

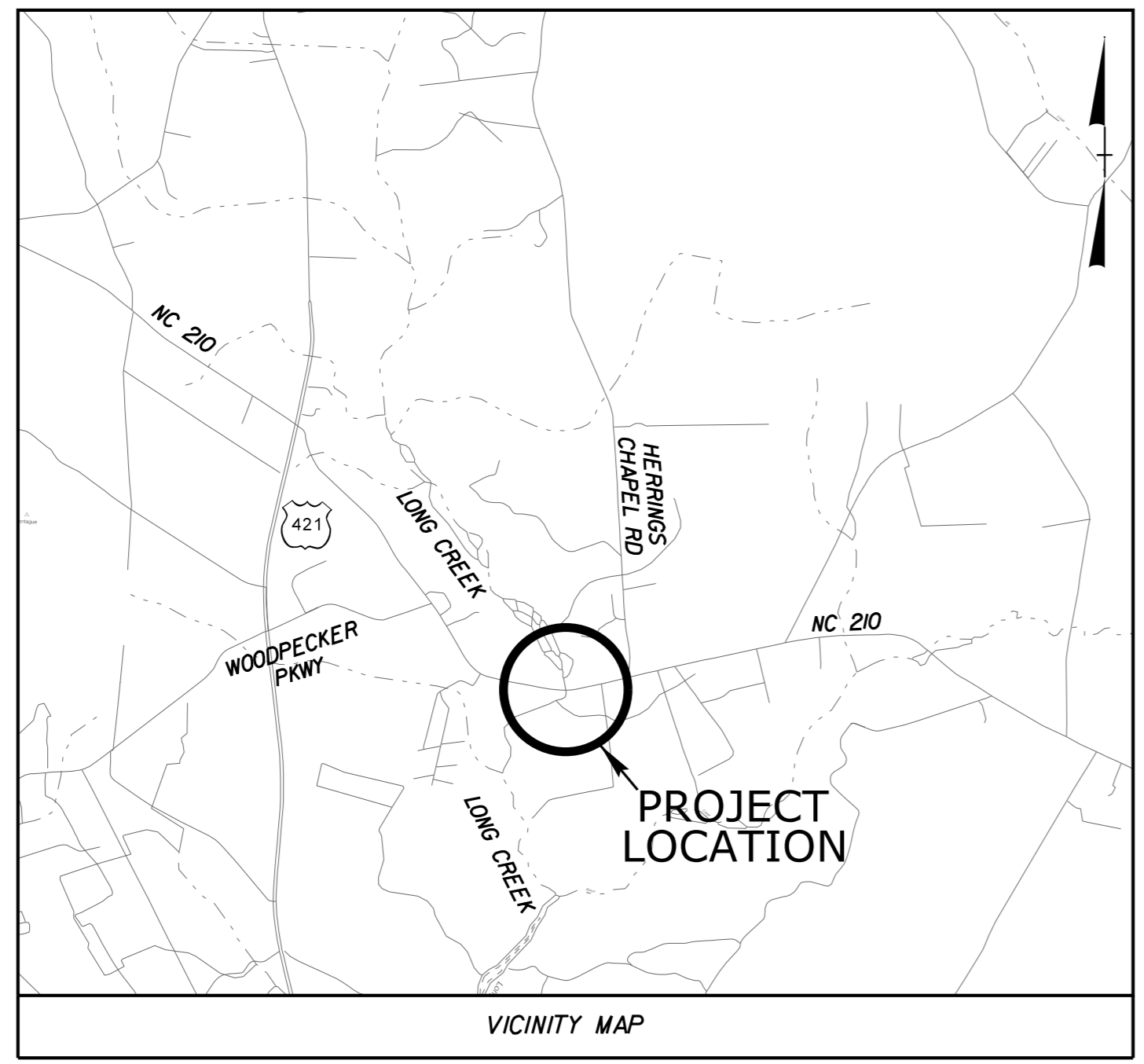
09/08/19

TIP PROJECT: B-5156

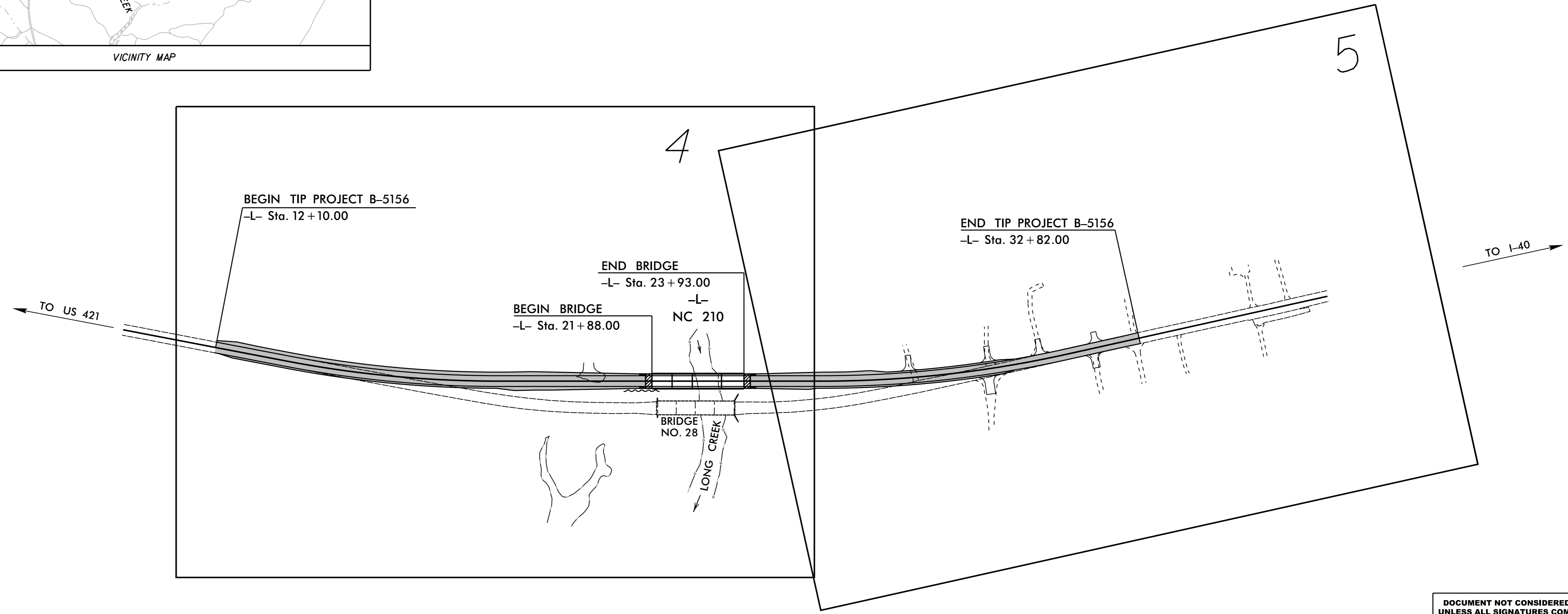
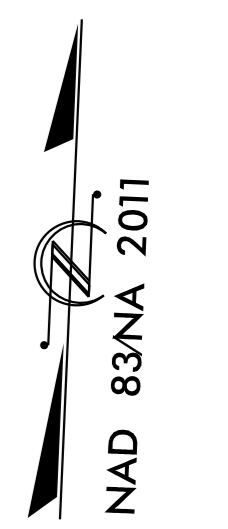
CONTRACT: C204724

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PENDER COUNTY

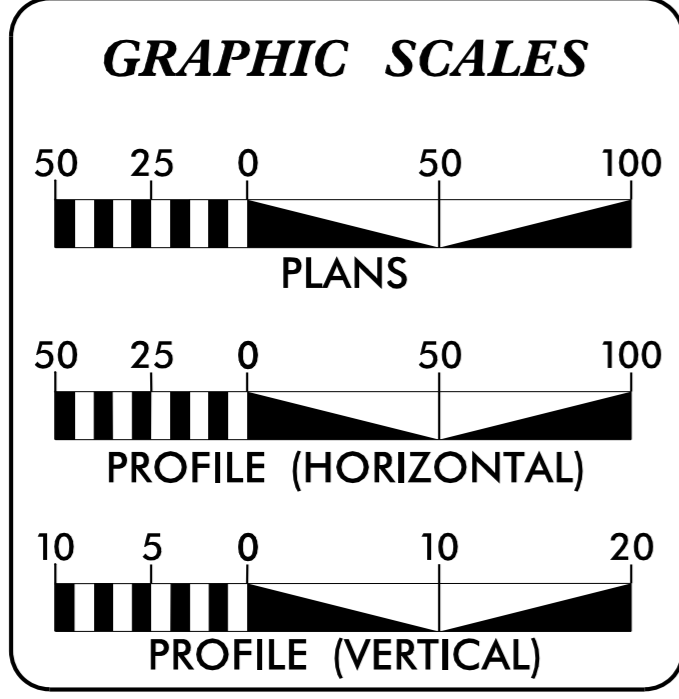
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5156	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
42331.1.2		P.E.	
42331.2.1		RIGHT OF WAY	
42331.2.1		UTILITIES	
42331.3.1		CONSTRUCTION	



LOCATION: BRIDGE 28 OVER LONG CREEK ON NC 210
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

AADT 2020 =	3,000
AADT 2040 =	3,600
K =	10%
D =	55%
T =	12%*
V =	60 MPH
* (TTST 4% + DUAL 8%)	
FUNCTIONAL CLASSIFICATION:	RURAL MAJOR COLLECTOR
REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5156	=	0.353 MILES
LENGTH STRUCTURES TIP PROJECT B-5156	=	0.039 MILES
TOTAL LENGTH TIP PROJECT B-5156	=	0.392 MILES

PLANS PREPARED FOR THE NCDOT BY:

2024 STANDARD SPECIFICATIONS

Kimley »Horn

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

SETH DENNEY, P.E.
PROJECT DESIGN ENGINEER

DAVID STUTTS, P.E.
STRUCTURES MANAGEMENT UNIT
PROJECT ENGINEER -
PEPROGRAM MANAGEMENT

RIGHT OF WAY DATE:
AUGUST 28, 2019

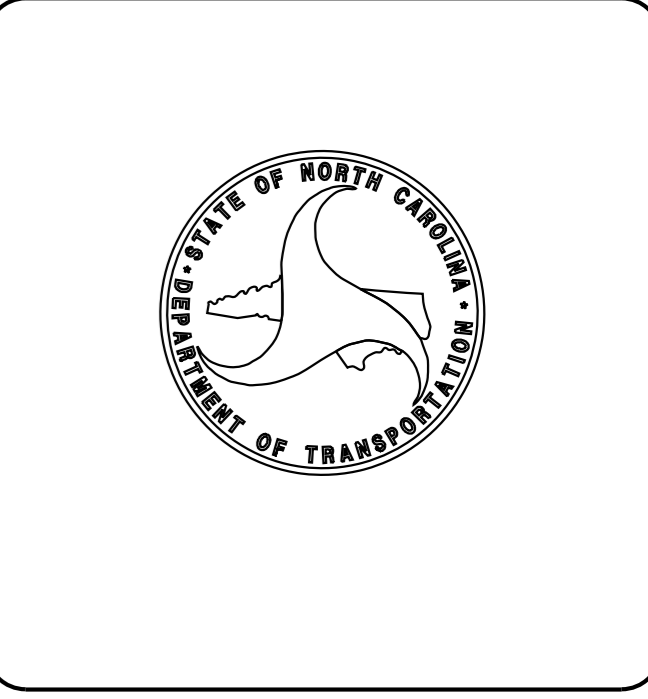
LETTING DATE:
APRIL 16, 2024

HYDRAULICS ENGINEER

DocuSigned by:
David Pursey 7/2024
SIGNATURE:

ROADWAY DESIGN ENGINEER

DocuSigned by:
Jeffrey W. Moore 7/2024
SIGNATURE:



3/7/2024

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

Kimley » Horn

421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, N.C. 27601

RIGHT-OF-WAY REV.

