

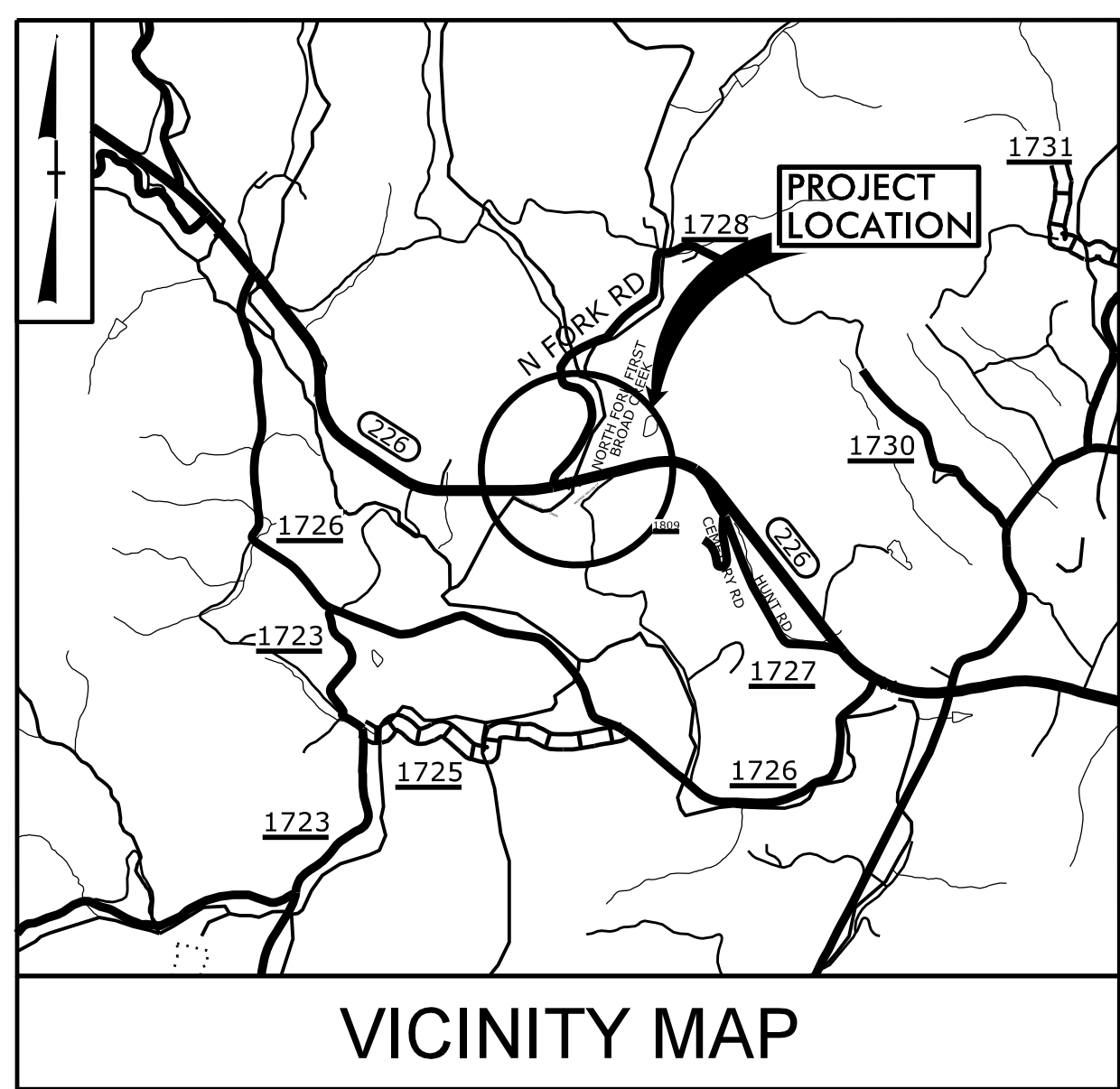
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0100		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
67100.1.1	N/A	PE	
67100.2.1	N/A	RW & UTILITY	
67100.3.1	N/A	CONSTRUCTION	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

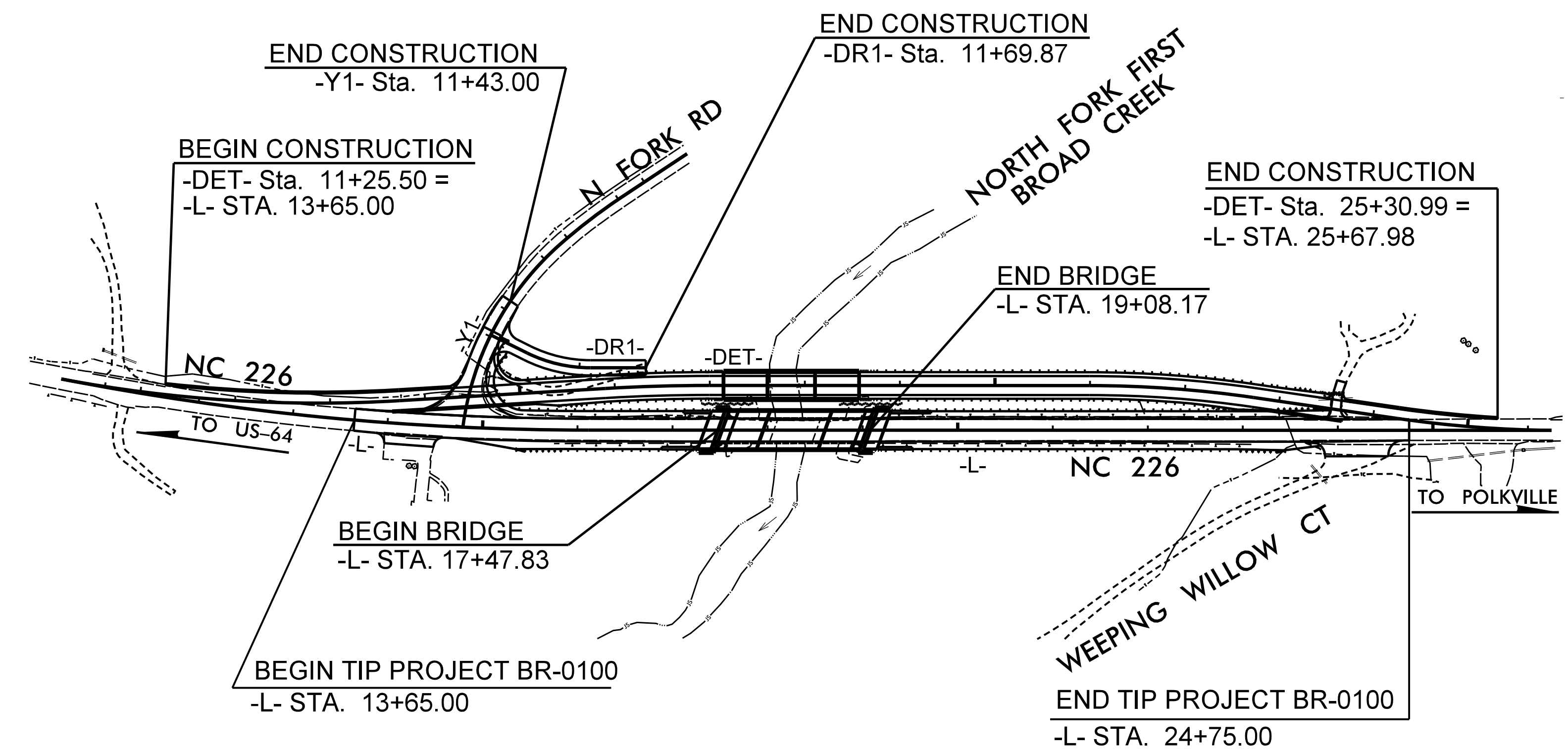
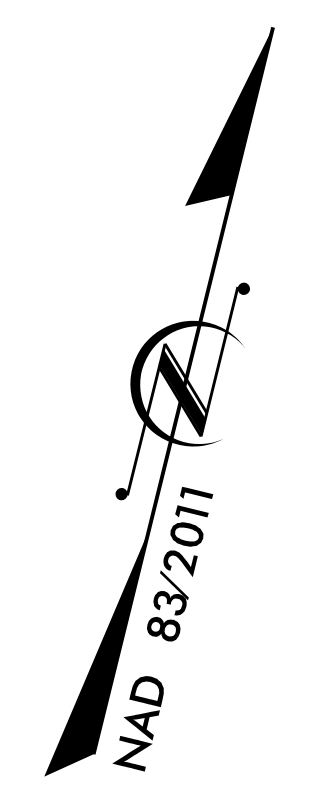
RUTHERFORD COUNTY

LOCATION: REPLACE BRIDGE No. 800040 ON NC 226 OVER NORTH FORK FIRST BROAD CREEK

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE



VICINITY MAP



STRUCTURE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT: BR-0100

CONTRACT: C204883

DESIGN DATA

ADT 2024 =	2,160
ADT 2044 =	3,210
K =	%
D =	%
T =	13 % *
V =	60 MPH
* (TTST = 7% + DUAL = 6%)	
FUNC CLASS =	
RURAL, MAJOR COLLECTOR	
REGIONAL TIER	

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT BR-0100	=	0.180 MI
LENGTH OF STRUCTURE TIP PROJECT BR-0100	=	0.030 MI
TOTAL LENGTH OF TIP PROJECT BR-0100	=	0.210 MI

PREPARED IN THE OFFICE OF:

WSP
WSP USA
337 EMMETTVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 919.836.4040
FAX: 919.836.4099
LICENSE NO. E-0165

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS

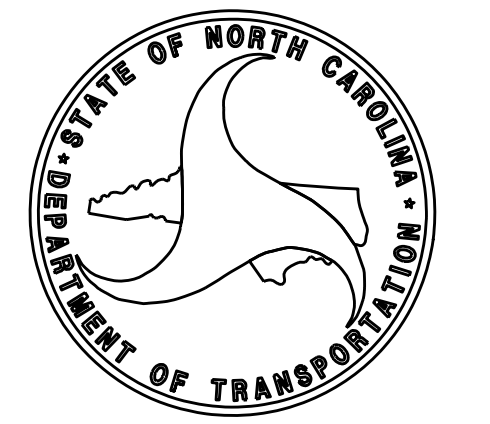
RIGHT OF WAY DATE: JUNE 01, 2023	JOHN N. SMITH PROJECT ENGINEER
LETTING DATE: FEBRUARY 18, 2025	ELIZABETH F. LAWES PROJECT DESIGN ENGINEER
NCDOT CONTACT:	CLAUDIA LEE, PE NCDOT DIVISION 13 PROJECT LEAD

STRUCTURES DESIGN ENGINEER

12/18/2024

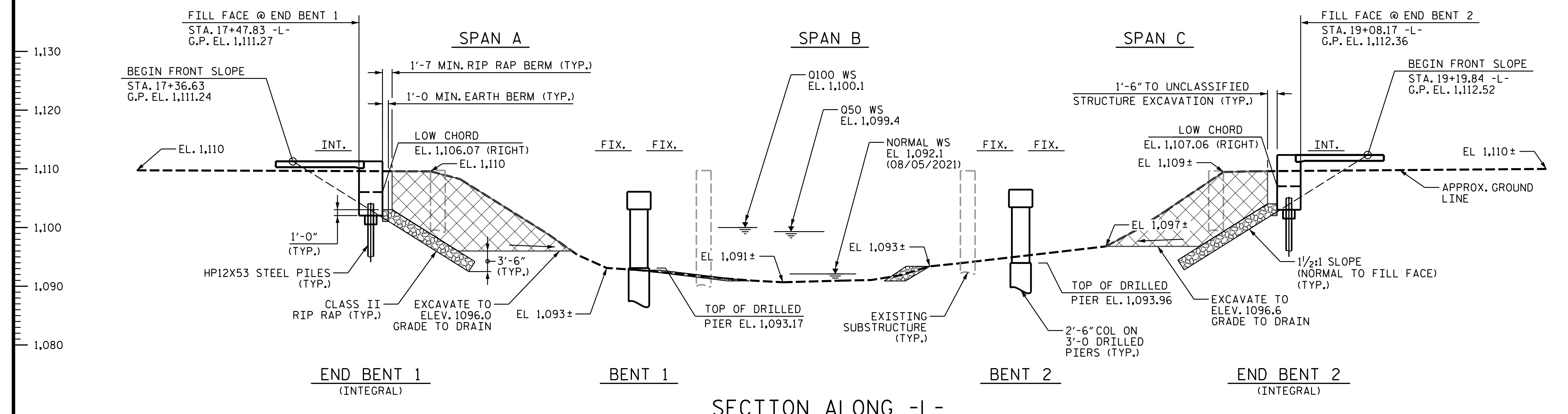
DocuSigned by:
Elizabeth F. Lawes
535E64223C0547C

ELIZABETH F. LAWES, PE
SIGNATURE:



12/1/2024
\\corporate\us\CentralData\USRAG\00\Jobs\30900678R\BR-0100\Structures\2.0 Drafting\DGNS\40L_000_BR100_SMU_TSH.dgn
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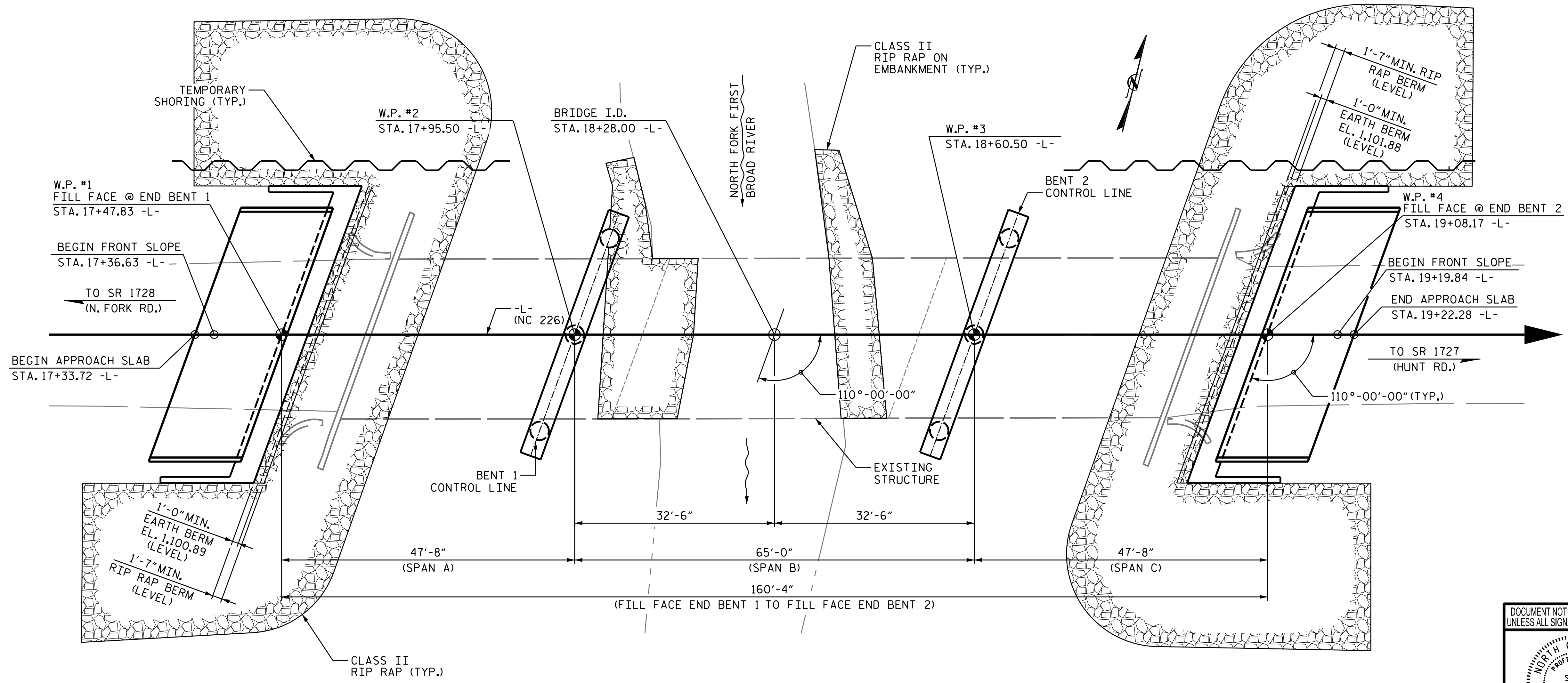
17+00 +50 18+00 +50 19+00 +50



DESIGN DISCHARGE 3200 CFS
 FREQUENCY OF DESIGN FLOOD 50 YRS.
 DESIGN HIGH WATER ELEVATION 1099.4
 DRAINAGE AREA 14.2 SQ.MI.
 BASE DISCHARGE (0100) 3800 CFS
 BASE HIGH WATER ELEVATION 1,100.1

OVERTOPPING FLOOD DATA
 OVERTOPPING FLOOD DISCHARGE 18,000 CFS
 FREQUENCY OF OVERTOPPING FLOOD 500+ YRS.
 OVERTOPPING FLOOD ELEVATION 1,111.1
 @ STA. 10+65.00 -L-

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE OVER NORTH FORK
 FIRST BROAD RIVER ON NC 226
 BETWEEN SR 1728 & SR 1727

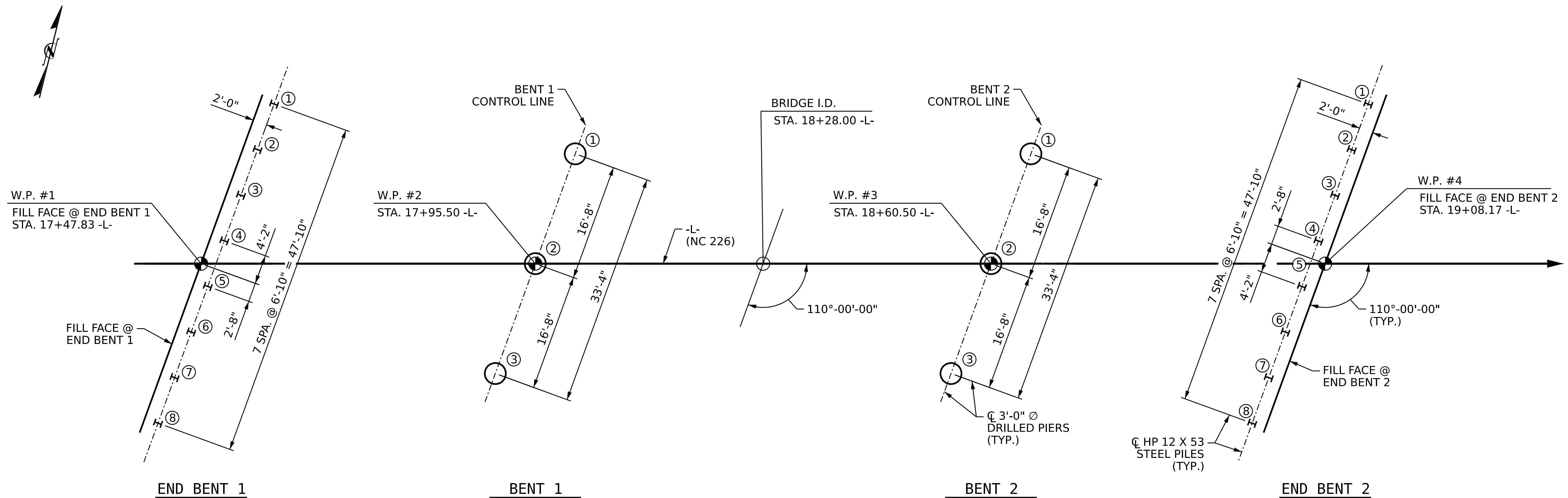
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wsp
 WSP USA Inc.
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165

DESIGNED BY: J. WHEATLEY DATE: MAY 2024
 DRAWN BY: M. HOBBS DATE: MAY 2024
 CHECKED BY: E. LAWES DATE: MAY 2024
 DESIGN ENGINEER OF RECORD: EEFLAWES DATE: MAY 2024

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

S-1
TOTAL SHEETS: 30



FOUNDATION LAYOUT PLAN
 (ALL END BENTS AND BENTS ARE PARALLEL)
 DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO
 THE CENTERLINE OF PILES AND DRILLED PIERS

FOUNDATION NOTES
 FOR NOTES, SEE "PILE AND DRILLED PIER FOUNDATION
 TABLES" SHEET.

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER NORTH FORK
 FIRST BROAD RIVER ON NC 226
 BETWEEN SR 1728 & SR 1727

DESIGNED BY: J. WHEATLEY DATE: MAY 2024
 DRAWN BY: M. HOBBS DATE: MAY 2024
 CHECKED BY: E. F. LAWES DATE: MAY 2024
 DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024

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STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL
 044167
 ELIZABETH F. LAWES
 ENGINEER

DocuSigned by:
 Elizabeth F. Lawes
 9386542230212/18/2024

REVISIONS						SHEET NO. S-2 TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-8	63	See Structure	20	N/A		104							
End Bent 2, Piles 1-8	63	Drawings	20	N/A		104							

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

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

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 1-8	63			0.60			1.00
End Bent 2, Piles 1-8	63			0.60			1.00
							1.00
							1.00
							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	344	1073.0	60	1082	6.0	6.0	14.1		MAYBE	1085.0	8.0
Bent 1, Pier 3	344	1079.0	70	1086	6.0	6.0	8.1		MAYBE	1088.0	5.0
Bent 2, Piers 1-2	345	1081.0	100	1086	6.0	6.0	7.0		MAYBE	1088.0	6.0
Bent 2, Pier 3	345	1084.0	90	1089	6.0	6.0	4.0		MAYBE	1091.0	3.0
TOTAL QTY:							36.0	54.3			36

*Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "36" Dia. Drilled Piers" or "36" Dia. Drilled Piers Not in Soil" and "36" Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the NCDOT Standard Specifications.

**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 and is measured and paid for as "Permanent Steel Casting for 36" Dia. Drilled Pier" in accordance with Article 411-7 of the NCDOT Standard Specifications.

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	86.4		
Bent 2, Pier 3		MAYBE	62.4		
Bent 2, Piers 1-2		MAYBE	58.0		
Bent 2, Pier 3		MAYBE	46.0		
TOTAL QTY:		1	397.2		

*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.

GEOTECHNICAL TABLES

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 Shipping Yang, License No. 031361 on 1/4/2023.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for PDA Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, CSL Testing, SID Inspections and PITs when these items may be required.

PROJECT NO. **BR-0100**

RUTHERFORD COUNTY

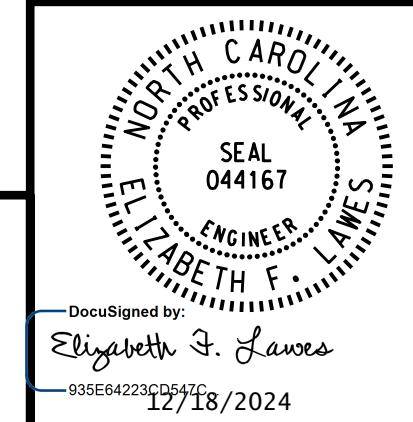
STATION: **18+28.00 -L-**

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**PILE AND DRILLED PIER
FOUNDATION TABLES**

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



WSP
WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

DESIGNED BY:	J. WHEATLEY	DATE :	MAY 2024
DRAWN BY:	M. HOBBS	DATE :	MAY 2024
CHECKED BY:	E. F. LAWES	DATE :	MAY 2024
DESIGN ENGINEER OF RECORD:	E. LAWES	DATE :	MAY 2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			30

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP STRUCTURE AT STA 18+28.00-L-	REMOVAL OF EXISTING STRUCTURE AT STATION 18+28.00 -L-	ASBESTOS ASSESSMENT	3'-0" DIA DRILLED PIERS IN SOIL	3'-0" DIA DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-0" DIA DRILLED PIER	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 18+28.00 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE (BRIDGE)	BRIDGE APPROACH SLABS, STATION 18+28.00 -L-	REINFORCING STEEL (BRIDGE)	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	45" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	HP12X53 STEEL PILES	VERTICAL CONCRETE BARRIER RAIL		
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	LUMP SUM	SQ. FT.	SQ. FT.	CY. YDS.	LUMP SUM	LBS.	LBS.	No.	LIN. FT.	EA.	No.	LIN. FT.	LIN. FT.
SUPERSTRUCTURE									6,699	7,005					12	626.96				317.13
END BENT 1								LUMP SUM			34		4,106			8	8	160		
BENT 1				36.3	18	21					14.8		7,558	1,491						
BENT 2				18	18	15					14.6		6,853	1,130						
END BENT 2								LUMP SUM			34		4,106			8	8	160		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	54.3	36	36	1	LUMP SUM	6,699	7,005	97.4	LUMP SUM	22,623	2,621	12	626.96	16	16	320	317.13

TOTAL BILL OF MATERIAL (CONT.)

	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE			LUMP SUM
END BENT 1	529	588	
BENT 1			
BENT 2			
END BENT 2	518	576	
TOTAL	1,047	1,164	LUMP SUM

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR 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.

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 18+28.00 -L-".

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 40 FT TO THE LEFT SIDE AND 66FT TO THE RIGHT SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 18+28.00 -L- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

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 EXISTING STRUCTURE CONSISTING OF THREE SPANS: 1 @ 45'-3", 1 @ 45'-0", AND 1 @ 45'-3" WITH A REINFORCED CONCRETE DECK AND 2" OF ASPHALT WEARING SURFACE ON W33X130 STEEL I-BEAM GIRDERS AND A CLEAR ROADWAY WIDTH OF 26'-0" ON REINFORCED CONCRETE CAP AND COLUMN PIERS AND ABUTMENTS WITH RIP RAP SPILL THROUGH SLOPES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, THE LOAD LIMIT MAYBE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. 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.

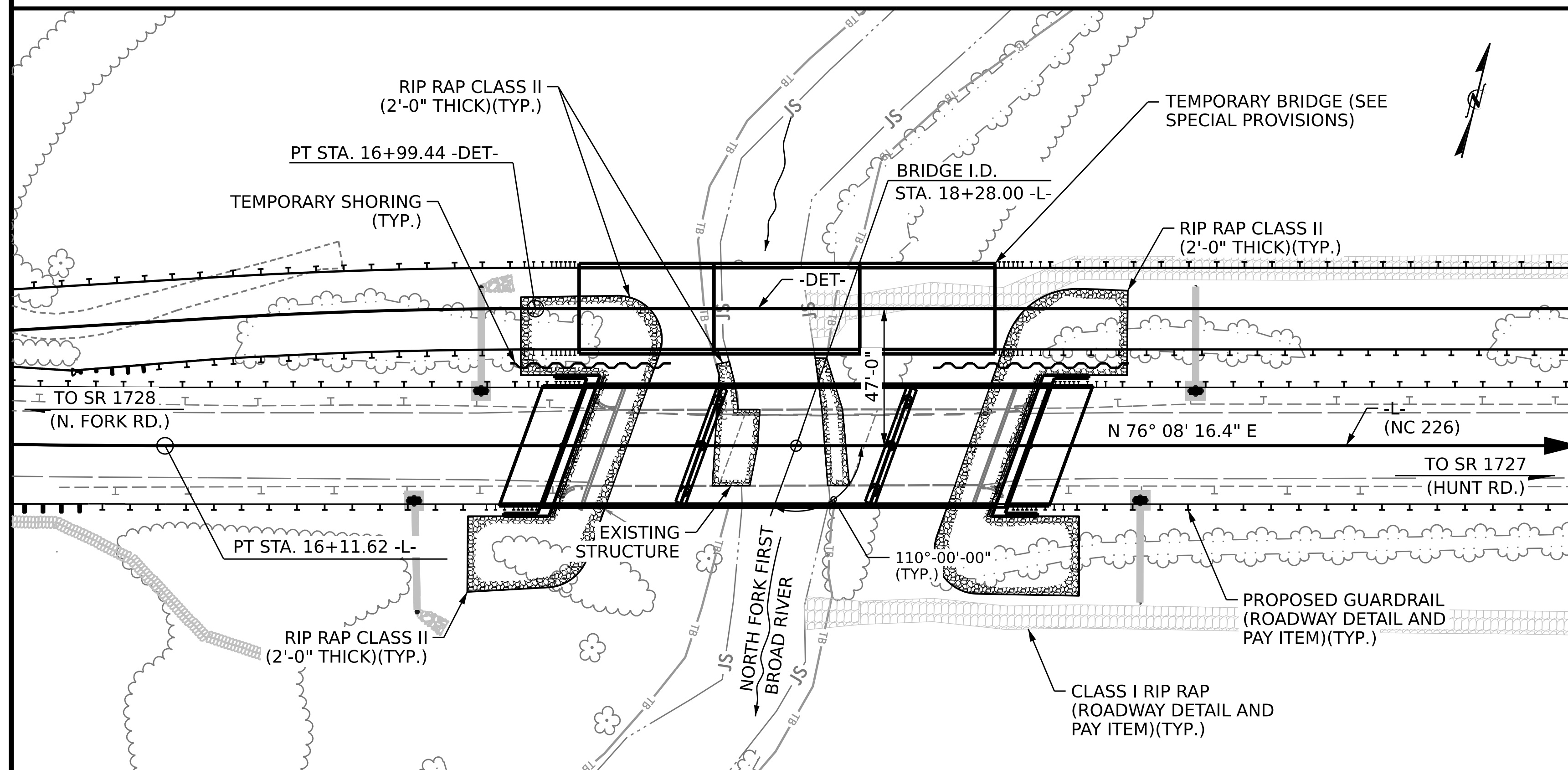
THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES." FOR SCOUR CRITICAL ELEVATIONS, SEE "PILE AND DRILLED PIER FOUNDATION TABLES" SHEET. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR LIMITS OF TEMPORARY SHORING, FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE, SEE ROADWAY PLANS.

BM #1: RR SPIKE IN BASE OF 22" WHITE OAK, STA. 24+72.02 -L-, OFFSET 76.89' RT., ELEV. 1142.53



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

DESIGNED BY:	J. WHEATLEY	DATE :	MAY 2024
DRAWN BY:	M. HOBBS	DATE :	MAY 2024
CHECKED BY:	E. LAWES	DATE :	MAY 2024
DESIGN ENGINEER OF RECORD:	E. LAWES	DATE :	MAY 2024

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
Elizabeth F. Lawes
935E64223127918/2024

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER NORTH FORK FIRST BROAD RIVER ON NC 226 BETWEEN SR 1728 & SR 1727

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

TOTAL SHEETS: 30

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.21	-	1.75	0.97	1.71	A	I	22.35	1.15	1.21	A	I	13.14	0.80	0.97	1.86	A	I	22.35		
	HL-93 (OPERATING)	N/A		2.10	-	1.35	0.97	2.21	A	I	22.35	1.15	2.10	A	I	8.54	N/A	-	-	-	-	-		
	HS-20 (INVENTORY)	36.000	②	1.81	65.16	1.75	0.97	2.10	A	I	22.35	1.15	1.81	A	I	13.14	0.80	0.97	2.30	A	I	22.35		
	HS-20 (OPERATING)	36.000		2.43	87.48	1.35	0.97	2.72	A	I	22.35	1.15	2.43	A	I	13.14	N/A	-	-	-	-	-		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.56	61.56	1.40	0.97	5.22	A	I	22.35	1.15	4.92	A	I	13.14	0.80	0.97	4.56	A	I	22.35	
		SNGARBS2	20.000		3.64	72.80	1.40	0.97	4.17	A	I	22.35	1.15	3.70	A	I	13.14	0.80	0.97	3.64	A	I	22.35	
		SNAGRIS2	22.000		3.52	77.44	1.40	0.97	4.02	A	I	26.96	1.15	3.52	A	I	13.14	0.80	0.97	3.56	A	I	22.35	
		SNCOTTS3	27.250		2.28	62.13	1.40	0.97	2.61	A	I	22.35	1.15	2.46	A	I	13.14	0.80	0.97	2.28	A	I	22.35	
		SNAGGRS4	34.925		1.99	69.49	1.40	0.97	2.28	A	I	22.35	1.15	2.20	A	I	13.14	0.80	0.97	1.99	A	I	22.35	
		SNS5A	35.550		1.95	69.32	1.40	0.97	2.23	A	I	22.35	1.15	2.33	A	I	13.14	0.80	0.97	1.95	A	I	22.35	
		SNS6A	39.950		1.83	73.11	1.40	0.97	2.09	A	I	22.35	1.15	2.18	A	I	13.14	0.80	0.97	1.83	A	I	22.35	
	SNS7B	42.000		1.74	73.08	1.40	0.97	1.99	A	I	22.35	1.15	2.21	A	I	8.54	0.80	0.97	1.74	A	I	22.35		
	TRUCK TRACTOR SEMI- TRAILER (TTST)	TNAGRIT3	33.000		2.26	74.58	1.40	0.97	2.58	A	I	22.35	1.15	2.56	A	I	13.14	0.80	0.97	2.26	A	I	22.35	
		TNT4A	33.075		2.26	74.75	1.40	0.97	2.58	A	I	22.35	1.15	2.41	A	I	13.14	0.80	0.97	2.26	A	I	22.35	
		TNT6A	41.600		1.89	78.62	1.40	0.97	2.16	A	I	22.35	1.15	2.36	A	I	13.14	0.80	0.97	1.89	A	I	22.35	
		TNT7A	42.000		1.93	81.06	1.40	0.97	2.20	A	I	22.35	1.15	2.17	A	I	8.54	0.80	0.97	1.93	A	I	22.35	
		TNT7B	42.000		2.00	84.00	1.40	0.97	2.29	A	I	22.35	1.15	2.12	A	I	13.14	0.80	0.97	2.00	A	I	22.35	
		TNAGRIT4	43.000		1.92	82.56	1.40	0.97	2.19	A	I	22.35	1.15	2.03	A	I	13.14	0.80	0.97	1.92	A	I	22.35	
TNAGT5A		45.000		1.78	80.10	1.40	0.97	2.04	A	I	22.35	1.15	2.12	A	I	8.54	0.80	0.97	1.78	A	I	22.35		
TNAGT5B	45.000	③	1.74	78.30	1.40	0.97	1.98	A	I	22.35	1.15	1.86	A	I	36.16	0.80	0.97	1.74	A	I	22.35			
EMERGENCY VEHICLE (EV)	EV2	28.750		2.62	75.33	1.30	0.97	3.20	A	I	26.96	1.15	2.84	A	I	13.14	0.80	0.97	2.62	A	I	22.35		
	EV3	45.000	④	1.68	72.24	1.30	0.97	2.07	A	I	22.35	1.15	1.91	A	I	13.14	0.80	0.97	1.68	A	I	22.35		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ _{DC}	γ _{OW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

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

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

COMMENTS:

- 1.
- 2.
- 3.
- 4.

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

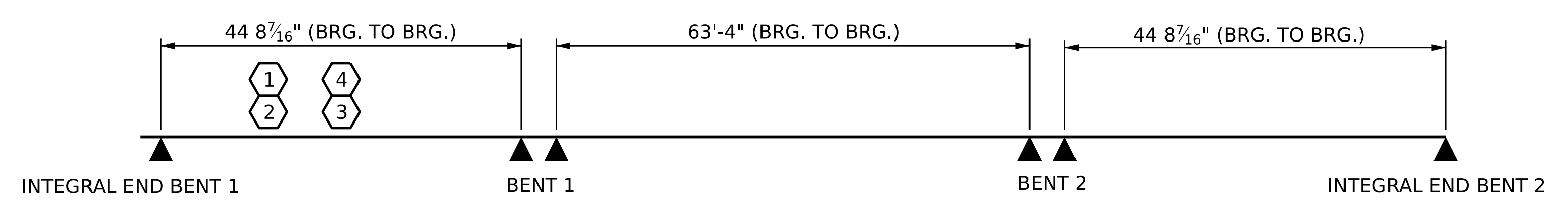
③ LEGAL LOAD RATING **

④ EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 1 OF 2

DRAWN BY: MAA 1/08	REV. 11/12/OBRR	MAA/GM
CHECKED BY: GM/DI 2/08	REV. 10/11/11	MAA/GM
	REV. 12/17	MAA/THC
DESIGNED BY: J. WHEATLEY	DATE: MAY 2024	
DRAWN BY: M. HOBBS	DATE: MAY 2024	
CHECKED BY: E. LAWES	DATE: MAY 2024	
DESIGN ENGINEER OF RECORD: E. LAWES	DATE: MAY 2024	

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WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

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DocuSigned by:
Elizabeth F. Lawes
9385842230457
12/18/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

**LRFR SUMMARY FOR
PRESTRESSED CONCRETE
GIRDERS (SPANS A & C)
(NON-INTERSTATE TRAFFIC)**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-5
2			4			TOTAL SHEETS 30

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.14	-	1.75	0.96	1.32	B	E	31.67	1.16	1.37	B	I	44.60	0.80	0.90	1.14	B	I	31.67		
	HL-93 (OPERATING)	N/A		1.72	-	1.35	0.96	1.72	B	E	31.67	1.16	1.88	B	I	12.27	N/A	-	-	-	-	-		
	HS-20 (INVENTORY)	36.000	②	1.46	52.56	1.75	0.96	1.70	B	E	31.67	1.16	1.77	B	I	51.07	0.80	0.90	1.46	B	I	31.67		
	HS-20 (OPERATING)	36.000		2.21	79.56	1.35	0.96	2.21	B	E	31.67	1.16	2.33	B	I	51.07	N/A	-	-	-	-	-		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.23	43.61	1.40	0.96	4.69	B	E	31.67	1.16	5.58	B	I	12.27	0.80	0.90	3.23	B	I	31.67	
		SNGARBS2	20.000		2.44	48.80	1.40	0.96	3.54	B	E	31.67	1.16	4.03	B	I	12.27	0.80	0.90	2.44	B	I	31.67	
		SNAGRIS2	22.000		2.32	51.04	1.40	0.96	3.38	B	E	31.67	1.16	3.77	B	I	12.27	0.80	0.90	2.32	B	I	31.67	
		SNCOTTS3	27.250		1.61	43.87	1.40	0.96	2.34	B	E	31.67	1.16	2.56	B	I	51.07	0.80	0.90	1.61	B	I	31.67	
		SNAGGRS4	34.925		1.35	47.14	1.40	0.96	1.97	B	E	31.67	1.16	2.15	B	I	12.27	0.80	0.90	1.35	B	I	31.67	
		SNS5A	35.550		1.32	46.93	1.40	0.96	1.93	B	E	31.67	1.16	2.13	B	I	12.27	0.80	0.90	1.32	B	I	31.67	
		SNS6A	39.950		1.22	48.74	1.40	0.96	1.77	B	E	31.67	1.16	1.95	B	I	51.07	0.80	0.90	1.22	B	I	31.67	
	SNS7B	42.000		1.16	48.72	1.40	0.96	1.69	B	E	31.67	1.16	1.94	B	I	51.07	0.80	0.90	1.16	B	I	31.67		
	TRUCK TRACTOR SEMI- TRAILER (TTST)	TNAGRIT3	33.000		1.49	49.17	1.40	0.96	2.17	B	E	31.67	1.16	2.36	B	I	12.27	0.80	0.90	1.49	B	I	31.67	
		TNT4A	33.075		1.50	49.61	1.40	0.96	2.18	B	E	31.67	1.16	2.33	B	I	12.27	0.80	0.90	1.50	B	I	31.67	
		TNT6A	41.600		1.23	51.17	1.40	0.96	1.79	B	E	31.67	1.16	2.21	B	I	12.27	0.80	0.90	1.23	B	I	31.67	
		TNT7A	42.000		1.24	52.08	1.40	0.96	1.80	B	E	31.67	1.16	2.06	B	I	51.07	0.80	0.90	1.24	B	I	31.67	
		TNT7B	42.000		1.29	54.18	1.40	0.96	1.87	B	E	31.67	1.16	1.87	B	I	51.07	0.80	0.90	1.29	B	I	31.67	
		TNAGRIT4	43.000		1.22	52.46	1.40	0.96	1.77	B	E	31.67	1.16	1.88	B	I	51.07	0.80	0.90	1.22	B	I	31.67	
TNAGT5A		45.000		1.15	51.75	1.40	0.96	1.67	B	E	31.67	1.16	1.98	B	I	51.07	0.80	0.90	1.15	B	I	31.67		
TNAGT5B	45.000	③	1.13	50.85	1.40	0.96	1.65	B	E	31.67	1.16	1.78	B	I	12.27	0.80	0.90	1.13	B	I	31.67			
EMERGENCY VEHICLE (EV)	EV2	28.750		1.73	49.74	1.30	0.96	2.70	B	E	31.67	1.16	2.95	B	I	12.27	0.80	0.90	1.73	B	I	31.67		
	EV3	45.000	④	1.13	48.59	1.30	0.96	1.77	B	E	31.67	1.16	1.78	B	I	12.27	0.80	0.90	1.13	B	I	31.67		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ _{DC}	γ _{OW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

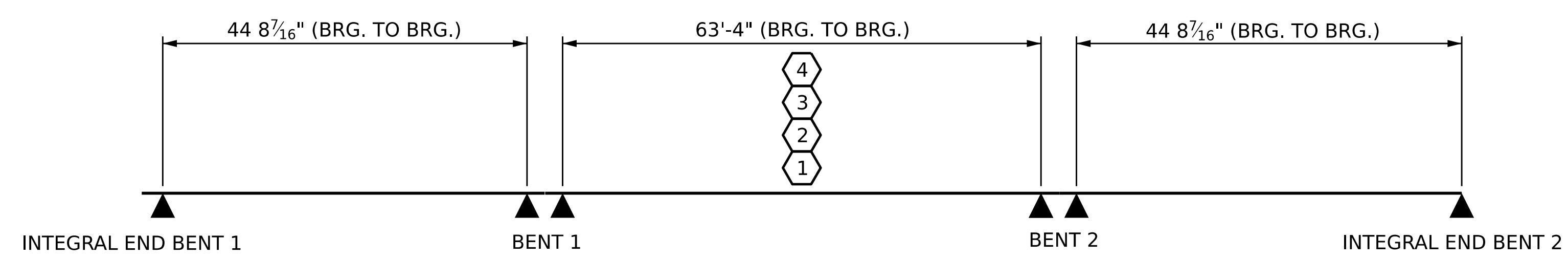
③ LEGAL LOAD RATING **

④ EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD

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

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

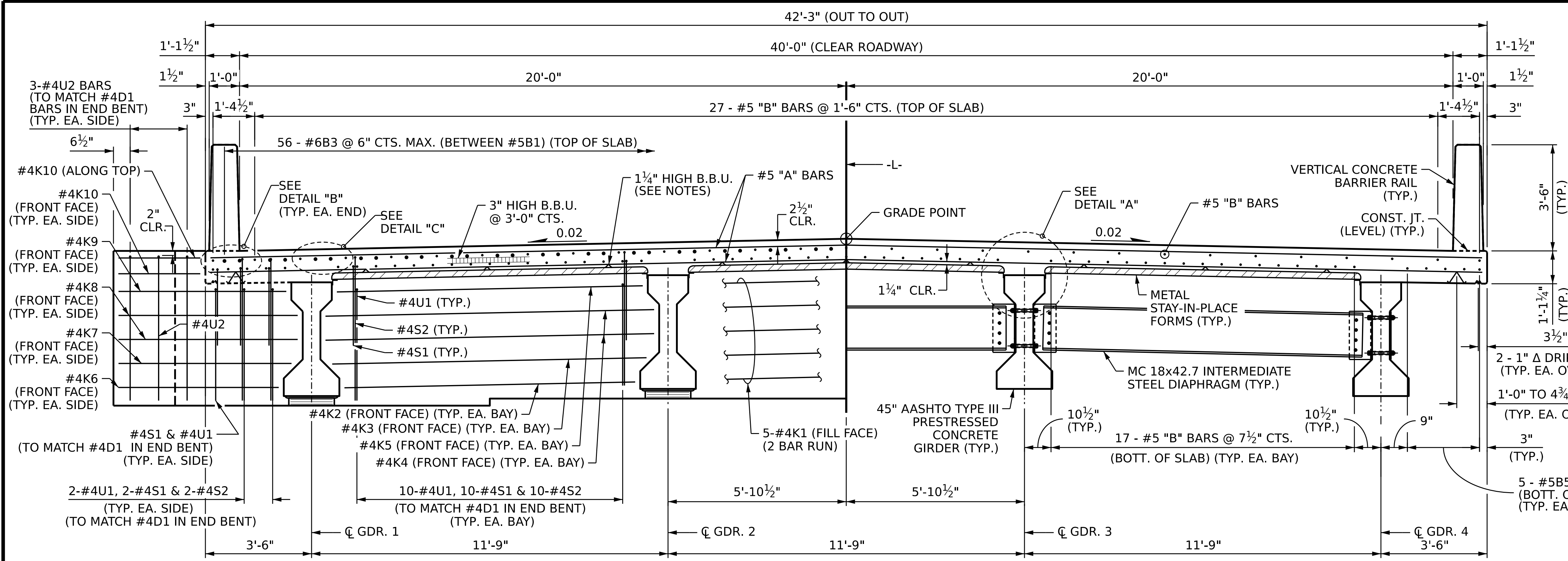
DocuSigned by:
 Elizabeth F. Lawes
 93564422312718/2024

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 SUITE 1500
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 TEL: 1.919.836.4040
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DRAWN BY: MAA 1/08	REV. 11/12/OBRR	MAA/GM
CHECKED BY: GM/DI 2/08	REV. 10/11/11	MAA/GM
	REV. 12/17	MAA/THC
DESIGNED BY: J. WHEATLEY	DATE: MAY 2024	
DRAWN BY: M. HOBBS	DATE: MAY 2024	
CHECKED BY: E. LAWES	DATE: MAY 2024	
DESIGN ENGINEER OF RECORD: E. LAWES	DATE: MAY 2024	

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-6
2			4			TOTAL SHEETS 30



HALF SECTION AT END BENT DIAPHRAGM (INTEGRAL END BENT)

TYPICAL SECTION FOR INTERMEDIATE STEEL DIAPHRAGMS SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 45" TYPE III PRESTRESSED CONCRETE GIRDER" SHEET.

