

09/08/09

See Sheet 1A For Index of Sheets

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

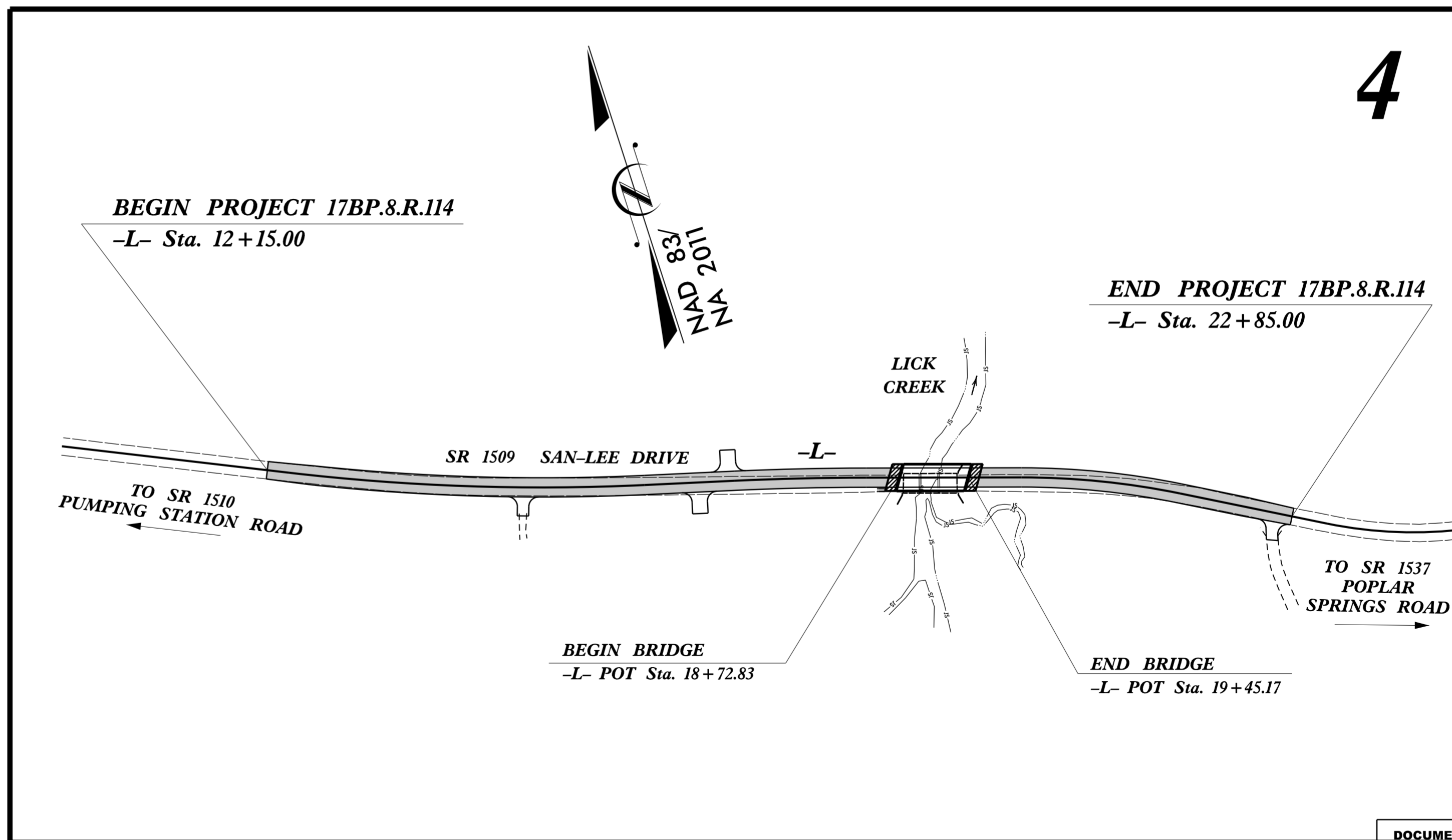
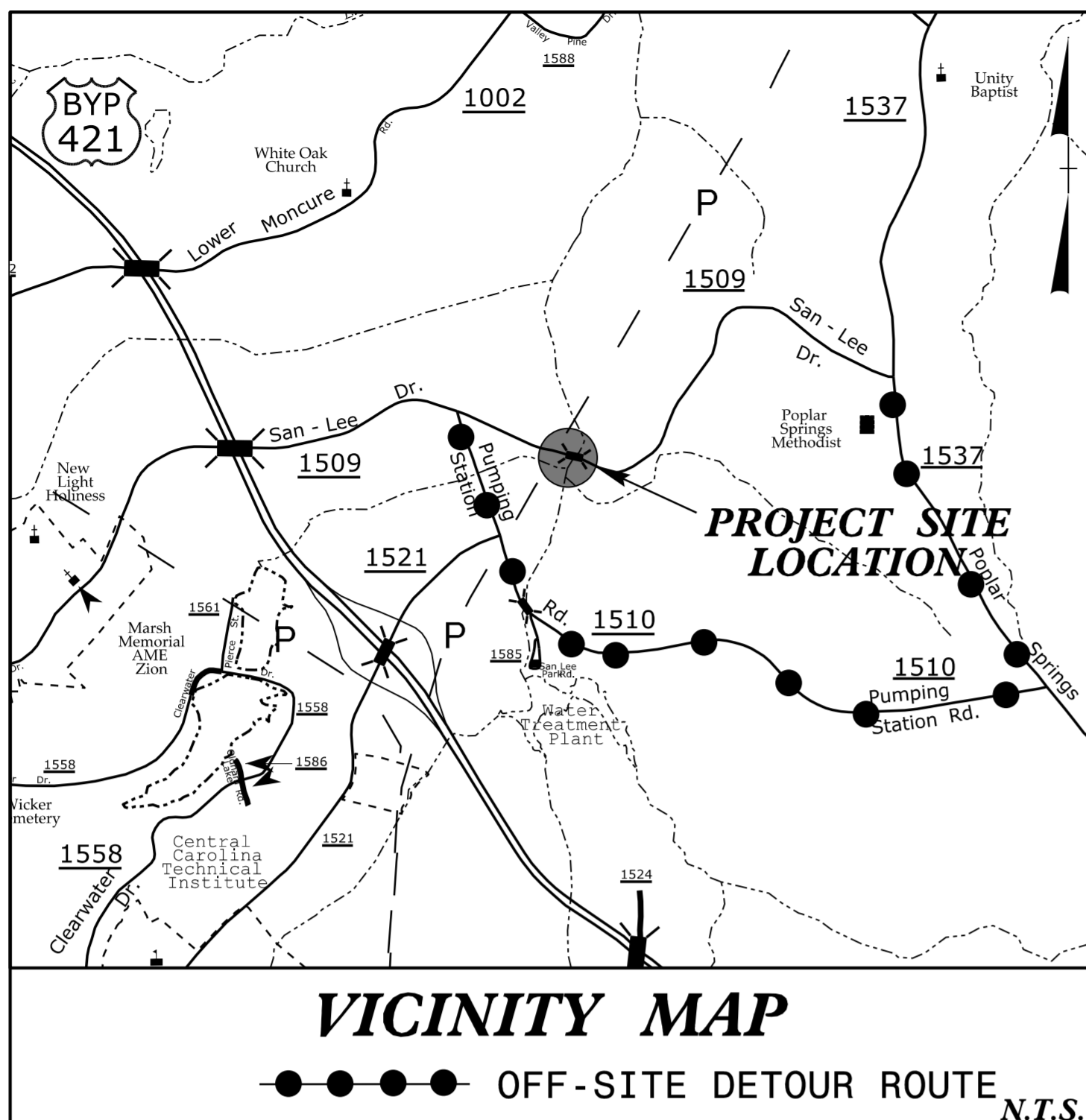
**LEE COUNTY**

**LOCATION: BRIDGE NO. 520016 ON SR 1509 (SAN-LEE DRIVE)  
OVER LICK CREEK**

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

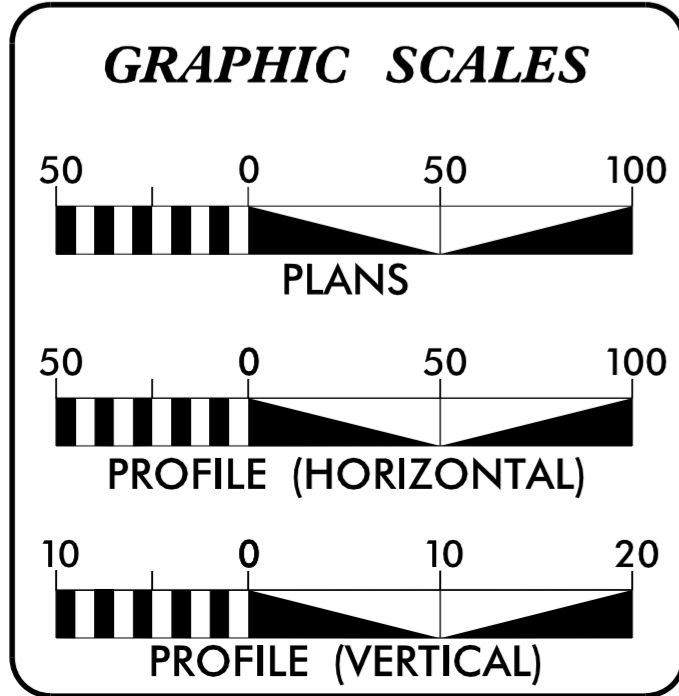
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.8.R.114	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.8.R.114		PE	

**TIP PROJECT: 17BP.8.R.114**



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**CONTRACT:**



**DESIGN DATA**

ADT 2012 =	300
ADT 2025 =	600
K =	%
D =	%
T =	6 % *
V =	60 MPH
* TTST =	DUAL
FUNC CLASS =	MINOR COLLECTOR
SUBREGIONAL TIER	

**PROJECT LENGTH**

LENGTH ROADWAY PROJECT 17BP.8.R.114	=	0.189 mi
LENGTH STRUCTURE PROJECT 17BP.8.R.114	=	0.014 mi
TOTAL LENGTH OF PROJECT 17BP.8.R.114	=	0.203 mi

**PLANS PREPARED BY:**  
**CH ENGINEERING**  
3220 GLEN ROYAL RD., RALEIGH, NC 27617  
TELE 919.788.0224 FAX 919.788.0232  
NC LICENSE #P-0189

**2012 STANDARD SPECIFICATIONS**

**RIGHT OF WAY DATE:**  
JANUARY 2017

**LETTING DATE:**  
JUNE 2017

**PLANS PREPARED FOR:**  
**DIVISION OF HIGHWAYS  
DIVISION 8**  
902 N Sandhills Blvd  
Aberdeen, NC 28315

**BRIAN A. WILES, PE**  
PROJECT ENGINEER

**TIM WELCH, PE**  
NCDOT CONTACT  
DIV 8 BRIDGE PROGRAM MANAGER

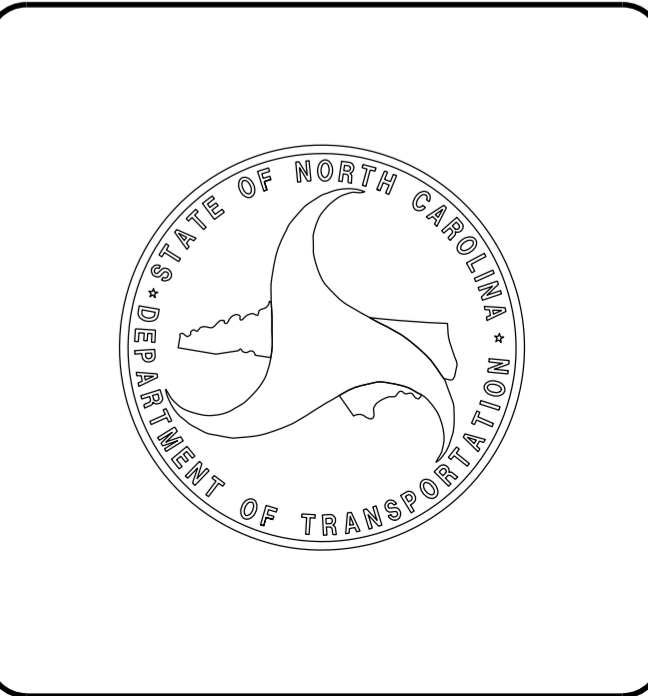
**HYDRAULICS ENGINEER**

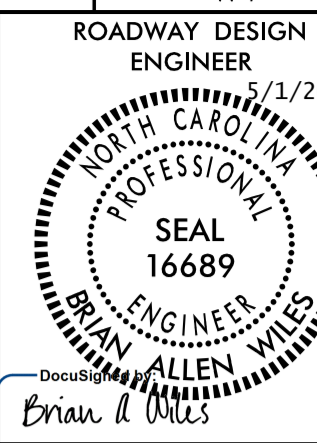
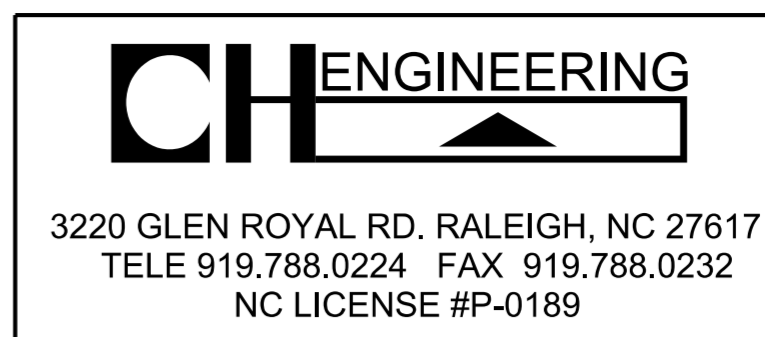
**MI ENGINEERING**  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6906  
FIRM PE NUMBER: P-0671

DocuSigned by:  
**Andrew T. Nottingham** 5/1/2017  
SIGNATURE: \_\_\_\_\_

**ROADWAY DESIGN ENGINEER**

DocuSigned by:  
**Brian A Wiles** 5/1/2017  
SIGNATURE: \_\_\_\_\_





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

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEETS
2A-1	PAVEMENT SCHEDULE, TYPICAL SECTIONS AND WEDGING DETAILS
2C-1	DETAIL OF STRUCTURE ANCHOR UNIT, TYPE III
2G-1	DETAIL OF STANDARD ROCK PLATING
3B-1	SUMMARIES OF EARTHWORK, ASPHALT PAVEMENT REMOVAL, SHOULDER BERM GUTTER AND GUARDRAIL
3D-1	LIST OF PIPES, ENDWALLS, ETC. (for PIPES 48" & UNDER)
3G-1	SUMMARIES OF ROCK PLATING AND AGGREGATE SUBGRADE/STABILIZATION
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 THRU TMP-3	TRAFFIC MANAGEMENT PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1 THRU RF-3	REFORESTATION PLANS
UC-1 THRU UC-5	UTILITY CONSTRUCTION PLANS
UD-1 THRU UD-2	UTILITIES BY OTHERS PLANS
X-1 THRU X-16	CROSS-SECTIONS
S-1 THRU S-13	STRUCTURE PLANS

**GENERAL NOTES:** 2012 SPECIFICATIONS  
EFFECTIVE: 01-17-2012  
REVISED: 01-24-2017

**GRADE LINE:  
GRADING AND SURFACING:**

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

**CLEARING:**

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY 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 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 Central EMC - Power (Distribution), Duke Energy Progress - Power (Transmission), Windstream - Telephone, TimeWarner Cable/Charter - CATV and City of Sanford - Water.

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 CONTRACT.

EFF. 01-17-2012  
REV. 02-29-2016

2012 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, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD. NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.11	Bridge Approach Fills - Sub Regional Tier
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
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
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets

# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

## CONVENTIONAL PLAN SHEET SYMBOLS

*Note: Not to Scale* \*S.U.E. = *Subsurface Utility Engineering*

04/06/15

### BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Property Corner	----->
Property Monument	□ 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	-NLB-
Proposed Wetland Boundary	-NLB-
Existing Endangered Animal Boundary	-EAB-
Existing Endangered Plant Boundary	-EPB-
Existing Historic Property Boundary	-HPB-
Known Contamination Area: Soil	☠
Potential Contamination Area: Soil	☠?
Known Contamination Area: Water	☠
Potential Contamination Area: Water	☠?
Contaminated Site: Known or Potential	☠?

### BUILDINGS AND OTHER CULTURE:

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

### HYDROLOGY:

Stream or Body of Water	~~~~~
Hydro, Pool or Reservoir	□
Jurisdictional Stream	-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:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite RW Marker	-----
Proposed Control of Access Line with Concrete CA Marker	-----
Existing Control of Access	-----
Proposed Control of Access	-----
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	-----
Proposed Permanent Easement with Iron Pin and Cap Marker	-----

### ROADS AND RELATED FEATURES:

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

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 LOS B (S.U.E.*)	-----
U/G Power Line LOS C (S.U.E.*)	-----
U/G Power Line LOS D (S.U.E.*)	-----

### TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊕
Telephone Pedestal	⊠
Telephone Cell Tower	⊠
U/G Telephone Cable Hand Hole	○
U/G Telephone Cable LOS B (S.U.E.*)	-----
U/G Telephone Cable LOS C (S.U.E.*)	-----
U/G Telephone Cable LOS D (S.U.E.*)	-----
U/G Telephone Conduit LOS B (S.U.E.*)	-----
U/G Telephone Conduit LOS C (S.U.E.*)	-----
U/G Telephone Conduit LOS D (S.U.E.*)	-----
U/G Fiber Optics Cable LOS B (S.U.E.*)	-----
U/G Fiber Optics Cable LOS C (S.U.E.*)	-----
U/G Fiber Optics Cable LOS D (S.U.E.*)	-----

### WATER:

Water Manhole	⊕
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
U/G Water Line LOS B (S.U.E.*)	-----
U/G Water Line LOS C (S.U.E.*)	-----
U/G Water Line LOS D (S.U.E.*)	-----
Above Ground Water Line	-----

### TV:

TV Pedestal	⊠
TV Tower	⊗
U/G TV Cable Hand Hole	○
U/G TV Cable LOS B (S.U.E.*)	-----
U/G TV Cable LOS C (S.U.E.*)	-----
U/G TV Cable LOS D (S.U.E.*)	-----
U/G Fiber Optic Cable LOS B (S.U.E.*)	-----
U/G Fiber Optic Cable LOS C (S.U.E.*)	-----
U/G Fiber Optic Cable LOS D (S.U.E.*)	-----

### GAS:

Gas Valve	◇
Gas Meter	⊕
U/G Gas Line LOS B (S.U.E.*)	-----
U/G Gas Line LOS C (S.U.E.*)	-----
U/G Gas Line LOS D (S.U.E.*)	-----
Above Ground Gas Line	-----

### SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
SS Forced Main Line LOS B (S.U.E.*)	-----
SS Forced Main Line LOS C (S.U.E.*)	-----
SS Forced Main Line LOS D (S.U.E.*)	-----

### MISCELLANEOUS:

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

# SURVEY CONTROL SHEET 17BP.8.R.114 LEE COUNTY #16 (FINAL)

## CH ENGINEERING

3220 GLEN ROYAL RD. RALEIGH, NC 27617  
TELE 919.788.0224 FAX 919.788.0232  
NC LICENSE #P-0189

PROJECT REFERENCE NO.	SHEET NO.
17BP.8.R.114	1C-1

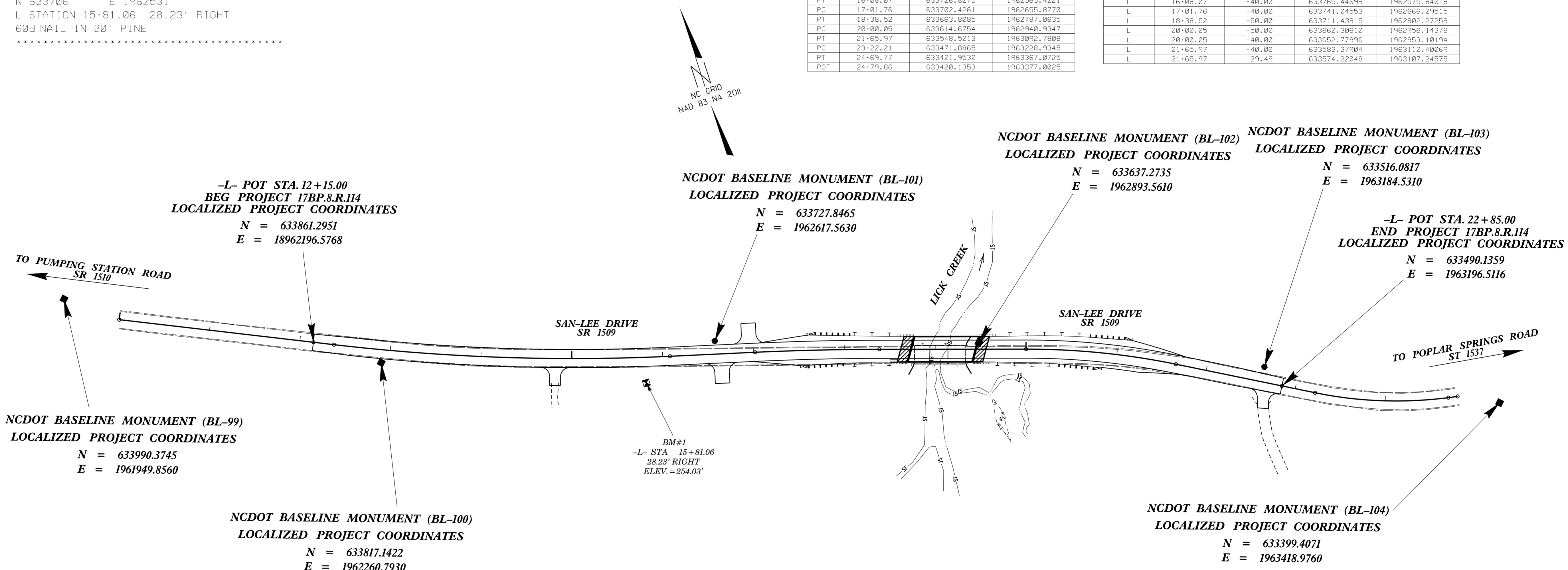
BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
99	BL-99	633990.3745	1961949.8560	271.92	OUTSIDE PROJECT LIMITS	
100	BL-100	633817.1422	1962260.7930	258.75	12+91.39	14.29 RT
101	BL-101	633727.8465	1962617.5630	249.77	16+58.15	14.56 LT
102	BL-102	633637.2735	1962893.5610	253.21	19+48.05	7.12 LT
103	BL-103	633516.0817	1963184.5310	261.49	22+61.83	16.74 LT
104	BL-104	633399.4071	1963418.9600	275.01	OUTSIDE PROJECT LIMITS	

CENTERLINE CONTROL POINT AND ROW  
CONTROL POINTS TABLES PROVIDED BY  
NCDOT LOCATION AND SURVEYS

\*\*\*\*\*  
BM1 ELEVATION = 254.03  
N 633706 E 1962531  
L STATION 15+81.06 28.23' RIGHT  
60d NAIL IN 30" PINE  
\*\*\*\*\*

		L	
TYPE	STATION	NORTH	EAST
POT	10+00.00	633950.1848	1962000.8127
PC	12+37.85	633851.8493	1962217.3795
PT	16+08.07	633726.8275	1962565.4221
PC	17+01.76	633702.4261	1962655.8770
PT	18+38.52	633663.8085	1962787.0635
PC	20+00.05	633614.6754	1962940.9347
PT	21+65.97	633548.5213	1963092.7808
PC	23+22.21	633471.8865	1963228.9345
PT	24+69.77	633421.9532	1963367.0725
POT	24+79.86	633420.1353	1963377.0025

		ROW MARKER REBAR		
ALIGN	STATION	OFFSET	NORTH	EAST
L	14+00.00	-29.87	633818.13620	1962377.67070
L	14+00.00	-40.00	633827.63169	1962381.19020
L	16+08.07	-40.00	633765.44699	1962575.84018
L	17+01.76	-40.00	633741.04553	1962666.29515
L	18+38.52	-50.00	633711.43915	1962802.27259
L	20+00.05	-50.00	633662.30610	1962956.14376
L	20+00.05	-40.00	633652.77996	1962953.10194
L	21+65.97	-40.00	633583.37904	1963112.40069
L	21+65.97	-29.49	633574.22048	1963107.24575



**NOTES:**

- SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
- ◆ INDICATES CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
  - INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
- PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

### DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "BL-101" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 633,727.847(ft) EASTING: 1,962,617.563(ft) ELEVATION: 249.775(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998743423

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL-101" TO -L- STATION 12+15.00 IS N 72° 24' 42.80" W 441.63'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

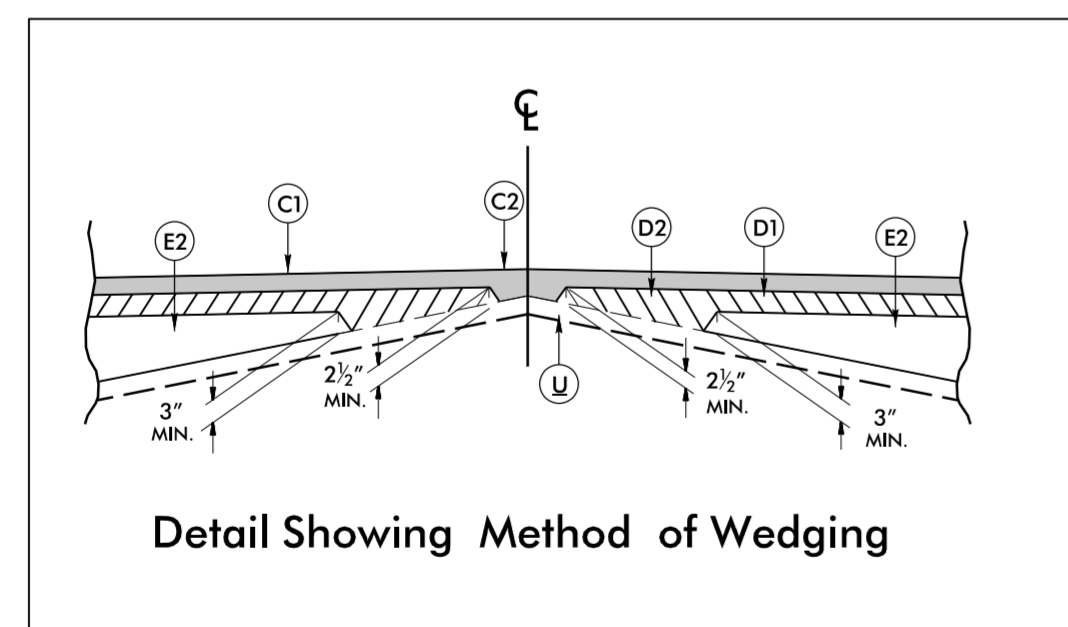
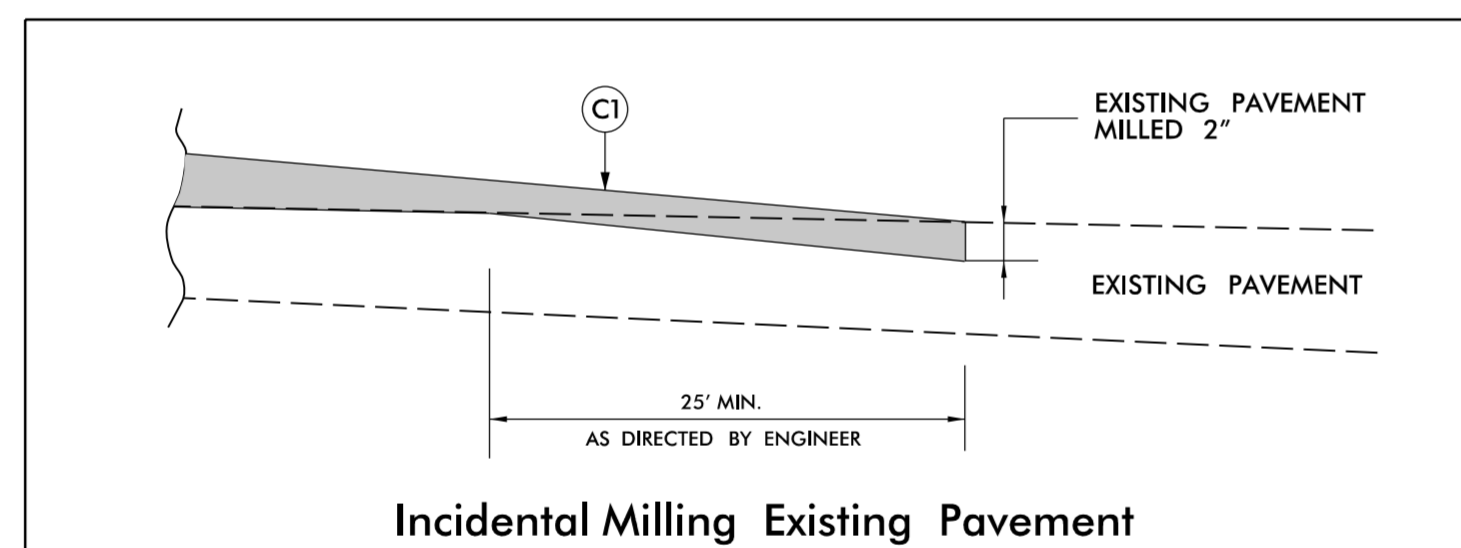
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4/21/2017  
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USER:RMB

6/2/99

PAVEMENT SCHEDULE

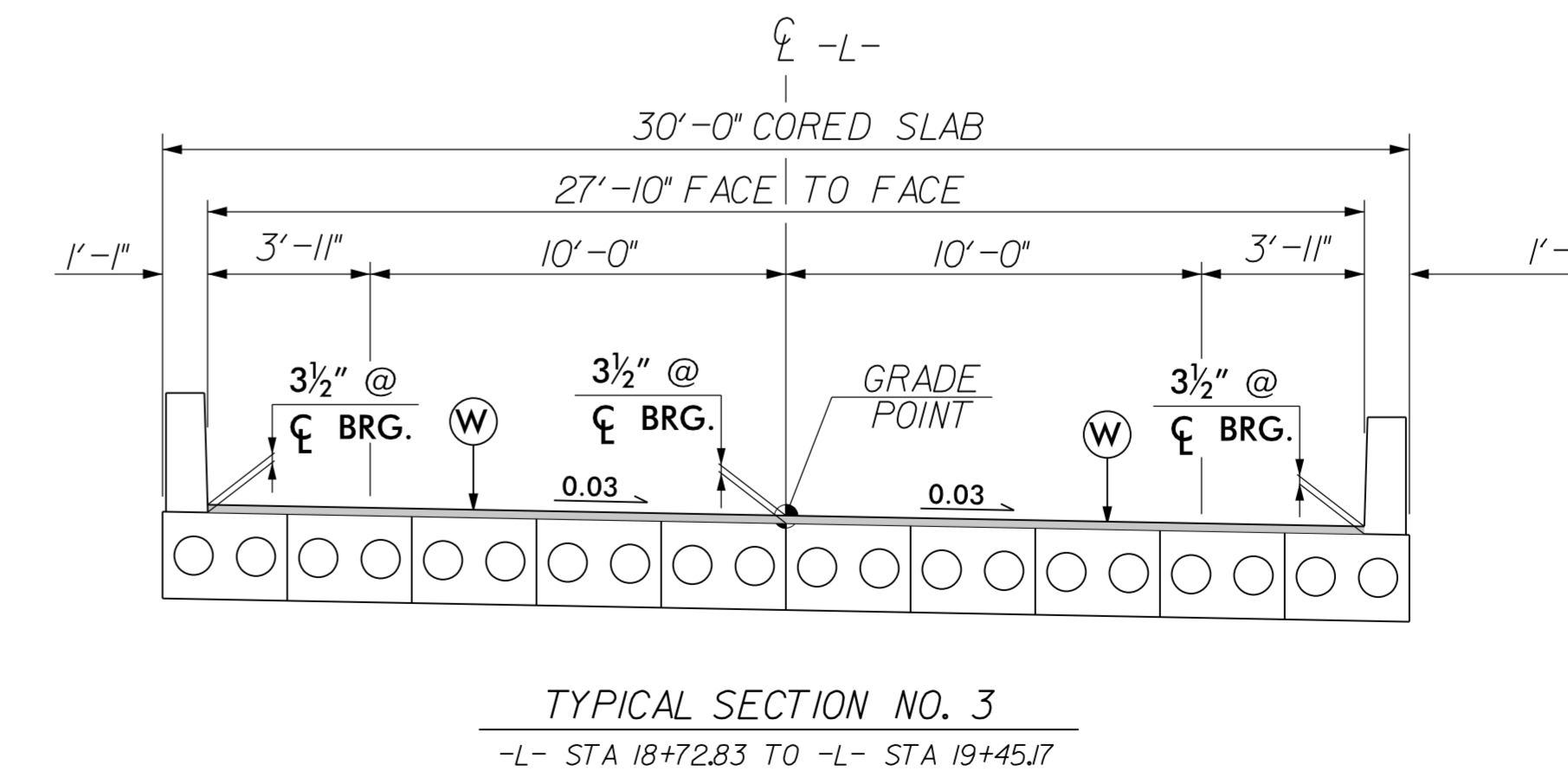
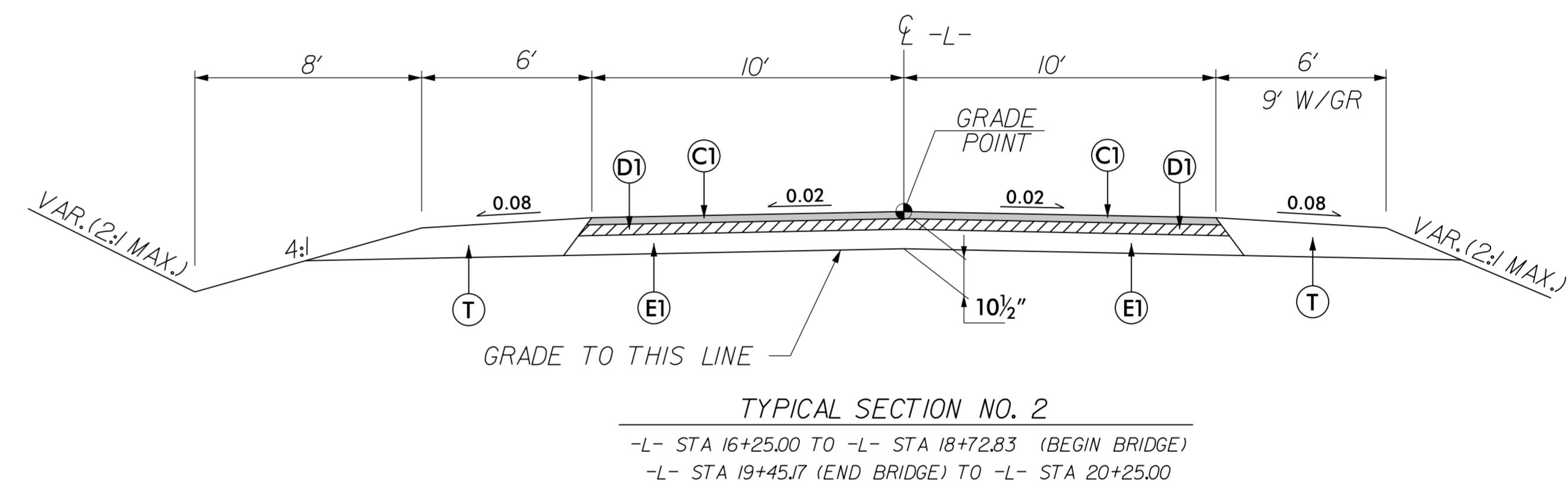
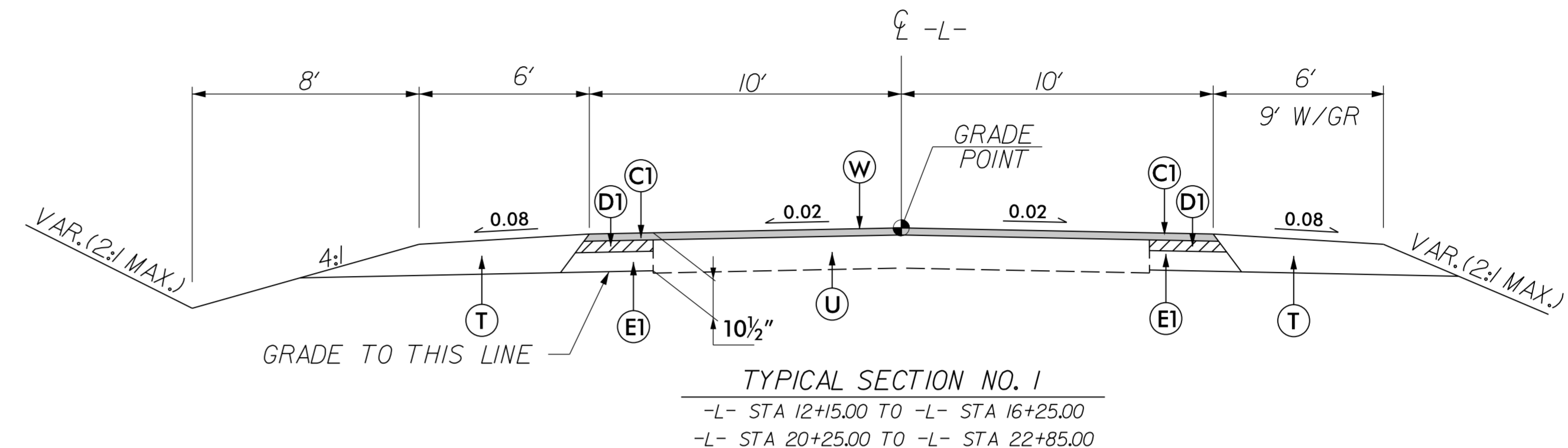
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, 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 5½" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET)

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



**CH ENGINEERING**  
3220 GLEN ROYAL RD. RALEIGH, NC 27617  
TELE 919.788.0224 FAX 919.788.0232  
NC LICENSE #P-0189

PROJECT REFERENCE NO. 17BP.8.R.J14	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER 5/1/2017	PAVEMENT DESIGN ENGINEER
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	

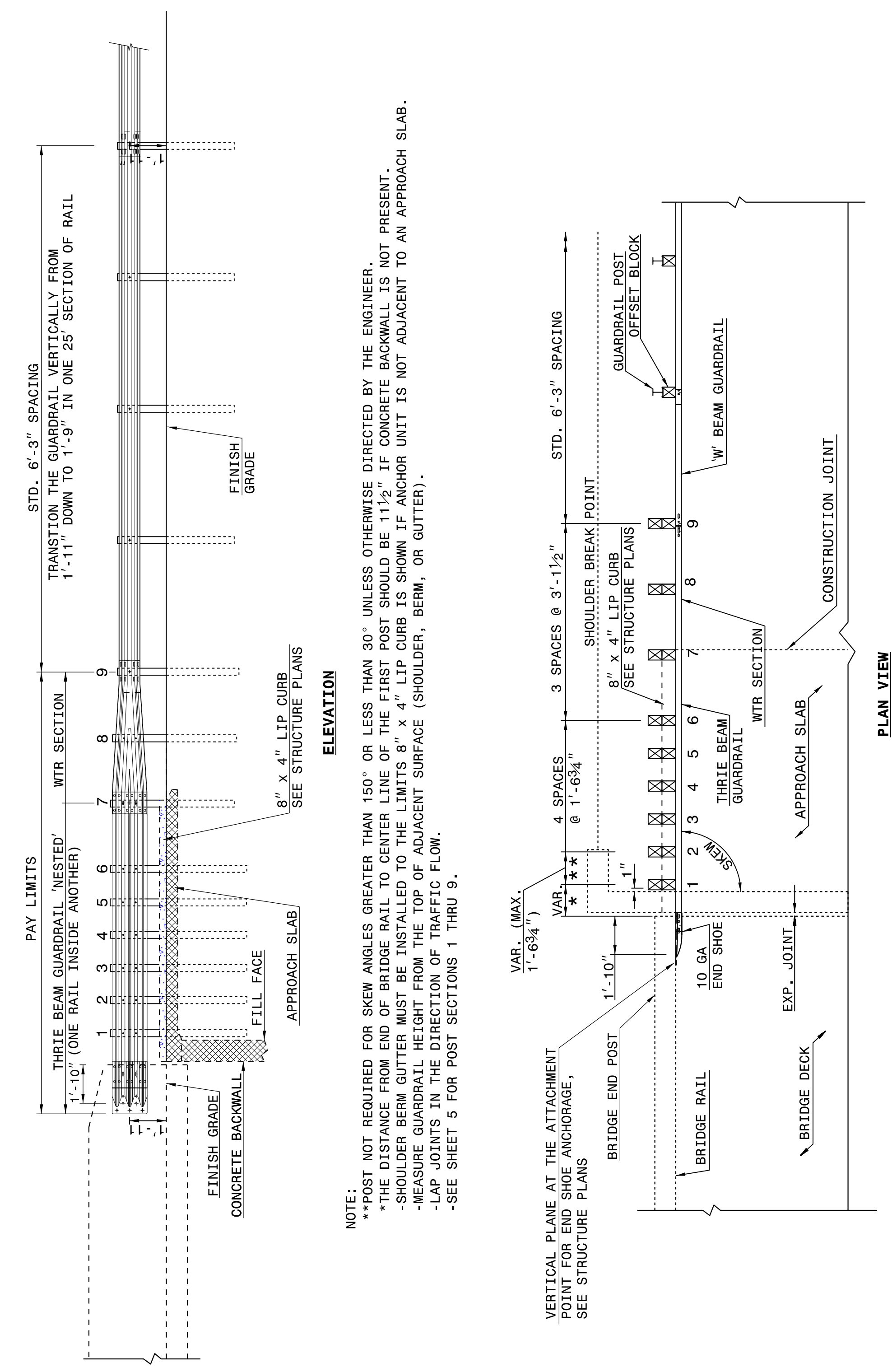


4/24/2017  
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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH 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



**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 1 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 5 FOR POST SECTIONS 1 THRU 9.

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

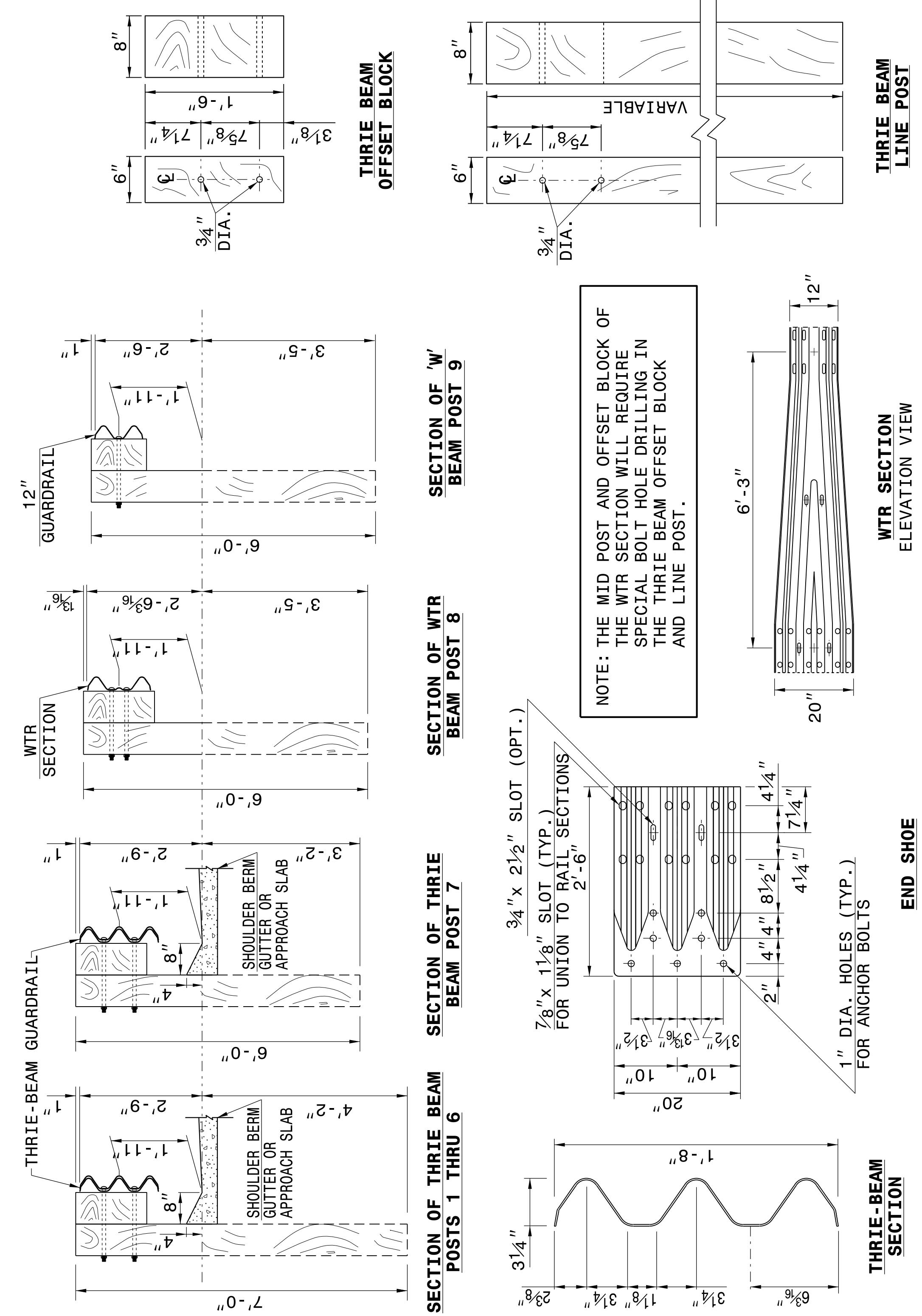
ENGLISH DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7 862d03

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

ENGLISH DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III

SHEET 3 OF 7 862d03



**NOTE:** THE MID POST AND OFFSET BLOCK OF THE WTR SECTION WILL REQUIRE SPECIAL BOLT HOLE DRILLING IN THE THRIE BEAM OFFSET BLOCK AND LINE POST.

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


ENGLISH DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III

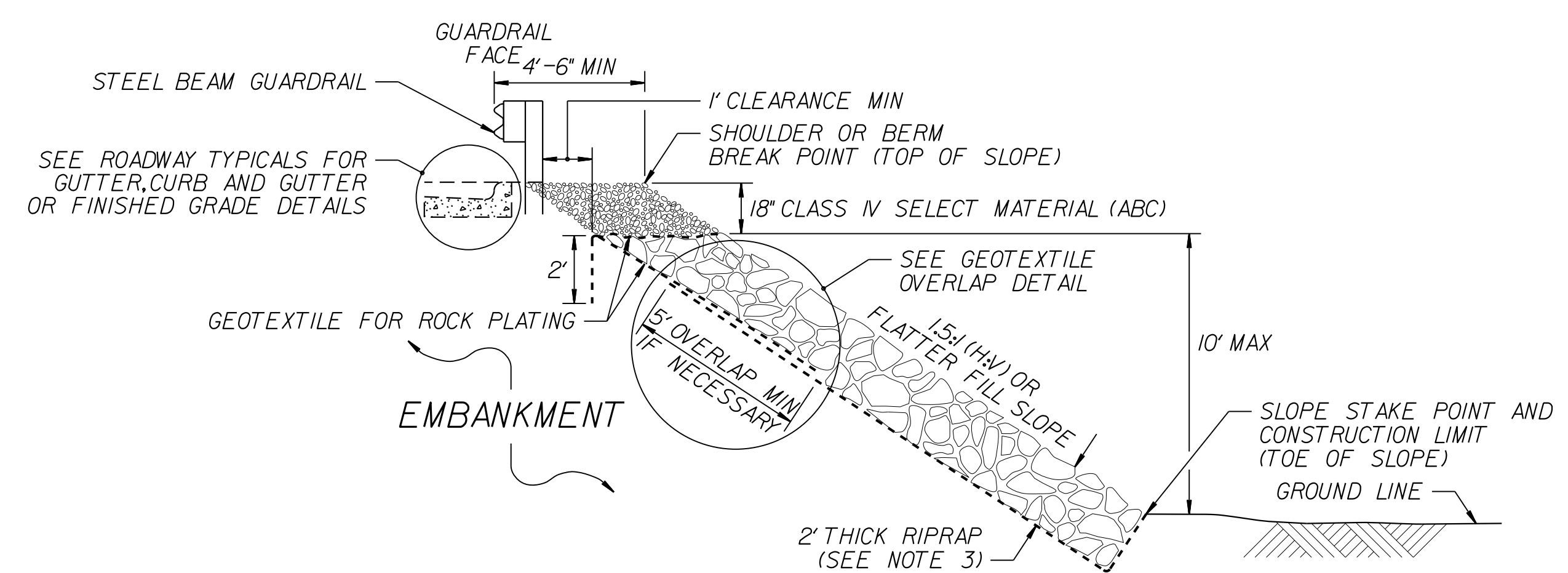
SHEET 3 OF 7 862d03

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

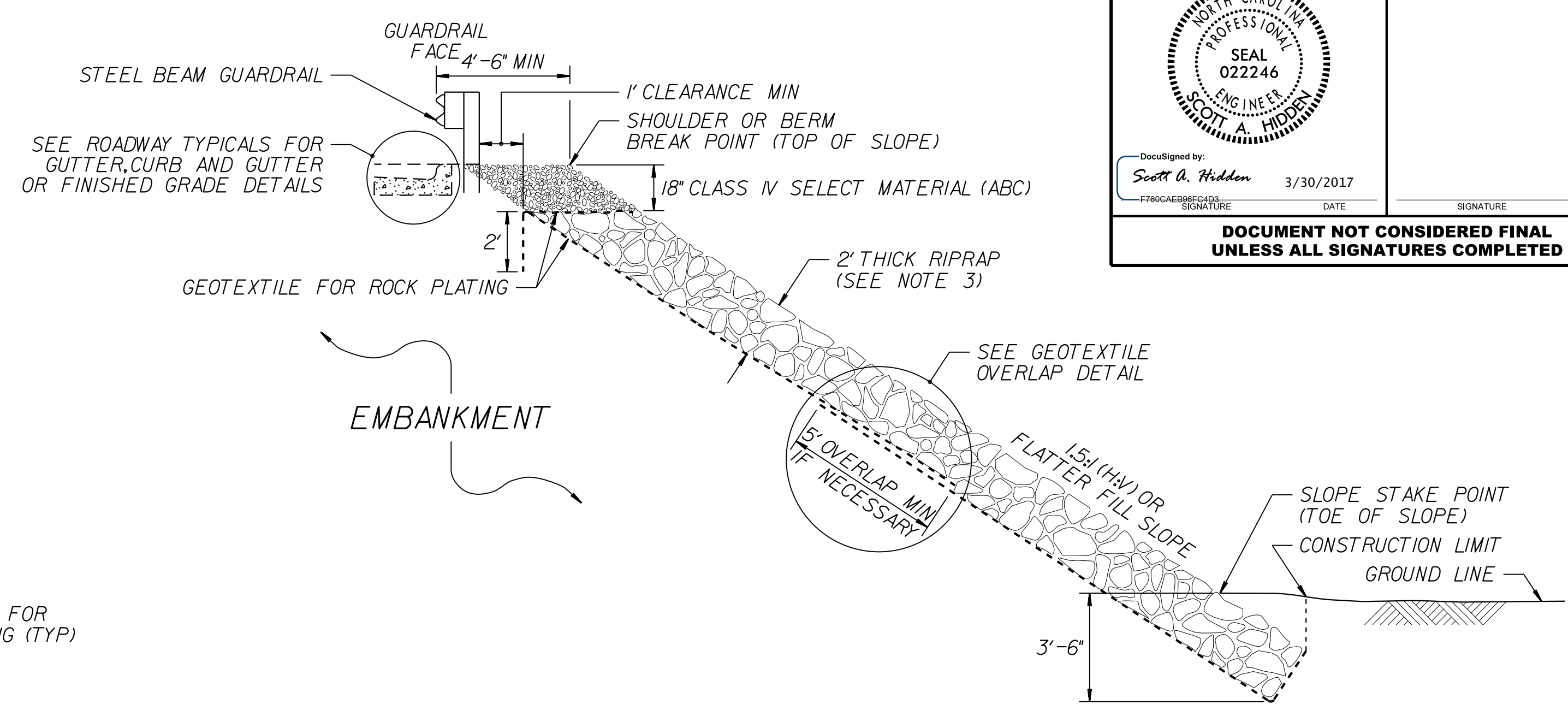
**SEE TITLE BLOCK**

ORIGINAL BY: J. HOWERTON DATE: 06-22-12  
 MODIFIED BY: DATE:  
 CHECKED BY: DATE:  
 FILE SPEC.:

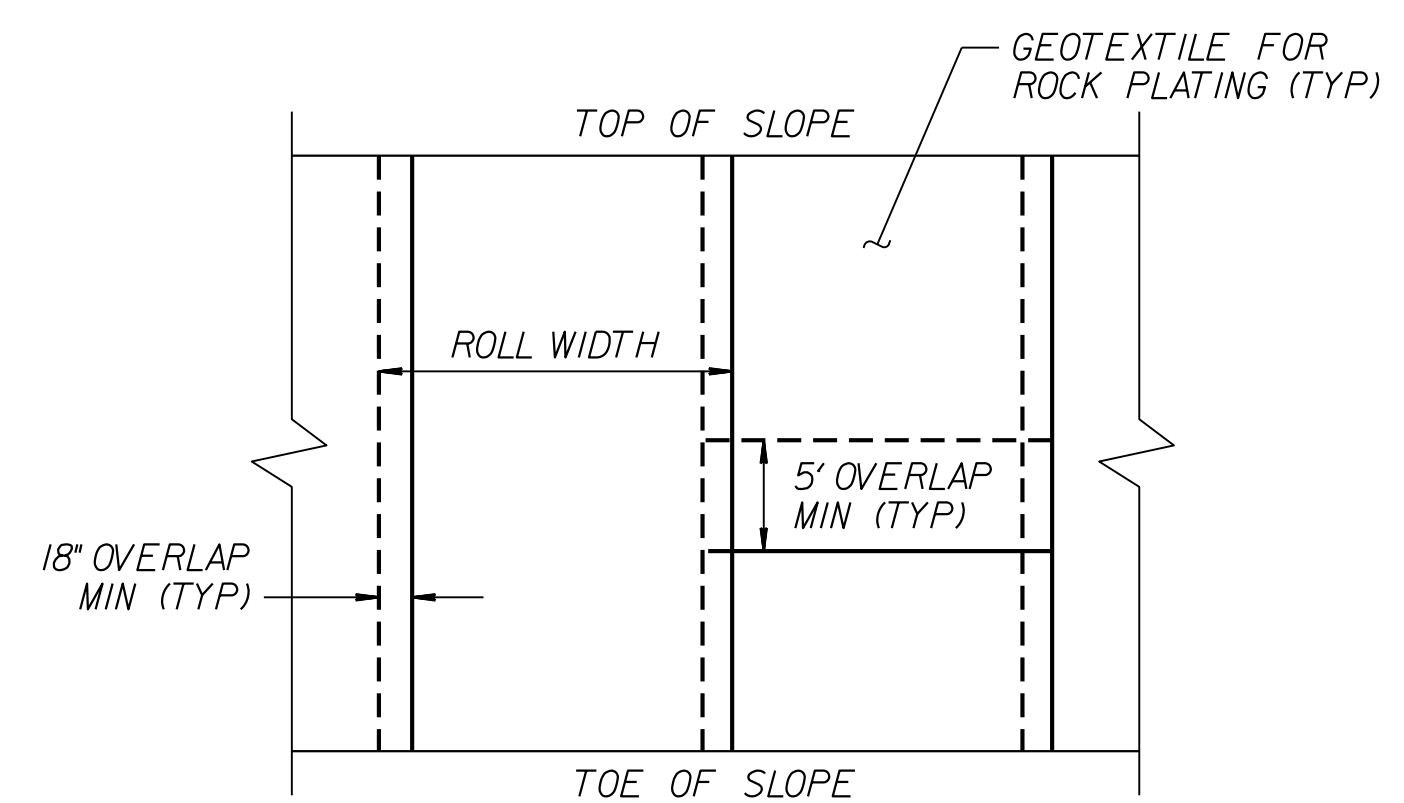
<b>PROJECT REFERENCE NO.</b> 17BP.8.R.114	<b>SHEET NO.</b> 2G-1
GEOTECHNICAL ENGINEER  DocuSigned by: Scott A. Hidden 3/30/2017	ENGINEER DATE SIGNATURE
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	



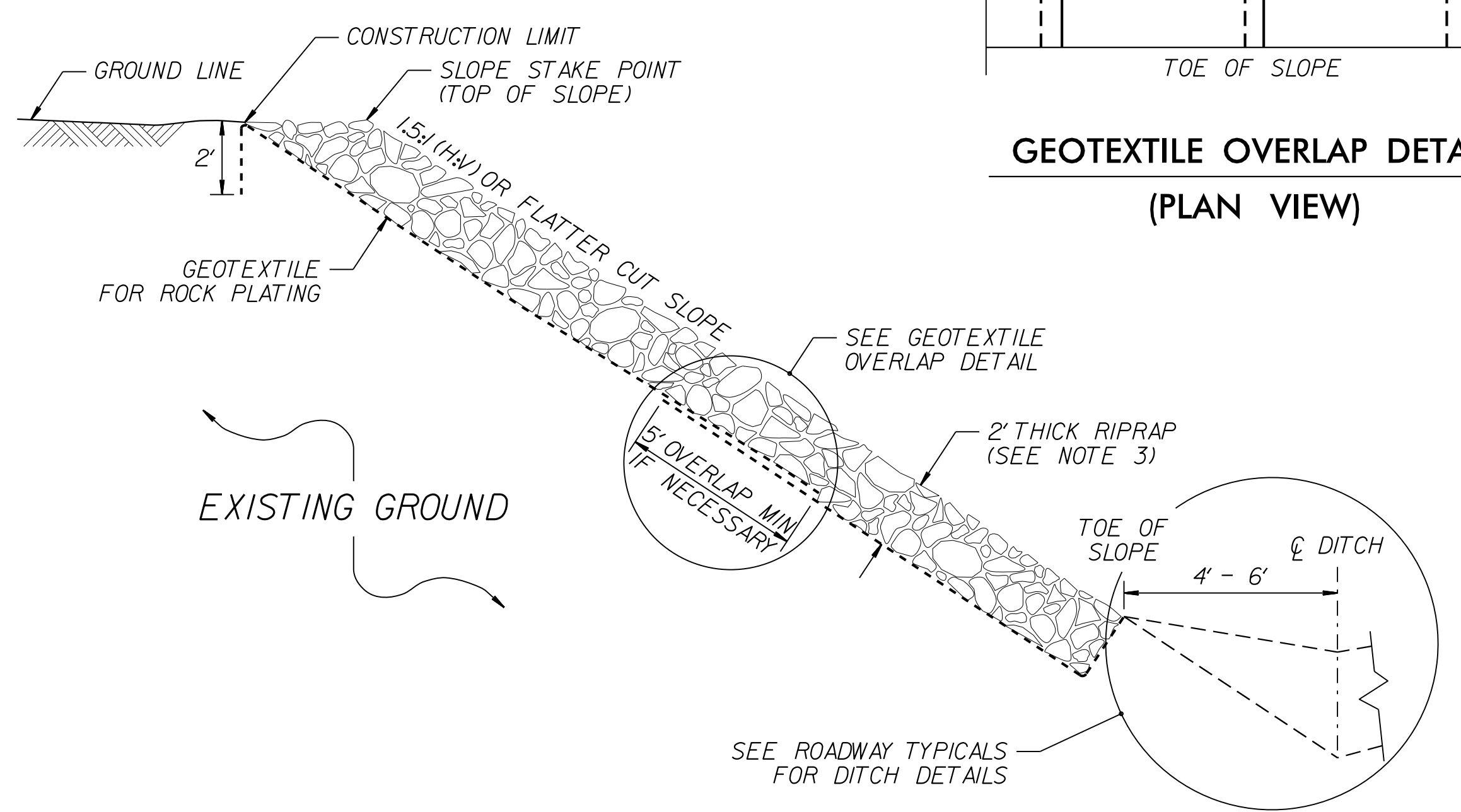
**ROCK PLATING DETAIL NO. 1 – TYPICAL SECTION**



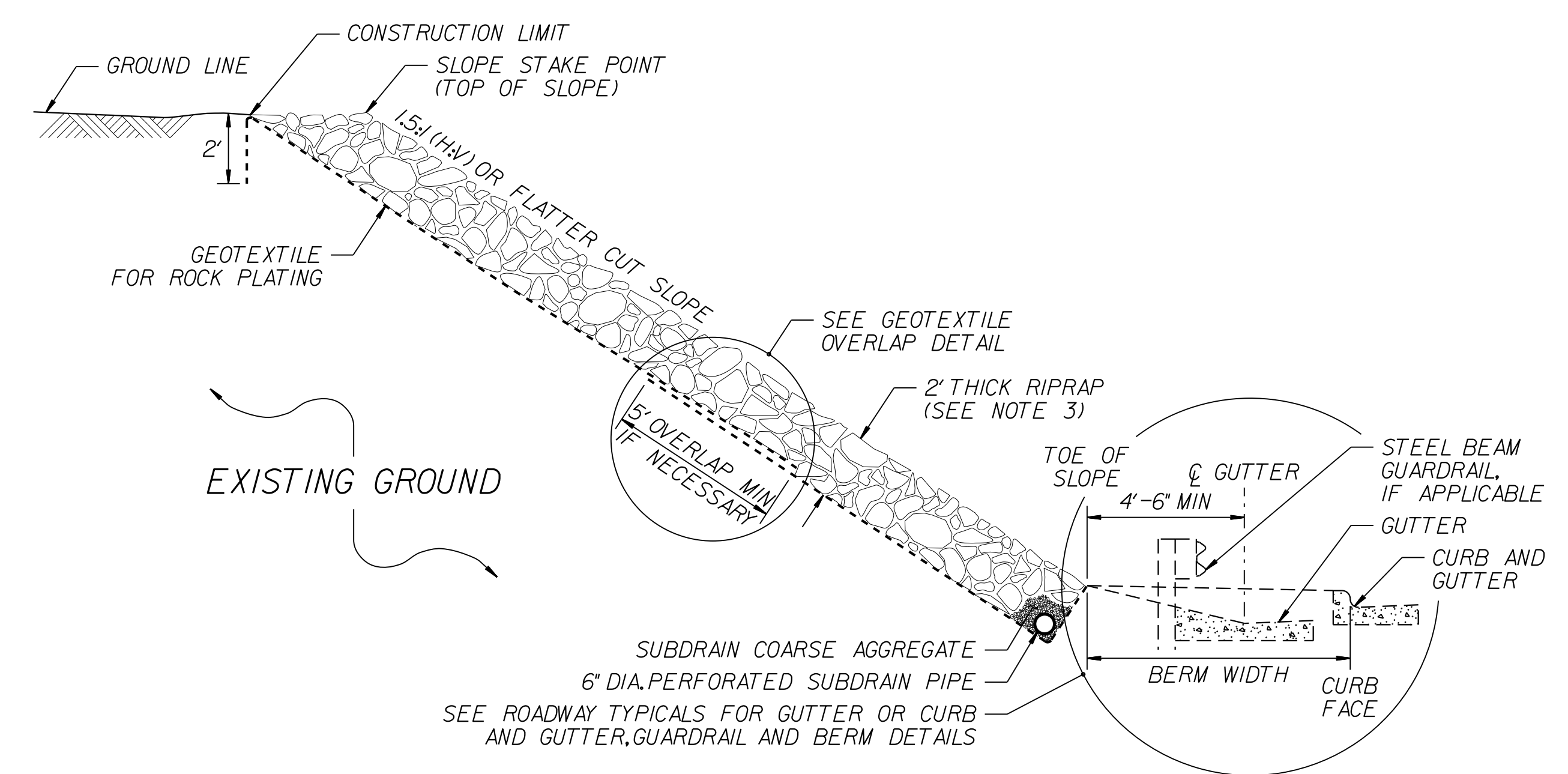
**ROCK PLATING DETAIL NO. 2 – TYPICAL SECTION**



**GEOTEXTILE OVERLAP DETAIL (PLAN VIEW)**



**ROCK PLATING DETAIL NO. 3 – TYPICAL SECTION**



**ROCK PLATING DETAIL NO. 4 – TYPICAL SECTION**

- NOTES:**
1. SEE ROADWAY PLANS AND SUMMARY SHEETS FOR ROCK PLATING LOCATIONS.
  2. FOR STANDARD ROCK PLATING, SEE SECTION 275 OF THE STANDARD SPECIFICATIONS.
  3. USE CLASS 1, 2 OR B RIPRAP UNLESS REQUIRED OTHERWISE IN THE ROADWAY SUMMARY SHEETS.

