

TIP PROJECT: U-5108

CONTRACT: C204501

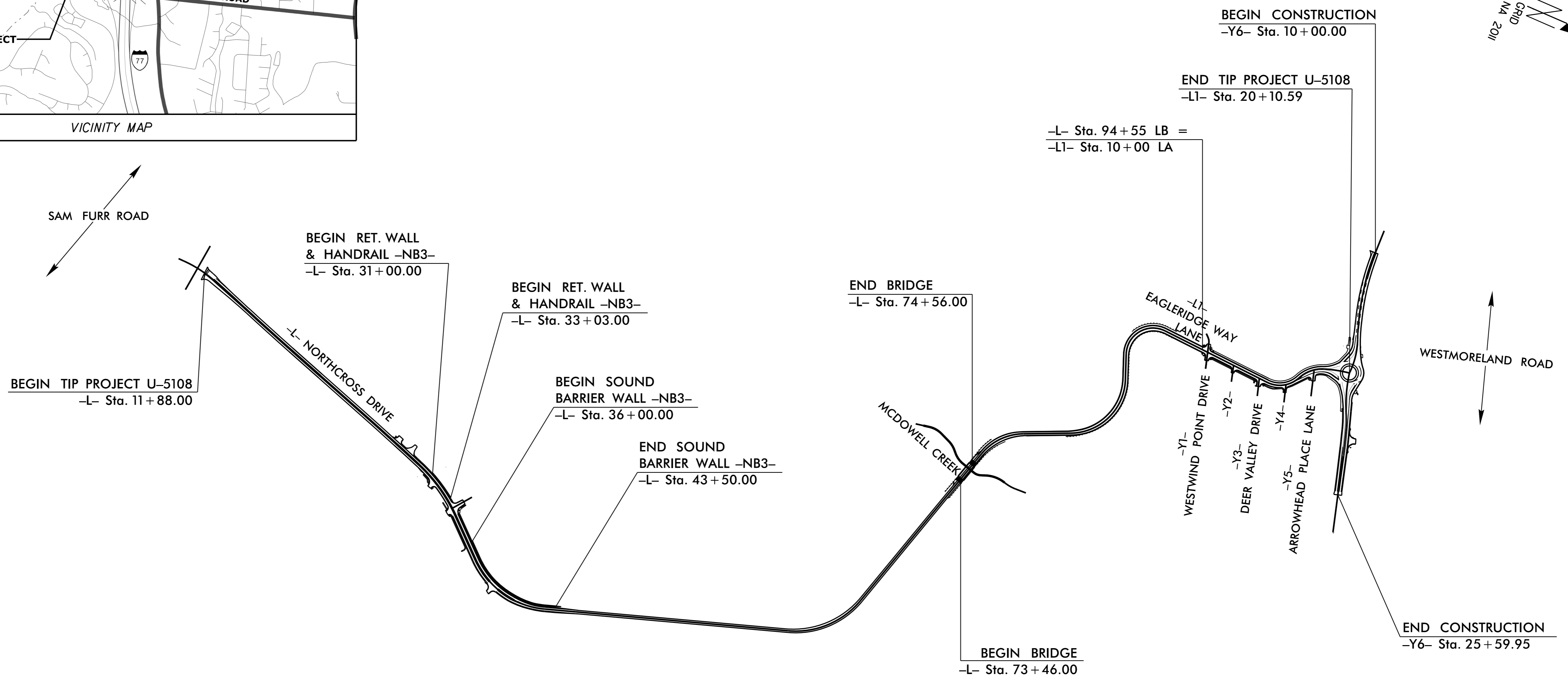
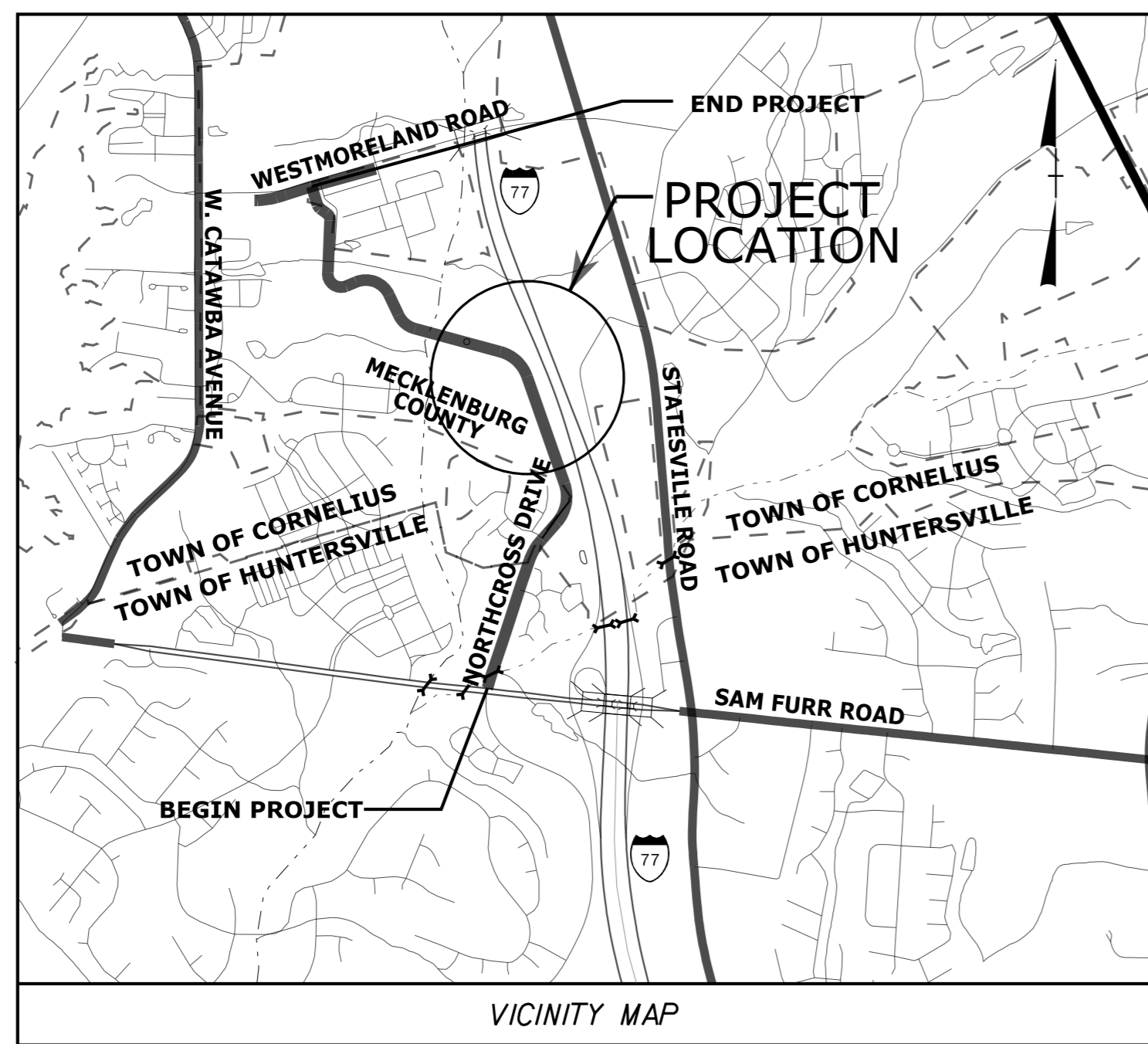
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MECKLENBURG COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5108		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
42370.1.1		PE	
42370.2.2	STBGDA-1001(078)	RW & UTIL.	
42370.3.3	STBGDA-1001(078)	CONST.	

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UNLESS ALL SIGNATURES COMPLETED

LOCATION: *NORTHCROSS DRIVE EXTENSION FROM END OF NORTHCROSS DRIVE TO WESTMORELAND ROAD*
TYPE OF WORK: *GRADING, DRAINAGE, PAVING, AND STRUCTURES*



STRUCTURES

DESIGN DATA

ADT 2022	=	9900 VPD
ADT 2040	=	16800 VPD
K	=	10%
D	=	70%
T	=	4%*
V	=	25 - 40 MPH

FUNCTIONAL CLASSIFICATION: URBAN MAJOR COLLECTOR
* 1% TTST 3% DUAL REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5108	=	1.736 MILES
LENGTH STRUCTURE TIP PROJECT U-5108	=	0.021 MILES
TOTAL LENGTH TIP PROJECT U-5108	=	1.757 MILES

PLANS PREPARED FOR THE NCDOT BY:

Kimley»Horn

2024 STANDARD SPECIFICATIONS

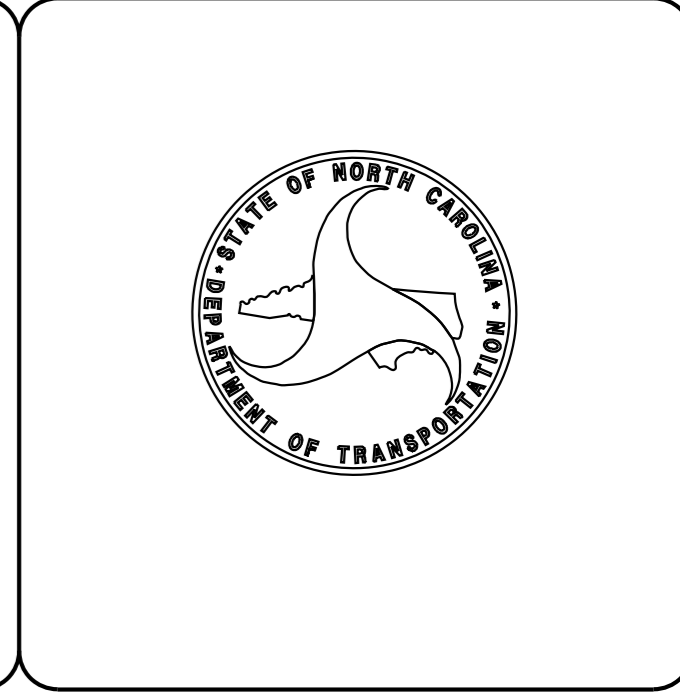
RIGHT OF WAY DATE: JUNE 19, 2019

LETTING DATE: JUNE 18, 2024

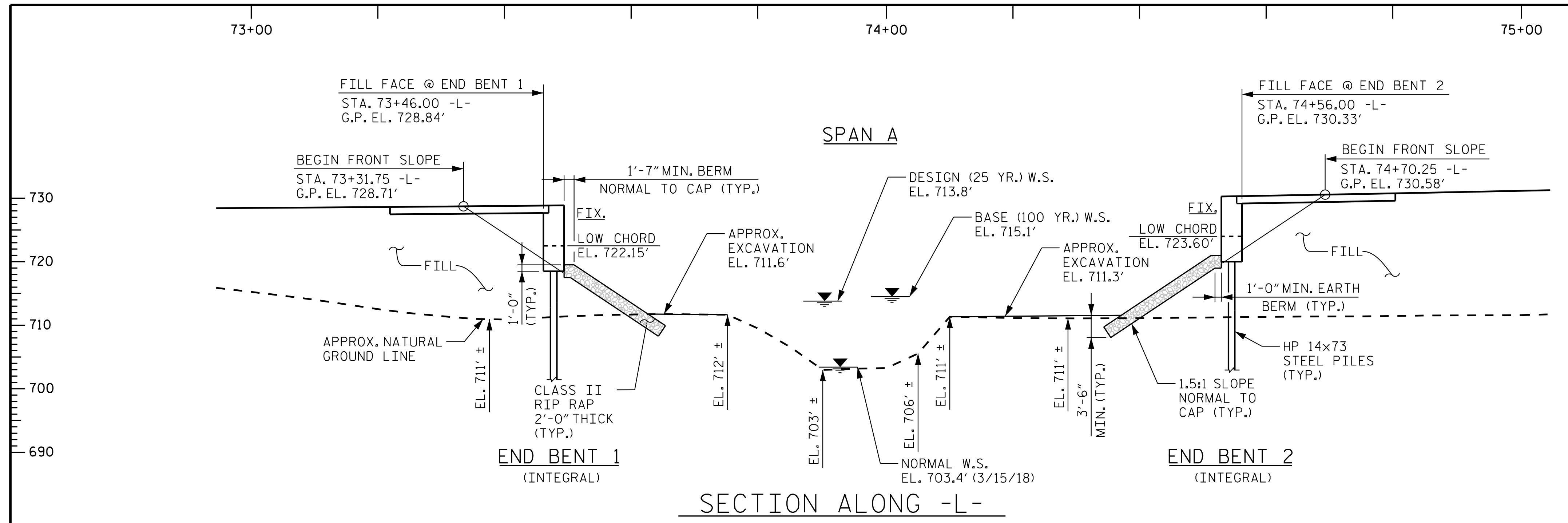
CLAY T. POOLE, P.E.
PROJECT ENGINEER

TANNER H. ORR
PROJECT DESIGN ENGINEER

SEAN EPPERSON, P.E.
PROJECT MANAGER
NCDOT ROADWAY DESIGN COORDINATION SECTION



K:\RDT_Structures\Bridge\NC\01036359 - U-5108\Cad\Dgn\U5108_SMU_TSH01_591403.dgn 4/4/2024

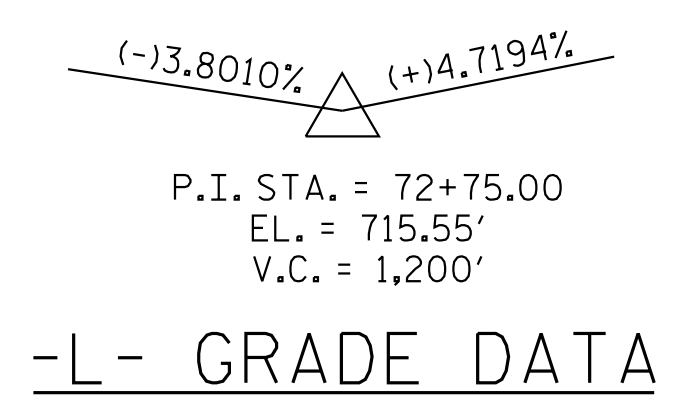


HYDRAULIC DATA

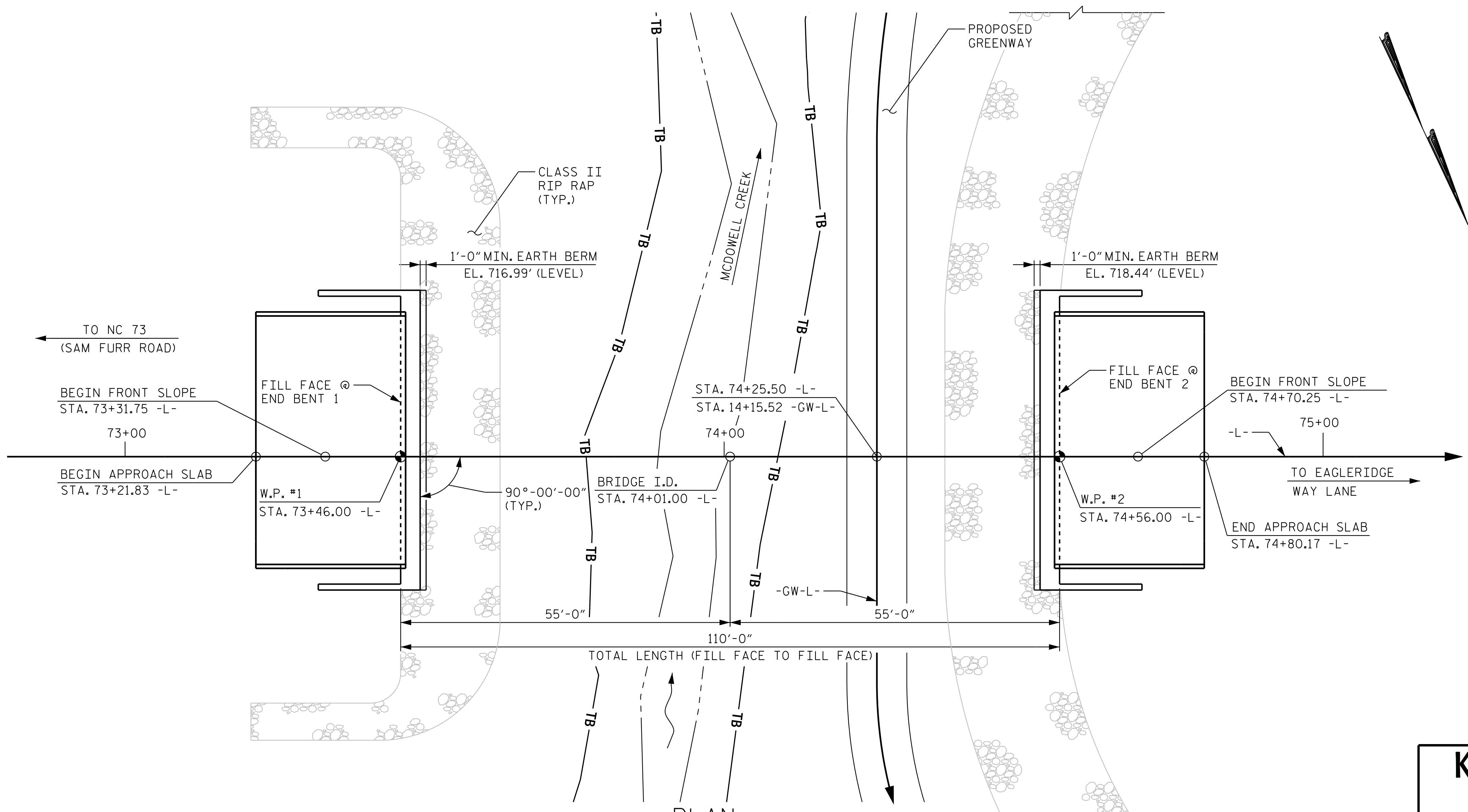
DESIGN DISCHARGE -----1,600 CFS
 FREQUENCY OF DESIGN FLOOD -----25-YR.
 DESIGN HIGH WATER ELEVATION-----713.8 FT.
 DRAINAGE AREA -----2.87 SQ. MI.
 BASE DISCHARGE (Q100) -----2,453 CFS
 BASE HIGH WATER ELEVATION -----715.1 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ----->2,500 CFS
 FREQUENCY OF OVERTOPPING FLOOD --->500-YR.
 OVERTOPPING FLOOD ELEVATION -----728.2 FT.



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.



K:\BID Structures\Bridges\NC\101036359 - U-5108\Cad\Drawings\08_SML\01_591403.dgn

DRAWN BY: J. I. KIMBLE DATE: 10/2023
 CHECKED BY: T. H. ORR DATE: 10/2023
 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

PILES NOT SHOWN IN PLAN VIEW

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Kimley»Horn

421 Fayetteville Street, Suite 600
 Raleigh, NC 27601-1772
 Phone (919) 677-2000 NC LICENSE # F-0102

Professional Engineer Seal: C. T. POOLE, ENGINEER, 047653, 4/4/2024

PROJECT NO. U-5108
 COUNTY MECKLENBURG
 STATION: 74+01.00 -L-

SHEET 1 OF 4 BRIDGE NO. 591403

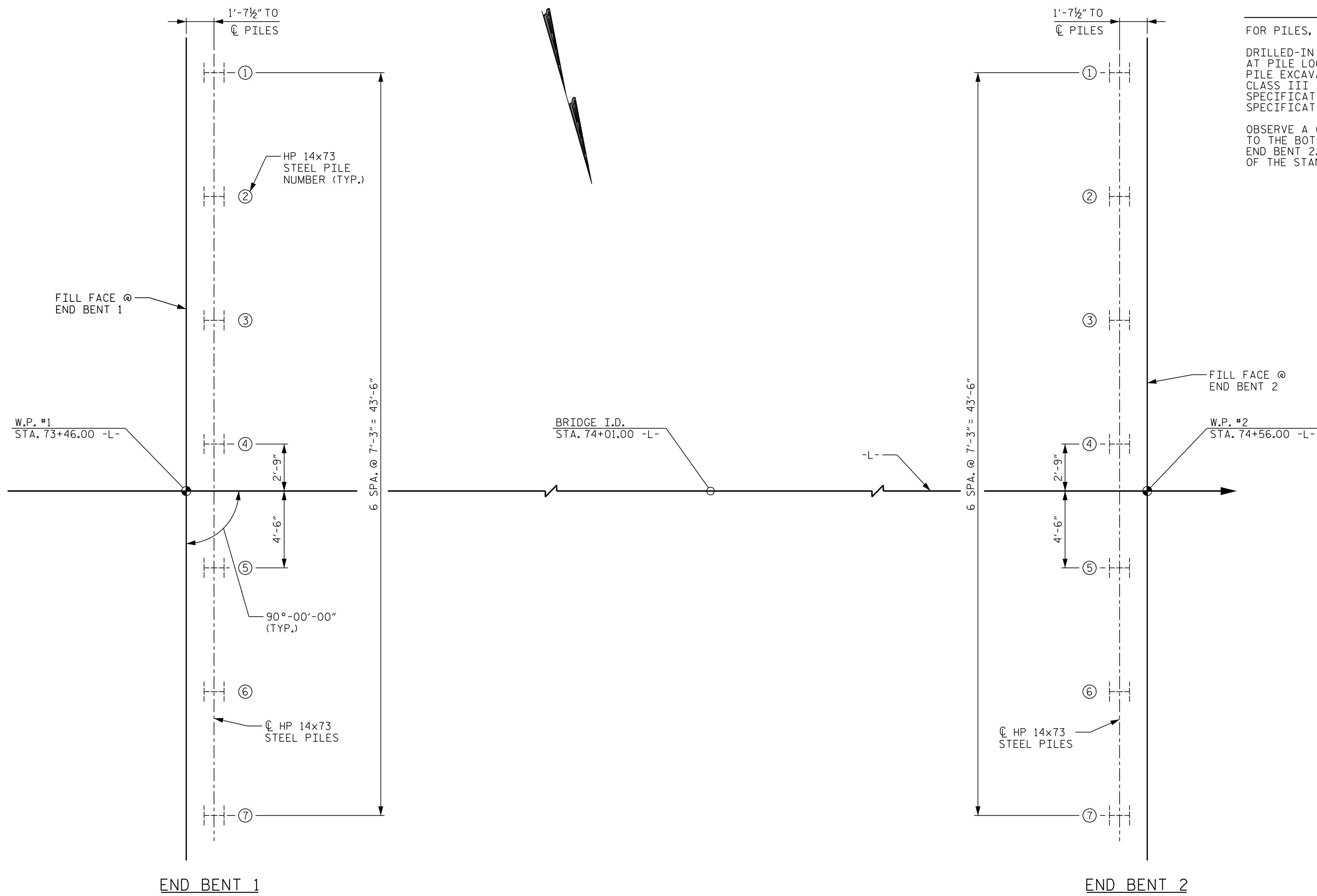
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR BRIDGE ON NORTHCROSS DRIVE EXTENSION OVER MCDOWELL CREEK BETWEEN NC 73 AND EAGLERIDGE WAY LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-1					TOTAL SHEETS 33

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRILLED-IN PILES ARE REQUIRED FOR INTEGRAL END BENT 1. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 701 FT. FILL THE BOTTOM 3 FEET OF HOLES FOR PILE EXCAVATION WITH CONCRETE AND REST OF THE HOLES WITH CLASS II OR CLASS III SELECT MATERIAL THAT MEETS SECTION 1016 OF THE STANDARD SPECIFICATIONS. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

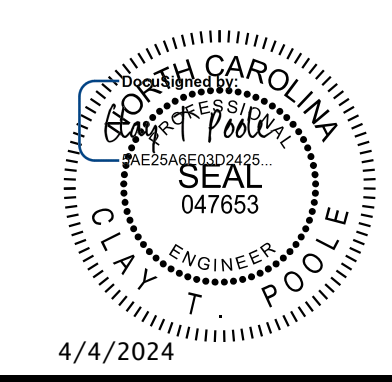


FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES AT BOTTOM OF CAP)

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 2 OF 4



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NORTHCROSS
 DRIVE EXTENSION
 OVER MCDOWELL CREEK BETWEEN
 NC 73 AND EAGLERIDGE WAY LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			33

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K:\RD1_Structures\Bridges\NC\01036559 - U-5108\Geo\09\05108_SML_FLL_591403.dgn 2/28/2024

DRAWN BY: J. I. KIMBLE DATE: 10/2023
 CHECKED BY: T. H. ORR DATE: 10/2023
 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

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 1-7	135	719.99	19		701.0						701.0	4.0	14.0
End Bent 2, Piles 1-7	135	721.44	33		688.0	225							

*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 1-7	NO				
End Bent 2, Piles 1-7	NO				

*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 1-7	135			0.60			1.00
End Bent 2, Piles 1-7	135			0.60			1.00
							1.00
							1.00

*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 1-7				NO	NO
End Bent 2, Piles 1-7				YES	NO
TOTAL QTY:				7	

NOTES:

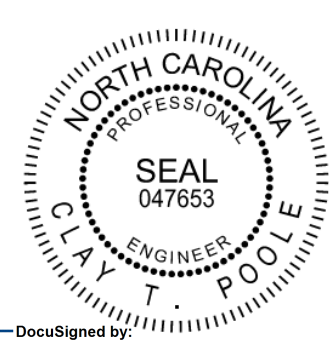
- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Michael S. Ulmer, 051684) on 03-14-2024.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for PDA Testing and Pipe Pile Plates when PDAs or plates may be required.

PROJECT NO. U-5108

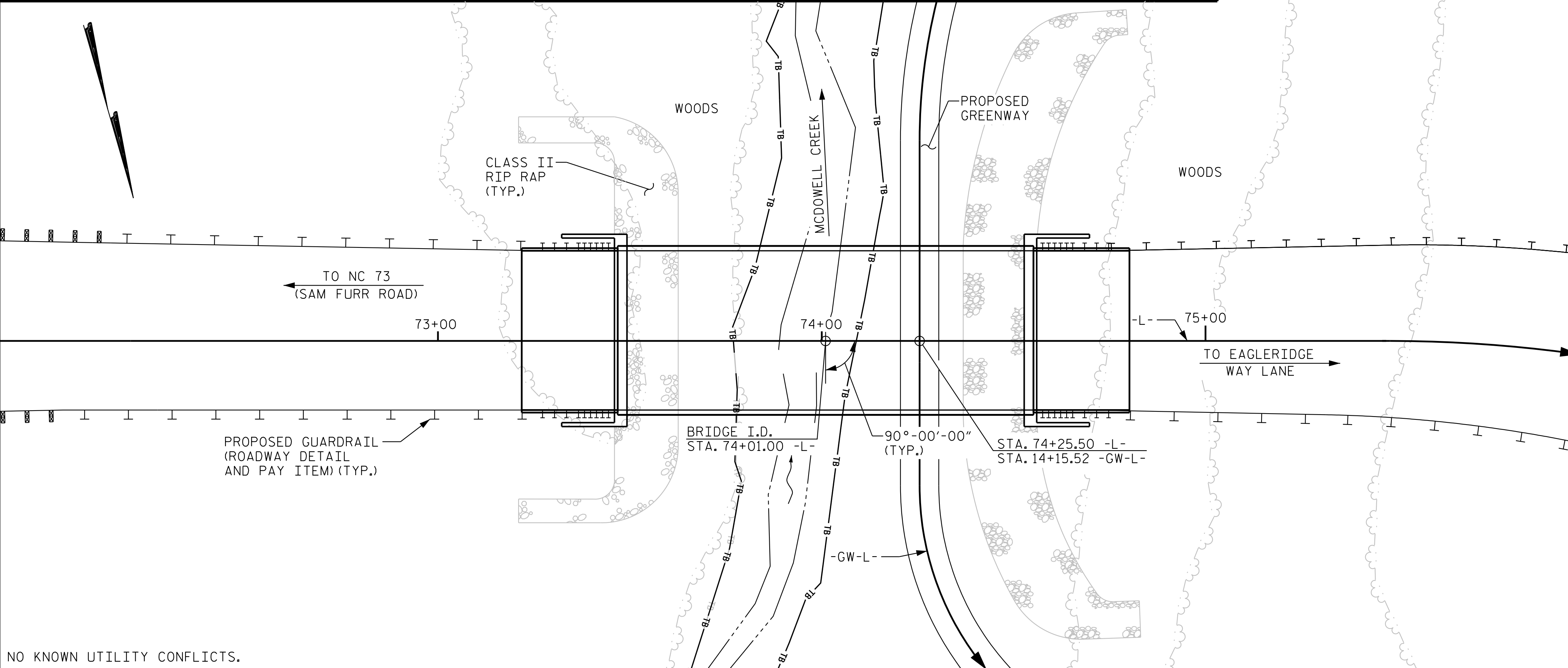
MECKLENBURG COUNTY

STATION: 74+01.00 -L-

SHEET 3 OF 4

 Documented by Clay T. Poole SAESABE0302425 SIGNATURE DATE 4/4/2024	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH PILE FOUNDATION TABLES						SHEET NO. S-3 TOTAL SHEETS 33
	REVISIONS						
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	NO.	BY:	DATE:	NO.	BY:	DATE:	
	1			3			
	2			4			

BENCHMARK: BM10 -L- STA. 75+31.71, 323.10' LT. (R.R. SPIKE IN 15" MAPLE), EL. 711.96'



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH 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 SPLICED 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.
 PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
 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.
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES".
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 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.

TOTAL BILL OF MATERIAL

	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SET UP FOR HP 14x73 STEEL PILES	HP 14x73 STEEL PILES	STEEL PILE POINTS	TWO BAR METAL RAIL	1'-2" x 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS		
	LIN. FT.	LIN. FT.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	EA.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE			4,776	6,048		LUMP SUM		5	540.83				201.67	216.67				LUMP SUM
END BENT 1	98	25			30.8		6,419			7	140			205	227			
END BENT 2					30.8		6,429		7	7	245	7		367	407			
TOTAL	98	25	4,776	6,048	61.6	LUMP SUM	12,848	5	540.83	7	14	385	7	201.67	216.67	572	634	LUMP SUM

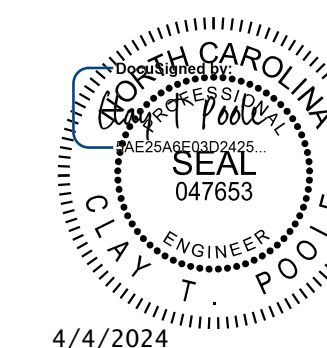
SAMPLE BAR REPLACEMENT

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"

NOTE:
 SAMPLE BAR REPLACEMENT LENGTHS
 BASED ON 30" (SAMPLE LENGTH) PLUS
 TWO SPLICE LENGTHS AND $f_y = 60\text{ksi}$.

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 4 OF 4



Kimley»Horn

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 Phone (919) 677-2000
 NC LICENSE # F-0102

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NORTHCROSS
 DRIVE EXTENSION
 OVER MCDOWELL CREEK BETWEEN
 NC 73 AND EAGLERIDGE WAY LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			33

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K:\RD1-Structures\Bridges\NC\U1036359 - U-5108\Cad\Drawings\08_SML\02_591403.dgn

DRAWN BY: J. I. KIMBLE DATE: 10/2023
 CHECKED BY: T. H. ORR DATE: 10/2023
 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LOAD TYPE	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		
						LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	MOMENT						
							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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD	HL-93 (INVENTORY)	N/A	①	1.14	--	1.75	0.843	1.26	A	EL	53.400	0.914	1.46	A	I	31.700	0.80	0.843	1.14	A	EL	53.400	1	
	HL-93 (OPERATING)	N/A		1.63	--	1.35	0.843	1.63	A	EL	53.400	0.914	1.93	A	I	10.100	N/A	--	--	--	--	--	1, 2	
	HS-20 (INVENTORY)	36.000	②	1.61	57.96	1.75	0.843	1.78	A	EL	53.400	0.914	2.02	A	I	10.100	0.80	0.843	1.61	A	EL	53.400	1	
	HS-20 (OPERATING)	36.000		2.31	83.16	1.35	0.843	2.31	A	EL	53.400	0.914	2.66	A	I	10.100	N/A	--	--	--	--	--	1, 2	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.87	52.25	1.40	0.843	5.33	A	EL	53.400	0.914	6.50	A	I	10.100	0.80	0.843	3.87	A	EL	53.400	1
		SNGARBS2	20.000		2.78	55.60	1.40	0.843	3.84	A	EL	53.400	0.914	4.51	A	I	10.100	0.80	0.843	2.78	A	EL	53.400	1
		SNAGRIS2	22.000		2.60	57.20	1.40	0.843	3.58	A	EL	53.400	0.914	4.14	A	I	10.100	0.80	0.843	2.60	A	EL	53.400	1
		SNCOTTS3	27.250		1.92	52.32	1.40	0.843	2.65	A	EL	53.400	0.914	3.18	A	I	10.100	0.80	0.843	1.92	A	EL	53.400	1
		SNAGGRS4	34.925		1.57	54.83	1.40	0.843	2.16	A	EL	53.400	0.914	2.56	A	I	10.100	0.80	0.843	1.57	A	EL	53.400	1
		SNS5A	35.550		1.54	54.75	1.40	0.843	2.12	A	EL	53.400	0.914	2.57	A	I	10.100	0.80	0.843	1.54	A	EL	53.400	1
		SNS6A	39.950		1.39	55.53	1.40	0.843	1.92	A	EL	53.400	0.914	2.31	A	I	10.100	0.80	0.843	1.39	A	EL	53.400	1
		SNS7B	42.000		1.33	55.86	1.40	0.843	1.83	A	EL	53.400	0.914	2.24	A	I	10.100	0.80	0.843	1.33	A	EL	53.400	1
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.70	56.10	1.40	0.843	2.34	A	EL	53.400	0.914	2.79	A	I	10.100	0.80	0.843	1.70	A	EL	53.400	1
		TNT4A	33.075		1.70	56.23	1.40	0.843	2.34	A	EL	53.400	0.914	2.74	A	I	10.100	0.80	0.843	1.70	A	EL	53.400	1
		TNT6A	41.600		1.38	57.41	1.40	0.843	1.90	A	EL	53.400	0.914	2.34	A	I	10.100	0.80	0.843	1.38	A	EL	53.400	1
		TNT7A	42.000		1.37	57.54	1.40	0.843	1.90	A	EL	53.400	0.914	2.30	A	I	10.100	0.80	0.843	1.37	A	EL	53.400	1
		TNT7B	42.000		1.40	58.80	1.40	0.843	1.94	A	EL	53.400	0.914	2.20	A	I	10.100	0.80	0.843	1.40	A	EL	53.400	1
		TNAGRIT4	43.000		1.35	58.05	1.40	0.843	1.86	A	EL	53.400	0.914	2.14	A	I	10.100	0.80	0.843	1.35	A	EL	53.400	1
EMERGENCY VEHICLE (EV)	TNAGT5A	45.000		1.28	57.60	1.40	0.843	1.76	A	EL	53.400	0.914	2.09	A	I	10.100	0.80	0.843	1.28	A	EL	53.400	1	
	TNAGT5B	45.000	③	1.27	57.15	1.40	0.843	1.75	A	EL	53.400	0.914	2.03	A	I	10.100	0.80	0.843	1.27	A	EL	53.400	1	
EMERGENCY VEHICLE (EV)	EV2	28.750		1.96	56.35	1.30	0.843	2.91	A	EL	53.400	0.914	3.37	A	I	10.100	0.80	0.843	1.96	A	EL	53.400	1	
	EV3	43.000	④	1.29	55.47	1.30	0.843	1.92	A	EL	53.400	0.914	2.22	A	I	10.100	0.80	0.843	1.29	A	EL	53.400	1	

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:
 1. ALL DISTANCES ARE MEASURED FROM CENTERLINE OF BEARING AT THE LEFT END OF THE SPAN.
 2. SERVICE III LIMIT STATE NOT APPLICABLE AT THE OPERATIONAL LEVEL.
 3.
 4.

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

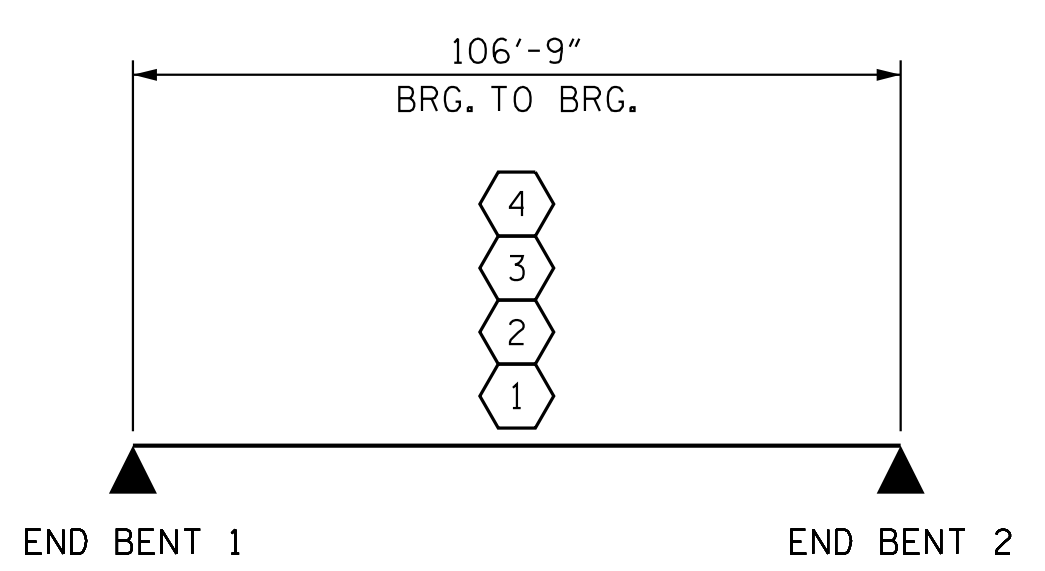
③ LEGAL LOAD RATING **

④ EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

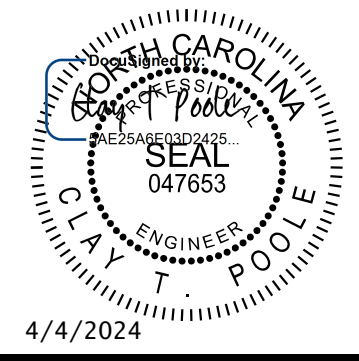
GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-



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 Phone (919) 677-2000 NC LICENSE # F-0102

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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

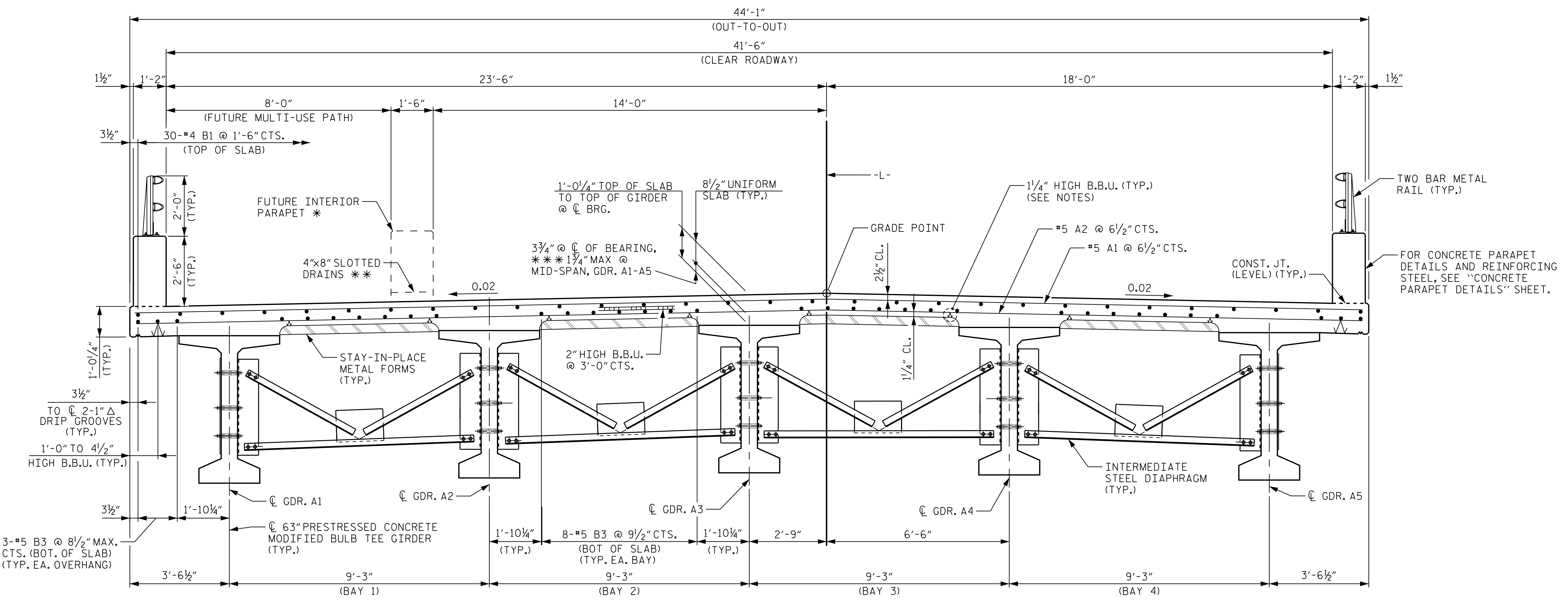
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			33

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ASSEMBLED BY : J. I. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 04/23 BNB/AAI



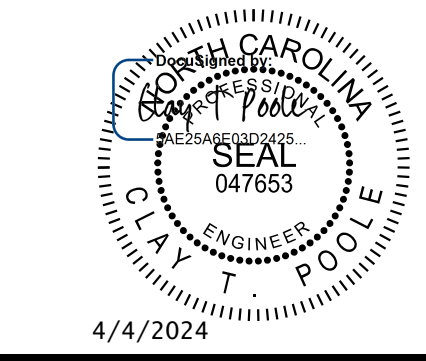
TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGM)

NOTES

- PROVIDE 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 (C.H.C.M.) @ 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.
- REINFORCING IN TOP OF INTEGRAL END BENT MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH BLOCKOUT.
- 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.
- * ALL SUPERSTRUCTURE AND SUBSTRUCTURE ELEMENTS HAVE BEEN DESIGNED TO ACCOMMODATE THE ADDITION OF THE FUTURE INTERIOR PARAPET. THE TOTAL WEIGHT OF THE PROPOSED INTERIOR PARAPET AND DOUBLE FACED RAIL (NOT SHOWN) ASSUMED FOR DESIGN WAS 590 PLF. SHOULD THE LOCATION AND/OR TOTAL LOAD OF THE ACTUAL PARAPET AND RAIL SYSTEM VARY FROM THAT SHOWN IN THESE PLANS, NOTIFY THE ENGINEER OF RECORD. DEVIATIONS FROM THE DESIGN ASSUMPTION ARE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER OF RECORD.
- ** 4"x8" SLOTTED DRAINS ARE REQUIRED THROUGH THE BASE OF THE INTERIOR PARAPET AS SHOWN AND SHALL BE SPACED AT 3'-0" MAX. CTS. BETWEEN STA. 73+47.00 -L- AND STA. 74+55.00 -L-.
- *** BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 1 OF 2



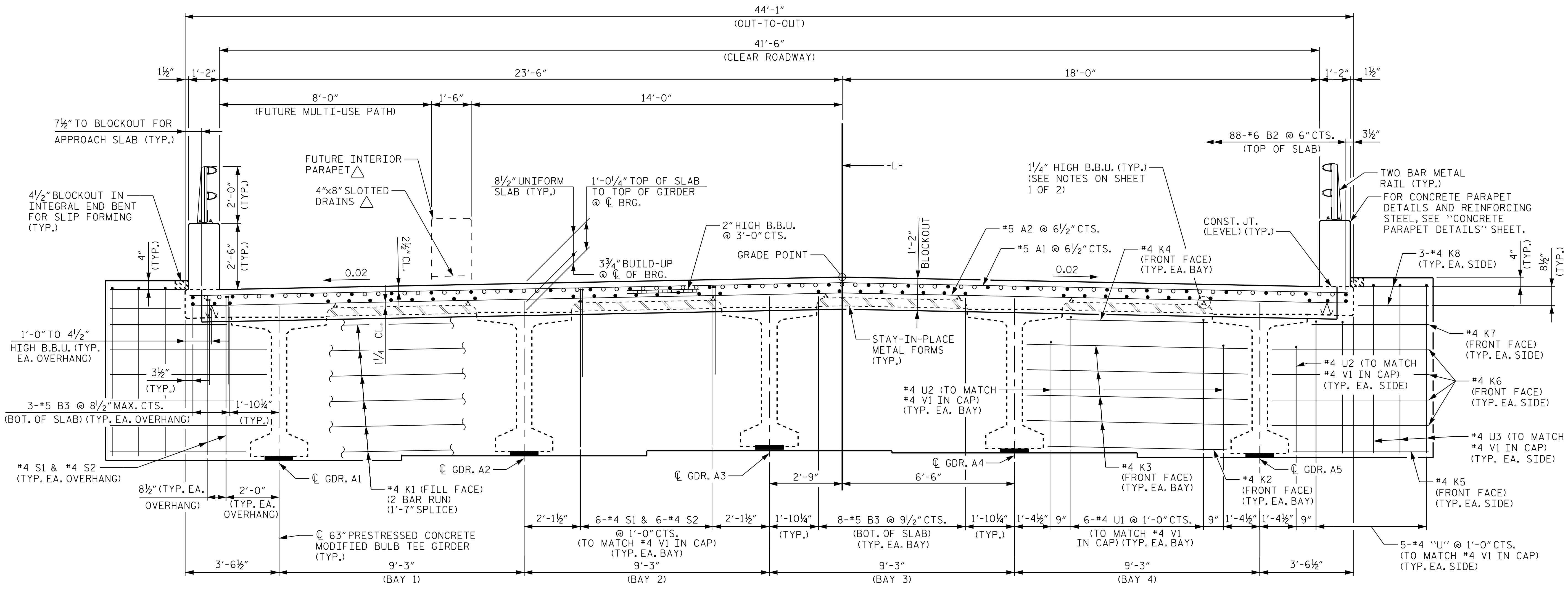
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STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
SUPERSTRUCTURE					
TYPICAL SECTION					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					33

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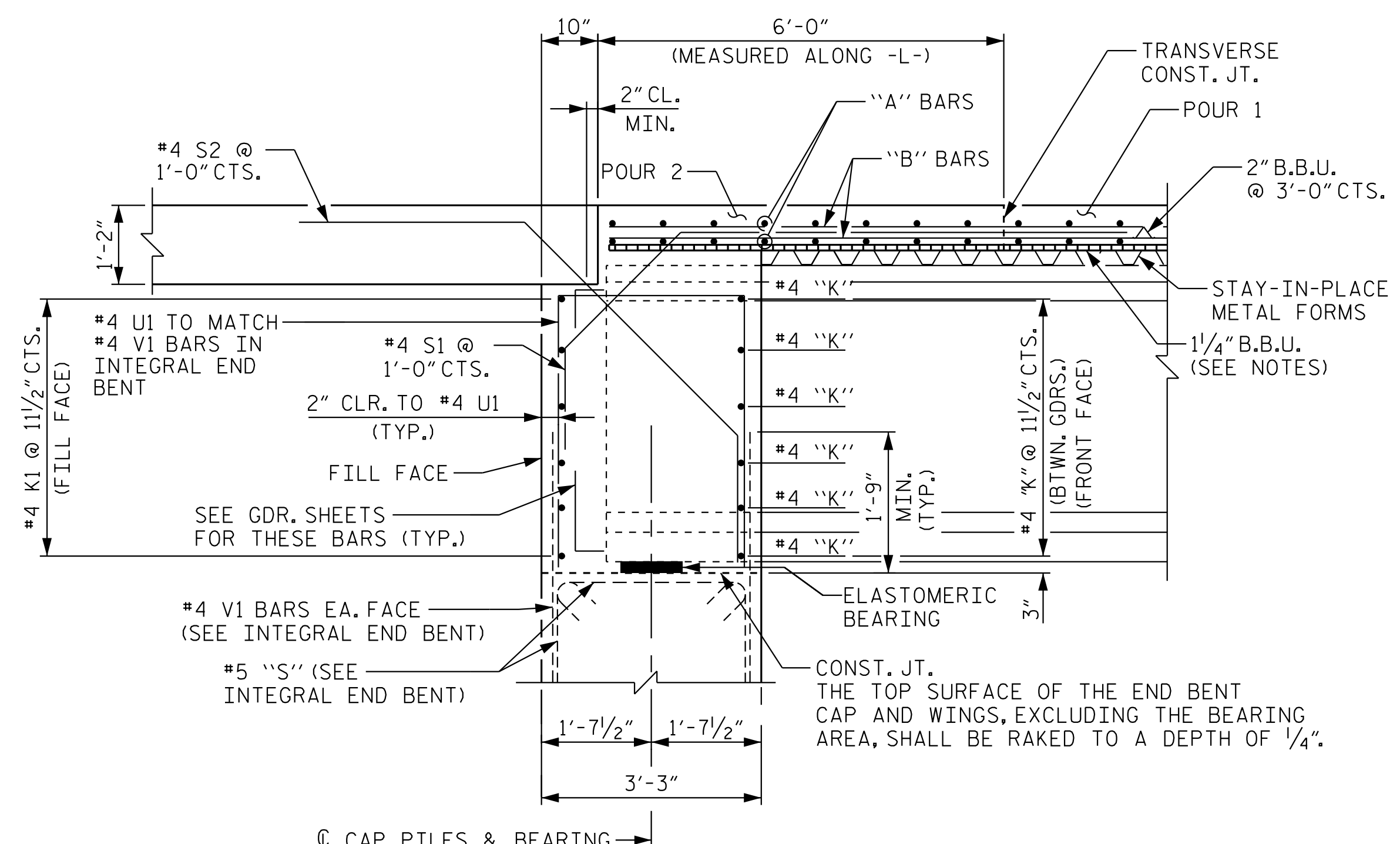
DRAWN BY: J. I. KIMBLE DATE: 10/2023
 CHECKED BY: I. H. ORR DATE: 10/2023
 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023



△ SEE SHEET 1 OF 2 FOR NOTES

TYPICAL SECTION
(SHOWING INTEGRAL END BENT DIAPHRAGM)

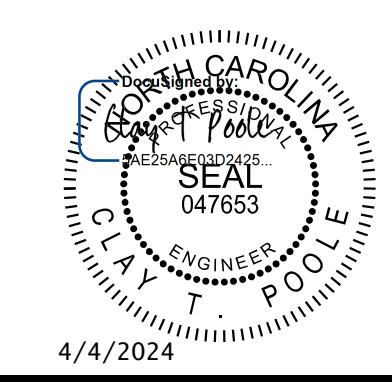
- INDICATES NON-CONTINUOUS REINFORCING STEEL OVER END BENTS.
- INDICATES CONTINUOUS REINFORCING STEEL FROM END BENT 1 TO END BENT 2.



