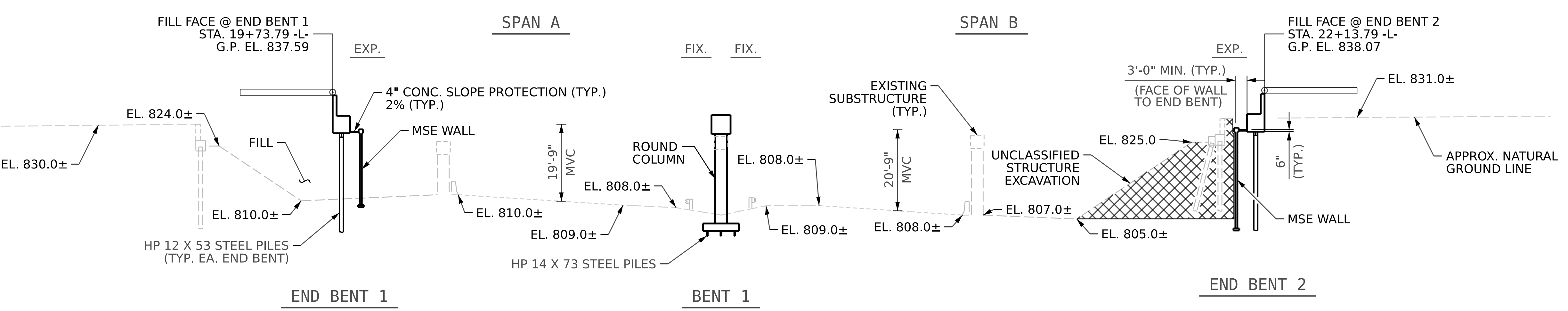




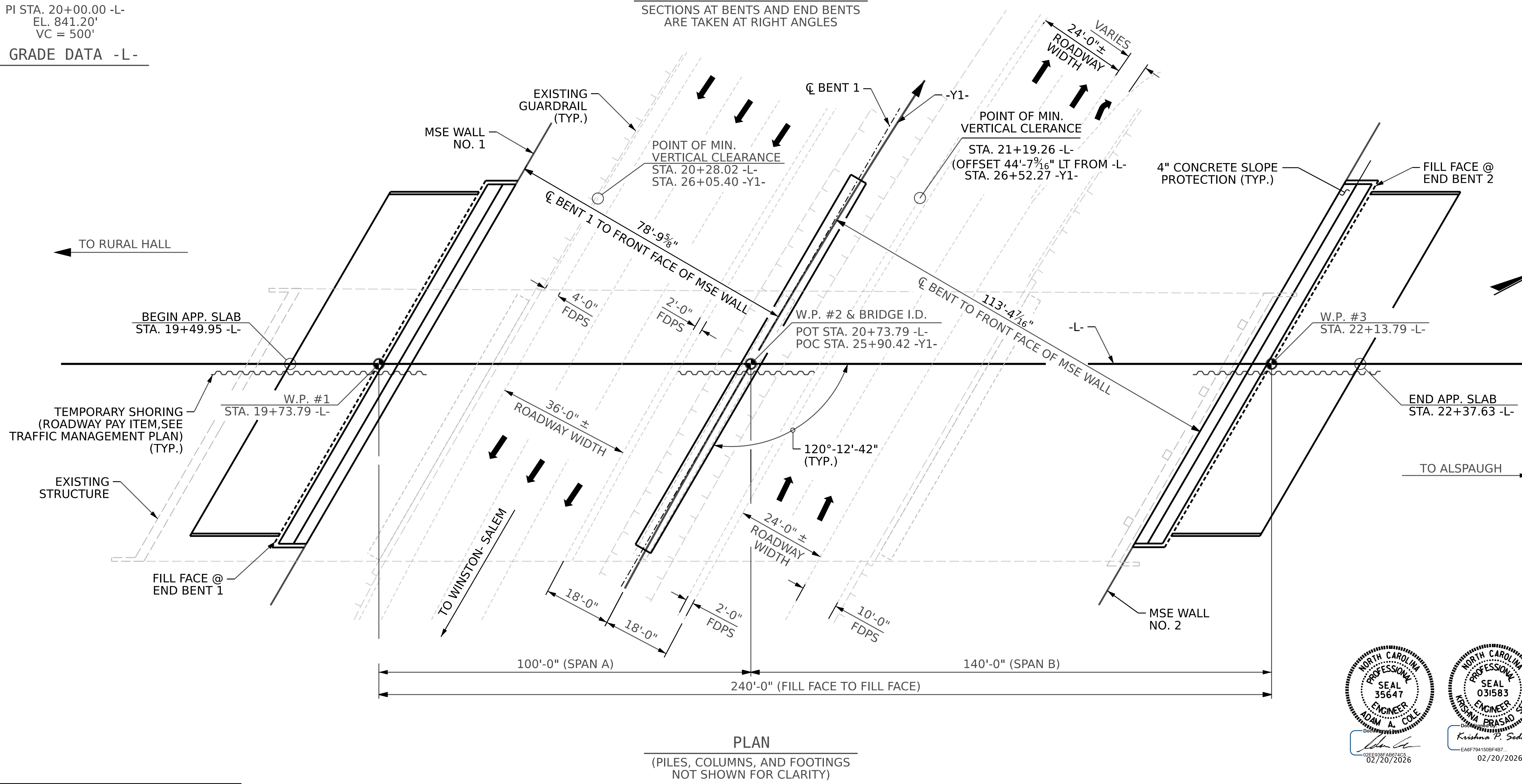
19+00 19+50 20+00 20+50 21+00 21+50 22+00 22+50 23+00



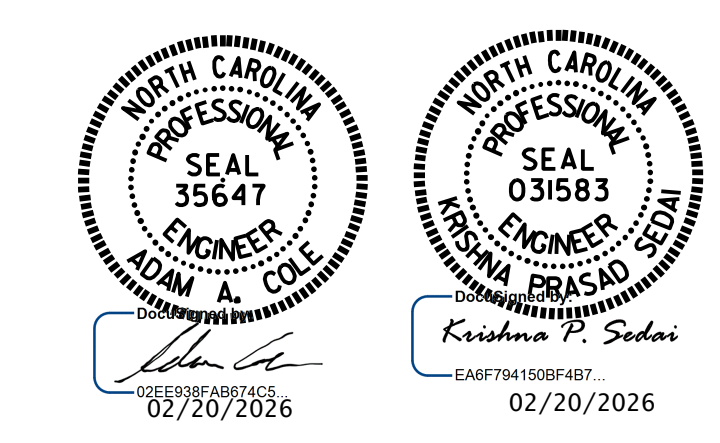
**HORIZONTAL CURVE DATA**

CUR DATA -Y1-	CUR DATA -Y1-
Plc 24+94.30	Plc 26+96.17
$\Delta c = 08^\circ-39'-34.5"$ (RT)	$\Delta c = 03^\circ-49'-49.8"$ (RT)
D = 02'-43'-42.1"	D = 04'-24'-26.5"
Lc = 317.39'	Lc = 86.91'
Tc = 159.00'	Tc = 43.47'
R = 2,100'	R = 1,300'

(+)3.7844% (-)1.4342%  
PI STA. 20+00.00 -L-  
EL. 841.20'  
VC = 500'  
**GRADE DATA -L-**



PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
STATION: **20+73.79 -L-**  
**25+90.42 -Y1-**  
SHEET 1 OF 5 REPLACES BRIDGE NO. 289



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

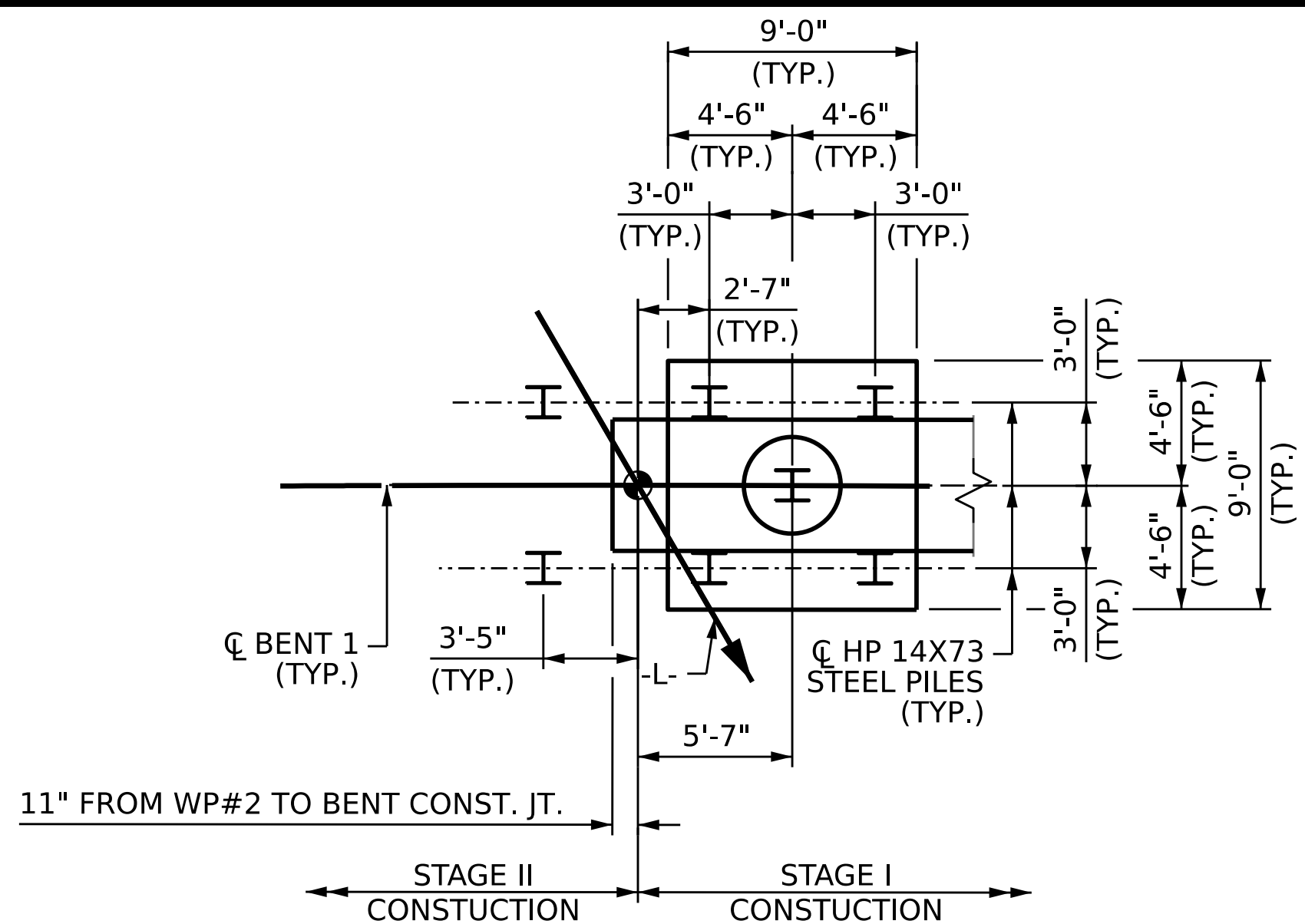
**GENERAL DRAWING**  
FOR BRIDGE ON  
SR-4000 (UNIVERSITY PARKWAY)  
OVER US 52

DRAWN BY : E. MOHAMED DATE : 04/2025  
CHECKED BY : A. SORSENGINH DATE : 04/2025  
DESIGN ENGINEER OF RECORD: A. IGHWAIR DATE : 04/2025

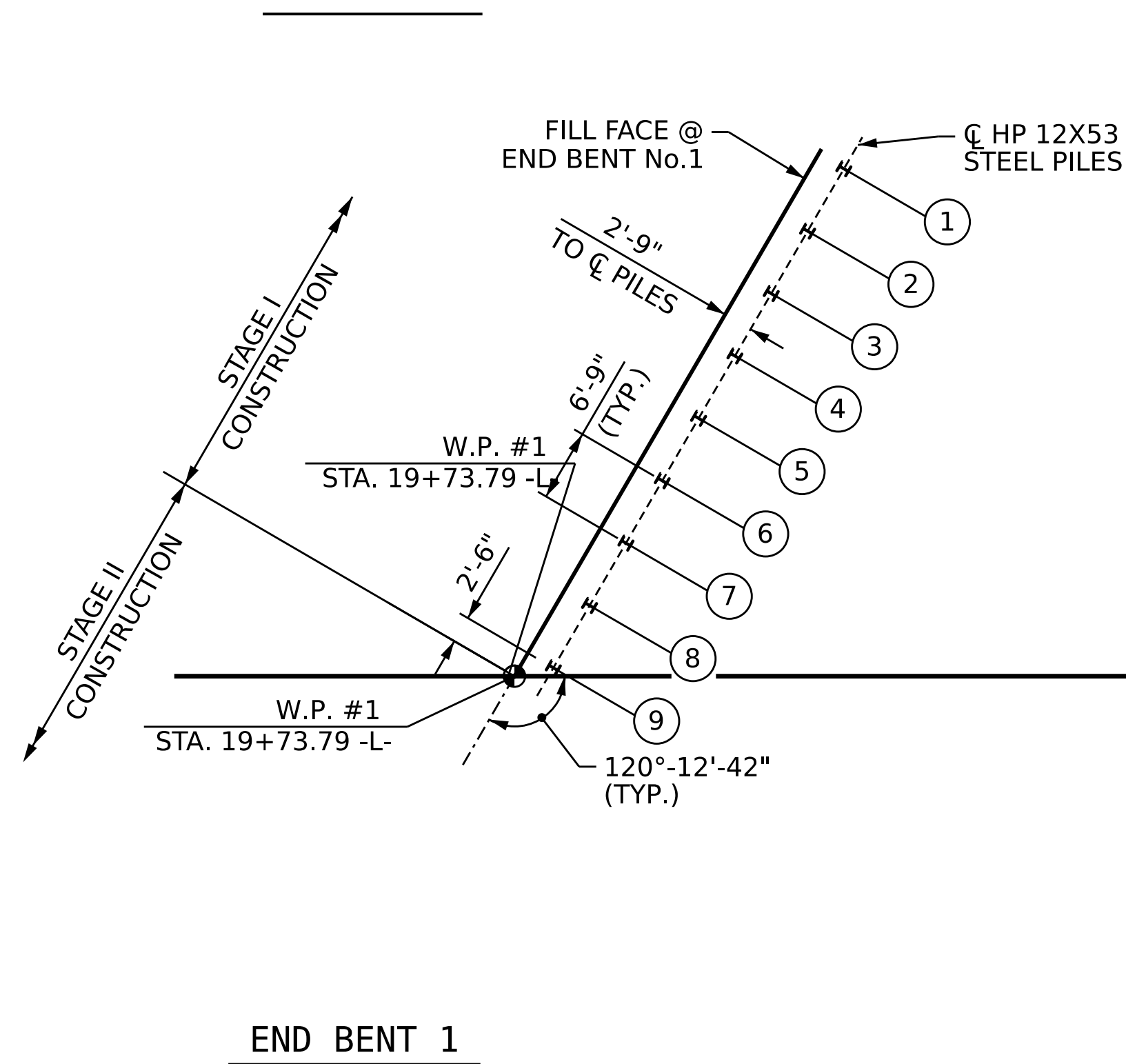
DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

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

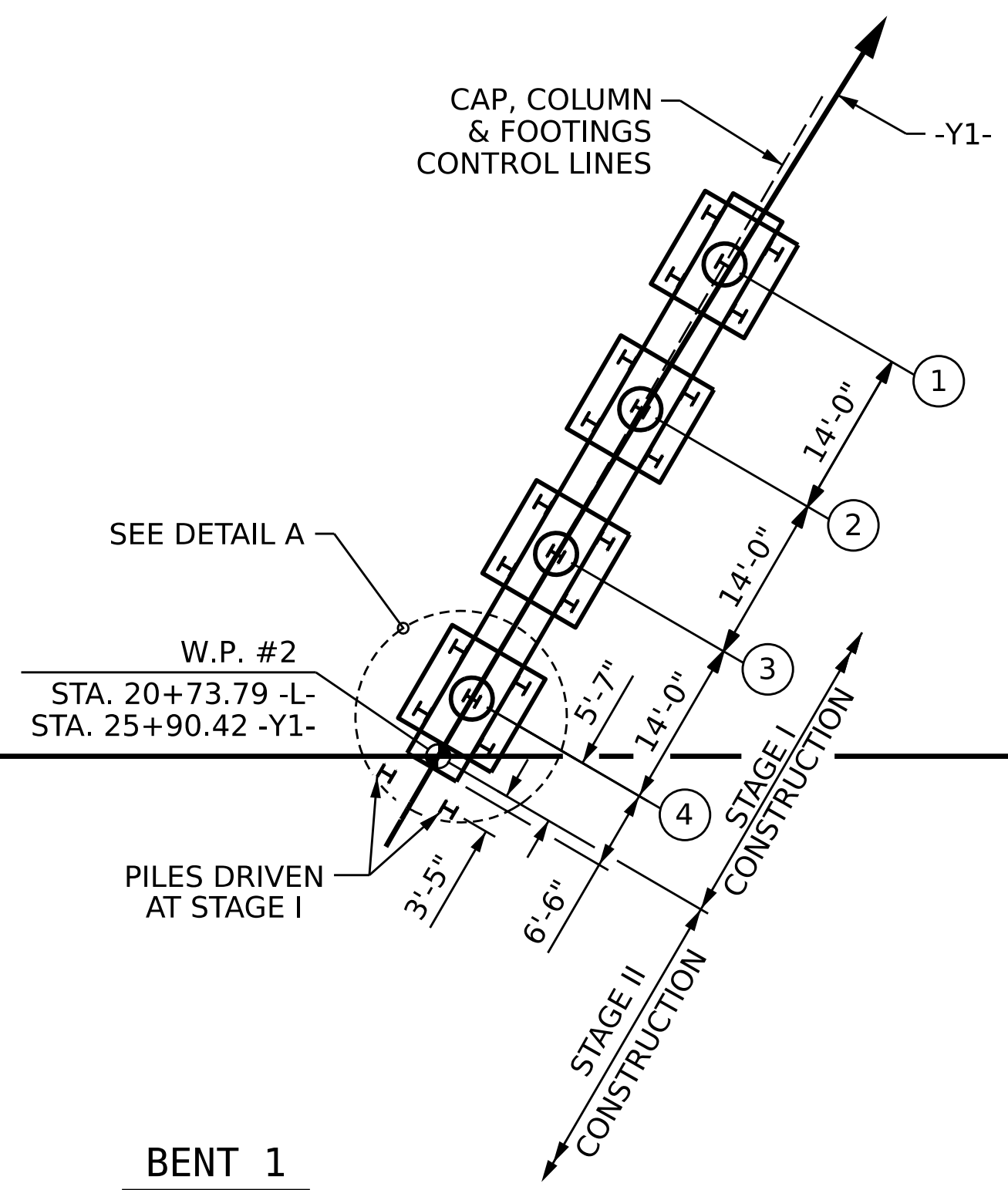
TOTAL SHEETS: 53



**DETAIL A**



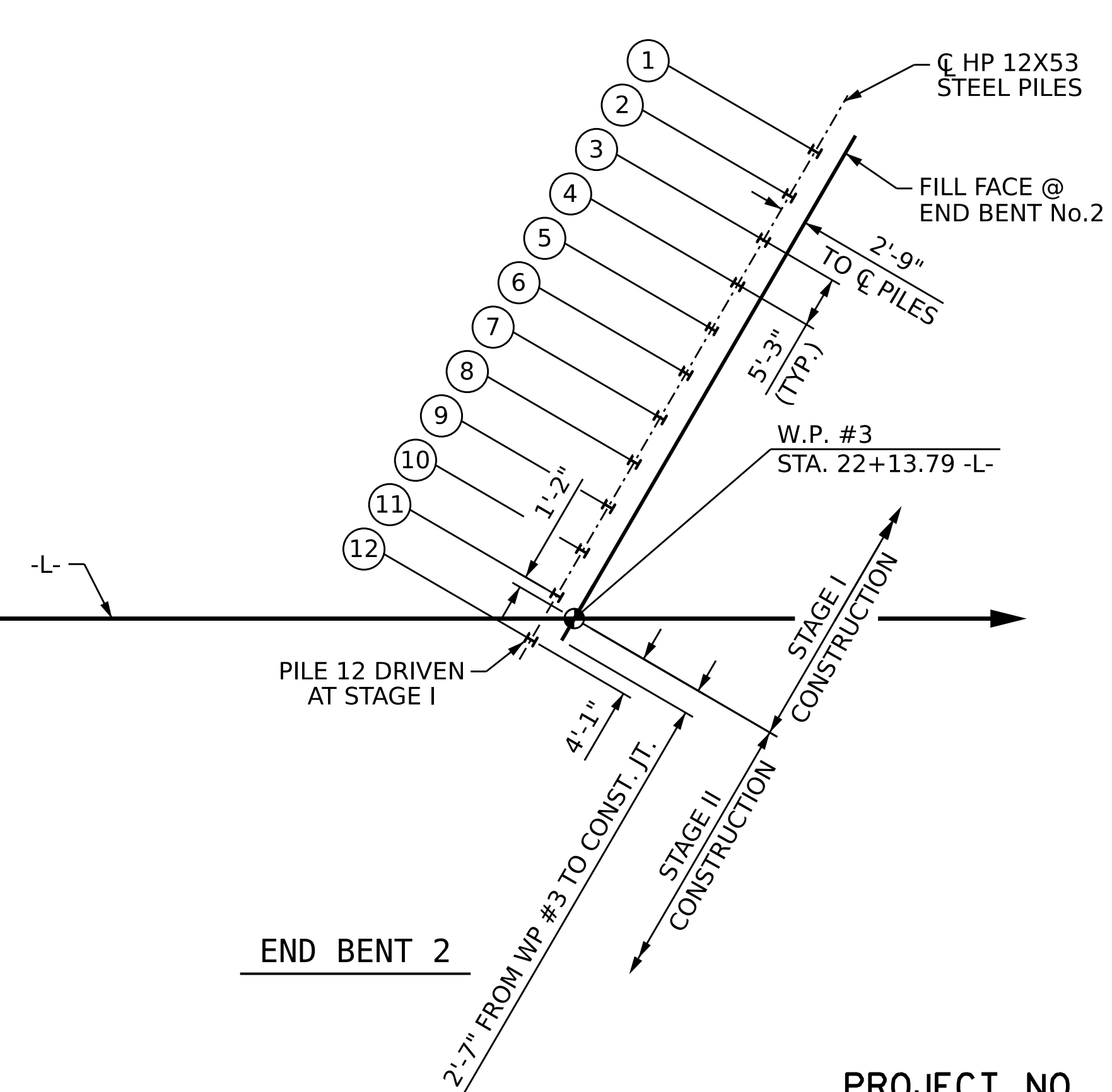
**END BENT 1**



**BENT 1**

**FOUNDATION LAYOUT- CONSTRUCTION STAGE I**

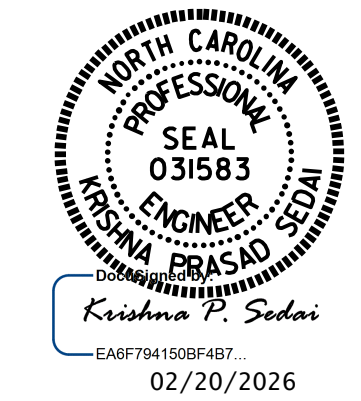
DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES.



**END BENT 2**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 2 OF 5

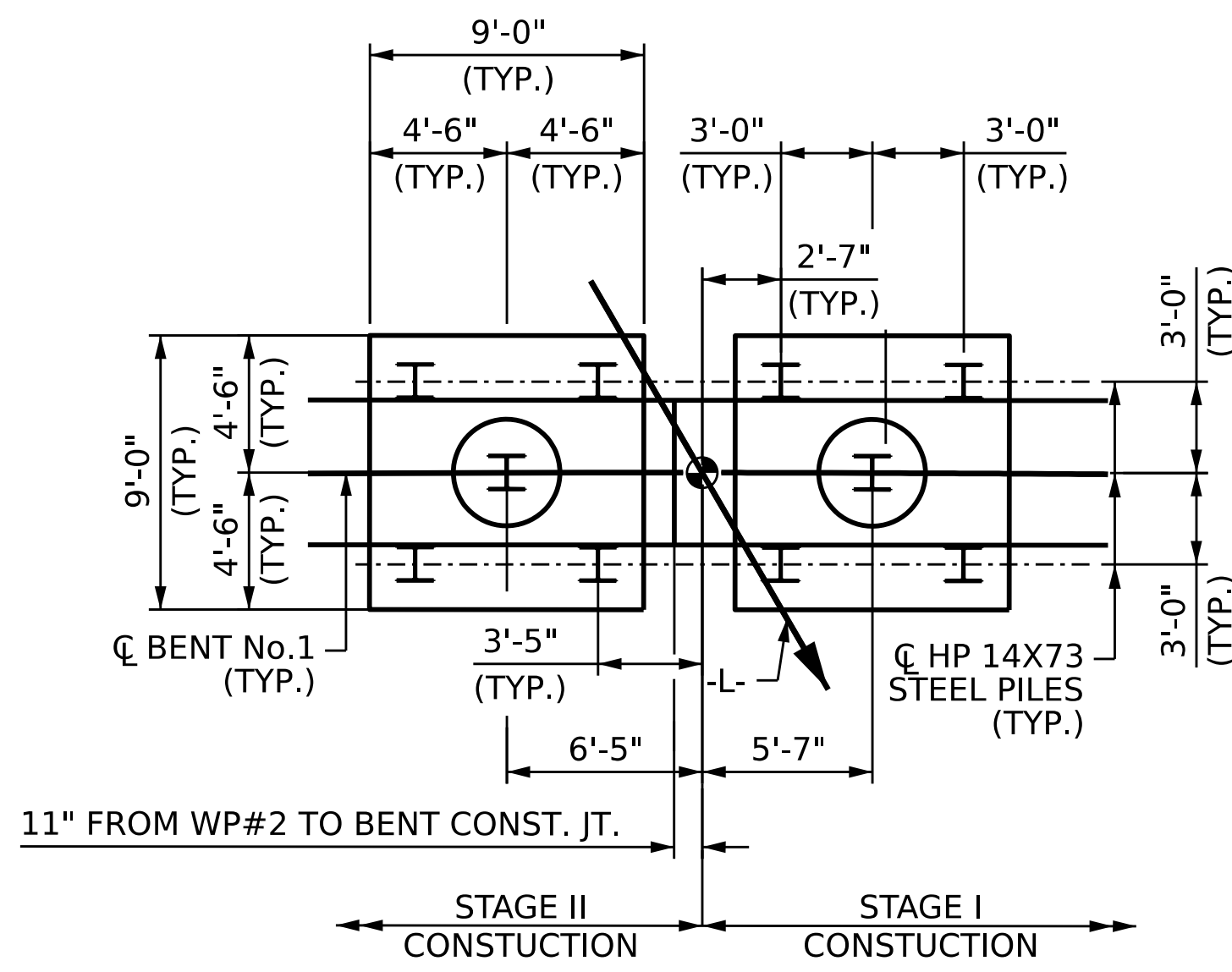


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON  
 SR-4000/UNIVERSITY PARKWAY  
 OVER US 52

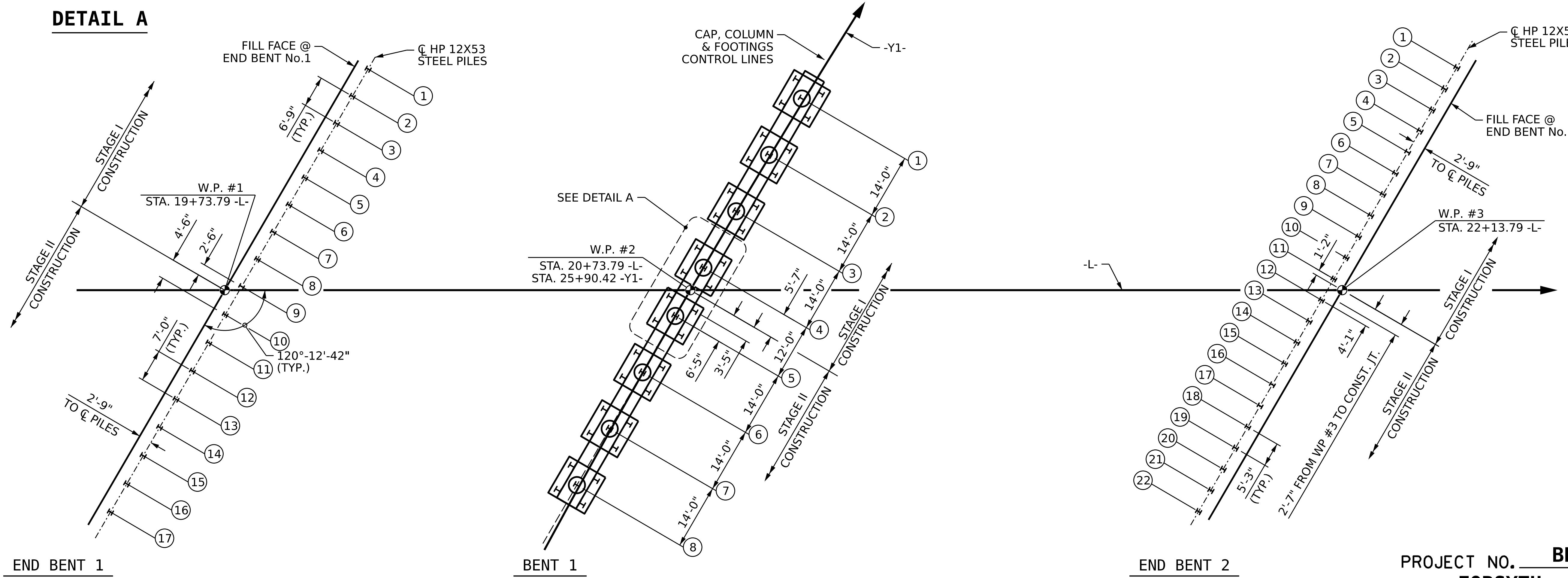
DRAWN BY : **E. MOHAMED/AAI/NBS** DATE : **10/2025**  
 CHECKED BY : **A. SORSENGINH** DATE : **10/2025**  
 DESIGN ENGINEER OF RECORD : **A. IGHWAIR** DATE : **10/2025**

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REVISIONS						SHEET NO. S-02
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 53
2			4			



**DETAIL A**



**FOUNDATION LAYOUT- FINAL STAGE**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 3 OF 5



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON  
 SR-4000/UNIVERSITY PARKWAY  
 OVER US 52

DRAWN BY : E. MOHAMED/AI/NBS DATE : 10/2025  
 CHECKED BY : A. SORSENGINH DATE : 10/2025  
 DESIGN ENGINEER OF RECORD : A. IGHWAIR DATE : 10/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-03
2			4			TOTAL SHEETS 53

**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")	Number of Piles per Line	Factored Resistance per Pile <b>KIPS</b>	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		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile <b>KIPS</b>	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent No. 1, Piles 1-13	13	225		45			375							
End Bent No. 1, Piles 14-17	4	225		55			375							
Bent No. 1, Footings 1-6	30	240		25			400							
Bent No. 1, Footings 7-8	10	240		45			400							
End Bent No. 2, Piles 1-4	4	240		45			400							
End Bent No. 2, Piles 5-22	18	240		55			400							
<b>TOTAL QUANTITY:</b>														

\*  $RDR = \frac{\text{Factored Resistance} + \text{Factored Drag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \text{Nominal Drag Load Resistance} + \text{Nominal Resistance from Scourable Material}$

\*\* 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.

**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 <b>KIPS</b>	Factored Drag Load per Pile <b>KIPS</b>	Factored Dead Load * per Pile <b>KIPS</b>	Dynamic Resistance Factor	Nominal Drag Resistance per Pile <b>KIPS</b>	Nominal Scour Resistance per Pile <b>KIPS</b>
End Bent No.1	225			0.60		
Bent No. 1	240			0.60		
End Bent No.2	240			0.60		
<b>TOTAL QUANTITY:</b>						

\* 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 EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
<b>TOTAL QUANTITY:</b>				

**SUMMARY OF DPT/PILE ORDER LENGTHS**

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing (DPT)		
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	DPT Test Pile Length FT	DPT Testing Quantity EACH
<b>TOTAL QUANTITY:</b>		

Pile Order Lengths for Concrete Piles	
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	Pile Order Length Basis* EST or DPT
<b>TOTAL QUANTITY:</b>	

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

**NOTES**

THE PILE FOUNDATION TABLES ARE BASED ON THE BRIDGE SUBSTRUCTURE DESIGN AND FOUNDATION RECOMMENDATIONS SEALED BY A NORTH CAROLINA PROFESSIONAL ENGINEER (MICHAEL H. STEPHENS, #028893) ON 01-31-2025.

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 REQUIRED DRIVING RESISTANCE.

THE ENGINEER MAY ADJUST THE QUANTITY FOR DPT TESTING AND PIPE PILE PLATES WHEN NECESSARY.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MSE ABUTMENT WALLS, END BENTS AND BRIDGE APPROACH FILLS, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NOS.1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40,000 FT-LBS TO 55,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NOS. 1 AND 2 AND BENT NO. 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

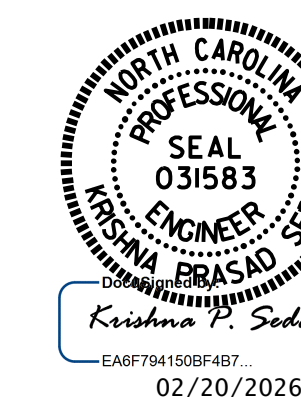
DRIVE PILES AT END BENT NOS. 1 AND 2 PRIOR TO THE CONSTRUCTION OF MSE ABUTMENT WALLS.

PROJECT NO. **BR-0168**

**FORSYTH** COUNTY

STATION: **20+73.79 -L-**

SHEET 4 OF 5



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

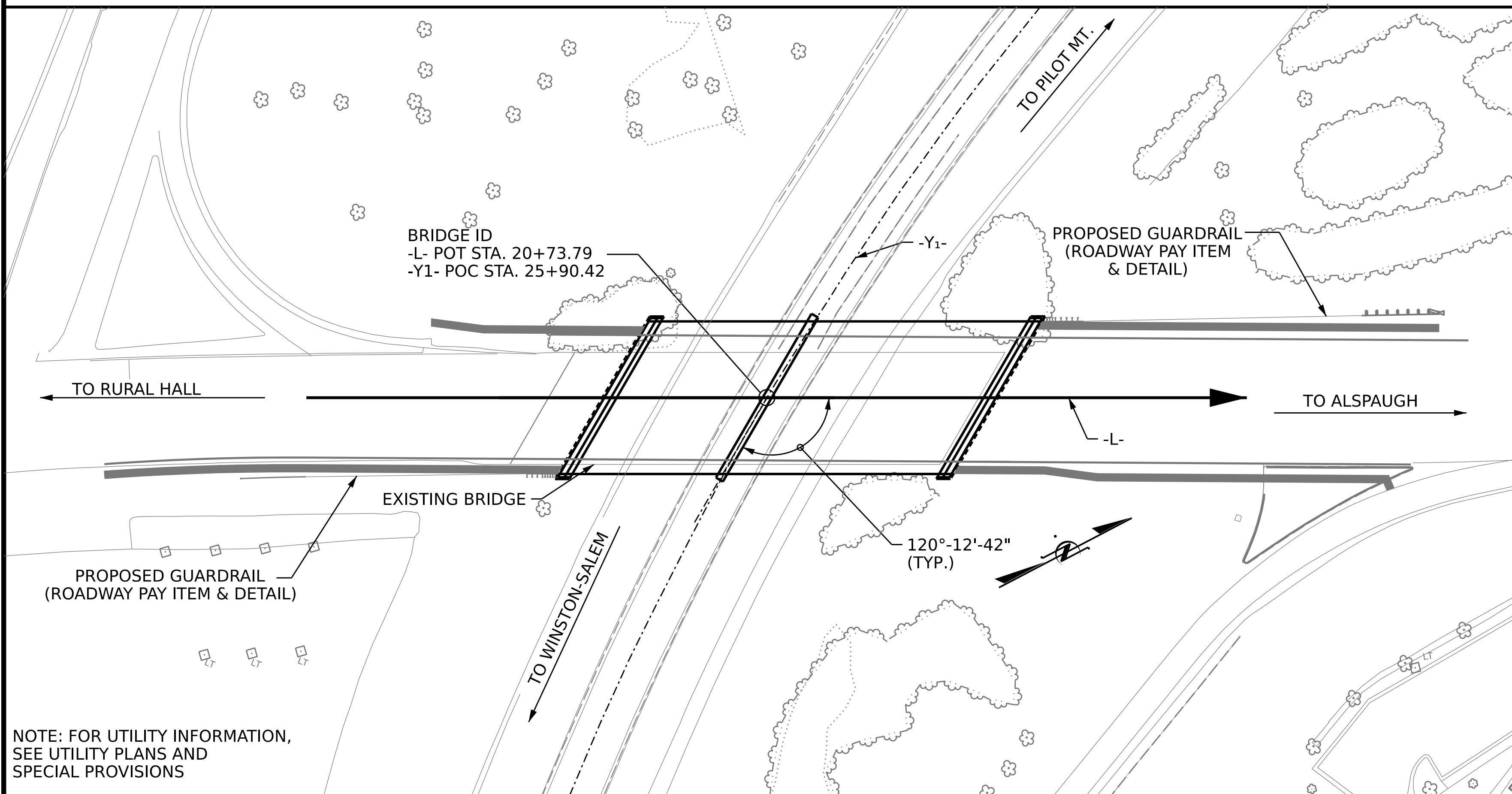
**PILE FOUNDATION TABLES**

DRAWN BY : E. MOHAMED DATE : 04/2025  
 CHECKED BY : A. SORSENGINH DATE : 04/2025  
 DESIGN ENGINEER OF RECORD : A. IGHWAIR DATE : 04/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-04
1			3			TOTAL SHEETS
2			4			53

BM#1: RR SPIKE IN 24" OAK, 273.14' LT. OF STA. 11+24.80 -L- , EL. 804.70



**LOCATION SKETCH**

**NOTES:**

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- 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.
- FOR TEMPORARY GUARDRAIL, SEE TRAFFIC MANAGEMENT PLANS.
- TEMPORARY SHORING WILL BE REQUIRED IN THE AREAS INDICATED IN THE PLAN VIEW
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 56 FT. EACH SIDE OF THE CENTERLINE ROADWAY AS DIRRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURES AT STATION 20+73.79 -L-, SEE SPECIAL PROVISIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 20+73.79 -L-."

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

THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATIONS ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

FOR MSE WALLS, SEE GEOTECHNICAL SPECIAL PROVISIONS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING BRIDGE CONSISTING OF 4 SPANS (1 @ 62'-6", 1 @ 71'-6", 1 @ 66'-0" AND 1 @ 62'-6") SHALL BE REMOVED. THE SUPERSTRUCTURE HAS A CLEAR ROADWAY WIDTH OF 68'-0" WITH REINFORCED CONCRETE DECK ON PRECAST PRESTRESSED CONCRETE GIRDERS. THE END BENTS CONSIST OF REINFORCED CONCRETE CAP AND PRECAST PRESTRESSED CONCRETE PILES. INTERIOR BENTS CONSIST OF REINFORCED CONCRETE CAPS WITH 5 CONCRETE COLUMNS ON SPREAD FOOTINGS. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING THE CONSTRUCTION OF THE PROPOSED BRIDGE, THE LOAD LIMIT MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE EXISTING BRIDGE WILL BE IN SERVICE DURING CONSTRUCTION OF THE REPLACEMENT STRUCTURE. FOR DETAILS REGARDING CONSTRUCTION STAGING AND REQUIREMENTS FOR TEMPORARY SHORING, SEE TRAFFIC MANAGEMENT PLANS.

FOR 63" F.I.B. PRESTRESSED CONCRETE GIRDERS, SEE STANDARD SPECIFICATIONS.

**TOTAL BILL OF MATERIAL**

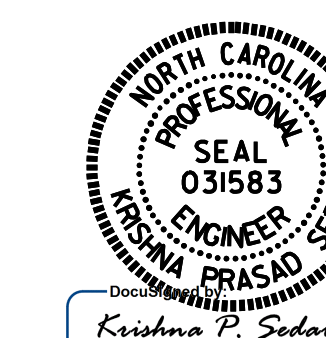
	REMOVAL OF EXISTING STRUCTURE AT STATION 20+73.79 -L-	ASBESTOS ASSESMENT	FOUNDATION EXCAVATION FOR BENT NO.1 AT STATION 20+73.79 -L-	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLAB	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	FIB 63" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	EACH	EACH
SUPERSTRUCTURE					21,984	21,498					24	2811.00		
END BENT No. 1							120.6		13,634				17	
BENT No.1			LUMP SUM				250.2		28,567	4,461				40
END BENT No.2							119.9		14,122				22	
<b>TOTAL</b>	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	21,984	21,498	490.7	LUMP SUM	56,323	4,461	24	2811.00	39	40

**TOTAL BILL OF MATERIAL**

	HP 12 X 53 STEEL PILES		HP 14 X 73 STEEL PILES		TWO BAR METAL RAIL	1'-2" X 3'-3 1/2" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	STRIP SEAL EXPANSION JOINTS
	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE					458.06	474.4		LUMP SUM	LUMP SUM
END BENT No. 1	17	805					28		
BENT No.1			40	1200					
END BENT No.2	22	1170					28		
<b>TOTAL</b>	39	1975	40	1200	458.06	474.4	56	LUMP SUM	LUMP SUM

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 5 OF 5



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON  
 SR-4000/ UNIVERISTY PARKWAY  
 OVER US 52

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

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DRAWN BY : E. MOHAMED DATE : 10/2025  
 CHECKED BY : A. SORSENGINH DATE : 10/2025  
 DESIGN ENGINEER OF RECORD: A. IGHWAIR DATE : 10/2025

## 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			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS (VLL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS (VLL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD	HL-93(Inventory)	N/A	1	1.088	--	1.75	0.721	1.252	B	ER	67.86	0.829	1.214	B	ER	40.71	0.80	0.721	1.088	B	1	67.86		
	HL-93(Operating)	N/A	--	1.573	--	1.35	0.721	1.622	B	ER	67.86	0.829	1.573	B	ER	40.71	N/A	--	--	--	--	--		
	HS-20(Inventory)	36.000	2	1.574	56.650	1.75	0.772	1.867	A	EL	47.86	0.826	1.574	A	EL	38.28	0.80	0.772	1.770	A	1	47.86		
	HS-20(Operating)	36.000	--	2.040	73.435	1.35	0.772	2.420	A	EL	47.86	0.826	2.040	A	EL	38.28	N/A	--	--	--	--	--		
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500	--	4.179	56.411	1.40	0.772	5.511	A	EL	47.86	0.826	4.601	A	EL	38.28	0.80	0.772	4.179	A	1	47.86	
		SNGARBS2	20.000	--	3.034	60.677	1.40	0.772	4.001	A	EL	47.86	0.826	3.297	A	EL	38.28	0.80	0.772	3.034	A	1	47.86	
		SNAGRIS2	22.000	--	2.841	62.496	1.40	0.772	3.747	A	EL	47.86	0.826	3.070	A	EL	38.28	0.80	0.772	2.841	A	1	47.86	
		SNCOTTS3	27.250	--	2.077	56.599	1.40	0.772	2.739	A	EL	47.86	0.826	2.299	A	EL	38.28	0.80	0.772	2.077	A	1	47.86	
		SNAGGRS4	34.925	--	1.705	59.543	1.40	0.772	2.249	A	EL	47.86	0.826	1.926	A	EL	38.28	0.80	0.772	1.705	A	1	47.86	
		SNS5A	35.550	--	1.669	59.342	1.40	0.772	2.202	A	EL	47.86	0.826	1.960	A	EL	38.28	0.80	0.772	1.669	A	1	47.86	
		SNS6A	39.950	--	1.519	60.682	1.40	0.772	2.003	A	EL	47.86	0.826	1.796	A	EL	38.28	0.80	0.772	1.519	A	1	47.86	
	SNS7B	42.000	--	1.446	60.734	1.40	0.772	1.907	A	EL	47.86	0.826	1.774	A	EL	22.33	0.80	0.772	1.446	A	1	47.86		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.849	61.003	1.40	0.772	2.438	A	EL	47.86	0.826	2.131	A	EL	38.28	0.80	0.772	1.849	A	1	47.86	
		TNT4A	33.075	--	1.853	61.299	1.40	0.772	2.444	A	EL	47.86	0.826	2.069	A	EL	38.28	0.80	0.772	1.853	A	1	47.86	
		TNT6A	41.600	--	1.504	62.548	1.40	0.772	1.983	A	EL	47.86	0.826	1.907	A	EL	38.28	0.80	0.772	1.504	A	1	47.86	
		TNT7A	42.000	--	1.505	63.203	1.40	0.772	1.985	A	EL	47.86	0.826	1.866	A	EL	38.28	0.80	0.772	1.505	A	1	47.86	
		TNT7B	42.000	--	1.542	64.749	1.40	0.772	2.033	A	EL	47.86	0.826	1.725	A	EL	38.28	0.80	0.772	1.542	A	1	47.86	
		TNAGRIT4	43.000	--	1.478	63.545	1.40	0.772	1.949	A	EL	47.86	0.826	1.667	A	EL	38.28	0.80	0.772	1.478	A	1	47.86	
TNAGT5A		45.000	--	1.399	62.941	1.40	0.772	1.845	A	EL	47.86	0.826	1.668	A	EL	38.28	0.80	0.772	1.399	A	1	47.86		
TNAGT5B	45.000	3	1.387	62.394	1.40	0.772	1.829	A	EL	47.86	0.826	1.585	A	EL	38.28	0.80	0.772	1.387	A	1	47.86			
EV LOAD RATING	EV2	28.750	--	2.135	61.386	1.30	0.772	3.033	A	EL	47.86	0.826	2.493	A	EL	38.28	0.80	0.772	2.135	A	1	47.86		
	EV3	43.000	4	1.406	60.466	1.30	0.772	1.997	A	EL	47.86	0.826	1.683	A	EL	38.28	0.80	0.772	1.406	A	1	47.86		

**LOAD FACTORS:**

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.5
	SERVICE III	1.00	1.00

**NOTES:**

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

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

# CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING \*\*

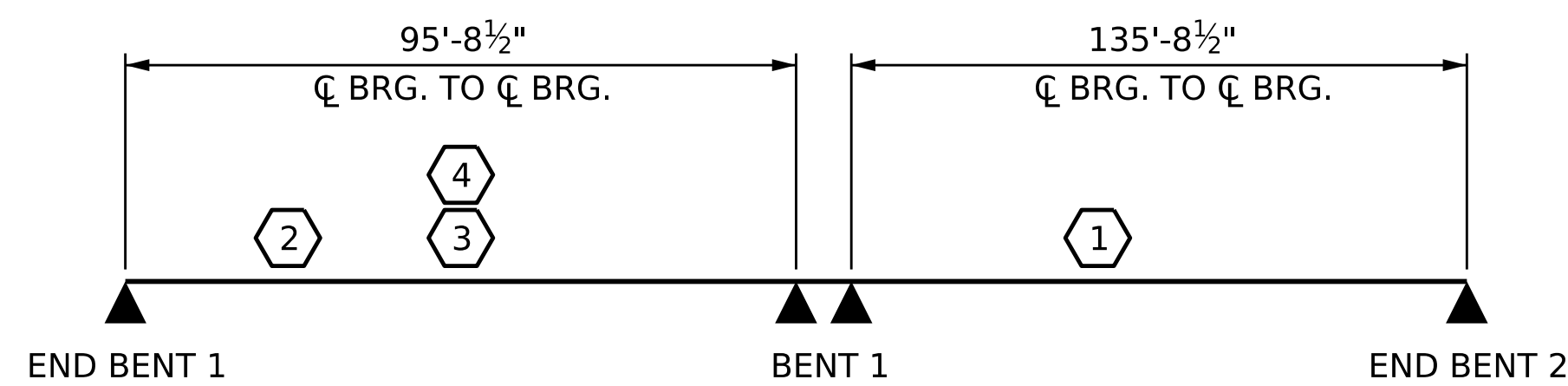
4 EMERGENCY VEHICLE LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

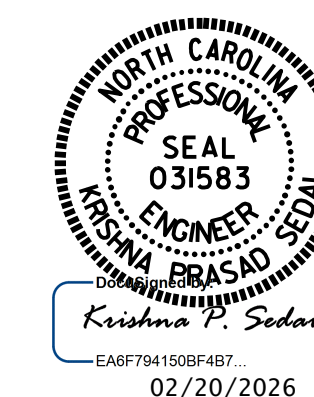
**GIRDER LOCATION**

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



**LRFR SUMMARY**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

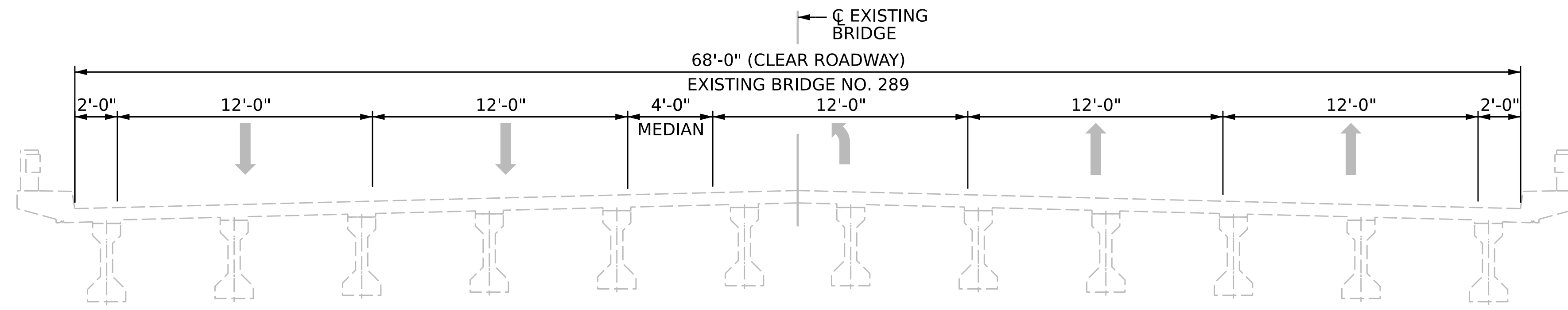


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE GIRDERS  
 (NON-INTERSTATE TRAFFIC)**

DRAWN BY : E. MOHAMED DATE : 05/2025  
 CHECKED BY : A. SORSENGINH DATE : 05/2025  
 DESIGN ENGINEER OF RECORD : A. IGHWAIR DATE : 05/2025

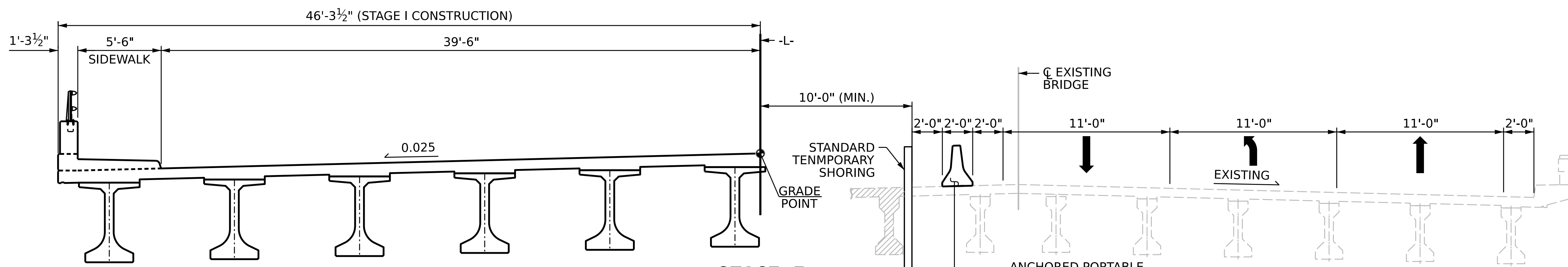
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 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-06
1			3			TOTAL SHEETS
2			4			53



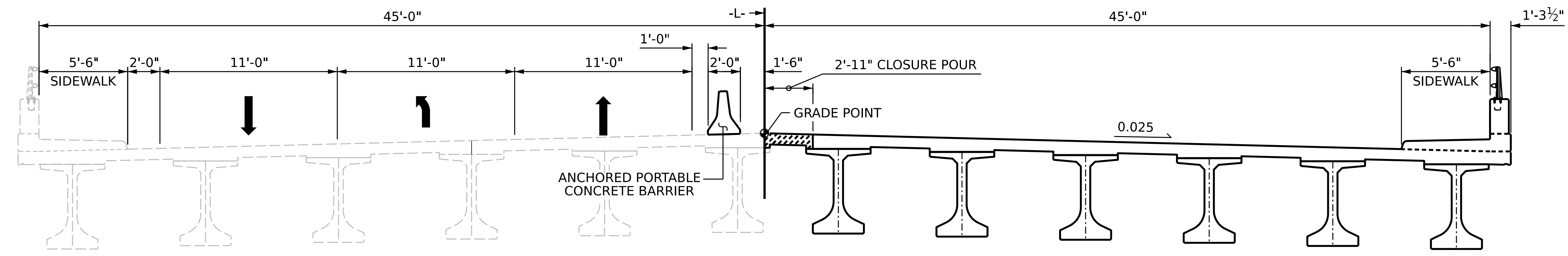
**EXISTING SECTION**

**NOTES:**  
 FOR PHASING, MAINTENANCE OF TRAFFIC, LOCATION OF TEMPORARY SHORING AND PORTABLE CONCRETE BARRIER, SEE TRAFFIC CONTROL PLANS.



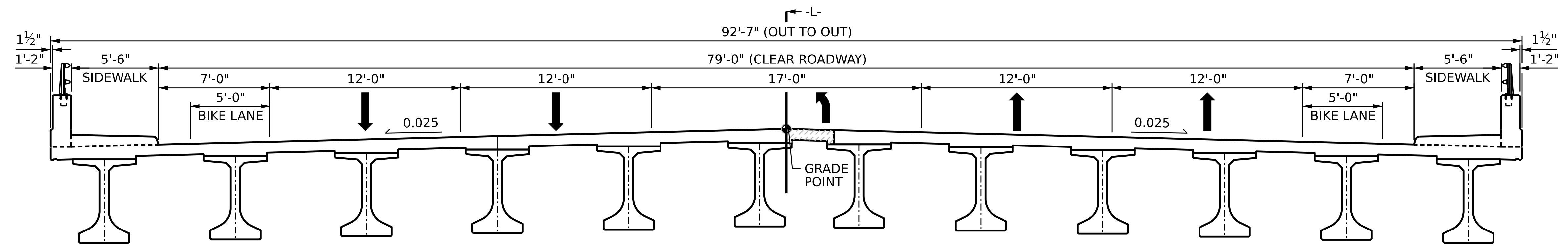
**STAGE I**

TRANSFER ALL TRAFFIC TO RIGHT SIDE OF EXISTING BRIDGE NO.289  
 DEMOLISH LEFT SIDE EXISTING BRIDGE NO.289  
 CONSTRUCT LEFT SIDE OF PROPOSED BRIDGE



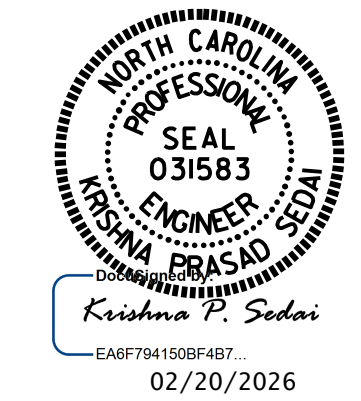
**STAGE II & CLOSURE POUR**

TRANSFER ALL TRAFFIC TO LEFT SIDE OF PROPOSED BRIDGE  
 CONSTRUCT RIGHT SIDE OF PROPOSED BRIDGE AND CLOSURE POUR



**FINAL TYPICAL SECTION**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**



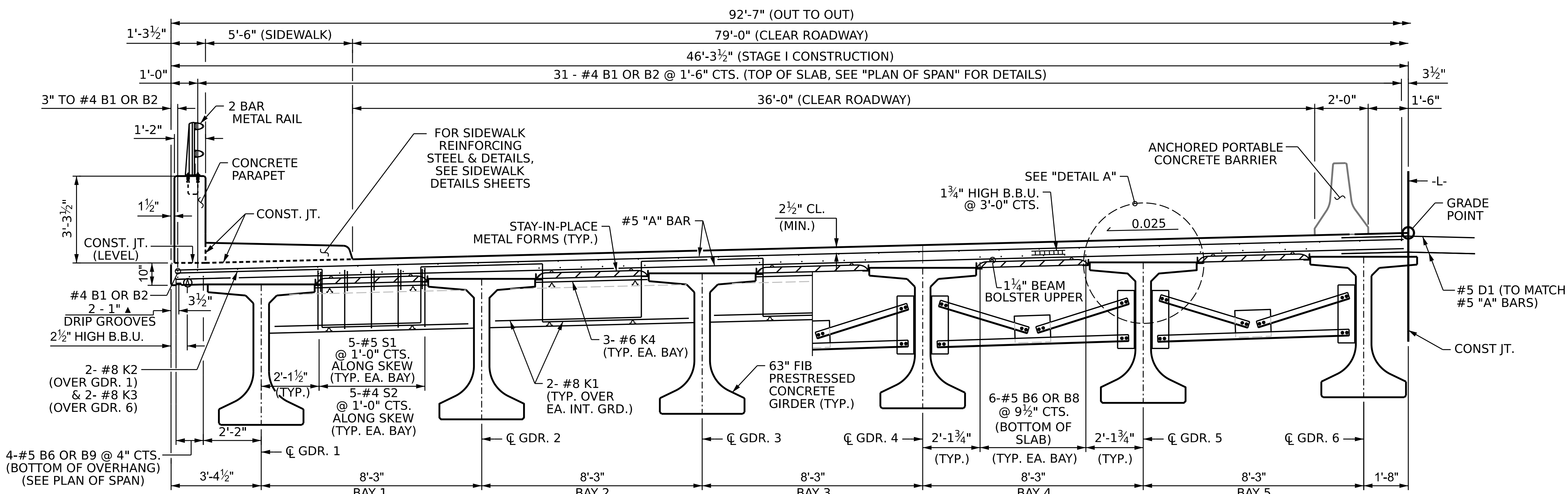
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**CONSTRUCTION SEQUENCE**

DRAWN BY : **E. MOHAMED** DATE : **05/2025**  
 CHECKED BY : **A. SORSENGINH** DATE : **05/2025**  
 DESIGN ENGINEER OF RECORD : **A. IGHWAIR** DATE : **05/2025**

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-07
1			3			TOTAL SHEETS
2			4			53



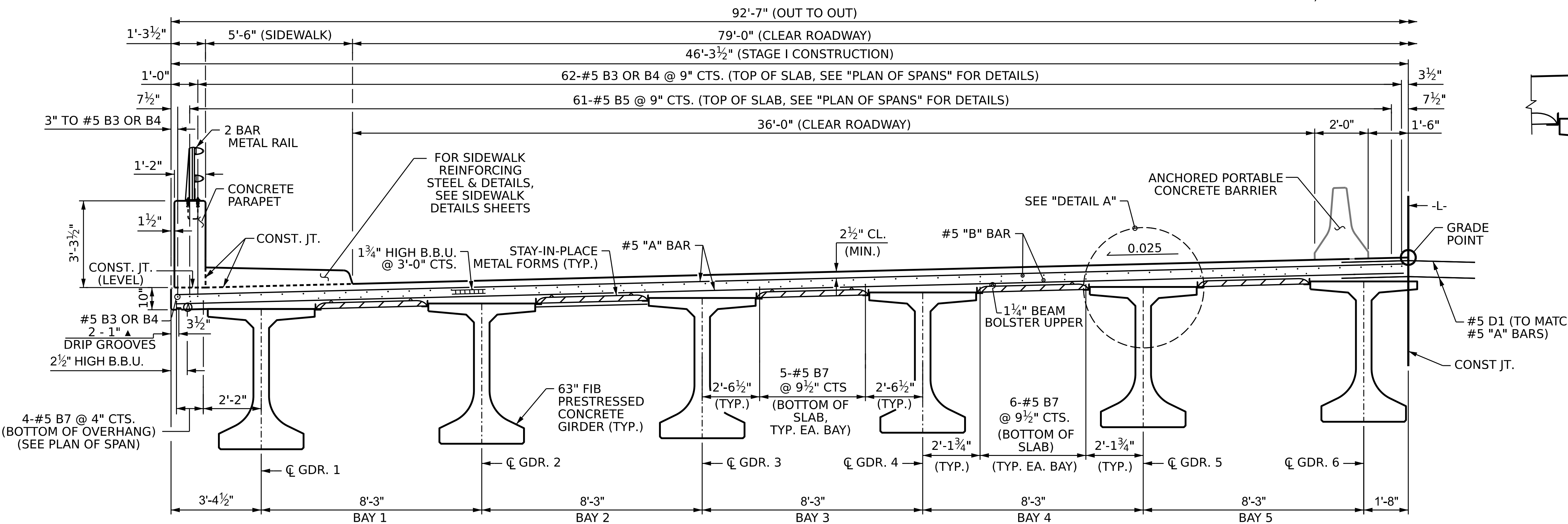
SECTION AT END BENT DIAPHRAGMS

TYPICAL SECTION

SECTION AT INTERMEDIATE DIAPHRAGMS

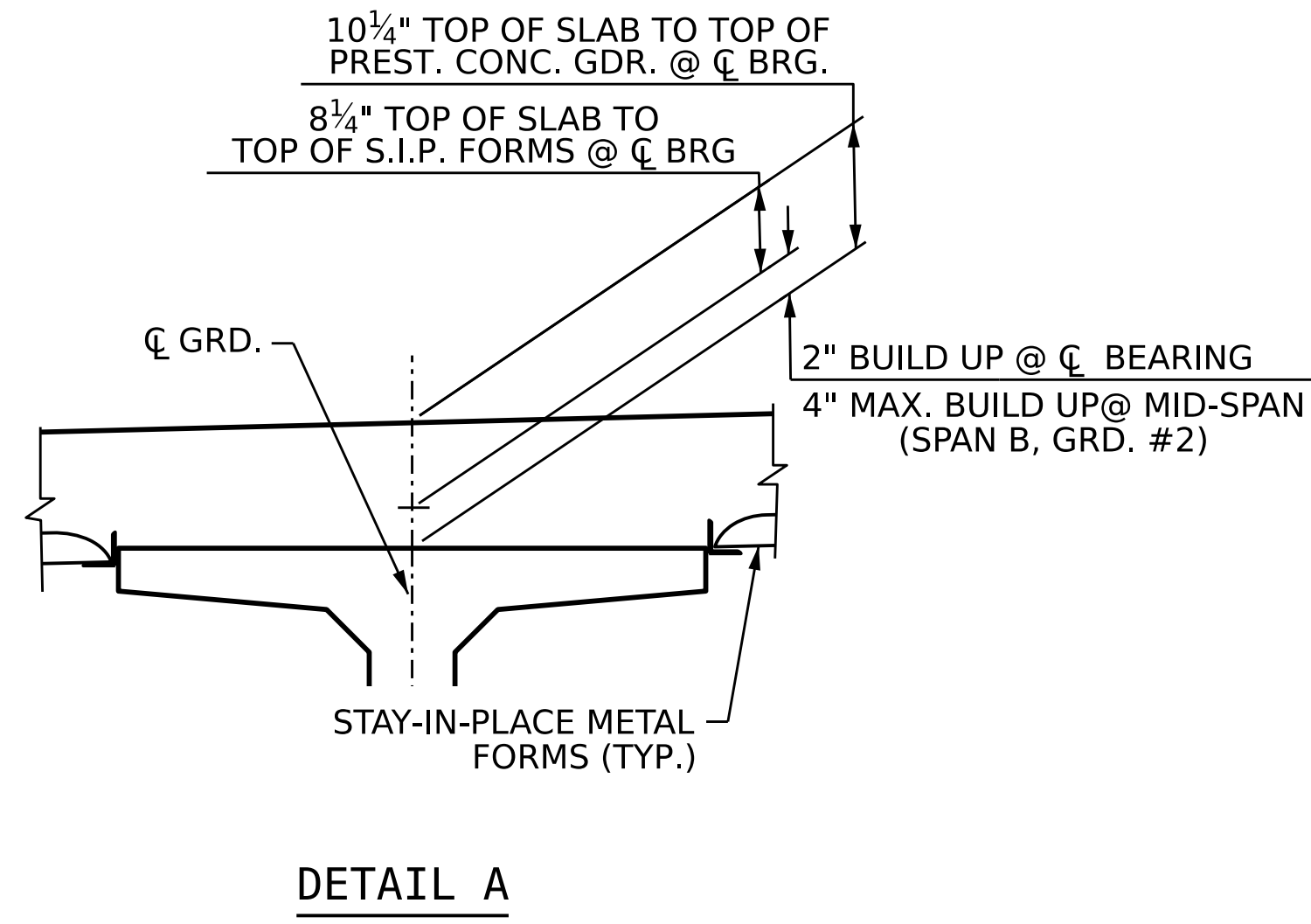
STAGE I - LEFT SIDE

(FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS. SEE "INTERMEDIATE DIAPHRAGMS FOR 63" FIB PRESTRESSED CONCRETE GIRDER")



TYPICAL SECTION AT LINK SLAB

STAGE I - LEFT SIDE



NOTES:

PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (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.

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.

CONCRETE PARAPET AND SIDE WALK IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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

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

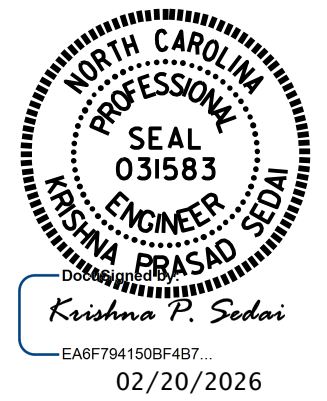
FOR SIDE WALK, 2 BAR METAL RAIL, SEE DETAILS SHEET.

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO CASTING OF SIDEWALK.

FOR STRIP SEAL EXPANSION JOINT, SEE SPECIAL PROVISIONS.