CONST. REV.

PROJECT REFERENCE NO. SHEET NO.

B-5156

1A

ROADWAY DESIGN
ENGINEER



3/11/2024

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

GENERAL NOTES

2024 SPECIFICATIONS

EFFECTIVE: 01-16-2024
REVISED:

GRADE LINE:
GRADING AND SURFACING:

EFFECTIVE: 01-16-2024
REVISED:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SUBSURFACE DRAINS:

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

DRIVEWAYS:

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

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE:

POWER: DUKE ENERGY - RANDY MILLER - 910-399-3081 - RAMILLER@PIKE.COM
TELEPHONE: AT&T - CRISSY COSTON - CC6265@ATT.COM
TELEPHONE: CHARTER - STEVE BARNETTE - 910-772-5755 - STEVE.BARNETTE@CHARTER.COM
FIBER: CENTURYLINK - CHERYL SASSER - 252-751-5750 - CHERYL.L.SASSER@LUMEN.COM
WATER: PENDER COUNTY - ANTHONY COLON - ACOLON@PENDERCOUNTYNC.GOV

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

RIGHT-OF-WAY MARKERS:

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

2024 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO. TITLE

DIVISION 2 - EARTHWORK

200.03 Method of Clearing - Method III
225.02 Guide for Grading Subgrade - Secondary and Local
225.04 Method of Obtaining Superlevation - Two Lane Pavement

DIVISION 3 - PIPE CULVERTS

300.01 Method of Pipe Installation
310.10 Driveway Pipe Construction

DIVISION 4 - MAJOR STRUCTURES

423.01 Bridge Approach Fills - Type I Approach Fill Approach Fill for Bridge Abutment

DIVISION 5 - SUBGRADE, BASES AND SHOULDERS

560.01 Method of Shoulder Construction - High Side of Superelevated Curve - Method I

DIVISION 8 - INCIDENTALS

815.02 Subsurface Drain
840.00 Concrete Base Pad for Drainage Structures
840.01 Brick Catch Basin - 12" thru 54" Pipe
840.02 Concrete Catch Basin - 12" thru 54" Pipe
840.03 Frame, Grates and Hood - for Use on Standard Catch Basin
840.18 Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.25 Anchorage for Frames - Brick / Concrete / Precast Concrete
840.27 Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29 Frames and Narrow Slot Flat Grates
840.35 Traffic Bearing Grated Drop Inlet - for Double Frame and Grates
840.45 Precast Drainage Structure
840.46 Traffic Bearing Precast Drainage Structure
840.66 Drainage Structure Steps
846.01 Concrete Curb, Gutter and Curb & Gutter
846.04 Drop Inlet Installation in Shoulder Berm Gutter
848.02 Driveway Turnout - Radius Type
862.01 Guardrail Placement
862.02 Guardrail Installation
862.03 Structure Anchor Units
876.02 Guide for Rip Rap at Pipe Outlets

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	(23)
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	MLB
Proposed Wetland Boundary	MLB
Existing Endangered Animal Boundary	EAB
Existing Endangered Plant Boundary	EPB
Existing Historic Property Boundary	HPB
Known Contamination Area: Soil	⊗-S-⊗-S-
Potential Contamination Area: Soil	⊗-S-⊗-S-
Known Contamination Area: Water	⊗-W-⊗-W-
Potential Contamination Area: Water	⊗-W-⊗-W-
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	JS
Buffer Zone 1	BZ 1
Buffer Zone 2	BZ 2
Flow Arrow	←
Disappearing Stream	-----
Spring	○
Wetland	MLB
Proposed Lateral, Tail, Head Ditch	-----
False Sump	-----

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	⊙
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)	⬢
Proposed 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	E
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	C
Proposed Slope Stakes Fill	F
Proposed Curb Ramp	CR
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	-----
VEGETATION:	
Single Tree	⊕
Single Shrub	⊕
Hedge	-----

Woods Line	-----
Orchard	⊕
Vineyard	-----

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	⊕
Power Line Tower	⊕
Power Transformer	⊕
U/G Power Cable Hand Hole	⊕
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	⊕
Telephone Pedestal	⊕
Telephone Cell Tower	⊕
U/G Telephone Cable Hand Hole	⊕
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	⊕
Water Meter	⊕
Water Valve	⊕
Water Hydrant	⊕
U/G Water Line Test Hole (SUE - LOS A)*	⊕
U/G Water Line (SUE - LOS B)*	-----
U/G Water Line (SUE - LOS C)*	-----
U/G Water Line (SUE - LOS D)*	-----
Above Ground Water Line	A/G Water

TV:

TV Pedestal	⊕
TV Tower	⊕
U/G TV Cable Hand Hole	⊕
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

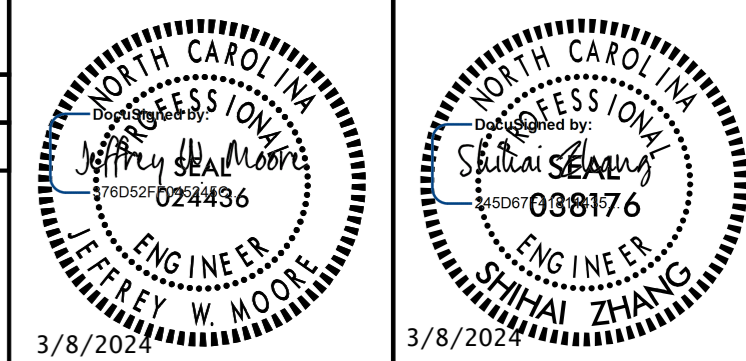
MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	⊕
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line (SUE - LOS B)*	U/G
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.