NOTES:

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

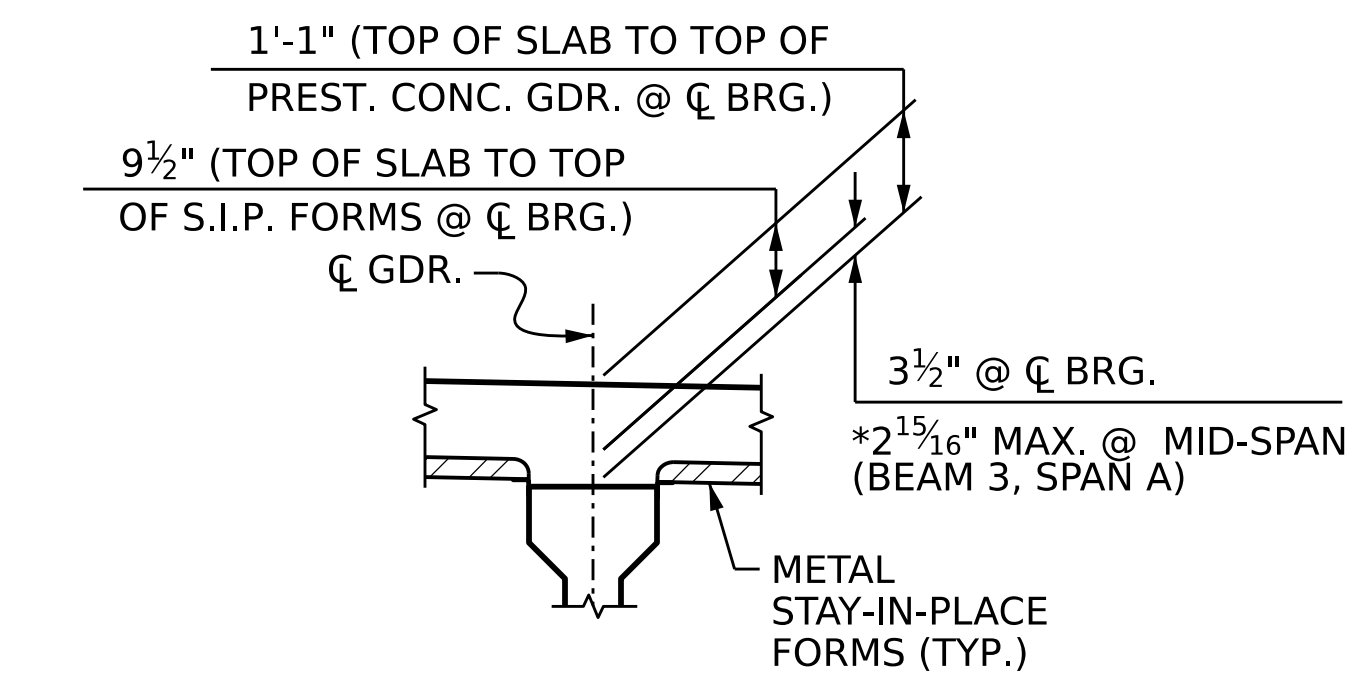
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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

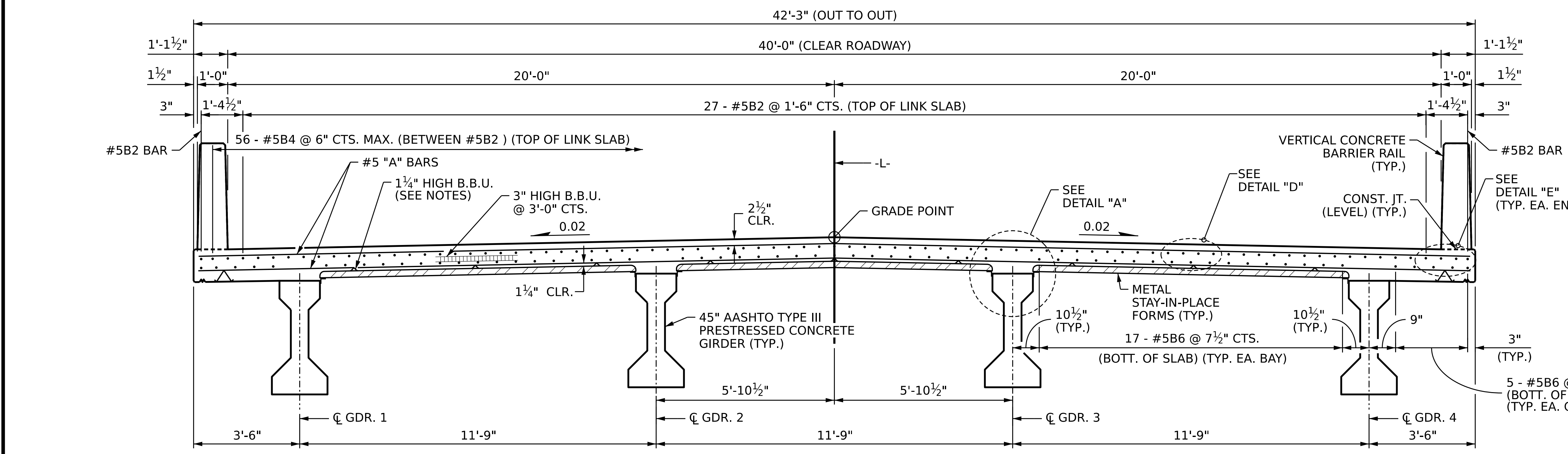
VERTICAL CONCRETE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

NO WELDING OF FORMS OR FALSEWORK TO THE TOP OF THE GIRDER WILL BE PERMITTED IN THE LINK SLAB AREA. SEE "PLAN OF SPANS" SHEETS FOR LOCATIONS.

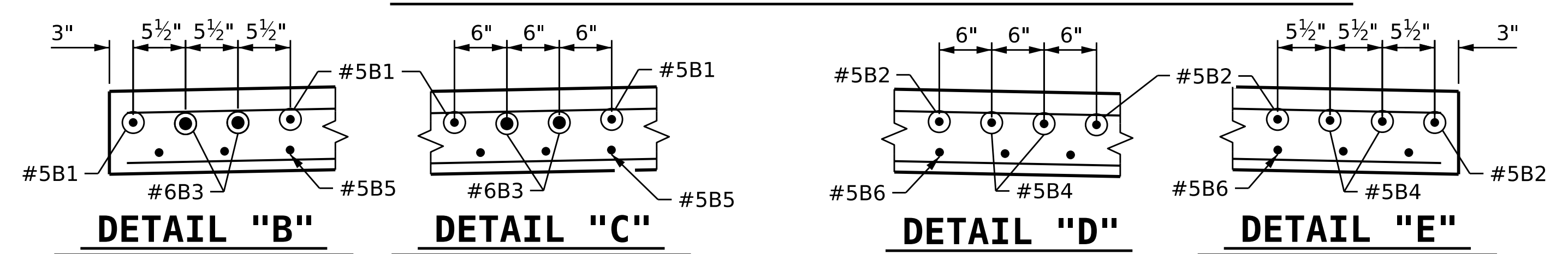
FOR VERTICAL CONCRETE BARRIER RAIL REINFORCING STEEL AND DETAILS, SEE "VERTICAL CONCRETE BARRIER RAIL" SHEETS.



DETAIL "A" (TYP. EACH GIRDER) *BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.



TYPICAL SECTION AT BENTS THROUGH LINK SLAB

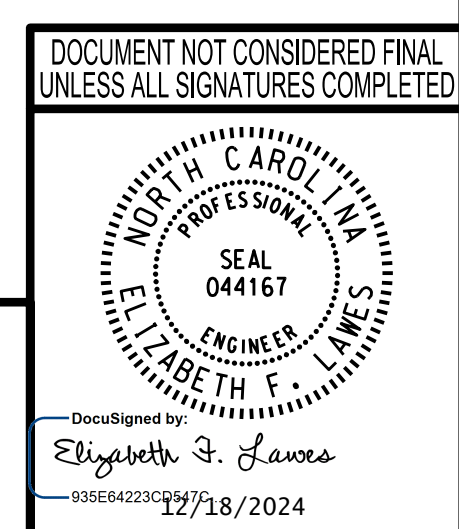


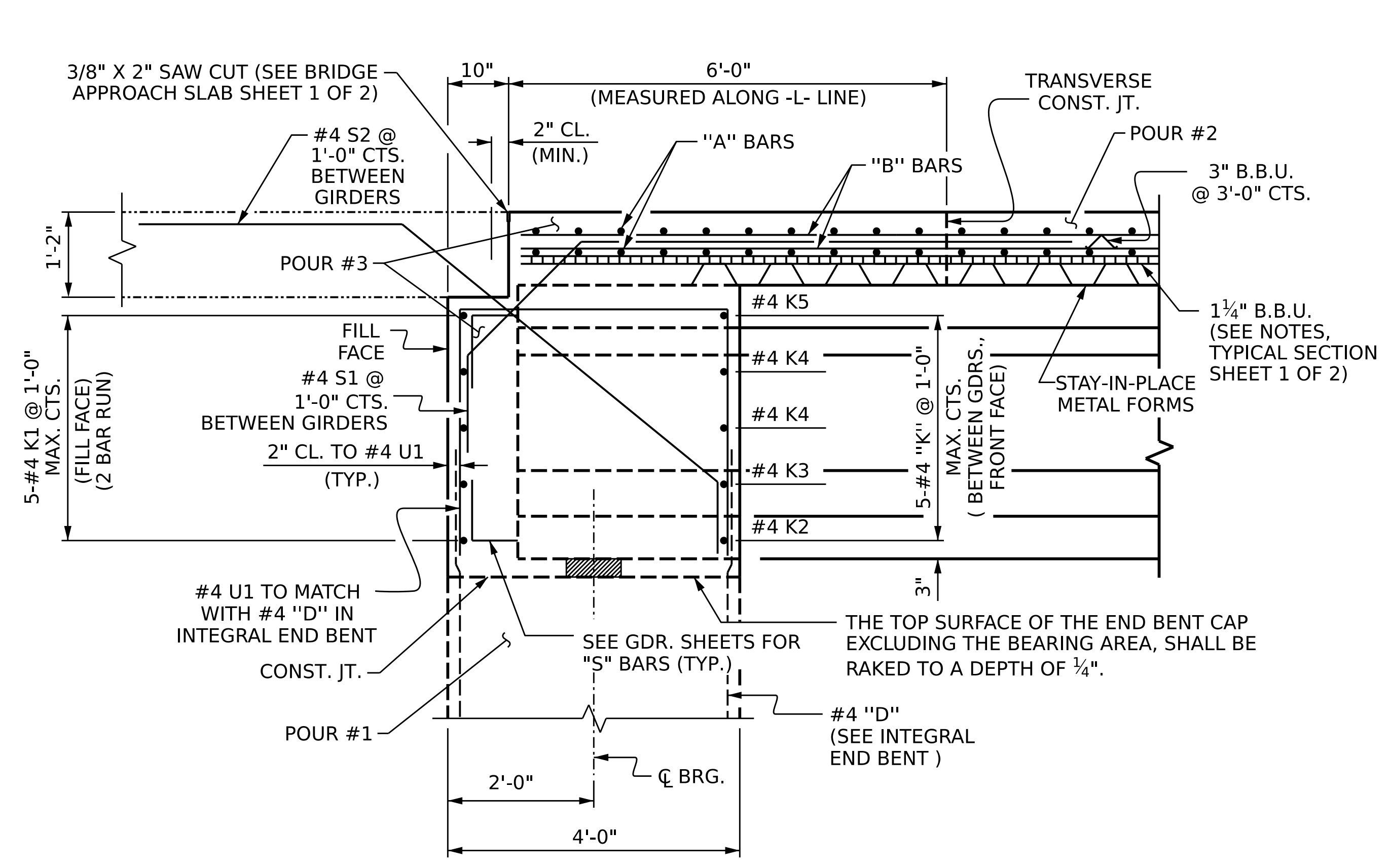
PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUPERSTRUCTURE TYPICAL SECTION	
REVISIONS			
NO.	BY:	DATE:	NO.
1			3
2			4
SHEET NO.			S-7
TOTAL SHEETS			30

DESIGNED BY: J. WHEATLEY DATE: MAY 2024
 DRAWN BY: M. HOBBS DATE: MAY 2024
 CHECKED BY: E. LAWES DATE: MAY 2024
 DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024

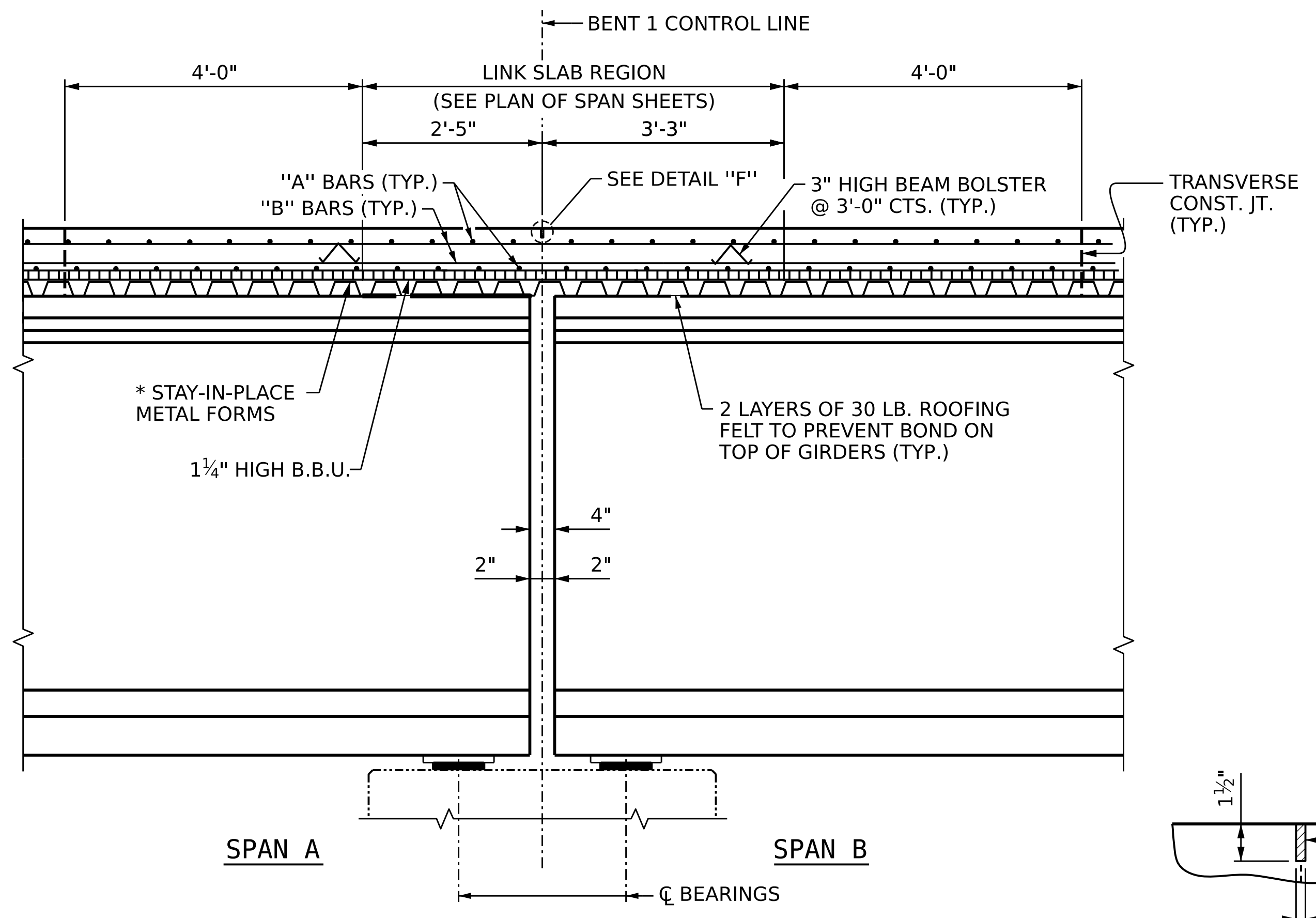
WSP
 WSP USA Inc.
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165





END OF GIRDER DETAIL AT INTEGRAL END BENT

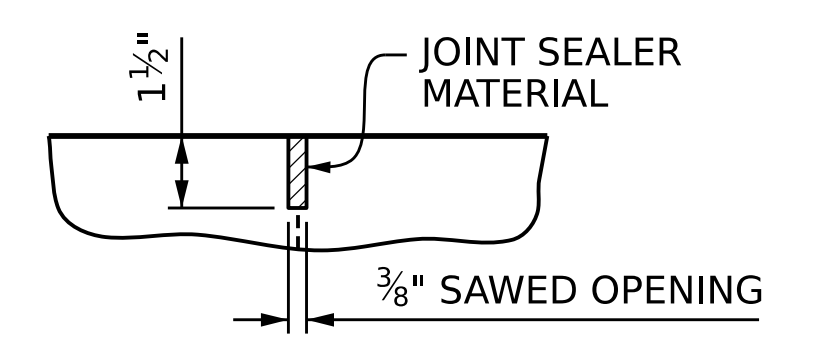
(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)
(SEE END BENT SHEETS FOR INTEGRAL END BENT REINFORCING DETAILS)



SECTION AT LINK SLAB

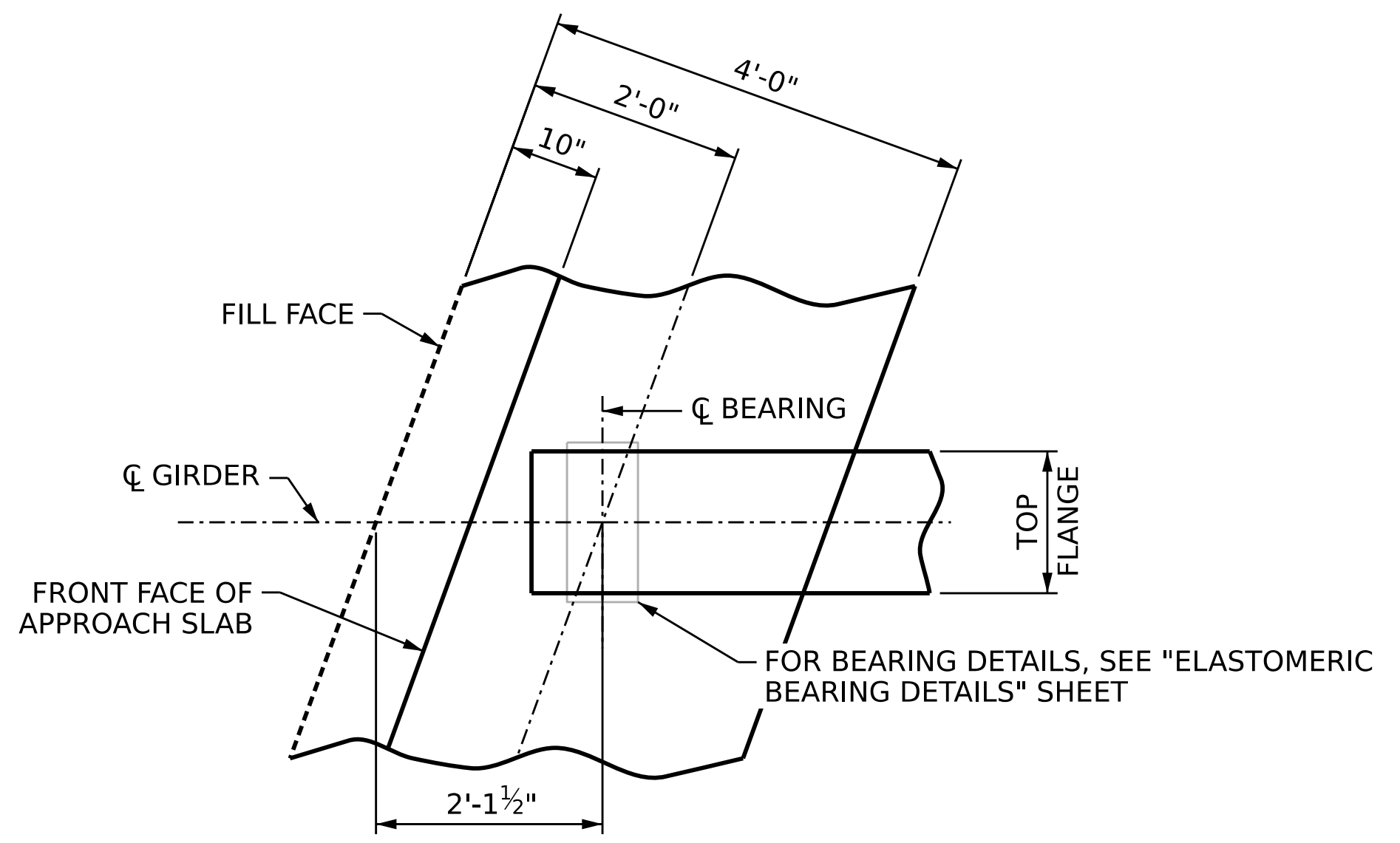
(SECTION SHOWN ALONG GIRDER)
(BENT 1 SHOWN, BENT 2 SIMILAR BY ROTATION)

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



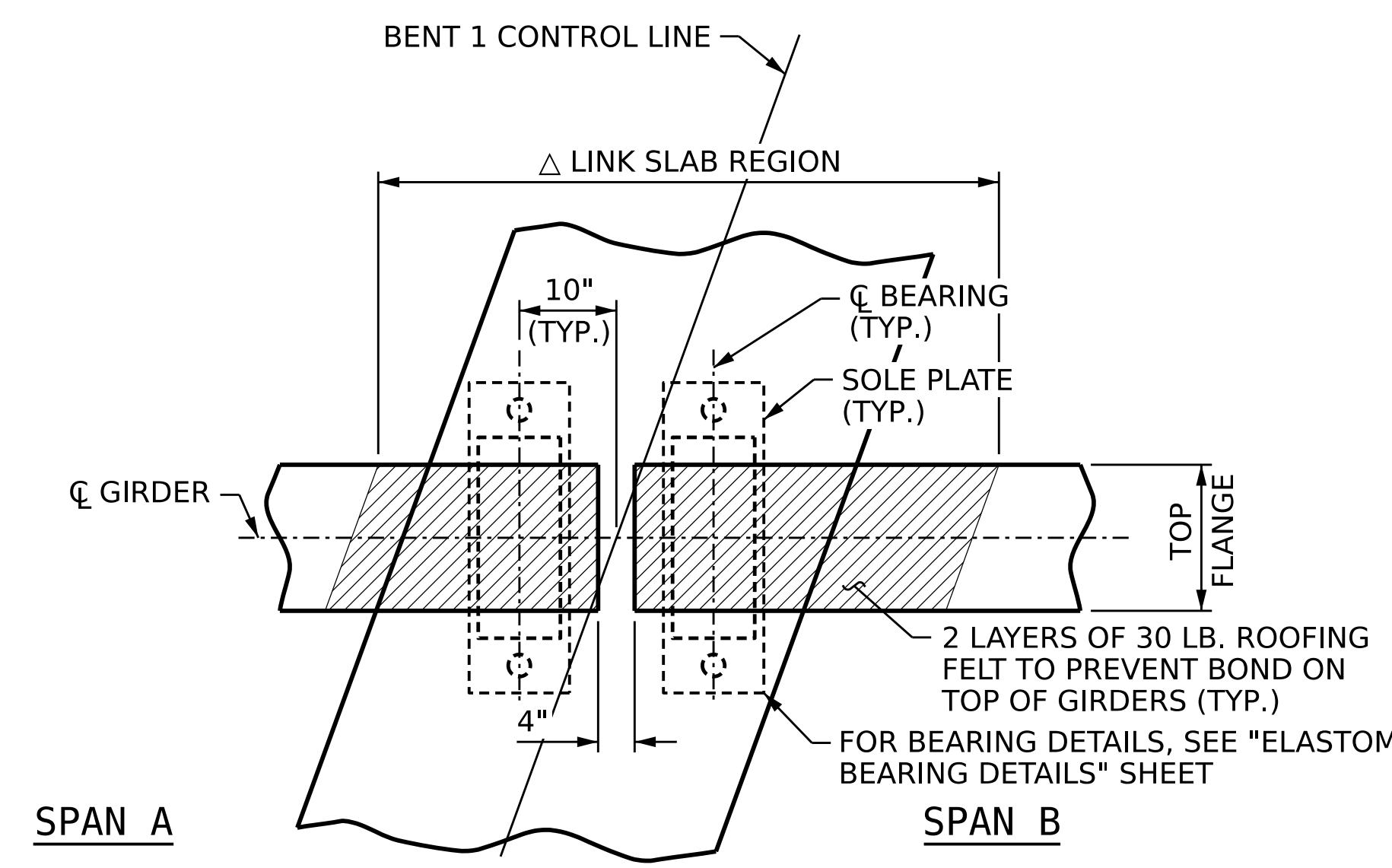
DETAIL "F"

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



PLAN OF GIRDER @ INTEGRAL END BENT

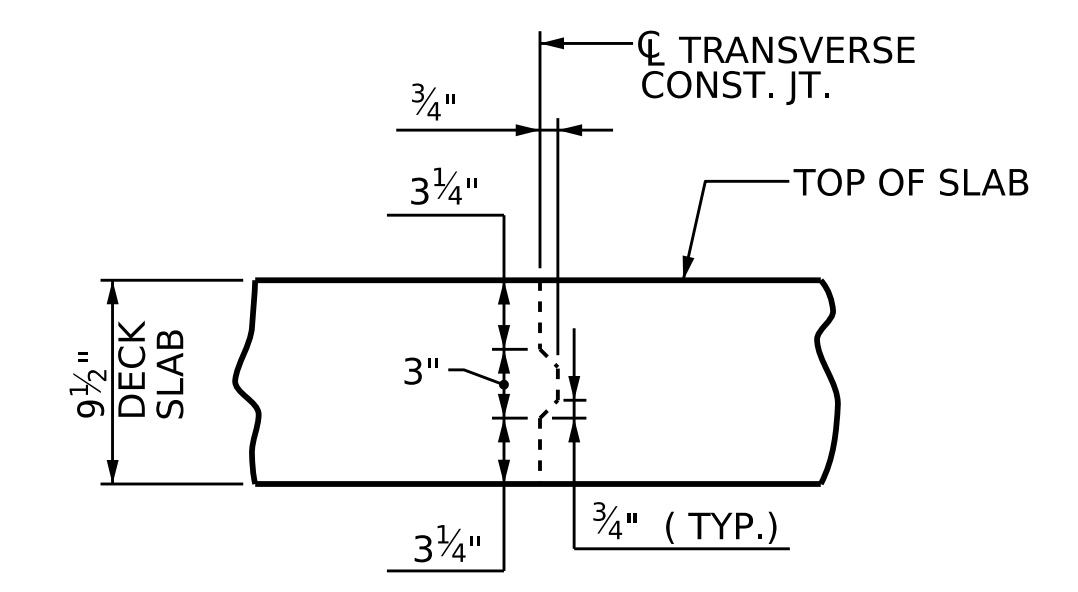
(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)
(REINFORCING IN GIRDER NOT SHOWN FOR CLARITY)



PLAN OF GIRDERS AT LINK SLAB BENT

(BENT 1 SHOWN, BENT 2 SIMILAR BY ROTATION)

△ 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.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
TYPICAL SECTION DETAILS

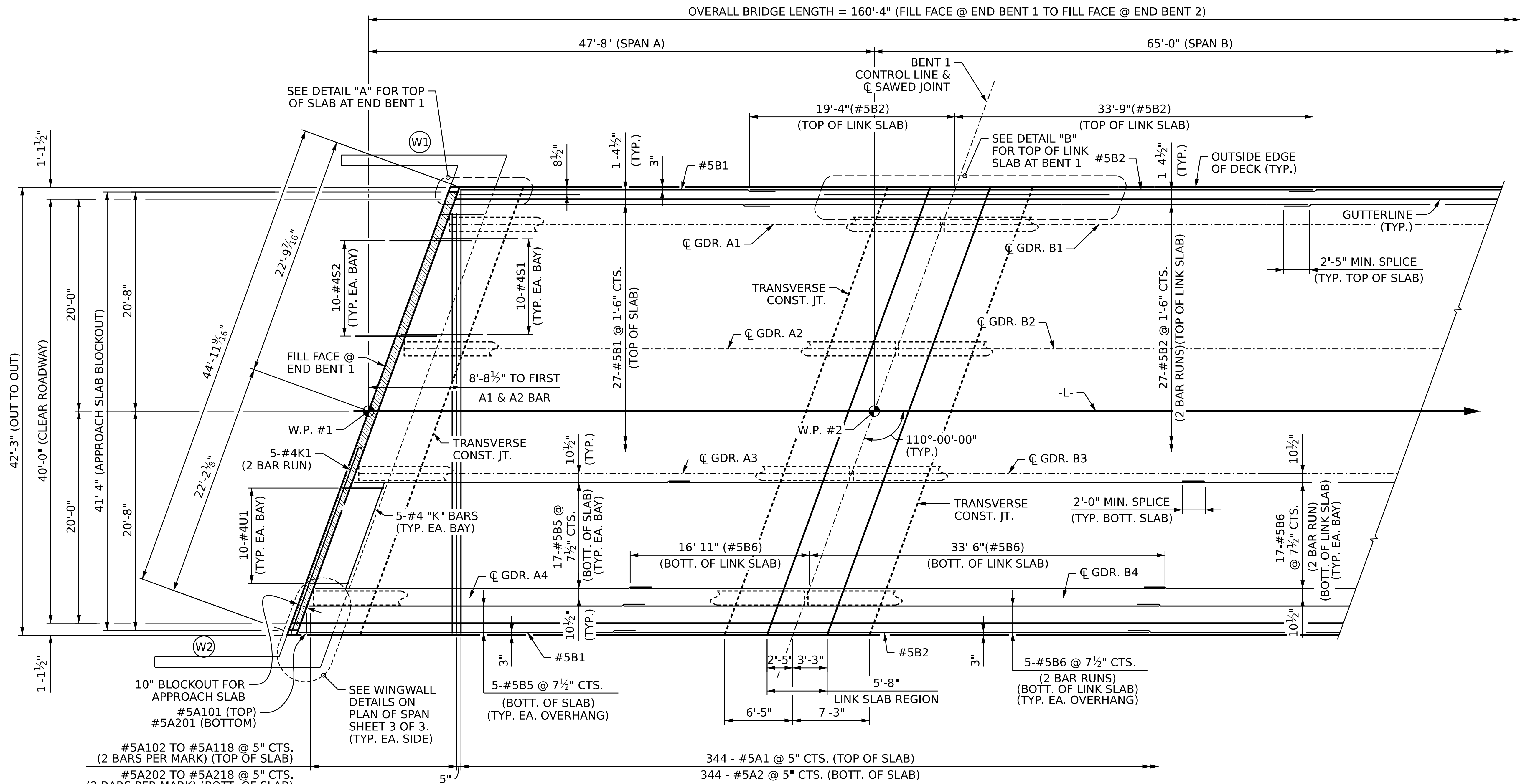
DESIGNED BY:	J. WHEATLEY	DATE :	MAY 2024
DRAWN BY:	M. HOBBS	DATE :	MAY 2024
CHECKED BY:	E. LAWES	DATE :	MAY 2024
DESIGN ENGINEER OF RECORD:	E. LAWES	DATE :	MAY 2024

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DocuSigned by:
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 935E44223C24E
 12/18/2024

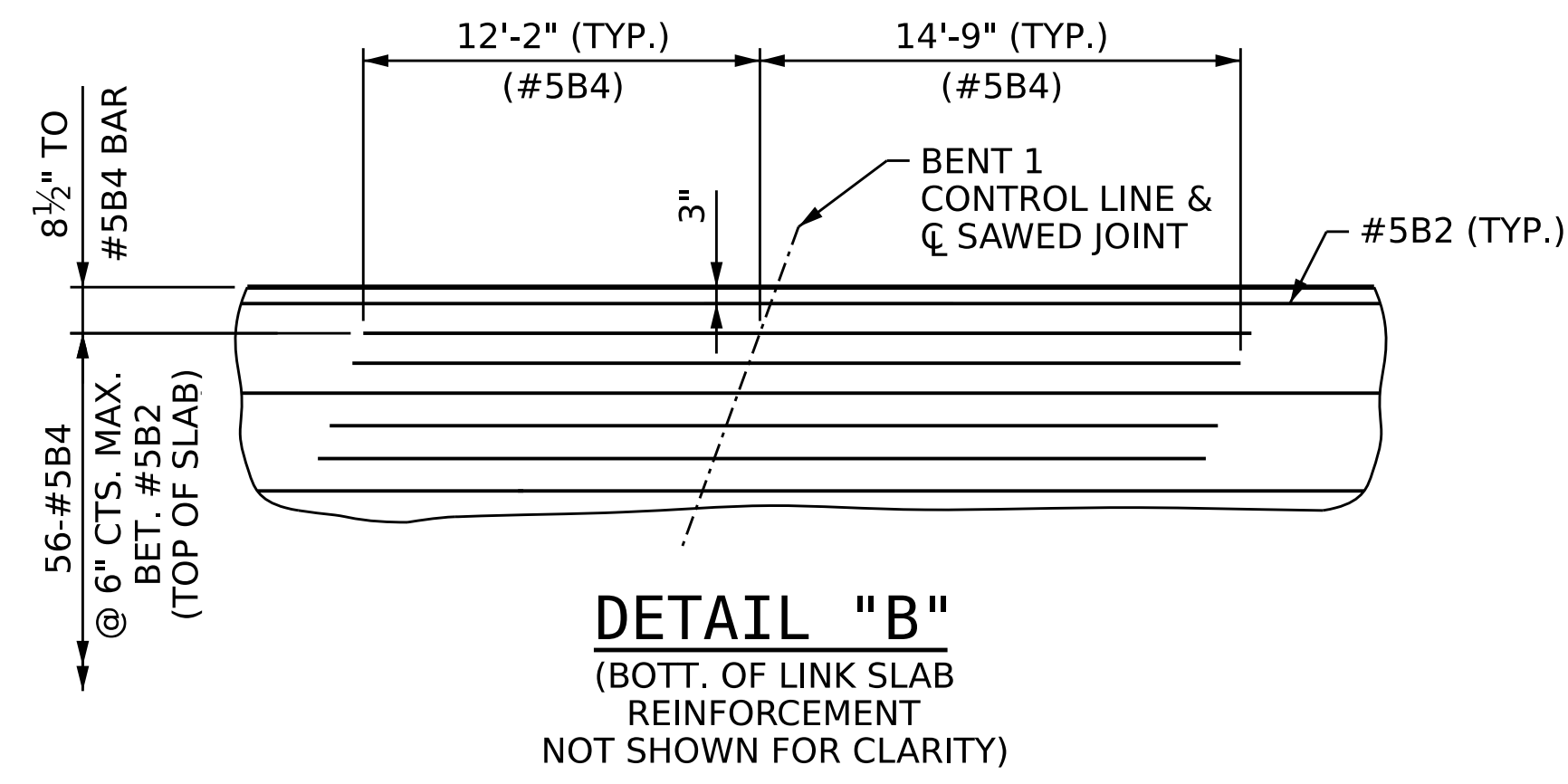
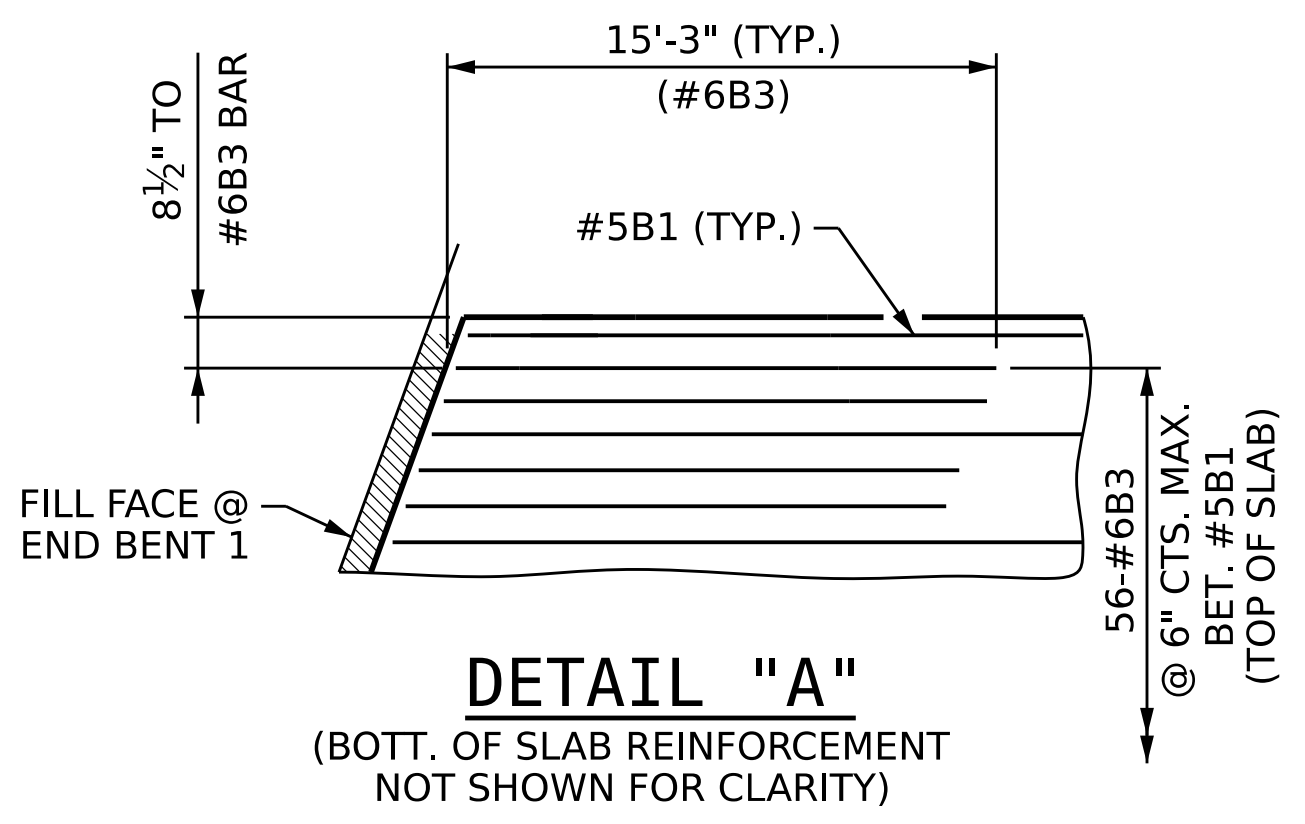
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-8
2			4			TOTAL SHEETS 30



PLAN OF SPANS A & B

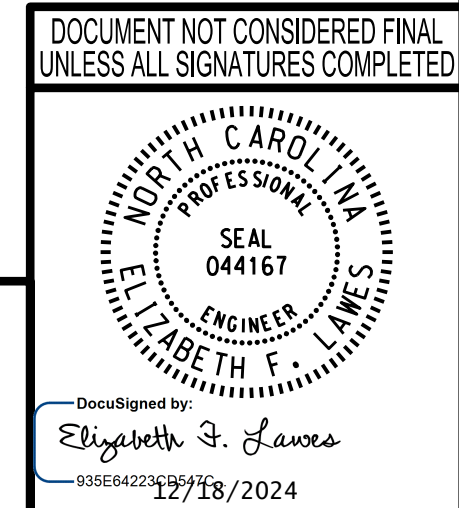
NOTES:

- FOR LENGTH NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL".
- STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEETS.
- FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS" SHEET.
- #5 "A" BARS SHALL BE PLACED PERPENDICULAR TO -L- LINE WITH 2" MINIMUM CLEARANCE ON EACH END.
- FOR SAWED JOINT DETAIL, SEE "TYPICAL SECTION DETAILS" SHEET.
- FOR SECTION VIEWS, SEE "TYPICAL SECTION DETAILS" SHEET.



PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
PLAN OF SPANS A & B



DESIGNED BY:	J. WHEATLEY	DATE:	MAY 2024
DRAWN BY:	M. HOBBS	DATE:	MAY 2024
CHECKED BY:	E. LAWES	DATE:	MAY 2024
DESIGN ENGINEER OF RECORD:	E. LAWES	DATE:	MAY 2024

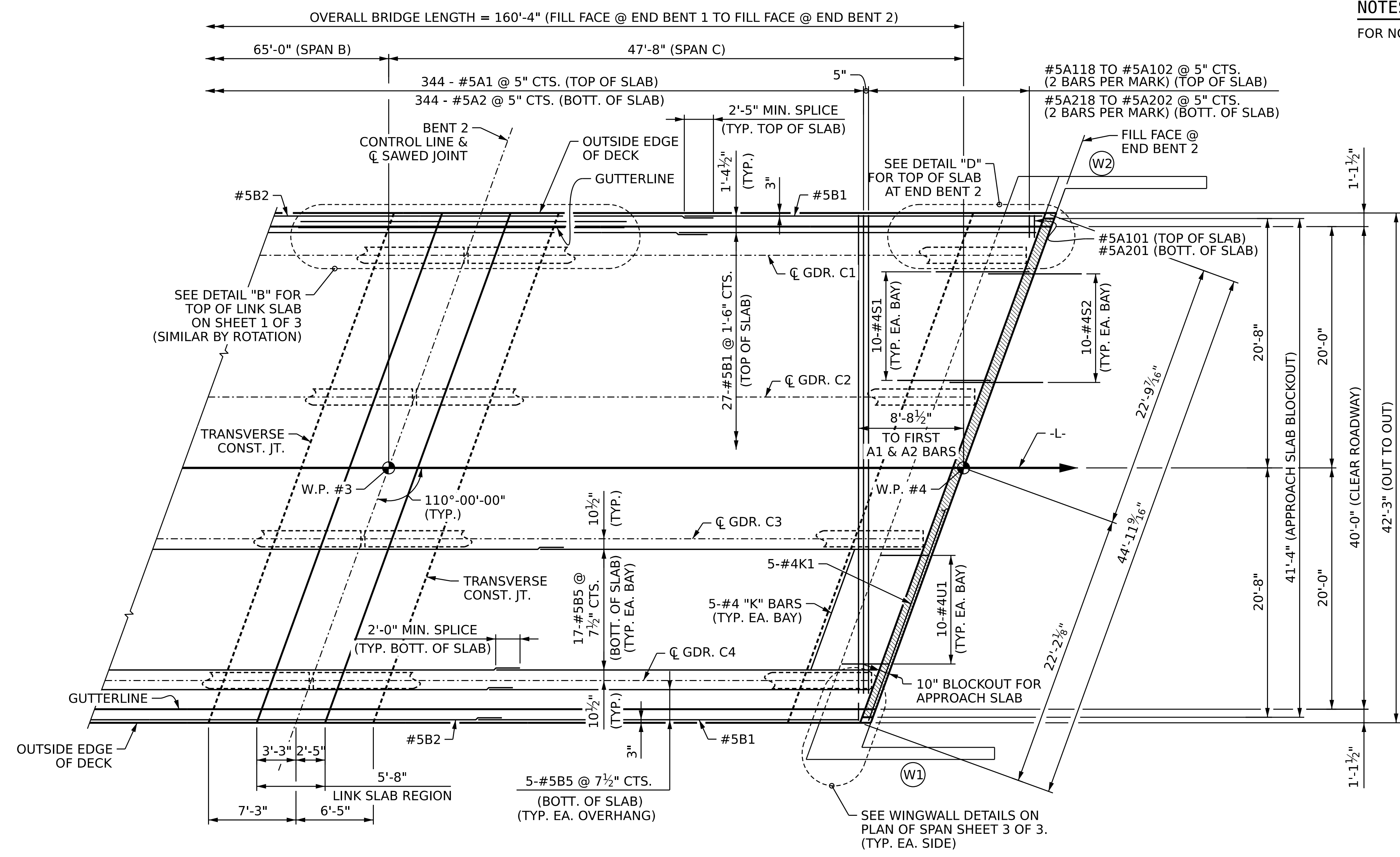
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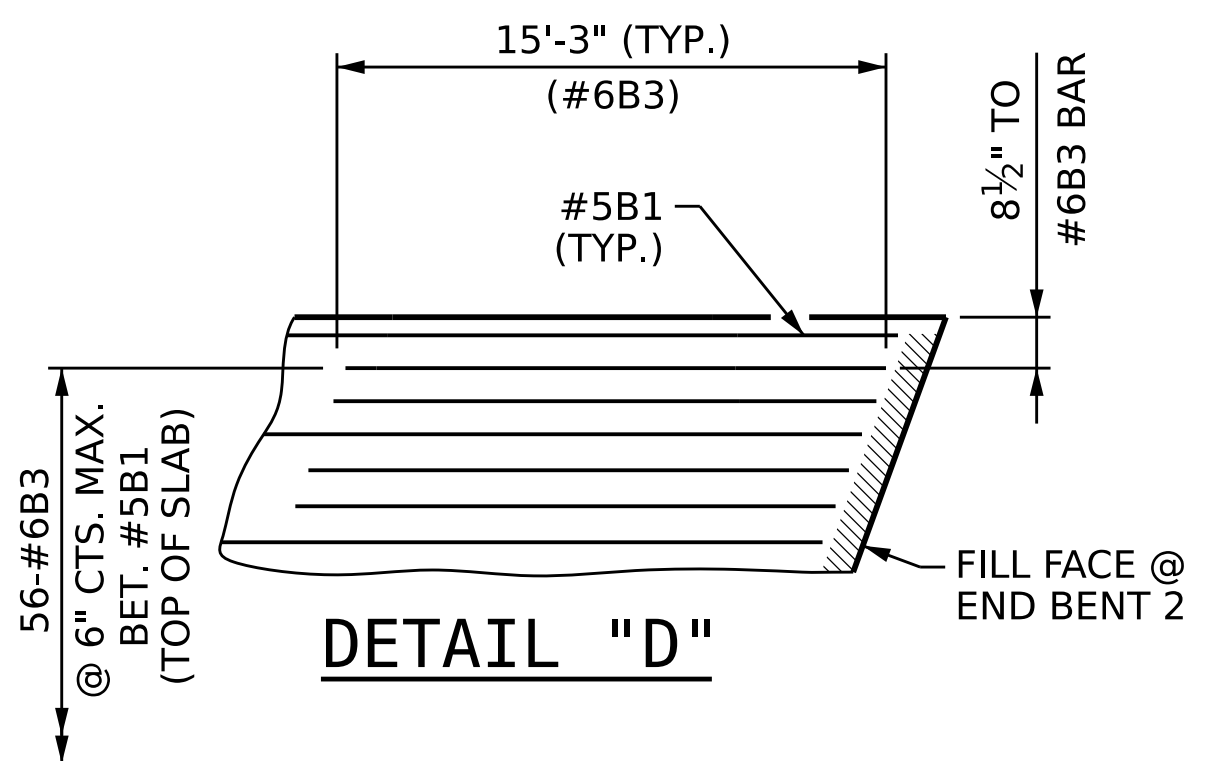
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

S-9
 TOTAL SHEETS
 30

NOTES:
FOR NOTES SEE SHEET 1 OF 3.



