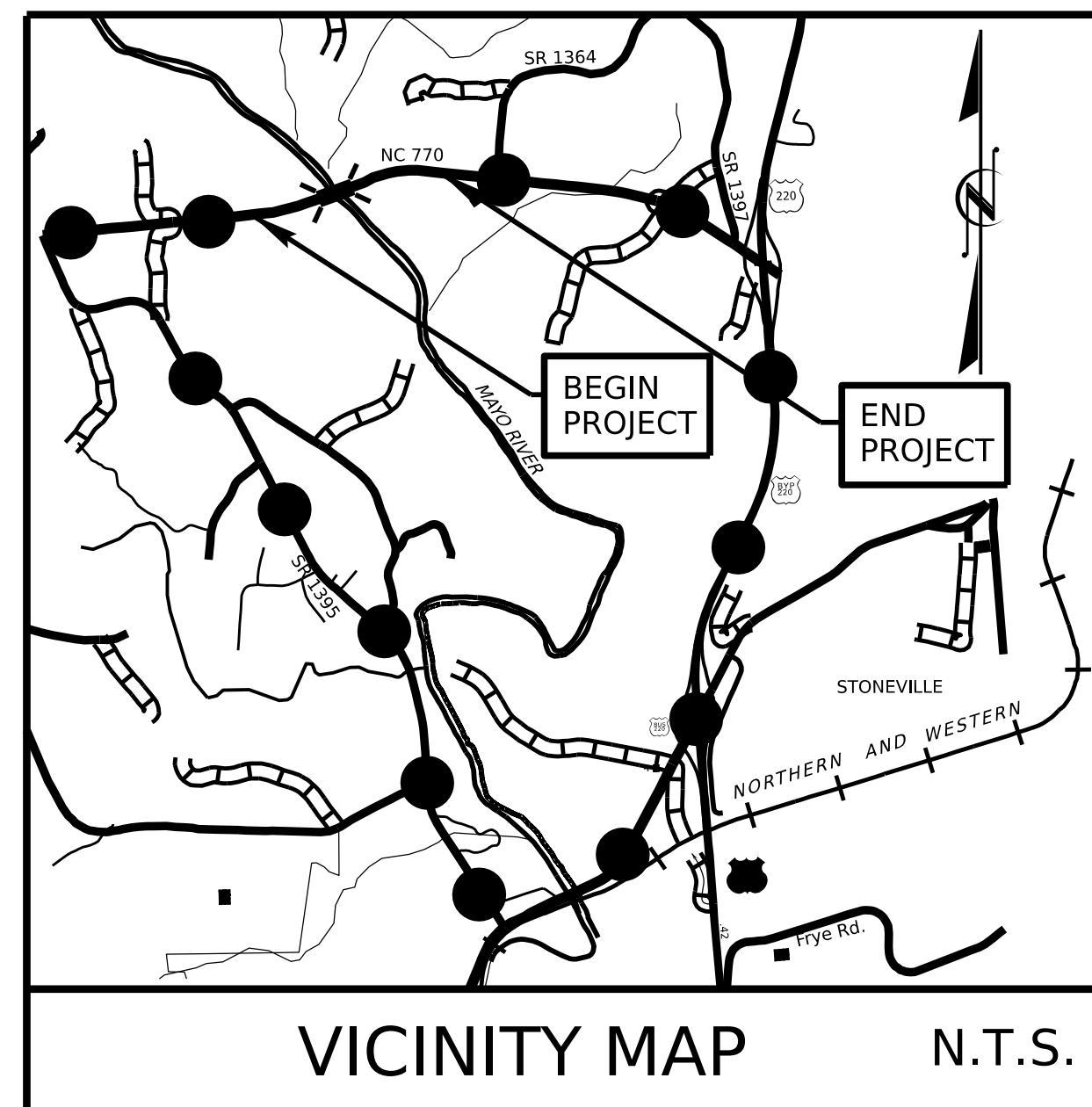


TIP PROJECT: BR-0093

CONTRACT: C204929



DETOUR ROUTE ●—●—●

STATE OF NORTH CAROLINA

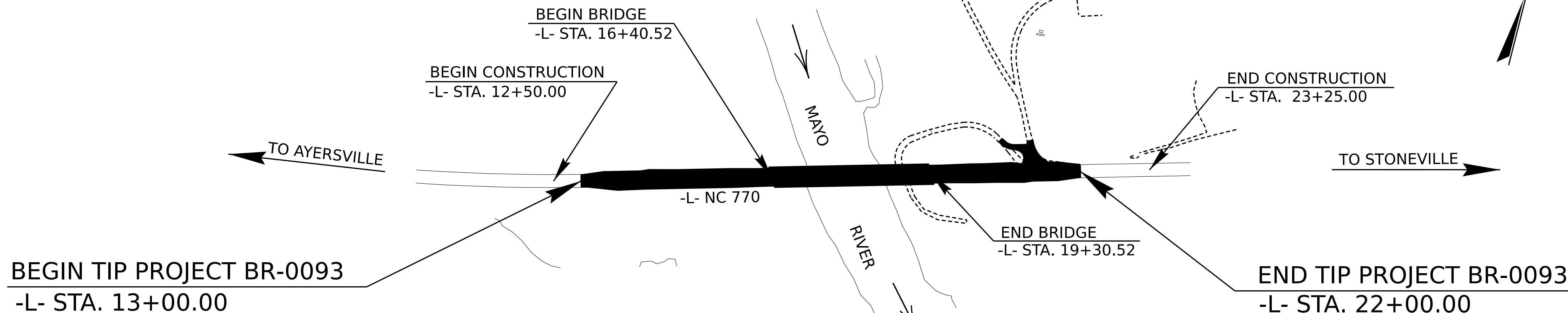
DIVISION OF HIGHWAYS

ROCKINGHAM COUNTY

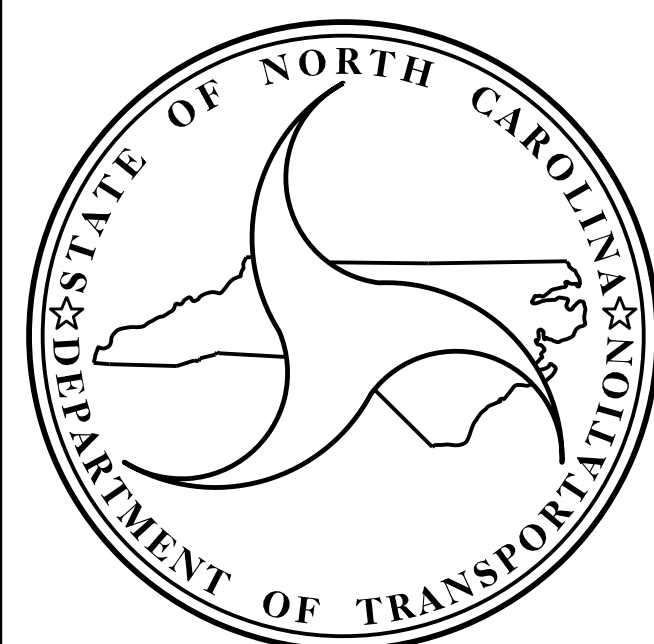
LOCATION: BRIDGE #780035 ON NC 770 OVER MAYO RIVER

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0093		
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
67093.1.1	N/A	P.E.	
67093.2.1	N/A	UTIL /RW	
67093.3.1	N/A	CONST.	



STRUCTURES



DESIGN DATA

ADT (2024) = 2,315
 ADT (2045) = 2,800
 K = 9 %
 D = 65 %
 T = 10 % *
 V = 60 MPH
 * (TTST 4 %, DUAL 6 %)

FUNC CLASS = MAJOR COLLECTOR
 REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0093 = 0.115 MILES
 LENGTH STRUCTURE TIP PROJECT BR-0093 = 0.055 MILES
 TOTAL LENGTH TIP PROJECT BR-0093 = 0.170 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
 STRUCTURES MANAGEMENT UNIT
 1000 BIRCH RIDGE DR.
 RALEIGH, N.C. 27610

2024 STANDARD SPECIFICATIONS

LETTING DATE :

JUNE 18, 2024

KRISTY W. ALFORD, PE
 PROJECT ENGINEER

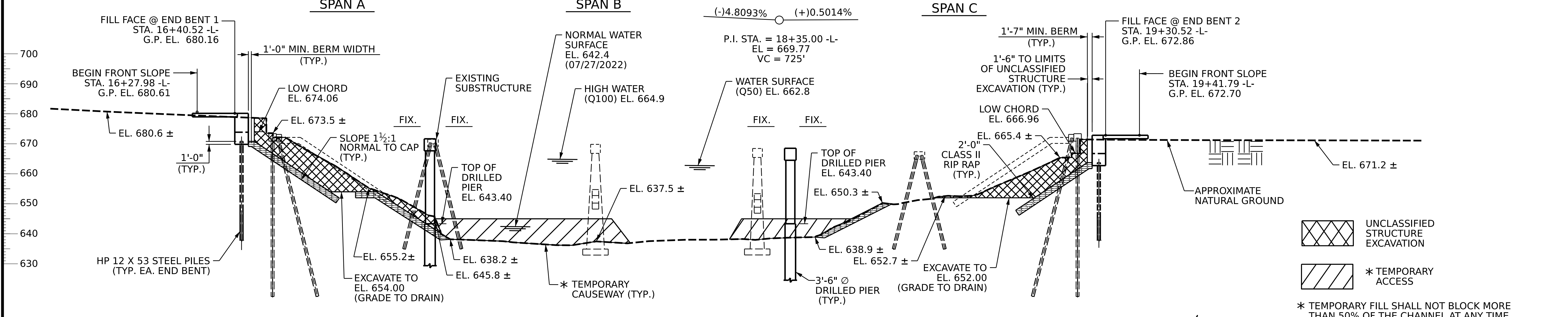
FRANCESCA LEA, PE
 PROJECT DESIGN ENGINEER

16+00.00 16+50.00 17+00.00 17+50.00 18+00.00 18+50.00 19+00.00 19+50.00

GRADE DATA

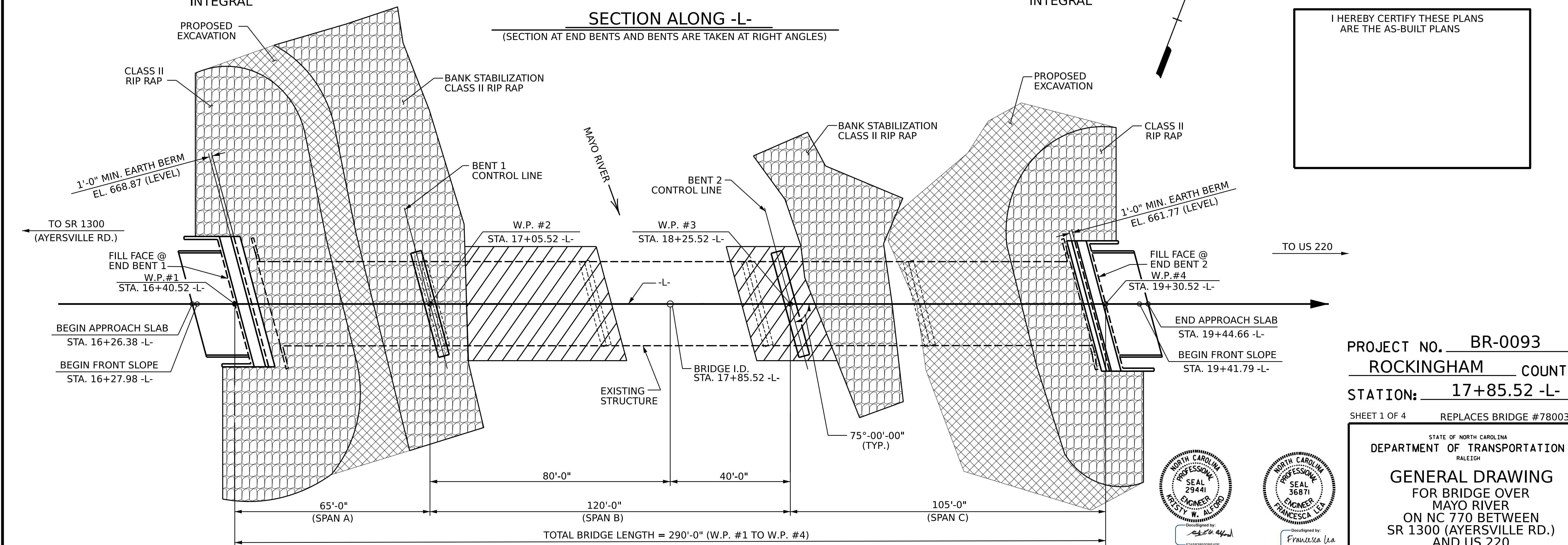
(-)4.8093% (+)0.5014%

P.I. STA. = 18+35.00 -L-
EL. = 669.77
VC = 725'



SECTION ALONG -L-

(SECTION AT END BENTS AND BENTS ARE TAKEN AT RIGHT ANGLES)

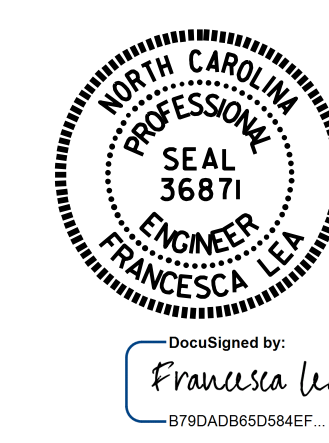
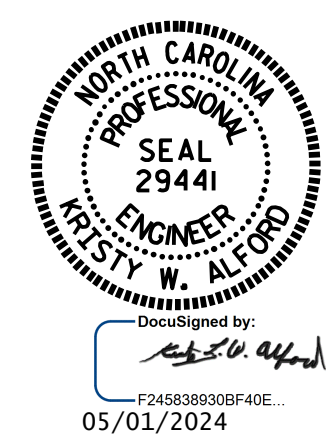


I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 1 OF 4 REPLACES BRIDGE #780035

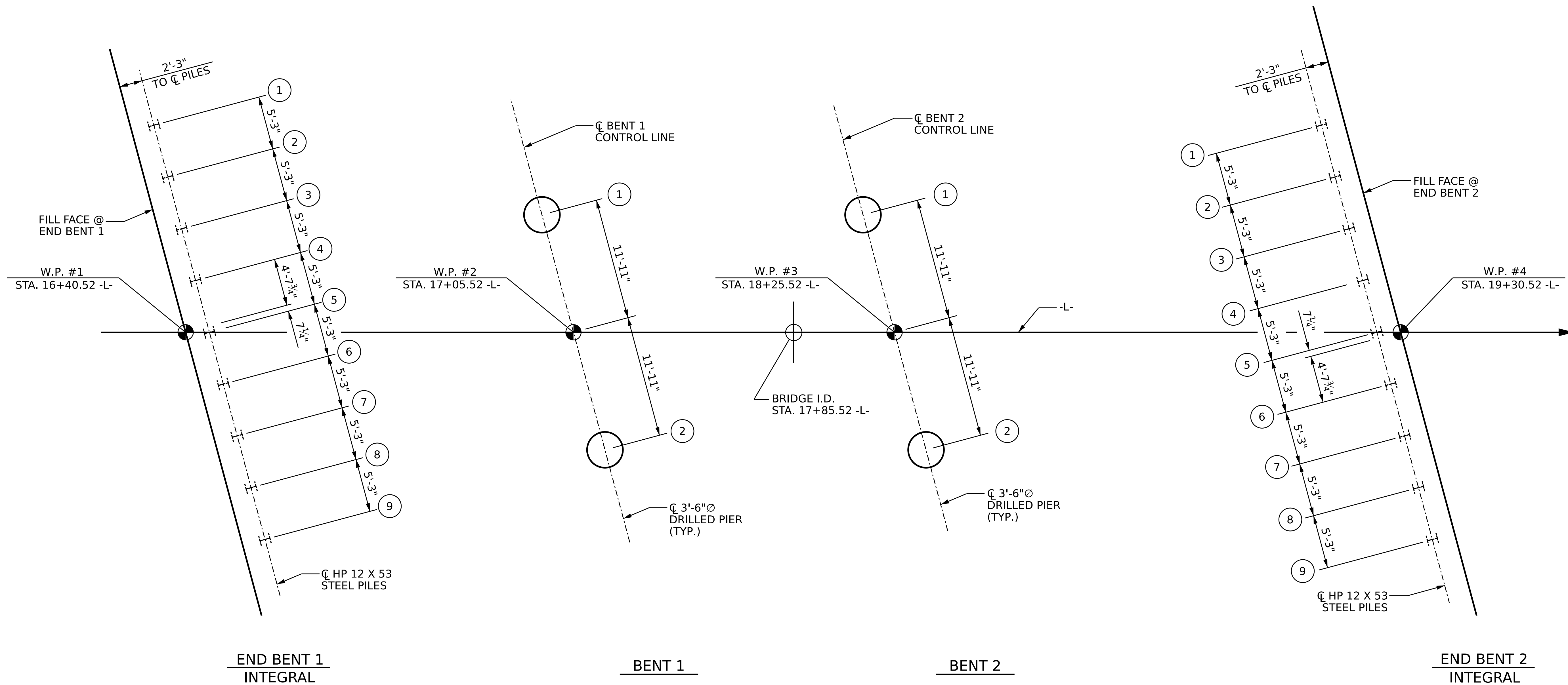
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE OVER
 MAYO RIVER
 ON NC 770 BETWEEN
 SR 1300 (AYERSVILLE RD.)
 AND US 220



DRAWN BY : E. BAYISSA / Q.T. NGUYEN DATE : 11/2023
 CHECKED BY : Z. MALIK DATE : 01/2024
 DESIGN ENGINEER OF RECORD : E. BAYISSA DATE : 05/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS					SHEET NO. S-01
NO.	BY:	DATE:	NO.	DATE:	
1			3		TOTAL SHEETS 36
2			4		



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO THE CENTERLINE OF PILES AND DRILLED PIERS

NOTES

- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- DO NOT DEWATER DRILLED PIER EXCAVATIONS AT BENT NO. 1 AND BENT NO. 2. CLEAN THE BOTTOM OF EXCAVATIONS WITH A SUBMERSIBLE PUMP OR AN AIRLIFT. WET PLACEMENT OF CONCRETE IS REQUIRED.
- FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 2 OF 4



DocuSigned by:
 Francesca Lea
 B79DA28650584EF...
 05/01/2024

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE OVER
 MAYO RIVER
 ON NC 770 BETWEEN
 SR 1300 (AYERSVILLE RD.)
 AND US 220

DRAWN BY : Q. T. NGUYEN DATE : 11/2023
 CHECKED BY : Z. MALIK DATE : 01/2024
 DESIGN ENGINEER OF RECORD: E. BAYISSA DATE : 05/2023

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-02
1			3			TOTAL SHEETS
2			4			36

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SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Exc Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-9	85	671.87	35			145							
End Bent 2, Piles 1-9	110	664.77	35			185							
							9						

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

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-9	85			0.6			1.00
End Bent 2, Piles 1-9	110			0.6			1.00

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

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) ## (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length per Pier Lin FT	Drilled Pier Length Not In Soil per Pier Lin FT	Drilled Pier Length In Soil per Pier Lin FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length* per Pier Lin FT
Bent 1, Piers 1-2	635	620	150	633		14.0	9.4	YES	635	8.4	
Bent 2, Piers 1-2	685	619	165	633		15.1	9.3	YES	635	8.4	

*Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation.

SUMMARY OF DYNAMIC PILE TESTING/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No	Dynamic Pile Testing			Pile Order Lengths	
	Dynamic Pile Testing Required? YES or MAYBE	Dynamic Pile Testing Test Pile Length FT	Total Dynamic Pile Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or Dynamic Pile Testing
End Bent 1, Piles 1-9	MAYBE	40	1		
End Bent 2, Piles 1-9	MAYBE	40			

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

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) ## (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?*	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
Bent 1, Piers 1-2	MAYBE	MAYBE	100	MAYBE	
Bent 2, Piers 1-2	MAYBE	MAYBE	104	MAYBE	
TOTAL QTY:	2	2	408	2	

*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

NOTES:

- The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Jacob Wessell, P.E., NC PE 030395) on 8-7-2023.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for SPTs, CSL Testing, and SID Inspections when these items may be required.

PROJECT NO. BR-0093

ROCKINGHAM COUNTY

STATION: 17+85.52 -L-

SHEET 3 OF 4



DocuSigned by:
Francesca Lea
05/01/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**PILE AND DRILLED PIER
FOUNDATION TABLES**

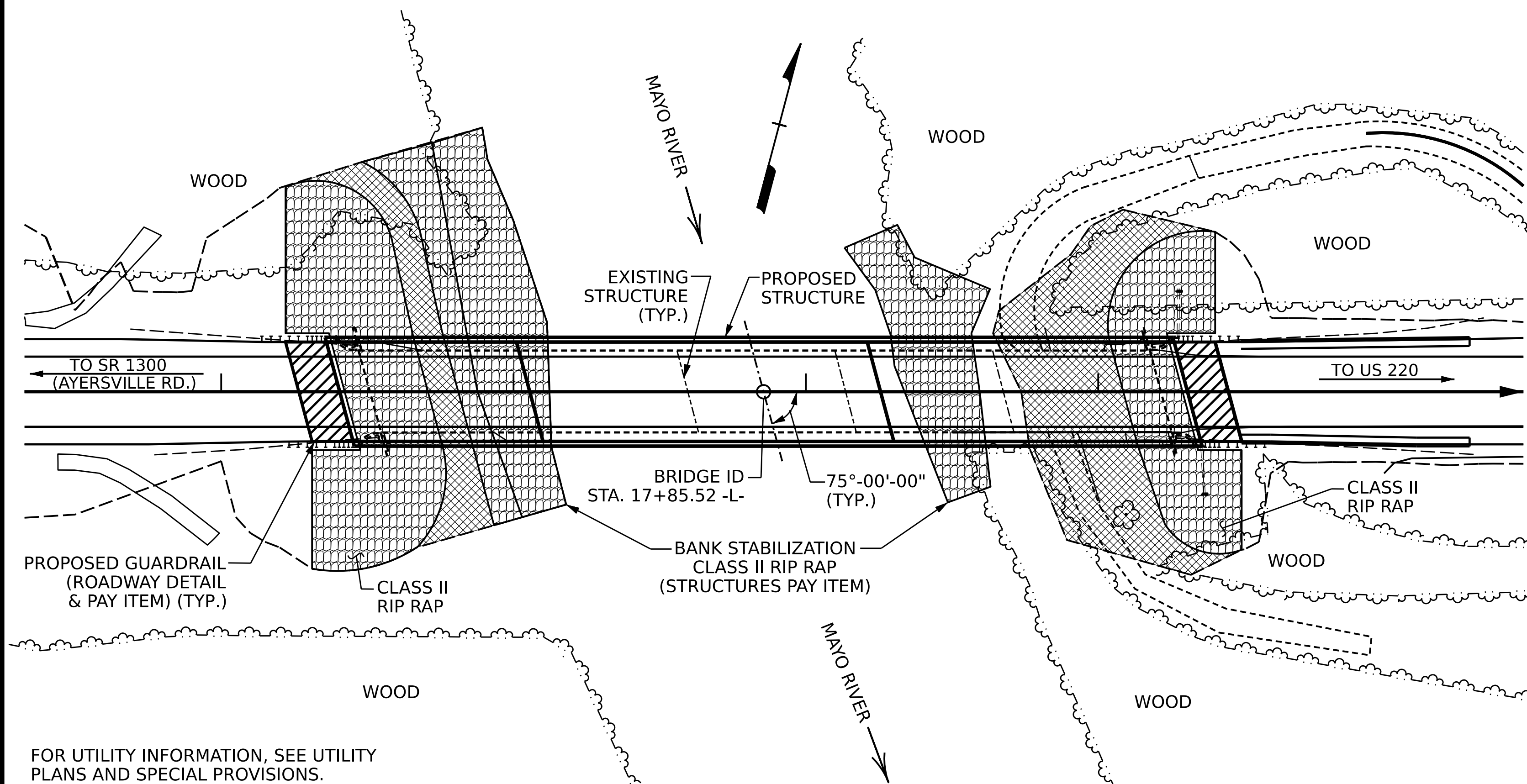
REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-03
2			4			TOTAL SHEETS 36

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

DRAWN BY : Q. T. NGUYEN DATE : 03/2024
CHECKED BY : F. LEA DATE : 03/2024

BM #1: STA. 9+93 -L-, 82' LT (RAILROAD SPIKE IN 24" POPLAR), EL. 721.47'



LOCATION SKETCH

NOTES

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 17+85.52 -L-.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 79' LEFT AND 54' RIGHT OF CENTERLINE ROADWAY AT END BENT #1 AND 63' EACH SIDE OF CENTERLINE ROADWAY AT END BENT #2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

- THE EXISTING STRUCTURE CONSISTING OF 1 @ 54.5', 3 @ 54', AND 1 @ 54.5' SPANS, CLEAR ROADWAY WIDTH OF 28' WITH 4 LINES OF 45" PRECAST PRESTRESSED CONCRETE GIRDERS @ 8' CTS., END BENTS AND INTERIOR BENTS 1 & 4 ON RC CAP ON PPC PILES, INTERIOR BENTS 2 & 3 ON RC CAP AND POSTS AND LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT.
- 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.
- REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."
- THE SCOUR CRITICAL ELEVATION FOR BENTS NO. 1 AND 2 IS ELEVATION 633 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
- TEMPORARY CAUSEWAY SHALL NOT BE PERMITTED TO BLOCK THE CONFLUENCE OF ANY JURISDICTIONAL TRIBUTARY STREAM WITH MAYO RIVER.
- TEMPORARY FILL SHALL NOT BLOCK MORE THAN 50 PERCENT OF THE CHANNEL AT ANY TIME.

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

	CONSTRUCTION MAINTENANCE, AND REMOVAL OF TEMP ACCESS STA. 17+85.52 -L-	REMOVAL OF EXISTING STRUCTURE AT STA. 17+85.52 -L-	ASBESTOS ASSESSEMENT	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STA. 17+85.52 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	EA.	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.
SUPERSTRUCTURE											10,738	9,835	
END BENT 1													41.0
BENT 1				18.8	28.0	16.8							39.1
BENT 2				18.6	30.2	16.8							37.2
END BENT 2													40.0
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	37.4	58.2	33.6	2	2	2	LUMP SUM	10,738	9,835	157.3

HYDRAULIC DATA

DESIGN DISCHARGE	= 26,332 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 662.8 FT.
DRAINAGE AREA	= 293 SQ. MI.
BASIC DISCHARGE (Q100)	= 31,689 CFS
BASIC HIGH WATER ELEVATION	= 664.9 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= N/A CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION *	= 671.4 FT

* CL @ SAG STA. 21+29 -L-
WS ELEVATION TAKEN @ RIVER STATION 45929 (U/S TOE)

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-

SHEET 4 OF 4



Designed by
Francesca Lea
B79DADB650584EF
05/01/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE OVER
MAYO RIVER
ON NC 770 BETWEEN
SR 1300 (AYERSVILLE RD.)
AND US 220

DRAWN BY : Q. T. NGUYEN DATE : 12/2023
CHECKED BY : F. LEA DATE : 03/2024
DESIGN ENGINEER OF RECORD: E. BAYISSA DATE : 09/2023

4/24/2024
R:\Structures\Plans\401.007_BR0093.SMU.GD.S04.780035.dgn
tnguyen

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-04
1			3			TOTAL SHEETS
2			4			36

LOAD FACTORS:

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVELOAD FACTORS (VLL)	MOMENT					SHEAR					LIVELOAD FACTORS (VLL)	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inventory)	N/A	1	1.05	--	1.75	0.877	1.23	B	1	59.13	0.971	1.06	C	3	84.83	0.80	0.877	1.05	B	1	59.13		
	HL-93(Operating)	N/A	--	1.38	--	1.35	0.877	1.60	B	1	59.13	0.971	1.38	C	3	84.83	N/A	--	--	--	--	--		
	HS-20(Inventory)	36.000	2	1.40	50.41	1.75	0.877	1.79	B	1	59.13	0.971	1.40	C	3	84.83	0.80	0.877	1.52	B	1	59.13		
	HS-20(Operating)	36.000	--	1.82	65.35	1.35	0.877	2.32	B	1	59.13	0.971	1.82	C	3	84.83	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.69	49.78	1.40	0.877	5.42	B	1	59.13	0.966	4.07	A	2	54.50	0.80	0.877	3.69	B	1	59.13	
		SNGARBS2	20.000	--	2.64	52.75	1.40	0.877	3.88	B	1	59.13	0.966	2.92	A	2	54.50	0.80	0.877	2.64	B	1	59.13	
		SNAGRIS2	22.000	--	2.45	53.99	1.40	0.877	3.61	B	1	59.13	0.966	2.73	A	2	54.50	0.80	0.877	2.45	B	1	59.13	
		SNCOTTS3	27.250	--	1.83	49.92	1.40	0.877	2.69	B	1	59.13	0.966	2.03	A	2	54.50	0.80	0.877	1.83	B	1	59.13	
		SNAGGRS4	34.925	--	1.49	51.97	1.40	0.877	2.19	B	1	59.13	0.966	1.71	A	2	54.50	0.80	0.877	1.49	B	1	59.13	
		SNS5A	35.550	--	1.46	51.83	1.40	0.877	2.14	B	1	59.13	0.966	1.74	A	2	54.50	0.80	0.877	1.46	B	1	59.13	
		SNS6A	39.950	--	1.32	52.76	1.40	0.877	1.94	B	1	59.13	0.971	1.59	C	3	84.83	0.80	0.877	1.32	B	1	59.13	
	SNS7B	42.000	--	1.26	52.79	1.40	0.877	1.85	B	1	59.13	0.971	1.55	C	3	84.83	0.80	0.877	1.26	B	1	59.13		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.61	52.98	1.40	0.877	2.36	B	1	59.13	0.966	1.90	A	2	54.50	0.80	0.877	1.61	B	1	59.13	
		TNT4A	33.075	--	1.61	53.18	1.40	0.877	2.36	B	1	59.13	0.966	1.84	A	2	54.50	0.80	0.877	1.61	B	1	59.13	
		TNT6A	41.600	--	1.30	54.03	1.40	0.877	1.91	B	1	59.13	0.971	1.63	C	3	84.83	0.80	0.877	1.30	B	1	59.13	
		TNT7A	42.000	--	1.30	54.47	1.40	0.877	1.91	B	1	59.13	0.971	1.60	C	3	84.83	0.80	0.877	1.30	B	1	59.13	
		TNT7B	42.000	--	1.32	55.51	1.40	0.877	1.94	B	1	59.13	0.971	1.52	C	3	84.83	0.80	0.877	1.32	B	1	59.13	
		TNAGRIT4	43.000	--	1.27	54.70	1.40	0.877	1.87	B	1	59.13	0.971	1.48	C	3	84.83	0.80	0.877	1.27	B	1	59.13	
TNAGT5A		45.000	--	1.21	54.29	1.40	0.877	1.77	B	1	59.13	0.971	1.45	C	3	84.83	0.80	0.877	1.21	B	1	59.13		
TNAGT5B	45.000	3	1.20	53.92	1.40	0.877	1.76	B	1	59.13	0.971	1.41	C	3	84.83	0.80	0.877	1.20	B	1	59.13			
EV LOAD RATING	EV2	28.750	--	1.85	53.24	1.30	0.877	2.93	B	1	59.13	0.966	2.21	A	2	54.50	0.80	0.877	1.85	B	1	59.13		
	EV3	43.000	4	1.22	52.61	1.30	0.877	1.94	B	1	59.13	0.966	1.49	A	2	54.50	0.80	0.877	1.22	B	1	59.13		

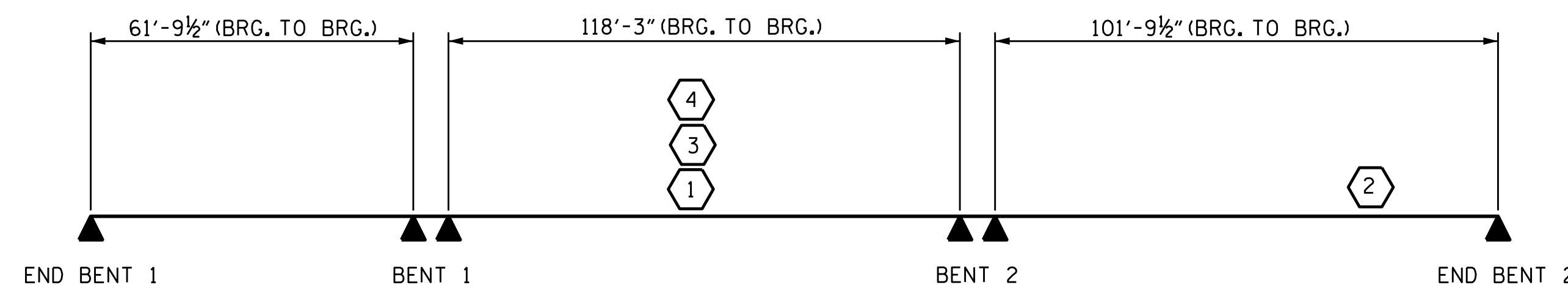
NOTES:

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.

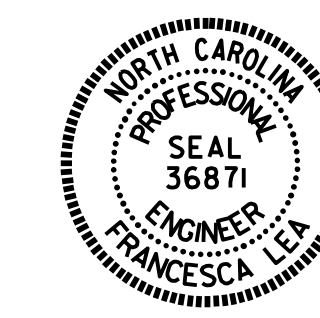
#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
4	EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	

GIRDER LOCATION	
2, 3	- INTERIOR GIRDER
1	- EXTERIOR LEFT GIRDER



LRFR SUMMARY

PROJECT NO. BR-0093
 ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-



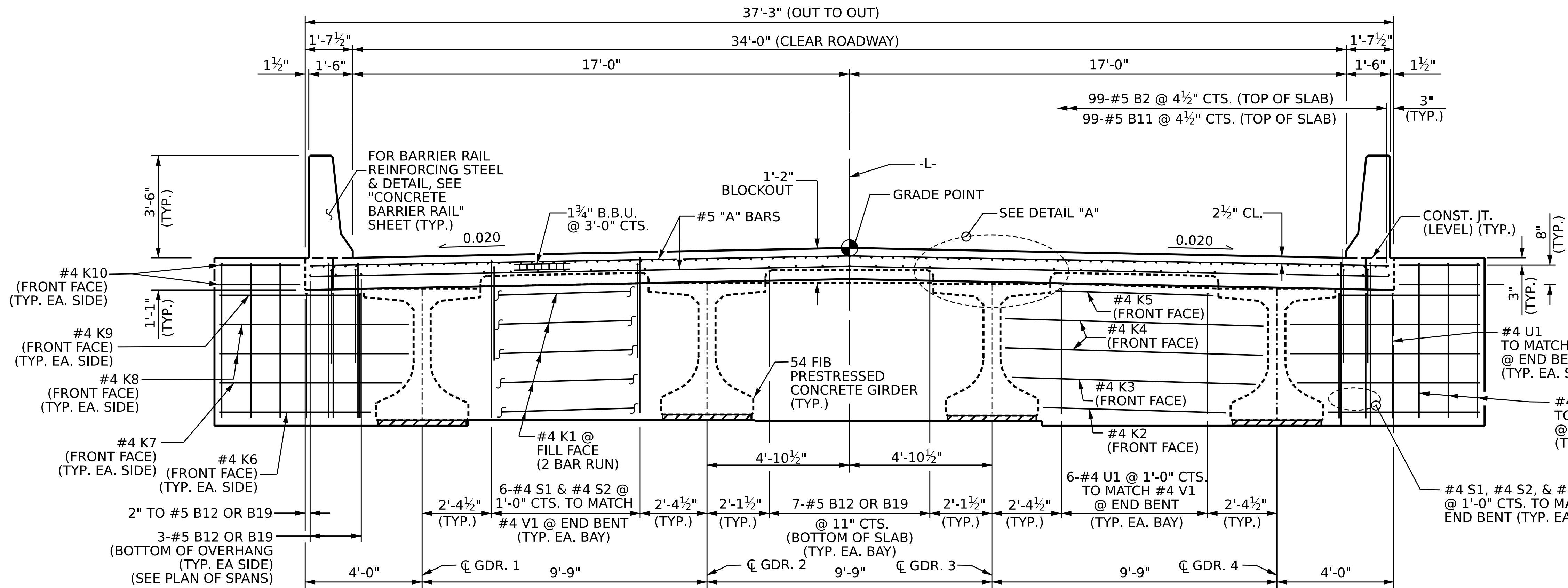
DocuSigned by:
 Francesca Lea
 879DADB65D84EF
 05/01/2024

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

ASSEMBLED BY: E. BAYISSA	DATE: 10/2023
CHECKED BY: Z. MALIK	DATE: 01/2024
DRAWN BY: MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY: GM/DI 2/08	REV. 10/1/18 MAA/GM
	REV. 04/23 BNB/AM

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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

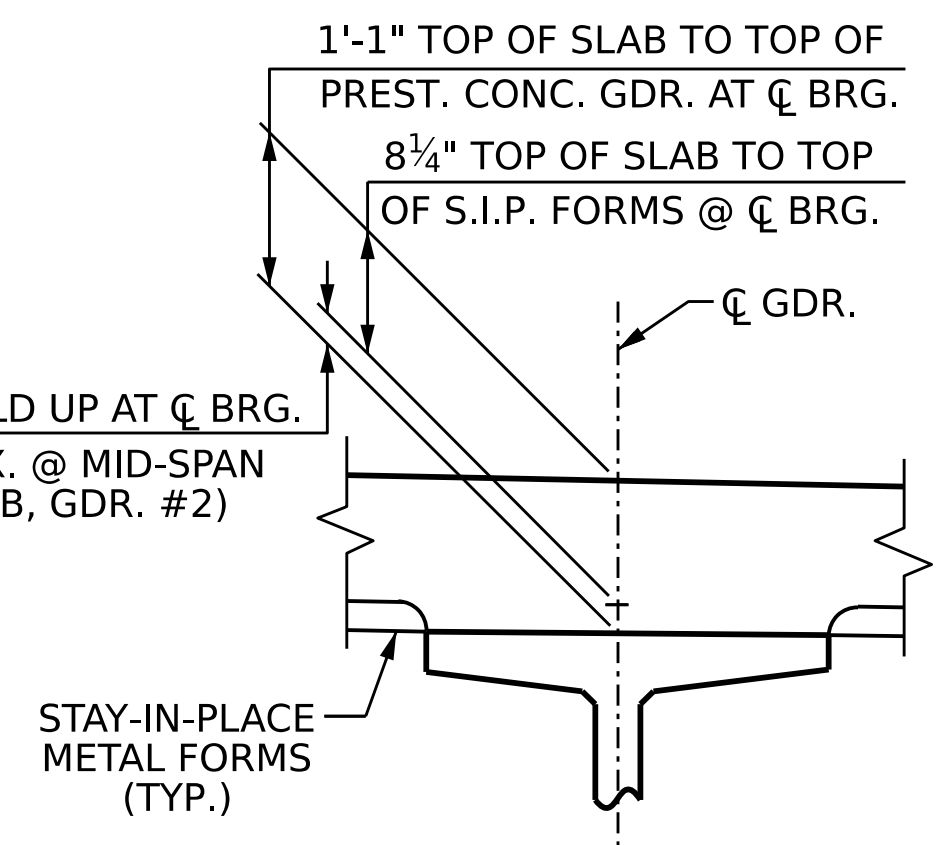


TYPICAL SECTION AT INTEGRAL END BENT

SHOWING ABUTMENT WALL @ FILL FACE OF END BENTS

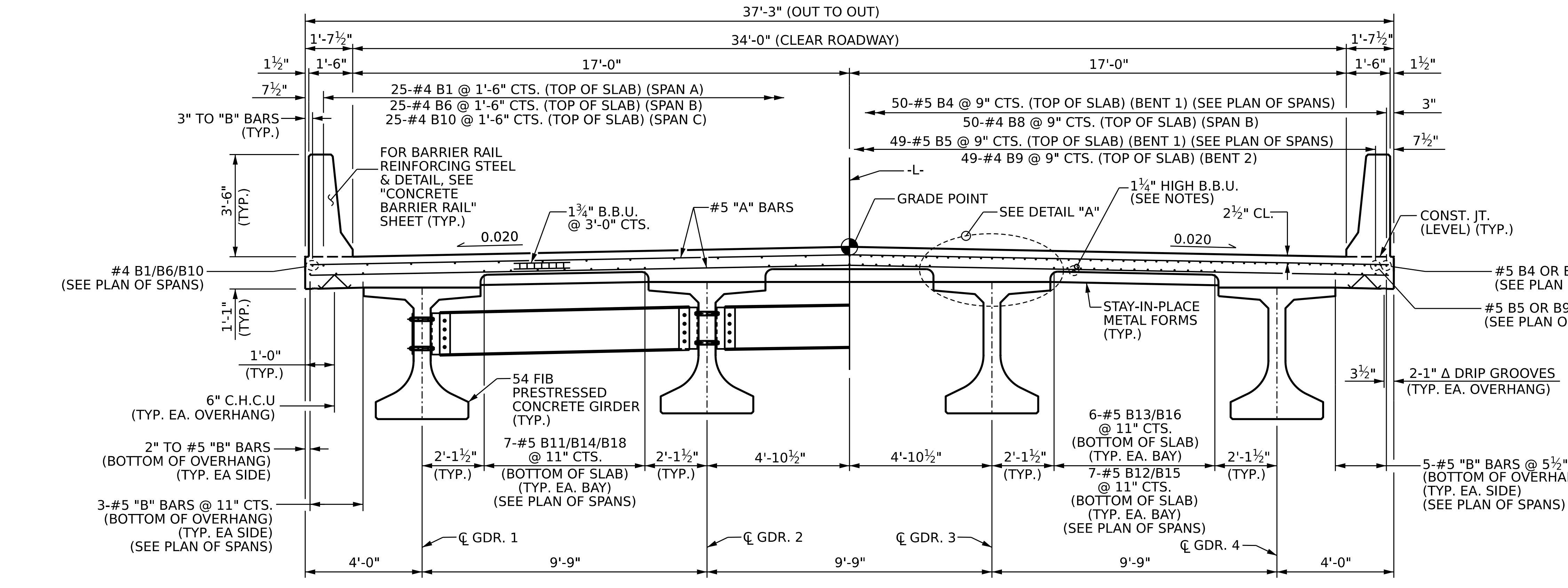
NOTES

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



DETAIL "A"

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



PARTIAL TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

PARTIAL TYPICAL SECTION AT LINK SLAB AT BENTS

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 1 OF 2

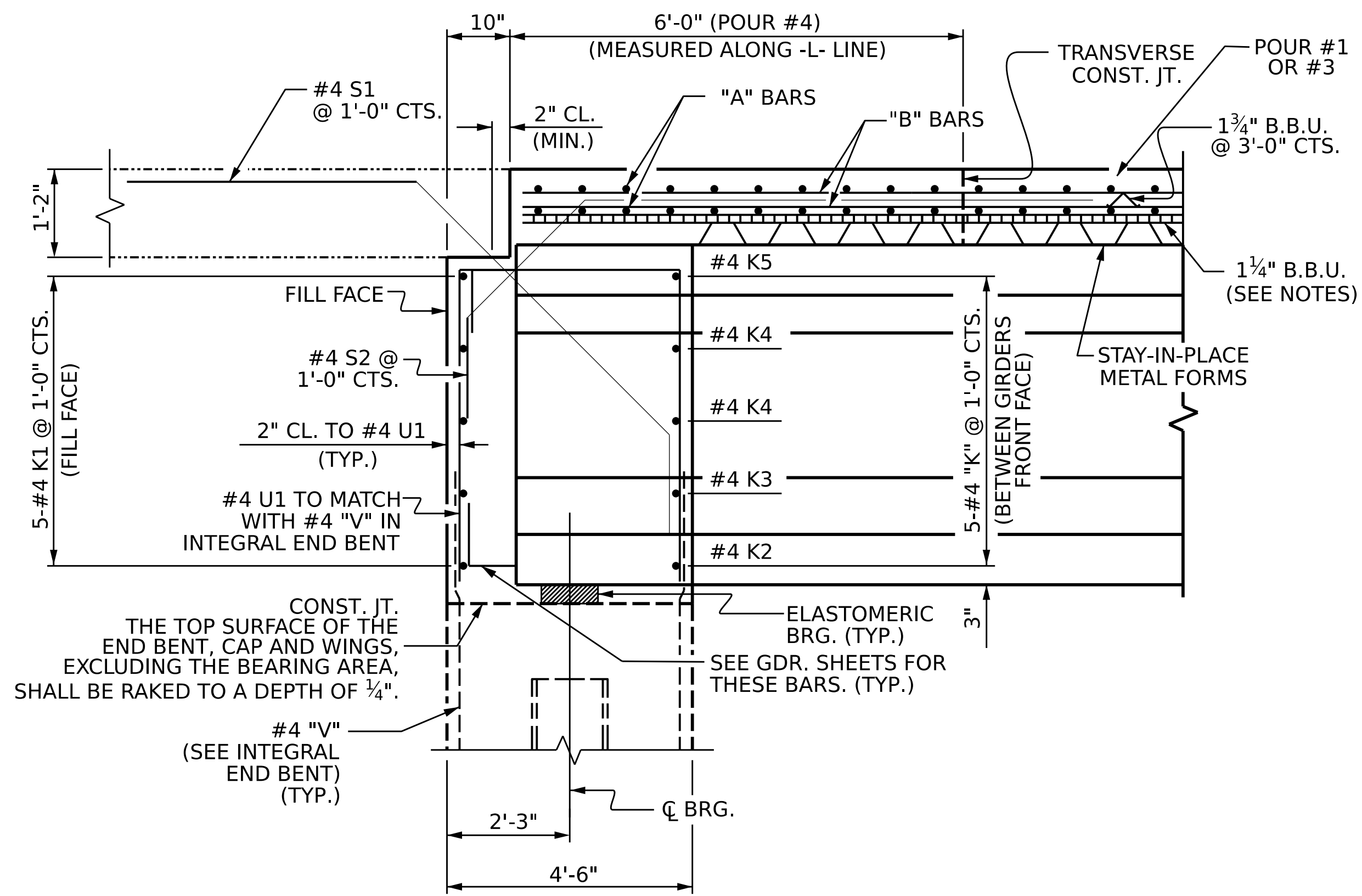


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION

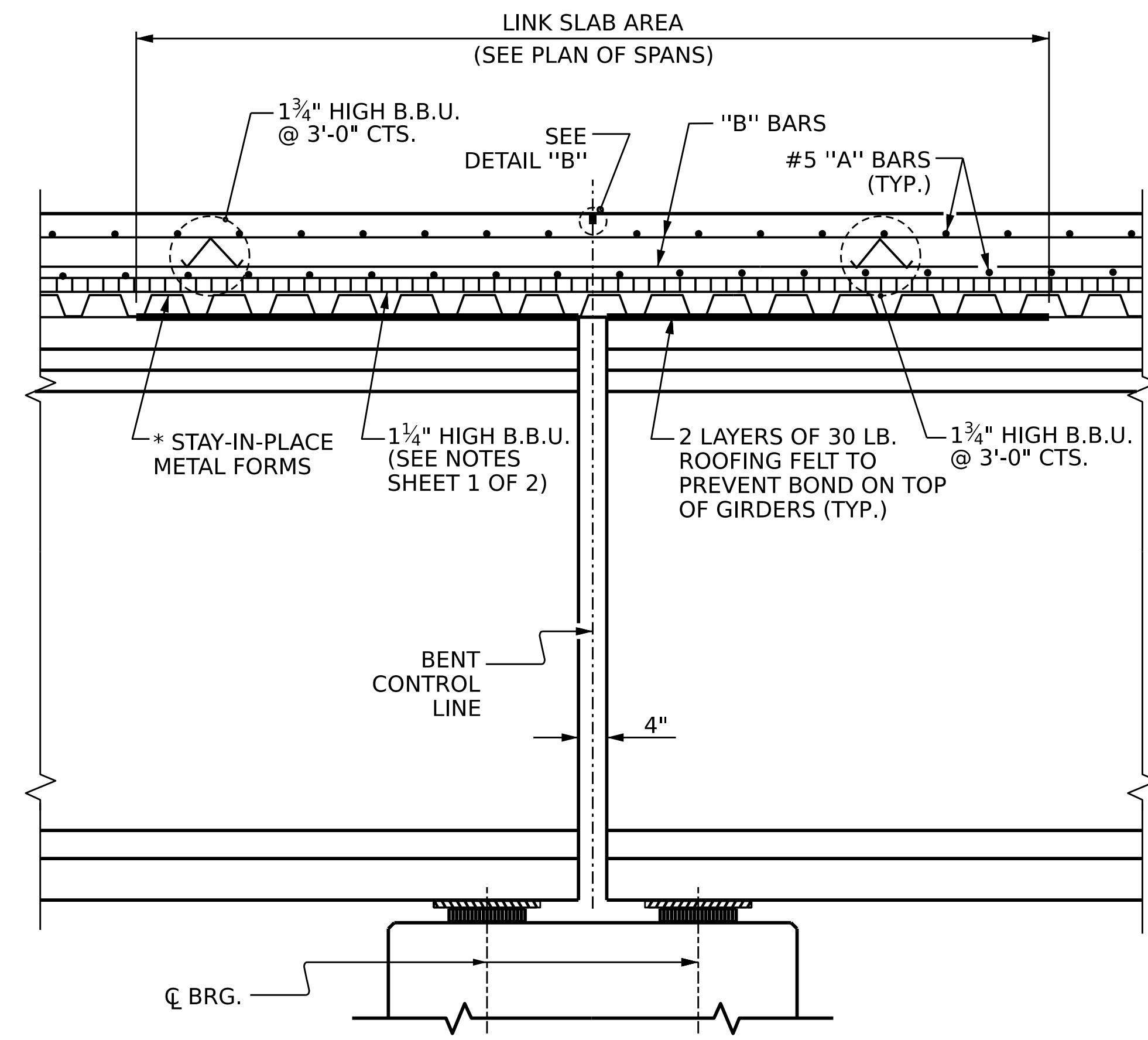
DRAWN BY : Q. T. NGUYEN DATE : 10/2023
 CHECKED BY : Z. MALIK DATE : 12/2023
 DESIGN ENGINEER OF RECORD : E. BAYISSA DATE : 09/2023

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

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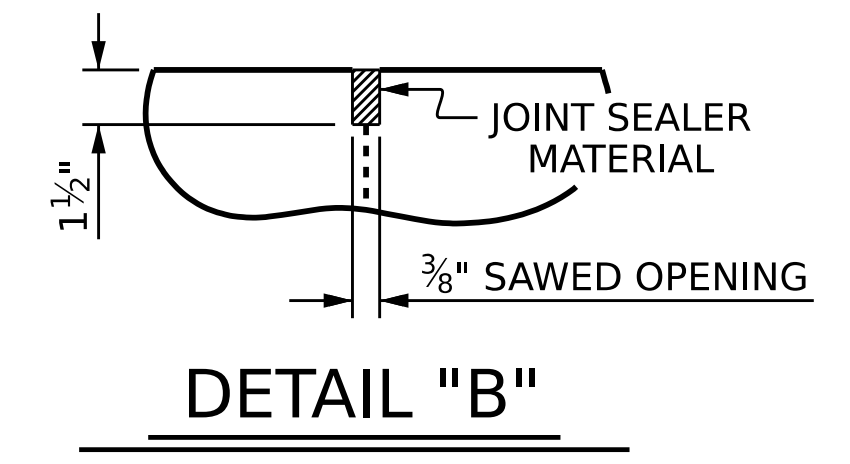


SECTION AT INTEGRAL END BENT

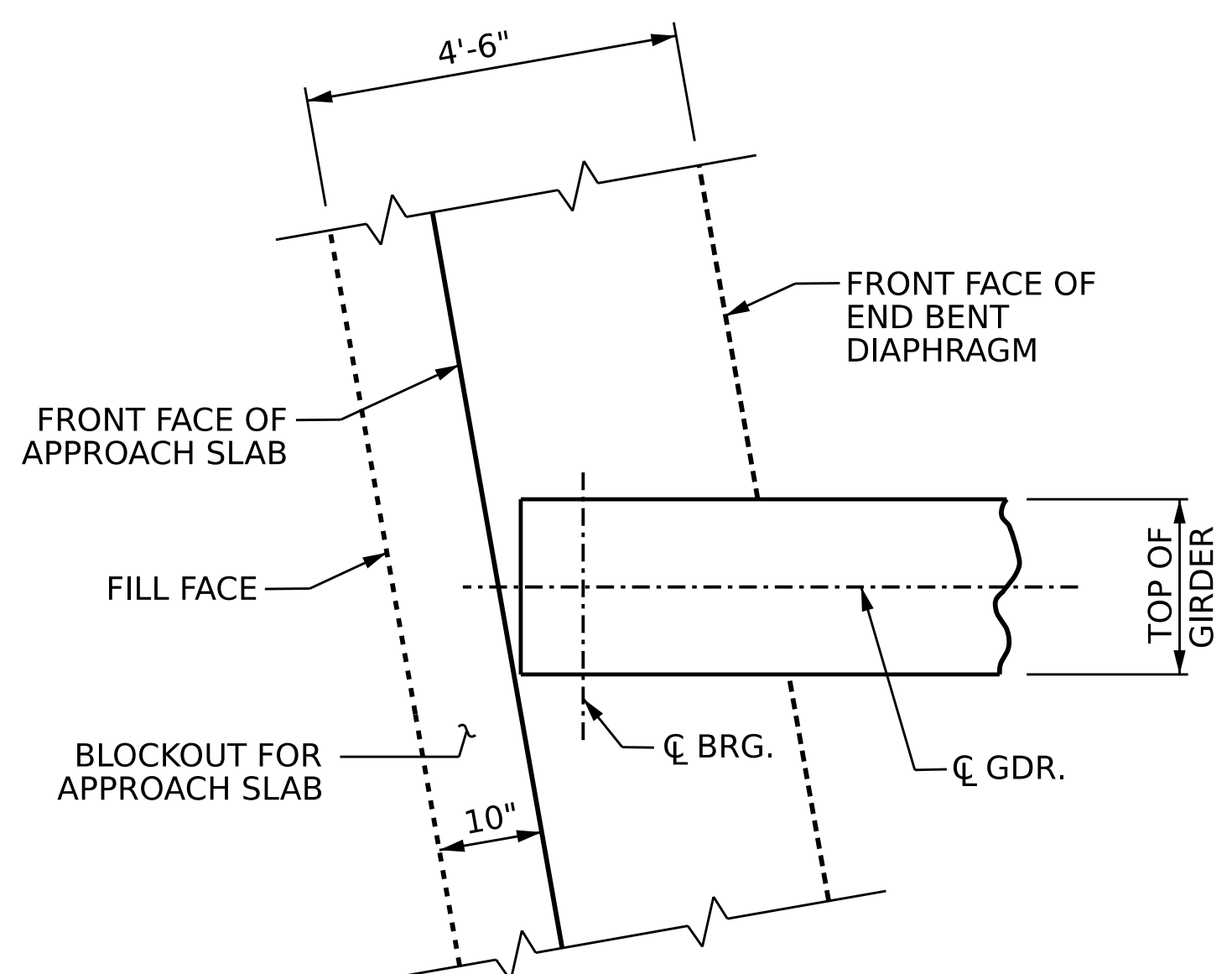


SECTION @ LINK SLAB

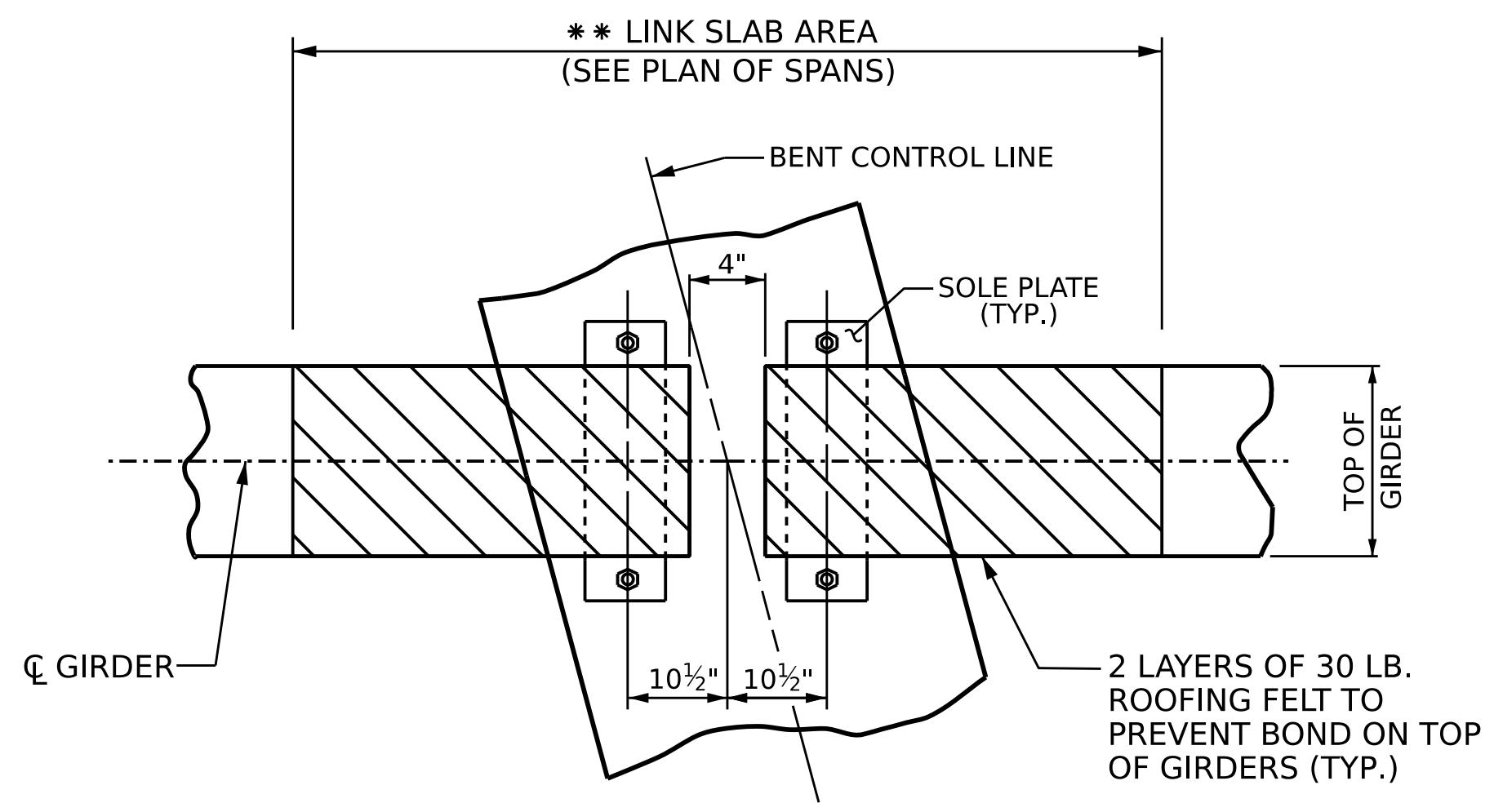
* STAY-IN-PLACE METAL FORMS SHALL NOT BE WELDED TO THE SUPPORT ANGLES WITHIN THE LINK SLAB AREAS.



A 1 1/2" DEEP, 3/8" WIDE CONTRACTION JOINT AT BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE LINK SLAB 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.