 <p><b>NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS</b></p> <p><b>GEOTECHNICAL ENGINEERING UNIT</b></p>	<b>STANDARD DETAIL NO. 1802.01</b>
	<b>STANDARD ROCK PLATING</b>

DATE: 2-19-13

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

**SUMMARY OF EARTHWORK**

IN CUBIC YARDS

STATION	STATION	UNCL. EXCAV.	EMBANK. ±%	BORROW	WASTE
-L- 12+15	18+72.83	293	629	336	
	SUBTOTAL	293	629	336	
-L- 19+45.17	22+85	70	510	440	
	SUBTOTAL	70	510	440	
	SUBTOTAL	363	1,139	776	
TOTAL		363	1,139	776	
MATERIAL FOR SHOULDER CONSTRUCTION			416	416	
LOSS DUE TO CLEARING & GRUBBING					
WASTE IN LIEU OF BORROW					
PROJECT TOTAL		363	1,555	1,192	
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT				60	
GRAND TOTALS:		363		1,252	
SAY:		375		1,275	

SHALLOW UNDERCUT EXCAVATION CONTINGENCY PER GEOTECH REPORT = 100 CY  
 UNDERCUT EXCAVATION CONTINGENCY PER GEOTECH REPORT = 420 CY  
 SELECT GRANULAR MATERIAL CONTINGENCY PER GEOTECH REPORT = 200 CY  
 CLASS IV SUBGRADE MATERIAL CONTINGENCY PER GEOTECH REPORT = 100 TONS  
 GEOTEXTILE FOR SOIL STABILIZATION CONTINGENCY PER GEOTECH REPORT = 400 SY

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

**SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL**

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD <sup>3</sup>
L	16+25	18+77	CL	504
L	19+33	20+25	CL	184
TOTAL:				688
SAY:				690

**SHOULDER BERM GUTTER SUMMARY**

SURVEY LINE	STATION	STATION	LENGTH
L (RT SIDE)	18+50	18+58.25	8.25
TOTAL:			8.25
SAY:			10

"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**

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 CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS		
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	XI MOD	XI	GRAU 350	M-350	TYPE III	CAT-1	VI MOD	BIC	AT-1	EA	G	NG							
L	17+58.98	18+77.73	LT	118.75							50		1				1														
L	17+51.52	18+70.27	RT	118.75							50		1				1														
L	19+47.73	21+16.48	LT	168.75							50		1				1														
L	19+40.27	20+84.02	RT	143.75							50	50		1			1														
			SUBTOTAL	550.00													4		4												
			LESS ANCHOR DEDUCTIONS																												
			GRAU-350 4 @ 50'	-200.00																											
			TYPE III 4 @ 18.75'	-75.00																											
			TOTAL	275.00													4		4												
			SAY	275.00																											

12/06/07  
 R:\172017-A\REFRAME\A\PRo\NLEE016\_Rev1\_sum.dgn





COMPUTED BY: XCB DATE: 3/2/17  
 CHECKED BY: BAW DATE: 3/14/17

PROJECT NO. 17BP.8.R.114  
 SHEET NO. 3G-1

**STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS**

**SUMMARY OF ROCK PLATING**

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
L	2:1	19+60	2:1	20+15	RT	1	2	120
	CONTINGENCY							50
							<b>TOTAL SY:</b>	170

\*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
	CONTINGENCY		ASU		100	100	100		
			<b>TOTAL CY/TONS/SY:</b>		100	100	100**	0	0

\*ASU = Aggregate Subgrade

\*AST = Aggregate Stabilization

\*\*Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.

8/17/99

**CH ENGINEERING**  
 3220 GLEN ROYAL RD. RALEIGH, NC 27617  
 TELE 919.788.0224 FAX 919.788.0232  
 NC LICENSE #P-0189

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

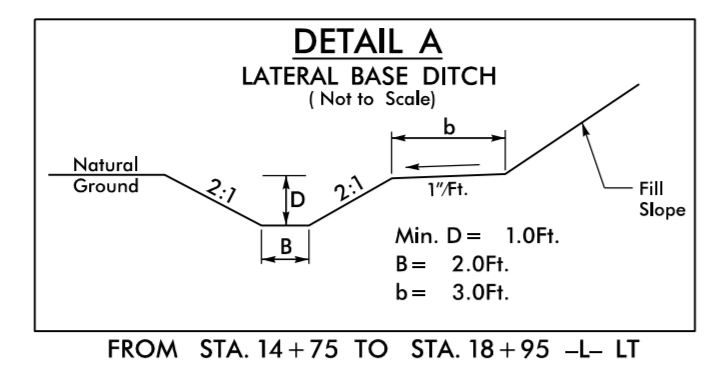
PROJECT REFERENCE NO. 1717BP.8.R.114 SHEET NO. 4  
 LEE COUNTY BRIDGE 016

ROADWAY DESIGN ENGINEER 5/1/2017  
 HYDRAULICS ENGINEER 5/1/2017

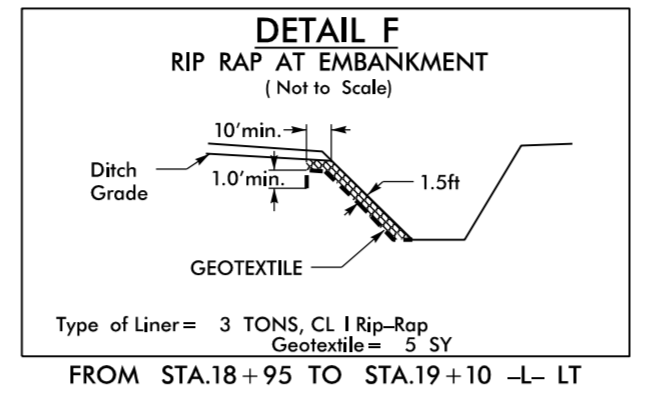
SEAL 16689  
 BRIAN ALLEN WILES

SEAL 18533  
 ANDREW T. WOTtingham

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



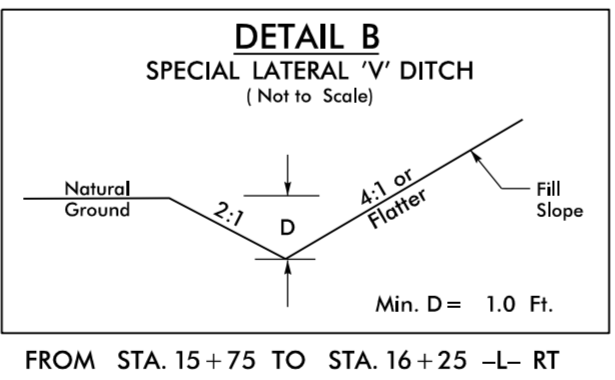
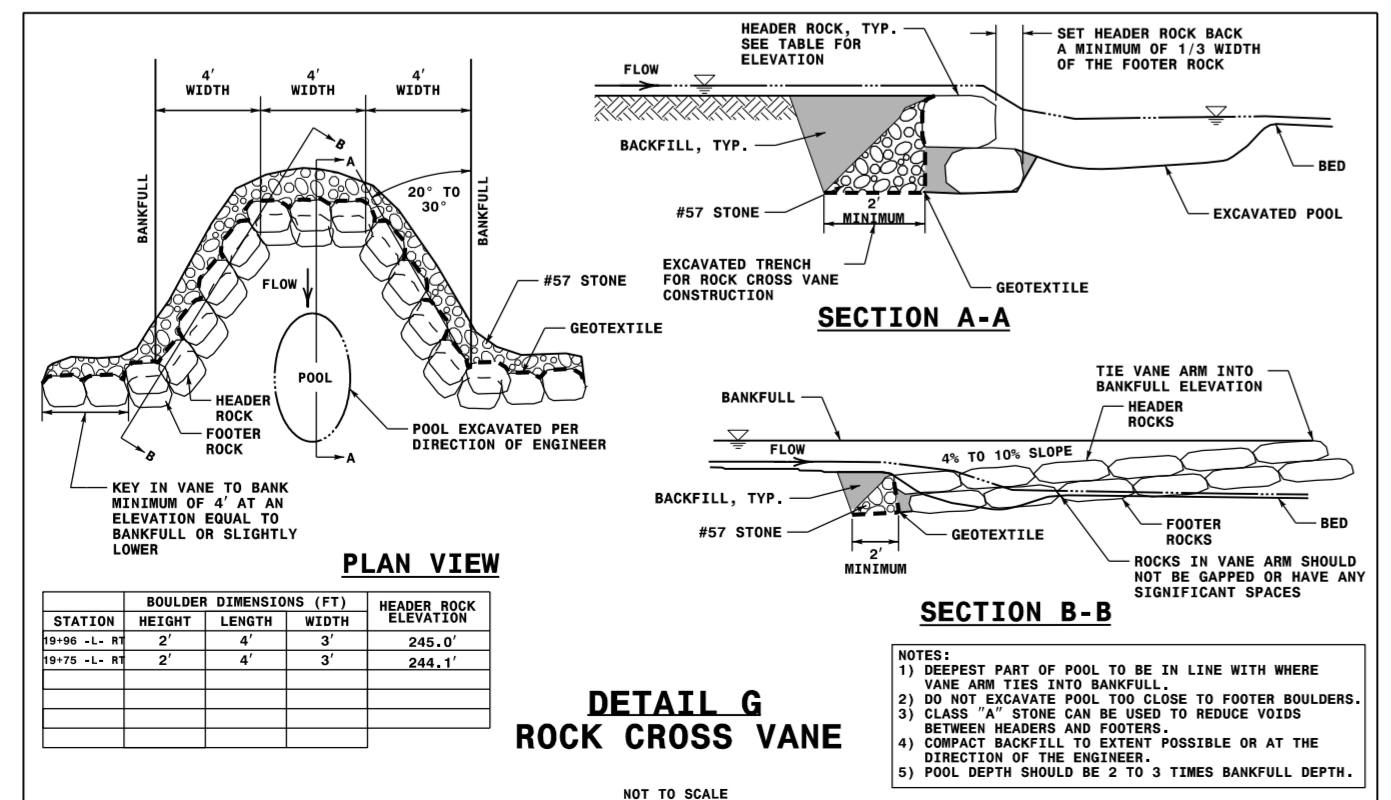
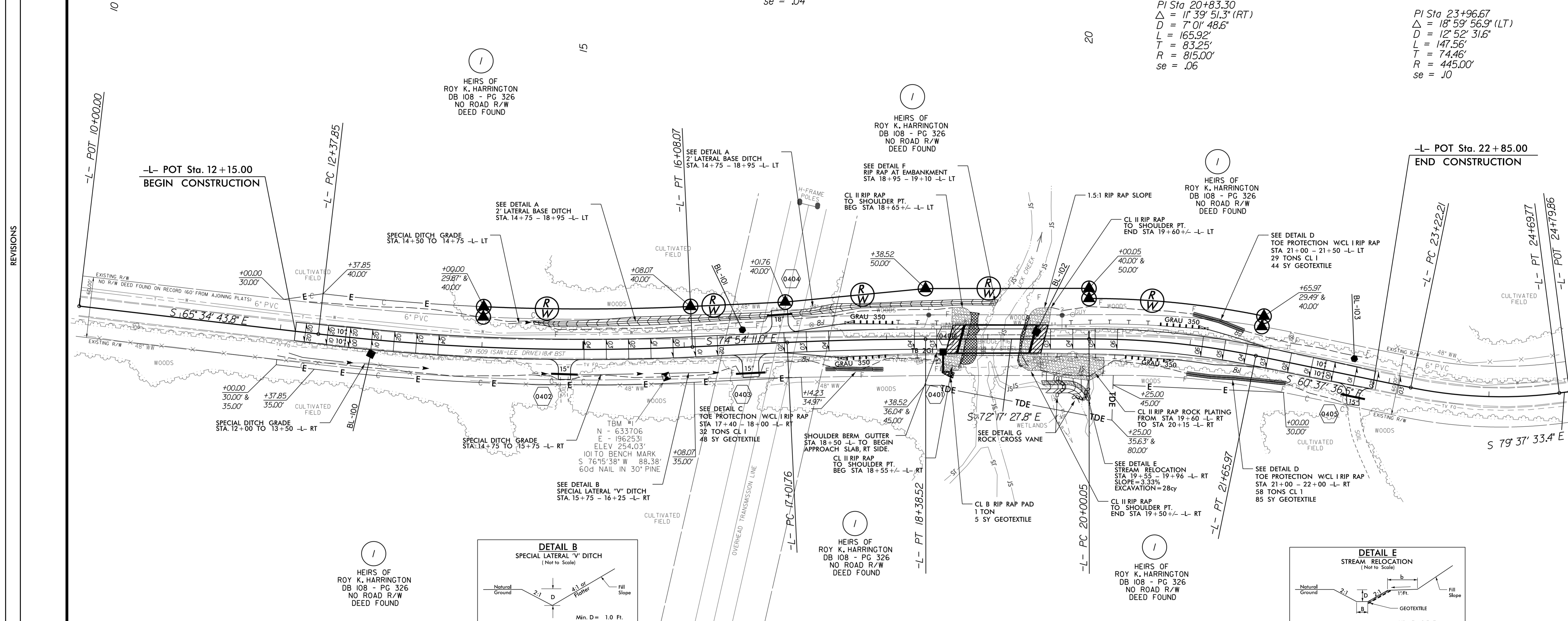
PI Sta 14+23.37  
 $\Delta = 9' 19" 26.7" (LT)$   
 $D = 2' 31" 06.6"$   
 $L = 370.22'$   
 $T = 185.52'$   
 $R = 2,275.00'$   
 $se = .04$



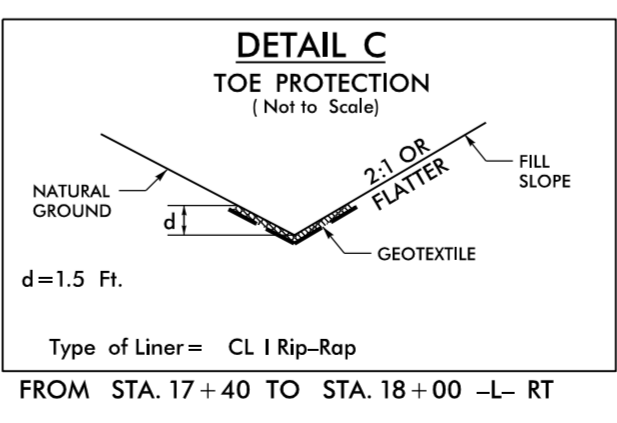
PI Sta 17+70.15  
 $\Delta = 2' 36" 43.2" (RT)$   
 $D = 1' 54" 35.5"$   
 $L = 136.76'$   
 $T = 68.39'$   
 $R = 3,000.00'$   
 $se = .04$

PI Sta 20+83.30  
 $\Delta = 11' 39" 51.3" (RT)$   
 $D = 7' 01" 48.6"$   
 $L = 165.92'$   
 $T = 83.25'$   
 $R = 815.00'$   
 $se = .06$

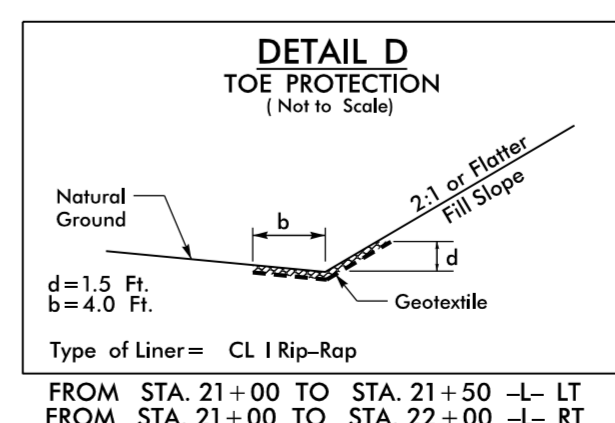
PI Sta 23+96.67  
 $\Delta = 18' 59" 56.9" (LT)$   
 $D = 12' 52" 31.6"$   
 $L = 147.56'$   
 $T = 74.46'$   
 $R = 445.00'$   
 $se = .10$



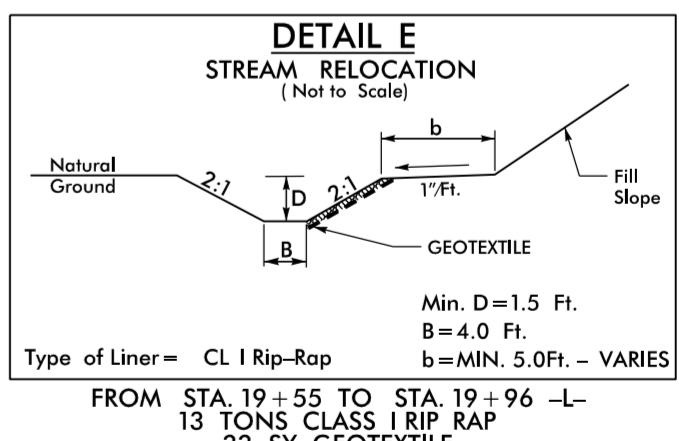
FROM STA. 15+75 TO STA. 16+25 -L- RT



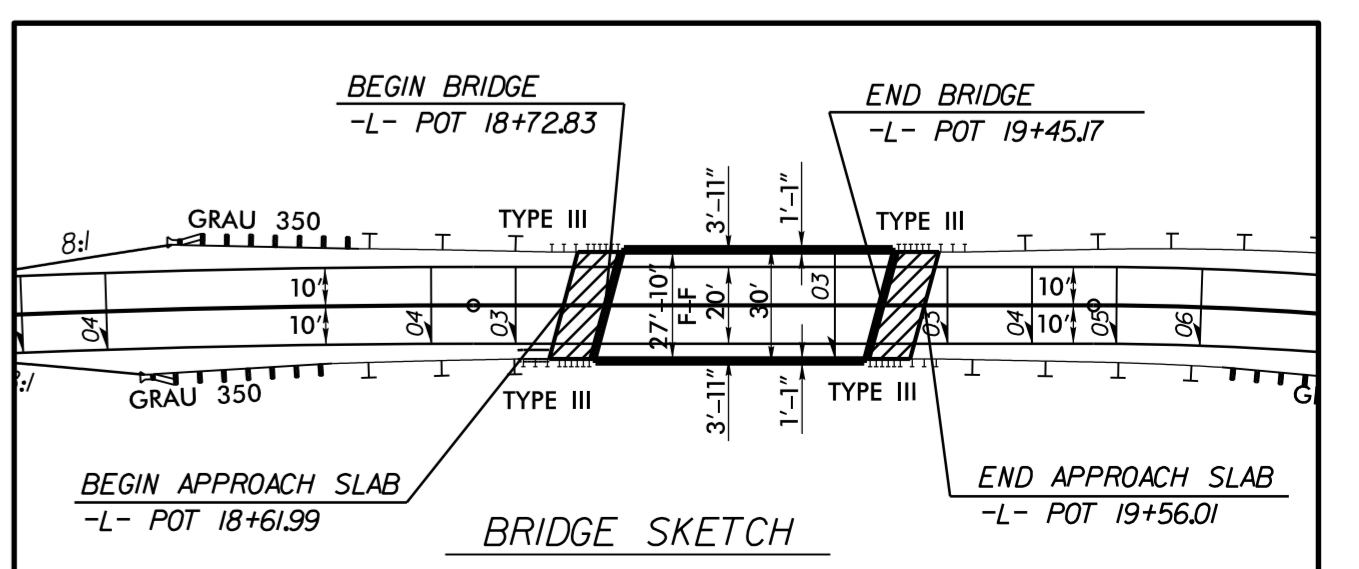
FROM STA. 17+40 TO STA. 18+00 -L- RT



FROM STA. 21+00 TO STA. 21+50 -L- LT  
 FROM STA. 21+00 TO STA. 22+00 -L- RT



FROM STA. 19+55 TO STA. 19+96 -L-  
 13 TONS CLASS I RIP RAP  
 22 SY GEOTEXTILE



FOR PROFILE, SEE SHEET 5

REVISIONS

4/26/2017  
 REVISIONS  
 Pro: NLEE016\_RdL.psh\_04.dgn

5/14/19

**CH ENGINEERING**  
 3220 GLEN ROYAL RD. RALEIGH, NC 27617  
 TELE 919.788.0224 FAX 919.788.0232  
 NC LICENSE #P-0189

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

PROJECT REFERENCE NO. <b>17BP.8.R.114</b>	SHEET NO. <b>5</b>
ROADWAY DESIGN ENGINEER 5/1/2017	HYDRAULICS ENGINEER 5/1/2017
Brian A. Wiles	Andrew T. Nottingham

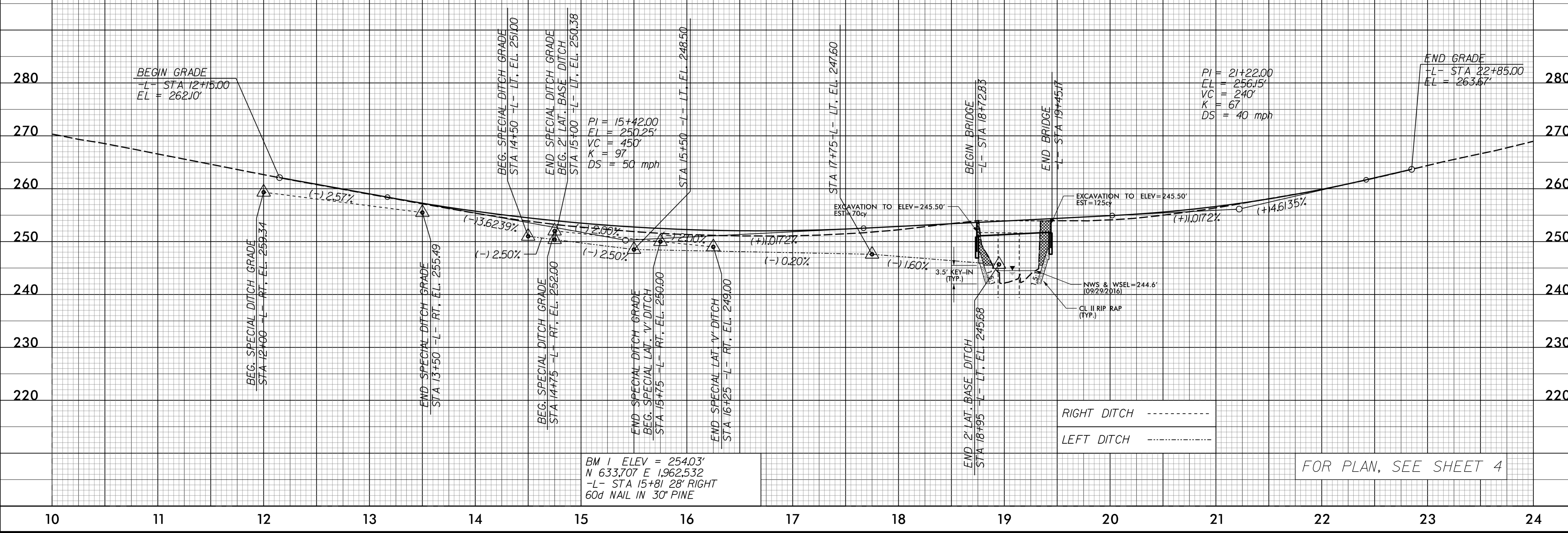
Designed by  
**Andrew T. Nottingham**  
ESC204P94042451

**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE	= 1300	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 248.9	FT
BASE DISCHARGE	= 1800	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 249.73	FT
OVERTOPPING DISCHARGE	= 3000	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 252.24	FT

DATE OF SURVEY	= 9-29-16	
W.S.ELEVATION AT DATE OF SURVEY	= 244.6	FT



FOR PLAN, SEE SHEET 4

4/26/2017  
P:\Projects\17BP.8.R.114\17BP.8.R.114\_P01.dgn

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - TYPES AND MOUNTING
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

### GENERAL NOTES

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

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

#### TRAFFIC PATTERN ALTERATIONS

- A) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTEN ALTERATION.

#### SIGNING

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

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

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

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

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

#### TRAFFIC CONTROL DEVICES

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

#### PAVEMENT MARKINGS AND MARKERS

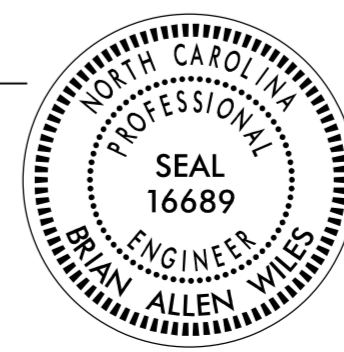
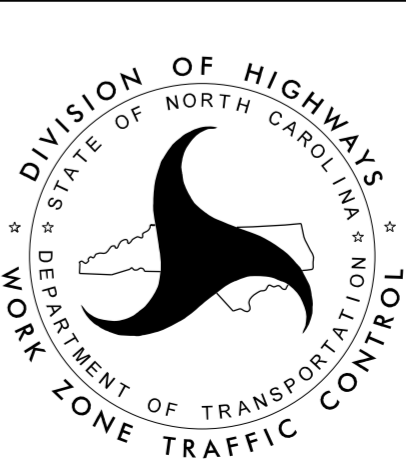
- F) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE.

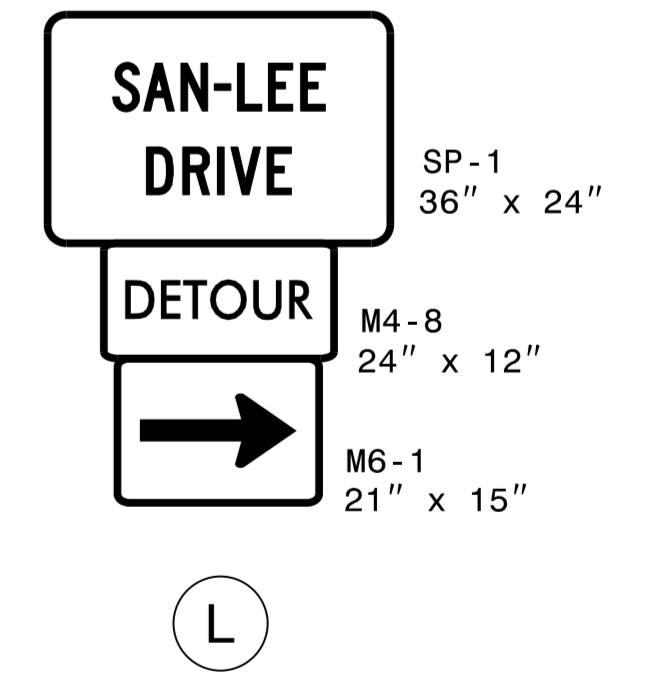
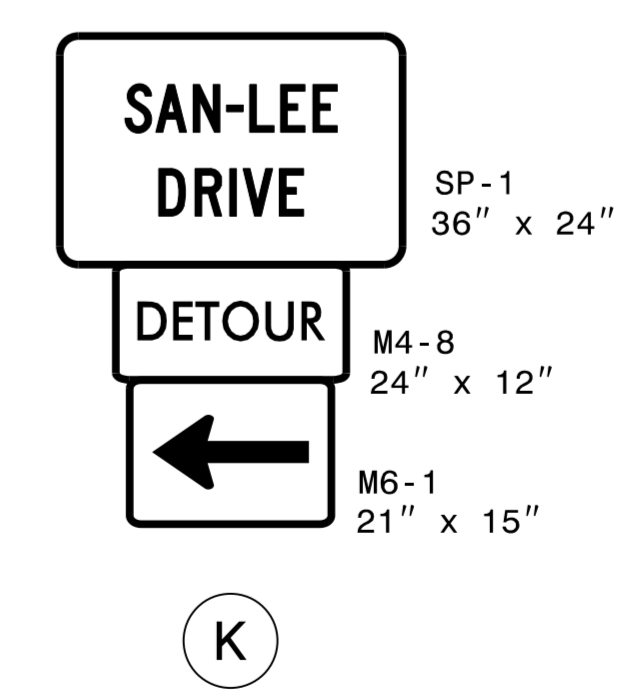
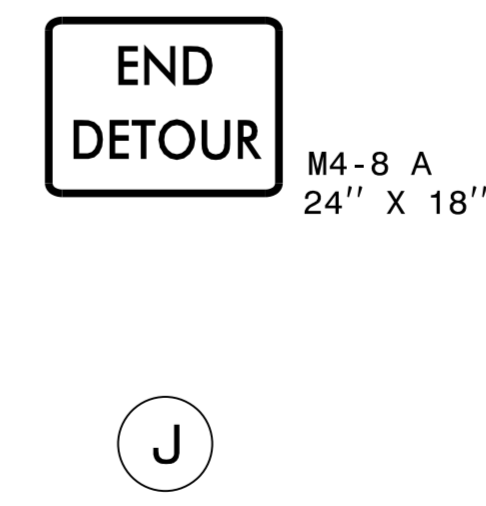
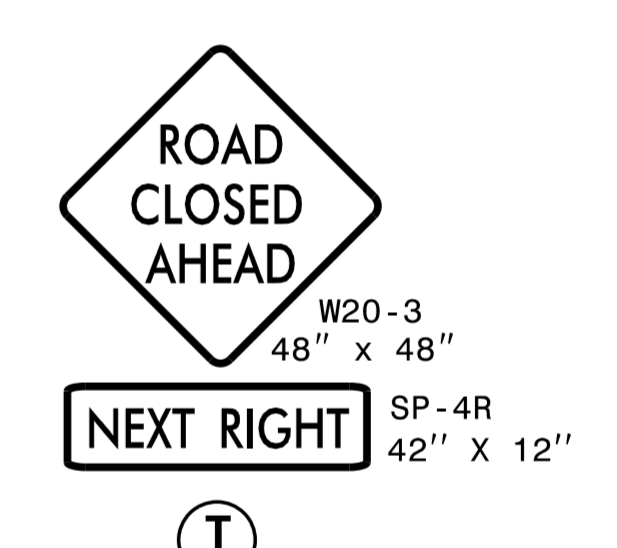
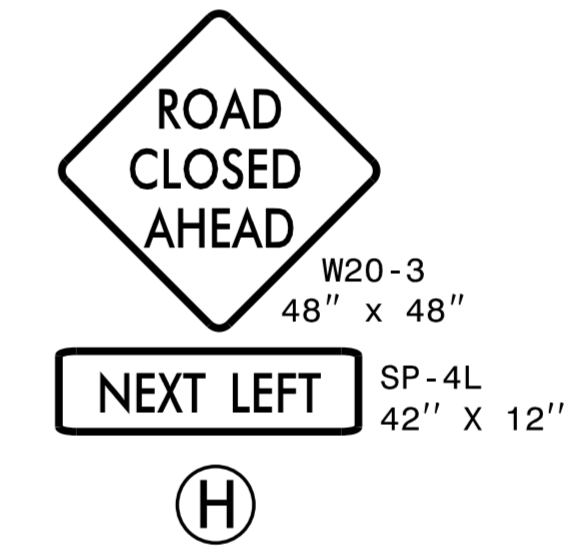
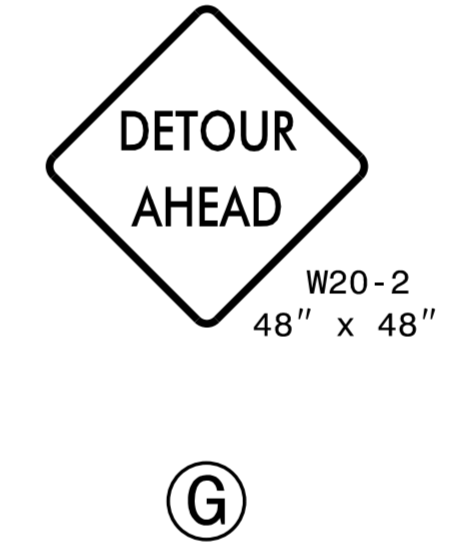
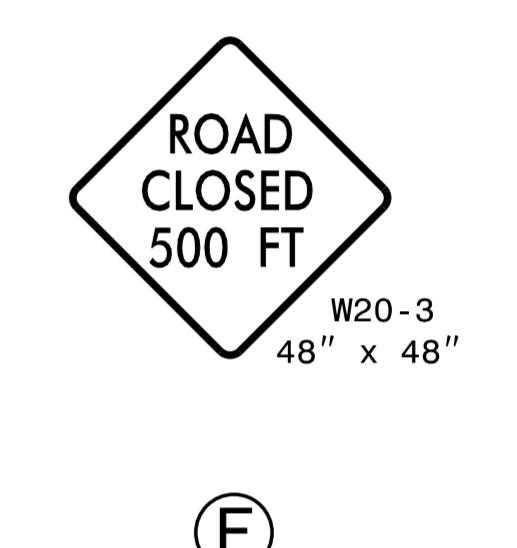
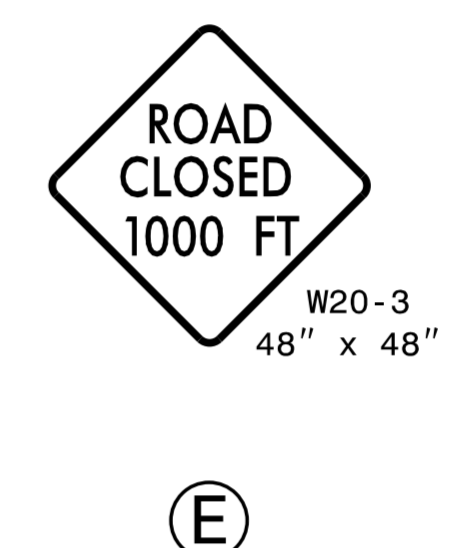
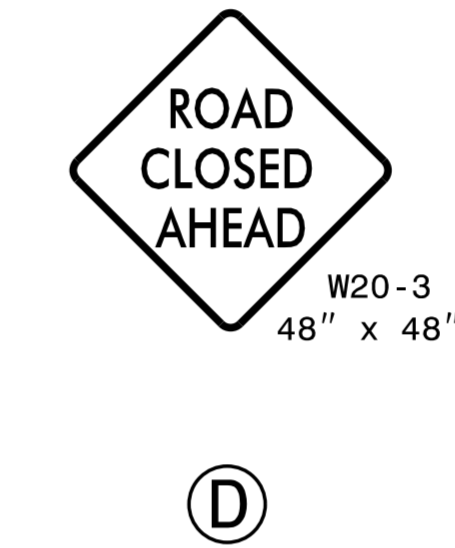
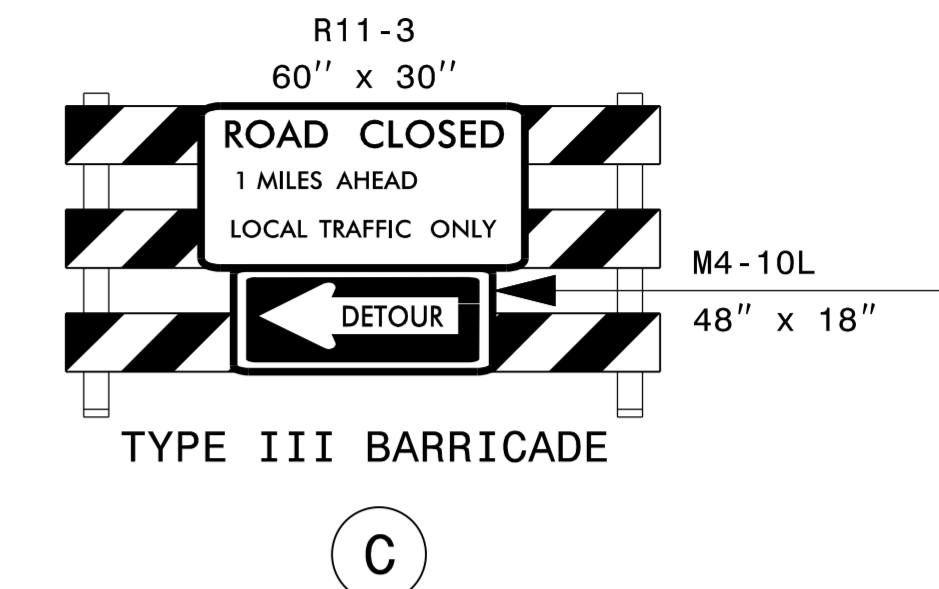
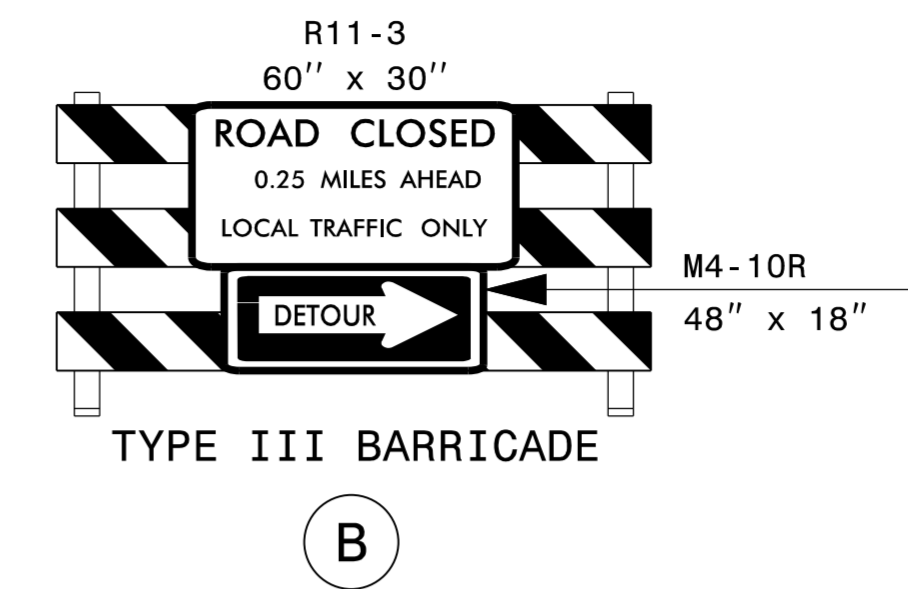
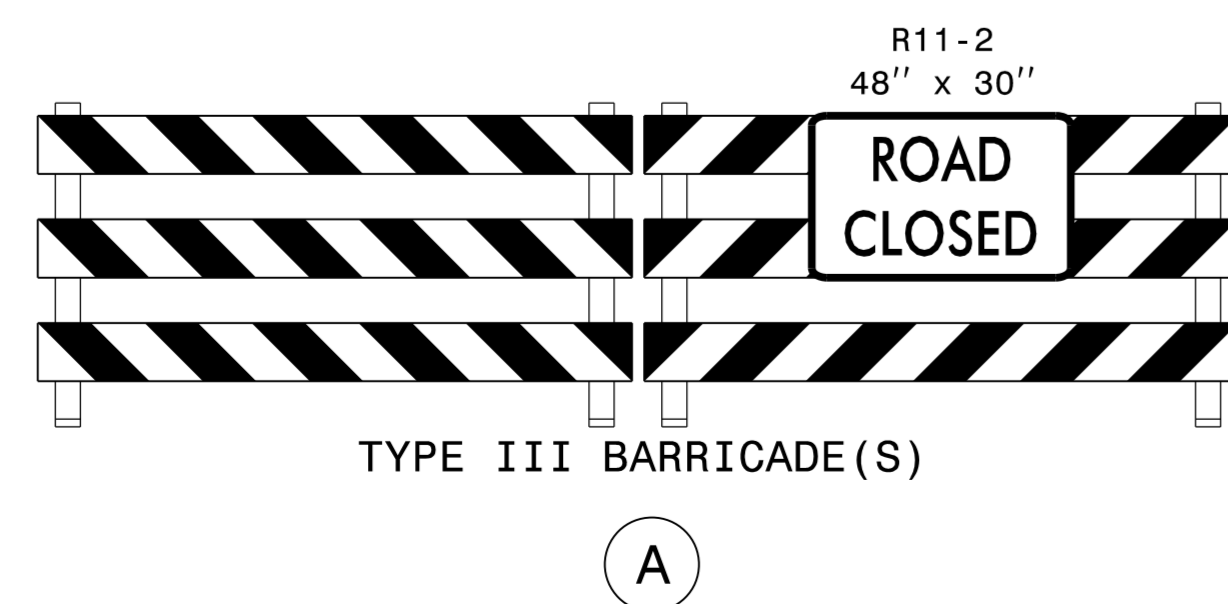
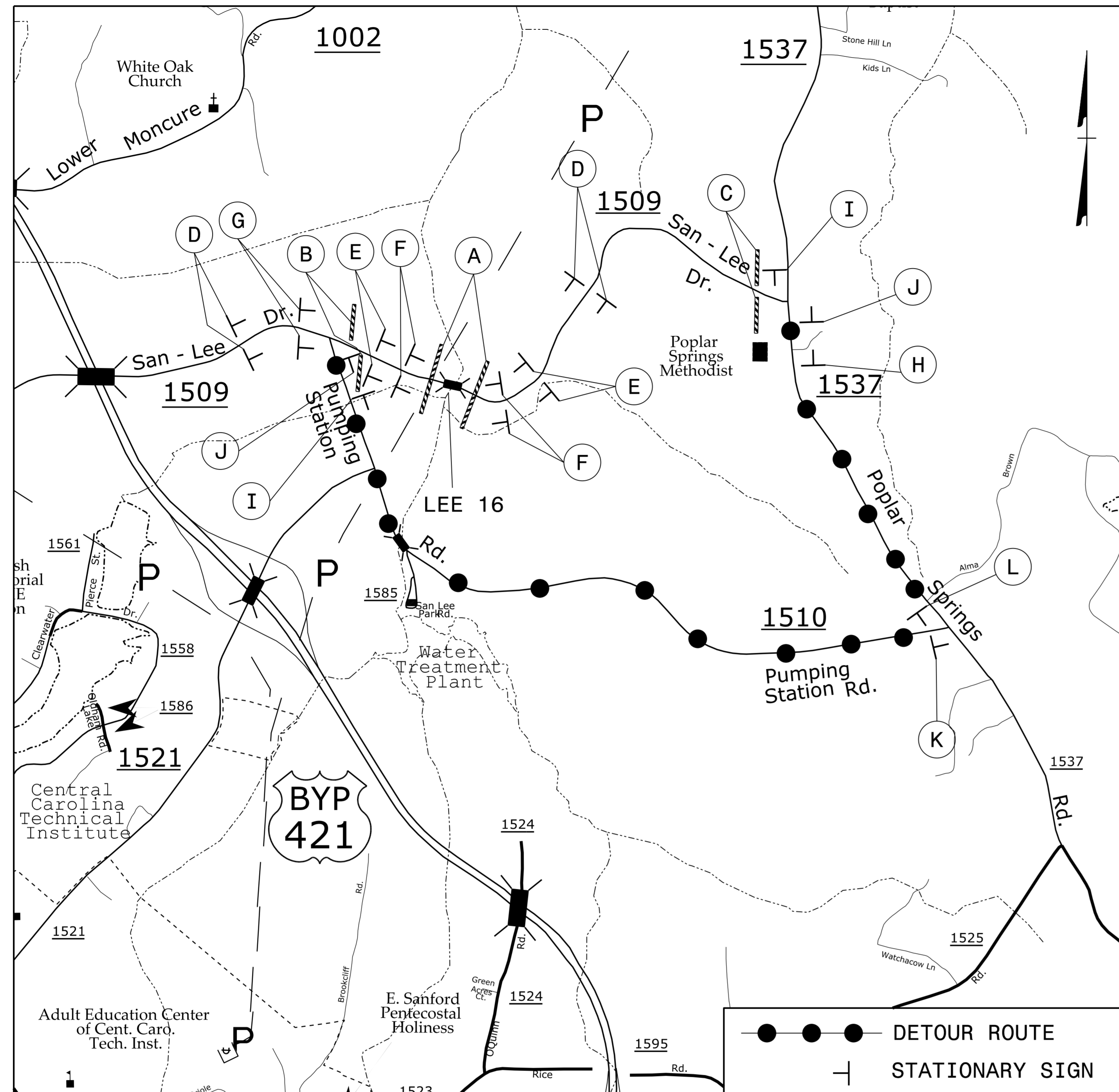
### PHASING

- STEP 1: USING ROADWAY STANDARD DRAWING NUMBER 1101.03, SHEET 1 OF 9, AND TMP-2, PERFORM THE FOLLOWING:  
 - INSTALL ALL ROAD CLOSURE AND DETOUR SIGNING INCLUDING BARRICADES  
 - CLOSE SR 1509 (SAN-LEE DRIVE)  
 - PLACE TRAFFIC ONTO OFF-SITE DETOUR
- STEP 2: REMOVE EXISTING BRIDGE #016 AND CONSTRUCT THE PROPOSED BRIDGE AND APPROACHES AS SHOWN IN THE CONSTRUCTION PLANS.
- STEP 3: INSTALL FINAL PAVEMENT MARKINGS.
- STEP 4: REMOVE ALL TRAFFIC CONTROL SIGNING AND DEVICES AND RE-OPEN SR 1509 (SAN-LEE DRIVE) TO THE FINAL TRAFFIC PATTERN.

### PAVEMENT MARKING

THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	2140 LF
THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	2140 LF
PERMANENT RAISED PAVEMENT MARKERS	30 EACH

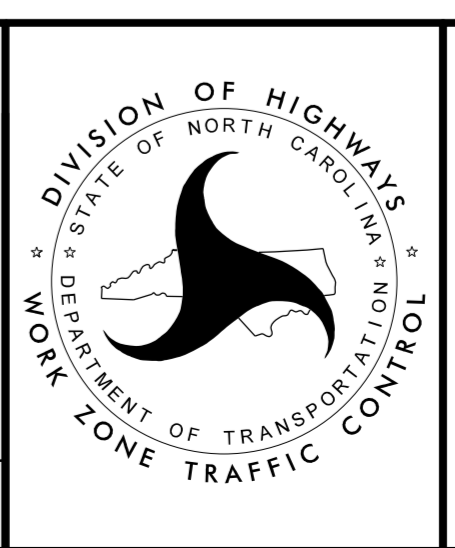
APPROVED: <u>Brian A Wiles</u> <small>8890DFEAE34DE</small> DATE: 5/1/2017 SEAL 		<b>TRANSPORTATION OPERATIONS PLAN</b>
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>		



APPROVED: *Brian A. Willes*  
DATE: 5/1/2017

SEAL

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



DETOUR ROUTE AND SIGNS

4/25/2017 8:47:00 AM C:\TrafficControl\TCP\Lee6.TC.TMP.dgn USERNAME

<b>SIGN NUMBER:</b> SP-1	<b>BACKG COLOR:</b> Fluorescent Orange	<b>DESIGN BY:</b>	<b>CHECKED BY:</b>	<b>Apr 24, 2017</b>
<b>TYPE:</b> STATIONARY	<b>COPY COLOR:</b> Black	<b>PROJECT ID:</b> 17BP.8.R.114	<b>LOCATION:</b>	<b>DIV:</b> 8
<b>QUANTITY:</b> SEE PLANS				
<b>SIGN WIDTH:</b> 3'-0"				
<b>HEIGHT:</b> 2'-0"				
<b>TOTAL AREA:</b> 6.0 Sq.Ft.				
<b>BORDER TYPE:</b> INSET				
<b>RECESS:</b> 0.47"				
<b>WIDTH:</b> 0.63"				
<b>RADII:</b> 1.5"				
<b>NO. Z BARS:</b>	<b>MAT'L:</b> 0.080" (2.0 mm) ALUMINUM			
<b>LENGTH:</b>				

Spacing Factor is 1 unless specified otherwise

**LETTER POSITIONS**

Letter spacings are to start of next letter													Series/Size
													Text Length
	S	A	N	-	L	E	E						C 2000
	6.9	3.3	3.9	3.5	2.5	3.3	3.4	2.6	6.9				22.3
	D	R	I	V	E								C 2000
	10.4	3.8	3.6	1.4	3.8	2.6	10.4						15.2

FILENAME: lee16\_san-lee dr\_sign\_design

NORTH CAROLINA D.O.T. SIGN DETAIL

4/25/2017 R:\TrafficControl\TCP\Lee16\_TC\_specialsign.dgn USERNAME

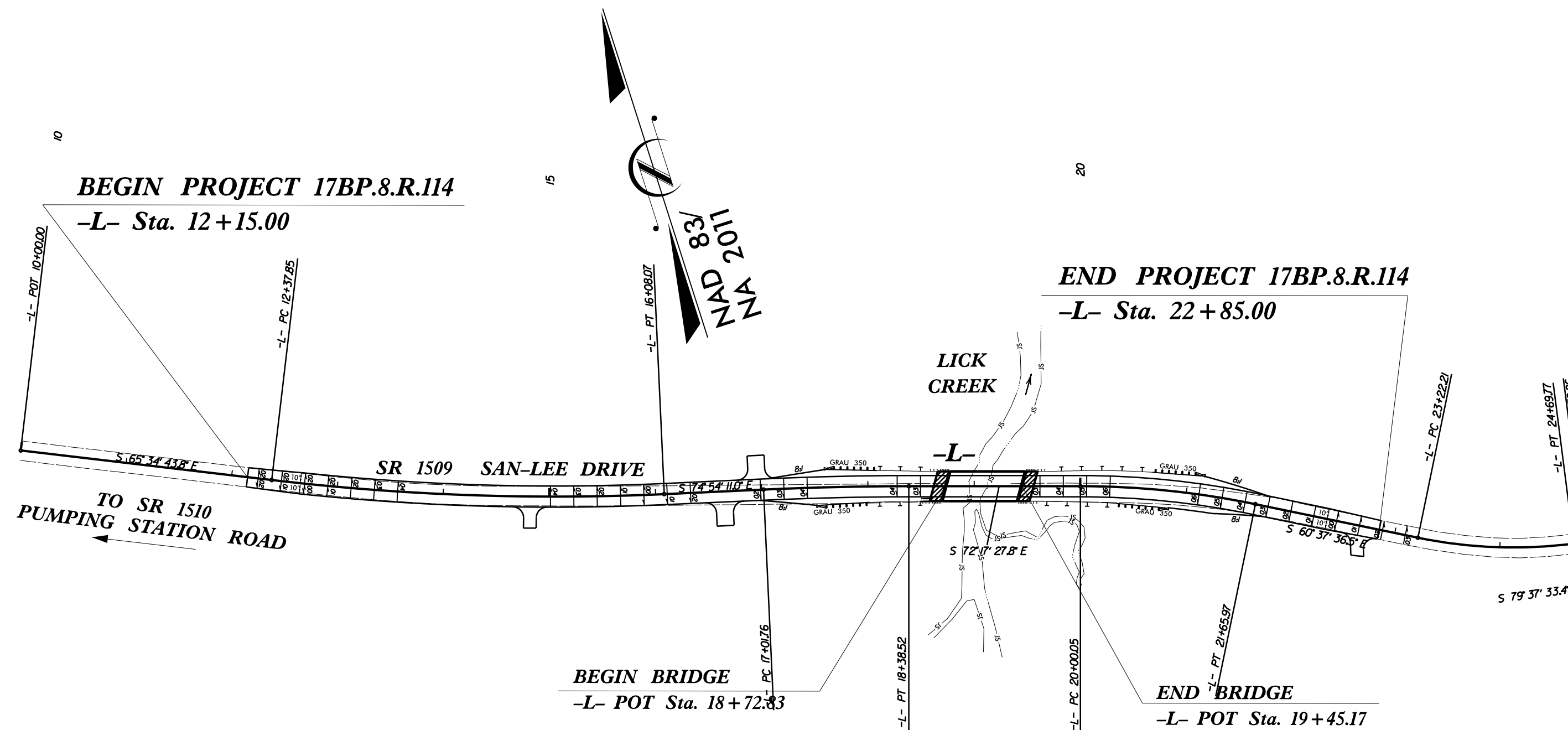
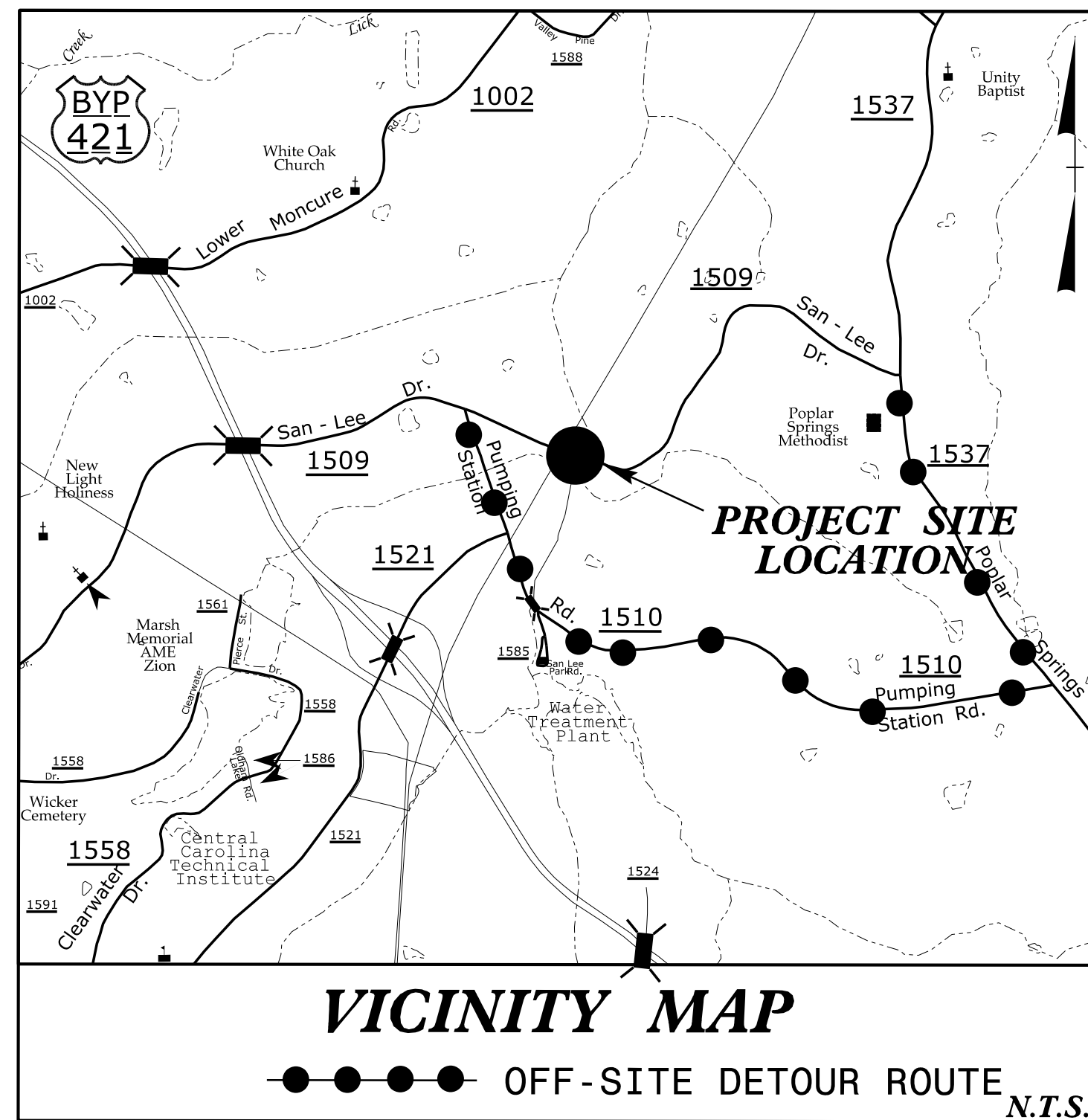
APPROVED: <u>Brian A. Wiles</u> <small>DocuSigned by: BRIAN A WILES</small> DATE: 5/1/2017  SEAL 		<b>SIGN DESIGN</b>
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>		

**TIP PROJECT: 17BP.8.R.114**

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
PLAN FOR PROPOSED  
HIGHWAY EROSION CONTROL  
**LEE COUNTY**

**LOCATION: BRIDGE NO. 520016 ON SR 1509 (SAN-LEE DRIVE)  
OVER LICK CREEK**

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



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.8.R.114	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

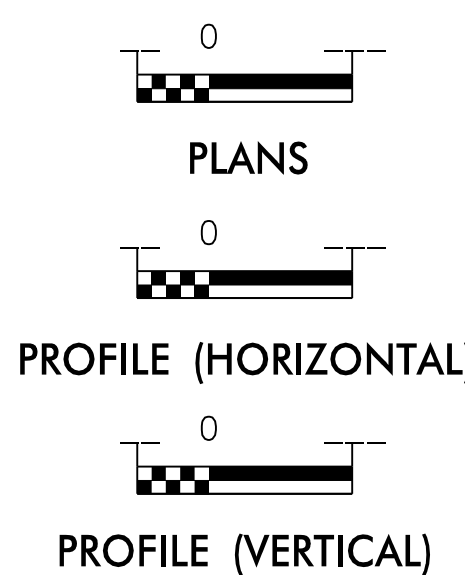
**EROSION AND SEDIMENT CONTROL MEASURES**

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	III III III
1606.01	Special Sediment Control Fence	▲▲▲▲▲
1622.01	Temporary Berms and Slope Drains	▲
1630.02	Silt Basin Type B	▨
1633.01	Temporary Rock Silt Check Type-A	▨
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	▨
1633.02	Temporary Rock Silt Check Type-B	▨
	Wattle/Coir Fiber Wattle	W
	Wattle/Coir Fiber Wattle with Polyacrylamide (PAM)	W
1634.01	Temporary Rock Sediment Dam Type-A	▨
1634.02	Temporary Rock Sediment Dam Type-B	▨
1635.01	Rock Pipe Inlet Sediment Trap Type-A	U
1635.02	Rock Pipe Inlet Sediment Trap Type-B	U
1630.04	Stilling Basin	▭
1630.06	Special Stilling Basin	▭
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	▭
	Tiered Skimmer Basin	▭
	Infiltration Basin	▭

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

**ENVIRONMENTALLY  
SENSITIVE AREA(S) EXIST  
ON THIS PROJECT**  
*Refer To E. C. Special Provisions  
for Special Considerations.*

**GRAPHIC SCALE**



THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 1, 2016 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER RESOURCES.

Prepared in the Office of:  
**MI ENGINEERING**  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606

Designed by:  
**KAREN HEFNER, PE** 3824  
NAME LEVEL III CERTIFICATION NO.