PLAN OF SPAN C



PROJECT NO. **BR-0100**

RUTHERFORD COUNTY

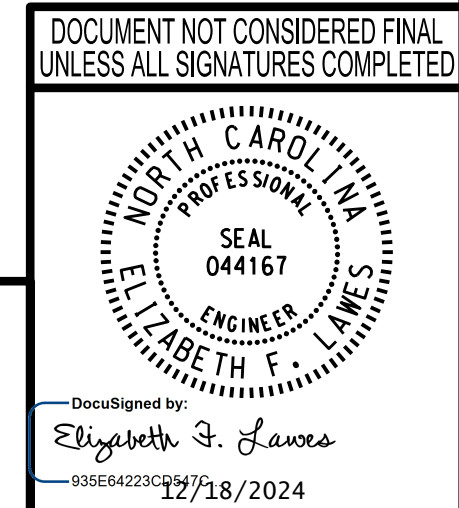
STATION: **18+28.00 -L-**

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
PLAN OF SPAN C**

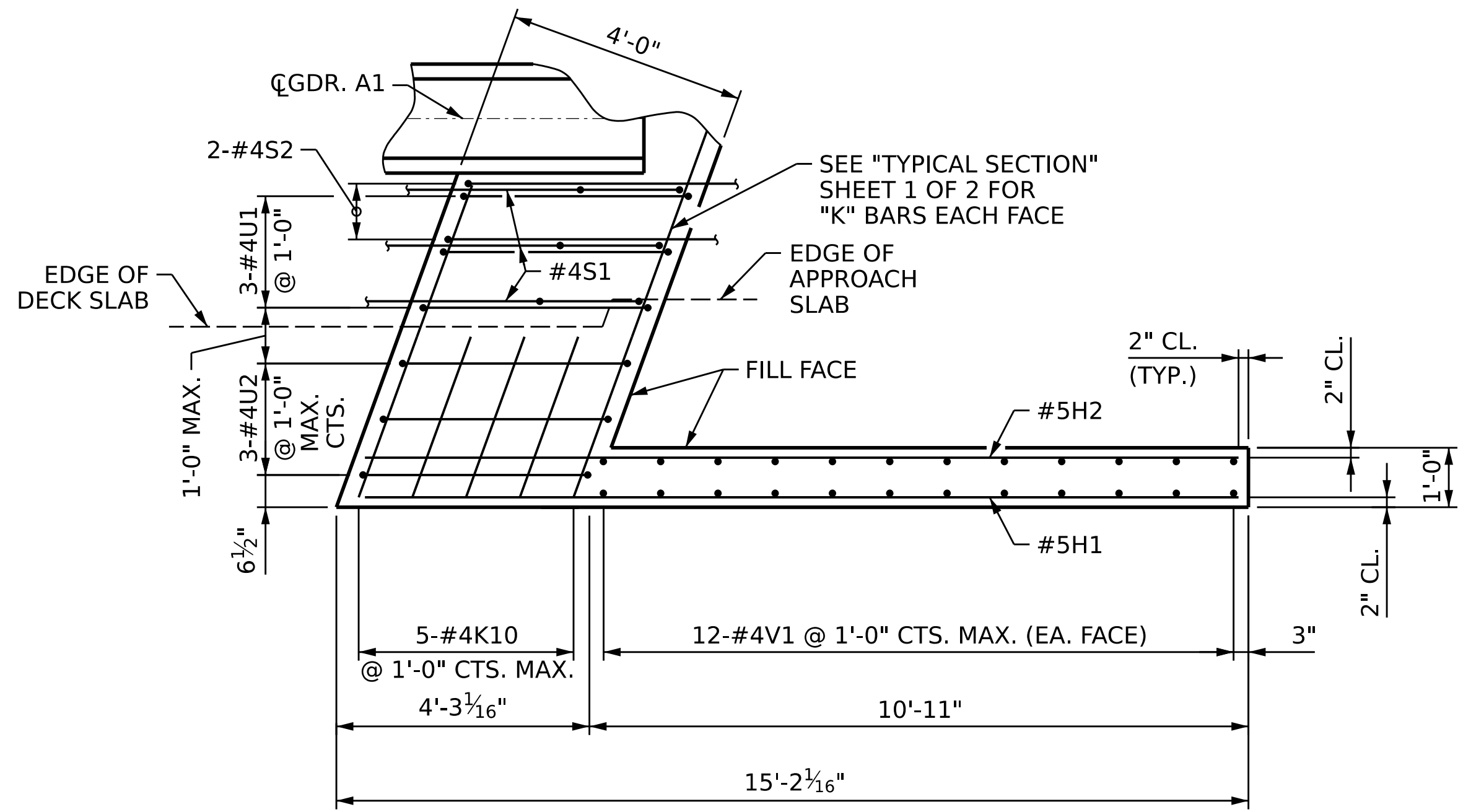
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-10
2			4			30



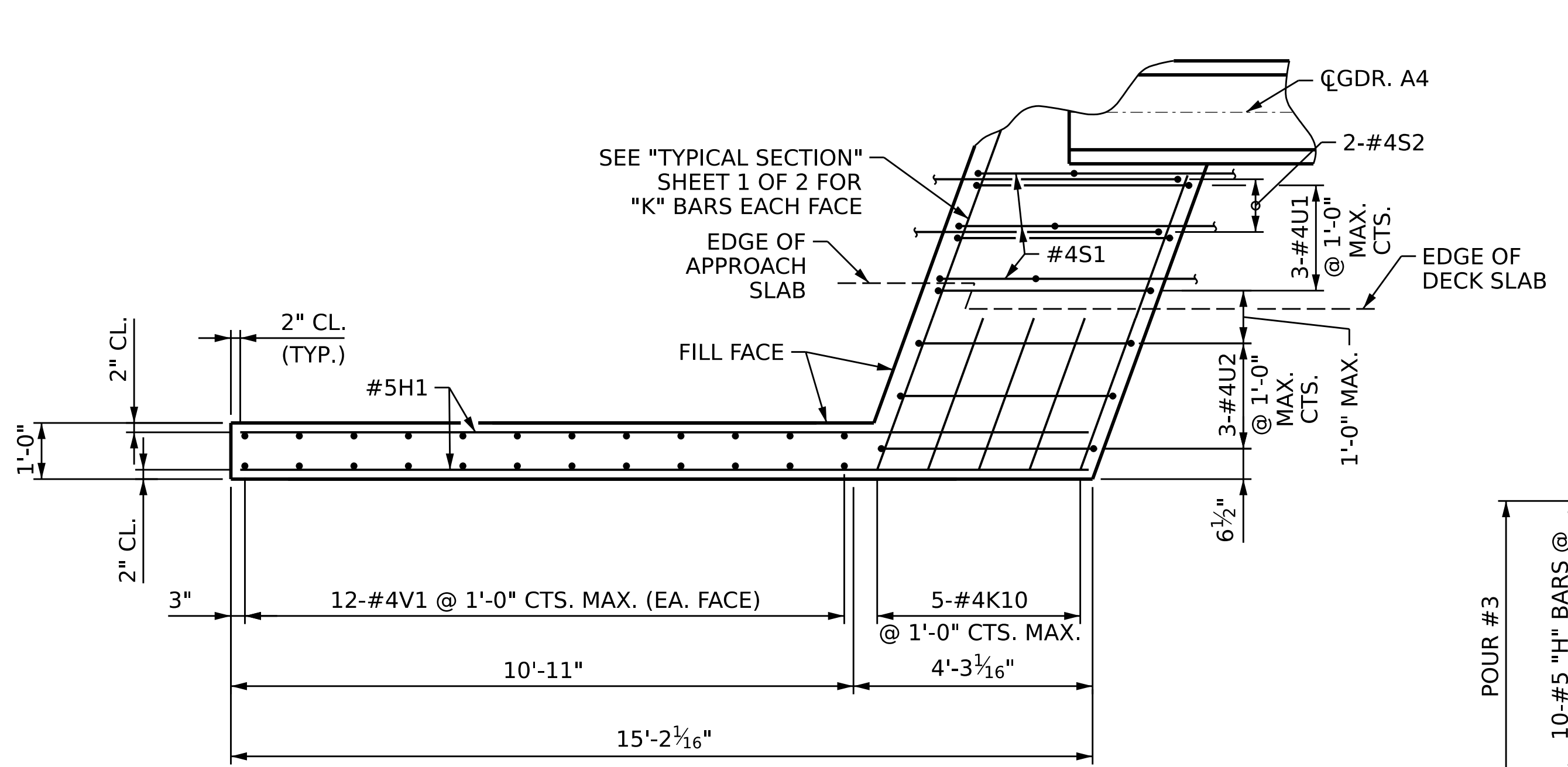
wsp

WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

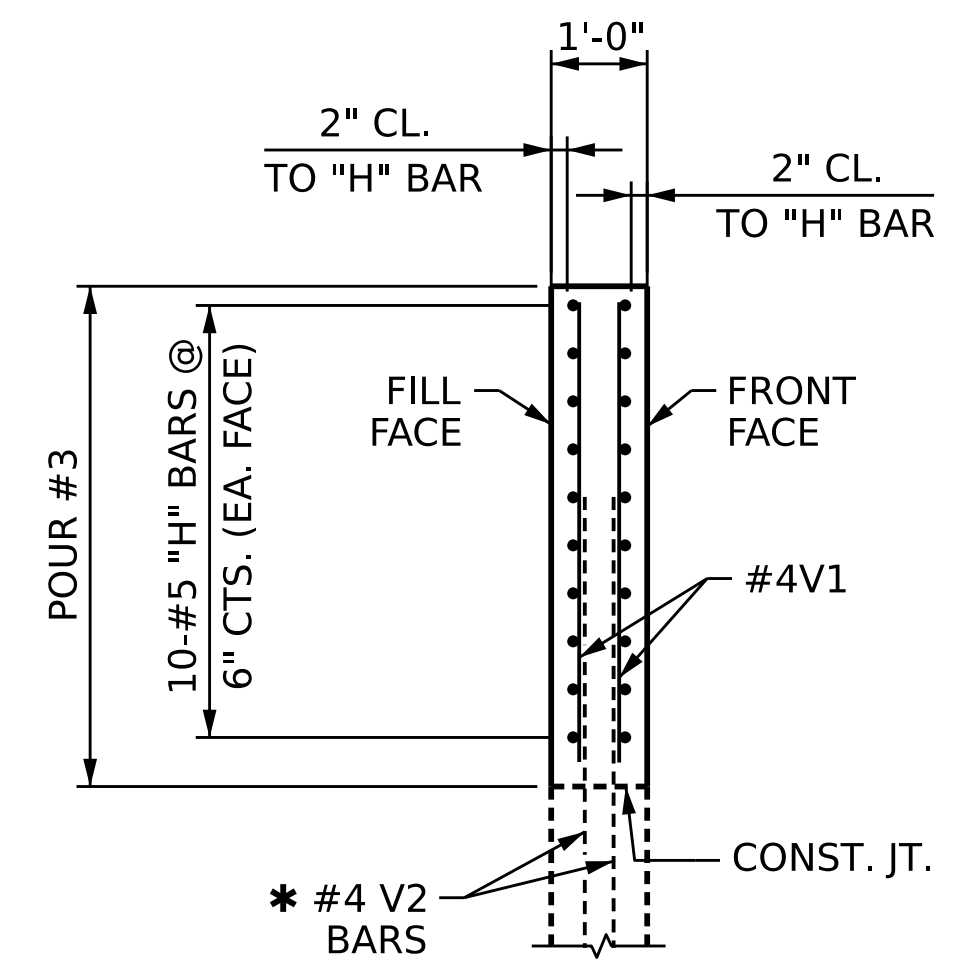
DESIGNED BY: J. WHEATLEY DATE: MAY 2024
DRAWN BY: M. HOBBS DATE: MAY 2024
CHECKED BY: E. LAWES DATE: MAY 2024
DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024



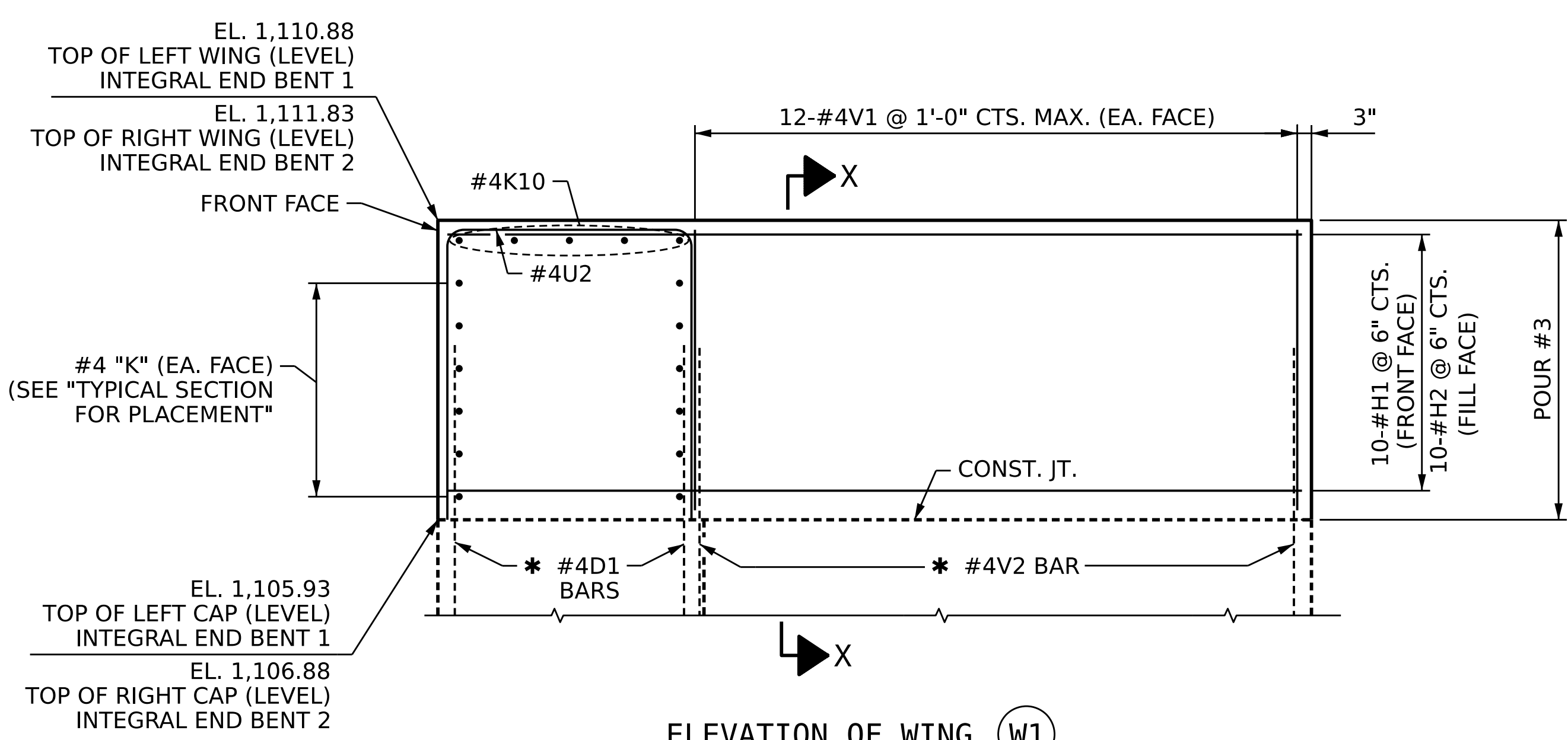
PLAN OF WING (W1)
 INTEGRAL END BENT 1 (LEFT)
 INTEGRAL END BENT 2 (RIGHT)



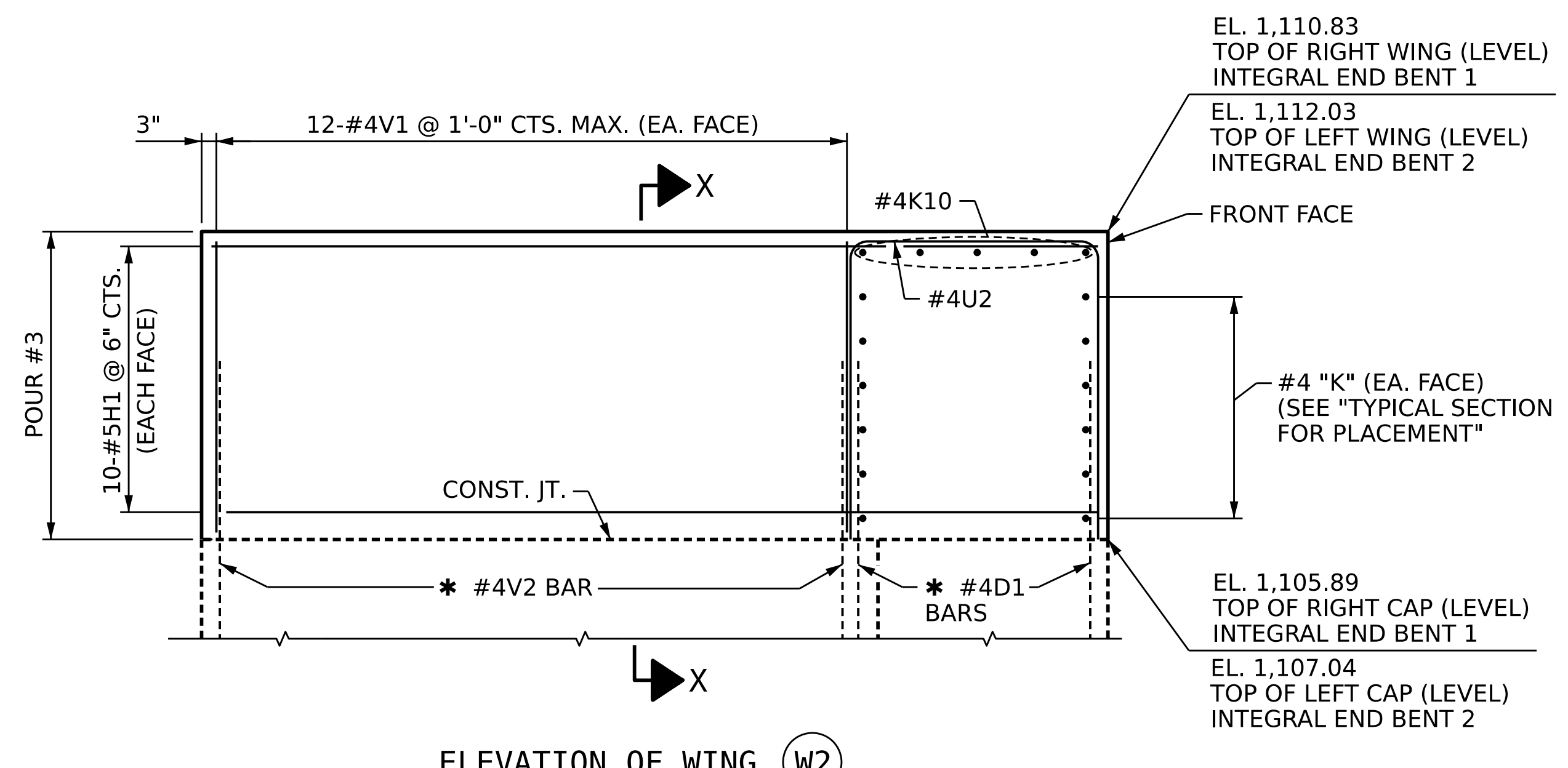
PLAN OF WING (W2)
 INTEGRAL END BENT 1 (RIGHT)
 INTEGRAL END BENT 2 (LEFT)



SECTION X-X



ELEVATION OF WING (W1)
 INTEGRAL END BENT 1 (LEFT)
 INTEGRAL END BENT 2 (RIGHT)



ELEVATION OF WING (W2)
 INTEGRAL END BENT 1 (RIGHT)
 INTEGRAL END BENT 2 (LEFT)

UPPER WINGS AT INTEGRAL END BENTS

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

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
**PLAN OF SPAN
 UPPER WING DETAILS
 (INTEGRAL)**

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

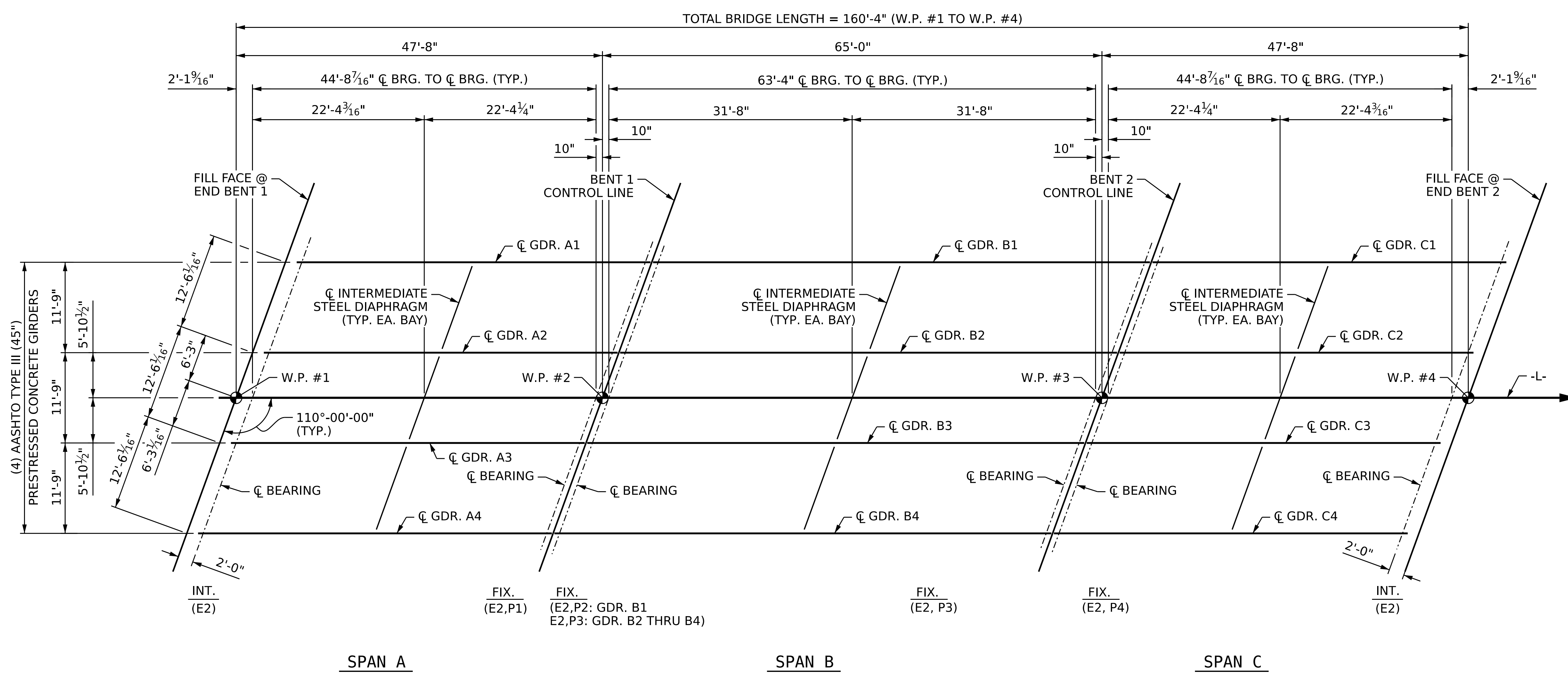
DocuSigned by:
 Elizabeth F. Lawes
 035E44222C1547C
 12/18/2024

WSP USA Inc.
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165

DESIGNED BY:	J. WHEATLEY	DATE :	MAY 2024
DRAWN BY:	M. HOBBS	DATE :	MAY 2024
CHECKED BY:	M. WAGNER	DATE :	MAY 2024
DESIGN ENGINEER OF RECORD:	E. LAWES	DATE :	MAY 2024

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

TOTAL SHEETS	30
SHEET NO.	S-11



FRAMING PLAN

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SUPERSTRUCTURE
 FRAMING PLAN**

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DocuSigned by:
 Elizabeth F. Lawes
 6/3/2024 12/18/2024

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 434 FAYETTEVILLE STREET
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 RALEIGH, NC 27601
 TEL: 1.919.836.4040
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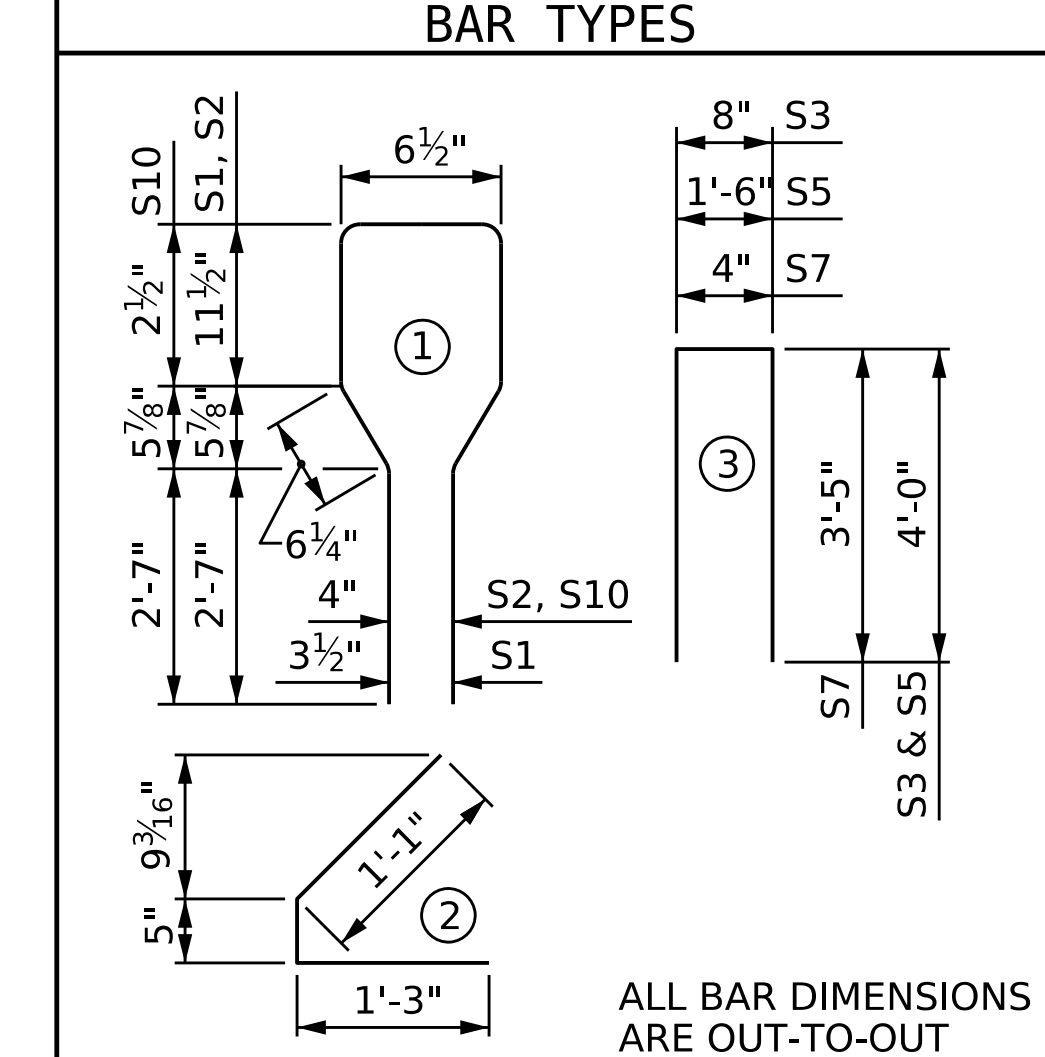
REVISIONS						SHEET NO. S-12 TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DESIGNED BY:	J. WHEATLEY	DATE :	MAY 2024
DRAWN BY:	M. HOBBS	DATE :	MAY 2024
CHECKED BY:	T. HARRIS	DATE :	MAY 2024
DESIGN ENGINEER OF RECORD:	E. LAWES	DATE :	MAY 2024

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 GIRDER					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	48	#4	1	8'-8"	278
S2	7	#6	1	8'-8"	91
S3	4	#4	3	8'-8"	23
S4	124	#4	2	2'-9"	228
S5	1	#4	3	9'-6"	6
*S6	8	#5	STR	3'-8"	31
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S10	7	#6	1	7'-2"	75
S11	1	#3	STR	1'-0"	1

* NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



QUANTITIES FOR ONE GIRDER			
SPANS A & C	REINFORCING STEEL	5,000 PSI CONCRETE	0.6" Ø L.R. GRADE STRANDS
	LB.	C.Y.	No.
GIRDER QTY.	770	6.6	16

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
8	46.04	368.29

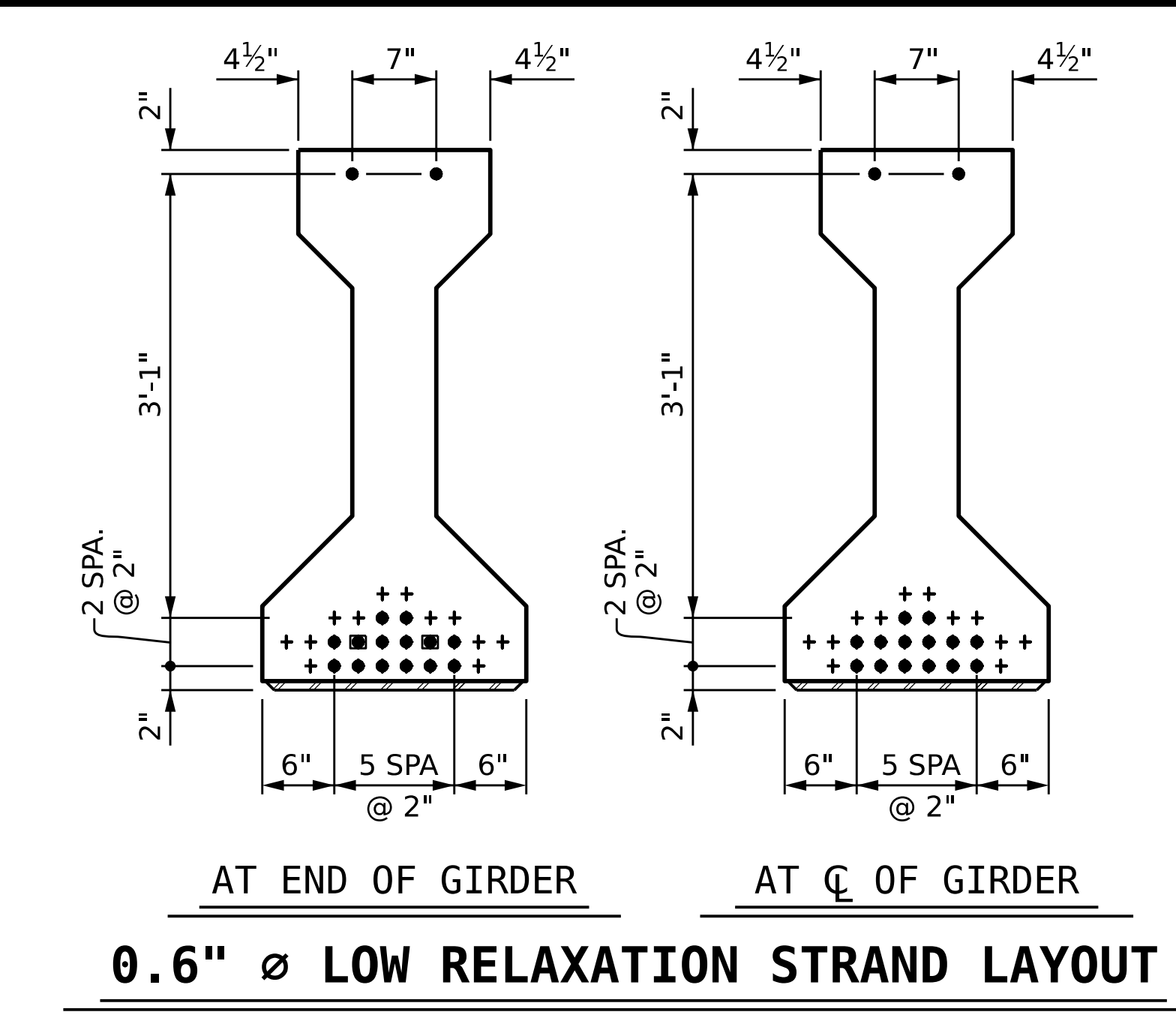
PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**AASHTO TYPE III
 PRESTRESSED CONCRETE
 GIRDER - LINK SLAB
 SPANS A & C**

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

S-13
TOTAL SHEETS 30

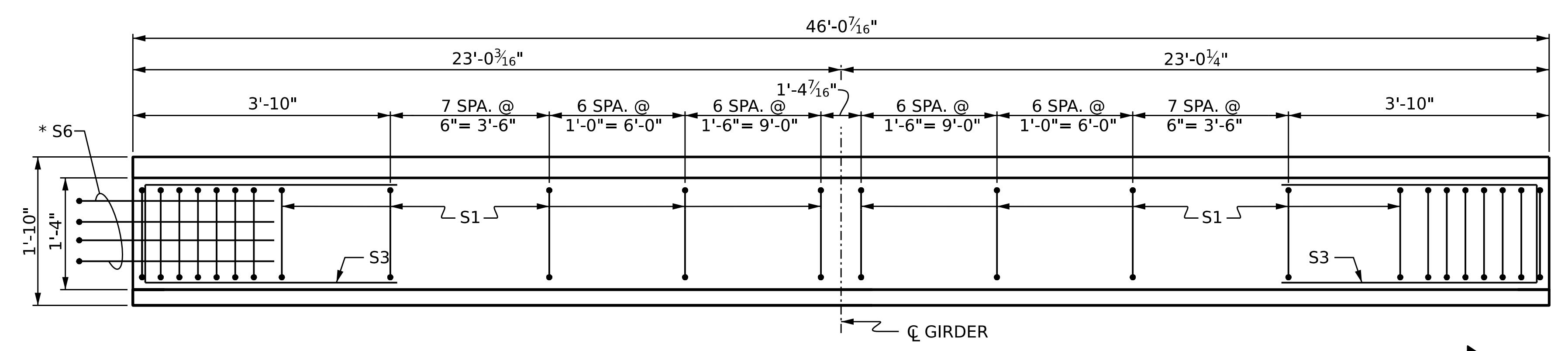
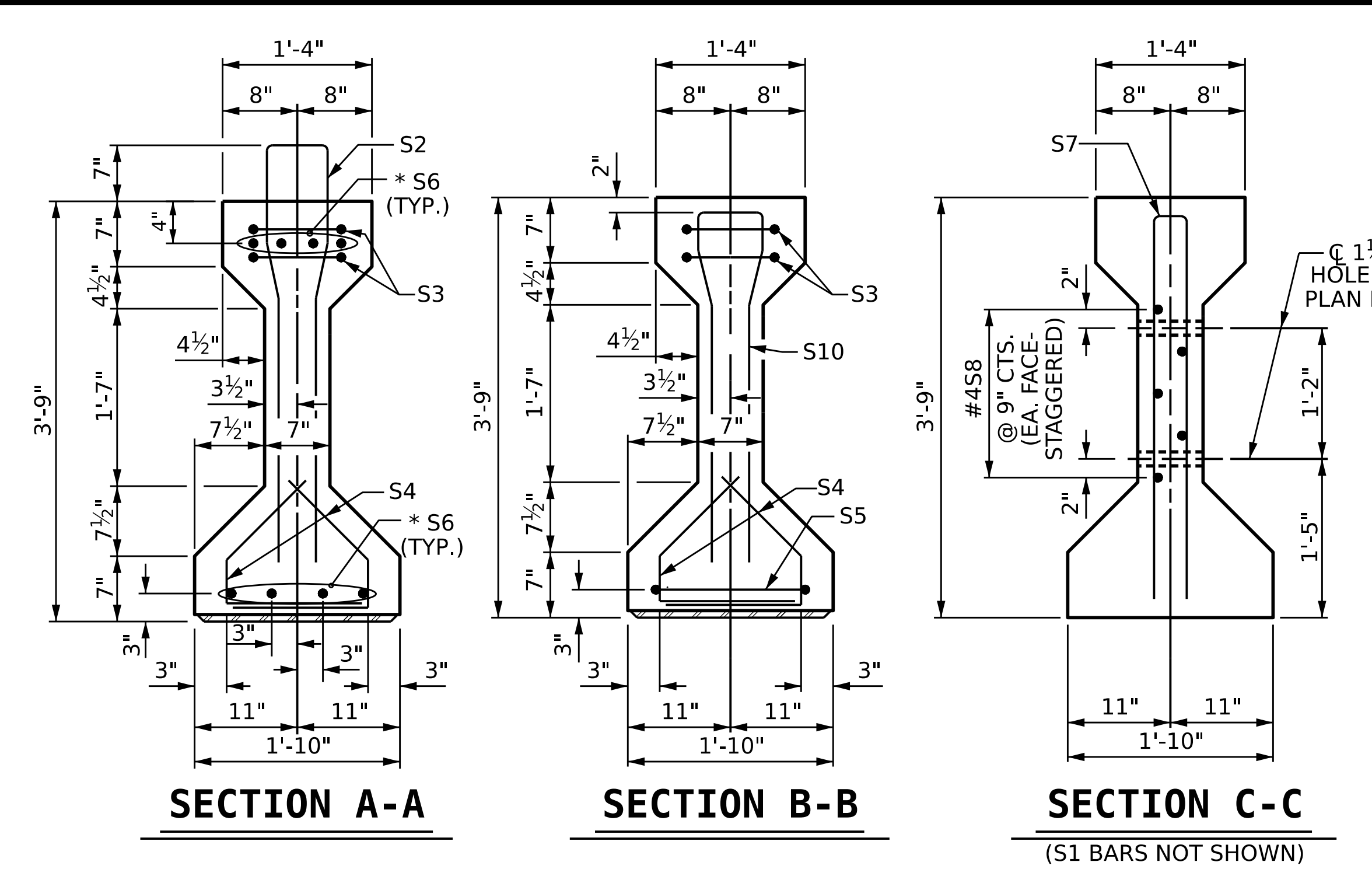
STD. NO. PCG5



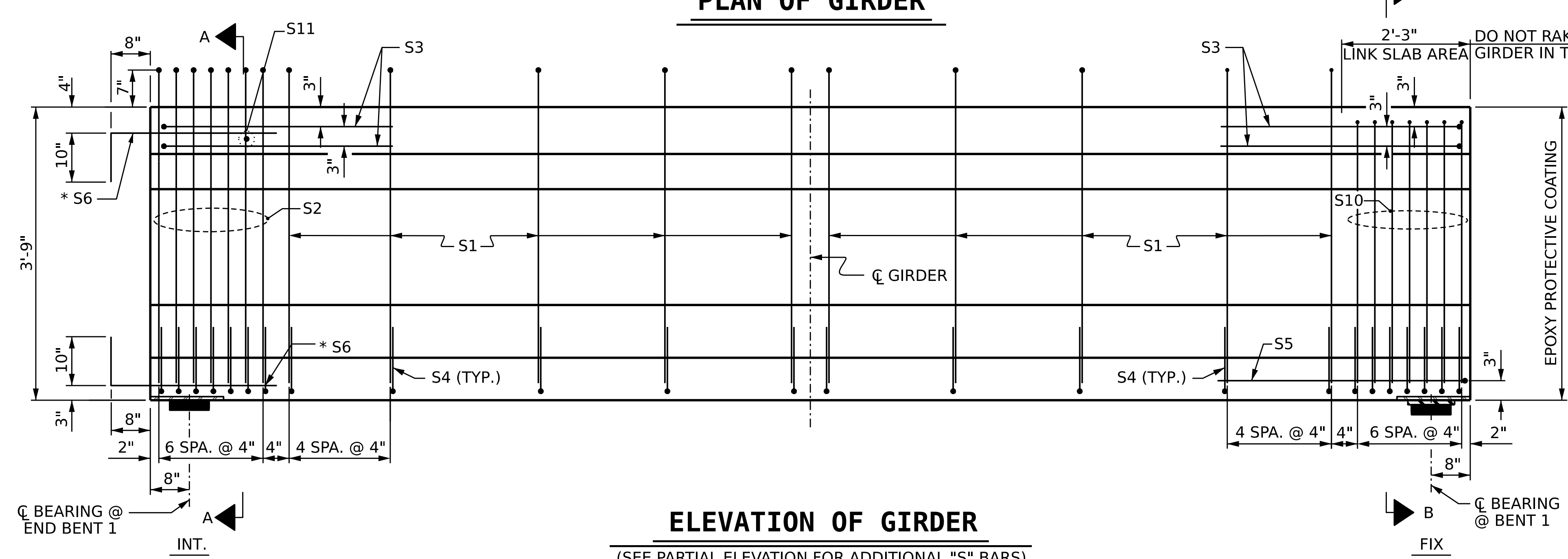
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

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

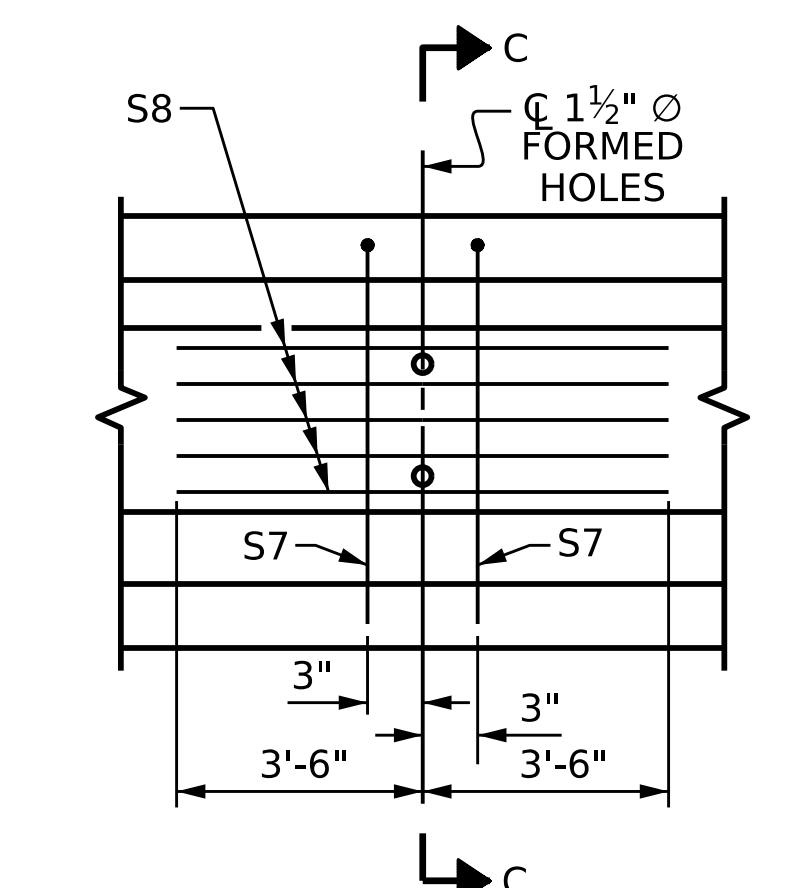


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
 (GIRDERS IN SPAN A SHOWN, GIRDERS IN SPAN C SIMILAR BY ROTATION)



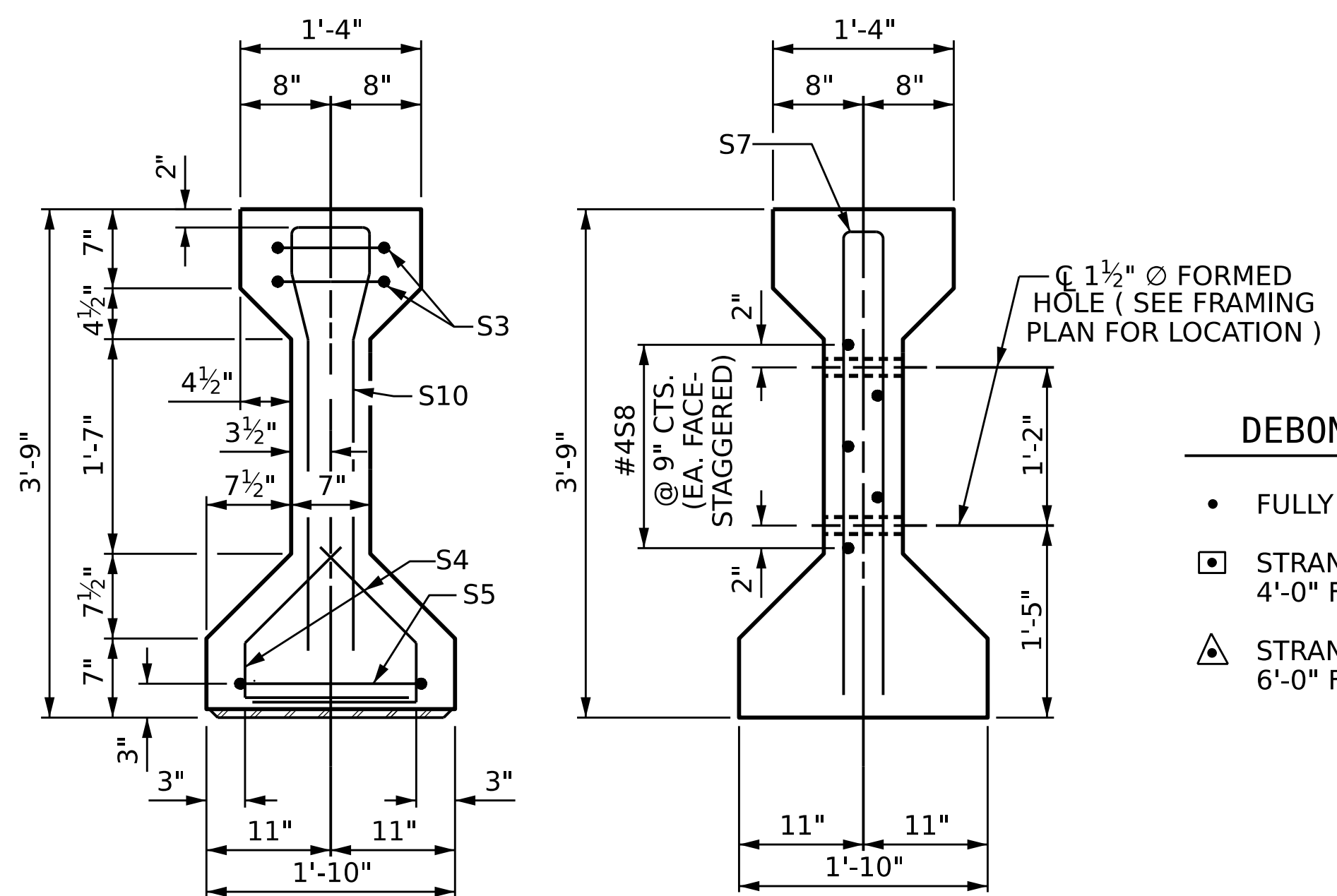
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER NOS. A1 THRU A4 & C1 THRU C4

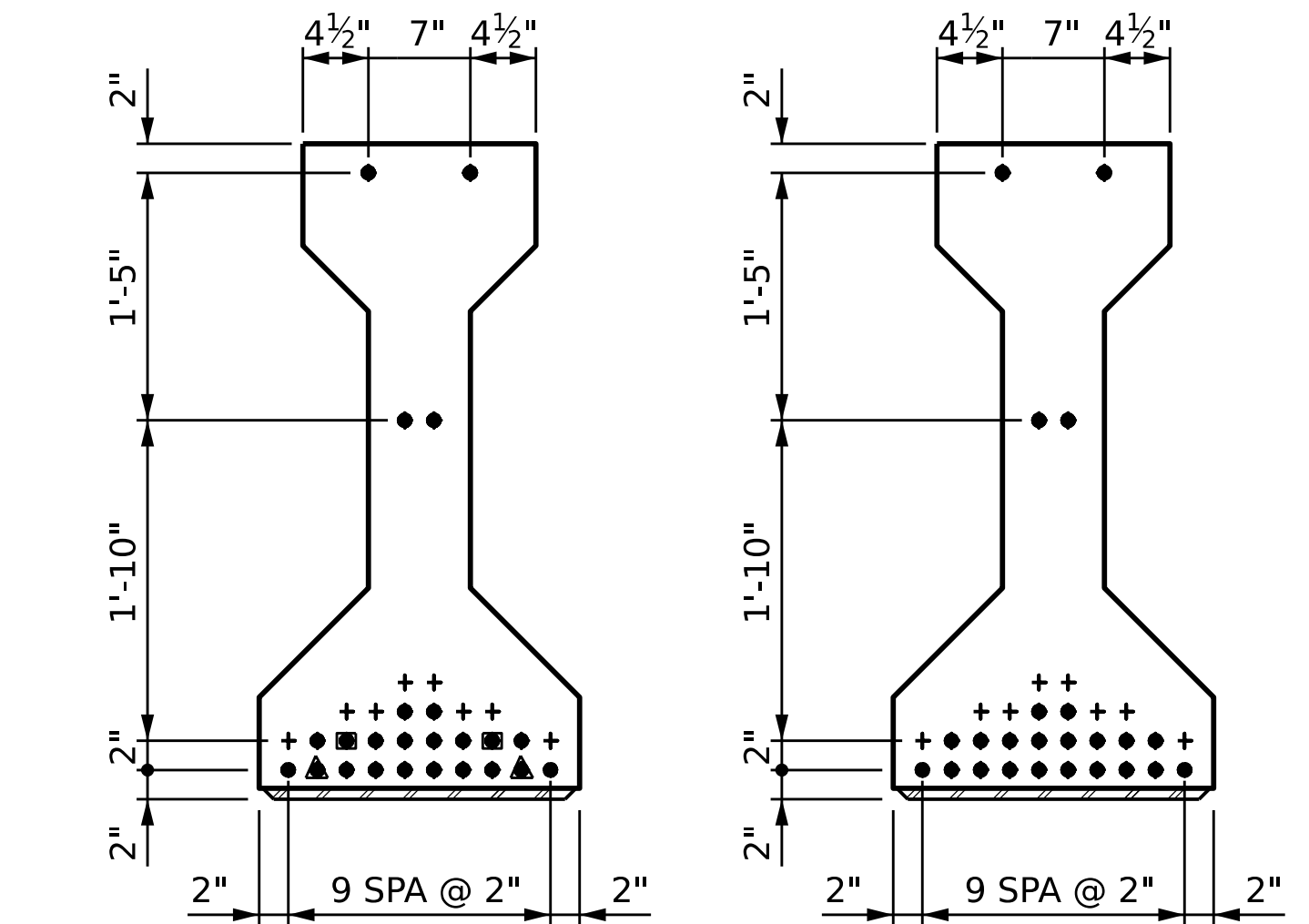
wsp
 WSP USA Inc.
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 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	BNB	09/21
CHECKED BY :	AAI	09/21
DESIGNED BY :	J. WHEATLEY	DATE : MAY 2024
DRAWN BY :	M. HOBBS	DATE : MAY 2024
CHECKED BY :	E. LAWES	DATE : MAY 2024
DESIGN ENGINEER OF RECORD :	E. LAWES	DATE : MAY 2024



