

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

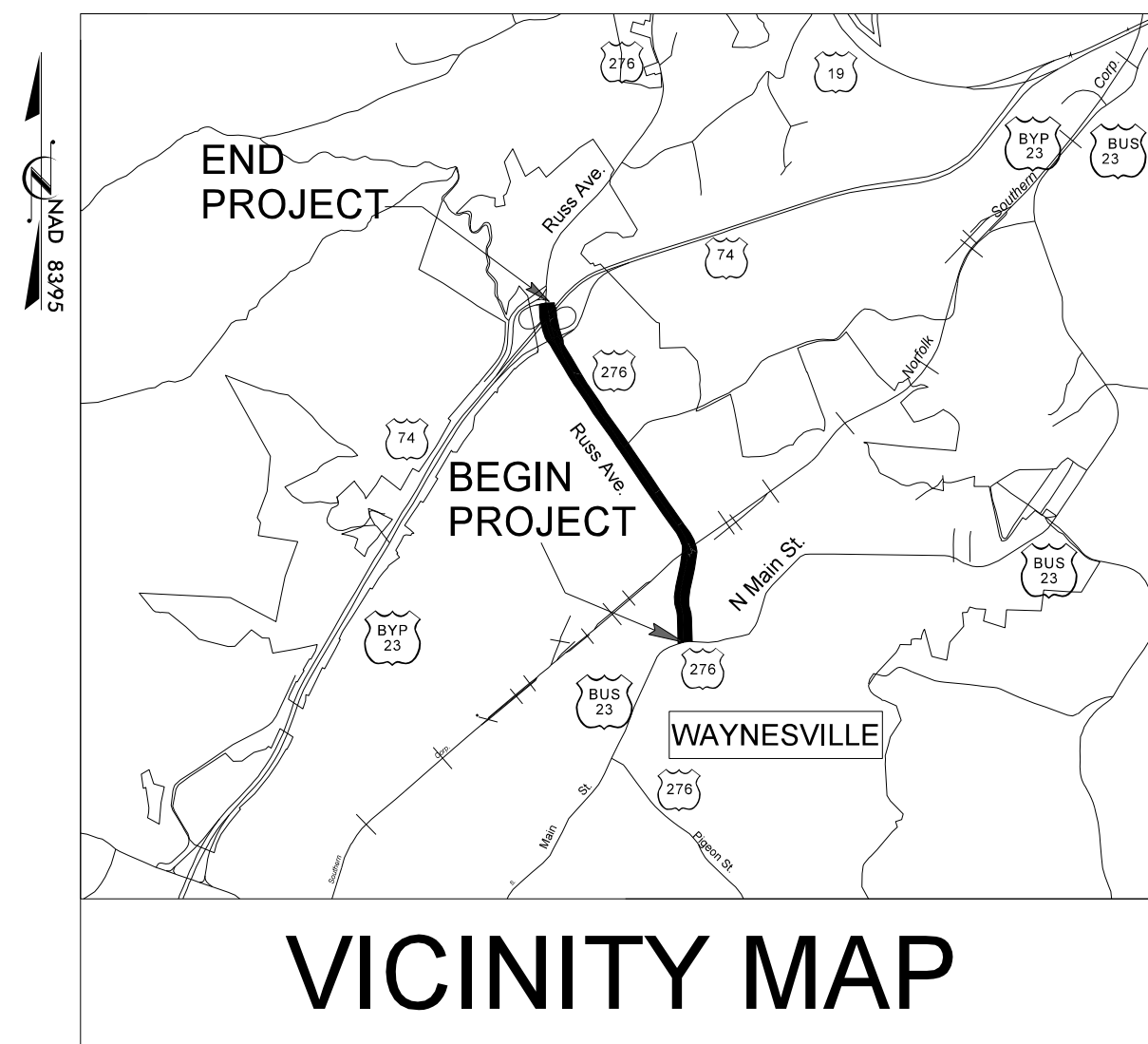
# HAYWOOD COUNTY

LOCATION: US-276 (RUSS AVENUE) FROM US 23 /74 TO US 23  
BUSINESS (MAIN STREET) UPGRADE CORRIDOR

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS,  
RETAINING WALLS AND STRUCTURES

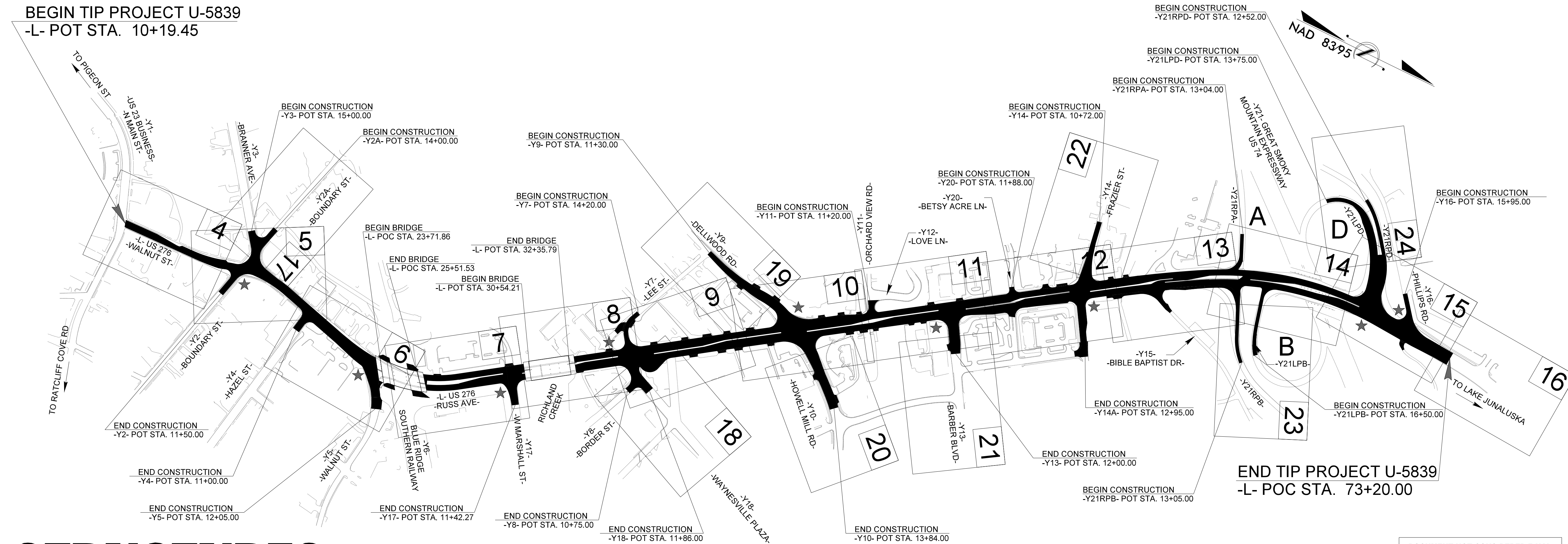
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5839	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50230.1.1		P.E.	
50230.2.1		RW, UTL.	
50230.3.1		CONST.	

★ UPGRADE EXISTING SIGNAL



VICINITY MAP

BEGIN TIP PROJECT U-5839  
-L- POT STA. 10+19.45

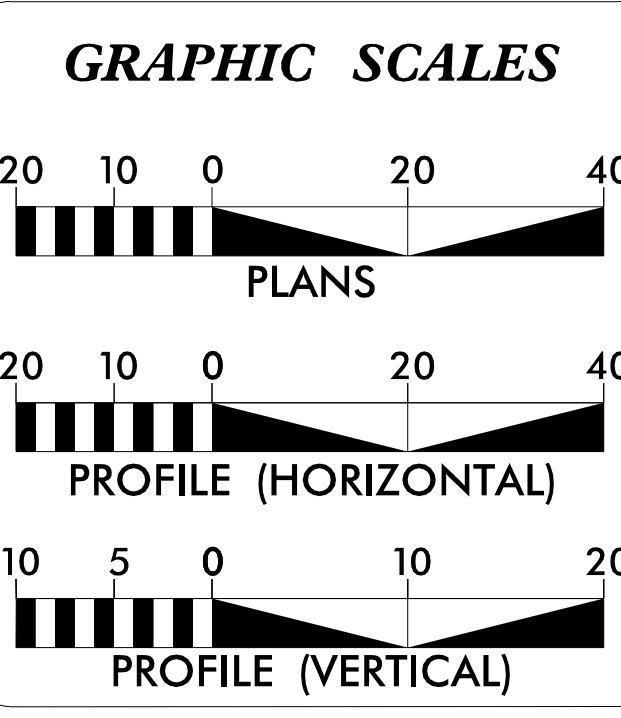


END TIP PROJECT U-5839  
-L- POC STA. 73+20.00

## STRUCTURES

THERE IS NO CONTROL OF ACCESS ON THIS PROJECT EXCEPT INTERCHANGES & U-TURN BULBS HAVE FULL CONTROL OF ACCESS. THIS PROJECT DESIGN CRITERIA IS BASED ON LOW SPEED STREETS IN URBAN AREAS.

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

ADT 2021 =	26,475
ADT 2041 =	29,975
K =	8 %
D =	55 %
T =	4 % *
V =	40 MPH
* TTST =	1% DUAL 3%
FUNC CLASS =	URBAN ARTERIAL
STATEWIDE TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-5839	1.125 Miles
LENGTH STRUCTURE TIP PROJECT U-5839	0.068 Miles
TOTAL LENGTH TIP PROJECT U-5839	1.193 Miles

PREPARED IN THE OFFICE OF:

**NV5**  
NVS ENGINEERS & CONSULTANTS, INC. NC License # F-1333

FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION  
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 3, 2019  
LETTING DATE: DECEMBER 19, 2023  
NCDOT CONTACT:

ELIZABETH R. PHIPPS, P.E.  
PROJECT ENGINEER

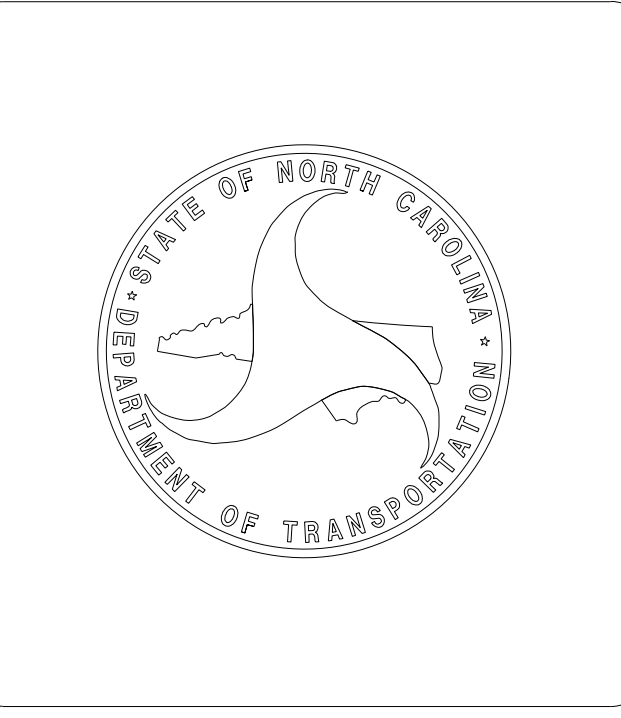
ROBERT C. LARSON, P.E.  
PROJECT DESIGN ENGINEER