PLAN OF GIRDER @ INTEGRAL END BENT



PLAN @ INTERIOR BENTS

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

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-
 SHEET 2 OF 2

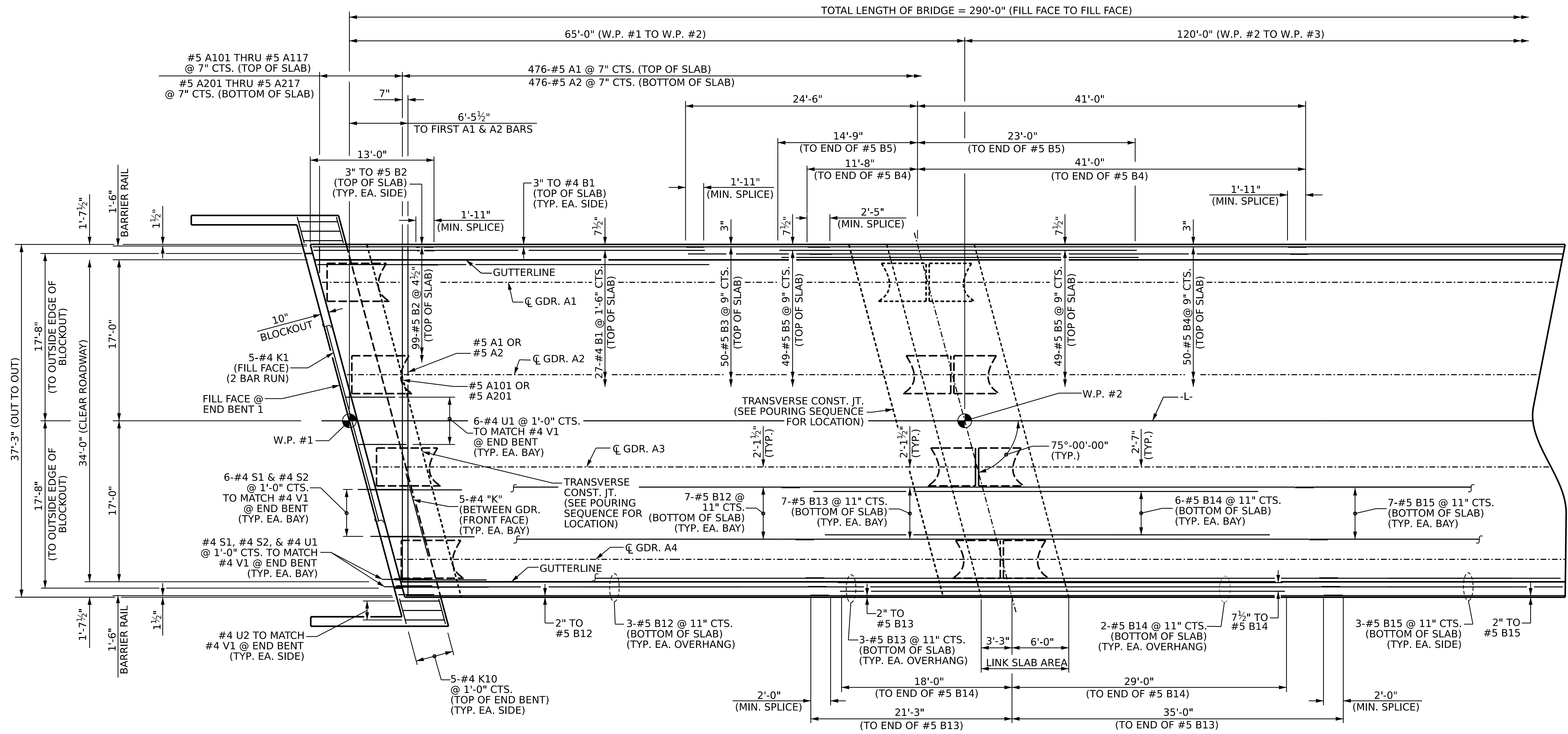


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION

DRAWN BY : Q. T. NGUYEN DATE : 10/2023
 CHECKED BY : ZIA MALIK DATE : 12/2023
 DESIGN ENGINEER OF RECORD : E. BAYISSA DATE : 09/2023

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-07
1			3			TOTAL SHEETS
2			4			36

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN OF SPAN A

FOR INTERMEDIATE DIAPHRAGM LOCATION,
SEE "FRAMING PLAN" SHEET.
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS,
SEE "INTERMEDIATE STEEL DIAPHRAGM FOR 54"
FIB" SHEET.

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 1 OF 5



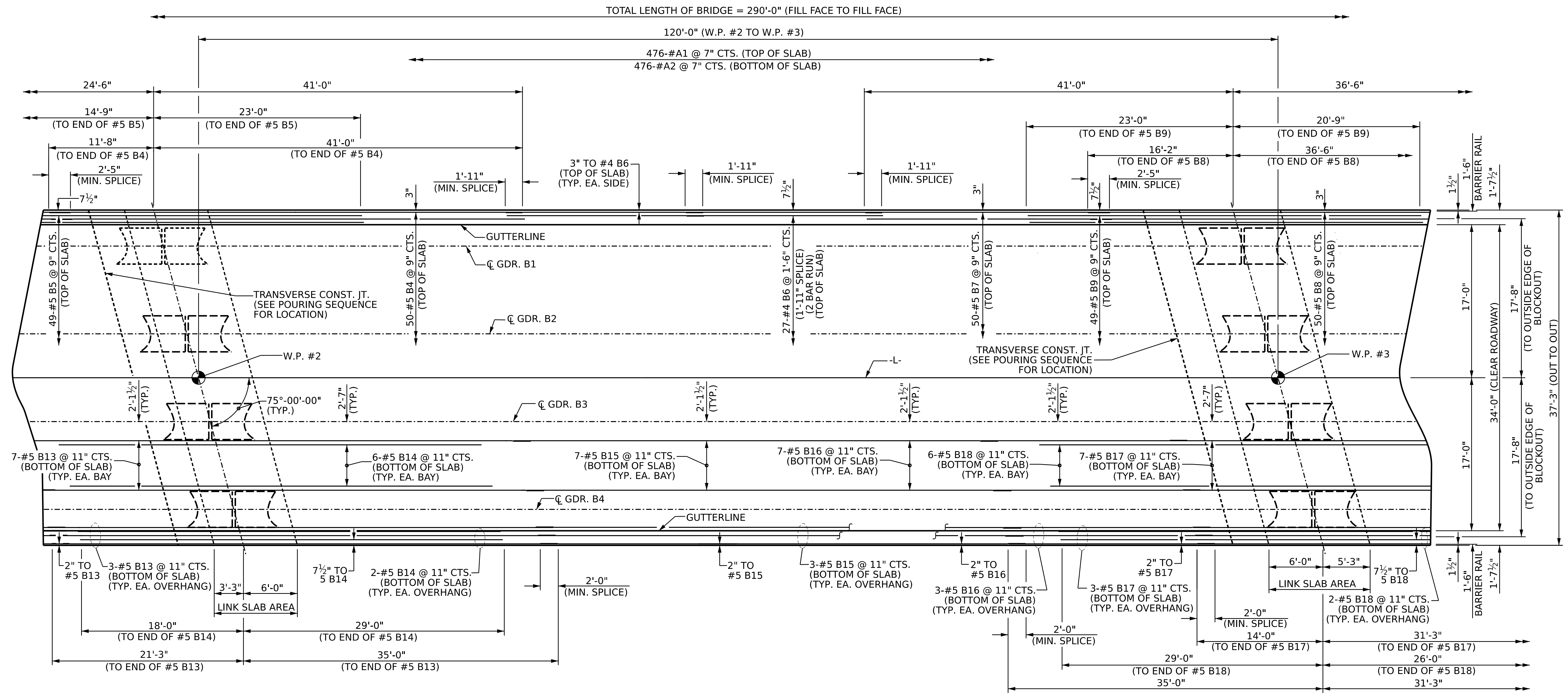
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN A

DRAWN BY : Q. T. NGUYEN DATE : 10/2023
 CHECKED BY : Z. MALIK DATE : 12/2023
 DESIGN ENGINEER OF RECORD : E. BAYISSA DATE : 09/2023

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

TOTAL SHEETS: 36



PLAN OF SPAN B

FOR INTERMEDIATE STEEL DIAPHRAGM LOCATION, SEE "FRAMING PLAN" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGM 54" FIB" SHEET.

PROJECT NO. BR-0093
 ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 2 OF 5

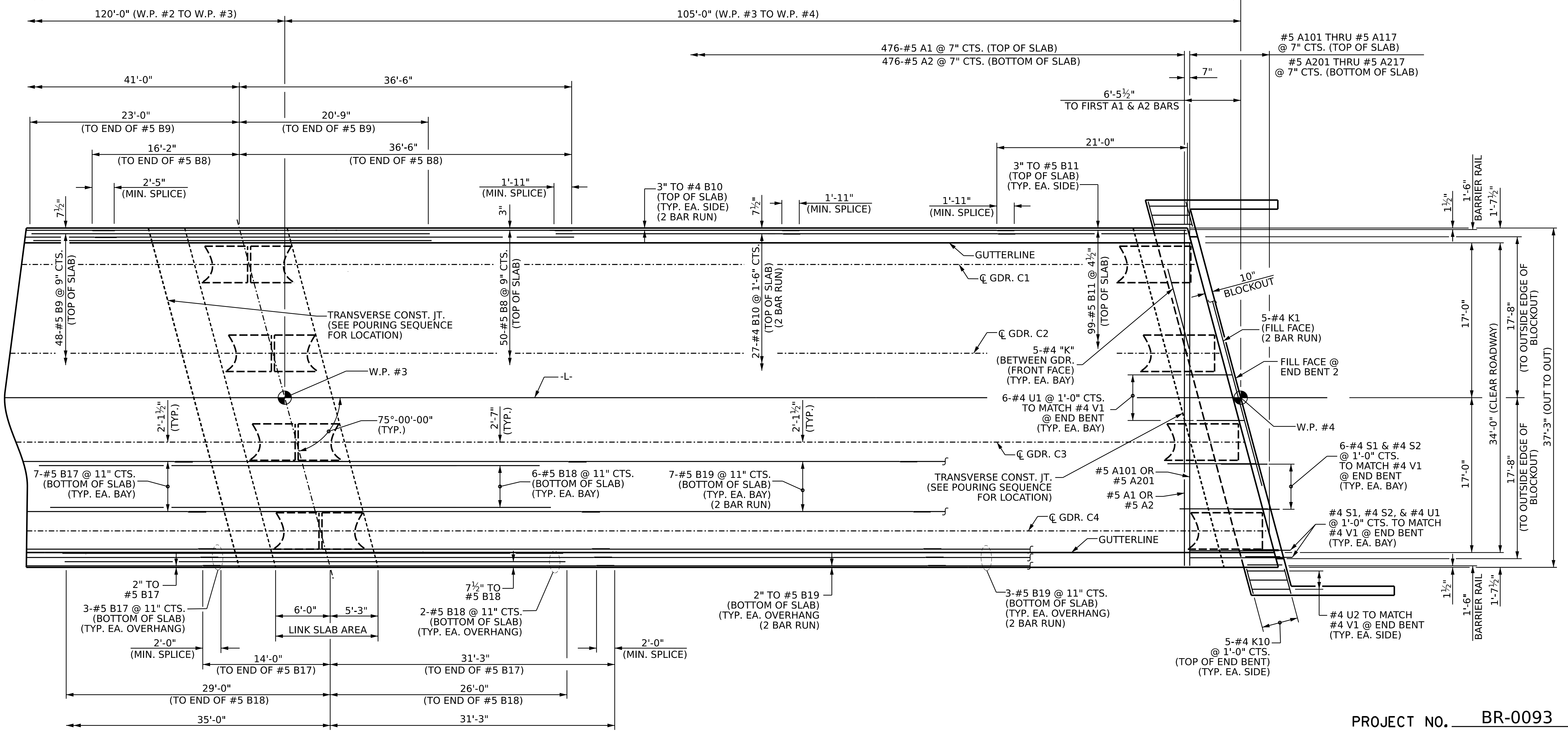


DocuSigned by:
 Francesca Lea
 8790ADB85D84EF...
 05/01/2024

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-09
SUPERSTRUCTURE						
PLAN OF SPAN B						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 36
1			3			
2			4			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED						

DRAWN BY : Q. T. NGUYEN DATE : 10/2023
 CHECKED BY : Z. MALIK DATE : 12/2023
 DESIGN ENGINEER OF RECORD : E. BAYISSA DATE : 09/2023

TOTAL LENGTH OF BRIDGE = 290'-0" (FILL FACE TO FILL FACE)



PLAN OF SPAN C

FOR INTERMEDIATE STEEL DIAPHRAGM LOCATION, SEE "FRAMING PLAN" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGM 54" FIB" SHEET.

PROJECT NO. BR-0093
 ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 3 OF 5

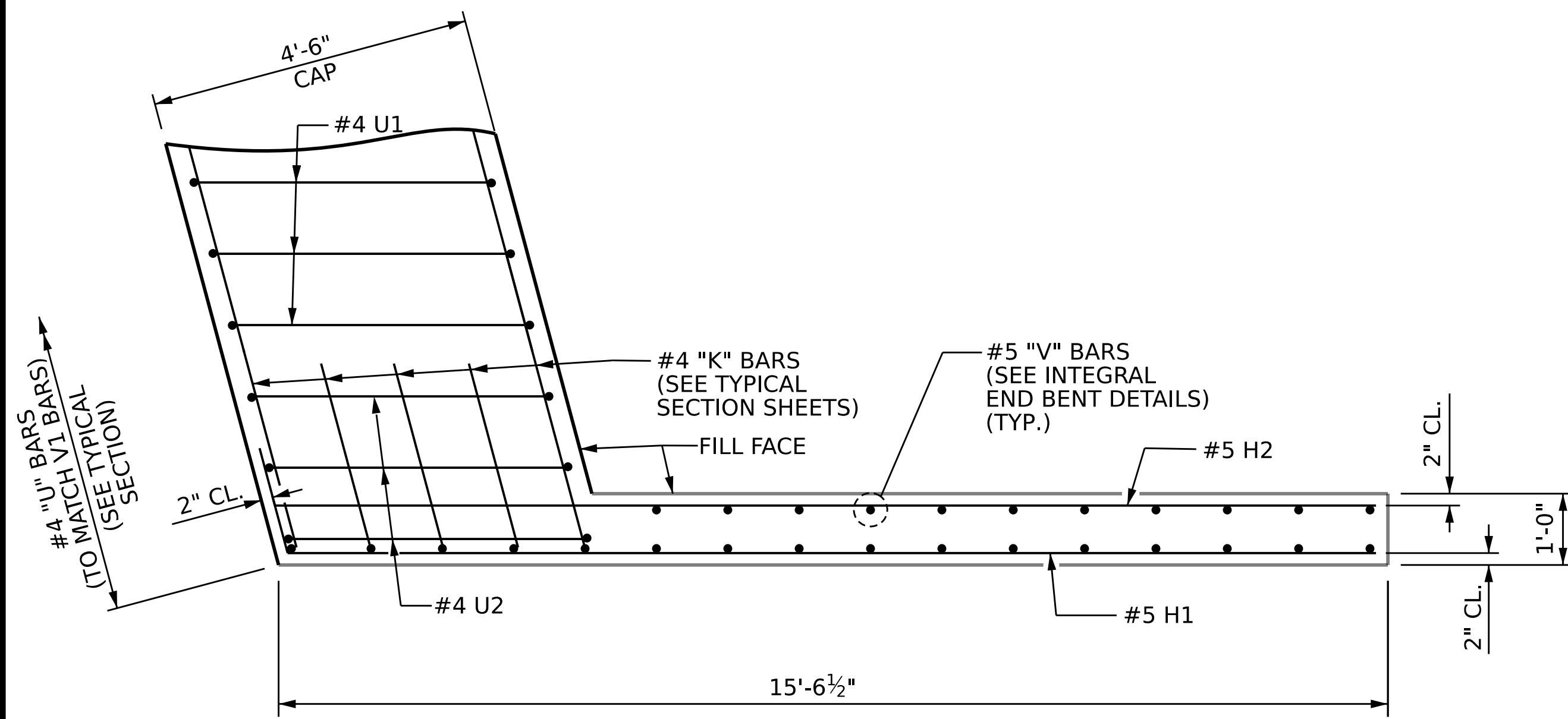


Designed by: *Francesca Lea*
 8780ADB65D84EF
 05/01/2024

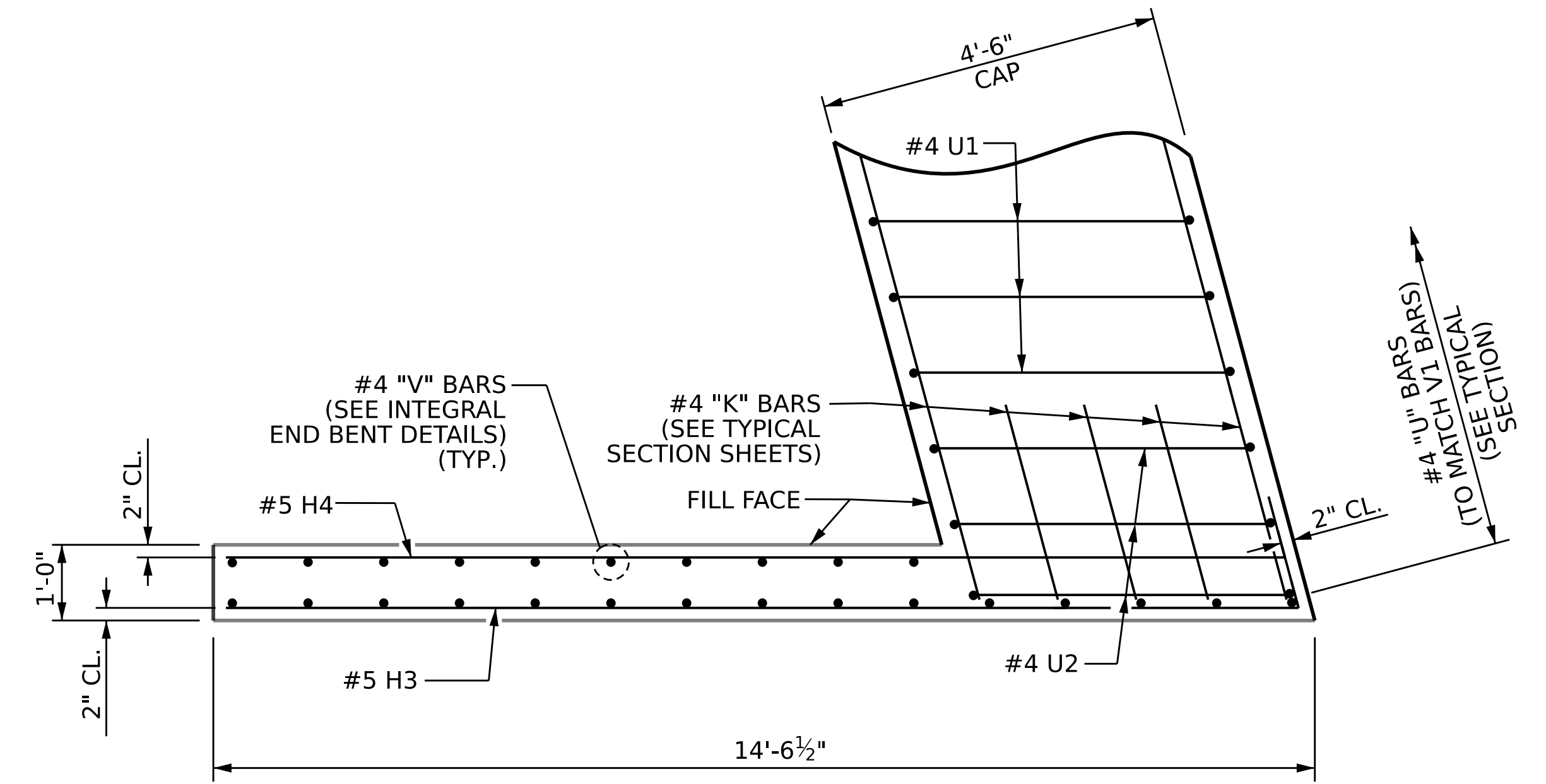
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-10
SUPERSTRUCTURE						TOTAL SHEETS 36
PLAN OF SPAN C						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

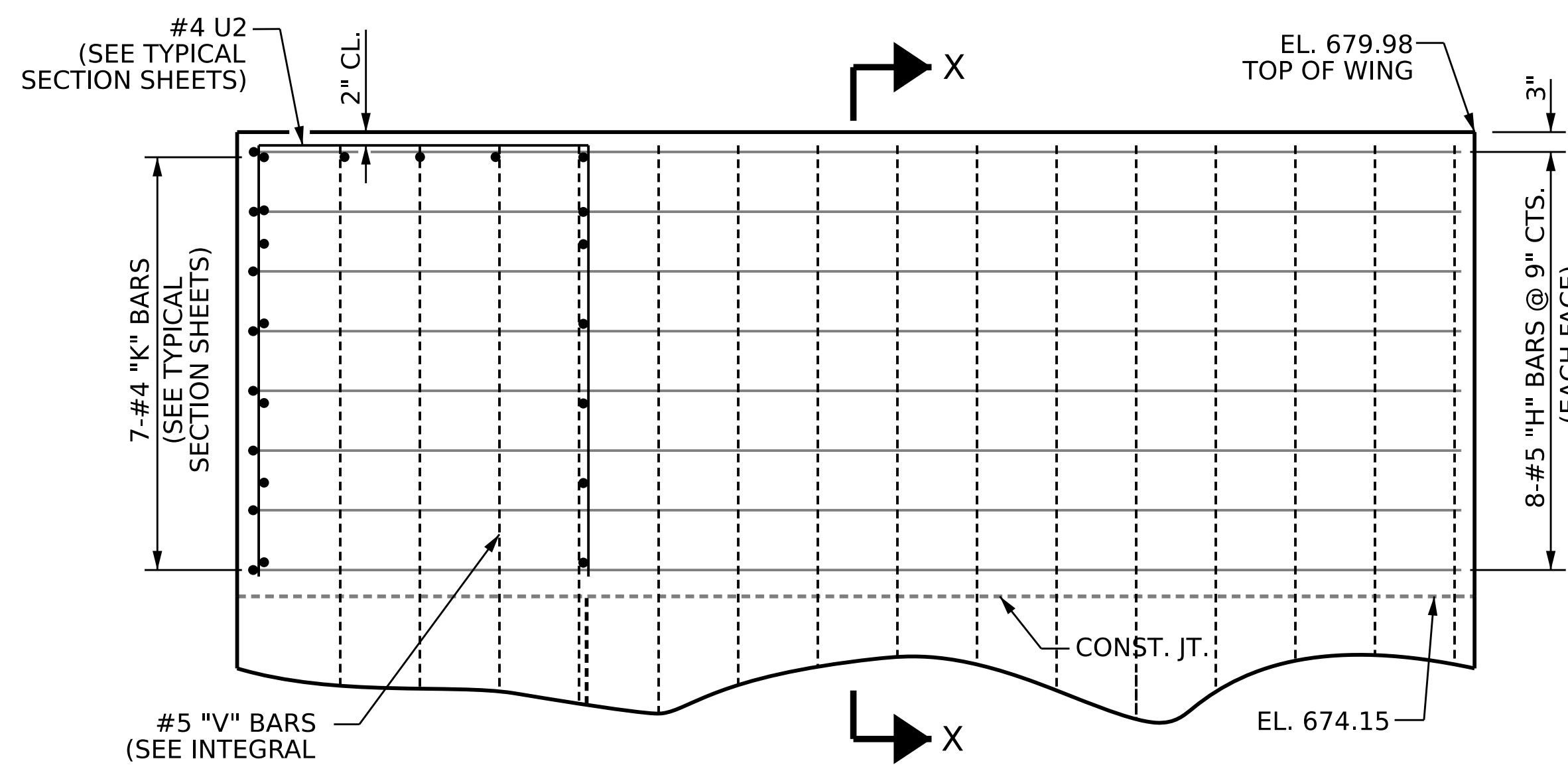
DRAWN BY: Q. T NGUYEN DATE: 10/2023
 CHECKED BY: Z. MALIK DATE: 12/2023
 DESIGN ENGINEER OF RECORD: E. BAYISSA DATE: 09/2023



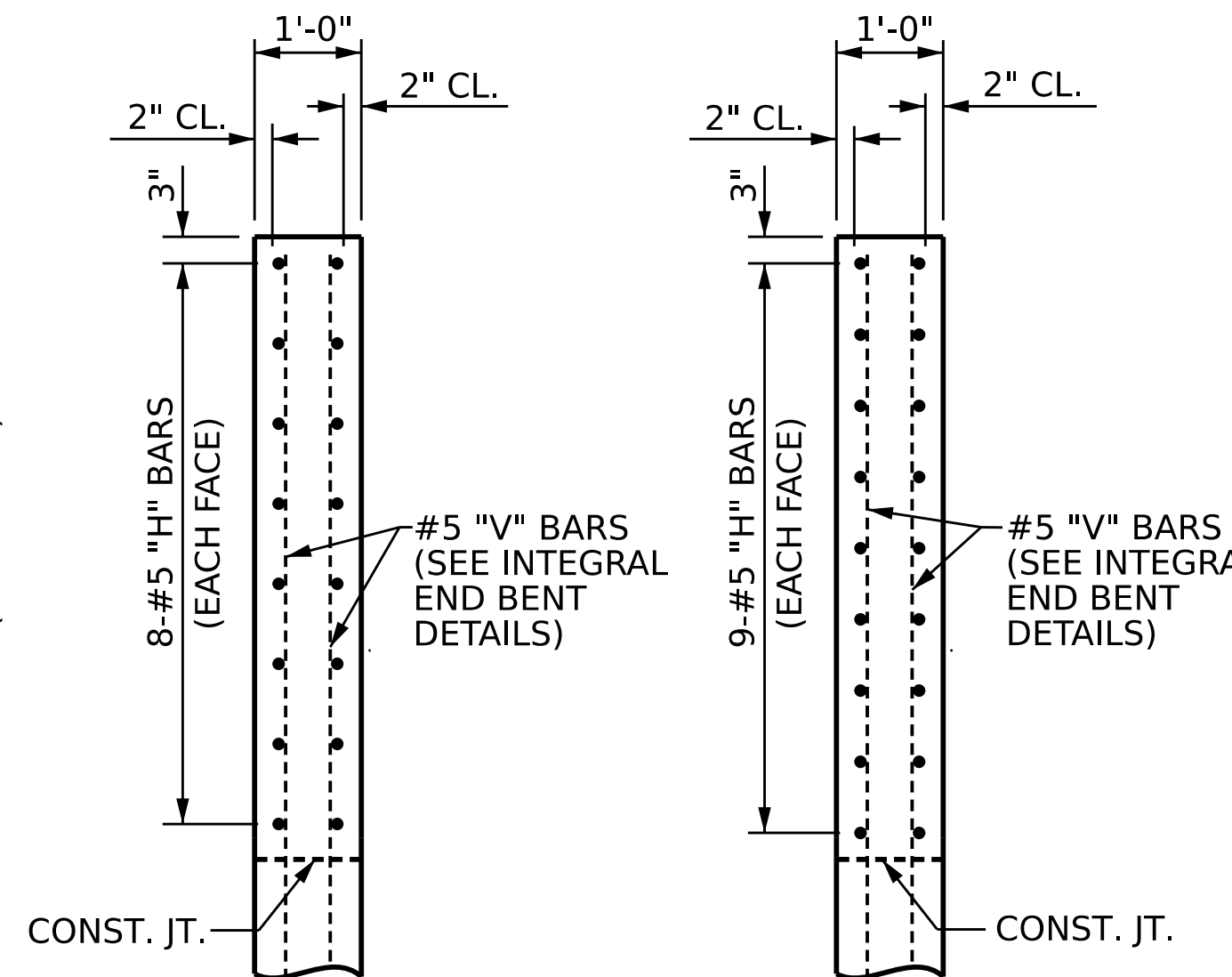
PLAN OF WING W1



PLAN OF WING W2

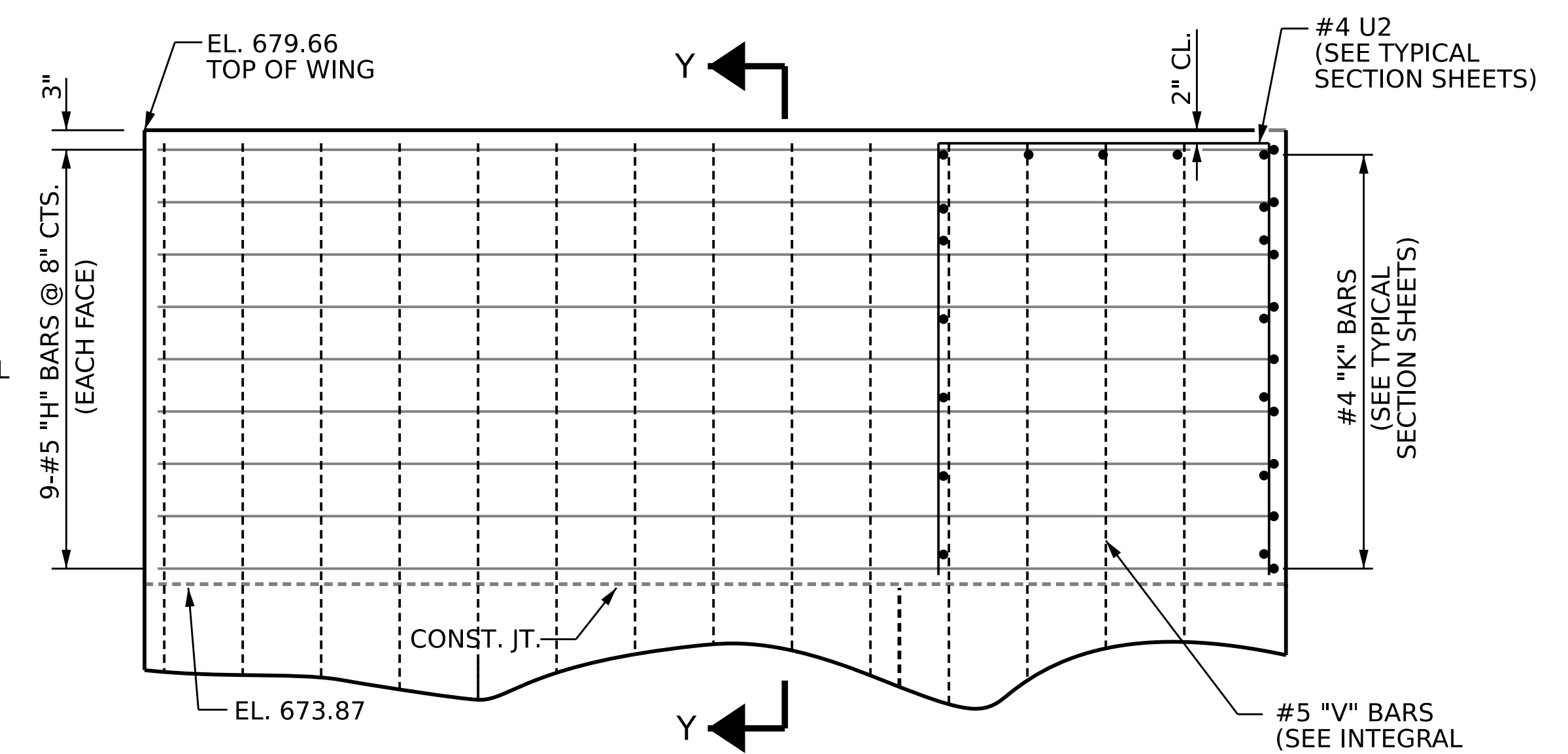


ELEVATION OF WING W1



SECTION X-X

SECTION Y-Y



ELEVATION OF WING W2

UPPER WINGS AT INTEGRAL END BENT 1

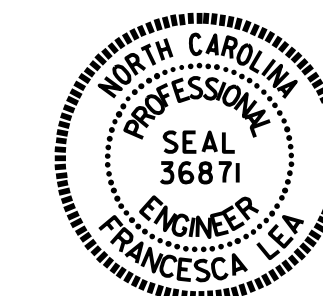
FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "INTEGRAL END BENT 1" SHEETS

PROJECT NO. BR-0093

ROCKINGHAM COUNTY

STATION: 17+85.52 -L-

SHEET 4 OF 5



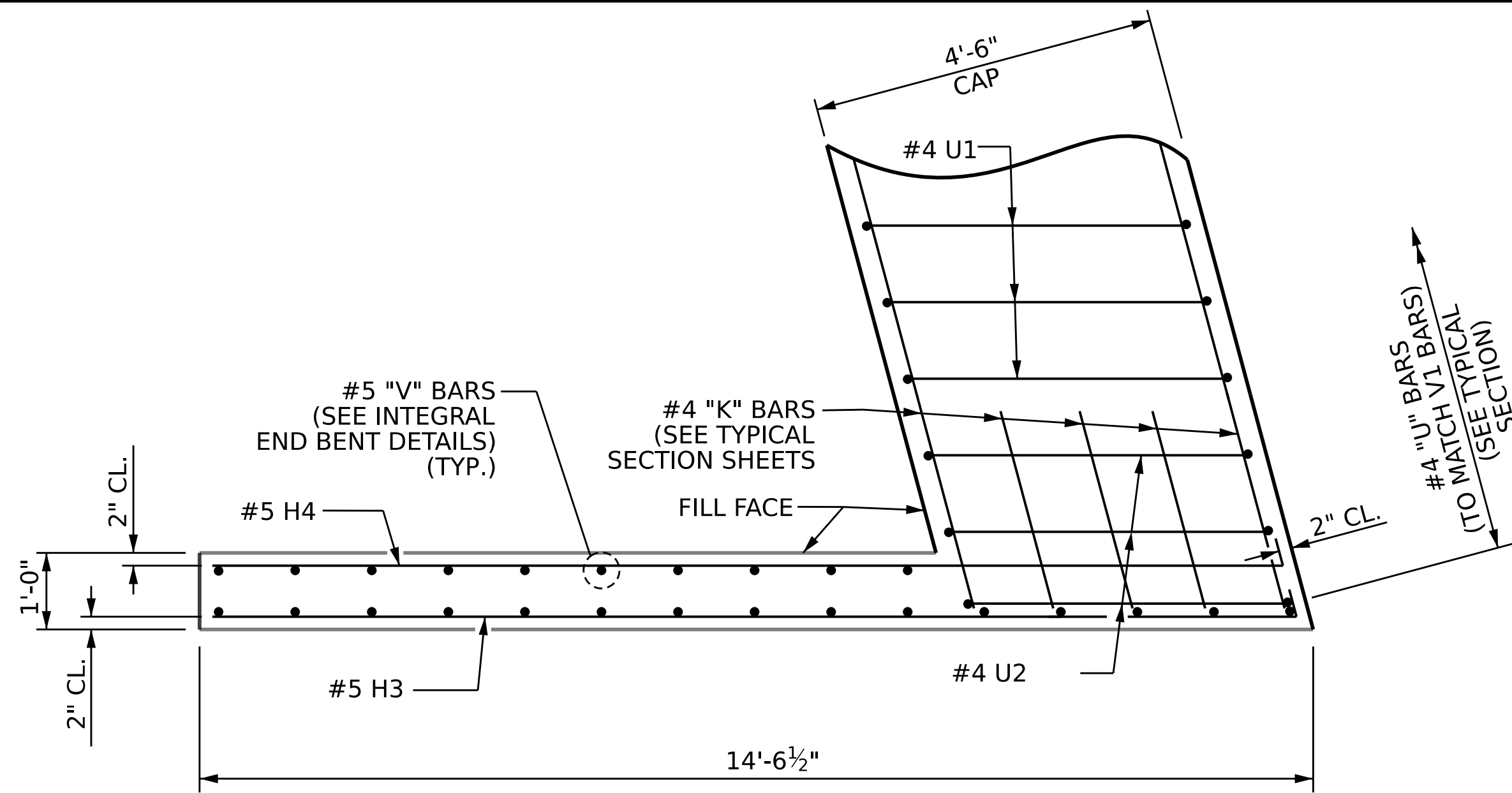
DocuSigned by:
Francesca Ua
B79DADB8E5D84EF
05/01/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
DETAILS AT END BENT 1

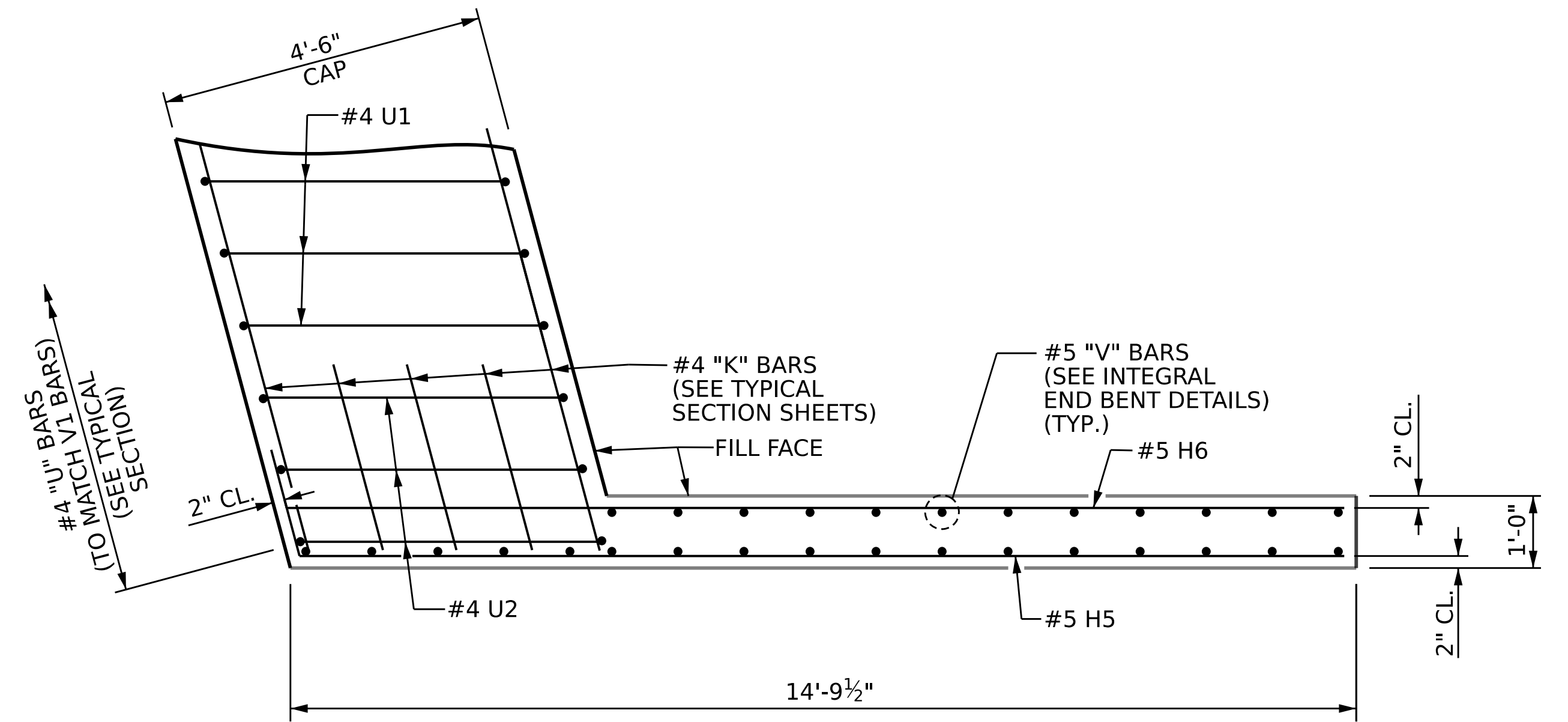
DRAWN BY : Q. T. NGUYEN DATE : 10/2023
CHECKED BY : ZIA MALIK DATE : 12/2023
DESIGN ENGINEER OF RECORD : E. BAYISSA DATE : 09/2023

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

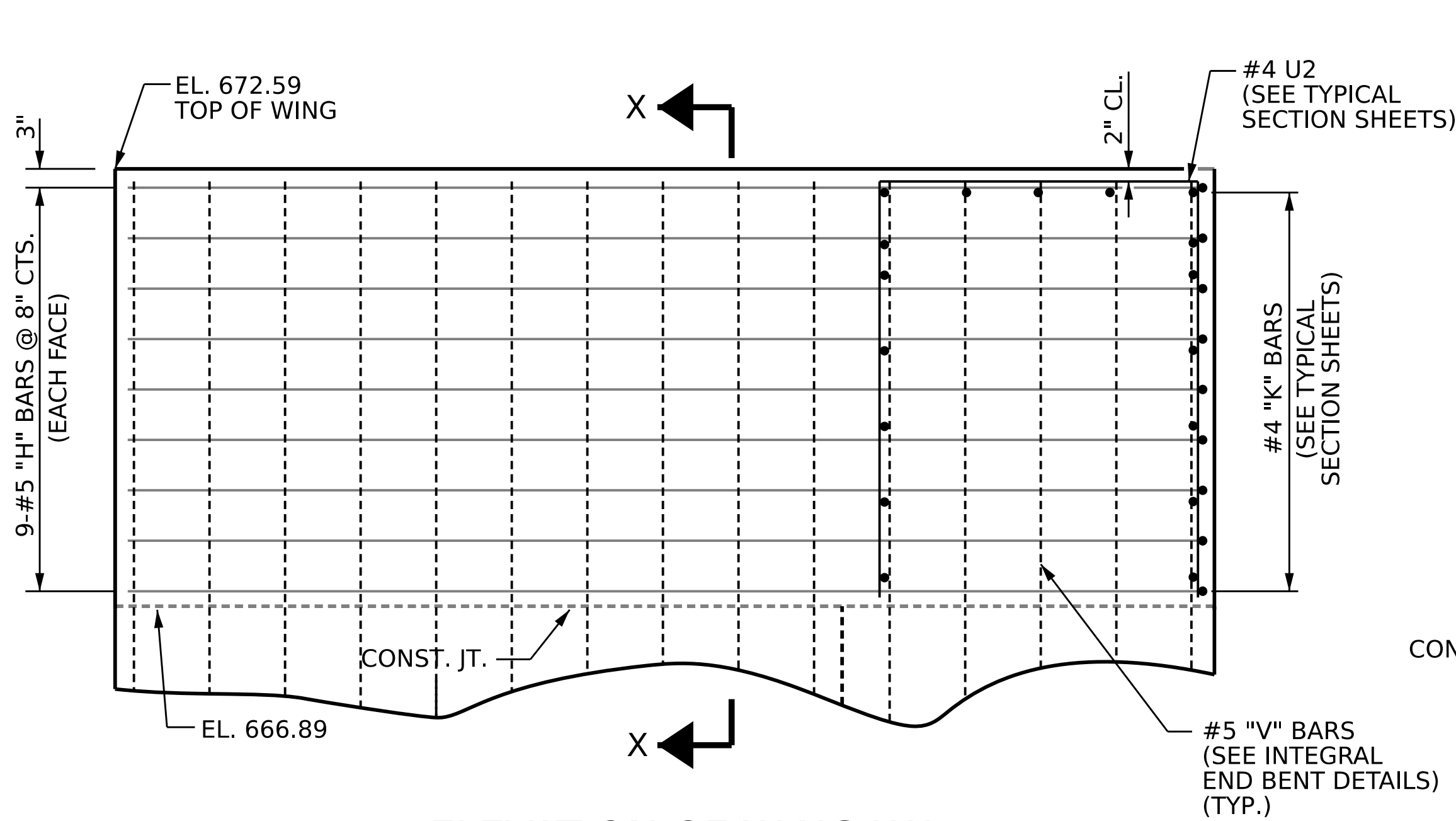
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			36



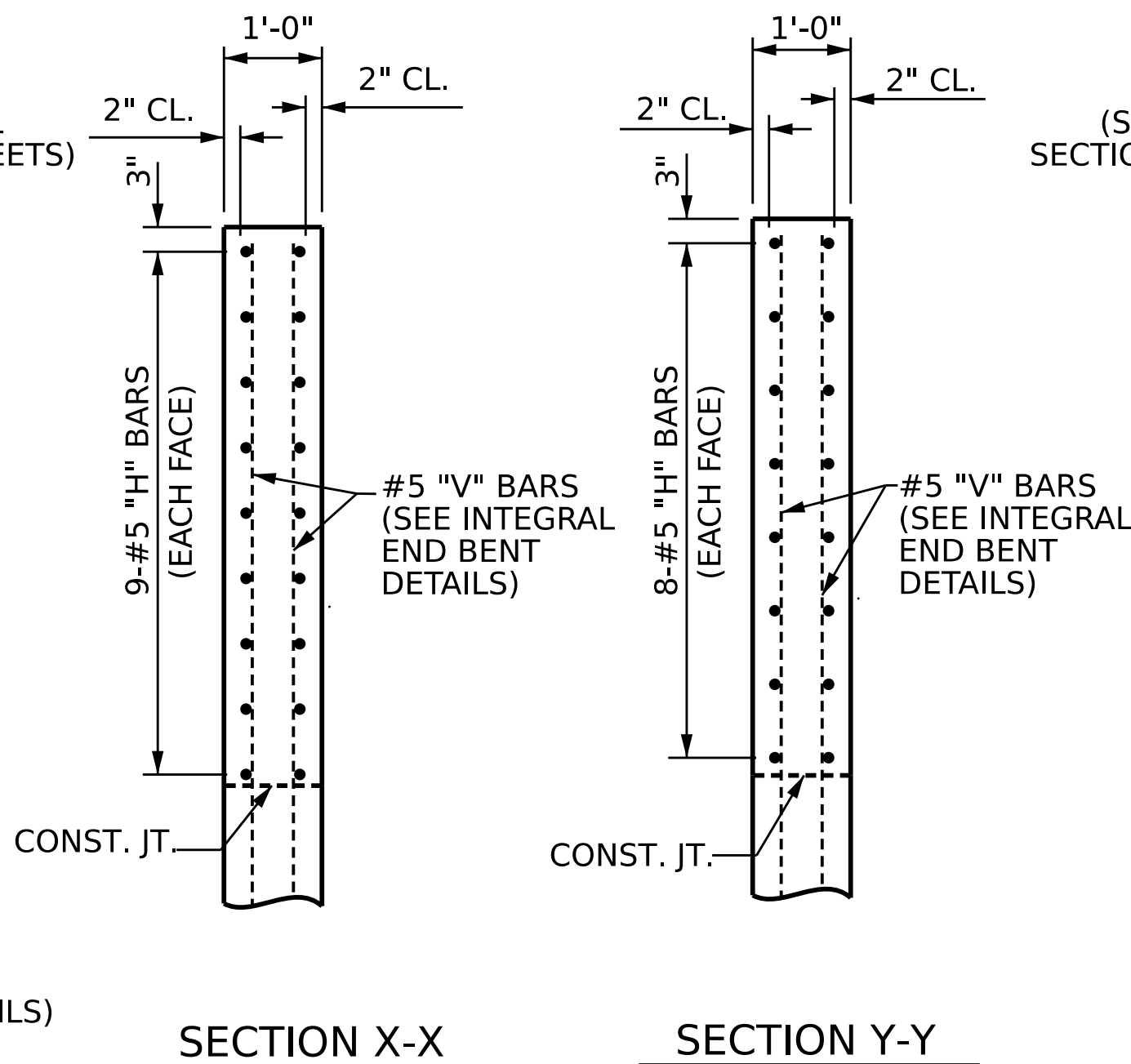
PLAN OF WING W1



PLAN OF WING W2

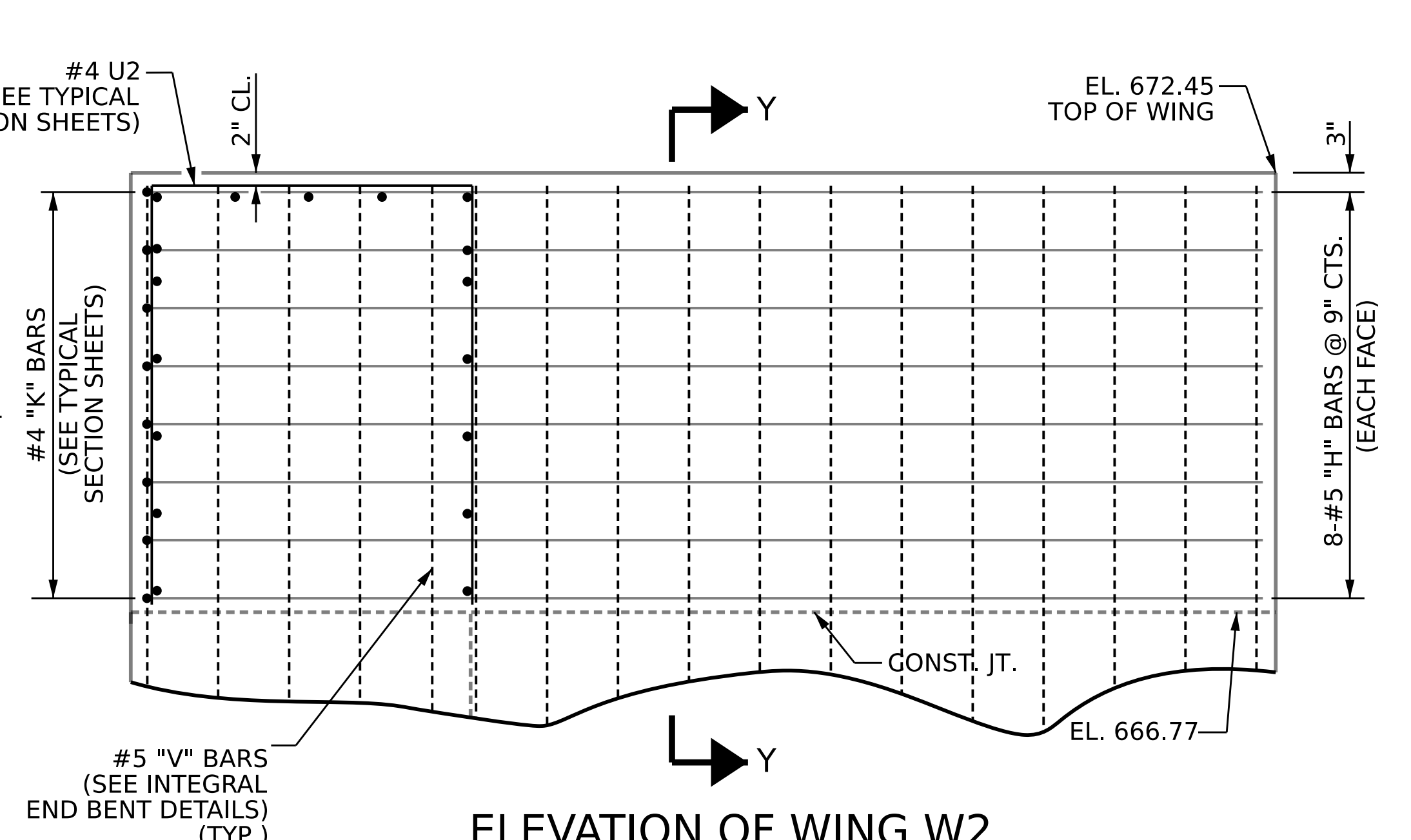


ELEVATION OF WING W1



SECTION X-X

SECTION Y-Y



ELEVATION OF WING W2

UPPER WINGS AT INTEGRAL END BENT 2

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "INTEGRAL END BENT 2" SHEETS

PROJECT NO. BR-0093

ROCKINGHAM COUNTY

STATION: 17+85.52 -L-

SHEET 5 OF 5



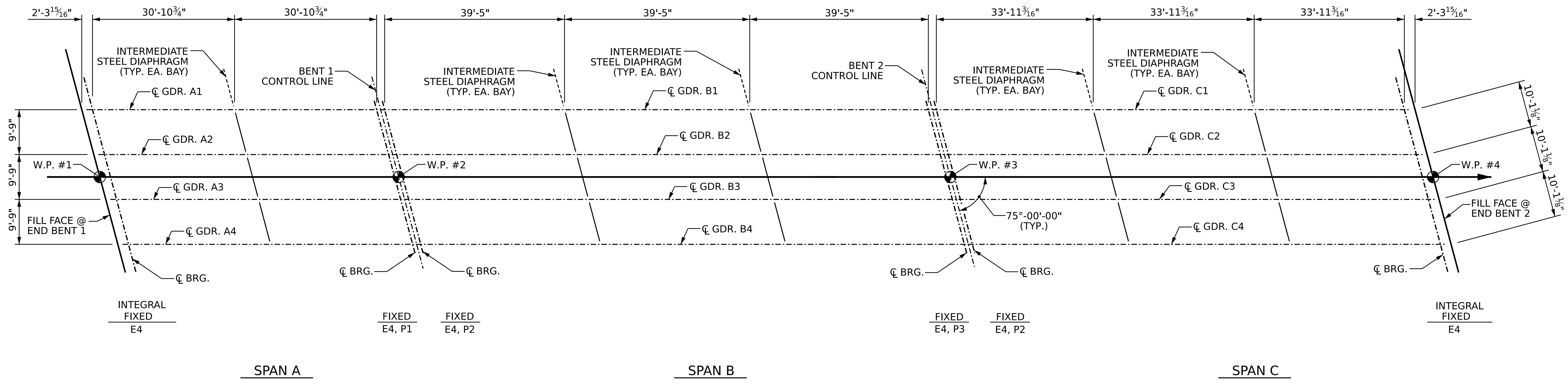
Documented by:
Francesca Lea
05/01/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
DETAILS AT END BENT 2

DRAWN BY: Q. T. NGUYEN DATE: 10/2023
CHECKED BY: ZIA MALIK DATE: 12/2023
DESIGN ENGINEER OF RECORD: E. BAYISSA DATE: 09/2023

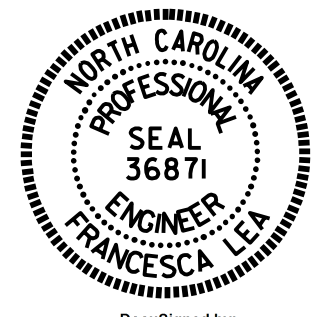
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			36



FRAMING PLAN

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-



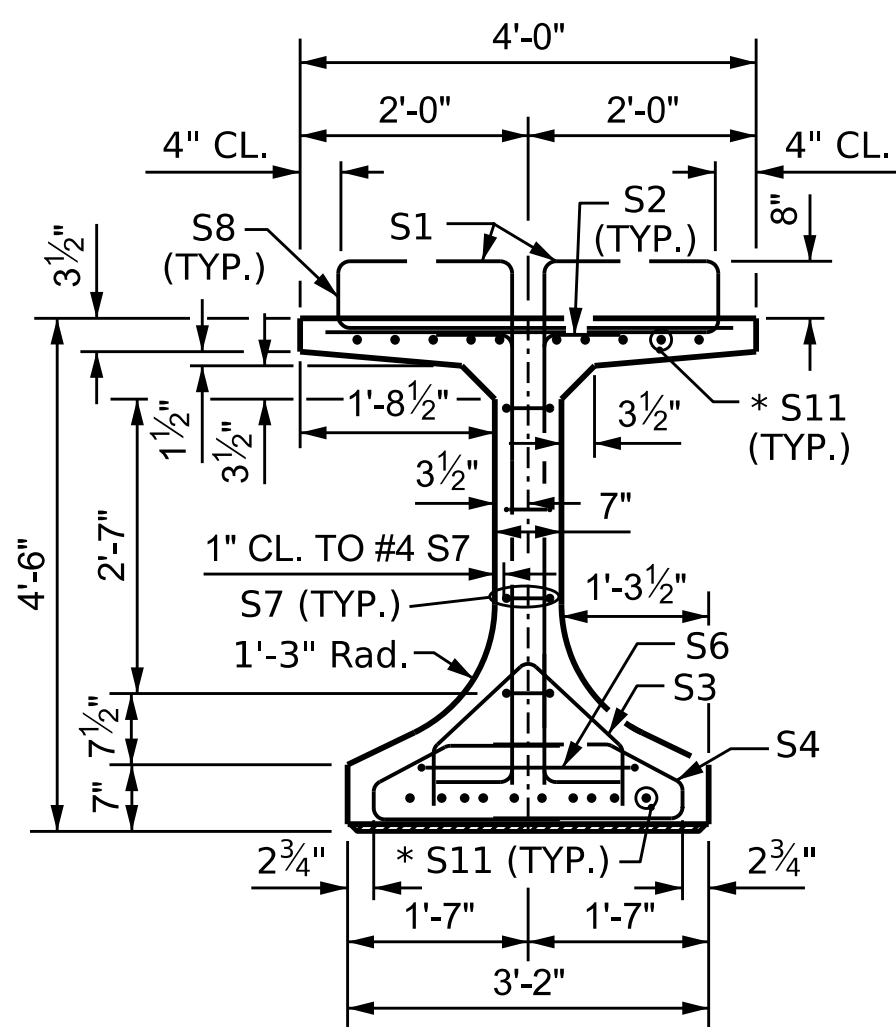
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 FRAMING PLAN

DRAWN BY : E. BAYISSA \ Q. T. NGUYEN DATE : 11/2023
 CHECKED BY : Z. MALIK DATE : 10/2023
 DESIGN ENGINEER OF RECORD: E. BAYISSA DATE : 07/2023

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

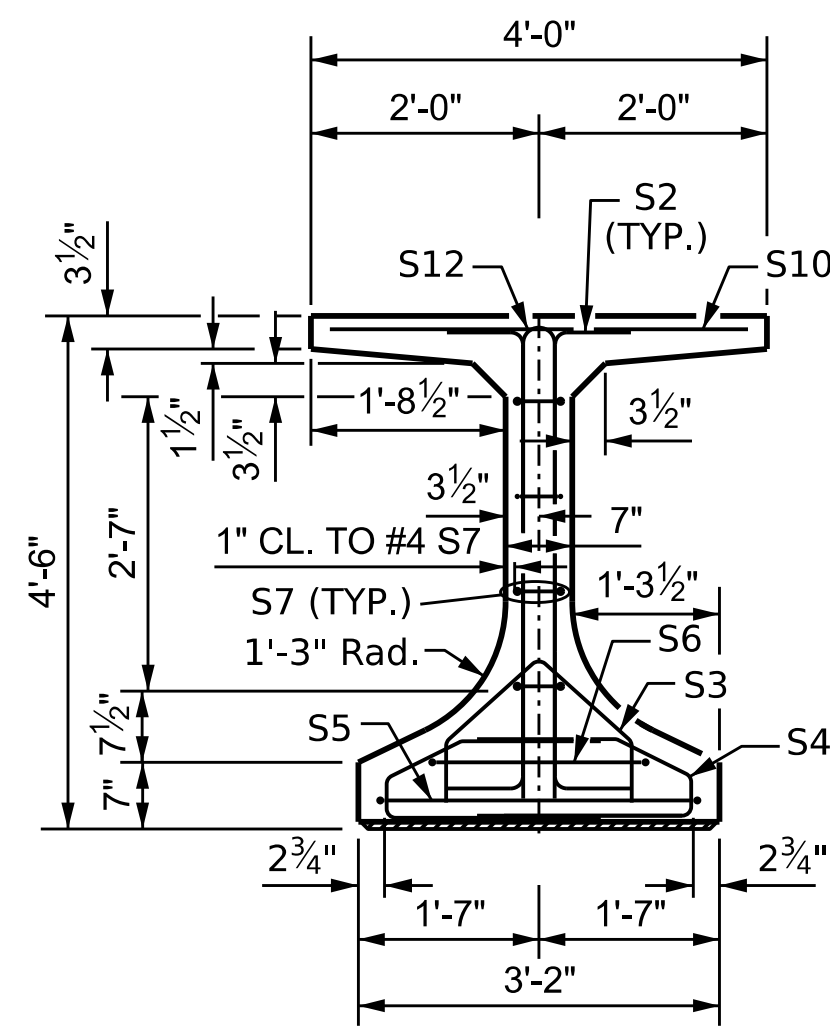
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			36