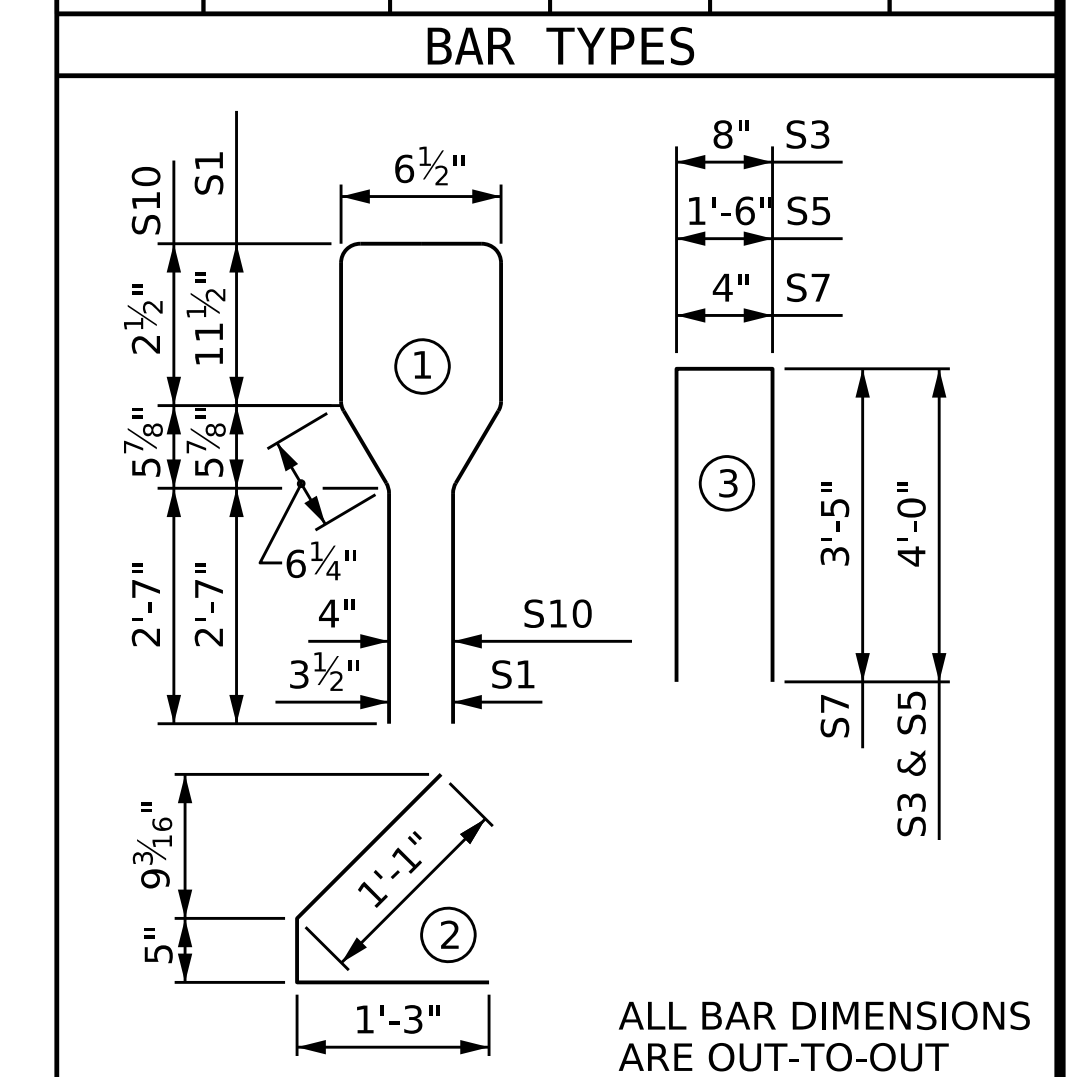
- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER



0.6" Ø LOW RELAXATION STRAND LAYOUT

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

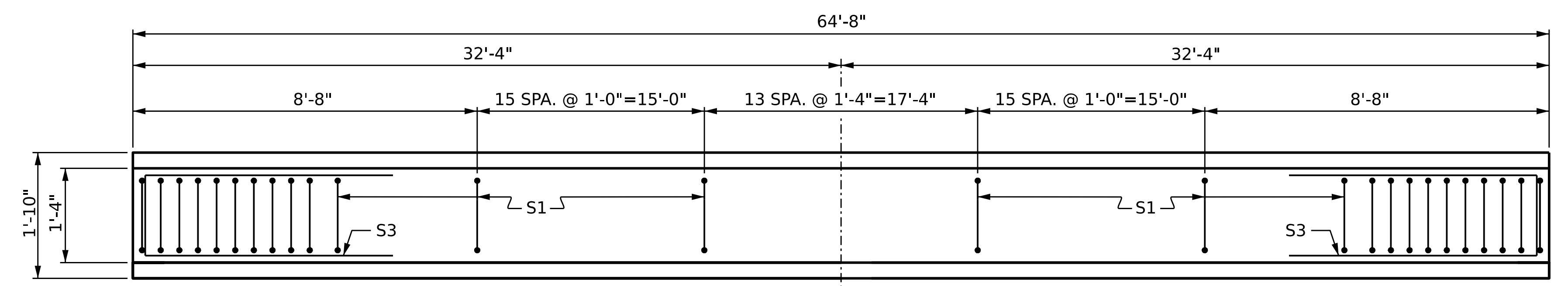
REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	64	#4	1	8'-8"	371
S3	4	#4	3	8'-8"	23
S4	168	#4	2	2'-9"	309
S5	2	#4	3	9'-6"	13
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S10	20	#6	1	7'-2"	215



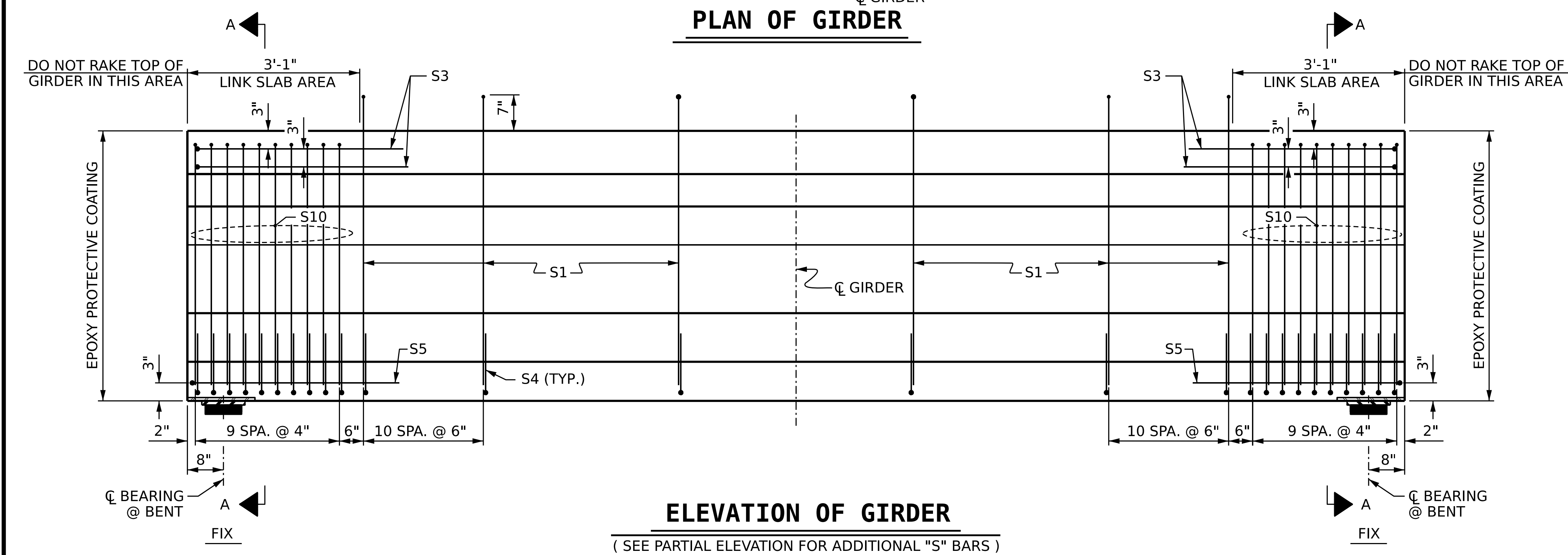
QUANTITIES FOR ONE GIRDER

SPAN B	REINFORCING STEEL	7,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER QTY.	969	9.3	24

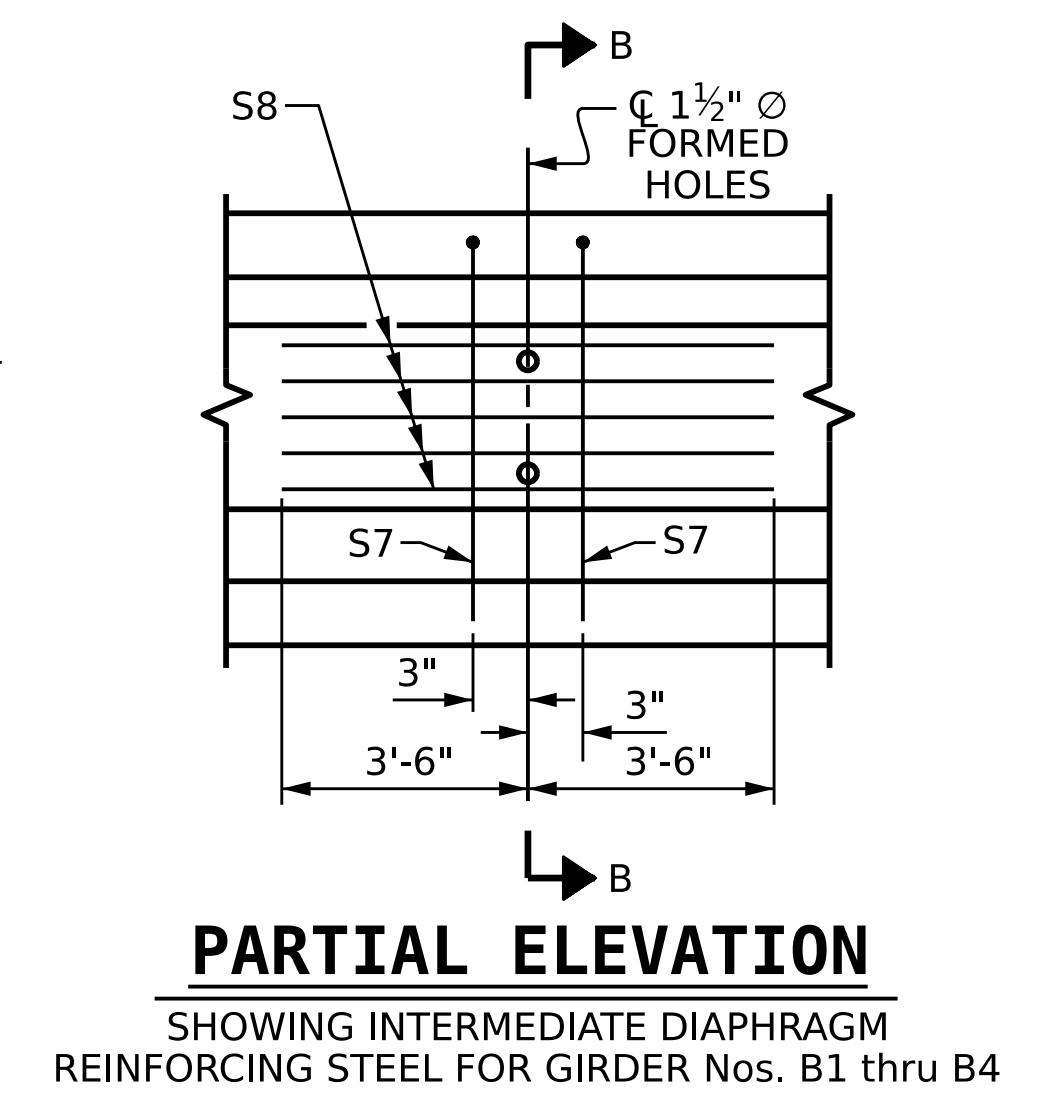
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	64.67	258.67



PLAN OF GIRDER



ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B1 thru B4

DRAWN BY :	BNB	09/21
CHECKED BY :	AAI	09/21
DESIGNED BY :	J. WHEATLEY	DATE : MAY 2024
DRAWN BY :	M. HOBBS	DATE : MAY 2024
CHECKED BY :	E. LAWES	DATE : MAY 2024
DESIGN ENGINEER OF RECORD :	E. LAWES	DATE : MAY 2024

wsp
WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
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LICENSE NO. F-0165

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Elizabeth F. Lawes
53560422/2024/12/18/2024

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
STATION: **18+28.00 -L-**
SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH			
STANDARD			
AASHTO TYPE III PRESTRESSED CONCRETE GIRDER - LINK SLAB SPAN B			
REVISIONS			SHEET NO.
NO.	BY:	DATE:	NO.
1			3
2			4
			S-14
			TOTAL SHEETS 30

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
SPANS A & C																						
GIRDERS 1 & 4	TWENTIETH POINTS	CL BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	CL BRG.
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.010	0.019	0.028	0.036	0.043	0.049	0.054	0.058	0.060	0.061	0.060	0.058	0.054	0.049	0.043	0.036	0.028	0.019	0.010	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.003	0.006	0.009	0.012	0.014	0.017	0.018	0.020	0.020	0.021	0.020	0.020	0.018	0.017	0.014	0.012	0.009	0.006	0.003	0.000
	FINAL CAMBER	0"	1/16"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/16"	0"
GIRDERS 2 & 3	TWENTIETH POINTS	CL BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	CL BRG.
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.010	0.019	0.028	0.036	0.043	0.049	0.054	0.058	0.060	0.061	0.060	0.058	0.054	0.049	0.043	0.036	0.028	0.019	0.010	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.003	0.007	0.011	0.014	0.017	0.020	0.022	0.023	0.024	0.025	0.024	0.023	0.022	0.020	0.017	0.014	0.011	0.007	0.003	0.000
	FINAL CAMBER	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
SPAN B																						
GIRDERS 1 & 4	TWENTIETH POINTS	CL BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	CL BRG.
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.019	0.039	0.056	0.072	0.087	0.100	0.110	0.117	0.121	0.123	0.121	0.117	0.110	0.100	0.087	0.073	0.056	0.039	0.019	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.010	0.021	0.032	0.042	0.051	0.059	0.065	0.069	0.072	0.073	0.072	0.069	0.065	0.059	0.051	0.042	0.032	0.021	0.010	0.000
	FINAL CAMBER	0"	1/8"	3/16"	5/16"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	3/16"	1/8"	0"
GIRDERS 2 & 3	TWENTIETH POINTS	CL BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	CL BRG.
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.019	0.039	0.056	0.072	0.087	0.100	0.110	0.117	0.121	0.123	0.121	0.117	0.110	0.100	0.087	0.073	0.056	0.039	0.019	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.012	0.025	0.038	0.050	0.061	0.071	0.078	0.083	0.086	0.087	0.086	0.083	0.078	0.071	0.061	0.050	0.038	0.025	0.012	0.000
	FINAL CAMBER	0"	1/16"	3/16"	3/16"	1/4"	5/16"	3/8"	3/8"	3/8"	7/16"	7/16"	7/16"	3/8"	3/8"	3/8"	5/16"	1/4"	3/16"	3/16"	1/16"	0"

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

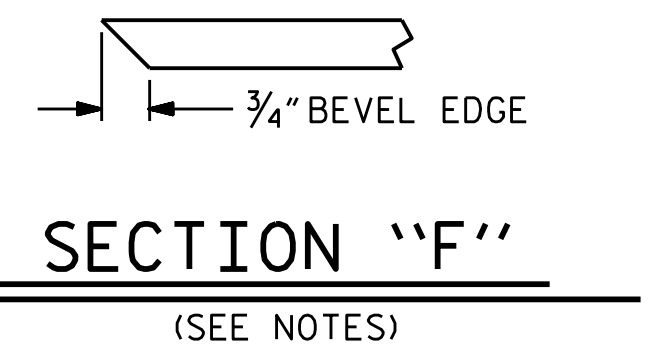
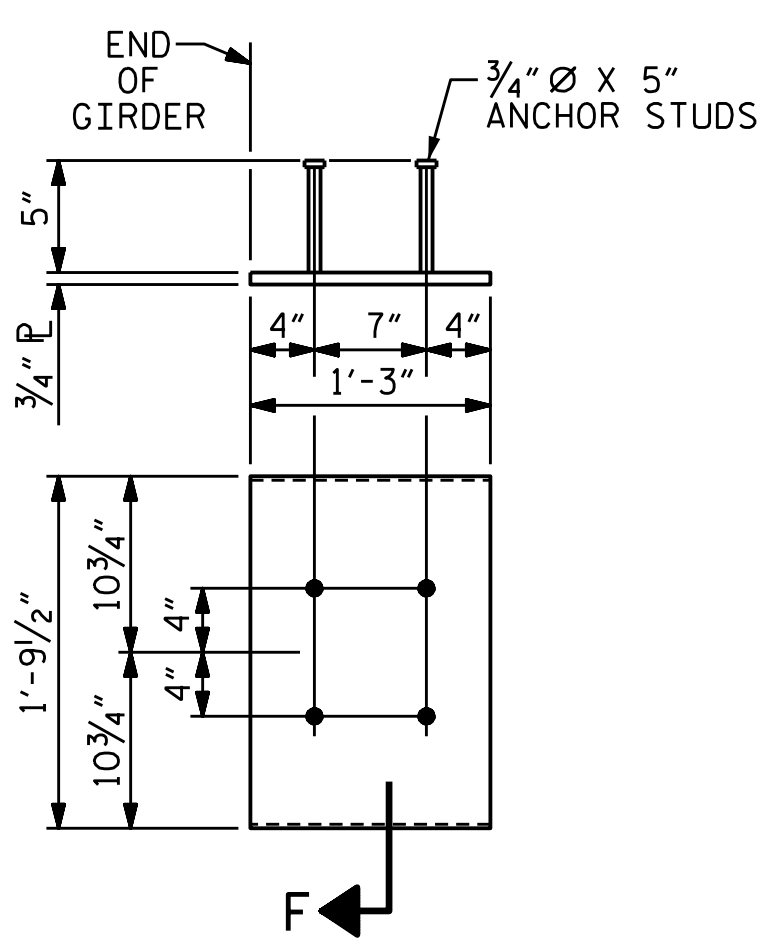
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI FOR SPANS A & C AND 6,000 PSI FOR SPAN B.

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

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

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

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



EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE III GIRDER
(2 REQ'D PER GIRDER)

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
PRESTRESSED CONCRETE GIRDER FOR LINK SLAB DETAILS

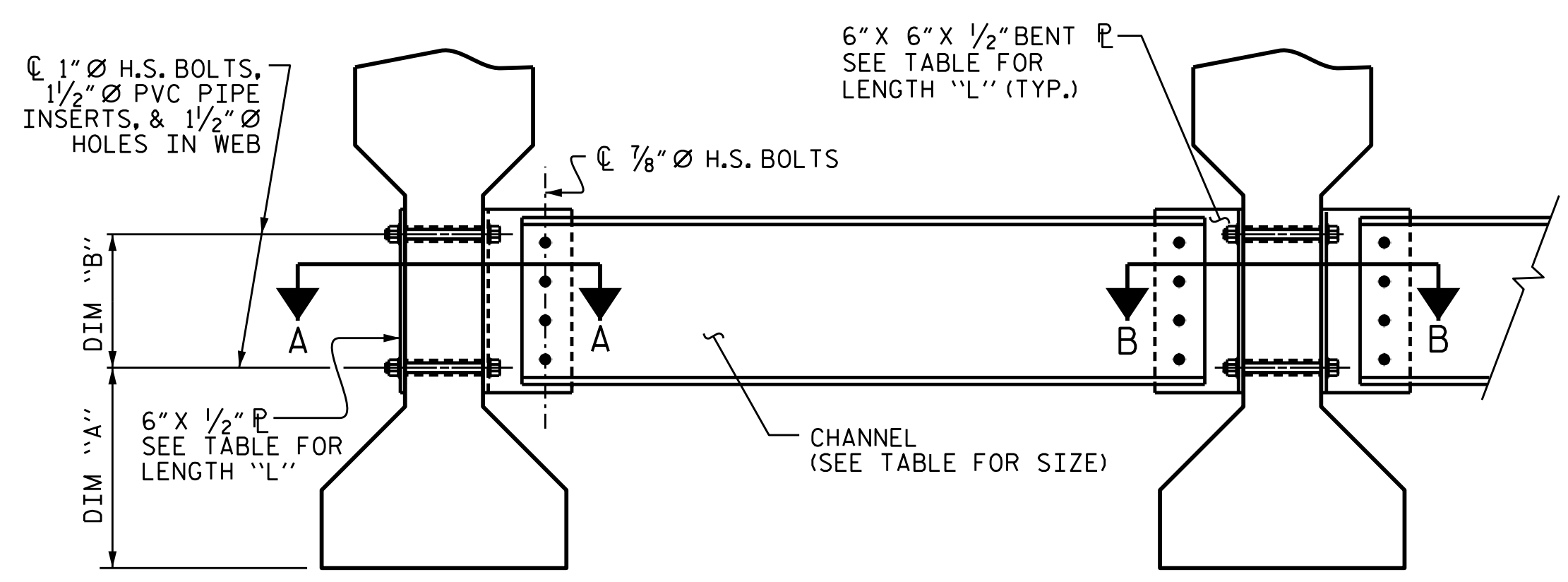
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
 Elizabeth J. Lawes
 5/23/2024 12:18

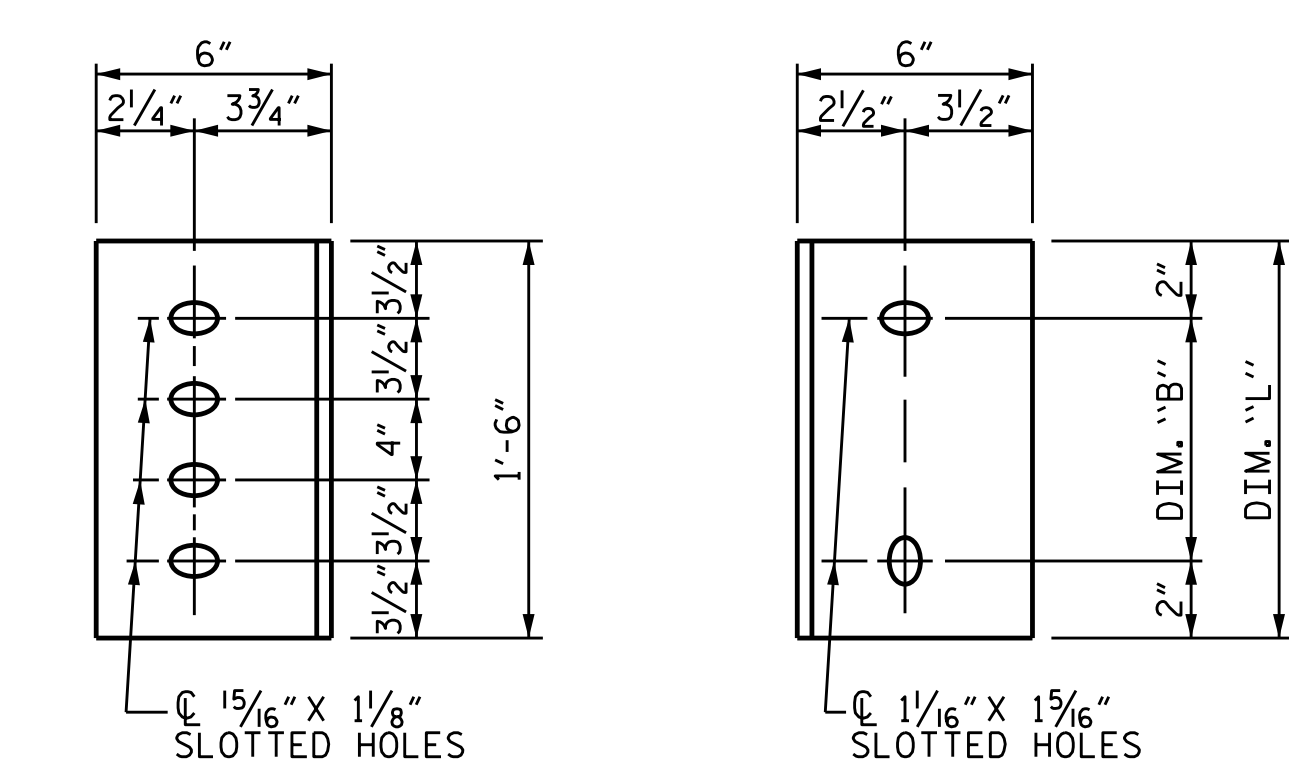
WSP USA Inc.
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-15
2			4			30

DESIGNED BY:	J. WHEATLEY	DATE :	MAY 2024
DRAWN BY:	M. HOBBS	DATE :	MAY 2024
CHECKED BY:	E. LAWES	DATE :	MAY 2024
DESIGN ENGINEER OF RECORD:	E. LAWES	DATE :	MAY 2024



EXTERIOR GIRDER **INTERIOR GIRDER**
PART SECTION AT INTERMEDIATE DIAPHRAGM
 (TYPE III GIRDER SHOWN)



DIAPHRAGM FACE
 (TYPE III GDR.) **WEB FACE**
CONNECTOR PLATE DETAILS

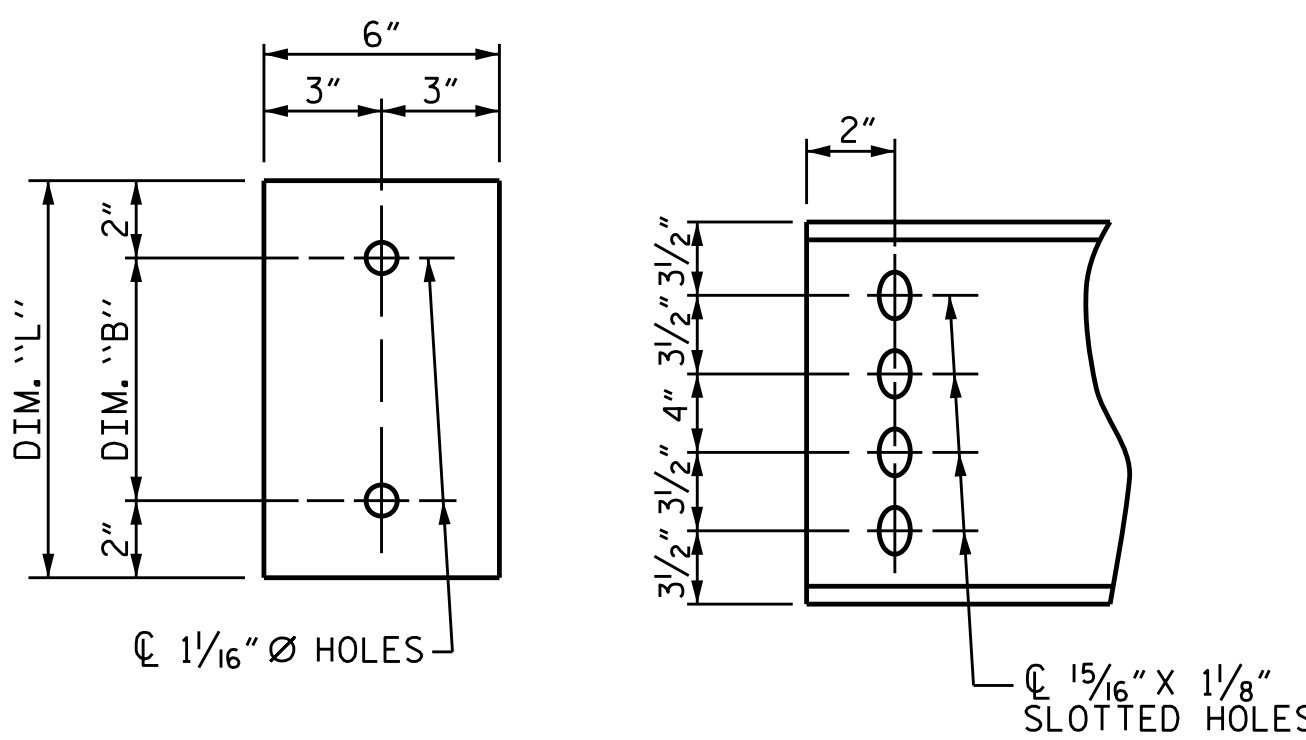
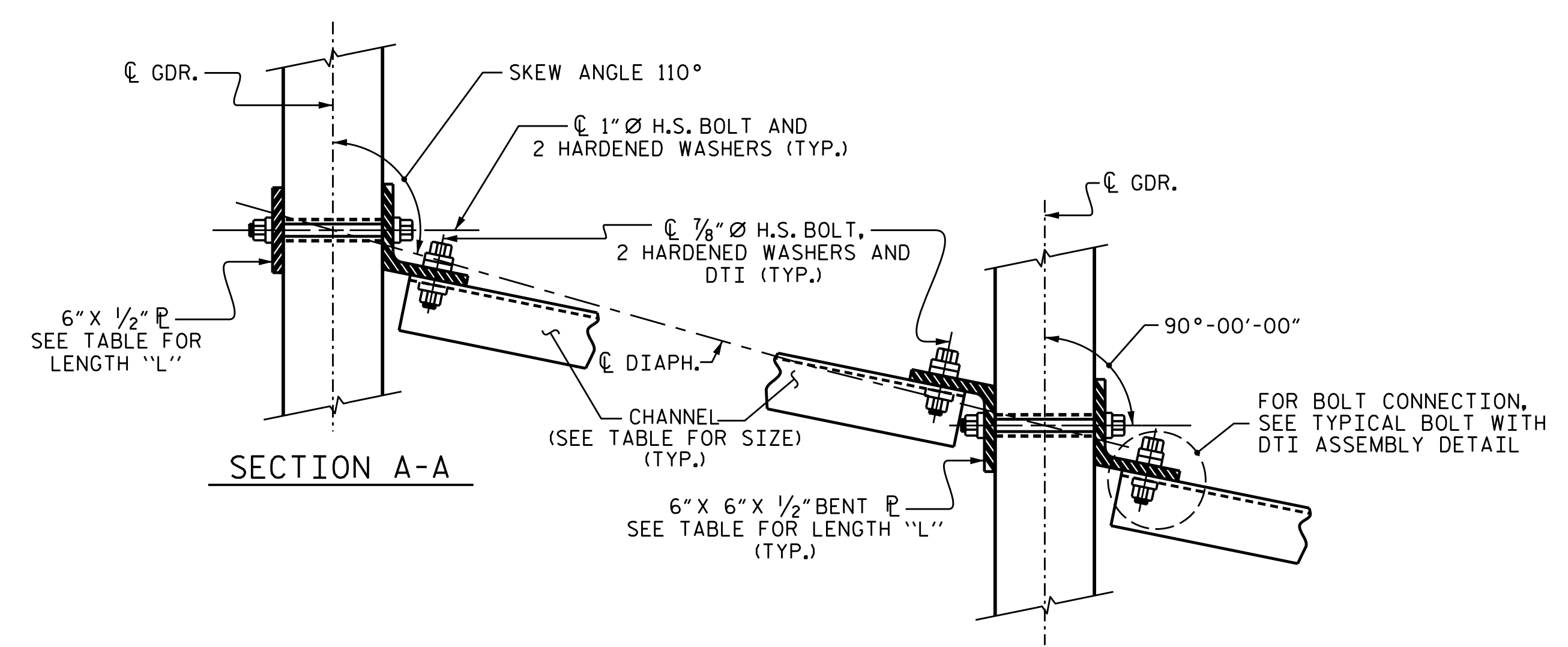
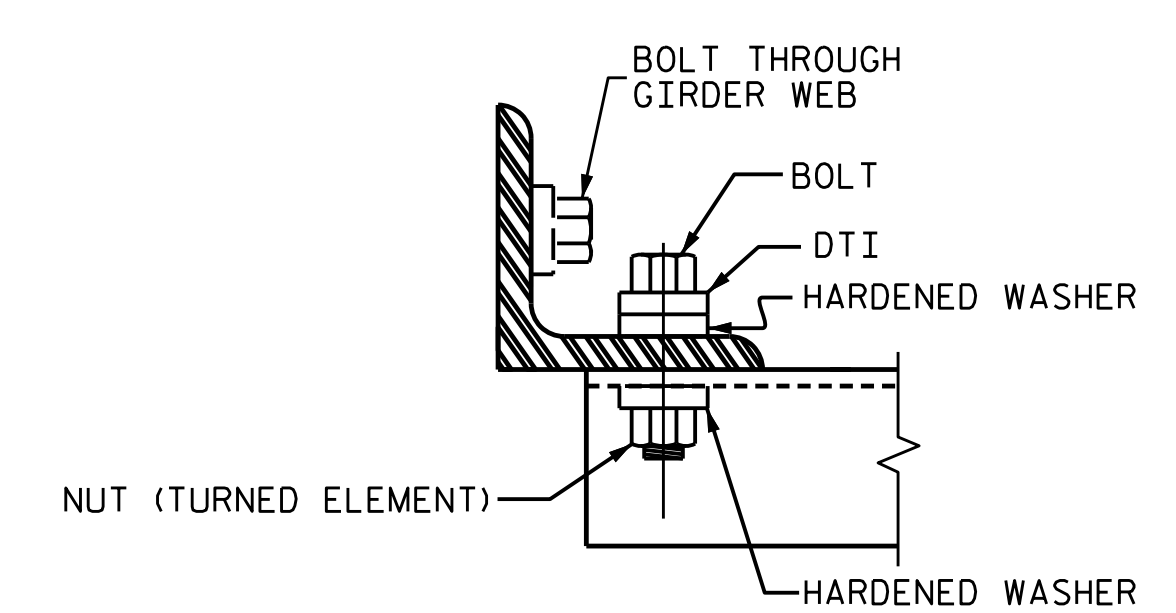


PLATE DETAILS **CHANNEL END**
 (TYPE III GDR.)



SECTION A-A **SECTION B-B**
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

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

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

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

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
III	MC 18 x 42.7	1'-5"	1'-2"	1'-6"

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

DRAWN BY: TLA	6/05	REV. 5/1/06RRR	KMM/GM
CHECKED BY: VC	6/05	REV. 10/1/11	MAA/GM
		REV. 12/17	MAA/THC
DESIGNED BY: J. WHEATLEY	DATE: MAY 2024		
DRAWN BY: M. HOBBS	DATE: MAY 2024		
CHECKED BY: E. LAWES	DATE: MAY 2024		
DESIGN ENGINEER OF RECORD: E. LAWES	DATE: MAY 2024		

wsp
 WSP USA Inc.
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL 044167
 ELIZABETH F. LAWES
 ENGINEER
 03/26/2023 18/2024

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**INTERMEDIATE
 STEEL DIAPHRAGMS FOR
 TYPE III PRESTRESSED
 CONCRETE GIRDERS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-16
2			4			30

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.

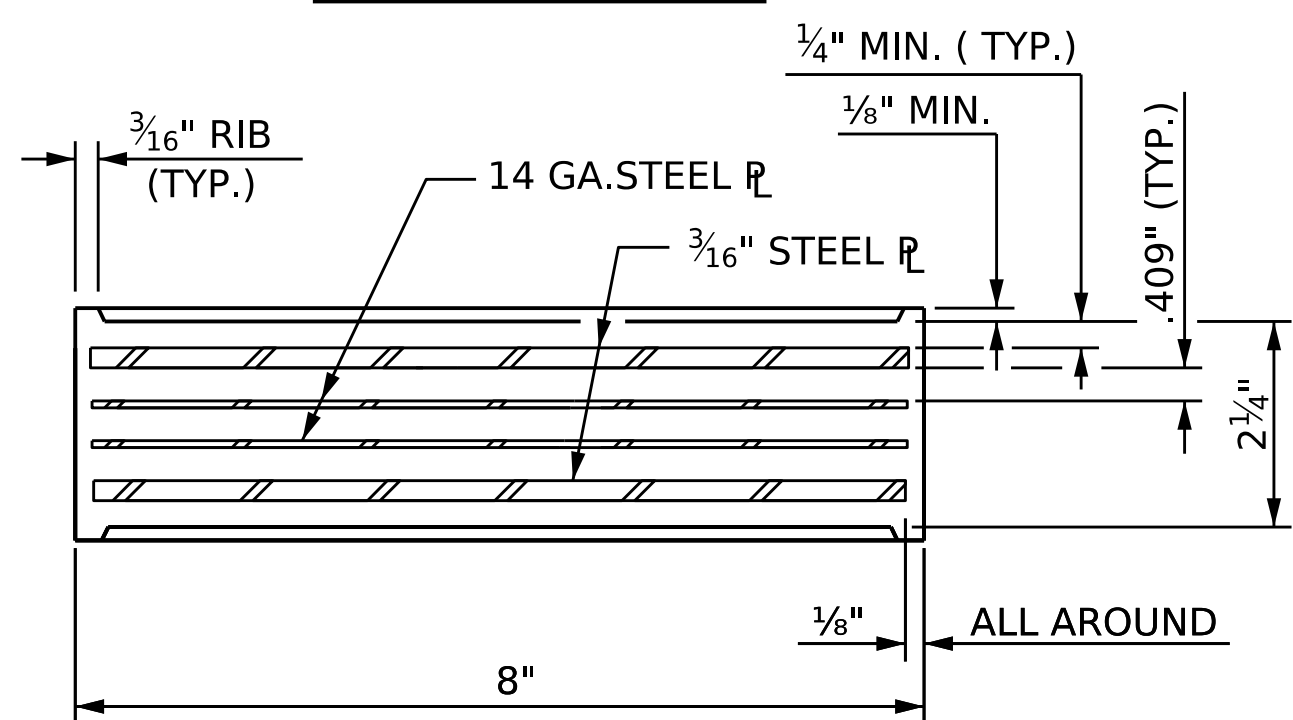
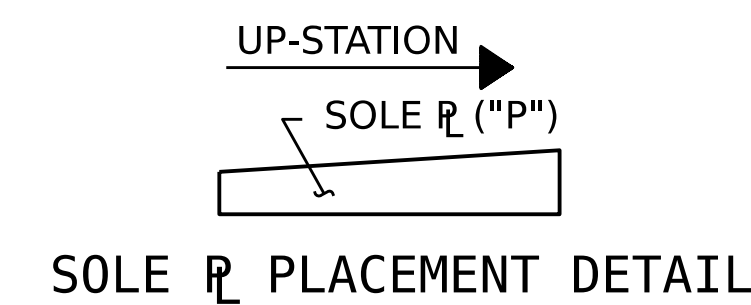
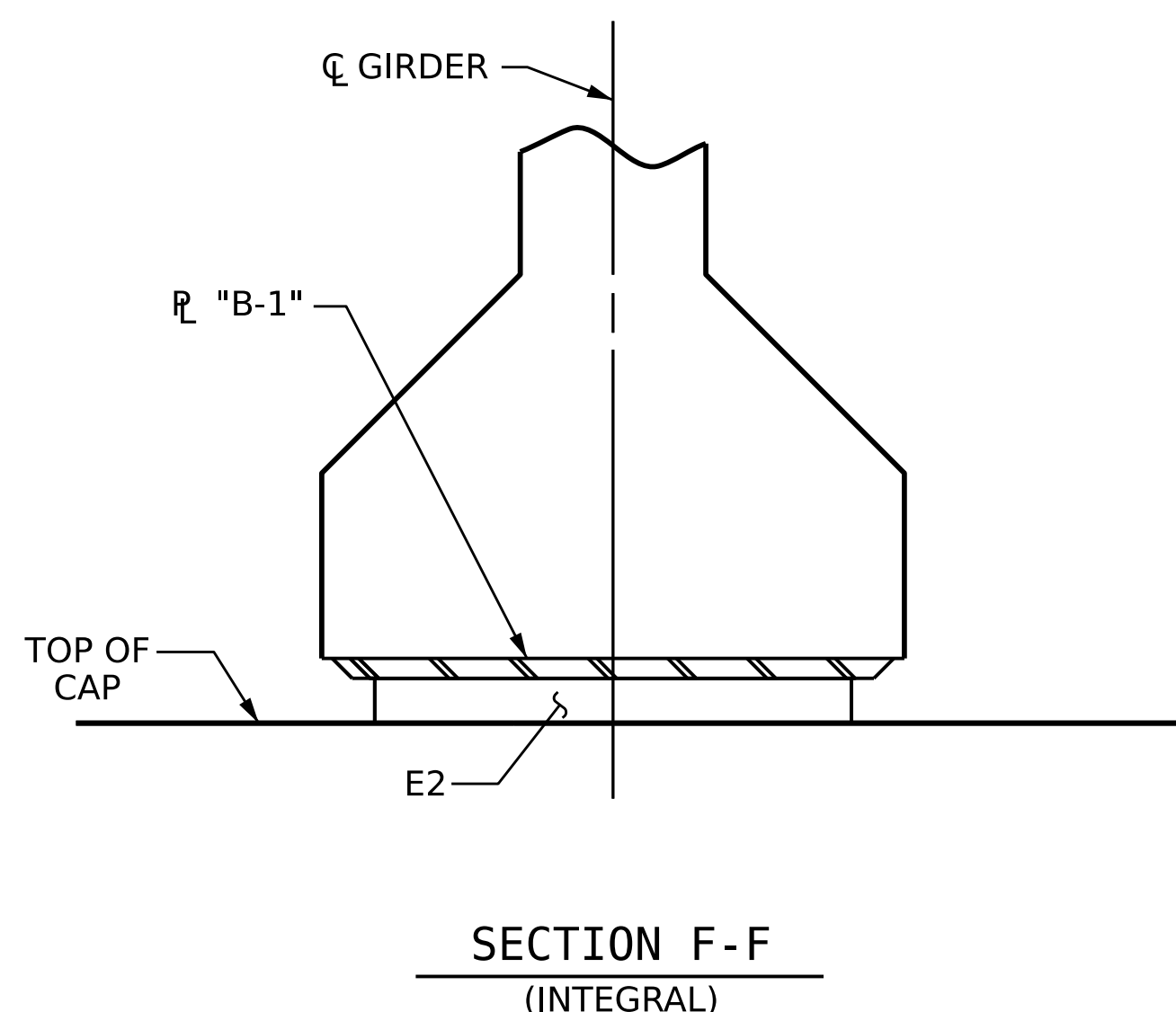
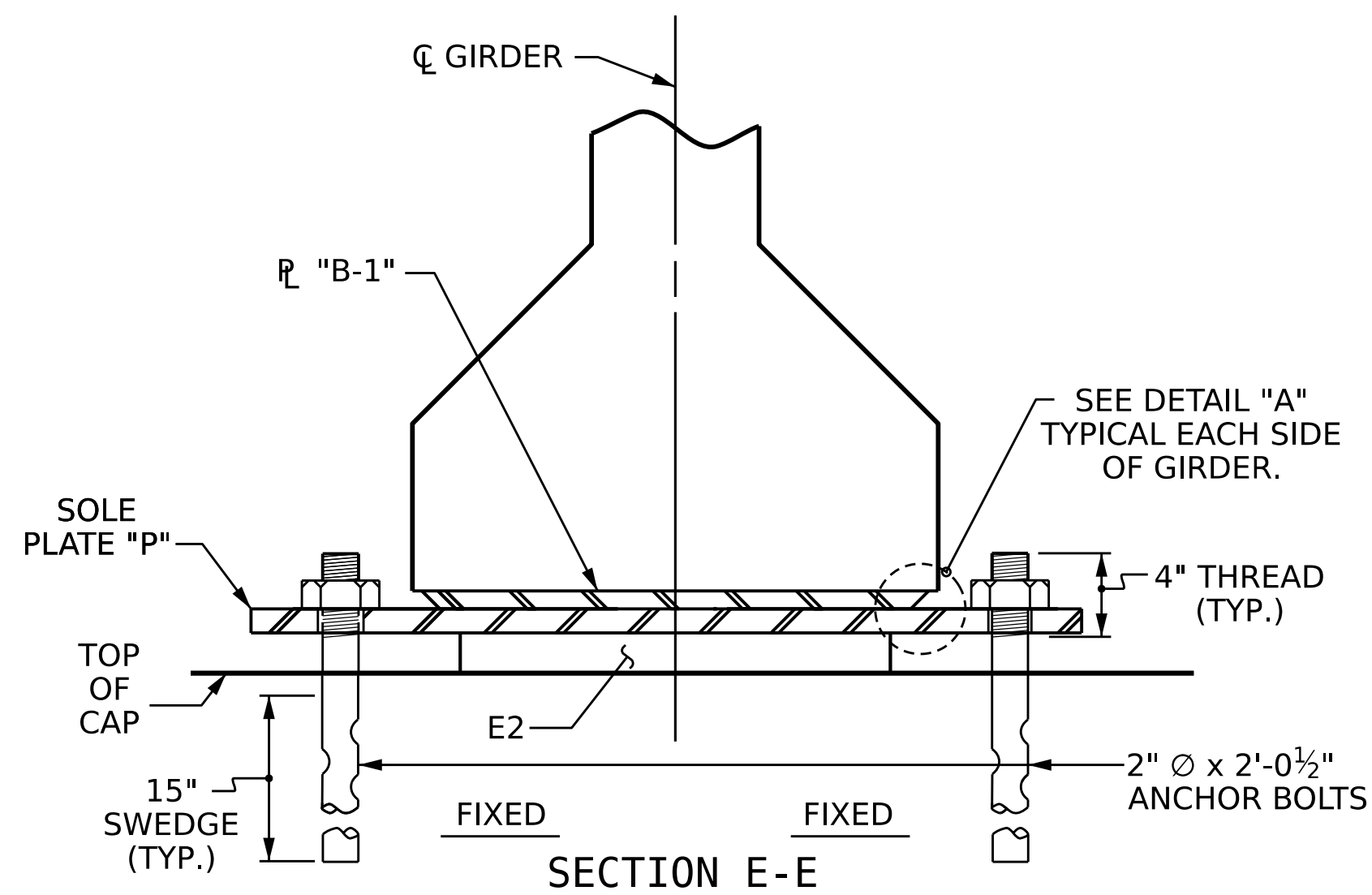
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

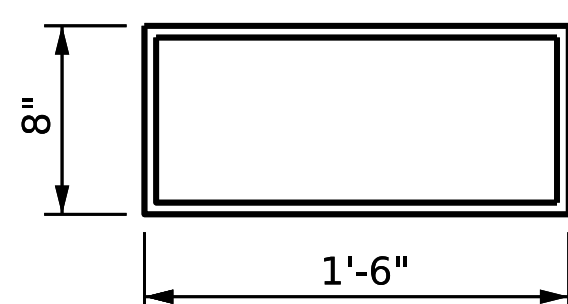
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

