

09/05/2019

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

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## NASH COUNTY

**LOCATION: BRIDGE NO. 630091 OVER TAR RIVER  
ON NC 581**

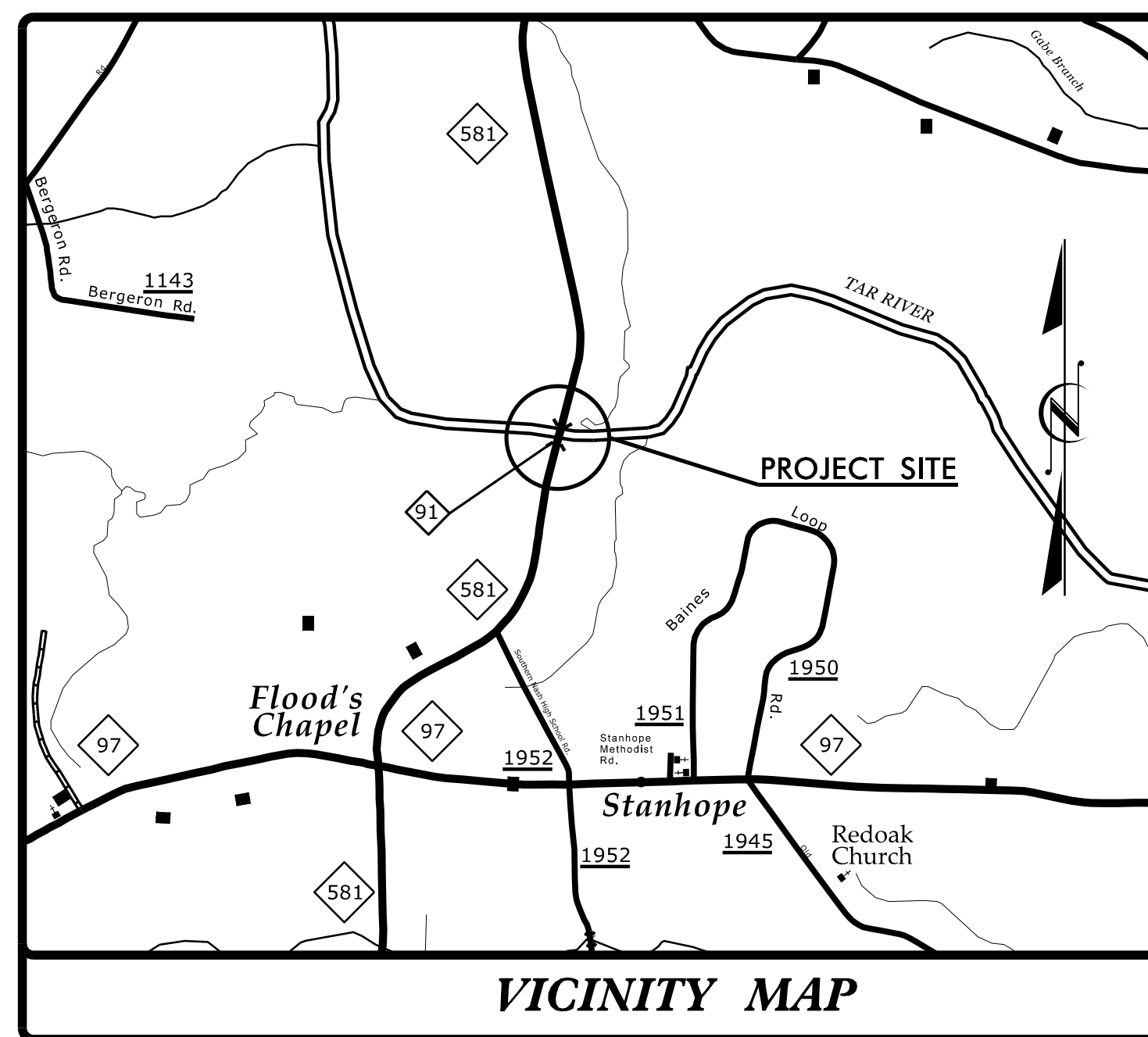
**TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5947	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45983.1.1		PE	
45983.2.1	0581032	ROW	
45983.2.2		UTILITIES	
45983.3.1	0581032	CONST.	



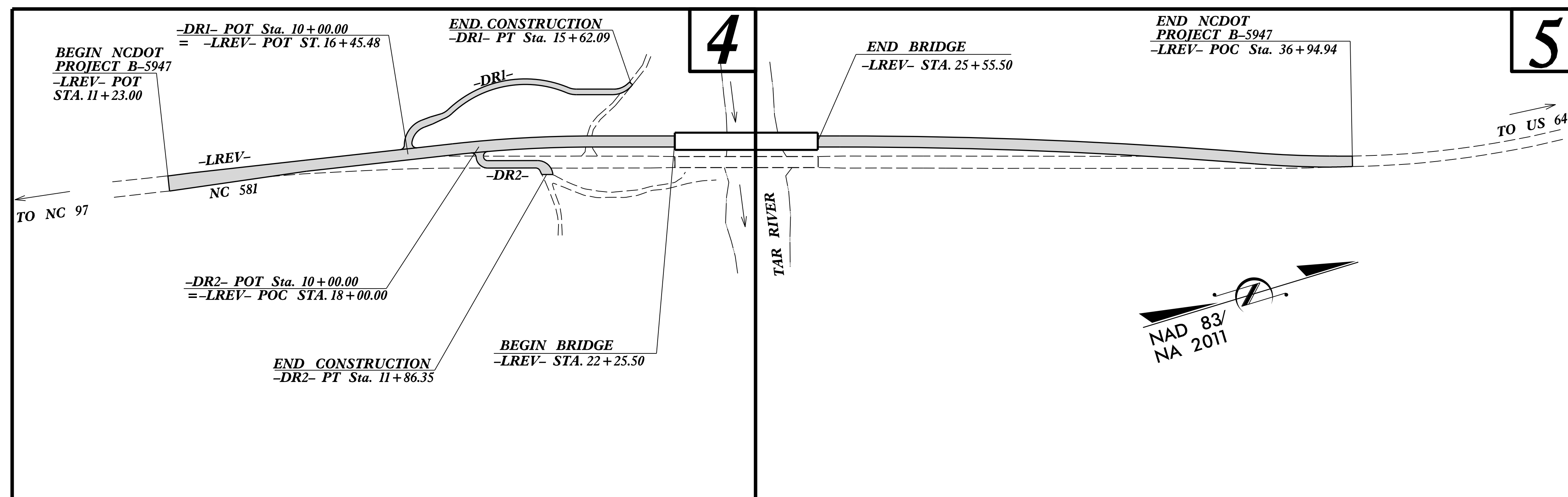
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
License No. F-0377  
Bus: 919 851 8077  
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



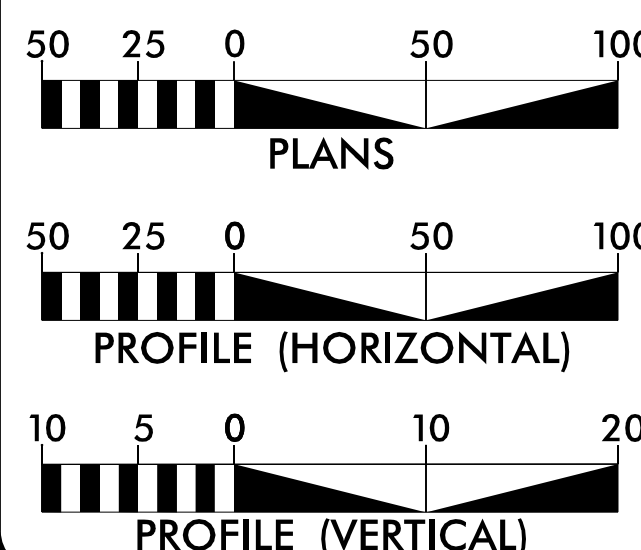
**PROJECT: B-5947**

**CONTRACT: C204725**



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

### GRAPHIC SCALES



### DESIGN DATA

ADT 2022 = 5,400  
ADT 2040 = 6,300  
K = 10 %  
D = 55 %  
T = 5 % \*  
V = 60 MPH  
\* (TTST = 1% +  
DUAL = 4%)  
FUNC CLASS =  
MAJOR COLLECTOR  
REGIONAL TIER

### PROJECT LENGTH

LENGTH ROADWAY PROJECT B-5947 = 0.424 MILES  
LENGTH STRUCTURE PROJECT B-5947 = 0.063 MILES  
TOTAL LENGTH PROJECT B-5947 = 0.487 MILES

NCDOT CONTACT: KRISTY ALFORD, PE  
PROJECT ENGINEER - PEP/PROGRAM MGT.

Prepared for:  
**DIVISION OF HIGHWAYS  
STRUCTURES MANAGEMENT UNIT**  
1000 BIRCH RIDGE DRIVE RALEIGH NC, 27610

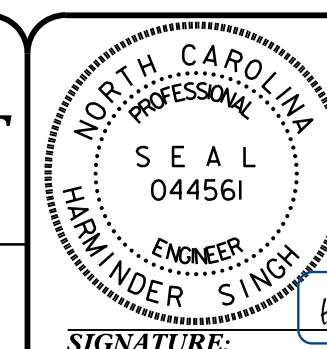
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
JUNE 1, 2021

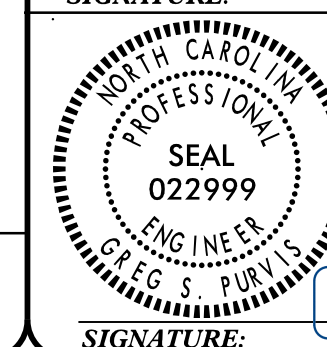
LETTING DATE:  
JULY 18, 2023

EDWARD G. WETHERILL, PE  
PROJECT ENGINEER

GREG S. PURVIS, PE  
PROJECT DESIGN ENGINEER

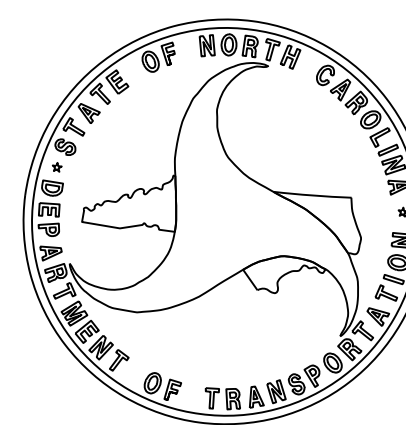



HYDRAULICS ENGINEER  
5/9/2023



ROADWAY DESIGN ENGINEER  
5/9/2023

GREG S. PURVIS P.E.



PROJECT REFERENCE NO. <b>B-5947</b>	SHEET NO. <b>1-A</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 11/16/2022	
	
DocuSigned by: <b>Greg S. Purvis</b>	

# 2018 ROADWAY ENGLISH STANDARD DRAWINGS

EFF. 01-16-2018  
REV.

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

## GENERAL NOTES

**GENERAL NOTES:** 2018 SPECIFICATIONS  
EFFECTIVE: 01-16-2018  
REVISED:

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

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

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

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

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

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

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

**UTILITIES:**  
UTILITY OWNERS ON THIS PROJECT ARE  
COMMUNICATION - CENTURYLINK  
POWER - DUKE POWER  
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

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

### 2018 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
<b>DIVISION 2 - EARTHWORK</b>	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
<b>DIVISION 3 - PIPE CULVERTS</b>	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
<b>DIVISION 4 - MAJOR STRUCTURES</b>	
422.01	Bridge Approach Fills - Type I Standard Approach Fill
422.03	Reinforced Bridge Approach Fills - Type A Alternate Approach Fill for Integral Abutment
<b>DIVISION 5 - SUBGRADE, BASES AND SHOULDERS</b>	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
<b>DIVISION 6 - ASPHALT BASES AND PAVEMENTS</b>	
654.01	Pavement Repairs
<b>DIVISION 8 - INCIDENTALS</b>	
840.00	Concrete Base Pad for Drainage Structures
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

### INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-2	TYPICAL SECTIONS, PAVEMENT SCHEDULE, & MISCELLANEOUS DETAILS
2C-1	DETAIL FOR GUARDRAIL INSTALLATION
2C-2	DETAIL FOR TYPE III STRUCTURE ANCHOR UNIT
2C-3	DETAIL FOR AT-1
2D-1	DRAINAGE DETAILS
2G-1	TEMPORARY SHORING
2G-2 THRU 2G-4	STANDARD TEMPORARY WALL
2G-5	REINFORCED SOIL SLOPE DETAIL
3B-1 THRU 3B-2	SUMMARY OF DRAINAGE QUANTITIES, GUARDRAIL SUMMARY, EARTHWORK SUMMARY, PAVEMENT REMOVAL SUMMARY, SHOULDER BERM GUTTER SUMMARY, AND TEMPORARY GUARDRAIL SUMMARY
3G-1	SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION
3P-1	PARCEL INDEX SHEET
4 THRU 6	PLAN AND PROFILE SHEETS
RW01 THRU RW05	RIGHT OF WAY SHEETS, SURVEY CONTROL SHEETS, PROPOSED ALIGNMENT CONTROL SHEET AND PROPOSED EASEMENT CONTROL SHEET
TMP-1 THRU TMP-13	TRANSPORTATION MANAGEMENT PLAN
PMP-1 THRU PMP-3	PAVEMENT MARKING PLAN
EC-1 THRU EC-7	EROSION CONTROL PLANS
RF-1	REFORESTATION PLAN
SIGN-01 THRU SIGN-05	SIGNING PLANS
UO-1 THRU UO-3	UTILITIES BY OTHERS PLANS
X-1A	CROSS SECTION SUMMARY SHEET
X-1 THRU X-14	CROSS SECTIONS
S-1 THRU S-39	STRUCTURE PLANS

# 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	-WLB-
Proposed Wetland Boundary	-WLB-
Existing Endangered Animal Boundary	-EAB-
Existing Endangered Plant Boundary	-EPB-
Existing Historic Property Boundary	-HPB-
Known Contamination Area: Soil	-S-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	⬇
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)	◆
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	-----
Proposed Permanent Drainage Easement	-----
Proposed Permanent Drainage/Utility Easement	-----
Proposed Permanent Utility Easement	-----
Proposed Temporary Utility Easement	-----
Proposed Aerial Utility Easement	-----

### 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	T T T
Proposed Guardrail	T T T
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	PH
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	PH
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	PH
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)*	-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.

6/2/2022

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1.5" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
J1	PROP. APPROX. 8" AGGREGATE BASE COURSE
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	MILLING BITUMINOUS PAVEMENT. (SEE MILLING DETAIL)
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

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

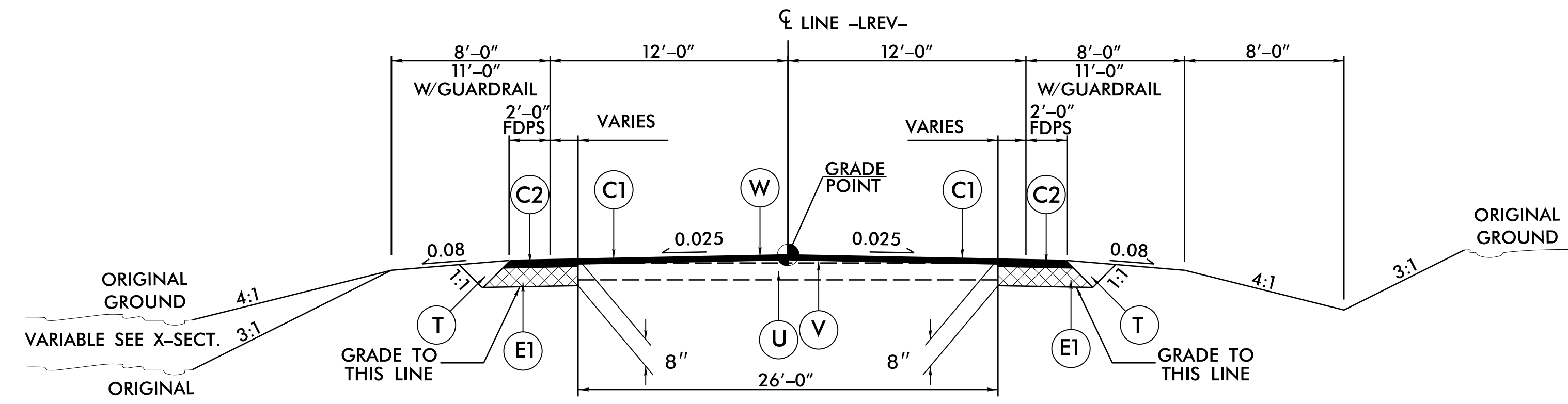
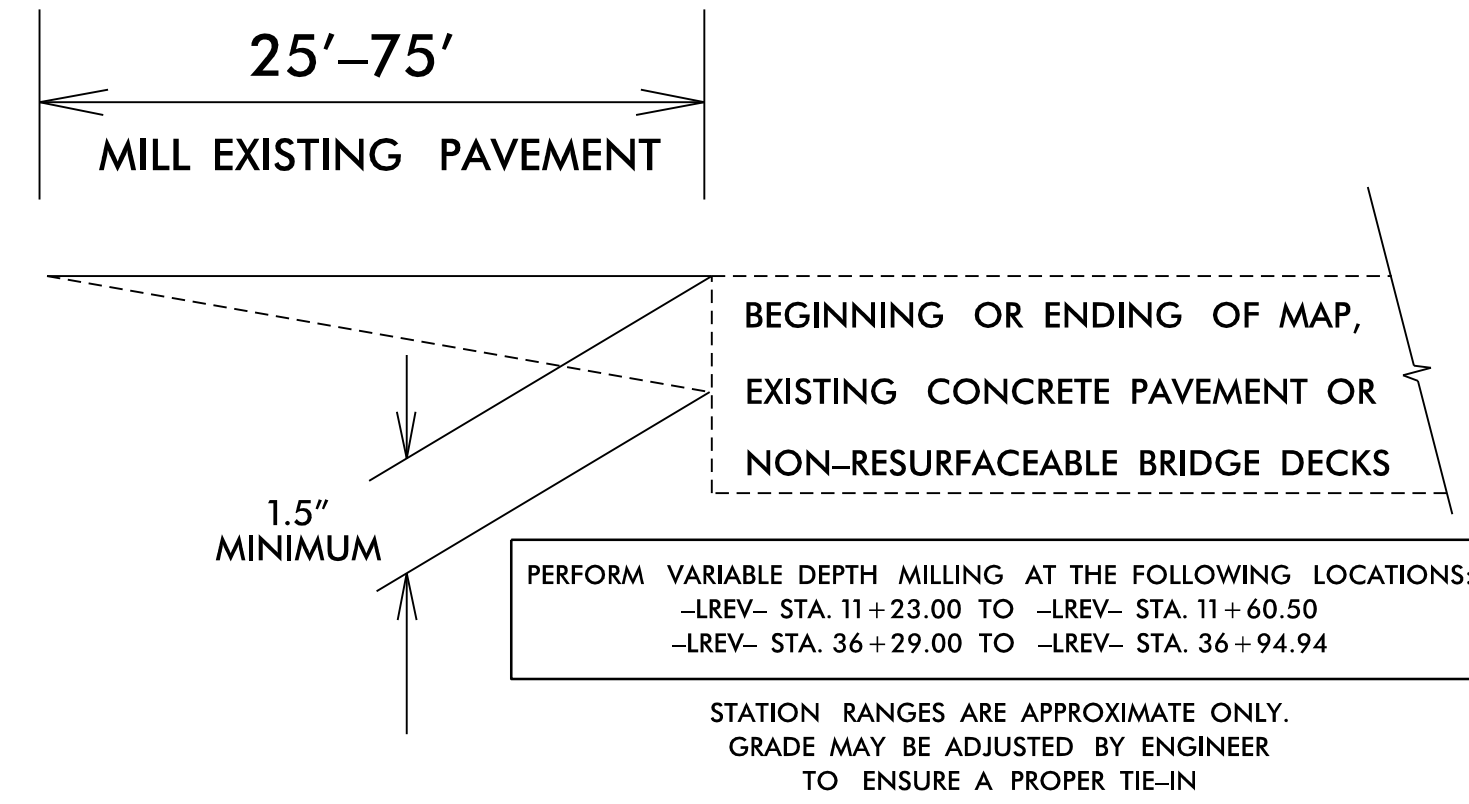
### INCIDENTAL MILLING AT PAVEMENT TIE-INS

**NOTES TO CONTRACTOR**

For surface mixes over 1" in thickness, mill the existing pavement in accordance with the following sketch as directed by the Engineer.

