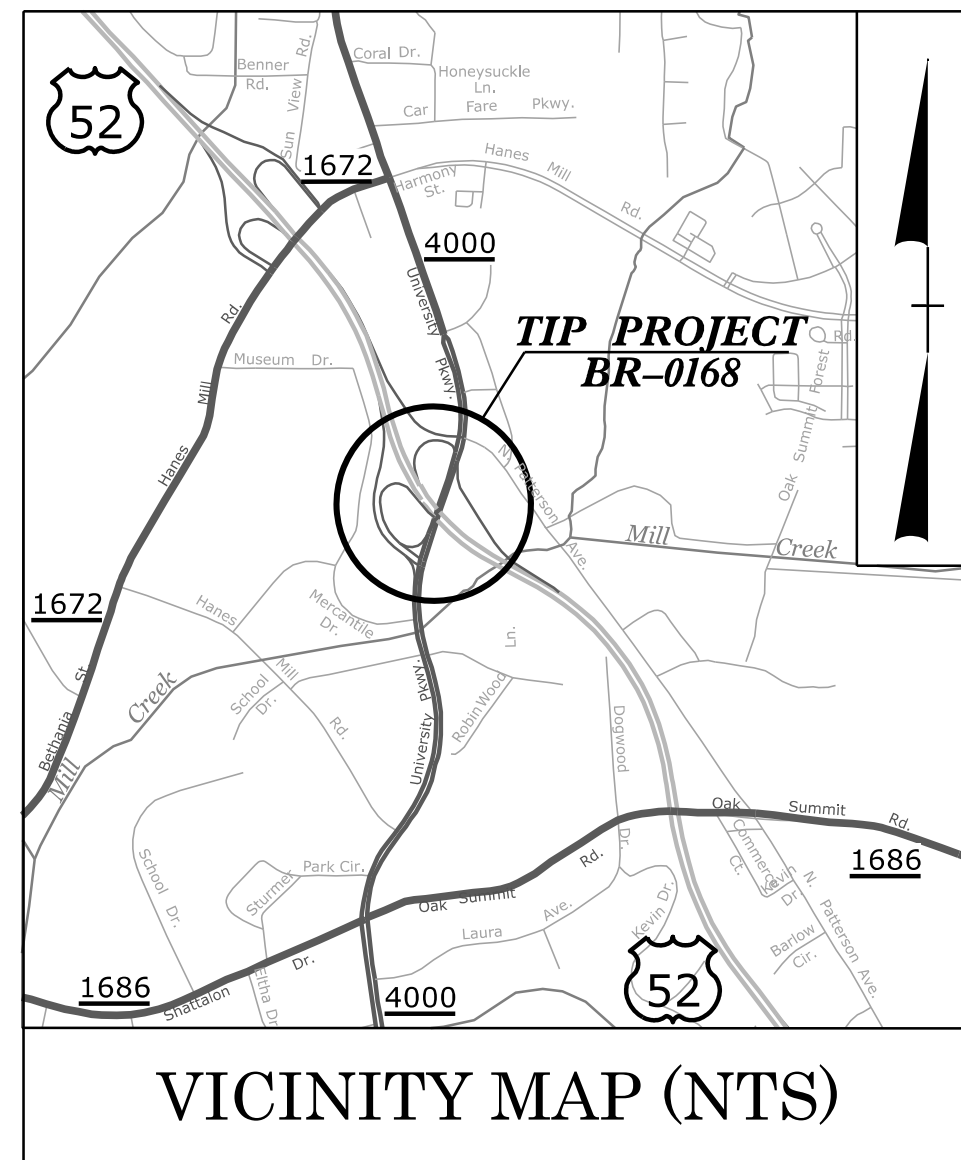


09/08/09

TIP PROJECT: BR-0168

CONTRACT: C205160

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



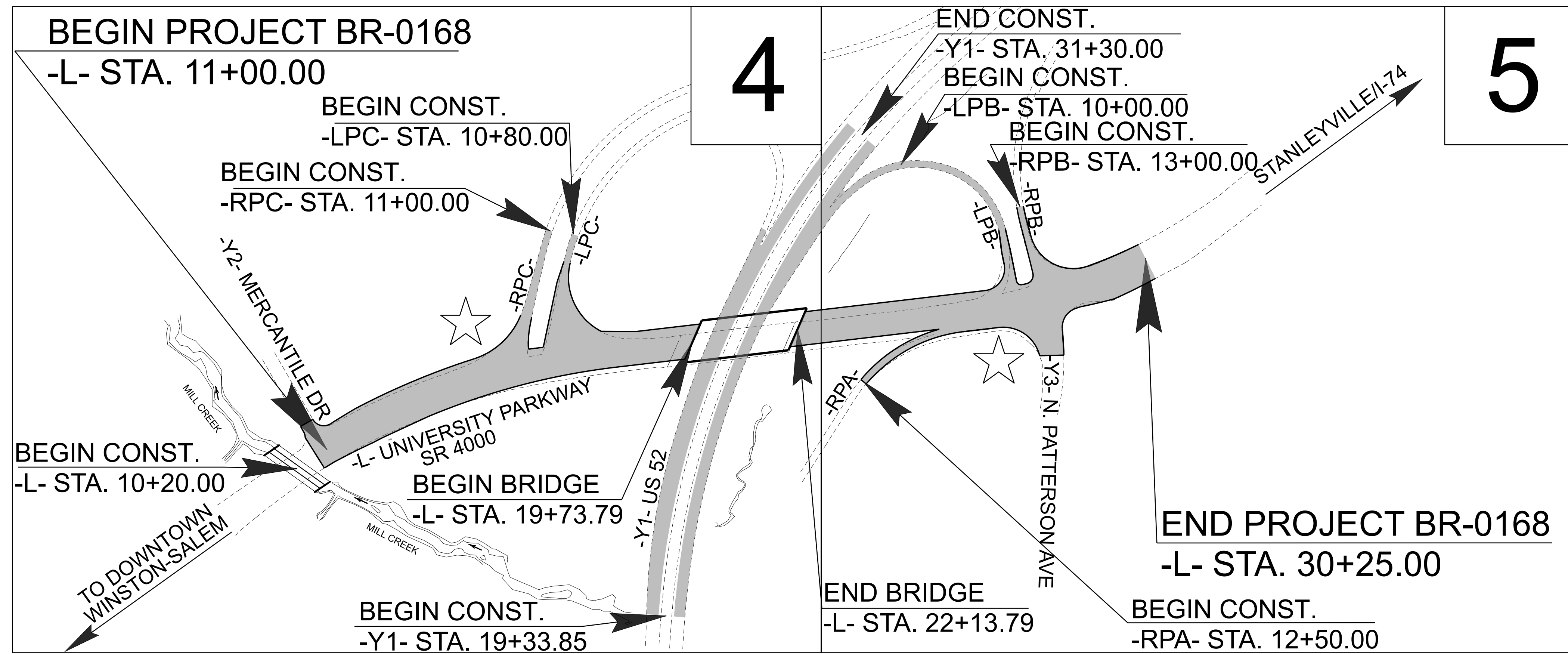
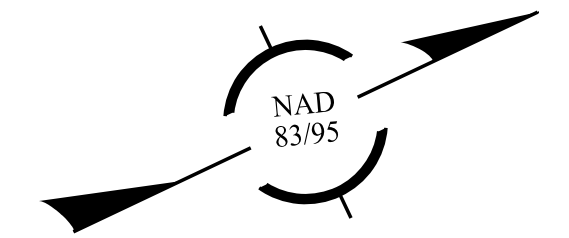
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

FORSYTH COUNTY

LOCATION: REPLACE BRIDGE 330289 ON SR 4000 (UNIVERSITY PARKWAY) OVER US 52

TYPE OF WORK: DRAINAGE, GRADING, PAVING, SIGNALS, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0168	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
67168.1.1		P.E.	
67168.2.1		ROW	
67168.2.2		UTILITIES	
67168.3.1		CONST.	

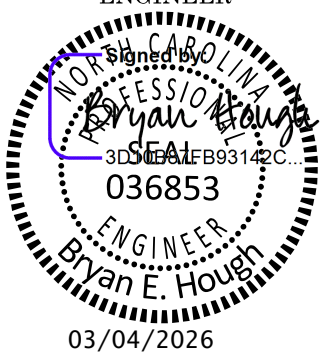
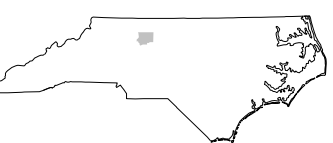


★ REVISED SIGNAL

THIS PROJECT HAS FULL CONTROLLED ACCESS THROUGH THE INTERCHANGE.

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

<p>GRAPHIC SCALES</p> <p>50 25 0 50 100 PLANS</p> <p>50 25 0 50 100 PROFILE (HORIZONTAL)</p> <p>10 5 0 10 20 PROFILE (VERTICAL)</p>	<p>DESIGN DATA</p> <p>ADT 2026 = 32800 ADT 2046 = 31550</p> <p>K = 9 % D = 65 % T = 4 %* V = 50 MPH</p> <p>* TTST = 1% DUAL 3% FUNC CLASS = PRINCIPAL ARTERIAL REGIONAL TIER</p>	<p>PROJECT LENGTH</p> <p>LENGTH OF ROADWAY TIP PROJECT BR-0168 = 0.320 MILES LENGTH OF STRUCTURE TIP PROJECT BR-0168 = 0.045 MILES TOTAL LENGTH OF TIP PROJECT BR-0168 = 0.365 MILES</p>	<p>Prepared in the Office of: DIVISION OF HIGHWAYS 1000 Birch Ridge Dr., Raleigh NC, 27610</p> <p>2024 STANDARD SPECIFICATIONS</p> <p>RIGHT OF WAY DATE: NOVEMBER 22, 2024</p> <p>LETTING DATE: MAY 19, 2026</p> <p>JOEL P. PERLIN PROJECT MANAGER</p> <p>PIOTR J. STOJDA PROJECT TEAM LEAD</p> <p>BRYAN E. HOUGH, PE PROJECT DESIGN ENGINEER</p>	<p>HYDRAULICS ENGINEER</p> <p>DocuSigned by: Matthew York E0B27B30696141D... SIGNATURE: 03/03/2026</p> <p>ROADWAY DESIGN ENGINEER</p> <p>Signed by: Bryan Hough 3D10B87F893142C... SIGNATURE: 03/03/2026</p>	
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INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-4	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1	INTERSECTION DETAILS
2C-1 THRU 2C-2	METHOD OF PIPE INSTALLATION DETAILS
2C-3	CONCRETE SIDEWALK DETAILS
2C-4	GUARDRAIL PLACEMENT DETAILS
2C-5	TRANSITION 2'-6" C&G TO PAVED SHOULDER DETAIL
2C-6 THRU 2C-7	MINIMUM DEPTH CATCH BASIN DETAILS
2C-8	CONCRETE JUCTION BOX DETAIL
2D-1	DRAINAGE DETAILS
2G-1 THRU 2G-4	TEMPORARY SHORING DETAILS
3B-1	ROADWAY SUMMARIES
3D-1 THRU 3D-4	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4 THRU 5	PLAN SHEETS
6 THRU 8	PROFILE SHEETS
RW-1 THRU RW-5	SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASMENT AND PROPERTY TIES
TMP-1 THRU TMP-5.2	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-4	PAVEMENT MARKING PLANS
EC-1 THRU EC-7	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-9A	SIGNING PLANS
SIG-1 THRU SIG-7.5	SIGNAL PLANS
SIG M-1A THRU SIG M-9	STANDARD METAL POLE PLANS
SCP-1 THRU SCP-7	SIGNAL COMMUNICATIONS PLANS
ITS-1 THRU ITS-12	ITS PLANS
UO-1 THRU UO-3	UTILITIES BY OTHERS PLANS
X-1	CROSS-SECTION INDEX
X-1A	CROSS-SECTION SUMMARY SHEET
X-2 THRU X-30	CROSS-SECTIONS
S-1 THRU S-53	STRUCTURE PLANS
W-1 THRU W-5	WALL PLANS

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

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.02

SIDE ROADS:

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

SUBSURFACE DRAINS:

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

STREET TURNOUT:

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

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC 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 DUKE ENERGY, SEGRA COMMUNICATION, CITY OF WINSTON SALEM, VERIZON COMMUNICATION, NCDOT ITS

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.

CURB RAMPS

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. CONSTRUCT ALL CURB RAMPS ACCORDANCE WITH STD 848.06.

EFF. 01-16-2024
REV.
2024 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit - N. C. Department of Transportation - Raleigh, N. C., Dated January 16, 2024 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
235.01	Embankment Monitoring
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation (Use Details in Lieu of Standards for Sheets 1 and 2 of 2)
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
423.03	Bridge Approach Fills - Type 2 Approach Fill for Bridge Abutment with MSE Wall
423.04	Bridge Approach Fills - Type 2A Alternate Approach Fill for Integral Bridge Abutment with MSE Wall
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.02	Method of Shoulder Construction - High Side of Superelevated Curve - Method II
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.27	Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew
838.33	Reinforced Concrete Endwall - for Single 66" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.57	Reinforced Brick Endwall - for Single 60" Pipe 90 Skew
838.63	Reinforced Brick Endwall - for Single 66" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
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
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.45	Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk (Use Detail in Lieu of Standard for Sheet 1 of 1)
848.04	Street Turnout
848.06	Curb Ramp (Use Details in Lieu of Standards for Sheets 9 and 10 of 13)
852.01	Concrete Islands
852.06	Method for Placement of Drop Inlets in Concrete Islands
862.01	Guardrail Placement (Use Details in Lieu of Standards for Sheets 4, 6, 12, and 14 of 15)
862.02	Guardrail Installation
862.03	Structure Anchor Units (Use Detail in Lieu of Standard for Sheet 8 of 9)
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

REVISIONS

Note: Not to Scale

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

BR-0168
FP IB

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin (EIP)	○ EIP
Computed Property Corner	×
Existing Concrete Monument (ECM)	□ ECM
Parcel / Sequence Number	⑫③
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---
Potential Contamination Area: Soil	---S---
Known Contamination Area: Water	---W---
Potential Contamination Area: Water	---W---
Contaminated Site: Known or Potential	☠ ?

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	✕
Foundation	□
Area Outline	□
Cemetery	□ +
Building	□
School	□
Church	□
Dam	□

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	□
Jurisdictional Stream	---JS---
Buffer Zone 1	---BZ 1---
Buffer Zone 2	---BZ 2---
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	---WLB---
Proposed Lateral, Tail, Head Ditch	---FLDM---
False Sump	◇

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY & PROJECT CONTROL:

Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	●
Secondary Horiz and Vert Control Point	◆
Vertical Benchmark	⊠
Existing Right of Way Monument	△
Proposed Right of Way Monument (Rebar and Cap)	▲
Proposed Right of Way Monument (Concrete)	⊙
Existing Permanent Easement Monument	◇
Proposed Permanent Easement Monument (Rebar and Cap)	◆
Existing C/A Monument	△
Proposed C/A Monument (Rebar and Cap)	▲
Proposed C/A Monument (Concrete)	⊙
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
Existing Control of Access Line	-----
Proposed Control of Access Line	-----
Proposed ROW and CA Line	-----
Existing Easement Line	-----
Proposed Temporary Construction Easement	-----
Permanent 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	-----
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	-----
Bridge Wing Wall, Head Wall and End Wall	-----
MINOR:	
Head and End Wall	-----
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	-----
Paved Ditch Gutter	-----
Storm Sewer Manhole	-----
Storm Sewer	-----

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)*	-----
U/G Power Line (SUE - LOS C)*	-----
U/G Power Line (SUE - LOS D)*	-----

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)*	-----
U/G Telephone Cable (SUE - LOS C)*	-----
U/G Telephone Cable (SUE - LOS D)*	-----
U/G Telephone Conduit (SUE - LOS B)*	-----
U/G Telephone Conduit (SUE - LOS C)*	-----
U/G Telephone Conduit (SUE - LOS D)*	-----
U/G Fiber Optics Cable (SUE - LOS B)*	-----
U/G Fiber Optics Cable (SUE - LOS C)*	-----
U/G Fiber Optics Cable (SUE - LOS D)*	-----

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	-----

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)*	-----
U/G TV Cable (SUE - LOS C)*	-----
U/G TV Cable (SUE - LOS D)*	-----
U/G Fiber Optic Cable (SUE - LOS B)*	-----
U/G Fiber Optic Cable (SUE - LOS C)*	-----
U/G Fiber Optic Cable (SUE - LOS D)*	-----

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

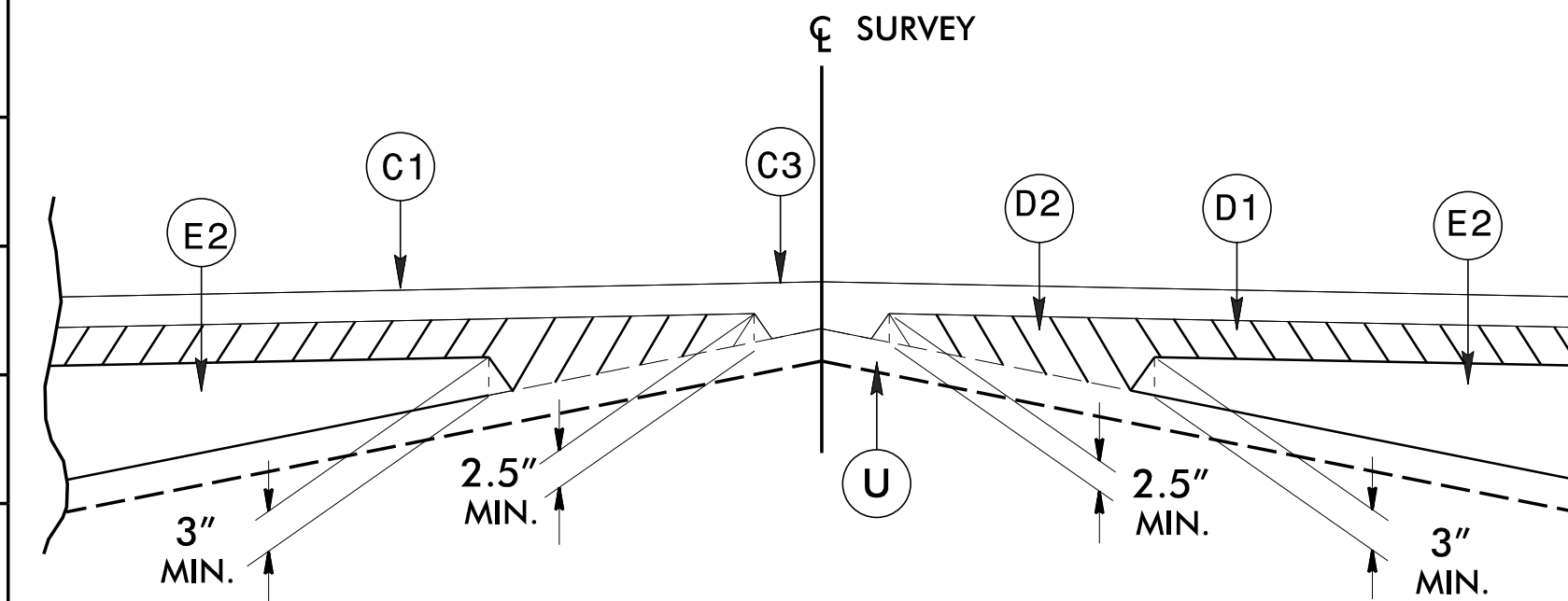
SANITARY SEWER:	
Sanitary Sewer Manhole	⊙
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
SS Force Main Line Test Hole (SUE - LOS A)*	⊙
SS Force Main Line (SUE - LOS B)*	-----
SS Force Main Line (SUE - LOS C)*	-----
SS Force Main Line (SUE - LOS D)*	-----

MISCELLANEOUS:	
Utility Pole	●
Utility Pole with Base	⊠
Utility Located Object	○
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line (SUE - LOS B)*	-----
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	⊠
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊙
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

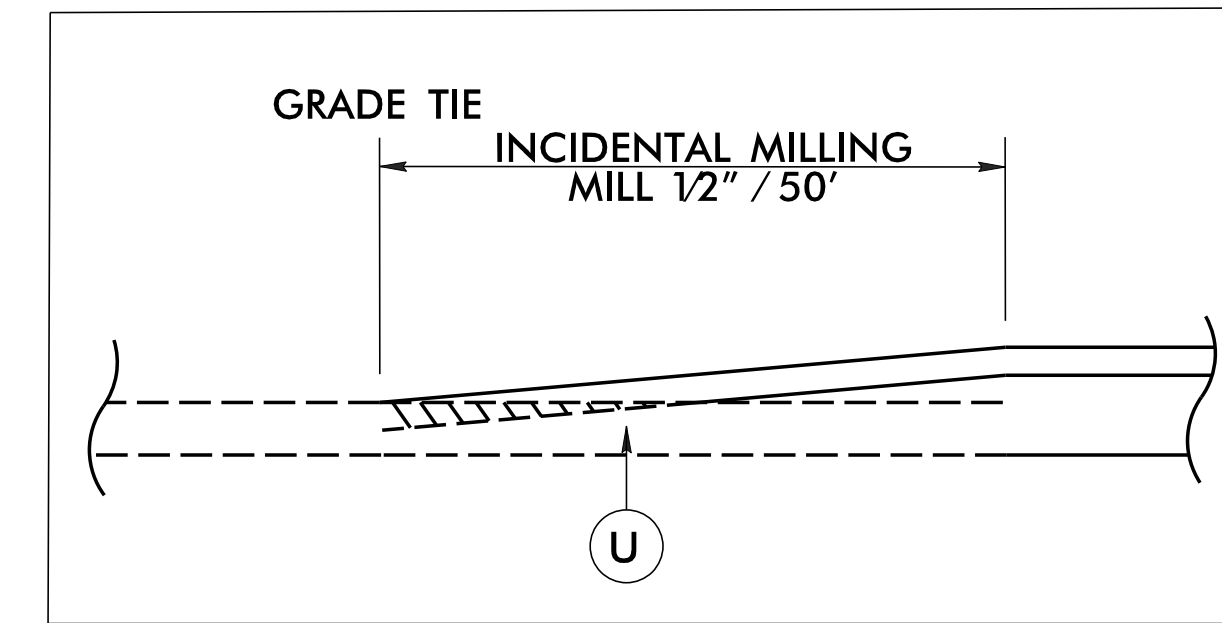
FINAL PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	R1	2'-6" CURB AND GUTTER
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R2	5" MONOLITHIC CONCRETE ISLAND (KEYED IN)
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" IN DEPTH OR GREATER THAN 2" IN DEPTH.	S	4" CONCRETE SIDEWALK
C4	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.	T	EARTH MATERIAL
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	U	EXISTING PAVEMENT
D2	PROP. 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 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.	V1	5/8" FINE MILLING
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	V2	1.5" FINE MILLING
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 1/2" IN DEPTH.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)
N	PROP. APPROX. 5/8" ULTRATHIN HOT MIX BONDED WEARING SURFACE COURSE, TYPE B, AT AN AVERAGE RATE OF 70 LBS. PER SQ. YD.		

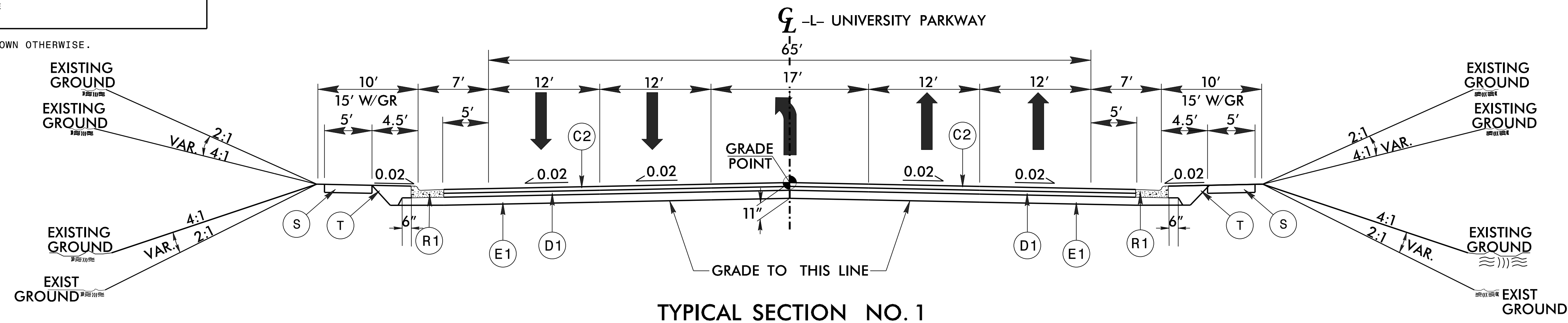
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



Detail Showing Method of Wedging



PROFILE TIE-IN DETAIL



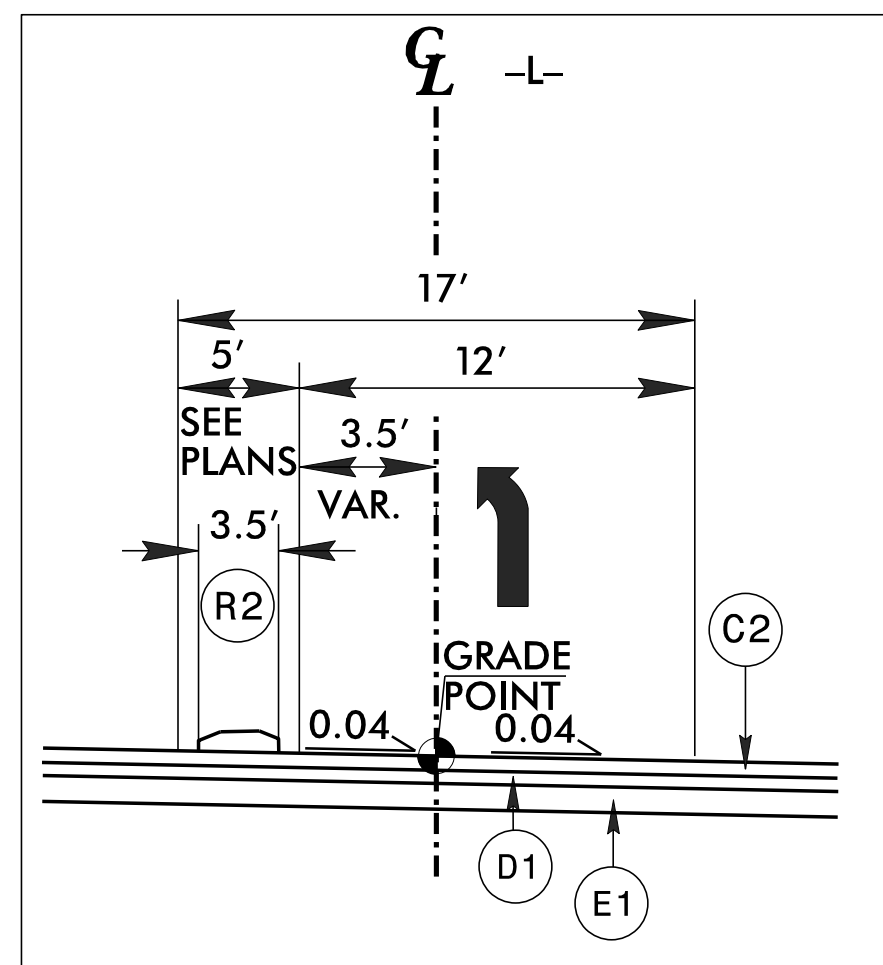
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING TO TYPICAL NO. 1
FROM -L- STA. 11+00.00 TO STA. 12+00.00