SECTION THRU INTEGRAL END BENT
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 2 OF 2



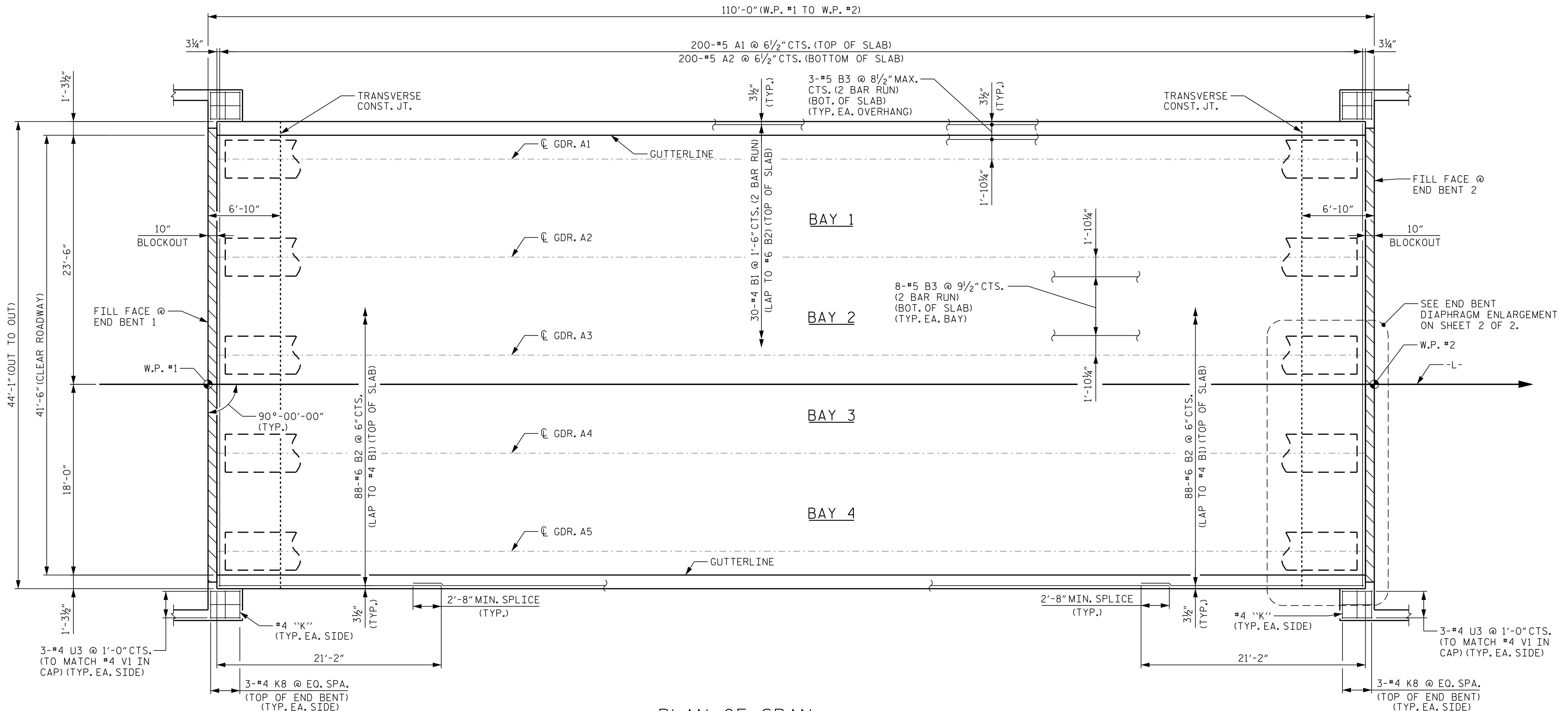
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TYPICAL SECTION					
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1			3		
2			4		
SHEET NO.					S-7
TOTAL SHEETS					33

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 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023



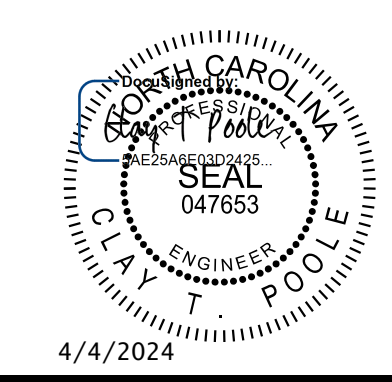
PLAN OF SPAN

NOTES

- FOR POUR SEQUENCE AND LOCATION OF CONSTRUCTION JOINT, SEE SUPERSTRUCTURE "BILL OF MATERIAL" SHEET.
- LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.
- FOR CONCRETE PARAPET REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEET.
- INTERMEDIATE DIAPHRAGM NOT SHOWN FOR CLARITY, SEE "FRAMING PLAN" SHEET.

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SHEET 1 OF 4



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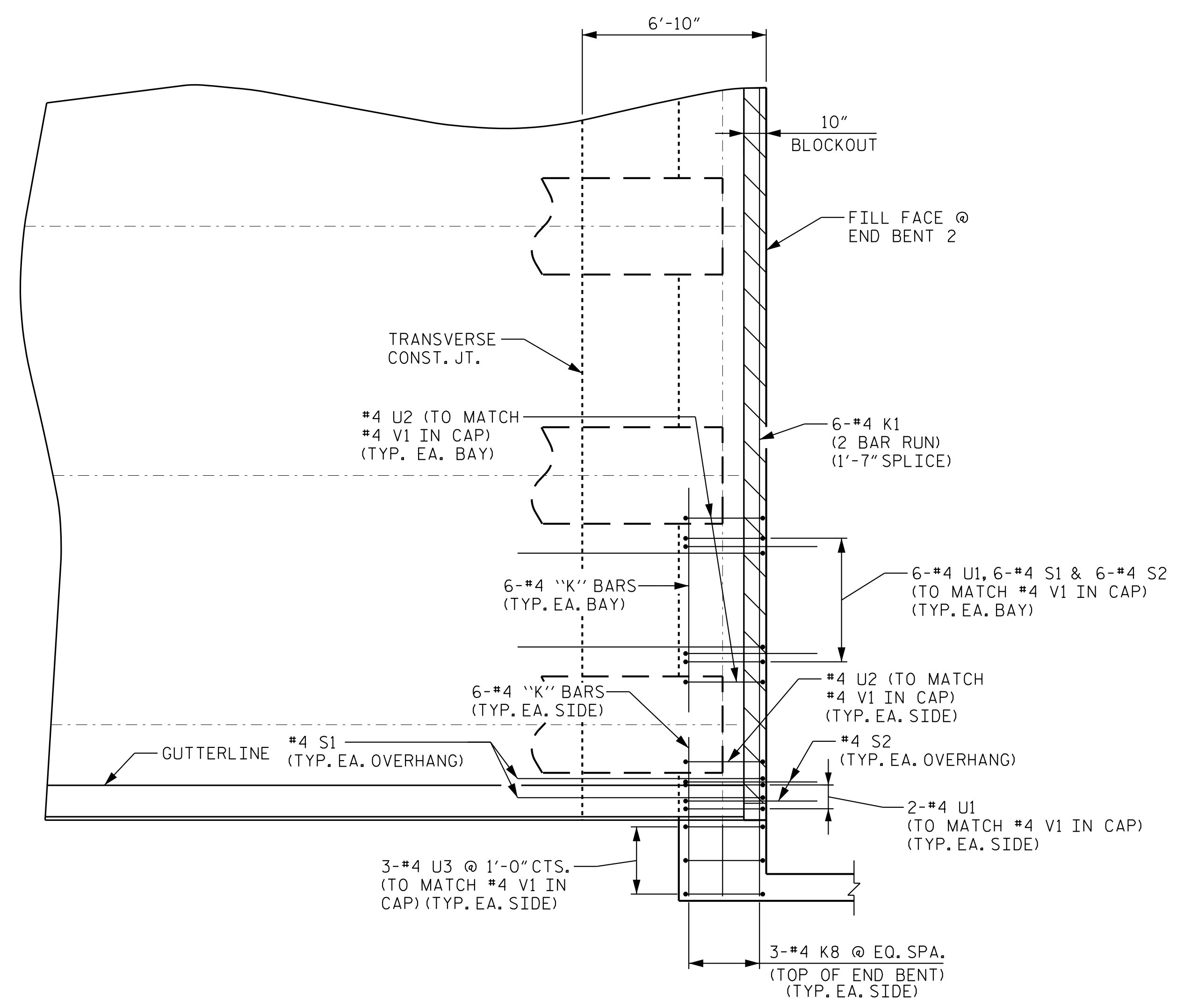
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN

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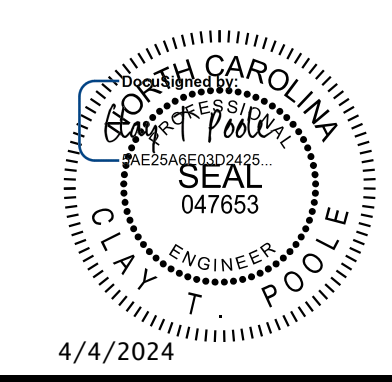
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END BENT DIAPHRAGM ENLARGEMENT
(END BENT 2 SHOWN, END BENT 1 SIMILAR)

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MECKLENBURG COUNTY
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SHEET 2 OF 4



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SUPERSTRUCTURE
PLAN OF SPAN

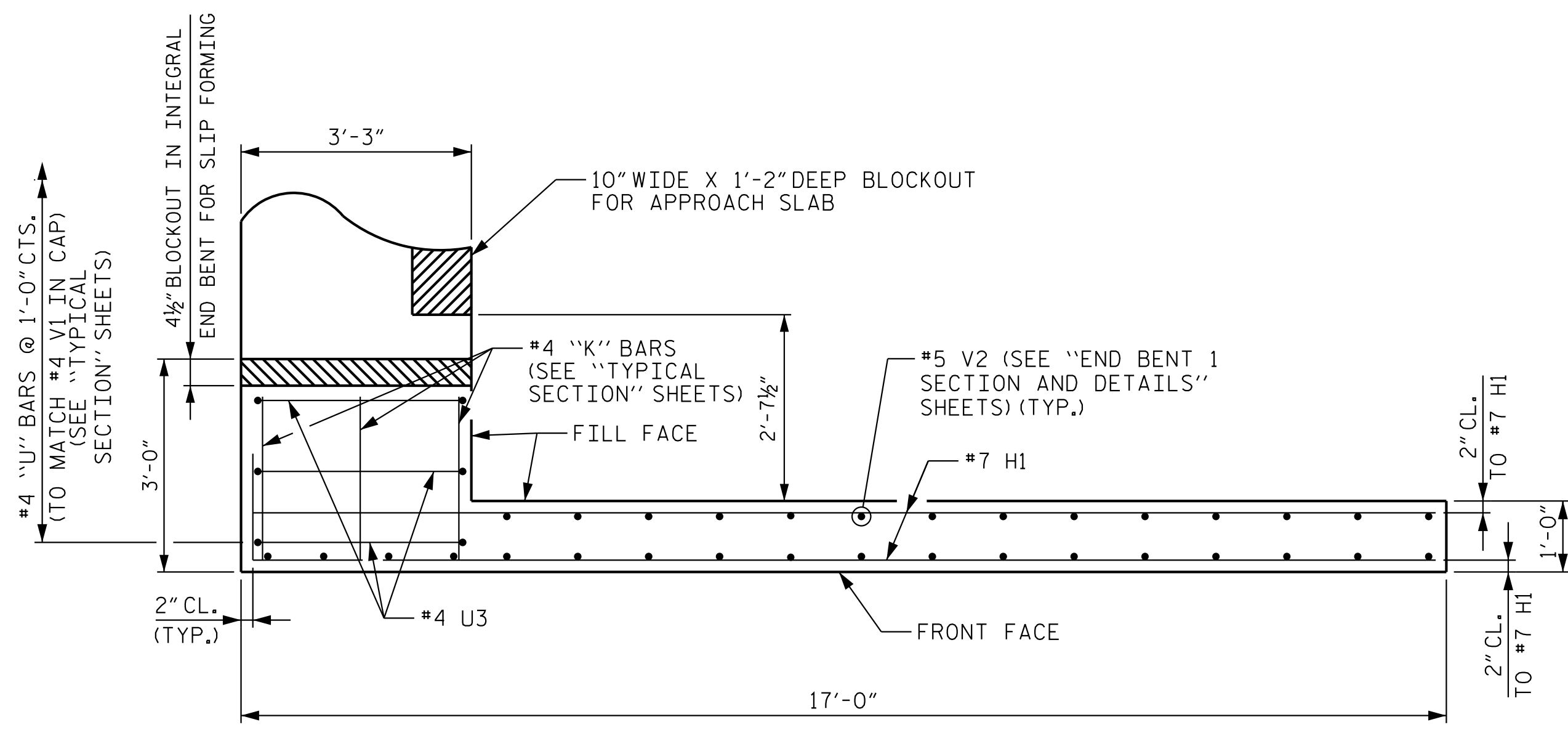
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1			3			TOTAL SHEETS
2			4			33

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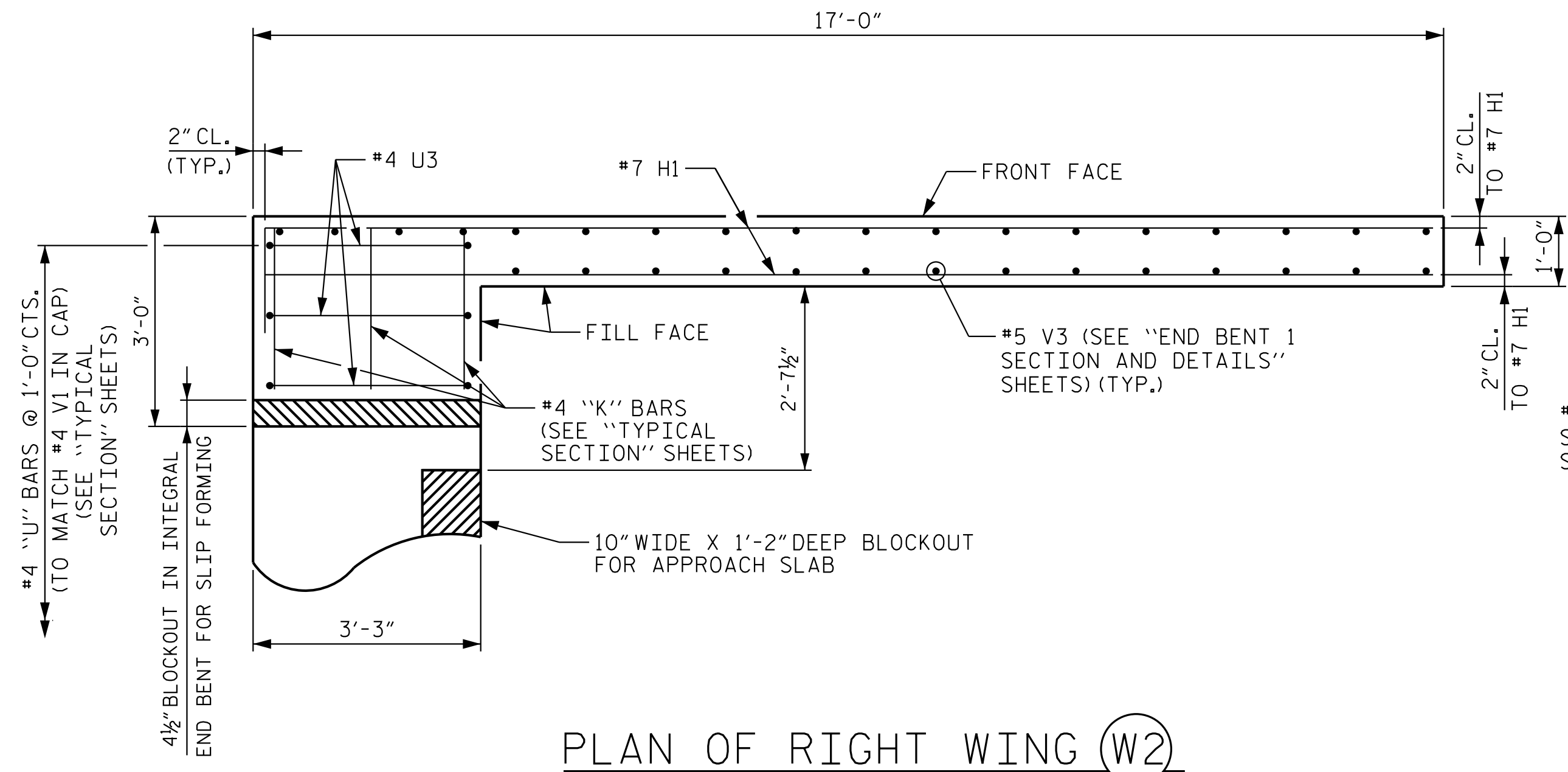
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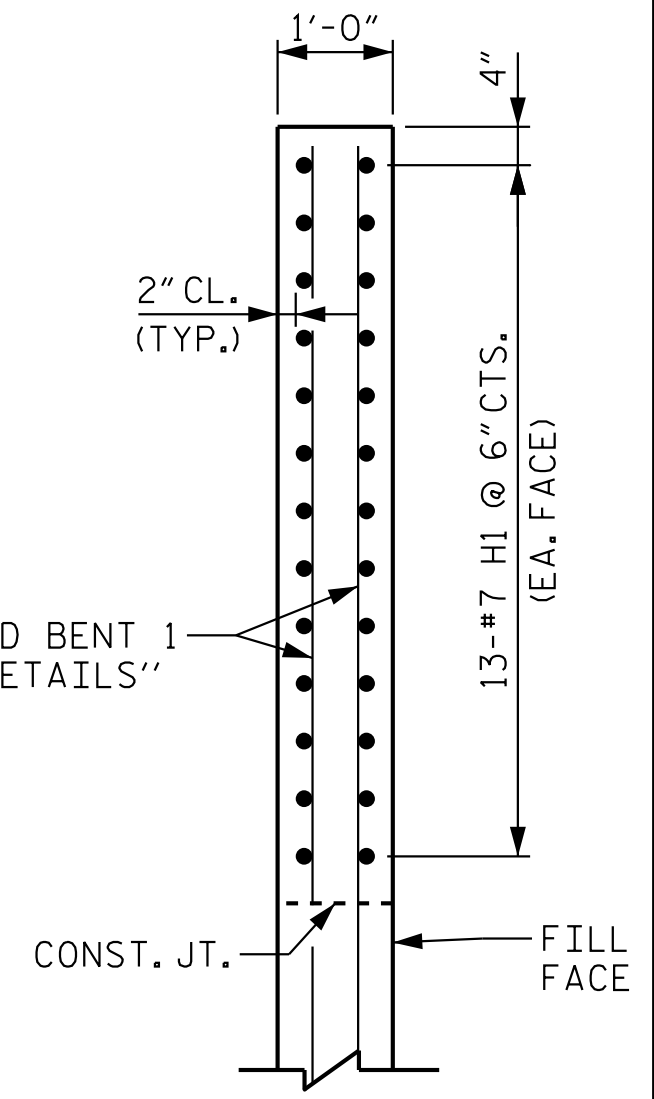
DRAWN BY: <u>J. I. KIMBLE</u>	DATE: <u>10/2023</u>
CHECKED BY: <u>T. H. ORR</u>	DATE: <u>10/2023</u>
DESIGN ENGINEER OF RECORD: <u>C. T. POOLE</u>	DATE: <u>10/2023</u>



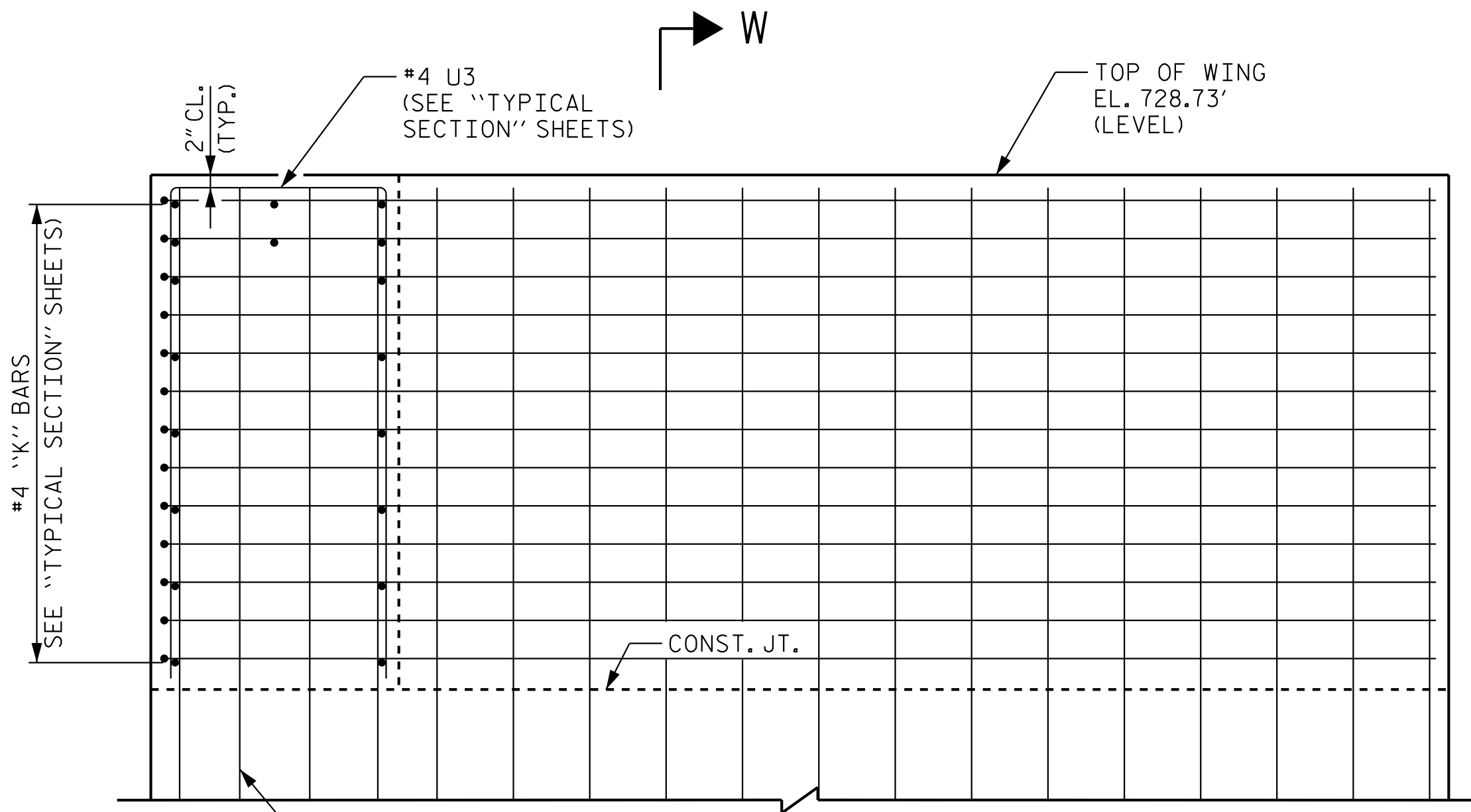
PLAN OF LEFT WING (W1)
#4 U1 NOT SHOWN FOR CLARITY



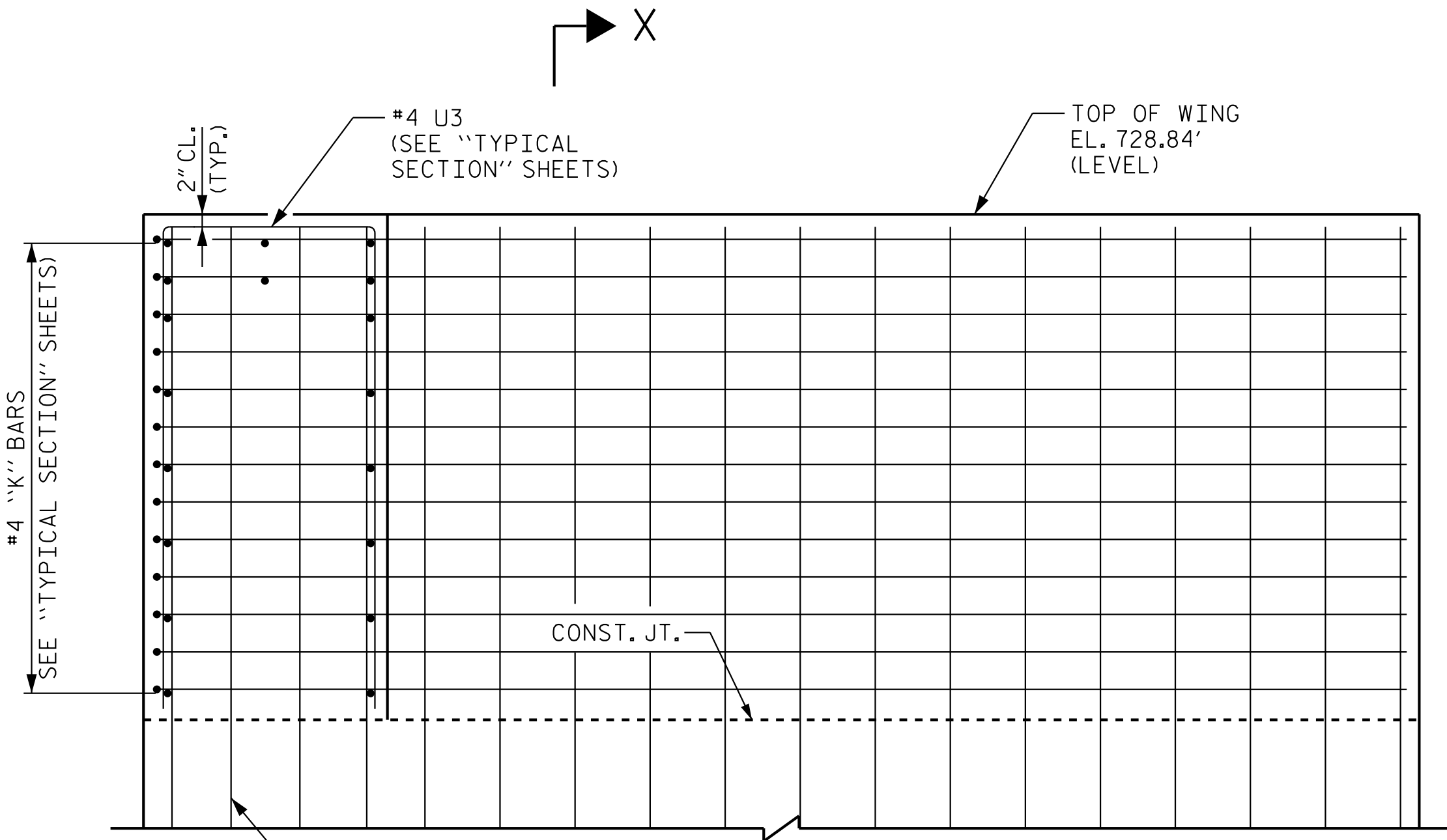
PLAN OF RIGHT WING (W2)
#4 U1 NOT SHOWN FOR CLARITY



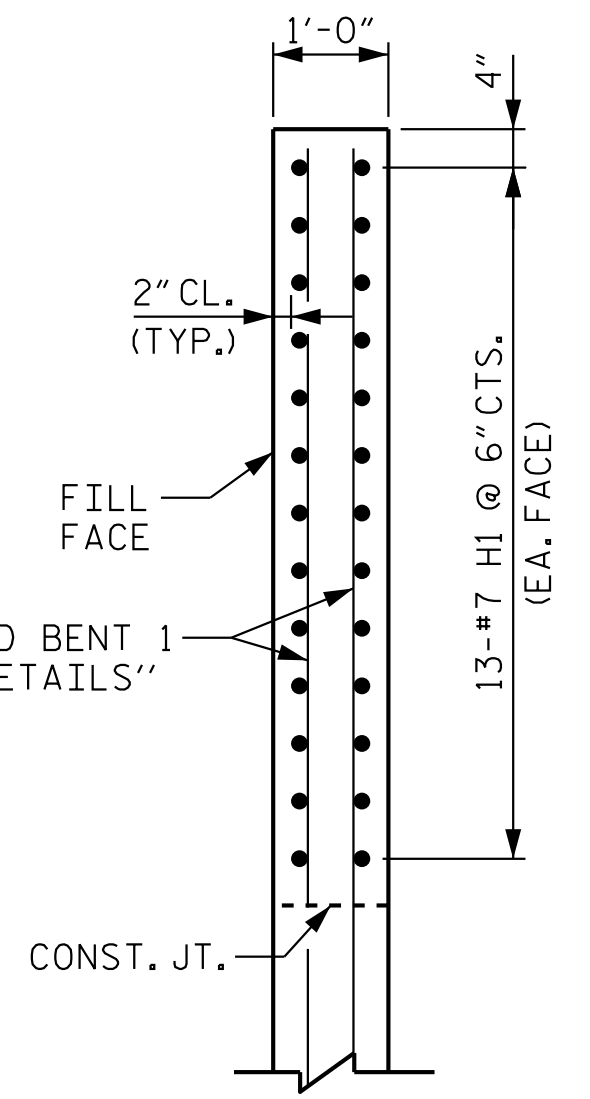
SECTION X-X



ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)

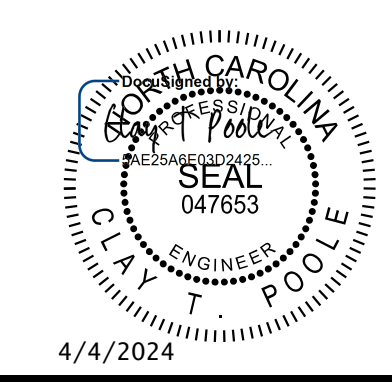


SECTION W-W

UPPER WINGS AT INTEGRAL END BENT 1
FOR LOWER WING REINFORCING AND DETAILS, SEE "END BENT 1 SECTION AND DETAILS" SHEETS

PROJECT NO. U-5108
MECKLENBURG COUNTY
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SHEET 3 OF 4



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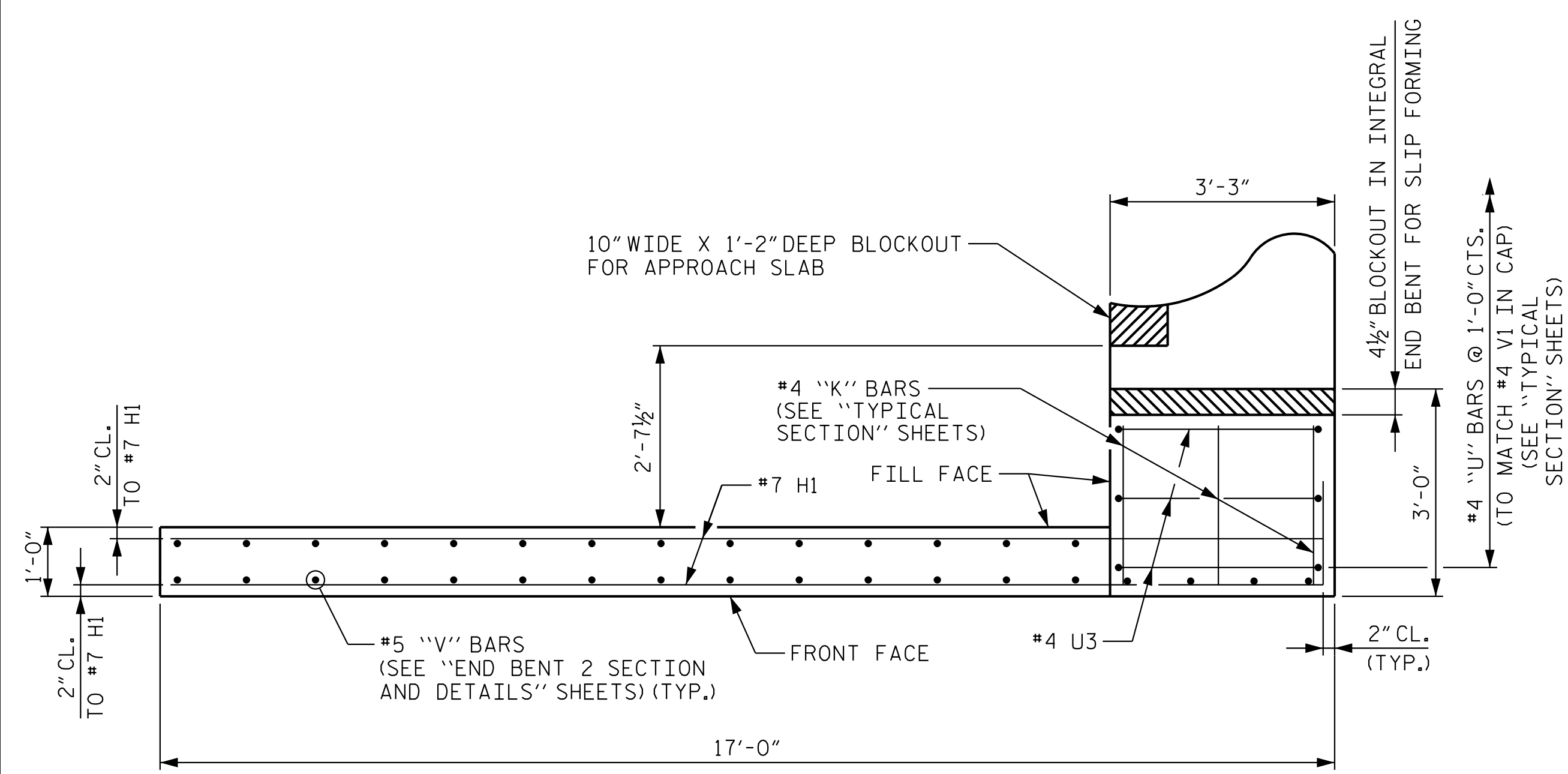
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN
DETAILS @ END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			33

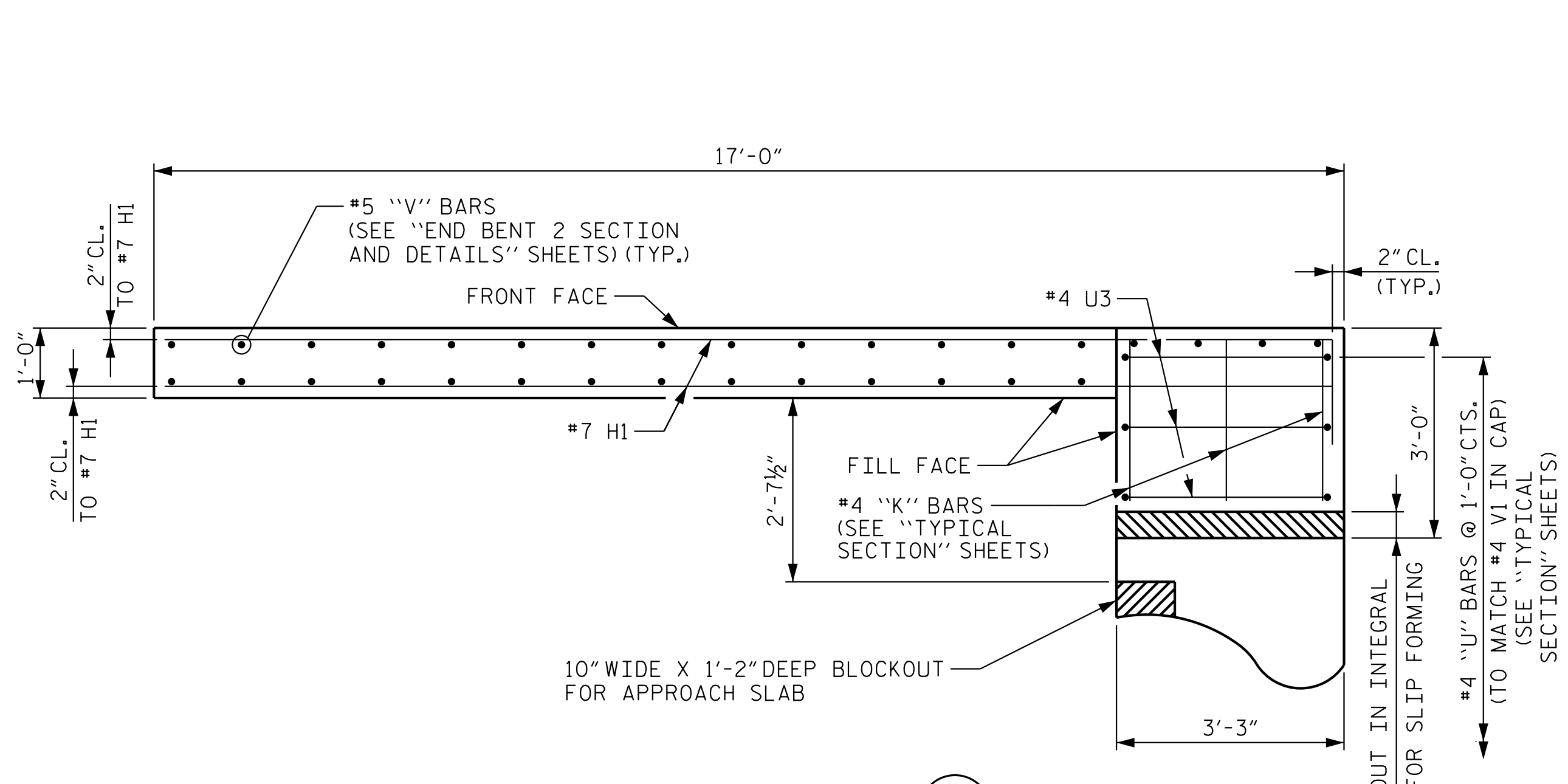
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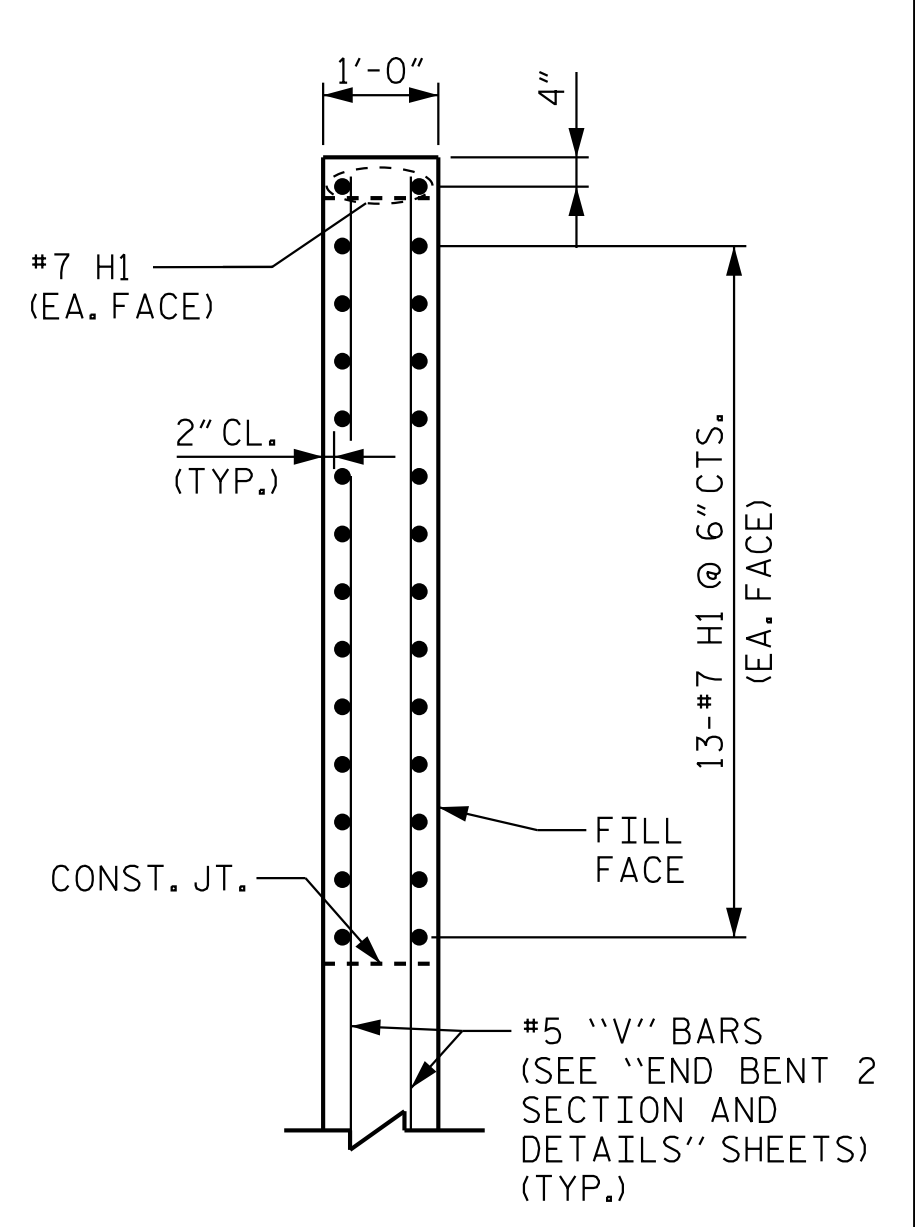
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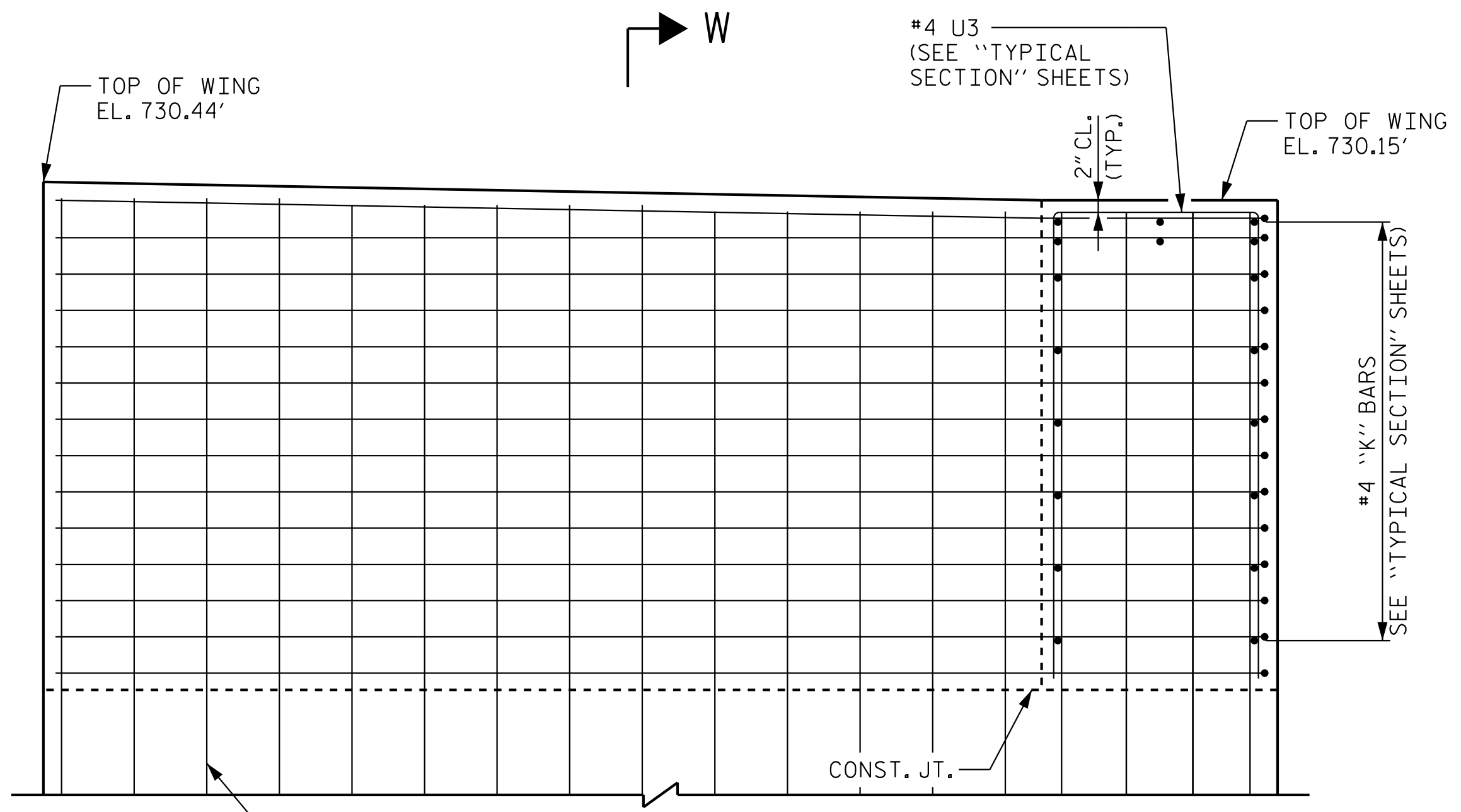
PLAN OF LEFT WING (W3)
#4 U1 NOT SHOWN FOR CLARITY



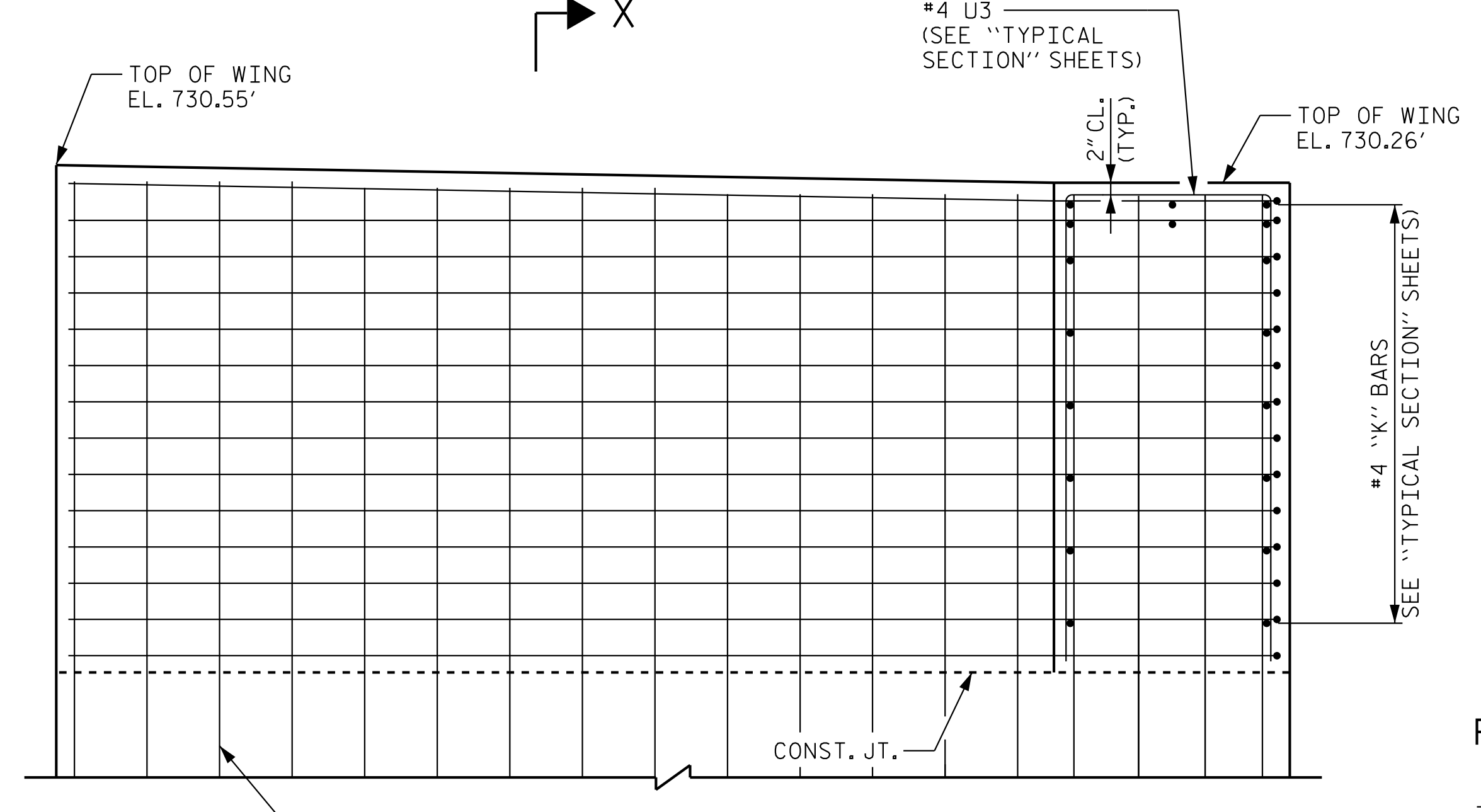
PLAN OF RIGHT WING (W4)
#4 U1 NOT SHOWN FOR CLARITY



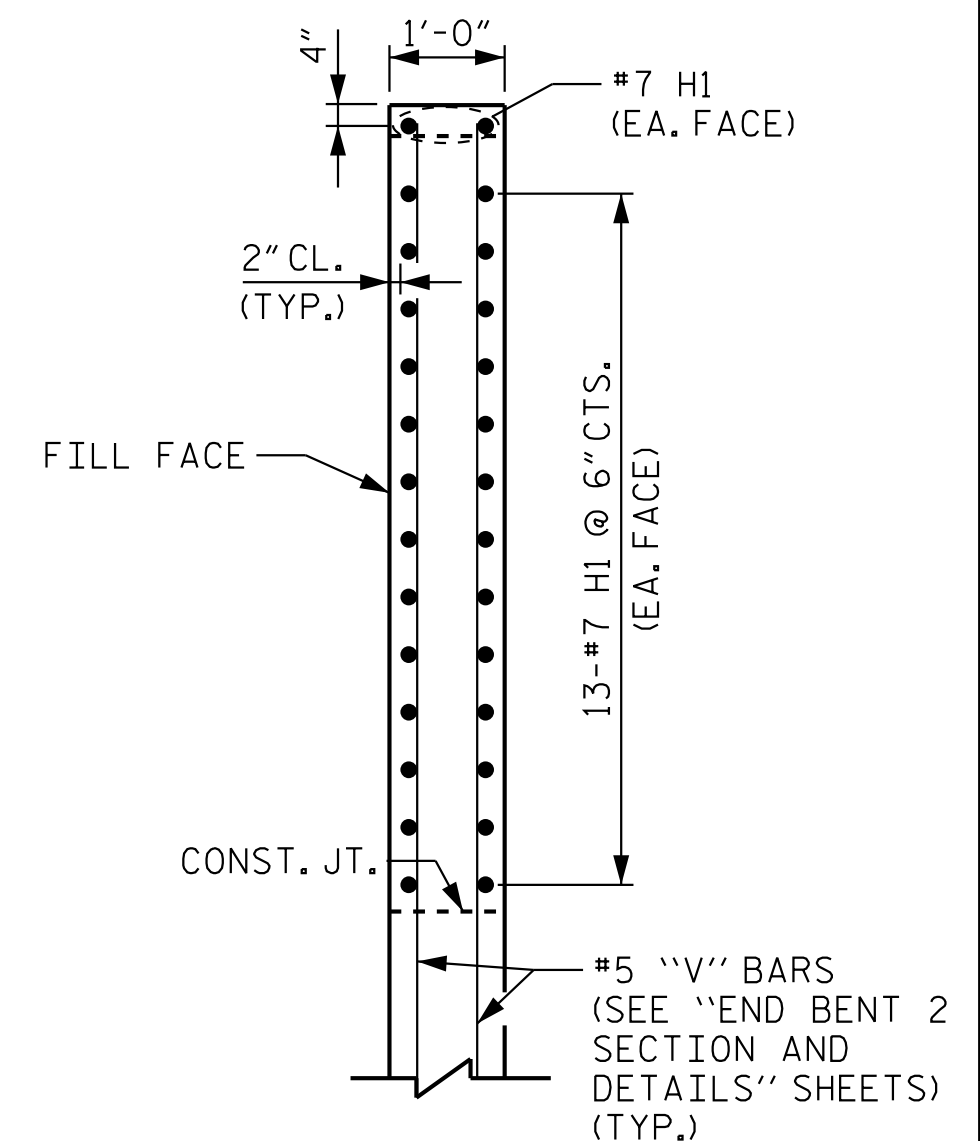
SECTION X-X



ELEVATION OF LEFT WING (W3)



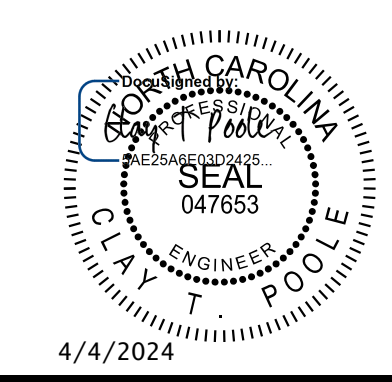
ELEVATION OF RIGHT WING (W4)



SECTION W-W

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 4 OF 4



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 DETAILS @ END BENT 2

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			33

UPPER WINGS AT INTEGRAL END BENT 2
 FOR LOWER WING REINFORCING AND DETAILS, SEE "END BENT 2 SECTION AND DETAILS" SHEETS

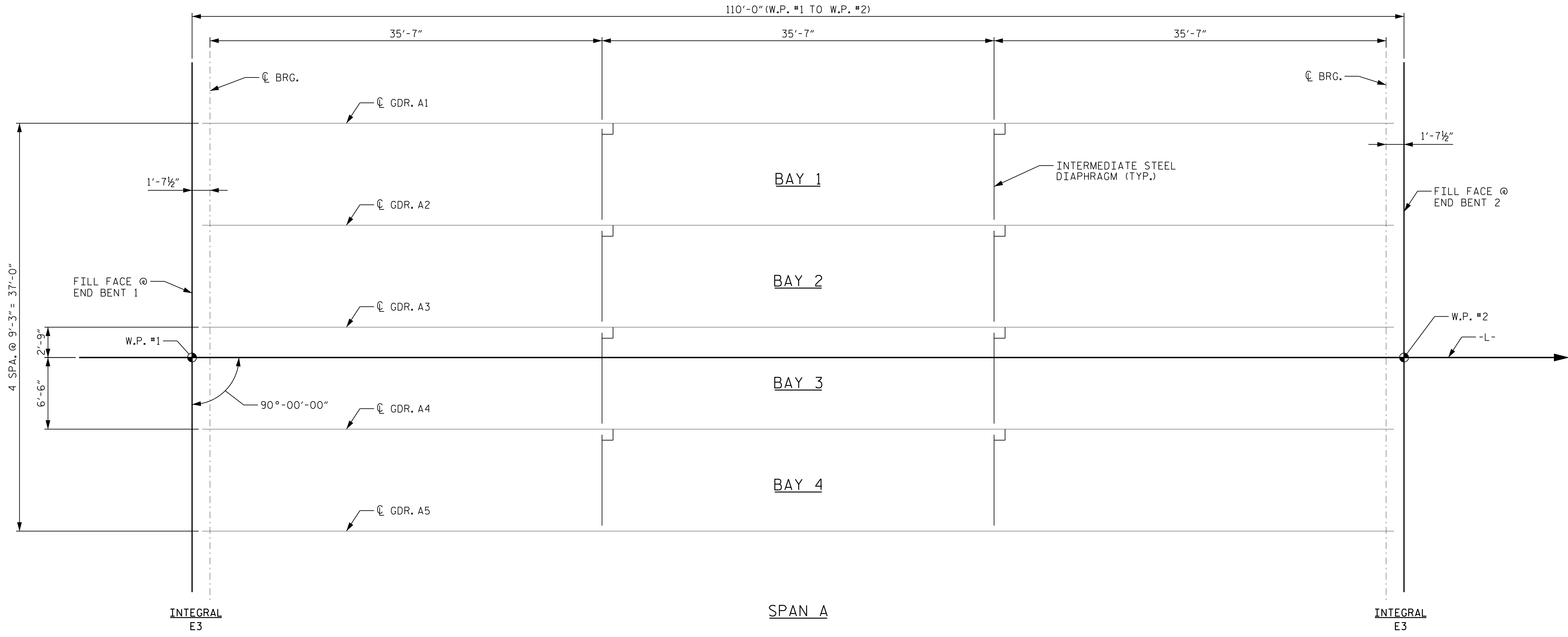
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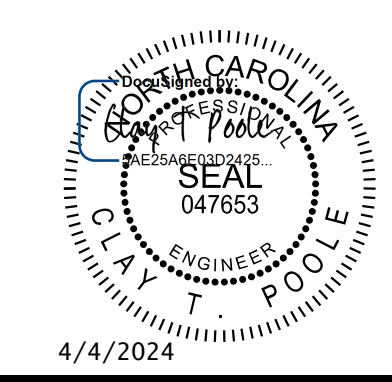
NOTES

FOR STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDER" SHEET.