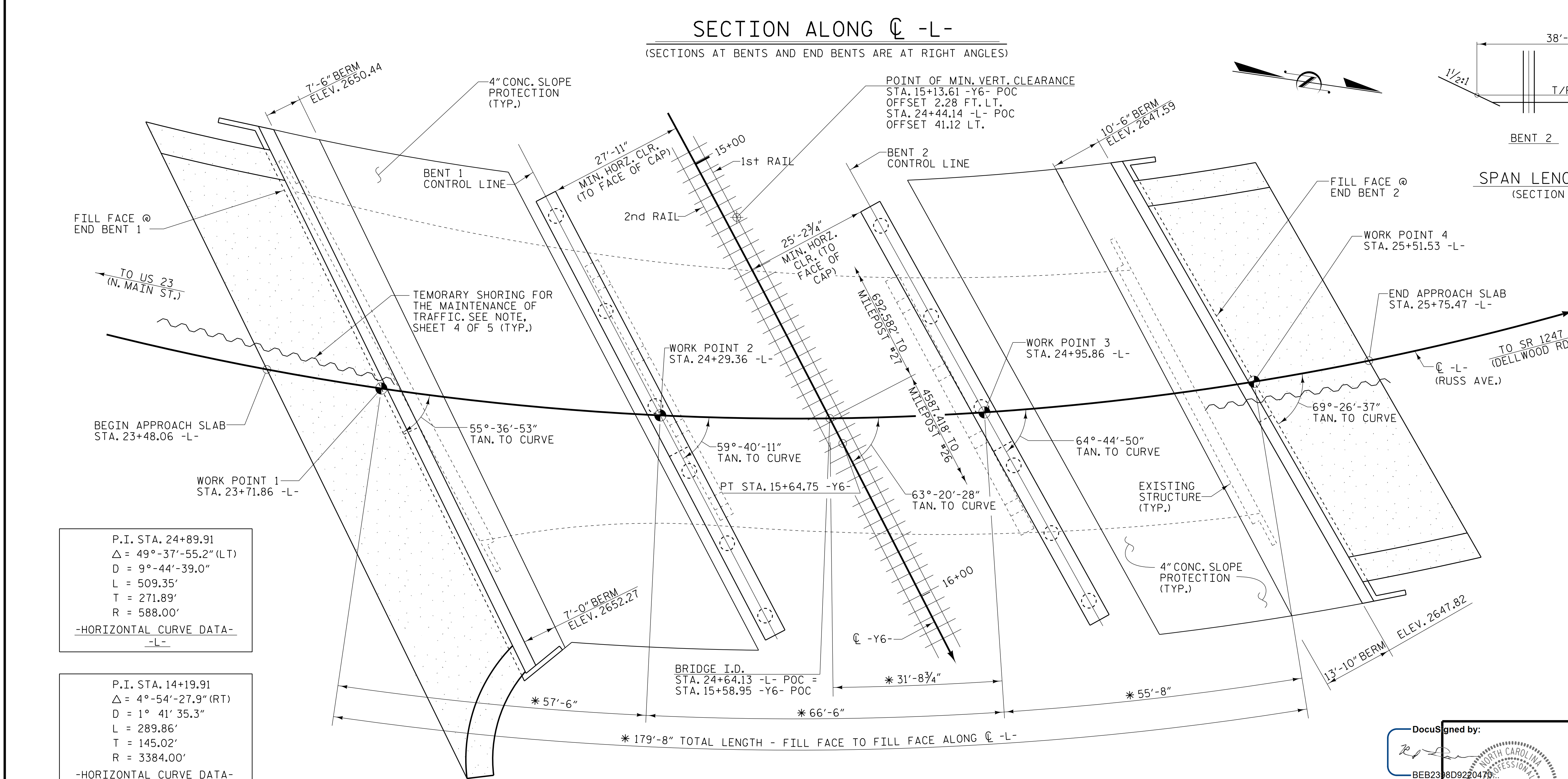
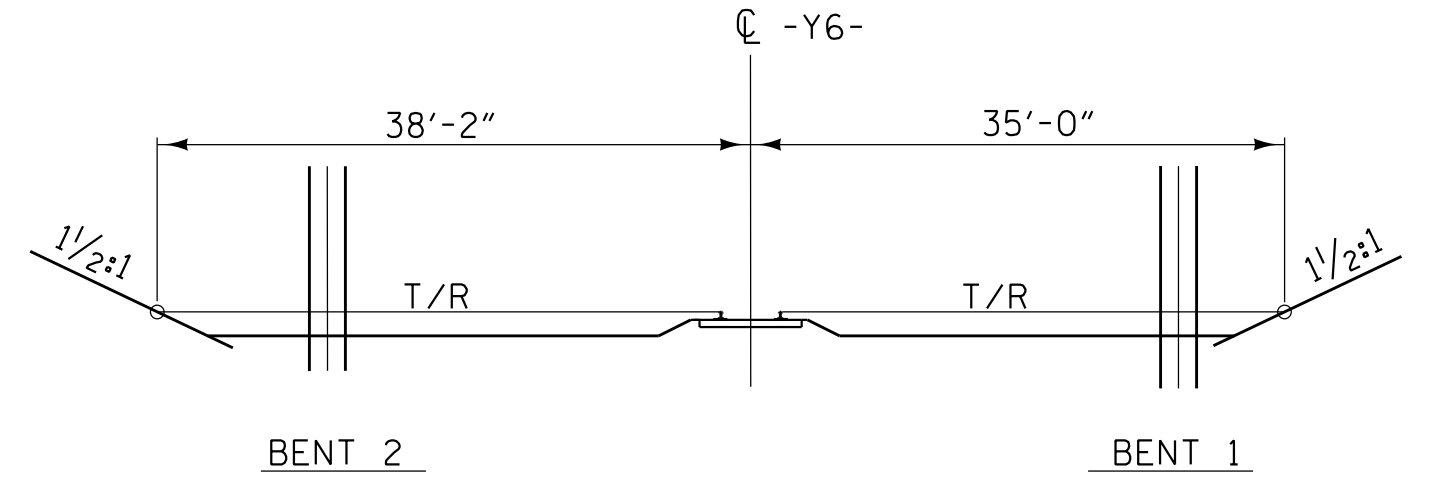
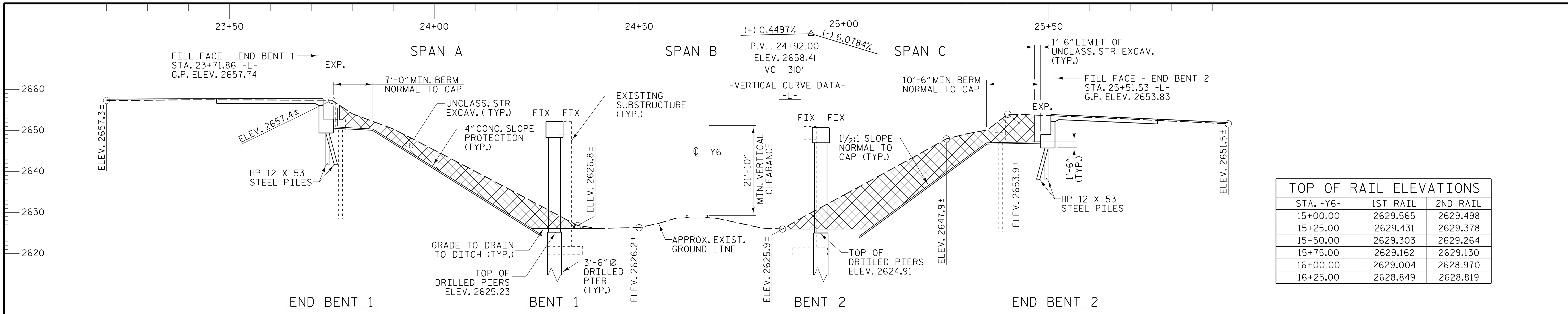
DAVID STUTTS, P.E.  
STRUCTURES MANAGEMENT UNIT

SIGNATURE: \_\_\_\_\_ P.E.

**STRUCTURES DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.





**TOP OF RAIL ELEVATIONS**

STA. -Y6-	1ST RAIL	2ND RAIL
15+00.00	2629.565	2629.498
15+25.00	2629.431	2629.378
15+50.00	2629.303	2629.264
15+75.00	2629.162	2629.130
16+00.00	2629.004	2628.970
16+25.00	2628.849	2628.819



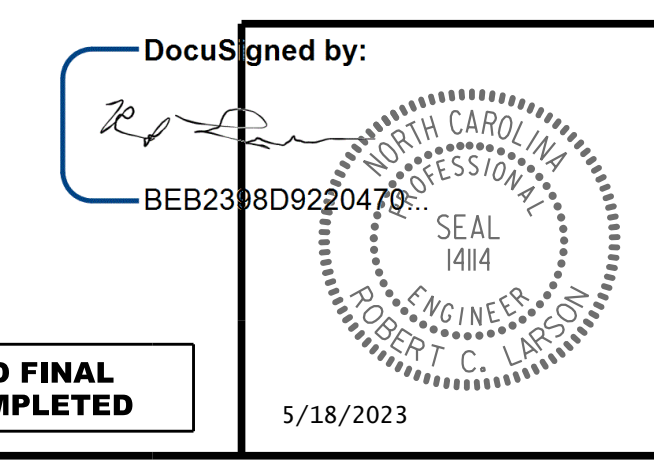
PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC =  
15+58.95 -Y6- POC  
 SHEET 1 OF 5 REPLACES BRIDGE NO. 430184

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON -L- US 276  
 (RUSS AVE.) OVER -Y6-  
 (BLUE RIDGE SOUTHERN RAILROAD)  
 BETWEEN US 23 (N. MAIN ST.)  
 AND SR 1247 (DELLWOOD RD.)