2/21/2024
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 ttnguyen1

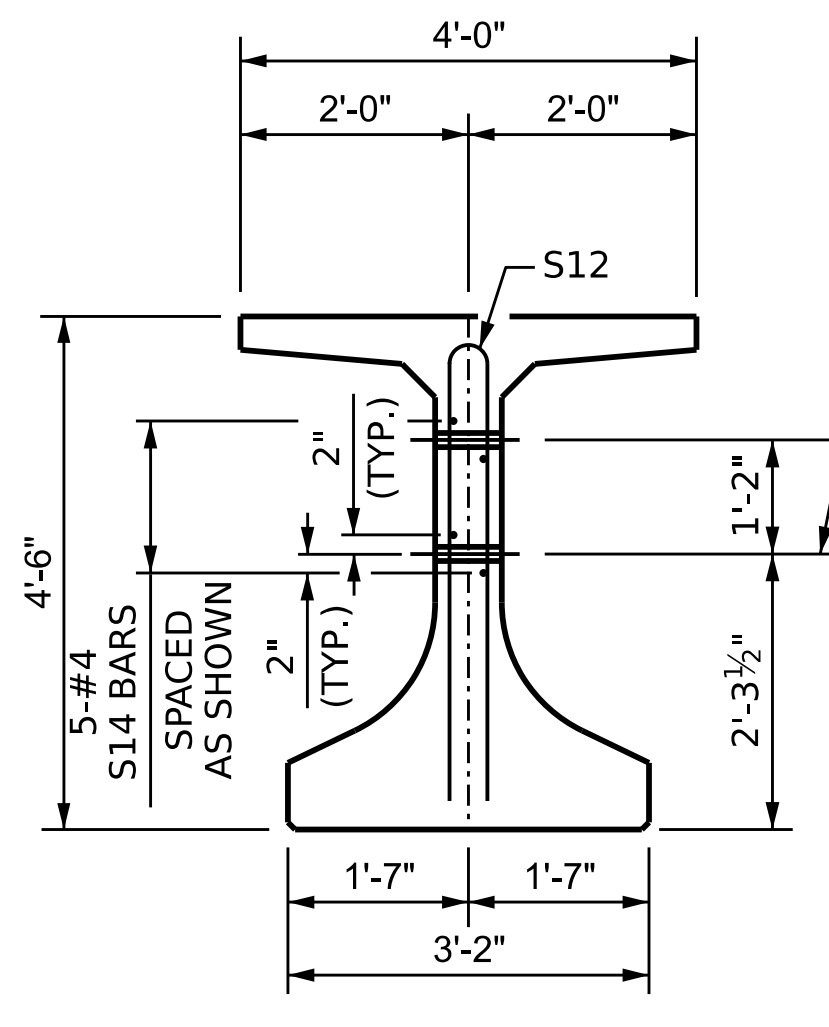


SECTION A-A

* FOR S11 BARS, SEE DETAIL "C" OF "FLORIDA I BEAM INTEGRAL END BENT DETAILS" SHEET



SECTION B-B



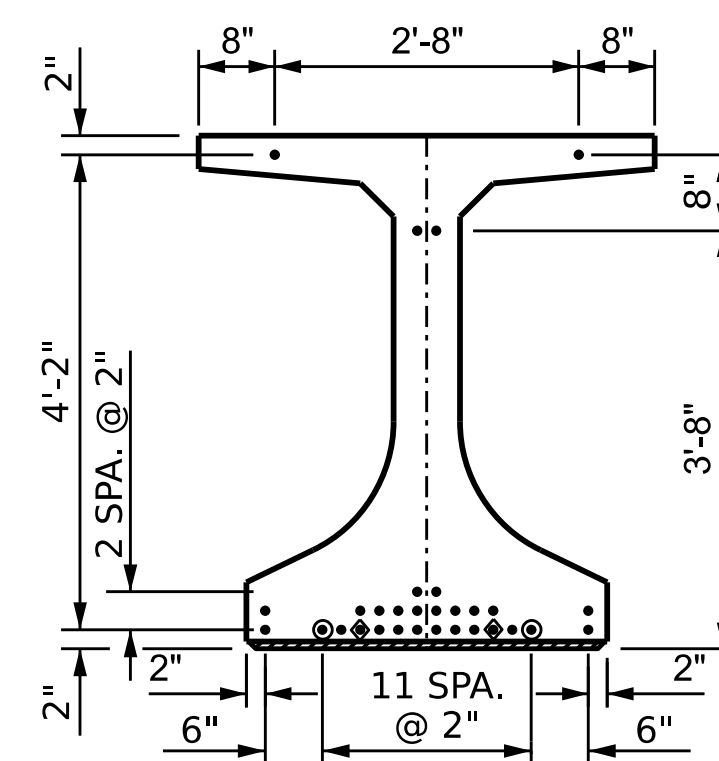
SECTION C-C

(S8, S9 AND S10 BARS NOT SHOWN)

1 1/2" Ø FORMED HOLE. (SEE FRAMING PLAN FOR LOCATION)

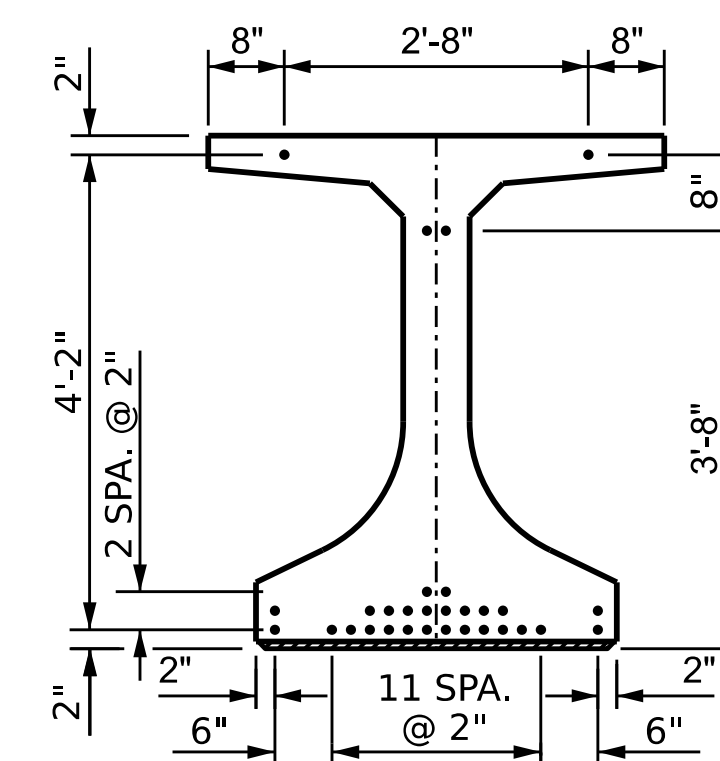
DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

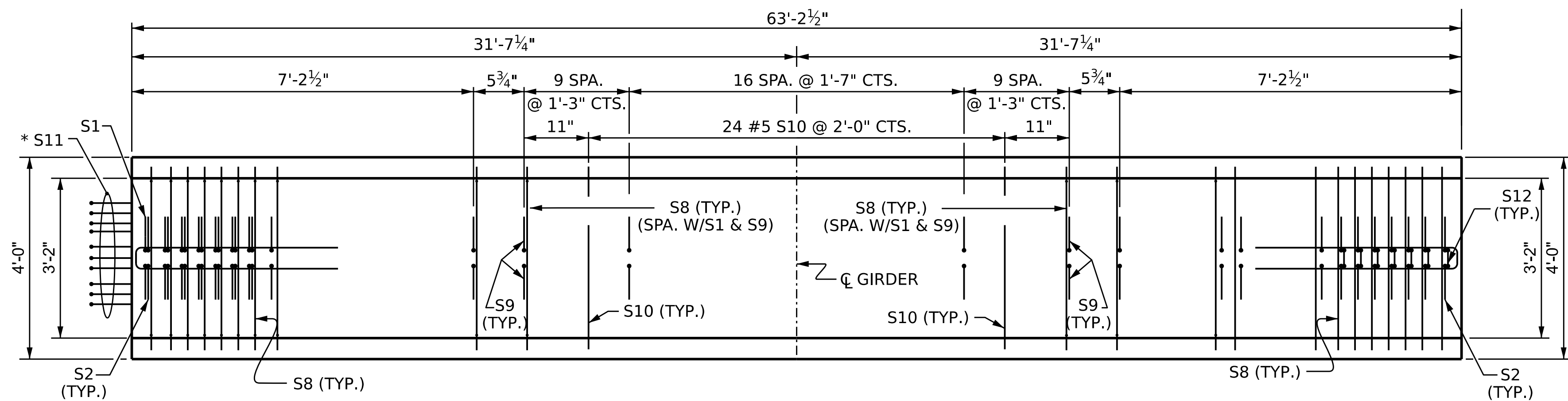


AT END OF GIRDER

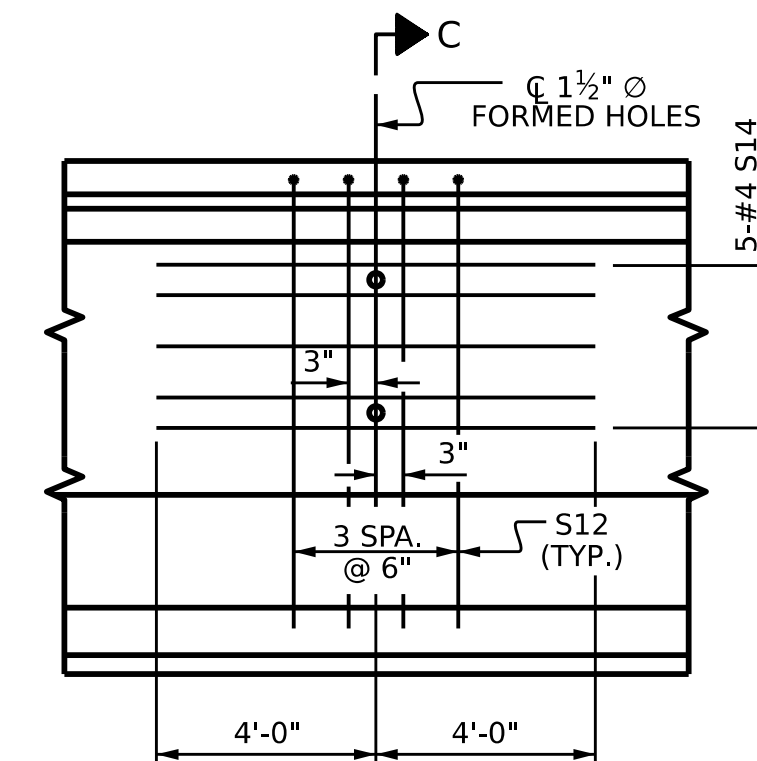
0.6" Ø LOW RELAXATION STRAND LAYOUT



AT C OF GIRDER

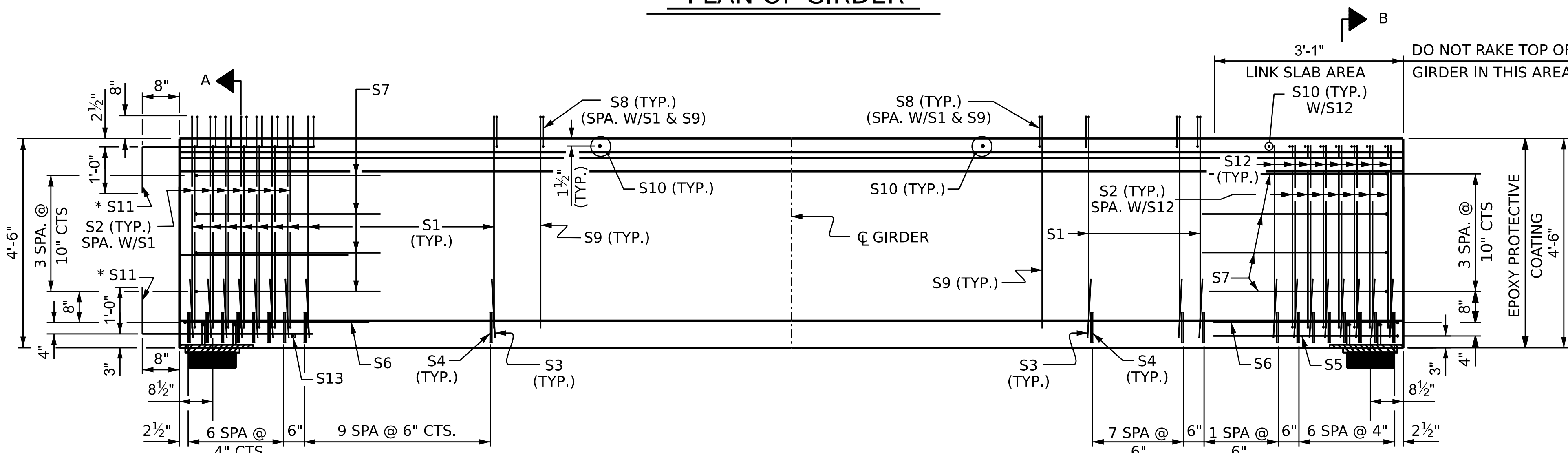


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS.



ELEVATION OF GIRDER

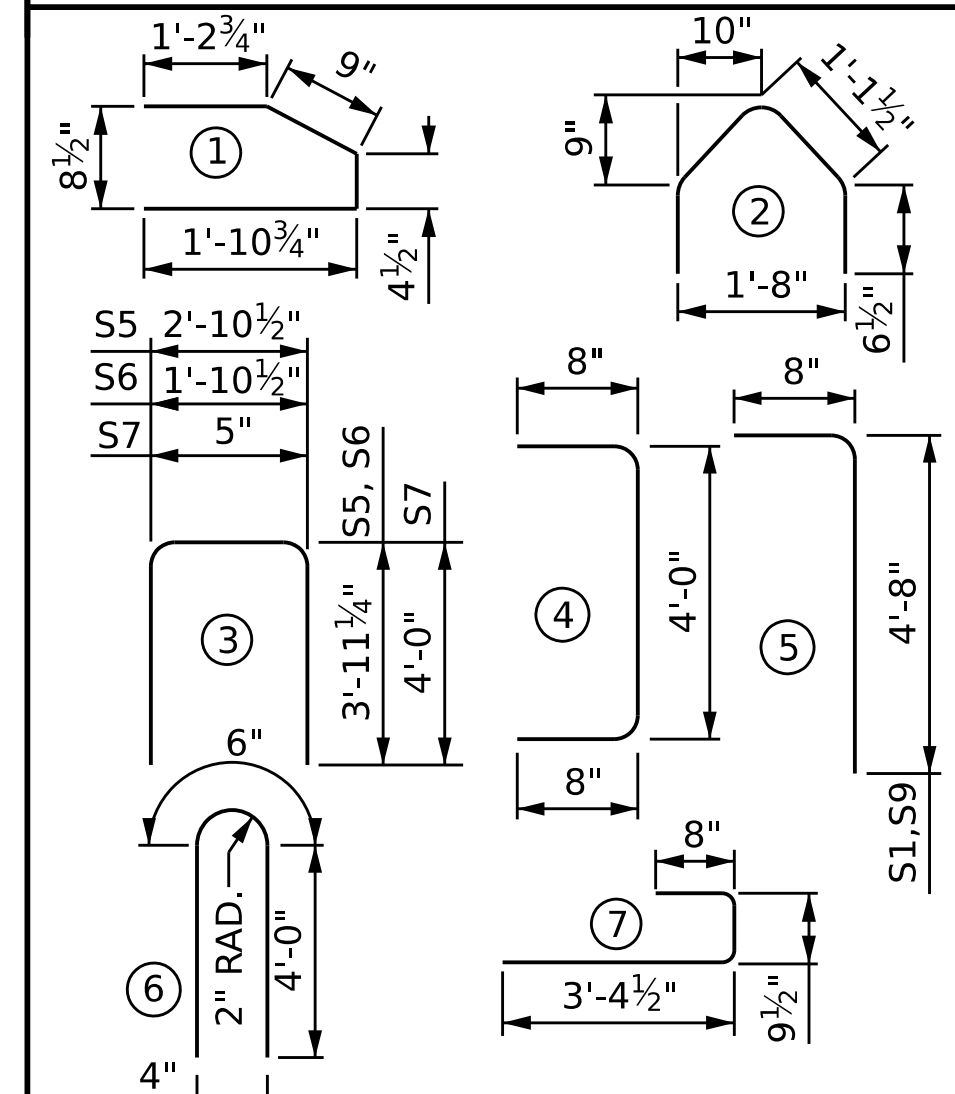
INTEGRAL END BENT

* NOTE:

S11 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

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	52	#5	5'-4"	289
S2	28	#5	4	156
S3	34	#3	2	43
S4	68	#3	1	109
S5	1	#5	3	11
S6	2	#5	3	20
S7	8	#4	3	45
S8	122	#5	7	615
S9	70	#4	5	249
S10	32	#5	STR	122
*S11	20	#6	STR	140
S12	12	#5	6	106
S13	1	#3	STR	1
S14	5	#4	STR	27

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	6500PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
1934	15.2	30

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	63'-2 1/2"	252'-10"

PROJECT NO. BR-0093
 ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 54" FIB PRESTRESSED
 CONCRETE GIRDER
 INTEGRAL END BENT
 LINK SLAB
 SPAN A

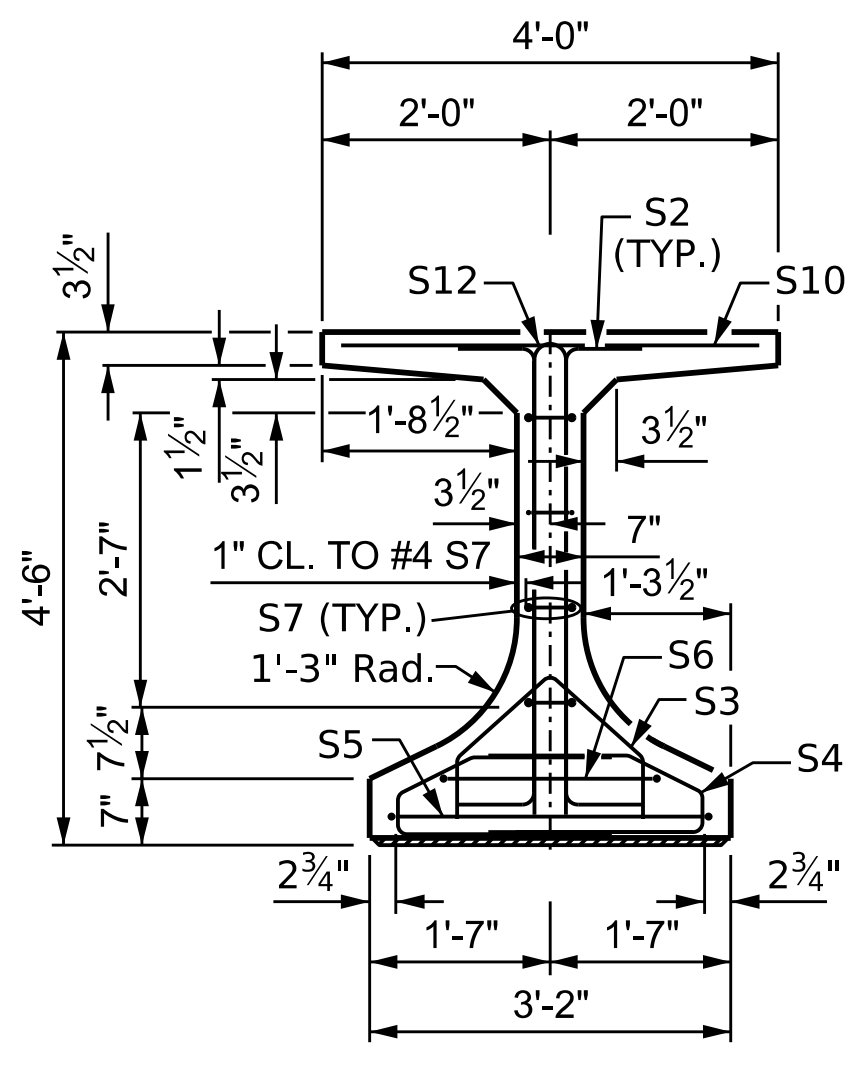


ASSEMBLED BY : E. BAYISSA DATE : 07/2023
 CHECKED BY : Z. MALIK DATE : 10/2023
 DRAWN BY : BNB 01/21
 CHECKED BY : AAI 08/22

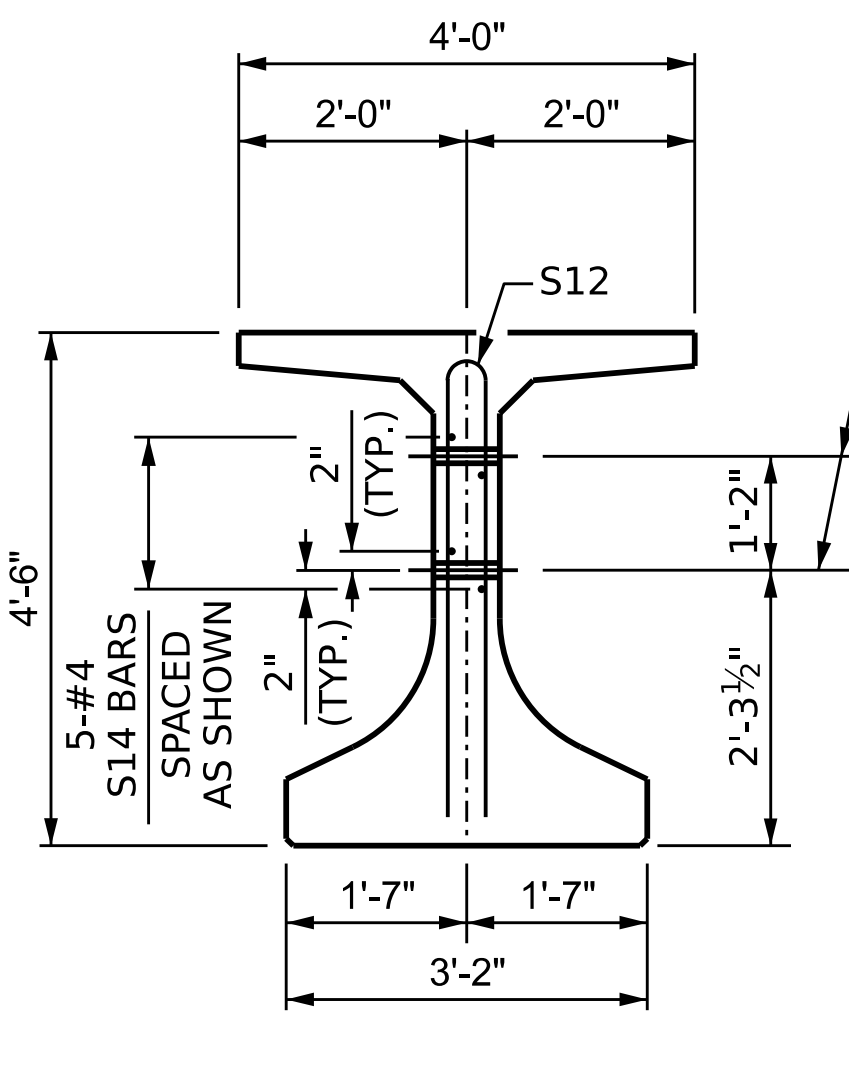
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

S-14
TOTAL SHEETS 36



SECTION B-B

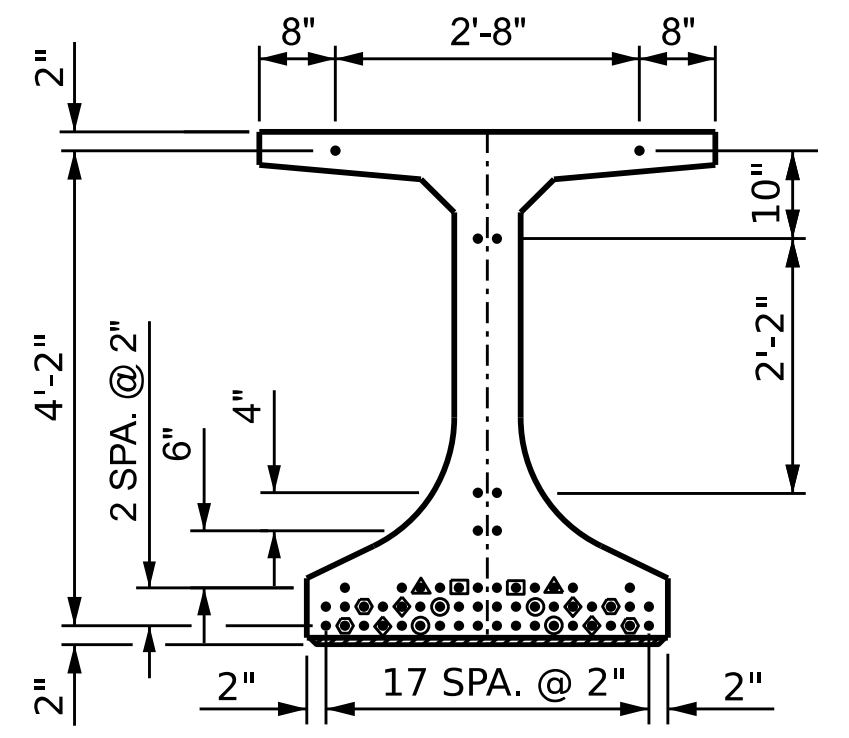


SECTION C-C
(S8, S9 AND S10 BARS NOT SHOWN)

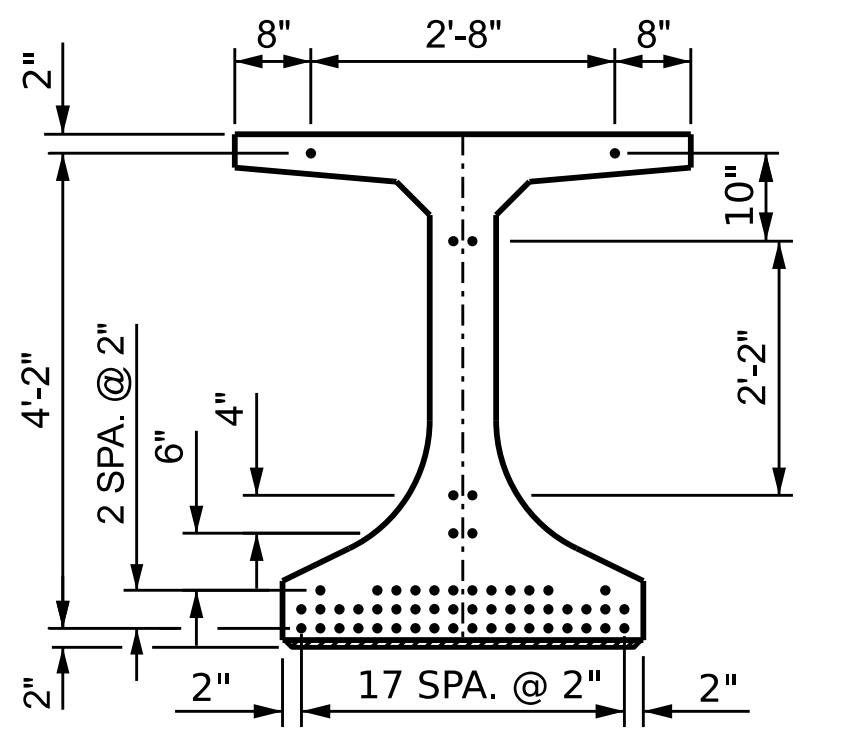
1/2" Ø FORMED HOLE. (SEE FRAMING PLAN FOR LOCATION)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- ⊙ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- ◇ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER
- ⊕ STRANDS DEBONDED FOR 18'-0" FROM END OF GIRDER

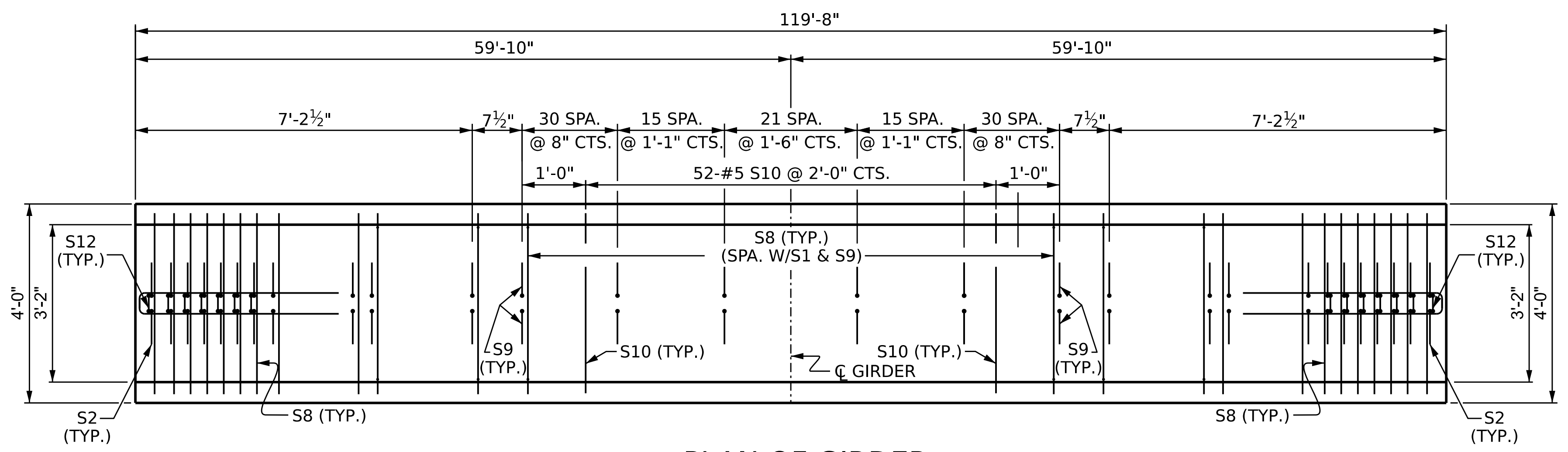


AT END OF GIRDER

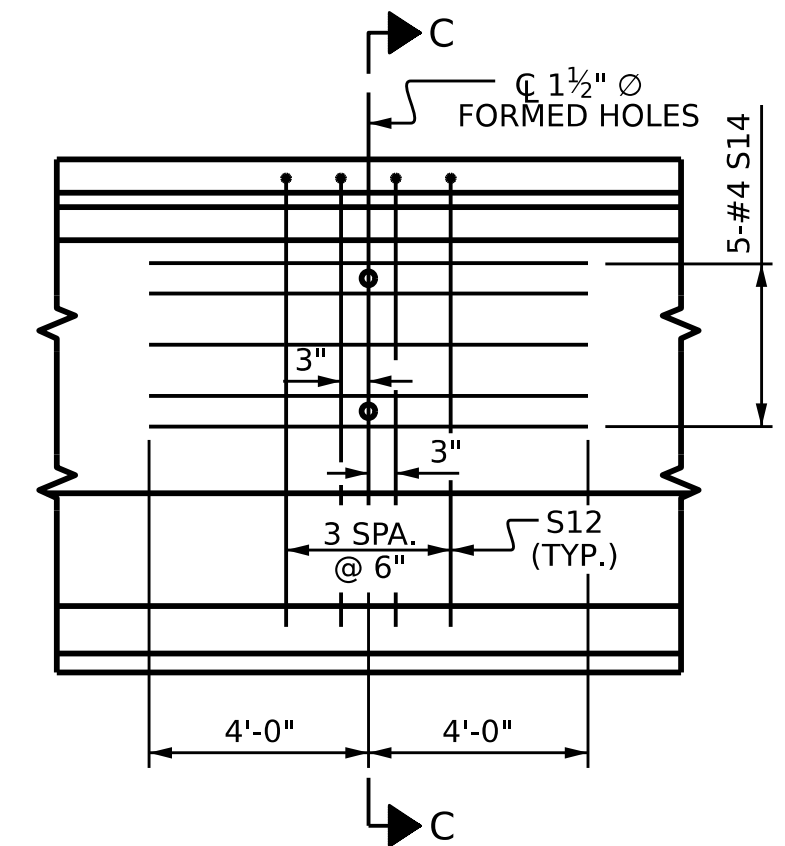


AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

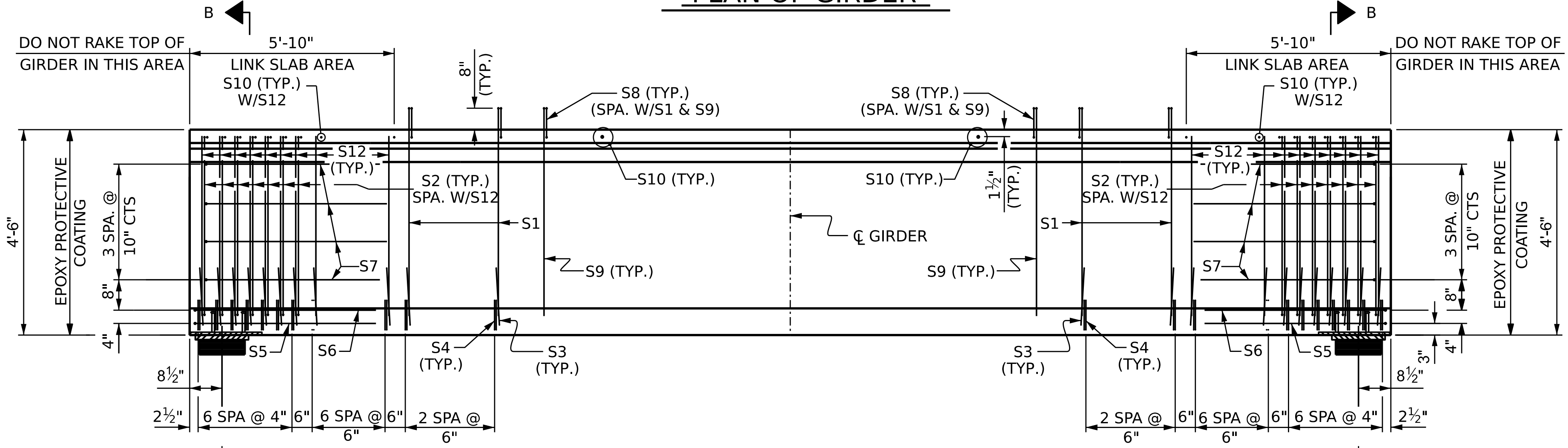


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

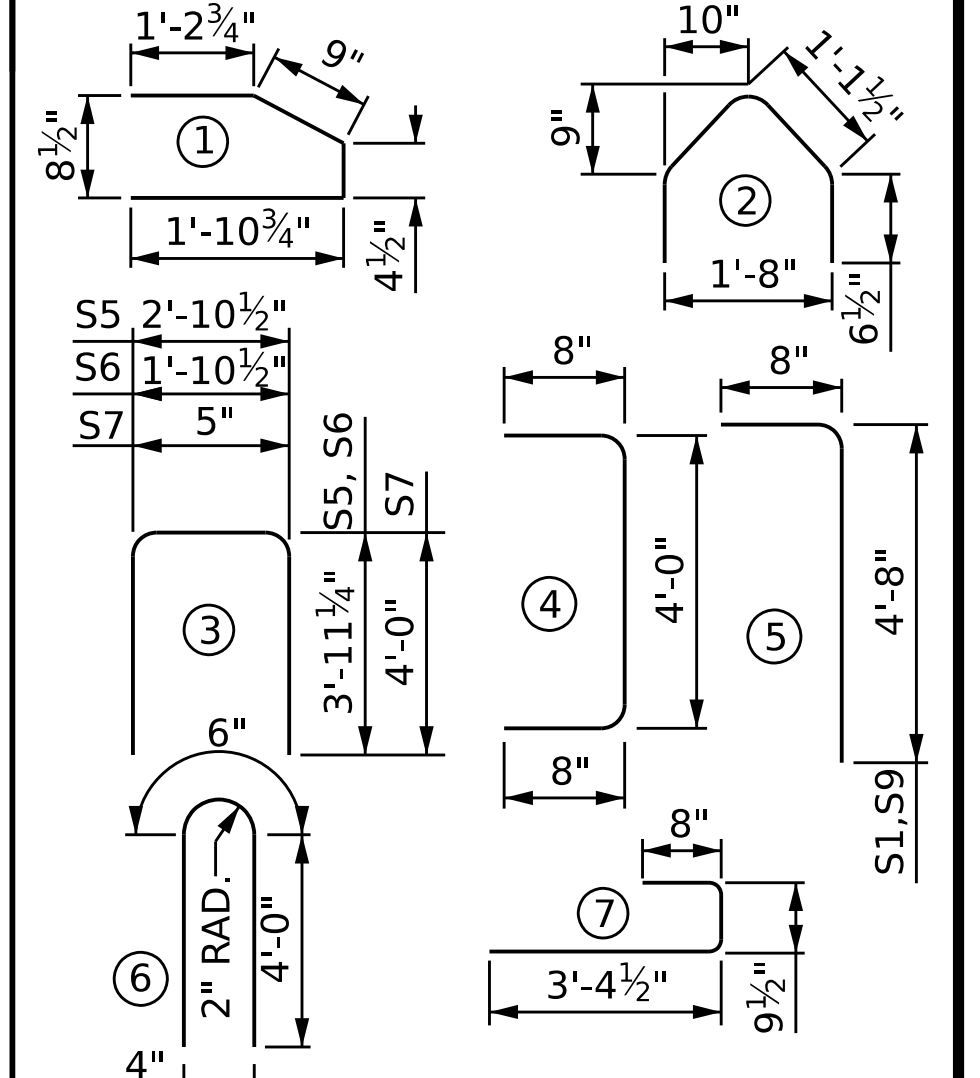


ELEVATION OF GIRDER

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

REINFORCING STEEL FOR ONE GDR				
BAR NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	12	#5	5'-4"	67
S2	28	#5	4'-4"	156
S3	34	#3	2'-4"	43
S4	68	#3	1'-3"	109
S5	2	#5	3'-10'-9"	22
S6	2	#5	3'-9'-9"	20
S7	8	#4	3'-8'-5"	45
S8	236	#5	7'-4'-10"	1190
S9	224	#4	5'-4"	798
S10	80	#5	STR 3'-8"	306
S12	36	#5	6'-8'-6"	319
S14	10	#4	STR 8'-0"	53

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL LB.	9500 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
3128	28.7	56

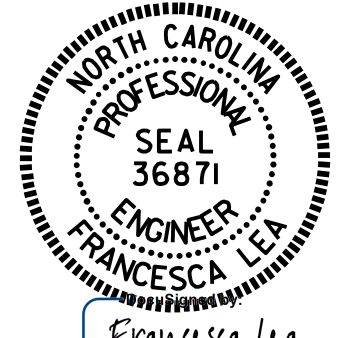
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	119'-8"	478'-8"

PROJECT NO. BR-0093
 ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 54" FIB PRESTRESSED
 CONCRETE GIRDER
 LINK SLAB
 SPAN B

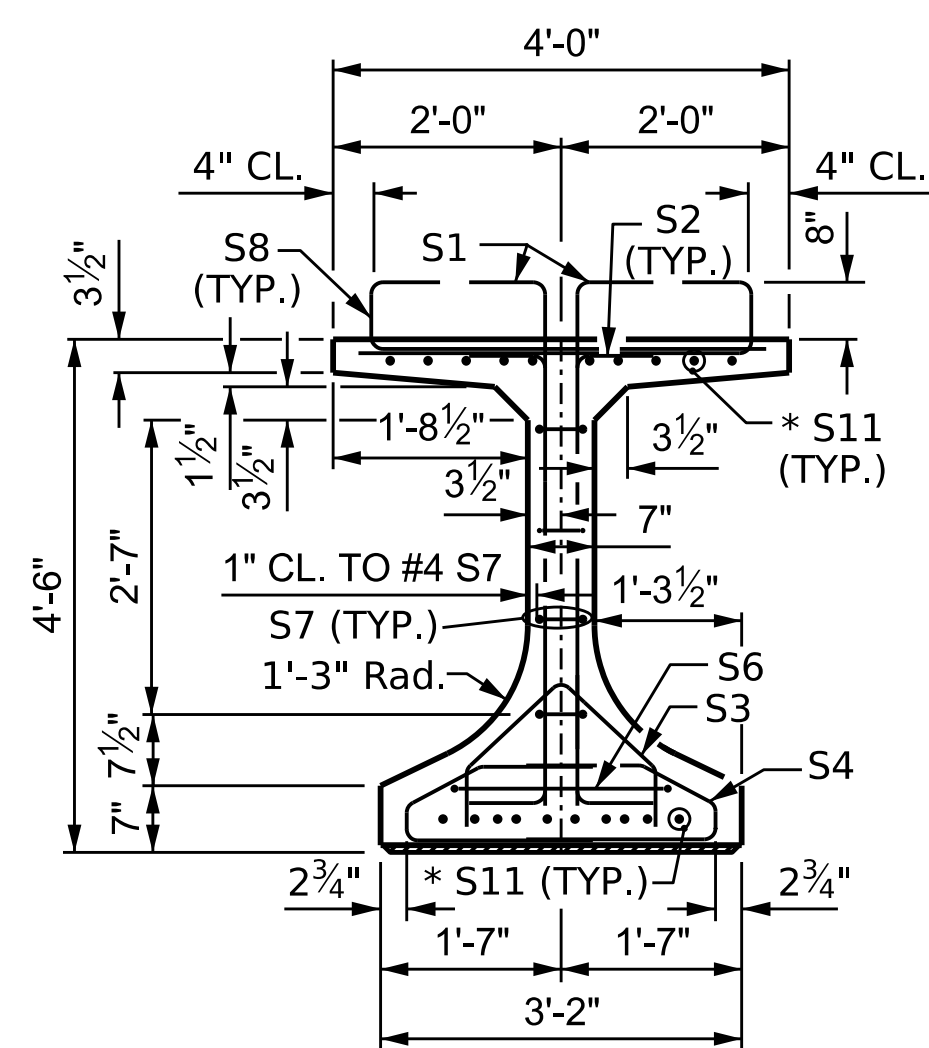


REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS	
36	

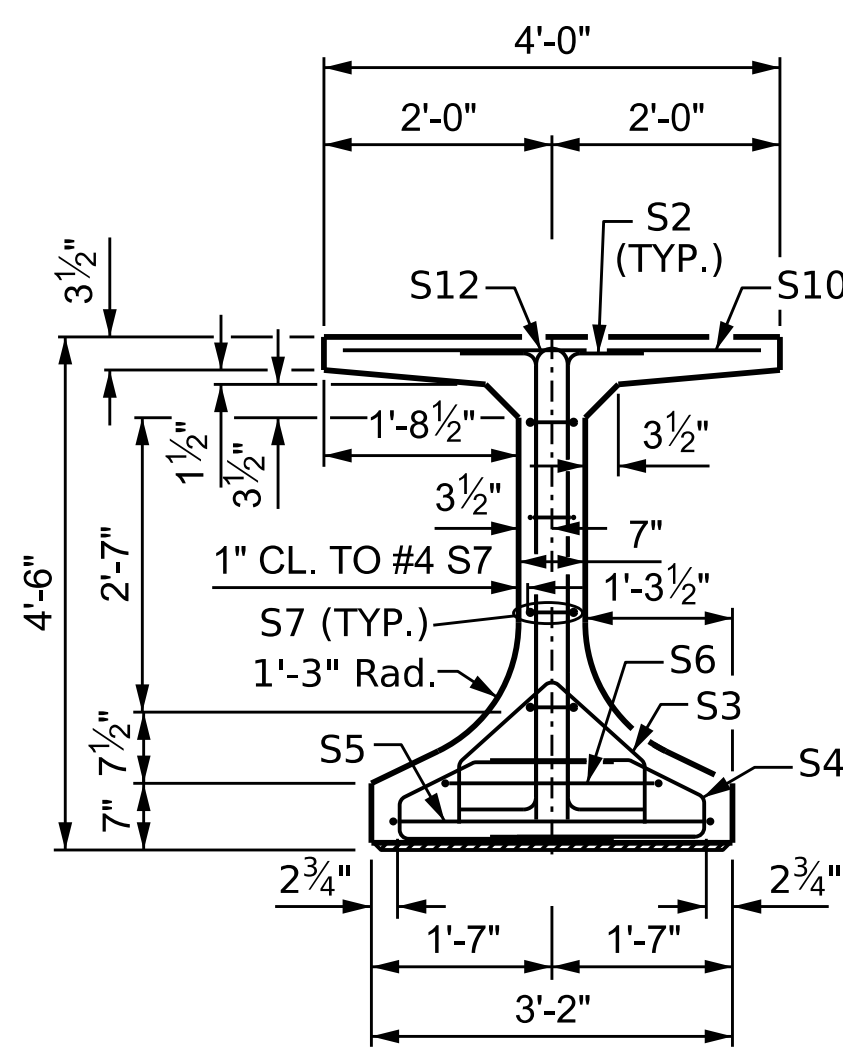
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY: E. BAYISSA DATE: 07/2023
 CHECKED BY: Z. MALIK DATE: 10/2023
 DRAWN BY: BNB 01/21
 CHECKED BY: AAI 08/22

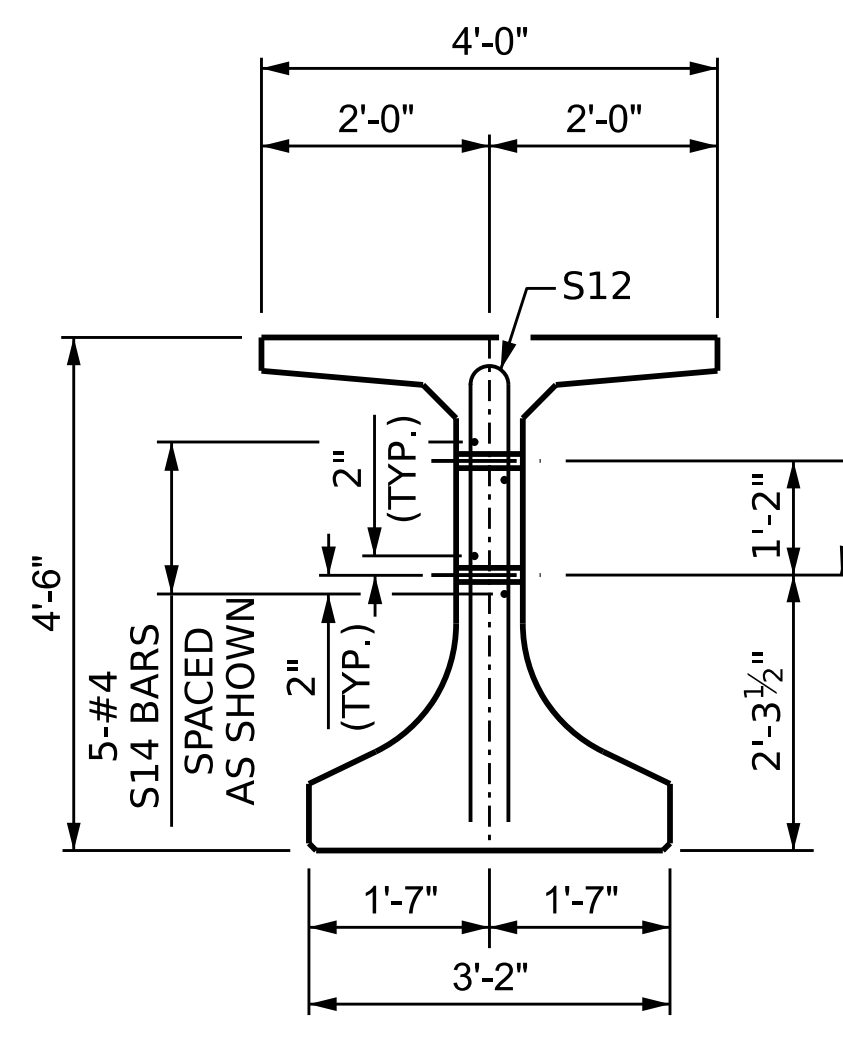


SECTION A-A

* FOR S11 BARS, SEE DETAIL "C" OF "FLORIDA I BEAM INTEGRAL END BENT DETAILS" SHEET



SECTION B-B

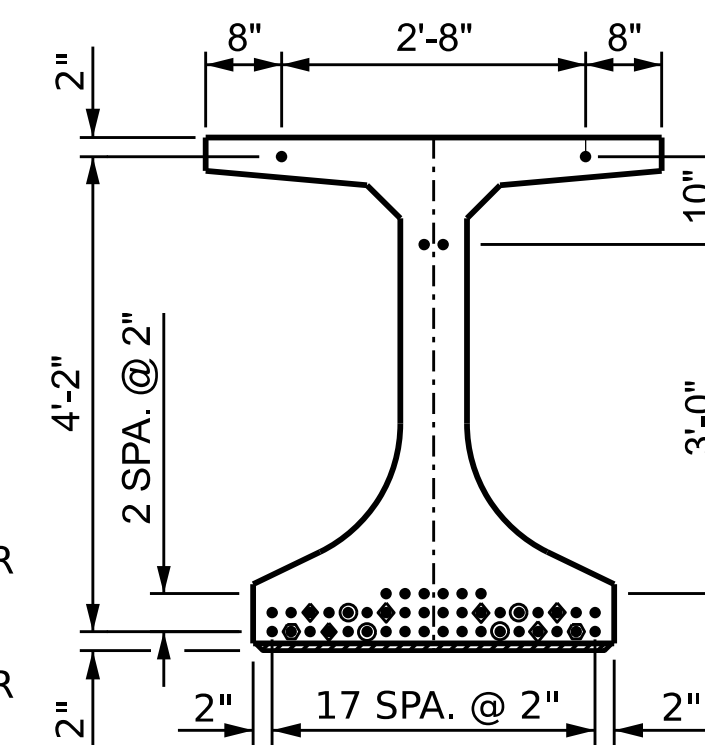


SECTION C-C
(S8, S9 AND S10 BARS NOT SHOWN)

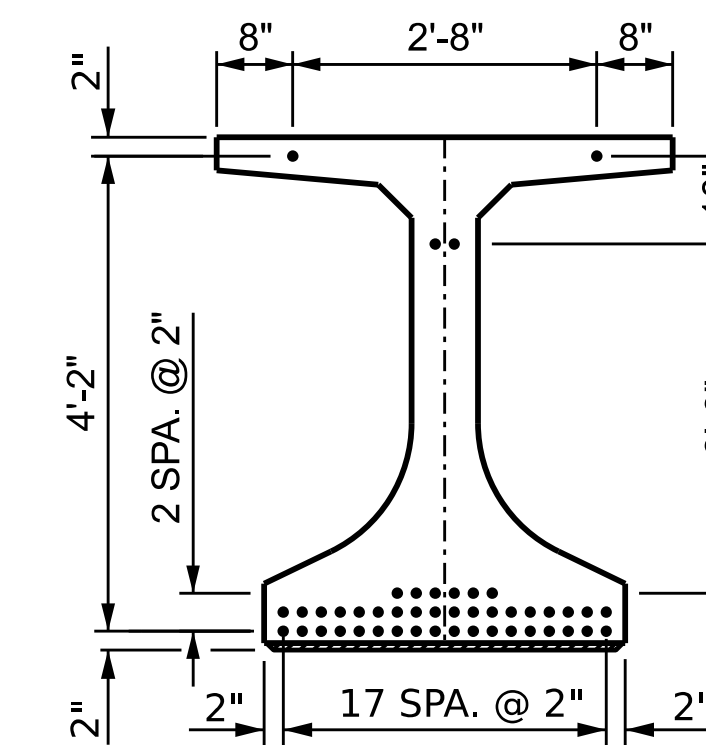
1 1/2" Ø FORMED HOLE. (SEE FRAMING PLAN FOR LOCATION)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- ◇ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER
- ⊙ STRANDS DEBONDED FOR 18'-0" FROM END OF GIRDER



AT END OF GIRDER



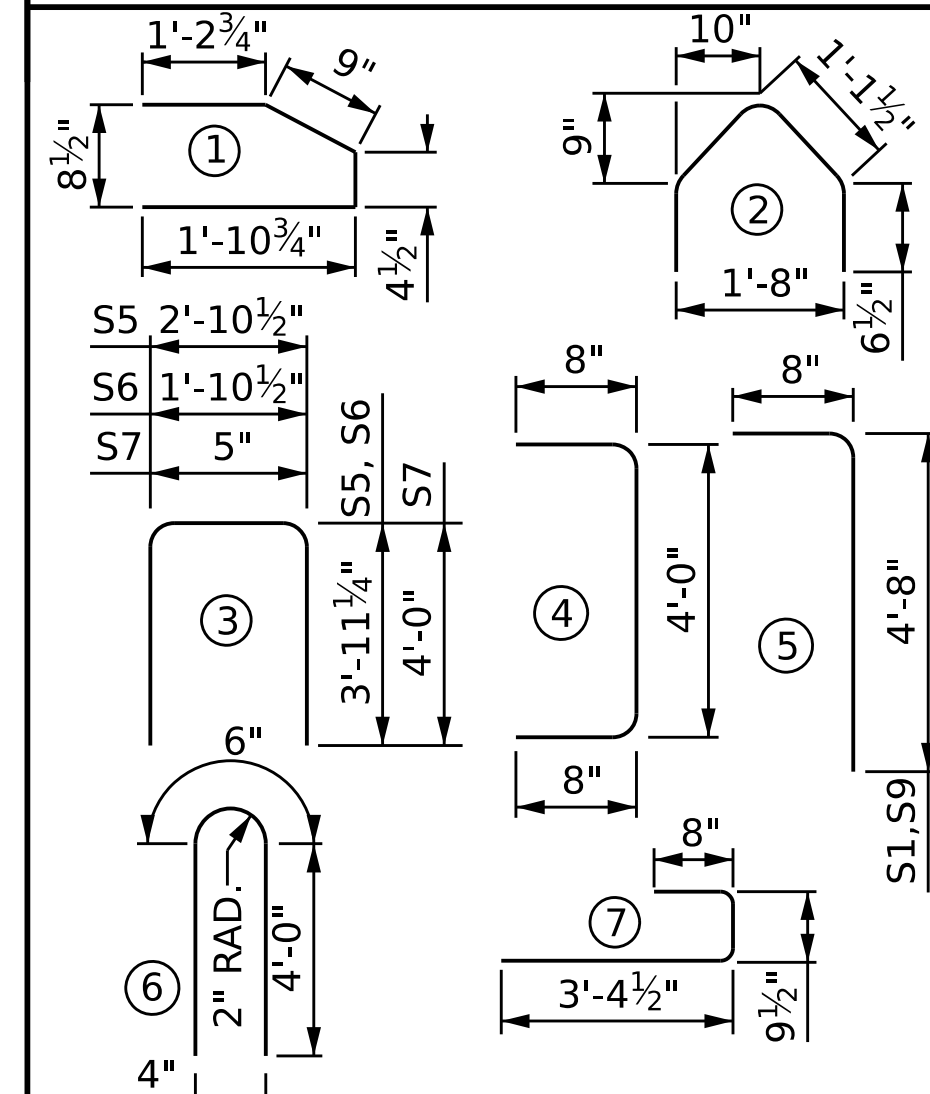
AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
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S3	34	#3	2'-4"	43
S4	68	#3	1'-3"	109
S5	1	#5	3'-10'-9"	11
S6	2	#5	3'-9'-9"	20
S7	8	#4	3'-8"	45
S8	198	#5	7'-4'-10"	998
S9	154	#4	5'-4"	549
S10	56	#5	STR 3'-8"	214
* S11	20	#6	STR 4'-8"	140
S12	20	#5	6'-8"	177
S13	1	#3	STR 2'-10"	1
S14	10	#4	STR 8'-0"	53

BAR TYPES



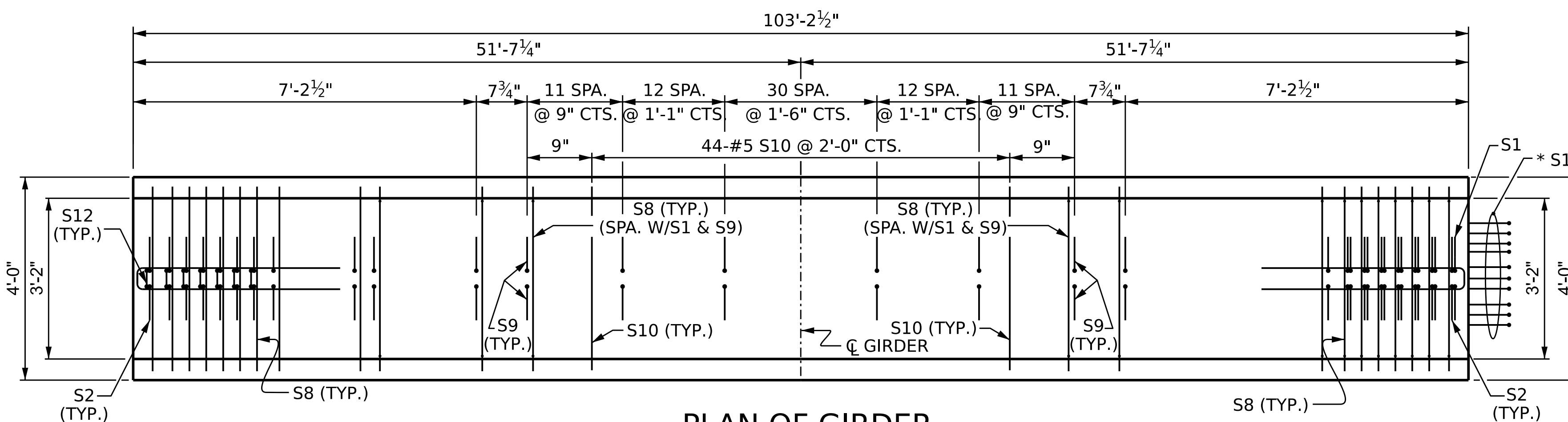
ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

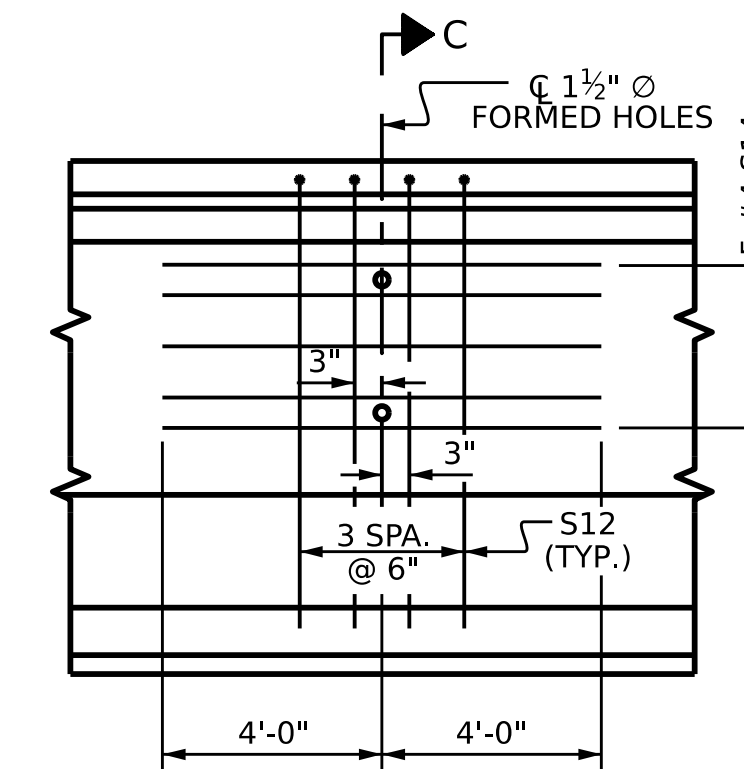
REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
2761	24.8	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	103'-2 1/2"	412'-10"

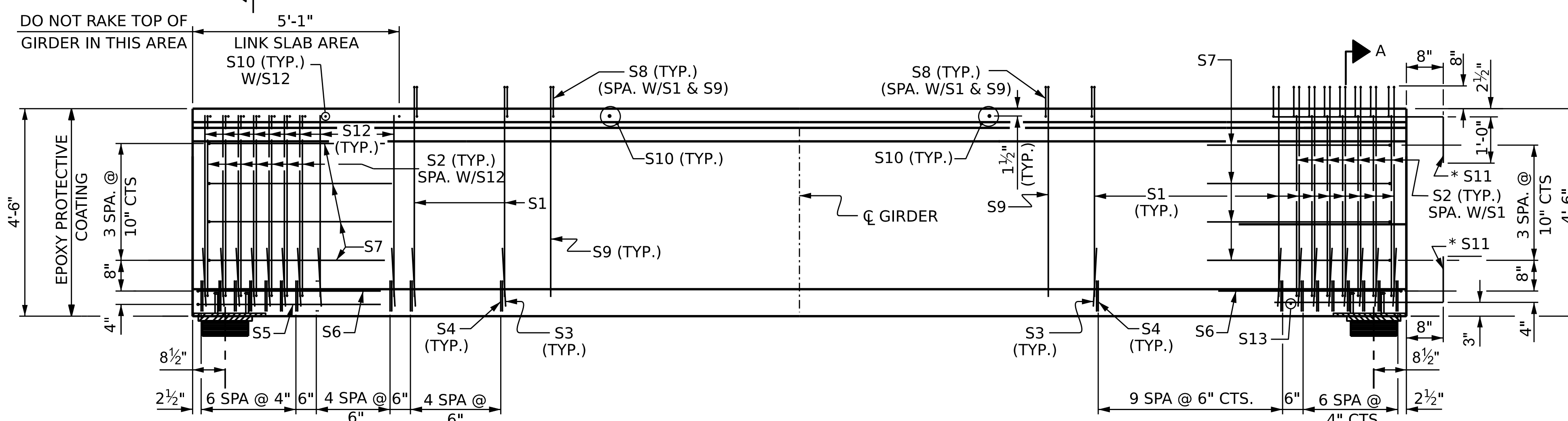


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS



ELEVATION OF GIRDER

INTEGRAL END BENT

* NOTE:
S11 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



PROJECT NO. BR-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-

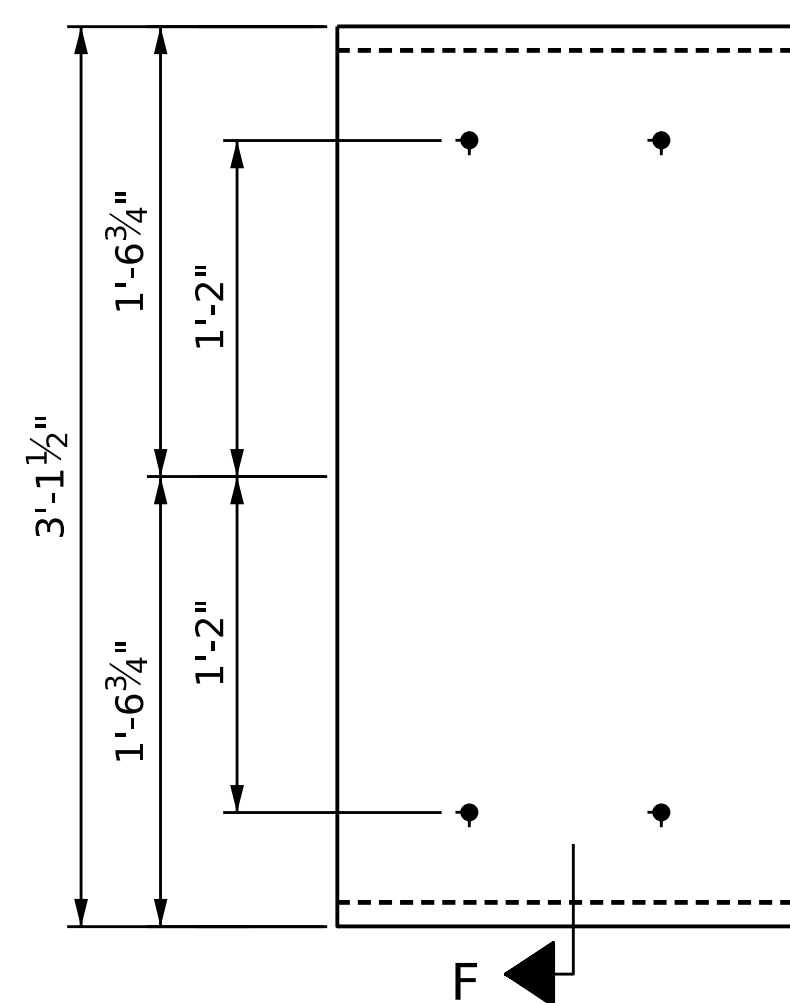
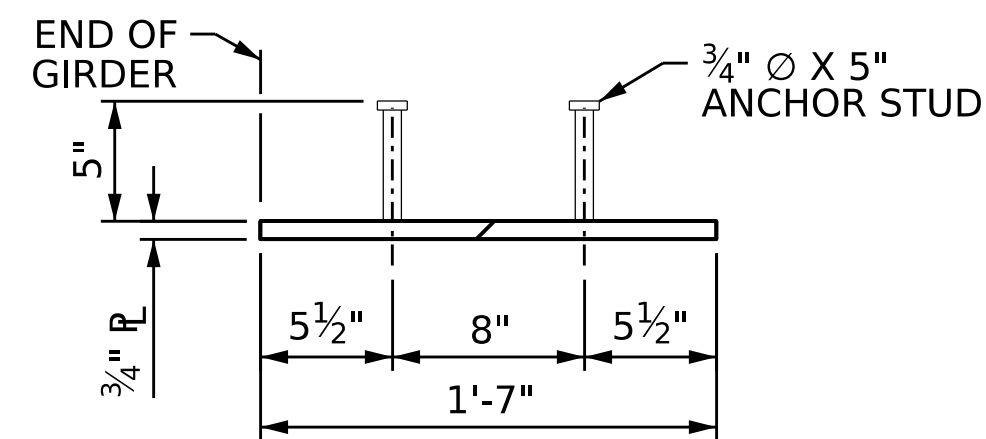
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
54" FIB PRESTRESSED
CONCRETE GIRDER
LINK SLAB
SPAN C

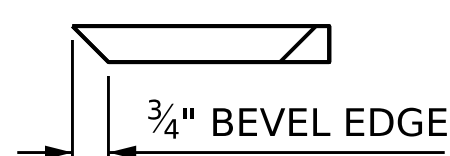
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

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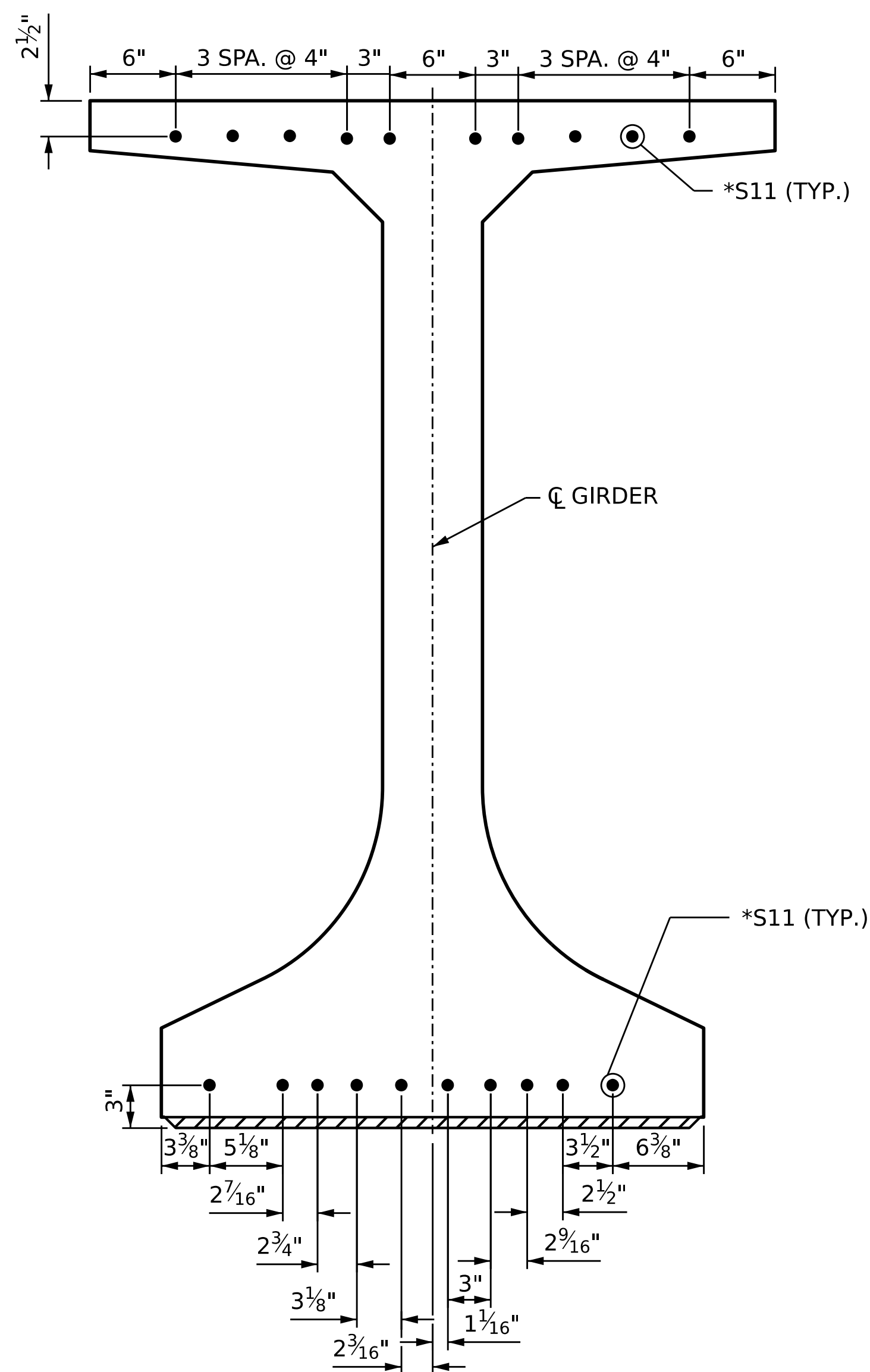
ASSEMBLED BY: E. BAYISSA DATE: 07/2023
CHECKED BY: Z. MALIK DATE: 10/2023
DRAWN BY: BNB 01/21
CHECKED BY: AAI 08/22



**EMBEDDED PLATE "B-1" DETAILS
FOR FLORIDA I BEAM**
(2 REQ'D PER GIRDER)



SECTION "F"
(SEE NOTES)



DETAIL "C"
(FLORIDA I BEAM)

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 SUB SECTION 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 4600 PSI FOR SPAN A, NOT LESS THAN 7200 PSI FOR SPAN B, AND NOT LESS THAN 5600 PSI FOR SPAN C.