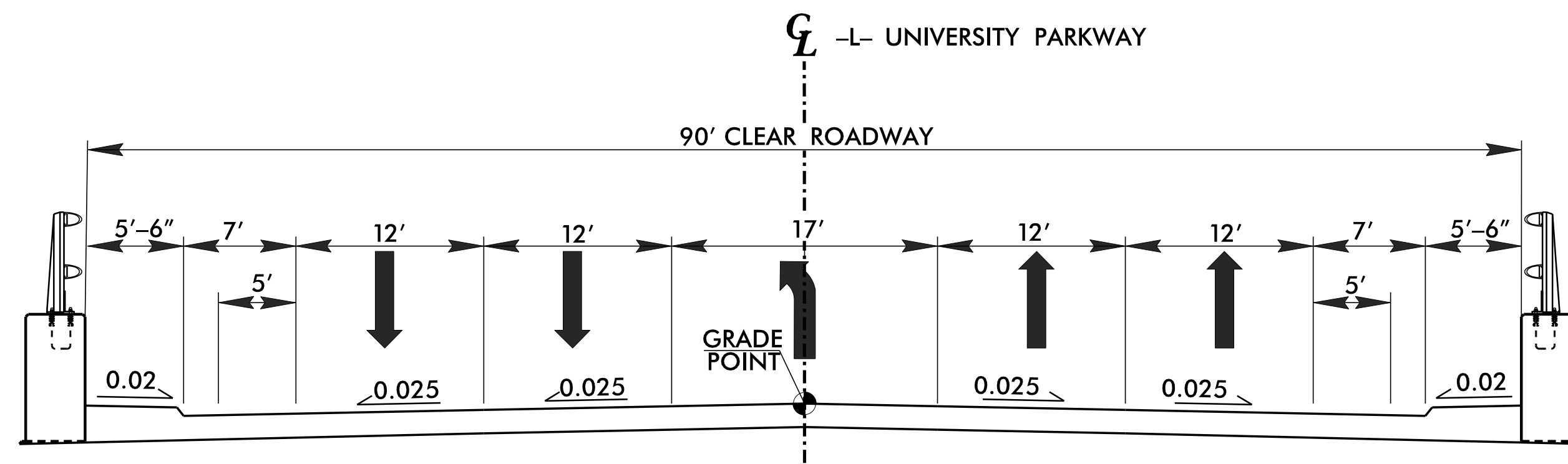
-L- STA. 12+00.00 TO STA. 19+73.79 (BEGIN BRIDGE)
22+13.79 (END BRIDGE) TO -L- STA. 28+50.00

TRANSITION FROM TYPICAL NO. 1 TO EXISTING
FROM -L- STA. 28+50.00 TO STA. 30+25.00



USE INSET A WITH TYPICAL SECTION NO. 1

-L- STA. 11+22.00 TO STA. 15+83.00

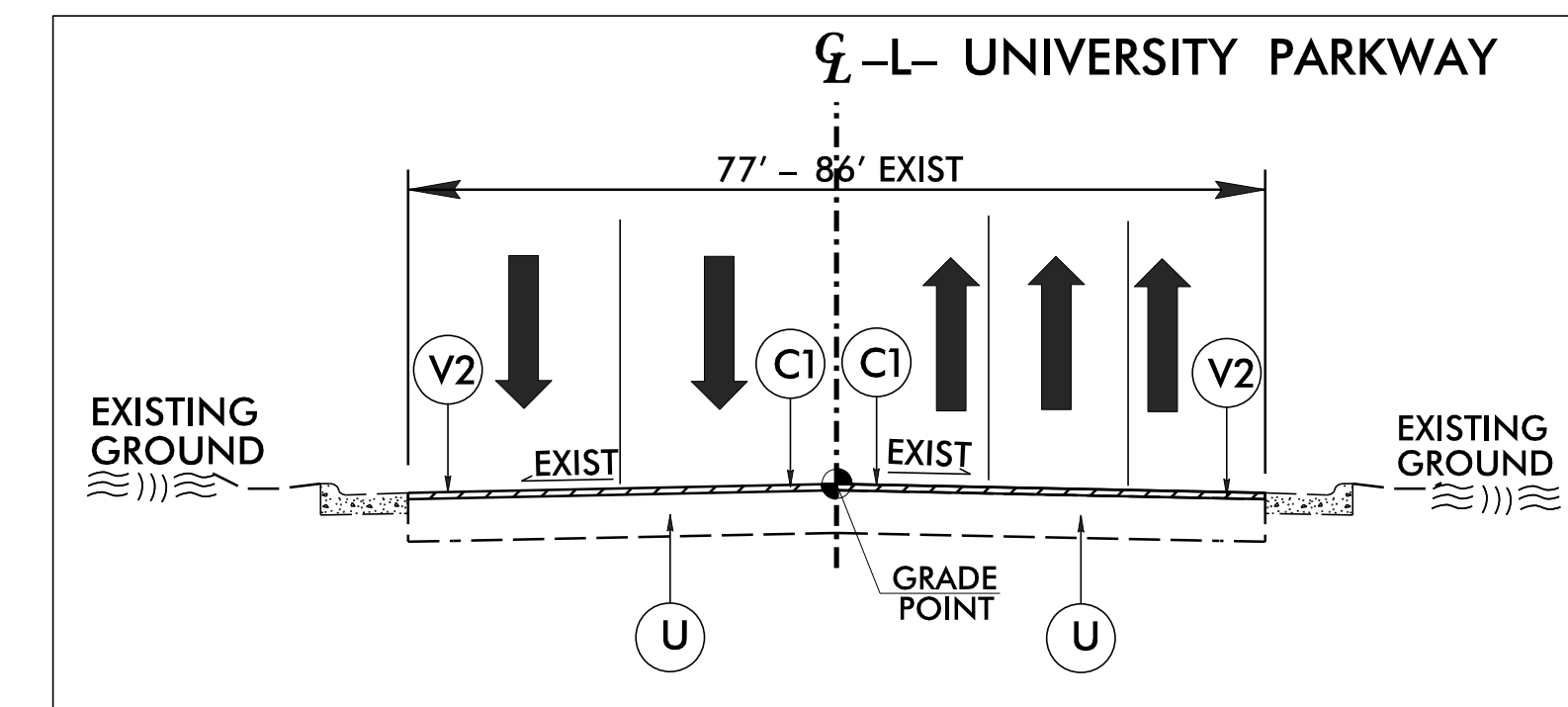


TYPICAL SECTION NO. 2

(SEE STRUCTURE PLANS FOR STRUCTURE CONSTRUCTION DETAILS)

USE TYPICAL ON STRUCTURE

-L- STA. 19+73.79 (BEGIN BRIDGE)
TO 22+13.79 (END BRIDGE)



INSET B

FOR 650'± OUTSIDE OF CONSTRUCTION LIMITS
(SEE SHEET 5 AND TMP PLANS FOR DETAILS)

BR-0168
FP 2A-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSYTH COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN ENGINEER

Professional Engineer Seal:
Bryan E. Hough
036853
03/03/2026

PAVEMENT ENGINEER
Professional Engineer Seal:
Joseph Holland
024964
03/05/2026

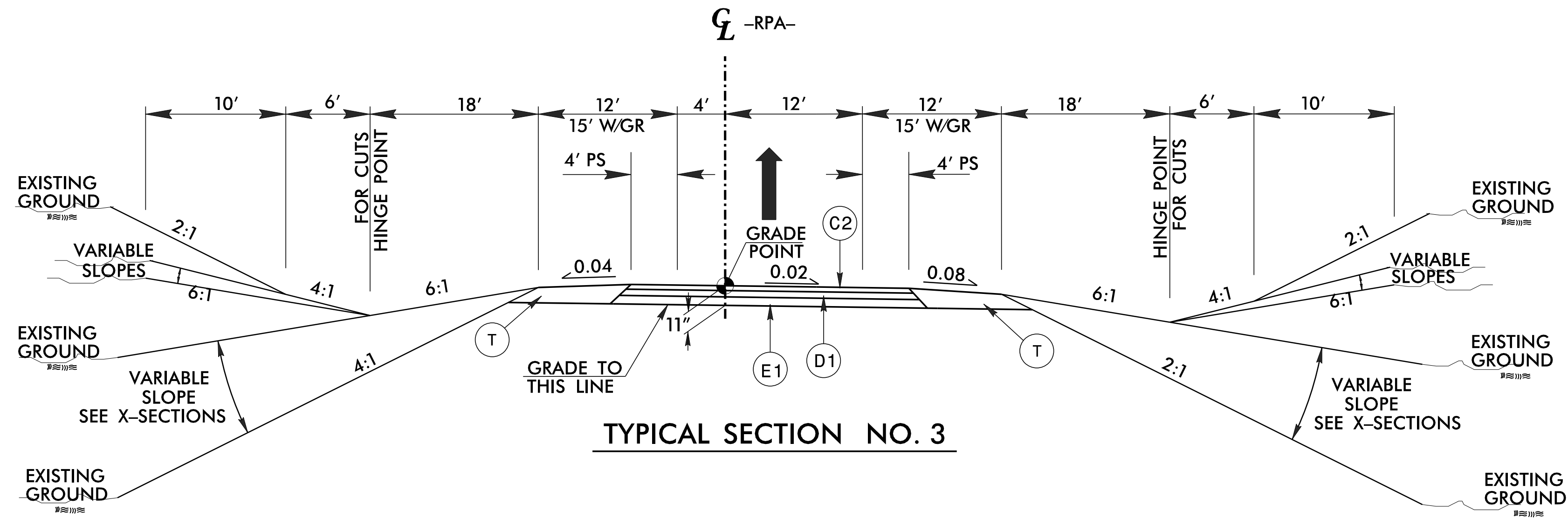
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REVISIONS

FINAL PAVEMENT SCHEDULE

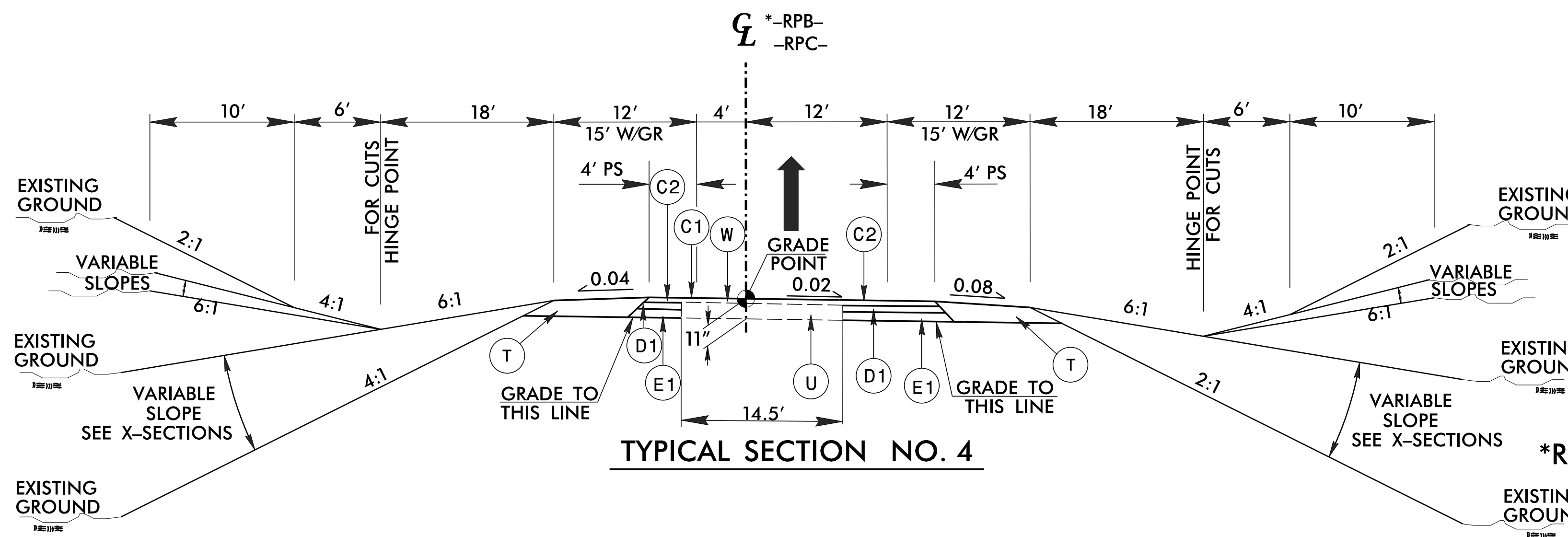
C1	1.5" S9.5C
C2	3" S9.5C
D1	4" I19.0C
E1	4" B25.0C
R1	2'-6" C&G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL

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



USE TYPICAL SECTION NO. 3

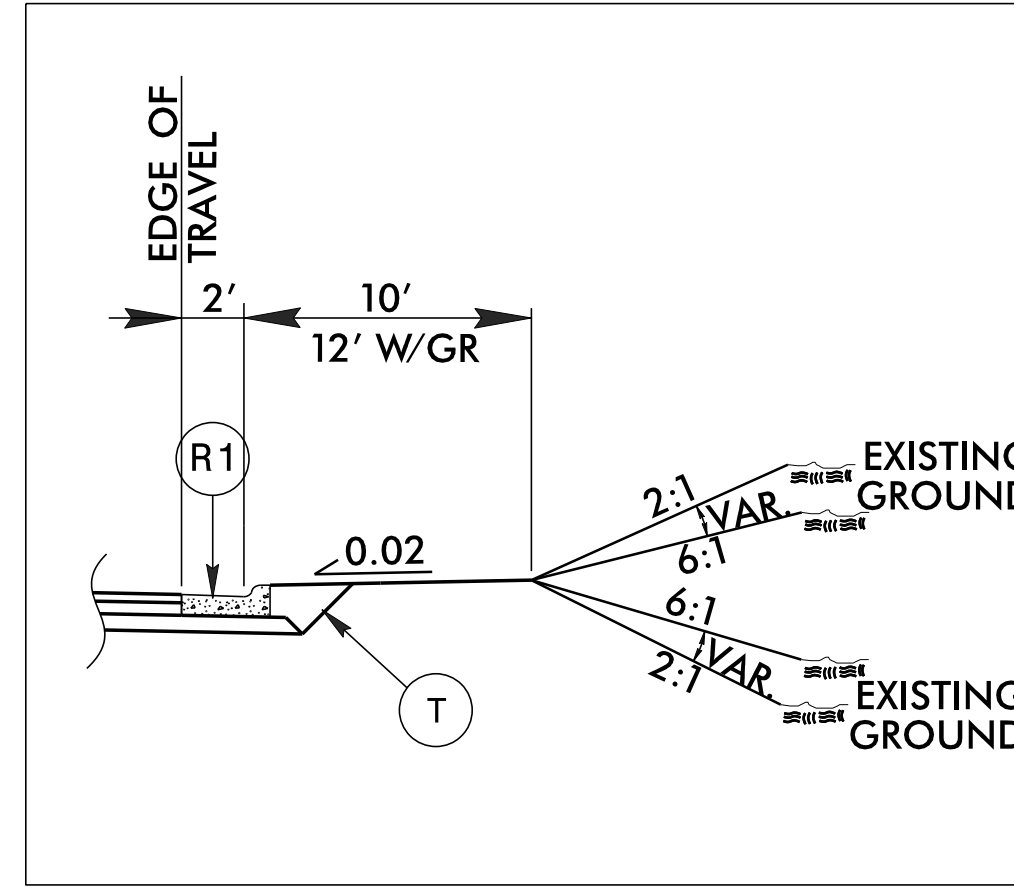
-RPA- STA. 12+50.00 TO STA. 15+14.96



*REVERSE OF TYPICAL

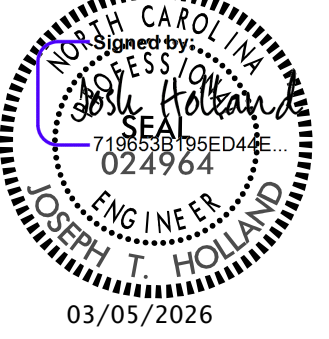
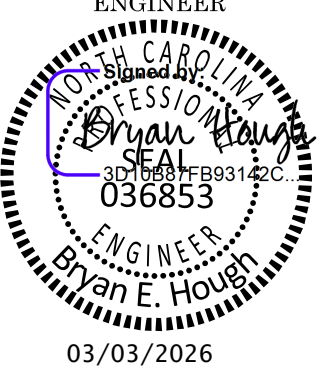
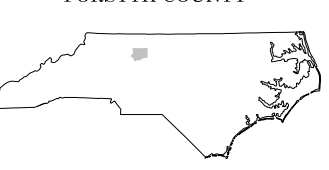
USE TYPICAL SECTION NO. 4

*-RPB- STA. 13+00.00 TO STA. 14+74.02
-RPC- STA. 13+00.00 TO STA. 13+74.94



USE INSET C WITH TYPICAL SECTIONS NO. 3, NO. 4, NO. 5, AND NO. 6

- RPA- STA. 13+35.00 TO STA. 15+14.96 LT & RT
- RPB- STA. 13+70.49 TO STA. 14+74.02 LT
- LPB- STA. 13+78.20 TO STA. 14+31.37 LT
- RPC- STA. 13+00.00 TO STA. 13+74.94 LT & RT
- LPC- STA. 12+55.00 TO STA. 13+38.00 RT
- LPCA- STA. 10+78.33 TO STA. 11+97.60 RT

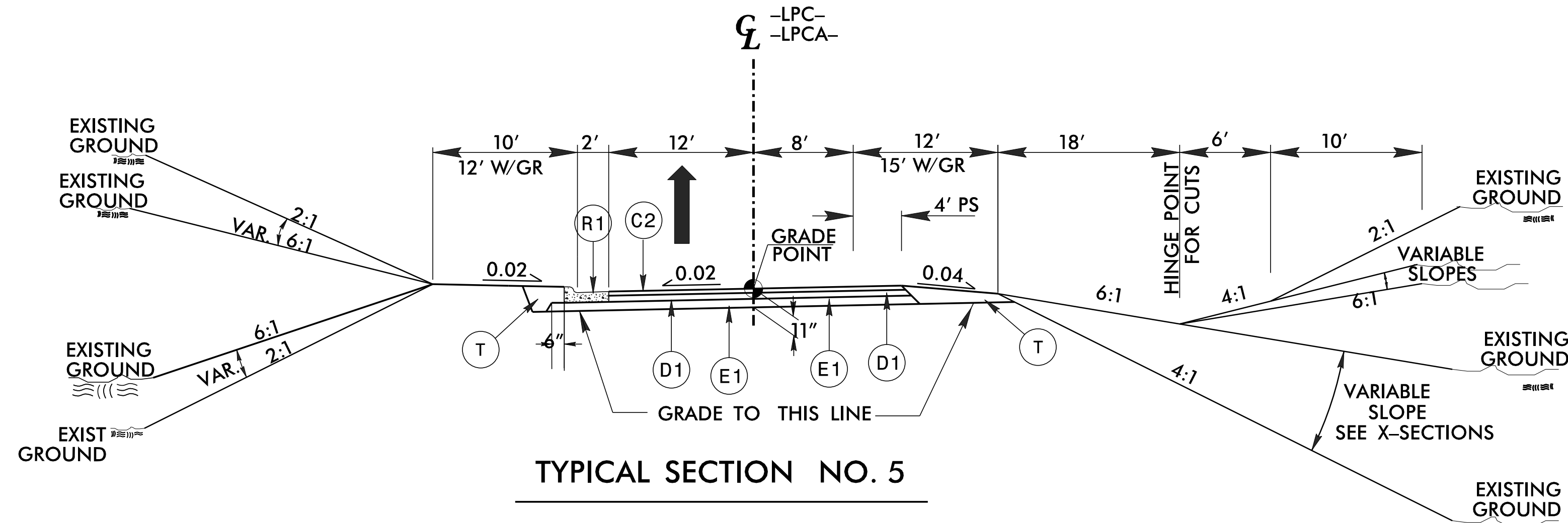


REVISIONS

FINAL PAVEMENT SCHEDULE

C1	1.5" S9.5C
C2	3" S9.5C
D1	4" I19.0C
E1	4" B25.0C
R1	2'-6" C&G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL

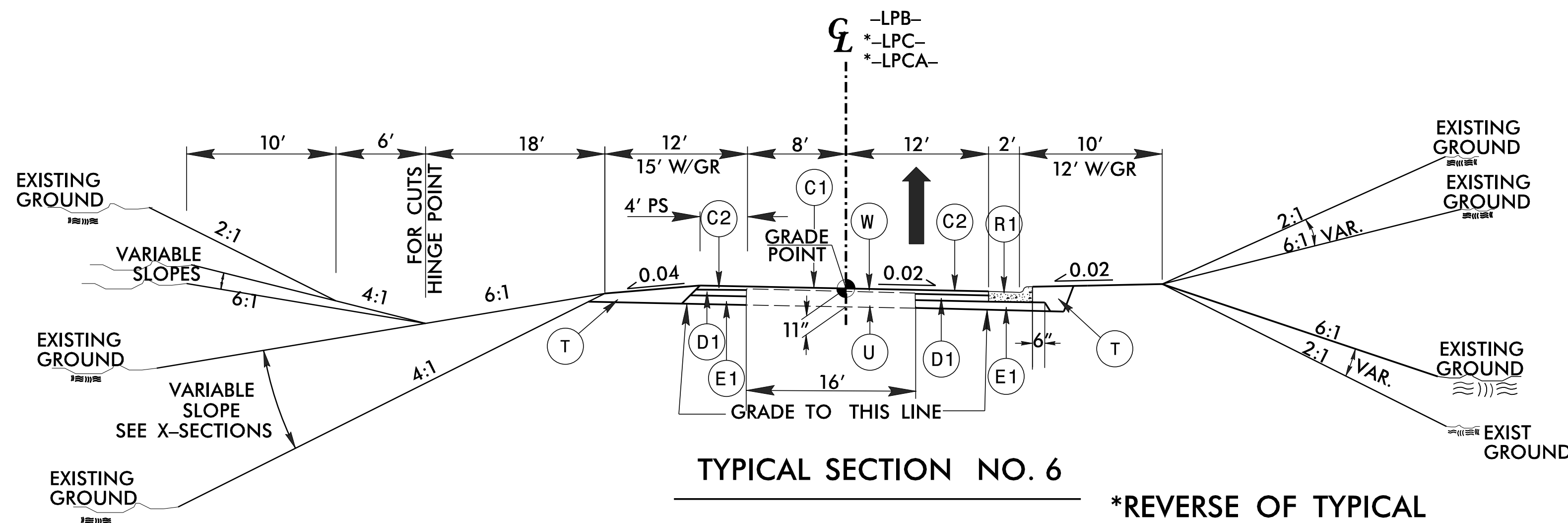
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5

-LPC- STA. 12+75.00 TO STA. 13+38.00
 -LPCA- STA. 10+80.00 TO STA. 11+96.13

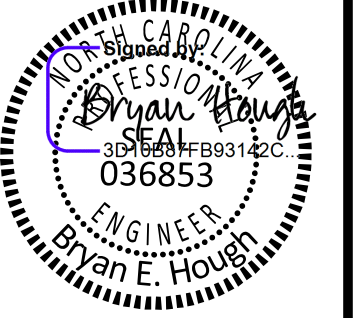
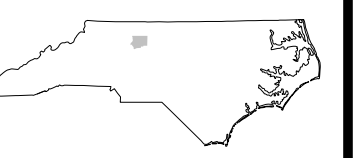


TYPICAL SECTION NO. 6

*REVERSE OF TYPICAL

USE TYPICAL SECTION NO. 6

-LPB- STA. 13+00.00 TO STA. 14+31.37
 *-LPC- STA. 11+45.00 TO STA. 12+75.00
 *-LPCA- STA. 10+69.61 TO STA. 10+80.00

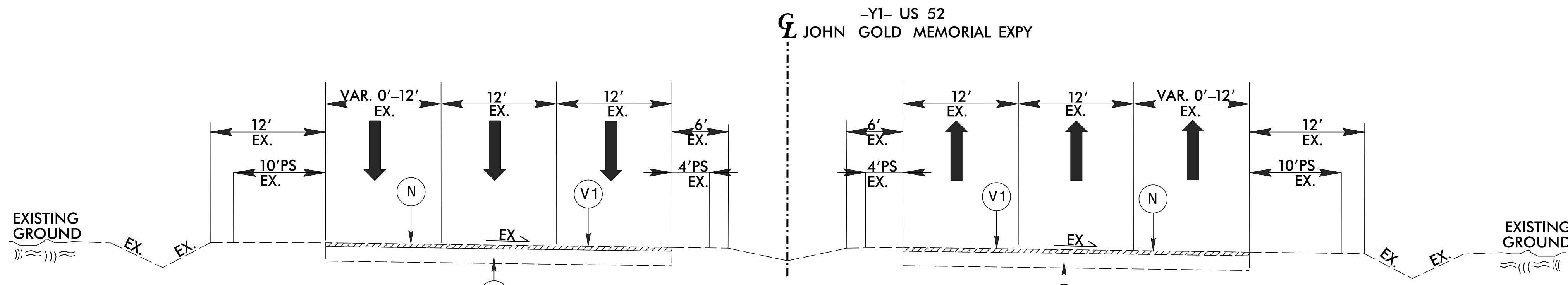


REVISIONS

FINAL PAVEMENT SCHEDULE

C2	3" S9.5C
C4	2" S9.5C
D1	4" I19.0C
E1	4" B25.0C
N	5/8" UTBWC, TYPE B
R1	2'-6" C&G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	5/8" FINE MILLING

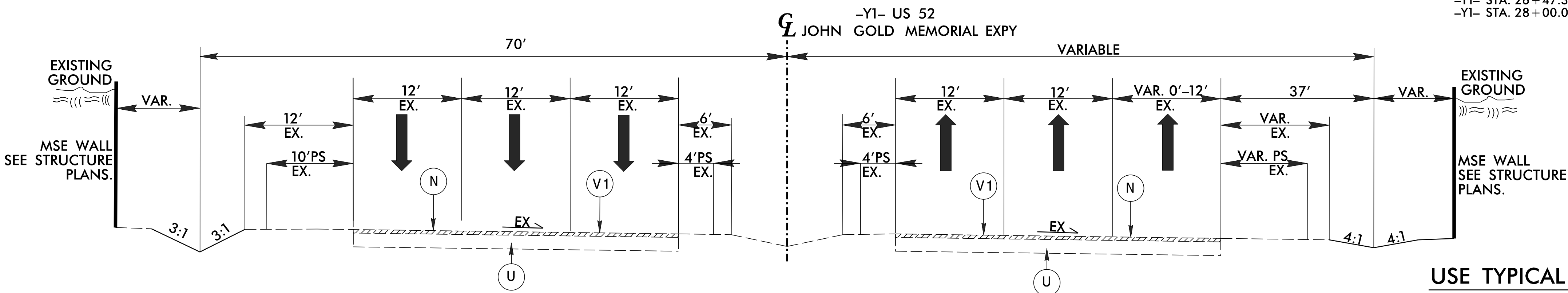
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 7 (APPROACHING BRIDGE)