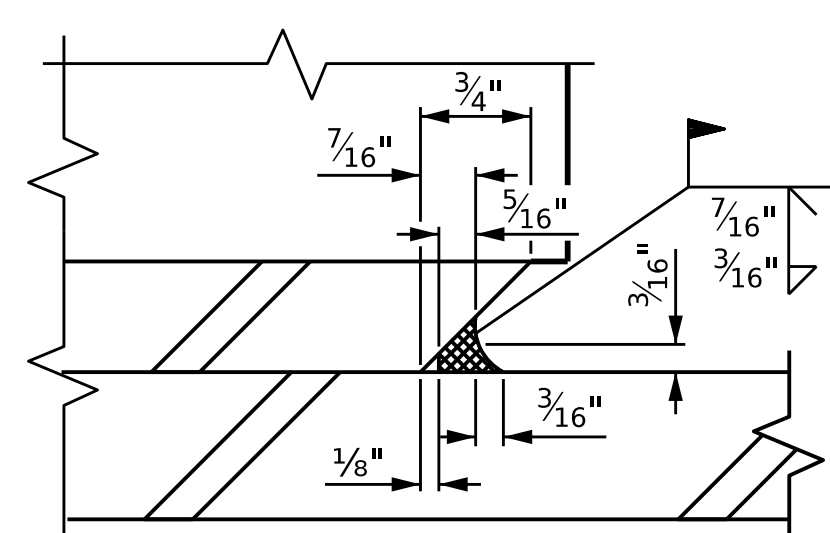


TYPICAL SECTION OF ELASTOMERIC BEARINGS

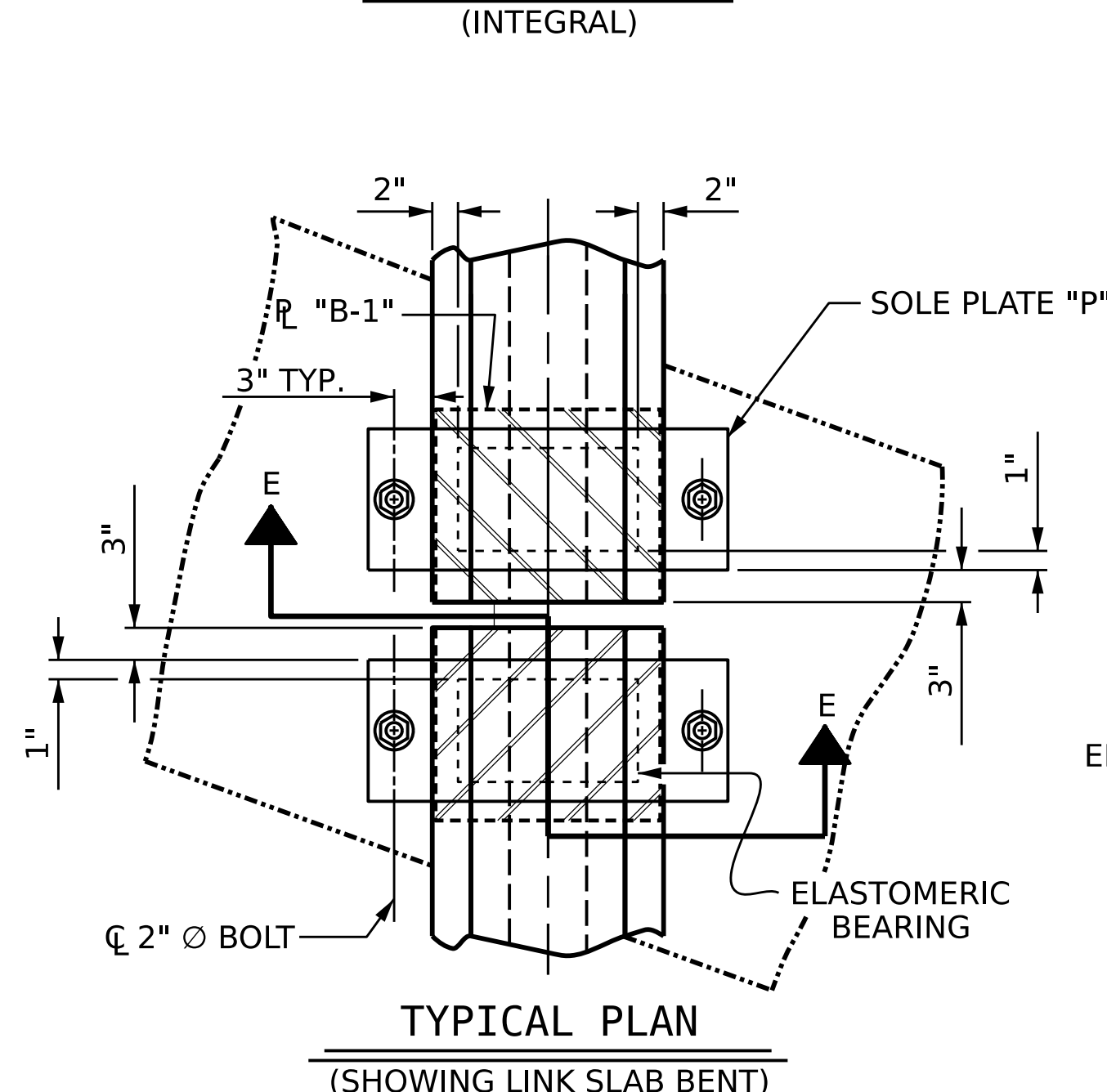


PLAN VIEW OF ELASTOMERIC BEARING

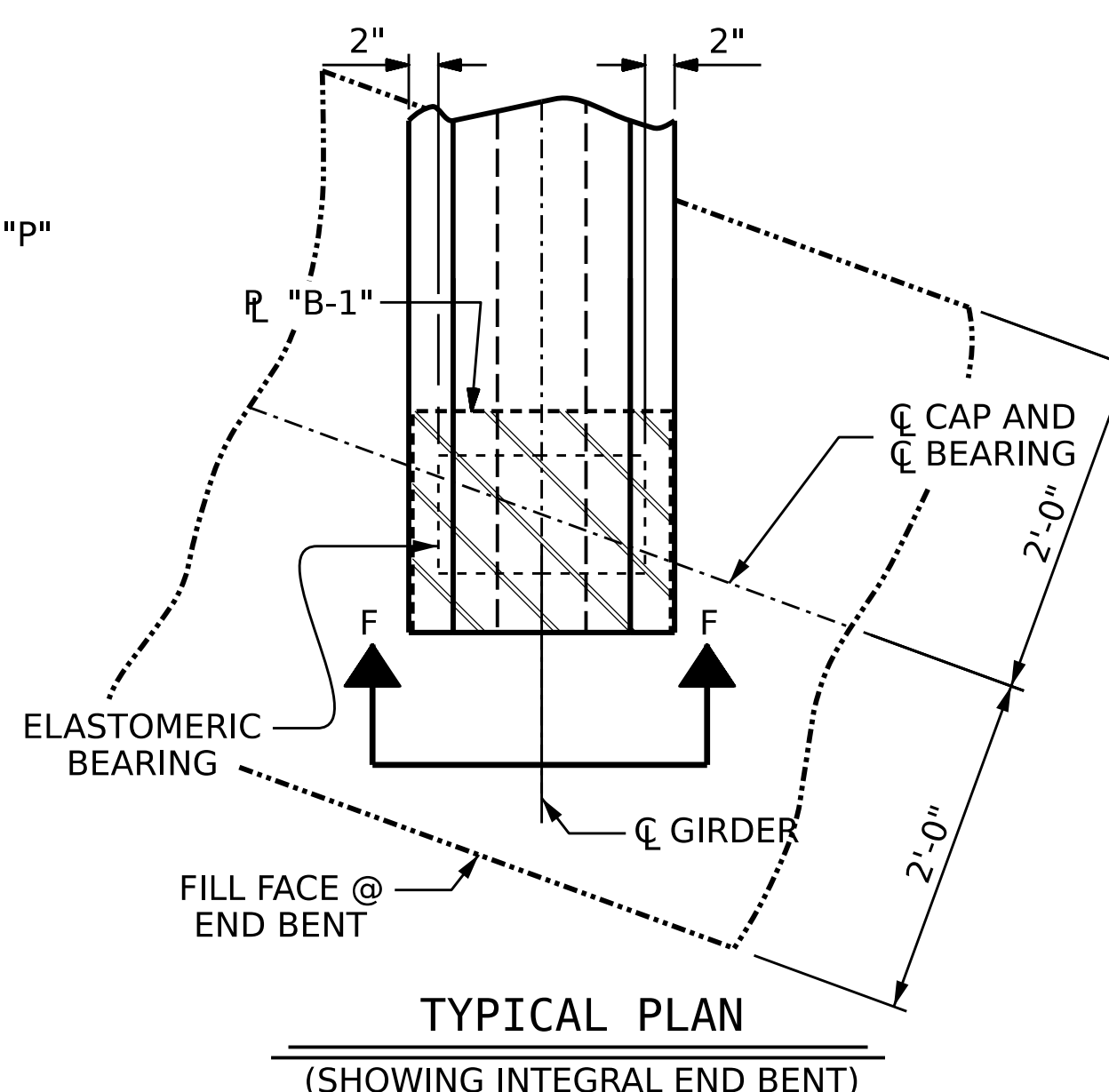
TYPE III MOD
(MODIFIED FOR 2 3/4" THICK PAD)



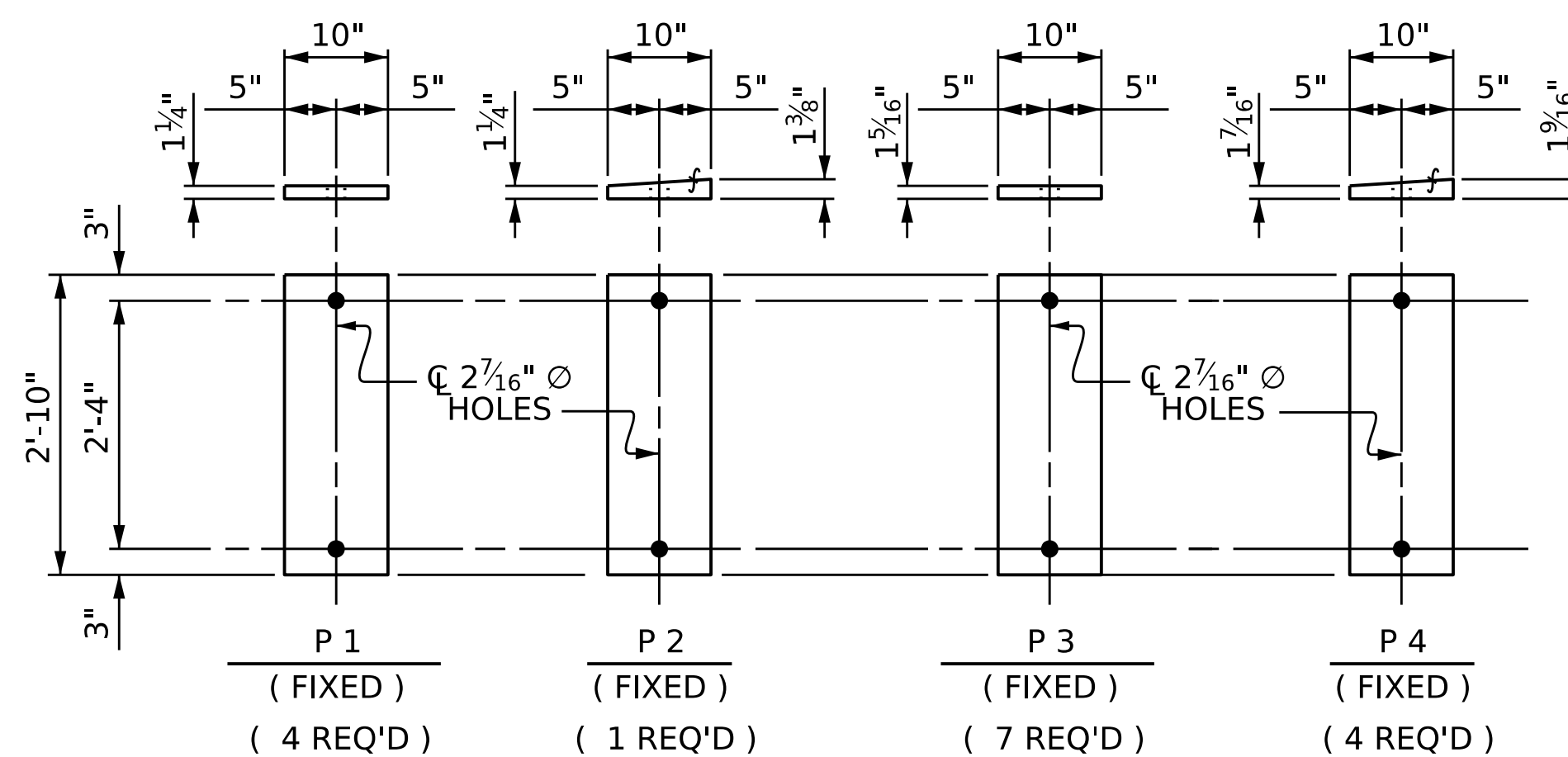
DETAIL "A"



TYPICAL PLAN (SHOWING LINK SLAB BENT)



TYPICAL PLAN (SHOWING INTEGRAL END BENT)



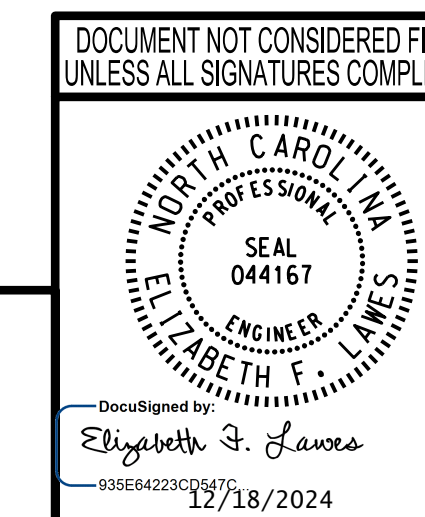
SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS
D.L.+L.L. (NO IMPACT)
TYPE III (MOD) 215 K

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

ELASTOMERIC BEARING DETAILS
 PRESTRESSED CONCRETE GIRDERS
 SUPERSTRUCTURE



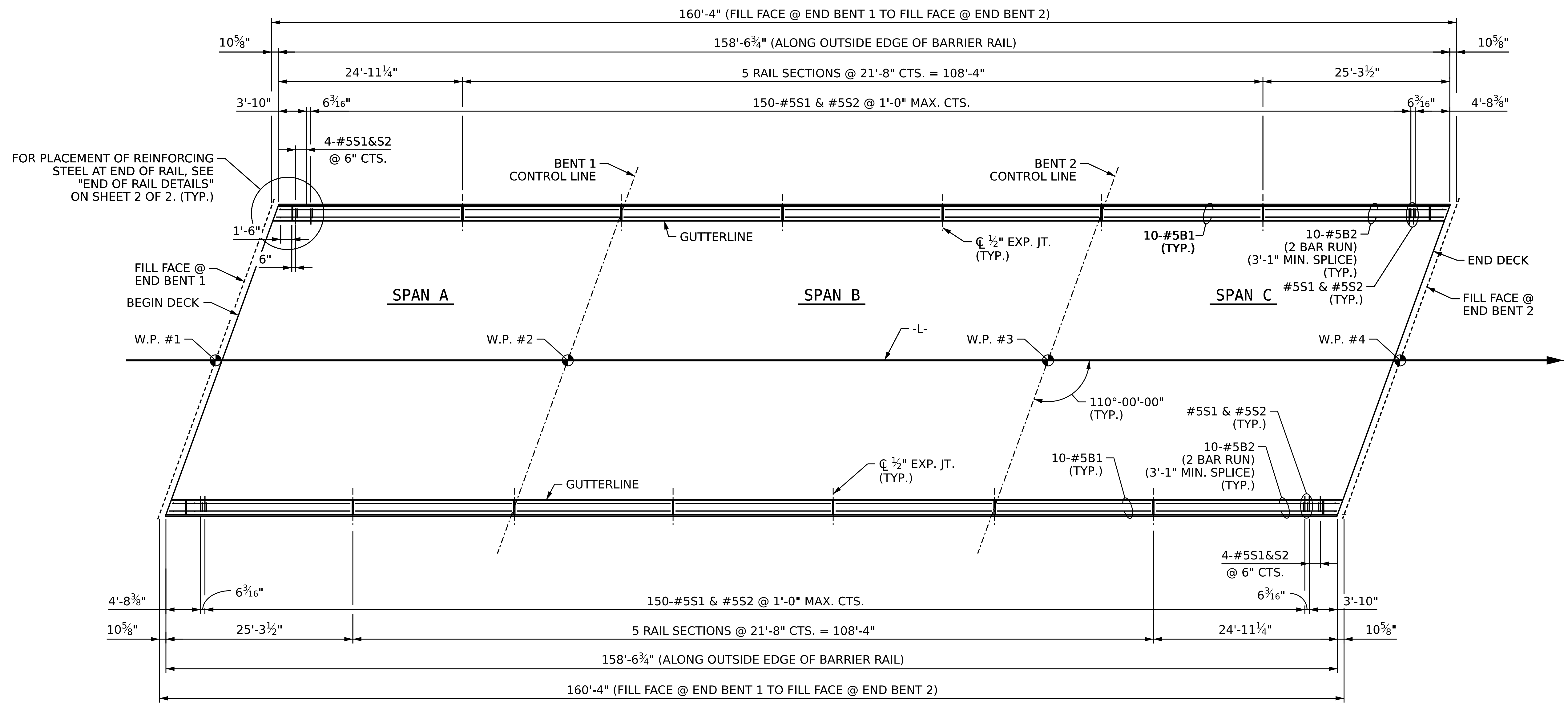
REVISIONS			SHEET NO.
NO.	BY:	DATE:	NO.
1			3
2			4

S-17
 TOTAL SHEETS
 30

DESIGNED BY: J. WHEATLEY DATE: MAY 2024
 DRAWN BY: M. HOBBS DATE: MAY 2024
 CHECKED BY: E. LAWES DATE: MAY 2024
 DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024

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 RALEIGH, NC 27601
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NOTES:
 #5 S1 AND S2 BARS MAY BE SHIFTED SLIGHTLY TO MAINTAIN 2" CLEAR TO EXPANSION JOINT IN RAIL.
 DIMENSIONS ARE MEASURED ALONG OUTSIDE EDGE OF DECK SLAB.



PLAN OF VERTICAL CONCRETE BARRIER RAIL

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
VERTICAL CONCRETE BARRIER RAIL

DESIGNED BY: J. WHEATLEY DATE: MAY 2024
 DRAWN BY: M. HOBBS DATE: MAY 2024
 CHECKED BY: E. LAWES DATE: MAY 2024
 DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024

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STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL
 044167
 ELIZABETH F. LAWES
 ENGINEER
 12/18/2024

REVISIONS						SHEET NO. S-18 TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

NOTES

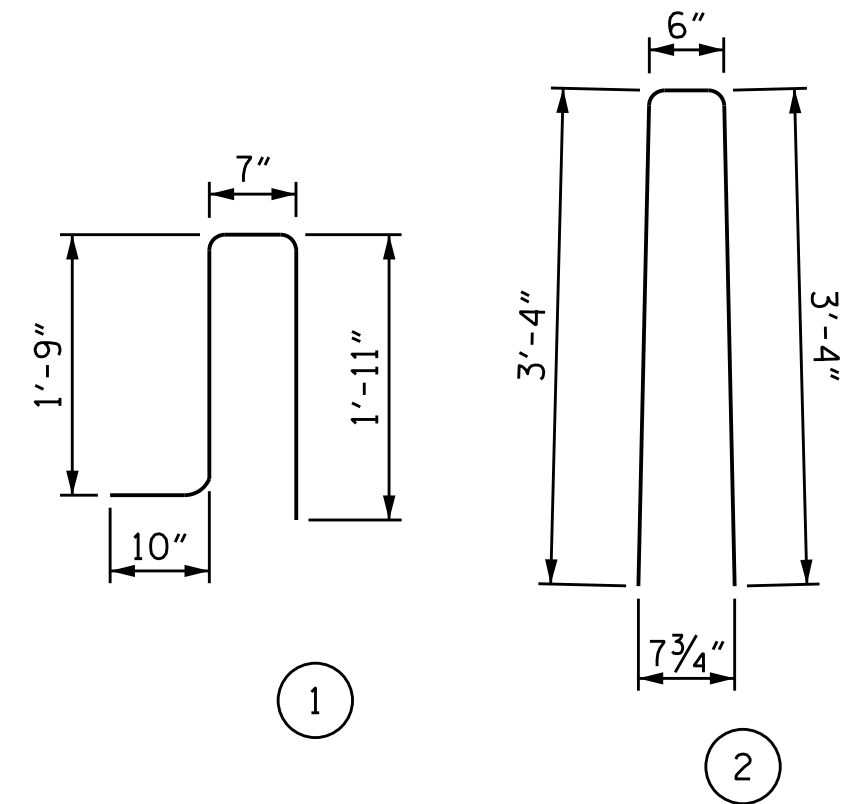
THE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 & S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM. THE YIELD LOAD FOR THE #5 S3 & S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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.

BAR TYPES



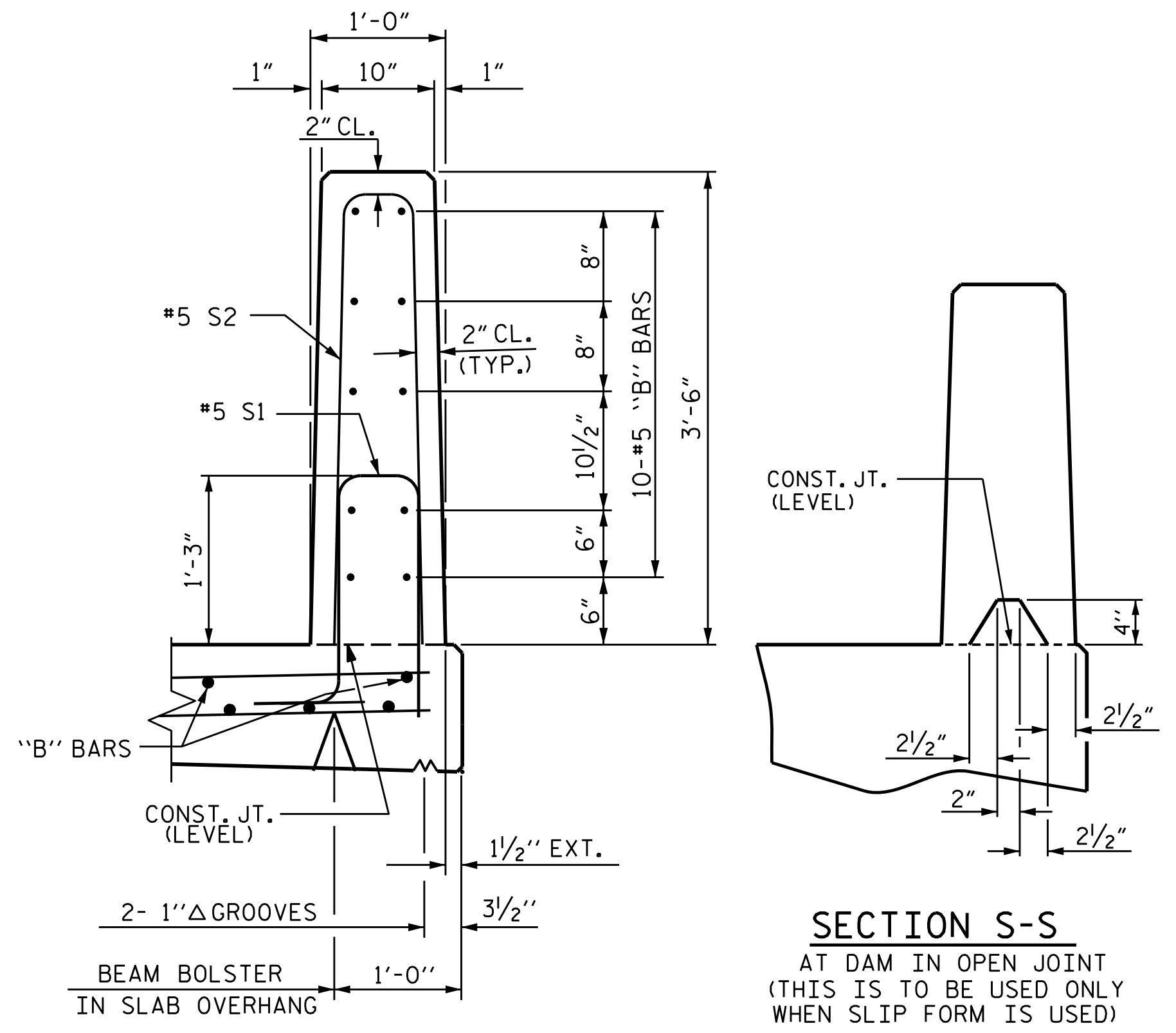
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR VERTICAL CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	100	#5	STR	21'-3"	2,216
* B2	80	#5	STR	13'-8"	1,140
* S1	310	#5	1	5'-1"	1,644
* S2	310	#5	2	7'-2"	2,317
* S3	16	#5	STR	4'-0"	67
* S4	32	#5	STR	3'-6"	117
* EPOXY COATED REINFORCING STEEL					7,501 LBS.
CLASS AA CONCRETE					37.7 CU. YDS.
VERTICAL CONCRETE BARRIER RAIL					317.13 LIN. FT.

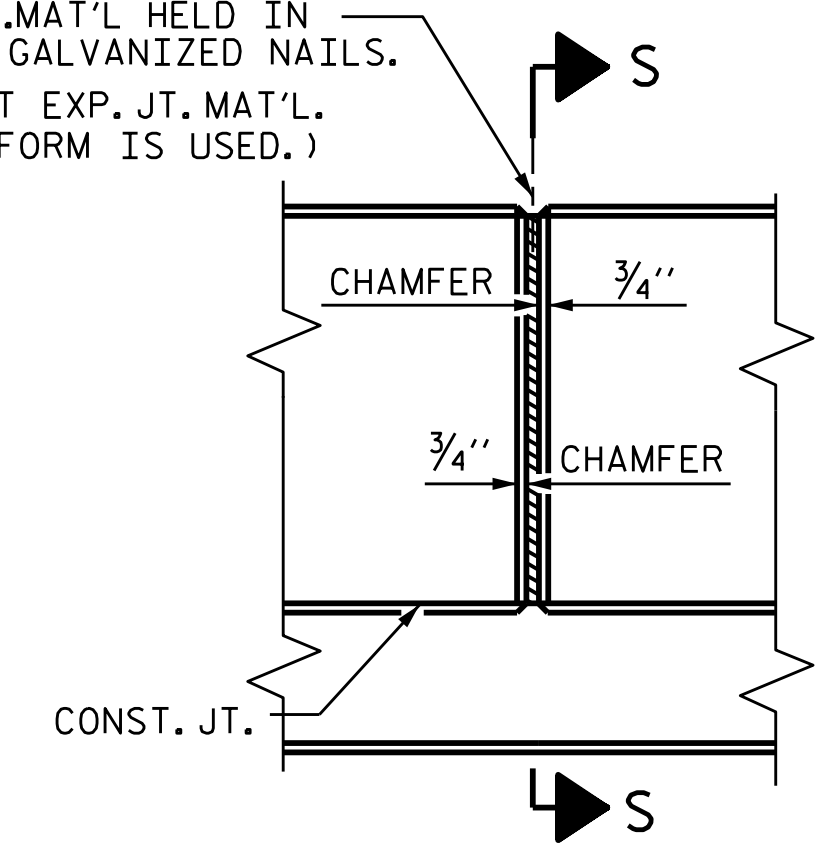
FOR PLAN OF VERTICAL CONCRETE BARRIER RAIL, SEE SHEET 1 OF 2.



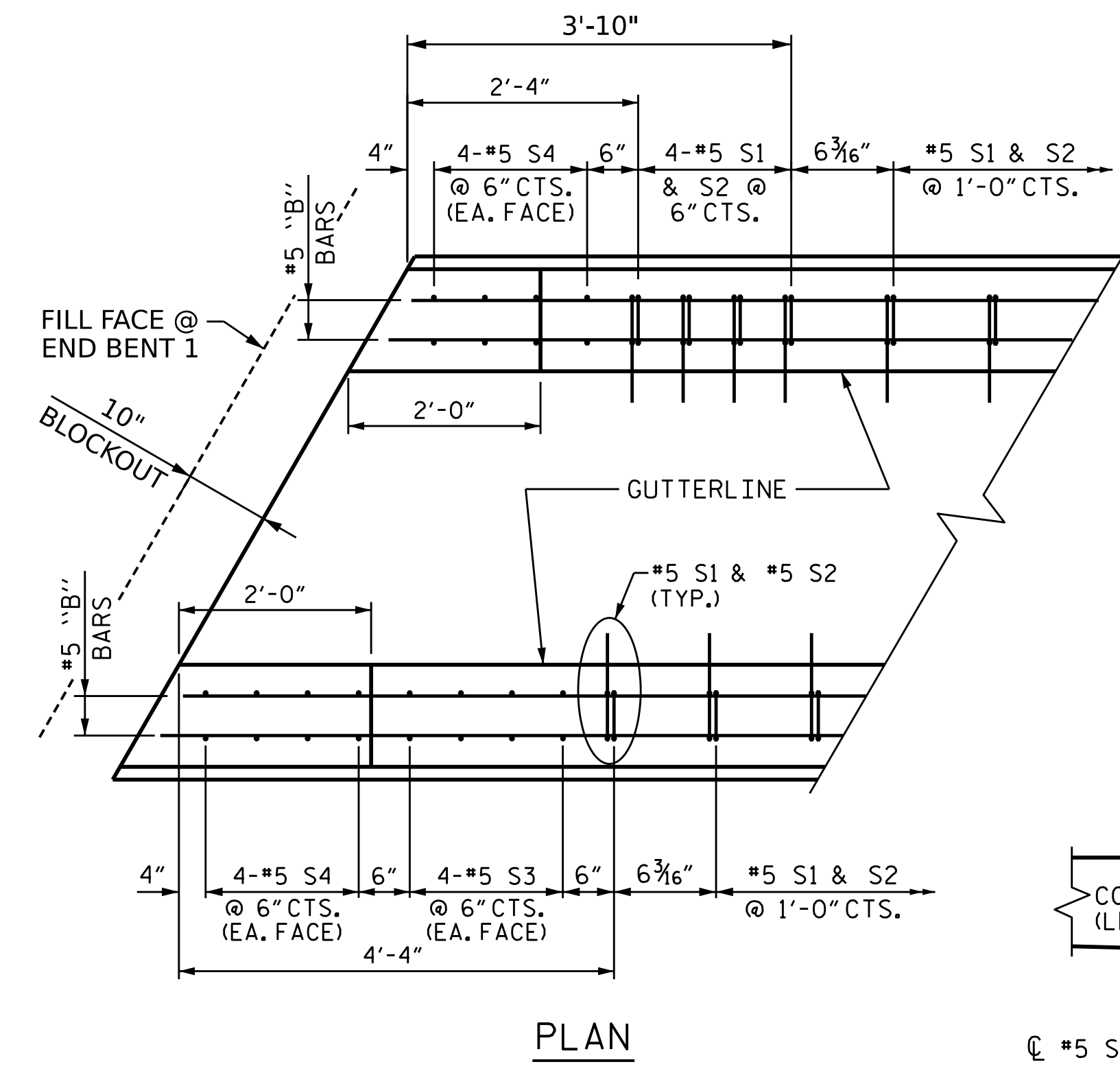
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

SECTION THRU RAIL

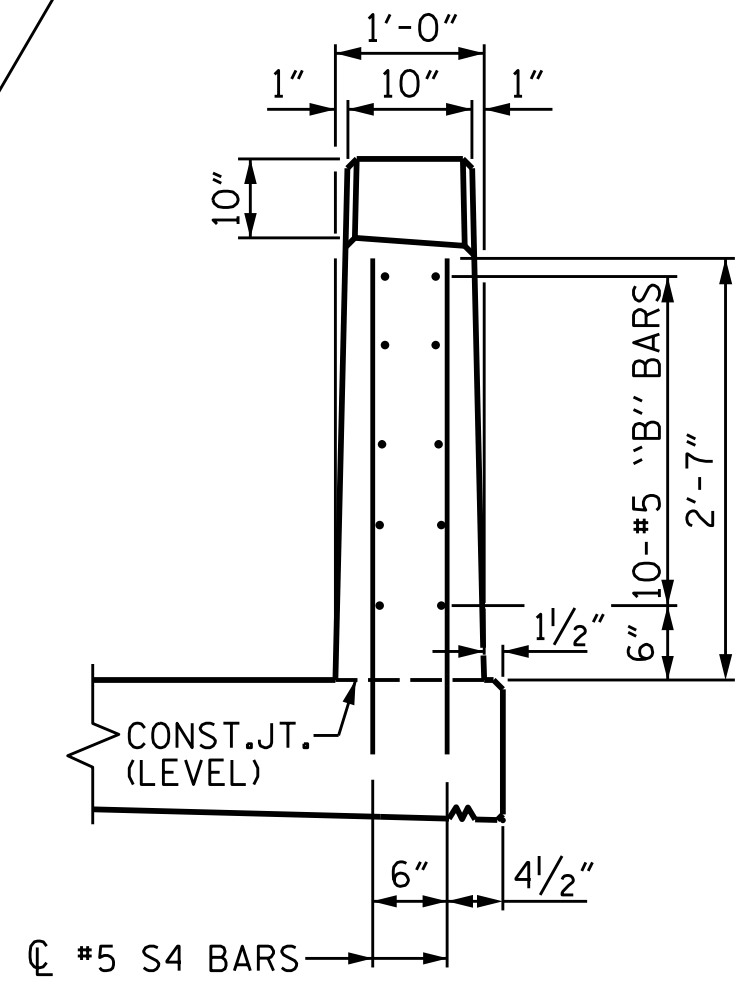
@ 1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS.
(NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)



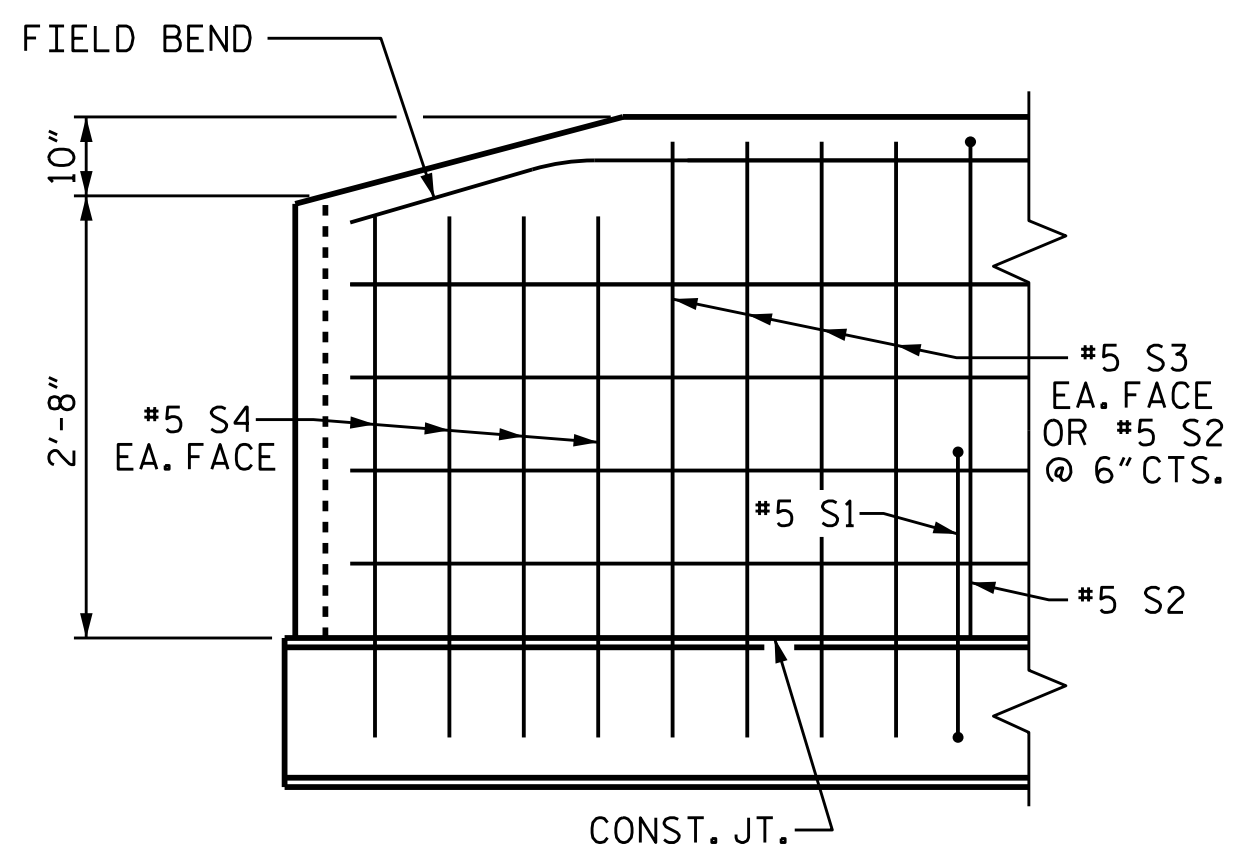
ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS



PLAN



END VIEW



SIDE VIEW

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWS JOINTS

DRAWN BY : MAA	5/10	REV. 6/13	MAA/GM
CHECKED BY : GM	5/10	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC
DESIGNED BY : J. WHEATLEY	DATE : MAY 2024		
DRAWN BY : M. HOBBS	DATE : MAY 2024		
CHECKED BY : E. LAWES	DATE : MAY 2024		
DESIGN ENGINEER OF RECORD : E. LAWES	DATE : MAY 2024		

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RALEIGH, NC 27601
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DocuSigned by:
Elizabeth J. Lawes
5356422322/2024/12/18/2024

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
STATION: **18+28.00 -L-**
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
VERTICAL CONCRETE BARRIER RAIL

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

TOTAL SHEETS: 30

NOTES

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

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

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

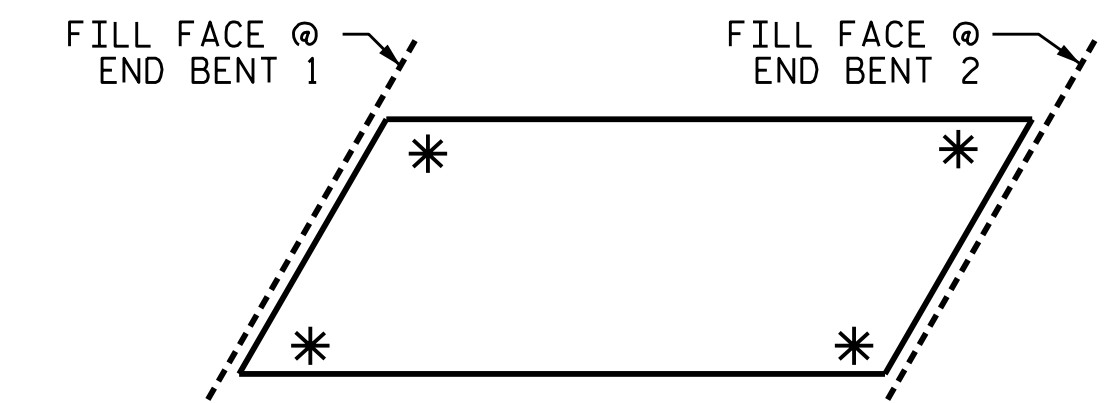
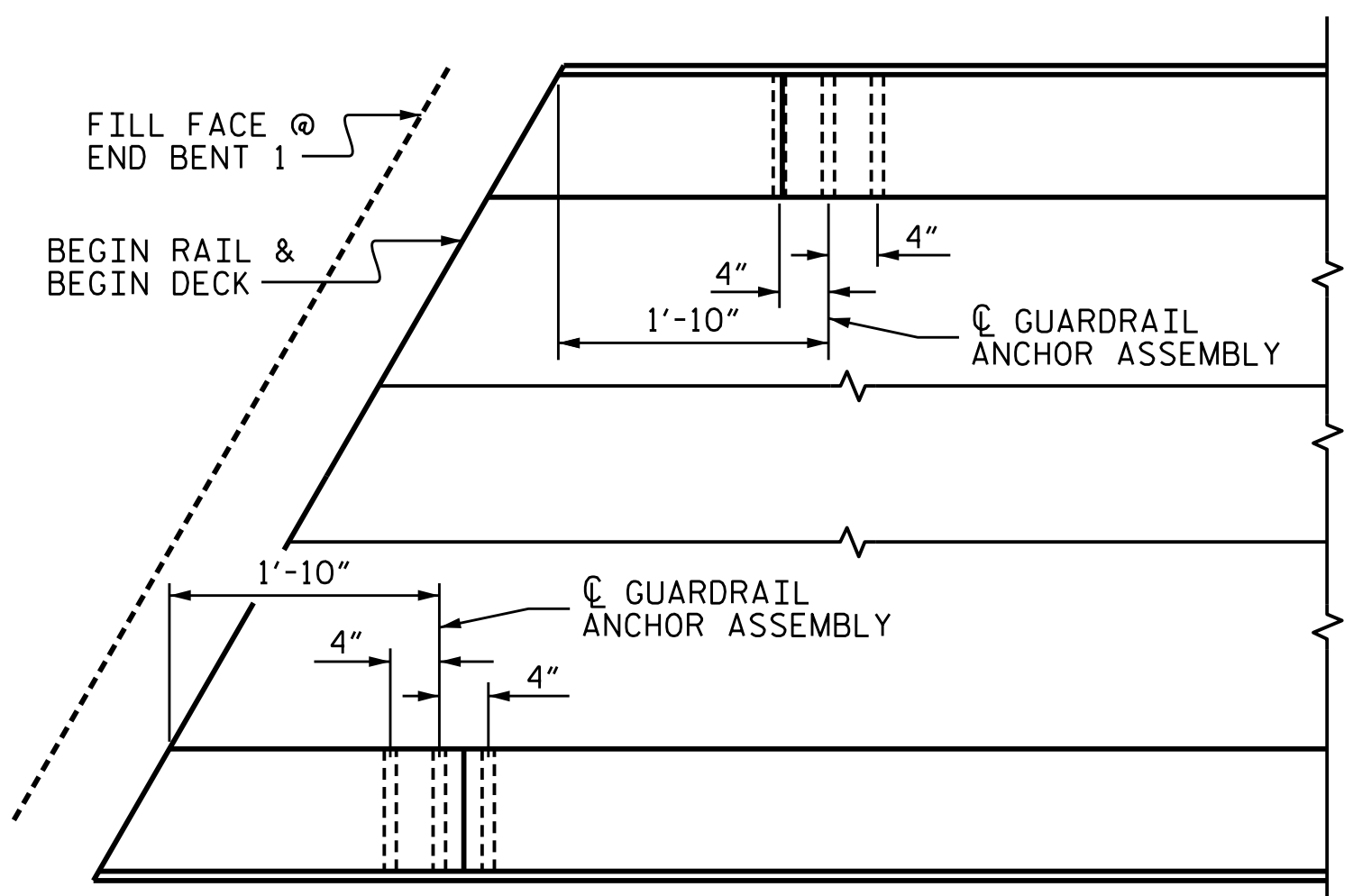
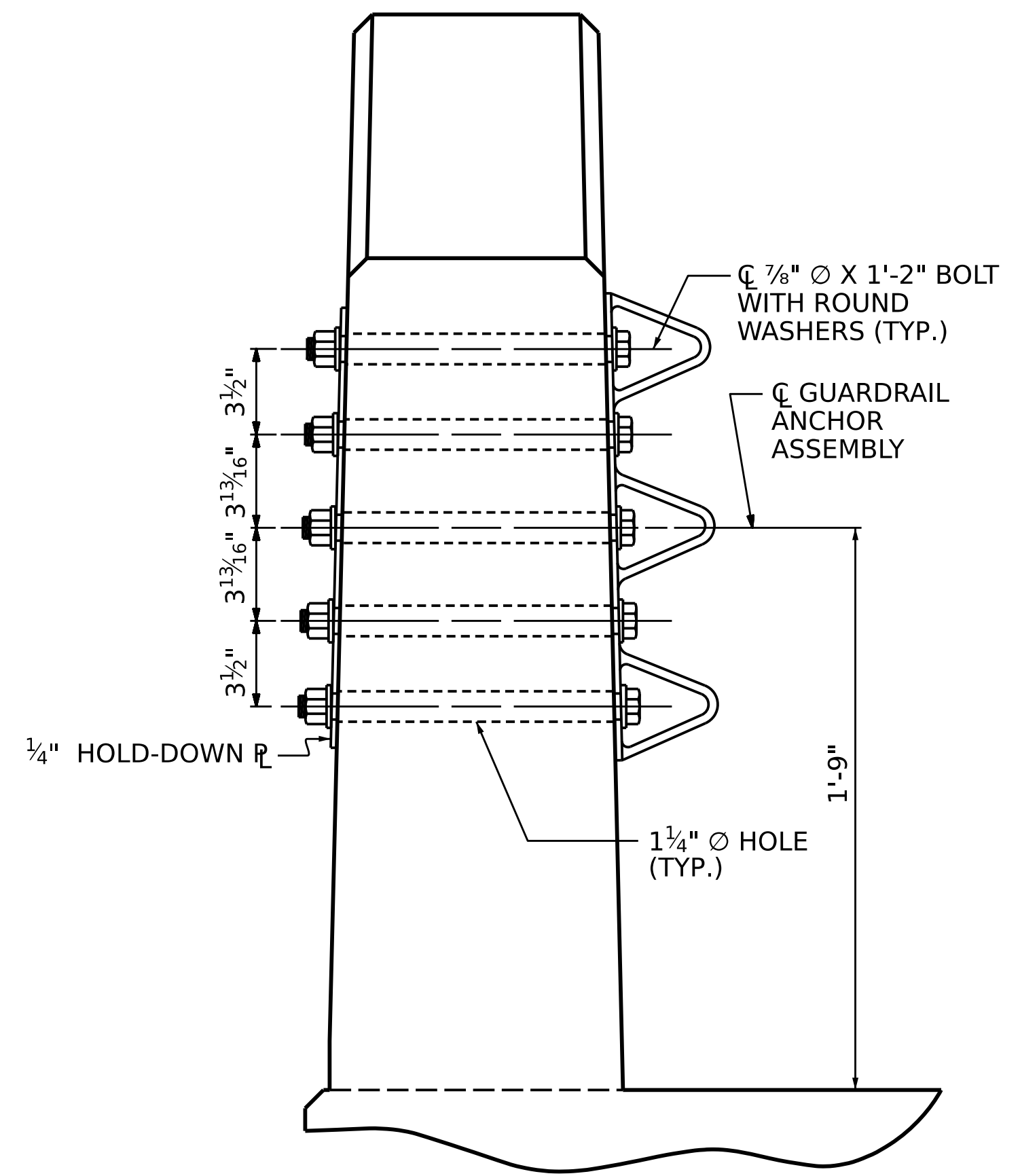
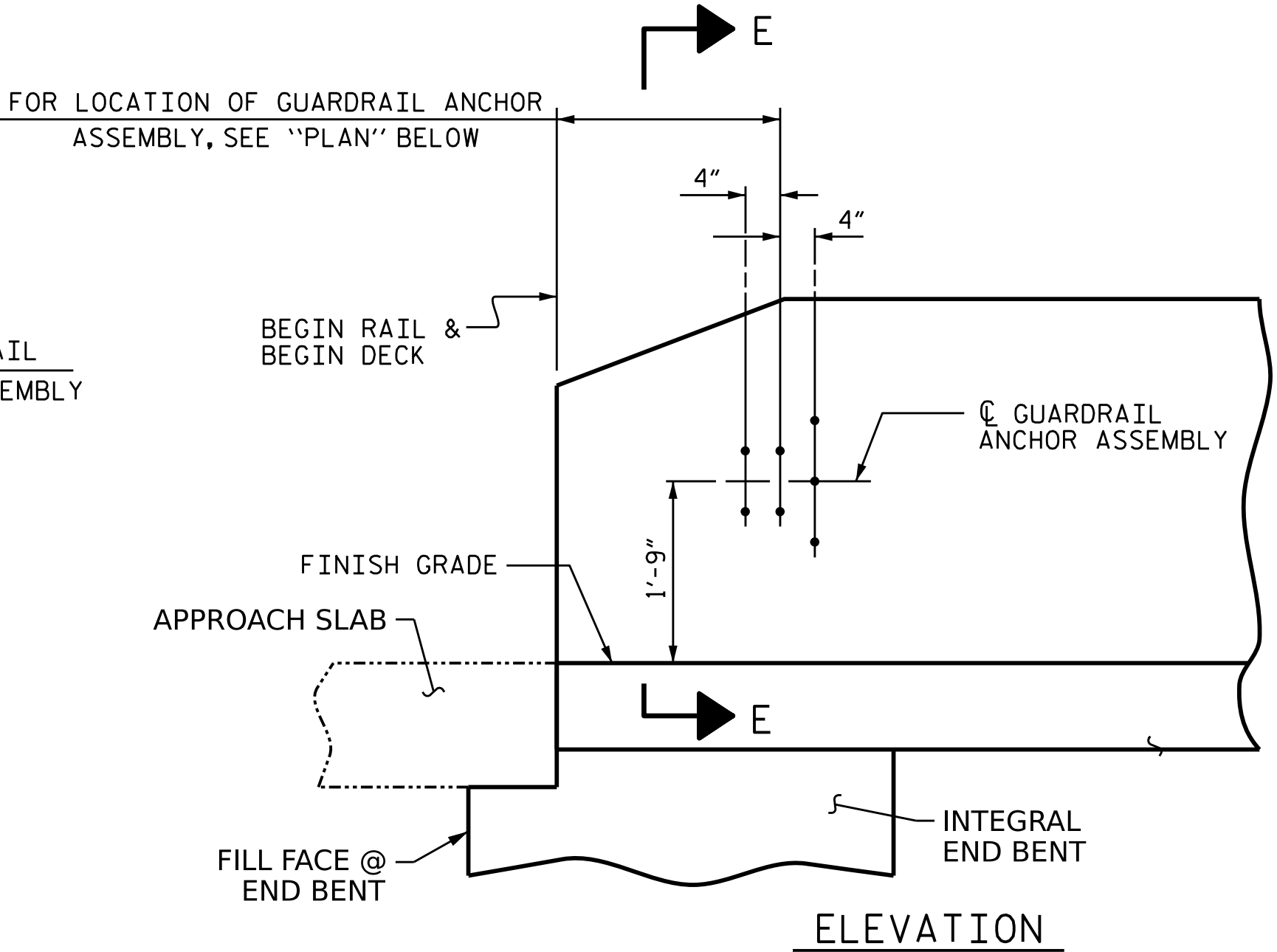
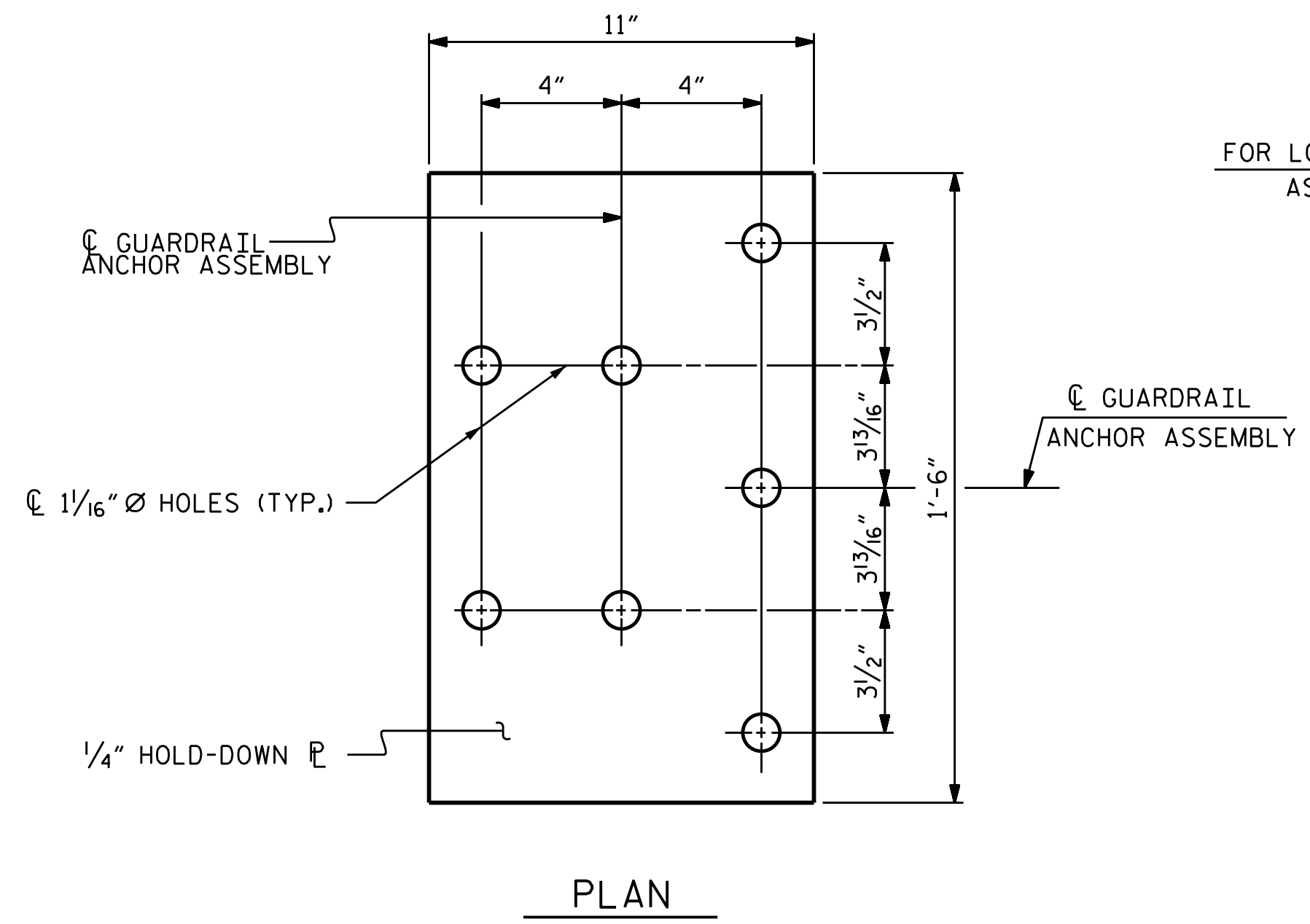
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