Reviewed in the Office of:  
**ROADSIDE ENVIRONMENTAL UNIT**  
1 South Wilmington St.  
Raleigh, NC 27611

**2012 STANDARD SPECIFICATIONS**

Reviewed by:  
**JENNIFER PARISH**

Roadway Standard Drawings

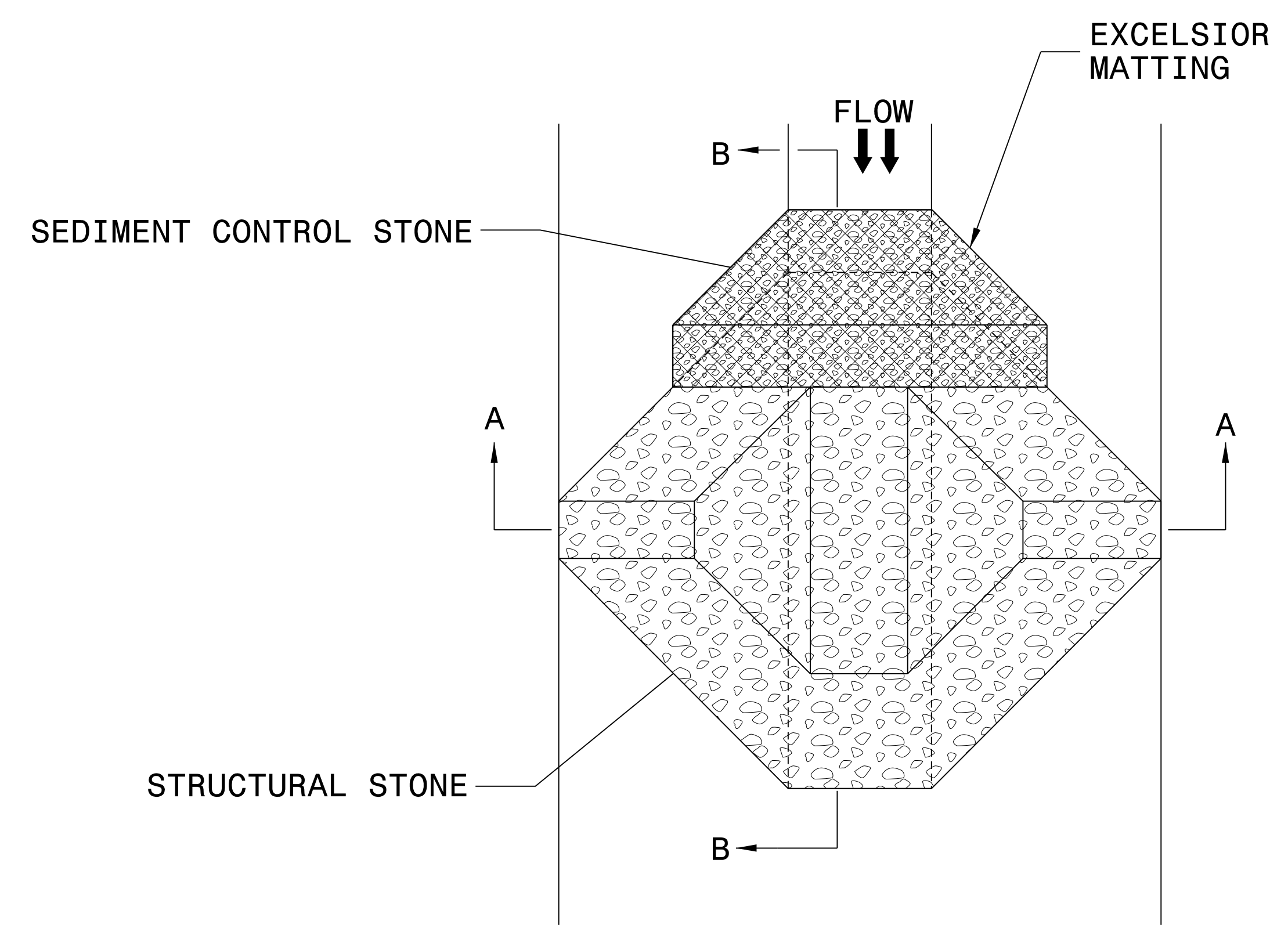
The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2012 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01 Railroad Erosion Control Detail	1632.01 Rock Inlet Sediment Trap Type A
1605.01 Temporary Silt Fence	1632.02 Rock Inlet Sediment Trap Type B
1606.01 Special Sediment Control Fence	1632.03 Rock Inlet Sediment Trap Type C
1607.01 Gravel Construction Entrance	1633.01 Temporary Rock Silt Check Type A
1622.01 Temporary Berms and Slope Drains	1633.02 Temporary Rock Silt Check Type B
1630.01 Riser Basin	1634.01 Temporary Rock Sediment Dam Type A
1630.02 Silt Basin Type B	1634.02 Temporary Rock Sediment Dam Type B
1630.03 Temporary Silt Ditch	1635.01 Rock Pipe Inlet Sediment Trap Type A
1630.04 Stilling Basin	1635.02 Rock Pipe Inlet Sediment Trap Type B
1630.05 Temporary Diversion	1640.01 Coir Fiber Baffle
1630.06 Special Stilling Basin	1645.01 Temporary Stream Crossing
1631.01 Matting Installation	



PROJECT REFERENCE NO. 17BP.8.R.114	SHEET NO. EC-2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN

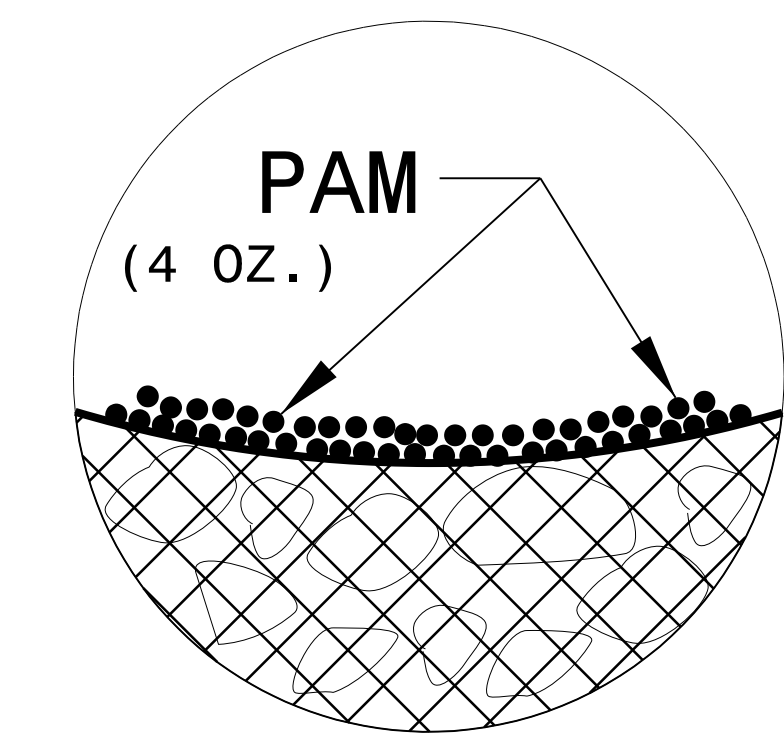
**NOTES:**

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

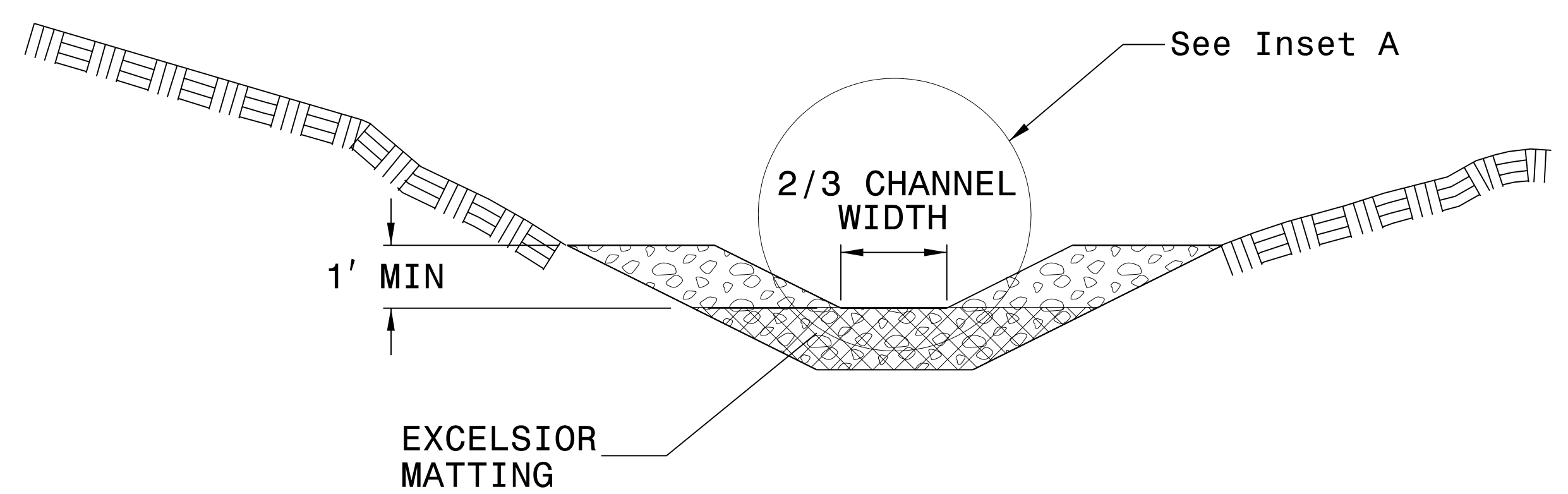
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

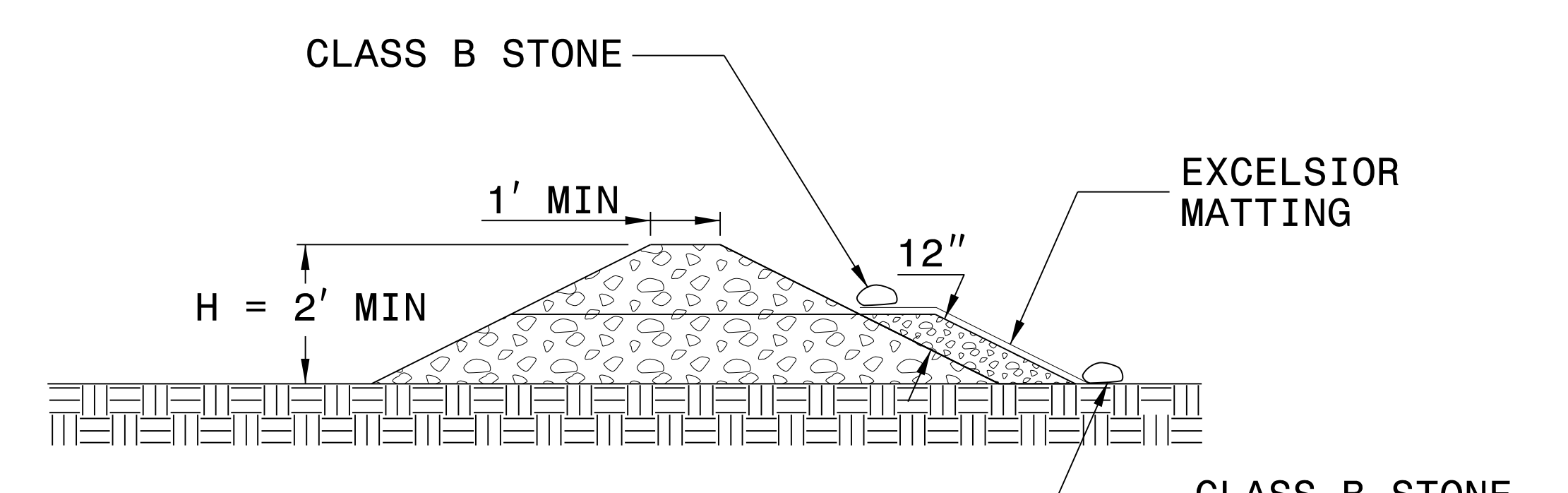
INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION A-A

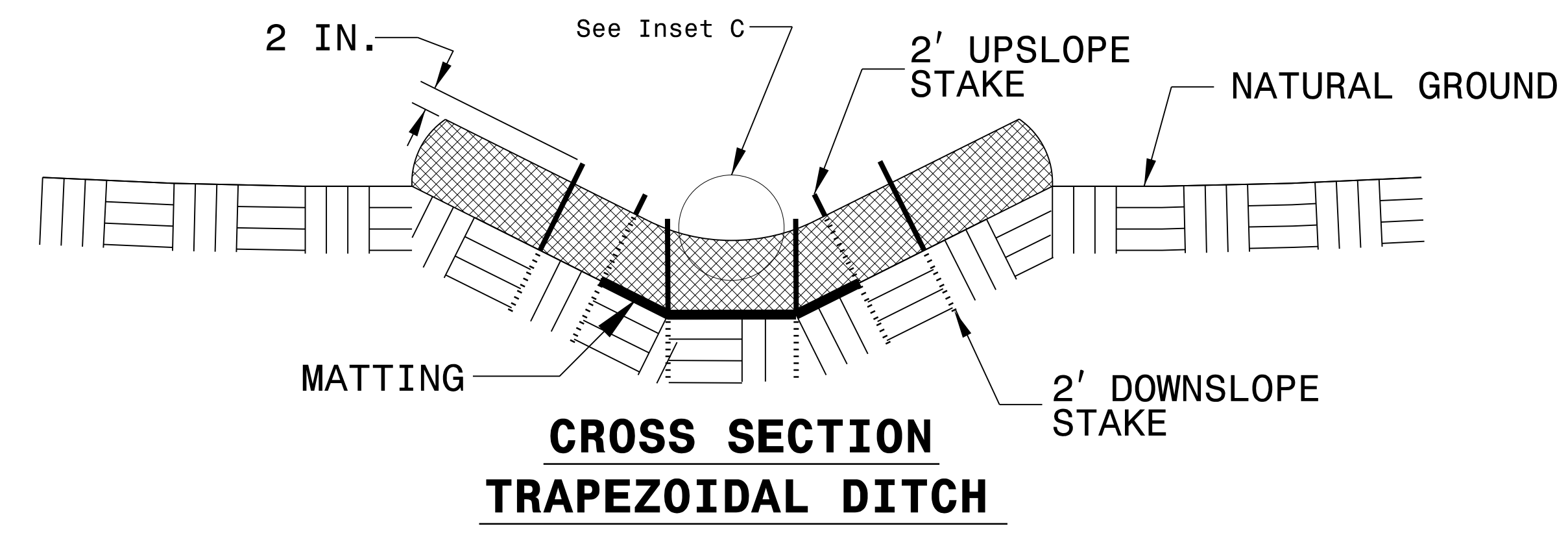
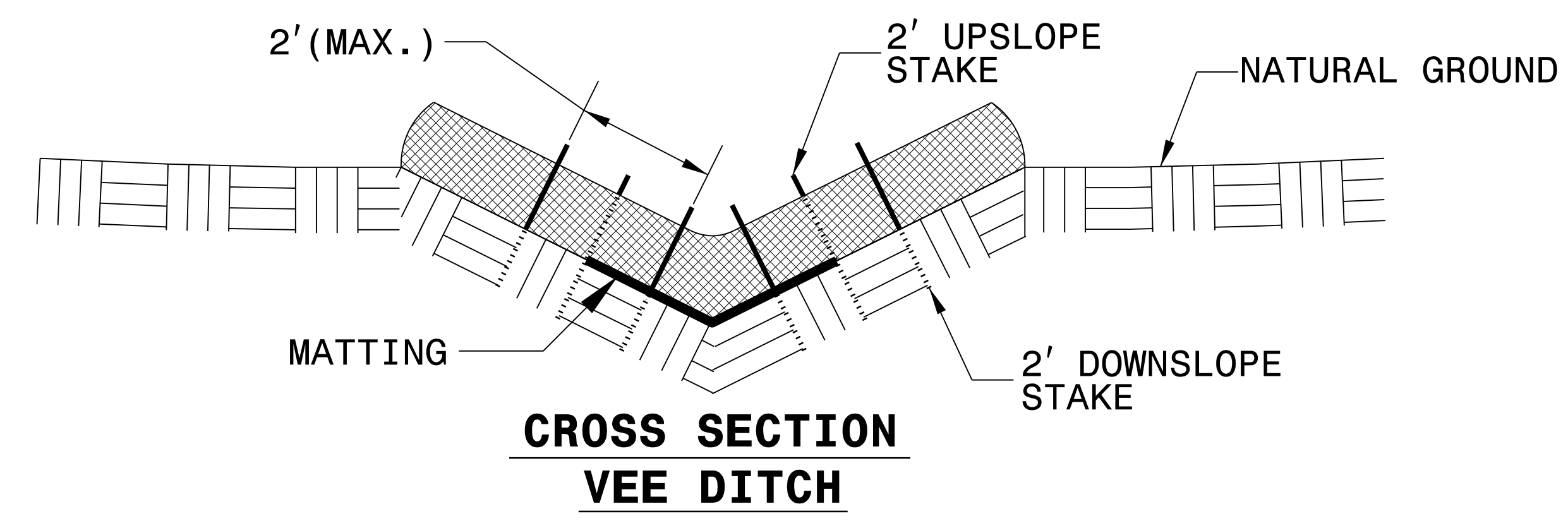
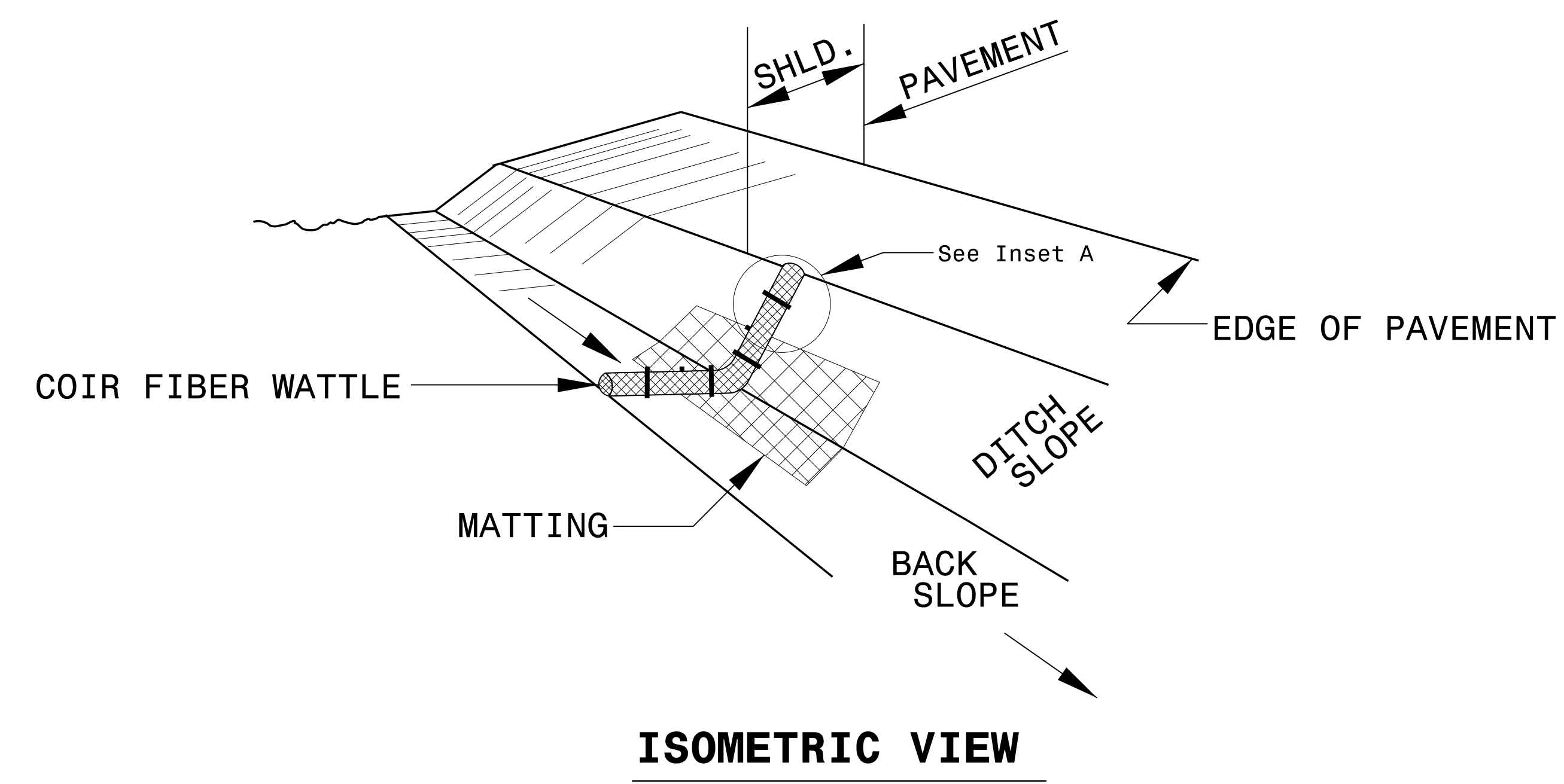


SECTION B-B

NOT TO SCALE

PROJECT REFERENCE NO. 17BP.8.R.114	SHEET NO. EC-2A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



**NOTES:**

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.

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

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

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

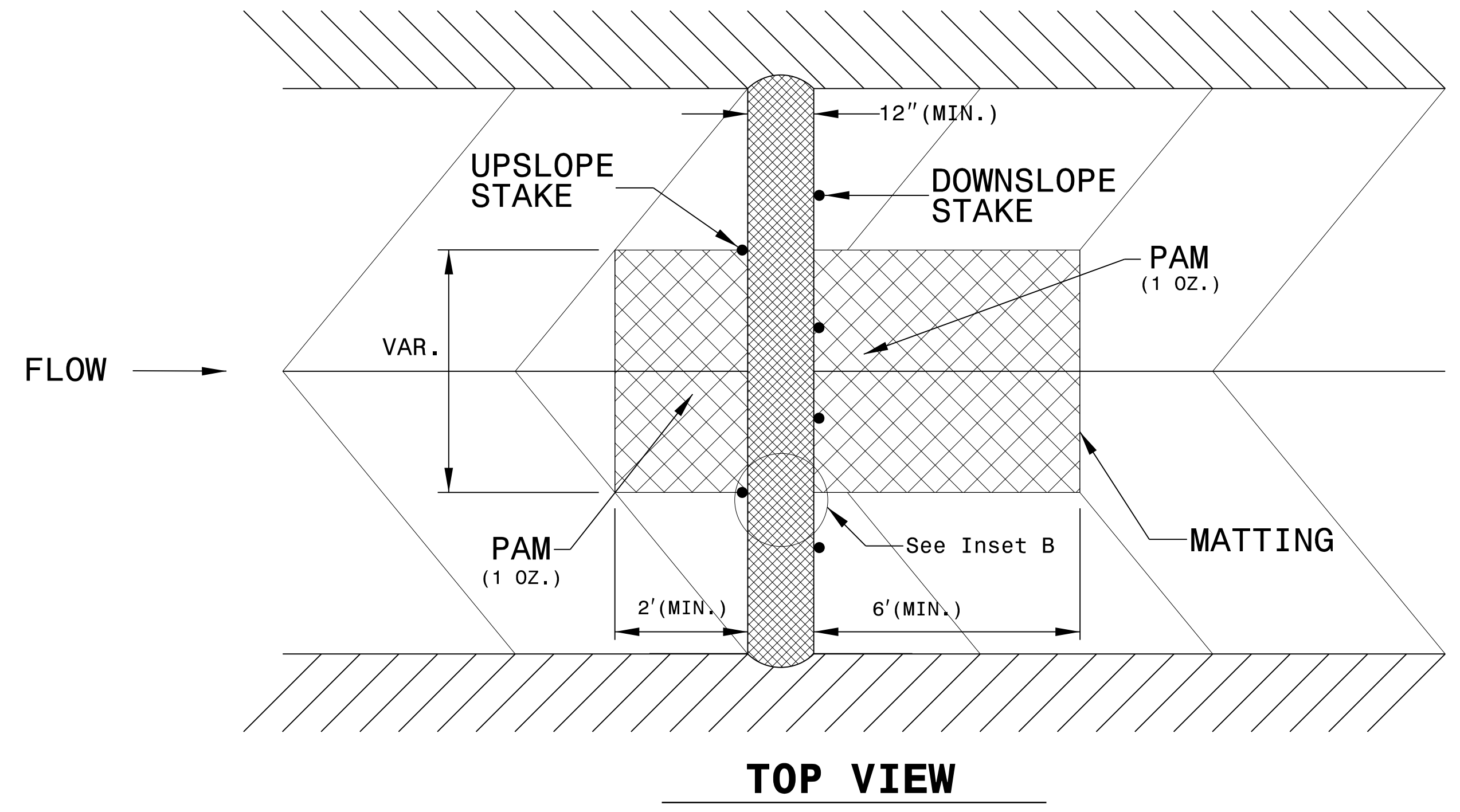
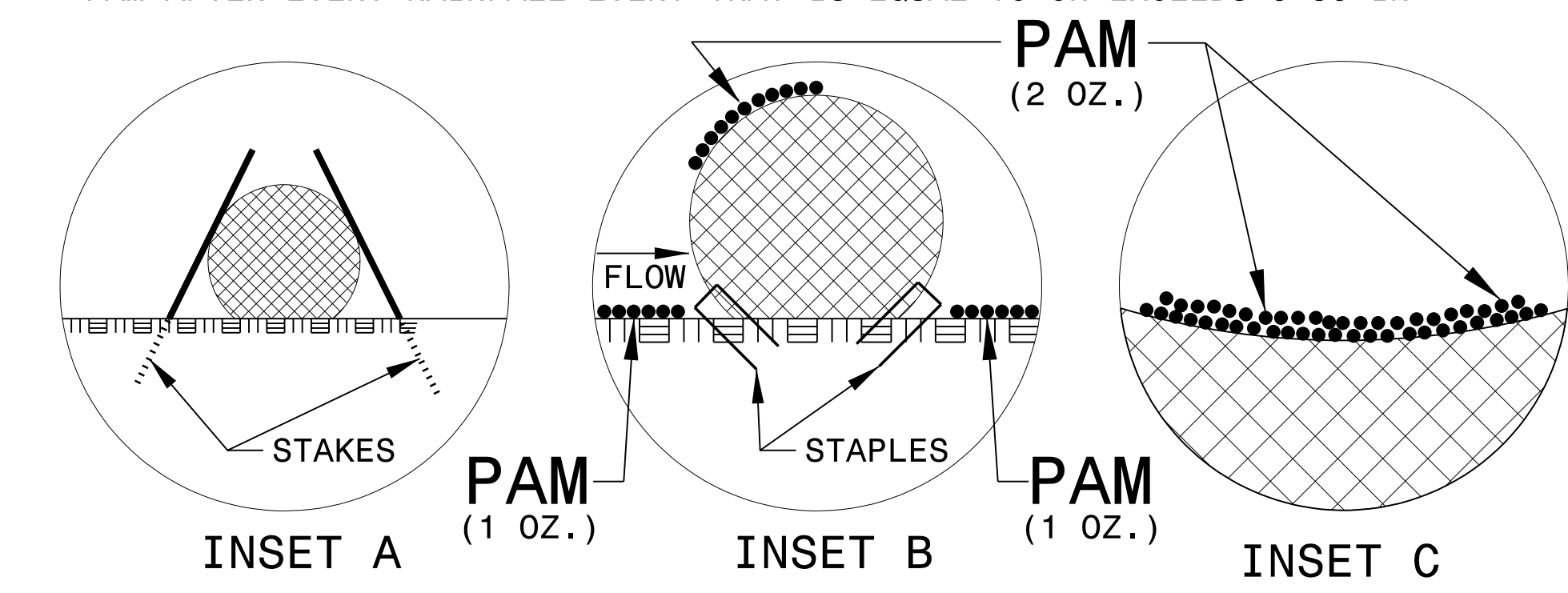
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

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

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.





DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

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PROJECT REFERENCE NO. <i>17BP.8.R.114</i>	SHEET NO. <i>EC-3A</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# ***SOIL STABILIZATION TIMEFRAMES***

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

8/17/99

# CLEARING & GRUBBING PLAN

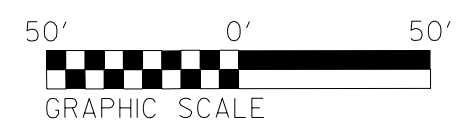
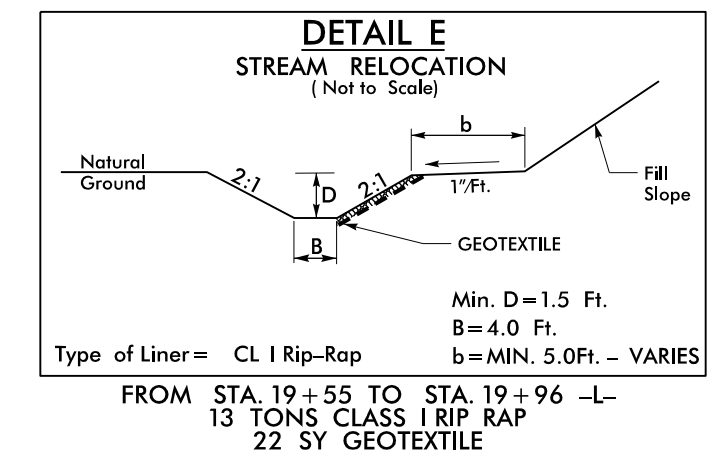
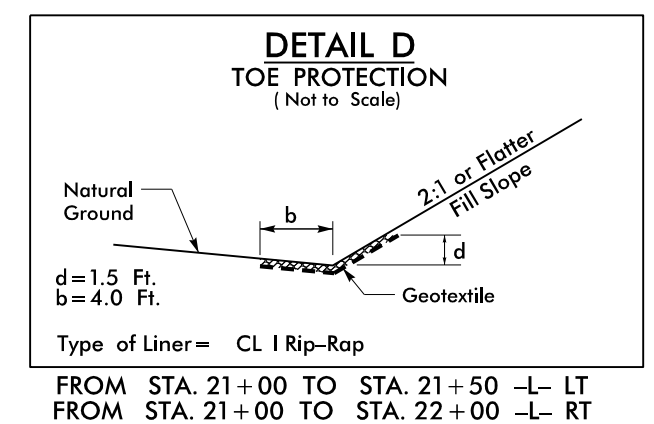
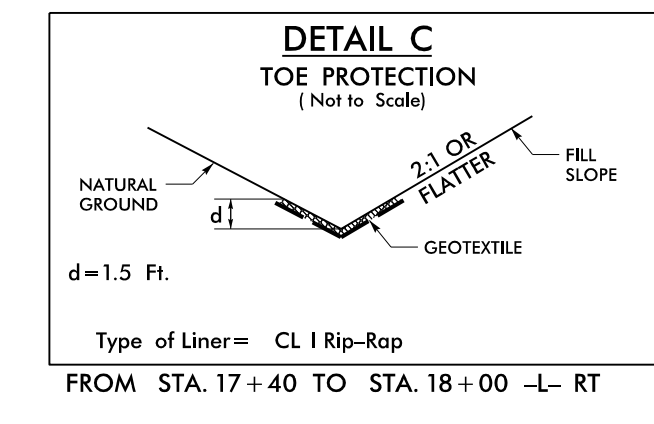
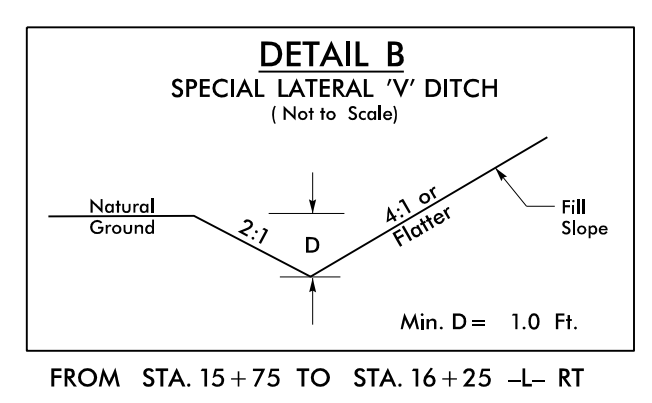
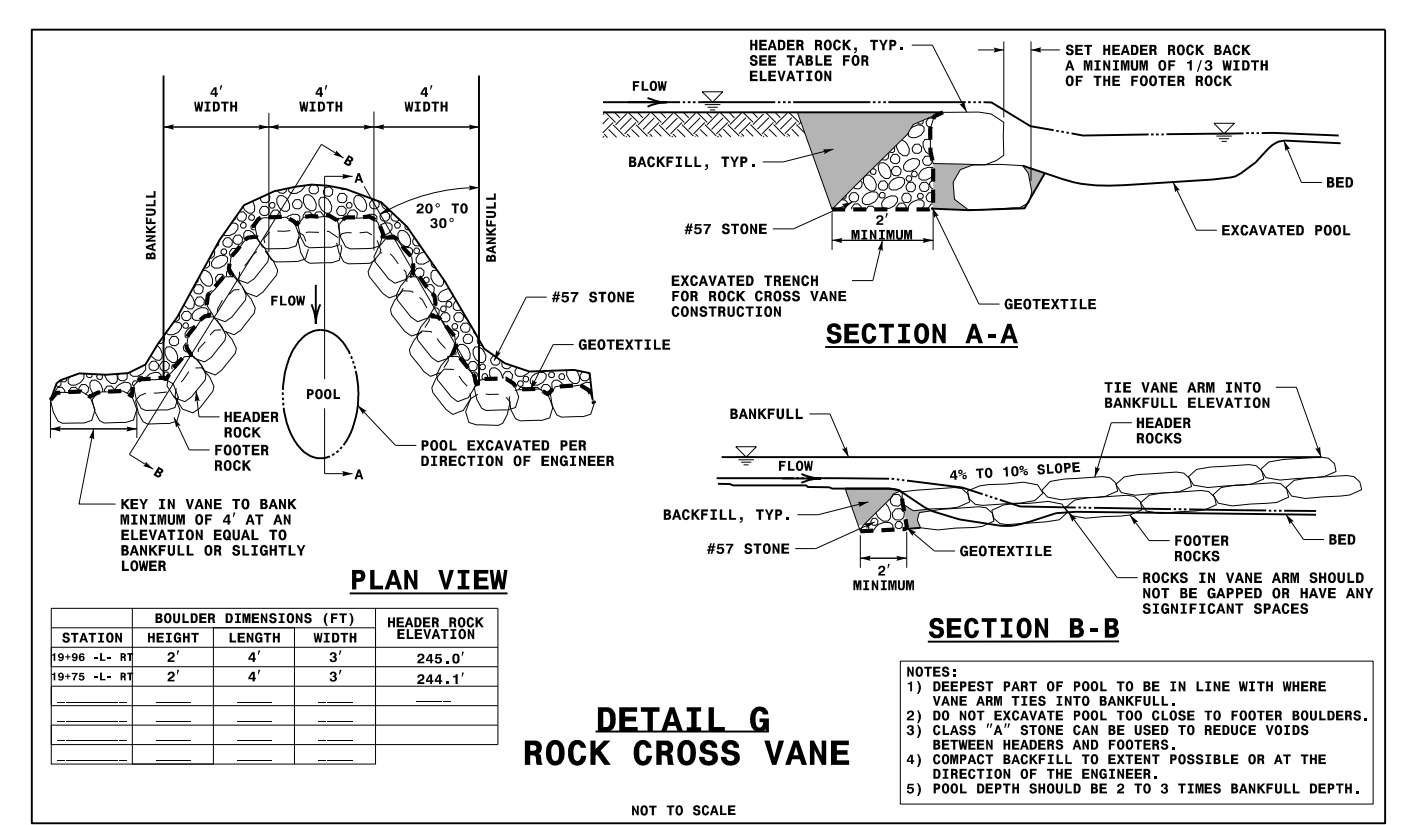
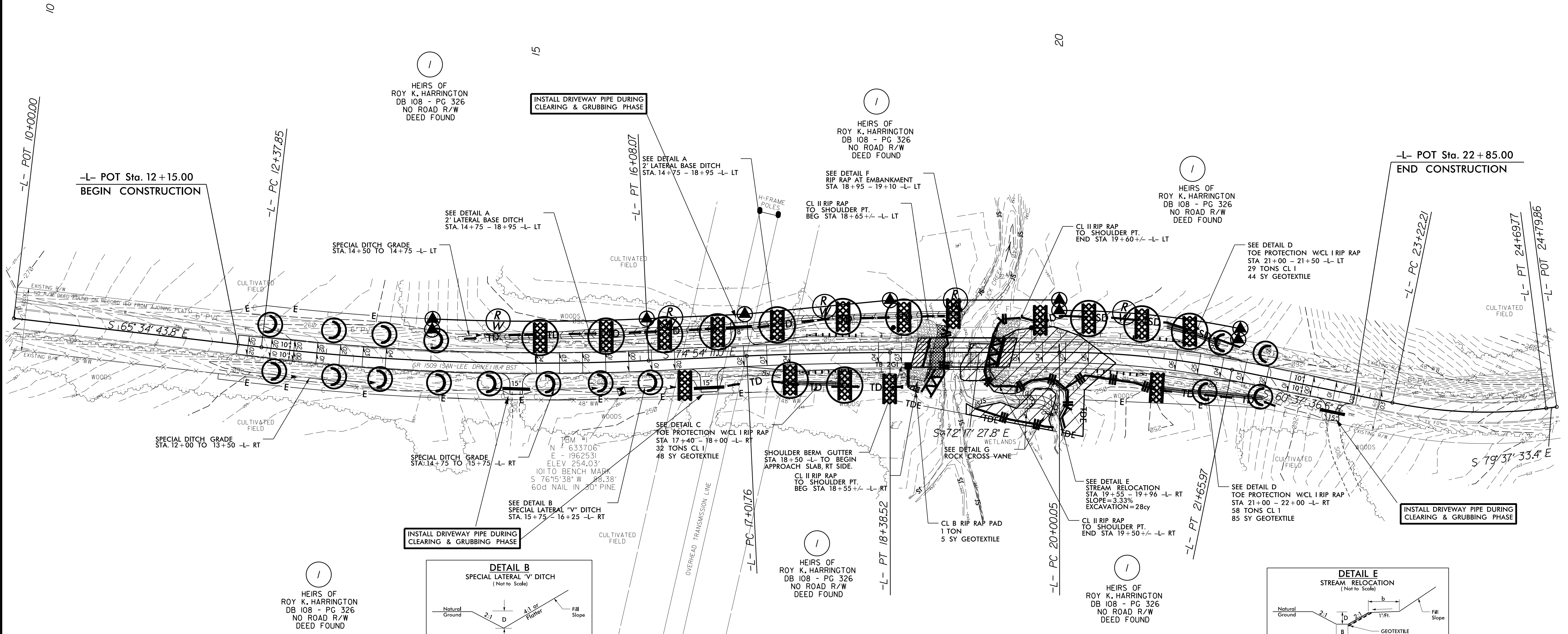
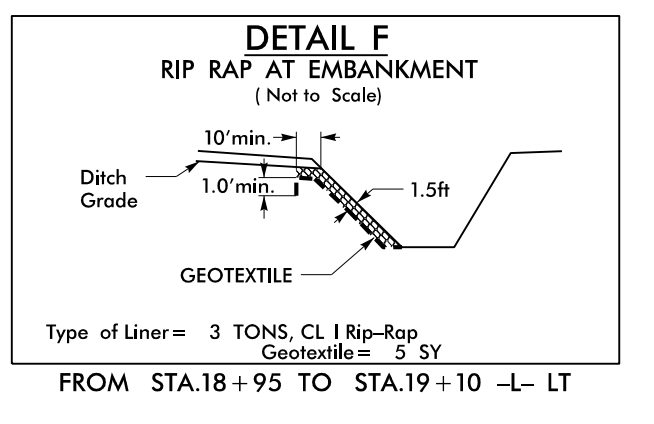
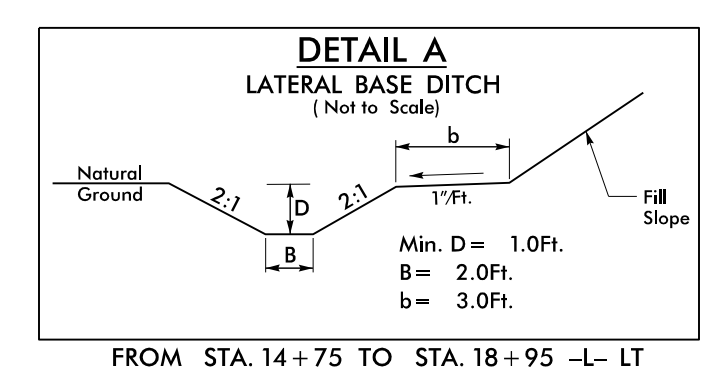
1102 ANS 88 DAN

PROJECT REFERENCE NO.	SHEET NO.
17BP.8.R.114	EC-04/CONST.04
R/W SHEET NO.	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET \_4\_

NOTE: PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE - B AND TEMPORARY ROCK SILT CHECKS TYPE - A AT DRAINAGE OUTLETS.

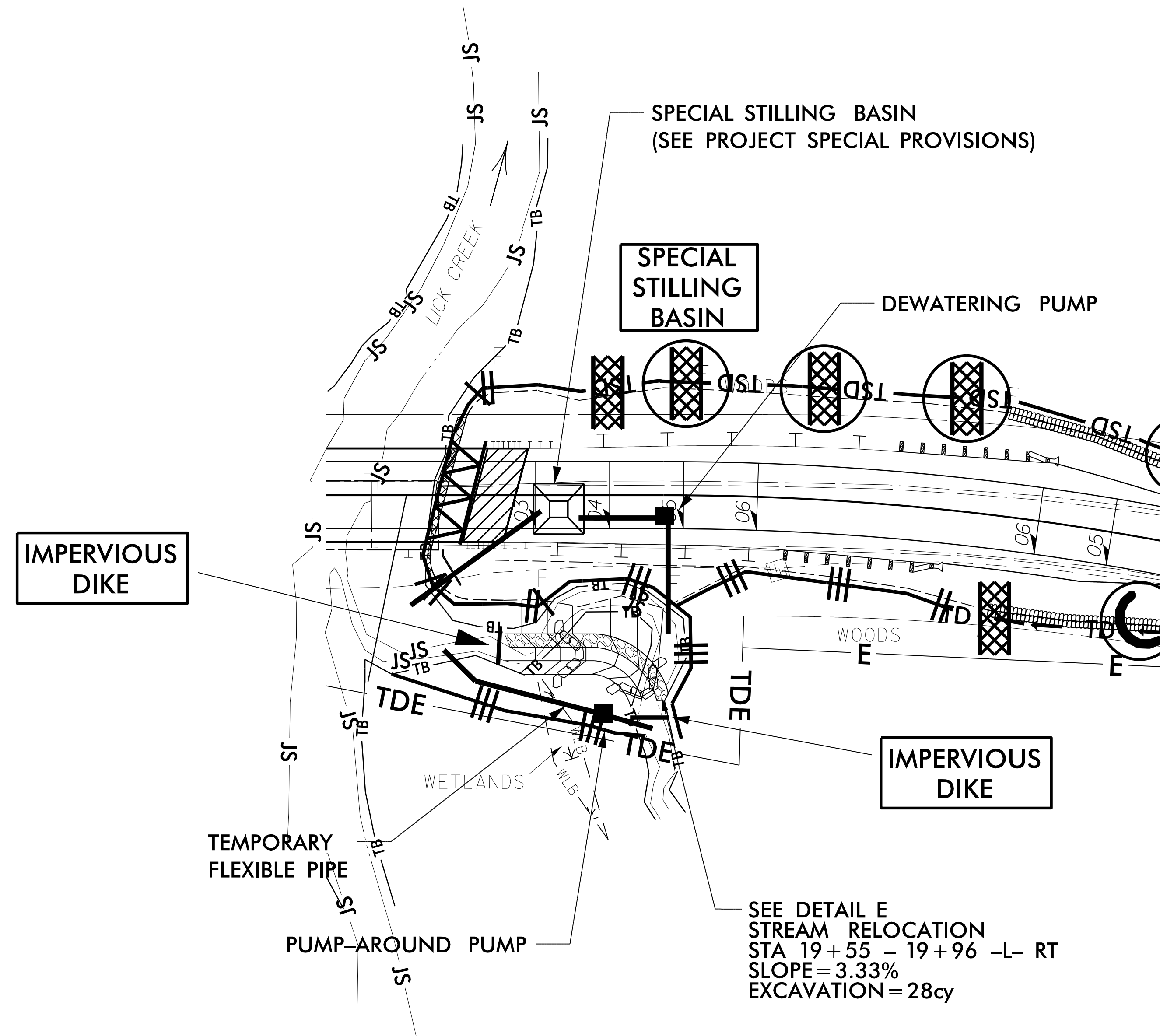
NOTE: PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED DURING CLEARING AND GRUBBING PHASE.



SYTIME D:\CON\1999\17BP.8.R.114\17BP.8.R.114.DWG

# STREAM RELOCATION CONSTRUCTION SEQUENCE (NOT TO SCALE)

PROJECT REFERENCE NO. 17BP.8.R.114	SHEET NO. EC-04A/CONSTR.4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



**NOTES:**

1. ALL EXCAVATION SHALL BE PERFORMED IN ONLY DRY OR ISOLATED AREAS OF THE WORK AREA.
2. IMPERVIOUS DIKES ARE TO BE USED TO ISOLATE WORK FROM THE STREAM FLOW WHEN NECESSARY.
3. MAINTENANCE OF THE STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK. THIS INCLUDES POLYETHYLENE SHEARING, DIVERSION PIPES, PUMPS, AND HOSES.
4. PUMPS AND HOSES SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA.

**SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA:**

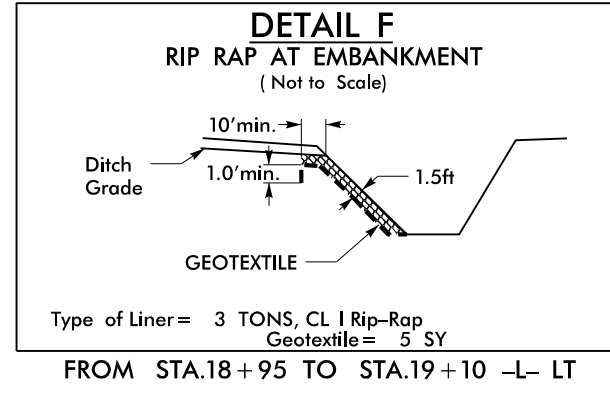
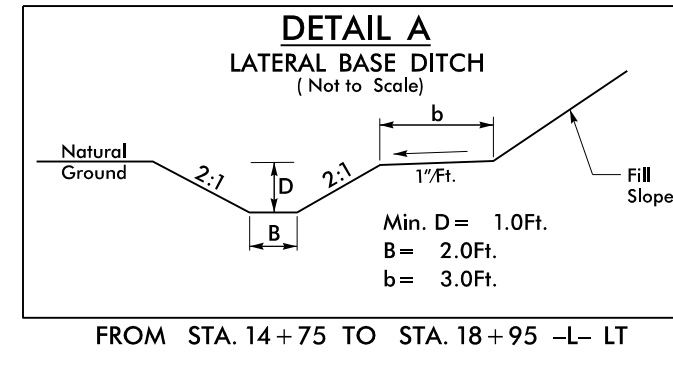
1. INSTALL SPECIAL STILLING BASINS.
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATION FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. CONSTRUCT NEW STREAM RELOCATION IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE. (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. REMOVE SPECIAL STILLING BASINS AND BACKFILL. STABILIZE AREA WITH SEED AND MULCH.

8/17/99

SYSTEMS DESIGN

# FINAL PLAN

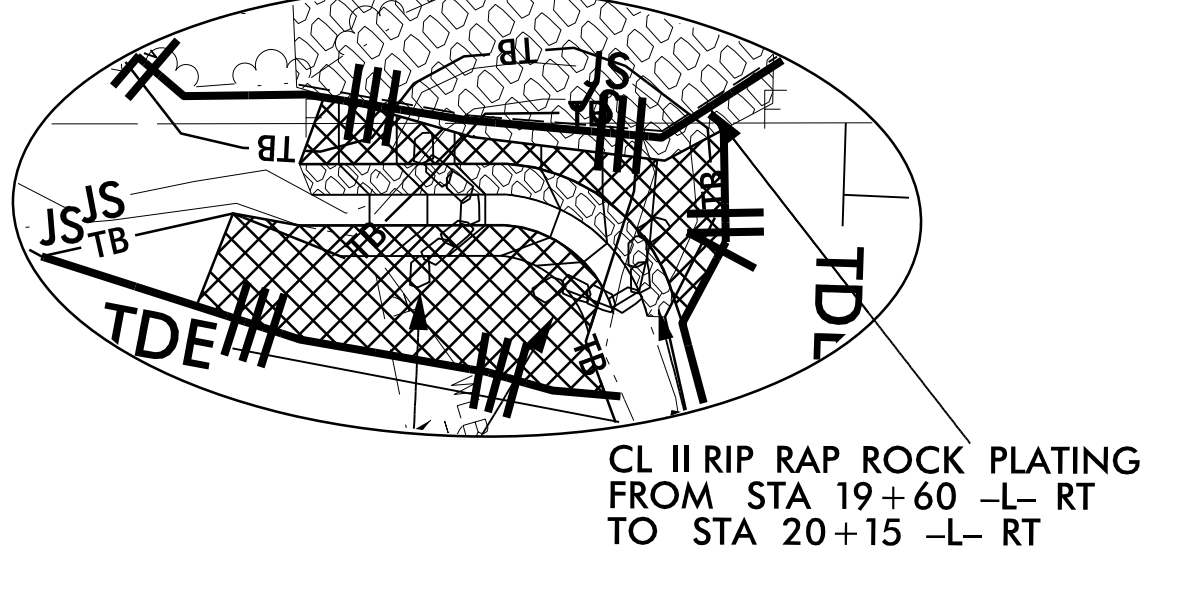
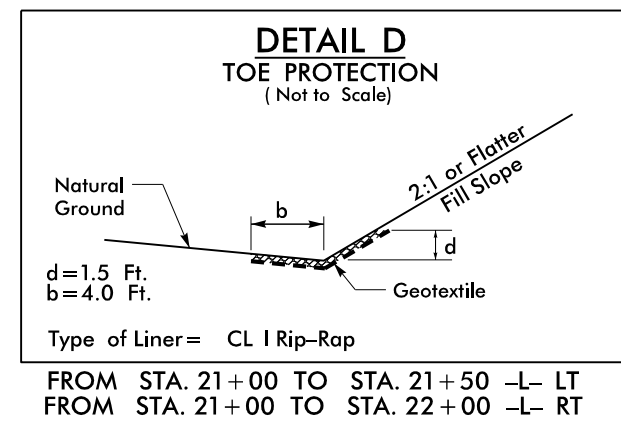
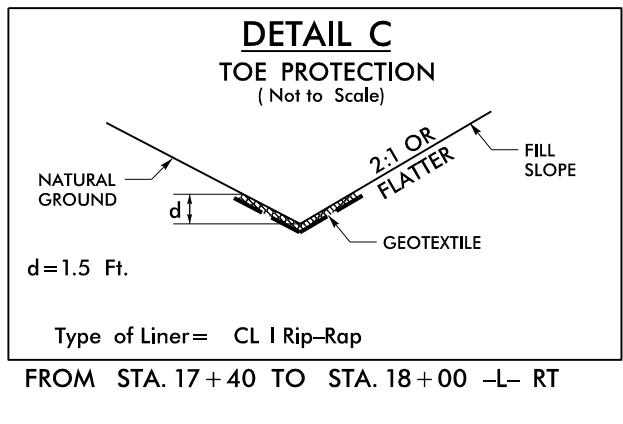
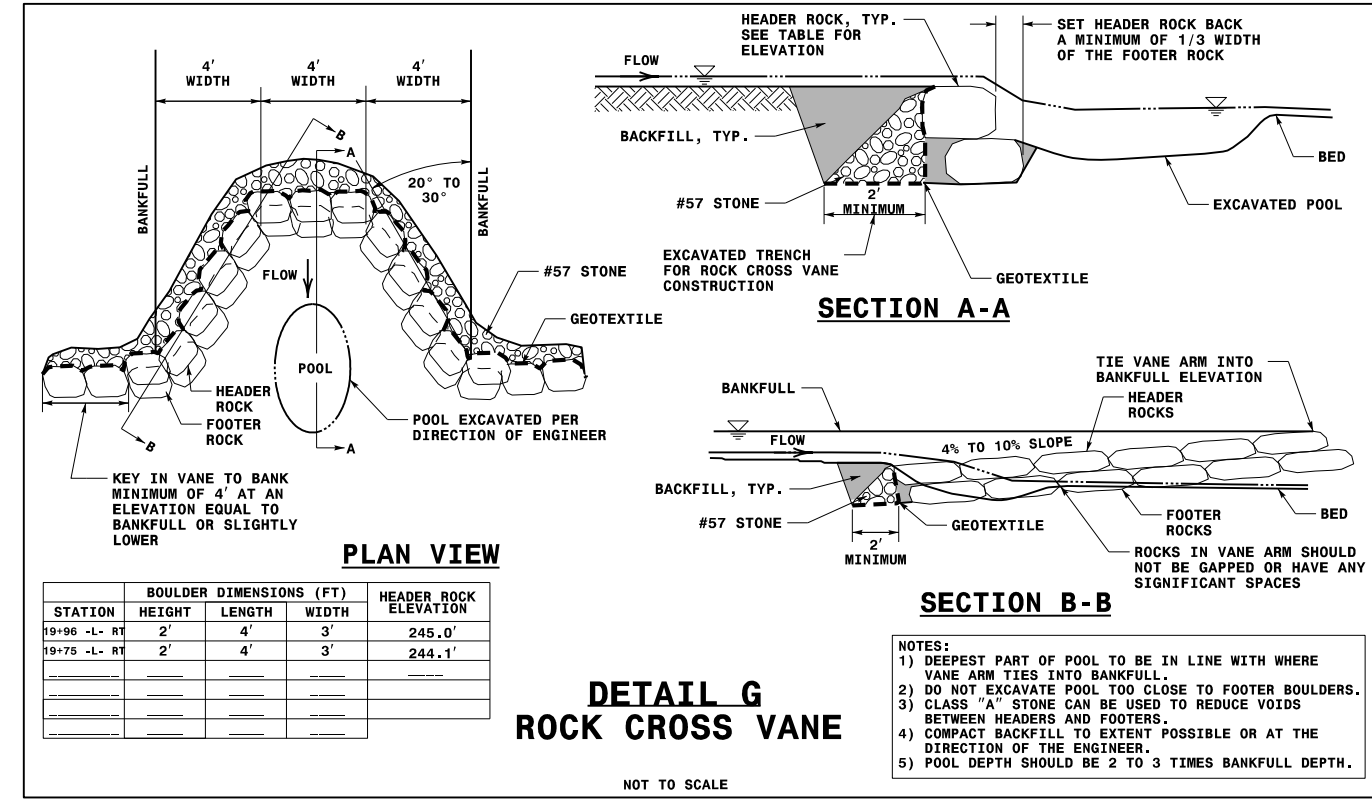
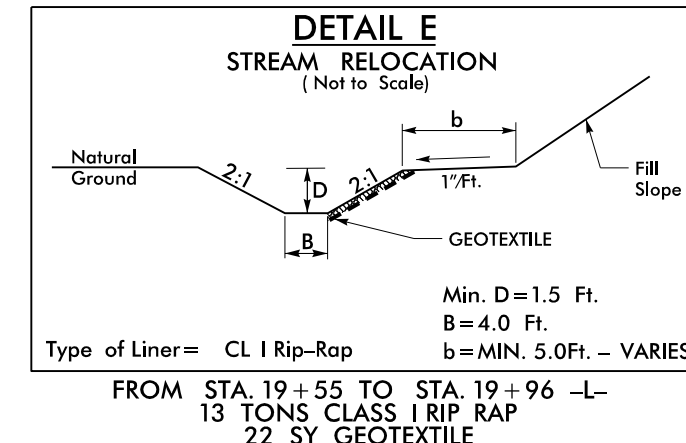
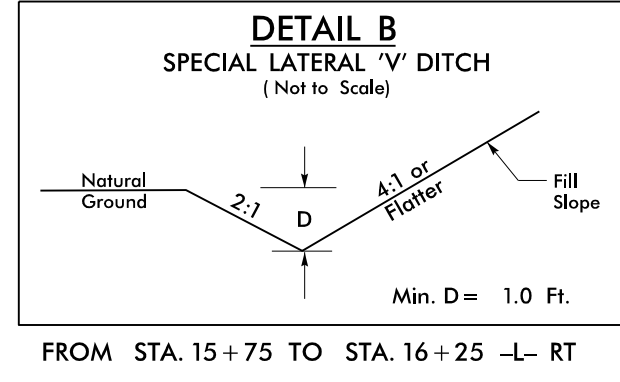
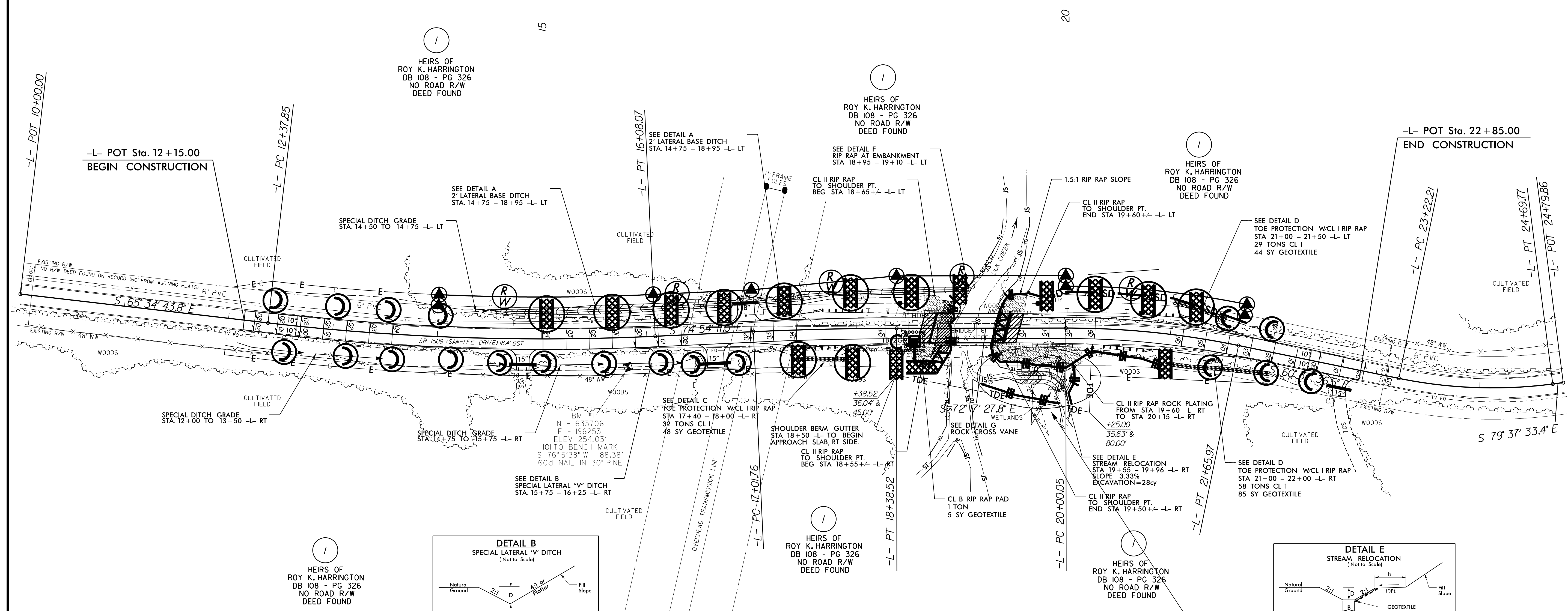
PROJECT REFERENCE NO.	SHEET NO.
17BP.8.R.114	EC-05/CONST.04
R/W SHEET NO.	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



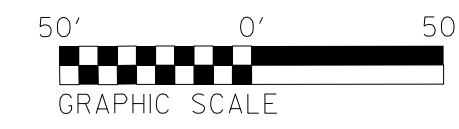
HEIRS OF  
ROY K. HARRINGTON  
DB 108 - PG 326  
NO ROAD R/W  
DEED FOUND

HEIRS OF  
ROY K. HARRINGTON  
DB 108 - PG 326  
NO ROAD R/W  
DEED FOUND

HEIRS OF  
ROY K. HARRINGTON  
DB 108 - PG 326  
NO ROAD R/W  
DEED FOUND



0.02 ACRE STREAMBANK REFORESTATION  
SEE RF-2, RF-3 AND SPECIAL PROVISIONS

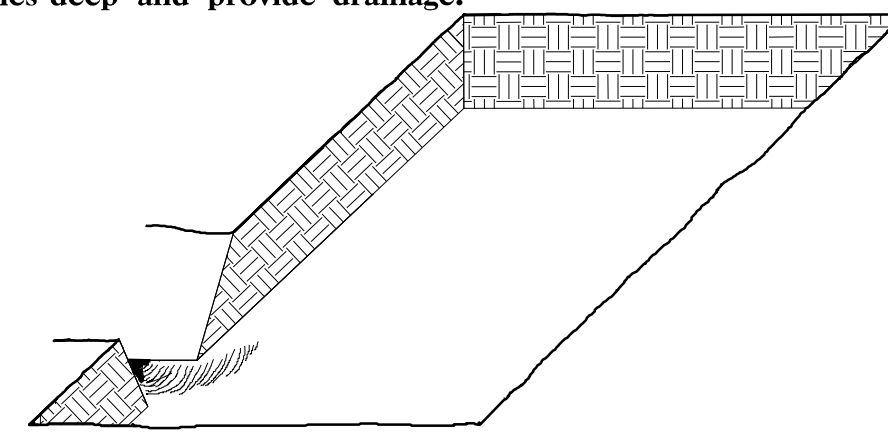


## PLANTING DETAILS

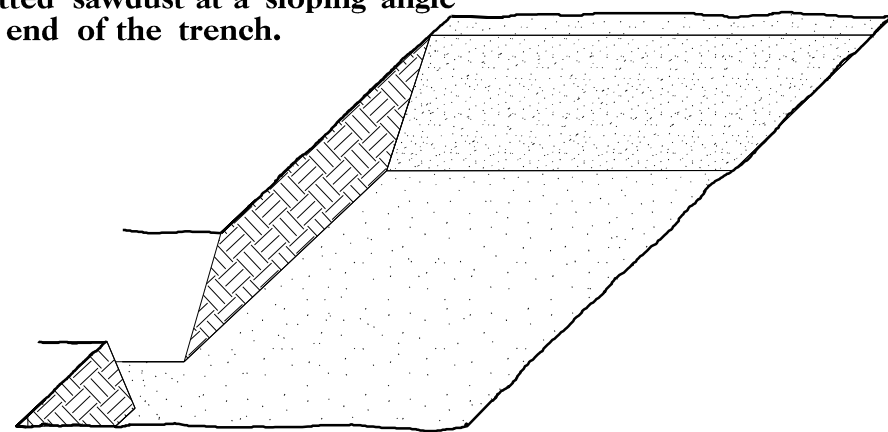
### SEEDLING / LINER BAREROOT PLANTING DETAIL

#### HEALING IN

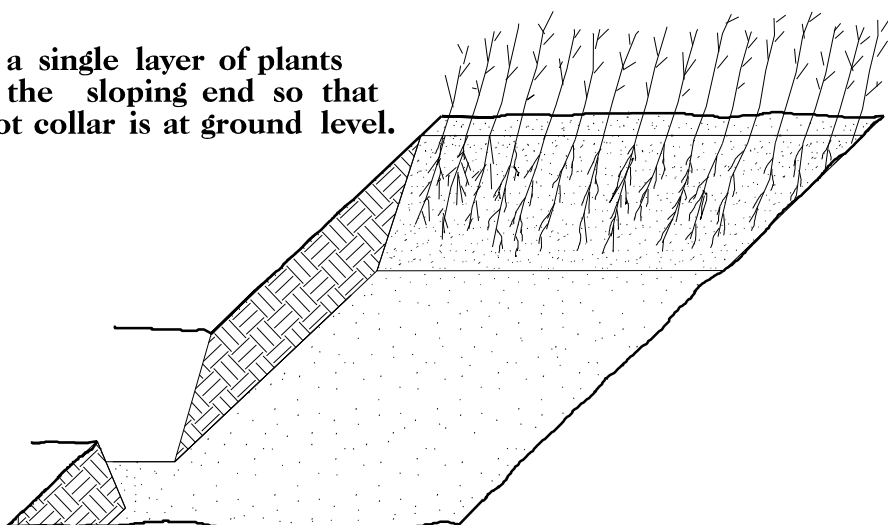
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



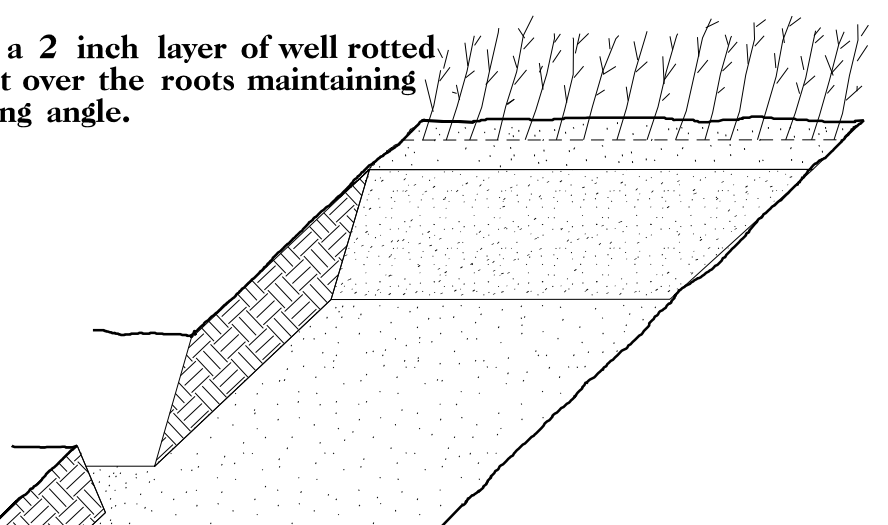
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

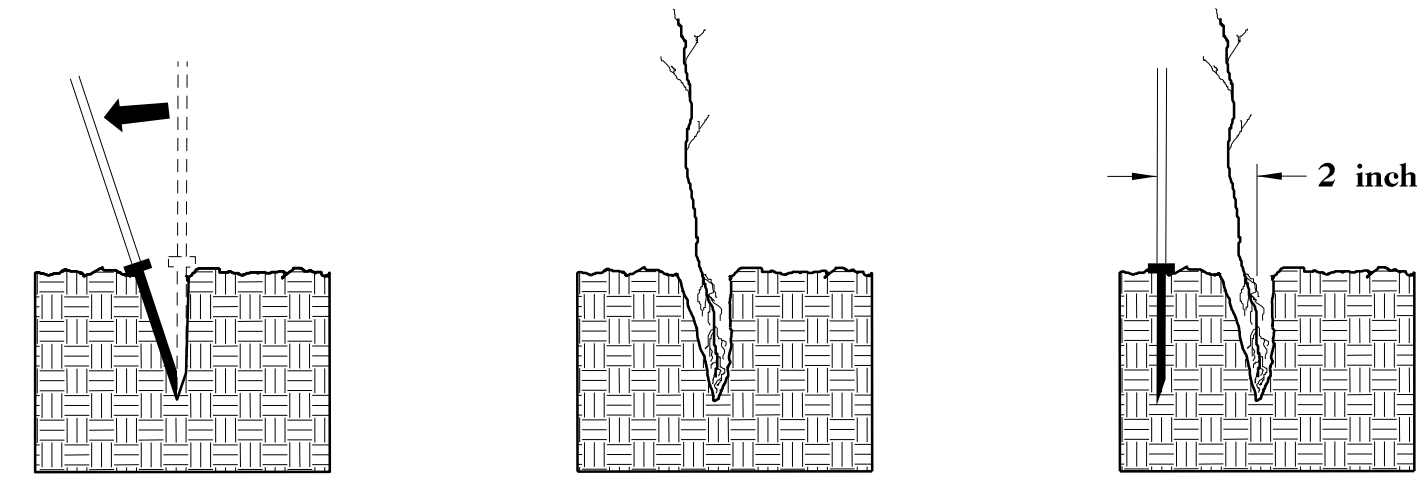


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.



6. Repeat layers of plants and sawdust as necessary and water thoroughly.

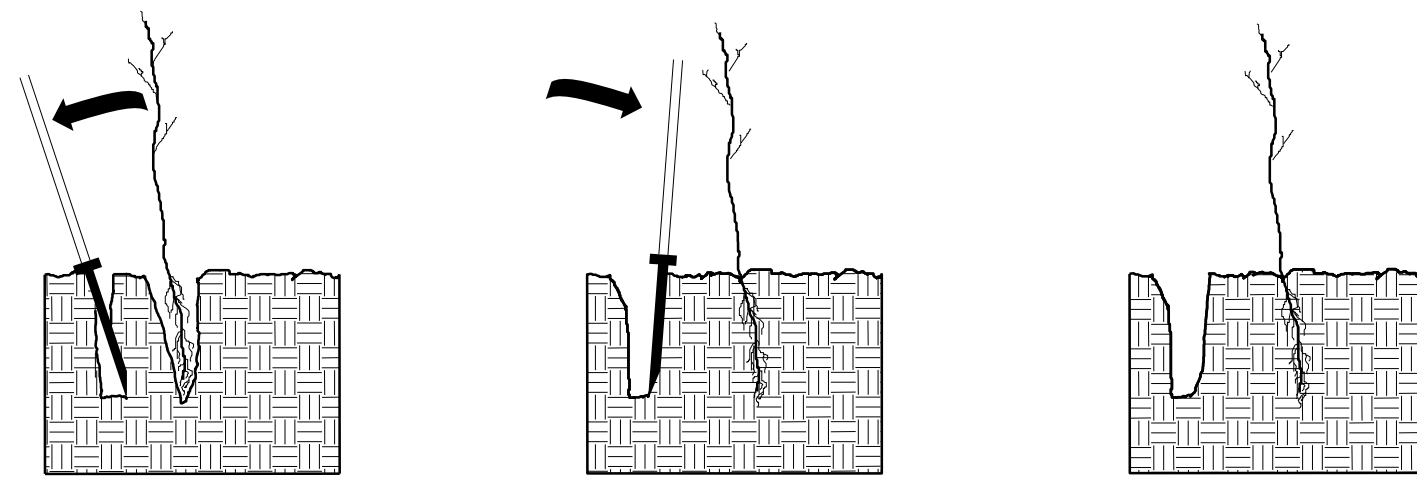
#### DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.

2. Remove planting bar and place seedling at correct depth.

3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.

5. Push handle forward firming soil at top.

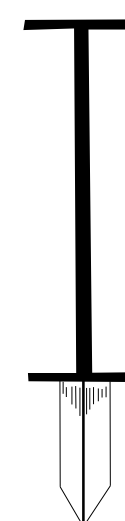
6. Leave compaction hole open. Water thoroughly.