FRAMING PLAN

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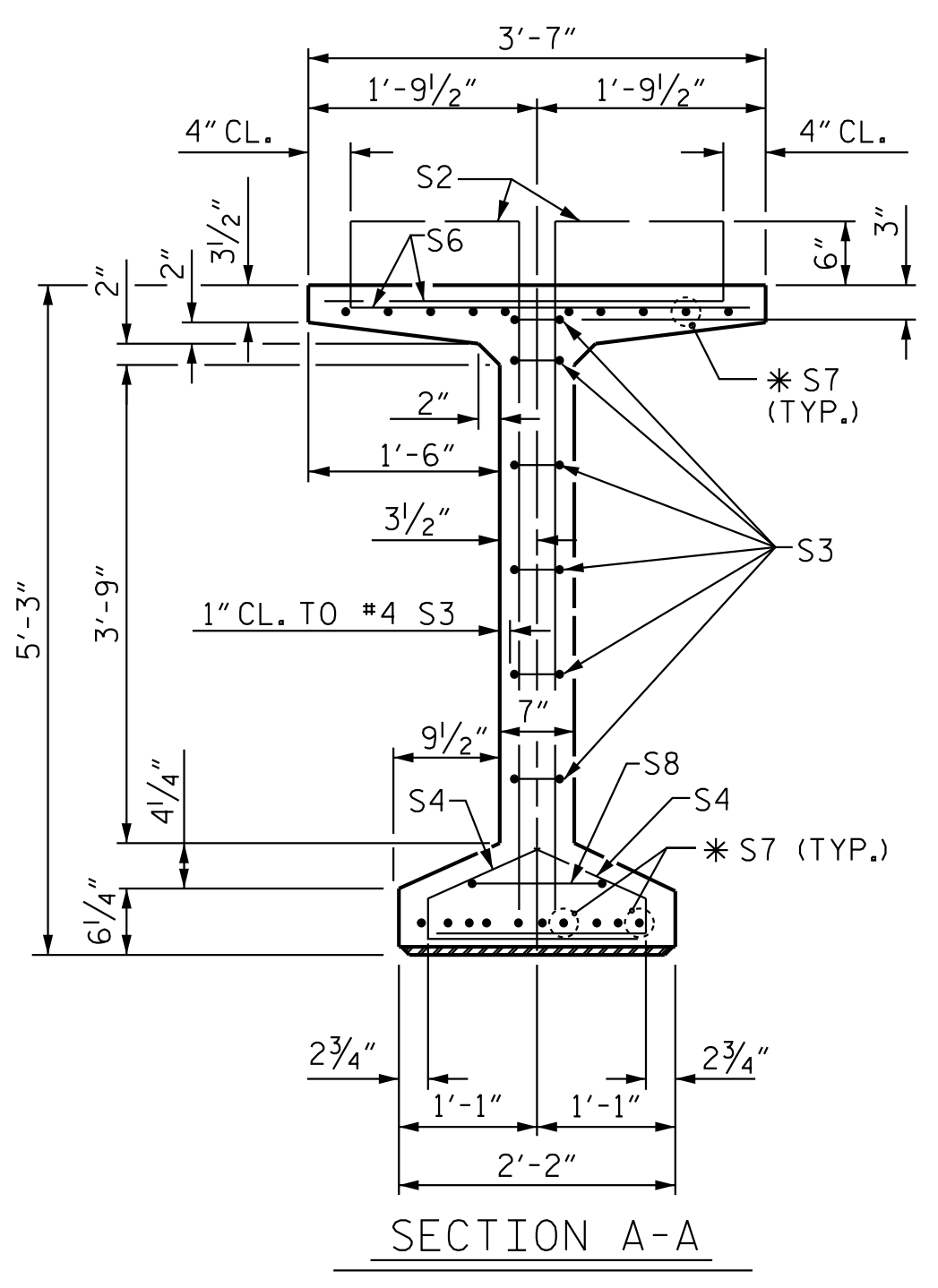
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DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

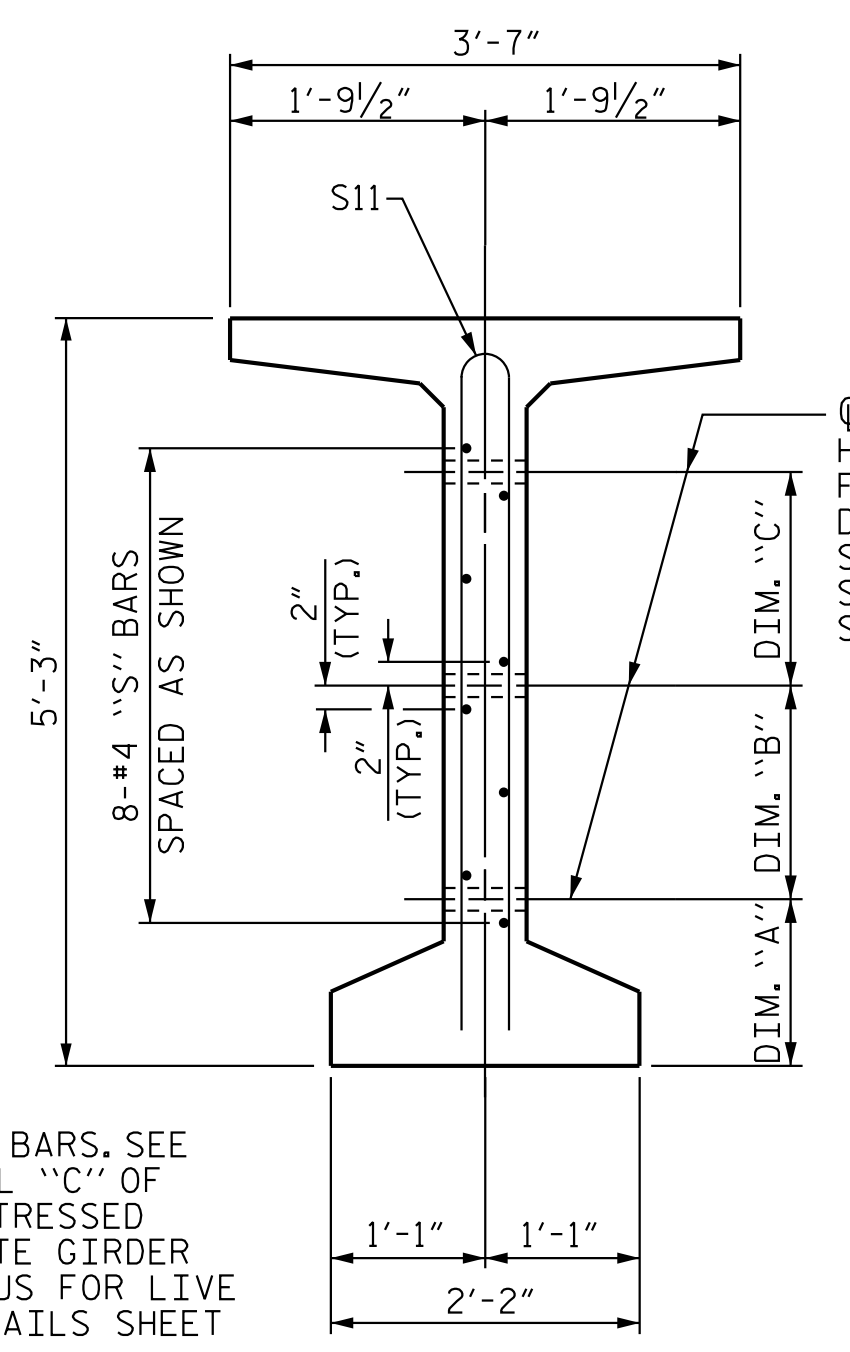
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SECTION A-A



SECTION C-C

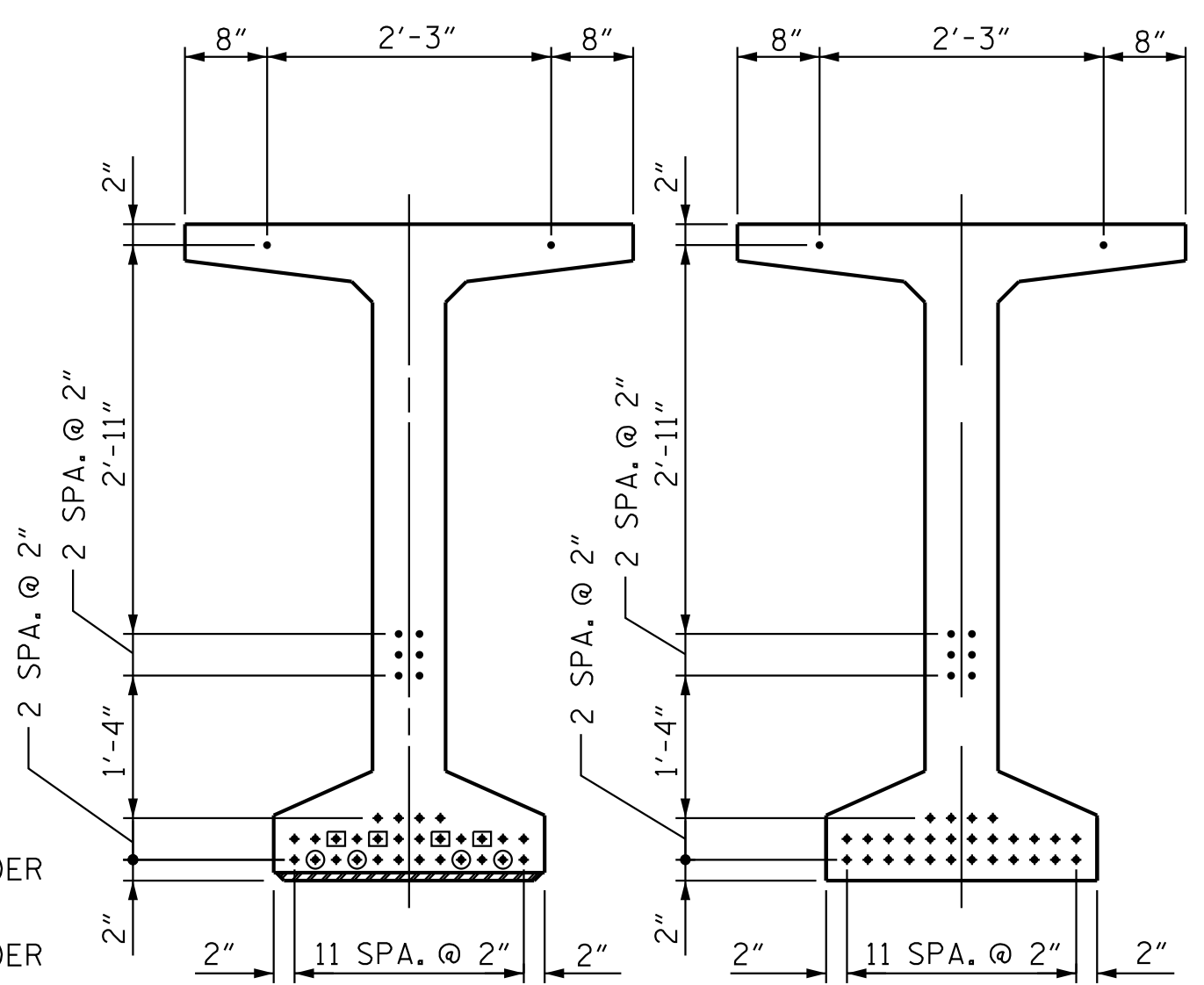
* FOR S7 BARS, SEE
DETAIL "C" OF
PRESTRESSED
CONCRETE GIRDER
CONTINUOUS FOR LIVE
LOAD DETAILS SHEET

(S1, S6 AND S9 BARS NOT SHOWN)

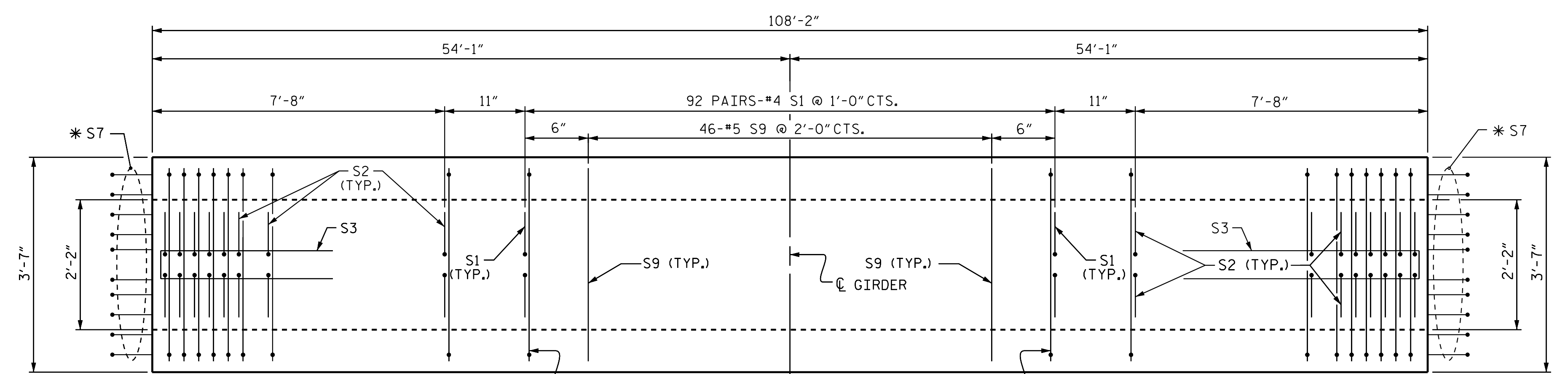
Ø 1 1/2" FORMED
HOLE. SEE ELEVATION
FOR LOCATION. FOR
DIM. "A", "B" & "C",
SEE "INTERMEDIATE
STEEL DIAPHRAGMS"
SHEET.)

DEBONDING LEGEND

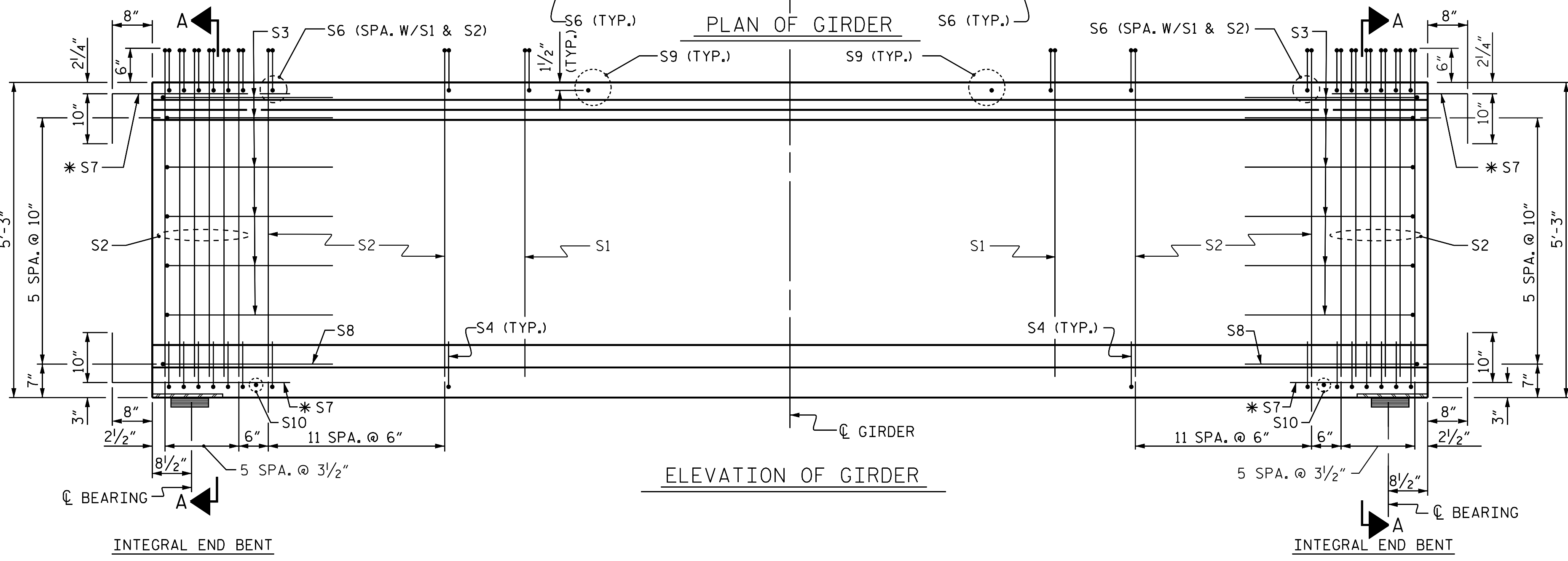
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER



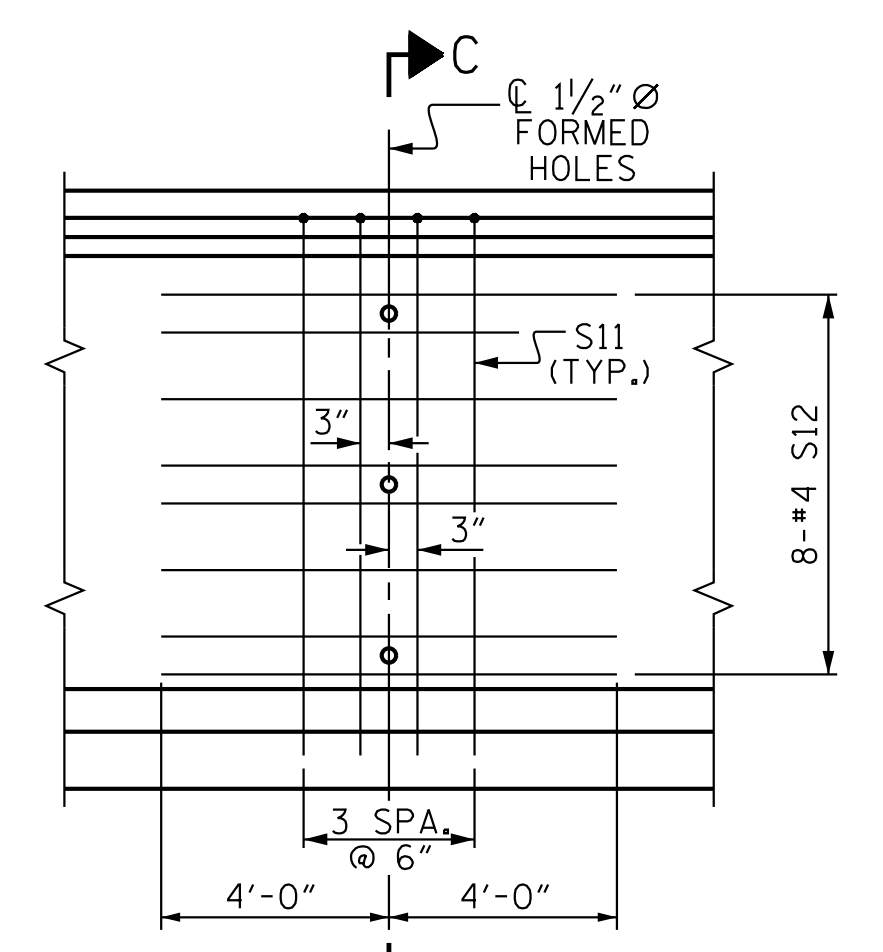
AT END OF GIRDER AT C OF GIRDER
0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

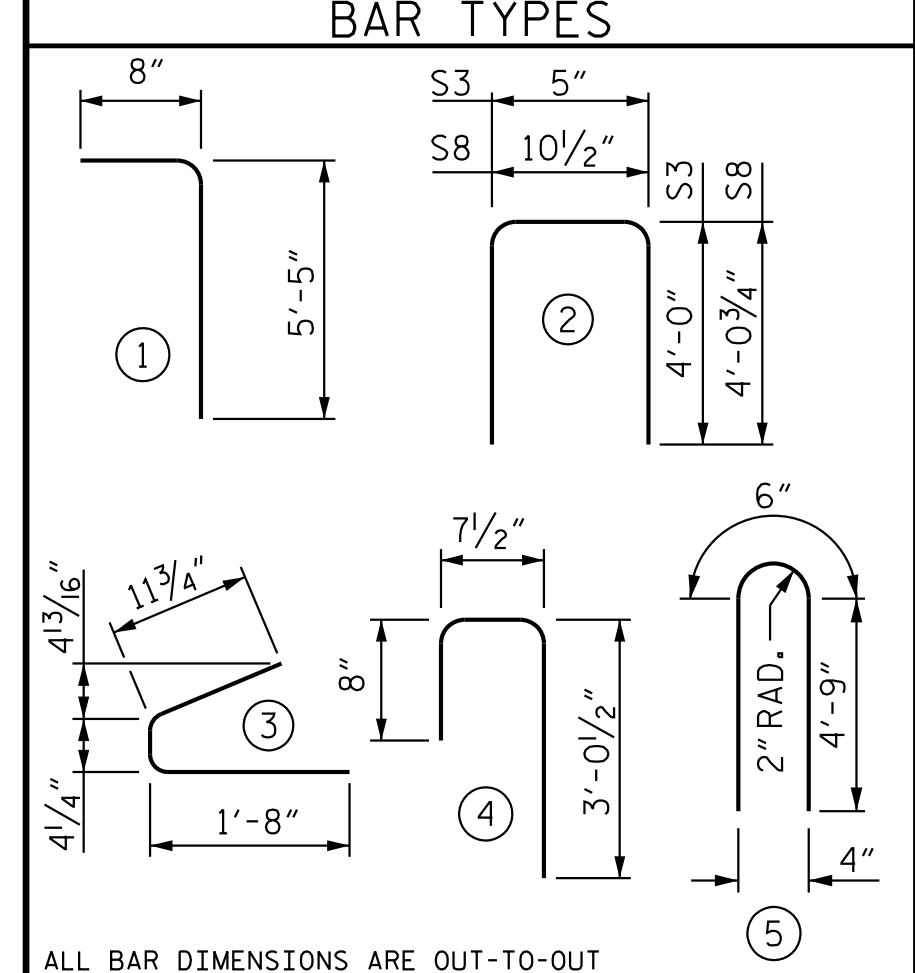


PARTIAL ELEVATION
SHOWING INTERMEDIATE STEEL DIAPHRAGM
REINFORCING STEEL FOR ALL GIRDERS

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	184	#4	1	6'-1"	748
S2	72	#5	1	6'-1"	457
S3	12	#4	2	8'-5"	67
S4	72	#4	3	3'-0"	144
S6	256	#5	4	4'-4"	1,157
* S7	40	#5	STR	3'-8"	153
S8	2	#5	2	9'-0"	19
S9	46	#5	STR	3'-3"	156
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	10'-0"	83
S12	16	#4	STR	8'-0"	86

* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



ALL BAR DIMENSIONS ARE OUT-TO-OUT

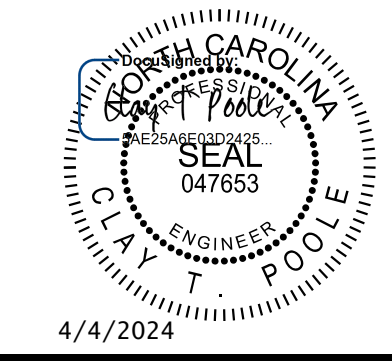
QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	8,000 PSI CONCRETE		0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	3,071	21.4	36

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	108'-2"	540'-10"

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
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 RALEIGH
 STANDARD
 63" PRESTRESSED CONCRETE
 MODIFIED BULB TEE
 CONTINUOUS FOR LIVE LOAD



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1			3			TOTAL SHEETS 33
2			4			

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ASSEMBLED BY : J. L. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : EEM 2/6/97	REV. 6/13 MAA/GM
CHECKED BY : VAP 2/6/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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 PLATE "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.

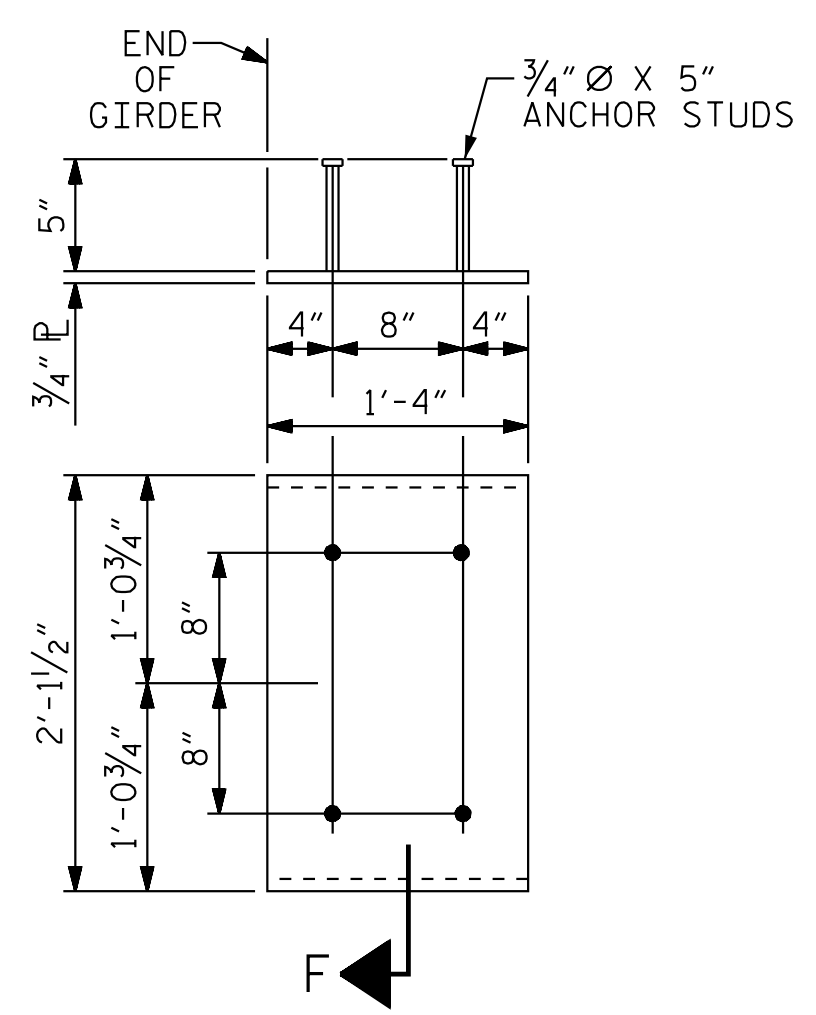
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,400 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

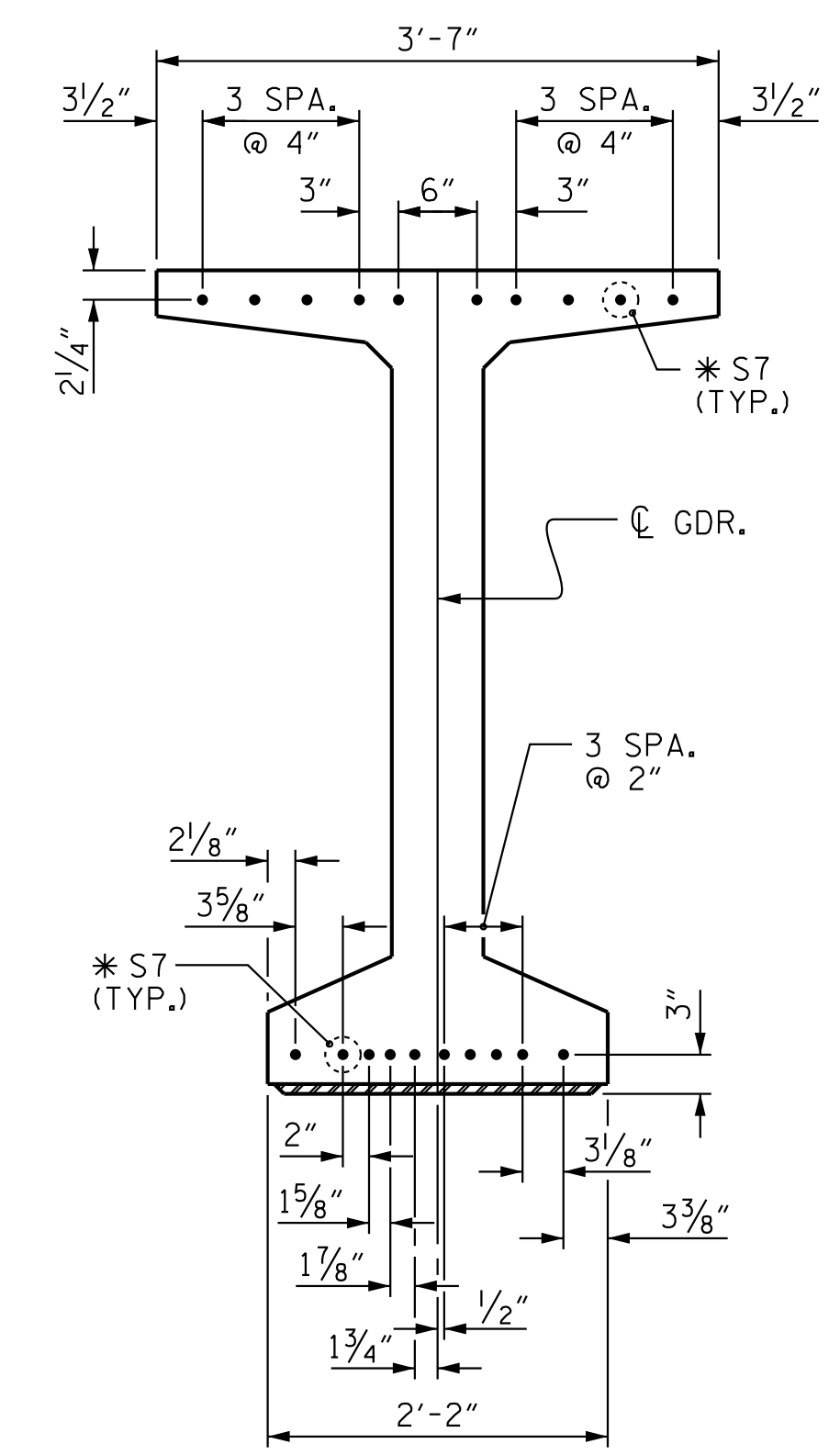
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" MODIFIED BULB TEES ONLY.

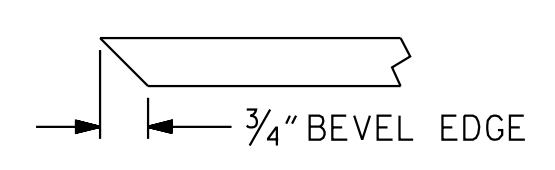
THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



EMBEDDED PLATE "B-1" DETAILS
FOR 63" MODIFIED BULB TEES
(2 REQ'D PER GIRDER)



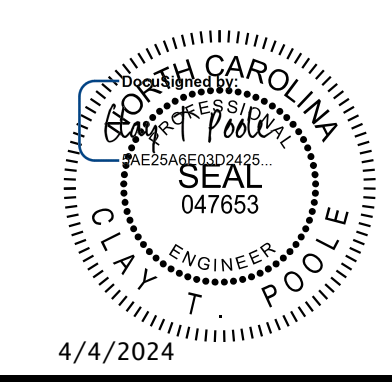
DETAIL "C"



SECTION "F"
(SEE NOTES)

PROJECT NO. U-5108
MECKLENBURG COUNTY
STATION: 74+01.00 -L-

SHEET 2 OF 3



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS

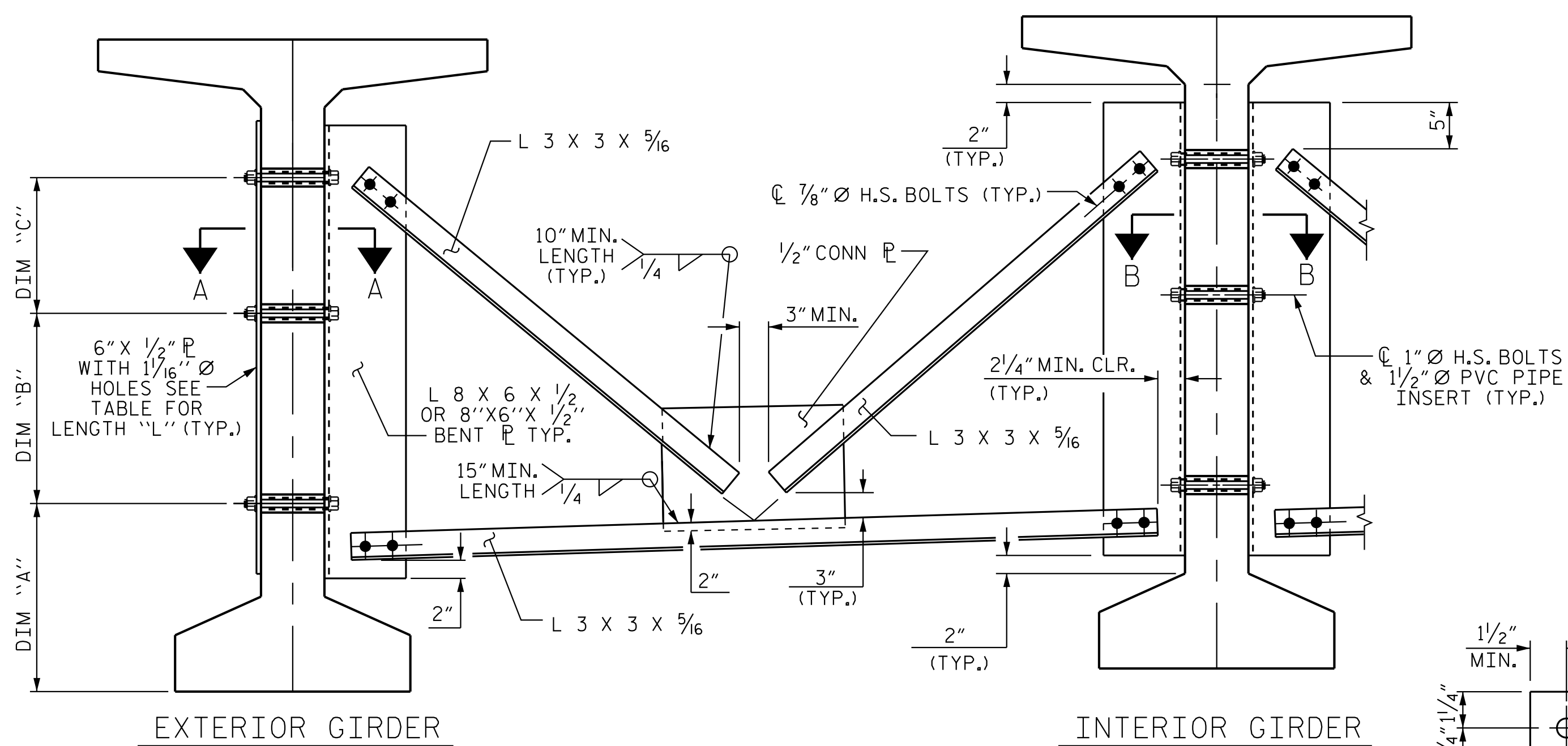
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2			4			33

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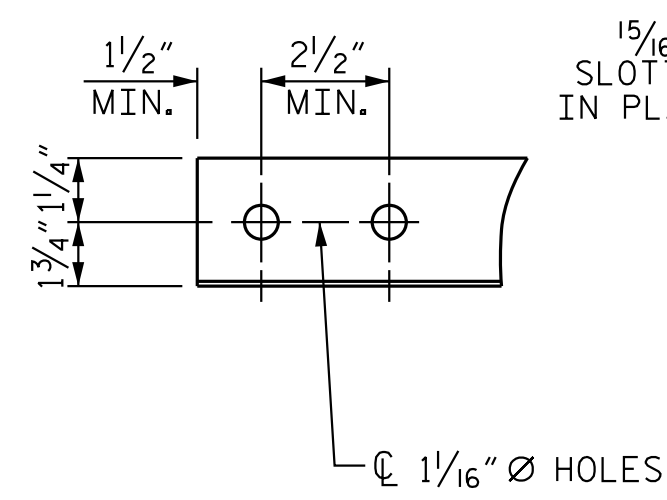
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K:\RD1_Structures\Bridges\NC\U5108\G01\036359 - U-5108\G01\036359.SMU.02.591403.dgn

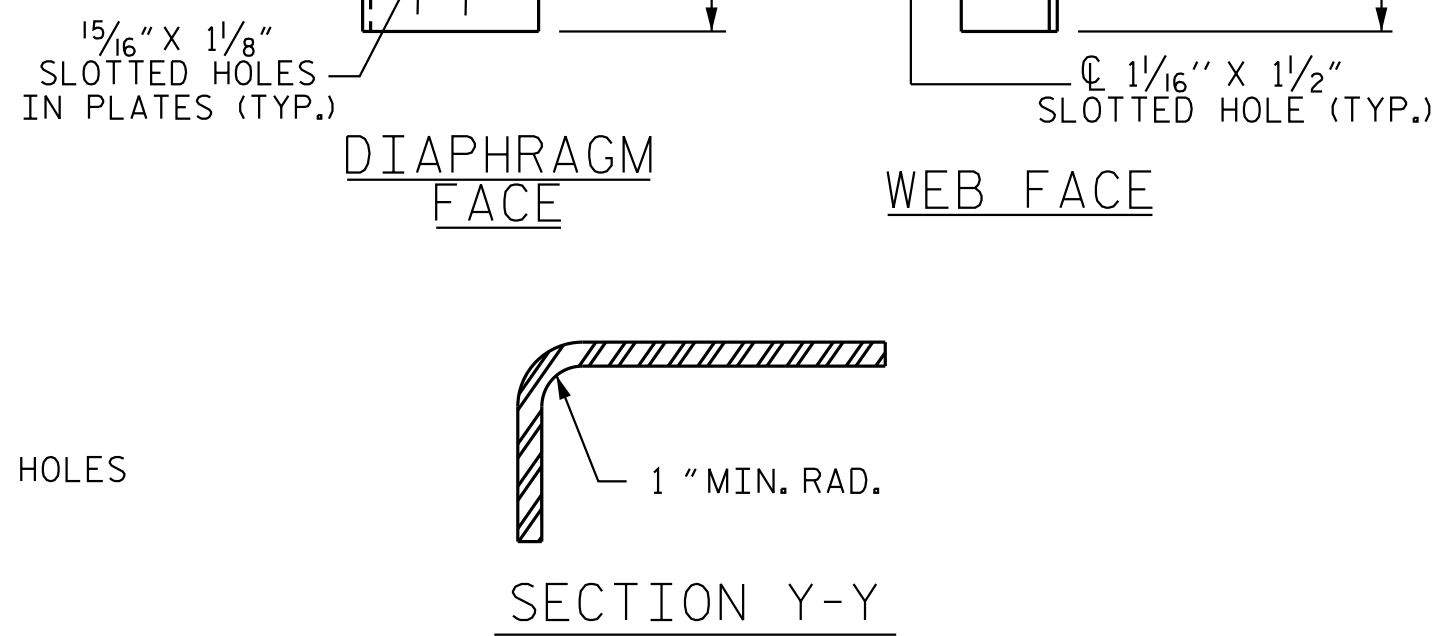
ASSEMBLED BY : J. L. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC



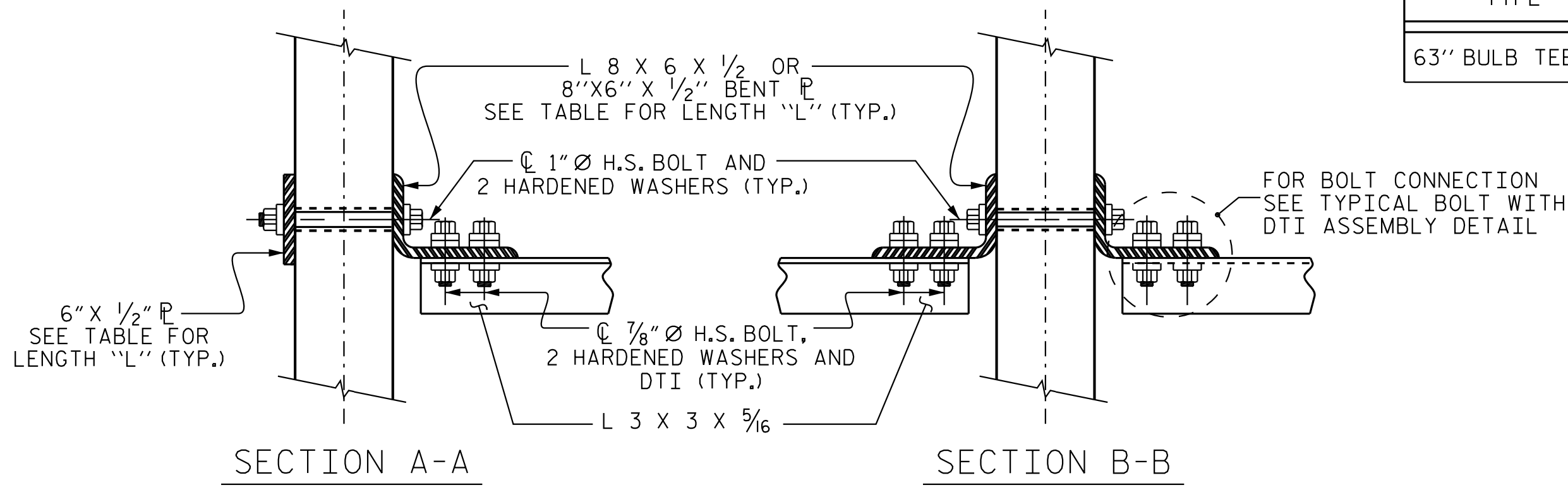
PART SECTION AT INTERMEDIATE DIAPHRAGM



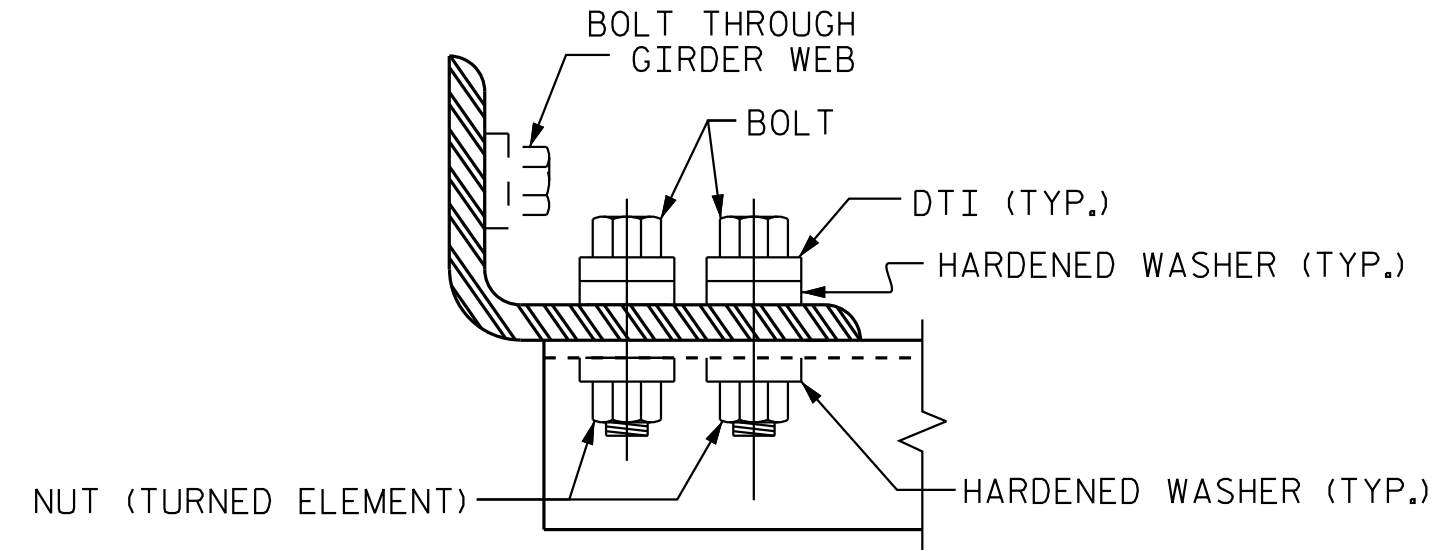
ANGLE END
(L 3 x 3 x 5/16)



CONNECTOR PLATE DETAIL



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

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 ANGLE 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, 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.