SKETCH SHOWING POINTS OF ATTACHMENT
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

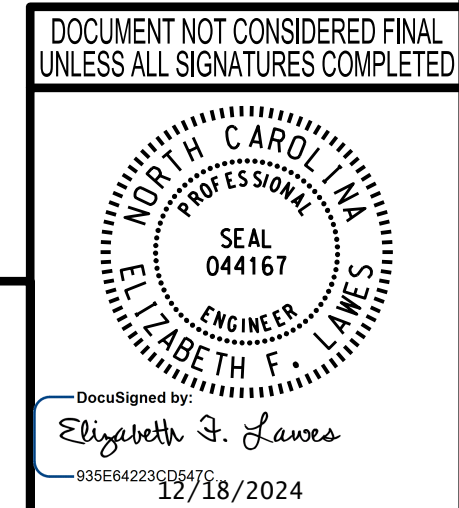
LOCATION OF ANCHORS FOR GUARDRAIL

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

SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
STATION: **18+28.00 -L-**

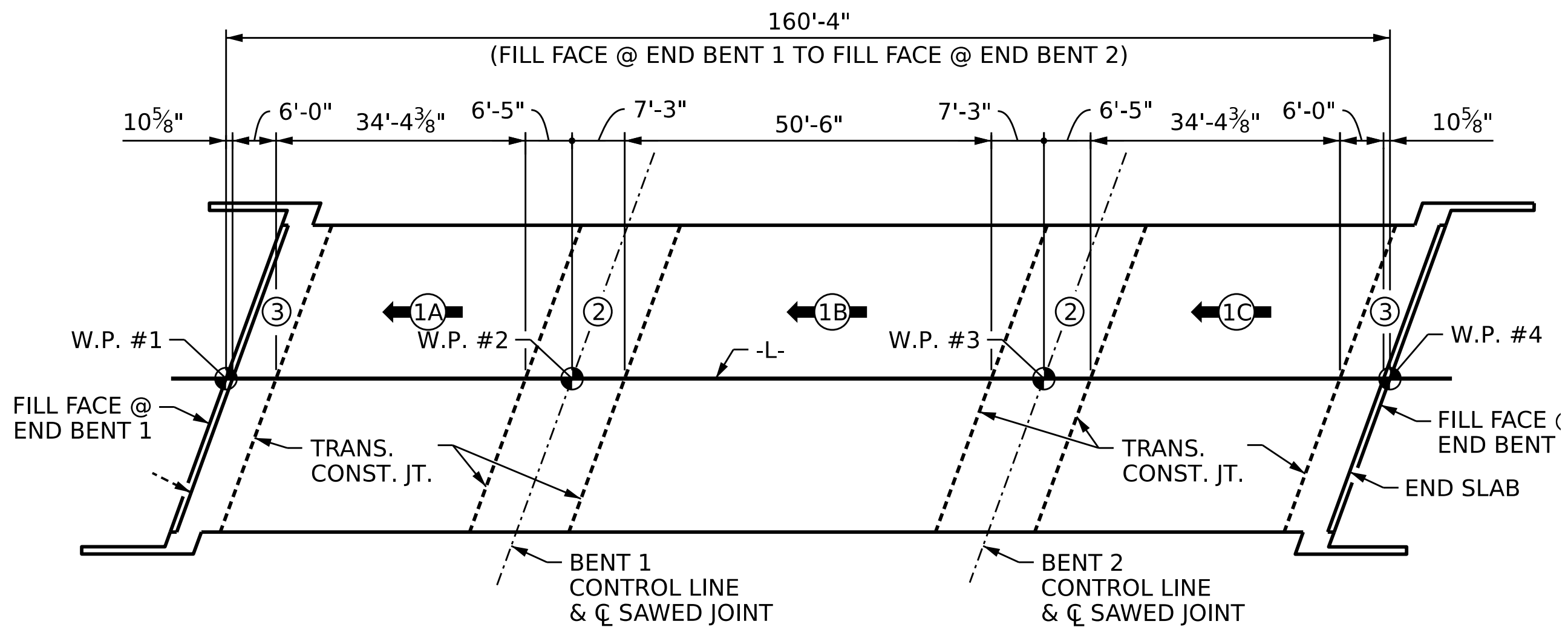
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
**GUARDRAIL ANCHORAGE
DETAILS
FOR VERTICAL CONCRETE
BARRIER RAIL**



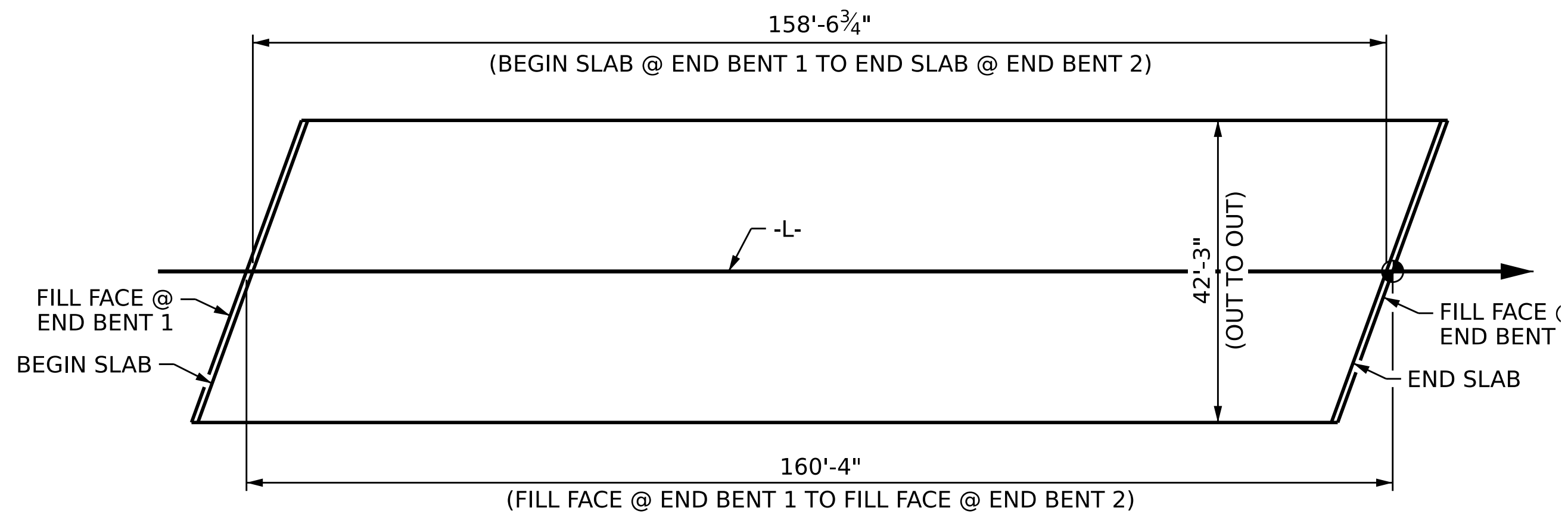
wsp
WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

REVISIONS						SHEET NO. S-20 TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DRAWN BY: MAA	5/10	REV. 1/15	MAA/TMG
CHECKED BY: GM	5/10	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC
DESIGNED BY: J. WHEATLEY	DATE: MAY 2024		
DRAWN BY: M. HOBBS	DATE: MAY 2024		
CHECKED BY: E. LAWES	DATE: MAY 2024		
DESIGN ENGINEER OF RECORD: E. LAWES	DATE: MAY 2024		

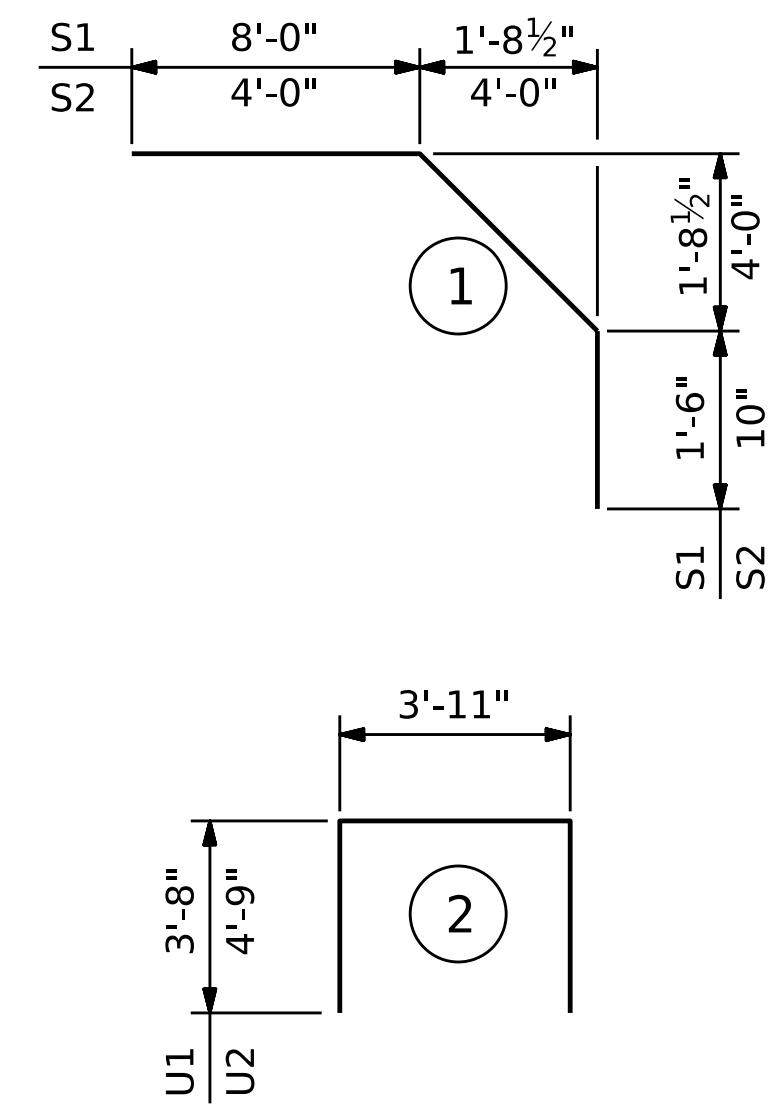


POURING SEQUENCE
 POURS CANNOT BE STARTED UNTIL BOTH ADJACENT POURS REACH A MINIMUM OF 3,000 PSI.
 ← ① → INDICATED POUR NUMBER AND DIRECTION OF POUR



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB
 (SQ. FT. = 6,699)

BILL OF MATERIAL											
SPANS A, B & C											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	344	#5	STR	41'-11"	15,039	*B1	58	#5	STR	29'-11"	1,810
A2	344	#5	STR	41'-11"	15,039	*B2	58	#5	STR	53'-1"	3,211
*A101	2	#5	STR	1'-10"	4	*B3	112	#6	STR	15'-3"	2,565
*A102	4	#5	STR	3'-0"	13	*B4	112	#5	STR	26'-11"	3,144
*A103	4	#5	STR	5'-4"	22	B5	122	#5	STR	31'-11"	4,061
*A104	4	#5	STR	7'-7"	32	B6	122	#5	STR	50'-5"	6,415
*A105	4	#5	STR	9'-11"	41						
*A106	4	#5	STR	12'-2"	51	H1	60	#5	STR	14'-9"	923
*A107	4	#5	STR	14'-6"	60	H2	20	#5	STR	14'-6"	302
*A108	4	#5	STR	16'-9"	70						
*A109	4	#5	STR	19'-1"	80	K1	20	#4	STR	26'-6"	354
*A110	4	#5	STR	21'-4"	89	K2	6	#4	STR	10'-3"	41
*A111	4	#5	STR	23'-8"	99	K3	6	#4	STR	10'-11"	44
*A112	4	#5	STR	25'-11"	108	K4	12	#4	STR	11'-7"	93
*A113	4	#5	STR	28'-2"	118	K5	6	#4	STR	10'-10"	43
*A114	4	#5	STR	30'-6"	127	K6	4	#4	STR	4'-8"	12
*A115	4	#5	STR	32'-9"	137	K7	4	#4	STR	5'-4"	14
*A116	4	#5	STR	35'-1"	146	K8	8	#4	STR	6'-0"	32
*A117	4	#5	STR	37'-4"	156	K9	4	#4	STR	5'-2"	14
*A118	4	#5	STR	39'-8"	165	K10	28	#4	STR	2'-11"	55
A201	2	#5	STR	1'-10"	4						
A202	4	#5	STR	3'-0"	13	S1	72	#4	1	11'-11"	573
A203	4	#5	STR	5'-4"	22	S2	68	#4	1	10'-6"	477
A204	4	#5	STR	7'-7"	32						
A205	4	#5	STR	9'-11"	41	U1	72	#4	2	11'-3"	541
A206	4	#5	STR	12'-2"	51	U2	12	#4	2	13'-5"	108
A207	4	#5	STR	14'-6"	60						
A208	4	#5	STR	16'-9"	70	V1	48	#4	STR	4'-7"	147
A209	4	#5	STR	19'-1"	80						
A210	4	#5	STR	21'-4"	89						
A211	4	#5	STR	23'-8"	99						
A212	4	#5	STR	25'-11"	108						
A213	4	#5	STR	28'-2"	118						
A214	4	#5	STR	30'-6"	127						
A215	4	#5	STR	32'-9"	137						
A216	4	#5	STR	35'-1"	146						
A217	4	#5	STR	37'-4"	156						
A218	4	#5	STR	39'-8"	165						



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 1A (SPAN "A")	46.6	30,659	27,287
POUR 1b (SPAN "B")	68.4		
POUR 1c (SPAN "C")	46.6		
POUR 2	34.7		
POUR 3	82.2		
TOTALS**	278.5	30,659	27,287

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

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	1,073 SQ.FT.
BRIDGE DECK	5,932 SQ.FT.
TOTAL	7,005 SQ.FT.

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

DRAWN BY: JMB 5/87 REV. 10/11/11 MAA/GM
 CHECKED BY: SJD 9/87 REV. 12/17 MAA/THC
 REV. 06/19 BNB/THC

DESIGNED BY: J. WHEATLEY DATE: MAY 2024
 DRAWN BY: M. HOBBS DATE: MAY 2024
 CHECKED BY: E. LAWES DATE: MAY 2024
 DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024

wsp
 WSP USA Inc.
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL 044167
 ELIZABETH F. LAWES
 12/18/2024

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL & POURING SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-21
2			4			30

NOTES:

FOR BEARING DETAILS, SEE "ELASTOMERIC BEARING DETAILS" SHEET.

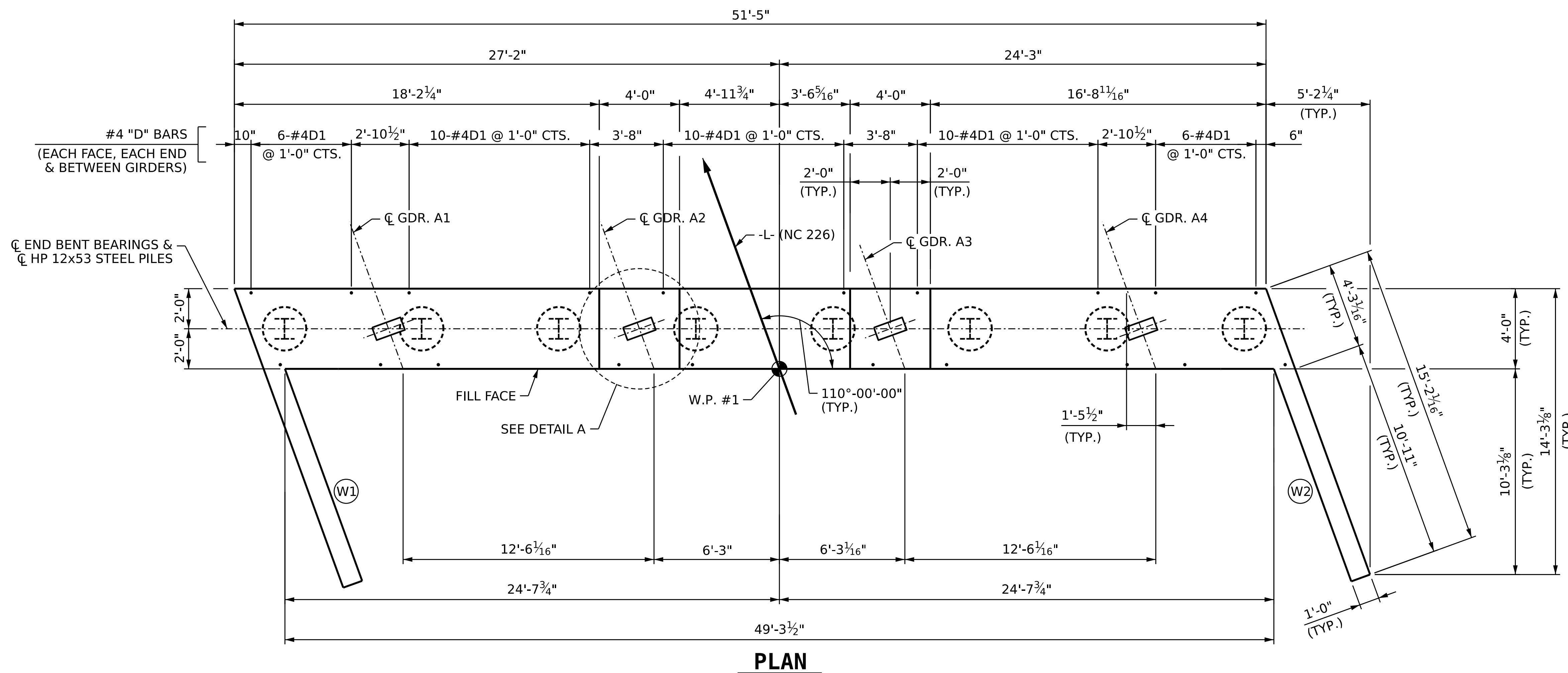
FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR SECTION A-A & B-B SHEET 4 OF 4.

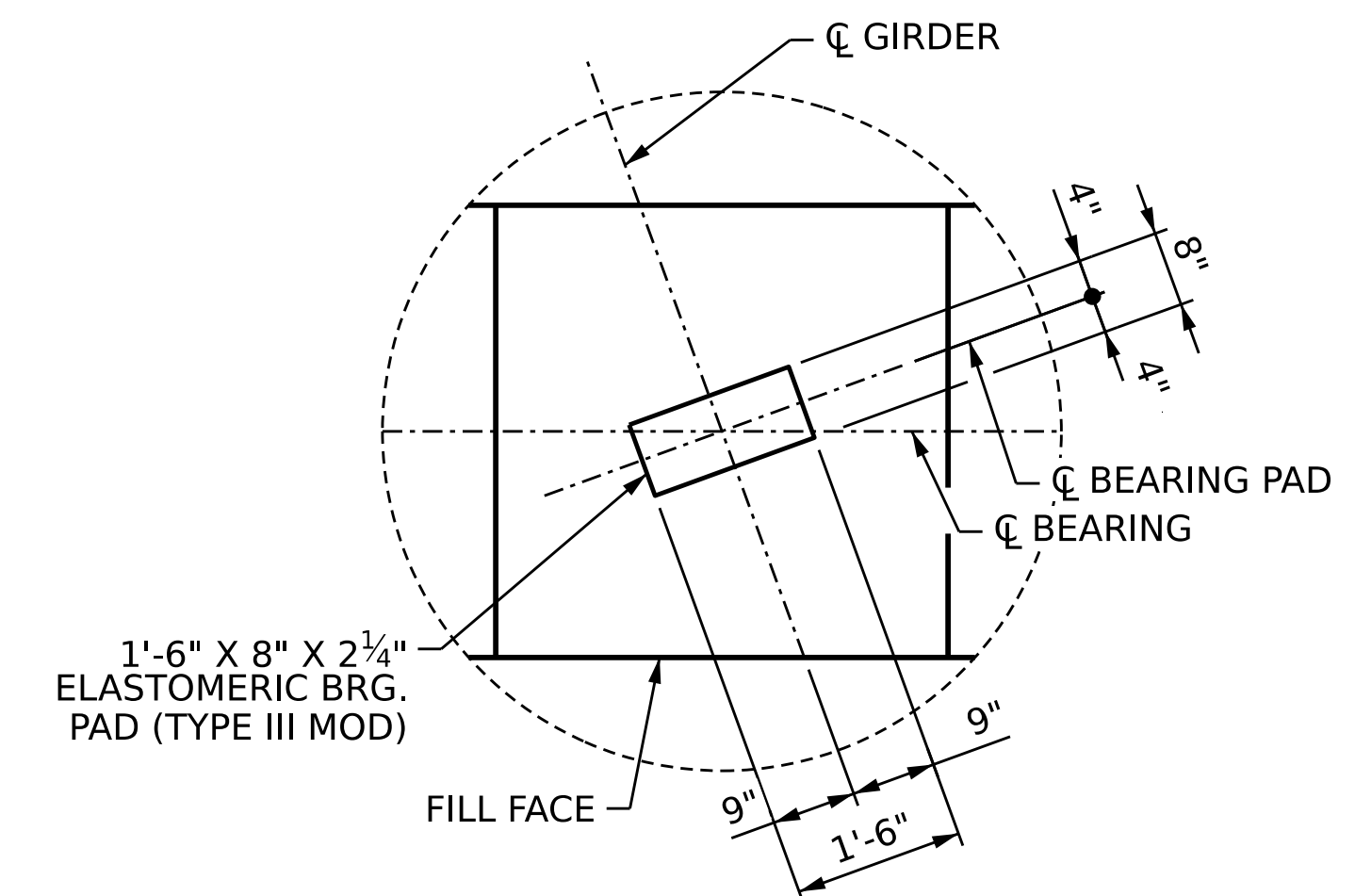
THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE UPPER PART OF THE WINGS ARE TO BE POURED WITH THE SUPERSTRUCTURE.

SEE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT WING DETAILS.

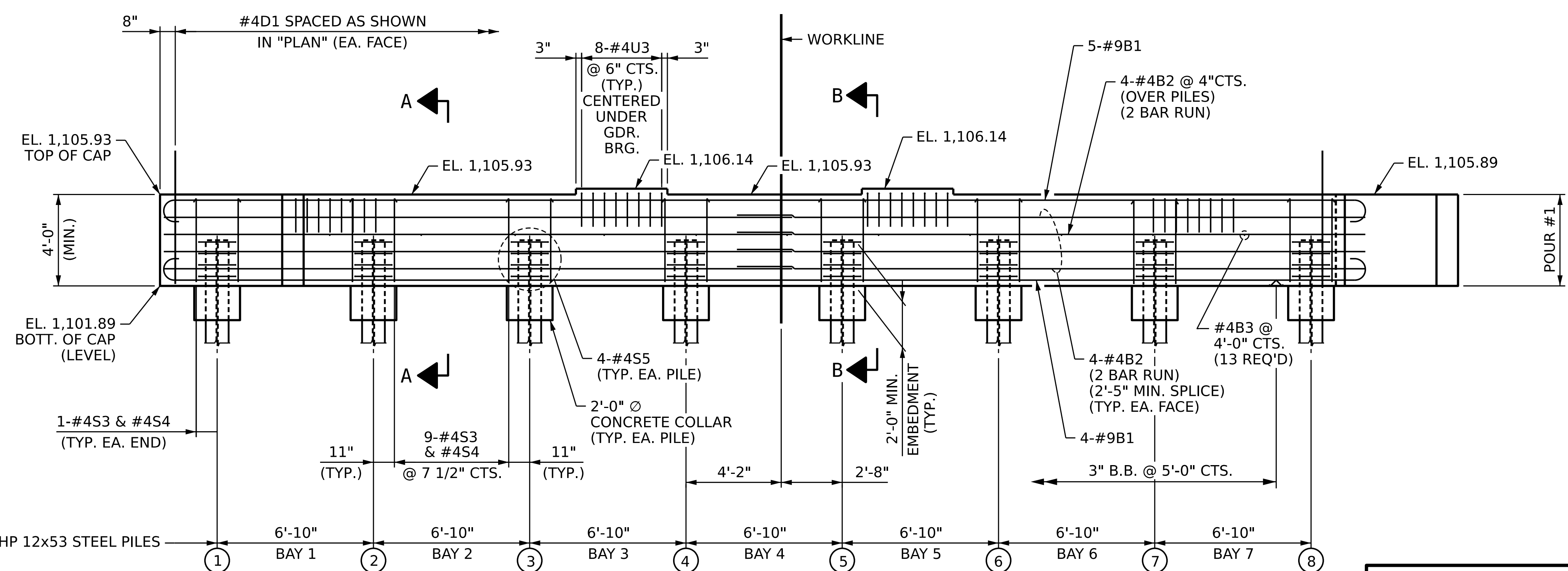


PLAN



DETAIL "A"

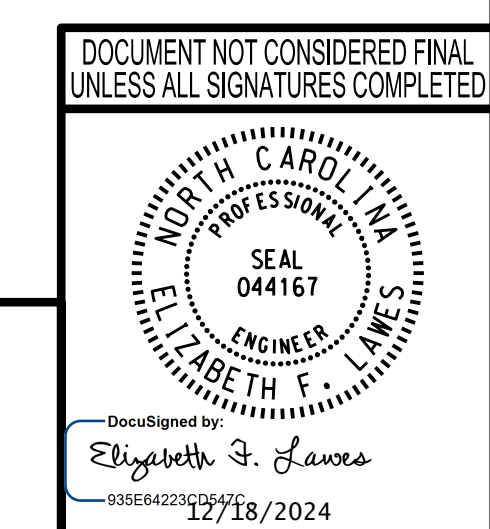
(TYP. EA. GIRDER, EXCEPT GIRDERS 1 AND 4 HAVE NO PEDESTALS)



ELEVATION

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
**END BENT 1
 PLAN & ELEVATION
 (INTEGRAL)**

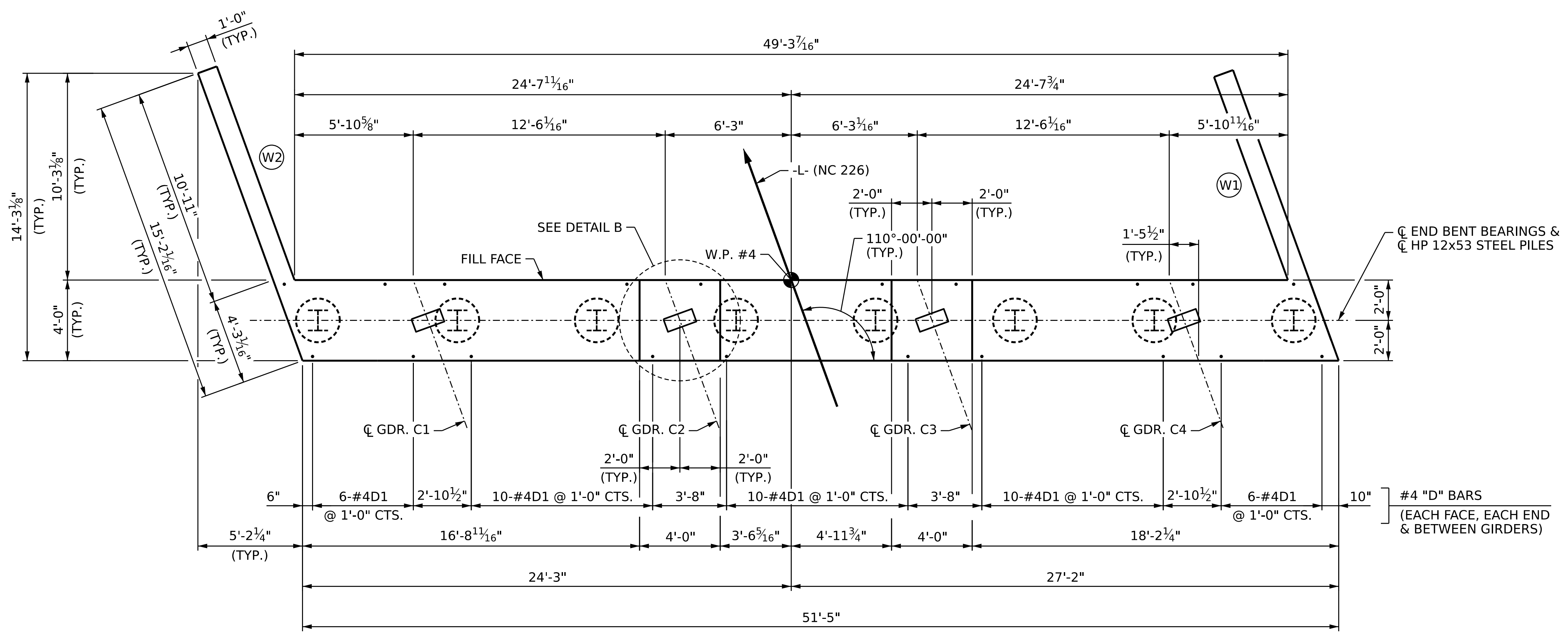


REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

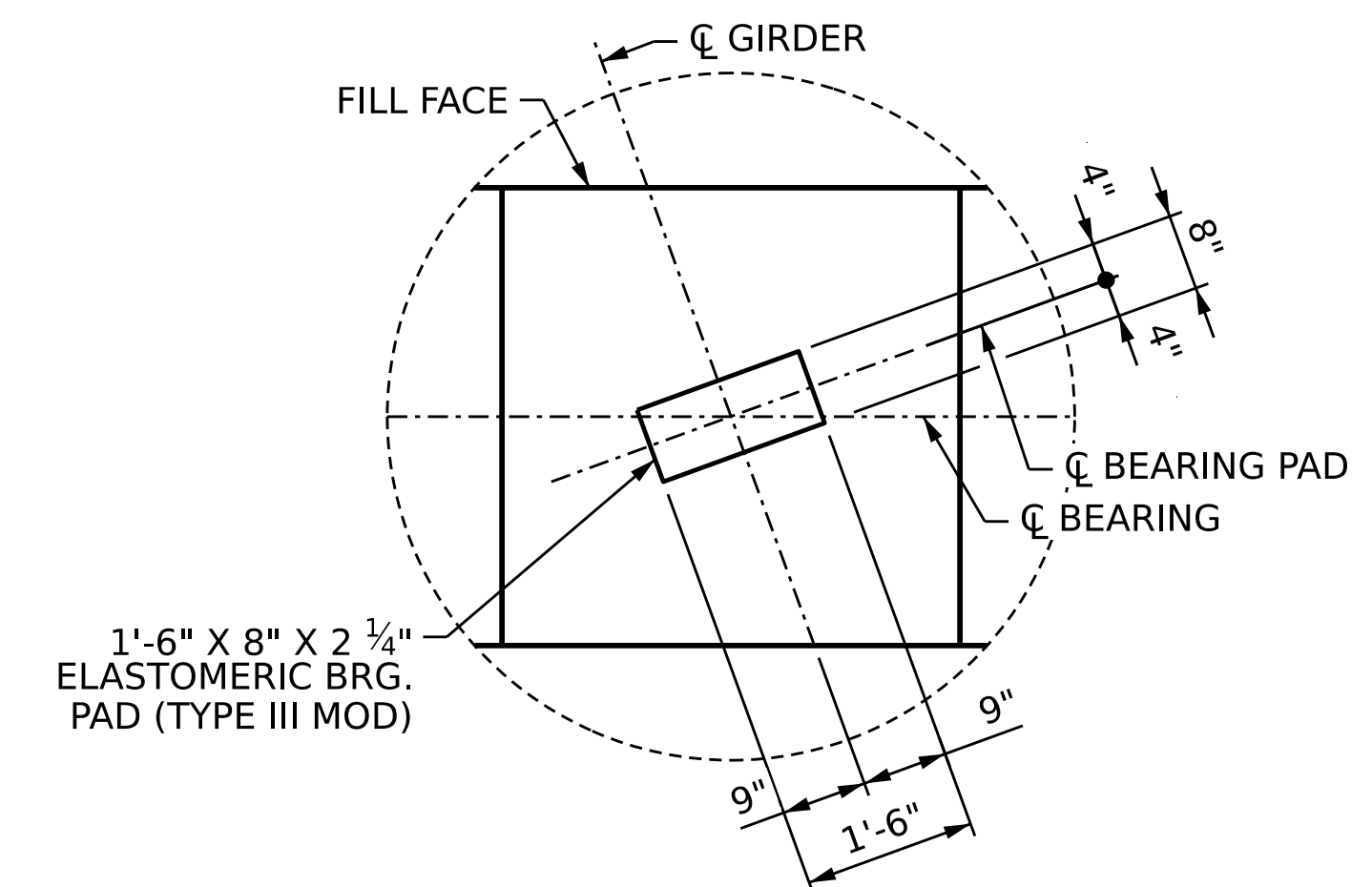
DESIGNED BY: J. WHEATLEY DATE: MAY 2024
 DRAWN BY: M. HOBBS DATE: MAY 2024
 CHECKED BY: E. LAWES DATE: MAY 2024
 DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024

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 RALEIGH, NC 27601
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 LICENSE NO. F-0165

NOTES:
FOR NOTES, SEE END BENT SHEET 1 OF 4.

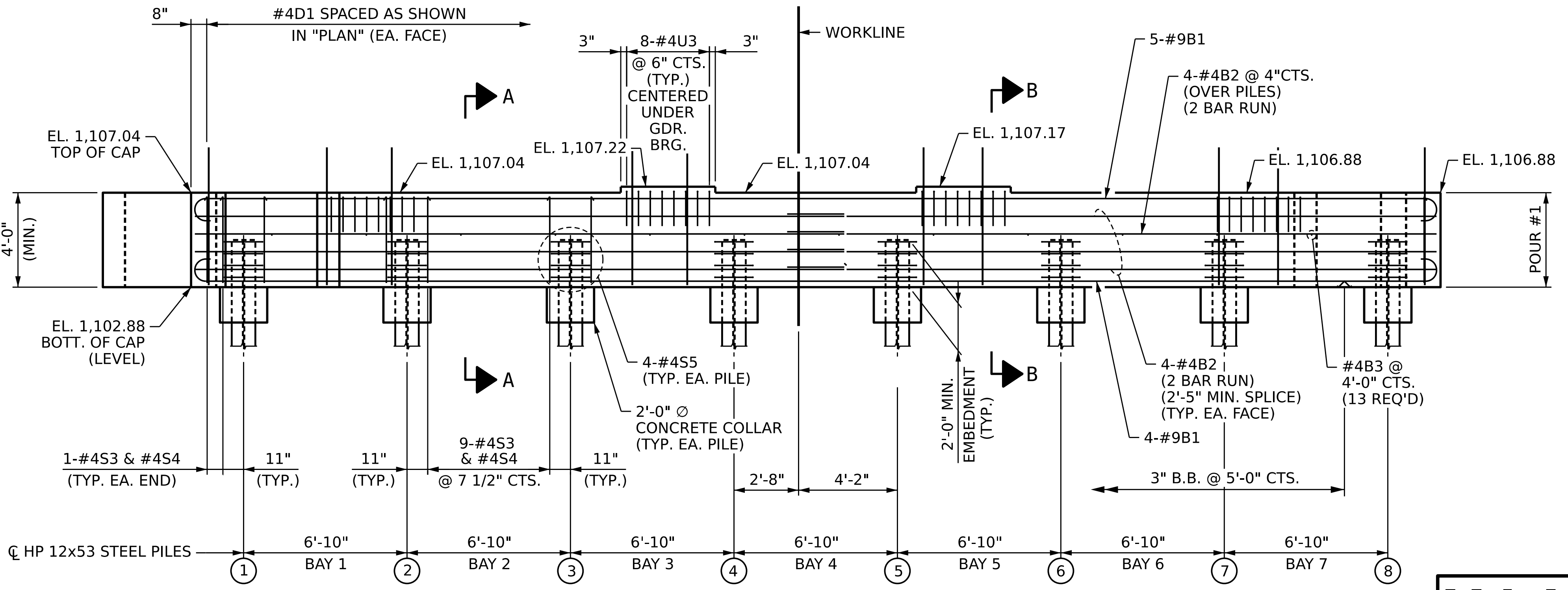


PLAN



DETAIL "B"

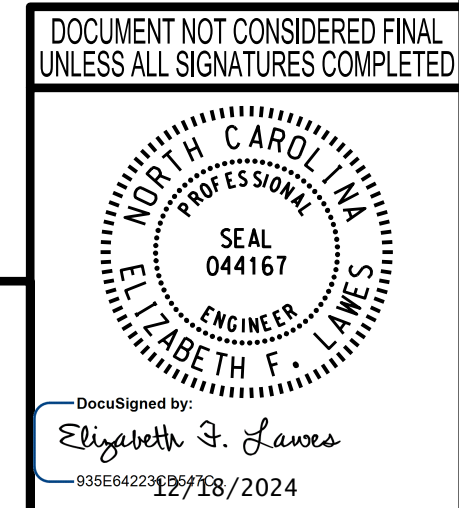
(TYP. EA. GIRDER, EXCEPT GIRDERS 1 AND 4 HAVE NO PEDESTALS)



ELEVATION

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
STATION: **18+28.00 -L-**
SHEET 2 OF 4

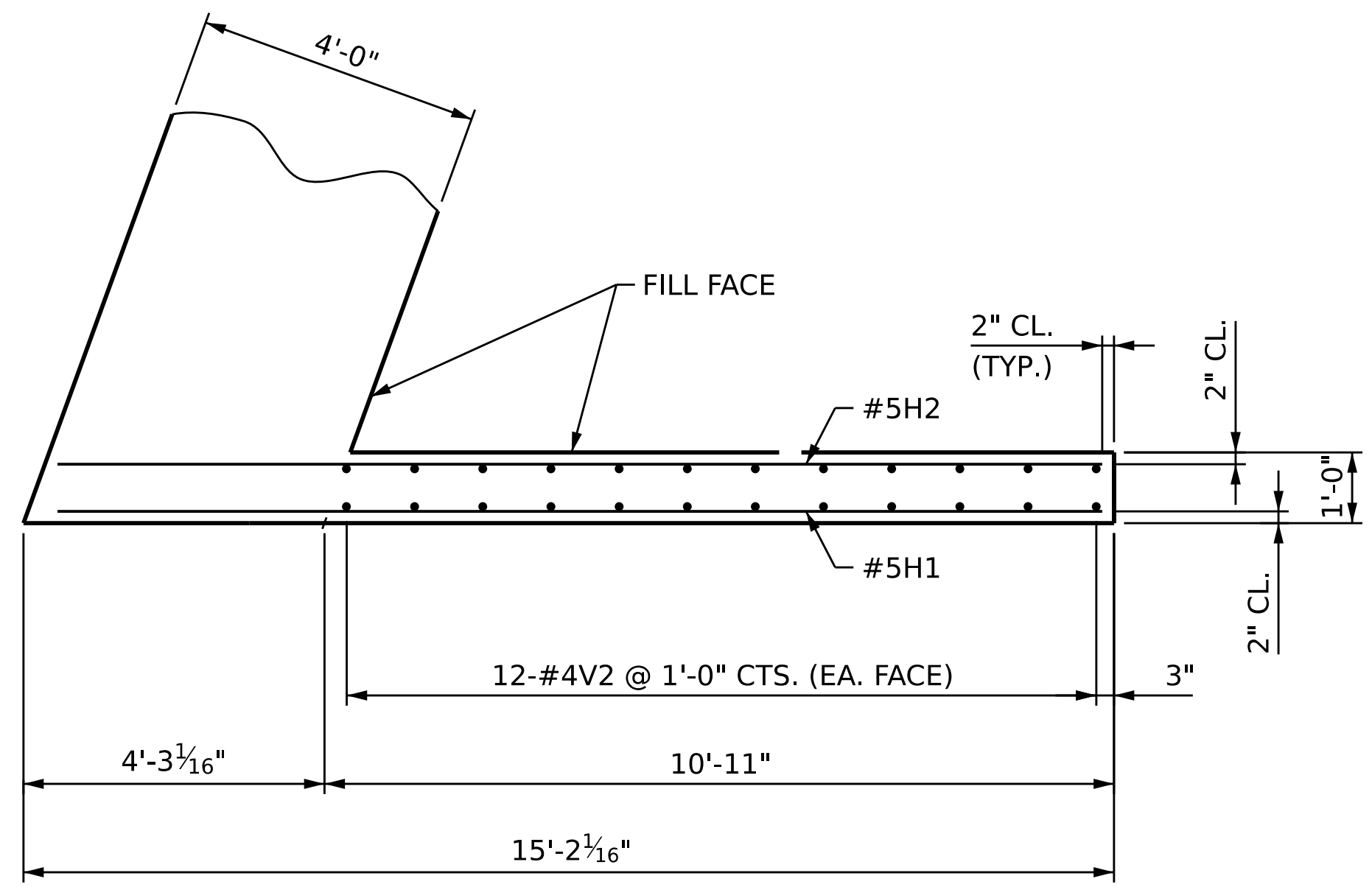
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
**END BENT 2
PLAN & ELEVATION
(INTEGRAL)**



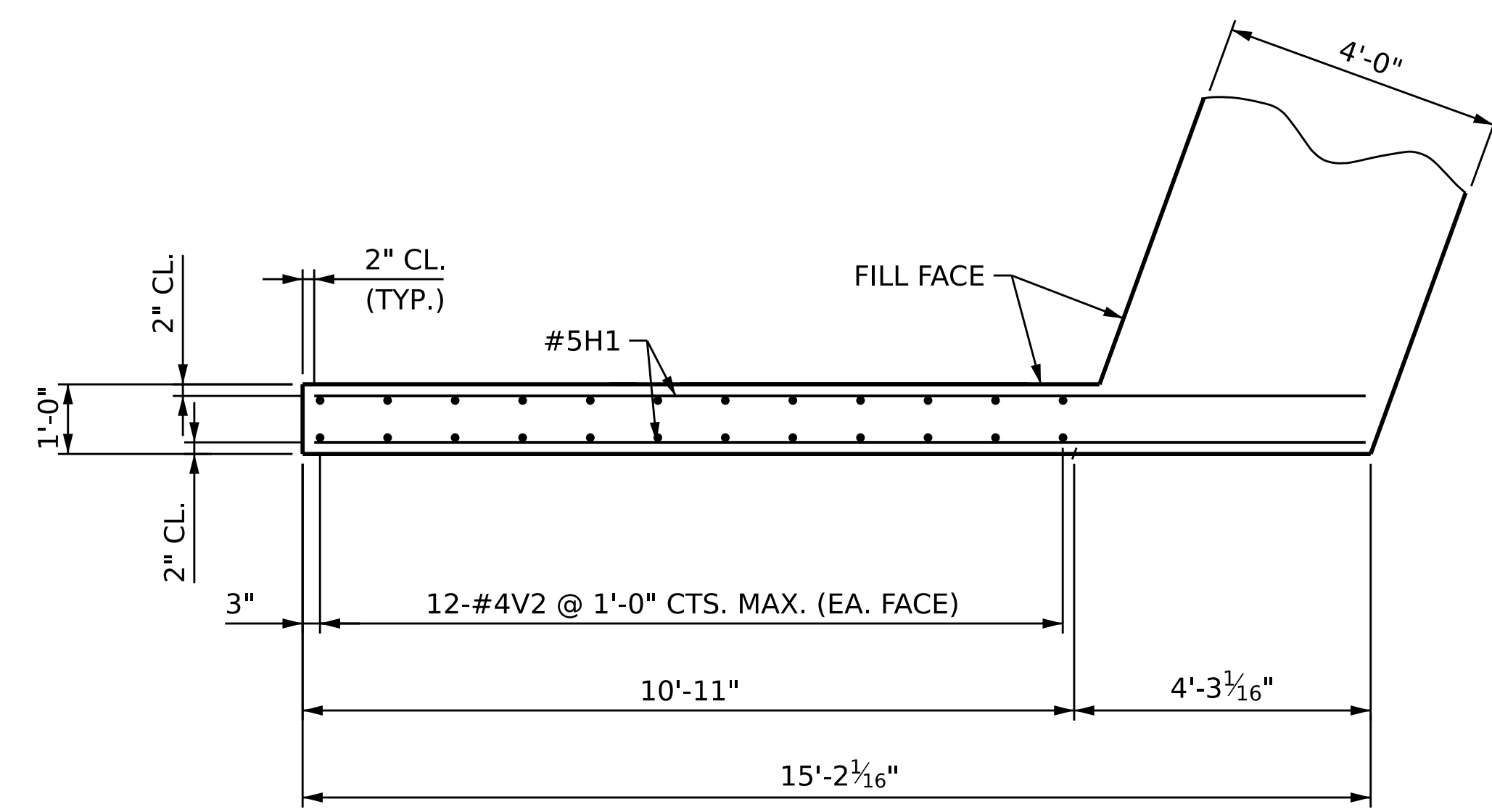
REVISIONS						SHEET NO. S-23 TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DESIGNED BY: J. WHEATLEY DATE: MAY 2024
DRAWN BY: M. HOBBS DATE: MAY 2024
CHECKED BY: E. LAWES DATE: MAY 2024
DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024