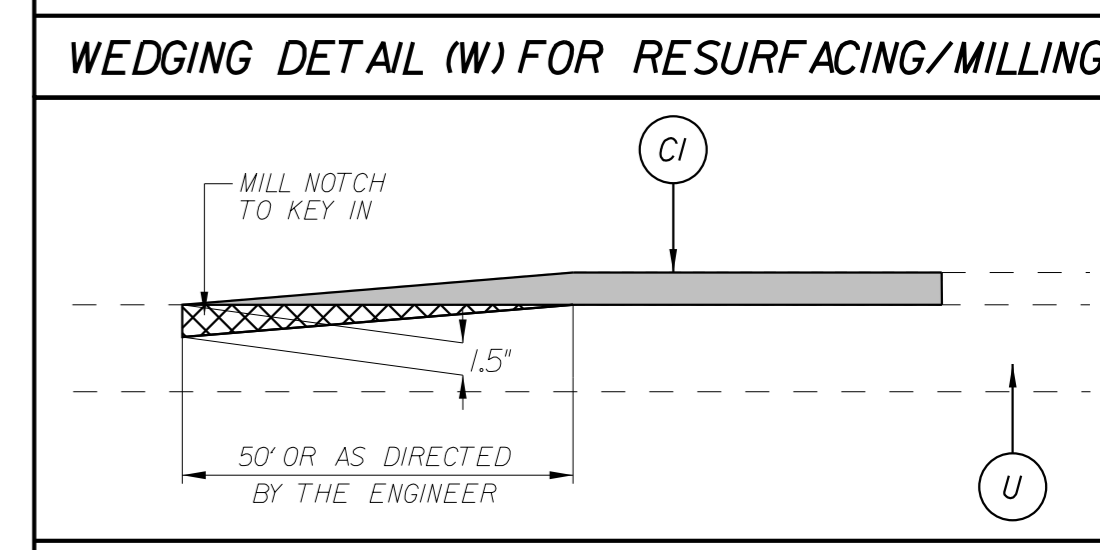
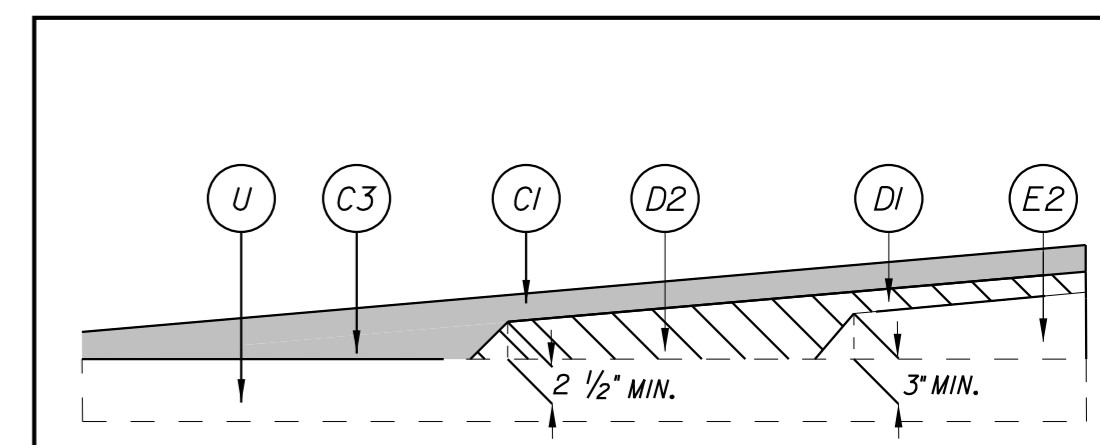
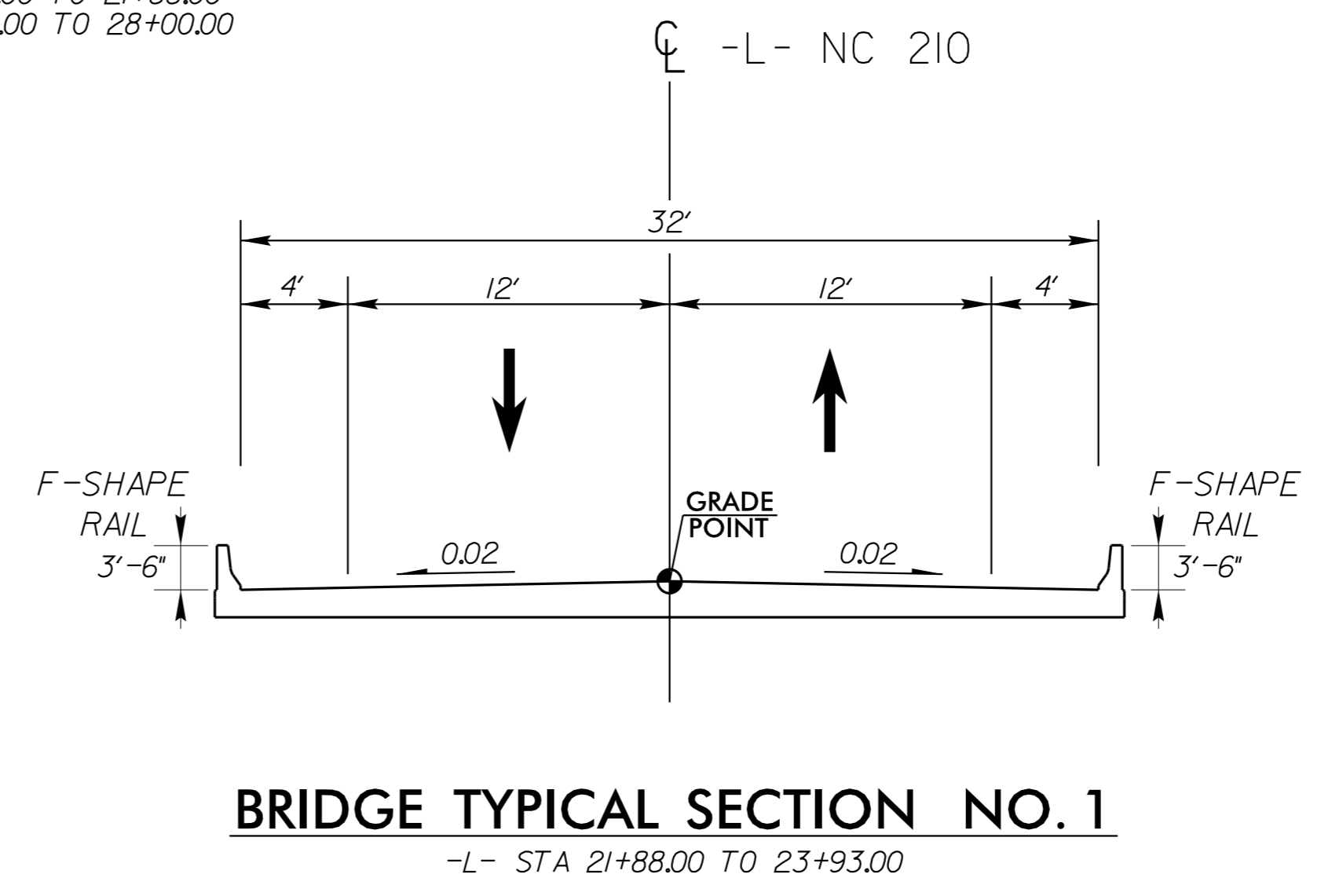
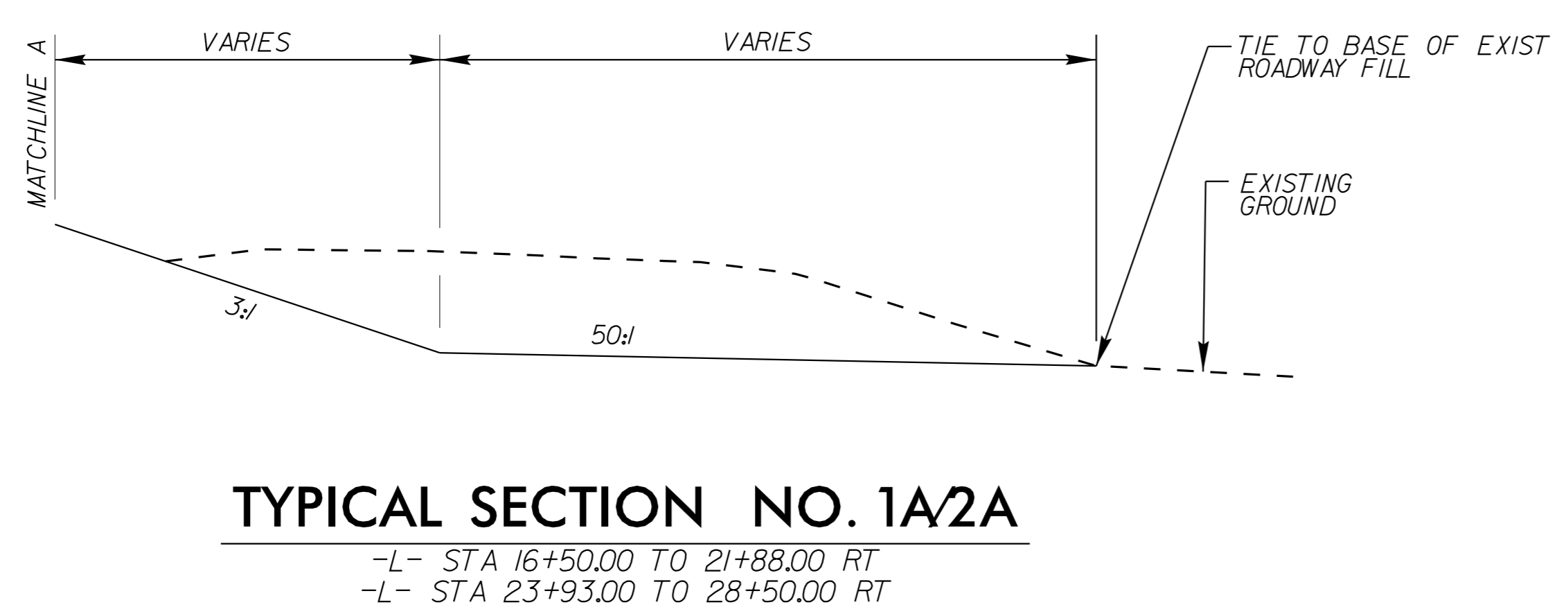
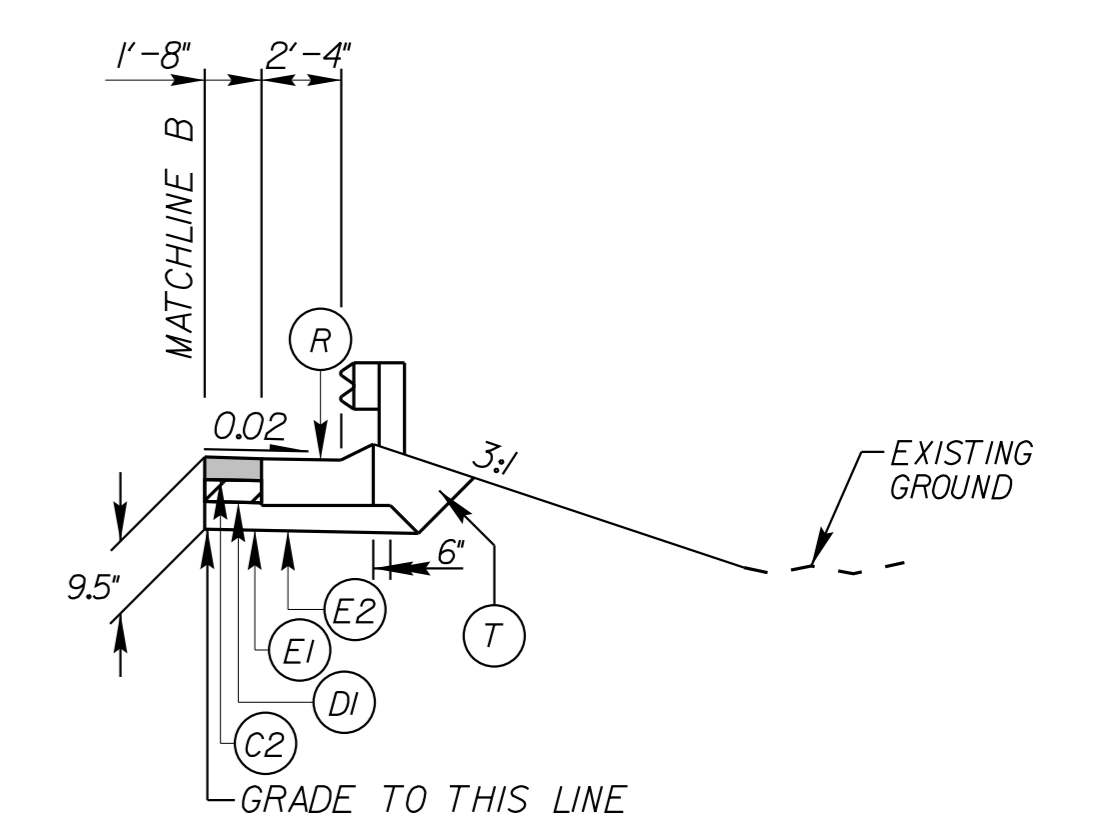
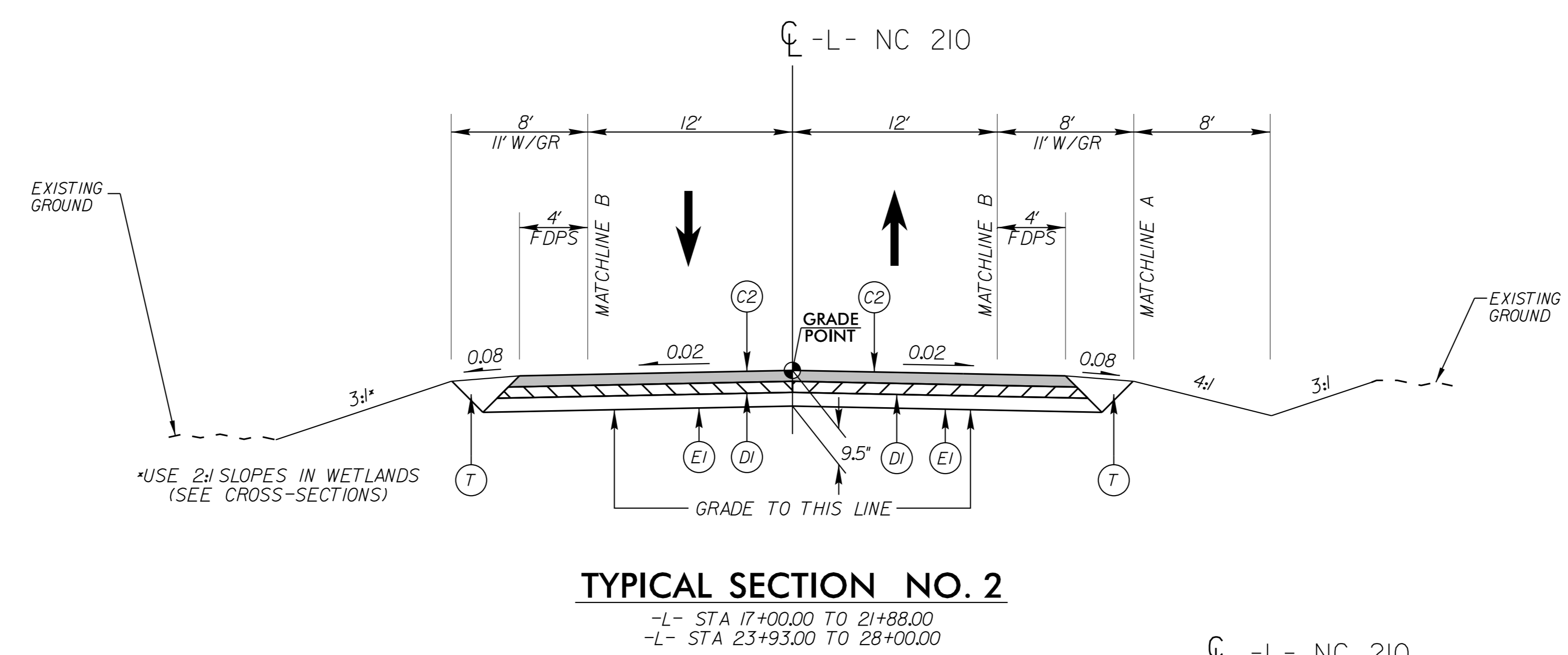
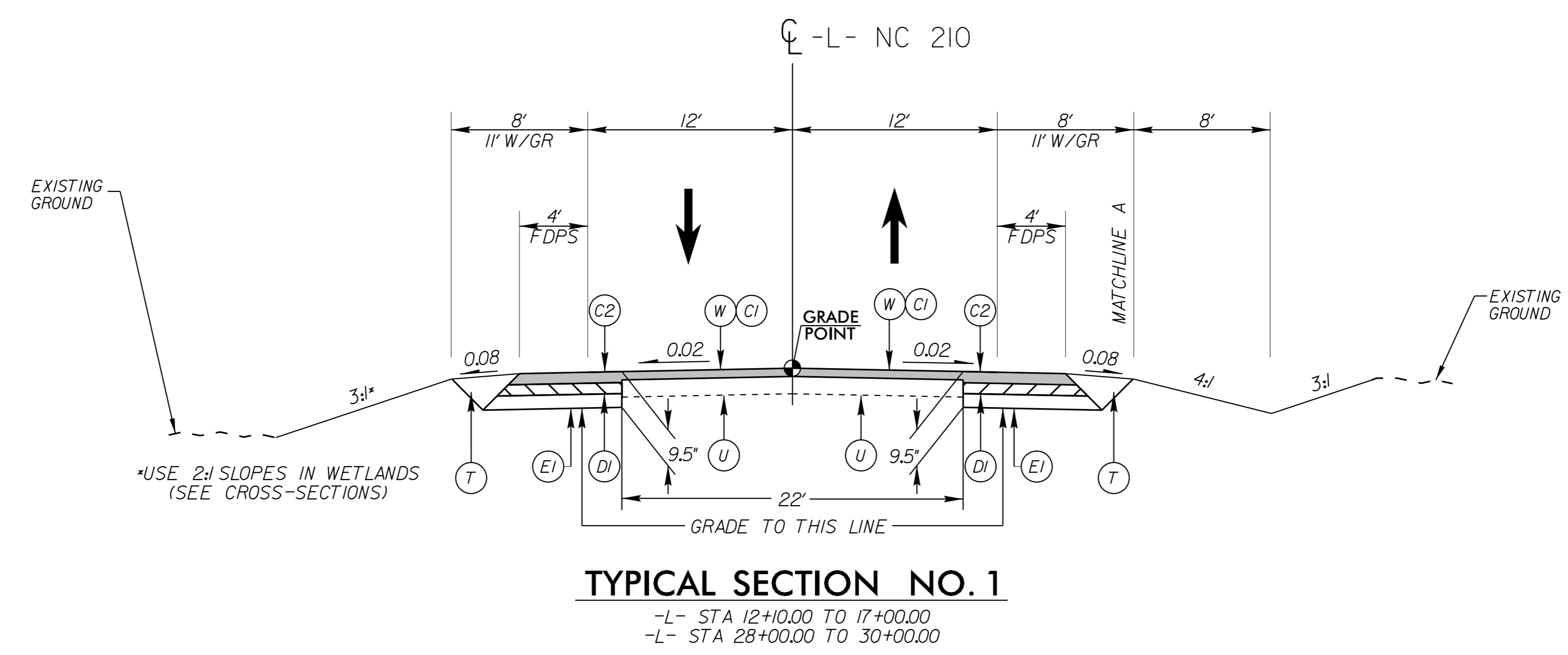
REVISIONS