USE TYPICAL SECTION NO. 7

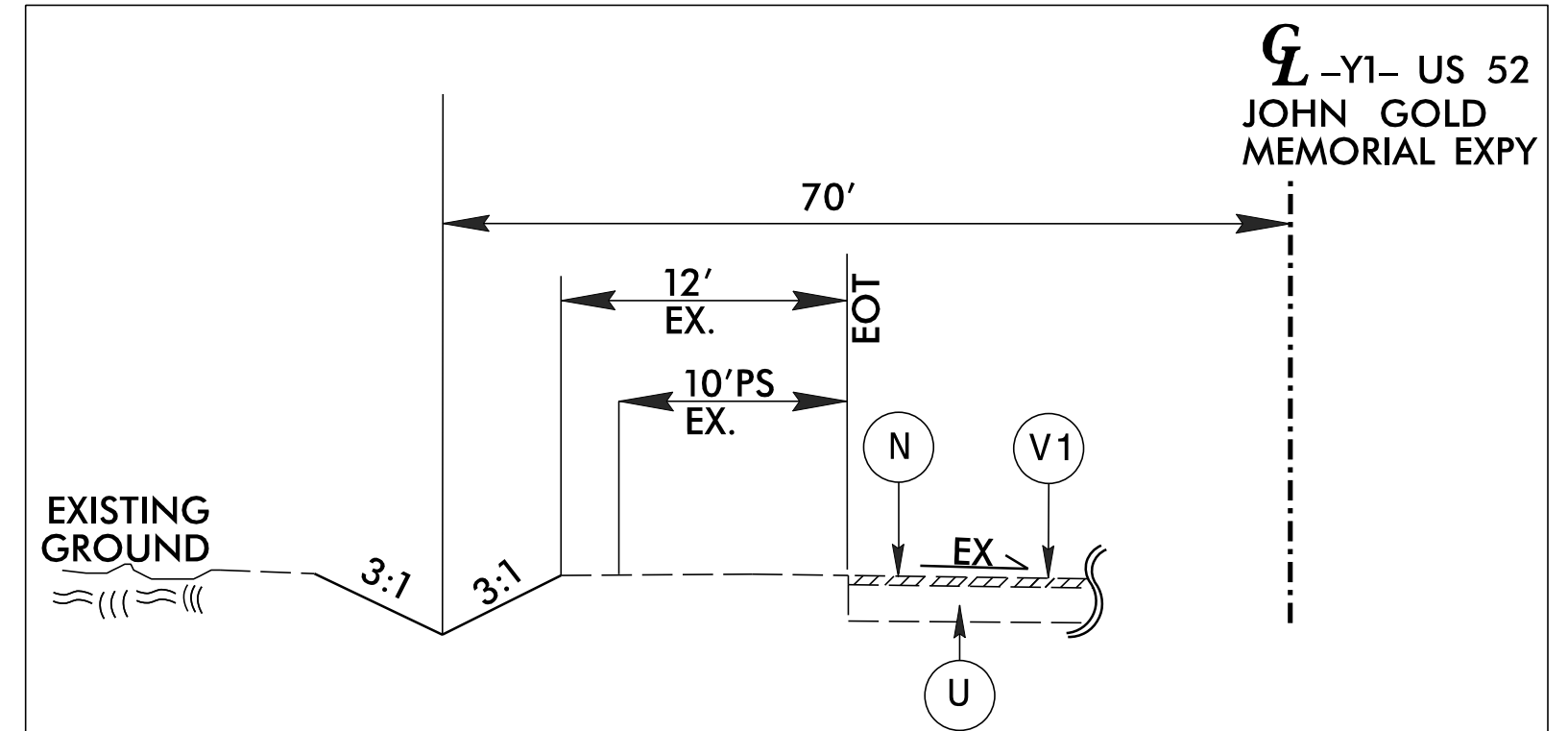
-Y1- STA. 19+33.85 TO STA. 24+35.09 (LT)
 -Y1- STA. 19+33.85 TO STA. 25+00.00 (RT)
 -Y1- STA. 26+47.35 TO STA. 31+30.00 (LT)
 -Y1- STA. 28+00.00 TO STA. 31+30.00 (RT)



TYPICAL SECTION NO. 8 (UNDER THE BRIDGE)

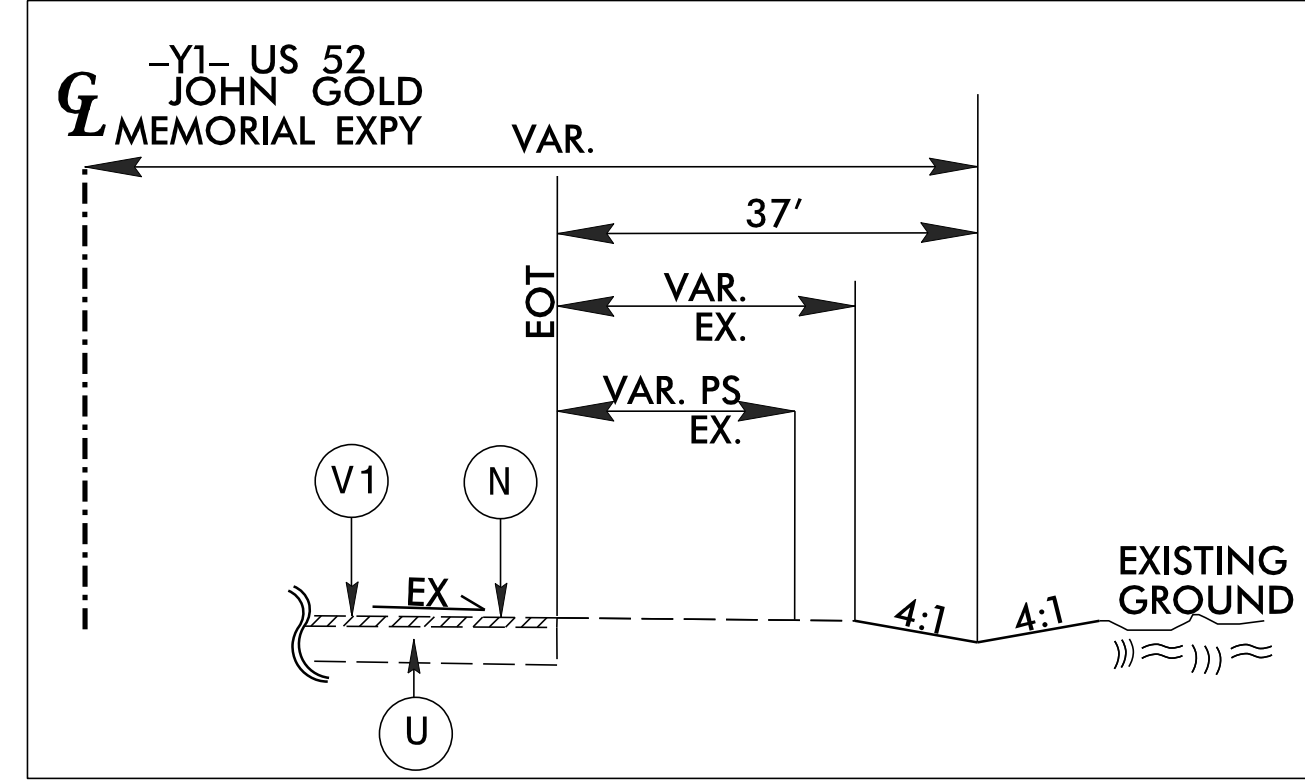
USE TYPICAL SECTION NO. 8

-Y1- STA. 24+35.09 TO STA. 26+47.35 (LT)
 -Y1- STA. 25+00.00 TO STA. 28+00.00 (RT)



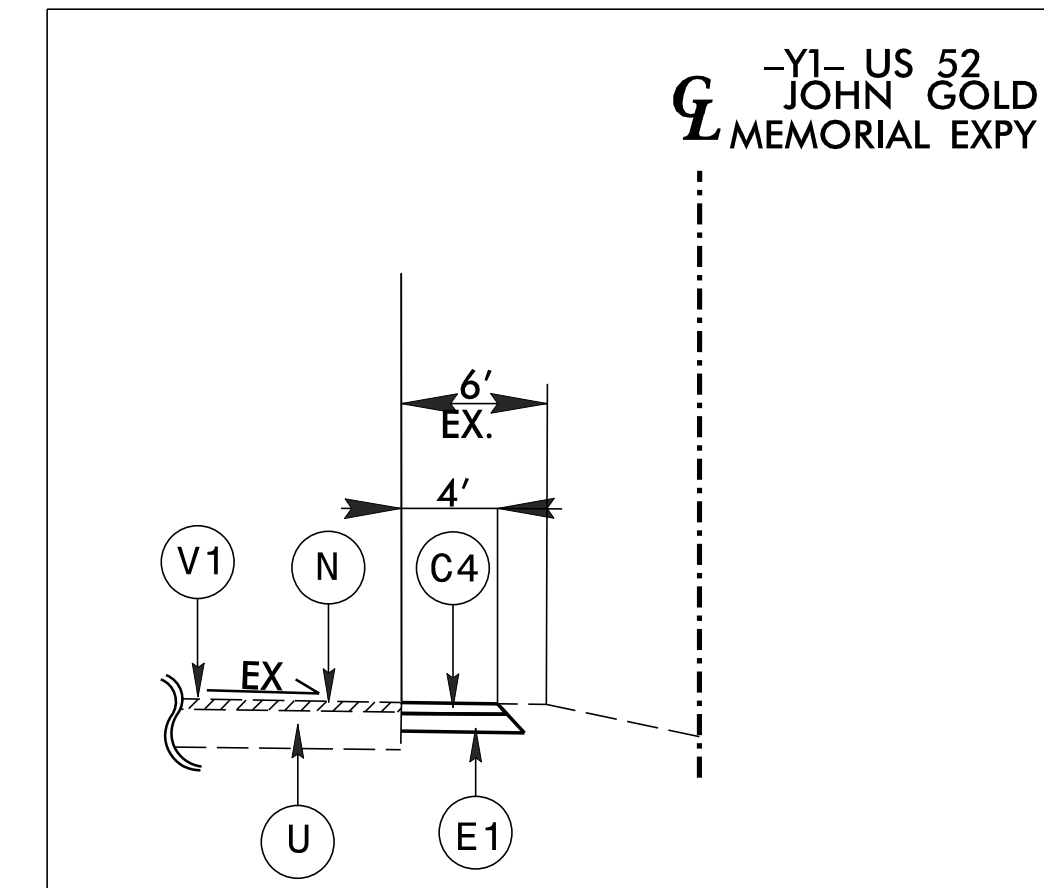
INSET D
 (USE WITH TYPICAL SECTIONS NO. 7 & 8 WHERE MSE WALL IS NOT PRESENT)

TRANSITION FROM EXISTING TO INSET D FROM -Y1- STA. 24+25.00 TO STA. 24+75.00 (LT)
 -Y1- STA. 24+75.00 TO STA. 26+00.00 (LT)
 TRANSITION FROM INSET D TO EXISTING FROM -Y1- STA. 26+00.00 TO 26+50.00 (LT)



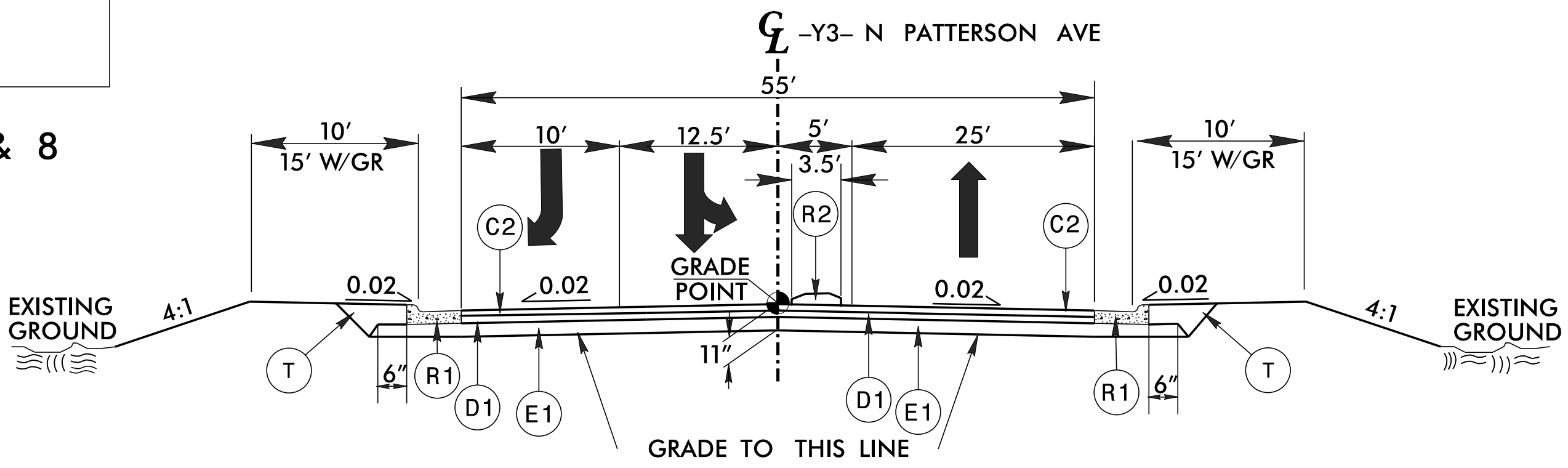
INSET E
 (USE WITH TYPICAL SECTIONS NO. 7 & 8 WHERE MSE WALL IS NOT PRESENT)

TRANSITION FROM EXISTING TO INSET E FROM -Y1- STA. 25+00.00 TO STA. 25+50.00 (RT)
 -Y1- STA. 25+50.00 TO STA. 27+35.00 (RT)
 TRANSITION FROM INSET E TO EXISTING FROM -Y1- STA. 27+35.00 TO 28+25.00 (RT)



INSET F
 (TEMPORARY PAVEMENT WIDENING)

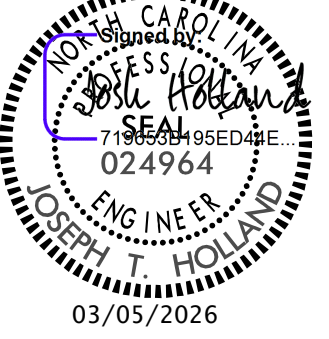
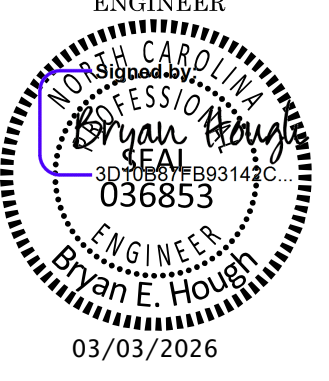
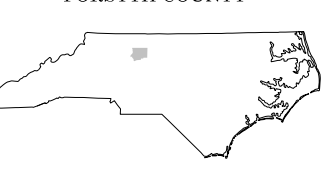
USE INSET F WITH TYPICAL SECTIONS NO. 7 AND NO. 8
 -Y1- STA. 23+80 TO STA. 27+75 (LT)
 *-Y1- STA. 23+89 TO STA. 27+75 (RT)
 *REVERSE OF TYPICAL SEE TMP PLANS



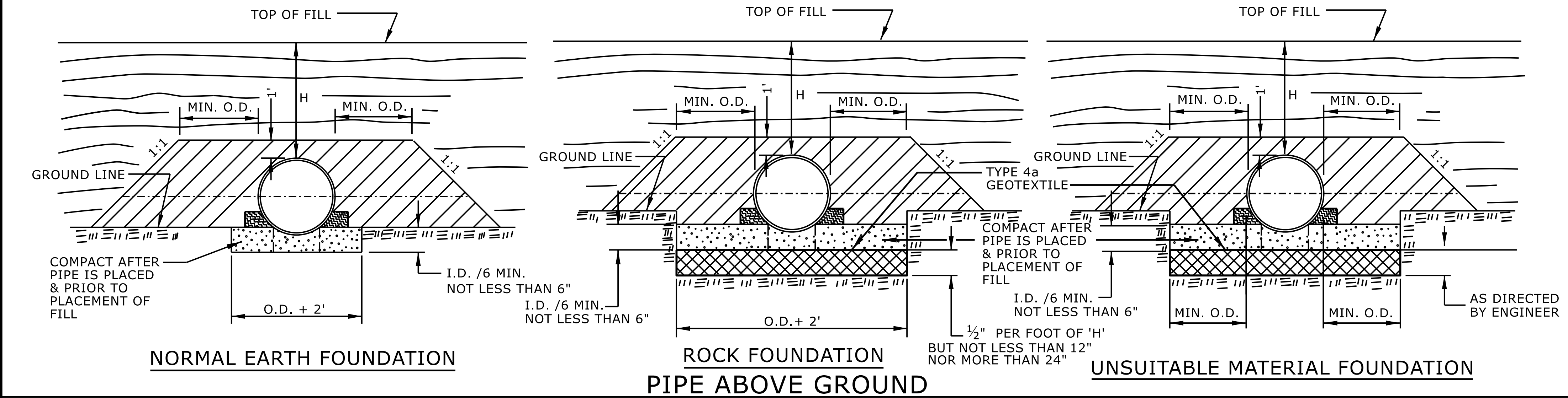
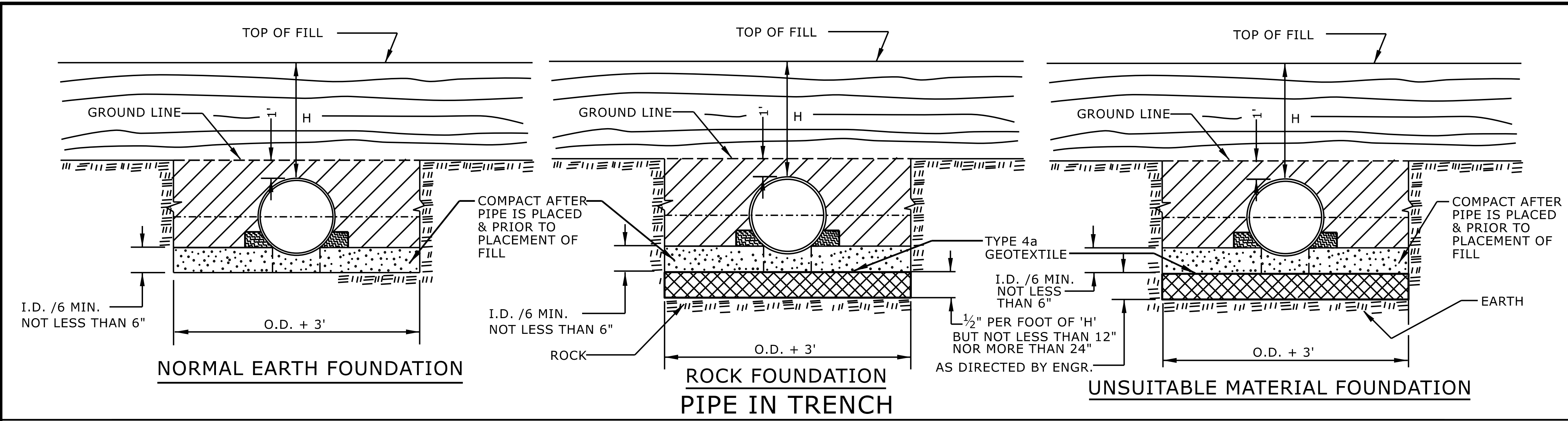
TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9

-Y3- STA. 10+46.57 TO -Y3- STA. 11+35.00



REVISIONS



GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

APPROVED SUITABLE LOCAL MATERIAL.
 TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
 LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

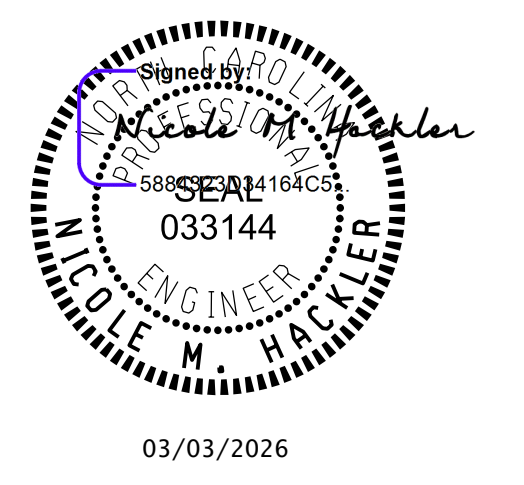
DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

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

SPRINGLINE OF PIPE
 SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.
 UNDISTURBED EARTH MATERIAL
 SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

ROADWAY DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 FLEXIBLE PIPE



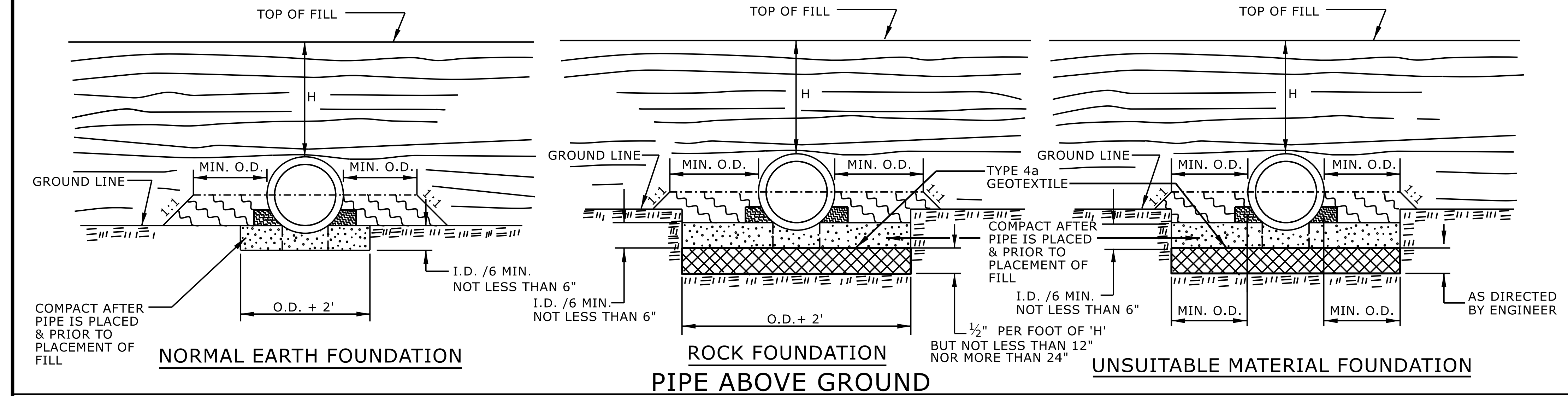
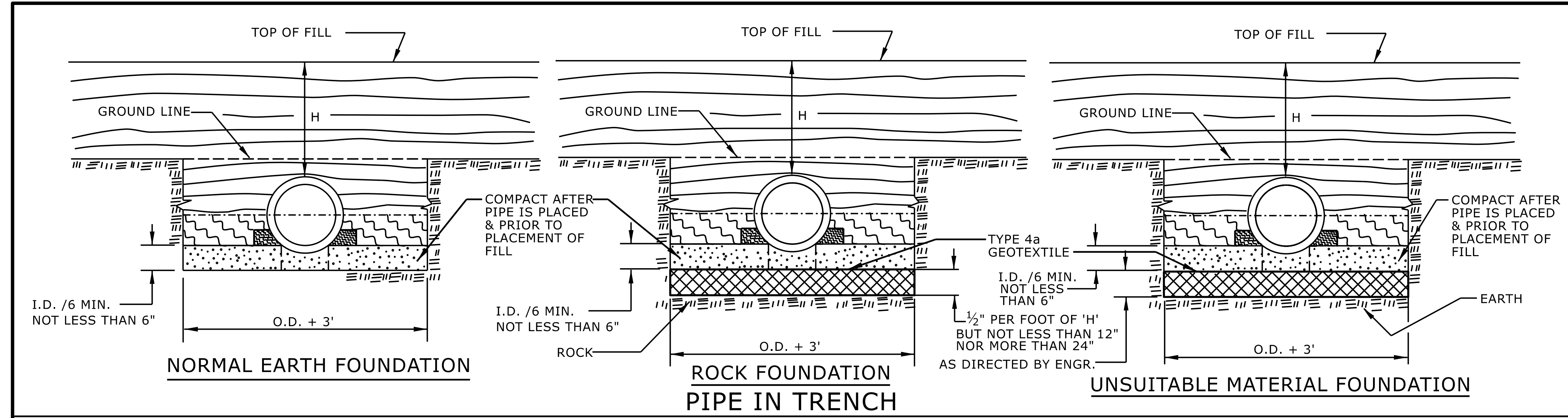
SHEET 1 OF 2
300.01

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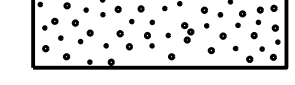
CONTRACTS STANDARDS AND DEVELOPMENT UNIT
 Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

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

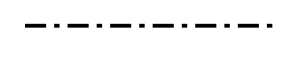

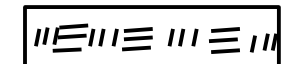
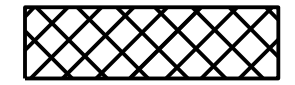


GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

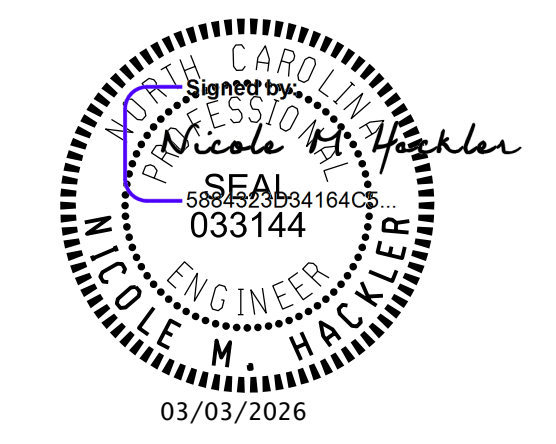
-  APPROVED SUITABLE LOCAL MATERIAL.
-  TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
-  LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

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

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

-  SPRINGLINE OF PIPE
-  SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.
-  UNDISTURBED EARTH MATERIAL
-  SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.
 ROADWAY DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 RIGID PIPE



SHEET 2 OF 2
300.01

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

SEE TITLE BLOCK

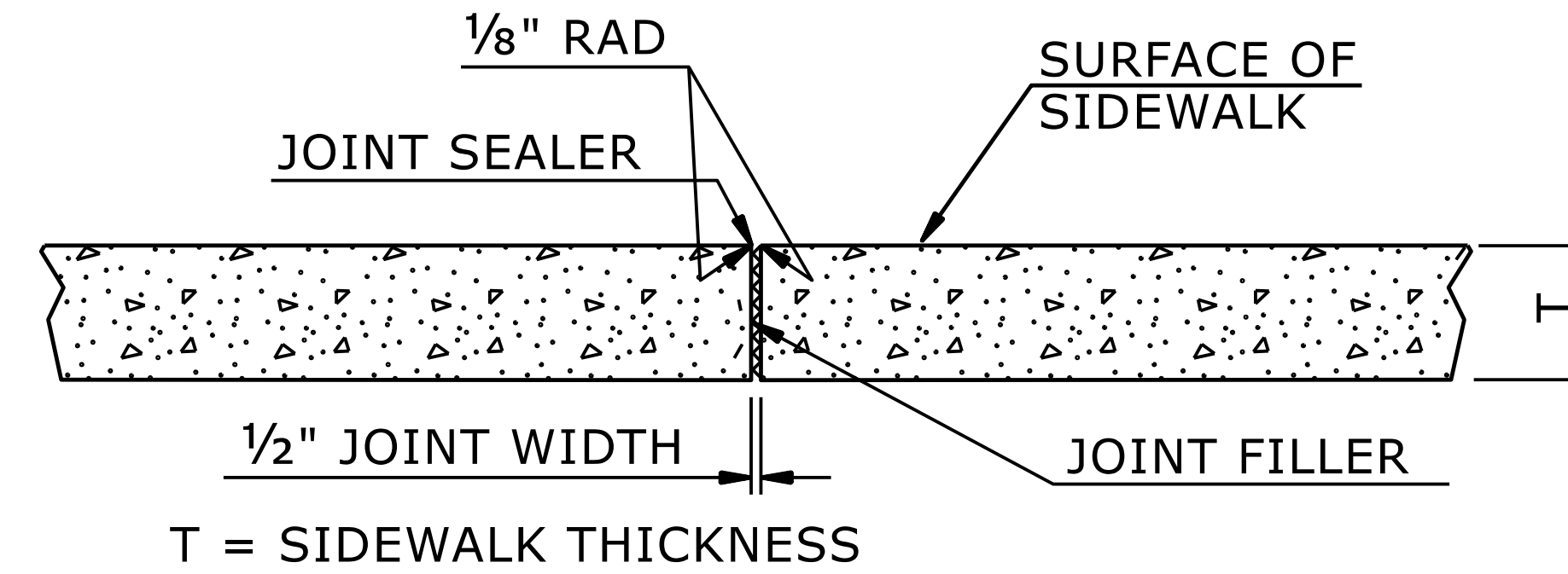
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 MODIFIED BY: DATE: _____
 CHECKED BY: DATE: _____
 FILE SPEC.: _____

NOTES:

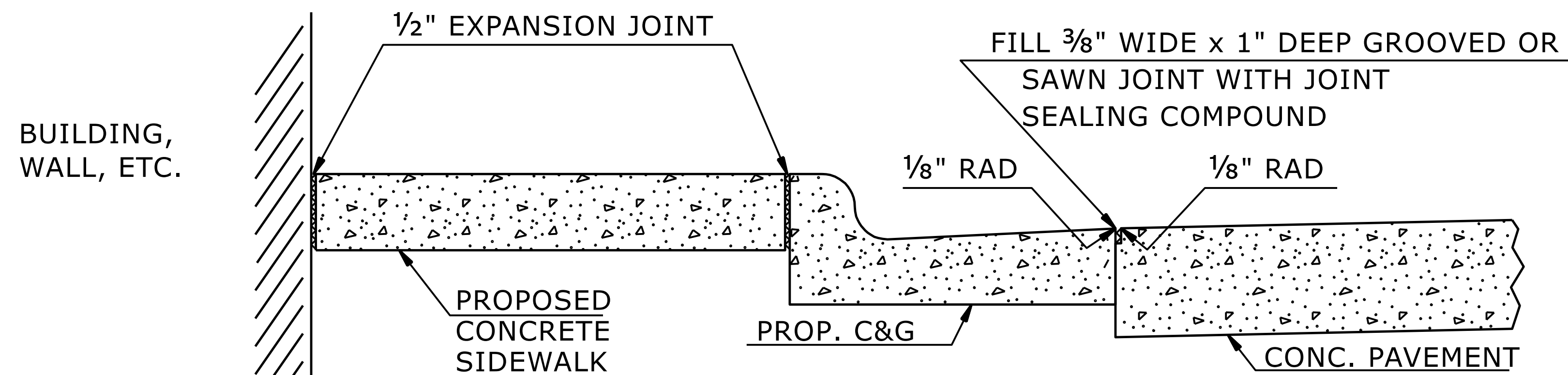
CONSTRUCT STANDARD SIDEWALK 5' WIDE AND 4" THICK UNLESS OTHERWISE DENOTED ON PLANS.