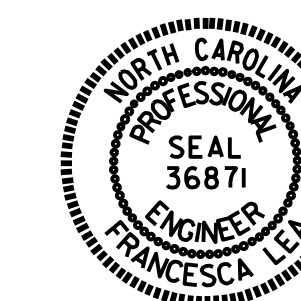
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4" AND THE PORTION WITHIN THE LINK SLAB AREAS, SHALL BE RAKED TO A DEPTH OF 1/4".

NO WELDING OF THE FORMS OR FALSEWORK TO THE TOP OF THE GIRDER WILL BE PERMITTED IN THE LINK SLAB AREAS.

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-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-
SHEET 4 OF 4



DocuSigned by:
Francesca Lea
05/01/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
FLORIDA I BEAMS
INTEGRAL END BENT
DETAILS

ASSEMBLED BY: E. BAYISSA	DATE: 01/2024
CHECKED BY: ZIA MALIK	DATE: 01/2024
DRAWN BY: AAI 09/23	
CHECKED BY: -	

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			36

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

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

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

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

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

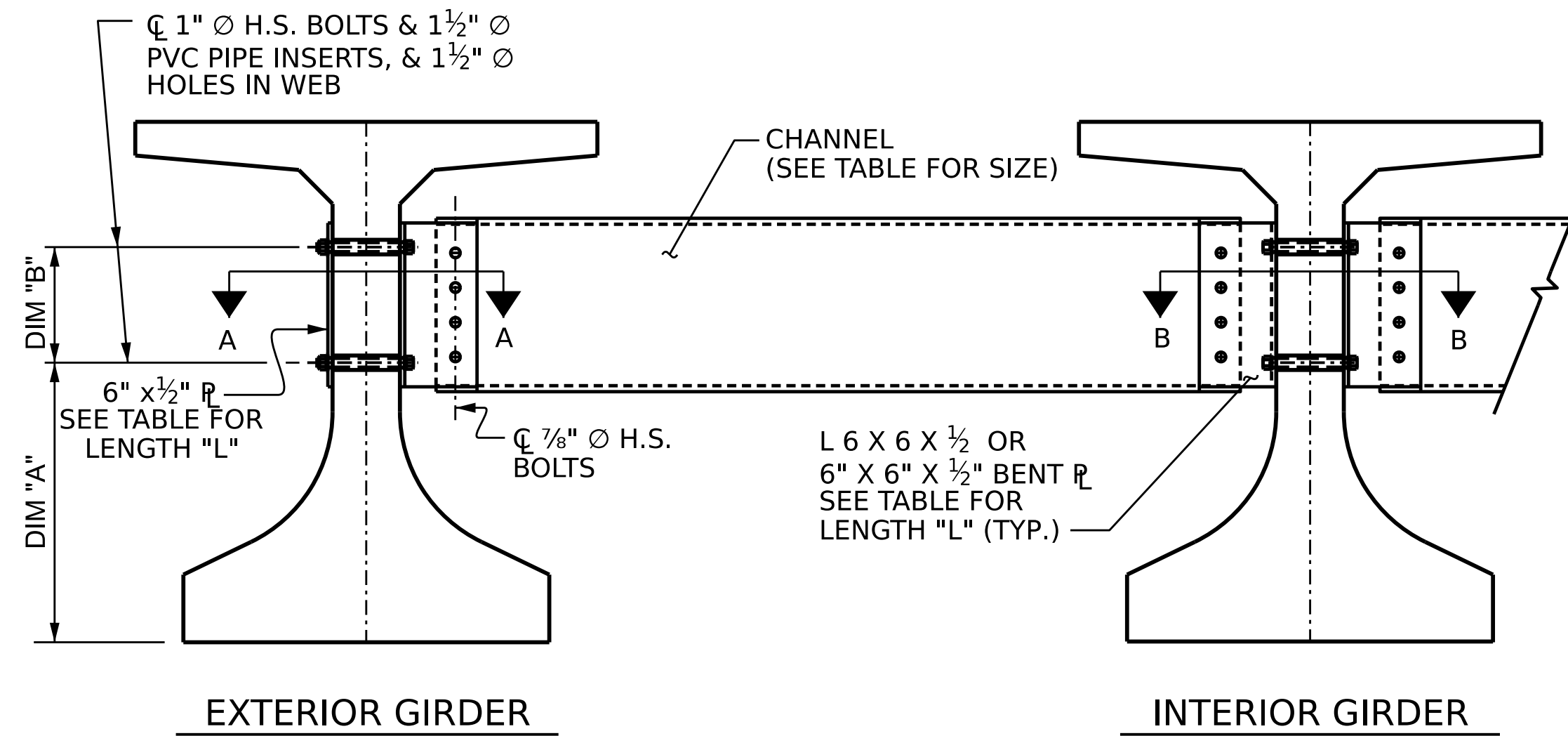
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

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

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

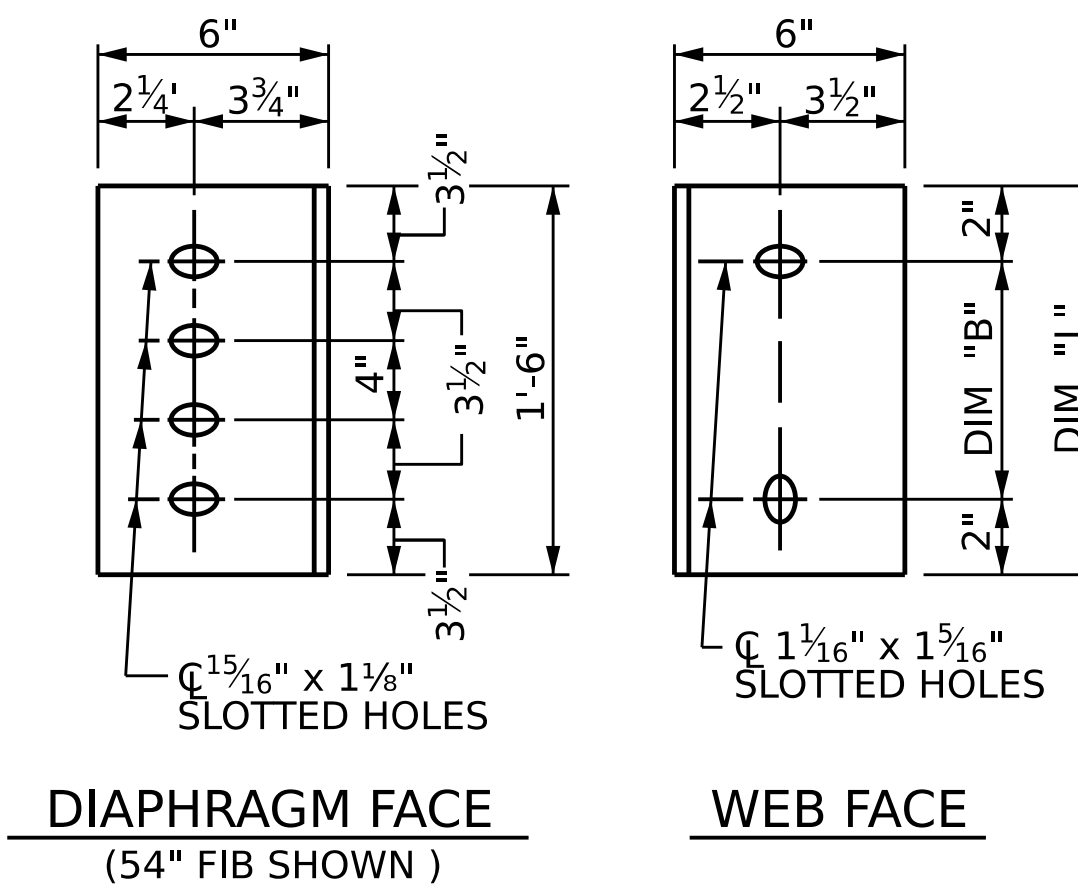
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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



PART SECTION AT INTERMEDIATE DIAPHRAGM

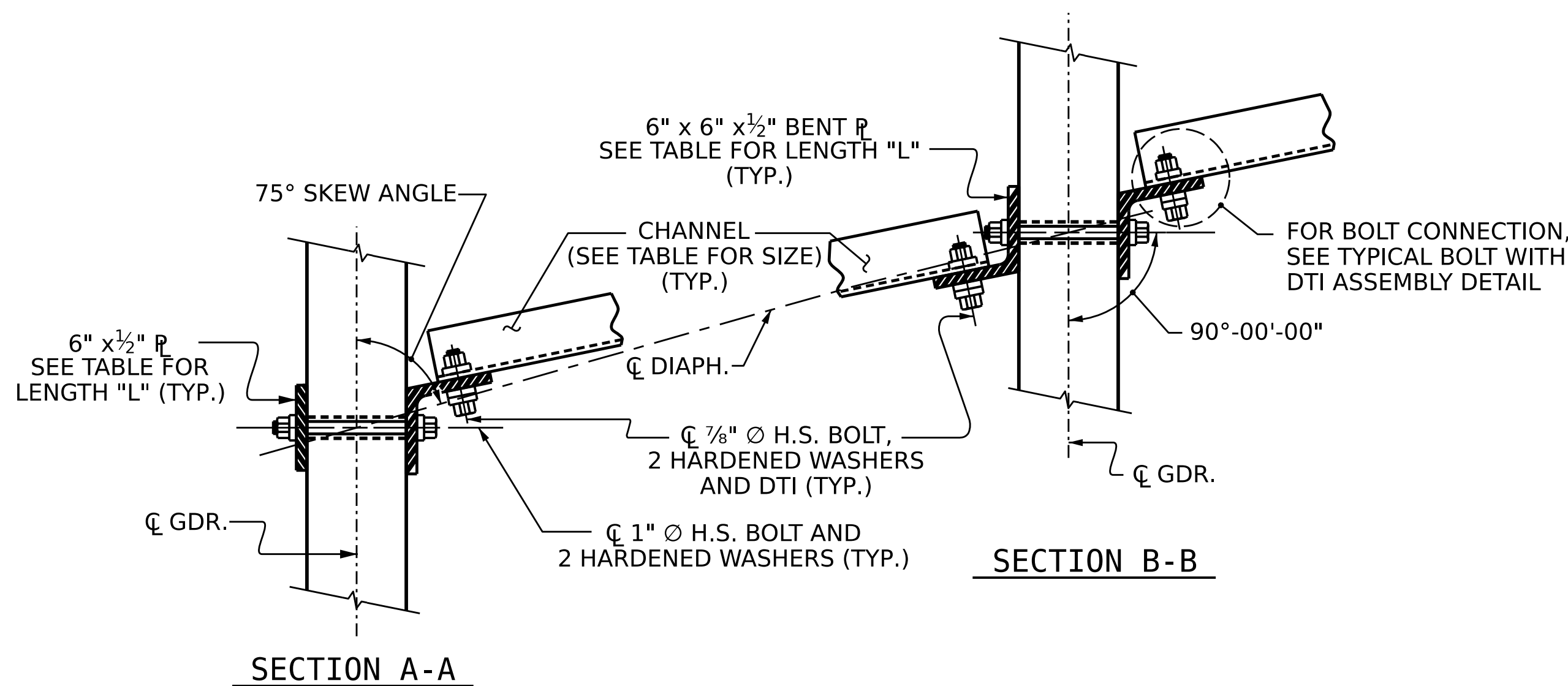
(54" FIB SHOWN)



DIAPHRAGM FACE
(54" FIB SHOWN)

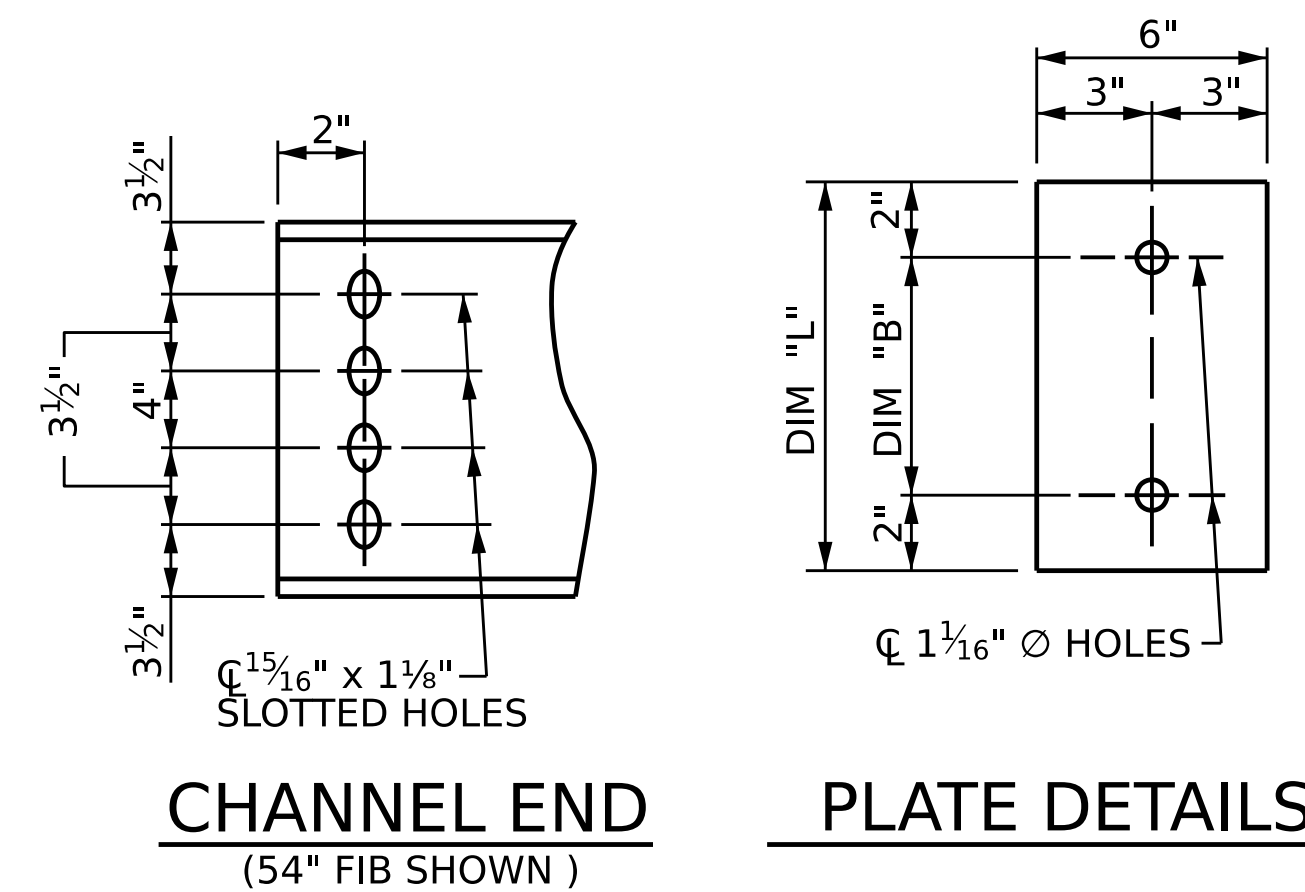
WEB FACE

CONNECTOR PLATE DETAILS



CONNECTION DETAILS

(FOR 70° ≤ SKEW < 90°)

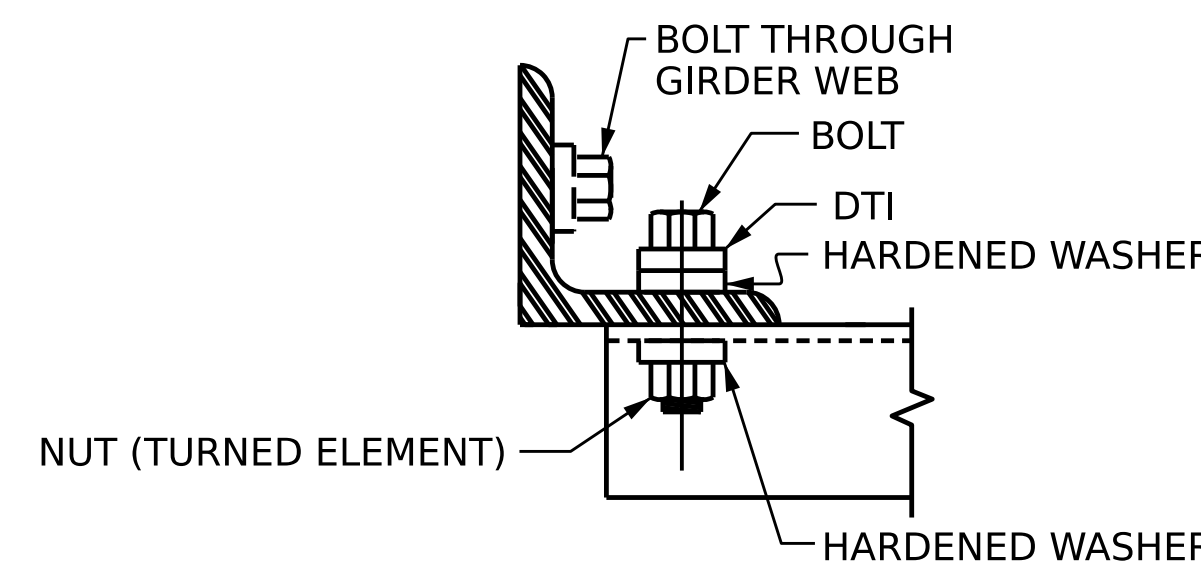


CHANNEL END
(54" FIB SHOWN)

PLATE DETAILS

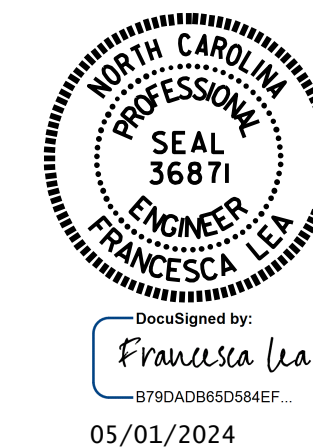
TABLE

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



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 INTERMEDIATE
 STEEL DIAPHRAGMS
 FOR 54" FIB

ASSEMBLED BY : E.BAYISSA DATE : 07/2023
 CHECKED BY : ZIA MALIK DATE : 10/2023
 DRAWN BY : BNB 01/21
 CHECKED BY : AAI 01/21

REV. ---/---
 REV. ---/---

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			36

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.

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.

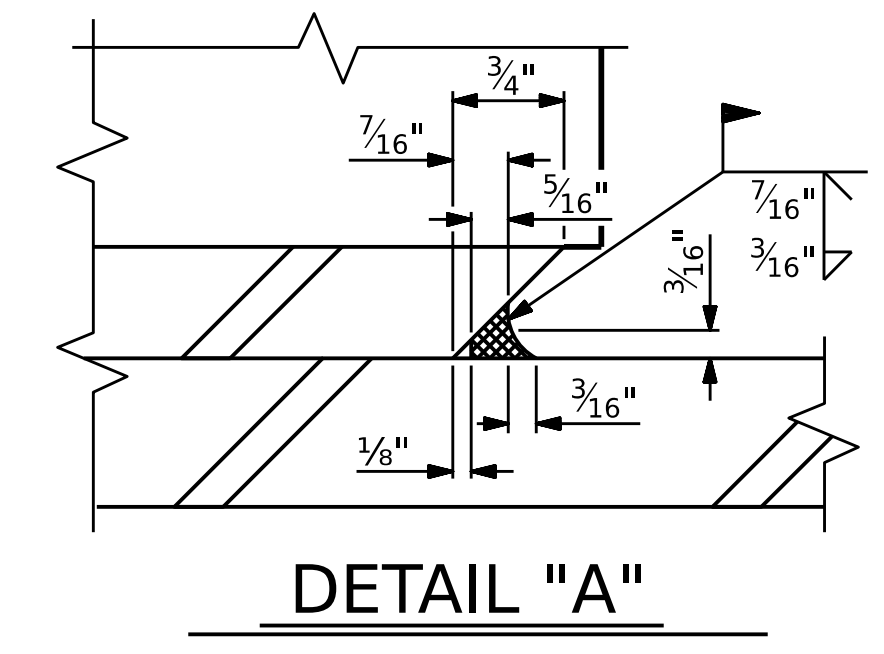
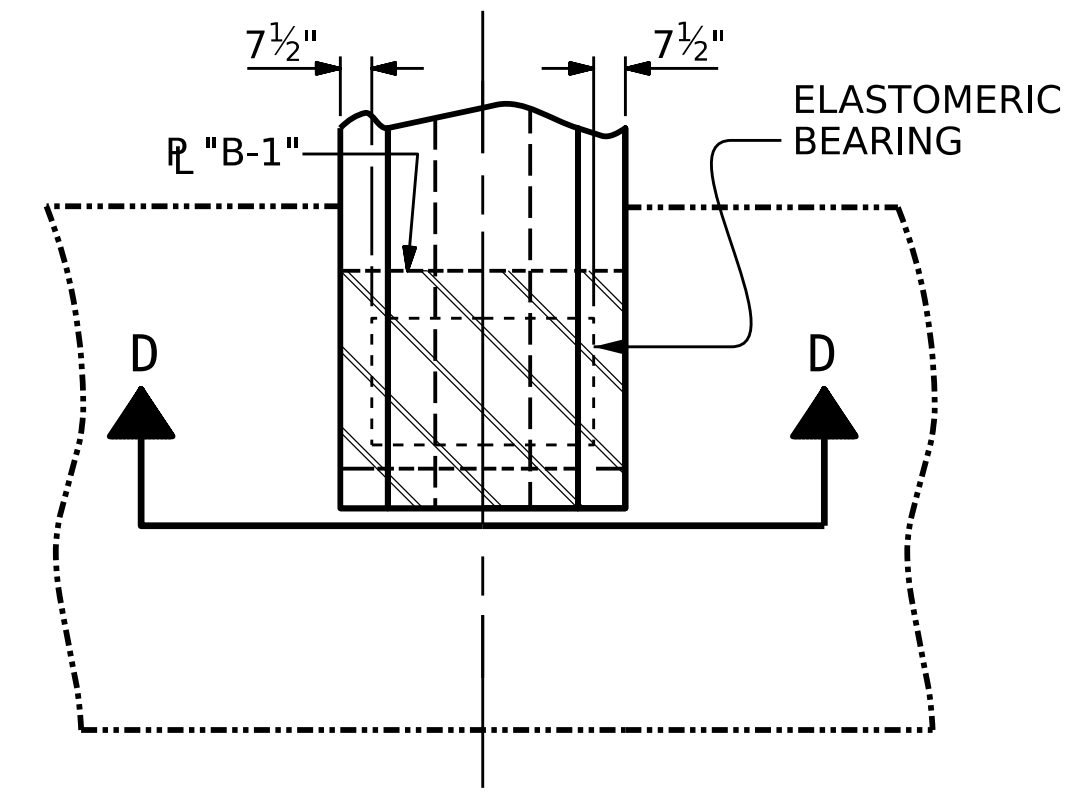
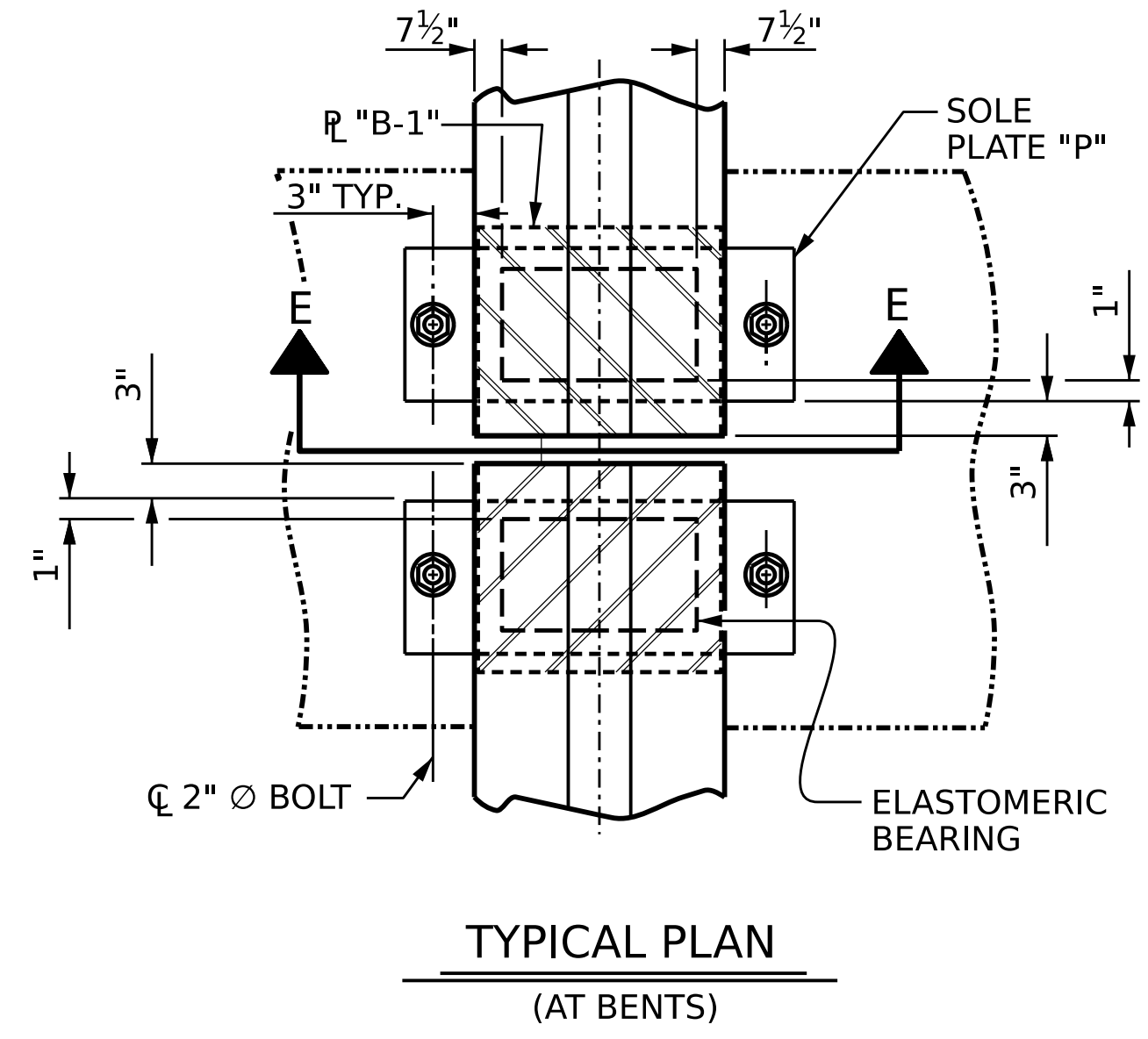
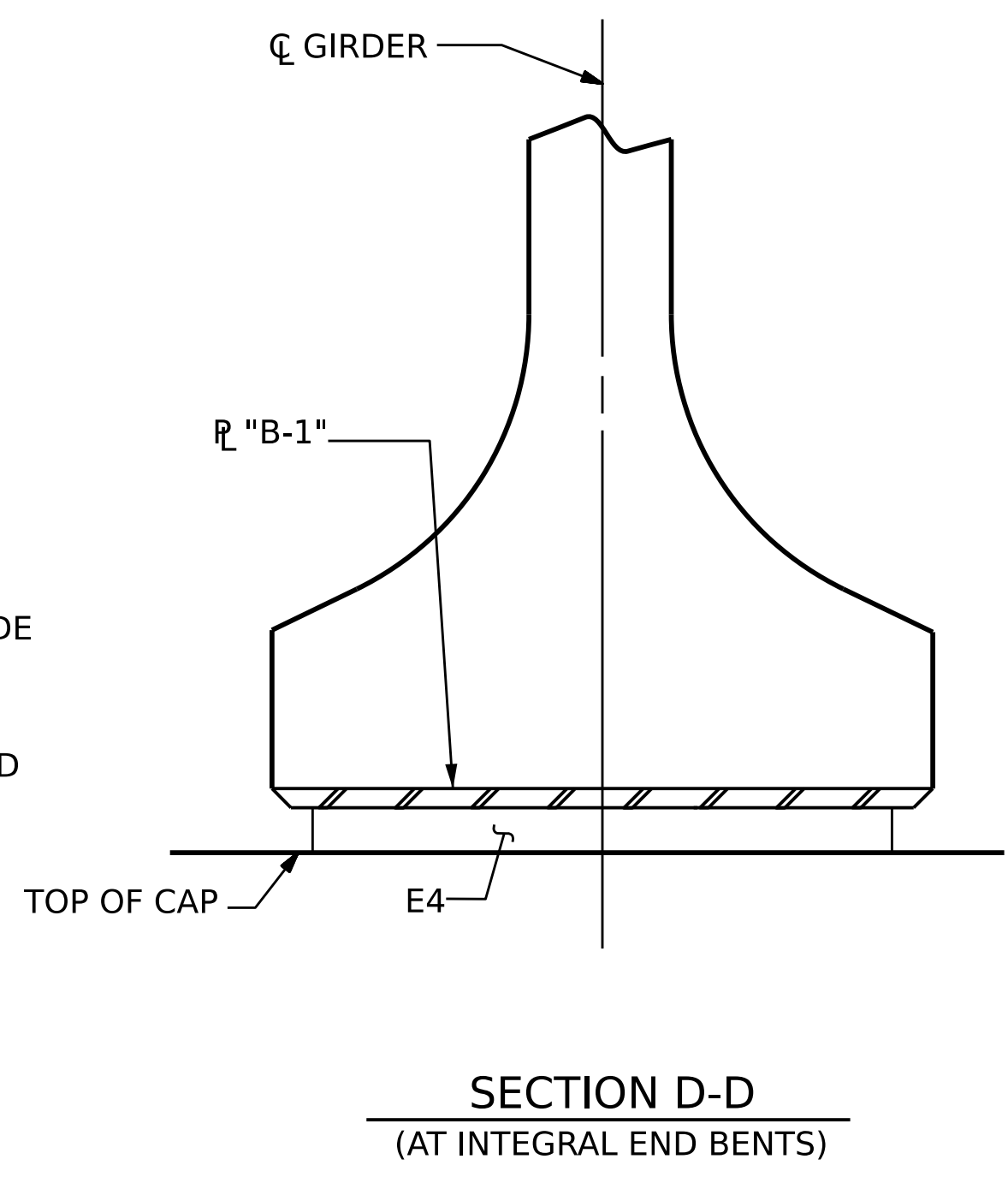
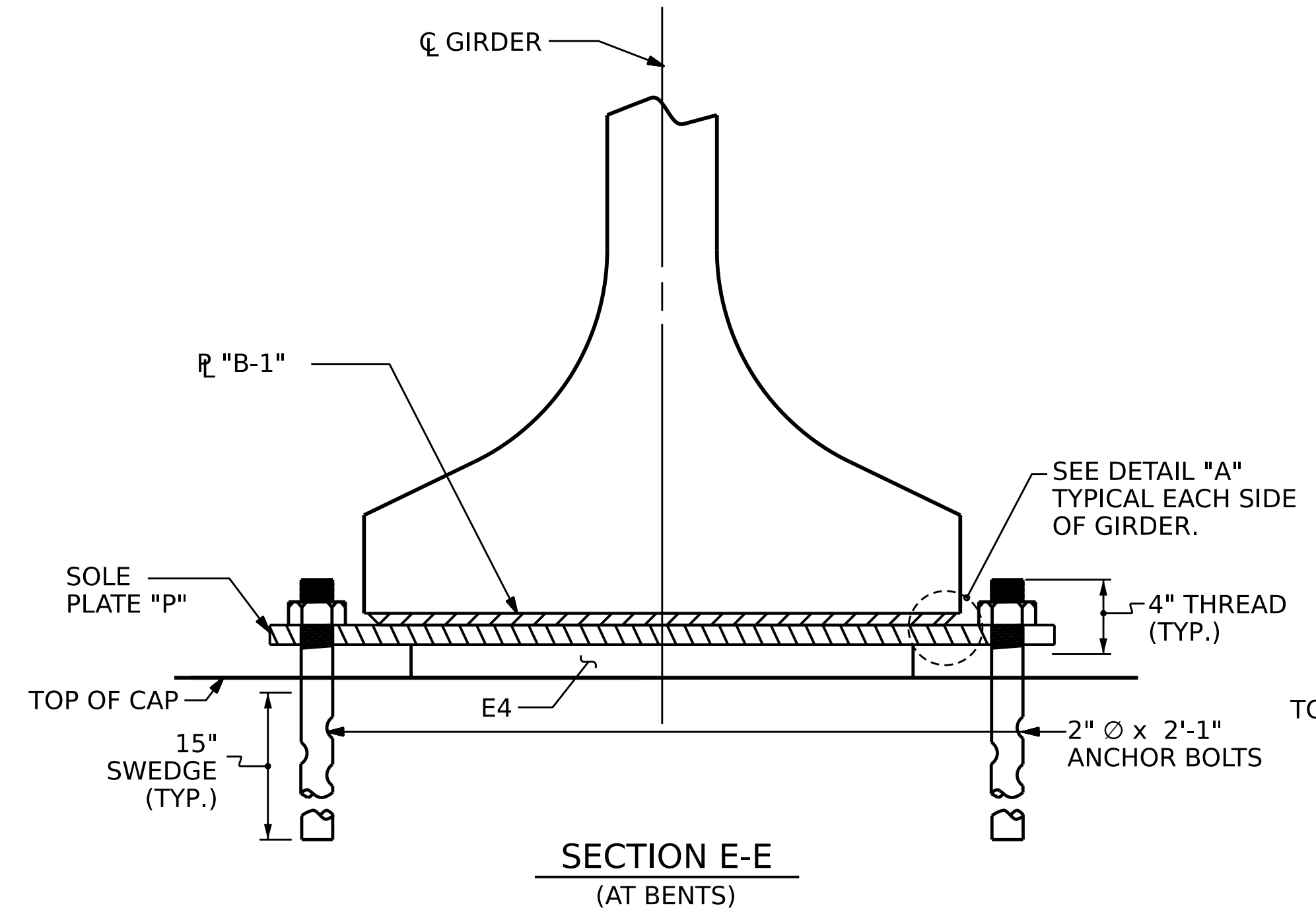
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

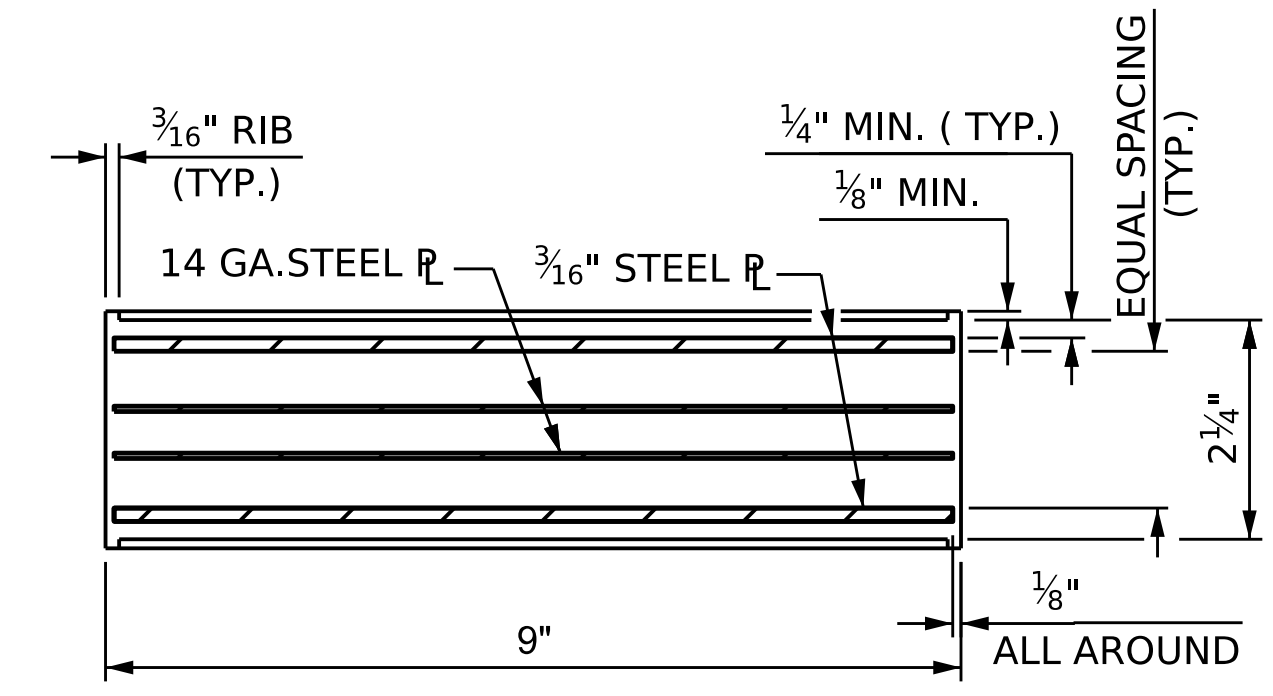
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE STANDARD SPECIFICATIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

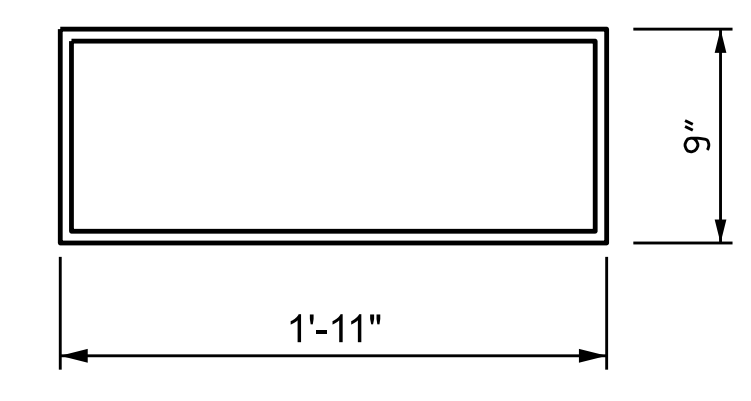


MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k

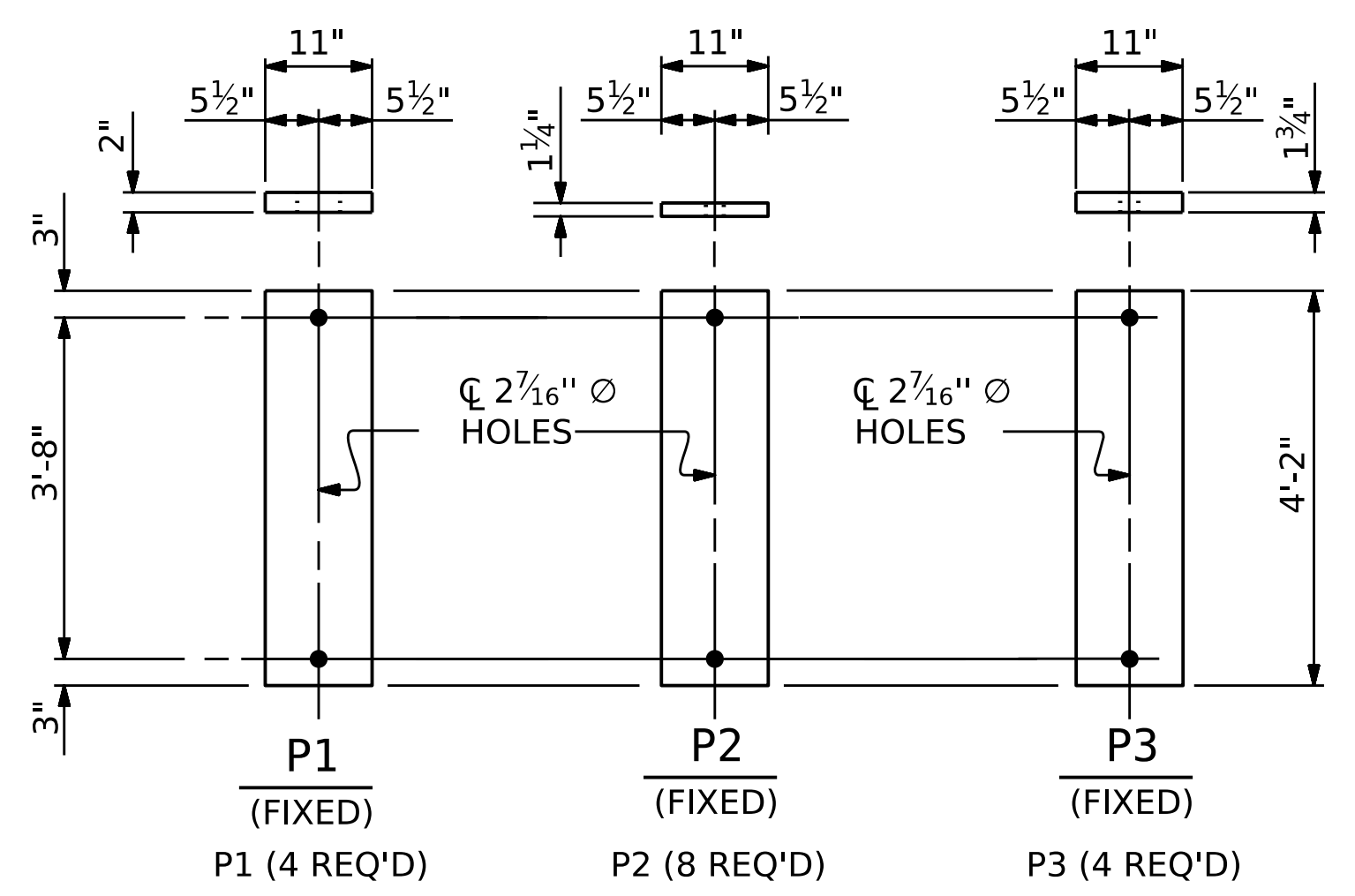


TYPICAL PLAN AT INTEGRAL END BENTS

TYPICAL SECTION OF ELASTOMERIC BEARINGS

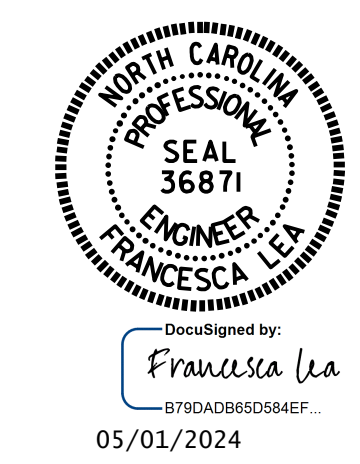


E4 (24 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE V



SOLE PLATE DETAILS ("P")

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ELASTOMERIC BEARING
DETAILS
FIB SUPERSTRUCTURE

DRAWN BY: E. BAYISSA DATE: 07/2023
CHECKED BY: Z. MALIK DATE: 10/2023
DESIGN ENGINEER OF RECORD: E. BAYISSA DATE: 07/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS 36
2			4			

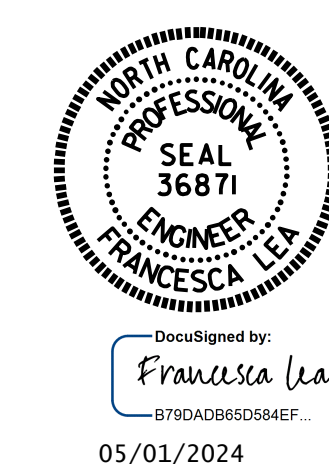
DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
SPAN A																						
0.6"Ø LOW RELAXATION	GIRDERS 1 THRU 4																					
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.012	0.023	0.033	0.044	0.052	0.060	0.065	0.070	0.072	0.074	0.072	0.070	0.065	0.060	0.052	0.044	0.033	0.023	0.012	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.003	0.007	0.01	0.013	0.015	0.018	0.019	0.021	0.021	0.022	0.021	0.021	0.019	0.018	0.015	0.013	0.01	0.007	0.003	0
FINAL CAMBER	↑	0	1/8"	3/16"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	9/16"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	3/16"	1/8"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																										
SPAN B																																										
0.6"Ø LOW RELAXATION	GIRDERS 1 THRU 4																																									
FOURIETH POINTS	0	.025	.05	.075	.1	.125	.15	.175	.2	.225	.25	.275	.3	.325	.35	.375	.4	.425	.45	.475	.5	.525	.55	.575	.6	.625	.65	.675	.7	.725	.75	.775	.8	.825	.85	.875	.9	.925	.95	.975	0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.03	0.05	0.08	0.1	0.13	0.15	0.18	0.2	0.22	0.24	0.25	0.27	0.28	0.29	0.31	0.32	0.32	0.33	0.33	0.33	0.33	0.32	0.32	0.31	0.29	0.28	0.27	0.25	0.24	0.22	0.2	0.18	0.15	0.13	0.1	0.08	0.05	0.03	0	
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.02	0.04	0.06	0.08	0.10	0.11	0.13	0.15	0.16	0.18	0.19	0.21	0.21	0.22	0.23	0.24	0.24	0.25	0.25	0.25	0.25	0.24	0.24	0.23	0.22	0.21	0.21	0.19	0.18	0.16	0.15	0.13	0.11	0.10	0.08	0.06	0.04	0.02	0	
FINAL CAMBER	↑	0	1/16"	1/8"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	13/16"	7/8"	7/8"	15/16"	15/16"	15/16"	1"	1"	1"	15/16"	15/16"	15/16"	7/8"	7/8"	13/16"	13/16"	3/4"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																										
SPAN C																																										
0.6"Ø LOW RELAXATION	GIRDERS 1 THRU 4																																									
FOURIETH POINTS	0	.025	.05	.075	.1	.125	.15	.175	.2	.225	.25	.275	.3	.325	.35	.375	.4	.425	.45	.475	.5	.525	.55	.575	.6	.625	.65	.675	.7	.725	.75	.775	.8	.825	.85	.875	.9	.925	.95	.975	0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.02	0.04	0.06	0.08	0.09	0.11	0.13	0.15	0.16	0.17	0.19	0.20	0.21	0.22	0.23	0.23	0.24	0.24	0.24	0.24	0.23	0.23	0.22	0.21	0.20	0.19	0.17	0.16	0.15	0.13	0.11	0.09	0.08	0.06	0.04	0.02	0			
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.01	0.02	0.03	0.05	0.06	0.07	0.08	0.09	0.10	0.10	0.11	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.12	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.05	0.03	0.02	0.01	0	
FINAL CAMBER	↑	0	1/16"	3/16"	1/4"	3/8"	7/16"	9/16"	5/8"	11/16"	3/4"	13/16"	7/8"	15/16"	1"	1 1/16"	1 1/16"	1 1/8"	1 1/8"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/8"	1 1/8"	1 1/16"	1 1/16"	1"	15/16"	7/8"	13/16"	3/4"	11/16"	5/8"	9/16"	7/16"	3/8"	1/4"	3/16"	1/16"	0

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

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-

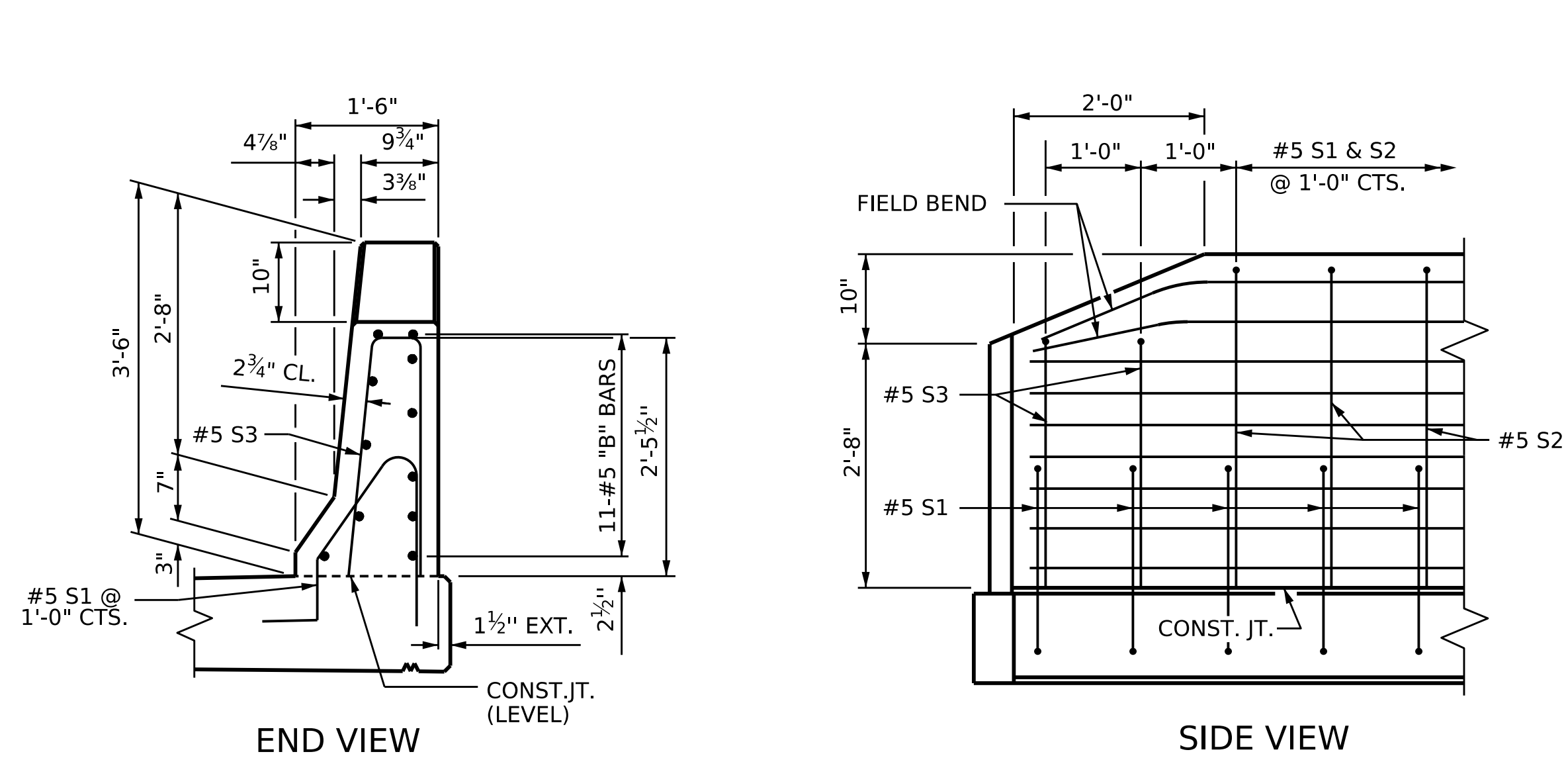


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
DEFLECTION TABLE

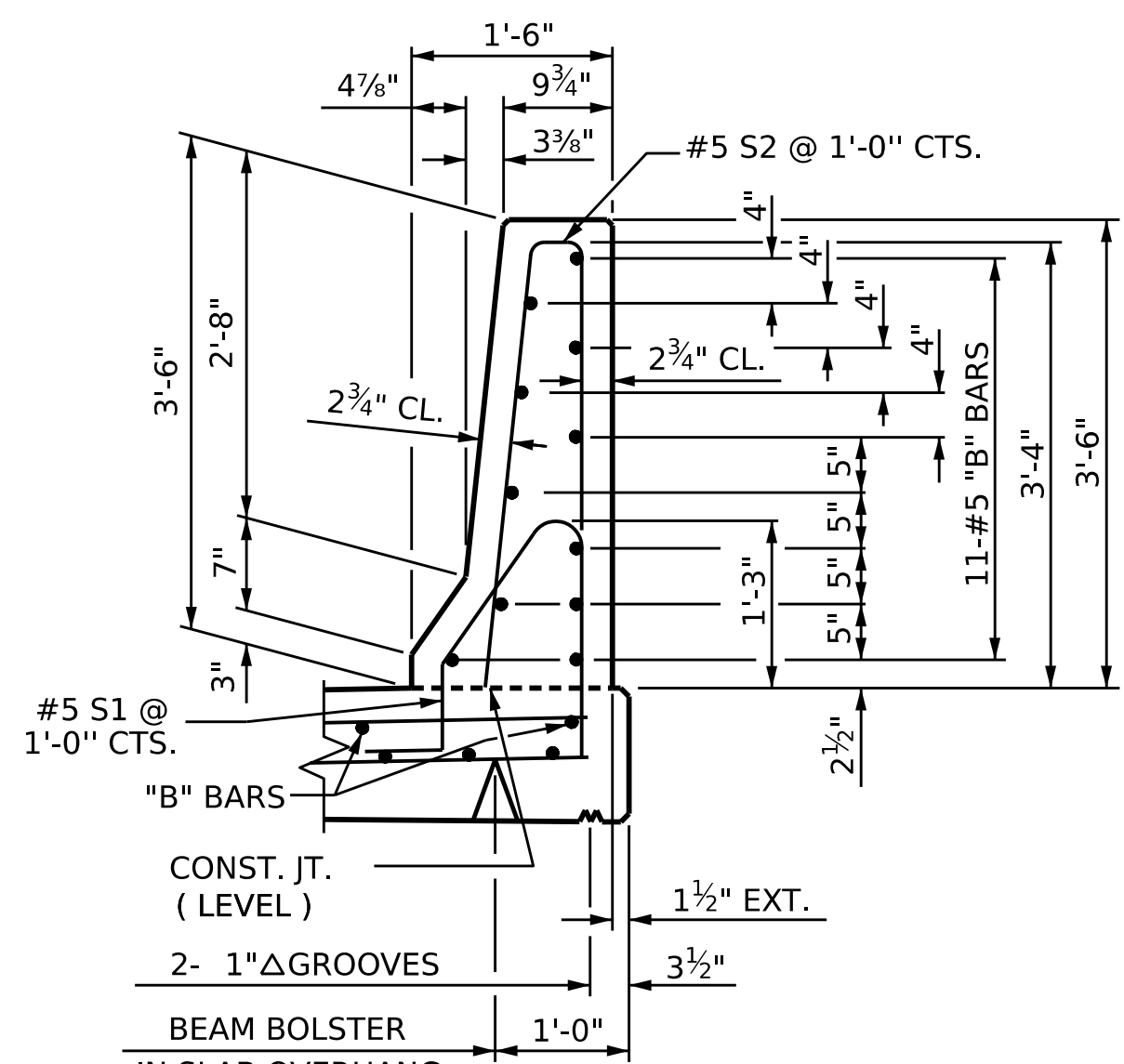
DRAWN BY : E. BAYISSA DATE : 01/2024
CHECKED BY : ZIA MALIK DATE : 01/2024
DESIGN ENGINEER OF RECORD: E. BAYISSA DATE : 11/2023