PROJECT NO. BR-0168  
FORSYTH COUNTY  
STATION: 20+73.79 -L-

SHEET 1 OF 4



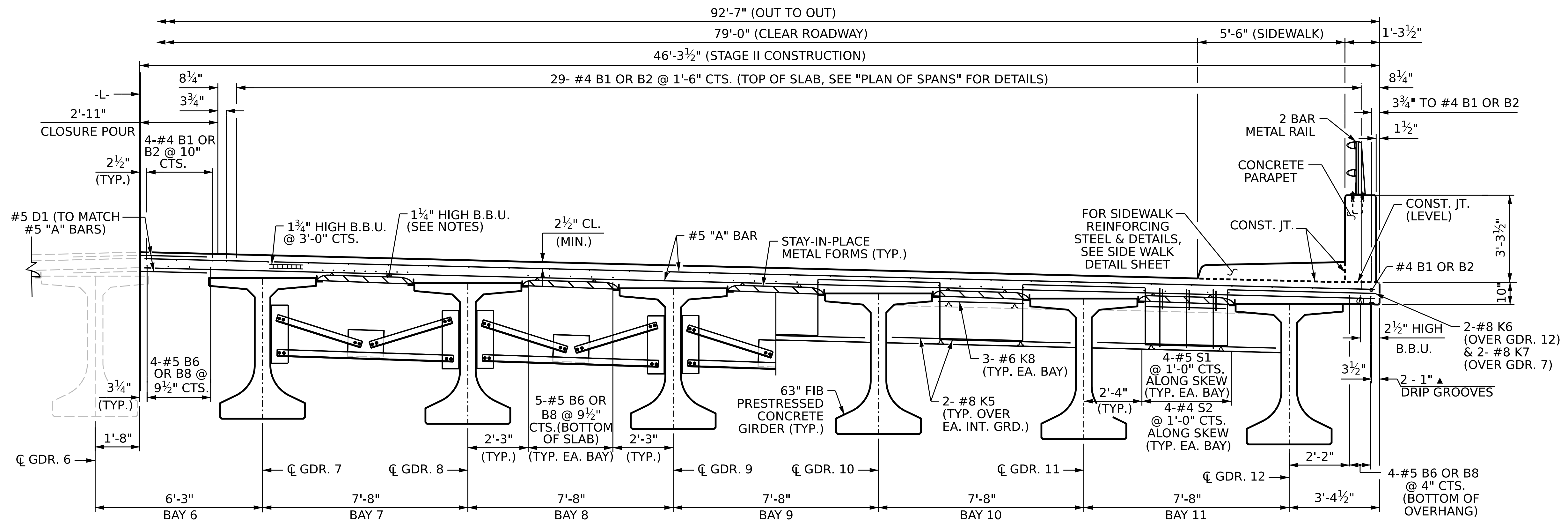
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
**TYPICAL SECTION**  
STAGE I

DRAWN BY: E. MOHAMED DATE: 03/2025  
CHECKED BY: A. SORSENGINH DATE: 03/2025  
DESIGN ENGINEER OF RECORD: A. IGHWAIR DATE: 03/2025

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2		4									

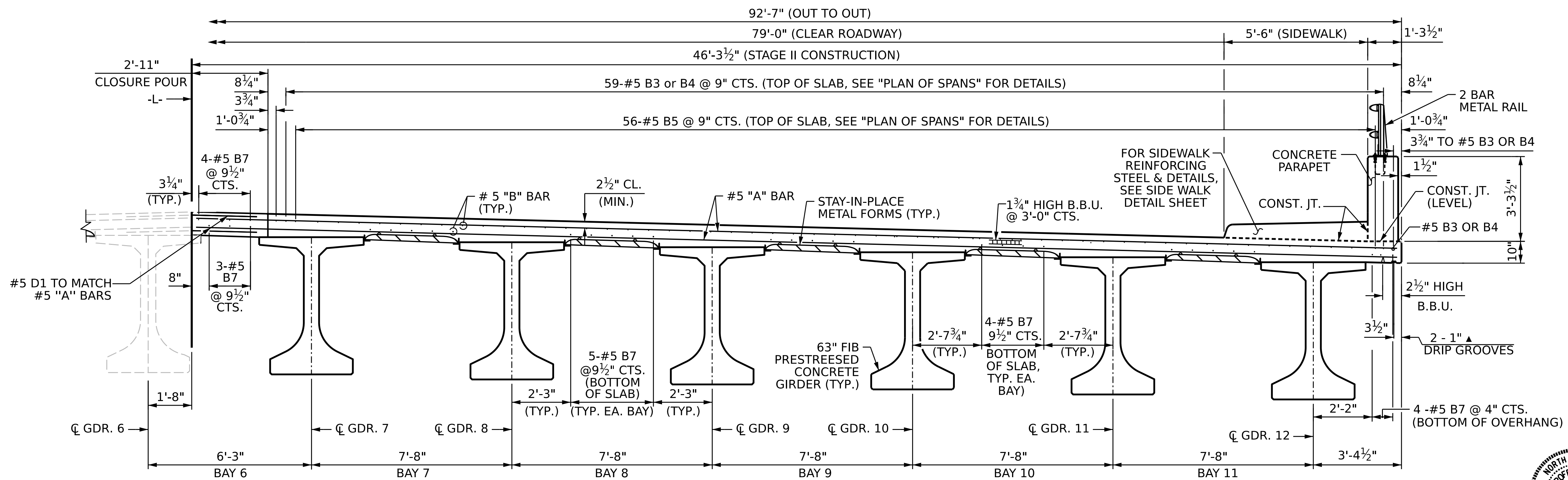
8/26/21



**SECTION AT INTERMEDIATE DIAPHRAGMS**  
 (FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FIB DETAILS" SHEET)

**TYPICAL SECTION**  
 STAGE II - RIGHT SIDE

**SECTION AT END BENT DIAPHRAGMS**



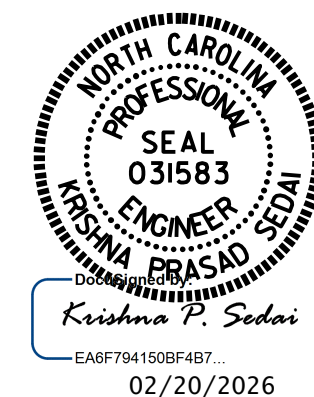
**TYPICAL SECTION AT LINK SLAB**  
 STAGE II - RIGHT SIDE

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE**  
**TYPICAL SECTION**  
**STAGE II**



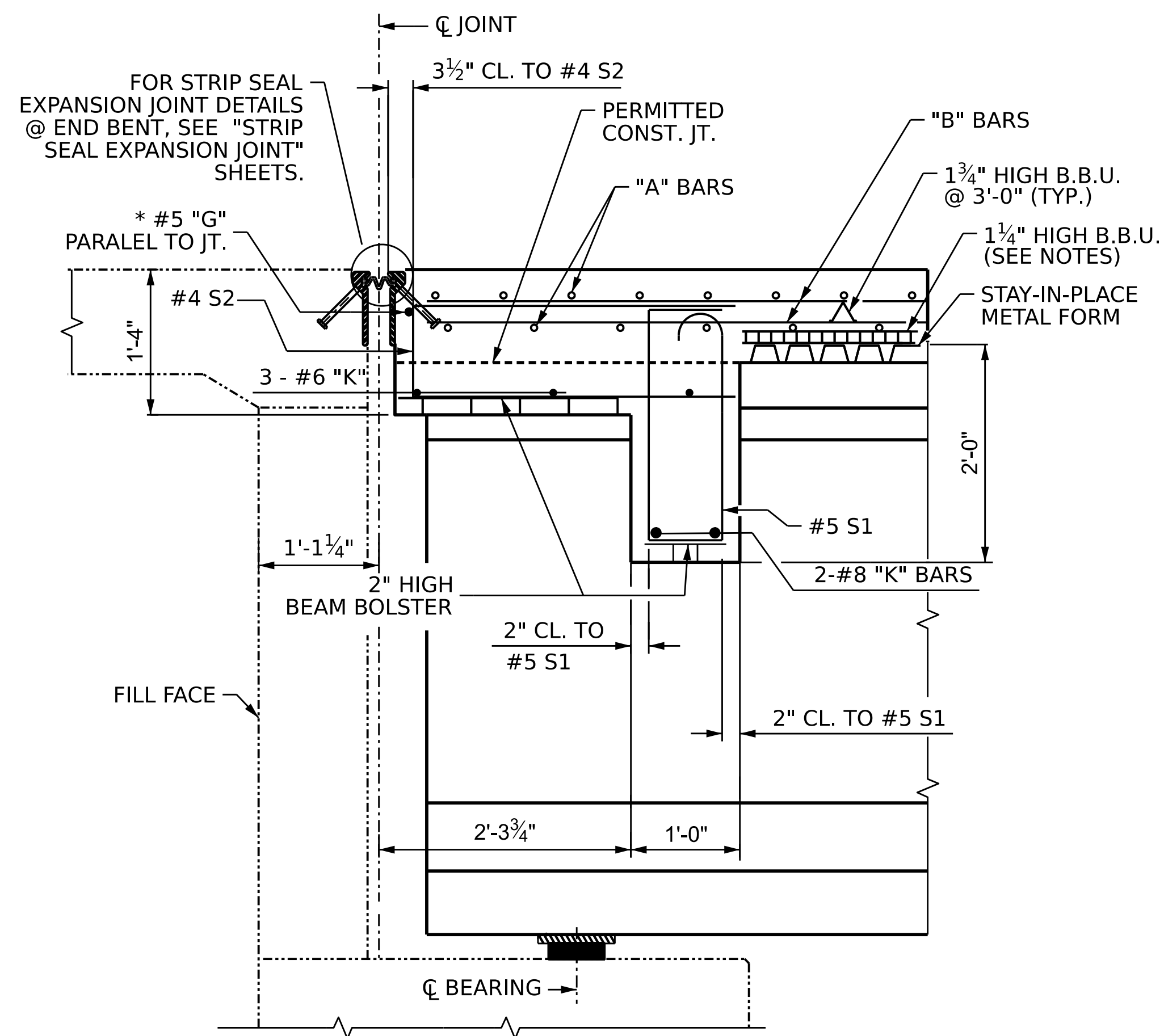
DRAWN BY : **E. MOHAMED** DATE : **03/2025**  
 CHECKED BY : **A. SORSENGINH** DATE : **03/2025**  
 DESIGN ENGINEER OF RECORD : **A. IGHWAIR** DATE : **03/2025**

2/16/2026  
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 ksedai

DOCUMENT NOT CONSIDERED  
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 SIGNATURES COMPLETED

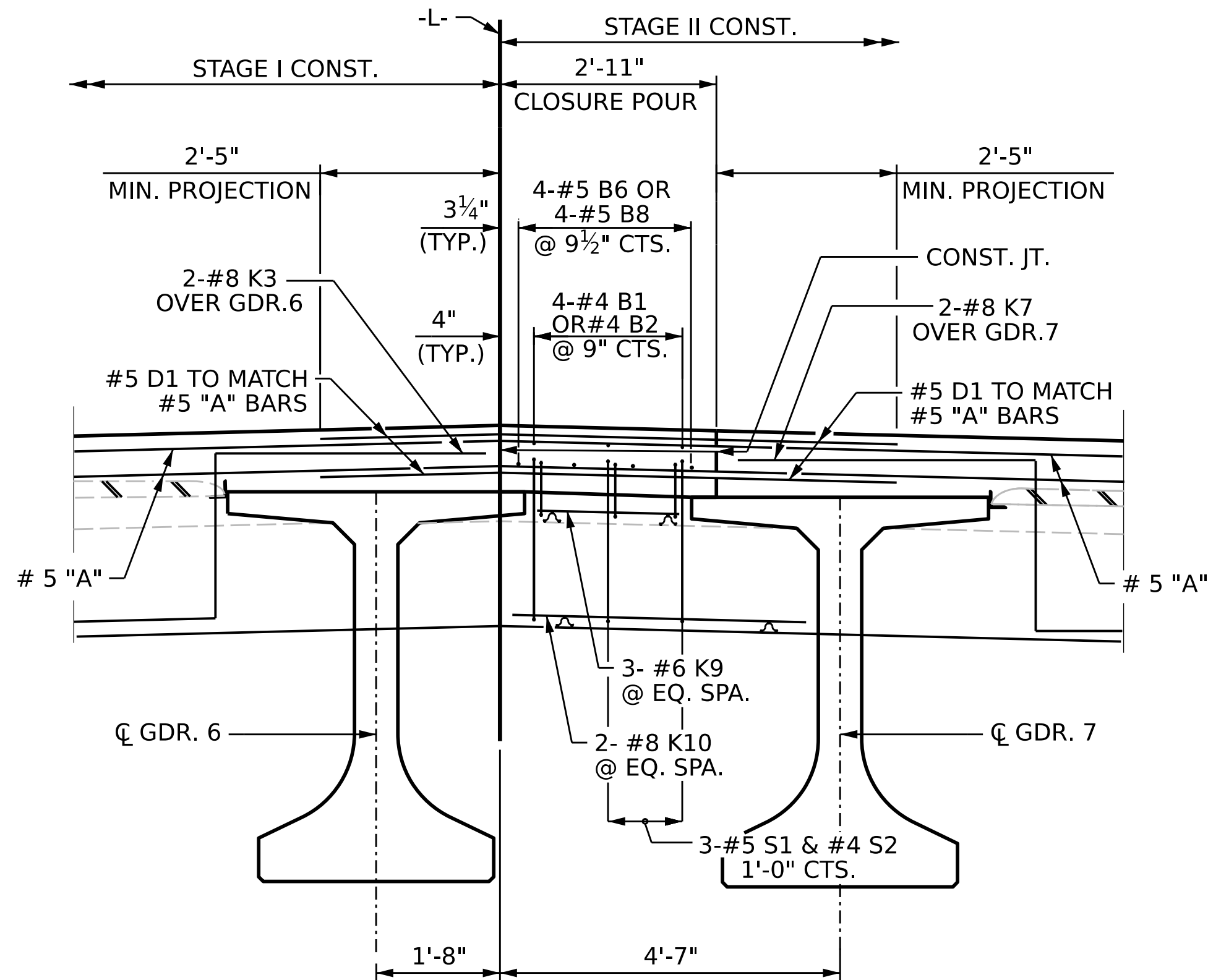
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NO.	BY:	DATE:	NO.	BY:	DATE:
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S-09  
TOTAL SHEETS  
53

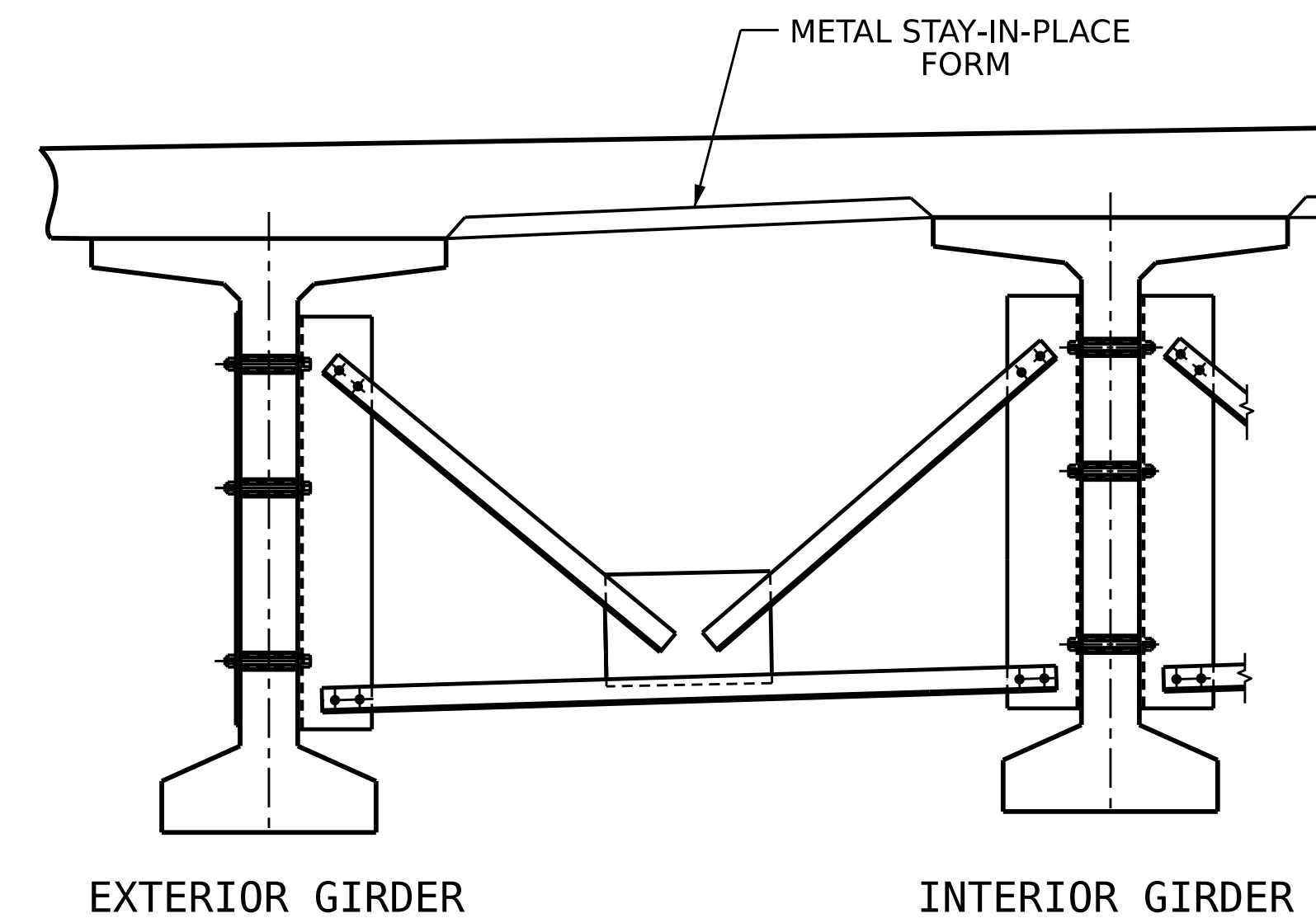


**SECTION THRU END BENT**

\* #5 G MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

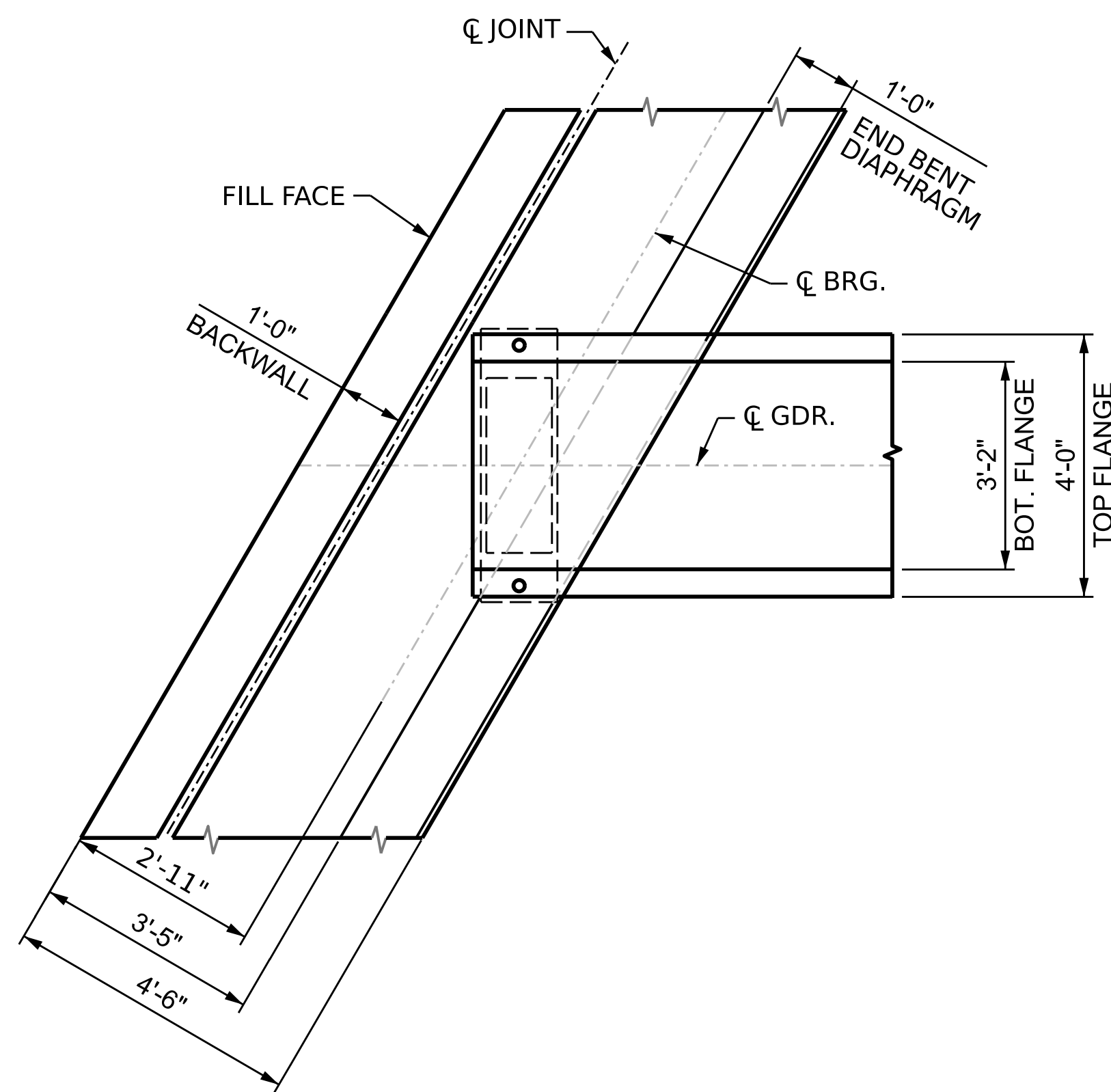


**CLOSURE POUR DETAIL**  
DECK CLOSURE POUR DETAIL @ END BENT



**SECTION @ INTERMEDIATE DIAPHRAGM**

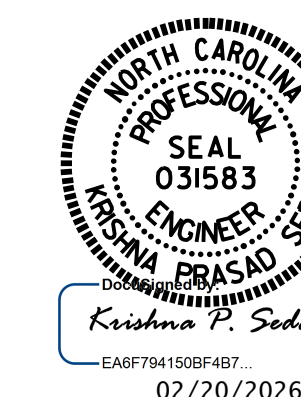
(FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FIB DETAILS" SHEET)



**PLAN VIEW @ END BENT**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
STATION: **20+73.79**

SHEET 3 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

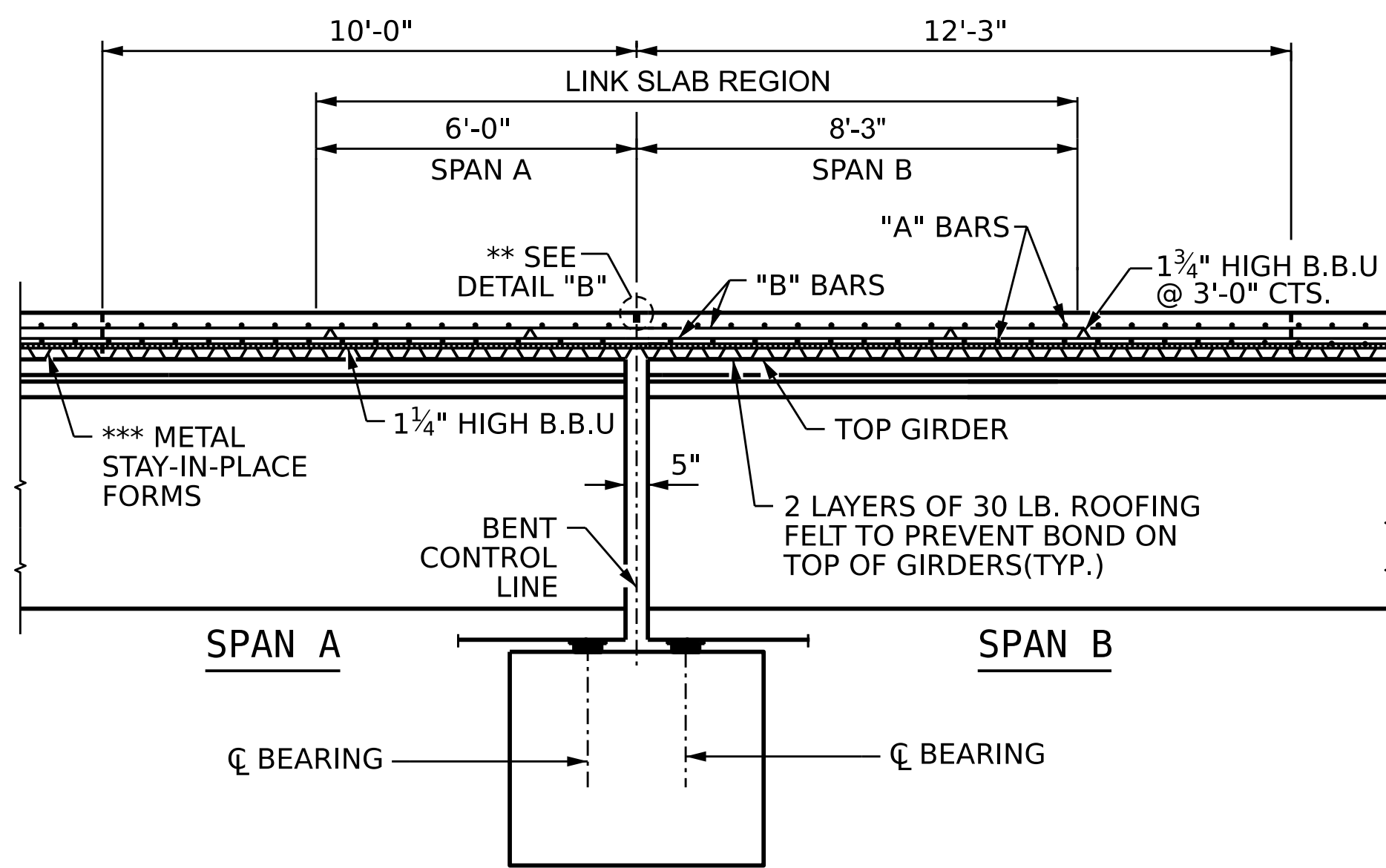
SUPERSTRUCTURE  
**TYPICAL SECTION  
DETAIL**

DRAWN BY : **E. MOHAMED** DATE : **03/2025**  
CHECKED BY : **A. SORSENGINH** DATE : **03/2025**  
DESIGN ENGINEER OF RECORD : **A. IGHWAIR** DATE : **03/2025**

2/20/2026  
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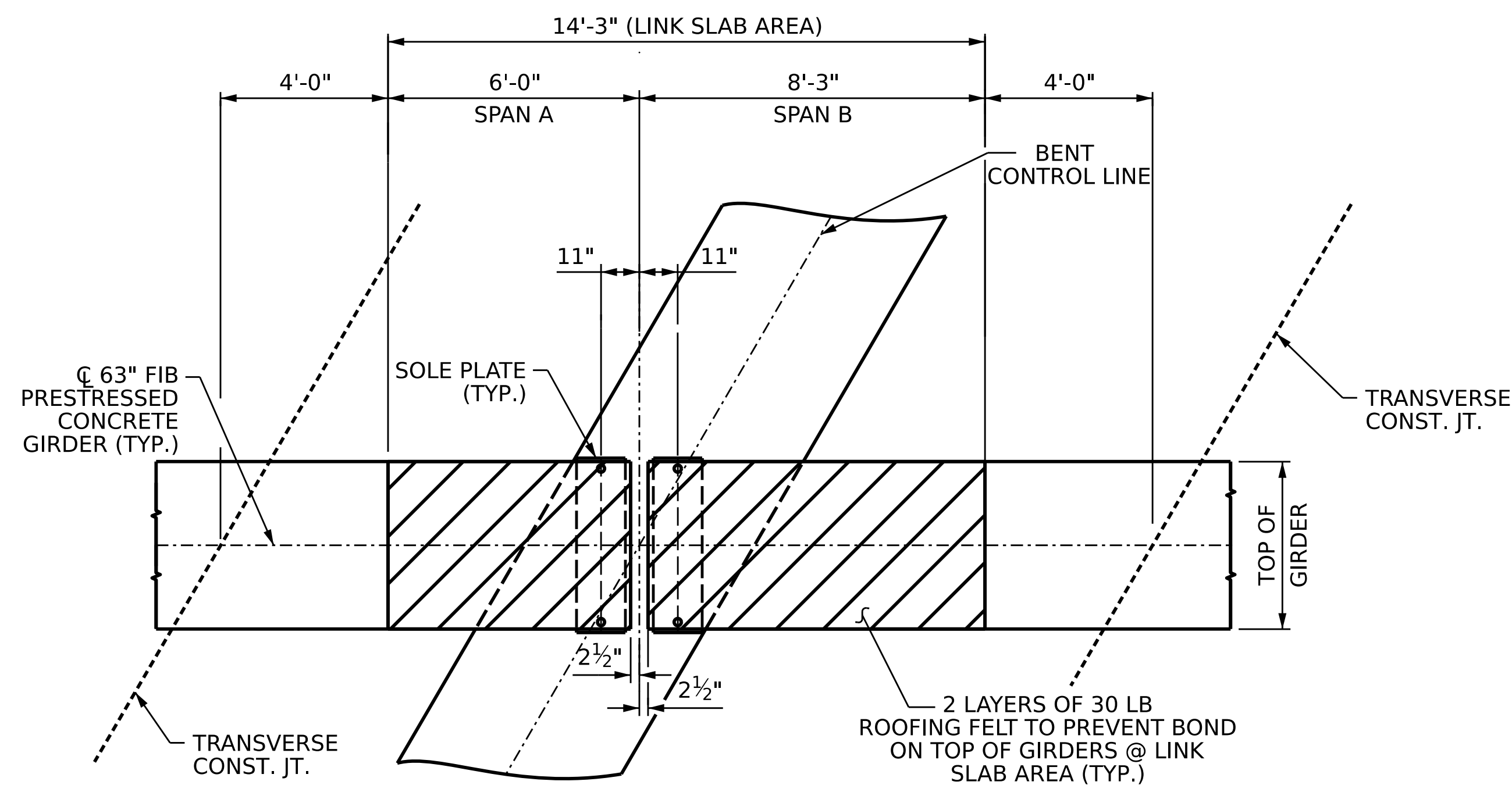
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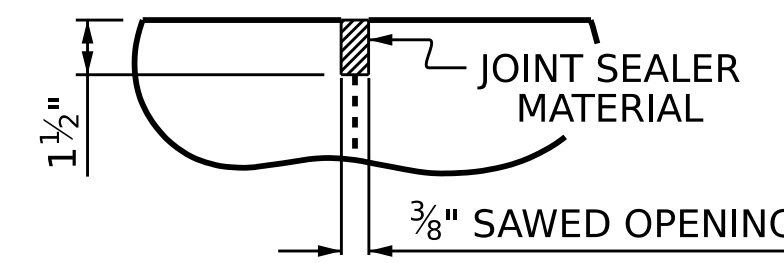
**SECTION @ LINK SLAB**

\*\*\* METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO THE GIRDER FLANGES IN THE REGION OF THE LINK SLAB

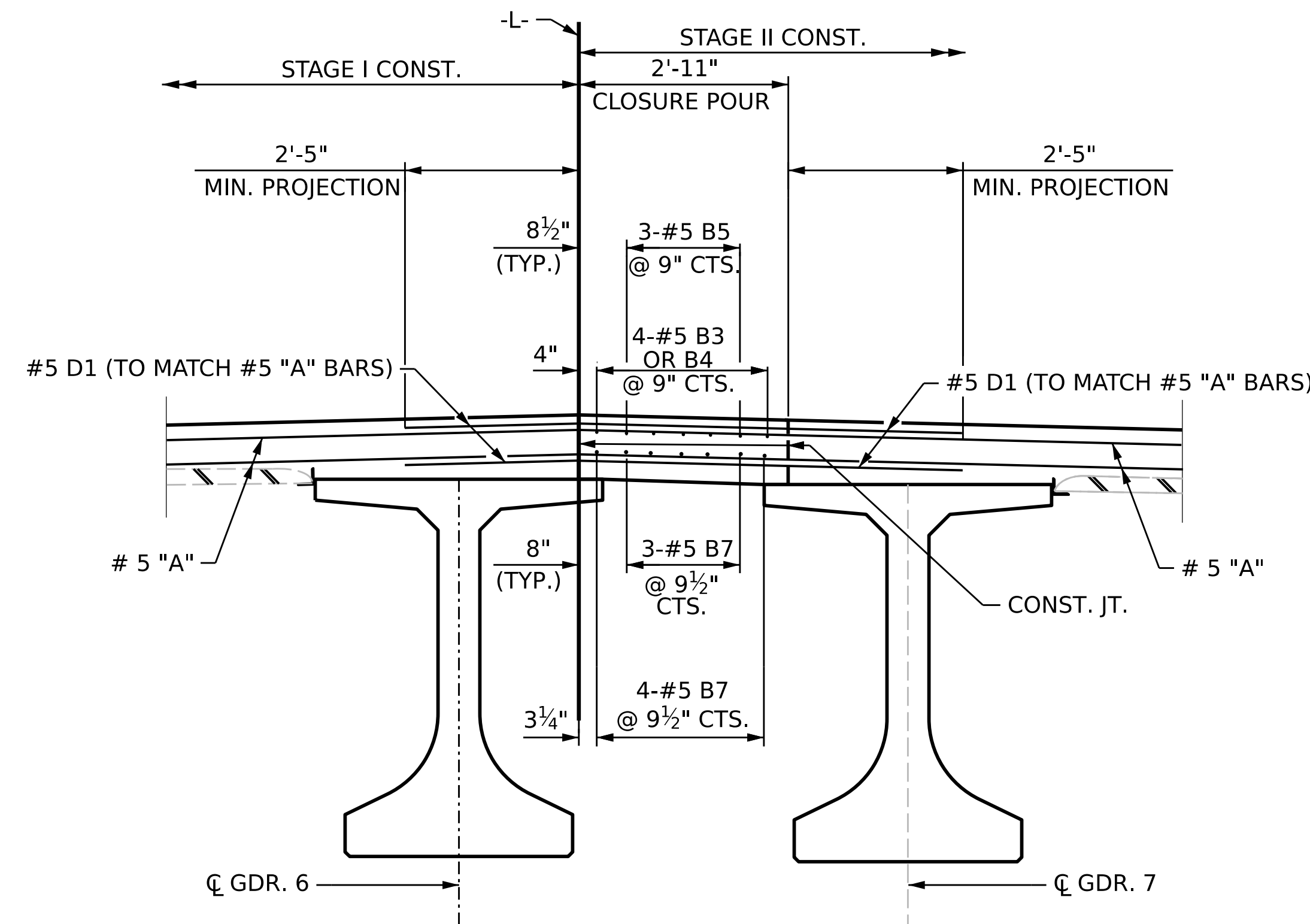


**PLAN @ BENT**

THE TOP OF THE GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS, ANCHOR STUDS, DECK FORMWORK ATTACHMENTS AND OVERHANGE FALSEWORK/FORMWORK ATTACHMENTS.



**DETAIL "B"**



**CLOSURE POUR DETAILS**

DECK CLOSURE POUR DETAIL @ LINK SLAB

**NOTES**

\*\* A 1 1/2" DEEP, 3/8" WIDE CONTRACTION JOINT AT THE BENT CONTROL LINE SHALL BE SAWED WITHIN 24 HOURS OF POURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79**

SHEET 4 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**TYPICAL SECTION  
 DETAIL @ LINK SLAB AREA**

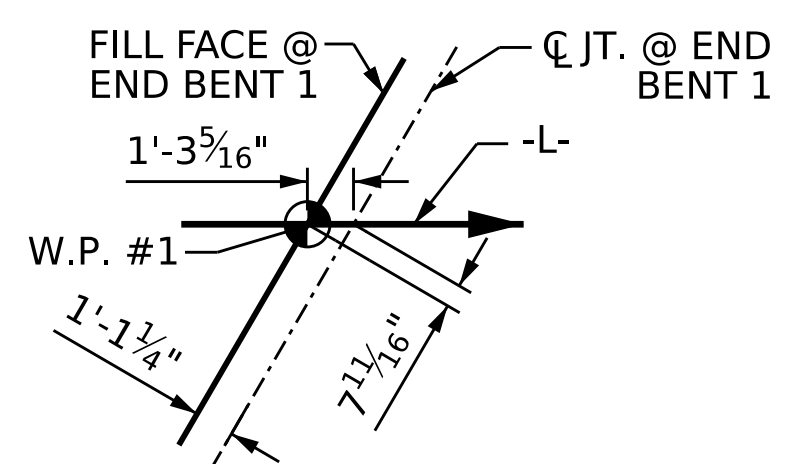
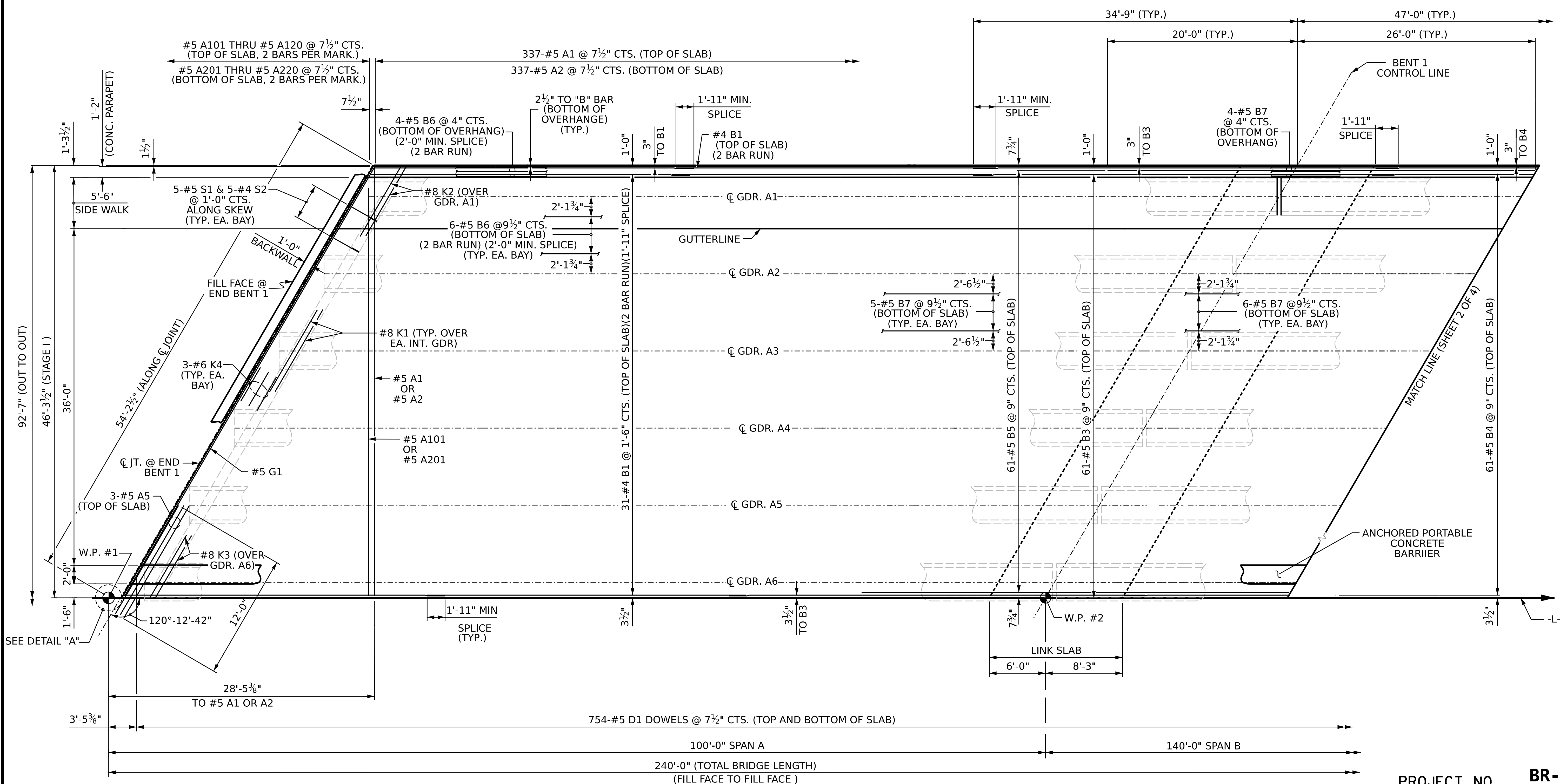
DRAWN BY : **E. MOHAMED** DATE : **03/2025**  
 CHECKED BY : **A. SORSENGINH** DATE : **03/2025**  
 DESIGN ENGINEER OF RECORD : **A. IGHWAIR** DATE : **03/2025**

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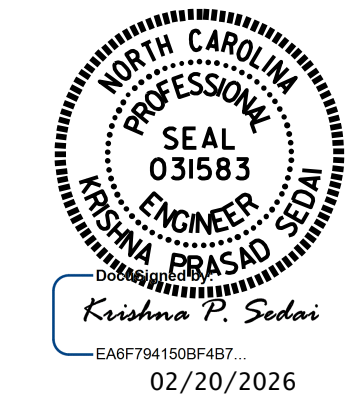
8/26/21



**DETAIL A**  
END BENT 1 SHOWN  
END BENT 2 SIMILAR

**SPAN A**  
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS,  
SEE "INTERMEDIATE STEEL DIAPHRAGMS  
FOR 63' FIB DETAILS" SHEET.  
FOR LOCATION OF TRANSVERSE CONSTRUCTION  
JOINTS, SEE SHEET S-35

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
STATION: **20+73.79 -L-**  
SHEET 1 OF 4



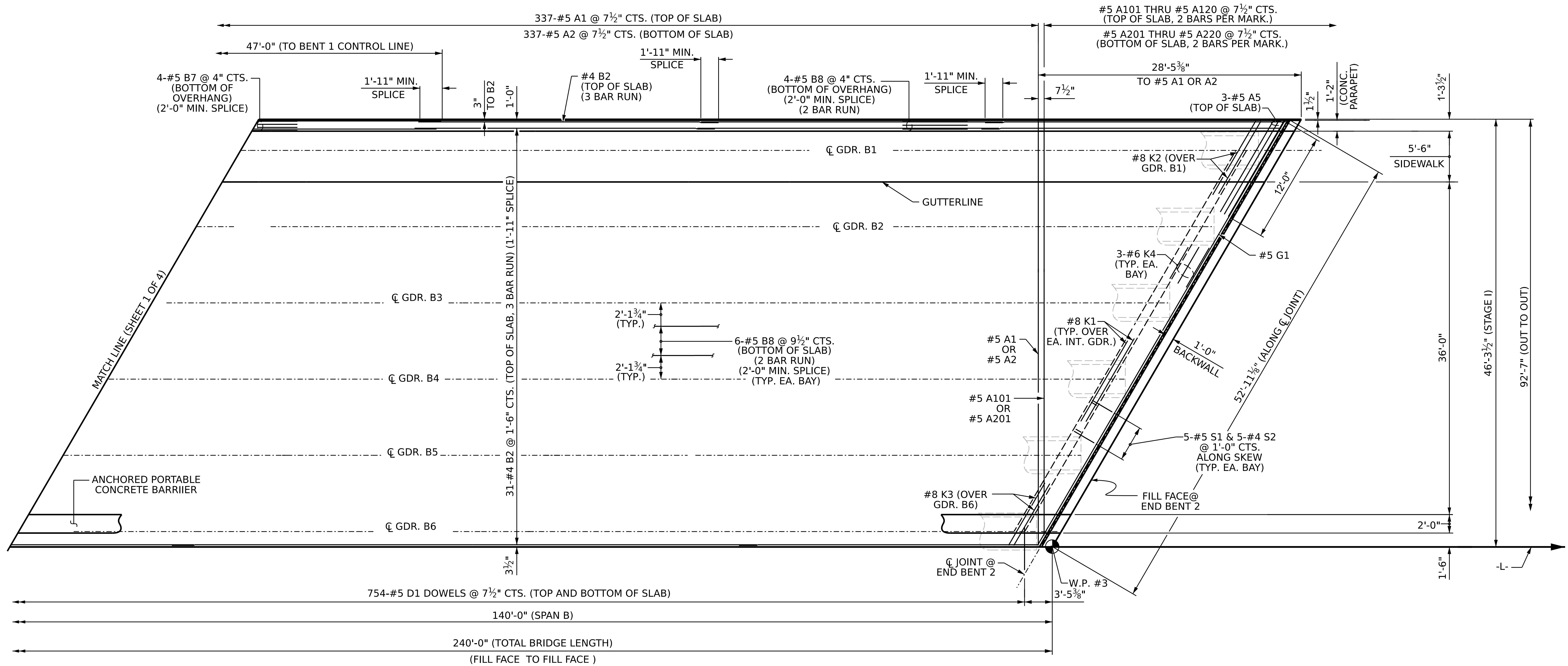
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
**PLAN OF SPAN A**  
STAGE I (LEFT SIDE)

DRAWN BY: **E. MOHAMED** DATE: **03/2025**  
CHECKED BY: **A. SORSENGINH** DATE: **03/2025**  
DESIGN ENGINEER OF RECORD: **A. IGHWAIR** DATE: **03/2025**

DOCUMENT NOT CONSIDERED  
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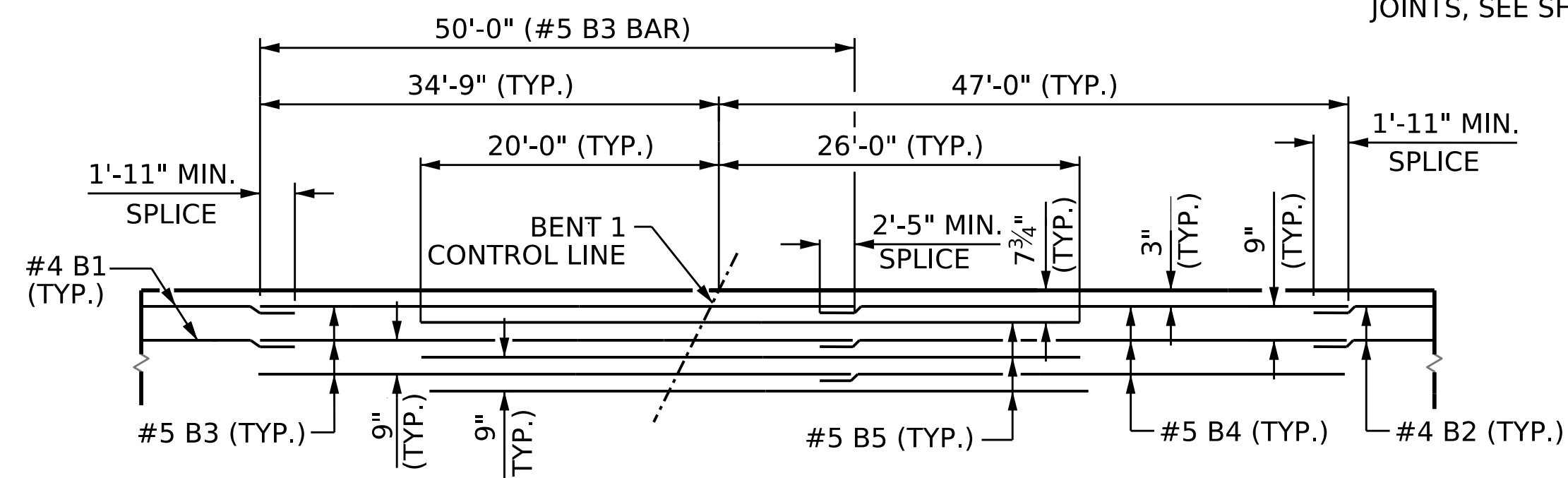
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8/26/21



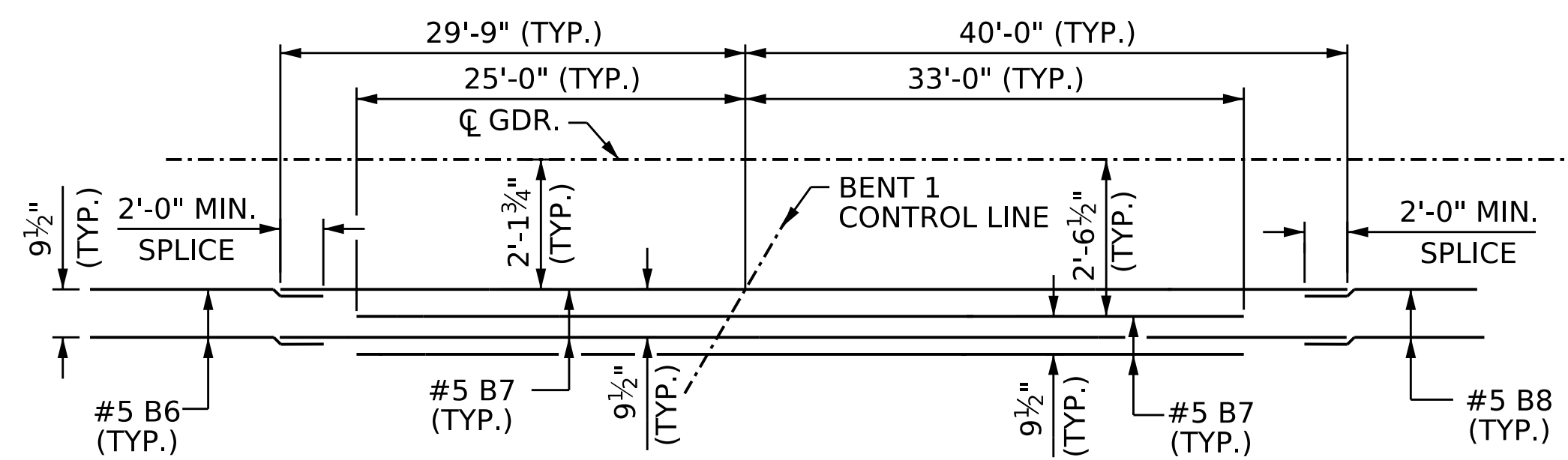
### SPAN B

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FIB DETAILS" SHEET.  
FOR LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE SHEET S-35



### DECK REINFORCEMENT DETAILS @ BENT 1

SHOWIN "B" BARS IN TOP OF SLAB (NOT DRAWN TO SCALE)

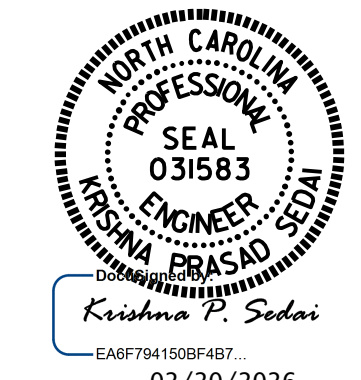


### DECK REINFORCEMENT DETAILS @ BENT 1

SHOWING "B" BARS IN BOTTOM SLAB (NOT DRAWN TO SCALE)

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 2 OF 4

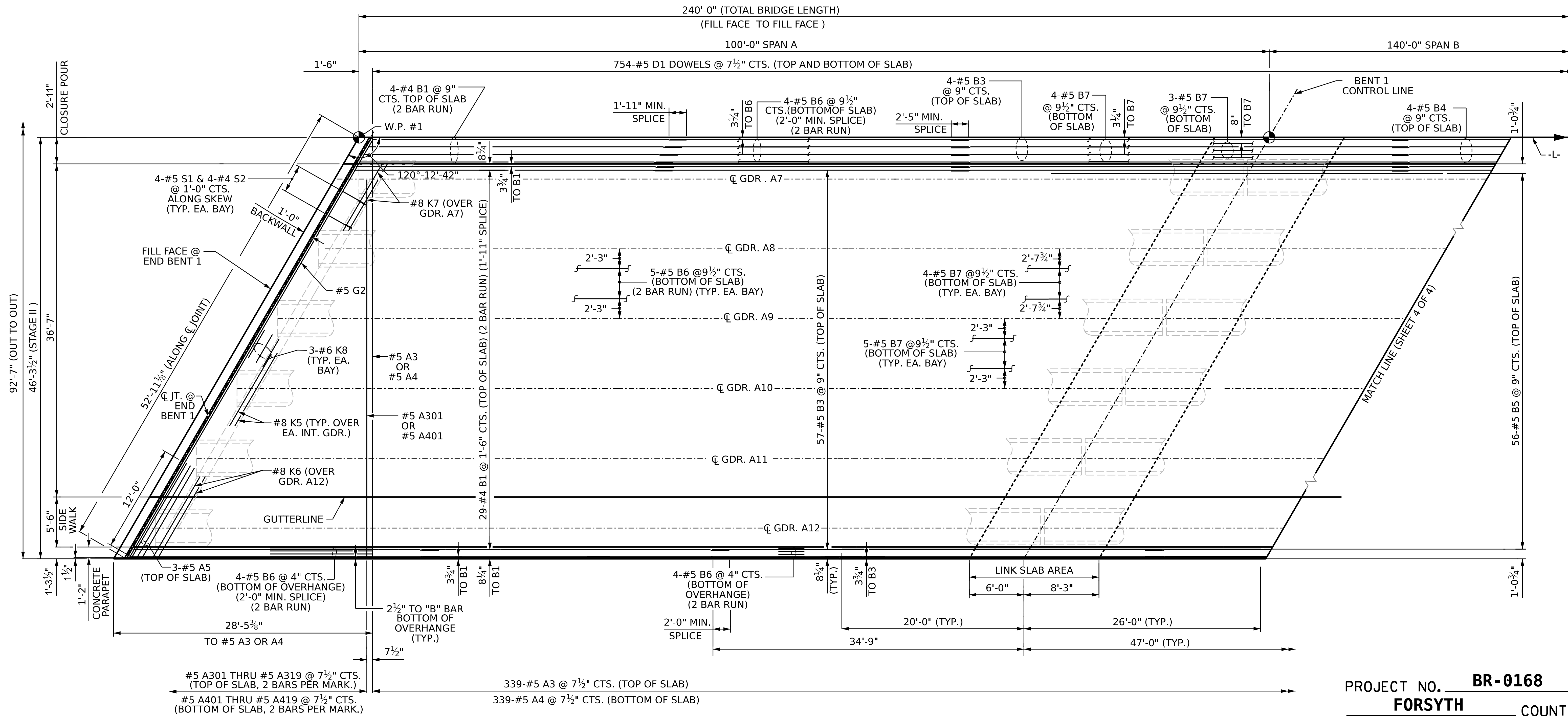


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**PLAN OF SPAN B**  
 STAGE I (LEFT SIDE)

DRAWN BY : E. MOHAMED DATE : 03/2025  
 CHECKED BY : A. SORSENGINH DATE : 03/2025  
 DESIGN ENGINEER OF RECORD : A. IGHWAIR DATE : 03/2025

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REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	S-13
1			3	TOTAL SHEETS
2			4	53



### SPAN A

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS,  
SEE "INTERMEDIATE STEEL DIAPHRAGMS  
FOR 63" FIB DETAILS" SHEET.  
FOR LOCATION OF TRANSVERSE CONSTRUCTION  
JOINTS, SEE SHEET S-35

PROJECT NO. **BR-0168**

**FORSYTH** COUNTY

STATION: **20+73.79 -L-**

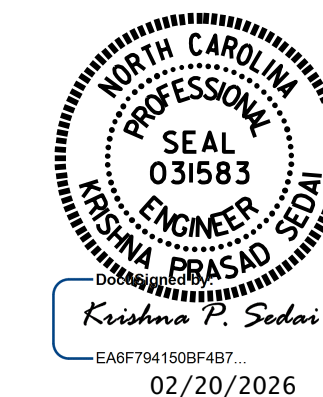
SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE

**PLAN OF SPAN A**

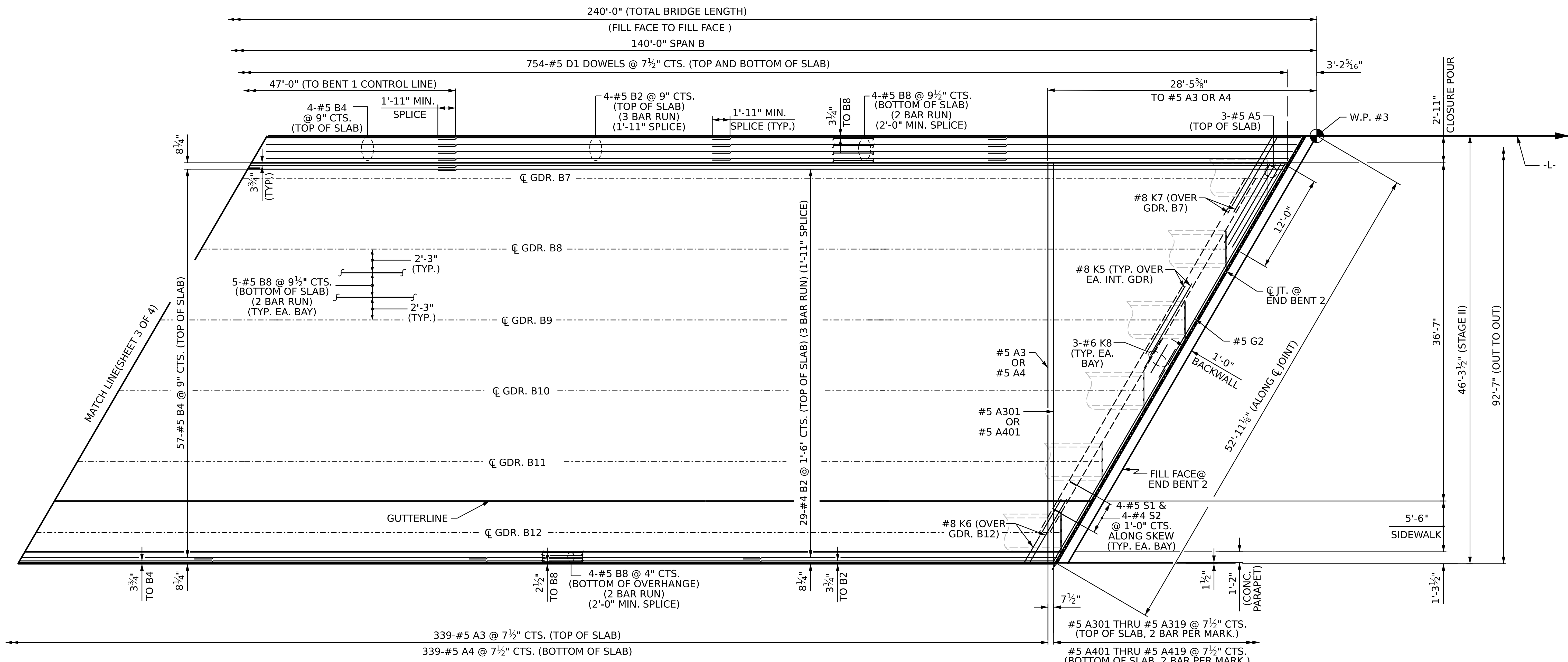
STAGE II (RIGHT SIDE)



DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

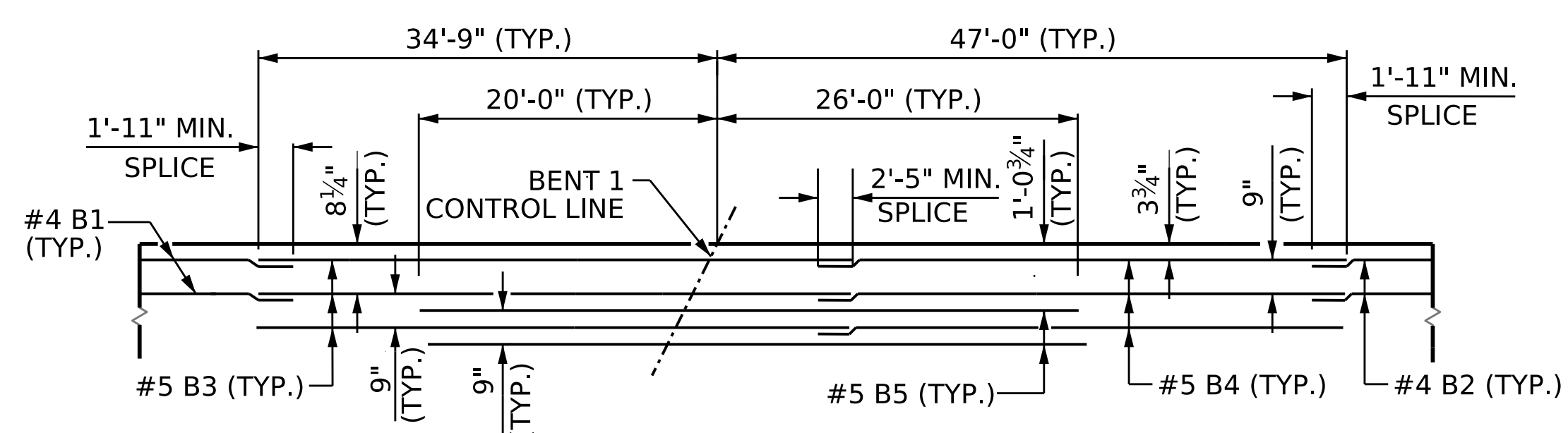
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DRAWN BY : **E. MOHAMED** DATE : **03/2025**  
 CHECKED BY : **A. SORSENGINH** DATE : **03/2025**  
 DESIGN ENGINEER OF RECORD : **A. IGHWAIR** DATE : **03/2025**



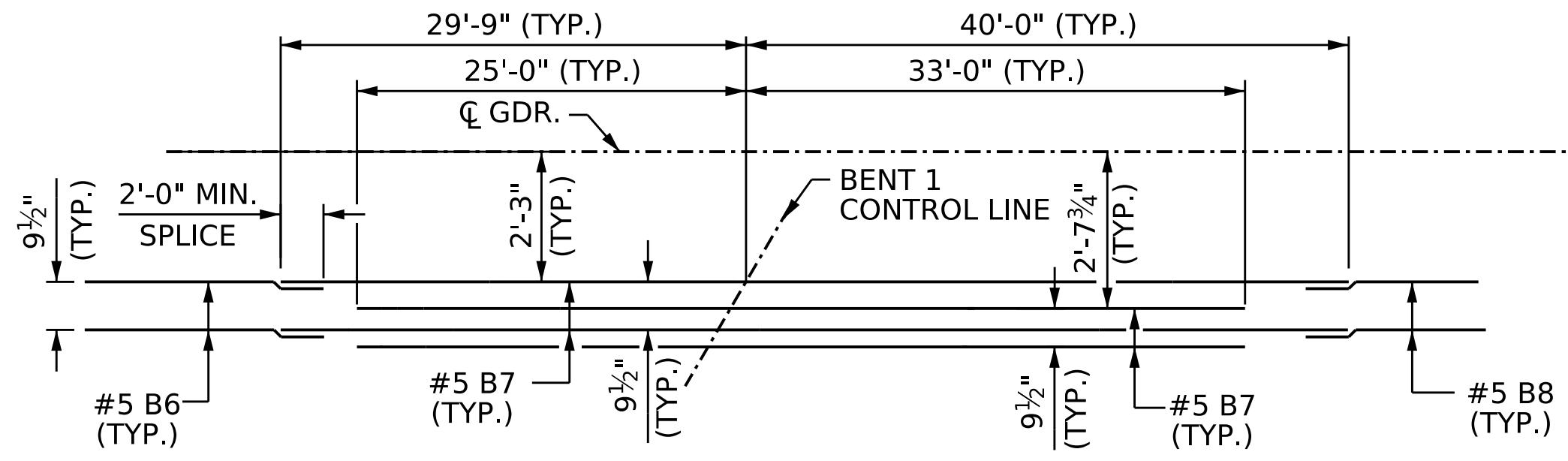
### SPAN B

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FIB DETAILS" SHEET.  
FOR LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE SHEET S-35



### DECK REINFORCEMENT DETAILS @ BENT 1

SHOWING "B" BARS IN TOP OF SLAB (NOT DRAWN TO SCALE)



### DECK REINFORCEMENT DETAILS @ BENT 1

SHOWING "B" BARS IN BOTTOM SLAB (NOT DRAWN TO SCALE)

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
STATION: **20+73.79 -L-**

SHEET 4 OF 4



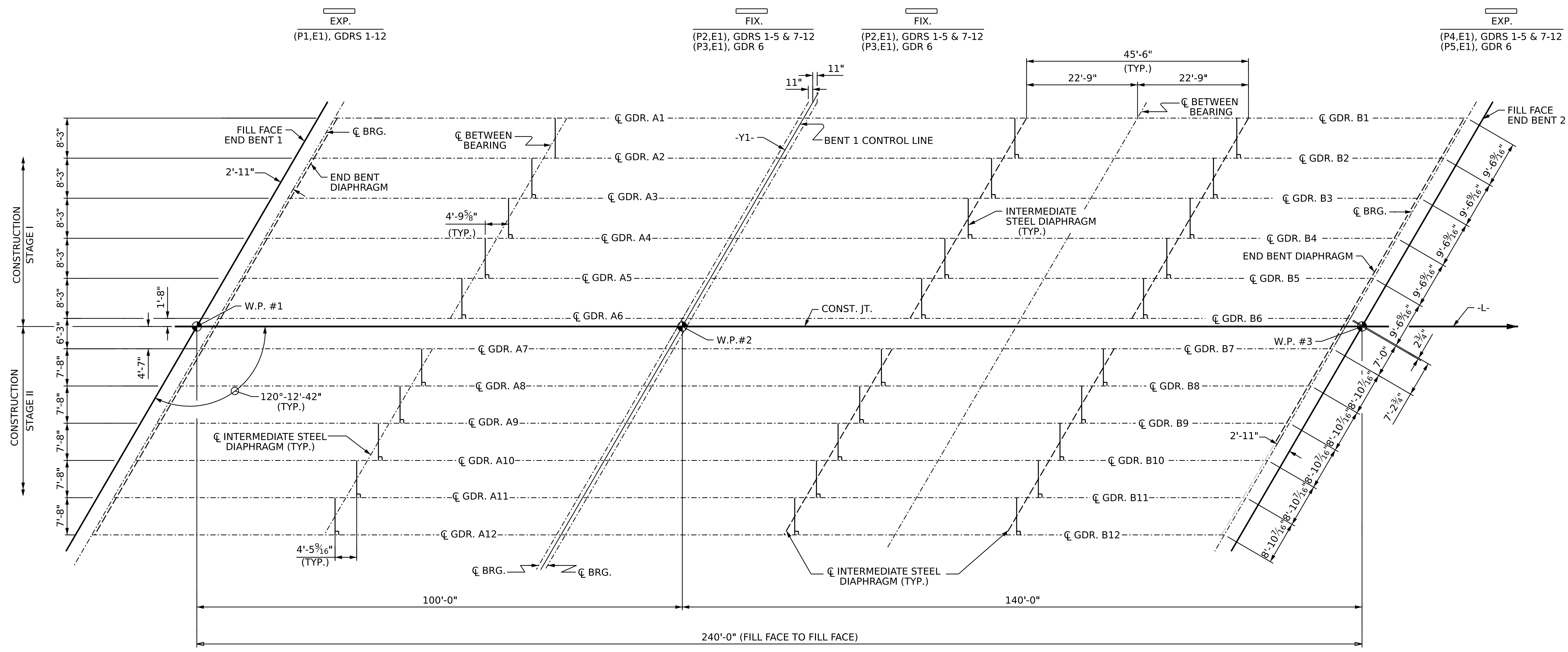
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
**PLAN OF SPAN B**  
STAGE II (RIGHT SIDE)

DRAWN BY : E. MOHAMED DATE : 05/2025  
CHECKED BY : A. SORSENGINH DATE : 05/2025  
DESIGN ENGINEER OF RECORD : A. IGHWAIR DATE : 05/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			53

8/26/21

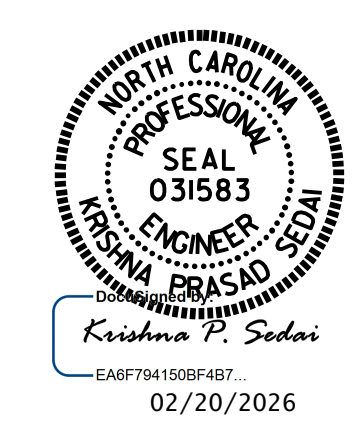


SPAN A

SPAN B

### FRAMING PLAN

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE**

**FRAMING PLAN**

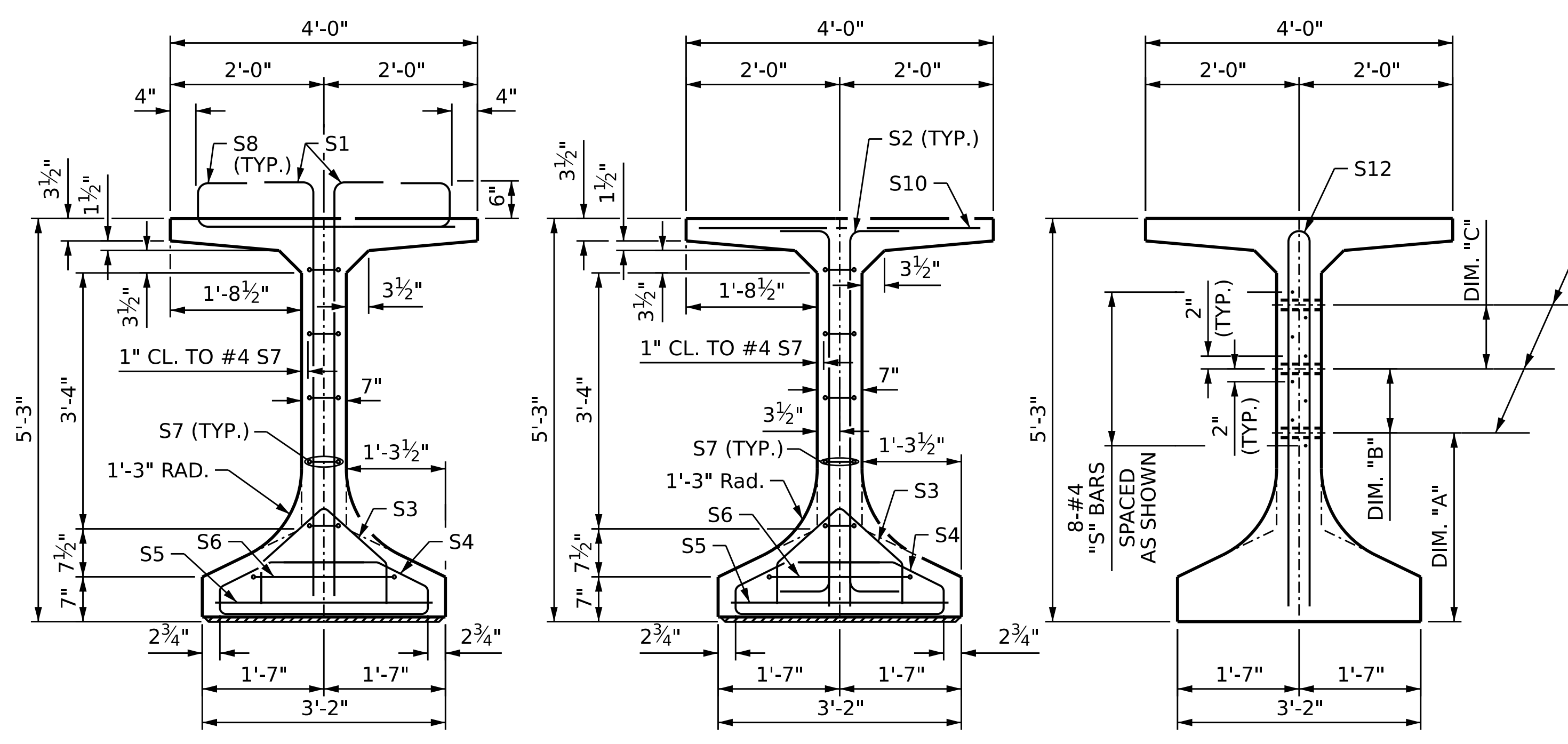
DRAWN BY : E. MOHAMED DATE : 04/2025  
 CHECKED BY : A. SORSENGINH DATE : 04/2025  
 DESIGN ENGINEER OF RECORD : A. IGHWAIR DATE : 04/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			53

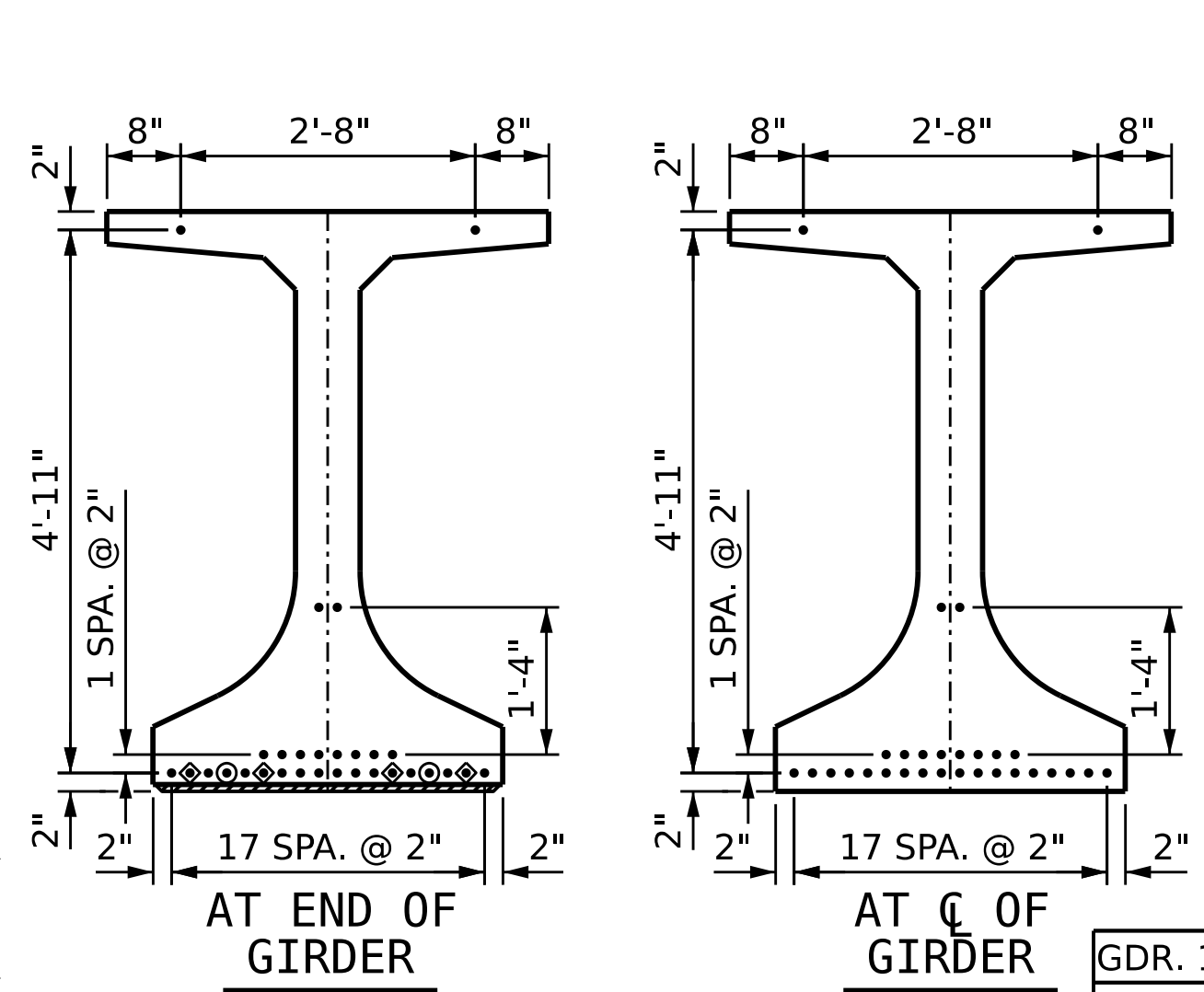
2/16/2026  
 S:\DPO3\BR-0168\Final Plans\401.031.BR0168.SMU.FP.S16.330289.dgn  
 ksedai