PLACE A GROOVE JOINT 1" DEEP WITH 1/8" RADII IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE 1/2" EXPANSION JOINT WILL BE REQUIRED AT 50' INTERVALS. A 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.

SEE STD. DWG. 848.06 FOR CURB RAMP LOCATION REQUIREMENTS AND CONSTRUCTION GUIDELINES.



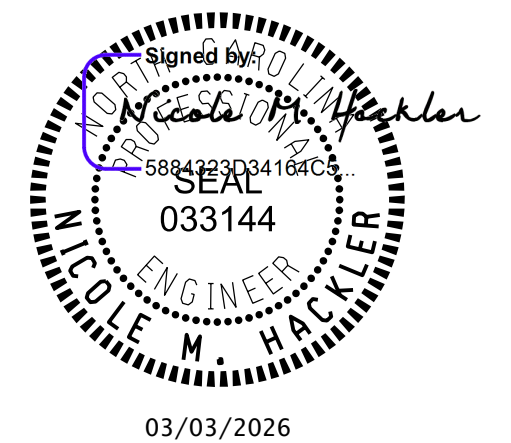
TRANSVERSE EXPANSION JOINT
IN SIDEWALK



DETAILS SHOWING JOINTS IN CONCRETE SIDEWALK

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

ROADWAY DETAIL DRAWING FOR
CONCRETE SIDEWALK



SHEET 1 OF 1

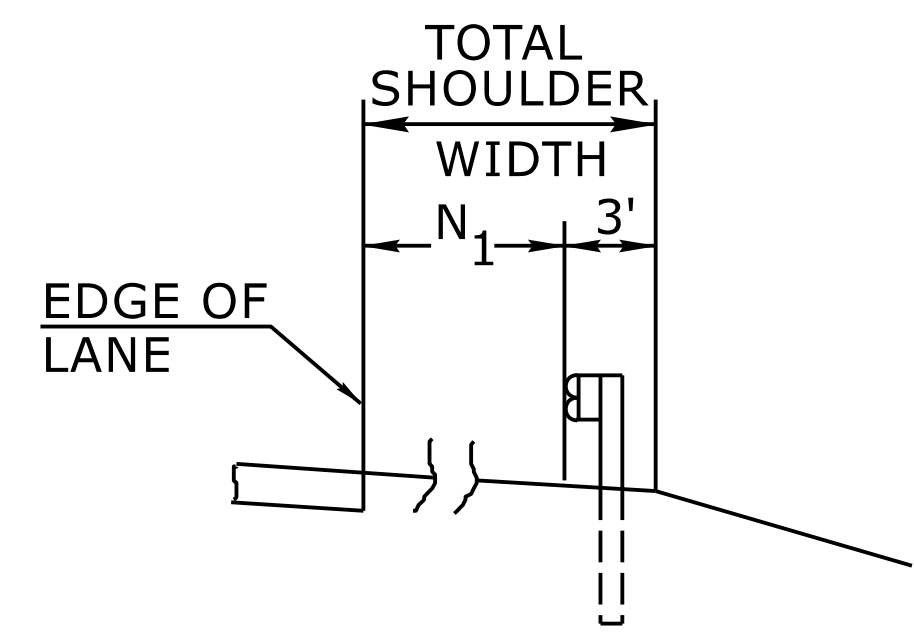
848D01

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UNLESS ALL SIGNATURES COMPLETED

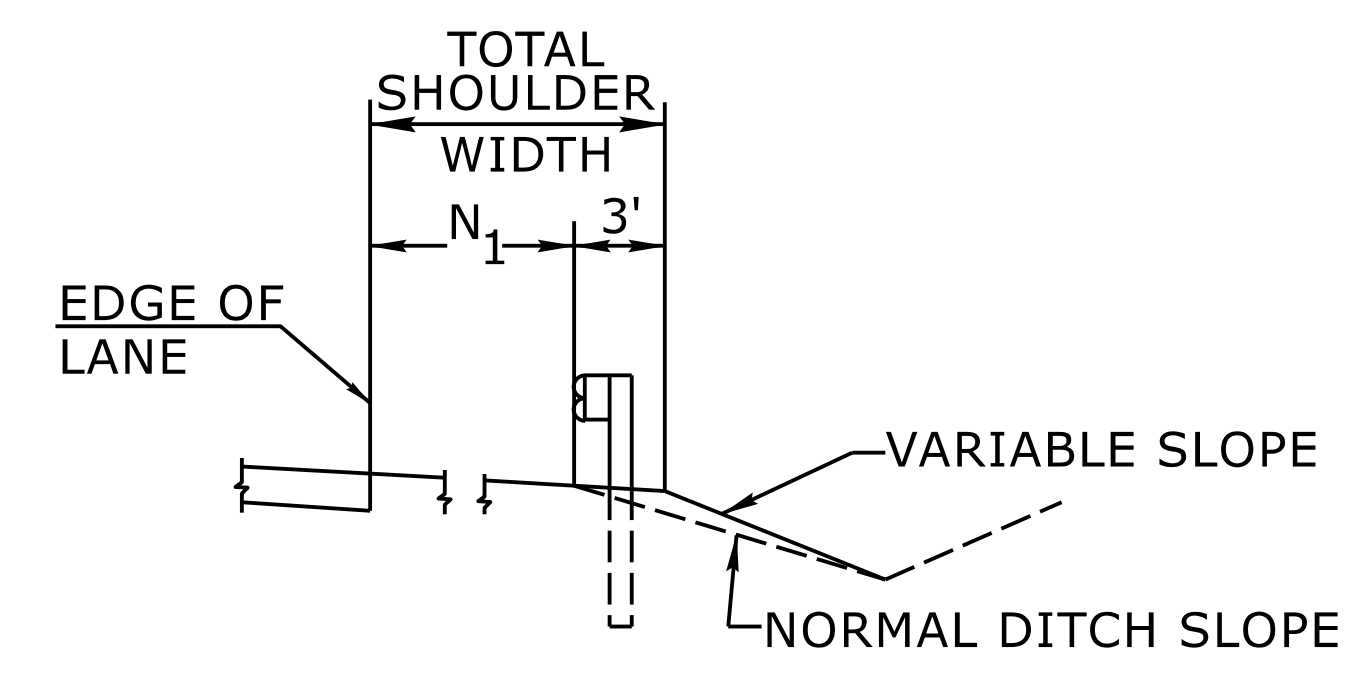
**CONTRACTS STANDARDS
AND DEVELOPMENT UNIT**
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

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

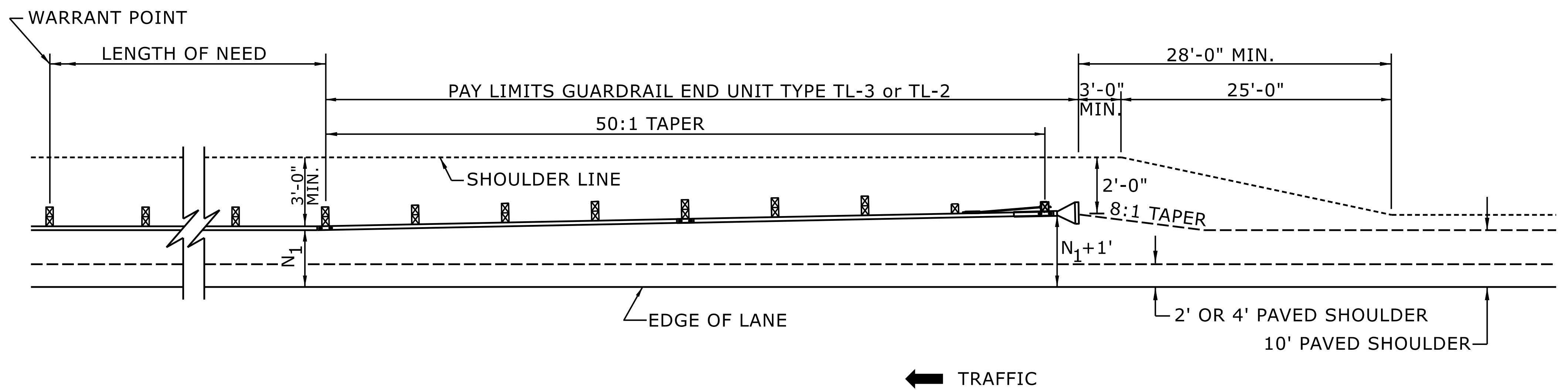


FILL SECTION



CUT SECTION

"N₁" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.

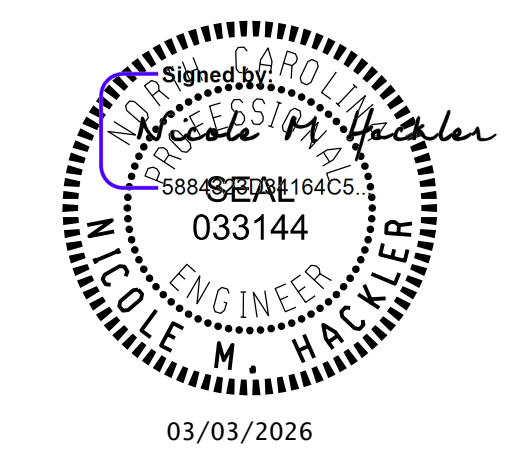


FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT



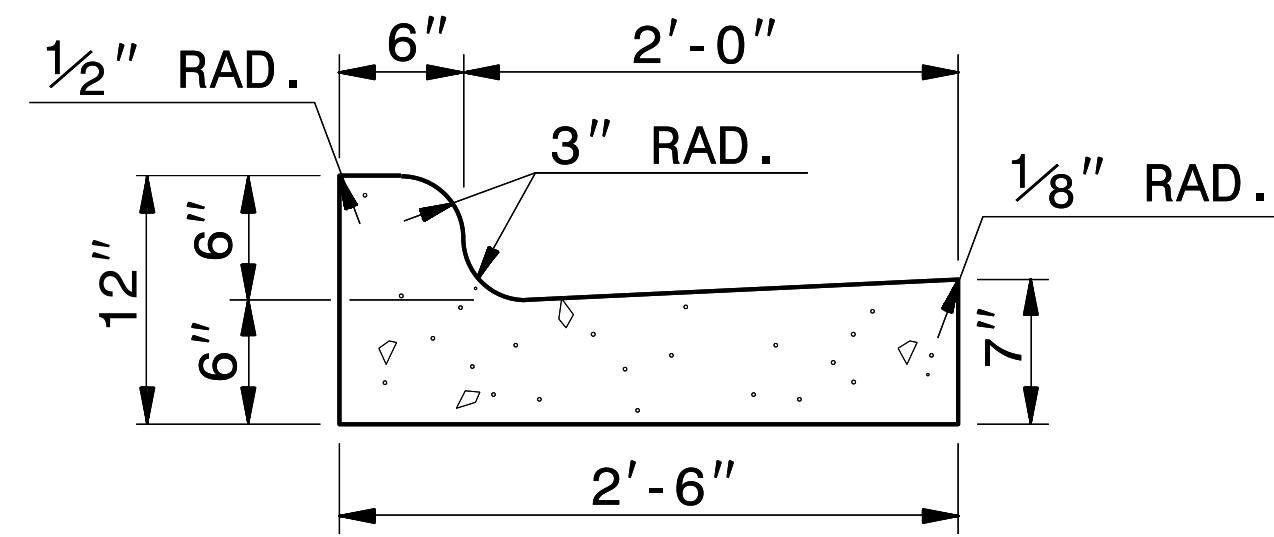
SHEET 6 OF 15
862D01

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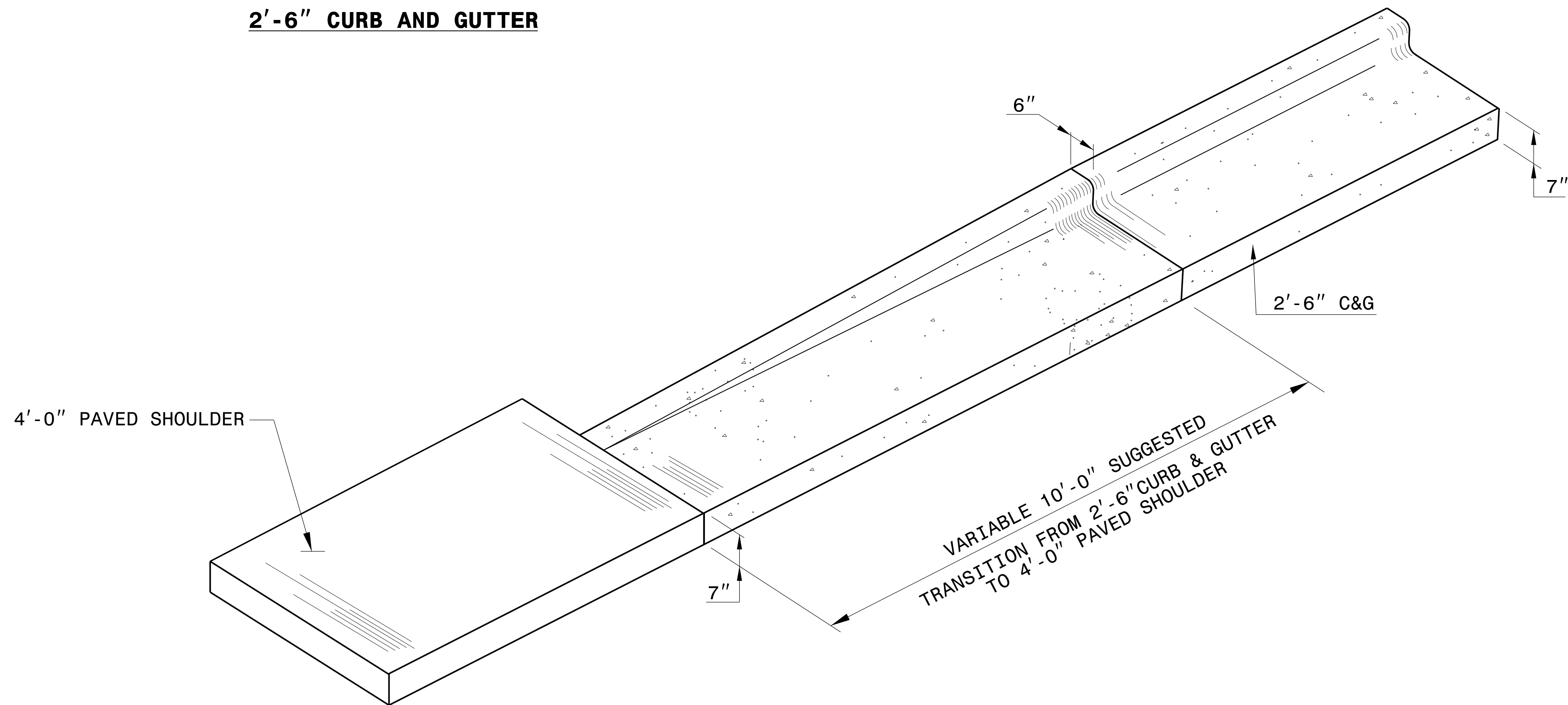
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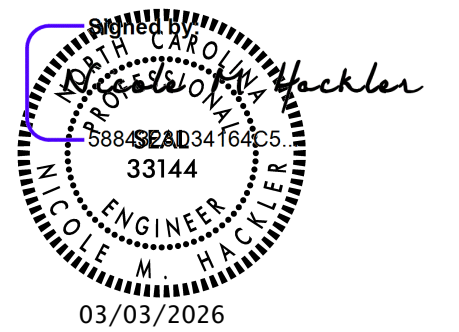


2'-6" CURB AND GUTTER

***NOTE: SEE STD. DWG. 846.01 FOR GENERAL NOTES**



ISOMETRIC VIEW OF TRANSITION



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

**DETAIL OF 10' TRANSITION
FROM 2'-6" CURB & GUTTER
TO 4'-0" PAVED SHOULDER**

ORIGINAL BY: _____ DATE: _____
 MODIFIED BY: rnbritt DATE: 04-13-2016
 CHECKED BY: _____ DATE: _____
 FILE SPEC: details/nbritt/english/misc/c&g_transition_sections.dgn

5/14/99
 I:\MAR-2020\1425
 S:\Contracts\Special Details\english\misc\c&g_transition_sections.dgn
 J:\overton AT USD-320965

\$\$\$\$\$SYTIME\$\$\$\$\$
 \$\$\$USER\$\$\$\$\$

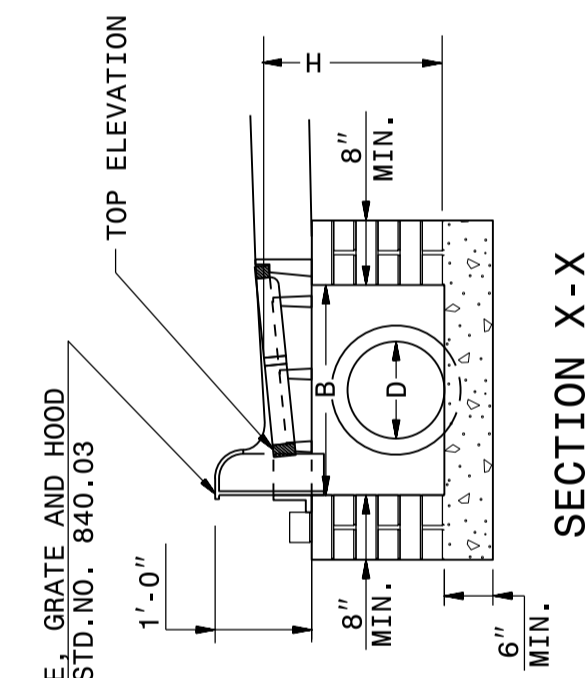
5/14/99

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

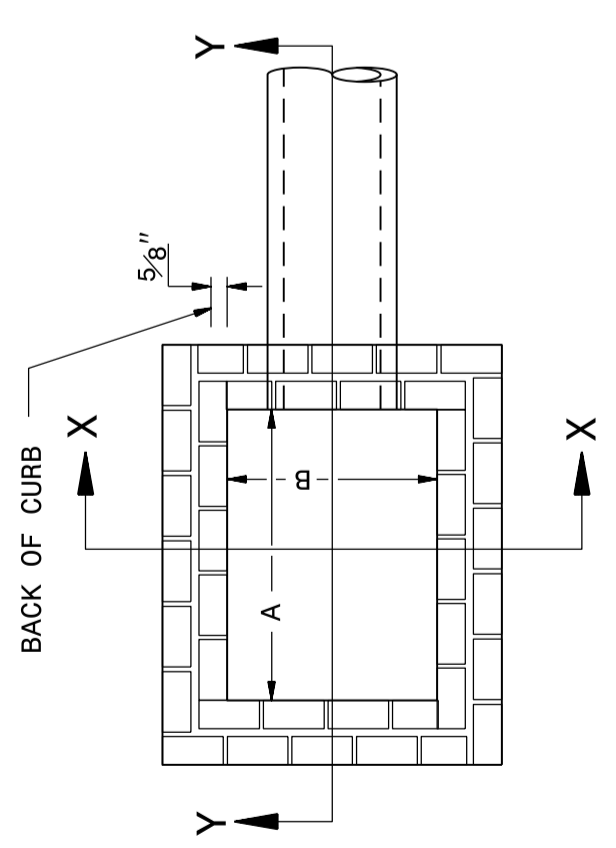
ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH BRICK CATCH BASIN
 12" THRU 24" PIPE

SHEET 1 OF 1
840D01

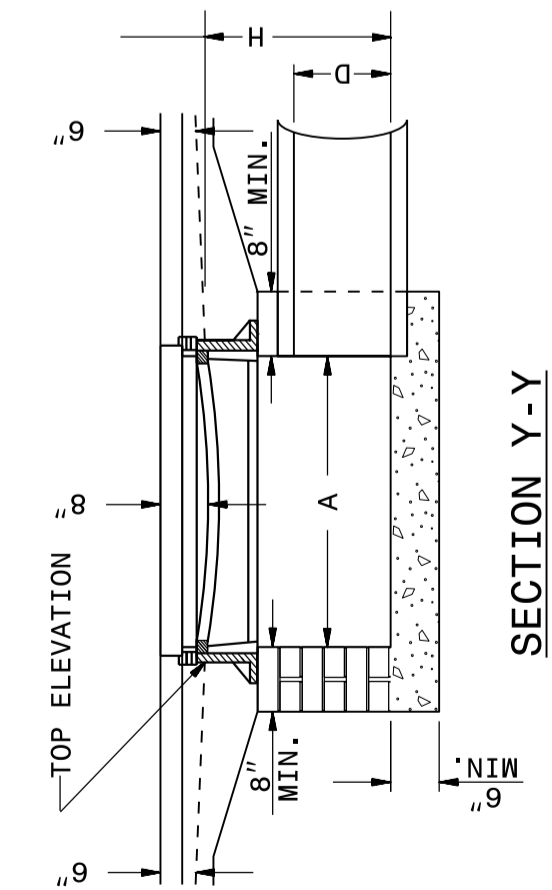
GENERAL NOTES:
 MORTAR JOINTS 1/2" TO 1/8" THICK.
 USE CLASS "B" CONCRETE THROUGHOUT.
 USE FORMS FOR CONSTRUCTION OF THE BOTTOM SLAB.
 DEDUCT FOR PIPE(S) FROM TOTAL CU. YDS. OF BRICK MASONRY.
 USE TYPE "E", "F", AND "G" GRATES UNLESS OTHERWISE INDICATED.
 USE BRICK OR CONCRETE BLOCK WHICH COMPLIES WITH THE REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.
 IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
 CONSTRUCT WITH PIPE CROWNS MATCHING.
 CHAMFER ALL EXPOSED CORNERS 1".
 DRAWING NOT TO SCALE.