5/14/99

REVISIONS



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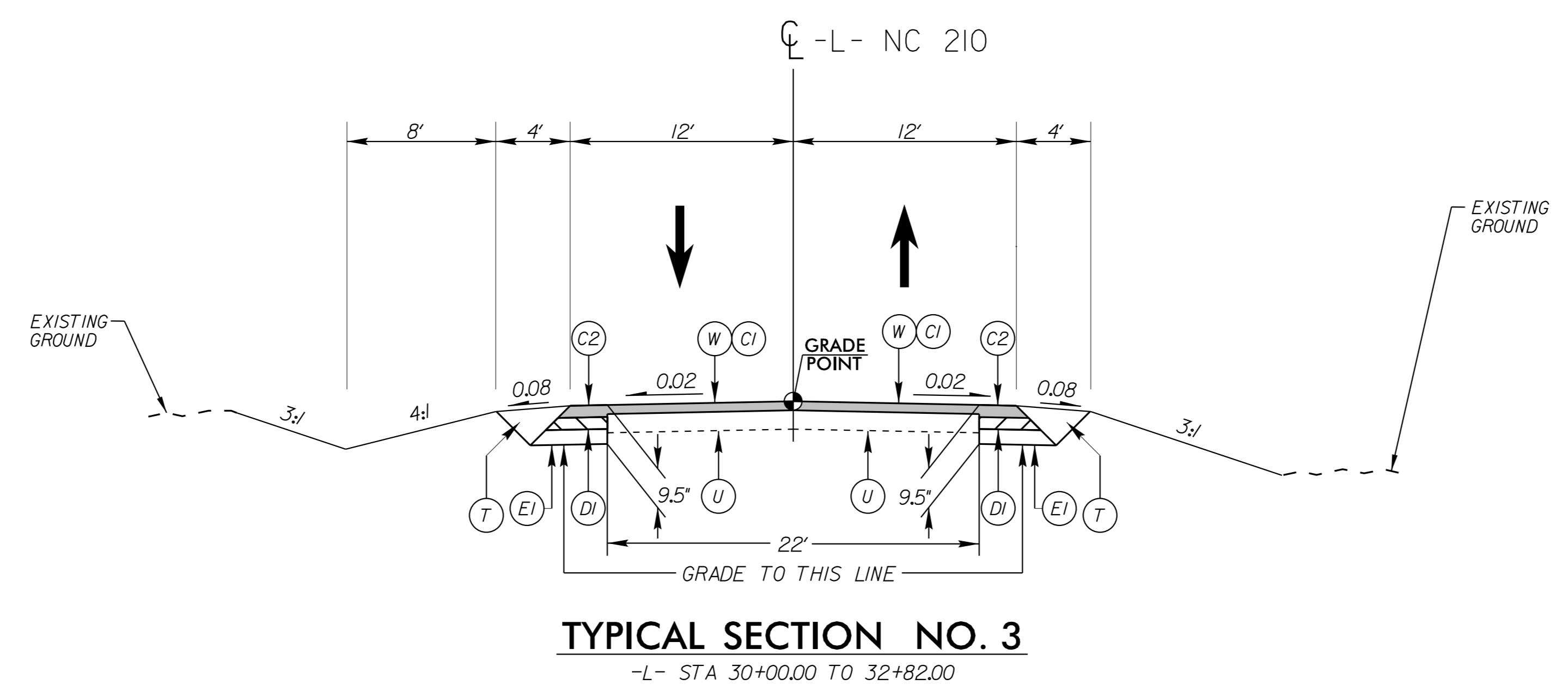


3/8/2024

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REVISIONS

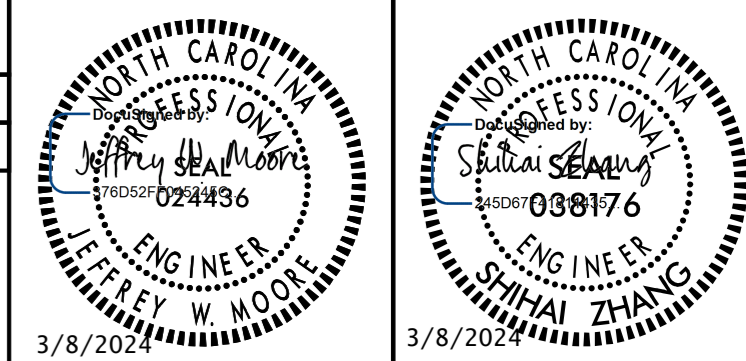
3/8/2024



Kimley » Horn

P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

PROJECT REFERENCE NO. B-5156	SHEET NO. 2A-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER



**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
C1	PROPOSED APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN.
C2	PROPOSED APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROPOSED 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.
D1	PROPOSED APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROPOSED VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4" IN DEPTH.
E1	PROPOSED APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROPOSED 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" OR GREATER THAN 5.5" IN DEPTH.
R	PROPOSED SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL FOR RESURFACING