#### PLANTING NOTES:

**PLANTING BAG**  
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



**KBC PLANTING BAR**  
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



**ROOT PRUNING**  
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

## REFORESTATION

- TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

#### REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25% PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in - 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR
25% BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

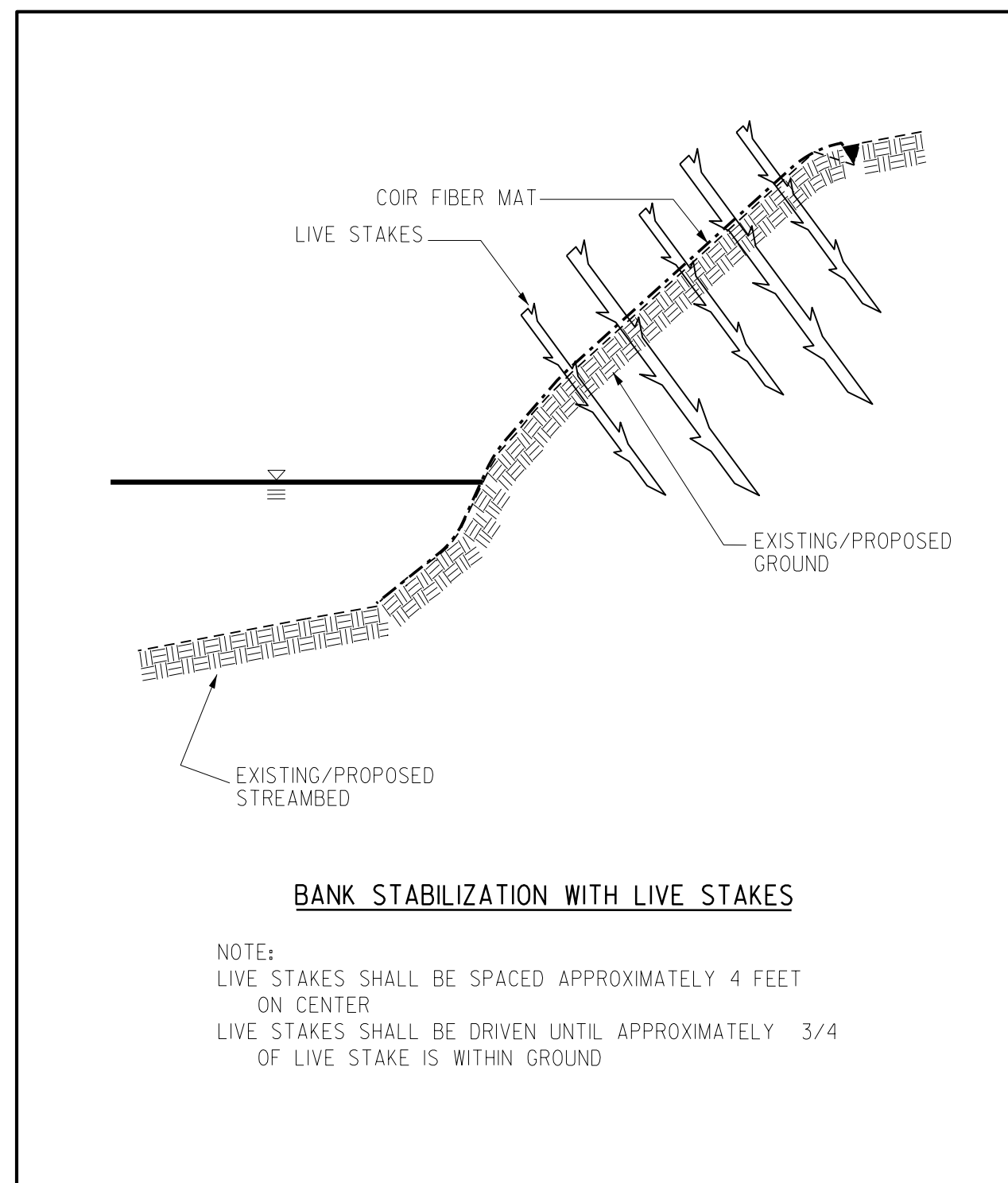
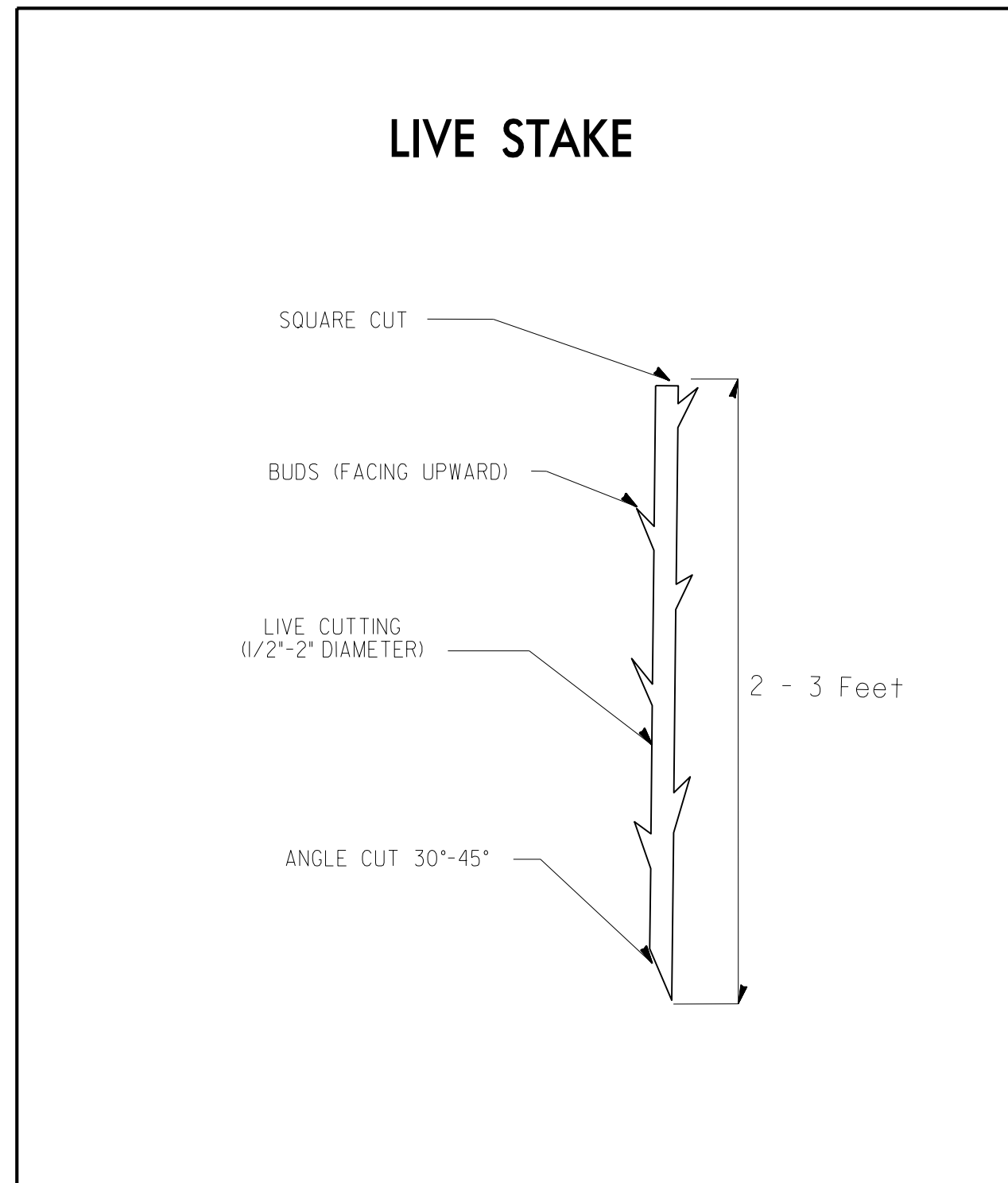
## REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

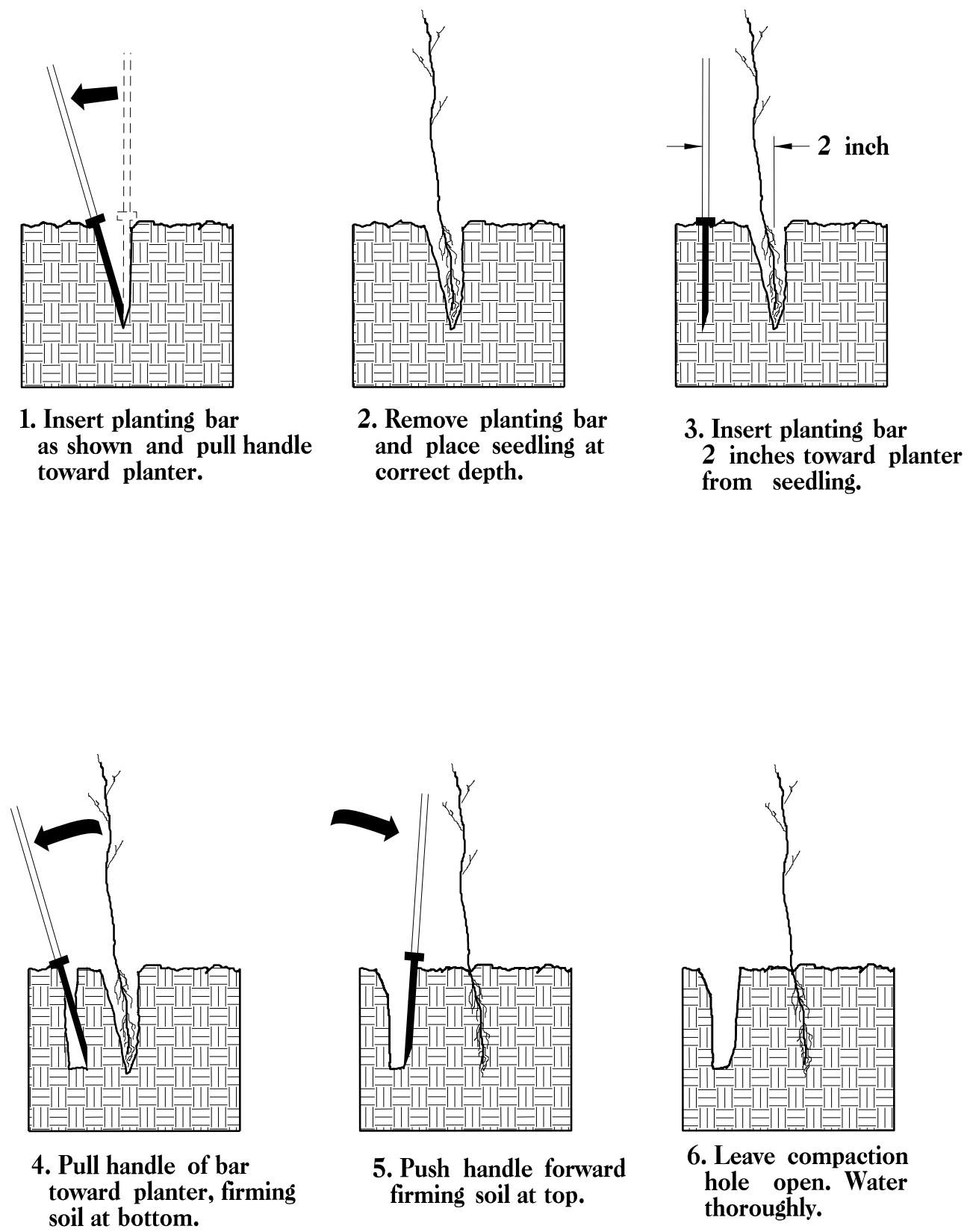


# PLANTING DETAILS

## LIVE STAKES PLANTING DETAIL



## BAREROOT PLANTING DETAIL DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR

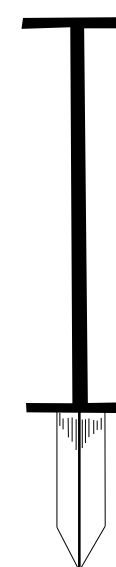


### PLANTING NOTES:

**PLANTING BAG**  
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



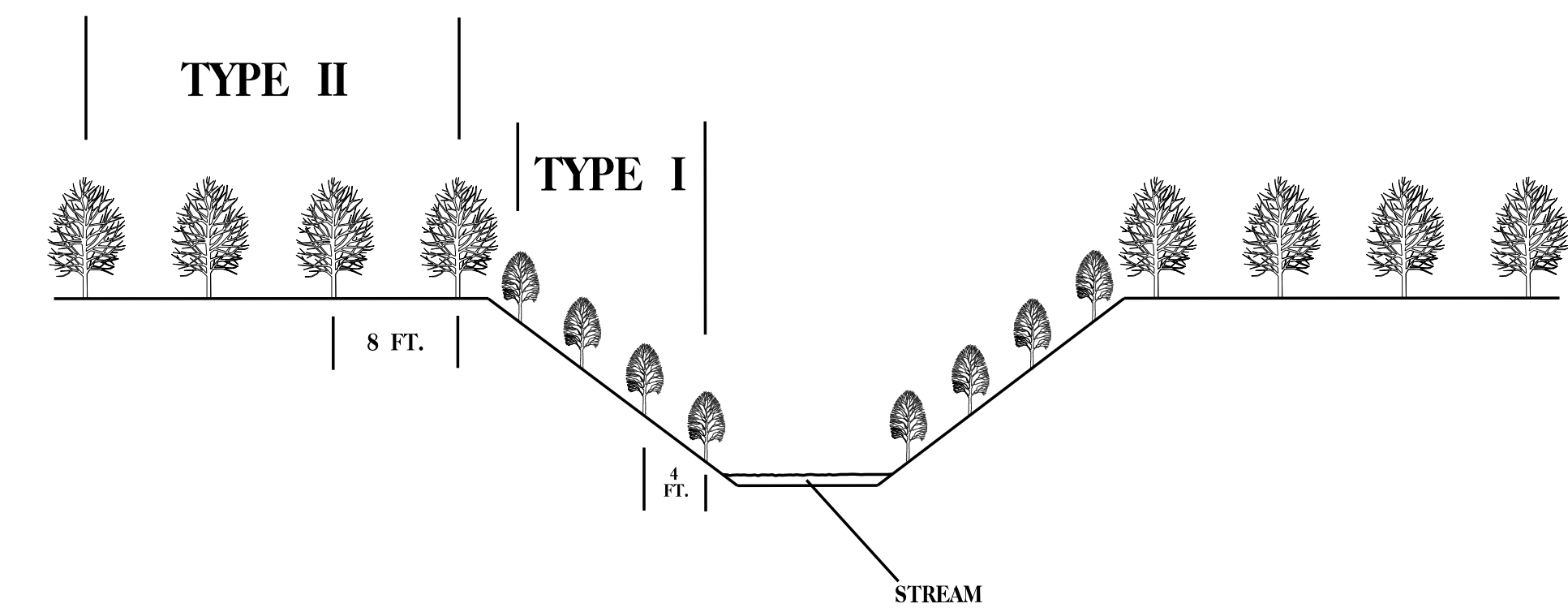
**KBC PLANTING BAR**  
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



**ROOT PRUNING**  
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

- TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.
- TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.
- NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

## STREAMBANK REFORESTATION TYPICAL



### STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

#### TYPE 1

50% SALIX NIGRA	BLACK WILLOW	2 ft - 3 ft LIVE STAKES
50% CORNUS AMOMUM	SILKY DOGWOOD	2 ft - 3 ft LIVE STAKES

#### TYPE 2

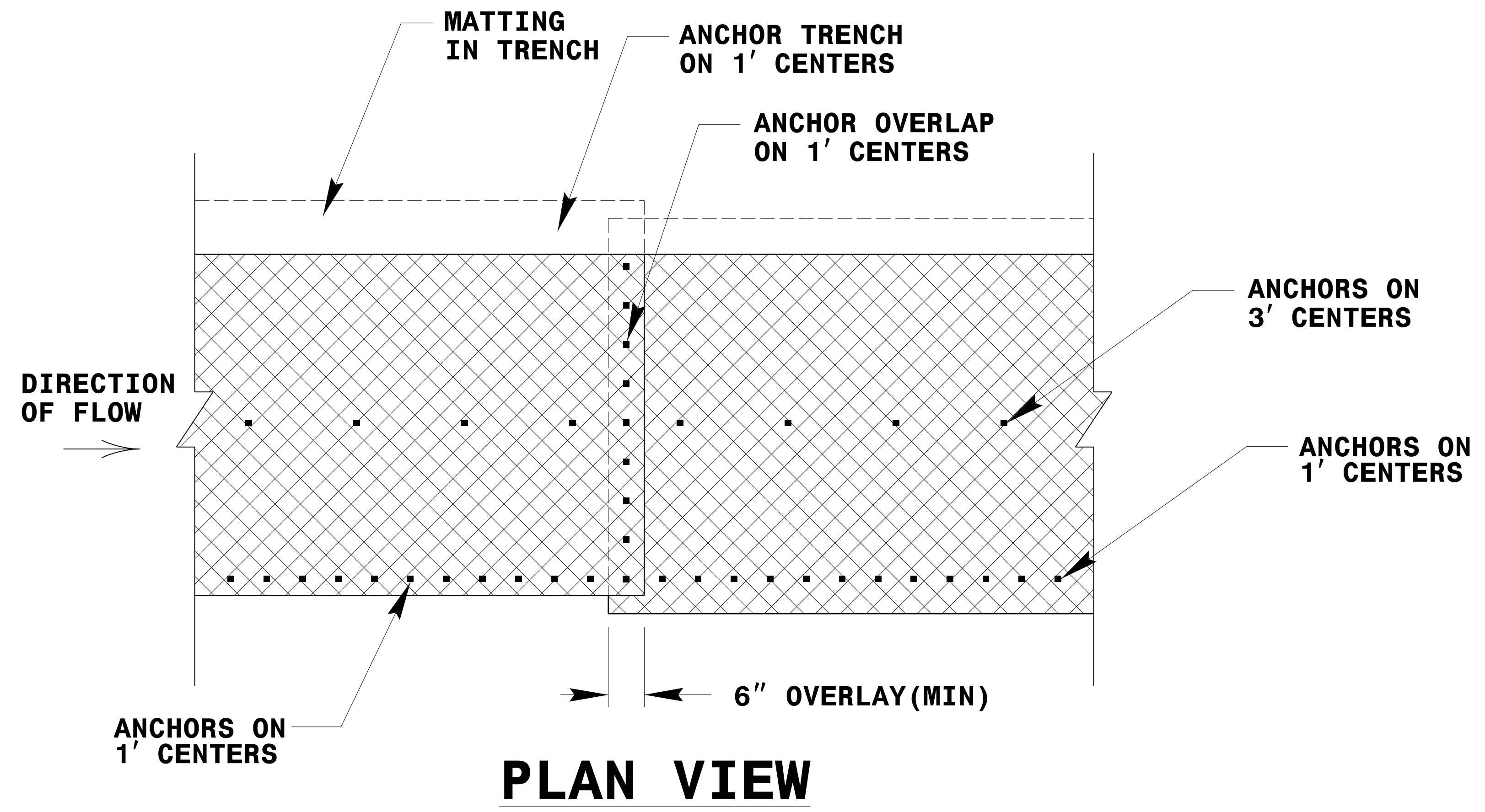
25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25% PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR
25% BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

- SEE PLAN SHEETS FOR AREAS TO BE PLANTED

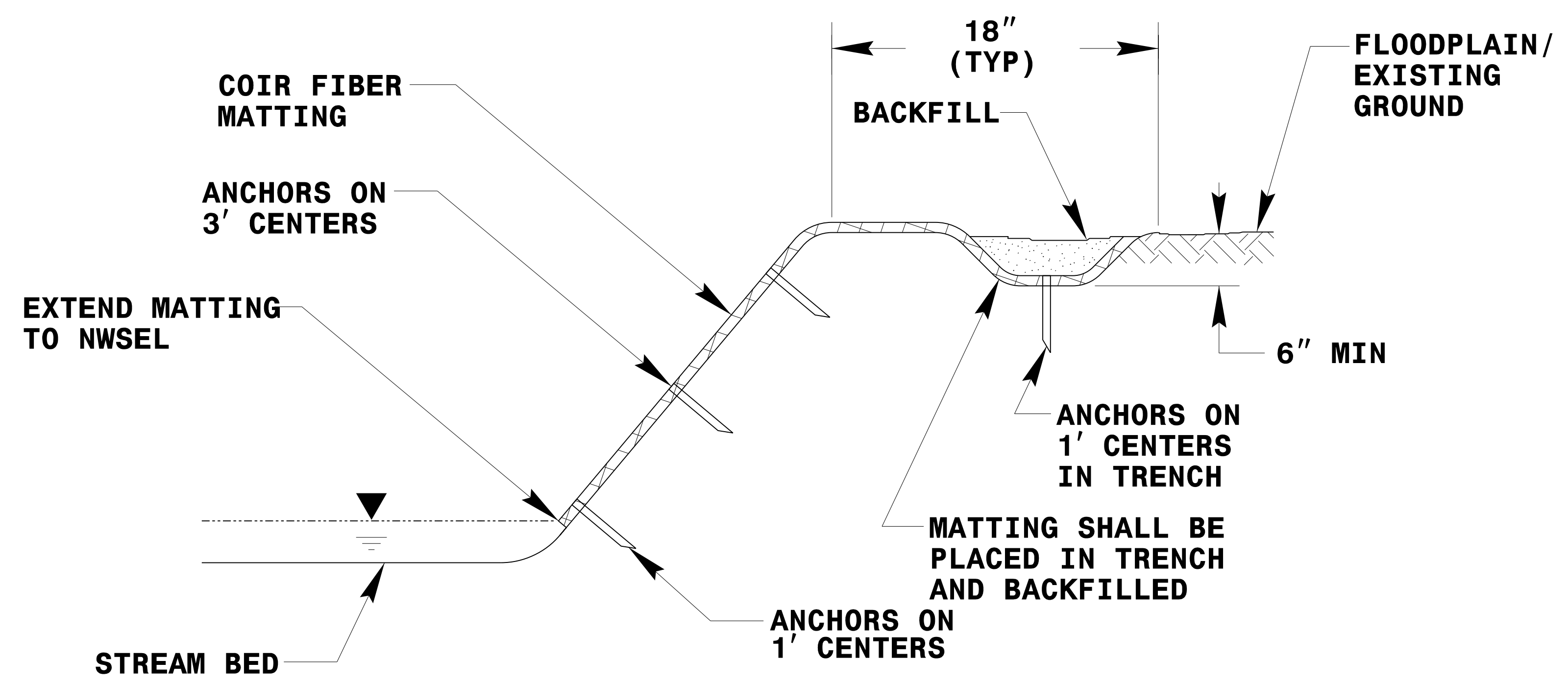
## STREAMBANK REFORESTATION

### DETAIL SHEET 1 OF 2

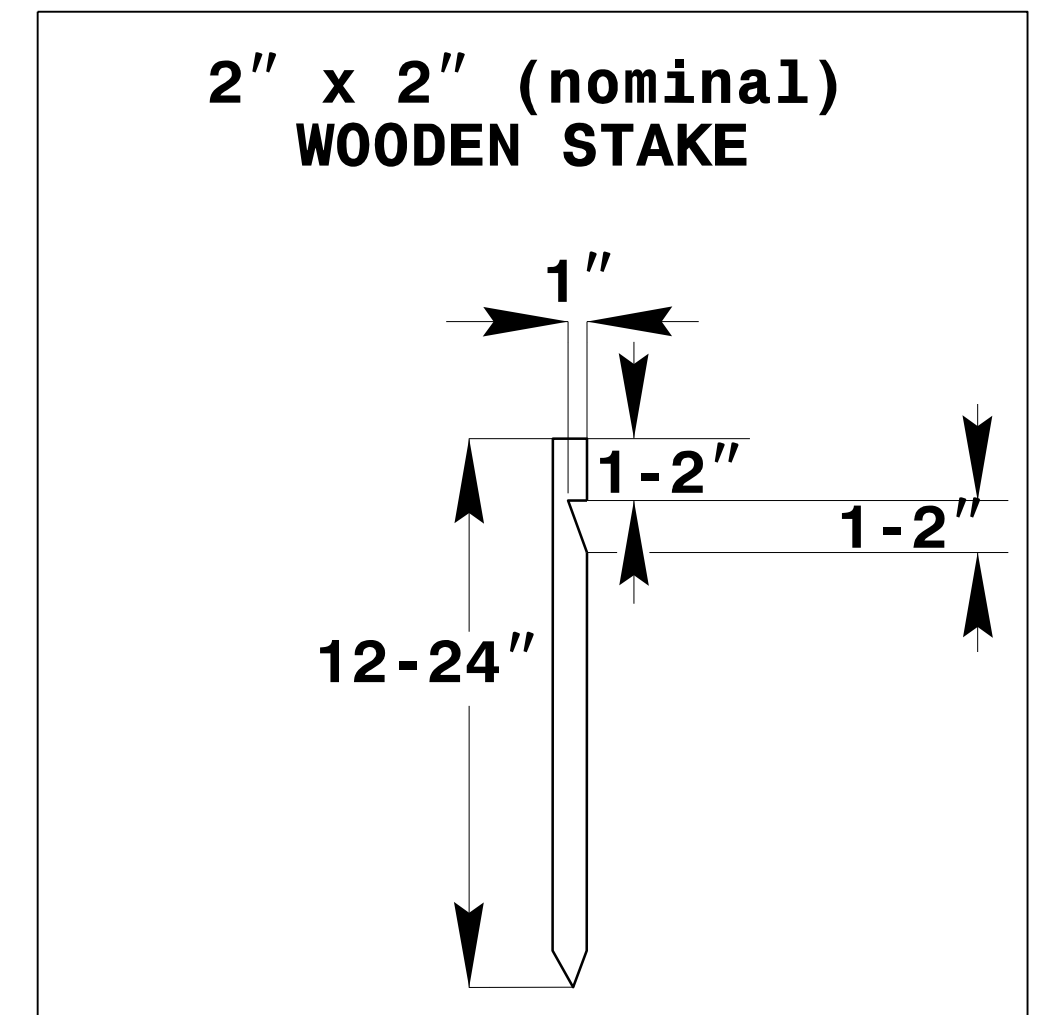
PROJECT REFERENCE NO. 17BP.8.R.114	SHEET NO. RF-3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



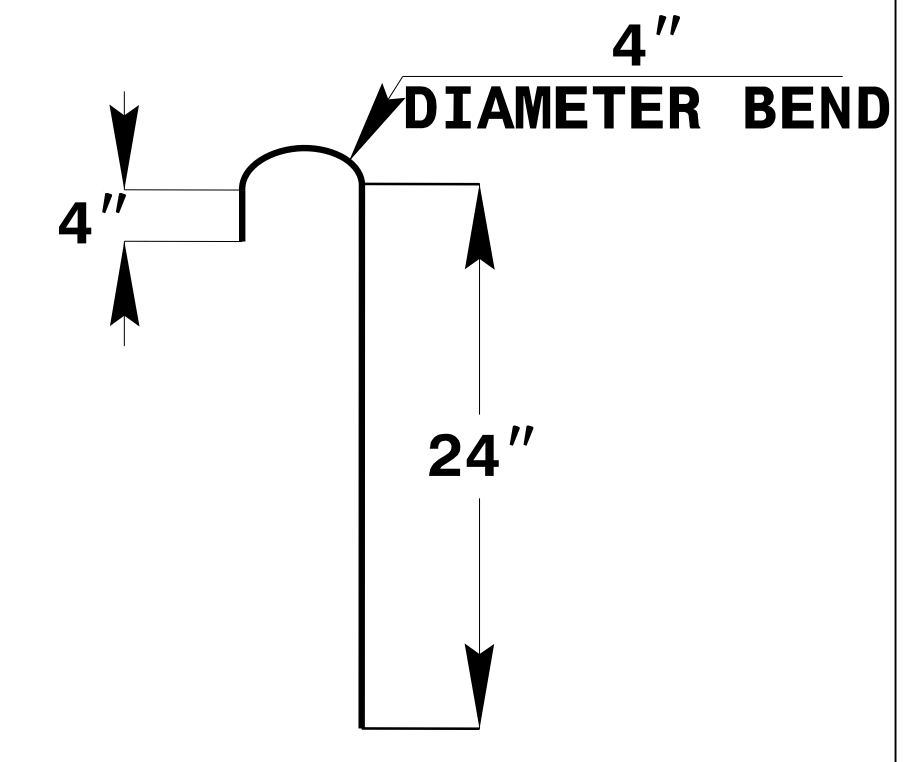
**PLAN VIEW**



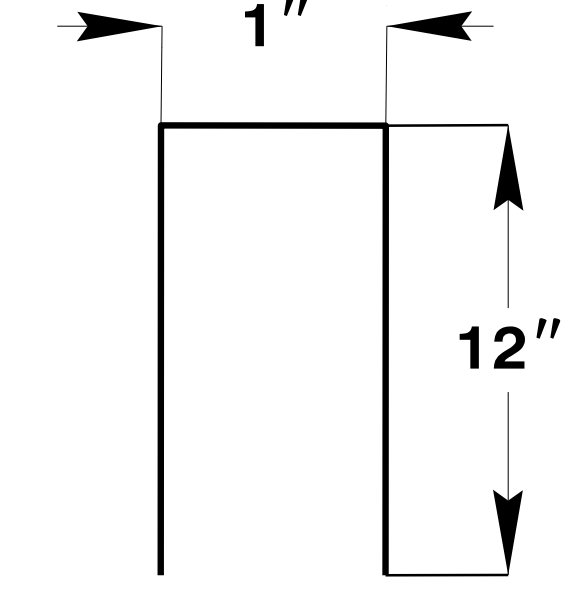
**TYPICAL CROSS SECTION**



**#10 STEEL REINFORCEMENT BAR**



**1\" (nominal) STAPLE**



**ANCHOR OPTIONS**

**COIR FIBER MATTING DETAIL**

NOT TO SCALE

**STREAMBANK REFORESTATION  
DETAIL SHEET 2 OF 2**  
N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

09/08/09  
 SYSTEM\$\$\$\$  
 DGN\$\$\$\$  
 USER\$\$\$\$  
 NAME\$\$\$\$

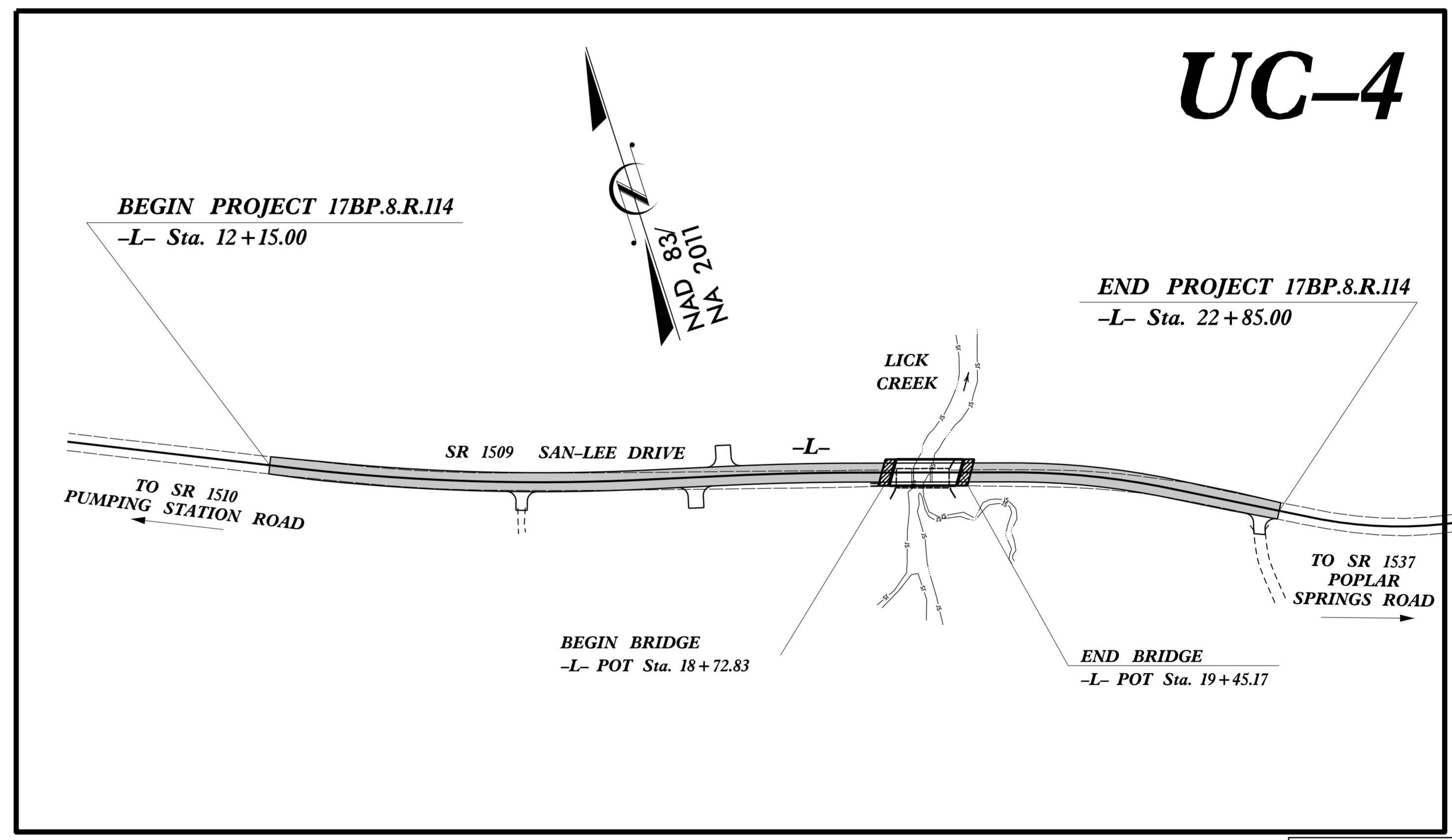
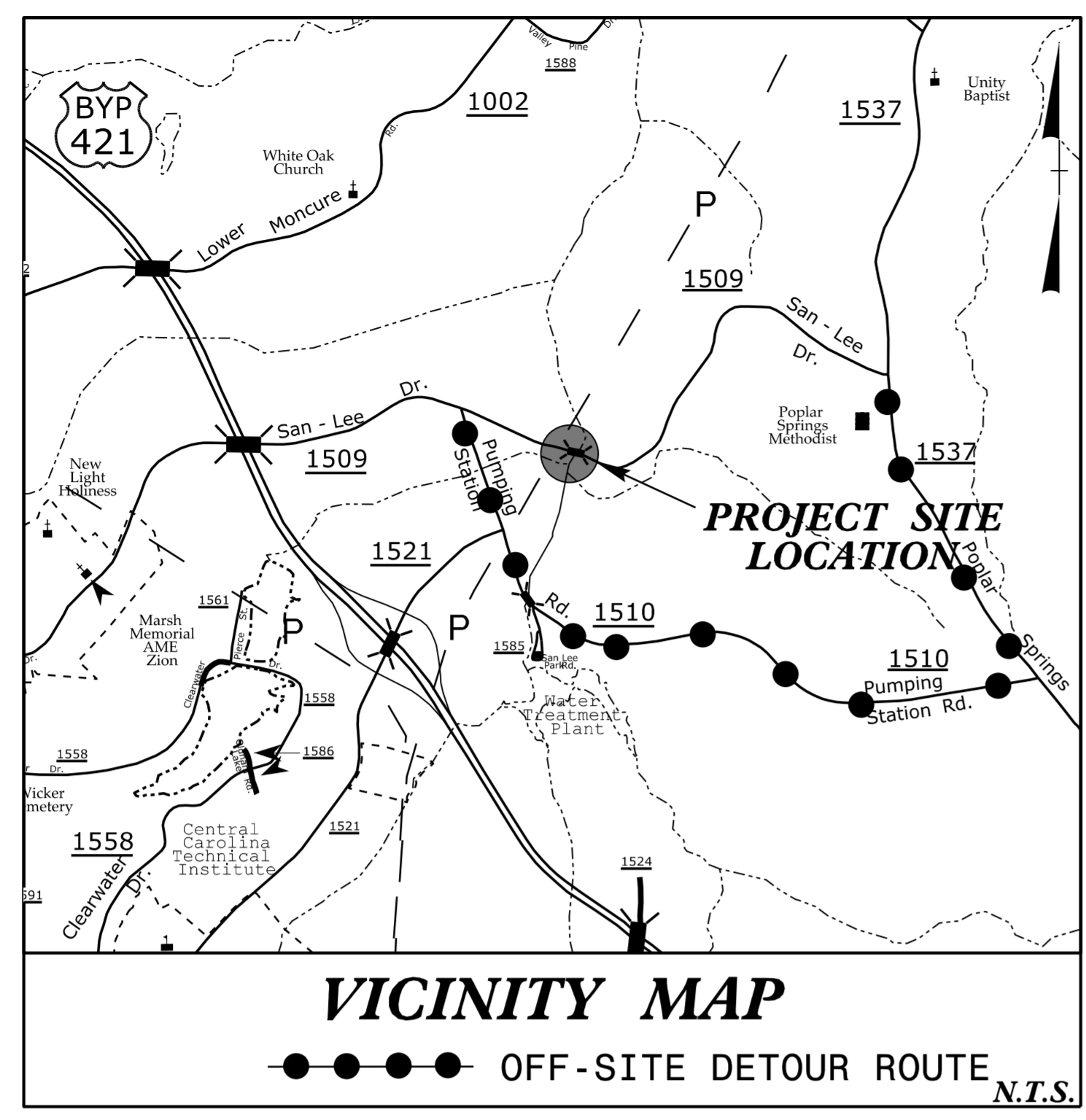
**TIP PROJECT: 17BP.8.R.114**

T.I.P. NO.	SHEET NO.
17BP.8.R.114	UC-1

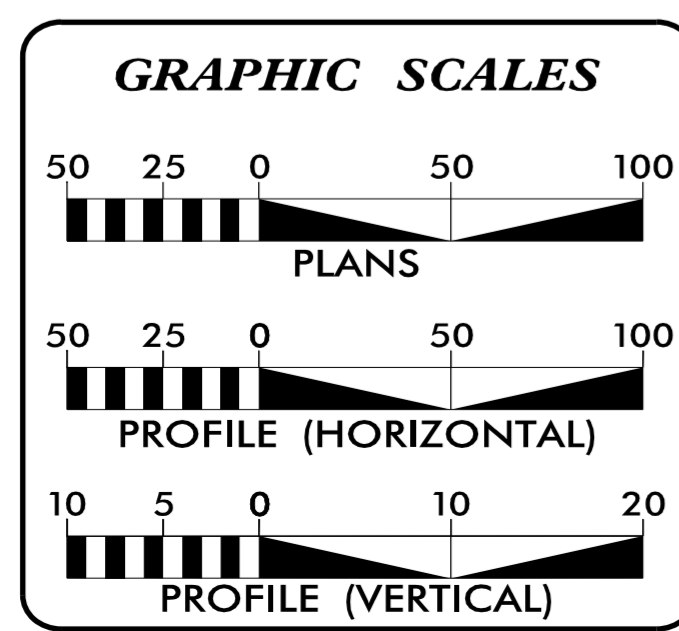
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**UTILITY CONSTRUCTION PLANS  
LEE COUNTY**

**BRIDGE NO. 520016 ON SR 1509 (SAN-LEE DRIVE)  
OVER LICK CREEK**  
**TYPE OF WORK: WATER LINE RELOCATION**



DOCUMENT NOT CONSIDERED FINAL  
UNTIL ALL SIGNATURES ARE COMPLETED



**INDEX OF SHEETS**

SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	NOTES
UC-3A	DETAILS
UC-4	UTILITY CONSTRUCTION SHEETS
UC-5	PROFILE SHEETS

**WATER AND SEWER OWNERS ON PROJECT**

(A) WATER: CITY OF SANFORD

PREPARED IN THE OFFICE OF  
**CH ENGINEERING**  
 3220 GLEN ROYAL RD. RALEIGH, NC 27617  
 TELE 919.788.0224 FAX 919.788.0232  
 NC LICENSE #P-0189

ERIC TWEED, PE CONSULTANT CONTACT #1  
 BRIAN WILES, PE CONSULTANT CONTACT #2  
 MARY JO LEE, PE CONSULTANT CONTACT #3

SEAL

**ERIC M. TWEED**  
 PROFESSIONAL ENGINEER  
 SEAL 028912  
 2/22/2017

**DIVISION OF HIGHWAYS UTILITIES UNIT**  
 1555 MAIL SERVICES CENTER  
 RALEIGH NC 27699-1555  
 PHONE (919) 707-6690  
 FAX (919) 250-4151

**DONNA JACKSON** UTILITIES REGIONAL ENGINEER  
**BO HEMPHILL** UTILITIES ENGINEER  
**ED REAMS** UTILITIES AREA COORDINATOR  
**JAMIE YOW** UTILITIES COORDINATOR

# UTILITIES PLAN SHEET SYMBOLS

## PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11¼ Degree Bend	
22½ Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	
Butterfly Valve	
Tapping Valve	
Line Stop	
Line Stop with Bypass	
Blow Off	
Fire Hydrant	
Relocate Fire Hydrant	
Remove Fire Hydrant	REM FH
Water Meter	
Relocate Water Meter	
Remove Water Meter	REM WM
Water Pump Station	
RPZ Backflow Preventer	
DCV Backflow Preventer	
Relocate RPZ Backflow Preventer	
Relocate DCV Backflow Preventer	

## PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	
Force Main Sewer Line (Sized as Shown)	
Manhole (Sized per Note)	
Sewer Pump Station	

## PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement by Open Cut	
Encasement	

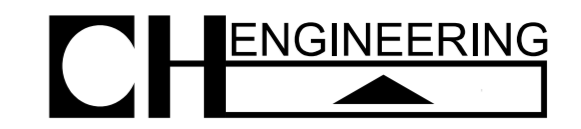
Thrust Block	
Air Release Valve	
Utility Vault	
Concrete Pier	
Steel Pier	
Plan Note	
Pay Item Note	

## EXISTING UTILITIES SYMBOLS

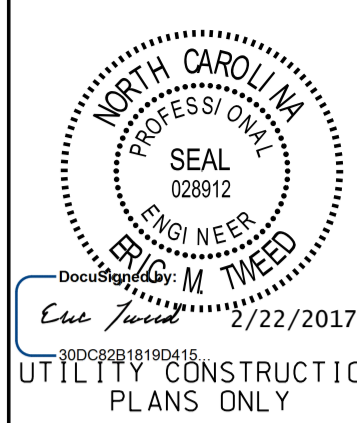
Power Pole		*Underground Power Line	
Telephone Pole		*Underground Telephone Cable	
Joint Use Pole		*Underground Telephone Conduit	
Utility Pole		*Underground Fiber Optics Telephone Cable	
Utility Pole with Base		*Underground TV Cable	
H-Frame Pole		*Underground Fiber Optics TV Cable	
Power Transmission Line Tower		*Underground Gas Pipeline	
Water Manhole		Aboveground Gas Pipeline	
Power Manhole		*Underground Water Line	
Telephone Manhole		Aboveground Water Line	
Sanitary Sewer Manhole		*Underground Gravity Sanitary Sewer Line	
Hand Hole for Cable		Aboveground Gravity Sanitary Sewer Line	
Power Transformer		*Underground SS Forced Main Line	
Telephone Pedestal		Underground Unknown Utility Line	
CATV Pedestal		SUE Test Hole	
Gas Valve		Water Meter	
Gas Meter		Water Valve	
Located Miscellaneous Utility Object		Fire Hydrant	
Abandoned According to Utility Records	AATUR	Sanitary Sewer Cleanout	
End of Information	E.O.I.		

\*For Existing Utilities  
 Utility Line Drawn from Record (Type as Shown) \_\_\_\_\_  
 Designated Utility Line (Type as Shown) \_\_\_\_\_

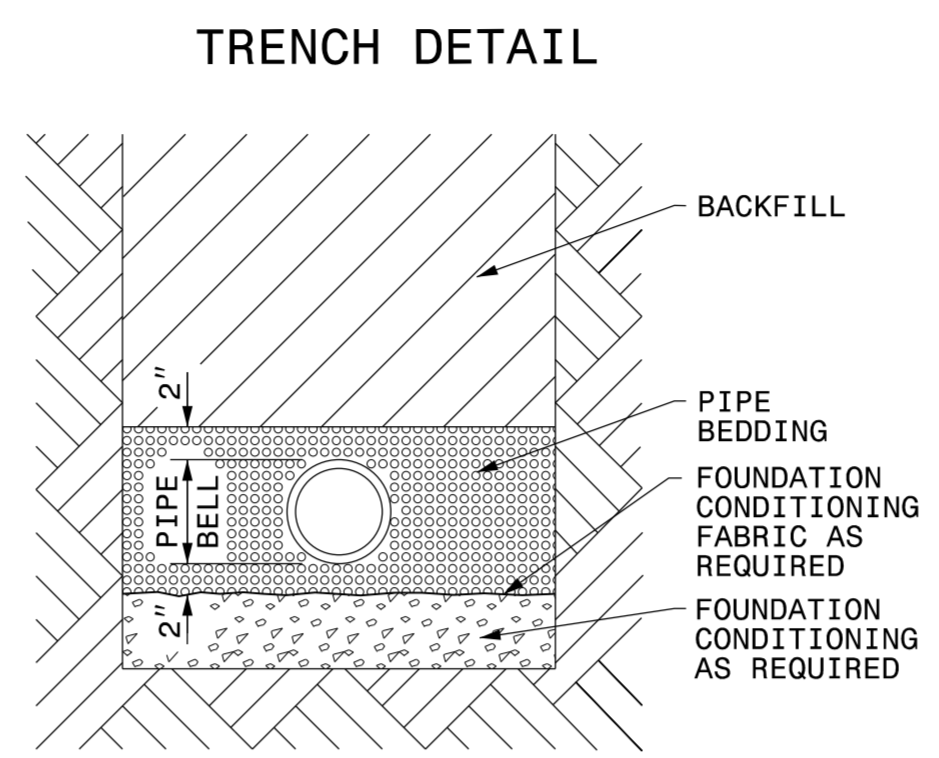
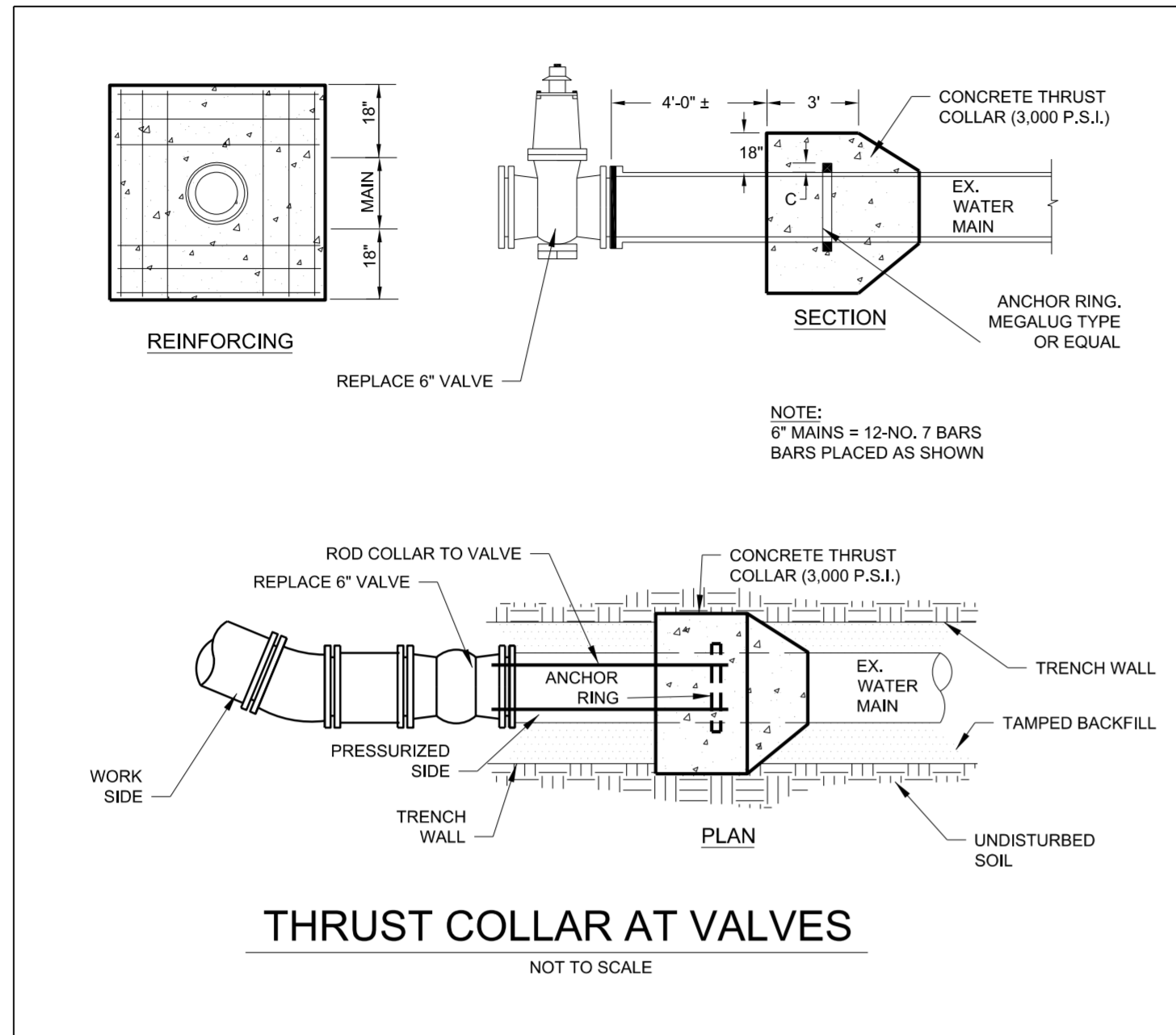
5/14/99



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 NC LICENSE #P-0189

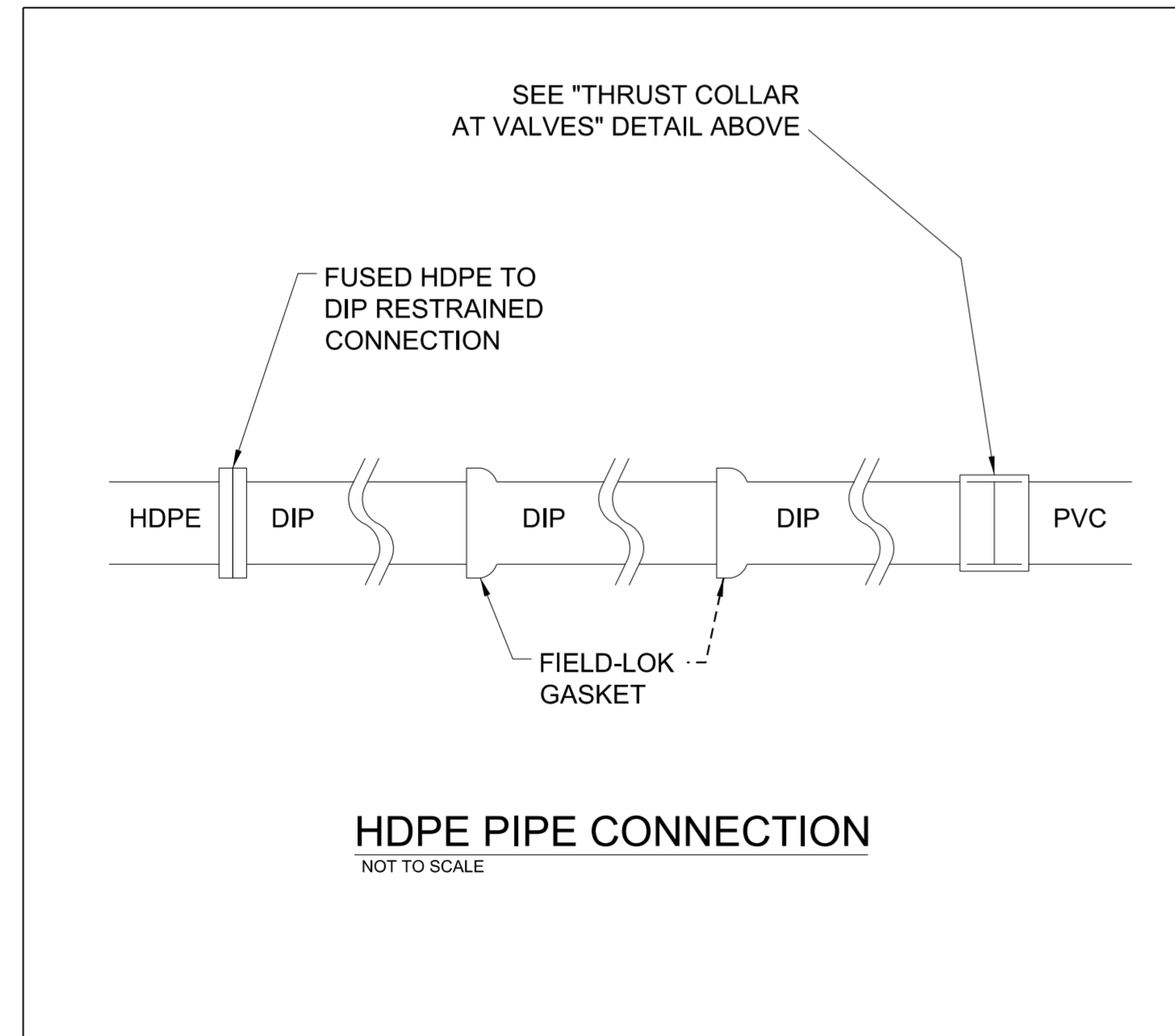


# PROJECT TYPICAL DETAILS

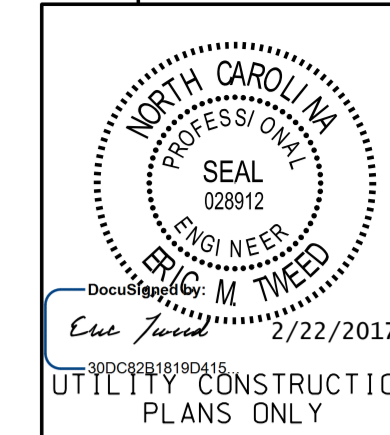
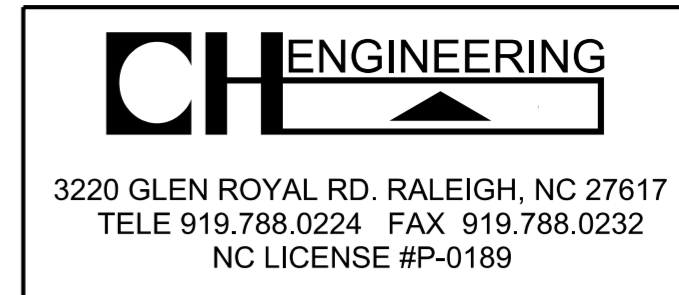


PLACE FOUNDATION CONDITIONING MATERIAL BELOW BEDDING IF REQUIRED, AS DIRECTED BY ENGINEER. PIPE BEDDED IN SELECT MATERIAL, CLASS II (TYPE 1) OR CLASS III. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROXIMATELY 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

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



# UTILITY CONSTRUCTION



## GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2012.
2. THE EXISTING WATER LINE BELONGS TO CITY OF SANFORD .
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE CITY OF SANFORD OWNS THE EXISTING WATER LINE AND WILL OWN THE NEW WATER LINE AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND CITY OF SANFORD ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE CITY OF SANFORD AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.
5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPROTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITONAL COST TO THE DEPARTMENT.
7. MAKE FINAL WATER LINE CONNECTIONS TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.
8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE CITY OF SANFORD REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

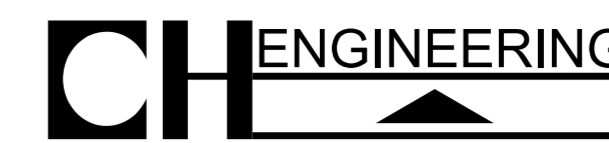
## PROJECT SPECIFIC NOTES:

1. PROPOSED WATER LINE FROM STATION 50+30 TO STATION 51+30 AND FROM STATION 53+10 TO STATION 55+10 SHALL BE D.I.R.J. (DUCTILE IRON RESTRAINED JOINT) PIPE.
2. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS CONCERNING TRENCHLESS INSTALLATION. IT IS CONTRACTOR'S RESPONSIBILITY TO HAVE BORE DESIGNED AND SEALED BY A LICENSED NORTH CAROLINA PROFESSIONAL ENGINEER. NO DAMAGE IS ALLOWED TO RIVER, WETLANDS, OR BUFFER ZONES.
3. HDPE PIPE IS INSTALLED BY DIRECTIONAL DRILL. IT SHALL BE FILLED WITH WATER AND NOT BE CONNECTED TO ANY OTHER PIPE OR FITTINGS FOR ONE WEEK FROM THE TIME OF INSTALLATION.

## UTILITY CONSTRUCTION

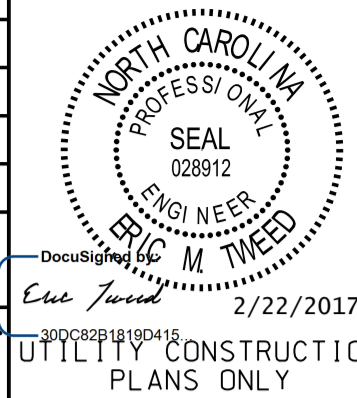
**DOCUMENT NOT CONSIDERED FINAL  
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5/14/199  
UNION



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 NC LICENSE #P-0189

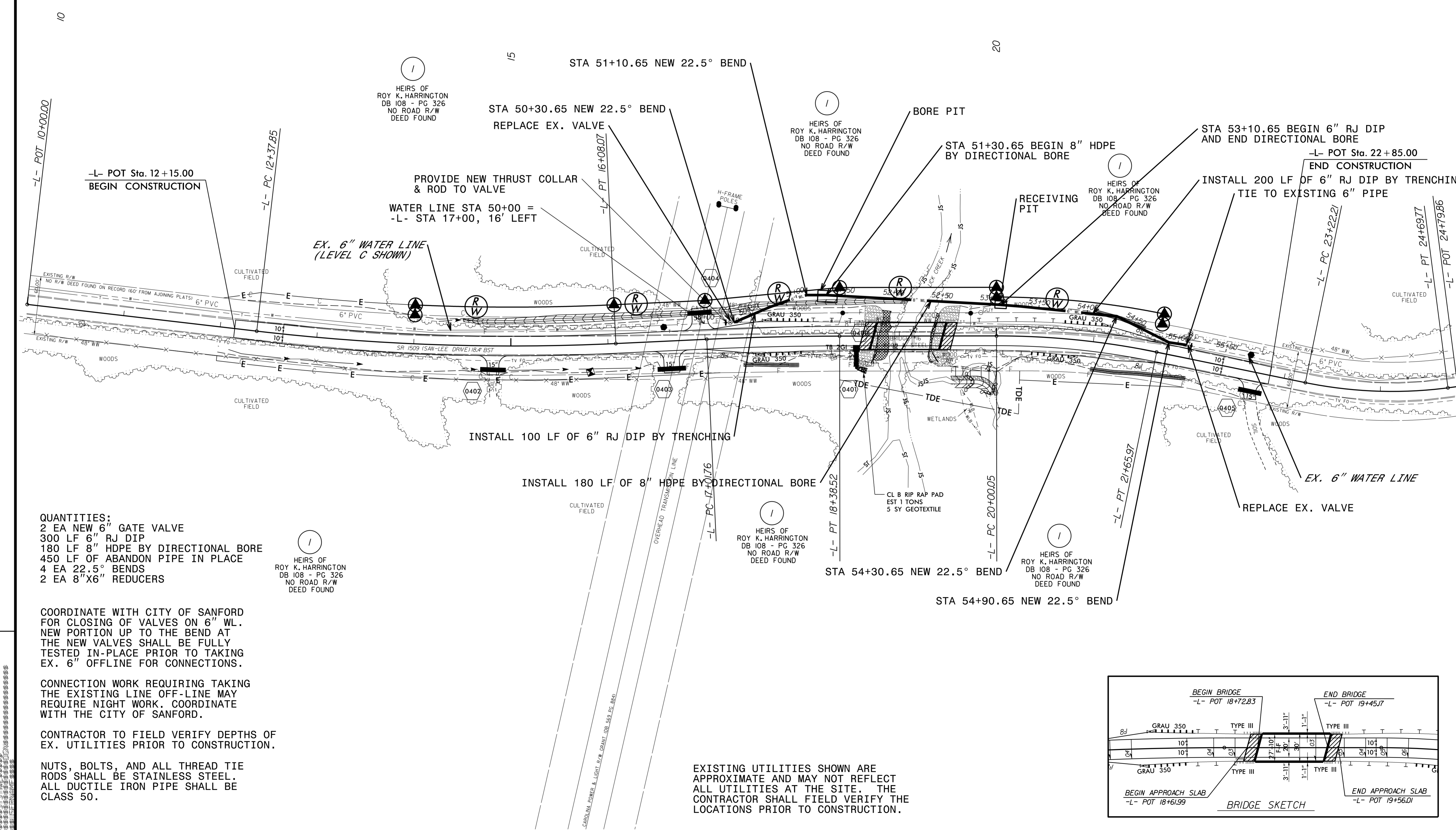
PROJECT REFERENCE NO.	SHEET NO.
1717BP.8.R114	UC-4
DESIGNED BY: EMT	LEE COUNTY BRIDGE 016
DRAWN BY: EMT	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SECTION PHONE: (919) 707-6690 FAX: (919) 1250-4151	



### UTILITY CONSTRUCTION

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REVISIONS



- QUANTITIES:**
- 2 EA NEW 6" GATE VALVE
  - 300 LF 6" RJ DIP
  - 180 LF 8" HDPE BY DIRECTIONAL BORE
  - 450 LF OF ABANDON PIPE IN PLACE
  - 4 EA 22.5° BENDS
  - 2 EA 8"X6" REDUCERS

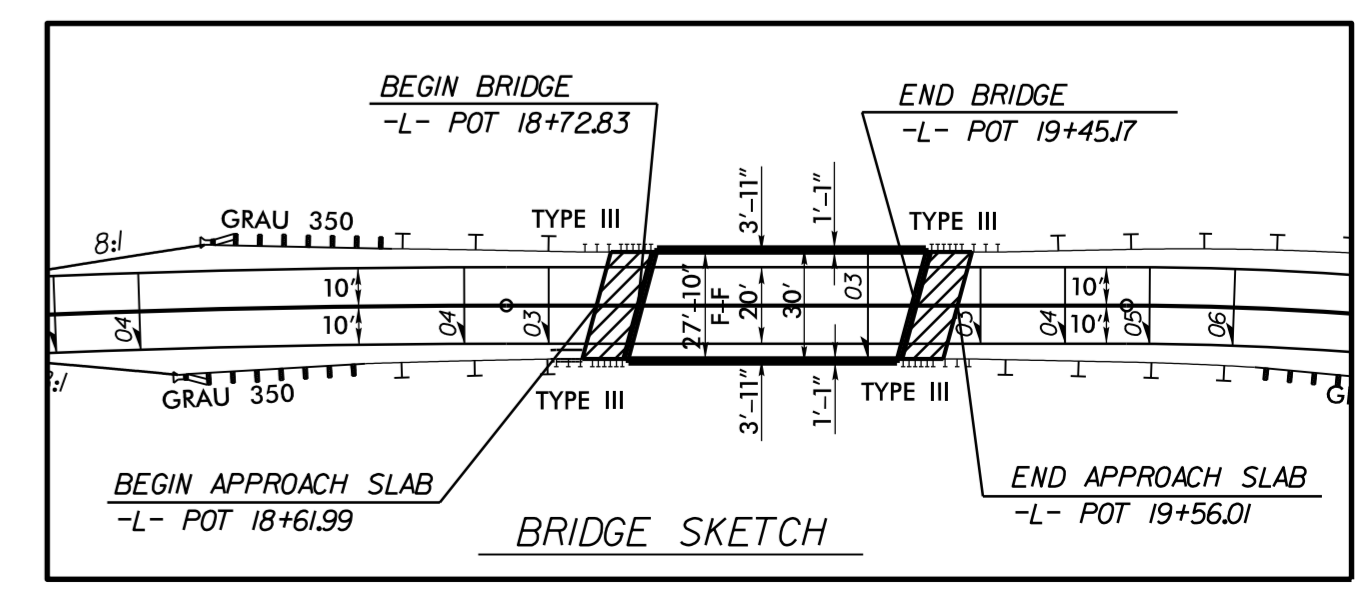
COORDINATE WITH CITY OF SANFORD FOR CLOSING OF VALVES ON 6" WL. NEW PORTION UP TO THE BEND AT THE NEW VALVES SHALL BE FULLY TESTED IN-PLACE PRIOR TO TAKING EX. 6" OFFLINE FOR CONNECTIONS.

CONNECTION WORK REQUIRING TAKING THE EXISTING LINE OFF-LINE MAY REQUIRE NIGHT WORK. COORDINATE WITH THE CITY OF SANFORD.

CONTRACTOR TO FIELD VERIFY DEPTHS OF EX. UTILITIES PRIOR TO CONSTRUCTION.

NUTS, BOLTS, AND ALL THREAD TIE RODS SHALL BE STAINLESS STEEL. ALL DUCTILE IRON PIPE SHALL BE CLASS 50.

EXISTING UTILITIES SHOWN ARE APPROXIMATE AND MAY NOT REFLECT ALL UTILITIES AT THE SITE. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS PRIOR TO CONSTRUCTION.