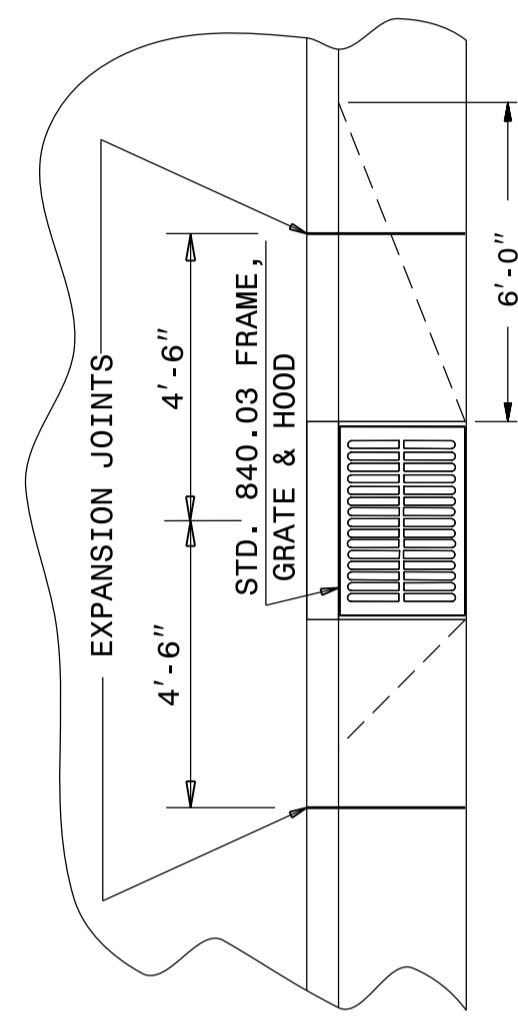
SECTION X-X



PLAN

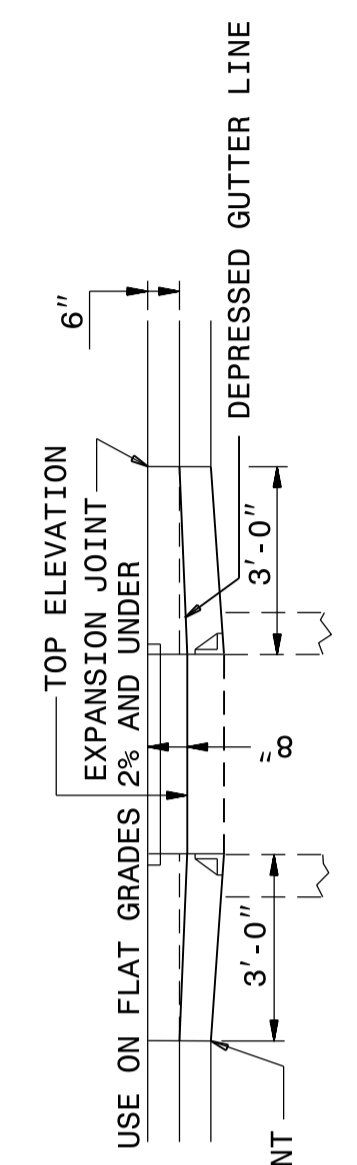


SECTION Y-Y



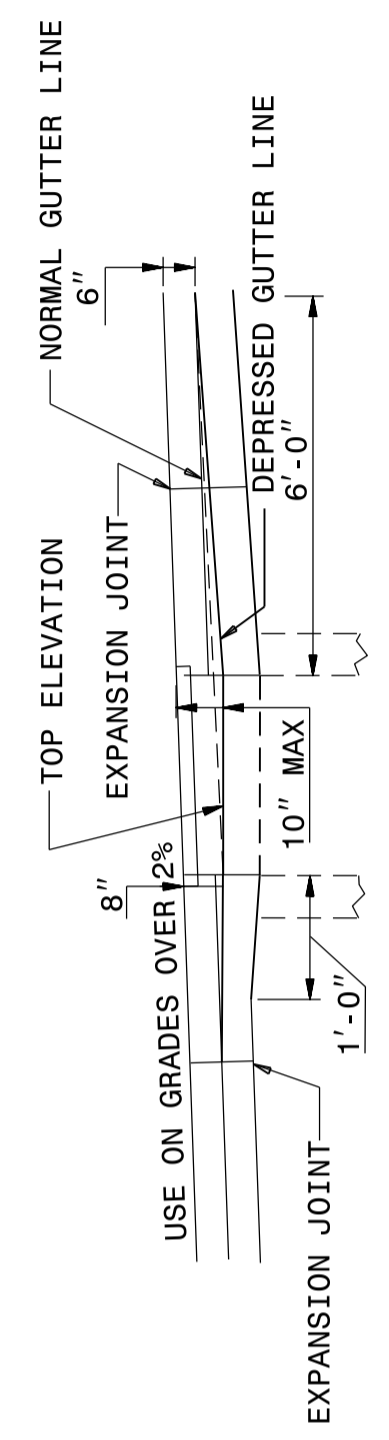
PLAN

CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES



ELEVATION

NORMAL CURB AND GUTTER ON LIGHT GRADES



ELEVATION

NORMAL CURB AND GUTTER ON STEEP GRADES

MINIMUM DIMENSIONS AND QUANTITIES FOR BRICK CATCH BASIN								
PIPE D	DIMENSIONS OF BOX AND PIPE		TOTAL BOTTOM SLAB CONC.	TOTAL BRICK MASONRY IN WALLS	TOTAL BRICK AND CONCRETE	DEDUCTIONS ONE PIPE		
	SPAN A	WIDTH B					HEIGHT H	C. M.
12"	3'-0"	2'-2"	2'-0"	0.281	0.481	0.762	0.020	0.042
15"	3'-0"	2'-2"	2'-3"	0.281	0.843	0.562	0.031	0.047
18"	3'-0"	2'-2"	2'-6"	0.281	0.642	0.923	0.044	0.065
24"	3'-0"	2'-2"	3'-1"	0.281	0.828	1.109	0.078	0.121

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

ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH BRICK CATCH BASIN
 12" THRU 24" PIPE

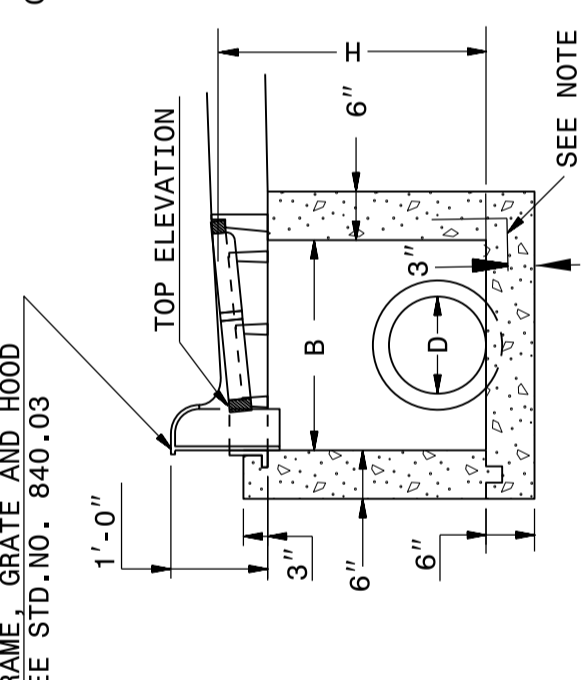
SHEET 1 OF 1
840D01

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

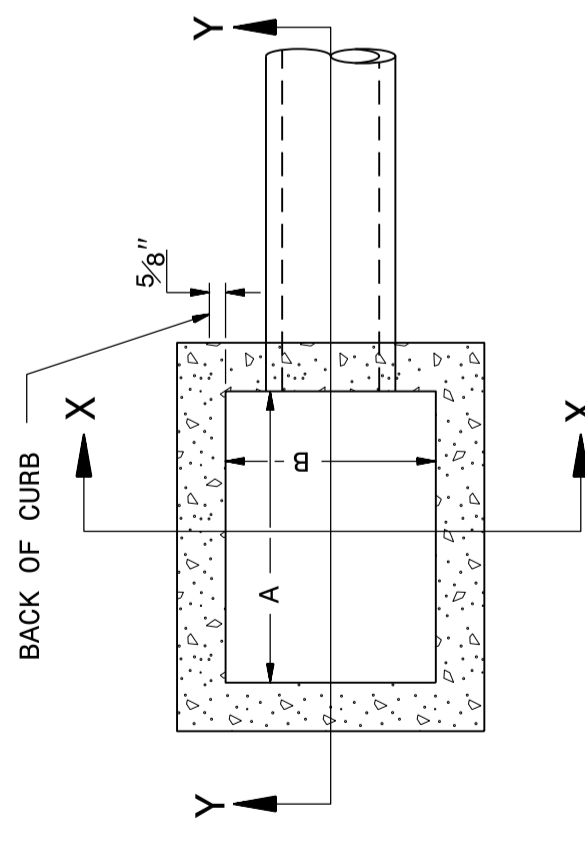
ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH CONCRETE CATCH BASIN
 12" THRU 24" PIPE

SHEET 1 OF 1
840D02

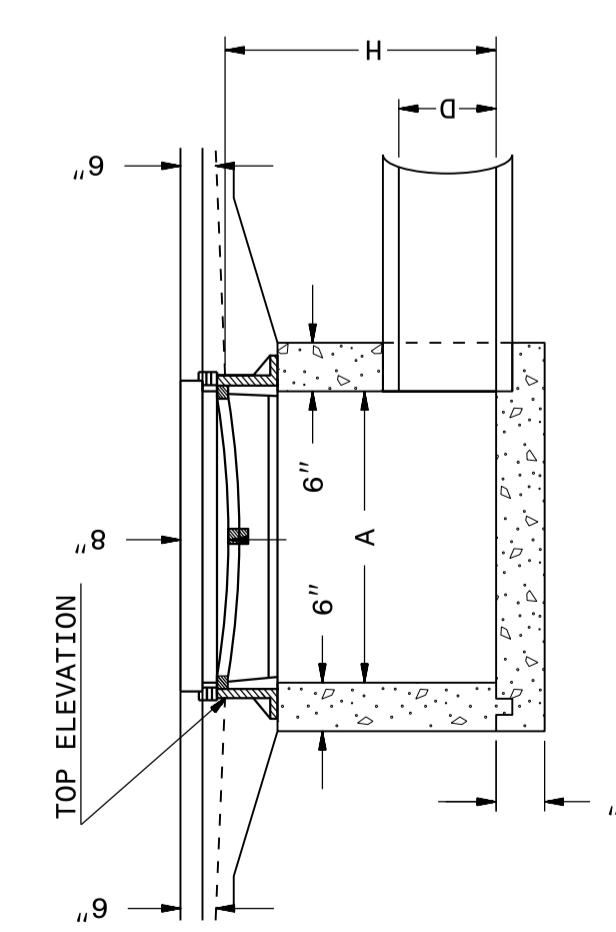
GENERAL NOTES:
 USE CLASS "B" CONCRETE THROUGHOUT.
 OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
 USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
 IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
 USE TYPE "E", "F", AND "G" GRATES UNLESS OTHERWISE INDICATED.
 CONSTRUCT WITH PIPE CROWNS MATCHING.
 CHAMFER ALL EXPOSED CORNERS 1".
 DRAWING NOT TO SCALE.



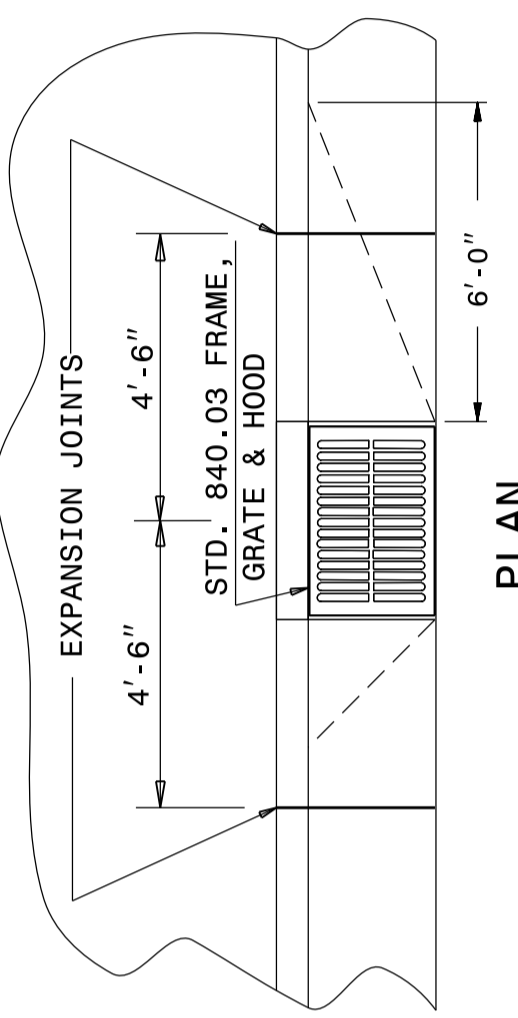
SECTION X-X



PLAN

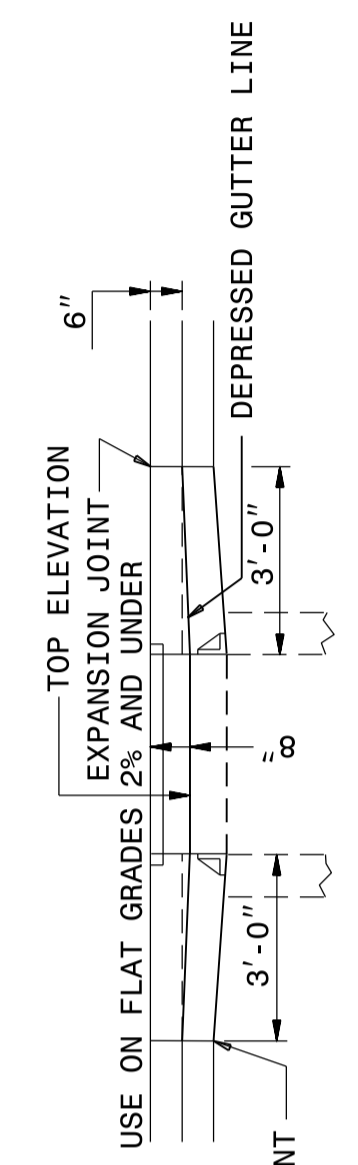


SECTION Y-Y



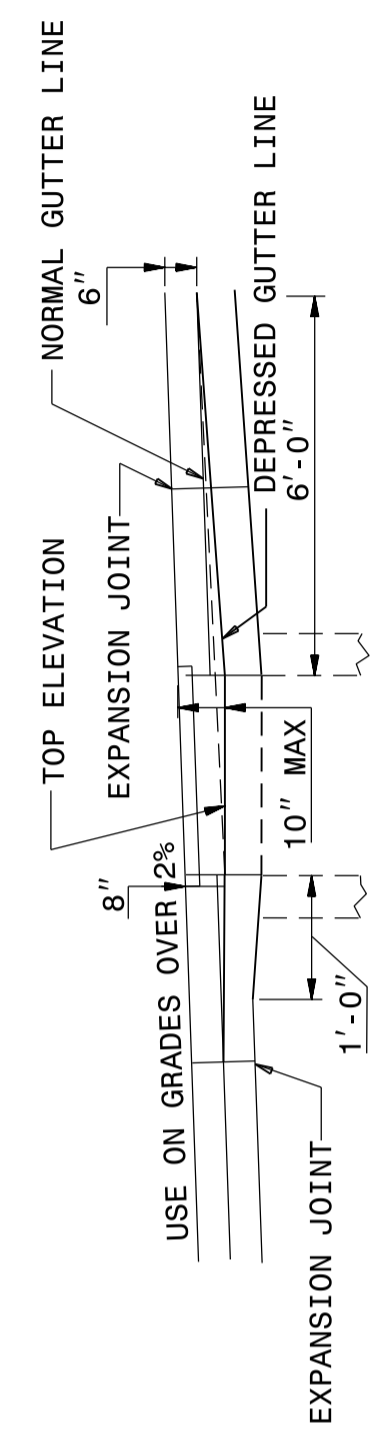
PLAN

CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES



ELEVATION

NORMAL CURB AND GUTTER ON LIGHT GRADES



ELEVATION

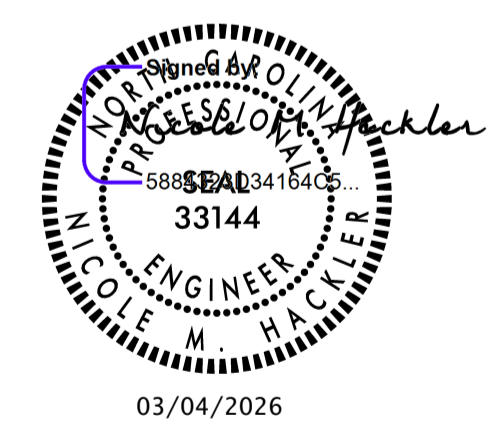
NORMAL CURB AND GUTTER ON STEEP GRADES

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN							
PIPE D	DIMENSIONS OF BOX AND PIPE		TOTAL BOTTOM SLAB CONC.	TOTAL CONCRETE IN WALLS	TOTAL CONCRETE	DEDUCTIONS ONE PIPE	
	SPAN A	WIDTH B					HEIGHT H
12"	3'-0"	2'-2"	2'-0"	0.343	0.578	0.015	0.026
15"	3'-0"	2'-2"	2'-3"	0.400	0.635	0.023	0.036
18"	3'-0"	2'-2"	2'-6"	0.457	0.692	0.033	0.049
24"	3'-0"	2'-2"	3'-1"	0.590	0.825	0.059	0.085

STATE OF NORTH CAROLINA
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ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH CONCRETE CATCH BASIN
 12" THRU 24" PIPE

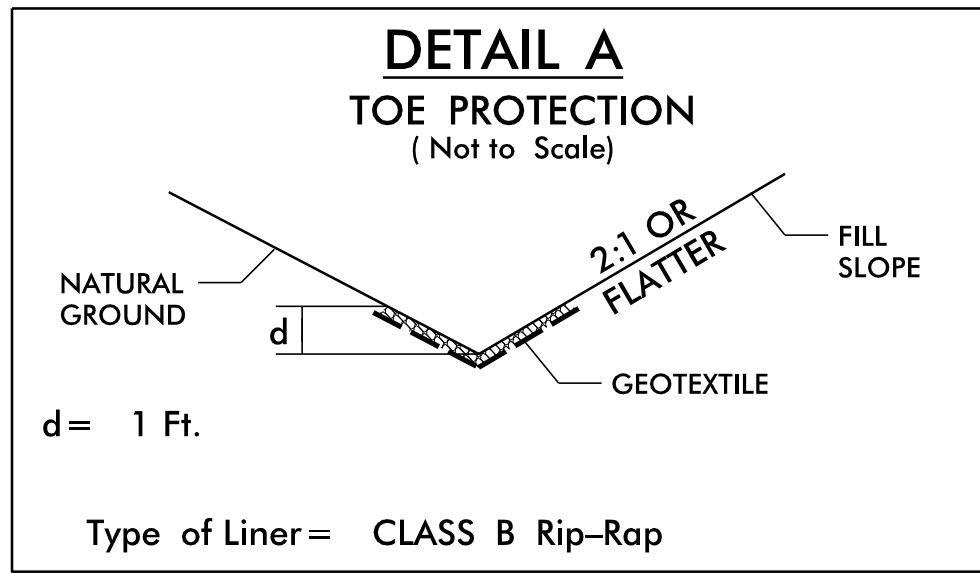
SHEET 1 OF 1
840D02



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

SEE PLATE FOR TITLE

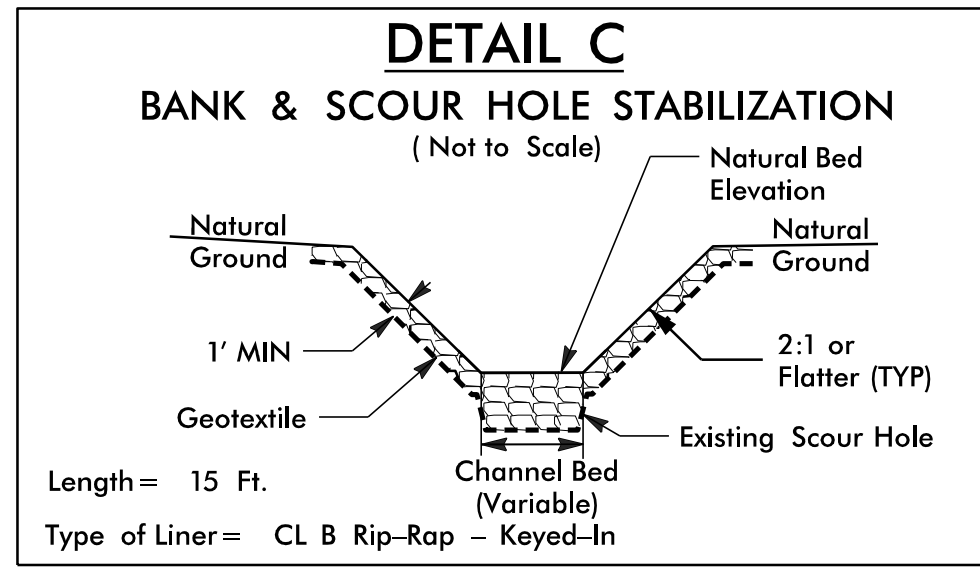
ORIGINAL BY: 2002 STD. 840.01 DATE: _____
 MODIFIED BY: E. E. WARD DATE: 3-1-02
 CHECKED BY: _____ DATE: _____
 FILE SPEC.: s:details/stand/840d01.dgn



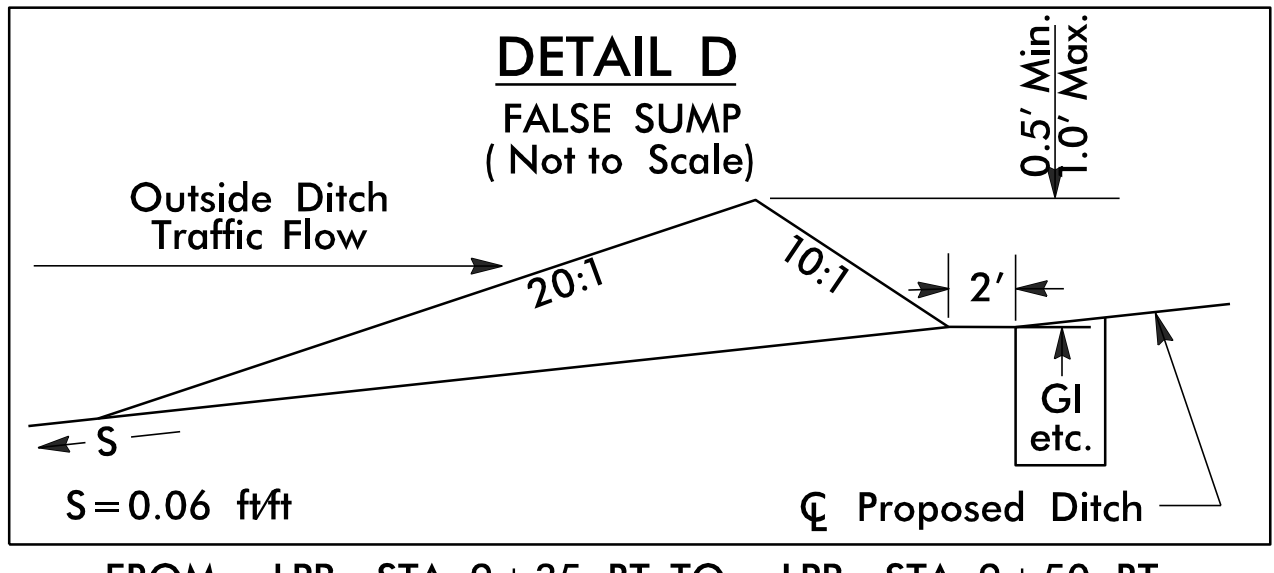
FROM -LPCA- STA. 10+40 LT TO -L- STA. 19+00 LT
 EST. 100 TONS CLASS B RIP RAP
 EST. 222 SY GEOTEKSTILE

FROM -RPC- STA. 13+00 RT TO -RPC- STA. 13+60 RT
 EST. 38.5 TONS CLASS B RIP RAP
 EST. 86 SY GEOTEKSTILE

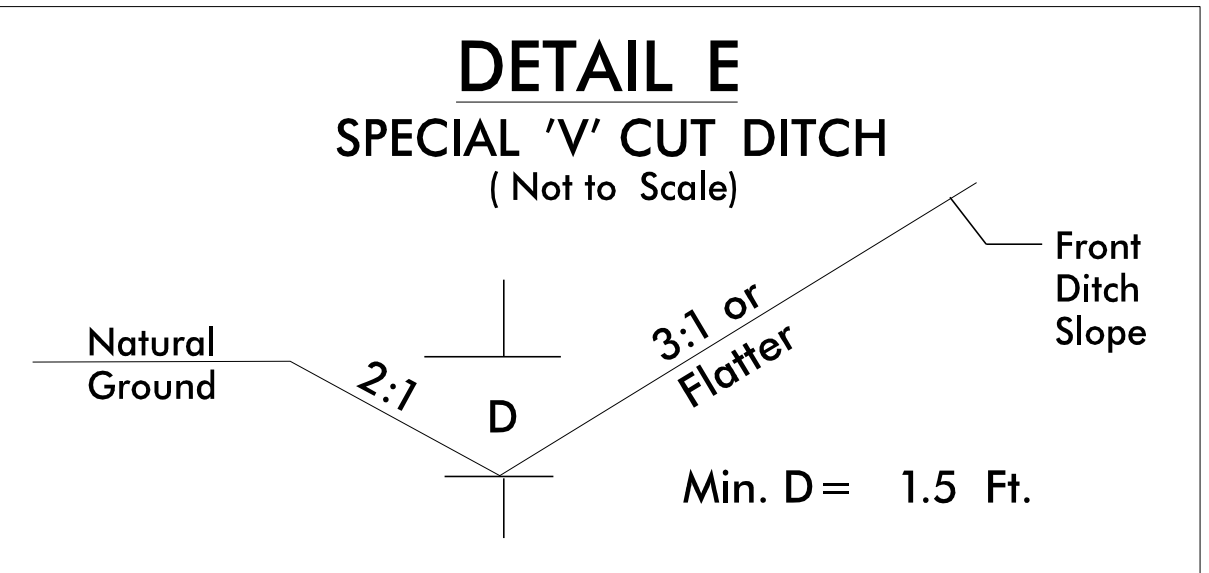
FROM -RPB- STA. 14+00 LT TO -RPB- STA. 14+45 LT
 EST. 40 TONS CLASS B RIP RAP
 EST. 90 SY GEOTEKSTILE



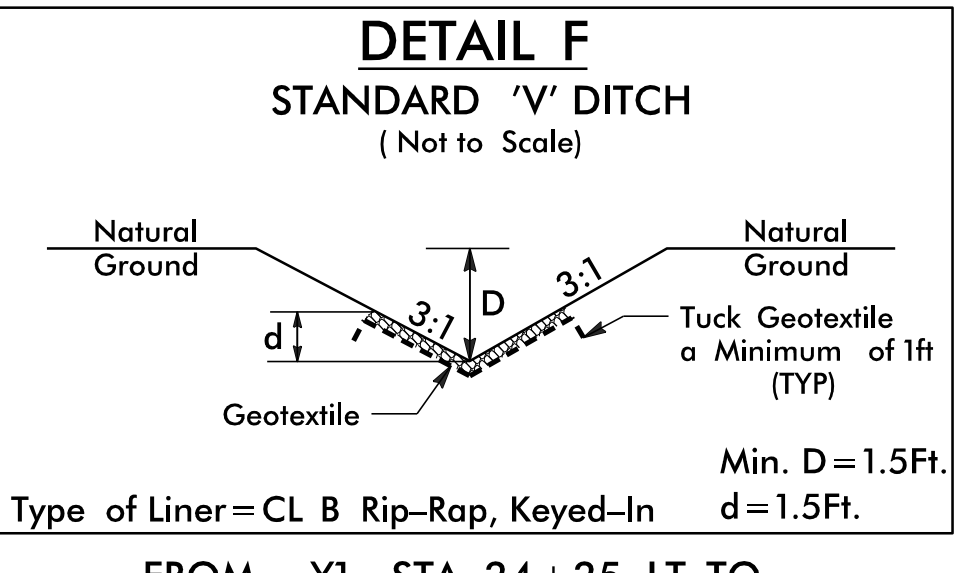
FROM -Y1- STA. 21+65 RT TO
 -Y1- STA. 21+80 RT
 EST. 100 TONS CLASS B RIP RAP
 EST. 225 SY GEOTEKSTILE