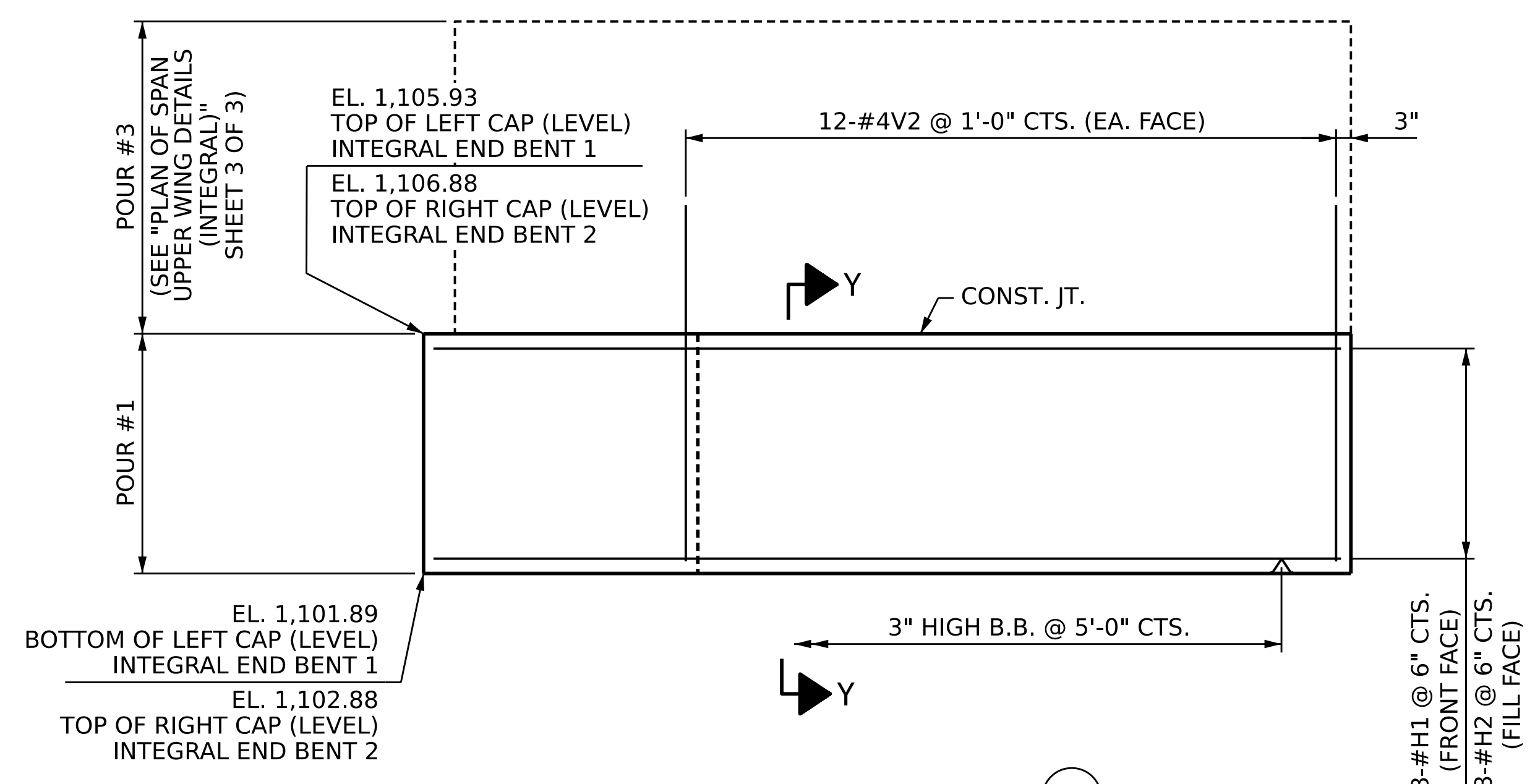
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434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165



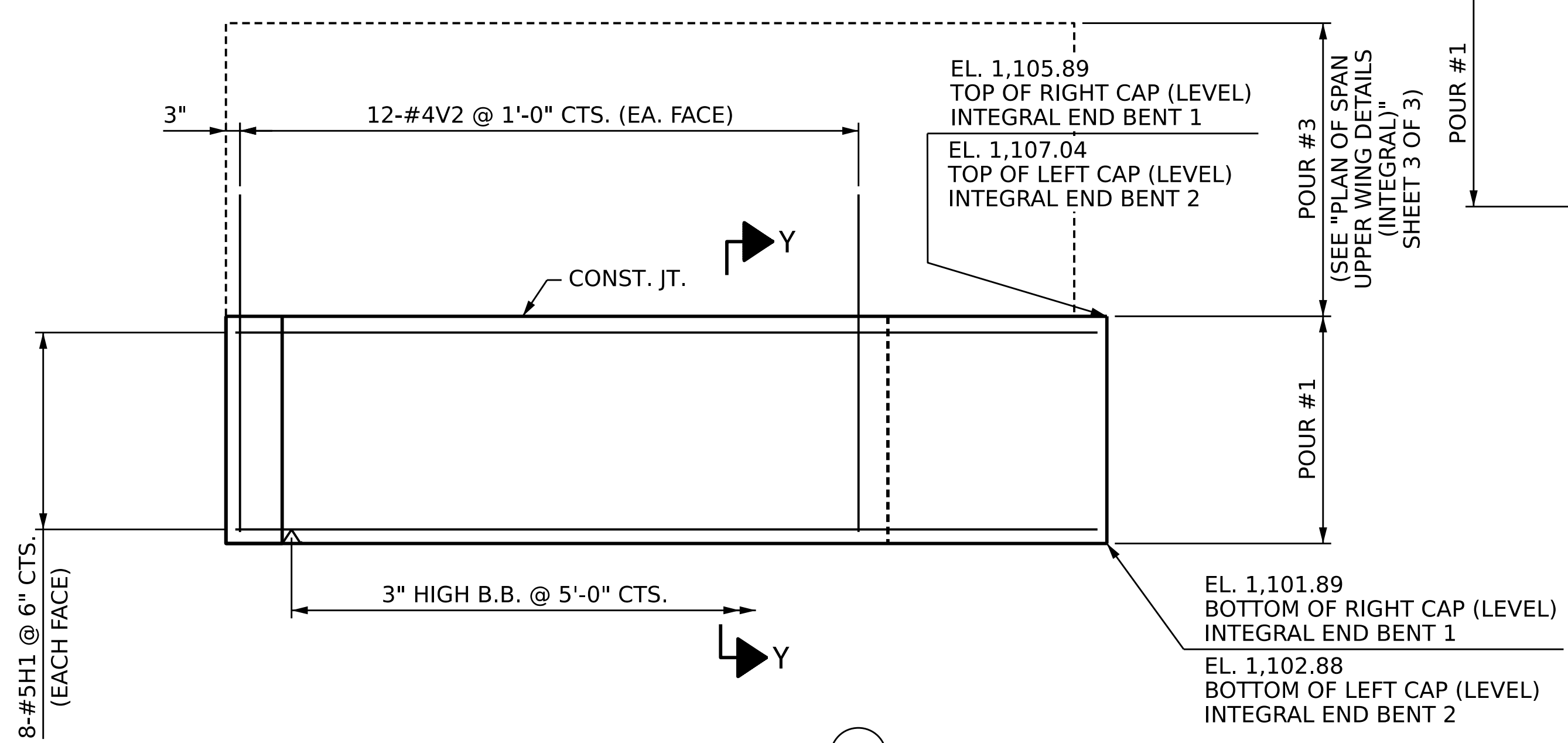
PLAN OF WING (W1)
 INTEGRAL END BENT 1 (LEFT)
 INTEGRAL END BENT 2 (RIGHT)



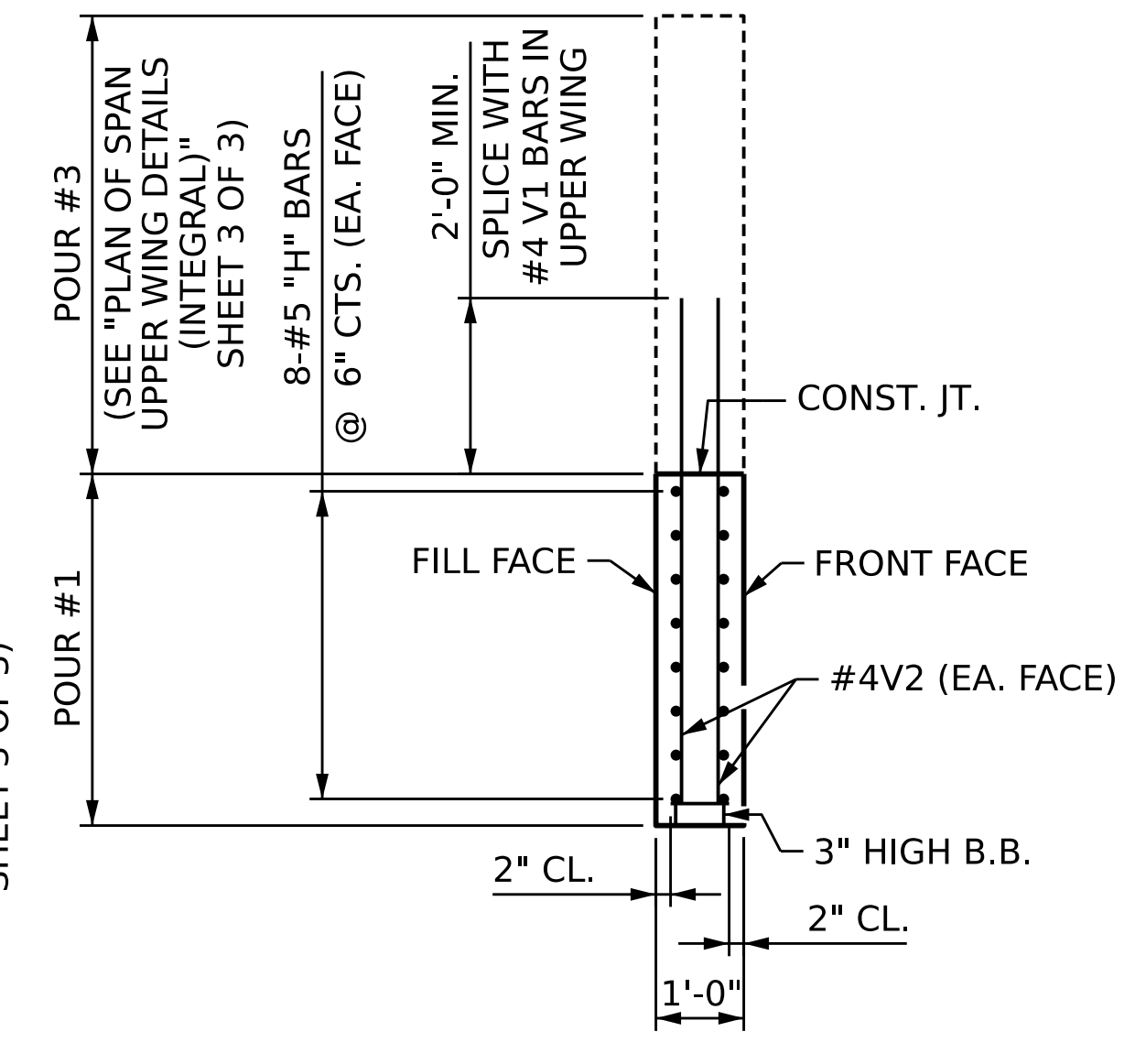
PLAN OF WING (W2)
 INTEGRAL END BENT 1 (RIGHT)
 INTEGRAL END BENT 2 (LEFT)



ELEVATION OF WING (W1)
 INTEGRAL END BENT 1 (LEFT)
 INTEGRAL END BENT 2 (RIGHT)



ELEVATION OF WING (W2)
 INTEGRAL END BENT 1 (RIGHT)
 INTEGRAL END BENT 2 (LEFT)



SECTION Y-Y

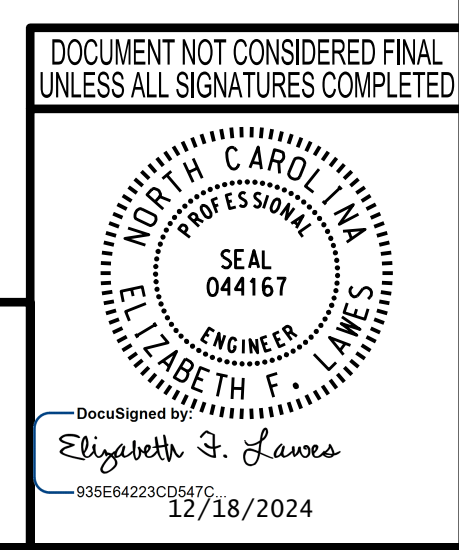
LOWER WINGS AT INTEGRAL END BENTS 1 & 2

(FOR UPPER WING REINFORCING STEEL AND DETAILS, SEE "PLAN OF SPAN UPPER WING DETAILS (INTEGRAL)" SHEET 3 OF 3)

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 3 OF 4

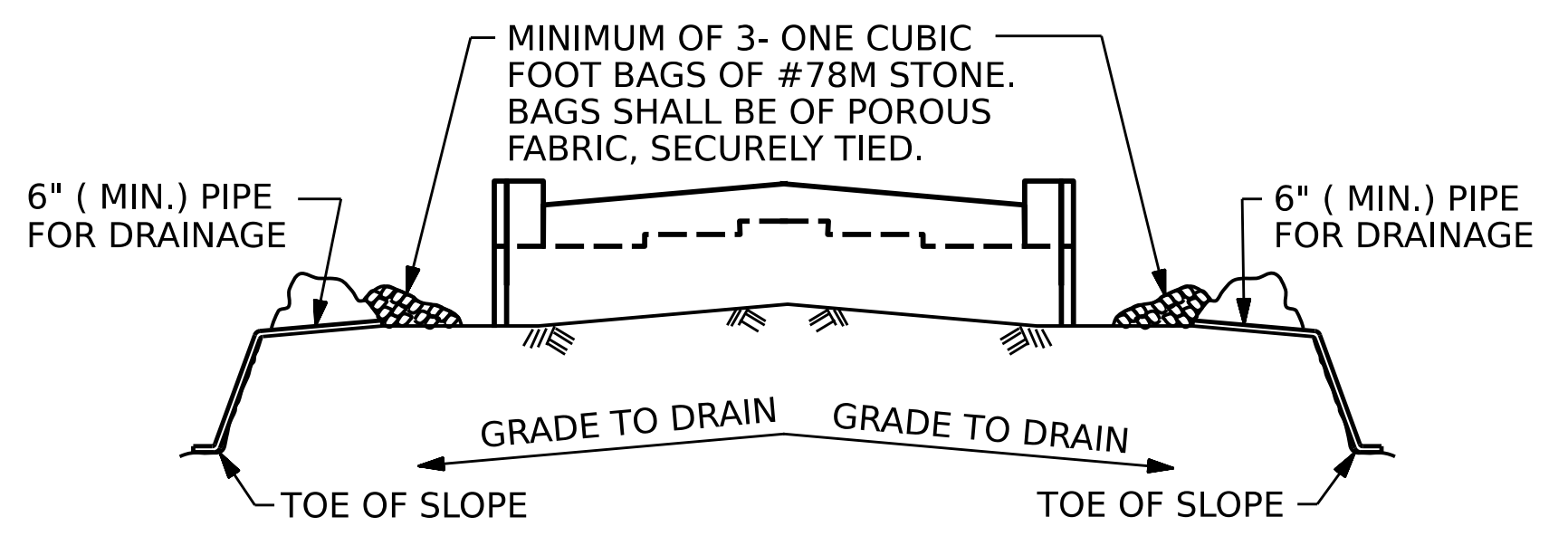
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
END BENTS 1 & 2
LOWER WINGS
(INTEGRAL)

REVISIONS						SHEET NO. S-24 TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



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 434 FAYETTEVILLE STREET
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 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165

DESIGNED BY:	J. WHEATLEY	DATE :	MAY 2024
DRAWN BY:	M. HOBBS	DATE :	MAY 2024
CHECKED BY:	E. LAWES	DATE :	MAY 2024
DESIGN ENGINEER OF RECORD:	E. LAWES	DATE :	MAY 2024

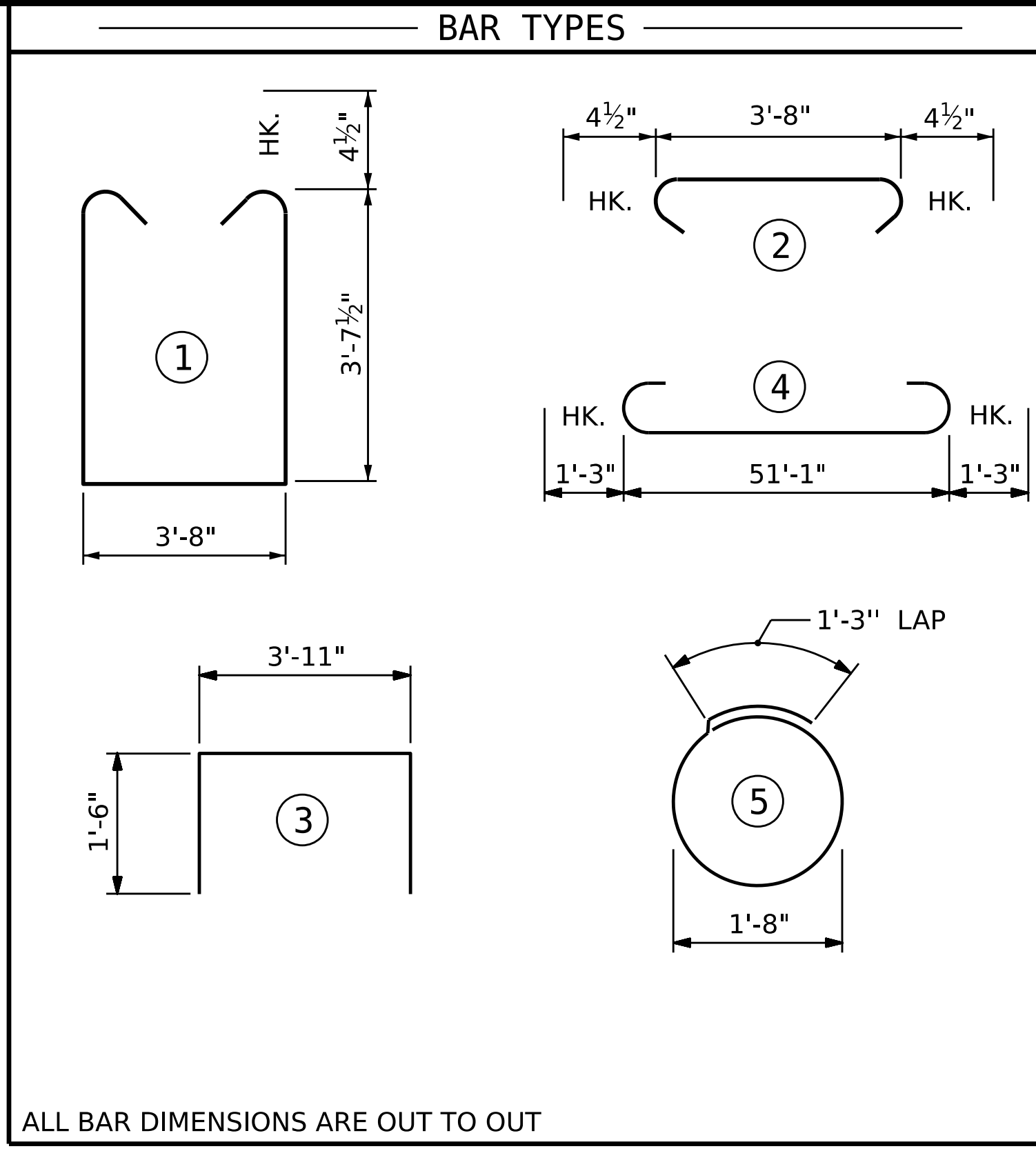


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

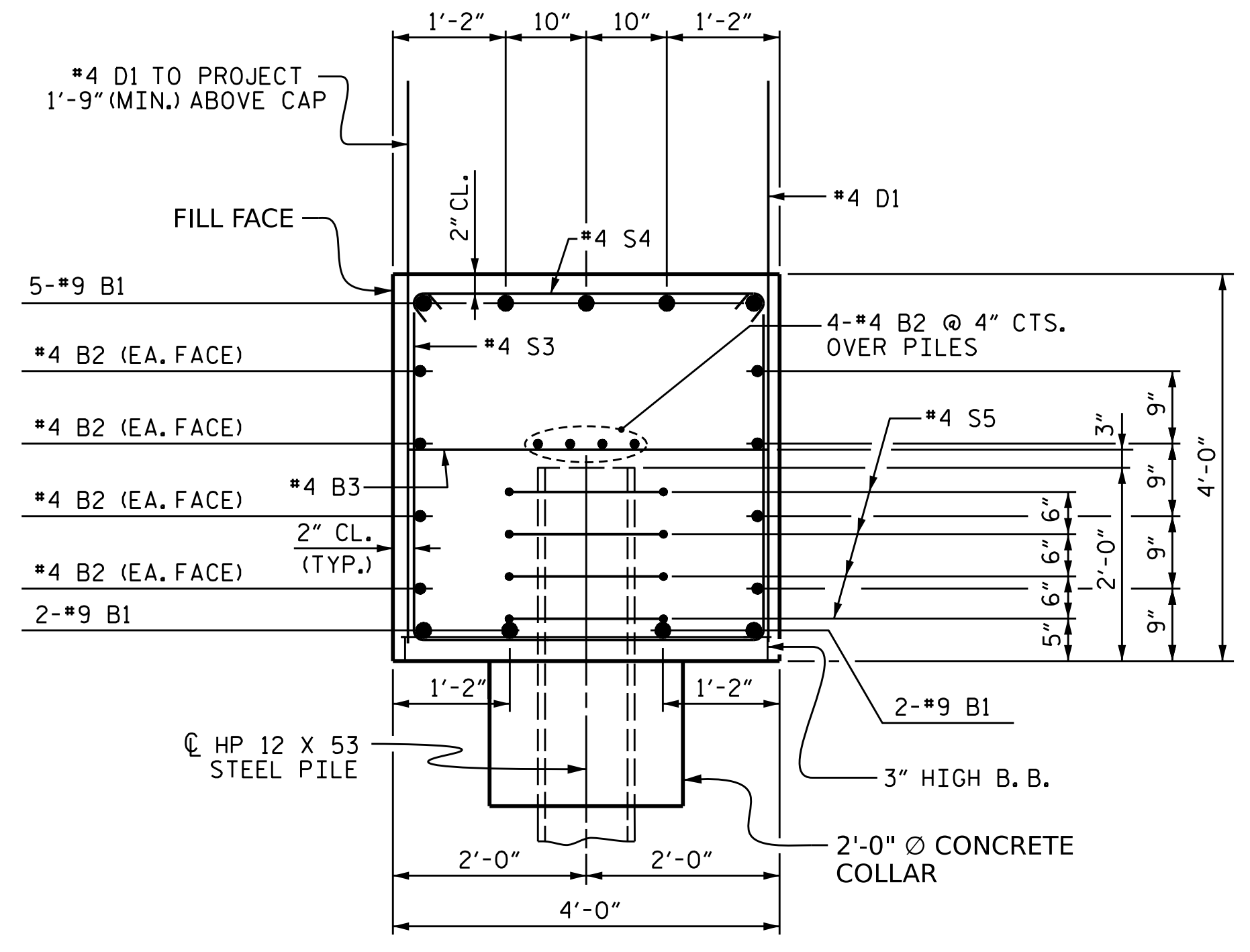
TEMPORARY DRAINAGE AT END BENT



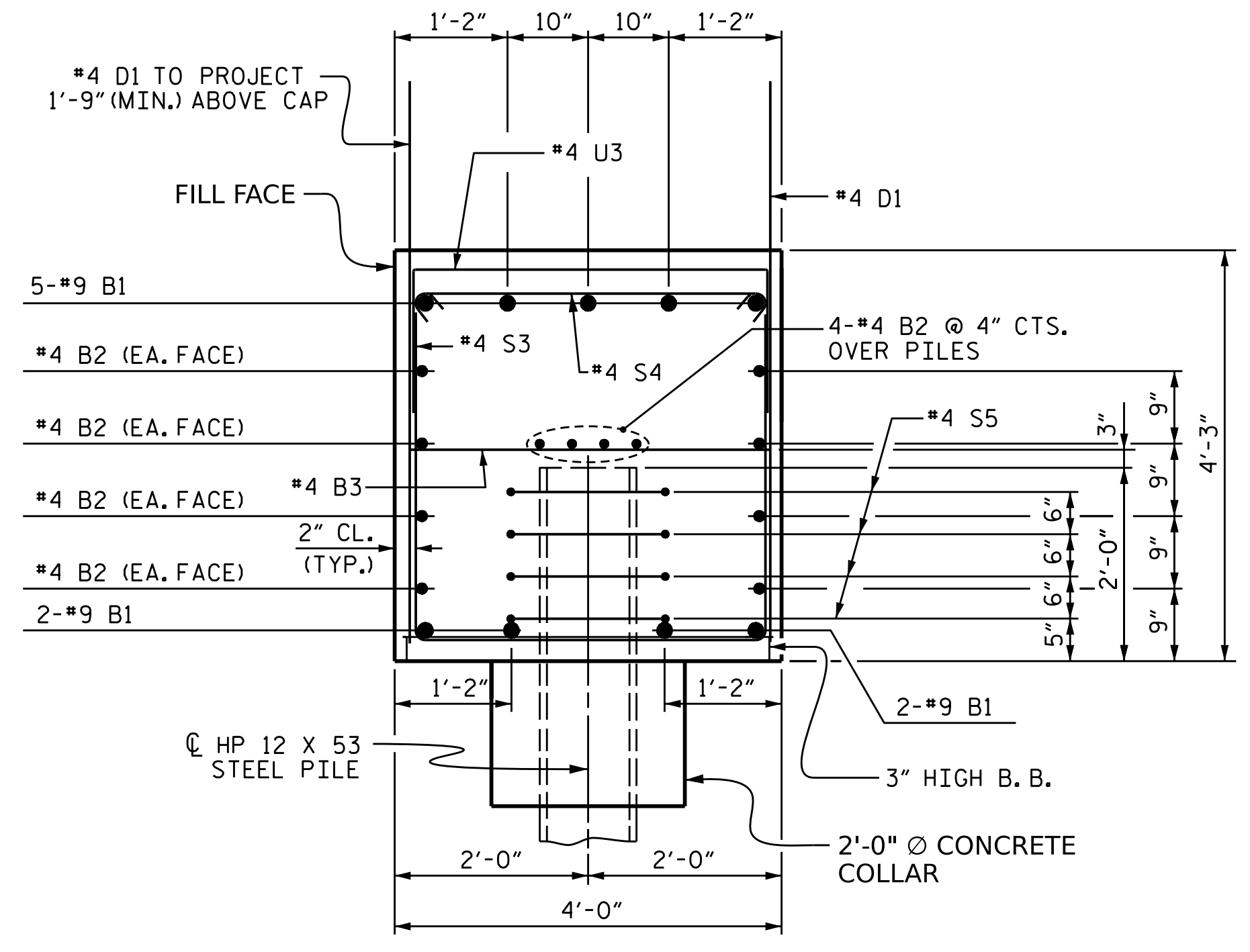
BILL OF MATERIAL

END BENT 1						END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	#9	4	53'-7"	1640	B1	9	#9	4	53'-7"	1640
B2	24	#4	STR	26'-9"	429	B2	24	#4	STR	26'-9"	429
B3	13	#4	STR	3'-8"	32	B3	13	#4	STR	3'-8"	32
D1	84	#4	STR	6'-0"	337	D1	84	#4	STR	6'-0"	337
H1	24	#5	STR	14'-9"	369	H1	24	#5	STR	14'-9"	369
H2	8	#5	STR	14'-6"	121	H2	8	#5	STR	14'-6"	121
S3	65	#4	1	11'-8"	507	S3	65	#4	1	11'-8"	507
S4	65	#4	2	4'-5"	192	S4	65	#4	2	4'-5"	192
S5	32	#4	5	6'-6"	139	S5	32	#4	5	6'-6"	139
V2	48	#4	STR	6'-0"	192	V2	48	#4	STR	6'-0"	192
U3	32	#4	3	6'-11"	148	U3	32	#4	3	6'-11"	148
REINFORCING STEEL						REINFORCING STEEL					
4,106						4,106					
CLASS "A" CONCRETE BREAKDOWN						CLASS "A" CONCRETE BREAKDOWN					
POUR #1 - CAP & LOWER WING C.Y. 34.0						POUR #1 - CAP & LOWER WING C.Y. 34.0					
POUR #3 - UPPER WING*						POUR #3 - UPPER WING*					
CLASS "A" CONCRETE TOTAL C.Y. 34.0						CLASS "A" CONCRETE TOTAL C.Y. 34.0					

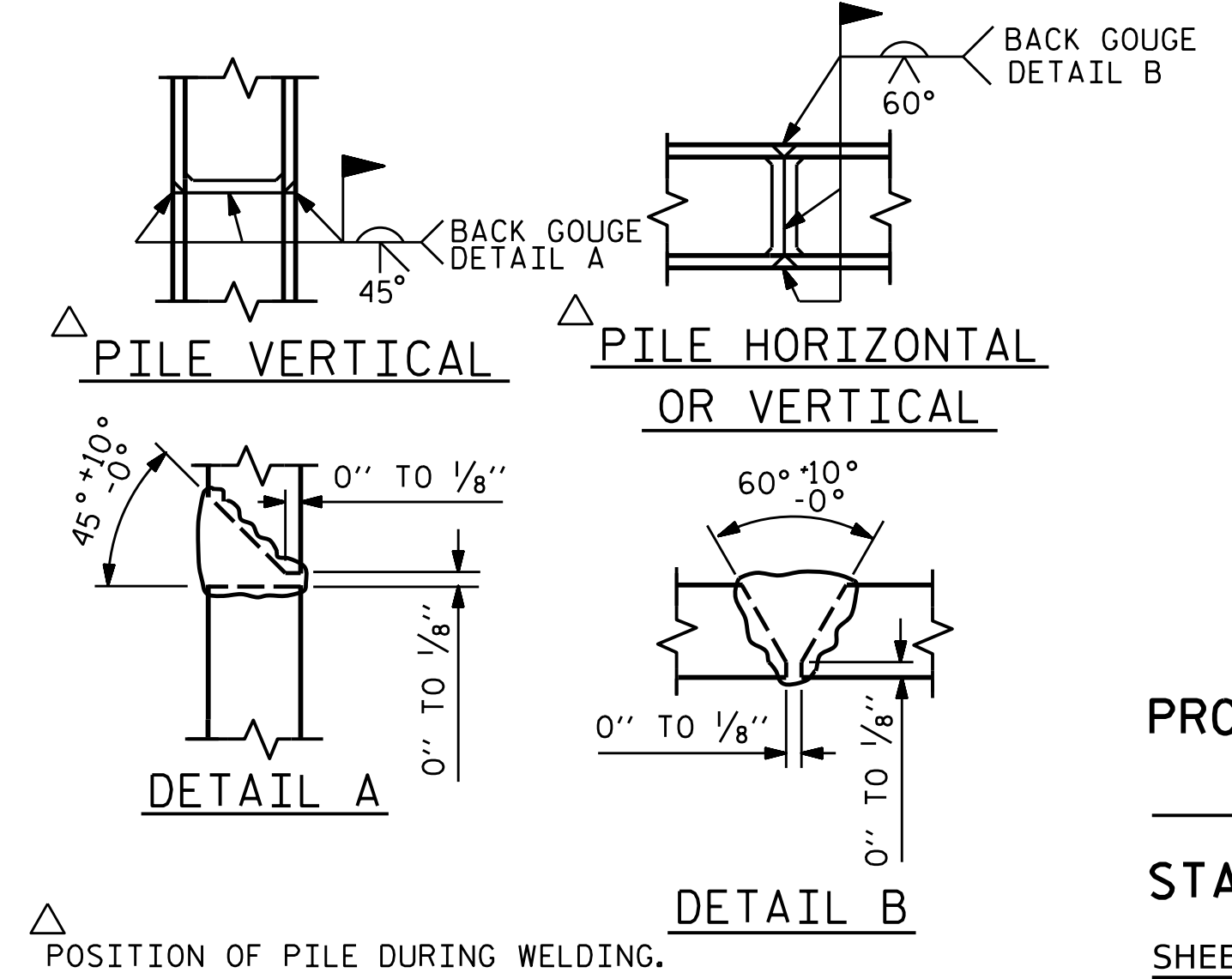
*UPPER WING QUANTITIES INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL SHEET S-20.



SECTION A-A



SECTION B-B



PILE SPLICE DETAILS

PROJECT NO. **BR-0100**

RUTHERFORD COUNTY

STATION: **18+28.00 -L-**

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

**END BENTS 1 & 2
DETAILS &
BILL OF MATERIAL**

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROFESSIONAL SEAL
ELIZABETH F. LAWES
ENGINEER
044167
12/18/2024

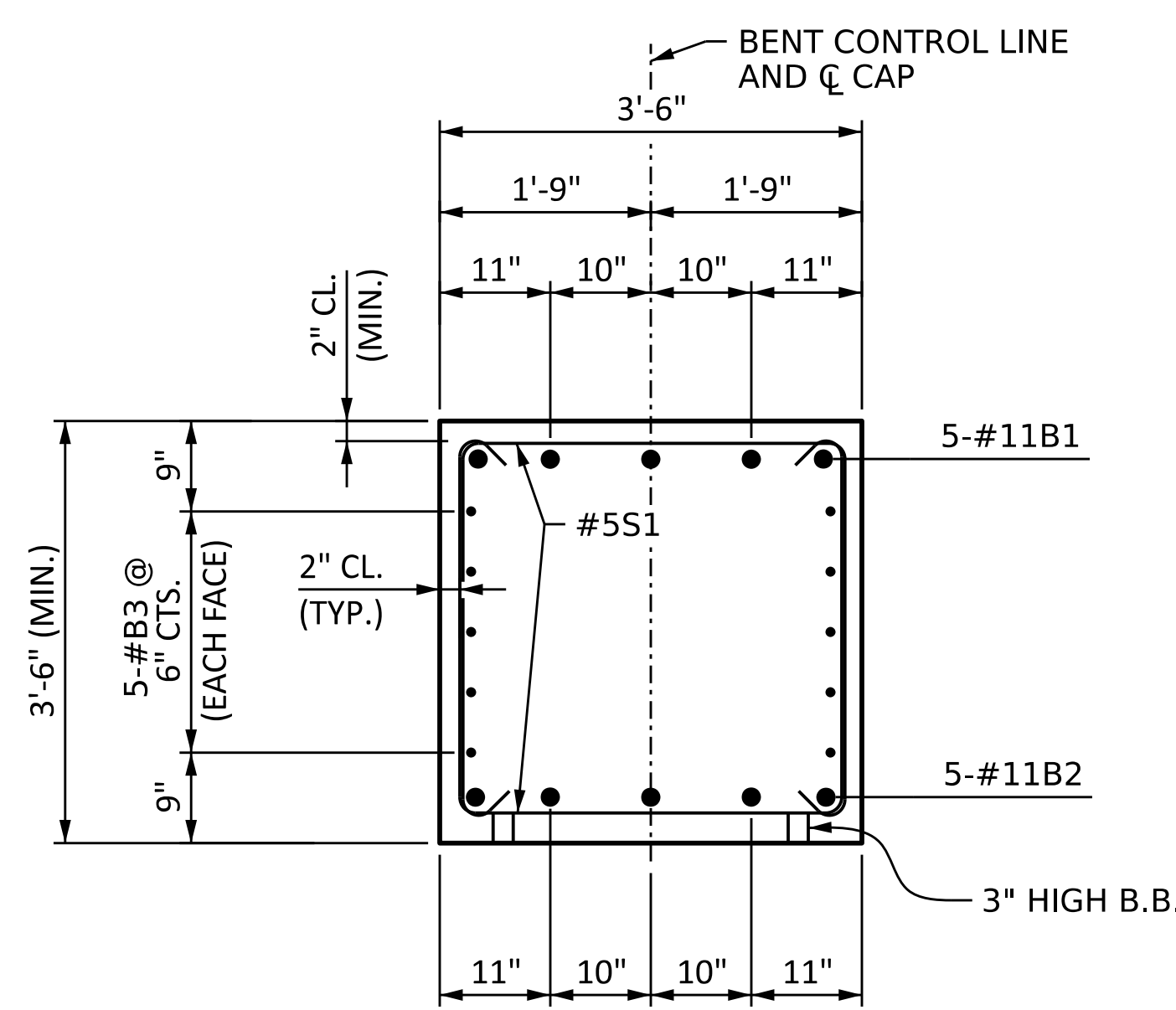
DESIGNED BY: J. WHEATLEY DATE: MAY 2024
DRAWN BY: M. HOBBS DATE: MAY 2024
CHECKED BY: E. LAWES DATE: MAY 2024
DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024

wsp

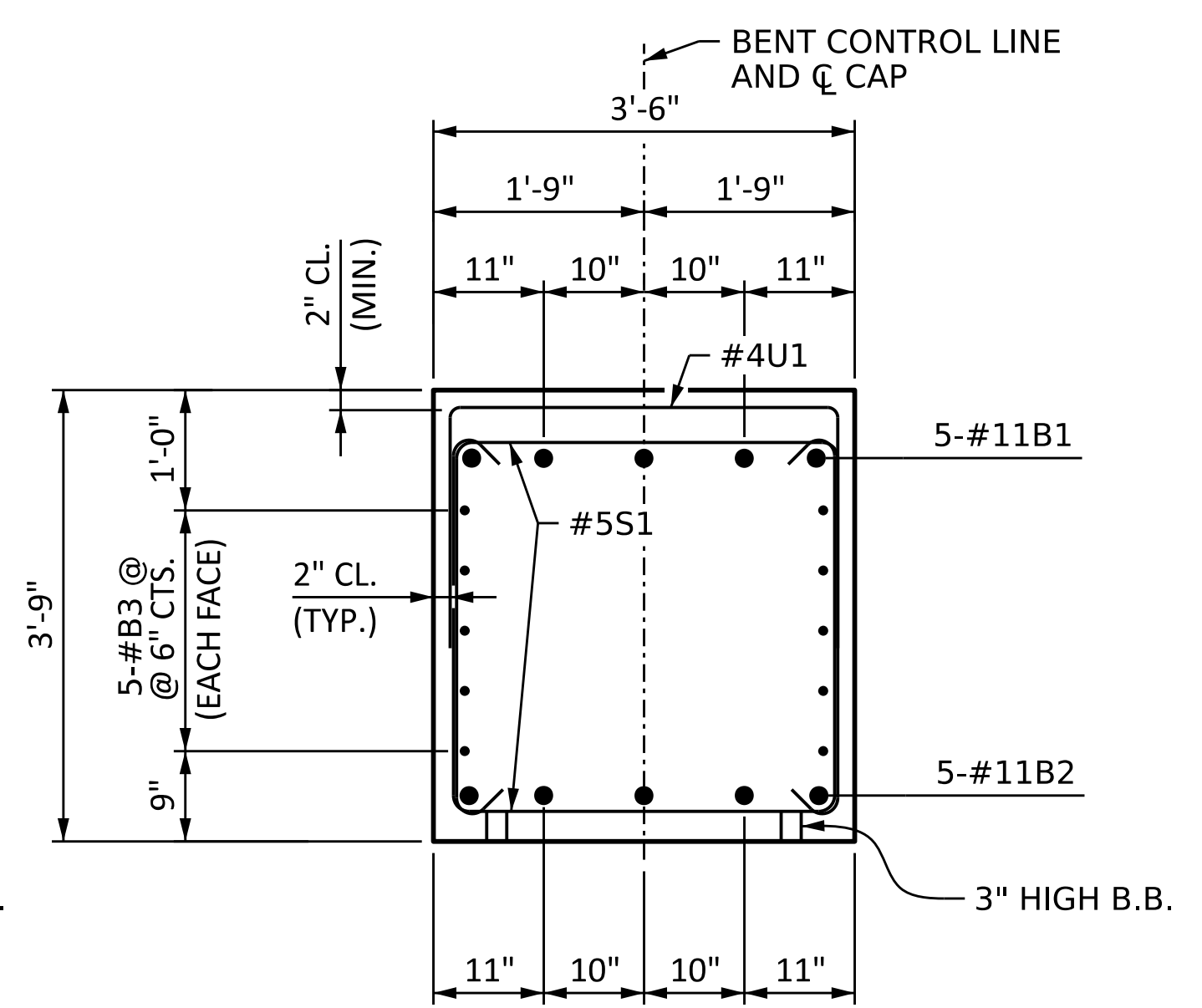
WSP USA Inc.
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
LICENSE NO. F-0165