REVISIONS

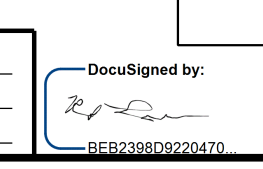
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-1  
 TOTAL SHEETS 63

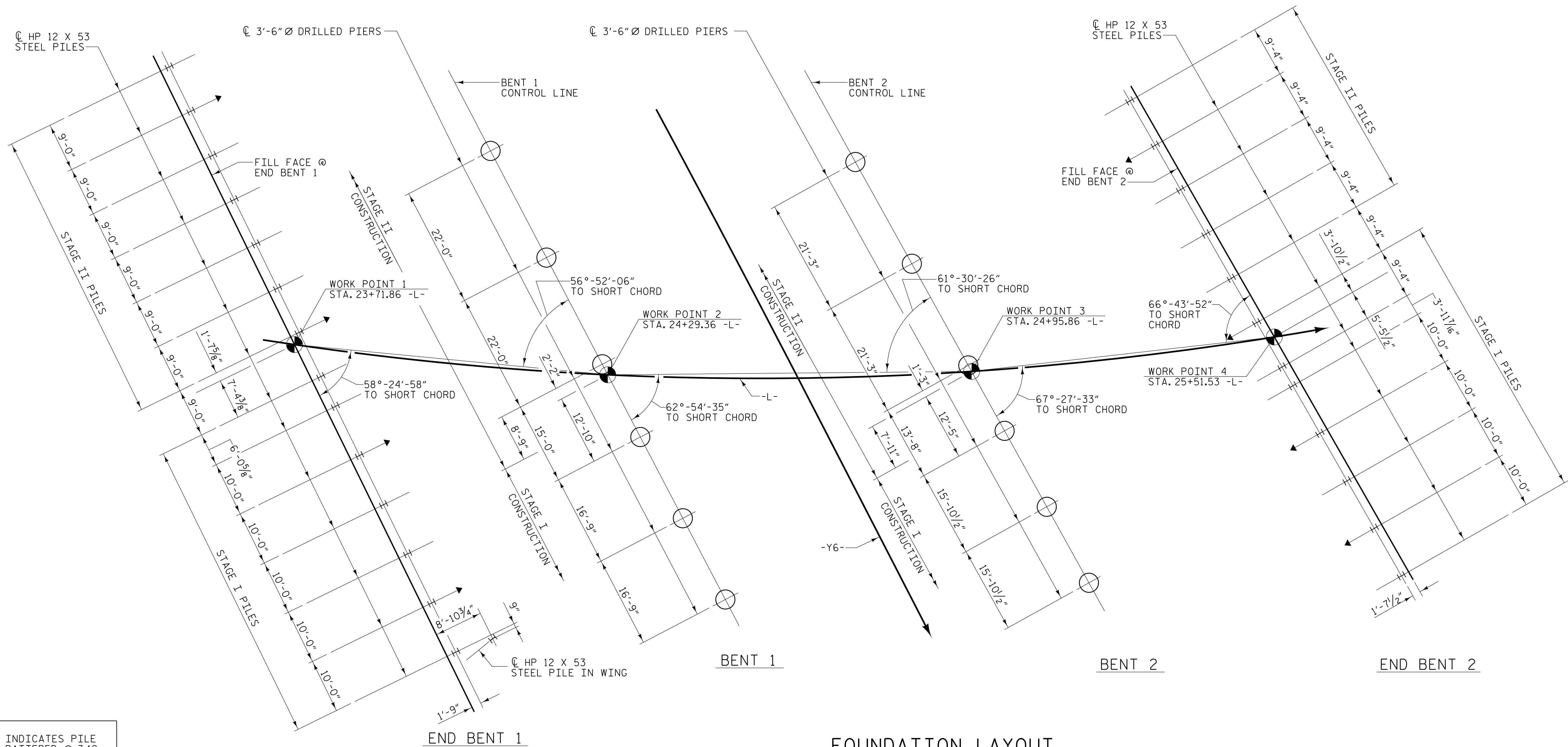


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DRAWN BY: W. B. ALLEN DATE: 5/19  
 CHECKED BY: Z. H. BROWN DATE: 6/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23



5/17/2023 7:04:46 PM RA\Structures3 span Bridge cover RRV01UG839.SMI.GD430184.dgn



**FOUNDATION LAYOUT**

▲ INDICATES PILE BATTERED @ 3:12 IN DIRECTION OF ARROW

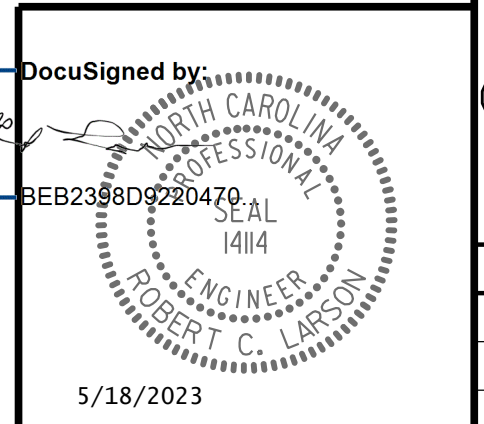
**NOTES**

- ALL PILES ARE HP 12 X 53.
- DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF THE CAP. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 97 TONS PER PILE.
- PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 106 TONS PER PILE.
- DRILLED-IN PILES ARE REQUIRED FOR END BENT 1 EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 2625 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 162 TONS PER PILE.
- CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT 1
- DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 177 TONS PER PILE.

- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 386 TONS PER PIER. TIP RESISTANCE IS NOT REQUIRED.
- DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 387 TONS PER PIER. TIP RESISTANCE IS NOT REQUIRED.
- INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 2585.3 FT. AND A PENETRATION OF AT LEAST 8 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 2583.8 FT. AND A PENETRATION OF AT LEAST 8 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 2 OF 5

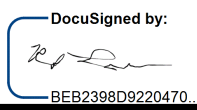


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON -L- US 276  
 (RUSS AVE.) OVER -Y6-  
 (BLUE RIDGE SOUTHERN RAILROAD)  
 BETWEEN US 23 (N. MAIN ST.)  
 AND SR 1247 (DELLWOOD RD.)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
2			4			63

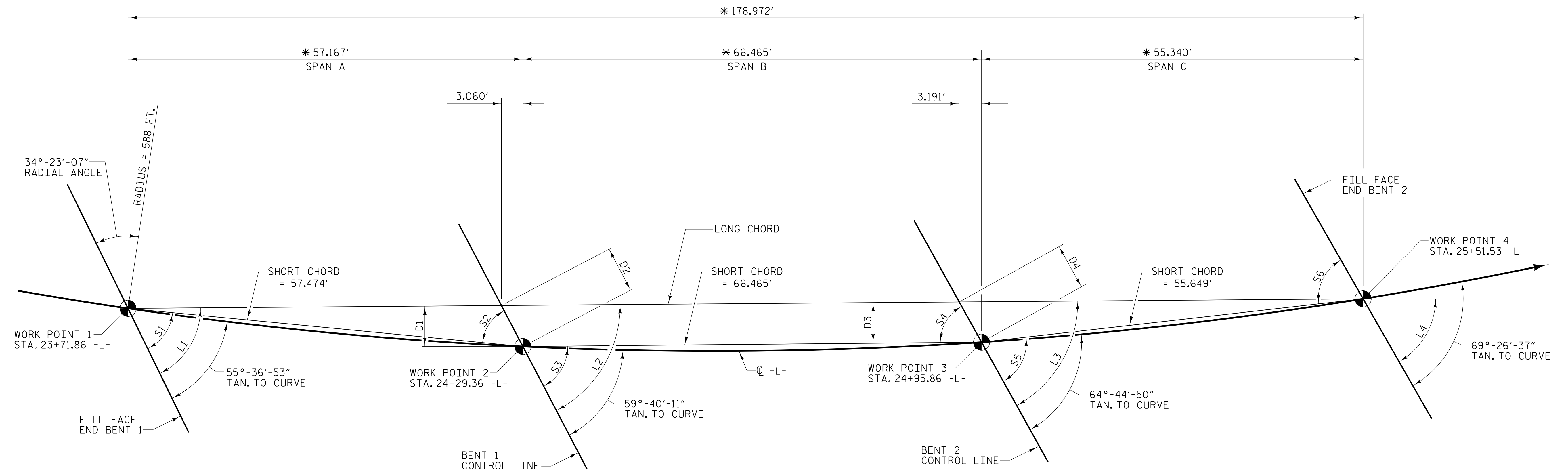
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 CHECKED BY : Z. H. BROWN DATE : 8/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23



5/17/2023 7:04:46 PM R:\Structures\3 span Bridge cover RRV02 USB19 SMU\_FL\_43084.dgn

**NOTE:**  
 END BENTS AND INTERIOR BENTS  
 ARE NOT PARALLEL.



**LONG CHORD LAYOUT**  
 \* ALONG LONG CHORD

ANGLES				OFFSETS	
	LONG CHORD		SHORT CHORD		
L1	64°-22'-06"	S1	58°-24'-58"	D1	5.960'
L2	62°-49'-13"	S2	56°-52'-06"	D2	6.700'
L3	61°-25'-04"	S3	62°-54'-35"	D3	5.857'
L4	60°-41'-23"	S4	61°-30'-26"	D4	6.670'
		S5	67°-27'-33"		
		S6	66°-43'-52"		

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON -L- US 276  
 (RUSS AVE.) OVER -Y6-  
 (BLUE RIDGE SOUTHERN RAILROAD)  
 BETWEEN US 23 (N. MAIN ST.)  
 AND SR 1247 (DELLWOOD RD.)

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

DocuSigned by:

5/18/2023

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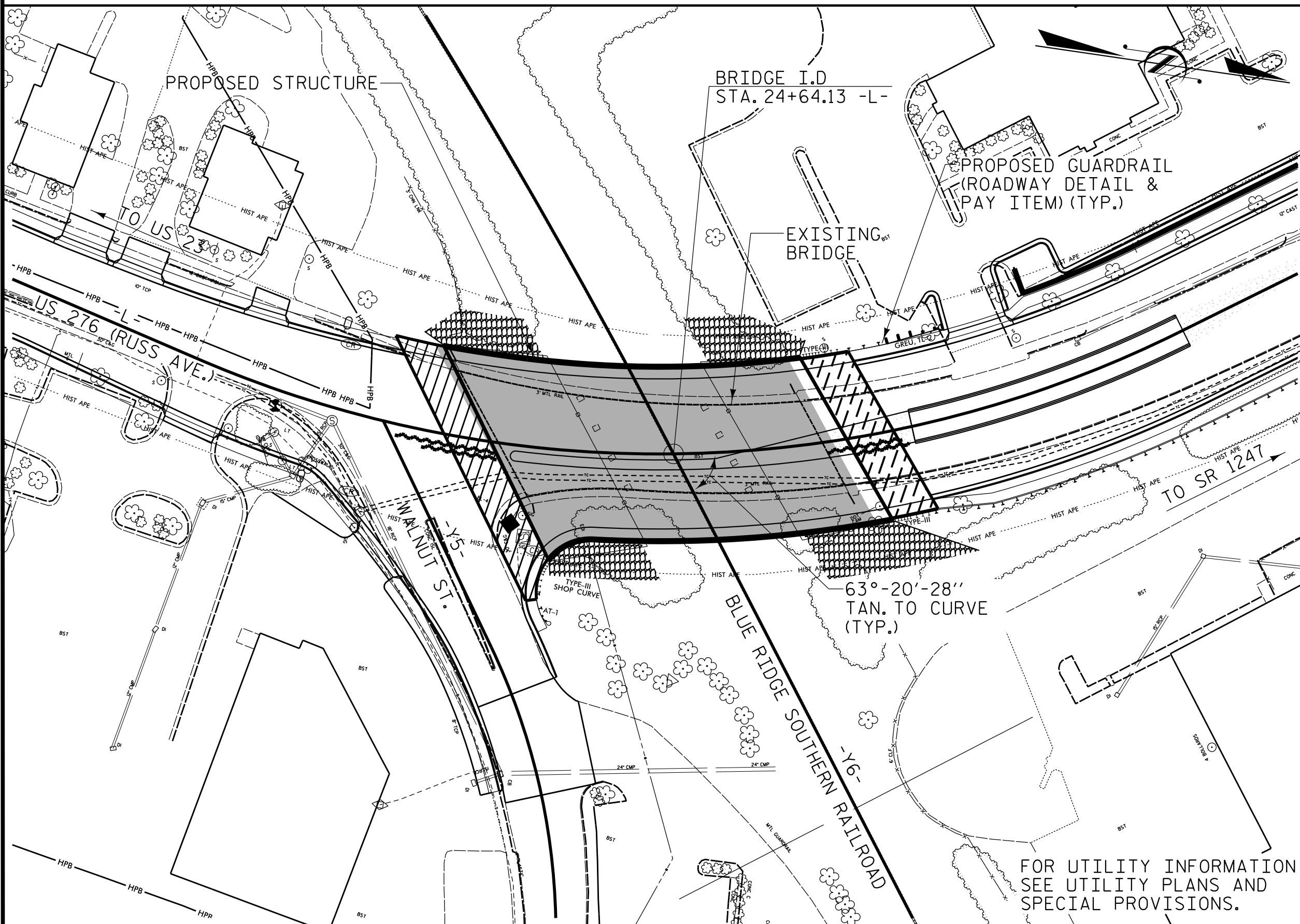
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-3
1			3			TOTAL SHEETS
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DRAWN BY: W. B. ALLEN DATE: 5/19  
 CHECKED BY: Z. H. BROWN DATE: 6/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
  
 BEB239809220478

5/17/2023 7:04:47 PM RA:\Structures\3 span Bridge over RR\03 US276\_SMU\_G02\_43084.dgn

BM #5: CHISELED-X TOP OF CONC. LP BASE; 58.32' LT STA. 29+37.84 -L- ELEV. 2636.78



LOCATION SKETCH

TOTAL BILL OF MATERIAL											
	REMOVAL OF EXISTING STRUCTURE @ STA. 24+64.13 -L-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 24+64.13 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.
SUPERSTRUCTURE									15,900	14,757	
END BENT 1			252	84							66.8
BENT 1					154.0	86.0					103.3
BENT 2					147.0	100.0					95.2
END BENT 2											52.8
TOTAL	LUMP SUM	LUMP SUM	252	84	301.0	186.0	2	LUMP SUM	15,900	14,757	318.1

TOTAL BILL OF MATERIAL												
	BRIDGE APPROACH SLABS @ STA. 24+64.13 -L-	REIN-FORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	45" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	THREE BAR METAL RAIL	104" CHAIN LINK FENCE	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	STRIP SEAL EXPANSION JOINTS	
	LUMP SUM	LBS.	LBS.	LIN. FT.	EACH	NO.	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	LUMP SUM			1564.13			335.11	120			LUMP SUM	LUMP SUM
END BENT 1		10,239			15	15	525		600			
BENT 1		29,583	8100									
BENT 2		28,355	8124									
END BENT 2		7996			12	12	660		520			
TOTAL	LUMP SUM	76,173	16,224	1564.13	27	27	1185	335.11	1120	LUMP SUM	LUMP SUM	

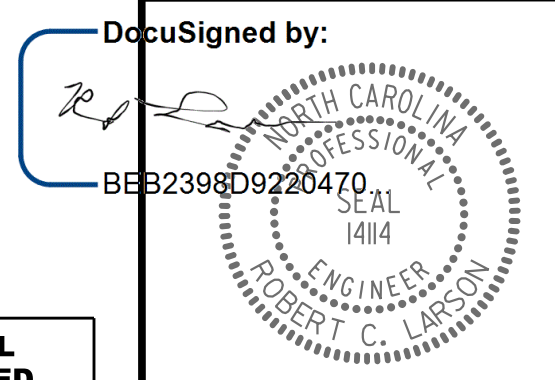
NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENT OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR 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.  
 THE RAILROAD TRACK TOP OF RAIL ELEVATIONS ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.  
 ALL PAVEMENT MARKING WILL BE IN ACCORDANCE WITH THE PAVEMENT MARKING PLANS AND SHALL PROVIDE FOR BICYCLES.  
 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 24+64.13 -L-'.  
 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.

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN TABLE 2 OF THE DEPARTMENT'S THERMAL SPRAYED COATING (METALIZATION) PROGRAM. FOR THERMAL SPRAYED COATING, SEE SPECIAL PROVISIONS.  
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE AS FOLLOWS, END BENT 1 - 75 FT. LEFT AND 60 FT. RIGHT, END BENT 2 - 50 FT. LEFT AND 65 FT. RIGHT 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.  
 FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.  
 AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF 3 SPANS - 1 @ 57'-10", 1 @ 61'-8", 1 @ 48'-7"; 44'-0" CLEAR ROADWAY WIDTH AND REINFORCED CONCRETE FLOOR ON I-BEAMS 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, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.  
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.  
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.  
 THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.  
 FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.  
 FOR STRIP SEAL EXPANSION JOINTS, SEE SPECIAL PROVISIONS.

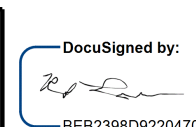
PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 4 OF 5



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON -L- US 276  
 (RUSS AVE.) OVER -Y6-  
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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23



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1			3			TOTAL SHEETS
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5/18/2023

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# 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						
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	MOMENT			SHEAR			LIVE-LOAD FACTORS (γ <sub>LL</sub> )	MOMENT										
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)		RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)							
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.27	--	1.75	0.782	1.52	B	I	32.00	1.111	1.31	B	I	25.50	0.80	0.782	1.27	B	I	32.00		
	HL-93 (OPERATING)	N/A		1.87	--	1.35	0.782	1.97	B	I	32.00	1.111	1.87	B	I	12.40	N/A	--	--	--	I	--		
	HS-20 (INVENTORY)	36.000	②	1.63	58.68	1.75	0.782	1.95	B	I	32.00	1.111	1.74	B	I	12.40	0.80	0.782	1.63	B	I	32.00		
	HS-20 (OPERATING)	36.000		2.28	82.08	1.35	0.782	2.52	B	I	32.00	1.111	2.28	B	I	12.40	N/A	--	--	--	I	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.58	48.33	1.40	0.782	5.34	B	I	32.00	1.111	5.16	B	I	12.40	0.80	0.782	3.58	B	I	32.00	
		SNGARBS2	20.000		2.71	54.20	1.40	0.782	4.04	B	I	32.00	1.111	3.70	B	I	12.40	0.80	0.782	2.71	B	I	32.00	
		SNAGRIS2	22.000		2.59	56.98	1.40	0.782	3.86	B	I	32.00	1.111	3.45	B	I	12.40	0.80	0.782	2.59	B	I	32.00	
		SNCOTTS3	27.250		1.78	48.51	1.40	0.782	2.66	B	I	32.00	1.111	2.53	B	I	12.40	0.80	0.782	1.78	B	I	32.00	
		SNAGGRS4	34.925		1.51	52.74	1.40	0.782	2.25	B	I	32.00	1.111	2.13	B	I	12.40	0.80	0.782	1.51	B	I	32.00	
		SNS5A	35.550		1.47	52.26	1.40	0.782	2.20	B	I	32.00	1.111	2.18	B	I	12.40	0.80	0.782	1.47	B	I	32.00	
		SNS6A	39.950		1.36	54.33	1.40	0.782	2.02	B	I	32.00	1.111	2.00	B	I	12.40	0.80	0.782	1.36	B	I	32.00	
		SNS7B	42.000		1.29	54.18	1.40	0.782	1.93	B	I	32.00	1.111	1.98	B	I	12.40	0.80	0.782	1.29	B	I	32.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.29	42.57	1.40	0.782	1.92	B	I	32.00	1.111	1.93	B	I	12.40	0.80	0.782	1.29	B	I	32.00	
		TNT4A	33.075		1.29	42.67	1.40	0.782	1.93	B	I	32.00	1.111	1.86	B	I	12.40	0.80	0.782	1.29	B	I	32.00	
		TNT6A	41.600		1.11	46.18	1.40	0.782	1.65	B	I	32.00	1.111	1.77	B	I	12.40	0.80	0.782	1.11	B	I	32.00	
		TNT7A	42.000		1.11	46.62	1.40	0.782	1.66	B	I	32.00	1.111	1.69	B	I	12.40	0.80	0.782	1.11	B	I	32.00	
		TNT7B	42.000		1.15	48.30	1.40	0.782	1.72	B	I	32.00	1.111	1.61	B	I	12.40	0.80	0.782	1.15	B	I	32.00	
		TNAGRIT4	43.000		1.10	47.30	1.40	0.782	1.64	B	I	32.00	1.111	1.55	B	I	12.40	0.80	0.782	1.10	B	I	32.00	
TNAGT5A	45.000		1.05	47.25	1.40	0.782	1.56	B	I	32.00	1.111	1.55	B	I	12.40	0.80	0.782	1.05	B	I	32.00			
TNAGT5B	45.000		③	1.04	46.80	1.40	0.782	1.54	B	I	32.00	1.111	1.47	B	I	12.40	0.80	0.782	1.04	B	I	32.00		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

**NOTES:**

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

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

**COMMENTS:**

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

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

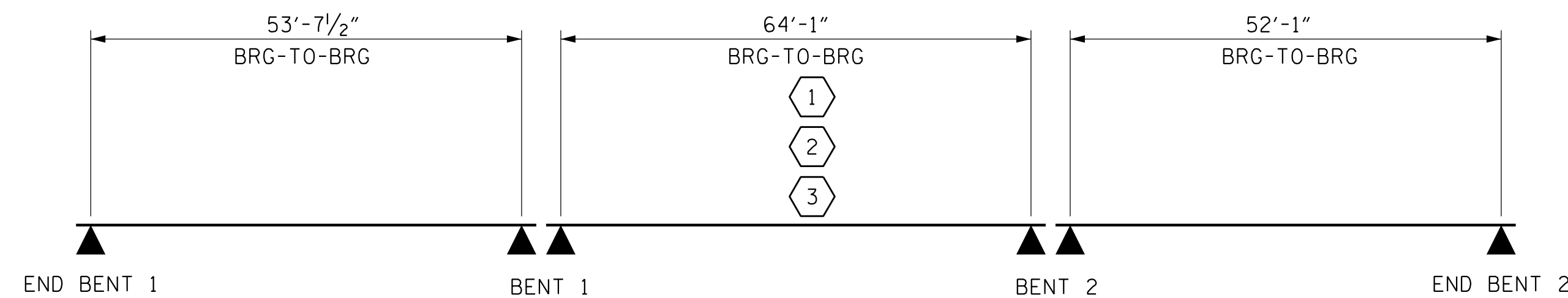
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 5 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-5
1			3			TOTAL SHEETS
2			4			63