NOTE: PAVEMENT EDGE SLOPES 1:1 UNLESS OTHERWISE INDICATED

GEOTECHNICAL ENGINEER

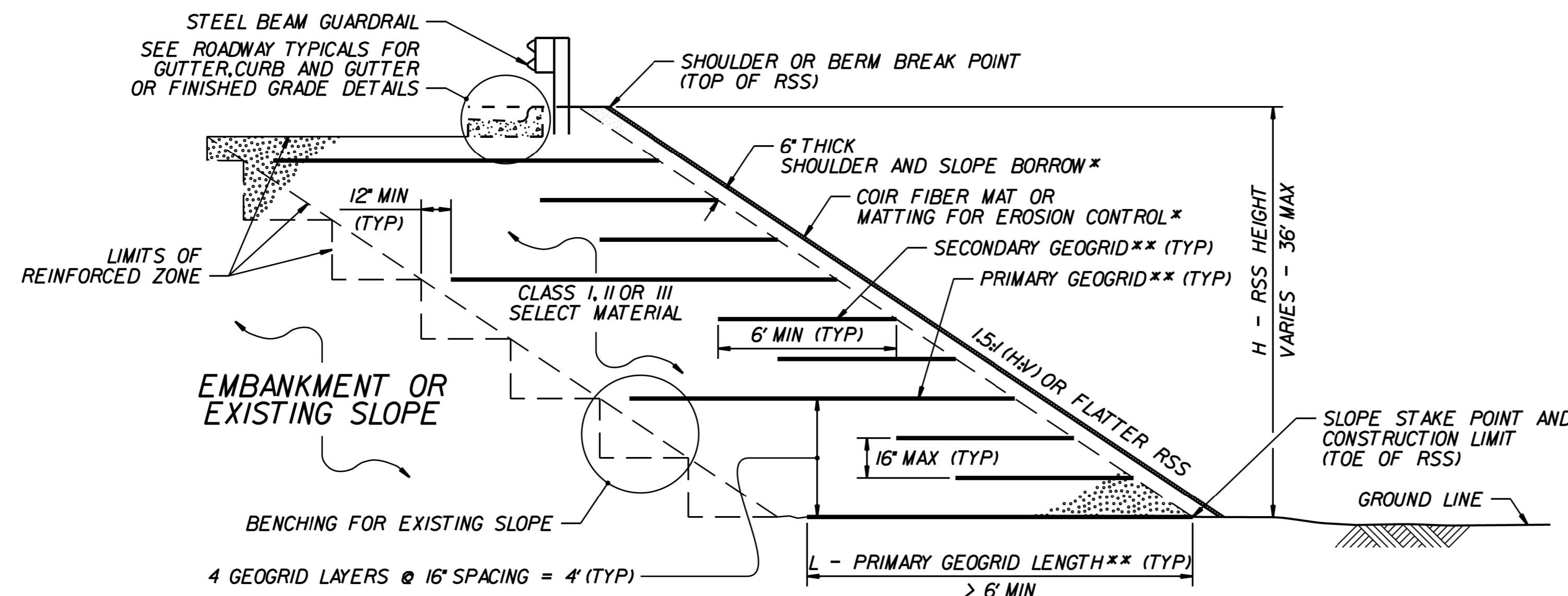
ENGINEER



SIGNATURE DATE

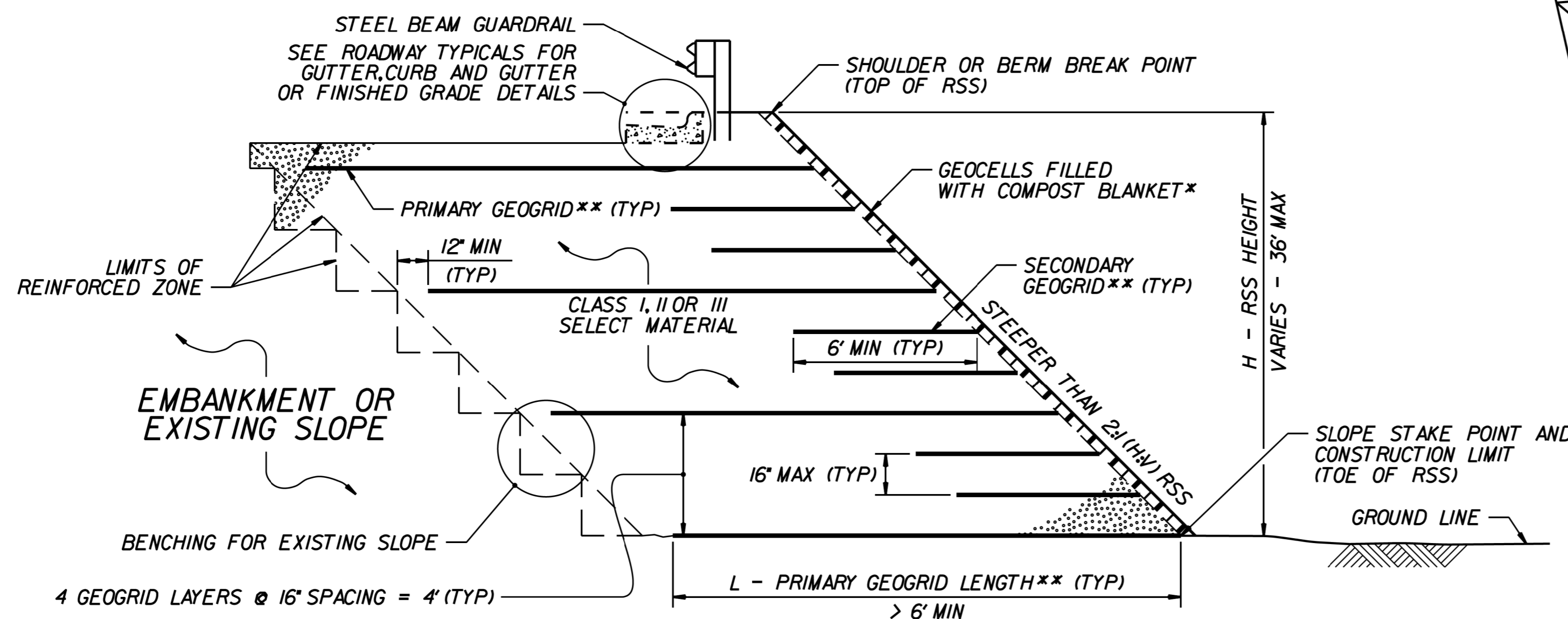
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MATTING WITH SHOULDER AND SLOPE BORROW

*SEE NOTES 3 AND 10 ON SHEET 2.

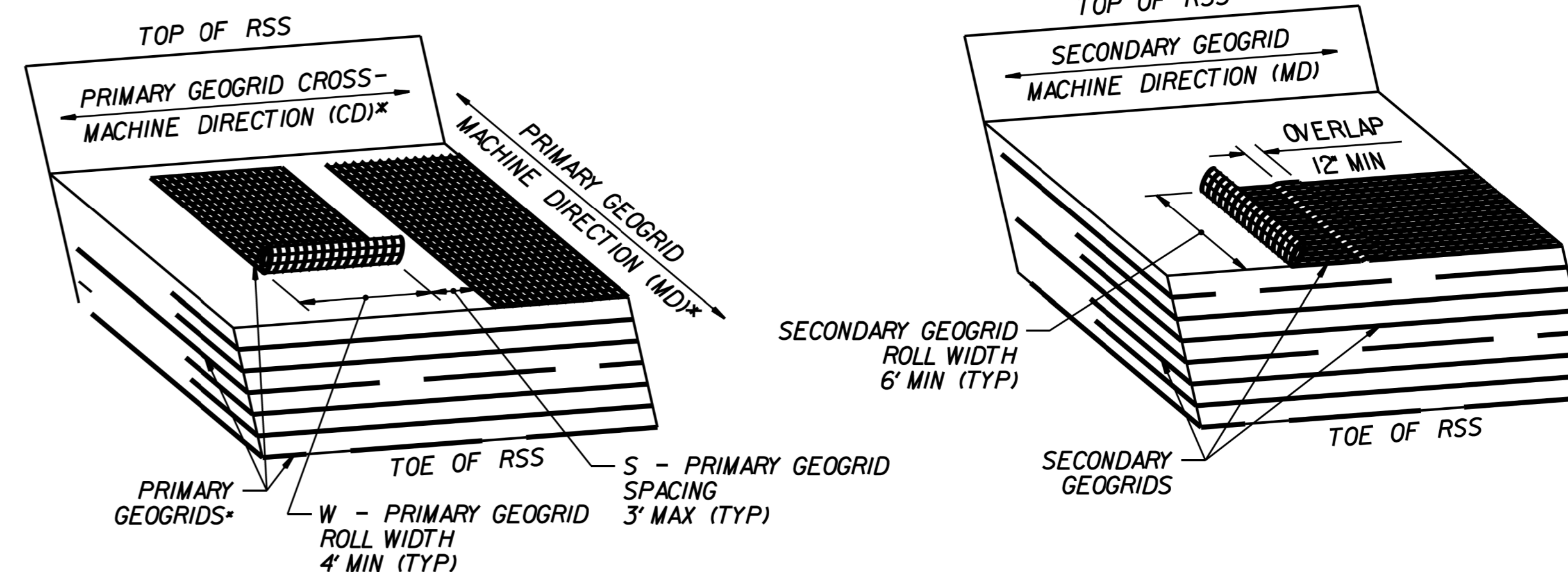


GEOCELLS WITH COMPOST BLANKET

*SEE NOTES 3 AND 10 ON SHEET 2.

STANDARD REINFORCED SOIL SLOPE (RSS)

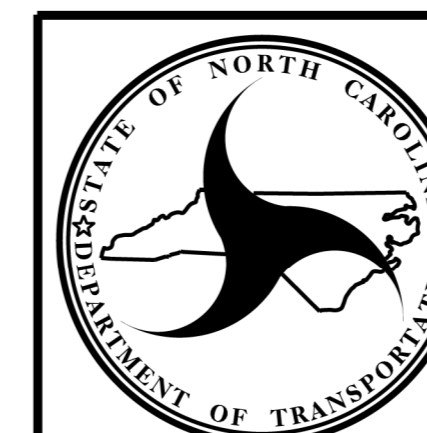
**SEE TABLES ON SHEET 2 AND GEOGRID PLACEMENT DETAILS.
IF RSS ANGLE IS 2:1 (H:V) OR FLATTER, REPLACE PRIMARY GEOGRID WITH SECONDARY GEOGRID PLACED AS SHOWN IN THE GEOGRID PLACEMENT DETAILS.



GEOGRID PLACEMENT DETAILS

$$(\% \text{ COVERAGE} = \frac{W}{W+S} \times 100 \geq 75\%)$$

*SEE NOTE 8 ON SHEET 2. DO NOT OVERLAP PRIMARY GEOGRIDS IN ANY DIRECTION.

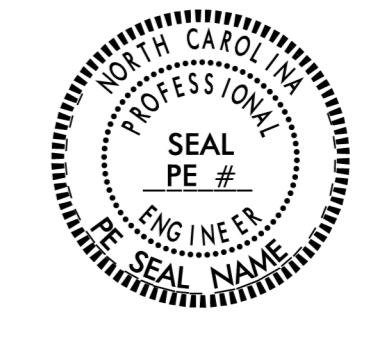


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 1802.02

STANDARD
REINFORCED SOIL SLOPE (RSS)
WITH LOW GROUNDWATER
SHEET 1 OF 2

PROJECT REFERENCE NO. B-5156		SHEET NO. 26-2	
GEOTECHNICAL ENGINEER  SEAL PE # ENGINEER SEAL NAME		ENGINEER	
SIGNATURE	DATE	SIGNATURE	DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

H (FT)	0 - < 12		12 - 24		> 24 - 36	
	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (HW) RSS	900	500	1200	900	1800	1200
1.5:1 TO 1.75:1 (HW) RSS	500	500	900	500	1400	1000
> 1.75:1 TO < 2:1 (HW) RSS	500	500	600	500	1000	800

**MINIMUM REQUIRED PRIMARY GEOGRID
LONG-TERM DESIGN STRENGTH (LTDS, LB/FT) IN MACHINE DIRECTION (MD)**
(LTDS IS BASED ON 100% COVERAGE FOR PRIMARY GEOGRID.
SEE NOTE 8 FOR LESS THAN 100% COVERAGE.)