6/17/99

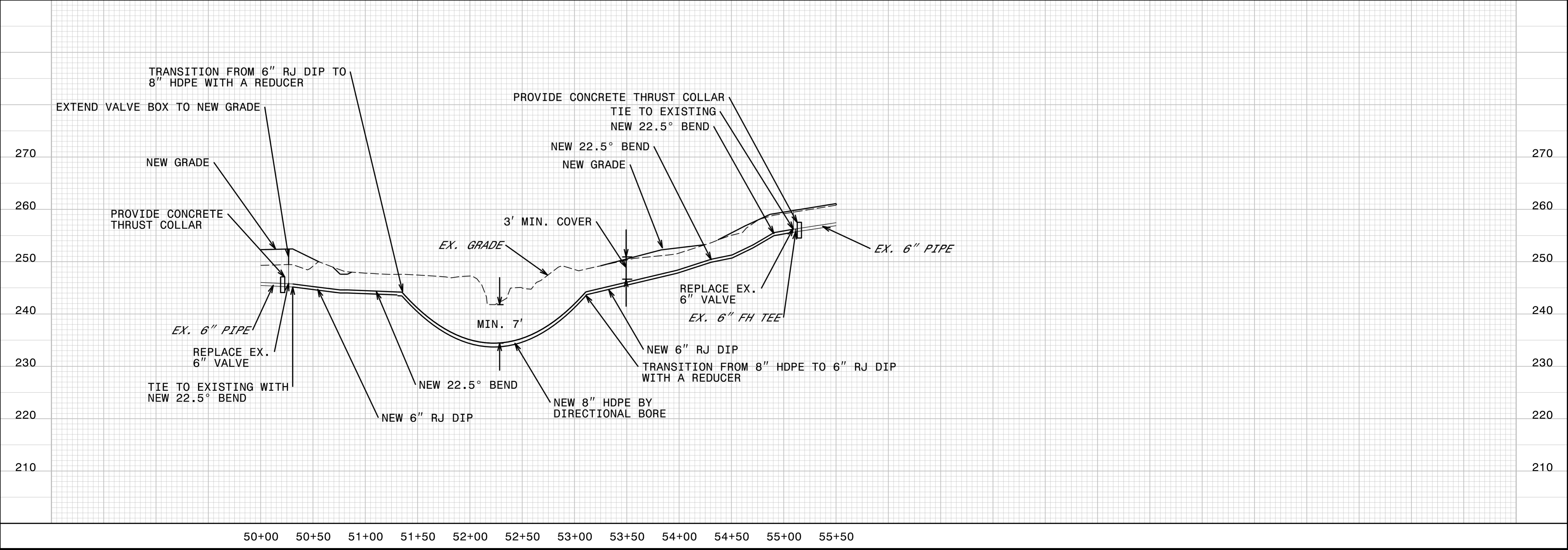
5/28/09

**CH ENGINEERING**  
 3220 GLEN ROYAL RD. RALEIGH, NC 27617  
 TELE 919.788.0224 FAX 919.788.0232  
 NC LICENSE #P-0189

PROJECT REFERENCE NO. <i>177BP.8.R.114</i>	SHEET NO. <b>UC-5</b>
DESIGNED BY: EMT	LEE COUNTY BRIDGE 016
DRAWN BY: EMT	
CHECKED BY:	
APPROVED BY:	
REVISER:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

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# UTILITY CONSTRUCTION





T.I.P. NO.	SHEET NO.
17BP.8.R.114	UO-1

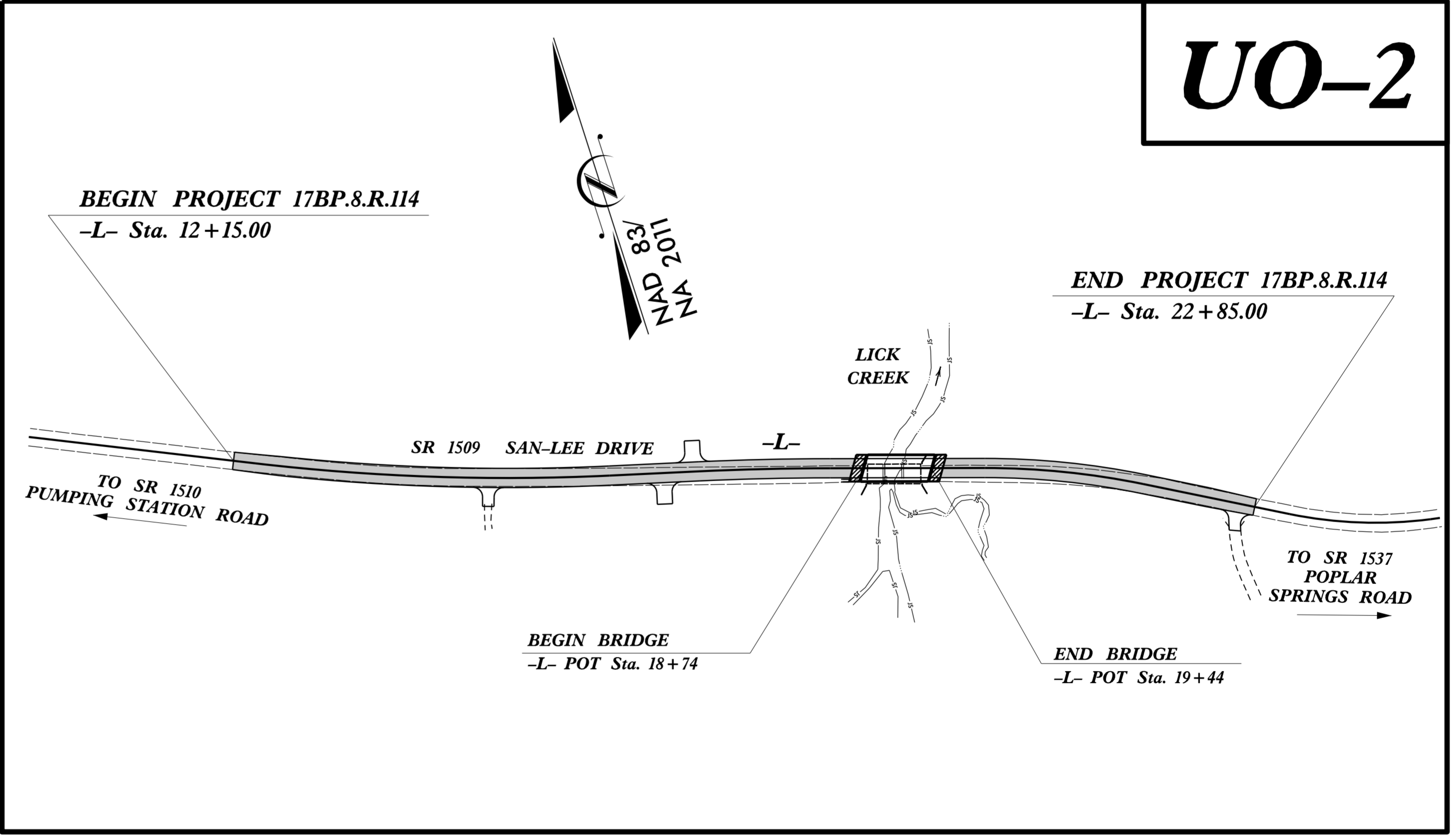
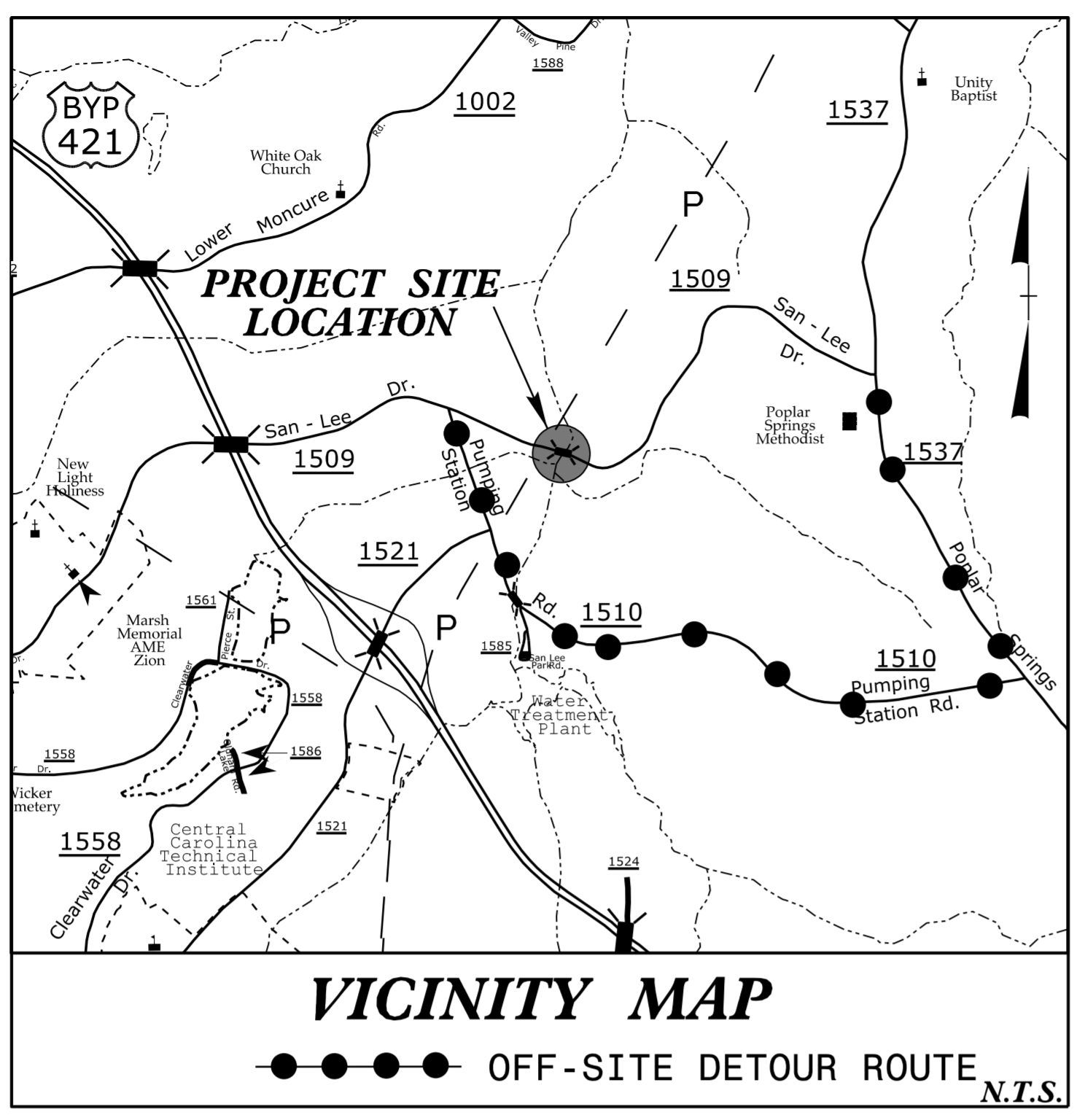
NOTE:  
 ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.  
 NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

**UTILITIES BY OTHERS PLANS  
 LEE COUNTY**

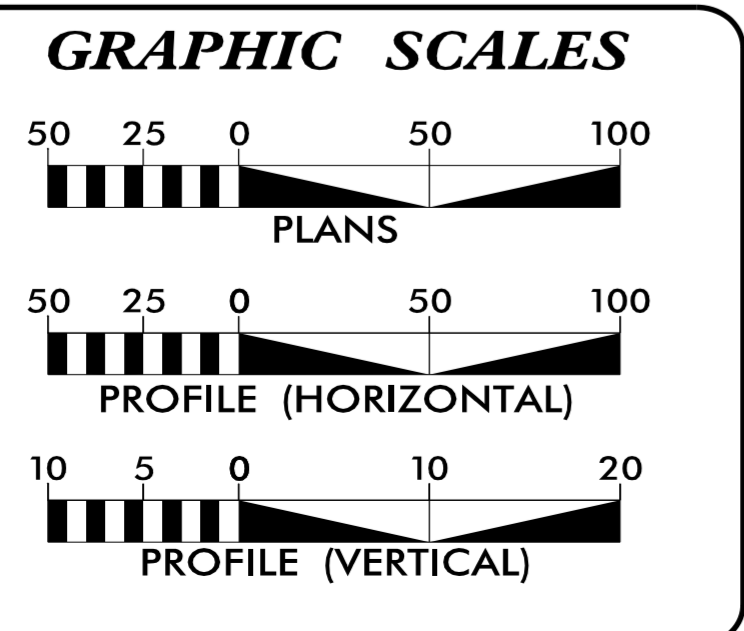
LOCATION: BRIDGE NO. 530016 ON SR 1509 (SAN-LEE DRIVE)  
 OVER LICK CREEK

TYPE OF WORK: WATER, TELEPHONE, & CATV RELOCATION



**UO-2**

TIP PROJECT: 17BP.8.R.114



**INDEX OF SHEETS**

SHEET NO.:	DESCRIPTION:
UO-1	TITLE SHEET
UO-2	UBO PLAN SHEET

**UTILITY OWNERS ON PROJECT**

(A) WATER - CITY OF SANFORD  
 (B) TELEPHONE - WINDSTREAM  
 (C) CATV - TWC/CHARTER COMMUNICATION  
 (D) POWER TRANSMISSION - DUKE ENERGY  
 PROGRESS

PREPARED IN THE OFFICE OF:

**CH ENGINEERING**

3220 GLEN ROYAL RD. RALEIGH, NC 27617  
 TELE 919.788.0224 FAX 919.788.0232  
 NC LICENSE #P-0189

**UTILITIES PROJECT ENGINEER**  
 Mary Jo Lee, P.E.

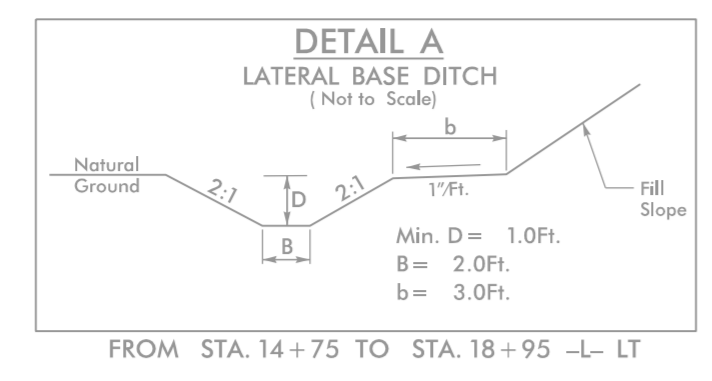
**DIVISION OF HIGHWAYS  
 DIVISION 8**

902 N SANDHILLS BLVD.  
 ABERDEEN, 28315

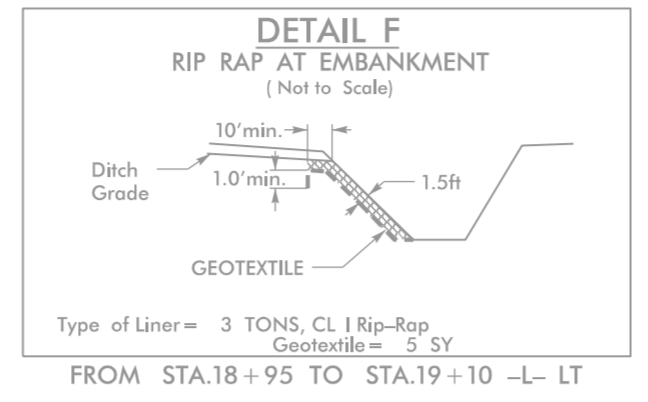
JAMIE YOW	DIVISION CONTACT #1
LEE PARRIS	DIVISION CONTACT #2
TIM WELCH	DIVISION CONTACT #3
	DIVISION CONTACT #4

UTILITIES BY OTHERS

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



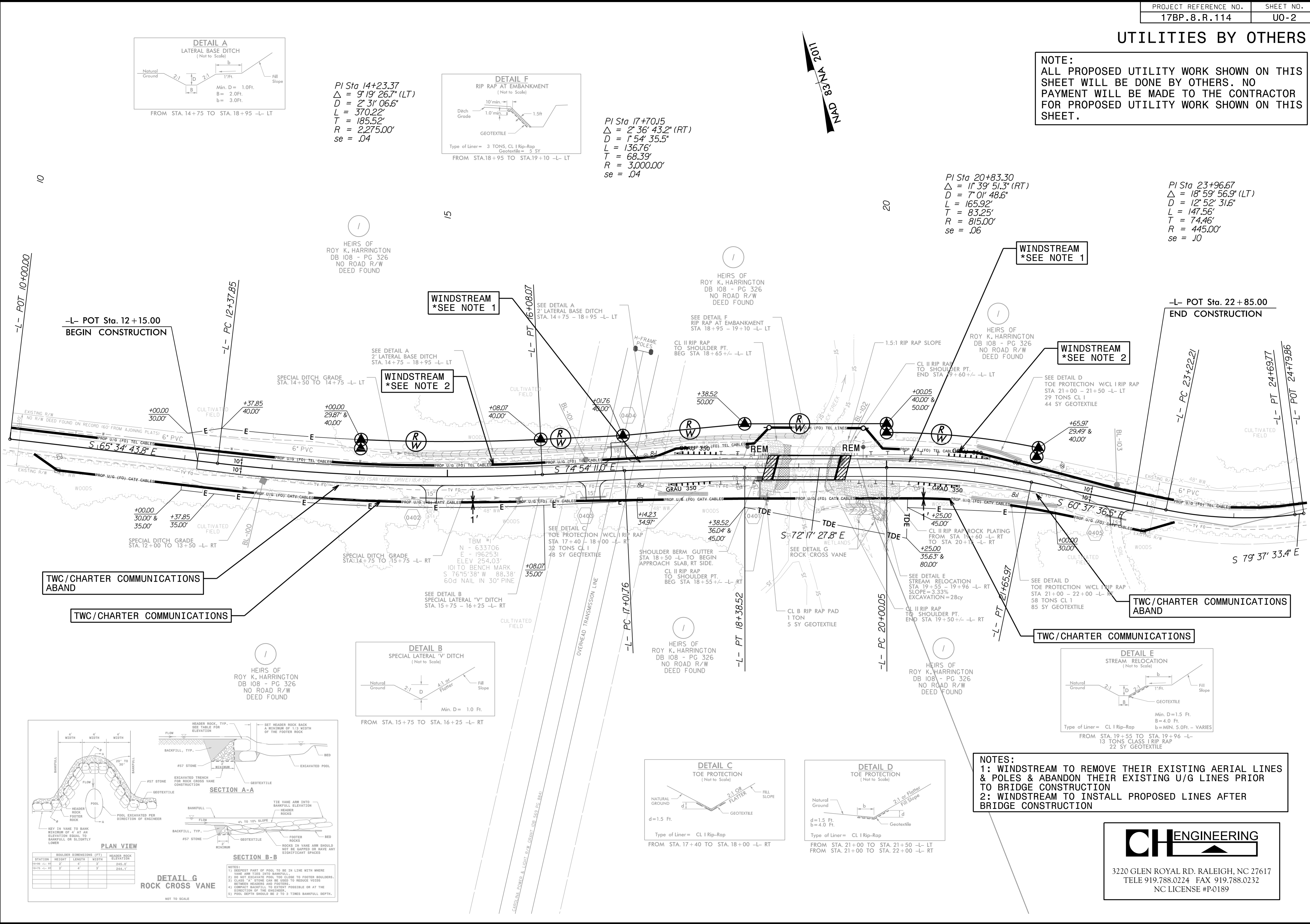
PI Sta 14+23.37  
 $\Delta = 9' 19' 26.7''$  (LT)  
 $D = 2' 31' 06.6''$   
 $L = 370.22'$   
 $T = 185.52'$   
 $R = 2,275.00'$   
 $se = .04$



PI Sta 17+70.15  
 $\Delta = 2' 36' 43.2''$  (RT)  
 $D = 1' 54' 35.5''$   
 $L = 136.76'$   
 $T = 68.39'$   
 $R = 3,000.00'$   
 $se = .04$

PI Sta 20+83.30  
 $\Delta = 11' 39' 51.3''$  (RT)  
 $D = 7' 01' 48.6''$   
 $L = 165.92'$   
 $T = 83.25'$   
 $R = 815.00'$   
 $se = .06$

PI Sta 23+96.67  
 $\Delta = 18' 59' 56.9''$  (LT)  
 $D = 12' 52' 31.6''$   
 $L = 147.56'$   
 $T = 74.46'$   
 $R = 445.00'$   
 $se = .10$



TWC/CHARTER COMMUNICATIONS ABAND

TWC/CHARTER COMMUNICATIONS

WINDSTREAM \*SEE NOTE 2

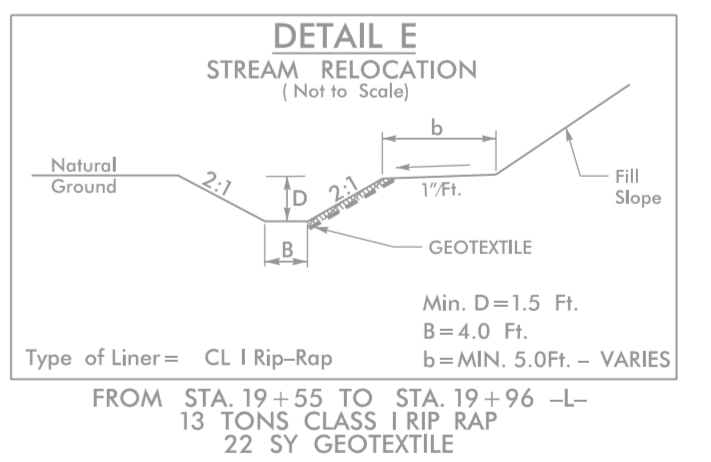
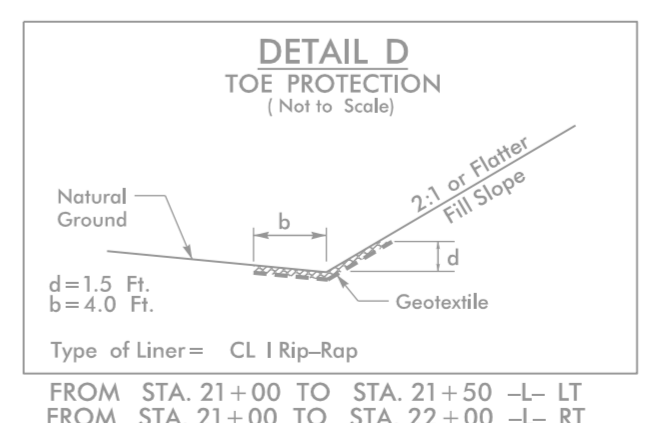
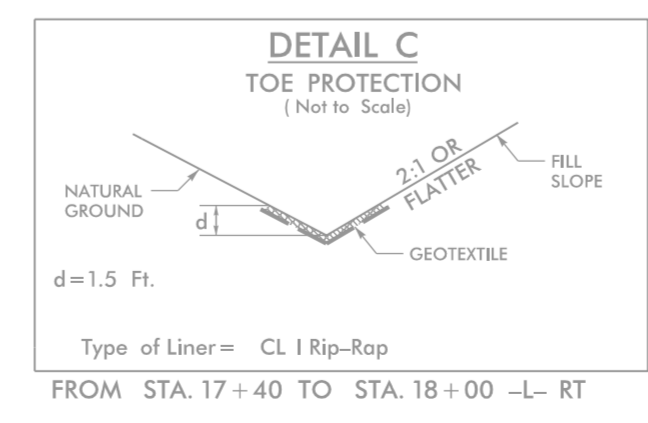
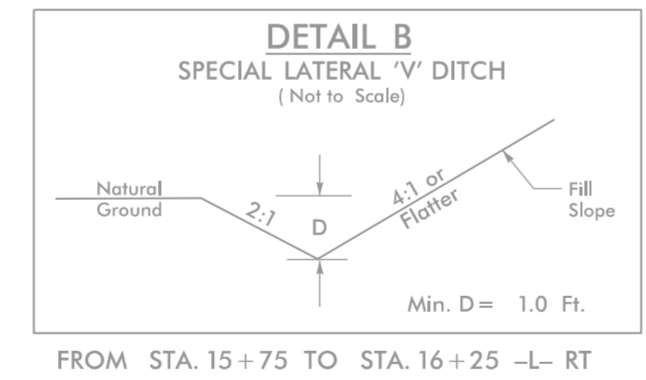
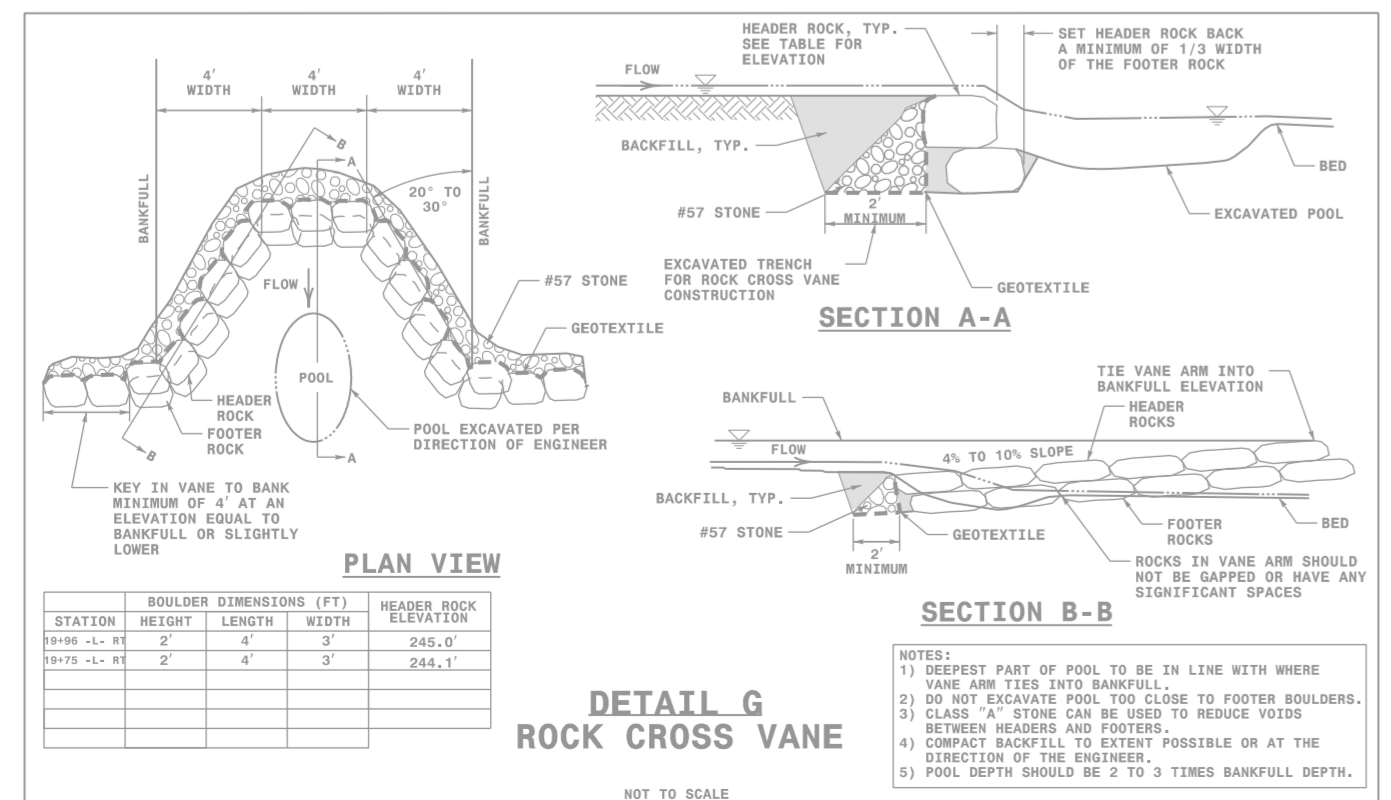
WINDSTREAM \*SEE NOTE 1

WINDSTREAM \*SEE NOTE 1

WINDSTREAM \*SEE NOTE 2

TWC/CHARTER COMMUNICATIONS ABAND

TWC/CHARTER COMMUNICATIONS

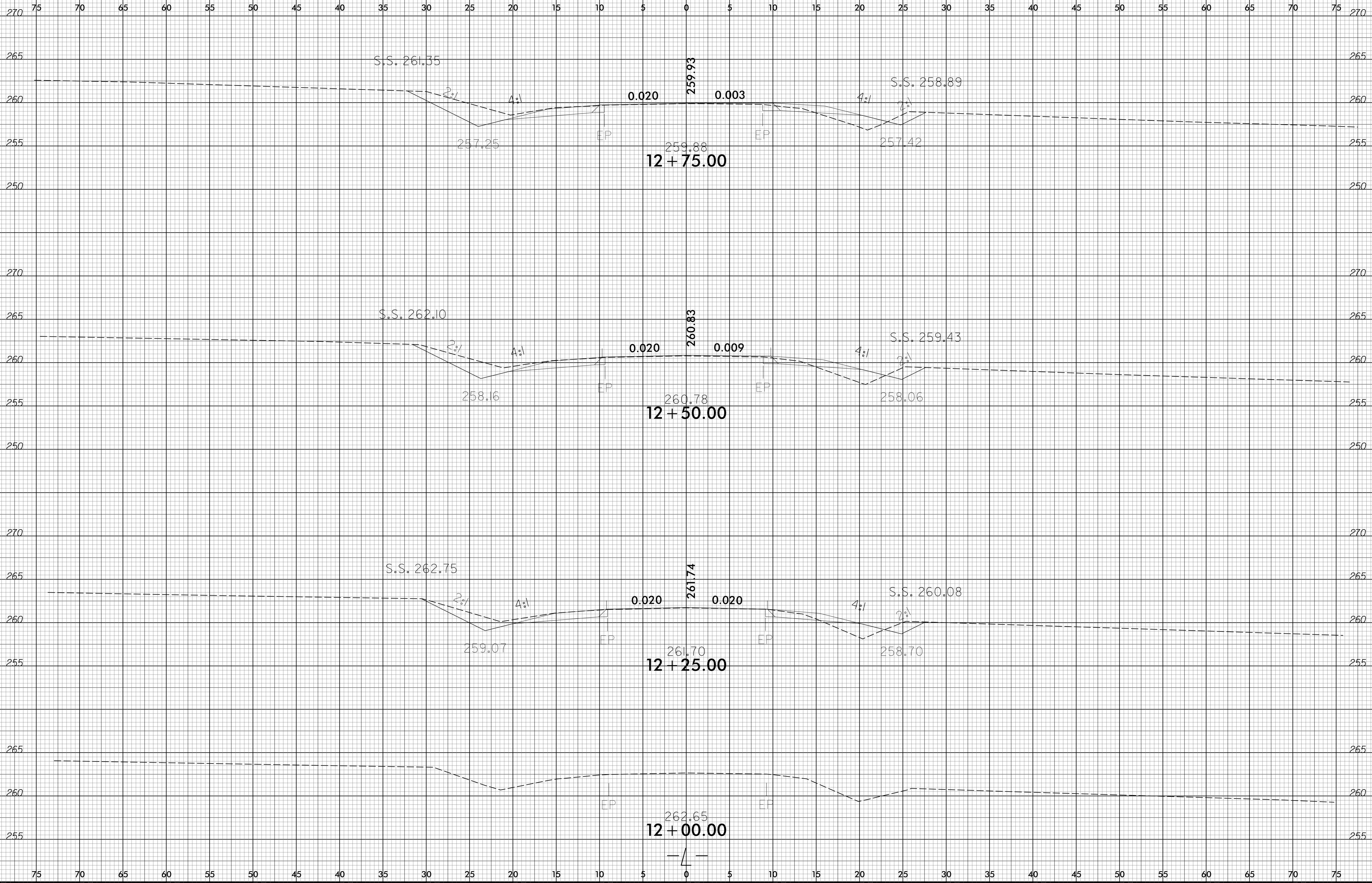


NOTES:  
 1: WINDSTREAM TO REMOVE THEIR EXISTING AERIAL LINES & POLES & ABANDON THEIR EXISTING U/G LINES PRIOR TO BRIDGE CONSTRUCTION  
 2: WINDSTREAM TO INSTALL PROPOSED LINES AFTER BRIDGE CONSTRUCTION

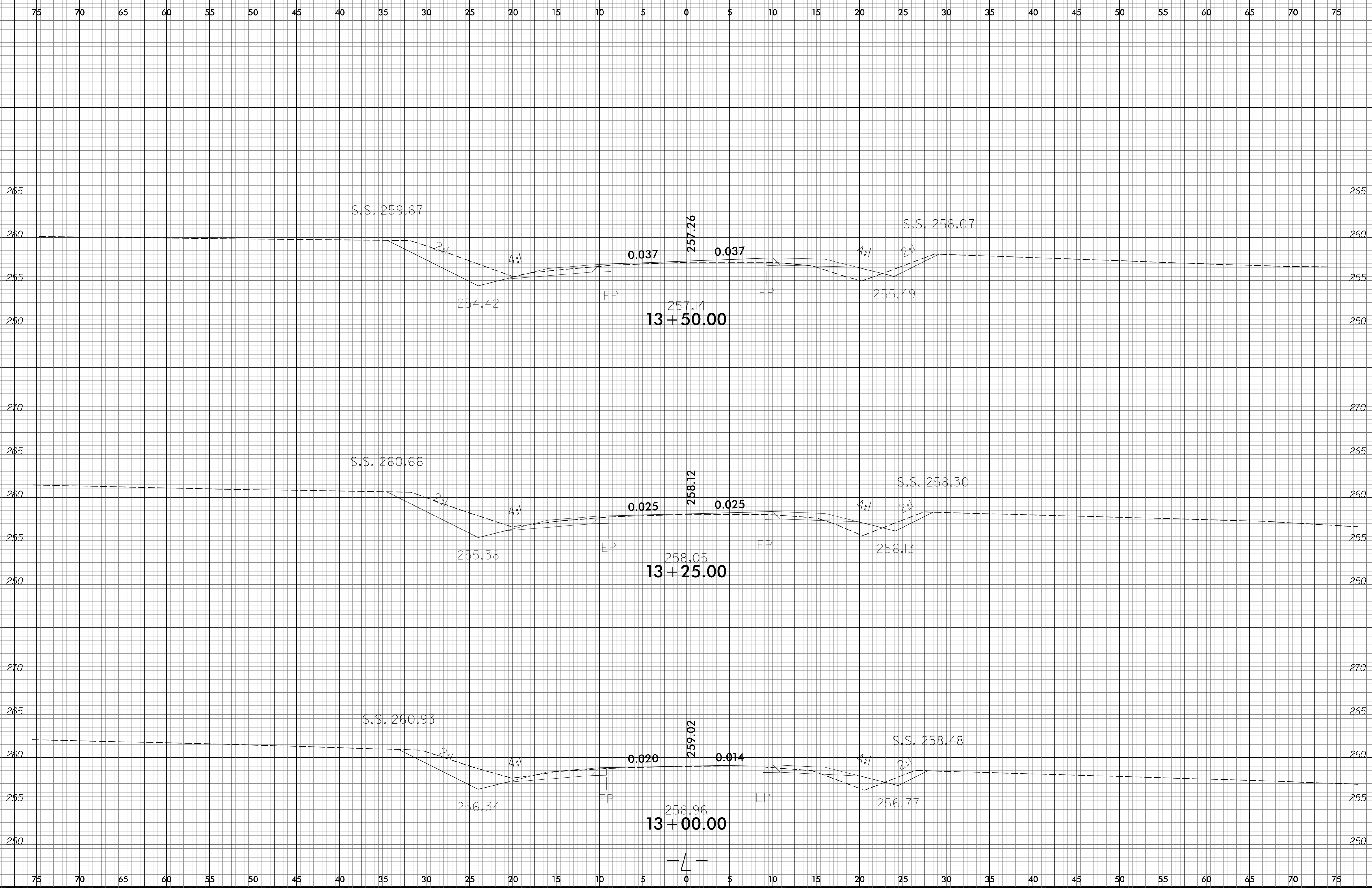
**CH ENGINEERING**  
 3220 GLEN ROYAL RD. RALEIGH, NC 27617  
 TELE 919.788.0224 FAX 919.788.0232  
 NC LICENSE #P0189

5/14/99  
 4/25/2017  
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6/23/16

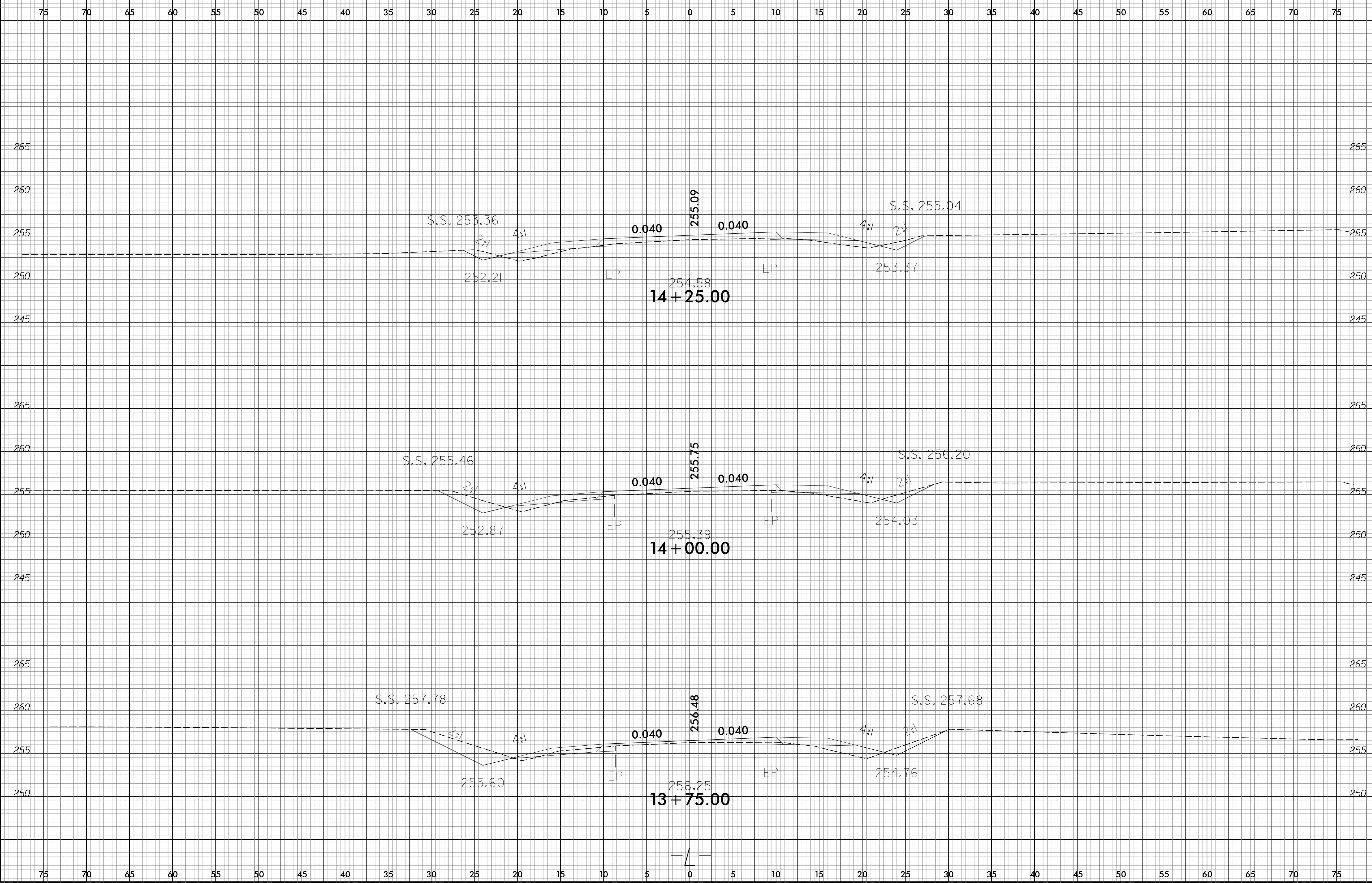


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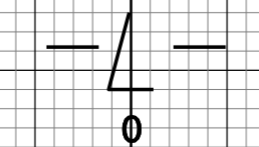


6/23/16

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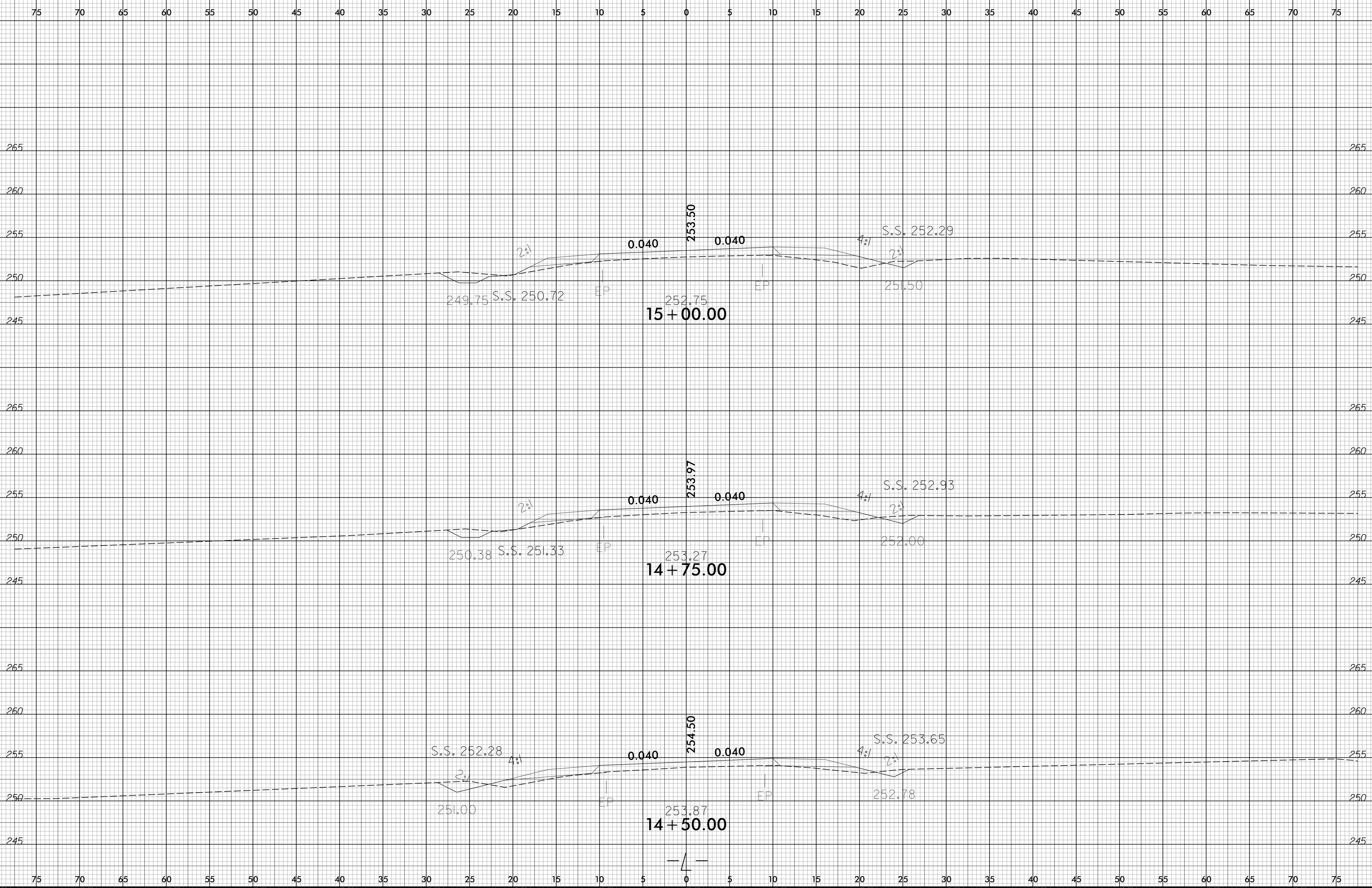


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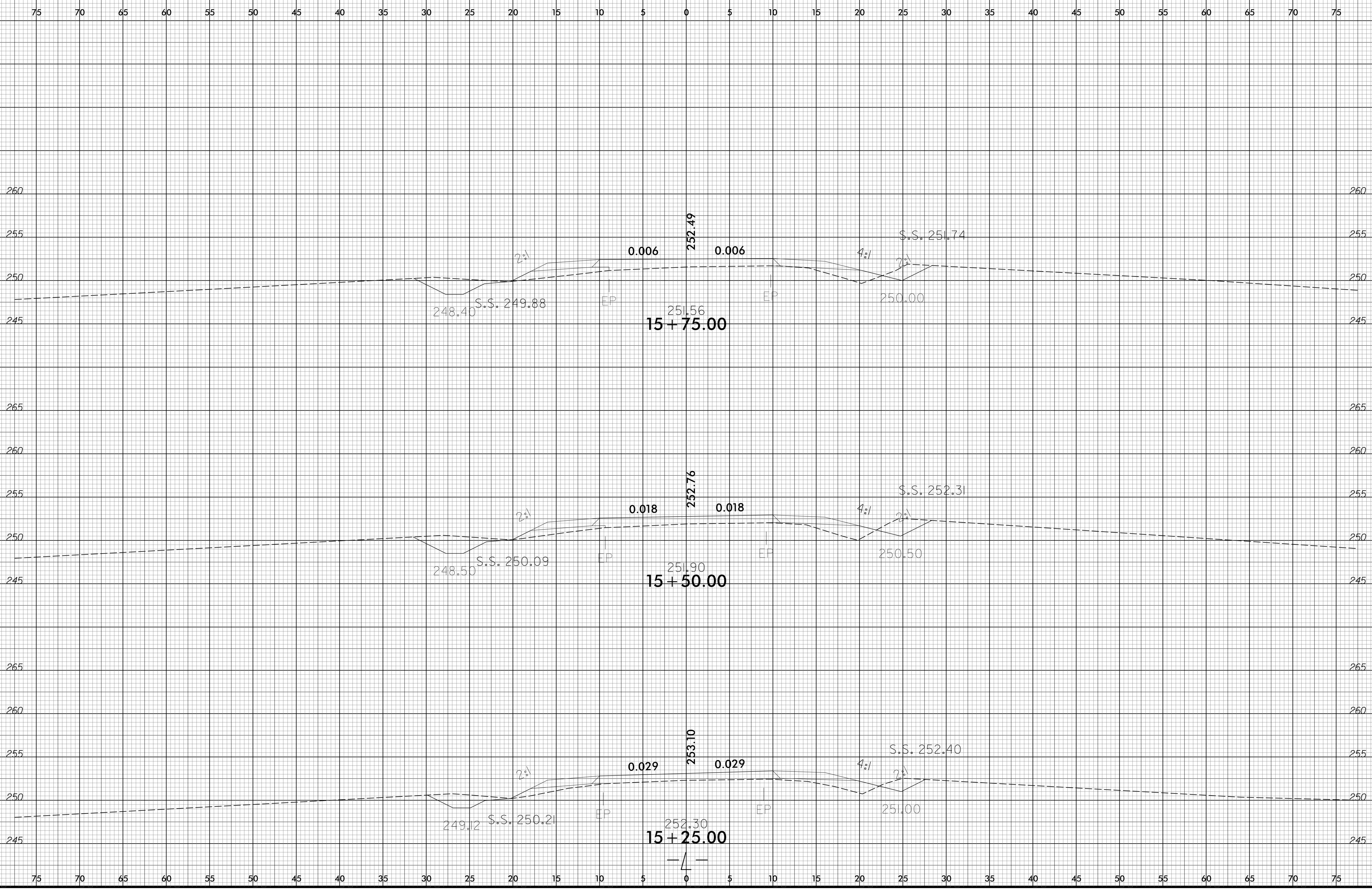


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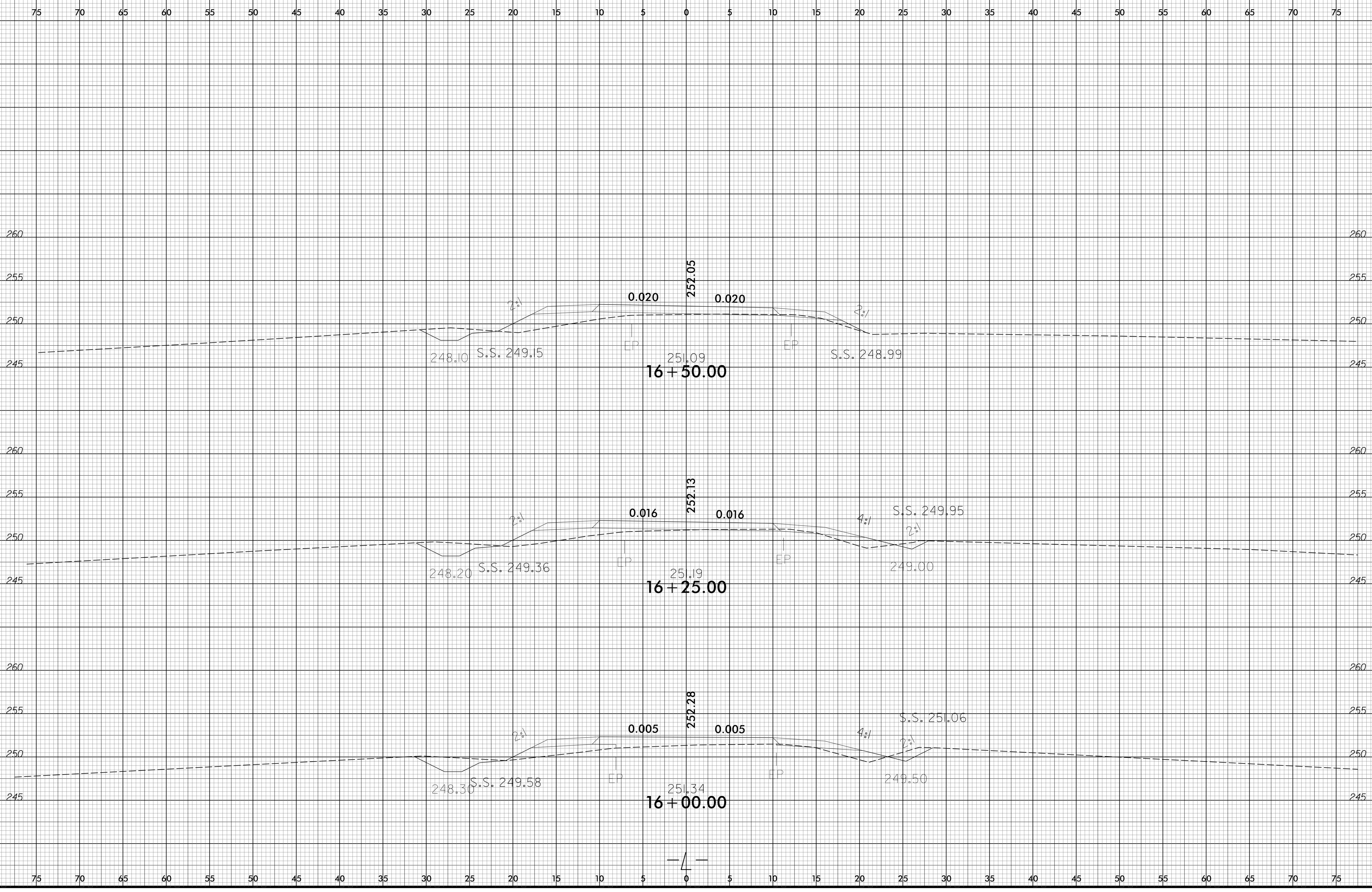
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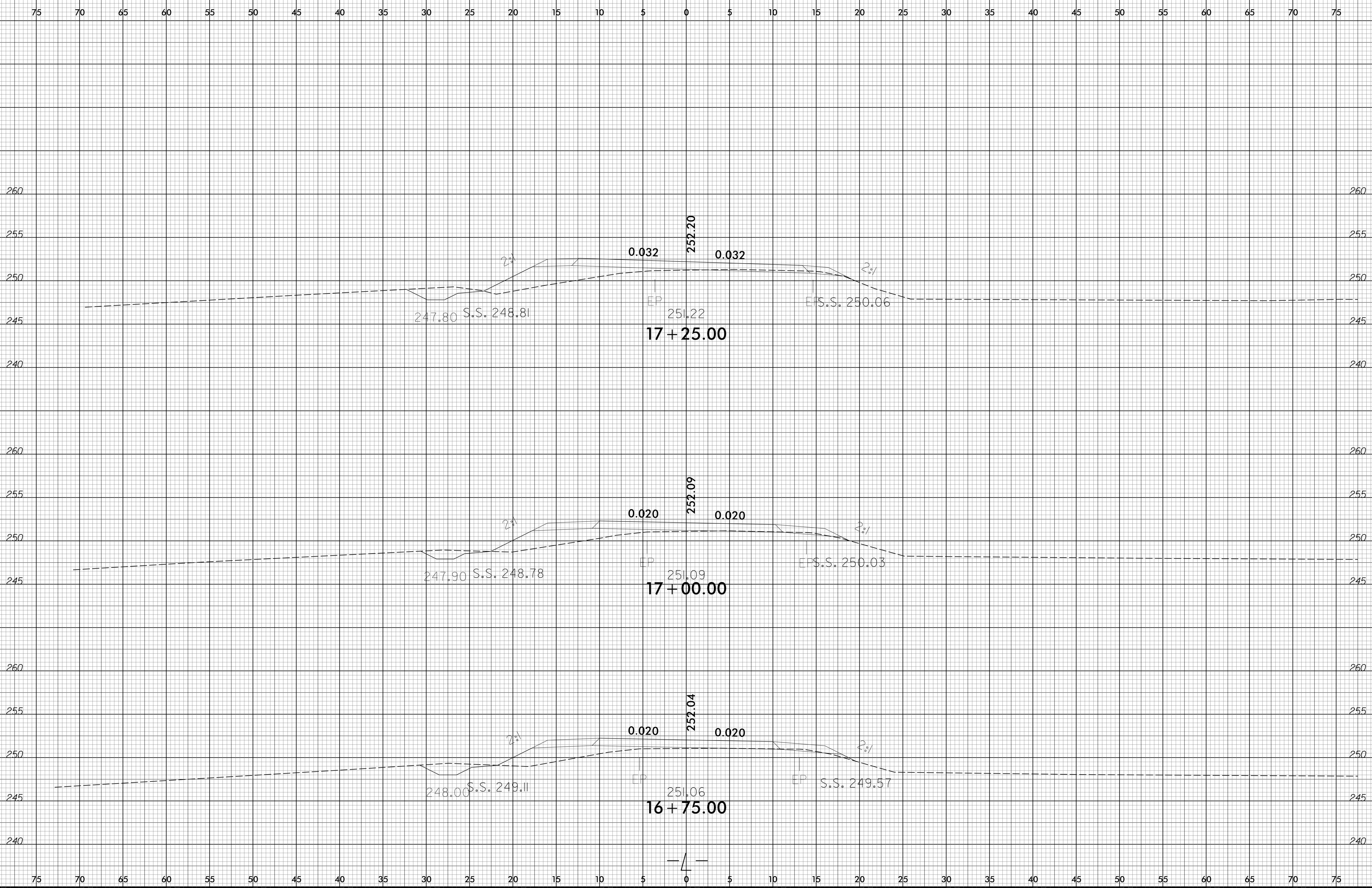
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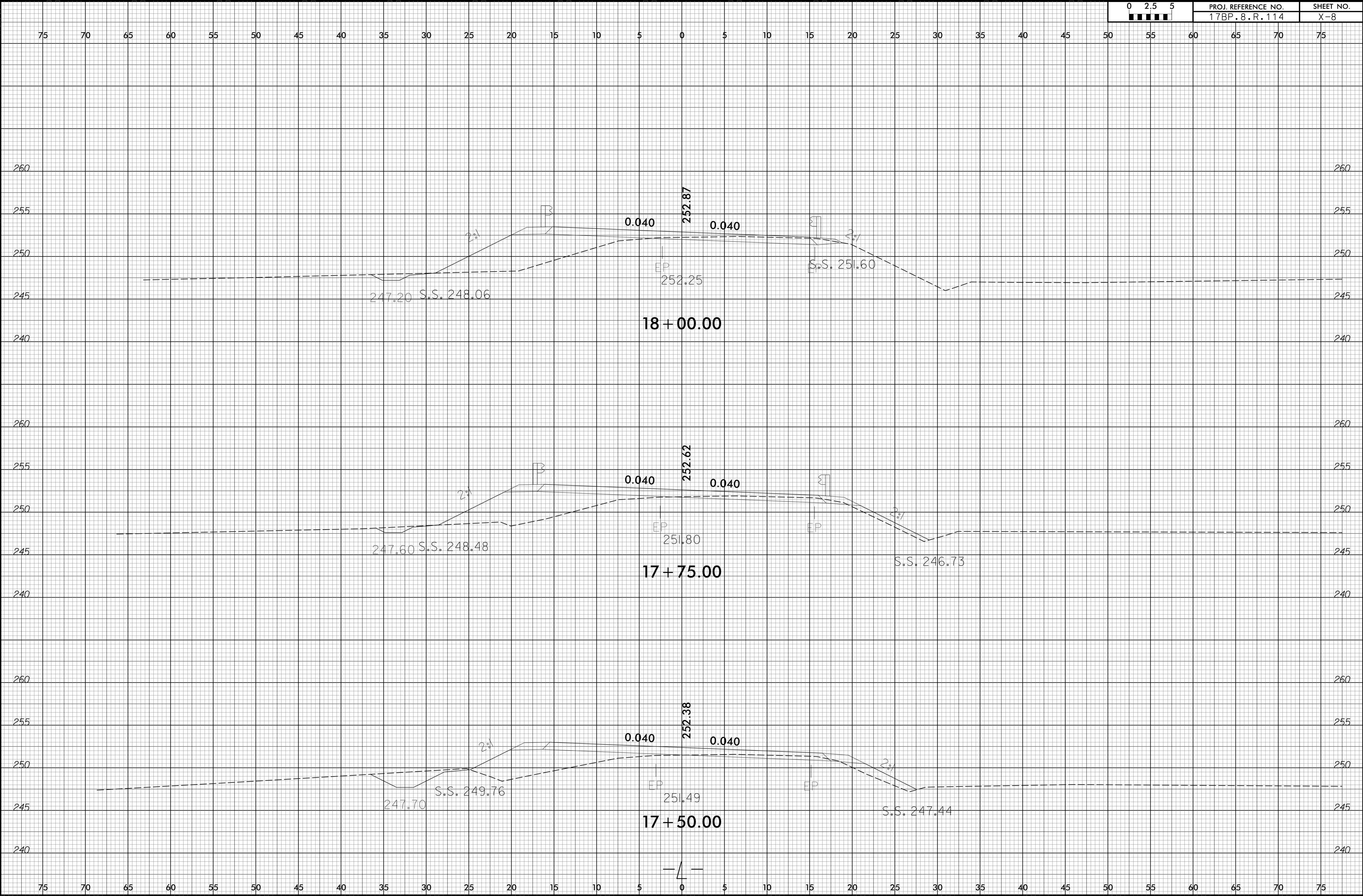
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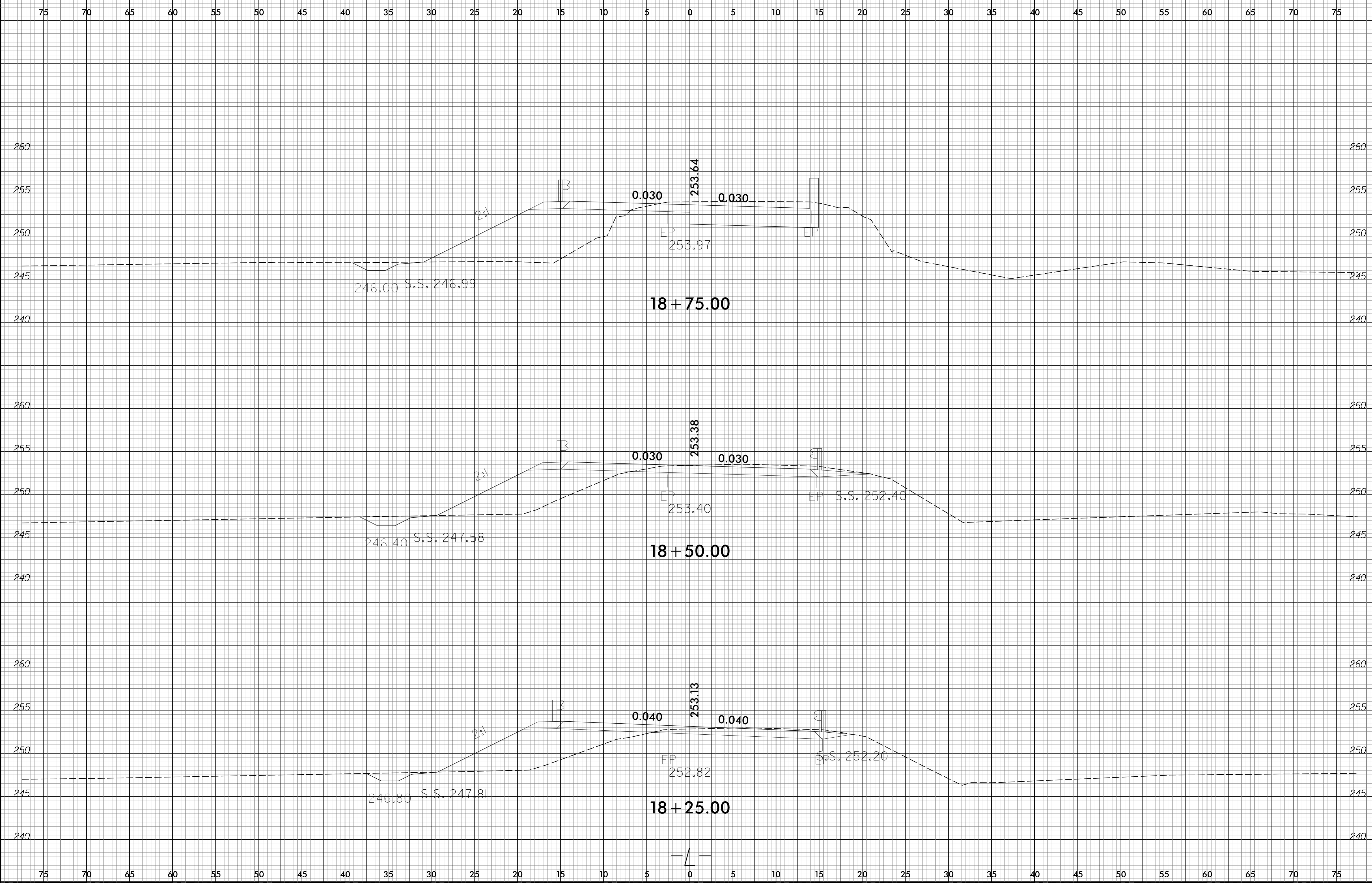
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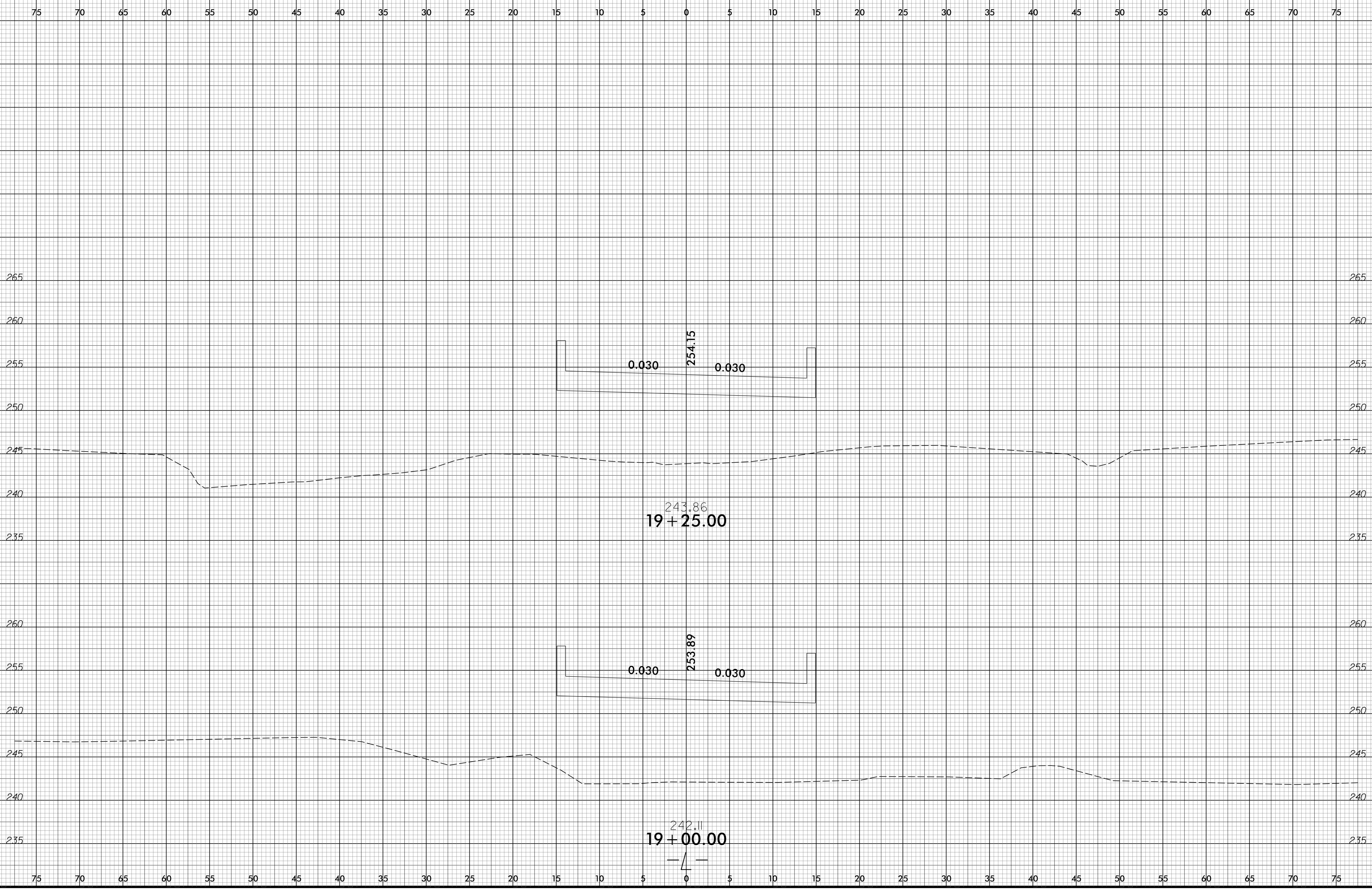
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6/23/16