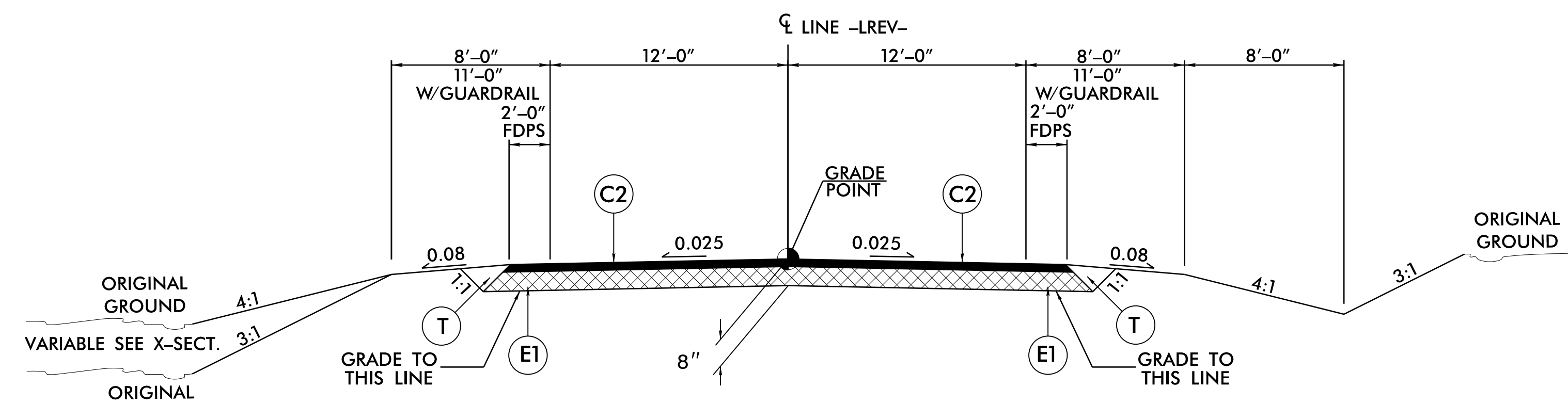
Locations shall include ties into existing concrete pavement, at bridge approaches where the bridge will not be resurfaced, and at the beginning and ending point of each resurfacing map.

Perform the work in accordance with Section 607 of the January 2018 North Carolina Department of Transportation Standard Specifications for Roads and Structures. Resurfacing will be accomplished at the same time as the milling operation.



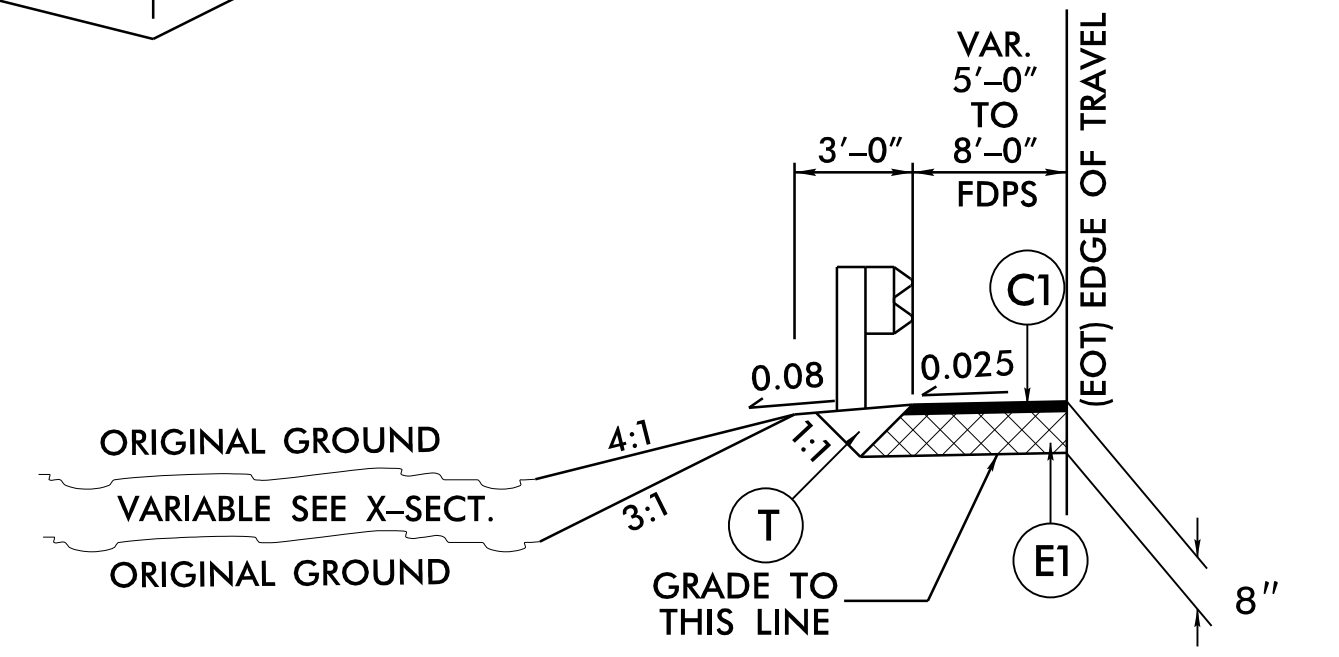
### TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 AS FOLLOWS:  
-LREV- STA. 11+23.00 TO -LREV- STA. 17+36.46  
-LREV- STA. 32+16.03 TO -LREV- STA. 36+94.94



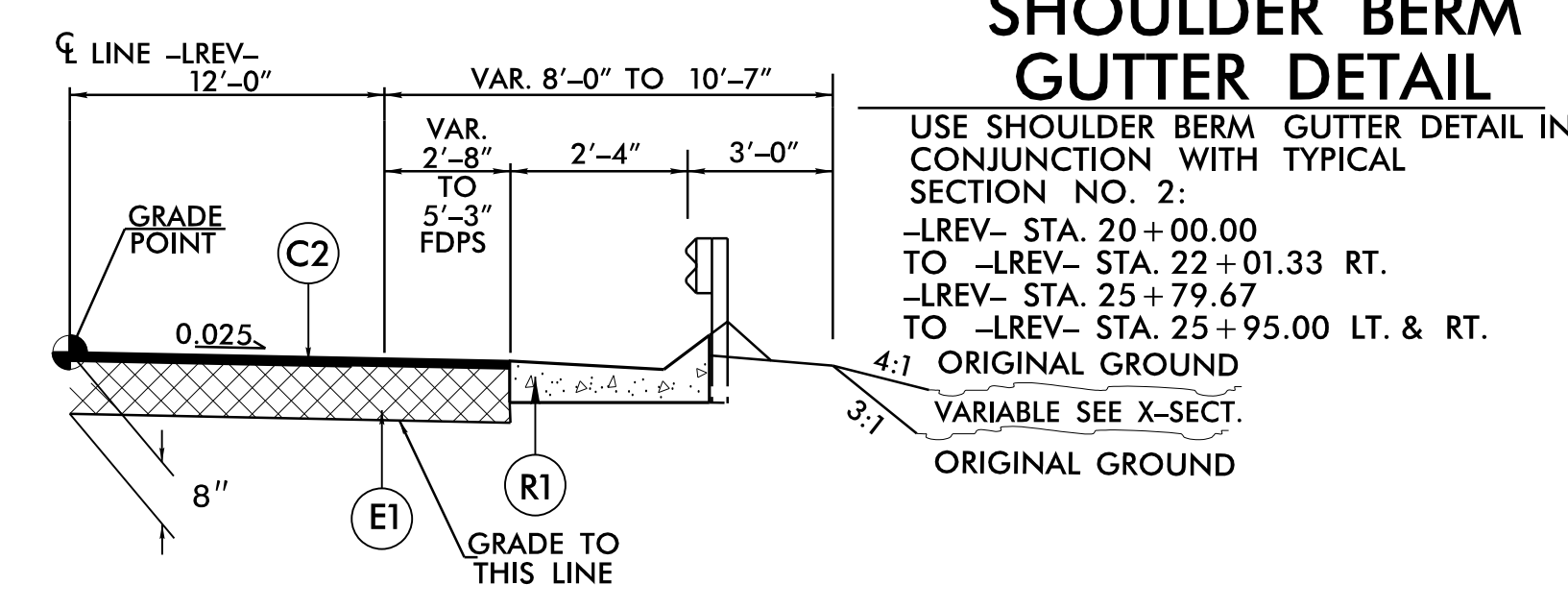
### TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AS FOLLOWS:  
-LREV- STA. 17+36.46 TO -LREV- STA. 22+25.50 (BEGIN BRIDGE)  
-LREV- STA. 25+55.50 (END BRIDGE) TO -LREV- STA. 32+16.03



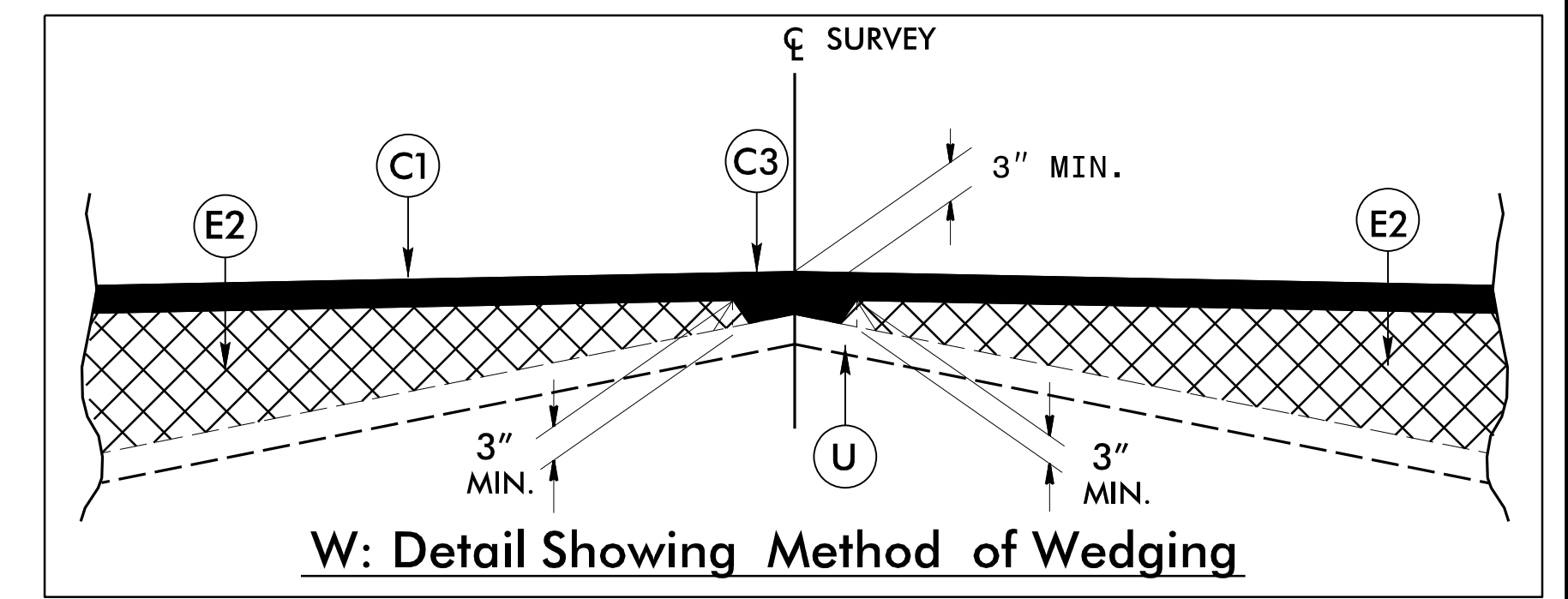
### SHOULDER DETAIL

USE SHOULDER DETAIL IN CONJUNCTION WITH TYPICAL SECTIONS NO. 2:  
-LREV- STA. 17+44.25 TO -LREV- STA. 22+25.50 LT.  
-LREV- STA. 19+19.25 TO -LREV- STA. 22+25.50 RT.  
-LREV- STA. 25+55.50 TO -LREV- STA. 30+74.25 LT.  
-LREV- STA. 25+55.50 TO -LREV- STA. 26+99.25 RT.



### SHOULDER BERM GUTTER DETAIL

USE SHOULDER BERM GUTTER DETAIL IN CONJUNCTION WITH TYPICAL SECTION NO. 2:  
-LREV- STA. 20+00.00 TO -LREV- STA. 22+01.33 RT.  
-LREV- STA. 25+79.67 TO -LREV- STA. 25+95.00 LT. & RT.



### W: Detail Showing Method of Wedging

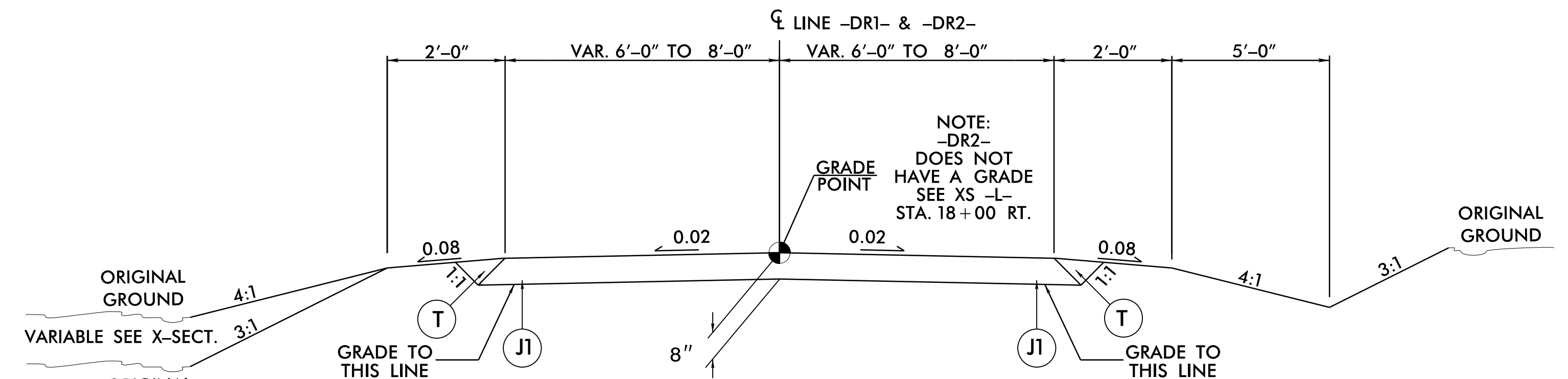
PROJECT REFERENCE NO. B-5947	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER SEAL 022999 5/10/2022	PAVEMENT DESIGN ENGINEER SEAL 22896 5/11/2022
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	

5/5/2022 B-5947-Relay-tyr.dgn

6/2/2019

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
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V	MILLING BITUMINOUS PAVEMENT. (SEE MILLING DETAIL)
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

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



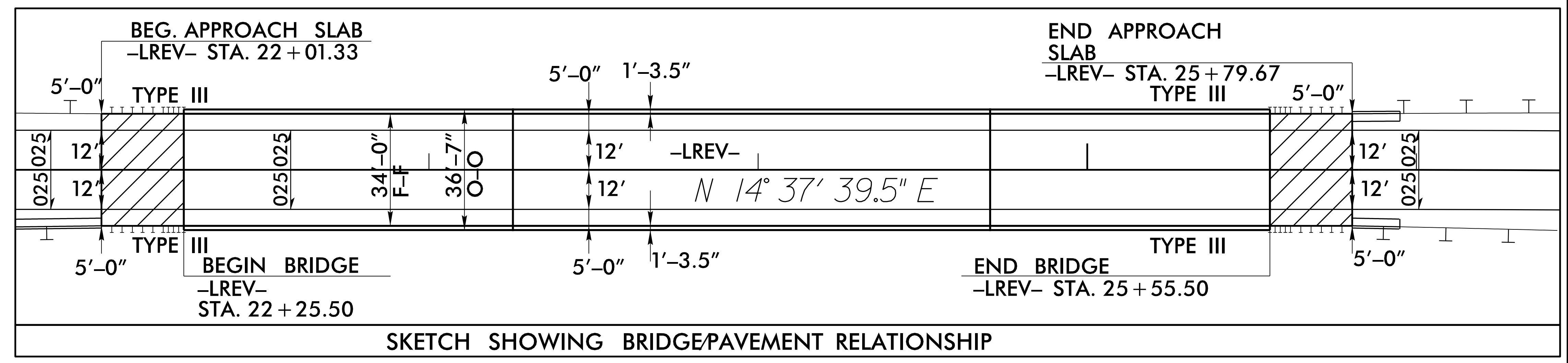
**TYPICAL SECTION NO. 4**

USE TYPICAL SECTION NO. 4 AS FOLLOWS:  
 -DR1- STA. 10+14.09 TO -DR1- STA. 15+62.09  
 -DR2- STA. 10+14.00 TO -DR2- STA. 11+86.35

CURVE DATA		
-LREV-		
PI Sta 18+97.28	PI Sta 30+33.32	PI Sta 38+21.44
$\Delta = 6^\circ 21' 17.0''$ (RT)	$\Delta = 4^\circ 39' 02.3''$ (RT)	$\Delta = 18^\circ 11' 02.0''$ (LT)
D = 2' 04' 36.7"	D = 0' 30' 58.2"	D = 2' 42' 49.1"
L = 305.98'	L = 900.98'	L = 670.09'
T = 153.15'	T = 450.74'	T = 337.89'
R = 2,758.76'	R = 11,100.00'	R = 2,111.40'
DS = 60 MPH	DS = 60 MPH	DS = 60 MPH
SE = .06	SE = NC	SE = MATCH EXIST.
RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS

-DRI-				
PI Sta 10+54.09	PI Sta 11+34.96	PI Sta 12+98.96	PI Sta 14+28.42	PI Sta 15+41.46
$\Delta = 69^\circ 12' 44.9''$ (RT)	$\Delta = 22^\circ 31' 51.6''$ (LT)	$\Delta = 65^\circ 56' 25.6''$ (RT)	$\Delta = 22^\circ 37' 18.9''$ (LT)	$\Delta = 50^\circ 55' 18.0''$ (LT)
D = 114' 35' 29.6"	D = 114' 35' 29.6"	D = 24' 05' 14.1"	D = 114' 35' 29.6"	D = 114' 35' 29.6"
L = 60.40'	L = 19.66'	L = 273.76'	L = 19.74'	L = 44.44'
T = 34.50'	T = 9.96'	T = 154.30'	T = 10.00'	T = 23.81'
R = 50.00'	R = 50.00'	R = 237.87'	R = 50.00'	R = 50.00'

-DR2-	
PI Sta 10+35.38	PI Sta 11+72.22
$\Delta = 84^\circ 53' 03.5''$ (LT)	$\Delta = 83^\circ 34' 31.3''$ (RT)
D = 38' 58' 18.7"	D = 229' 10' 59.2"
L = 22.22'	L = 36.47'
T = 13.72'	T = 22.34'
R = 15.00'	R = 25.00'



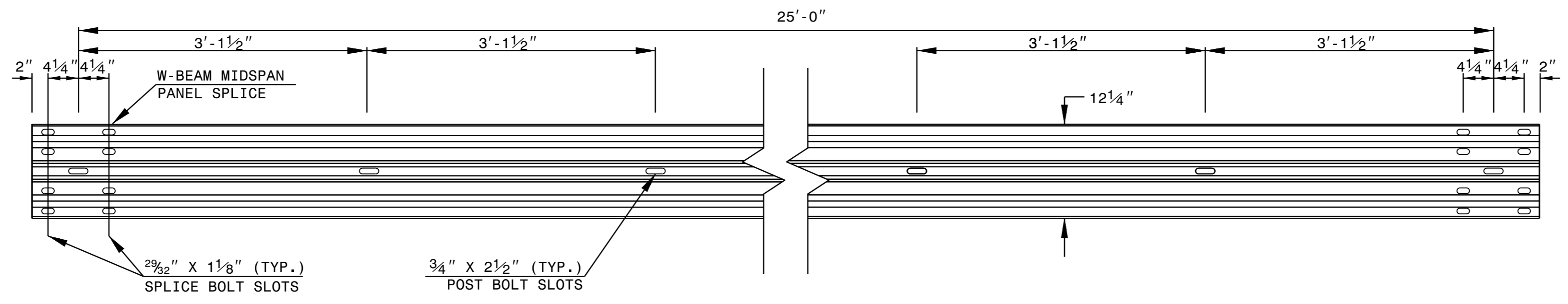
PROJECT REFERENCE NO. B-5947	SHEET NO. 2A-2
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER 
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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	

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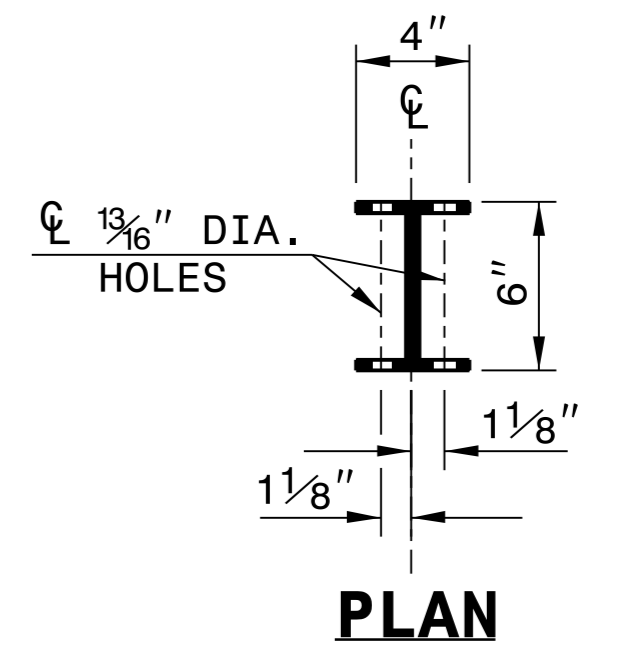
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