8/26/21



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

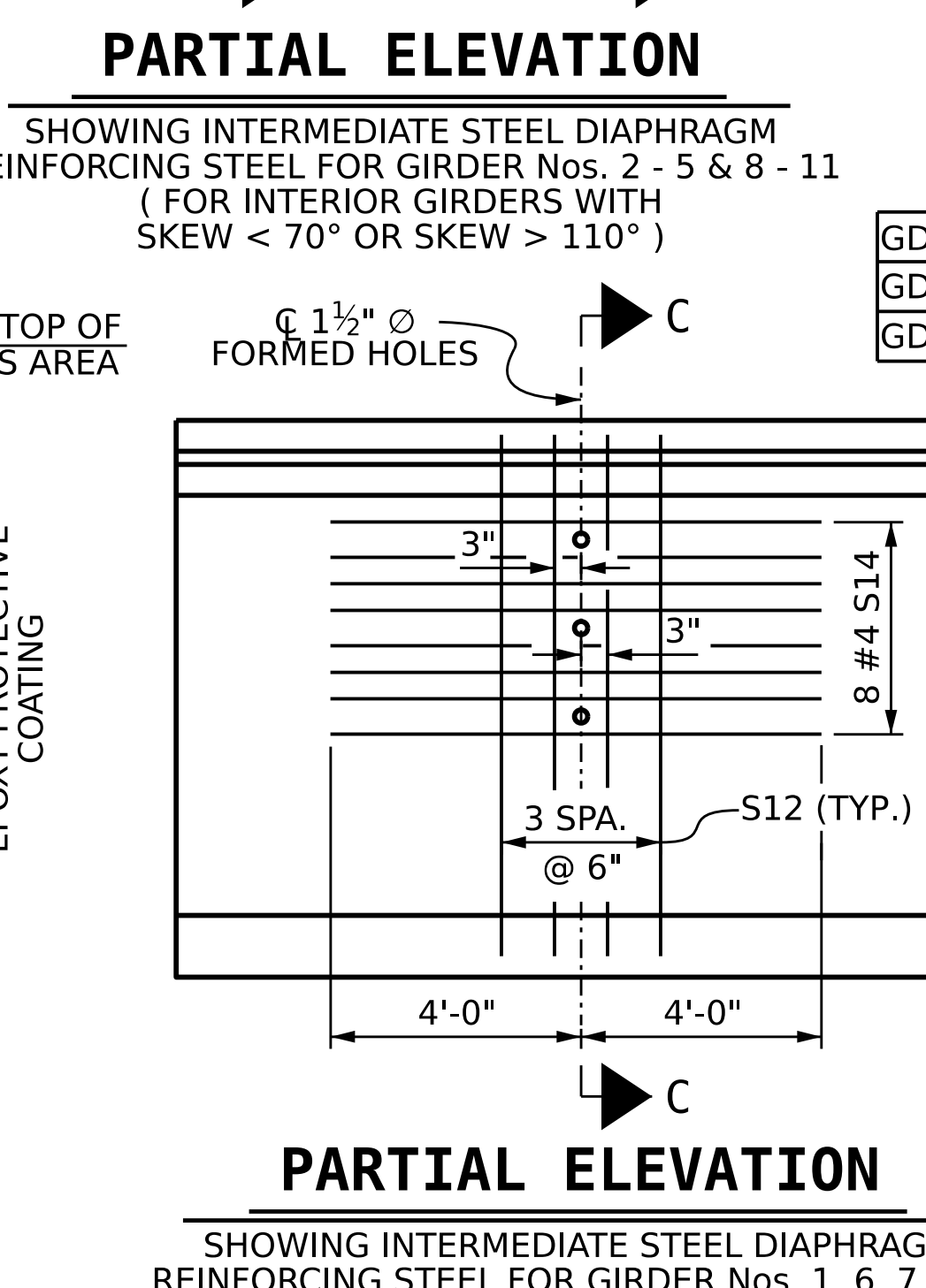
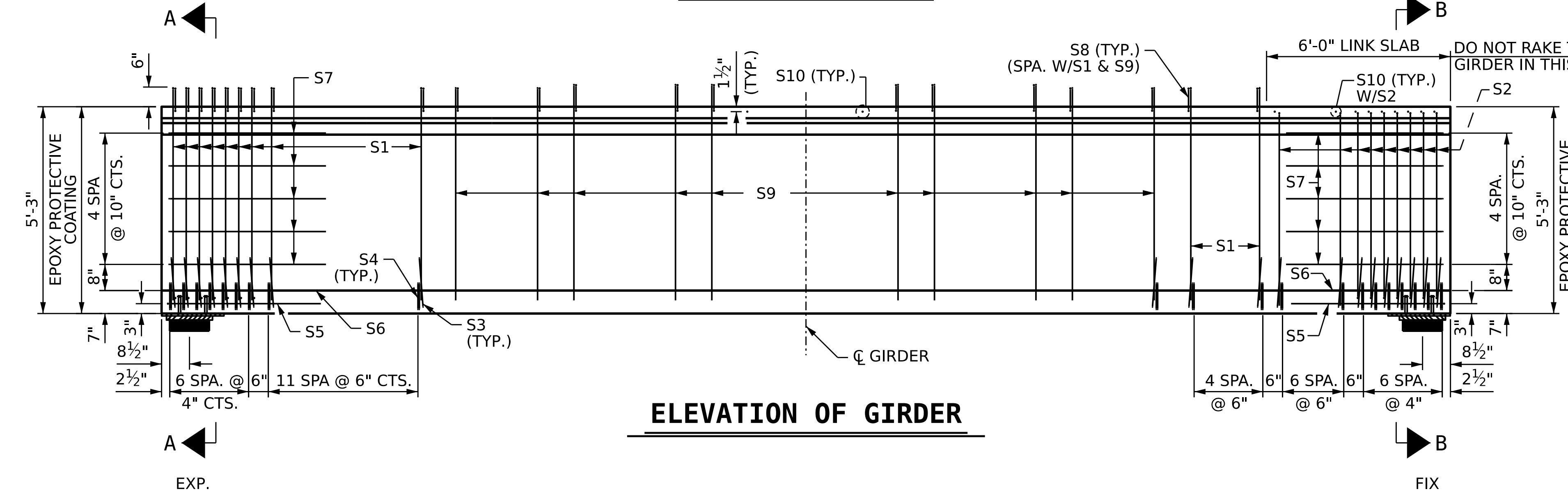
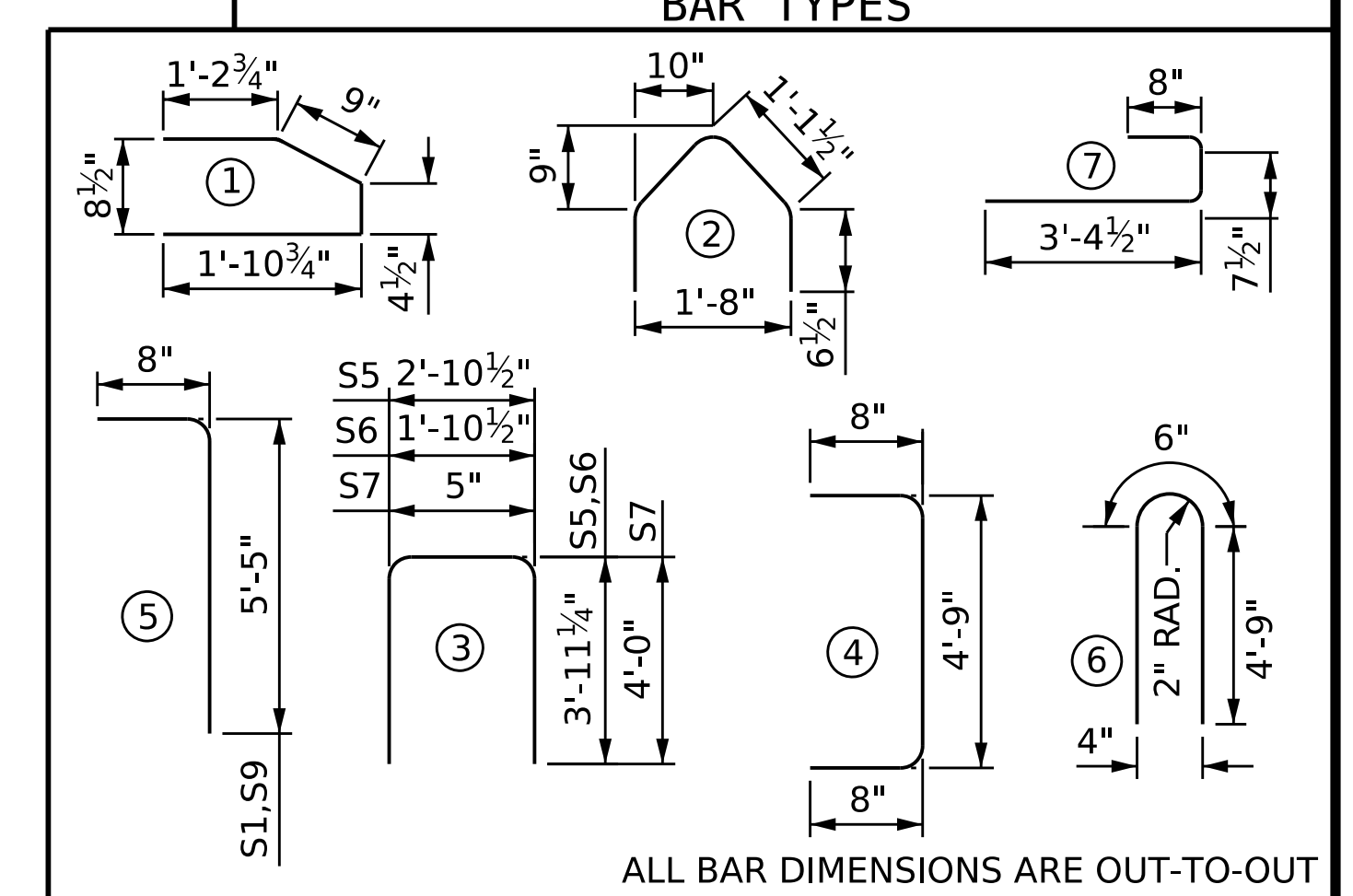
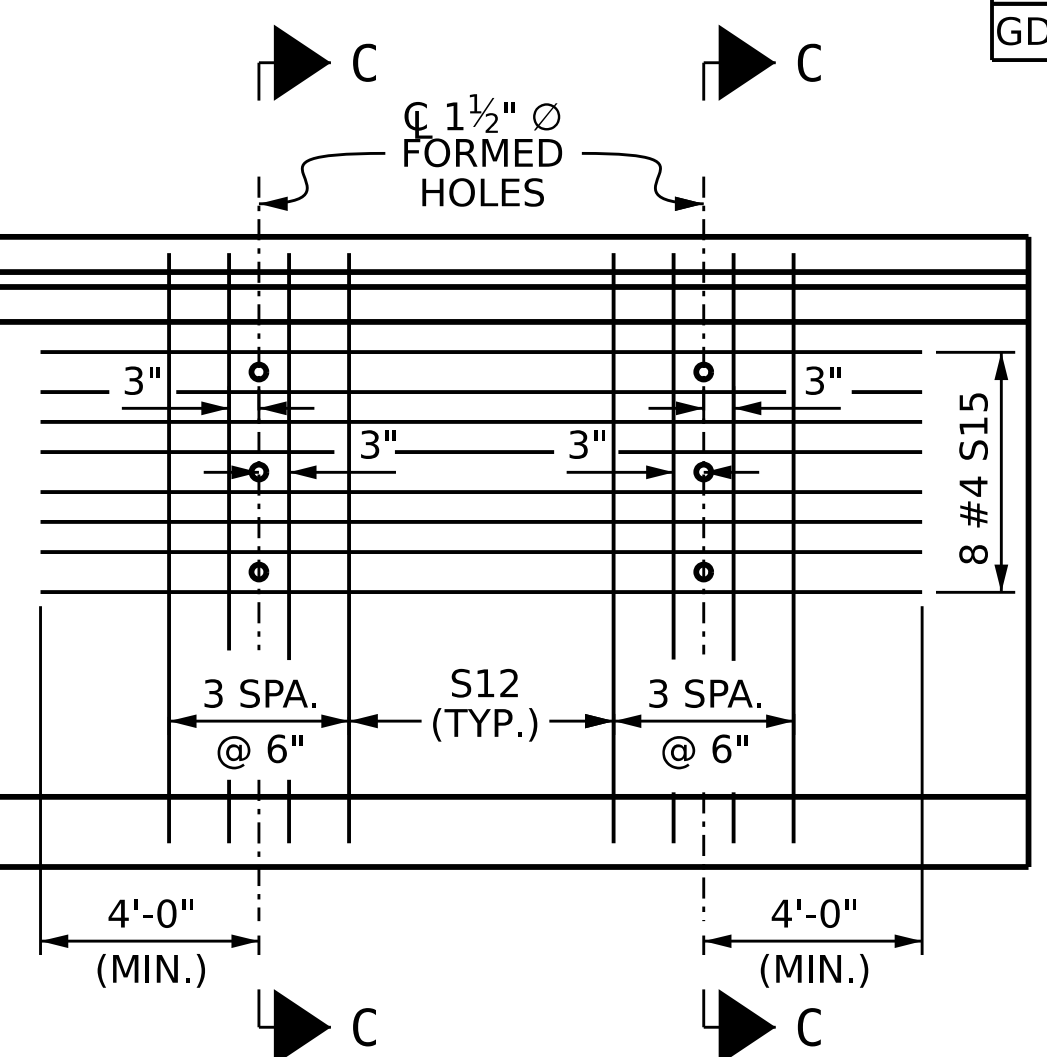
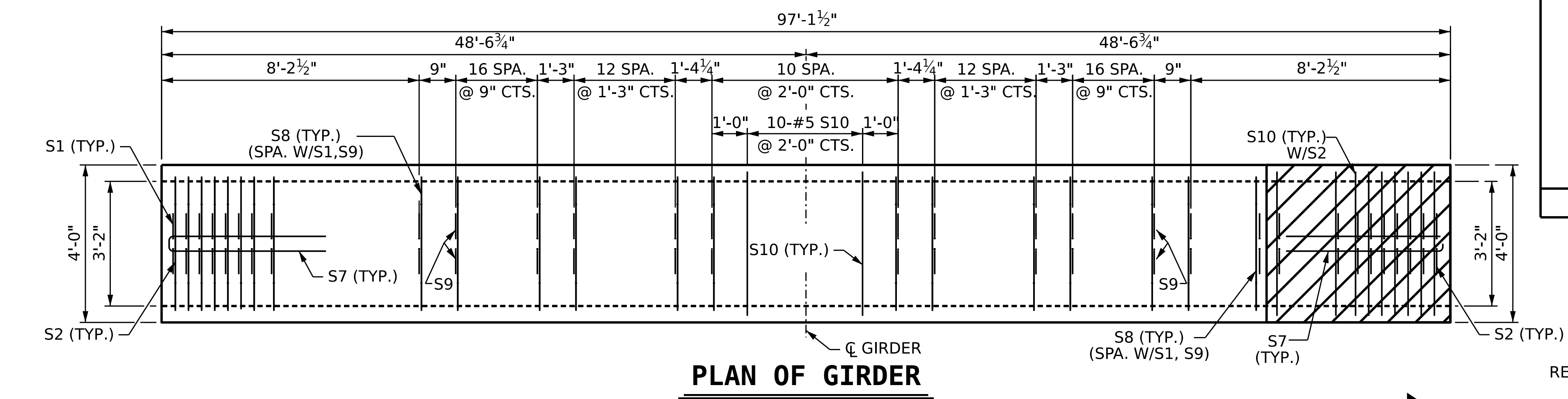
- DEBONDING LEGEND**
- FULLY BONDED STRANDS
  - STRANDS DEBONED FOR 12'-0" FROM END OF GIRDER
  - STRANDS DEBONED FOR 15'-0" FROM END OF GIRDER



0.6" Ø L. R. GRADE 270 STRANDS					
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)			
0.217	58,600	43,950			
REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	48	#5	5	6'-1"	305
S2	28	#5	4	6'-1"	178
S3	38	#3	2	3'-4"	48
S4	76	#3	1	4'-3"	121
S5	2	#5	3	10'-9"	22
S6	2	#5	3	9'-9"	20
S7	10	#4	3	8'-5"	56
S8	190	#5	7	4'-8"	925
S9	142	#4	5	6'-1"	577
S10	24	#5	STR	3'-8"	92

BAR TYPES						
GDR. 1 6 7 & 12	S12	4	#5	6	10'-0"	42
GDR. 2-5 & 8-11	S12	8	#5	6	10'-0"	83
GDR. 1 6 7 & 12	S14	8	#4	STR	8'-0"	43
GDR. 2 - 5	S15	8	#4	STR	12'-10"	69
GDR. 8 - 11	S15	8	#4	STR	12'-6"	67

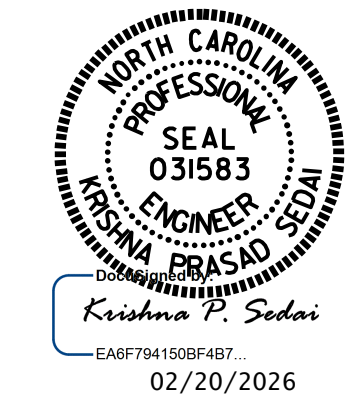


QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	5000PSI CONCRETE	0.6" Ø L.R. STRANDS	
LB.	C.Y.	No.	
GDR. 1 6 7 & 12	2429	24.9	30
GDR. 2 - 5	2496	24.9	30
GDR. 8 - 11	2494	24.9	30

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
12	97'-1 1/2"	1165'-6"

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 BRIDGE NO. **20+73.79 -L-**  
 SHEET 1 OF 7



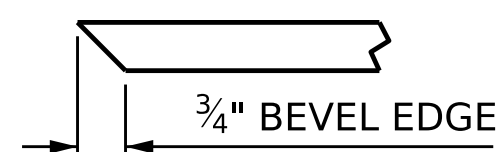
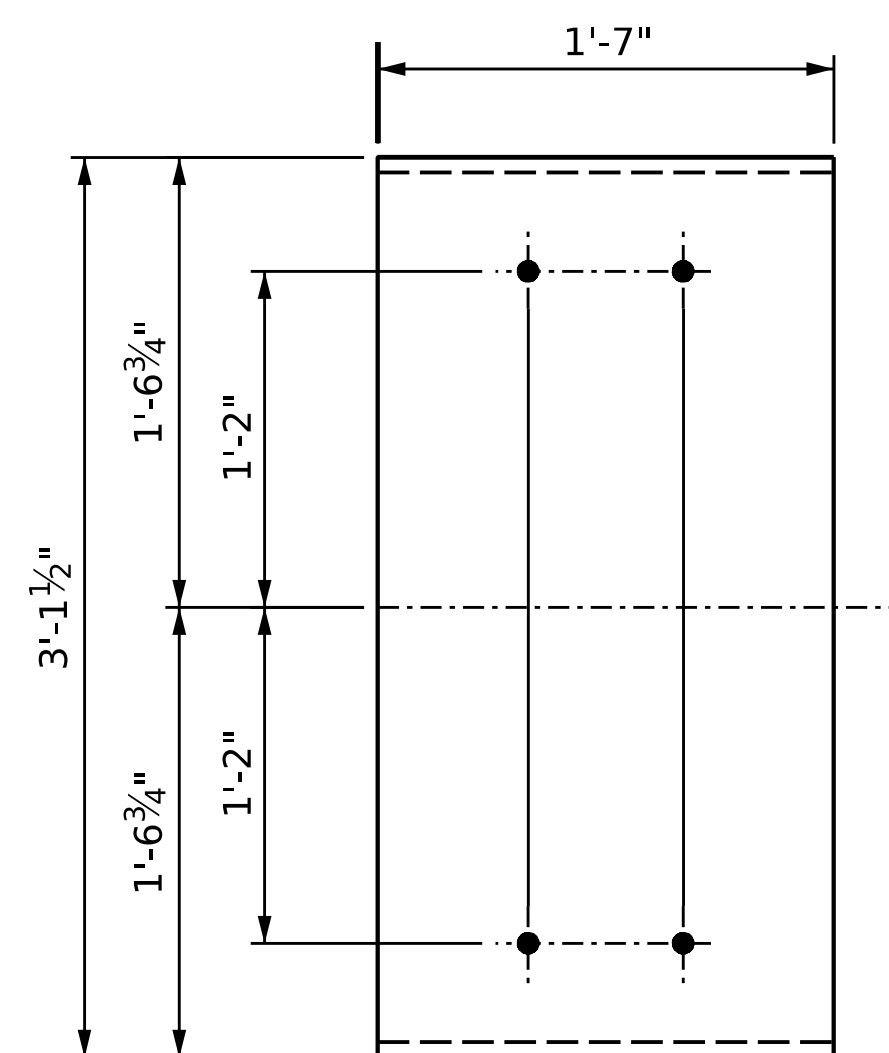
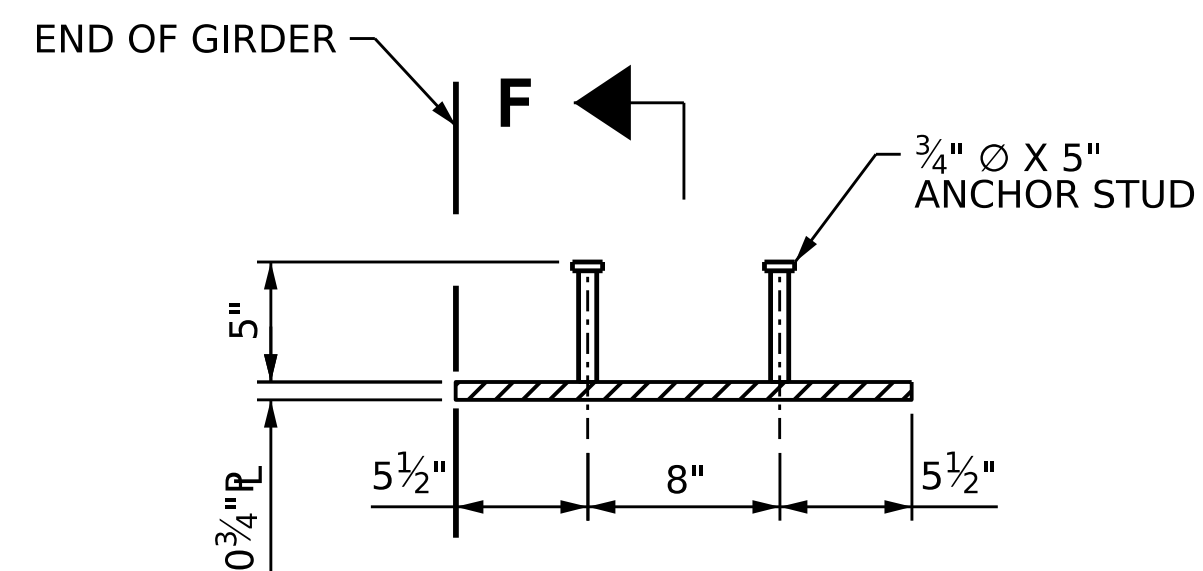
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**63" FIB PRESTRESSED CONCRETE GIRDER LINK SLAB SPAN A**

ASSEMBLED BY: A. IGHWAIR, PE DATE: 07/25  
 CHECKED BY: A. SORSENGIN DATE: 07/25  
 DRAWN BY: AAI 08/23  
 CHECKED BY: -  
 DESIGN ENGINEER OF RECORD: A. IGHWAIR, PE DATE: 04/25

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	DATE:	S-17
1			3		TOTAL SHEETS 53
2			4		

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**SECTION "F"**

(SEE NOTES)

**EMBEDDED PLATE "B-1" DETAILS**

(2 REQ'D PER GIRDER)

**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 4000 PSI FOR SPAN A AND 6600 PSI FOR SPAN B.

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".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

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.

PROJECT NO. **BR-0168**

**FORSYTH** COUNTY

STATION: **20+73.79 -L-**

SHEET 3 OF 7



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**63" FIB PRESTRESSED  
CONCRETE GIRDER  
DETAIL**

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

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

SHEET NO.  
**S-19**  
TOTAL SHEETS  
**53**

DRAWN BY : A. IGHWAIR, PE DATE : 07/25  
CHECKED BY : A. SORSENGINH DATE : 07/25  
DESIGN ENGINEER OF RECORD: A. IGHWAIR, PE DATE : 07/25

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

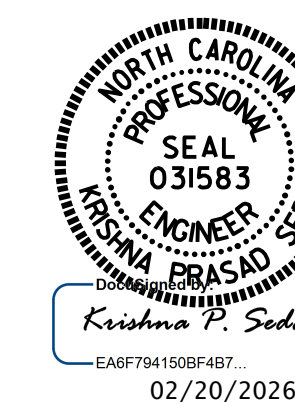
Table with columns for span (SPAN A), girder (GIRDER 1-12), and deflection values (BRG., 20TH POINTS, CAMBER, DEFLECTION DUE TO SDL\*, FINAL CAMBER) across various points (0.050 to 0.950).

\* INCLUDES FUTURE WEARING SURFACE.

ALL VALUES ARE SHOWN IN INCHES (DECIMAL FORM), EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES (FRACTION FORM).

PROJECT NO. BR-0168
FORSYTH COUNTY
STATION: 20+73.79 -L-

SHEET 4 OF 7



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
DEAD LOAD DEFLECTIONS TABLE
SPAN A

Table with columns for NO., BY, DATE, and SHEET NO. (S-20, TOTAL SHEETS 53).

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DRAWN BY: E. MOHAMED DATE: 04/2025
CHECKED BY: A. SORSENGINH DATE: 04/2025
DESIGN ENGINEER OF RECORD: A. IGHWAIR DATE: 04/2025

8/26/21

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

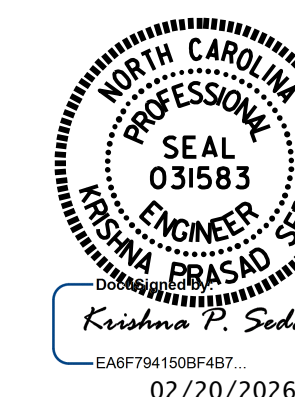
Table with columns for GIRDERS 1-9, 40TH POINTS, CAMBER, DEFLECTION DUE TO SDL\*, and FINAL CAMBER. Values are in inches (decimal or fraction).

\* INCLUDES FUTURE WEARING SURFACE.

ALL VALUES ARE SHOWN IN INCHES (DECIMAL FORM), EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES (FRACTION FORM).

PROJECT NO. BR-0168
FORSYTH COUNTY
STATION: 20+73.79 -L-

SHEET 5 OF 7



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
DEAD LOAD DEFLECTION TABLE
SPAN B

DRAWN BY: E. MOHAMED DATE: 05/2025
CHECKED BY: A. SORSENGINH DATE: 05/2025
DESIGN ENGINEER OF RECORD: A. IGHWAIR DATE: 05/2025

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Table with columns: NO., BY, DATE, NO., BY, DATE, SHEET NO. (S-21), TOTAL SHEETS (53)

8/26/21

## DEAD LOAD DEFLECTION TABLE FOR GIRDERS

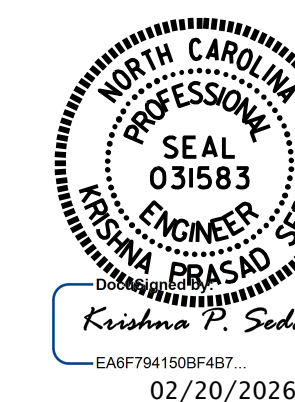
SPAN B																																										
0.6" Ø LOW RELAXATION		GIRDER 10 & 11																																								
40TH POINTS	BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	BRG.	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.338	0.677	1.015	1.354	1.655	1.957	2.259	2.561	2.797	3.034	3.270	3.506	3.656	3.806	3.956	4.106	4.158	4.209	4.261	4.312	4.261	4.209	4.158	4.106	3.956	3.806	3.656	3.506	3.270	3.034	2.797	2.561	2.259	1.957	1.655	1.354	1.015	0.677	0.338	0
DEFLECTION DUE TO SDL*	↓	0	0.258	0.515	0.773	1.031	1.261	1.491	1.721	1.950	2.130	2.310	2.490	2.670	2.785	2.899	3.013	3.127	3.167	3.206	3.245	3.284	3.245	3.206	3.167	3.127	3.013	2.899	2.785	2.670	2.490	2.310	2.130	1.950	1.721	1.491	1.261	1.031	0.773	0.515	0.258	0
FINAL CAMBER	↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	9/16"	5/8"	11/16"	3/4"	3/4"	13/16"	7/8"	15/16"	15/16"	1"	1"	1"	1"	1"	1"	1"	1"	1"	15/16"	15/16"	7/8"	13/16"	3/4"	3/4"	11/16"	5/8"	9/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"
0.6" Ø LOW RELAXATION		GIRDER 12																																								
40TH POINTS	BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	BRG.	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.338	0.677	1.015	1.354	1.655	1.957	2.259	2.561	2.797	3.034	3.270	3.506	3.656	3.806	3.956	4.106	4.158	4.209	4.261	4.312	4.261	4.209	4.158	4.106	3.956	3.806	3.656	3.506	3.270	3.034	2.797	2.561	2.259	1.957	1.655	1.354	1.015	0.677	0.338	0
DEFLECTION DUE TO SDL*	↓	0	0.252	0.504	0.756	1.008	1.232	1.457	1.682	1.906	2.082	2.258	2.434	2.610	2.722	2.834	2.945	3.057	3.095	3.133	3.172	3.210	3.172	3.133	3.095	3.057	2.945	2.834	2.722	2.610	2.434	2.258	2.082	1.906	1.682	1.457	1.232	1.008	0.756	0.504	0.252	0
FINAL CAMBER	↑	0"	1/16"	3/16"	1/4"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	7/8"	15/16"	1"	1"	1 1/16"	1 1/16"	1 1/16"	1 1/16"	1 1/8"	1 1/16"	1 1/16"	1 1/16"	1 1/16"	1"	1"	15/16"	7/8"	13/16"	3/4"	1 1/16"	5/8"	9/16"	1/2"	7/16"	3/8"	1/4"	3/16"	1/16"	0"

\* INCLUDES FUTURE WEARING SURFACE.

ALL VALUES ARE SHOWN IN INCHES (DECIMAL FORM), EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES (FRACTION FORM).

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 6 OF 7



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**DEAD LOAD DEFLECTION  
 TABLE  
 SPAN B**

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : E. MOHAMED DATE : 04/2025  
 CHECKED BY : A. SORSENGINH DATE : 04/2025  
 DESIGN ENGINEER OF RECORD: A. IGHWAIR DATE : 04/2025



**NOTES**

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

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

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

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

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

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

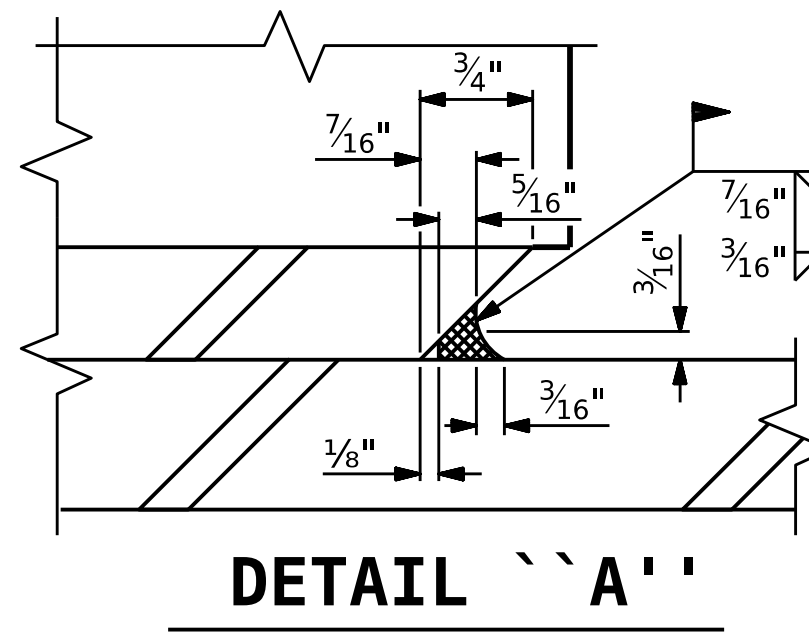
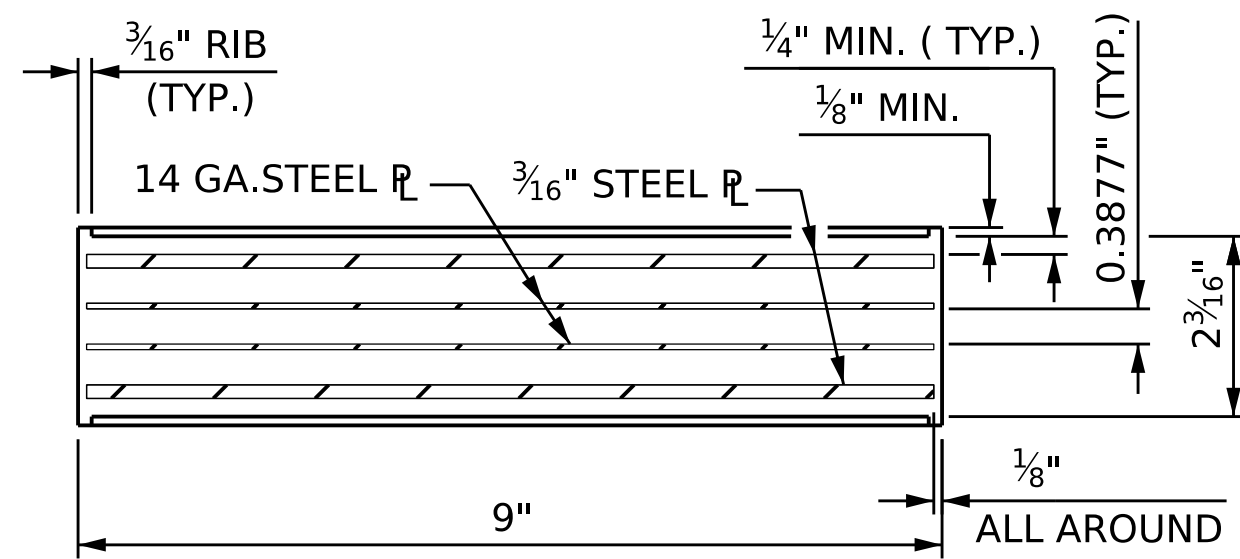
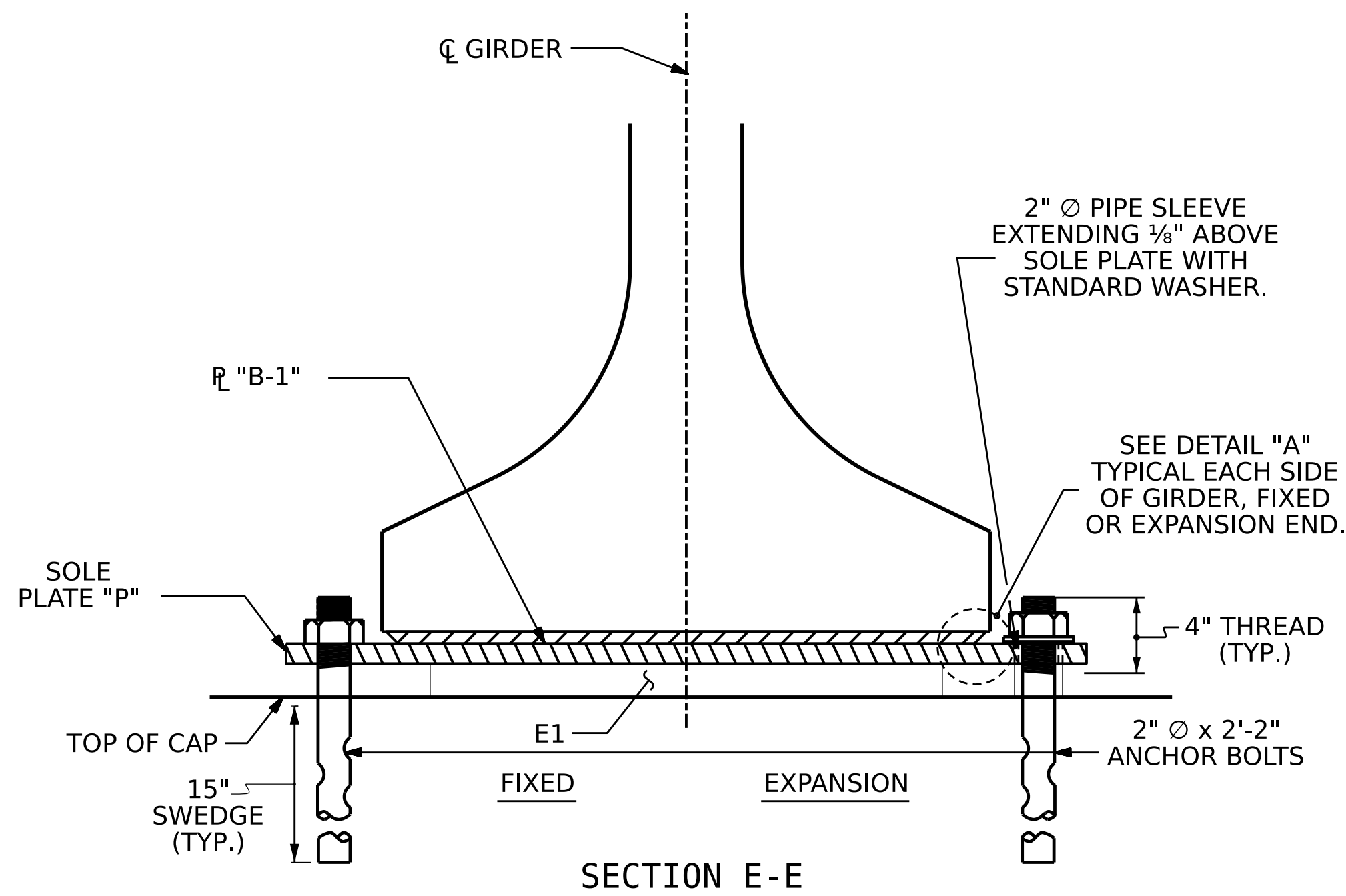
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

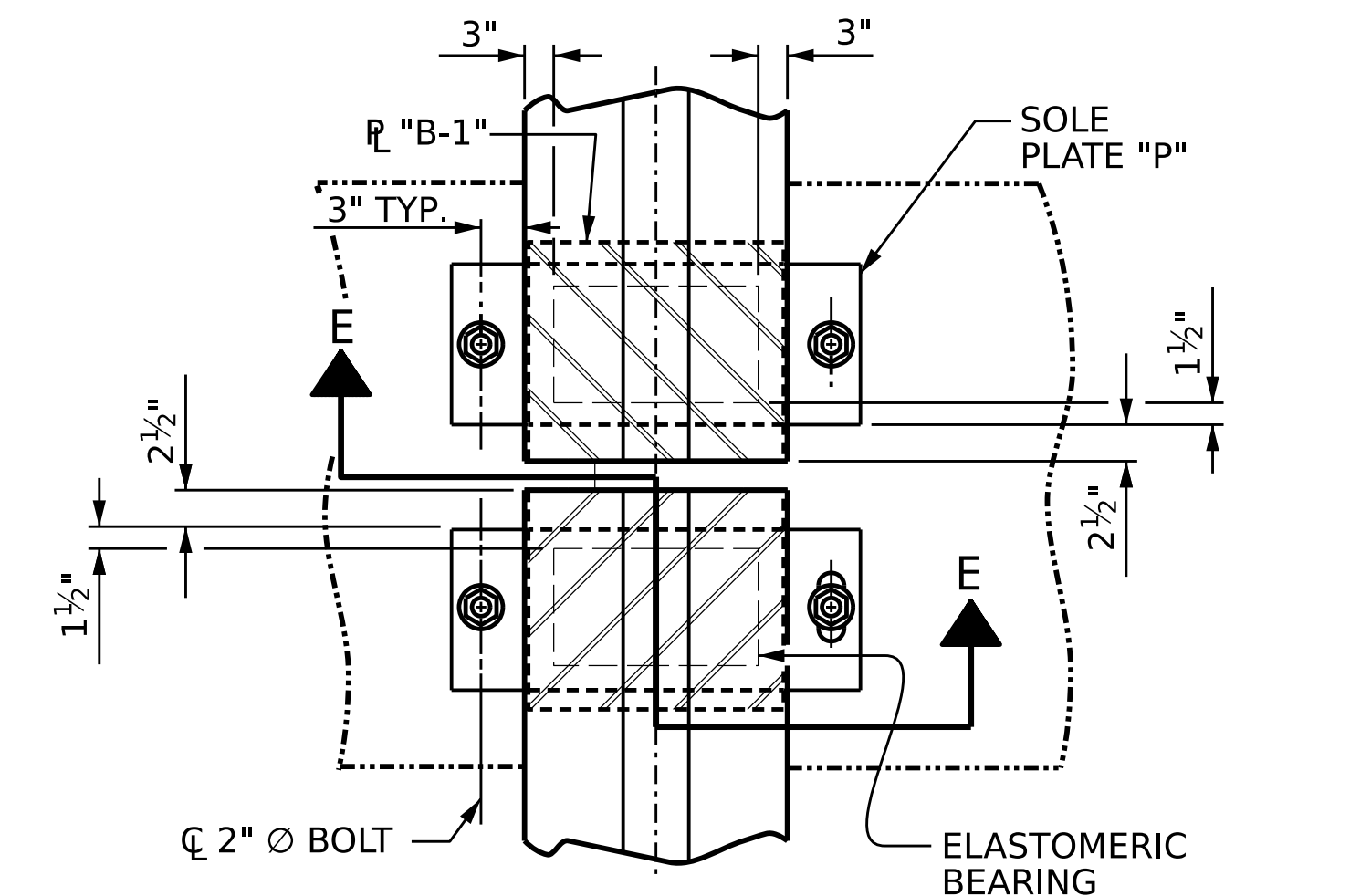
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE STANDARD SPECIFICATIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

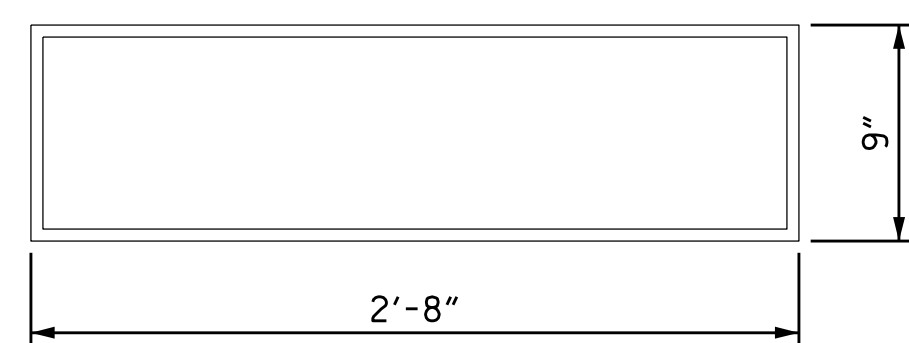


SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
E1 PAD	290 K
EXPANSION LENGTH	
E1 PAD	140 FT.



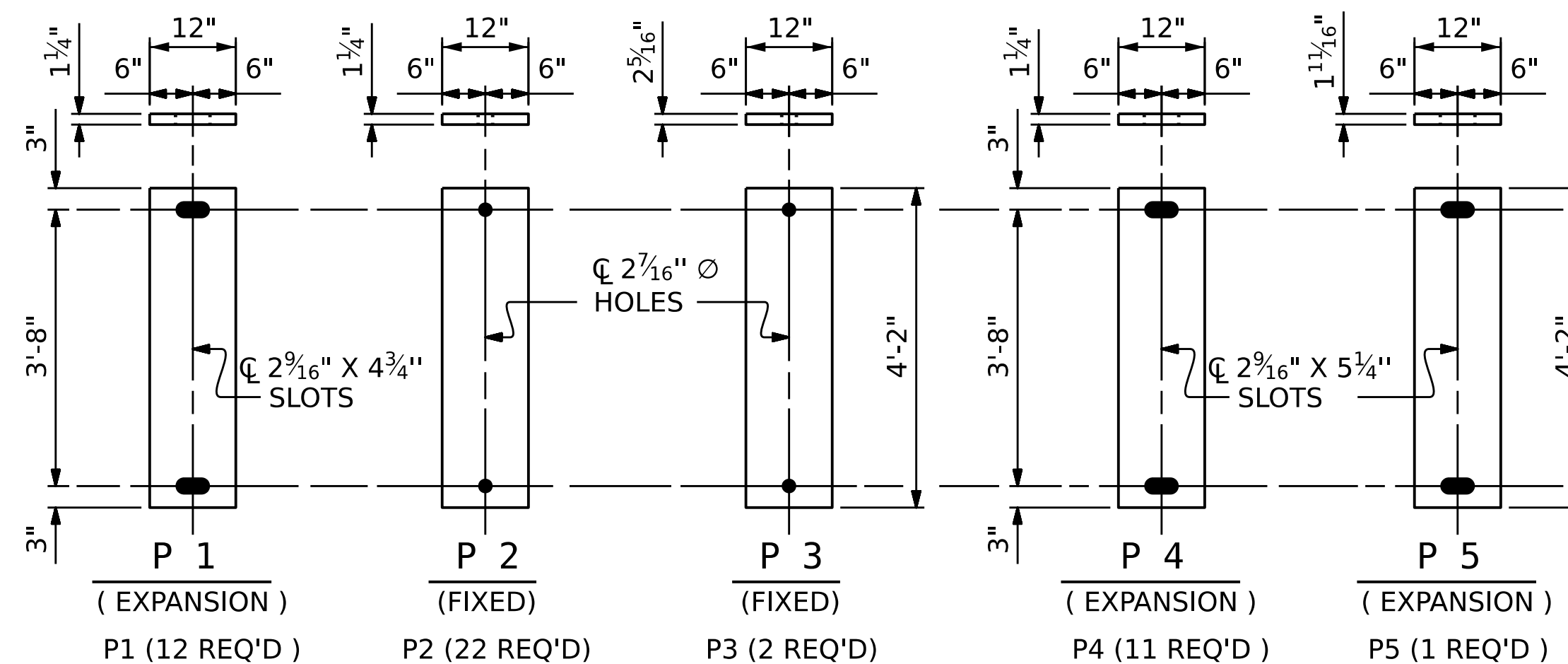
TYPICAL SECTION OF ELASTOMERIC BEARINGS

TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT) TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)



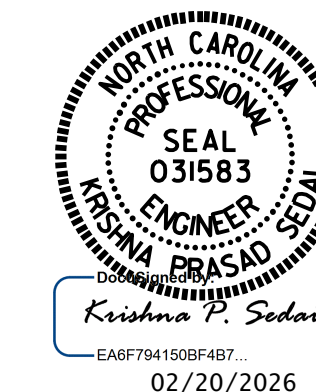
PLAN VIEW OF ELASTOMERIC BEARING

**E1 PAD**  
(48 REQ'D)



**SOLE PLATE DETAILS ("P")**

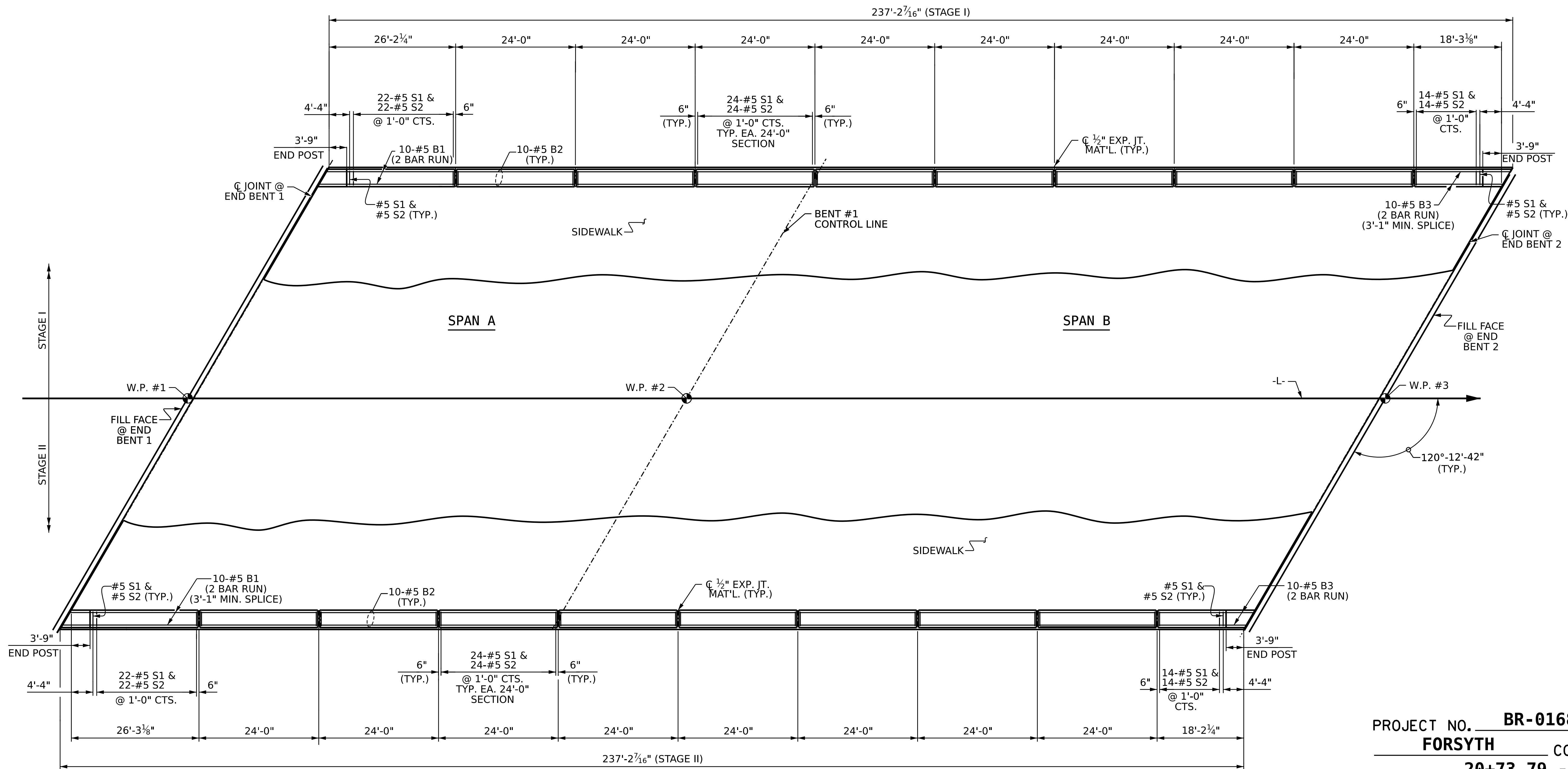
PROJECT NO. BR-0168  
 FORSYTH COUNTY  
 STATION: 20+73.79 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**ELASTOMERIC BEARING DETAILS**  
**63" FIB PRESSTRSED CONCRETE GIRDER SUPERSTRUCTURE**

DRAWN BY: A. IGHWAIR, PE DATE: 04/25  
 CHECKED BY: A. SORSENGINH DATE: 04/25  
 DESIGN ENGINEER OF RECORD: A. IGHWAIR, PE DATE: 04/25

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24	
1			3			TOTAL SHEETS	
2			4			53	



**PLAN OF CONCRETE PARAPET**

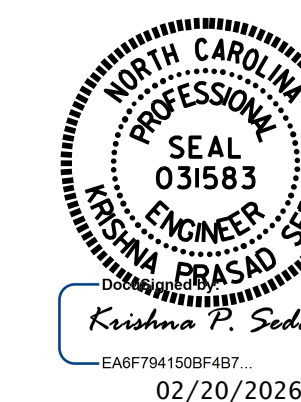
ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF CONCRETE PARAPET

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE

**CONCRETE PARAPET**

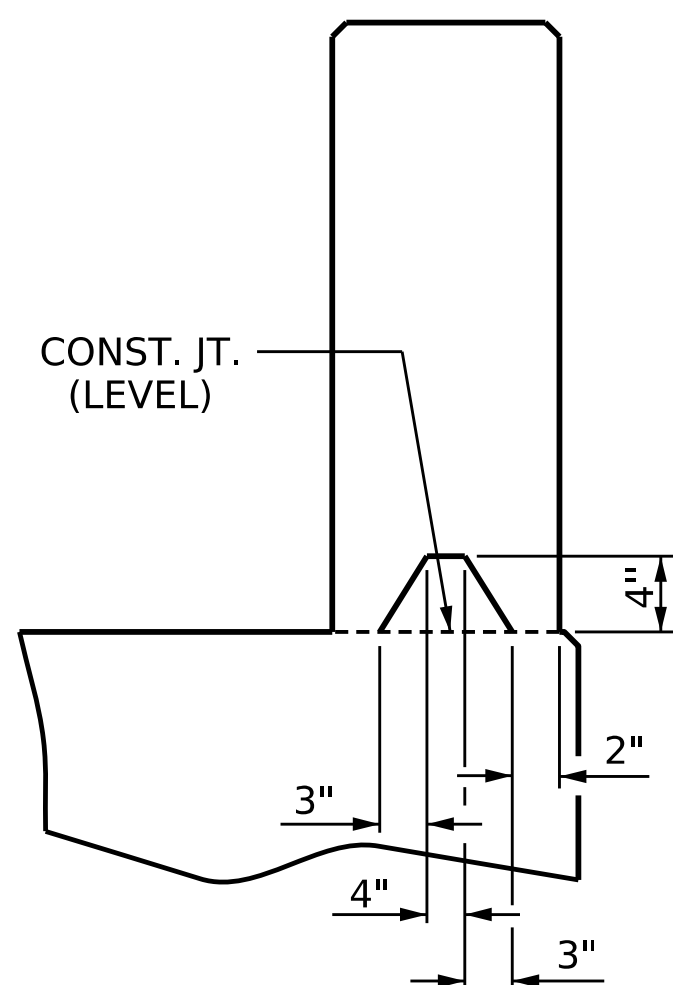


DRAWN BY: **E. MOHAMED** DATE: **04/2025**  
 CHECKED BY: **A.SORSENGINH** DATE: **04/2025**  
 DESIGN ENGINEER OF RECORD: **A.IGHWAIR** DATE: **04/2025**

2/9/2026  
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 ksedai

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

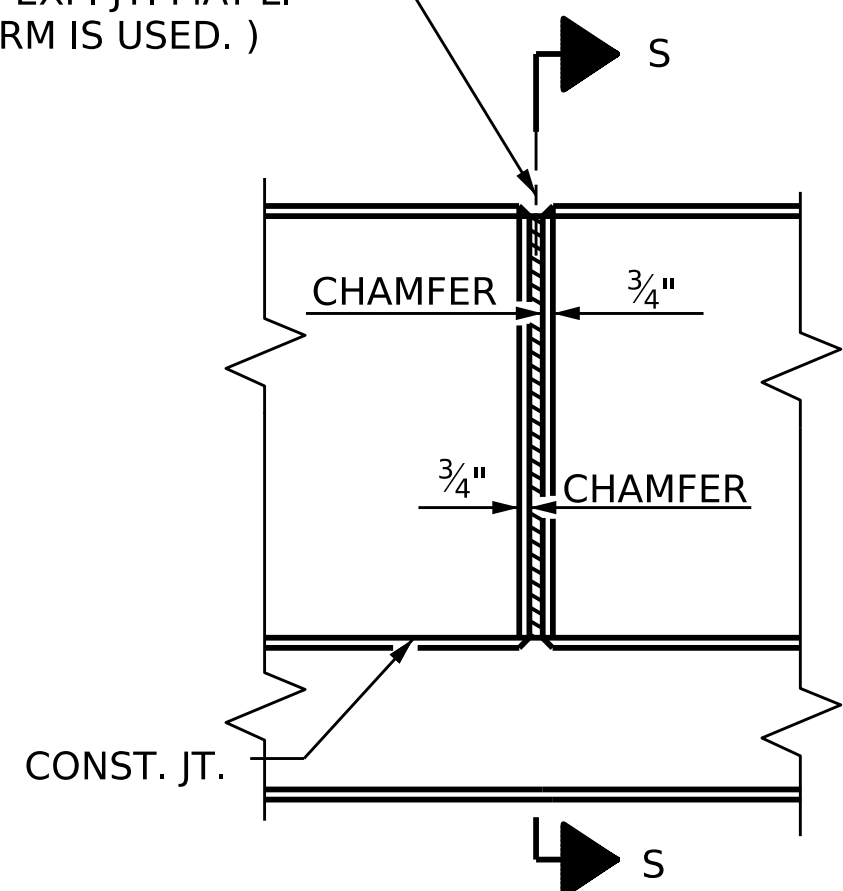
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			53



SECTION S-S

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

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



ELEVATION AT EXPANSION JOINTS

**NOTES:**

CONCRETE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT 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.

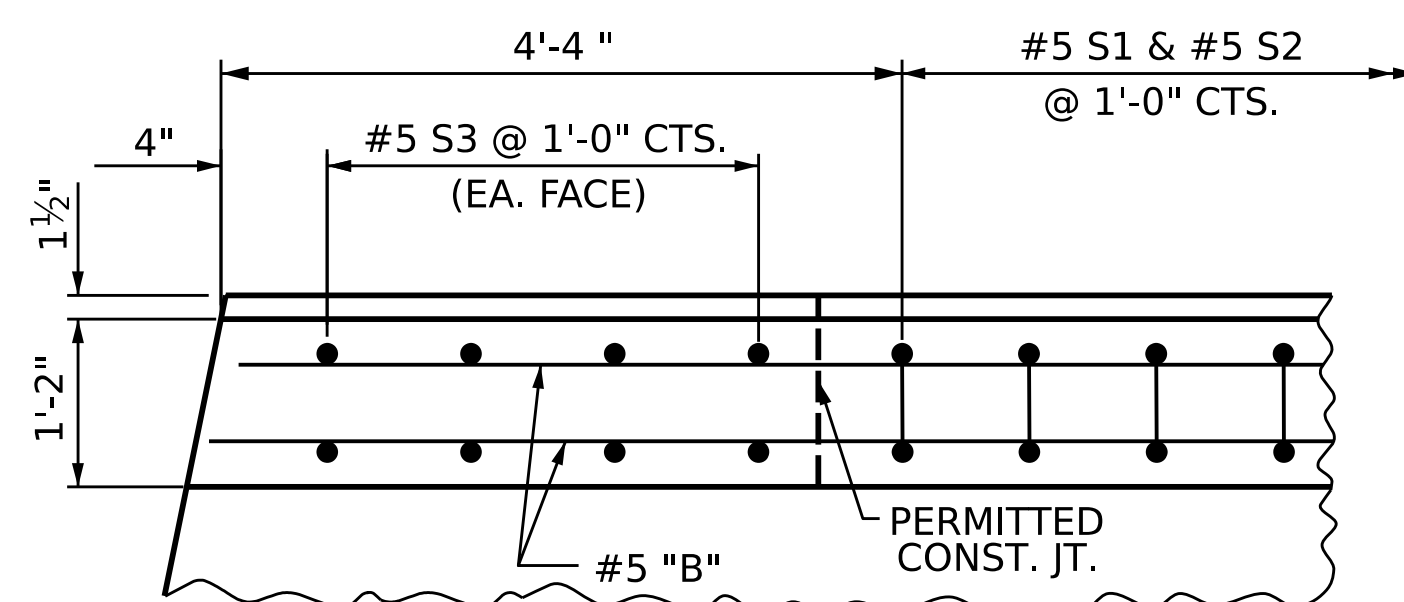
THE #5 "S" BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JT. MATERIAL IN PARAPET.

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

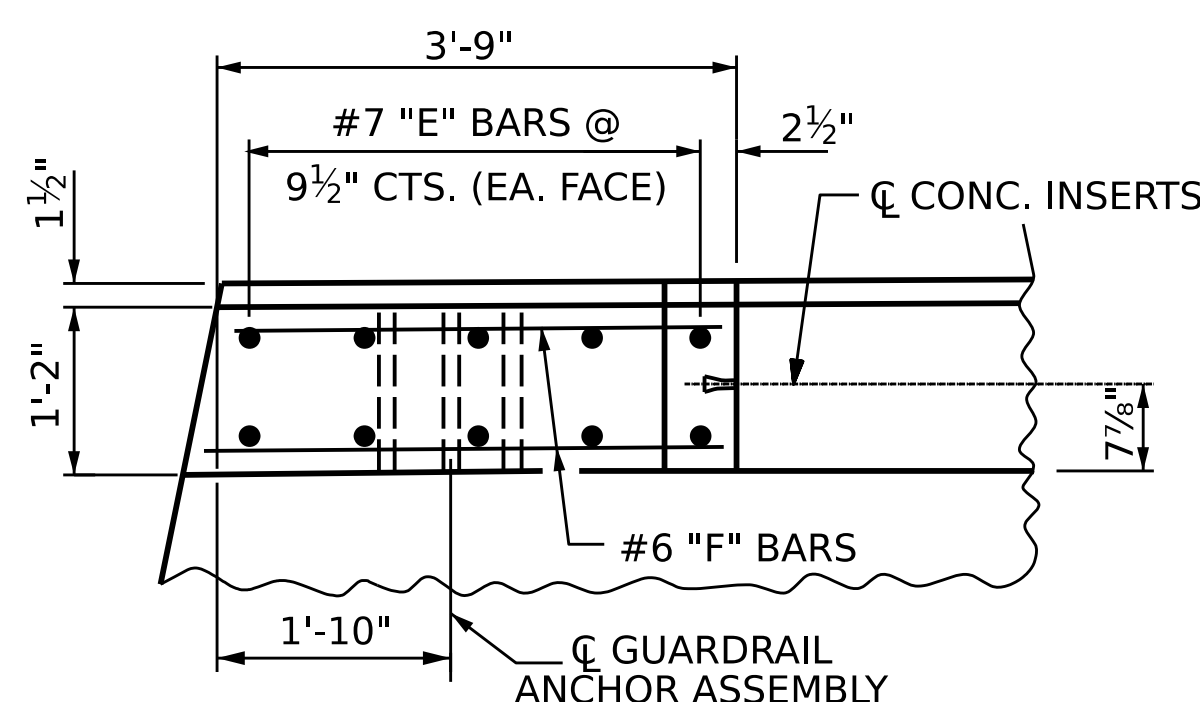
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MID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

FOR DETAILS AND LOCATION OF THE GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.

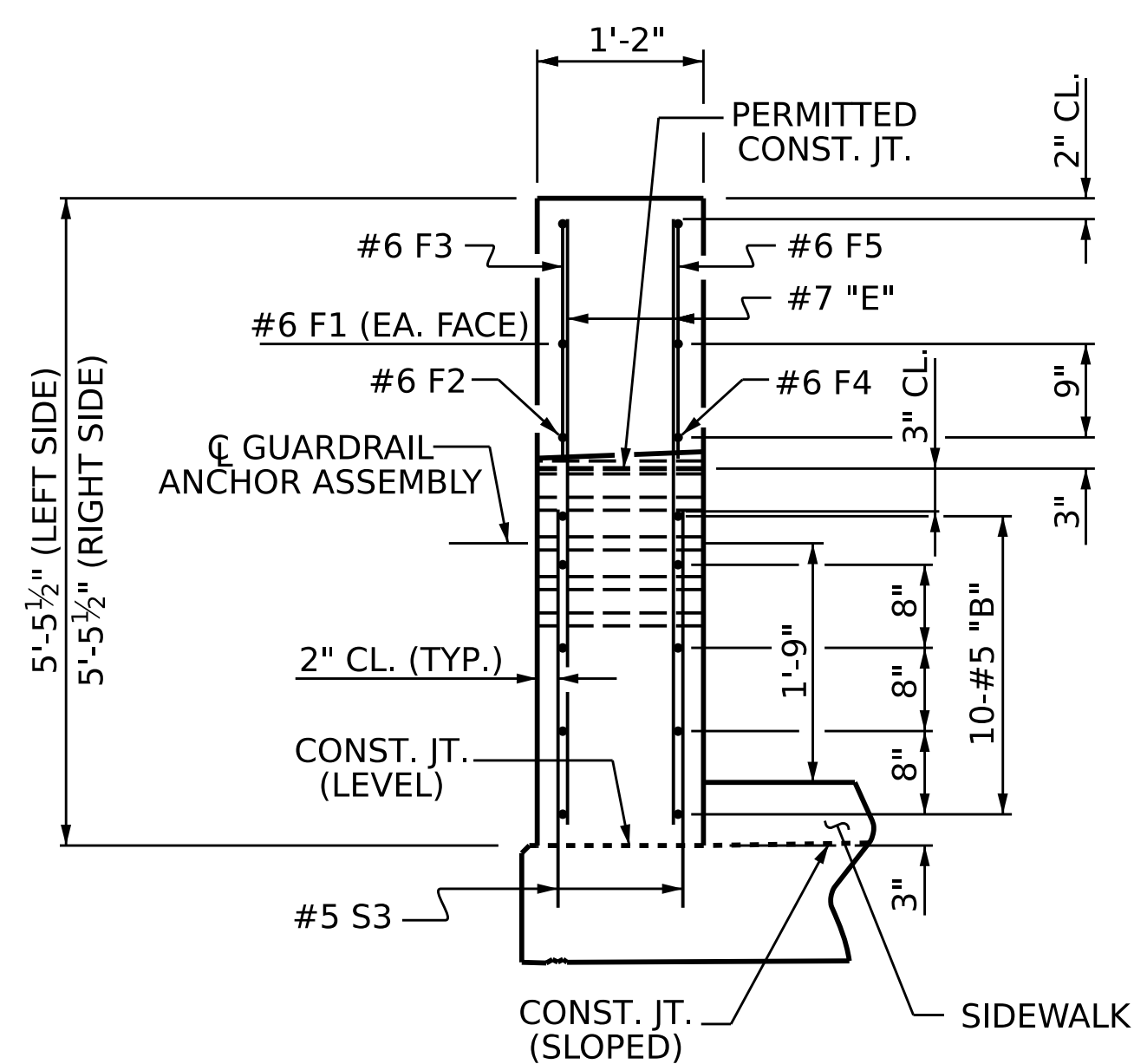
**PARAPET DETAILS**



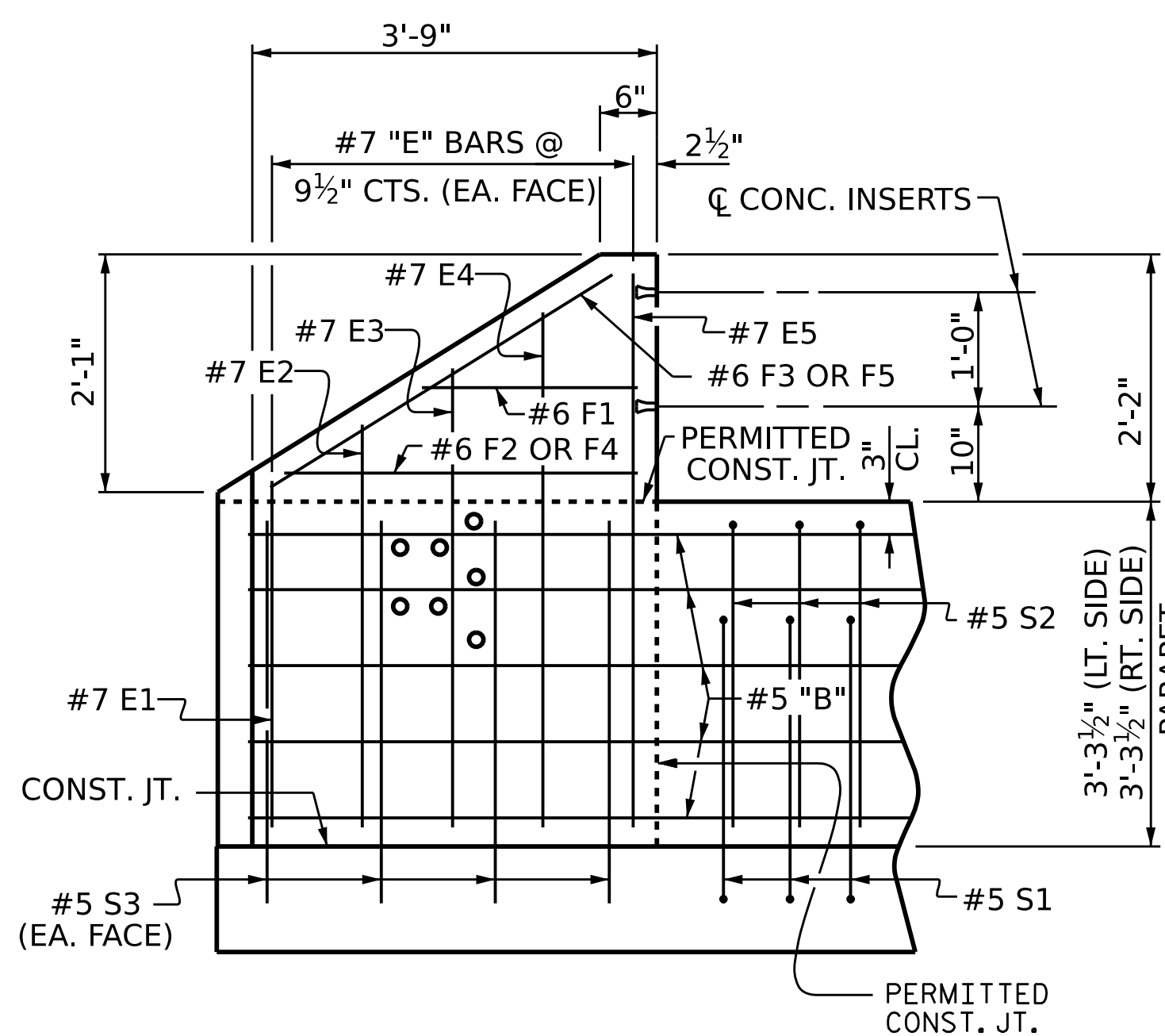
PLAN OF PARAPET



PLAN OF END POST

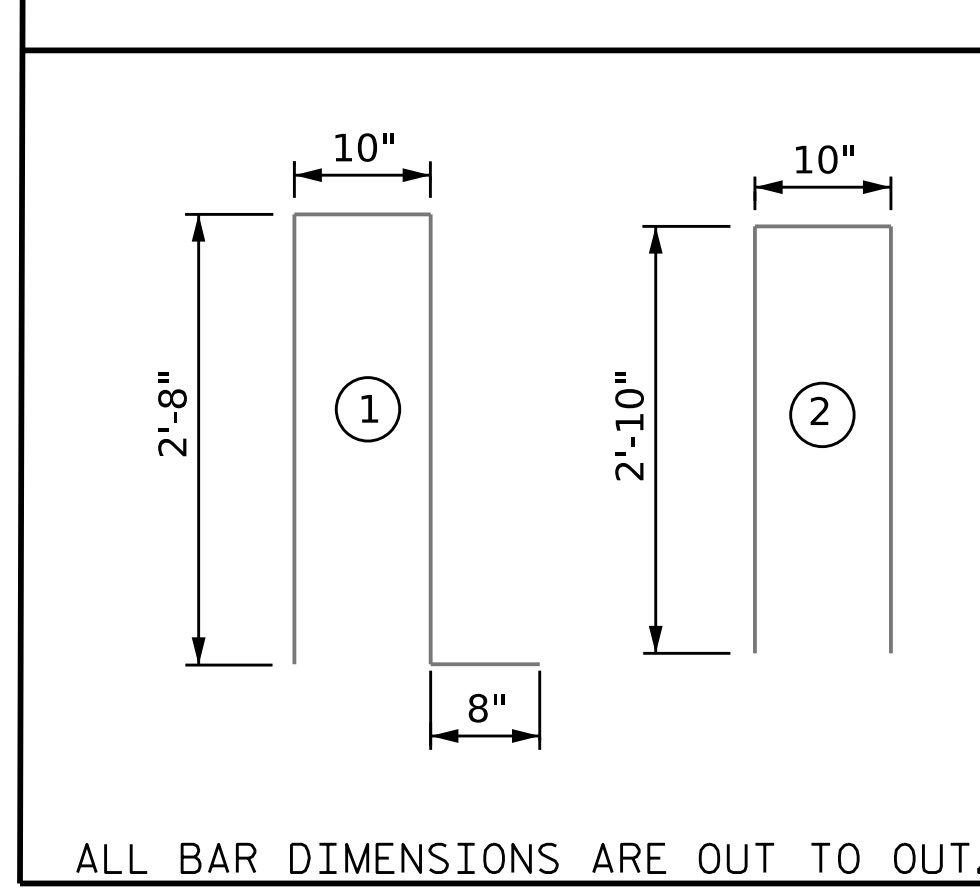


END VIEW

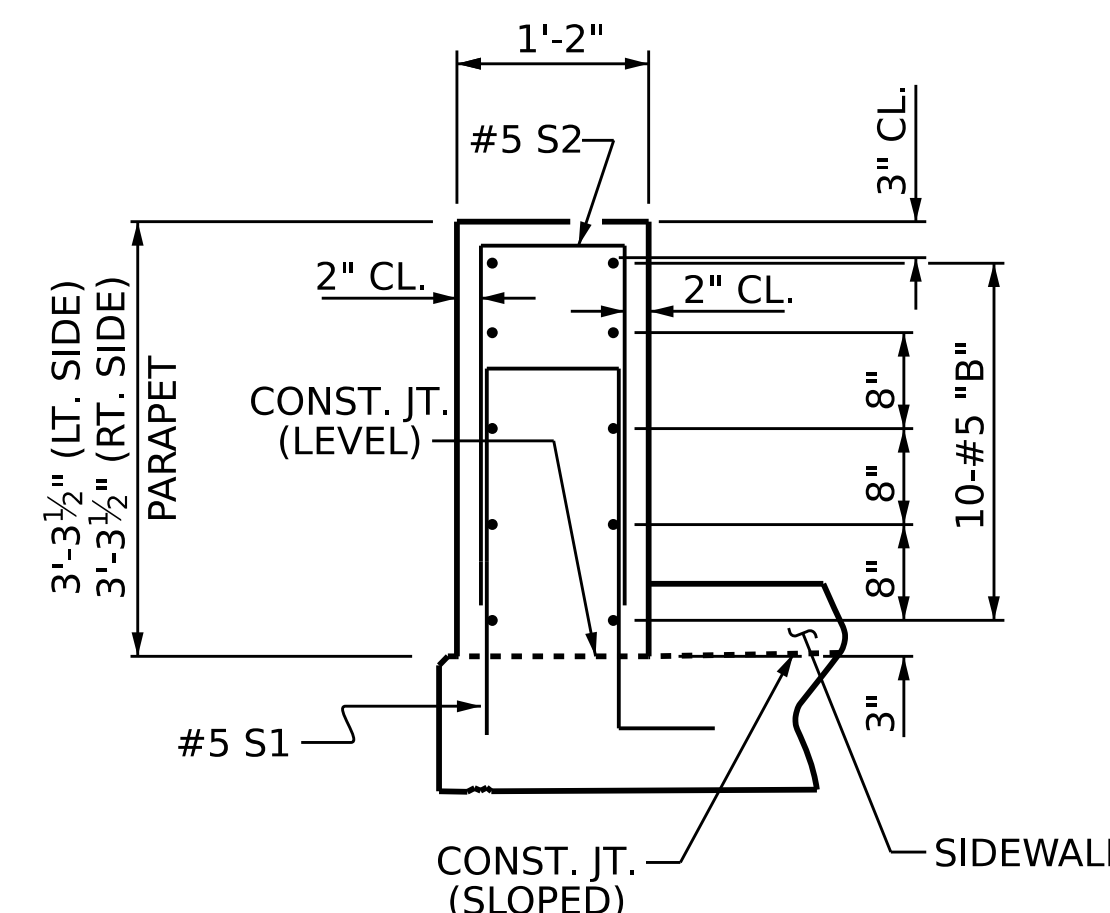


ELEVATION

**PARAPET AND END POST FOR TWO BAR METAL RAIL**



ALL BAR DIMENSIONS ARE OUT TO OUT.