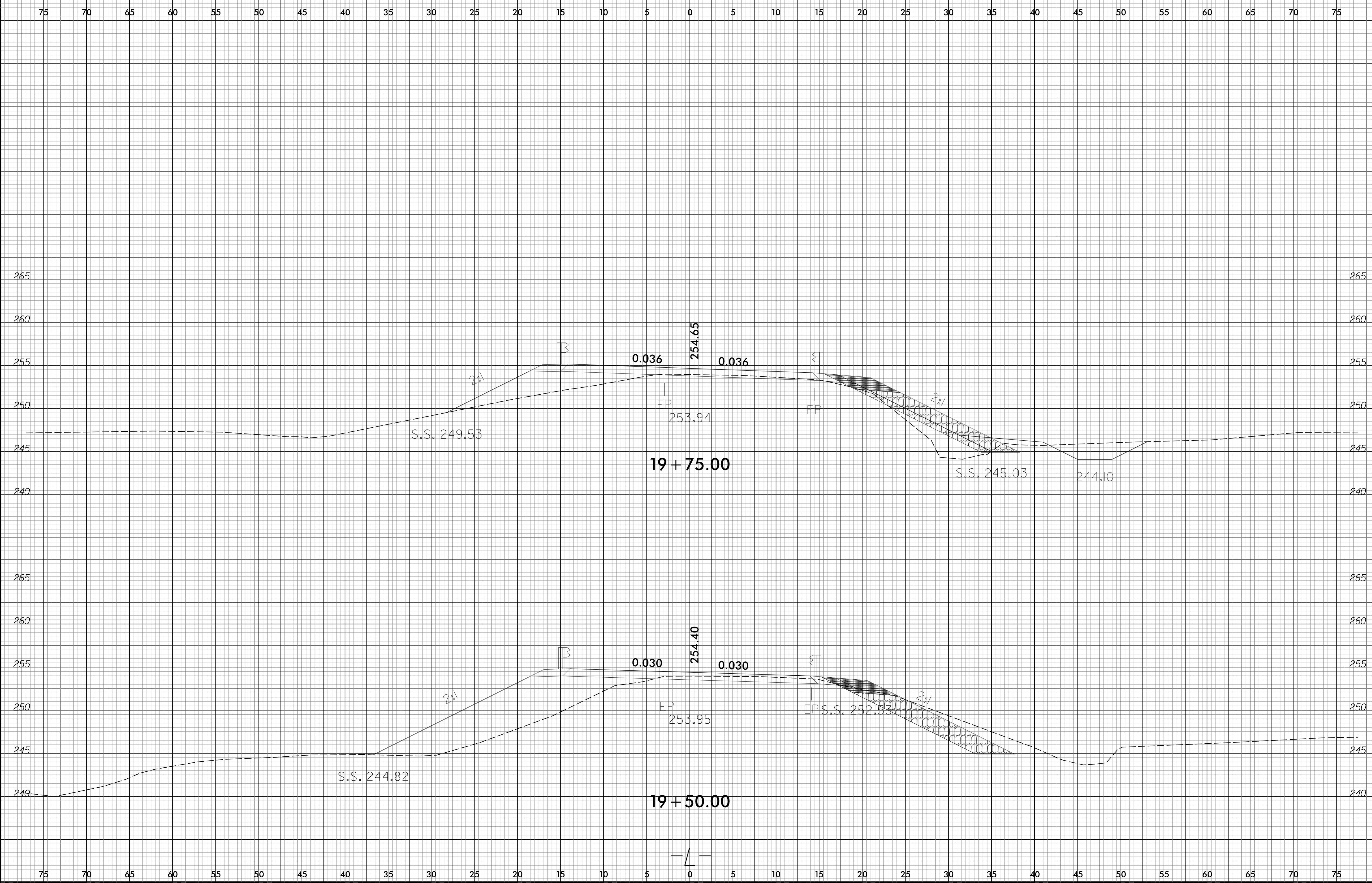
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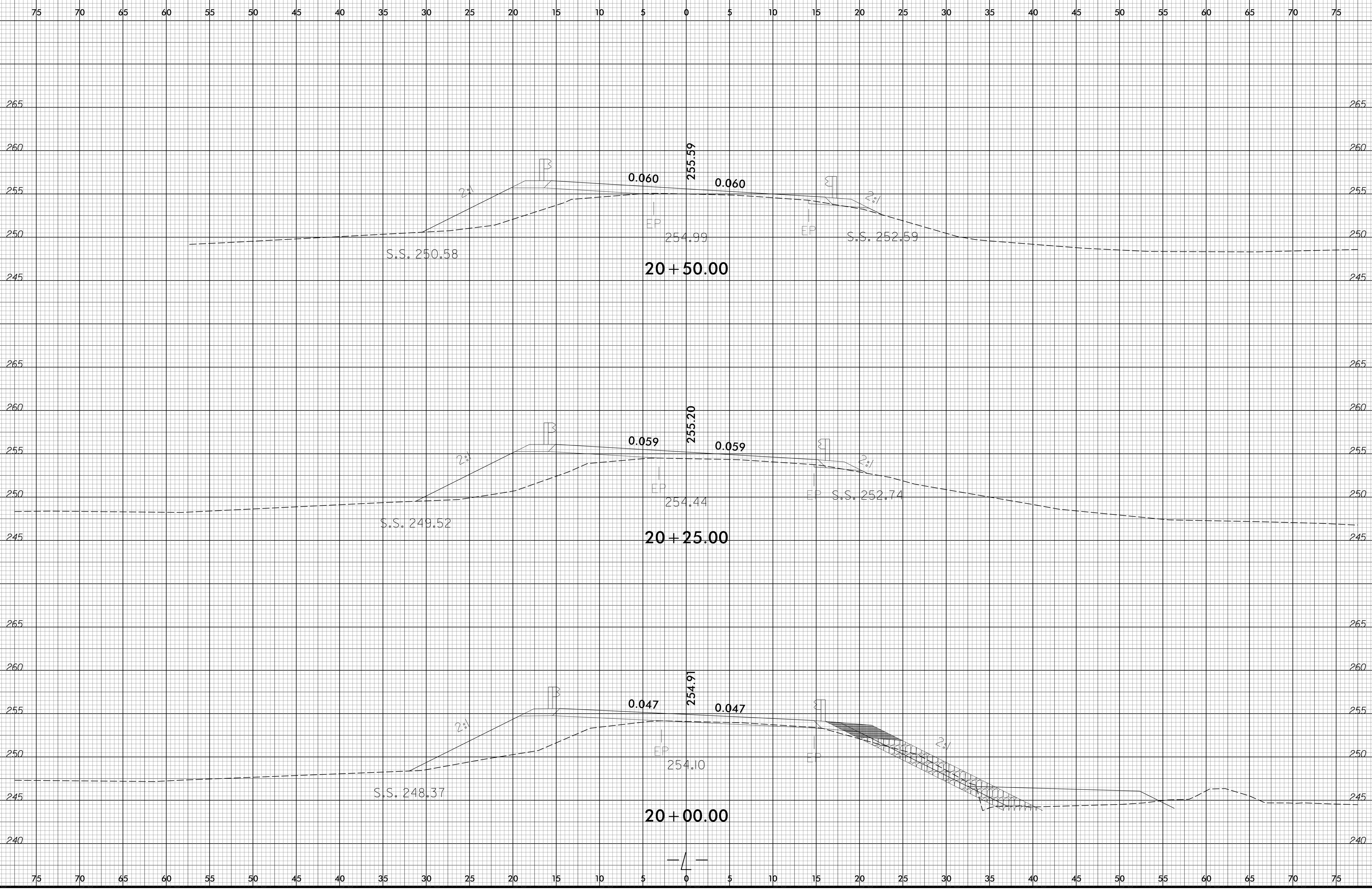
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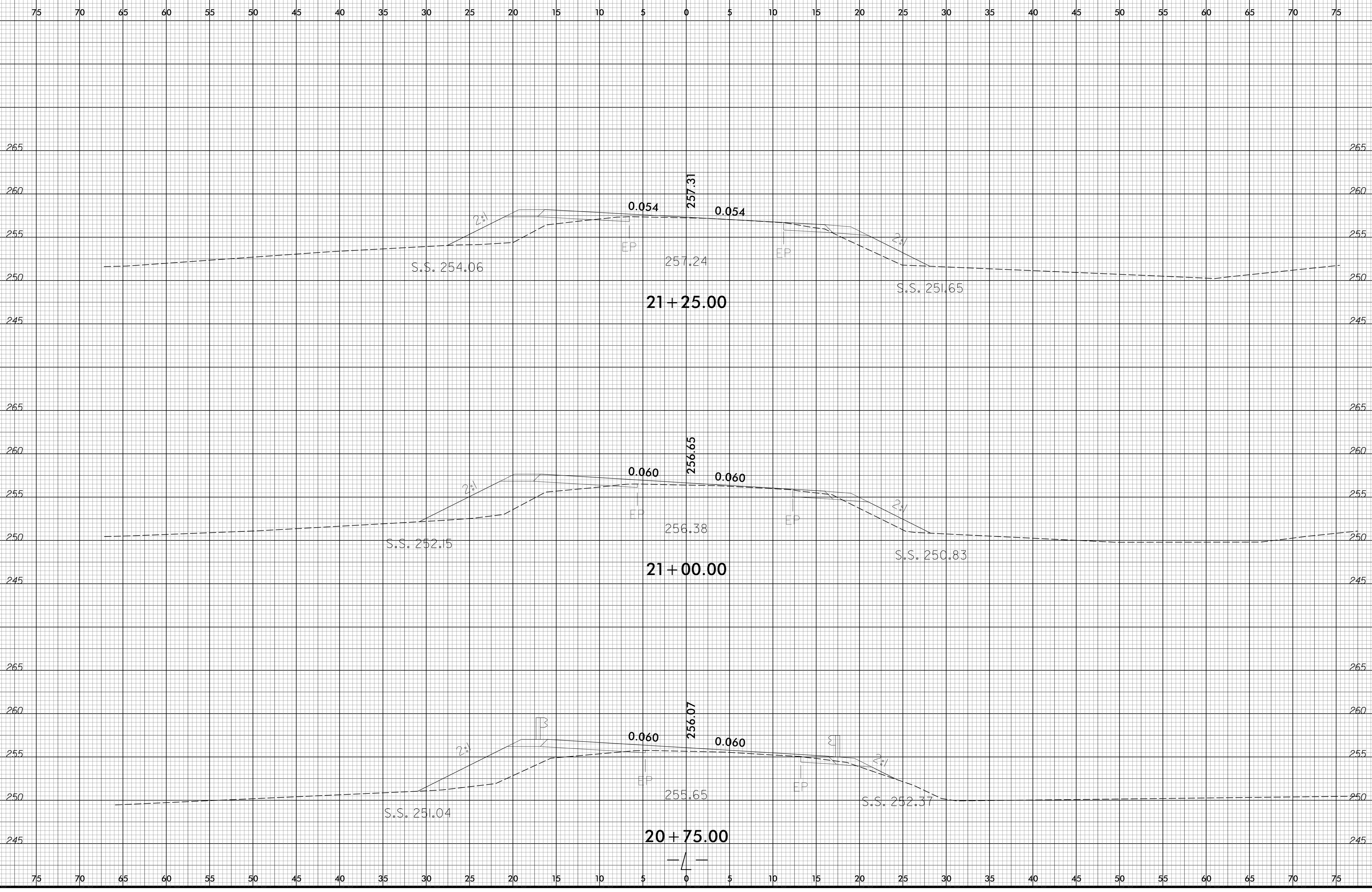
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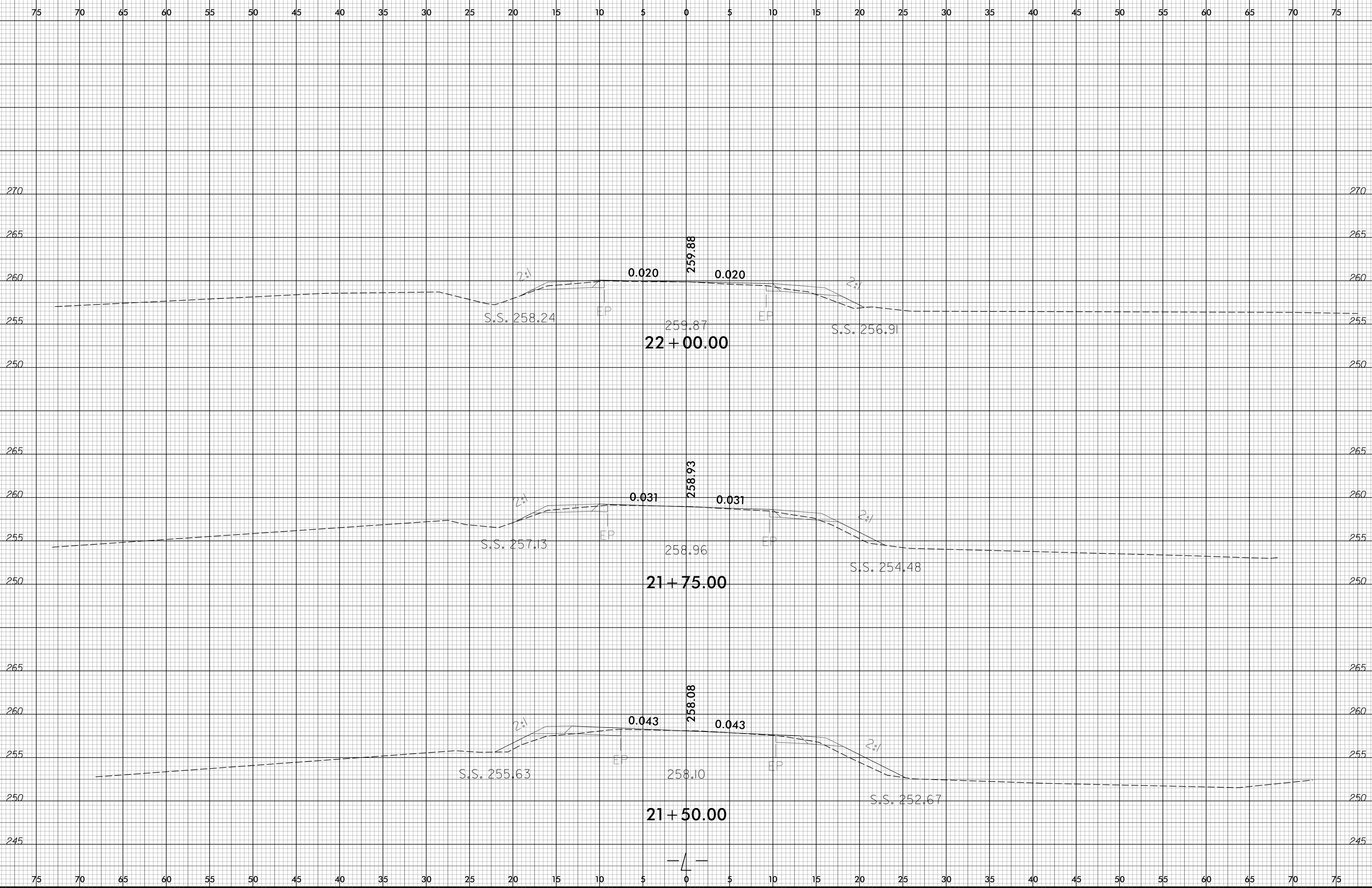
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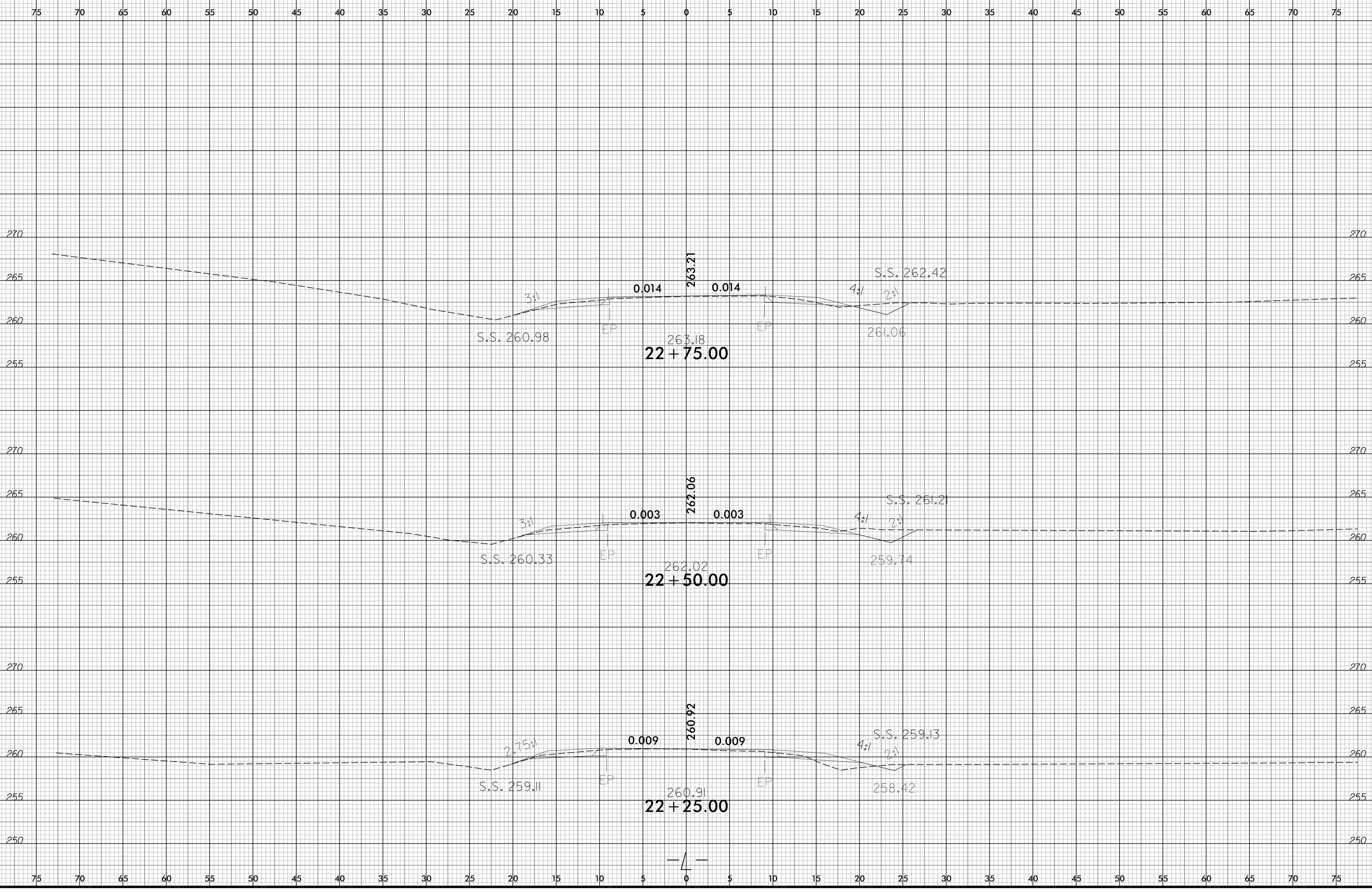
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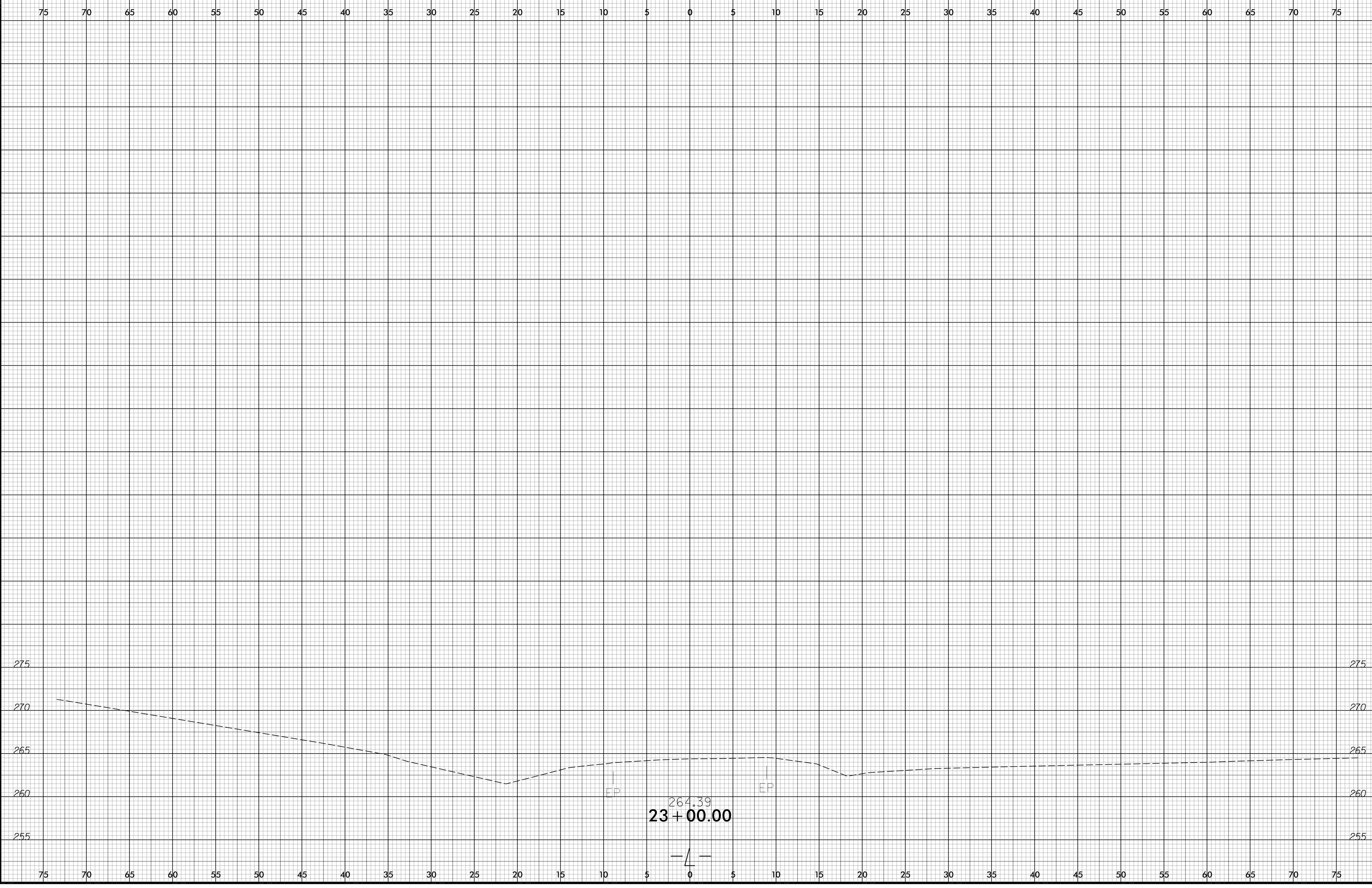
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6/23/16

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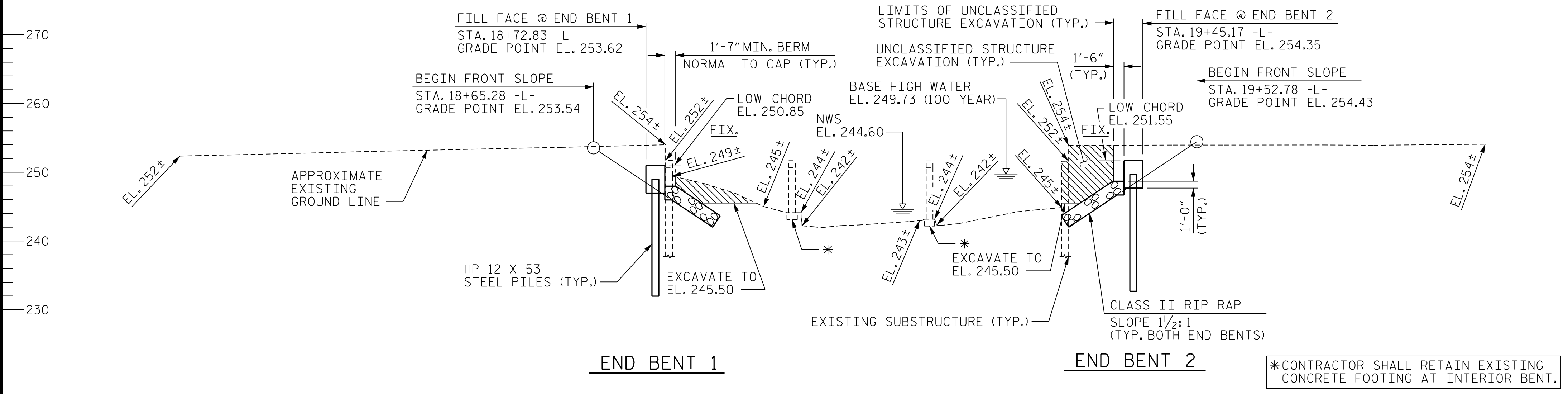
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USER:VAME

19+00

-3.6239%  $\Delta$  +1.0172%  
PVI = 15+420.00 -L-  
EL. = 250.25  
V.C. = 450.00'

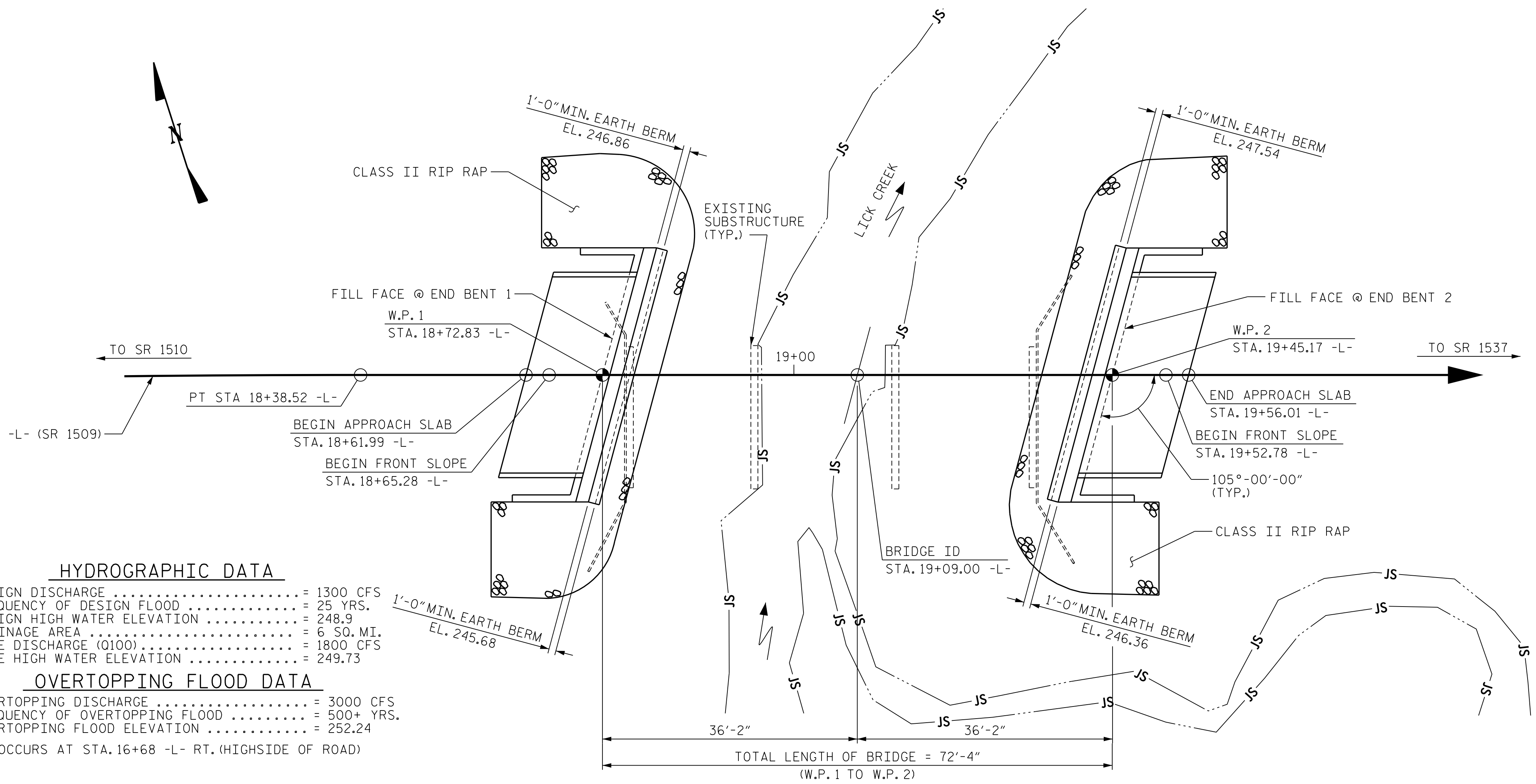
GRADE DATA -L-

SPAN A



\*CONTRACTOR SHALL RETAIN EXISTING CONCRETE FOOTING AT INTERIOR BENT.

SECTION ALONG -L-  
(SECTION TAKEN AT RIGHT ANGLES TO END BENTS)



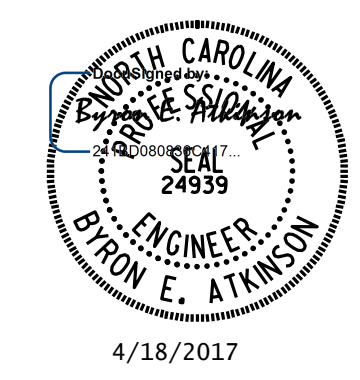
PLAN  
(PILES NOT SHOWN FOR CLARITY)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
STATION: 19+09.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 16

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
GENERAL DRAWING  
FOR BRIDGE ON SR 1509  
OVER LICK CREEK  
BETWEEN SR 1510 AND SR 1537



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			13

**HYDROGRAPHIC DATA**

DESIGN DISCHARGE ..... = 1300 CFS  
 FREQUENCY OF DESIGN FLOOD ..... = 25 YRS.  
 DESIGN HIGH WATER ELEVATION ..... = 248.9  
 DRAINAGE AREA ..... = 6 SQ. MI.  
 BASE DISCHARGE (Q100) ..... = 1800 CFS  
 BASE HIGH WATER ELEVATION ..... = 249.73

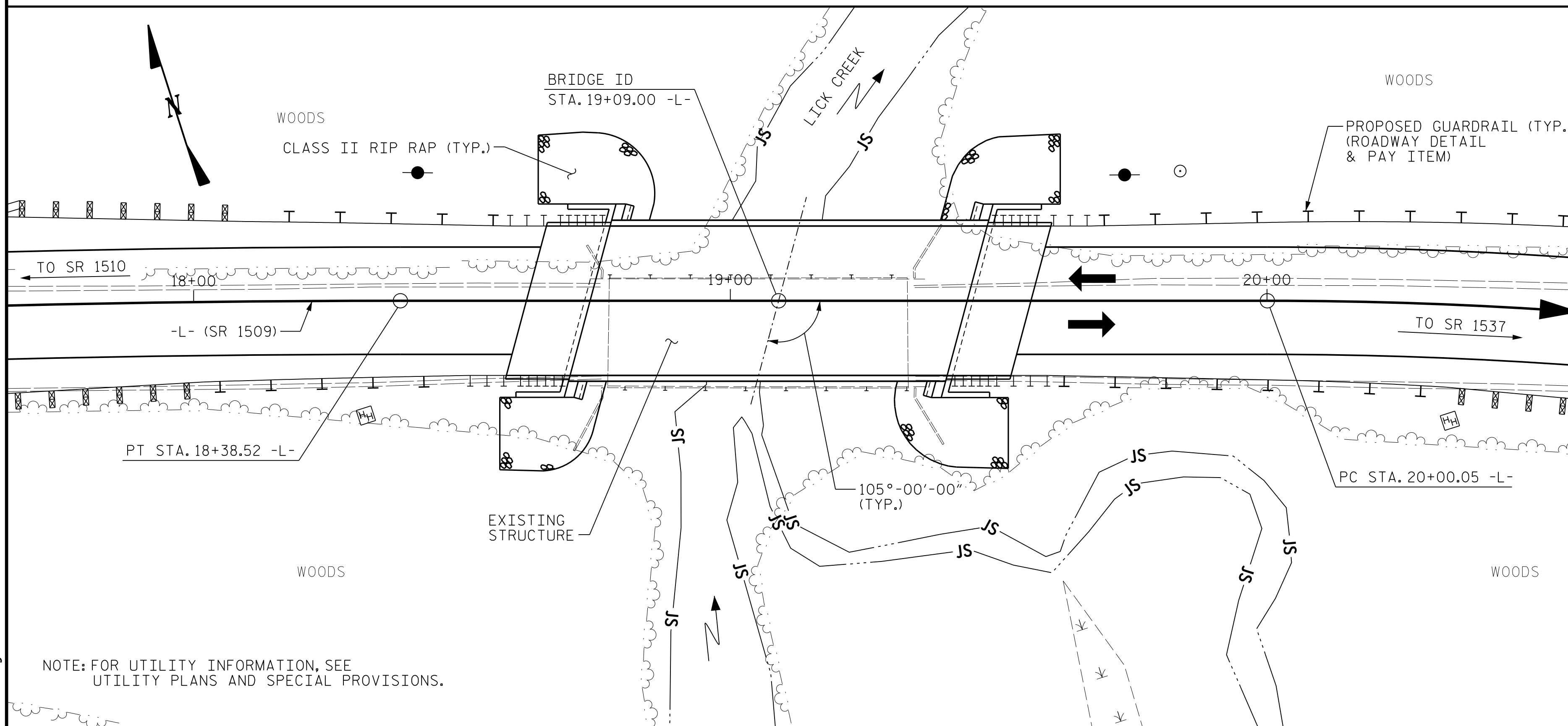
**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE ..... = 3000 CFS  
 FREQUENCY OF OVERTOPPING FLOOD ..... = 500+ YRS.  
 OVERTOPPING FLOOD ELEVATION ..... = 252.24  
 OT OCCURS AT STA. 16+68 -L- RT. (HIGHSIDE OF ROAD)

DRAWN BY : J.I. BREWER DATE : 01/17  
 CHECKED BY : B.E. ATKINSON DATE : 03/17  
 DESIGN ENGINEER OF RECORD : B.E. ATKINSON DATE : 03/17

4/18/2017 11:07:38 AM User: blanning File: P:\NC Bridges\16005.CH Eng.Div. 8 Br. Repl. 16 Bridges\16005.01.Lee 16\17BP8R114\Structures\401.001.17BP8R114.SMU.GDI.dgn

B.M. 1: 60d NAIL IN 30" PINE, 28' RT. OF STA. 15+81.00 -L-, EL. 254.03



LOCATION SKETCH

NOTES

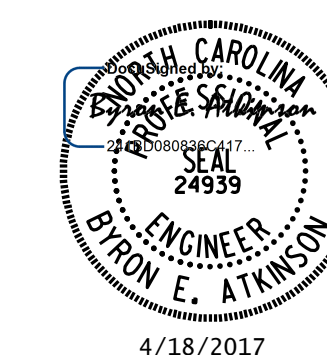
- ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 19+09.00 -L-".
- THE EXISTING STRUCTURE CONSISTING OF THREE SPANS (1 @ 18'-5", 1 @ 20'-0" AND 1 AT 20'-3"), WITH ASPHALT WEARING SURFACE ON TIMBER DECK WITH STEEL I BEAMS AND A CLEAR ROADWAY WIDTH OF 19'-6" ON TIMBER CAP WITH TIMBER PILE END BENTS AND BENTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. EXISTING CONCRETE FOOTINGS AT INTERIOR BENTS TO REMAIN. FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.
- THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 35 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION, SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
- ASPHALT WEARING SURFACE IS INCLUDED IN THE ROADWAY QUANTITY, SEE ROADWAY QUANTITIES.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18- EVALUATING SCOUR AT BRIDGES".
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.
- AT THE CONTRACTOR'S OPTION, PRESTRESSED CONCRETE END BENT AND BENT CAPS MAY BE SUBSTITUTED IN PLACE OF THE CAST-IN-PLACE CAPS. THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER TO RECEIVE REVISED PLANS AND DETAILS FROM THE STRUCTURES MANAGEMENT UNIT. THE REDESIGN AND ANY ADDITIONAL MATERIALS NEEDED WILL BE AT NO ADDITIONAL COST TO THE CONTRACTOR.
- FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.
- DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE.
- TESTING THE PRODUCTION PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 1 AND END BENT 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS		ASBESTOS ASSESSMENT
	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TON	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE					LUMP SUM						140.26			LUMP SUM	10	700.00	
END BENT 1			LUMP SUM	20.7		2522	5	5	85	5		99	110				
END BENT 2			LUMP SUM	20.7		2522	5	5	85	5		109	121				
TOTAL	LUMP SUM	1	LUMP SUM	41.4	LUMP SUM	5044	10	10	170	10	140.26	208	231	LUMP SUM	10	700.00	LUMP SUM

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
STATION: 19+09.00 -L-

SHEET 2 OF 2



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1509  
OVER LICK CREEK  
BETWEEN SR 1510 AND SR 1537

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-2 TOTAL SHEETS 13
2			4			

DRAWN BY : J.I. BREWER DATE : 01/17  
CHECKED BY : B.E. ATKINSON DATE : 03/17  
DESIGN ENGINEER OF RECORD : B.E. ATKINSON DATE : 03/17

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Filename: P:\NC Bridges\MI6005.CH Eng.Div. 8 Br. Repl. 16 Bridges\MI6005.01.Lee 16\17BP8R114\Structures\401.003.17BP8R114.SMU.002.dgn

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.014	--	1.75	0.269	1.04	70'	EL	34.482	0.608	1.1	70'	EL	3.448	0.80	0.269	1.01	70'	EL	34.482		
	HL-93(Opr)	N/A	--	1.355	--	1.35	0.269	1.35	70'	EL	34.482	0.608	1.43	70'	EL	3.448	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.315	47.356	1.75	0.269	1.36	70'	EL	34.482	0.608	1.38	70'	EL	3.448	0.80	0.269	1.32	70'	EL	34.482		
	HS-20(Opr)	36.000	--	1.757	63.236	1.35	0.269	1.76	70'	EL	34.482	0.608	1.79	70'	EL	3.448	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.938	39.656	1.4	0.269	3.78	70'	EL	34.482	0.608	4.12	70'	EL	3.448	0.80	0.269	2.94	70'	EL	34.482	
		SNGARBS2	20.000	--	2.203	44.052	1.4	0.269	2.84	70'	EL	34.482	0.608	2.93	70'	EL	3.448	0.80	0.269	2.20	70'	EL	34.482	
		SNAGRIS2	22.000	--	2.092	46.016	1.4	0.269	2.69	70'	EL	34.482	0.608	2.72	70'	EL	3.448	0.80	0.269	2.09	70'	EL	34.482	
		SNCOTTS3	27.250	--	1.462	39.844	1.4	0.269	1.88	70'	EL	34.482	0.608	2.06	70'	EL	3.448	0.80	0.269	1.46	70'	EL	34.482	
		SNAGGRS4	34.925	--	1.227	42.856	1.4	0.269	1.58	70'	EL	34.482	0.608	1.71	70'	EL	3.448	0.80	0.269	1.23	70'	EL	34.482	
		SNS5A	35.550	--	1.2	42.646	1.4	0.269	1.54	70'	EL	34.482	0.608	1.73	70'	EL	3.448	0.80	0.269	1.20	70'	EL	34.482	
		SNS6A	39.950	--	1.103	44.058	1.4	0.269	1.42	70'	EL	34.482	0.608	1.58	70'	EL	3.448	0.80	0.269	1.10	70'	EL	34.482	
	TTST	SNS7B	42.000	--	1.05	44.113	1.4	0.269	1.35	70'	EL	34.482	0.608	1.55	70'	EL	3.448	0.80	0.269	1.05	70'	EL	34.482	
		TNAGRIT3	33.000	--	1.345	44.401	1.4	0.269	1.73	70'	EL	34.482	0.608	1.88	70'	EL	3.448	0.80	0.269	1.35	70'	EL	34.482	
		TNT4A	33.075	--	1.352	44.717	1.4	0.269	1.74	70'	EL	34.482	0.608	1.83	70'	EL	3.448	0.80	0.269	1.35	70'	EL	34.482	
		TNT6A	41.600	--	1.108	46.073	1.4	0.269	1.43	70'	EL	34.482	0.608	1.65	70'	EL	3.448	0.80	0.269	1.11	70'	EL	34.482	
		TNT7A	42.000	--	1.114	46.794	1.4	0.269	1.43	70'	EL	34.482	0.608	1.62	70'	EL	3.448	0.80	0.269	1.11	70'	EL	34.482	
		TNT7B	42.000	--	1.155	48.526	1.4	0.269	1.49	70'	EL	34.482	0.608	1.51	70'	EL	3.448	0.80	0.269	1.16	70'	EL	34.482	
		TNAGRIT4	43.000	--	1.097	47.174	1.4	0.269	1.41	70'	EL	34.482	0.608	1.46	70'	EL	3.448	0.80	0.269	1.10	70'	EL	34.482	
TNAGT5A	45.000	--	1.033	46.505	1.4	0.269	1.33	70'	EL	34.482	0.608	1.45	70'	EL	3.448	0.80	0.269	1.03	70'	EL	34.482			
TNAGT5B	45.000	3	1.02	45.905	1.4	0.269	1.31	70'	EL	34.482	0.608	1.39	70'	EL	3.448	0.80	0.269	1.02	70'	EL	34.482			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

- 
- 
- 
- 

# CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

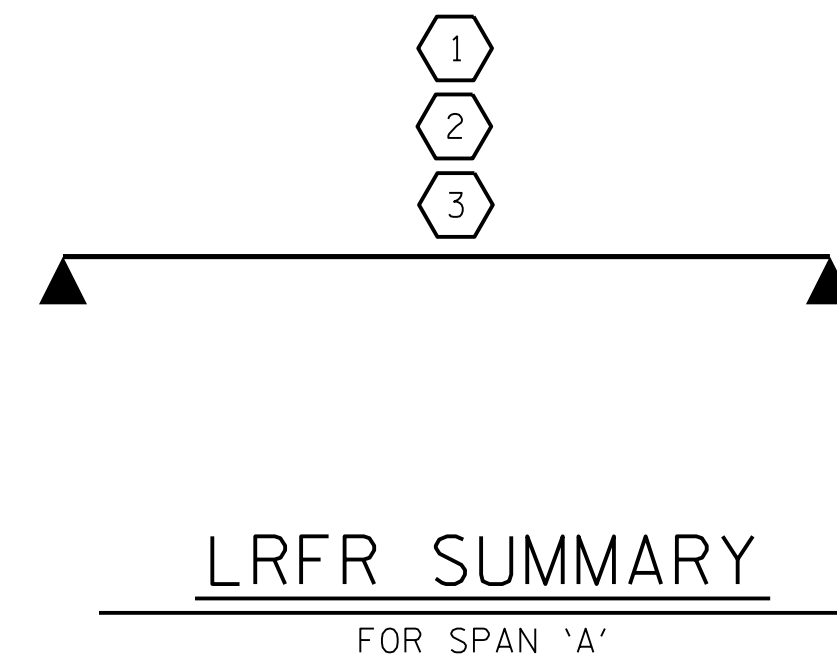
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

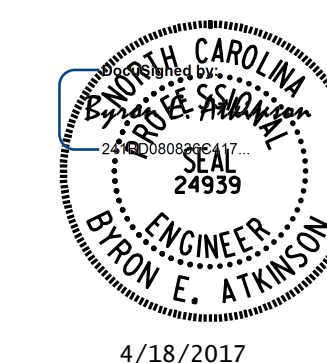
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GIRDER LOCATION

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



PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
 STATION: 19+09.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 LRFR SUMMARY FOR  
 70' CORED SLAB UNIT  
 75° SKEW & 105° SKEW  
 (NON-INTERSTATE TRAFFIC)

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

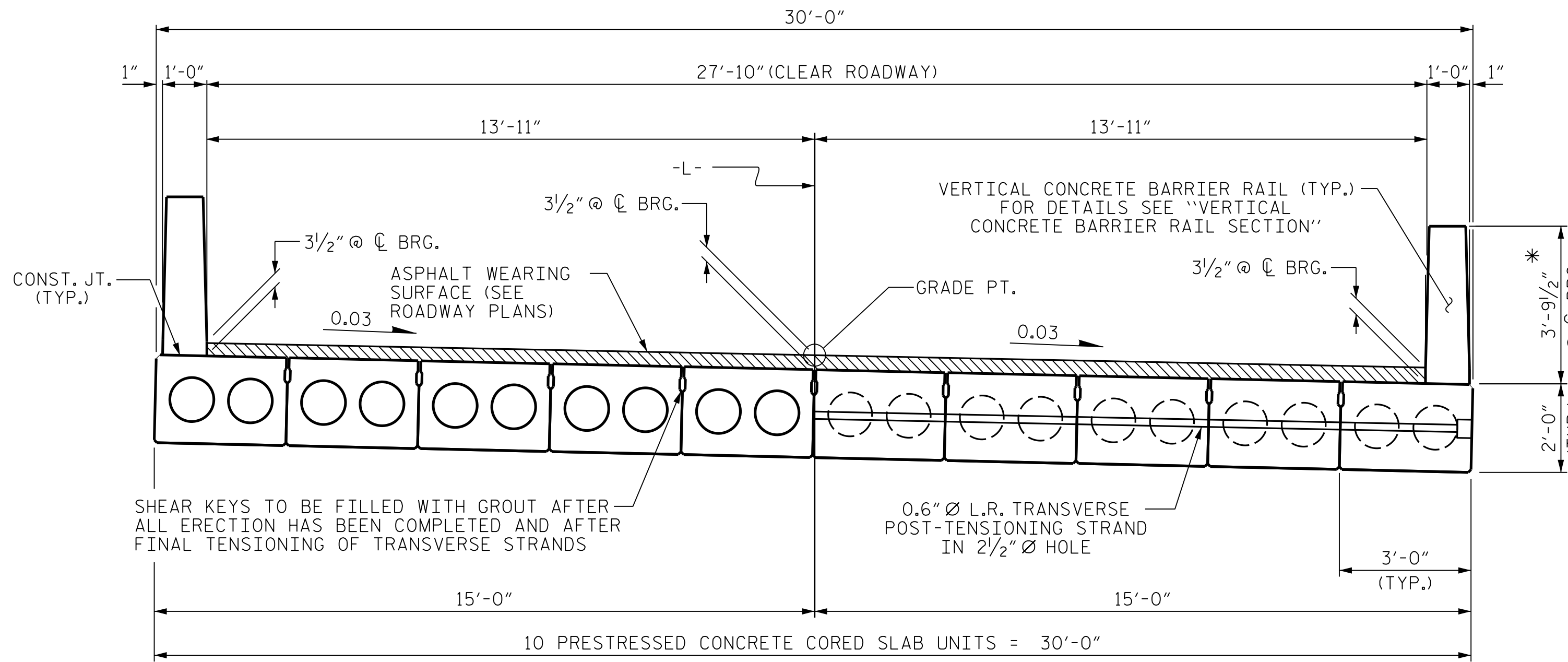
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			13

STD. NO. 24LRFR1\_75&105S\_70L

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ASSEMBLED BY: J.I. BREWER DATE: 01/17  
 CHECKED BY: B.E. ATKINSON DATE: 02/17  
 DESIGN ENGINEER OF RECORD: B.E. ATKINSON DATE: 03/17  
 DRAWN BY: CVC 6/10  
 CHECKED BY: DNS 6/10



HALF SECTION AT INTERMEDIATE DIAPHRAGMS      **TYPICAL SECTION**      HALF SECTION THROUGH VOIDS

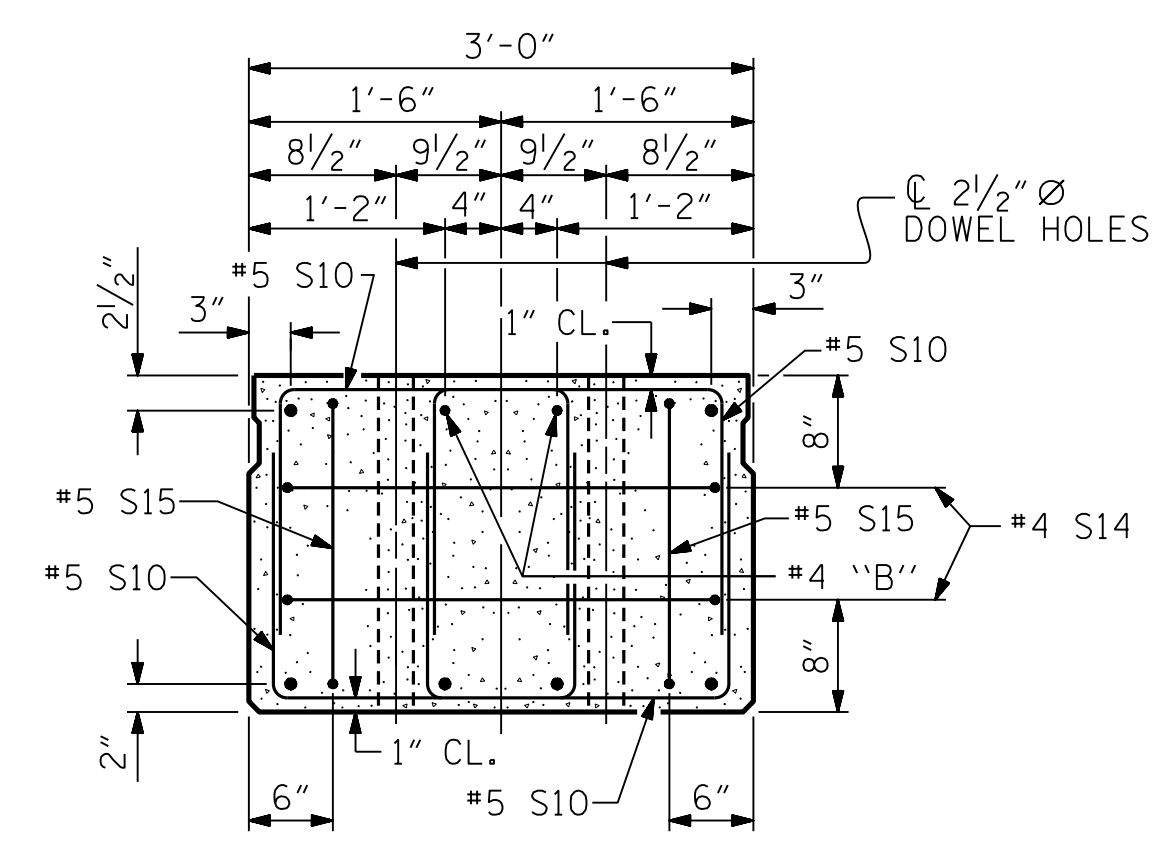
\* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

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

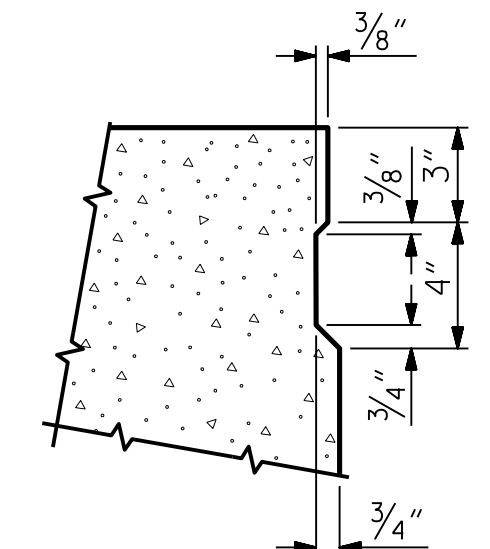
**INTERIOR SLAB SECTION (70' UNIT)**  
(28 STRANDS REQUIRED)  
**0.6" Ø LOW RELAXATION STRAND LAYOUT**

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

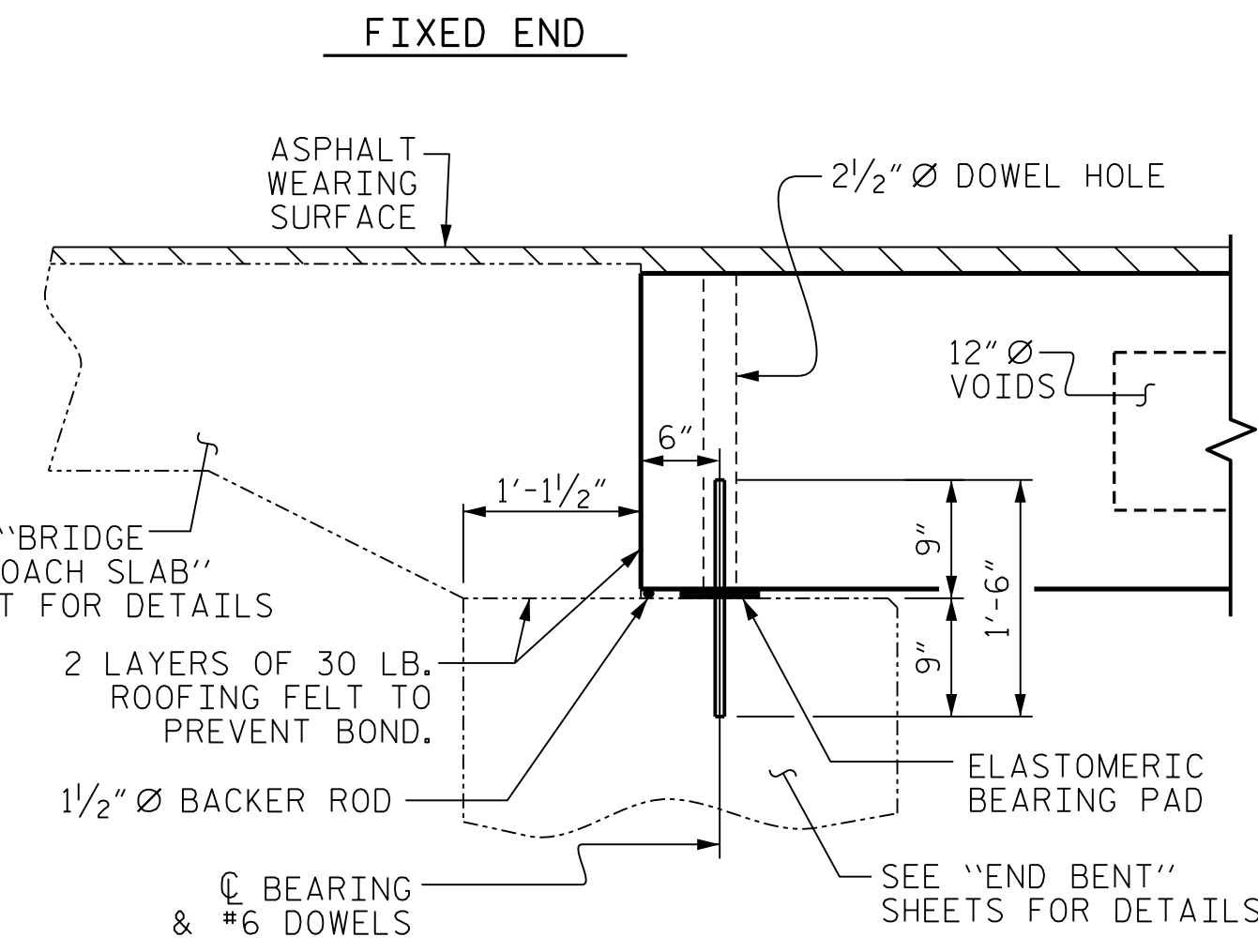
**DEBONDING LEGEND**



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

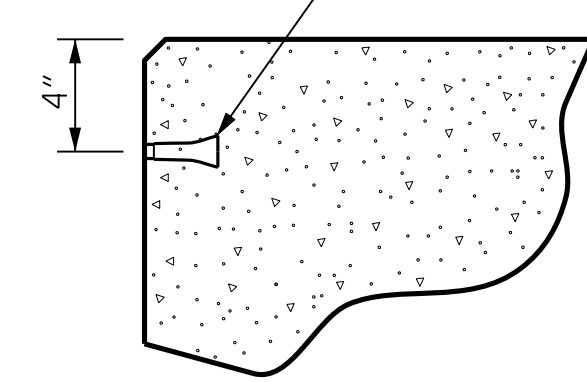


**SHEAR KEY DETAIL**  
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

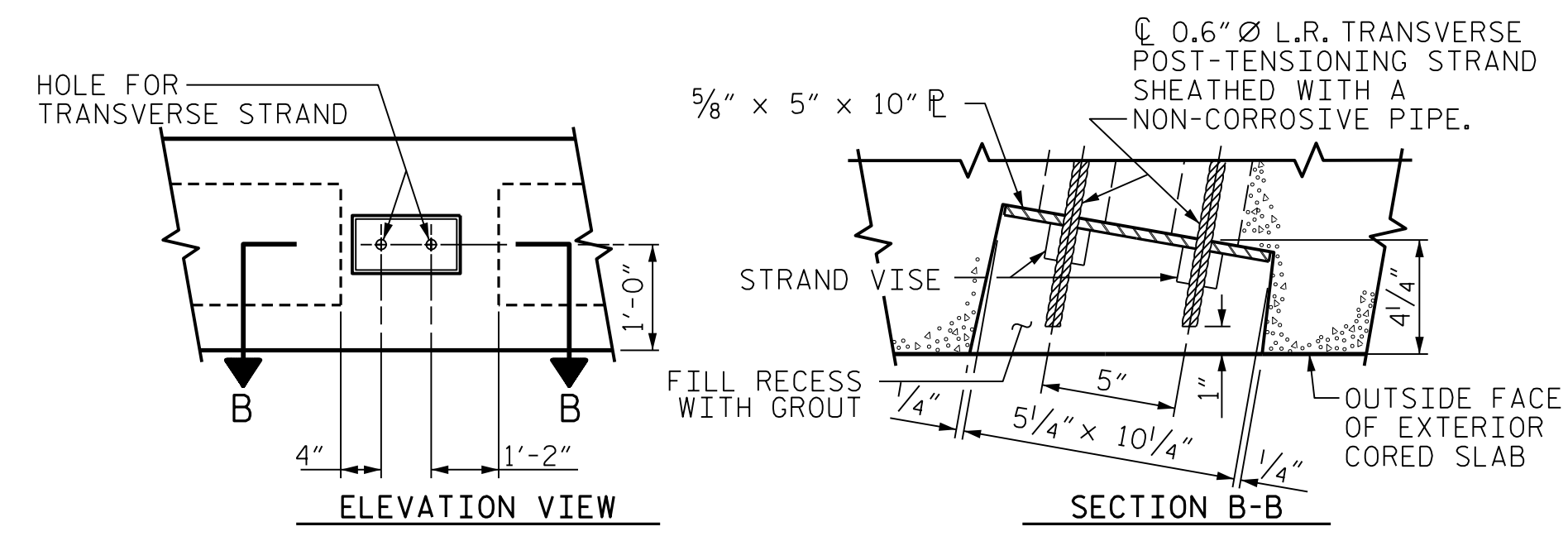


**SECTION AT END BENT**

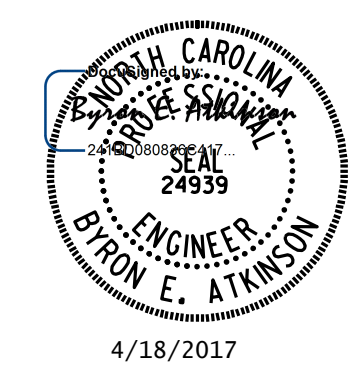
PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED 3/8" SIZE TO BE DETERMINED BY CONTRACTOR.