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

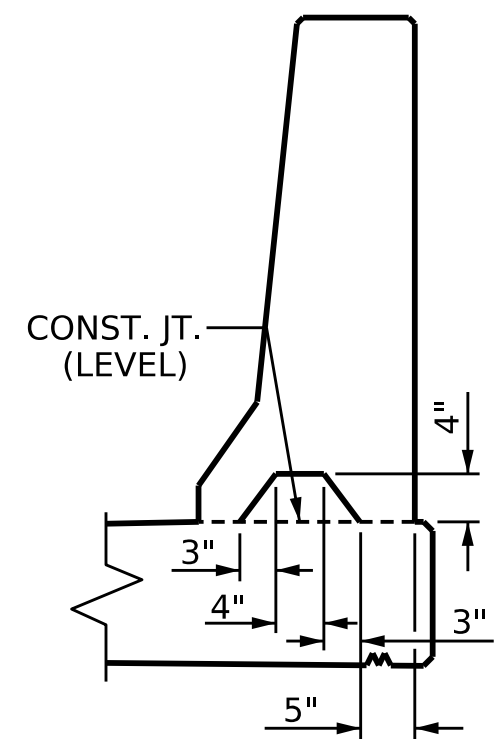
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			36



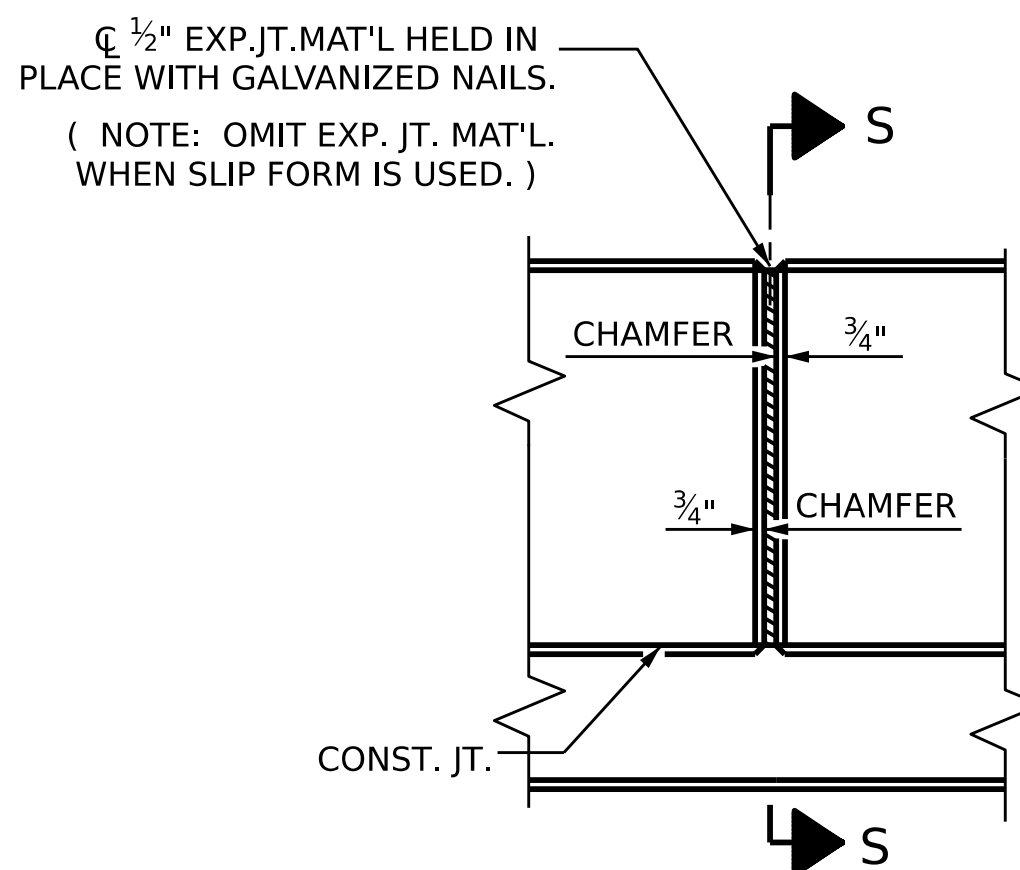
END OF RAIL DETAILS



SECTION THRU RAIL



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



ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS

NOTES

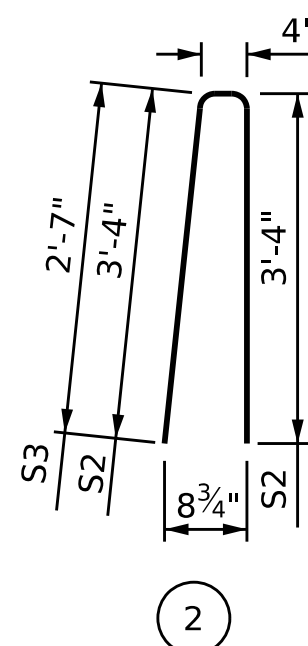
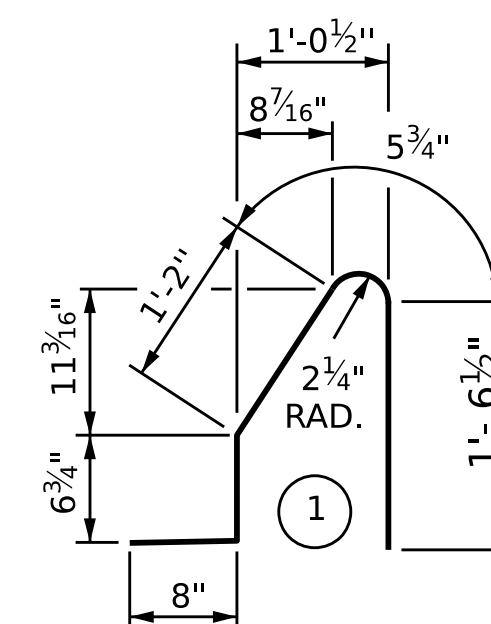
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

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

BAR TYPES



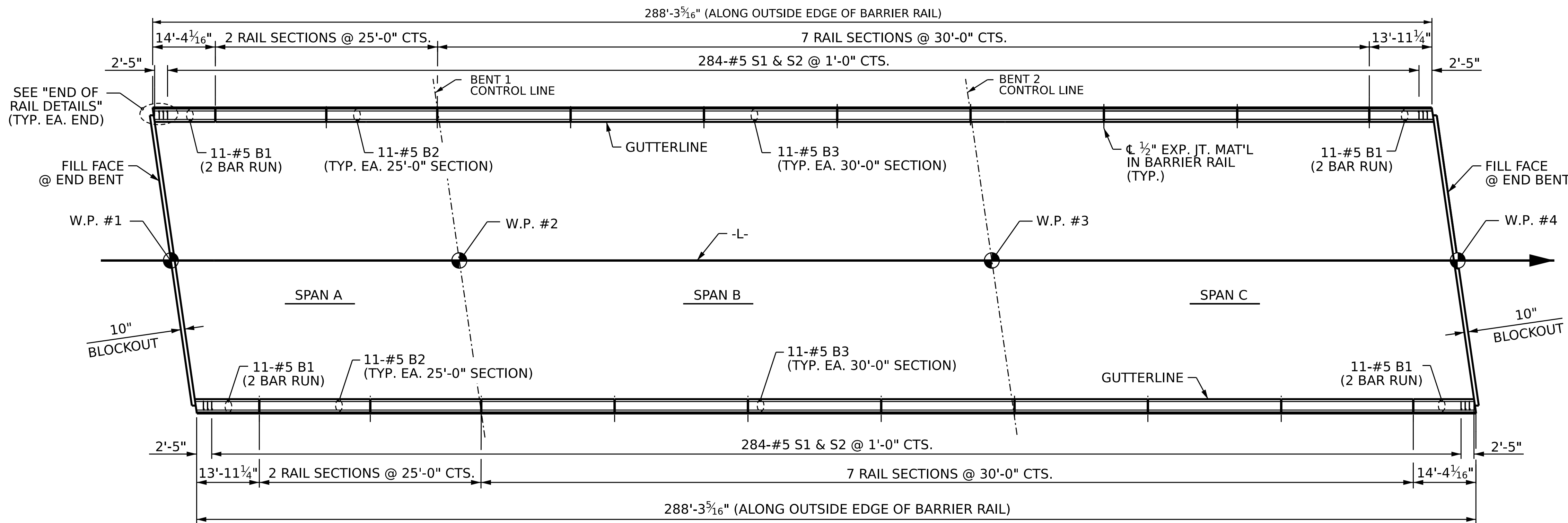
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

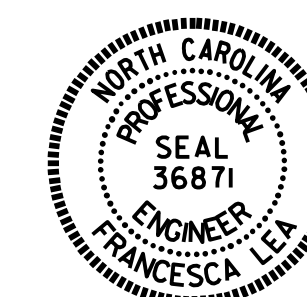
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	88	#5	STR	8'-6"	780
* B2	44	#5	STR	24'-7"	1128
* B3	154	#5	STR	29'-7"	4752
* S1	576	#5	1	4'-5"	2653
* S2	568	#5	2	7'-0"	4147
* S3	8	#5	2	5'-6"	46

EPOXY COATED	
* REINFORCING STEEL	13,506 LBS.
CLASS AA CONCRETE	78.5 CU. YDS.
CONCRETE BARRIER RAIL	576.55 LIN. FT.



PLAN OF CONCRETE BARRIER RAIL

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-



Designed by
Francesca Lea
E-790AD8ASD8AEF...
05/01/2024

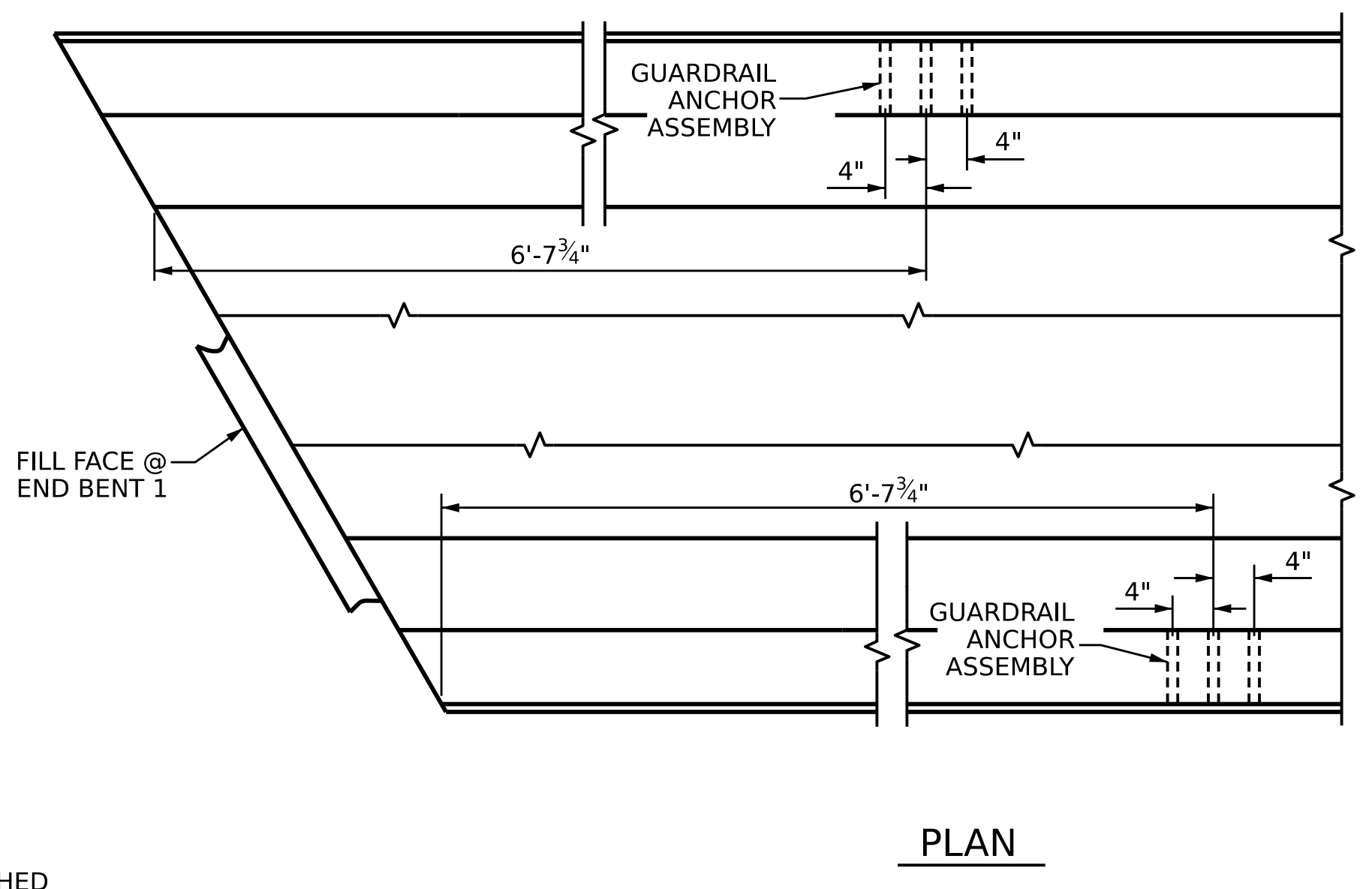
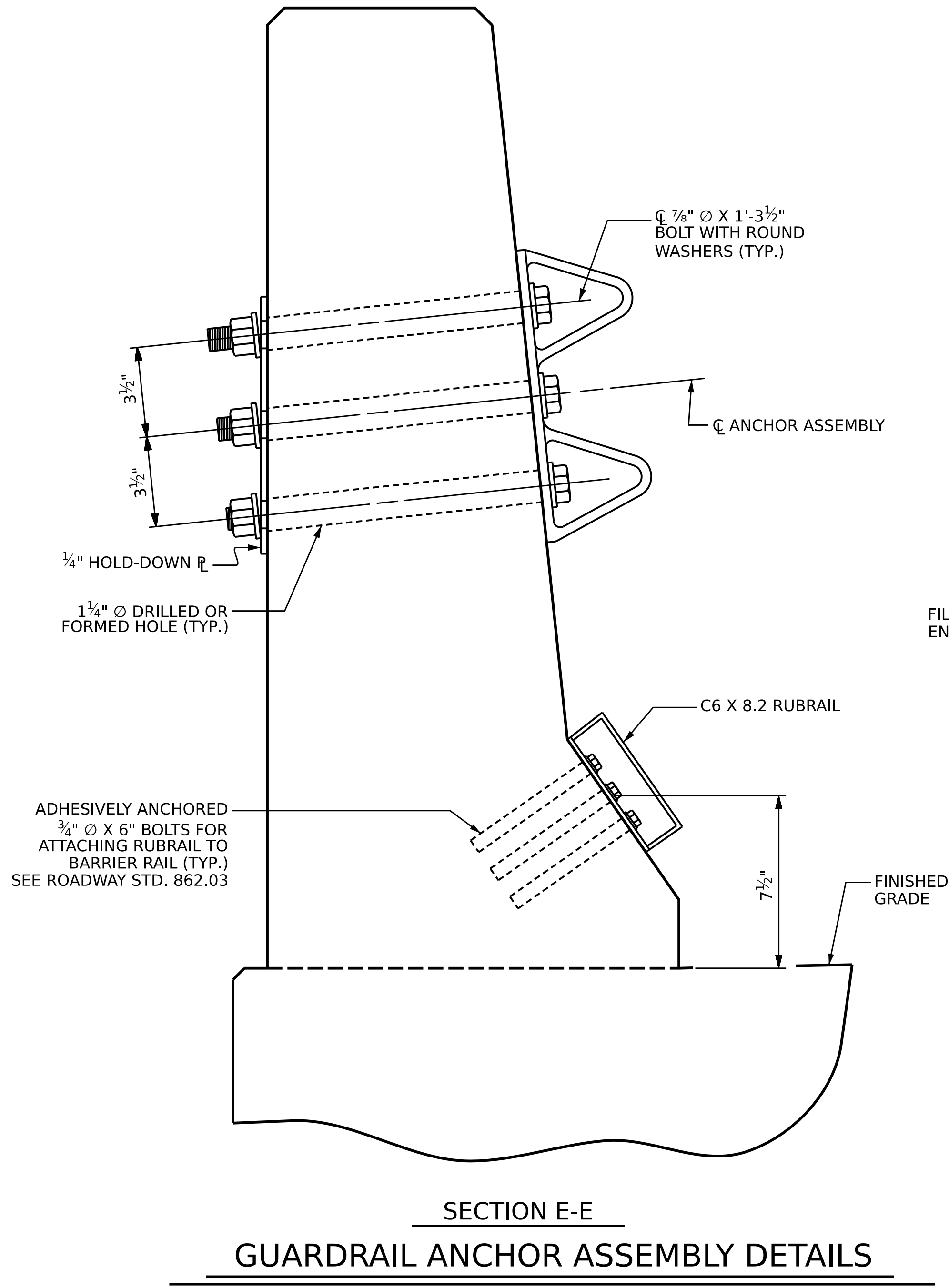
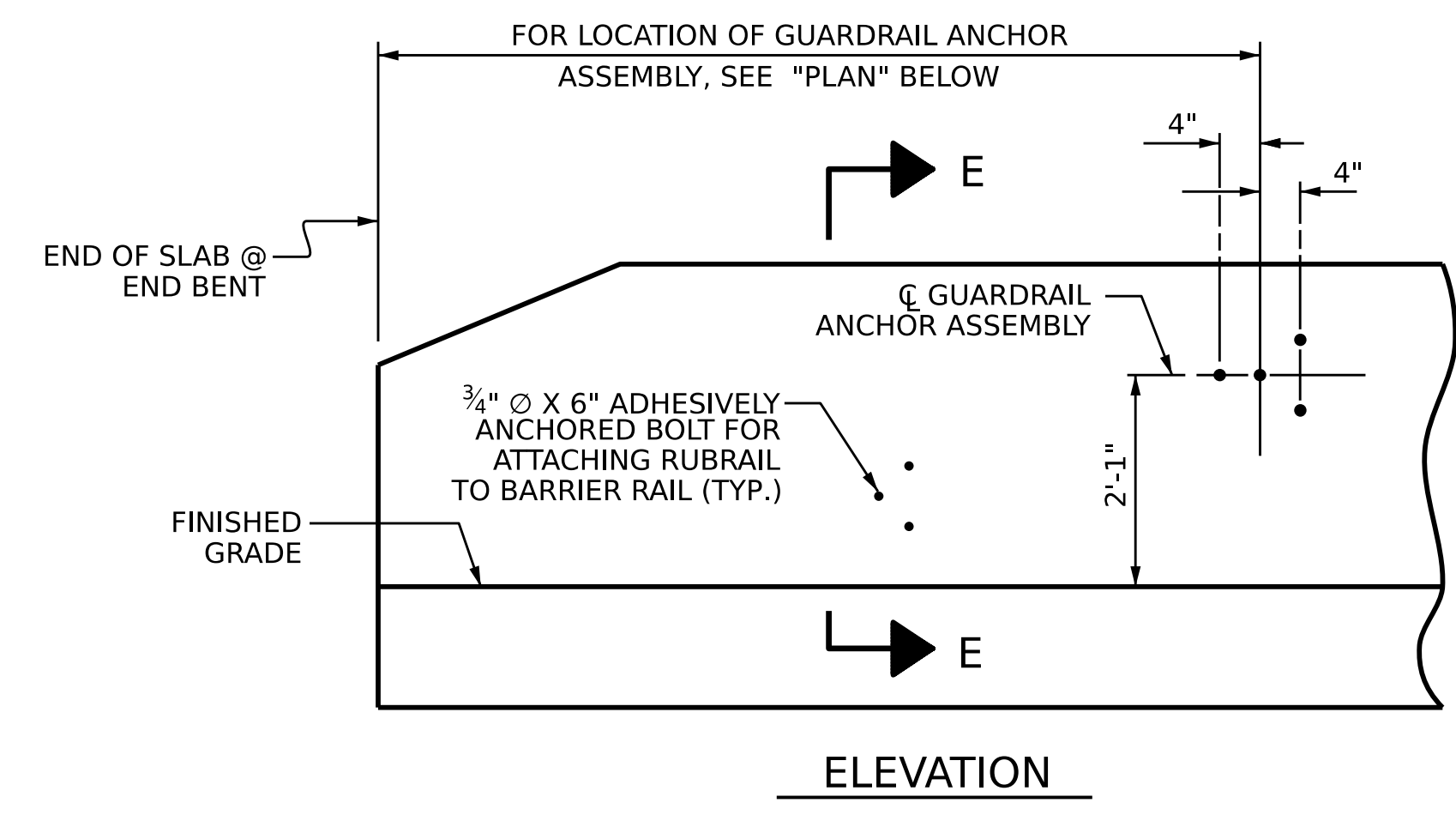
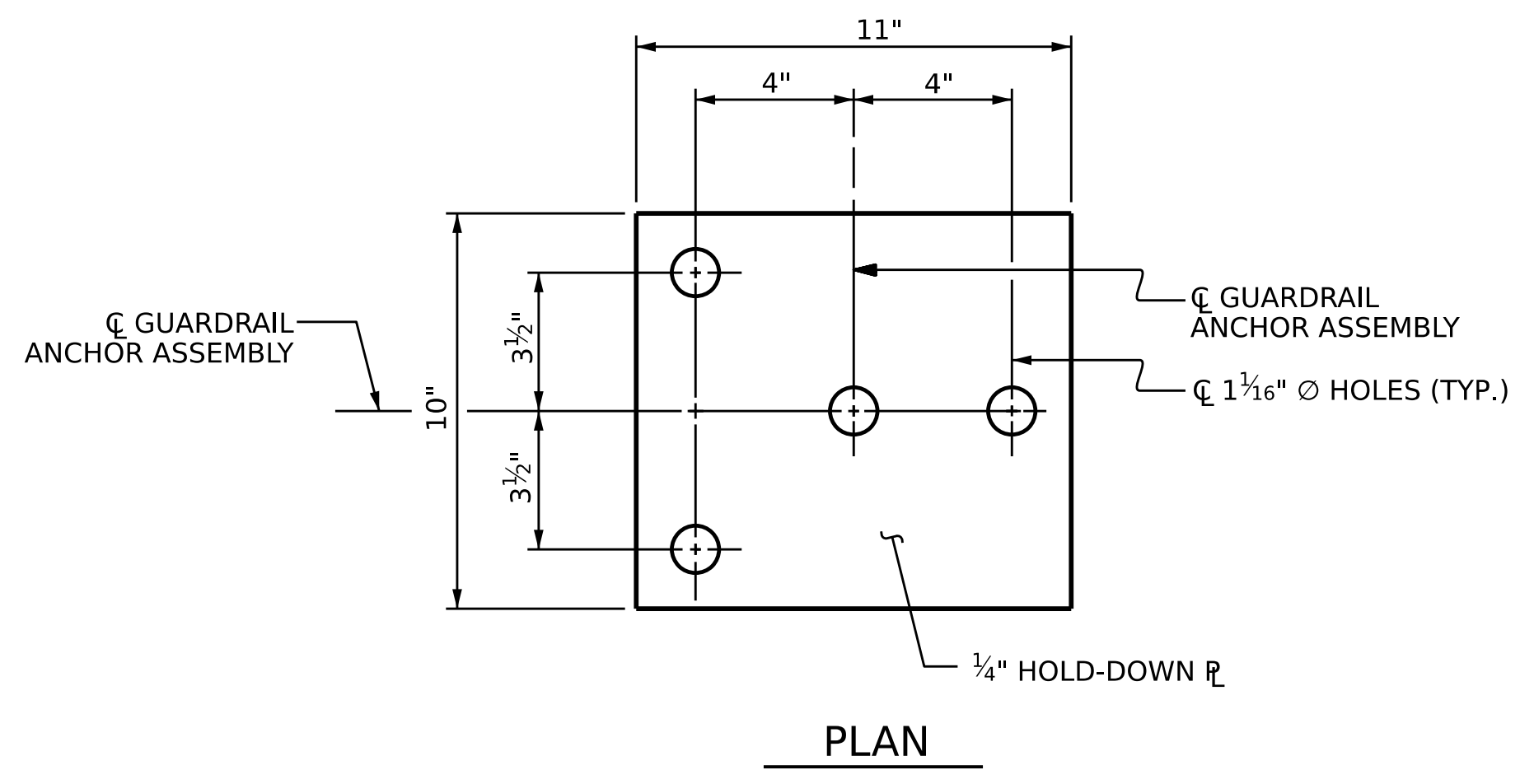
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE
BARRIER RAIL

ASSEMBLED BY:	E. BAYISSA	DATE:	02/2024
CHECKED BY:	Z. MALIK	DATE:	02/2024
DRAWN BY:	ARB 5/87	REV. 7/12	MAA/GM
CHECKED BY:	SJD 9/87	REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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

S-21
TOTAL SHEETS
36



LOCATION OF ANCHORS FOR GUARDRAIL
END BENT 1 SHOWN, END BENT 2 SIMILAR



SKETCH SHOWING POINTS OF ATTACHMENTS
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

NOTES

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

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

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

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

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

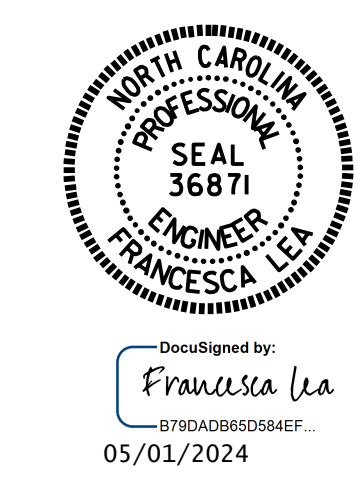
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

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

ASSEMBLED BY: Q. T. NGUYEN	DATE: 11/2023
CHECKED BY: Z. MALIK	DATE: 01/2024
DRAWN BY: TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

2/27/2024
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tnguyenl

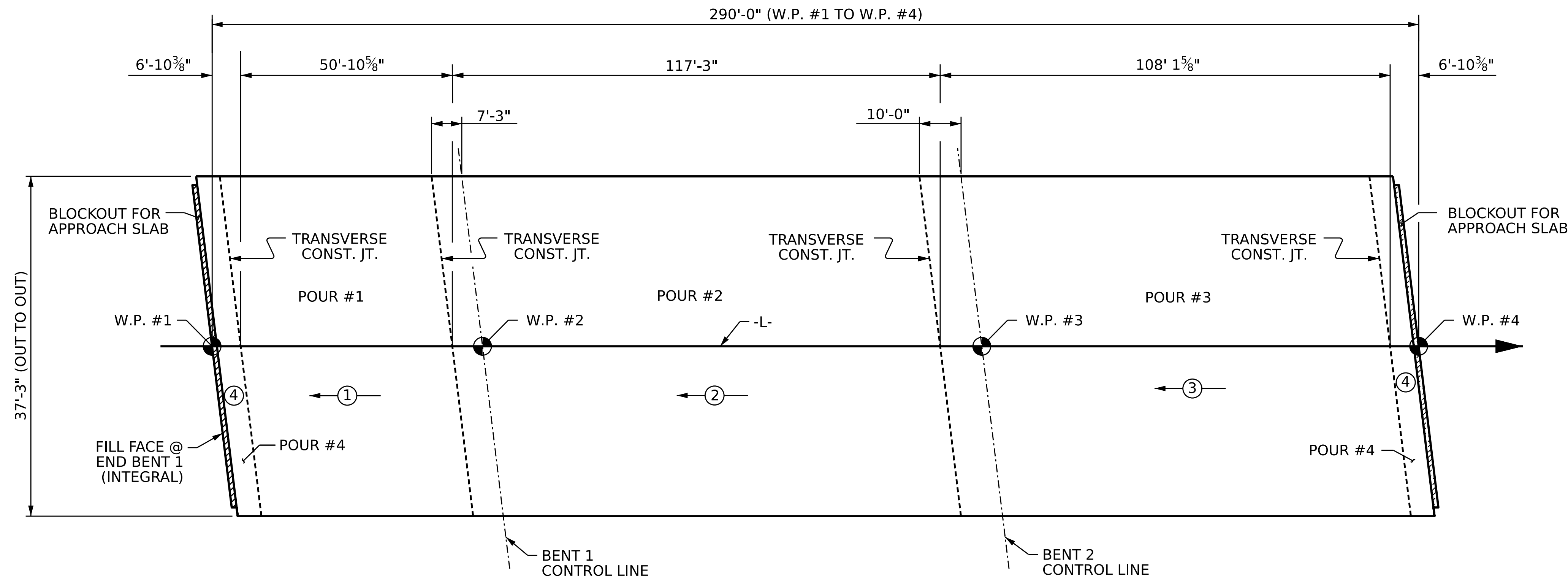


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-

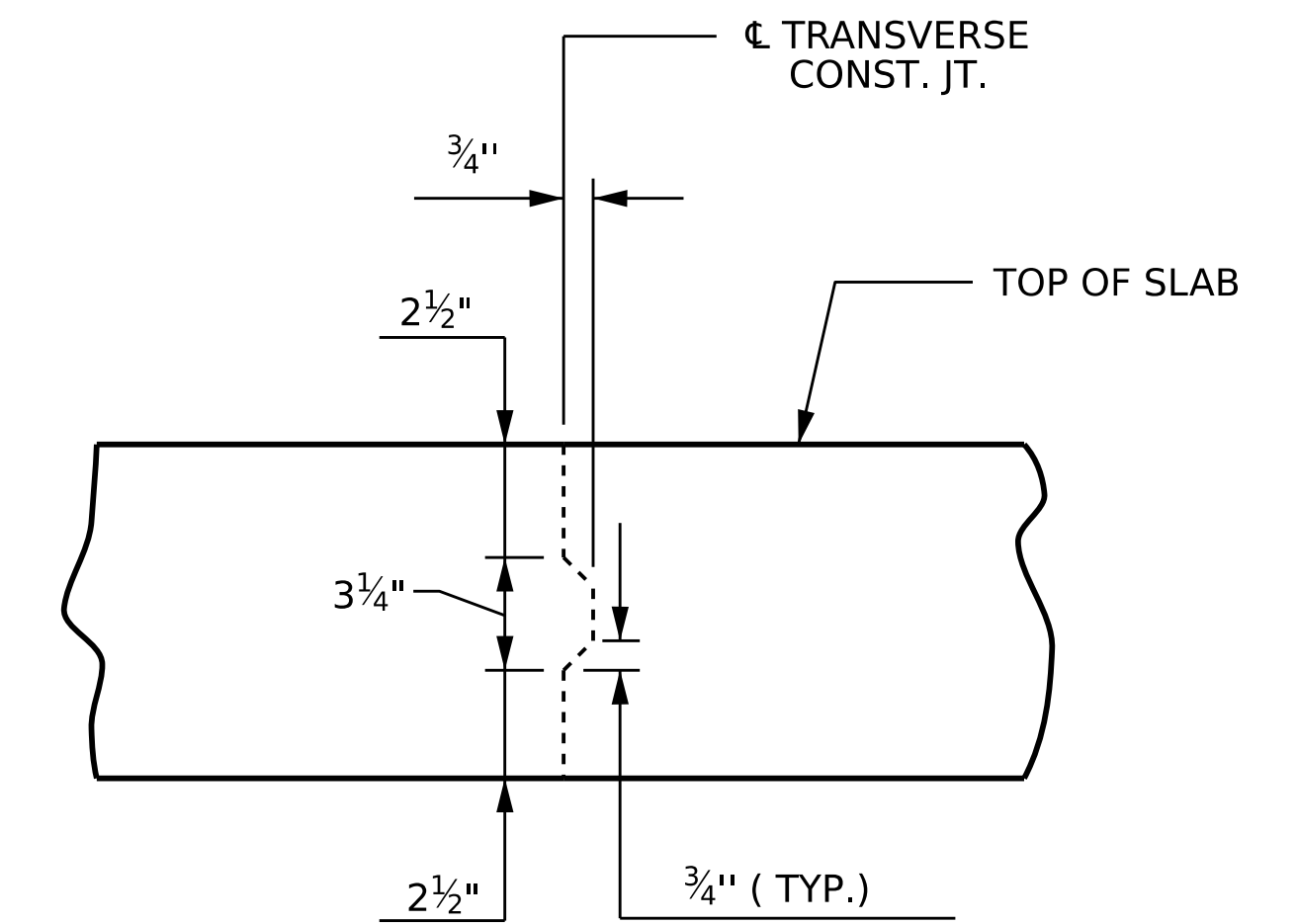
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE
FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			36



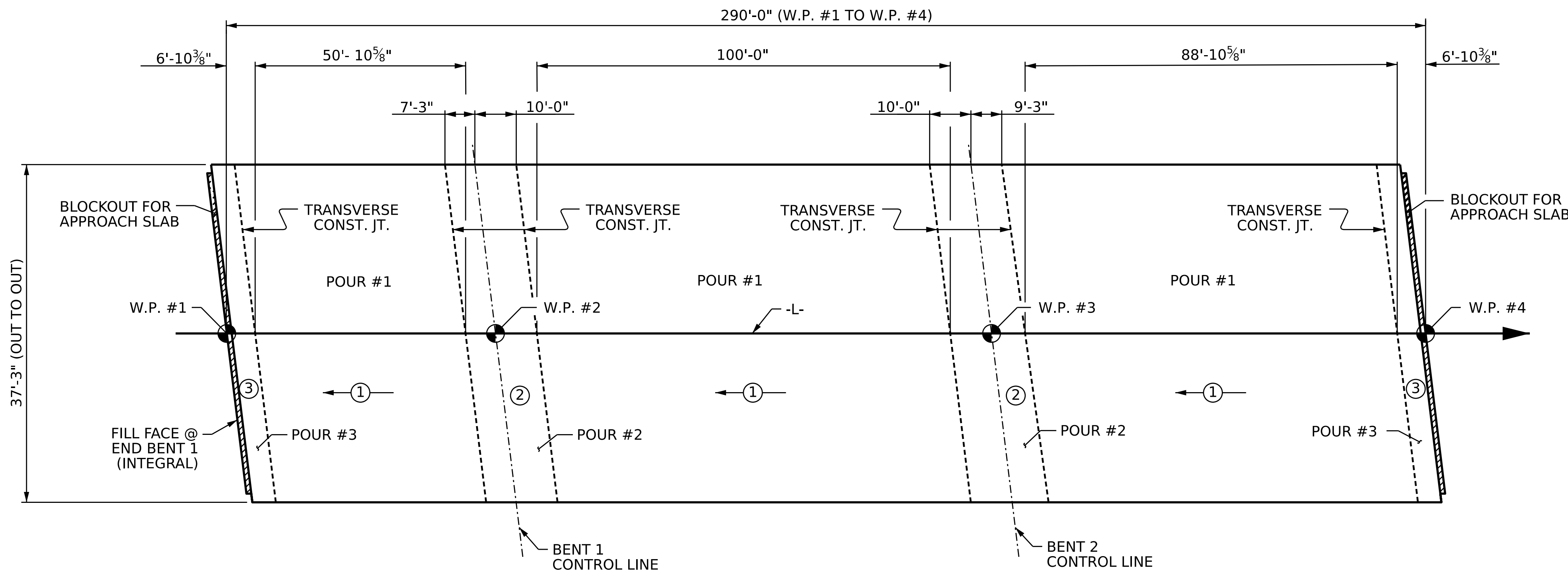
POURING SEQUENCE

POURS #2, #3, AND #4 CANNOT BE STARTED UNTIL THE ADJACENT POUR REACHES A MIN. OF 3000PSI



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



OPTIONAL POURING SEQUENCE

POUR #2 CANNOT BE STARTED UNTIL BOTH ADJACENT POUR #1 REACH A MIN. OF 3000PSI

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-



Designed by:
 Francesca Lea
 5790AD86D5084EF...
 05/01/2024

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

POURING SEQUENCE

DRAWN BY: E. BAYISSA DATE: 02/2024
 CHECKED BY: Z. MALIK DATE: 02/2024
 DESIGN ENGINEER OF RECORD: E. BAYISSA DATE: 06/2023

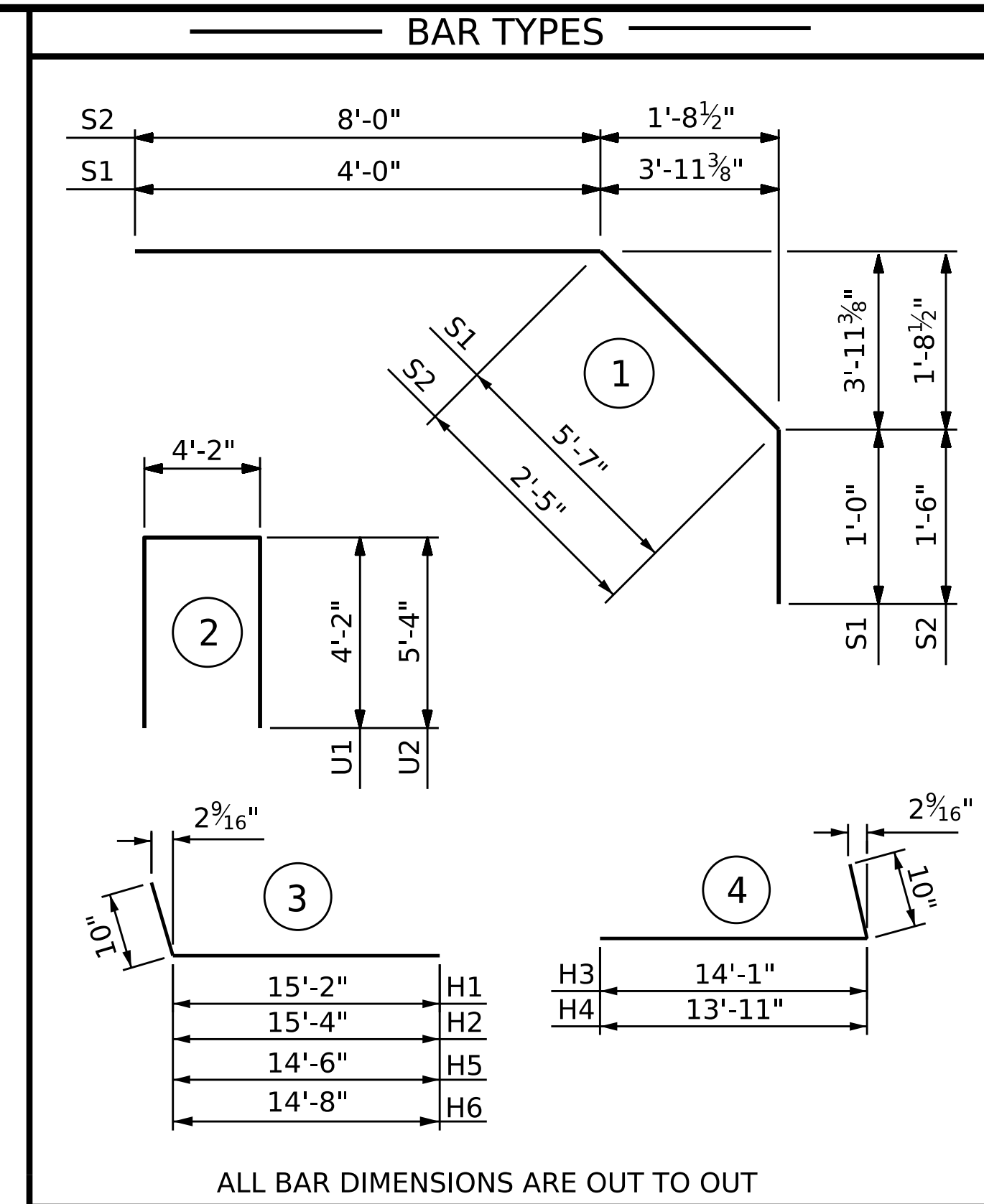
3/7/2024
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 ttnguyen1

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			36

REINFORCING BAR SCHEDULE

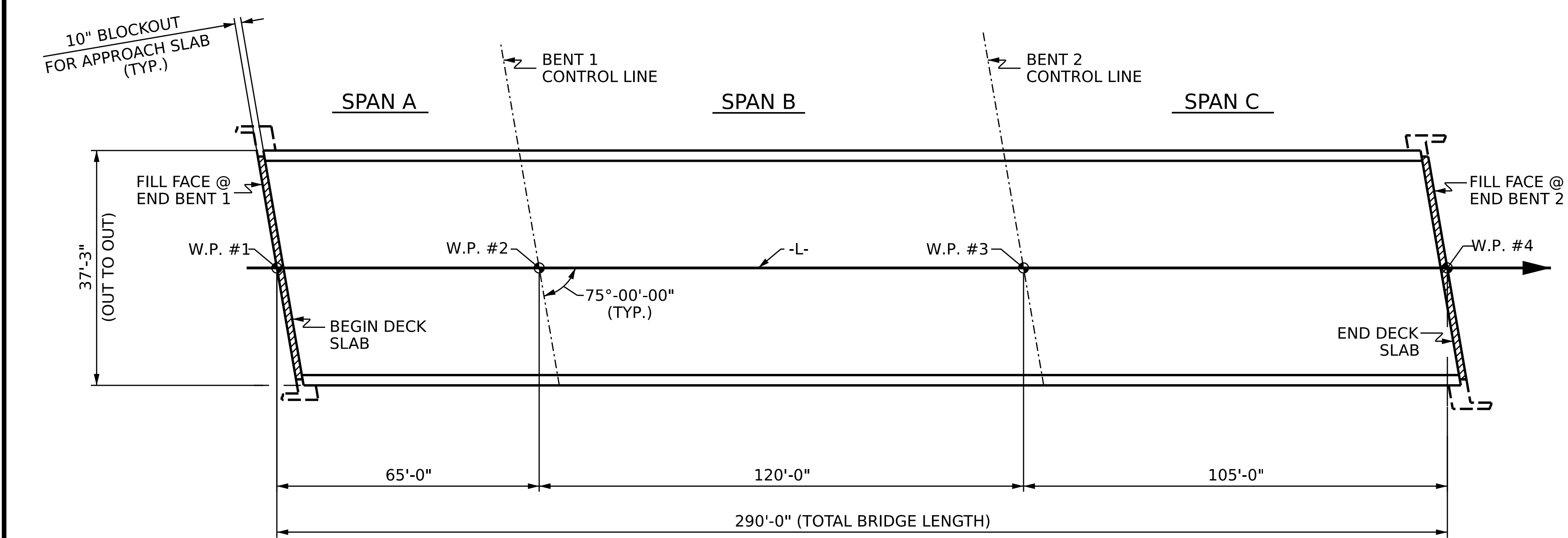
SPANS A & C												SPANS A-B-C											
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT	BAR	No.	SIZE	TYPE	LENGTH	WEIGHT	BAR	No.	SIZE	TYPE	LENGTH	WEIGHT	BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* A101	2	#5	STR.	36'-6"	76	A201	2	#5	STR.	36'-6"	76	K1	20	#4	STR.	23'-1"	308	* A1	476	#5	STR.	36'-11"	18,328
* A102	2	#5	STR.	34'-4"	72	A202	2	#5	STR.	34'-4"	72	K2	6	#4	STR.	6'-3"	25	A2	476	#5	STR.	36'-11"	18,328
* A103	2	#5	STR.	32'-2"	67	A203	2	#5	STR.	32'-2"	67	K3	6	#4	STR.	8'-4"	33						
* A104	2	#5	STR.	29'-11"	62	A204	2	#5	STR.	29'-11"	62	K4	12	#4	STR.	8'-9"	70	* B1	27	#4	STR.	30'-6"	550
* A105	2	#5	STR.	27'-9"	58	A205	2	#5	STR.	27'-9"	58	K5	6	#4	STR.	5'-5"	22	* B2	99	#5	STR.	12'-10"	1,325
* A106	2	#5	STR.	25'-7"	53	A206	2	#5	STR.	25'-7"	53	K6	4	#4	STR.	5'-1"	14	* B3	50	#5	STR.	15'-3"	795
* A107	2	#5	STR.	23'-5"	49	A207	2	#5	STR.	23'-5"	49	K7	4	#4	STR.	6'-1"	16	* B4	50	#5	STR.	52'-8"	2,747
* A108	2	#5	STR.	21'-3"	44	A208	2	#5	STR.	21'-3"	44	K8	8	#4	STR.	6'-5"	34	* B5	49	#5	STR.	37'-9"	1,929
* A109	2	#5	STR.	19'-1"	40	A209	2	#5	STR.	19'-1"	40	K9	4	#4	STR.	4'-8"	12	* B6	54	#4	STR.	21'-11"	791
* A110	2	#5	STR.	16'-11"	35	A210	2	#5	STR.	16'-11"	35	K10	40	#4	STR.	2'-8"	71	* B7	50	#5	STR.	27'-3"	1,421
* A111	2	#5	STR.	14'-9"	31	A211	2	#5	STR.	14'-9"	31							* B8	50	#5	STR.	52'-8"	2,747
* A112	2	#5	STR.	12'-6"	26	A212	2	#5	STR.	12'-6"	26	H1	8	#5	3	16'-1"	134	* B9	49	#5	STR.	43'-9"	2,236
* A113	2	#5	STR.	10'-4"	22	A213	2	#5	STR.	10'-4"	22	H2	8	#5	3	16'-3"	136	* B10	54	#4	STR.	26'-3"	947
* A114	2	#5	STR.	8'-2"	17	A214	2	#5	STR.	8'-2"	17	H3	18	#5	4	14'-11"	280	* B11	99	#5	STR.	20'-10"	2,151
* A115	2	#5	STR.	6'-0"	13	A215	2	#5	STR.	6'-0"	13	H4	18	#5	4	14'-9"	277						
* A116	2	#5	STR.	3'-10"	8	A216	2	#5	STR.	3'-10"	8	H5	8	#5	3	15'-4"	128	B12	27	#5	STR.	44'-9"	1,260
* A117	2	#5	STR.	1'-8"	3	A217	2	#5	STR.	1'-8"	3	H6	8	#5	3	15'-6"	129	B13	27	#5	STR.	56'-3"	1,584
* S1	44	#4	1	10'-7"	311	U1	48	#4	2	12'-6"	401							B14	22	#5	STR.	47'-0"	1,078
* S2	44	#4	1	11'-11"	350	U2	12	#4	2	14'-11"	120							B15	27	#5	STR.	54'-0"	1,521
												REINFORCING STEEL										2,887 LBS.	
												* EPOXY COATED REINFORCING STEEL										1,338 LBS.	
												REINFORCING STEEL										29,119 LBS.	
												* EPOXY COATED REINFORCING STEEL										35,967 LBS.	



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	66.4	---	---
POUR #2	153.0	---	---
POUR #3	141.2	---	---
POUR #4	95.4	---	---
TOTALS**	456.0	32,006	37,305

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

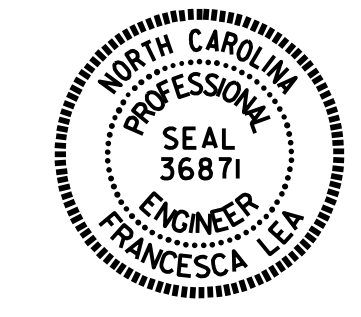


**LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 10,738)**

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS					
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	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"			

GROOVING BRIDGE FLOORS	
APPROACH SLABS	898 SQ.FT.
BRIDGE DECK	8,937 SQ.FT.
TOTAL	9,835 SQ.FT.

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-



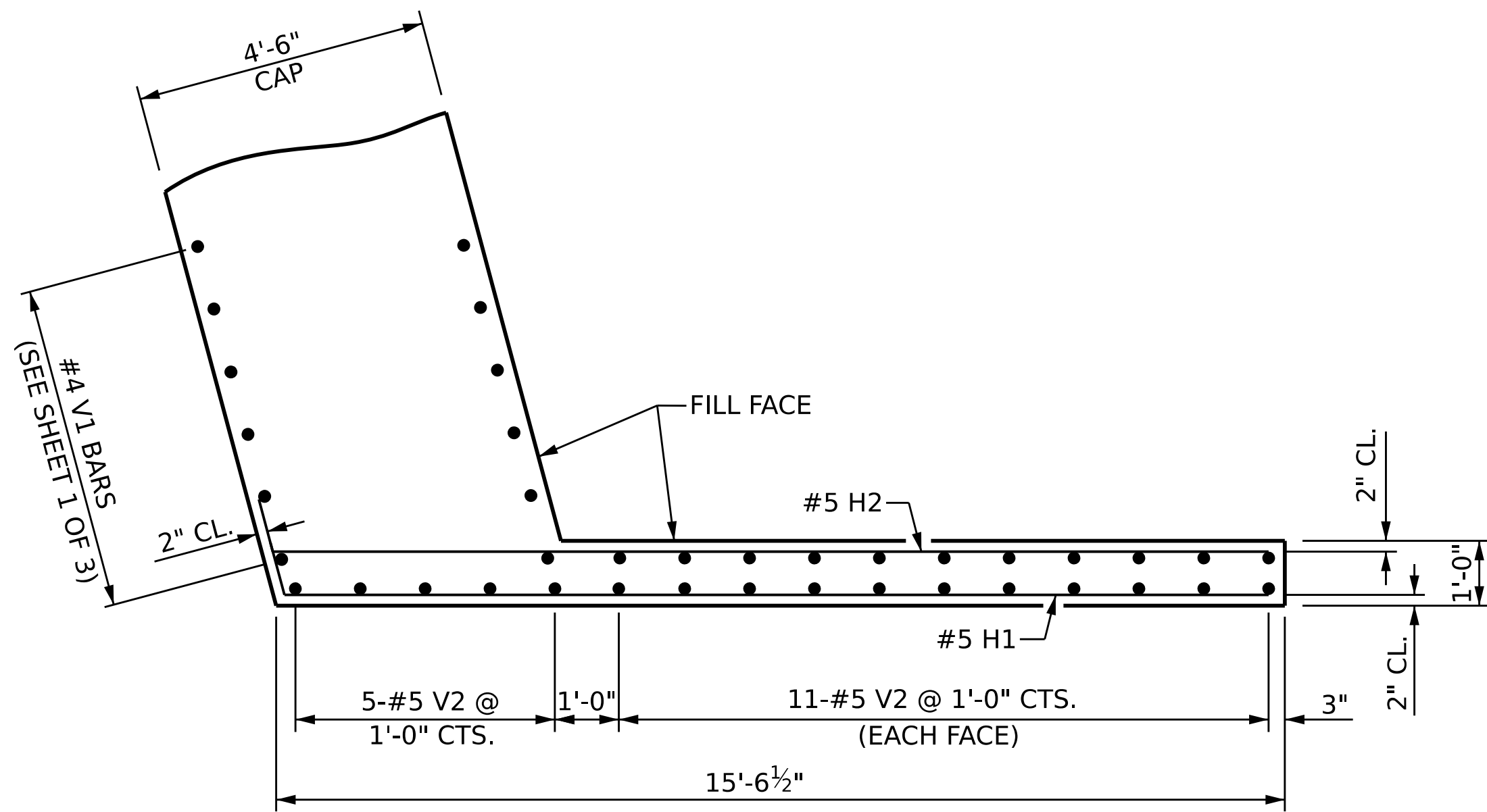
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

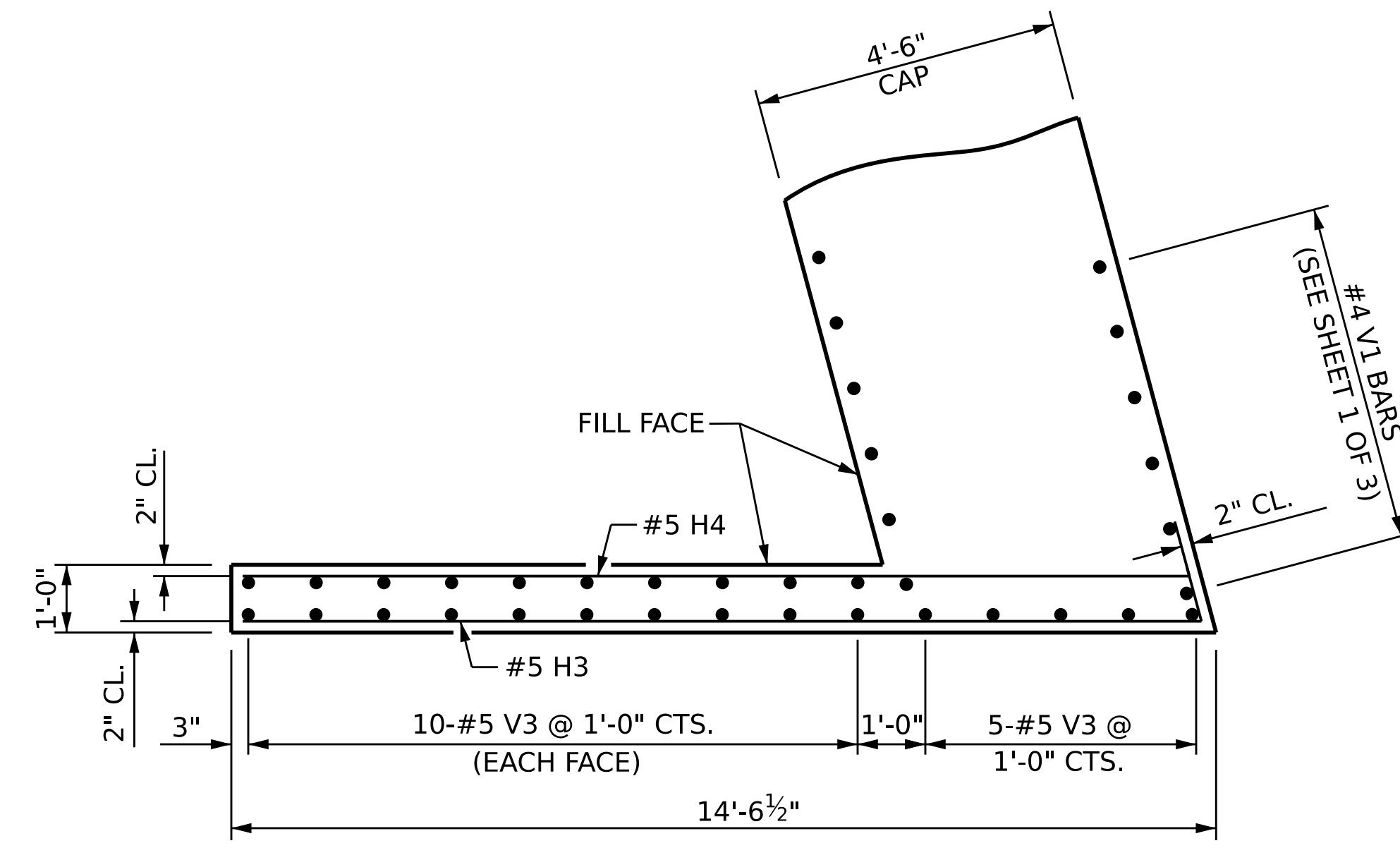
DRAWN BY : E. BAYISSA DATE : 02/2024
 CHECKED BY : F. LEA DATE : 03/2024
 DESIGN ENGINEER OF RECORD : E. BAYISSA DATE : 09/2023

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

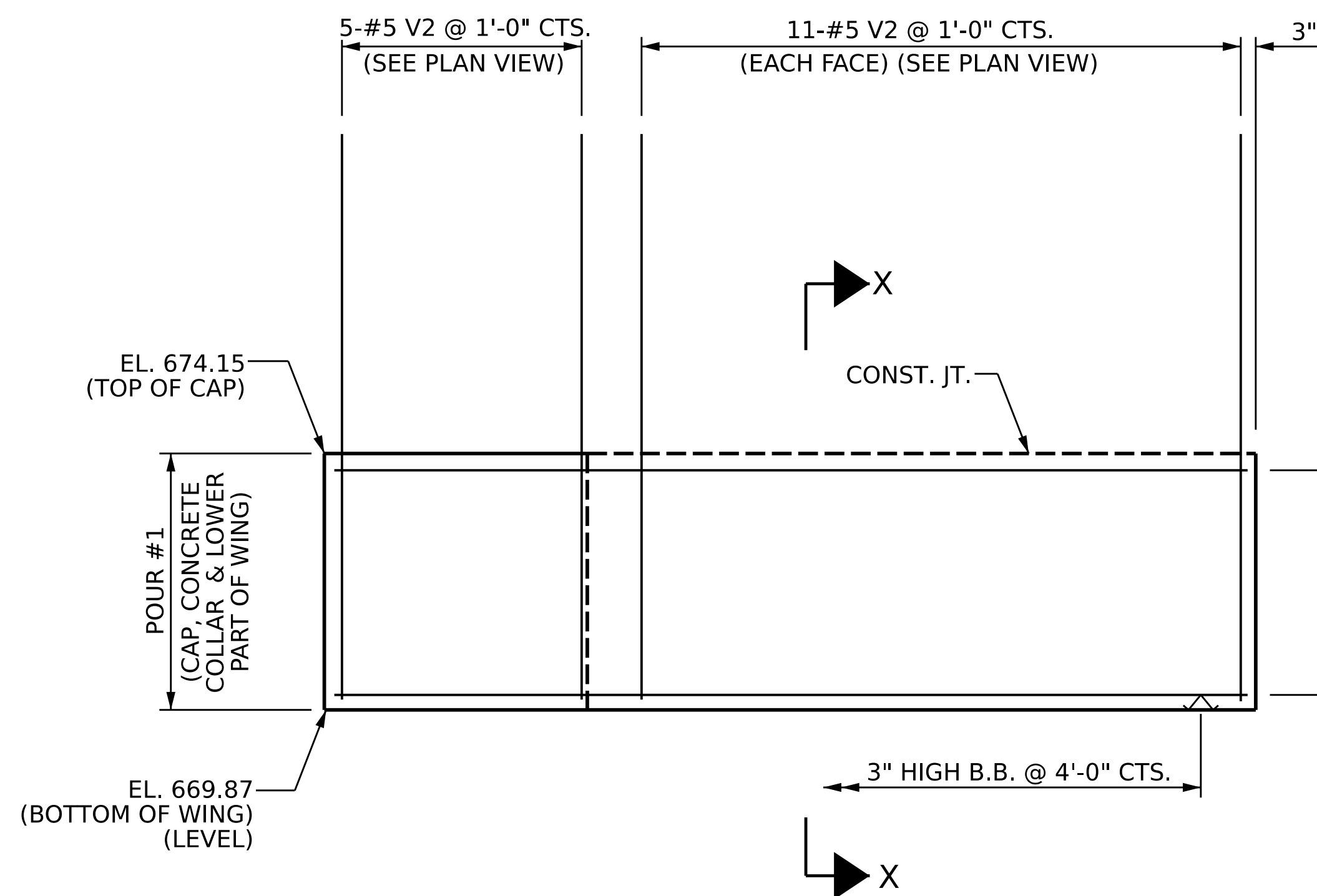
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