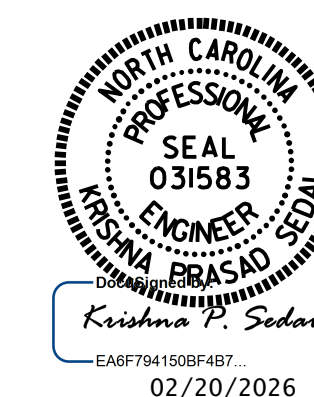


SECTION THROUGH PARAPET

STAGE I						
PARAPET & TWO END POSTS						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* B1	20	#5	STR	15'-0"	313	
* B2	80	#5	STR	23'-8"	1975	
* B3	20	#5	STR	10'-8"	223	
* E1	4	#7	STR	3'-7"	29	
* E2	4	#7	STR	4'-0"	33	
* E3	4	#7	STR	4'-5"	36	
* E4	4	#7	STR	4'-10"	40	
* E5	4	#7	STR	5'-1"	42	
* F1	4	#6	STR	2'-2"	13	
* F2	2	#6	STR	3'-5"	10	
* F3	2	#6	STR	3'-0"	9	
* F4	2	#6	STR	3'-11"	12	
* F5	2	#6	STR	3'-7"	11	
* S1	230	#5	1	6'-10"	1639	
* S2	230	#5	2	6'-6"	1559	
* S3	16	#5	STR	3'-6"	58	
* EPOXY COATED REINFORCING STEEL				LBS.	6002	
CLASS AA CONCRETE				CU. YDS.	34.7	
1'-2" x 3'-3 1/2" CONCRETE PARAPET				LIN. FT.	237.2	
STAGE II						
PARAPET & TWO END POSTS						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* B1	20	#5	STR	15'-0"	313	
* B2	80	#5	STR	23'-8"	1975	
* B3	20	#5	STR	10'-8"	223	
* E1	4	#7	STR	3'-7"	29	
* E2	4	#7	STR	4'-0"	33	
* E3	4	#7	STR	4'-5"	36	
* E4	4	#7	STR	4'-10"	40	
* E5	4	#7	STR	5'-1"	42	
* F1	4	#6	STR	2'-2"	13	
* F2	2	#6	STR	3'-5"	10	
* F3	2	#6	STR	3'-0"	9	
* F4	2	#6	STR	3'-11"	12	
* F5	2	#6	STR	3'-7"	11	
* S1	230	#5	1	6'-10"	1639	
* S2	230	#5	2	6'-6"	1559	
* S3	16	#5	STR	3'-6"	58	
* EPOXY COATED REINFORCING STEEL				LBS.	6002	
CLASS AA CONCRETE				CU. YDS.	34.7	
1'-2" x 3'-3 1/2" CONCRETE PARAPET				LIN. FT.	237.2	

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 2 OF 2



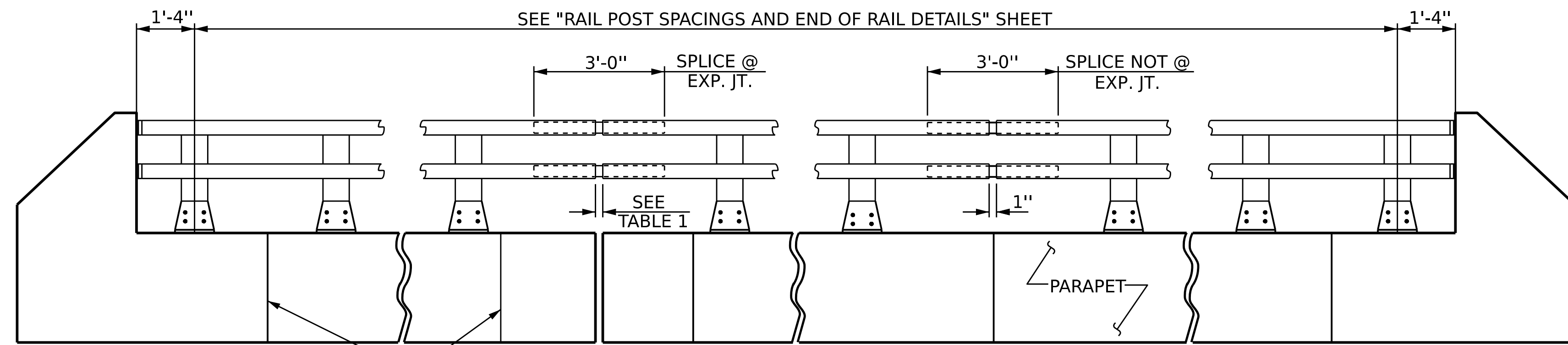
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**CONCRETE PARAPET  
 DETAILS**

DRAWN BY : E. MOHAMED DATE : 04/2025  
 CHECKED BY : A. SORSENGINH DATE : 04/2025  
 DESIGN ENGINEER OF RECORD : A. IGHWAIR DATE : 04/2025

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

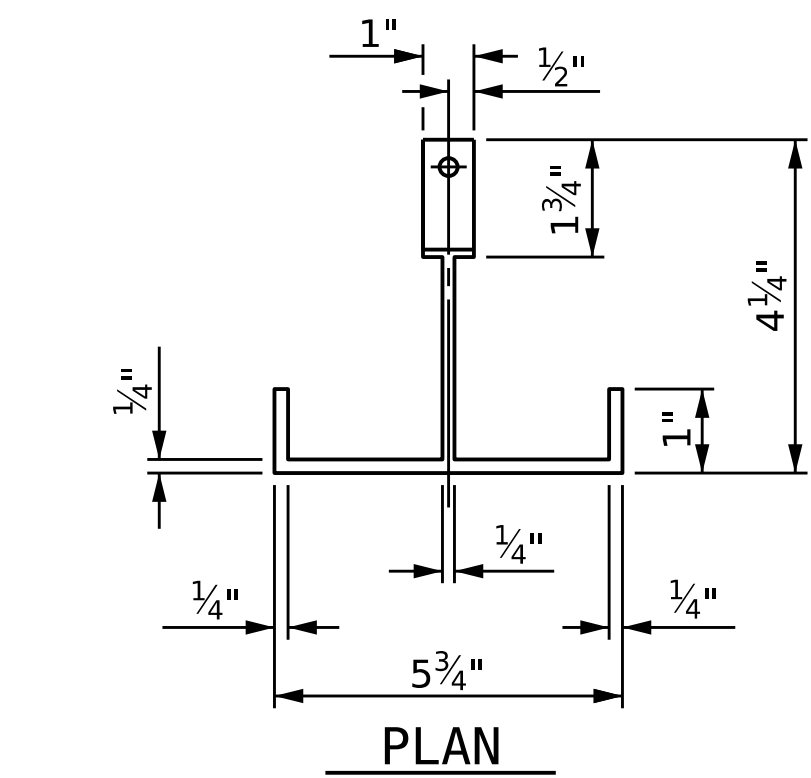
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 53

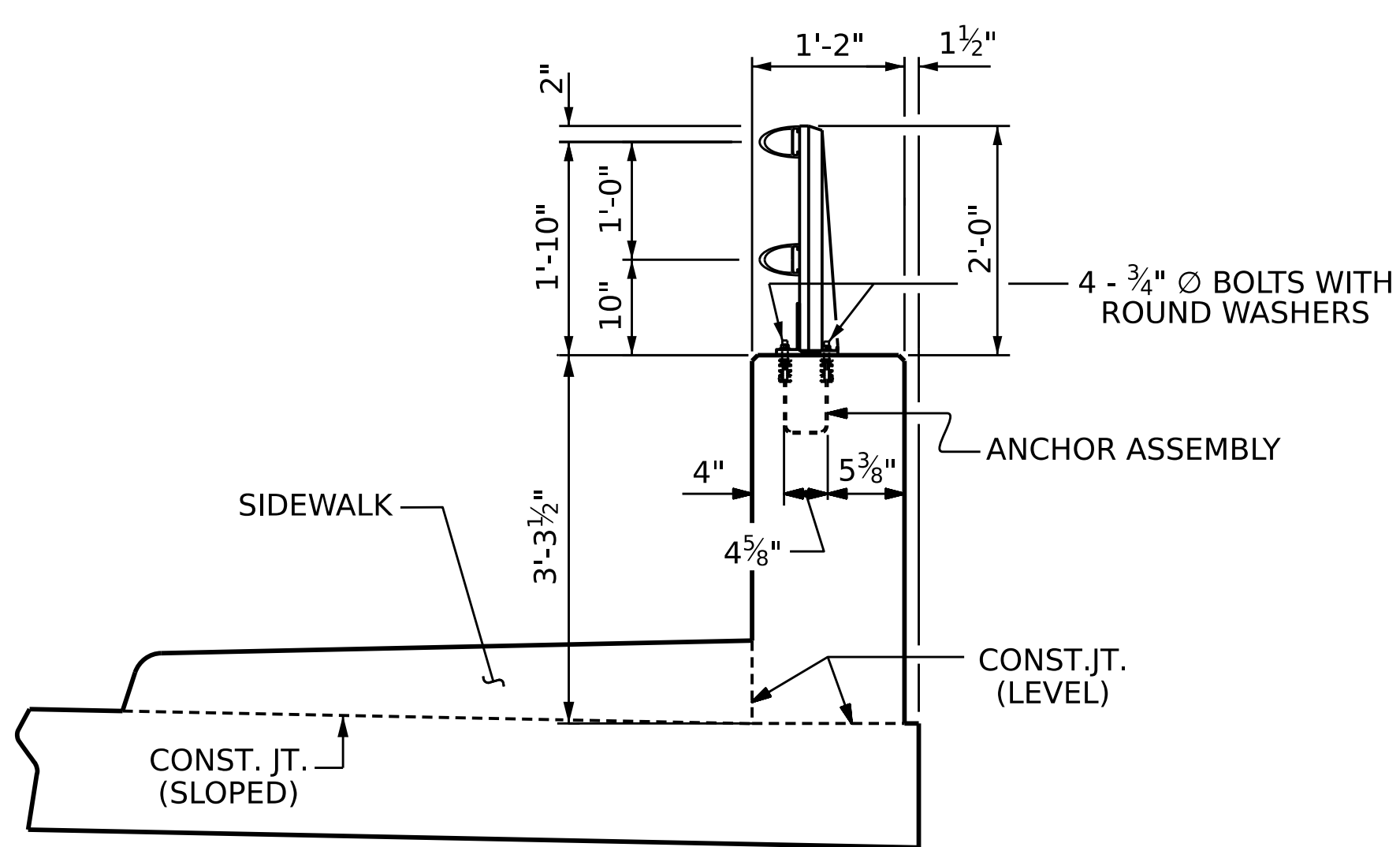


**ELEVATION**

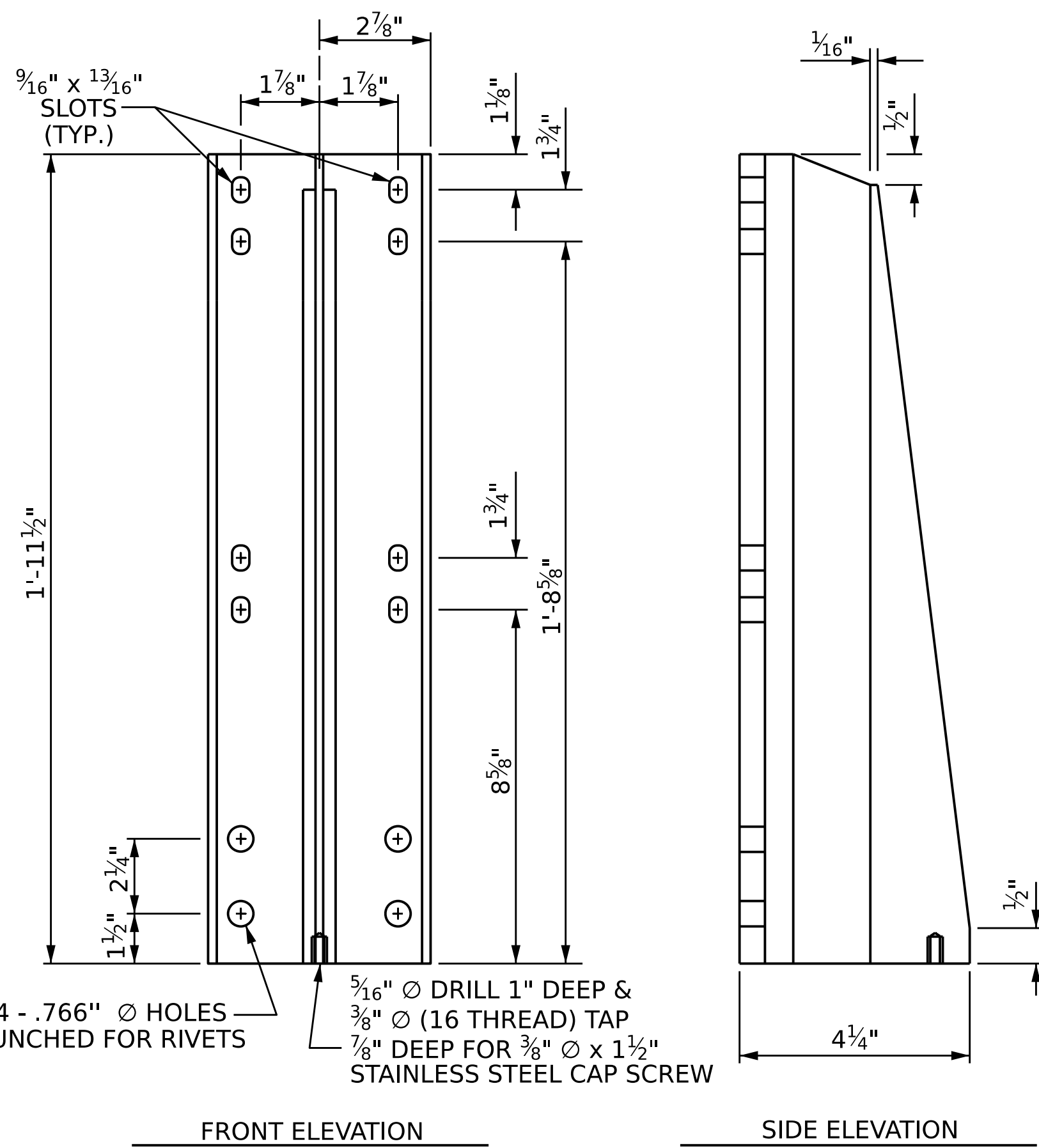
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



**PLAN**



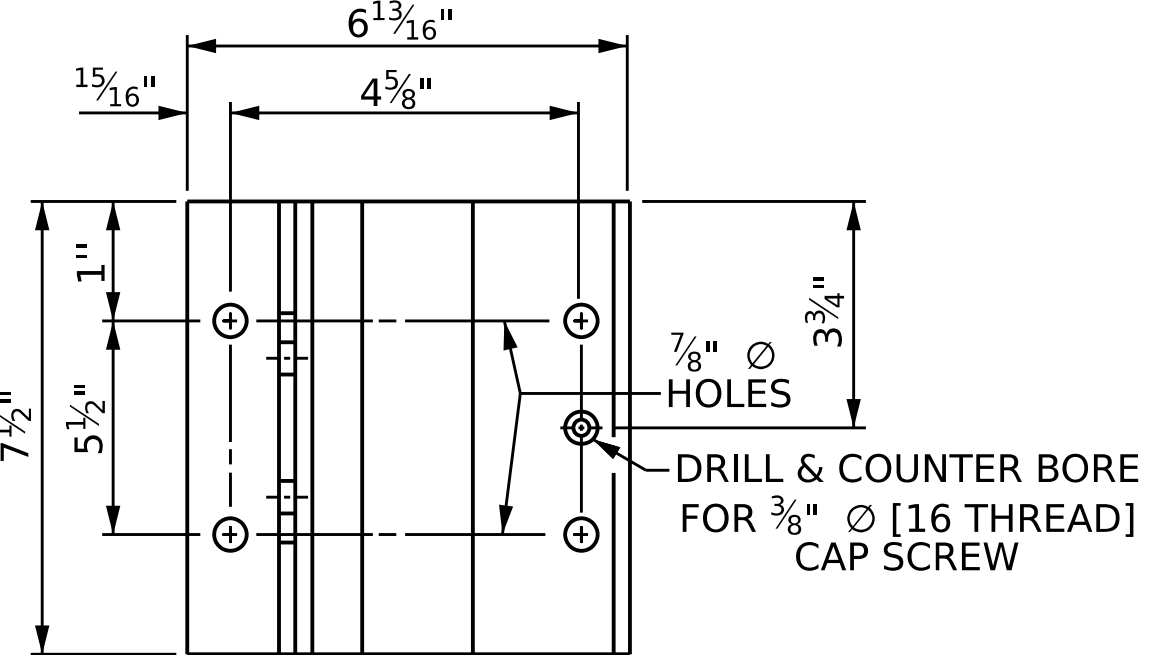
**SECTION THRU PARAPET AND RAIL**



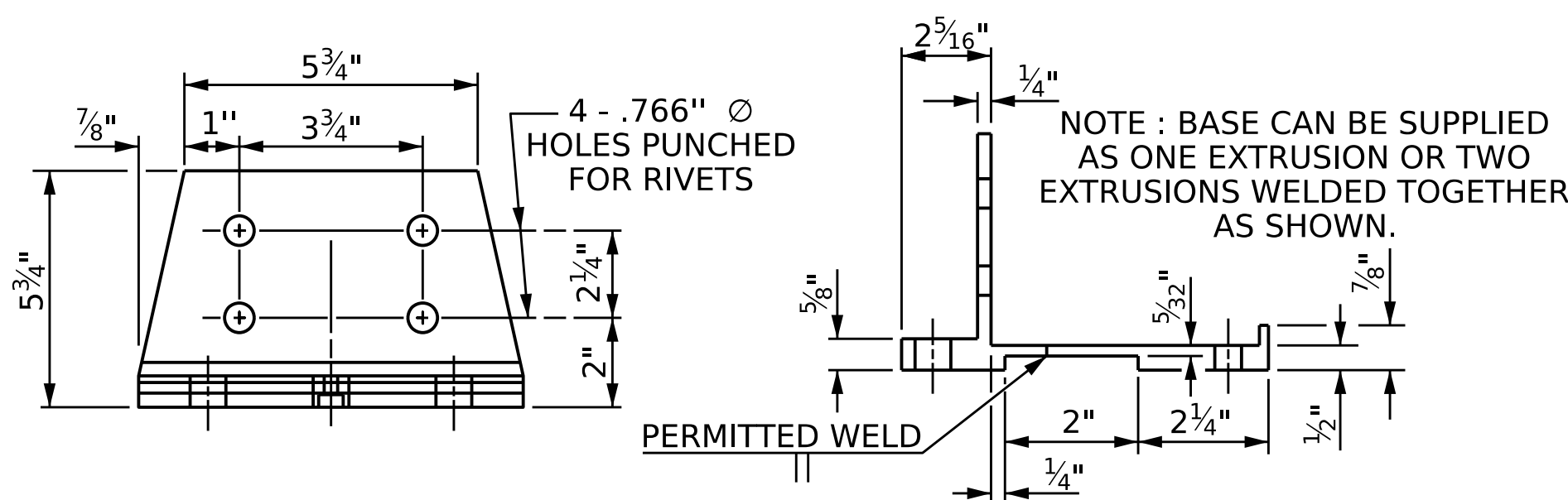
**FRONT ELEVATION**

**SIDE ELEVATION**

**DETAILS OF POST**



**PLAN**



**FRONT ELEVATION**

**SIDE ELEVATION**

**POST BASE DETAILS**

**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 LRFD BRIDGE 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**

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:  
 POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: ASTM A36 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO ASTM A123.  
 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.

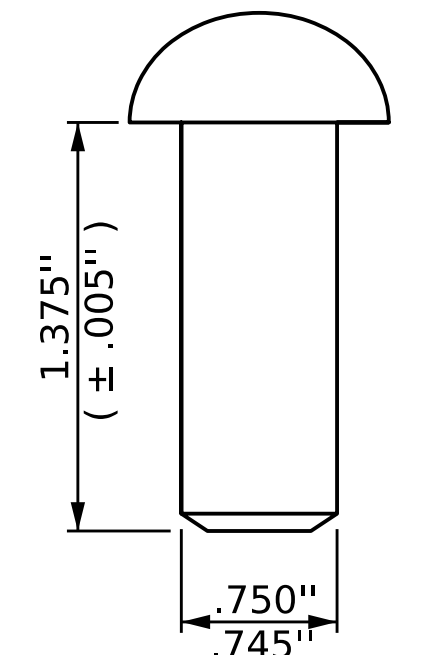
SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.  
 RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

**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 = (STAGE I) 229.03 LIN. FT.  
 (STAGE II) 229.03 LIN. FT.  
 TOTAL = 458.06 LIN. FT.

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**



**RIVET DETAIL**



SHEET 1 OF 3

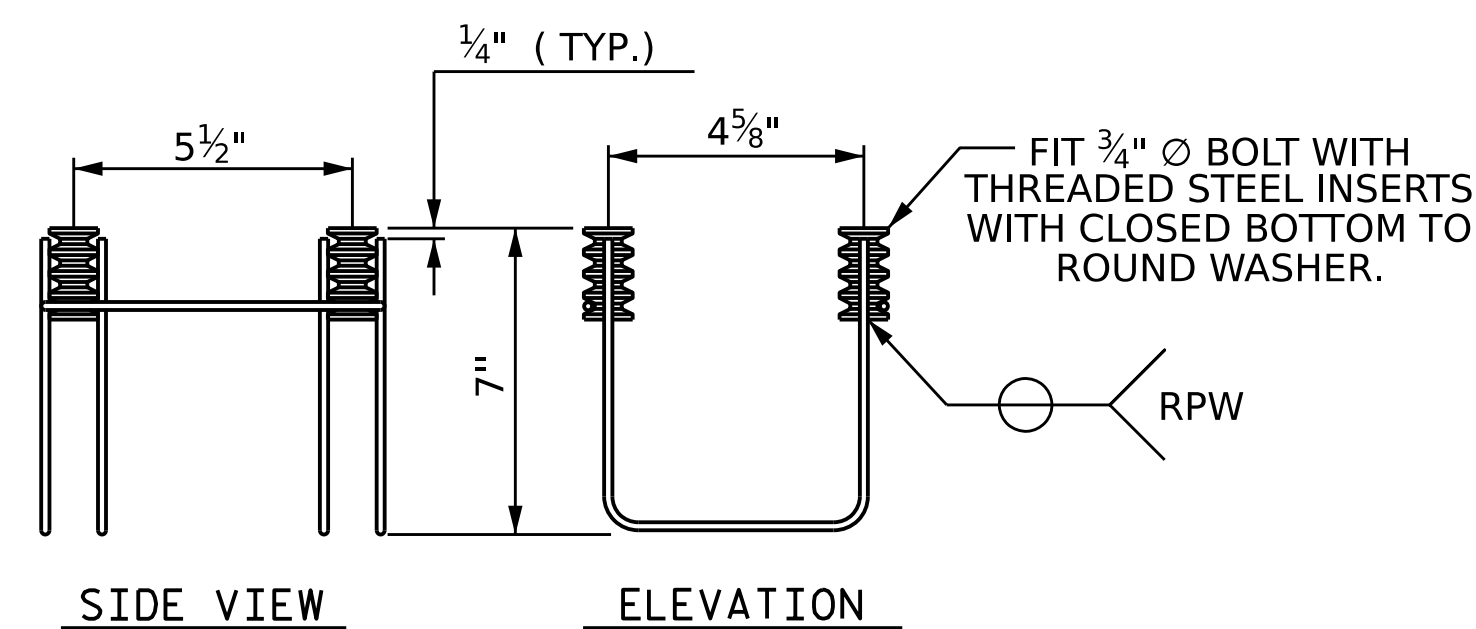
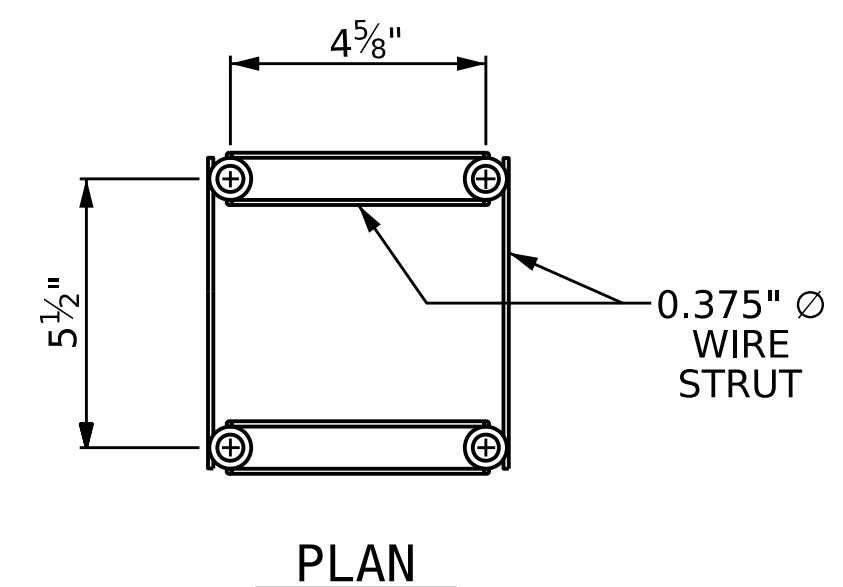
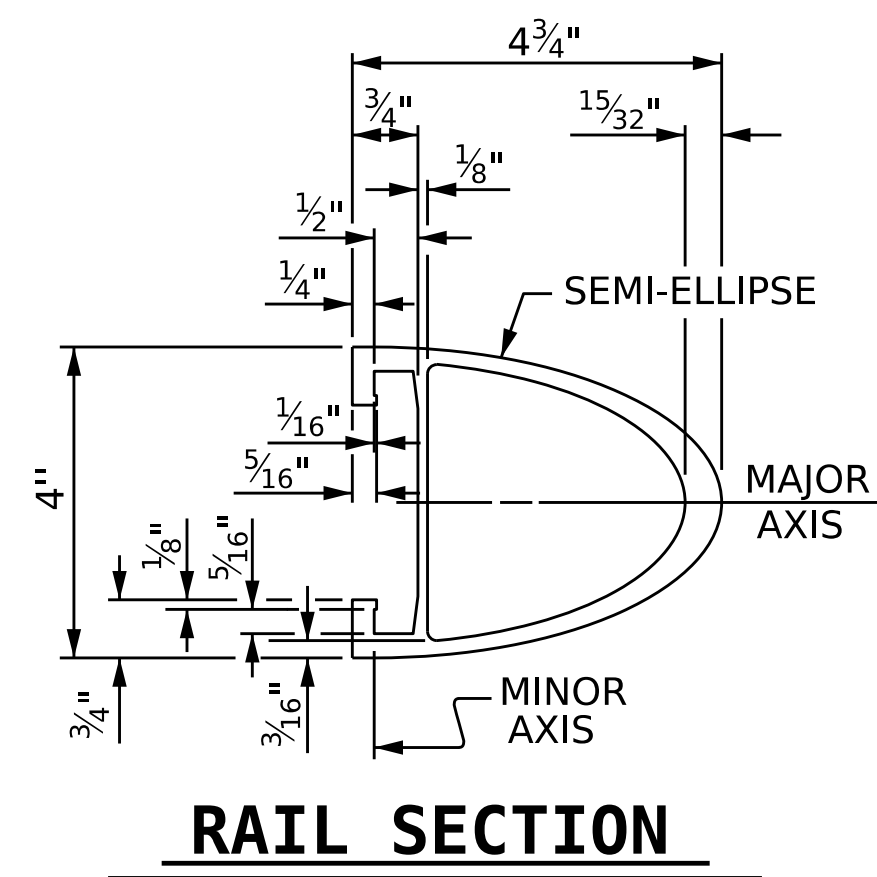
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD

**2 BAR METAL RAIL**

ASSEMBLED BY : E. MOHAMED	DATE : 01/2025
CHECKED BY : A. SORSENGINH	DATE : 04/2025
DRAWN BY : EEM 6/94	REV. 6/13 MAA/GM
CHECKED BY : RGW 6/94	REV. 12/17 MAA/THC
	REV. 10/23 BNB/SNM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS 53
2			4			



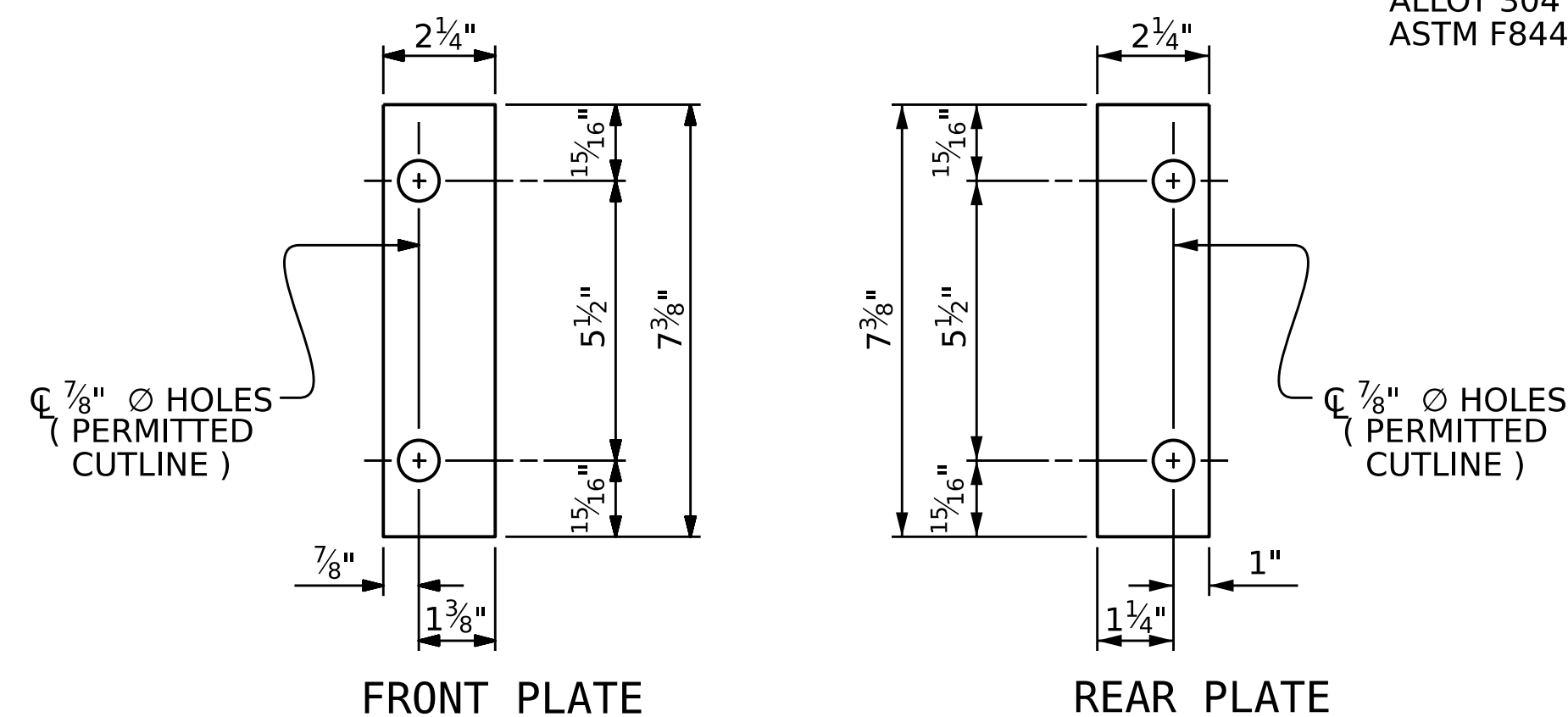
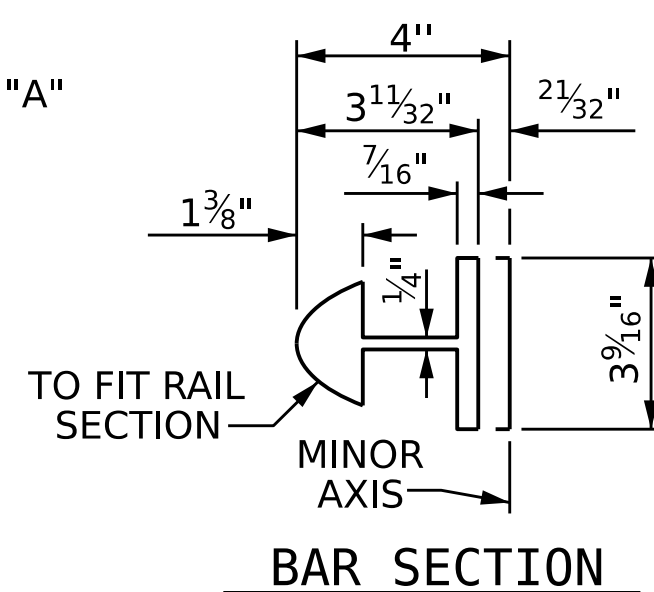
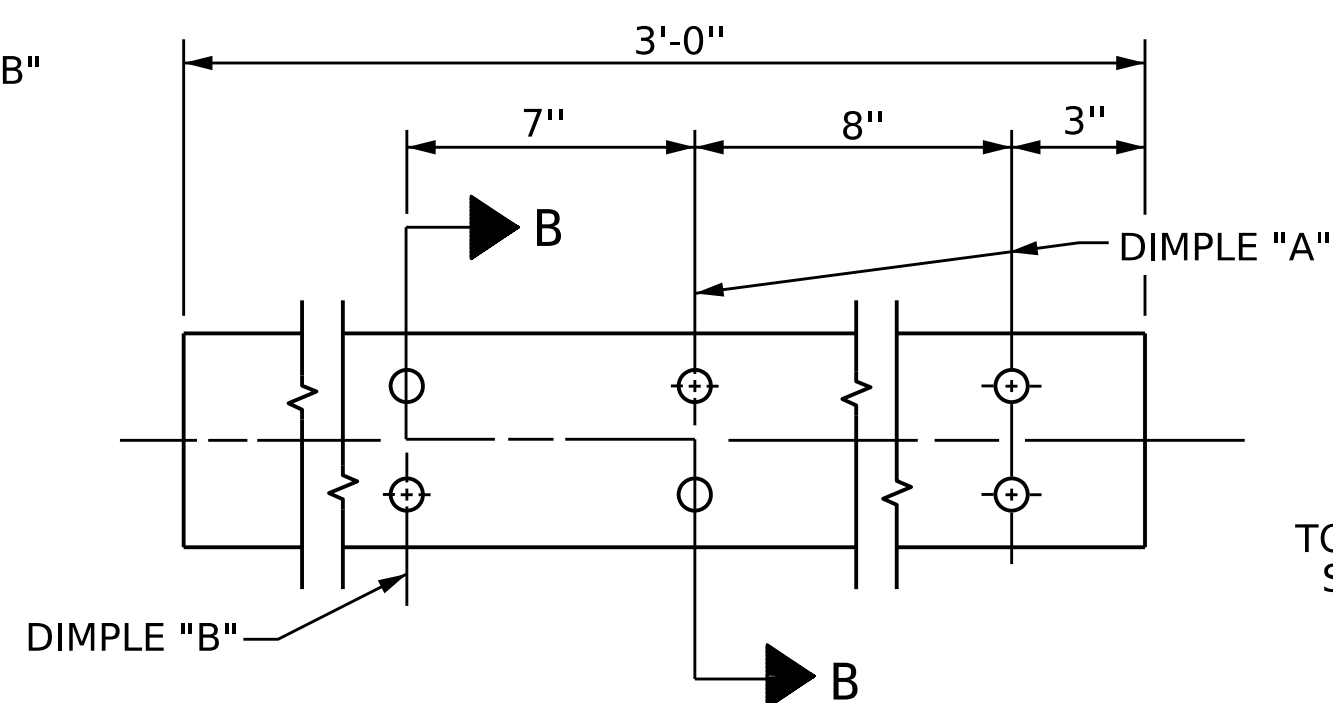
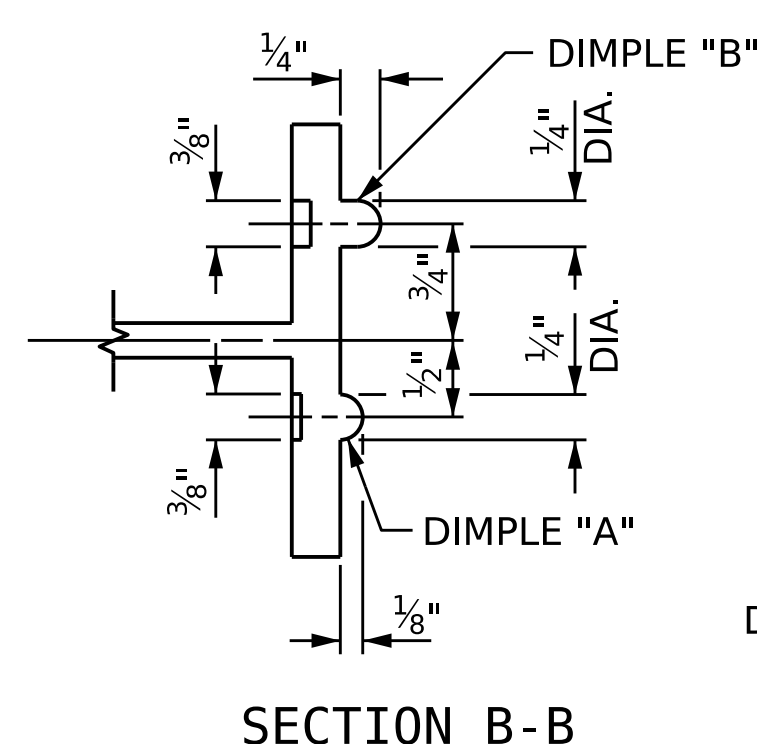
### 4-BOLT METAL RAIL ANCHOR ASSEMBLY

( 82 ASSEMBLIES REQUIRED )

- ### NOTES
- #### STRUCTURAL CONCRETE ANCHOR ASSEMBLY
- THE STRUCTURAL CONCRETE ANCHOR 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 2" FOR 3/4" FERRULES.
  - 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.
  - 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 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
  - THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF ASTM A123.
  - 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.
  - BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

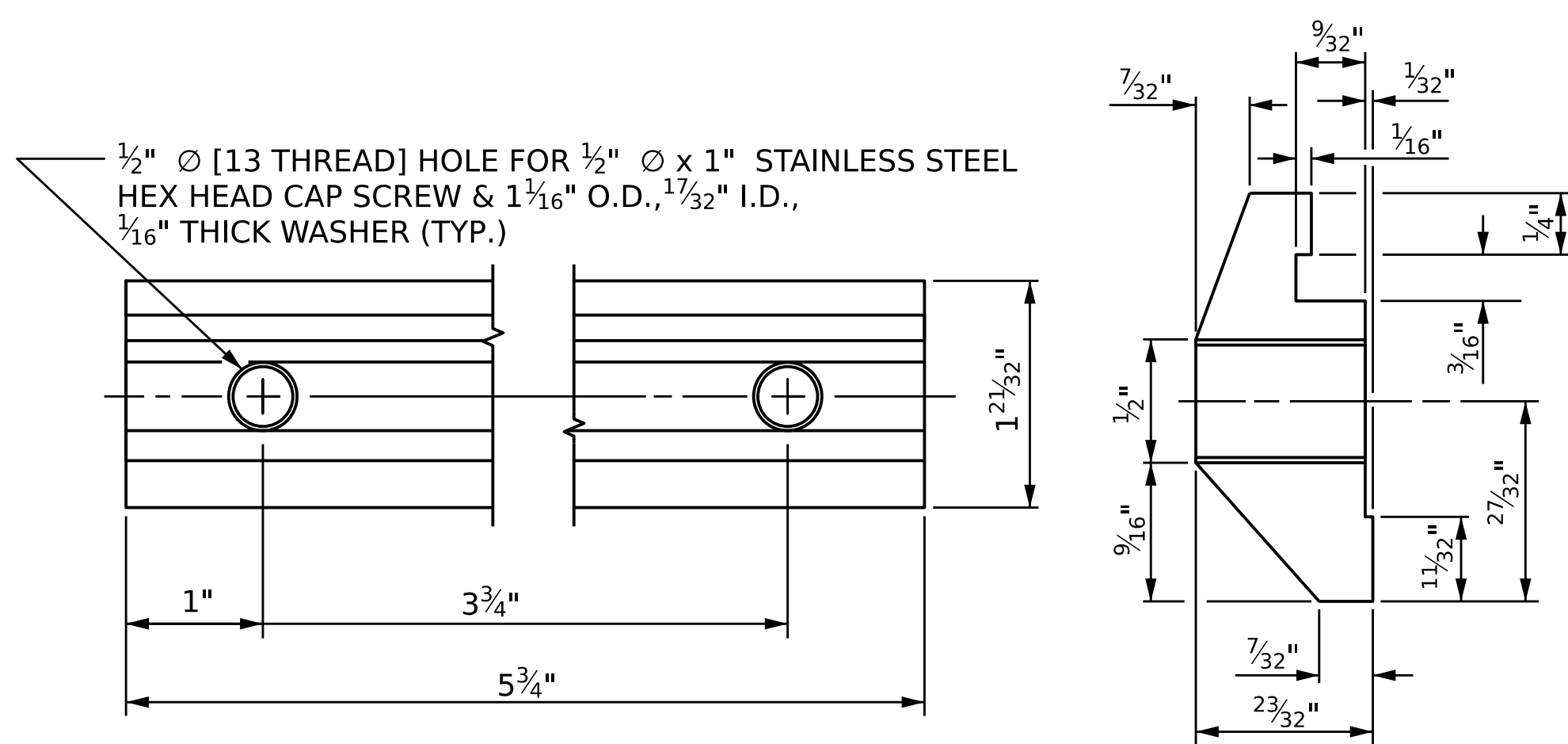
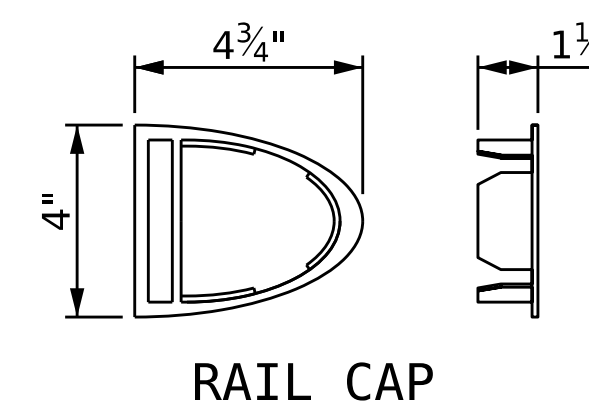
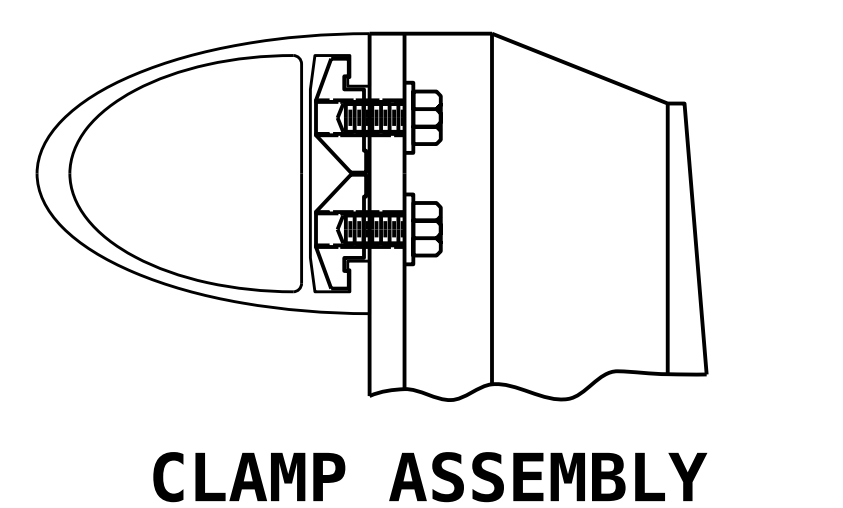
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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.



### SHIM DETAILS

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



### CLAMP BAR DETAIL

( 4 REQUIRED PER POST )

ASSEMBLED BY : E. MOHAMED DATE : 01/2025  
 CHECKED BY : A. SORSENGINH DATE : 04/2025  
 DRAWN BY : EEM 6/94  
 CHECKED BY : RGW 6/94

REV. 10/11 MAA/GM  
 REV. 12/17 MAA/THC  
 REV. 10/23 BNB/SNM

12/19/2025  
 S:\DPO3\BR-0168\Final Plans\401\_055\_BR0168\_SMU\_2MR\_S28\_330289.dgn  
 ksedai

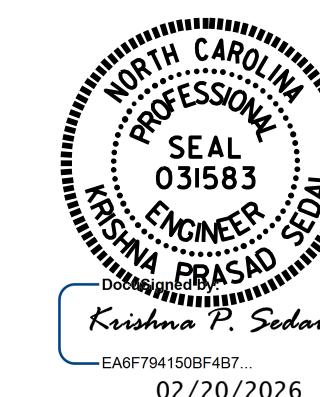
DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD

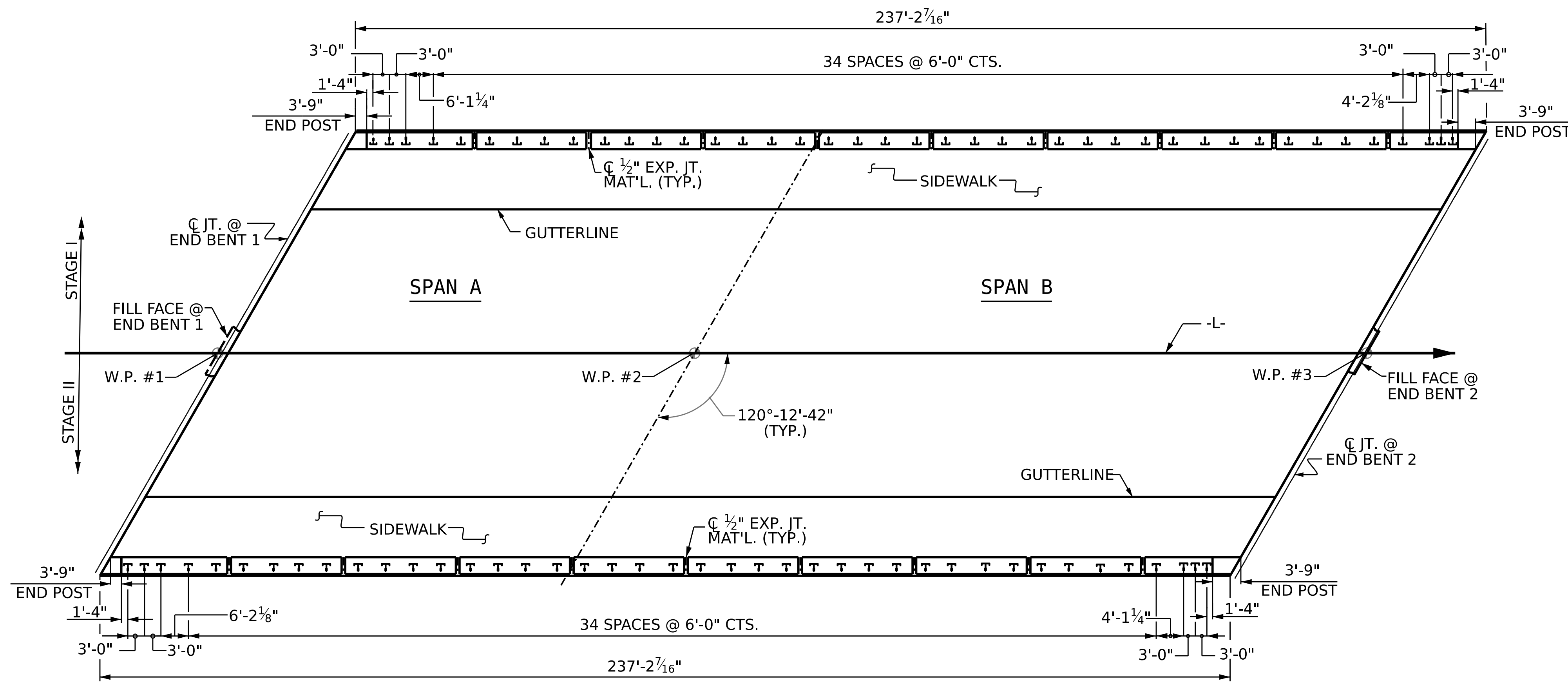
### 2 BAR METAL RAIL



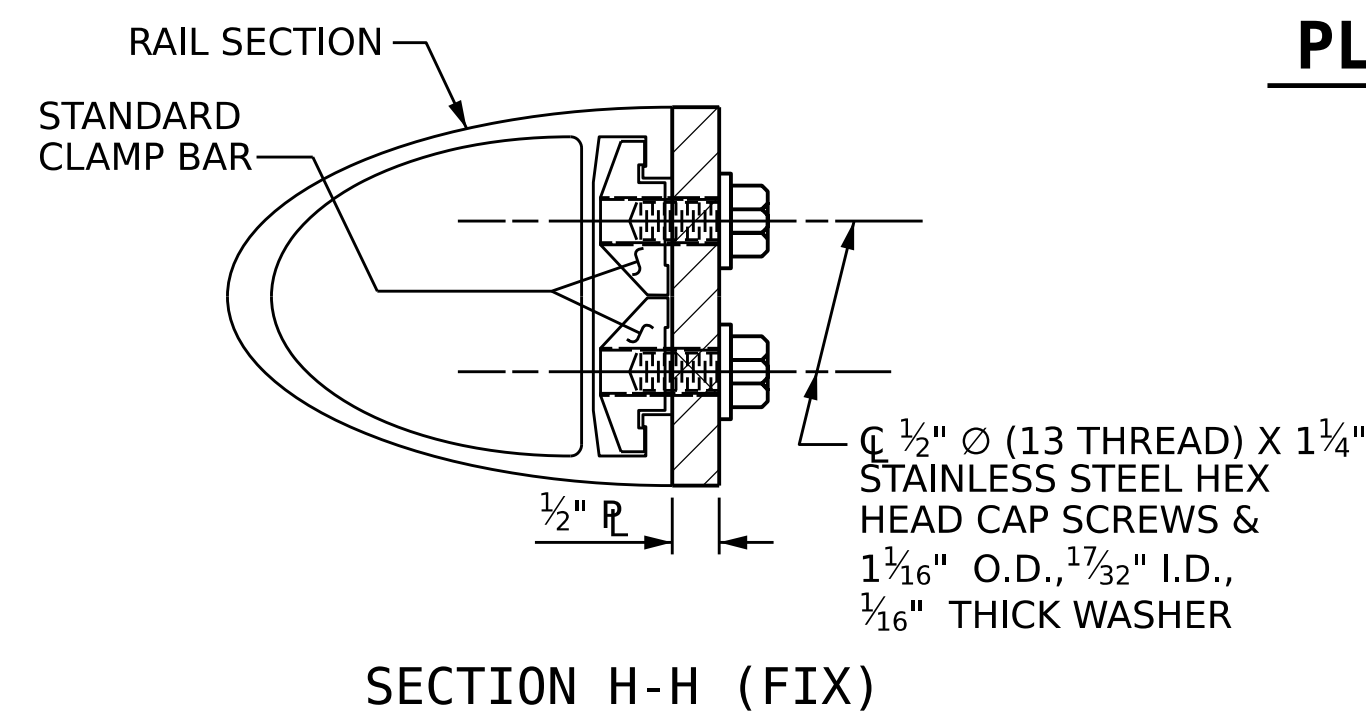
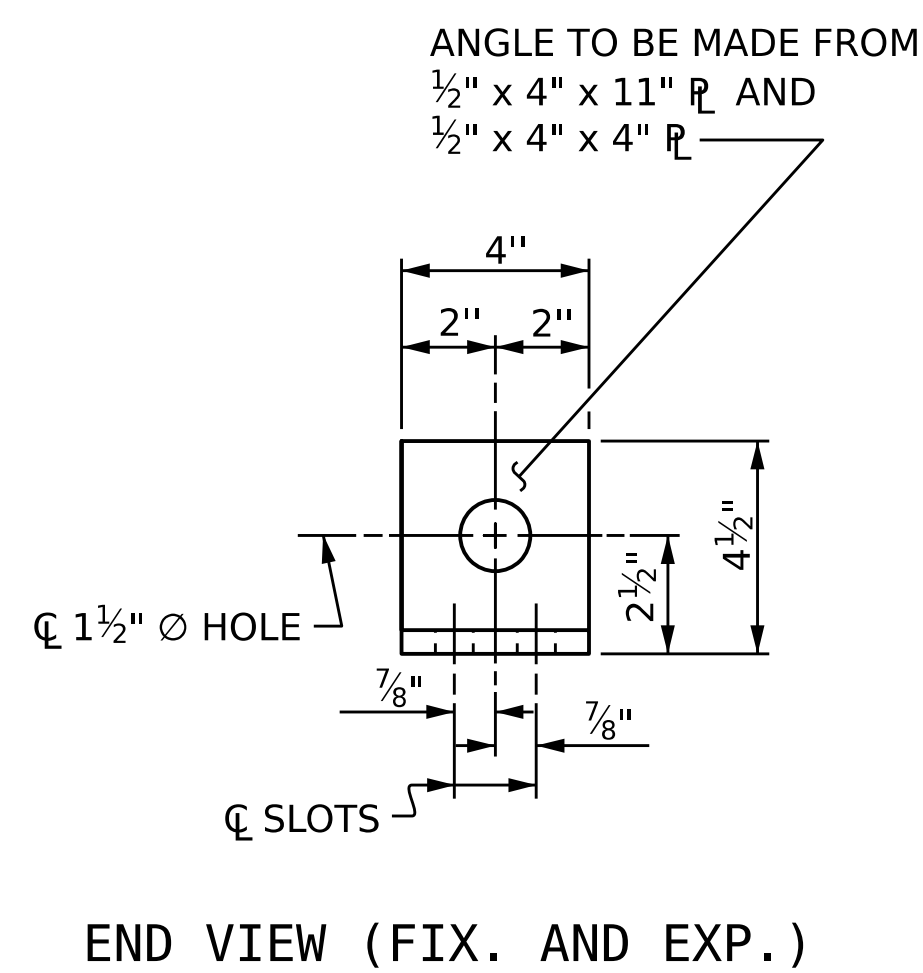
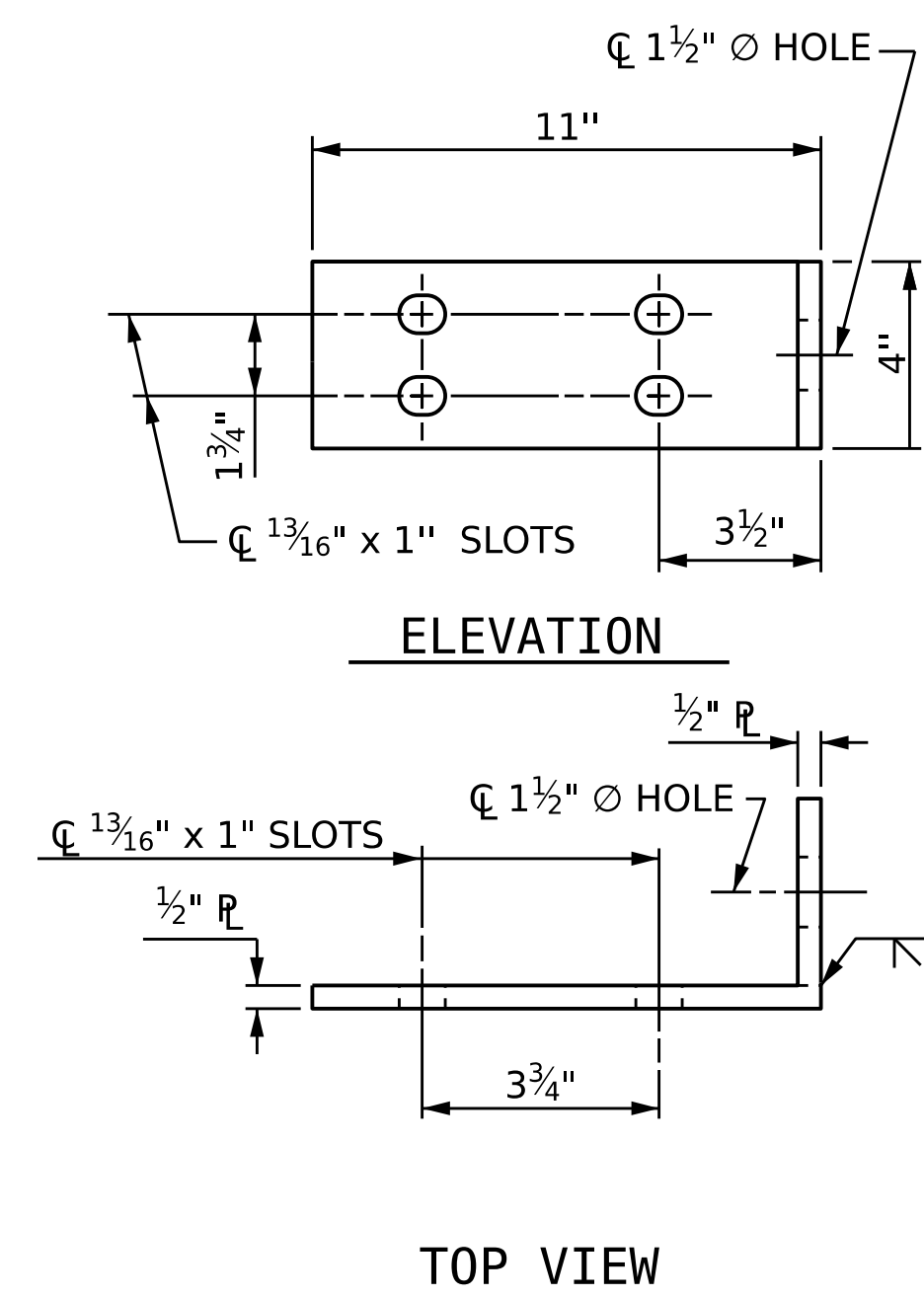
REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.
1			3
2			4

S-28  
 TOTAL SHEETS  
 53

STD. NO. BMR4



**PLAN OF RAIL POST SPACINGS**

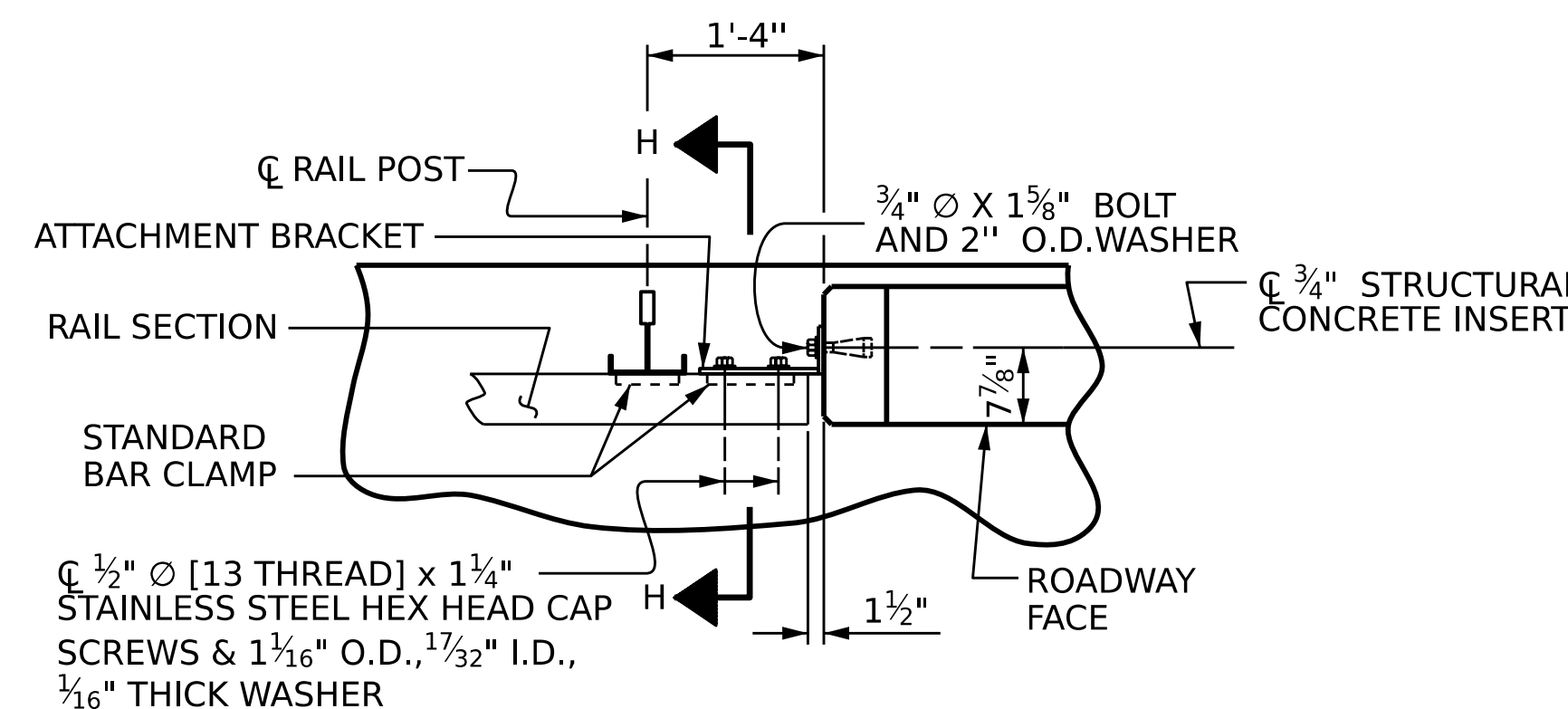


**DETAILS FOR ATTACHING METAL RAIL TO END POST**

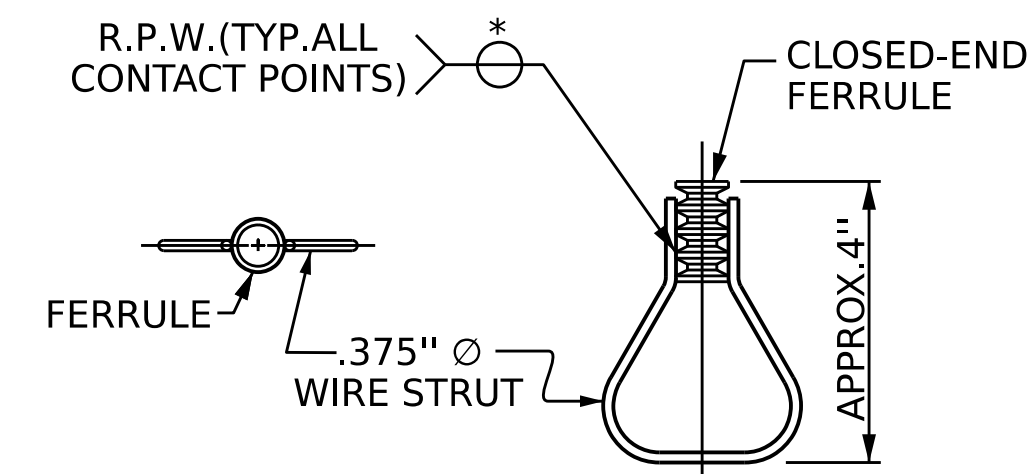
- NOTES**
- STRUCTURAL CONCRETE INSERT**
- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
  - 1 - 3/4" Ø x 1 5/8" BOLT WITH 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 7/16" 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 ASTM A36 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.



**PLAN - RAIL AND END POST**



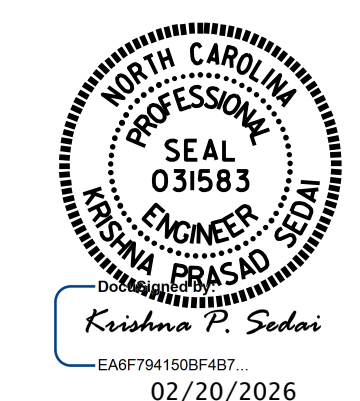
**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

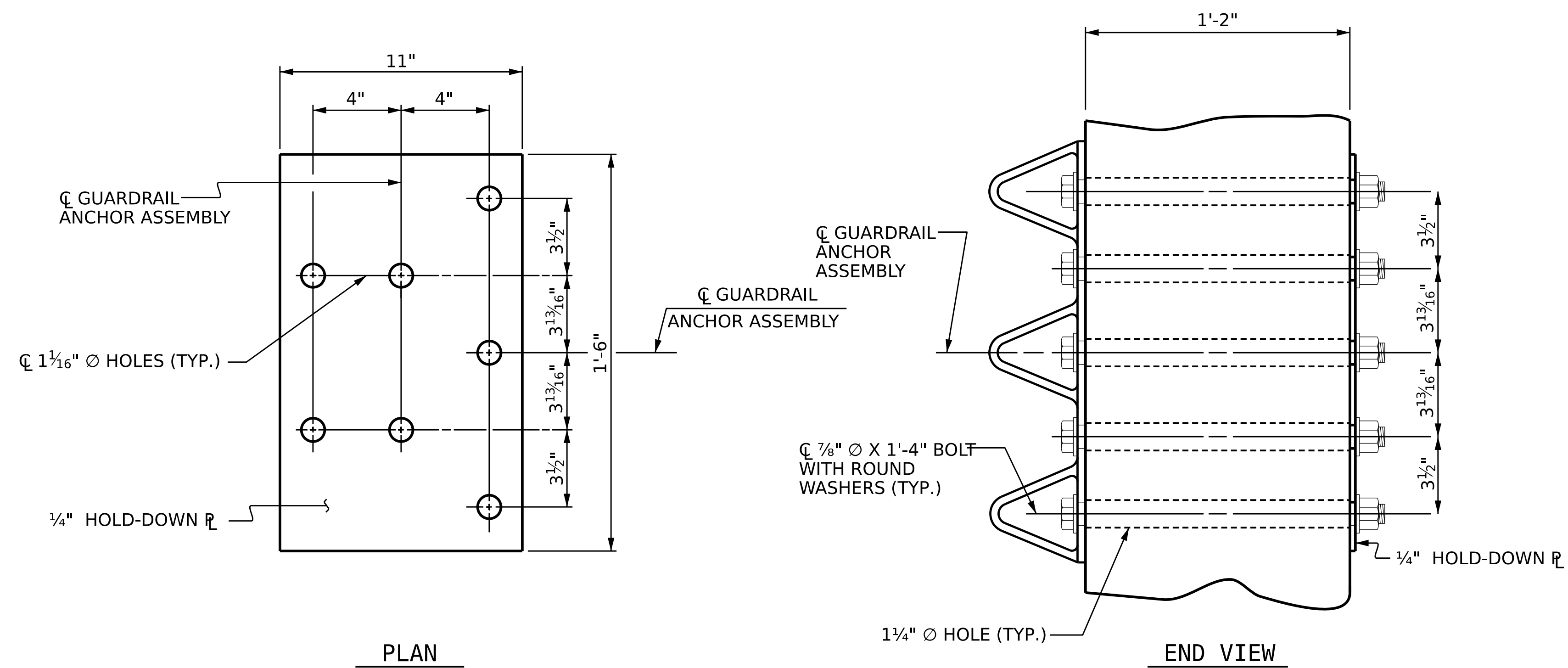
SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**RAIL POST SPACINGS  
 AND  
 END OF RAIL DETAILS**  
 FOR TWO BAR METAL RAILS



ASSEMBLED BY : E. MOHAMED	DATE : 01/2025
CHECKED BY : A. SORSENGINH	DATE : 04/2025
DRAWN BY : FCJ 1/88	REV. 10/1/11 MAA/GM
CHECKED BY : CRK 3/89	REV. 12/17 MAA/THC
	REV. 10/23 BNB/SNM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		NO. 1		DATE: 03/2025		NO. 2		DATE: 04/2025		SHEET NO. S-29	
		NO. 3				NO. 4				TOTAL SHEETS 53	



**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.

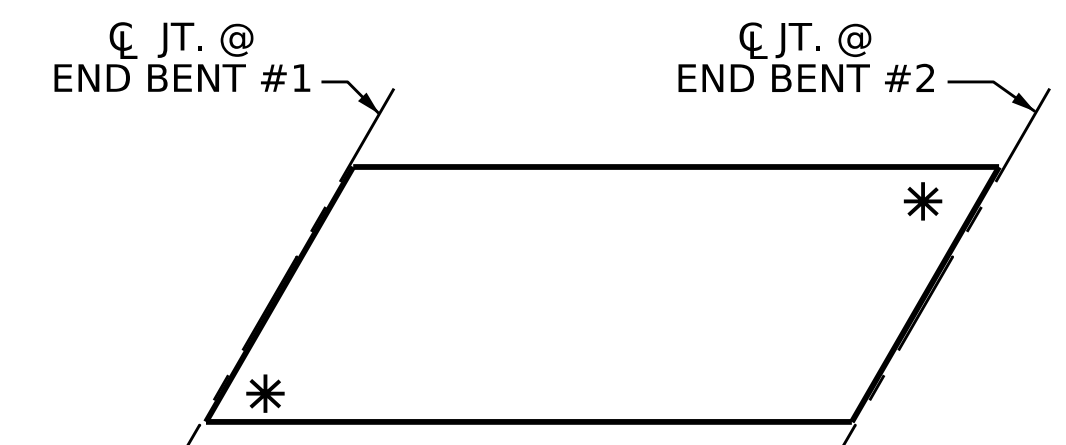
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

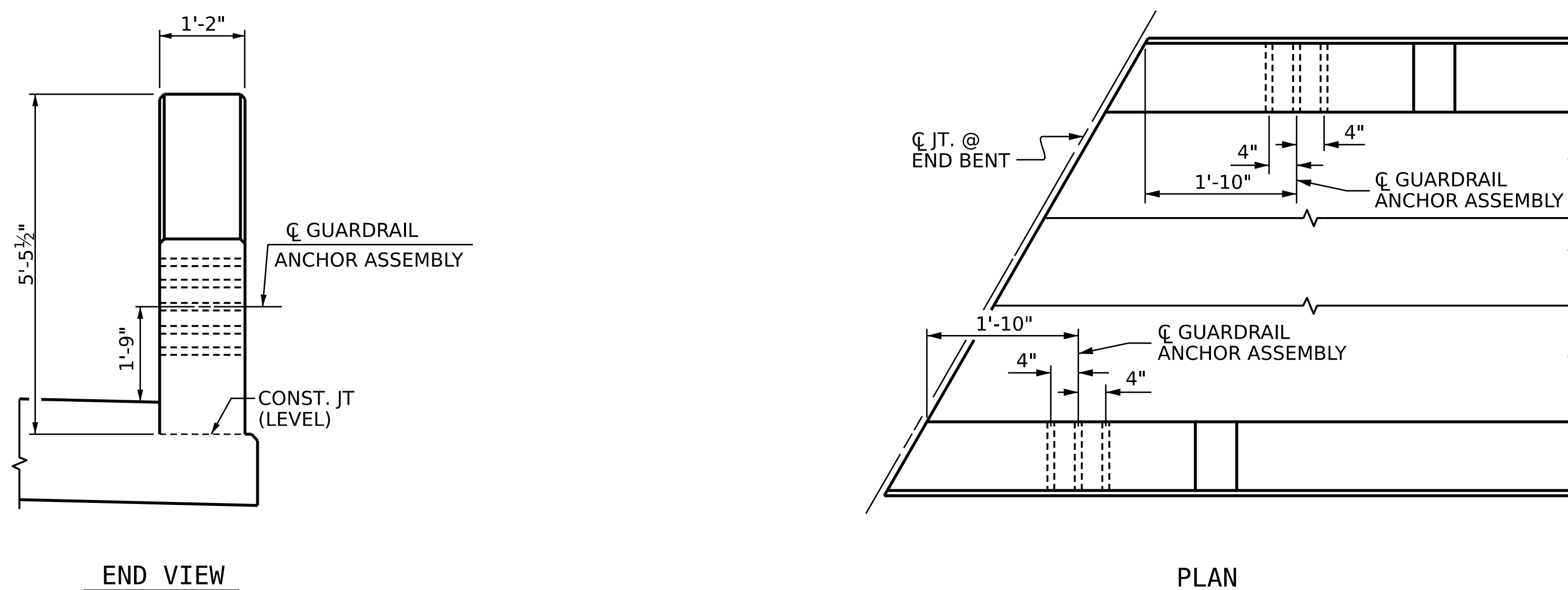
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.



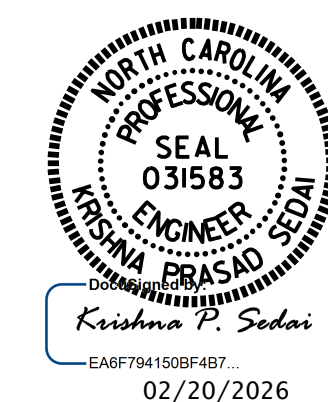
**SKETCH SHOWING POINTS OF ATTACHMENT**

\* LOCATION OF GUARDRAIL ATTACHMENT



**LOCATION OF GUARDRAIL ANCHOR AT END POST**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

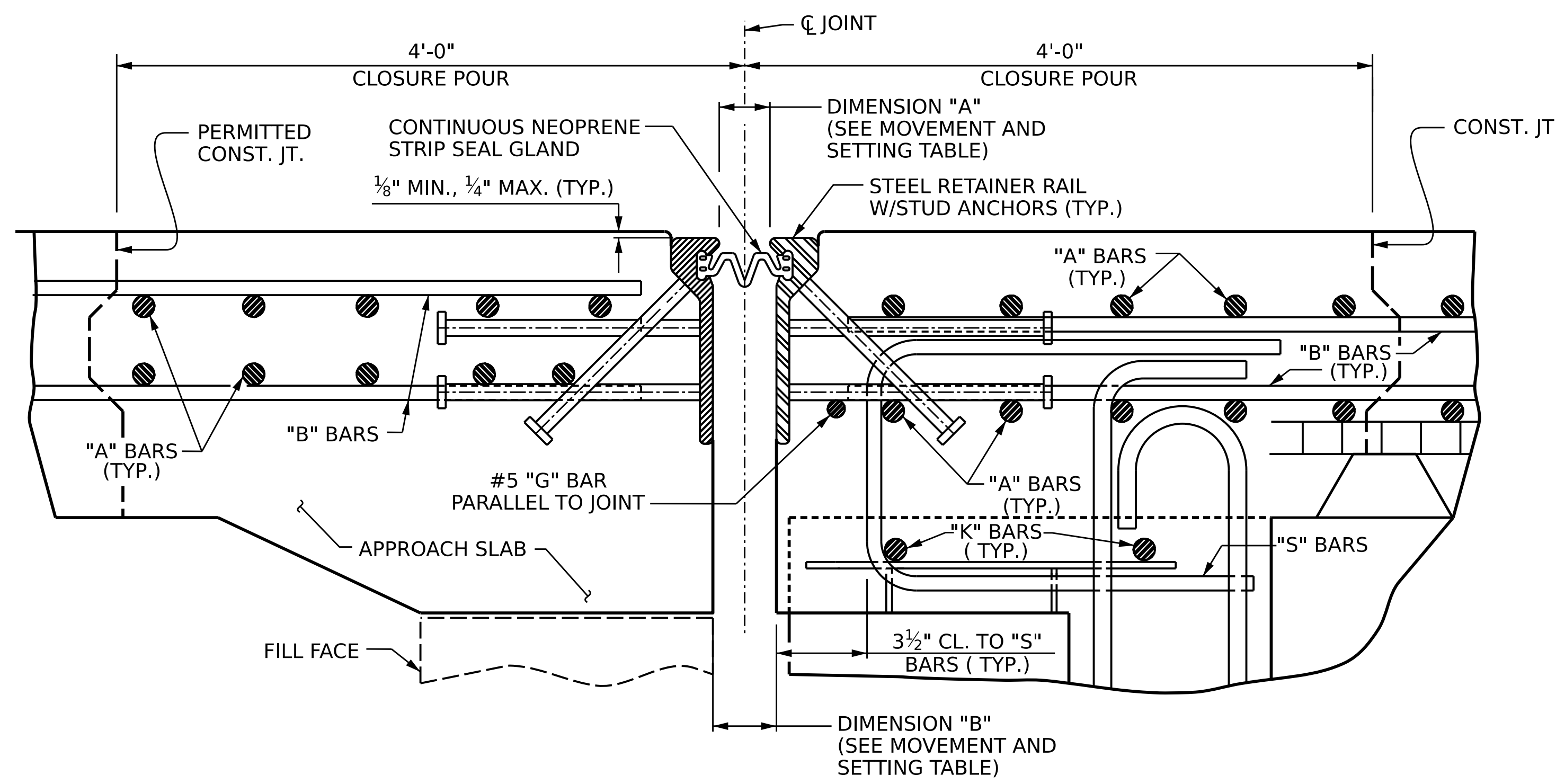


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS**

ASSEMBLED BY : E. MOHAMED	DATE : 04/2025
CHECKED BY : A. SORSENGINH	DATE : 04/2025
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMC
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

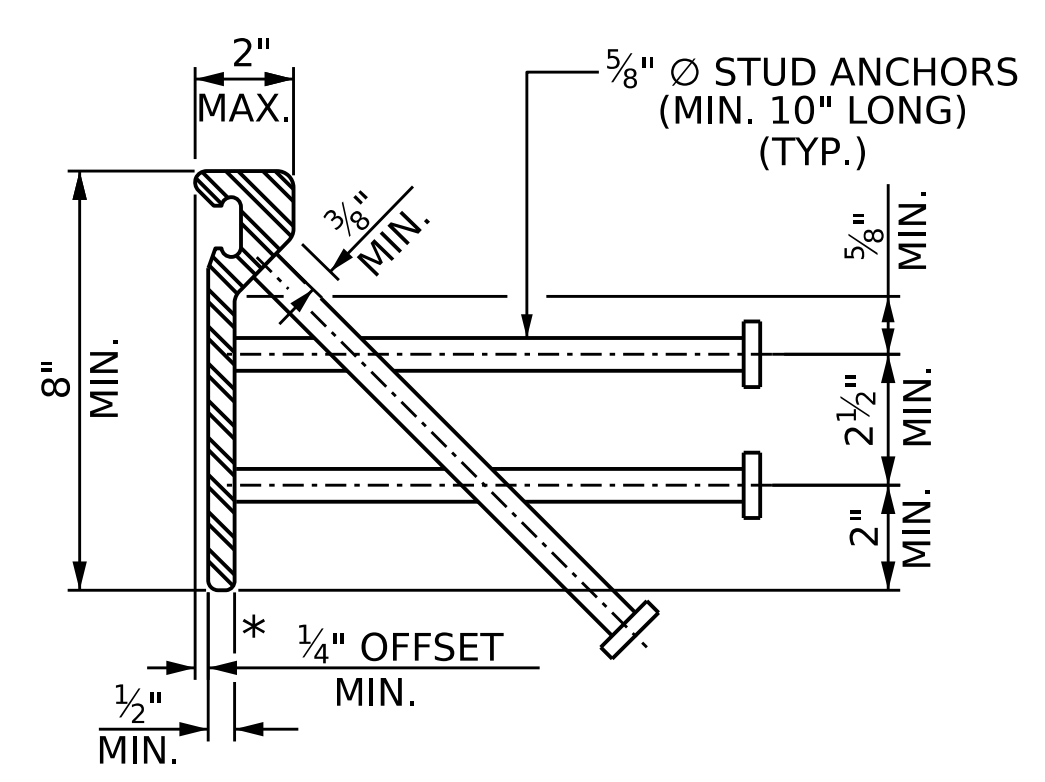
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 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

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1			3			TOTAL SHEETS
2			4			53



**STRIP SEAL EXPANSION JOINT DETAILS**

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE



**TYPICAL SECTION STEEL RETAINER RAIL**

\*DIMENSION "B" BASED ON STEEL RETAINER RAIL TOP OFFSET TO FACE OF RAIL OF 1/4" MINIMUM. IF ACTUAL OFFSET IS GREATER ADJUST DIMENSION "B" AS REQUIRED.

**JOINT INSTALLATION PROCEDURE:**

1. INSTALL THE STRIP SEAL EXPANSION JOINT AS RECOMMENDED BY THE MANUFACTURER.
2. A MANUFACTURER'S REPRESENTATIVE SHALL BE PRESENT DURING INSTALLATION OF THE JOINT.
3. PLACE STEEL RETAINER RAILS IN JOINT OPENING. PROPERLY ALIGN THE RAILS BOTH HORIZONTALLY AND VERTICALLY. DO NOT WELD SUPPORT SYSTEM TO THE METALLIZED SURFACES OF THE STEEL RETAINER RAILS.
4. CONFLICTING REINFORCING STEEL MAY BE SHIFTED SLIGHTLY WHEN NECESSARY.
5. DECK SLAB CONCRETE PLACEMENT OPERATIONS SHALL COMMENCE PER THE POURING SEQUENCE AFTER FINAL JOINT ALIGNMENT IS SET.
6. PROTECT THE STEEL RETAINER RAILS FROM BEING FOULED BY CONCRETE SPILLOVER DURING THE DECK POUR.
7. LOOSEN THE STEEL RETAINER RAIL SUPPORT SYSTEM TO ALLOW MOVEMENT WHILE CONCRETE CURES.
8. RE-LEVEL AND RE-ALIGN STEEL RETAINER RAIL AS REQUIRED ON OPPOSITE SIDE OF JOINT.
9. PLACE DECK SLAB CONCRETE.
10. ONCE THE CONCRETE HAS HARDENED SUFFICIENTLY ON BOTH SIDES OF JOINT, STEEL RETAINER RAILS SHALL BE CLEANED THOROUGHLY AND SEAL CHANNELS SHALL BE INSPECTED TO ASCERTAIN THE ABSENCE OF CONCRETE AND DEBRIS.
11. COAT THE STRIP SEAL LUGS WITH LUBRICANT-ADHESIVE AND INSTALL THE NEOPRENE STRIP SEAL GLAND AS RECOMMENDED BY THE STRIP SEAL EXPANSION JOINT MANUFACTURER.

**GENERAL NOTES**

FOR STRIP SEAL EXPANSION JOINTS, SEE SPECIAL PROVISIONS.

STEEL RETAINER RAILS AND COVER PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR GRADE 50 STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MIN.

ONLY STEEL RETAINER RAILS OF ONE-PIECE CONSTRUCTION ARE PERMITTED. STEEL RETAINER RAILS CONSISTING OF TWO OR MORE COMPONENTS WELDED TOGETHER TO OBTAIN THEIR FINAL CROSS-SECTIONAL SHAPE ARE NOT PERMITTED.

STUD ANCHORS SHALL BE SHOP WELDED AND SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

SURFACES COMING IN CONTACT WITH STRIP SEAL GLAND SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.

UPON COMPLETION OF SHOP FABRICATION, THE STEEL RETAINER RAILS SHALL BE METALLIZED AS SHOWN IN THE "METALLIZING DETAIL". SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

INSTALLED STEEL RETAINER RAILS SHALL FOLLOW THE ROADWAY SLOPE.

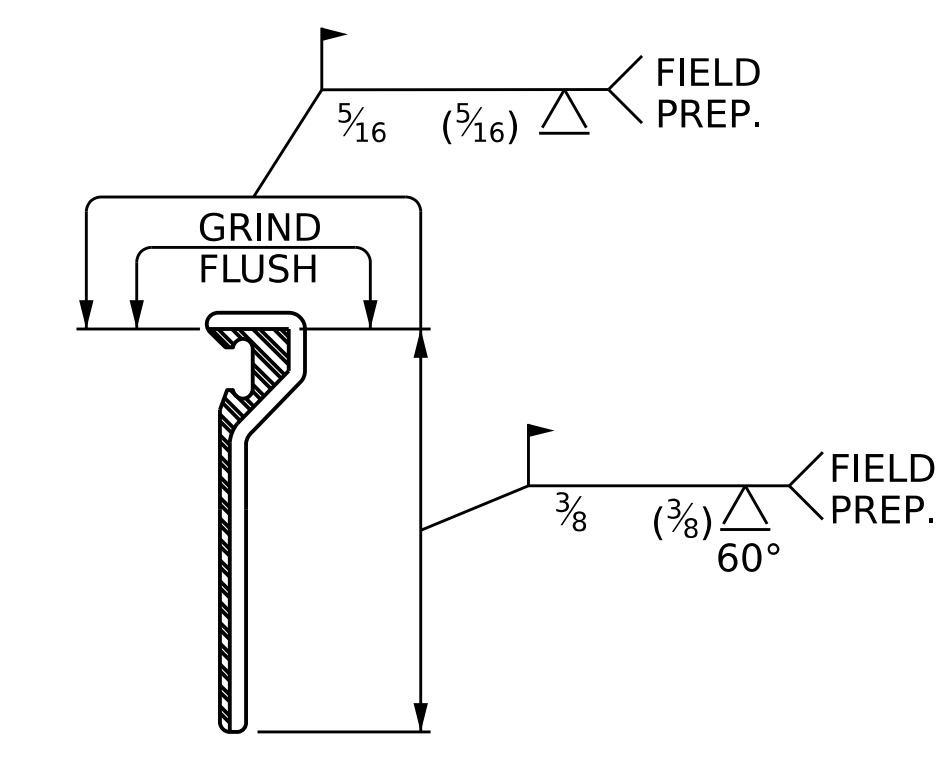
FIELD SPLICES OF THE RETAINER RAILS SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. FINISHED WELDS SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

NEOPRENE STRIP SEAL GLAND SHALL BE CONTINUOUS THROUGHOUT THE JOINT AND SHALL BE COMPATIBLE WITH THE STEEL RETAINER RAILS. FIELD SPlicing THE GLAND IS NOT PERMITTED.

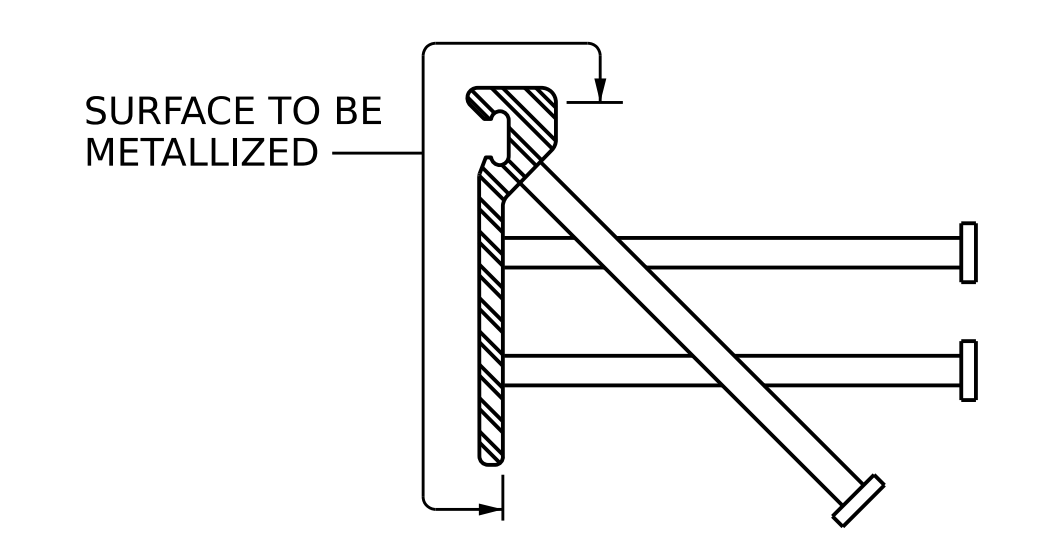
NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.

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

THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



**STEEL RETAINER RAIL (FIELD SPLICE DETAIL)**



**METALLIZING DETAIL**

END BENT	SKEW ANGLE	TOTAL MOVEMENT (ALONG C.RDWAY)	MOVEMENT AND SETTING AT JOINT					
			DIMENSION "A"			DIMENSION "B"		
			PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	120°-12'-42"	9/16"	2 1/16"	2"	1 13/16"	2 3/16"	2 1/2"	2 3/8"
2	120°-12'-42"	13/16"	2 1/8"	2"	1 13/16"	2 5/8"	2 1/2"	2 5/16"

ASSEMBLED BY : E. MOHAMED DATE : 04/2025  
 CHECKED BY : A. SORSENGINH DATE : 04/2025  
 DRAWN BY : MAA 6/20  
 CHECKED BY : BNB 6/20

12/19/2025  
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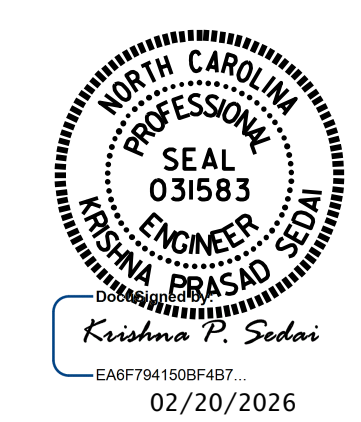
PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 1 OF 3

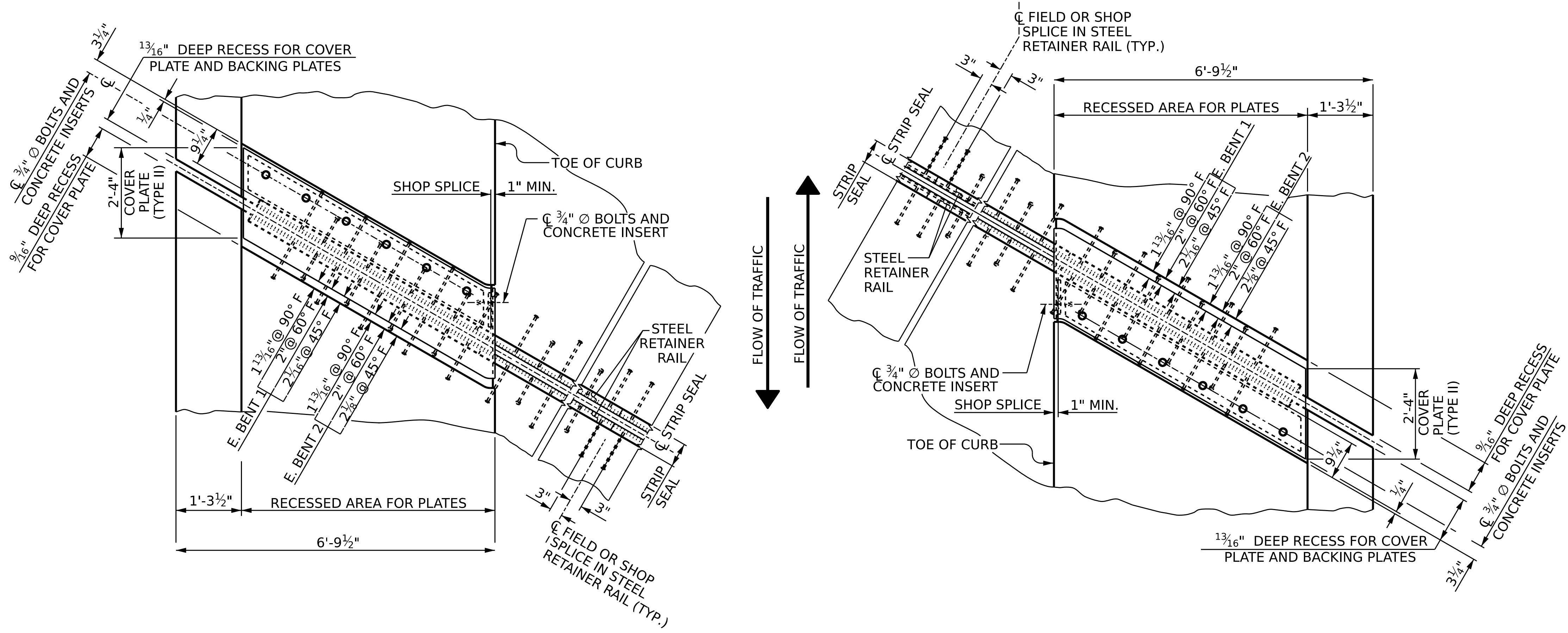
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD

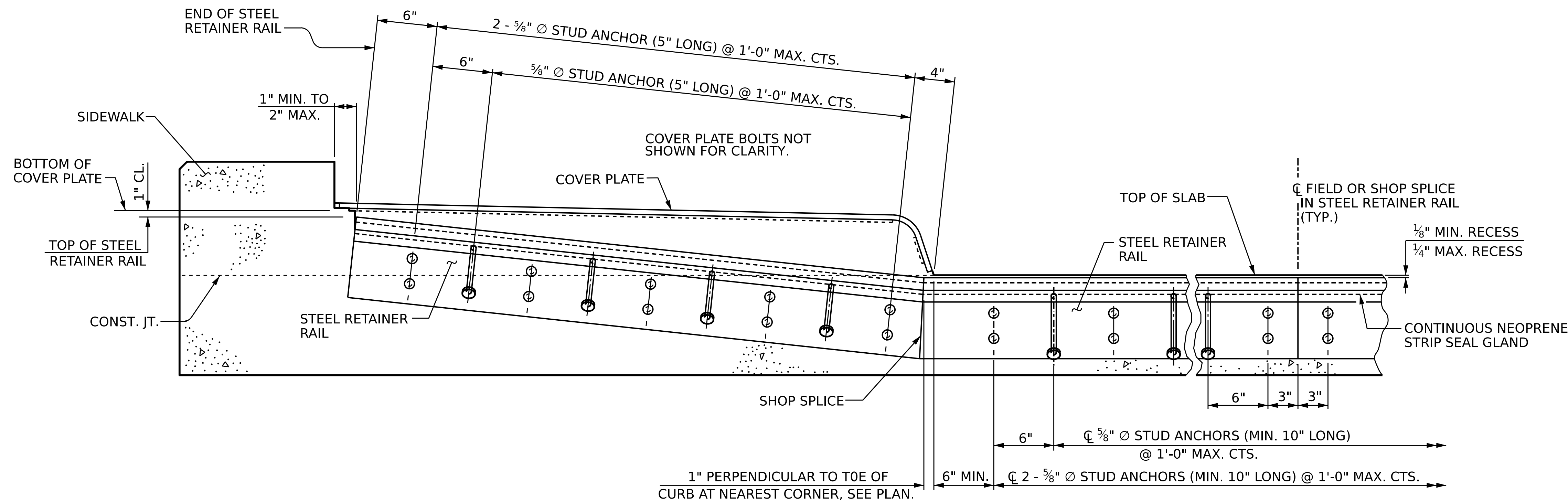
**STRIP SEAL EXPANSION JOINT DETAILS**



REVISIONS						SHEET NO. S-31
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 53
2			4			

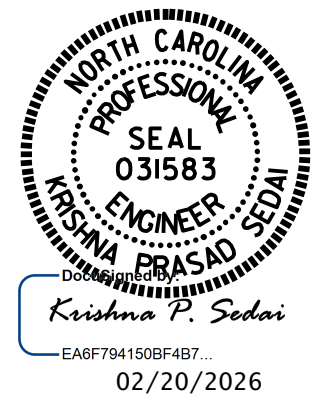


**PLAN OF STRIP SEAL EXPANSION JOINT**



**SECTION THRU SIDEWALK NORMAL TO JOINT**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**  
 SHEET 2 OF 3

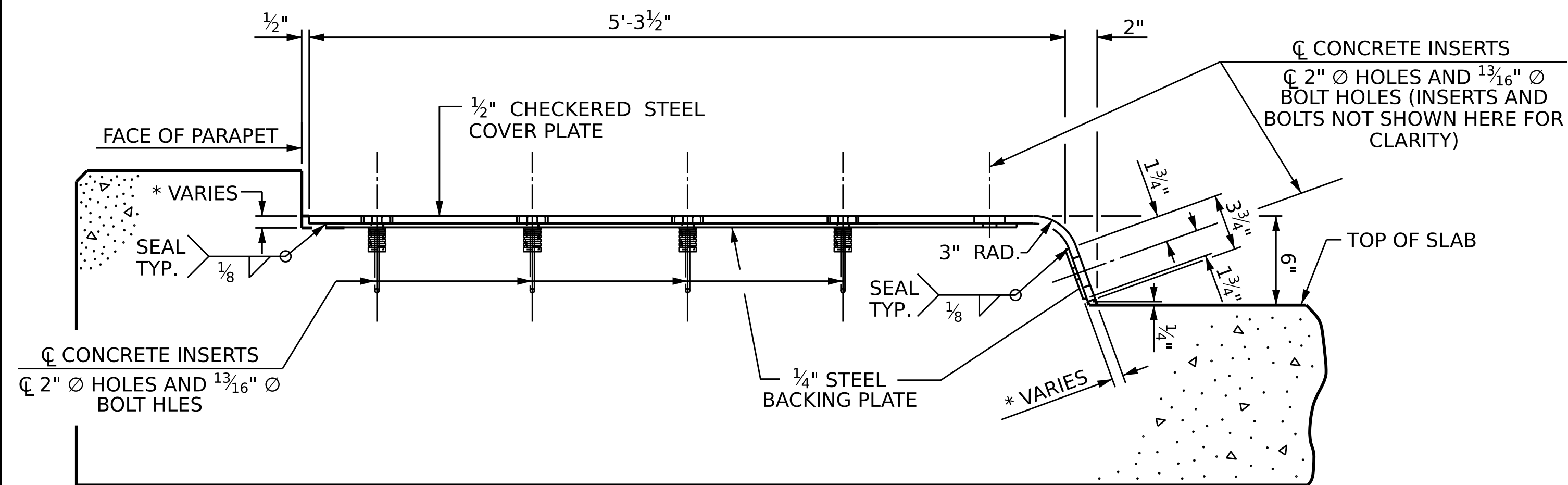


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**STRIP SEAL EXPANSION  
 JOINT DETAILS  
 FOR SIDEWALK**

ASSEMBLED BY : E.MOHAMED DATE : 04/2025  
 CHECKED BY : A.SORSENGINH DATE : 04/2025  
 DRAWN BY : MAA 6/20  
 CHECKED BY : BNB 6/20

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 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

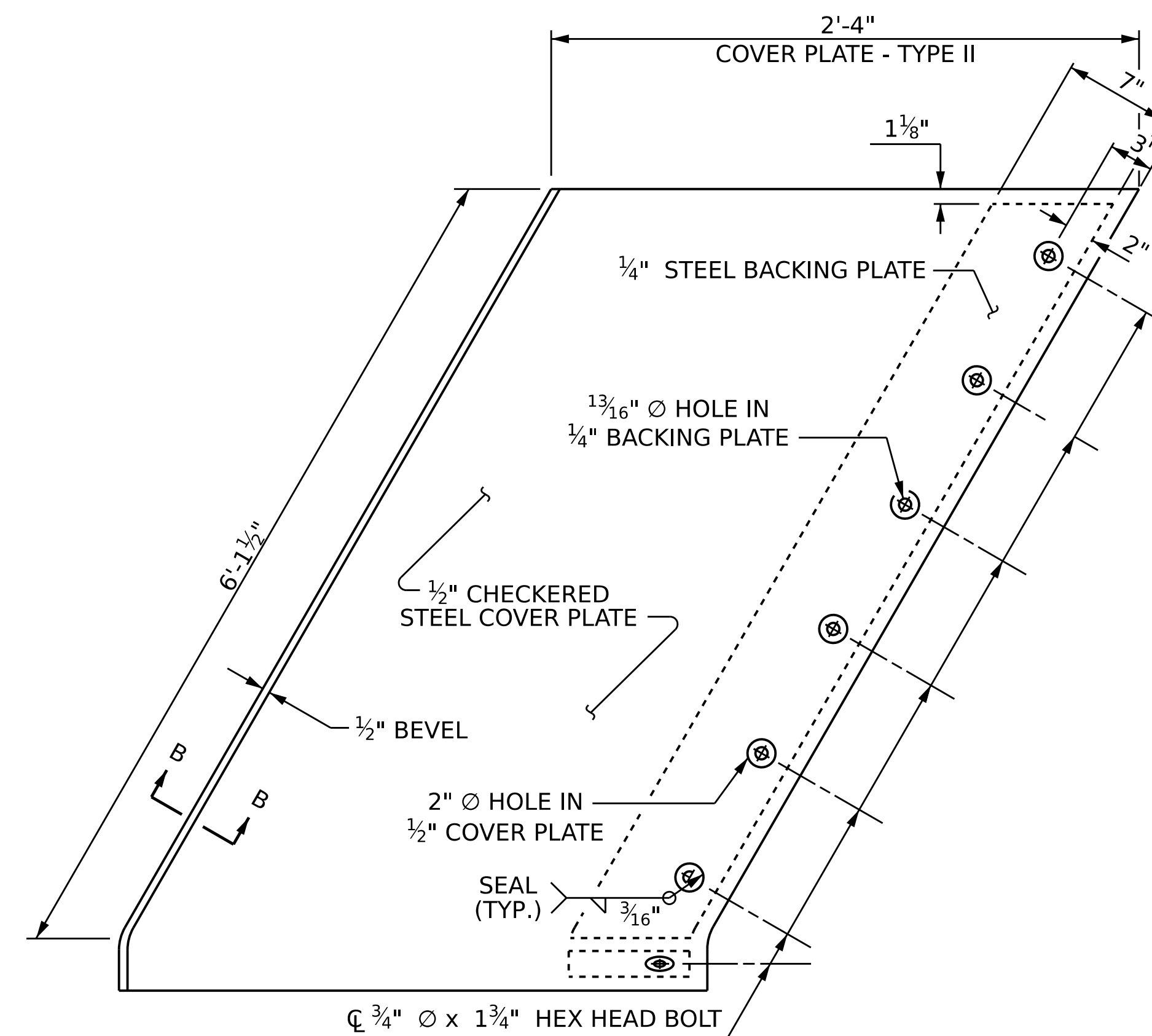
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			53



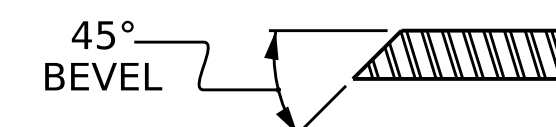
**END VIEW**  
(NORMAL TO SIDEWALK)

\* CONCRETE RECESS DIMENSIONS:  
 1 3/16" FOR THE SIDE OF THE JOINT HAVING THE 1/2" COVER PLATE WITH A 3/4" BACKING PLATE.  
 9/16" FOR THE SIDE OF THE JOINT HAVING ONLY THE 1/2" COVER PLATE.

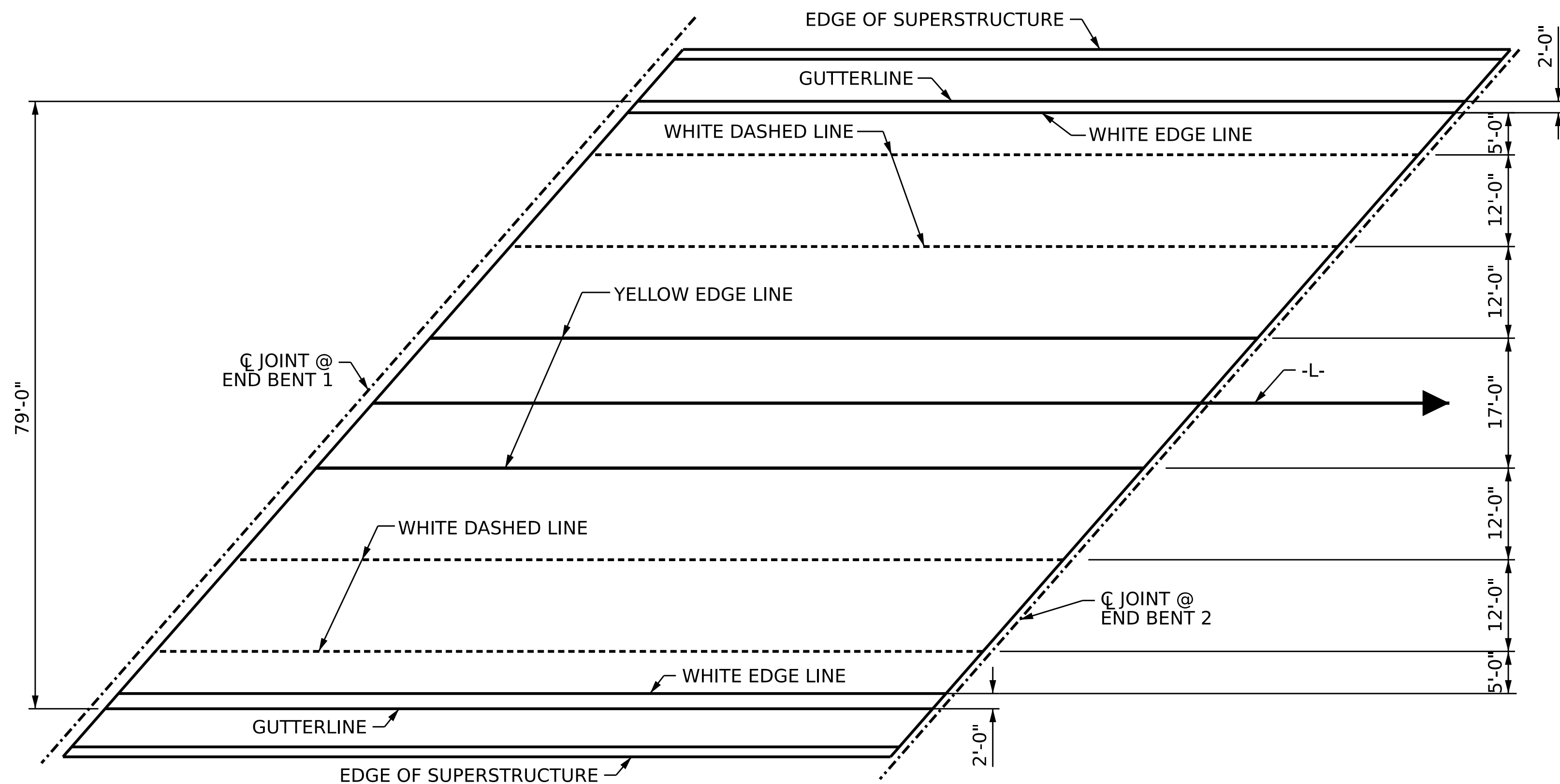
**COVER PLATE DETAILS**



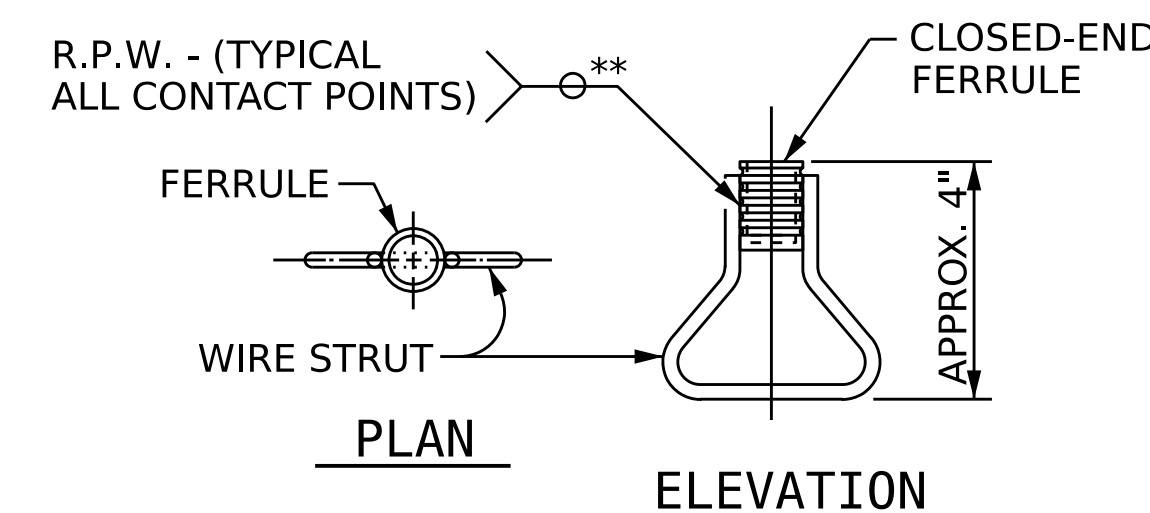
**TYPE II - PLAN VIEW**



**SECTION B - B**

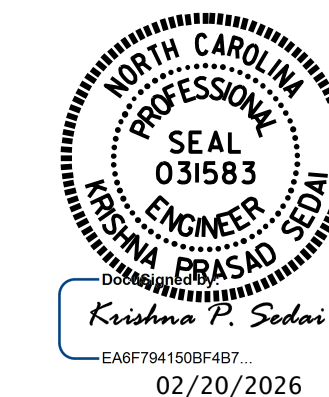


**PAVEMENT MARKING ALIGNMENT**



**CONCRETE INSERT**

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



PROJECT NO. **BR-0168**

**FORSYTH** COUNTY

STATION: **20+73.79 -L-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD

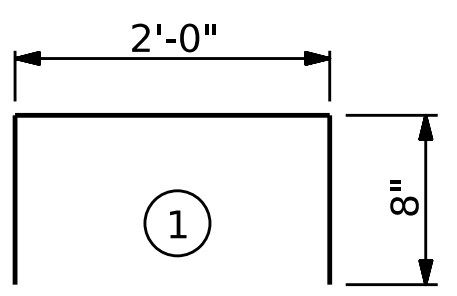
**STRIP SEAL EXPANSION JOINT DETAILS FOR SIDEWALK**

ASSEMBLED BY : E. MOHAMED DATE : 04/2025  
 CHECKED BY : A. SORSENGINH DATE : 04/2025  
 DRAWN BY : MAA 6/20  
 CHECKED BY : BNB 6/20

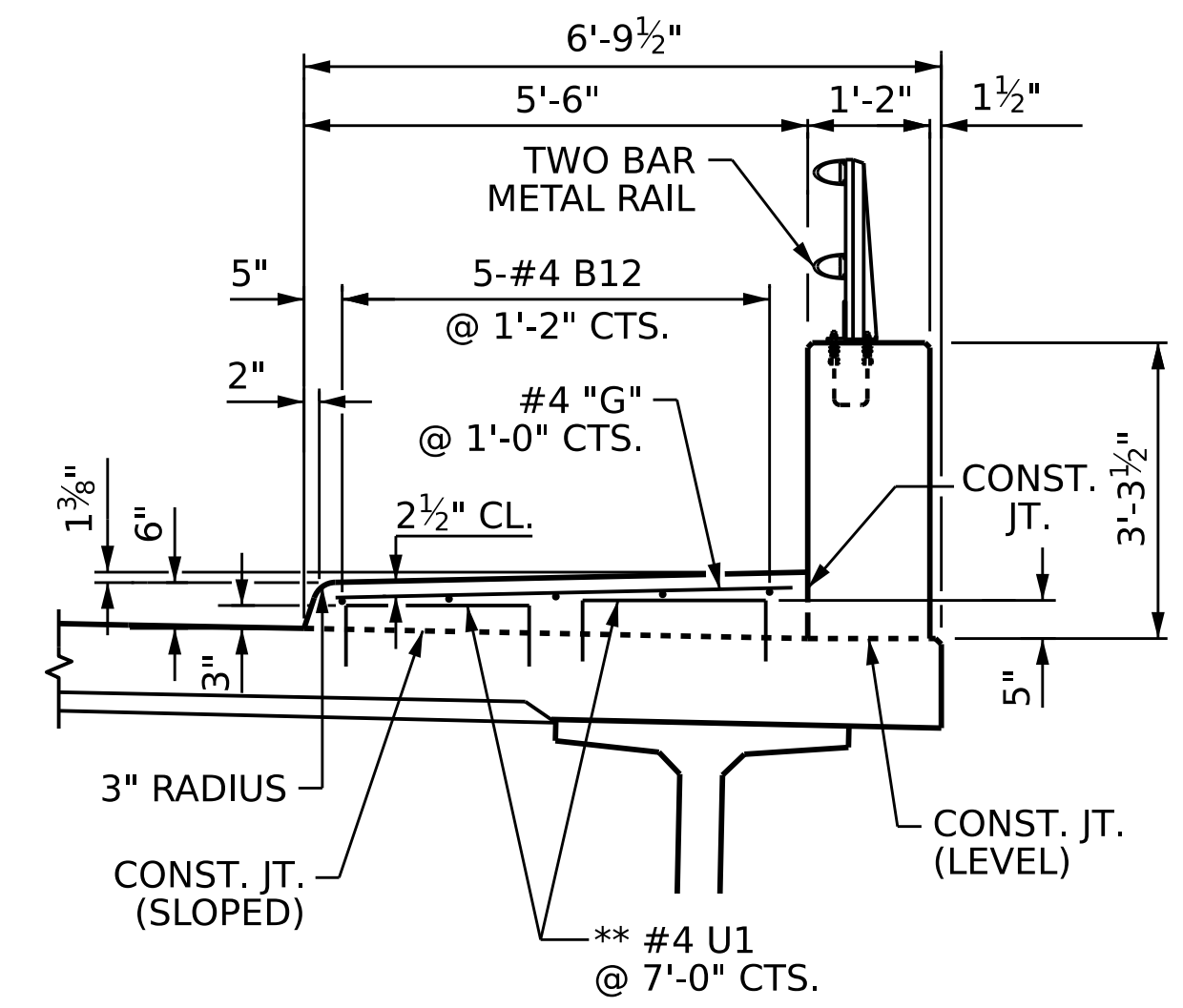
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			53

BAR TYPES		BILL OF MATERIAL FOR SIDEWALK					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
* B12	70	#4	STR	36'-0"	1683		
* G3	464	#4	STR	5'-1"	1576		
* G4	40	#4	STR	4'-0"	107		
* U1	144	#4	1	3'-4"	321		
* EPOXY COATED REINFORCING STEEL				LBS.	3687		
CLASS AA CONCRETE				CU. YDS.	59.6		



ALL BAR DIMENSIONS ARE OUT TO OUT



**SECTION THRU RIGHT SIDEWALK**

\*\* #4 U1 MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREED OFF (RIGHT SIDEWALK SHOWN, LEFT SIDEWALK SIMILAR)

**NOTES**

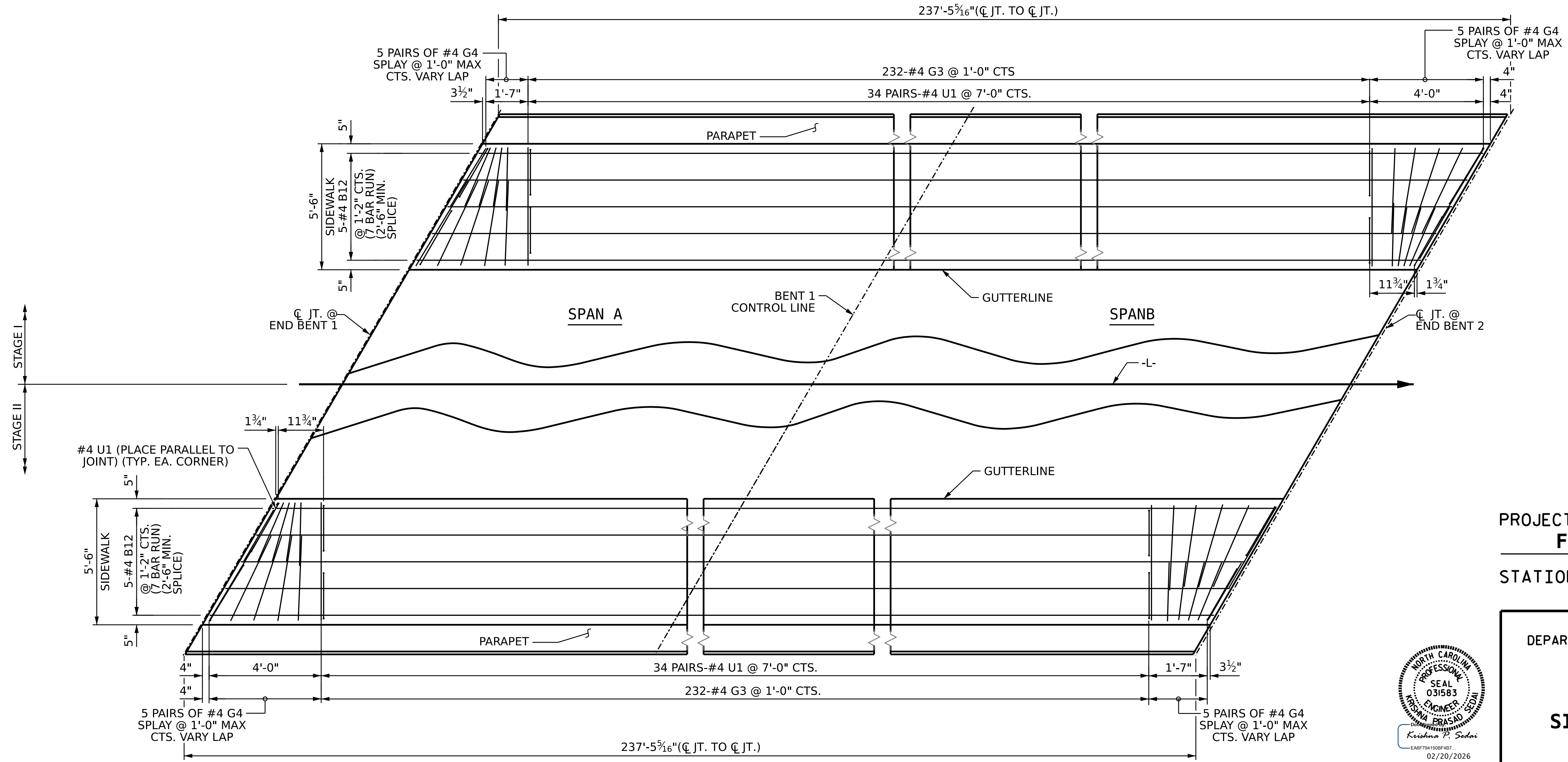
SIDEWALK IN THE SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI,

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FT. IN LENGTH.

ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

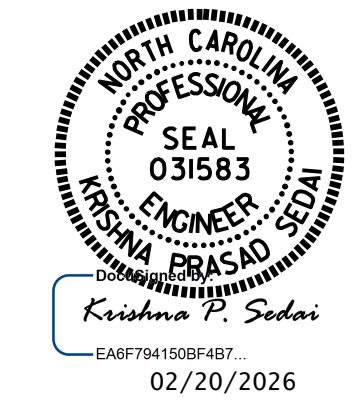
SEE "EXPANSION JOINT SEAL DETAILS FOR SIDEWALK" SHEETS FOR COVER PLATE DETAILS.

FOR SIDEWALK ON APPROACH SLAB, SEE APPROACH SLAB SHEETS.



**PLAN OF SIDEWALK**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

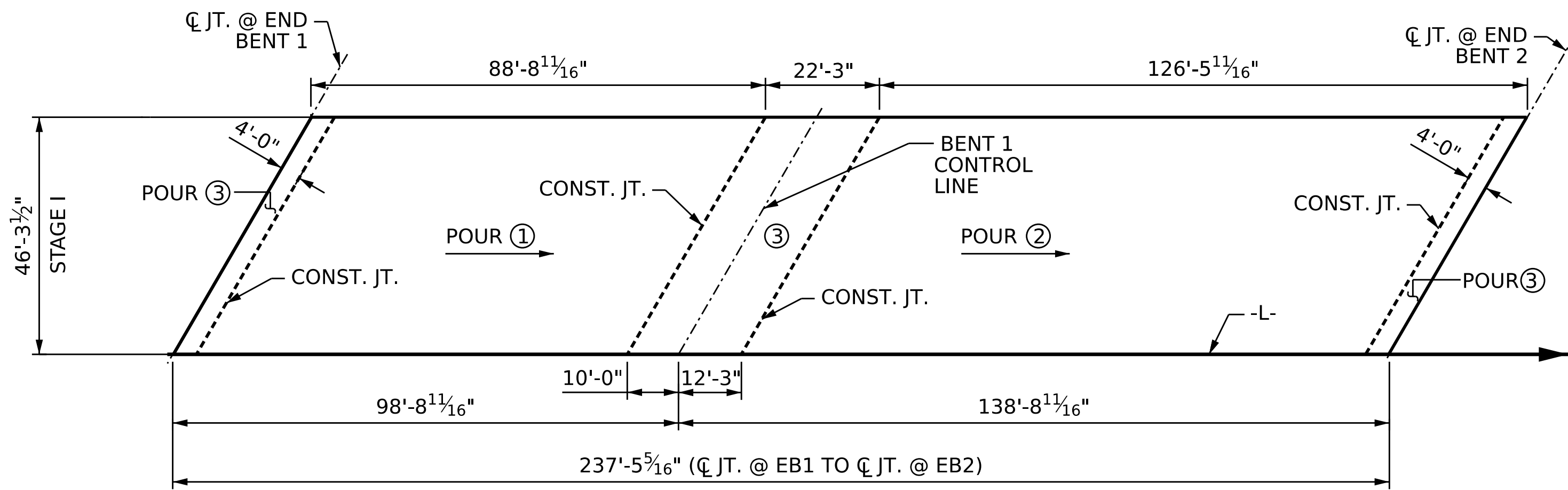
**SUPERSTRUCTURE**

**SIDEWALK DETAILS**

DRAWN BY : **E. MOHAMED** DATE : **09/2025**  
 CHECKED BY : **A. SORSENGINH** DATE : **09/2025**  
 DESIGN ENGINEER OF RECORD : **A. IGHWAIR** DATE : **09/2025**

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			53



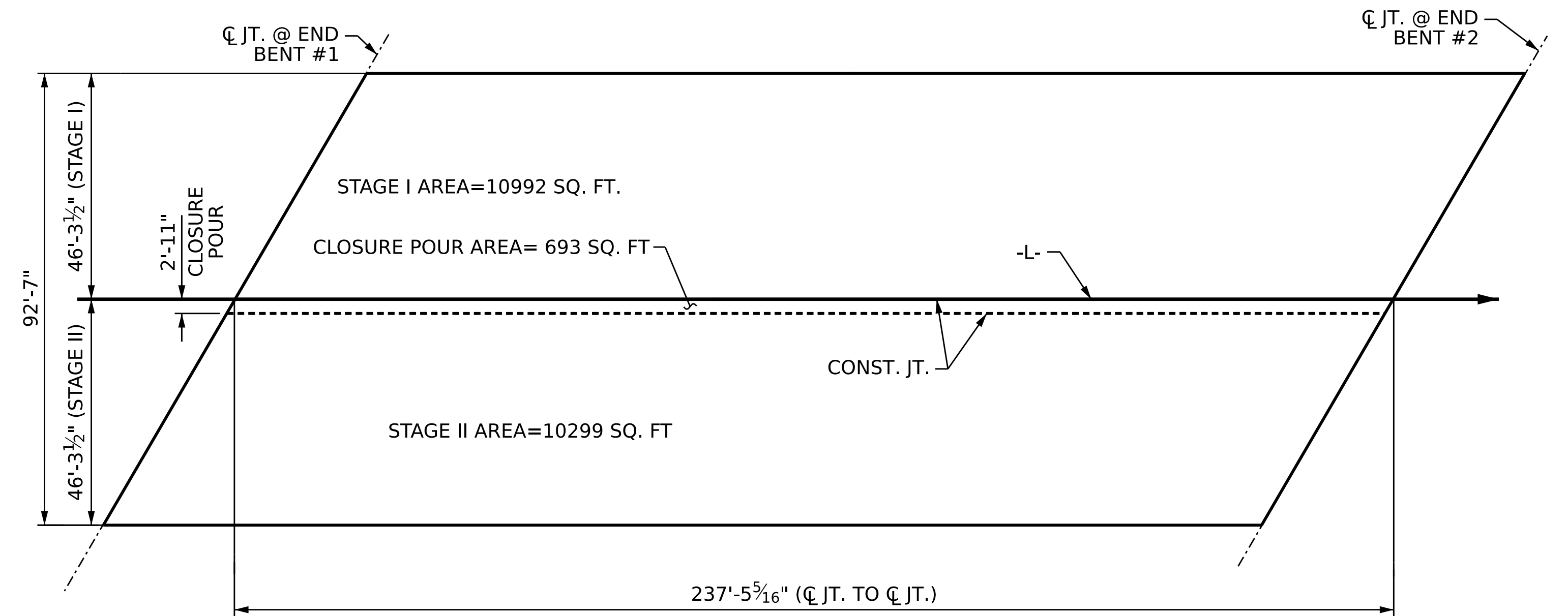
**POURING SEQUENCE STAGE I**

POUR 3 CAN NOT BE STARTED UNTIL BOTH ADJACENT POURS #1 & #2 REACH A MINIMUM OF 3,000 PSI.

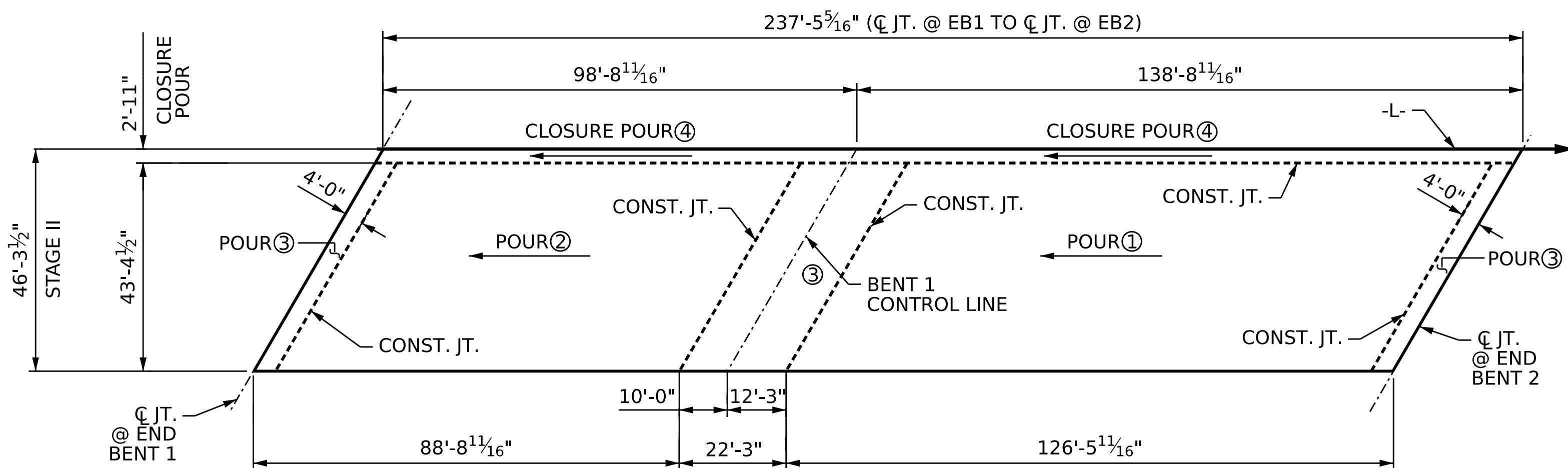
⊕ INDICATES POUR NUMBER AND DIRECTION OF POUR

CLASS AA CONCRETE BREAKDOWN (CU. YDS.)					
STAGE I	POUR 1	POUR 2	POUR 3	POUR 4	TOTAL
	119.0	172.4	48.7		340.1
STAGE II	POUR 1	POUR 2	POUR 3	POUR 4	TOTAL
	162.0	112.0	46.4	20.0	340.4
<b>TOTALS **</b>					<b>680.5</b>

\*\* QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED



**LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 21,984)**



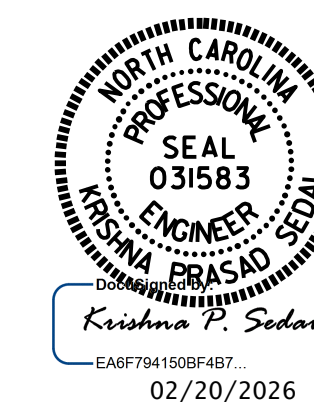
**POURING SEQUENCE STAGE II**

POUR 3 CAN NOT BE STARTED UNTIL BOTH ADJACENT POURS #1 & #2 REACH A MINIMUM OF 3,000 PSI.

⊕ INDICATES POUR NUMBER AND DIRECTION OF POUR

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**CONCRETE DECK  
 POURING DETAILS**

DRAWN BY: **E. MOHAMED** DATE: **04/2025**  
 CHECKED BY: **A. SORSENGINH** DATE: **04/2025**  
 DESIGN ENGINEER OF RECORD: **A. IGHWAIR** DATE: **04/2025**

2/20/2026  
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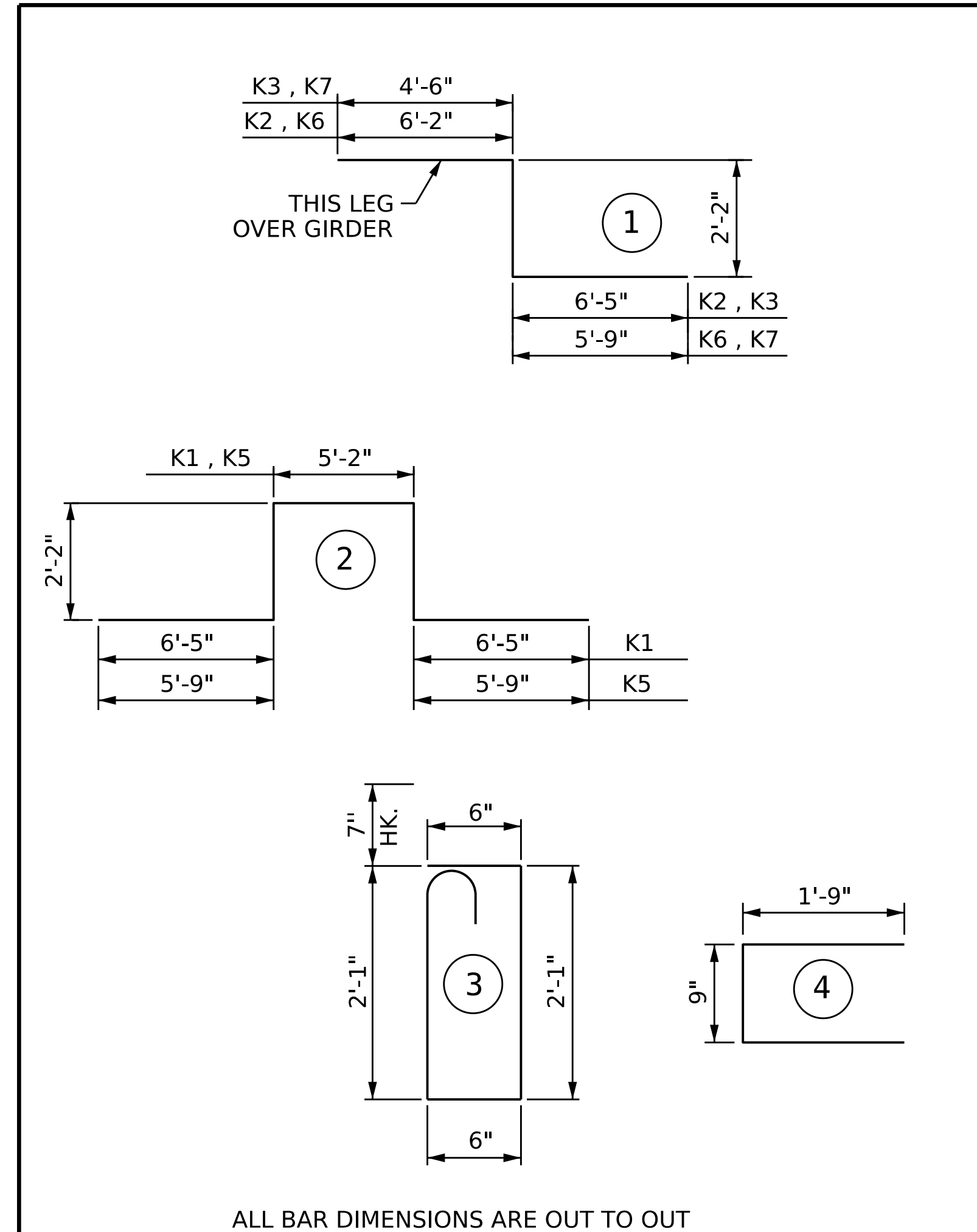
DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			53

### REINFORCING BAR SCHEDULE

STAGE I						STAGE II						CLOSURE POUR							
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT	BAR	No.	SIZE	TYPE	LENGTH	WEIGHT	BAR	No.	SIZE	TYPE	LENGTH	WEIGHT		
*A1	337	# 5	STR	45'-11"	16139	*A3	339	# 5	STR	43'-0"	15204	*B1	8	# 4	STR	33'-9"	180		
A2	337	# 5	STR	45'-11"	16139	A4	339	# 5	STR	43'-0"	15204	*B2	12	# 4	STR	32'-5"	260		
*A5	6	# 5	STR	12'-0"	75	*A5	6	# 5	STR	12'-0"	75	*B3	4	# 5	STR	50'-0"	209		
*A101	4	# 5	STR	43'-9"	183	*A301	4	# 5	STR	40'-10"	170	*B4	4	# 5	STR	34'-2"	143		
*A102	4	# 5	STR	41'-8"	174	*A302	4	# 5	STR	38'-9"	162	*B5	3	# 5	STR	46'-0"	144		
*A103	4	# 5	STR	39'-6"	165	*A303	4	# 5	STR	36'-7"	153	B6	8	# 5	STR	38'-9"	323		
*A104	4	# 5	STR	37'-4"	156	*A304	4	# 5	STR	34'-5"	144	B7	7	# 5	STR	58'-0"	423		
*A105	4	# 5	STR	35'-2"	147	*A305	4	# 5	STR	32'-3"	135	B8	8	# 5	STR	54'-9"	457		
*A106	4	# 5	STR	33'-0"	138	*A306	4	# 5	STR	30'-1"	126	*K9	3	# 6	STR	2'-2"	10		
*A107	4	# 5	STR	30'-11"	129	*A307	4	# 5	STR	28'-0"	117	*K10	2	# 8	STR	6'-2"	33		
*A108	4	# 5	STR	28'-9"	120	*A308	4	# 5	STR	25'-10"	108	*S1	3	# 5	3	5'-9"	18		
*A109	4	# 5	STR	26'-7"	111	*A309	4	# 5	STR	23'-8"	99	*S2	3	# 4	4	4'-3"	9		
*A110	4	# 5	STR	24'-5"	102	*A310	4	# 5	STR	21'-6"	90	REINFORCING STEEL 1,203 LBS.							
*A111	4	# 5	STR	22'-4"	93	*A311	4	# 5	STR	19'-5"	81	*EPOXY COATED REINFORCING STEEL 1,006 LBS.							
*A112	4	# 5	STR	20'-2"	84	*A312	4	# 5	STR	17'-3"	72								
*A113	4	# 5	STR	18'-0"	75	*A313	4	# 5	STR	15'-1"	63								
*A114	4	# 5	STR	15'-10"	66	*A314	4	# 5	STR	12'-11"	54								
*A115	4	# 5	STR	13'-9"	57	*A315	4	# 5	STR	10'-10"	45								
*A116	4	# 5	STR	11'-7"	48	*A316	4	# 5	STR	8'-8"	36								
*A117	4	# 5	STR	9'-5"	39	*A317	4	# 5	STR	6'-6"	27								
*A118	4	# 5	STR	7'-3"	30	*A318	4	# 5	STR	4'-4"	18								
*A119	4	# 5	STR	5'-2"	22	*A319	4	# 5	STR	2'-3"	9								
*A120	4	# 5	STR	3'-0"	13														
A201	4	# 5	STR	43'-9"	183	A401	4	# 5	STR	40'-10"	170								
A202	4	# 5	STR	41'-8"	174	A402	4	# 5	STR	38'-9"	162								
A203	4	# 5	STR	39'-6"	165	A403	4	# 5	STR	36'-7"	153								
A204	4	# 5	STR	37'-4"	156	A404	4	# 5	STR	34'-5"	144								
A205	4	# 5	STR	35'-2"	147	A405	4	# 5	STR	32'-3"	135								
A206	4	# 5	STR	33'-0"	138	A406	4	# 5	STR	30'-1"	126								
A207	4	# 5	STR	30'-11"	129	A407	4	# 5	STR	28'-0"	117								
A208	4	# 5	STR	28'-9"	120	A408	4	# 5	STR	25'-10"	108								
A209	4	# 5	STR	26'-7"	111	A409	4	# 5	STR	23'-8"	99								
A210	4	# 5	STR	24'-5"	102	A410	4	# 5	STR	21'-6"	90								
A211	4	# 5	STR	22'-4"	93	A411	4	# 5	STR	19'-5"	81								
A212	4	# 5	STR	20'-2"	84	A412	4	# 5	STR	17'-3"	72								
A213	4	# 5	STR	18'-0"	75	A413	4	# 5	STR	15'-1"	63								
A214	4	# 5	STR	15'-10"	66	A414	4	# 5	STR	12'-11"	54								
A215	4	# 5	STR	13'-9"	57	A415	4	# 5	STR	10'-10"	45								
A216	4	# 5	STR	11'-7"	48	A416	4	# 5	STR	8'-8"	36								
A217	4	# 5	STR	9'-5"	39	A417	4	# 5	STR	6'-6"	27								
A218	4	# 5	STR	7'-3"	30	A418	4	# 5	STR	4'-4"	18								
A219	4	# 5	STR	5'-2"	22	A419	4	# 5	STR	2'-3"	9								
A220	4	# 5	STR	3'-0"	13														
*B1	64	# 4	STR	33'-9"	1443	*B1	62	# 4	STR	33'-9"	1398								
*B2	96	# 4	STR	32'-5"	2079	*B2	93	# 4	STR	32'-5"	2014								
*B3	62	# 5	STR	50'-0"	3233	*B3	59	# 5	STR	50'-0"	3077								
*B4	62	# 5	STR	34'-2"	2209	*B4	59	# 5	STR	34'-2"	2103								
*B5	61	# 5	STR	46'-0"	2927	*B5	56	# 5	STR	46'-0"	2687								
B6	68	# 5	STR	38'-9"	2748	B6	58	# 5	STR	38'-9"	2344								
B7	59	# 5	STR	58'-0"	3569	B7	49	# 5	STR	58'-0"	2964								
B8	68	# 5	STR	54'-9"	3883	B8	58	# 5	STR	54'-9"	3312								
*D1	754	# 5	STR	5'-4"	4194	*D1	754	# 5	STR	5'-4"	4194								
*G1	2	# 5	STR	56'-6"	118	*G2	2	# 5	STR	53'-2"	111								
*K1	16	# 8	2	22'-4"	954	*K5	16	# 8	2	21'-0"	897								
*K2	4	# 8	1	14'-9"	158	*K6	4	# 8	1	14'-1"	150								
*K3	4	# 8	1	13'-1"	140	*K7	4	# 8	1	12'-5"	133								
*K4	30	# 6	STR	4'-6"	203	*K8	30	# 6	STR	3'-10"	173								
*S1	50	# 5	3	5'-9"	300	*S1	40	# 5	3	5'-9"	240								
*S2	50	# 4	4	4'-3"	142	*S2	40	# 4	4	4'-3"	114								
REINFORCING STEEL 28,291 LBS.						REINFORCING STEEL 25,533 LBS.													
*EPOXY COATED REINFORCING STEEL 36,266 LBS.						*EPOXY COATED REINFORCING STEEL 34,279 LBS.													

### BAR TYPES

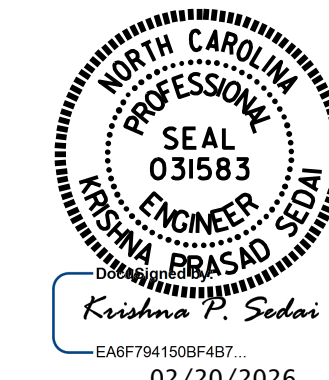


GROOVING BRIDGE FLOORS		
	STAGE I	STAGE II
	SQ.FT.	SQ.FT.
APPROACH SLAB	1,799	1,799
DECK SLAB	8,950	8,950
SUBTOTAL	10,749	10,749
TOTAL	21,498	

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	
#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"			

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 2 OF 2



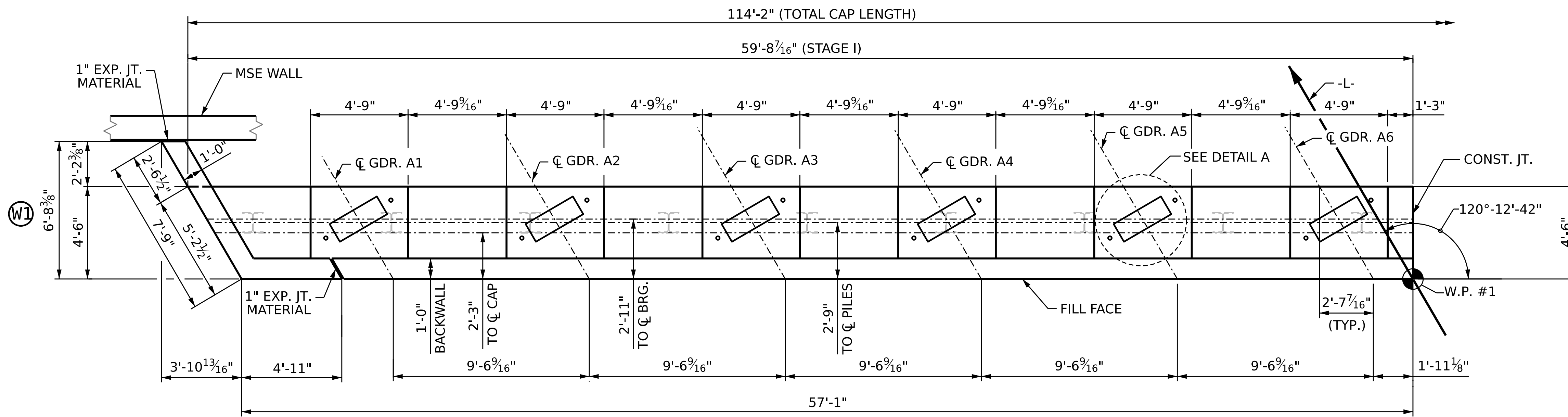
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE**  
**BILL OF MATERIAL**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-36
2			4			TOTAL SHEETS 53

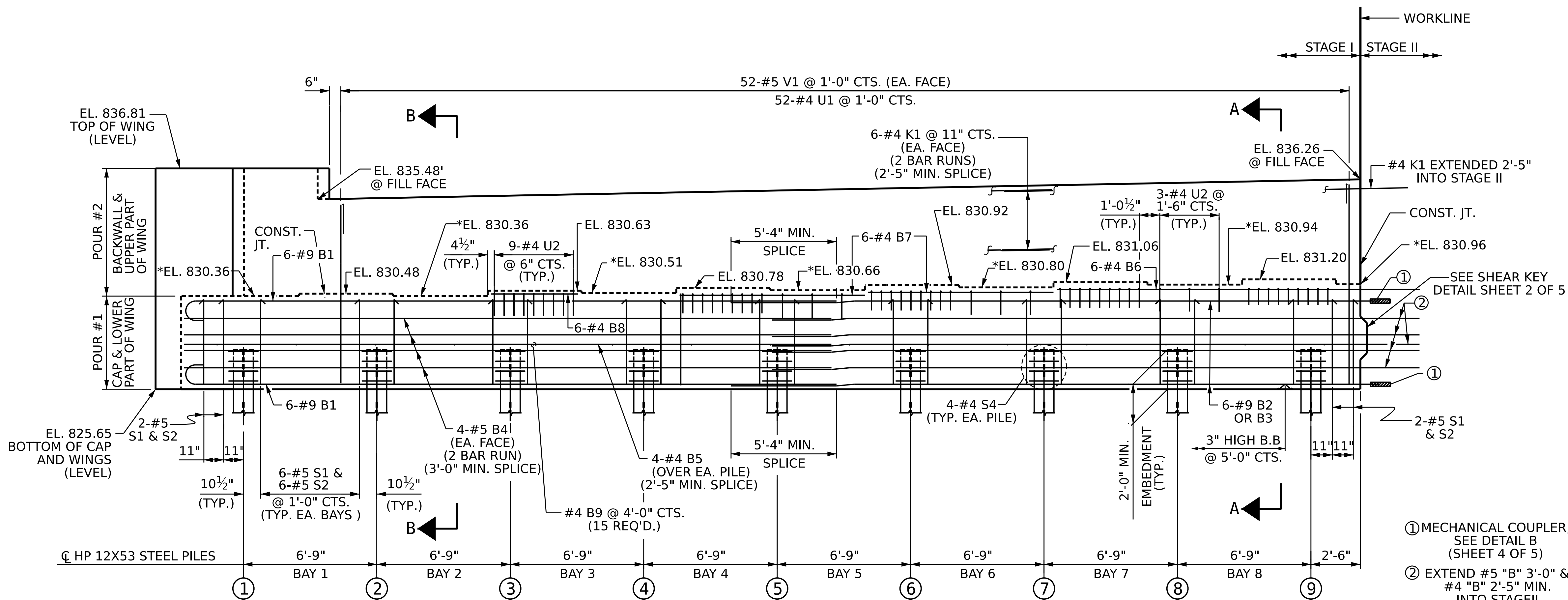
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY: **E. MOHAMED** DATE: **04/2025**  
 CHECKED BY: **A. SORSENGNH** DATE: **04/2025**  
 DESIGN ENGINEER OF RECORD: **A. IGHWAIR** DATE: **04/2025**

8/26/21



**PLAN OF STAGE I**



**ELEVATION OF STAGE I**

FOR SECTIONS A-A & B-B,  
SEE SHEET 4 OF 5

**NOTES:**

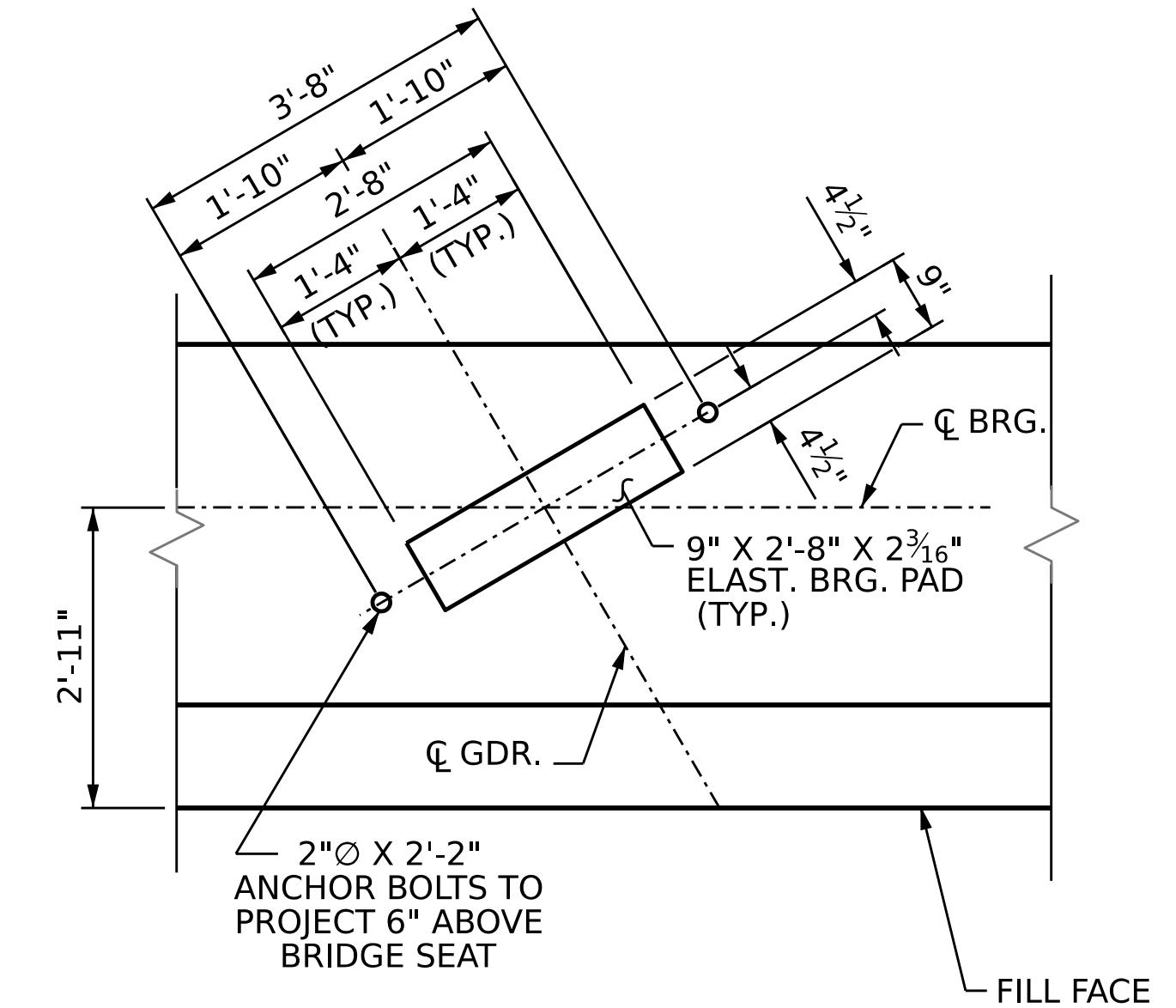
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHORS.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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



**DETAIL A**

(TYP. EA. GIRDER)

PROJECT NO. **BR-0168**

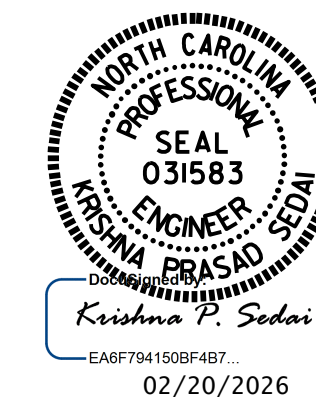
**FORSYTH** COUNTY

STATION: **20+73.79 -L-**

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
**END BENT #1**  
**STAGE I**



DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

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

DRAWN BY: **E. MOHAMED** DATE: **10/2025**  
 CHECKED BY: **A. SORSENGINH** DATE: **10/2025**  
 DESIGN ENGINEER OF RECORD: **A. IGHWAIR** DATE: **10/2025**

2/20/2026  
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 ksedai

NOTES:

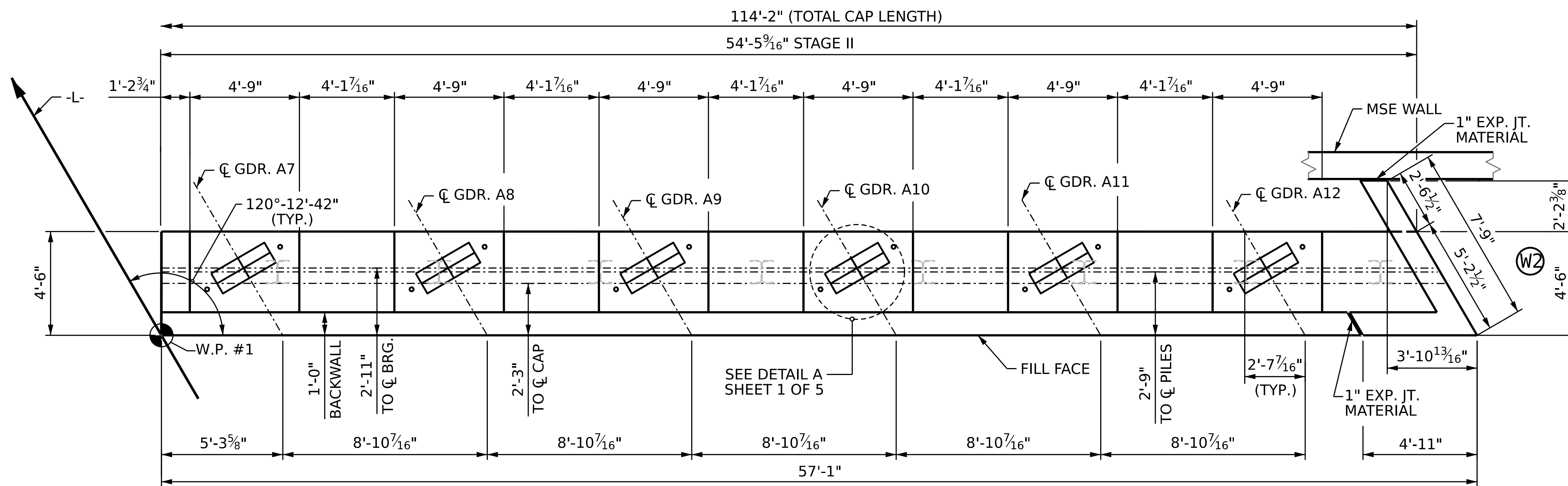
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHORS.

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

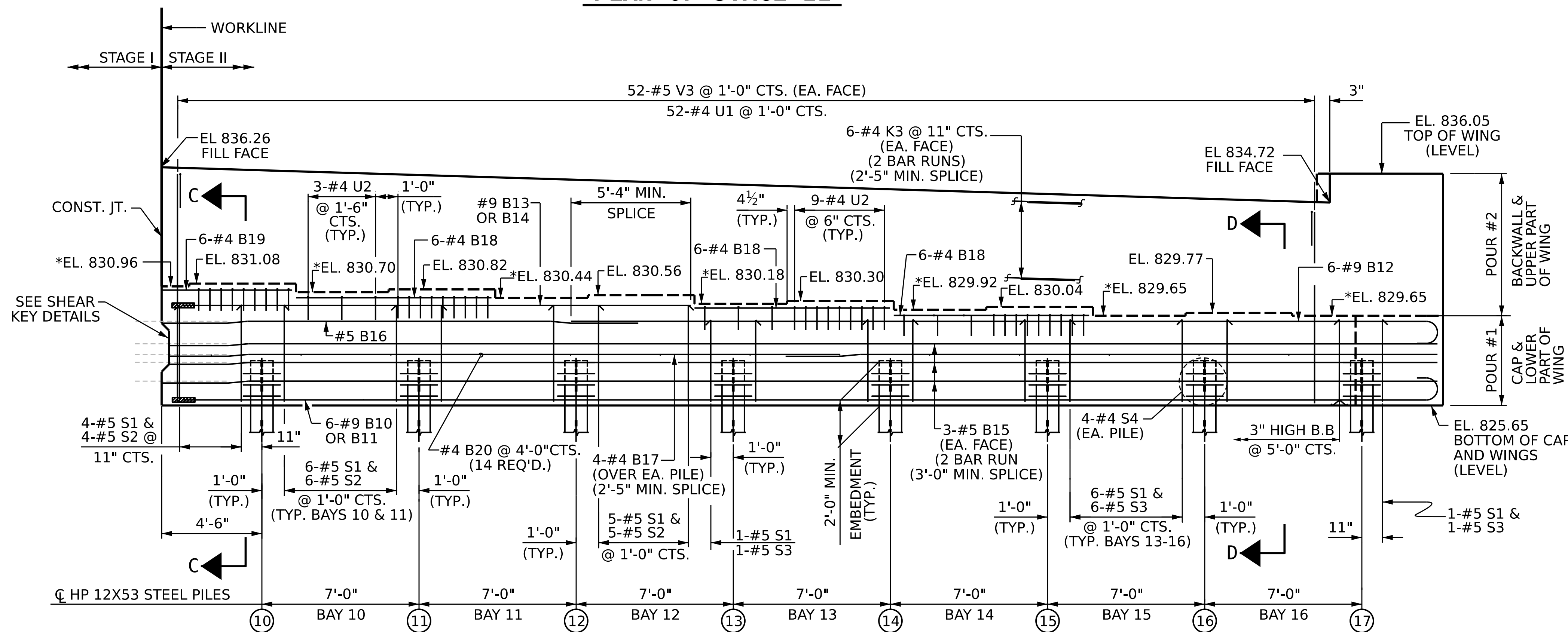
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

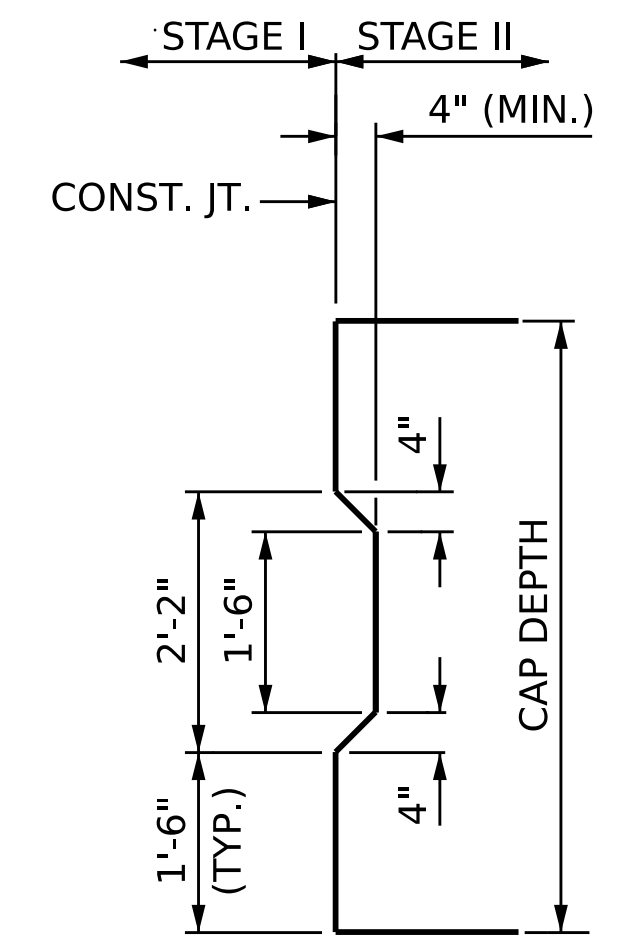


PLAN OF STAGE II



ELEVATION OF STAGE II

FOR SECTIONS C-C & D-D, SEE SHEET 5 OF 5



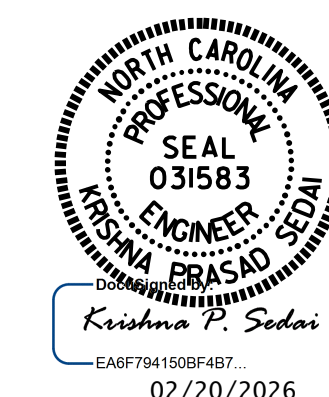
SHEAR KEY DETAIL

PROJECT NO. **BR-0168**

**FORSYTH** COUNTY

STATION: **20+73.79 -L-**

SHEET 2 OF 5



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
**END BENT #1  
STAGE II**

DRAWN BY: E. MOHAMED DATE: 09/2025  
 CHECKED BY: A. SORSENGINH DATE: 09/2025  
 DESIGN ENGINEER OF RECORD: A. IGHWAIR DATE: 09/2025

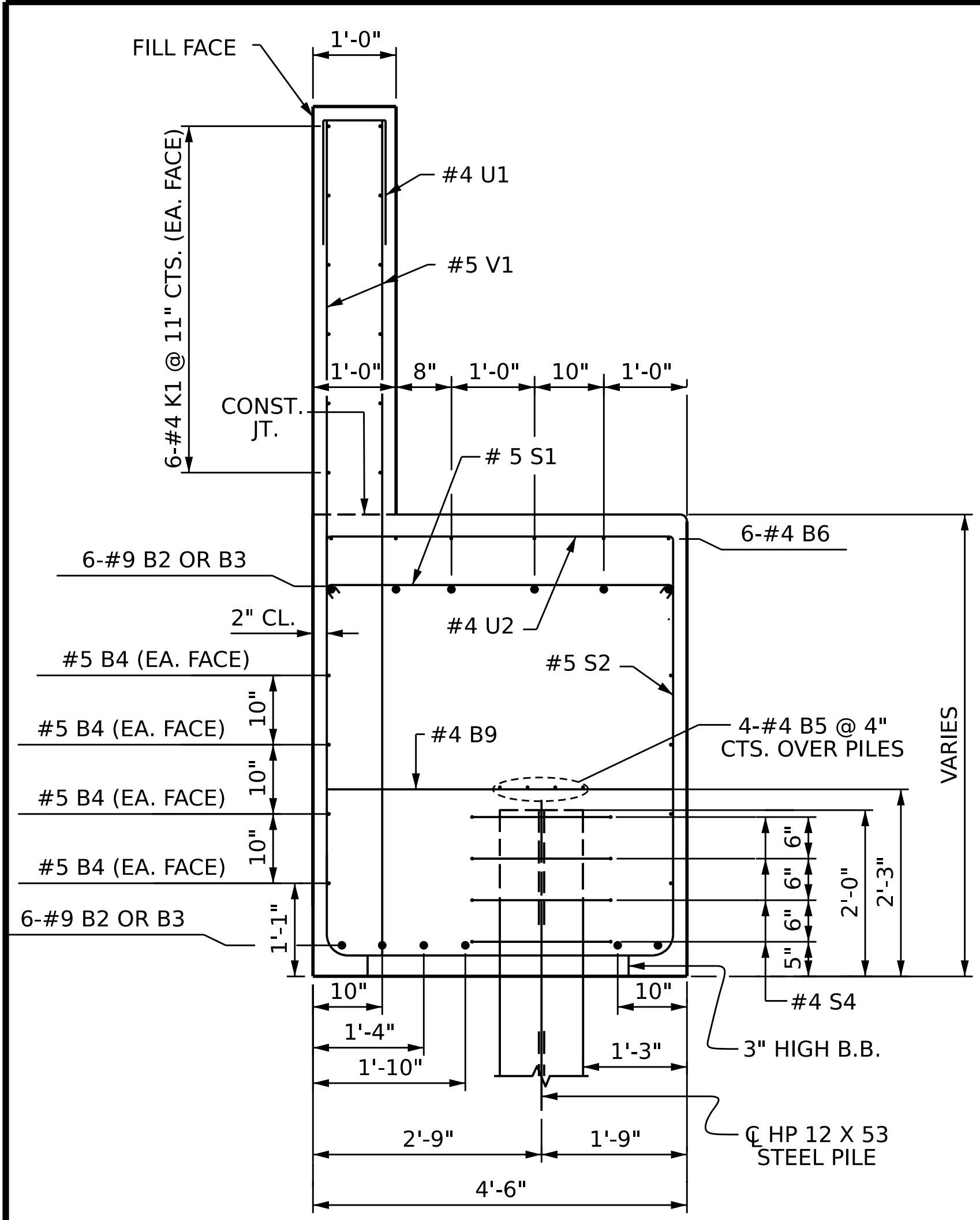
2/16/2026  
 S:\DPO3\BR-0168\Final Plans\401.075\_BR0168\_SMU.EB1.538\_330289.dgn  
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DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

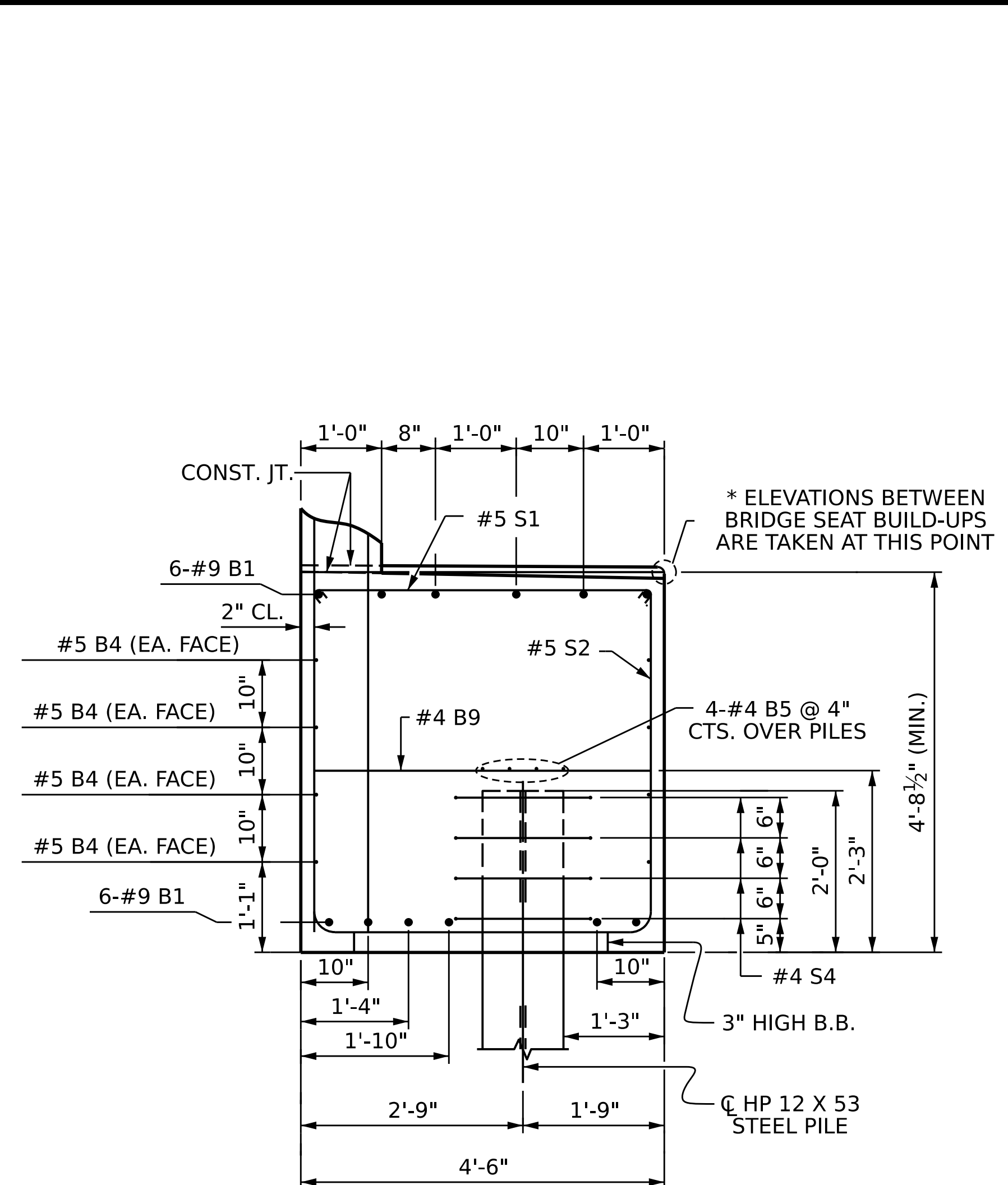
REVISIONS						SHEET NO. S-38
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 53
2			4			



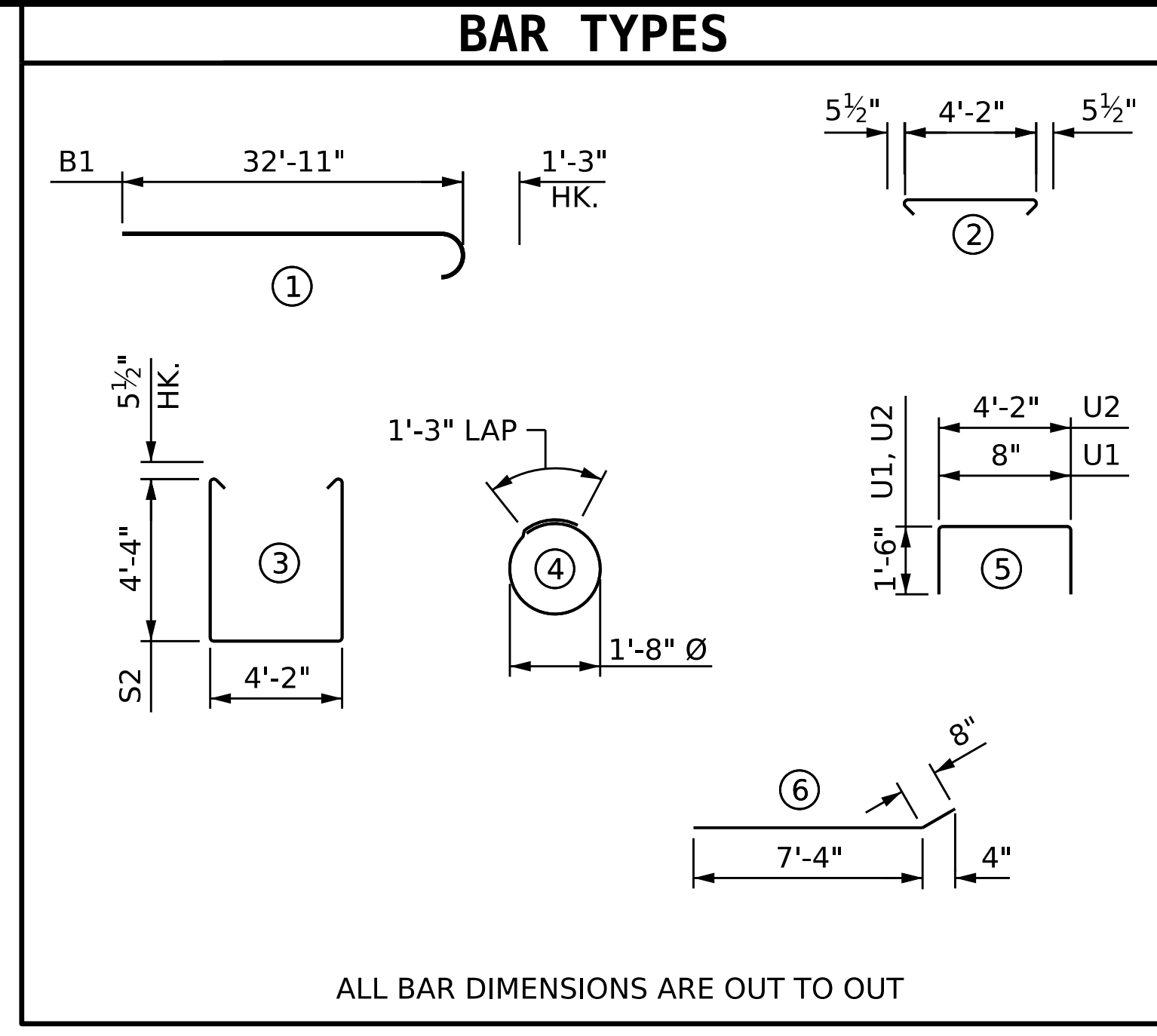
8/26/21



**SECTION A-A**



**SECTION B-B**

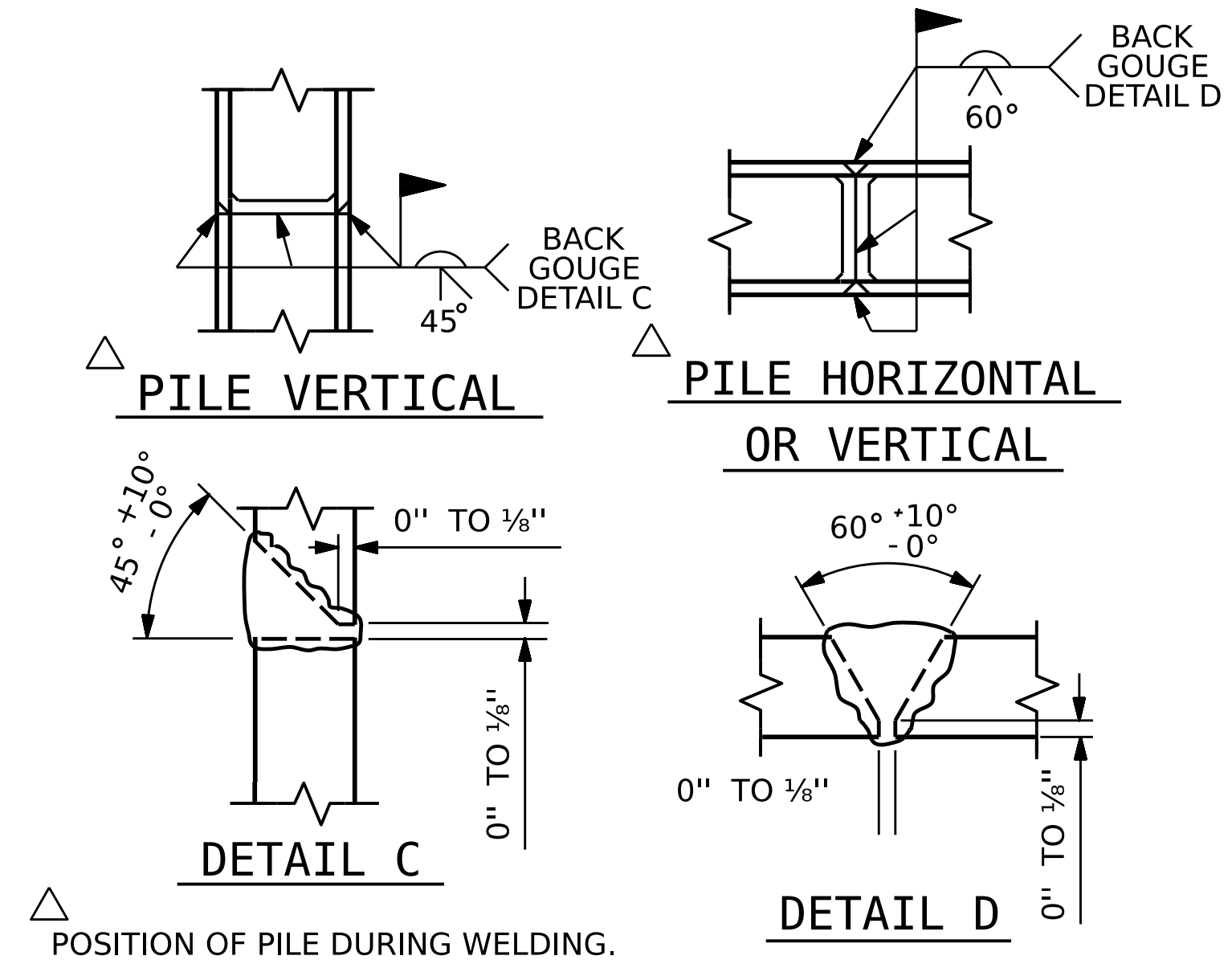


ALL BAR DIMENSIONS ARE OUT TO OUT

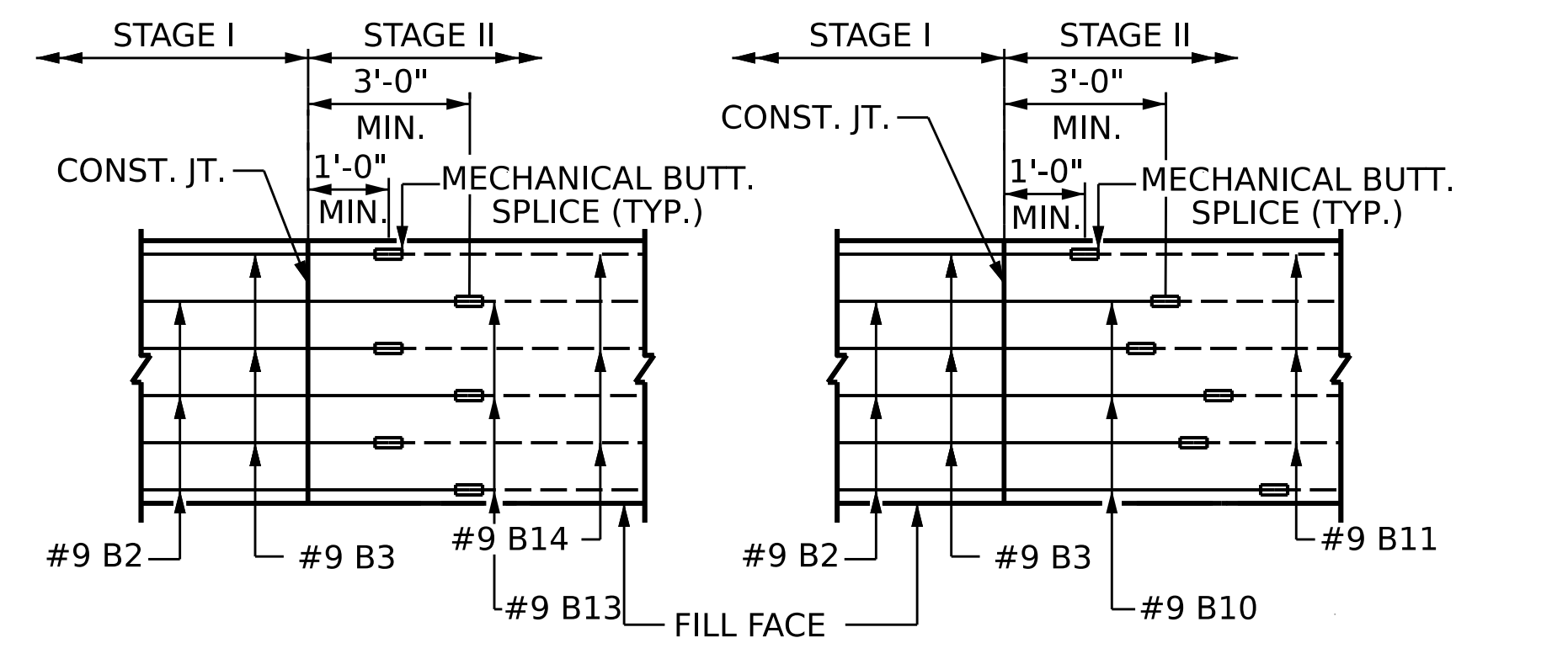
**BILL OF MATERIAL**

STAGE I					
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	34'-2"	1394
B2	6	#9	STR	34'-11"	712
B3	6	#9	STR	32'-11"	672
B4	16	#5	STR	32'-10"	548
B5	8	#4	STR	32'-6"	174
B6	6	#4	STR	18'-4"	73
B7	12	#4	STR	9'-4"	75
B8	6	#4	STR	4'-5"	18
B9	15	#4	STR	4'-2"	42
H1	28	#5	6	8'-0"	233
K1	24	#4	STR	29'-9"	477
K2	4	#4	STR	4'-6"	12
S1	52	#5	2	5'-1"	276
S2	52	#5	3	13'-9"	746
S4	36	#4	4	6'-6"	156
U1	52	#4	5	3'-8"	127
U2	54	#4	5	7'-2"	259
V1	104	#5	STR	9'-6"	1030
V2	26	#5	STR	10'-9"	292
REINFORCING STEEL				7,316 LBS.	

CLASS A CONCRETE BREAKDOWN (STAGE I)		
POUR #1	CAP & LOWER PART OF WINGS	50.9 C.Y.
POUR #2	BACKWALL & UPPER PART OF WINGS	13.5 C.Y.
TOTAL CLASS A CONCRETE		64.4 C.Y.
HP 12X53 STEEL PILES		
NO. 9		405 LIN. FT.



**PILE SPLICE DETAILS**

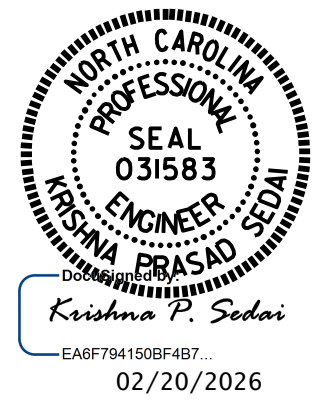


**PLAN OF TOP REINFORCEMENT    PLAN OF BOTTOM REINFORCEMENT**

**DETAIL B**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**  
 SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
**END BENT #1**  
**STAGE I**



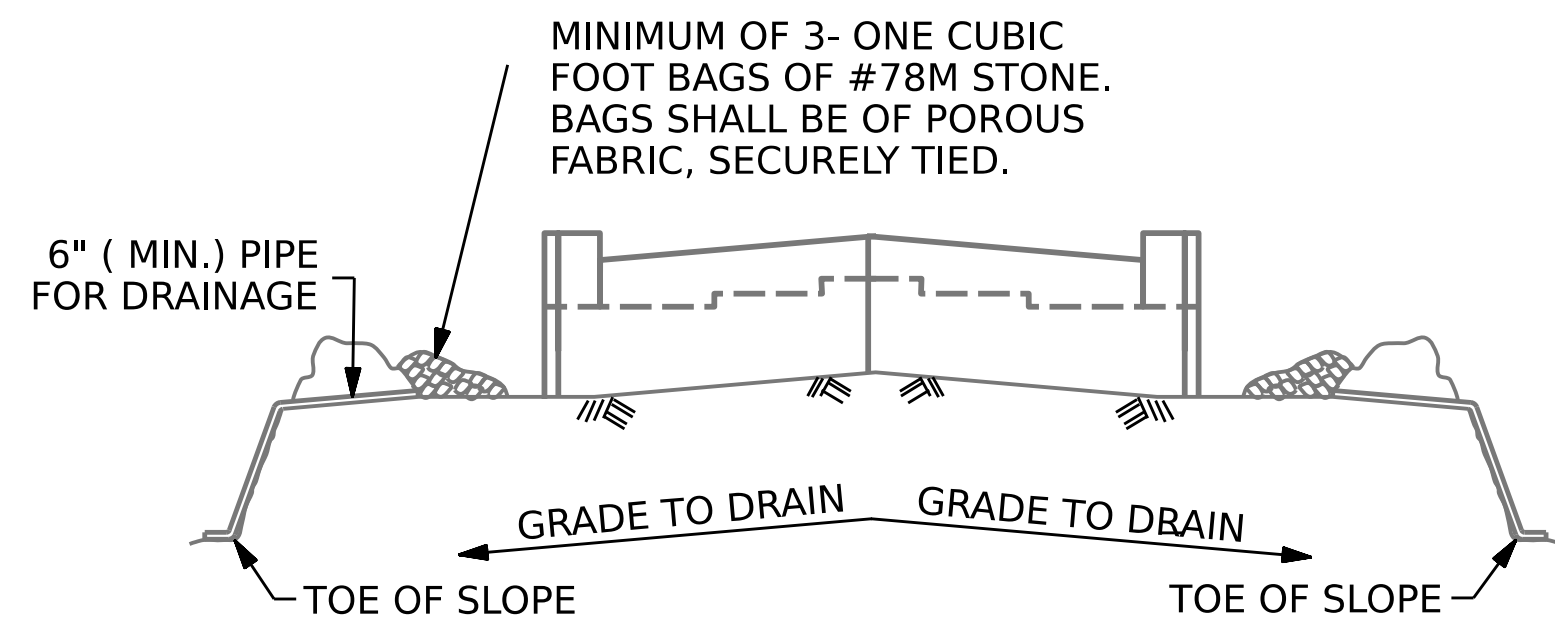
DRAWN BY : E. MOHAMED    DATE : 09/2025  
 CHECKED BY : A. SORSENGINH    DATE : 09/2025  
 DESIGN ENGINEER OF RECORD : A. IGHWAIR    DATE : 09/2025

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

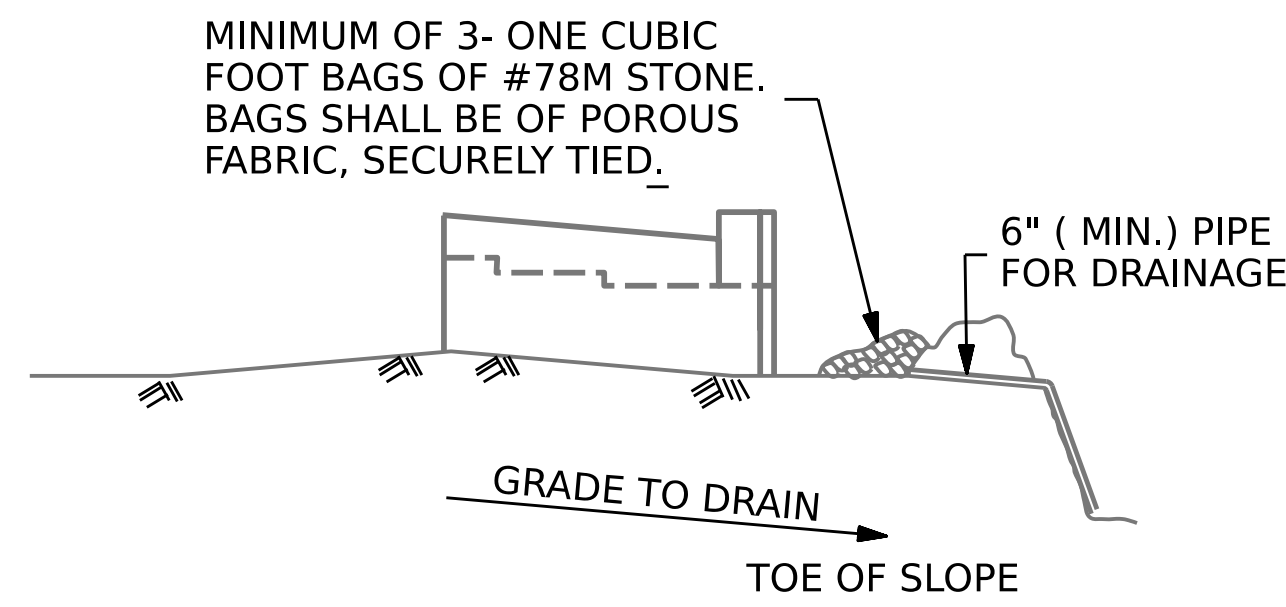
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 53

2/16/2026  
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 ksedai



**STAGE II CONSTRUCTION**



**STAGE I CONSTRUCTION**

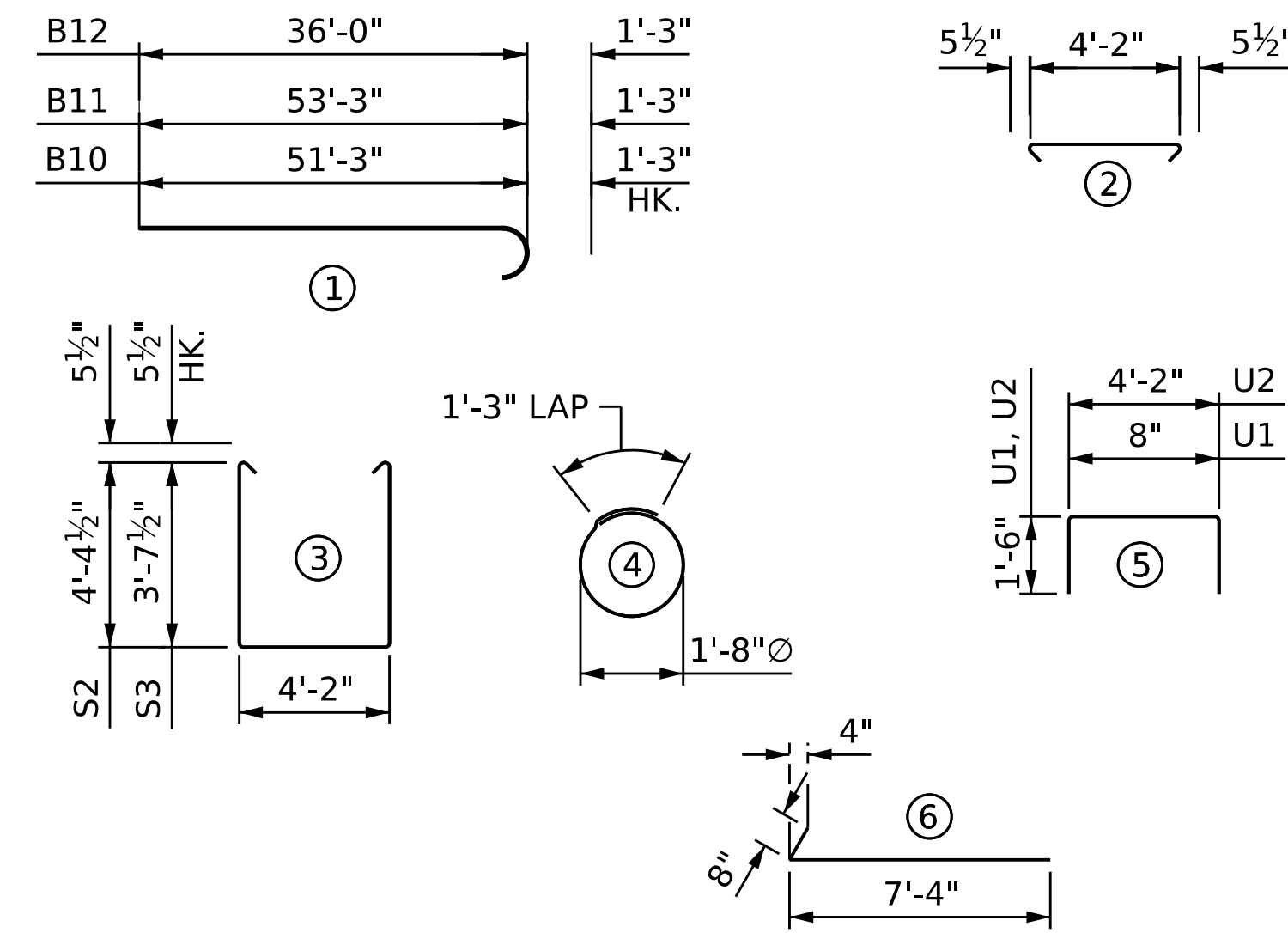
**TEMPORARY DRAINAGE AT END BENT**

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.

**BAR TYPES**



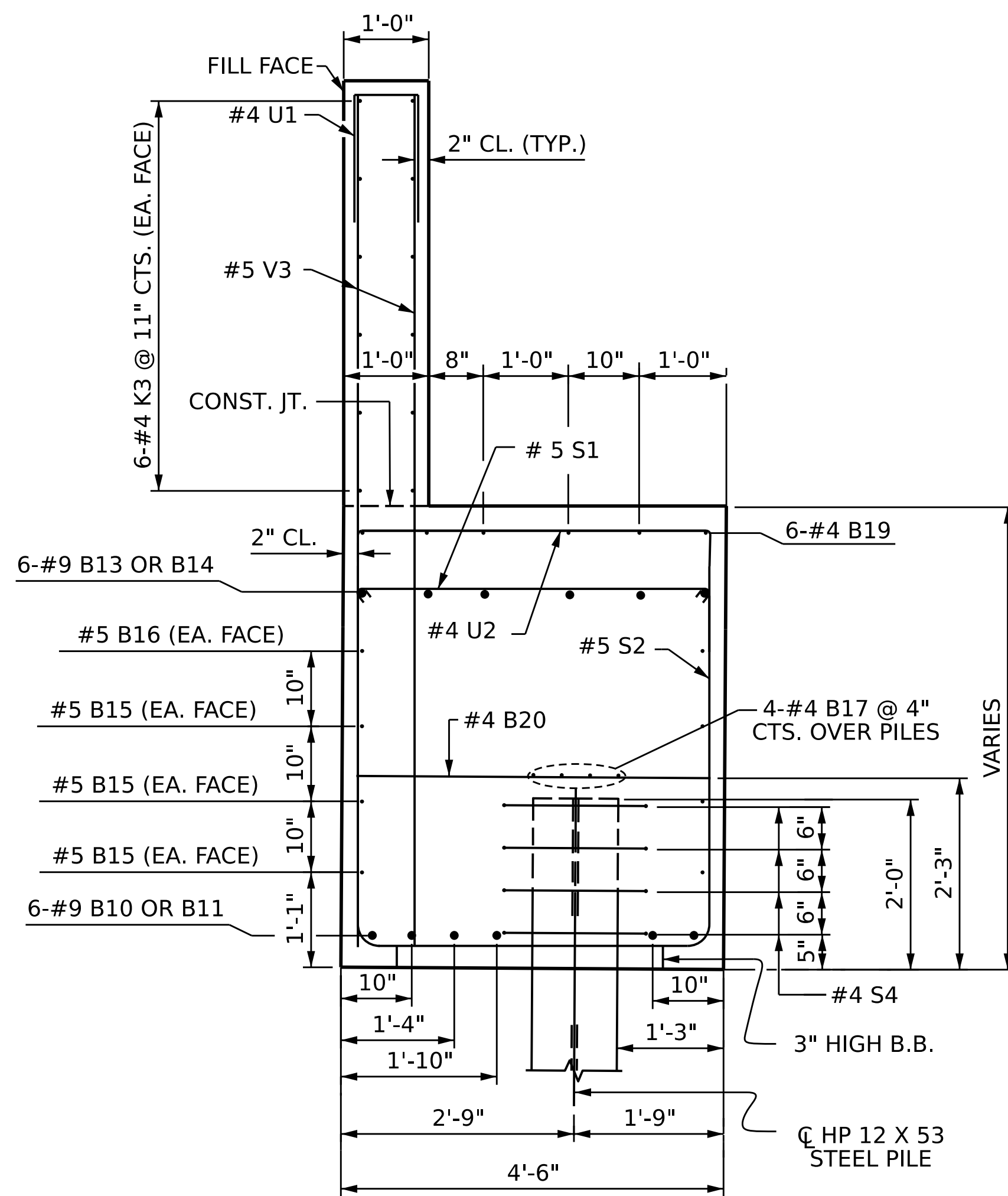
ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL**

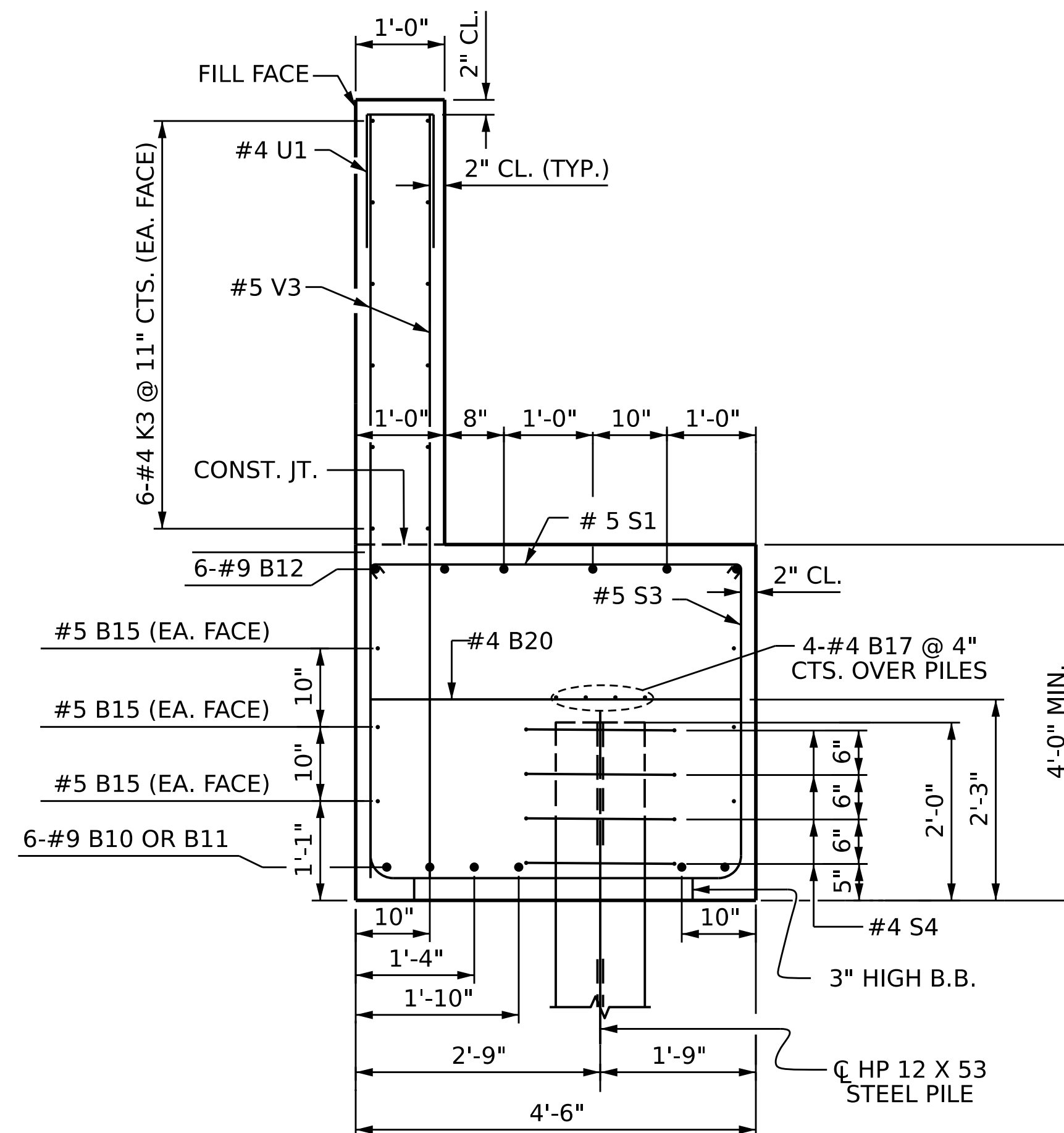
STAGE II					
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B10	3	#9	1	52'-6"	536
B11	3	#9	1	54'-6"	556
B12	6	#9	1	37'-3"	760
B13	3	#9	STR	20'-7"	210
B14	3	#9	STR	22'-7"	230
B15	12	#5	STR	29'-5"	368
B16	2	#5	STR	23'-10"	50
B17	8	#4	STR	29'-8"	159
B18	18	#4	STR	8'-8"	104
B19	6	#4	STR	5'-9"	23
B20	14	#4	STR	4'-2"	39
H2	26	#5	6	8'-0"	217
K2	4	#4	STR	4'-6"	12
K3	24	#4	STR	29'-8"	476
S1	47	#5	2	5'-1"	249
S2	21	#5	3	13'-10"	303
S3	26	#5	3	12'-4"	334
S4	32	#4	4	6'-6"	139
U1	52	#4	5	3'-8"	127
U2	45	#4	5	7'-2"	215
V3	104	#5	STR	8'-8"	940
V4	26	#5	STR	10'-0"	271
REINFORCING STEEL					6,318 LBS.

**CLASS A CONCRETE BREAKDOWN (STAGE II)**

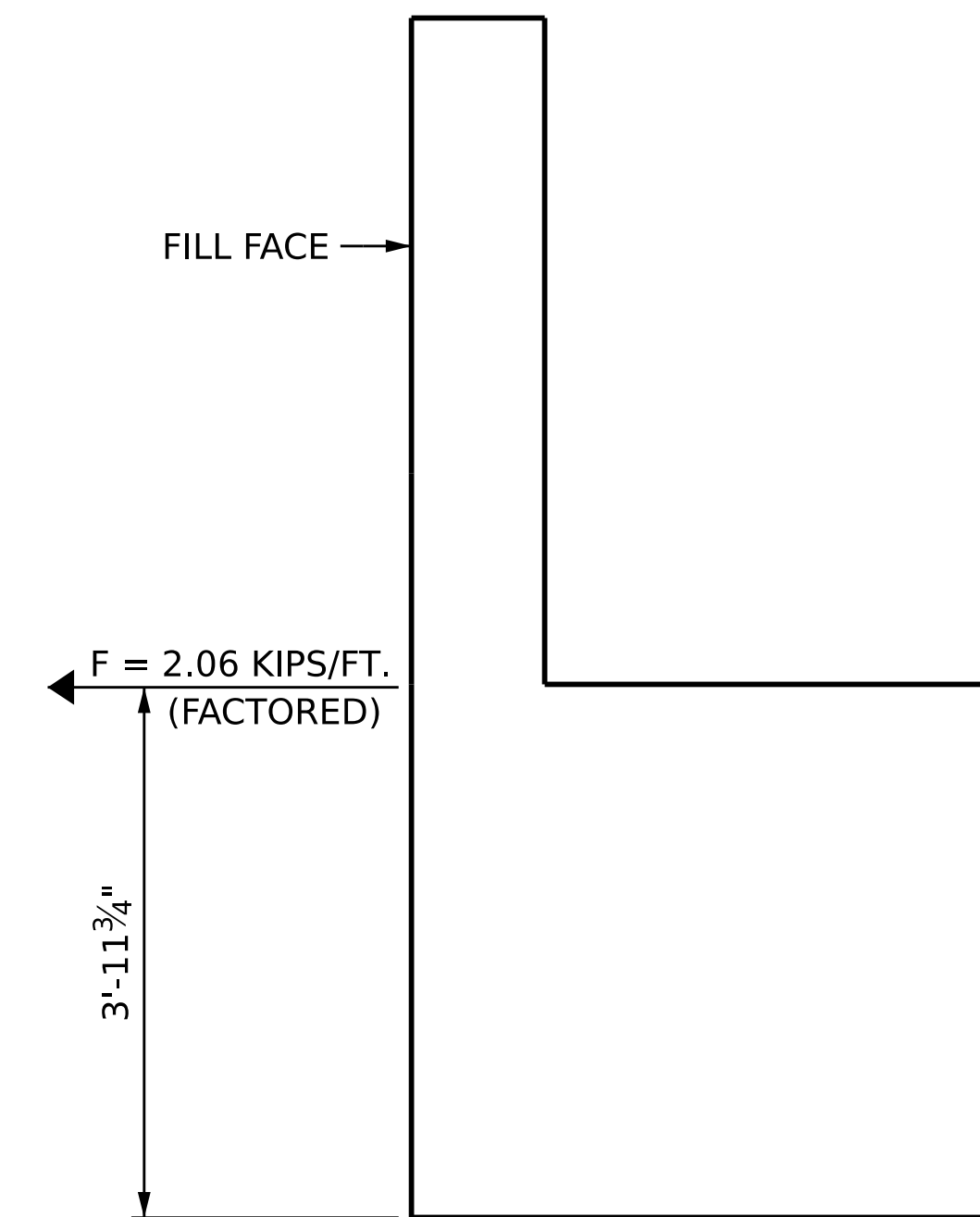
POUR #1	CAP & LOWER PART OF WINGS	42.6 C.Y.
POUR #2	BACKWALL & UPPER PART OF WINGS	13.6 C.Y.
<b>TOTAL CLASS A CONCRETE</b>		<b>56.2 C.Y.</b>
HP 12X53 STEEL PILES		
NO. 8		400 LIN. FT.



**SECTION C-C**

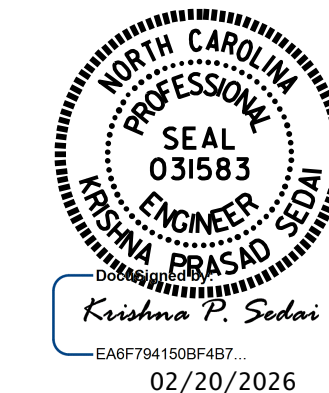


**SECTION D-D**



**TIE BACK DETAILS**

(DETAIL SHOWING TIE BACK RESTRAINT FOR END BENT)



PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**  
 SHEET 5 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**  
**END BENT #1**  
**STAGE II**

DRAWN BY : E. MOHAMED/T. STOGNER DATE : 09/2025  
 CHECKED BY : A. SORSENGINH DATE : 09/2025  
 DESIGN ENGINEER OF RECORD : E. MOHAMED DATE : 09/2025

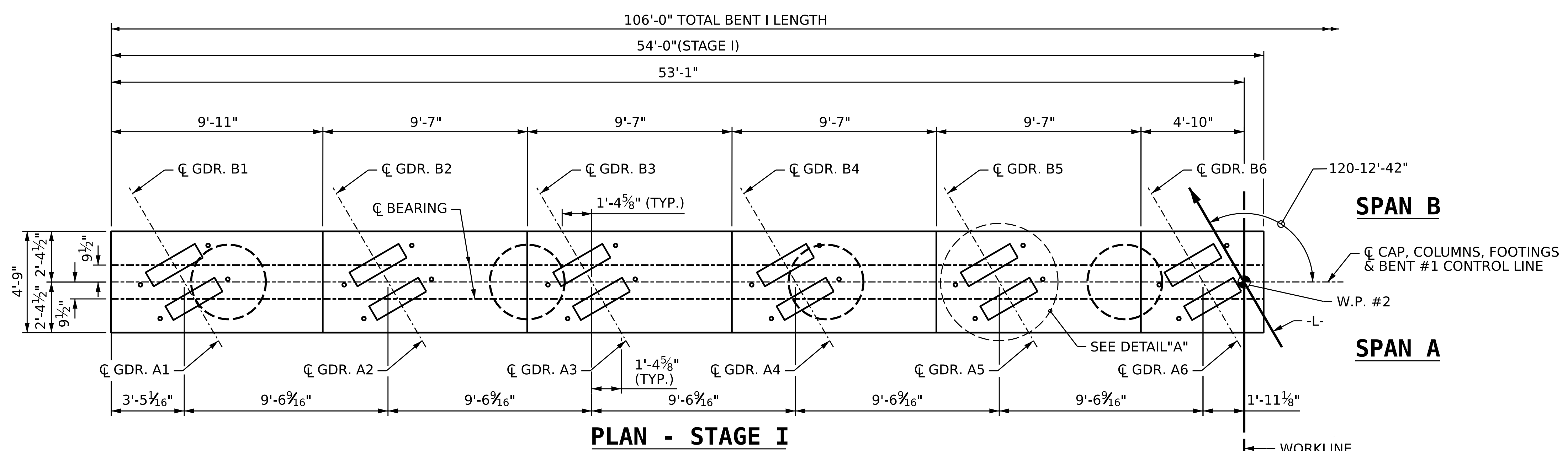
2/16/2026  
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 ksedai

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

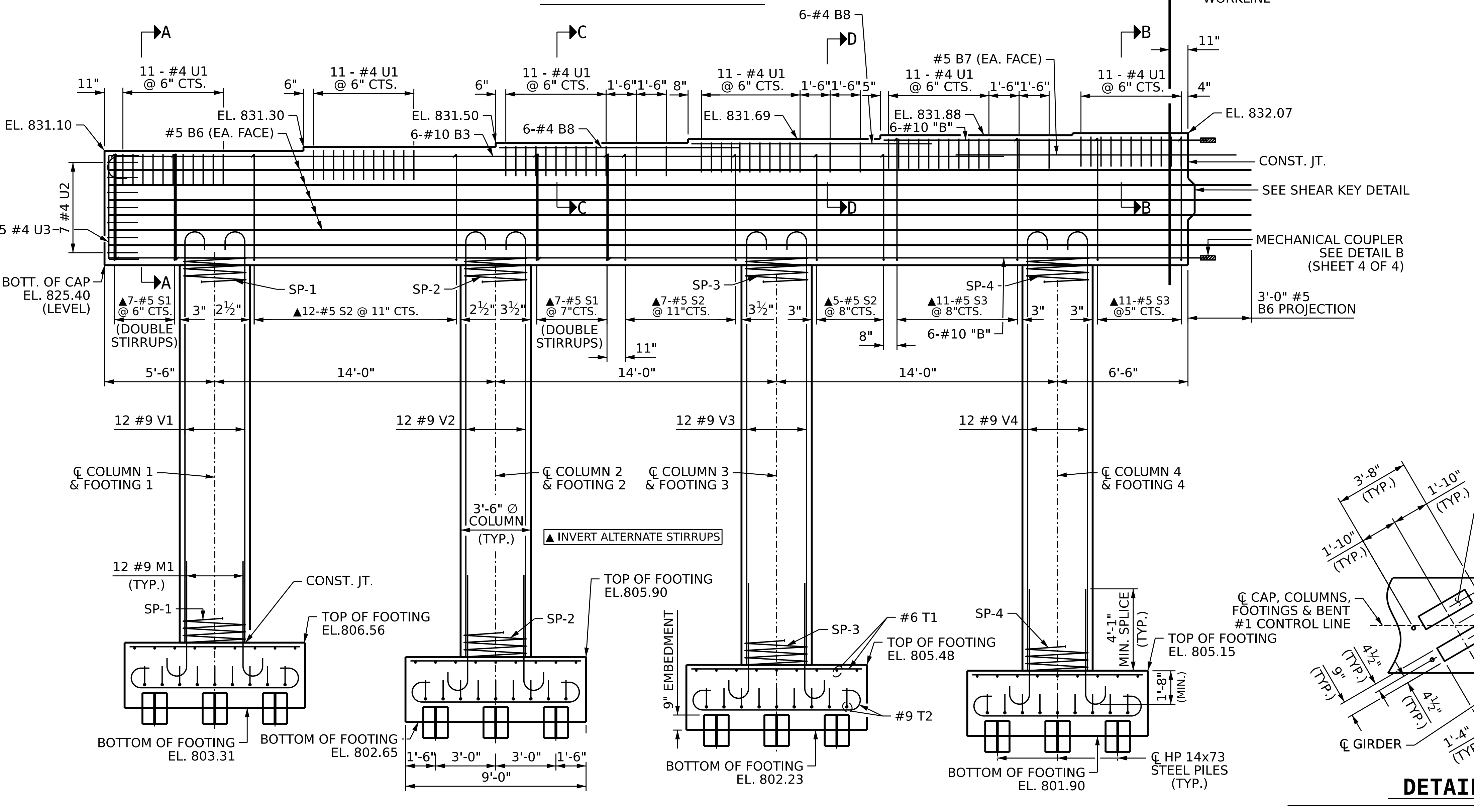
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 53

8/26/21



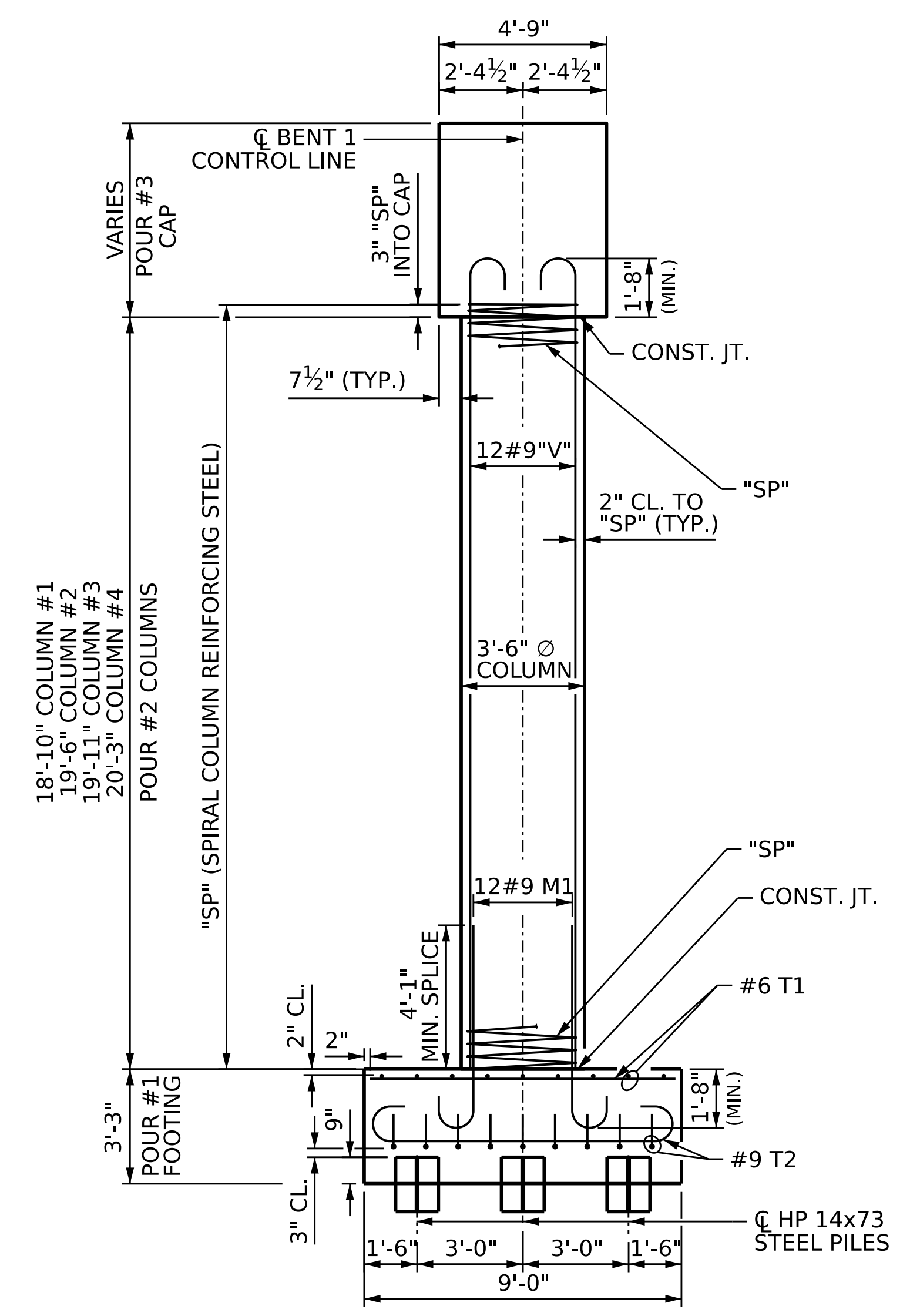
PLAN - STAGE I



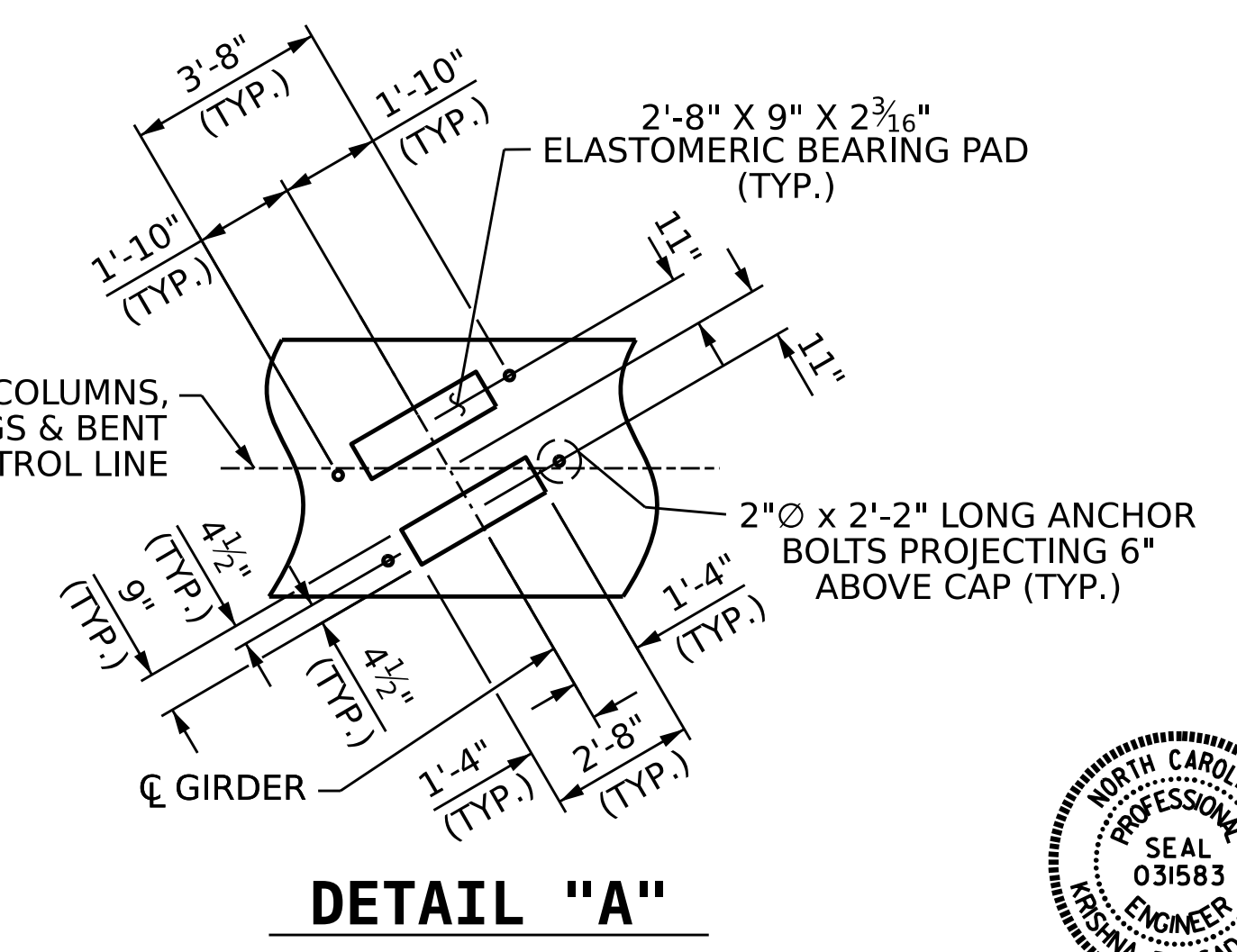
ELEVATION - STAGE I

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING UNLESS OTHERWISE NOTED.