**THREADED INSERT DETAIL**



**GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS**



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

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
STATION: 19+09.00 -L-

SHEET 1 OF 3

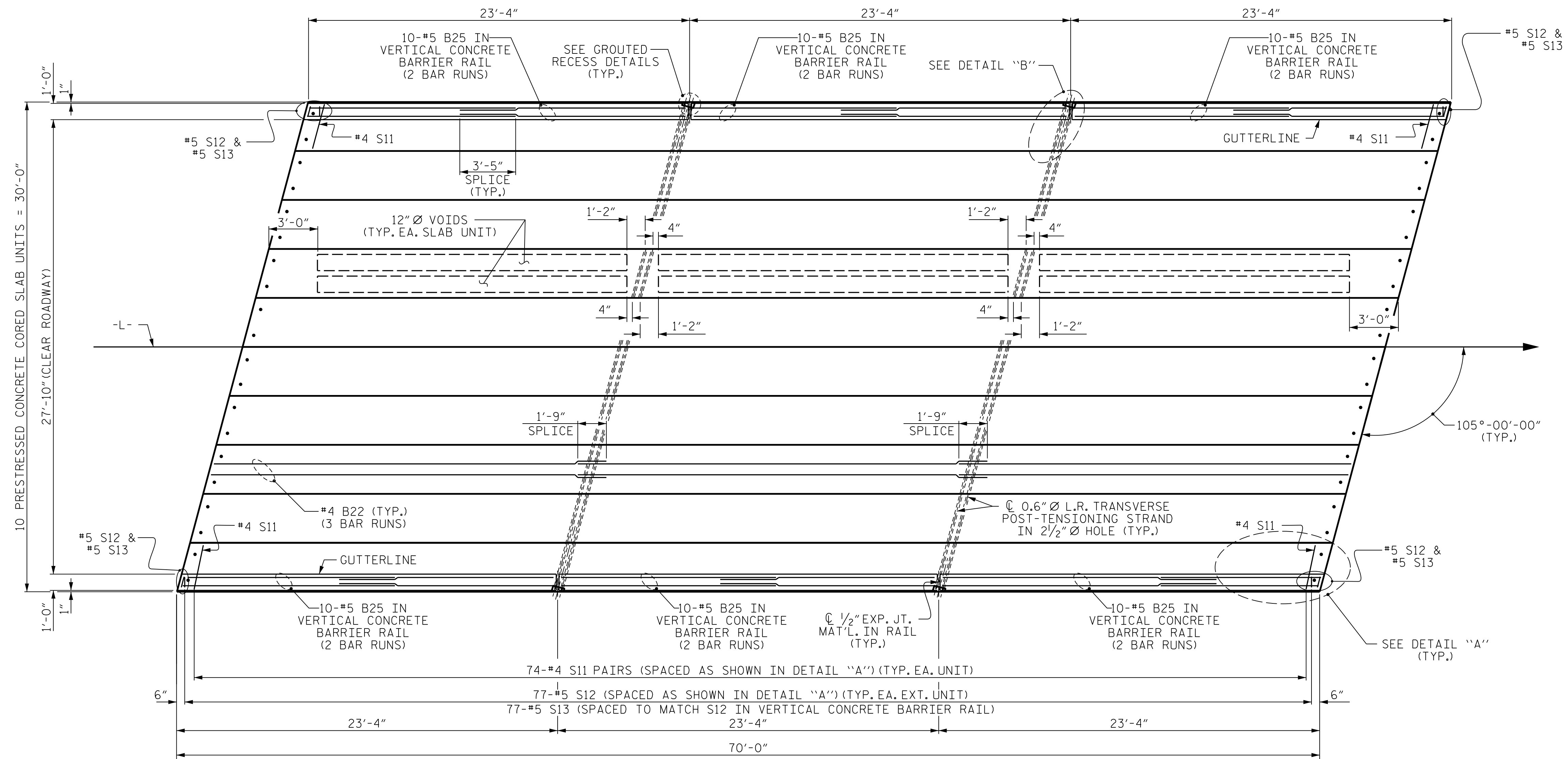
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 2'-0"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS 13
2			4			

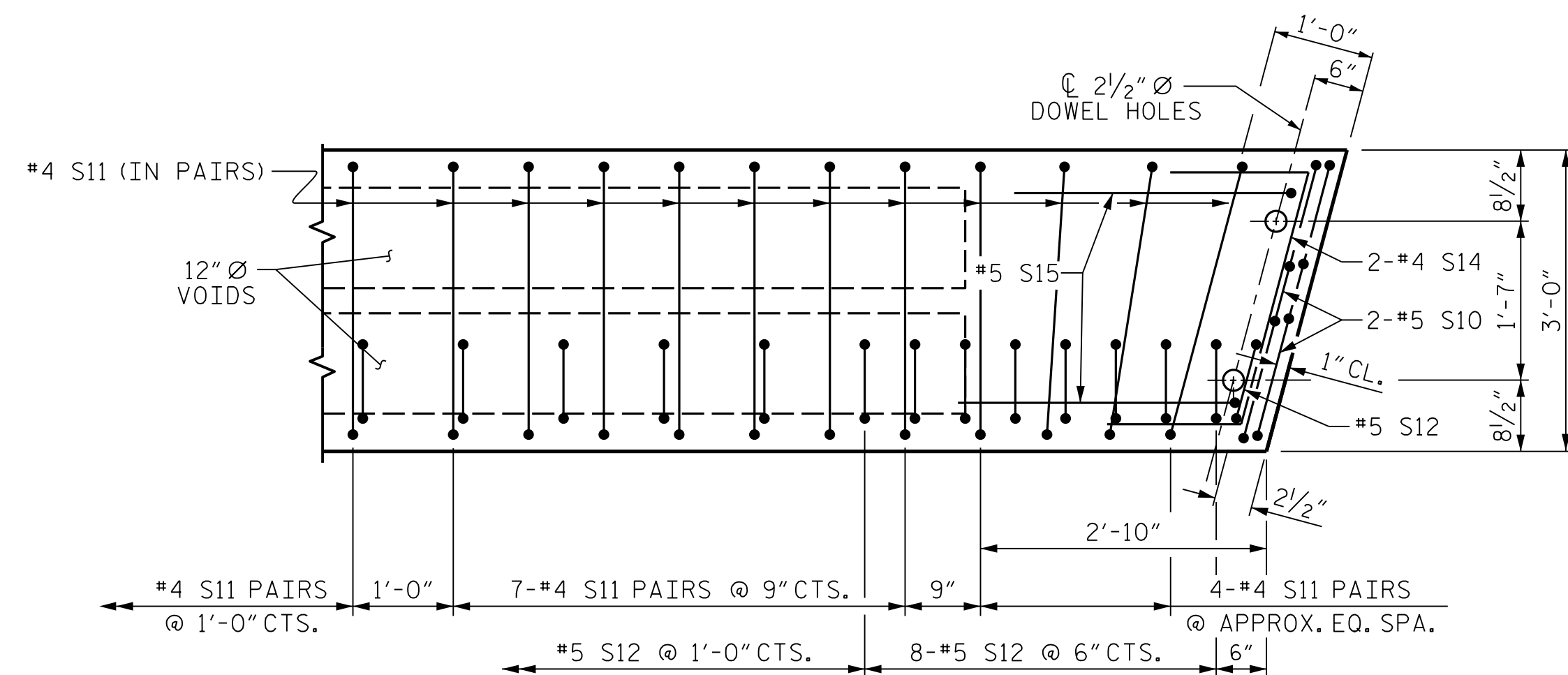
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ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 02/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: MAA 6/10	REV. 8/14 MAA/TMG
CHECKED BY: MKT 7/10	

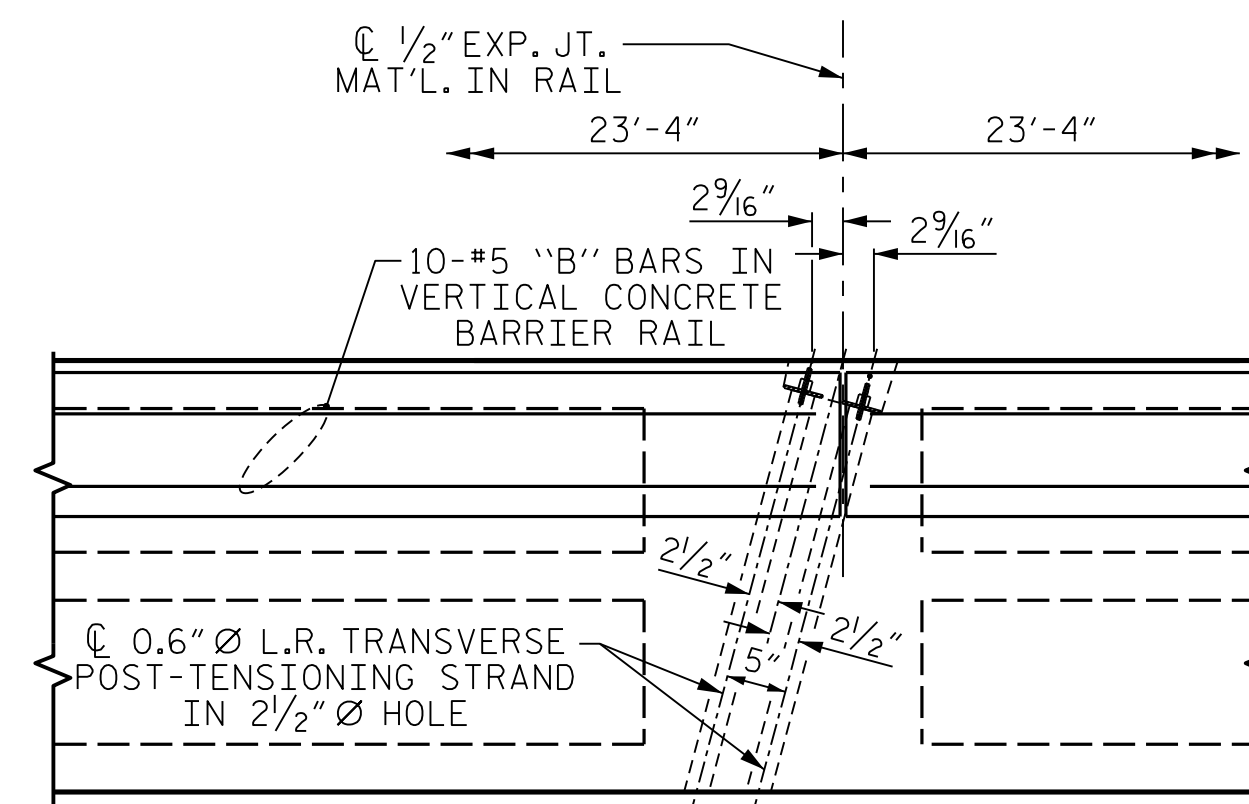


PLAN OF UNIT



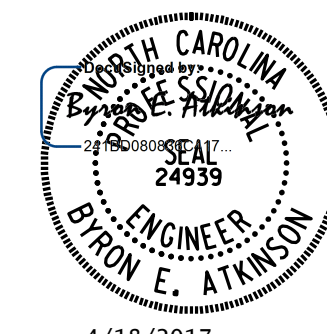
DETAIL "A"

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



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUDED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES



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LEE COUNTY  
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SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

PLAN OF 70' UNIT  
27'-10" CLEAR ROADWAY  
105° SKEW

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1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
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FIRM PE NUMBER: P-0671

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1			3			TOTAL SHEETS
2			4			13

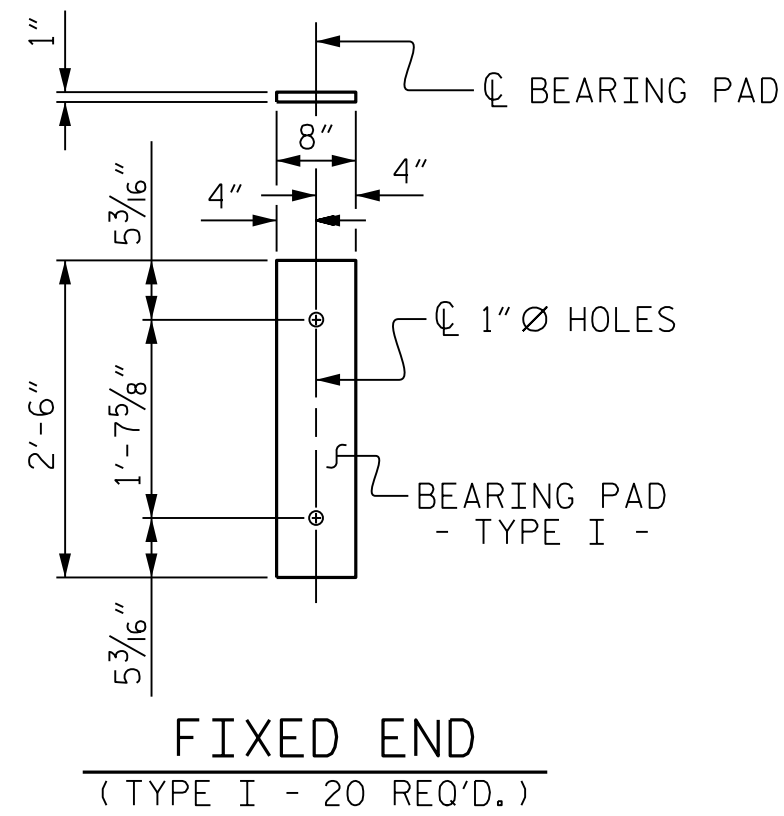
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ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 02/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: MAA 6/10	REV. 12/5/11 MAA/AAC
CHECKED BY: MKT 7/10	REV. 8/14 MAA/TMG



### ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

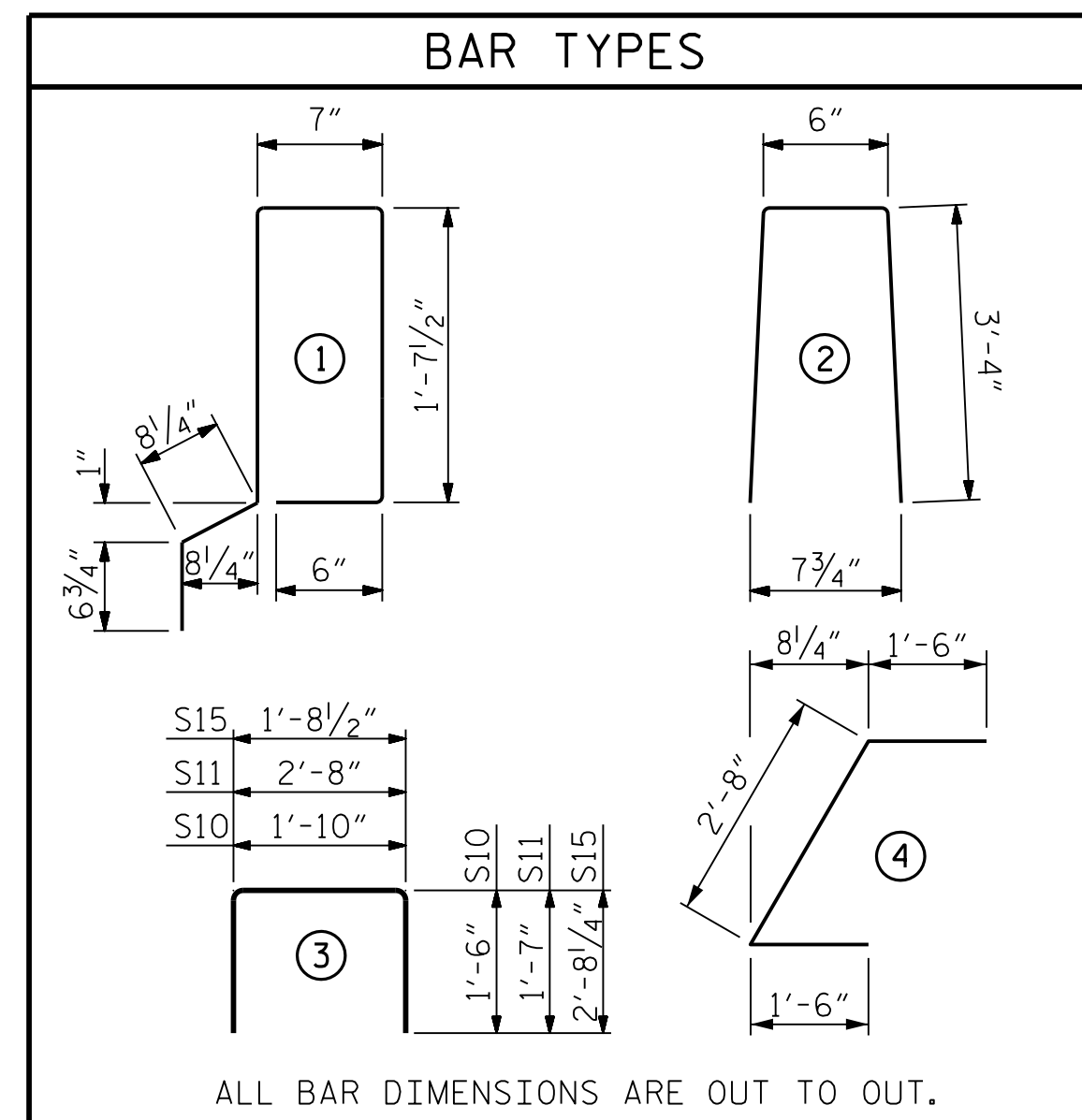
GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
70' UNITS	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
	2"	3'-8"

CORED SLABS REQUIRED			
70' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	70'-0"	140'-0"
INTERIOR C.S.	8	70'-0"	560'-0"
TOTAL	10		700'-0"

DEAD LOAD DEFLECTION AND CAMBER	
70' CORED SLAB UNIT	3'-0" x 2'-0" 0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2 1/4" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/4" ↓
FINAL CAMBER	1 1/2" ↑

\*\* INCLUDES FUTURE WEARING SURFACE

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



BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
70' UNIT						
*B25	120	120	#5	STR	13'-8"	1711
*S13	158	158	#5	2	7'-2"	1181
* EPOXY COATED REINFORCING STEEL					LBS.	2892
CLASS AA CONCRETE					CU. YDS.	18.1
TOTAL VERTICAL CONCRETE BARRIER RAIL					LN. FT.	140.26

BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
S10	8	#5	3	4'-10"	40	4'-10"	40
S11	148	#4	3	5'-10"	577	5'-10"	577
*S12	79	#5	1	5'-7"	460		
S14	4	#4	4	5'-8"	15	5'-8"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL				LBS.	760		760
* EPOXY COATED REINFORCING STEEL				LBS.	460		
7000 P.S.I. CONCRETE				CU. YDS.	12.0		12.0
0.6" Ø L.R. STRANDS				No.	28		28

CONCRETE RELEASE STRENGTH	
UNIT	PSI
70' UNITS	5500

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
 STATION: 19+09.00 -L-

SHEET 3 OF 3

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

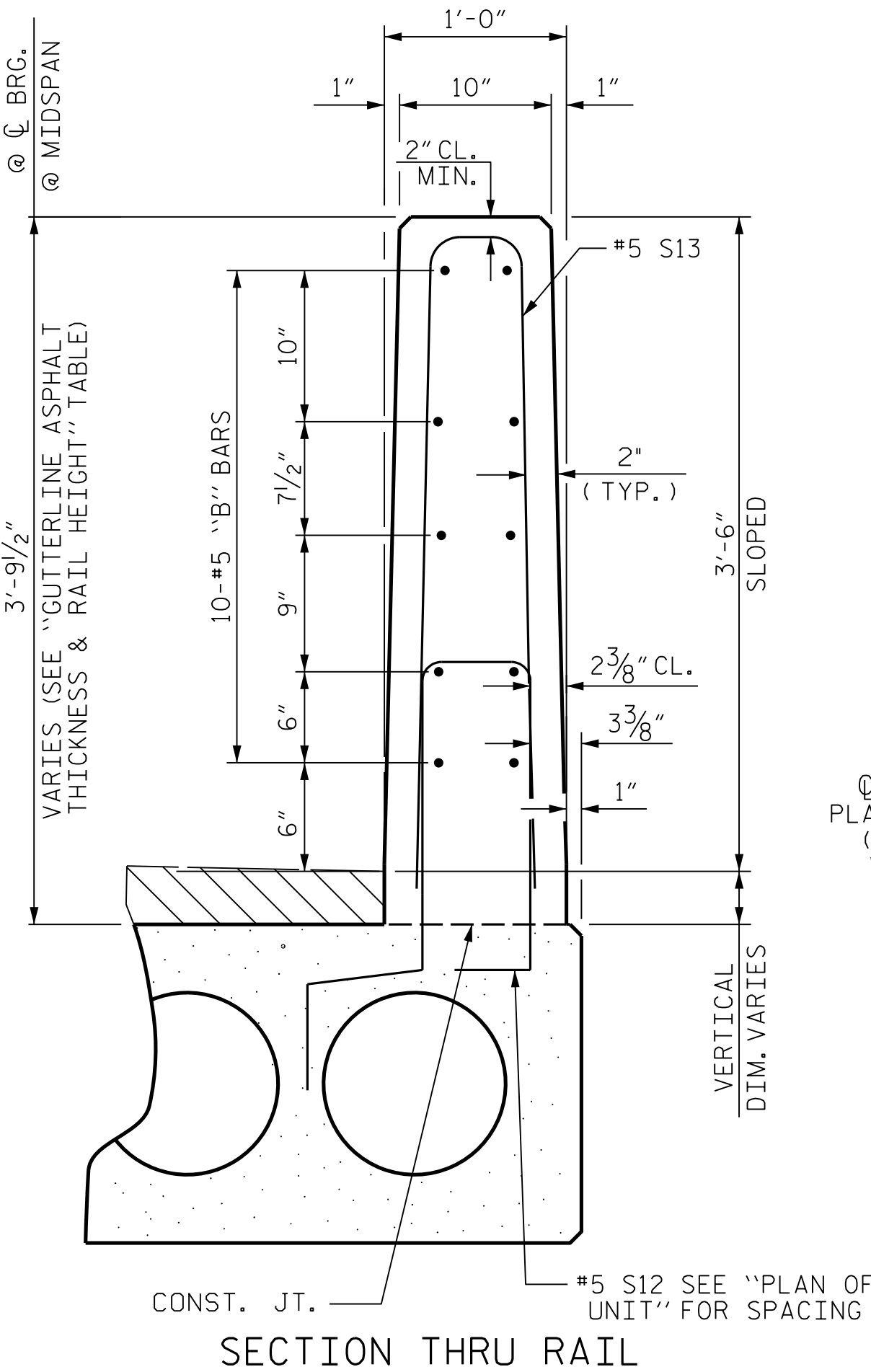


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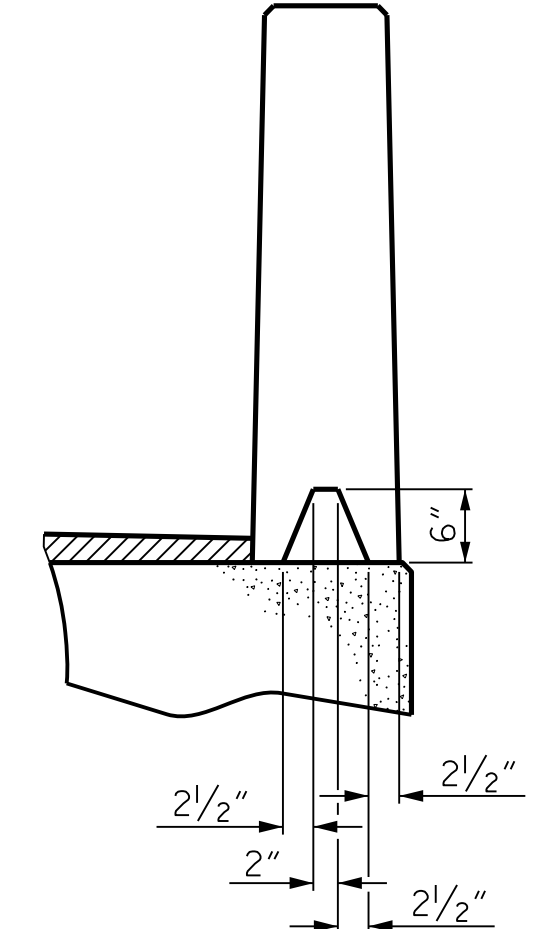
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

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1			3			TOTAL SHEETS 13
2			4			

STD. NO. 24PCS3\_30\_75&105S

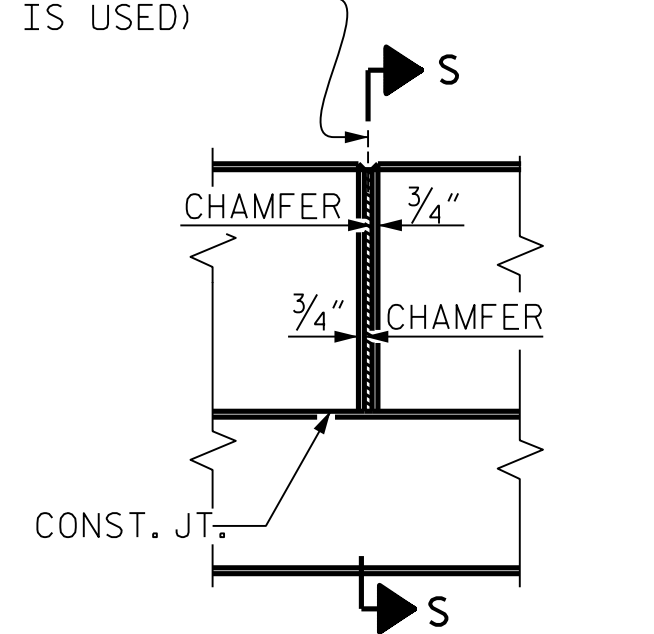


SECTION THRU RAIL

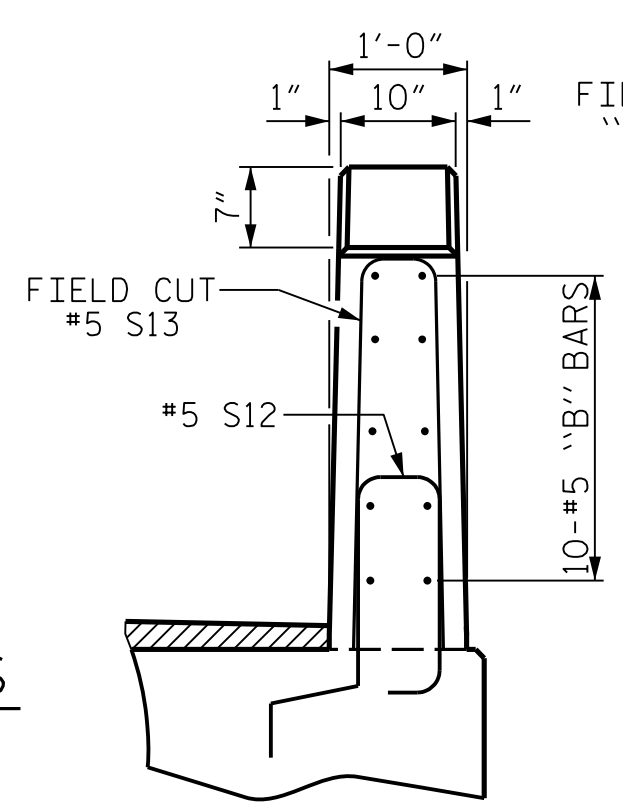


SECTION S-S AT DAM IN OPEN JOINT

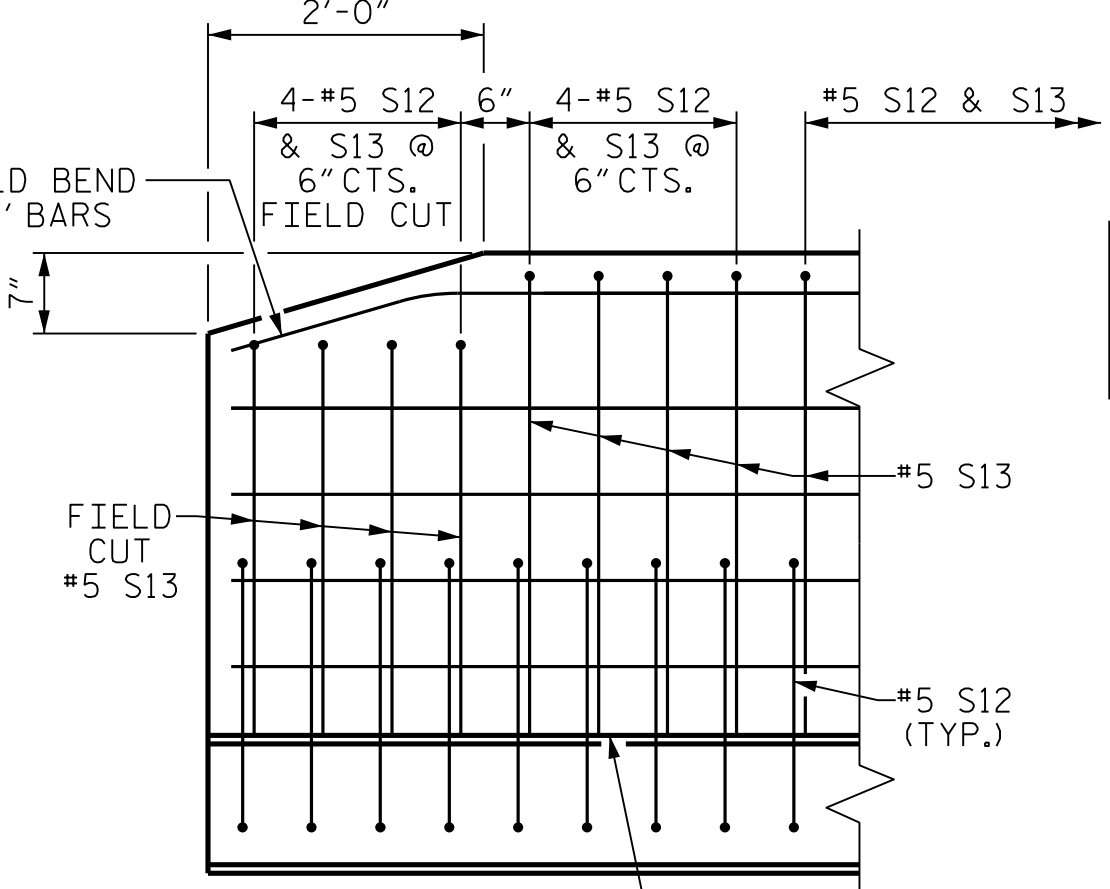
CL 1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS.  
 (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

4/18/2017 11:07:48 AM User: blanning  
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ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 02/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: MAA 6/10	REV. 11/14 MAA/TMG
CHECKED BY: MKT 7/10	



NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

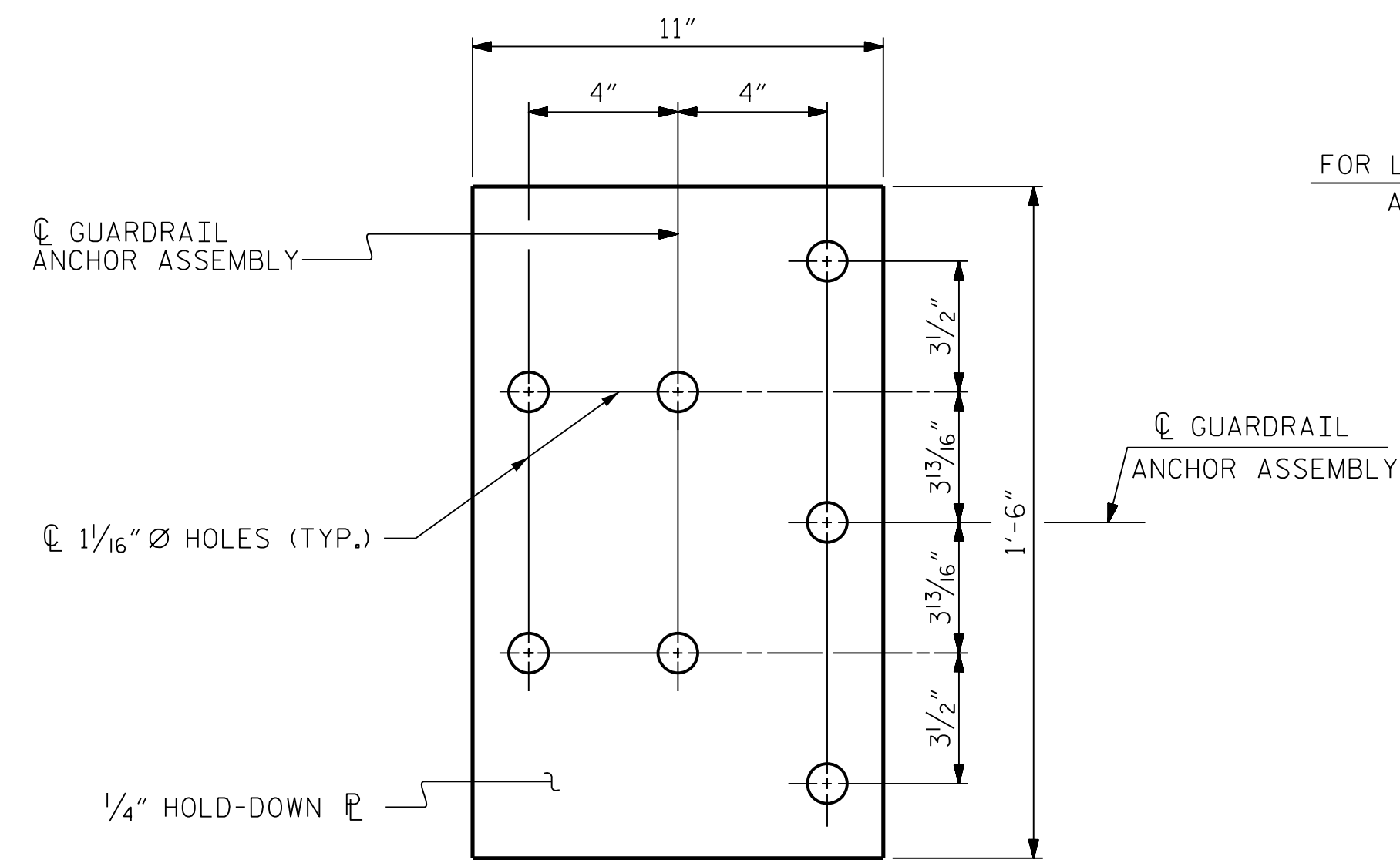
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

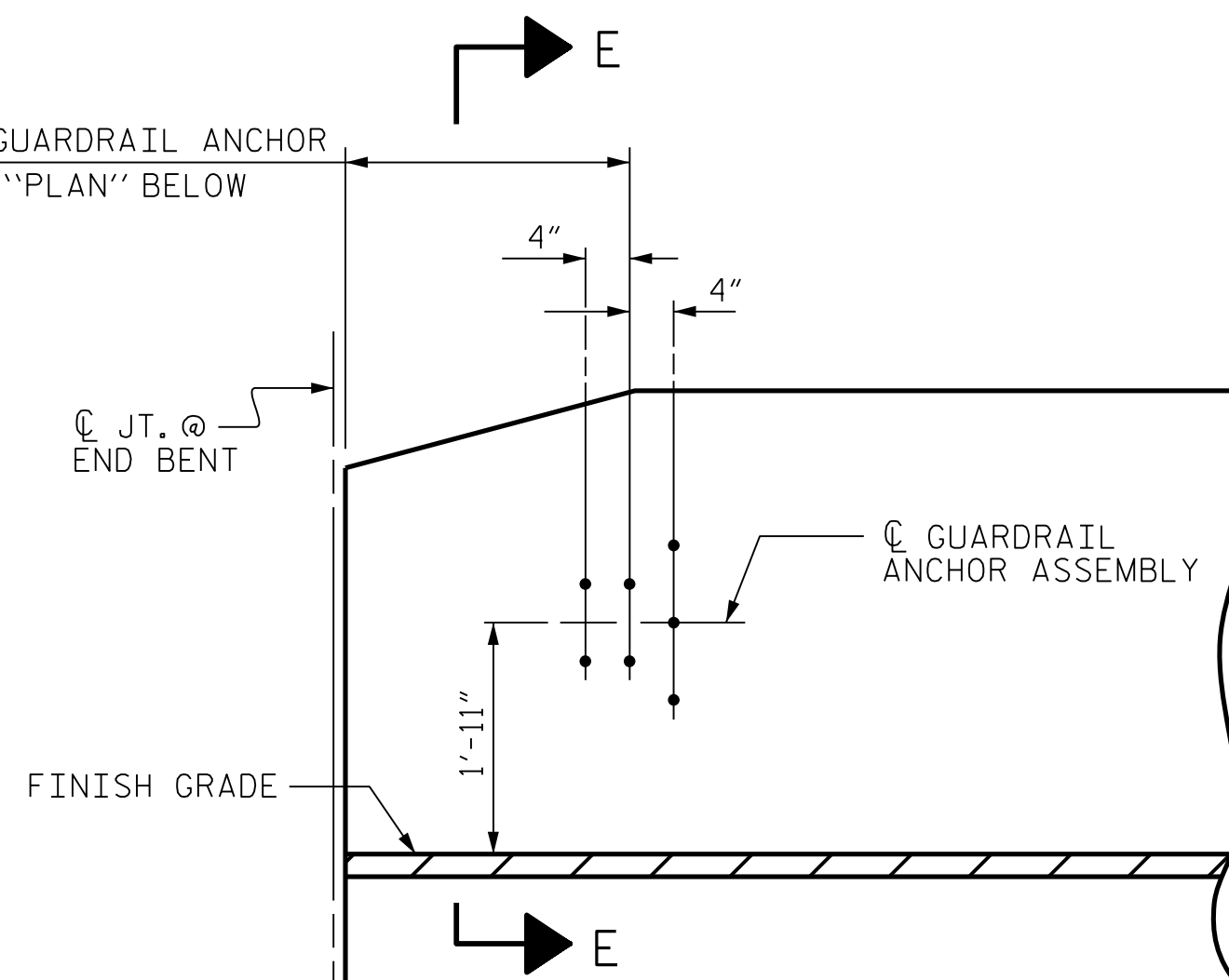
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

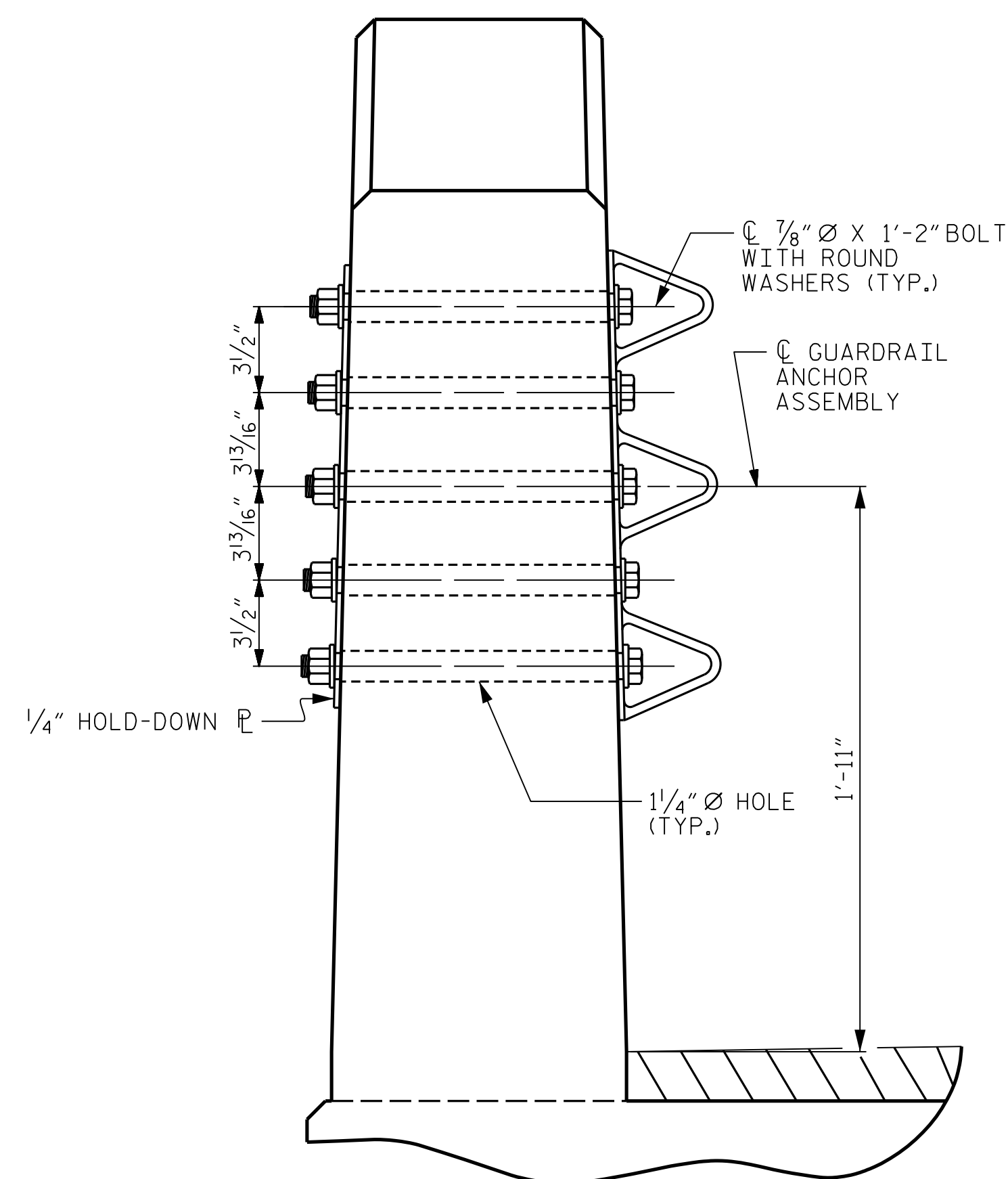


PLAN

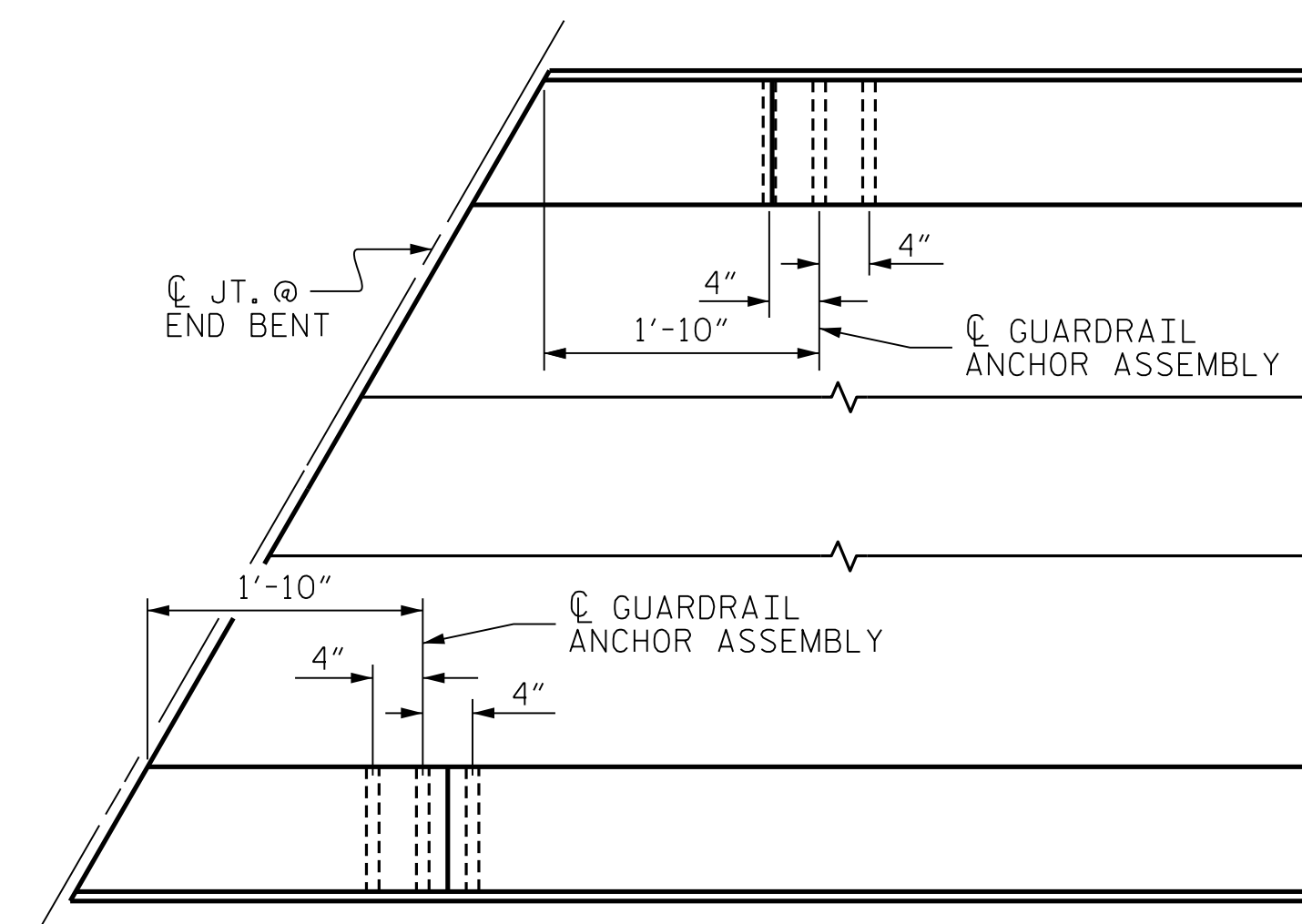
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



ELEVATION

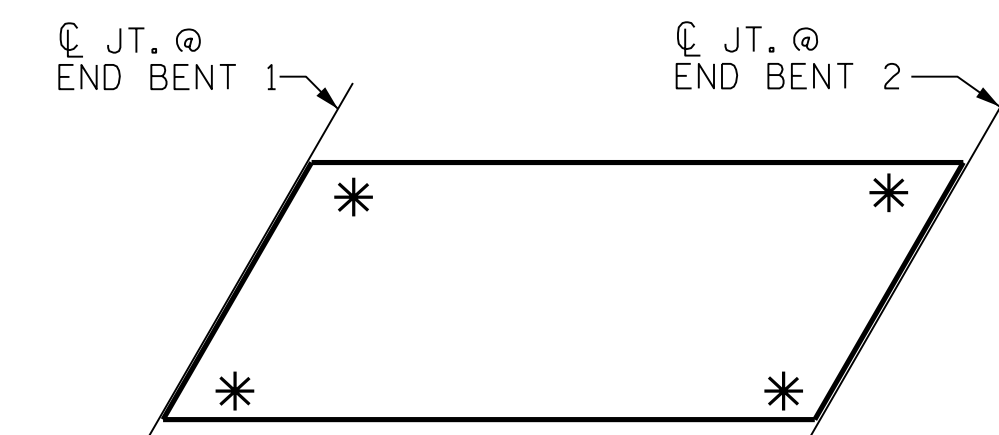


SECTION E-E  
GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

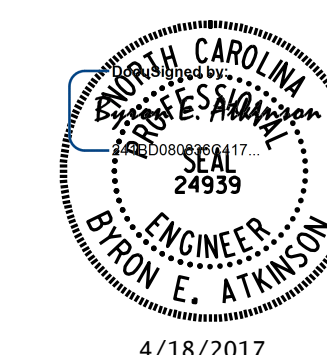
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
 STATION: 19+09.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR VERTICAL CONCRETE  
 BARRIER RAIL

DOCUMENT NOT CONSIDERED FINAL  
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MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

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ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 02/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY: GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG

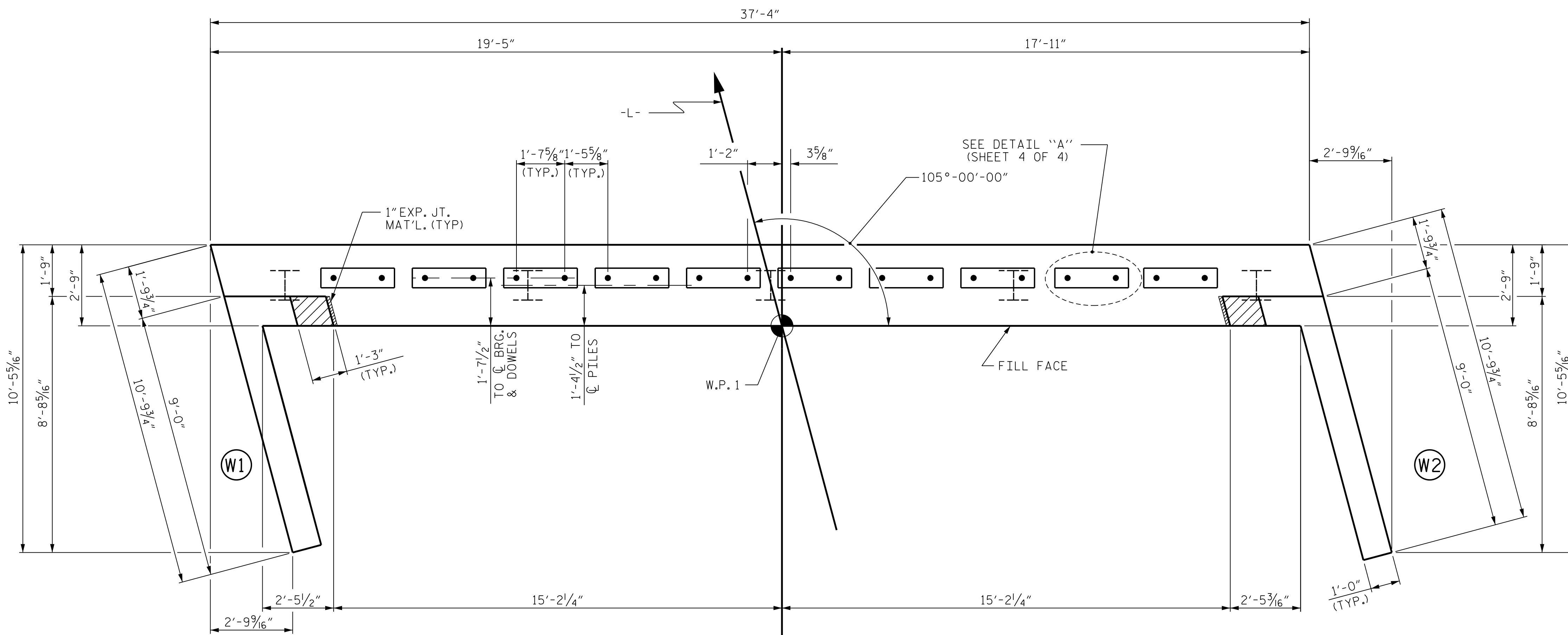
**NOTES**

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

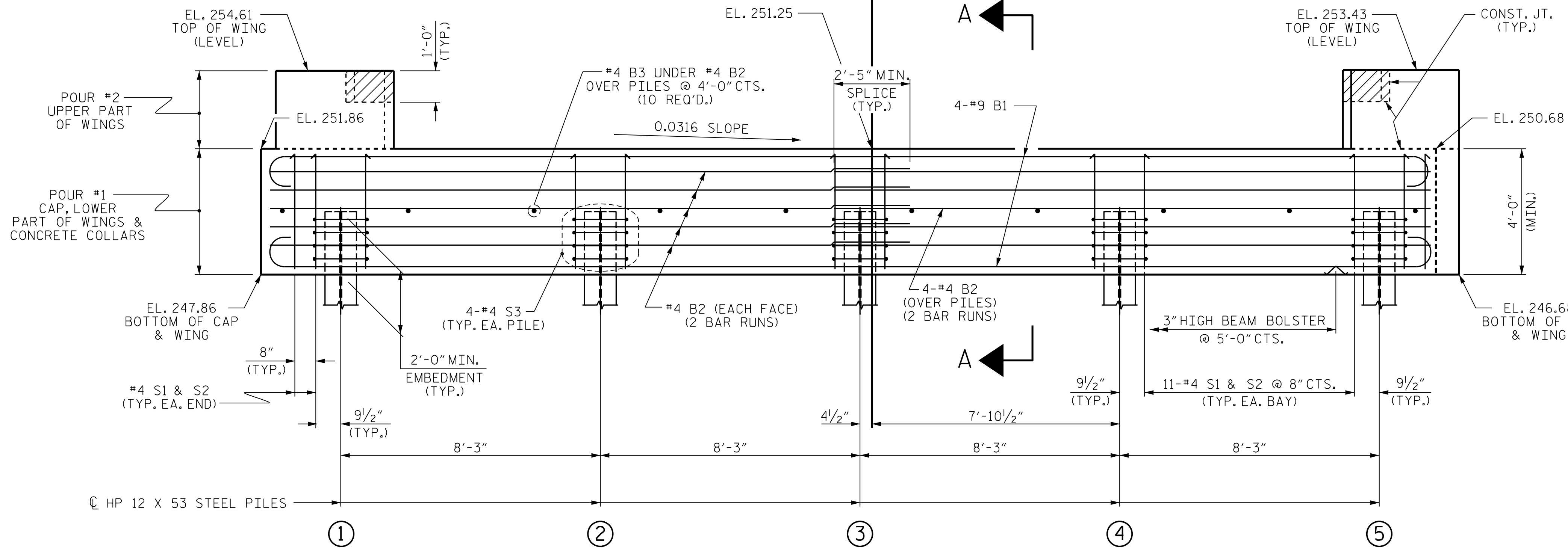
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



**PLAN**



**ELEVATION**

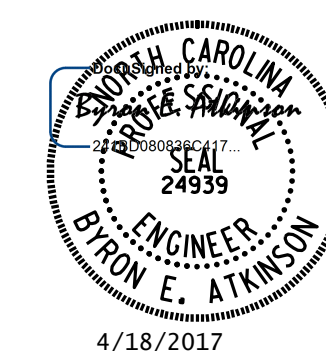
TOP OF PILE ELEVATIONS	
①	249.80
②	249.53
③	249.27
④	249.01
⑤	248.75

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
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SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1



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 1011 SCHAUB DRIVE, SUITE 100  
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-8
2			4			TOTAL SHEETS 13

WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

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ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 03/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: WJH 12/11	REV. 4/15
CHECKED BY: AAC 12/11	MAA/TMG

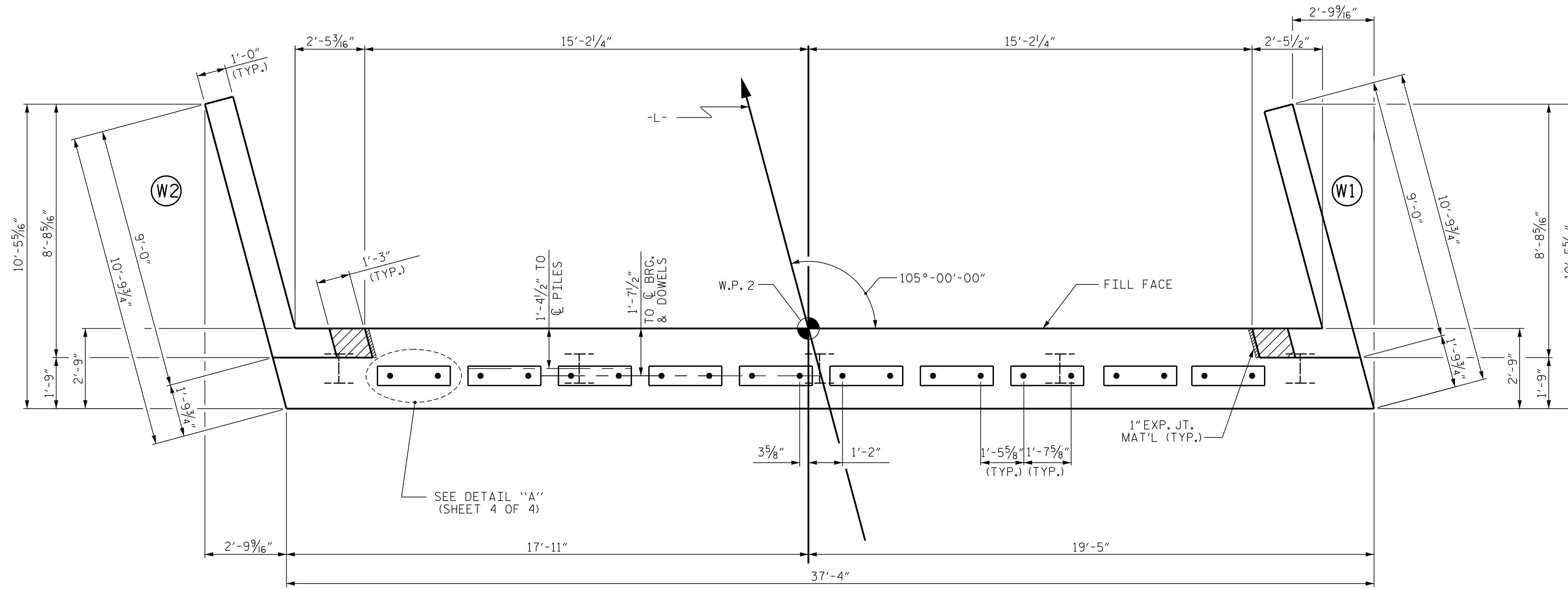
NOTES

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

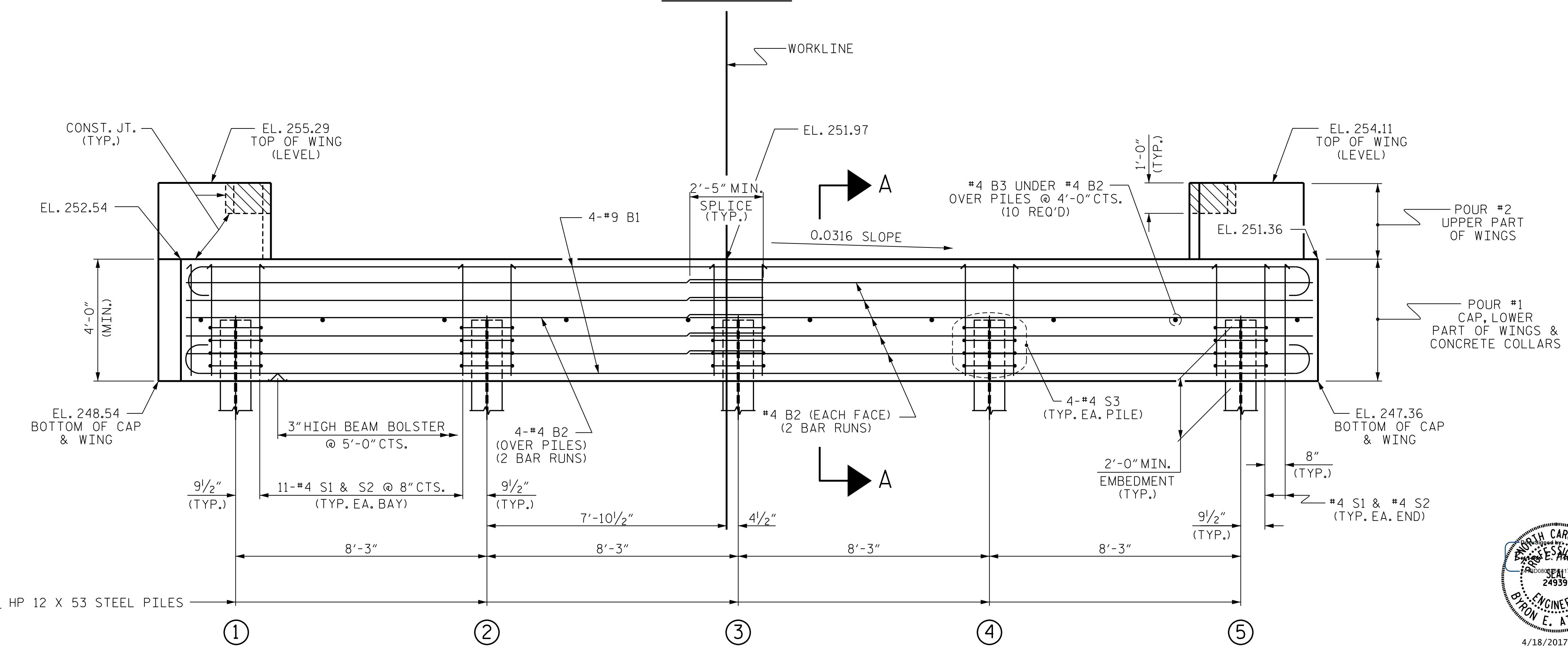
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

TOP OF PILE ELEVATIONS	
①	250.50
②	250.24
③	249.98
④	249.72
⑤	249.46

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
 STATION: 19+09.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2



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MI ENGINEERING  
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 (919) 851-6606  
 FIRM PE NUMBER: P-0671

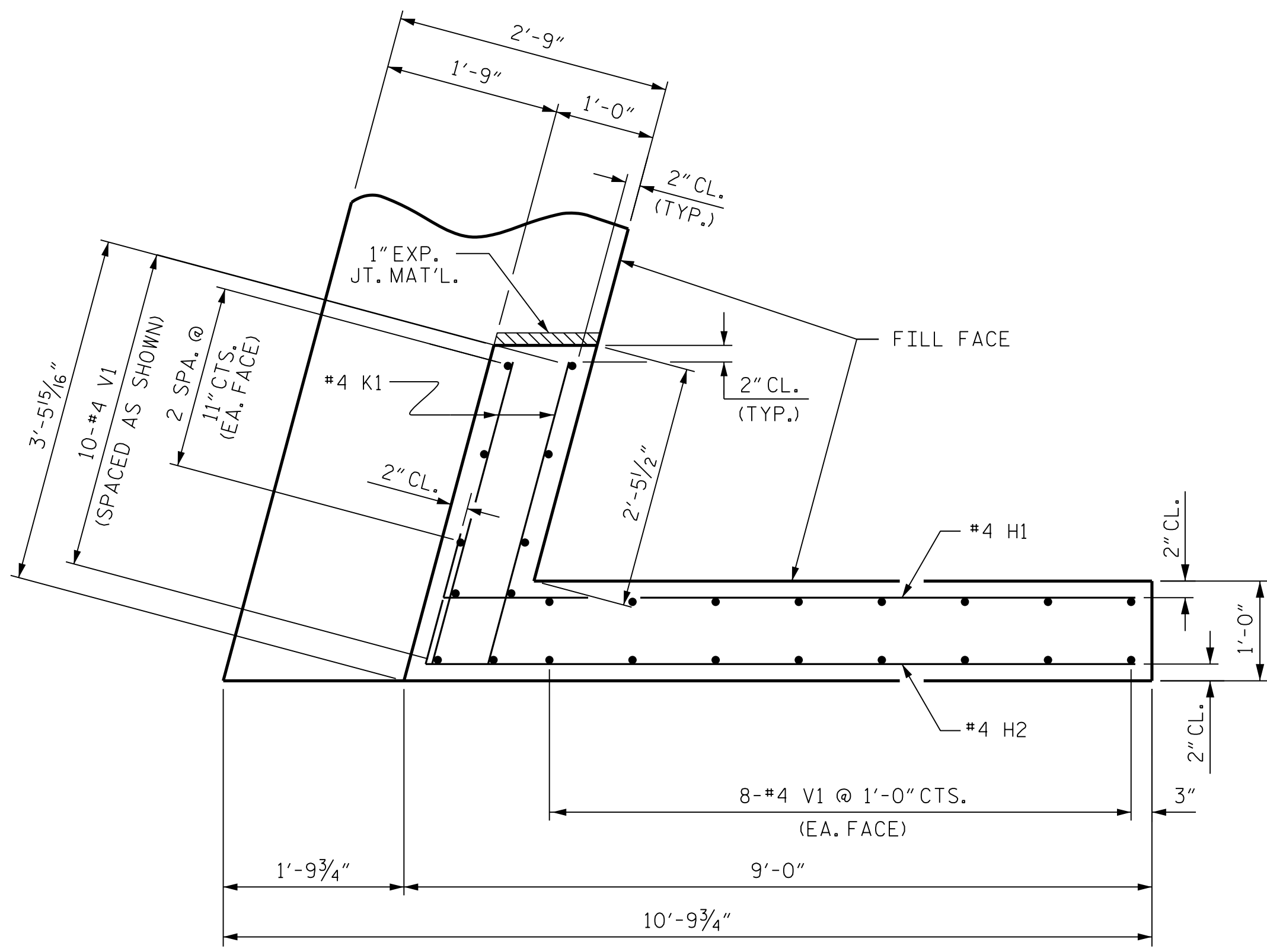
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			13

WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

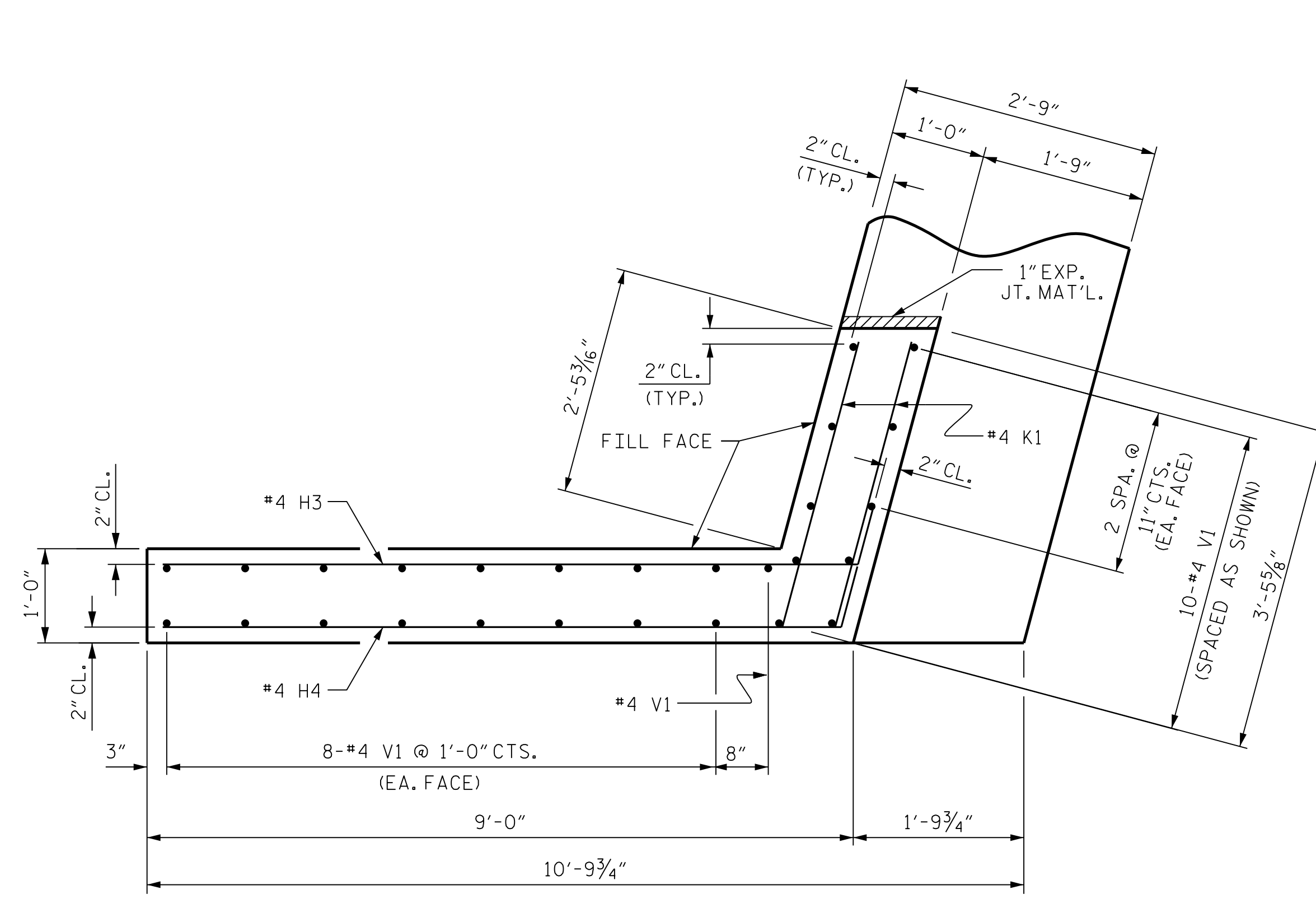
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ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 03/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: WJH	12/11
CHECKED BY: AAC	12/11
REV. 4/15	MAA/TMG