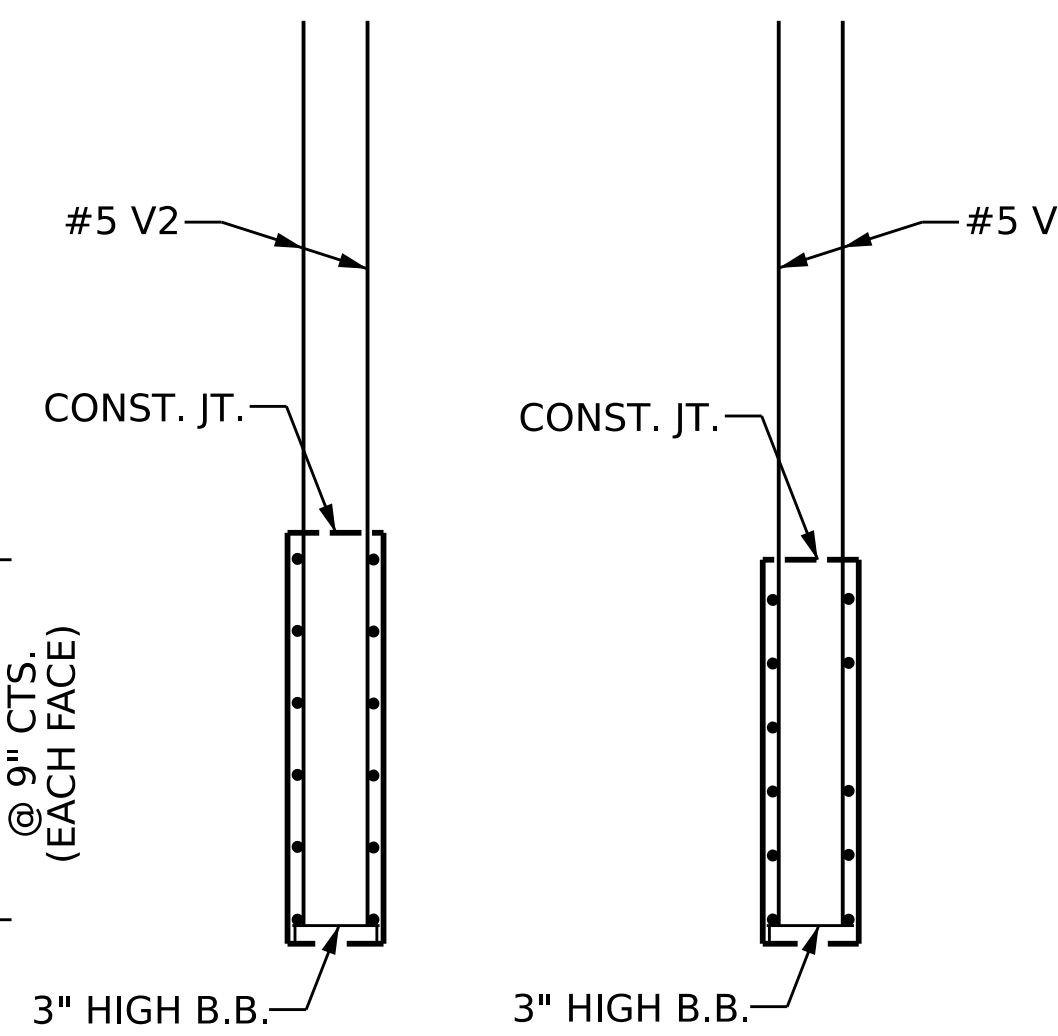
PLAN OF WING W1



PLAN OF WING W2

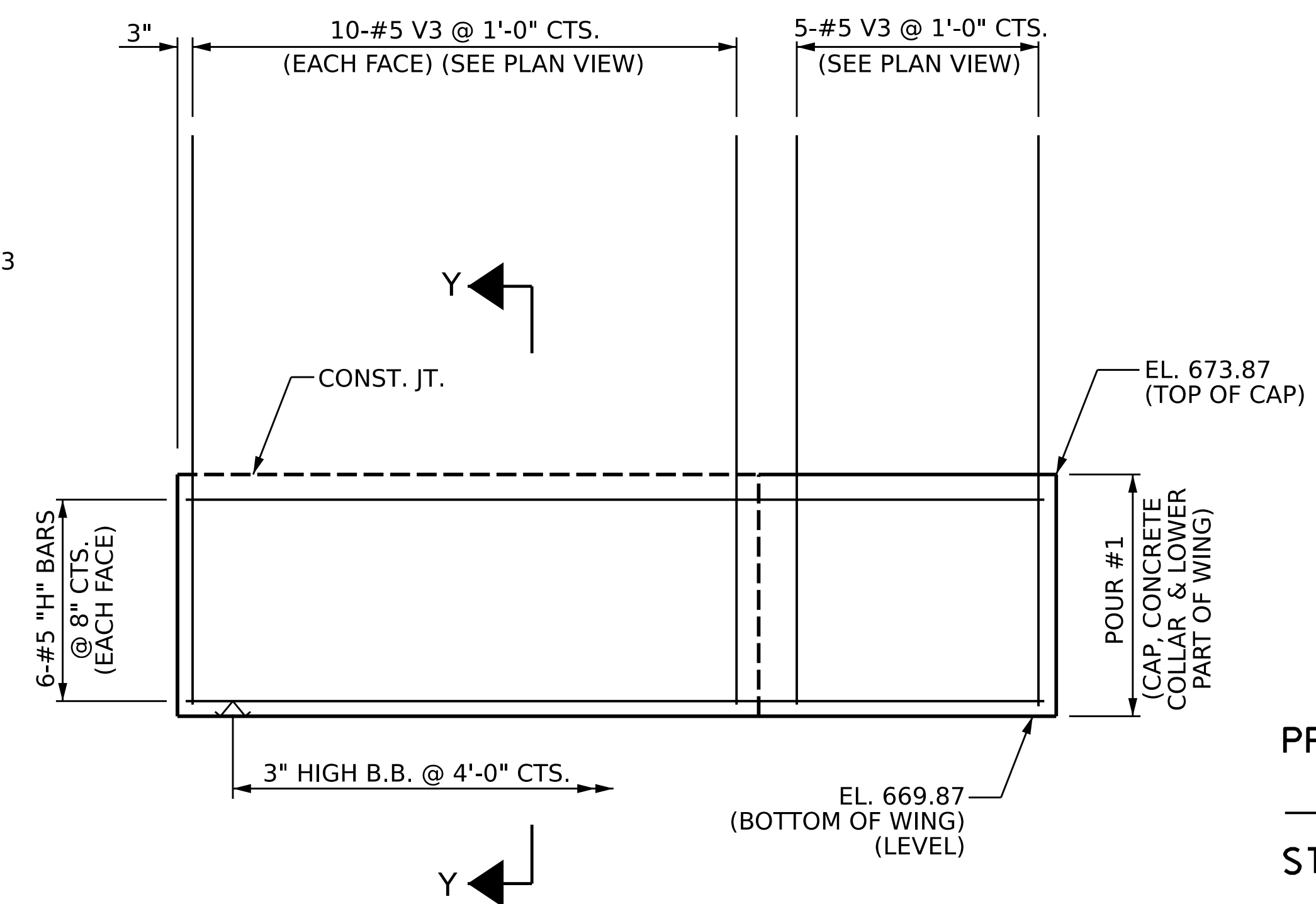


ELEVATION OF WING W1



SECTION X-X

SECTION Y-Y



ELEVATION OF WING W2

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1
 INTEGRAL

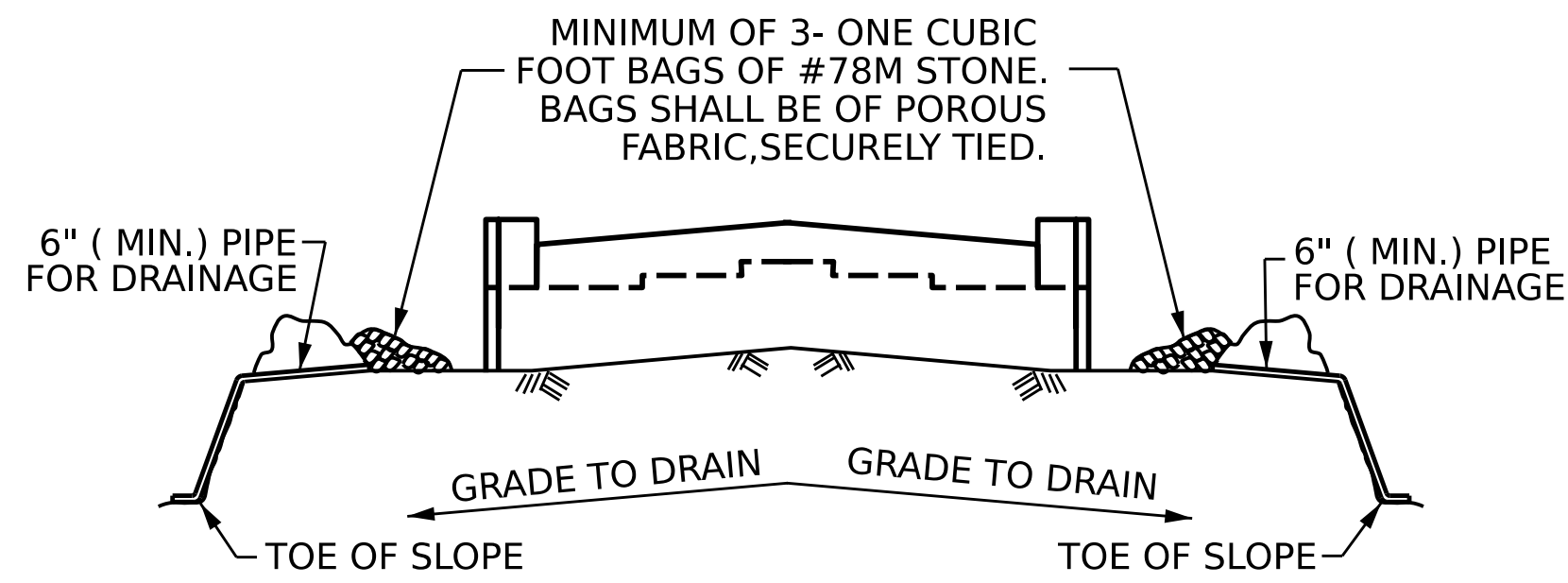


Designed by
 Francesca Lea
 B79DAD8650584EF
 05/01/2024

DRAWN BY : E. BAYISSA / Q.T. NGUYEN DATE : 11/2023
 CHECKED BY : F. LEA DATE : 11/2023
 DESIGN ENGINEER OF RECORD: E. BAYISSA DATE : 09/2023

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 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO. S-26
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

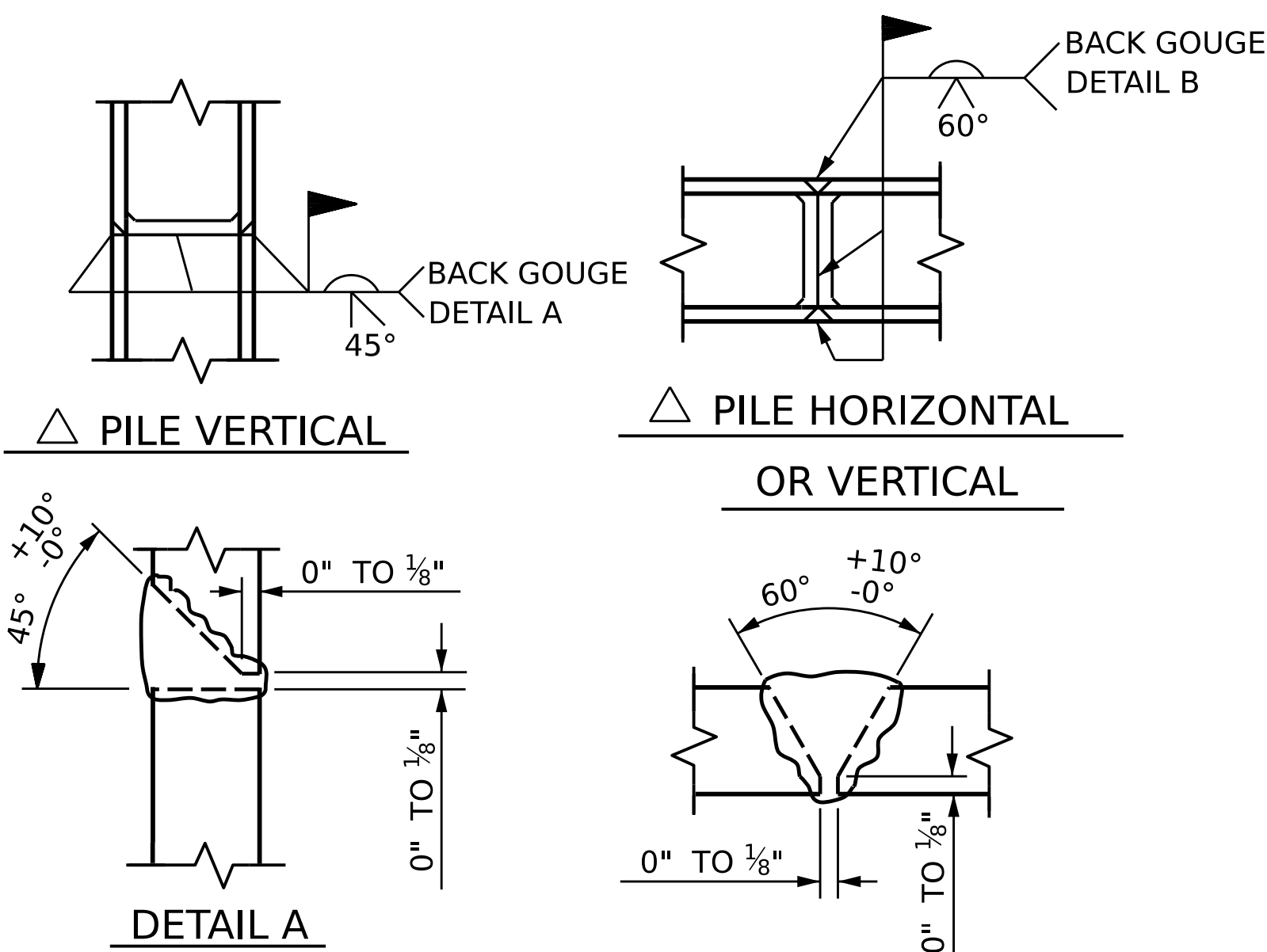


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

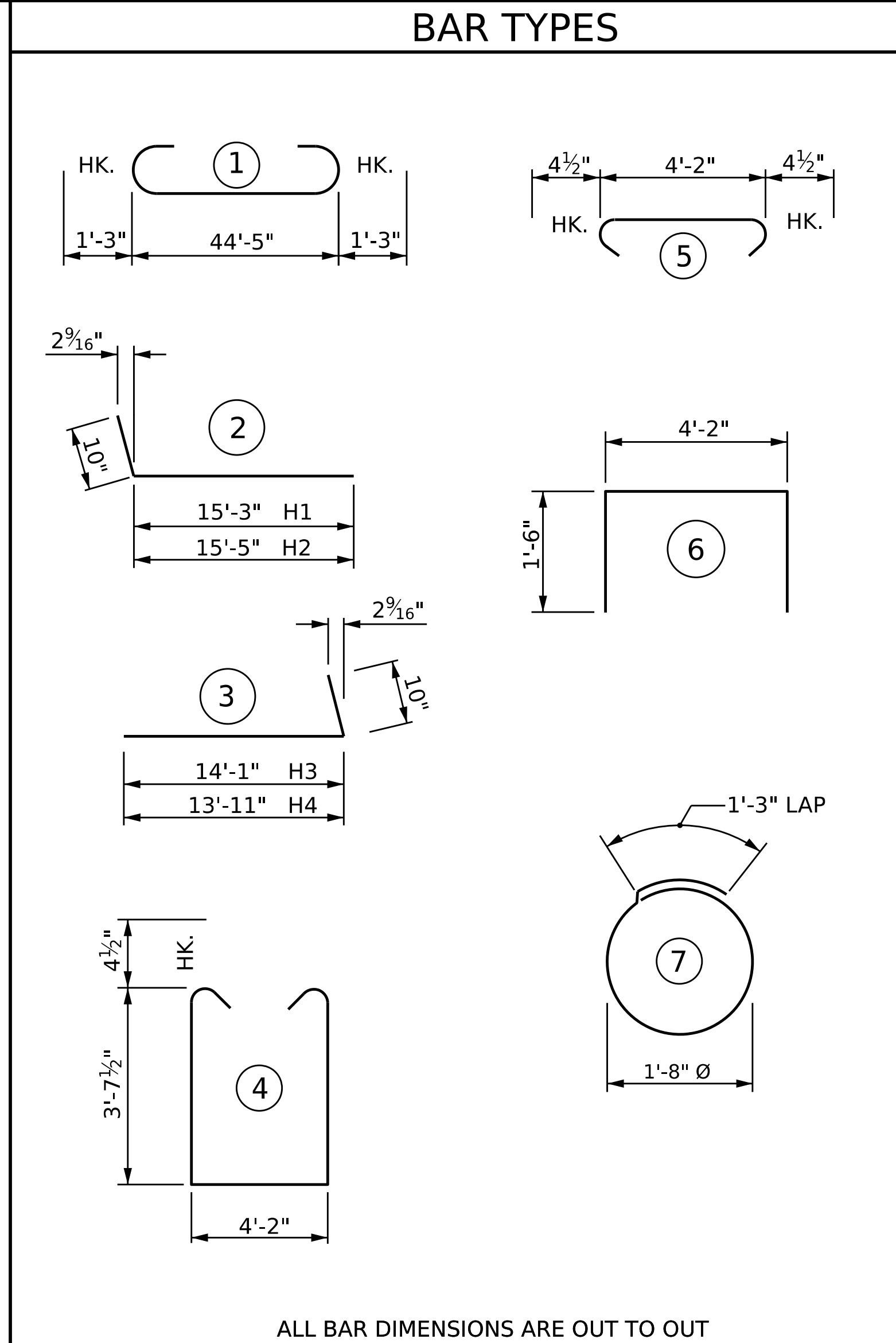
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



BILL OF MATERIAL

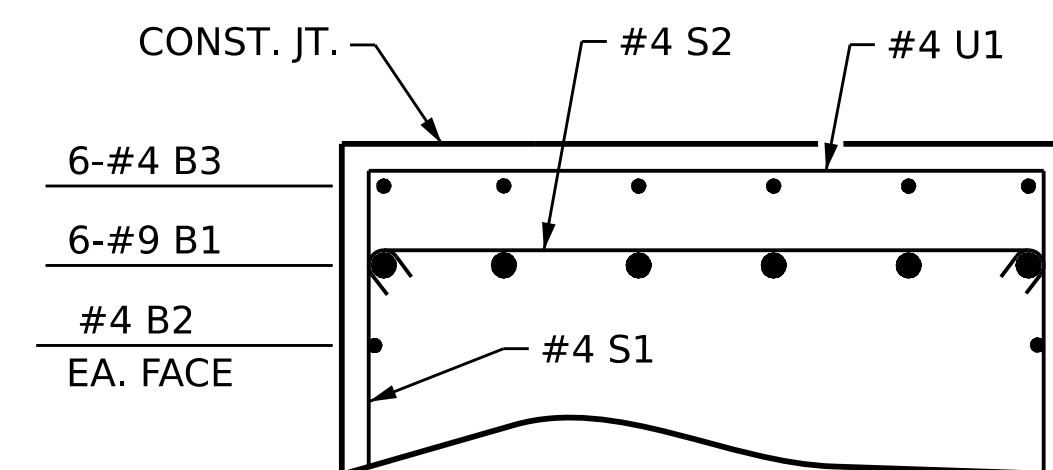
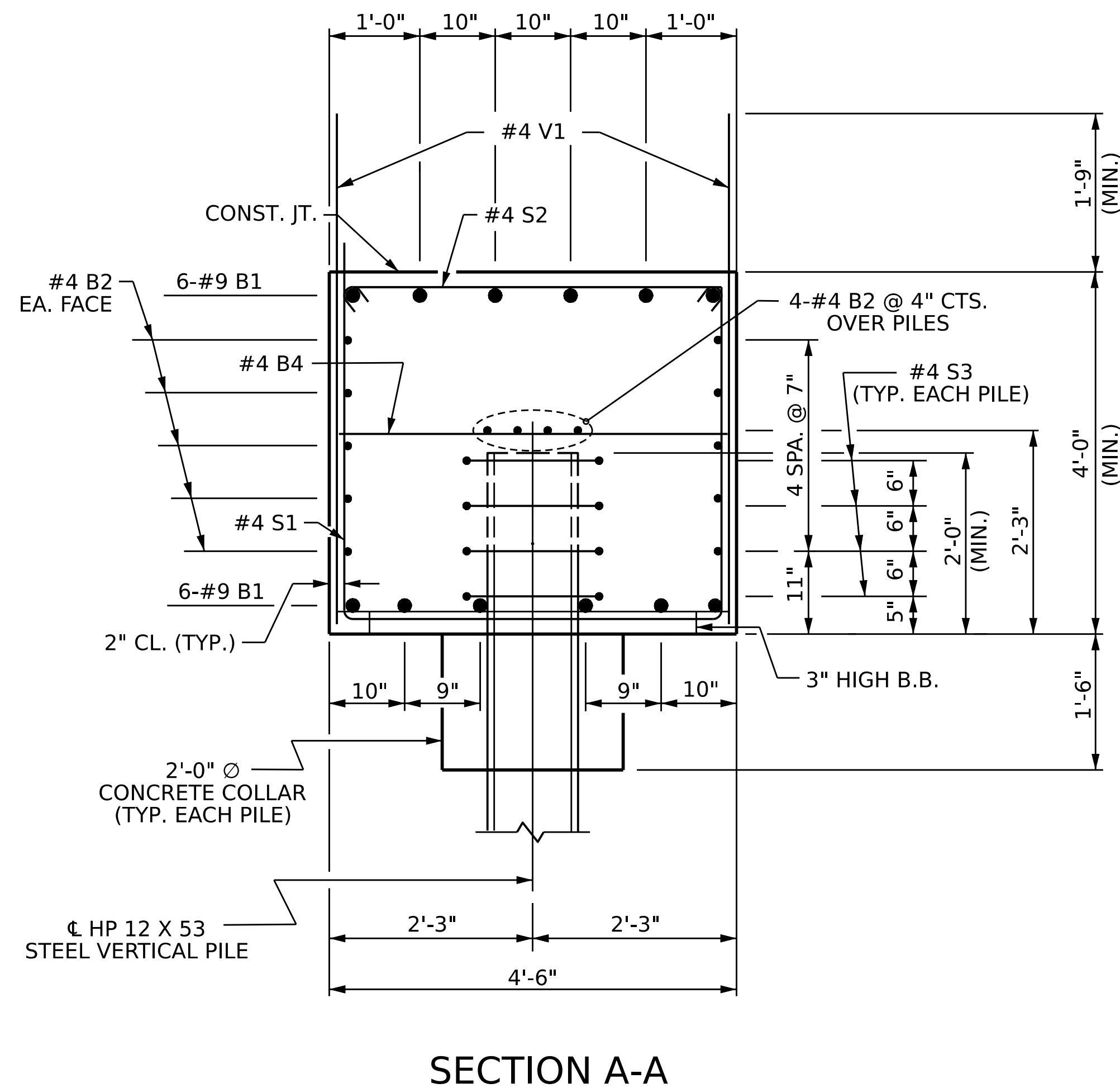
END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	46'-11"	1914
B2	28	#4	STR	23'-6"	440
B3	6	#4	STR	28'-4"	114
B4	12	#4	STR	4'-2"	33
H1	6	#5	2	16'-1"	101
H2	6	#5	2	16'-3"	102
H3	6	#5	3	14'-11"	93
H4	6	#5	3	14'-9"	92
S1	57	#4	4	12'-2"	463
S2	57	#4	5	4'-11"	187
S3	36	#4	7	6'-6"	156
U1	22	#4	6	7'-2"	105
V1	72	#4	STR	5'-7"	269
V2	27	#5	STR	9'-9"	275
V3	25	#5	STR	9'-5"	246

REINFORCING STEEL LBS. 4,589

CLASS A CONCRETE

POUR #1 CU. YDS. 41.0
(CAP, CONCRETE COLLARS & LOWER PART OF WINGS)



DocuSigned by:
Francesca Lea
B79DA0B8E5084EF

05/01/2024

PROJECT NO. BR-0093

ROCKINGHAM COUNTY

STATION: 17+85.52 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

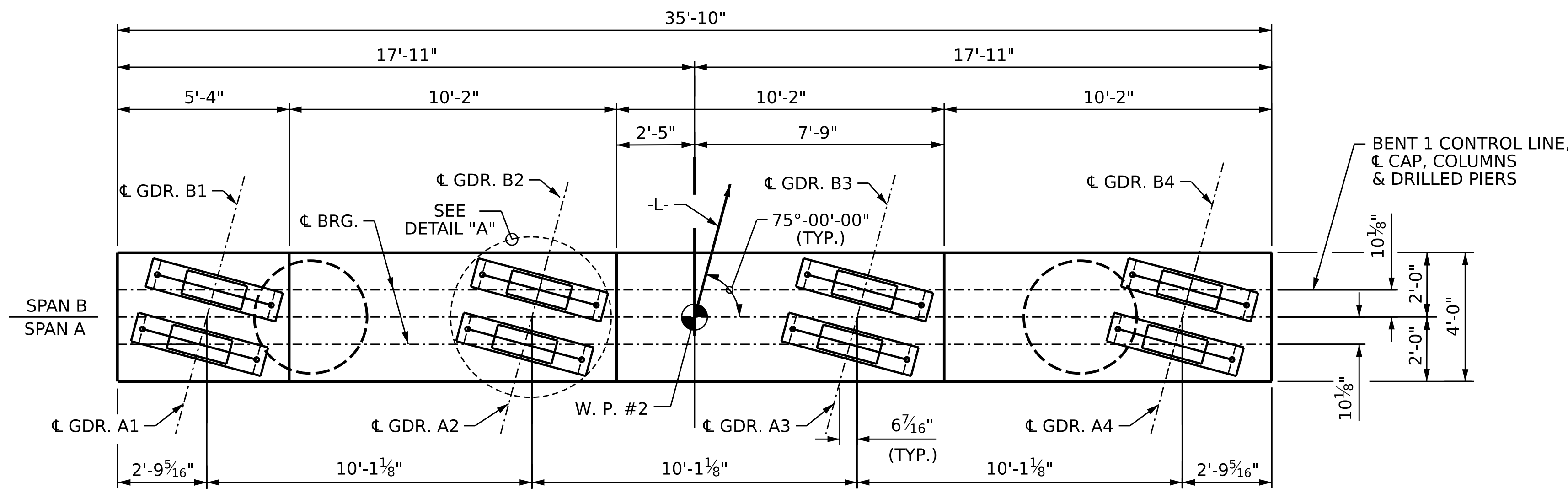
END BENT 1
INTEGRAL

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-27
2			4			TOTAL SHEETS 36

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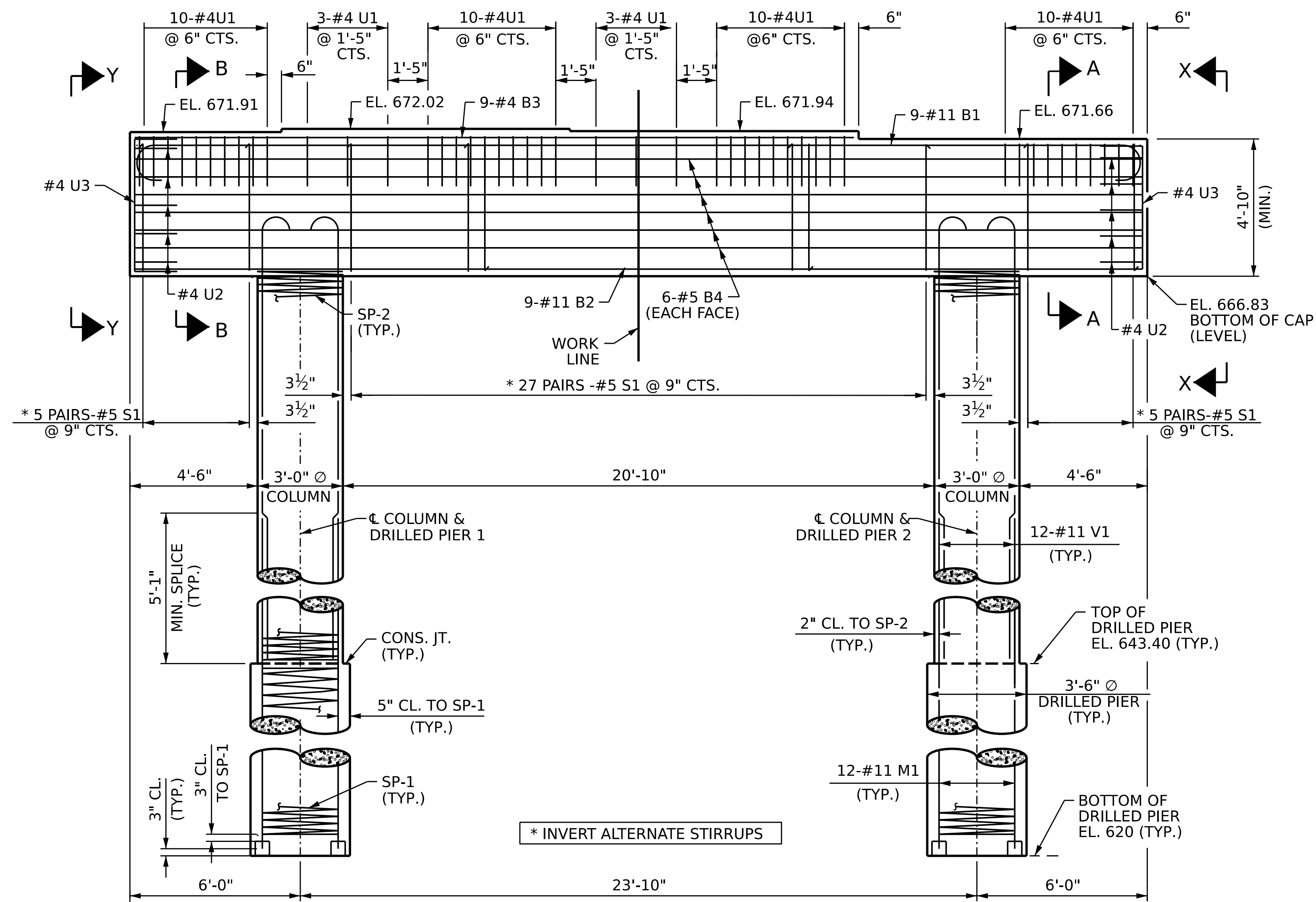
DRAWN BY: E. BAYISSA / Q.T. NGUYEN DATE: 11/2023
CHECKED BY: F. LEA DATE: 11/2023
DESIGN ENGINEER OF RECORD: E. BAYISSA DATE: 09/2023



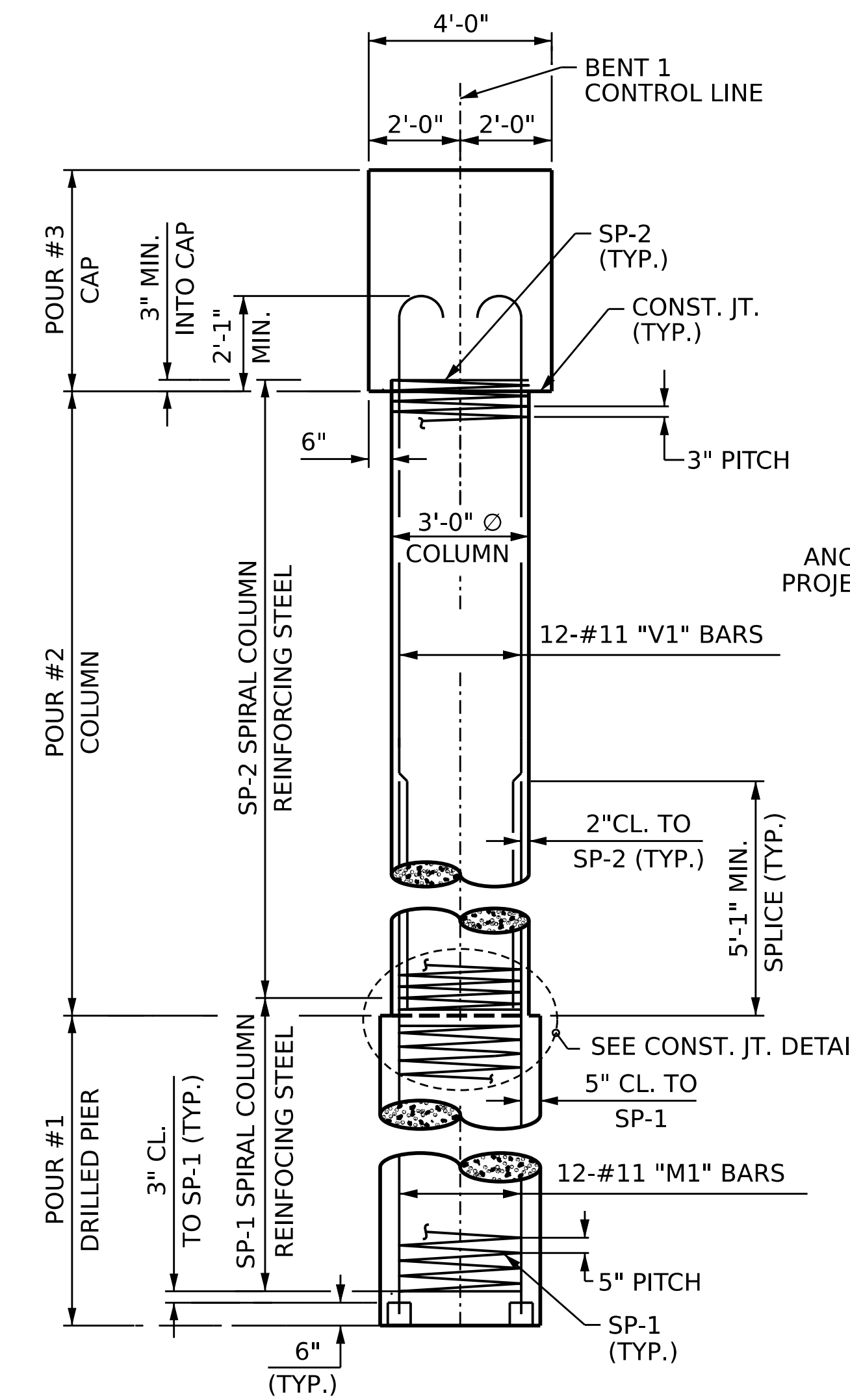
PLAN

NOTE

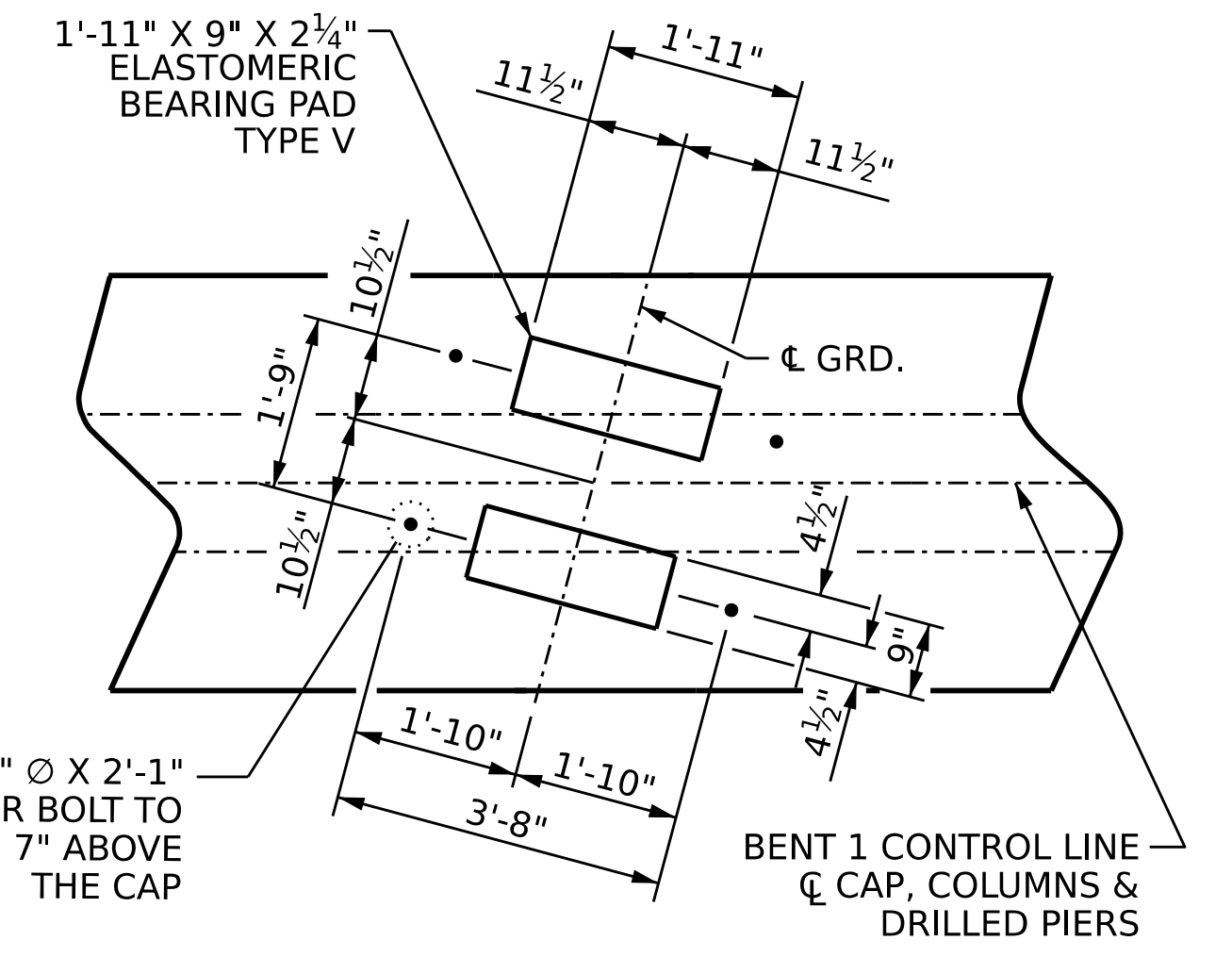
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 HOOKS ON "V" BARS MAYBE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
 ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL" OR "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".
 THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
 SPLICING OF THE LONGITUDINAL BARS ON THE DRILLED PIER WILL NOT BE PERMITTED.
 NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.



ELEVATION

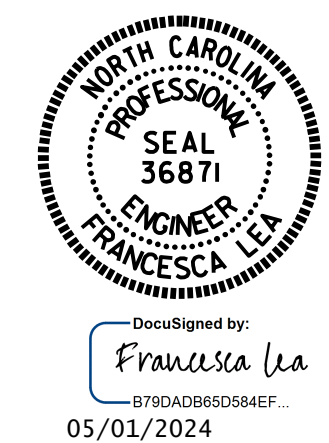


END ELEVATION



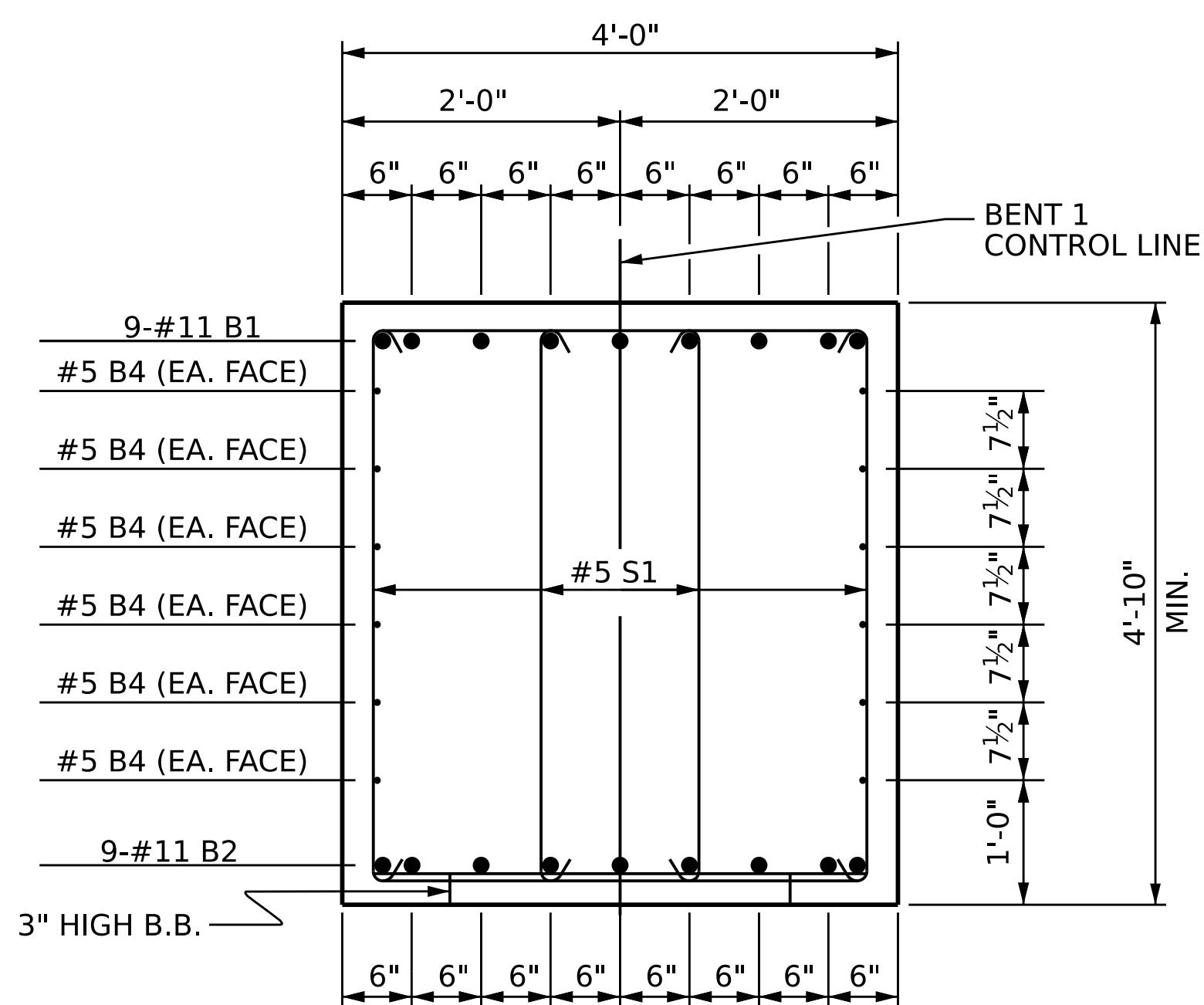
DETAIL "A"
(TYP. EA. GDR.)

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-
 SHEET 1 OF 2

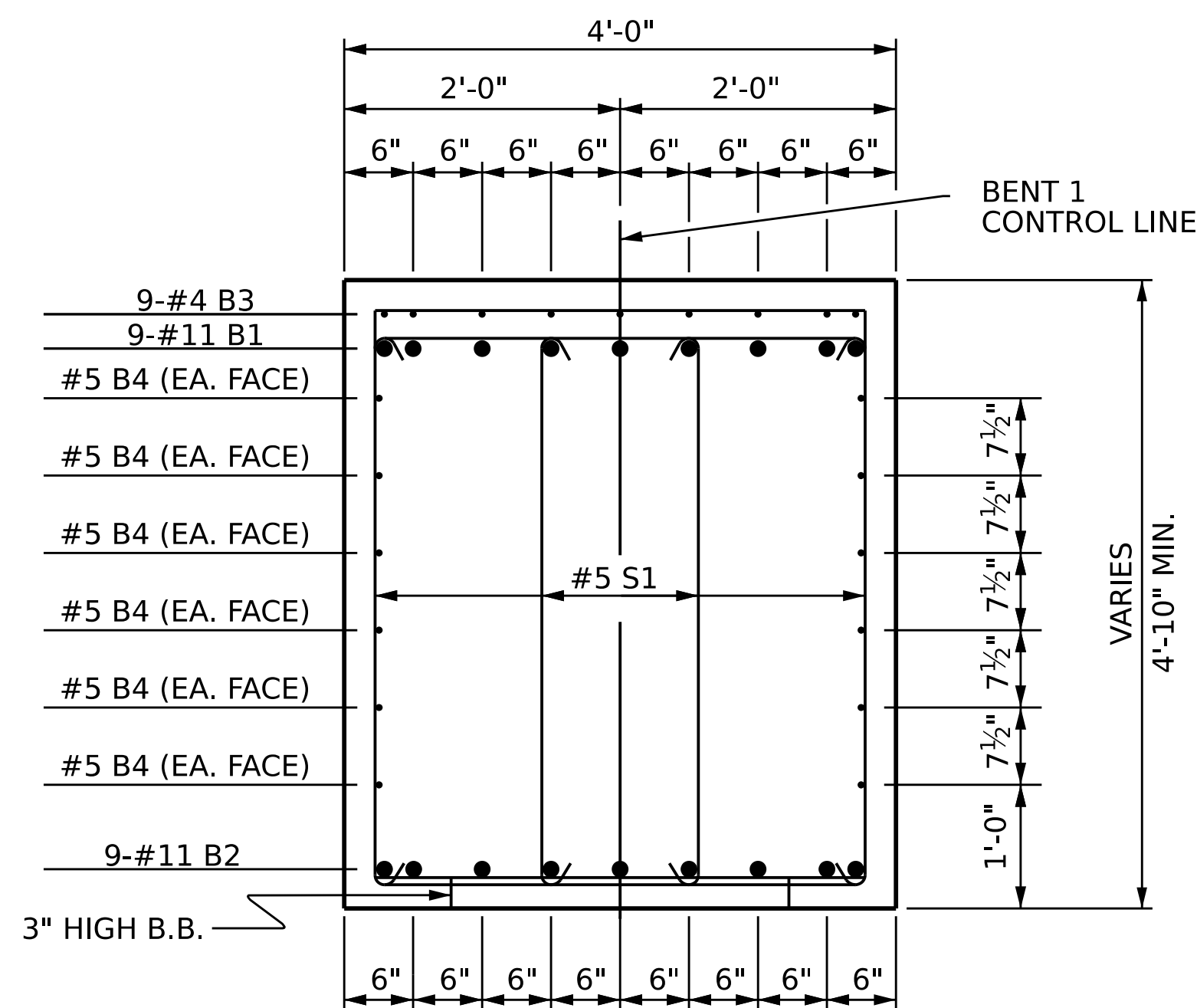


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE BENT 1	
REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.
1			3
2			4
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		S-28 TOTAL SHEETS 36	

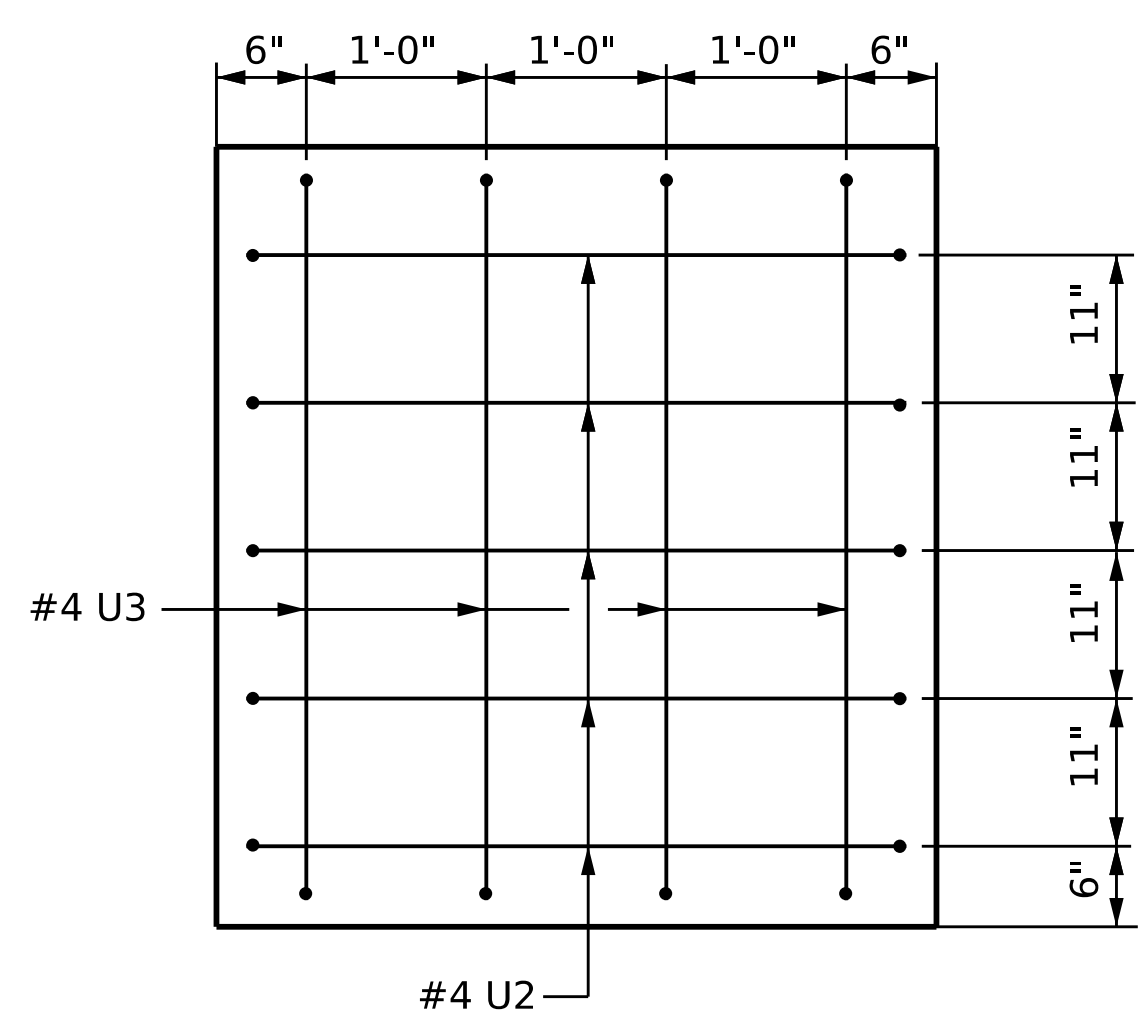
DRAWN BY : E. BAYISSA DATE : 12/2023
 CHECKED BY : F. LEA DATE : 12/2023
 DESIGN ENGINEER OF RECORD: E. BAYISSA DATE : 09/2023



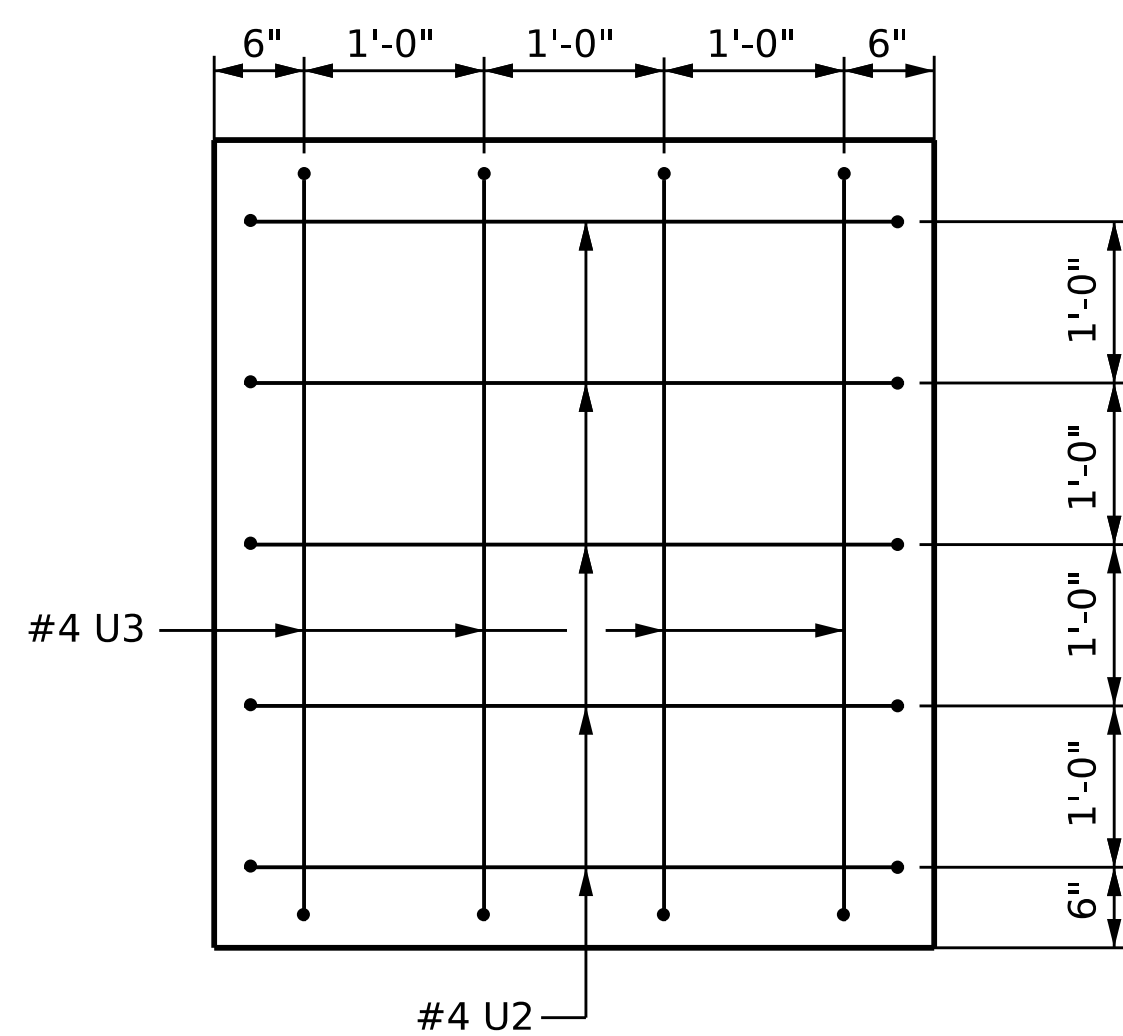
SECTION A-A



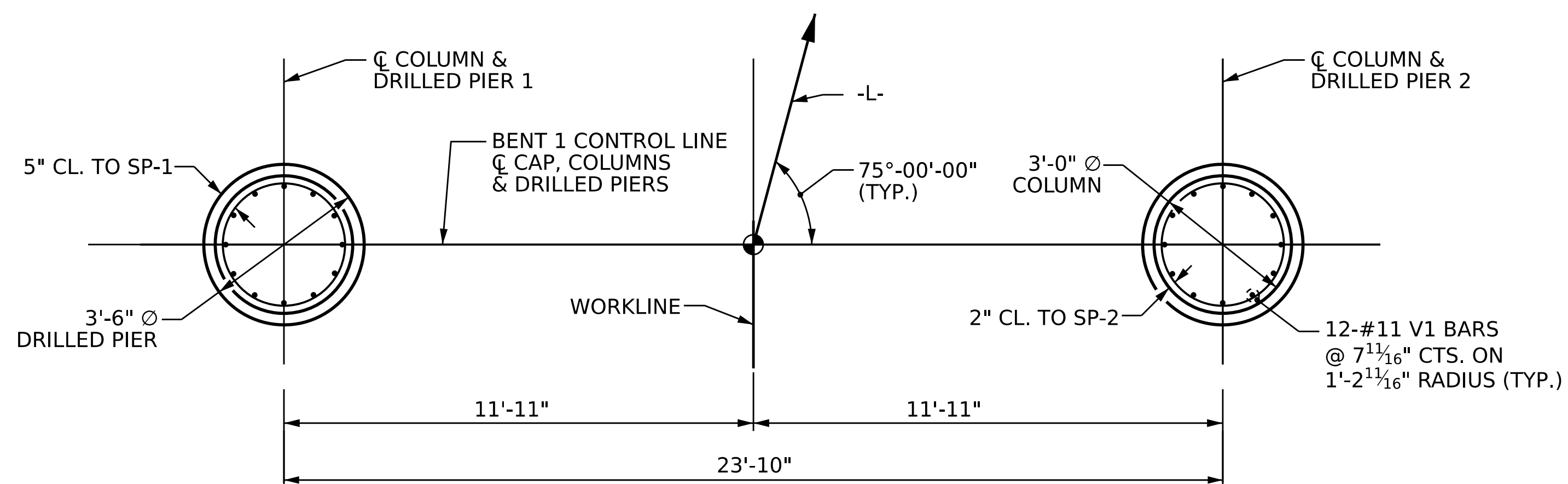
SECTION B-B



SECTION X-X

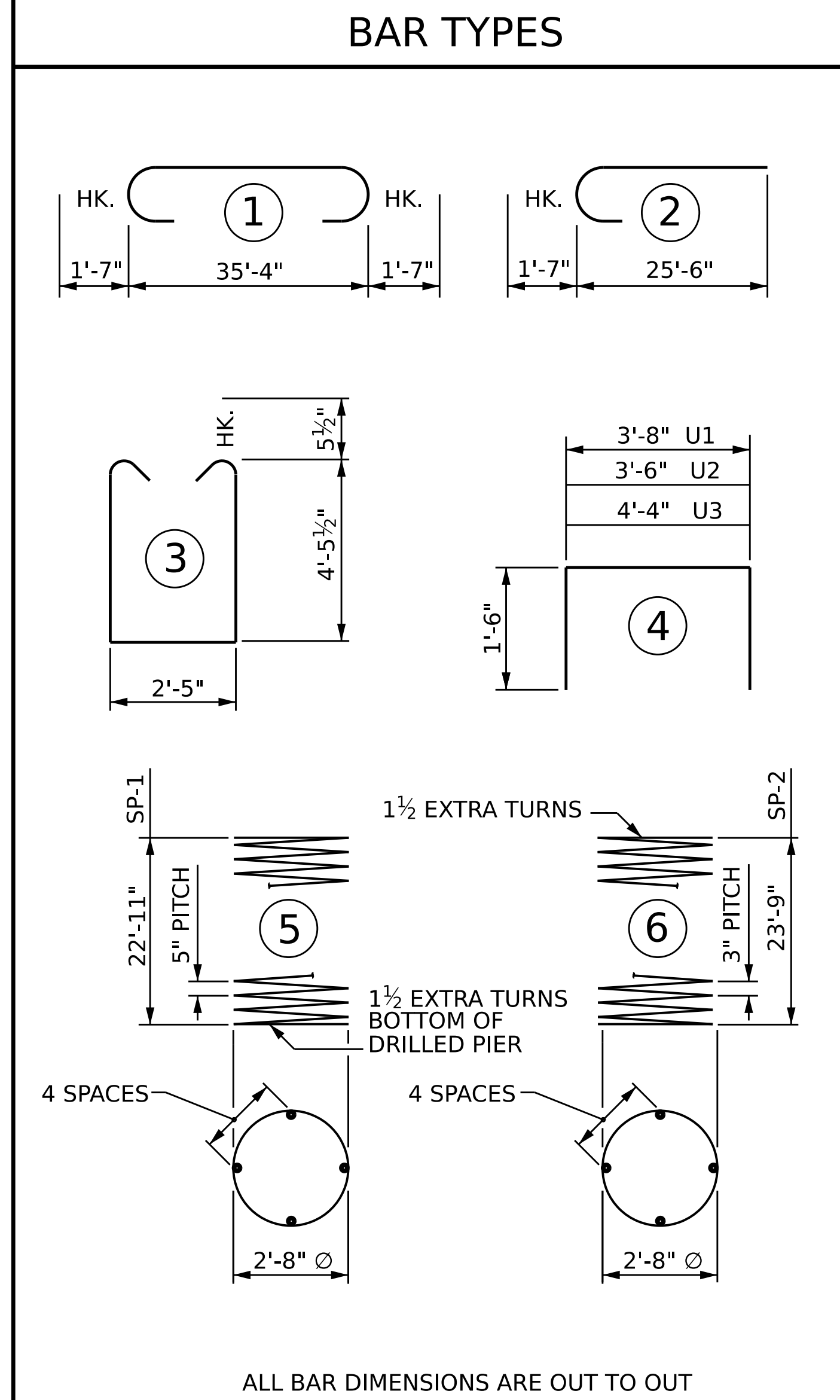


SECTION Y-Y



PLAN OF DRILLED PIERS AND COLUMNS

(REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH DRILLED PIER AND COLUMN)



