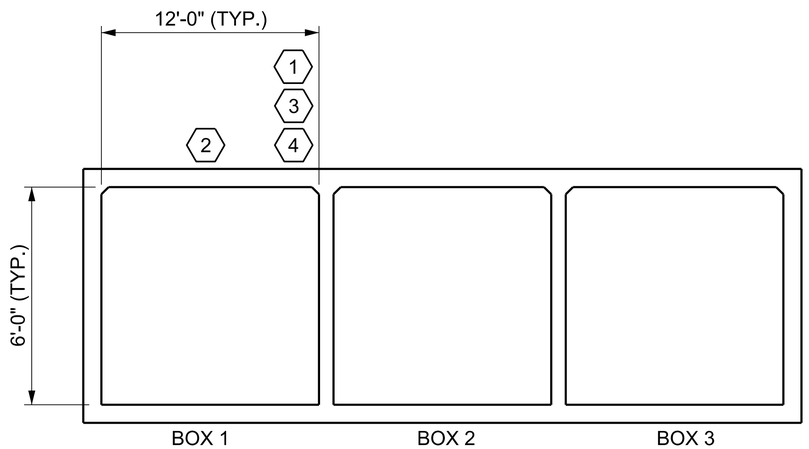
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU-29-1
1			3			TOTAL SHEETS
2			4			10

DRAWN BY : B. H. GONFA DATE : AUG 2023
CHECKED BY : M. SHARMA DATE : AUG 2023
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : AUG 2023

bgonfa
12/12/2023 R:\Structures\DGN\Final\BP6.R010_SMU_CU_29-1_250029.dgn

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
								MOMENT				SHEAR				
							LIVE-LOAD FACTORS (γ LL)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.45	--	1.75	1.80	1	TOP SLAB	6.0	1.45	1	TOP SLAB	11.9	
		HL-93 (OPERATING)	N/A		1.88	--	1.35	2.33	1	TOP SLAB	6.0	1.88	1	TOP SLAB	11.9	
		HS-20 (INVENTORY)	36.000	2	1.70	61.2	1.75	1.70	3	TOP SLAB	6.0	1.93	1	TOP SLAB	11.9	
		HS-20 (OPERATING)	36.000		2.21	79.4	1.35	2.21	3	TOP SLAB	6.0	2.51	1	TOP SLAB	11.9	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		2.72	36.7	1.40	2.72	3	TOP SLAB	6.0	3.52	1	TOP SLAB	11.9	
		SNGARBS2	20.000		2.55	50.9	1.40	2.55	3	TOP SLAB	6.0	3.18	1	TOP SLAB	11.9	
		SNAGRIS2	22.000		2.72	50.9	1.40	2.72	3	TOP SLAB	6.0	3.38	1	TOP SLAB	11.9	
		SNCOTTS3	27.250	3	1.53	41.8	1.40	1.85	3	TOP SLAB	6.0	1.53	1	TOP SLAB	11.9	
		SNAGGRS4	34.925		1.89	66.1	1.40	2.13	3	TOP SLAB	6.0	1.89	1	TOP SLAB	11.9	
		SNS5A	35.550		1.76	62.6	1.40	2.06	3	TOP SLAB	6.0	1.76	1	TOP SLAB	11.9	
		SNS6A	39.950		1.75	69.8	1.40	2.07	3	TOP SLAB	6.0	1.75	1	TOP SLAB	11.9	
		SNS7B	42.000		1.74	73.2	1.40	2.05	1	TOP SLAB	6.0	1.74	1	TOP SLAB	11.9	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.75	90.8	1.40	2.75	1	TOP SLAB	6.0	2.75	1	TOP SLAB	11.9	
		TNT4A	33.075		1.89	62.4	1.40	2.25	1	TOP SLAB	6.0	1.89	1	TOP SLAB	11.9	
		TNT6A	41.600		1.77	73.6	1.40	2.07	3	TOP SLAB	6.0	1.77	1	TOP SLAB	11.9	
		TNT7A	42.000		1.82	76.2	1.40	2.16	3	TOP SLAB	6.0	1.82	1	TOP SLAB	11.9	
		TNT7B	42.000		1.72	74.6	1.40	2.03	1	TOP SLAB	6.0	1.78	1	TOP SLAB	11.9	
		TNAGRIT4	43.000		1.82	78.1	1.40	2.25	1	TOP SLAB	6.0	1.82	1	TOP SLAB	11.9	
		TNAGT5A	45.000		1.84	82.9	1.40	2.21	1	TOP SLAB	6.0	1.84	1	TOP SLAB	11.9	
		TNAGT5B	45.000		1.73	77.7	1.40	2.21	3	TOP SLAB	6.0	1.73	1	TOP SLAB	11.9	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.78	51.2	1.30	1.78	3	TOP SLAB	6.0	2.05	1	TOP SLAB	11.9	
		EV3	43.000	4	1.14	49.1	1.30	1.51	3	TOP SLAB	6.0	1.14	1	TOP SLAB	11.9	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATES.

COMMENTS:

1.
2.
3.
4.

(#) 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

PROJECT NO. BP6.R010
CUMBERLAND COUNTY
STATION: 14+71.50 -L-

SHEET 2 OF 10

CULVERT NO. 29

RK&K
P: (919) 878-9560
8601 Six Forks Road, Forum 1 Suite 700
Raleigh, North Carolina 27615 | NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
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Responsive People | Creative Solutions

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15825 BRUCE D. KLAPPENBACH
7/31/2023
12/12/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

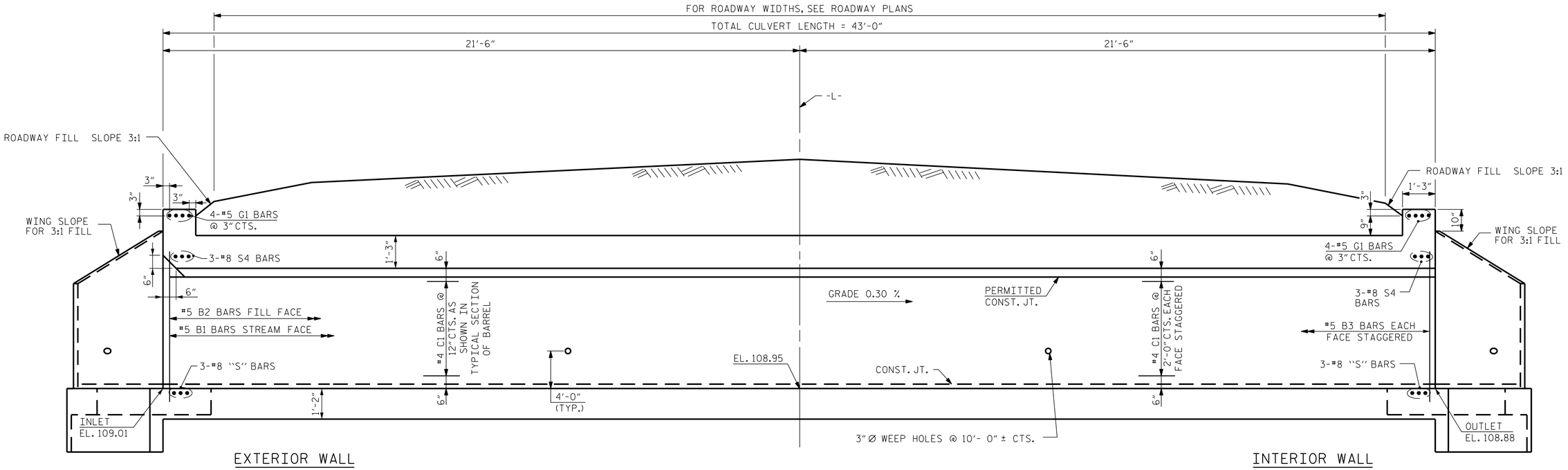
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_29-2
1			3			TOTAL SHEETS
2			4			10