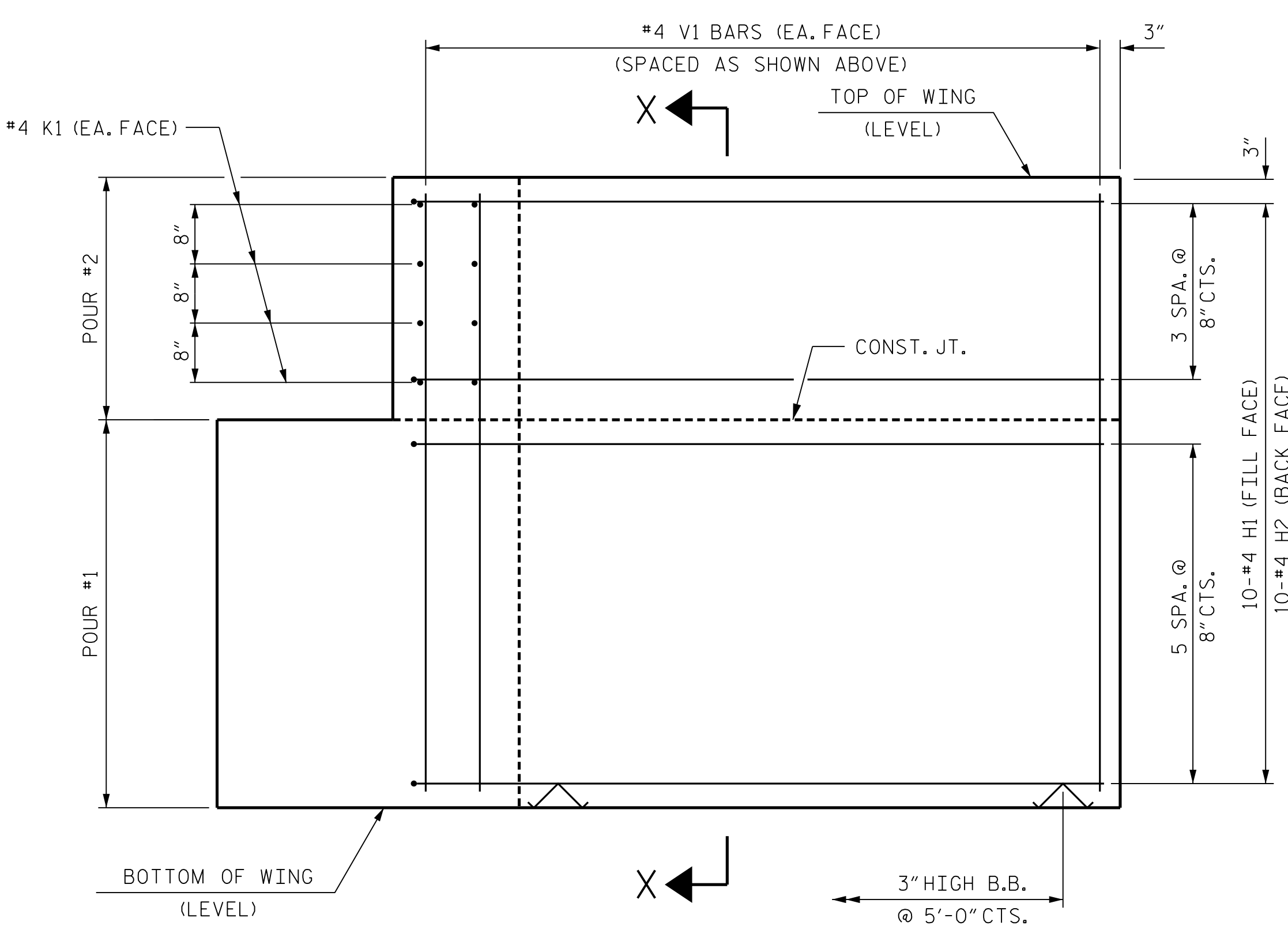
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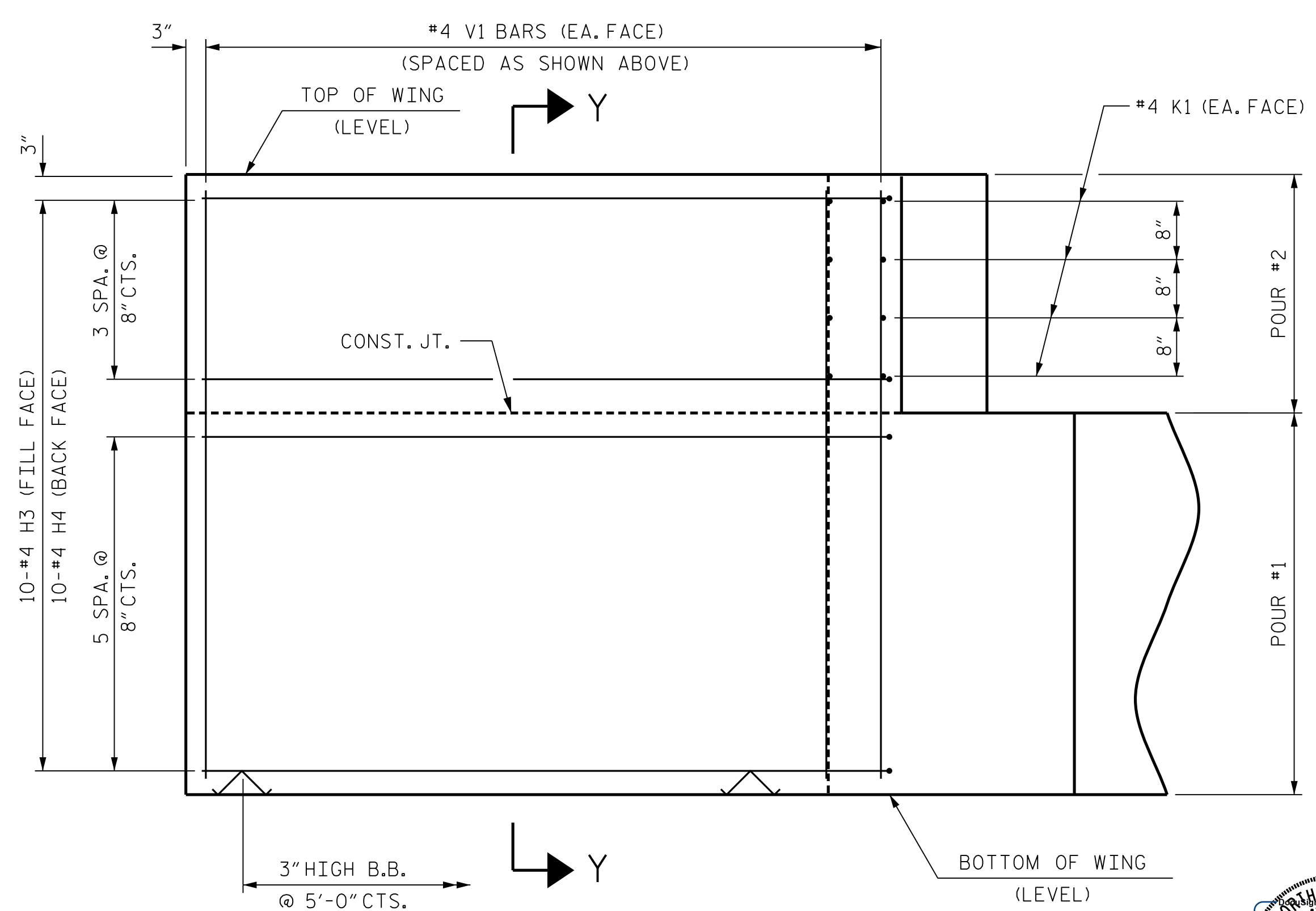
PLAN OF WING (W1)



PLAN OF WING (W2)

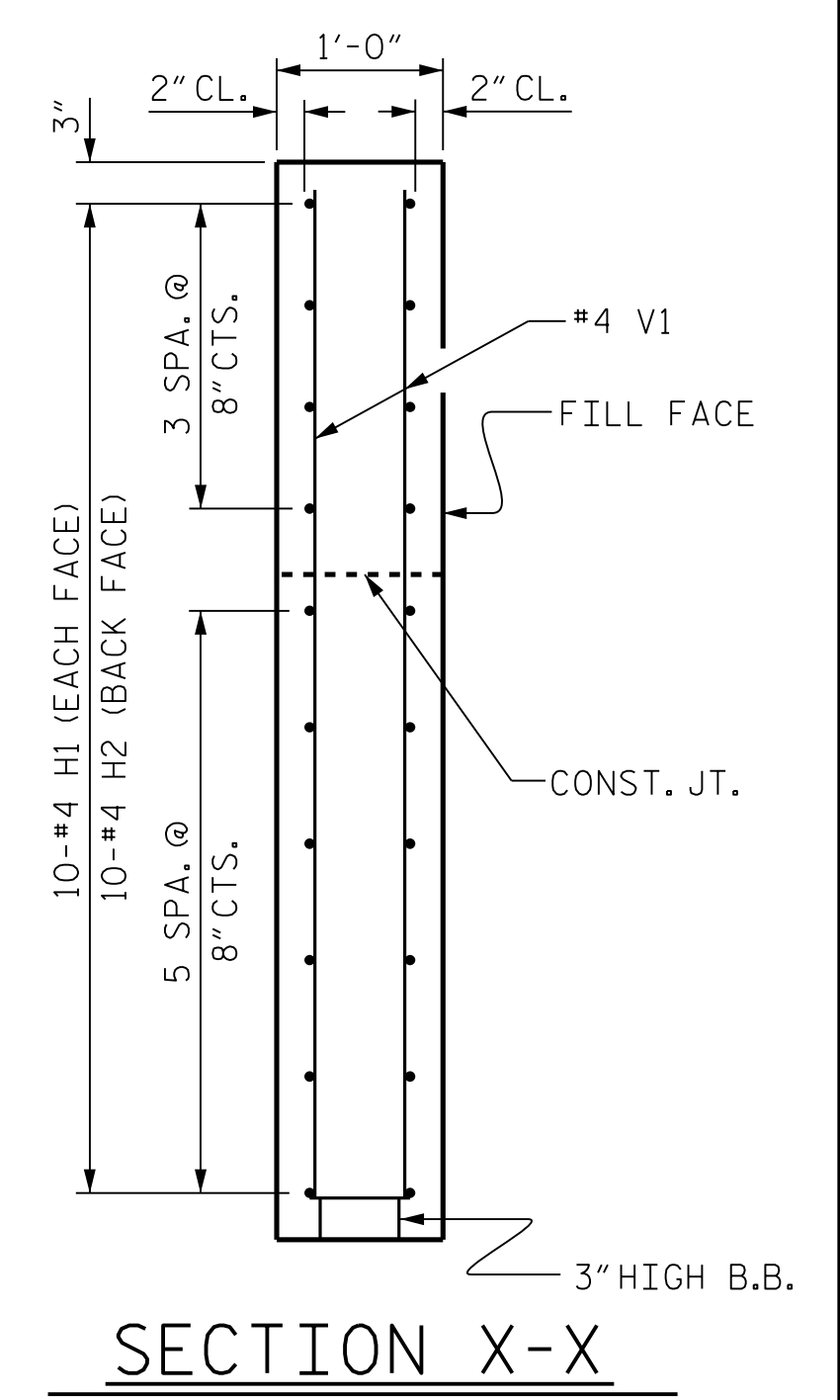


ELEVATION OF WING (W1)

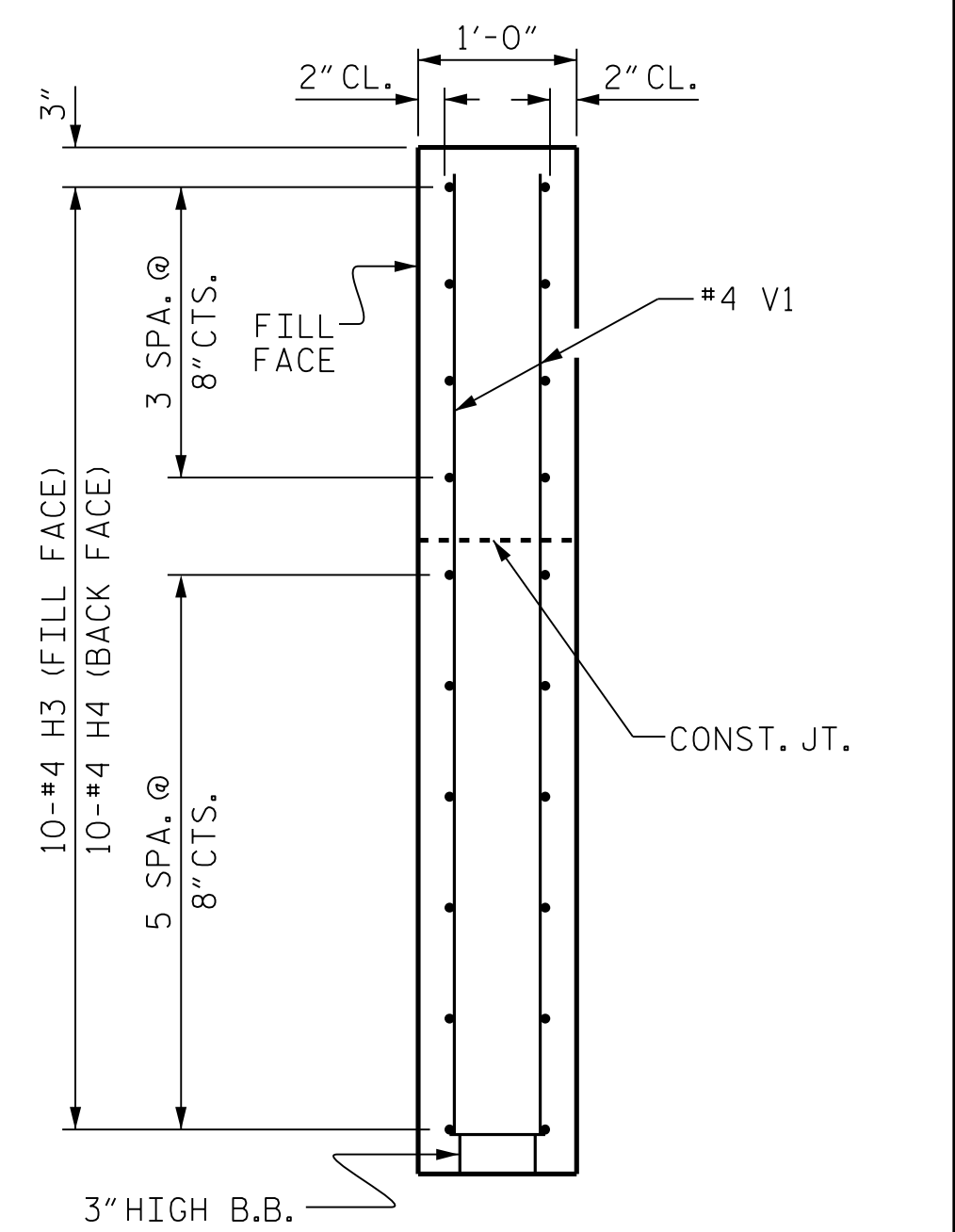


ELEVATION OF WING (W2)

WING DETAILS



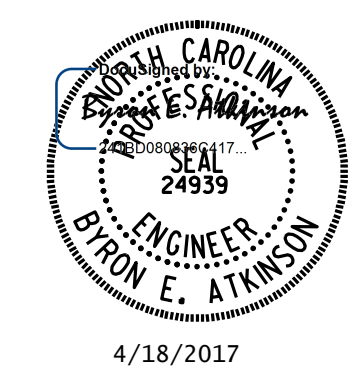
SECTION X-X



SECTION Y-Y

PROJECT NO. 17BP.8.R.114  
 LEE COUNTY  
 STATION: 19+09.00 -L-

SHEET 3 OF 4

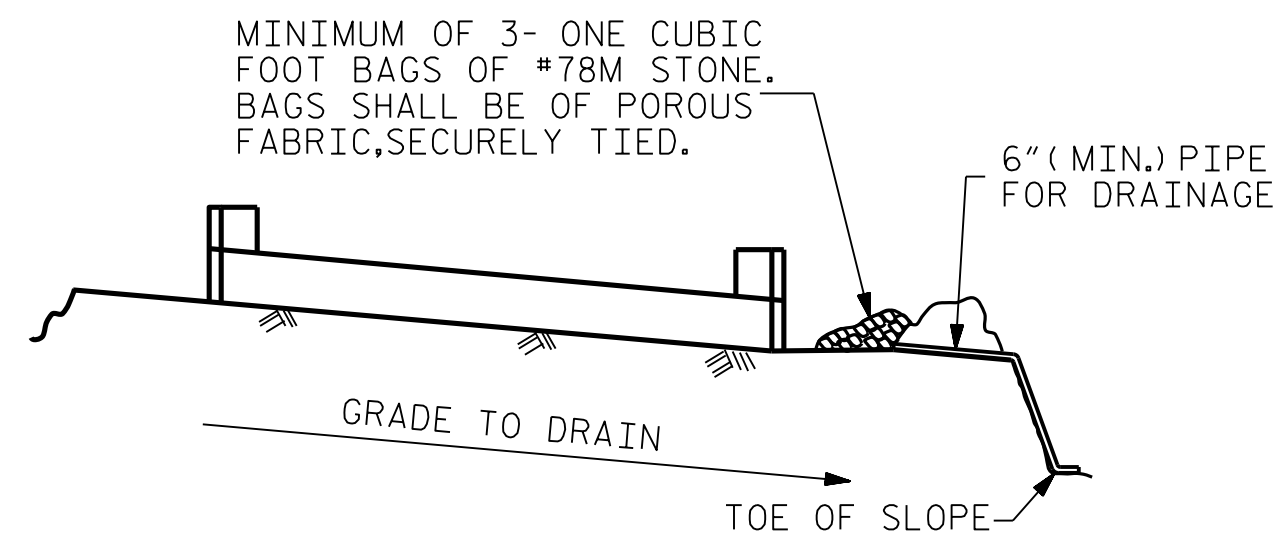


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MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT WING DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-10					TOTAL SHEETS 13

ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 03/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: WJH 12/11	REV. 4/15
CHECKED BY: AAC 12/11	MAA/TMG

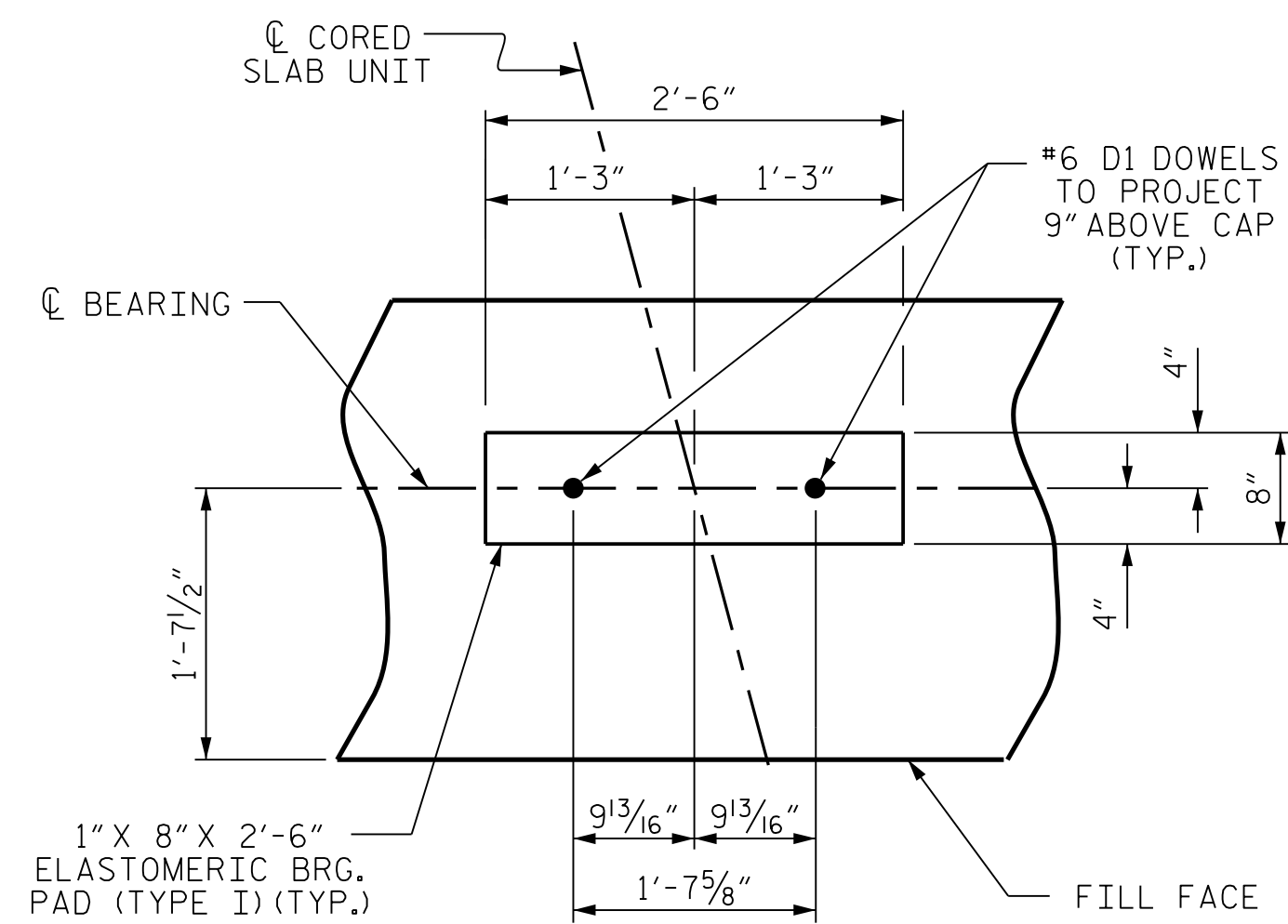


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

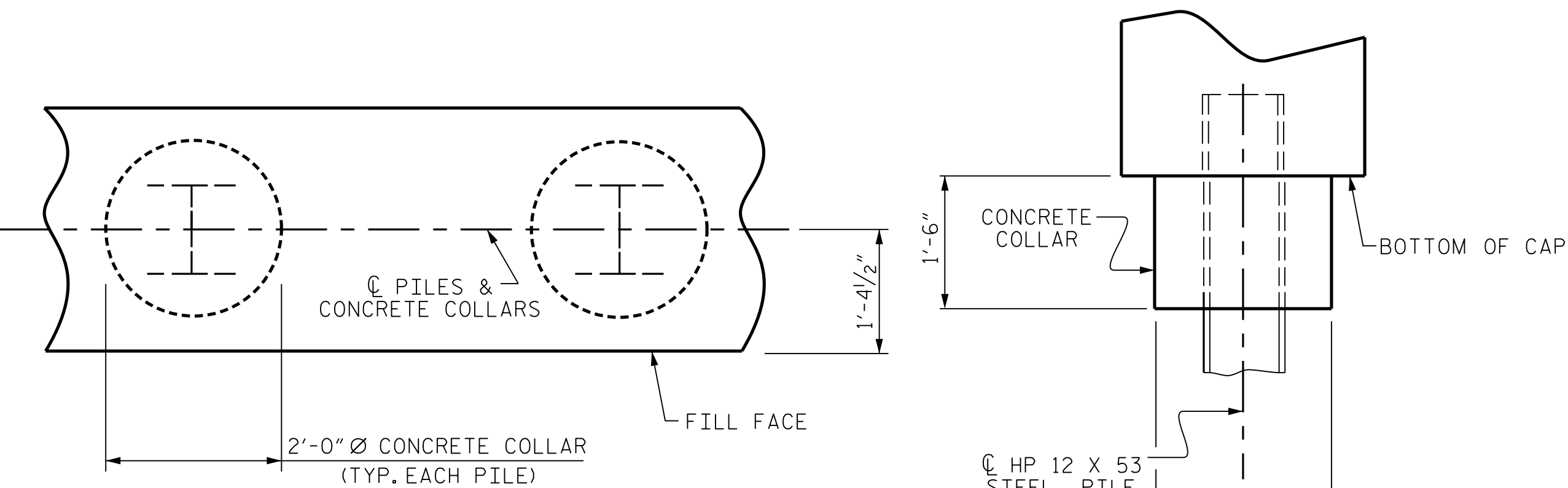
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



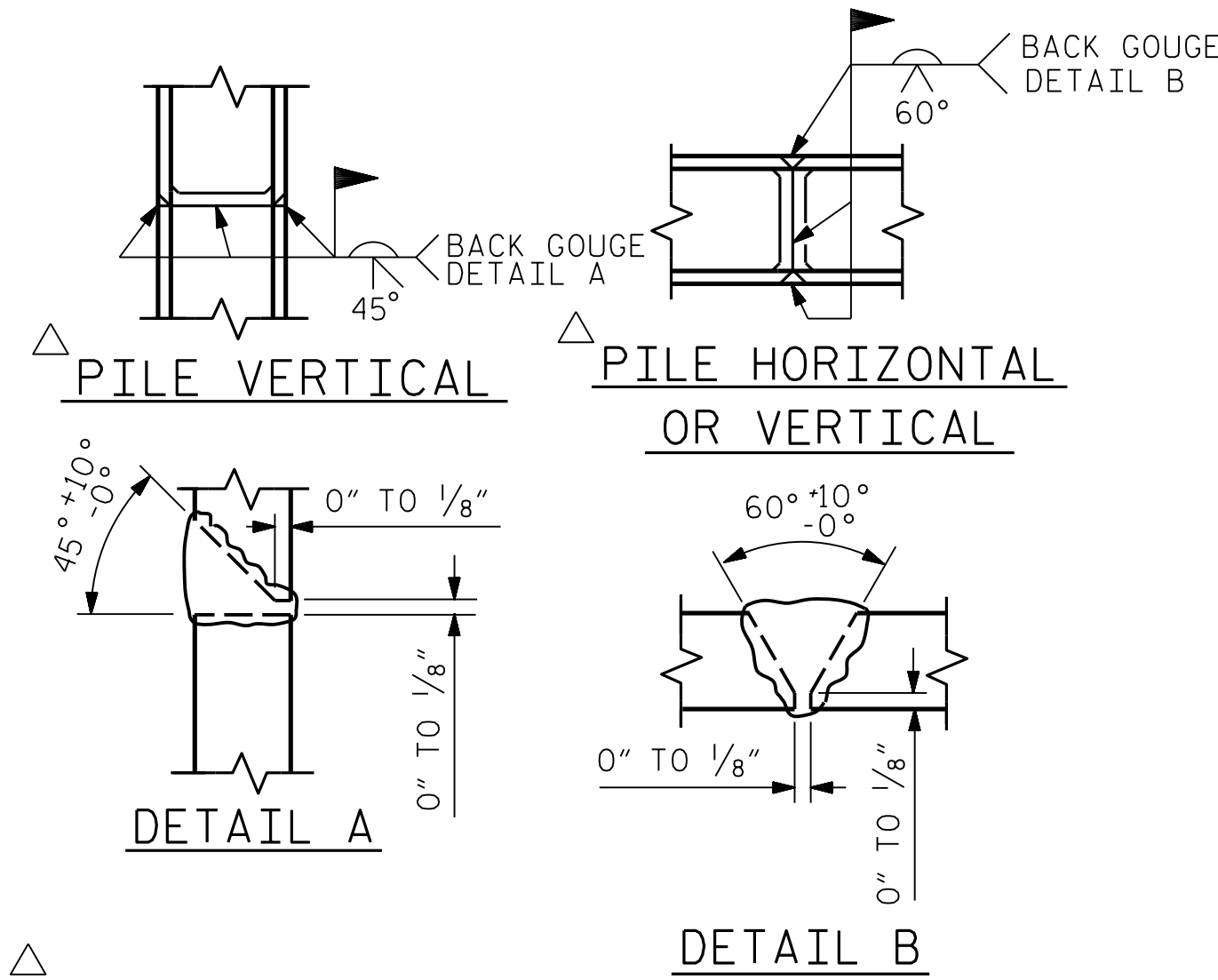
DETAIL "A"

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



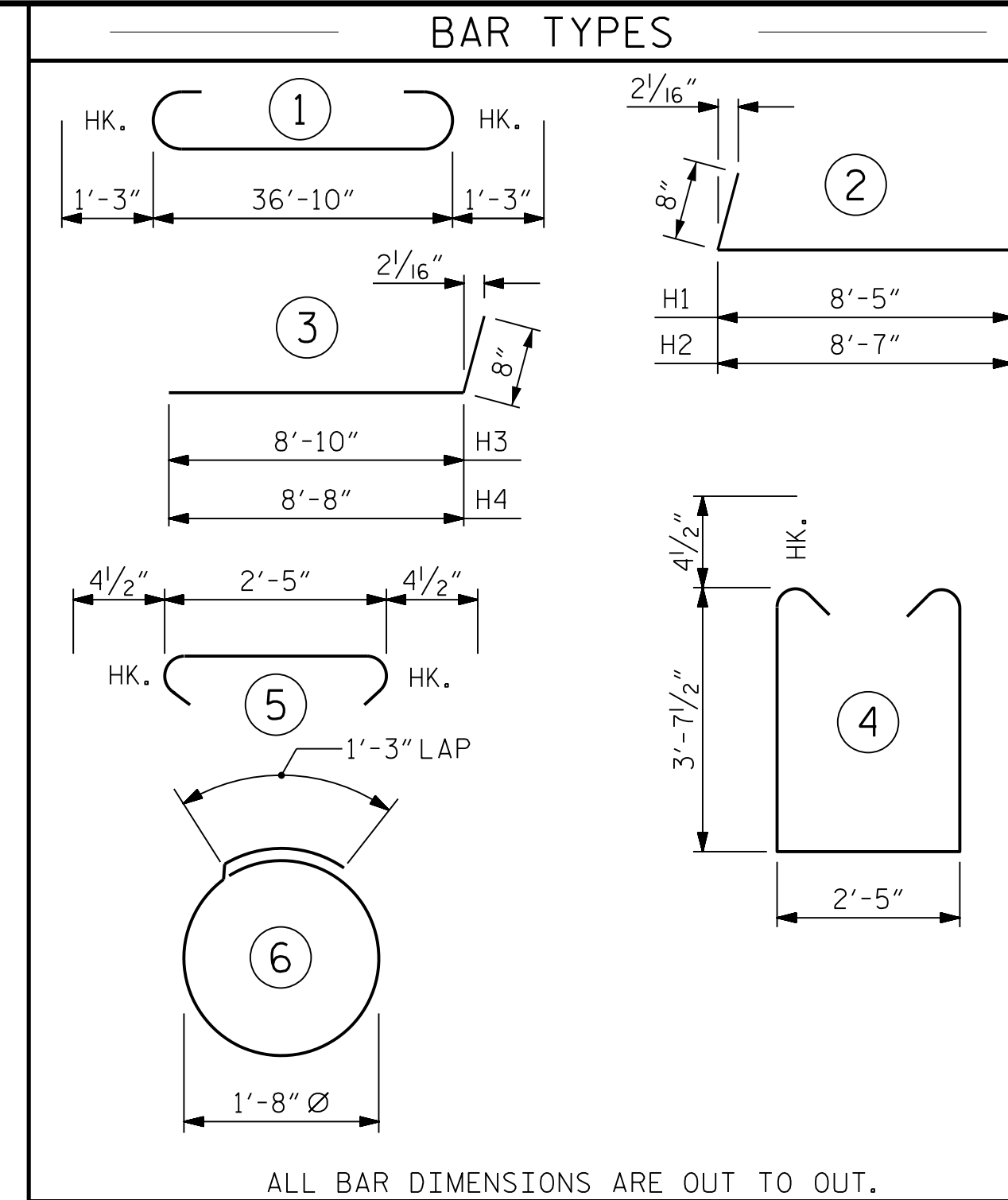
### CORROSION PROTECTION FOR STEEL PILES DETAIL

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



△ POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT.

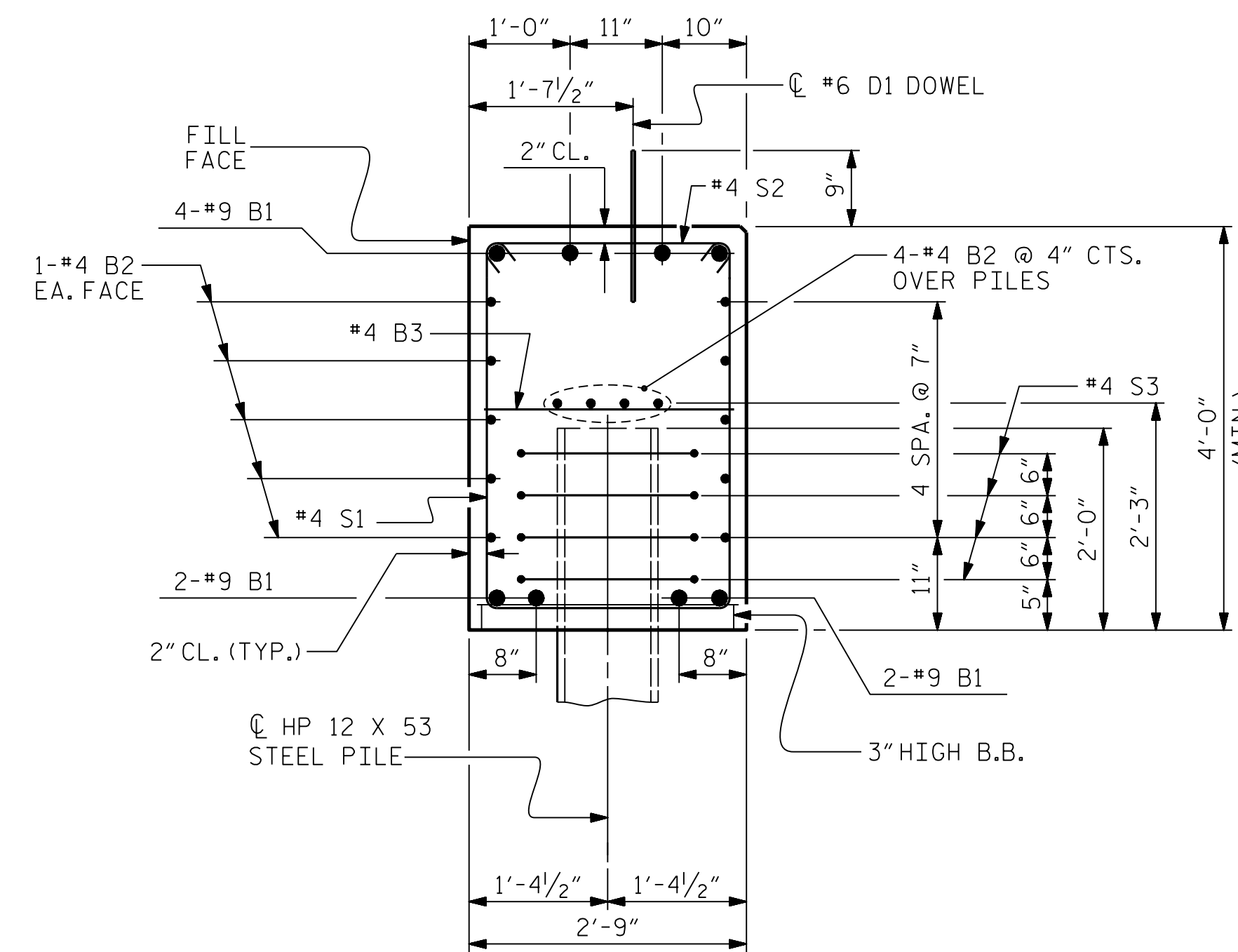
END BENT No. 1		END BENT No. 2	
HP 12 X 53 STEEL PILES	NO: 5	HP 12 X 53 STEEL PILES	NO: 5
STEEL PILE POINTS	EA. = 5	STEEL PILE POINTS	EA. = 5
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	EA. = 5	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	EA. = 5
LIN. FT. = 85		LIN. FT. = 85	

BILL OF MATERIAL FOR ONE END BENT					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#8		39'-4"	1070	
B2	#4	STR	19'-9"	369	
B3	#4	STR	2'-5"	16	
D1	#6	STR	1'-6"	45	
H1	#4	2	9'-1"	61	
H2	#4	2	9'-3"	62	
H3	#4	3	9'-6"	63	
H4	#4	3	9'-4"	62	
K1	#4	STR	3'-1"	33	
S1	#4	4	10'-5"	334	
S2	#4	5	3'-2"	102	
S3	#4	6	6'-6"	87	
V1	#4	STR	6'-2"	218	

REINFORCING STEEL (FOR ONE END BENT) 2522 LBS.

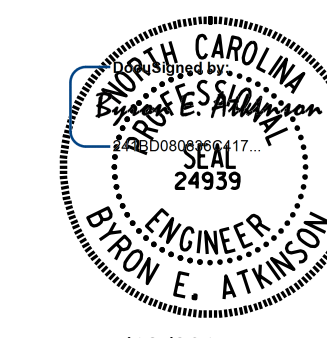
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	18.4 C.Y.
POUR #2	UPPER PART OF WINGS	2.3 C.Y.
TOTAL CLASS A CONCRETE		20.7 C.Y.



### SECTION A-A

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



4/18/2017

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MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11	
1			3			TOTAL SHEETS 13	
2			4				

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
STATION: 19+09.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2  
DETAILS

STD. NO. EB-30-105S4

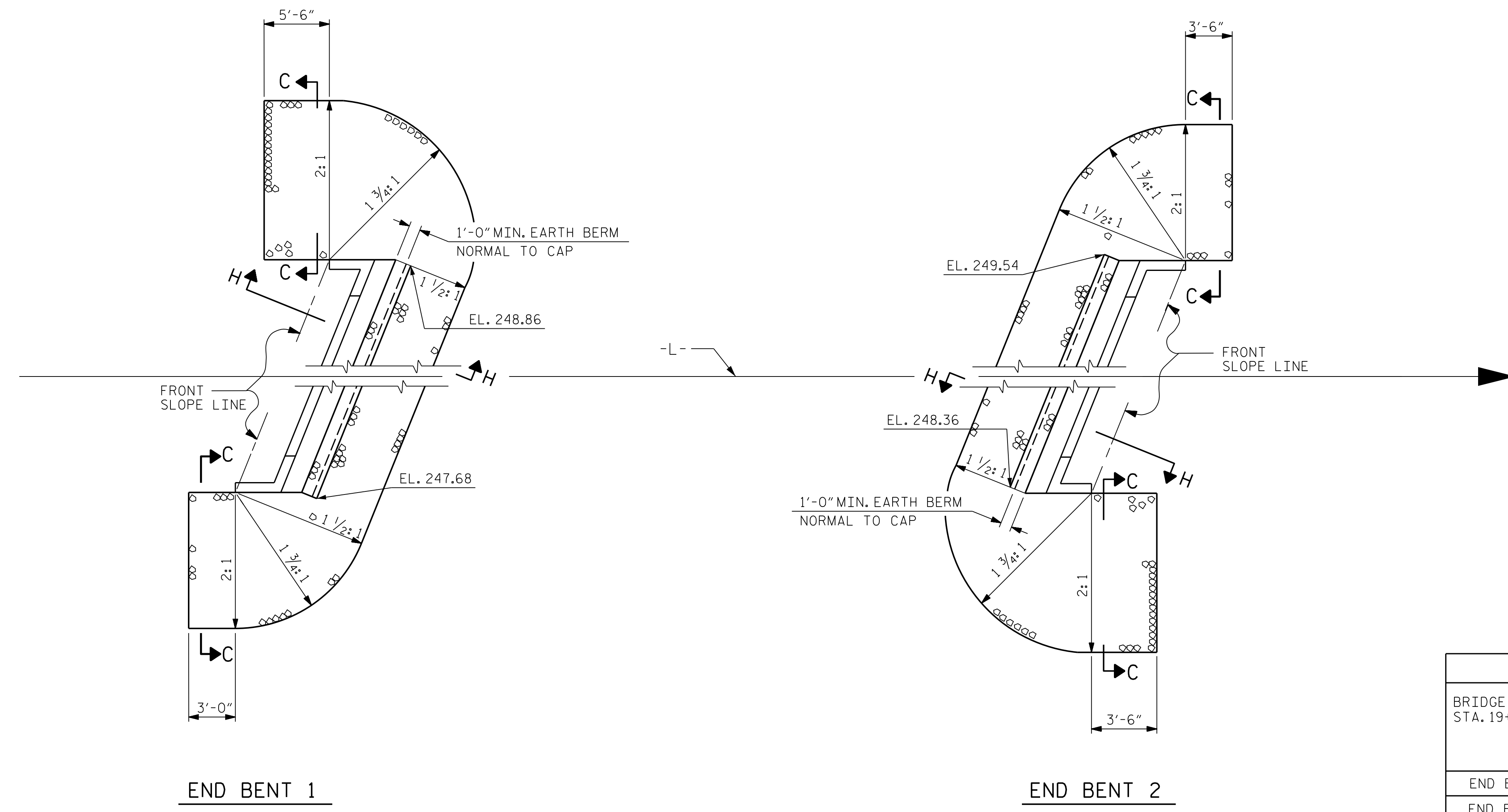
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User: blanning

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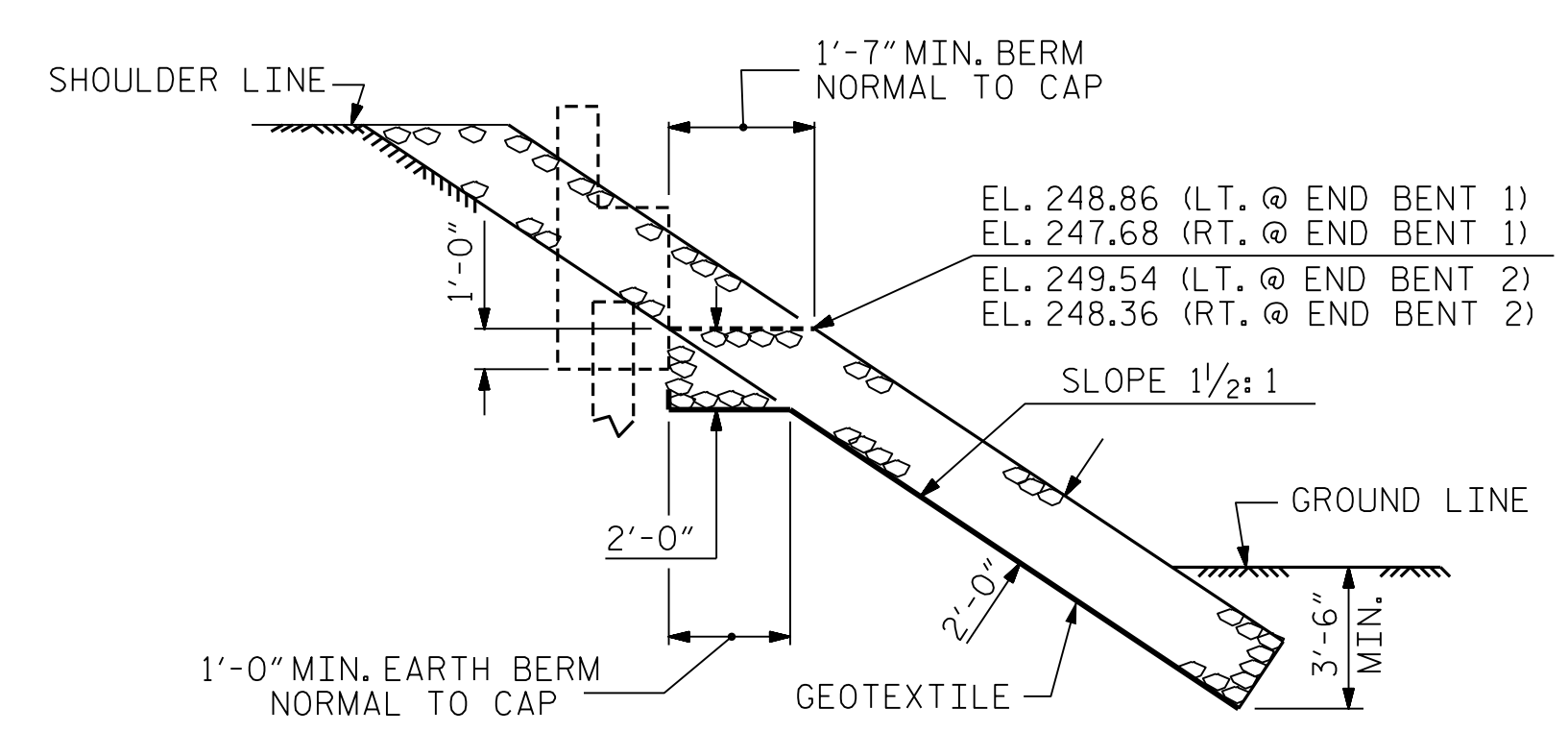
ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 03/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: WJH 12/11	
CHECKED BY: AAC 12/11	

NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

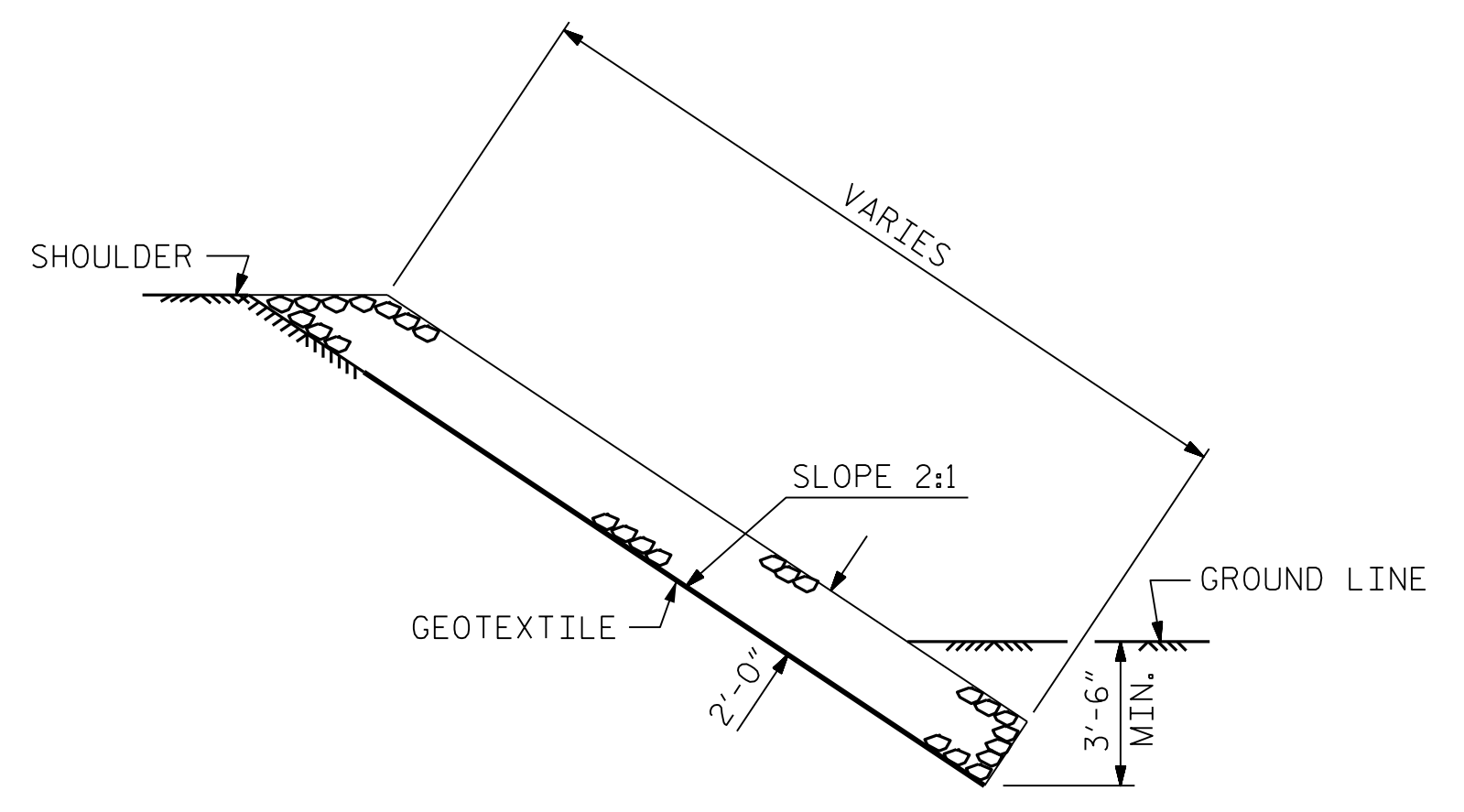


PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 19+09.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	99	110
END BENT 2	109	121

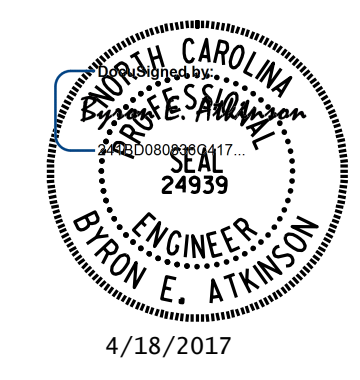


SECTION H-H



SECTION C-C

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
STATION: 19+09.00 -L-



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
= RIP RAP DETAILS =

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MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			13

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ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 02/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY: RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

**NOTES**

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

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

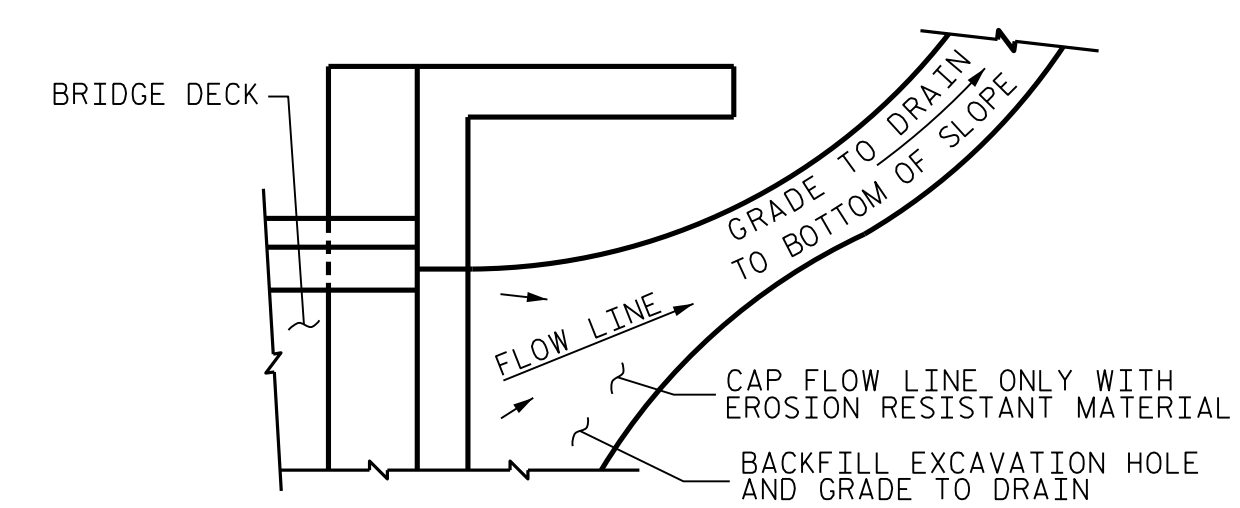
#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

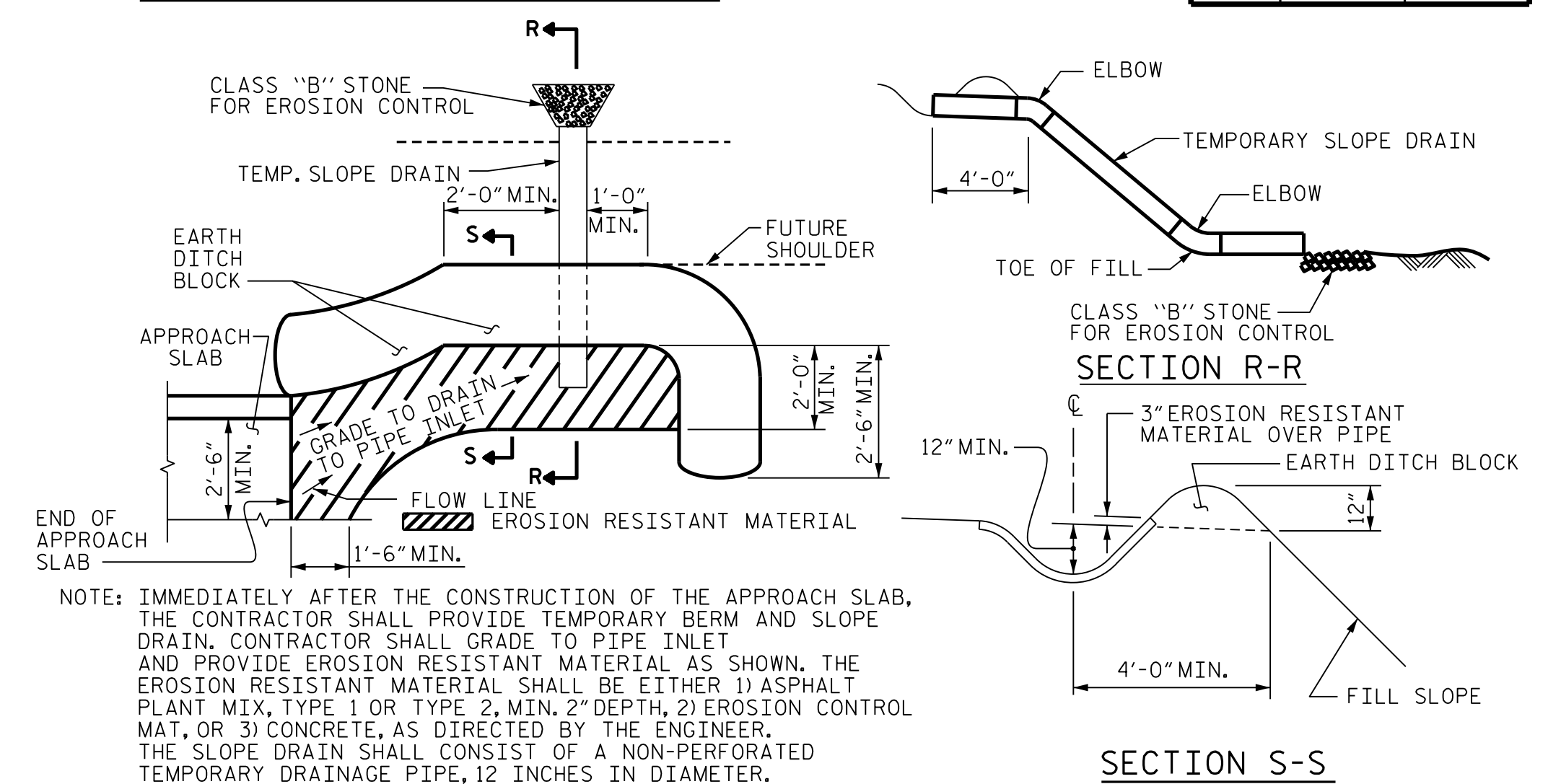
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED, SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



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

**TEMPORARY DRAINAGE DETAIL**



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

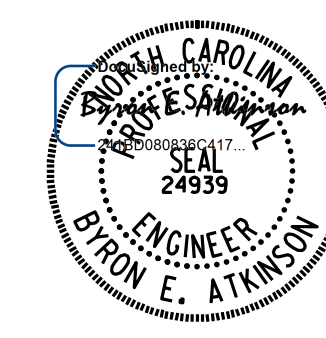
**PLAN VIEW**

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. 17BP.8.R.114  
LEE COUNTY  
 STATION: 19+09.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 (SUB-REGIONAL TIER)  
 105° SKEW

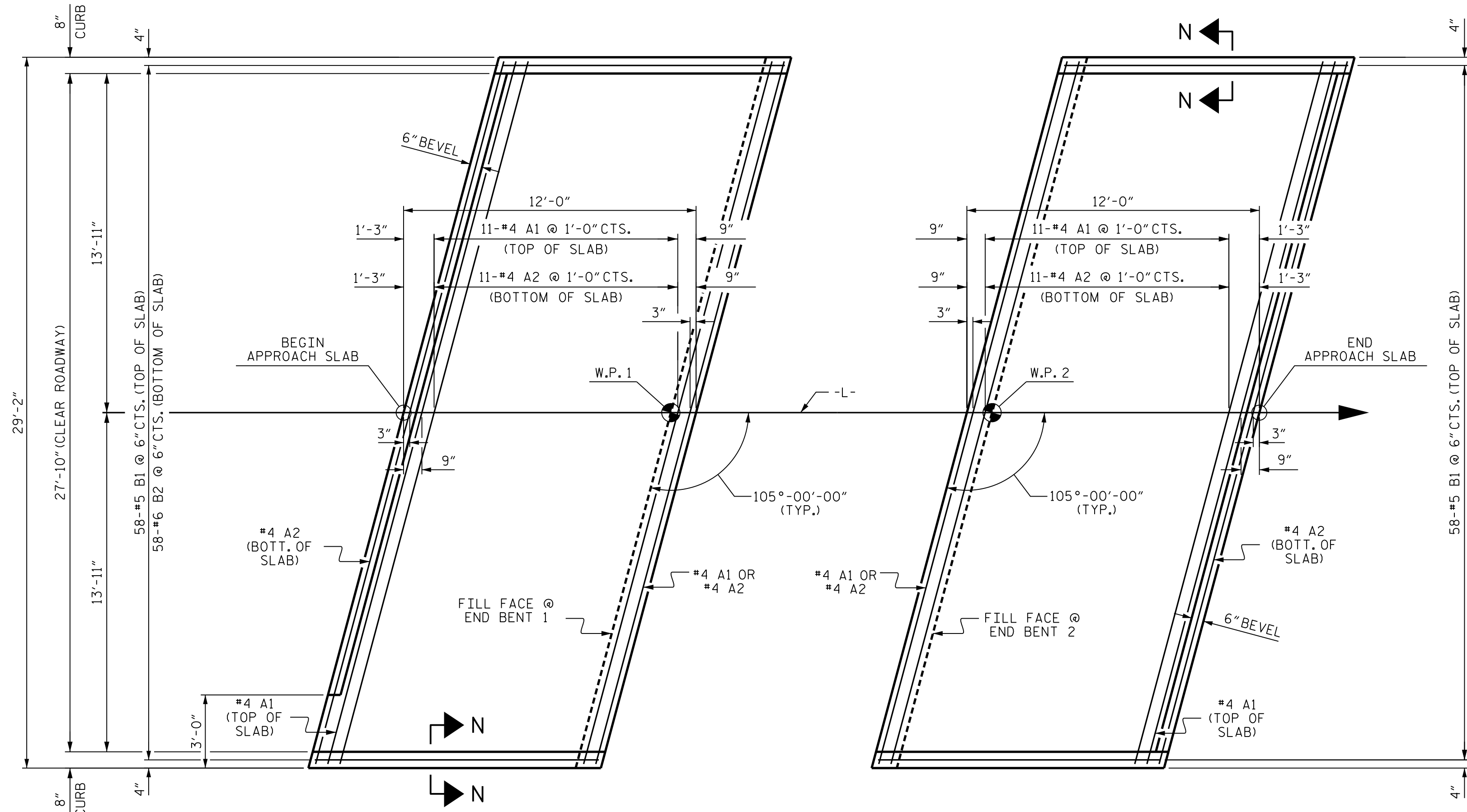


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MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13	
1			3			TOTAL SHEETS	
2			4			13	

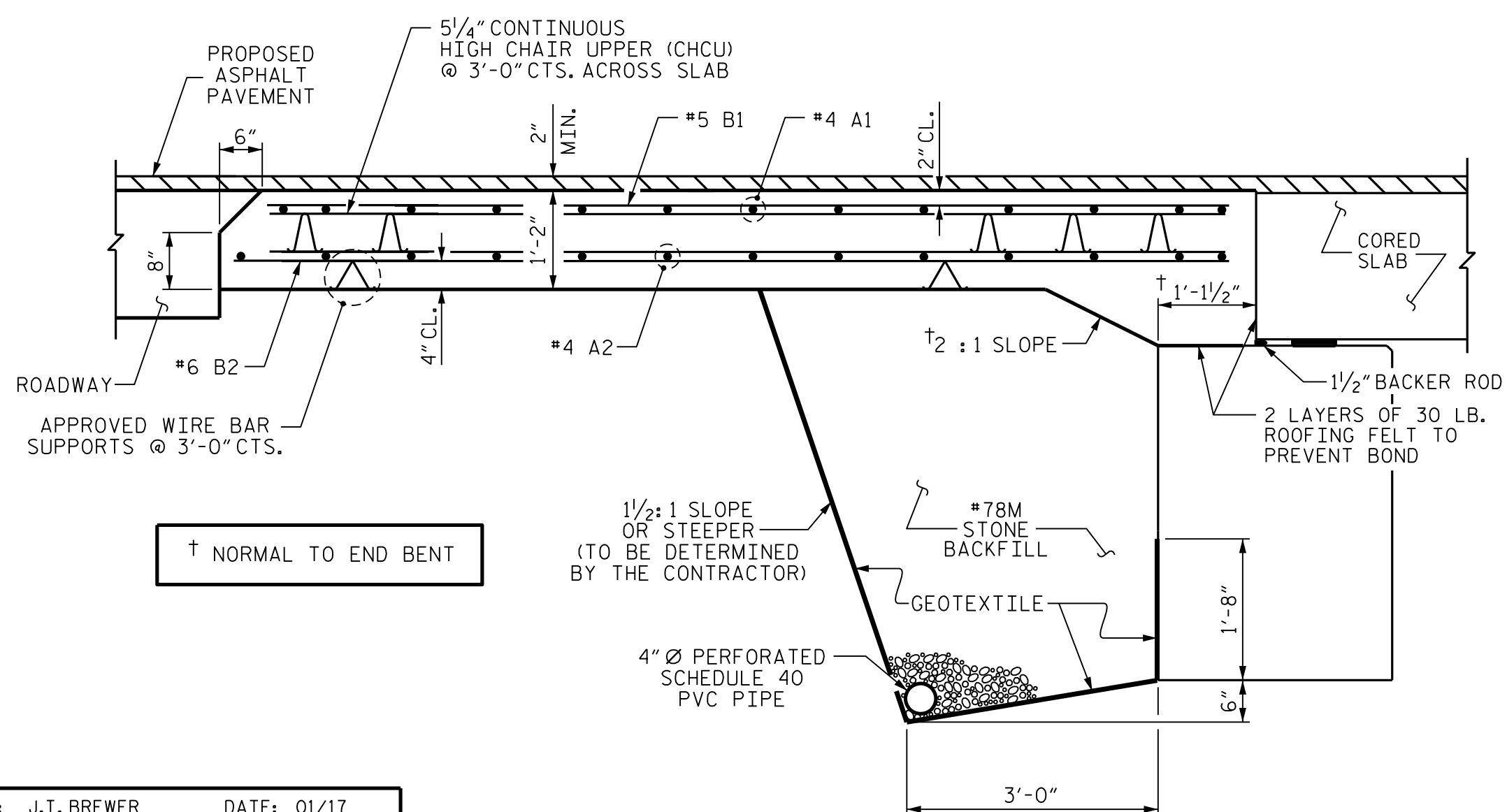
STD. NO. BAS\_30\_105S



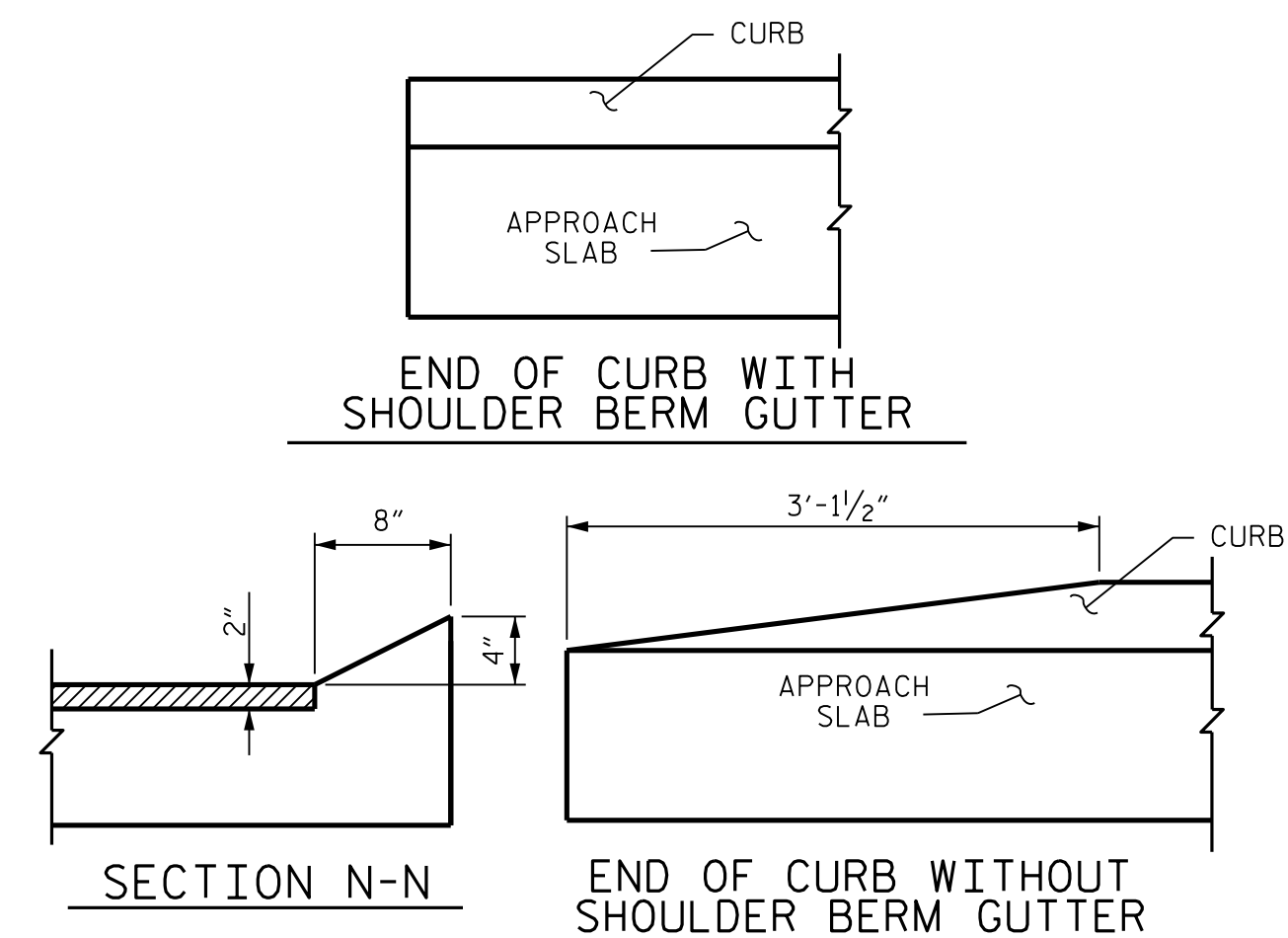
**PLAN @ END BENT 1**

**PLAN @ END BENT 2**

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



**SECTION THRU SLAB**



**CURB DETAILS**

4/18/2017 11:08:02 AM User: blanning  
 File: P:\NC Bridges\MI6005.CH Eng. Div. 8 Br. Repl. 16 Bridges\MI6005.01.L Lee 16\17BP8R114\Structures\401.025.17BP8R114.SMU.BAS1.dgn

ASSEMBLED BY: J.I. BREWER	DATE: 01/17
CHECKED BY: B.E. ATKINSON	DATE: 02/17
DESIGN ENGINEER OF RECORD: B.E. ATKINSON	DATE: 03/17
DRAWN BY: SHS/MAA 5-09	REV. 9-15
CHECKED BY: BCH 5-09	MAA/TMG

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

### DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

### ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

### HANDRAILS AND POSTS:

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

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

### SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN