

CONTRACT: C204684 TIP PROJECT: B-3186 / B-5898

See Sheet 1A For Index of Sheets

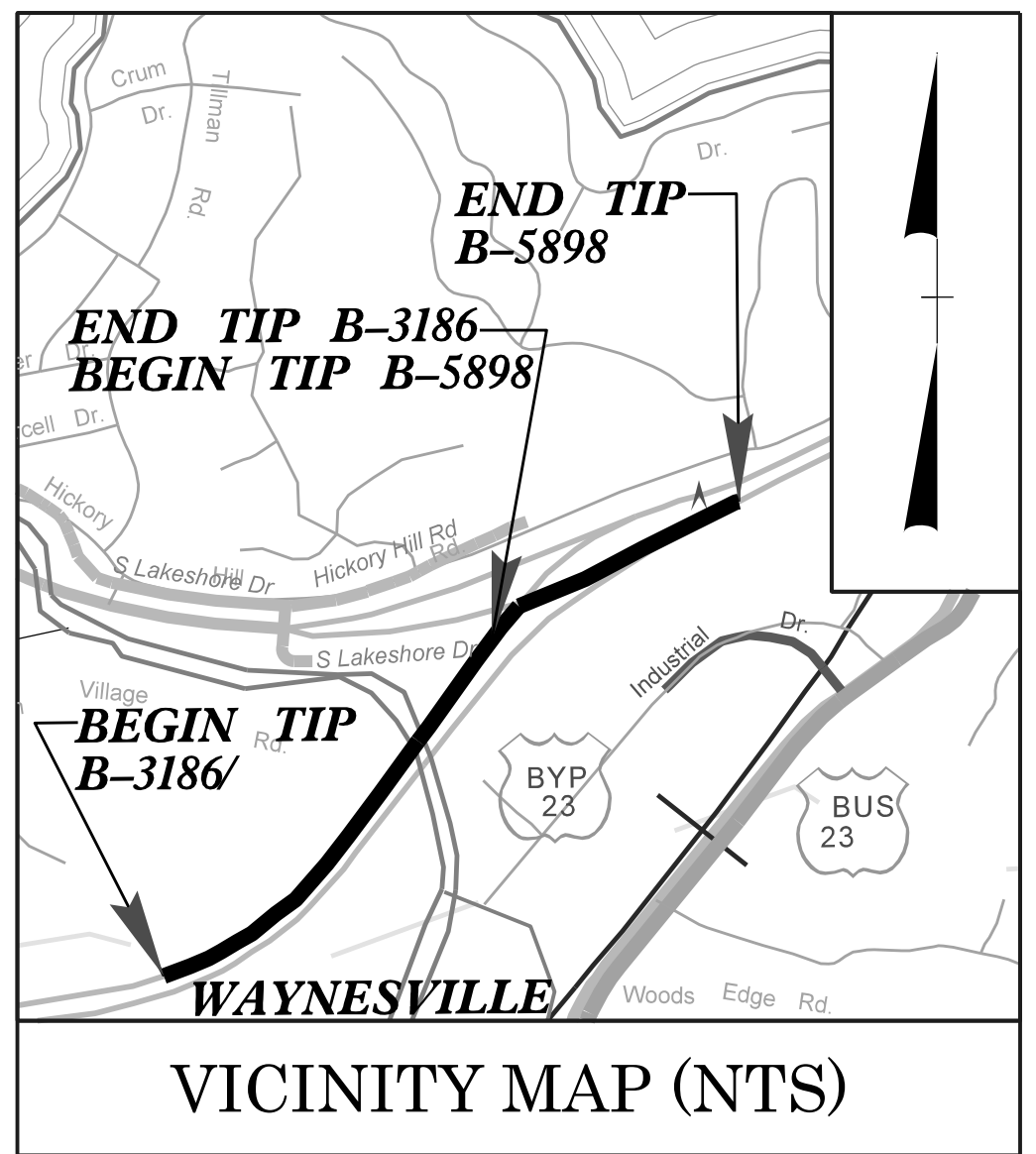
# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## HAYWOOD COUNTY

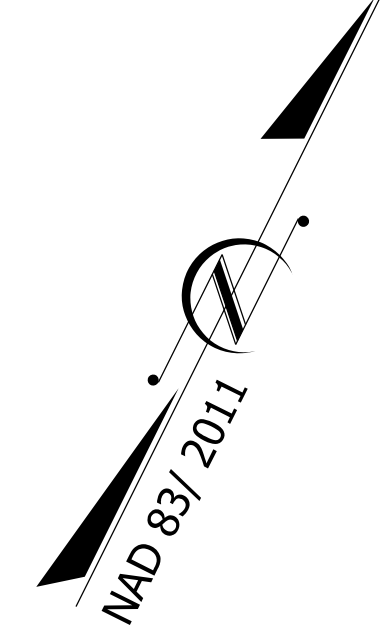
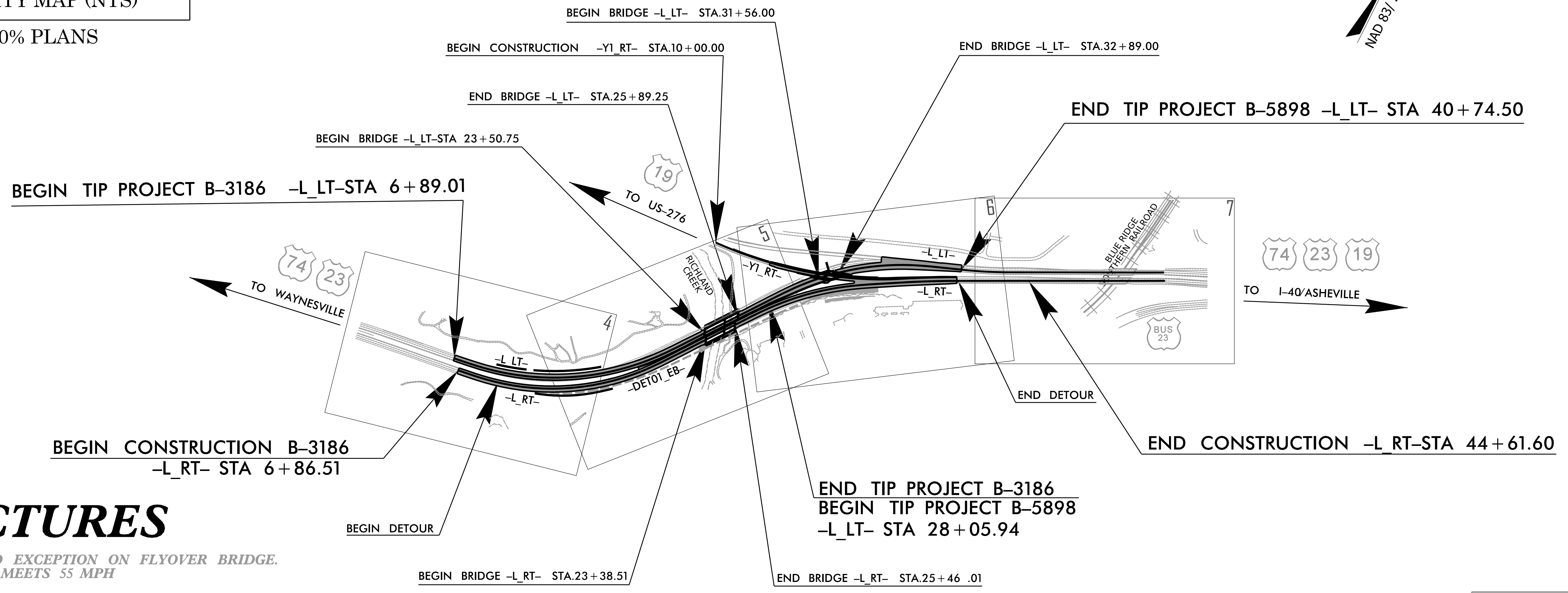
LOCATION: *B-3186, BRIDGES 430155 AND 430158 OVER RICHLAND CREEK ON US 23/74*  
*B-5898, BRIDGE 430168 OVER US 19/23 ON US 23/74*

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3186/ B-5898	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
38332.1.FS1 (B-3186)	BRNHP-0023(32)	P.E.	
48030.1.FS1 (B-5898)	BRSTP-0019(49)	P.E.	
38332.2.1 (B-3186)	BRNHP-0023(32)	RW/UTILITY	
48030.2.1 (B-5898)	BRSTP-0019(49)	RW/UTILITY	
38332.3.1 (B-3186)	BRNHP-0023(32)	CONST.	
48030.3.3 (B-5898)	BRSTP-0019(49)	CONST.	



90% PLANS

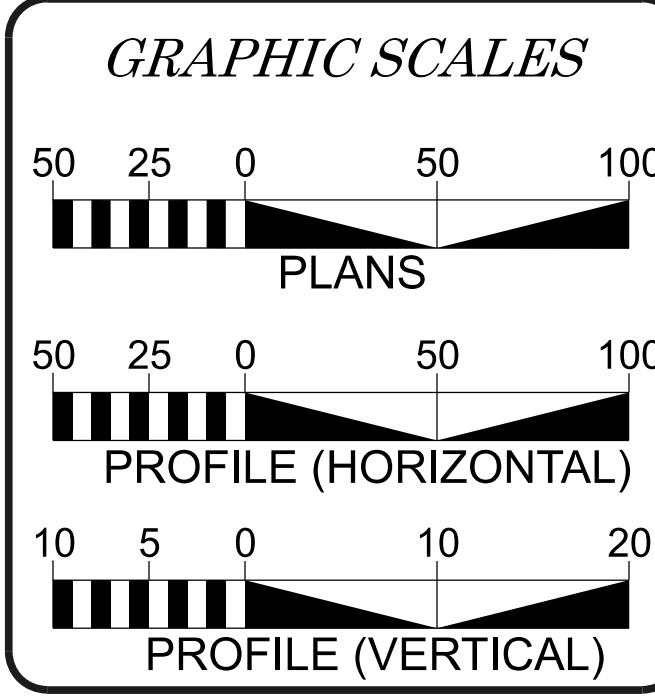


### STRUCTURES

\*\* HORIZONTAL SSD EXCEPTION ON FLYOVER BRIDGE.  
INSIDE SHOULDER MEETS 55 MPH

THIS IS A CONTROLLED-ACCESS PROJECT WITH  
ACCESS BEING LIMITED TO INTERCHANGES

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

ADT 2023 =	48,800
ADT 2043 =	60,800
K =	8 %
D =	55 %
T =	5 % *
V =	65 MPH **
* TTST = 2% DUAL 3%	
FUNC CLASS =	
FREEWAY	
STATEWIDE TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-3186 =	0.356 MI
LENGTH STRUCTURE TIP PROJECT B-3186 =	0.045 MI
TOTAL LENGTH TIP PROJECT B-3186 =	0.401 MI
LENGTH ROADWAY TIP PROJECT B-5898 =	0.215 MI
LENGTH STRUCTURE TIP PROJECT B-5898 =	0.025 MI
TOTAL LENGTH TIP PROJECT B-5898 =	0.240 MI

(LENGTHS BASED ON L-LT ALIGNMENT)

Prepared in the Office of:  
**AECOM**  
NC FIRM LICENSE No: F-0342  
5438 Wade Park Blvd., Suite 200  
Raleigh, NC 27607  
(919) 854-6200 • (919) 854-6259 (FAX)

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: DECEMBER 19, 2023

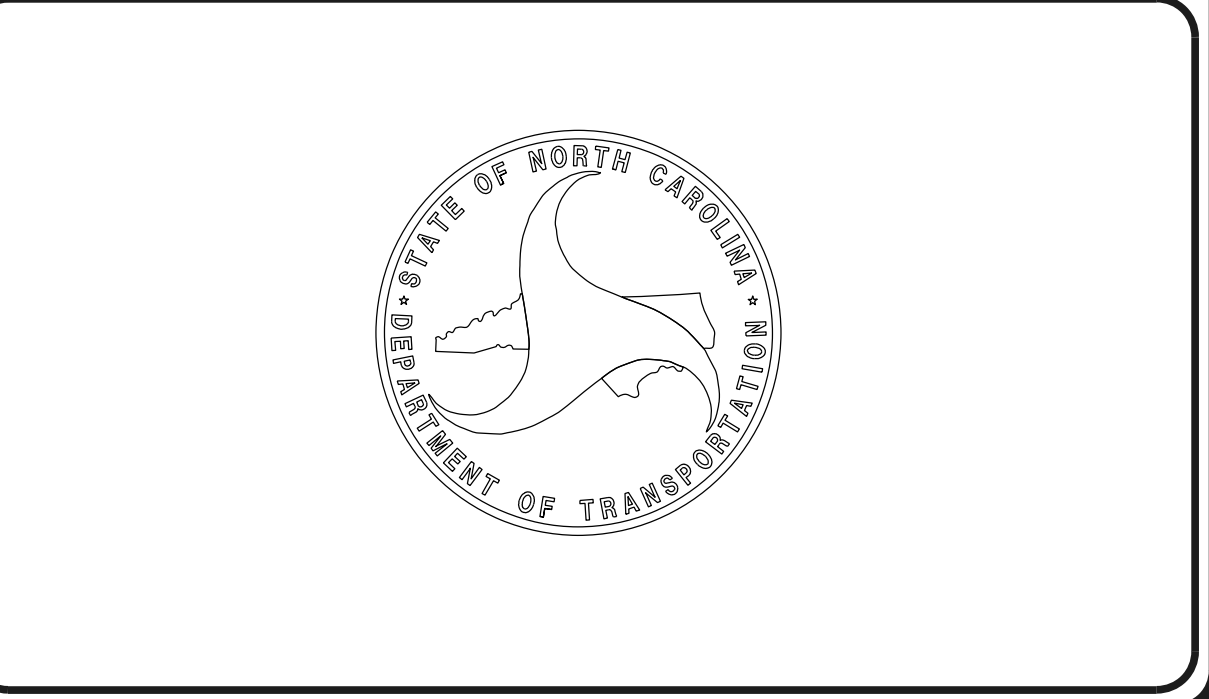
GREGORY COLS, P.E.  
PROJECT ENGINEER

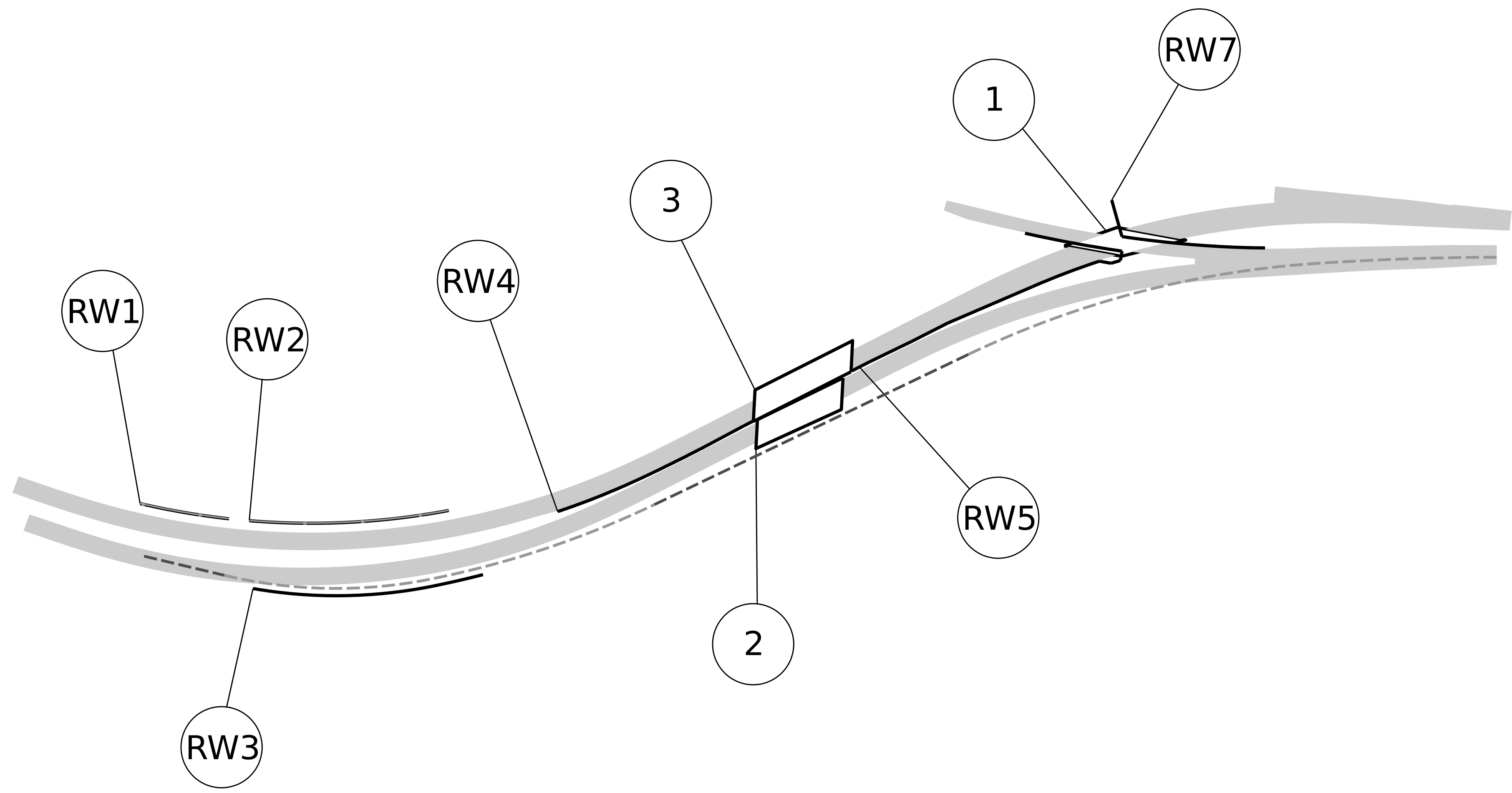
MOHAMMED FALLAHA, P.E.  
PROJECT DESIGN ENGINEER

GARRETT HIGDON  
NCDOT DIV.14 CONTACT

STRUCTURE DESIGN ENGINEER

GREGORY COLS, PE  
SIGNATURE:





INDEX			
STR	STATION	DESCRIPTION	"S" SHEETS
1	32+21.34 -L_LT- =20+65.22 -Y1_RT-	BRIDGE ON US74 WB/US23 SB OVER US19 NB BETWEEN US276 AND US23 BUS	S1
2	24+42.26 -L_RT-	BRIDGE ON US74 EB/US23 NB OVER RICHLAND CREEK BETWEEN US276 AND US19	S2
3	24+70.00 -L_LT-	BRIDGE ON US74 WB/US23 SB OVER RICHLAND CREEK BETWEEN US276 AND US19	S3

INDEX			
STR	STATION	DESCRIPTION	"W" SHEETS
RW1	9+60.00 -L_LT-	RETAINING WALL 1 ALONG -L_LT-	1
RW2	12+05.00 -L_LT-	RETAINING WALL 2 ALONG -L_LT-	2
RW3	11+89.75 -L_RT-	RETAINING WALL 3 ALONG -L_RT-	3
RW4	18+77.39 -L_LT-	RETAINING WALL 4 BETWEEN -L_LT- AND -L_RT- AT END BENT 1 OF STR 2 & 3 BETWEEN US74 AND US23	4
RW5	25+97.82 -L_LT-	RETAINING WALL 5 BETWEEN -L_LT- AND -L_RT- AND ALONG -Y1_RT- UNDER STR 1	5
RW7	20+36.42 -Y1_RT-	RETAINING WALL 7 ALONG -Y1_RT- UNDER STR 1	7

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY

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**PROFESSIONAL SEAL**  
 GREGORY R. COLS  
 ENGINEER  
 10/18/2023

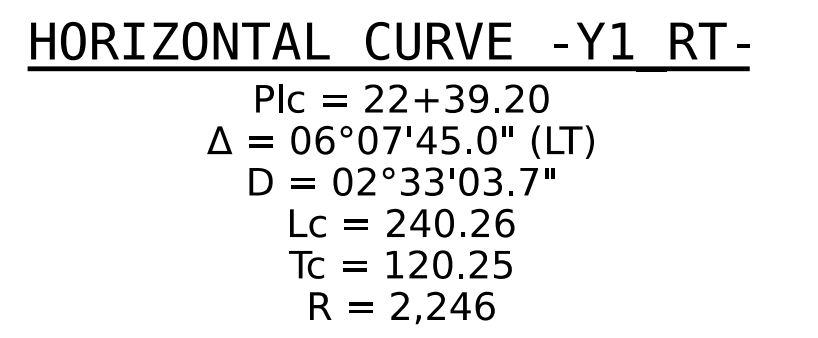
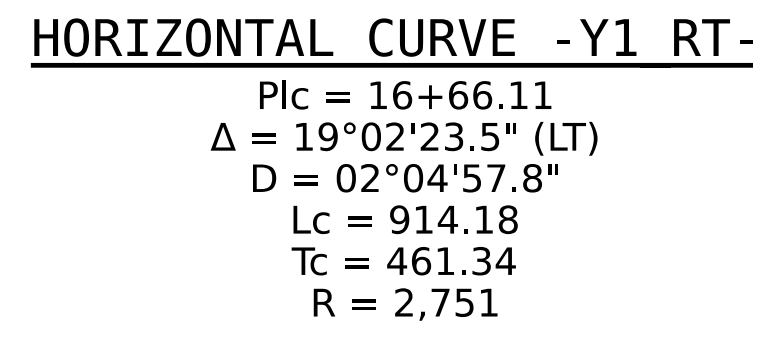
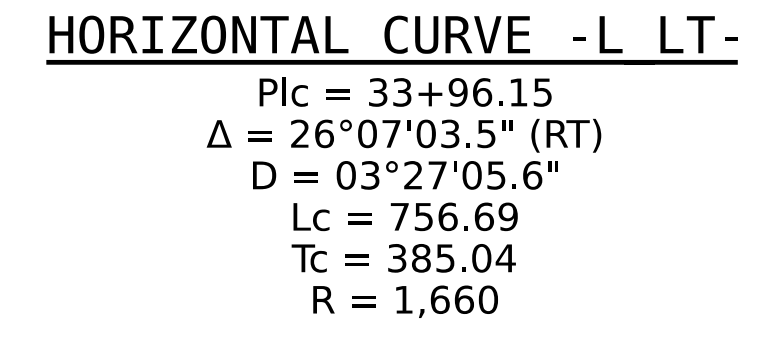
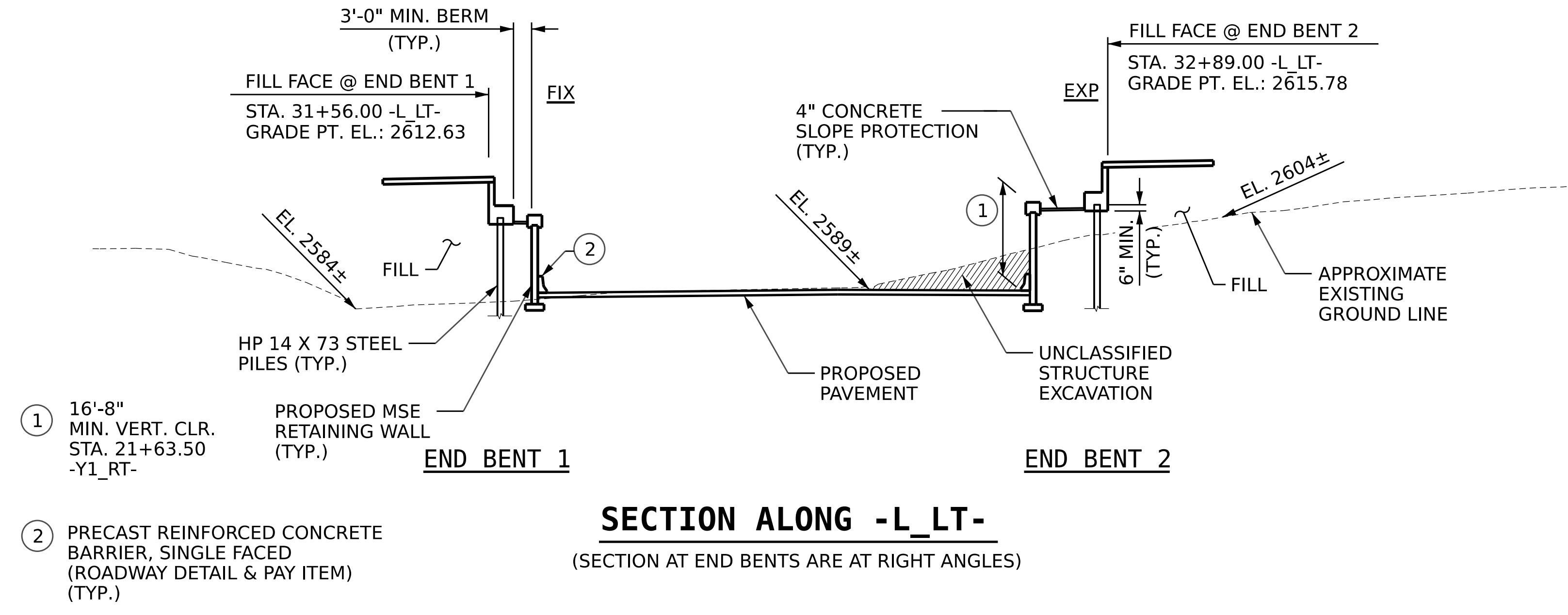
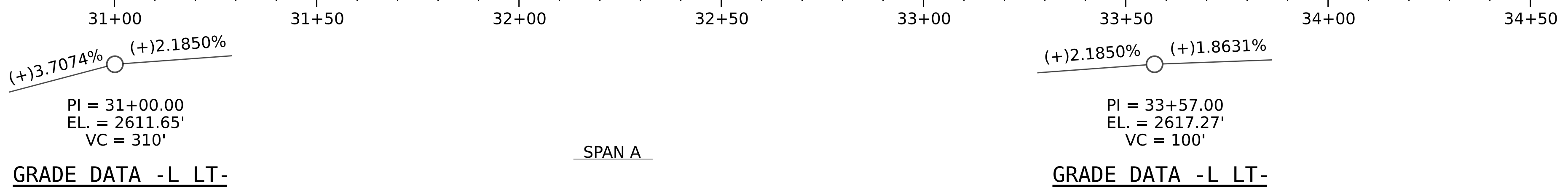
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**STRUCTURE INDEX SHEET**

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

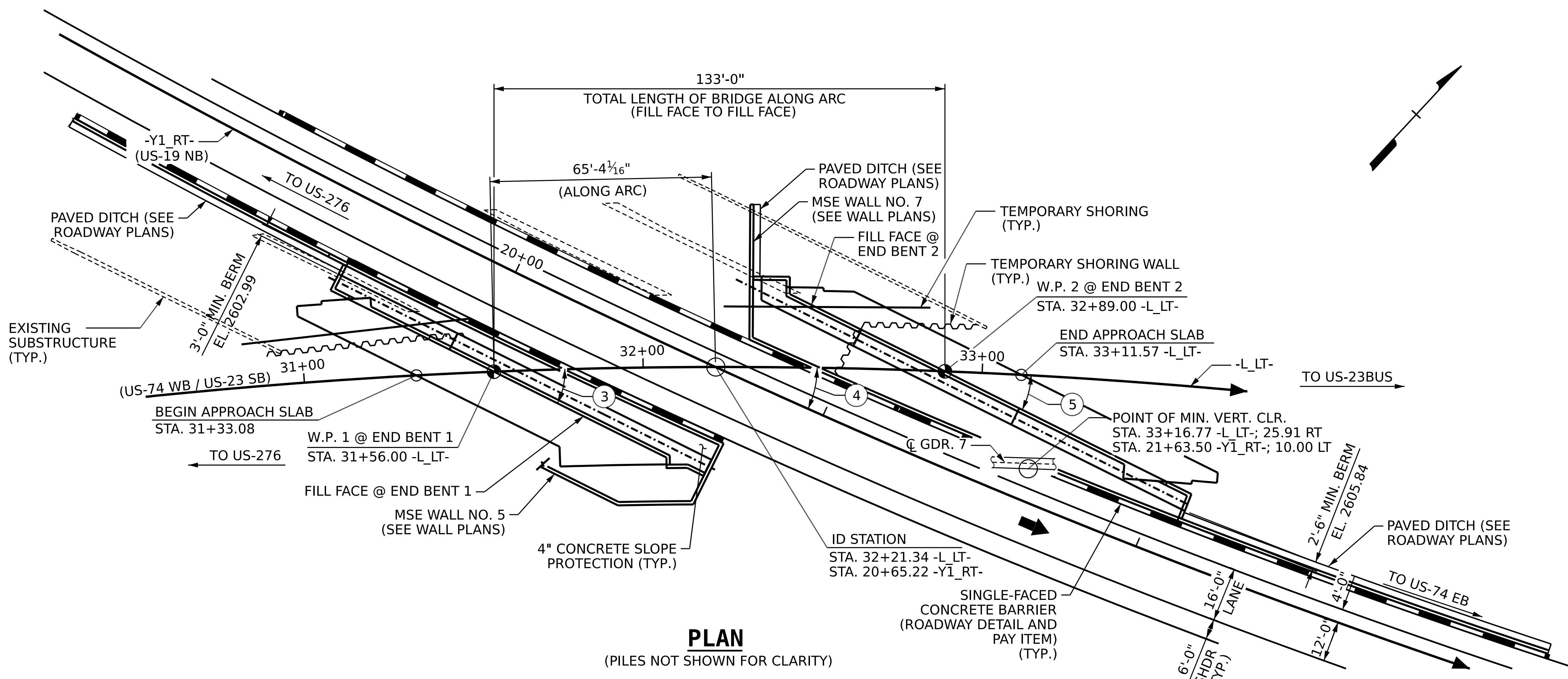
DRAWN BY : L. LEE DATE : 07/2023  
 CHECKED BY : G. COLS DATE : 07/2023  
 DESIGN ENGINEER OF RECORD : G. COLS DATE : 07/2023

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- ① 16'-8" MIN. VERT. CLR. STA. 21+63.50 -Y1\_RT-
- ② PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED (ROADWAY DETAIL & PAY ITEM) (TYP.)

- ③ 28°48'25" (TAN TO CURVE)
- ④ 24°42'45" (TAN TO CURVE)
- ⑤ 24°12'59" (TAN TO CURVE)



PROJECT NO. B-3186 / B-5898  
 HAYWOOD COUNTY  
 STATION: POC 32+21.34 -L LT-  
 POC 20+65.22 -Y1 RT  
 SHEET 1 OF 5 REPLACES BRIDGE NO. 430168

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Professional Engineer Seal:  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 041343  
 GREGORY R. COLS  
 10/18/2023

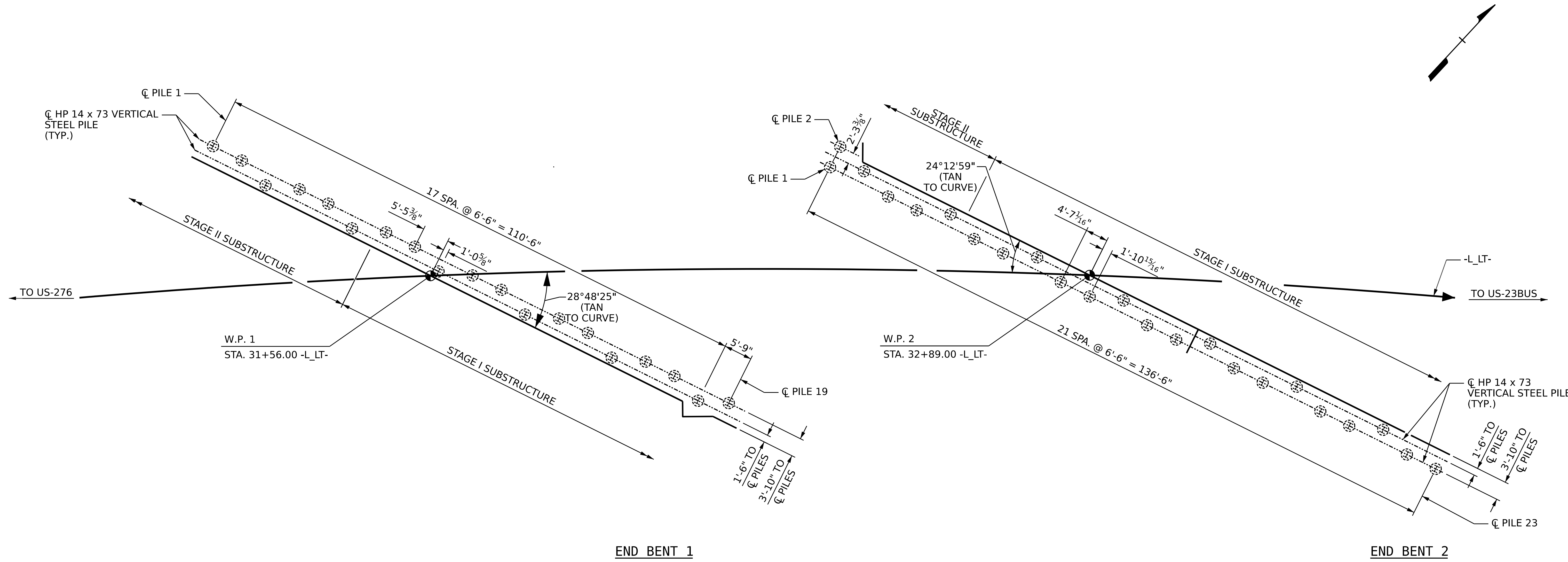
STATE OF NORTH CAROLINA  
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 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE ON  
 US 74 WB / US 23 SB  
 OVER US19 NB  
 BETWEEN US 276 & US 23 BUS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-01
1			3			TOTAL SHEETS
2			4			43

DRAWN BY :	M.L. CATER	DATE :	01/2023
CHECKED BY :	S. NATARAJAN	DATE :	01/2023
DESIGN ENGINEER OF RECORD:	G. COLS	DATE :	01/2023

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**FOUNDATION LAYOUT**  
(DIMENSIONS LOCATING PILES ARE TO CENTERLINE OF PILES)

**FOUNDATION NOTES:**

- 1) SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS FOR THE SETTLEMENT GAUGES AND SURCHARGE REQUIRED AT END BENTS NO. 1 AND 2.
- 2) INSTALL PILE SLEEVES BEFORE CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL AT END BENTS NO. 1 AND 2. OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MSE ABUTMENT WALL TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATION. THEN, INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS. FOR PILE SLEEVES, SEE MSE RETAINING WALL PLANS AND PROVISION. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
- 3) FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-3186 / B-5898

HAYWOOD COUNTY

STATION: 32+21.34 -L\_LT-

SHEET 2 OF 5

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Professional Engineer Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047572

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**

FOR BRIDGE ON US74 WB/US23 SB OVER US19 NB BETWEEN US 276 AND US23 BUS.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-02
1			3			TOTAL SHEETS
2			4			43

DRAWN BY :	M.L. CATER	DATE :	01/2023
CHECKED BY :	S. NATARAJAN	DATE :	01/2023
DESIGN ENGINEER OF RECORD:	D. RITACCO	DATE :	01/2023

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**SUMMARY OF PILE INFORMATION/INSTALLATION**

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-9	105	2604.45	60	NA	2562.0	175.0	4						
End Bent 1, Piles 10-19	105	2604.45	60	NA	2558.0	175.0							
End Bent 2, Piles 1-9	105	2607.34	55	NA	2564.0	175.0							
End Bent 2, Piles 10-23	105	2607.34	60	NA	2564.0	175.0							

\*Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

\*\*RDR = 
$$\frac{\text{Factored Resistance} + \text{Factored Downdrag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \text{Nominal Downdrag Resistance} + \frac{\text{Nominal Scour Resistance}}{\text{Scour Resistance Factor}}$$

**SUMMARY OF PDA/PILE ORDER LENGTHS**

(Blank entries indicate item is not applicable to structure)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
End Bent 1, Piles 1-9	MAYBE	65	4		
End Bent 1, Piles 10-19	MAYBE	65			
End Bent 2, Piles 1-9	MAYBE	60			
End Bent 2, Piles 10-23	MAYBE	65			

\*EST = Pile order lengths from estimated pile lengths; PDA = Pile order lengths based on PDA testing. For groups of end bents/bents with pile order lengths based on PDA testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the PDA.

**PILE DESIGN INFORMATION**

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-9	105			0.60			
End Bent 1, Piles 10-19	105			0.60			
End Bent 2, Piles 1-9	105			0.60			
End Bent 2, Piles 10-23	105			0.60			

\*Factored Dead Load is factored weight of pile above the ground line.

**SUMMARY OF PILE ACCESSORIES**

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
End Bent 1, Piles 1-9				YES	
End Bent 1, Piles 10-19				YES	
End Bent 2, Piles 1-9				YES	
End Bent 2, Piles 10-23				YES	
<b>TOTAL QTY:</b>				42	

**NOTES:**


- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Ryan Patrick Doyle, #045161) on 08-01-2023.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for PDA Testing when PDAs may be required.

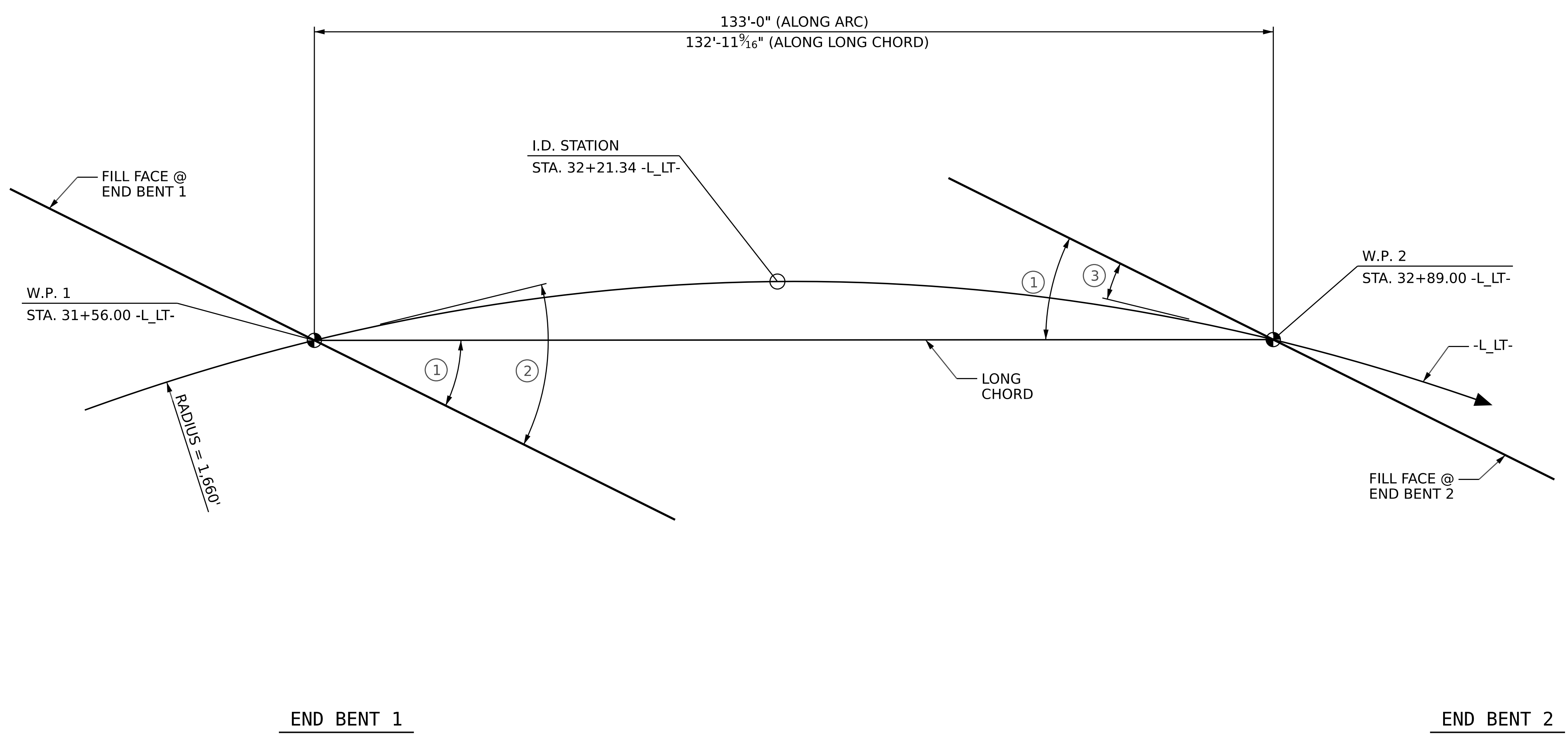
PROJECT NO. B-5898/ B-3186

Haywood COUNTY

STATION: POC 32+21.64 -L LT

SHEET 3 OF 5

 DocuSigned by: <b>Dannerys Ritacco</b> 10/18/2023 SIGNATURE DATE	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH  <h2 style="text-align: center;">PILE FOUNDATION TABLES</h2>						SHEET NO. S1-03
	REVISIONS NO. BY: DATE: NO. BY: DATE:						TOTAL SHEETS 43
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	1			3			
	2			4			



**LONG CHORD LAYOUT**

END BENTS ARE PARALLEL

ANGLES

- ① 26°30'42"
- ② 28°48'25" (TAN TO CURVE)
- ③ 24°12'59" (TAN TO CURVE)

PROJECT NO. B-3186 / B-5898

HAYWOOD COUNTY

STATION: POC 32+21.34 -L\_ LT-

SHEET 4 OF 5

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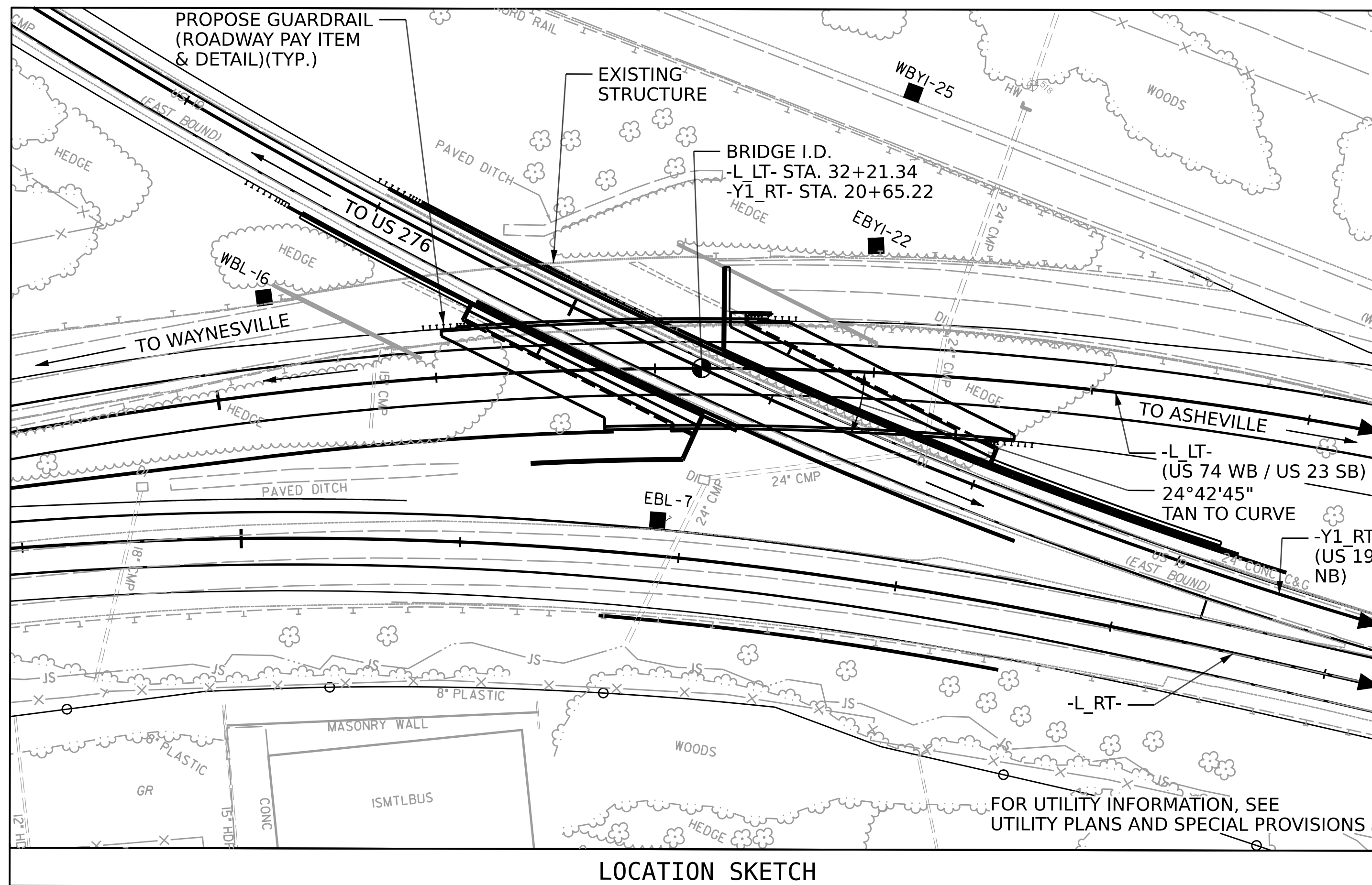
**PROFESSIONAL SEAL**  
 GREGORY R. COLS  
 ENGINEER  
 10/18/2023

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>LONG CHORD LAYOUT</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					TOTAL SHEETS
S1-04					43

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DRAWN BY :	M.L. CATER	DATE :	02/2023
CHECKED BY :	S. NATARAJAN	DATE :	02/2023
DESIGN ENGINEER OF RECORD:	G.R. COLS	DATE :	02/2023

BENCHMARK: #2: RR SPIKE IN BASE OF 48" OAK TREE, 41.39 RT OF STA. 35+67.27 -L\_LT-, ELEVATION 2615.00'



LOCATION SKETCH

**GENERAL 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 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.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- TEMPORARY SHORING WILL BE REQUIRED IN THE AREAS INDICATED IN THE PLAN VIEW.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION & RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- FOR MSE WALLS, SEE GEOTECHNICAL SPECIAL PROVISIONS.
- THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATIONS ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD FOR THE EXISTING STRUCTURE, 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 32+21.34 -L\_LT-".

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURES CONSISTING OF A 4 SPAN (51.75' - 70.67' - 36.25' - 38.50') CONCRETE DECK ON ROLLED STEEL W-SHAPE GIRDERS, WITH 28.0 FT CLEAR ROADWAY WIDTH, SUPPORTED BY PILE BENT CONCRETE END BENTS AND CONCRETE POST AND BEAM BENTS ON ISOLATED SPREAD FOOTINGS, AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGES DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS (360,000 KG) OF REINFORCING STEEL, ONE 30 INCH (760MM) SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS (360,000 KG) OF REINFORCING STEEL, TWO 30 INCH (760MM) SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLINED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 26 FT LEFT AND 29 FT RIGHT OF THE 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.

WORK SHALL NOT BE STARTED ON THIS BRIDGE (OR SPECIFIC PARTS OF BRIDGE) UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

NOTE:  
 SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND  $f_y = 60$ ksi. BAR LENGTHS IN THIS TABLE ARE A GUIDE. THE ENGINEER SHALL APPROVE FINAL LENGTHS BASED ON TYPE AND LOCATION OF SAMPLE BAR.

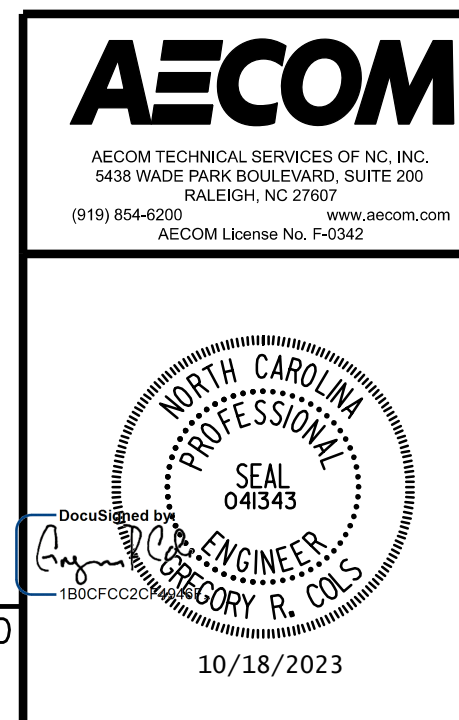
SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

TOTAL BILL OF MATERIAL								
	ASEBESTOS ASSESSMENT	REMOVAL OF EXISTING STRUCTURE AT STA. 32+21.34 -L_LT-	UNCLASSIFIED STRUCTURE EXCAVATION AT STA. 32+21.34 -L_LT-	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS
	LUMP SUM	LUMP SUM	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM
SUPERSTRUCTURE					6,733	8,114		
END BENT 1							128.6	
END BENT 2							155.6	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	4	6,733	8,114	284.2	LUMP SUM

TOTAL BILL OF MATERIAL												
	REINFORCING STEEL	54" F.I.B. PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP 14X73 STEEL PILES	STEEL PILE POINTS	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	PILE REDRIVES		
	LBS.	NO.	LIN. FT.	EACH	NO.	LIN. FT.	NO.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM	EACH
SUPERSTRUCTURE		7	846.70								334.35	
END BENT 1	15,153			19	19	1,140.0	19		48.7			
END BENT 2	18,077			23	23	1,335.0	23		116.8			
TOTAL	33,230	7	846.70	42	42	2,475.0	42	334.35	165.5	LUMP SUM	LUMP SUM	4

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L\_LT-

SHEET 5 OF 5



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-05
1			3			TOTAL SHEETS
2			4			43

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY: T. NEAL DATE: 01/2023  
 CHECKED BY: S. NATARAJAN DATE: 01/2023  
 DESIGN ENGINEER OF RECORD: G.R. COLS DATE: 01/2023

### LOAD AND RESISTANCE FACTOR RATING (LRFR) 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								
						LIVE-LOAD FACTORS (Y <sub>LL</sub> )	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)	LIVE-LOAD FACTORS (Y <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.22	--	1.75	0.460	1.97	A	I	59.2	0.790	1.81	A	ER	12.8	0.80	0.460	1.22	A	I	59.2		
	HL-93 (OPERATING)	N/A		2.38	--	1.35	0.460	2.55	A	I	59.2	0.790	2.38	A	ER	12.8	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	2	1.77	63.72	1.75	0.460	2.87	A	I	59.2	0.790	2.51	A	ER	38.5	0.80	0.460	1.77	A	I	59.2		
	HS-20 (OPERATING)	36.000		3.32	119.52	1.35	0.460	3.72	A	I	59.2	0.790	3.32	A	ER	38.5	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.29	57.92	1.40	0.460	8.68	A	I	59.2	0.790	8.16	A	ER	38.5	0.80	0.460	4.29	A	I	59.2	
		SNGARBS2	20.000		3.06	61.20	1.40	0.460	6.21	A	I	59.2	0.790	5.65	A	ER	38.5	0.80	0.460	3.06	A	I	59.2	
		SNAGRIS2	22.000		2.85	62.70	1.40	0.460	5.78	A	I	59.2	0.790	5.20	A	ER	38.5	0.80	0.460	2.85	A	I	59.2	
		SNCOTTS3	27.250		2.13	58.04	1.40	0.460	4.31	A	I	59.2	0.790	3.96	A	ER	38.5	0.80	0.460	2.13	A	I	59.2	
		SNAGGRS4	34.925		1.73	60.42	1.40	0.460	3.50	A	I	59.2	0.790	3.19	A	ER	38.5	0.80	0.460	1.73	A	I	59.2	
		SNS5A	35.550		1.69	60.08	1.40	0.460	3.43	A	I	59.2	0.790	3.20	A	ER	38.5	0.80	0.460	1.69	A	I	59.2	
		SNS6A	39.950		1.53	61.12	1.40	0.460	3.11	A	I	59.2	0.790	2.88	A	ER	38.5	0.80	0.460	1.53	A	I	59.2	
		SNS7B	42.000		1.46	61.32	1.40	0.460	2.96	A	I	59.2	0.790	2.80	A	ER	38.5	0.80	0.460	1.46	A	I	59.2	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.87	61.71	1.40	0.460	3.78	A	I	59.2	0.790	3.48	A	ER	38.5	0.80	0.460	1.87	A	I	59.2	
		TNT4A	33.075		1.87	61.85	1.40	0.460	3.78	A	I	59.2	0.790	3.42	A	ER	38.5	0.80	0.460	1.87	A	I	59.2	
		TNT6A	41.600		1.51	62.82	1.40	0.460	3.06	A	I	59.2	0.790	2.94	A	ER	38.5	0.80	0.460	1.51	A	I	59.2	
		TNT7A	42.000		1.51	63.42	1.40	0.460	3.05	A	I	59.2	0.790	2.88	A	ER	38.5	0.80	0.460	1.51	A	I	59.2	
		TNT7B	42.000		1.54	64.68	1.40	0.460	3.11	A	I	59.2	0.790	2.75	A	ER	38.5	0.80	0.460	1.54	A	I	59.2	
		TNAGRIT4	43.000		1.48	63.64	1.40	0.460	2.99	A	I	59.2	0.790	2.66	A	ER	38.5	0.80	0.460	1.48	A	I	59.2	
EMERGENCY VEHICLE (EV)	EV2	28.750		2.15	61.81	1.30	0.460	4.69	A	I	59.2	0.790	4.21	A	ER	38.5	0.80	0.460	2.15	A	I	59.2		
EV3	43.000	4	1.42	61.06	1.30	0.460	3.10	A	I	59.2	0.790	2.76	A	ER	38.5	0.80	0.460	1.42	A	I	59.2			

**LOAD FACTORS:**

DESIGN LOAD RATING FACTORS	LIMIT STATE	Y <sub>DC</sub>	Y <sub>DW</sub>
	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:**  
 A 2D GRILLAGE MODEL WAS DEVELOPED USING 3D FEM SOFTWARE (MIDAS 2021) AND THE DISTRIBUTION FACTORS WERE COMPUTED.

# CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING \*\*

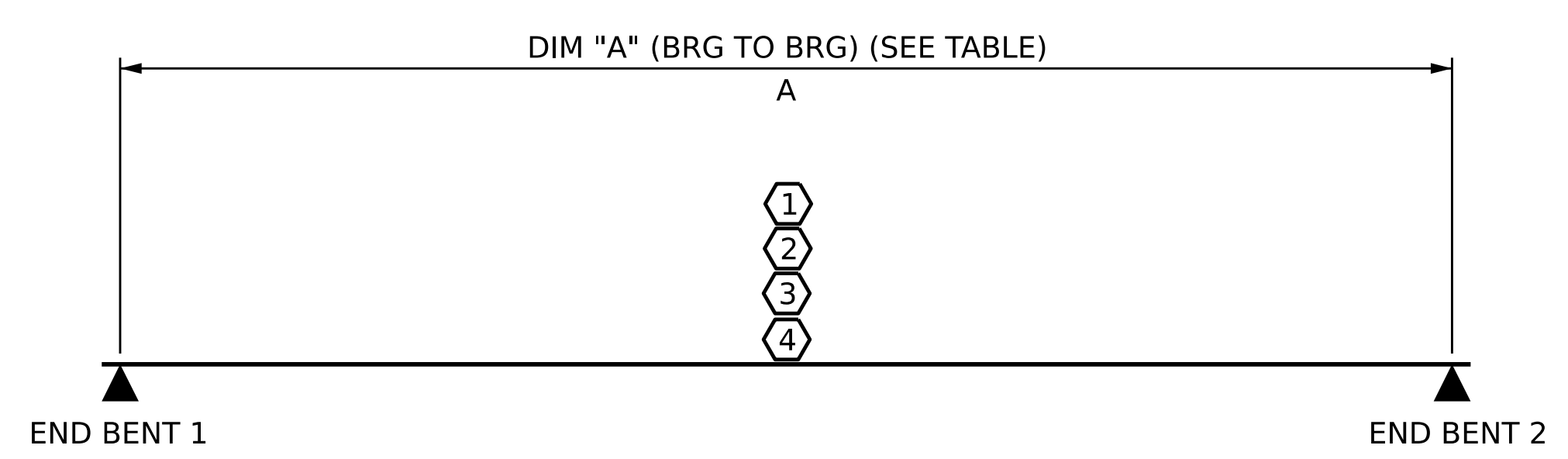
4 EMERGENCY VEHICLE LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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GIRDER LOCATION

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



**LRFR SUMMARY**

DIM "A"	
GIRDER 1	113' - 2 <sup>5</sup> / <sub>16</sub> "
GIRDER 2	114' - 9 <sup>5</sup> / <sub>8</sub> "
GIRDER 3	116' - 11 <sup>5</sup> / <sub>8</sub> "
GIRDER 4	119' - 2 <sup>3</sup> / <sub>16</sub> "
GIRDER 5	121' - 6 <sup>3</sup> / <sub>4</sub> "
GIRDER 6	124' - 1 <sup>3</sup> / <sub>4</sub> "
GIRDER 7	126' - 11 <sup>3</sup> / <sub>16</sub> "

**AECOM**

AECOM TECHNICAL SERVICES OF NC, INC.  
 5430 WADE PARK BOULEVARD, SUITE 200  
 RALEIGH, NC 27607  
 (919) 854-6200 www.aecom.com  
 AECOM License No. P0242

10/18/2023

**PROJECT NO. B-3186 / B-5898**  
**HAYWOOD COUNTY**  
**STATION: 32+21.34 -L- LT-**

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

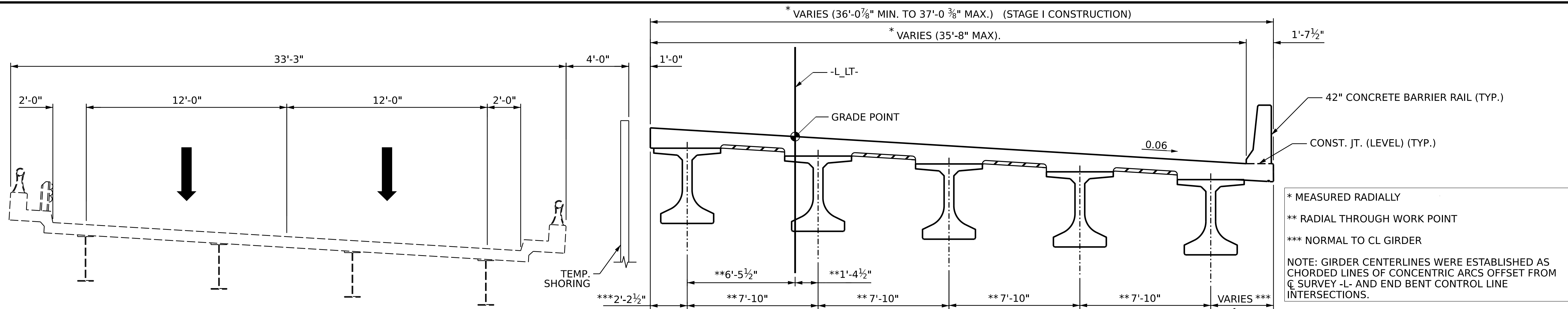
**STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS**  
 (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S1-06
2			4			43

ASSEMBLED BY : M.L. CATER	DATE : 05/23
CHECKED BY : S. NATARAJAN	DATE : 05/23
DRAWN BY : WJH 8/89	REV. 1/15 MAA/TMG
CHECKED BY : CRK 8/89	REV. 12/17 MAA/THC
	REV. 10/21 BNB/AAI

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

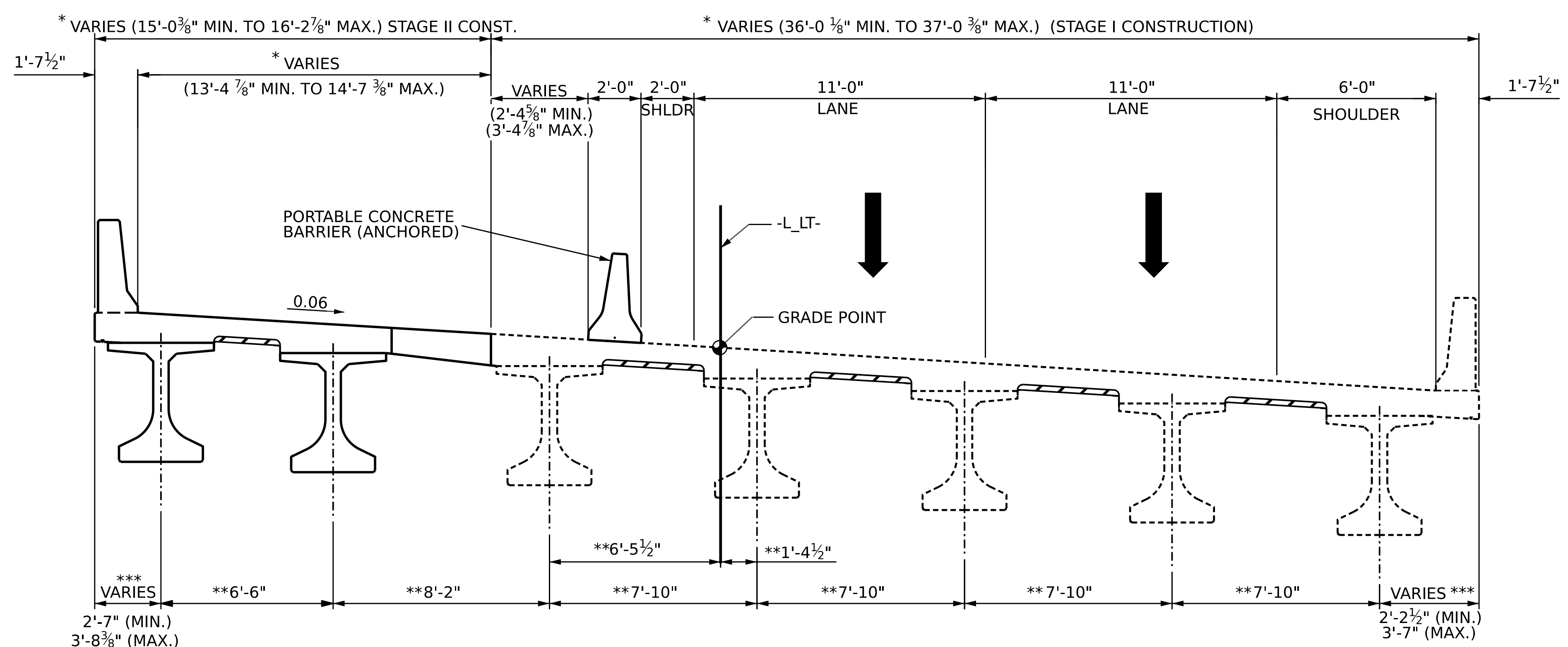




**EXISTING CONDITION**  
PHASE I TRAFFIC

**STAGE I CONSTRUCTION**  
MAINTAIN TRAFFIC ON EXISTING BRIDGE.  
CONSTRUCT PHASE I OF NEW BRIDGE.  
CORRESPONDS TO PHASE II OF TMP PLANS.

\* MEASURED RADIALLY  
\*\* RADIAL THROUGH WORK POINT  
\*\*\* NORMAL TO CL GIRDER  
NOTE: GIRDER CENTERLINES WERE ESTABLISHED AS CHORDED LINES OF CONCENTRIC ARCS OFFSET FROM Q SURVEY -L- AND END BENT CONTROL LINE INTERSECTIONS.



**STAGE II CONSTRUCTION**  
SHIFT TRAFFIC TO NEW BRIDGE.  
REMOVE EXISTING BRIDGE, CONSTRUCT PHASE 2 OF NEW BRIDGE.  
CORRESPONDS TO PHASE III OF TMP PLANS.

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
STATION: 32+21.34 -L\_ LT-  
SHEET 1 OF 2

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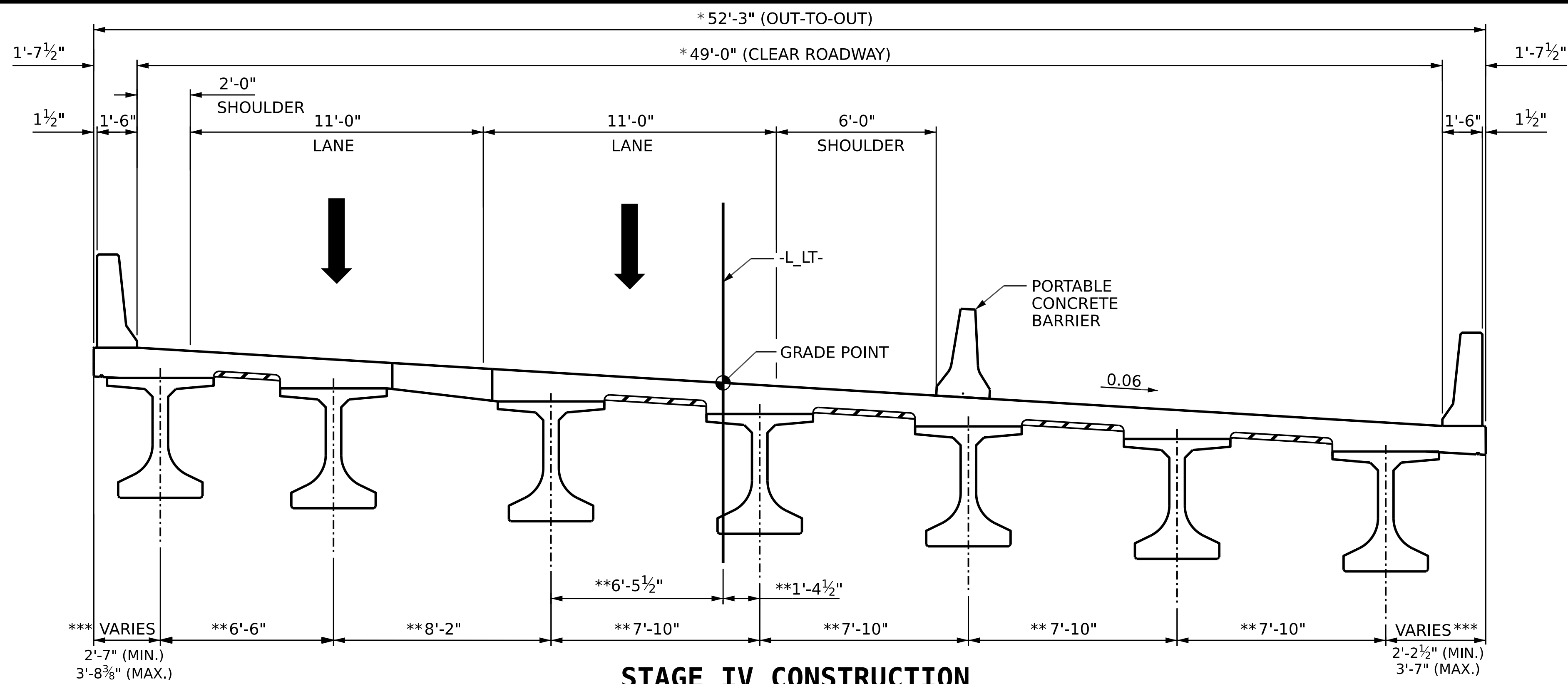
STATE OF NORTH CAROLINA  
PROFESSIONAL ENGINEER  
SEAL  
041343  
GREGORY R. COLS

10/18/2023

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>GENERAL DRAWING</b>					
CONSTRUCTION SEQUENCE					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 43

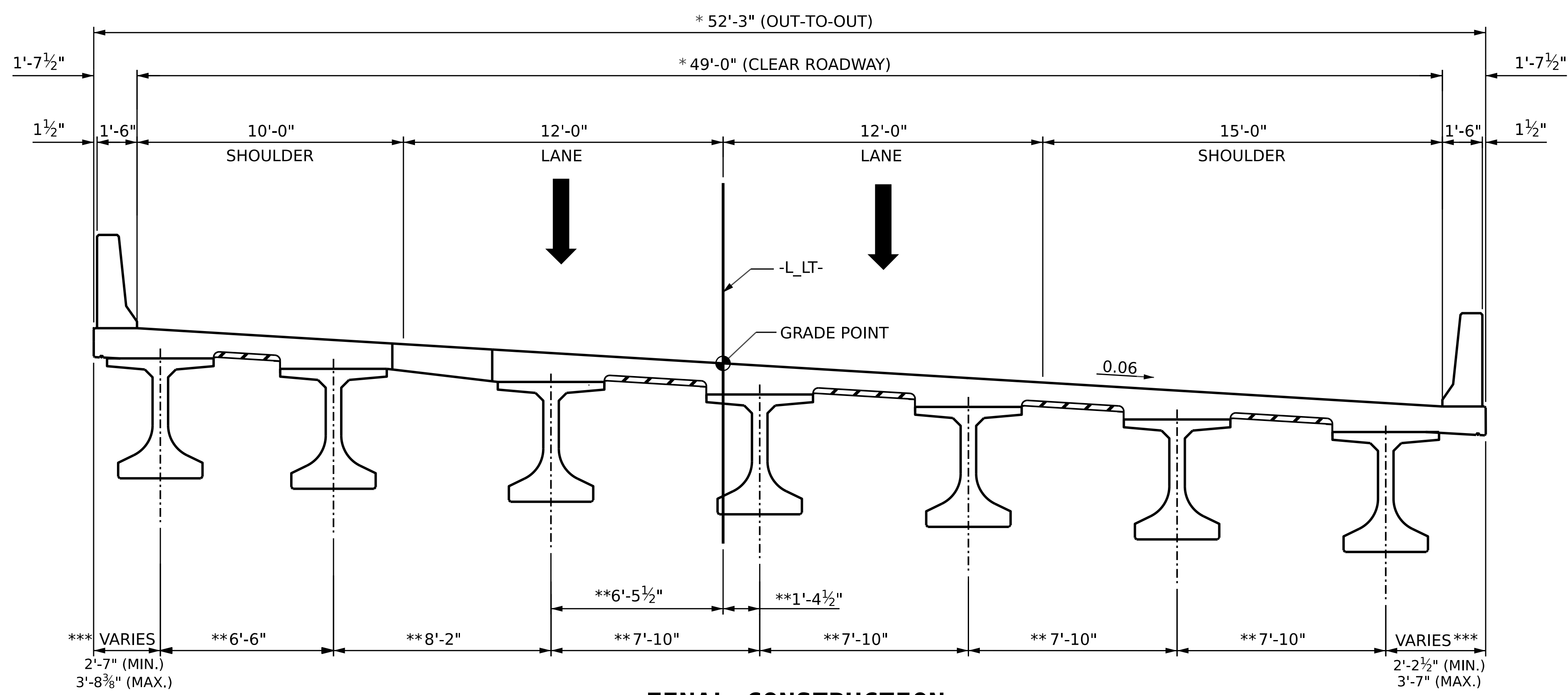
DRAWN BY :	T. E. NEAL	DATE :	01/2023
CHECKED BY :	S. NATARAJAN	DATE :	01/2023
DESIGN ENGINEER OF RECORD:	G.R. COLS	DATE :	01/2023

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED



**STAGE IV CONSTRUCTION**  
 RESET PORTABLE CONCRETE BARRIER  
 SHIFT TRAFFIC TO TEMPORARY CONFIGURATION.  
 CORRESPONDS TO PHASE IV OF TMP PLANS.  
 NOTE: NO BRIDGE CONSTRUCTION OCCURS IN THIS STAGE.