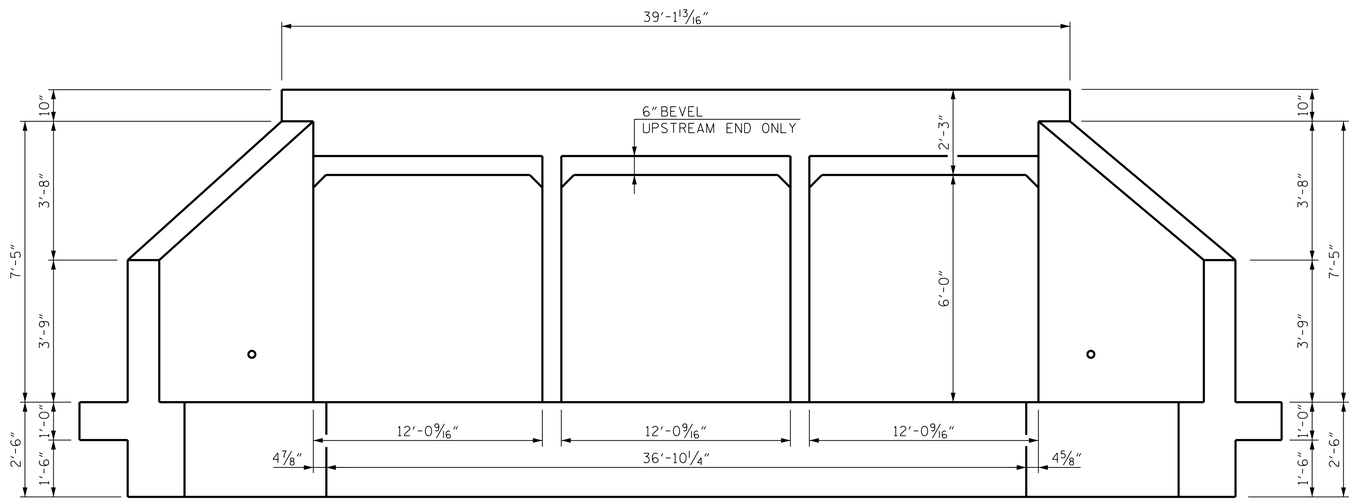
STD. NO. LRFR5

DRAWN BY : B. H. GONFA DATE : AUG 2023
CHECKED BY : M. SHARMA DATE : AUG 2023
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : AUG 2023

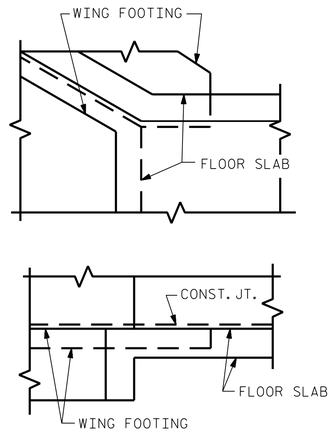
bgonfa
12/12/2023 R:\Structures\DGN\Final\BP6.R010_SMU_CU_29-2_250029.dgn



CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION



DETAIL

(CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING)

PROJECT NO. BP6.R010

CUMBERLAND COUNTY

STATION: 14+71.50 -L-

SHEET 3 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
85° SKEW

CULVERT NO. 29

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15825 BRUCE D. KLAPPENBACH
12/12/2023

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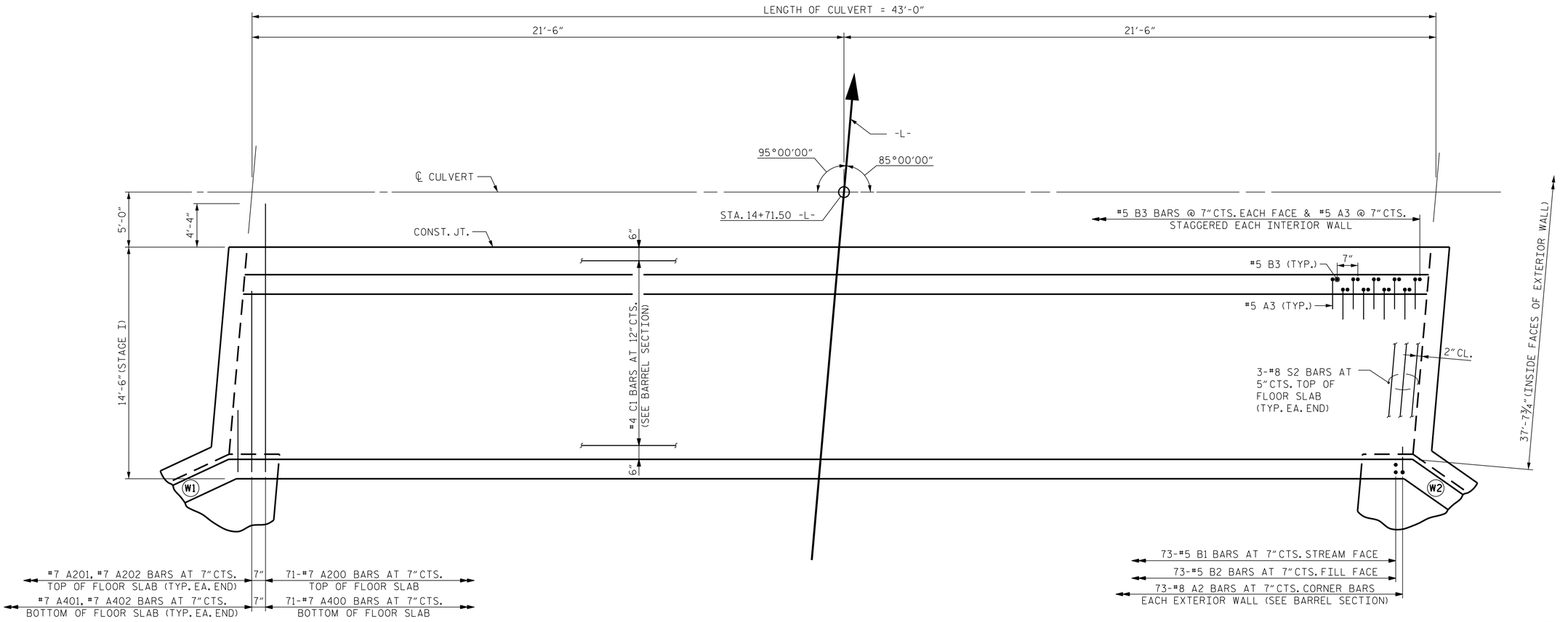

STAGE I

PLAN FLOOR SLAB

PROJECT NO. BP6.R010

CUMBERLAND COUNTY

STATION: 14+71.50 -L-

SHEET 4 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
85° SKEW
STAGE I

CULVERT NO. 29

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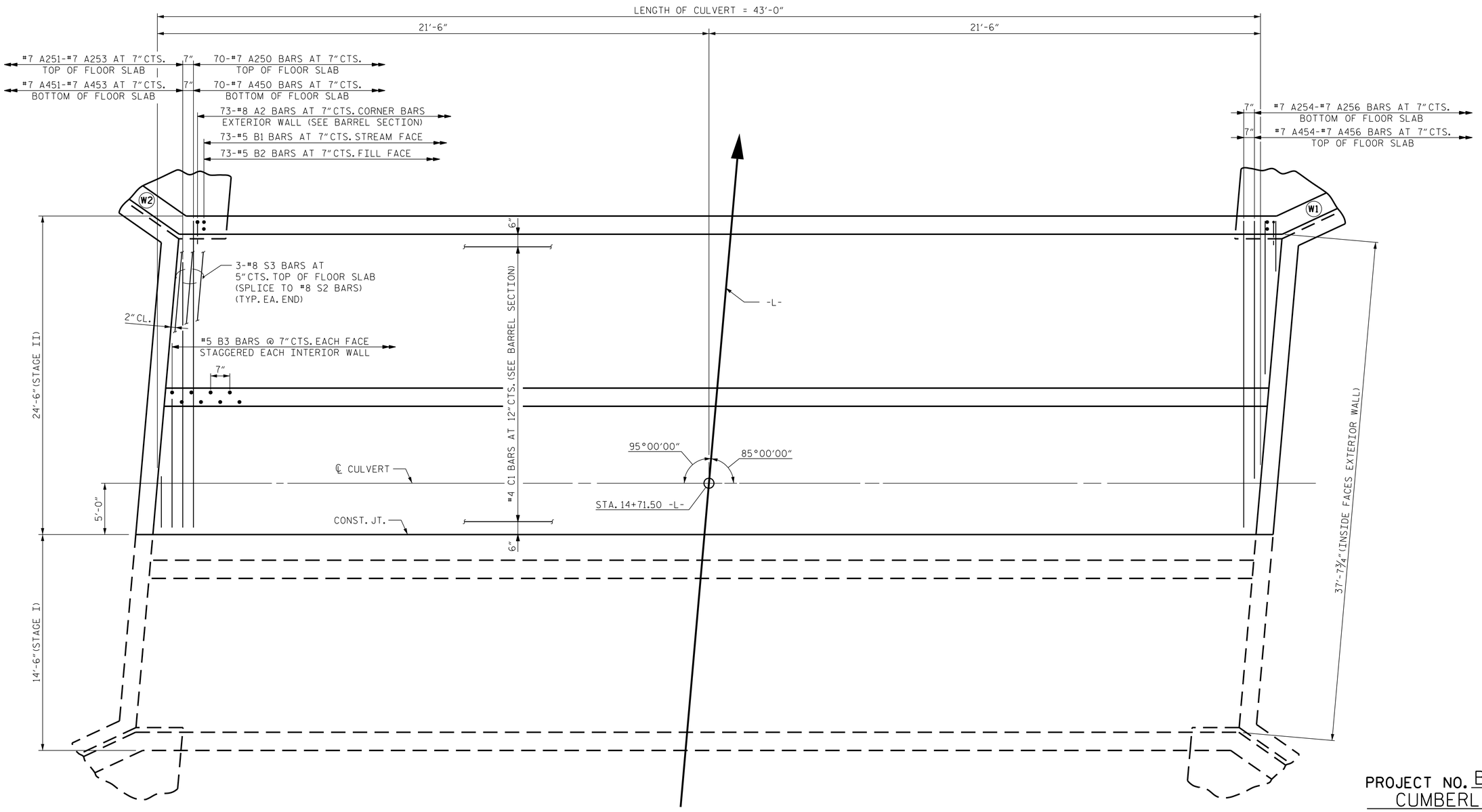