PLANS PREPARED BY:

NV5

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.NV5.com  
NC License # F-1333

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

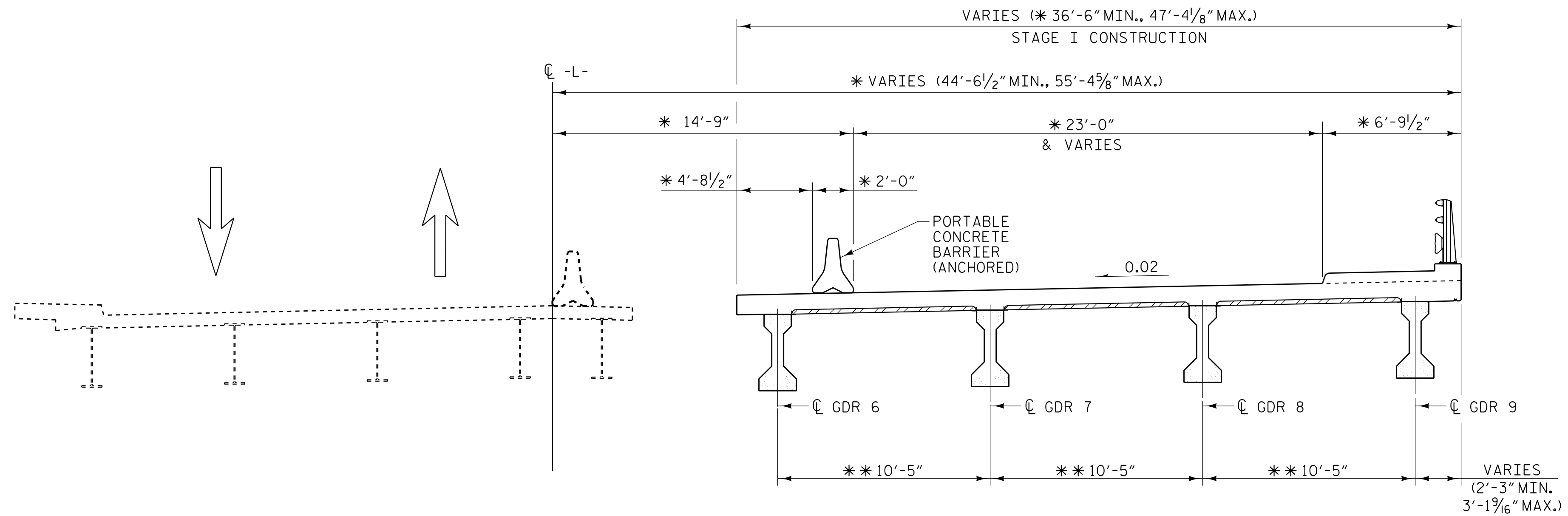
DocuSigned by:  
ROBERT C. LARSON  
Professional Engineer  
BEB2388D92204701  
5/18/2023

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5/17/2023 7:04:49 PM RA:\Structures\3 span Bridge cover BRV05 US839\_SML\_G04\_43084.dgn

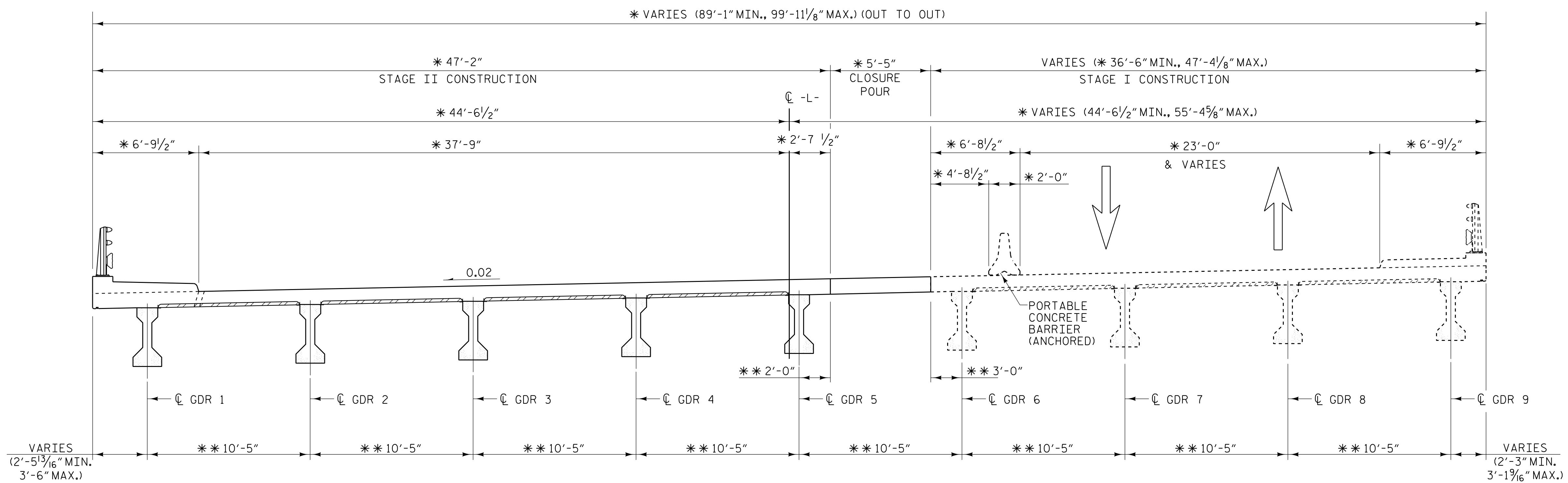
DESIGN ENGINEER OF RECORD: <b>R. C. LARSON</b> 4/23	
ASSEMBLED BY: <b>C. D. ROBINSON</b> DATE: 12/19	CHECKED BY: <b>Z. H. BROWN</b> DATE: 1/20
DRAWN BY: <b>MAA</b> 1/08	REV. 11/12/08RR <b>MAA/GM</b>
CHECKED BY: <b>GM/DI</b> 2/08	REV. 10/1/11 <b>MAA/GM</b>
	REV. 12/17 <b>MAA/THC</b>

DocuSigned by:  
R. C. LARSON  
Professional Engineer  
BEB2398D92204701



STAGE I CONSTRUCTION

\* RADIAL DIMENSIONS  
\* \* DIMENSIONS SHOWN ARE TO ARCS CONCENTRIC WITH CL -L-. GIRDERS ARE LAID OUT ON CHORDS OF THESE CONCENTRIC ARCS THRU THE FILL FACE AT END BENTS AND CONTROL LINES AT INTERIOR BENTS.



STAGE II CONSTRUCTION

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

5/17/2023 7:05:00 PM RA\Structures\3 span Bridge cover RRV\06\_U5839\_SMU\_PC\_43084.dgn

DRAWN BY : W. B. ALLEN DATE : 9/19  
 CHECKED BY : Z. H. BROWN DATE : 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

DocuSigned by:  
 BEB239809220470

PLANS PREPARED BY:

**N|V|5**

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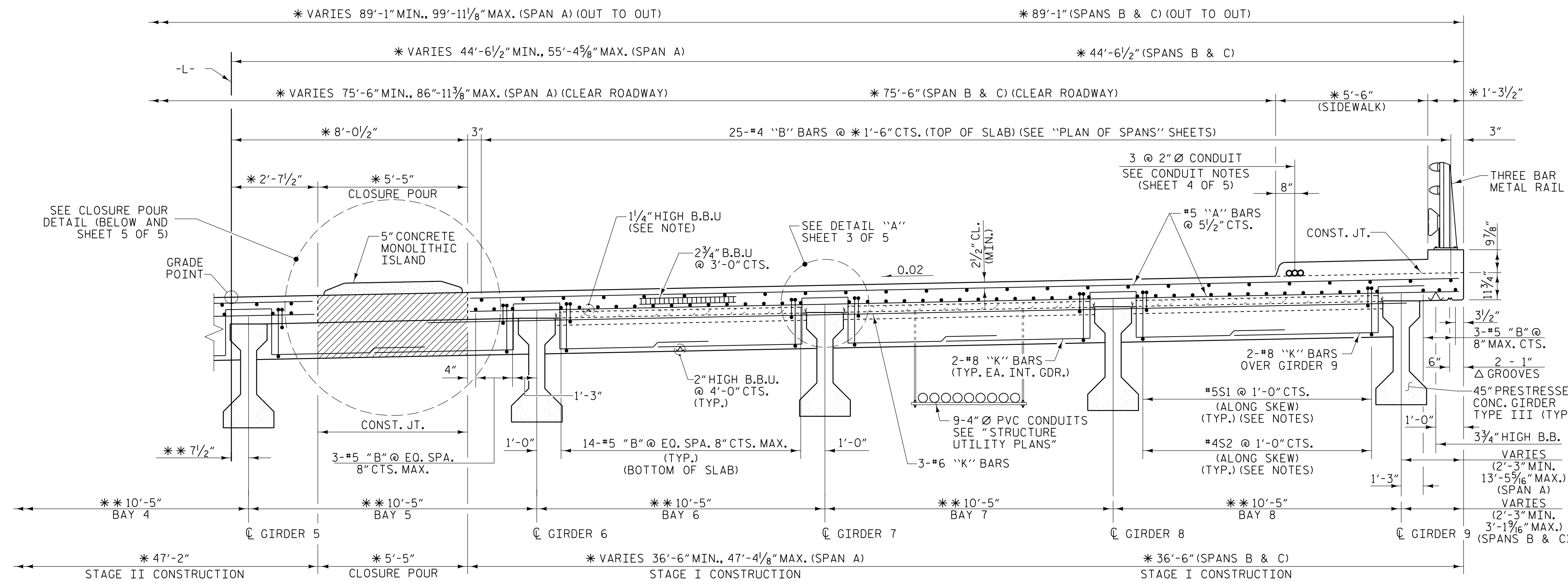
STATE OF NORTH CAROLINA  
 PROFESSIONAL SEAL  
 ENGINEER  
 ROBERT C. LARSON  
 14114

5/18/2023

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**CONSTRUCTION STAGING SEQUENCE**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-6
1			3			TOTAL SHEETS
2			4			63



\* RADIAL DIMENSIONS

\*\* DIMENSIONS SHOWN ARE TO ARCS CONCENTRIC WITH C-L-L. GIRDERS ARE LAID OUT ON CHORDS OF THESE CONCENTRIC ARCS THRU THE FILL FACE AT END BENTS AND CONTROL LINES AT INTERIOR BENTS.