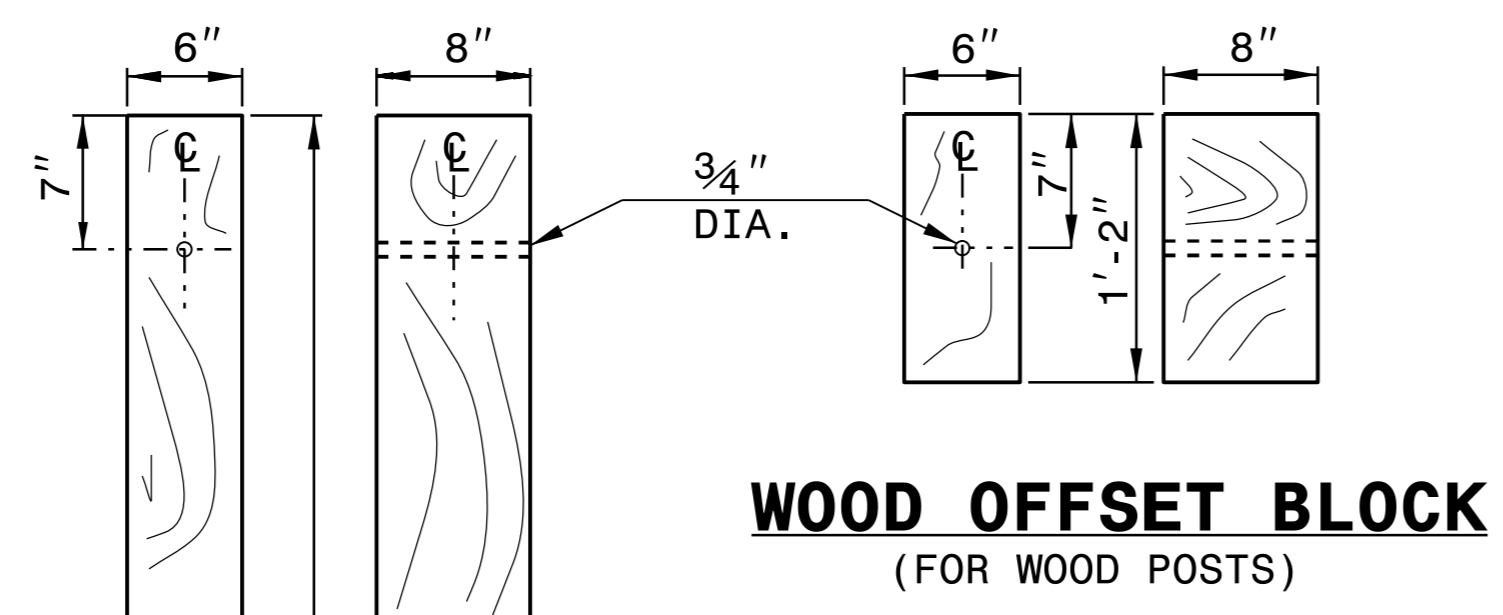
SHEET 6 OF 8  
**862D02**



**STANDARD W-BEAM GUARDRAIL**



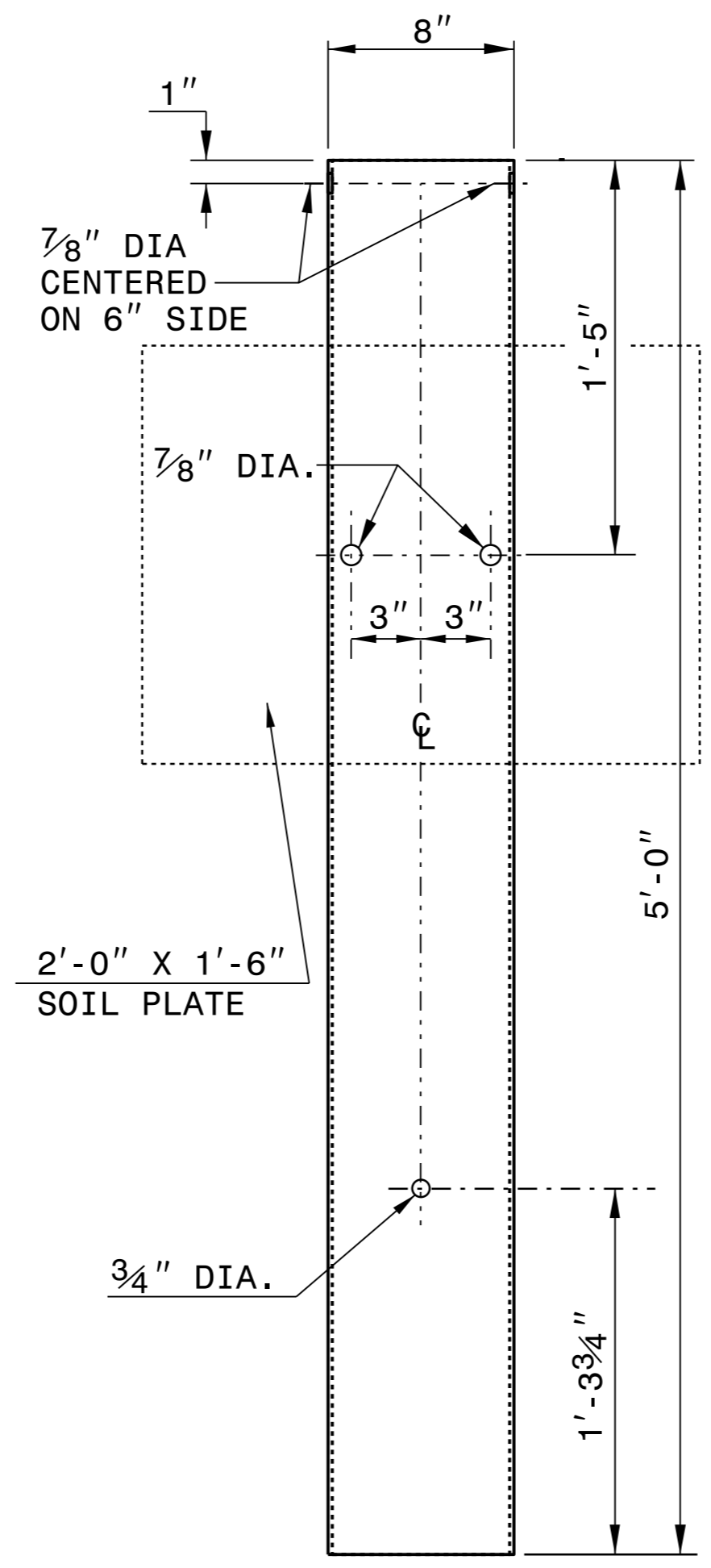
**PLAN**



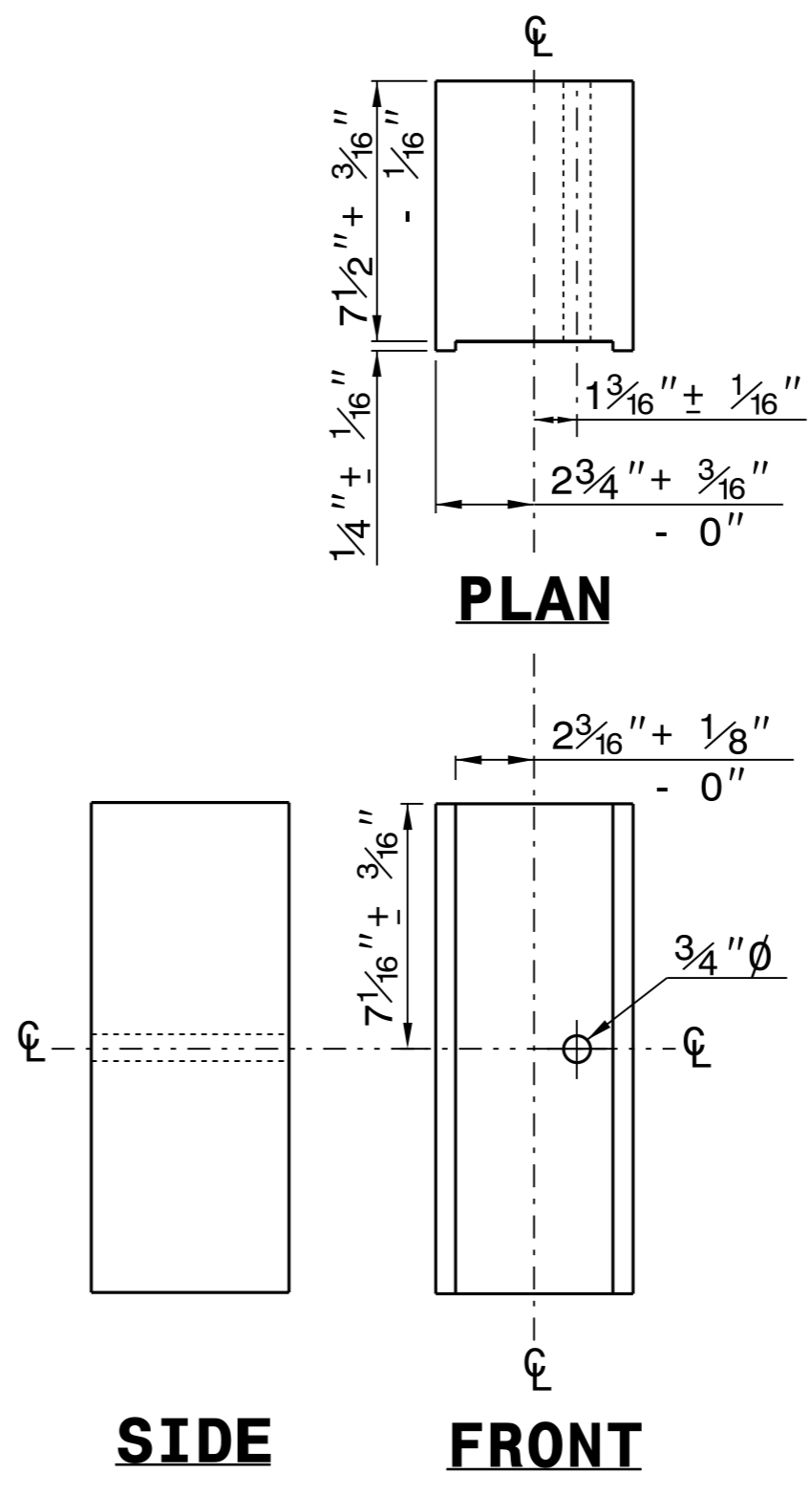
**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

**STANDARD  
LINE POST**

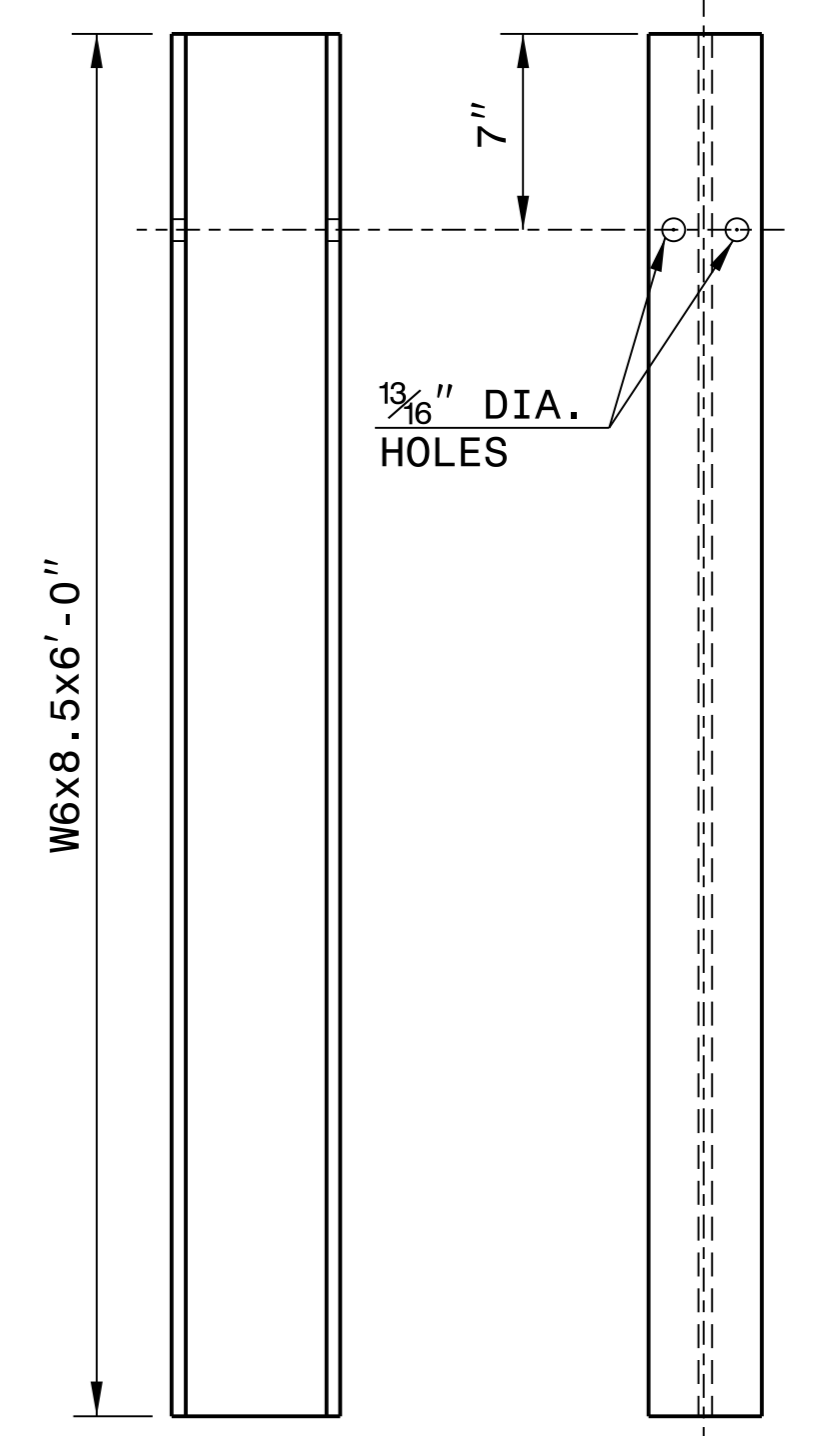
**SHORT WOOD  
BREAKAWAY POST**



**STEEL TUBE  
TS 6"x8"x0.1875"**



**ROUTED  
OFFSET BLOCK**



**"W6" STEEL POST**

**SYSTEM PARTS**

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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**



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

**SEE TITLE BLOCK**

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

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

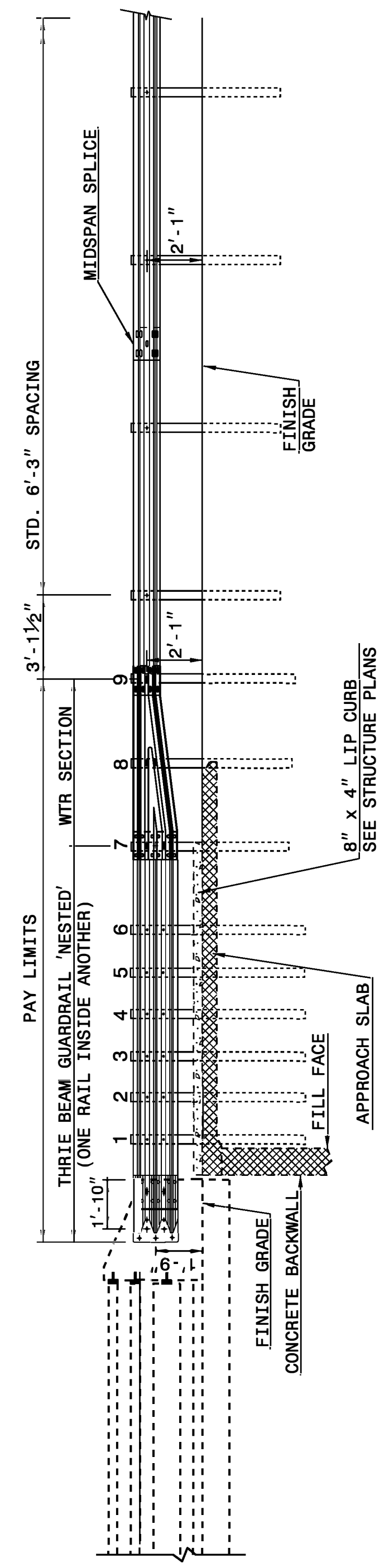
ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7 862D03

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

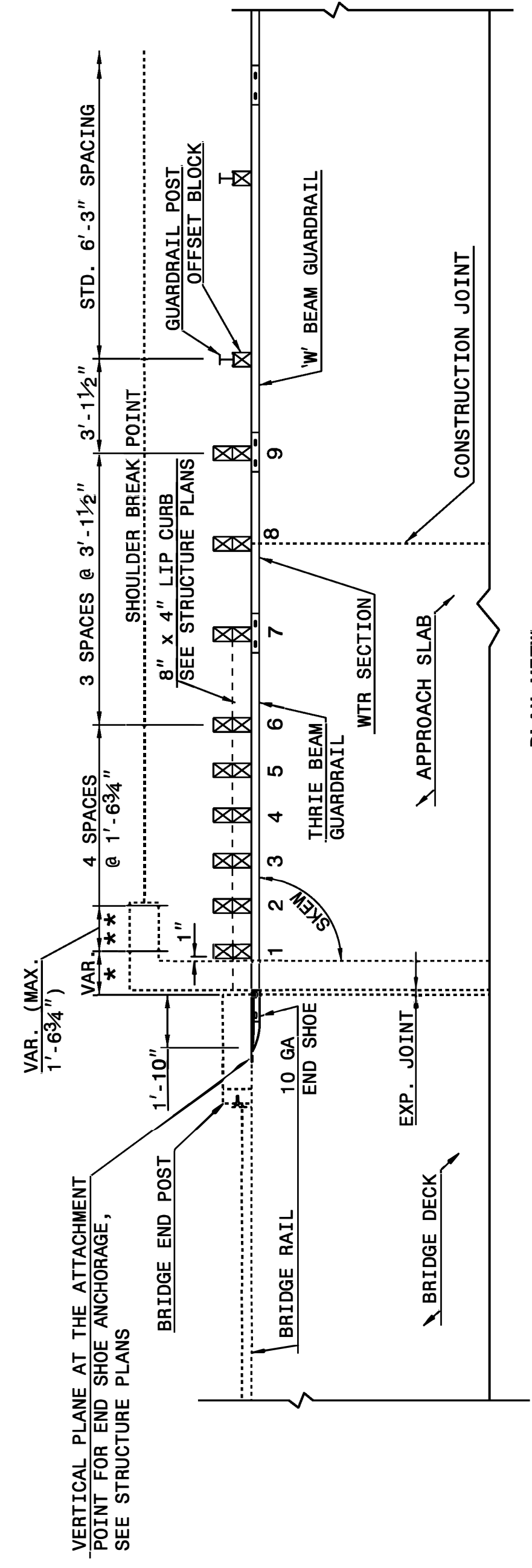
ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7 862D03



ELEVATION

NOTE: \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER. \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT. -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" X 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB. -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER). -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW. -SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

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

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

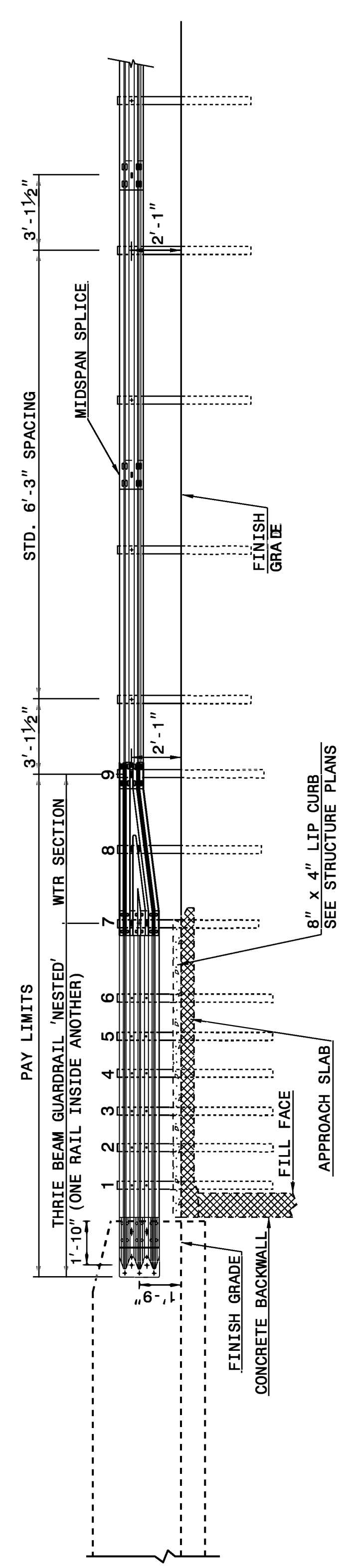
ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7 862D03

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

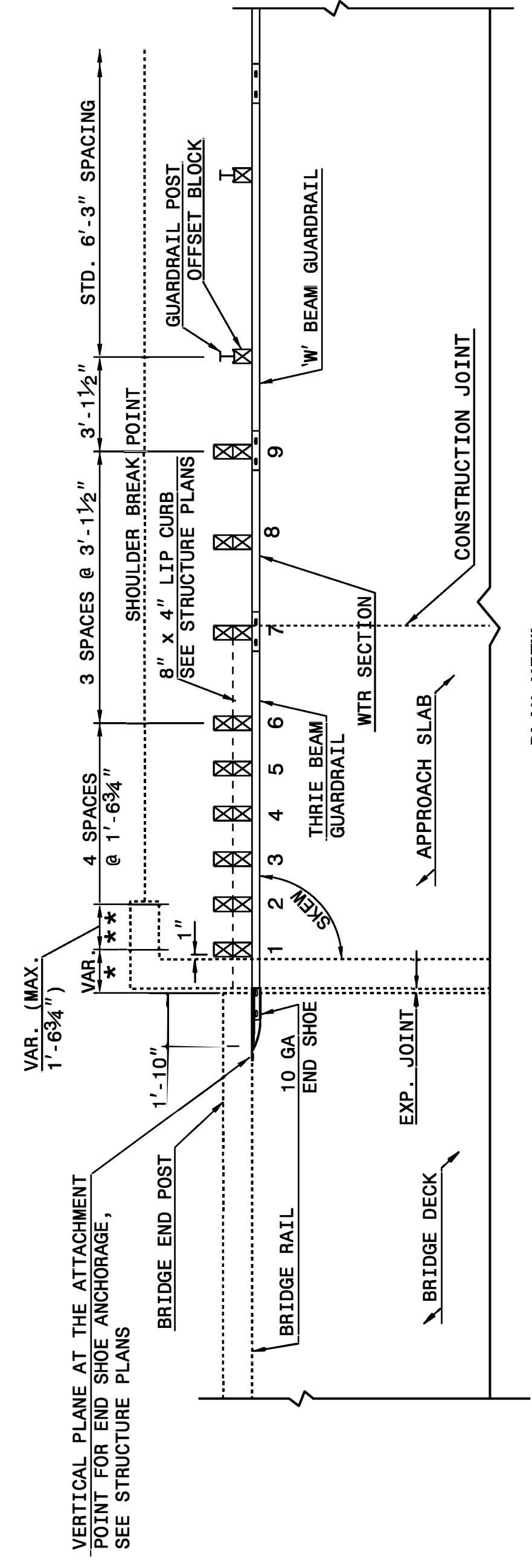
ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7 862D03



ELEVATION

NOTE: \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER. \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT. -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" X 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB. -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER). -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW. -SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

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

CONTRACT STANDARDS AND DEVELOPMENT UNIT Office 919-707-6950 FAX 919-250-4119 SEE TITLE BLOCK ORIGINAL BY: J. HOWERTON DATE: 06-22-12 MODIFIED BY: DATE: CHECKED BY: DATE: FILE SPEC.: DATE:



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

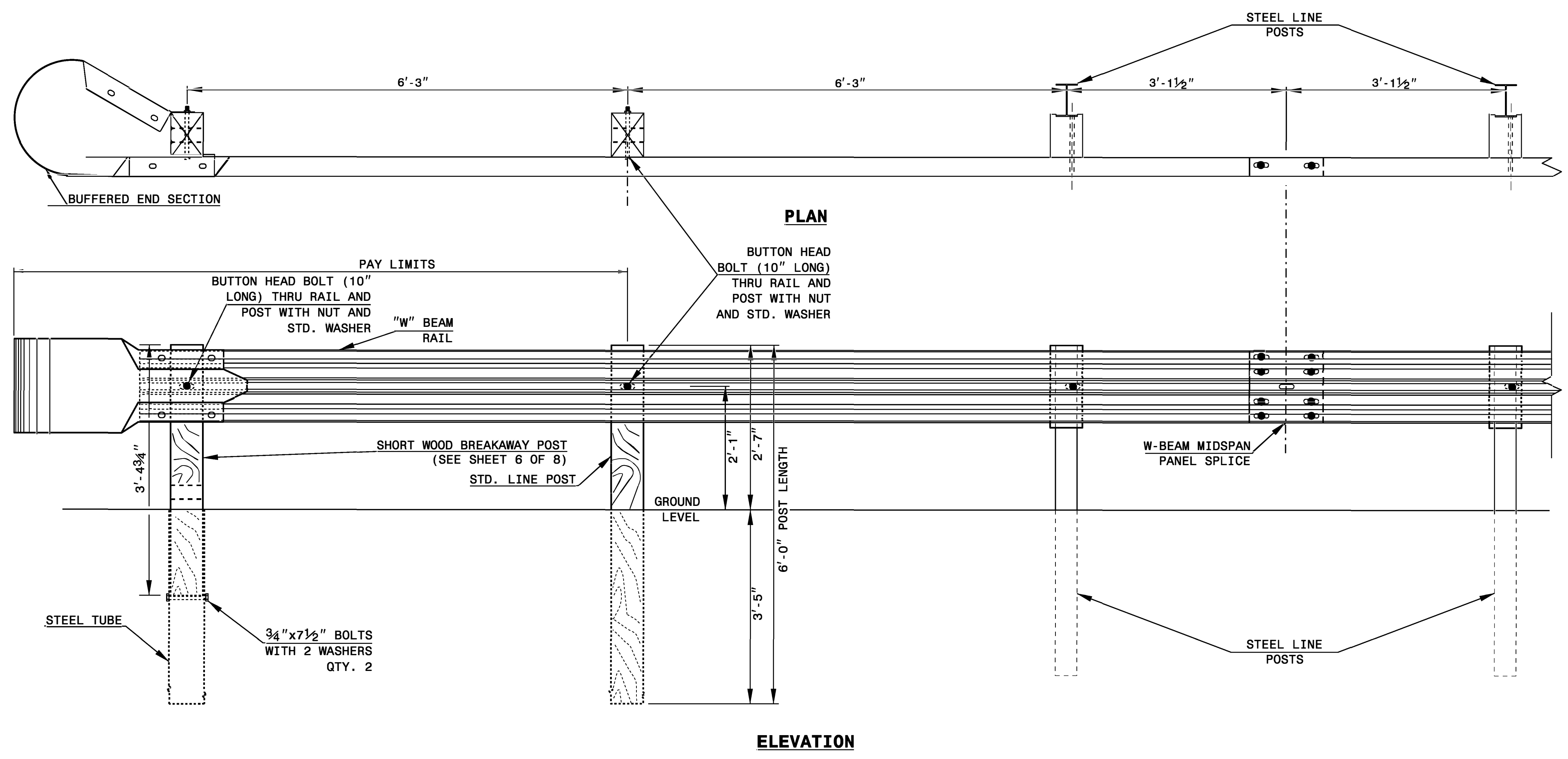
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET OF

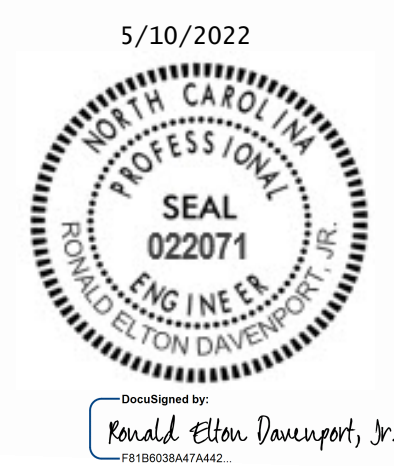
STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET OF



**TRAILING END UNIT ASSEMBLY**  
**A.T. - 1 SYSTEM**



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

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

**A.T. - 1 SYSTEM**

ORIGINAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 MODIFIED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
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6/2/2022

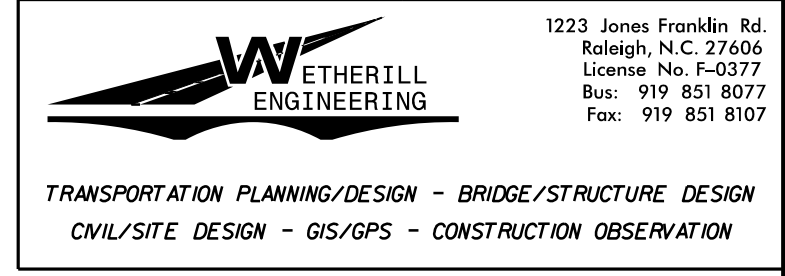
# DRAINAGE DETAILS

(NOT TO SCALE)

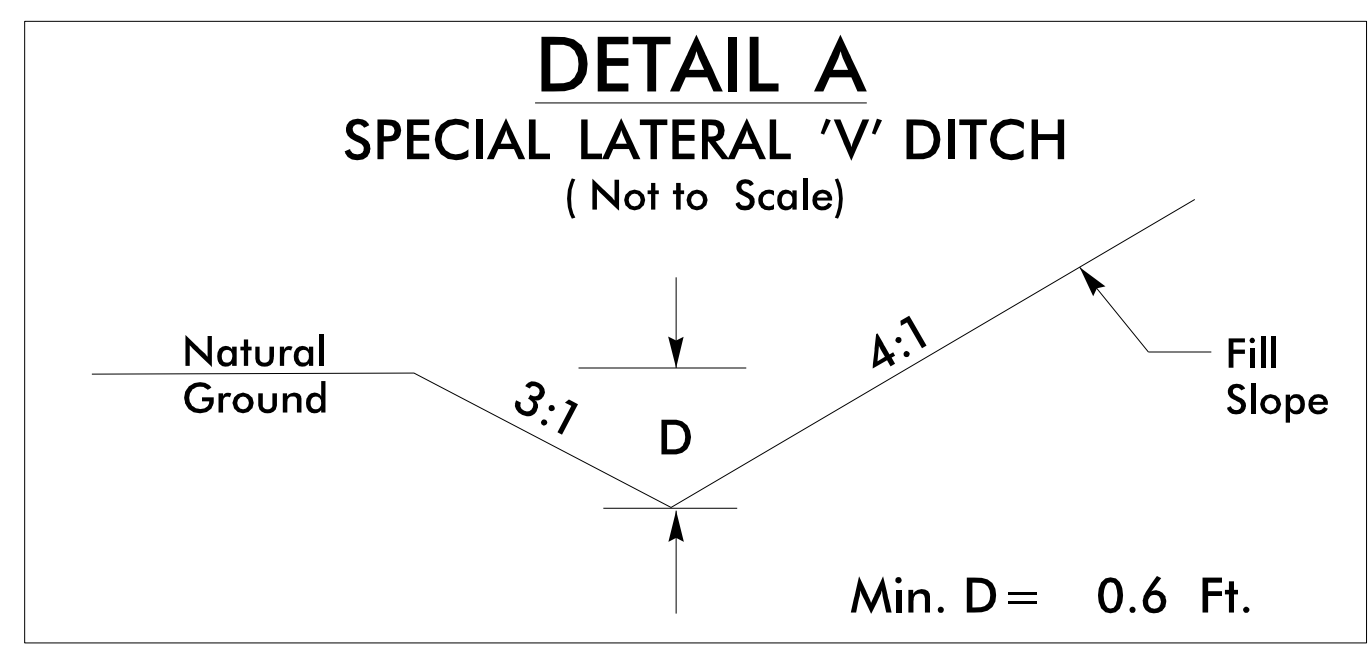
PROJECT REFERENCE NO. <b>B-5947</b>	SHEET NO. <b>2D-1</b>
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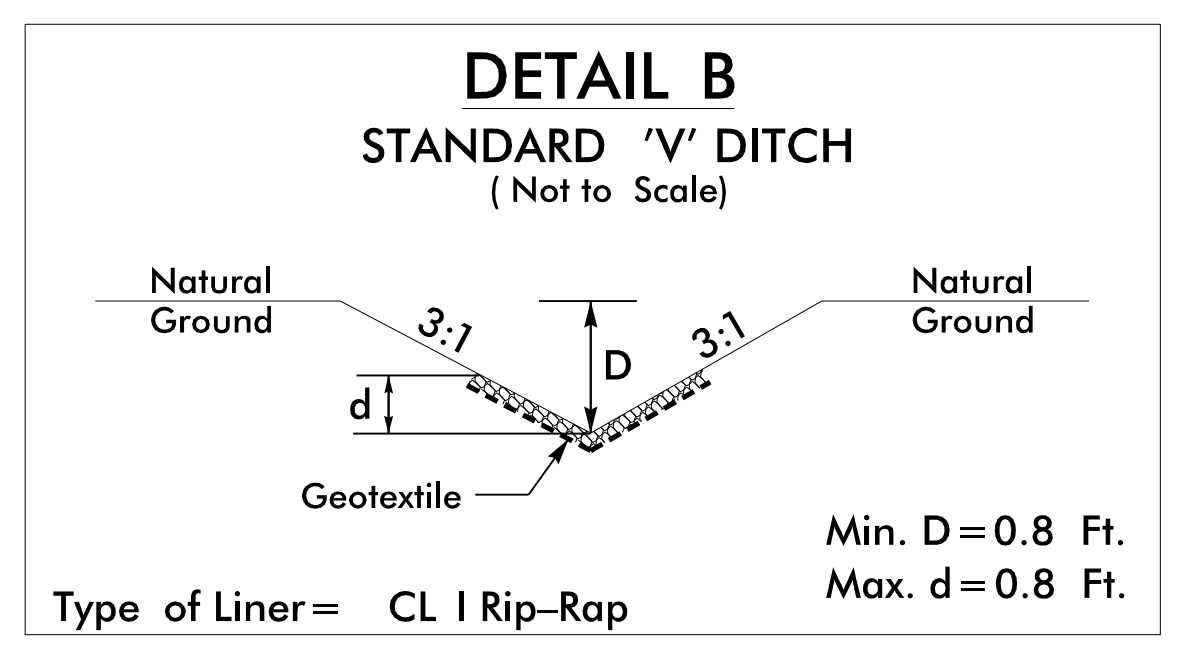
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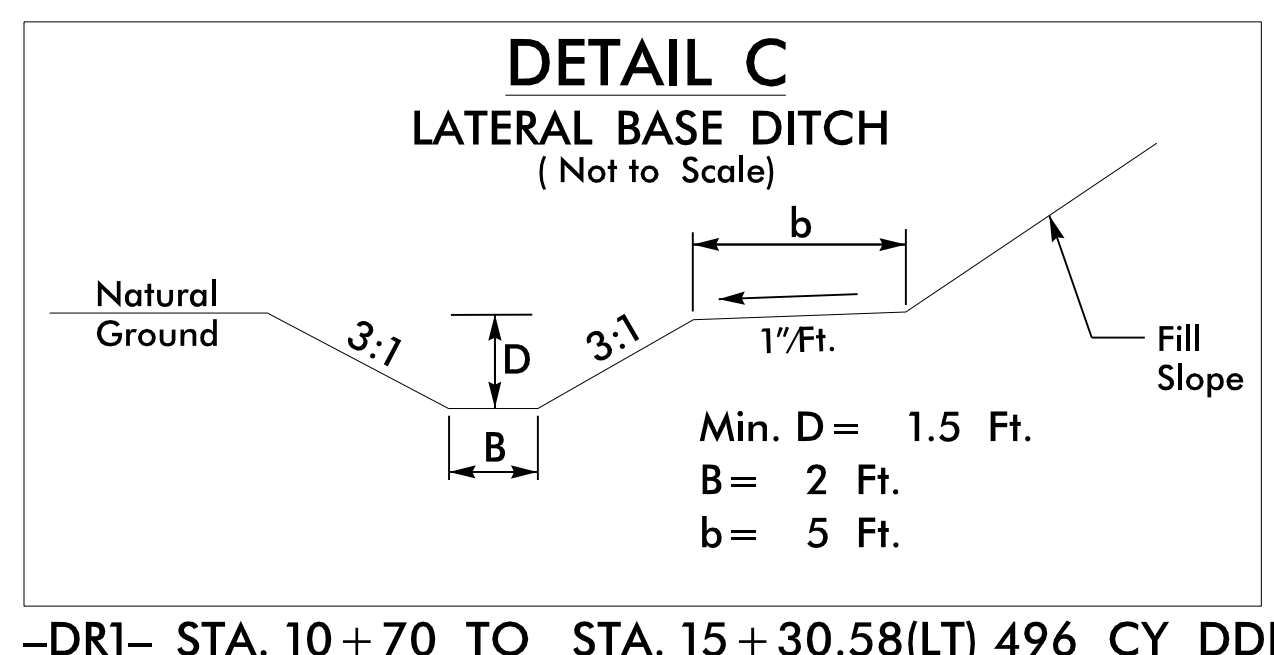
## BRIDGE #630091



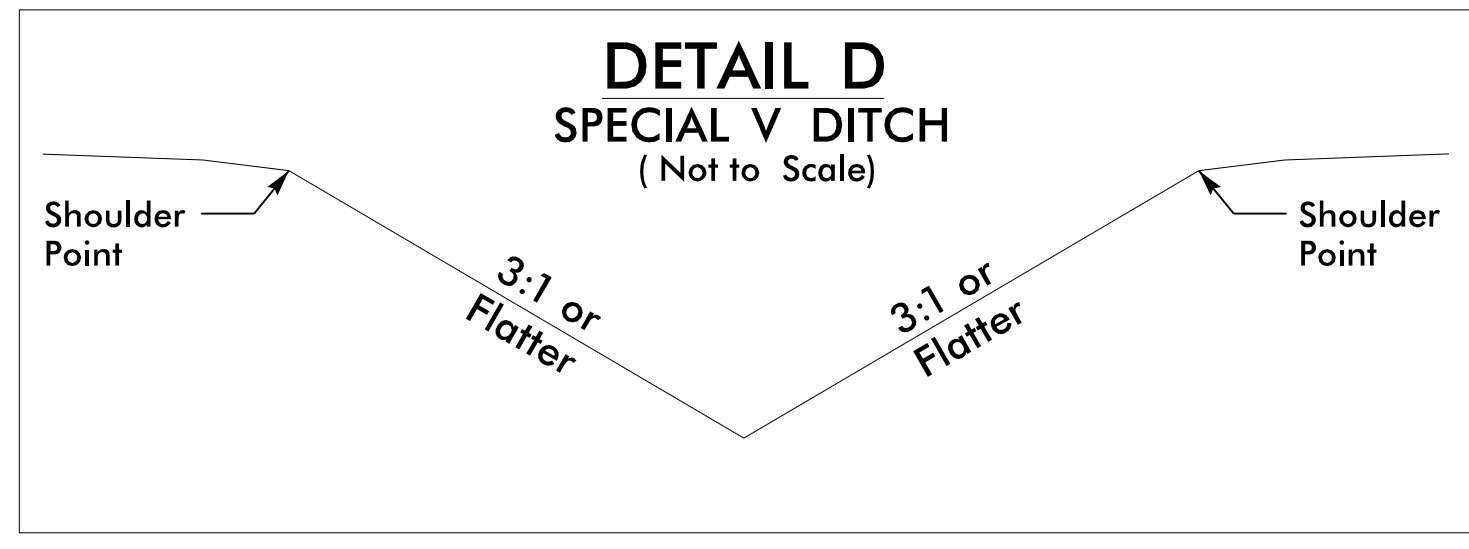
- LREV- STA. 12+00 TO STA. 14+00 (RT)
- LREV- STA. 26+50 TO STA. 30+50 (RT)
- LREV- STA. 31+00 TO STA. 34+00 (RT)
- LREV- STA. 33+50 TO STA. 36+94.94 (LT)



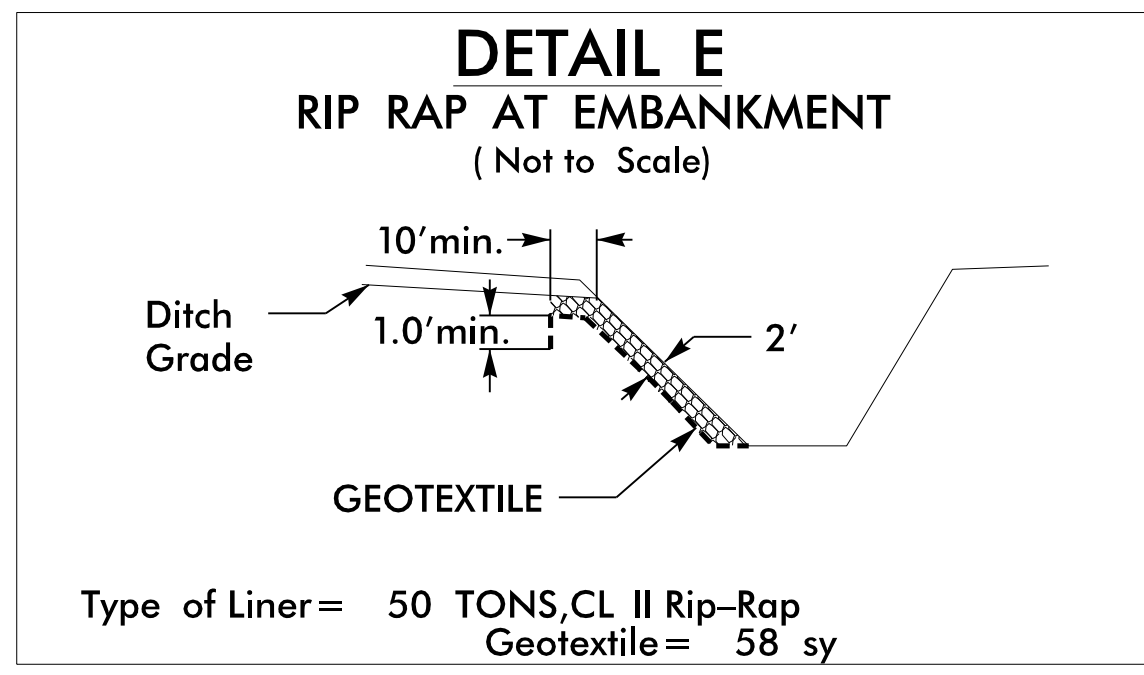
- LREV- STA. 30+42 (RT) 33 TONS CLI RIP RAP
- 65 SY GEO 27 CY DDE



- DR1- STA. 10+70 TO STA. 15+30.58(LT) 496 CY DDE
- LREV- STA. 21+25 TO STA. 23+00 (LT) 157 CY DDE

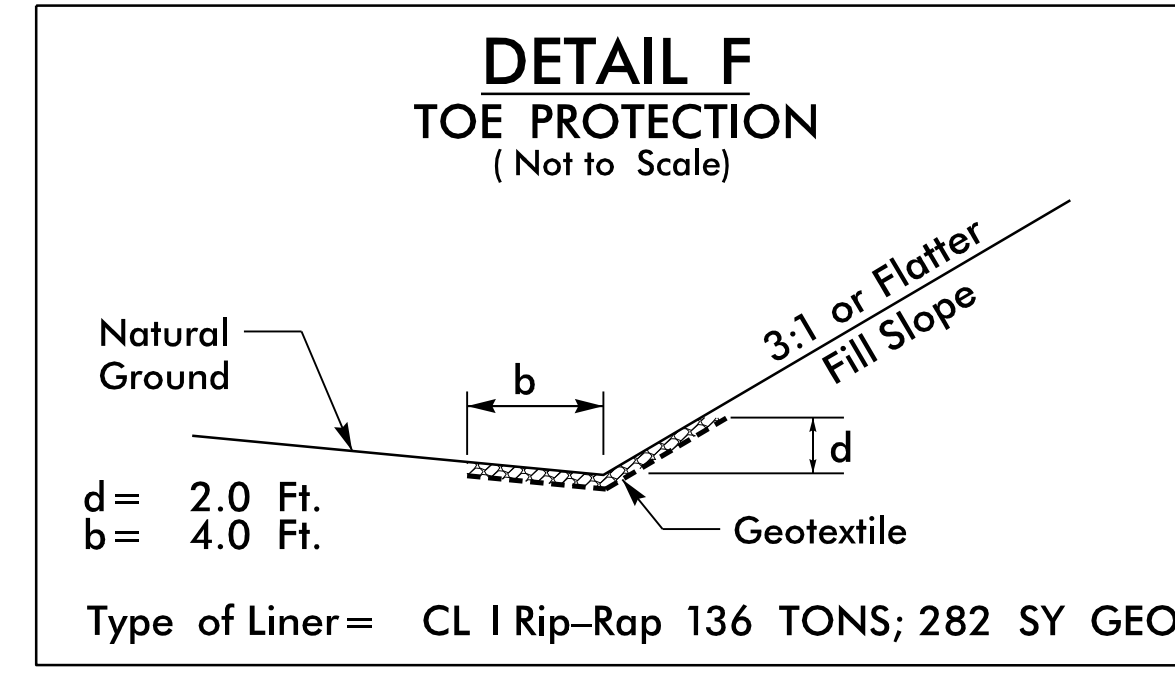


- LREV- STA. 20+00 TO STA. 21+25 (LT)



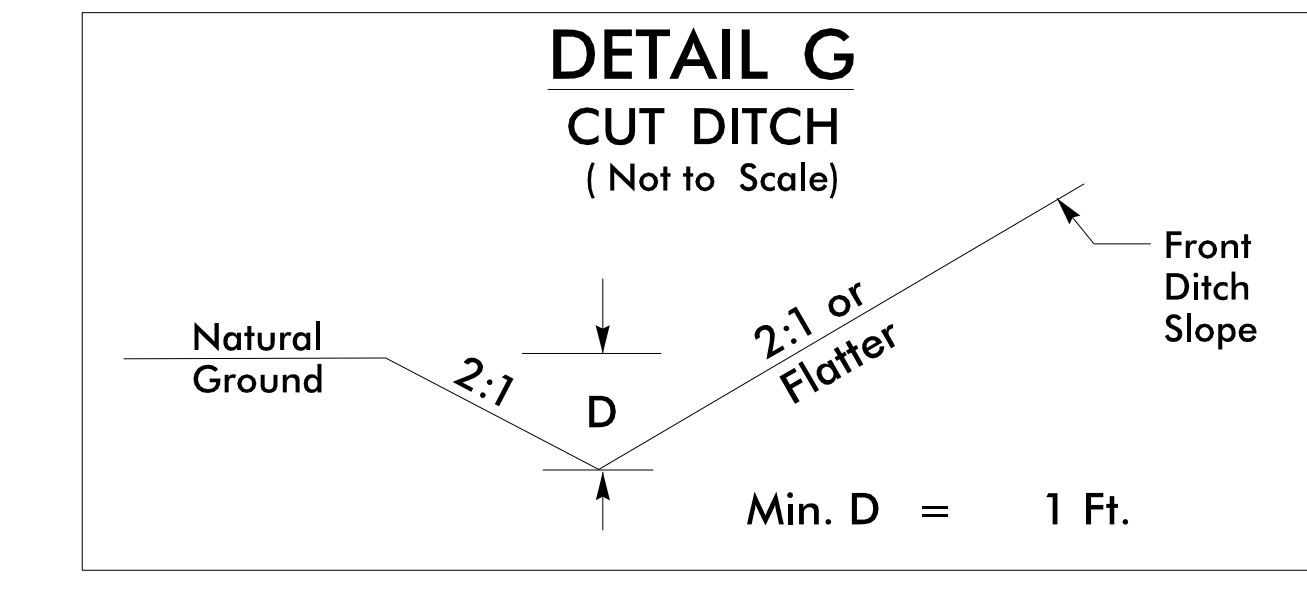
- Type of Liner = 50 TONS, CL II Rip-Rap
- Geotextile = 58 sy

- LREV- STA. 23+00 TO STA. 23+35 (LT)

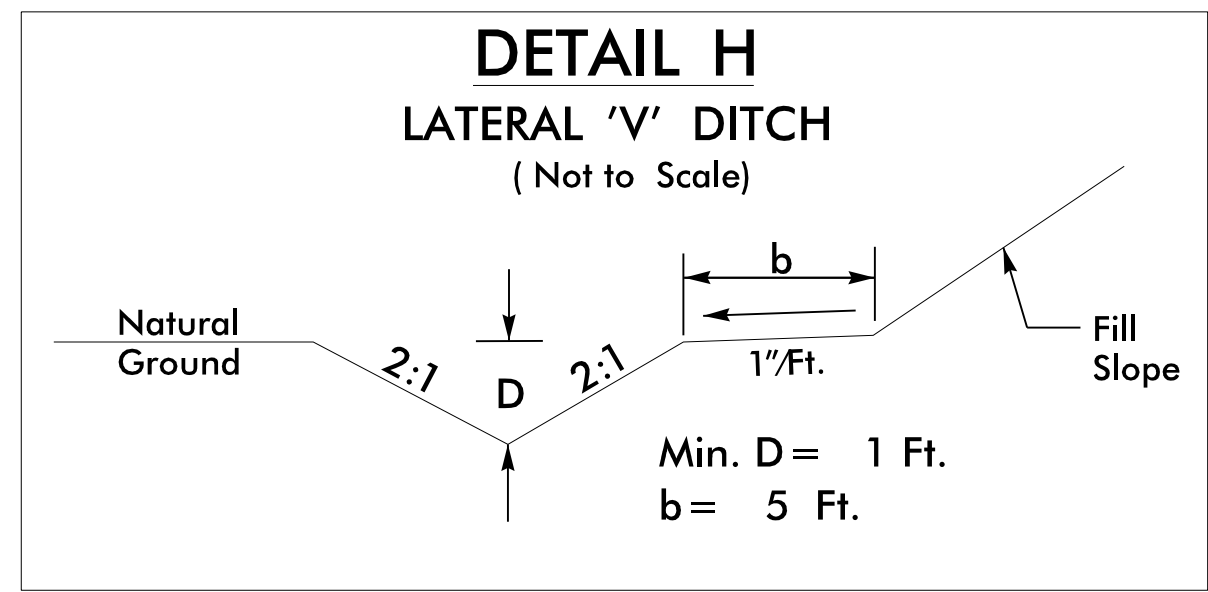


- Type of Liner = CL I Rip-Rap 136 TONS; 282 SY GEO

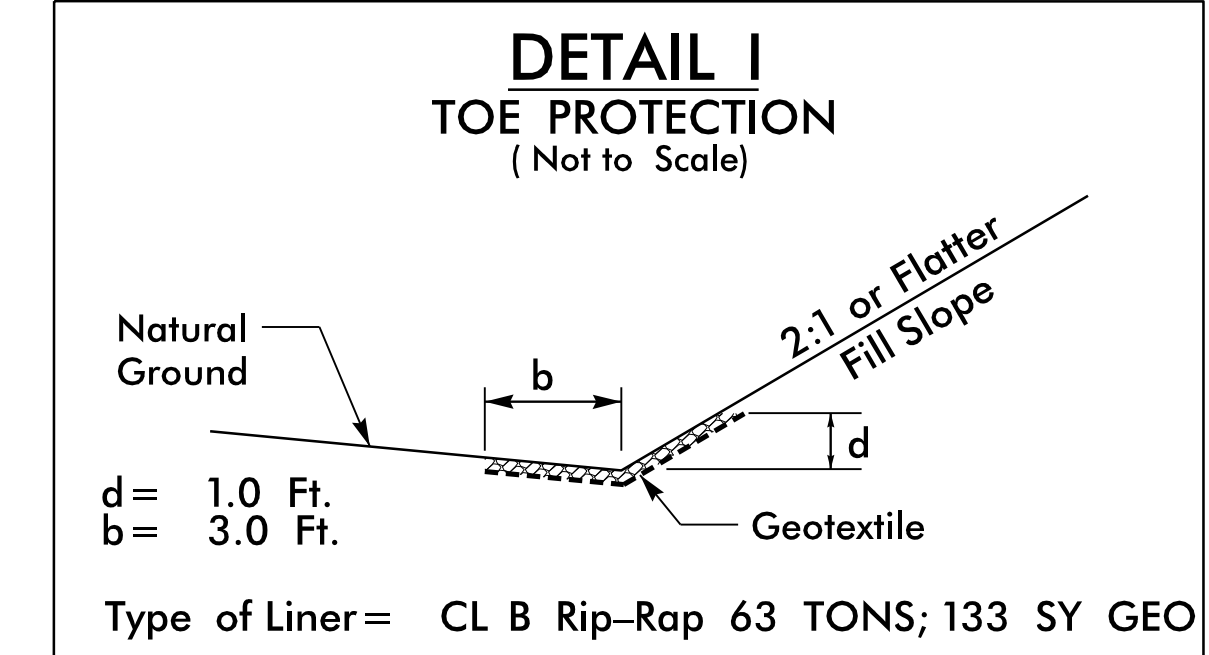
- LREV- FROM STA. 25+90 TO STA. 29+00 LT



- DR1- FROM STA. 12+50.00 TO STA. 14+24.47 RT.



- LREV- FROM STA. 18+50.00 TO STA. 20+00.00 LT. 26 CY DDE



- Type of Liner = CL B Rip-Rap 63 TONS; 133 SY GEO

- DR1- FROM STA. 10+50 TO STA. 12+50 RT

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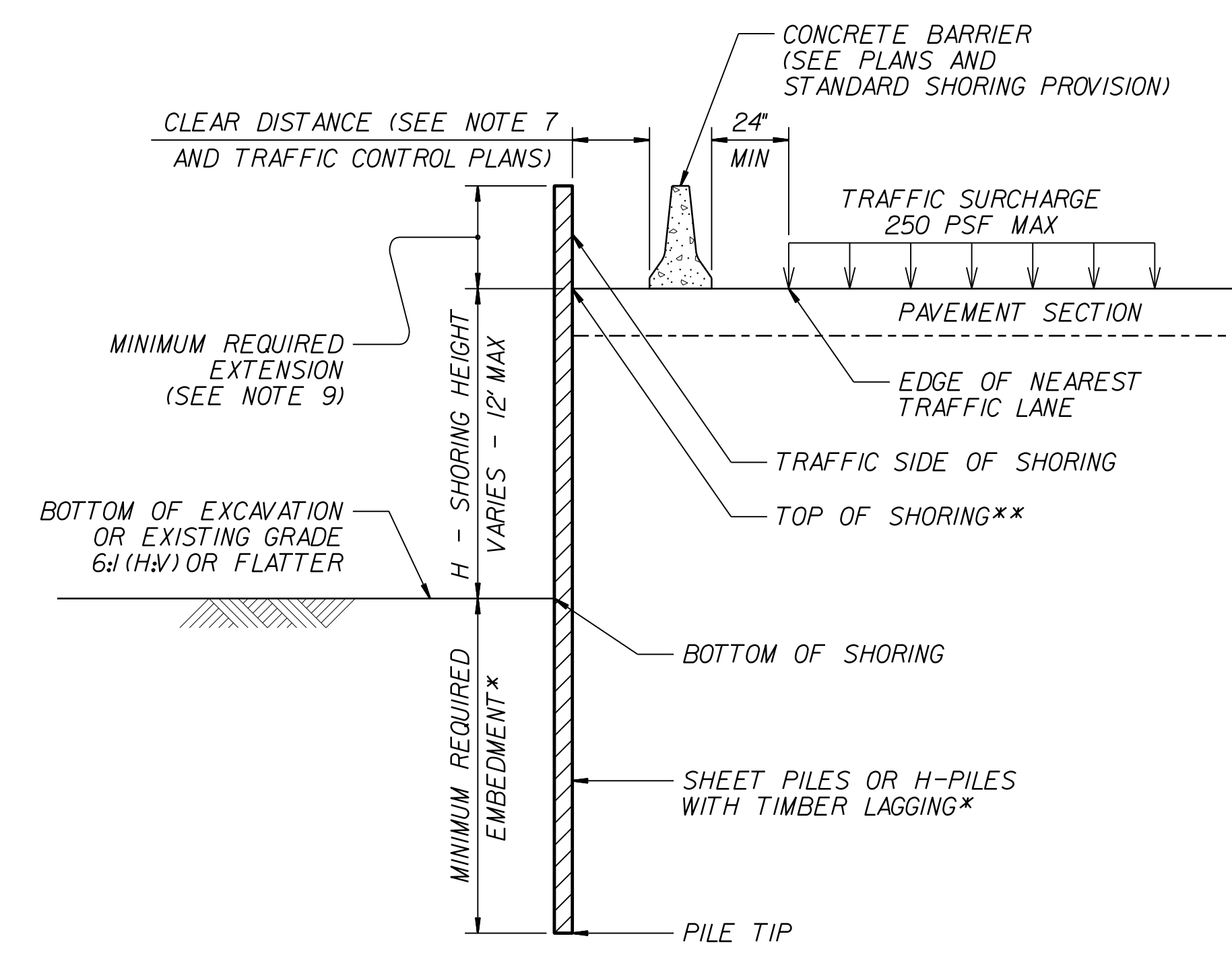
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
			HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73	
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5	
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5	

**MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS**

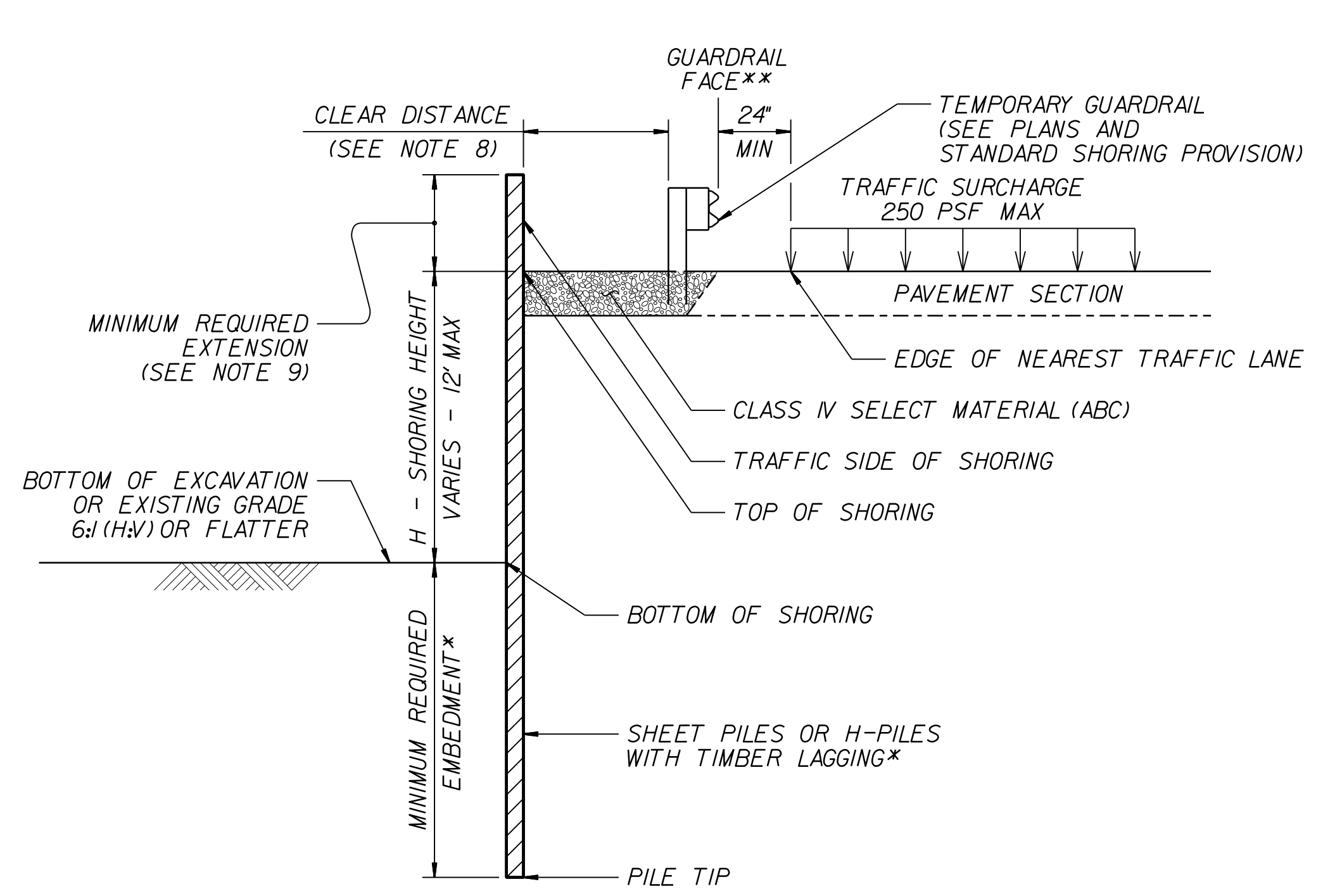
\*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

**NOTES:**

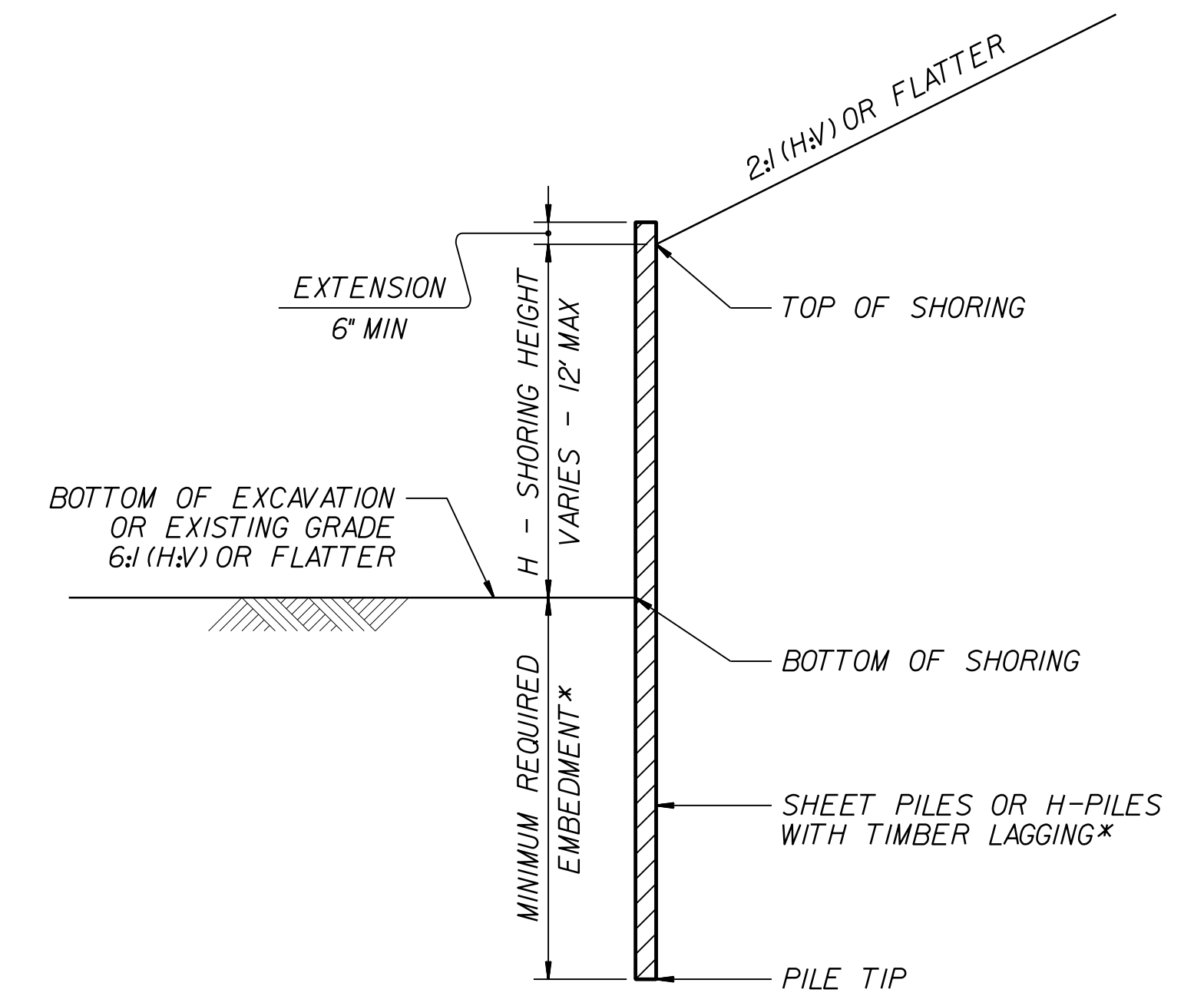
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120$  PCF  
FRICTION ANGLE,  $\phi = 30$  DEGREES  
COHESION,  $c = 0$  PSF
- DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EXTENSION IS 6' FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32' FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
- SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:  
[connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



**CONCRETE BARRIER**  
\*\*TOP OF SHORING =  
EDGE OF PAVEMENT

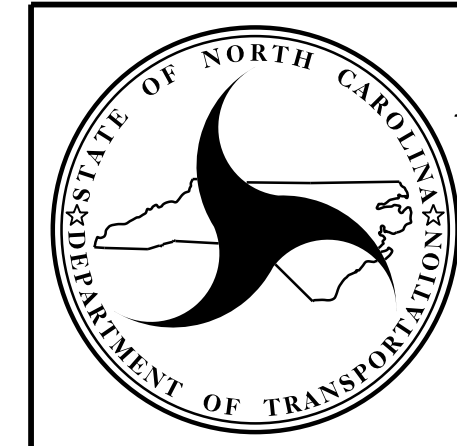


**TEMPORARY GUARDRAIL**  
\*\*GUARDRAIL FACE =  
EDGE OF PAVEMENT



**STANDARD TEMPORARY SHORING**  
(SLOPE CASE)  
\*SEE TABLE ABOVE.

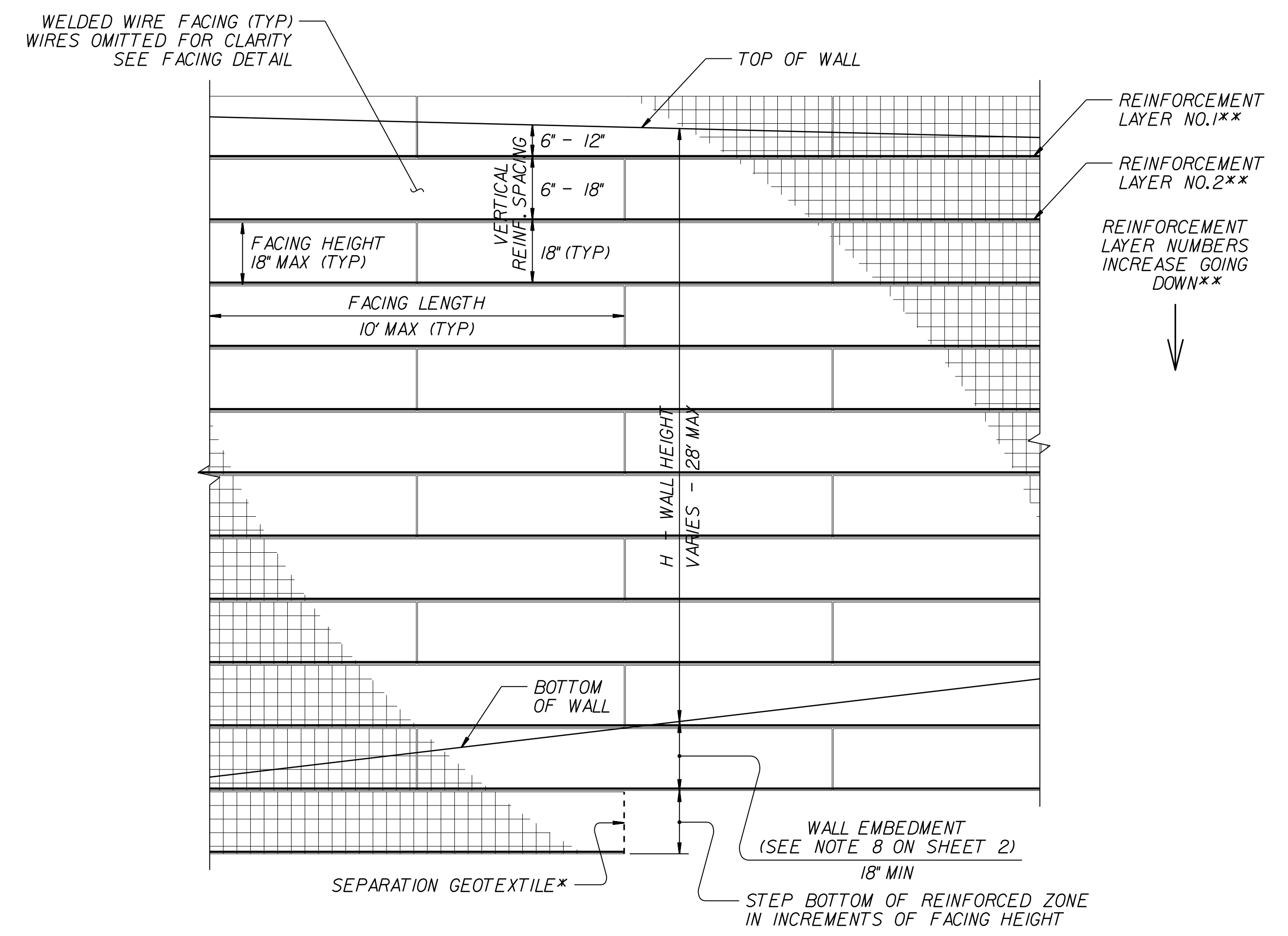
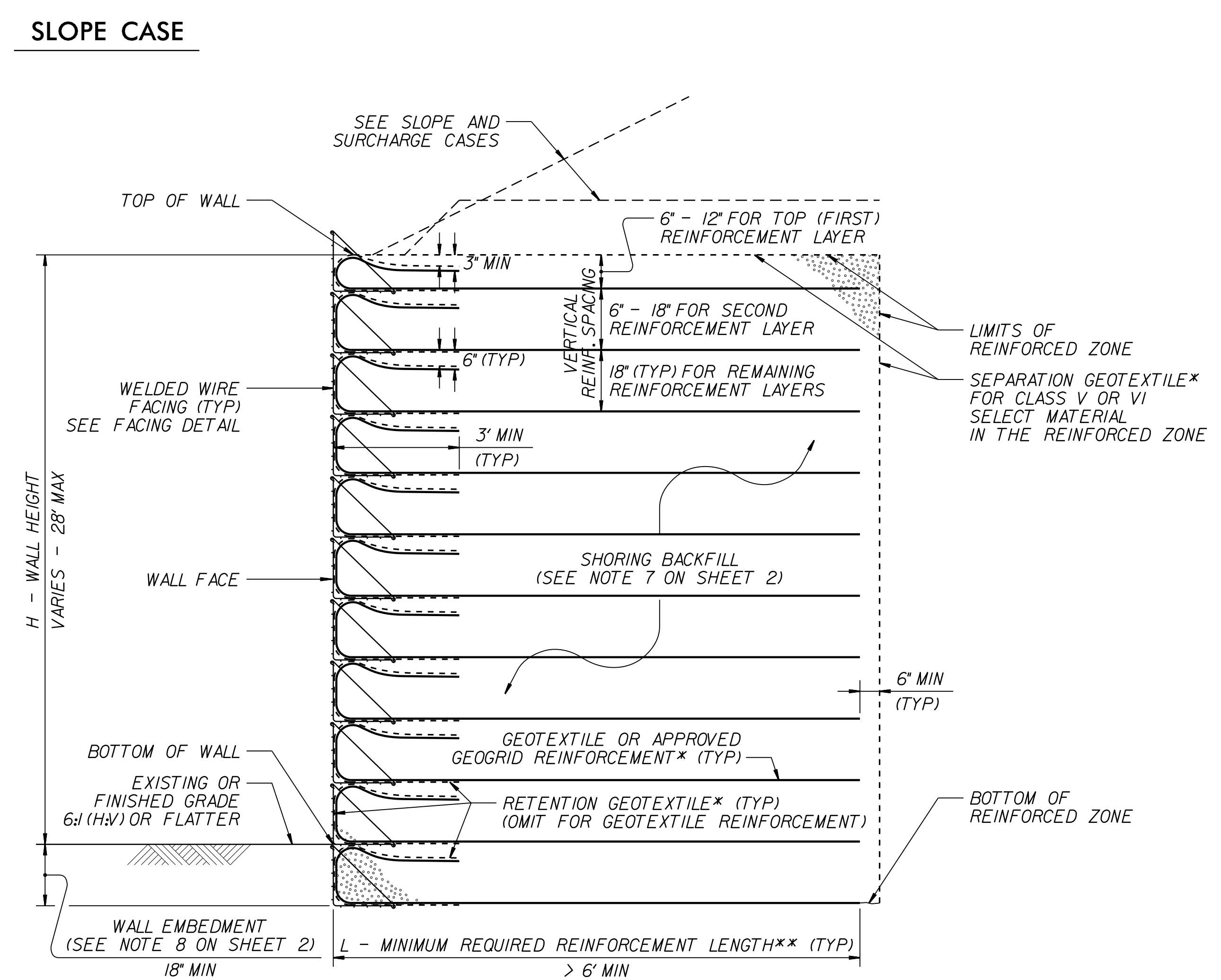
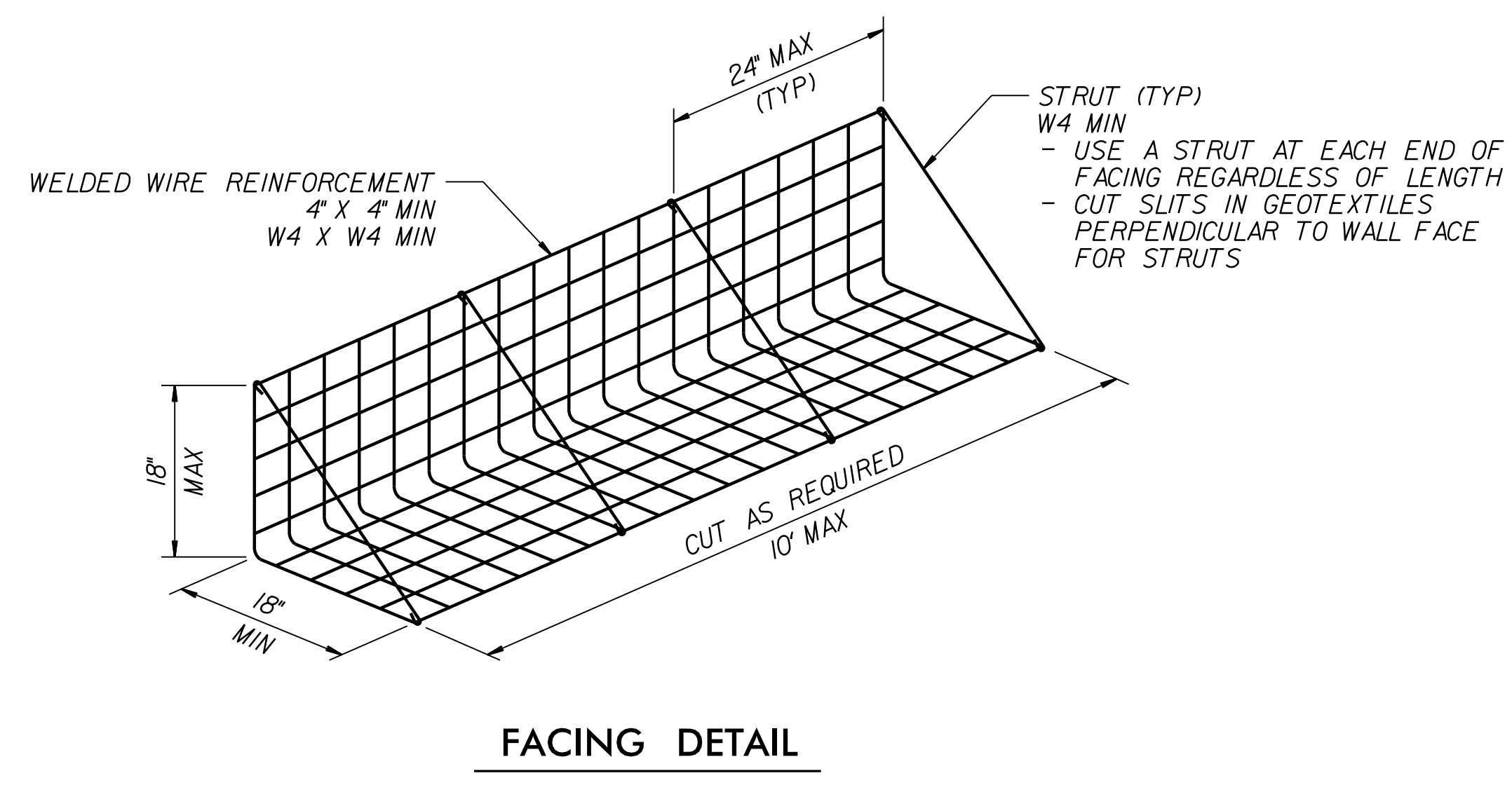
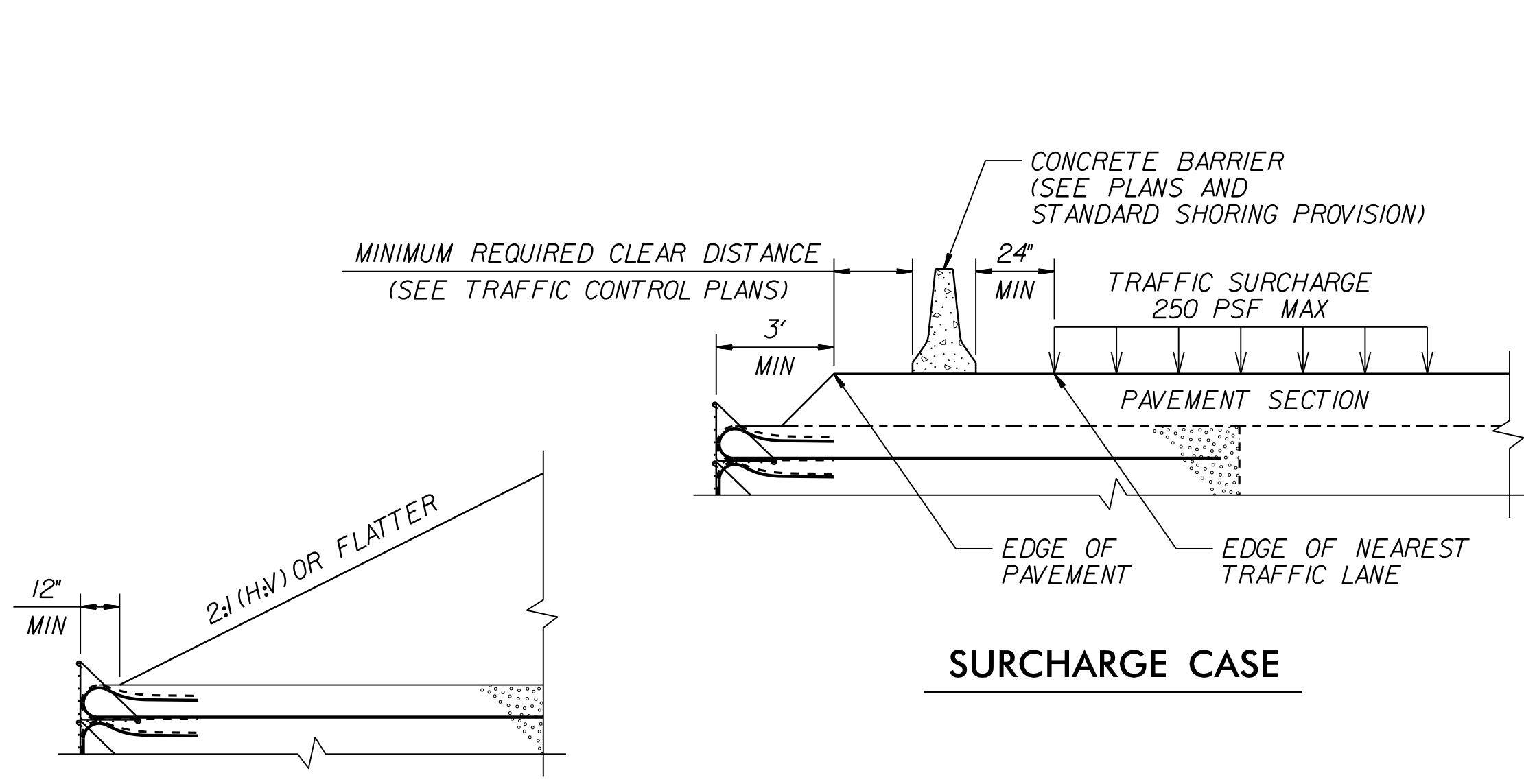
**STANDARD TEMPORARY SHORING**  
(SURCHARGE CASE)  
\*SEE TABLE ABOVE.



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
**GEOTECHNICAL  
ENGINEERING UNIT**

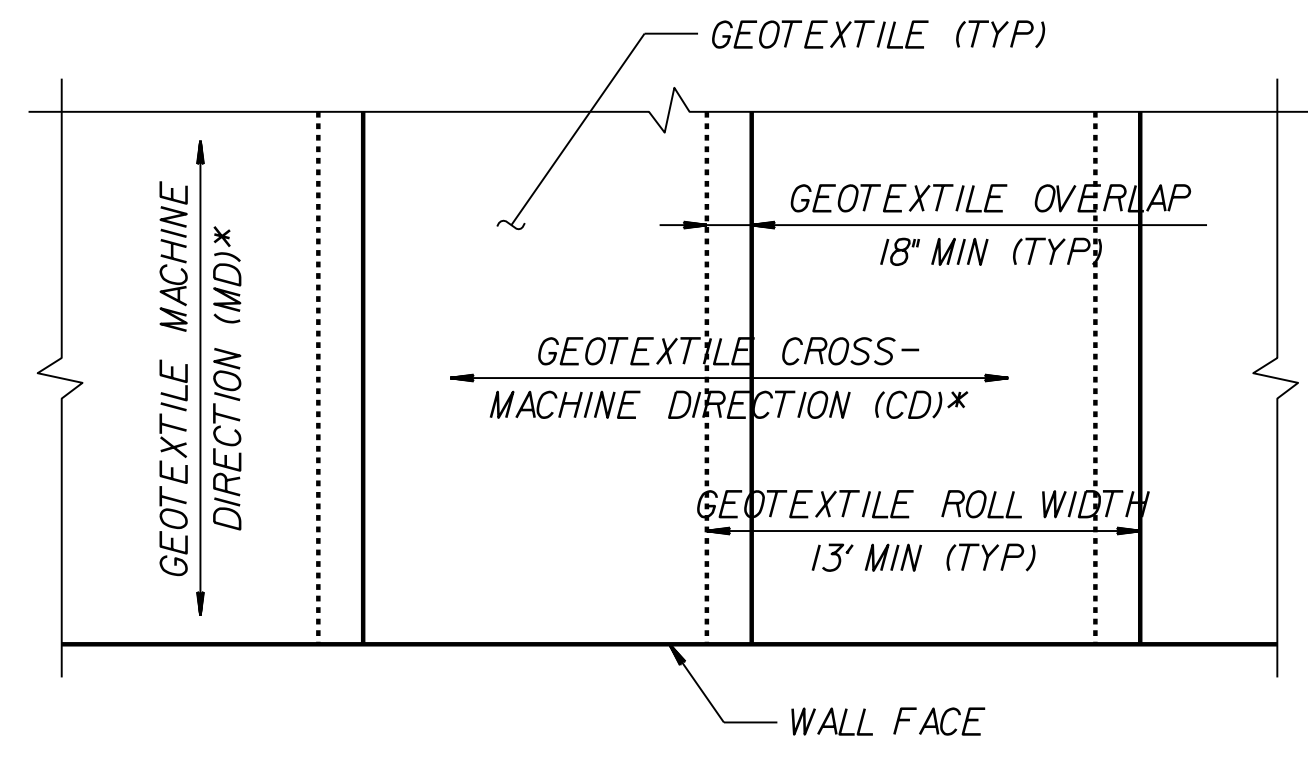
STANDARD DETAIL NO. 1801.01

STANDARD  
TEMPORARY SHORING

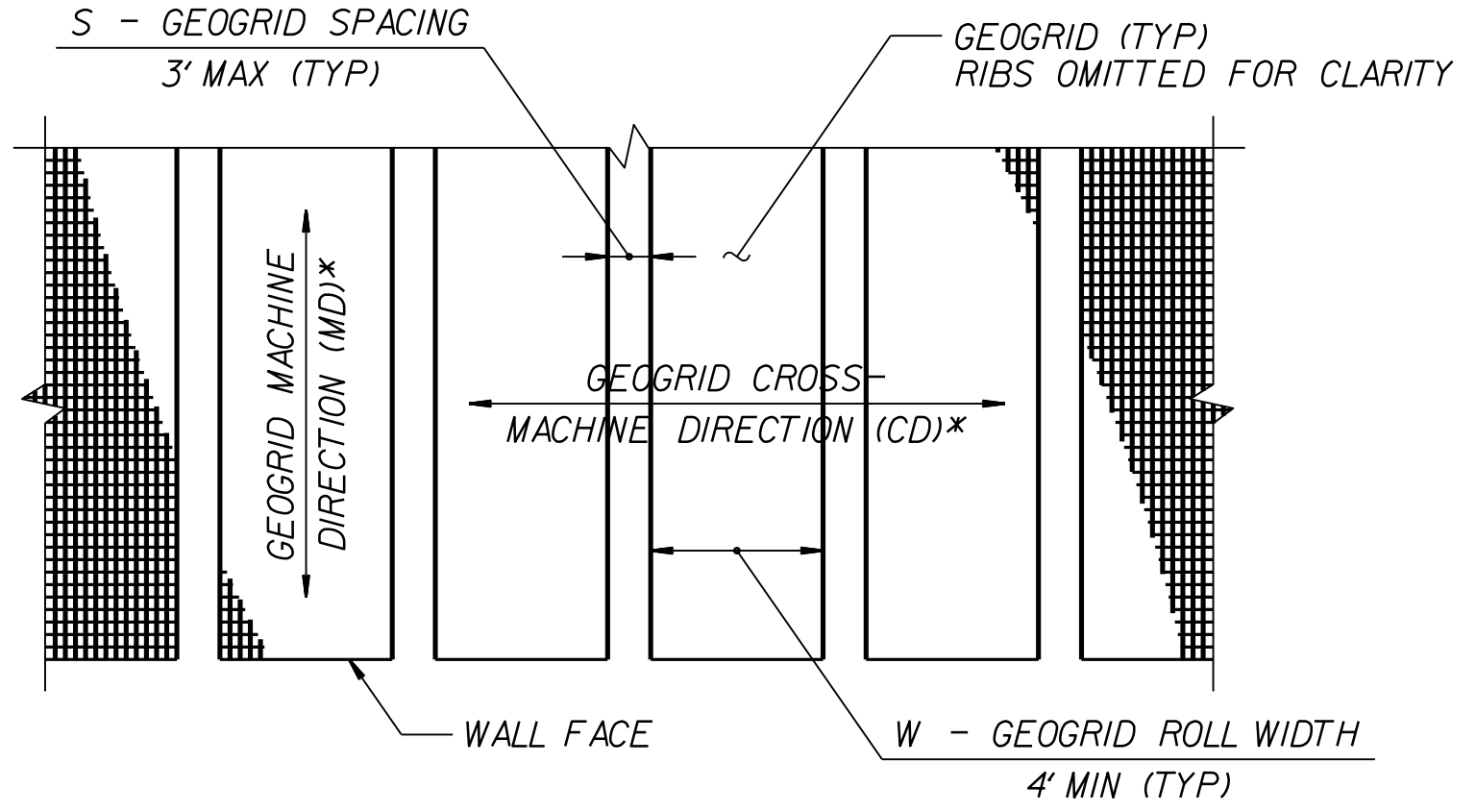


**STANDARD TEMPORARY WALL**  
 (FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)  
 \*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
 \*\*SEE REINFORCEMENT TABLES ON SHEET 3.

**STANDARD TEMPORARY WALL - PARTIAL ELEVATION**  
 \*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
 \*\*SEE REINFORCEMENT TABLES ON SHEET 3.

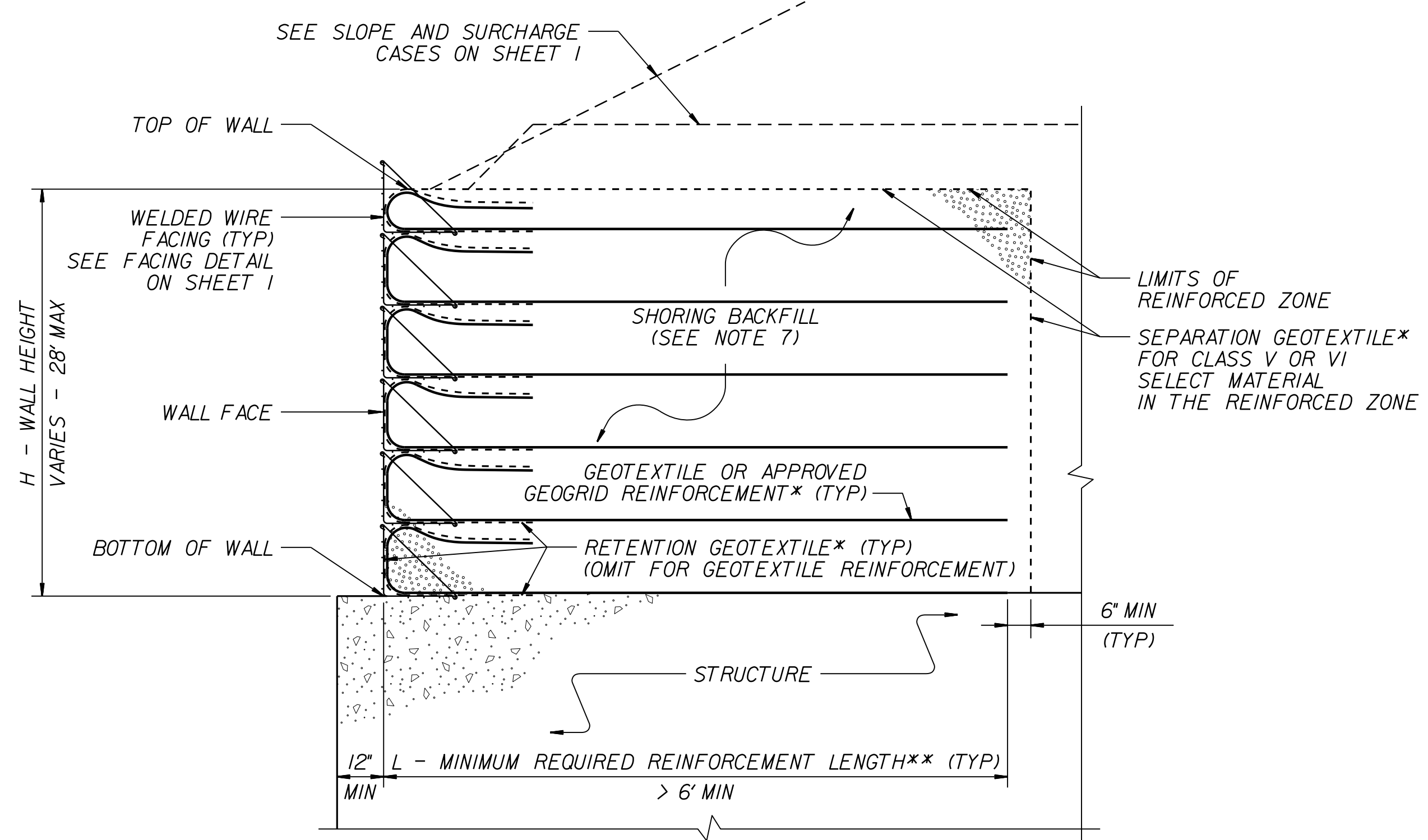


**GEOTEXTILE PLACEMENT**  
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



**GEOGRID PLACEMENT**  
(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT -  $\frac{W}{W+S} \times 100 \geq 80\%$ , SEE NOTE 11)

**GEOSYNTHETIC PLACEMENT DETAILS**  
(PLAN VIEW)  
\*SEE NOTE 12.



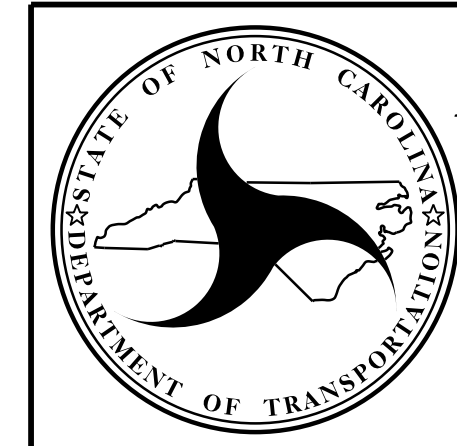
**TEMPORARY WALL ON STRUCTURE DETAIL**  
\*SEE GEOSYNTHETIC PLACEMENT DETAILS.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.

**NOTES:**

- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY WALLS 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 TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER OR FLOOD ELEVATION IS ABOVE BOTTOM OF REINFORCED ZONE.
- DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
- WALL EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
- DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
- GEOGRIDS FOR GEOGRID REINFORCEMENT ARE APPROVED FOR SHORT TERM DESIGN STRENGTHS (3-YEAR DESIGN LIFE) IN THE MD AND CD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: [connect.ncdot.gov/resources/Geological/Pages/Products.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Products.aspx)  
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL


- FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
- AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:  
- W (REINFORCEMENT ROLL WIDTH)  $\geq$  (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND  
- REINFORCEMENT STRENGTH IN CD  $\geq$  MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
- SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: [connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)
- DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
- DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
- CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
- FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
- FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
**GEOTECHNICAL  
ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02

STANDARD  
TEMPORARY WALL  
SHEET 2 OF 3

<b>PROJECT REFERENCE NO.</b> B-5947	<b>SHEET NO.</b> 2G-4
 GEOTECHNICAL ENGINEER ENGINEER	ENGINEER  DATE: 03/31/2022 SIGNATURE: _____
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																									
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
SLOPE CASE	> 0	CLASS II, TYPE I, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27	
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22	
		A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21	
		CLASS II, TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20	
	> 7 FOR H < 20' > 10 FOR H ≥ 20'	CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19		

**L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)**  
(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + WALL EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

\*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.


REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

**GEOTEXTILE REINFORCEMENT  
ULTIMATE TENSILE STRENGTH (LB/FT)**

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

**GEOGRID REINFORCEMENT  
SHORT-TERM DESIGN STRENGTH (LB/FT)**  
(SEE NOTE 10 ON SHEET 2.)

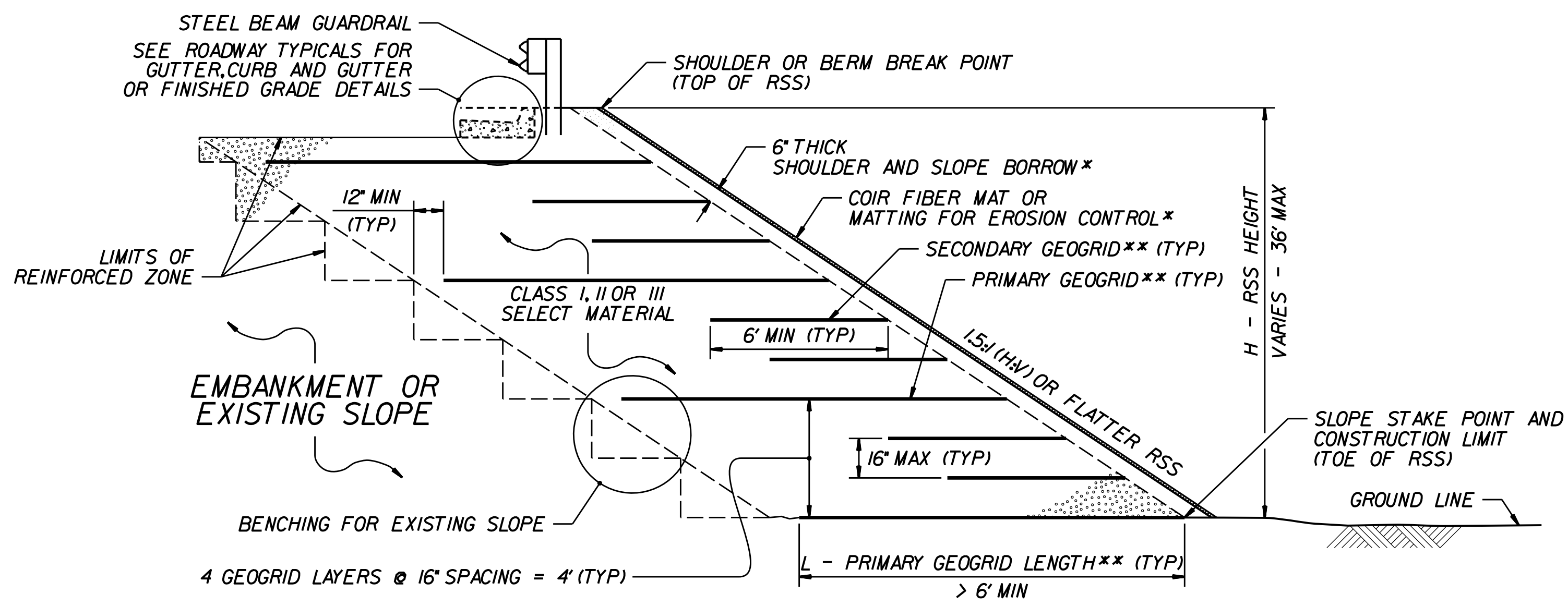
**MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD**  
(SEE NOTE 9 ON SHEET 2.)  
\*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.



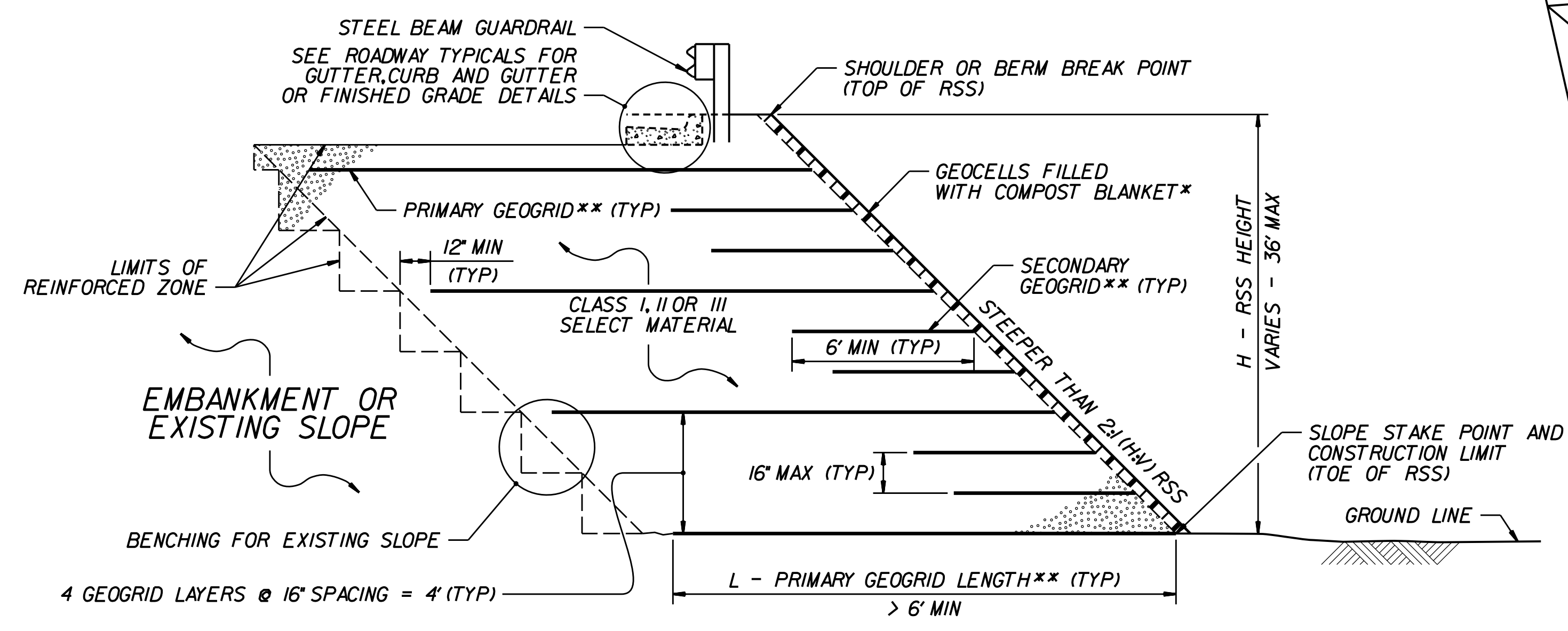
**NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS**  
  
**GEOTECHNICAL  
ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02

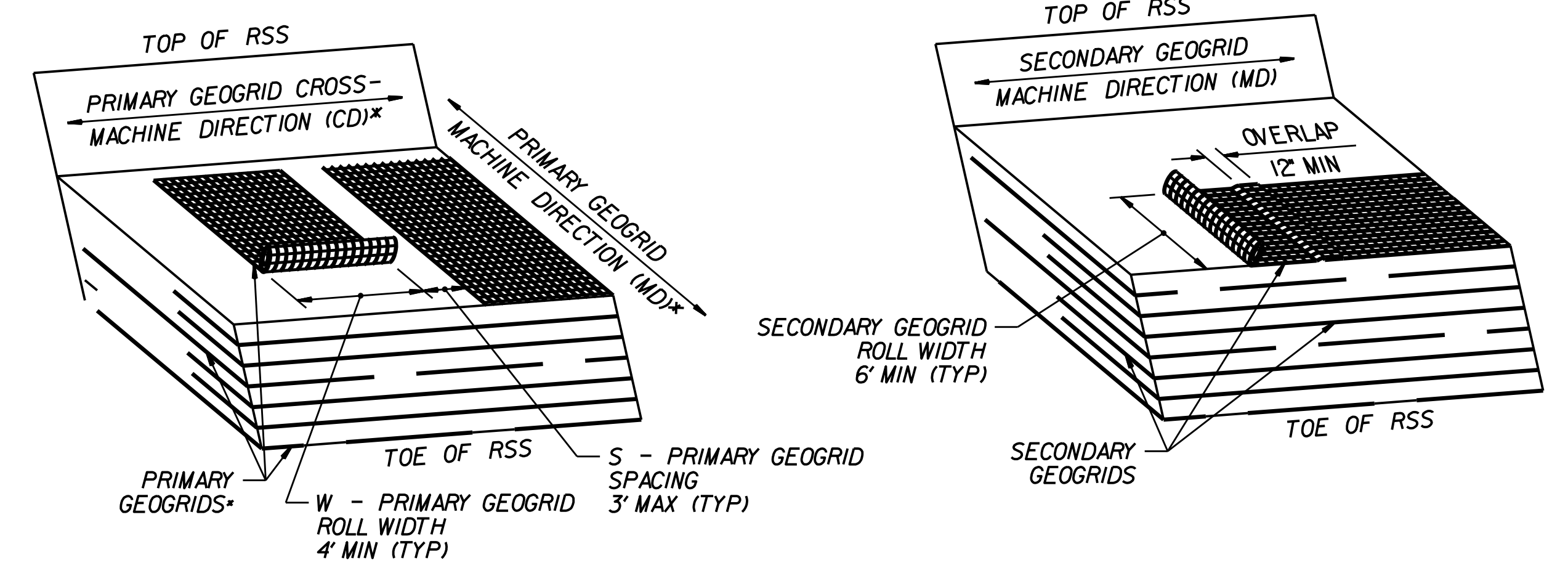
STANDARD  
TEMPORARY WALL  
SHEET 3 OF 3



**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.



**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.

**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.

<b>PROJECT REFERENCE NO.</b> B-5947	<b>SHEET NO.</b> 2G-6
GEOTECHNICAL ENGINEER  DocuSigned by: Scott A. Hidden 01/11/2023 <small>F790CA89F6C4D3 SIGNATURE DATE</small>	ENGINEER
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

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	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](http://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,

$$\text{MINIMUM REQUIRED PRIMARY GEOGRID LTDS} = \text{LTDS BASED ON 100\% COVERAGE} \times (W + S) / W$$

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  $L \leq 6'$ , 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

DATE: 12-17-19

12/06/07

COMPUTED BY: SLK DATE: 01/08/19  
CHECKED BY: GSP DATE: 01/08/19

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO. SHEET NO.  
B-5947 3B-1

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UNLESS ALL SIGNATURES COMPLETED



TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

SUMMARY OF EARTHWORK

Table with columns: STATION, STATION, UNCL EXCAV. (CY), EMBANK. (+/-) (CY), BORROW (CY), WASTE (CY). Rows include station ranges like -LREV- STA. 11+23.00 to -LREV- STA. 22+25.50 and project subtotals.

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

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

PAVEMENT REMOVAL SUMMARY SHOULDER BERM GUTTER SUMMARY

Table with columns: SURVEY LINE, STATION, STATION, LOCATION LT/RT/CL, YD'. Rows show removal for -LREV- RT. and -LREV- LT. at various stations.

Table with columns: SURVEY LINE, STATION, STATION, LENGTH. Rows show removal for -LREV- RT., -LREV- LT., and -LREV- RT. with a total of 231.99' and SAY: 232.00'.

UNDERCUT EXCAVATION = 300 CY PER GEOTECH RECS  
SELECT GRANULAR MATERIAL CLASS III = 300 CY PER GEOTECH RECS  
GEOTEXTILE SOIL STABILIZATION = 600 SY PER GEOTECH RECS  
SHALLOW UNDERCUT = 100 CY PER GEOTECH RECS  
CLASS IV SUBGRADE STABILIZATION = 200 TONS PER GEOTECH RECS  
DDE = 710 CY

SUB-REGIONAL & REGIONAL  
LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

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

Large table listing pipe details: STATION, LOCATION, STRUCTURE NO., TOP ELEVATION, INVERT ELEVATION, SLOPE CRITICAL, DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC), C.S. PIPE, R.C. PIPE (CLASS III), R.C. PIPE (CLASS IV), ENDWALLS, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES AND HOOD STANDARD 840.03, CONCRETE TRANSITIONAL SECTION, G.D.I. TYPE 'B' STD. 840.18 OR 840.24, G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24, T.B.D.I. STD. 840.35 OR STD. 840.46, G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29, M.H. FRAME & COVER STD. 840.54, T.B.J.B. STD. 840.34, CSP ELBOWS NO. & SIZE, CONC. COLLARS CL. 'B' C.Y. STD. 840.72, CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71, PIPE REMOVAL LIN.F.T., REMARKS.

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.  
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.  
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.  
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.  
G = GATING IMPACT ATTENUATOR TYPE 350  
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

Table with columns: SURVEY LINE, BEG. STA., END STA., LOCATION, LENGTH (STRAIGHT, SHOP CURVED, DOUBLE FACED), WARRANT POINT (APPROACH END, TRAILING END), "N" DIST. FROM E.O.L., TOTAL SHOUL. WIDTH, FLARE LENGTH (APPROACH END, TRAILING END), W (APPROACH END, TRAILING END), ANCHORS (XI MOD, TYPE III, GREU TL-3, AT-1, CAT-1, VI MOD, BIC, AT-1), IMPACT ATTENUATOR TYPE 350 (EA, G, NG), SINGLE FACED GUARDRAIL, REMOVE EXISTING GUARDRAIL, REMOVE AND STOCKPILE EXISTING GUARDRAIL, REMARKS.

9/23/2002 10:59:47 AM Rdy\_sum 3B-1.dgn



12/06/07

COMPUTED BY: SLK DATE: 01/08/19  
 CHECKED BY: GSP DATE: 01/08/19

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

BRIDGE #630091

PROJECT REFERENCE NO. SHEET NO.  
 B-5947 3B-2

DOCUMENT NOT CONSIDERED FINAL  
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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.  
 TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.  
 FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.  
 W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.  
 G = GATING IMPACT ATTENUATOR TYPE 350  
 NG = NON-GATING IMPACT ATTENUATOR TYPE 350

TEMPORARY 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			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS					
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	XI MOD	TEMP. B-77	GREU TL-3	TEMP. AT-1	TEMP. CAT-1	CAT-1	VI MOD	BIC	AT-1	EA	G	NG									
-LREV-	17+98.00	20+25.00	RT.	211.00'	37.5'				VAR.																							SEE TMP-04	
-LREV-	20+51.00	22+13.00	RT.	142.00'	37.5'				VAR.																						SEE TMP-04		
-LREV-	25+37.00	28+29.00	RT.	292.00'					VAR.																						SEE TMP-05		
-LREV-	20+09.00	20+71.00	RT.	62.00'					VAR.																						SEE TMP-04		
			PROJECT SUBTOTAL	787.00'	75.0'																												
			LESS ANCHOR DEDUCTIONS	(-)114.50'																													
			GR PROJECT TOTAL	592.50'	75.0'																												
			TEMPORARY GR SAY	600.00'	75.0'																												
														GUARDRAIL ANCHOR DEDUCTIONS GUARDRAIL ANCHOR DEDUCTIONS TEMP. TYPE B-77 = 2 @ 22.875' = 45.75' TEMP. GREU TL-3 = 1 @ 50' = 50' TEMP. AT-1 = 2 @ 6.25' = 12.50' TEMP. CAT-1 = 1 @ 6.25' = 6.25' TOTAL DEDUCTIONS = 114.50'																			

5/5/2022 B-5947-Rely.-sum 3B-2.dgn  
 I:\PROJECTS\B-5947

COMPUTED BY: Thein Tun Zan DATE: 11/08/2022  
 CHECKED BY: James Batts DATE: 11/08/2022

(12-17-19)

PROJECT NO.  
B-5947

SHEET NO.  
3G-1

**STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS**

**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
LREV	2.5	18+25	2.5	19+25	LT	500			500
DR1	2.5	11+25	2.5	14+25	LT	780			780
DR1	2.5	11+25	2.5	19+25	RT	470			470
					<b>TOTAL SY:</b>	0	0	0*	1750**

\*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.

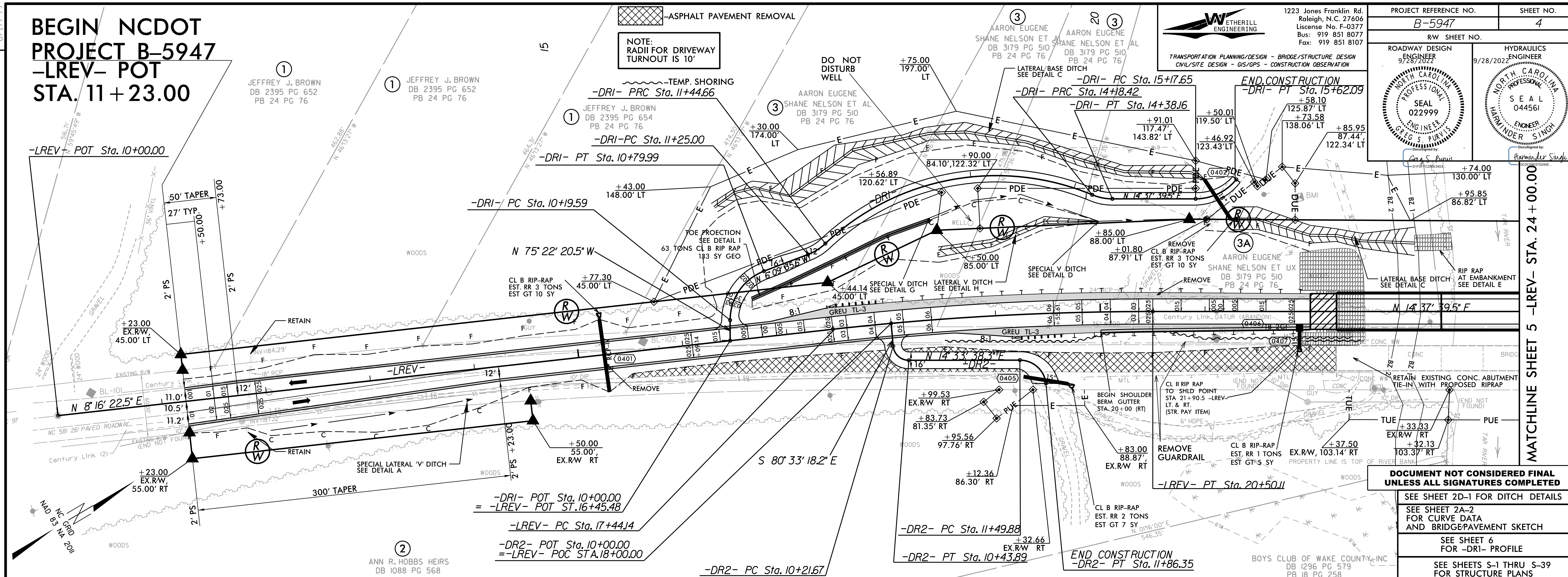
**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type* ASU(1/2)/AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
			CONTINGENCY	ASU	12	100	200	300	
			<b>TOTAL CY/TONS/SY:</b>		100	200**	300**	0	0

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

\_\_\_\_\_





**ETHERILL ENGINEERING**  
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 License No. F-0377  
 Bus: 919 851 8077  
 Fax: 919 851 8107

PROJECT REFERENCE NO. **B-5947**  
 SHEET NO. **4**  
 RW SHEET NO. \_\_\_\_\_

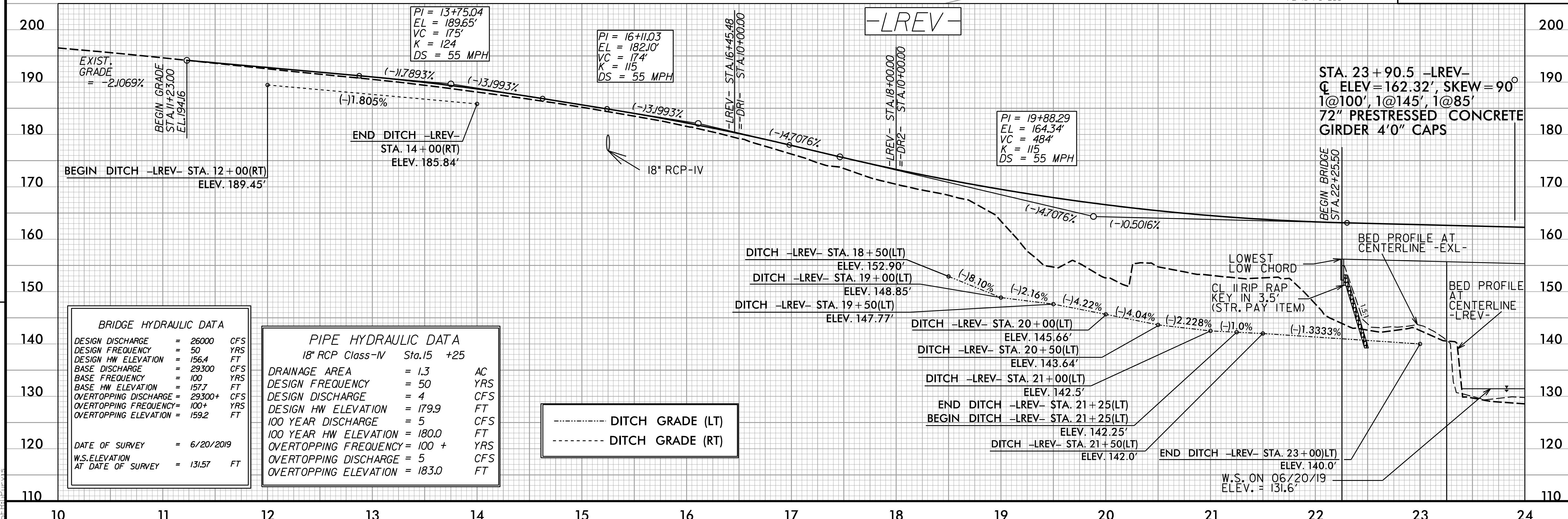
ROADWAY DESIGN  
 ENGINEER  
 9/28/2022

HYDRAULICS  
 ENGINEER  
 9/28/2022

Professional Engineer Seal: GREG S. PULLIN, No. 022999  
 Professional Engineer Seal: PHARMINDER SINGH, No. 044561

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

SEE SHEET 2D-1 FOR DITCH DETAILS  
 SEE SHEET 2A-2 FOR CURVE DATA AND BRIDGE PAVEMENT SKETCH  
 SEE SHEET 6 FOR -DRI- PROFILE  
 SEE SHEETS S-1 THRU S-39 FOR STRUCTURE PLANS



DESIGN DISCHARGE	= 26000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 156.4	FT
BASE DISCHARGE	= 29300	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 157.7	FT
OVERTOPPING DISCHARGE	= 29300+	CFS
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING ELEVATION	= 159.2	FT
DATE OF SURVEY	= 6/20/2019	
W.S.ELEVATION AT DATE OF SURVEY	= 131.57	FT

18" RCP Class-IV Sta.15 +25	
DRAINAGE AREA	= 1.3 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 4 CFS
DESIGN HW ELEVATION	= 179.9 FT
100 YEAR DISCHARGE	= 5 CFS
100 YEAR HW ELEVATION	= 180.0 FT
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING DISCHARGE	= 5 CFS
OVERTOPPING ELEVATION	= 183.0 FT

----- DITCH GRADE (LT)  
 - - - - - DITCH GRADE (RT)

REVISIONS  
 9/28/2022 B-5947\_rdy\_psh\_4.dgn  
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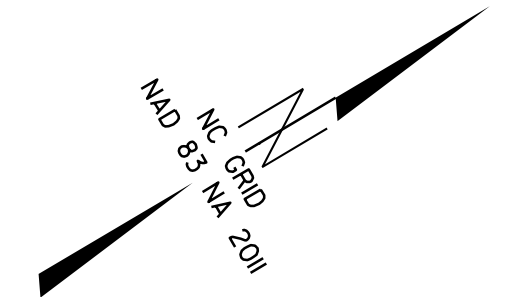
8/17/2019

25

30

35

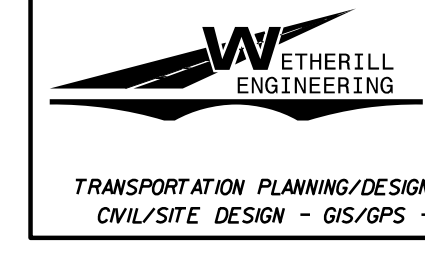
-TEMP. SHORING



MARK D. SMITH  
NO DEED REFERENCE  
④

ASPHALT PAVEMENT REMOVAL

NOTE:  
RADI FOR DRIVEWAY  
TURNOUT IS 10'



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PROJECT REFERENCE NO. <b>B-5947</b>	SHEET NO. <b>5</b>
RW SHEET NO.	
ROADWAY DESIGN 5/10/2022 ENGINEER	HYDRAULICS 5/10/2022 ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

# END NCDOT PROJECT B-5947 -LREV- POC Sta. 36+94.94

MARK D. SMITH  
NO DEED REFERENCE  
④

MATCHLINE SHEET 4 -LREV- STA. 24+00.00

200

190

180

170

160

150

140

130

120

110

-LREV-

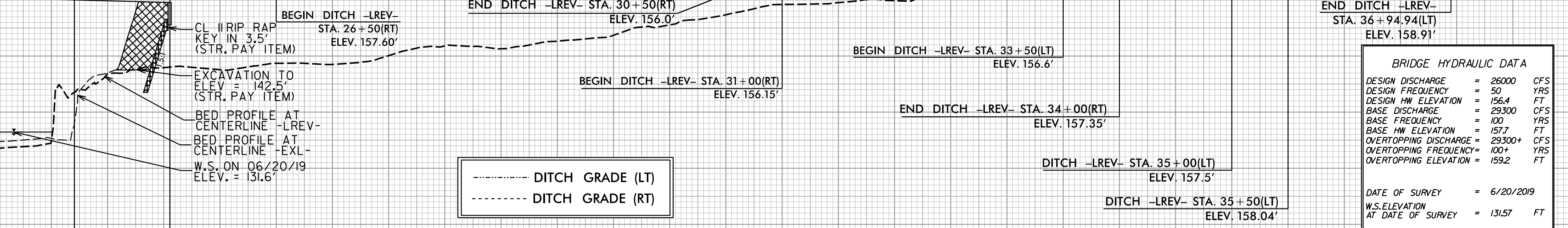
STA. 23+90.5 -LREV-  
CL ELEV = 162.32', SKEW = 90°  
1@100', 1@145', 1@85'  
72" PRESTRESSED CONCRETE  
GIRDER 4'0" CAPS

END BRIDGE  
STA. 25+55.50

PI = 30+79.78  
EL = 158.87'  
VC = 400'  
K = 498  
DS = 60 MPH

PI = 35+30.00  
EL = 160.22'  
VC = 180'  
K = 221  
DS = 60 MPH

END GRADE  
STA. 36+94.94  
ELL 162.06



----- DITCH GRADE (LT)  
----- DITCH GRADE (RT)

BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 26000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 156.4	FT
BASE DISCHARGE	= 29300	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 157.7	FT
OVERTOPPING DISCHARGE	= 29300+	CFS
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING ELEVATION	= 159.2	FT
DATE OF SURVEY	= 6/20/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 131.57	FT

SEE SHEET 2D-1 FOR DITCH DETAILS  
SEE SHEET 2A-2 FOR CURVE DATA  
AND BRIDGE PAVEMENT SKETCH  
SEE SHEETS S-1 THRU S-29  
FOR STRUCTURE PLANS

KEITH E. BRADLEY  
DB 1232 PG 414

STRICKLAND LAND LLC  
K DB 2199 PG 52  
PB 11PG 294  
⑤

-LREV- PRC Sta. 34+83.56

-LREV- PC Sta. 25+82.58

+05.00  
EX. RW, 90.00' RT

+65.00  
EX. RW, 90.00' RT

+97.50  
EX. RW, 93.25' RT

+65.00  
EX. RW, 90.00' RT

+55.50  
EX. RW, 103.94' RT

+61.65  
EX. RW, 103.94' RT

+20.00  
EX. RW, 83.00' RT

+55.00  
EX. RW, 83.00' RT

+16.00  
40.95' LT

+40.00  
40.00' LT

+40.00  
55.00' LT

+60.00  
41.63' LT

+94.94  
EX. RW, 40.00' LT

+67.94  
27' TYP

+44.94  
50' TAPER

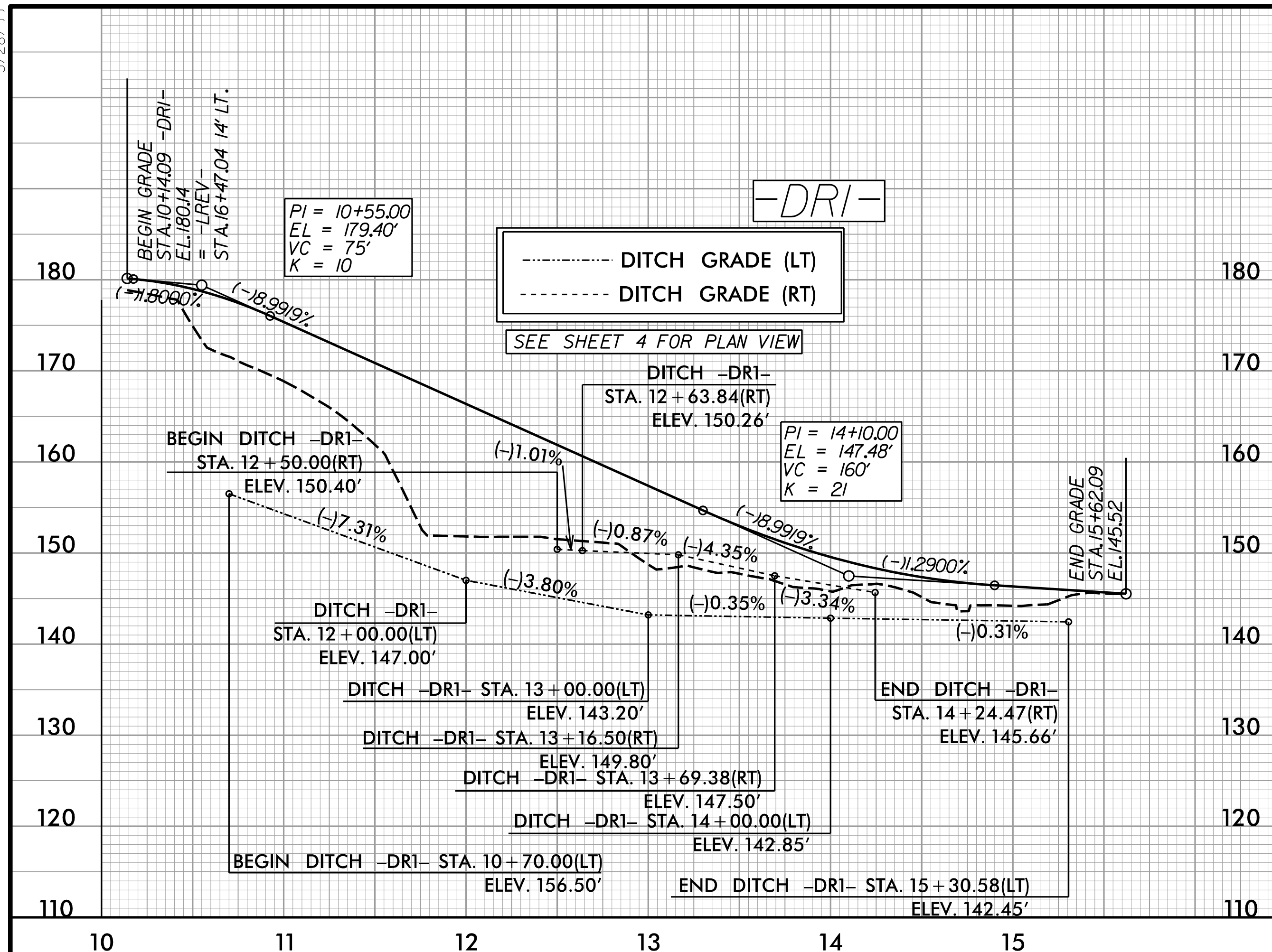
REVISIONS

3/28/2022  
B-5947\_rdy\_psh\_5.dgn

5/28/99

PROJECT REFERENCE NO. B-5947	SHEET NO. 6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
9/26/2022	9/26/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



9/26/2022 10:35:59 AM 5947\_rdy\_psh\_6.dgn