STAGE II

PLAN FLOOR SLAB

PROJECT NO. BP6.R010

CUMBERLAND COUNTY

STATION: 14+71.50 -L-

SHEET 5 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
85° SKEW
STAGE II

CULVERT NO. 29

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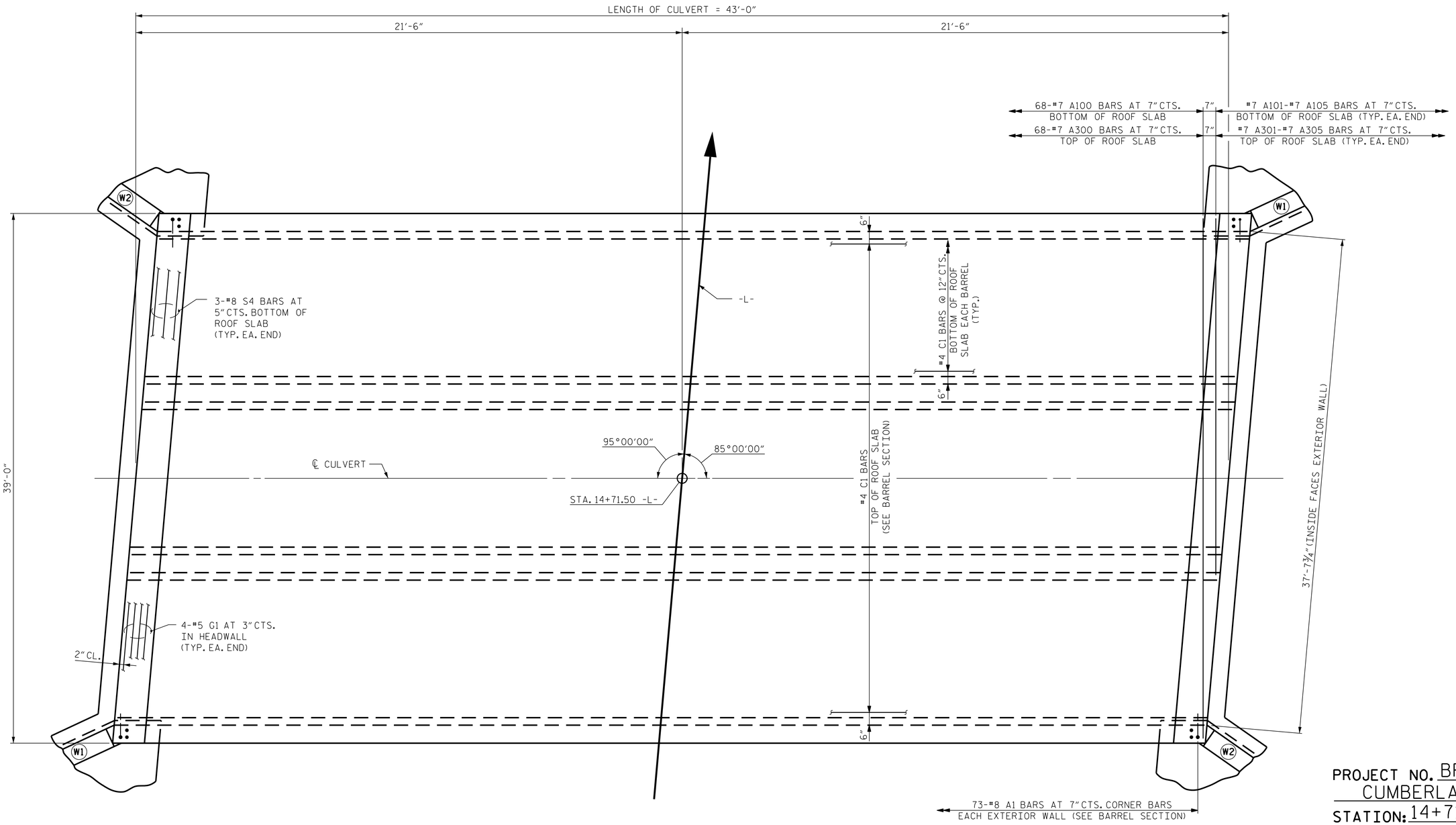

STAGE II

PLAN ROOF SLAB

PROJECT NO. BP6.R010

CUMBERLAND COUNTY

STATION: 14+71.50 -L-

SHEET 6 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
85° SKEW
STAGE II

CULVERT NO. 29

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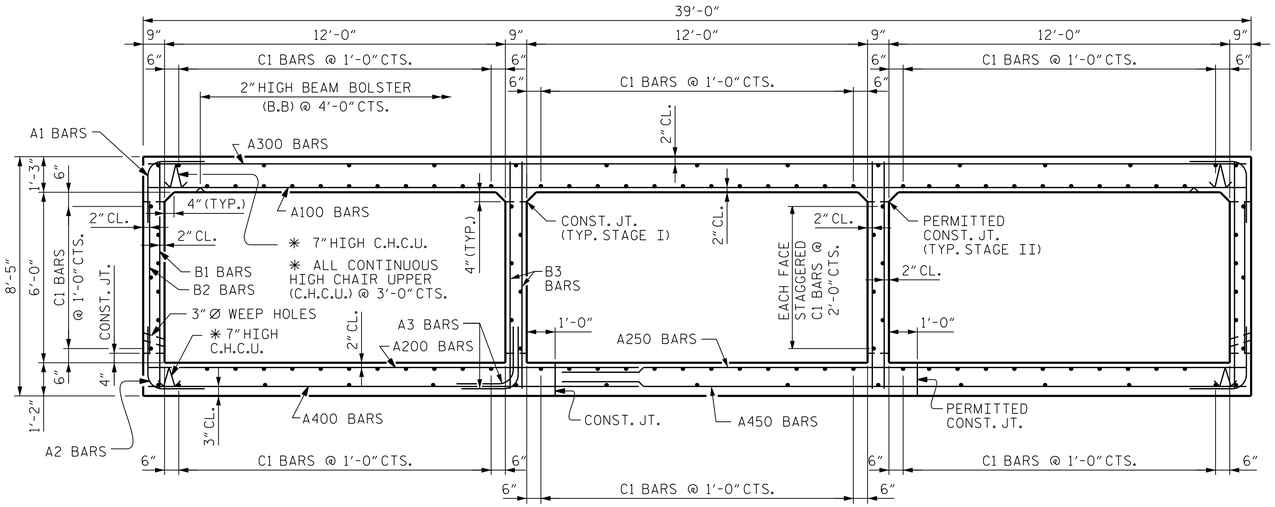
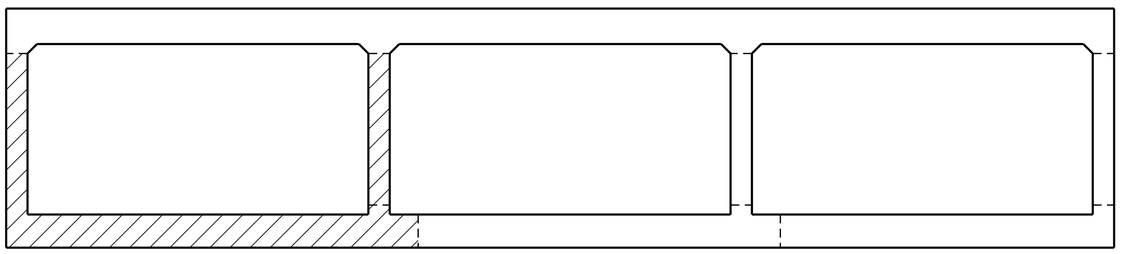
SPLICE LENGTHS		
BAR	SIZE	SPLICE LENGTHS
B1	#5	3′-8″
B2	#5	3′-8″
C1	#4	2′-5″
''S''	#8	4′-9″



RIGHT ANGLE SECTION OF BARREL

THERE ARE 124 ''C'' BARS IN SECTION OF BARREL

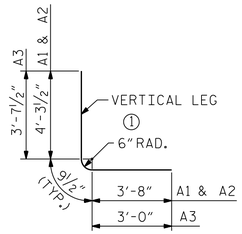


STAGE I

STAGE II

CONSTRUCTION SEQUENCE

BAR TYPE



DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL (STAGE I)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	73	#8	1	8′-9″	1,705
A2	73	#8	1	8′-9″	1,705
A3	147	#5	1	7′-5″	1,137
A200	71	#7	STR.	18′-8″	2,709
A201	2	#7	STR.	13′-2″	54
A202	2	#7	STR.	6′-6″	27
A400	71	#7	STR.	18′-8″	2,709
A401	2	#7	STR.	13′-2″	54
A402	2	#7	STR.	6′-6″	27
B1	73	#5	STR.	8′-0″	609
B2	73	#5	STR.	5′-3″	400
B3	147	#5	STR.	8′-0″	1,227
C1	62	#4	STR.	22′-6″	932
D1	8	#6	STR.	1′-9″	21
S2	6	#8	STR.	19′-6″	312

REINFORCING STEEL 13,628 LBS.

BILL OF MATERIAL (STAGE II)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	73	#8	1	8′-9″	1,705
A2	73	#8	1	8′-9″	1,705
A100	68	#7	STR.	38′-8″	5,374
A101	1	#7	STR.	33′-1″	68
A102	1	#7	STR.	26′-5″	54
A103	1	#7	STR.	19′-9″	40
A104	1	#7	STR.	13′-1″	27
A105	1	#7	STR.	6′-5″	13
A250	70	#7	STR.	24′-2″	3,458
A251	1	#7	STR.	18′-7″	38
A252	1	#7	STR.	11′-11″	24
A253	1	#7	STR.	5′-3″	11
A254	1	#7	STR.	19′-9″	40
A255	1	#7	STR.	13′-1″	27
A256	1	#7	STR.	6′-5″	13
A300	68	#7	STR.	38′-8″	5,374
A301	1	#7	STR.	33′-1″	68
A302	1	#7	STR.	26′-5″	54
A303	1	#7	STR.	19′-9″	40
A304	1	#7	STR.	13′-1″	27
A305	1	#7	STR.	6′-5″	13
A450	70	#7	STR.	24′-2″	3,458
A451	1	#7	STR.	18′-7″	38
A452	1	#7	STR.	11′-11″	24
A453	1	#7	STR.	5′-3″	11
A454	1	#7	STR.	19′-9″	40
A455	1	#7	STR.	13′-1″	27
A456	1	#7	STR.	6′-5″	13
B1	73	#5	STR.	8′-0″	609
B2	73	#5	STR.	5′-3″	400
B3	147	#5	STR.	8′-0″	1,227
C1	186	#4	STR.	22′-6″	2,796
D1	16	#6	STR.	1′-9″	42
G1	8	#5	STR.	38′-9″	323
S3	6	#8	STR.	24′-4″	390
S4	6	#8	STR.	38′-9″	621

REINFORCING STEEL 28,192 LBS.

PROJECT NO. BP6.R010

CUMBERLAND COUNTY

STATION: 14+71.50 -L-

SHEET 7 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
85° SKEW

CULVERT NO. 29

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15825 BRUCE D. KLAPPENBACH

12/12/2023

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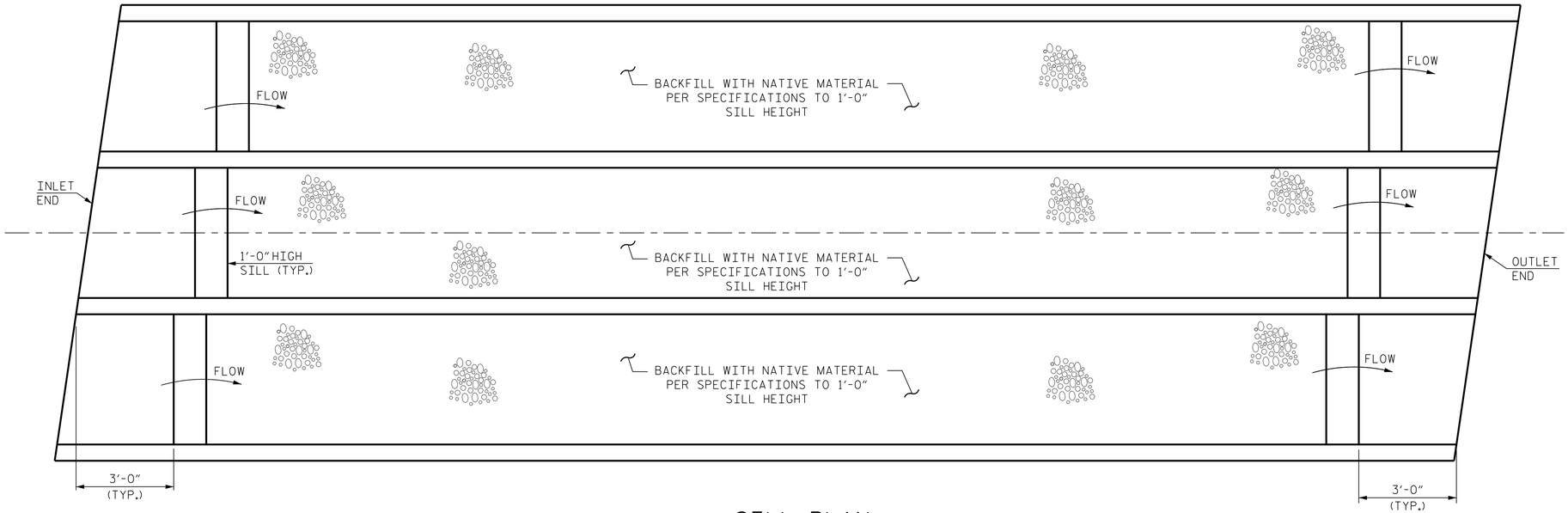
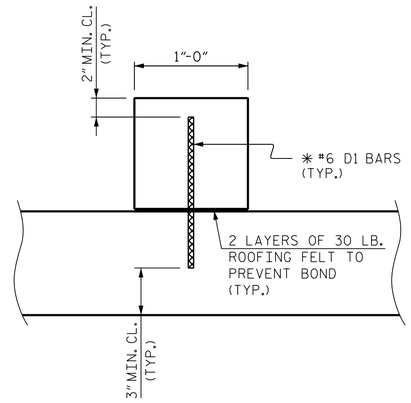


SILL PLAN

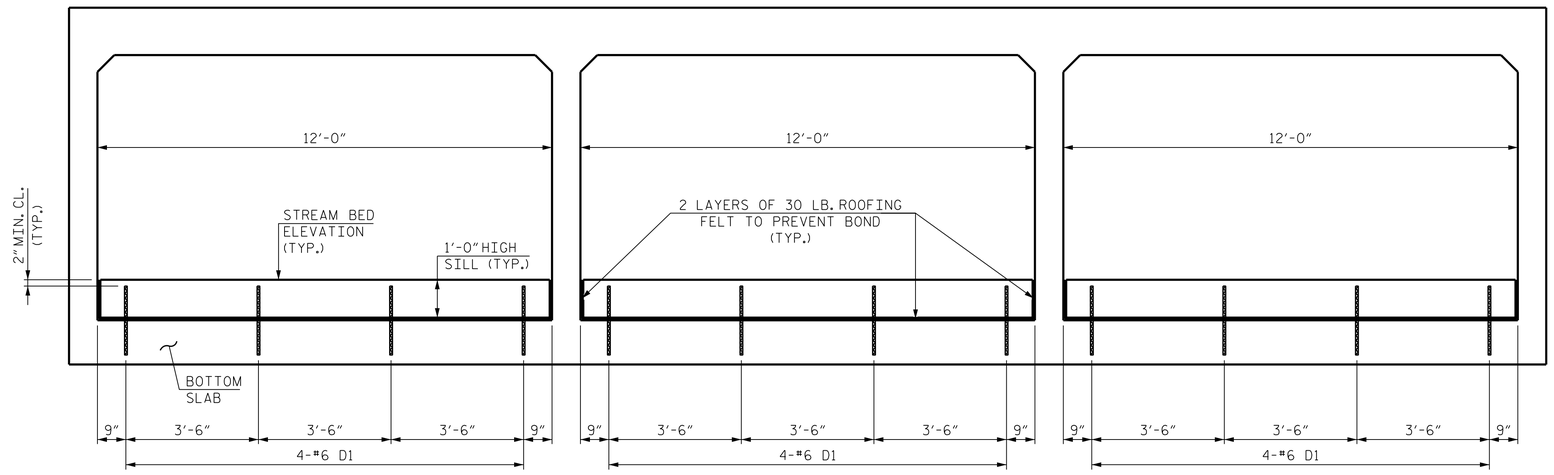


SECTION THROUGH SILL

* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

NOTE:

THE ENGINEER, IN CONSULTATION WITH DEO STAFF, SHALL REVIEW ALL MATERIAL TO BE USED AS BACKFILL PRIOR TO CONDUCTING THE BACKFILL ACTIVITY. BACKFILL SHALL CONSIST OF ONLY NATIVE MATERIAL UNLESS THE ENGINEER, IN CONSULTATION WITH DEO STAFF, DETERMINES THAT (1) THE NATIVE MATERIAL IS UNSUITABLE, OR (2) ADDITIONAL MATERIAL IS REQUIRED TO SUPPLEMENT THE NATIVE MATERIAL. THE CHOSEN BACKFILL MATERIAL SHALL NOT HAVE ADVERSE EFFECTS TO AQUATIC LIFE, AQUATIC LIFE PASSAGE, OR WATER QUALITY. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION.



SILL ELEVATION

PROJECT NO. BP6.R010
CUMBERLAND COUNTY
STATION: 14+71.50 -L-

SHEET 8 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 6 FT.
CONCRETE BOX CULVERT
85° SKEW

CULVERT NO. 29

NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER BRUCE D. KLAPPENBACH
12/12/2023

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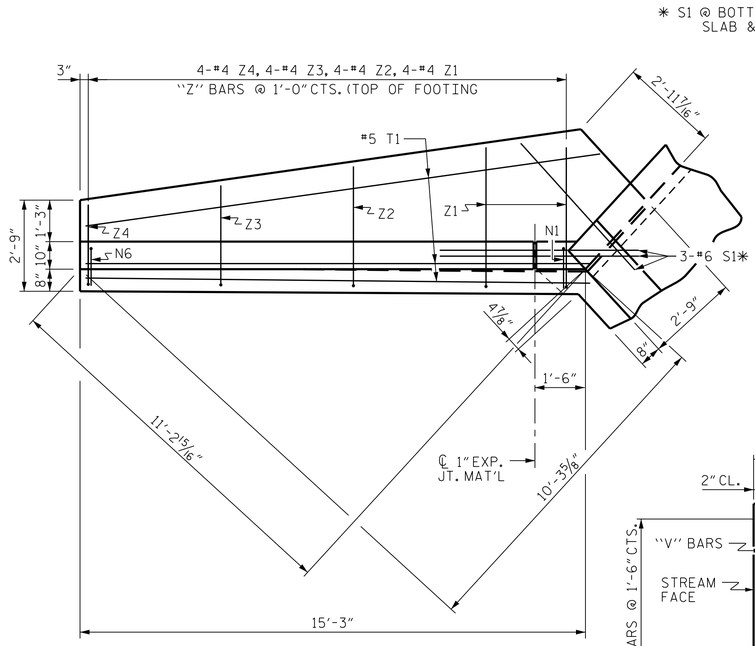
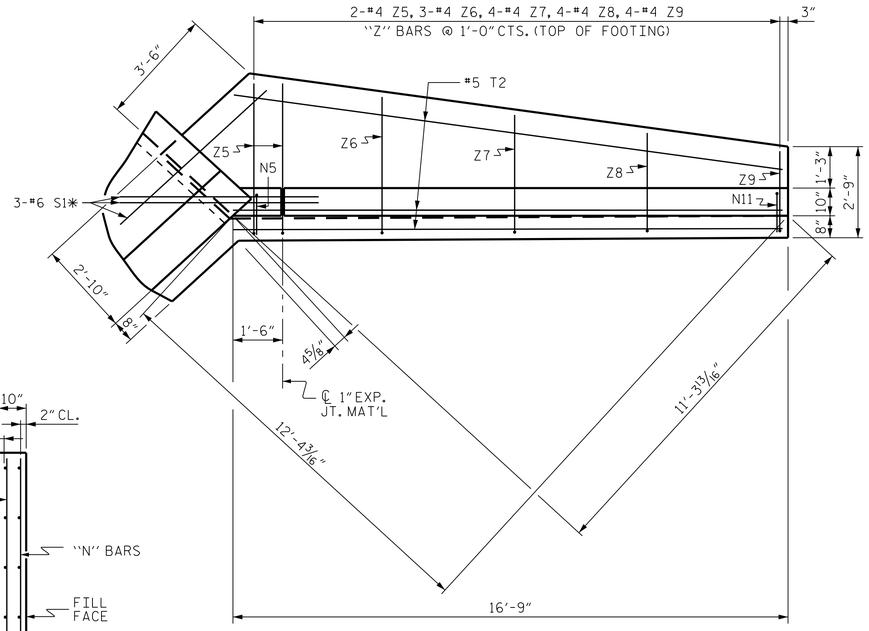
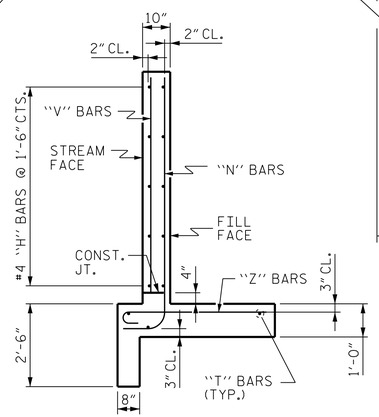


PLAN W2

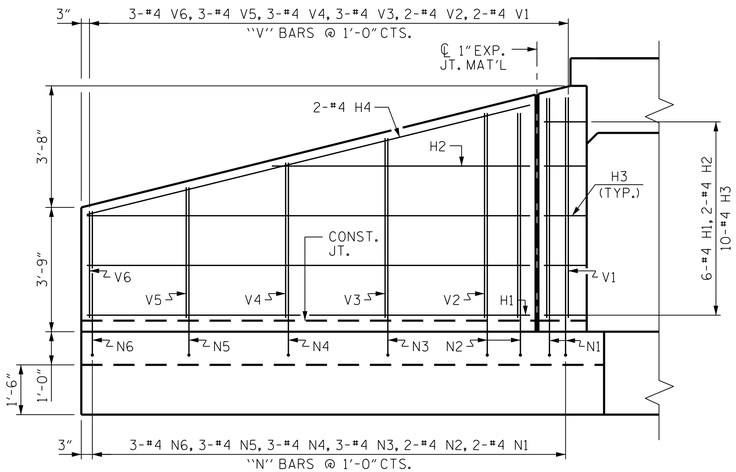


PLAN W1

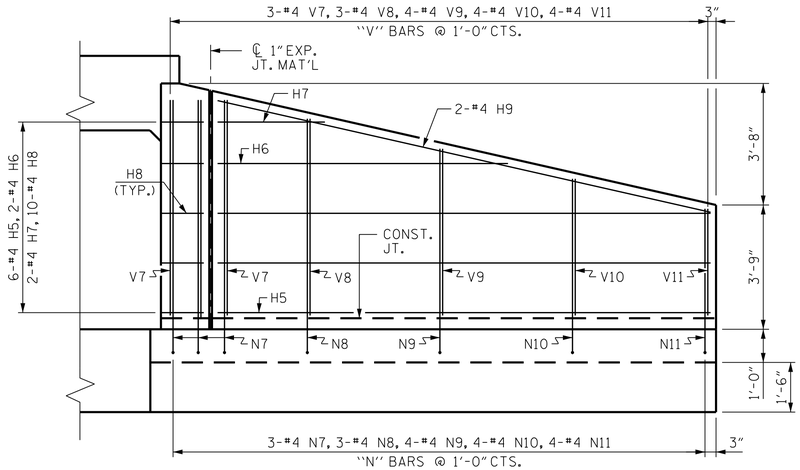
* S1 @ BOTTOM OF FLOOR SLAB & FOOTING



TYPICAL WING SECTION

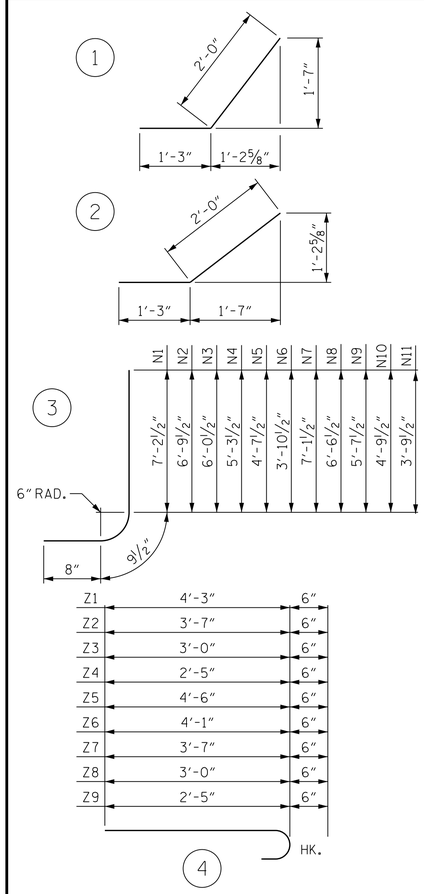


ELEVATION W2



ELEVATION W1

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR.	13'-4"	107
H2	4	#4	STR.	7'-9"	21
H3	20	#4	1	3'-3"	43
H4	4	#4	STR.	13'-9"	37
H5	12	#4	STR.	14'-10"	119
H6	4	#4	STR.	8'-9"	23
H7	4	#4	STR.	3'-2"	8
H8	20	#4	2	3'-3"	43
H9	4	#4	STR.	15'-3"	41
N1	4	#4	3	8'-8"	23
N2	4	#4	3	8'-3"	22
N3	6	#4	3	7'-6"	30
N4	6	#4	3	6'-9"	27
N5	6	#4	3	6'-1"	24
N6	6	#4	3	5'-4"	21
N7	6	#4	3	8'-7"	34
N8	6	#4	3	8'-0"	32
N9	8	#4	3	7'-1"	38
N10	8	#4	3	6'-3"	33
N11	8	#4	3	5'-3"	28
S1	12	#6	STR.	6'-0"	108
T1	6	#5	STR.	15'-3"	95
T2	6	#5	STR.	16'-9"	105
V1	4	#4	STR.	6'-7"	18
V2	4	#4	STR.	6'-2"	16
V3	6	#4	STR.	5'-5"	22
V4	6	#4	STR.	4'-8"	19
V5	6	#4	STR.	3'-11"	16
V6	6	#4	STR.	3'-2"	13
V7	6	#4	STR.	6'-6"	26
V8	6	#4	STR.	5'-11"	24
V9	8	#4	STR.	5'-0"	27
V10	8	#4	STR.	4'-1"	22
V11	8	#4	STR.	3'-2"	17
Z1	8	#4	4	4'-9"	25
Z2	8	#4	4	4'-1"	22
Z3	8	#4	4	3'-6"	19
Z4	8	#4	4	2'-11"	16
Z5	4	#4	4	5'-0"	13
Z6	6	#4	4	4'-7"	18
Z7	8	#4	4	4'-1"	22
Z8	8	#4	4	3'-6"	19
Z9	8	#4	4	2'-11"	16

REINFORCING STEEL FOR 4 WINGS	1,452 LBS
CLASS A CONCRETE	
4 WINGS	20.4 CY
2 HEADWALLS	3.6 CY
2 END CURTAIN WALLS	5.2 CY
TOTAL	29.2 CY

PROJECT NO. BP6.R010
CUMBERLAND COUNTY
STATION: 14+71.50 -L-

SHEET 9 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# WINGS FOR CONCRETE BOX CULVERT
H = 6'-0" SLOPE 3:1
85° SKEW

CULVERT NO. 29

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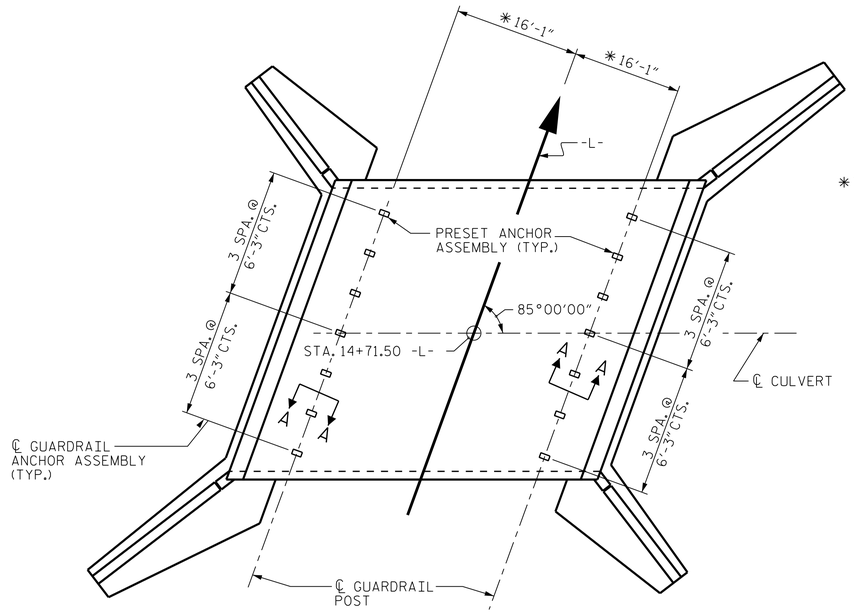


*THIS DIMENSION TO BE VERIFIED BY THE ENGINEER.

PLAN OF CULVERT GUARDRAIL ANCHOR ASSEMBLY SPACING

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1"Ø X 2¼" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1"Ø X 2 ¼" GALVANIZED BOLTS 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.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16"Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

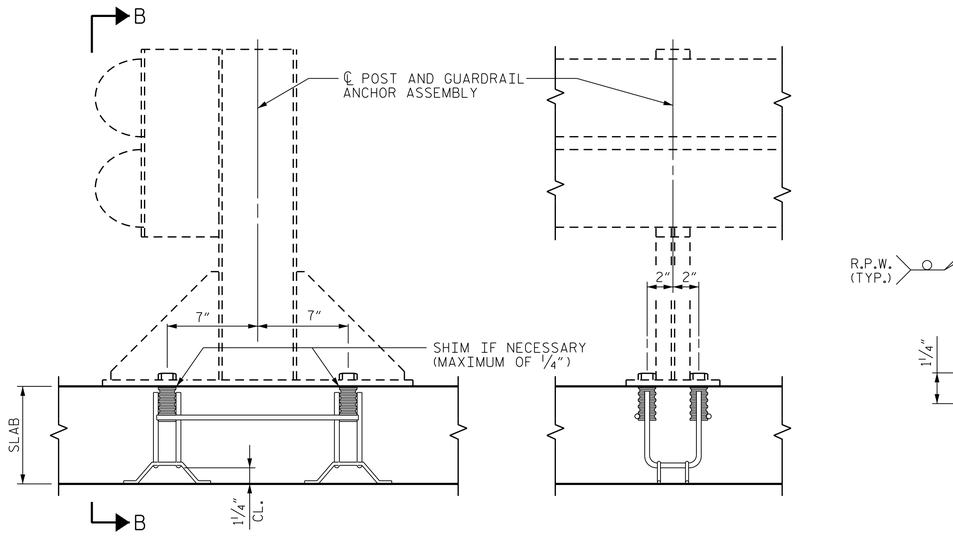
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

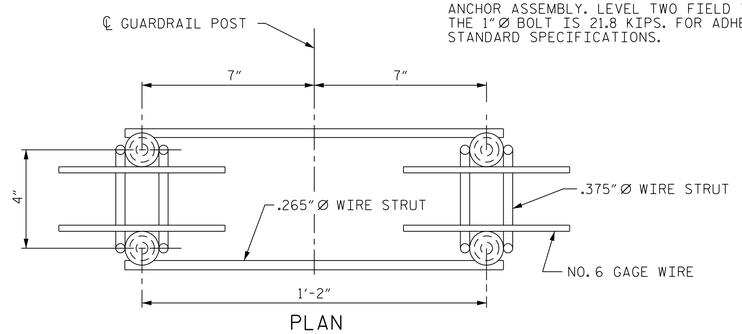
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1"Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.



SECTION A-A

SECTION B-B



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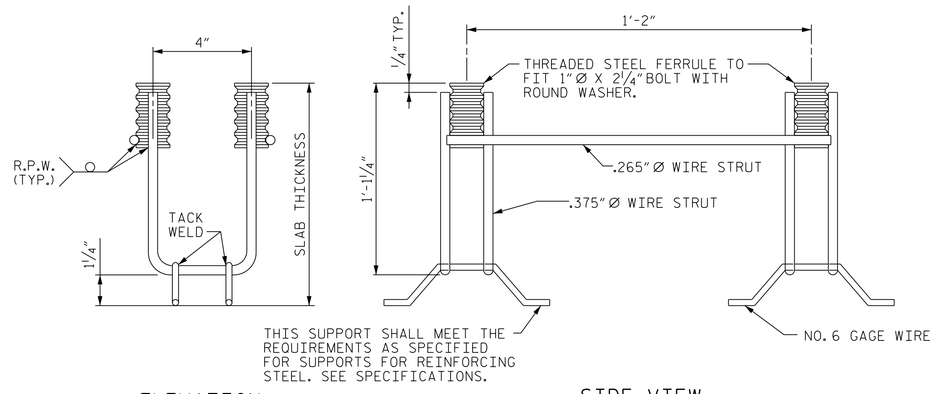

ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

PROJECT NO. BP6.R010
CUMBERLAND COUNTY
STATION: 14+71.50 -L-

SHEET 10 OF 10

CULVERT NO. 29

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERT

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Responsive People | Creative Solutions

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15825 BRUCE D. KLAPPENBACH
12/12/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	CU_29-10
1			3			TOTAL SHEETS
2			4			10

DRAWN BY : B. H. GONFA DATE : AUG 2023
CHECKED BY : M. SHARMA DATE : AUG 2023
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : AUG 2023

STD. NO. GRA1 (SHT 1)

bgonfa
12/12/2023 R:\Structures\DGN\Final\BP6.R010_SMU_CU_29-10_250029.dgn

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 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" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990