\* MEASURED RADIALLY  
 \*\* RADIAL THROUGH WORK POINT  
 NOTE: GIRDER CENTERLINES WERE ESTABLISHED AS CHORDED LINES OF CONCENTRIC ARCS OFFSET FROM Q SURVEY -L- AND END BENT CONTROL LINE INTERSECTIONS.



**FINAL CONSTRUCTION**  
 REMOVE PORTABLE CONCRETE BARRIER  
 SHIFT TRAFFIC TO FINAL LANE CONFIGURATION

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L\_LT-  
 SHEET 2 OF 2

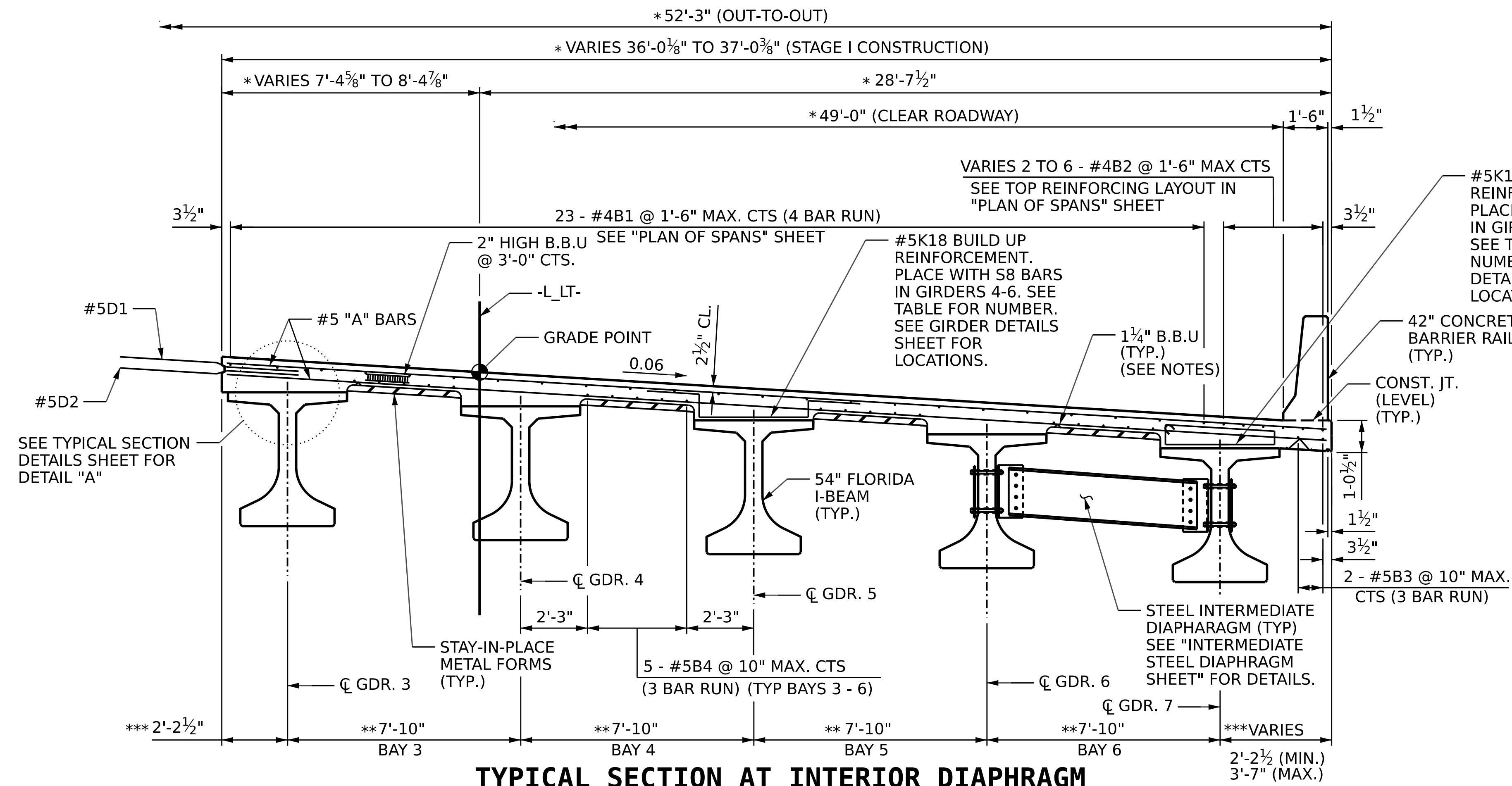
**AECOM**  
AECOM TECHNICAL SERVICES OF NC, INC.  
 5438 WADE PARK BOULEVARD, SUITE 200  
 RALEIGH, NC 27607  
 (919) 854-6200 www.aecom.com  
 AECOM License No. F0242

**PROFESSIONAL SEAL**  
 GREGORY R. COLS  
 ENGINEER  
 041343  
 10/18/2023

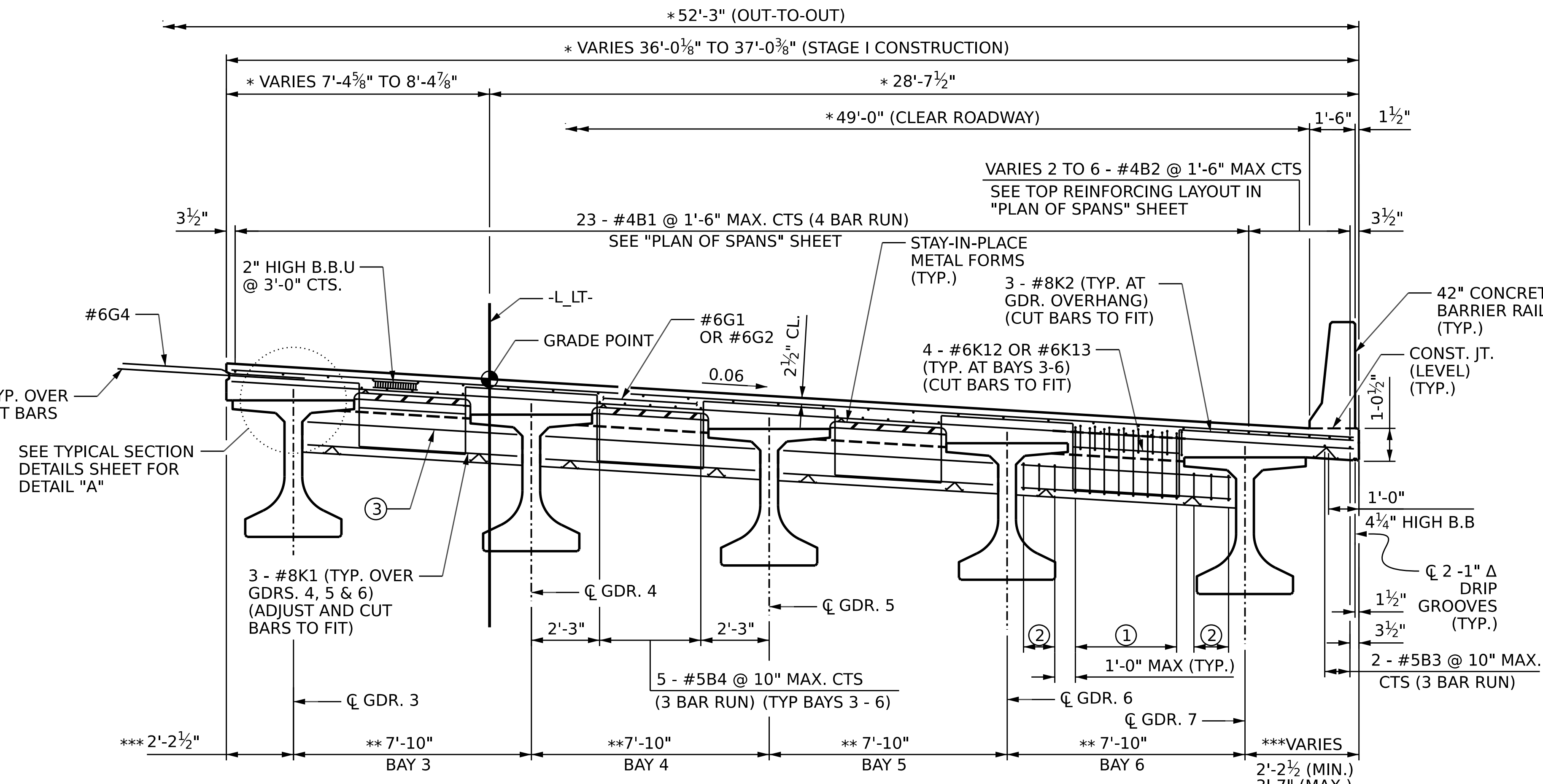
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>GENERAL DRAWING</b> CONSTRUCTION SEQUENCE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-08 TOTAL SHEETS 43

DRAWN BY : T. NEAL DATE : 02/2023  
 CHECKED BY : S. NATARAJAN DATE : 02/2023  
 DESIGN ENGINEER OF RECORD : G. COLS DATE : 02/2023

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED



**TYPICAL SECTION AT INTERIOR DIAPHRAGM**



**TYPICAL SECTION AT END DIAPHRAGM**

END BENT 1 SHOWN, END BENT 2 SIMILAR

**NOTES**

PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY IN PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.

SEE CONSTRUCTION SEQUENCE SHEETS FOR LOCATION OF TEMPORARY PORTABLE CONCRETE BARRIER.

SEE "FRAMING PLAN" SHEET FOR LOCATIONS OF STEEL INTERMEDIATE DIAPHRAGMS.

- \* MEASURED RADIALLY FROM -L\_LT-
- \*\* MEASURED RADIAL THROUGH WORK POINT
- \*\*\* MEASURED NORMAL TO C GIRDERS

- ① 8 - #5S1 & 8 - #4S3 @ END BENT 1 (TYP. BAYS 3-6) & 11 - #5S1 & 11 - #4S3 @ END BENT 2 (TYP. BAYS 3-6) AT 1'-0" MAX. CTS
- ② 3 - #5S2 @ END BENTS 1 & 2 (TYP. BAYS 3-6) AT 1'-0" MAX. CTS
- ③ 2 - #4K4 @ END BENT 1  
2 - #4K5 @ END BENT 2 (TYP. AT BAYS 3 - 6) (CUT BARS TO FIT)

GIRDER	TOTAL NO OF #5K18 OR #5K19 BARS
3	105
4	107
5	109
6	113
7	115

**BUILD UP REINFORCEMENT TABLE**

THE CONTRACTOR IS ALLOWED TO PLACE BUILD-UP BAR DIAGONALLY IF NEEDED TO CLEAR THE REINFORCEMENT AT TOP OF BRIDGE DECK

PROJECT NO. B-3186 / B-5898

HAYWOOD COUNTY

STATION: 32+21.34 -L\_LT-

SHEET 1 OF 3

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-09
1			3			TOTAL SHEETS
2			4			43

DRAWN BY : A. K. VASUDEVAN DATE : 01/2023  
 CHECKED BY : S. NATARAJAN DATE : 01/2023  
 DESIGN ENGINEER OF RECORD: G.R. COLS DATE : 01/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**NOTES**

PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY IN PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.

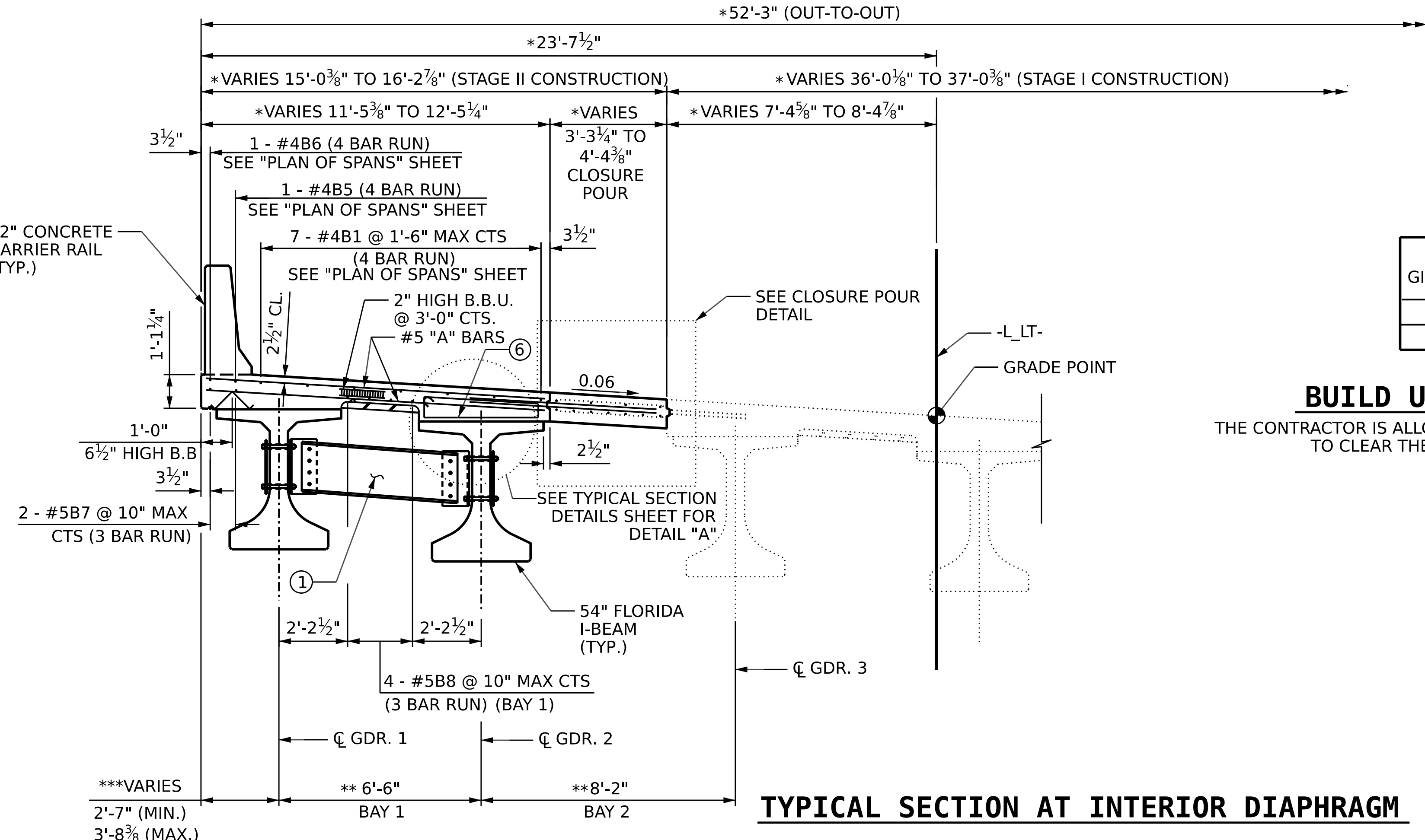
SEE CONSTRUCTION SEQUENCE SHEETS FOR LOCATION OF TEMPORARY PORTABLE CONCRETE BARRIER (ANCHORED)

SEE "FRAMING PLAN" SHEET FOR LOCATIONS OF STEEL INTERMEDIATE DIAPHRAGMS.

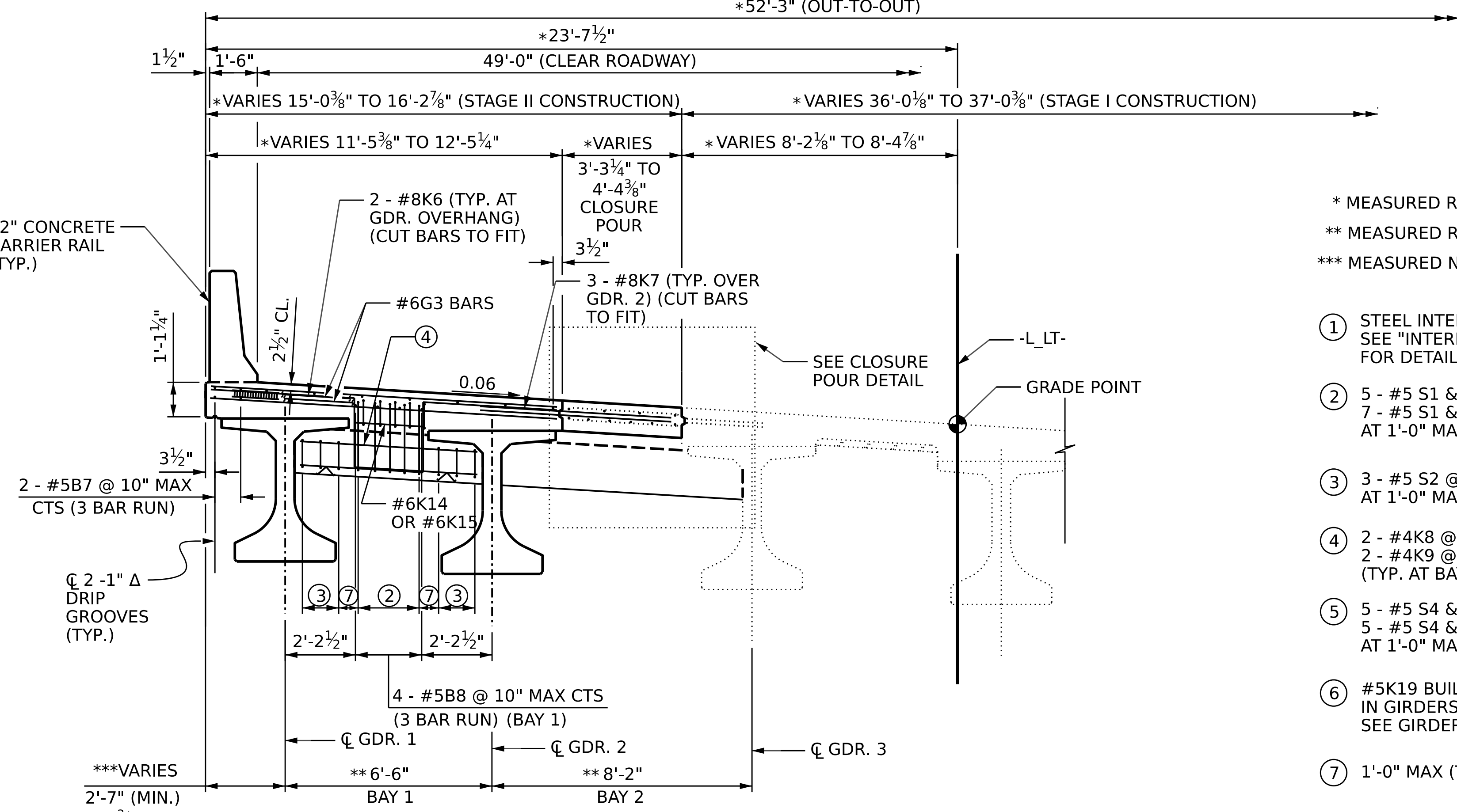
GIRDER	TOTAL NO OF #5K19 BARS
1	101
2	103

**BUILD UP REINFORCEMENT TABLE**

THE CONTRACTOR IS ALLOWED TO PLACE BUILD-UP BAR DIAGONALLY IF NEEDED TO CLEAR THE REINFORCEMENT AT TOP OF BRIDGE DECK

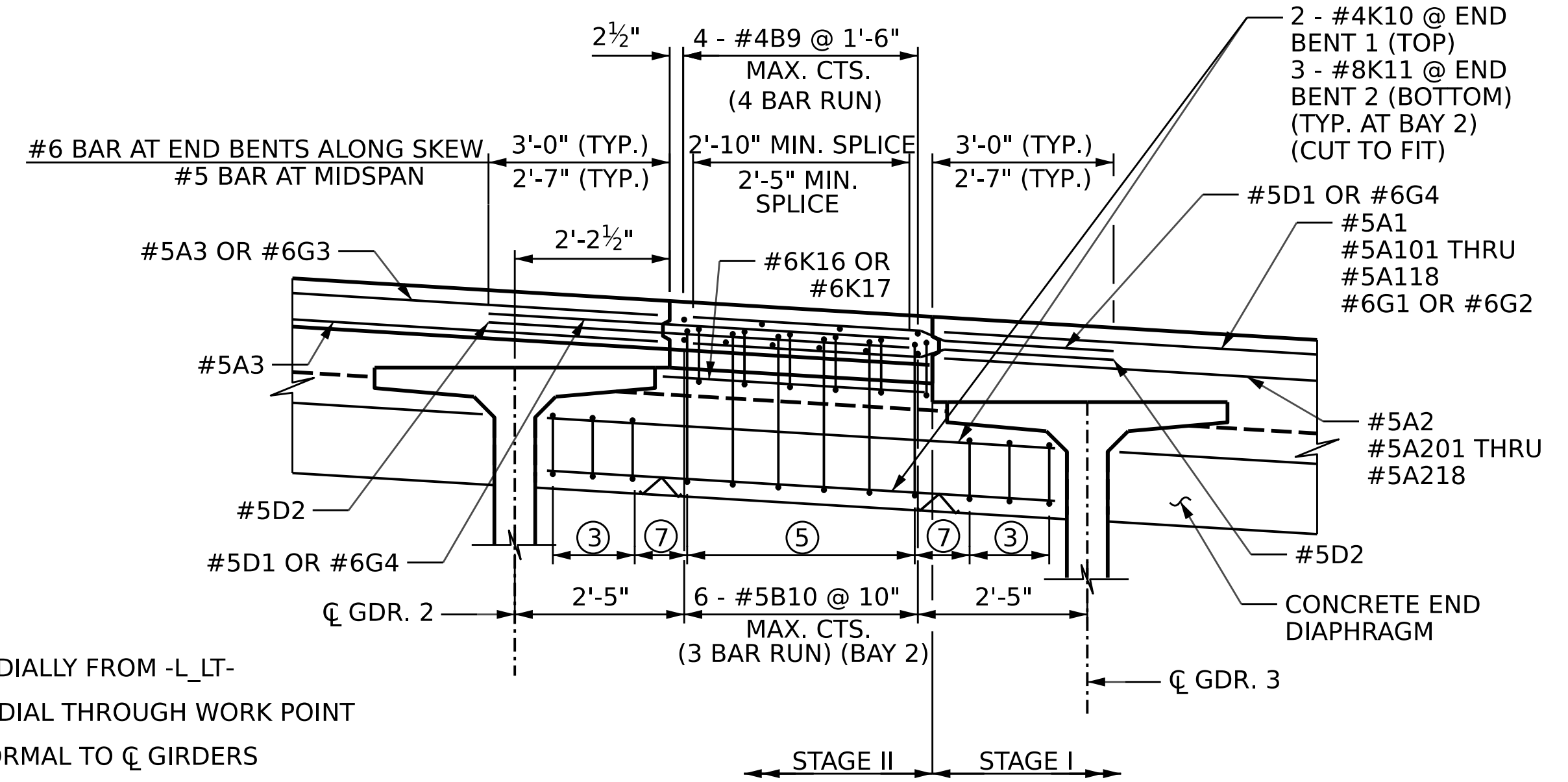


**TYPICAL SECTION AT INTERIOR DIAPHRAGM**



**TYPICAL SECTION AT END DIAPHRAGM**

END BENT 1 SHOWN, END BENT 2 SIMILAR



**CLOSURE POUR DETAIL**

DECK CLOSURE POUR DETAIL AT END BENTS

- \* MEASURED RADIALLY FROM -L\_LT-
- \*\* MEASURED RADIAL THROUGH WORK POINT
- \*\*\* MEASURED NORMAL TO C GIRDERS

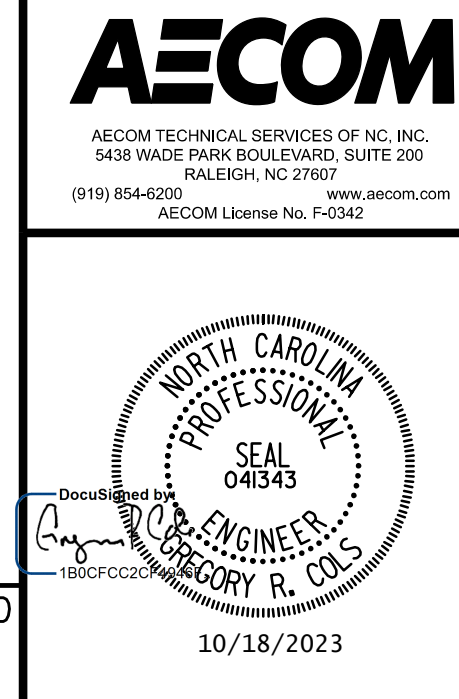
- ① STEEL INTERMEDIATE DIAPHRAGM SEE "INTERMEDIATE STEEL DIAPHRAGM SHEET" FOR DETAILS.
- ② 5 - #5 S1 & S3 @ END BENT 1 (BAY 1) & 7 - #5 S1 & S3 @ END BENT 2 (BAY 1) AT 1'-0" MAX. CTS
- ③ 3 - #5 S2 @ END BENTS 1 & 2 (TYP. BAYS 1 & 2) AT 1'-0" MAX. CTS
- ④ 2 - #4K8 @ END BENT 1  
2 - #4K9 @ END BENT 2 (TYP. AT BAY 1)
- ⑤ 5 - #5 S4 & S5 @ END BENT 1 (CLOSURE POUR) & 5 - #5 S4 & S5 @ END BENT 2 (CLOSURE POUR) AT 1'-0" MAX. CTS
- ⑥ #5K19 BUILD UP REINFORCEMENT. PLACE WITH S8 BARS IN GIRDERS. TYPICAL AT GIRDERS 1 & 2. SEE TABLE FOR NUMBER. SEE GIRDER DETAILS SHEET FOR LOCATIONS.
- ⑦ 1'-0" MAX (TYP.)

PROJECT NO. **B-3186 / B-5898**

**HAYWOOD** COUNTY

STATION: **32+21.34 -L\_LT-**

SHEET 2 OF 3



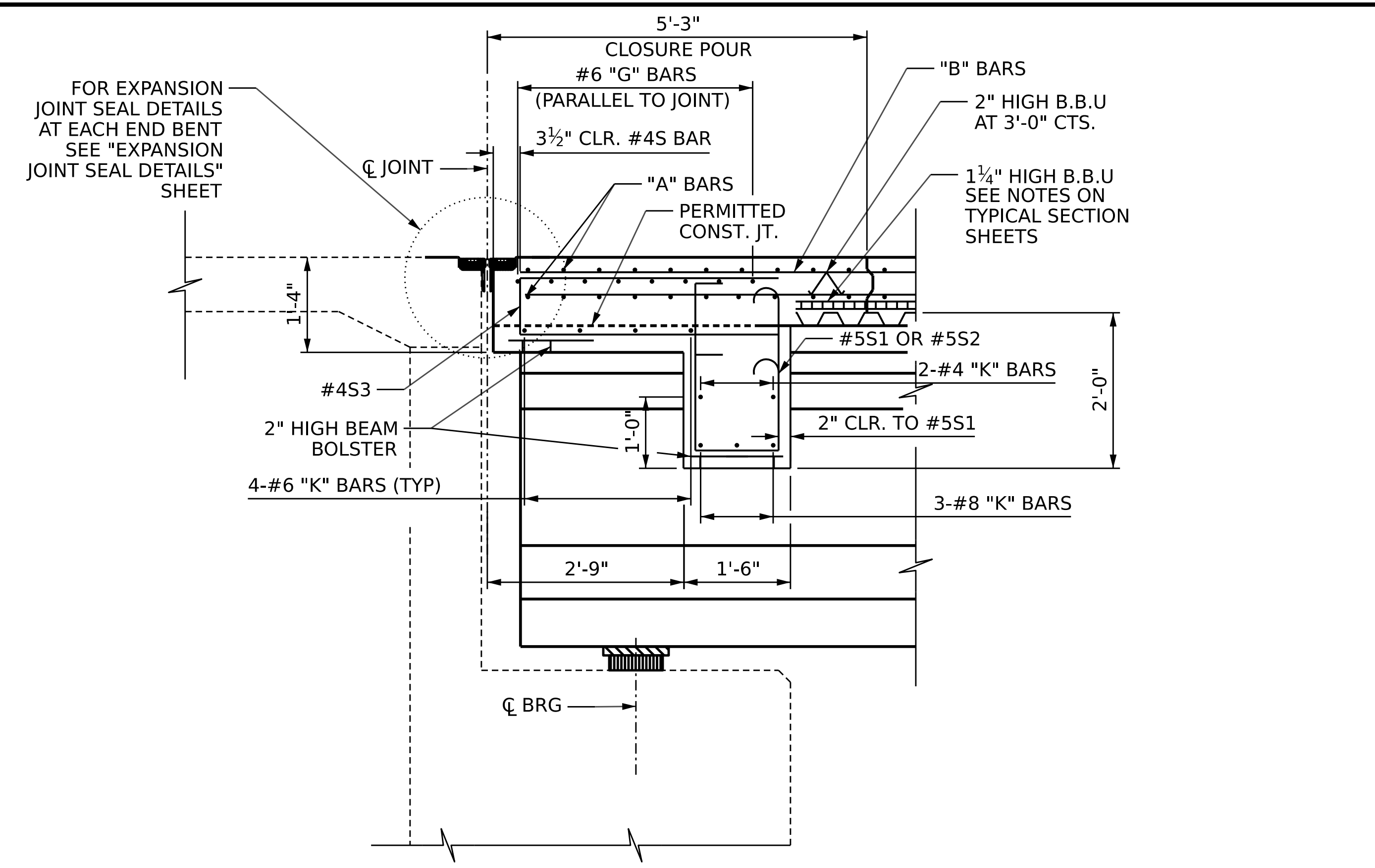
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
**TYPICAL SECTIONS**  
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			43

DRAWN BY: A.K. VASUDEVAN DATE: 01/2023  
 CHECKED BY: S. NATARAJAN DATE: 01/2023  
 DESIGN ENGINEER OF RECORD: G.R. COLS DATE: 01/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

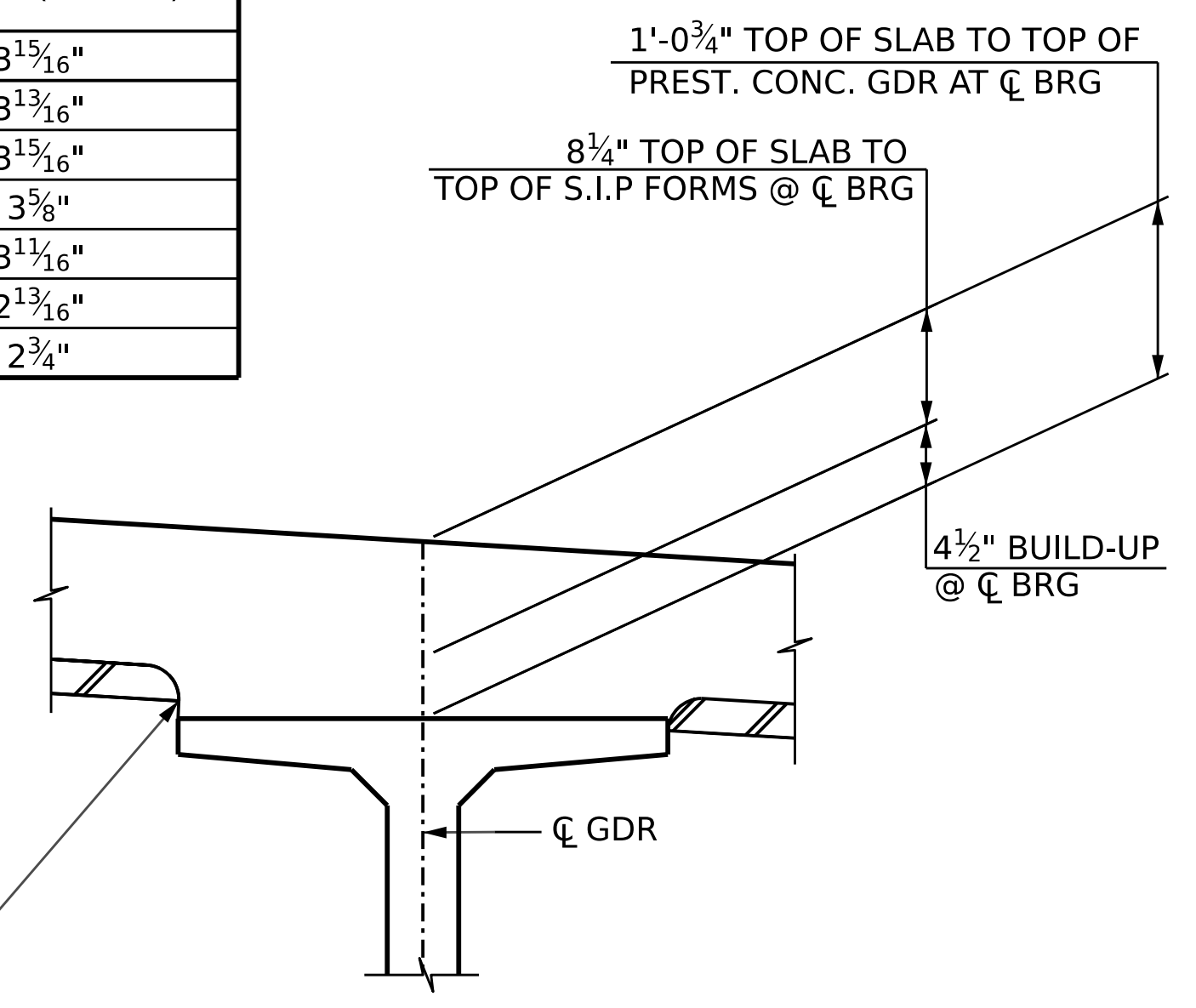
**NOTES**  
 USE THE CONSTRUCTION ELEVATIONS IN CONJUNCTION WITH THIS SHEET TO SET OUTSIDE EDGES OF THE BRIDGE DECK



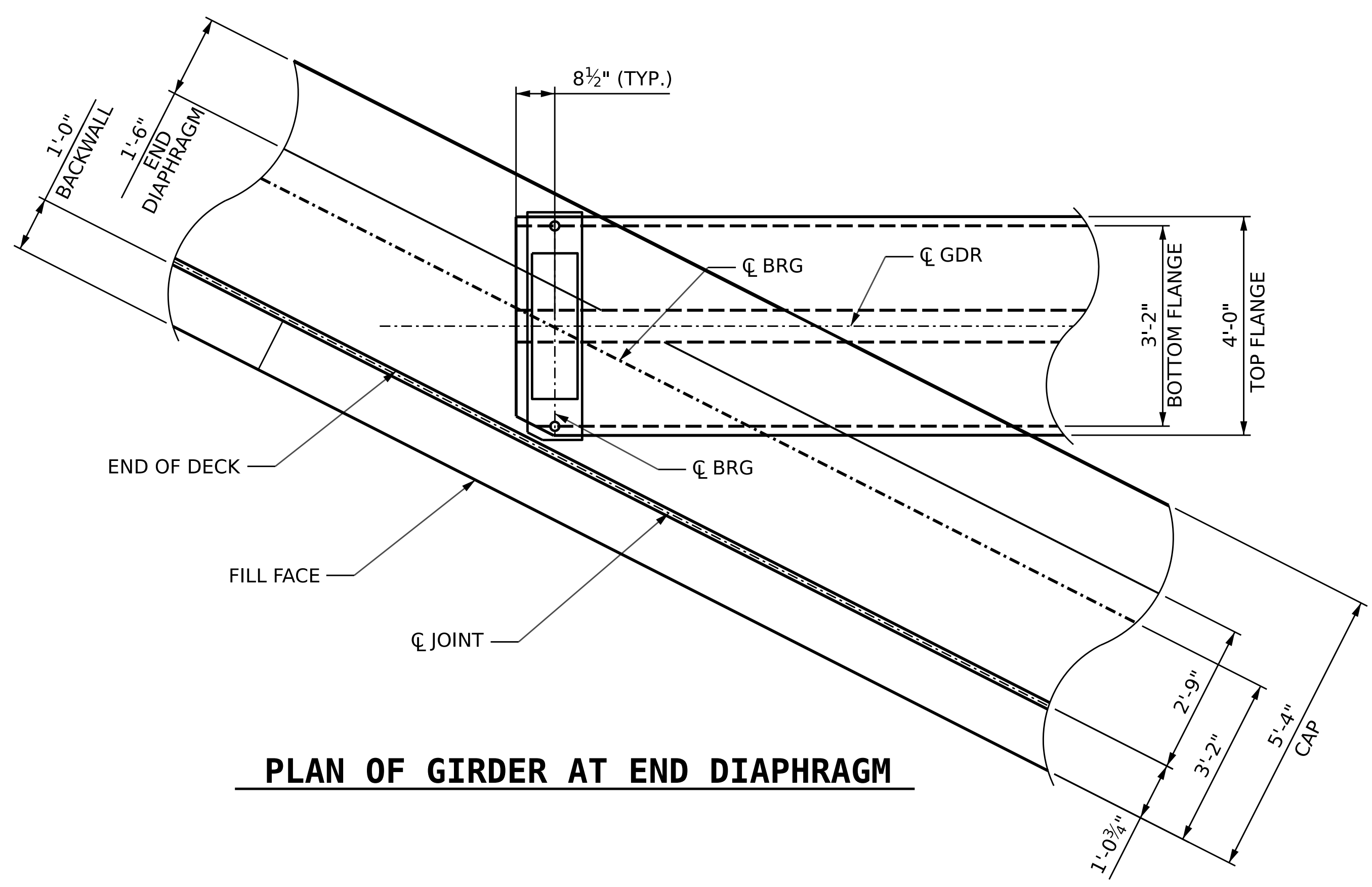
**SECTION THRU END BENT DIAPHRAGMS**

GIRDER	MAX. MIDSPAN BUILD-UP (INCHES)*
1	3 <sup>15</sup> / <sub>16</sub> "
2	3 <sup>13</sup> / <sub>16</sub> "
3	3 <sup>15</sup> / <sub>16</sub> "
4	3 <sup>5</sup> / <sub>8</sub> "
5	3 <sup>11</sup> / <sub>16</sub> "
6	2 <sup>13</sup> / <sub>16</sub> "
7	2 <sup>3</sup> / <sub>4</sub> "

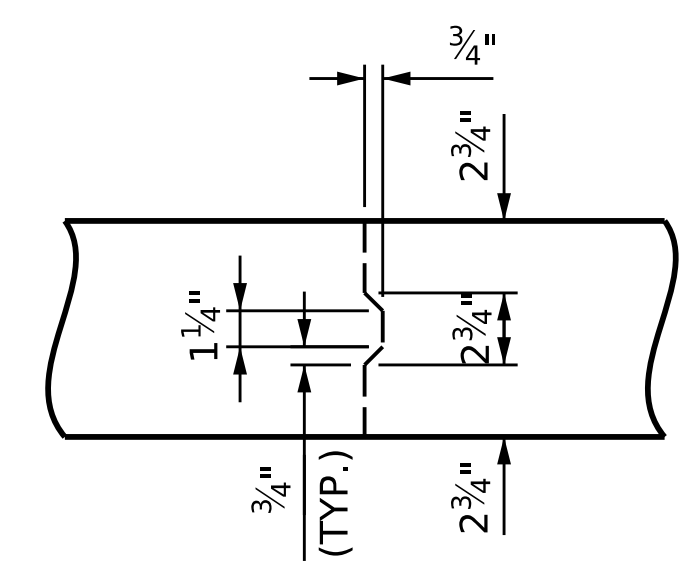
\* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS



**DETAIL "A"**



**PLAN OF GIRDER AT END DIAPHRAGM**



**TRANSVERSE CONSTRUCTION JOINT IN SLAB**

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-  
 SHEET 3 OF 3

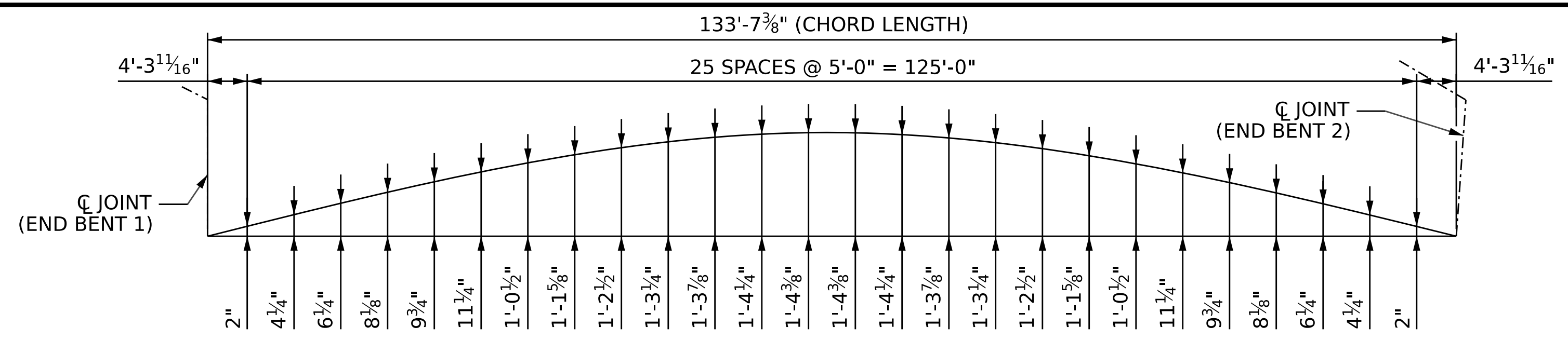
**AECOM**  
AECOM TECHNICAL SERVICES OF NC, INC.  
 5430 WADE PARK BOULEVARD, SUITE 200  
 RALEIGH, NC 27607  
 (919) 854-6200 www.aecom.com  
 AECOM License No. F0242

**PROFESSIONAL SEAL**  
 GREGORY R. COLS  
 ENGINEER  
 041343  
 10/18/2023

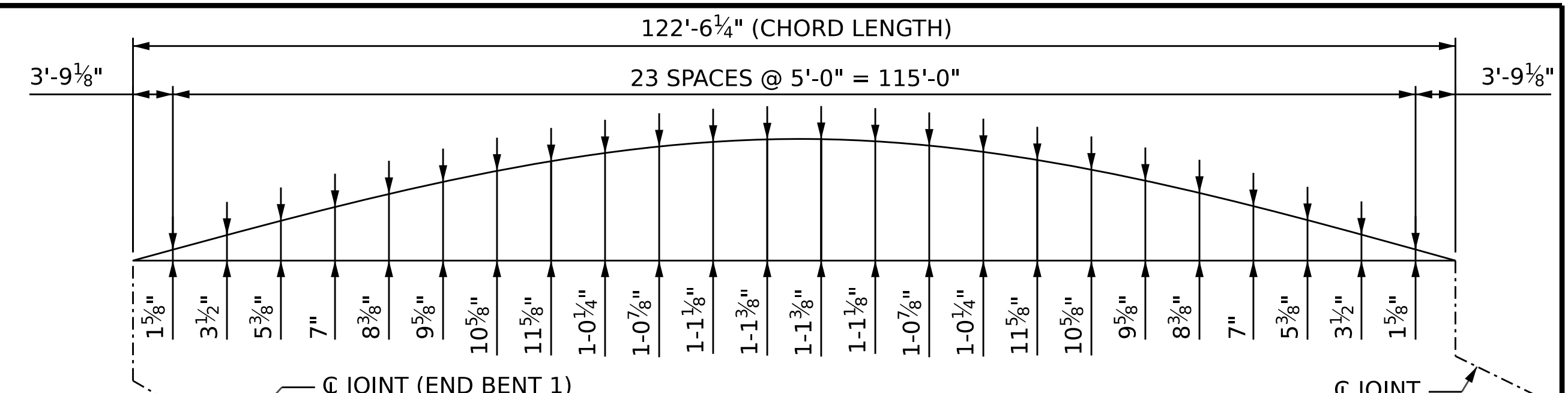
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
TYPICAL SECTION DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S1-11
TOTAL SHEETS					43

DRAWN BY : M.L. CATER DATE : 01/2023  
 CHECKED BY : S. NATARAJAN DATE : 01/2023  
 DESIGN ENGINEER OF RECORD: G.R. COLS DATE : 01/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

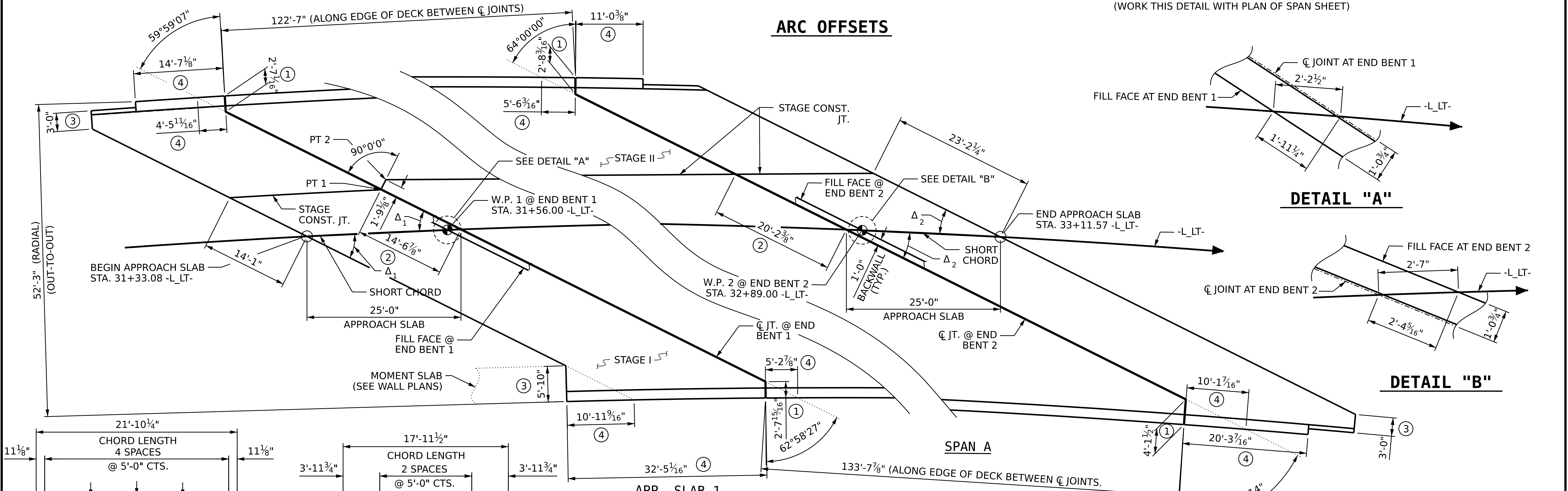


**RIGHT EDGE OF DECK - STAGE I CONSTRUCTION**  
(WORK THIS DETAIL WITH PLAN OF SPAN SHEET)



**LEFT EDGE OF DECK - STAGE II CONSTRUCTION**  
(WORK THIS DETAIL WITH PLAN OF SPAN SHEET)

**ARC OFFSETS**



**DETAIL "A"**

**DETAIL "B"**

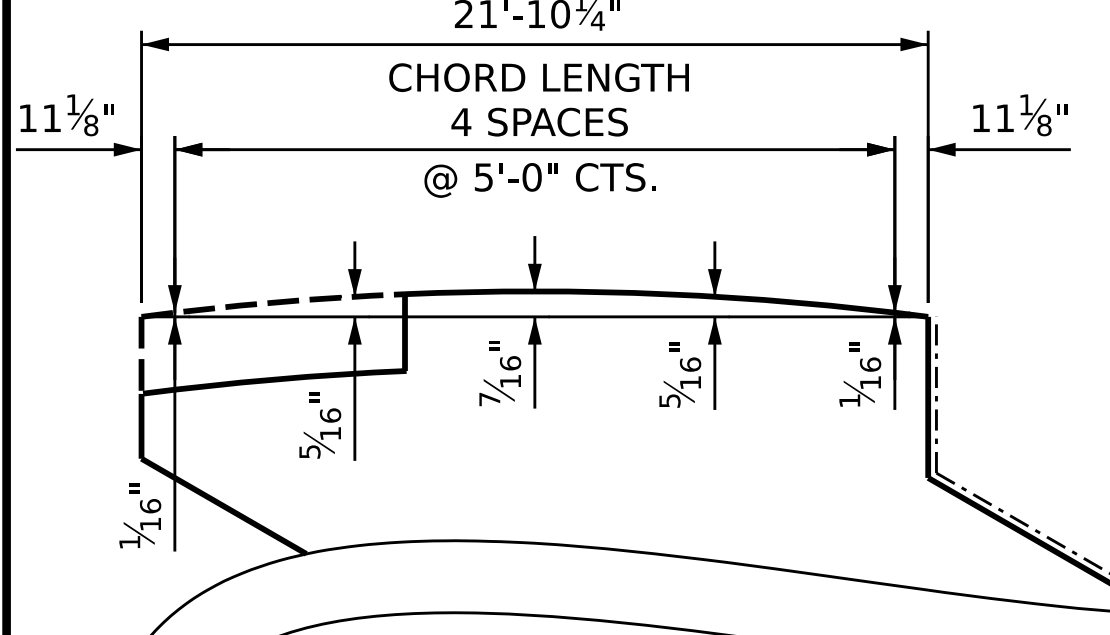
**END BENT 1**  
 $\Delta_1 = 29^\circ 10' 00''$  (END BENT 1)  
(TO APP. SLAB SHORT CORD)

**END BENT 2**  
 $\Delta_2 = 23^\circ 52' 08''$  (END BENT 2)  
(TO APP. SLAB SHORT CORD)

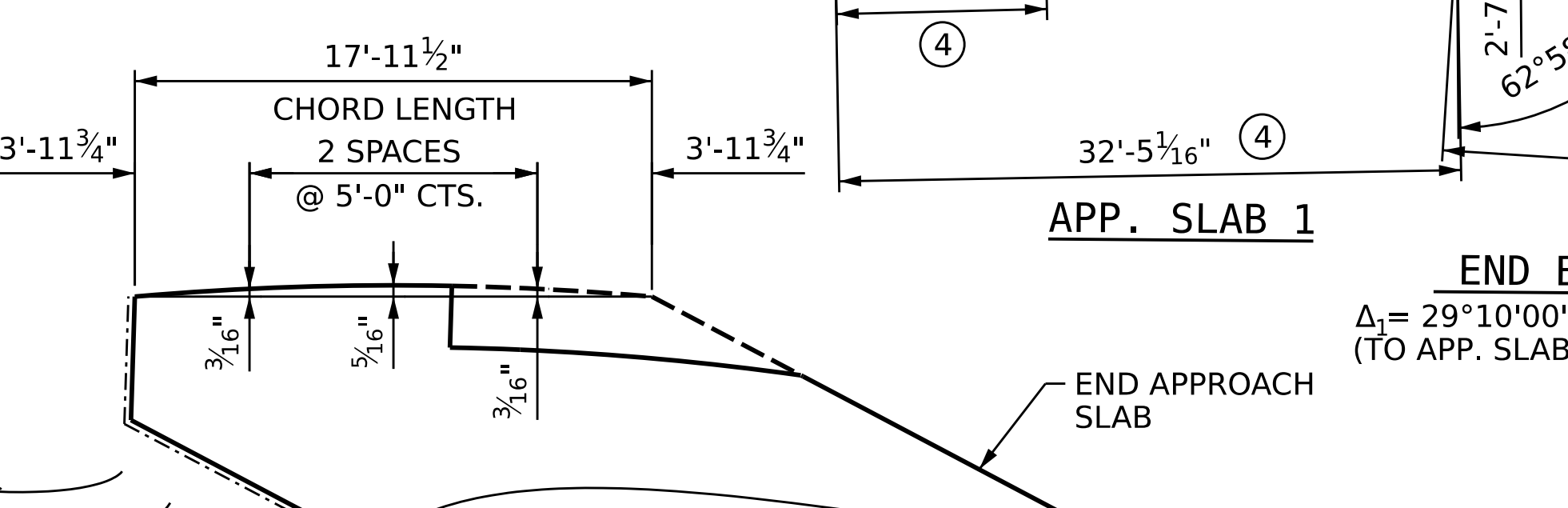
**PLAN**

POINT	STA.	OFF.	DESCRIPTION
PT 1	31+45.51	7.11' (RT)	END OF BREAKBACK AT CL OF JOINT
PT 2	31+46.34	8.59' (RT)	EDGE OF DECK AT START OF BREAKBACK

PROJECT NO. **B-3186 / B-5898**  
**HAYWOOD** COUNTY  
STATION: **32+21.34 -L LT-**

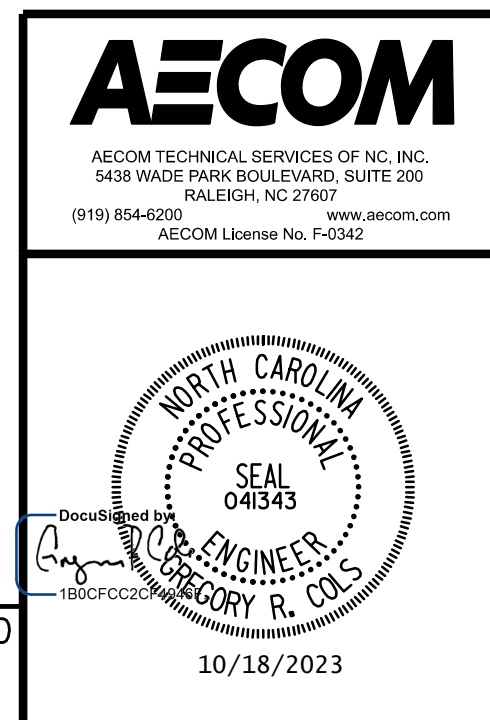


**ARC OFFSETS AT APPROACH 1**  
(NOT DRAWN TO SCALE)



**ARC OFFSETS AT APPROACH 2**  
(NOT DRAWN TO SCALE)

- ① MEASURED NORMAL TO EDGE OF DECK ALONG  $\text{C}\text{L}$  JOINT. ALL BREAKBACKS ARE 90 DEGREES TO EDGE OF DECK
  - ② MEASURED ALONG  $\text{C}\text{L}$  JOINT
  - ③ MEASURED NORMAL TO EDGE OF APPROACH SLAB. BREAKBACK IS AT 90 DEGREES
  - ④ MEASURED ALONG EDGE OF DECK/APPROACH SLAB TO/FROM  $\text{C}\text{L}$  JOINT WHERE APPLICABLE
- WORK THIS SHEET WITH THE PLAN OF SPANS, TYPICAL SECTION AND APPROACH SLAB SHEETS
- BEGIN AND END APPROACH SLABS AND FILL FACES ARE ALL PARALLEL



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

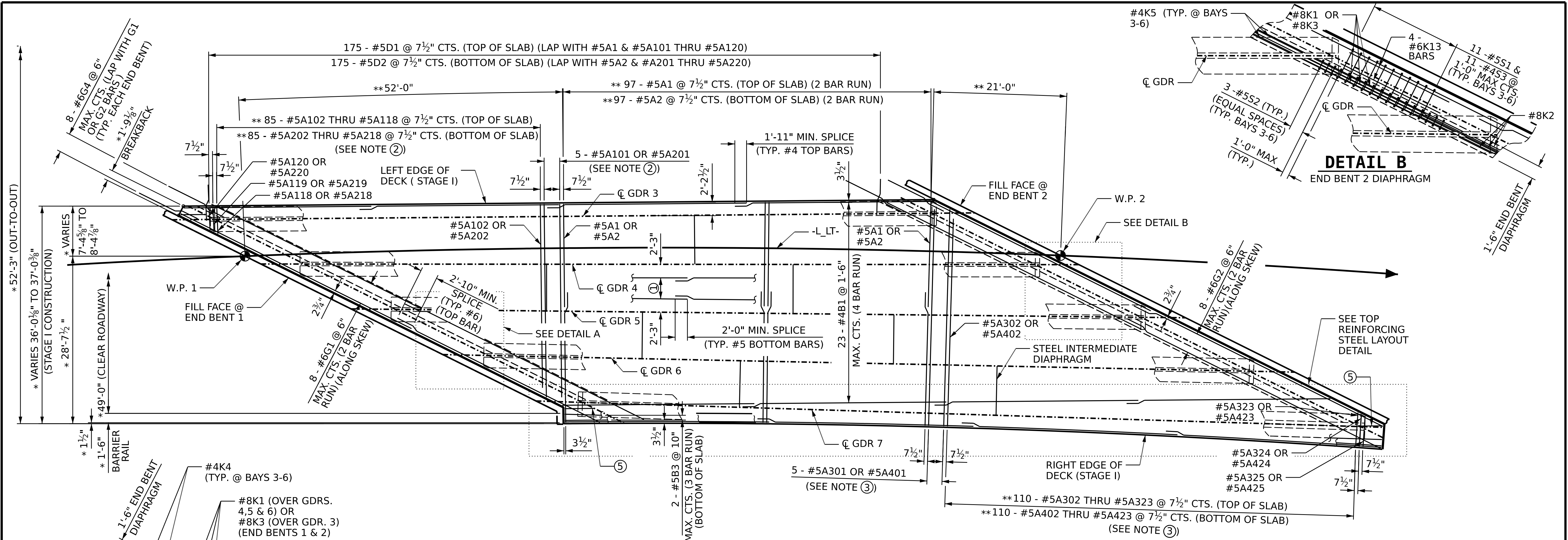
**SUPERSTRUCTURE**

**GEOMETRY CONTROL**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-12
1			3			TOTAL SHEETS
2			4			43

DRAWN BY: M. L. CATER DATE: 07/2023  
CHECKED BY: S. NATARAJAN DATE: 03/2023  
DESIGN ENGINEER OF RECORD: G. COLS DATE: 03/2023

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED



### PLAN OF SPAN A

(SEE SUPERSTRUCTURE GEOMETRY CONTROL SHEET FOR DIMENSIONS NOT SHOWN)

- ① 5 - #5B4 @ 10" MAX. CTS (3 BAR RUN) (TYP. BAYS 3 - 6) (BOTTOM OF SLAB)
- ② BARS #5A101 THRU #5A117 AND #5A201 THRU #5A217 SHALL BE PLACED IN 5 BAR INCREMENTS AT 7½" CTS. AS SHOWN
- ③ BARS #5A301 THRU #5A323 AND #5A401 THRU #5A423 SHALL BE PLACED IN 5 BAR INCREMENTS AT 7½" CTS. AS SHOWN
- ④ BREAKBACK RADIAL TO -L\_LT AND MEASURED NORMAL TO OUTSIDE EDGE OF DECK ALONG CENTERLINE OF JOINT.
- ⑤ #4J1 BARS PLACED AT 1'-0" CENTERS AT EACH VERTICAL STUD ANCHOR BOLT OF EXPANSION JOINT. SEE EXPANSION JOINT SHEETS FOR DETAILS. TYPICAL AT EACH END BENT AND APPROACH SLABS.

### NOTES

SEE PLAN OF SPAN SHEET 2 AND LONG CHORD LAYOUT SHEET FOR GEOMETRY DETAILS NOT SHOWN.

SEE TYPICAL SECTION DETAILS SHEET 3 FOR DECK ARC OFFSETS.

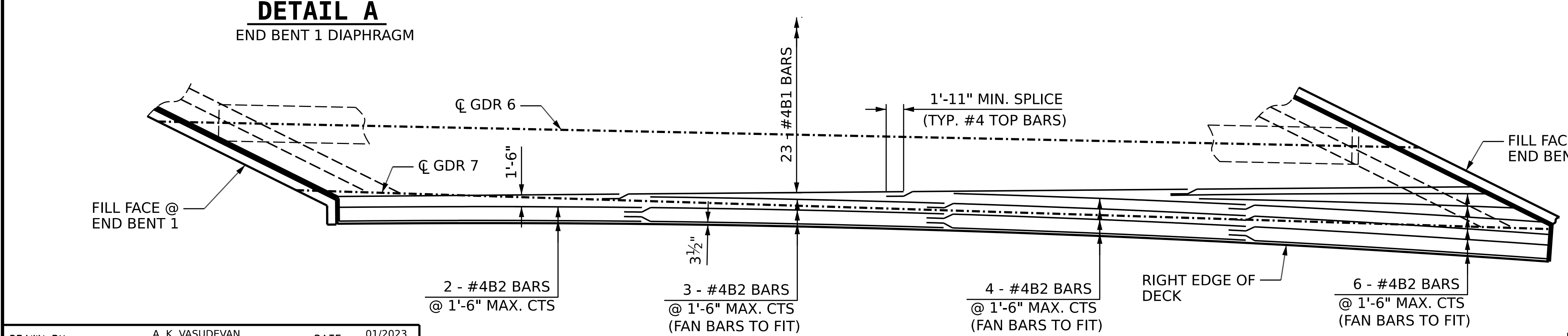
FOR SPLICE LENGTHS NOT SHOWN, REFER TO MINIMUM SPLICE LENGTH TABLE ON "SUPERSTRUCTURE BILL OF MATERIALS"

\* MEASURED RADIALLY FROM -L\_LT-

\*\* MEASURED ALONG -L\_LT AND BARS ARE PLACED RADIAL ALONG -L\_LT.

PROJECT NO. **B-3186 / B-5898**  
**HAYWOOD** COUNTY  
 STATION: **32+21.34 -L\_LT-**  
 SHEET 1 OF 2

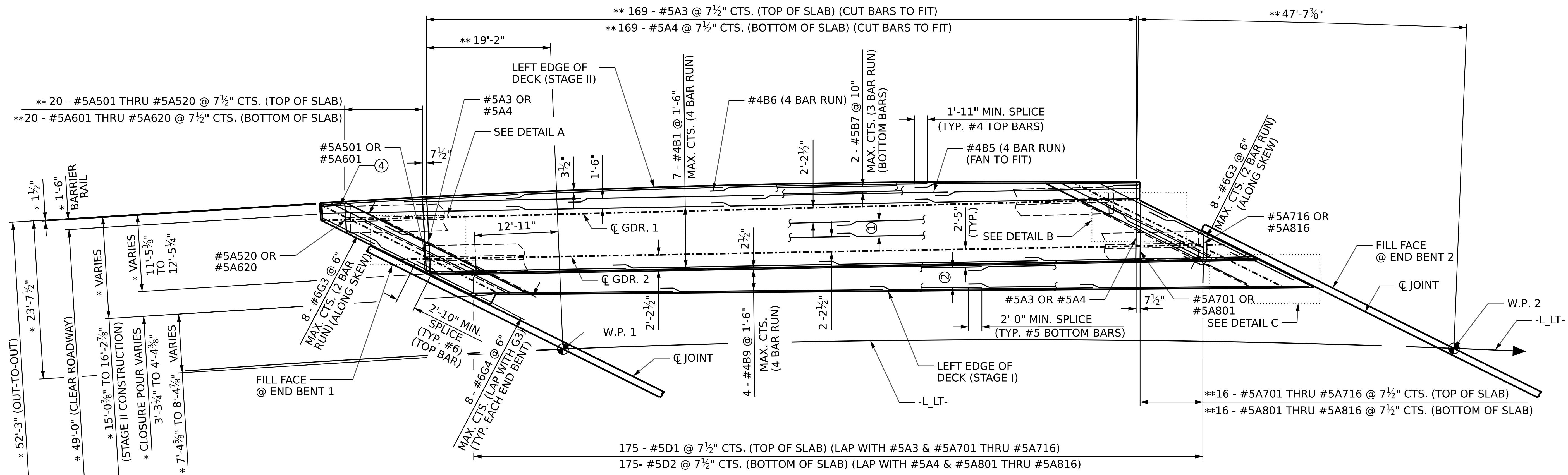
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
PLAN OF SPAN A STAGE I					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S1-13
TOTAL SHEETS					43



### TOP REINFORCING STEEL LAYOUT

DRAWN BY: A. K. VASUDEVAN DATE: 01/2023  
 CHECKED BY: S. NATARAJAN DATE: 01/2023  
 DESIGN ENGINEER OF RECORD: G.R. COLS DATE: 01/2023

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

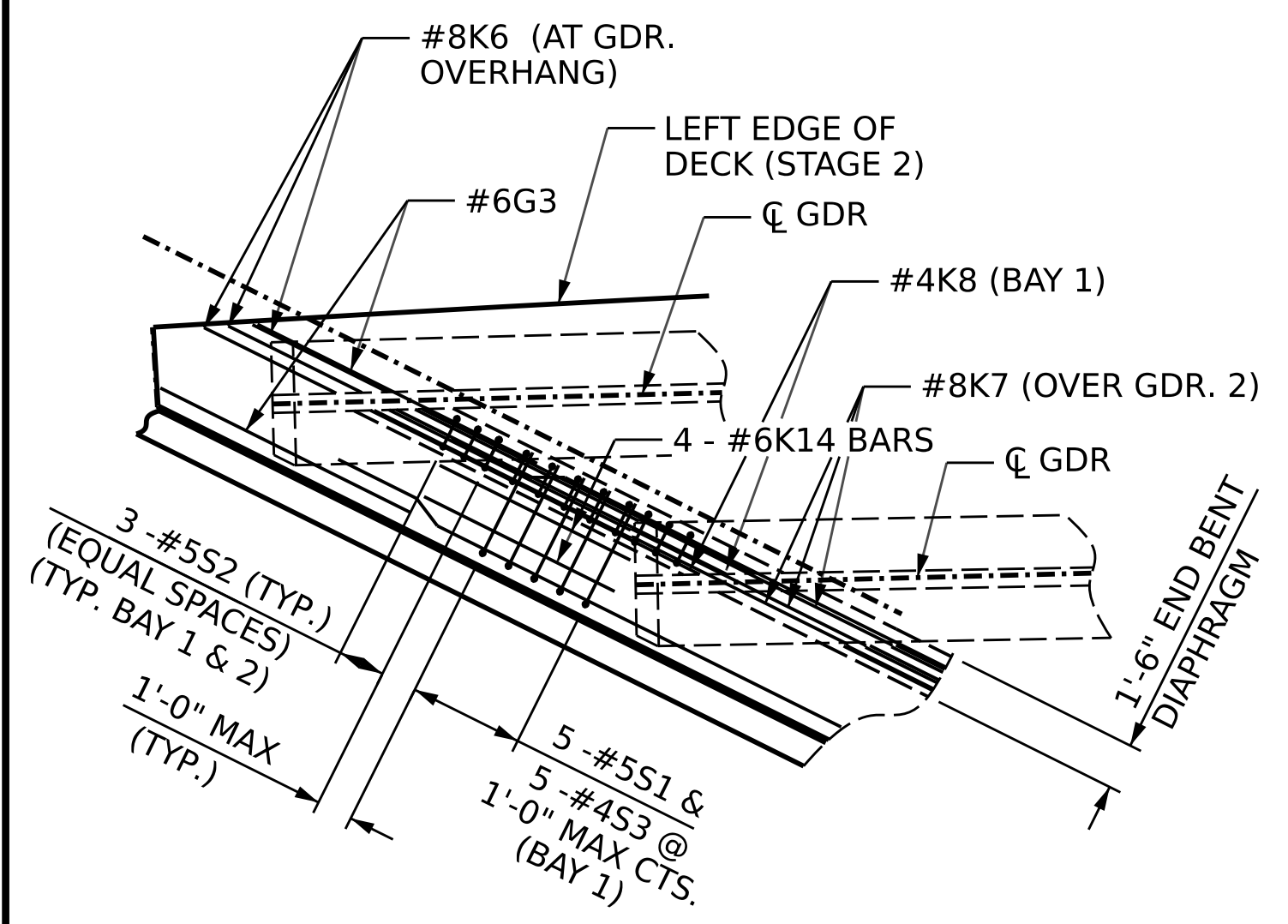


**PLAN OF SPAN A**  
(SEE SUPERSTRUCTURE GEOMETRY CONTROL SHEET FOR DIMENSIONS NOT SHOWN)

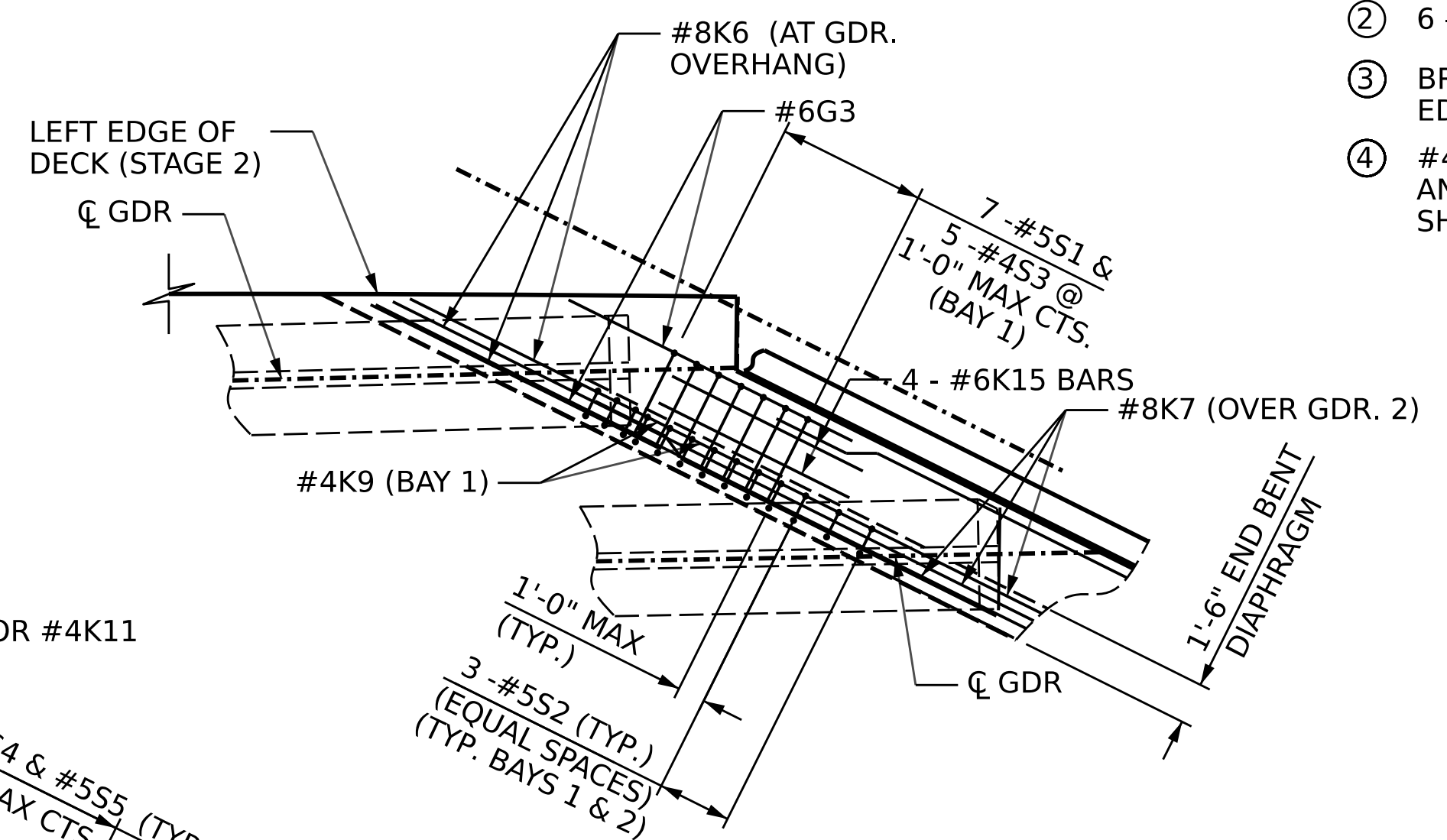
\* MEASURED RADially FROM -L\_LT-  
\*\* MEASURED ALONG -L\_LT AND BARS ARE PLACED RADIAL ALONG -L\_LT.

**NOTES**

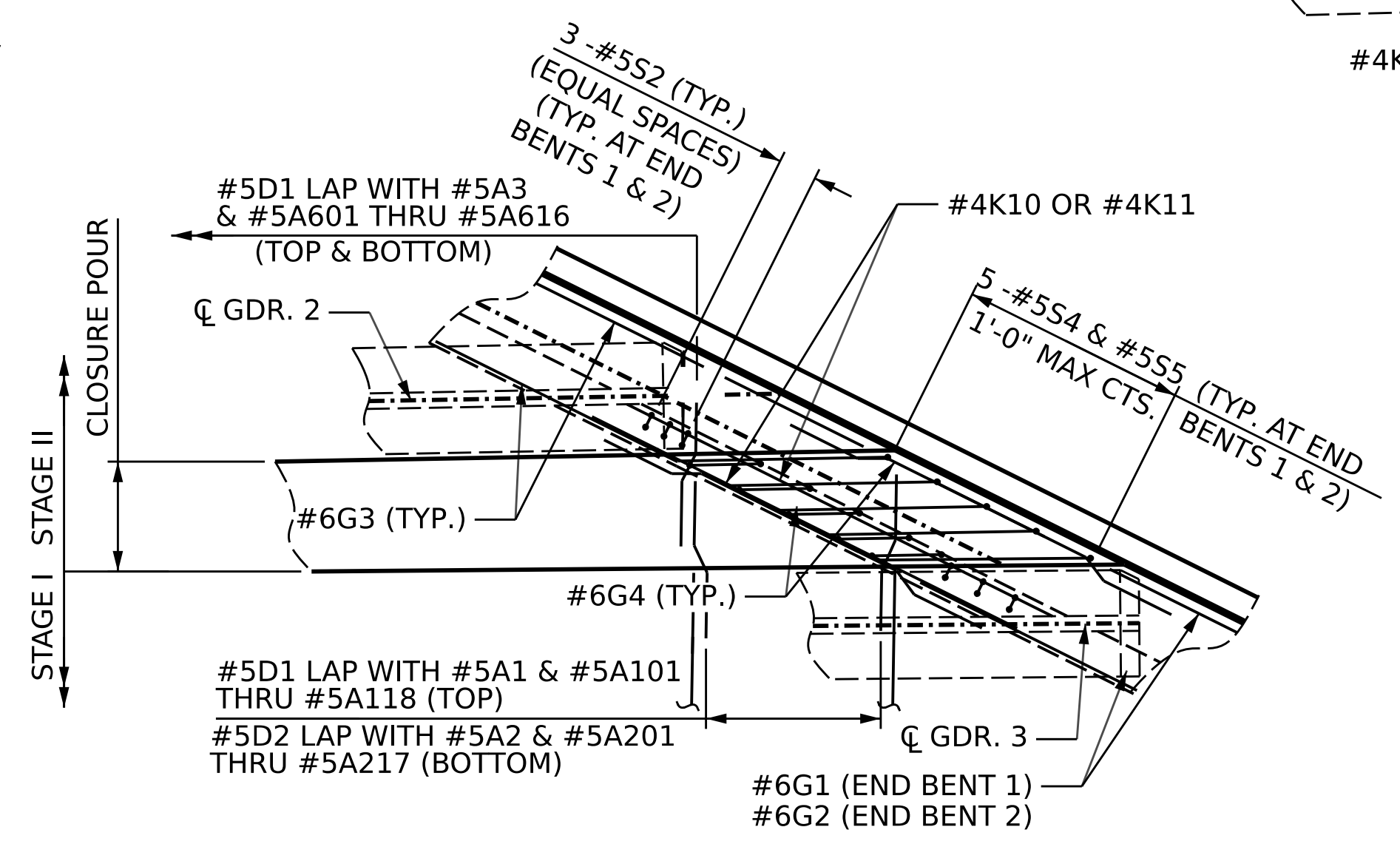
- SEE LONG CHORD LAYOUT SHEET FOR GEOMETRY DETAILS NOT SHOWN.
- ① 4 - #5B8 @ 10" MAX. CTS (3 BAR RUN) (BAY 1) (BOTTOM OF SLAB)
  - ② 6 - #5B10 @ 10" MAX. CTS (3 BAR RUN) (BAY 2) (BOTTOM OF SLAB)
  - ③ BREAKBACK RADIAL TO -L\_LT AND MEASURED NORMAL TO OUTSIDE EDGE OF DECK ALONG CENTERLINE OF JOINT.
  - ④ #4J1 BARS PLACED AT 1'-0" CENTERS AT EACH VERTICAL STUD ANCHOR BOLT OF EXPANSION JOINT. SEE EXPANSION JOINT SHEETS FOR DETAILS. TYPICAL AT EACH END BENT.



**DETAIL A**  
END BENT 1 DIAPHRAGM



**DETAIL B**  
END BENT 2 DIAPHRAGM



**DETAIL C**  
REINFORCEMENT AT CLOSURE POUR (END BENT 2 SHOWN, END BENT 1 SIMILAR U.N.O.)

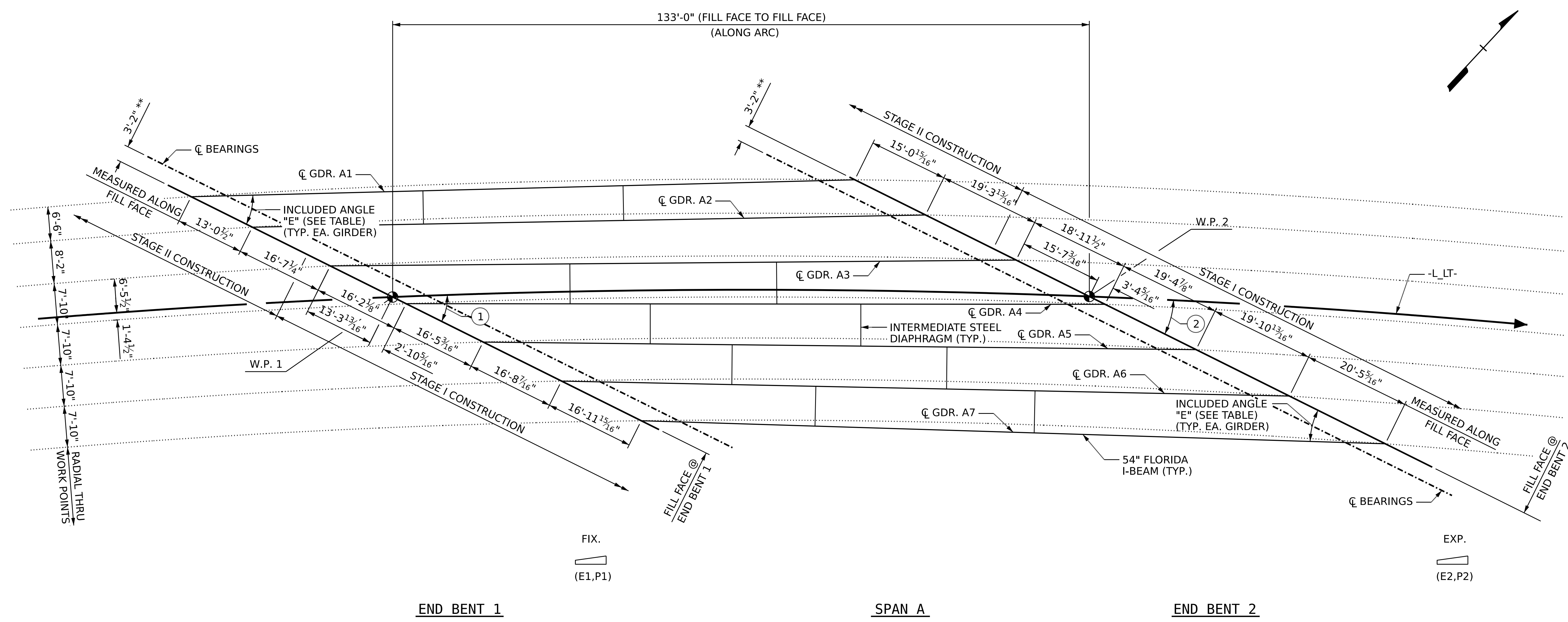
PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
STATION: 32+21.34 -L\_LT-  
SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
<b>PLAN OF SPAN A STAGE II</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S1-14
TOTAL SHEETS					43

DRAWN BY: A. K. VASUDEVAN DATE: 01/2023  
CHECKED BY: S. NATARAJAN DATE: 01/2023  
DESIGN ENGINEER OF RECORD: G.R. COLS DATE: 01/2023

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED



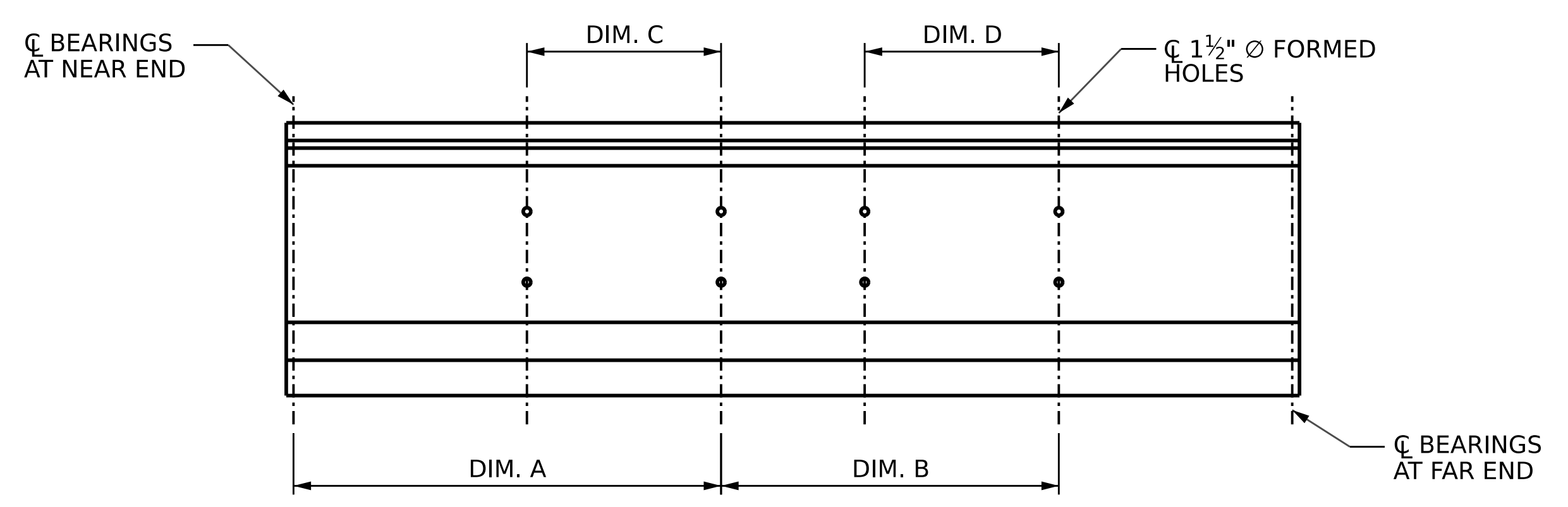


**FRAMING PLAN**

\*\* MEASURED PERPENDICULAR TO CONTROL LINE OR FILL FACE

- ① 28°48'25" (TAN TO CURVE)
- ② 24°12'59" (TAN TO CURVE)

DIM.	A	B	C	D	E
G1	37'-6"	38'-2½"	-	-	27°55'49"
G2	25'-10"	38'-2½"	-	-	27°30'18"
G3	38'-9"	39'-5½"	-	-	26°57'25"
G4	39'-5⅞"	40'-2⅜"	15'-3⅞"	16'-0⅝"	26°24'56"
G5	40'-3⅞"	41'-0"	15'-7⅞"	16'-5⅜"	25°51'29"
G6	41'-1¾"	41'-10¼"	16'-0⅞"	16'-10⅜"	25°16'59"
G7	25'-7⅝"	41'-10¼"	-	-	24°41'22"



PROJECT NO. **B-3186 / B-5898**  
**HAYWOOD** COUNTY  
 STATION: **32+21.34 -L LT-**  
 SHEET 1 OF 1

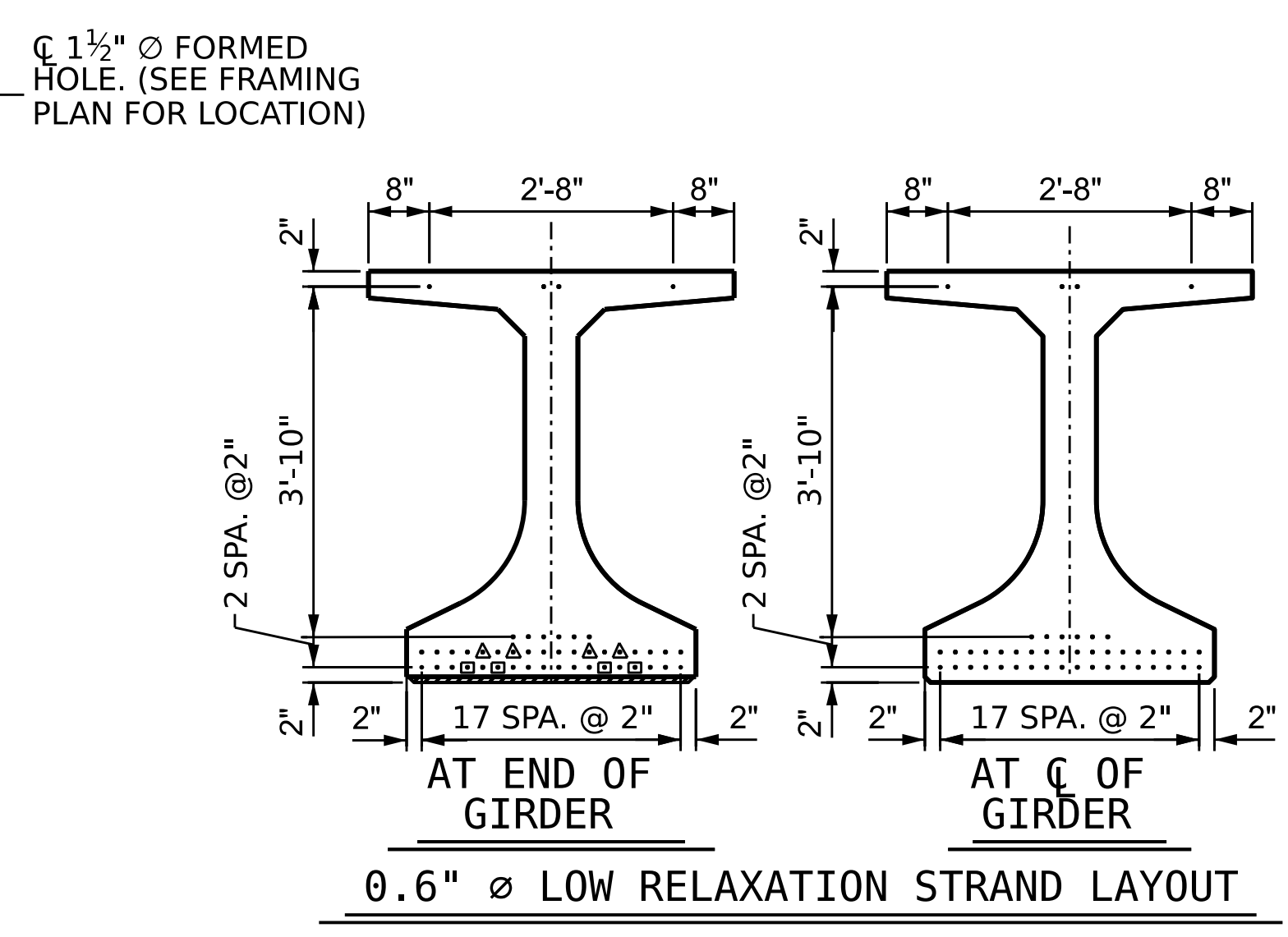
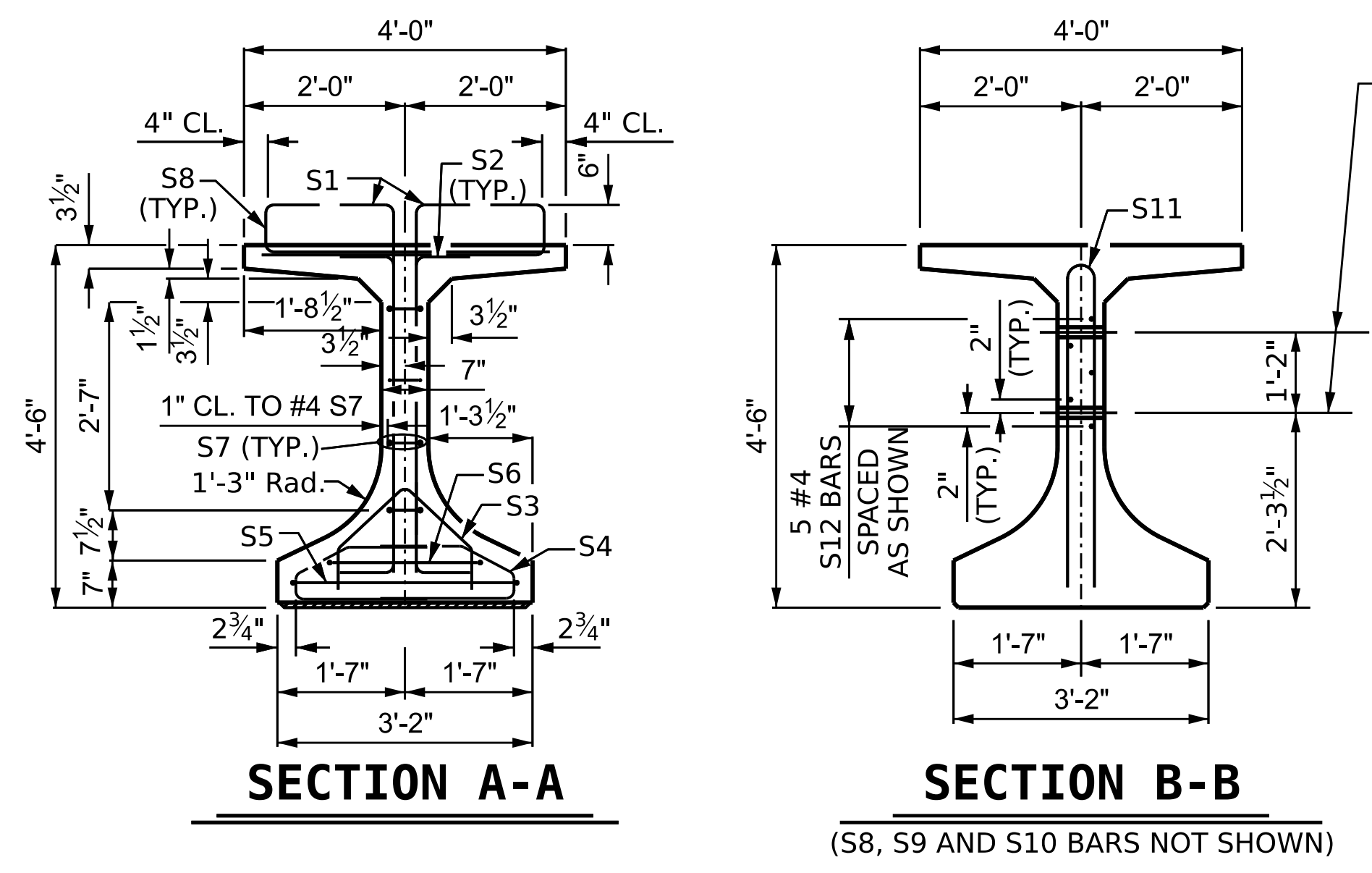
**AECOM**  
AECOM TECHNICAL SERVICES OF NC, INC.  
 5430 WADE PARK BOULEVARD, SUITE 200  
 RALEIGH, NC 27607  
 (919) 854-6200 www.aecom.com  
 AECOM License No. P0242

**PROFESSIONAL ENGINEER**  
SEAL 041343  
**GREGORY R. COLS**  
 10/18/2023

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
<b>FRAMING PLAN</b>					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 43

DRAWN BY : M.L. CATER DATE : 02/2023  
 CHECKED BY : S. NATARAJAN DATE : 02/2023  
 DESIGN ENGINEER OF RECORD: G.R. COLS DATE : 02/2023

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 FINAL UNLESS ALL  
 SIGNATURES COMPLETED



**DEBONDING LEGEND**

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

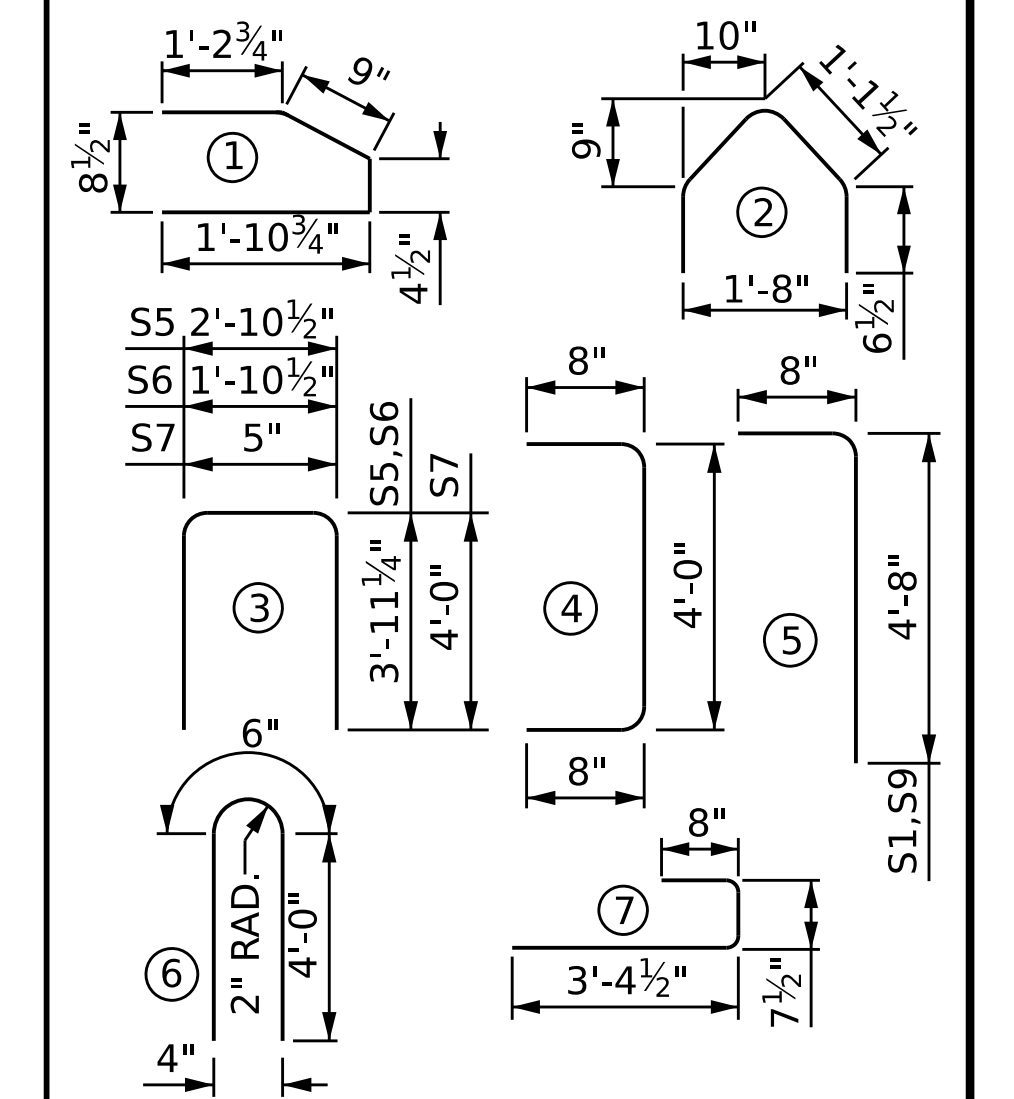
NOTE:  
CUT S8 BARS TO PROVIDE ADEQUATE CLEAR COVER

	A	B	C	D
GIRDER 1	114'-7 <sup>1</sup> / <sub>4</sub> "	57'-3 <sup>3</sup> / <sub>8</sub> "	1'-1 <sup>1</sup> / <sub>8</sub> "	17
GIRDER 2	116'-2 <sup>5</sup> / <sub>8</sub> "	58'-1 <sup>5</sup> / <sub>16</sub> "	0'-10 <sup>13</sup> / <sub>16</sub> "	18
GIRDER 3	118'-4 <sup>1</sup> / <sub>2</sub> "	59'-2 <sup>1</sup> / <sub>4</sub> "	0'-11 <sup>3</sup> / <sub>4</sub> "	19

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	68	#5	5	5'-4"	378	
S2	28	#5	4	5'-4"	156	
S3	34	#3	2	3'-4"	43	
S4	68	#3	1	4'-3"	109	
S5	2	#5	3	10'-9"	23	
S6	2	#5	3	9'-9"	21	
S7	8	#4	3	8'-5"	45	
S8	202	#5	7	4'-8"	983	
GIRDER 2	S8	206	#5	7	4'-8"	1003
GIRDER 3	S8	210	#5	7	4'-8"	1022
GIRDER 1	S9	134	#5	5	5'-4"	745
GIRDER 2	S9	138	#5	5	5'-4"	768
GIRDER 3	S9	142	#5	5	5'-4"	790
S10	32	#5	STR	3'-8"	123	
S11	8	#5	6	8'-6"	71	
S12	10	#4	STR	8'-0"	54	

**BAR TYPES**

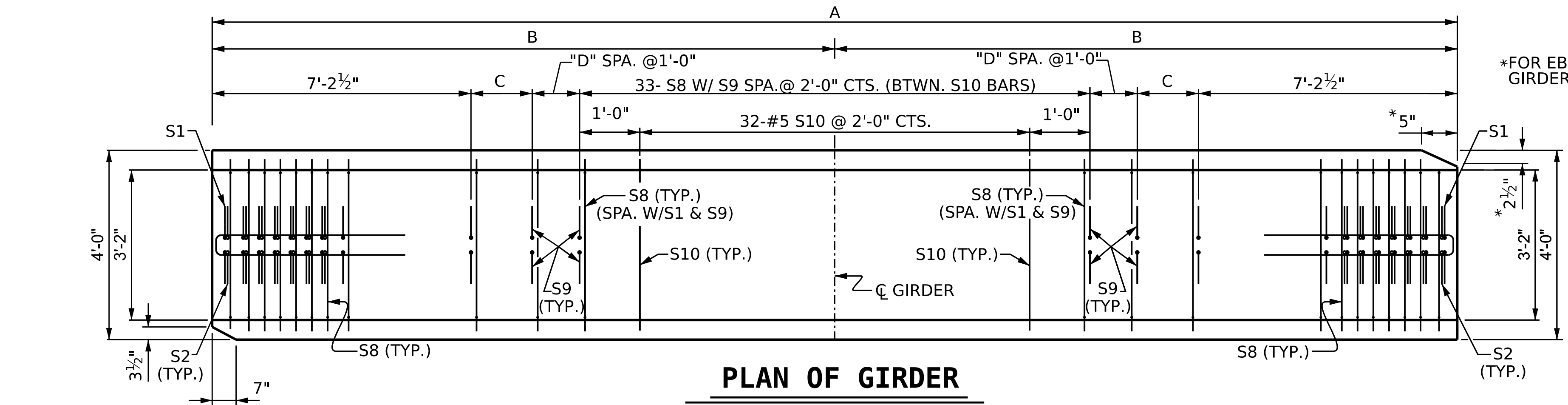


ALL BAR DIMENSIONS ARE OUT-TO-OUT

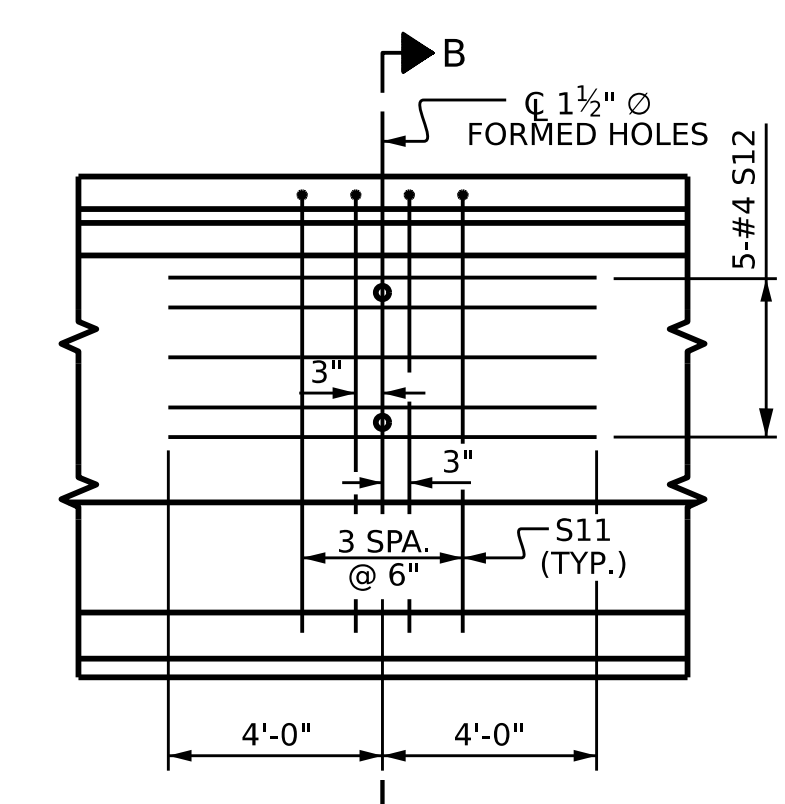
QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS	
LB.	C.Y.	No.	
GIRDER 3	2835	28.4	46
GIRDER 2	2794	27.9	46
GIRDER 1	2751	27.5	46

**GIRDERS REQUIRED**

NUMBER	LENGTH	TOTAL LENGTH
3	SEE TABLE	349'-2 <sup>3</sup> / <sub>8</sub> "

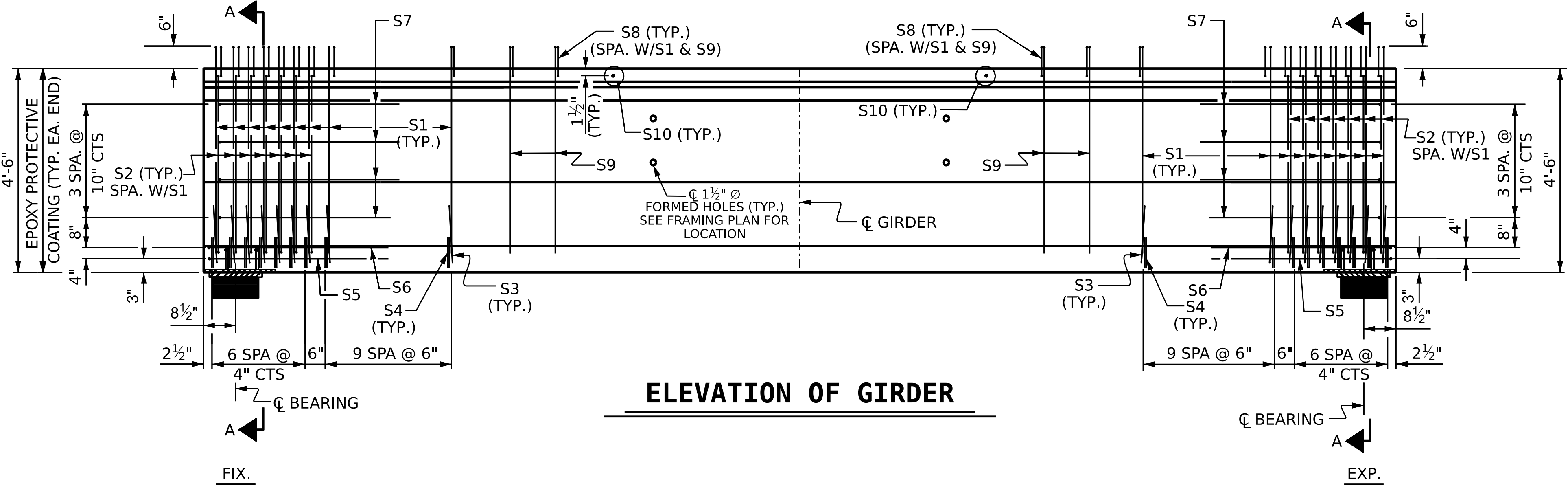


\*FOR EB2 END PROVIDE CLIPS FOR GIRDER 2 & 3 ONLY.



**PARTIAL ELEVATION**

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A1, A2 & A3



**ELEVATION OF GIRDER**

PROJECT NO. B-3186 / B-5898

HAYWOOD COUNTY

STATION: 32+21.34 -L LT-

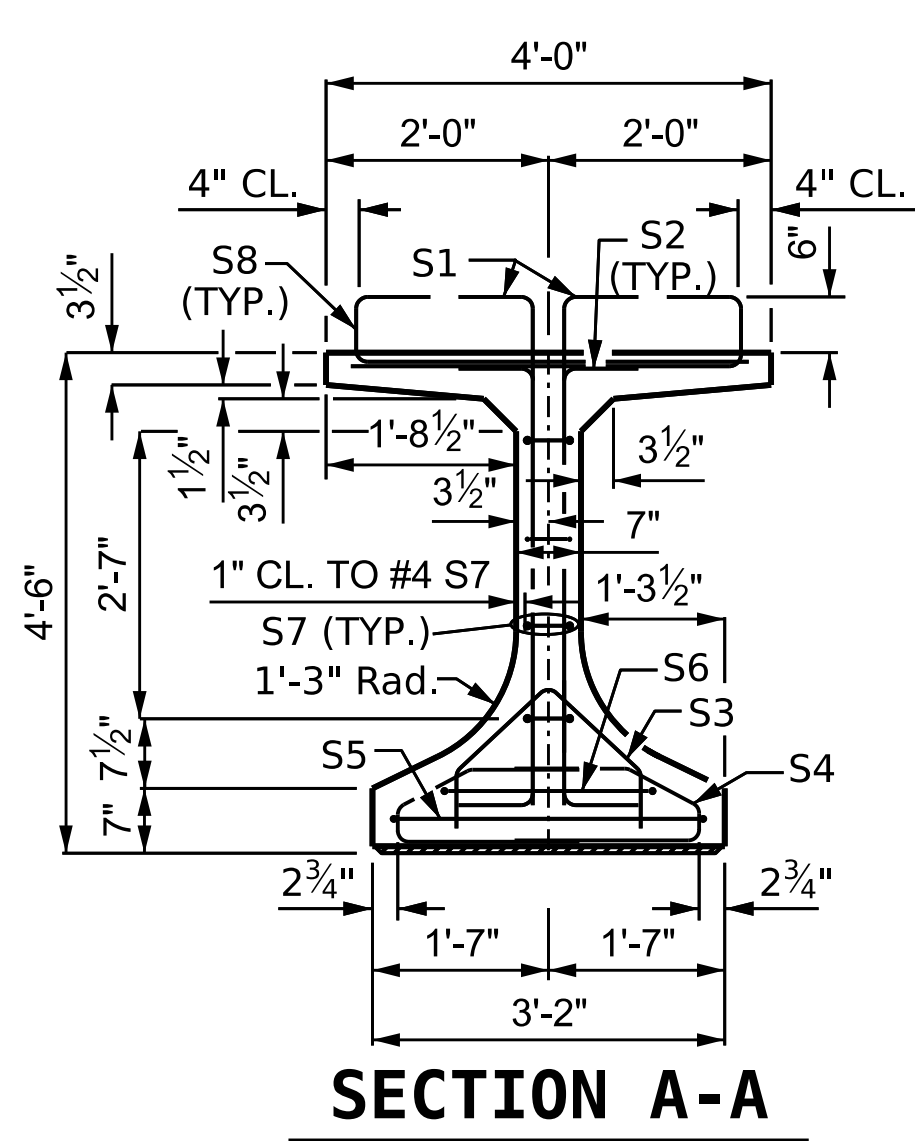
SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
54" FLORIDA I BEAM (FIB)  
**PRESTRESSED CONCRETE GIRDER**  
GIRDER A1, A2 AND A3

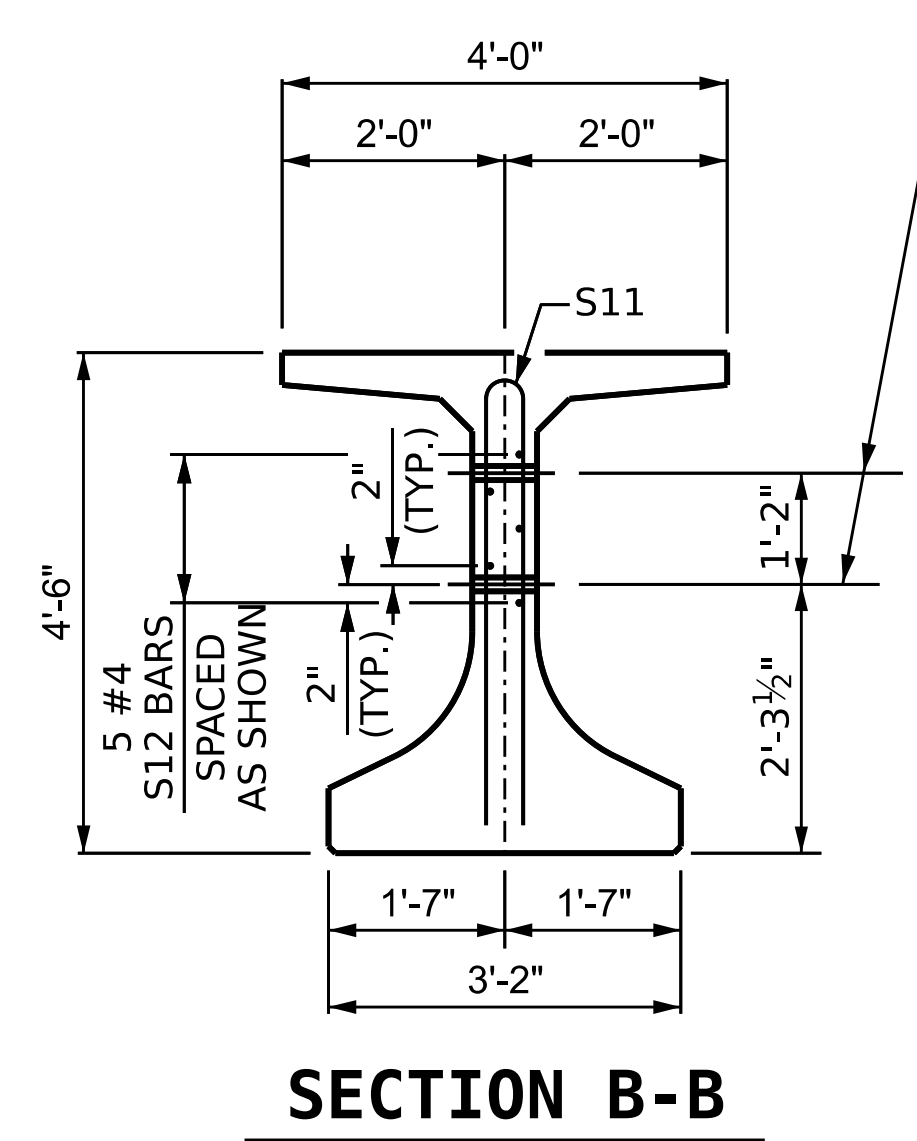
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-16
1			3			TOTAL SHEETS
2			4			43

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	S.NATARAJAN	DATE :	02/2023
CHECKED BY :	J.C.MORRISON	DATE :	02/2023
DESIGN ENGINEER OF RECORD:	G.R. COLS	DATE :	02/2023

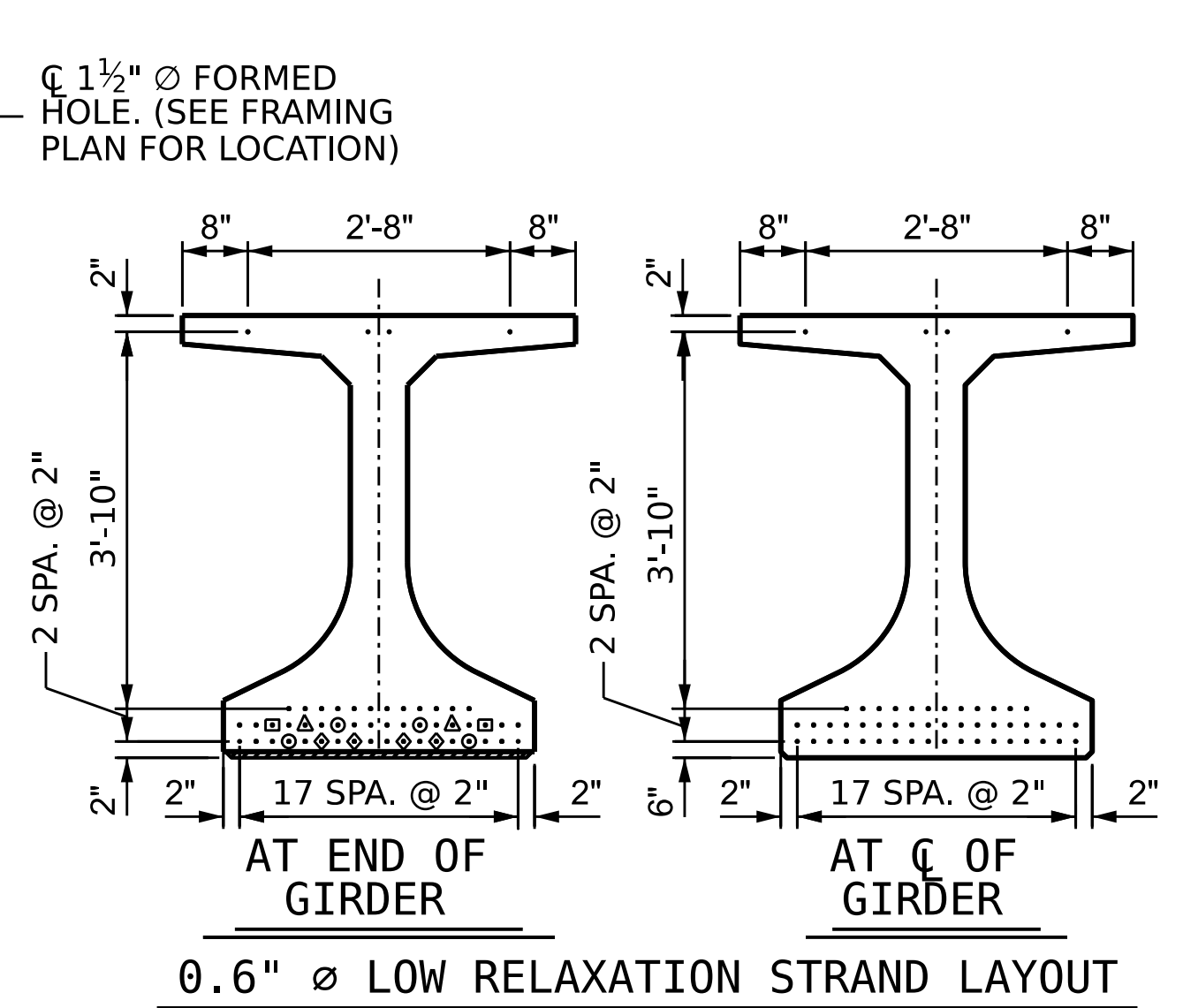


**SECTION A-A**



**SECTION B-B**

(S8, S9 AND S10 BARS NOT SHOWN)

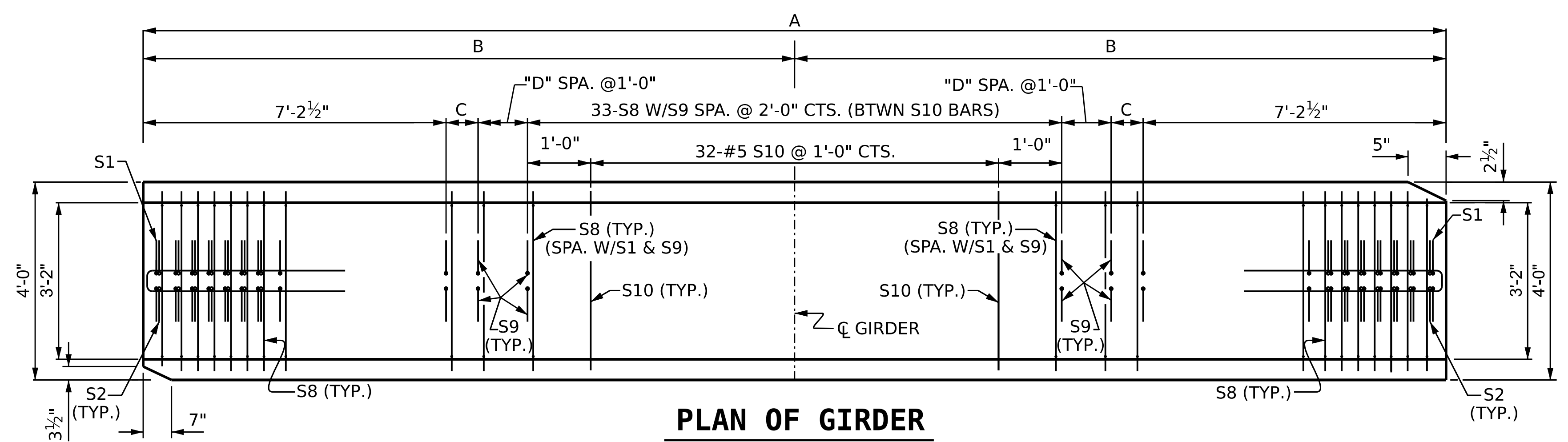


**0.6" Ø LOW RELAXATION STRAND LAYOUT**

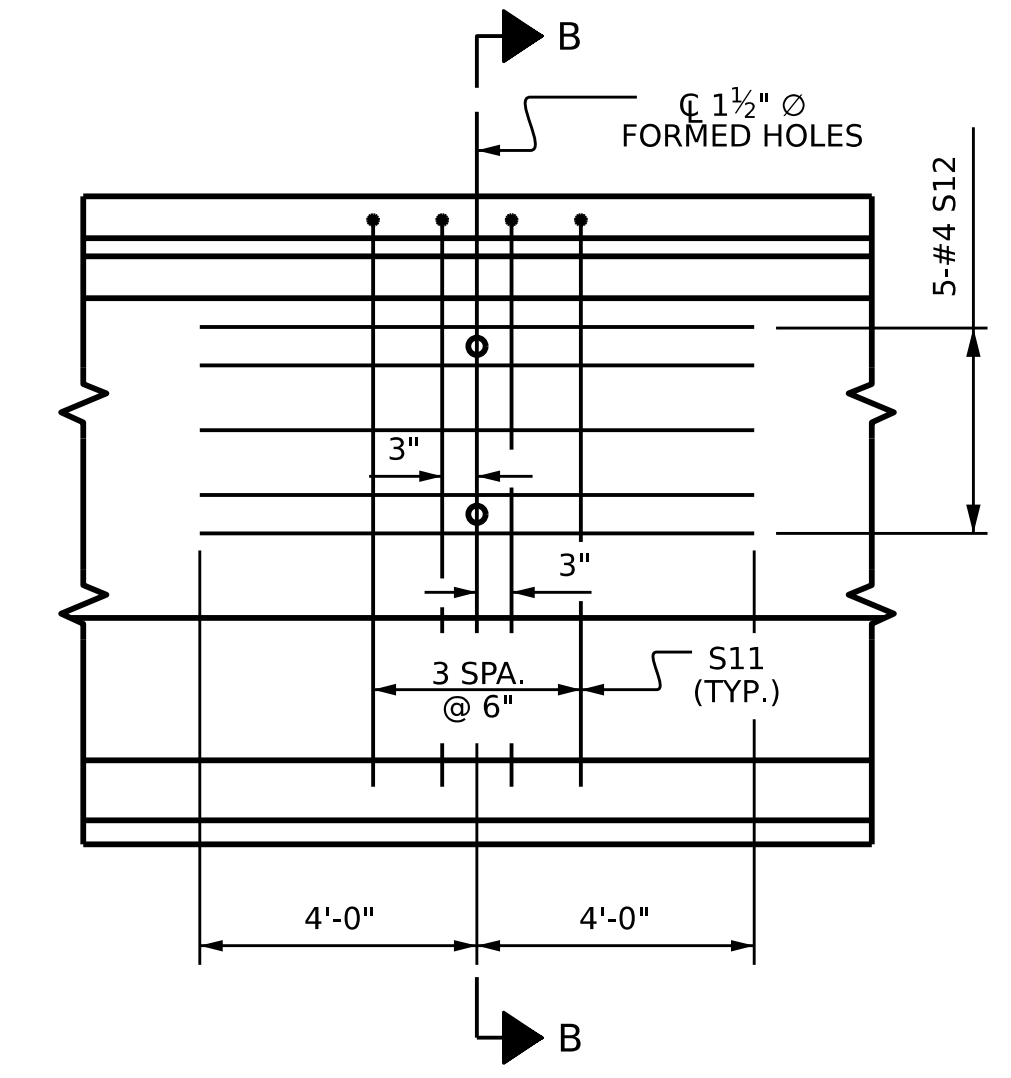
**DEBONDING LEGEND**

- FULLY BONDED STRANDS
- ◻ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- ◎ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- ◊ STRANDS DEBONDED FOR 24'-0" FROM END OF GIRDER

NOTE:  
CUT S8 BARS TO PROVIDE ADEQUATE CLEAR COVER

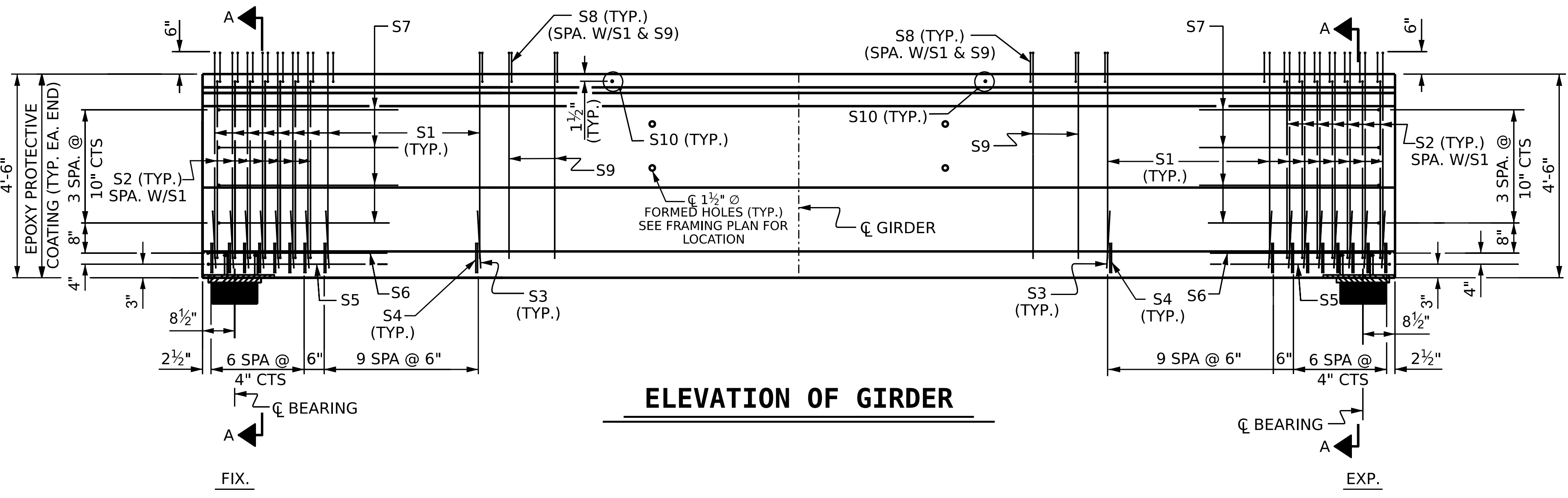


**PLAN OF GIRDER**



**PARTIAL ELEVATION**

SHOWING INTERMEDIATE STEEL DIAPHRAGM  
REINFORCING STEEL FOR GIRDER Nos. A4 & A5

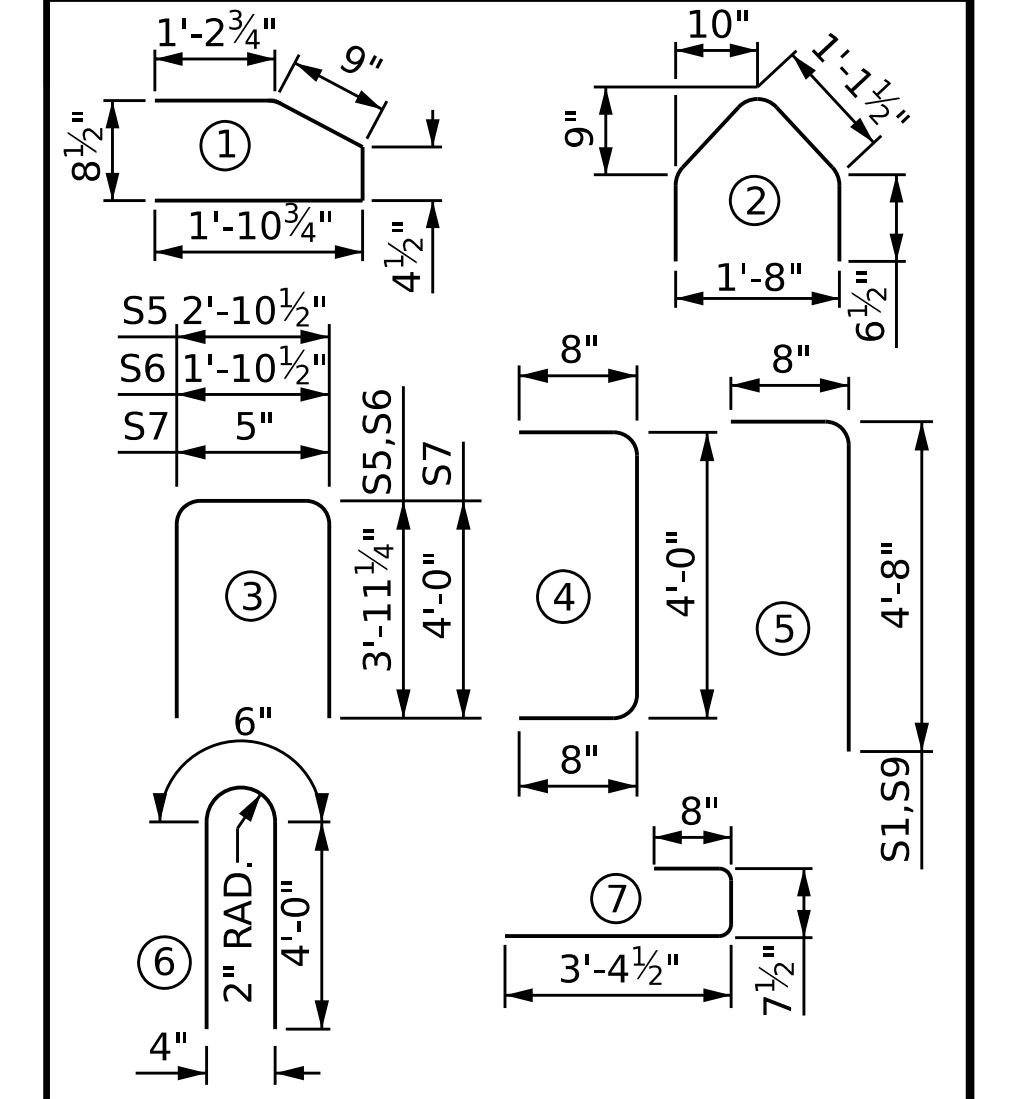


**ELEVATION OF GIRDER**

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	68	#5	5	5'-4"	378	
S2	28	#5	4	5'-4"	156	
S3	34	#3	2	3'-4"	43	
S4	68	#3	1	4'-3"	109	
S5	2	#5	3	10'-9"	23	
S6	2	#5	3	9'-9"	21	
S7	8	#4	3	8'-5"	45	
GIRDER 4	S8	214	#5	7	4'-8"	1042
GIRDER 5	S8	218	#5	7	4'-8"	1062
GIRDER 4	S9	146	#5	5	5'-4"	813
GIRDER 5	S9	150	#5	5	5'-4"	835
S10	32	#5	STR	3'-8"	123	
S11	16	#5	6	8'-6"	142	
S12	20	#4	STR	8'-0"	107	

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT-TO-OUT

**QUANTITIES FOR ONE GIRDER**

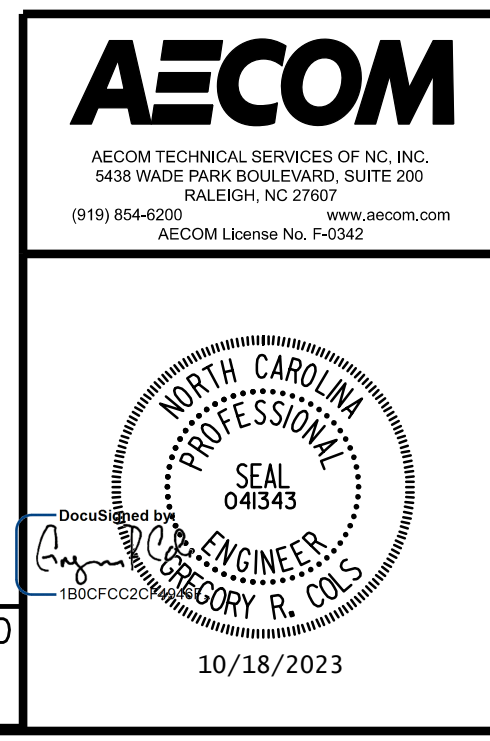
REINFORCING	8500 PSI	0.6" Ø	
STEEL	CONCRETE	L.R. STRANDS	
LB.	C.Y.	No.	
GIRDER 5	3044	29.5	52
GIRDER 4	3002	28.9	52

**GIRDERS REQUIRED**

NUMBER	LENGTH	TOTAL LENGTH
2	SEE TABLE	243'-7"

PROJECT NO. **B-3186 / B-5898**  
**HAYWOOD** COUNTY  
 STATION: **32+21.34 -L LT-**

SHEET 2 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 54" FLORIDA I BEAM (FIB)  
**PRESTRESSED CONCRETE GIRDER**  
 GIRDER A4 AND A5

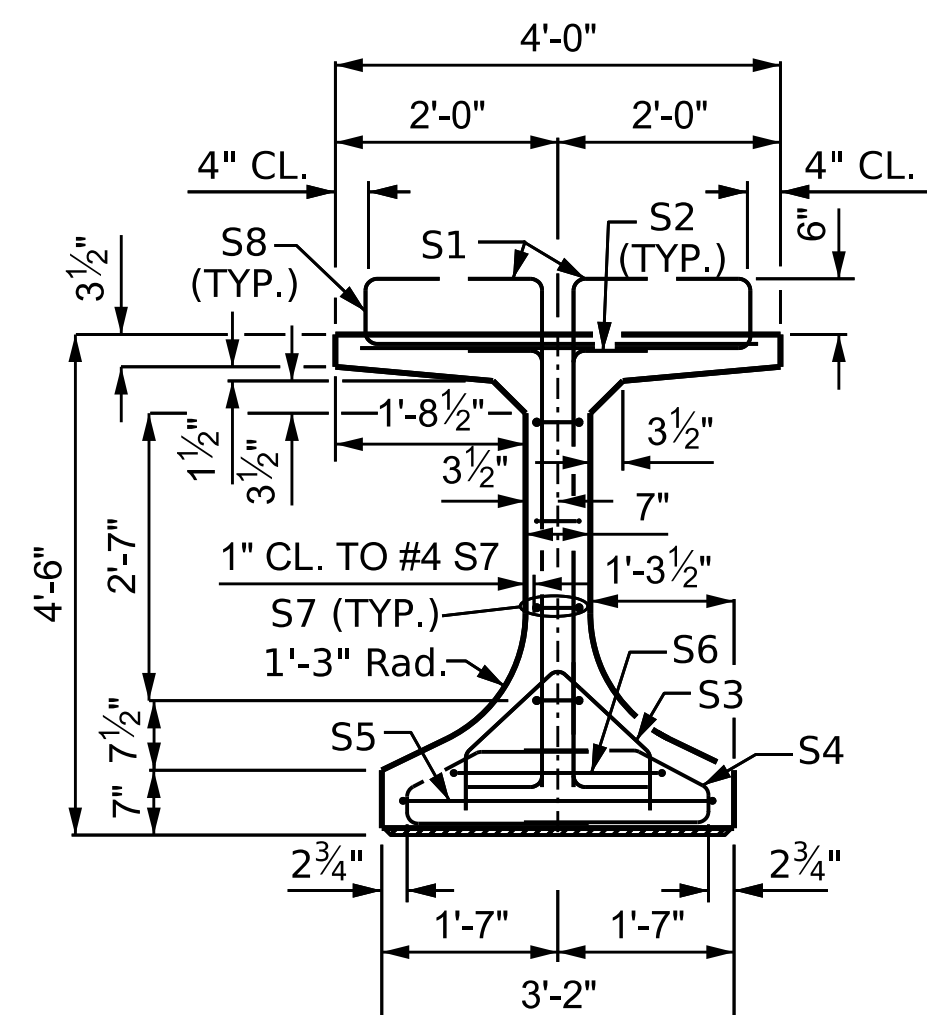
REVISIONS			SHEET NO.		
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

S1-17  
 TOTAL SHEETS: 43

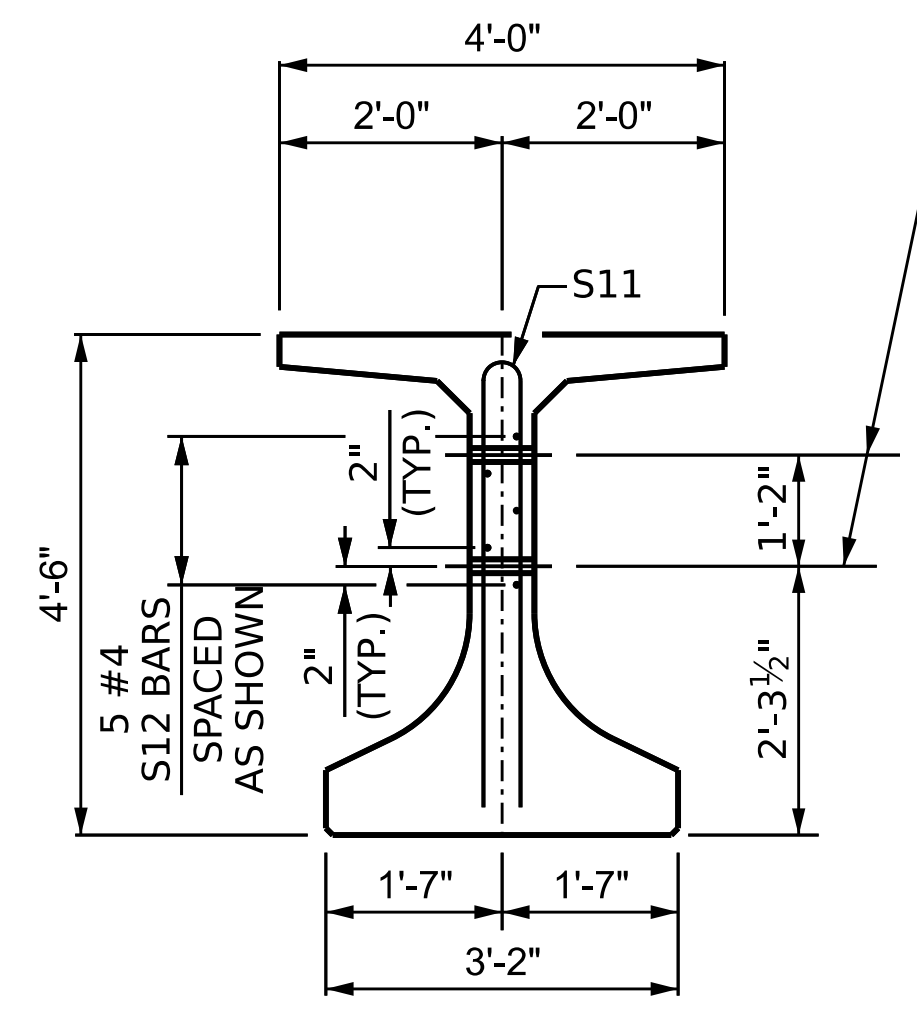
	A	B	C	D
GIRDER 4	120'-7 1/4"	60'-3 3/8"	1'-1 1/8"	20
GIRDER 5	122'-11 3/4"	61'-5 7/8"	1'-3 1/2"	21

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

DRAWN BY: S. NATARAJAN DATE: 02/2023  
 CHECKED BY: J.C. MORRISON DATE: 02/2023  
 DESIGN ENGINEER OF RECORD: G.R. COLS DATE: 02/2023

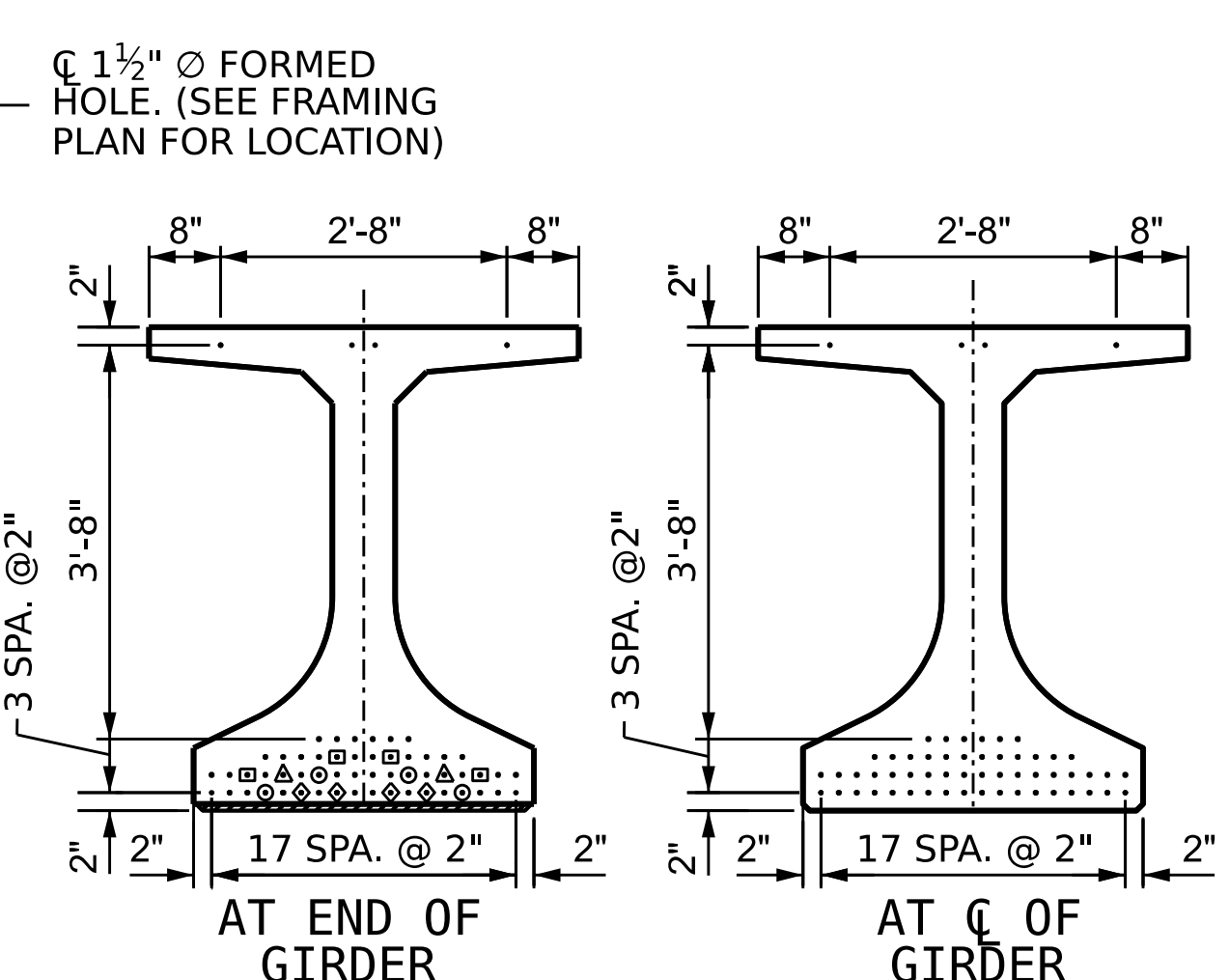


**SECTION A-A**



**SECTION B-B**

(S8, S9 AND S10 BARS NOT SHOWN)

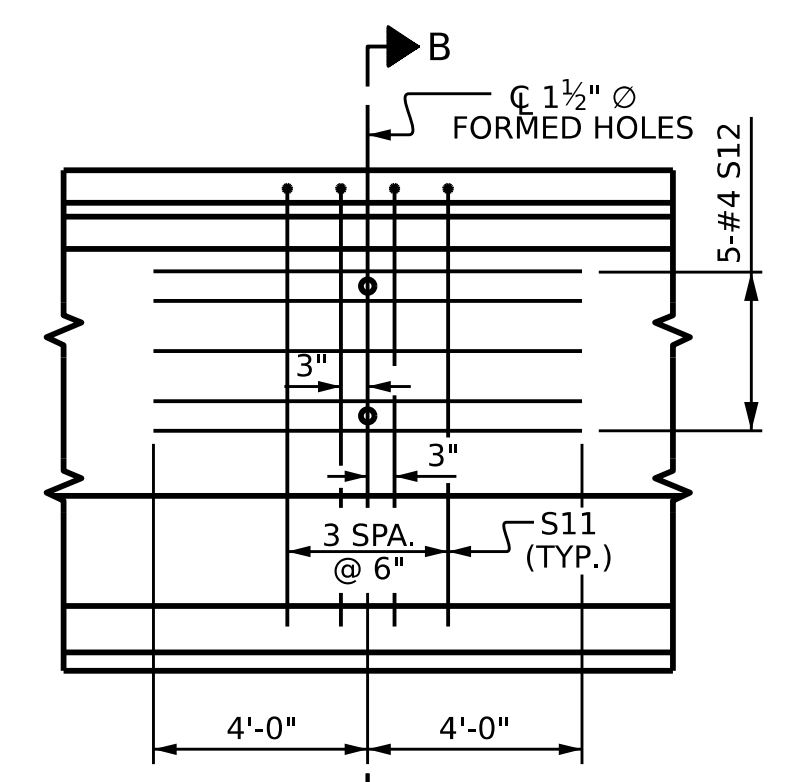


**0.6" Ø LOW RELAXATION STRAND LAYOUT**

**DEBONDING LEGEND**

- FULLY BONDED STRANDS
- ◻ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- ◇ STRANDS DEBONDED FOR 24'-0" FROM END OF GIRDER

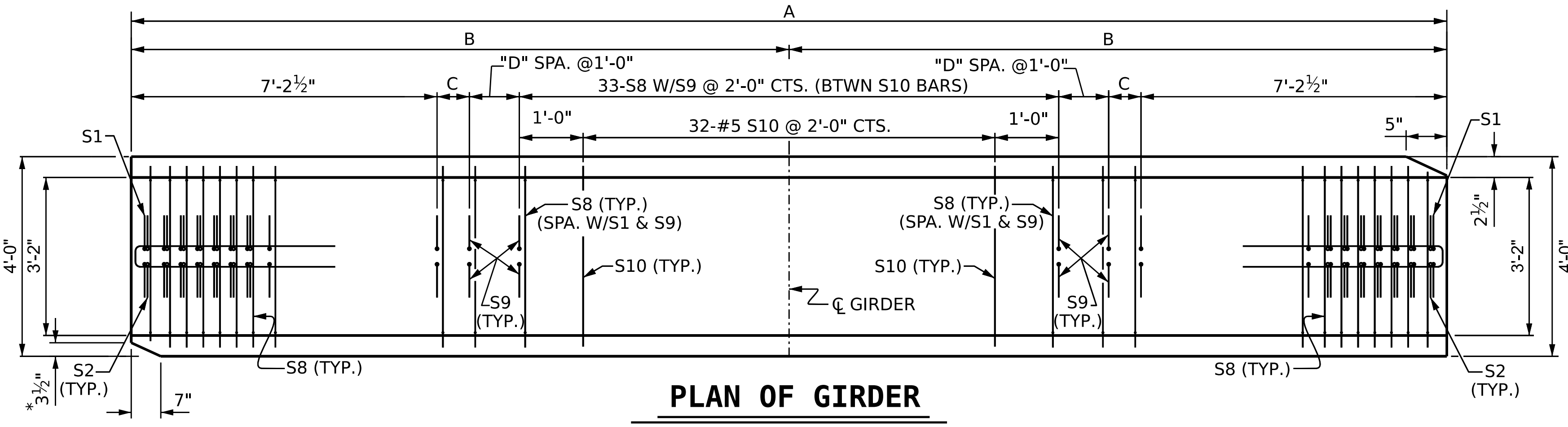
NOTE:  
CUT S8 BARS TO PROVIDE ADEQUATE CLEAR COVER



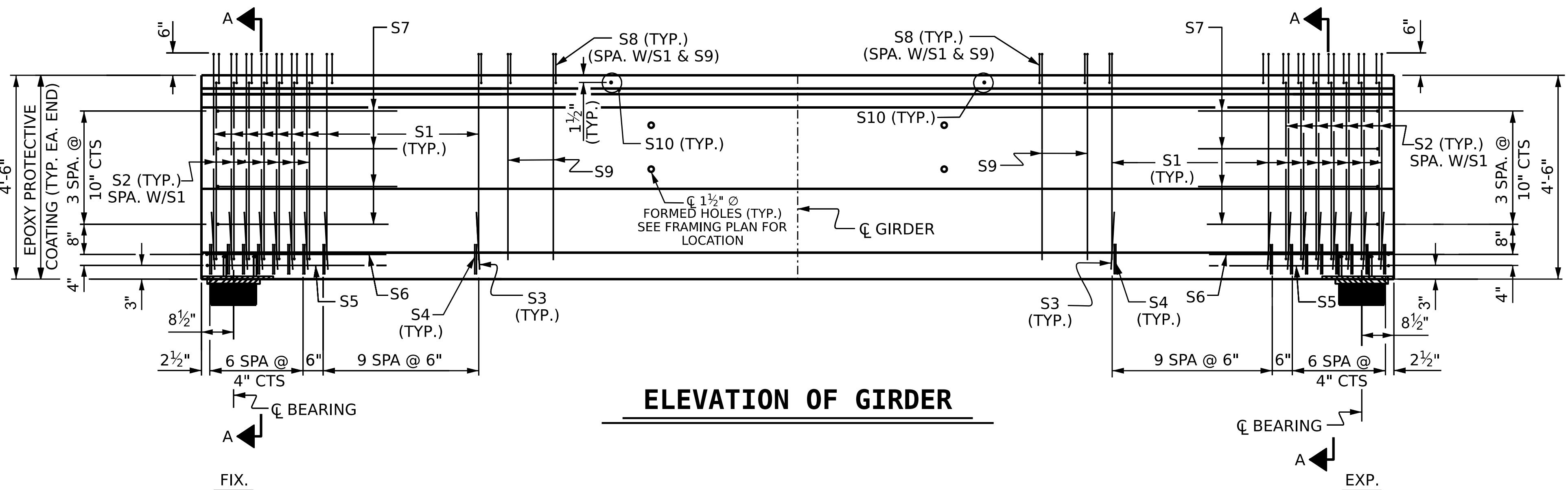
**PARTIAL ELEVATION**

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A6 & A7

\* FOR EB1 END, PROVIDE CLIP FOR GIRDER 6 ONLY



**PLAN OF GIRDER**

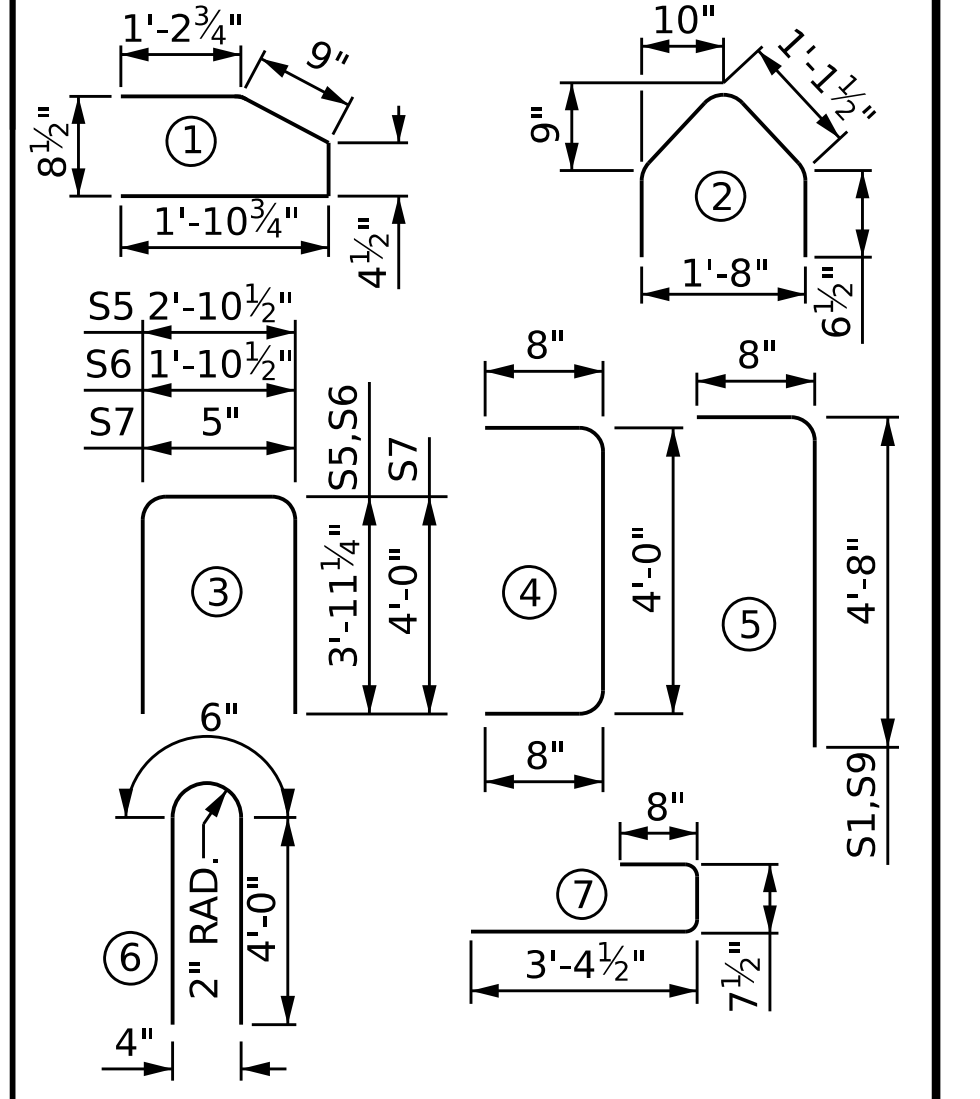


**ELEVATION OF GIRDER**

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR						
BAR NUMBER	SIZE	TYPE	LENGTH	WEIGHT		
S1	68	#5	5	5'-4"	378	
S2	28	#5	4	5'-4"	156	
S3	34	#3	2	3'-4"	43	
S4	68	#3	1	4'-3"	109	
S5	2	#5	3	10'-9"	23	
S6	2	#5	3	9'-9"	21	
S7	8	#4	3	8'-5"	45	
GIRDER 6	S8	226	#5	7	4'-8"	1101
GIRDER 7	S8	230	#5	7	4'-8"	1120
GIRDER 6	S9	158	#5	5	5'-4"	879
GIRDER 7	S9	162	#5	5	5'-4"	902
	S10	32	#5	STR	3'-8"	123
GIRDER 6	S11	16	#5	6	8'-6"	142
GIRDER 7	S11	8	#5	6	8'-6"	71
GIRDER 6	S12	20	#4	STR	8'-0"	107
GIRDER 7	S12	10	#4	STR	8'-0"	54

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
GIRDER 7	3045	30.8
GIRDER 6	3127	30.1

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
2	SEE TABLE	253'-11"

PROJECT NO. **B-3186 / B-5898**  
**HAYWOOD** COUNTY  
 STATION: **32+21.34 -L LT-**

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 54" FLORIDA I BEAM (FIB)  
**PRESTRESSED CONCRETE GIRDER**  
 GIRDER A6 AND A7

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-18
1			3			TOTAL SHEETS
2			4			43

	A	B	C	D
GIRDER 6	125'-6 3/4"	62'-9 3/8"	0'-6 7/8"	23
GIRDER 7	128'-4 1/4"	64'-2 1/8"	0'-11 1/2"	24

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DRAWN BY :	S.NATARAJAN	DATE :	02/2023
CHECKED BY :	J.C.MORRISON	DATE :	02/2023
DESIGN ENGINEER OF RECORD :	G.R. COLS	DATE :	02/2023

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN A

Table with columns for deflection values (0.000 to 0.500) and rows for 0.6" ø LOW RELAXATION and GIRDER 1 through 7. Includes sub-rows for 40TH POINTS, CAMBER, DEFLECTION, and FINAL CAMBER.

\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS SHOWN IN INCHES (FRACTION FORM)

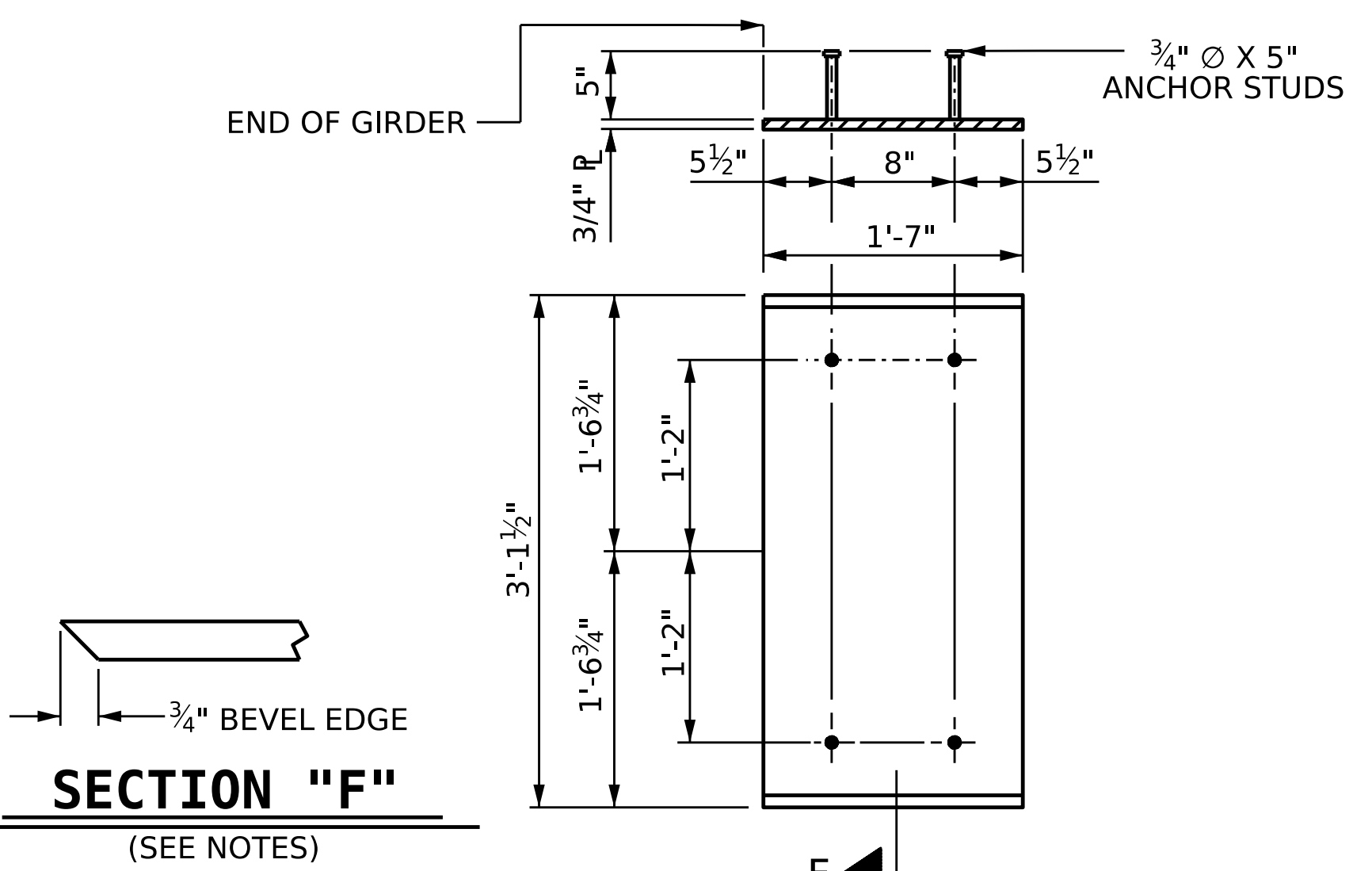
DRAWN BY: S.NATARAJAN DATE: 02/2023
CHECKED BY: G.R.COLS DATE: 03/2023
DESIGN ENGINEER OF RECORD: G.R. COLS DATE: 04/2023

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NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
ALL REINFORCING STEEL SHALL BE GRADE 60.
APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.
EMBEDDED PLACE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".



EMBEDDED PLATE "B-1" DETAILS FOR FIB GIRDER

(2 REQ'D PER GIRDER)

PROJECT NO. B-3186 / B-5898
HAYWOOD COUNTY
STATION: 32+21.34 -L\_ LT-

SHEET 4 OF 4

AECOM logo and seal for Gregory R. Cols, Professional Engineer, State of North Carolina, License No. F0342.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUPERSTRUCTURE DEAD LOAD DEFLECTION TABLES. Includes a REVISIONS table and SHEET NO. S1-19.

### STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

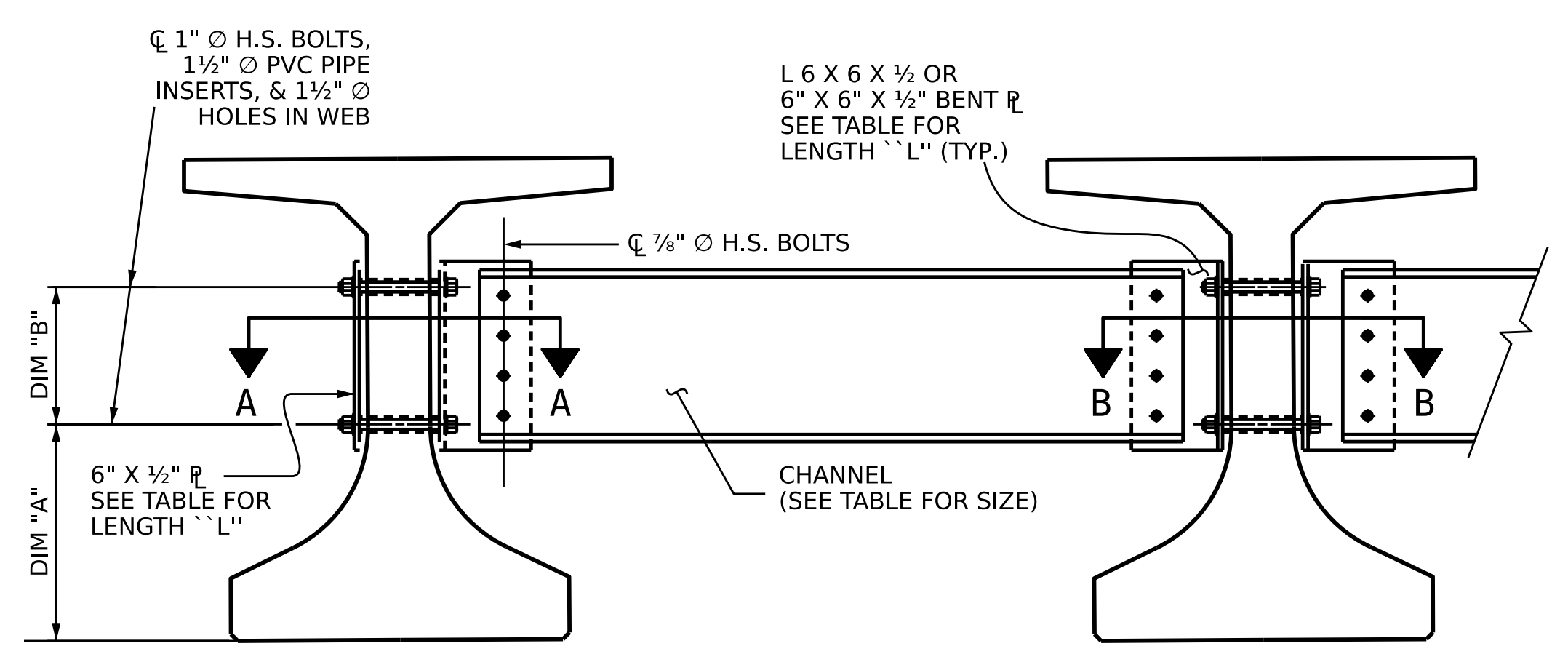
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

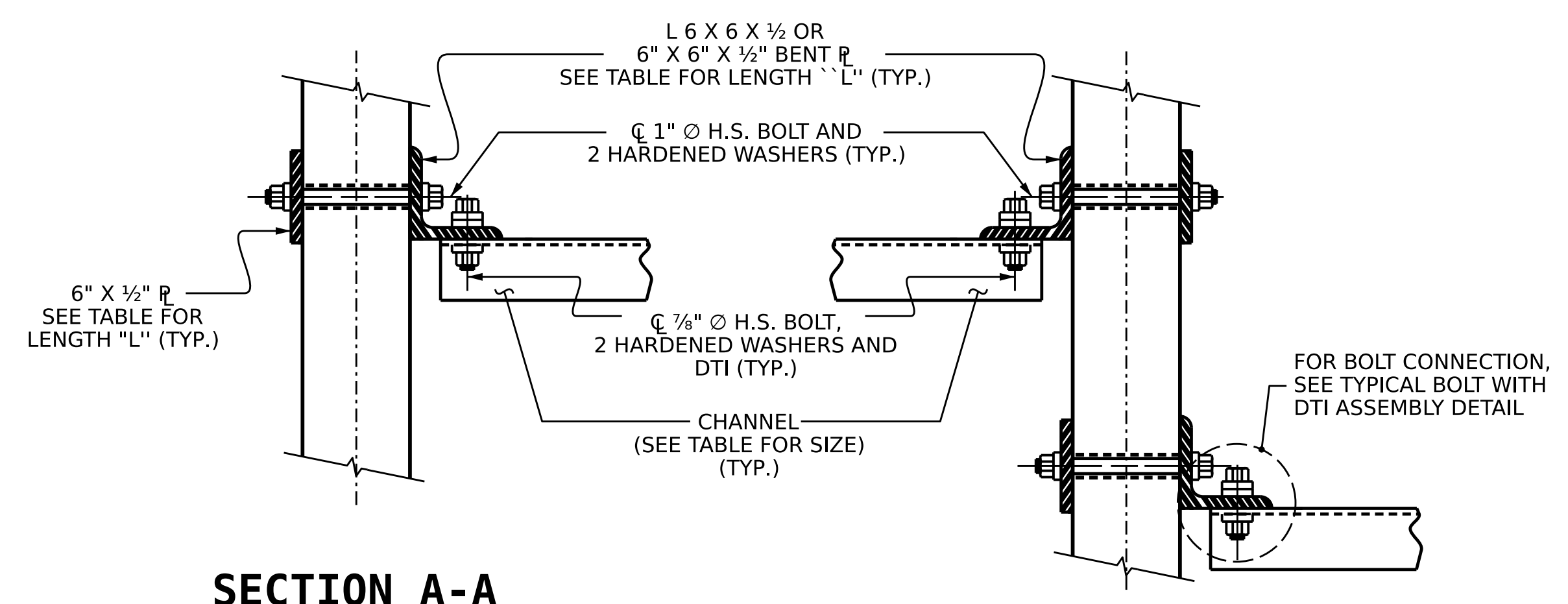
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



**EXTERIOR GIRDER**

**INTERIOR GIRDER**

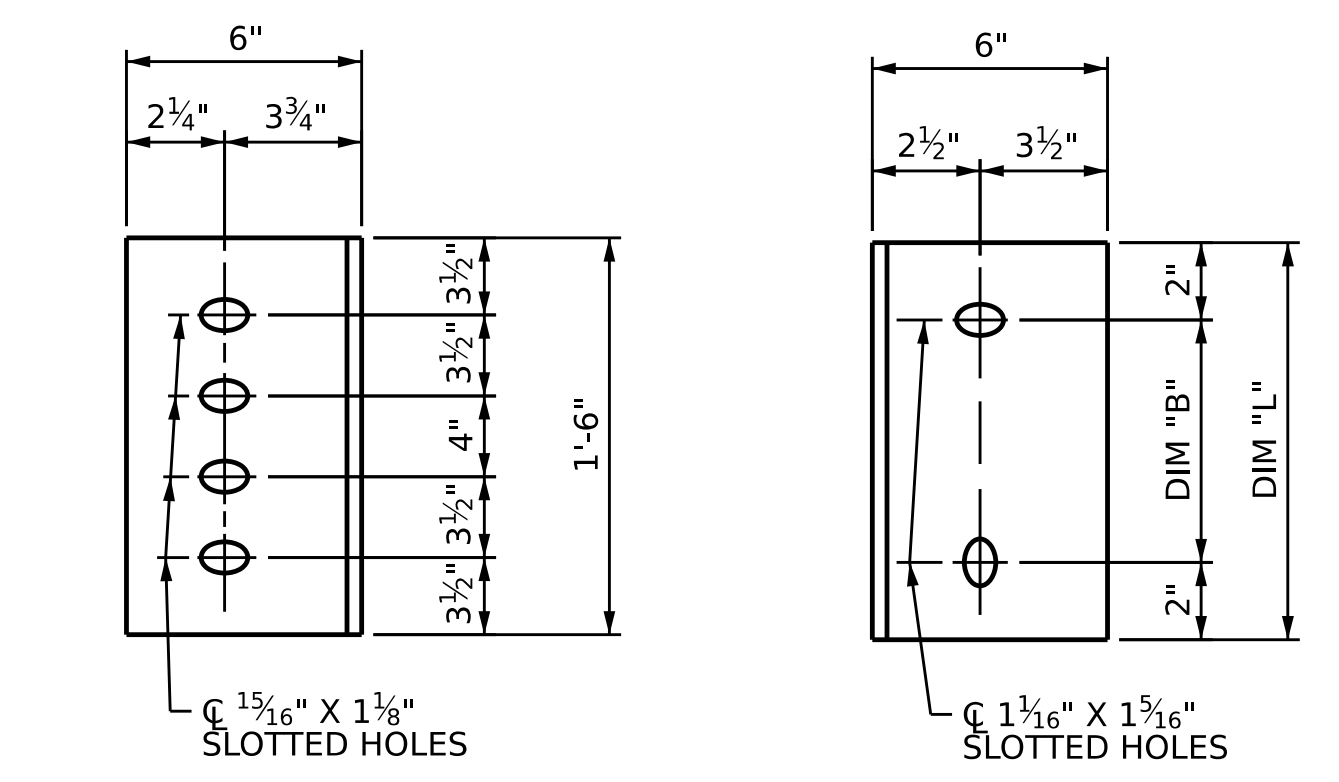
**PART SECTION AT INTERMEDIATE DIAPHRAGM**



**SECTION A-A**

**SECTION B-B**

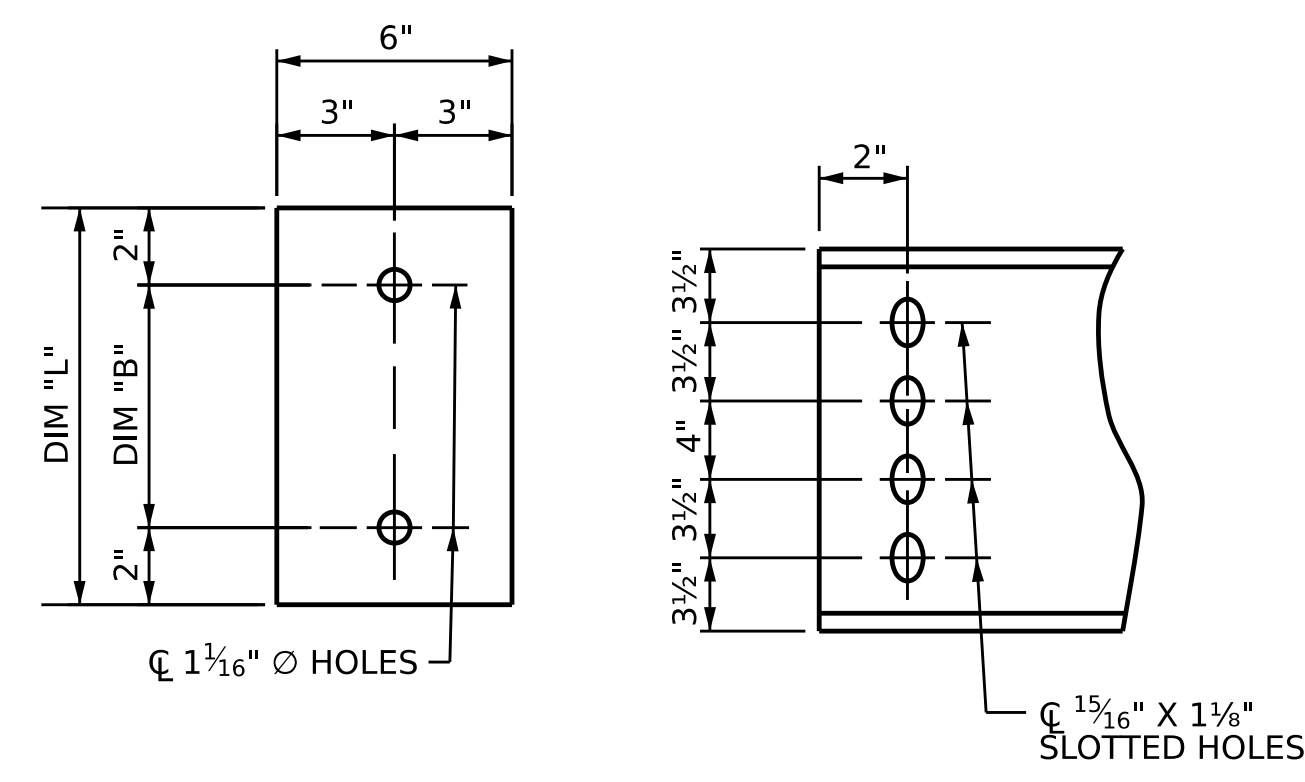
**CONNECTION DETAILS**



**DIAPHRAGM FACE**

**WEB FACE**

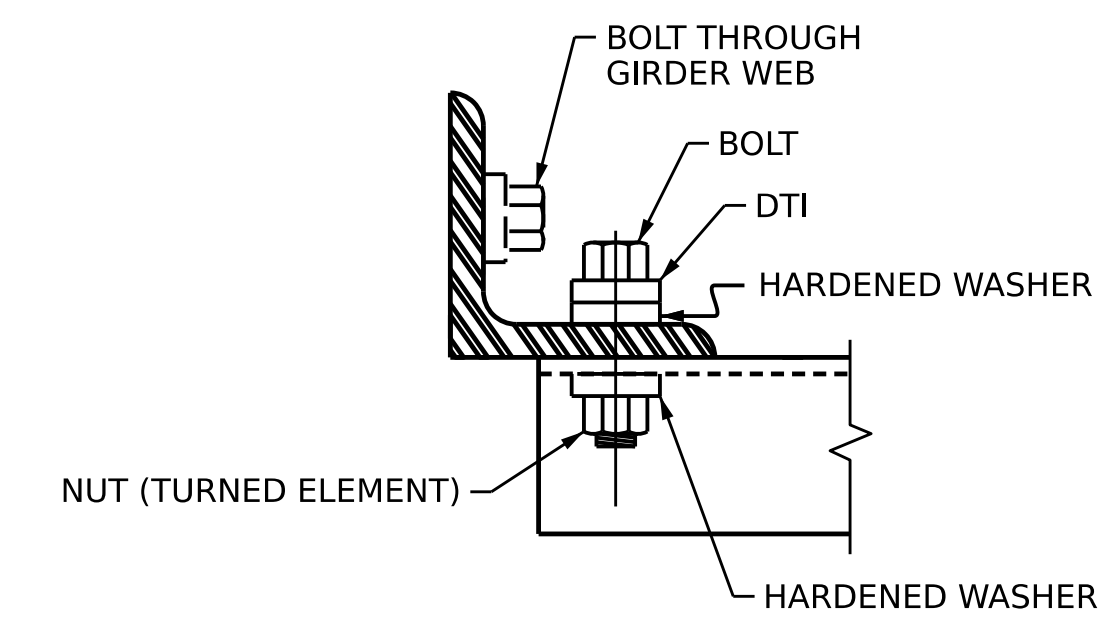
**CONNECTOR PLATE DETAILS**



**PLATE DETAILS**

**CHANNEL END**

**BOLT WITH DTI ASSEMBLY DETAIL**



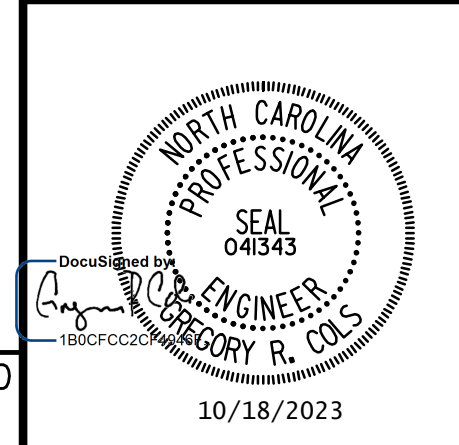
**TABLE**

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
54" FIB	MC 18 X 42.7	2'-3 1/2"	1'-2"	1'-6"

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY

STATION: 32+21.34 -L LT-

SHEET 1 OF 1



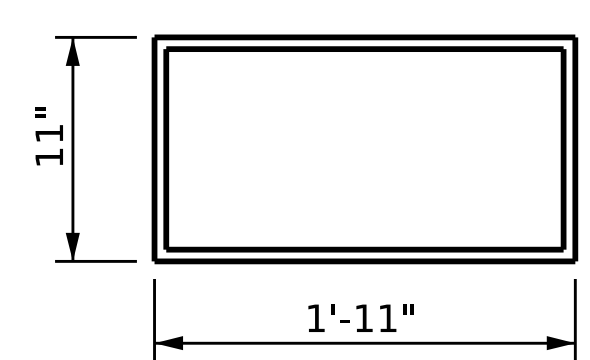
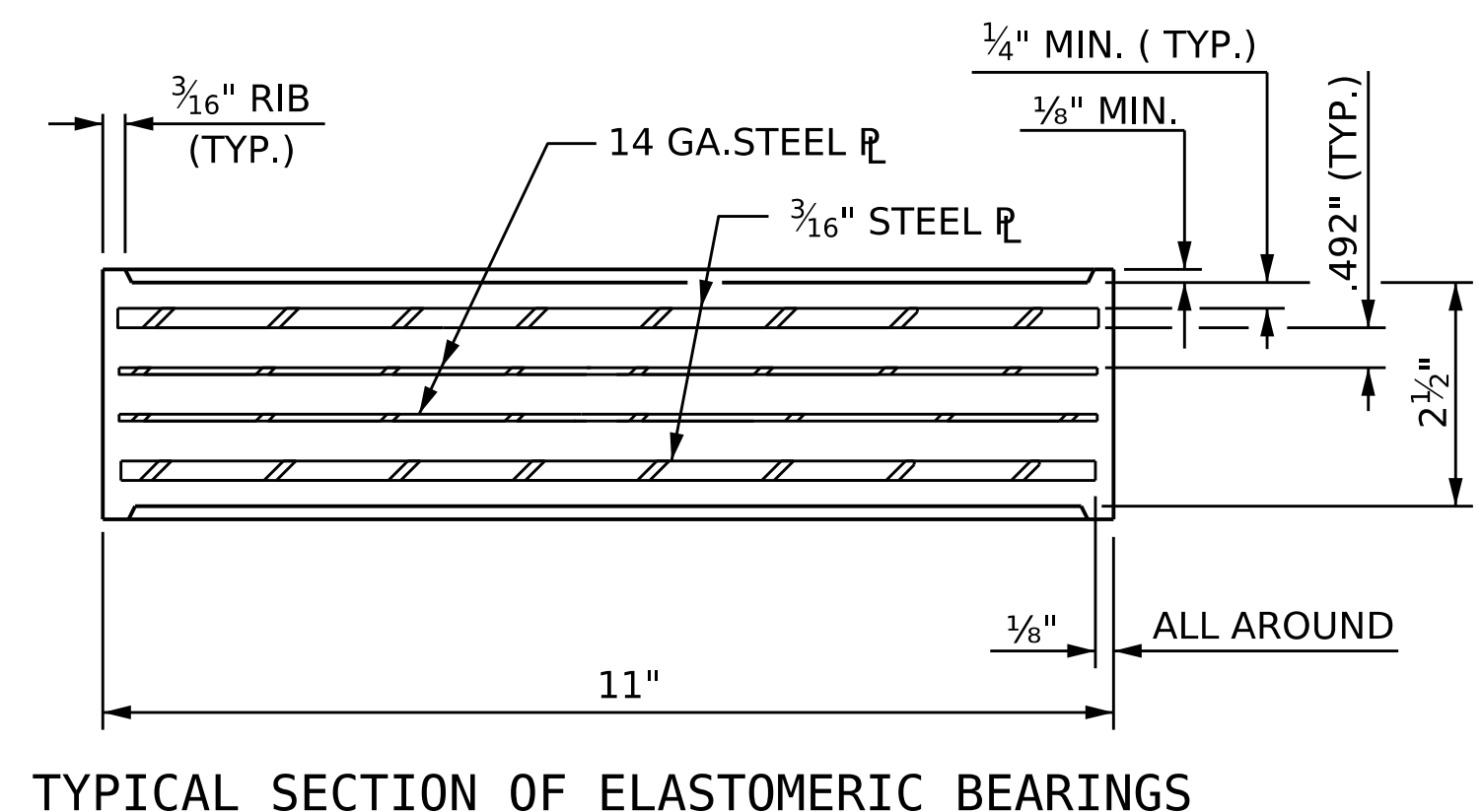
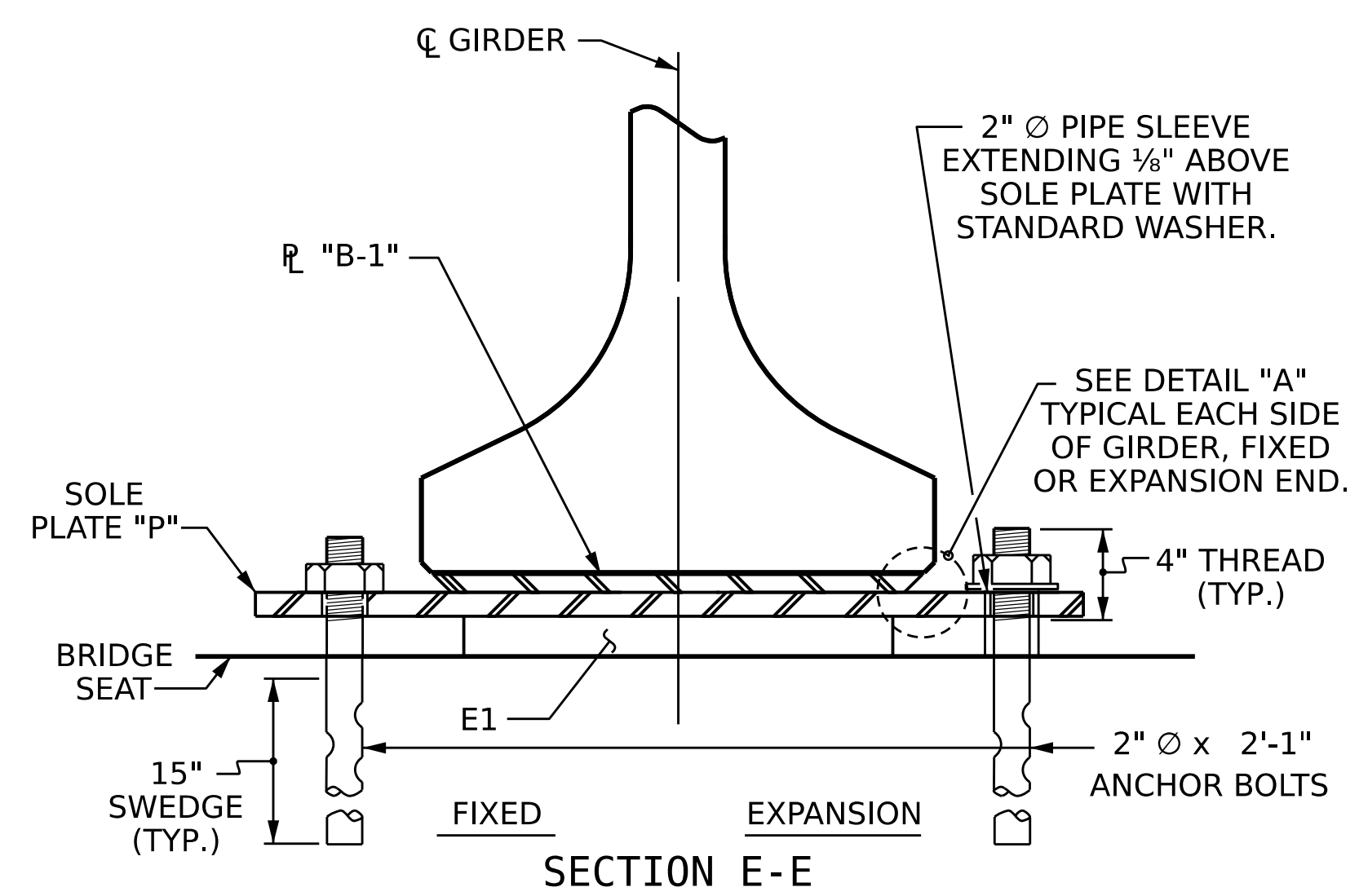
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD

**INTERMEDIATE STEEL DIAPHRAGMS FOR PRESTRESSED CONCRETE GIRDERS**

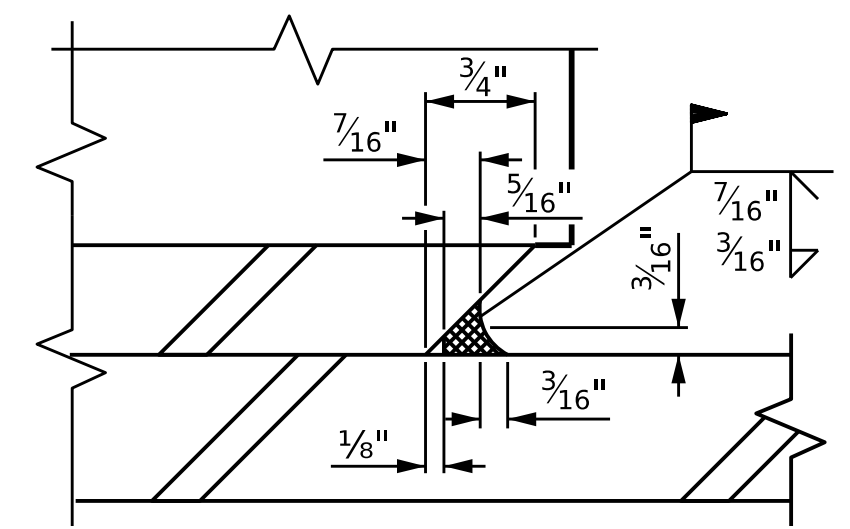
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-20
1			3			TOTAL SHEETS
2			4			43

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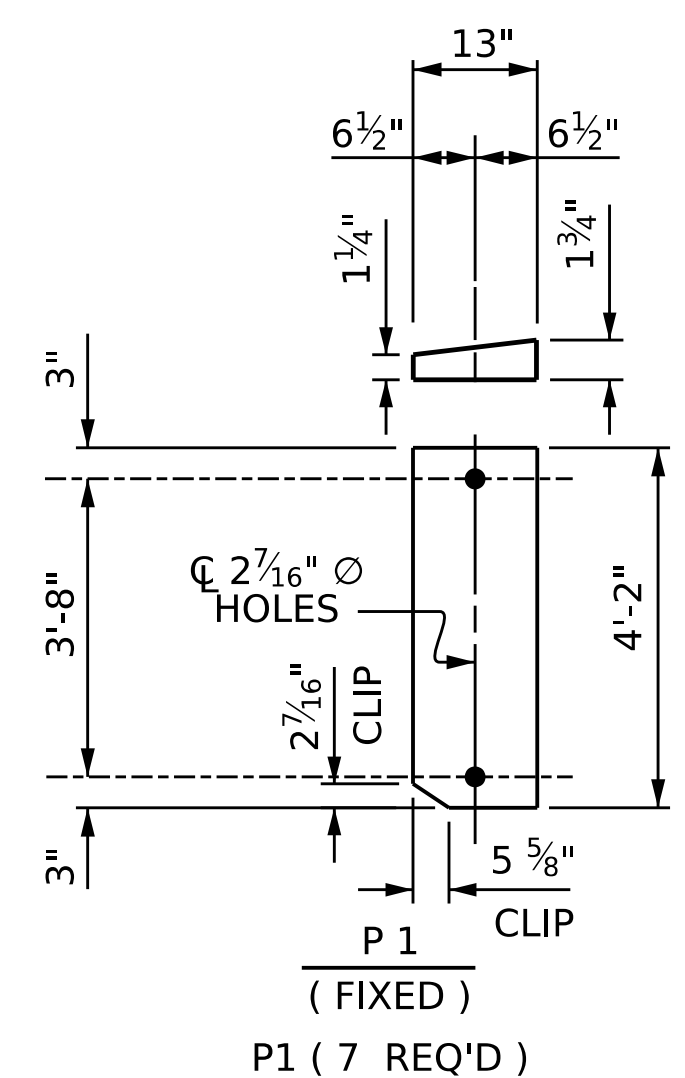
ASSEMBLED BY : T.E. NEAL	DATE : 02/2023
CHECKED BY : S. NATARAJAN	DATE : 02/2023
DRAWN BY : TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



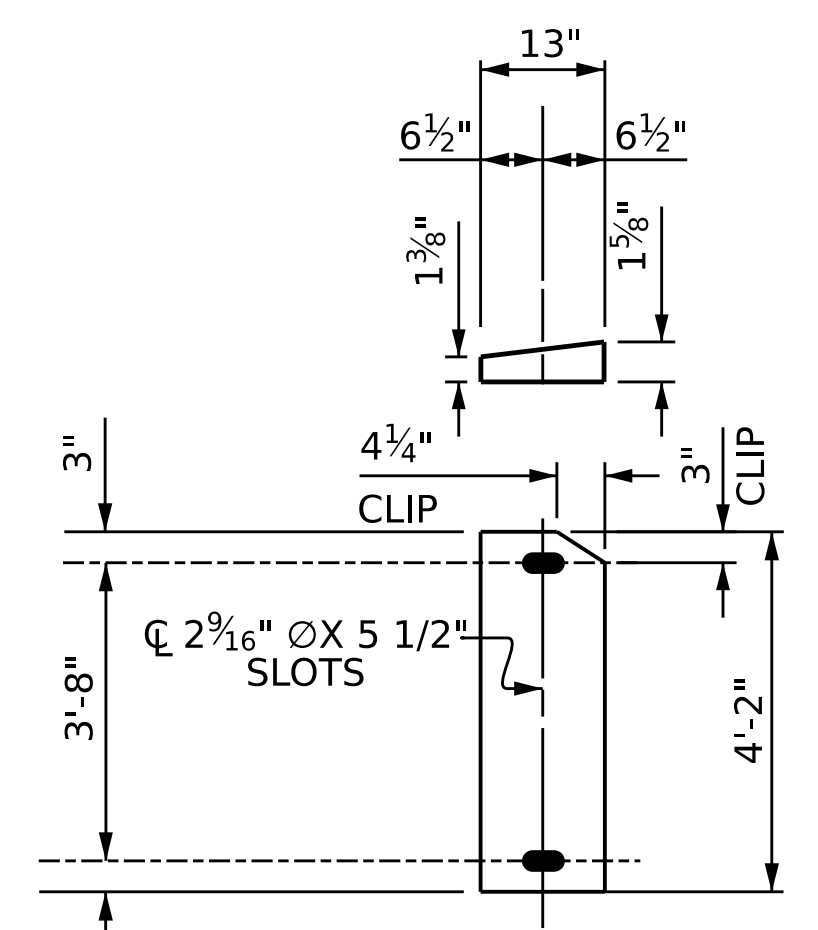
E1 (14 REQ'D)  
**PLAN VIEW OF ELASTOMERIC BEARING**  
**TYPE VI**



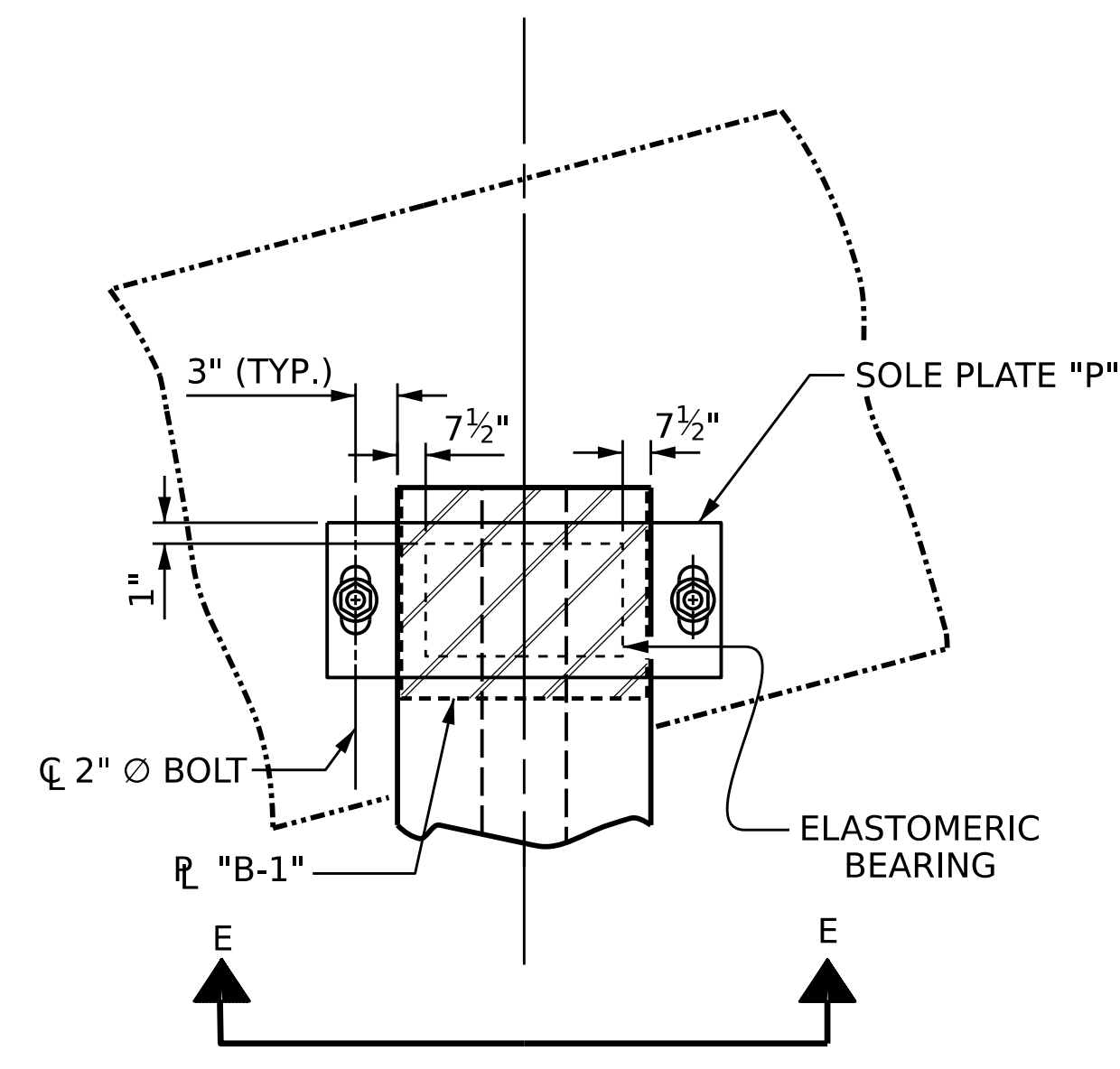
**DETAIL \"A\"**



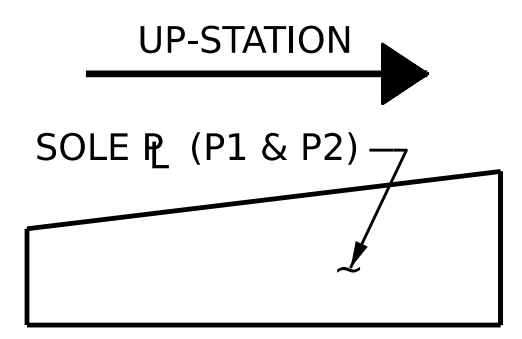
**SOLE PLATE DETAILS (\"P1\")**



**SOLE PLATE DETAILS (\"P2\")**



**TYPICAL HALF-PLAN**  
 (SHOWING SIMPLE SPAN END BENT)



**SOLE PLACEMENT DETAIL**

**NOTES**

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2"Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE, THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F3125 GRADE A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

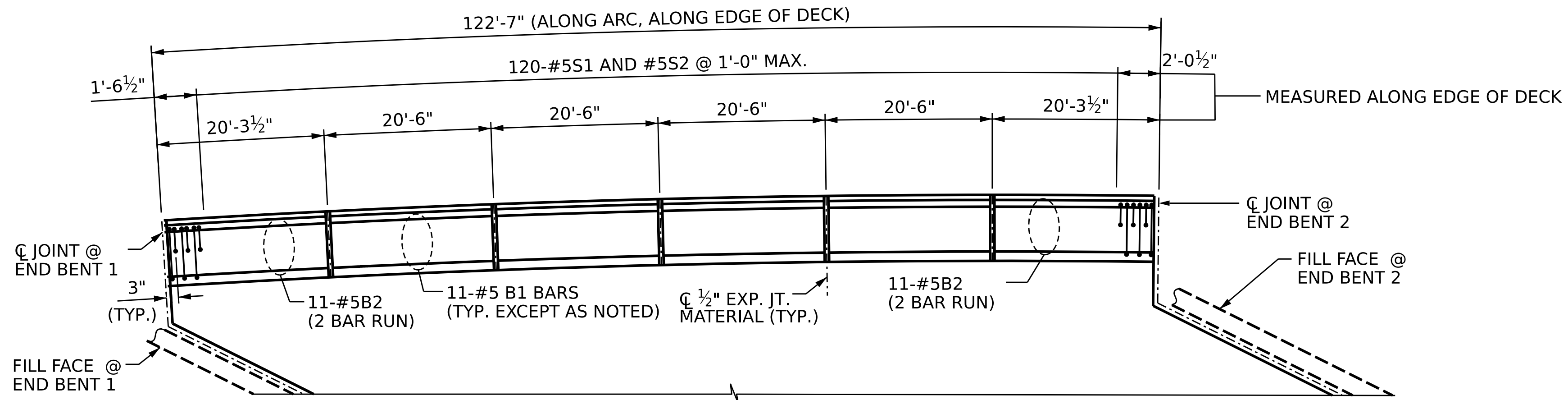
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L. + L.L. (NO IMPACT)	
TYPE VI	358 k

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L\_ LT-  
 SHEET 1 OF 1

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD <b>ELASTOMERIC BEARING DETAILS</b> PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-21					TOTAL SHEETS 43

ASSEMBLED BY : T.E. NEAL	DATE : 02/2023
CHECKED BY : S. NATARAJAN	DATE : 02/2023
DRAWN BY : WJH 8/89	REV. 1/15 MAA/TMG
CHECKED BY : CRK 8/89	REV. 12/17 MAA/THC
	REV. 10/21 BNB/AAI

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**NOTES:**

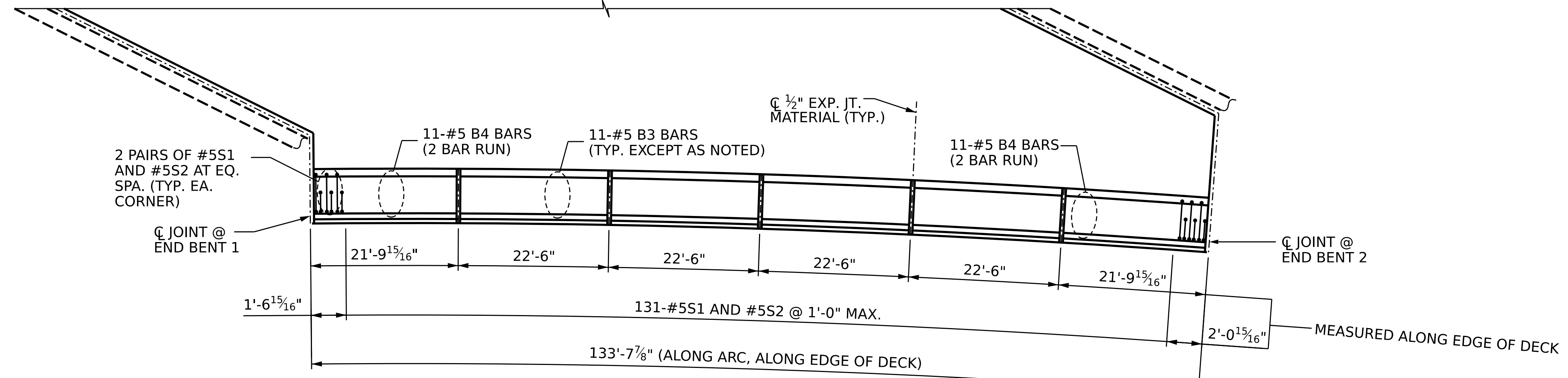
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT THE MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

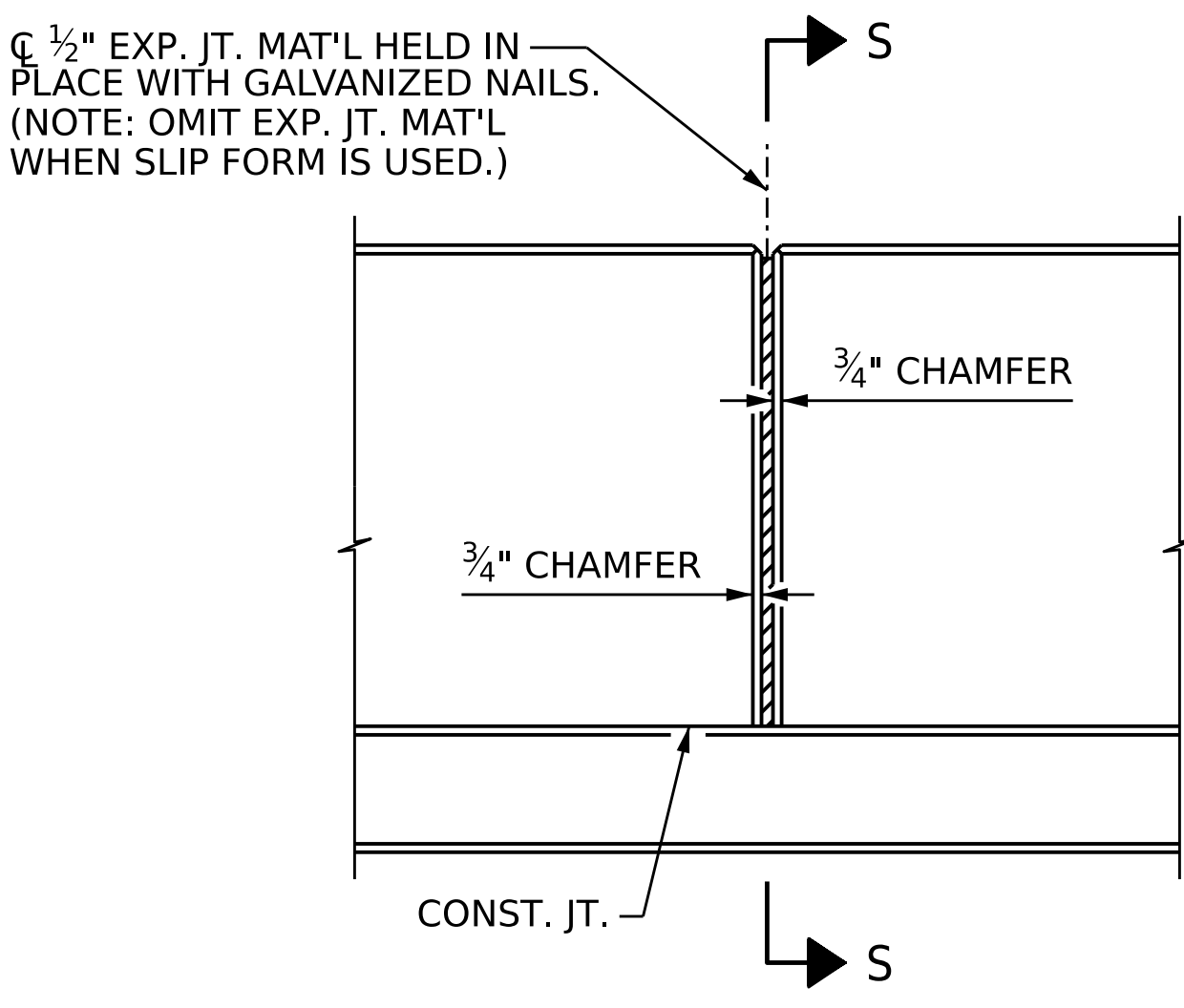
ALL REINFORCING STEEL IN THE CONCRETE BARRIER RAIL SHALL BE EPOXY COATED.

THE #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO PROVIDE 2" CLEARANCE TO THE 1/2" EXPANSION JOINT.

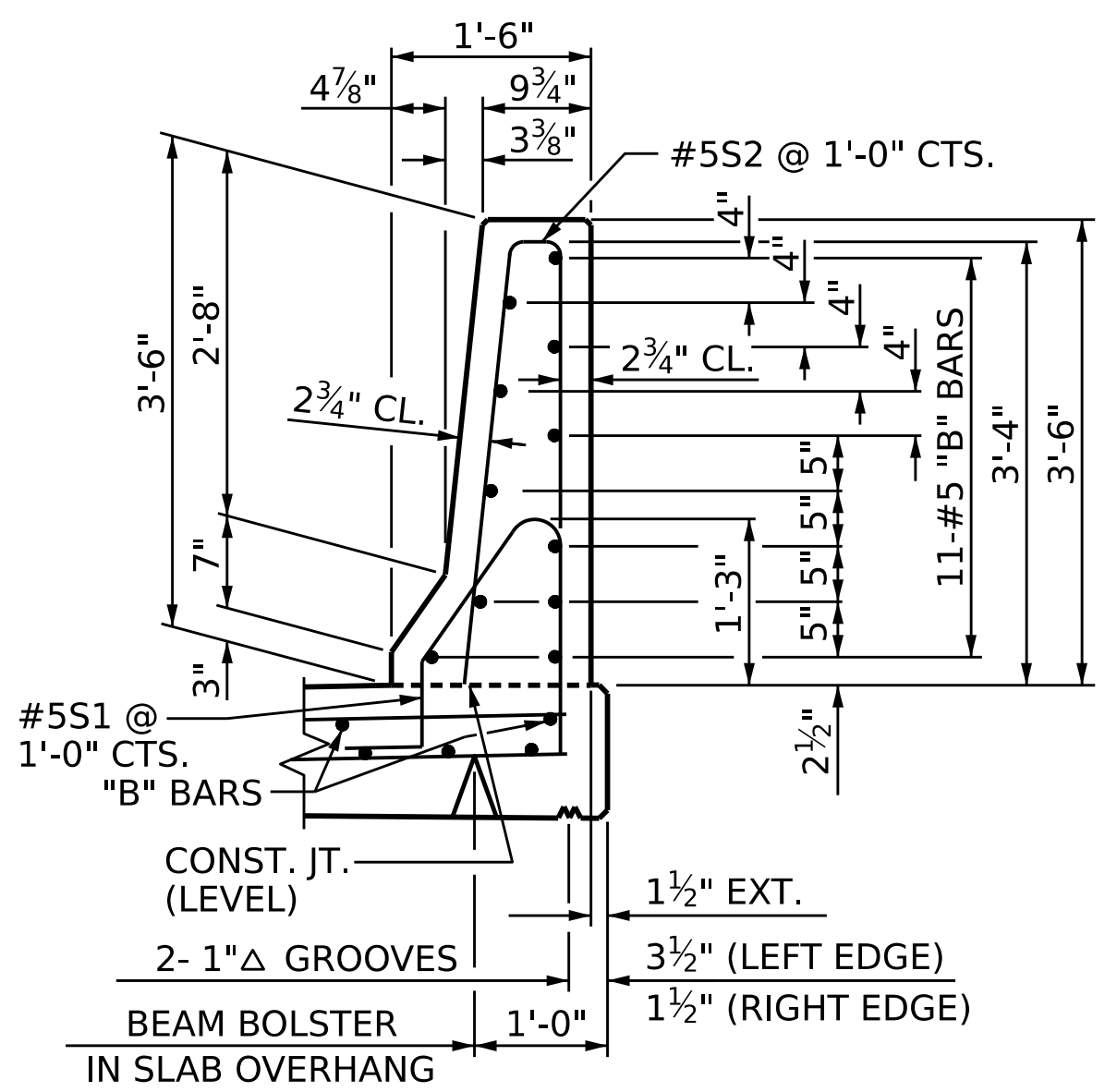
BILL OF MATERIAL					
CONCRETE BARRIER RAIL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	5	STR	20'-1"	922
* B2	44	5	STR	11'-7"	532
* B3	44	5	STR	22'-1"	1013
* B4	44	5	STR	12'-4"	566
* S1	259	5	1	4'-7"	1,238
* S2	259	5	2	7'-0"	1,891
* EPOXY COATED REINFORCING STEEL					6,162 LBS.
CLASS AA CONCRETE					34.9 C.Y.
CONCRETE BARRIER RAIL					256.25 L.F.
BAR TYPES					
ALL BAR DIMENSIONS ARE OUT TO OUT.					



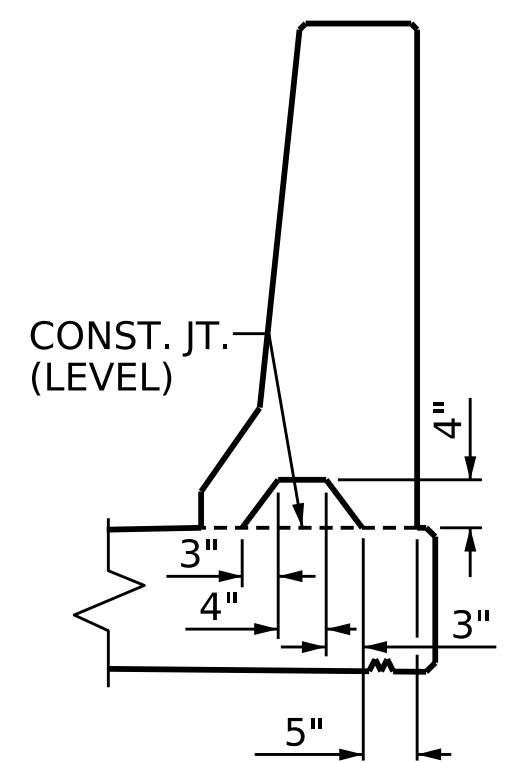
**PLAN OF CONCRETE BARRIER RAIL**



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL



SECTION S-S

AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L\_ LT-

**AECOM**  
AECOM TECHNICAL SERVICES OF NC, INC.  
 5438 WADE PARK BOULEVARD, SUITE 200  
 RALEIGH, NC 27607  
 (919) 854-6200 www.aecom.com  
 AECOM License No. F0242

**PROFESSIONAL ENGINEER**  
 GREGORY R. COLS  
 SEAL 041343  
 10/18/2023

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
<b>CONCRETE BARRIER RAIL</b>					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S1-22
					TOTAL SHEETS 43

DRAWN BY :	T. NEAL	DATE :	02/2023
CHECKED BY :	S. NATARAJAN	DATE :	04/2023
DESIGN ENGINEER OF RECORD :	G.R. COLS	DATE :	04/2023

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**NOTES**

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

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.)

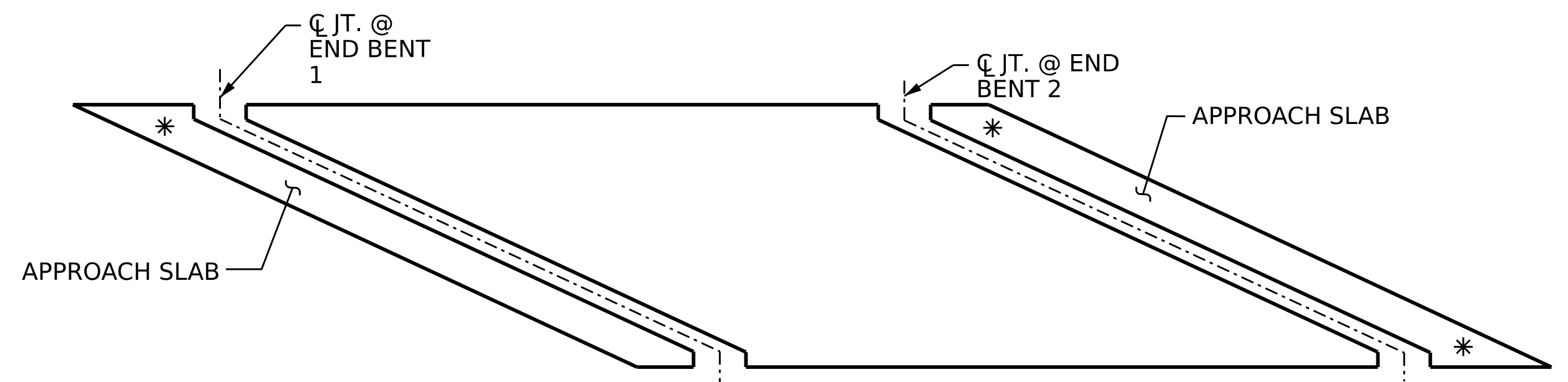
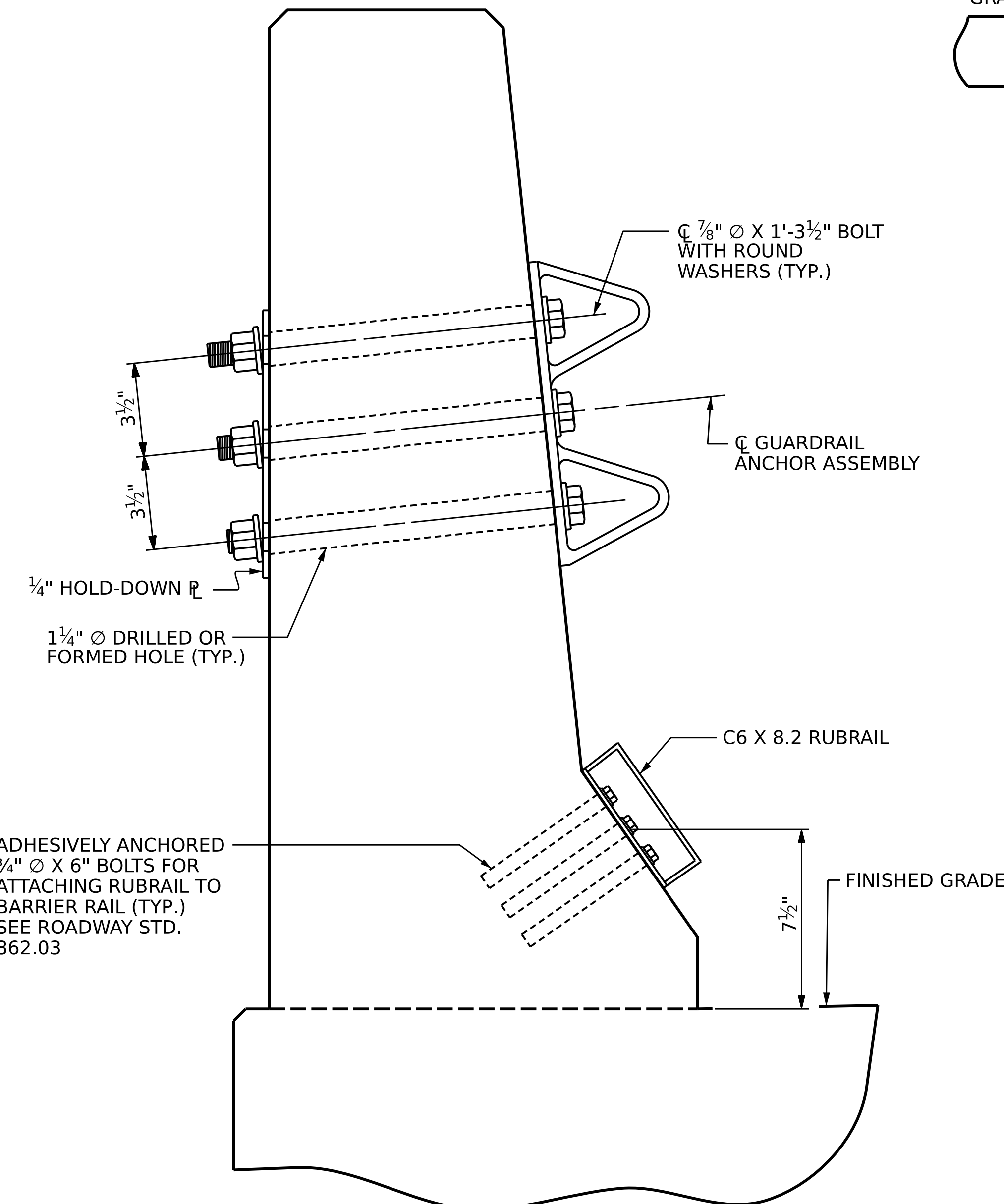
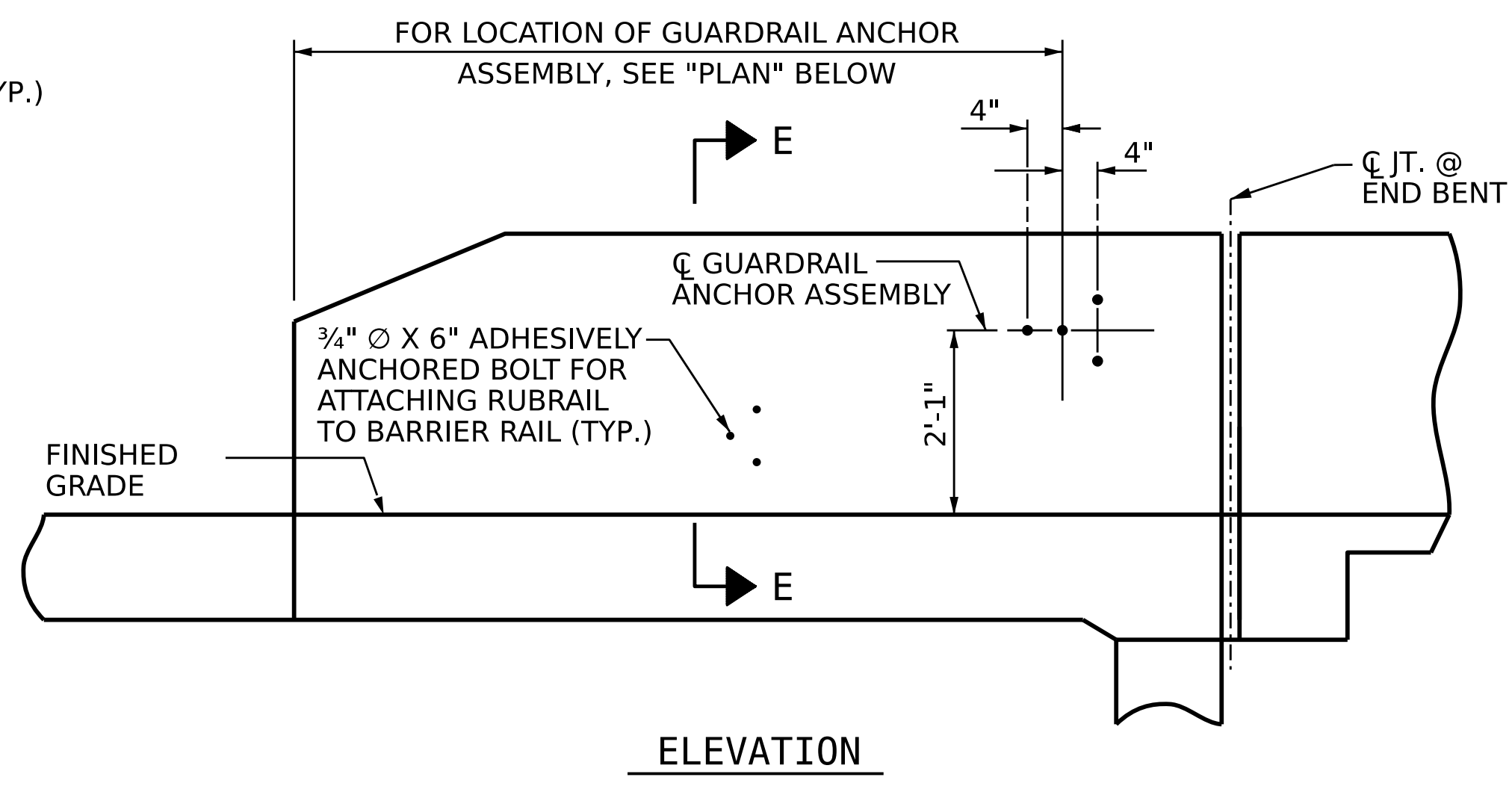
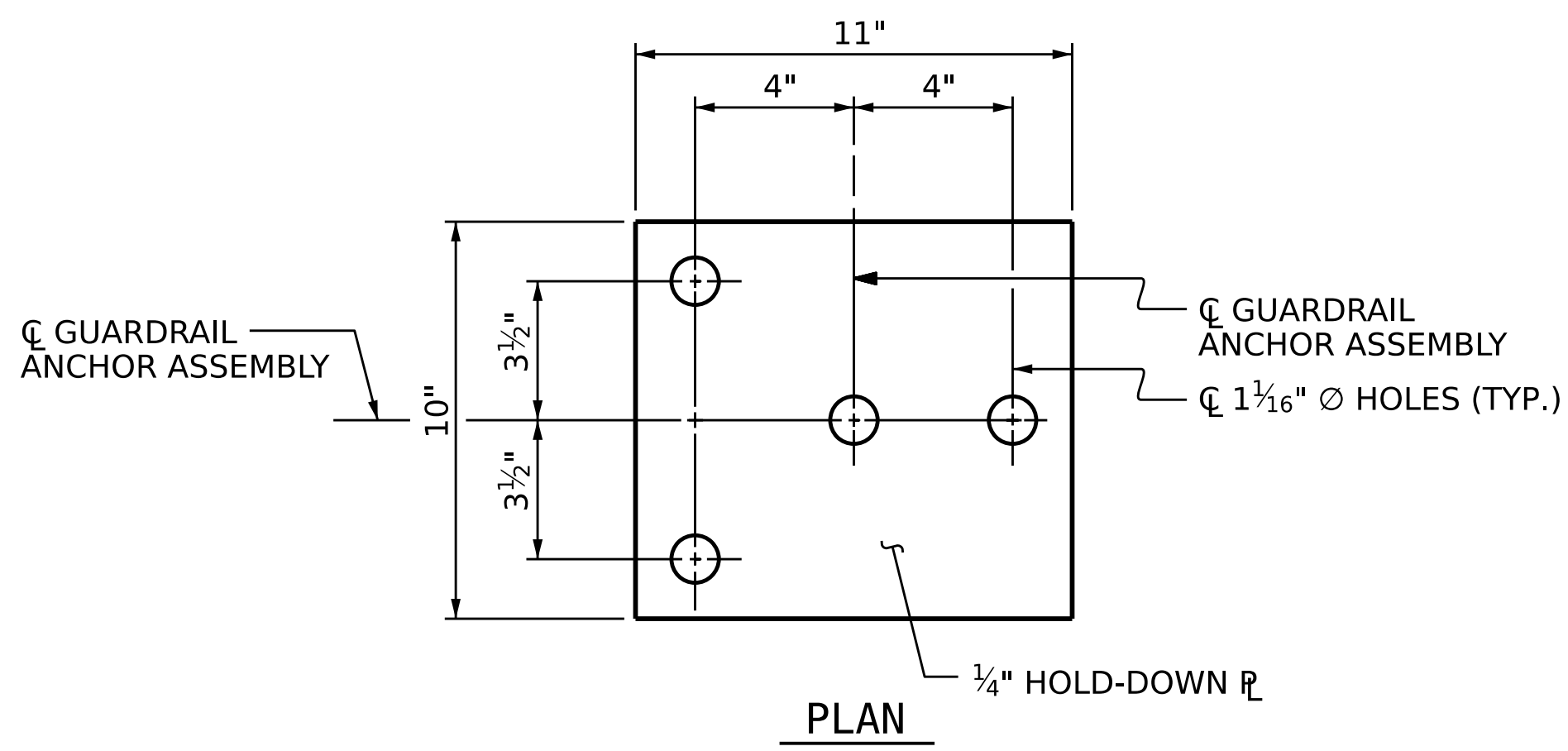
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 CONCRETE BARRIER RAIL.

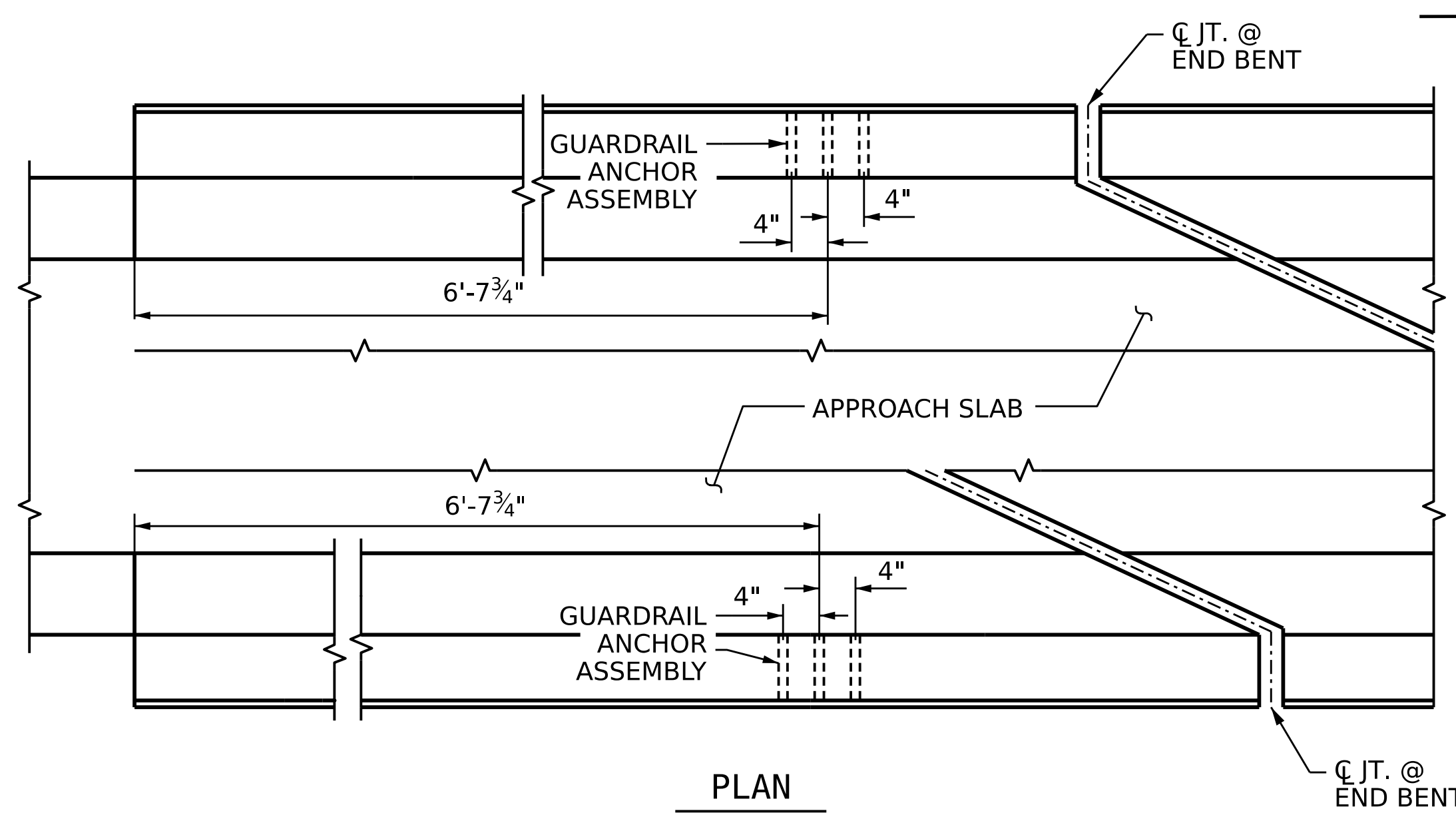
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



**SKETCH SHOWING POINTS OF ATTACHMENTS**

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY



**LOCATION OF ANCHORS FOR GUARDRAIL**

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

NOTE: NO GUARDRAIL ATTACHMENT ON END BENT #1 RIGHT SIDE.

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-

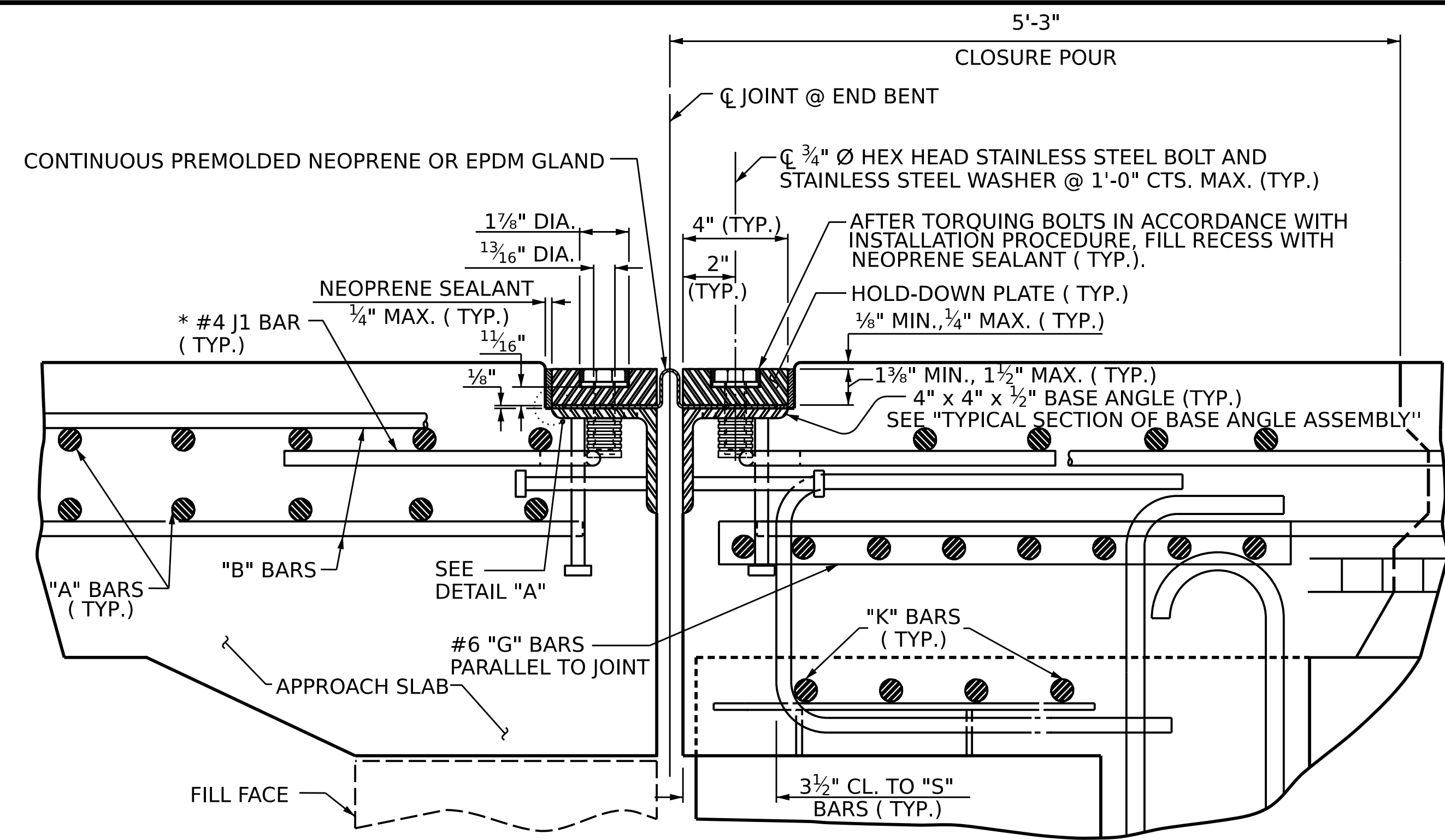
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 AECOM License No. F0242

**PROFESSIONAL ENGINEER**  
 SEAL 041343  
 GREGORY R. COLS  
 10/18/2023

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD <b>GUARDRAIL ANCHORAGE FOR BARRIER RAIL</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-23					TOTAL SHEETS 43

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

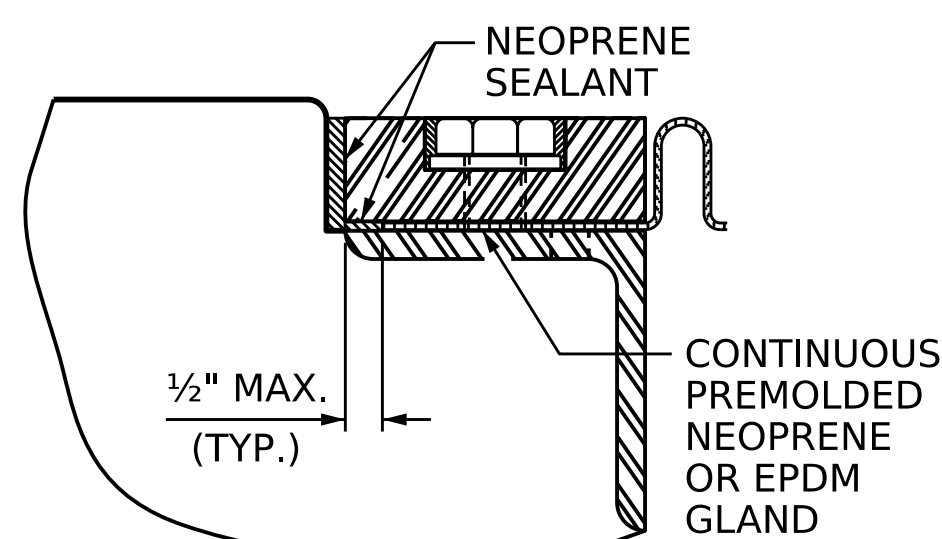
ASSEMBLED BY : T.E. NEAL	DATE : 03/2023
CHECKED BY : S. NATARAJAN	DATE : 03/2023
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RCW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



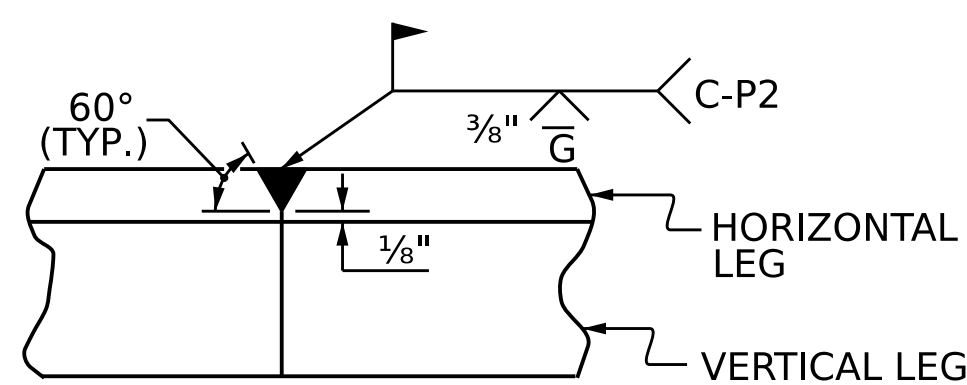
**EXPANSION JOINT DETAILS**

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

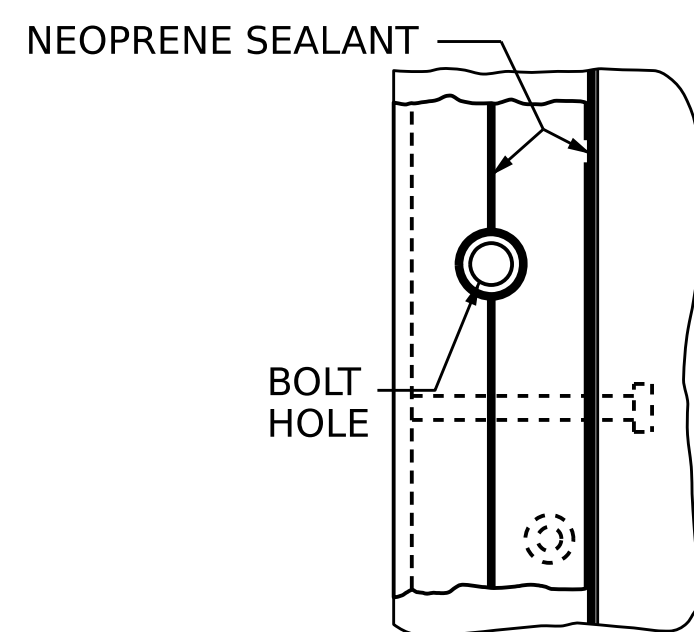
\* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



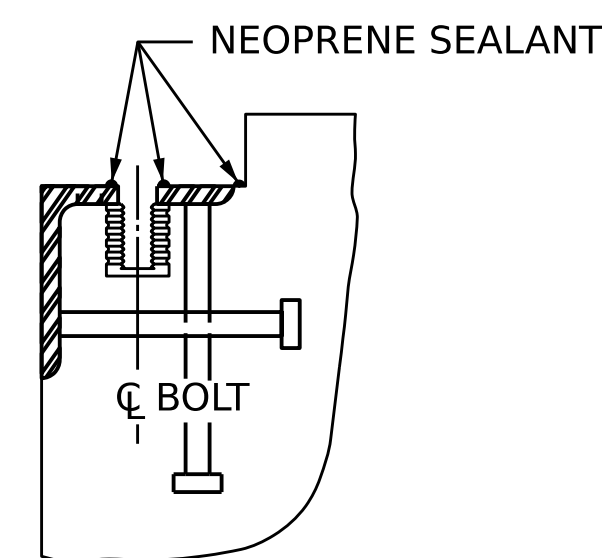
**DETAIL "A"**



**DETAIL - FIELD WELD  
SPLICE OF BASE ANGLE**



**PLAN VIEW**



**CROSS SECTION**

**INSTALLATION SKETCH**

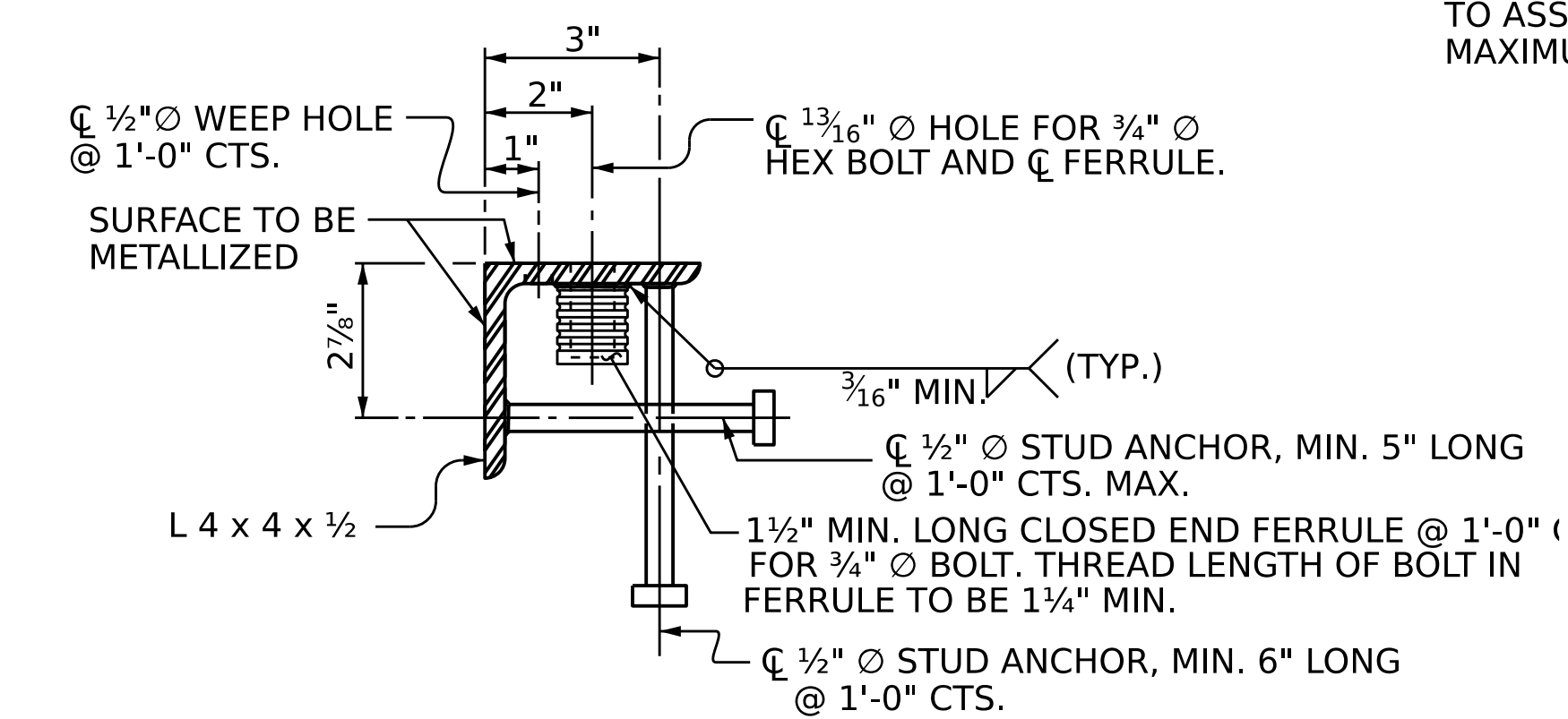
**INSTALLATION PROCEDURE**

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

**GENERAL NOTES**

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED. THE GLAND SHALL BE CONTINUOUS AT THE BREAKBACK. SUBMIT DETAILS FOR THE GLAND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.

MOVEMENT AND SETTING AT JOINT					
LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG CL RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT 1	28° 48' 25"	-	1 1/2"	1 1/2"	1 1/2"
END BENT 2	24° 12' 59"	1 3/16"	1 3/8"	1 1/2"	1 1/2"



**TYPICAL SECTION OF BASE ANGLE ASSEMBLY**

PROJECT NO. **B-3186 / B-5898**  
**HAYWOOD** COUNTY  
 STATION: **32+21.34 -L\_ LT-**

SHEET 1 OF 2

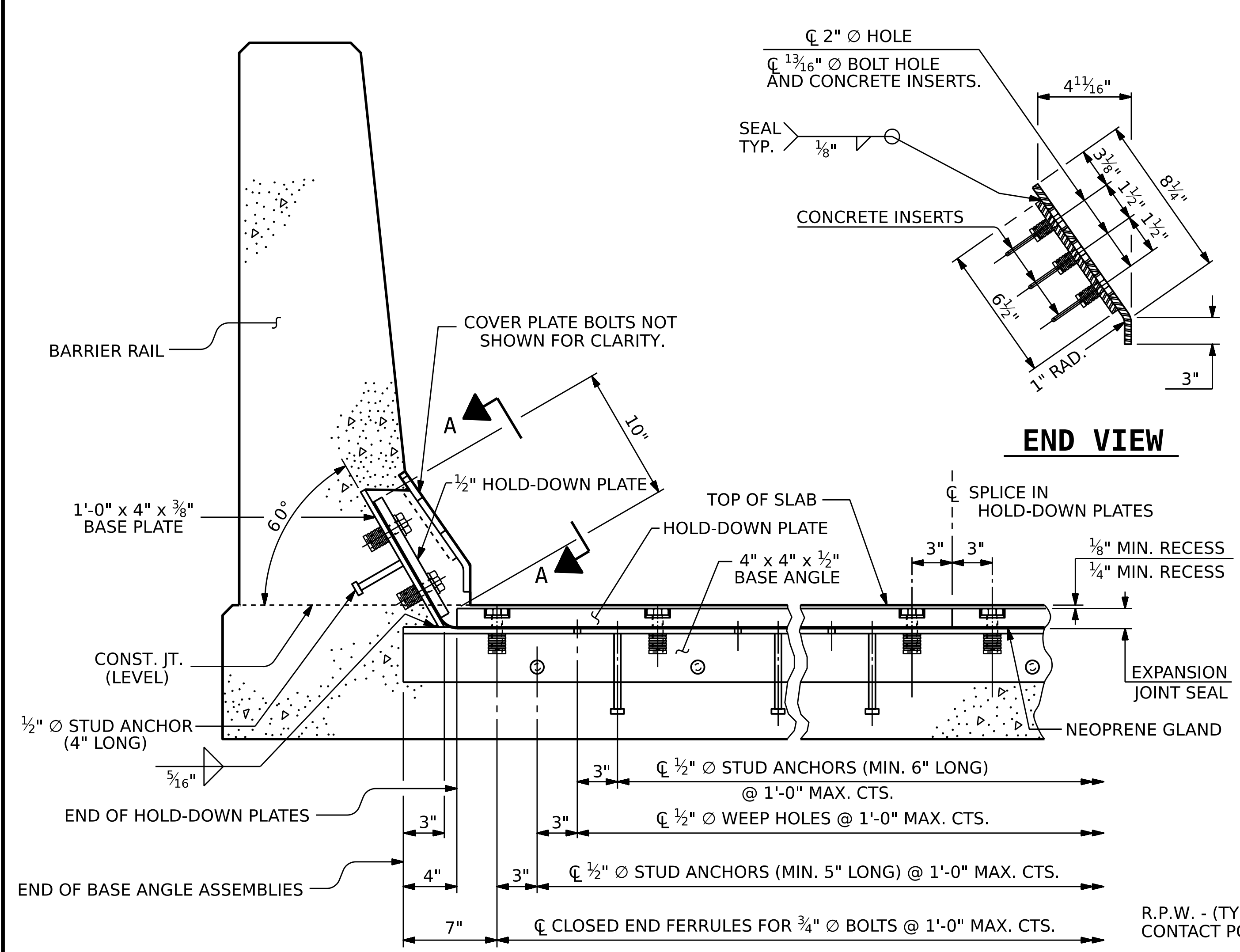
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**SEAL**  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 GREGORY R. COLS  
 041343  
 10/18/2023

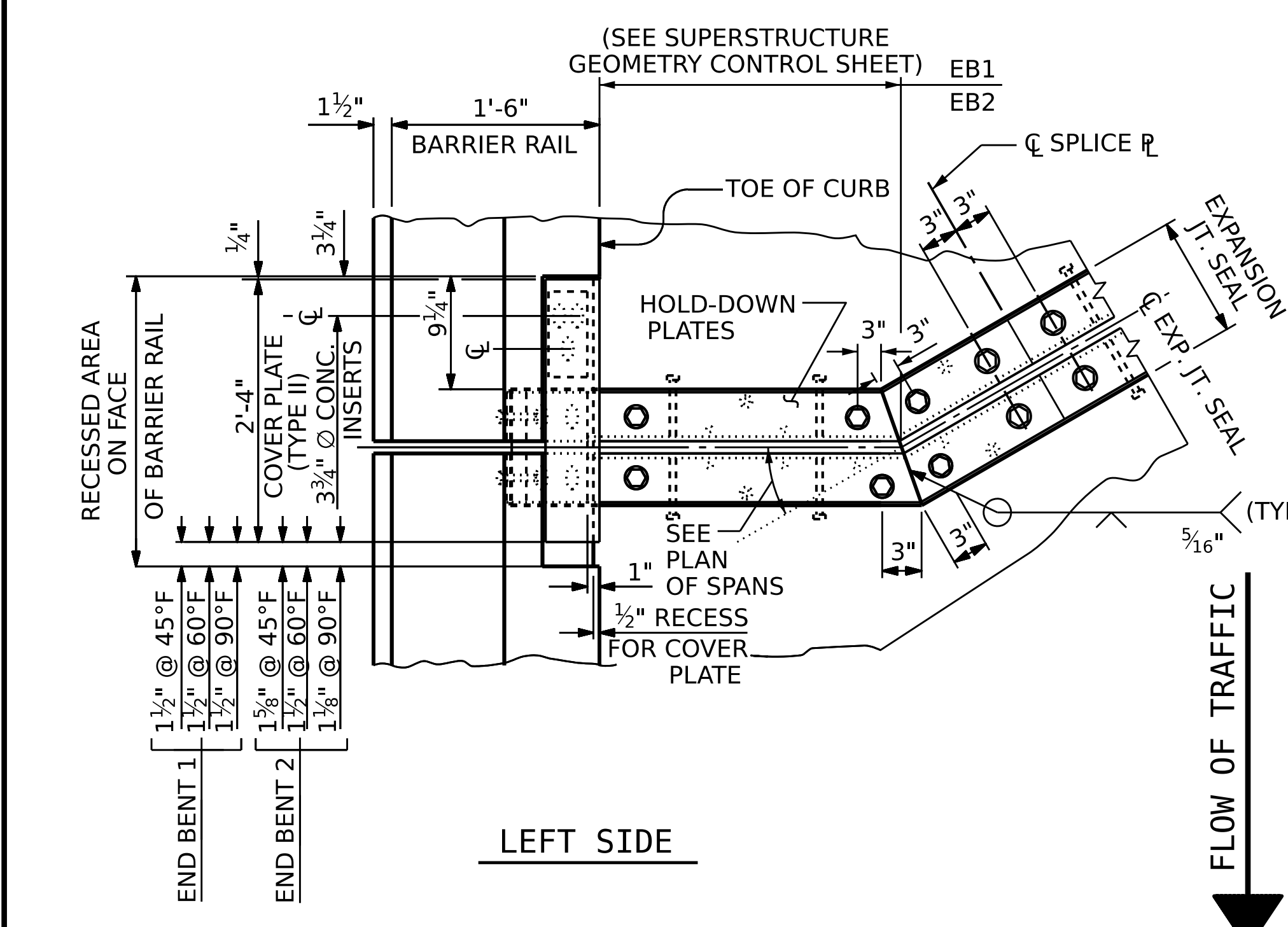
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
<b>EXPANSION JOINT SEAL DETAILS</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S1-24
TOTAL SHEETS					43

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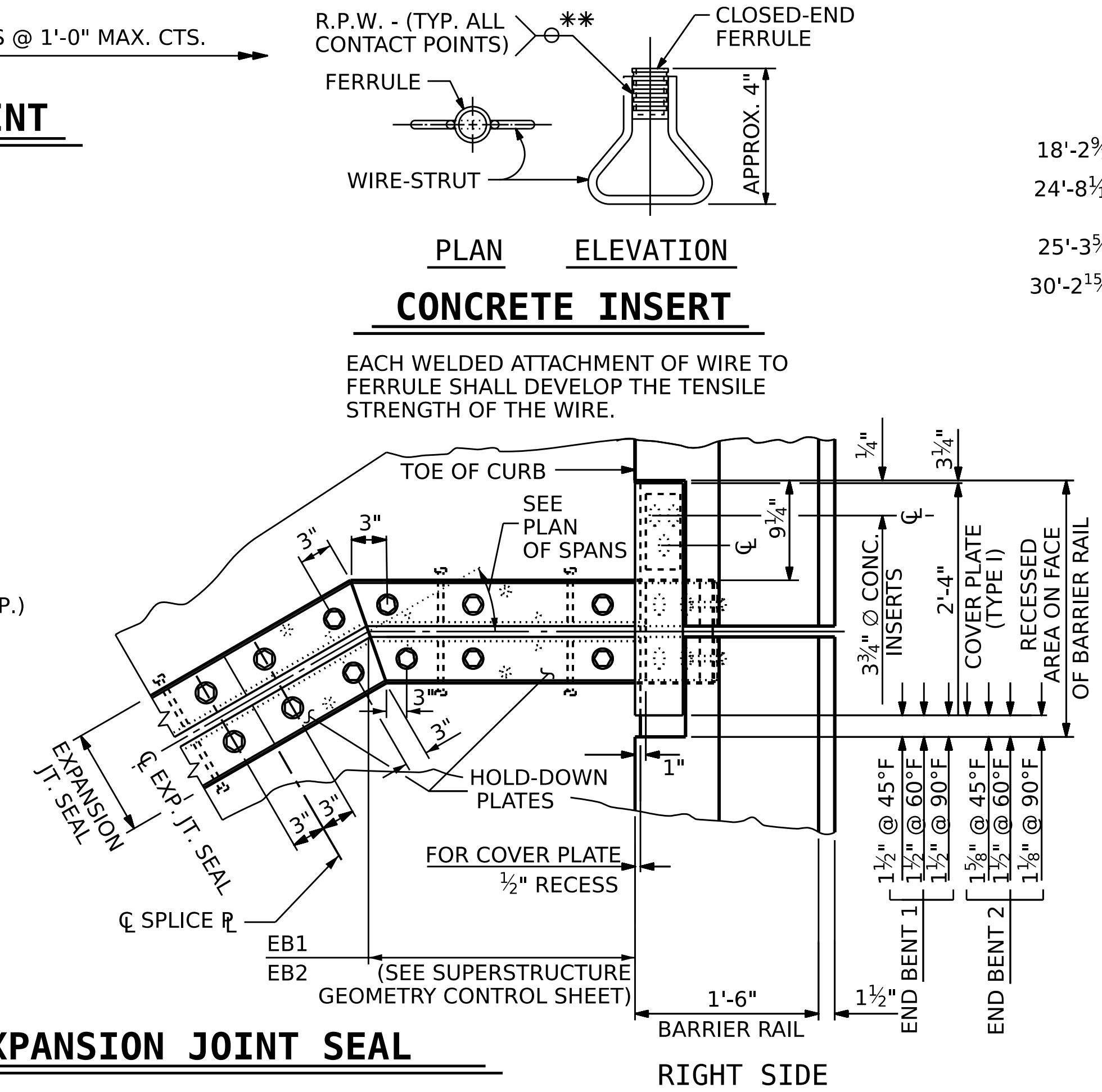
ASSEMBLED BY : T.E. NEAL	DATE : 03/2023
CHECKED BY : S. NATARAJAN	DATE : 03/2023
DRAWN BY : REK 9/87	REV. 10/17/11 MAA/GM
CHECKED BY : CRK 10/87	REV. 10/17 MAA/THC
	REV. 6/18 MAA/THC



**SECTION THRU RAIL NORMAL TO JOINT**

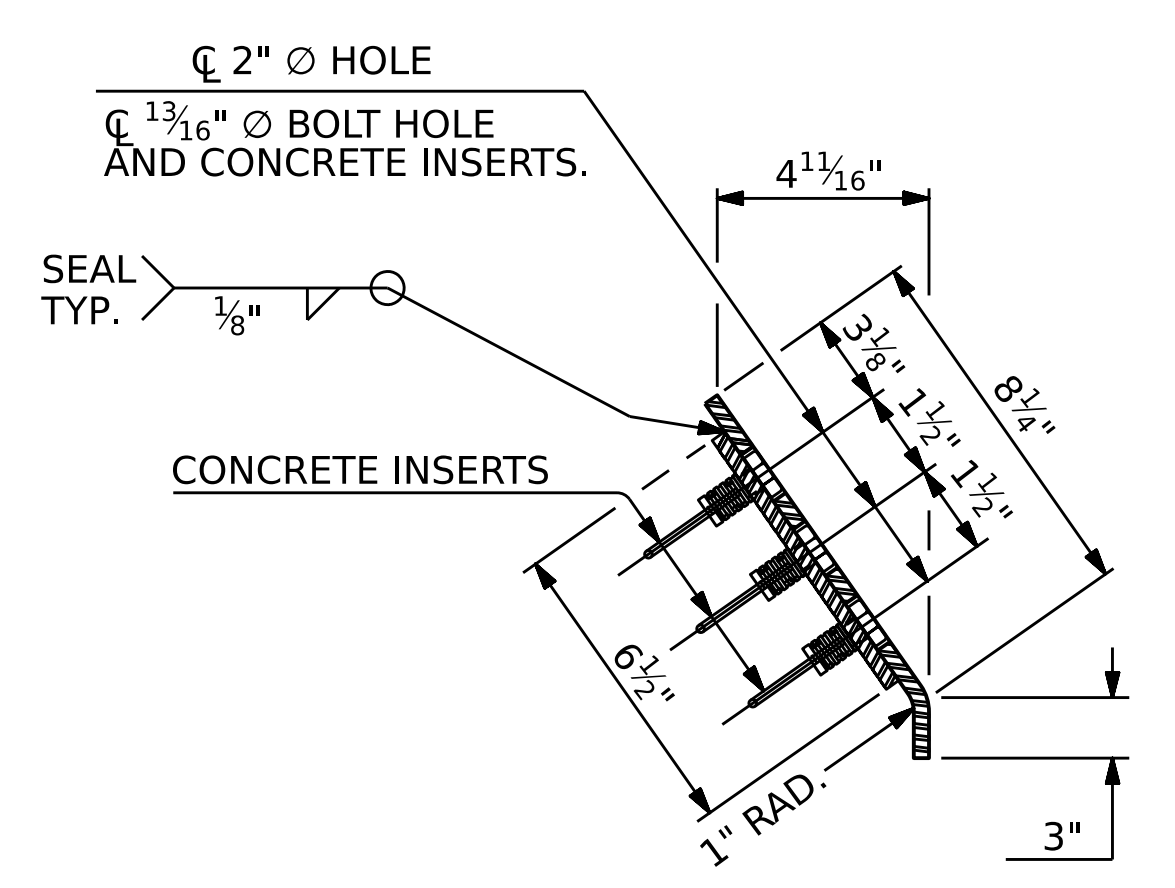


**LEFT SIDE**

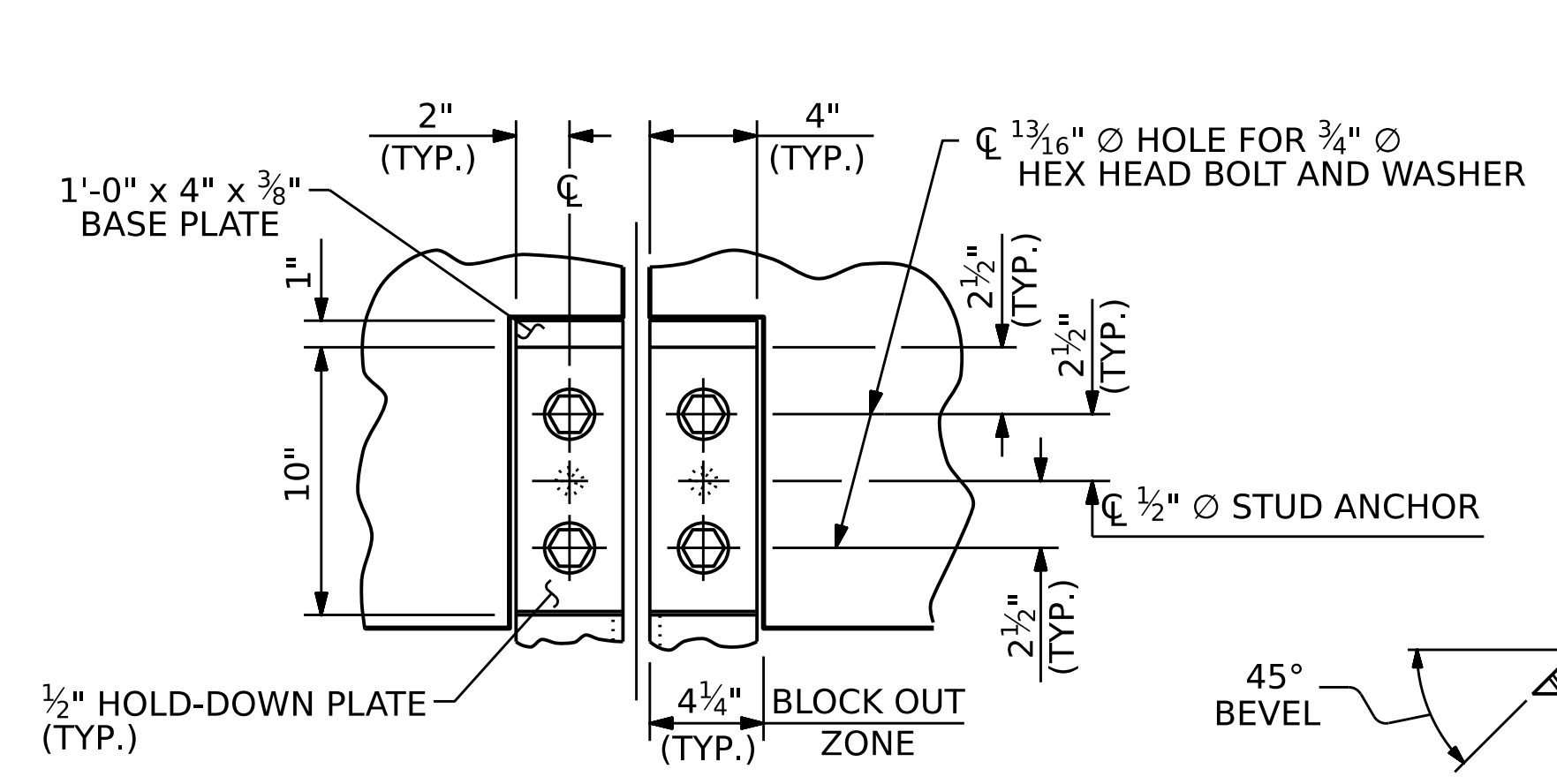


**PLAN OF EXPANSION JOINT SEAL**

ASSEMBLED BY : T.E. NEAL	DATE : 04/2023
CHECKED BY : S. NATARAJAN	DATE : 04/2023
DRAWN BY : REK 9/87	REV. 7/12 MAA/GM
CHECKED BY : CRK 10/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

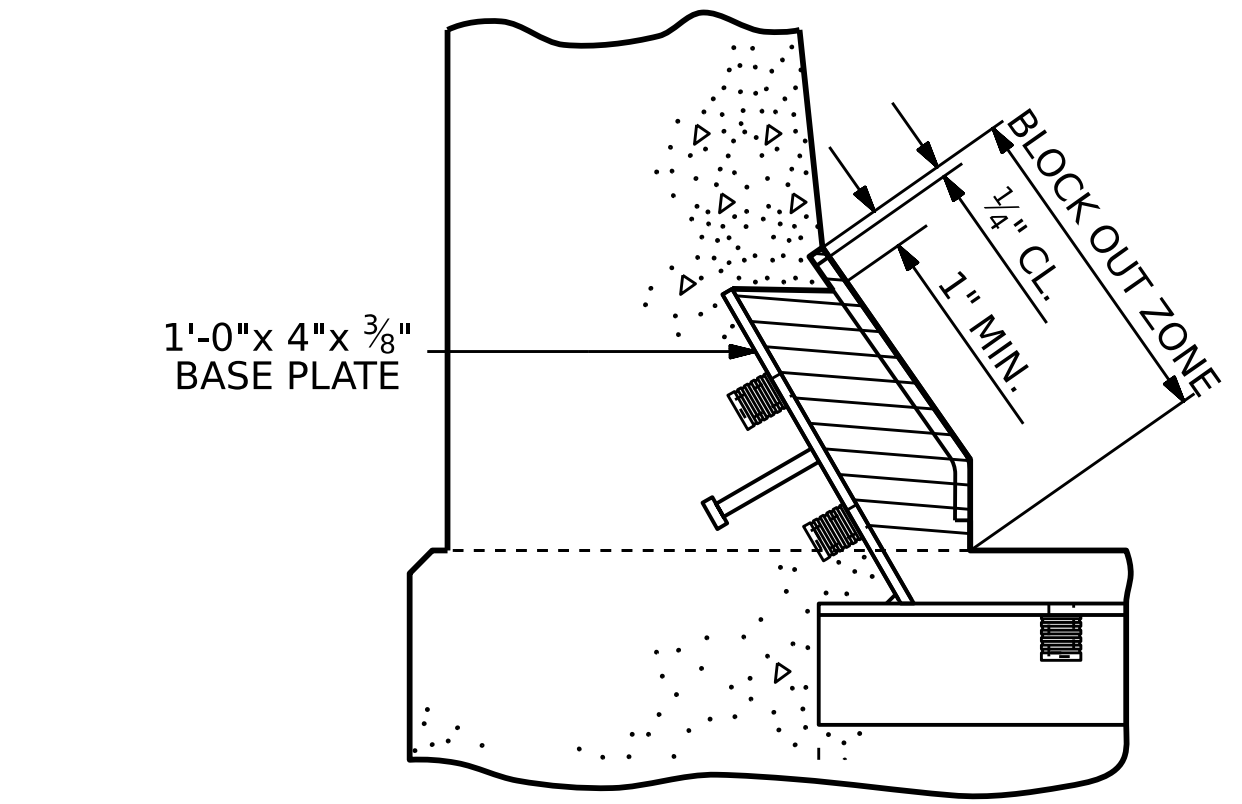


**END VIEW**

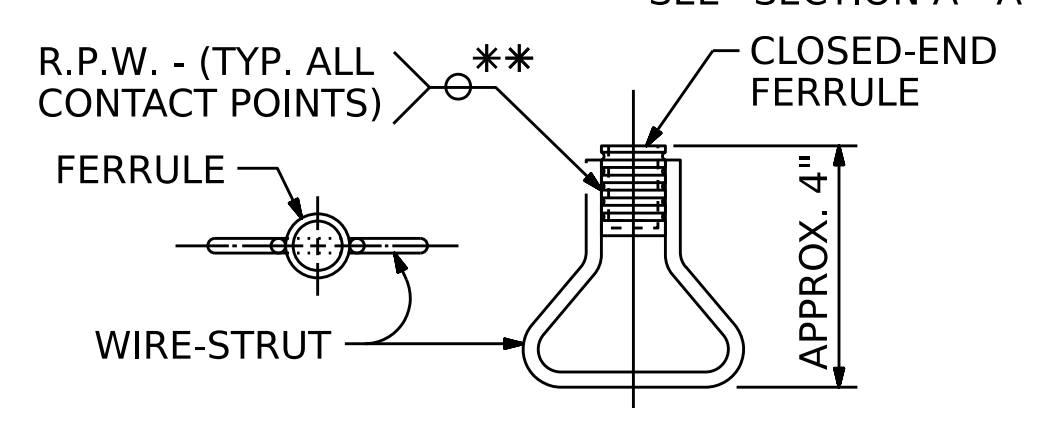


**SECTION A-A**

**SECTION B-B**

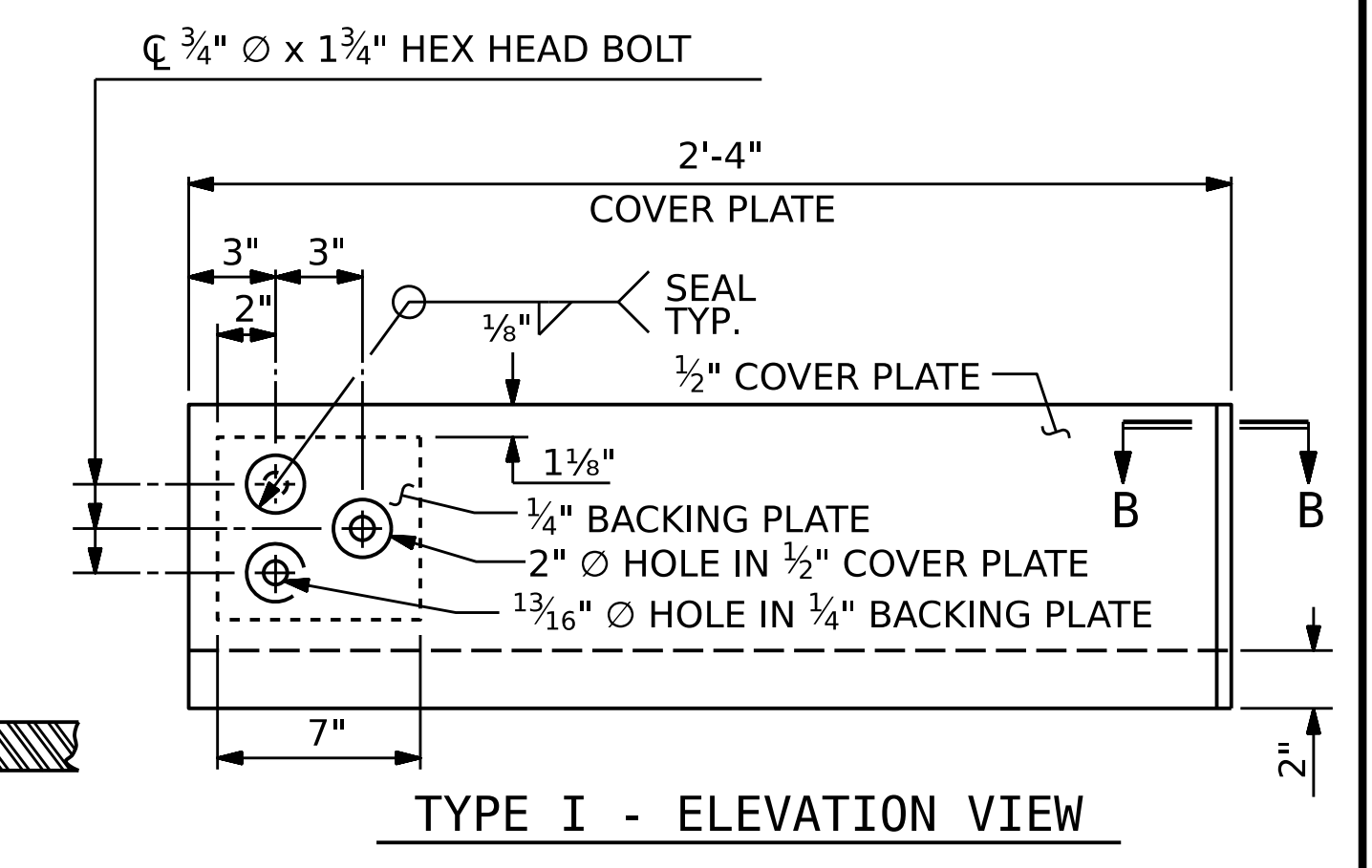


**BLOCK OUT DETAIL**

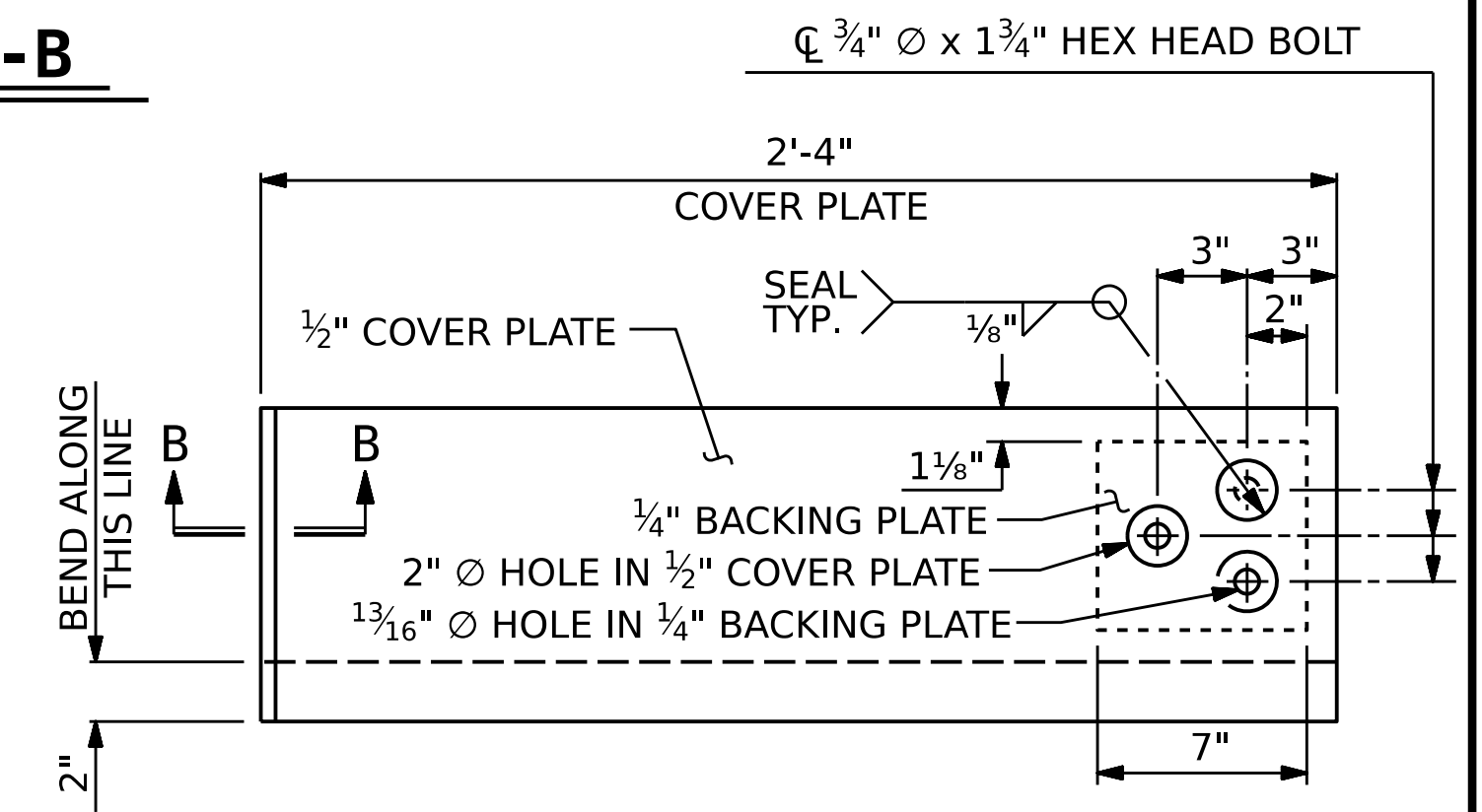


**CONCRETE INSERT**

EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

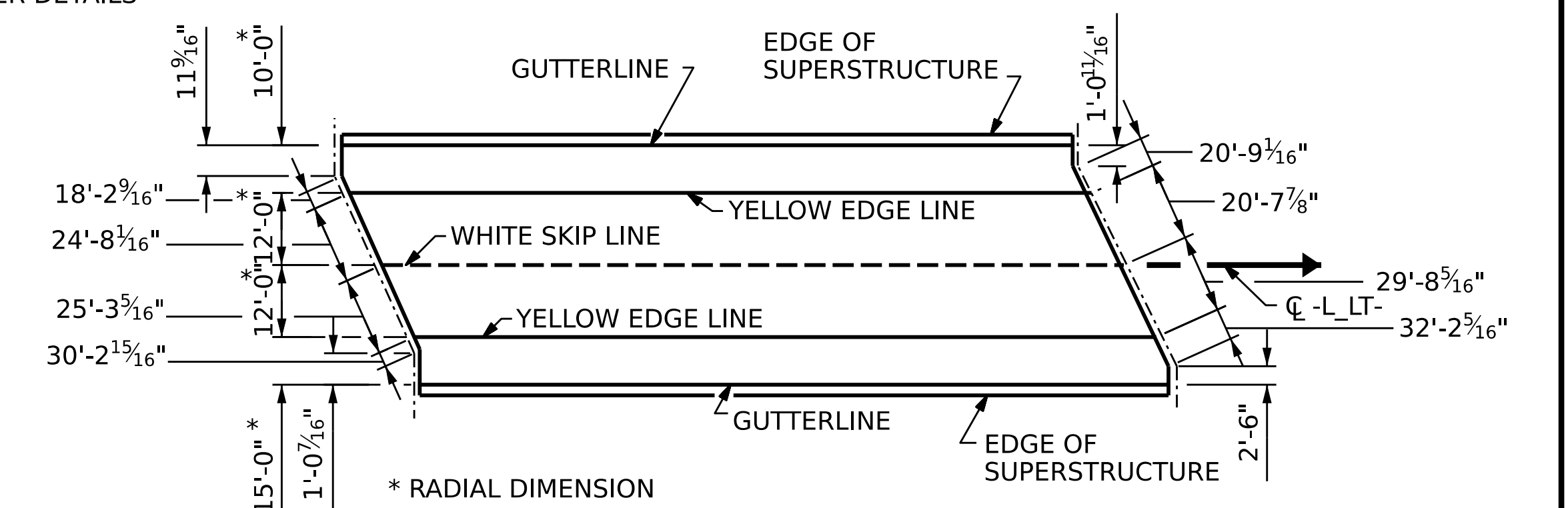


**TYPE I - ELEVATION VIEW**



**TYPE II - ELEVATION VIEW**

**COVER PLATE DETAILS**



**PAVEMENT MARKING ALIGNMENT**

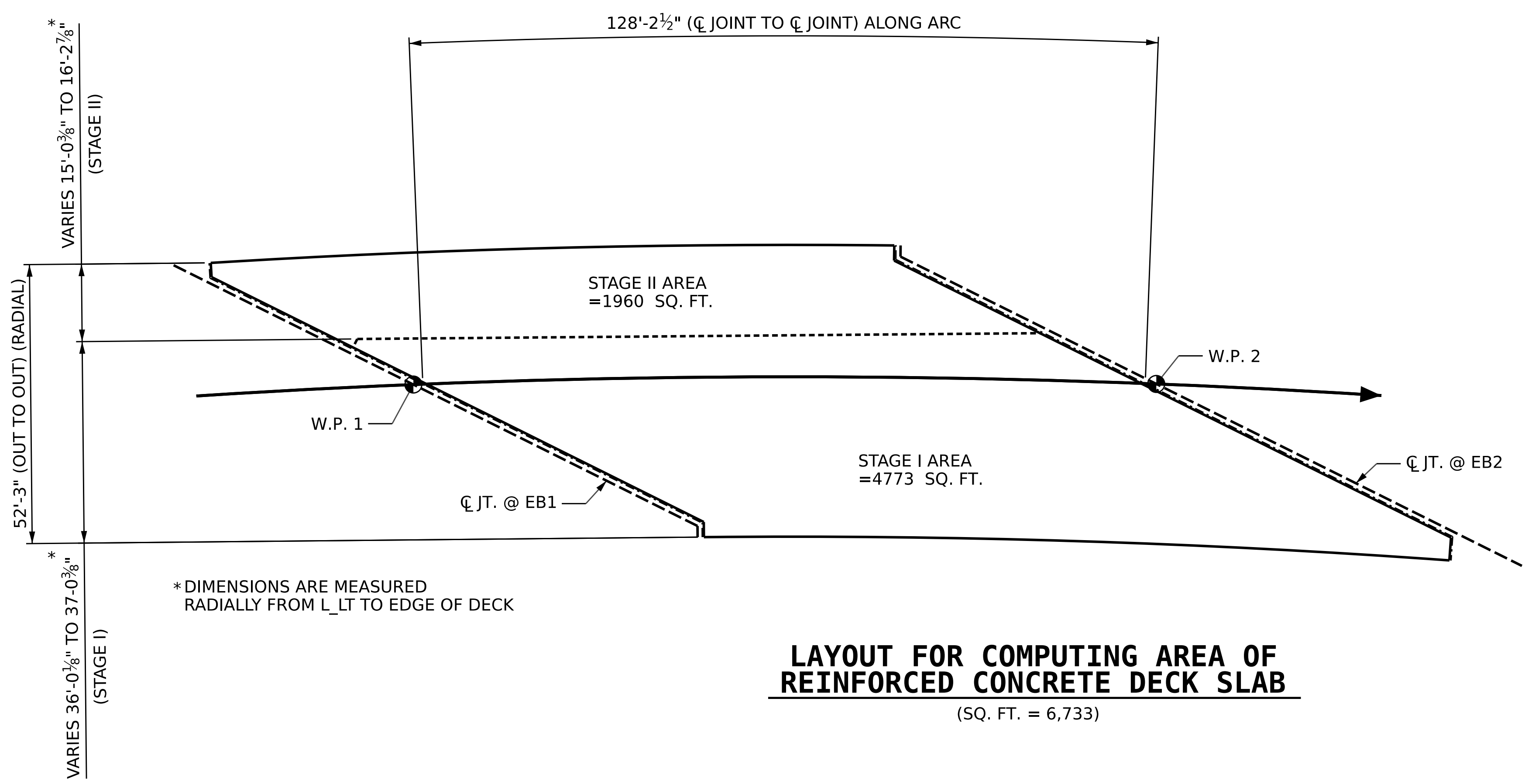
PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
STATION: 32+21.34 -L LT-  
SHEET 2 OF 2

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**PROFESSIONAL SEAL**  
041343  
GREGORY R. COLS  
10/18/2023

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S1-25
STANDARD						TOTAL SHEETS 43
<b>EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL</b>						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

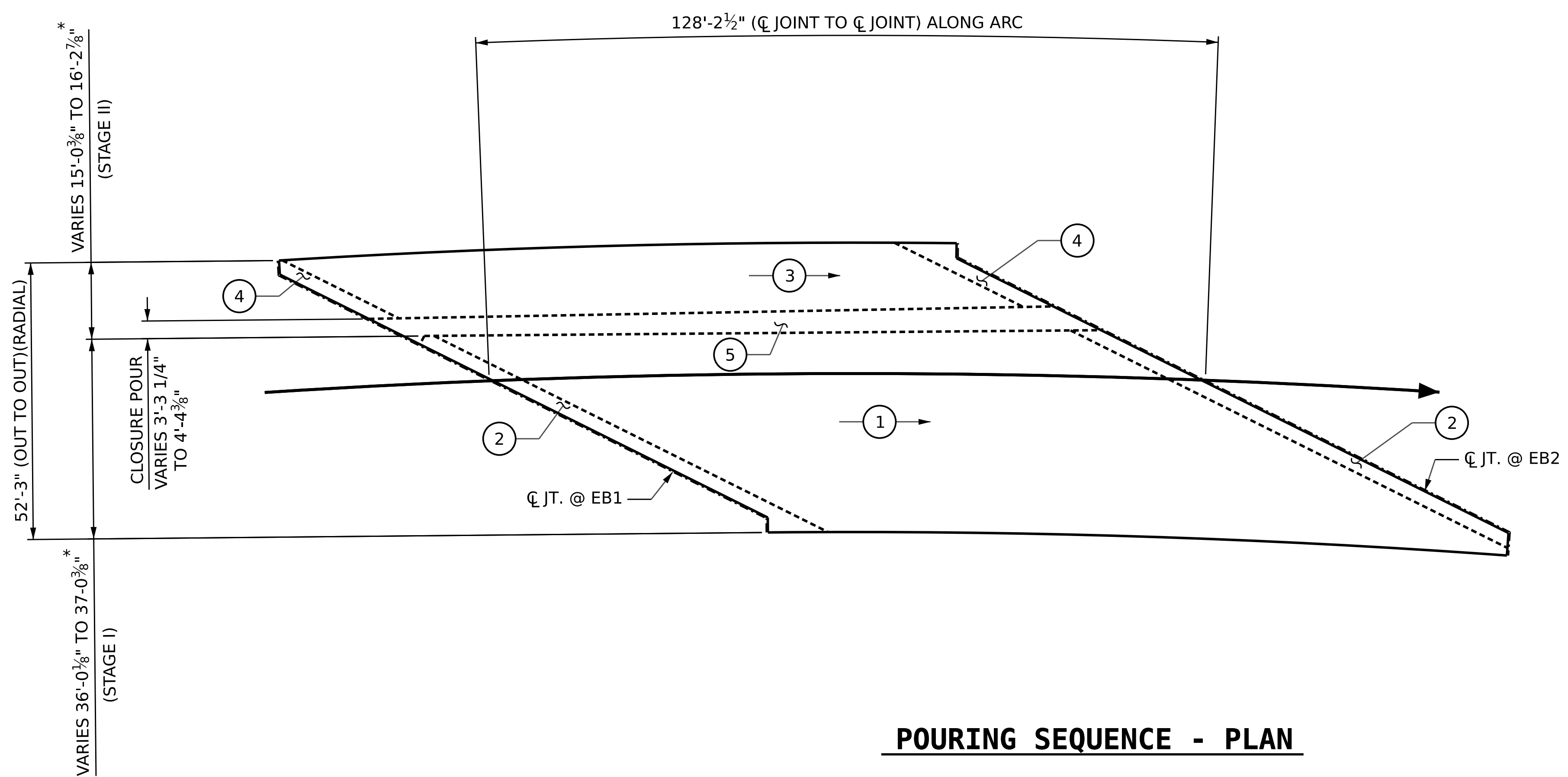
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**LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB**  
(SQ. FT. = 6,733)

SUPERSTRUCTURE BILL OF MATERIAL	
SPAN A	(CU. YDS.)
POUR #1	162
POUR #2	25
POUR #3	58
POUR #4	6
POUR #5	19
TOTALS**	270

\*\* QUANTITIES FOR BARRIER RAILS ARE NOT INCLUDED



**POURING SEQUENCE - PLAN**

(POUR #2 CANNOT BE STARTED UNTIL ADJACENT POUR LABELED POUR #1 REACHES A MINIMUM OF 3000 PSI.)

① → INDICATES POUR DIRECTION AND NUMBER

GROOVING BRIDGE FLOORS	
APPROACH SLABS	2,203 SQ. FT.
BRIDGE DECK	5,911 SQ. FT.
TOTAL	8,114 SQ. FT.

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
STATION: 32+21.34 -L LT-

SHEET 1 OF 2

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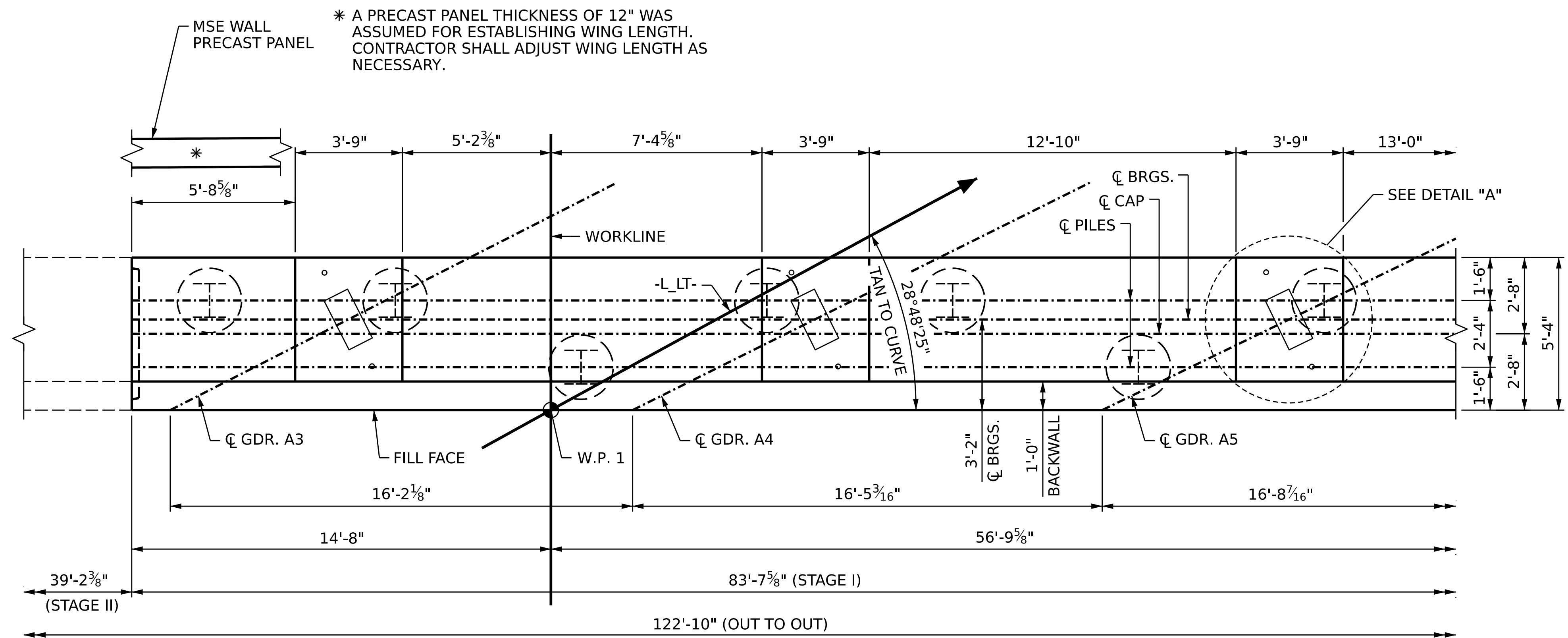
**PROFESSIONAL SEAL**  
GREGORY R. COLS  
ENGINEER  
10/18/2023

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BILL OF MATERIALS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S1-26
					TOTAL SHEETS 43

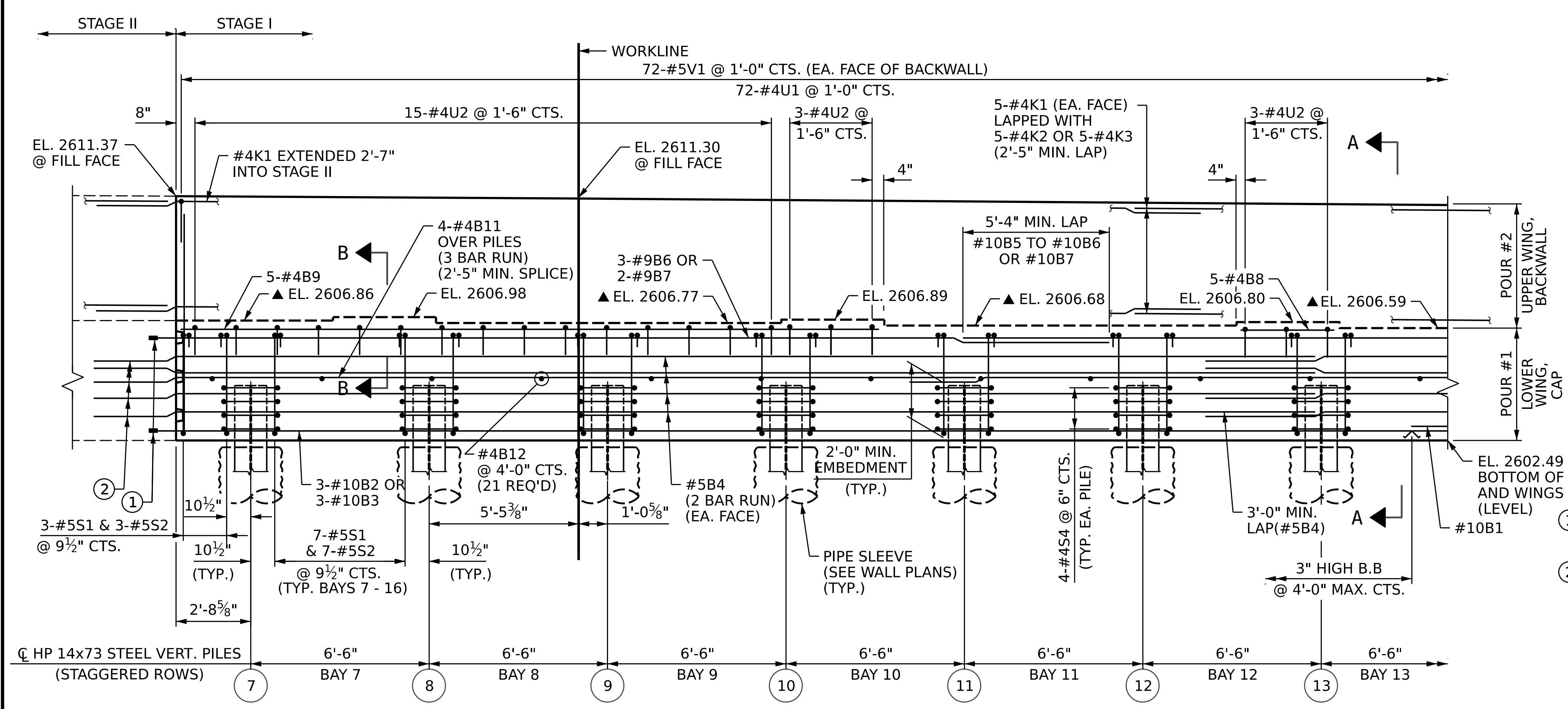
DRAWN BY :	A. K. VASUDEVAN	DATE :	03/2023
CHECKED BY :	S. NATARAJAN	DATE :	
DESIGN ENGINEER OF RECORD:	G.R. COLS	DATE :	03/2023

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FINAL UNLESS ALL  
SIGNATURES COMPLETED





**PLAN**



**ELEVATION**

DRAWN BY : D. RITACCO DATE : 03/2023  
 CHECKED BY : S. NATARAJAN DATE : 04/2023  
 DESIGN ENGINEER OF RECORD : D. RITACCO DATE : 04/2023

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 5.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**NOTES:**

MECHANICAL COUPLERS SHALL BE USED TO JOIN THE #9 "B" OR #10 "B" BARS IN STAGE I WITH THE #9 "B" OR #10 "B" BARS, RESPECTIVELY, IN STAGE II. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY 2'-0" AND THE STAGE I BARS SHALL BE CUT ACCORDINGLY TO ALLOW A MINIMUM OF 1'-0" AND A MAXIMUM OF 3'-0" EXTENSION INTO STAGE II CONSTRUCTION.

FOR MECHANICAL COUPLERS, SEE MECHANICAL BUTT SPLICES FOR REINFORCING STEEL IN STANDARD SPECIFICATIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LENGTHS OF THE #9 OR #10 "B" BARS AT THE STAGED CONSTRUCTION JOINT MAY NEED TO BE ADJUSTED DUE TO THE TYPE OF MECHANICAL BUTT SPLICE CHOSEN BY THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE FOR ANY ADJUSTMENTS.

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHORS.

#5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT THE RATE OF 2%.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR WING DETAILS, SEE SHEET 4 OF 6.

FOR SECTION A-A, SEE SHEET 6 OF 6.

FOR SECTION B-B, SEE SHEET 6 OF 6.

FOR DETAIL "C" SEE SHEET 4 OF 6.

FOR PILE SPLICE DETAILS SEE SHEET 6 OF 6.

FOR TEMPORARY DRAINAGE DETAILS, SEE SHEET 6 OF 6.

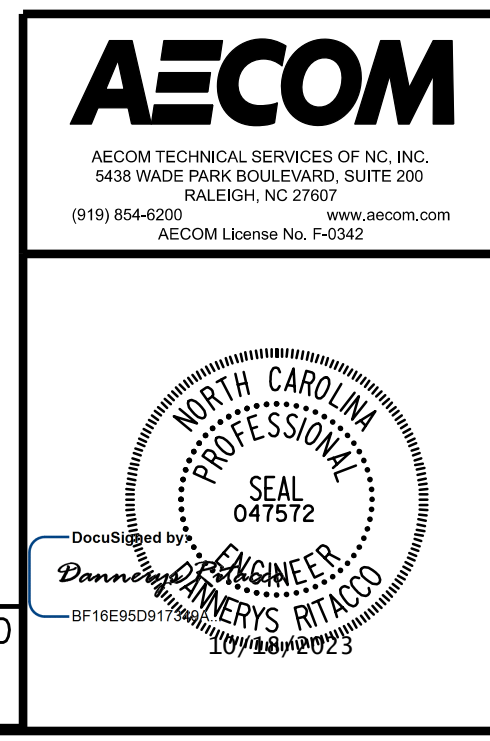
FOR CONSTRUCTION JOINT DETAILS, SEE "KEYED CONSTRUCTION JOINT DETAIL" ON SHEET 4 OF 6.

PROJECT NO. B-3186 / B-5898

HAYWOOD COUNTY

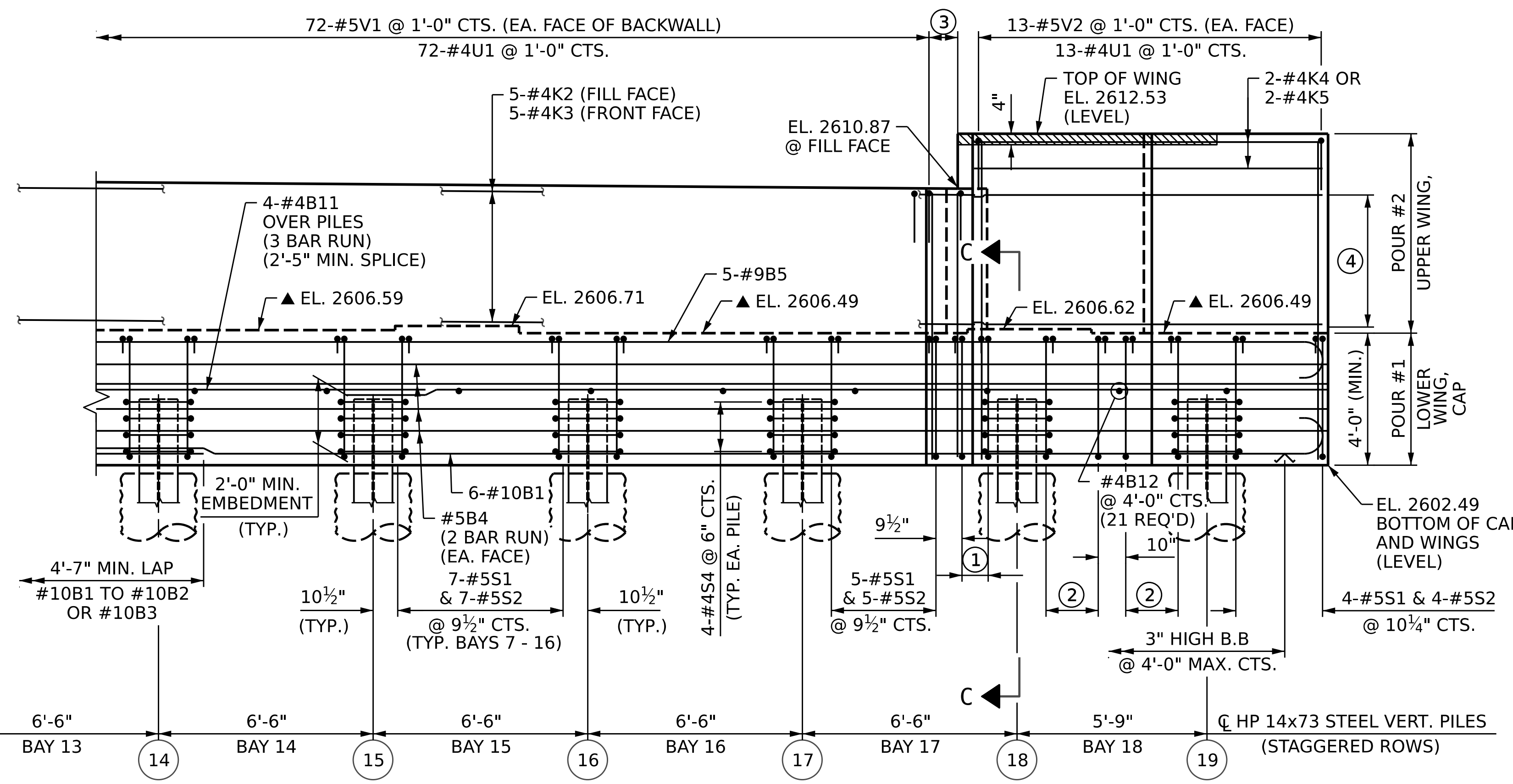
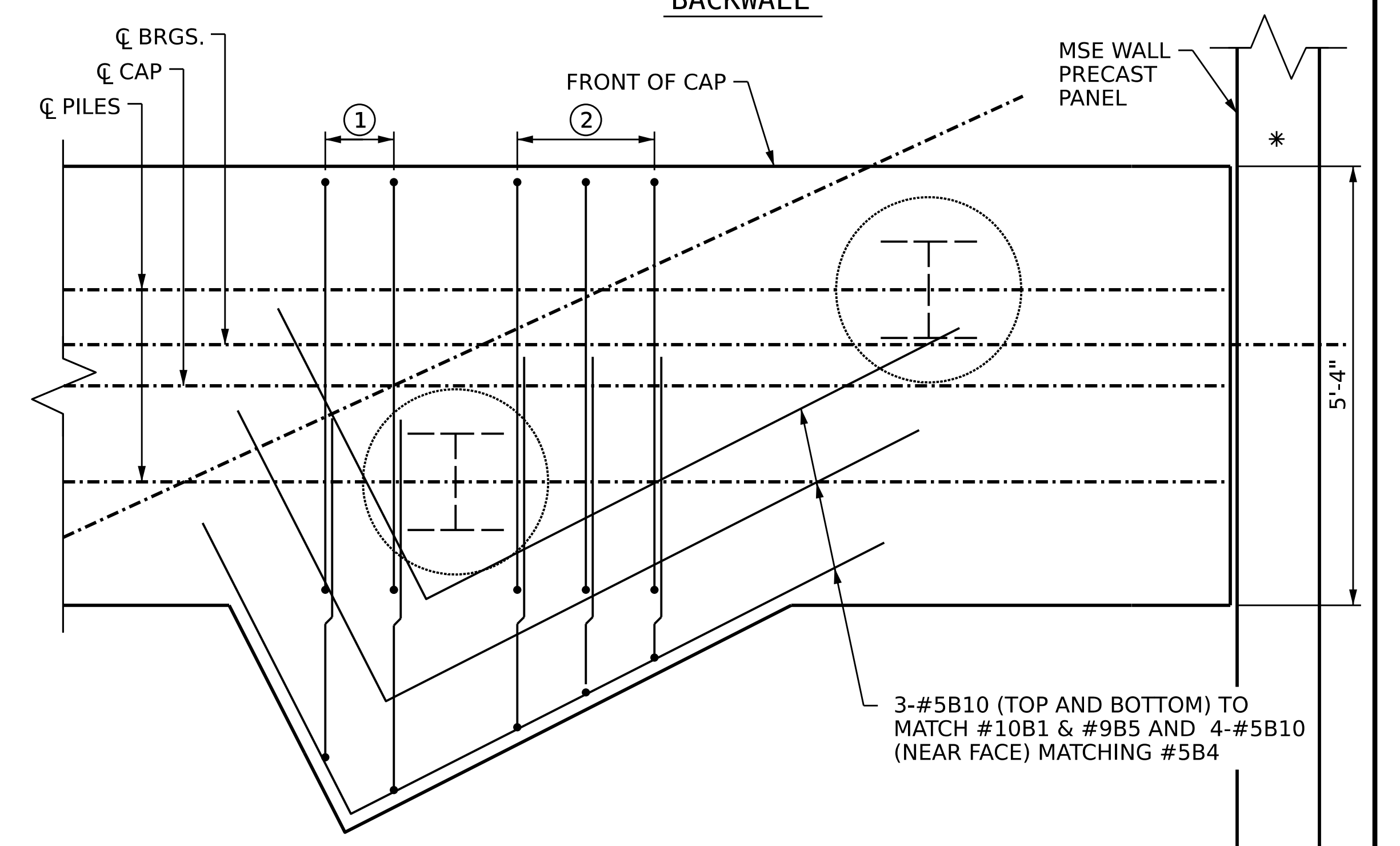
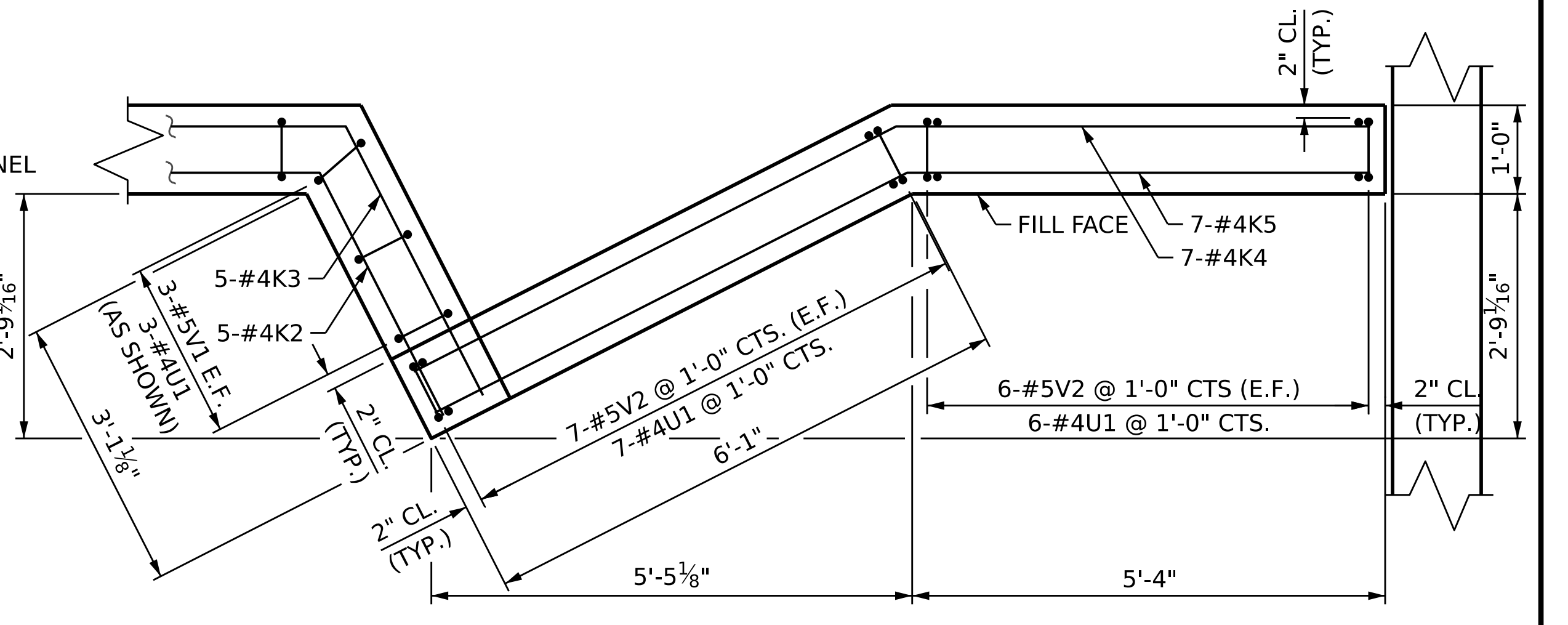
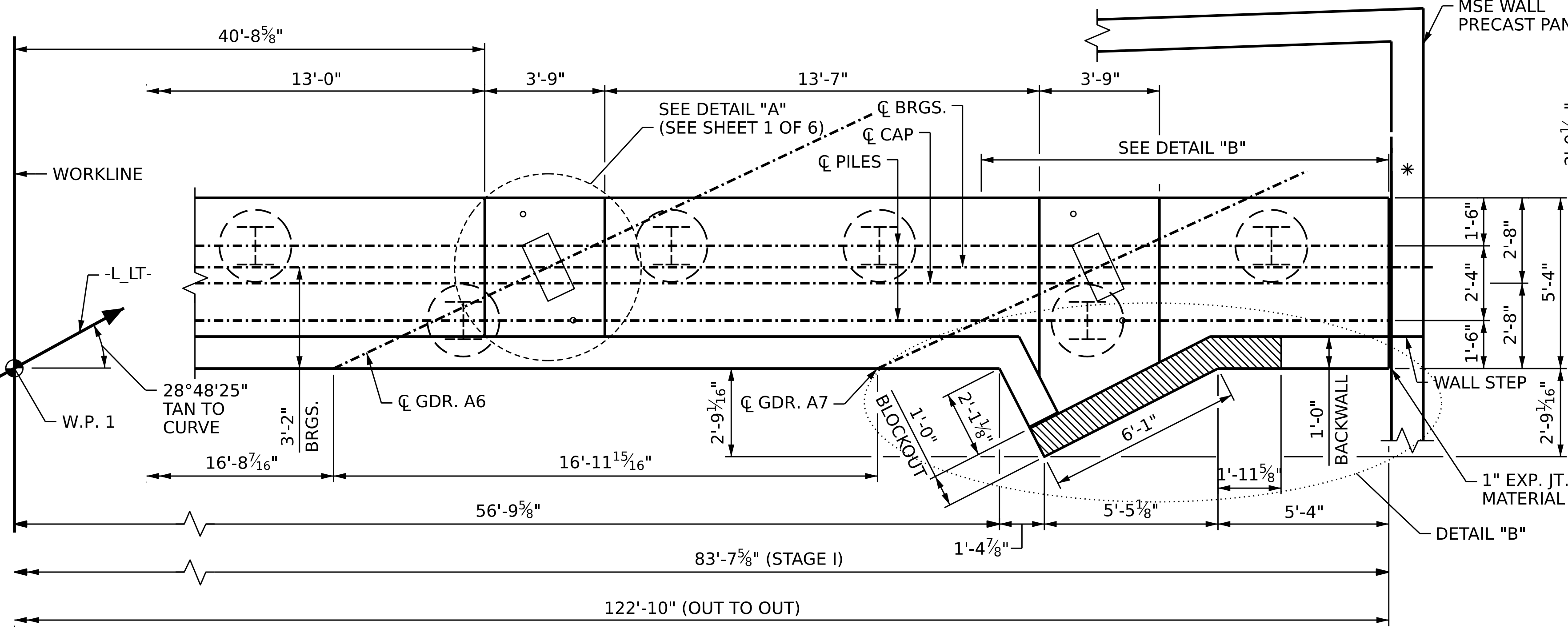
STATION: 32+21.34 -L LT-

SHEET 1 OF 6



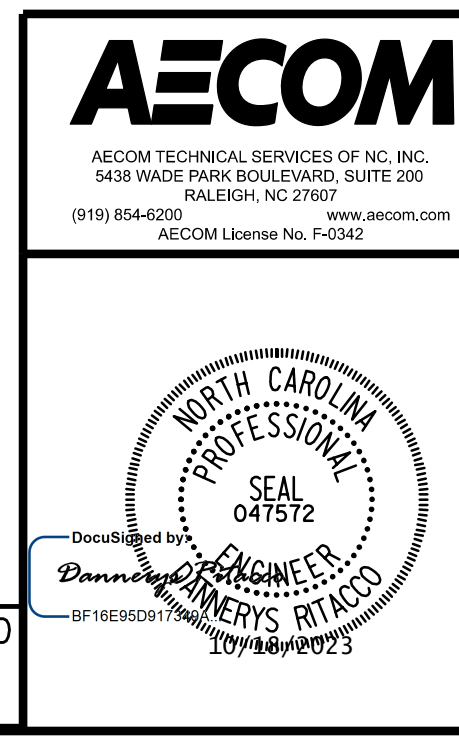
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE <b>END BENT 1</b> STAGE I - PART 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-28
					TOTAL SHEETS 43

\* A PRECAST PANEL THICKNESS OF 12" WAS ASSUMED FOR ESTABLISHING WING LENGTH. CONTRACTOR SHALL ADJUST WING LENGTH AS NECESSARY.



- ① 2-#5S3 PAIRED WITH 2-#5S1 & 2-#5S2 @ 9<sup>1</sup>/<sub>2</sub>" CTS.
- ② 3-#5S3 PAIRED WITH 3-#5S1 & 3-#5S2 @ 9<sup>1</sup>/<sub>2</sub>" CTS.
- ③ 3-#5V1 @ 1-0" CTS. (EA. FACE) 3-#4U1 @ 1-0" CTS.
- ④ 5-#4K4 OR 5-#4K5 TO MATCH "K" BARS IN BACKWALL (EA. FACE)

PROJECT NO. B-3186 / B-5898  
 HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-  
 SHEET 2 OF 6

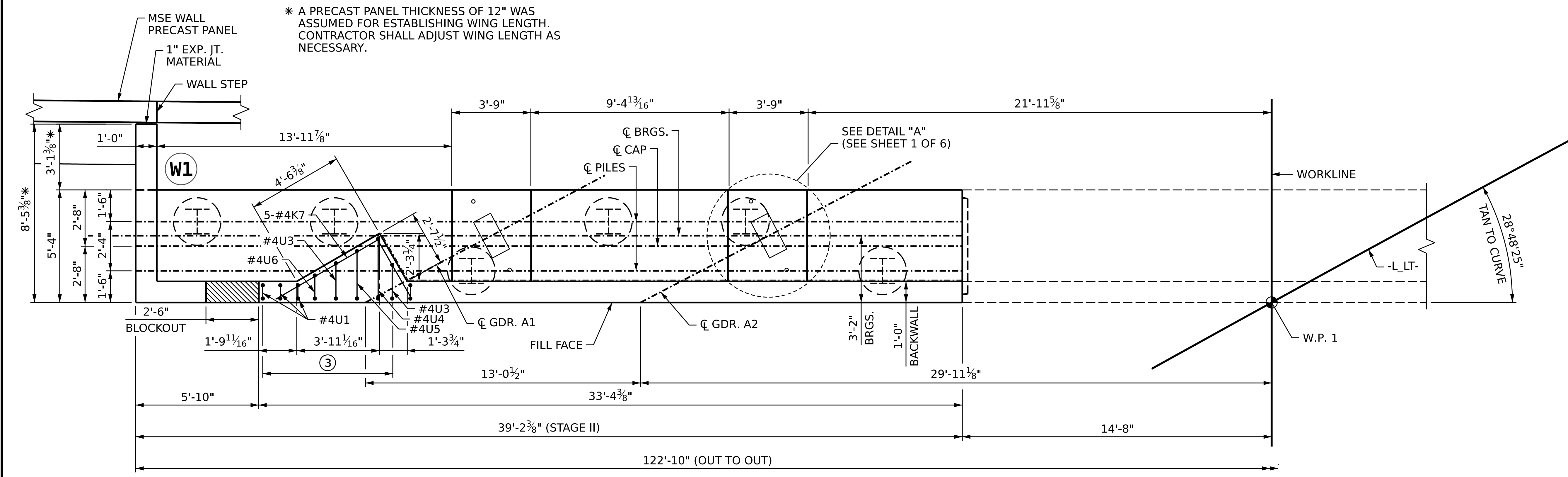


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
END BENT 1					
STAGE I - PART 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S1-29
TOTAL SHEETS					43

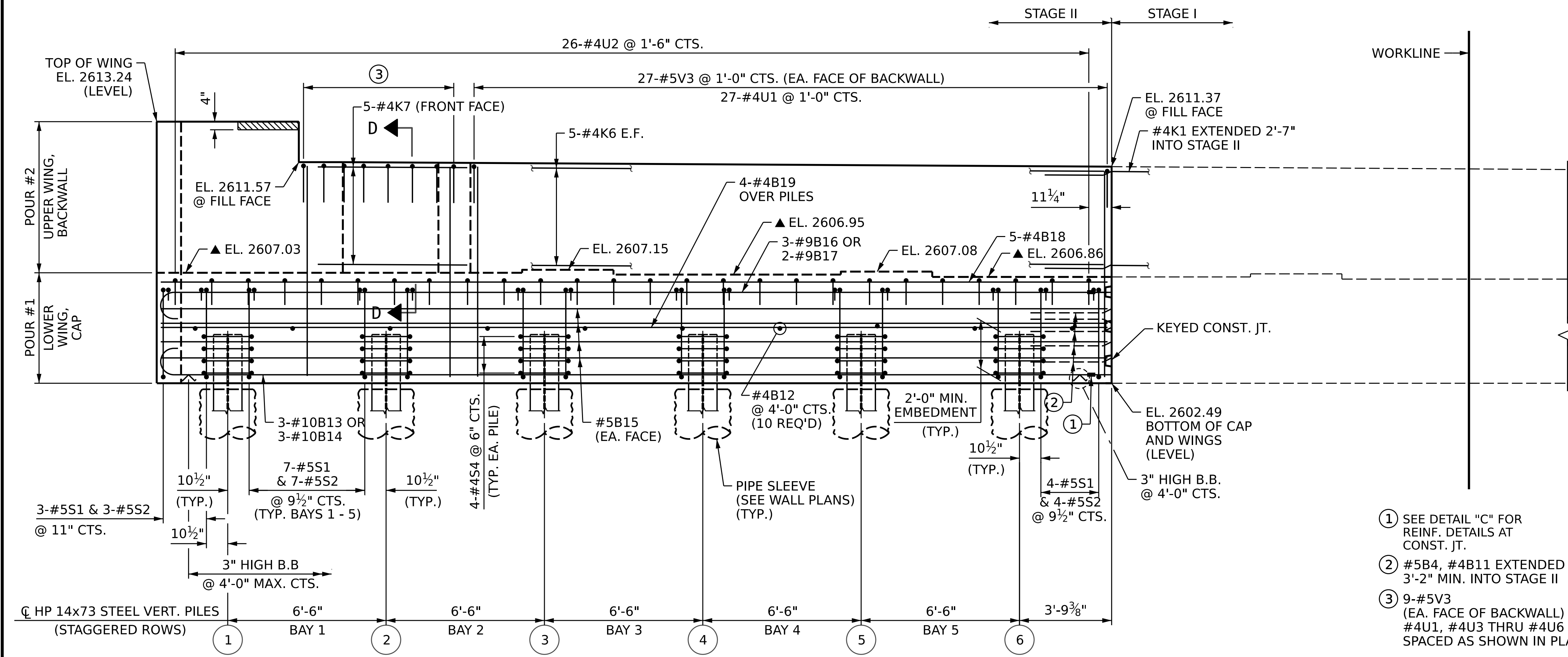
DRAWN BY: D. RITACCO DATE: 03/2023  
 CHECKED BY: S. NATARAJAN DATE: 04/2023  
 DESIGN ENGINEER OF RECORD: D. RITACCO DATE: 04/2023

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 5.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

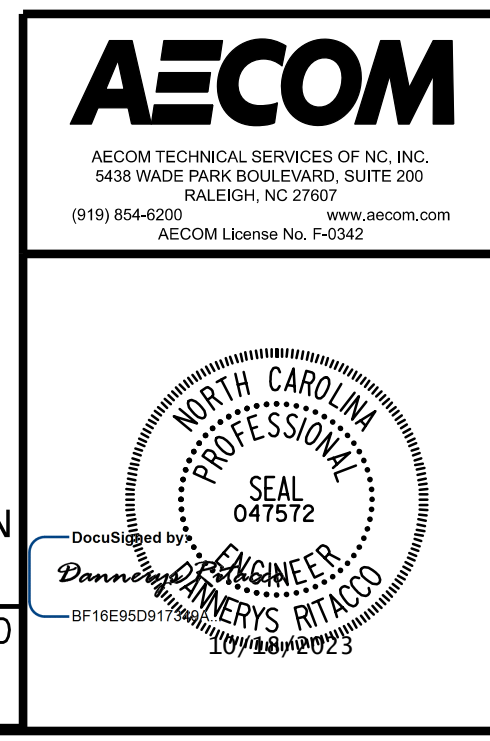


**PLAN**



**ELEVATION**

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-  
 SHEET 3 OF 6



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH <b>SUBSTRUCTURE</b> <b>END BENT 1</b> <b>STAGE II</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO.
					S1-30
					TOTAL SHEETS
					43

- ① SEE DETAIL "C" FOR REINF. DETAILS AT CONST. JT.
- ② #5B4, #4B11 EXTENDED 3'-2" MIN. INTO STAGE II
- ③ 9-#5V3 (EA. FACE OF BACKWALL) #4U1, #4U3 THRU #4U6 SPACED AS SHOWN IN PLAN

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DRAWN BY: D. RITACCO DATE: 03/2023  
 CHECKED BY: S. NATARAJAN DATE: 04/2023  
 DESIGN ENGINEER OF RECORD: D. RITACCO DATE: 04/2023

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 5.

\* A PRECAST PANEL THICKNESS OF 12" WAS ASSUMED FOR ESTABLISHING WING LENGTH. CONTRACTOR SHALL ADJUST WING LENGTH AS NECESSARY.

MSE WALL PRECAST PANEL  
 1" EXP. JT. MATERIAL  
 WALL STEP

WORKLINE

TANTO CURVE  
 28°48'25"

W.P. 1

SEE DETAIL "A" (SEE SHEET 1 OF 6)

WORKLINE

KEYED CONST. JT.

EL. 2602.49 BOTTOM OF CAP AND WINGS (LEVEL)  
 3" HIGH B.B. @ 4'-0" CTS.

TOP OF WING EL. 2613.24 (LEVEL)

POUR #2 UPPER WING, BACKWALL

POUR #1 LOWER WING, CAP

EL. 2611.57 @ FILL FACE

5-#4K7 (FRONT FACE)

26-#4U2 @ 1'-6" CTS.  
 27-#5V3 @ 1'-0" CTS. (EA. FACE OF BACKWALL)  
 27-#4U1 @ 1'-0" CTS.

5-#4K6 E.F.

EL. 2607.03

EL. 2607.15

4-#4B19 OVER PILES

3-#9B16 OR 2-#9B17

EL. 2606.95

EL. 2607.08

EL. 2606.86

KEYED CONST. JT.

EL. 2602.49  
 3" HIGH B.B. @ 4'-0" CTS.

EL. 2607.03

EL. 2607.15

EL. 2606.95

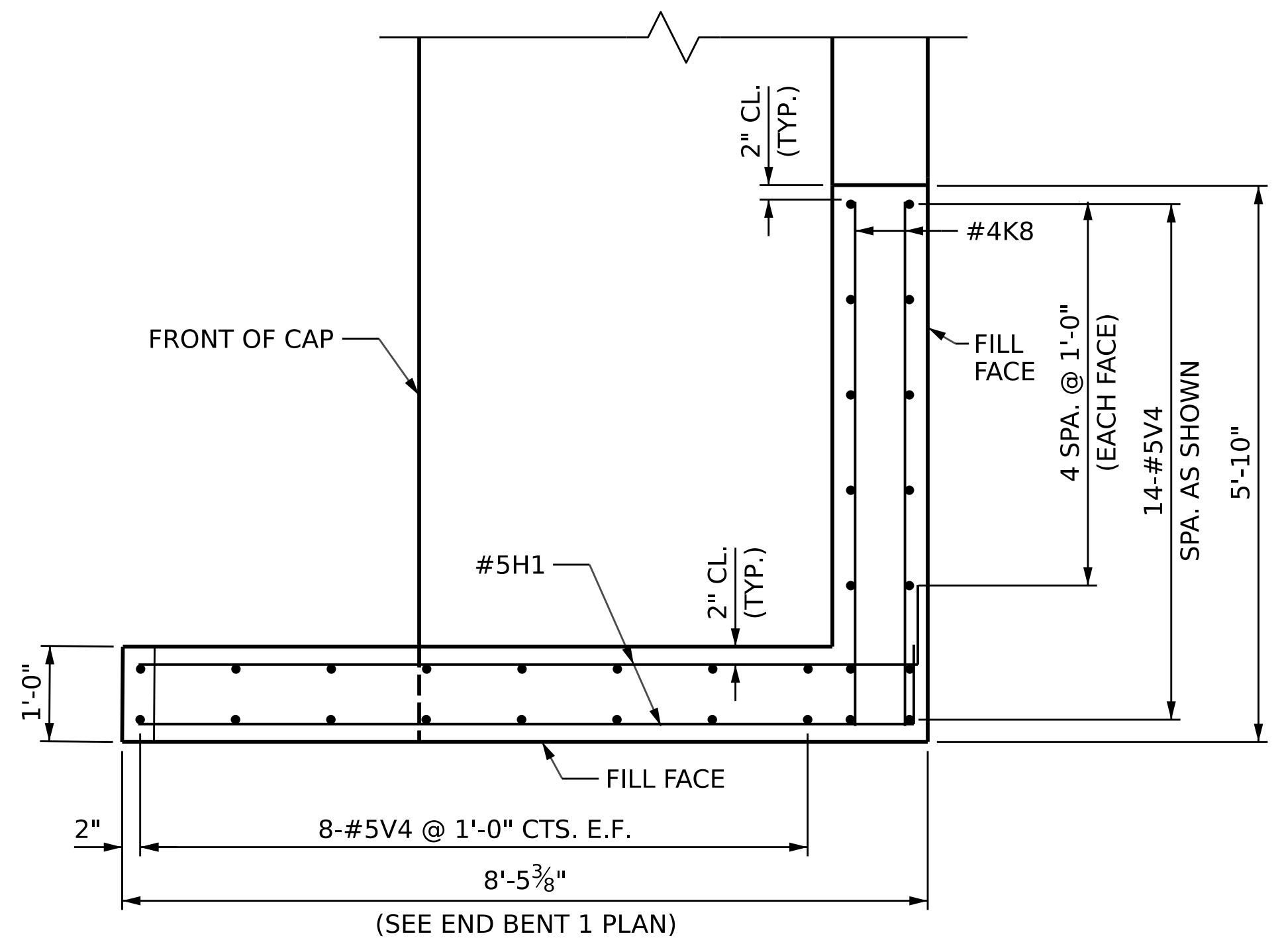
EL. 2607.08

EL. 2606.86

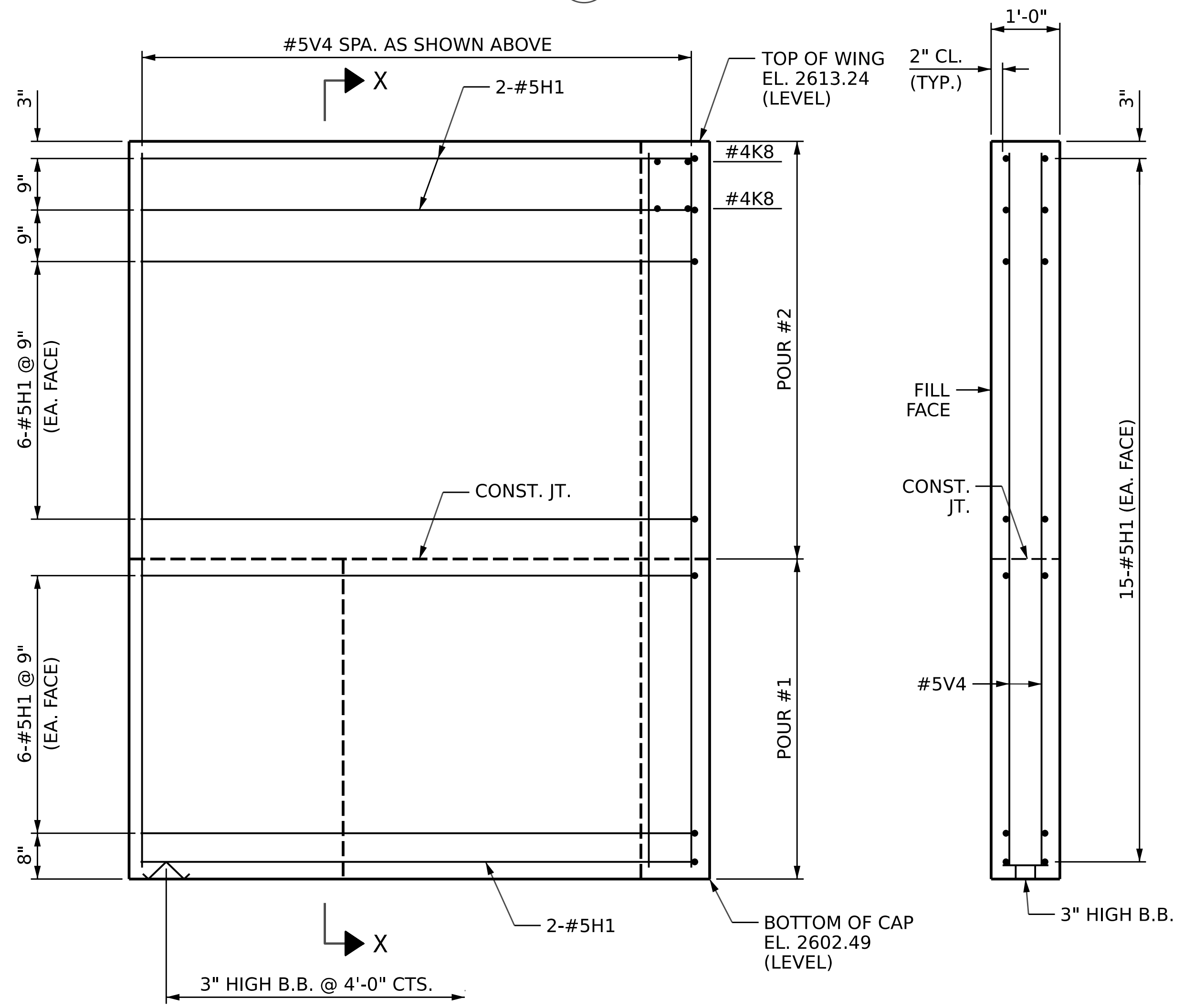
EL. 2602.49

EL. 2602.49



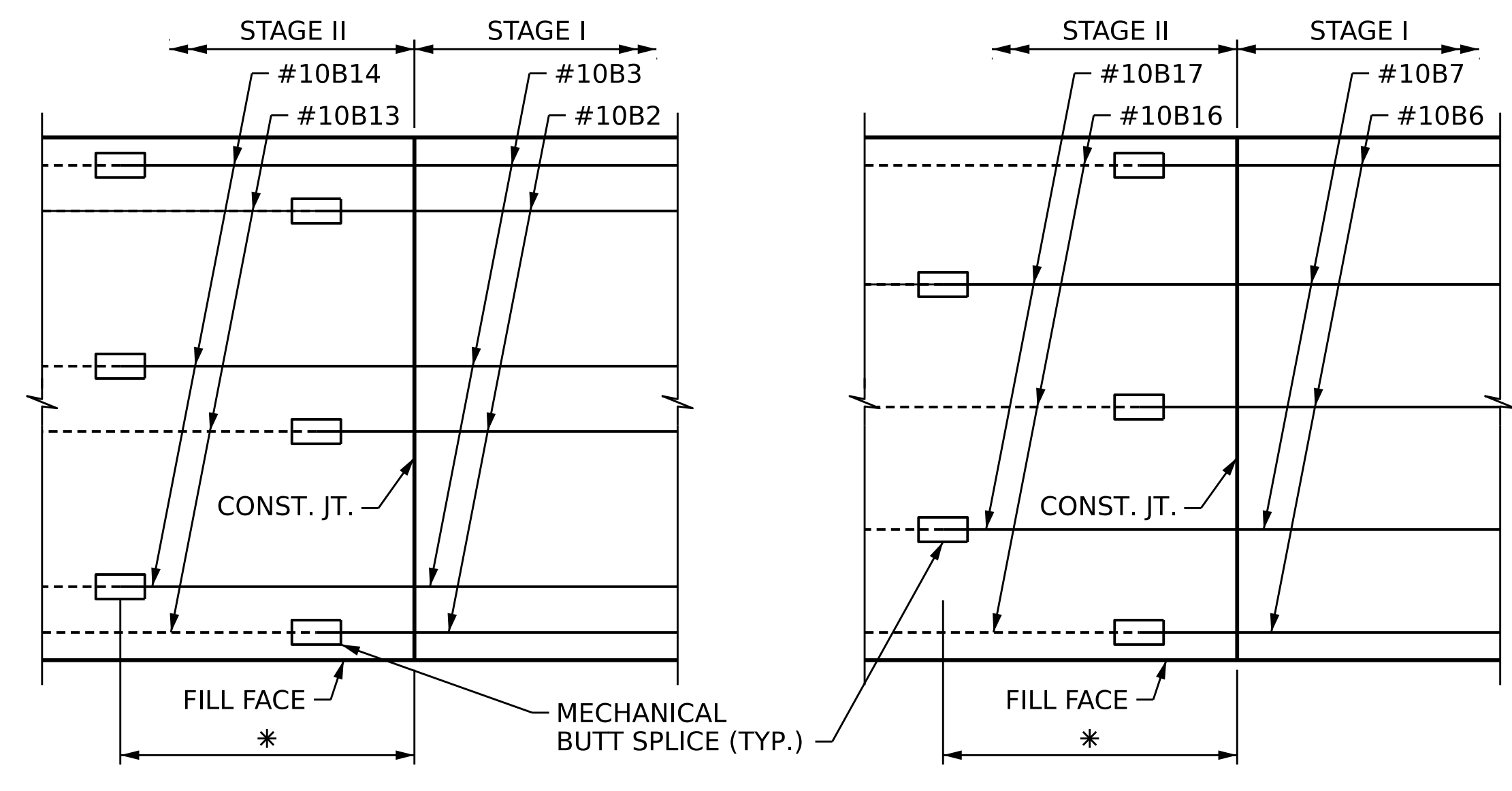


**PLAN OF WING W1**



**ELEVATION OF WING W1**

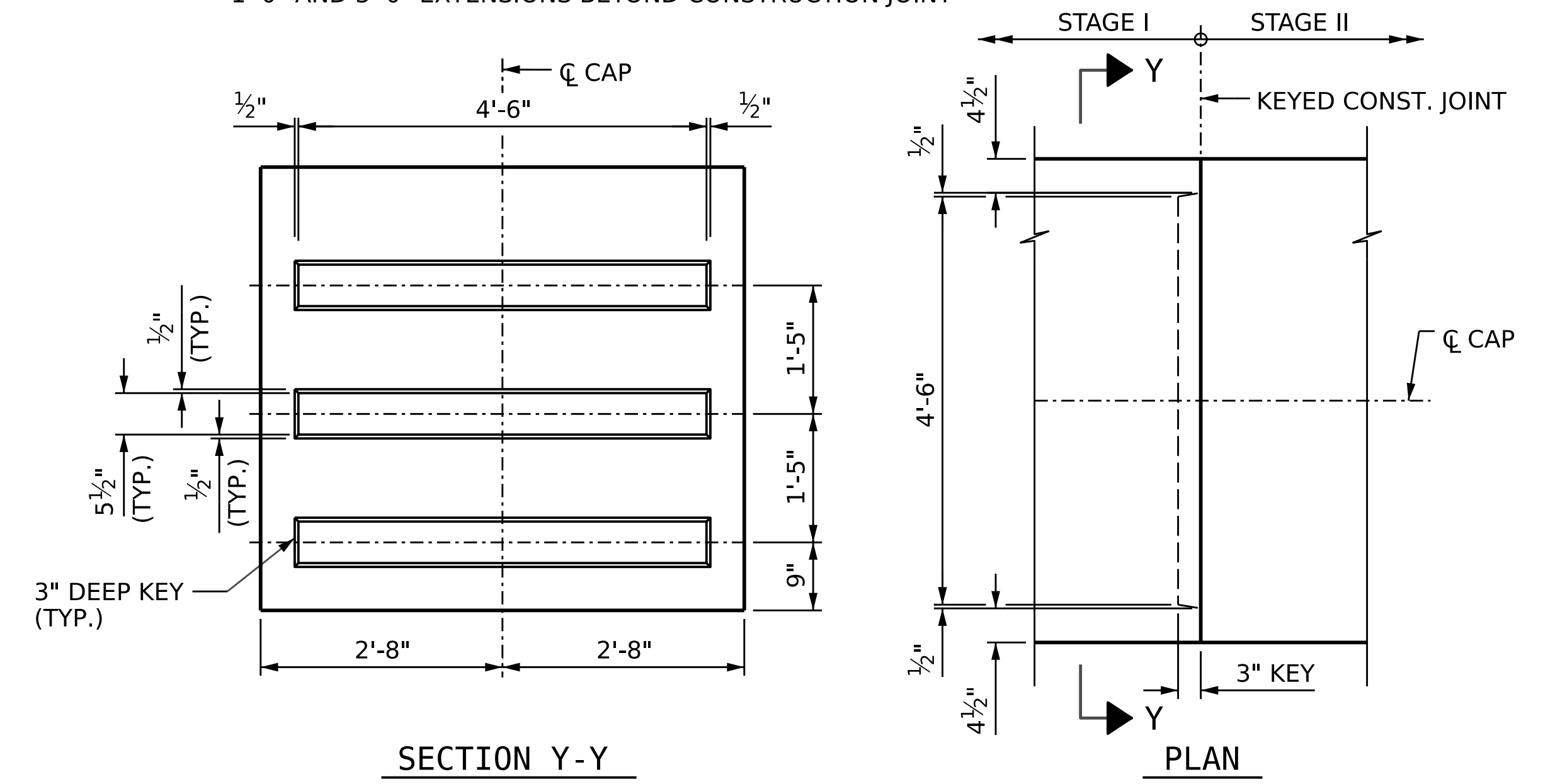
**SECTION X-X**



**PLAN OF BOTTOM REINFORCEMENT**      **PLAN OF TOP REINFORCEMENT**

**DETAIL "C"**

\* STAGE I TOP AND BOTTOM "B" BARS ARE DETAILED WITH STAGGERED 1'-0" AND 3'-0" EXTENSIONS BEYOND CONSTRUCTION JOINT



**SECTION Y-Y**

**PLAN**

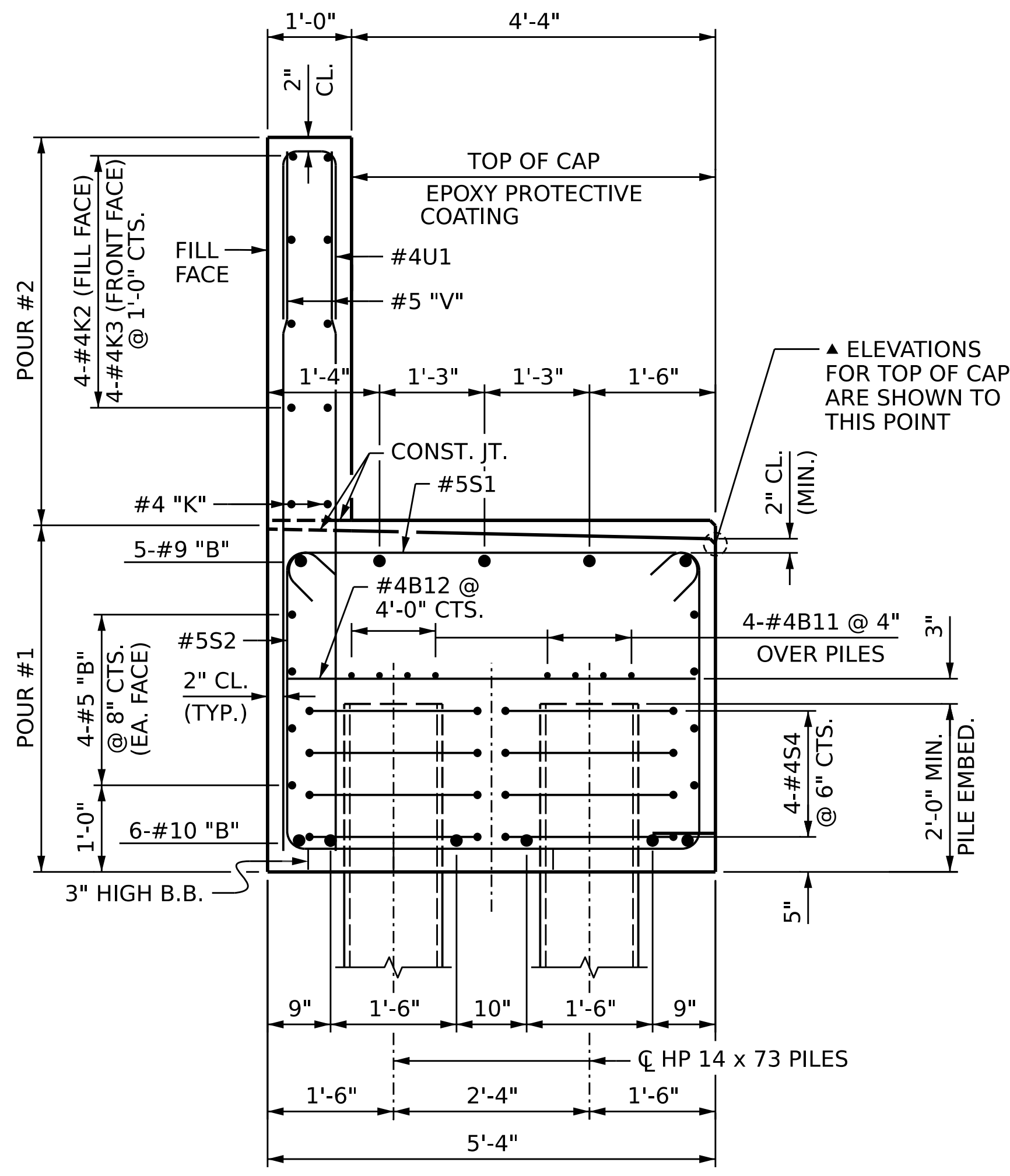
**KEYED CONSTRUCTION JOINT DETAIL**

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-  
 SHEET 4 OF 6

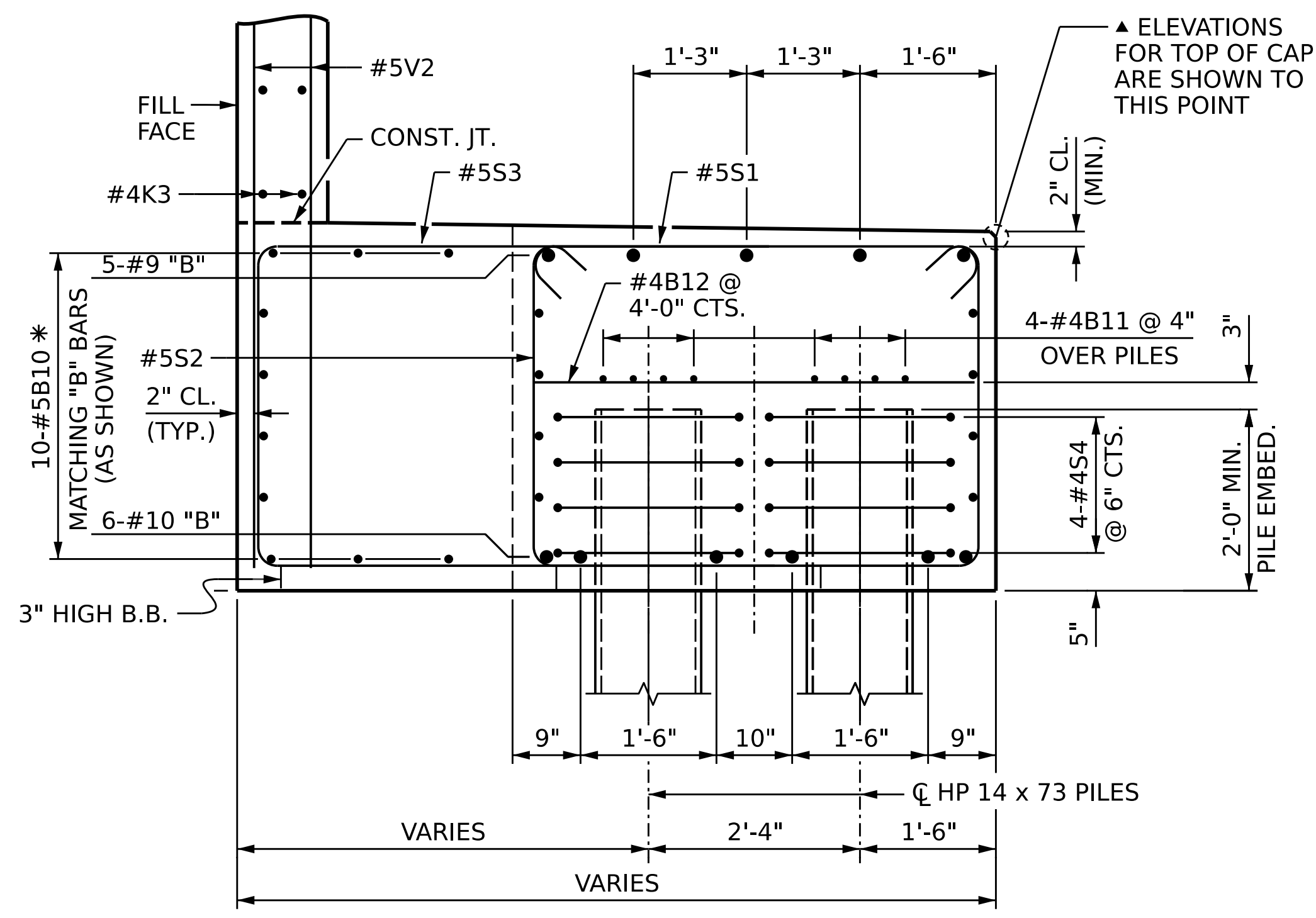
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE <b>END BENT 1</b> WINGWALLS & DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-31
					TOTAL SHEETS 43

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CHECKED BY :	S. NATARAJAN	DATE :	04/2023
DESIGN ENGINEER OF RECORD :	D. RITACCO	DATE :	04/2023

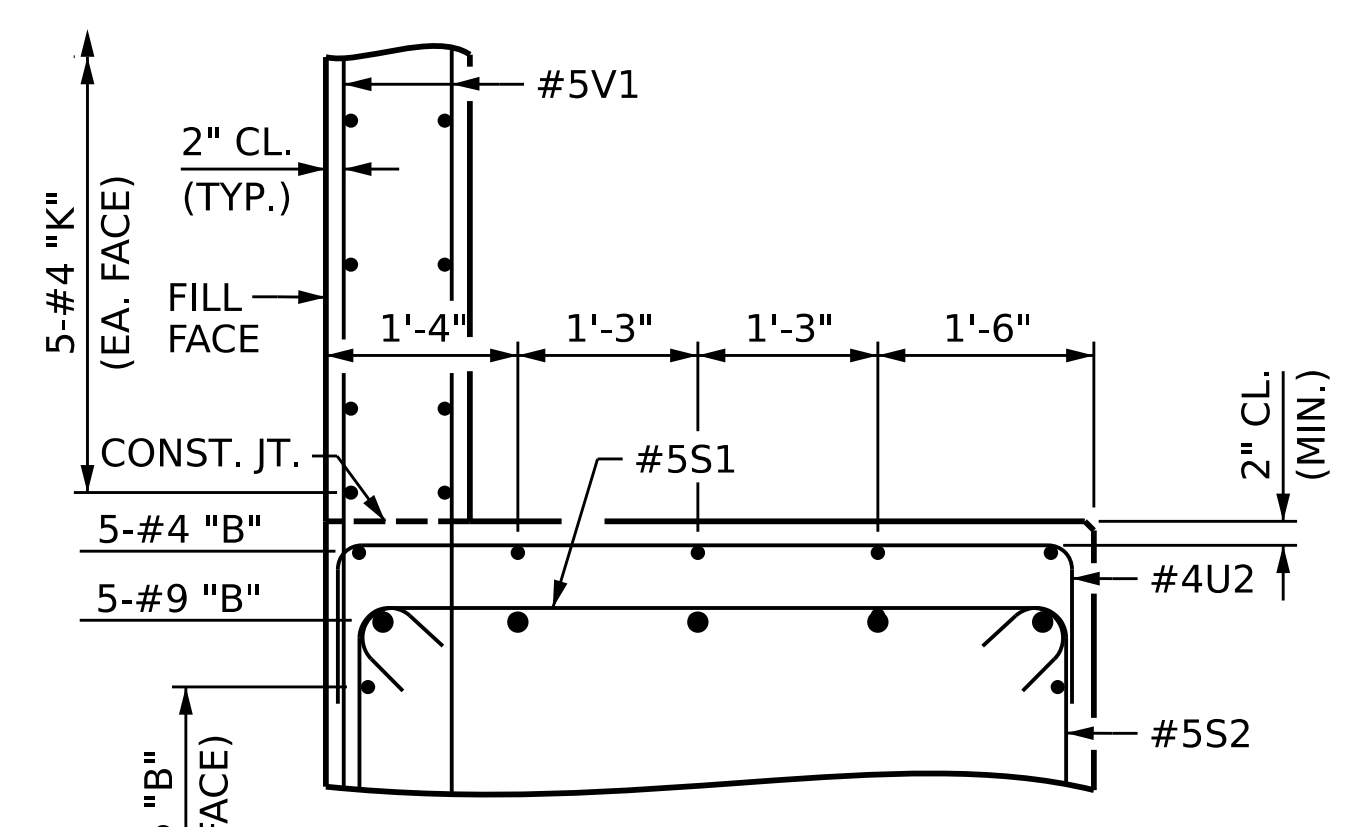


**SECTION A-A**

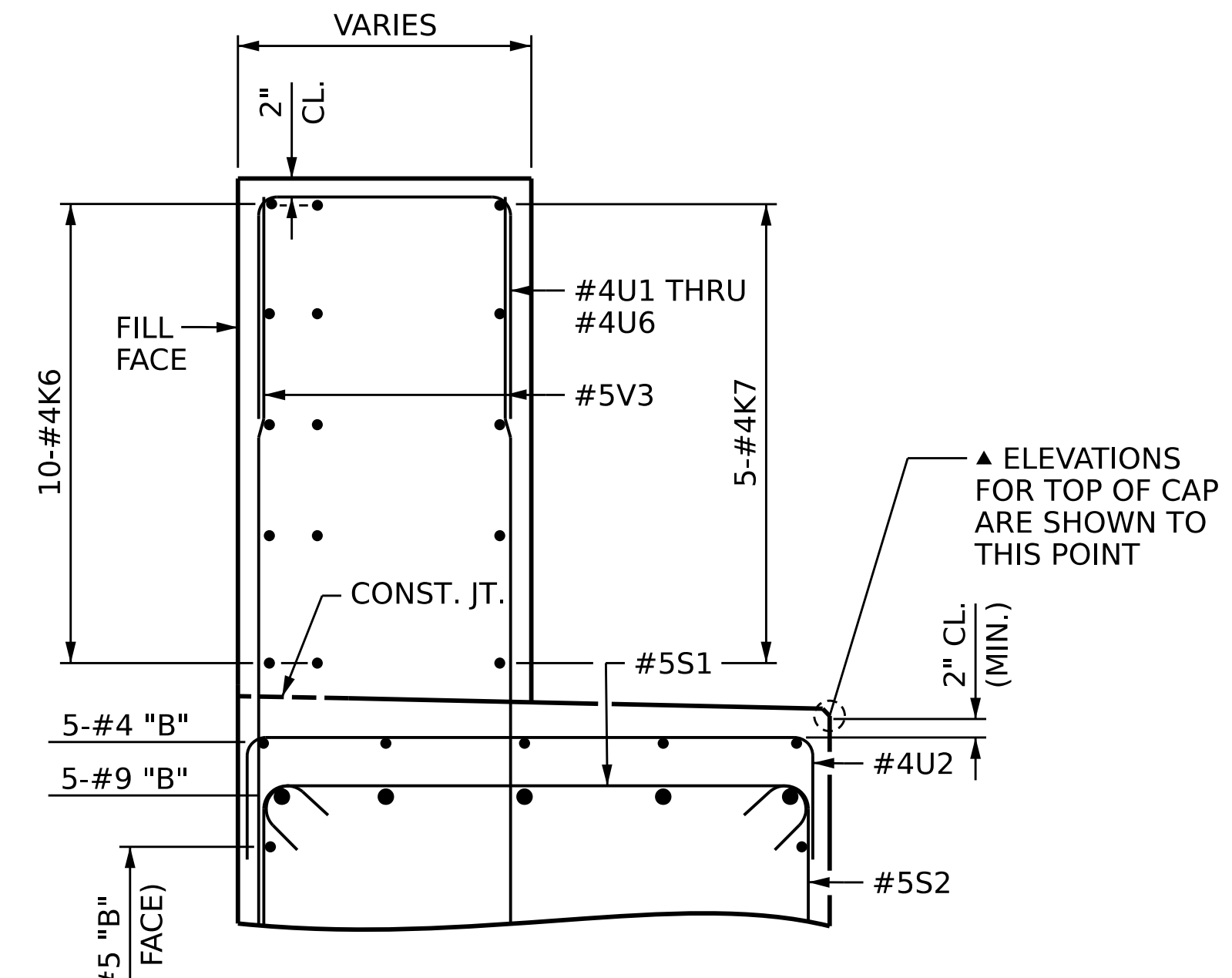


**SECTION C-C**

\* 3-#5B10 (TOP AND BOTTOM) TO MATCH #10B1 & #9B5  
AND 3-#5B10 (NEAR FACE) MATCHING #5B4

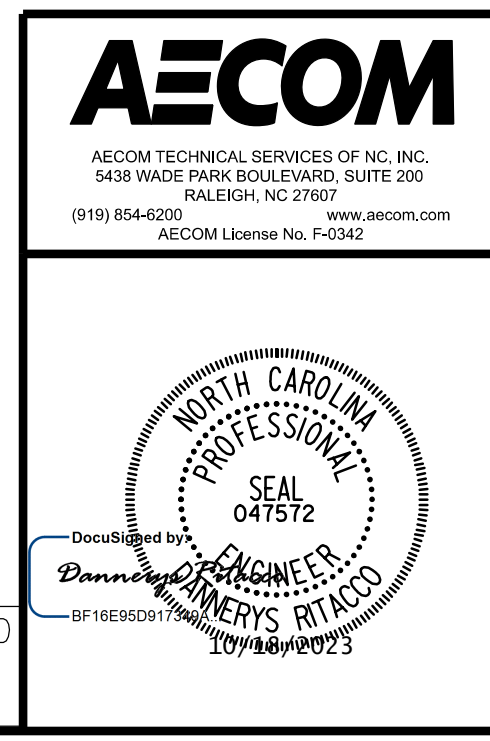


**SECTION B-B**



**SECTION D-D**

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
STATION: 32+21.34 -L LT-  
SHEET 5 OF 6

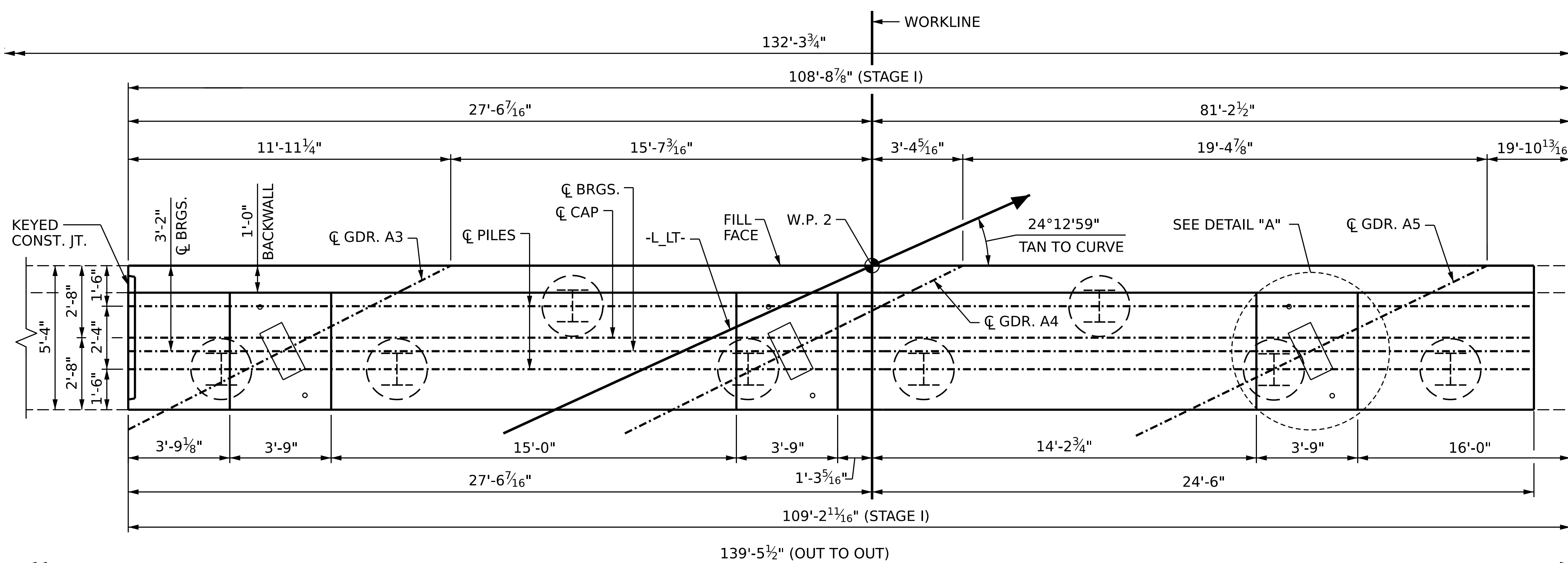


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE <b>END BENT 1</b> SECTIONS & DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S1-32
TOTAL SHEETS					43

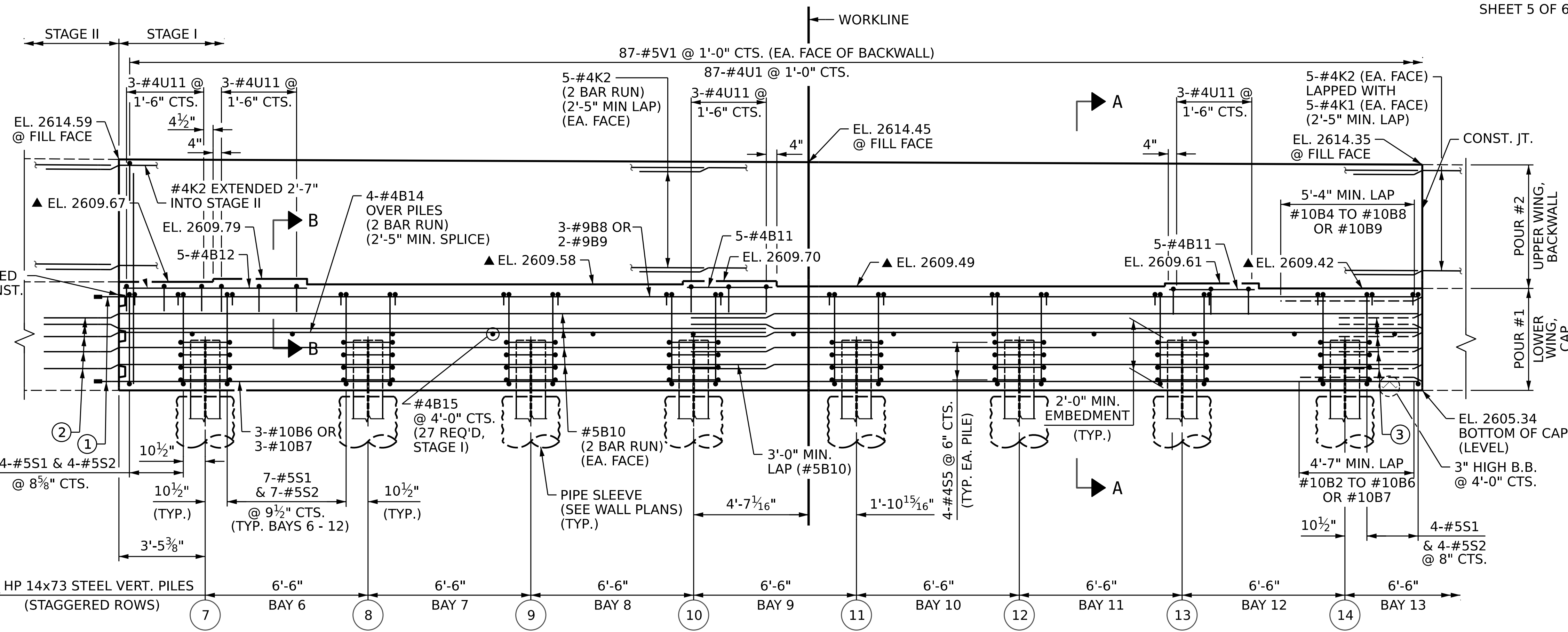
DRAWN BY : D. RITACCO DATE : 03/2023  
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**PLAN**



**ELEVATION**

**NOTES:**

MECHANICAL COUPLERS SHALL BE USED TO JOIN THE #9 "B" OR #10 "B" BARS IN STAGE I WITH THE #9 "B" OR #10 "B" BARS, RESPECTIVELY, IN STAGE II. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY 2'-0" AND THE STAGE I BARS SHALL BE CUT ACCORDINGLY TO ALLOW A MINIMUM OF 1'-0" AND A MAXIMUM OF 3'-0" EXTENSION INTO STAGE II CONSTRUCTION.

FOR MECHANICAL COUPLERS, SEE MECHANICAL BUTT SPLICES FOR REINFORCING STEEL IN STANDARD SPECIFICATIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LENGTHS OF THE #9 OR #10 "B" BARS AT THE STAGED CONSTRUCTION JOINT MAY NEED TO BE ADJUSTED DUE TO THE TYPE OF MECHANICAL BUTT SPLICE CHOSEN BY THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE FOR ANY ADJUSTMENTS.

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHORS.

#5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT THE RATE OF 2%.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR WING DETAILS, SEE SHEET 4 OF 6.

FOR SECTION A-A, SEE SHEET 5 OF 6.

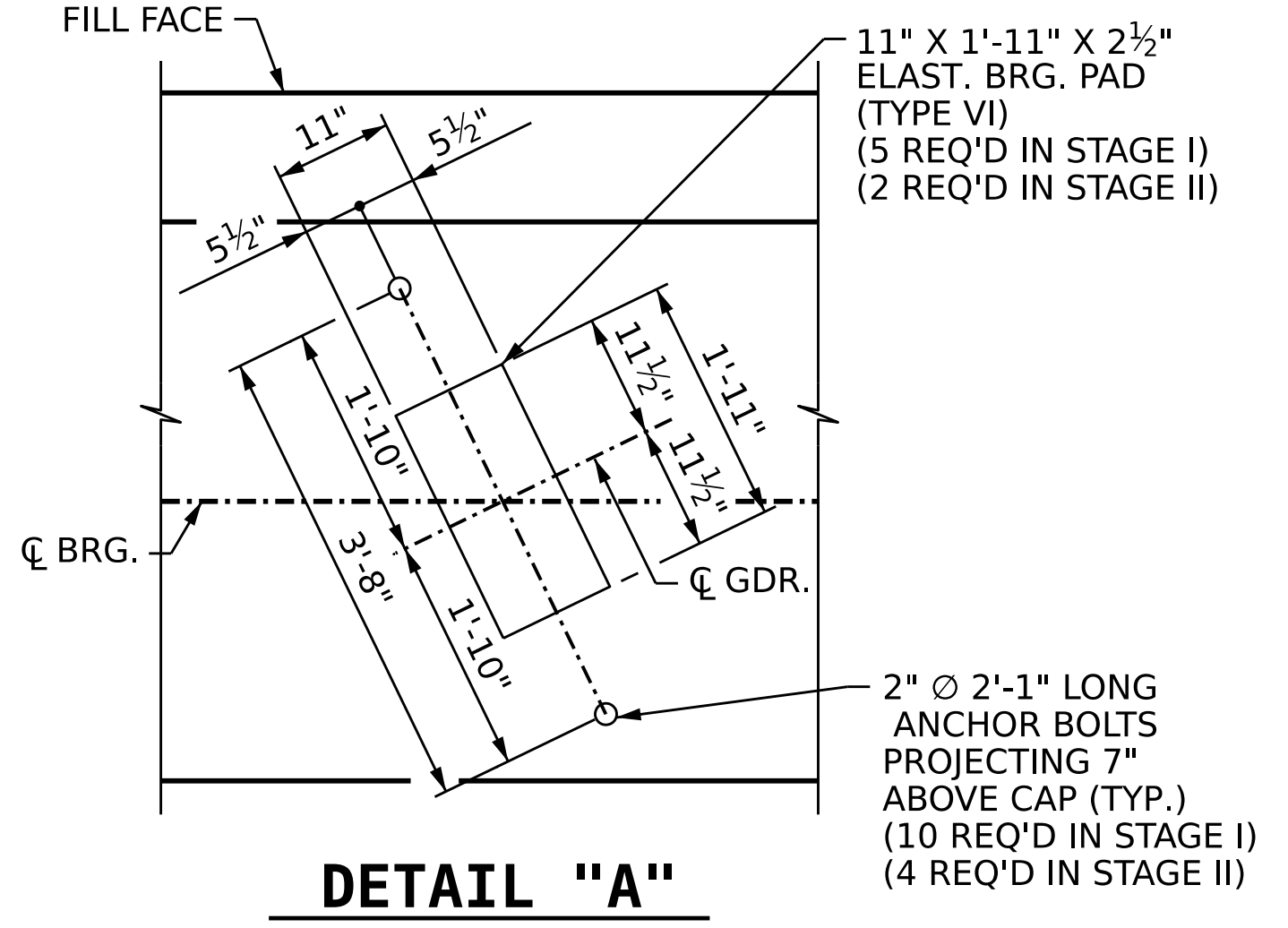
FOR SECTION B-B, SEE SHEET 5 OF 6.

FOR DETAIL "C" SEE SHEET 5 OF 6.

FOR PILE SPLICE DETAILS SEE SHEET 6 OF 6.

FOR TEMPORARY DRAINAGE DETAILS, SEE SHEET 6 OF 6.

FOR CONSTRUCTION JOINT DETAILS, SEE "KEYED CONSTRUCTION JOINT DETAIL" ON SHEET 5 OF 6.



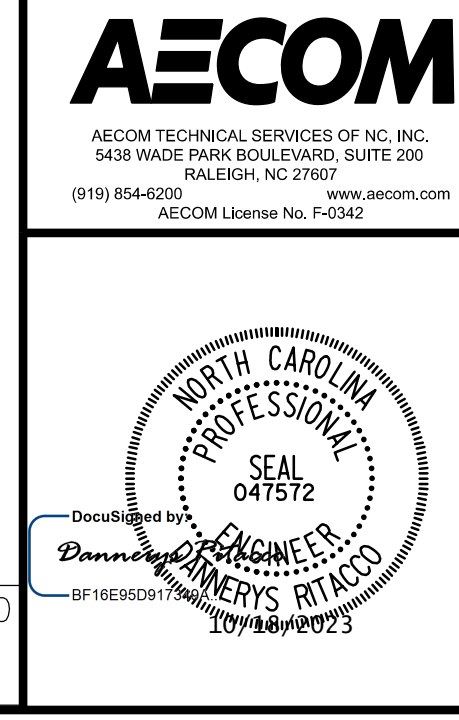
**DETAIL "A"**

PROJECT NO. **B-3186 / B-5898**

**HAYWOOD** COUNTY

STATION: **32+21.34 -L LT-**

SHEET 1 OF 6



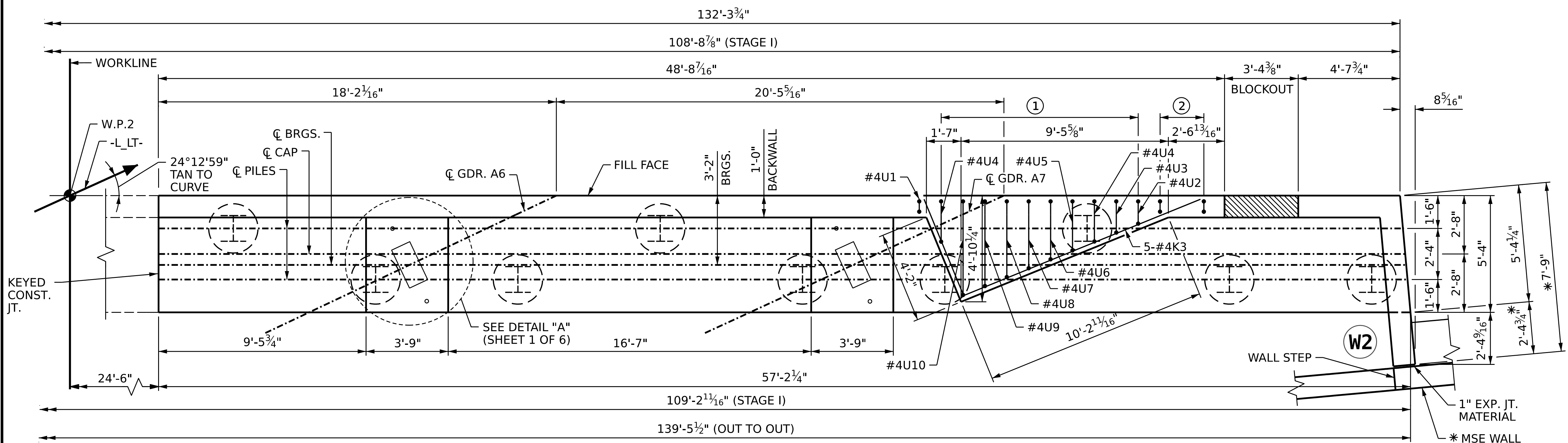
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE <b>END BENT 2</b> STAGE I - PART I					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S1-34
TOTAL SHEETS					43

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CHECKED BY :	S. NATARAJAN	DATE :	04/2023
DESIGN ENGINEER OF RECORD :	D. RITACCO	DATE :	04/2023

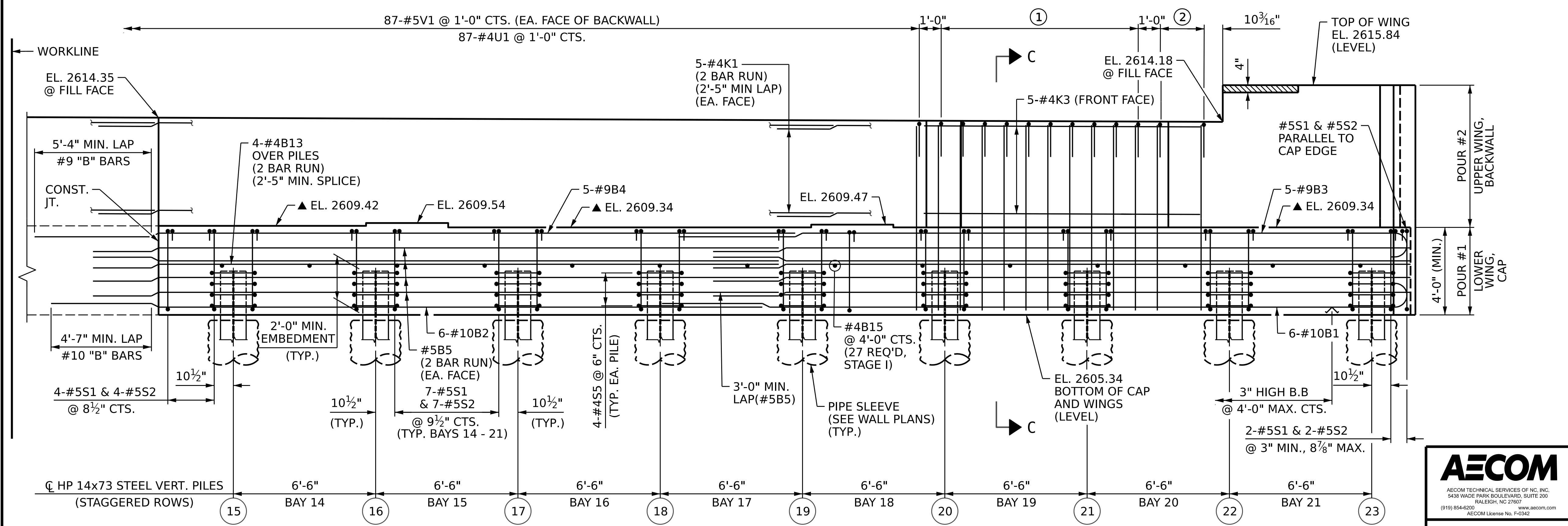
- ① SEE DETAIL "C" FOR REINF. DETAILS AT CONST. JT.
- ② EXTEND #5B10, #4B14 3'-2" MIN. INTO STAGE II
- ③ EXTEND #5B10, #4B14 3'-2" MIN. BEYOND CONST. JOINT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

\* A COPING THICKNESS OF 12" WAS ASSUMED FOR ESTABLISHING WING LENGTH. CONTRACTOR SHALL ADJUST WING LENGTH AS NECESSARY.



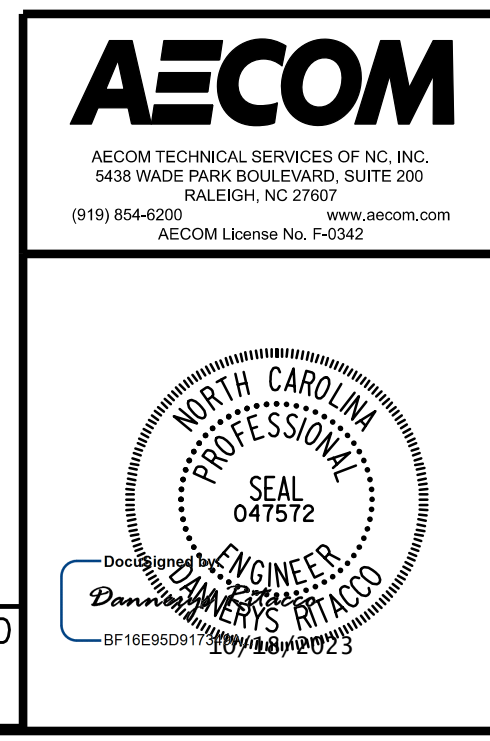
**PLAN**



**ELEVATION**

- ① 10-#5V1 (EA. FACE OF BACKWALL) & #4U2 THRU #4U10 @ 1'-0" CTS.
- ② 3-#5V1 (EA. FACE OF BACKWALL) & 3-#4U1 @ 1'-0" CTS.

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-  
 SHEET 2 OF 6

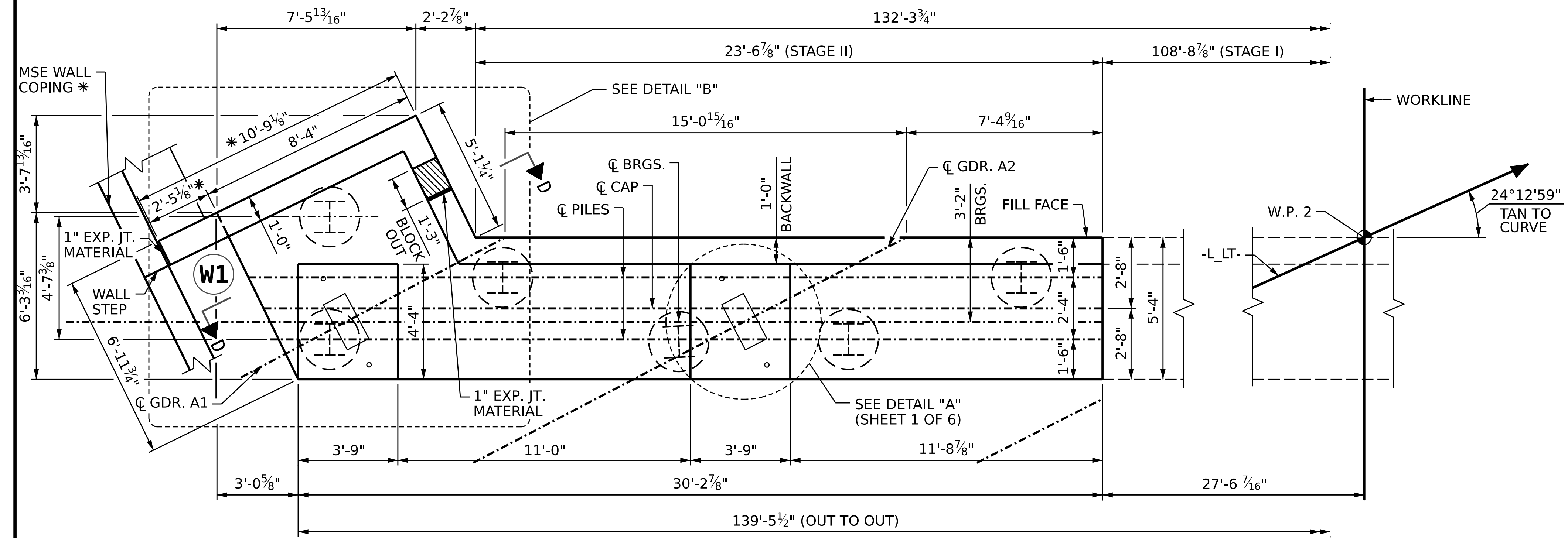


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE <b>END BENT 2</b> STAGE I - PART 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-35
					TOTAL SHEETS 43

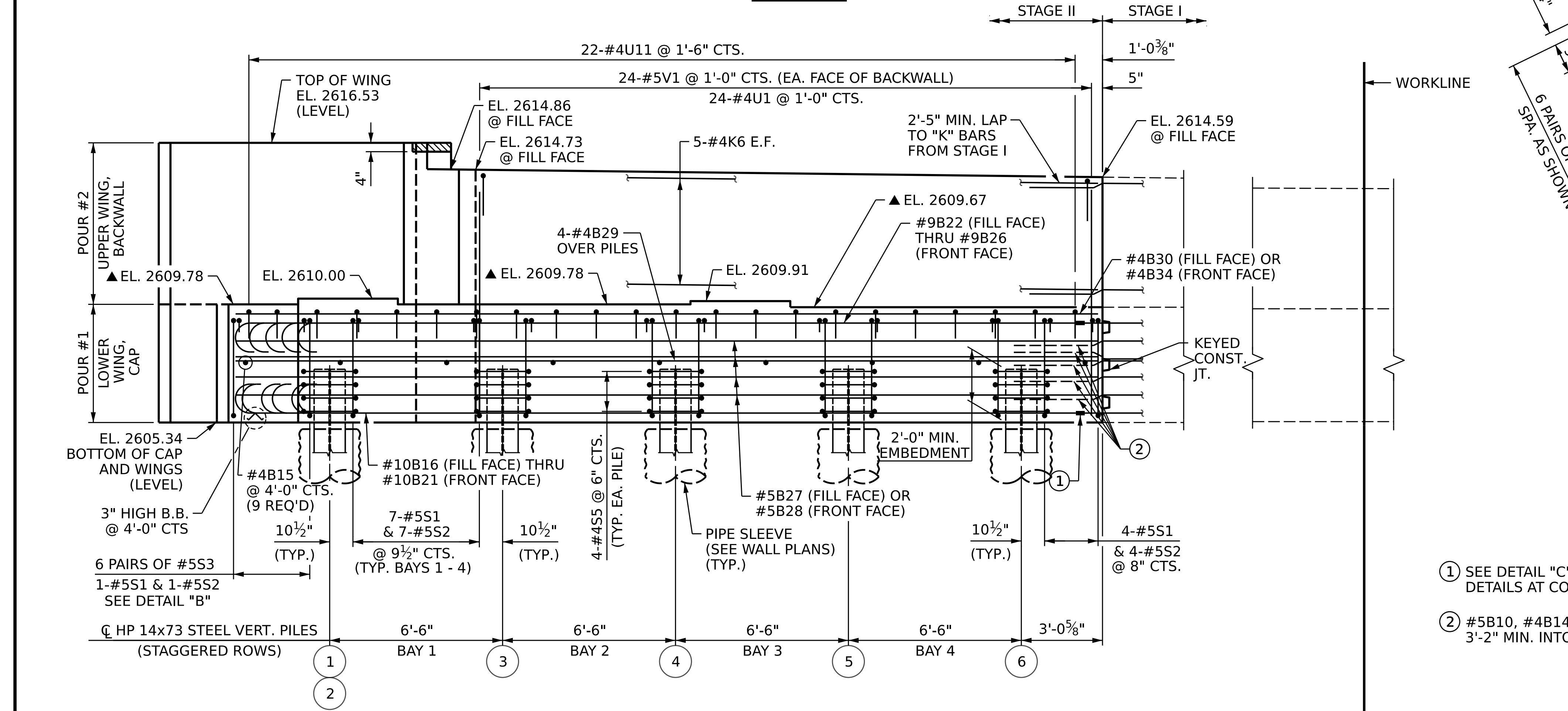
DRAWN BY : D. RITACCO DATE : 04/2023  
 CHECKED BY : S. NATARAJAN DATE : 04/2023  
 DESIGN ENGINEER OF RECORD : D. RITACCO DATE : 04/2023

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 SIGNATURES COMPLETED

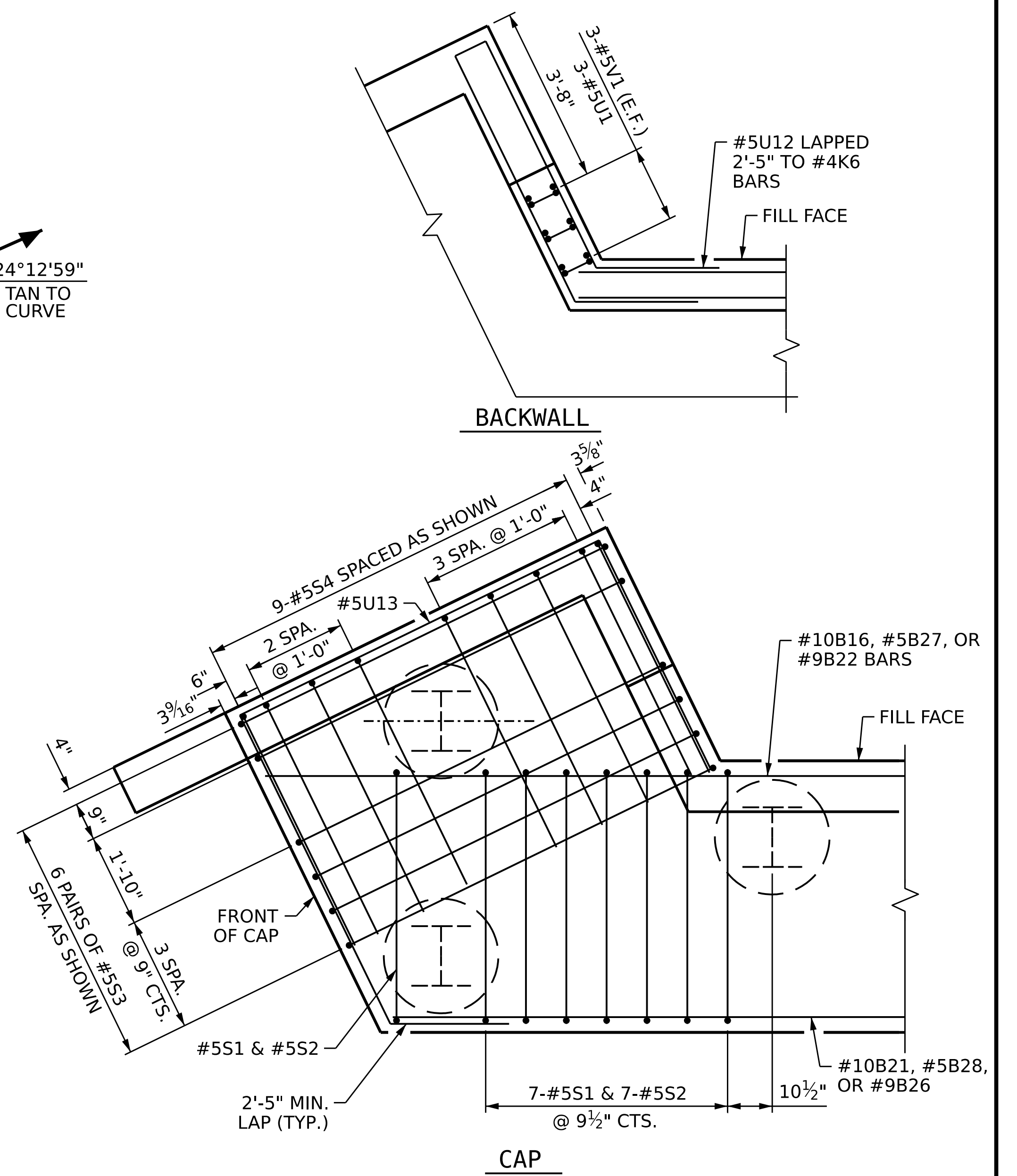
\* A COPING THICKNESS OF 12" WAS ASSUMED FOR ESTABLISHING WING LENGTH. CONTRACTOR SHALL ADJUST WING LENGTH AS NECESSARY.



**PLAN**



**ELEVATION**



**DETAIL "B"**

WINGWALL REINFORCEMENT NOT SHOWN

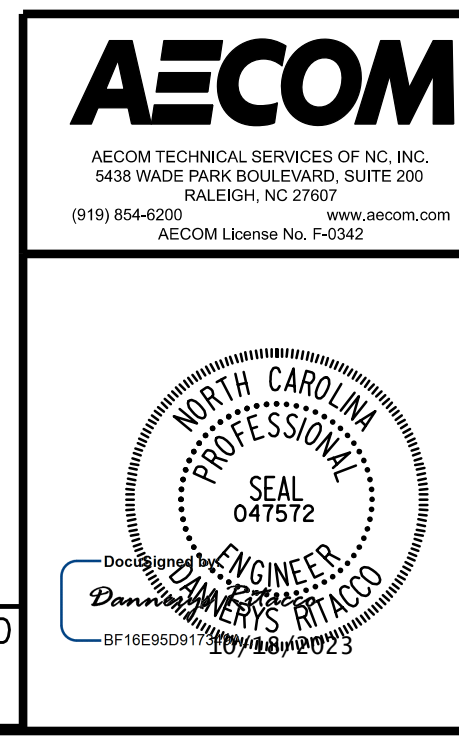
PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-  
 SHEET 3 OF 6

- ① SEE DETAIL "C" FOR REINF. DETAILS AT CONST. JT.
- ② #5B10, #4B14 EXTENDED 3'-2" MIN. INTO STAGE II

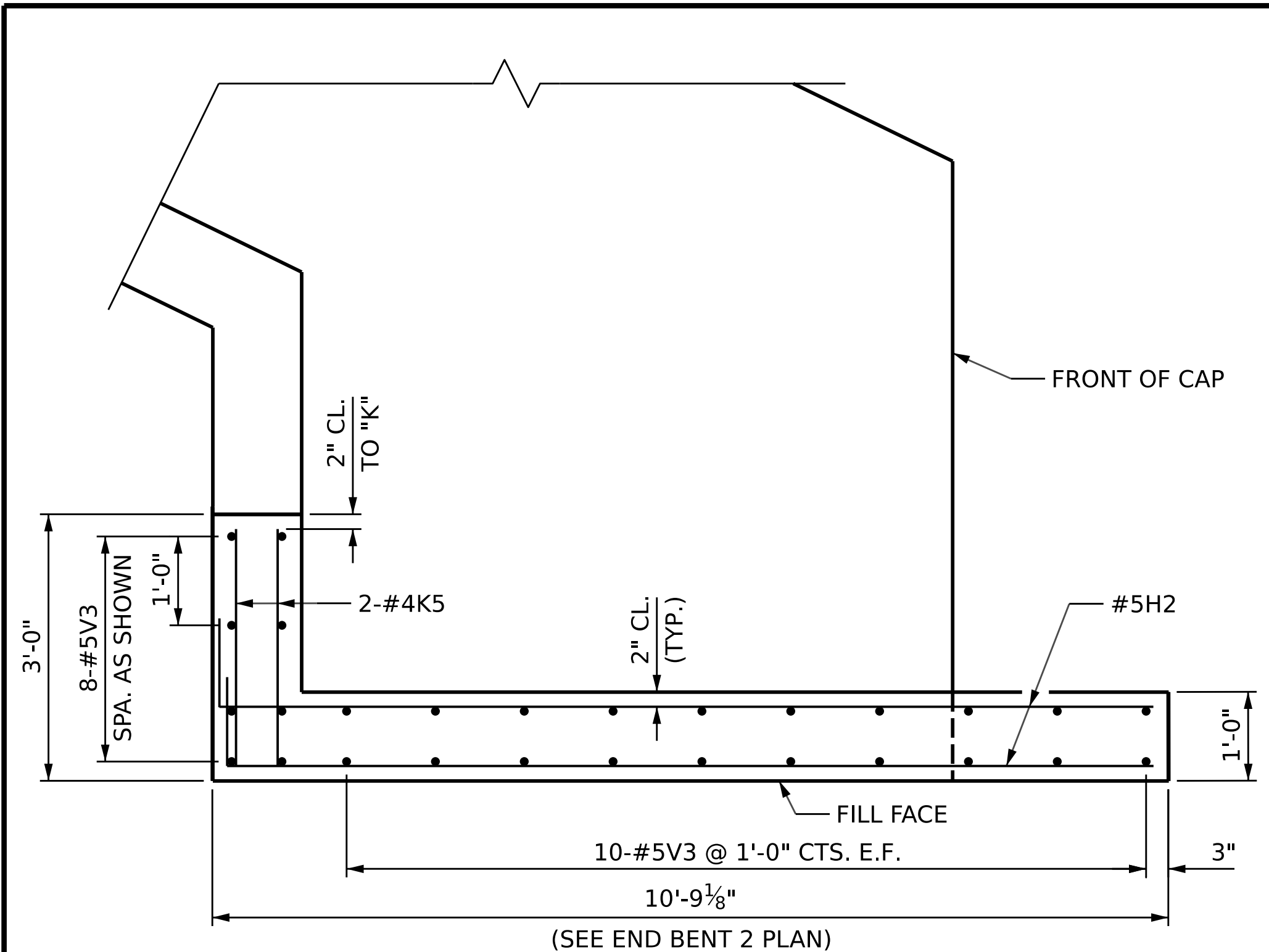
▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 5.

DRAWN BY :	D. RITACCO	DATE :	04/2023
CHECKED BY :	S. NATARAJAN	DATE :	04/2023
DESIGN ENGINEER OF RECORD :	D. RITACCO	DATE :	04/2023

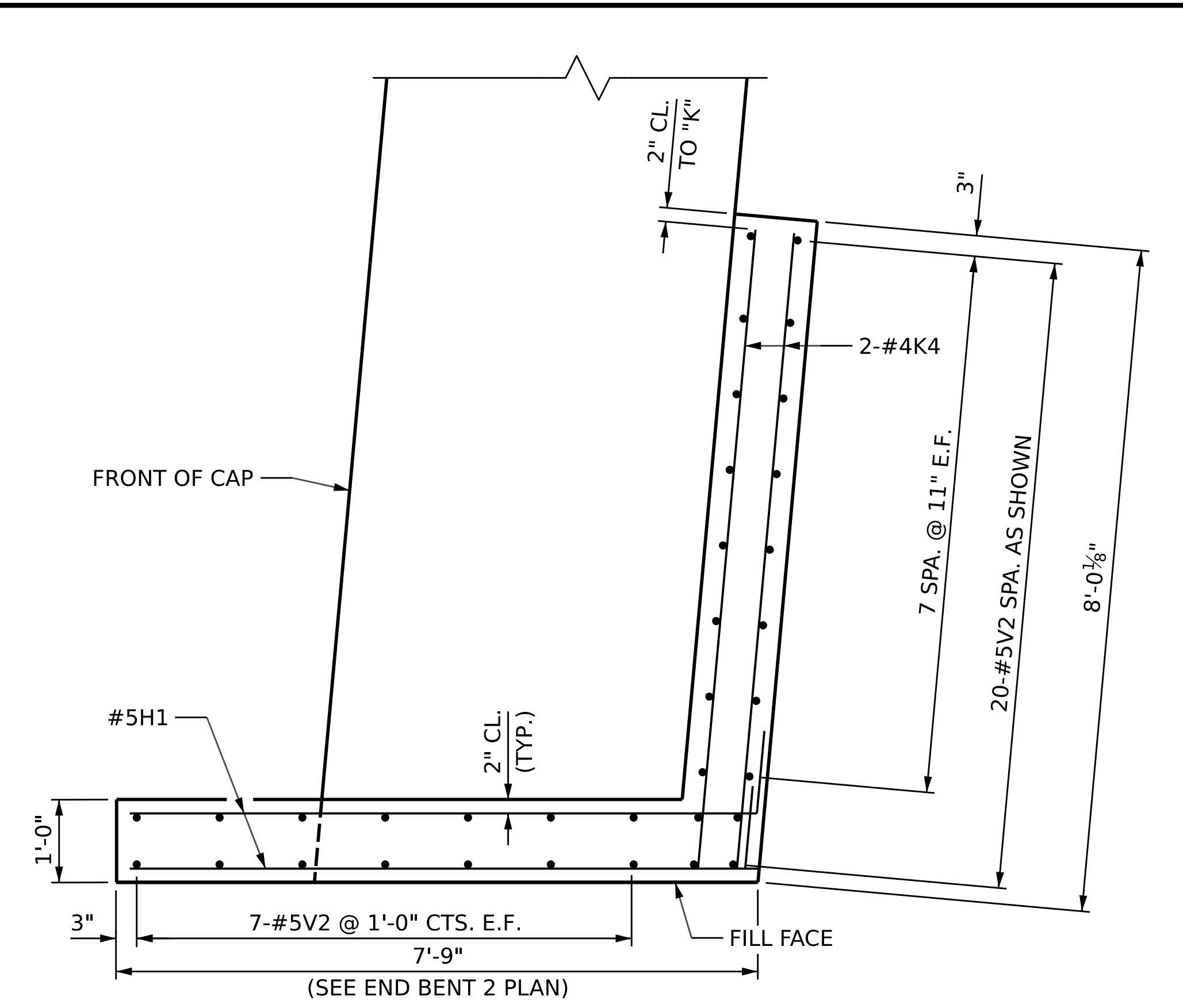
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



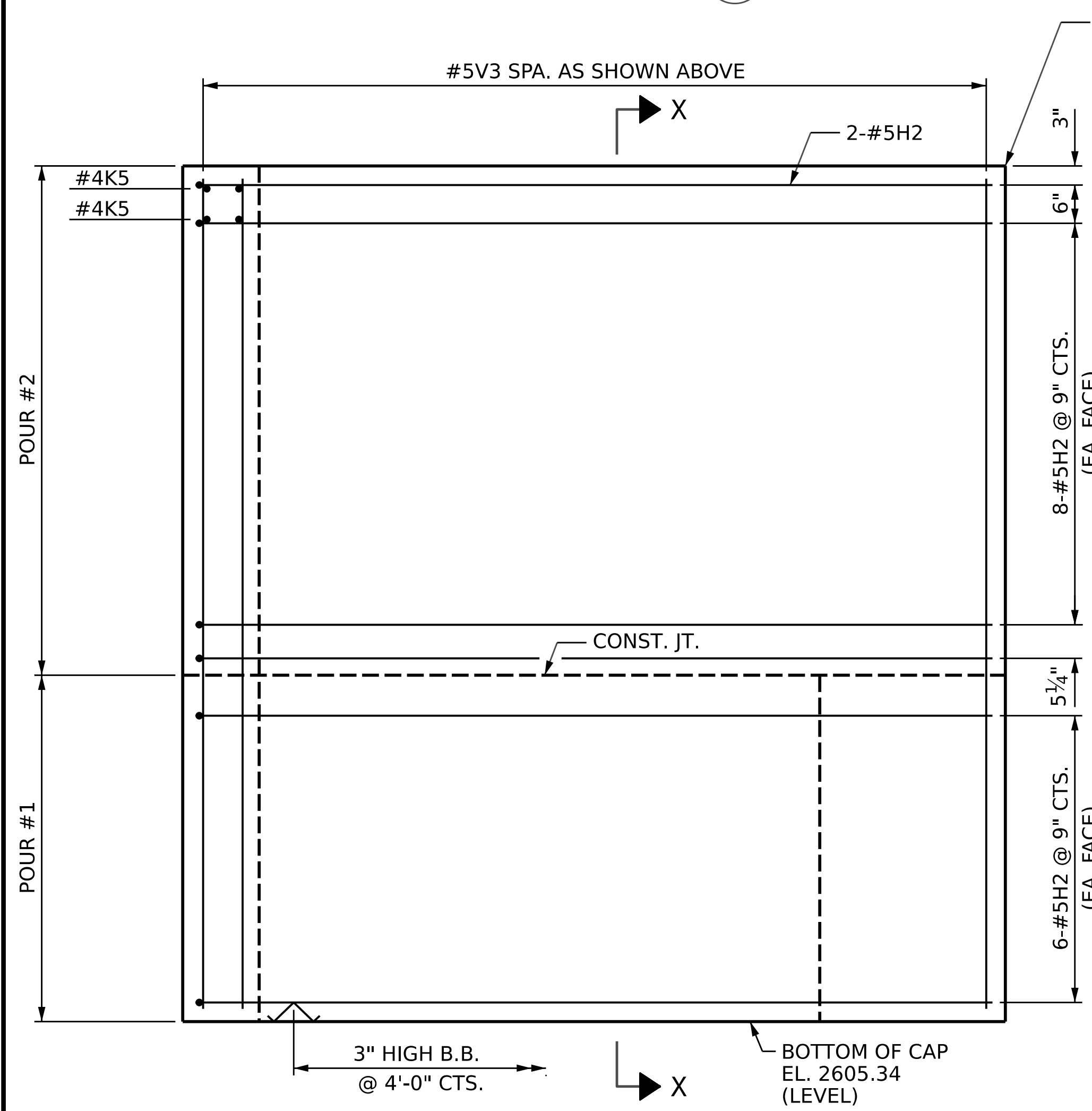
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE <b>END BENT 2</b> STAGE II					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-36
					TOTAL SHEETS 43



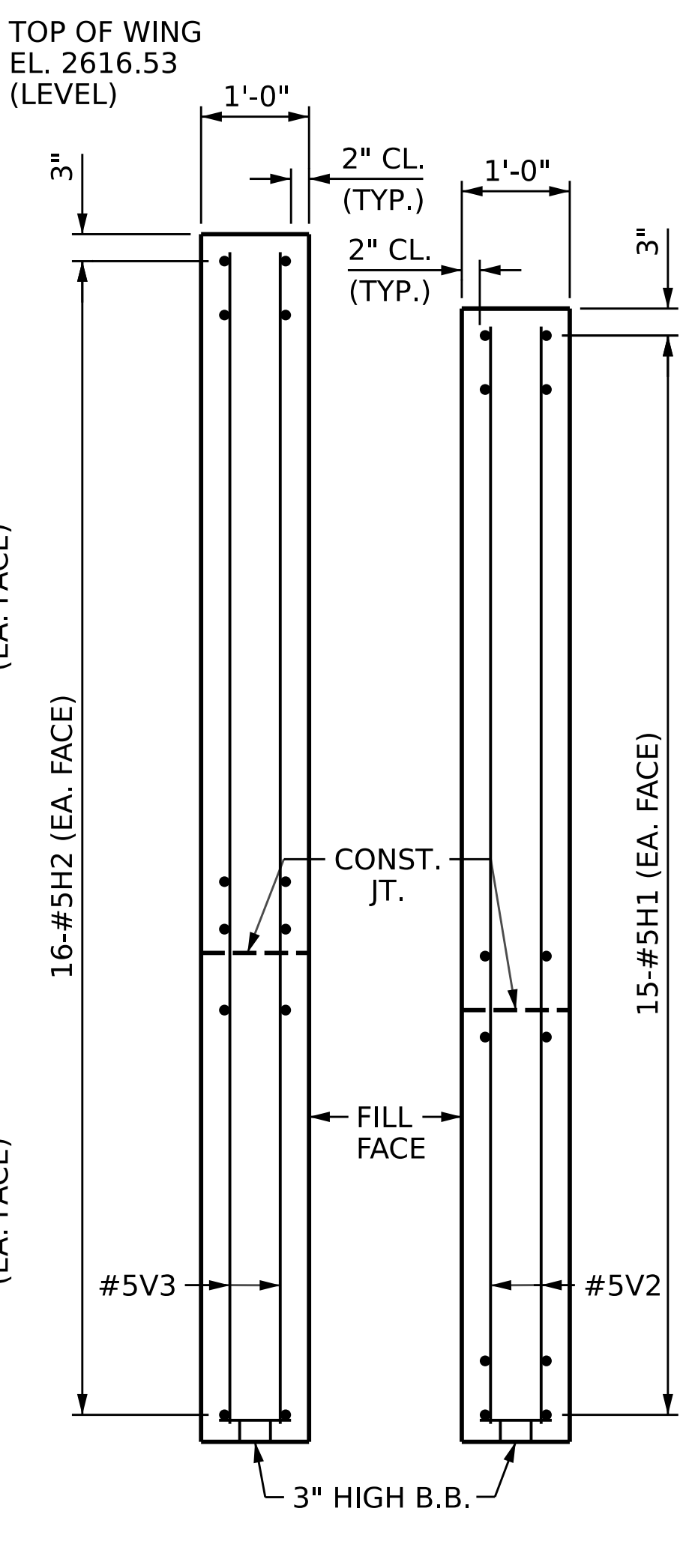
**PLAN OF WING W1**



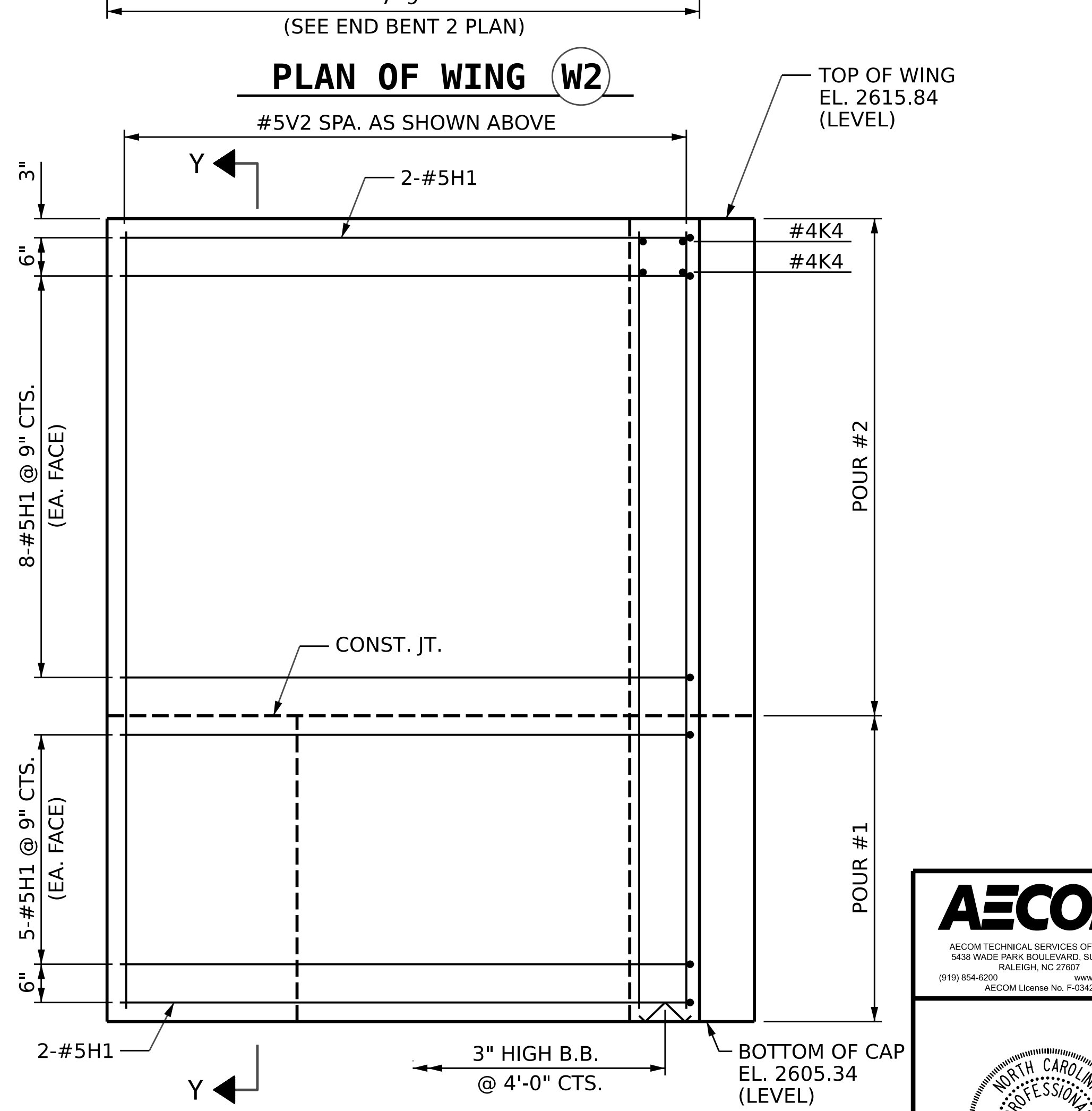
**PLAN OF WING W2**



**ELEVATION OF WING W1**

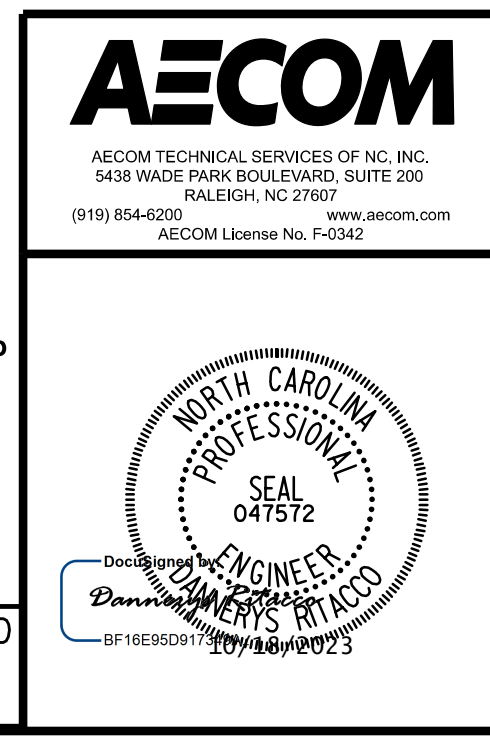


**SECTION X-X SECTION Y-Y**



**ELEVATION OF WING W2**

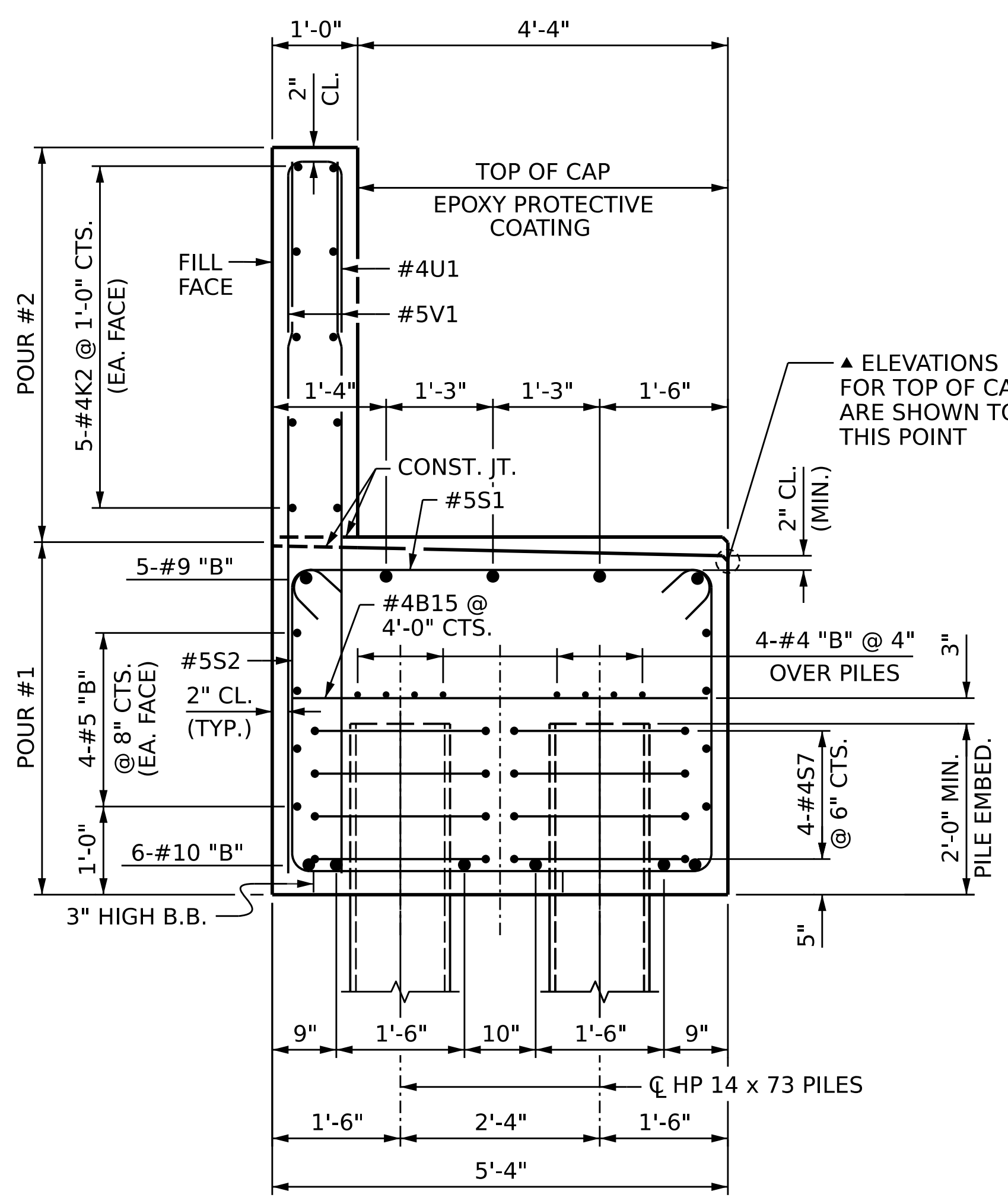
PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-  
 SHEET 4 OF 6



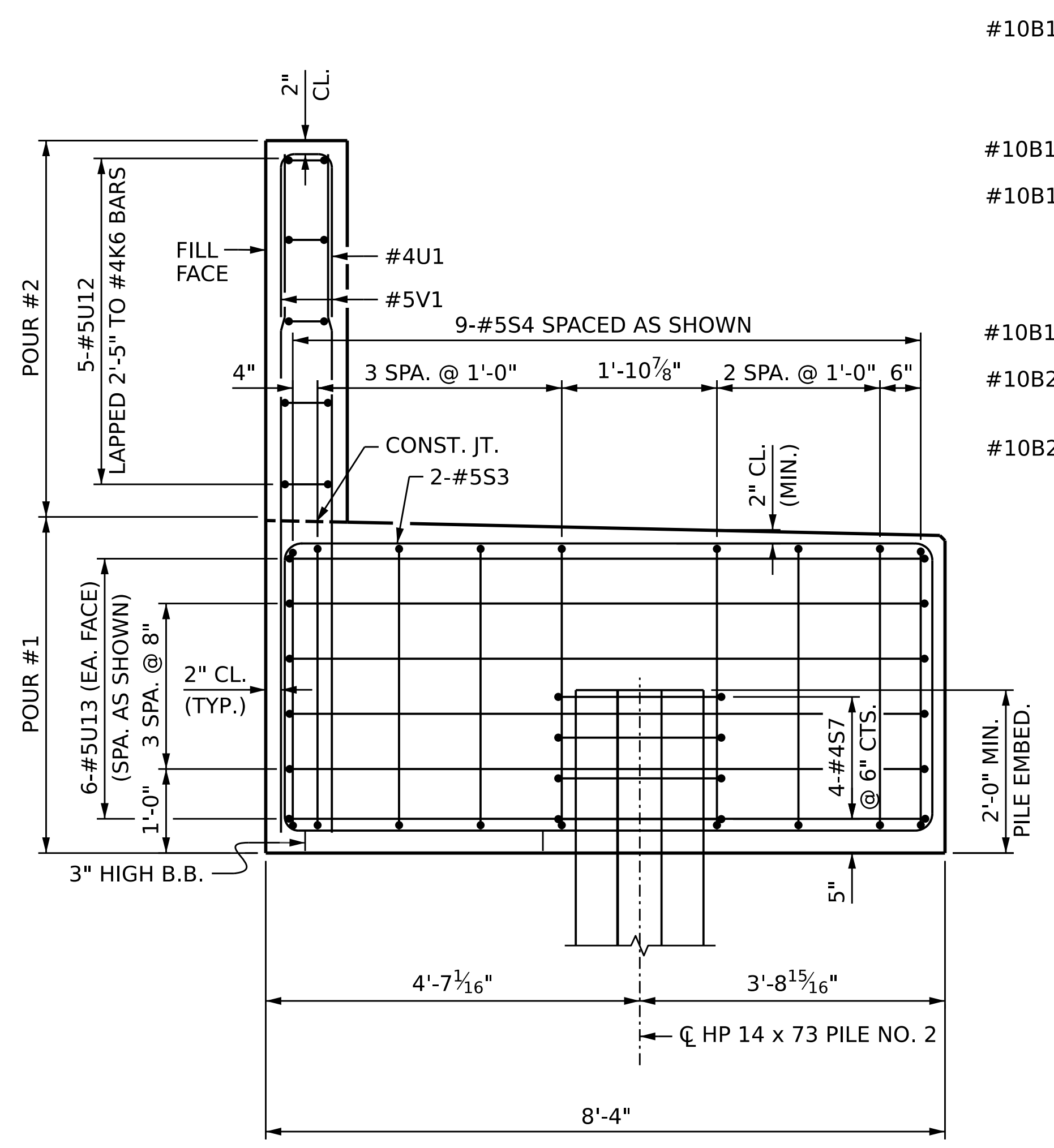
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE <b>END BENT 2</b> WINGWALLS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-37
					TOTAL SHEETS 43

DRAWN BY: D. RITACCO DATE: 04/2023  
 CHECKED BY: S. NATARAJAN DATE: 04/2023  
 DESIGN ENGINEER OF RECORD: D. RITACCO DATE: 04/2023

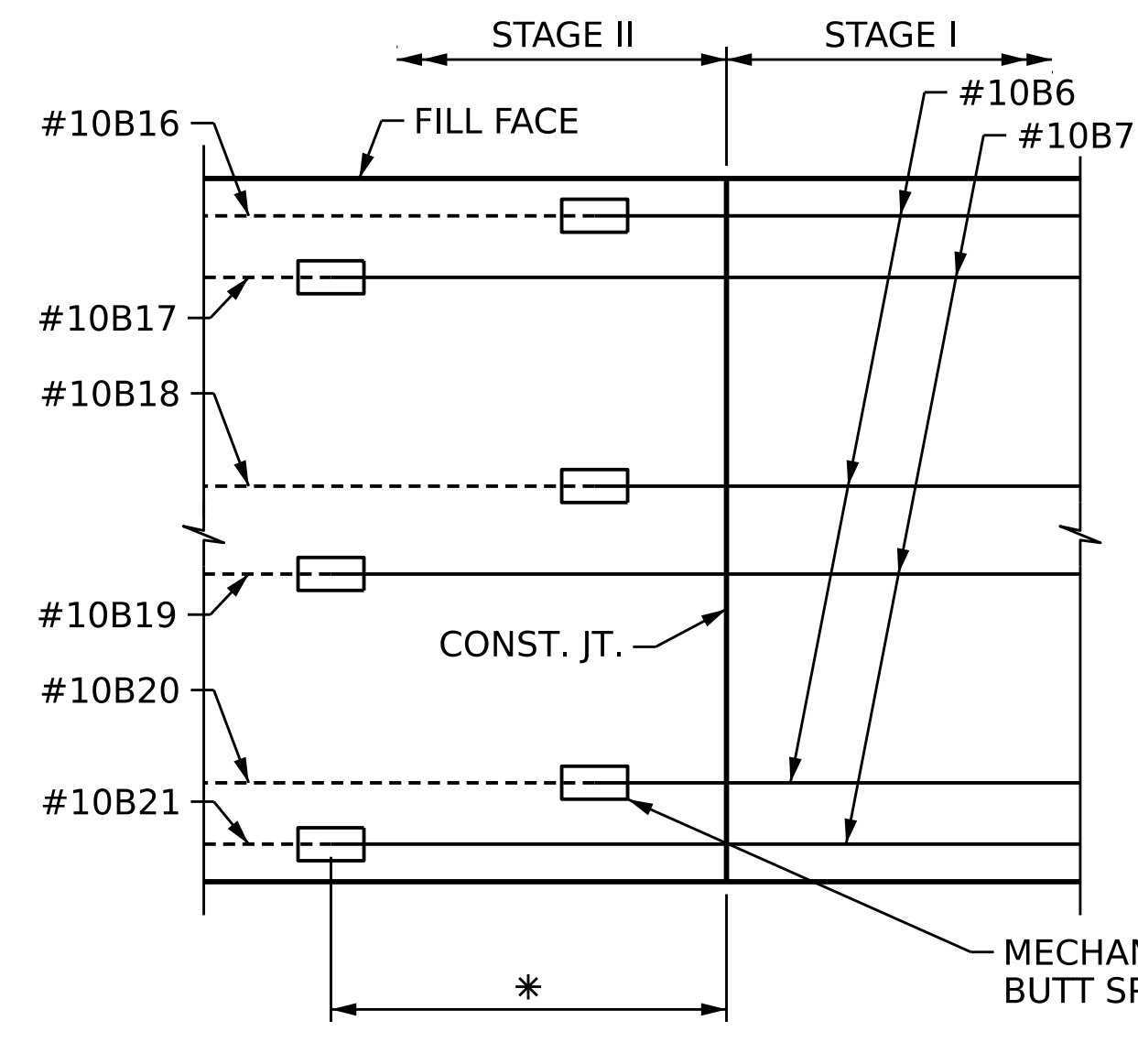
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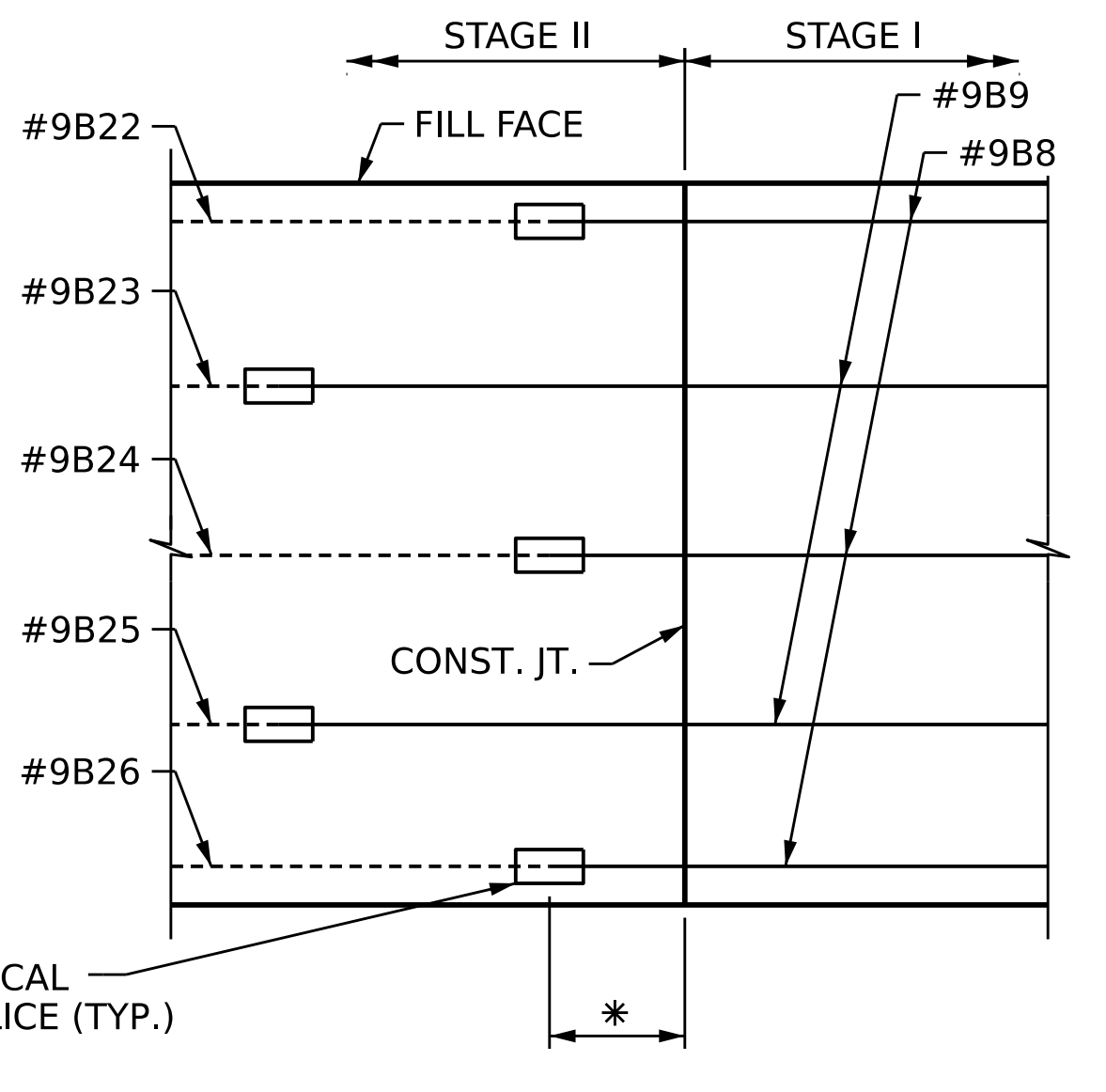
SECTION A-A



SECTION D-D



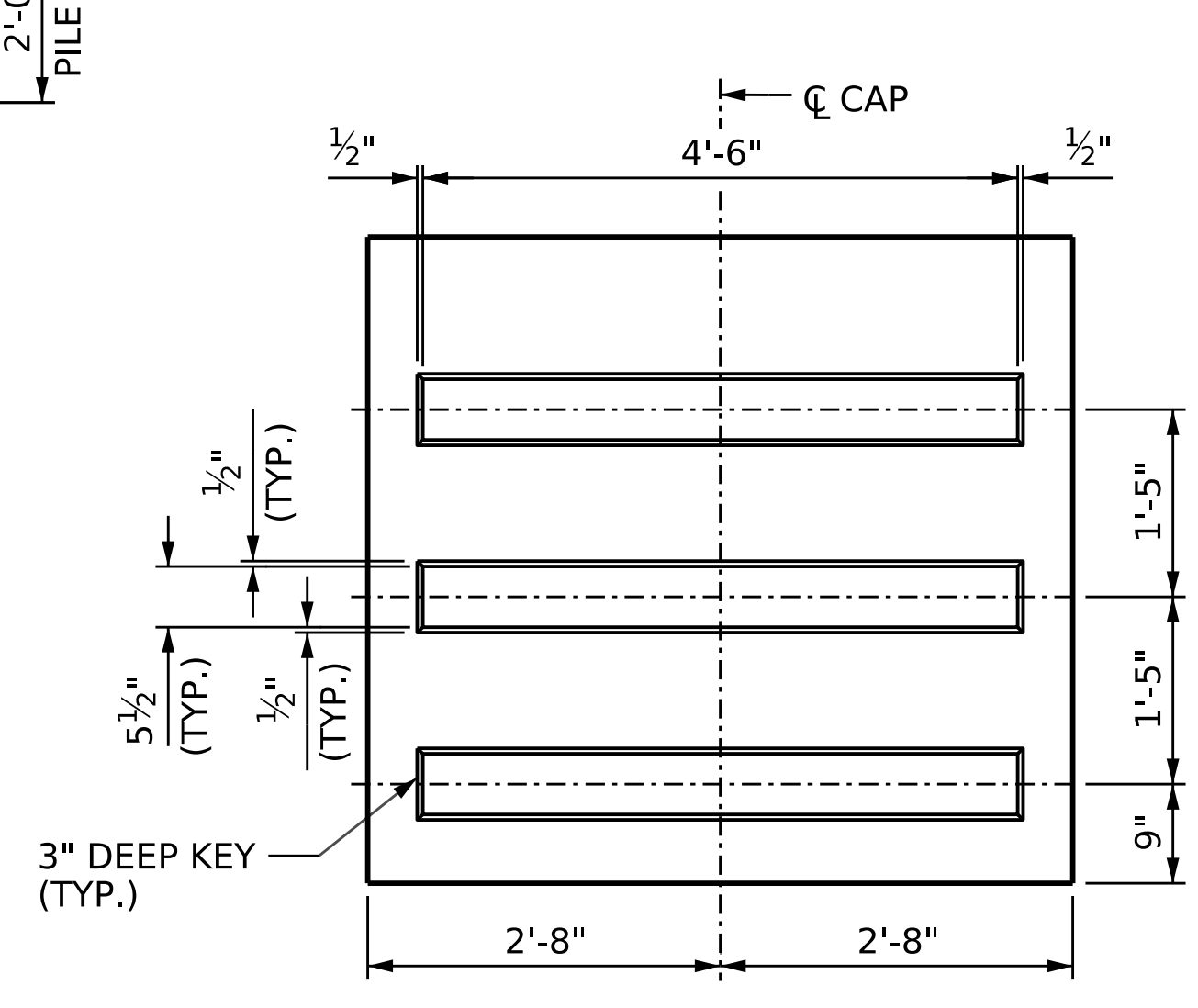
PLAN OF BOTTOM REINFORCEMENT



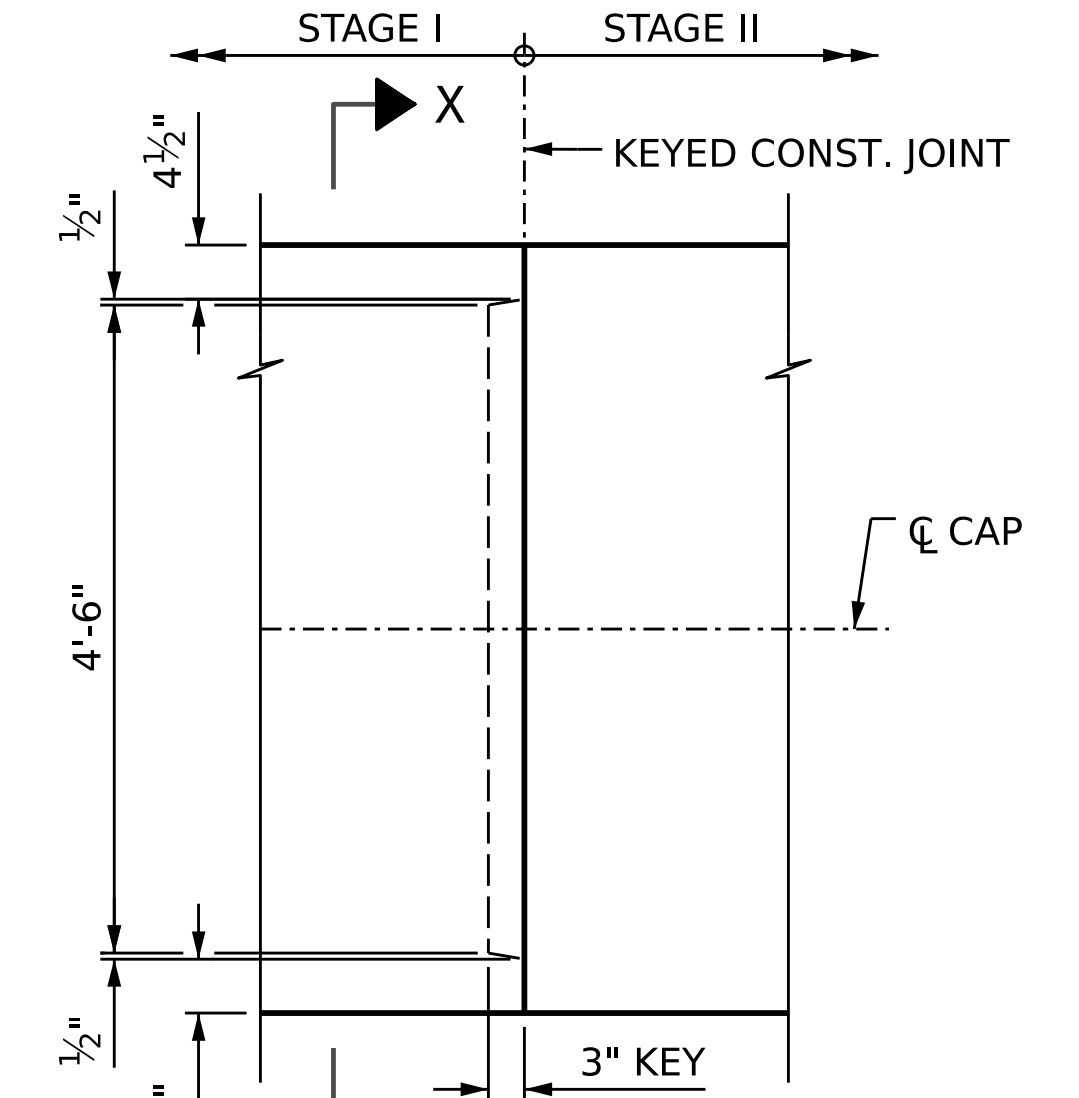
PLAN OF TOP REINFORCEMENT

DETAIL "C"

\* STAGE I TOP AND BOTTOM "B" BARS ARE DETAILED WITH STAGGERED 1'-0" AND 3'-0" EXTENSIONS BEYOND CONSTRUCTION JOINT

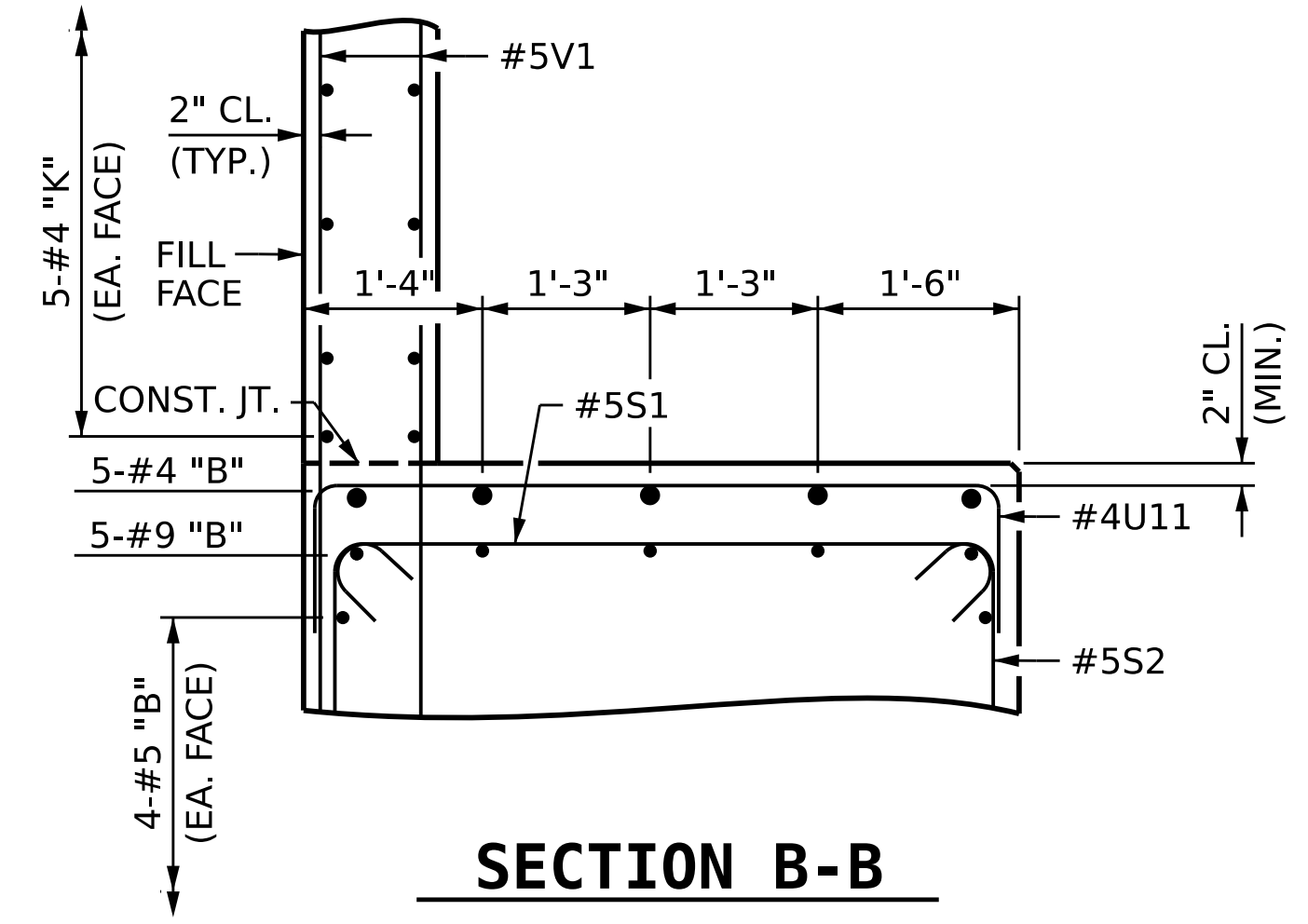


SECTION X-X

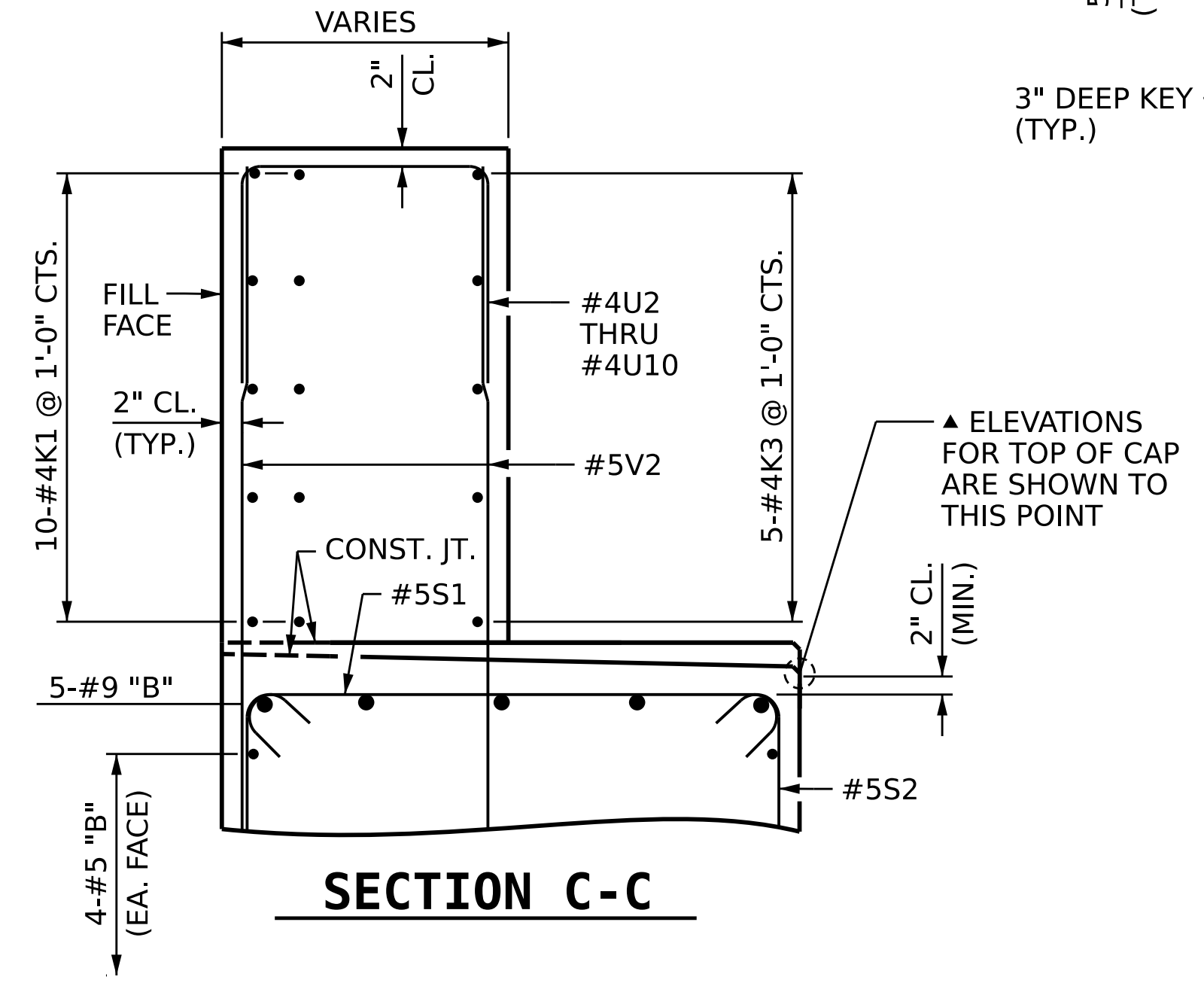


PLAN

KEYED CONSTRUCTION JOINT DETAIL

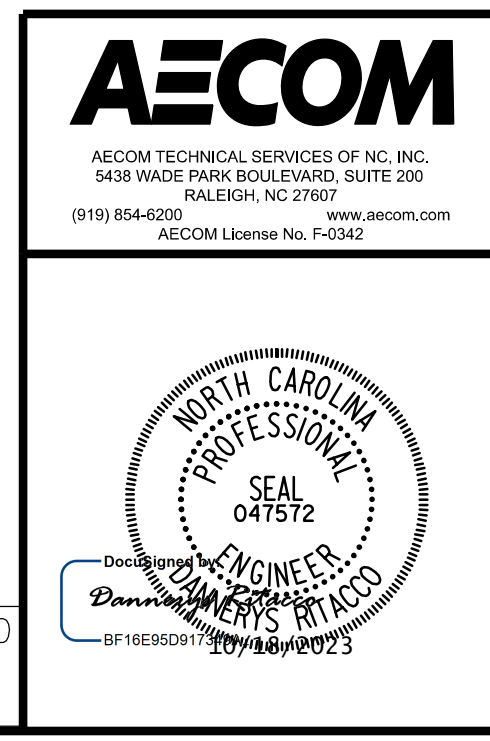


SECTION B-B



SECTION C-C

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L\_ LT-  
 SHEET 5 OF 6



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE <b>END BENT 2</b> SECTIONS & DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-38					TOTAL SHEETS 43

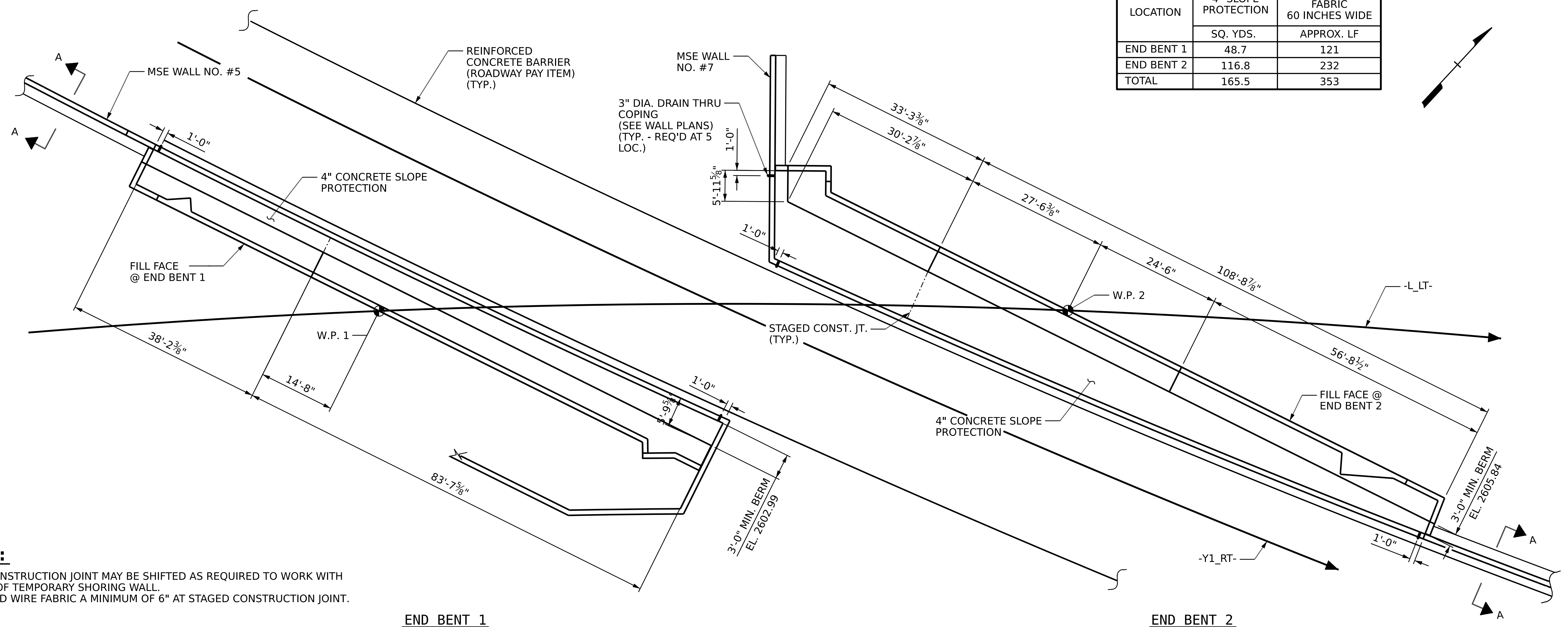
DRAWN BY: D. RITACCO DATE: 04/2023  
 CHECKED BY: S. NATARAJAN DATE: 04/2023  
 DESIGN ENGINEER OF RECORD: D. RITACCO DATE: 04/2023

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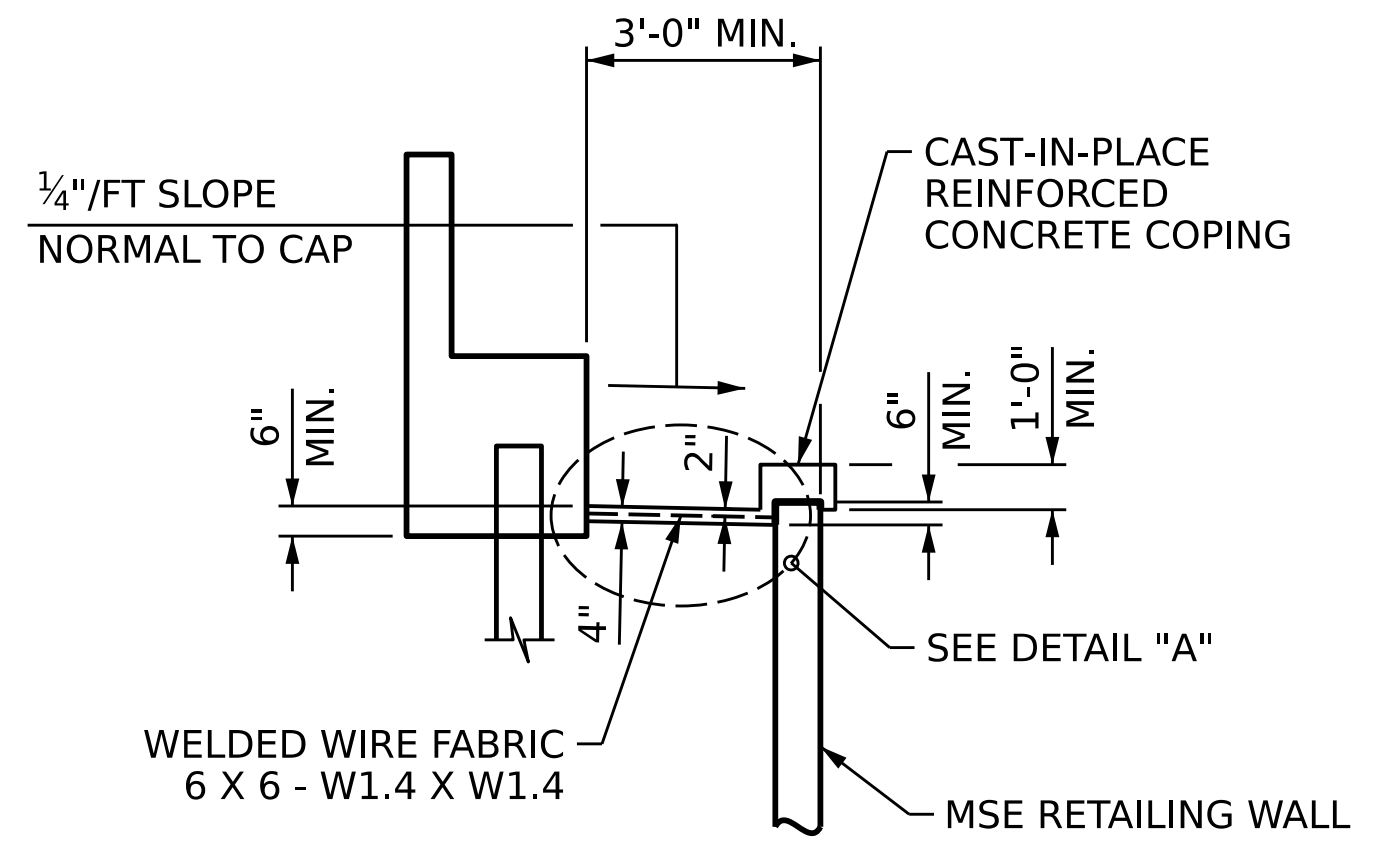


LOCATION	4" SLOPE PROTECTION	WELDED WIRE FABRIC 60 INCHES WIDE
	SQ. YDS.	APPROX. LF
END BENT 1	48.7	121
END BENT 2	116.8	232
TOTAL	165.5	353

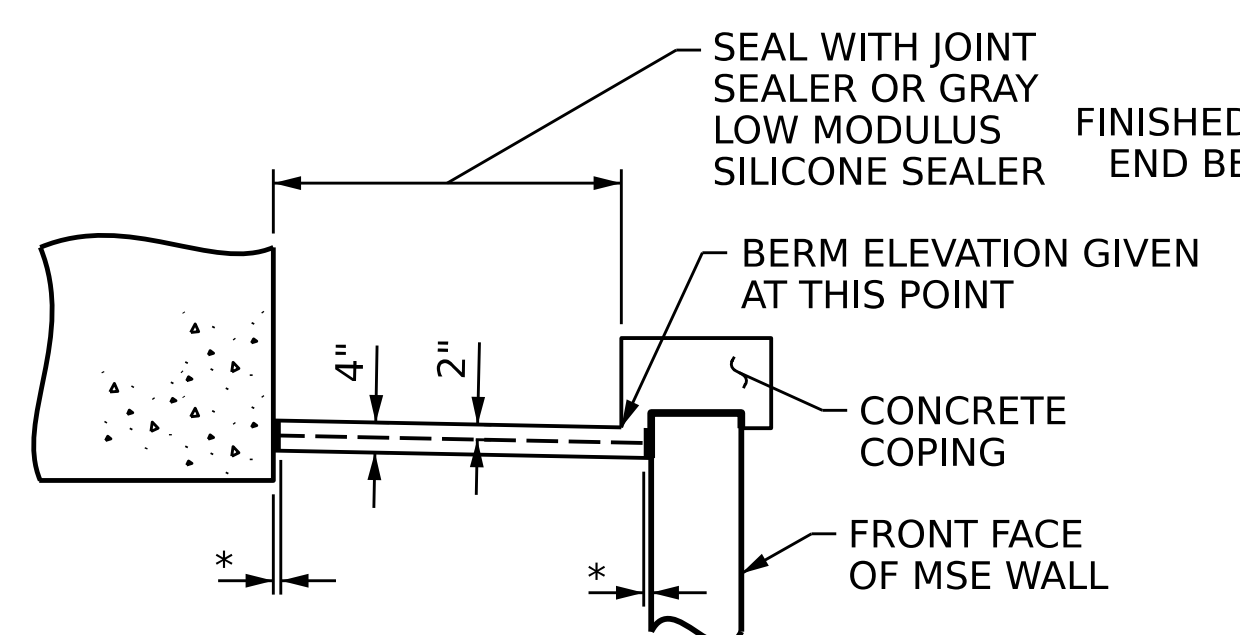


**NOTES:**  
 STAGED CONSTRUCTION JOINT MAY BE SHIFTED AS REQUIRED TO WORK WITH LOCATION OF TEMPORARY SHORING WALL.  
 LAP WELDED WIRE FABRIC A MINIMUM OF 6" AT STAGED CONSTRUCTION JOINT.

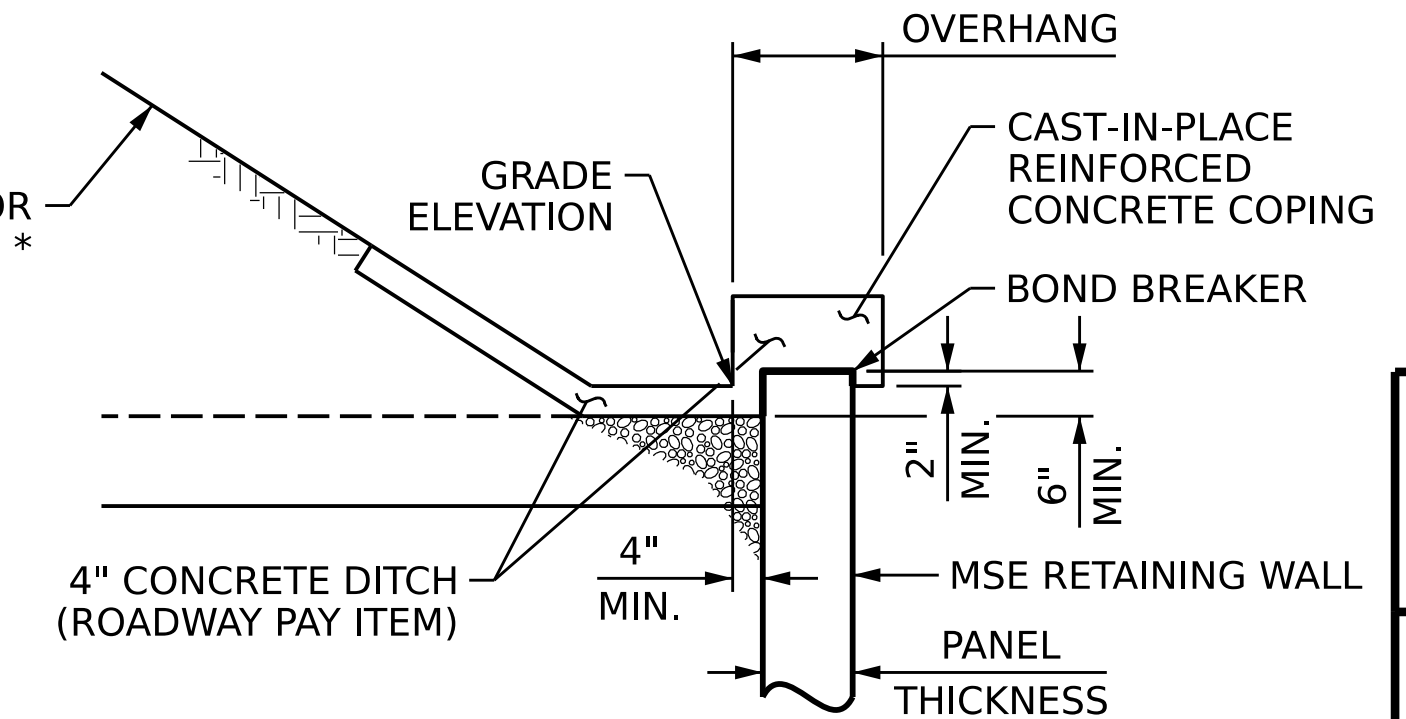
END BENT 1 PLAN END BENT 2



**SECTION AT END BENT**



**DETAIL "A"**  
 \* 1" EXP. JT. MAT'L (PLACE DEBONDING TAPE ON TOP OF EXP. JT. MAT'L)



**SECTION A-A**

PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L LT-

**AECOM**  
AECOM TECHNICAL SERVICES OF NC, INC.  
 5438 WADE PARK BOULEVARD, SUITE 200  
 RALEIGH, NC 27607  
 (919) 854-6200  
 AECOM License No. FC242

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PROFESSIONAL ENGINEER  
GREGORY R. COLS  
10/18/2023

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

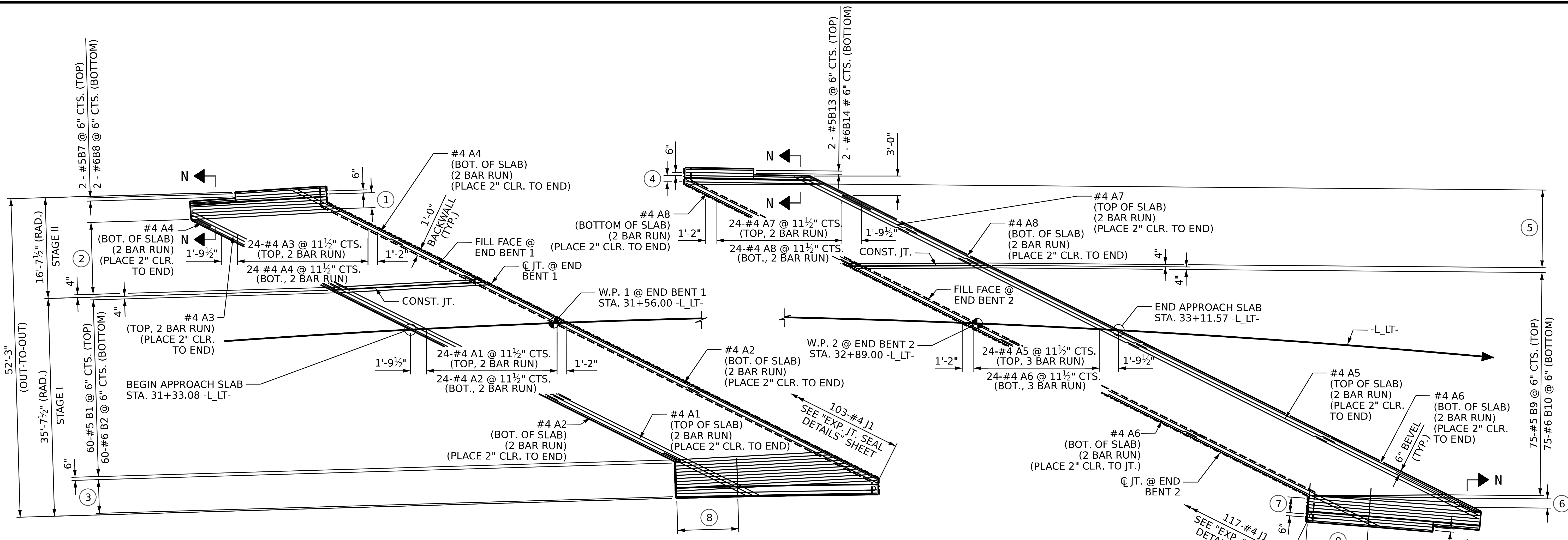
**GENERAL DRAWING**

**SLOPE PROTECTION**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-40
1			3			TOTAL SHEETS
2			4			43

DRAWN BY :	M.L. CATER	DATE :	04/2023
CHECKED BY :	S. NATARAJAN	DATE :	04/2023
DESIGN ENGINEER OF RECORD:	G.R. COLS	DATE :	04/2023

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**END BENT 1**

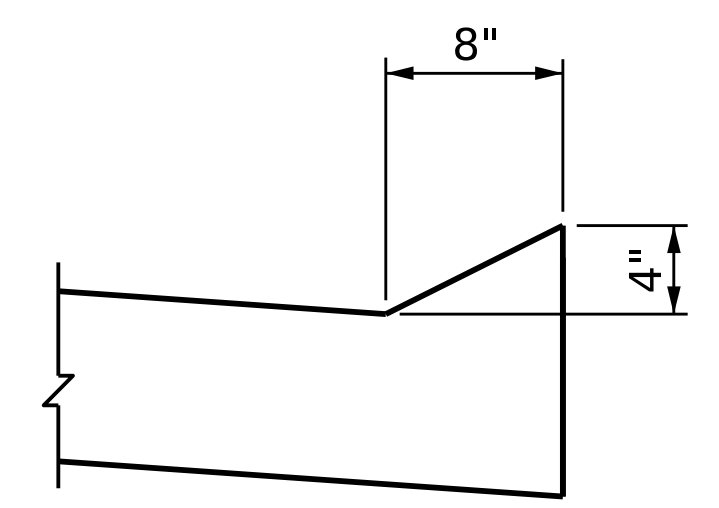
- ① 6-#5 B5 @ 6" CTS. (TOP OF SLAB) (CUT TO FIT)  
6-#6 B6 @ 6" CTS. (BOTTOM OF SLAB) (CUT TO FIT)
- ② 26-#5 B1 @ 6" CTS. (TOP OF SLAB)  
26-#6 B2 @ 6" CTS. (BOTTOM OF SLAB)
- ③ 12-#5 B3 @ 6" CTS. (TOP OF SLAB) (CUT TO FIT)  
12-#6 B4 @ 6" CTS. (BOTTOM OF SLAB) (CUT TO FIT)
- ⑧ 14-#5 B19 @ 9" CTS. (TOP OF SLAB)  
14-#6 B20 @ 9" CTS. (BOTTOM OF SLAB)

**END BENT 2**

- ④ 3-#5 B11 @ 6" CTS. (TOP OF SLAB) (CUT TO FIT)  
3-#6 B12 @ 6" CTS. (BOTTOM OF SLAB) (CUT TO FIT)
- ⑤ 27-#5 B9 @ 6" CTS. (TOP OF SLAB)  
27-#6 B10 @ 6" CTS. (BOTTOM OF SLAB)
- ⑥ 3-#5 B15 @ APPROX. 6" CTS. (TOP OF SLAB) (CUT TO FIT)  
3-#6 B16 @ APPROX. 6" CTS. (BOTTOM OF SLAB) (CUT TO FIT) (FAN BARS EVENLY)
- ⑦ 6-#5 B15 @ 6" CTS. (TOP OF SLAB) (CUT TO FIT)  
6-#6 B16 @ 6" CTS. (BOTTOM OF SLAB) (CUT TO FIT)
- ⑧ 14-#5 B19 @ 9" CTS. (TOP OF SLAB)  
14-#6 B20 @ 9" CTS. (BOTTOM OF SLAB)

**PLAN**

**NOTES:**  
 WORK THIS SHEET WITH THE "GEOMETRY CONTROL" SHEET.  
 SPLICE LENGTHS SHOWN ARE A MINIMUM AND WILL VARY.  
 A BAR SPACINGS ARE MEASURED ALONG THE SHORT CORD AND PLACED PARALLEL TO THE STAGE CONSTRUCTION JOINT.



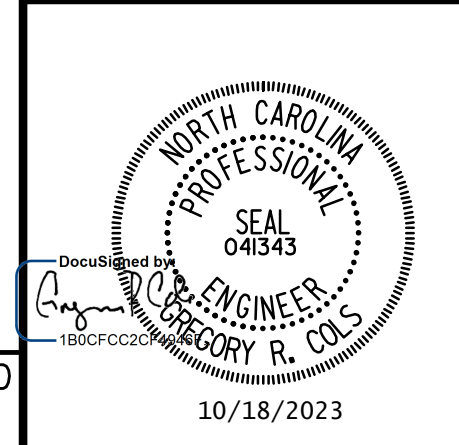
PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L\_ LT-

SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

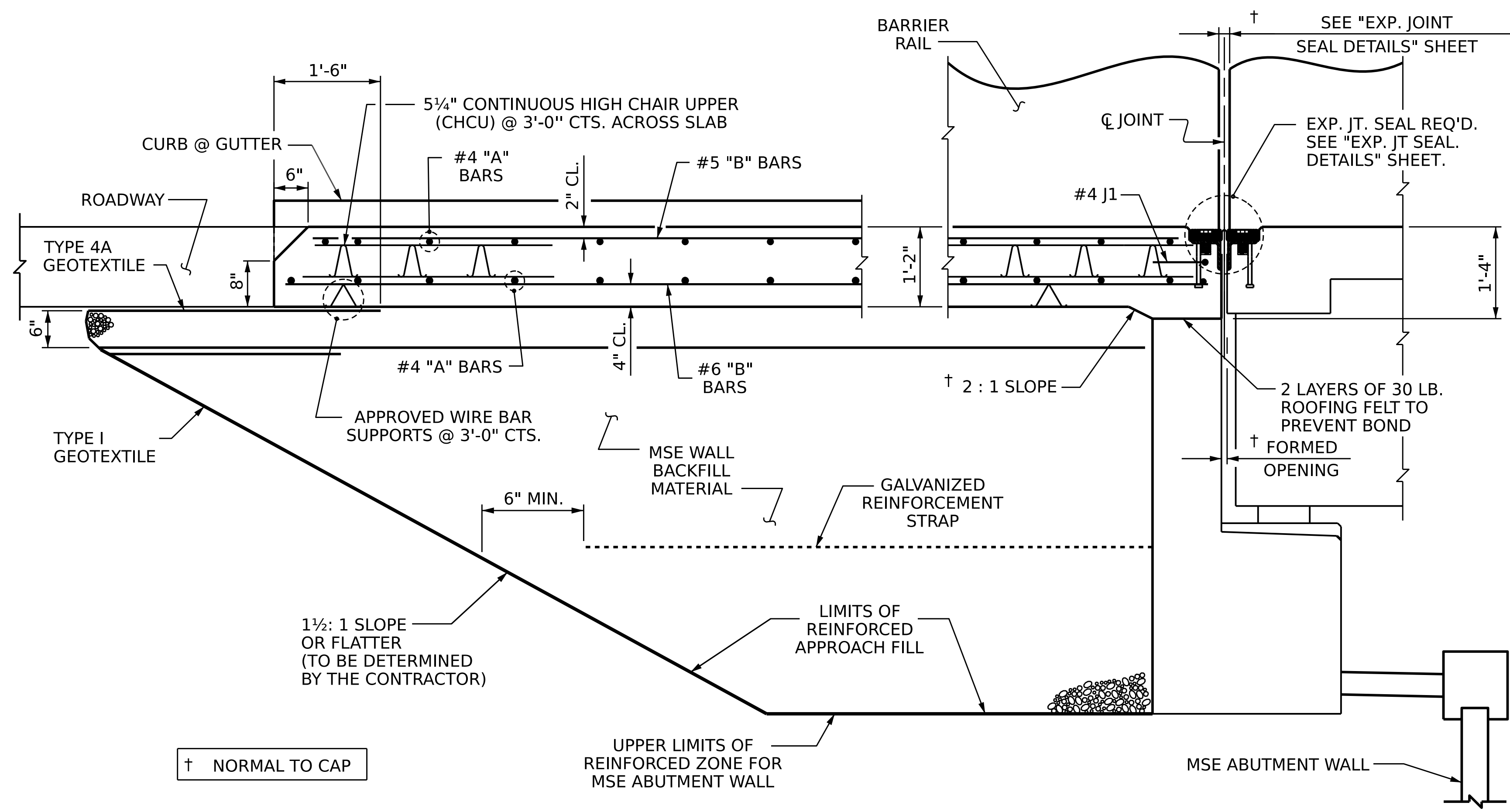
**APPROACH SLAB**



DRAWN BY : M. L. CATER DATE : 03/2023  
 CHECKED BY : S. NATARAJAN DATE : 03/2023  
 DESIGN ENGINEER OF RECORD: G. COLS DATE : 03/2023

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 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-41
1			3			TOTAL SHEETS
2			4			43



**NOTES**

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT, AND BACK FILL MATERIAL, SEE ROADWAY PLANS.

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

BACKFILL MATERIAL SHALL BE THE AGGREGATE USED IN THE REINFORCED ZONE FOR THE MSE RETAINING WALL.

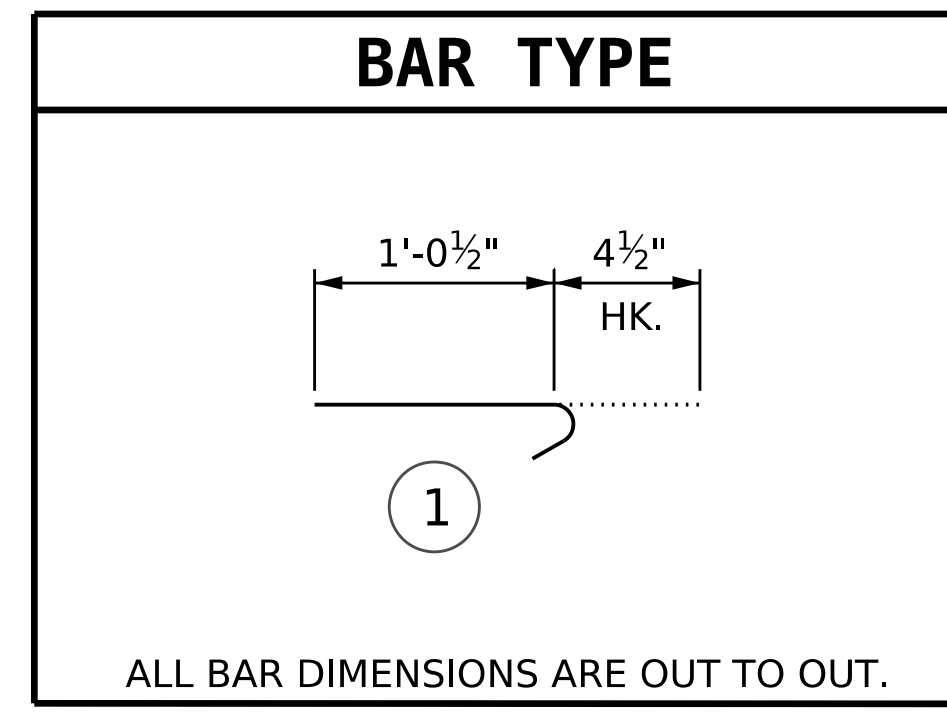
APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

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

FOR EXPANSION JOINT SEAL, SEE SPECIAL PROVISIONS.

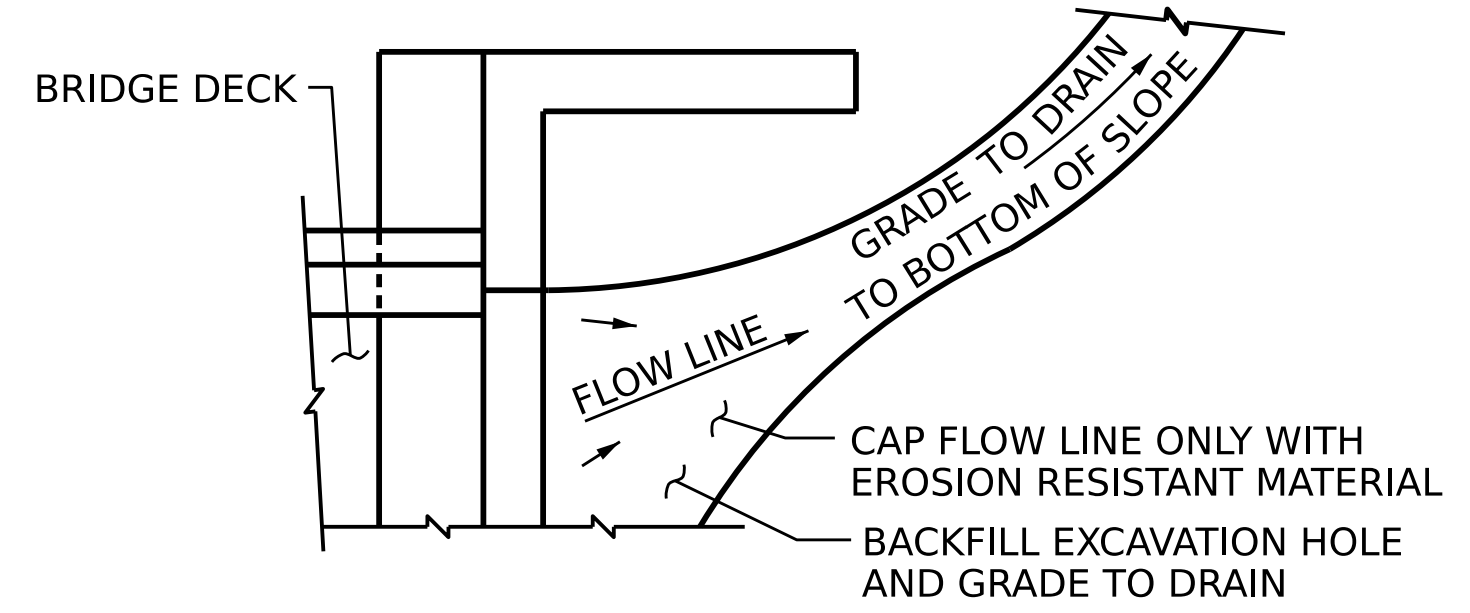
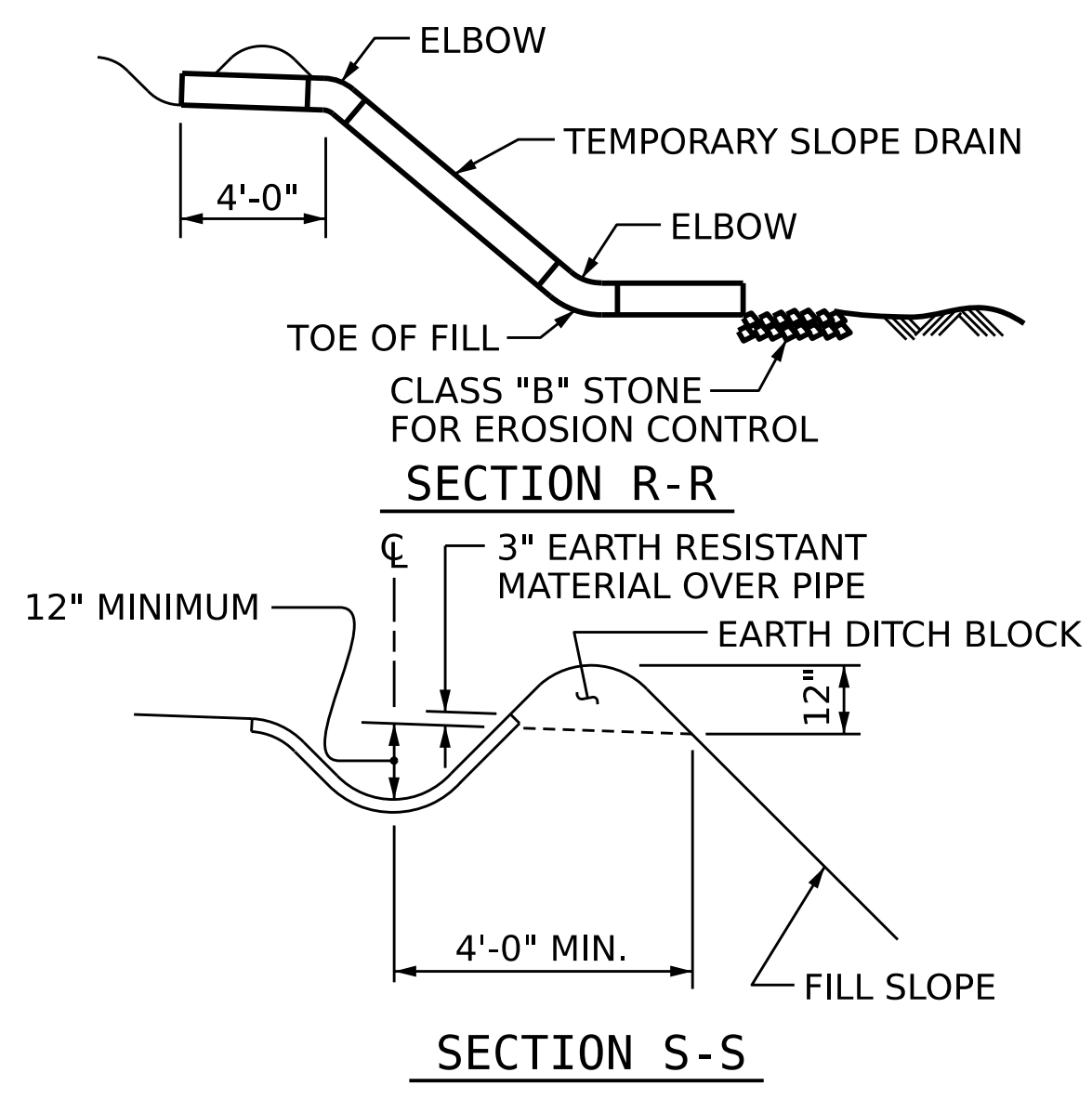
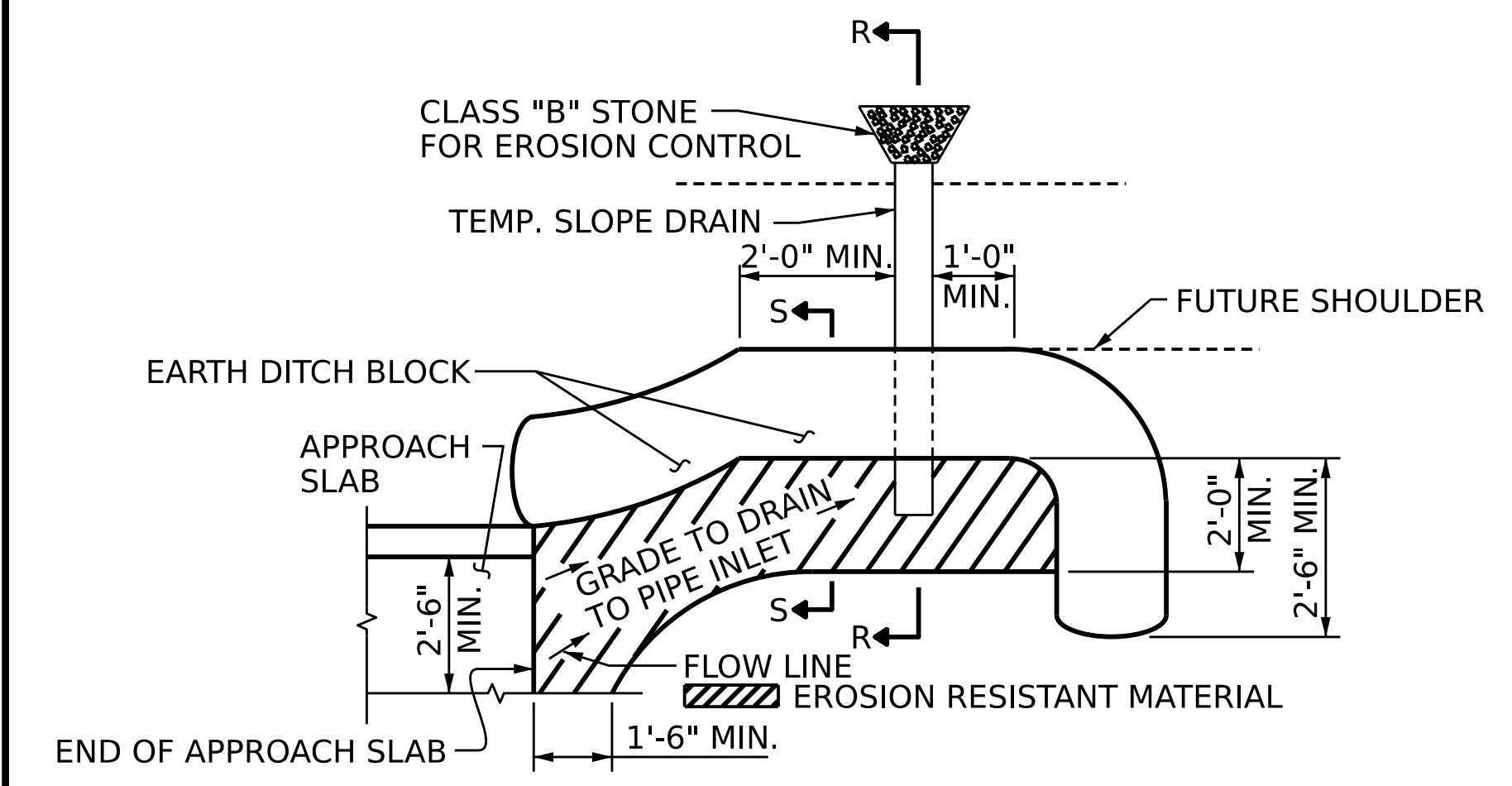
**SPLICE LENGTHS**

BAR SIZE	EPOXY COATED	UNCOATED
#4	1' - 11"	1' - 7"
#5	2' - 5"	2' - 0"
#6	3' - 7"	2' - 5"



**BILL OF MATERIAL**

STAGE I					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	50	#4	STR	39'-8"	1325
A2	52	#4	STR	39'-8"	1378
* A5	75	#4	STR	33'-7"	1683
A6	78	#4	STR	33'-7"	1750
* B1	60	#5	STR	22'-11"	1434
B2	60	#6	STR	23'-11"	2155
* B3	12	#5	STR	32'-0"	401
B4	12	#6	STR	32'-0"	577
* B9	75	#5	STR	20'-5"	1597
B10	75	#6	STR	21'-4"	2403
* B15	9	#5	STR	27'-5"	257
B16	9	#6	STR	27'-5"	371
* B17	2	#5	STR	19'-10"	41
B18	2	#6	STR	19'-10"	60
* B19	28	#5	STR	6'-0"	175
B20	28	#6	STR	6'-0"	252
* J1	158	#4	1	1'-5"	150
REINFORCING STEEL					8,946 LBS.
* EPOXY COATED REINFORCING STEEL					7,063 LBS.
CLASS AA CONCRETE					81.7 C.Y.
STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	50	#4	STR	17'-5"	582
A4	52	#4	STR	17'-5"	605
* A7	50	#4	STR	18'-2"	607
A8	52	#4	STR	18'-2"	631
* B1	26	#5	STR	22'-11"	621
B2	26	#6	STR	23'-11"	934
* B5	6	#5	STR	23'-1"	144
B6	6	#6	STR	23'-1"	208
* B7	2	#5	STR	14'-2"	30
B8	2	#6	STR	14'-2"	43
* B9	27	#5	STR	20'-5"	575
B10	27	#6	STR	21'-4"	865
* B11	3	#5	STR	22'-0"	69
B12	3	#6	STR	22'-0"	99
* B13	2	#5	STR	10'-7"	22
B14	2	#6	STR	10'-7"	32
* J1	62	#4	1	1'-5"	59
REINFORCING STEEL					3,417 LBS.
* EPOXY COATED REINFORCING STEEL					2,709 LBS.
CLASS AA CONCRETE					31.3 C.Y.



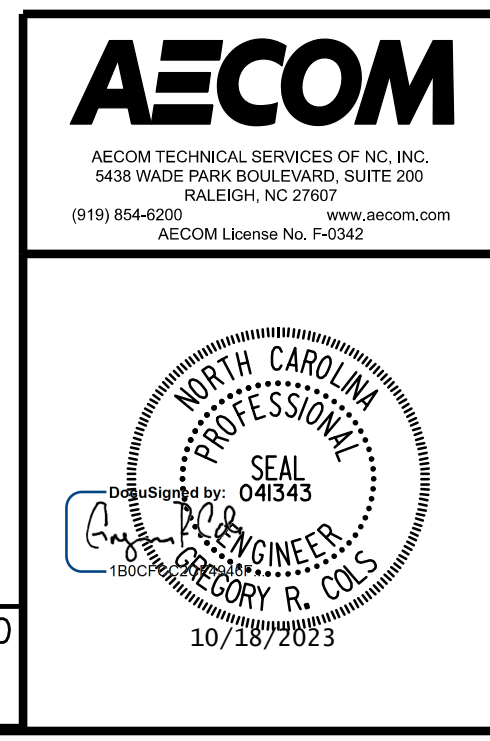
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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.

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.

DRAWN BY : M.L. CATER DATE : 05/2023  
 CHECKED BY : S. NATARAJAN DATE : 05/2023  
 DESIGN ENGINEER OF RECORD : G. COLS DATE : 05/2023

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**  
 (TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. **B-3186 / B-5898**  
**HAYWOOD** COUNTY  
 STATION: **32+21.34 -L LT-**  
 SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**APPROACH SLAB DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-42
1			3			TOTAL SHEETS
2			4			43

**NOTES**

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

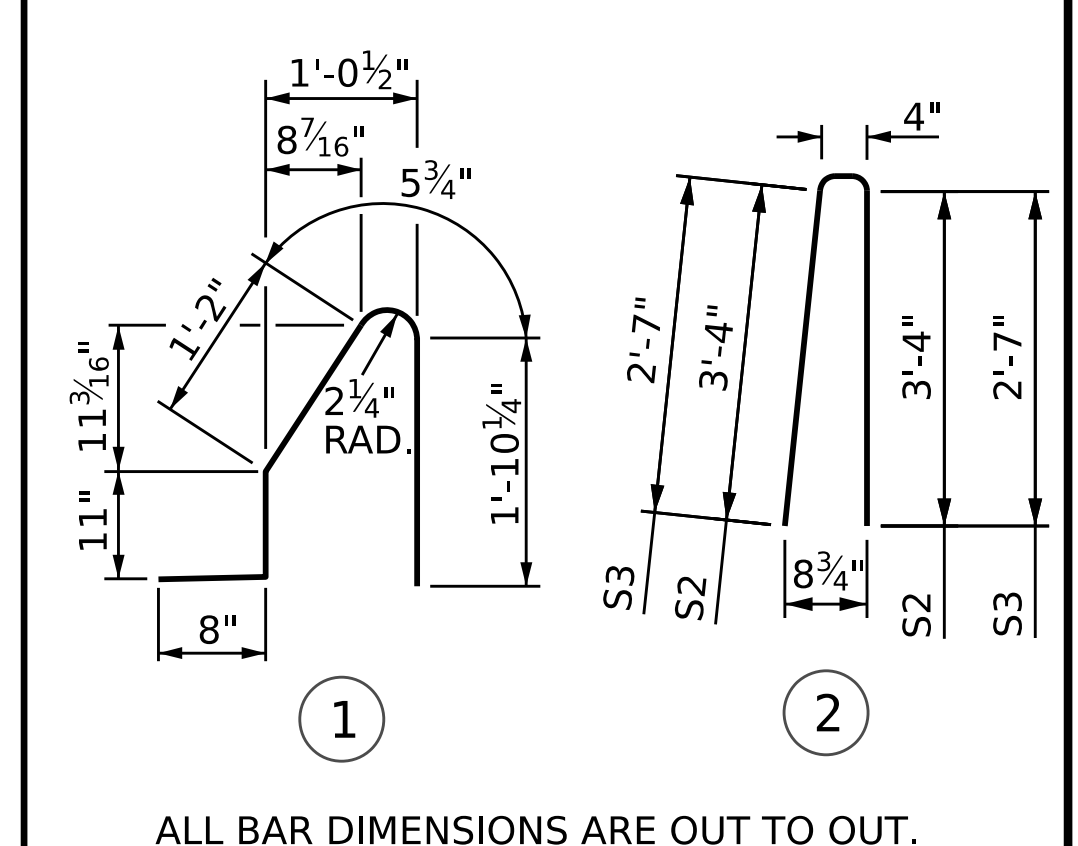
SHIFT, BEND, OR CUT REINFORCING STEEL AS NECESSARY TO CLEAR JOINT BLOCKOUT.

**BILL OF MATERIAL**

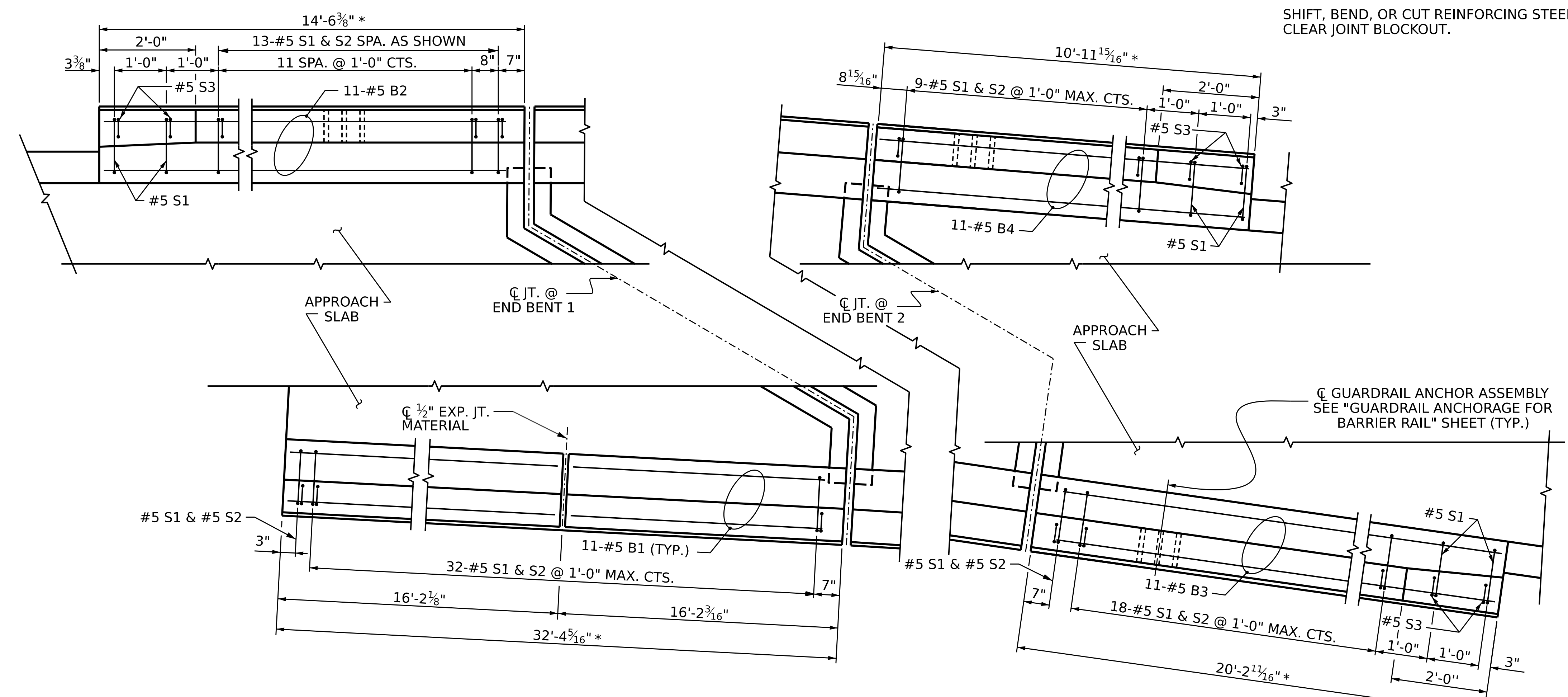
**CONCRETE BARRIER RAIL ON APPROACH SLABS**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	5	STR	15'-9"	361
* B2	11	5	STR	14'-3"	163
* B3	11	5	STR	19'-11"	229
* B4	11	5	STR	10'-8"	122
* S1	80	5	1	5'-1"	424
* S2	74	5	2	7'-0"	540
* S3	6	5	2	5'-6"	34
* EPOXY COATED REINFORCING STEEL					1,873 LBS.
CLASS AA CONCRETE					10.5 C.Y.
CONCRETE BARRIER RAIL					78.1 L.F.

**BAR TYPES**

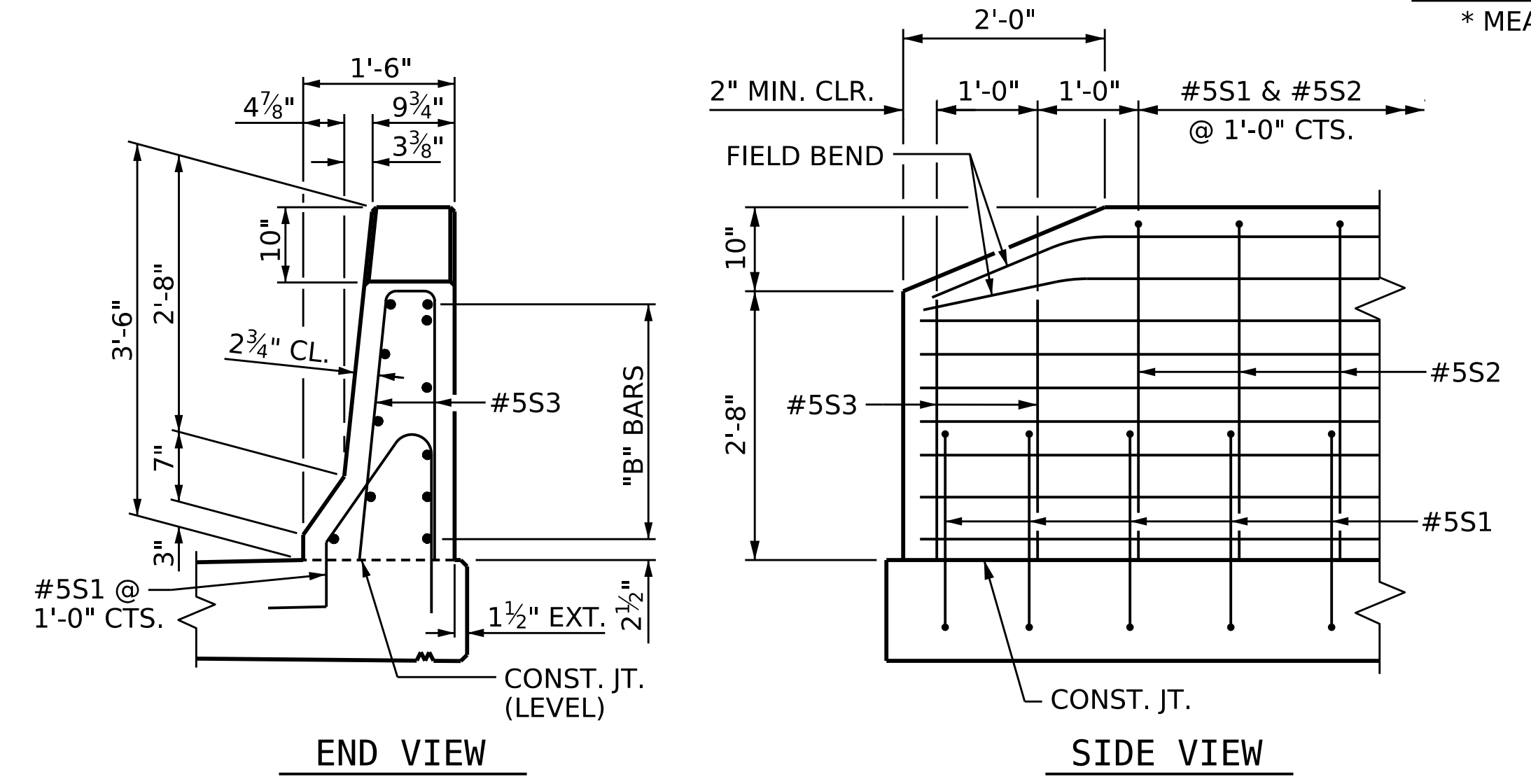


ALL BAR DIMENSIONS ARE OUT TO OUT.



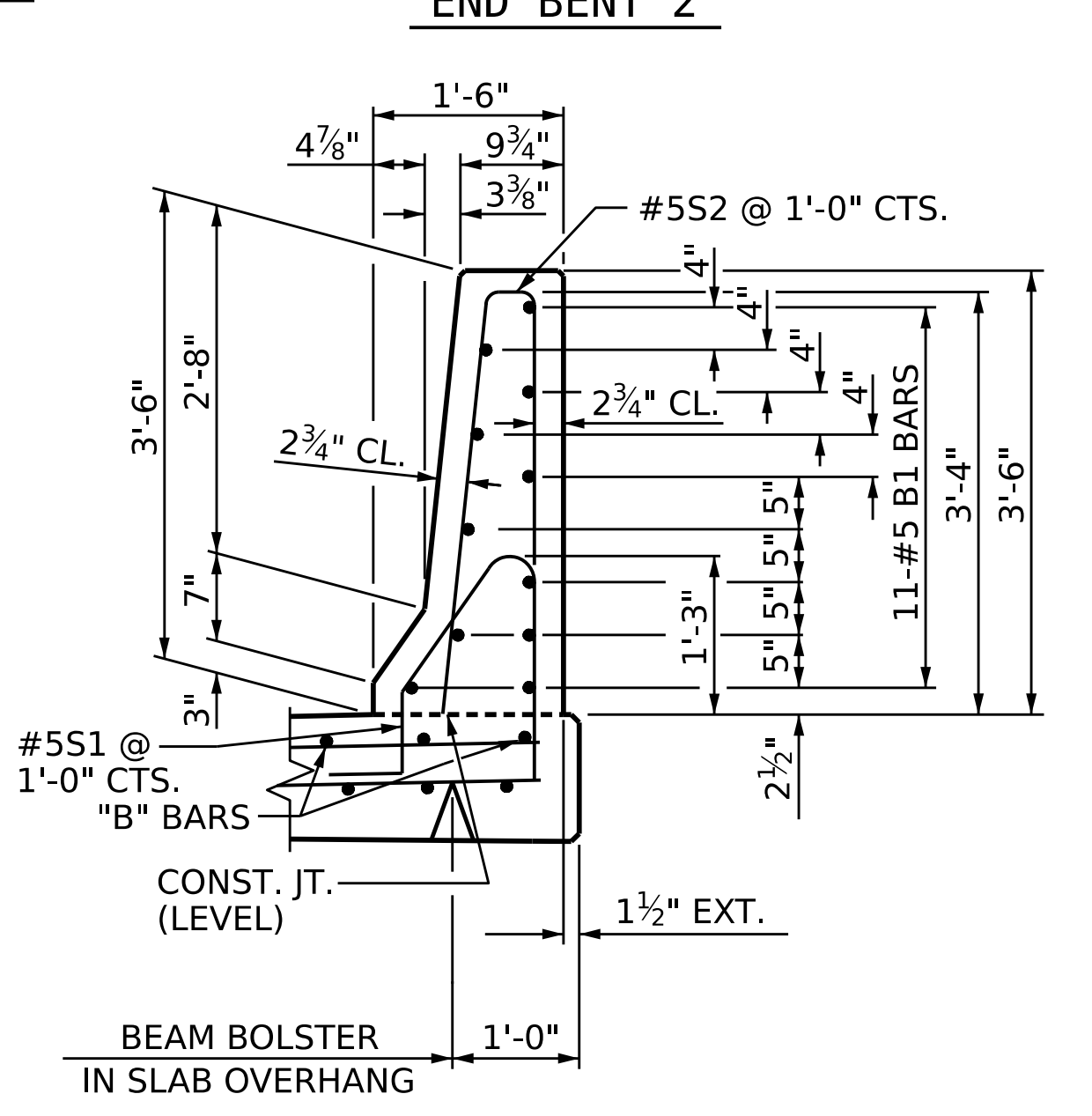
**PLAN OF BARRIER RAIL**

\* MEASURED ALONG EDGE OF APP. SLAB.



**END OF RAIL DETAILS**

DOES NOT APPLY AT END BENT 1, RIGHT SIDE



**SECTION THRU RAIL**

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PROJECT NO. B-3186 / B-5898  
HAYWOOD COUNTY  
 STATION: 32+21.34 -L\_ LT-  
 SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**APPROACH SLAB DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-43
1			3			TOTAL SHEETS
2			4			43

DRAWN BY :	M.L. CATER	DATE :	04/2023
CHECKED BY :	S. NATARAJAN	DATE :	04/2023
DESIGN ENGINEER OF RECORD:	G. COLS	DATE :	04/2023