**NOTES**  
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
 HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.  
 FOR SECTIONS A-A, B-B, C-C, & D-D, SEE SHEET 4 OF 4.



END ELEVATION



DETAIL "A"

PROJECT NO. **BR-0168**  
**FORYSTH** COUNTY  
 STATION: **20+73.79 -L-**  
 SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 BENT 1 STAGE I**

Seal of Krishna P. Sedai, Professional Engineer, No. 031583, State of North Carolina.

DRAWN BY: T. STOGNER DATE: 09/25  
 CHECKED BY: A. SORSENGINH DATE: 10/25  
 DESIGN ENGINEER OF RECORD: A. IGHWAR DATE: 10/25

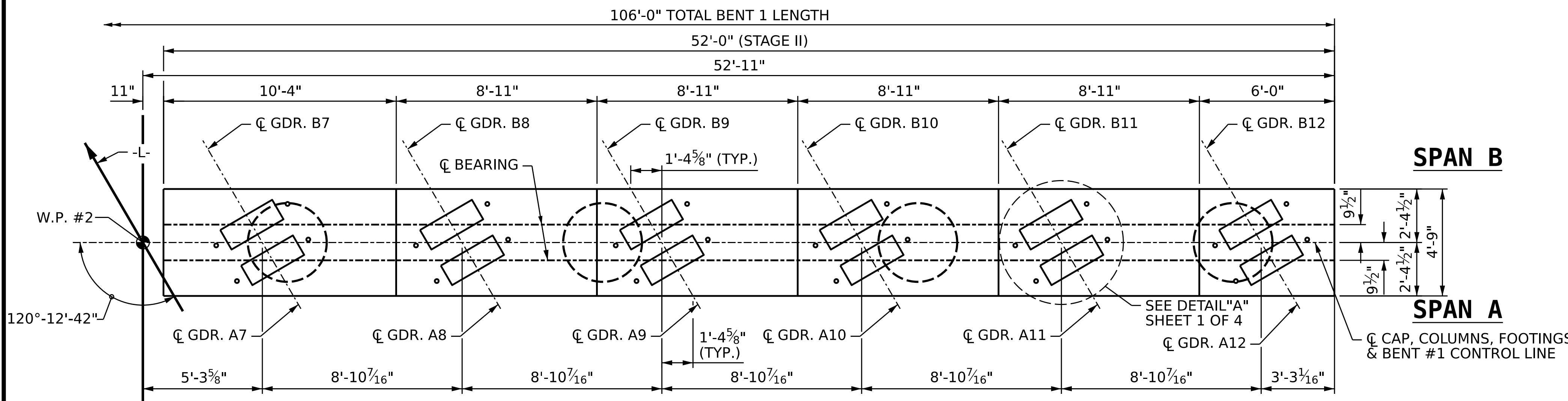
REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.
1			S-42
2			TOTAL SHEETS
			53

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

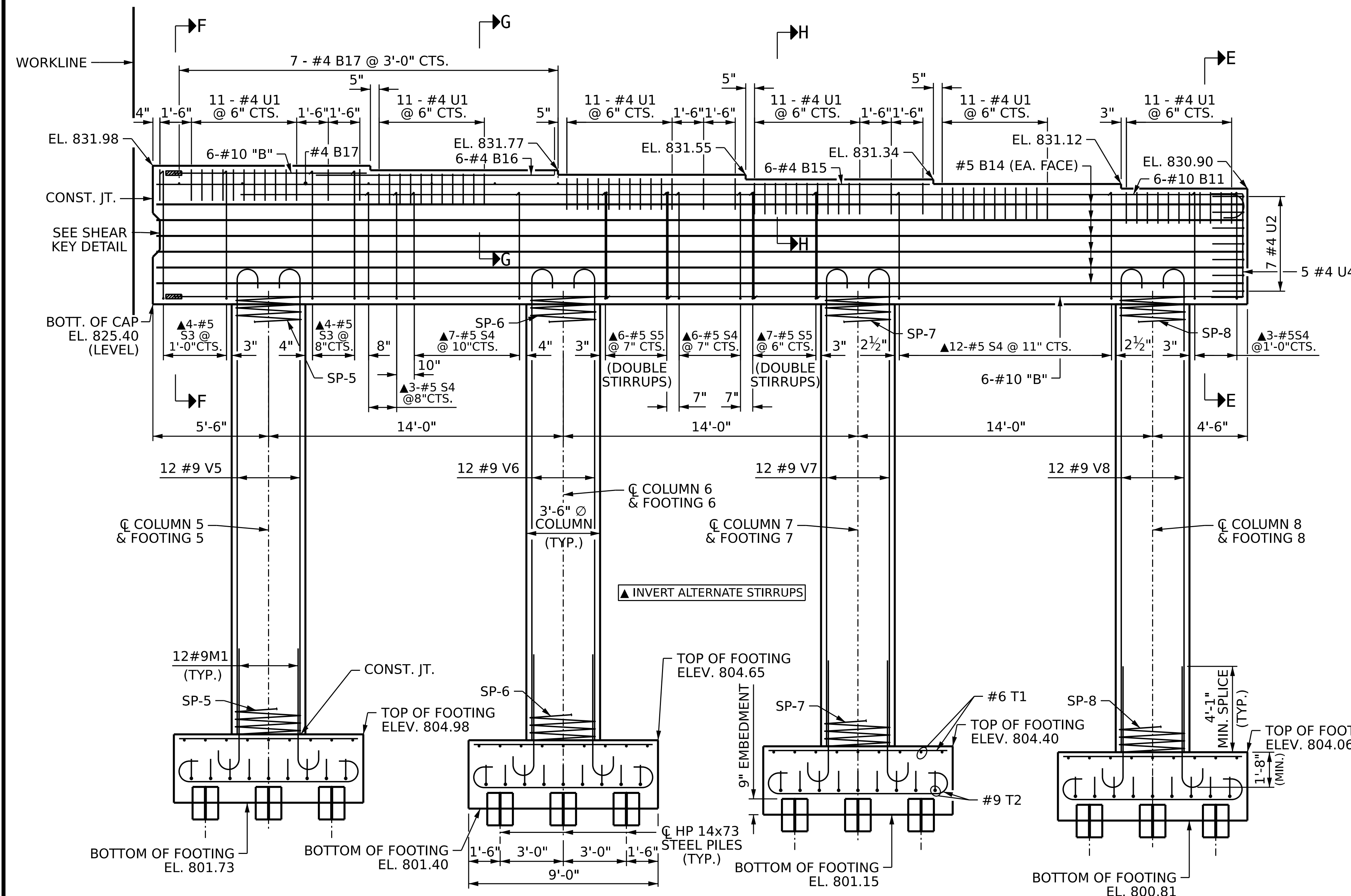
8/26/21

NOTES

FOR SECTIONS E-E, F-F, G-G, & H-H, SEE SHEET 3 OF 4.

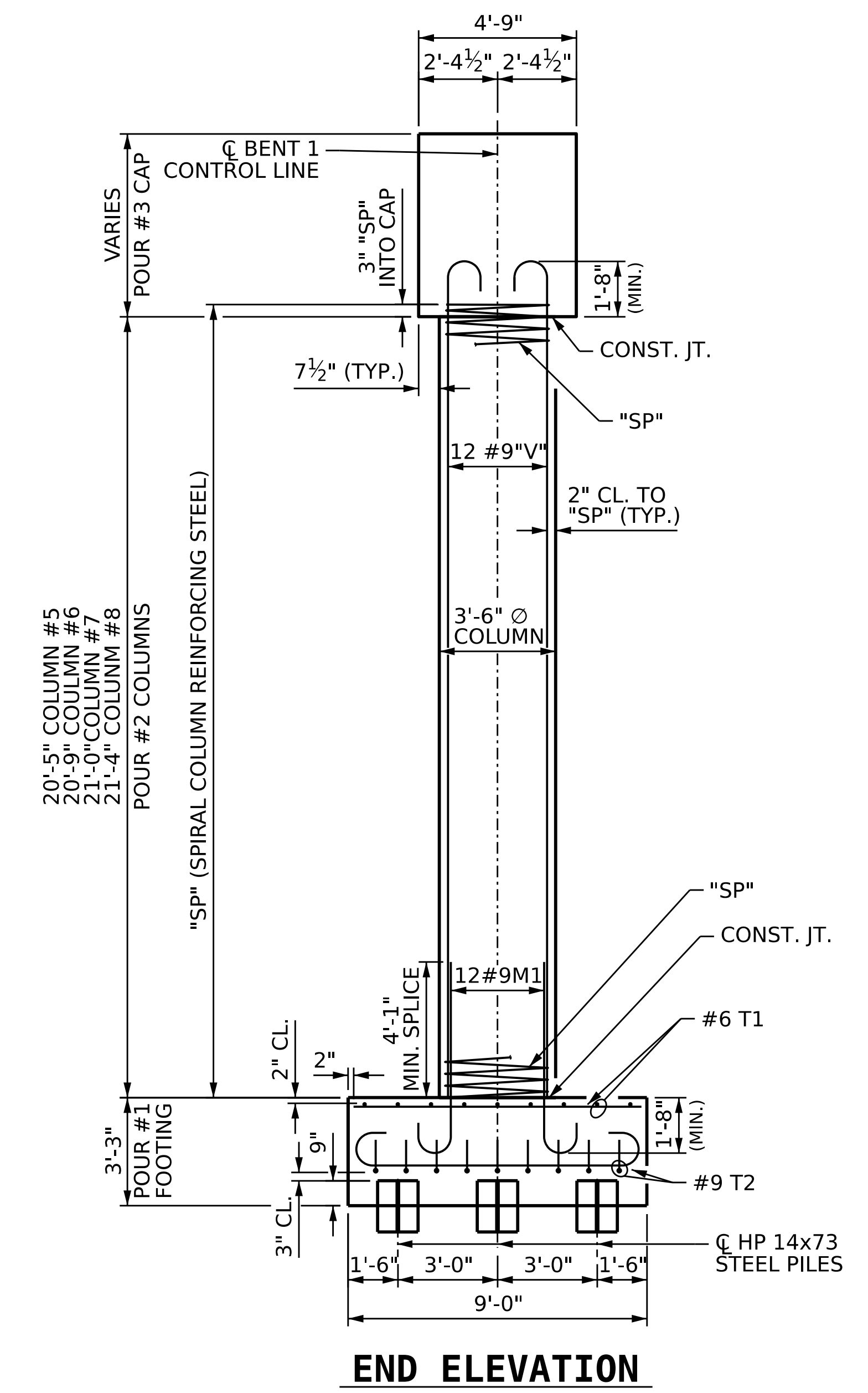


PLAN - STAGE II



ELEVATION - STAGE II

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING UNLESS OTHERWISE NOTED



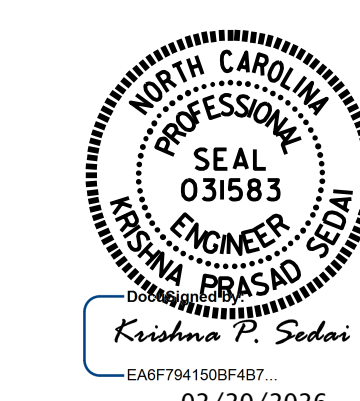
END ELEVATION

PROJECT NO. BR-0168

FORYSTH COUNTY

STATION: 20+73.79 -L-

SHEET 2 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT 1 STAGE II

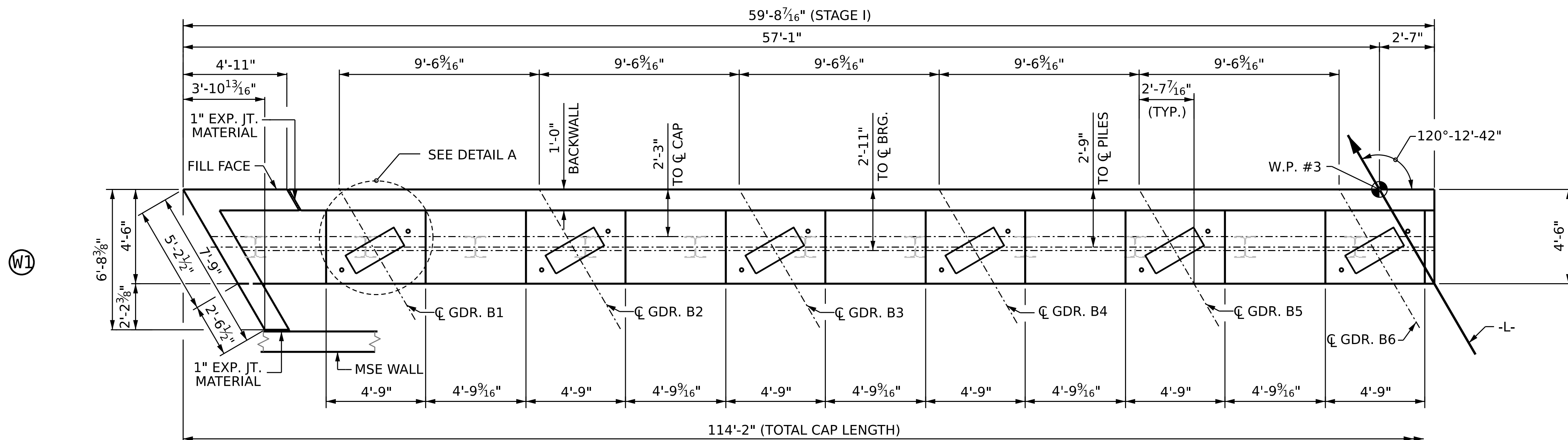
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 CHECKED BY: A. SORSENGINH DATE: 10/25  
 DESIGN ENGINEER OF RECORD: A. IGHWAR DATE: 10/25

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-43
2			4			TOTAL SHEETS 53







PLAN OF STAGE I

NOTES:

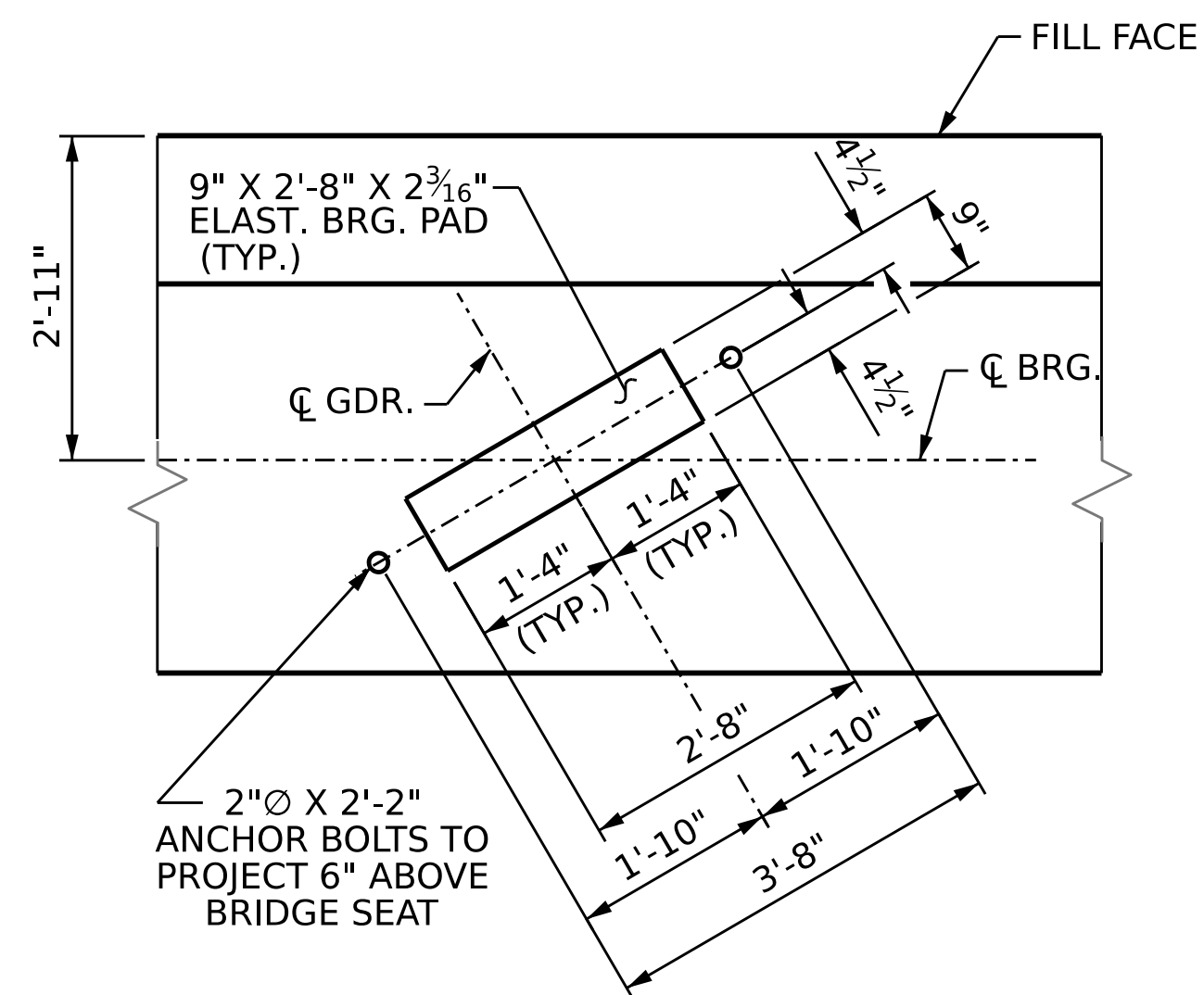
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHORS.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

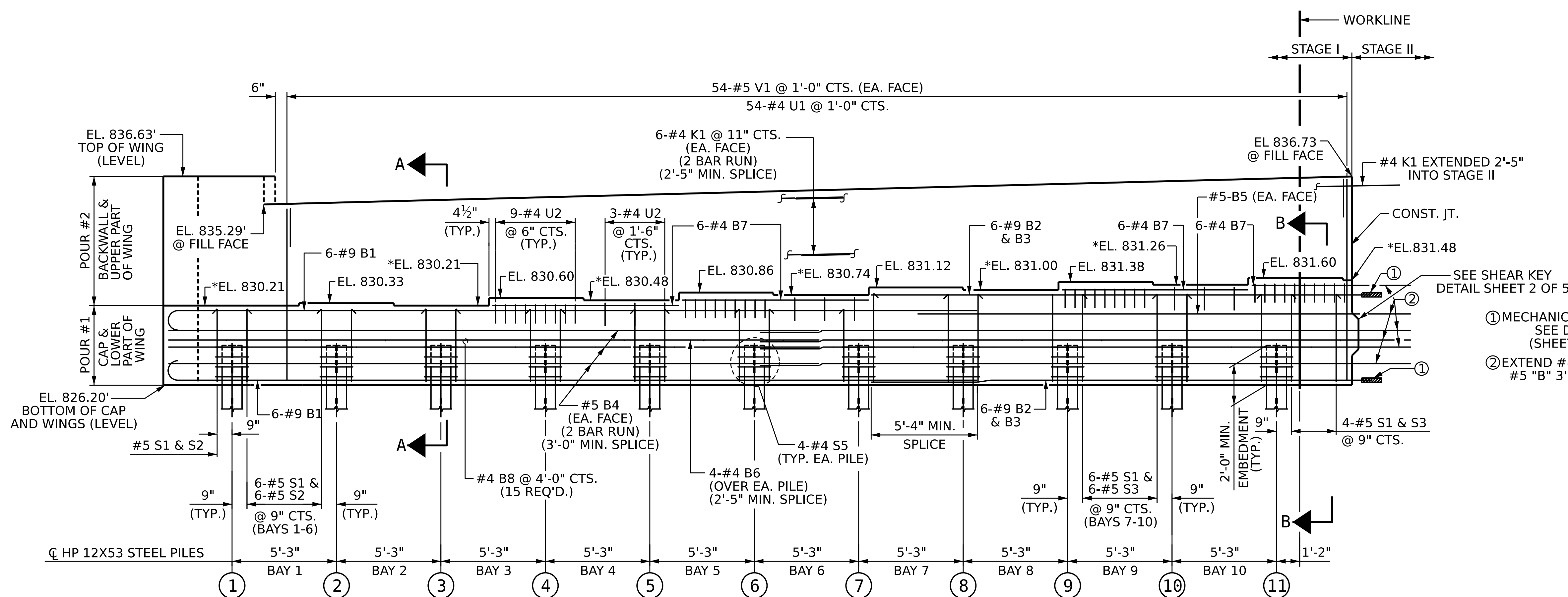
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT THE RATE OF 2%.

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



DETAIL A

(TYP. EA. GIRDER)



ELEVATION OF STAGE I

FOR SECTIONS A-A & B-B, SEE SHEET 4 OF 5

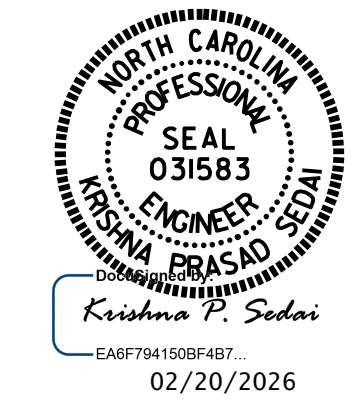
- ① MECHANICAL COUPLER, SEE DETAIL B (SHEET 4 OF 5)
- ② EXTEND #4 "B" 2'-5" MIN. & #5 "B" 3'-0" INTO STAGE II

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**  
**END BENT #2**  
**STAGE I**



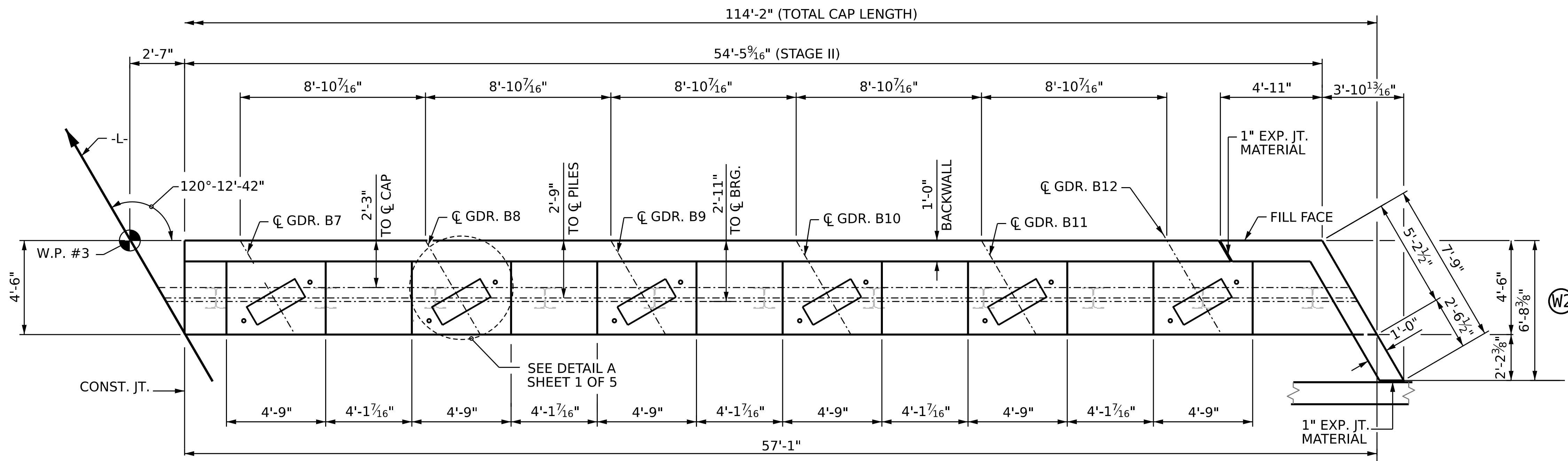
DRAWN BY: **E. MOHAMED** DATE: **10/2025**  
 CHECKED BY: **A. SORSENGINH** DATE: **10/2025**  
 DESIGN ENGINEER OF RECORD: **A. IGHWAIR** DATE: **10/2025**

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 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

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

TOTAL SHEETS: 53

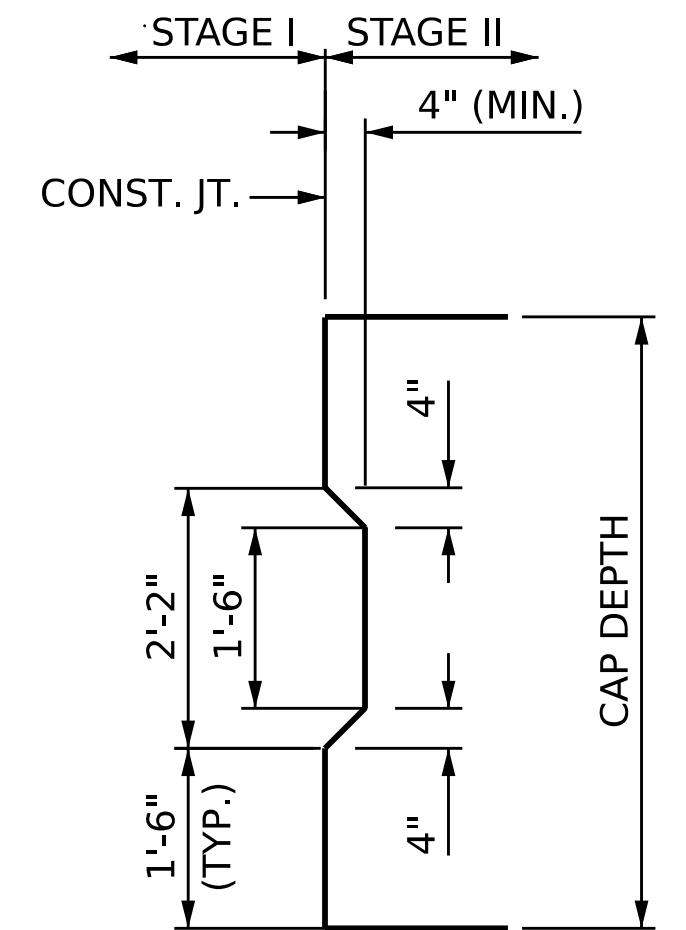
8/26/21



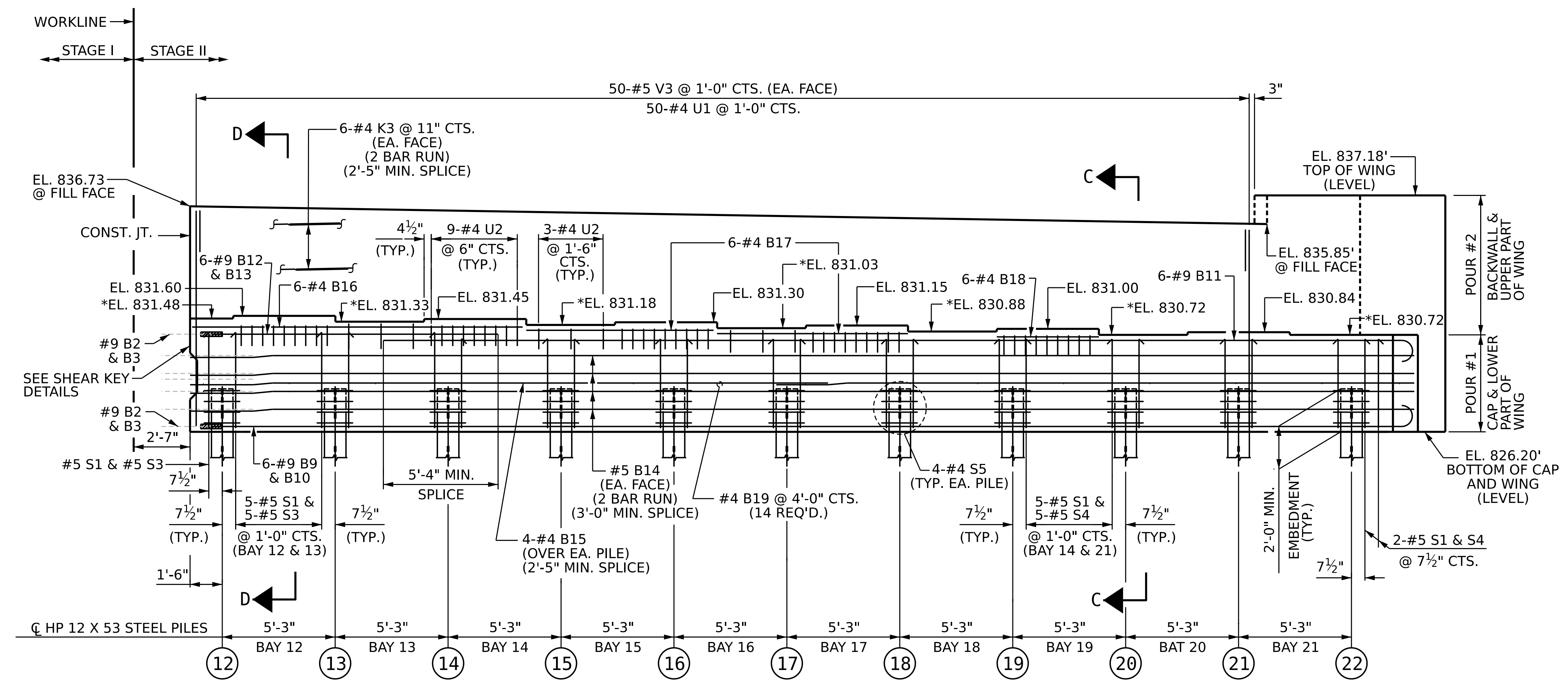
**PLAN OF STAGE II**

**NOTES:**

- STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHORS.
- #5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT THE RATE OF 2%.
- THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.



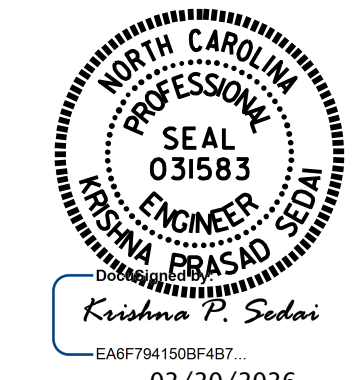
**SHEAR KEY DETAIL**



**ELEVATION OF STAGE II**

FOR SECTIONS C-C & SECTION D-D, SEE SHEET 5 OF 5

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**  
 SHEET 2 OF 5



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**  
**END BENT #2**  
**STAGE II**

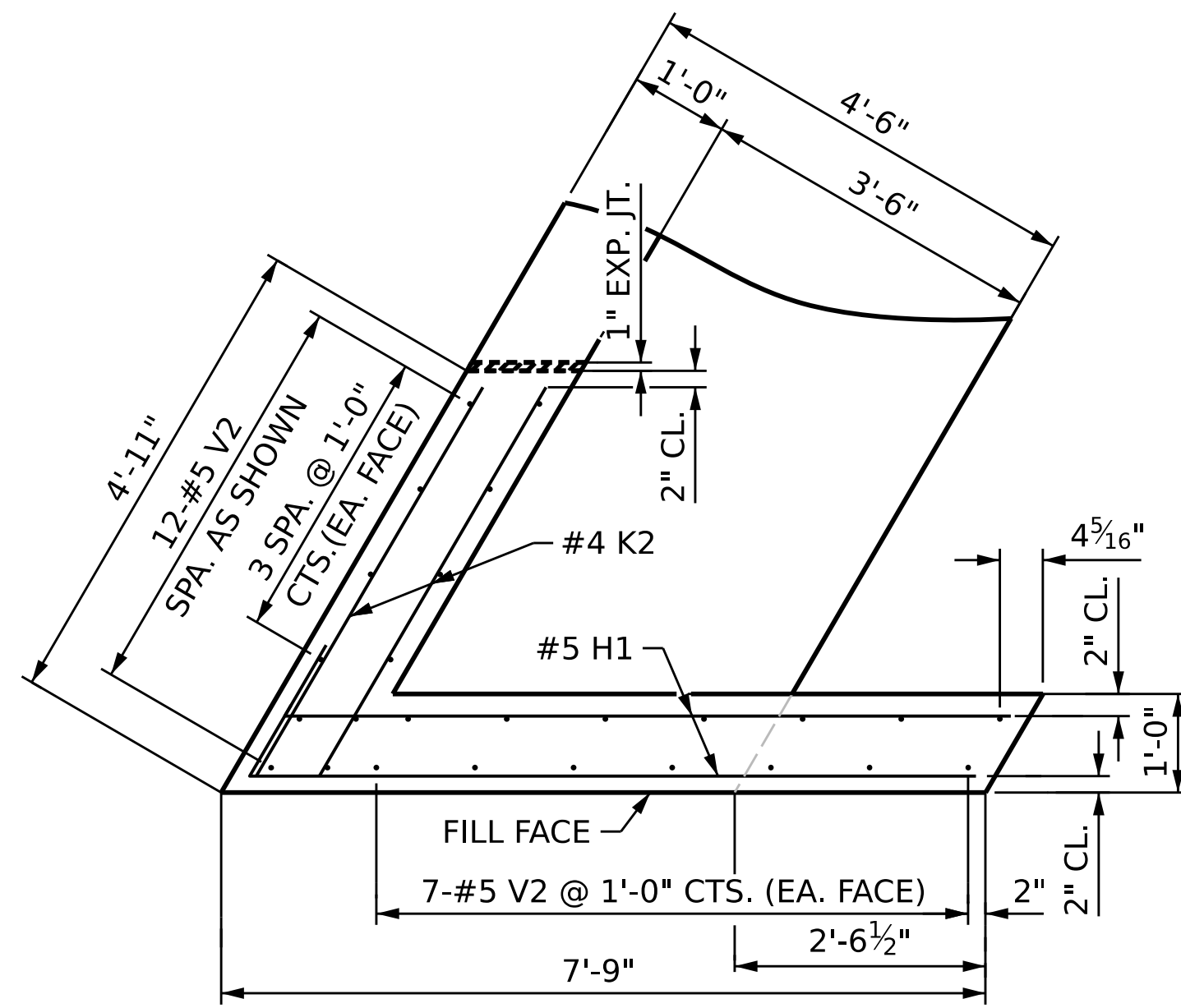
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 CHECKED BY : **A. SORSENGINH** DATE : **09/2025**  
 DESIGN ENGINEER OF RECORD : **A. IGHWAIR** DATE : **09/2025**

DOCUMENT NOT CONSIDERED  
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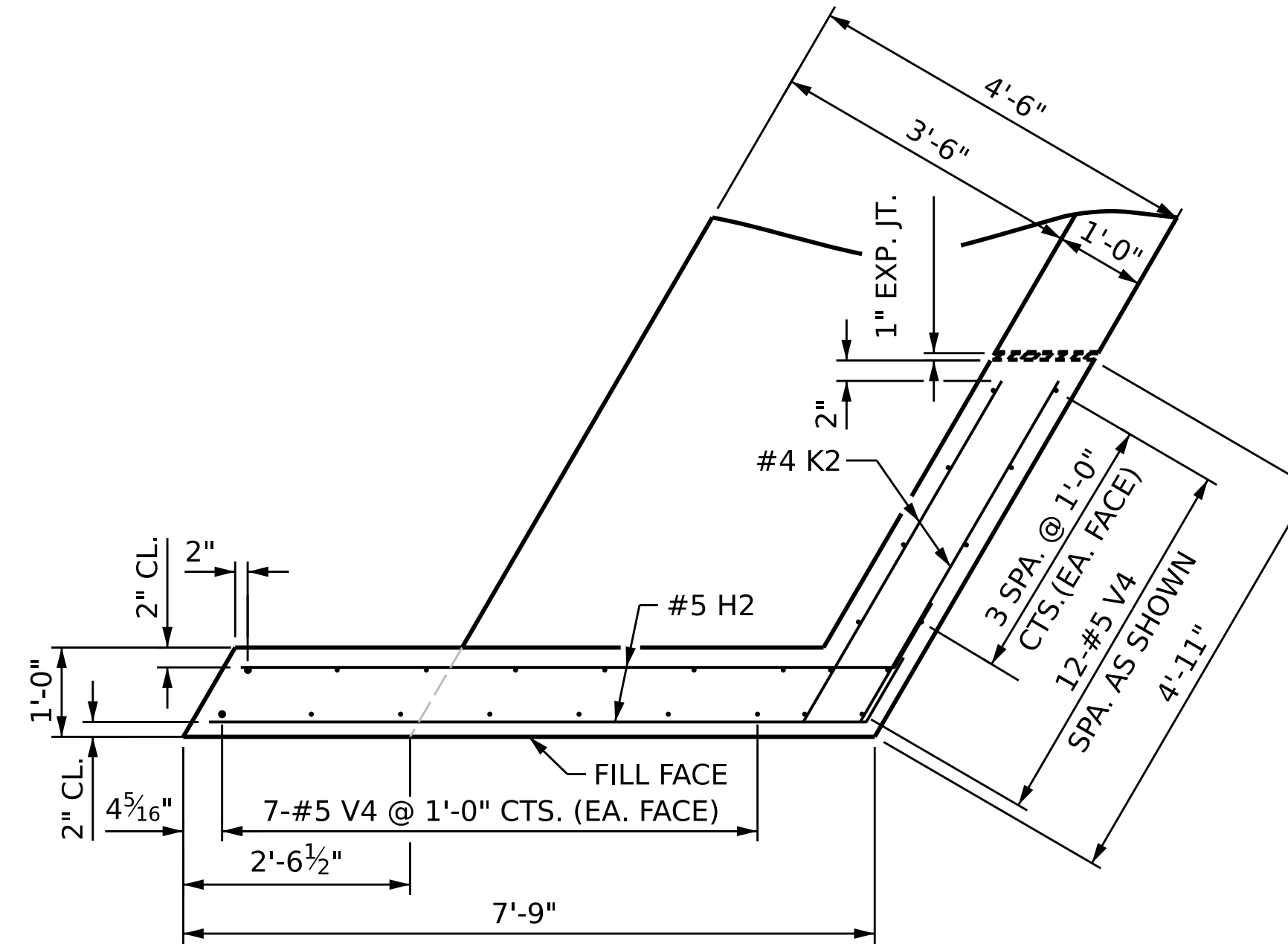
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NO.	DATE	NO.	DATE
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2		4	

TOTAL SHEETS: 53

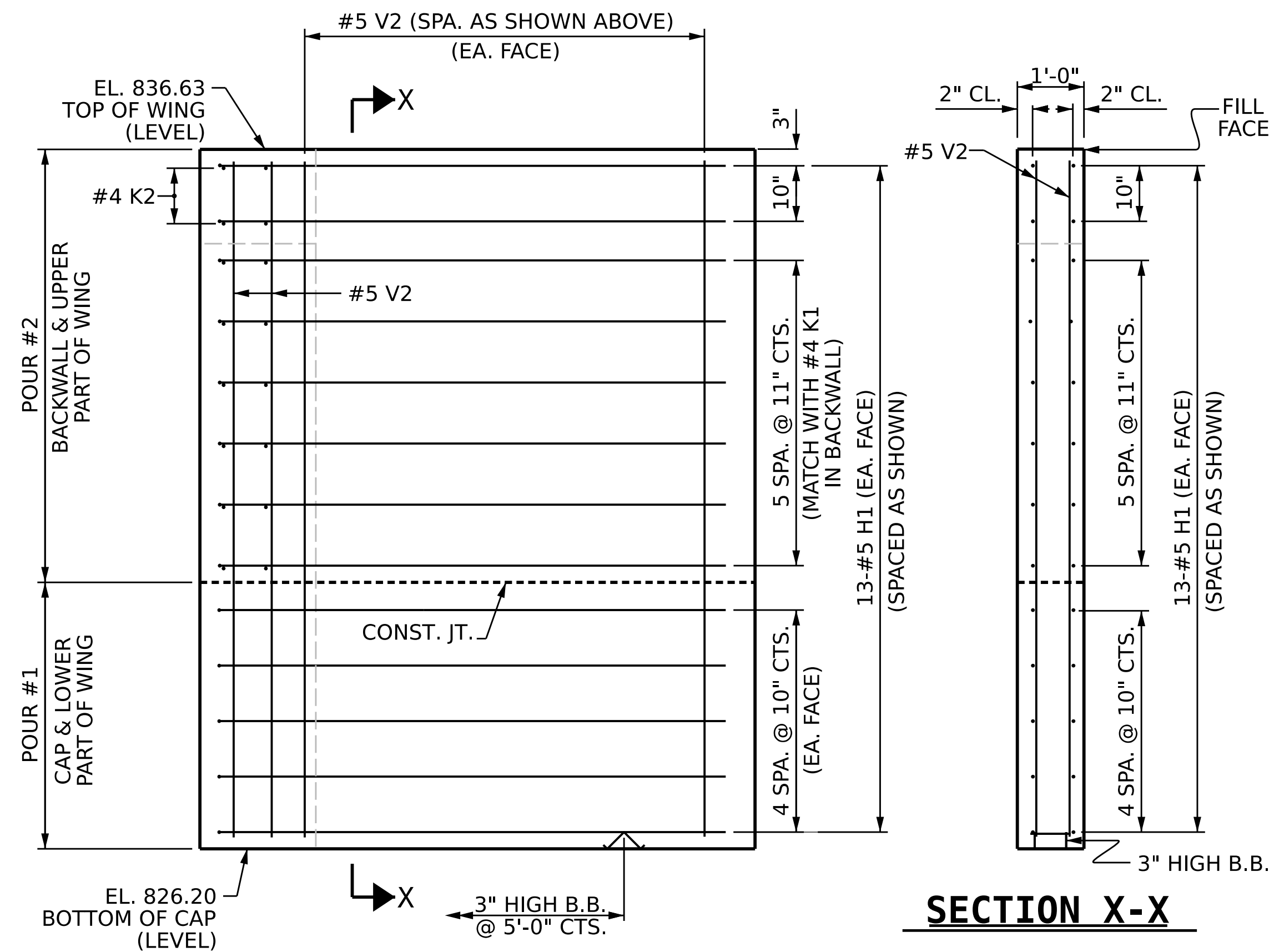
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 ksedai



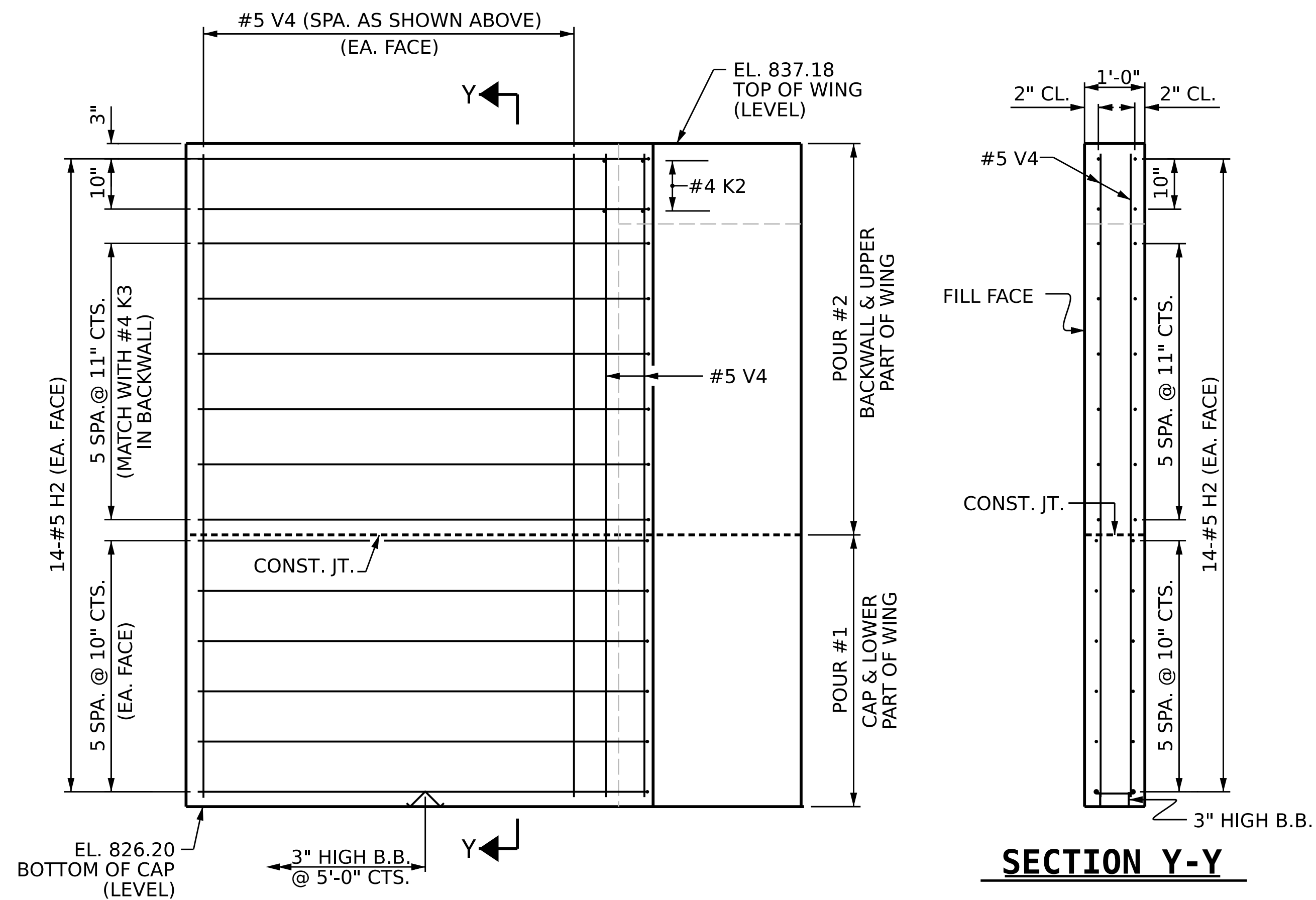
PLAN OF WING W1 STAGE I



PLAN OF WING W2 STAGE II



ELEVATION OF WING W1 STAGE I



ELEVATION OF WING W2 STAGE II

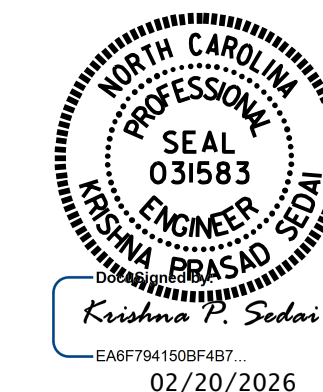
PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE

WING WALLS @ END BENT 2

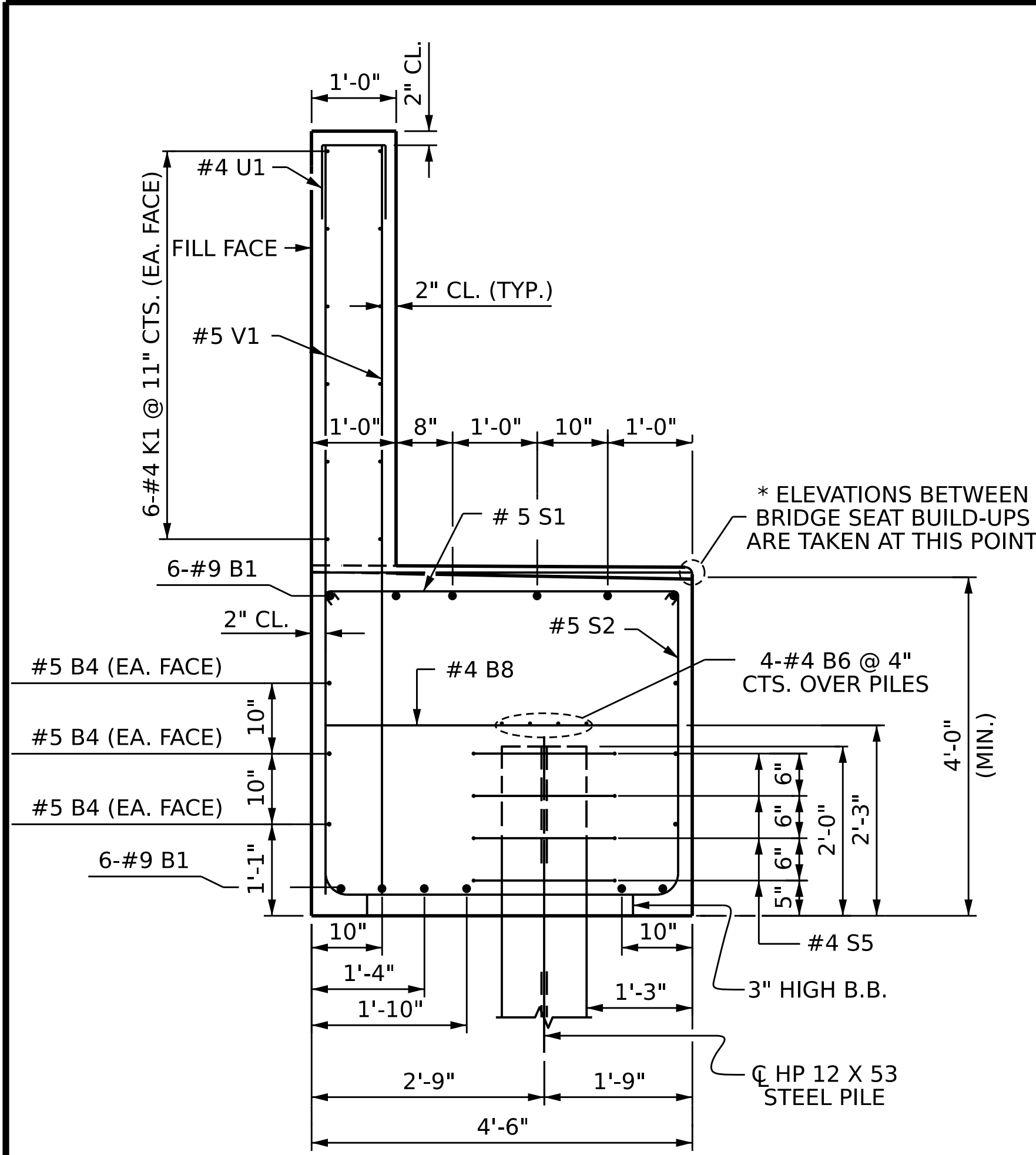


DRAWN BY: E. MOHAMED DATE: 09/2025  
 CHECKED BY: A. SORSENGINH DATE: 09/2025  
 DESIGN ENGINEER OF RECORD: A. IGHWAIR DATE: 09/2025

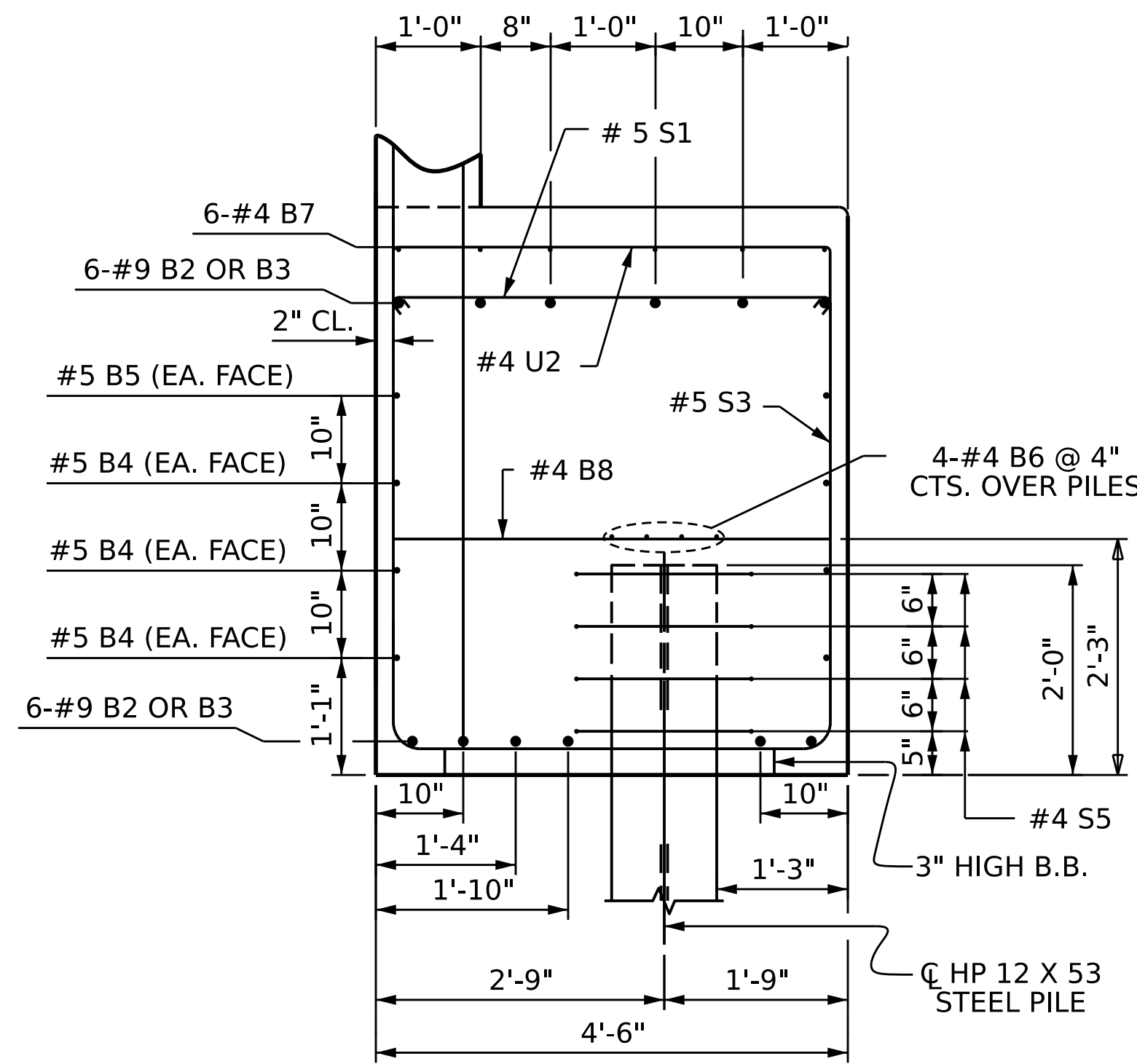
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DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

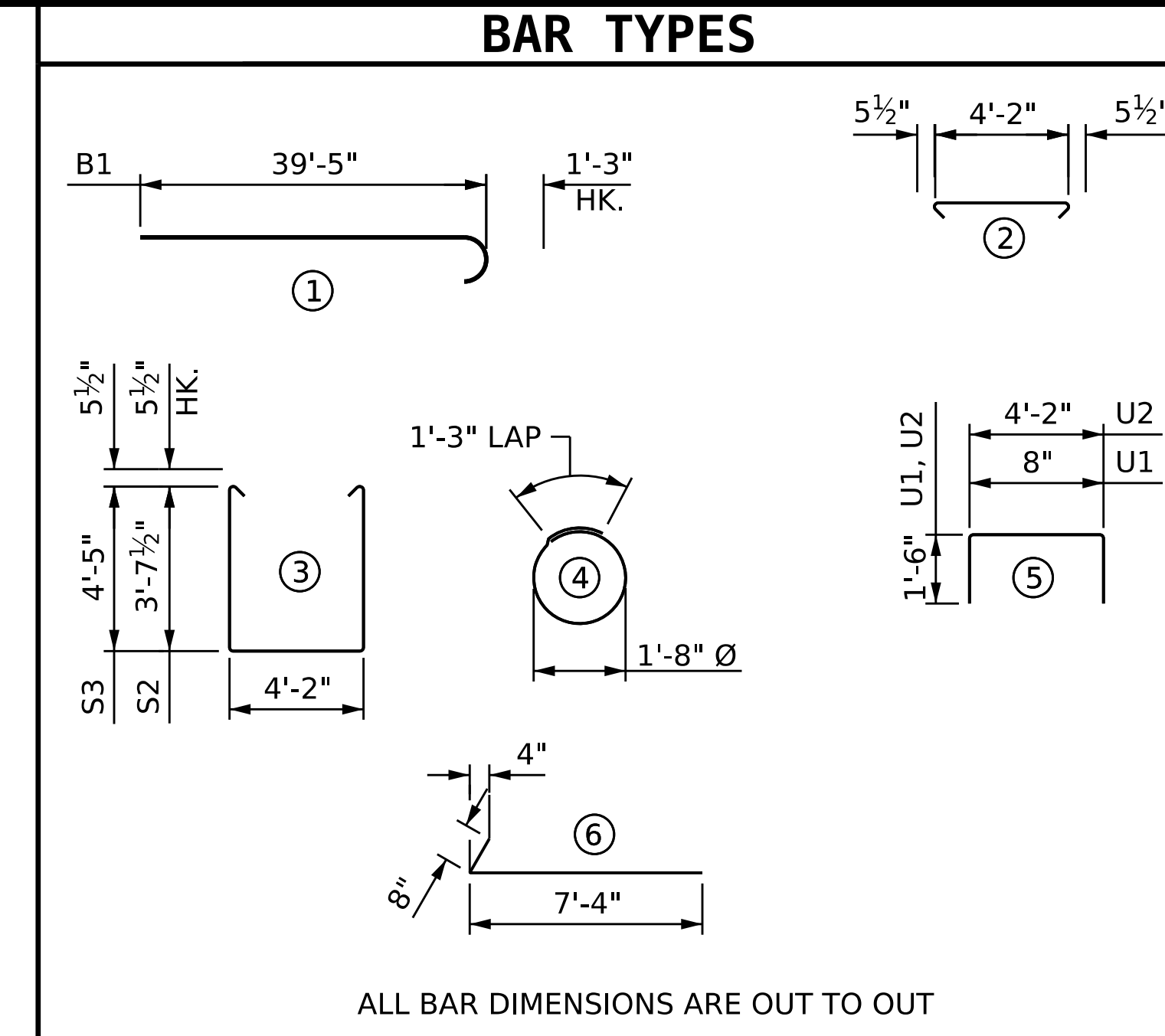
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			53



**SECTION A-A**



**SECTION B-B**



ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL**

**STAGE I**

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	40'-8"	1659
B2	6	#9	STR	26'-5"	539
B3	6	#9	STR	28'-5"	580
B4	12	#5	STR	32'-10"	411
B5	2	#5	STR	26'-0"	54
B6	8	#4	STR	32'-6"	174
B7	24	#4	STR	9'-5"	151
B8	15	#4	STR	4'-2"	42
H1	26	#5	6	8'-0"	217
K1	24	#4	STR	32'-3"	517
K2	4	#4	STR	4'-6"	12
S1	65	#5	2	5'-1"	347
S2	37	#5	3	12'-4"	476
S3	28	#5	3	13'-11"	406
S5	44	#4	4	6'-6"	191
U1	54	#4	5	3'-8"	132
U2	45	#4	5	7'-2"	215
V1	108	#5	STR	8'-9"	986
V2	26	#5	STR	10'-1"	273

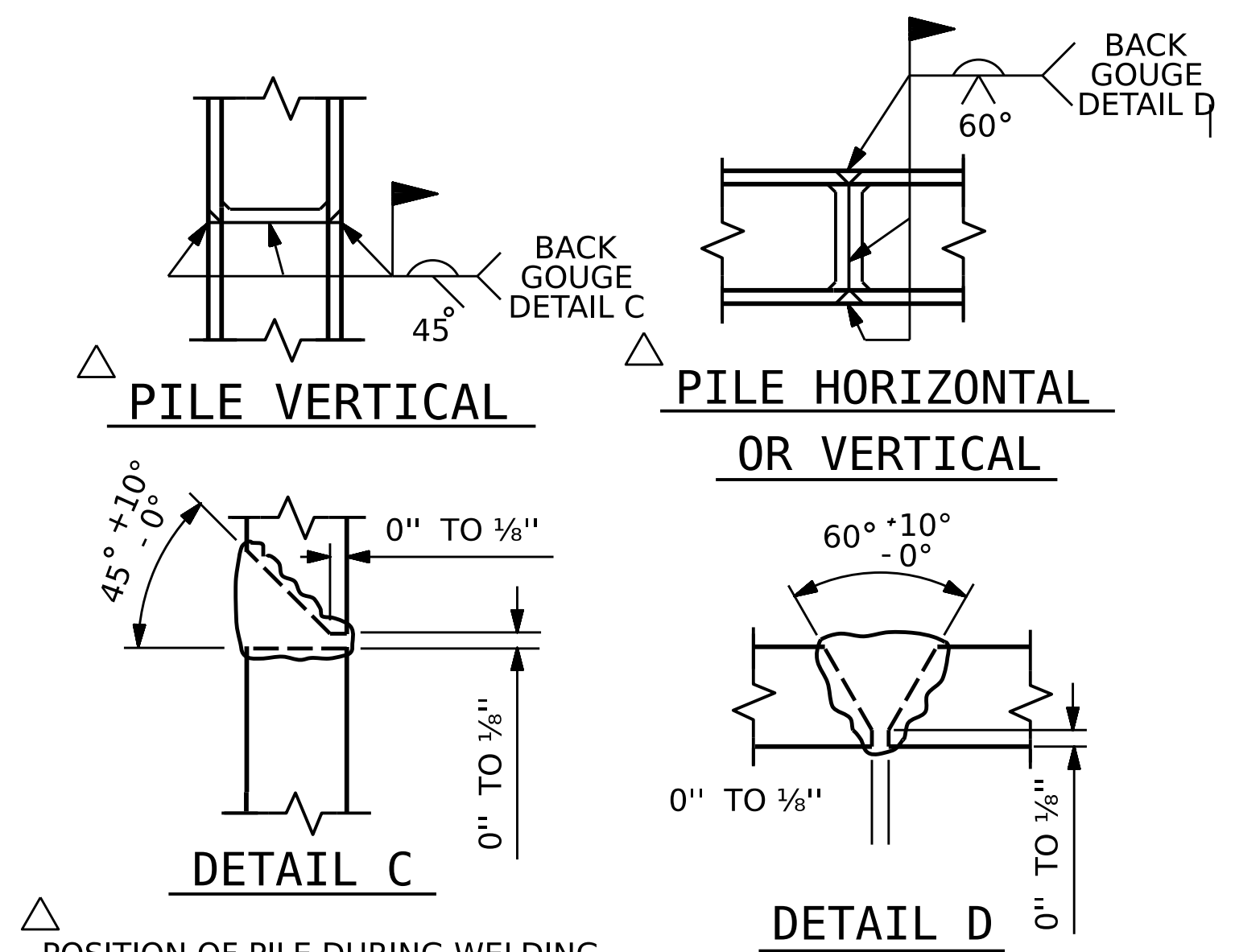
REINFORCING STEEL 7,382 LBS.

**CLASS A CONCRETE BREAKDOWN (STAGE I)**

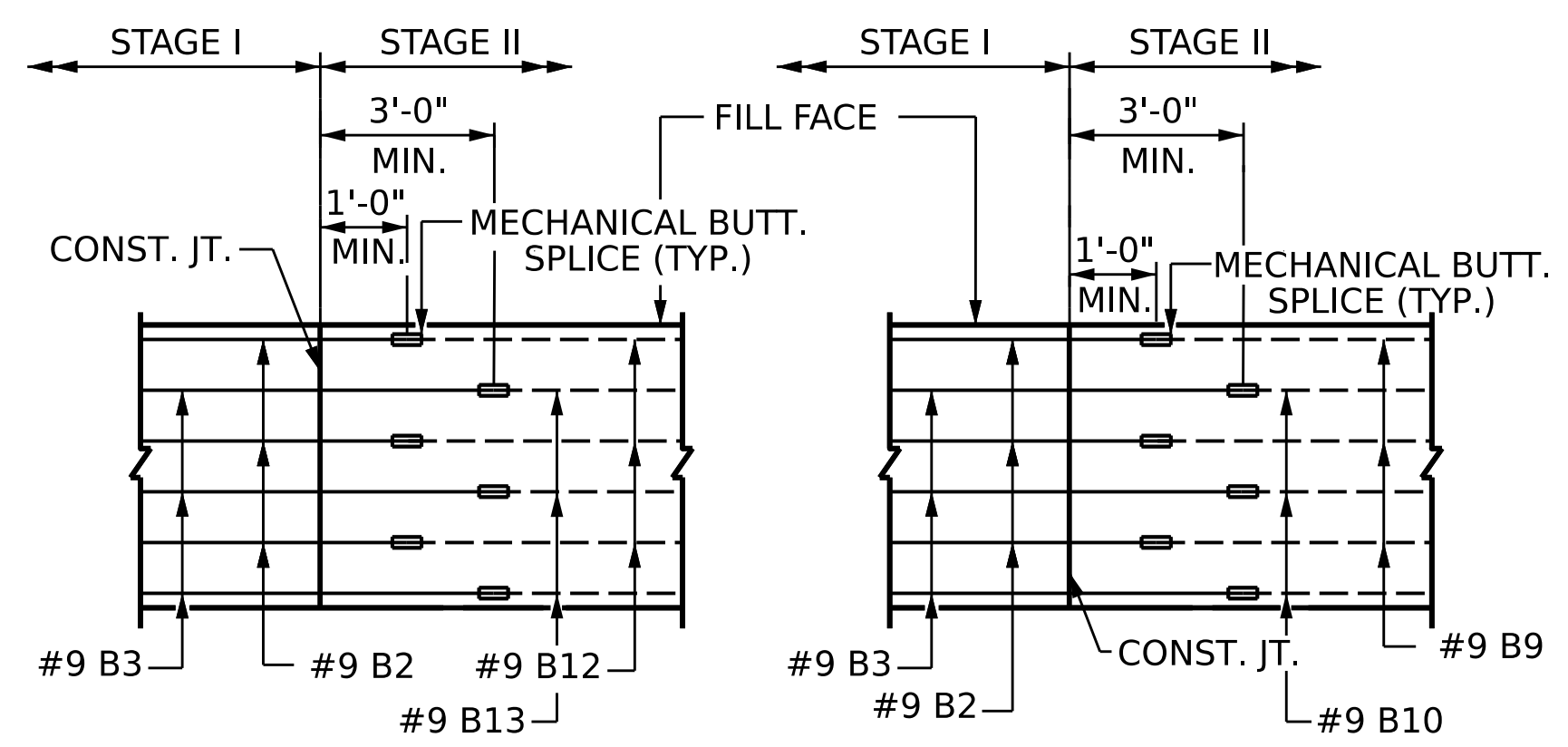
POUR #1	CAP & LOWER PART OF WINGS	46.4 C.Y.
POUR #2	BACKWALL & UPPER PART OF WINGS	13.6 C.Y.
<b>TOTAL CLASS A CONCRETE</b>		<b>60.0 C.Y.</b>

**HP 12X53 STEEL PILES**

NO. 11 565 LIN. FT.



**PILE SPLICE DETAILS**



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

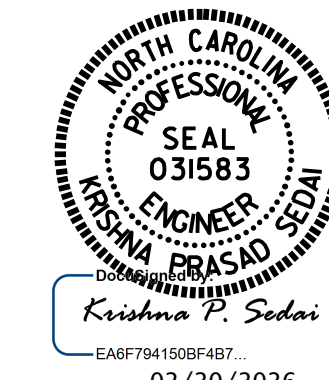
**DETAIL B**

PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

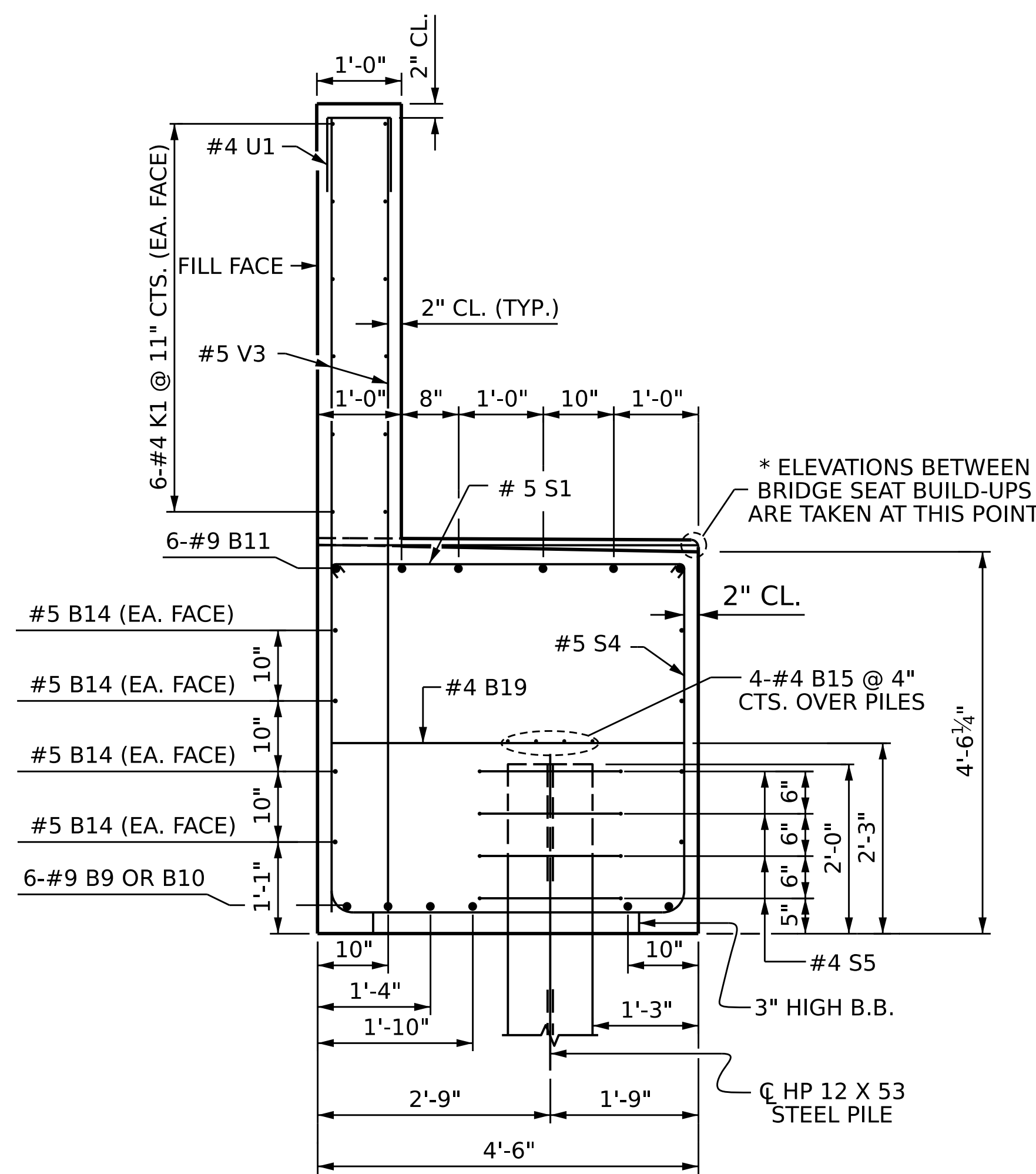
**SUBSTRUCTURE**  
**END BENT #2**  
**STAGE I**



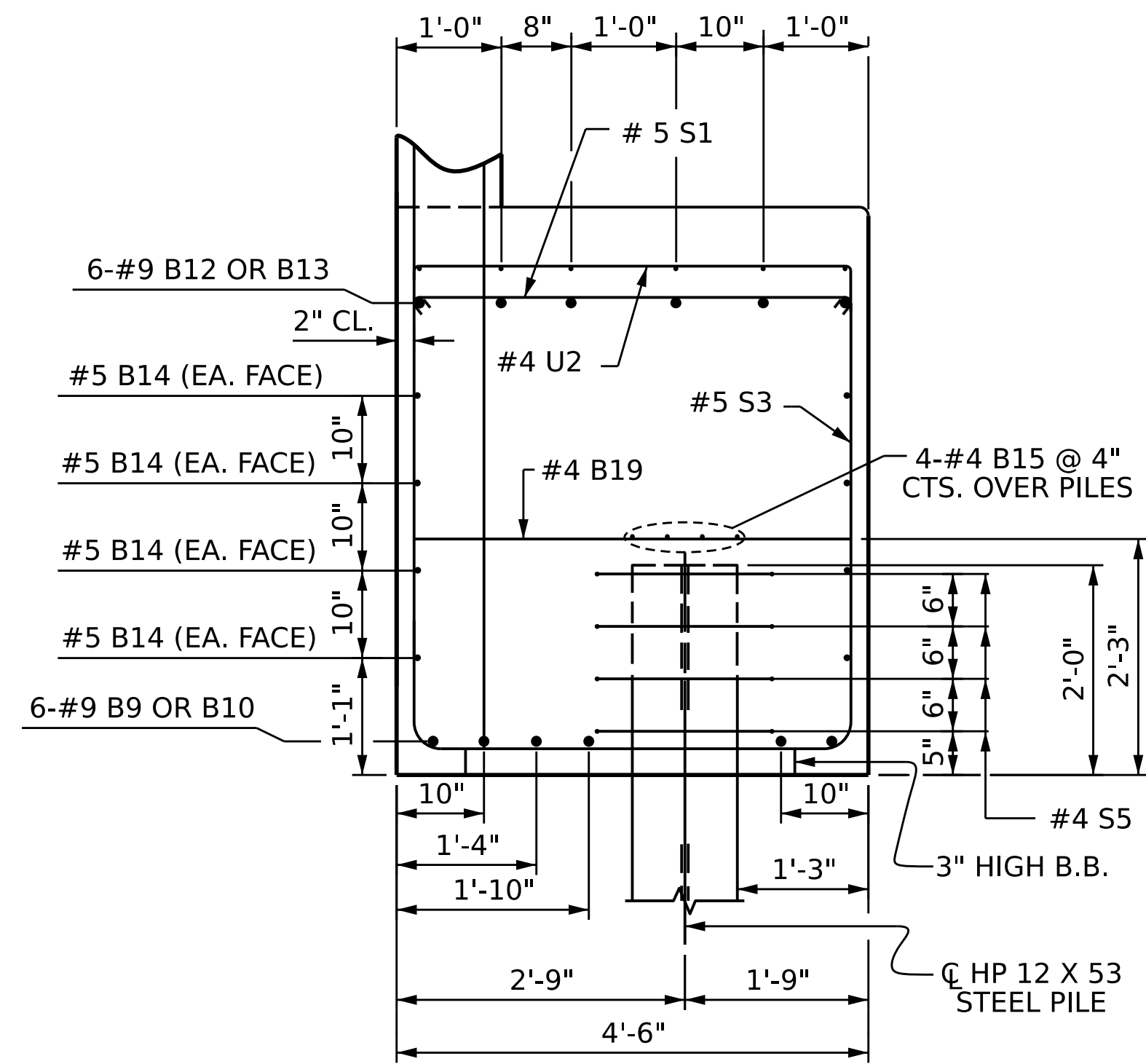
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

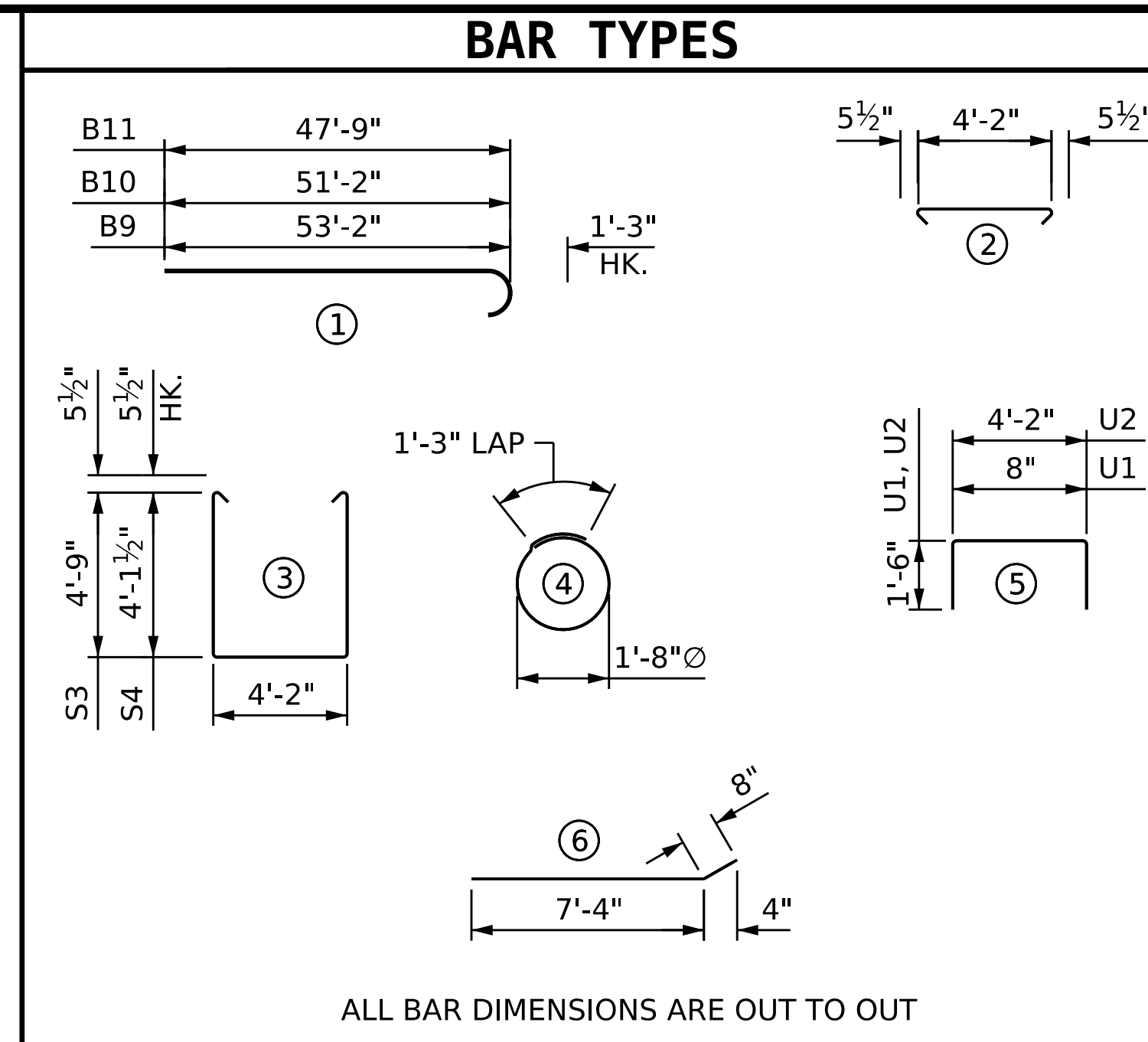
DRAWN BY : E. MOHAMED DATE : 10/2025  
 CHECKED BY : A. SORSENGINH DATE : 10/2025  
 DESIGN ENGINEER OF RECORD : A. IGHWAIR DATE : 10/2025



**SECTION C-C**



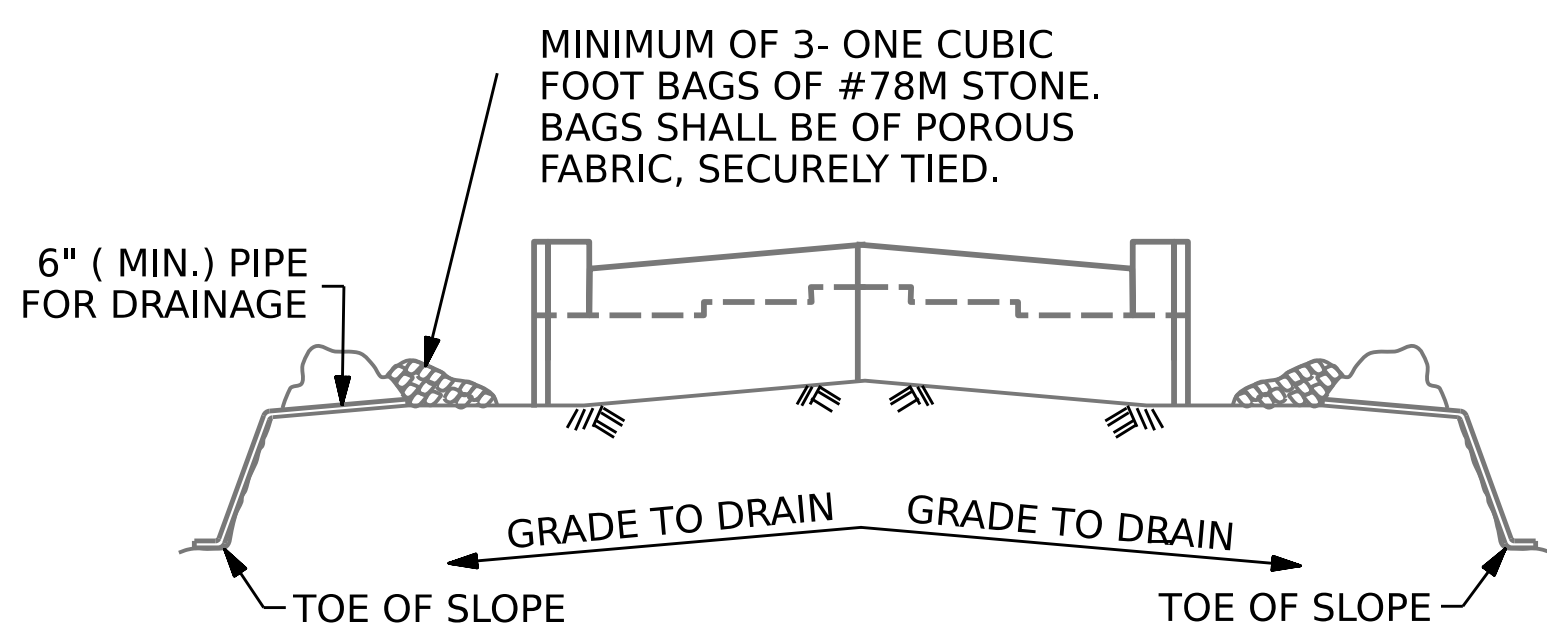
**SECTION D-D**



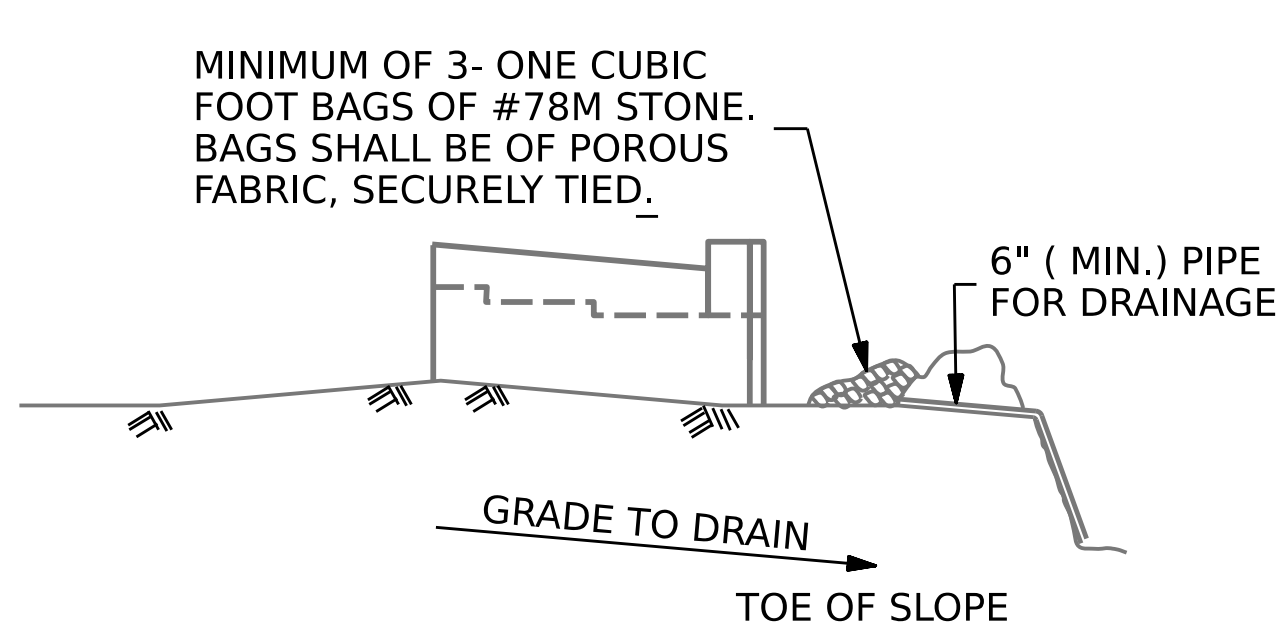
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
STAGE II					
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B9	3	#9	1	54'-5"	555
B10	3	#9	1	52'-5"	535
B11	6	#9	1	49'-0"	1000
B12	3	#9	STR	13'-5"	137
B13	3	#9	STR	11'-5"	116
B14	16	#5	STR	29'-11"	499
B15	8	#4	STR	29'-7"	158
B16	6	#4	STR	14'-2"	57
B17	12	#4	STR	8'-9"	70
B18	6	#4	STR	4'-9"	19
B19	14	#4	STR	4'-2"	39
H2	28	#5	6	8'-0"	234
K2	4	#4	STR	4'-6"	12
K3	24	#4	STR	28'-3"	453
S1	53	#5	2	5'-1"	281
S3	11	#5	3	14'-7"	167
S4	42	#5	3	13'-4"	584
S5	44	#4	4	6'-6"	191
U1	50	#4	5	3'-8"	122
U2	54	#4	5	7'-2"	259
V3	100	#5	STR	9'-3"	965
V4	26	#5	STR	10'-7"	287
REINFORCING STEEL					6,740 LBS.

CLASS A CONCRETE BREAKDOWN (STAGE II)		
POUR #1	CAP & LOWER PART OF WINGS	46.9 C.Y.
POUR #2	BACKWALL & UPPER PART OF WINGS	13.0 C.Y.
TOTAL CLASS A CONCRETE		59.9 C.Y.
HP 12X53 STEEL PILES		
NO. 11		605 LIN. FT.



**STAGE II CONSTRUCTION**



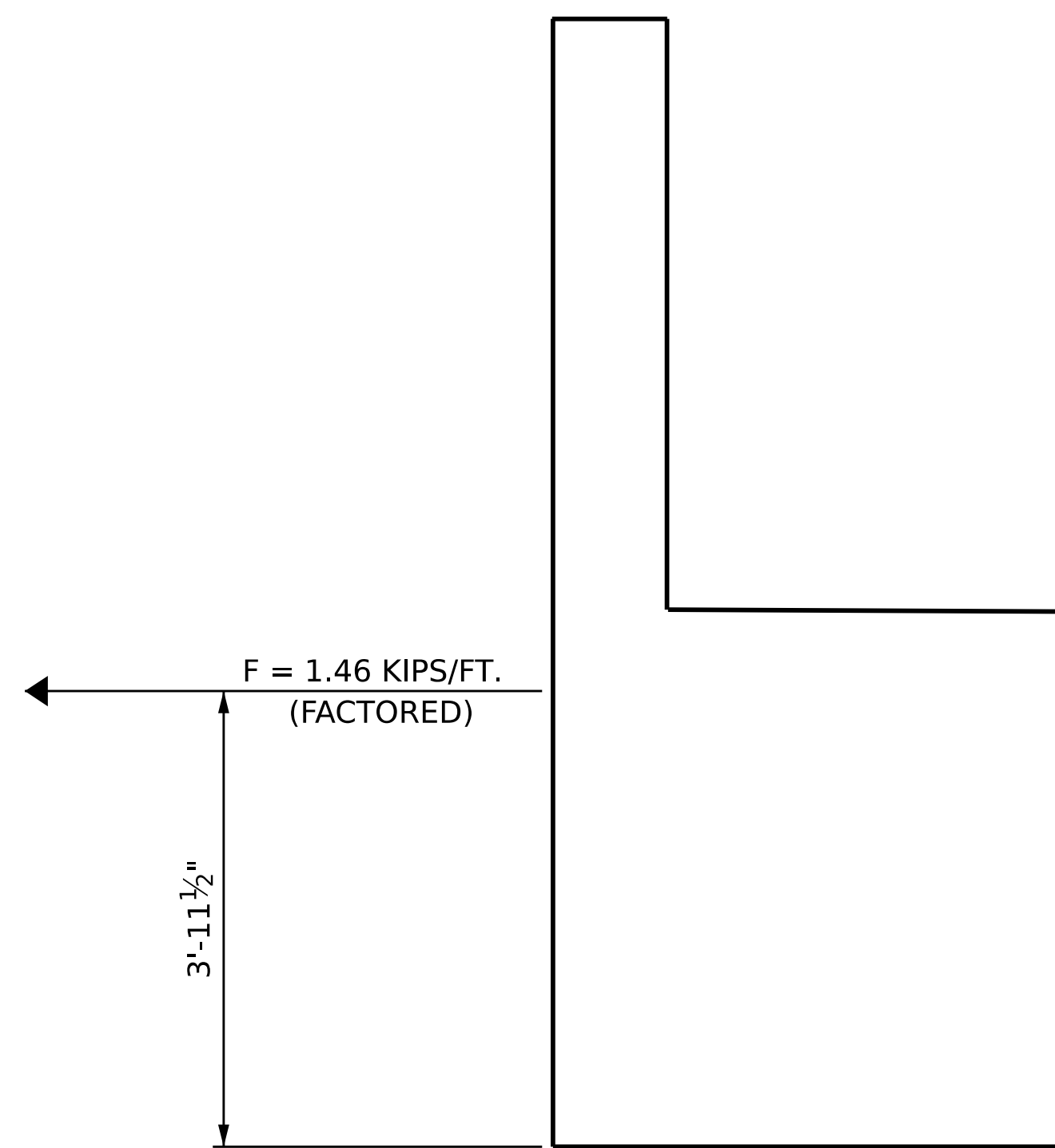
**STAGE I CONSTRUCTION**

**TEMPORARY DRAINAGE AT END BENT**

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.

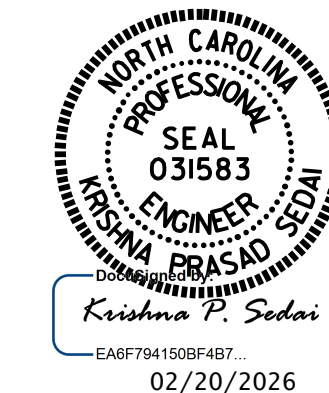
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



**TIE BACK DETAILS**

(DETAIL SHOWING TIE BACK RESTRAINT FOR END BENT)



PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**  
 SHEET 5 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE

**END BENT #2**  
**STAGE II**

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
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DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

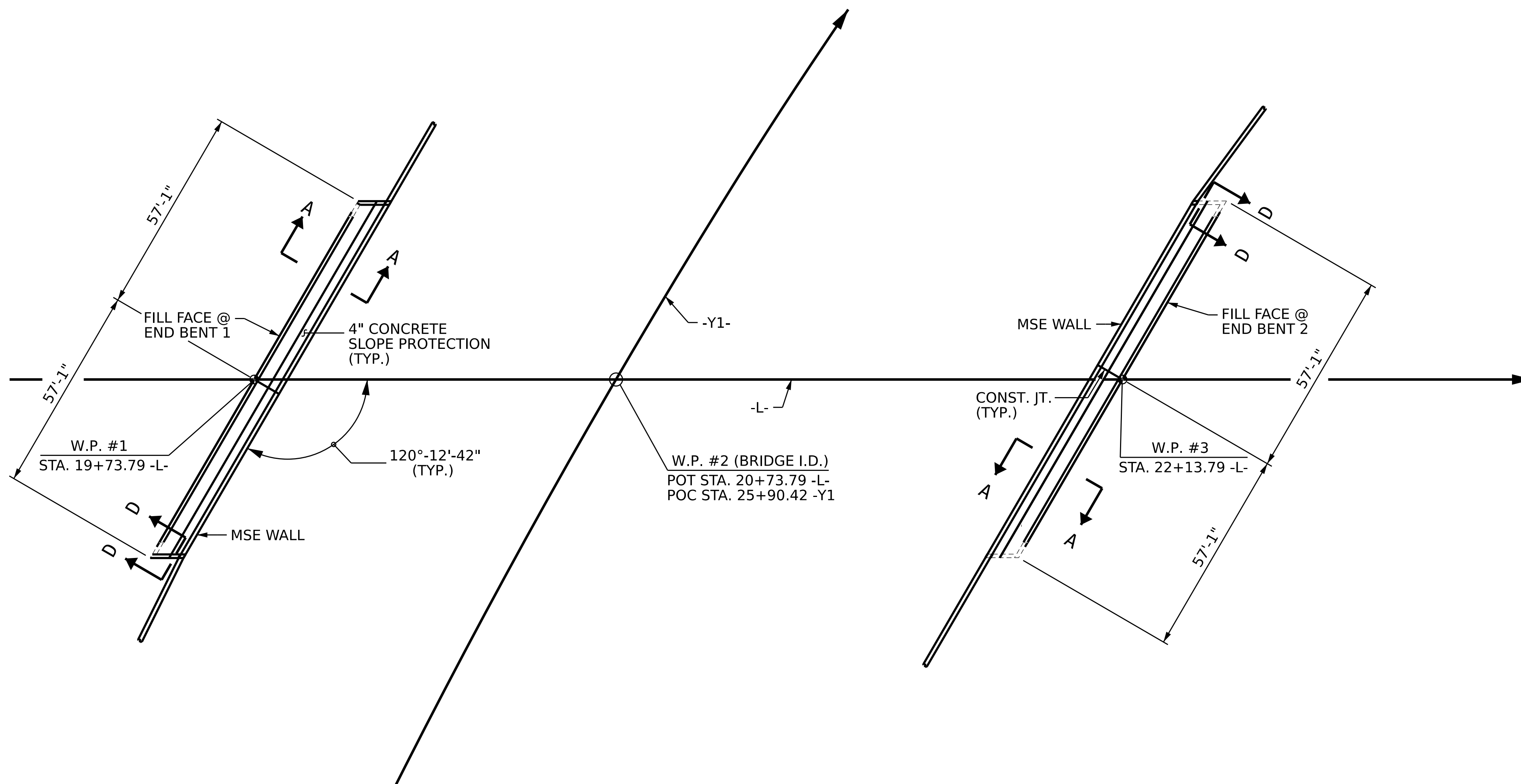
DRAWN BY : E. MOHAMED/T. STOGNER DATE : 10/2025  
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 DESIGN ENGINEER OF RECORD : E. MOHAMED DATE : 10/2025

**NOTES**

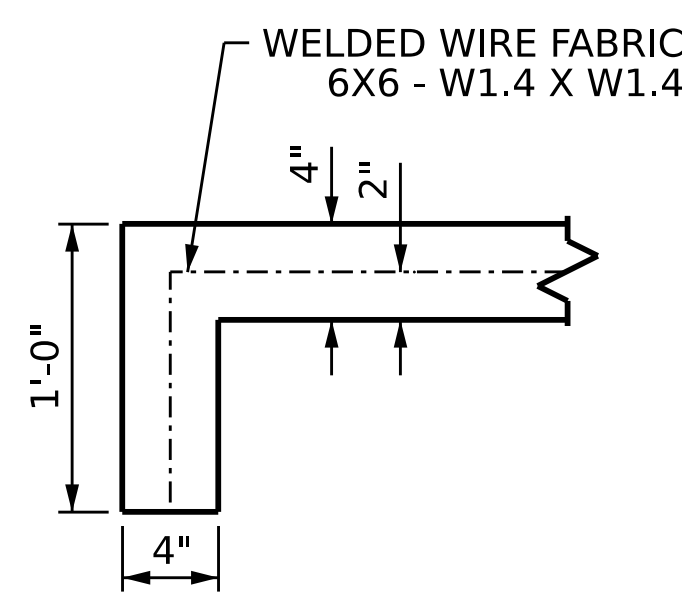
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

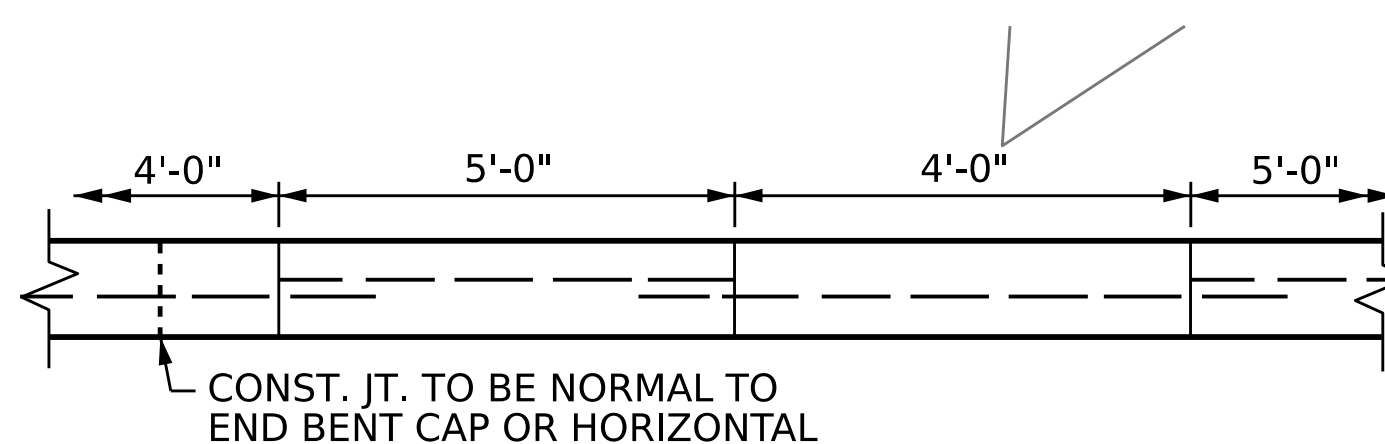
CONTRACTOR SHALL COORDINATE WITH WALL MANUFACTURER TO ENSURE PROPER DRAINAGE ON CONCRETE SLOPE PROTECTION.



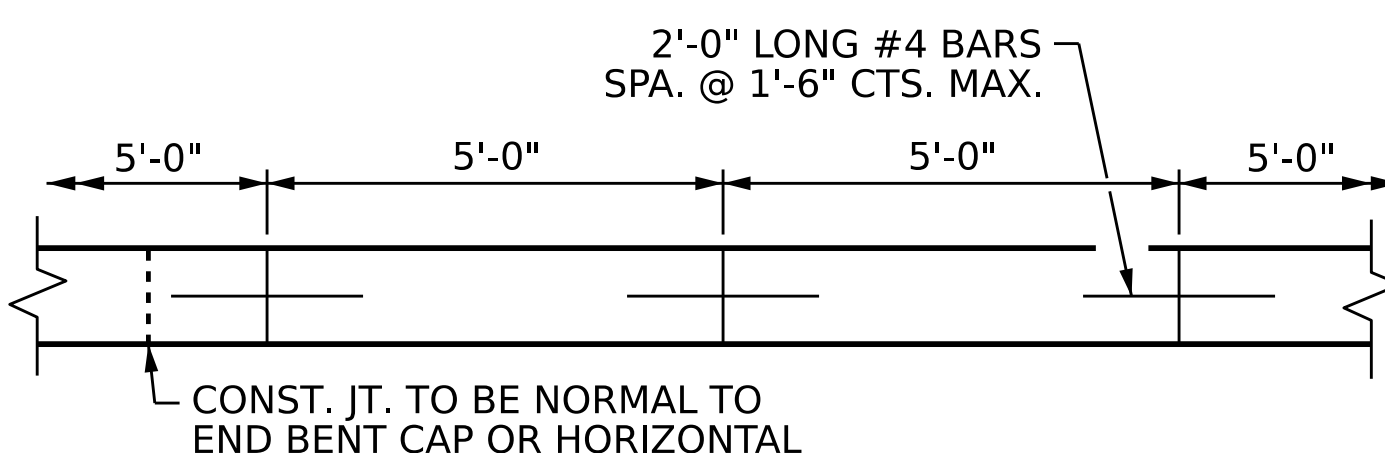
**PLAN**



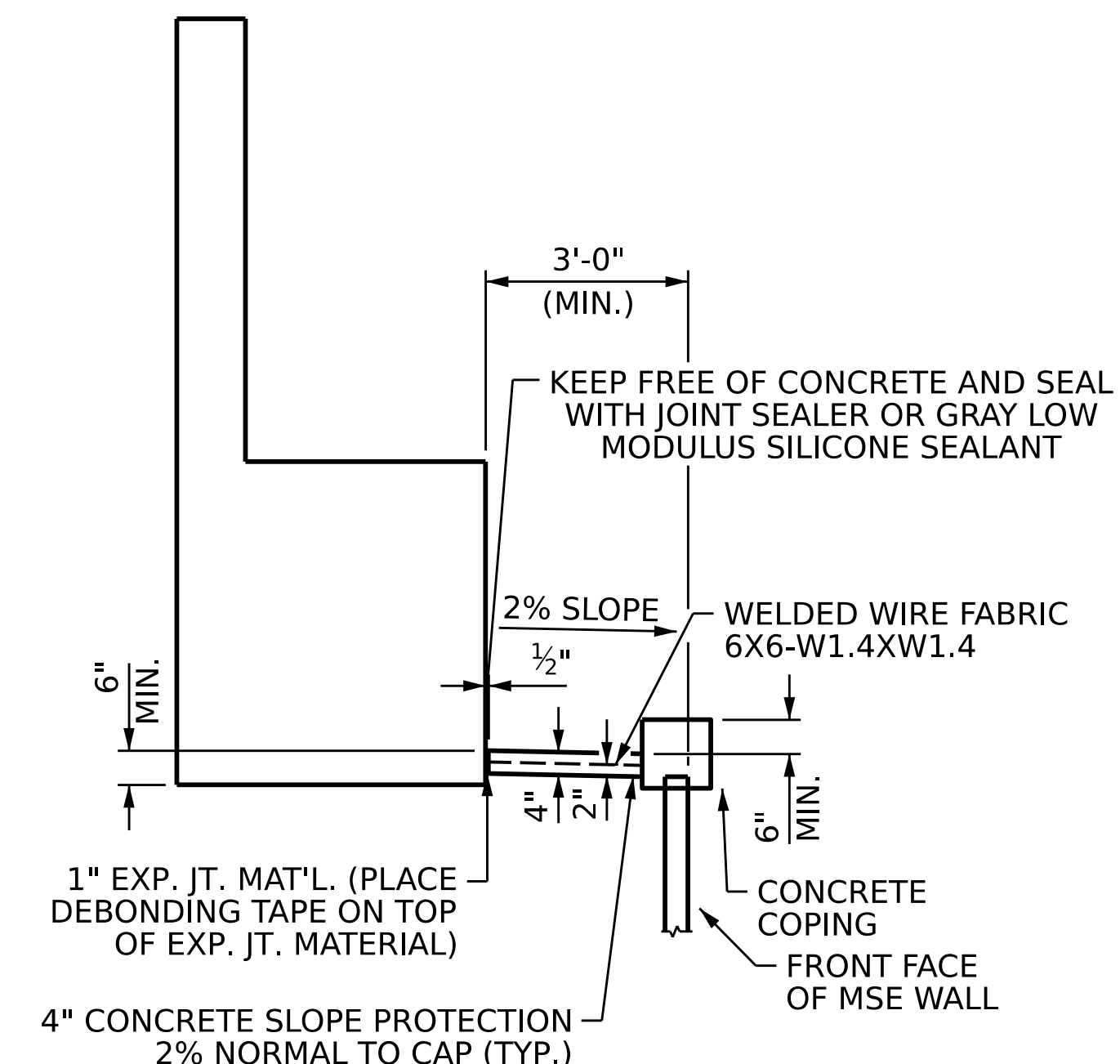
**SECTION D-D**



**OPTIONAL POURING DETAIL**



**POURING DETAIL**

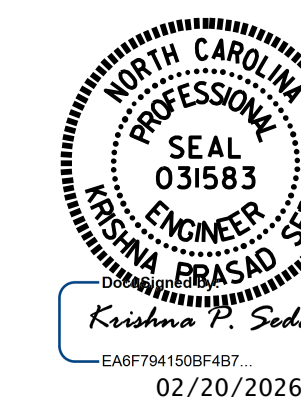


**SECTION A-A**

BRIDGE @ STA. 20+73.79 -L-	4" SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	28	50
END BENT 2	28	50

\* QUANTITIES SHOWN ARE BASED ON 5' POURS

PROJECT NO. **BR-0168**  
**FORYSTH** COUNTY  
 STATION: **20+73.79 -L-**



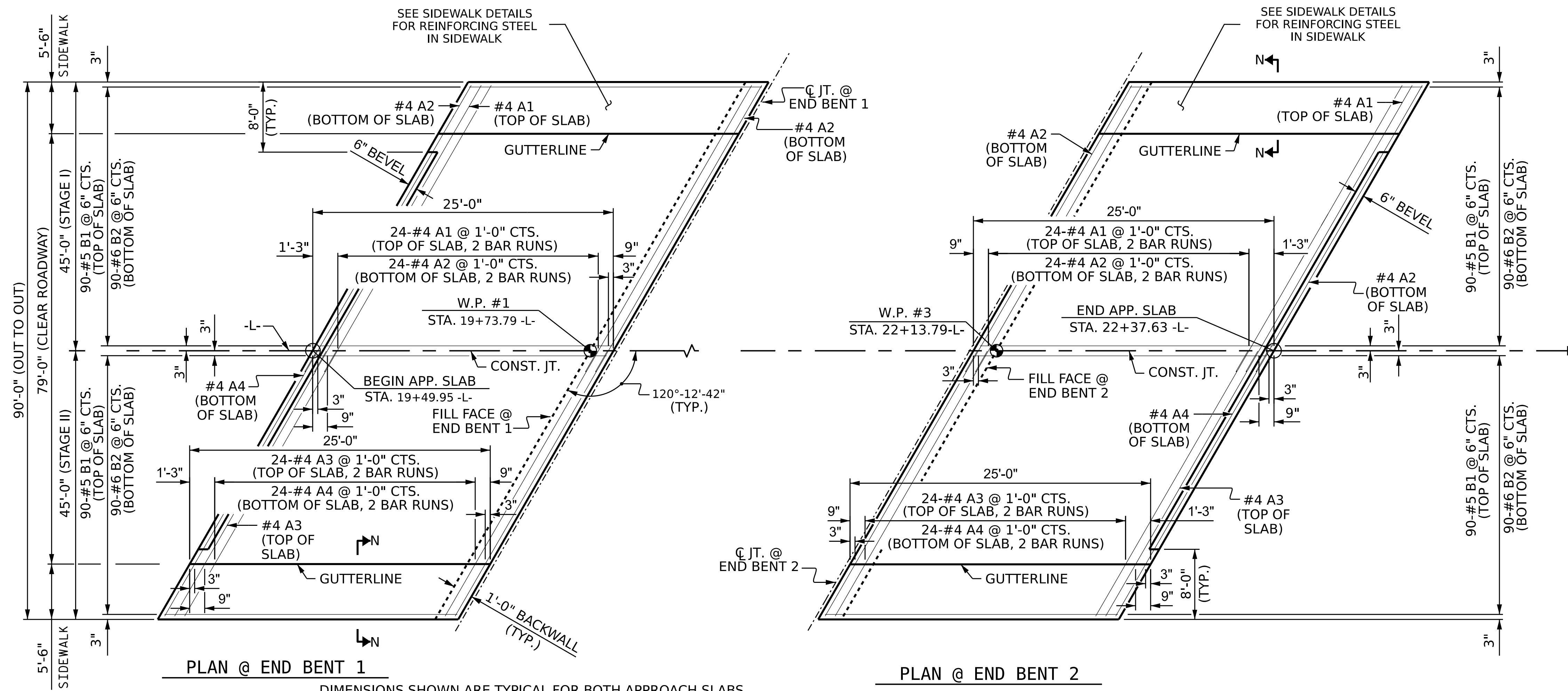
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SLOPE PROTECTION DETAILS**

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

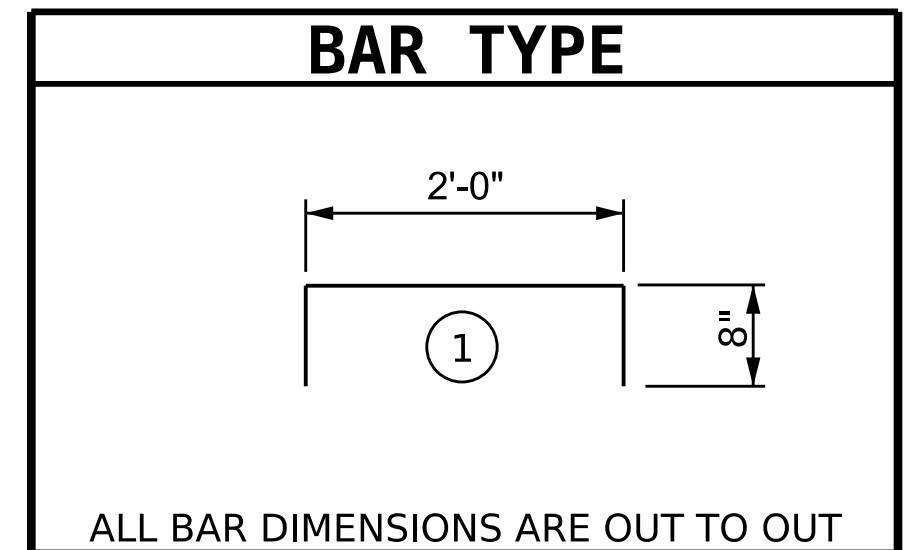
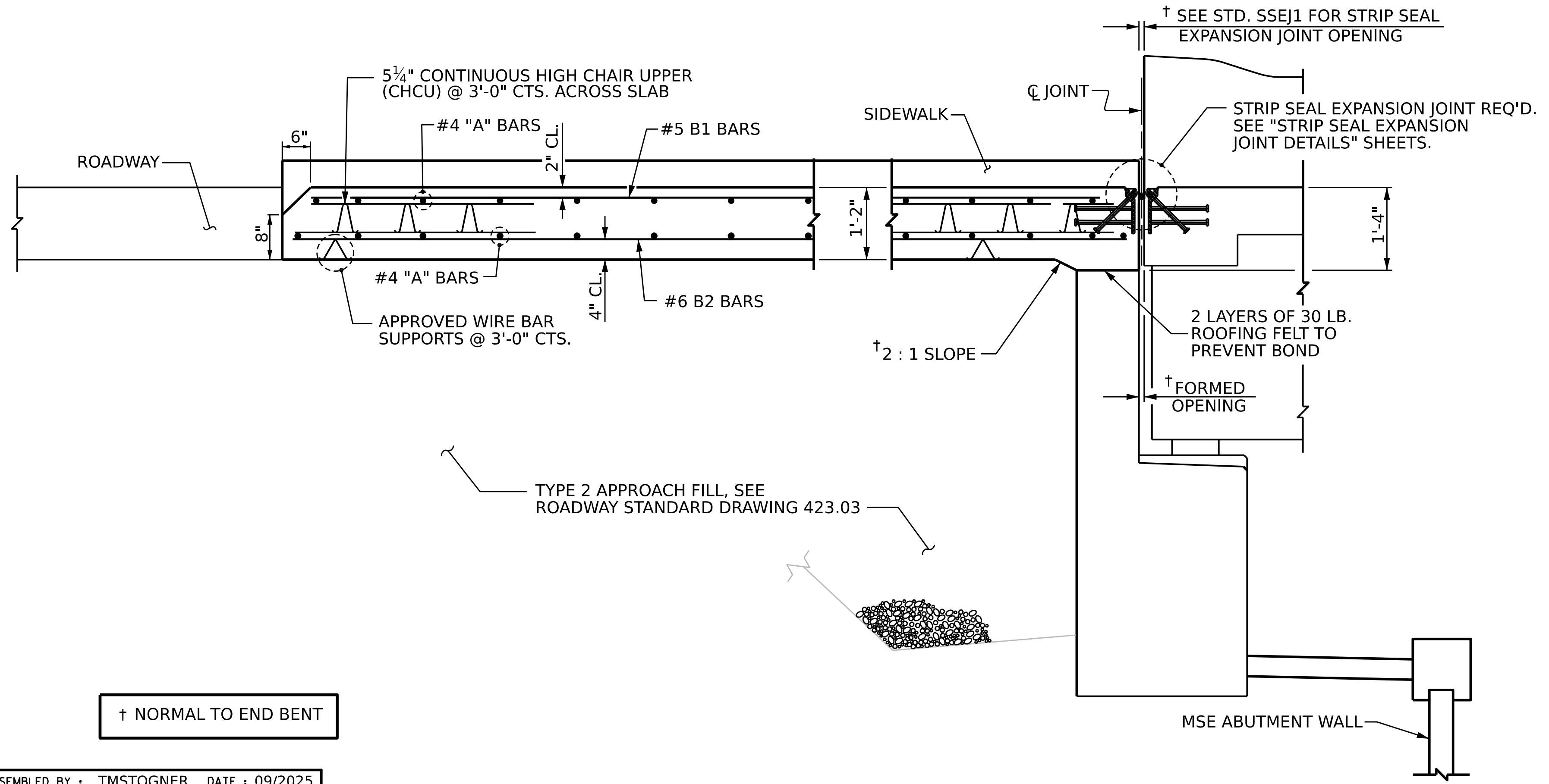
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : **TMSTOGER** DATE : **10/2025**  
 CHECKED BY : **A. SORSENGINH** DATE : **10/2025**  
 DESIGN ENGINEER OF RECORD: **T. STOGER** DATE : **10/2025**



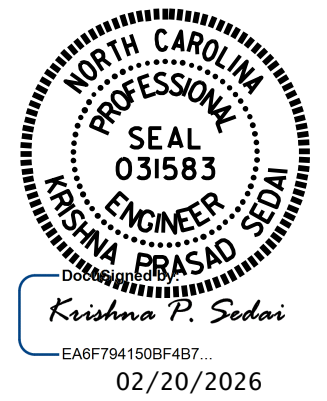
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

BILL OF MATERIAL													
APPROACH SLAB AT END BENT 1 STAGE I						APPROACH SLAB AT END BENT 2 STAGE I							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
*A1	50	#4	STR	28'-0"	935	*A1	50	#4	STR	28'-0"	935		
A2	52	#4	STR	27'-8"	961	A2	52	#4	STR	27'-8"	961		
*B1	90	#5	STR	23'-7"	2214	*B1	90	#5	STR	23'-7"	2214		
B2	90	#6	STR	24'-7"	3323	B2	90	#6	STR	24'-7"	3323		
*B3	5	#4	STR	23'-7"	79	*B3	5	#4	STR	23'-7"	79		
*G1	25	#4	STR	5'-8"	95	*G1	25	#4	STR	5'-8"	95		
*U1	10	#4	1	3'-4"	22	*U1	10	#4	1	3'-4"	22		
REINFORCING STEEL					LBS.	4284	REINFORCING STEEL					LBS.	4284
* EPOXY COATED REINFORCING STEEL					LBS.	3345	* EPOXY COATED REINFORCING STEEL					LBS.	3345
CLASS AA CONCRETE BREAKDOWN							CLASS AA CONCRETE BREAKDOWN						
POUR #1 SLAB					C. Y.	50.2	POUR #1 SLAB					C. Y.	50.2
POUR #2 SIDEWALK					C. Y.	3.1	POUR #2 SIDEWALK					C. Y.	3.1
CLASS AA CONCRETE TOTAL					C. Y.	53.3	CLASS AA CONCRETE TOTAL					C. Y.	53.3
APPROACH SLAB AT END BENT 1 STAGE II						APPROACH SLAB AT END BENT 2 STAGE II							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
*A3	50	#4	STR	26'-11"	899	*A3	50	#4	STR	26'-11"	899		
A4	52	#4	STR	26'-9"	929	A4	52	#4	STR	26'-9"	929		
*B1	90	#5	STR	23'-7"	2214	*B1	90	#5	STR	23'-7"	2214		
B2	90	#6	STR	24'-7"	3323	B2	90	#6	STR	24'-7"	3323		
*B3	5	#4	STR	23'-7"	79	*B3	5	#4	STR	23'-7"	79		
*G1	25	#4	STR	5'-8"	95	*G1	25	#4	STR	5'-8"	95		
*U1	10	#4	1	3'-4"	22	*U1	10	#4	1	3'-4"	22		
REINFORCING STEEL					LBS.	4252	REINFORCING STEEL					LBS.	4252
* EPOXY COATED REINFORCING STEEL					LBS.	3309	* EPOXY COATED REINFORCING STEEL					LBS.	3309
CLASS AA CONCRETE BREAKDOWN							CLASS AA CONCRETE BREAKDOWN						
POUR #1 SLAB					C. Y.	50.2	POUR #1 SLAB					C. Y.	50.2
POUR #2 SIDEWALK					C. Y.	3.1	POUR #2 SIDEWALK					C. Y.	3.1
CLASS AA CONCRETE TOTAL					C. Y.	53.3	CLASS AA CONCRETE TOTAL					C. Y.	53.3



ALL BAR DIMENSIONS ARE OUT TO OUT

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



PROJECT NO. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**  
 SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT**

ASSEMBLED BY :	TMSTOGNER	DATE :	09/2025
CHECKED BY :	A. SORSENGINH	DATE :	10/2025
DRAWN BY :	EEM	3/95	REV. 6/13 MAA/GM
CHECKED BY :	VAP	3/95	REV. 12/17 MAA/THC
			REV. 07/23 BNB/SNM

**SECTION THRU SLAB**

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS: 53

**NOTES**

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

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

BACKFILL MATERIAL IS GOING TO BE THE AGGREGATE USED IN THE REINFORCED ZONE FOR THE MSE RETAINING WALL.

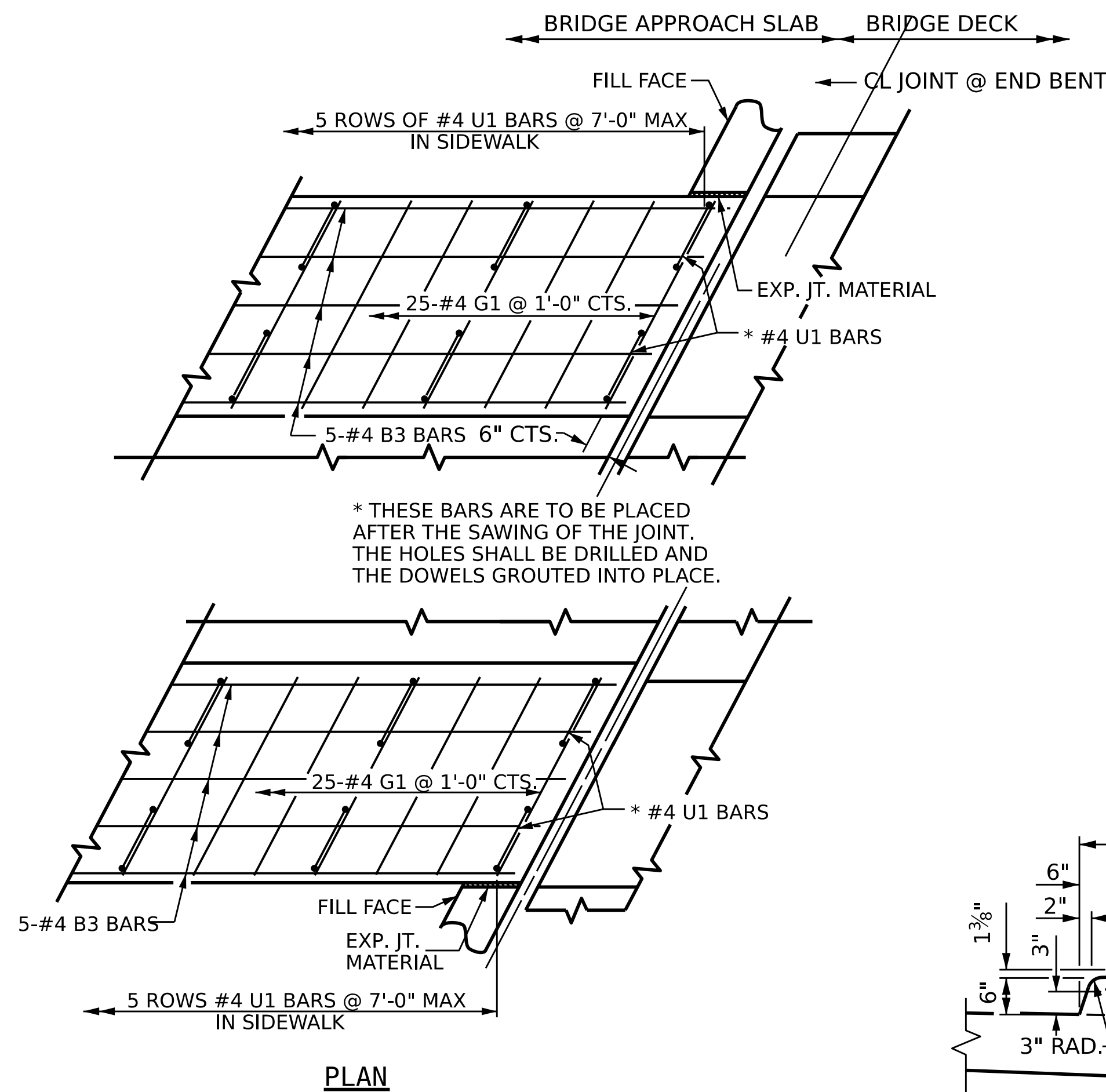
APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

AREA BETWEEN THE MSE WALL 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 SIDEWALK SHALL NOT BE CAST UNTIL APPROACH SLAB CONCRETE HAS BEEN CAST AND REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.

ALL REINFORCING STEEL IN THE SIDEWALKS SHALL BE EPOXY COATED.

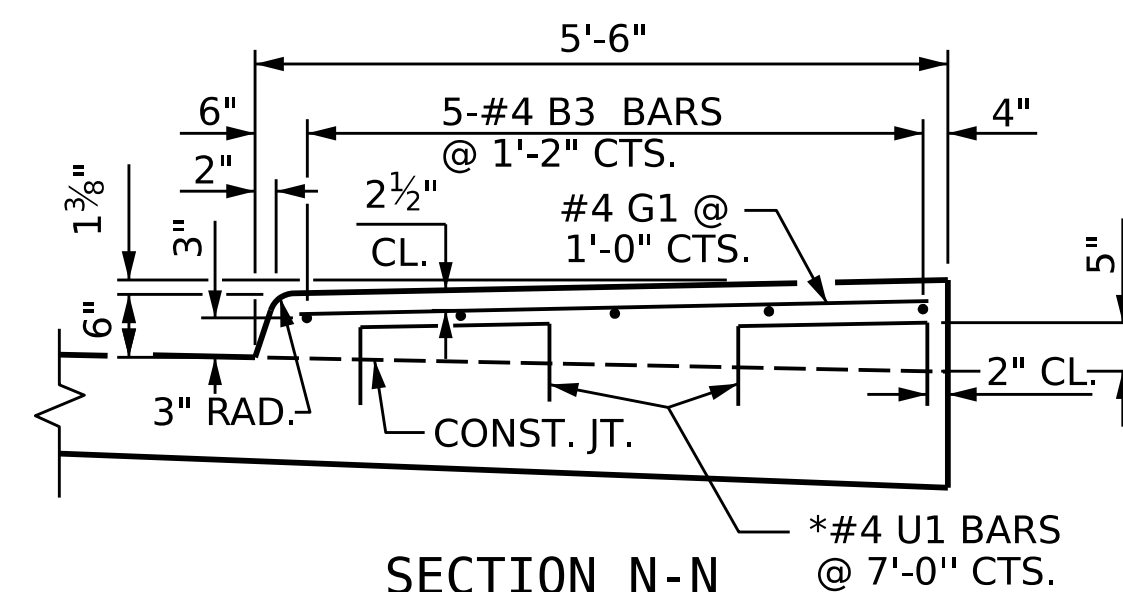
THE ENTIRE COST FOR SIDEWALKS ON APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR APPROACH SLABS, NO SEPERATE PAYMENT SHALL BE MADE.



\* THESE BARS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE DOWELS GROUTED INTO PLACE.

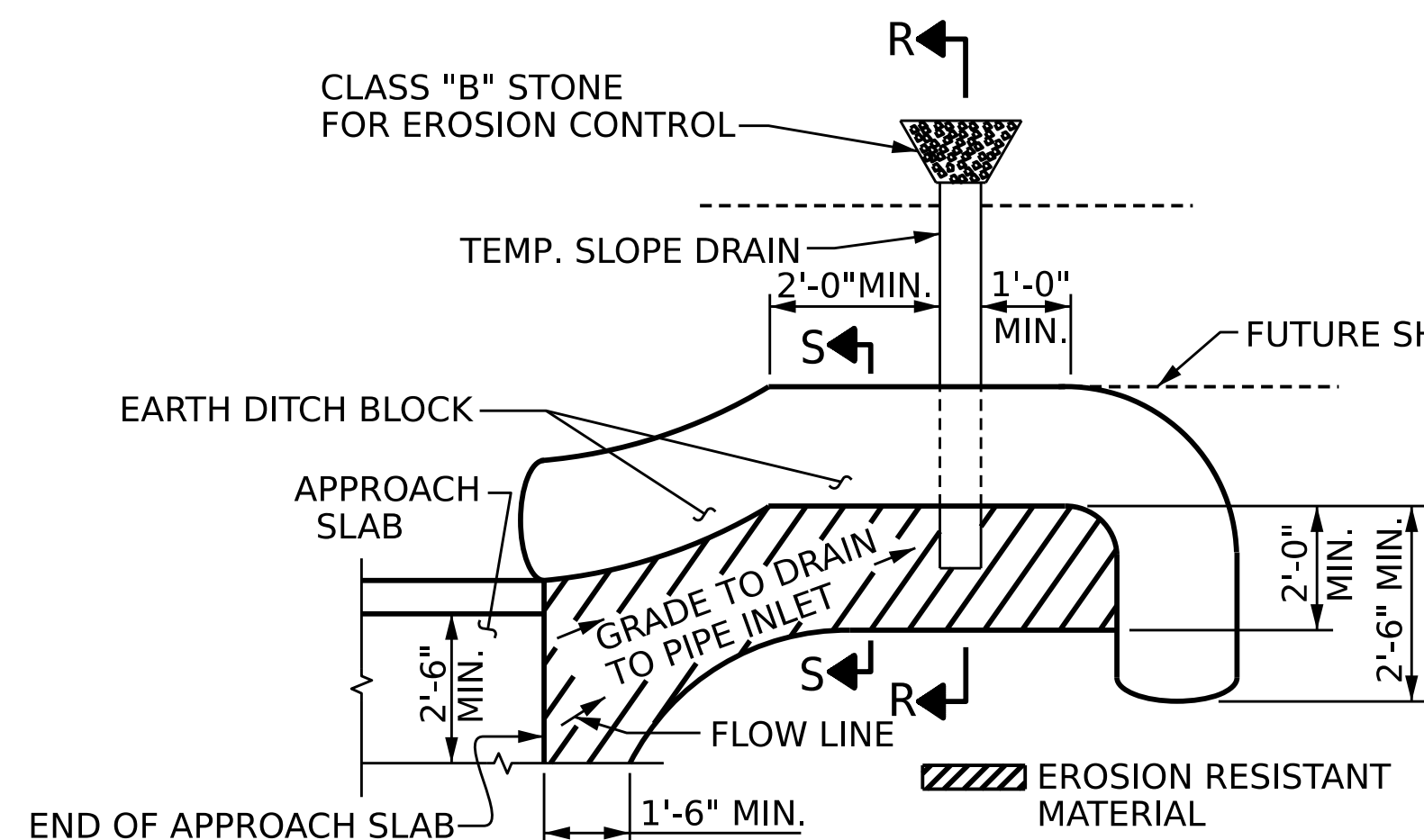
PLAN

**DETAILS OF SIDEWALK ON APPROACH SLAB**



SECTION N-N

**SIDEWALK DETAILS**

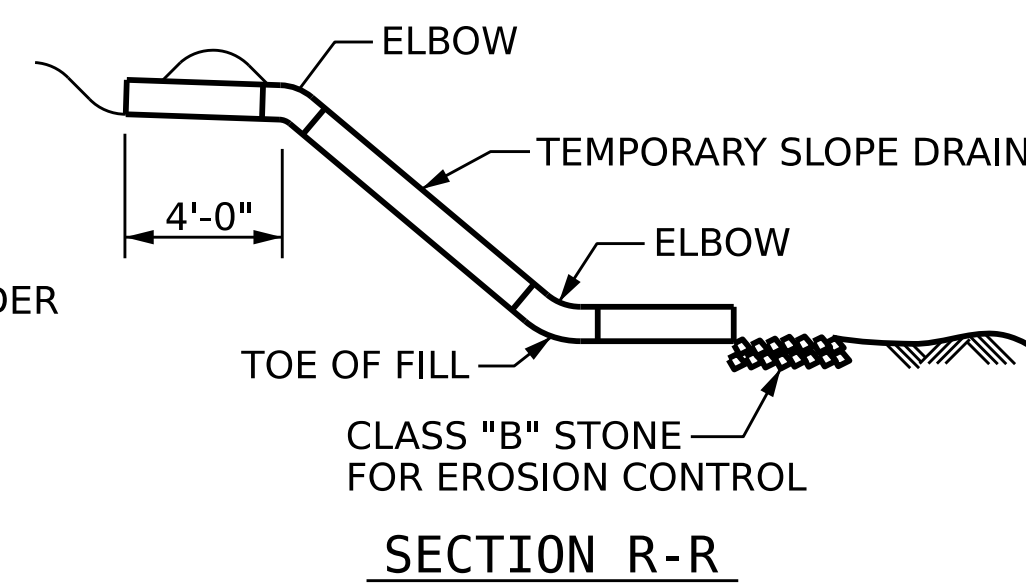


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

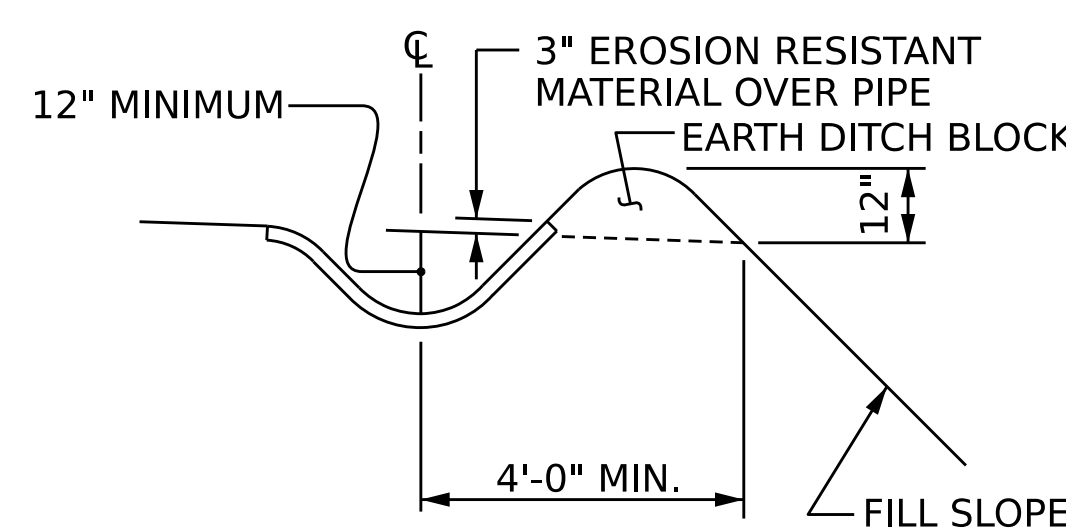
PLAN VIEW

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

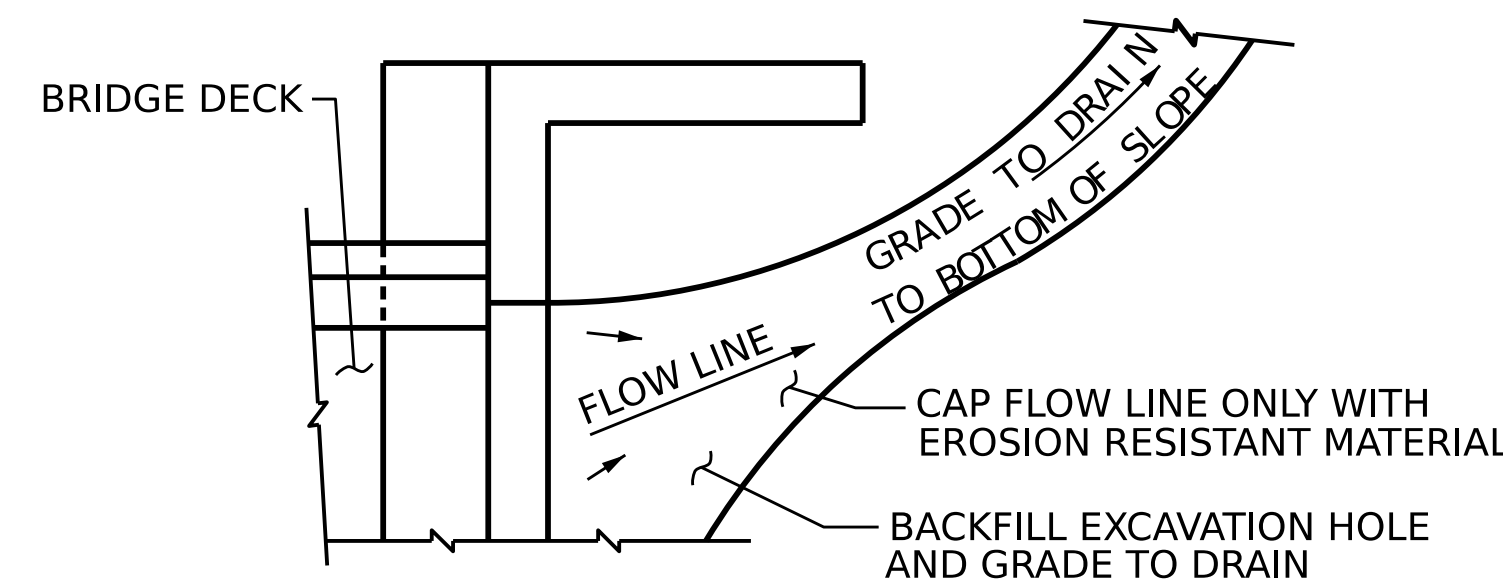
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION R-R



SECTION S-S



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. **BR-0168**  
**FORSYTH** COUNTY  
 STATION: **20+73.79 -L-**

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD

**BRIDGE APPROACH SLAB DETAILS**

ASSEMBLED BY: TMSTOGER	DATE: 09/2025
CHECKED BY: A. SORSENGINH	DATE: 10/2025
DRAWN BY: FCJ 11/88	REV. 6/13 MAA/GM
CHECKED BY: ARB 11/88	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS		REVISIONS		SHEET NO.		
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-53
2			4			53

## STANDARD NOTES

### DESIGN DATA:

SPECIFICATIONS .....	AASHTO (CURRENT)
LIVE LOAD .....	SEE PLANS
IMPACT ALLOWANCE .....	SEE AASHTO
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 AASHTO
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  $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO  $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A  $\frac{1}{4}$ " 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  $\frac{1}{4}$ " 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  $\frac{7}{8}$ "  $\emptyset$  SHEAR STUDS FOR THE  $\frac{3}{4}$ "  $\emptyset$  STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 -  $\frac{7}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF  $\frac{7}{8}$ "  $\emptyset$  STUDS ALONG THE BEAM AS SHOWN FOR  $\frac{3}{4}$ "  $\emptyset$  STUDS BASED ON THE RATIO OF 3 -  $\frac{7}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  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  $\frac{5}{16}$ " 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  $\frac{1}{16}$ " 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.