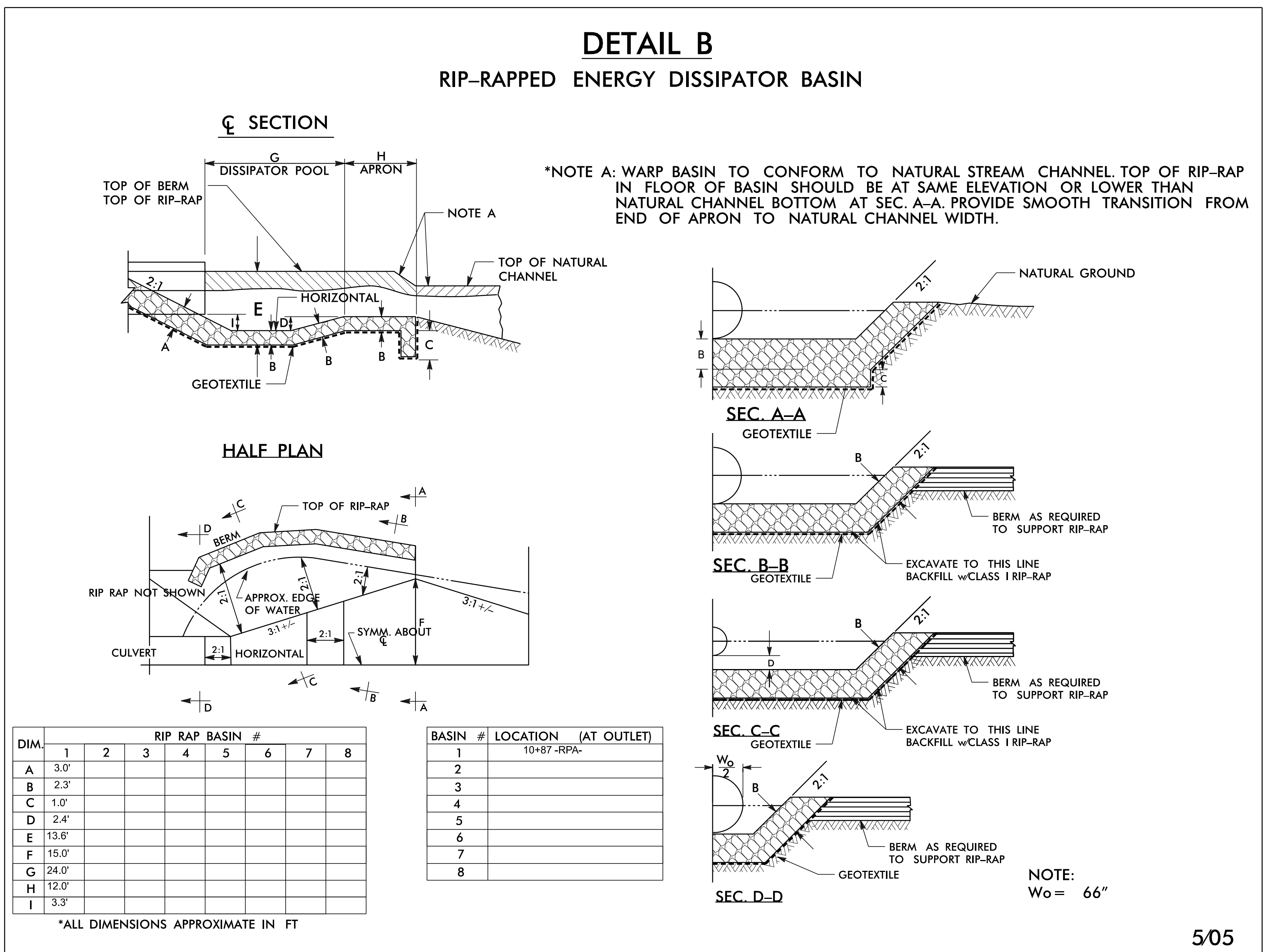
FROM -LPB- STA. 9+35 RT TO -LPB- STA. 9+50 RT



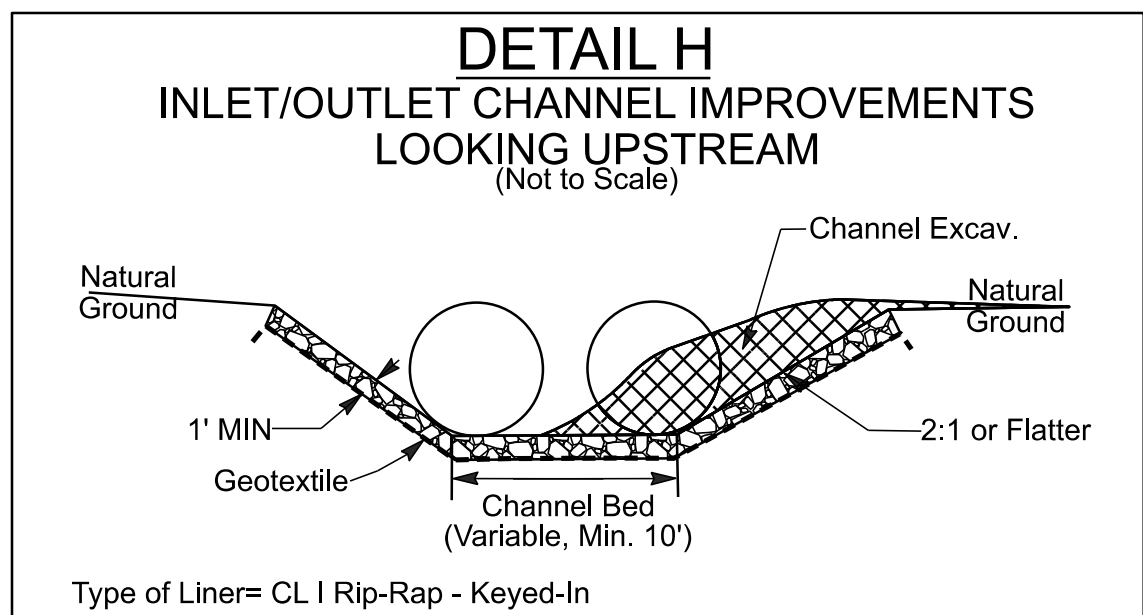
FROM -RPB- STA. 13+50 LT TO
 -RPB- STA. 14+10 LT



FROM -Y1- STA. 24+25 LT TO
 -Y1- STA. 26+50 LT
 EST. 102 TONS CLASS B RIP RAP
 EST. 225 SY GEOTEKSTILE

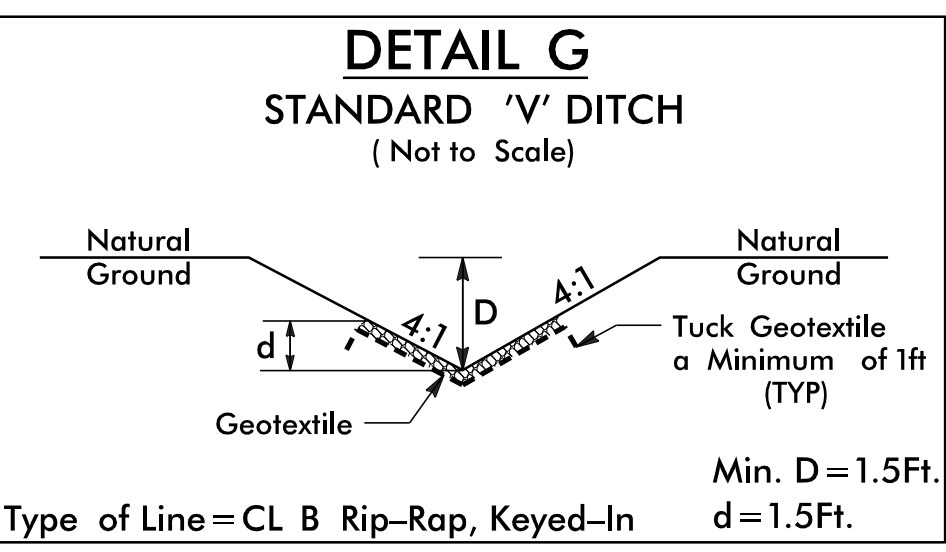


FROM -RPA- STA. 10+50 LT TO -RPA- STA. 10+90 LT

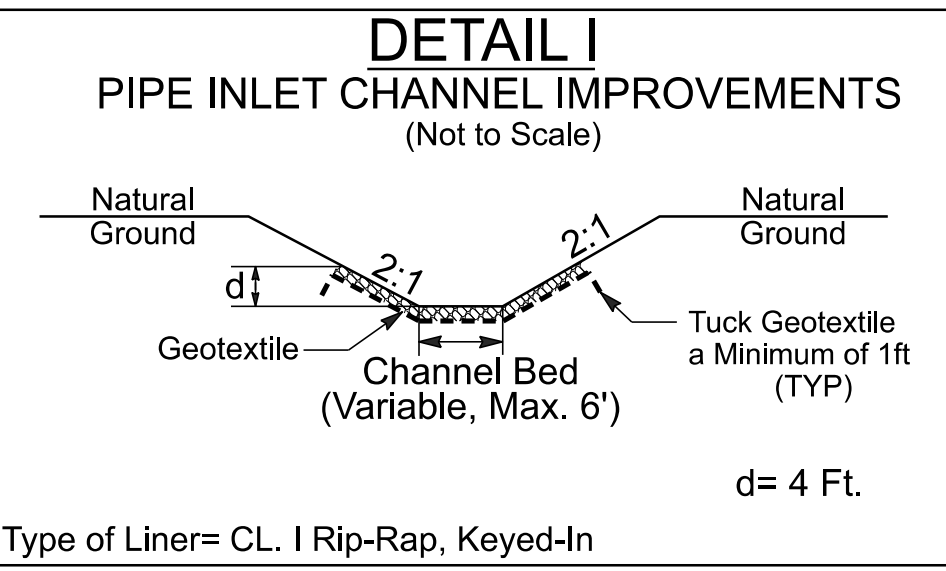


-Y1- STA. 21+55 OFFSET 82' RT
 EST. 25 TONS CLASS I RIP RAP
 EST. 52 SY GEOTEKSTILE
 EST. 24 CY EXCAVATION

-Y1- STA. 19+50 OFFSET 107' LT
 EST. 34 TONS CLASS I RIP RAP
 EST. 72 SY GEOTEKSTILE
 EST. 13 CY EXCAVATION



FROM -Y1- STA. 25+00 RT TO
 -Y1- STA. 28+25 RT
 EST. 195 TONS CLASS B RIP RAP
 EST. 434 SY GEOTEKSTILE



-Y1- STA. 28+40 OFFSET 115' RT
 EST. 15 TONS CLASS I RIP RAP
 EST. 25 SY GEOTEKSTILE
 EST. 20 CY EXCAVATION

REVISIONS

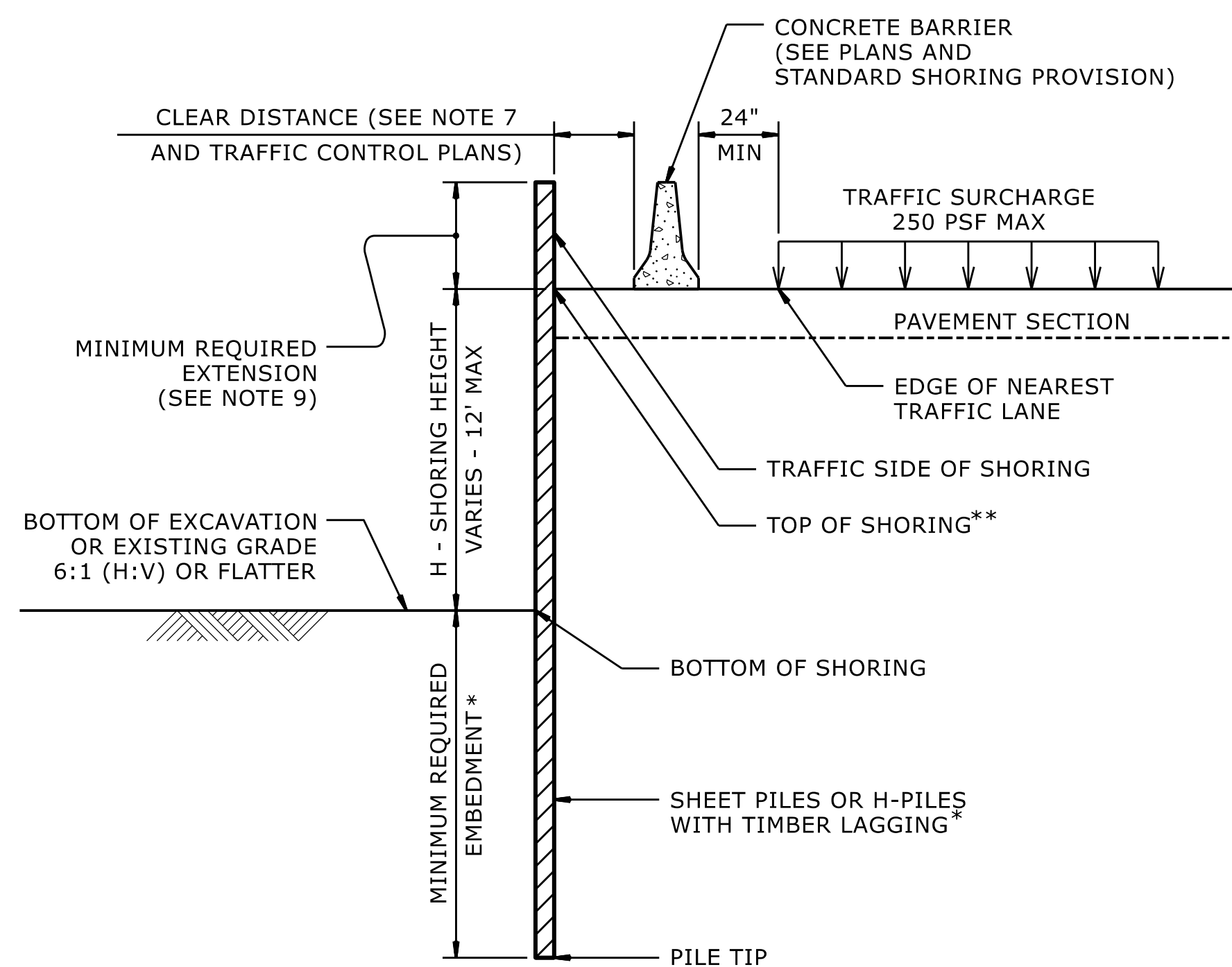
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN ⁴ /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN ⁴ /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 "--".

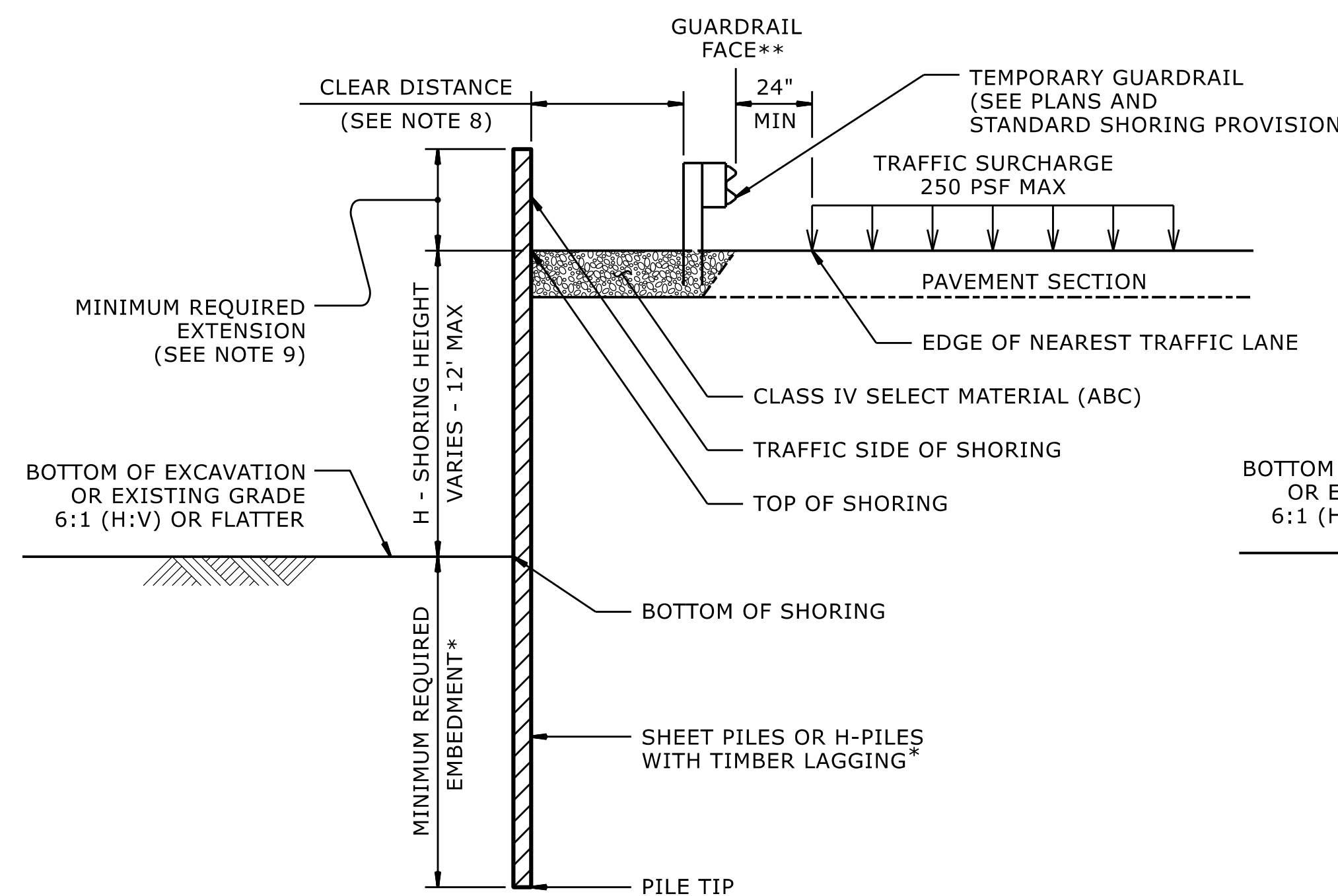
NOTES:

- 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
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



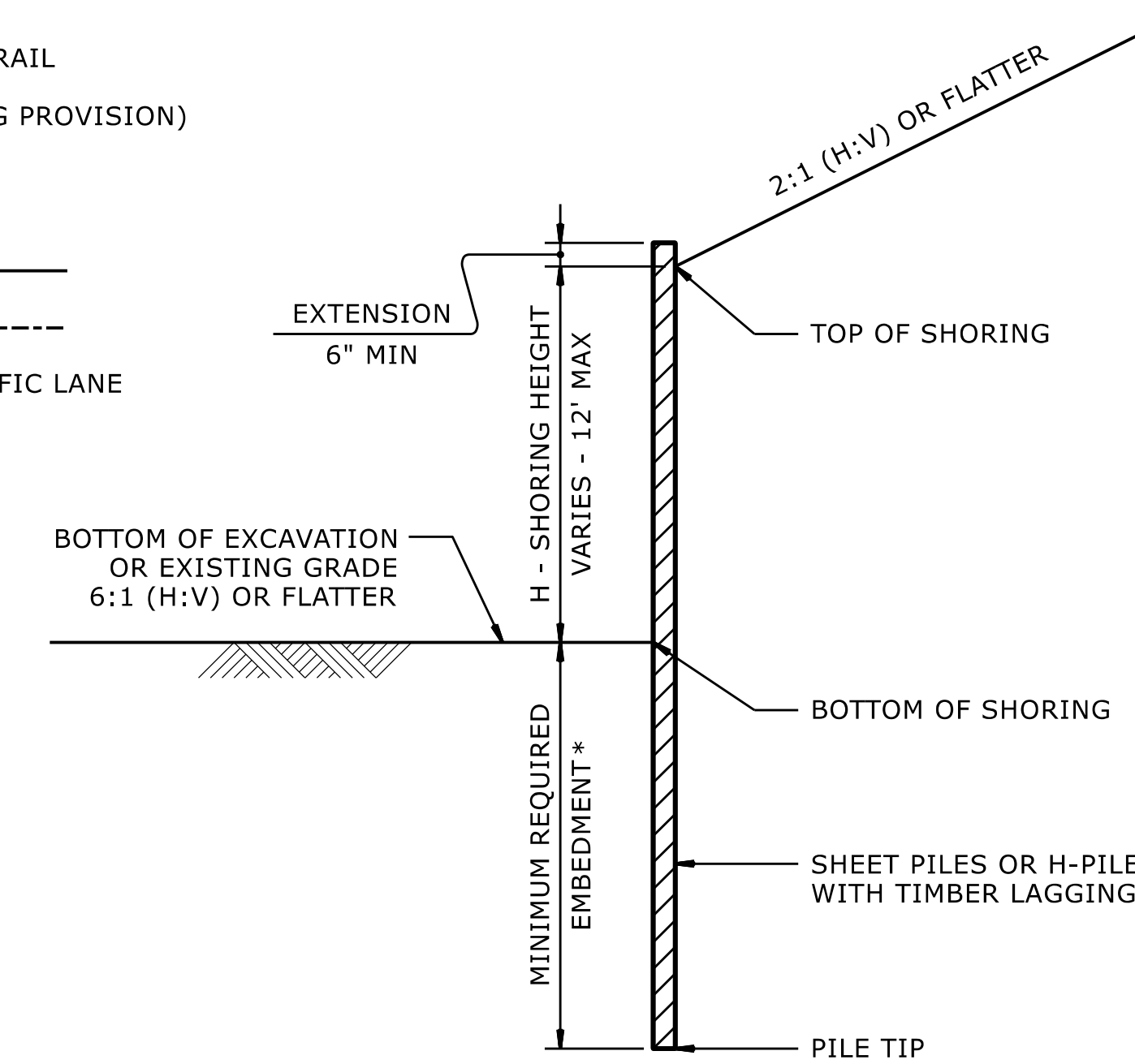
CONCRETE BARRIER

**TOP OF SHORING =
EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE =
EDGE OF PAVEMENT

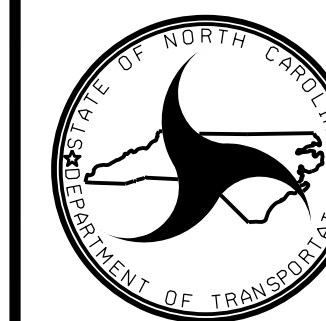


STANDARD TEMPORARY SHORING

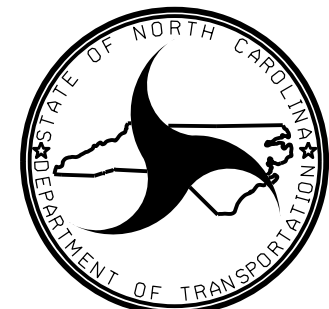
(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.