NOTES:

- SEE EROSION CONTROL AND ROADWAY PLANS AND SUMMARY SHEETS FOR REINFORCED SOIL SLOPE (RSS) AND SLOPE EROSION CONTROL LOCATIONS.
- FOR STANDARD REINFORCED SOIL SLOPES, SEE REINFORCED SOIL SLOPES PROVISION. FOR STEEL BEAM GUARDRAIL, SEE SECTION 862 OF THE STANDARD SPECIFICATIONS.
- FOR SHOULDER AND SLOPE BORROW, SEE ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS. FOR GEOCELLS, SEE CELLULAR CONFINEMENT SYSTEMS PROVISION. FOR COIR FIBER MAT, MATTING FOR EROSION CONTROL AND COMPOST BLANKET, SEE EROSION CONTROL PROVISIONS, SECTION 1631 OF THE STANDARD SPECIFICATIONS AND ROADWAY STANDARD DRAWING NO. 1631.01.
- STANDARD RSS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE STANDARD RSS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR DEPTH TO GROUNDWATER IS LESS THAN 7 FT.
- DO NOT USE STANDARD RSS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW RSS.
- PRIMARY GEOGRIDS ARE APPROVED FOR LTDS FOR A 75-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Products.aspx
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SELECT MATERIAL AS FOLLOWS:

MATERIAL TYPE	SELECT MATERIAL
BORROW	CLASS I SELECT MATERIAL
FINE AGGREGATE	CLASS II OR III SELECT MATERIAL

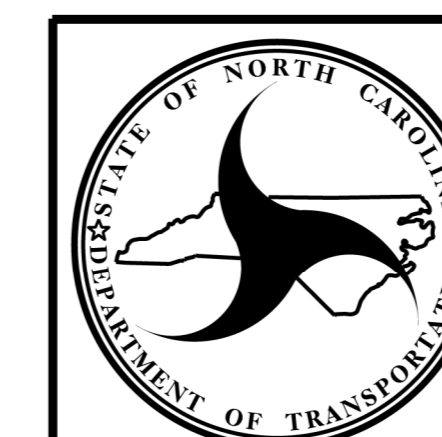
- FOR PRIMARY GEOGRIDS WITH 100% COVERAGE, PLACE PRIMARY GEOGRIDS SO GEOGRIDS ARE ADJACENT TO EACH OTHER IN THE CD. FOR PRIMARY GEOGRIDS WITH 75% TO LESS THAN 100% COVERAGE,
MINIMUM REQUIRED PRIMARY GEOGRID LTDS = LTDS BASED ON 100% COVERAGE $\times (W + S) / W$
SEE TABLE FOR LTDS BASED ON 100% COVERAGE AND GEOGRID PLACEMENT DETAILS FOR PRIMARY GEOGRID ROLL WIDTH (W) AND SPACING (S). FOR PRIMARY GEOGRIDS WITH LESS THAN 100% COVERAGE, STAGGER PRIMARY GEOGRIDS SO GEOGRIDS ARE CENTERED OVER GAPS IN THE PRIMARY GEOGRID LAYER BELOW. DO NOT USE LESS THAN 75% COVERAGE FOR PRIMARY GEOGRIDS.
- DO NOT PLACE ANY GEOGRIDS UNTIL EXCAVATION DIMENSIONS AND IN-SITU MATERIAL ARE APPROVED.
- FOR SLOPE EROSION CONTROL, USE GEOCELLS OR MATTING ON SLOPE FACES OF RSS AS FOLLOWS:

RSS ANGLE	SLOPE EROSION CONTROL
1:1 TO < 1.5:1 (HW)	GEOCELLS WITH COMPOST BLANKET
1.5:1 TO < 2:1 (HW)	GEOCELLS WITH COMPOST BLANKET OR COIR FIBER MAT WITH SHOULDER AND SLOPE BORROW*
2:1 (HW) OR FLATTER	MATTING FOR EROSION CONTROL WITH SHOULDER AND SLOPE BORROW

*SEE REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL SUMMARY TABLE IN THE ROADWAY SUMMARY SHEETS FOR SLOPE EROSION CONTROL ON SLOPE FACES OF RSS 1.5:1 (HW) TO STEEPER THAN 2:1.

H (FT)	0 - < 12		12 - 24		> 24 - 36	
SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (HW) RSS	1.10	1.00	0.90	0.85	0.85	0.80
1.5:1 TO 1.75:1 (HW) RSS	0.90	0.80	0.75	0.70	0.75	0.70
> 1.75:1 TO < 2:1 (HW) RSS	0.75	0.70	0.65	0.60	0.65	0.60

PRIMARY GEOGRID LENGTH / RSS HEIGHT (L/H) RATIO (L > 6' MIN)
(IF L ≤ 6', USE SECONDARY GEOGRID INSTEAD OF PRIMARY GEOGRID.)



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 1802.02

STANDARD
REINFORCED SOIL SLOPE (RSS)
WITH LOW GROUNDWATER
SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
SUMMARY OF EARTHWORK
 IN CUBIC YARDS

REVISIONS

STATION	STATION	EXCAVATION			EMBANKMENT	BORROW	WASTE
		TOTAL UNCLASSIFIED	UNDERCUT	UNSUIT. UNCLASSIFIED	EMBANKMENT +%		TOTAL
PHASE I (NEW LOCATION)							
SUMMARY NO. 1							
-L- 15 + 00.00	-L- 21 + 88.00	165	960		17739	17574	960
-L- 23 + 93.00	-L- 29 + 00.00	264	640	150	6265	6151	790
TOTAL SUMMARY NO. 1							
	SUBTOTAL	429	1600	150	24004	23725	1750
PHASE II (REMOVE EXISTING)							
SUMMARY NO. 2							
-L- 12 + 10.00	-L- 21 + 88.00	8805			1095		7710
-L- 23 + 93.00	-L- 32 + 82.00	3470			101		3369
TOTAL SUMMARY NO. 2							
	SUBTOTAL	12275			1196		11079
	TOTAL	12704	1600	150	25200	23725	12829
ESTIMATED ADDITIONAL UNDERCUT			700				700
PROJECT TOTAL		12704	2300	150	25200	23725	13529
EST. 5% TO REPLACE TOPSOIL ON BORROW PIT						1186	
GRAND TOTAL		12704	2300	150	25200	24911	13529
SAY		12800				25000	
EST. SELECT GRANULAR MATERIAL		2300 CY					

NOTE: APPROXIMATE QUANTITIES ONLY. CLEARING AND GRUBBING, UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, AND REMOVAL OF EXISTING ASPHALT PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING."
 THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS



"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
 TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
 FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
 W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
 G = GATING GUARDRAIL END UNIT, TYPE TL-3
 NG = NON-GATING GUARDRAIL END UNIT, TYPE TL-3

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS				IMPACT ATTENUATOR TYPE TL-3			TERMINAL SECTIONS	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS	
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU TL-3	TEMP GREU TL-3	TYPE III	TEMP TYPE III	EA	G	NG					
-L-	12+44.25	21+88.00	LT	943.75				21+88.00	8'	11'	50		1		1											
-L-	18+81.75	21+88.00	RT	306.25			21+88.00		8'	11'	50		1		1											
-L-	23+93.00	26+74.25	LT	281.25			23+93.00		8'	11'	50		1		1											
-L-	23+93.00	25+36.75	RT	143.75				23+93.00	8'	11'		50		1	1											
-L-	19+23	21+72	RT																						249	
-L-	23+73	26+47	RT																						274	
			SUBTOTAL	1675.00											4		4								523	
			LESS ANCHOR DEDUCTIONS																							
			GREU TL-3	4 @ 50'	=																					
			TYPE III	4 @ 18.75'	=																					
			TOTAL	1400.00											4		4								530	
			SAY	1400																						

ADDITIONAL GUARDRAIL POSTS = 5 EA

TEMPORARY GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH	WARRANT POINT		ANCHORS	
					APPROACH END	TRAILING END	TEMP GREU TL-3	TEMP TYPE III
-L-	18+77.00	21+98.50	LT	321.50	21+15.00	21+98.50	1	1
			SUBTOTAL	321.50			1	1
			LESS ANCHOR DEDUCTIONS					
			GREU TL-3	1 @ 50'	=	50.00		
			TYPE III	1 @ 18.75'	=	18.75		
			TOTAL	252.75			1	1
			SAY	253				

SHOULDER BERM GUTTER SUMMARY

LINE	STATION TO STATION	LOCATION	LENGTH (LF)
-L-	21+60.00 TO 21+73.83	LT	13.8
-L-	21+60.00 TO 21+73.83	RT	13.8
-L-	24+07.17 TO 24+20.00	LT	12.8
-L-	24+07.17 TO 24+20.00	RT	12.8
TOTAL			53.3
SAY			60

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SY
-L-	16+00	21+98	RT	1424
-L-	23+73	29+00	RT	1235
			TOTAL	2659
			SAY	2700

REVISIONS

COMPUTED BY: Tyler C. Bottoms DATE: 6/14/19
 CHECKED BY: Jinyoung Park DATE: 8/21/19

(5-15-18)

PROJECT NO.	SHEET NO.
B-5156	3G-1

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

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

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

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

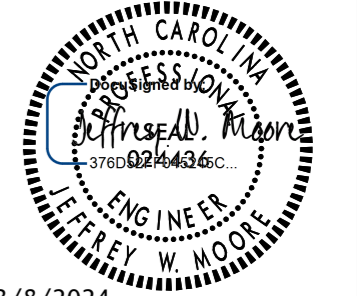
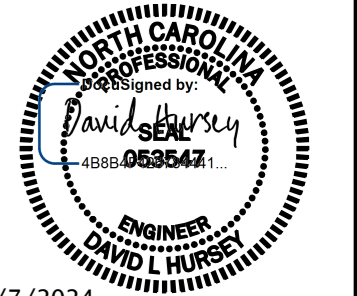
LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
-L-	2.5:1	13+75 ±	2:1	21+50 ±	LT	2300	0	0	2300
-L-	2:1	24+25 ±	2.5:1	24+75 ±	LT	200	0	0	200
TOTAL SY:						2500	0	0*	2500**

*Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.
 **Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.