ALL BAR DIMENSIONS ARE OUT TO OUT

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.
 ** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

BAR TYPES

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	#11	1	38'-6"	1841
B2	9	#11	STR	35'-6"	1698
B3	9	#4	STR	25'-4"	152
B4	6	#5	STR	35'-6"	222
M1	24	#11	STR	31'-2"	3974
S1	74	#5	3	12'-3"	945
U1	46	#4	4	6'-8"	205
U2	10	#4	4	6'-6"	43
U3	8	#4	4	7'-4"	39
V1	24	#11	2	27'-1"	3453

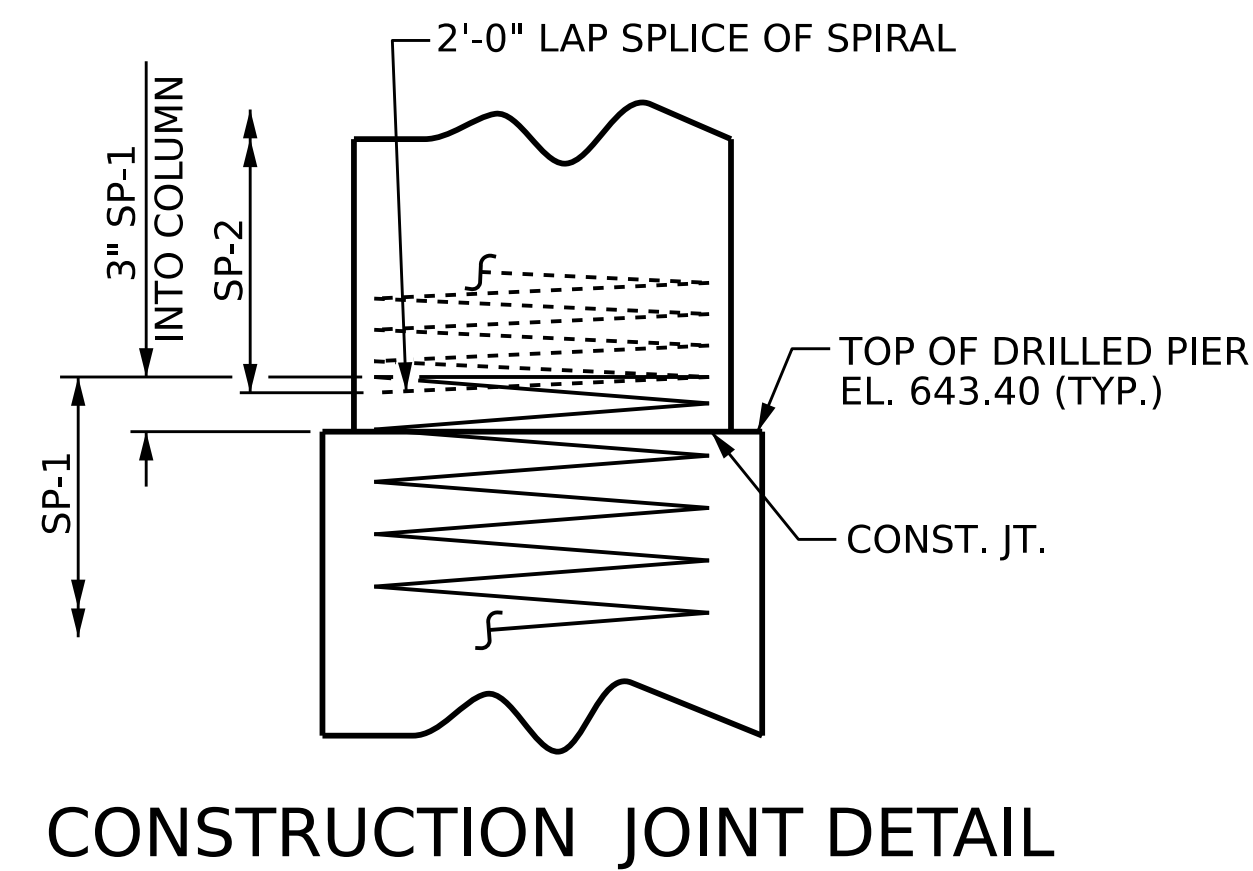
REINFORCING STEEL LBS. 12,573

SP-1	2	*	5	464'-9"	969
SP-2	2	**	6	796'-3"	1064

SPIRAL COLUMN REINFORCING STEEL LBS. 2,033

CLASS A CONCRETE
 POUR #2 - COLUMN CU. YDS. 12.3
 POUR #3 - CAP CU. YDS. 26.8
 TOTAL CU. YDS. 39.1

DRILLED PIER CONCRETE
 POUR #1 - DRILLED PIERS CU. YDS. 16.7



CONSTRUCTION JOINT DETAIL

PROJECT NO. BR-0093
 ROCKINGHAM COUNTY
 STATION: 18+75.52 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE

BENT 1



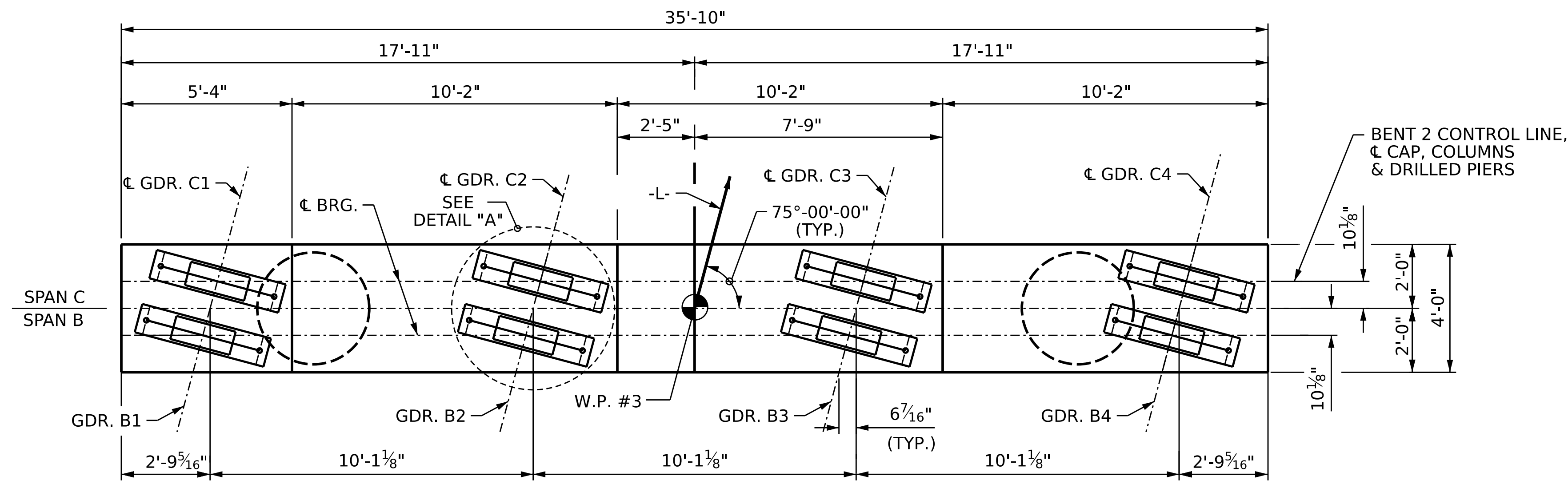
DocuSigned by:
 Francesca Lea
 05/01/2024

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-29
2			4			TOTAL SHEETS 36

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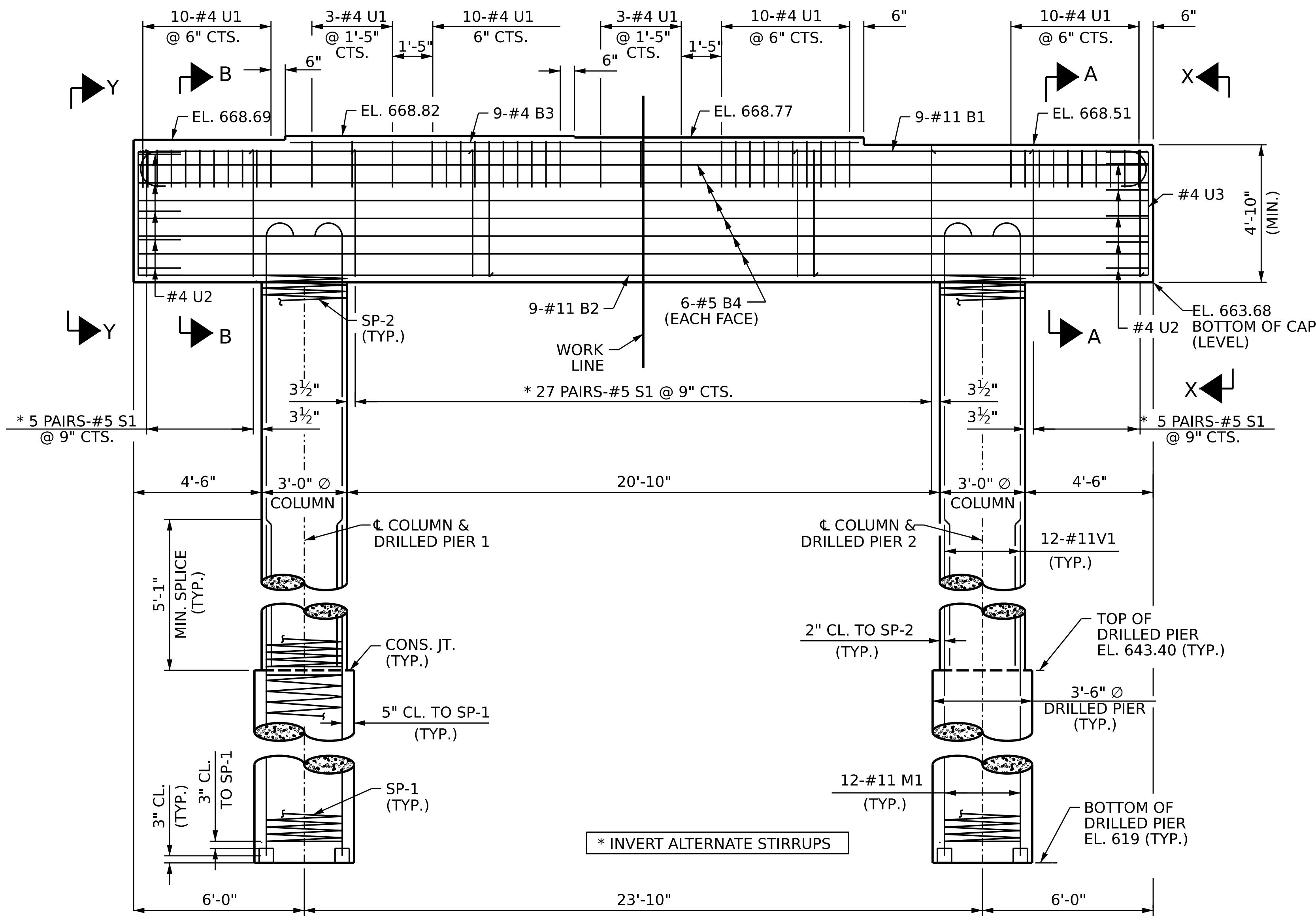
DRAWN BY: E. BAYISSA DATE: 12/2023
 CHECKED BY: F. LEA DATE: 01/2024
 DESIGN ENGINEER OF RECORD: E. BAYISSA DATE: 09/2023



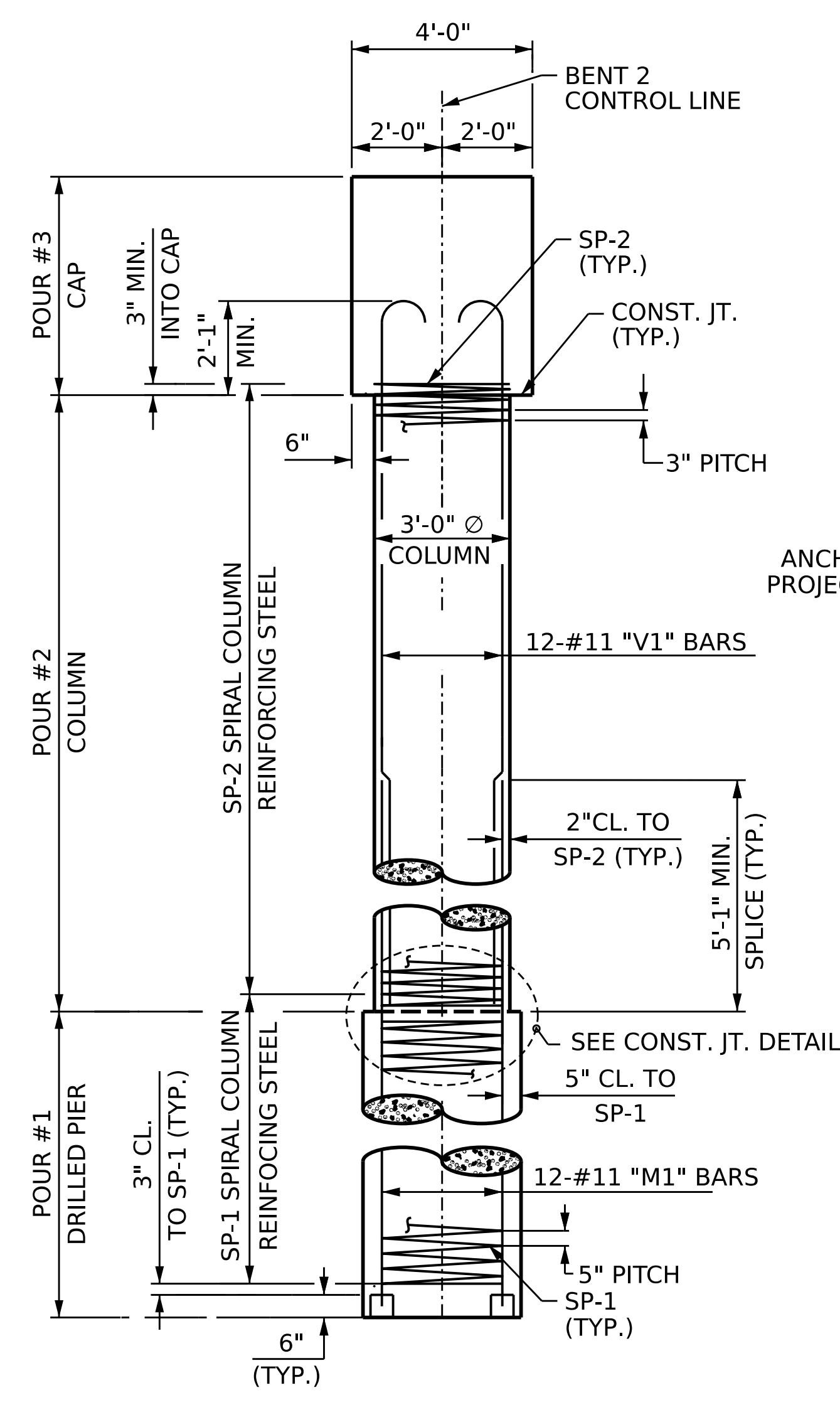
PLAN

NOTES:

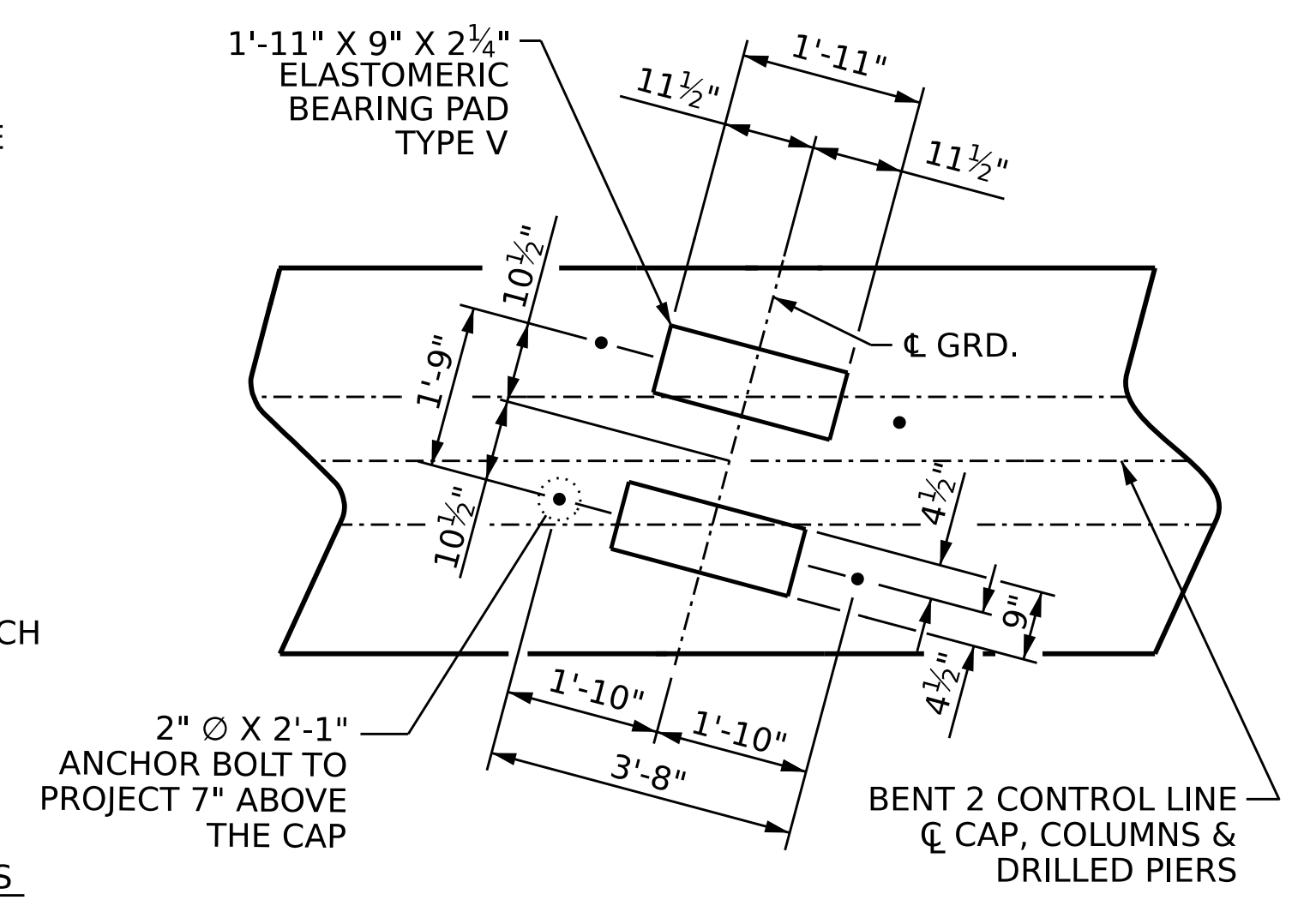
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
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ELEVATION

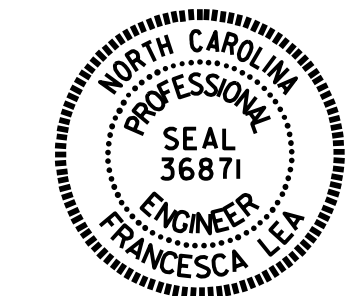


END ELEVATION



DETAIL "A"
(TYP. EA. GDR.)

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-
 SHEET 1 OF 2

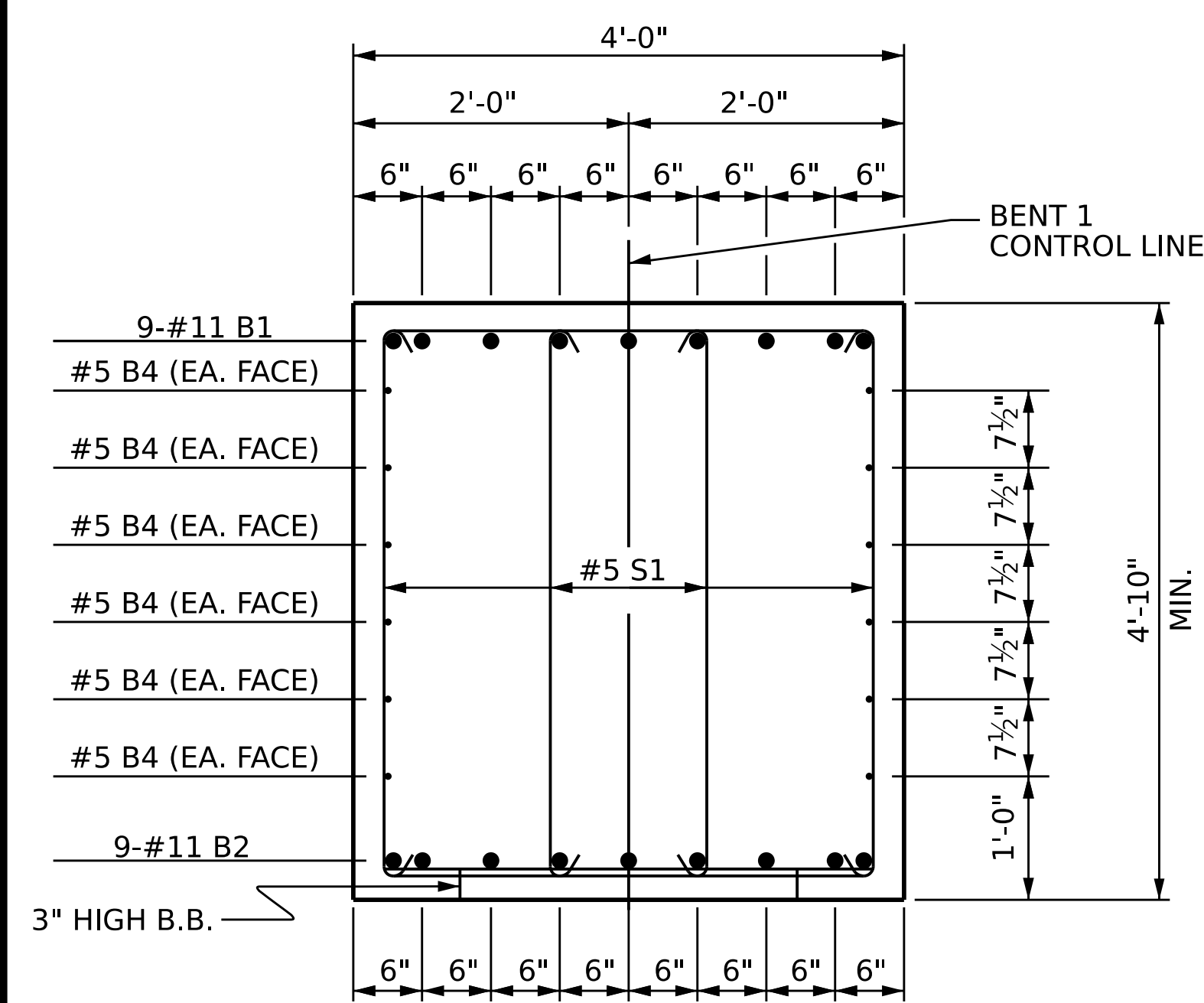


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 2

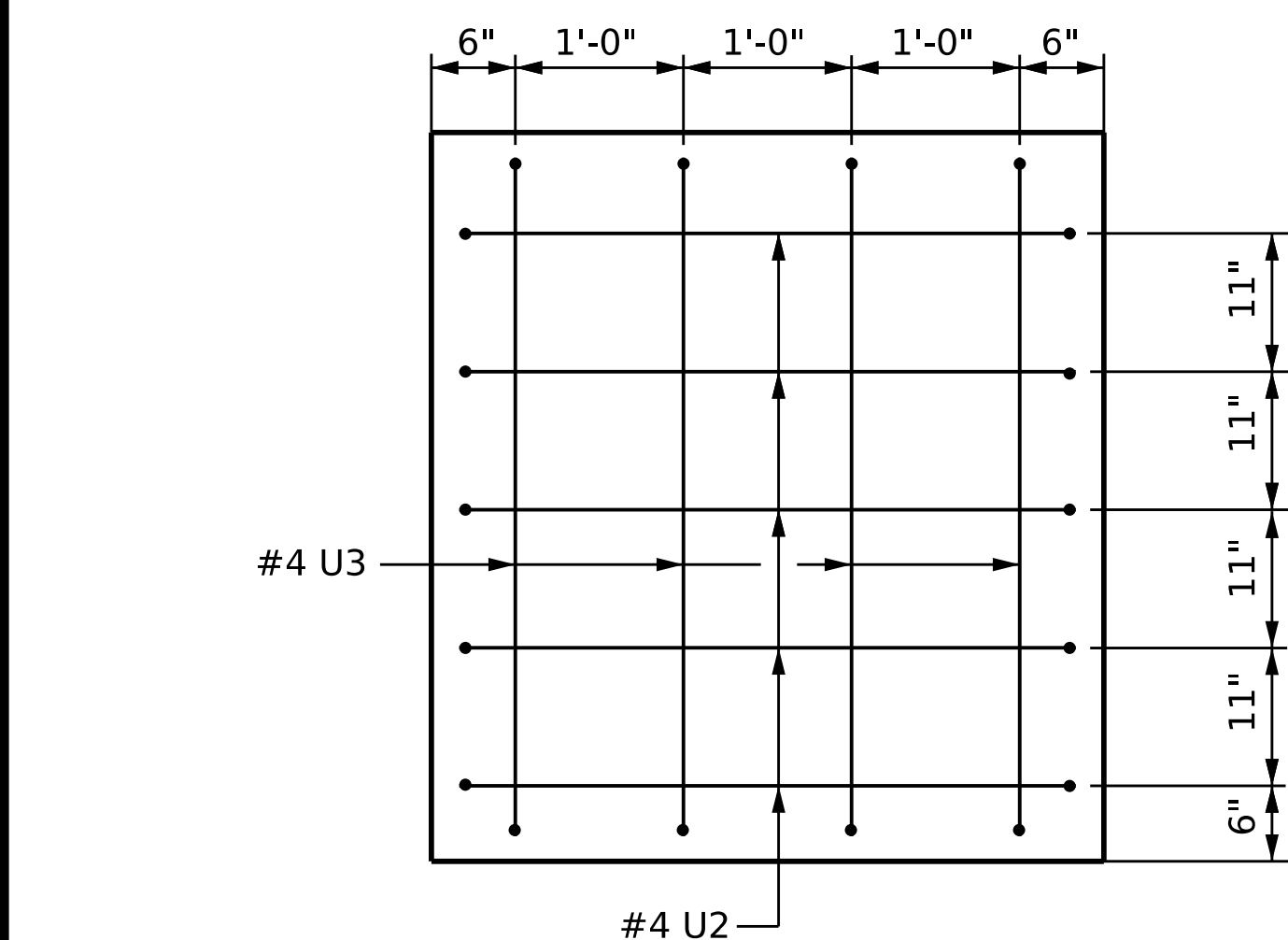
DRAWN BY : E. BAYISSA DATE : 12/2023
 CHECKED BY : F. LEA DATE : 01/2024
 DESIGN ENGINEER OF RECORD : E. BAYISSA DATE : 09/2023

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

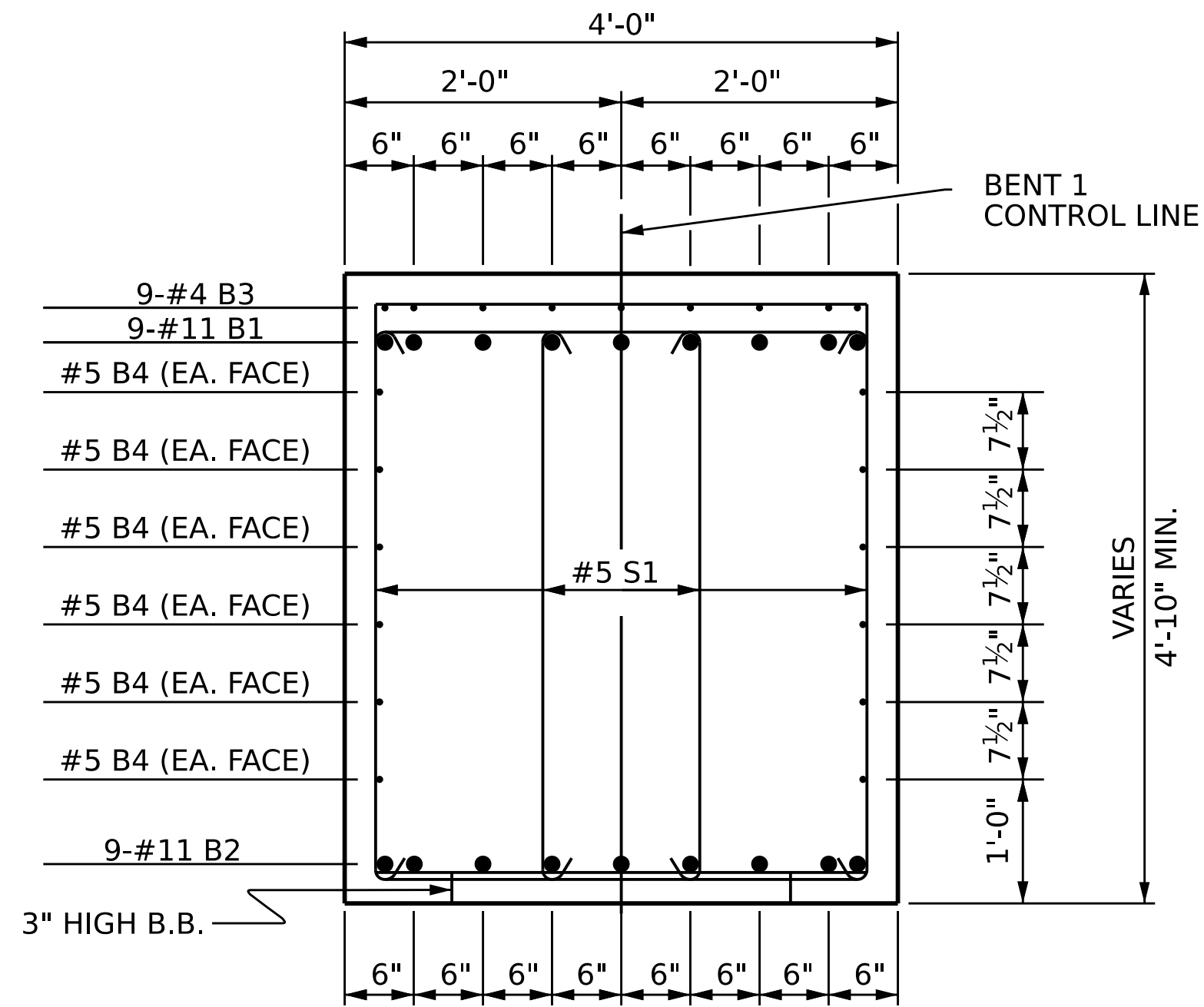
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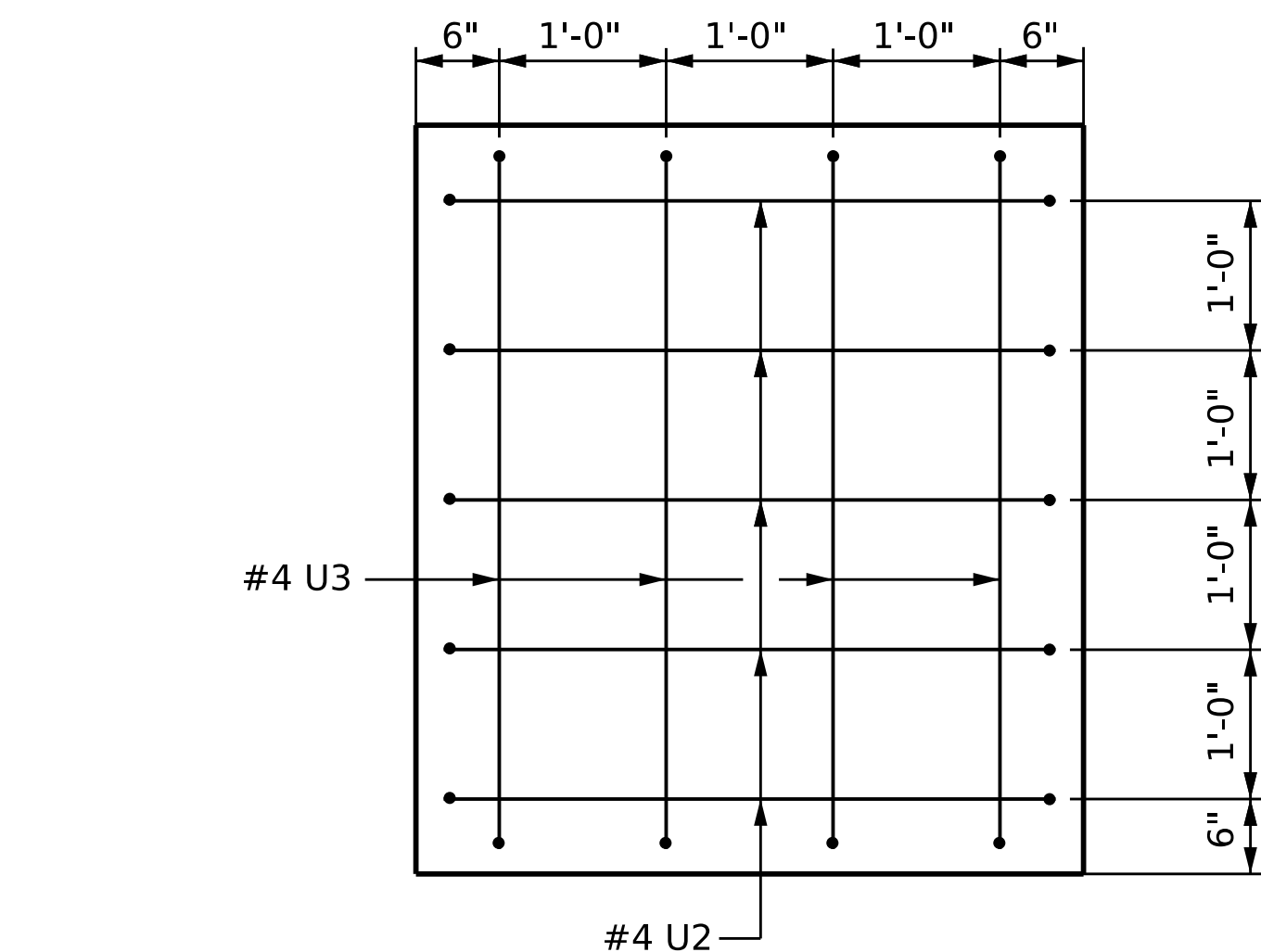
SECTION A-A



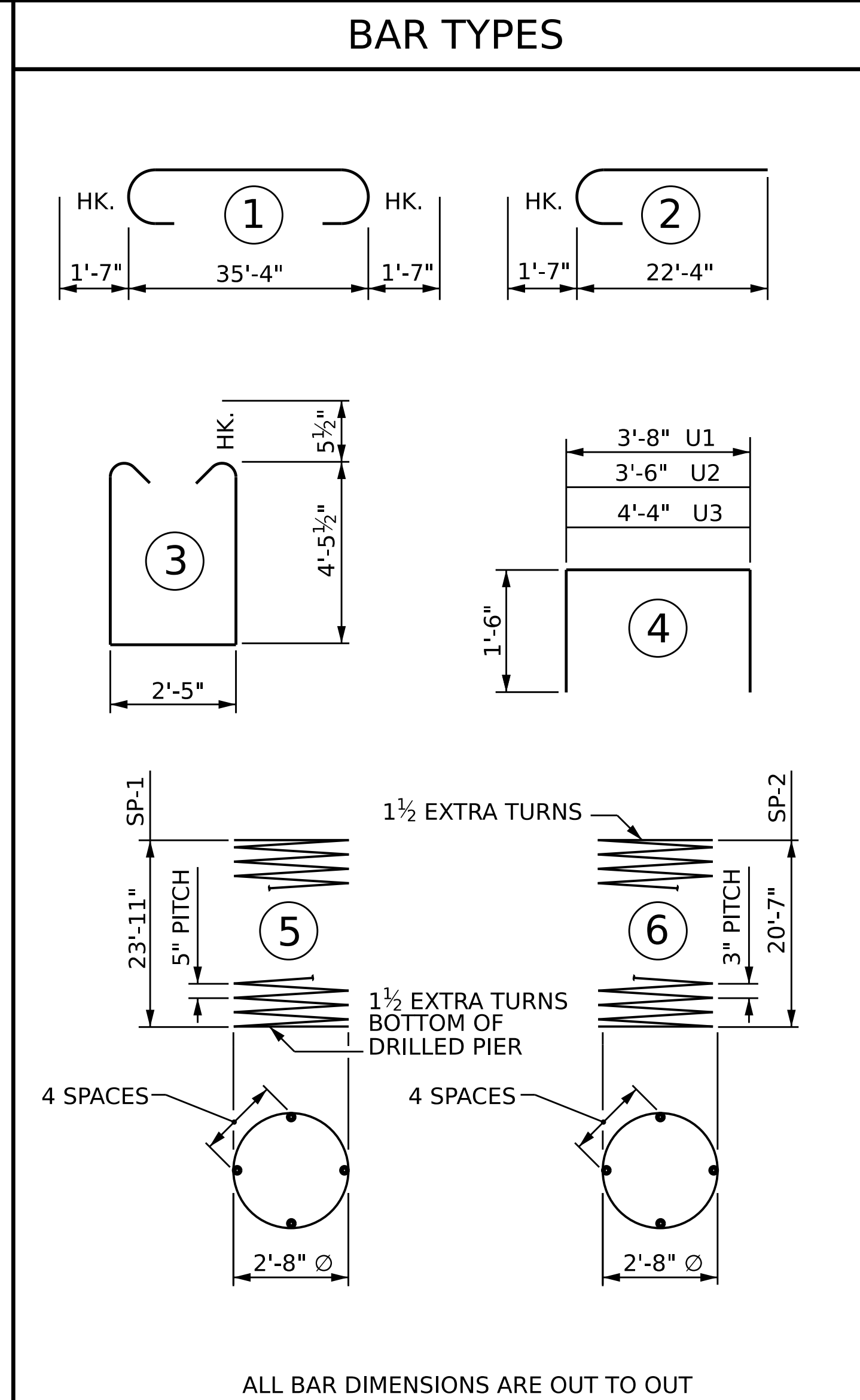
SECTION X-X



SECTION B-B



SECTION Y-Y

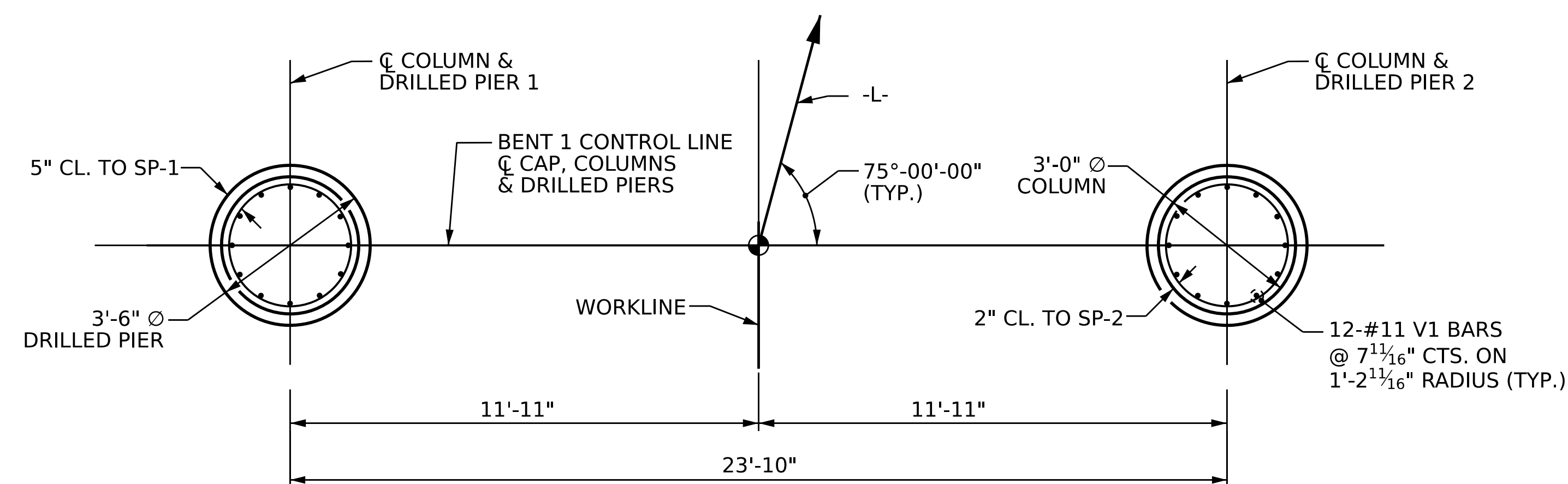


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

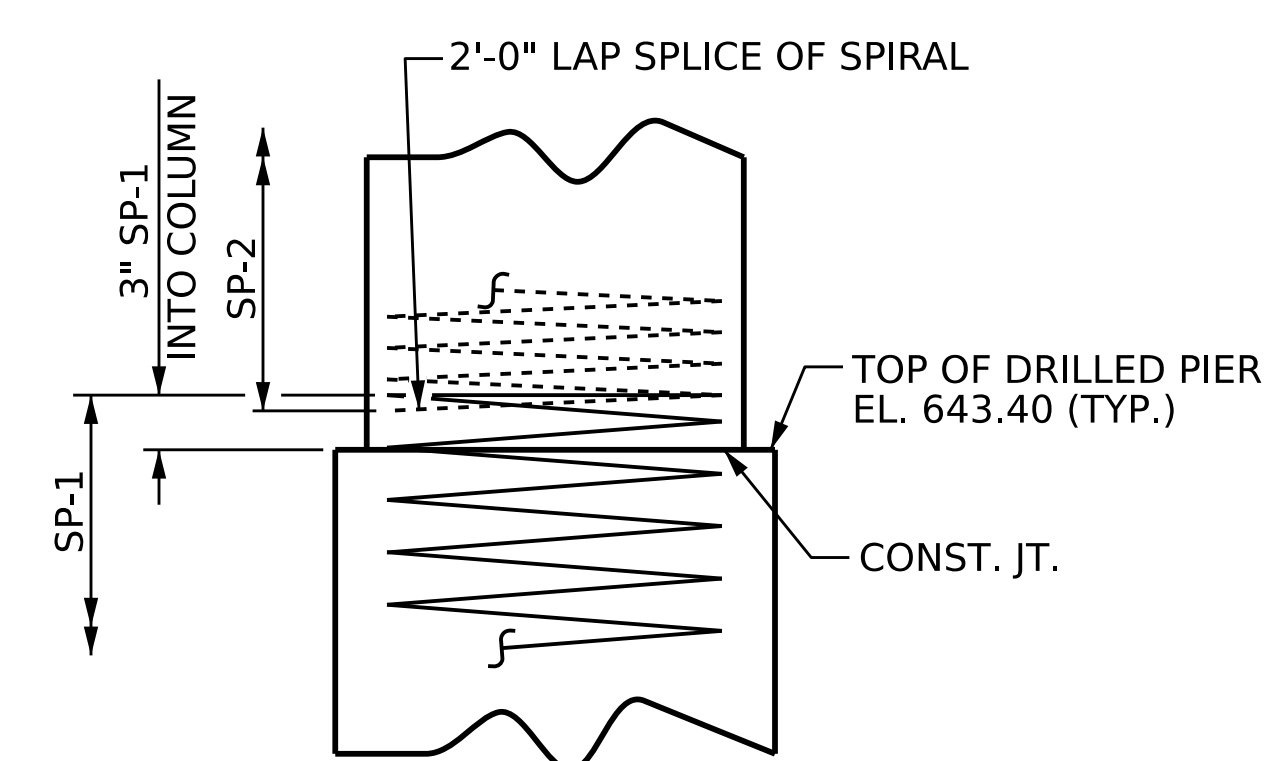
BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
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B2	9	#11	STR	35'-6"	1698
B3	9	#4	STR	20'-0"	120
B4	6	#5	STR	35'-6"	222
M1	24	#11	STR	32'-2"	4102
S1	74	#5	3	12'-3"	945
U1	46	#4	4	6'-8"	205
U2	10	#4	4	6'-6"	43
U3	8	#4	4	7'-4"	39
V1	24	#11	2	23'-11"	3050
REINFORCING STEEL				LBS.	12,265
SP-1	2	*	5	485'-3"	1012
SP-2	2	**	6	693'-1"	926
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,938
CLASS A CONCRETE					
POUR #2 - COLUMN				CU. YDS.	10.6
POUR #3 - CAP				CU. YDS.	26.6
TOTAL				CU. YDS.	37.2
DRILLED PIER CONCRETE					
POUR #1 - DRILLED PIERS				CU. YDS.	17.4

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.
 ** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



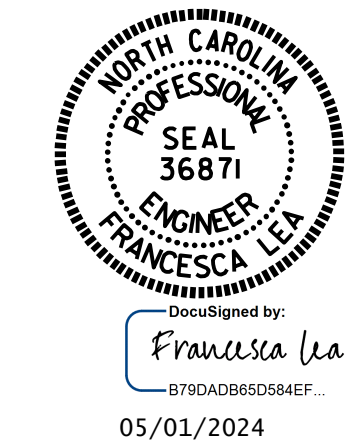
PLAN OF DRILLED PIERS AND COLUMNS

(REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH DRILLED PIER AND COLUMN)



CONSTRUCTION JOINT DETAIL

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-
 SHEET 2 OF 2



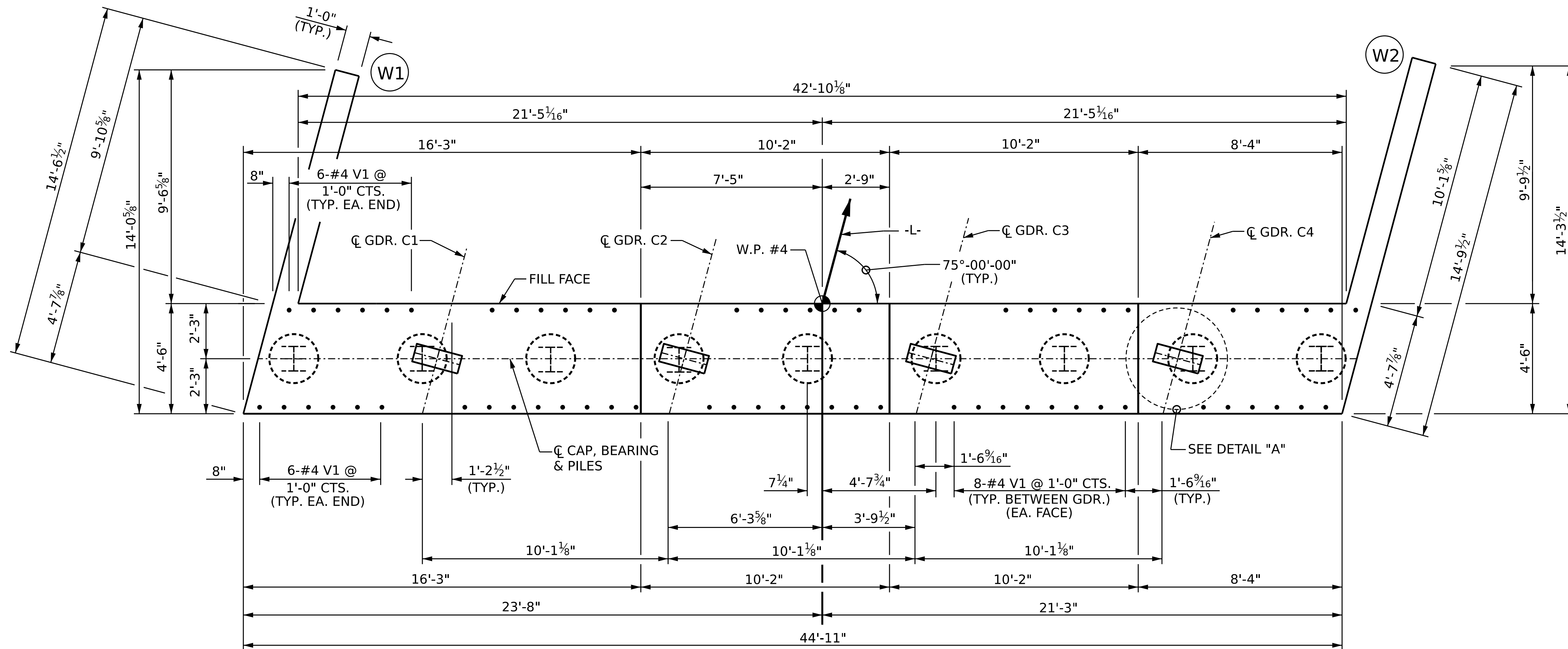
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 2

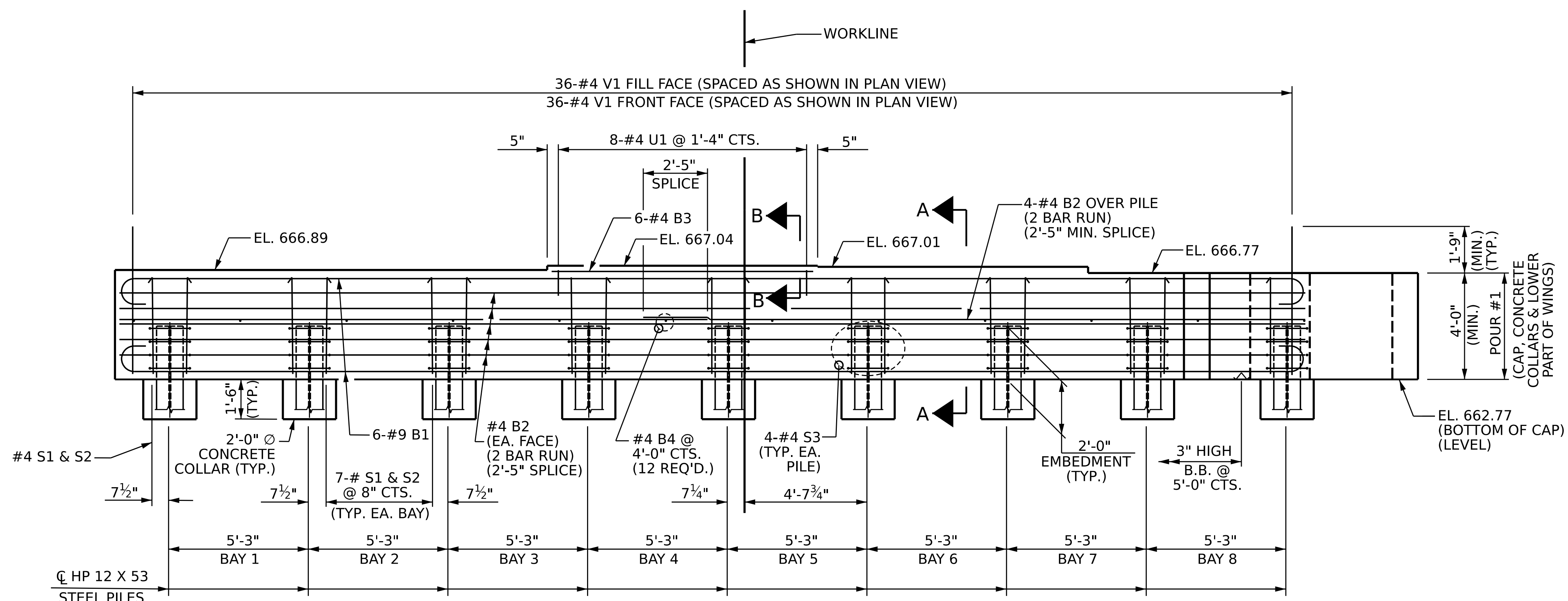
DRAWN BY: E. BAYISSA DATE: 12/2023
 CHECKED BY: F. LEA DATE: 01/2024
 DESIGN ENGINEER OF RECORD: E. BAYISSA DATE: 09/2023

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REVISIONS			SHEET NO.
NO.	BY:	DATE:	S-31
1			TOTAL SHEETS
2			36

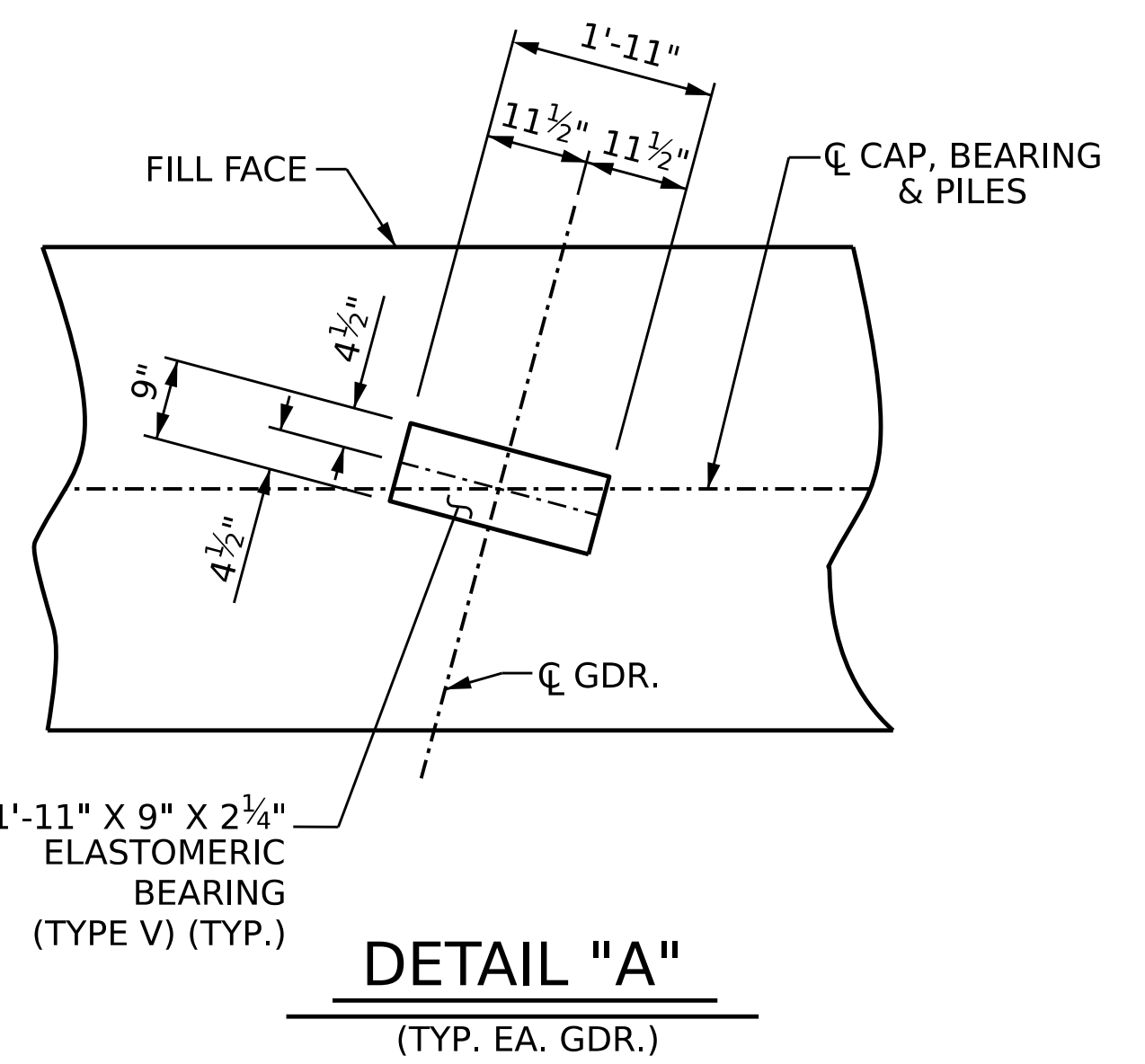


PLAN



ELEVATION

NOTES
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.
 SEE THE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT DETAILS.
 THE UPPER PART OF INTEGRAL PORTION AND WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE. SEE SUPERSTRUCTURE PLAN OF SPANS.
 THE TOP SURFACE OF POUR #1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

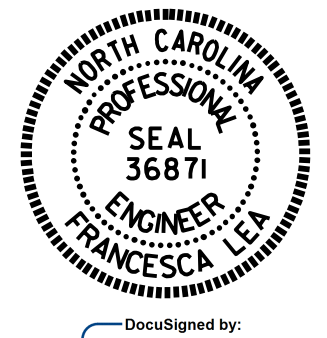


DETAIL "A"

(TYP. EA. GDR.)

PROJECT NO. BR-0093
 ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 1 OF 3

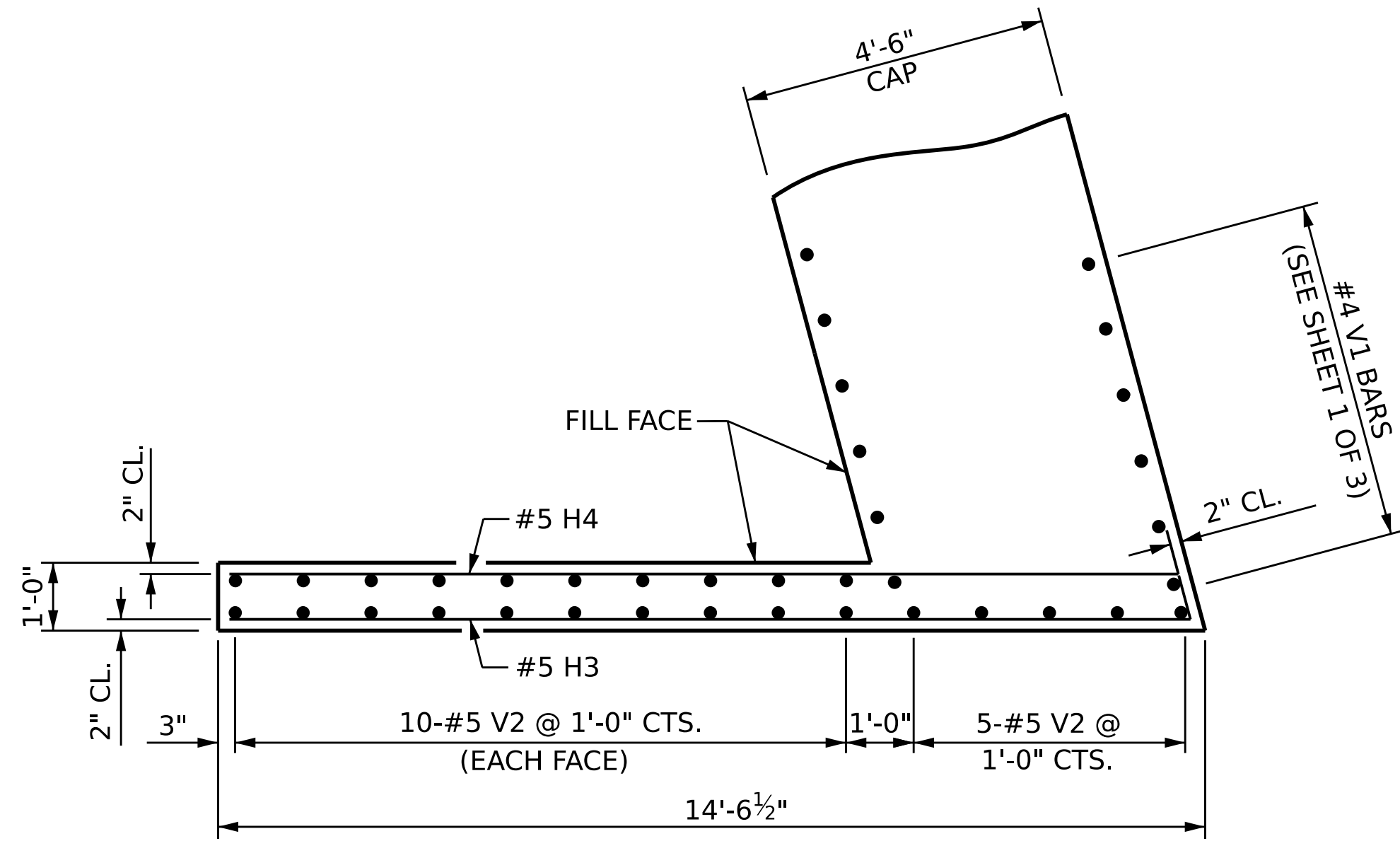


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2
 INTEGRAL

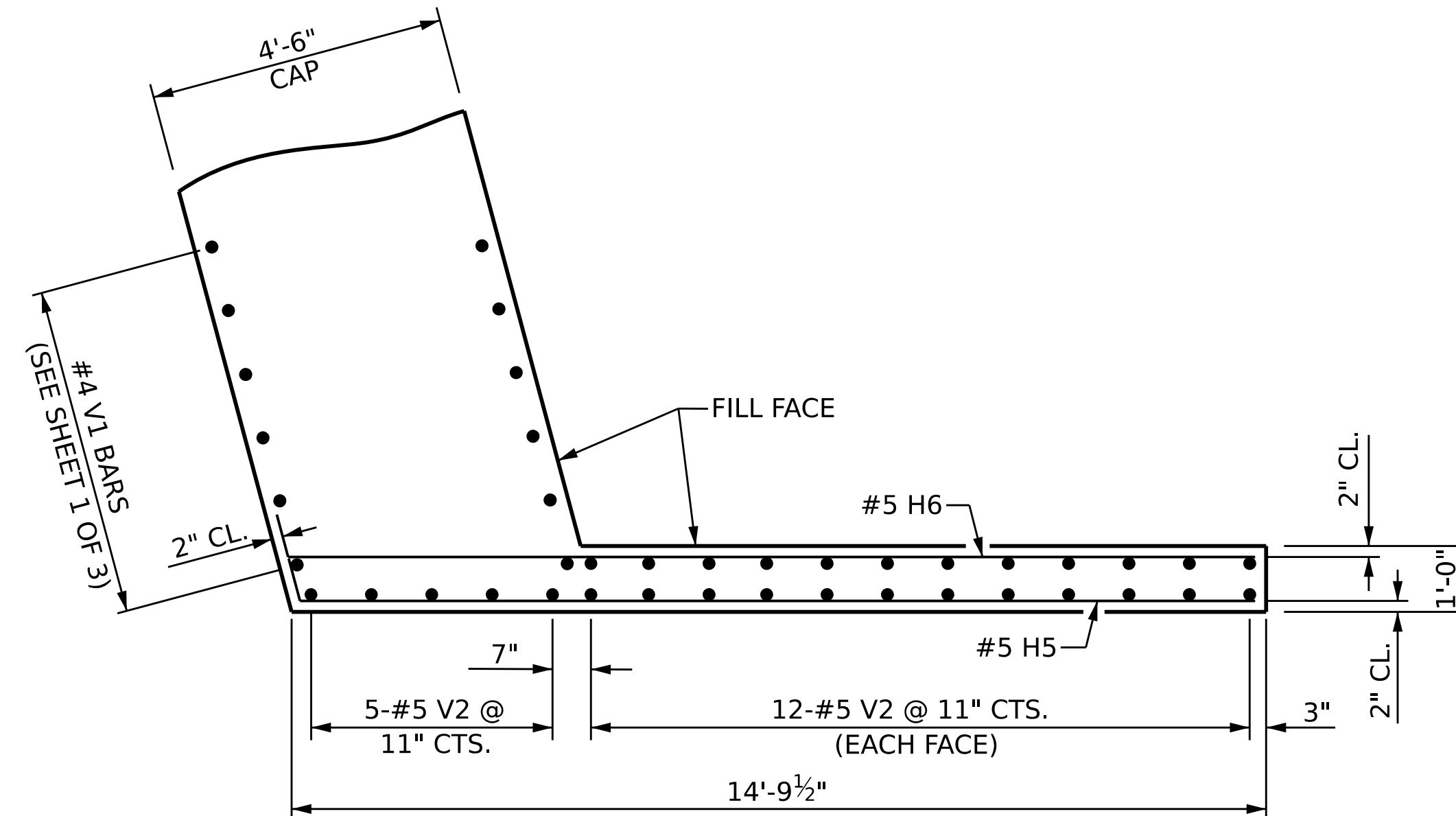
DRAWN BY : E. BAYISSA / Q.T. NGUYEN DATE : 11/2023
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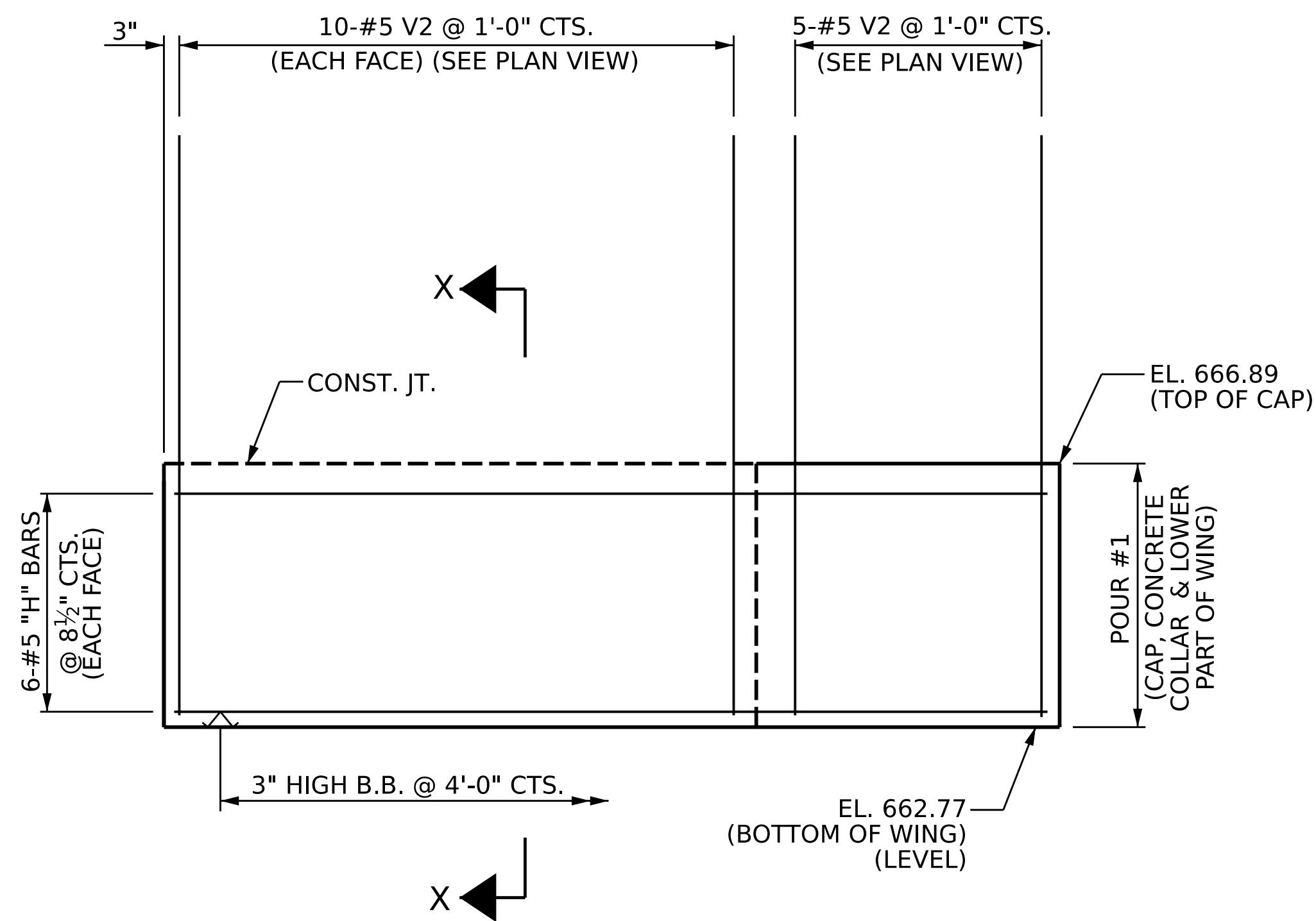
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NO.	BY:	DATE:	NO.
1			3
2			4



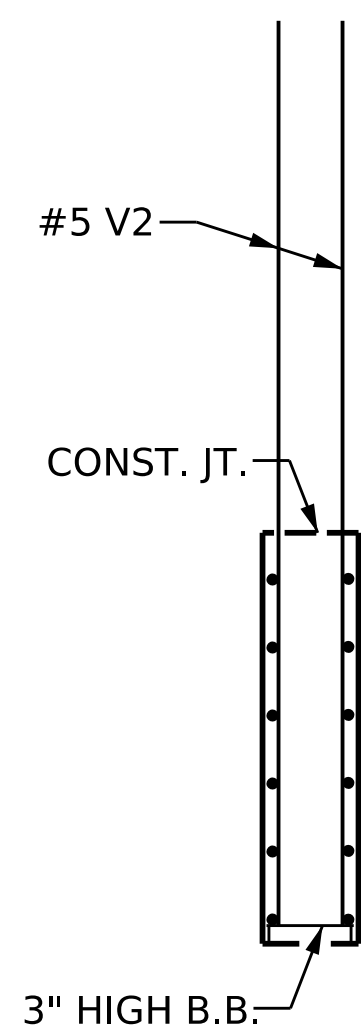
PLAN OF WING W1



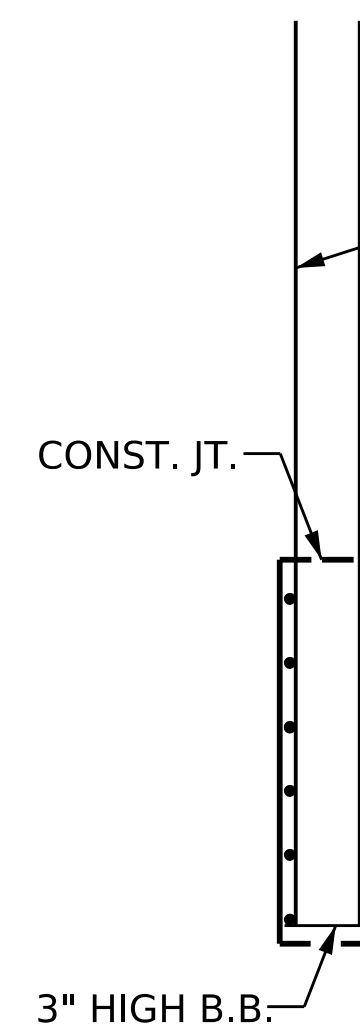
PLAN OF WING W2



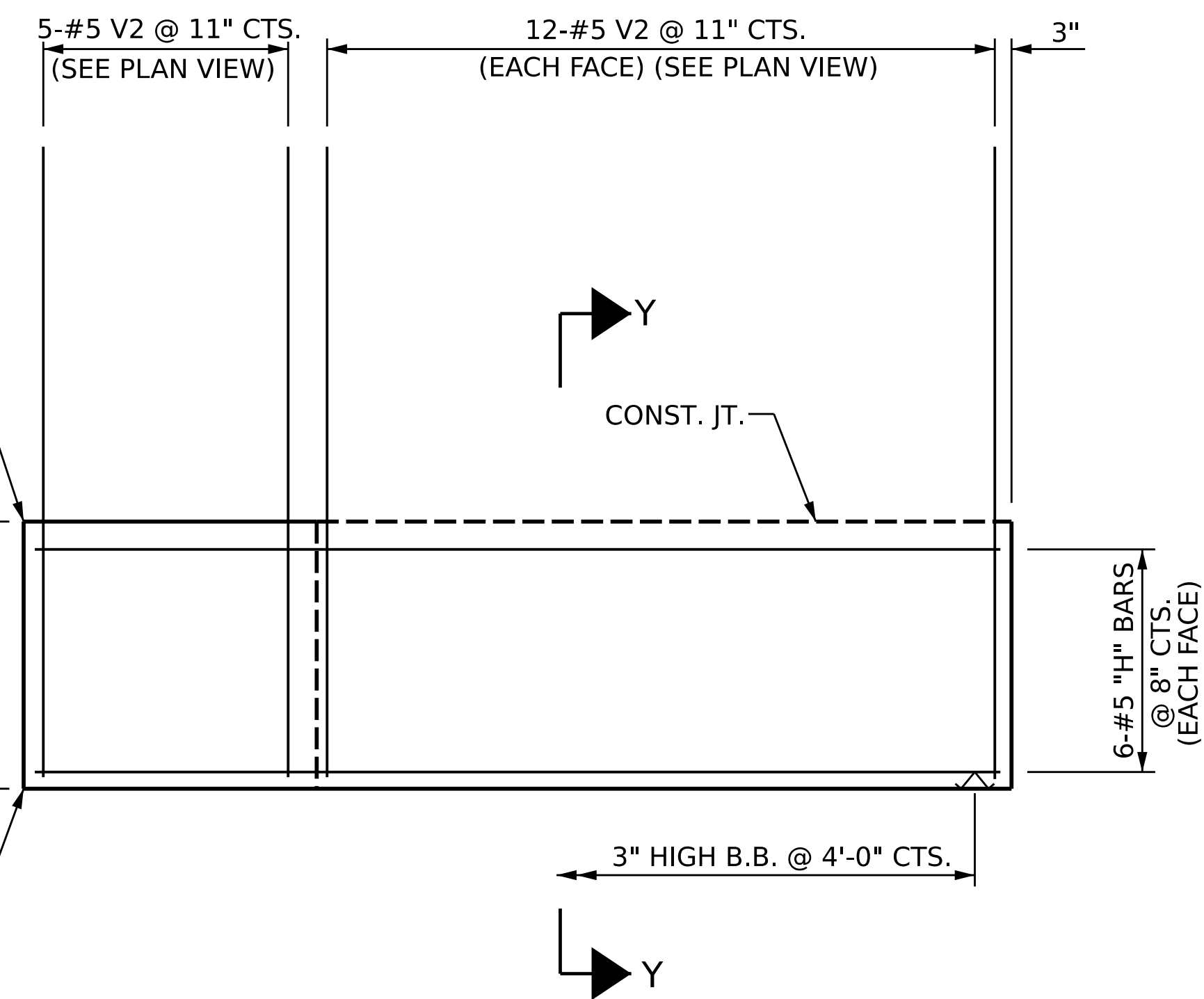
ELEVATION OF WING W1



SECTION X-X



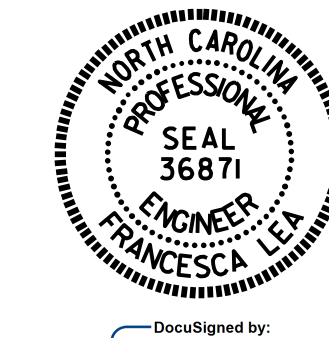
SECTION Y-Y



ELEVATION OF WING W2

PROJECT NO. BR-0093
 ROCKINGHAM COUNTY
 STATION: 17+85.52 -L-

SHEET 2 OF 3

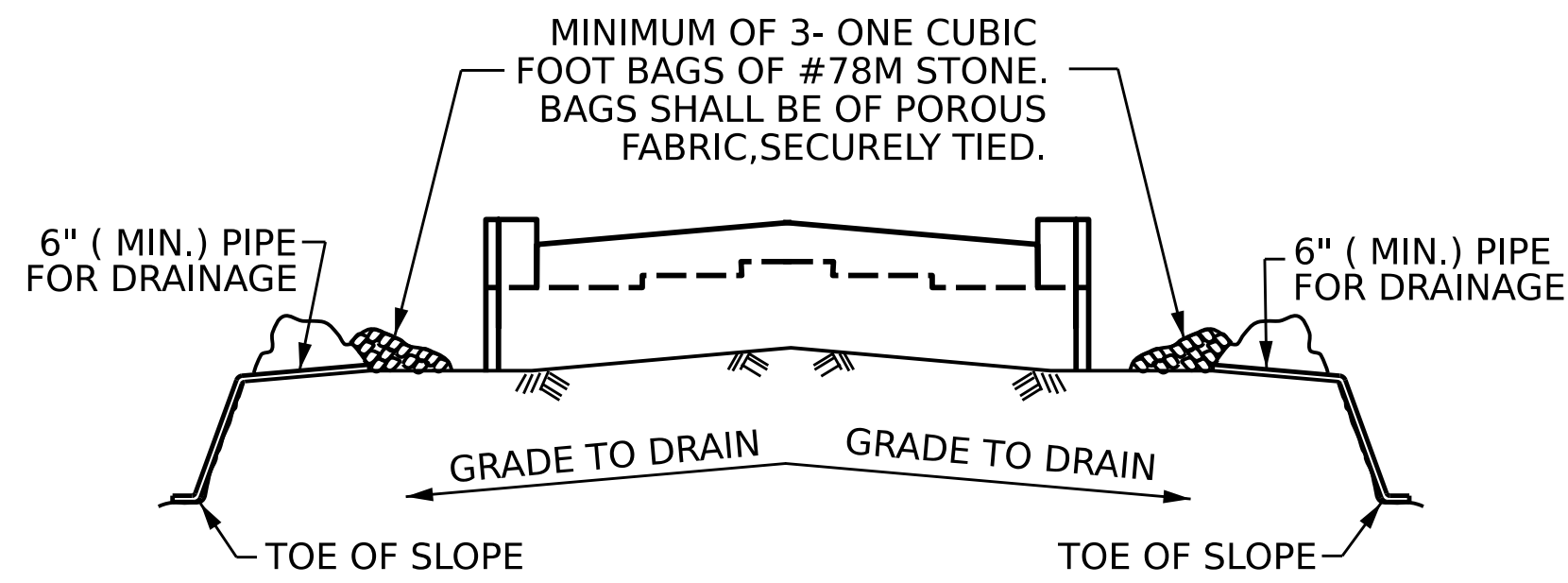


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2
 INTEGRAL

DRAWN BY : E. BAYISSA / Q.T. NGUYEN DATE : 11/2023
 CHECKED BY : F. LEA DATE : 12/2023
 DESIGN ENGINEER OF RECORD : E. BAYISSA DATE :

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			36

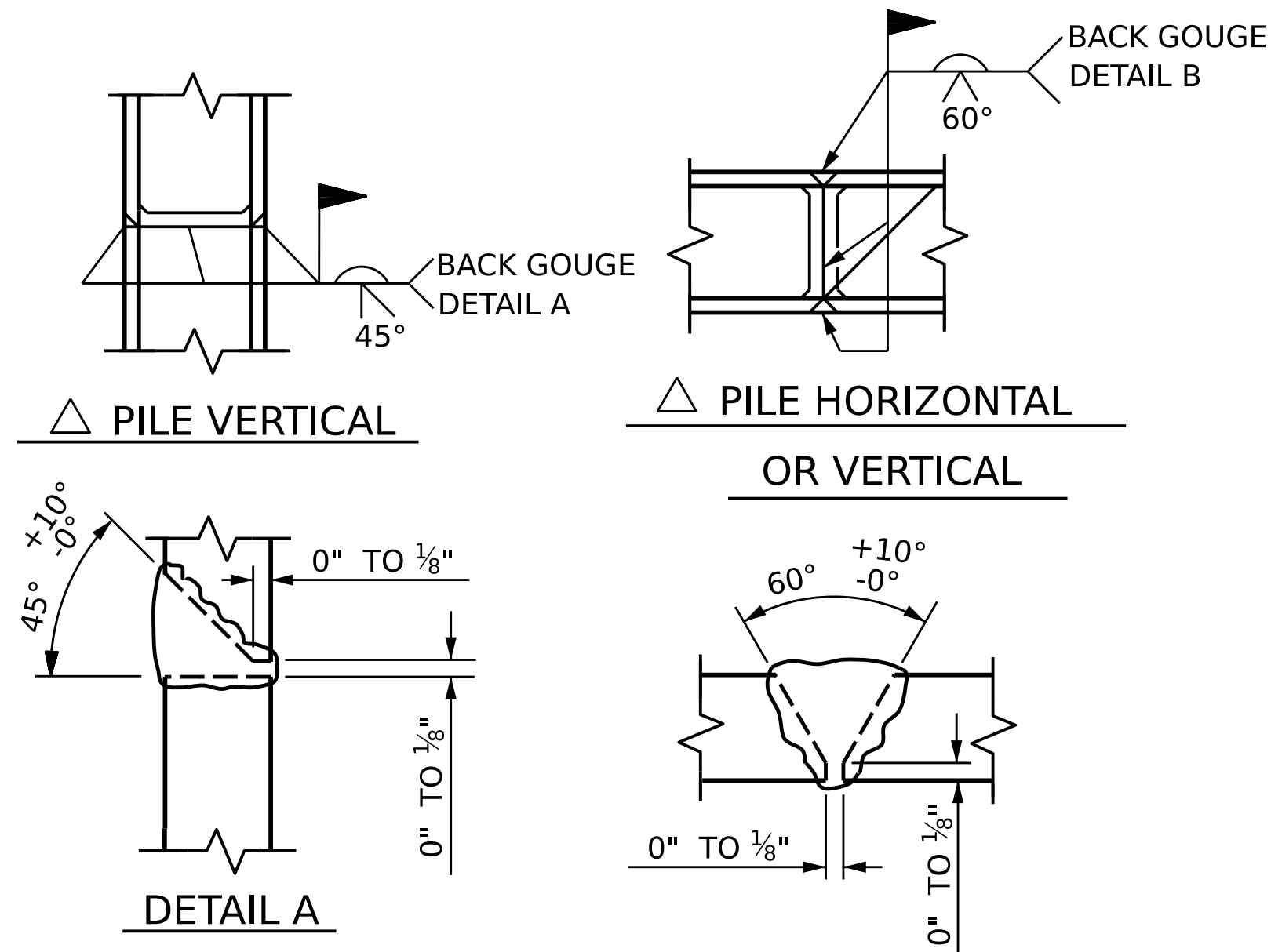


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

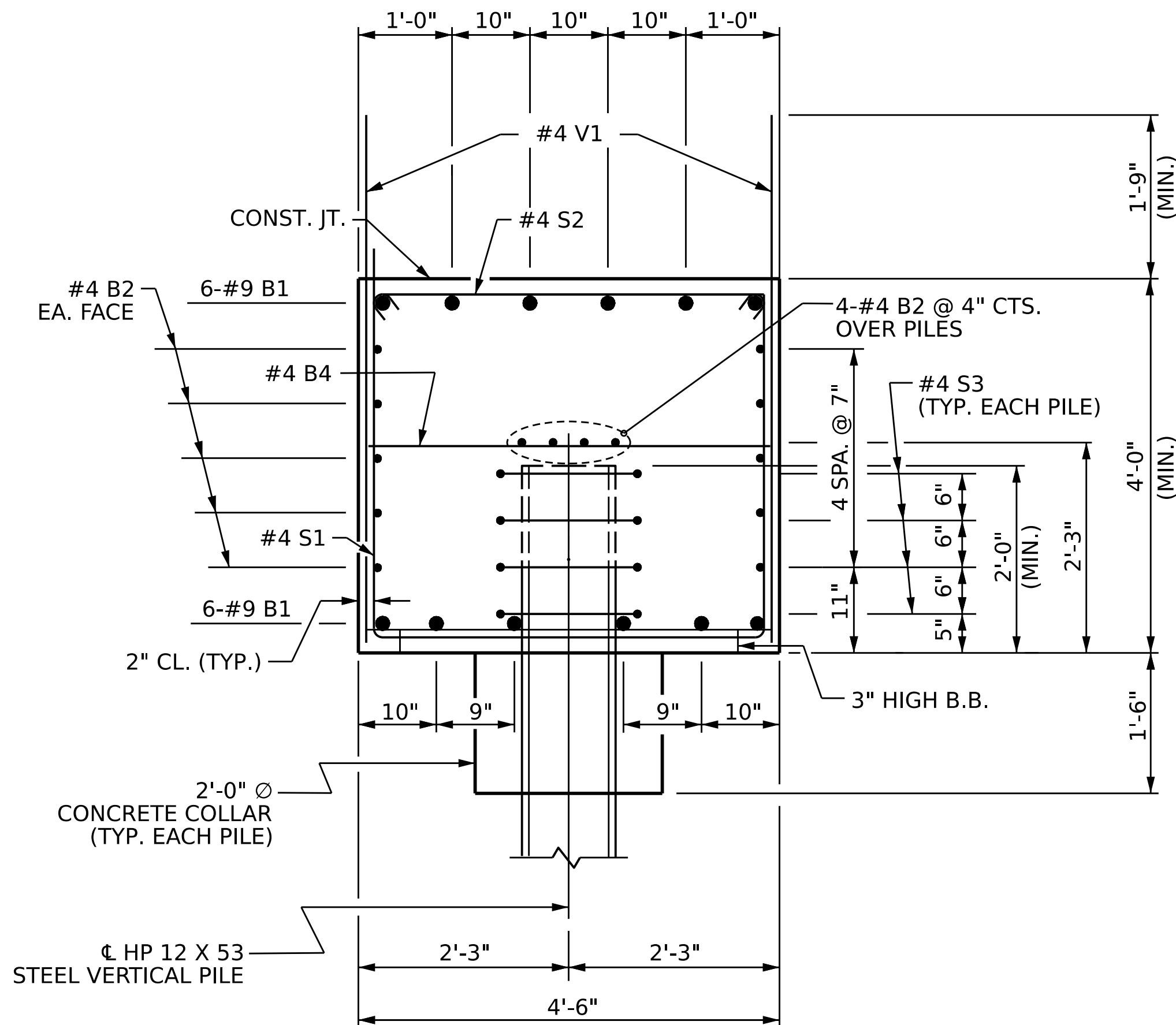
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

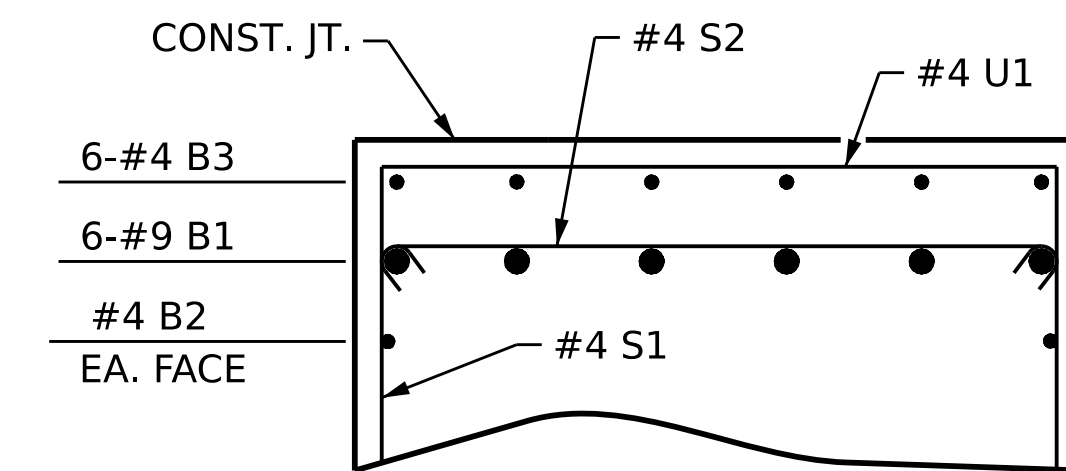


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



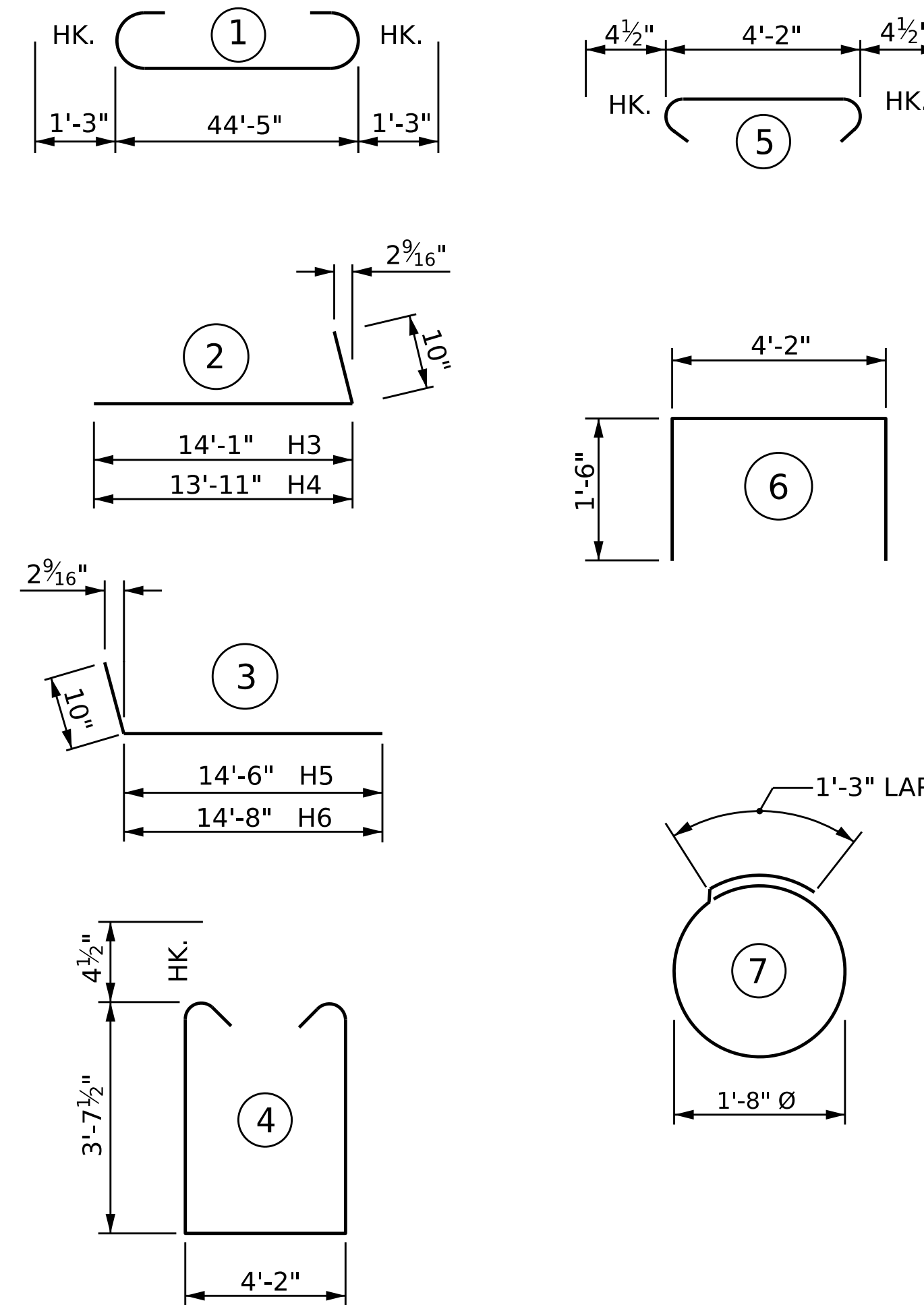
SECTION A-A



PARTIAL SECTION B-B

ALL BAR DIMENSIONS ARE OUT TO OUT

BAR TYPES



BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	46'-11"	1914
B2	28	#4	STR	23'-6"	440
B3	6	#4	STR	9'-10"	39
B4	12	#4	STR	4'-2"	33
H3	6	#5	2	14'-11"	93
H4	6	#5	2	14'-9"	92
H5	6	#5	3	15'-4"	96
H6	6	#5	3	15'-6"	97
S1	57	#4	4	12'-2"	463
S2	57	#4	5	4'-11"	187
S3	36	#4	7	6'-6"	156
U1	8	#4	6	7'-2"	38
V1	72	#4	STR	5'-7"	269
V2	54	#5	STR	9'-4"	526

REINFORCING STEEL LBS. 4,444

CLASS A CONCRETE

POUR #1 CU. YDS. 40.0
(CAP, CONCRETE COLLARS & LOWER PART OF WINGS)

PROJECT NO. BR-0093

ROCKINGHAM COUNTY

STATION: 17+85.52 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
INTEGRAL



DocuSigned by:
Francesca Lea
B79DAD86D584EF
05/01/2024

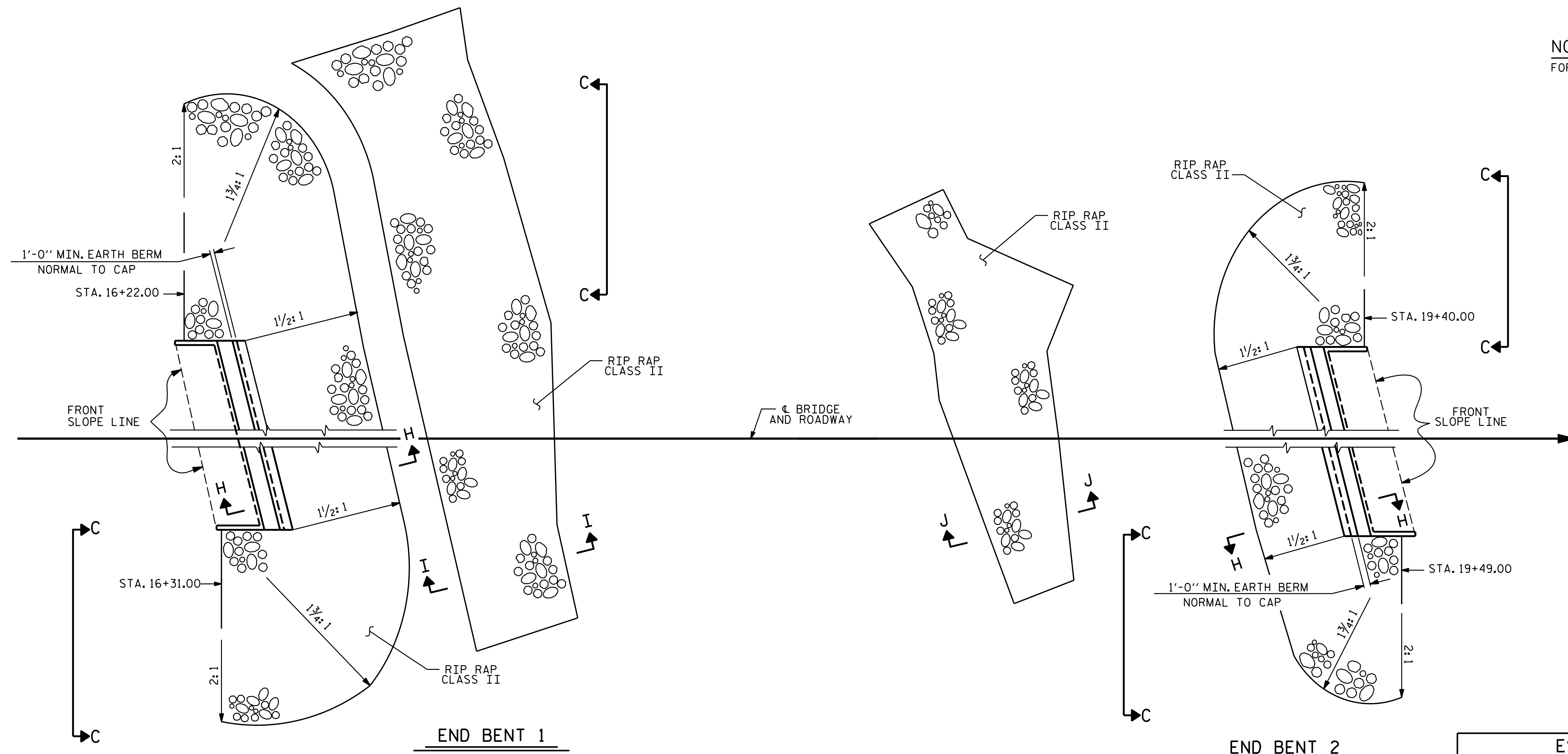
REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-34
2			4			TOTAL SHEETS 36

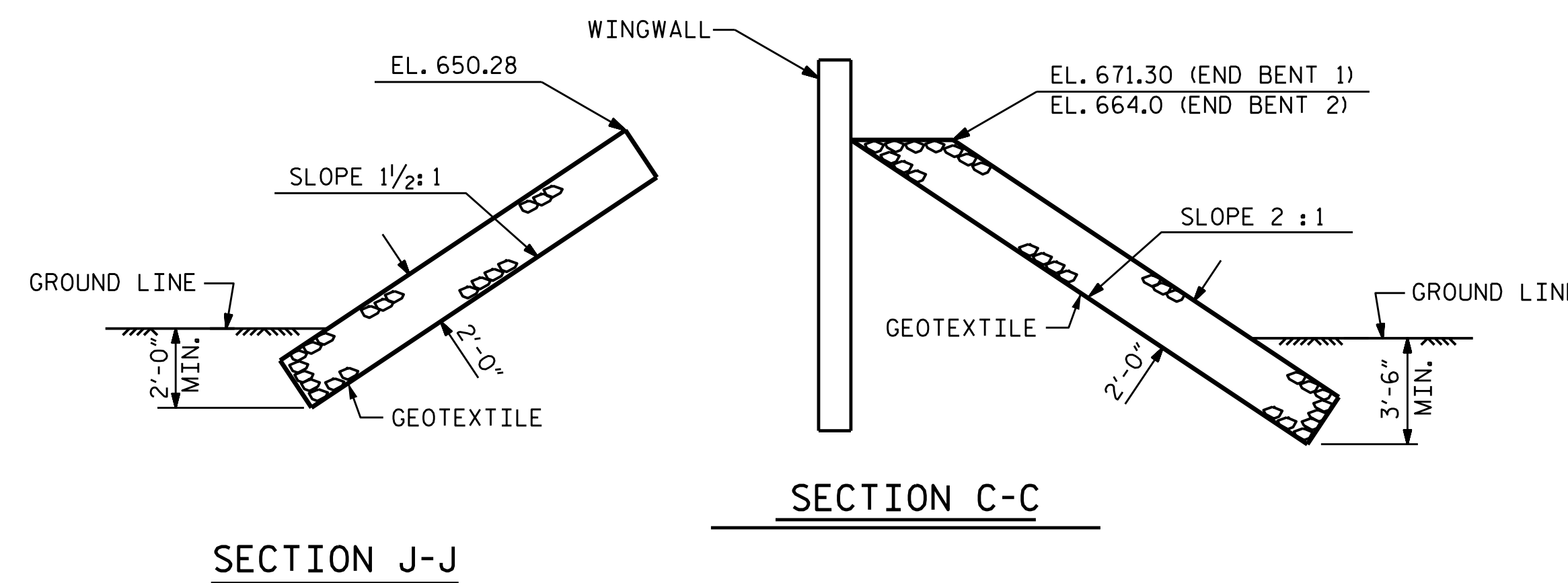
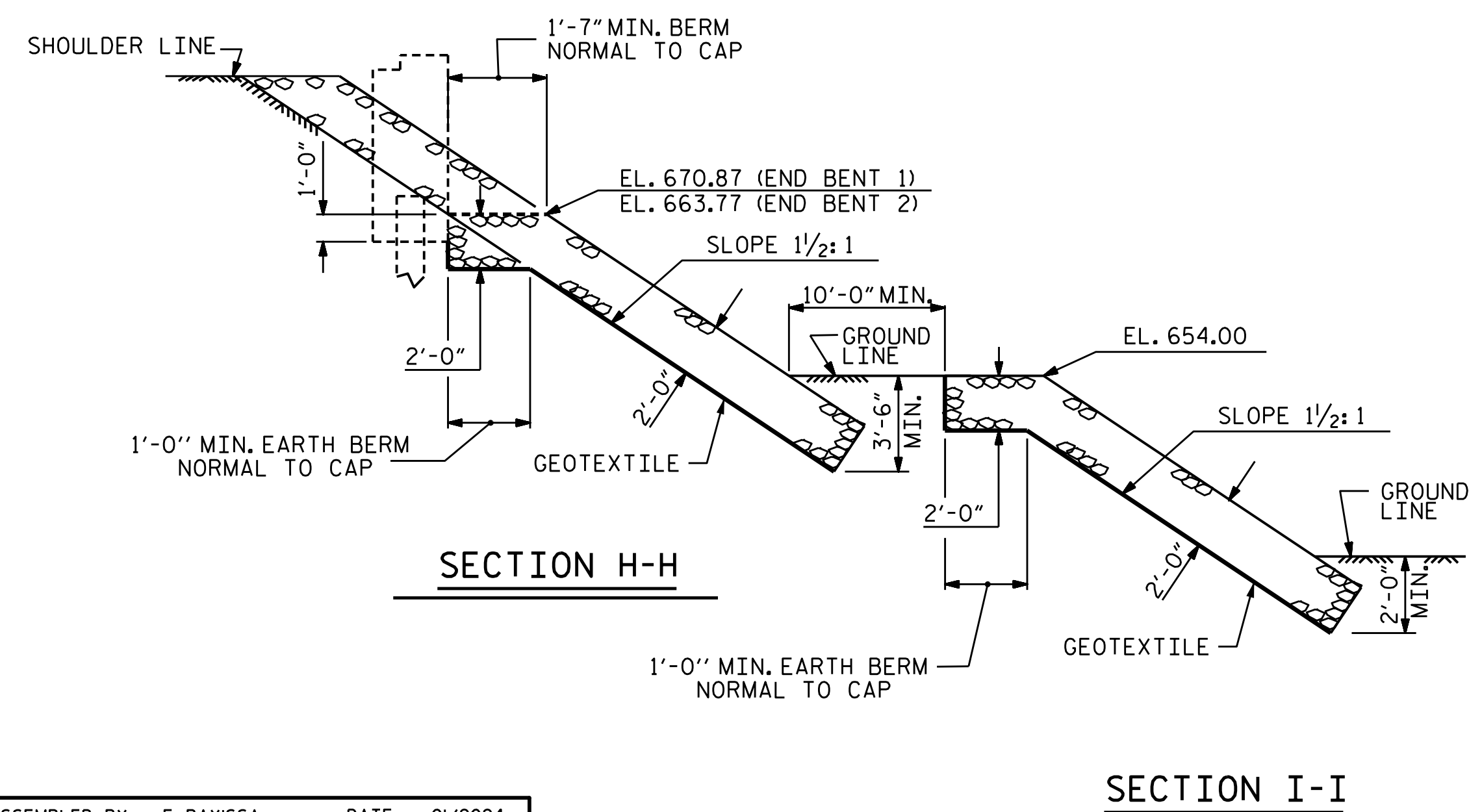
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY: E. BAYISSA / Q.T. NGUYEN DATE: 11/2023
CHECKED BY: F. LEA DATE: 12/2023
DESIGN ENGINEER OF RECORD: E. BAYISSA DATE: 09/2023

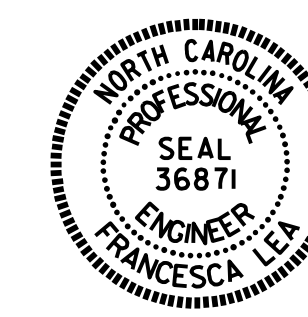
NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



ESTIMATED QUANTITIES		
BRIDGE @ STA. 17+85.52 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	1560	1735
END BENT 2	940	1045



PROJECT NO. BR-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-



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

ASSEMBLED BY : E. BAYISSA DATE : 01/2024
CHECKED BY : ZIA MALIK DATE : 02/2024
DRAWN BY : REK 1/84
CHECKED BY : RDU 1/84

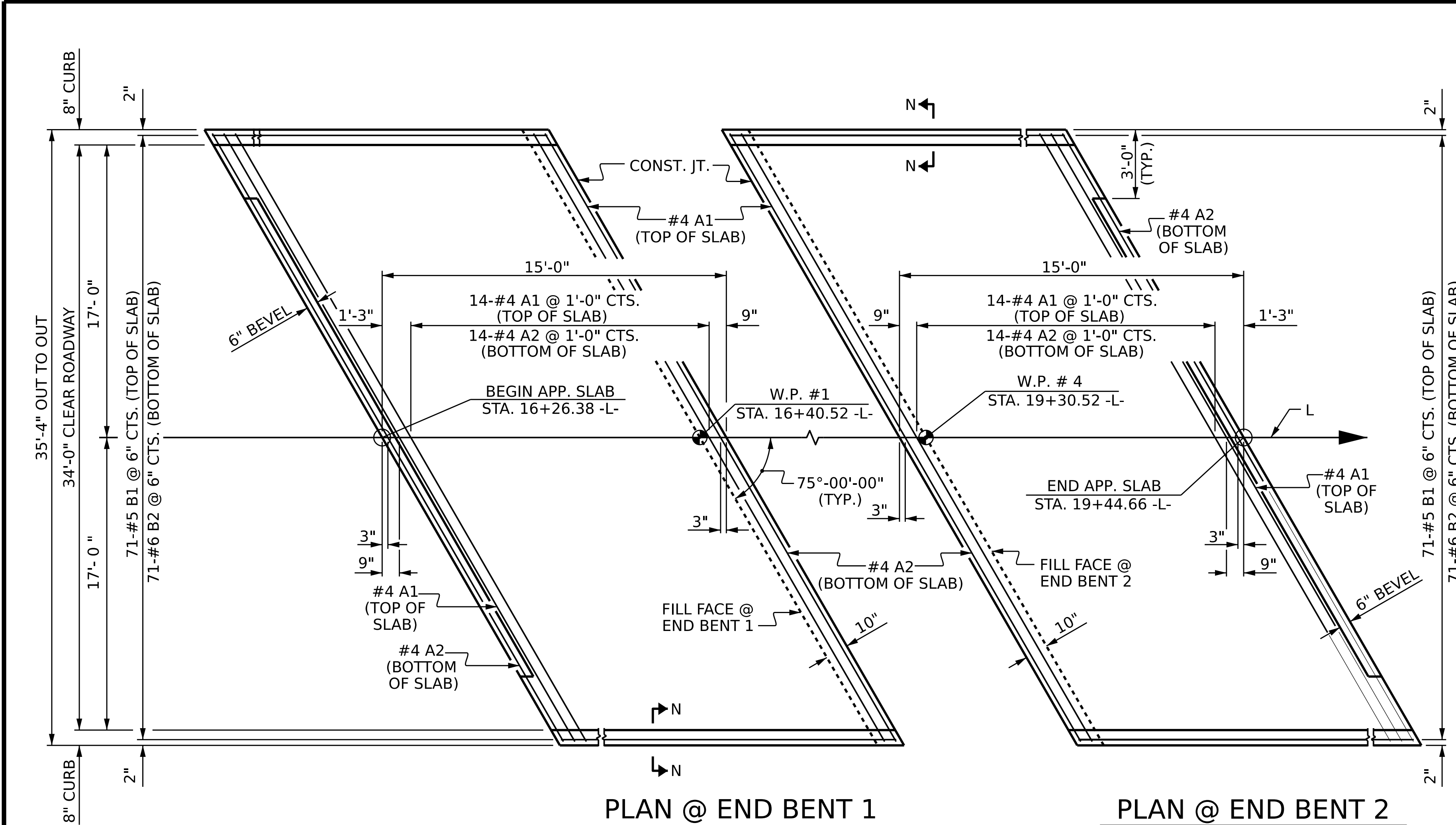
REV. 10/1/11 MAA/GM
REV. 12/21/11 MAA/GM
REV. 12/17 MAA/THC

2/27/2024
R:\Structures\Plans\401.069.BR-0093.SMU.RR.S35.780035.dgn
tnguyen1

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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

SHEET NO.
S-35
TOTAL SHEETS
36



NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

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

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

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

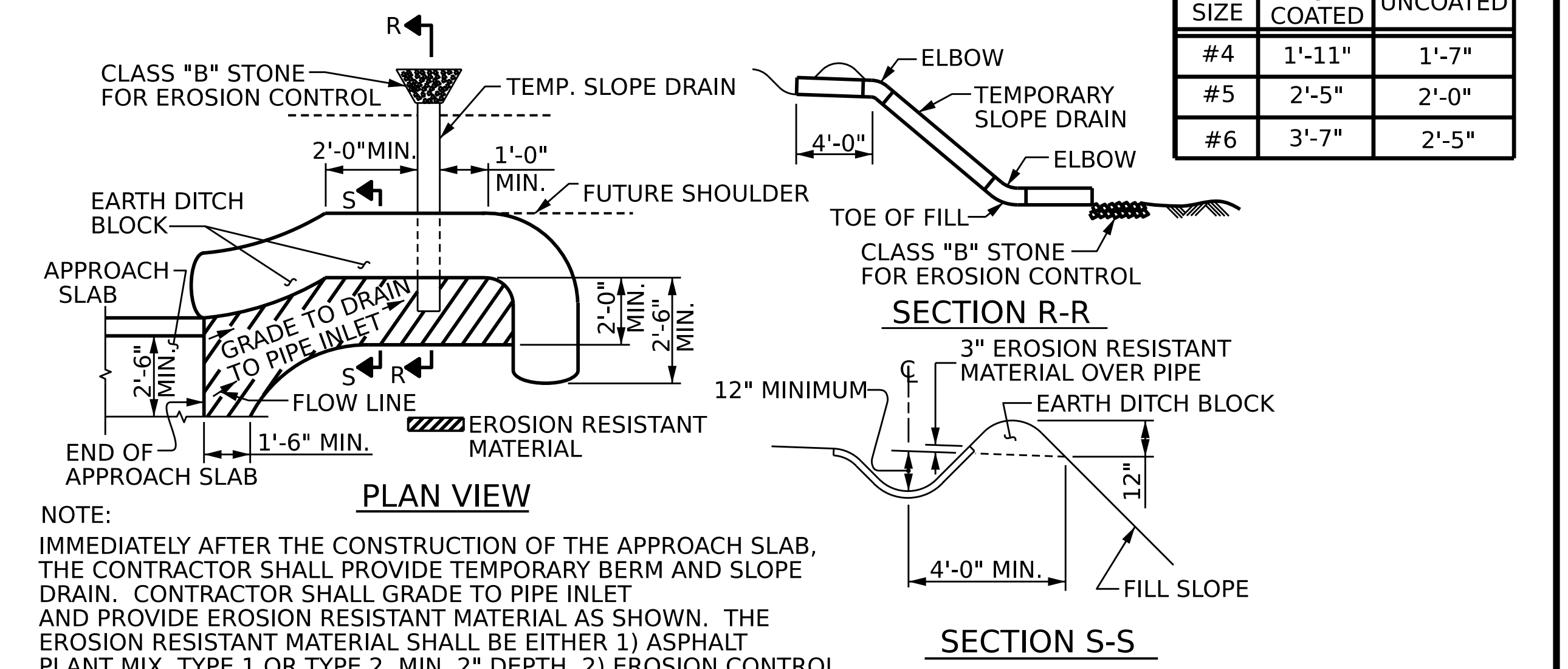
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	16	#4	STR	36'-2"	387
A2	16	#4	STR	36'-2"	387
*B1	71	#5	STR	14'-2"	1049
B2	71	#6	STR	14'-7"	1555
REINFORCING STEEL				LBS.	1942
* EPOXY COATED REINFORCING STEEL				LBS.	1436
CLASS AA CONCRETE				C. Y.	23

SPLICE LENGTHS

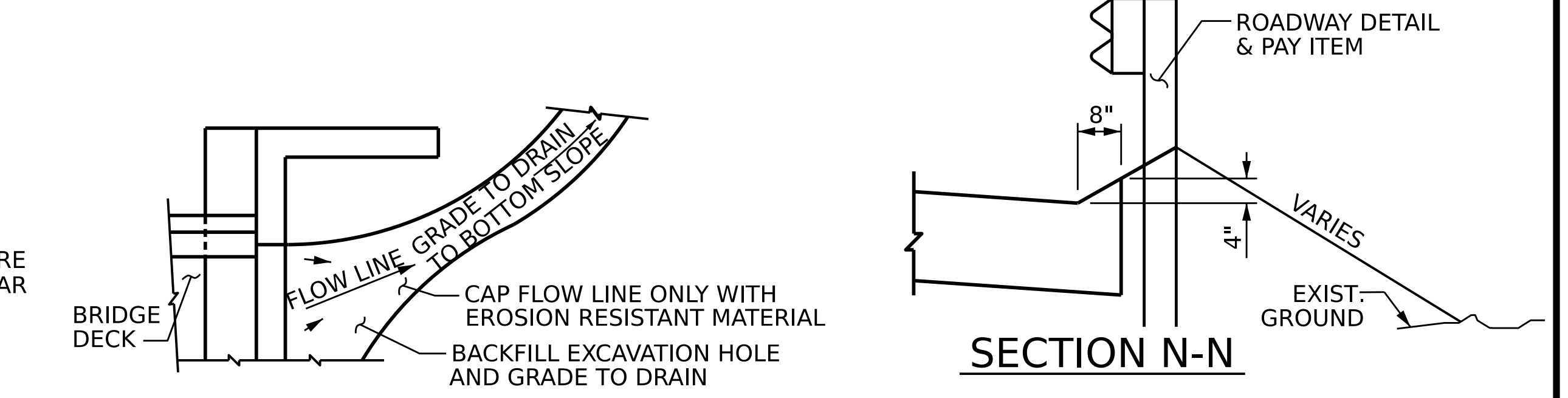
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



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

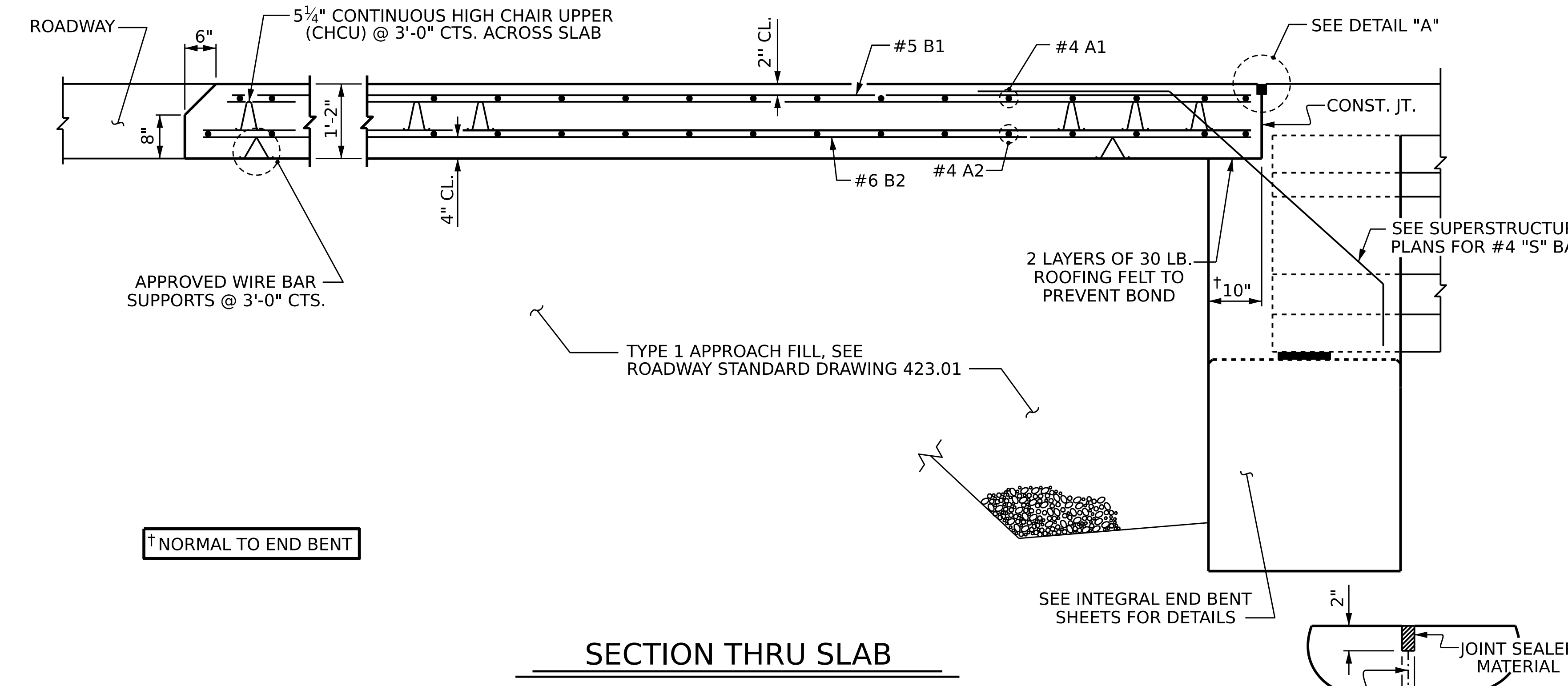
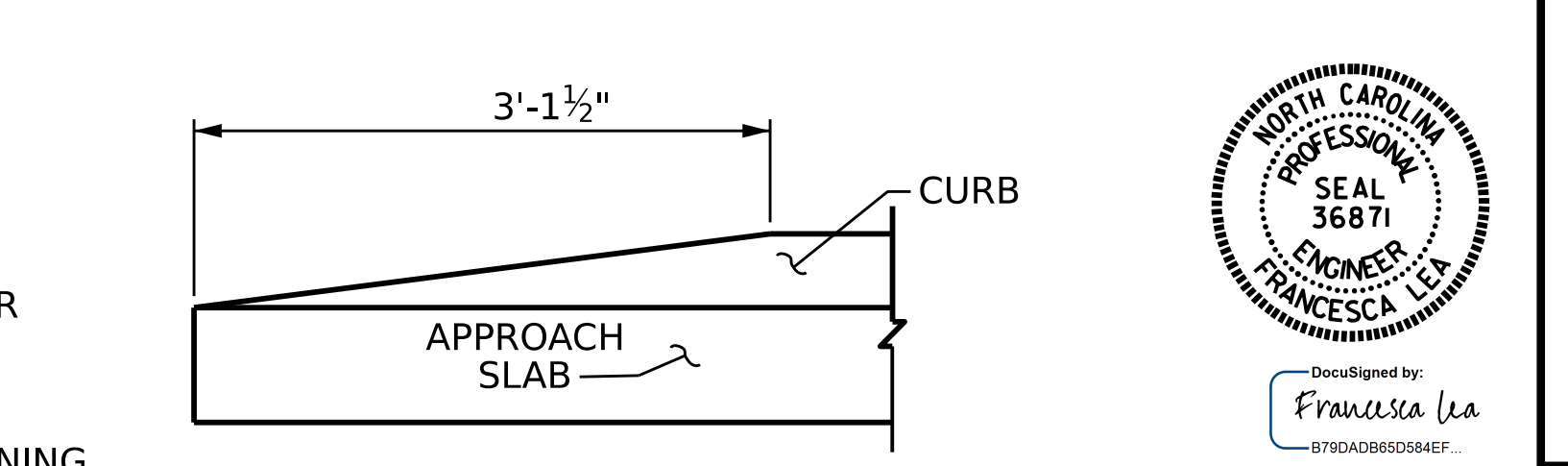
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

TEMPORARY DRAINAGE DETAIL



ASSEMBLED BY:	E. BAYISSA	DATE :	07/2023
CHECKED BY :	Z. MALIK	DATE :	10/2023
DRAWN BY :	TLA 10/05	REV. 12/17	MAA/THC
CHECKED BY :	GM 5/06	REV. 06/19	ENB/THC
		REV. 07/23	BNB/SNM

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



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB
FOR INTEGRAL ABUTMENT
WITH FLEXIBLE PAVEMENT

PROJECT NO. BR-0093
ROCKINGHAM COUNTY
STATION: 17+85.52 -L-

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.