GEOTECHNICAL STANDARD DETAIL FOR
TEMPORARY SHORING



GEOTECHNICAL ENGINEERING UNIT

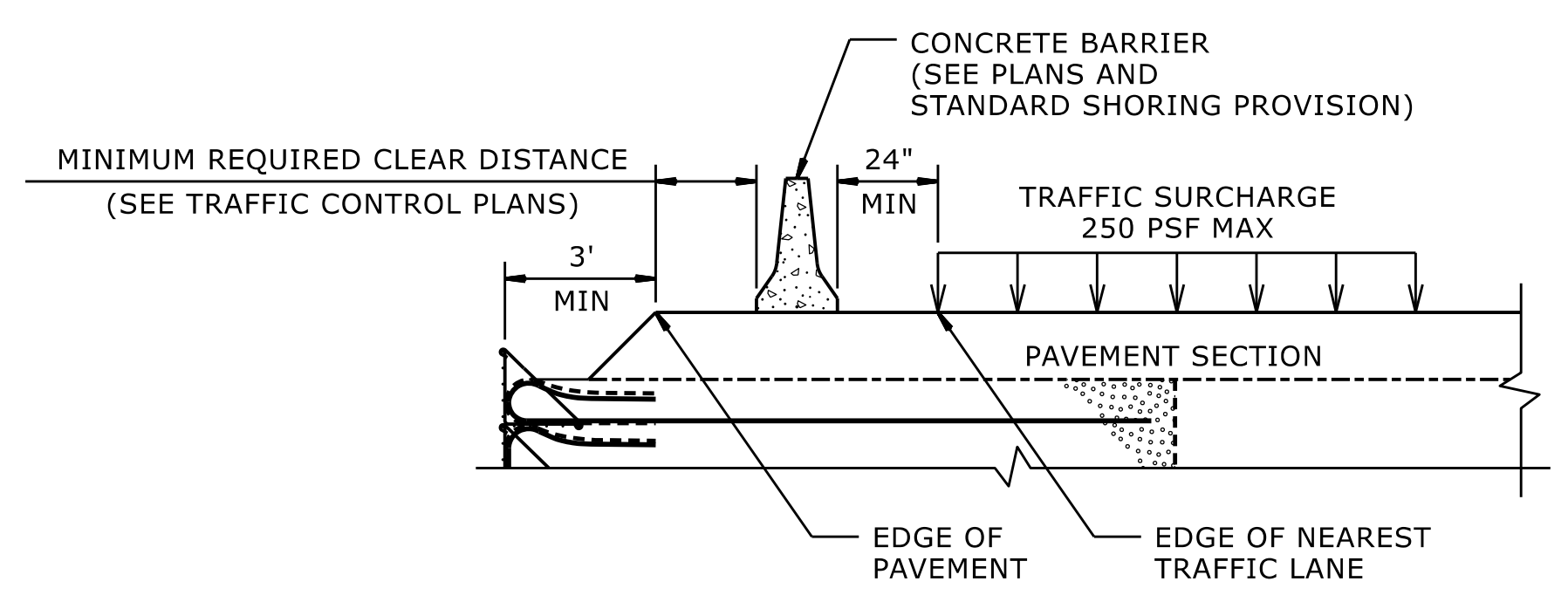
GEOTECHNICAL ENGINEER

DocuSigned by: Scott A. HIDDEN 02/2026

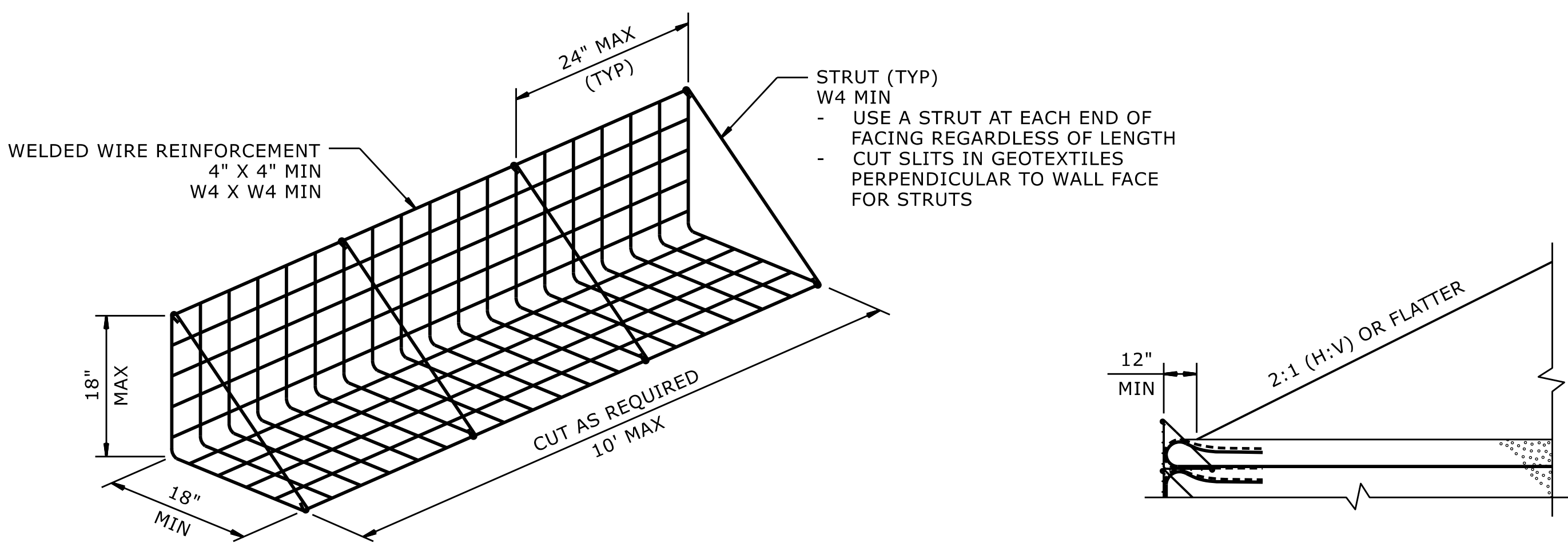


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STANDARD DETAIL NO. 1801.02

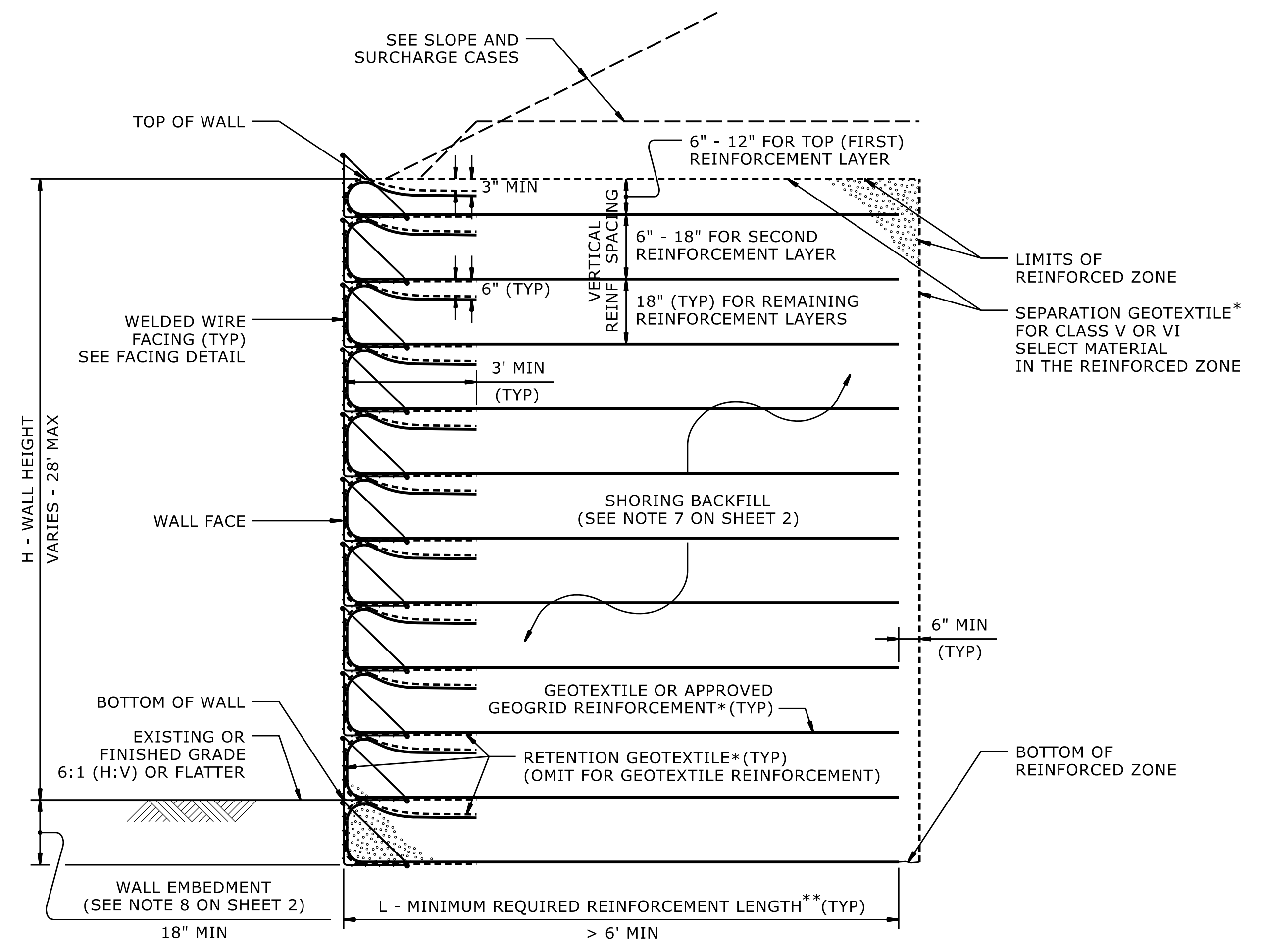


SURCHARGE CASE



FACING DETAIL

SLOPE CASE

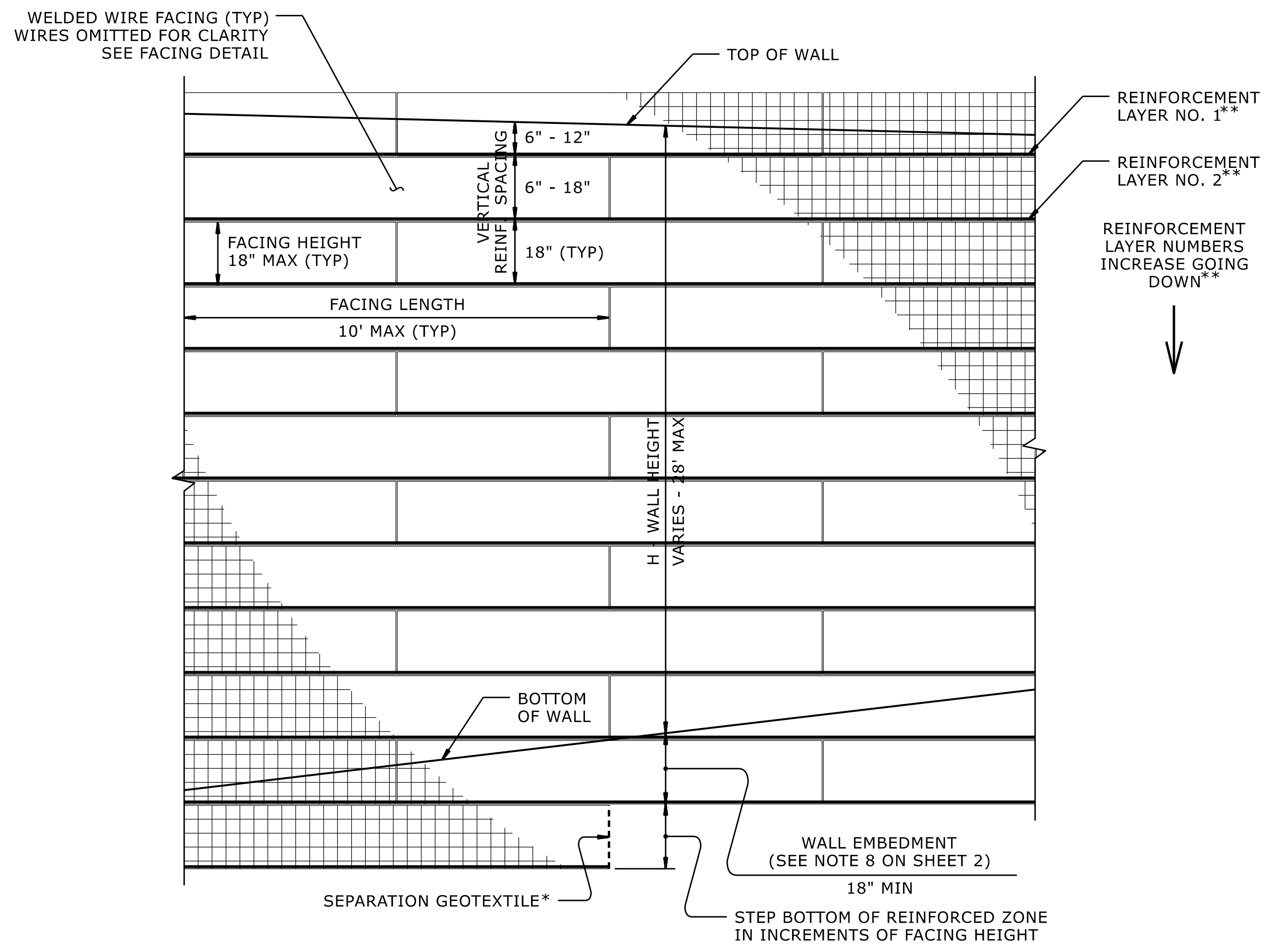


STANDARD TEMPORARY WALL

(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.

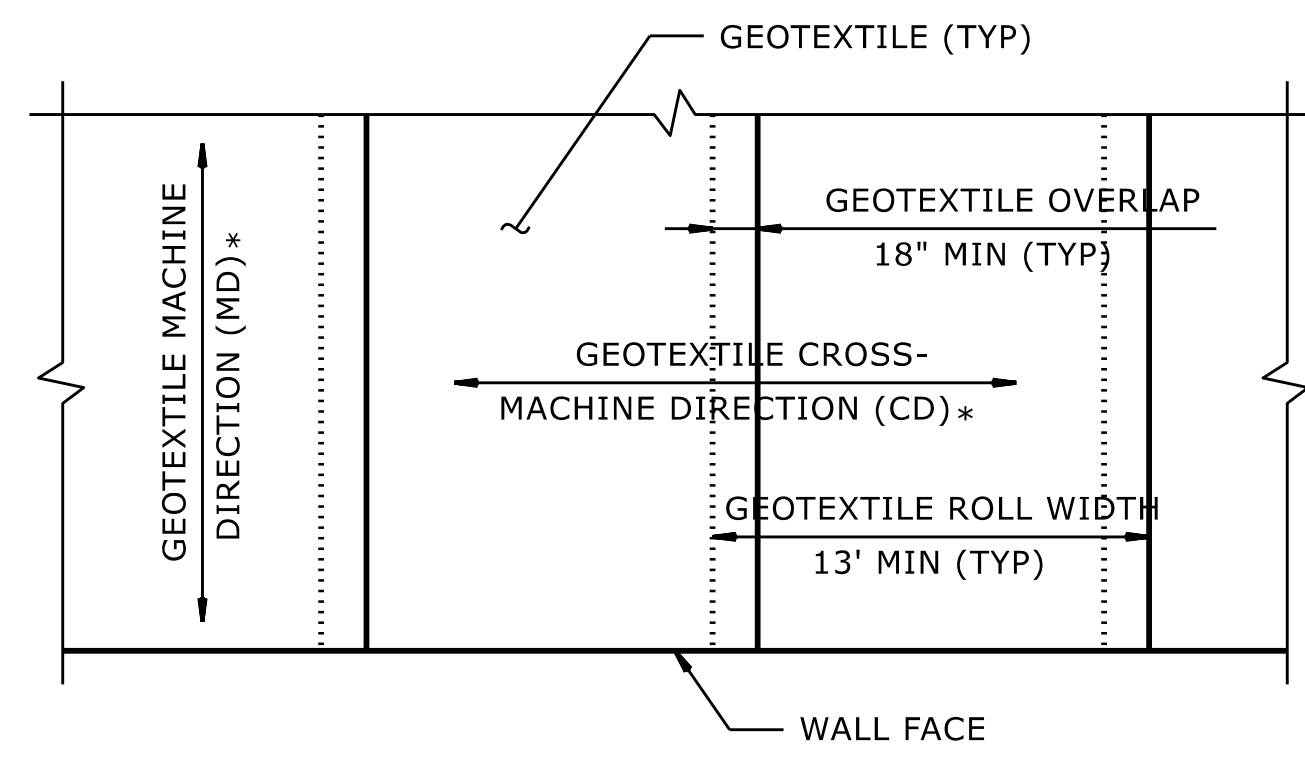


STANDARD TEMPORARY WALL - PARTIAL ELEVATION

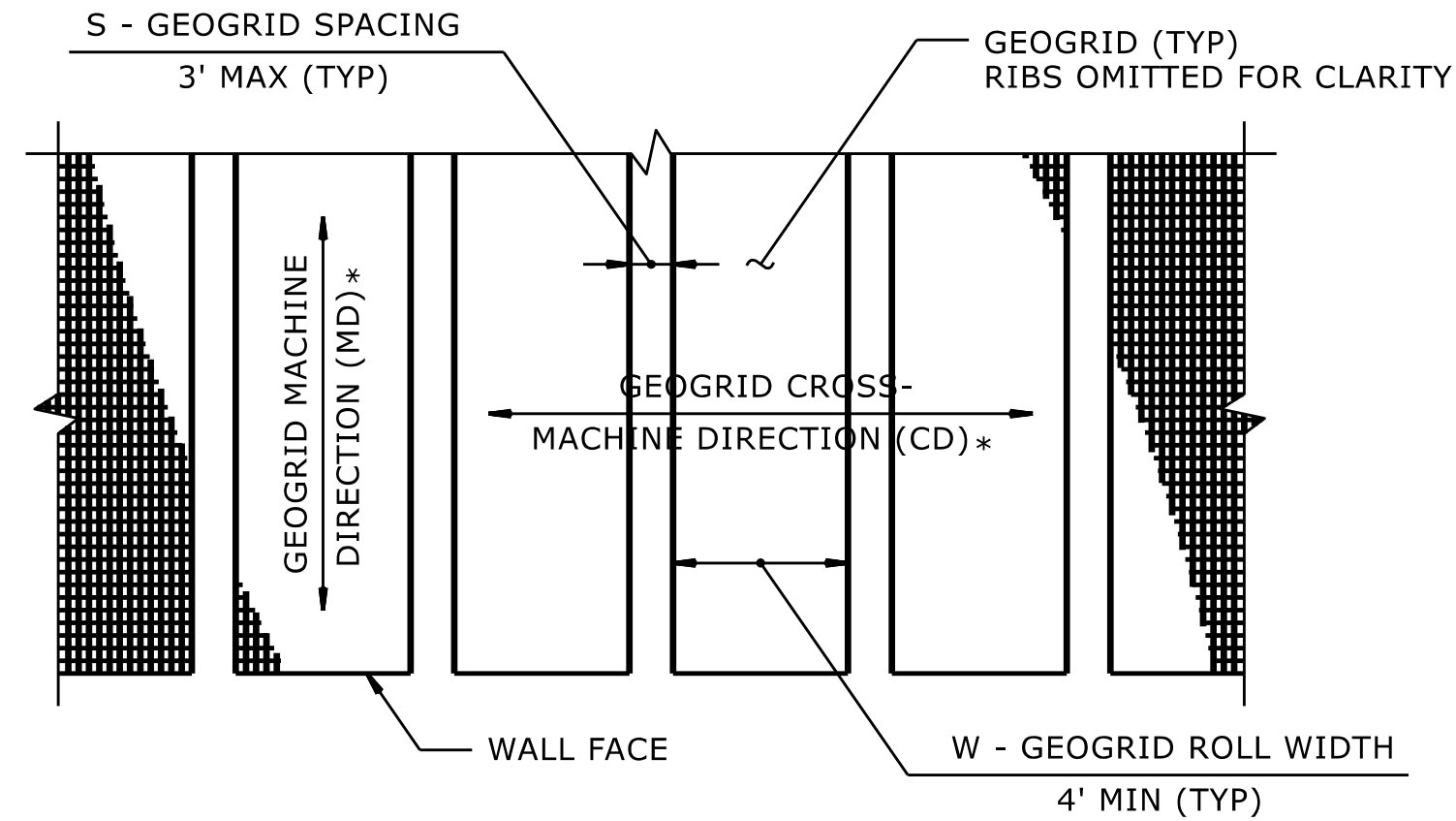
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.

**SEE REINFORCEMENT TABLES ON SHEET 3.

GEOTECHNICAL STANDARD DETAIL FOR TEMPORARY WALL (SHEET 1 OF 3)

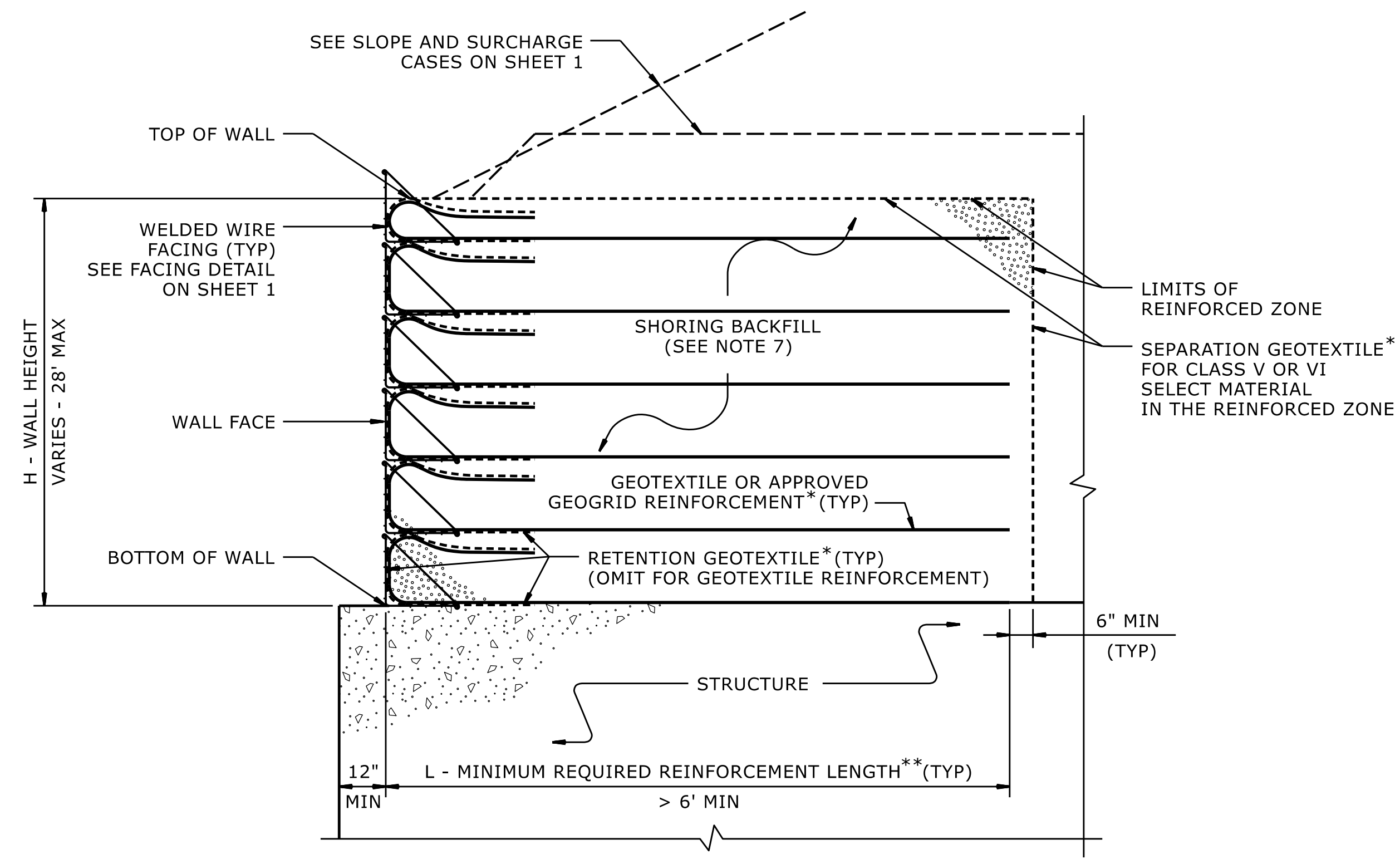


GEOTEXTILE PLACEMENT
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



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 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 1 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) > (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
- REINFORCEMENT STRENGTH IN CD > 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
- 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.

BR-0168
2G-3 -
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT
GEOTECHNICAL ENGINEER
Signed by: Scott A. Hidden 02/2026

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
STANDARD DETAIL NO. 1801.02

GEOTECHNICAL STANDARD DETAIL FOR
TEMPORARY WALL (SHEET 2 OF 3)

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 1, 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 1 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	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 1 OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE 1 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)**

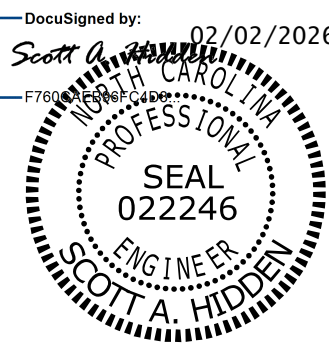
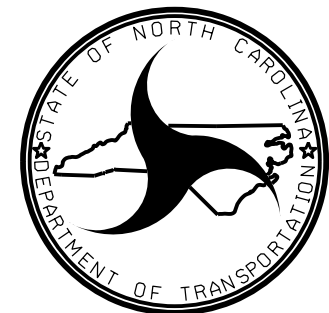
REINFORCEMENT LAYER NUMBER *	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
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.



GEOTECHNICAL STANDARD DETAIL FOR
TEMPORARY WALL (SHEET 3 OF 3)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

Main data table with columns for Line & Station, Offset, Structure Number, Invert Elevation, R.C. Pipe Class, Pipe Size, and various material specifications. Includes rows for LPB, RPB, L, and RPA structures.

SHEET TOTALS (48" or Less)

Summary row for SHEET TOTALS with columns for various pipe sizes and quantities.

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ROADWAY DESIGN UNIT

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DIVISION OF HIGHWAYS

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

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

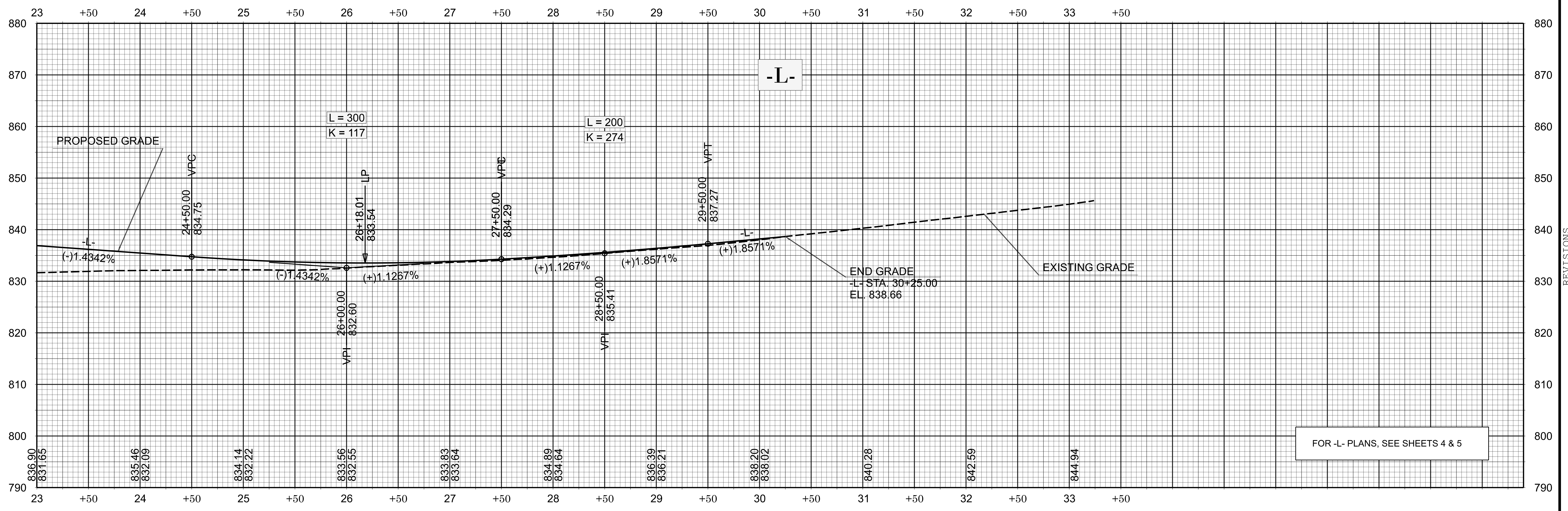
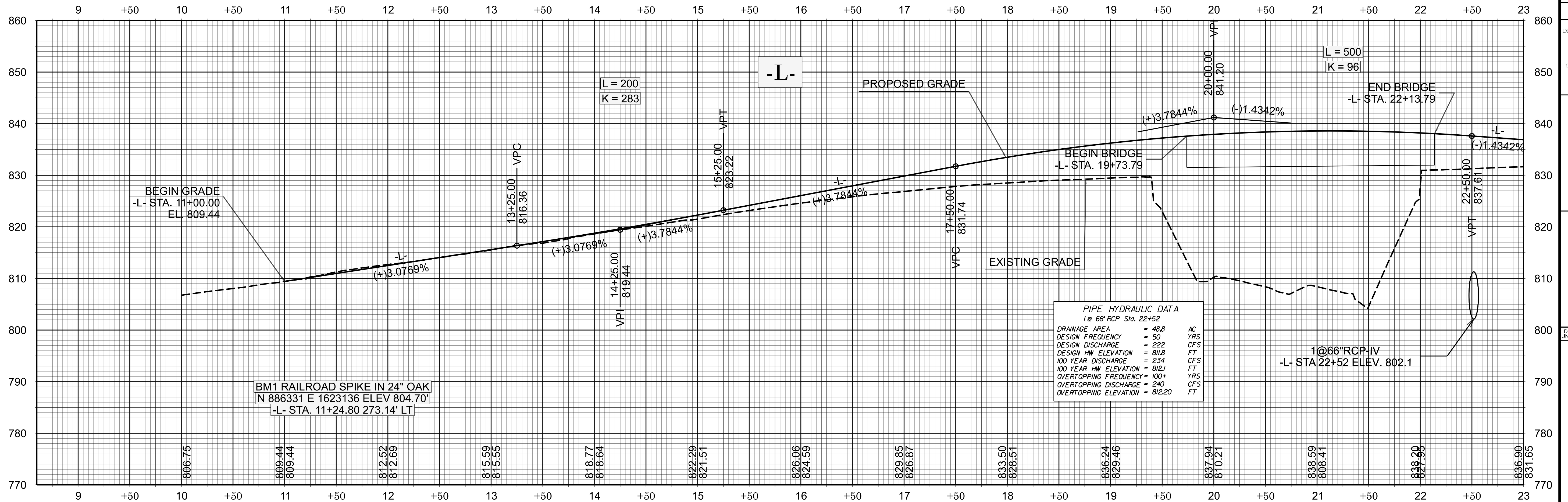
Main data table with columns for Line & Station, Offset, Structure Number, Pipe Specifications, R.C. Pipe Class, Endwalls, Reinforced Endwalls, Frame/Grates, and Remarks.

SHEET TOTALS (48" or Less)

Summary row for sheet totals with numerical values for various categories.