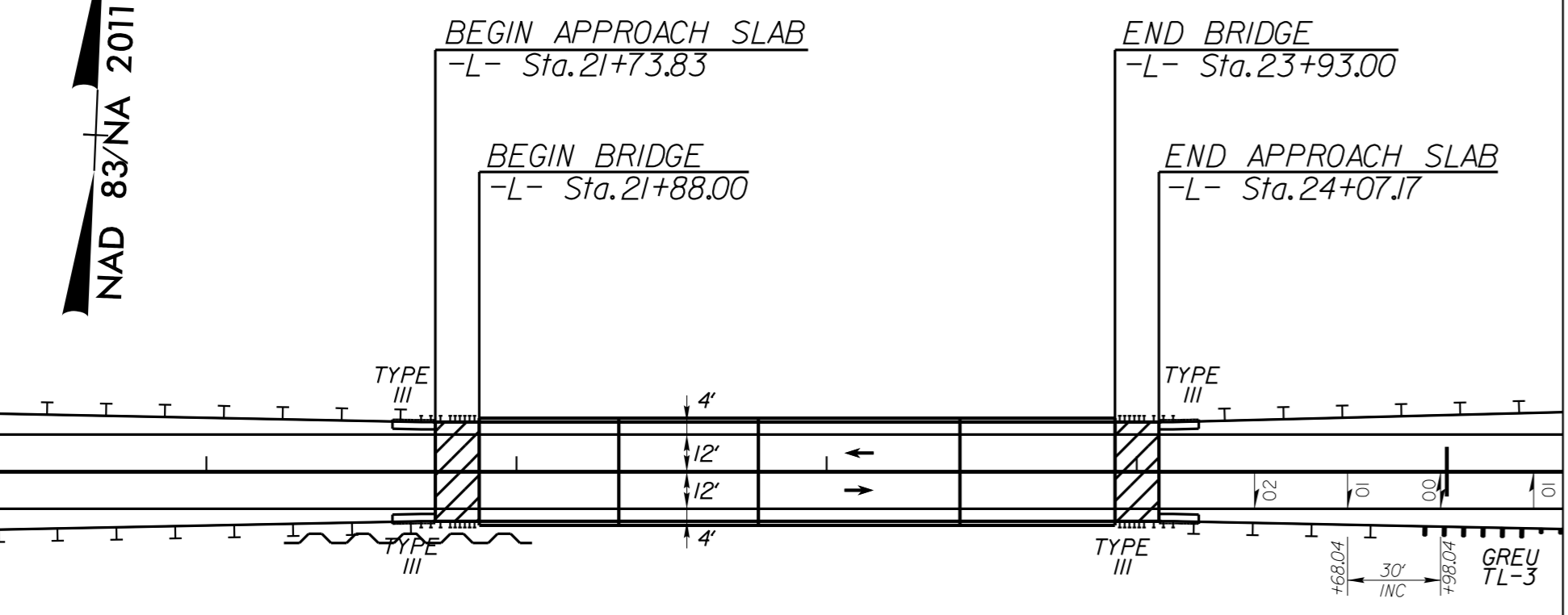
5/14/99

NAD 83 NA 2011

Kimley Horn
P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

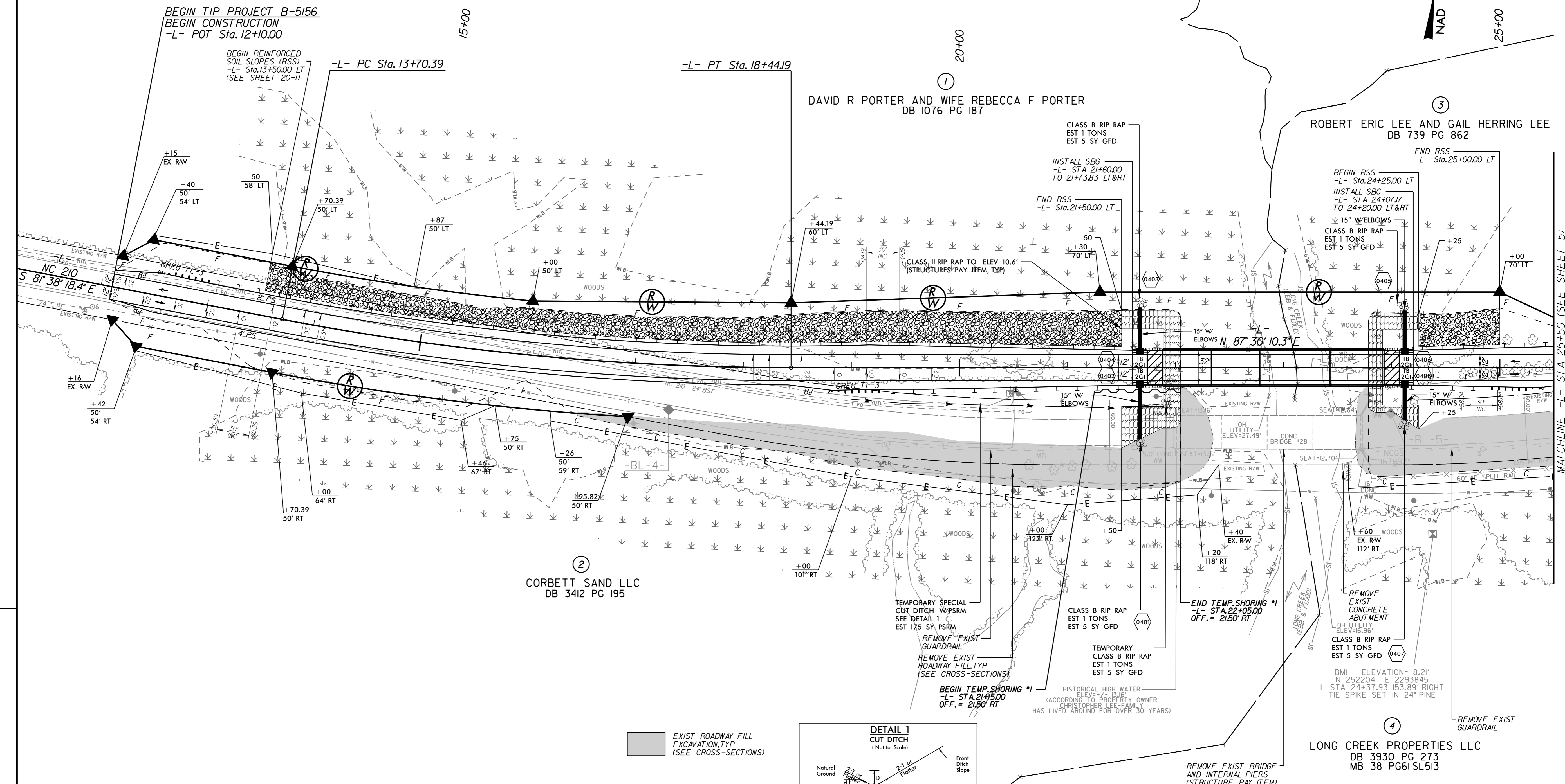
PROJECT REFERENCE NO. B-5156		SHEET NO. 4	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
			
3/8/2024		3/7/2024	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

-L-
 PI Sta. 16+08.01
 $\Delta = 10' 51" 31.3" (LT)$
 $D = 2' 17" 30.6"$
 $L = 473.80'$
 $T = 237.61'$
 $R = 2,500.00'$
 $SE = 0.035$
 $RO = 105'$



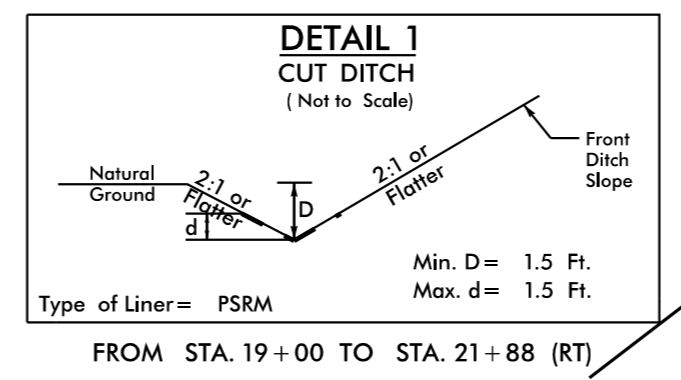
DETAIL SHOWING BRIDGE / PAVEMENT RELATIONSHIP

REVISIONS



MATCHLINE -L- STA 25+50 (SEE SHEET 5)

EXIST ROADWAY FILL
EXCAVATION, TYP.
(SEE CROSS-SECTIONS)