**NOTES:**

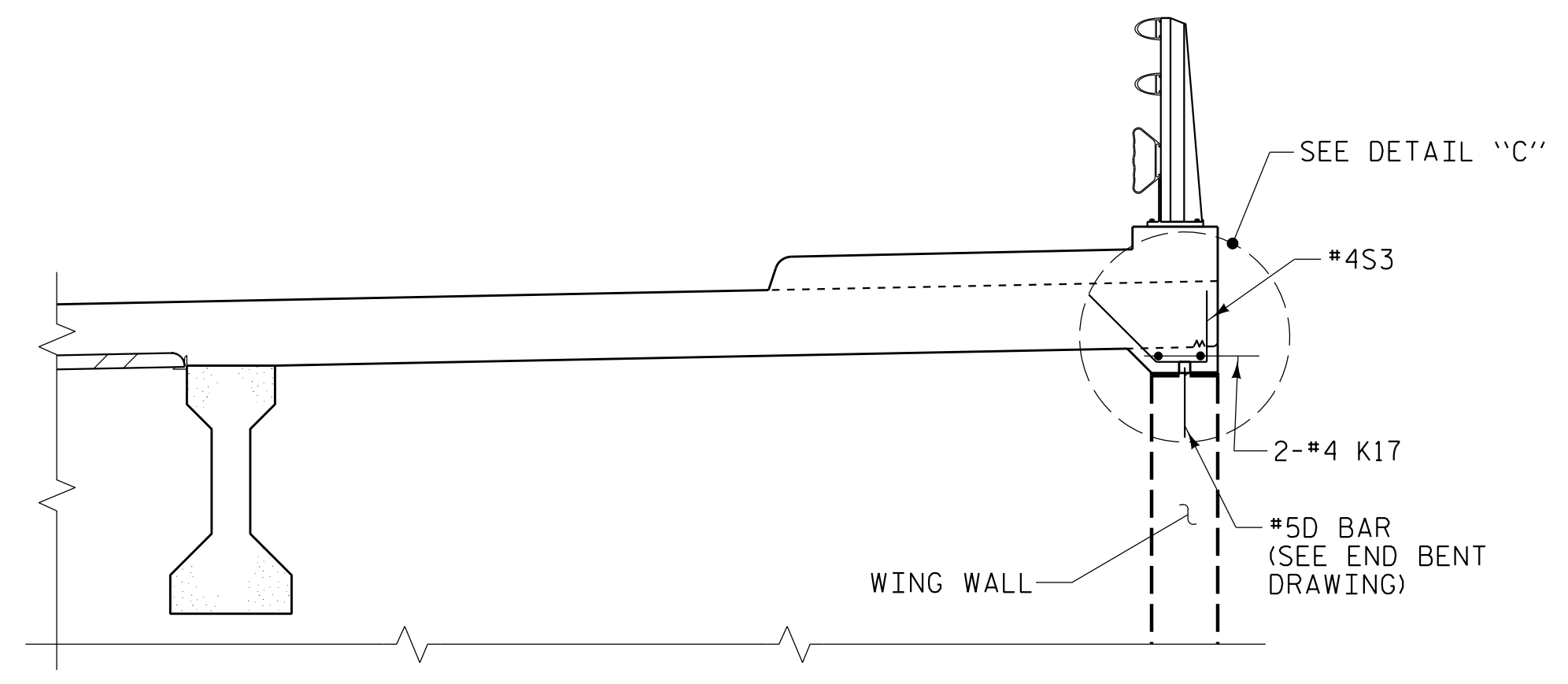
PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER (BBU) AT 4'-0" CENTERS ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE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

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

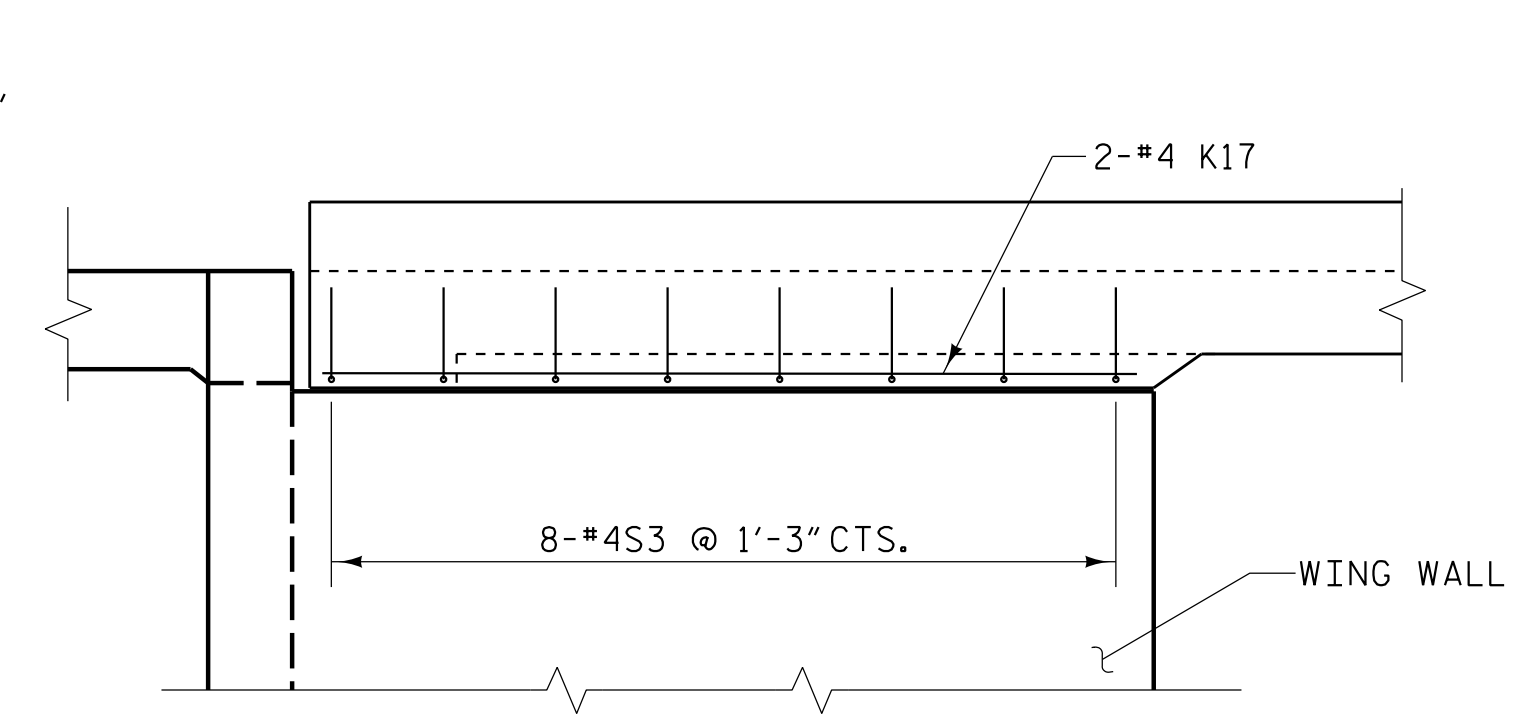
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

FOR NUMBER OF S1 & S2 BARS IN EACH BAY SEE "PLAN OF SPANS" SHEETS.

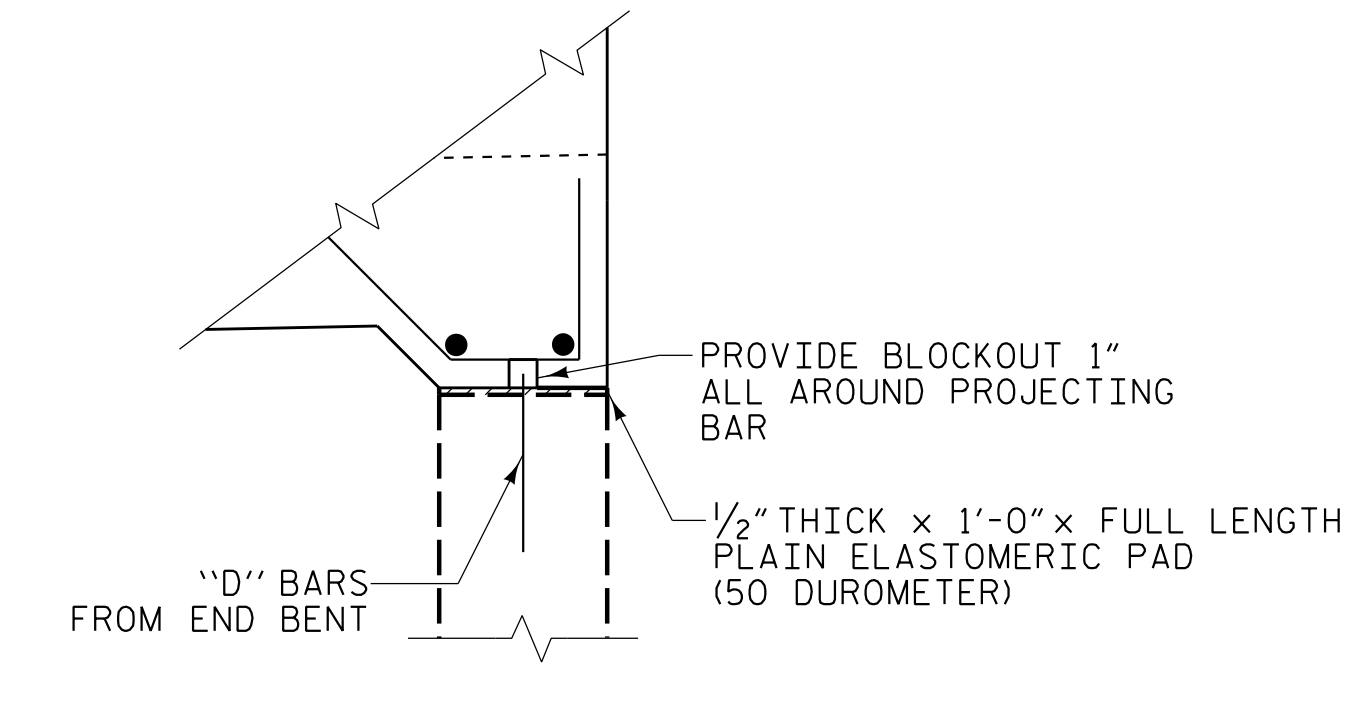
**TYPICAL HALF SECTION**  
(SHOWING END BENT DIAPHRAGMS)