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ROADWAY DESIGN UNIT

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 FORSYTH COUNTY

ROADWAY DESIGN UNIT
 ROADWAY DESIGN ENGINEER

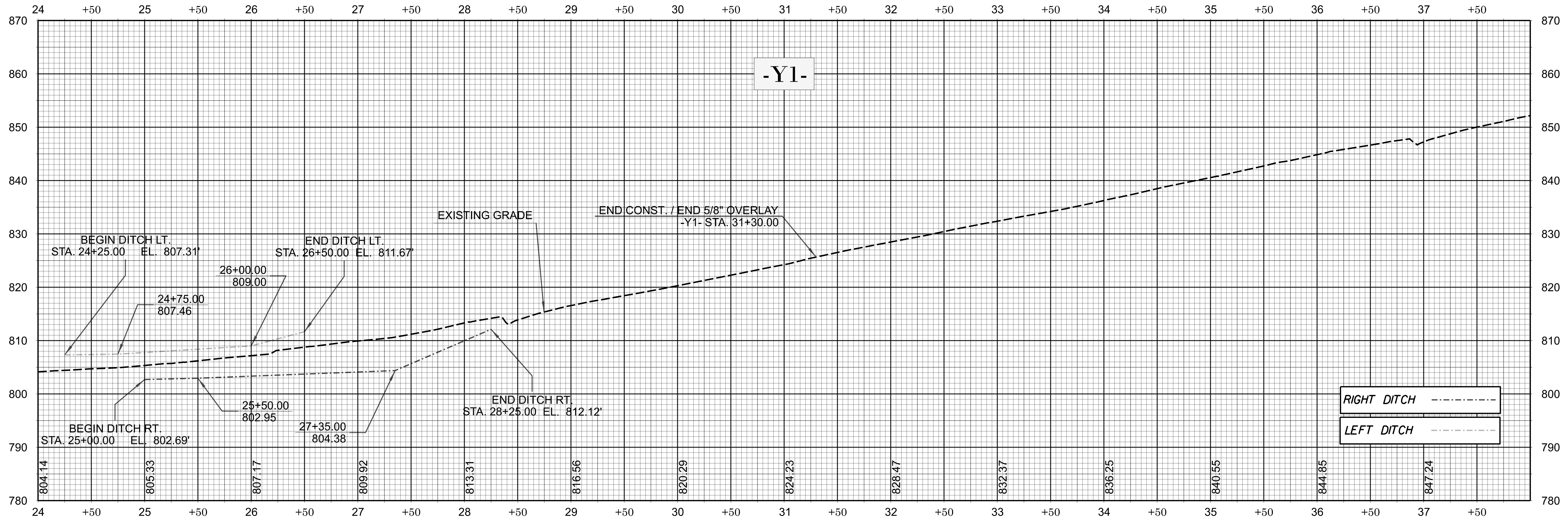
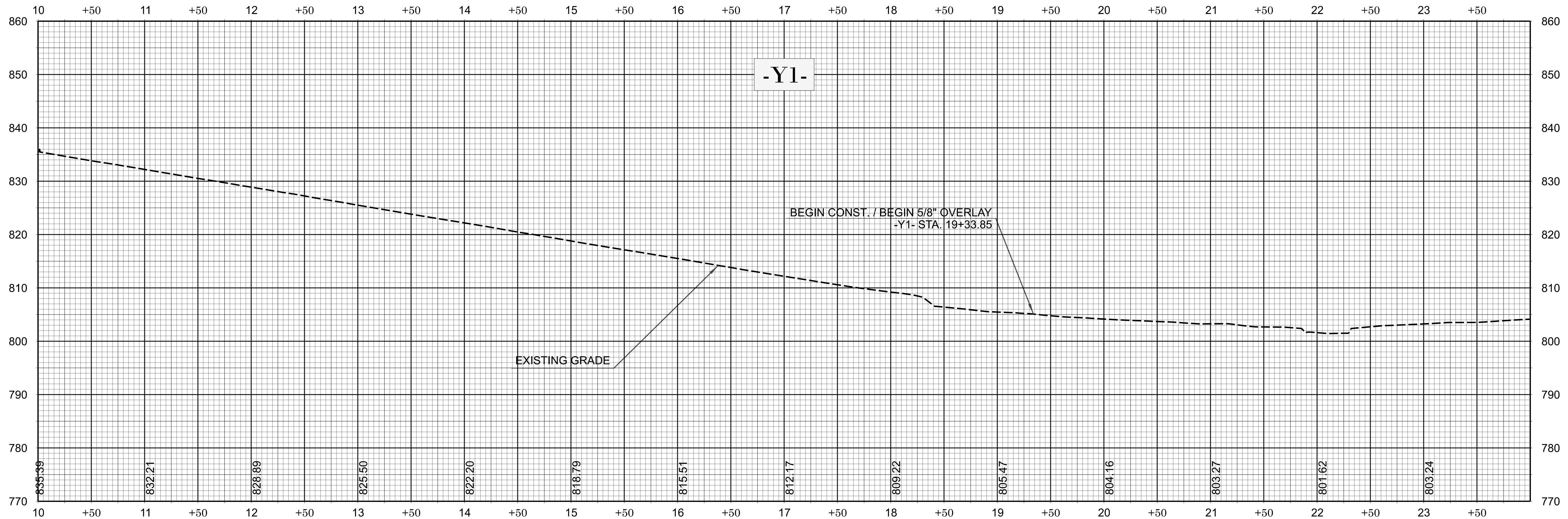
Professional Engineer Seal:
 State of North Carolina
 License No. 036853
 Name: Bryan E. Hough
 Date: 03/03/2026

Professional Engineer Seal:
 State of North Carolina
 License No. 043912
 Name: Matthew J. Park
 Date: 03/03/2026

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL
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 FORSYTH COUNTY

ROADWAY DESIGN UNIT
 ROADWAY DESIGN ENGINEER

Matthew H. Hout
 PROFESSIONAL ENGINEER
 SEAL NO. 00891410
 043912
 MATHIEU H. HOUT
 ENGINEER
 MATHEW HOUT
 03/03/2026

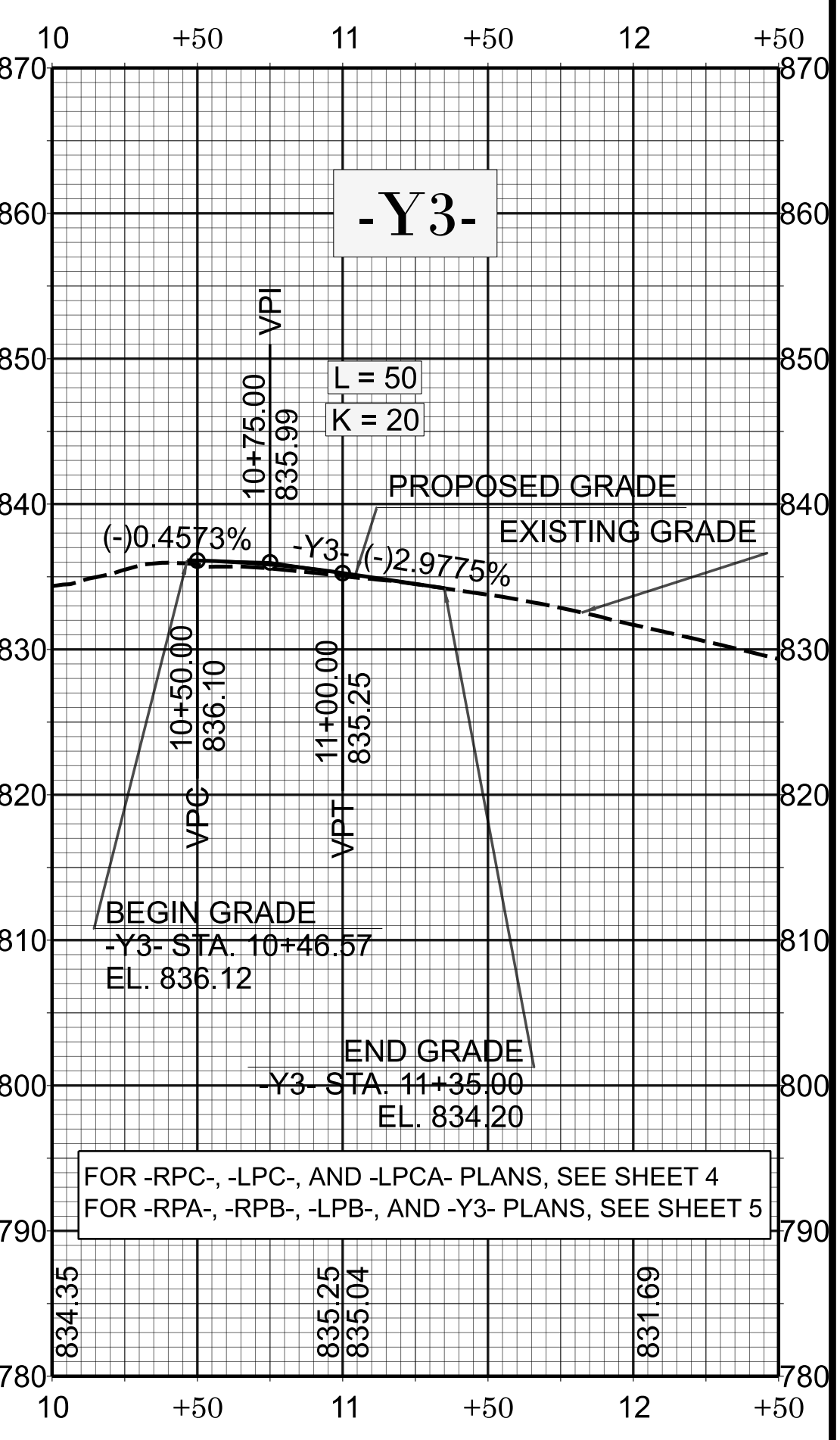
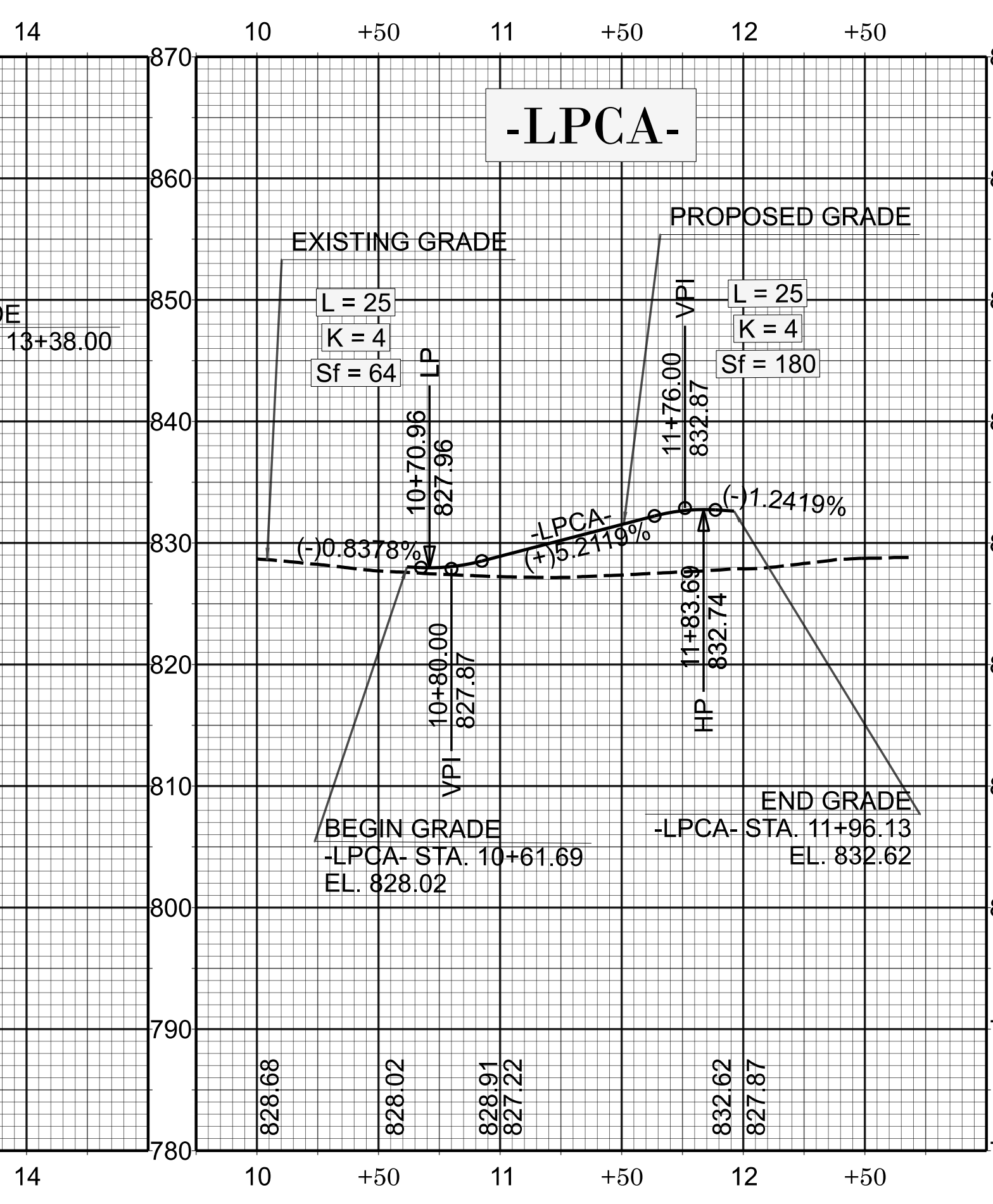
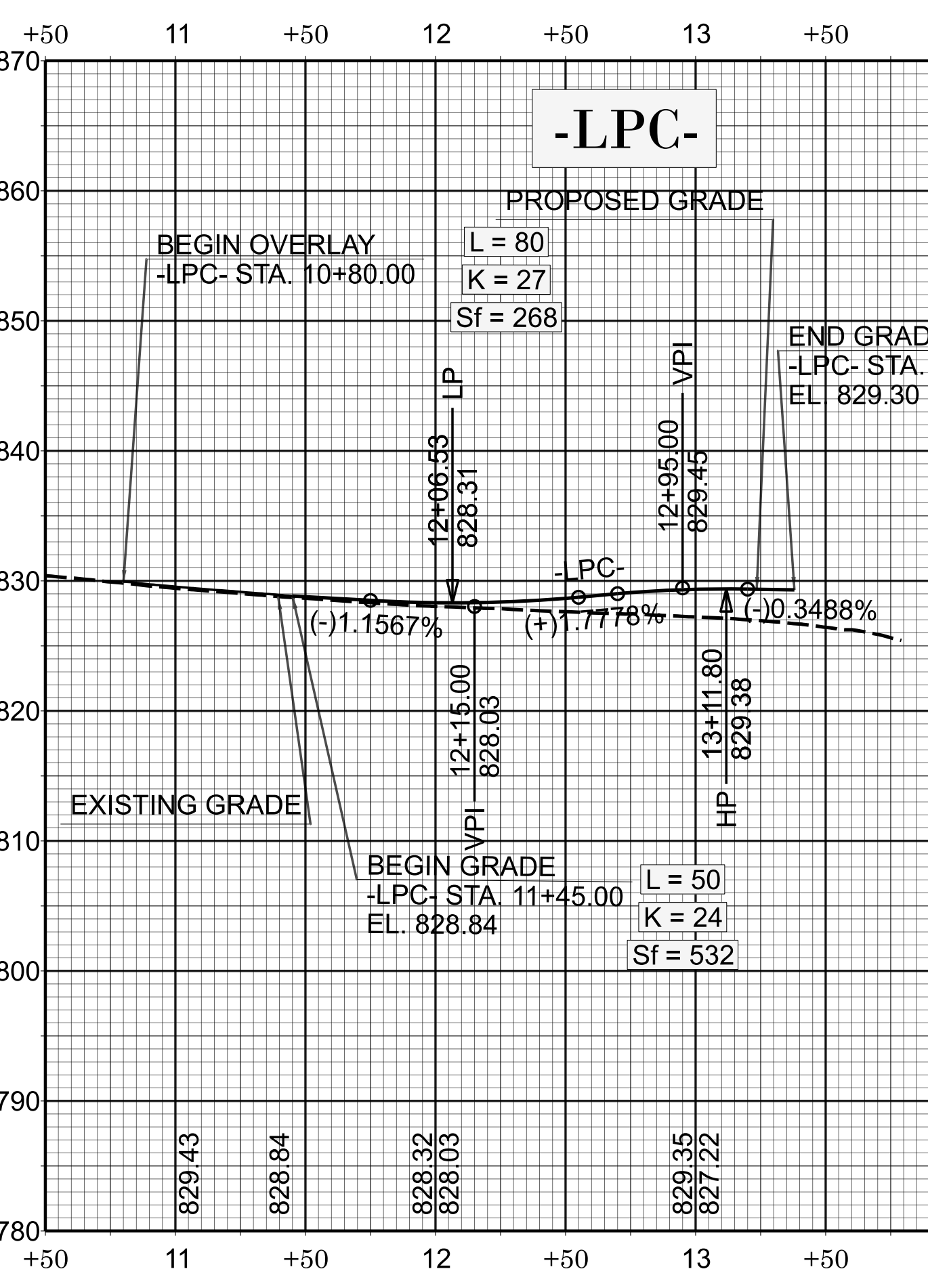
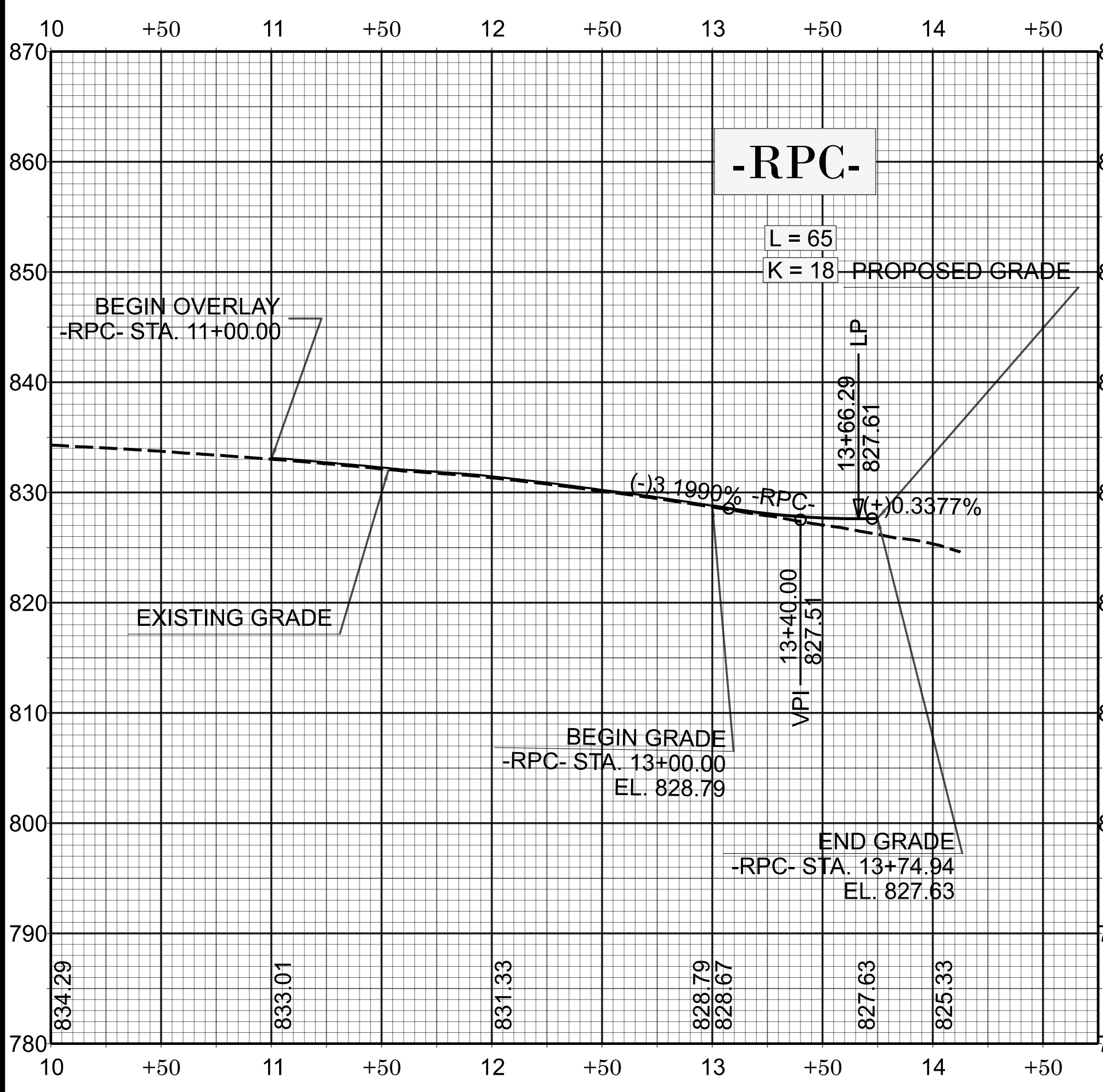
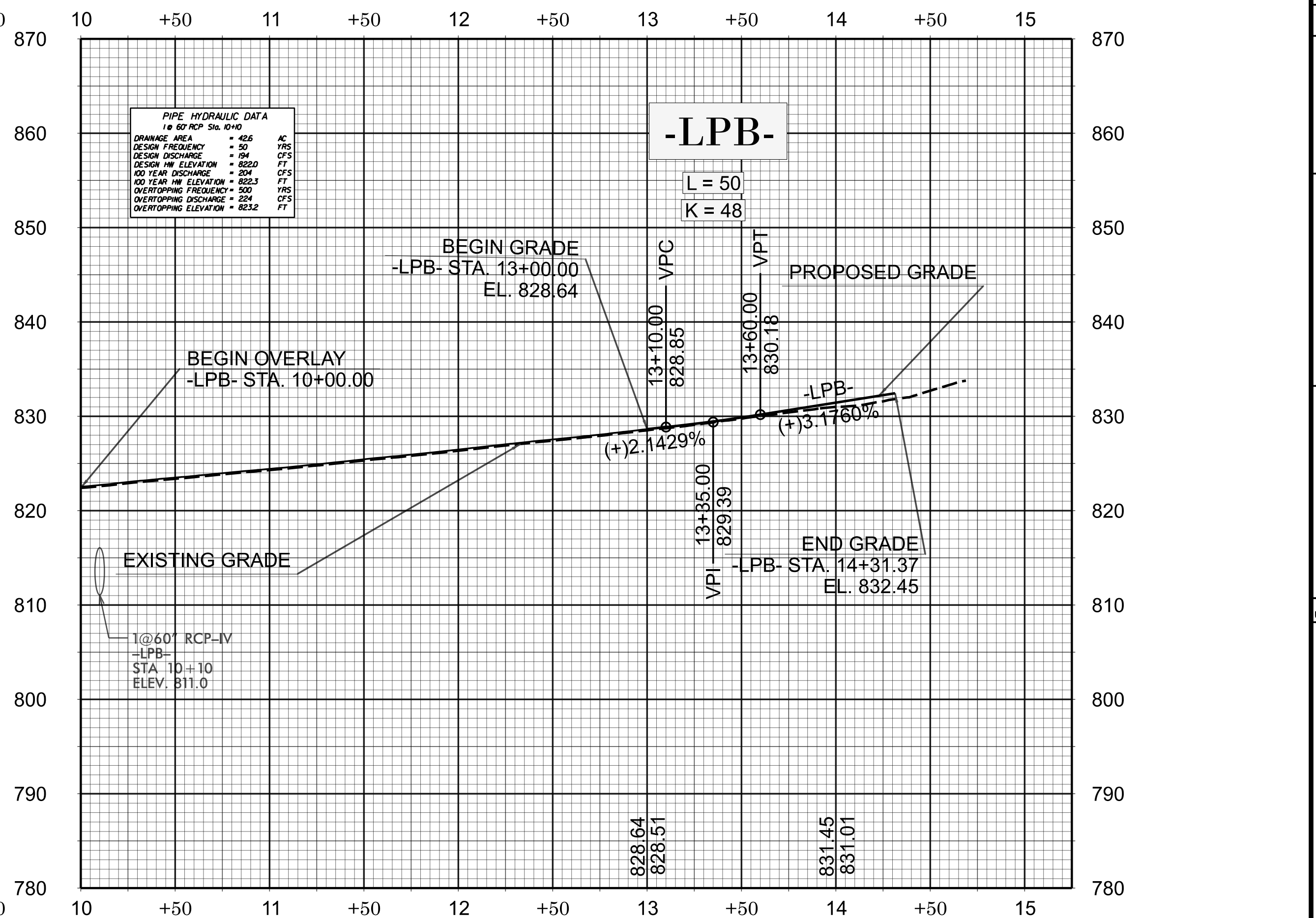
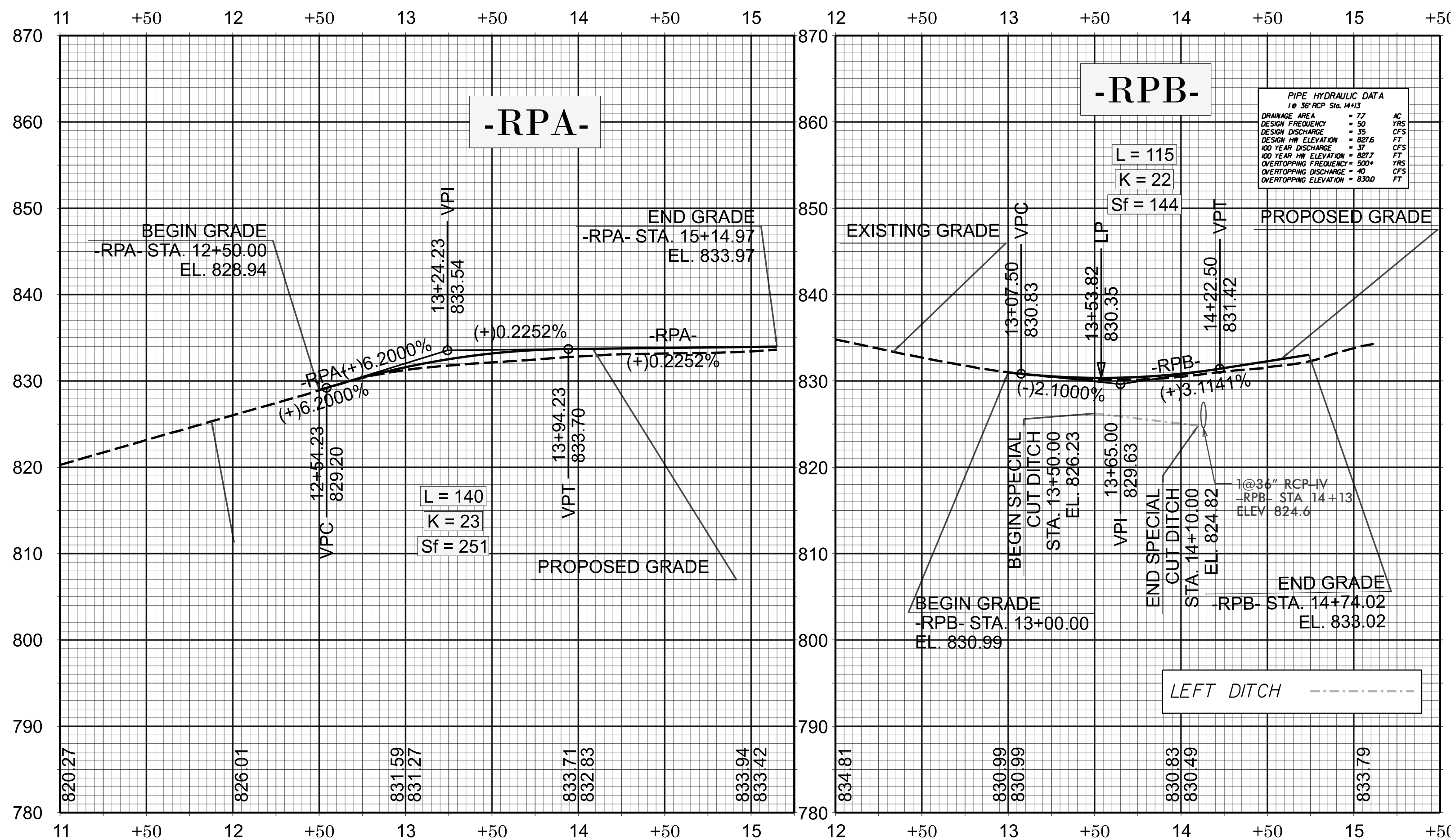
HYDRAULICS ENGINEER

Matthew H. Hout
 PROFESSIONAL ENGINEER
 SEAL NO. 00891410
 043912
 MATHIEU H. HOUT
 ENGINEER
 MATHEW HOUT
 03/03/2026

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FOR -RPC-, -LPC-, AND -LPCA- PLANS, SEE SHEET 4
FOR -RPA-, -RPB-, -LPB-, AND -Y3- PLANS, SEE SHEET 5

BR-0168
FP 8

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
FORSTH COUNTY

ROADWAY DESIGN UNIT
ROADWAY DESIGN
ENGINEER

Professional Engineer Seal: Matthew E. Houbert, No. 036853, State of North Carolina, Exp. 03/03/2026

Hydraulic Engineer Seal: Matthew E. Houbert, No. 043912, State of North Carolina, Exp. 03/03/2026

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