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

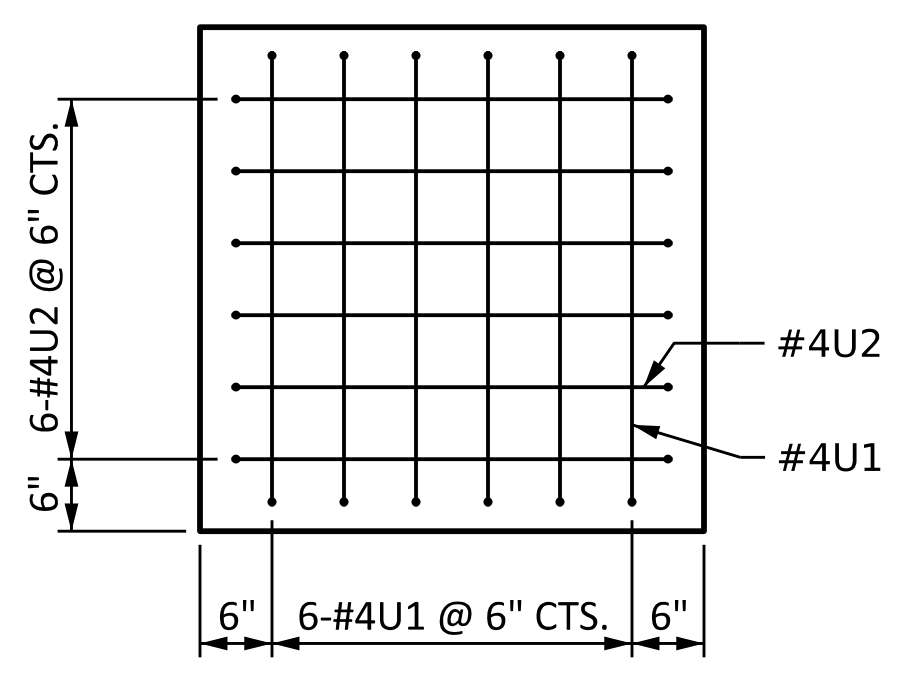
TOTAL SHEETS: 30



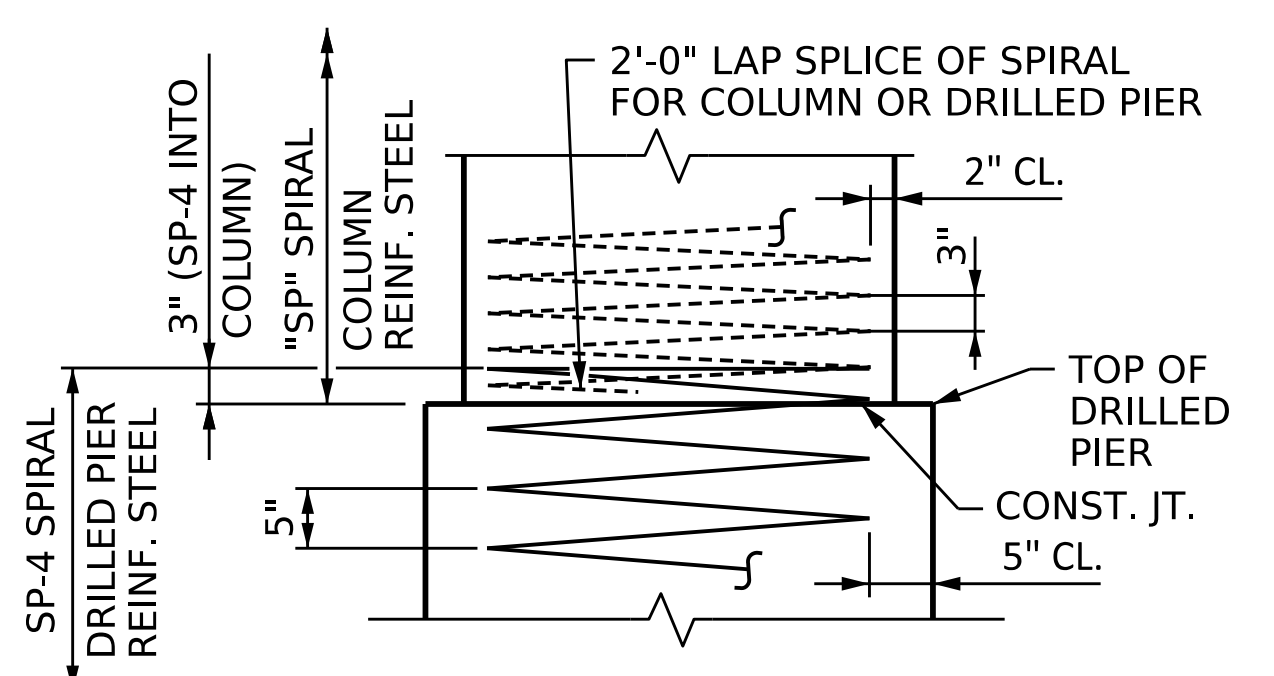
SECTION A-A



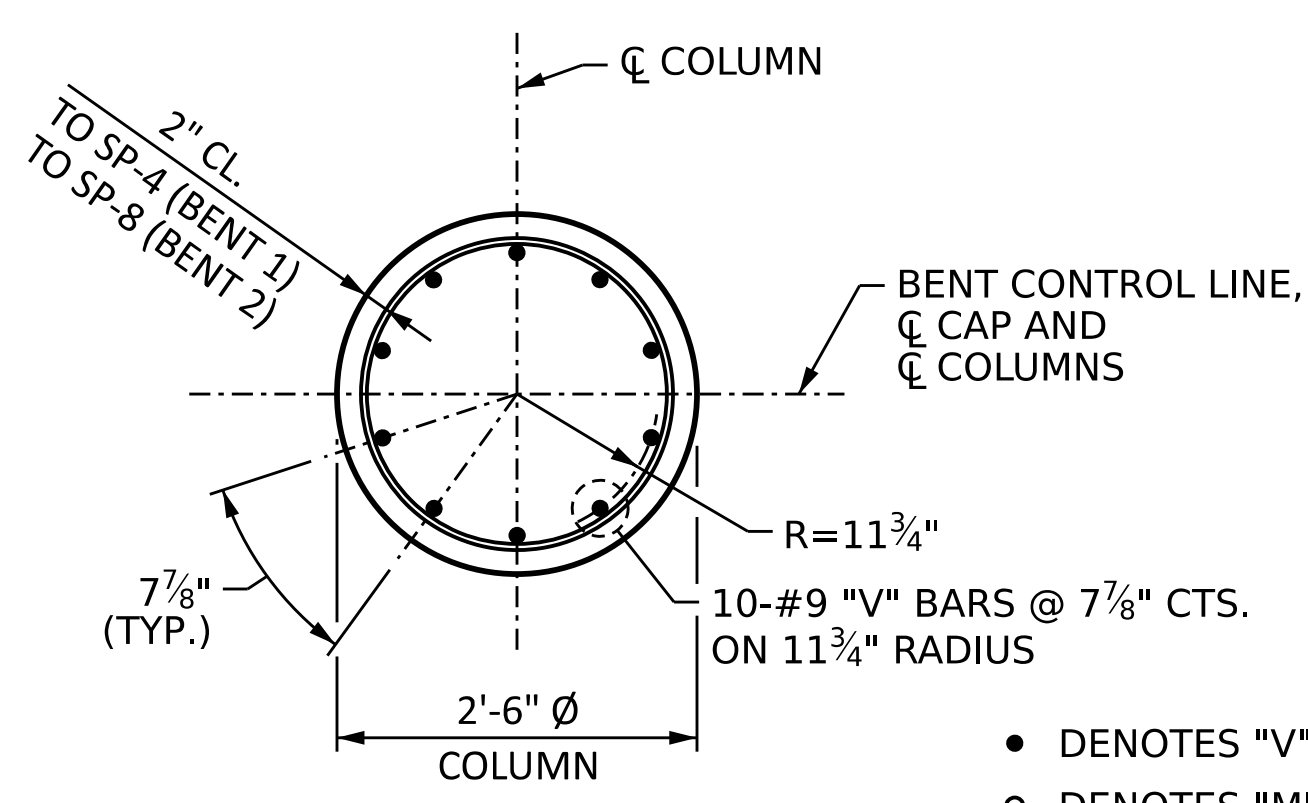
SECTION B-B



VIEW X-X

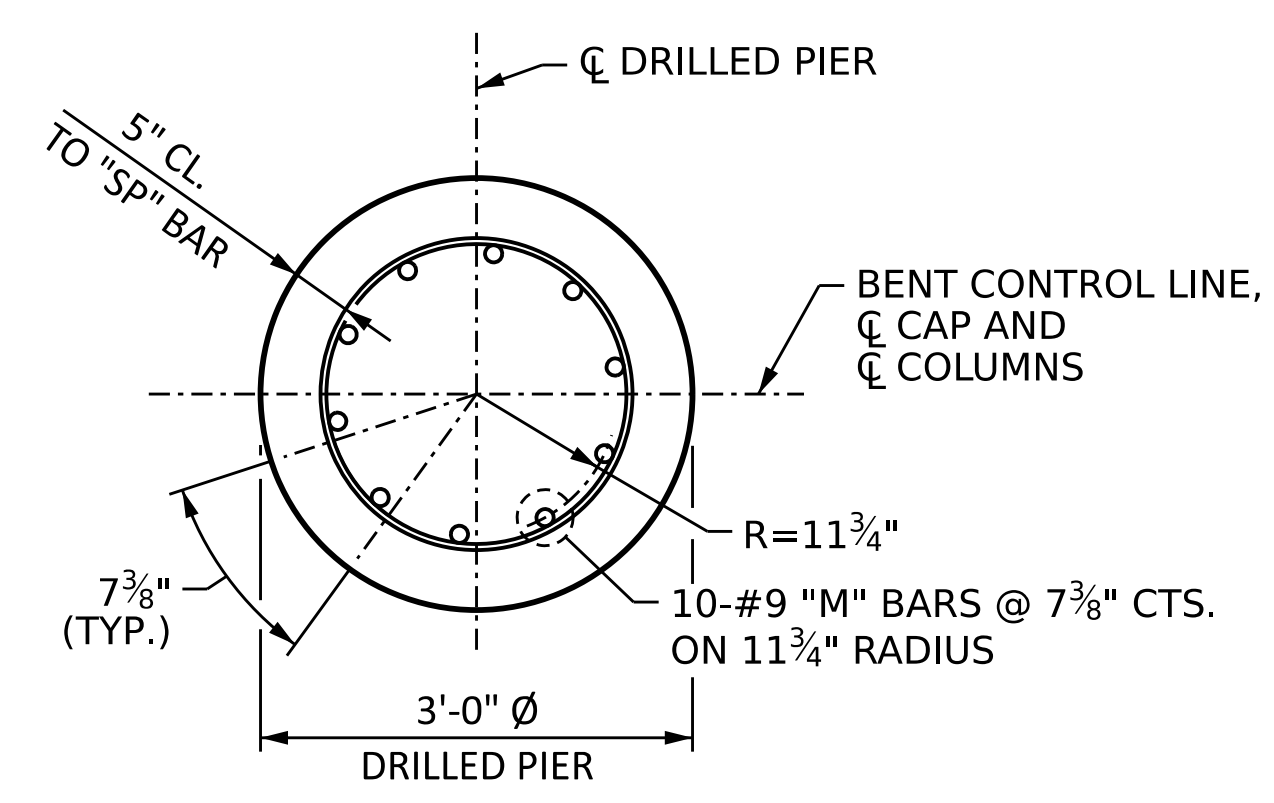


CONSTRUCTION JOINT DETAIL



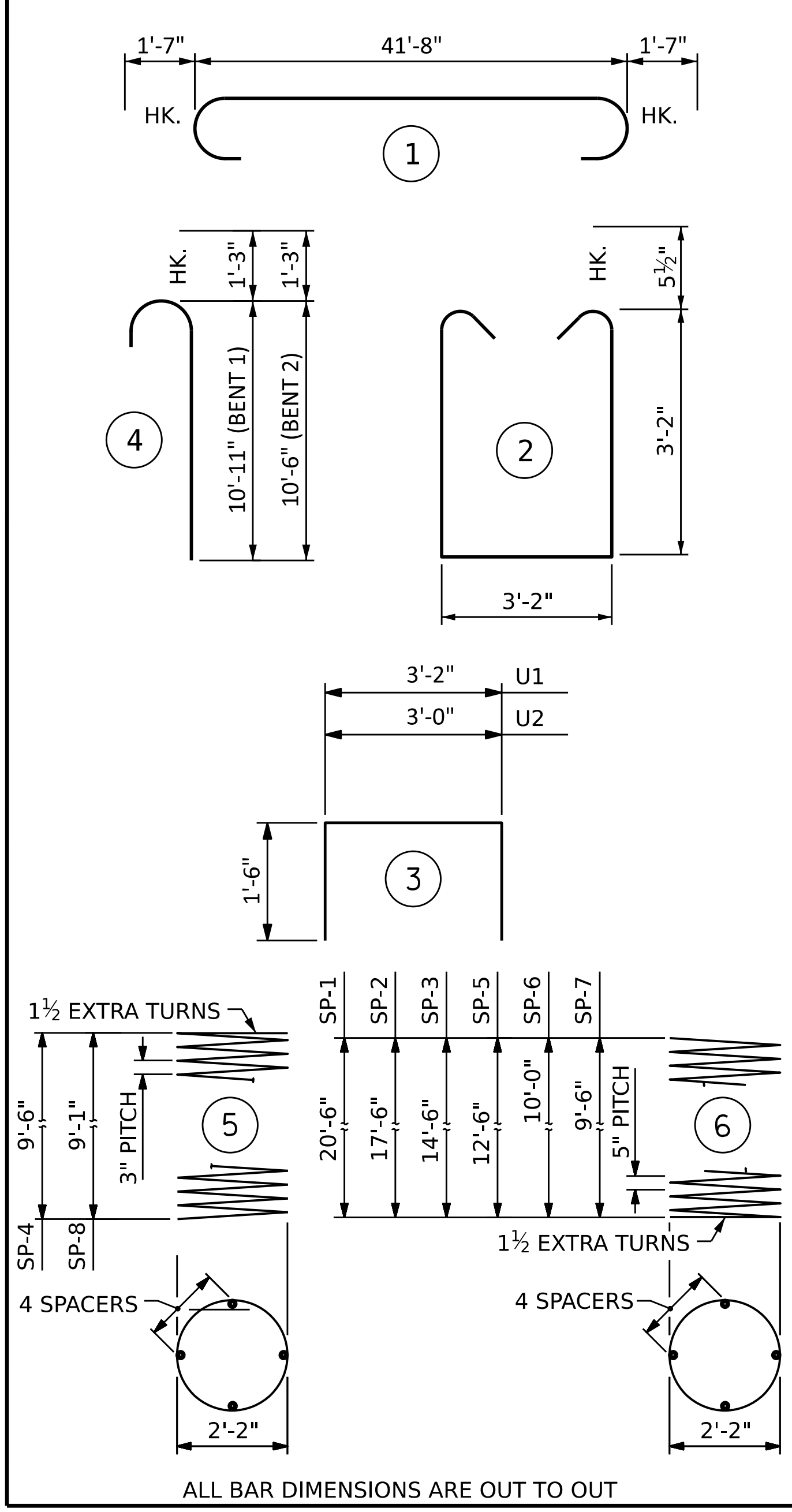
SECTION C-C

- DENOTES "V" BARS
- DENOTES "M" BARS



SECTION D-D

BAR TYPES

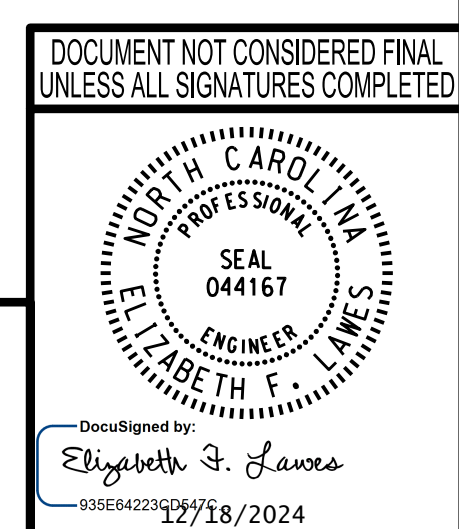


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1						BENT 2							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	5	#11	1	44'-10"	1191	B1	5	#11	1	44'-10"	1191		
B2	5	#11	STR	41'-8"	1107	B2	5	#11	STR	41'-8"	1107		
B3	10	#5	STR	41'-8"	435	B3	10	#5	STR	41'-8"	435		
M1	10	#9	STR	27'-7"	938	M4	10	#9	STR	19'-7"	666		
M2	10	#9	STR	24'-7"	836	M5	10	#9	STR	18'-1"	615		
M3	10	#9	STR	21'-7"	734	M6	10	#9	STR	16'-7"	564		
S1	78	#5	2	10'-5"	847	S1	78	#5	2	10'-5"	847		
U1	44	#4	3	6'-2"	181	U1	44	#4	3	6'-2"	181		
U2	12	#4	3	6'-0"	48	U2	12	#4	3	6'-0"	48		
V1	30	#9	4	12'-2"	1241	V2	30	#9	4	11'-9"	1199		
REINFORCING STEEL						7,558	REINFORCING STEEL						6,853
SP-1	1	*	6	349'-10"	365	SP-5	1	*	6	220'-3"	230		
SP-2	1	*	6	302'-1"	315	SP-6	1	*	6	193'-0"	201		
SP-3	1	*	6	254'-4"	265	SP-7	1	*	6	172'-6"	180		
SP-4	3	**	5	272'-6"	546	SP-8	3	**	5	258'-10"	519		
SPIRAL COLUMN REINFORCING STEEL						LBS. 1,491	SPIRAL COLUMN REINFORCING STEEL						LBS. 1,130
* THE SPIRAL SP-1, SP-2 & SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.						* THE SPIRAL SP-1, SP-2 & SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.							
**THE SPIRAL SP-4 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.						**THE SPIRAL SP-4 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.							
CLASS "A" CONCRETE BREAKDOWN						CLASS "A" CONCRETE BREAKDOWN							
POUR #2 - COLUMNS						5.0 C.Y.	POUR #2 - COLUMNS						4.8 C.Y.
POUR #3 - CAP						9.8 C.Y.	POUR #3 - CAP						9.8 C.Y.
CLASS "A" CONCRETE TOTAL						14.8 C.Y.	CLASS "A" CONCRETE TOTAL						14.6 C.Y.
4'-0" Ø DRILLED PIERS							4'-0" Ø DRILLED PIERS						
POUR #1 - DRILLED PIERS						C.Y. 14.1	POUR #1 - DRILLED PIERS						C.Y. 9.0

DESIGNED BY: J. WHEATLEY DATE: MAY 2024
 DRAWN BY: M. HOBBS DATE: MAY 2024
 CHECKED BY: E. LAWES DATE: MAY 2024
 DESIGN ENGINEER OF RECORD: E. LAWES DATE: MAY 2024



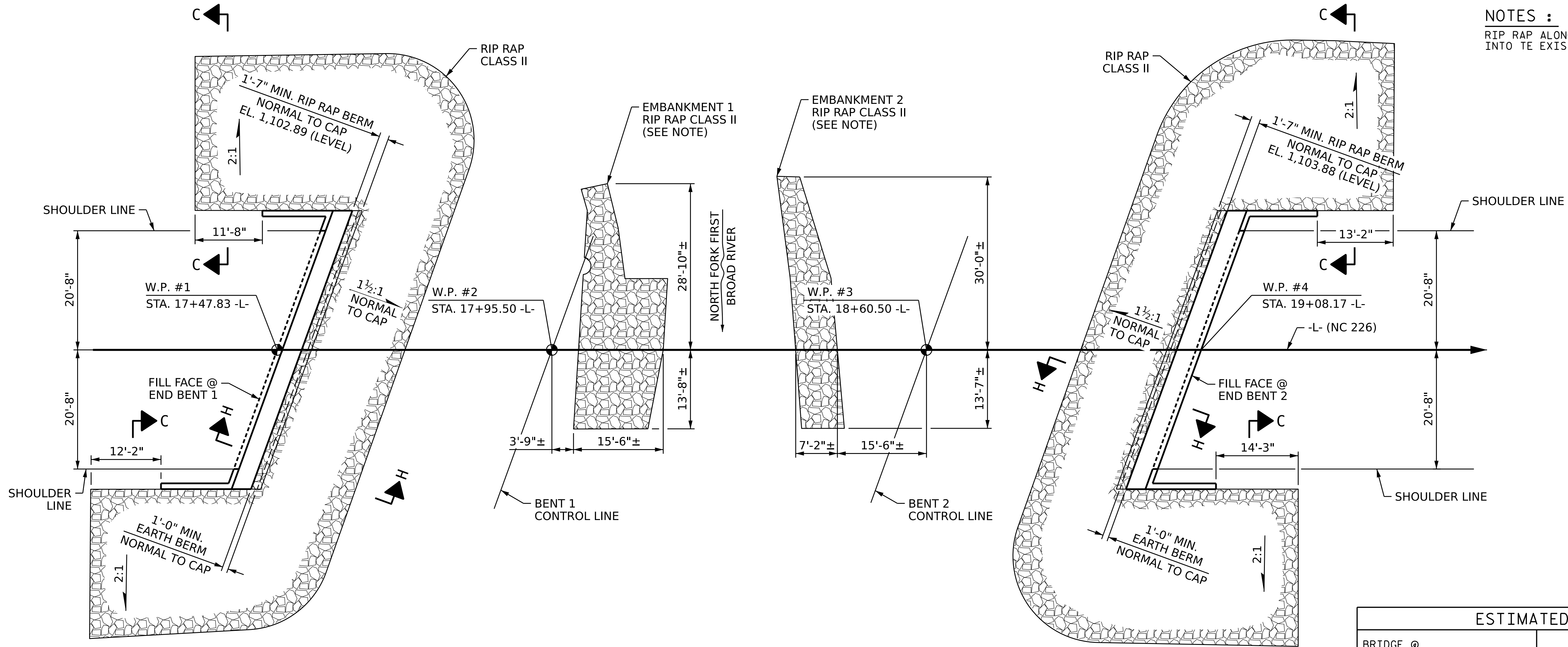
PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
BENTS 1 & 2
DETAILS AND
BILL OF MATERIAL

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

TOTAL SHEETS: 30

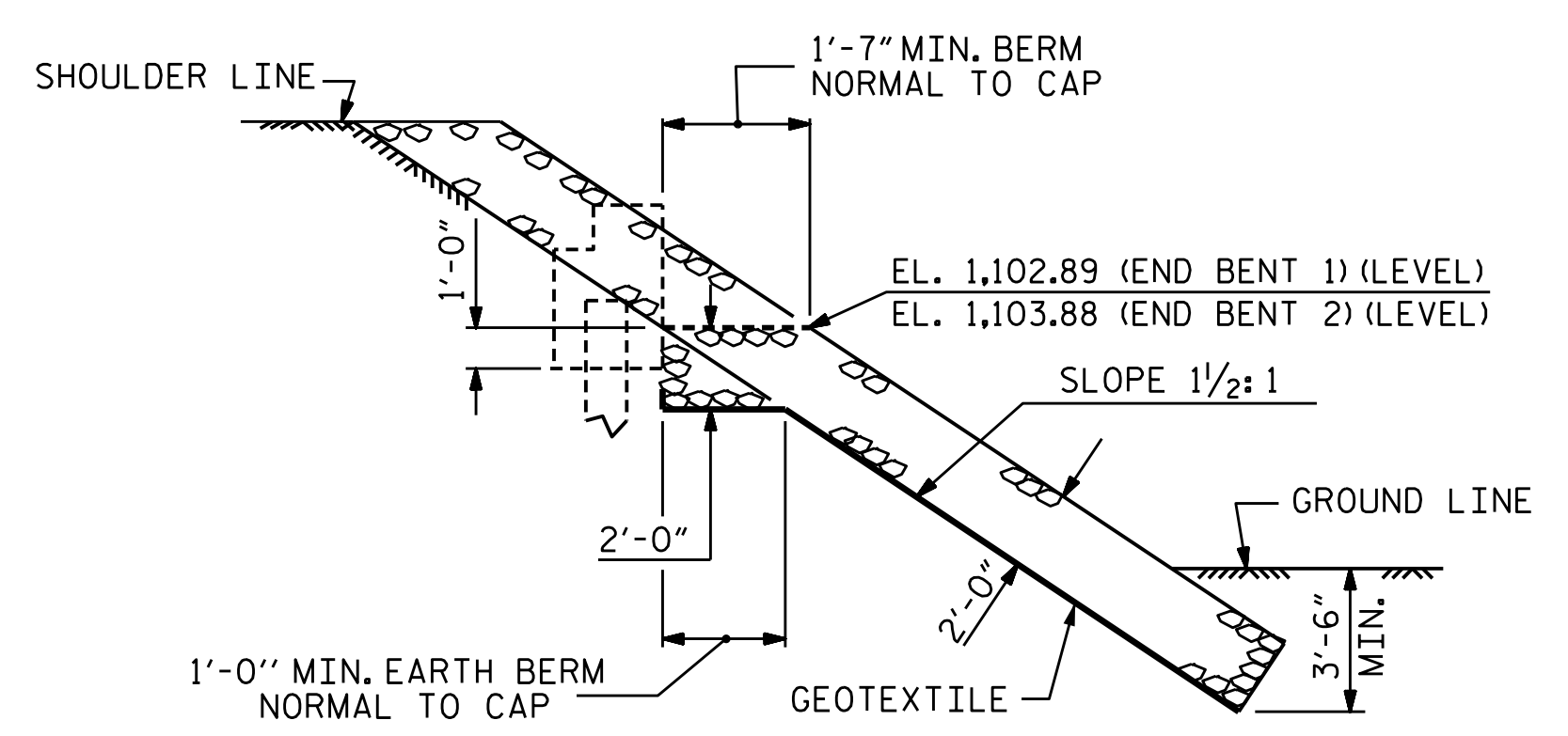
NOTES :
 RIP RAP ALONG EMBANKMENTS SHALL NOT BE KEYED INTO THE EXISTING SLOPE.



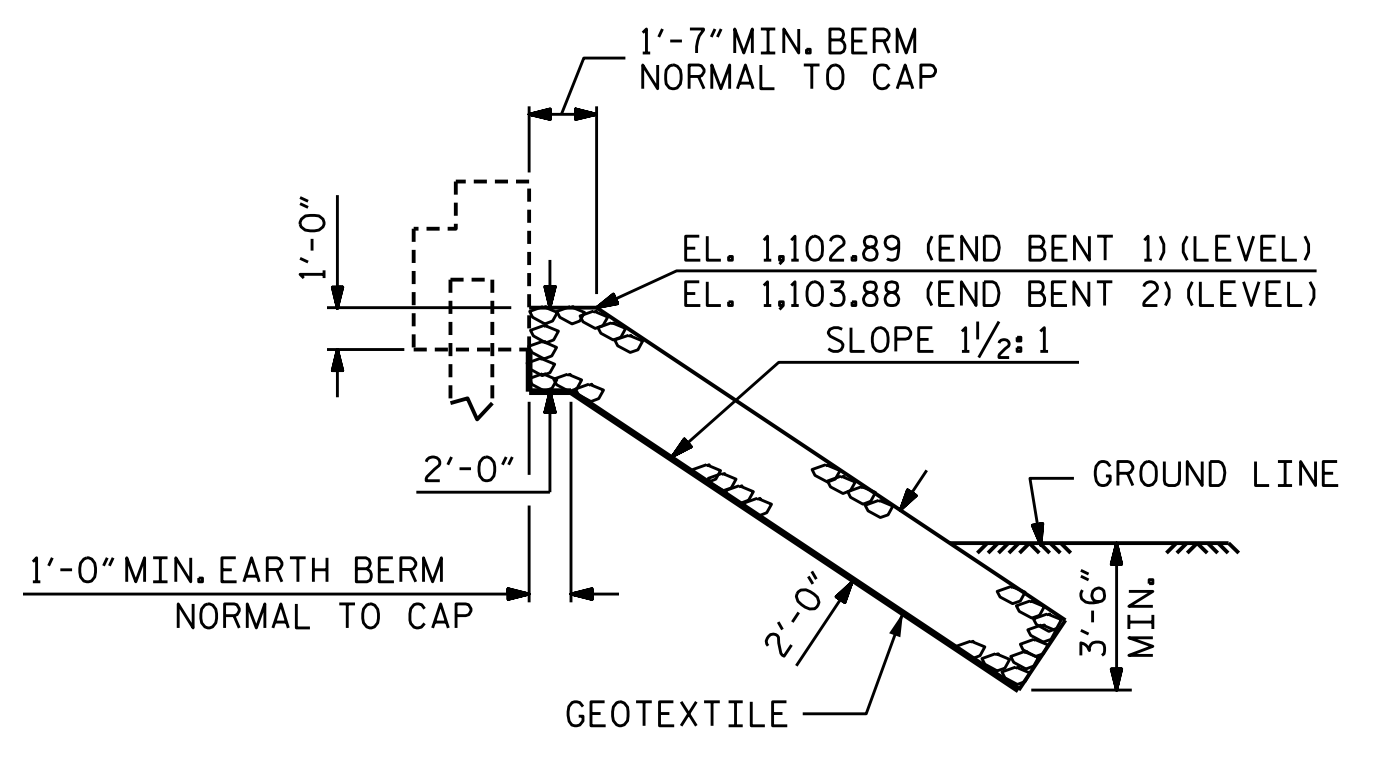
PLAN OF RIP RAP

ESTIMATED QUANTITIES		
BRIDGE @ STA. 18+28.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	* 529	* 588
END BENT 2	† 518	† 576

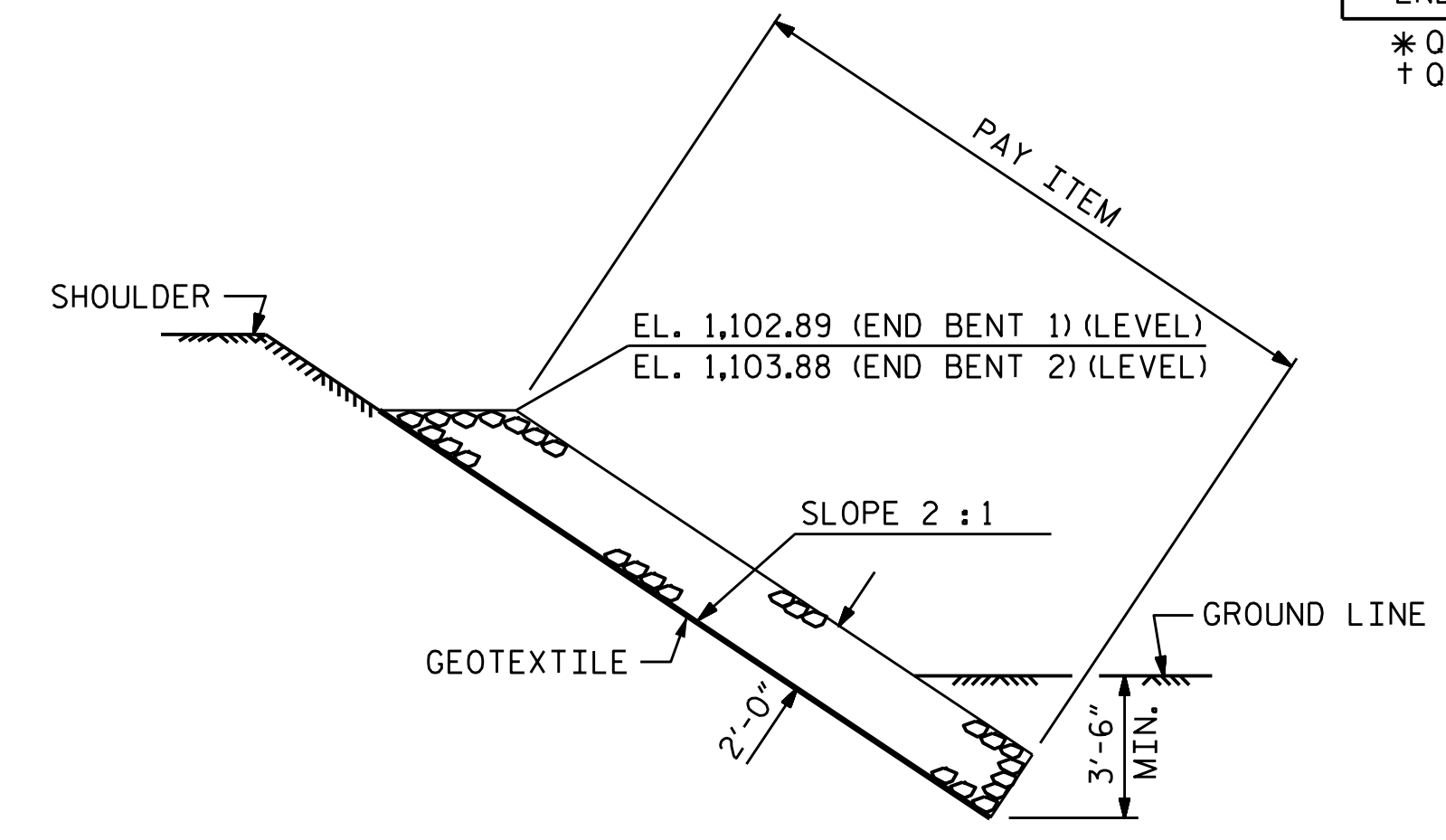
* QUANTITIES INCLUDE EMBANKMENT 1 RIP RAP
 † QUANTITIES INCLUDE EMBANKMENT 2 RIP RAP



SECTION H-H



SECTION BERM RIP RAPPED



SECTION C-C

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

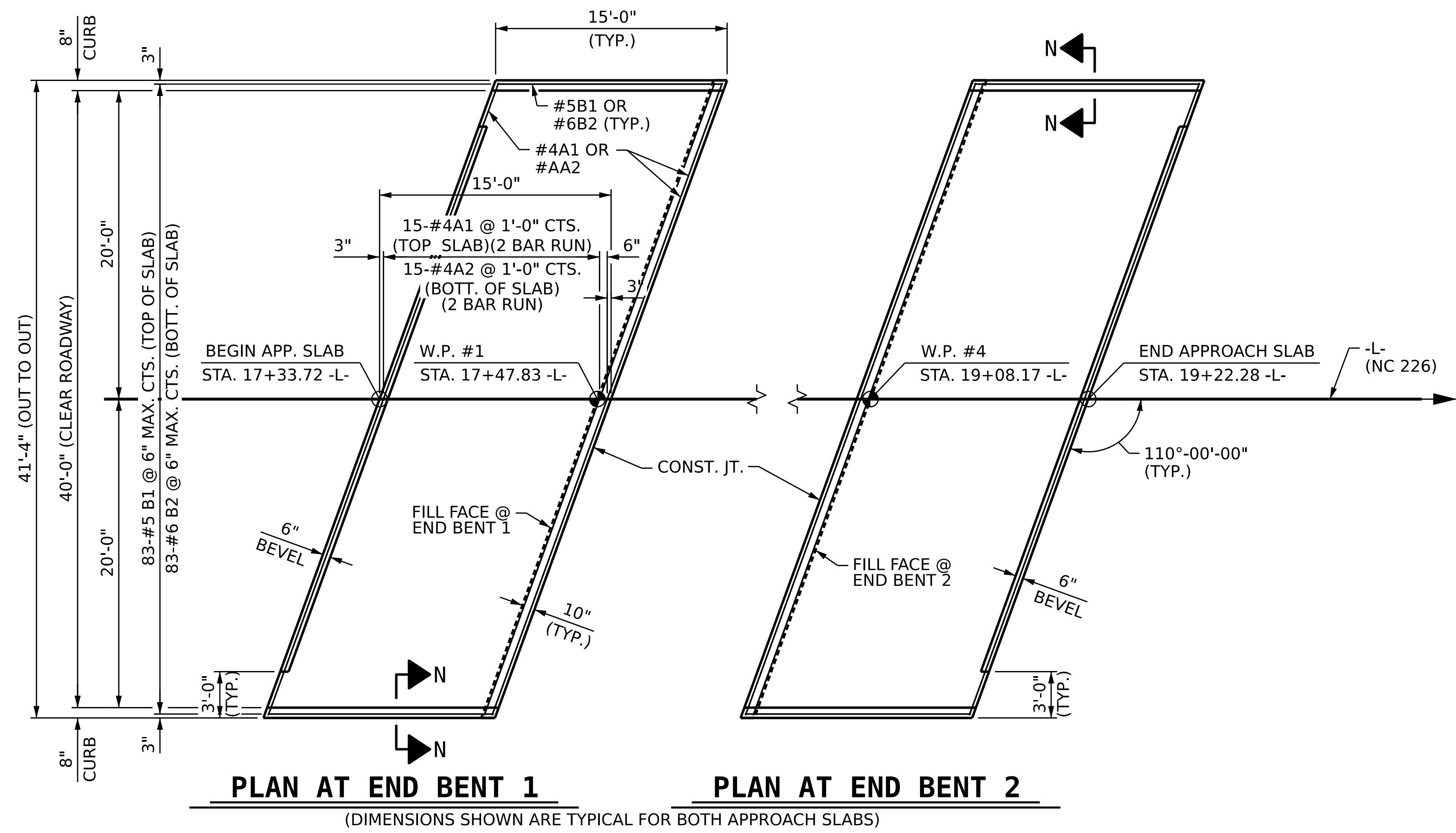
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
RIP RAP DETAILS

DRAWN BY :	REK 1/84	REV. 10/1/11	MAA/GM
CHECKED BY :	RDU 1/84	REV. 12/21/11	MAA/GM
		REV. 12/17	MAA/THC
DESIGNED BY :	J. WHEATLEY	DATE :	MAY 2024
DRAWN BY :	M. HOBBS	DATE :	MAY 2024
CHECKED BY :	E. LAWES	DATE :	MAY 2024
DESIGN ENGINEER OF RECORD :	E. LAWES	DATE :	MAY 2024

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REVISIONS						SHEET NO. S-28 TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

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

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

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

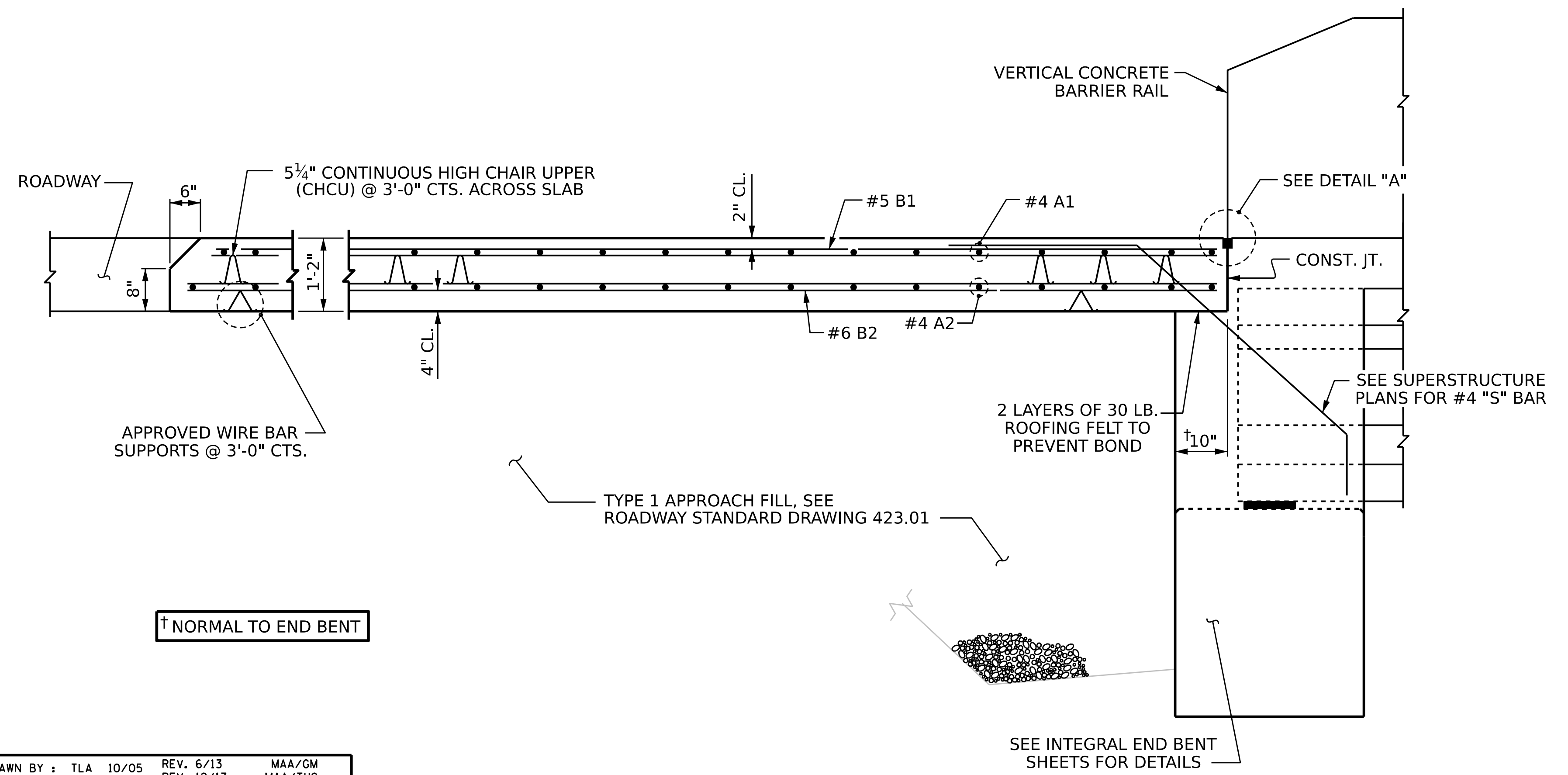
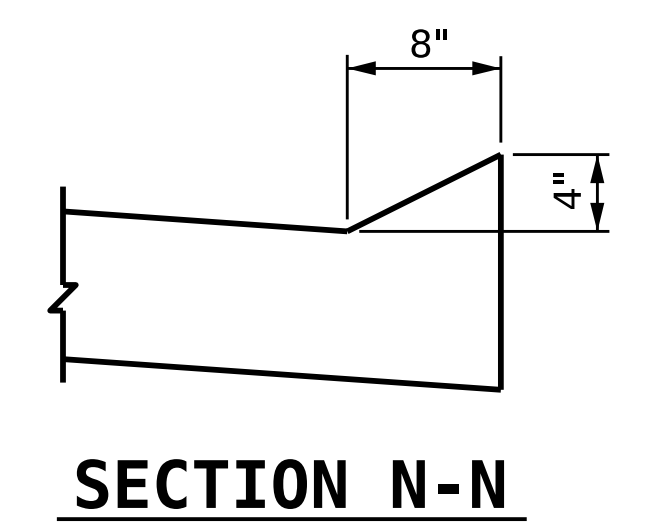
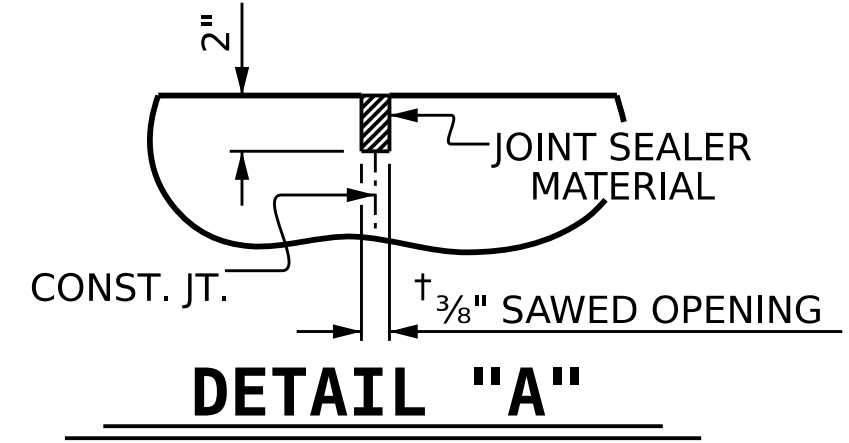
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

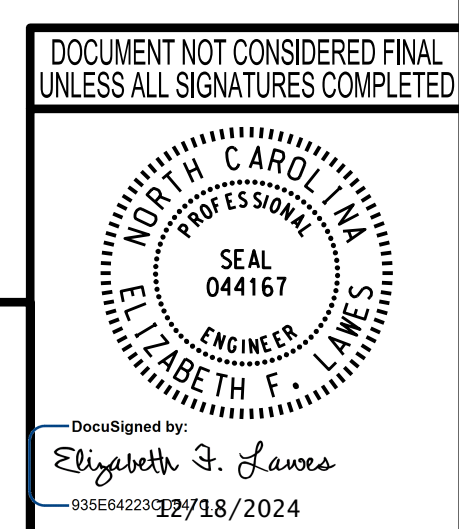
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	30	#4	STR	22'-9"	456
A2	30	#4	STR	22'-7"	453
* B1	83	#5	STR	14'-2"	1226
B2	83	#6	STR	14'-8"	1828
REINFORCING STEEL				LBS.	2,281
* EPOXY COATED REINFORCING STEEL				LBS.	1,682
CLASS AA CONCRETE				C. Y.	26.7

SPLICE LENGTHS

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



DRAWN BY: TLA	10/05	REV. 6/13	MAA/GM
CHECKED BY: GM	5/06	REV. 12/17	MAA/THC
		REV. 06/19	BNB/THC
DESIGNED BY: J. WHEATLEY	DATE: MAY 2024		
DRAWN BY: M. HOBBS	DATE: MAY 2024		
CHECKED BY: E. LAWES	DATE: MAY 2024		
DESIGN ENGINEER OF RECORD: E. LAWES	DATE: MAY 2024		



PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

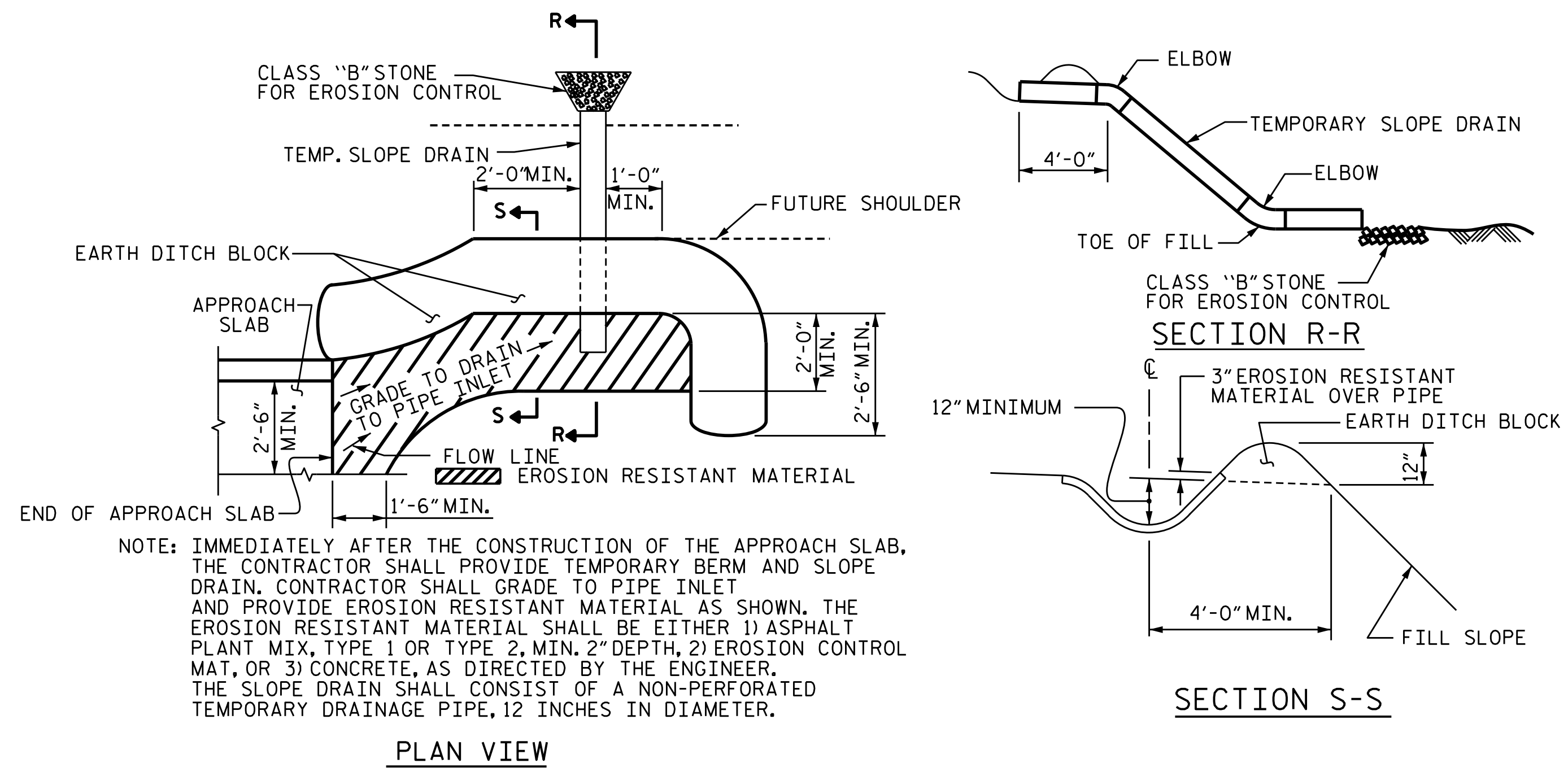
SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

REVISIONS			SHEET NO.
NO.	BY:	DATE:	
1			5-29
2			TOTAL SHEETS
			30

wsp

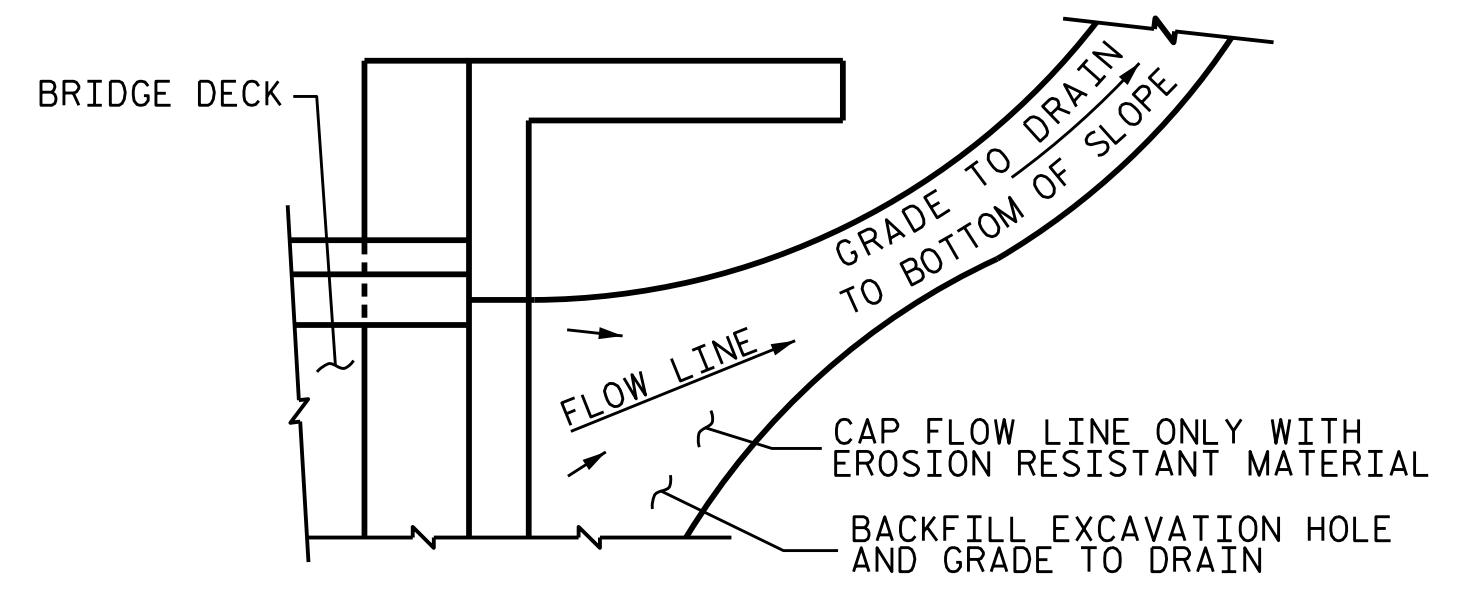
WSP USA Inc.
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165



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.

NOTES

FOR NOTES, SEE SHEET 1 OF 2.

TEMPORARY DRAINAGE DETAIL

PROJECT NO. **BR-0100**
RUTHERFORD COUNTY
 STATION: **18+28.00 -L-**

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**BRIDGE APPROACH
 SLAB DETAILS**

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
 Elizabeth F. Lawes
 12/18/2024

WSP USA Inc.
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601
 TEL: 1.919.836.4040
 LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			30
2			4			30

DRAWN BY: TLA	10/05	REV. 12/21/11	MAA/GM
CHECKED BY: GM	5/06	REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC
DESIGNED BY: J. WHEATLEY	DATE: MAY 2024		
DRAWN BY: M. HOBBS	DATE: MAY 2024		
CHECKED BY: E. LAWES	DATE: MAY 2024		
DESIGN ENGINEER OF RECORD: E. LAWES	DATE: MAY 2024		

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.