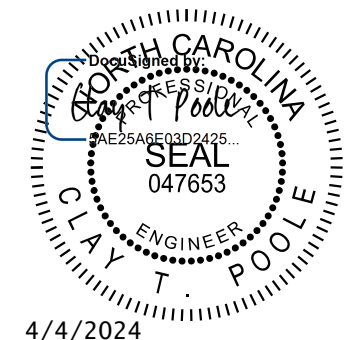
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63" BULB TEE	1'-6 3/4"	1'-3"	1'-3"	3'-5"

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 3 OF 3



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 RALEIGH
 STANDARD
 INTERMEDIATE
 STEEL DIAPHRAGMS
 FOR 63" MODIFIED BULB TEE
 PRESTRESSED CONCRETE
 GIRDERS

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ASSEMBLED BY : J. I. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : RWW 11/09	REV. 10/17/11 MAA/GM
CHECKED BY : GM 11/09	REV. 12/17 MAA/THC

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 30 columns for deflection values and 4 rows: 0.6" Ø LOW RELAXATION STRANDS, SPAN A GIRDERS AG1 & AG5, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), * DEFLECTION DUE TO SUPERIMPOSED D.L., FINAL CAMBER.

* INCLUDES SLAB, BUILDUPS, STAY-IN-PLACE FORMS, & FUTURE WEARING SURFACE. ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 30 columns for deflection values and 4 rows: 0.6" Ø LOW RELAXATION STRANDS, SPAN A GIRDERS AG2 & AG4, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), * DEFLECTION DUE TO SUPERIMPOSED D.L., FINAL CAMBER.

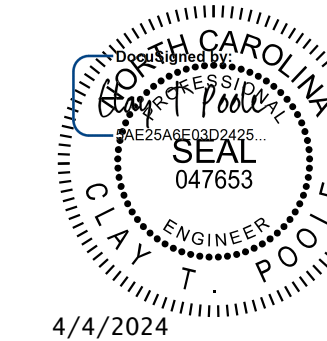
* INCLUDES SLAB, BUILDUPS, STAY-IN-PLACE FORMS, & FUTURE WEARING SURFACE. ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 30 columns for deflection values and 4 rows: 0.6" Ø LOW RELAXATION STRANDS, SPAN A GIRDER AG3, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), * DEFLECTION DUE TO SUPERIMPOSED D.L., FINAL CAMBER.

* INCLUDES SLAB, BUILDUPS, STAY-IN-PLACE FORMS, & FUTURE WEARING SURFACE. ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

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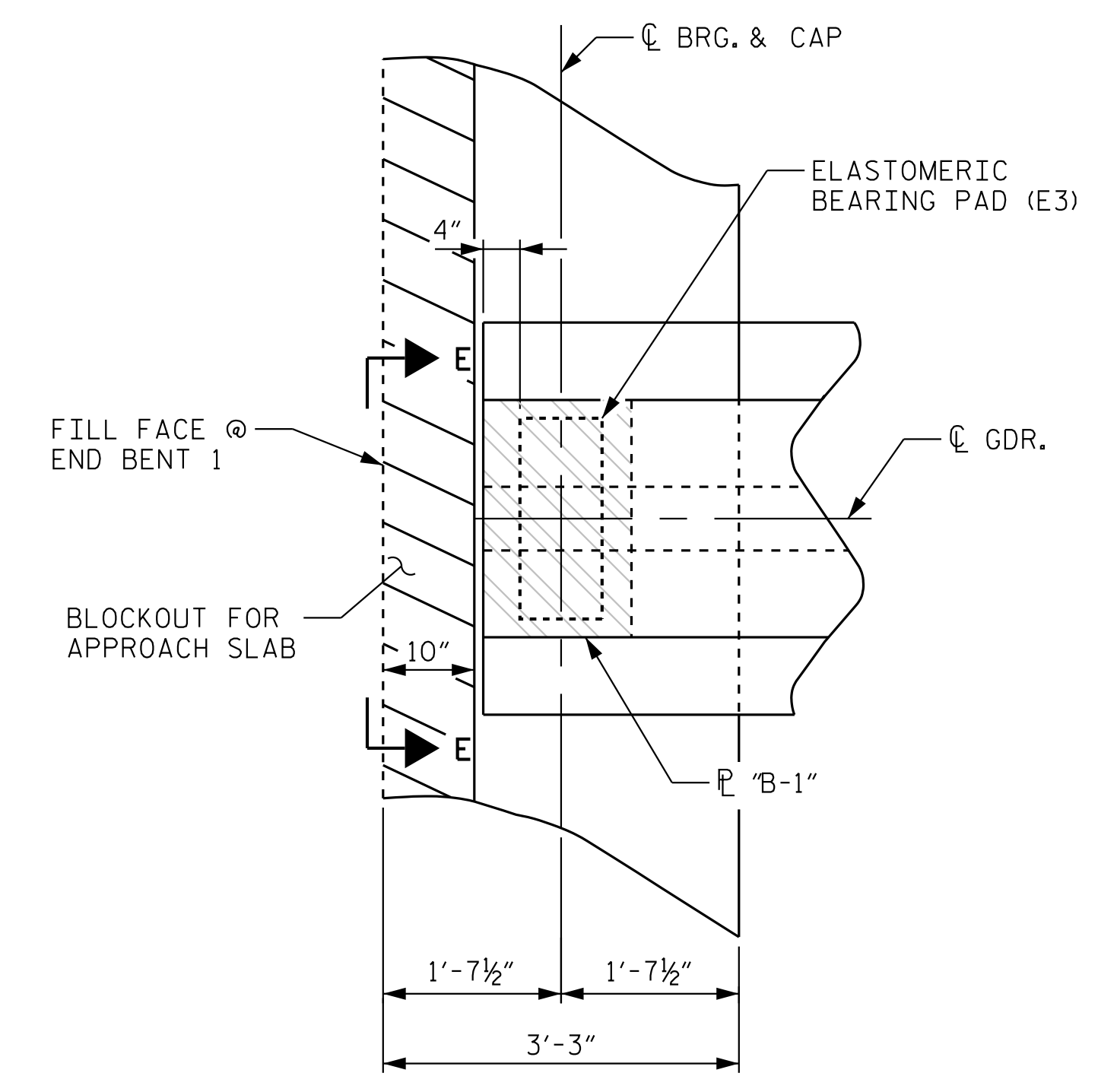
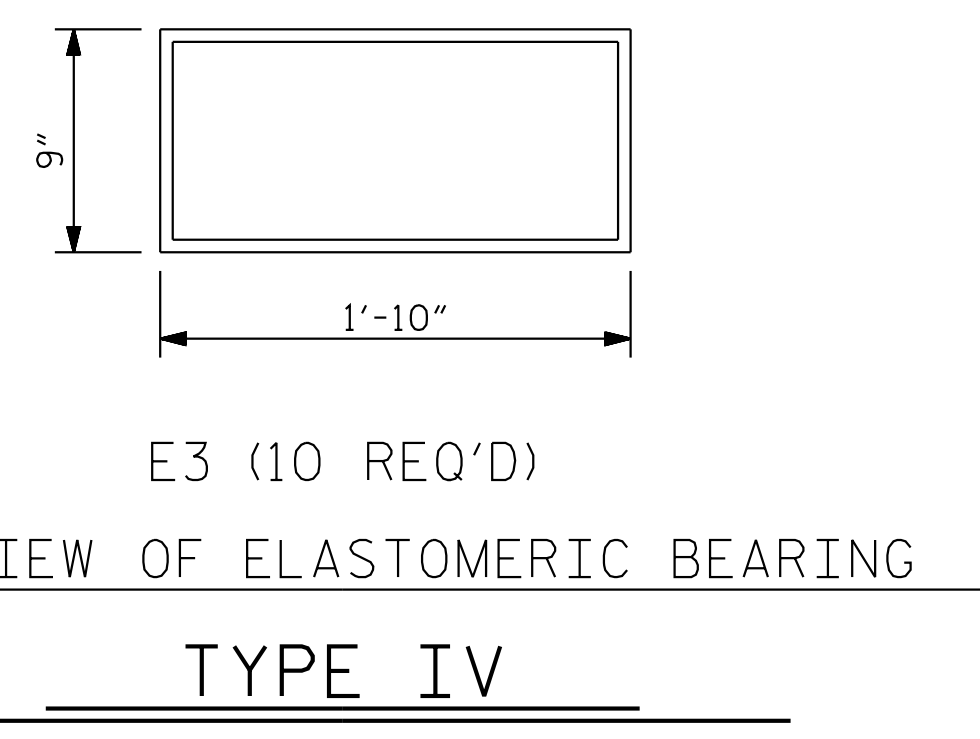
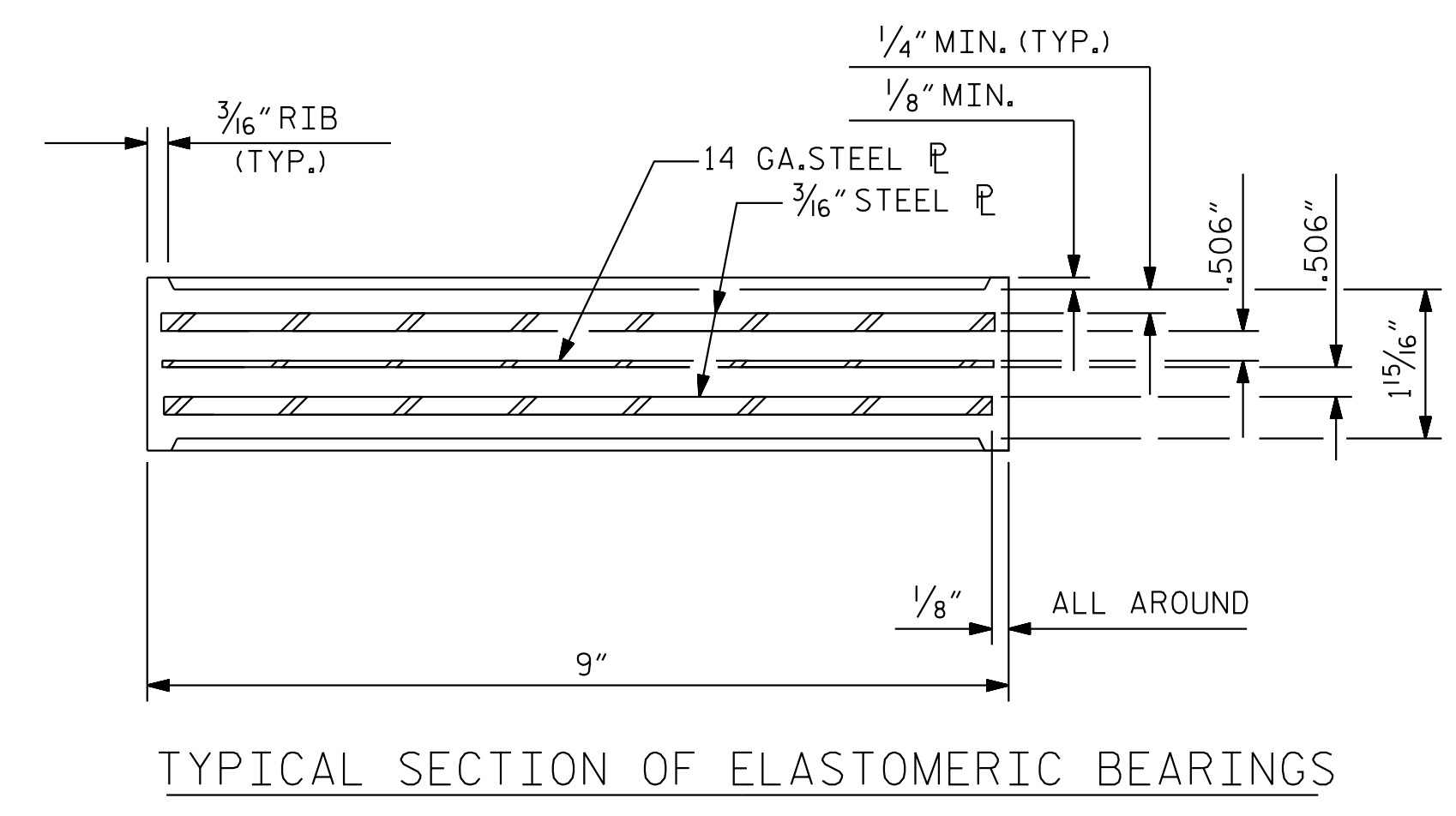
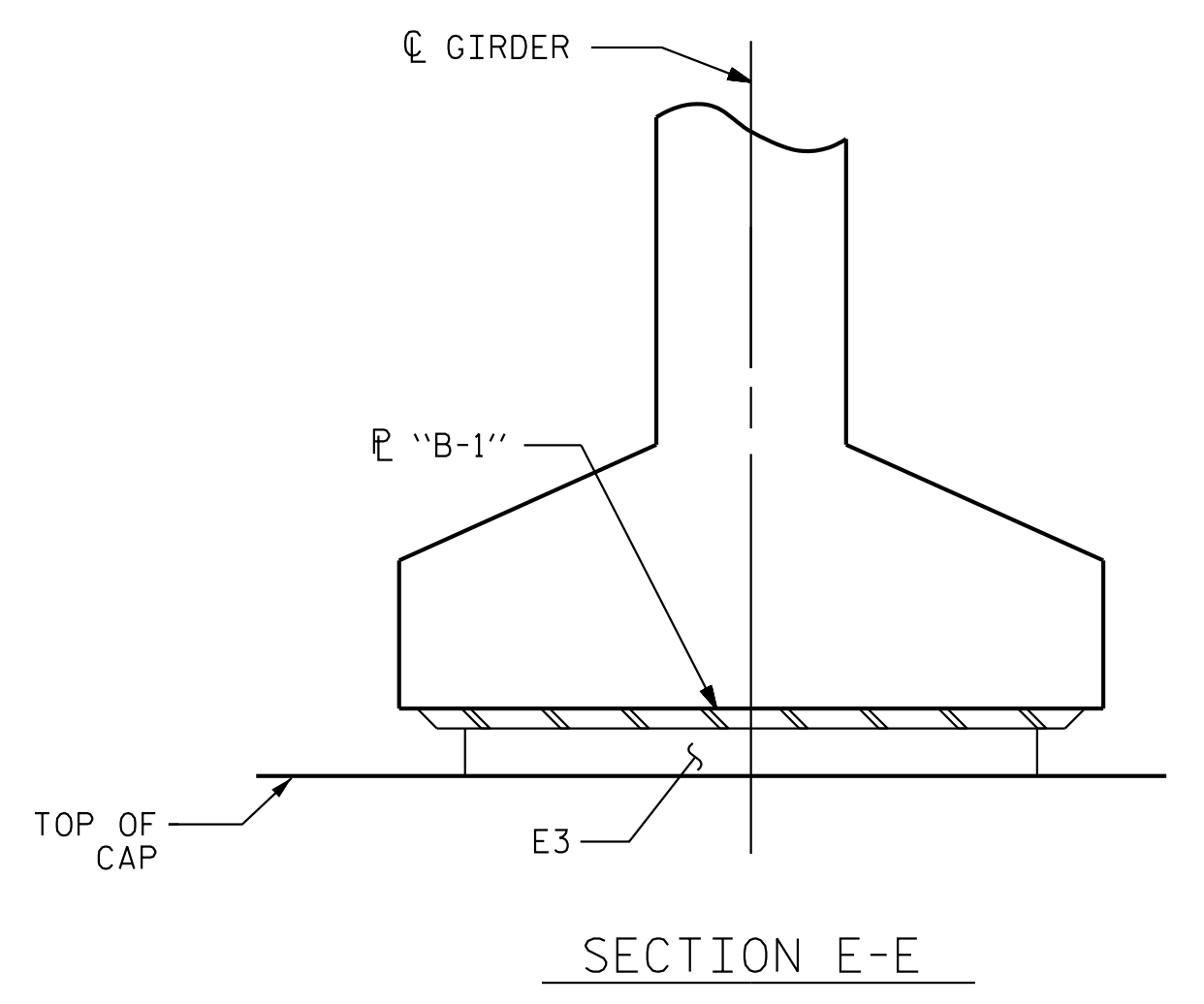
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
GIRDER DEFLECTION
AND CAMBER

Table with 2 columns: REVISIONS (NO., BY, DATE) and SHEET NO. (S-16, TOTAL SHEETS 33).

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DRAWN BY: J. I. KIMBLE DATE: 10/2023
CHECKED BY: T. H. ORR DATE: 10/2023
DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

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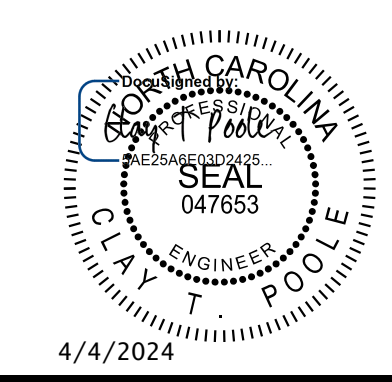
NOTES

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.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

PLAN VIEW AT INTEGRAL END BENT
 (END BENT 1 SHOWN, END BENT 2 SIMILAR)

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 RALEIGH
 STANDARD
ELASTOMERIC BEARING DETAILS
 PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

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ASSEMBLED BY : J. I. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : WJH 8/89	REV. 6/13 AAC/MAA
CHECKED BY : CRK 8/89	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFBIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

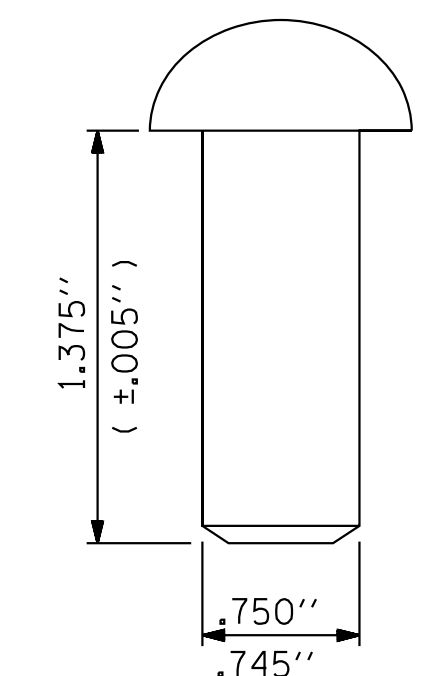
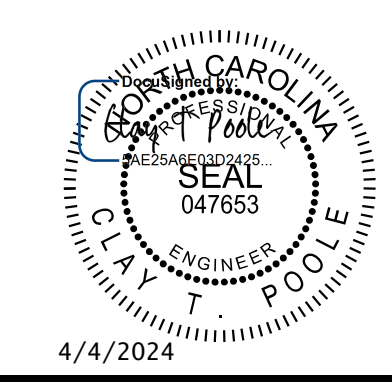
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT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

PAY LENGTH = 201.67 LIN. FT.

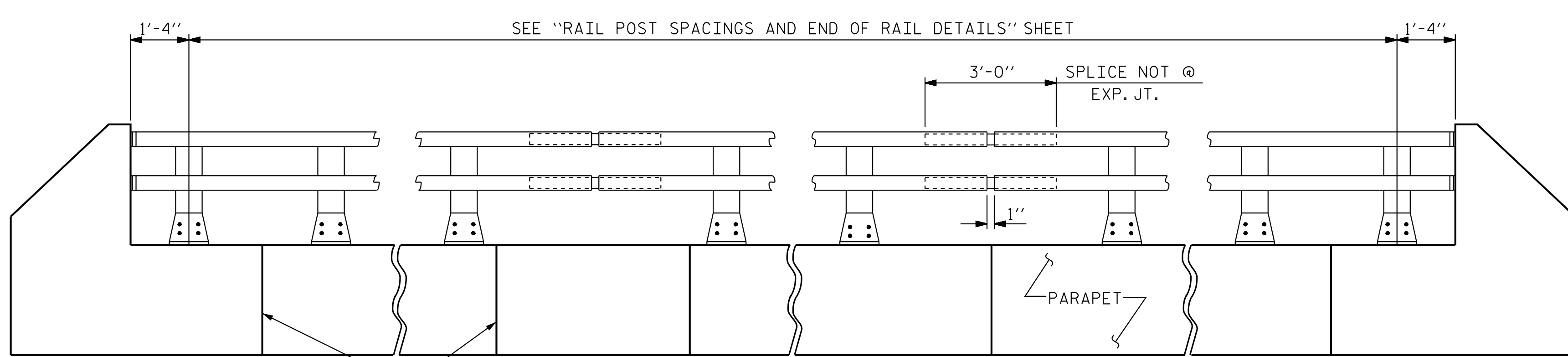
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MECKLENBURG COUNTY
STATION: 74+01.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
2 BAR METAL RAIL

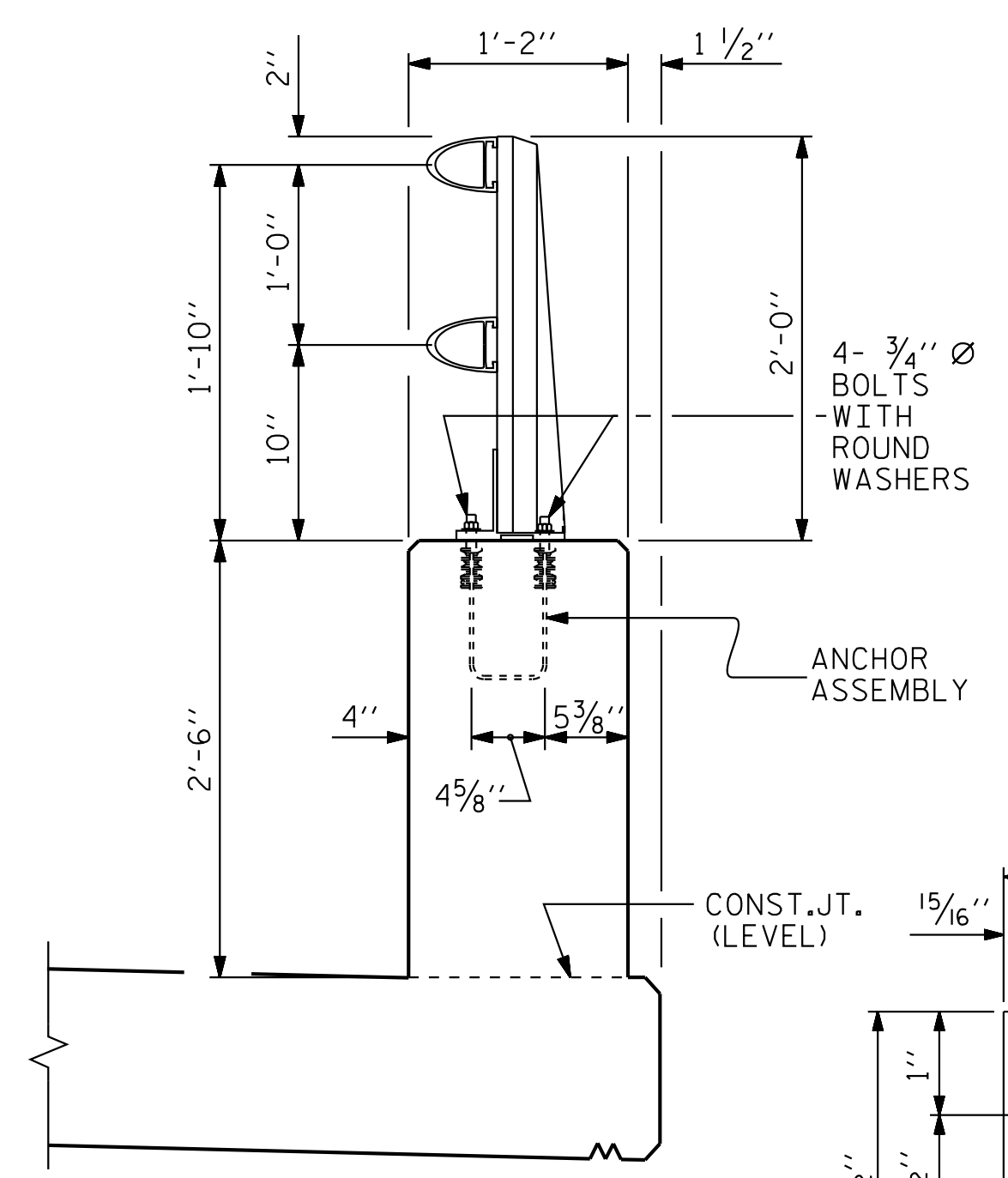


RIVET DETAIL

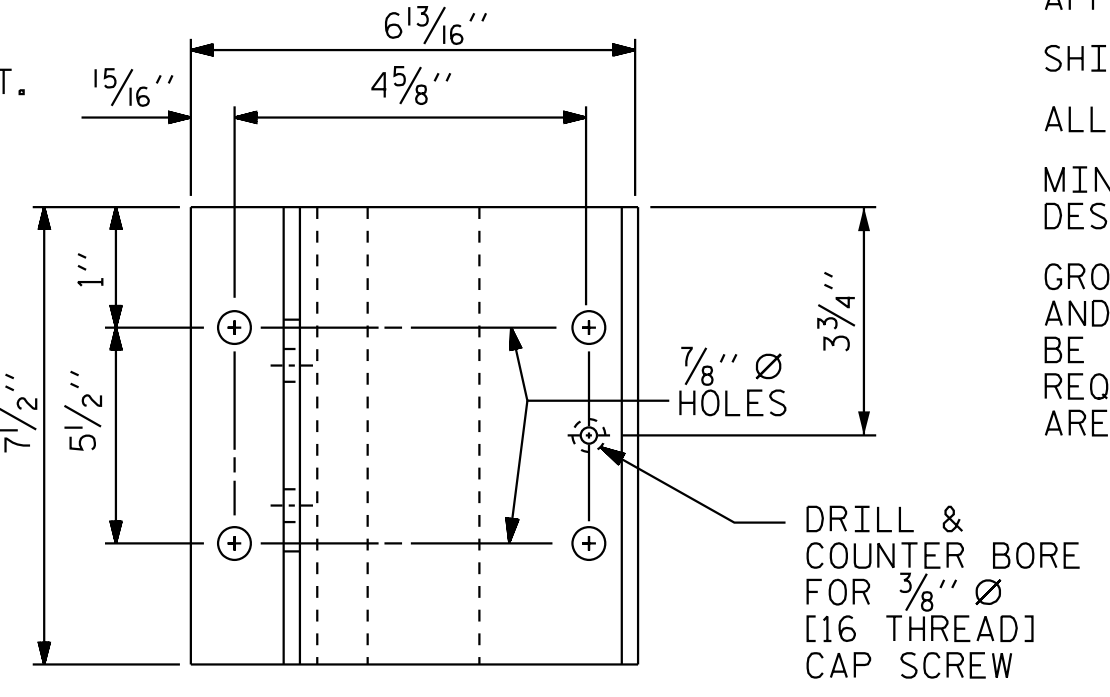


ELEVATION

NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.

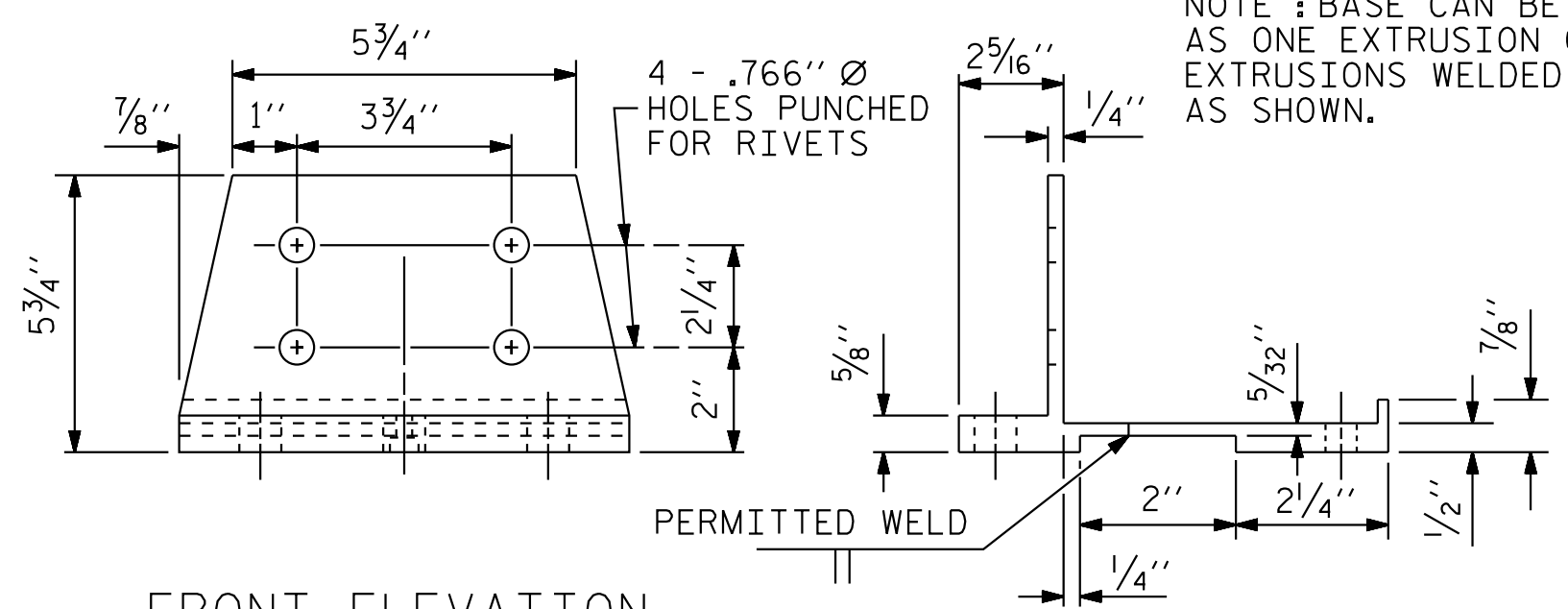


SECTION THRU PARAPET AND RAIL

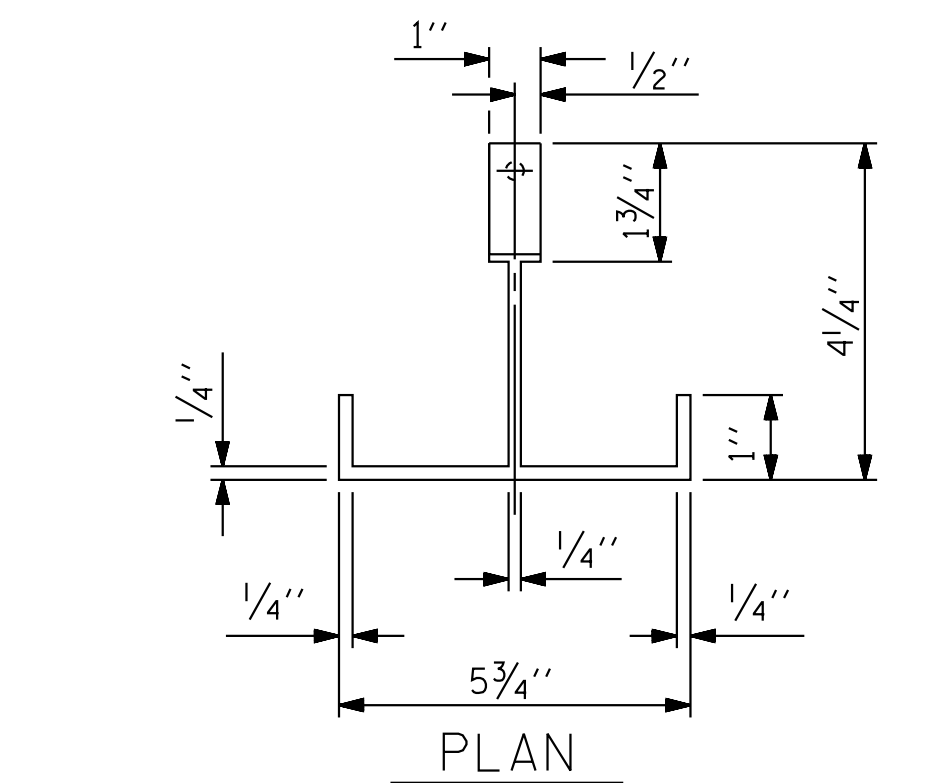


PLAN

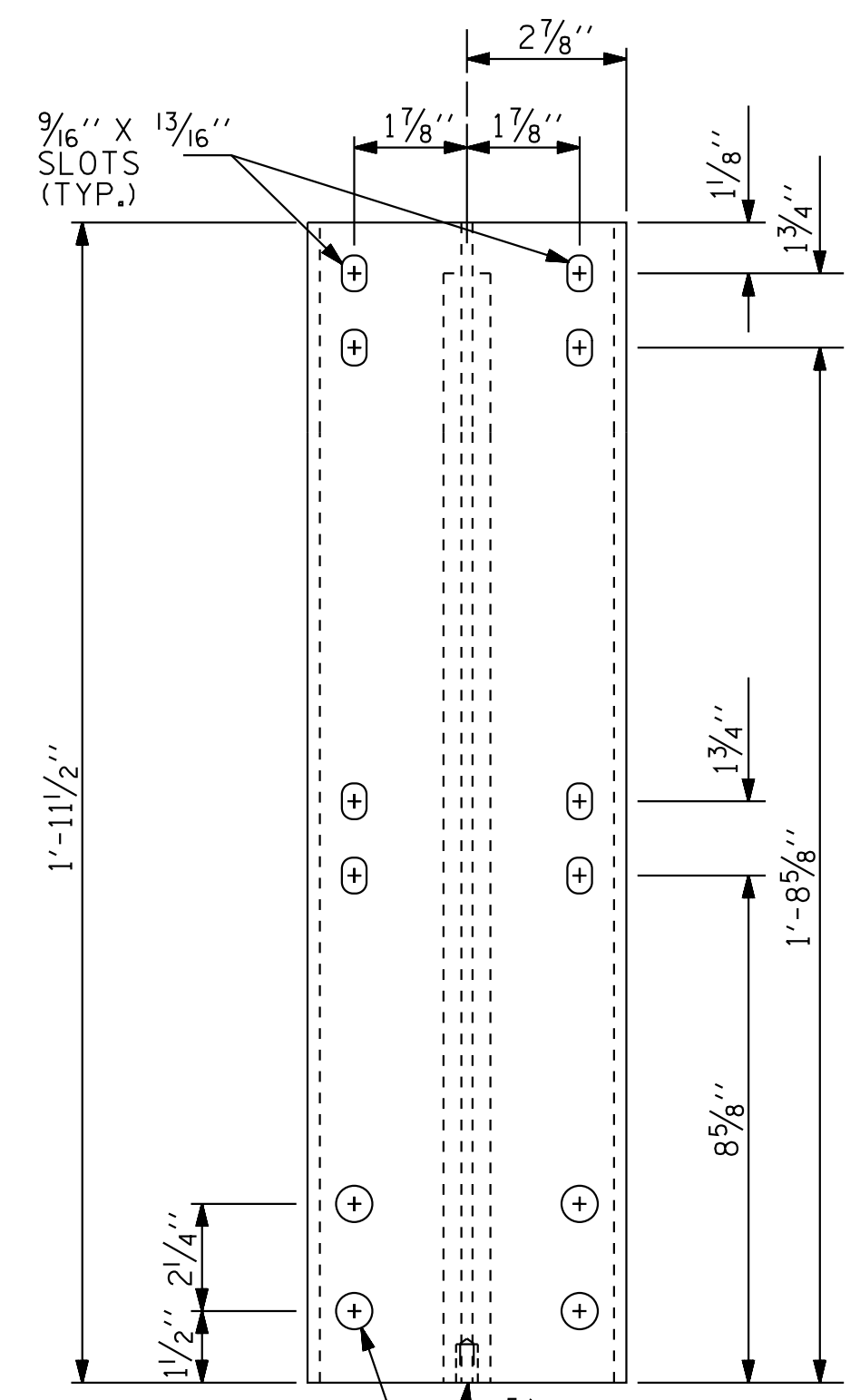
NOTE: BASE CAN BE SUPPLIED AS ONE EXTRUSION OR TWO EXTRUSIONS WELDED TOGETHER AS SHOWN.



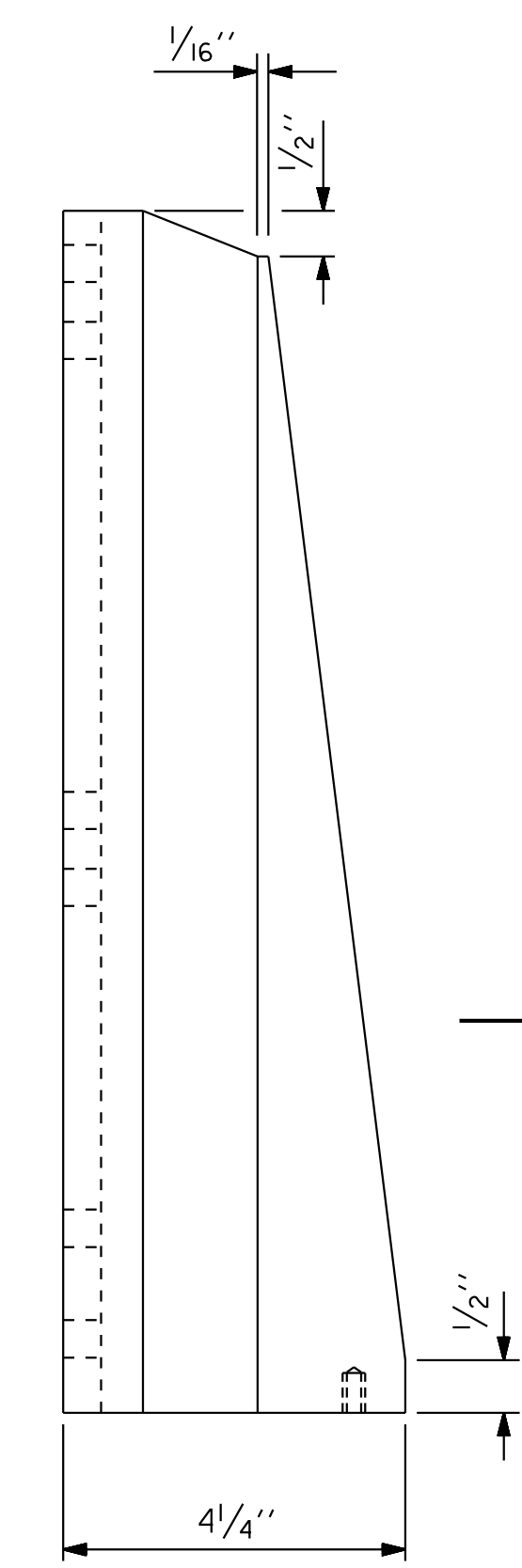
POST BASE DETAILS



PLAN



FRONT ELEVATION



SIDE ELEVATION

DETAILS OF POST

4 - .766" Ø HOLES PUNCHED FOR RIVETS
5/16" Ø DRILL 1" DEEP & 3/8" Ø [16 THREAD] TAP 1/8" DEEP FOR 3/8" Ø X 1 1/2" STAINLESS STEEL CAP SCREW

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ASSEMBLED BY : J. L. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : EEM 6/94	REV. 10/1/11 MAA/GM
CHECKED BY : RGW 6/94	REV. 6/13 MAA/GM
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1			3			TOTAL SHEETS
2			4			33

NOTES

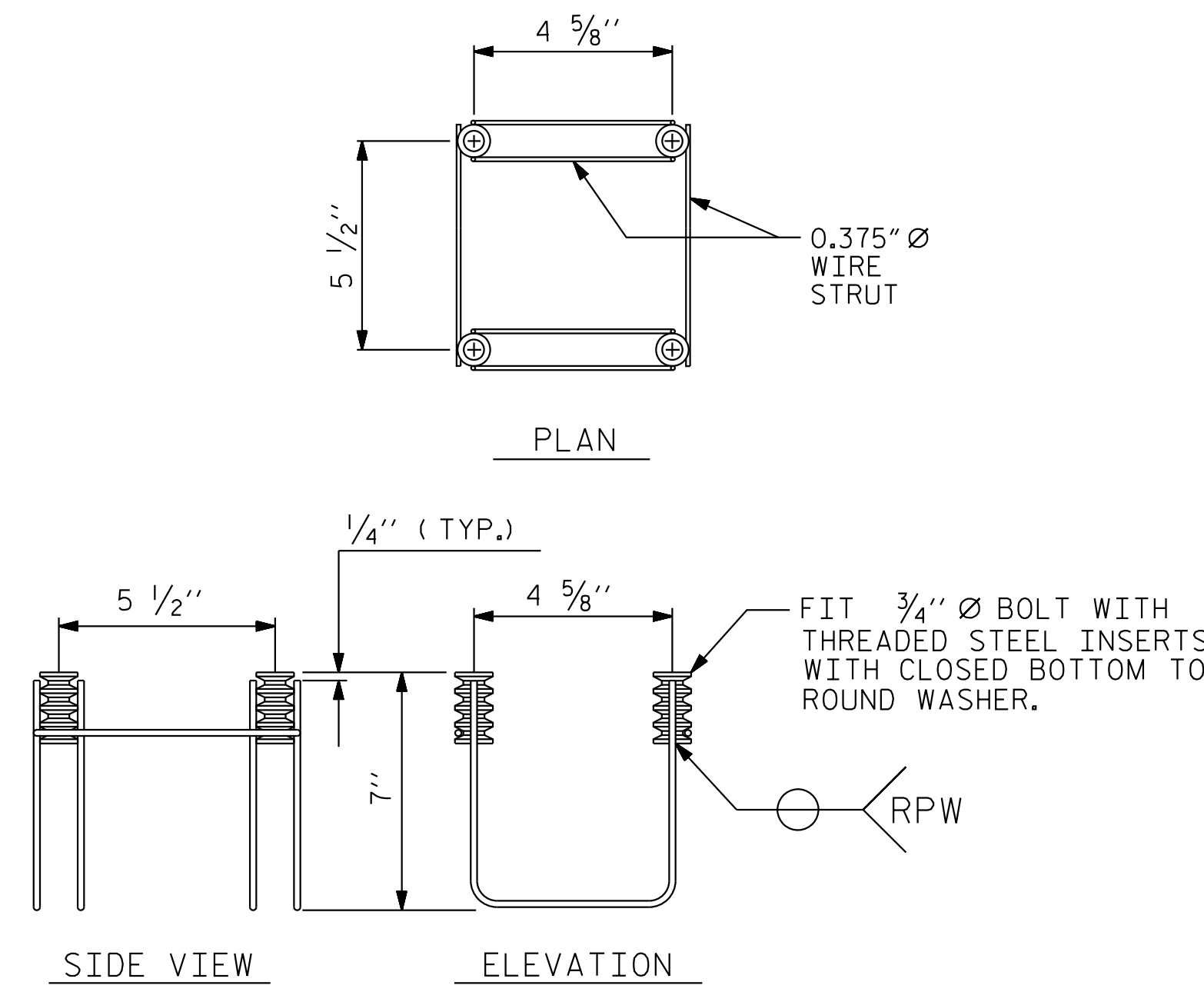
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS 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.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLY TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

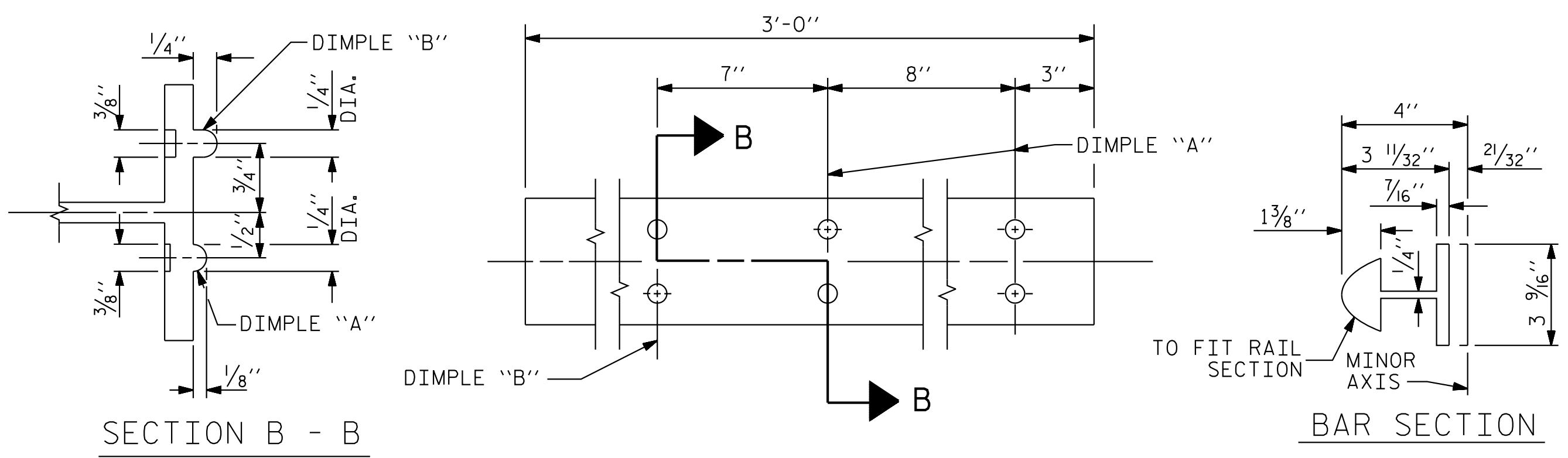
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

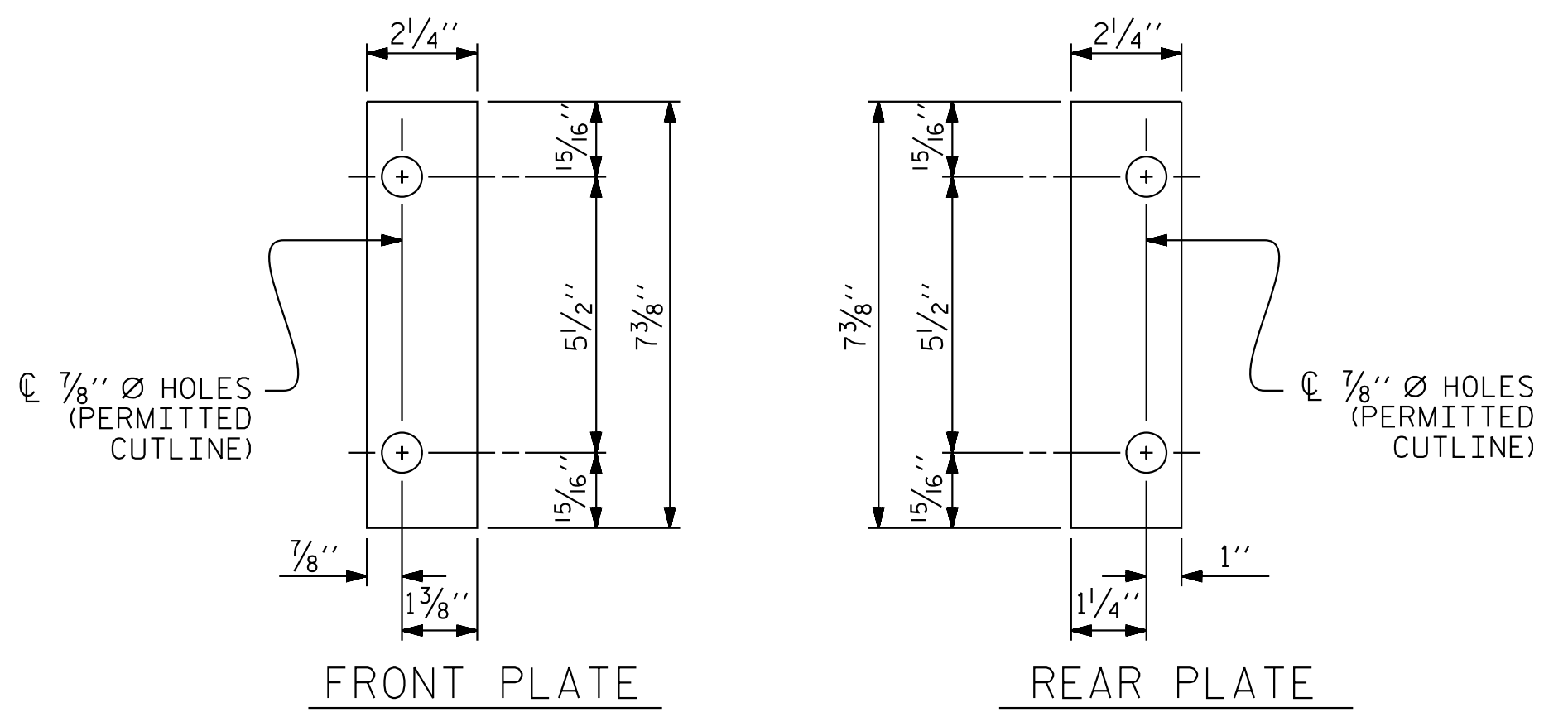


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(38 ASSEMBLIES REQUIRED)

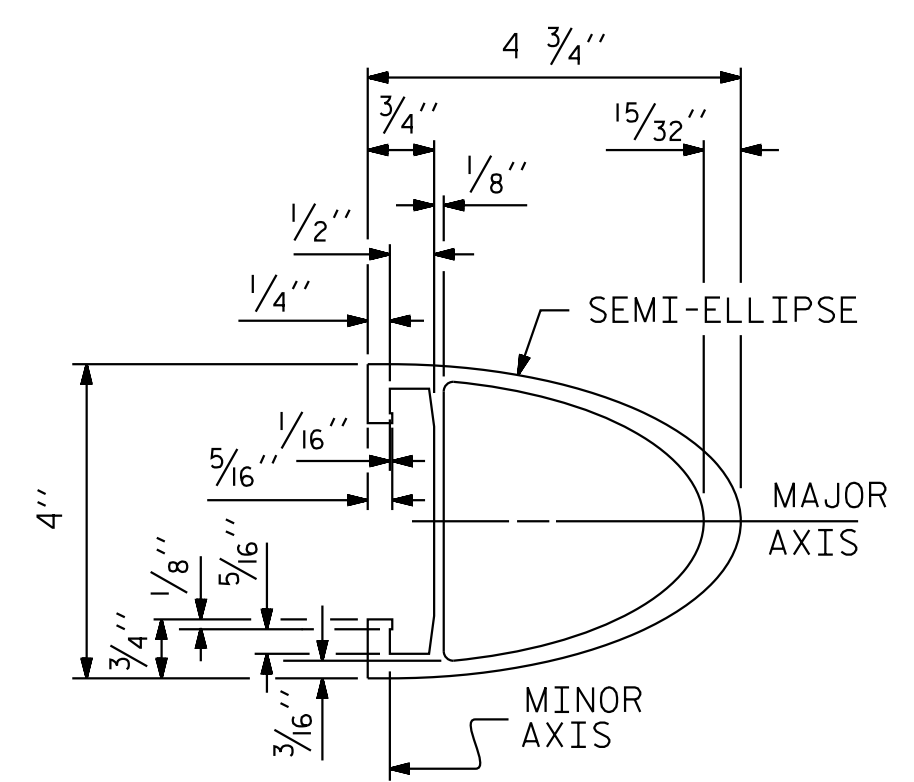


EXPANSION BAR DETAILS

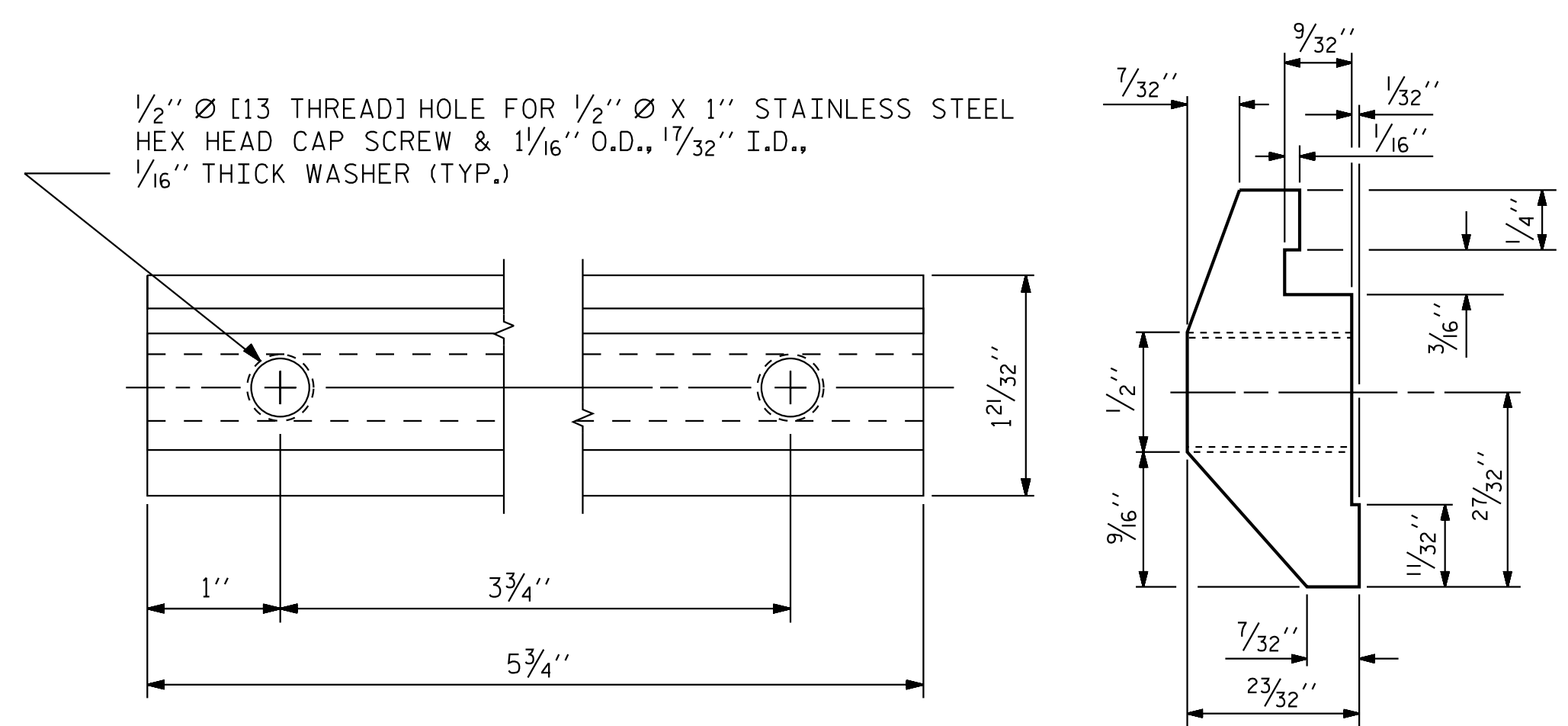


SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

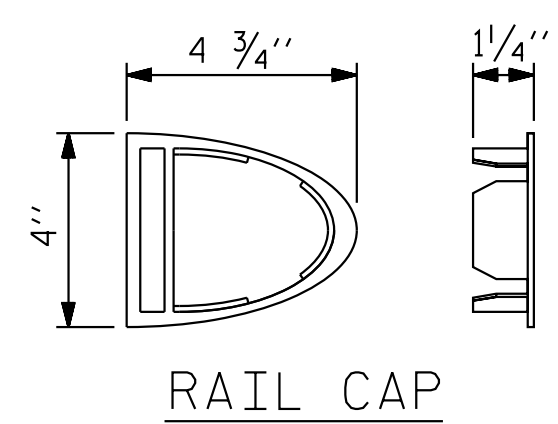


RAIL SECTION

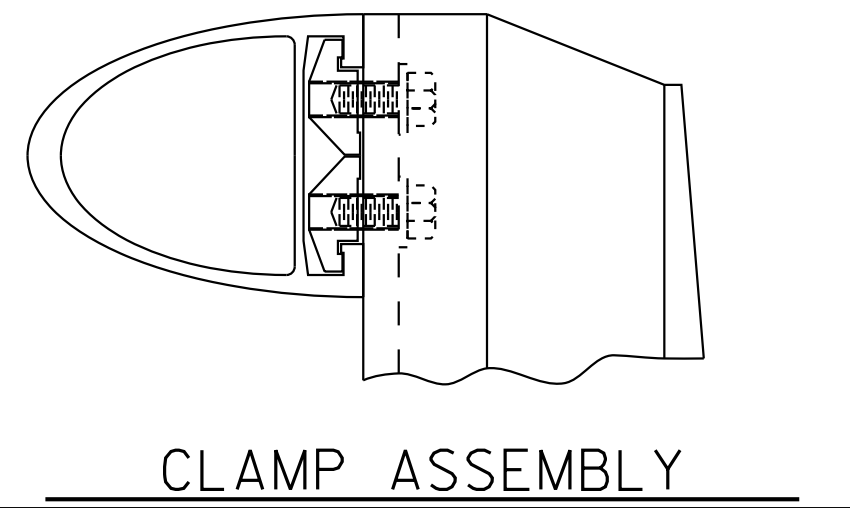


CLAMP BAR DETAIL

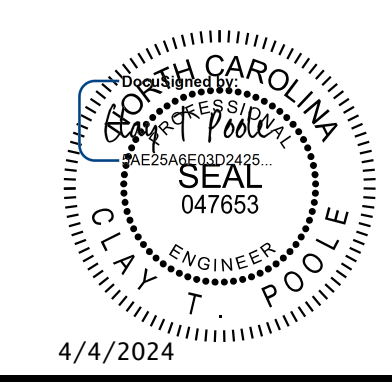
(4 REQUIRED PER POST)



RAIL CAP



CLAMP ASSEMBLY



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SHEET 2 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
2 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-19
TOTAL SHEETS					33

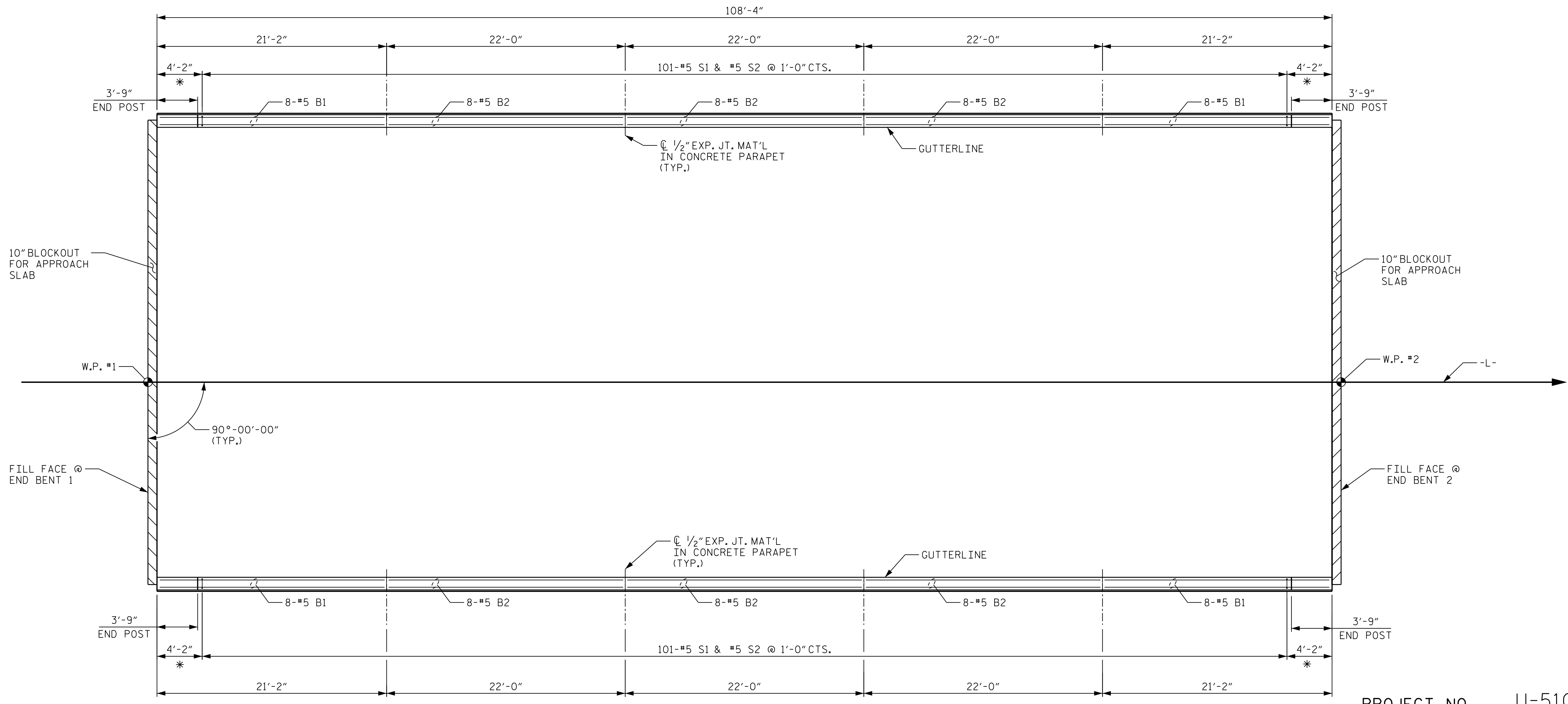
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ASSEMBLED BY : J. L. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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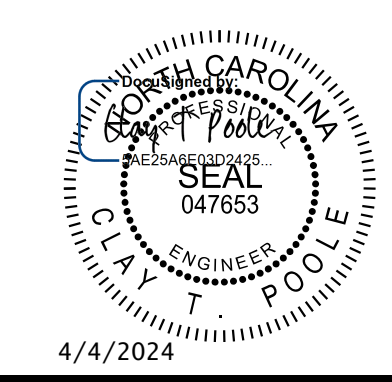


PLAN

* SEE "PLAN OF PARAPET" ON SHEET 4 OF 5 FOR SPACING OF S3 BARS

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SHEET 3 OF 5



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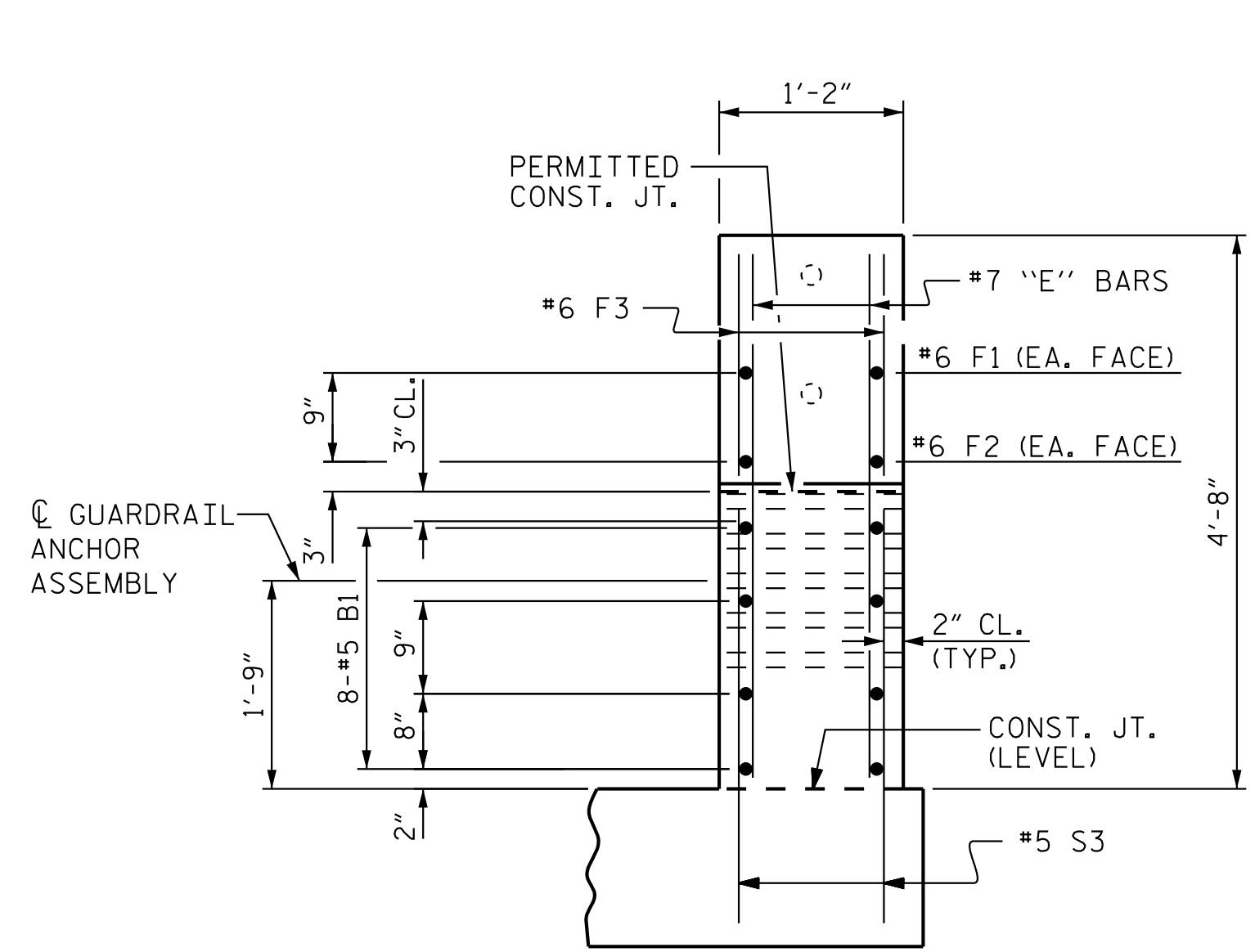
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 CONCRETE PARAPET
 DETAILS

DRAWN BY: J. I. KIMBLE DATE: 10/2023
 CHECKED BY: T. H. ORR DATE: 10/2023
 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

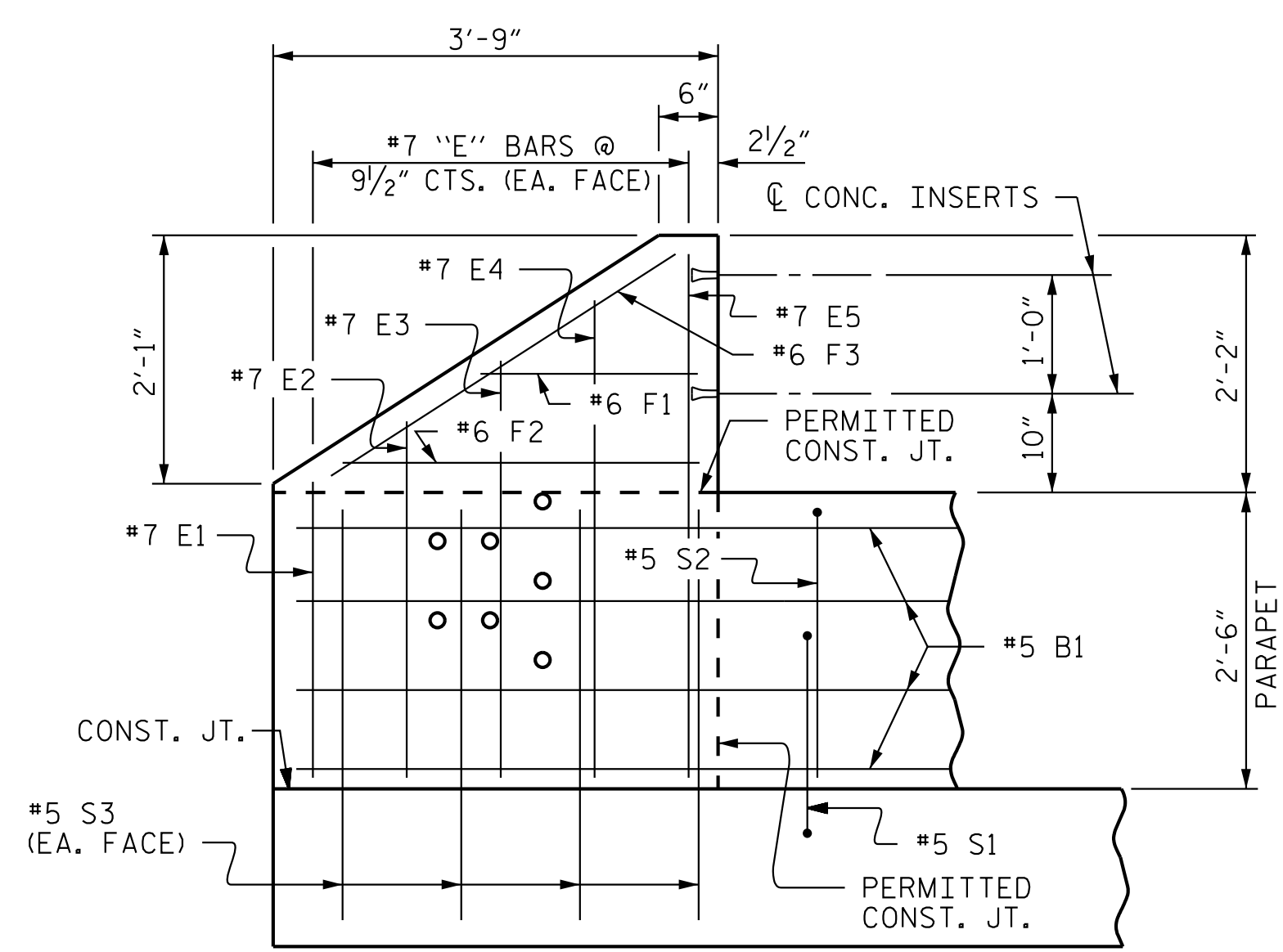
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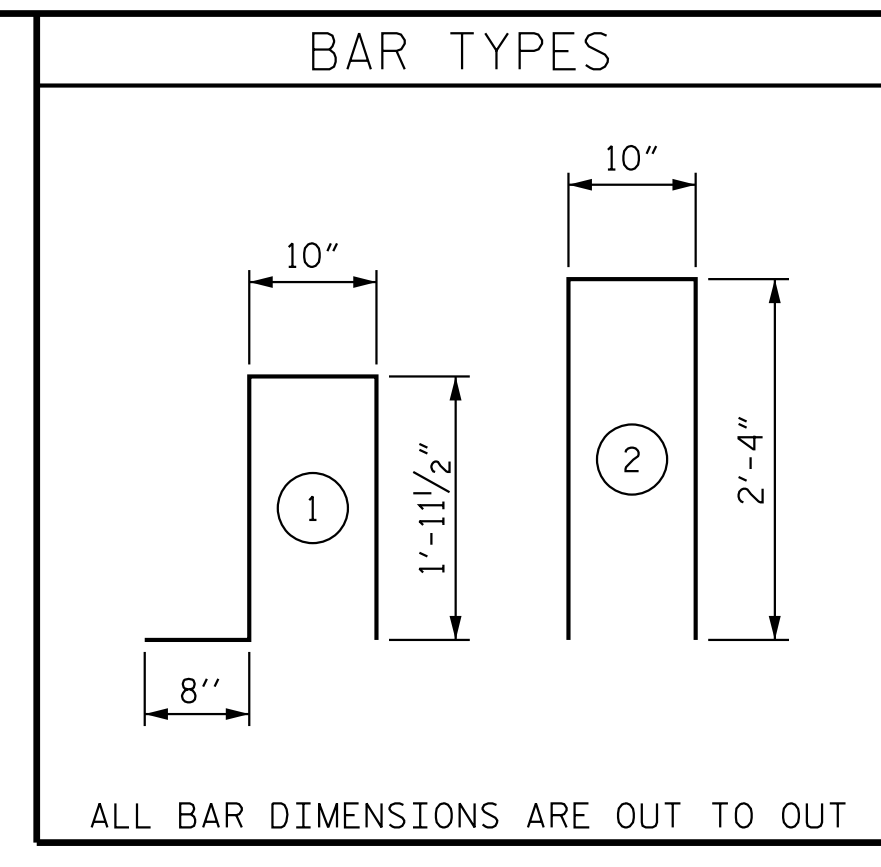


END VIEW

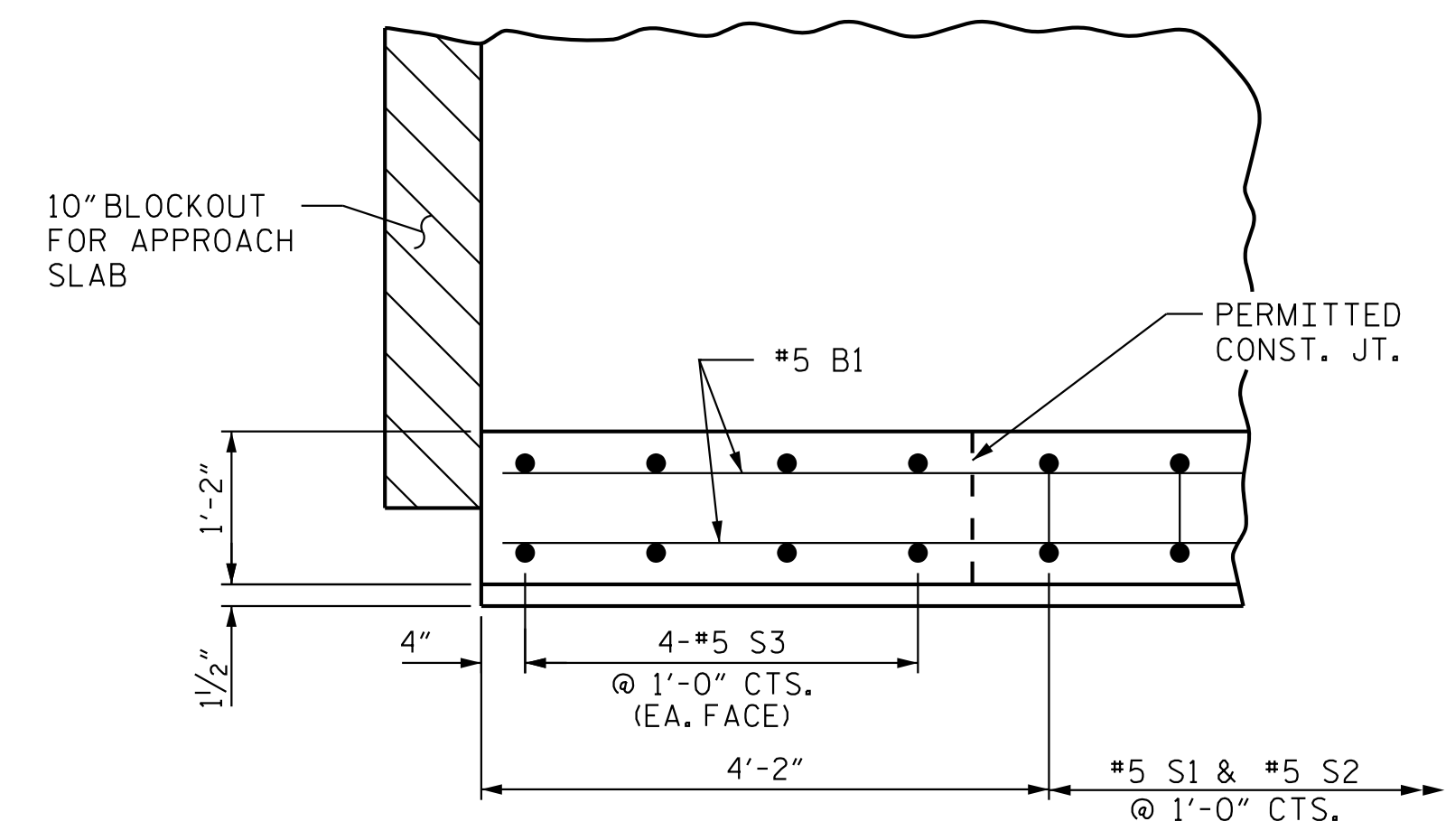


ELEVATION

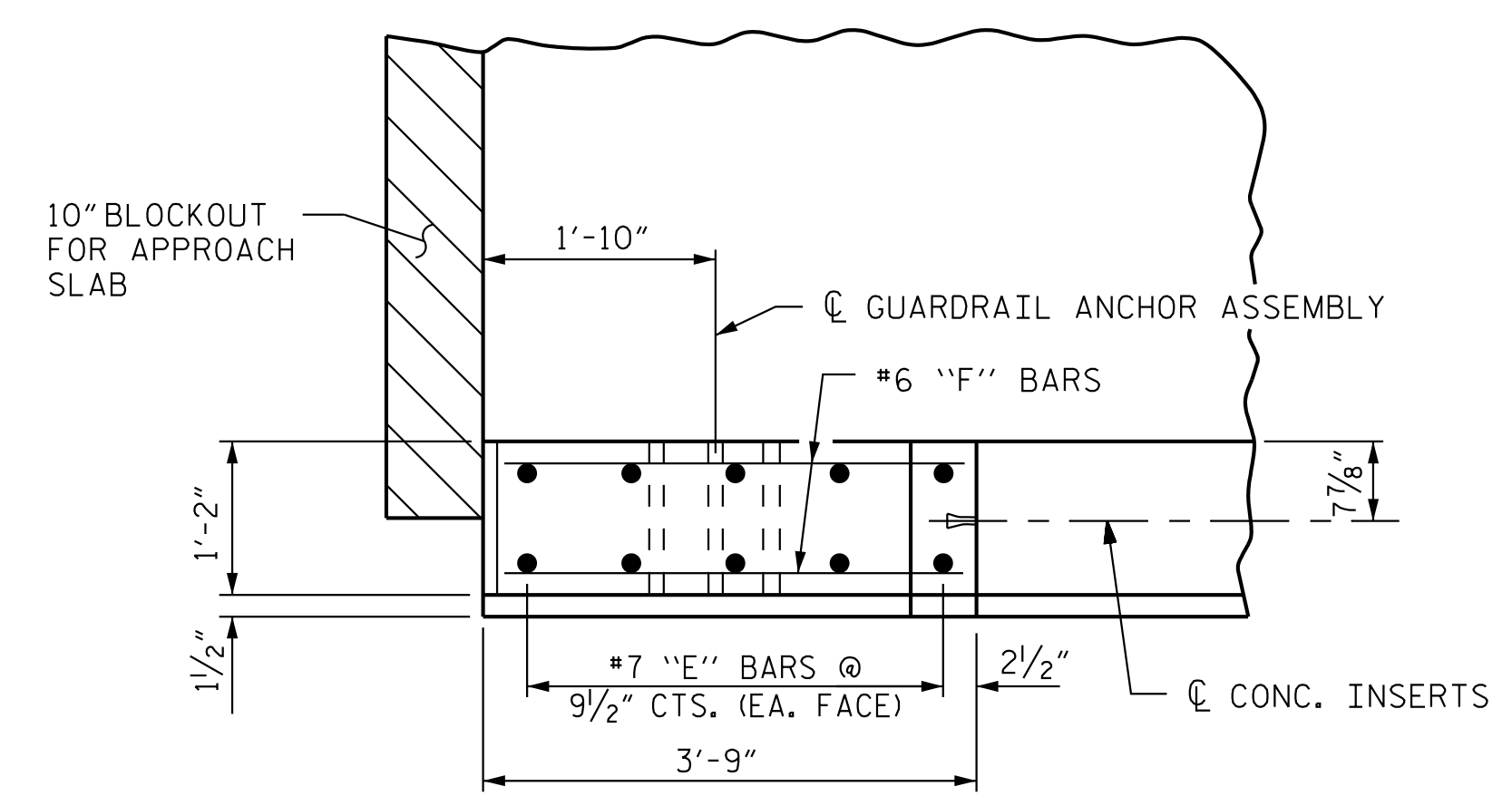
PARAPET AND END POST FOR TWO BAR RAIL



BILL OF MATERIAL					
2 CONCRETE PARAPETS AND 4 END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	32	5	STR	20'-10"	695
*B2	48	5	STR	21'-8"	1,085
*E1	8	7	STR	2'-6"	41
*E2	8	7	STR	3'-0"	49
*E3	8	7	STR	3'-6"	57
*E4	8	7	STR	4'-0"	65
*E5	8	7	STR	4'-4"	71
*F1	8	6	STR	1'-10"	22
*F2	8	6	STR	3'-0"	36
*F3	8	6	STR	3'-5"	41
*S1	202	5	1	5'-5"	1,141
*S2	202	5	2	5'-6"	1,159
*S3	32	5	STR	3'-0"	100
* EPOXY COATED REINFORCING STEEL					4,562 LBS.
CLASS AA CONCRETE					24.2 C.Y.
1'-2" X 2'-6" CONCRETE PARAPET					216.67 LIN. FT.



PLAN OF PARAPET



PLAN OF END POST

NOTES

THE PARAPET 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.

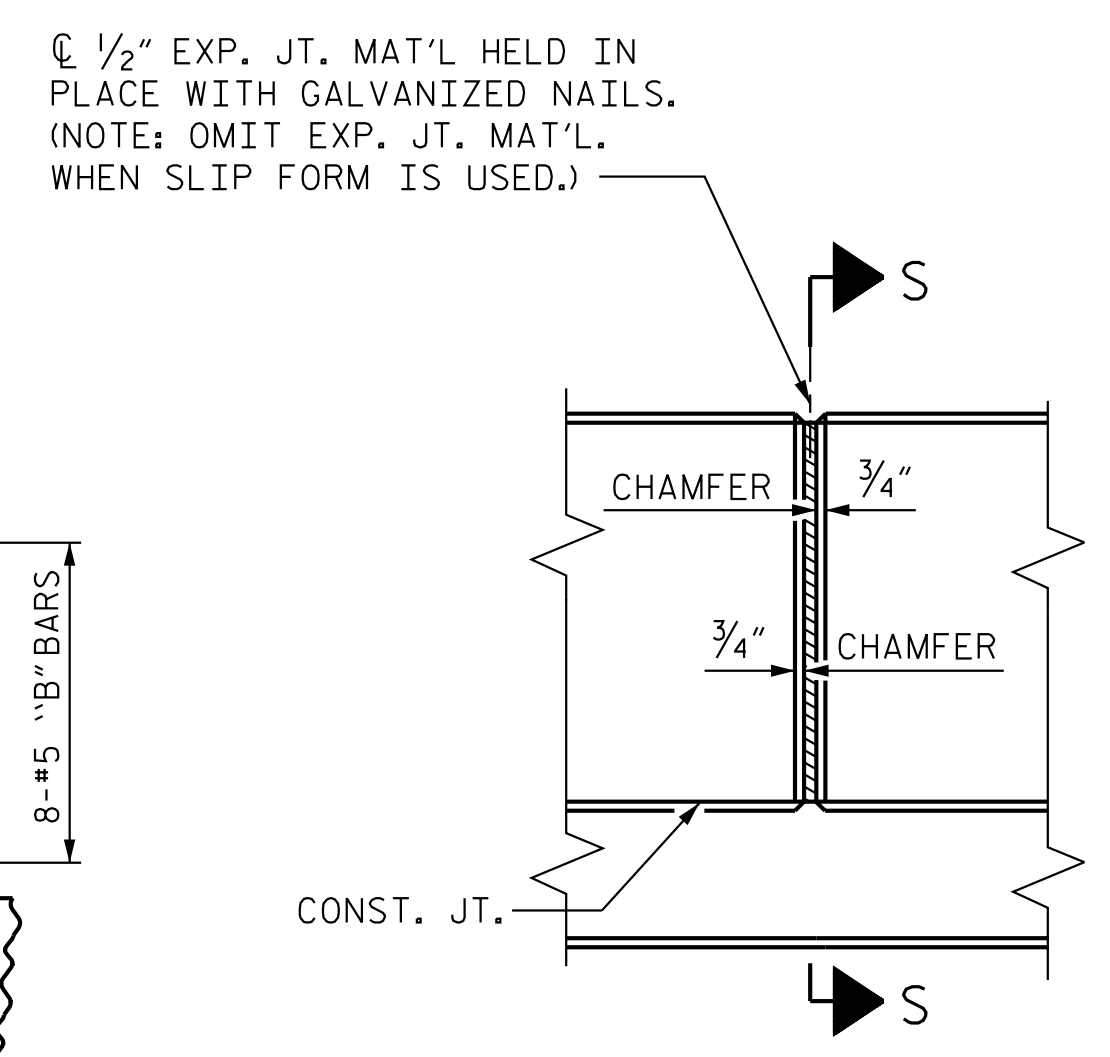
ALL REINFORCING STEEL IN PARAPET AND END POSTS SHALL BE EPOXY COATED.

THE #5 S1 & #5 S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN PARAPET.

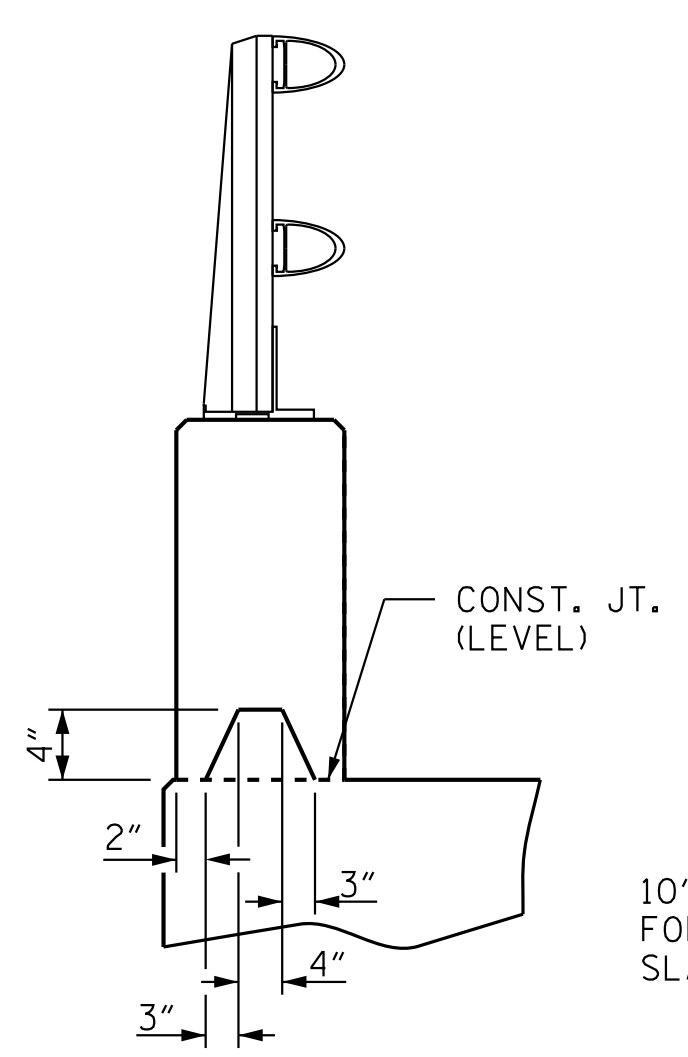
FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAIL" SHEET.

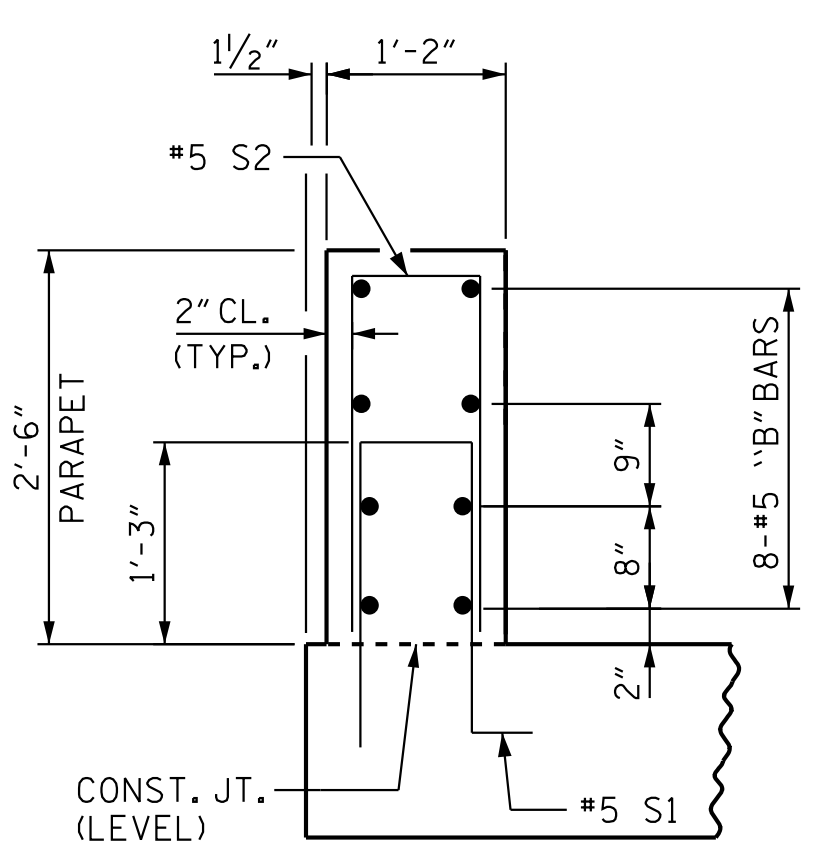
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT 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.



ELEVATION AT EXPANSION JOINTS



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

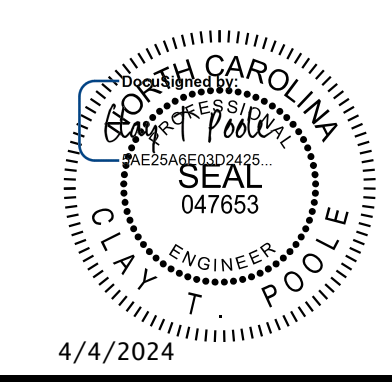


SECTION THRU PARAPET

ELEVATION AT EXPANSION JOINTS

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SHEET 4 OF 5



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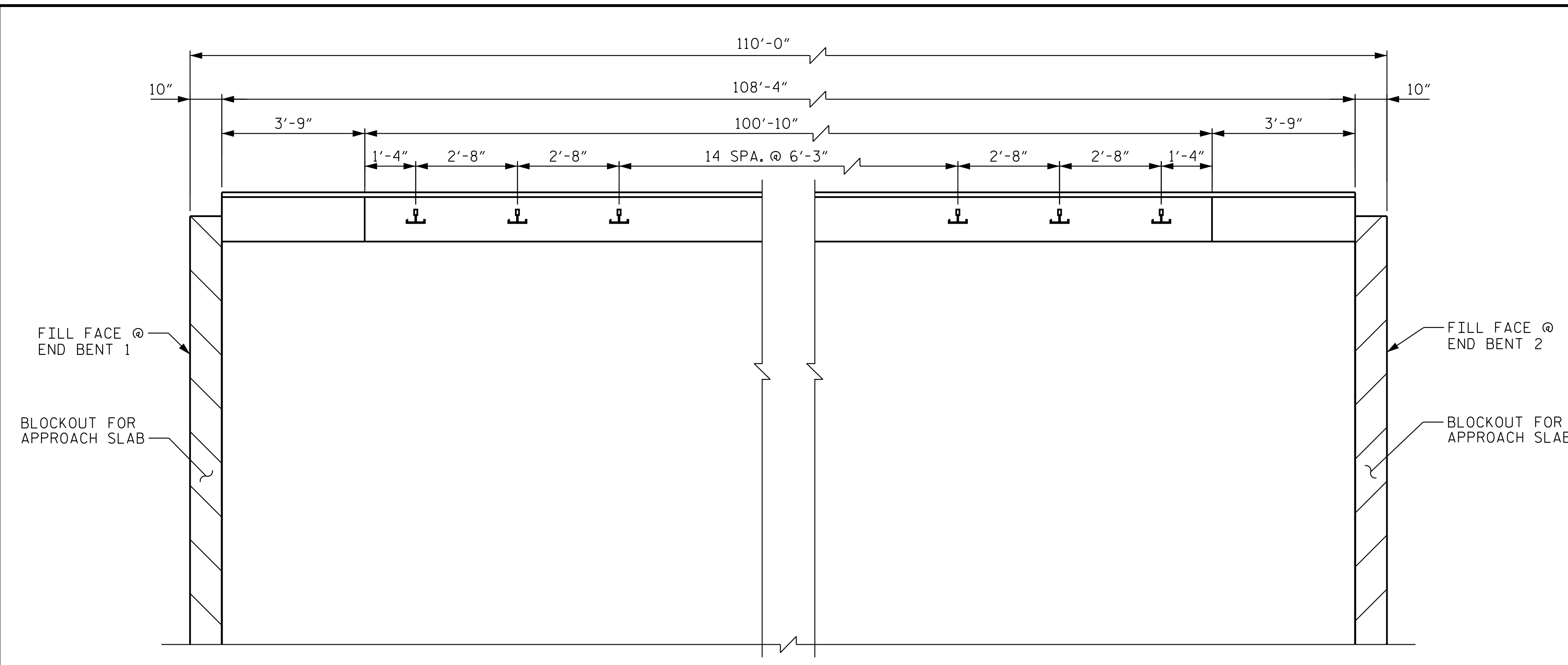
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 CONCRETE PARAPET
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DRAWN BY: J. I. KIMBLE DATE: 10/2023
 CHECKED BY: I. H. ORR DATE: 10/2023
 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023



PLAN OF RAIL POST SPACINGS
(LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)

NOTES
STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
- 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES
METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

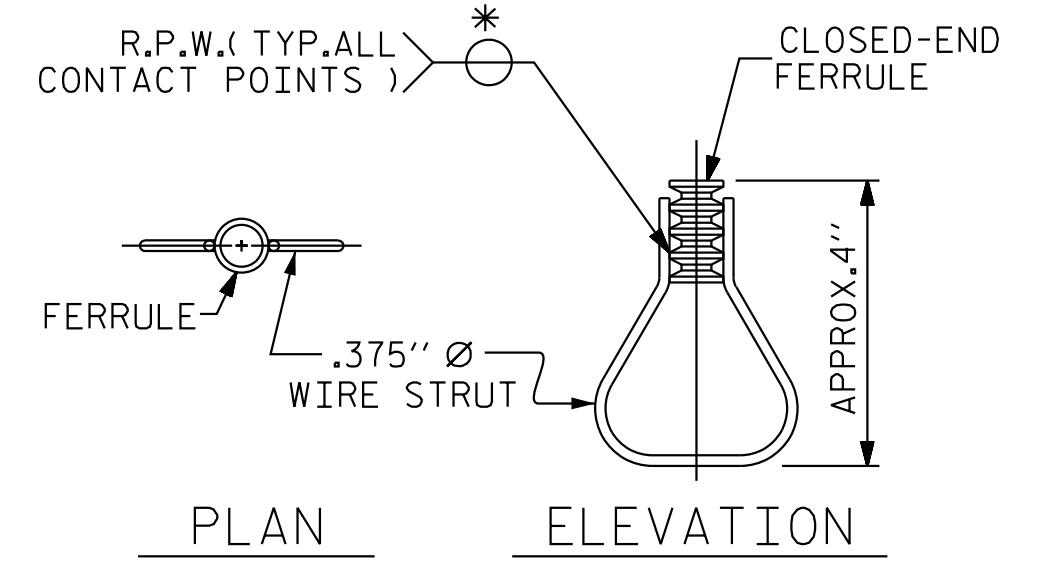
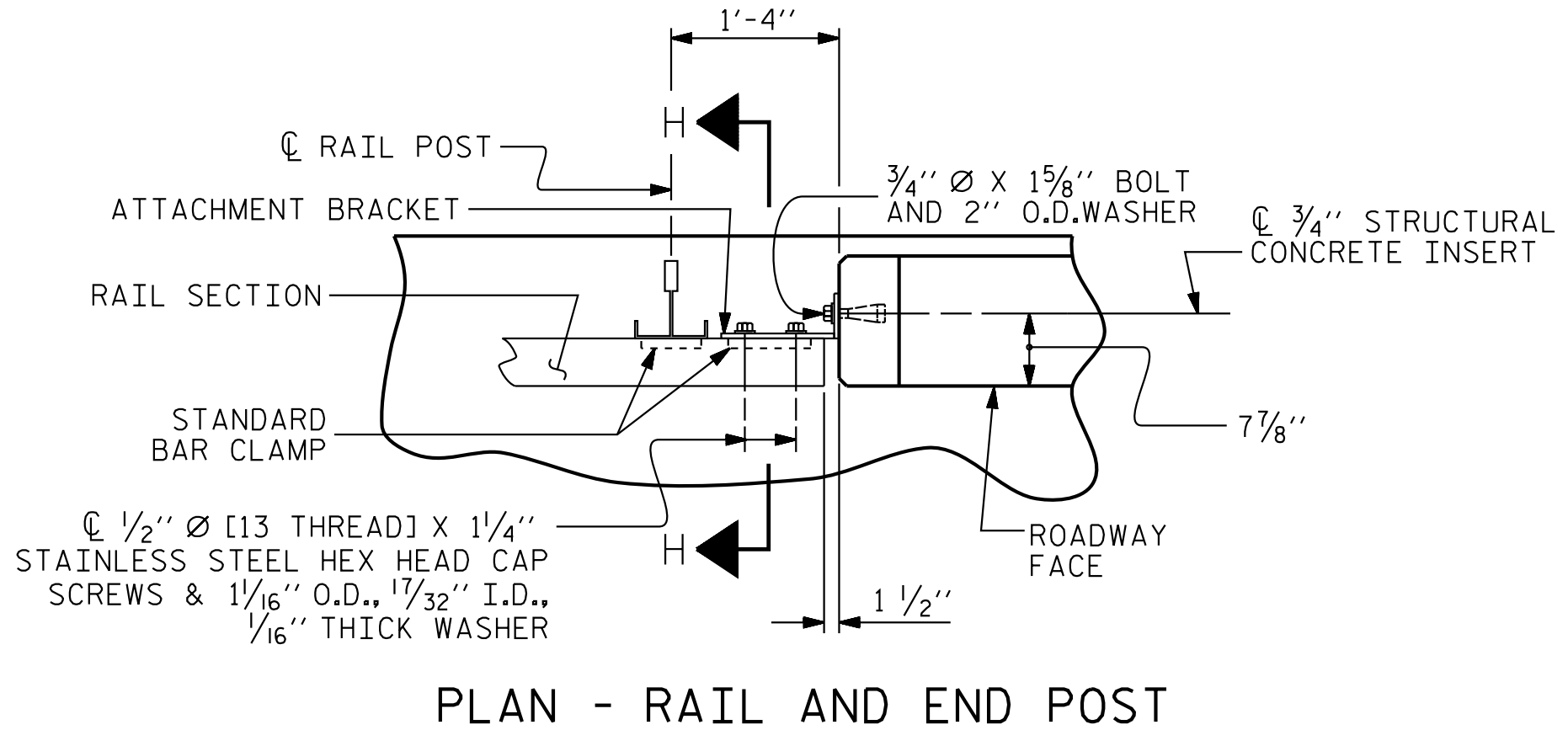
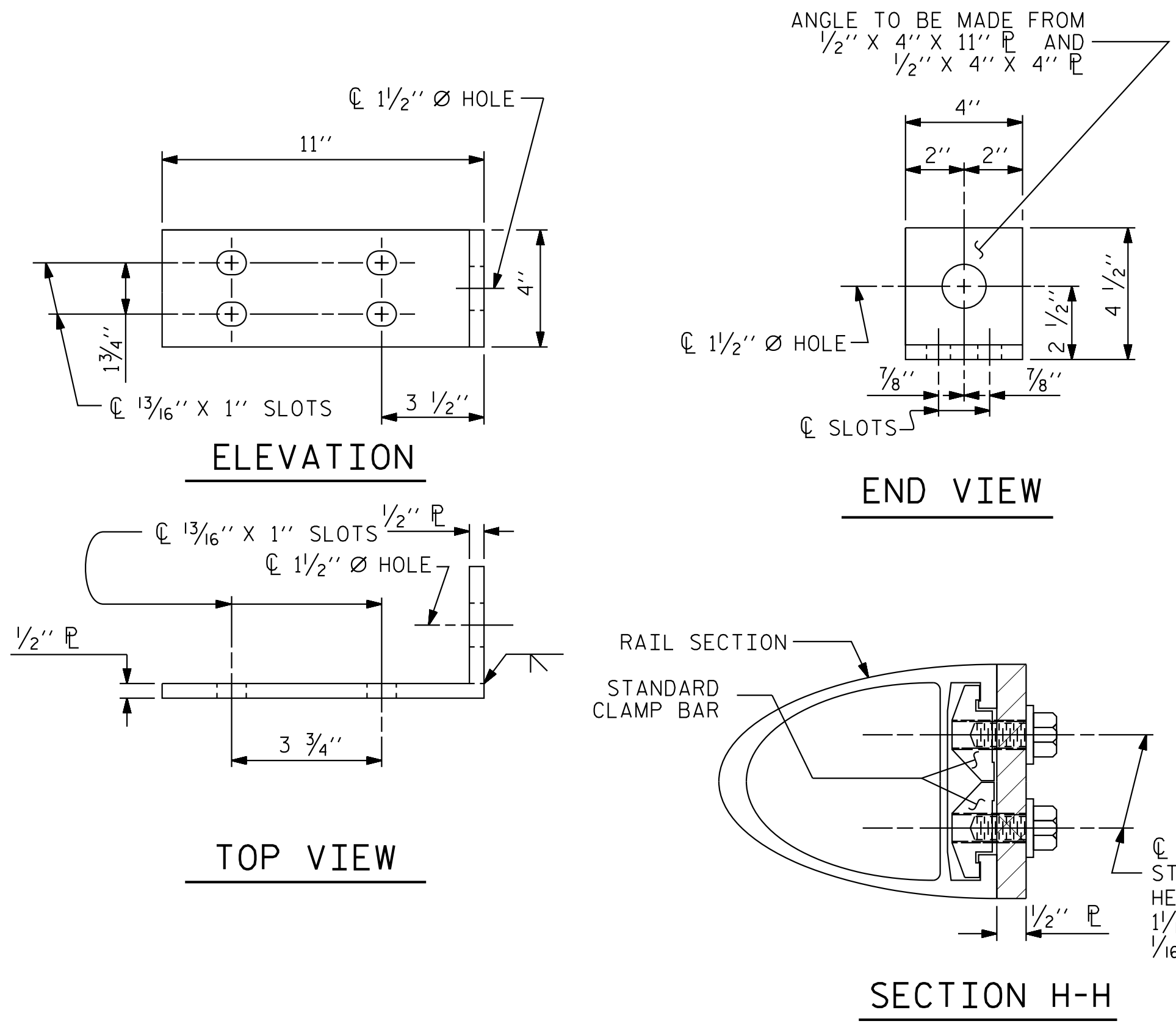
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
- CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
- STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
- 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

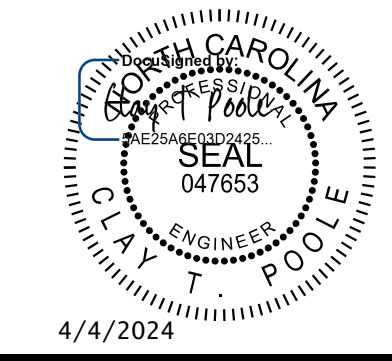


STRUCTURAL CONCRETE INSERT
* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

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STATION: 74+01.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
RAIL POST SPACINGS
AND
END OF RAIL DETAILS



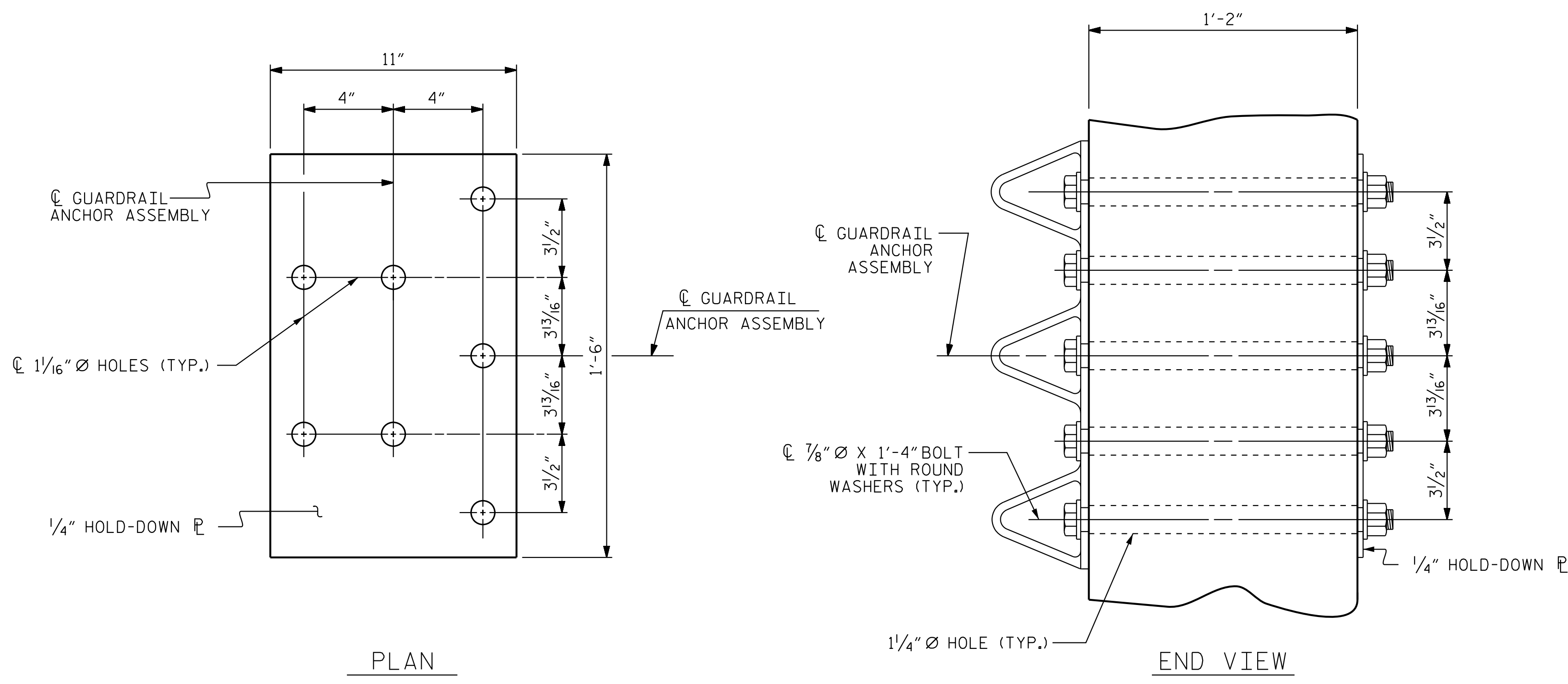
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CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : FCJ 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

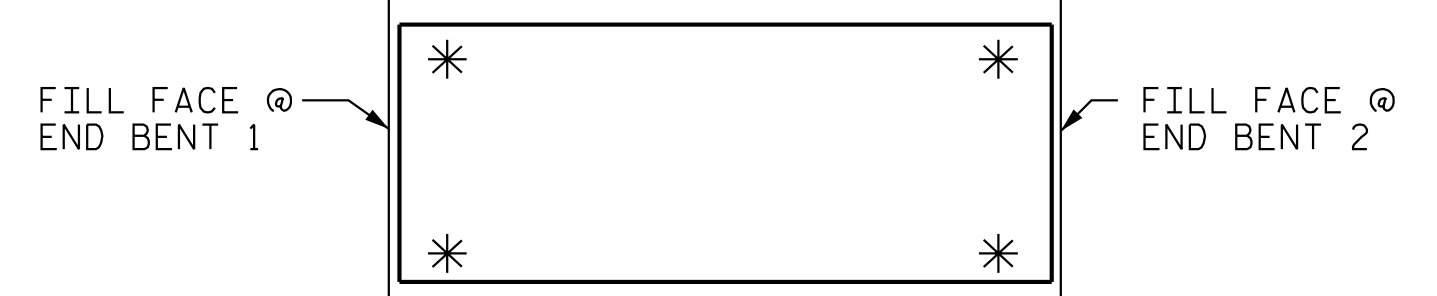
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

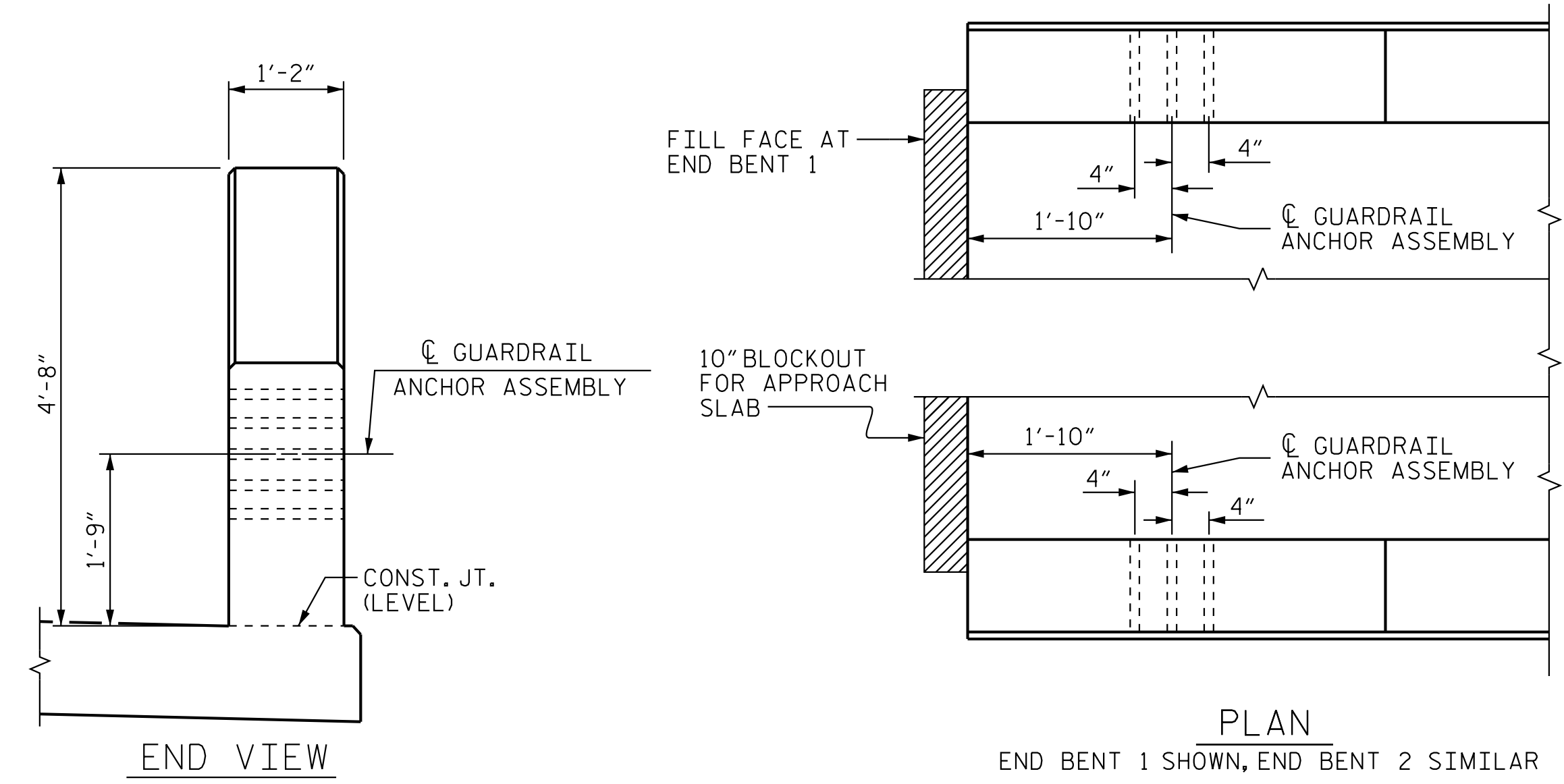
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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



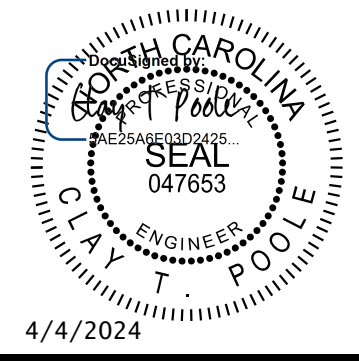
SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

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 STANDARD
 GUARDRAIL ANCHORAGE
 DETAILS
 FOR METAL RAILS

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2			4			33

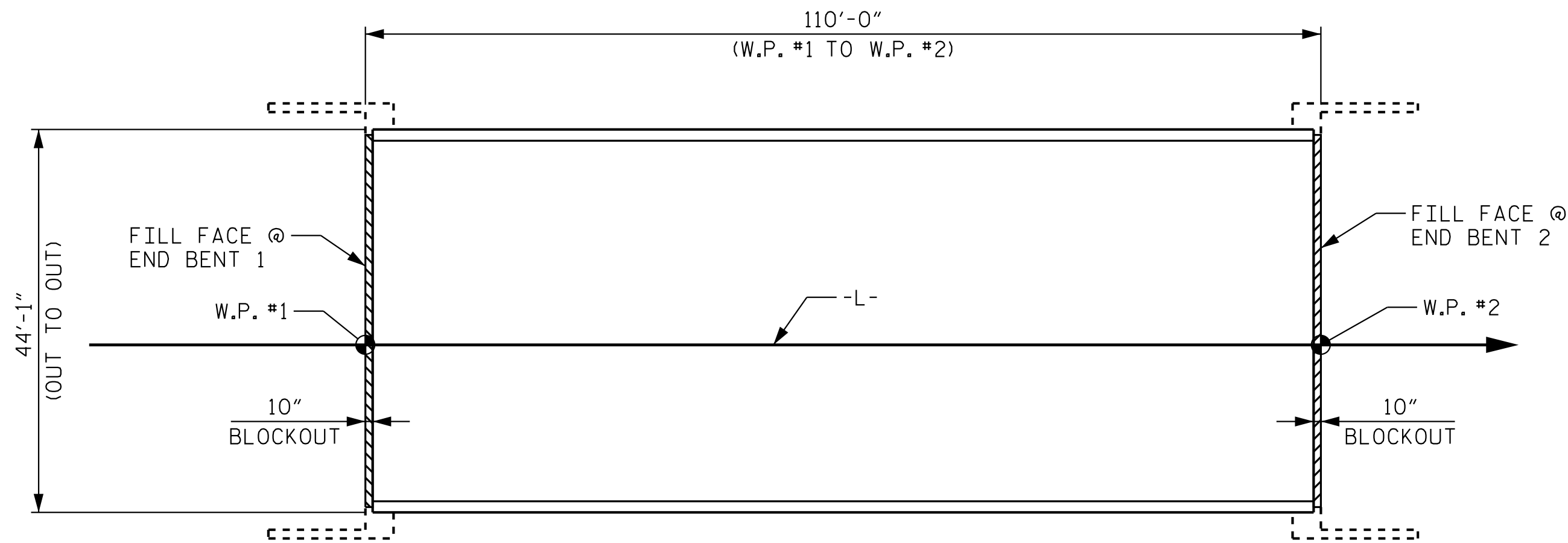
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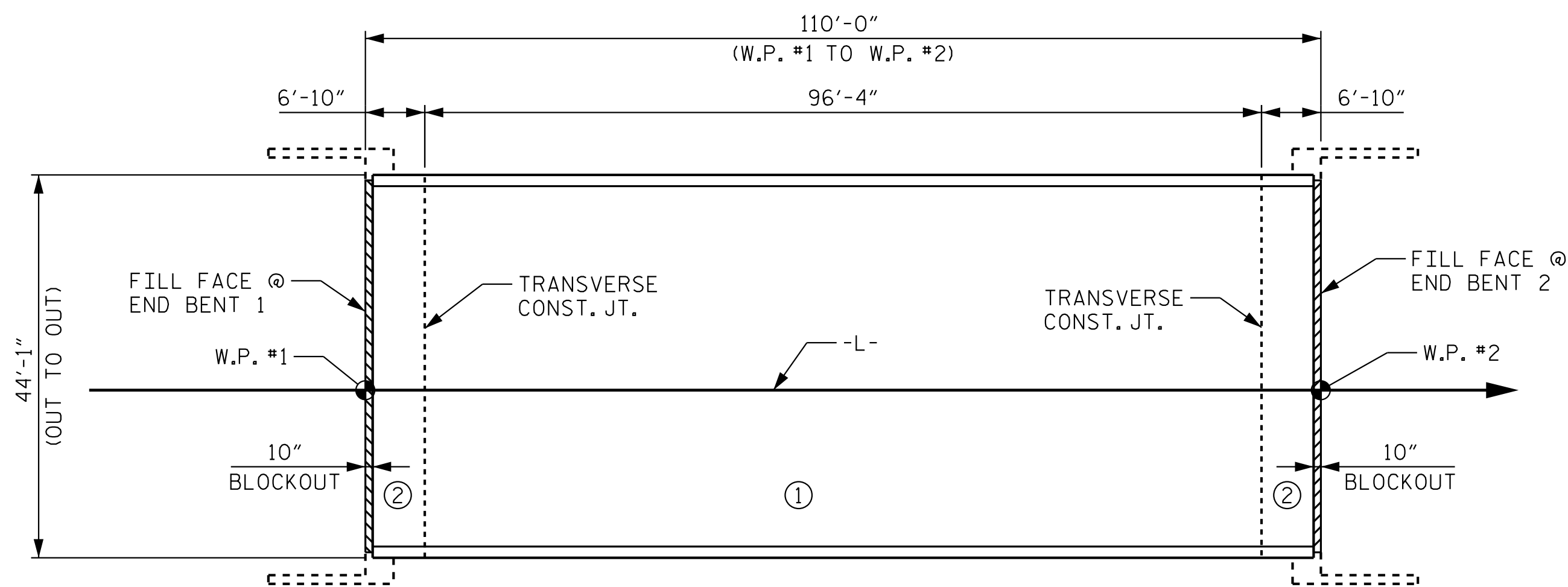
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ASSEMBLED BY : J. I. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

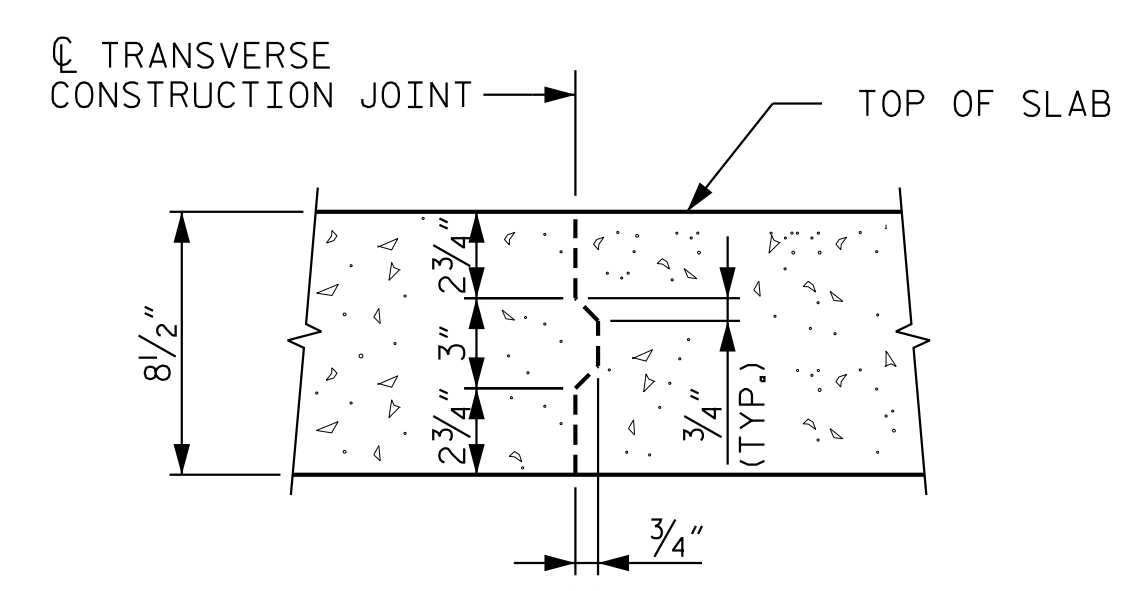


LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 4,776)



POUR SEQUENCE

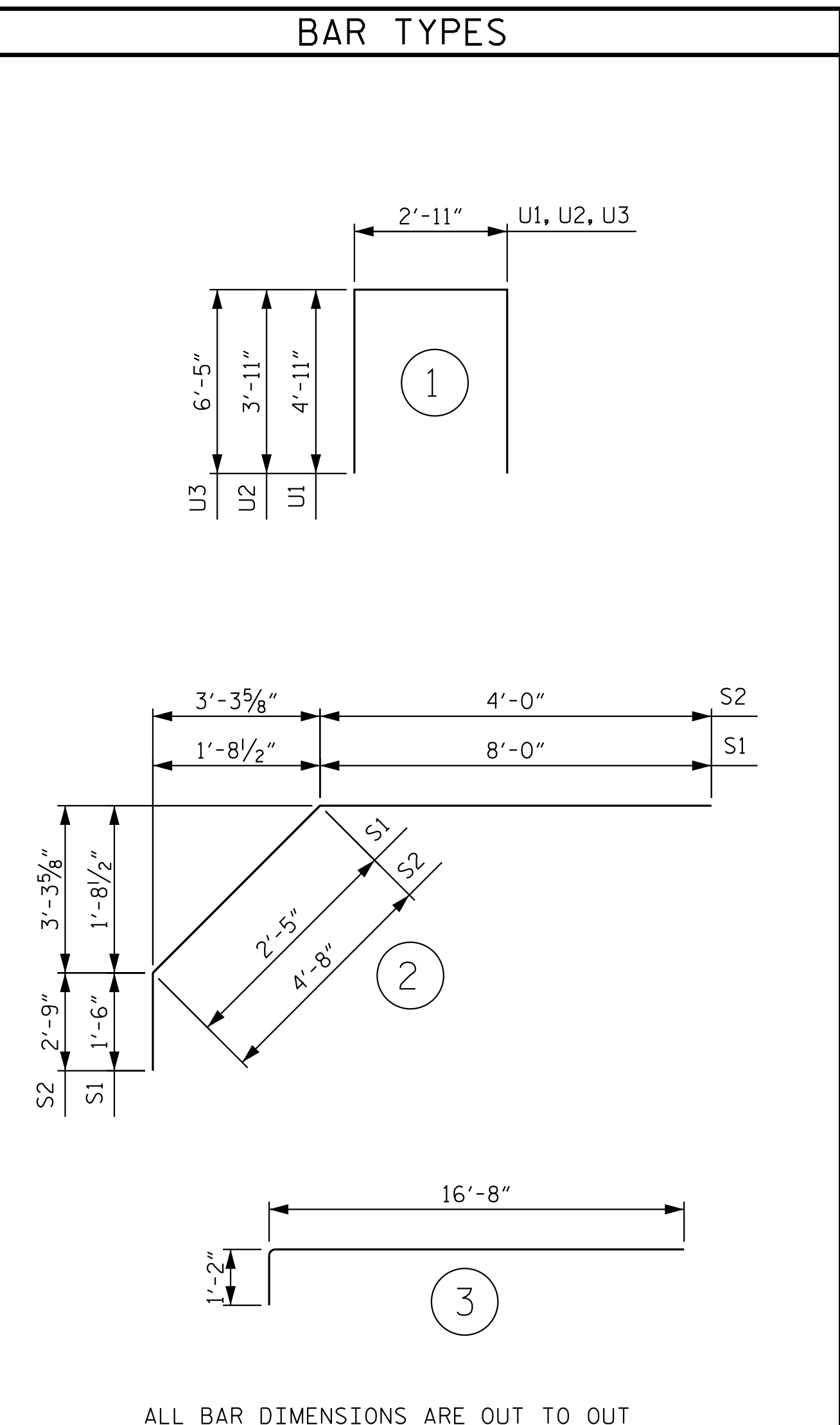
GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,890 SQ.FT.
BRIDGE DECK	4,158 SQ.FT.
TOTAL	6,048 SQ.FT.



TRANSVERSE CONSTRUCTION
JOINT IN DECK SLAB

REINFORCING STEEL IN SLAB NOT SHOWN, LONGITUDINAL
REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

BILL OF MATERIAL					
SUPERSTRUCTURE					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	200	5	STR	43'-9"	9,126
A2	200	5	STR	43'-9"	9,126
*B1	60	4	STR	36'-8"	1,470
*B2	176	6	STR	21'-0"	5,551
B3	76	5	STR	55'-0"	4,360
H1	108	7	3	17'-10"	3,937
K1	24	4	STR	25'-8"	411
K2	8	4	STR	6'-9"	36
K3	32	4	STR	8'-4"	178
K4	8	4	STR	5'-4"	29
K5	4	4	STR	5'-1"	14
K6	16	4	STR	5'-11"	63
K7	4	4	STR	4'-5"	12
K8	24	4	STR	2'-8"	43
*S1	56	4	2	11'-11"	446
*S2	56	4	2	11'-5"	427
U1	56	4	1	12'-9"	477
U2	20	4	1	10'-9"	144
U3	12	4	1	15'-9"	126

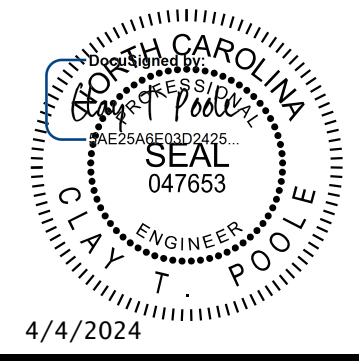


SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS					
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	EPOXY COATED
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	*EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
SPAN A			
POUR 1	143.2	18,956	17,020
POUR 2	94.1		
TOTALS**	237.3	18,956	17,020

** QUANTITIES FOR CONCRETE PARAPETS ARE NOT INCLUDED

PROJECT NO. U-5108
MECKLENBURG COUNTY
STATION: 74+01.00 -L-



Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000 NC LICENSE # F-0102

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE BILL OF MATERIAL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-24
TOTAL SHEETS 33

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ASSEMBLED BY : J. L. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : JMB 5/87	REV. 10/1/11 MAA/GM
CHECKED BY : SJD 9/87	REV. 12/17 MAA/THC
	REV. 06/19 BNB/THC

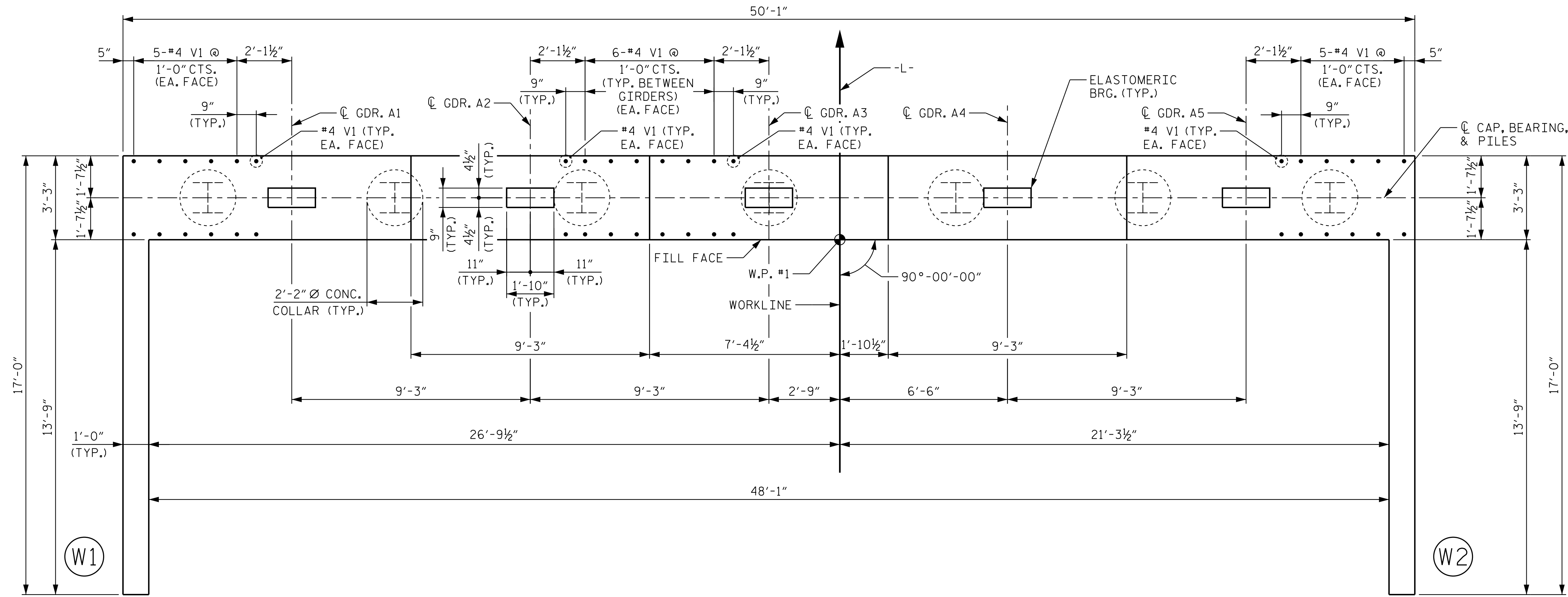
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FOR PILE SPLICE DETAILS, AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

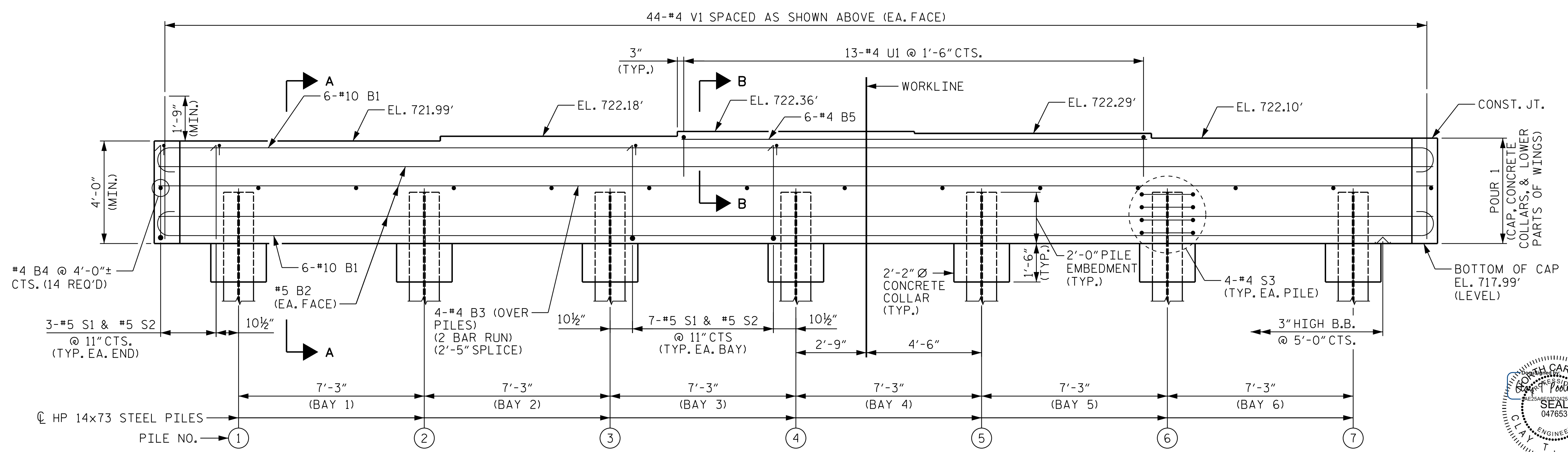
FOR SECTION A-A AND PARTIAL SECTION B-B, SEE SHEET 3 OF 3.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP SURFACE OF POUR 1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".



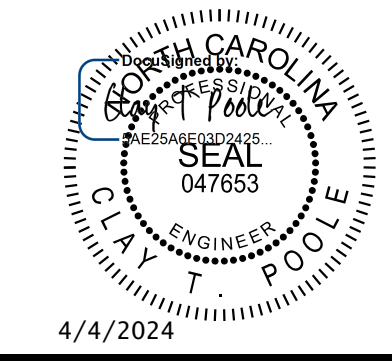
PLAN



ELEVATION

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1
 PLAN AND ELEVATION

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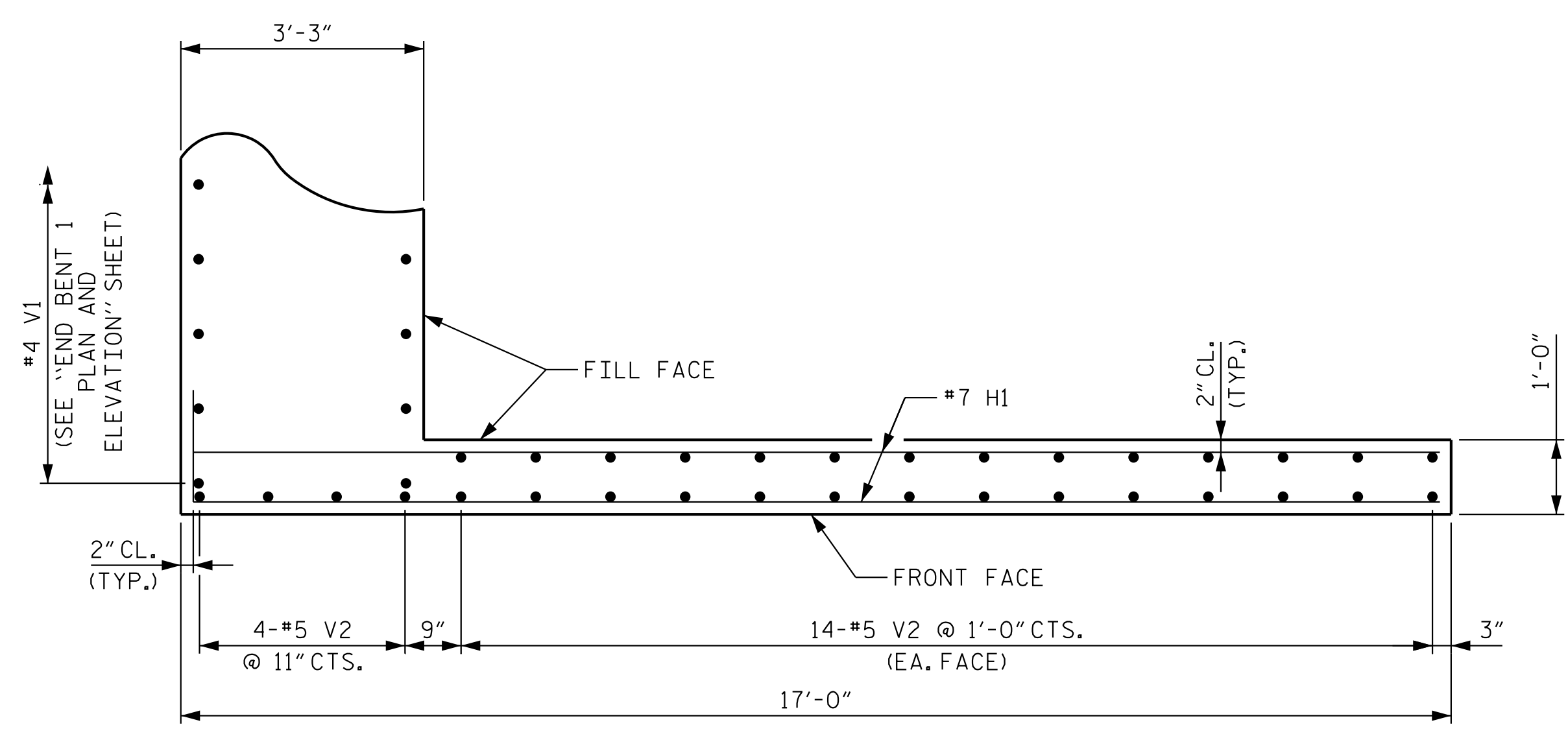
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
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2			4			33

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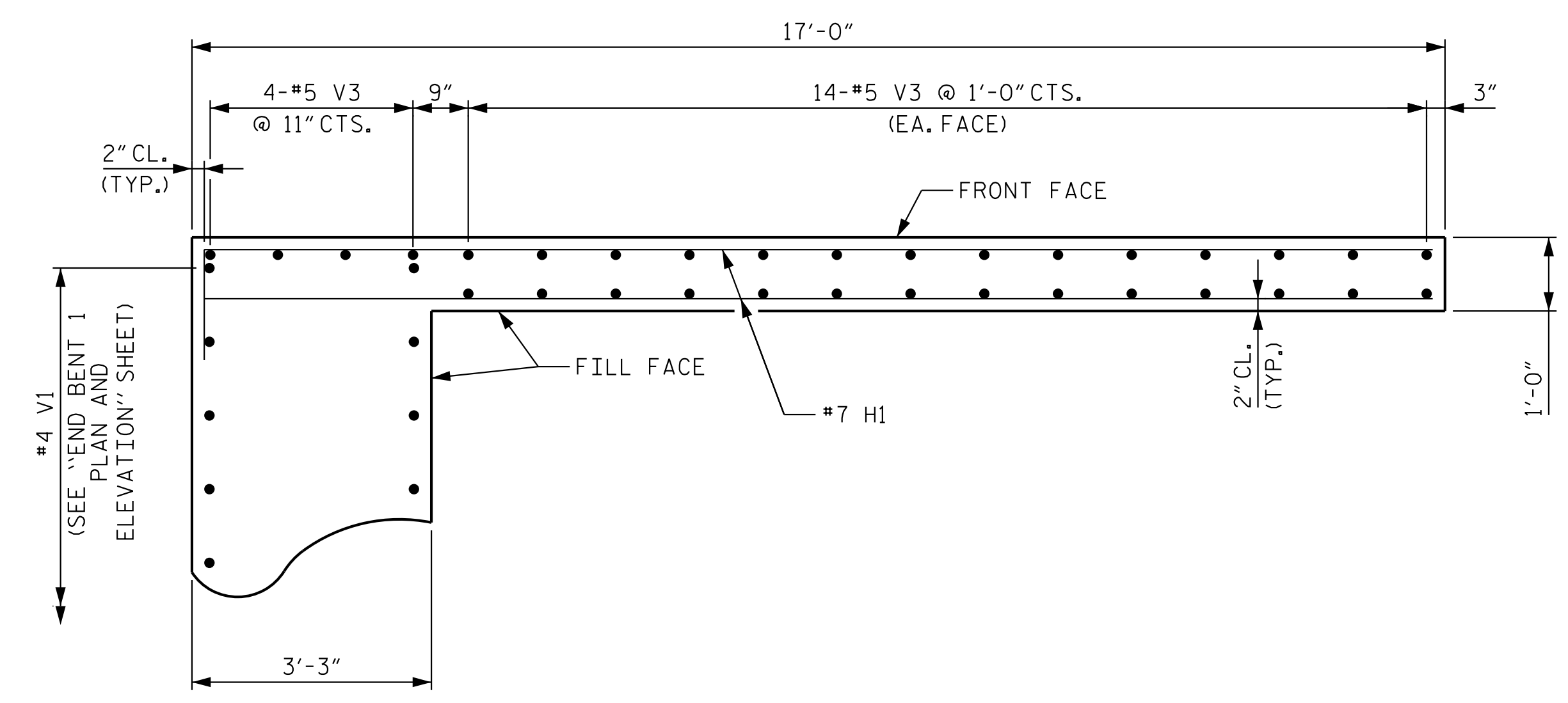
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DRAWN BY: J. I. KIMBLE DATE: 10/2023
 CHECKED BY: I. H. ORR DATE: 10/2023
 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

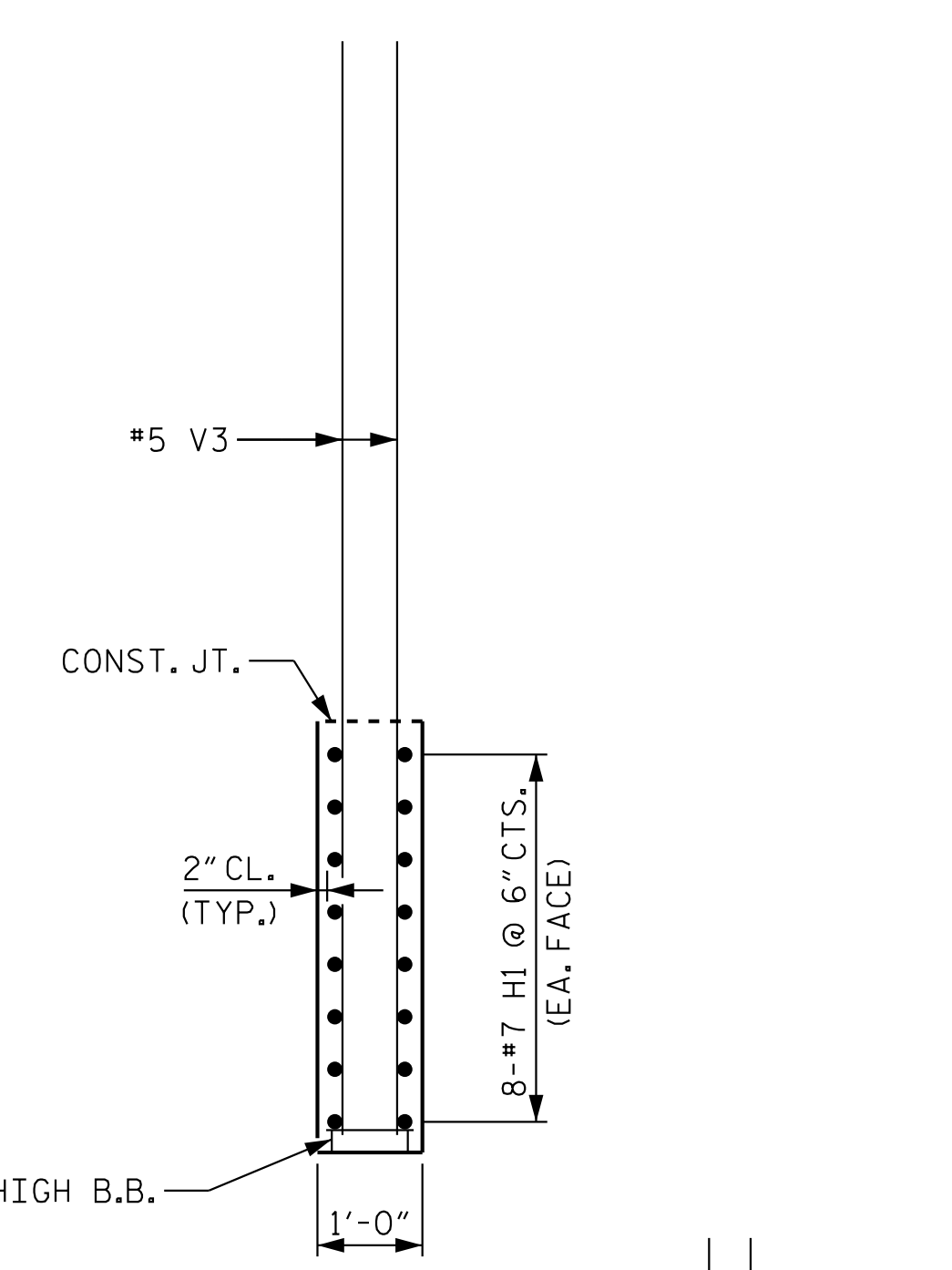
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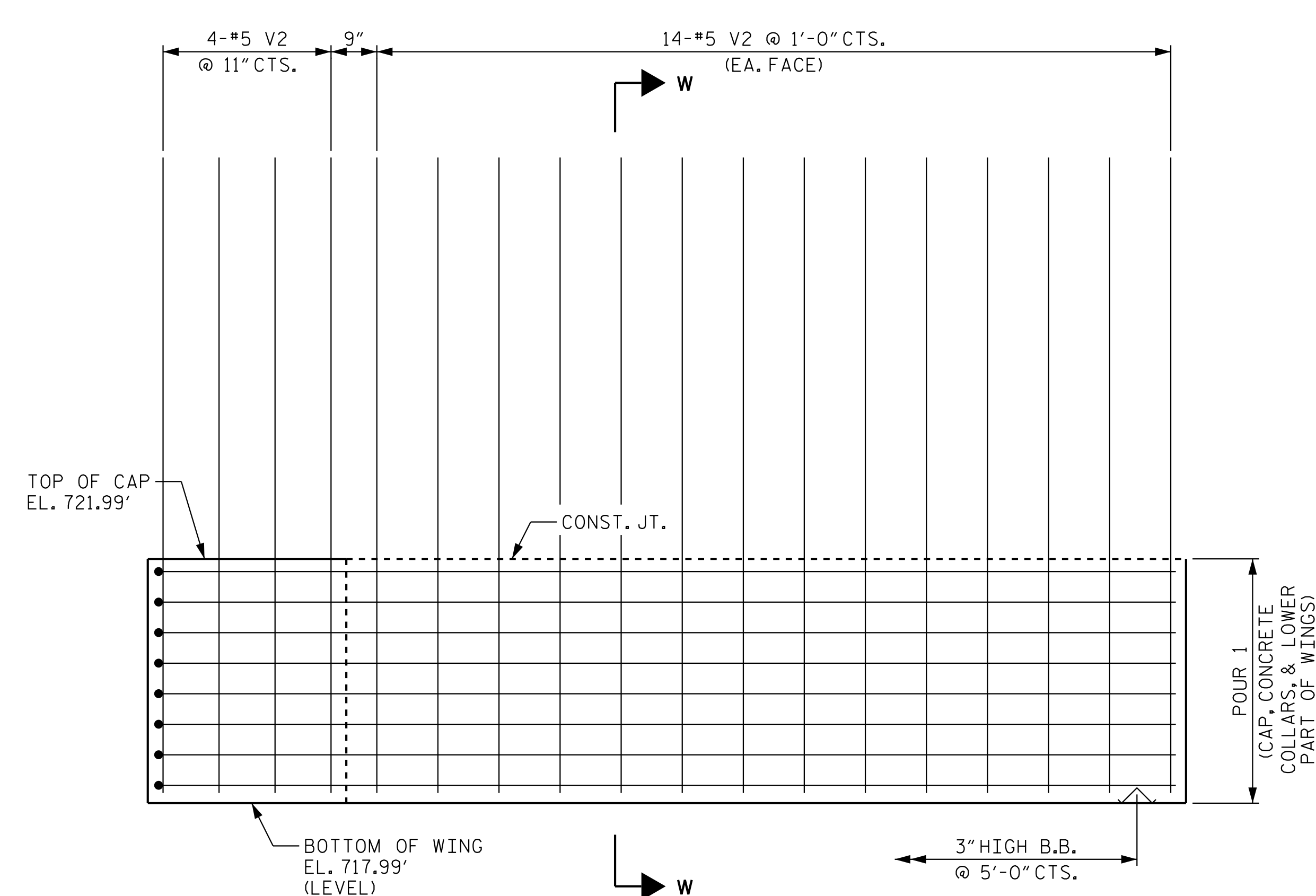
PLAN OF LEFT WING (W1)



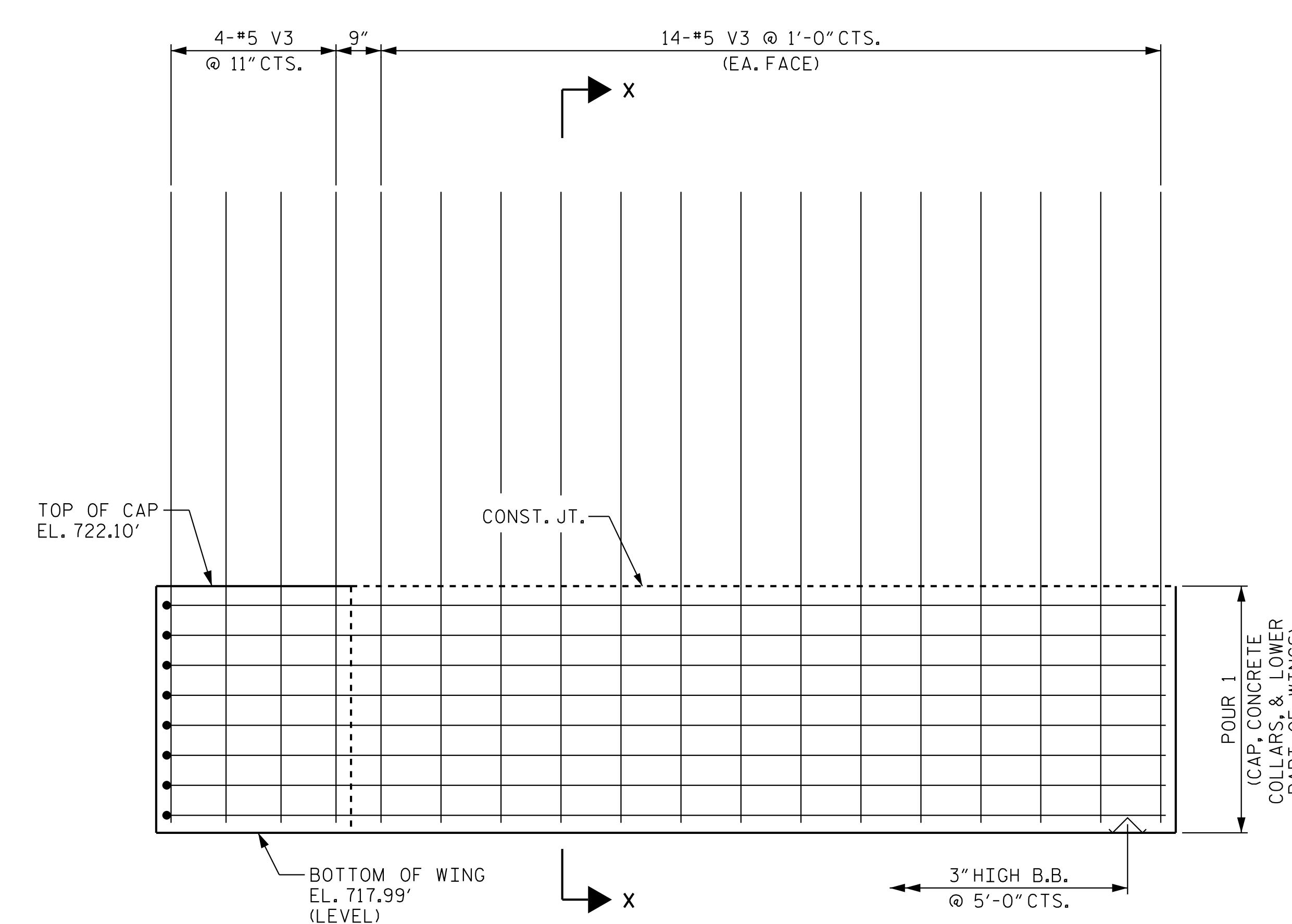
PLAN OF RIGHT WING (W2)



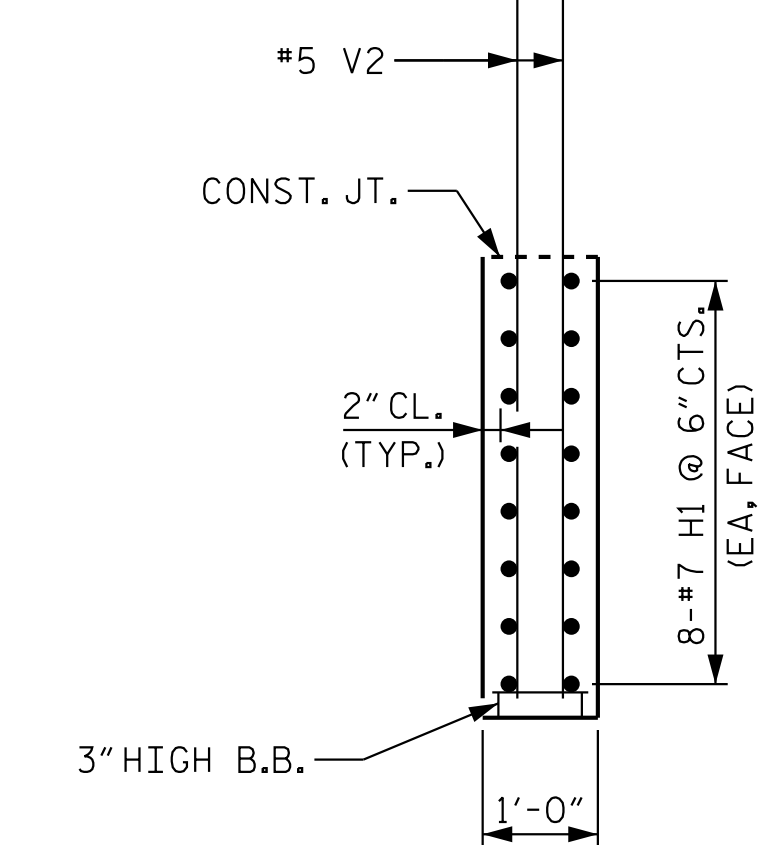
SECTION X-X



ELEVATION OF LEFT WING (W1)



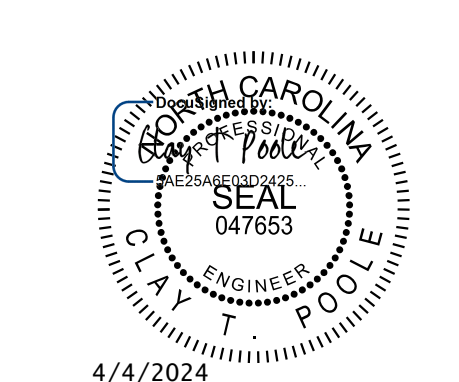
ELEVATION OF RIGHT WING (W2)



SECTION W-W

PROJECT NO. U-5108
 MECKLENBURG COUNTY
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SHEET 2 OF 3



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 END BENT 1
 SECTION AND DETAILS

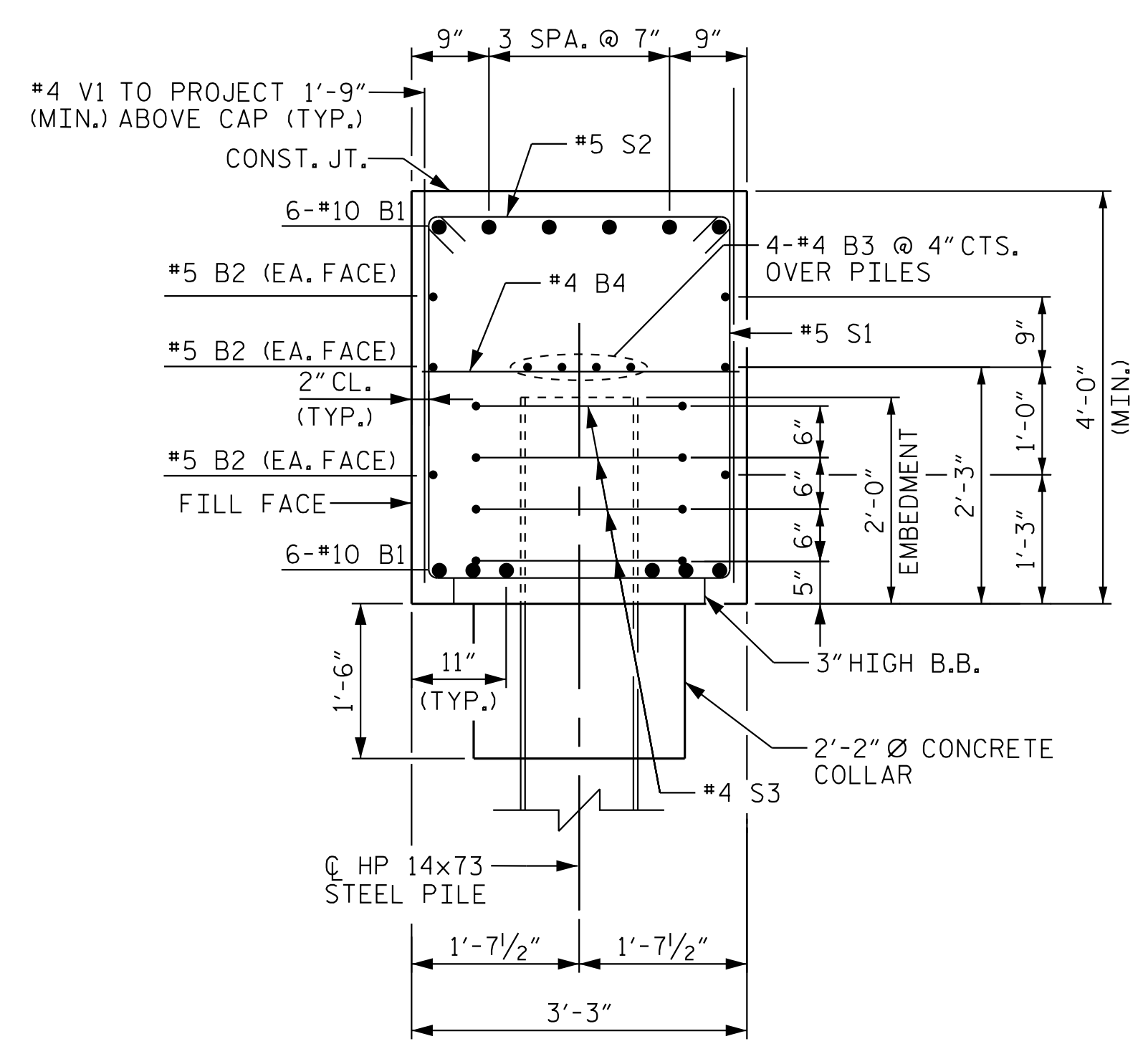
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
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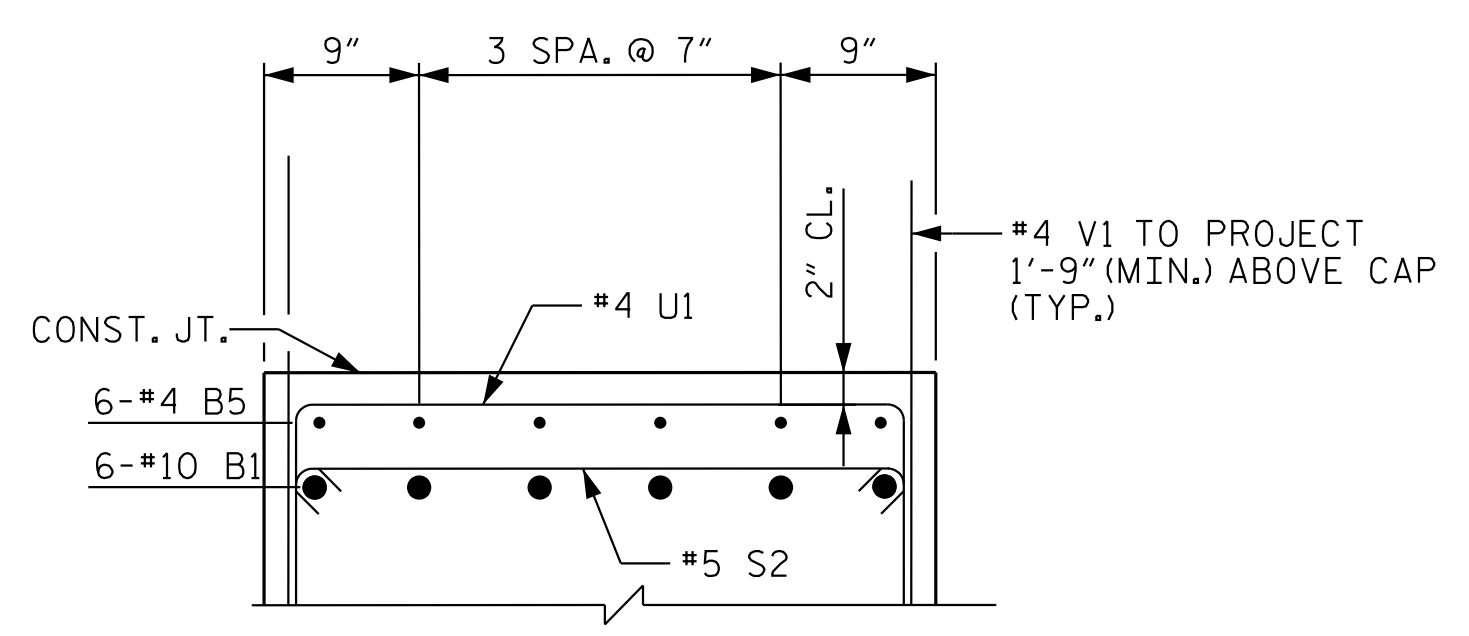
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 2/28/2024

DRAWN BY: J. I. KIMBLE DATE: 10/2023
 CHECKED BY: I. H. ORR DATE: 10/2023
 DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

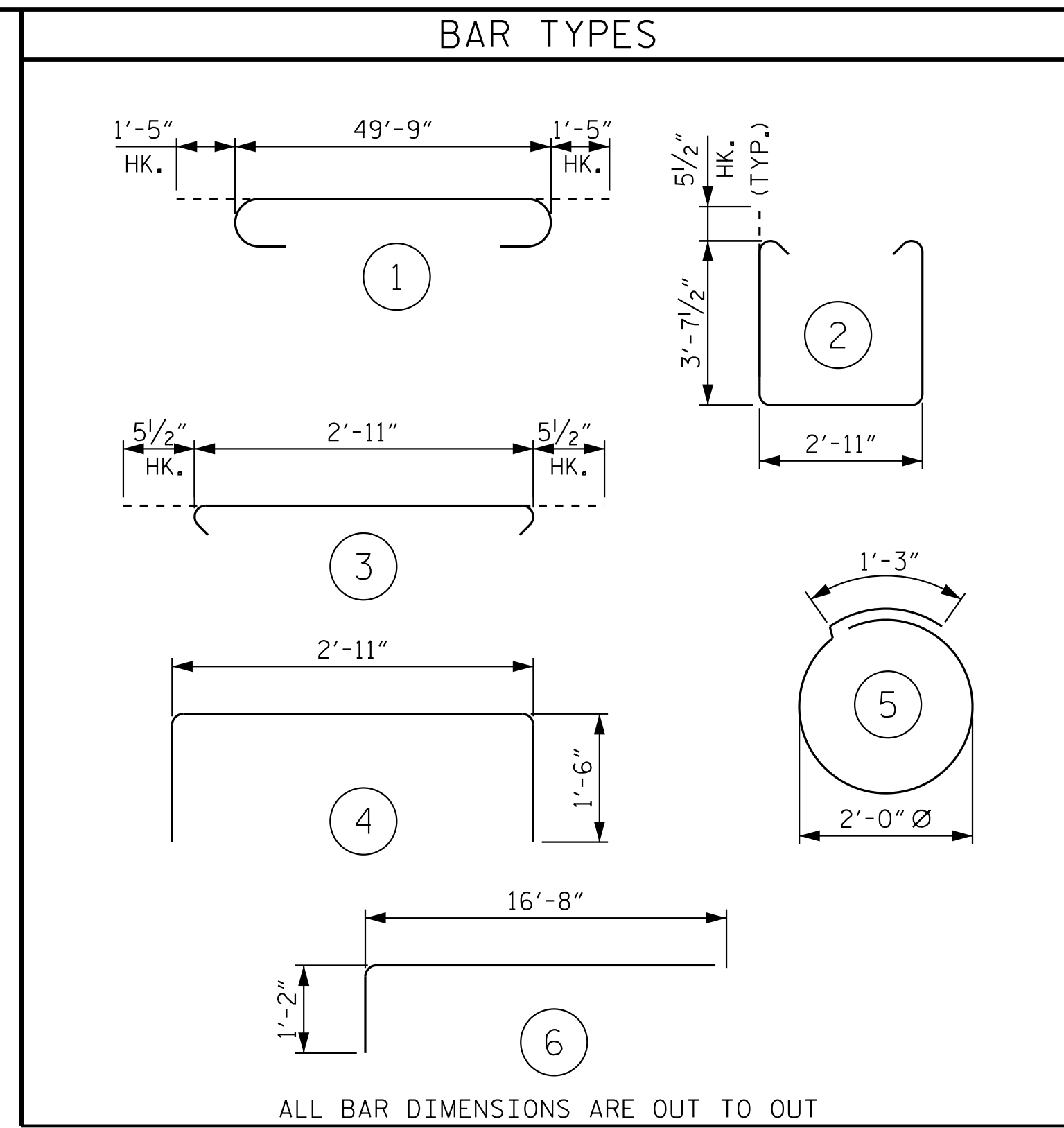
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SECTION A-A
(FOR LOCATION OF SECTION, SEE SHEET 1 OF 3)



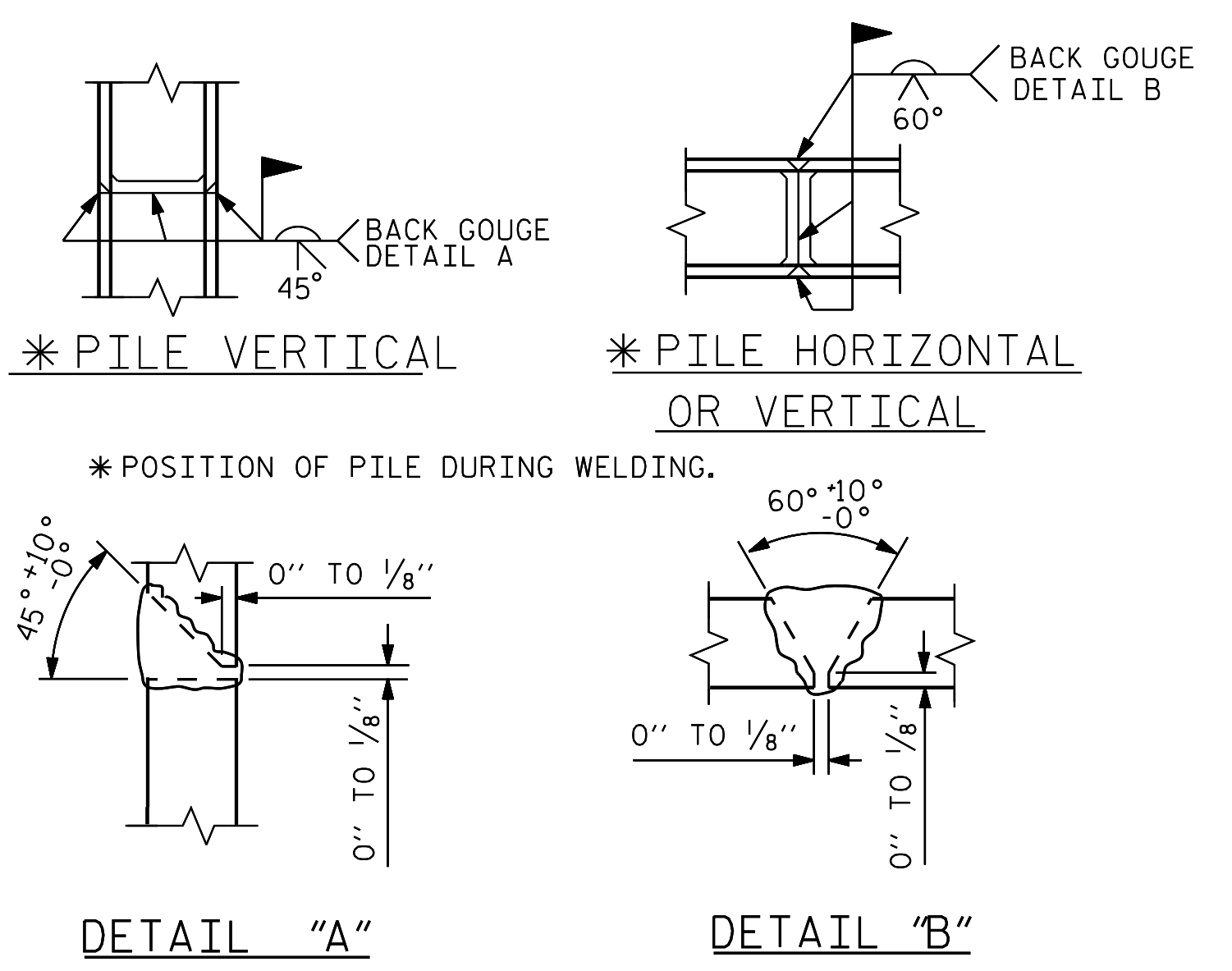
PARTIAL SECTION B-B
(FOR LOCATION OF SECTION, SEE SHEET 1 OF 3)



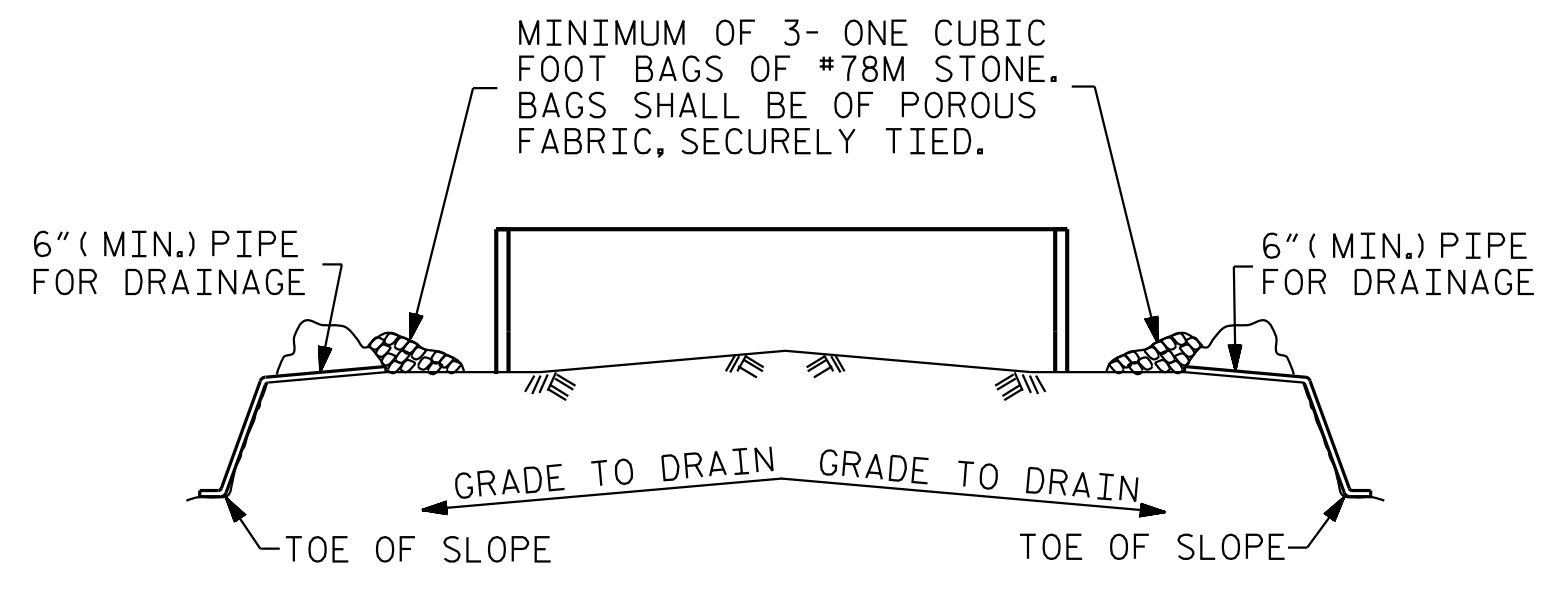
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	10	1	52'-7"	2,715
B2	6	5	STR	49'-9"	311
B3	8	4	STR	26'-1"	139
B4	14	4	STR	2'-11"	27
B5	6	4	STR	18'-2"	73
H1	32	7	6	17'-10"	1,166
S1	48	5	2	11'-1"	555
S2	48	5	3	3'-10"	192
S3	28	4	5	7'-7"	142
U1	13	4	4	5'-11"	51
V1	88	4	STR	6'-0"	353
V2	32	5	STR	10'-4"	345
V3	32	5	STR	10'-6"	350

REINFORCING STEEL 6,419 LBS.
CLASS A CONCRETE BREAKDOWN
POUR 1 (CAP, LOWER WING WALLS, & COLLARS) 30.8 C.Y.



HP PILE SPLICE DETAILS



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

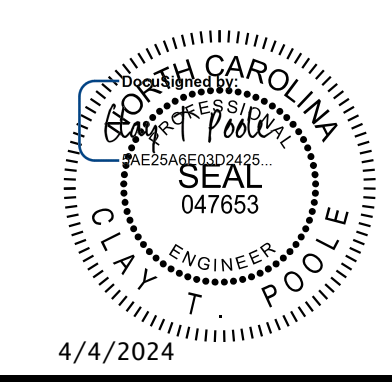
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. U-5108
MECKLENBURG COUNTY
STATION: 74+01.00 -L-

SHEET 3 OF 3



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DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 1
SECTION AND DETAILS

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2			4			33

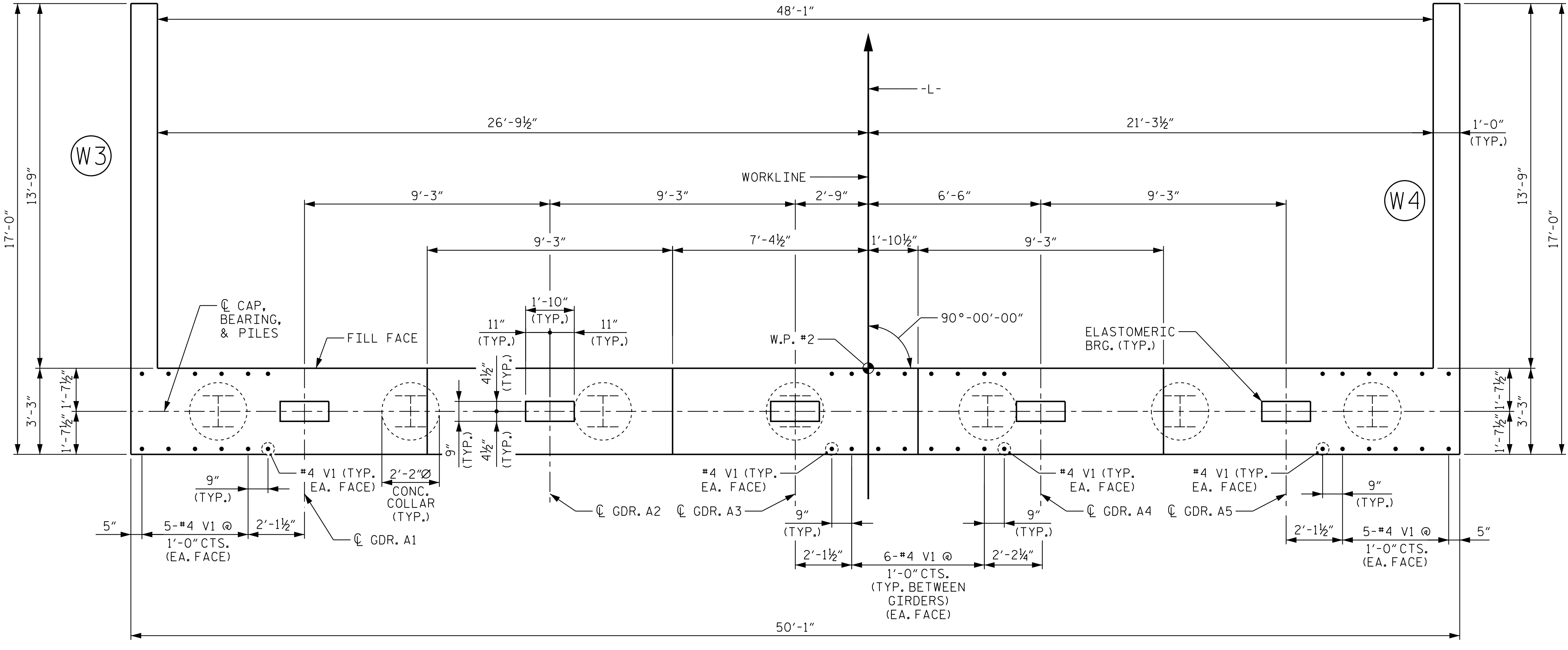
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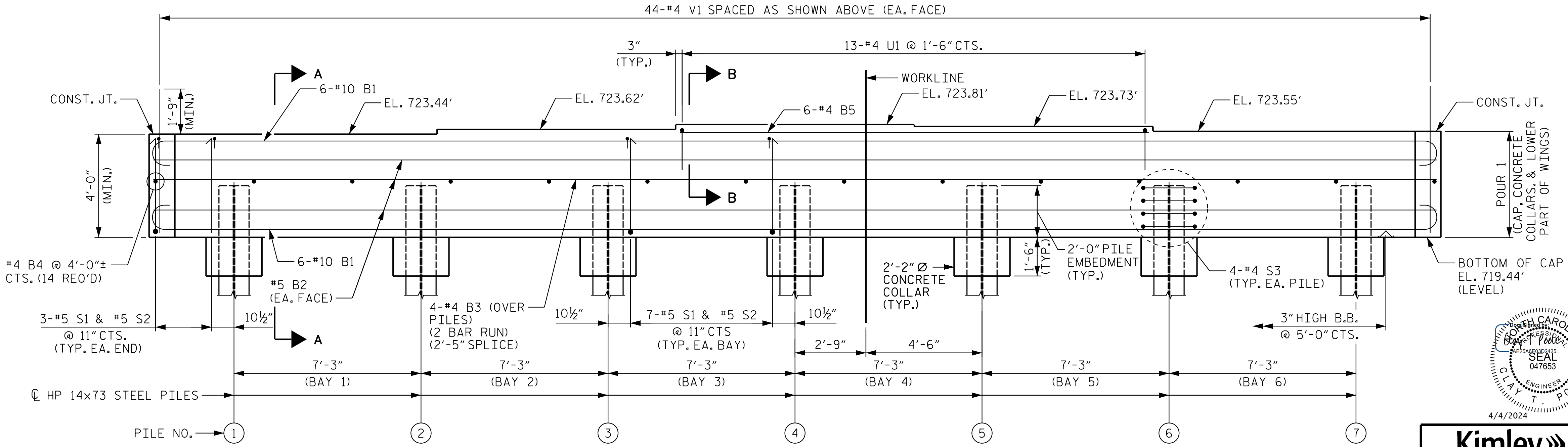
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CHECKED BY: T. H. ORR DATE: 10/2023
DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

NOTES

FOR PILE SPLICE DETAILS, AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.
FOR SECTION A-A AND PARTIAL SECTION B-B, SEE SHEET 3 OF 3.
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.
THE TOP SURFACE OF POUR 1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".



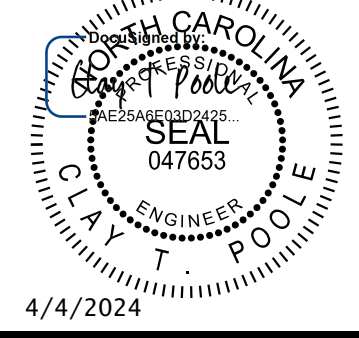
PLAN



ELEVATION

PROJECT NO. U-5108
MECKLENBURG COUNTY
STATION: 74+01.00 -L-

SHEET 1 OF 3



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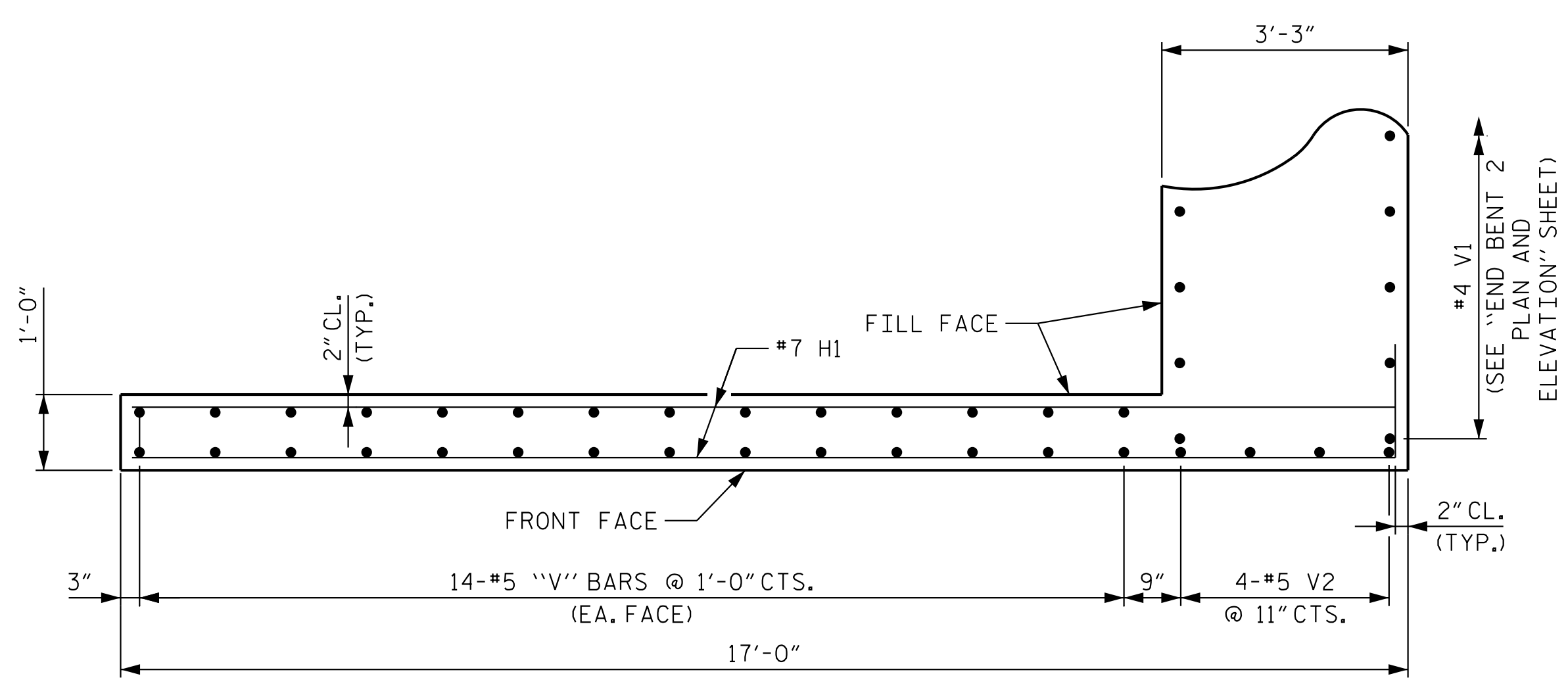
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 2
PLAN AND ELEVATION

REVISIONS						SHEET NO.
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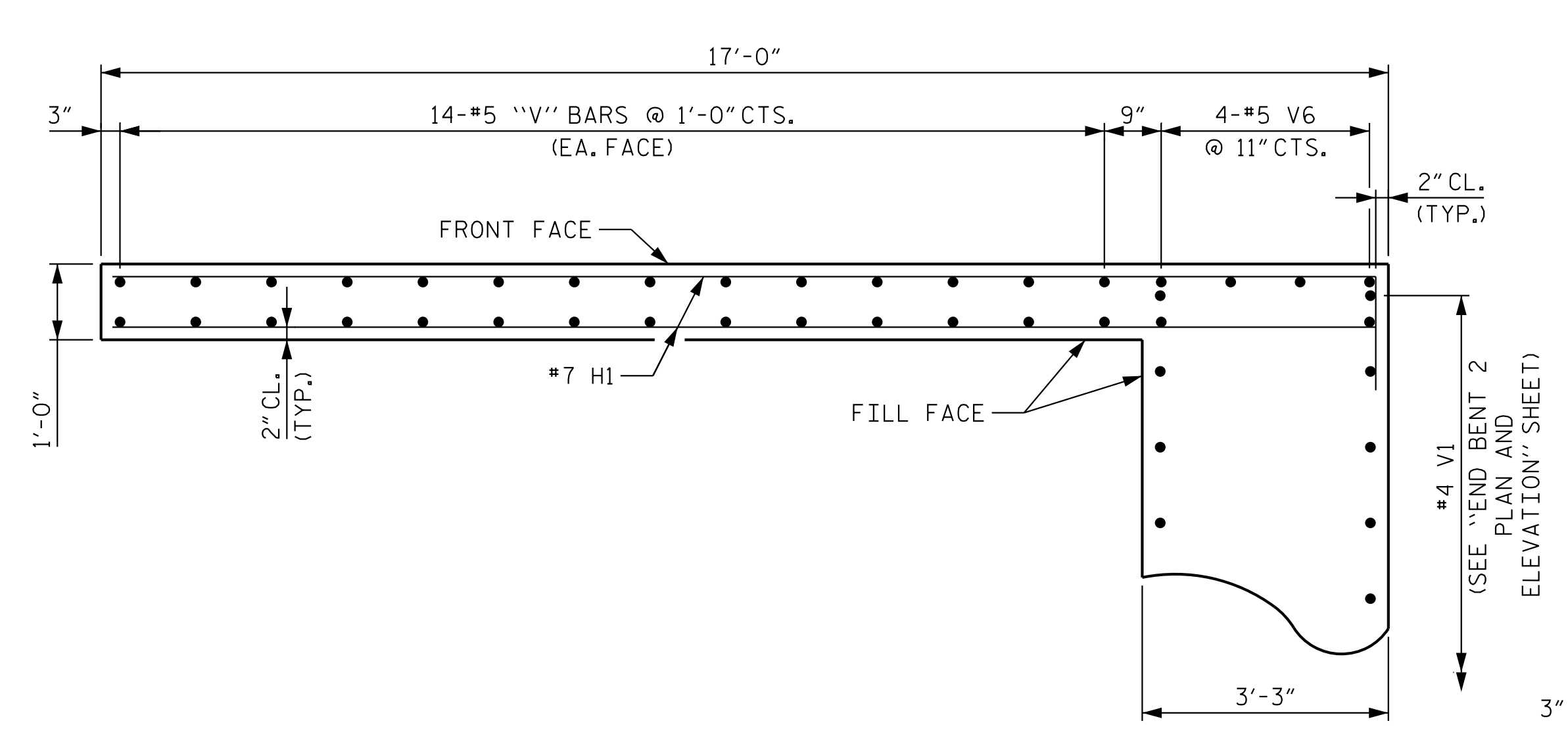
DRAWN BY: J. I. KIMBLE DATE: 10/2023
CHECKED BY: T. H. ORR DATE: 10/2023
DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

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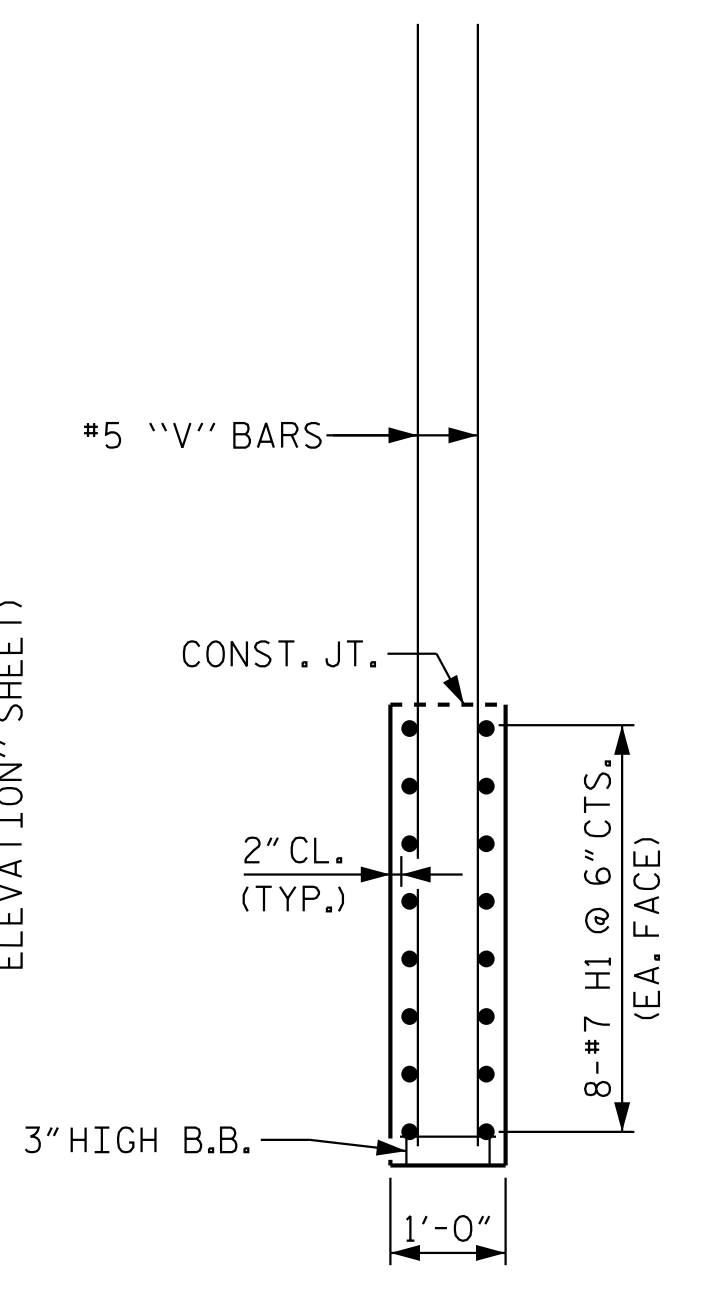
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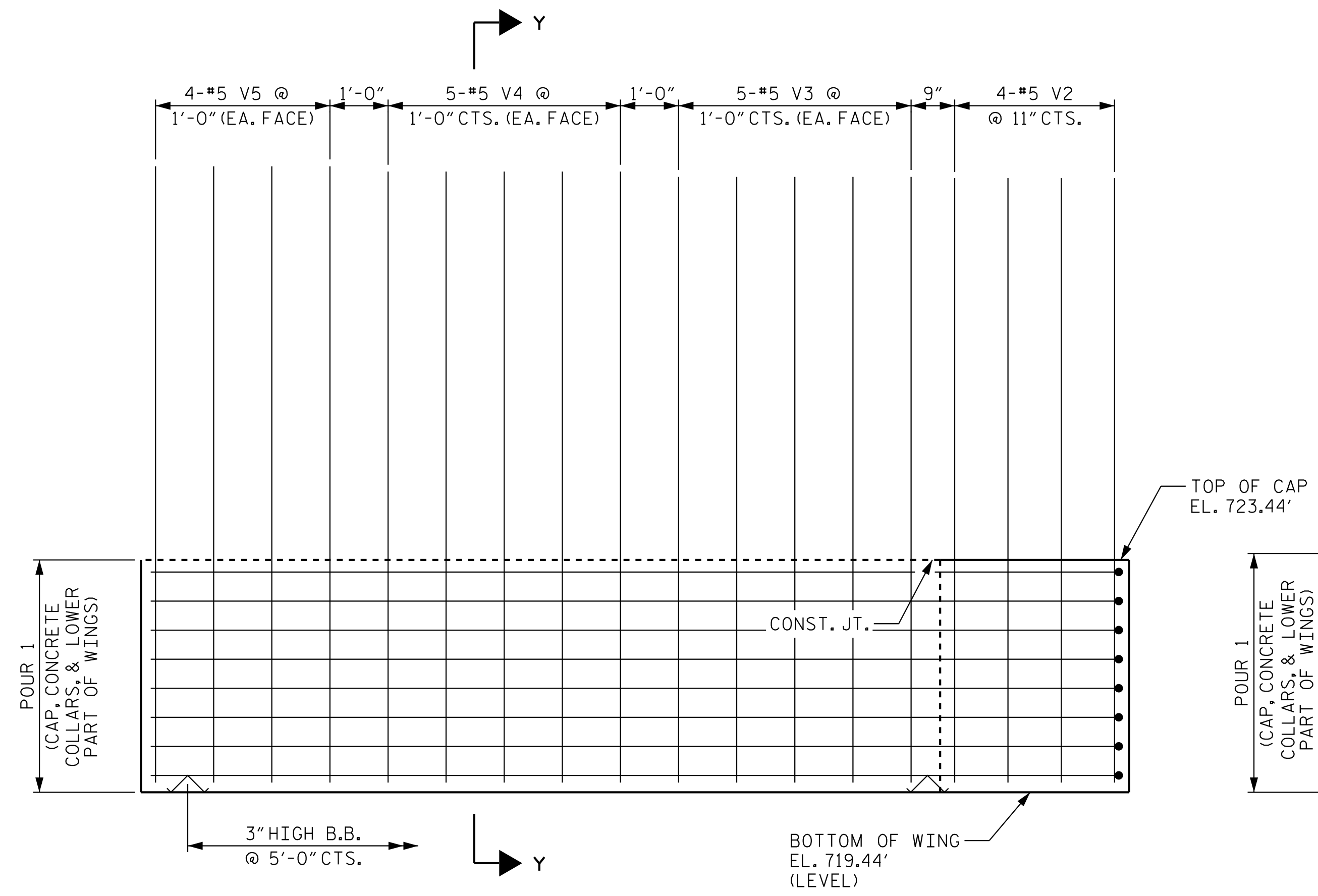
PLAN OF LEFT WING (W3)



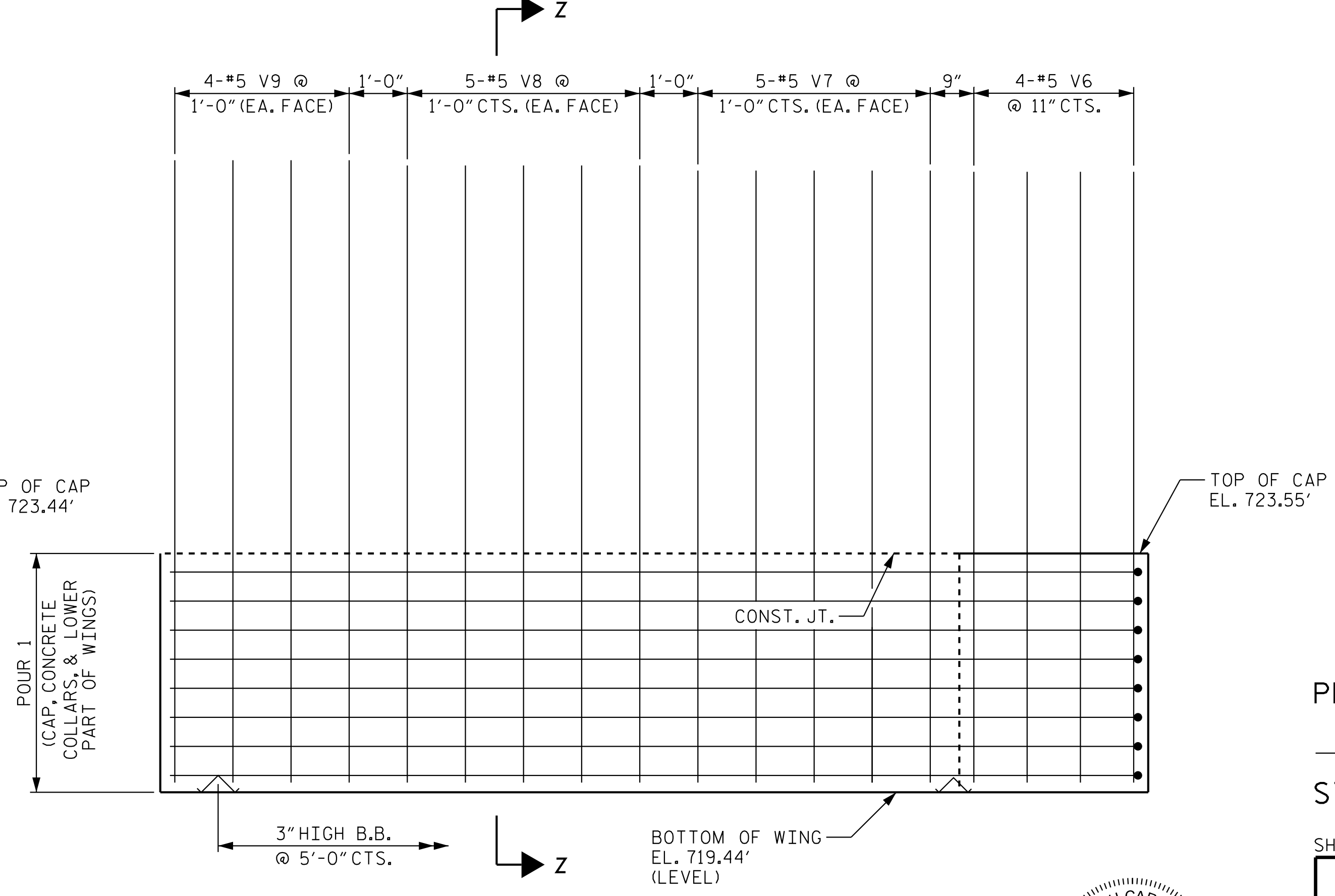
PLAN OF RIGHT WING (W4)



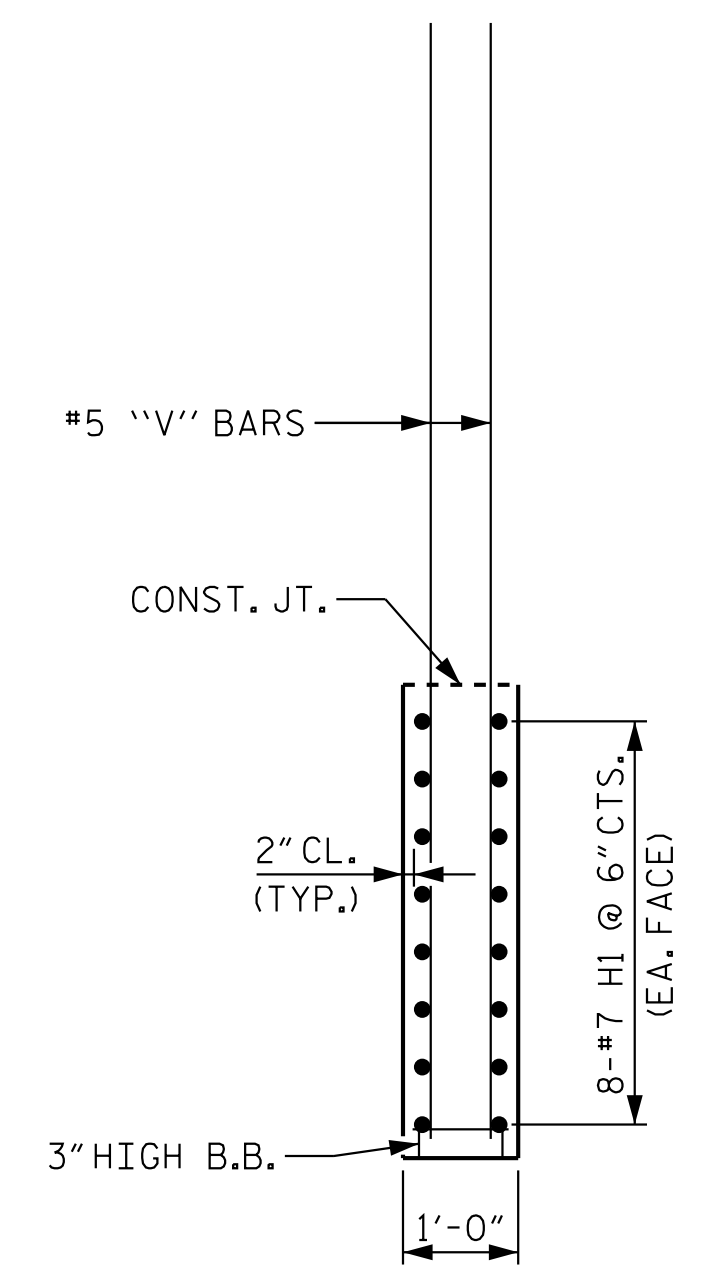
SECTION Y-Y



ELEVATION OF LEFT WING (W3)



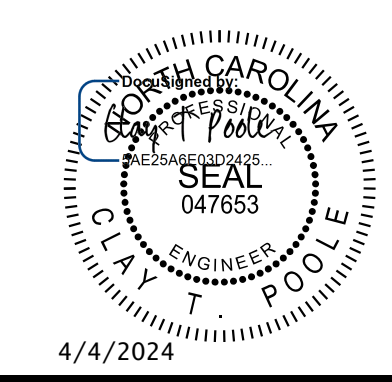
ELEVATION OF RIGHT WING (W4)



SECTION Z-Z

PROJECT NO. U-5108
MECKLENBURG COUNTY
 STATION: 74+01.00 -L-

SHEET 2 OF 3



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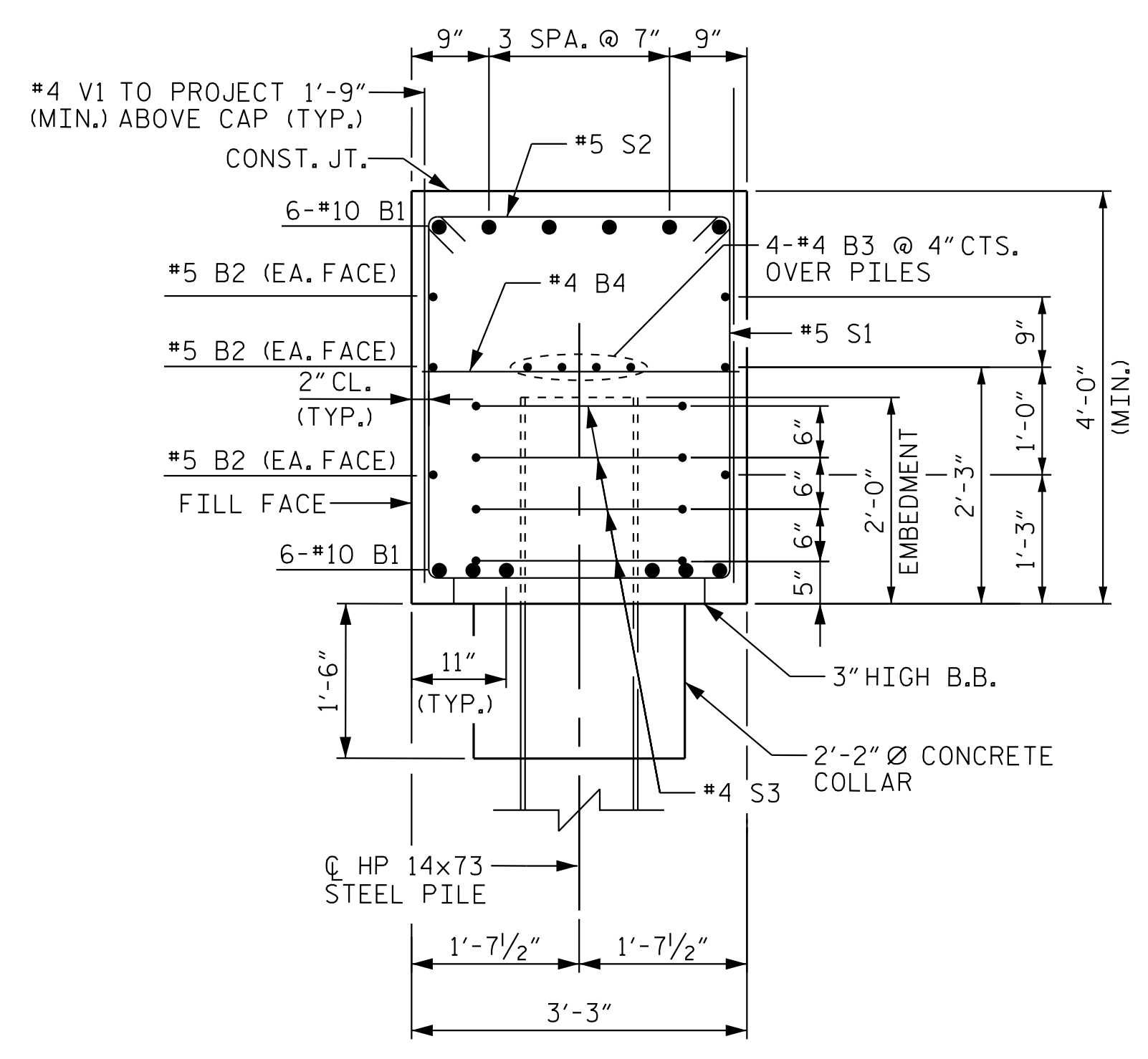
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2
 SECTION AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
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2			4			33

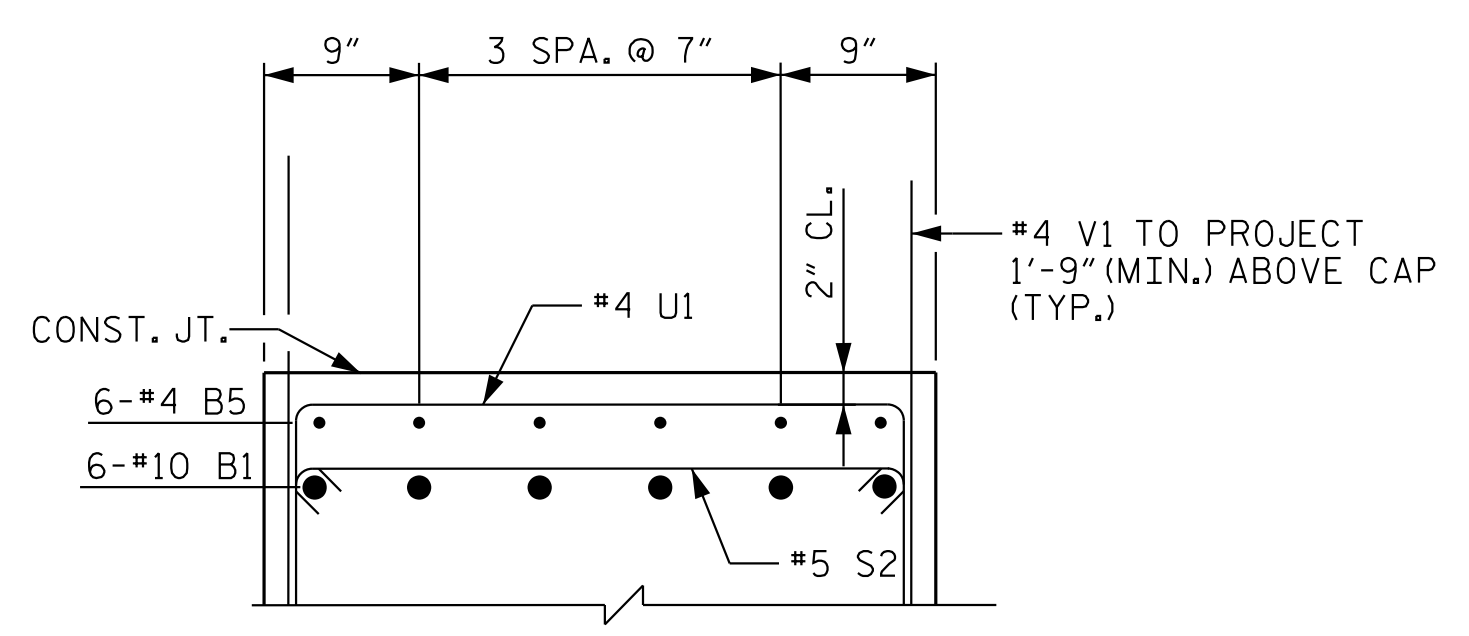
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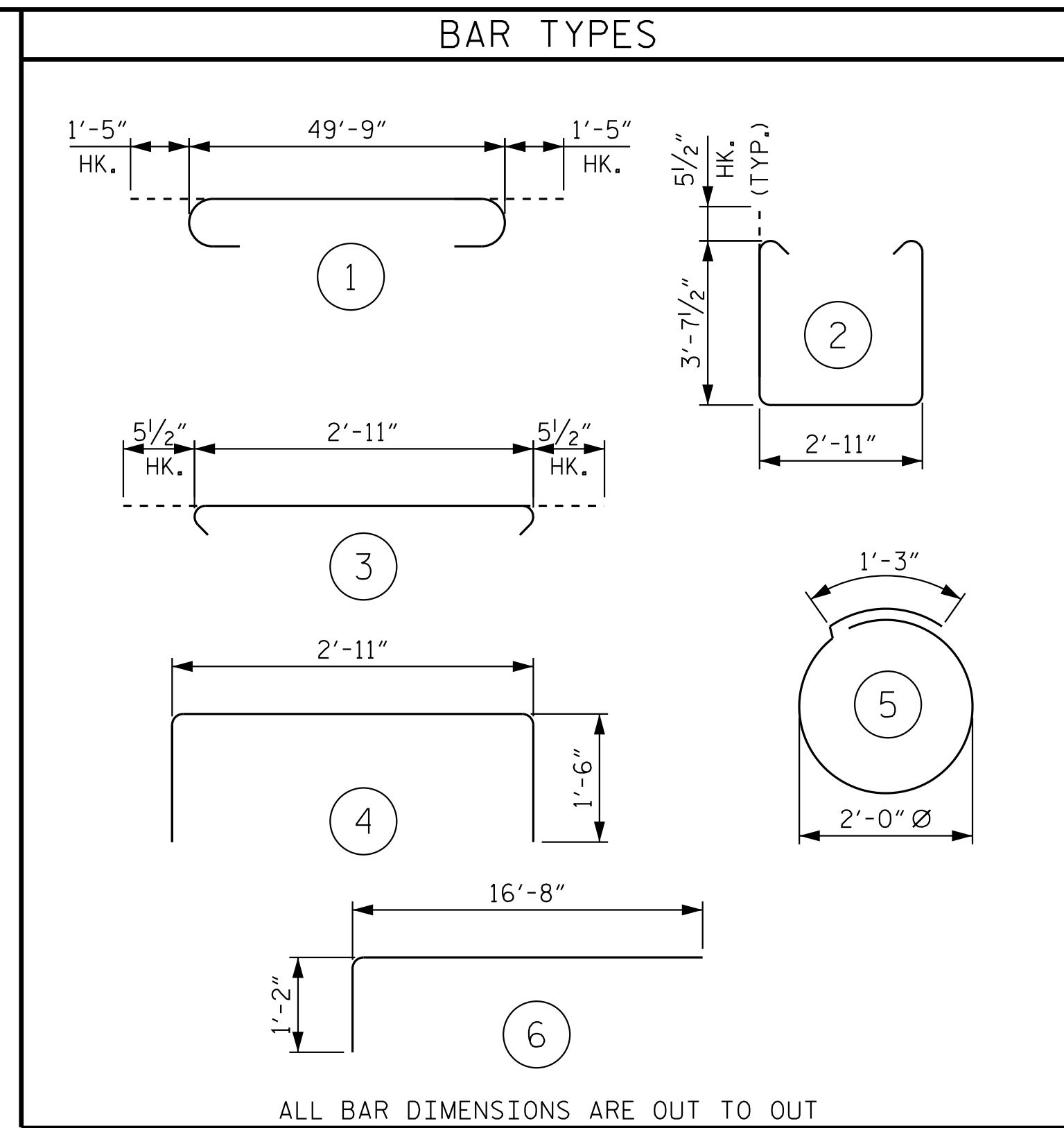
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SECTION A-A
(FOR LOCATION OF SECTION, SEE SHEET 1 OF 3)

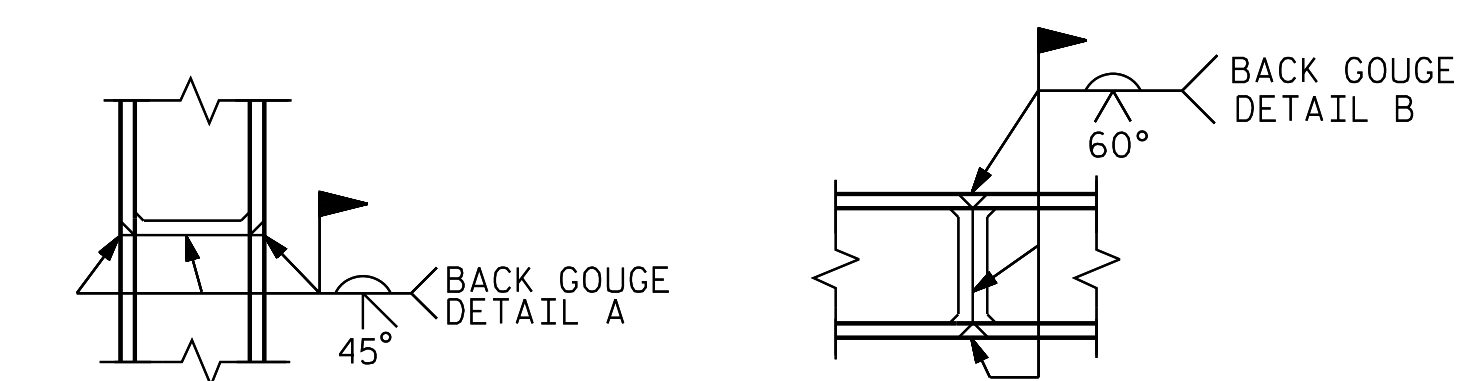


PARTIAL SECTION B-B
(FOR LOCATION OF SECTION, SEE SHEET 1 OF 3)

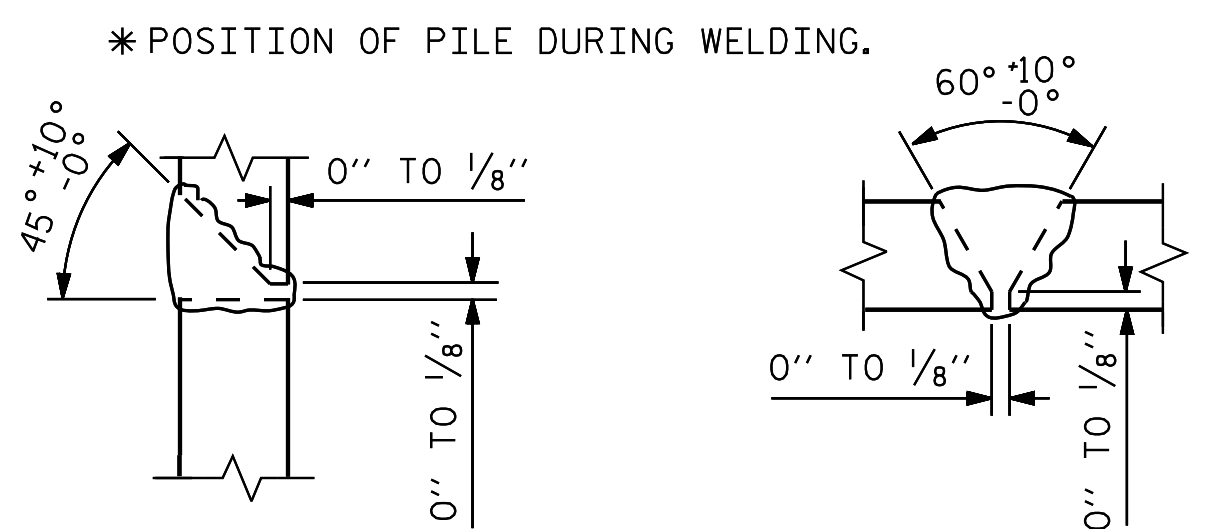


ALL BAR DIMENSIONS ARE OUT TO OUT

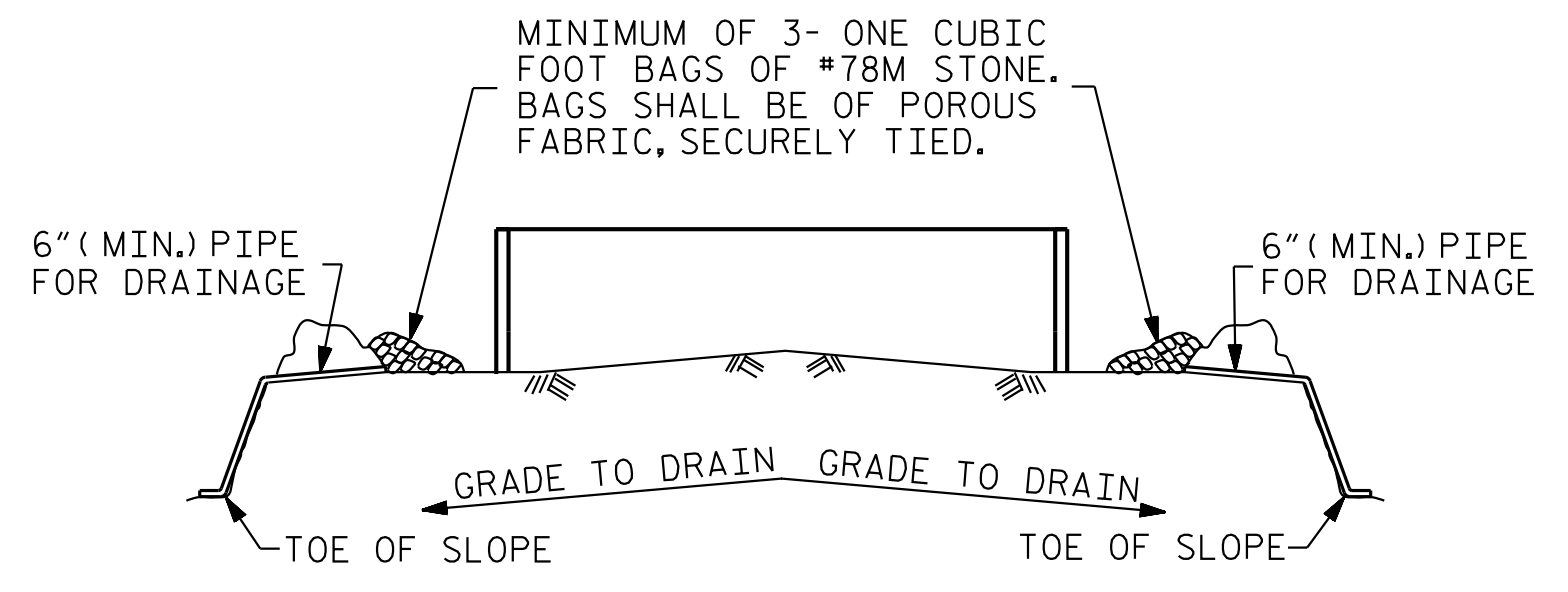
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END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	10	1	52'-7"	2,715
B2	6	5	STR	49'-9"	311
B3	8	4	STR	26'-1"	139
B4	14	4	STR	2'-11"	27
B5	6	4	STR	18'-2"	73
H1	32	7	6	17'-10"	1,166
S1	48	5	2	11'-1"	555
S2	48	5	3	3'-10"	192
S3	28	4	5	7'-7"	142
U1	13	4	4	5'-11"	51
V1	88	4	STR	6'-0"	353
V2	4	5	STR	10'-4"	43
V3	10	5	STR	10'-5"	109
V4	10	5	STR	10'-6"	110
V5	8	5	STR	10'-7"	88
V6	4	5	STR	10'-6"	44
V7	10	5	STR	10'-7"	110
V8	10	5	STR	10'-8"	111
V9	8	5	STR	10'-9"	90
REINFORCING STEEL					6,429 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR 1 (CAP, LOWER WING WALLS, & COLLARS)					30.8 C.Y.



* PILE VERTICAL * PILE HORIZONTAL OR VERTICAL



DETAIL "A" DETAIL "B"
HP PILE SPLICE DETAILS



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

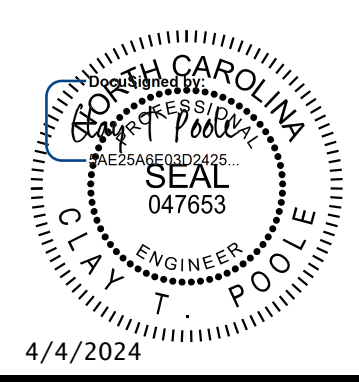
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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TEMPORARY DRAINAGE AT END BENT

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SHEET 3 OF 3



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SUBSTRUCTURE
END BENT 2
SECTION AND DETAILS

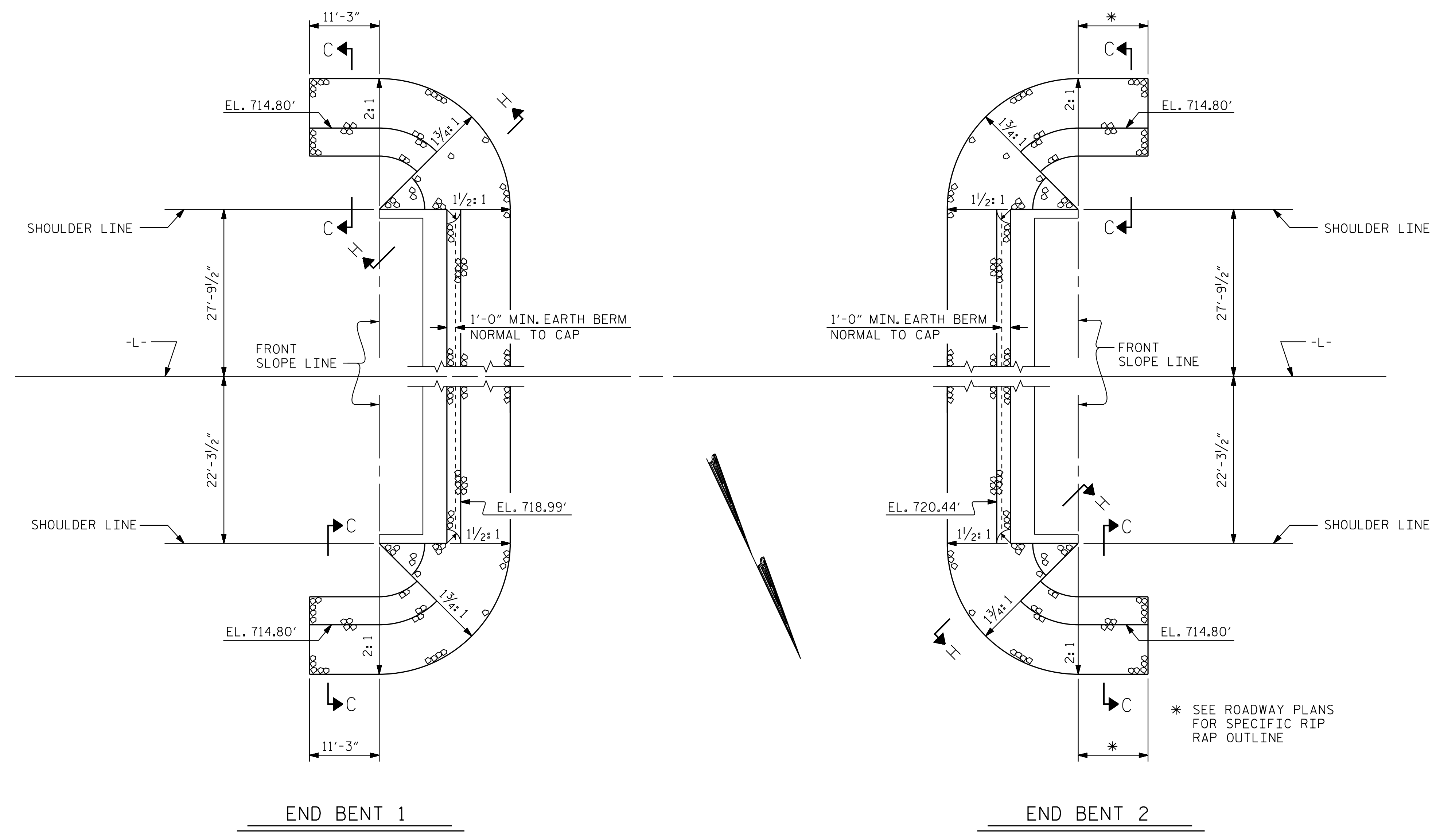
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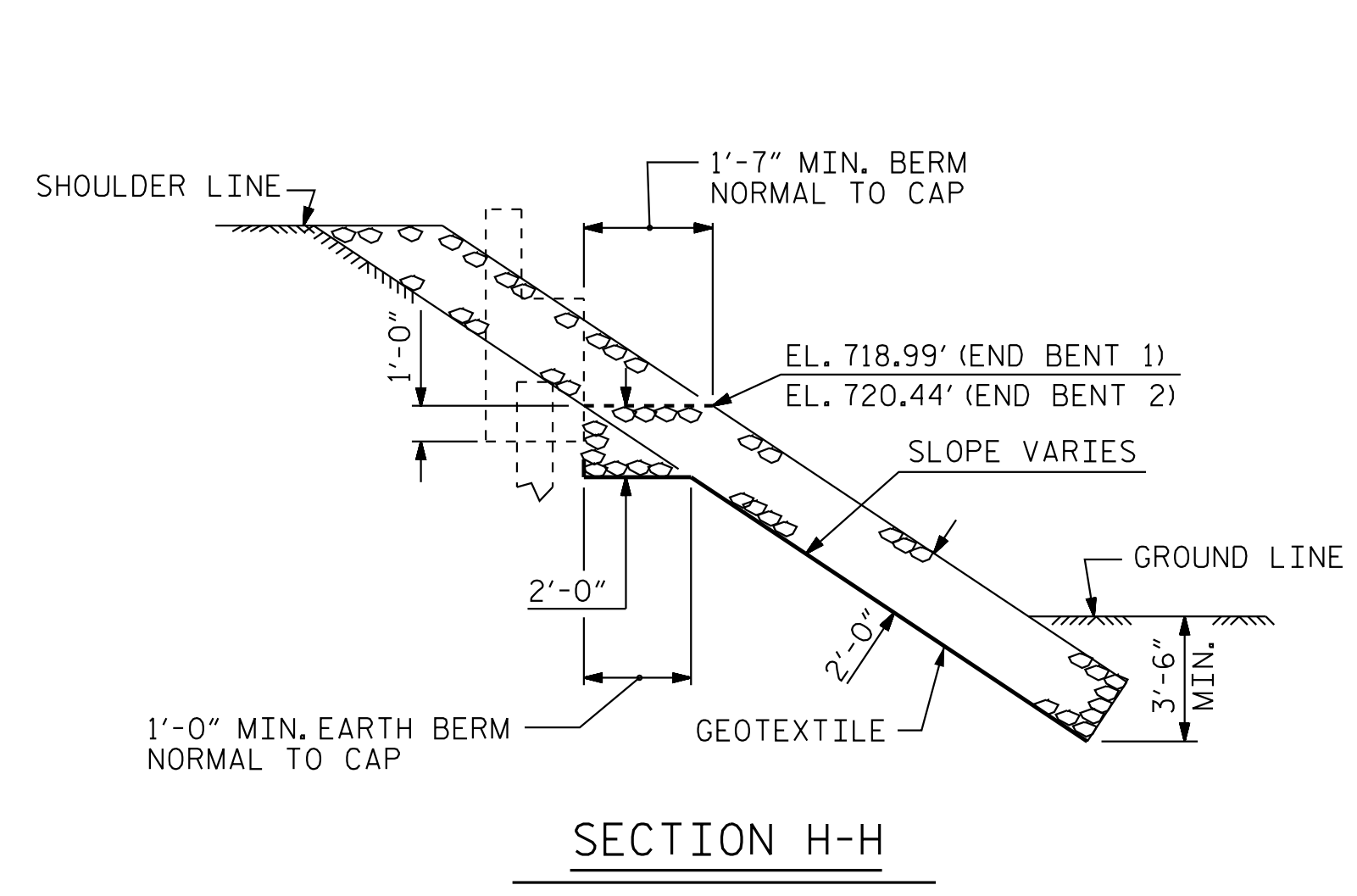
DRAWN BY: J. I. KIMBLE DATE: 10/2023
CHECKED BY: T. H. ORR DATE: 10/2023
DESIGN ENGINEER OF RECORD: C. T. POOLE DATE: 10/2023

NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

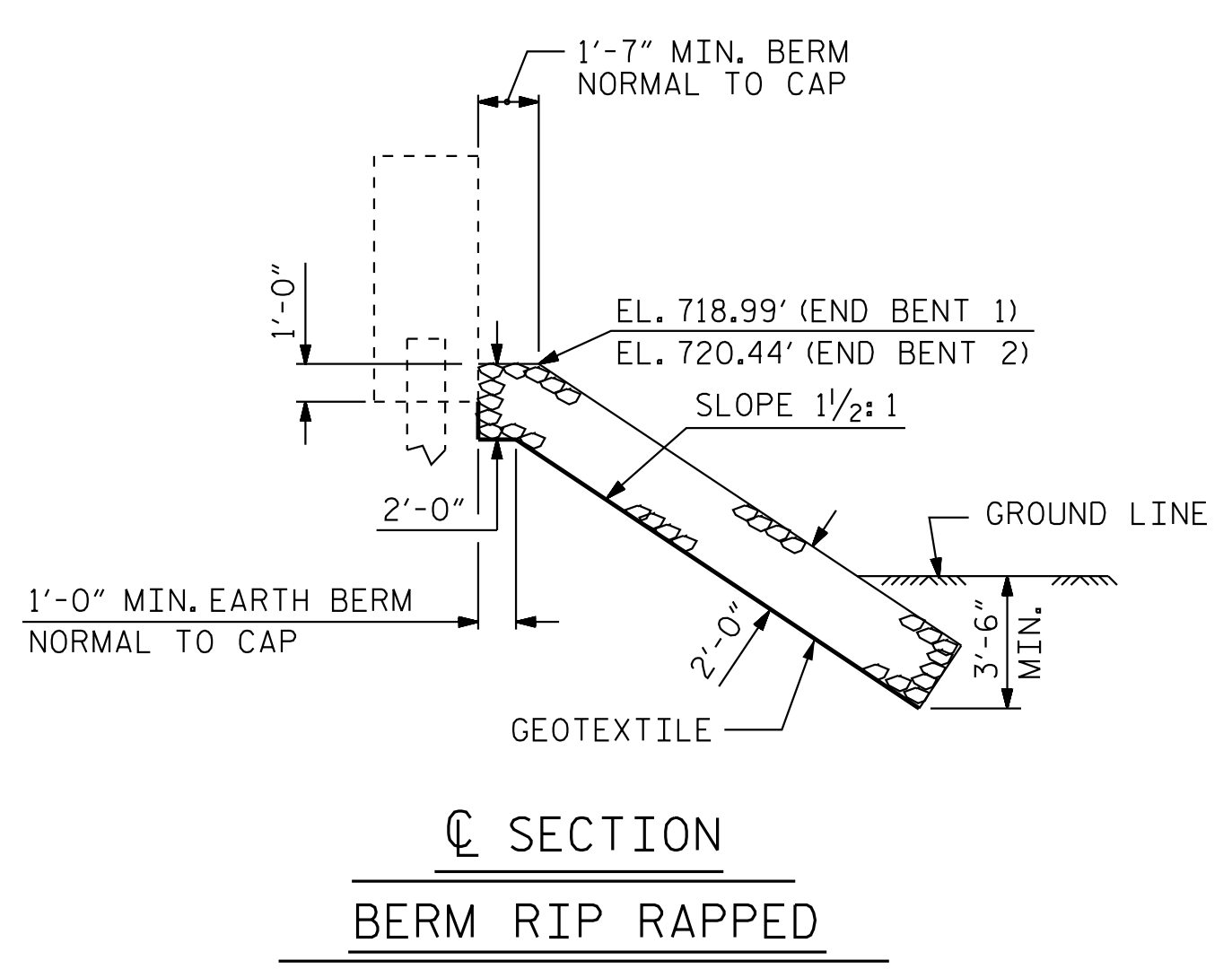


ESTIMATED QUANTITIES		
BRIDGE @ STA. 74+01.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	205	227
END BENT 2	367	407

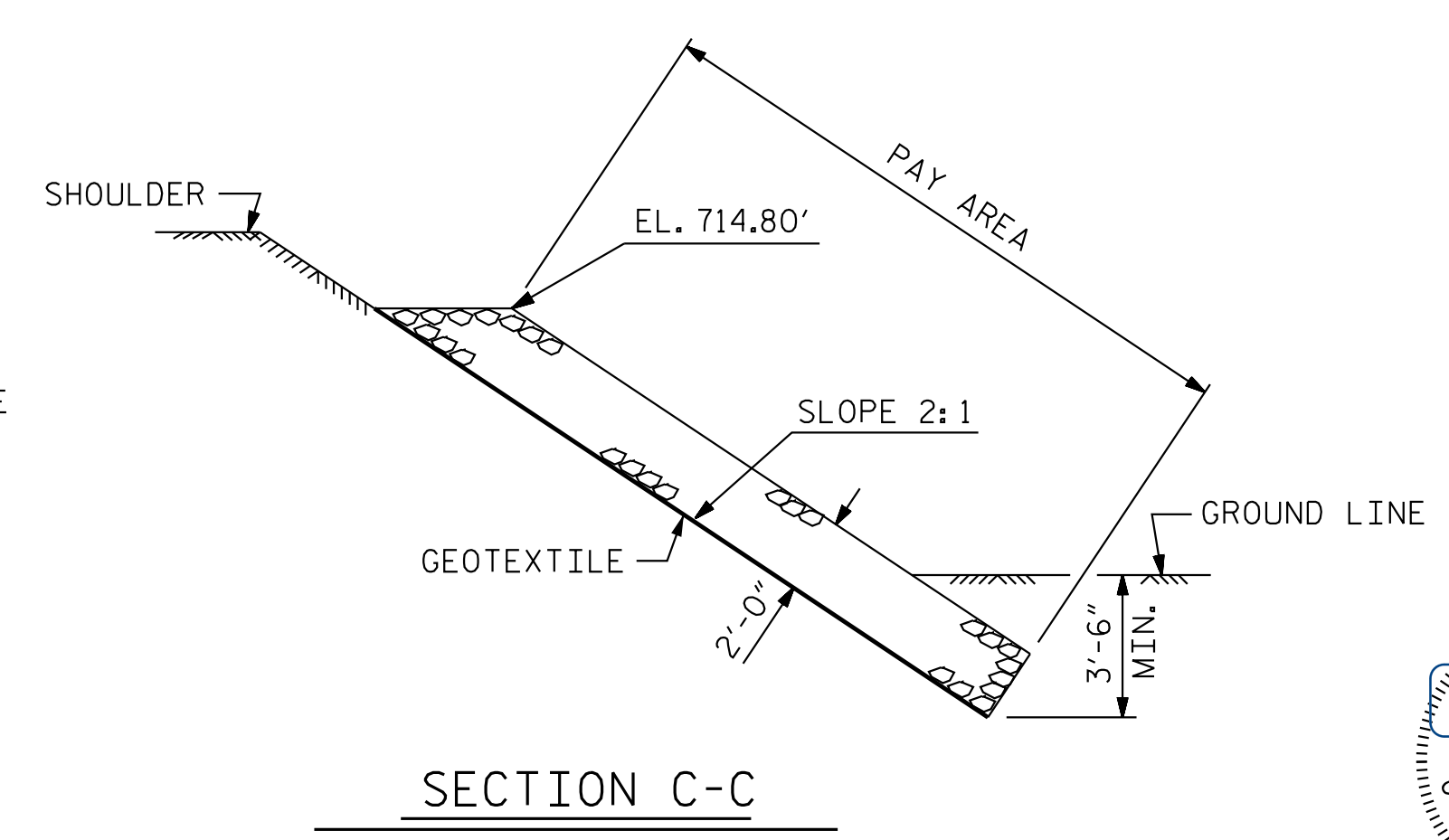
* SEE ROADWAY PLANS FOR SPECIFIC RIP RAP OUTLINE



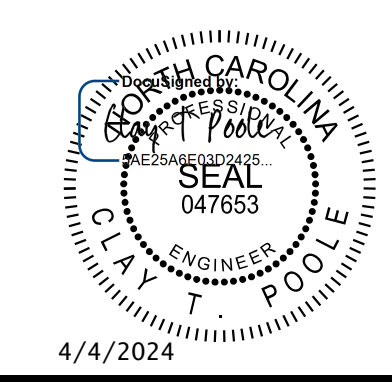
SECTION H-H



SECTION C-C
BERM RIP RAPPED



SECTION C-C



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PROJECT NO. U-5108
MECKLENBURG COUNTY
STATION: 74+01.00 -L-

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

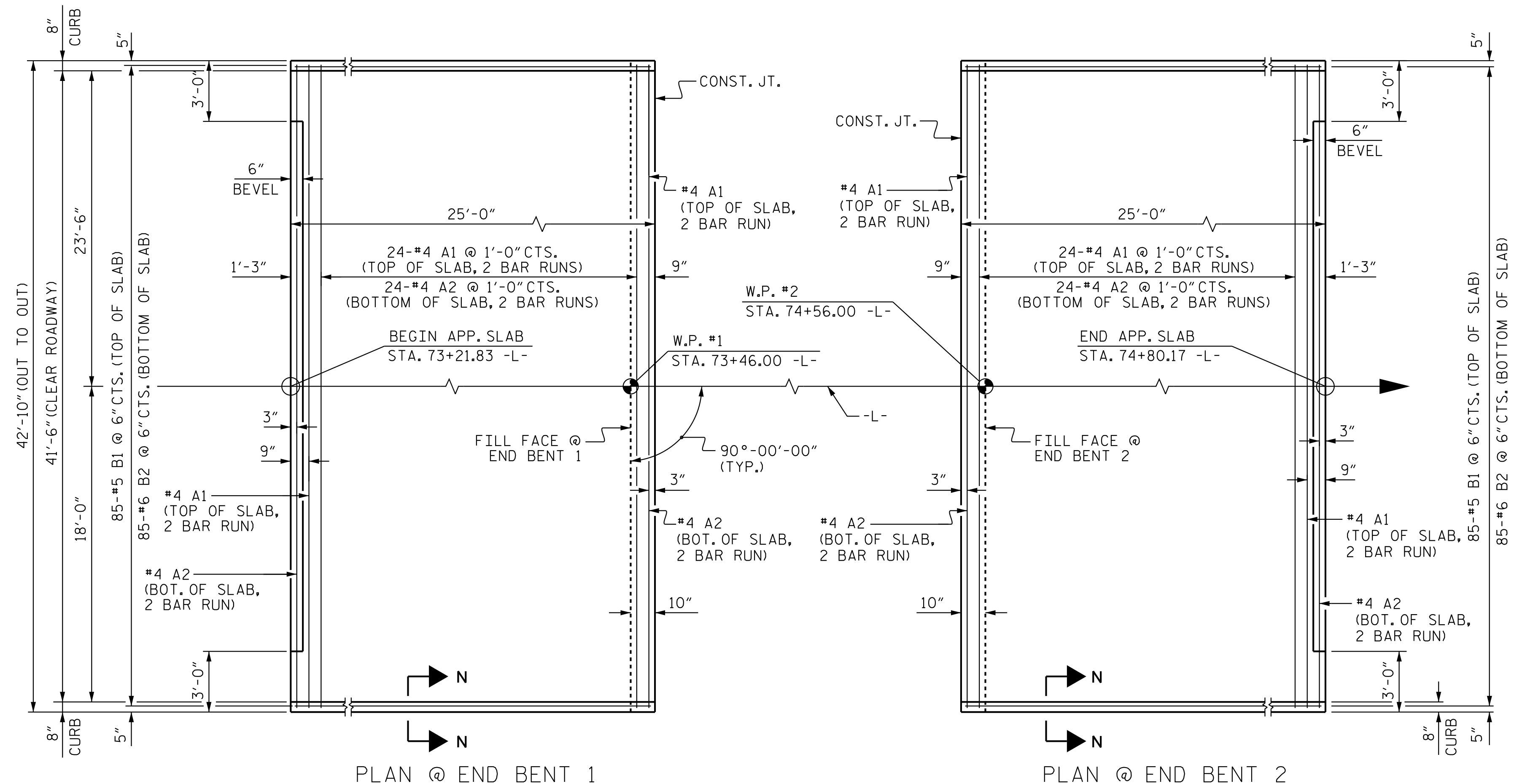
REVISIONS						SHEET NO. S-31
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			33

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ASSEMBLED BY : J. L. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : REK 1/84	REV. 10/1/11 MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/11 MAA/GM
	REV. 12/17 MAA/THC



PLAN @ END BENT 1
 PLAN @ END BENT 2
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

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

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTORS OPTION "TYPE 1A - ALTERNATE APPROACH FILL" (ROADWAY STD. 423.02) MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT IN LIEU OF "TYPE 1 - APPROACH FILL".

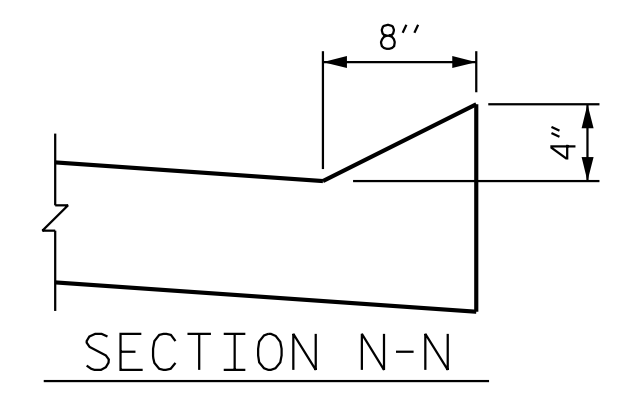
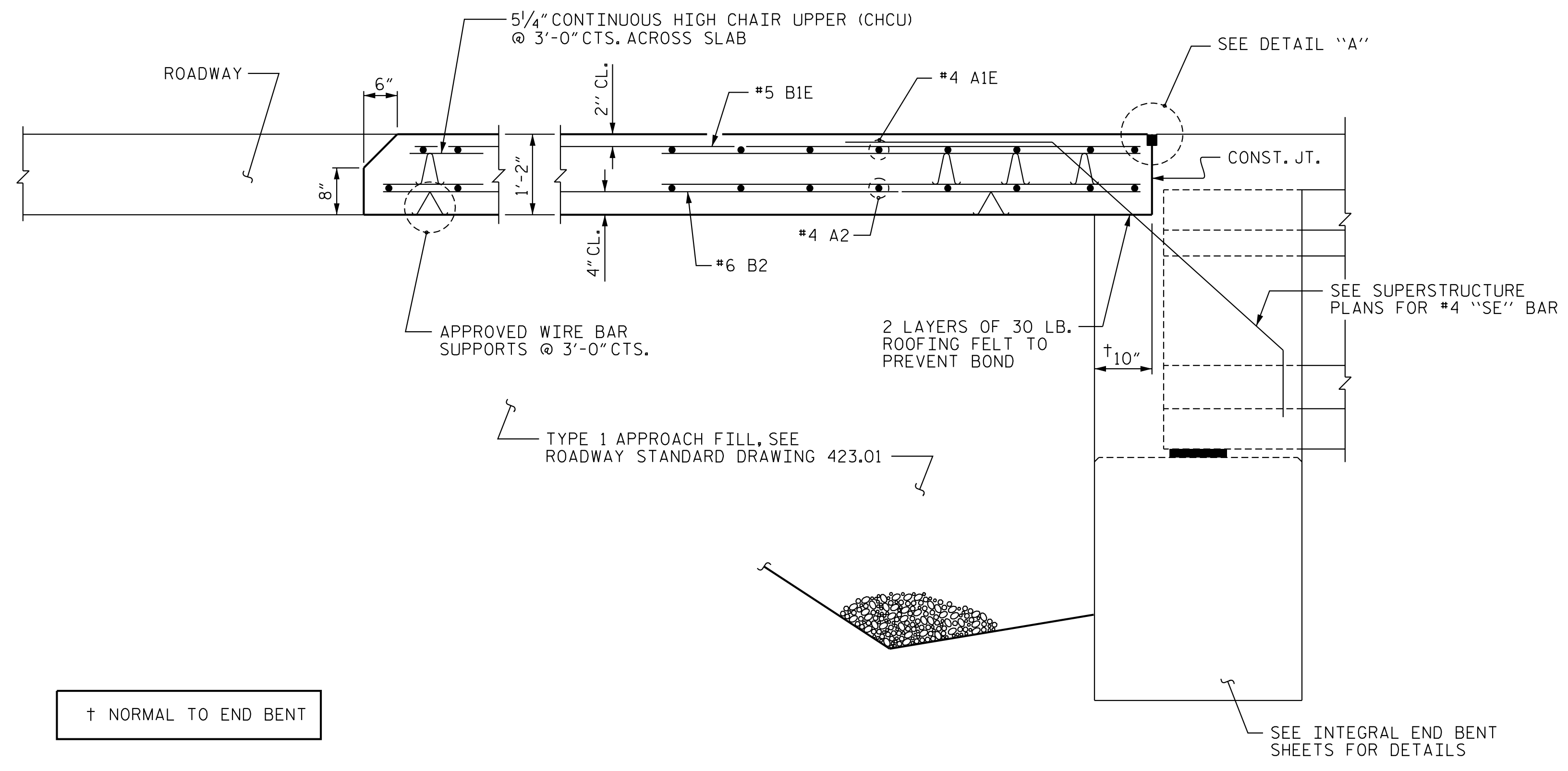
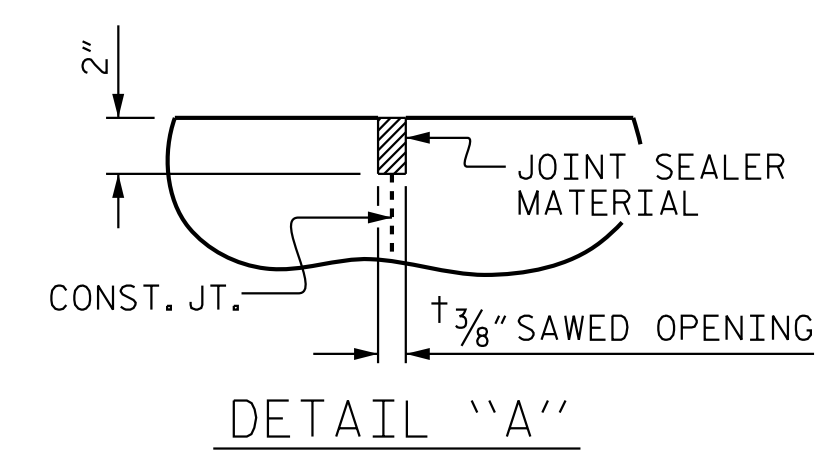
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	4	STR	22'-3"	773
A2	52	4	STR	22'-1"	767
* B1	85	5	STR	24'-2"	2,142
B2	85	6	STR	24'-8"	3,149
REINFORCING STEEL					3,916 LBS.
* EPOXY COATED REINFORCING STEEL					2,915 LBS.
CLASS AA CONCRETE					46.5 C.Y.

SPLICE LENGTHS

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

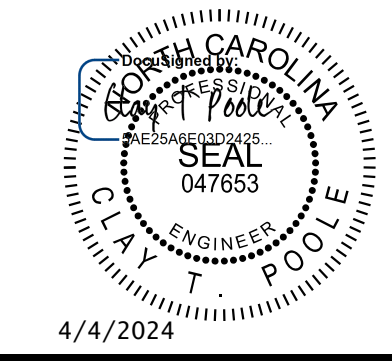


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SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH SLAB
 FOR INTEGRAL ABUTMENT
 WITH FLEXIBLE PAVEMENT



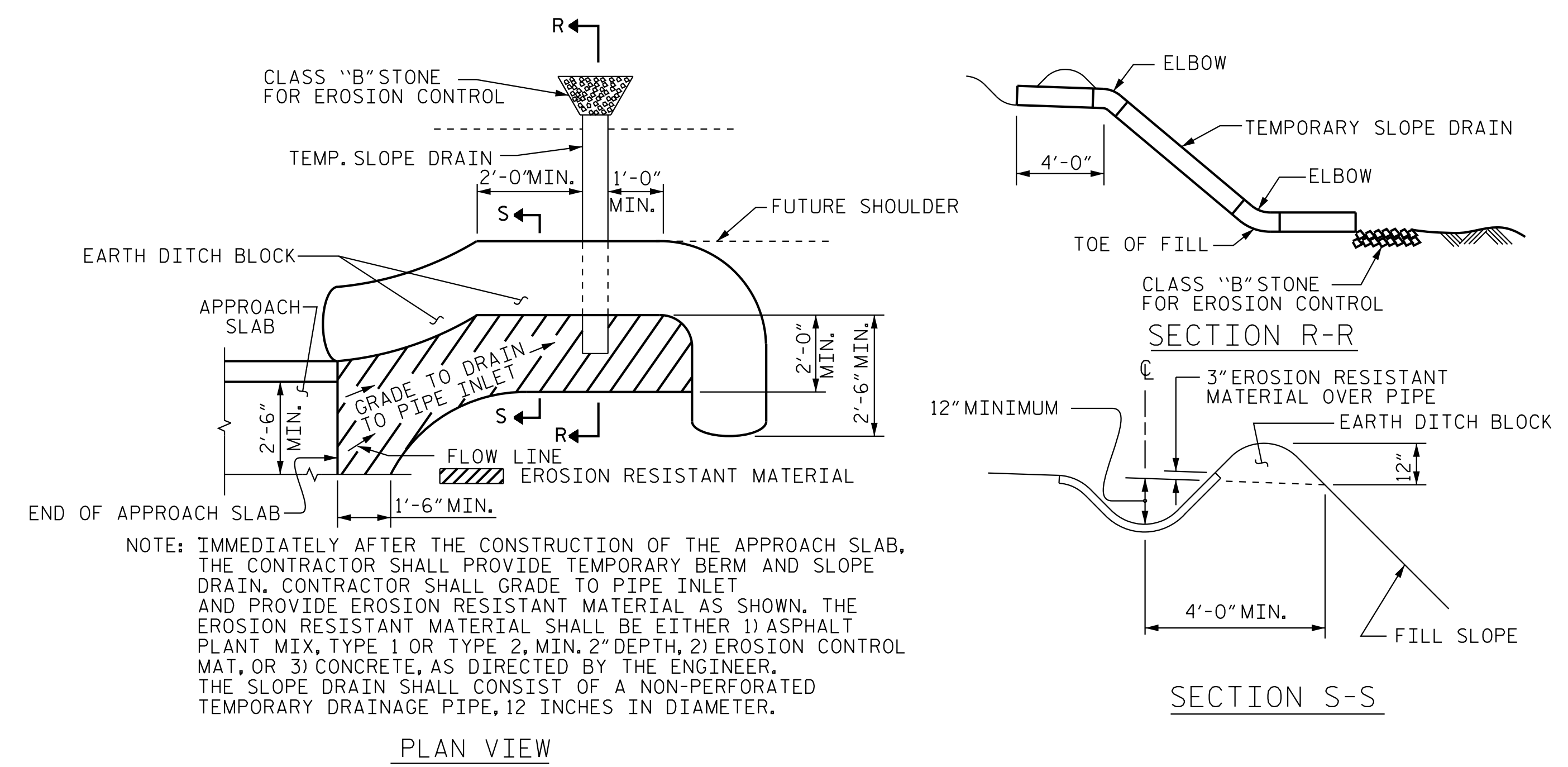
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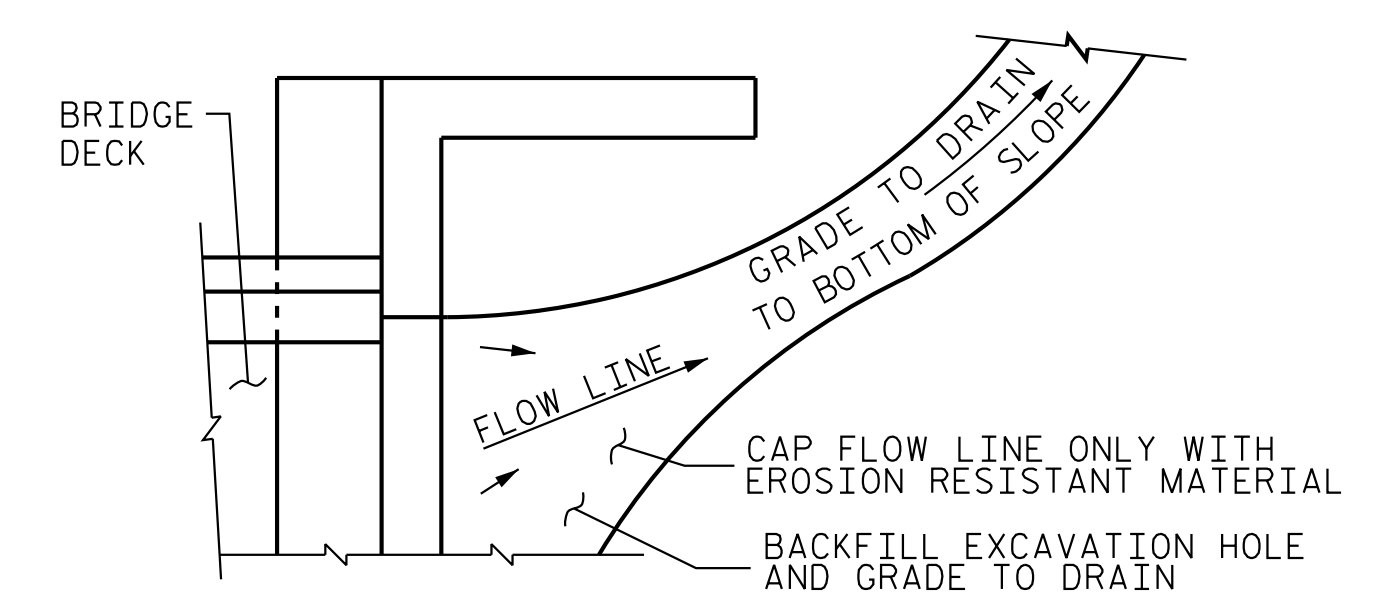
ASSEMBLED BY : J. L. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : TLA 10/05	REV. 12/17 MAA/THC
CHECKED BY : GM 5/06	REV. 06/19 BNB/THC
	REV. 07/23 BNB/SNM



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.

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

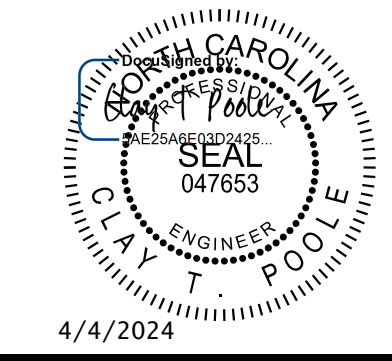


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

PROJECT NO. U-5108
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SHEET 2 OF 2



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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-33
STANDARD BRIDGE APPROACH SLAB DETAILS						TOTAL SHEETS 33
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 33
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ASSEMBLED BY : J. I. KIMBLE	DATE : 10/2023
CHECKED BY : T. H. ORR	DATE : 10/2023
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990