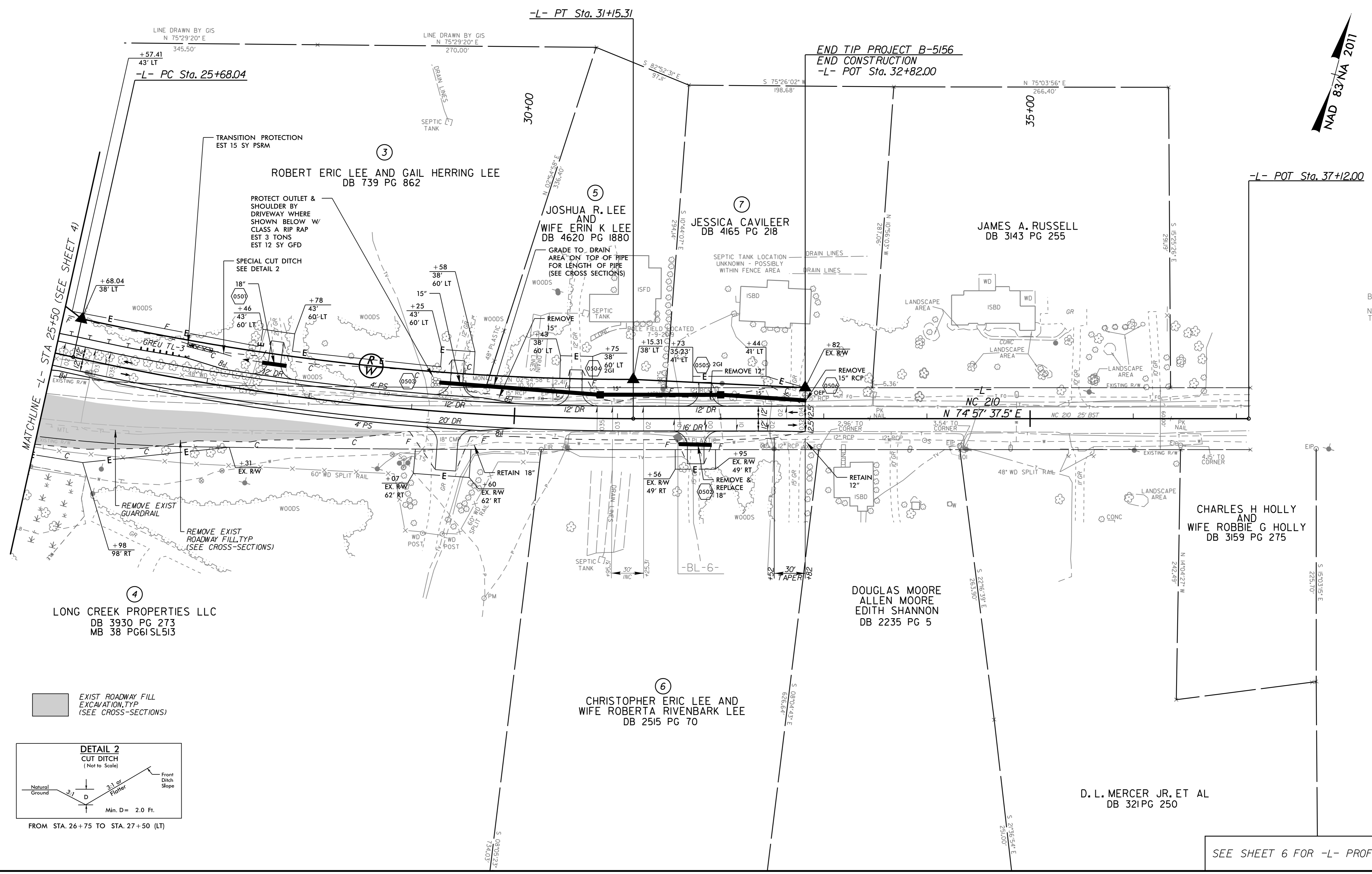


SEE SHEET 6 FOR -L- PROFILE
 SEE SHEETS S-1 TO S-42 FOR STRUCTURES PLANS
 SEE TMP PLANS FOR TEMPORARY SHORING DETAILS

3/7/2024

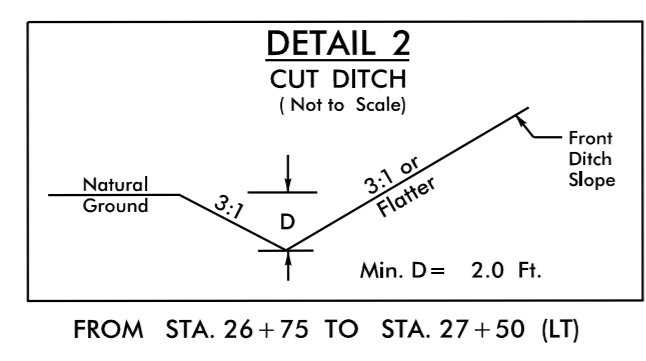
PROJECT REFERENCE NO. B-5156	SHEET NO. 5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L-
 PI Sta 28+42.77
 $\Delta = 12' 32' 32.8''$ (LT)
 $D = 2' 17' 30.6''$
 $L = 547.27'$
 $T = 274.73'$
 $R = 2,500.00'$
 $SE = 0.035$
 $RO = 105'$



BM2 ELEVATION= 23.72'
 L STA 37+12.00
 N 53°07'23.5" DIST 217.96'
 TIE SPIKE SET IN 24" OAK

EXIST ROADWAY FILL
 EXCAVATION, TYP
 (SEE CROSS-SECTIONS)



REVISIONS

5/14/99

3/7/2024

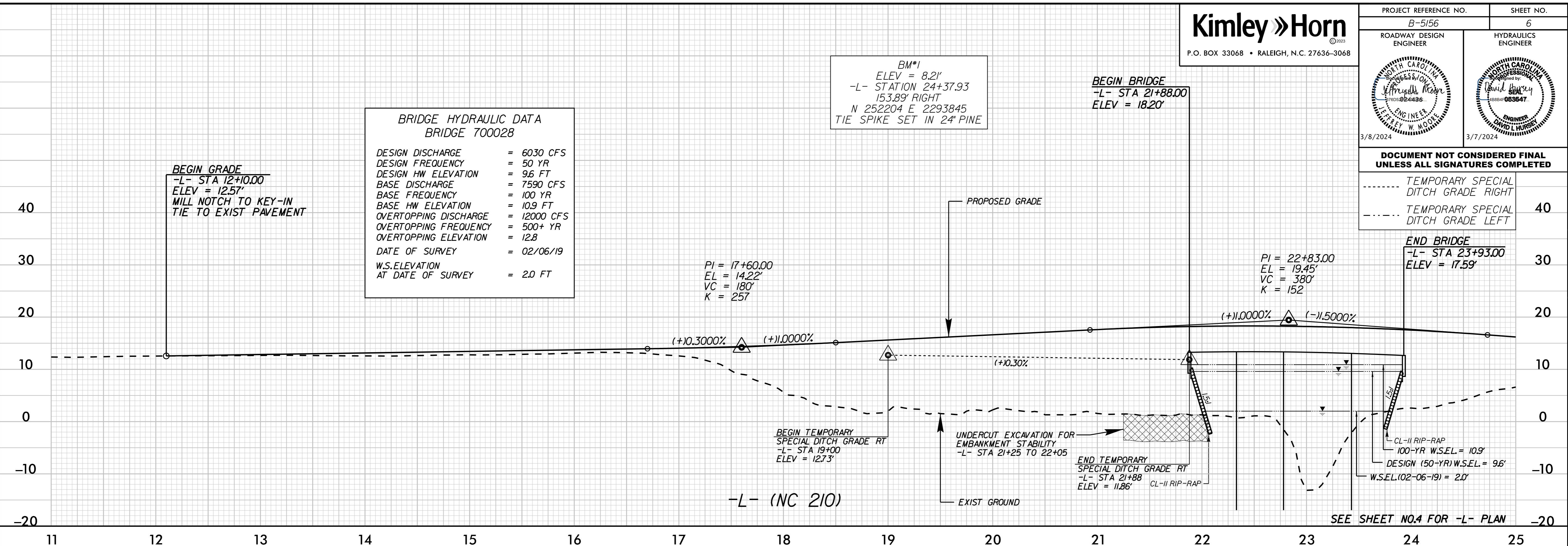
SEE SHEET 6 FOR -L- PROFILE

5/14/1999

PROJECT REFERENCE NO. B-5156	SHEET NO. 6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

----- TEMPORARY SPECIAL DITCH GRADE RIGHT
 ----- TEMPORARY SPECIAL DITCH GRADE LEFT



**BRIDGE HYDRAULIC DATA
BRIDGE 700028**

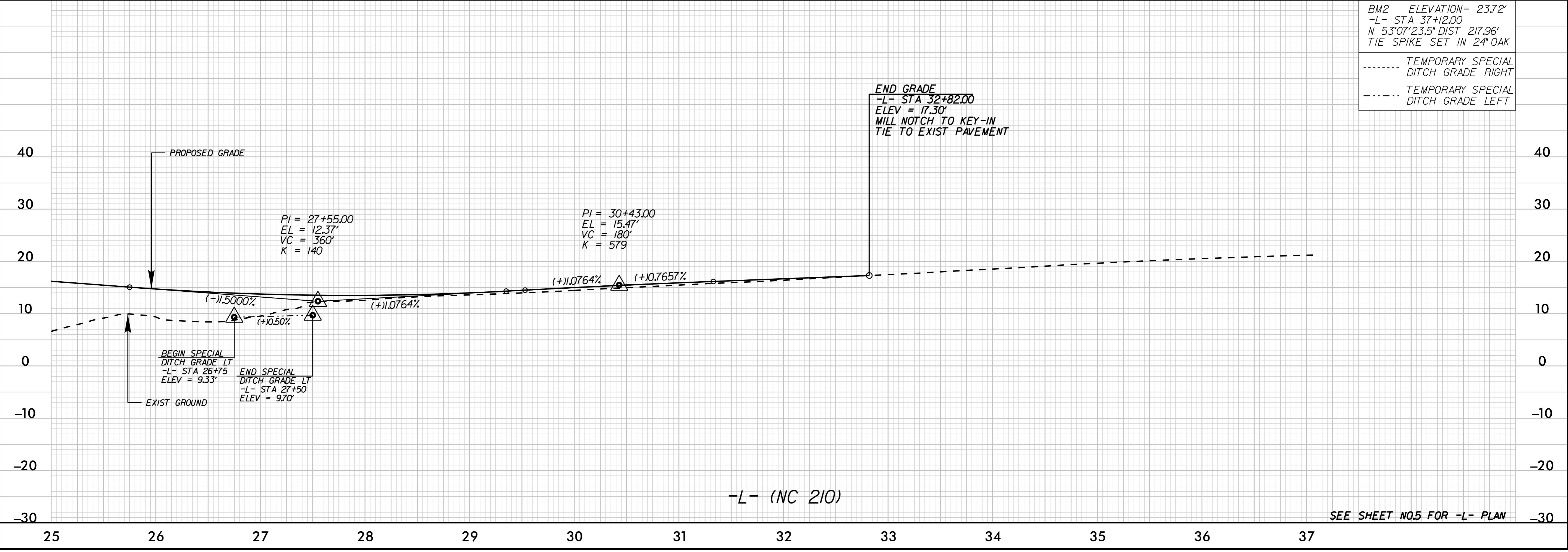
DESIGN DISCHARGE = 6030 CFS
 DESIGN FREQUENCY = 50 YR
 DESIGN HW ELEVATION = 9.6 FT
 BASE DISCHARGE = 7590 CFS
 BASE FREQUENCY = 100 YR
 BASE HW ELEVATION = 10.9 FT
 OVERTOPPING DISCHARGE = 12000 CFS
 OVERTOPPING FREQUENCY = 500+ YR
 OVERTOPPING ELEVATION = 12.8
 DATE OF SURVEY = 02/06/19
 W.S.ELEVATION AT DATE OF SURVEY = 2.0 FT

BM*1
 ELEV = 8.21'
 -L- STATION 24+37.93
 153.89' RIGHT
 N 252204 E 2293845
 TIE SPIKE SET IN 24' PINE

BEGIN BRIDGE
 -L- STA 21+88.00
 ELEV = 18.20'

END BRIDGE
 -L- STA 23+93.00
 ELEV = 17.59'

SEE SHEET NO.4 FOR -L- PLAN



BM2 ELEVATION = 23.72'
 -L- STA 37+12.00
 N 53°07'23.5" DIST 217.96'
 TIE SPIKE SET IN 24" OAK

----- TEMPORARY SPECIAL DITCH GRADE RIGHT
 ----- TEMPORARY SPECIAL DITCH GRADE LEFT

END GRADE
 -L- STA 32+82.00
 ELEV = 17.30'
 MILL NOTCH TO KEY-IN
 TIE TO EXIST PAVEMENT

SEE SHEET NO.5 FOR -L- PLAN

3/7/2024