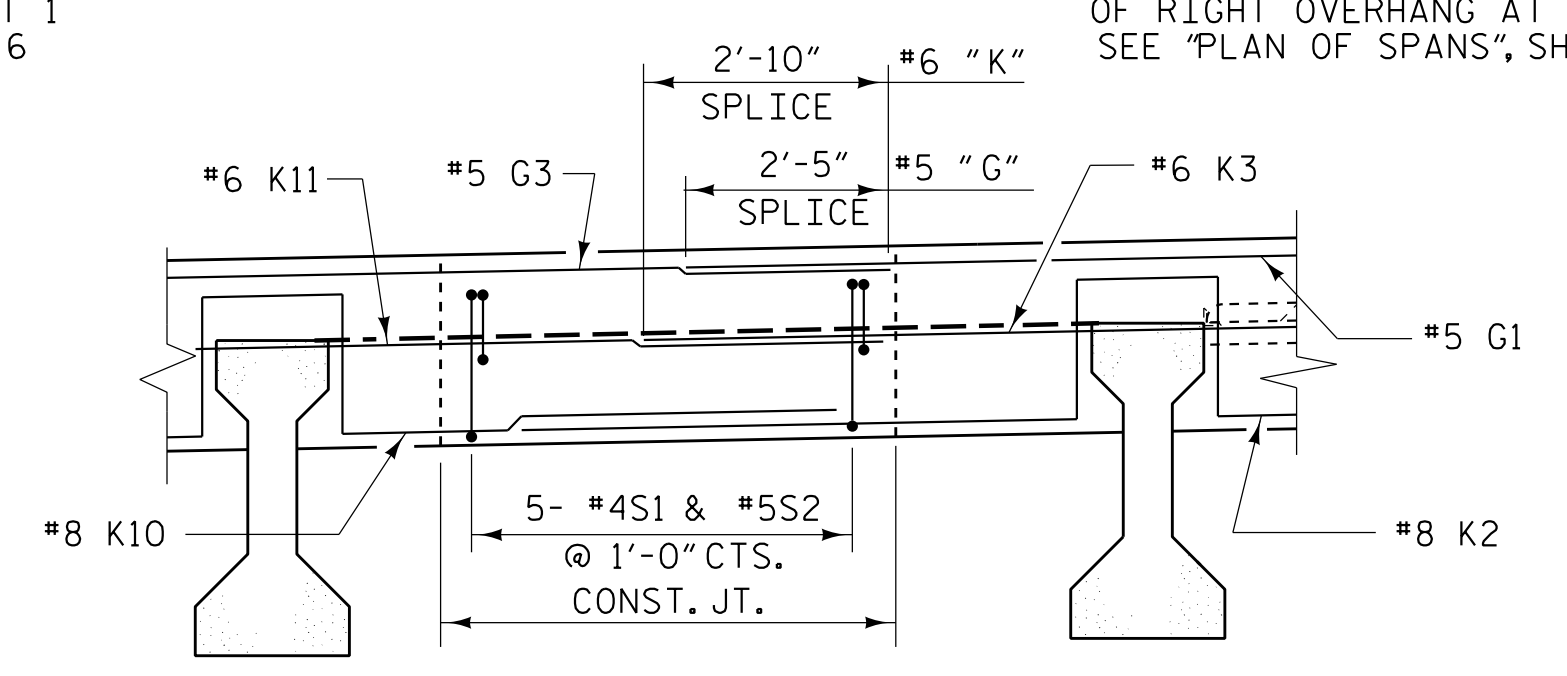
**PART SECTION C-C**  
THRU RIGHT OVERHANG AT END BENT 1  
SEE "PLAN OF SPANS", SHEET 1 OF 6



**ELEVATION B-B**  
OF RIGHT OVERHANG AT END BENT 1  
SEE "PLAN OF SPANS", SHEET 1 OF 6



**DETAIL "C"**



**END DIAPHRAGM AT CLOSURE POUR**  
REINFORCING STEEL IN DECK NOT SHOWN- SEE DETAIL ON SHEET 5 OF 5  
BAR MARKS SHOWN FOR END BENT 1 - END BENT 2 SIMILAR

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
TYPICAL SECTION

REVISIONS

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

SHEET NO. S1-7  
TOTAL SHEETS 63

PLANS PREPARED BY:

**NV5**

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912      www.NV5.com  
NC License # F-1333

DocuSigned by:

*[Signature]*

BE2398D9220470

STATE OF NORTH CAROLINA  
PROFESSIONAL SEAL  
14114  
ENGINEER  
ROBERT C. LARSON

5/18/2023

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DRAWN BY: W. B. ALLEN      DATE: 9/19  
CHECKED BY: Z. H. BROWN      DATE: 1/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON      DATE: 4/23

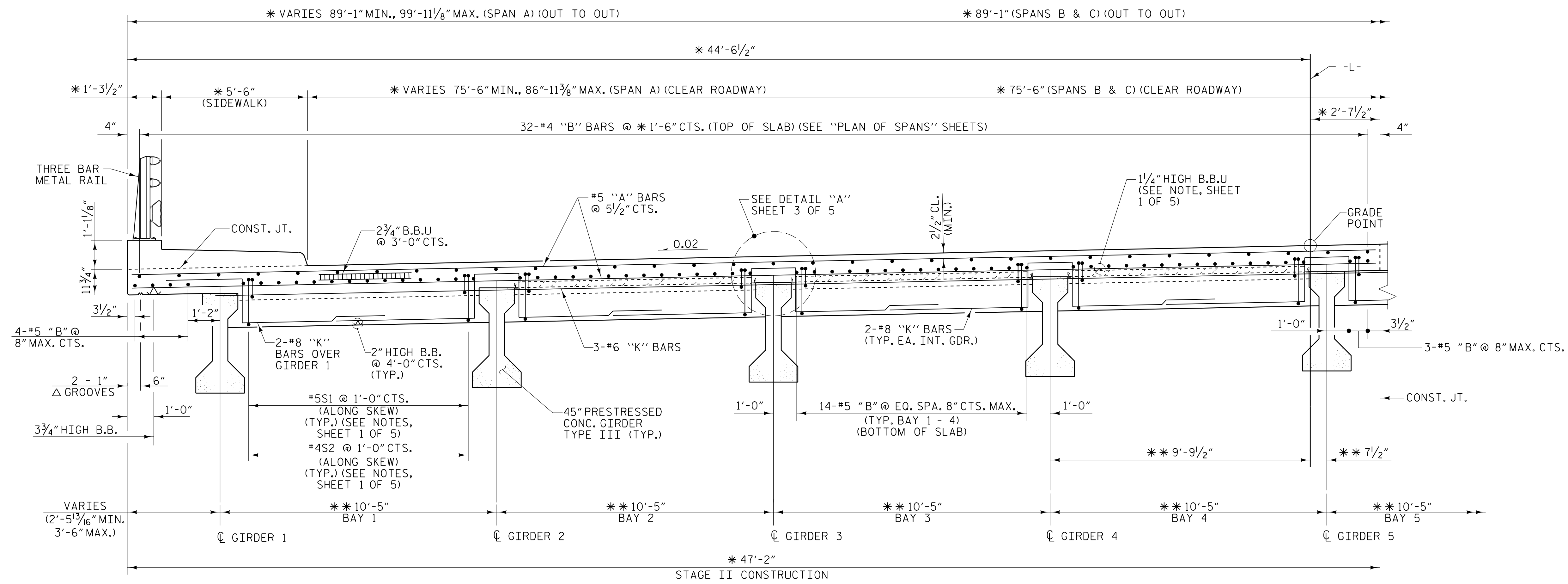
DocuSigned by:

*[Signature]*

BE2398D9220470

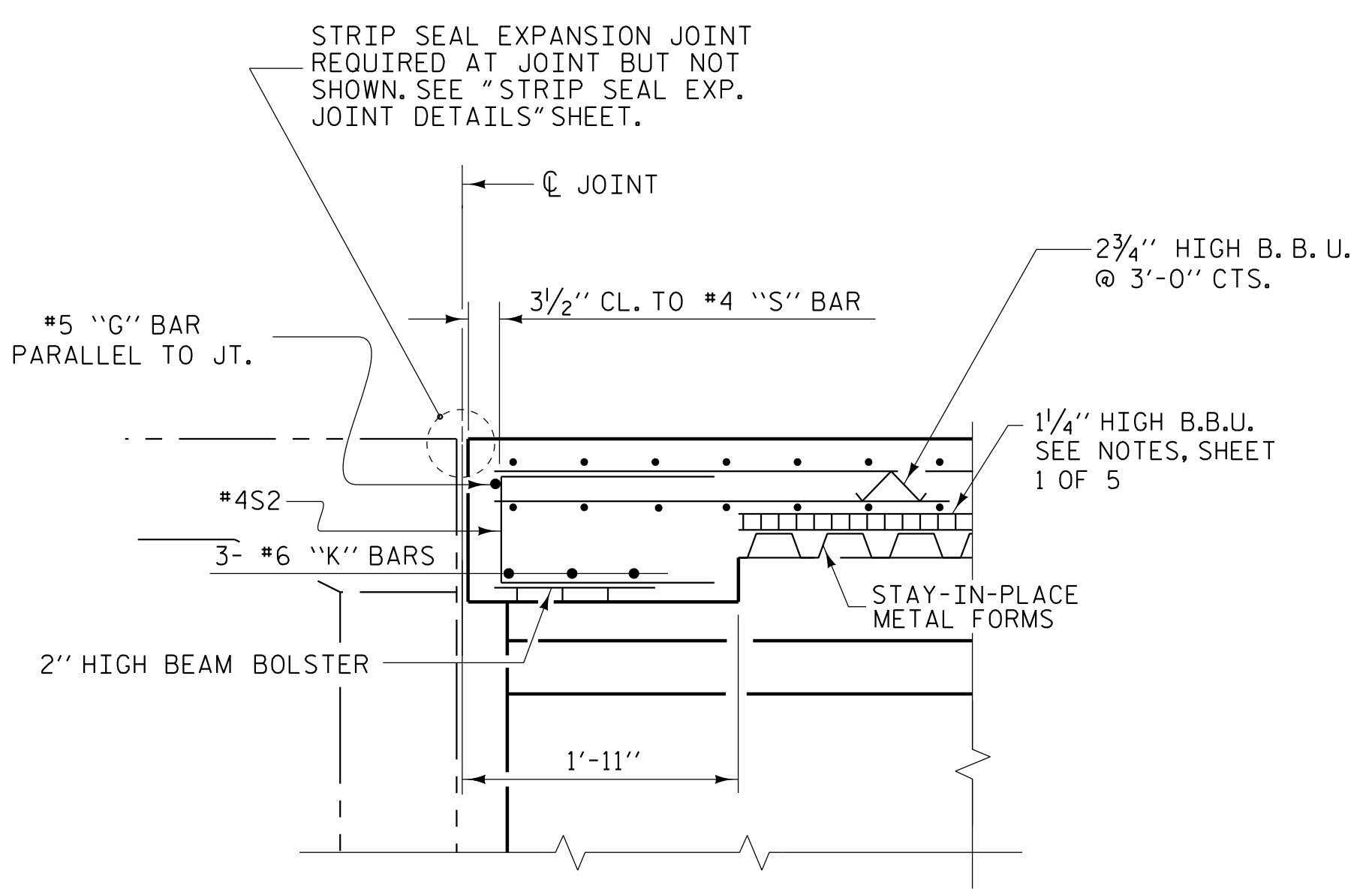
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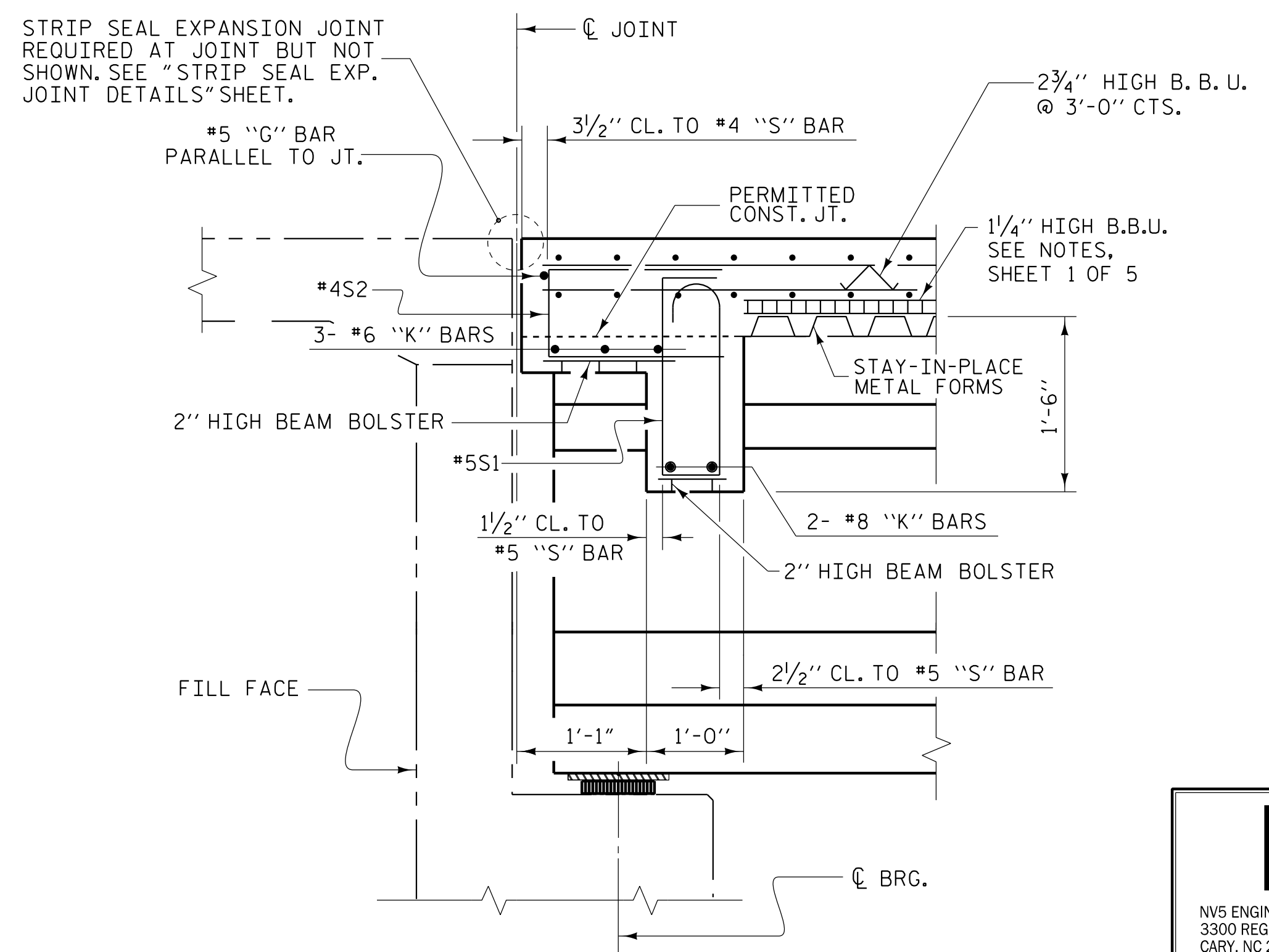


**TYPICAL HALF SECTION**  
(SHOWING END BENT DIAPHRAGM)

\* RADIAL DIMENSIONS  
 \*\* DIMENSIONS SHOWN ARE TO ARCS CONCENTRIC WITH C -L-. GIRDERS ARE LAID OUT ON CHORDS OF THESE CONCENTRIC ARCS THRU THE FILL FACE AT END BENTS AND CONTROL LINES AT INTERIOR BENTS.



**PART SECTION A-A**  
THRU RIGHT OVERHANG AT END BENT 1  
SEE "PLAN OF SPANS", SHEET 1 OF 6



**SECTION THRU END BENT DIAPHRAGMS**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 2 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-8 TOTAL SHEETS 63

PLANS PREPARED BY:

DocuSigned by:

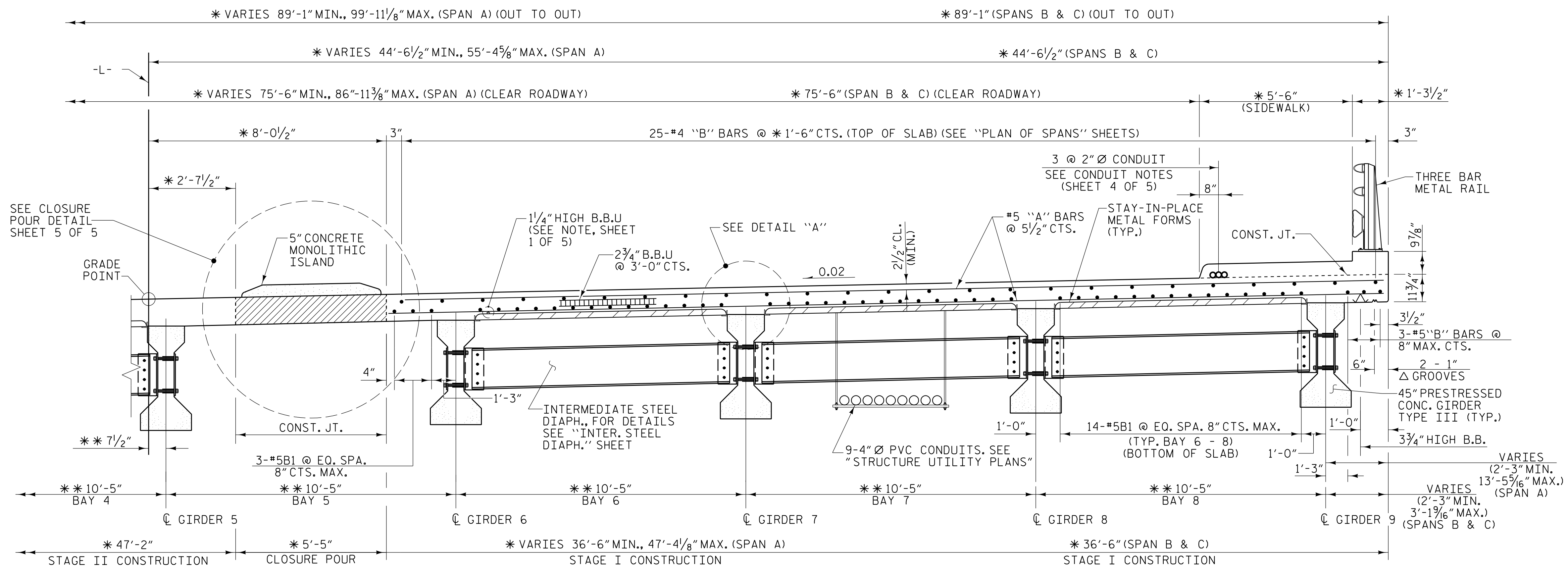
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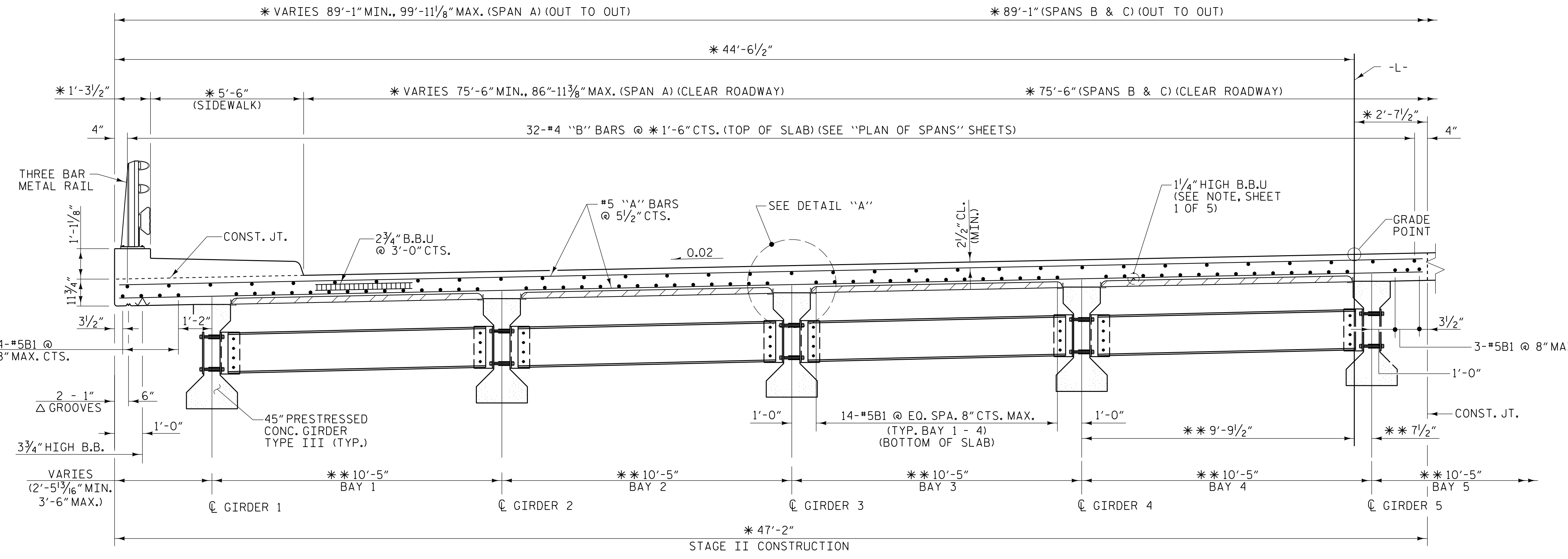
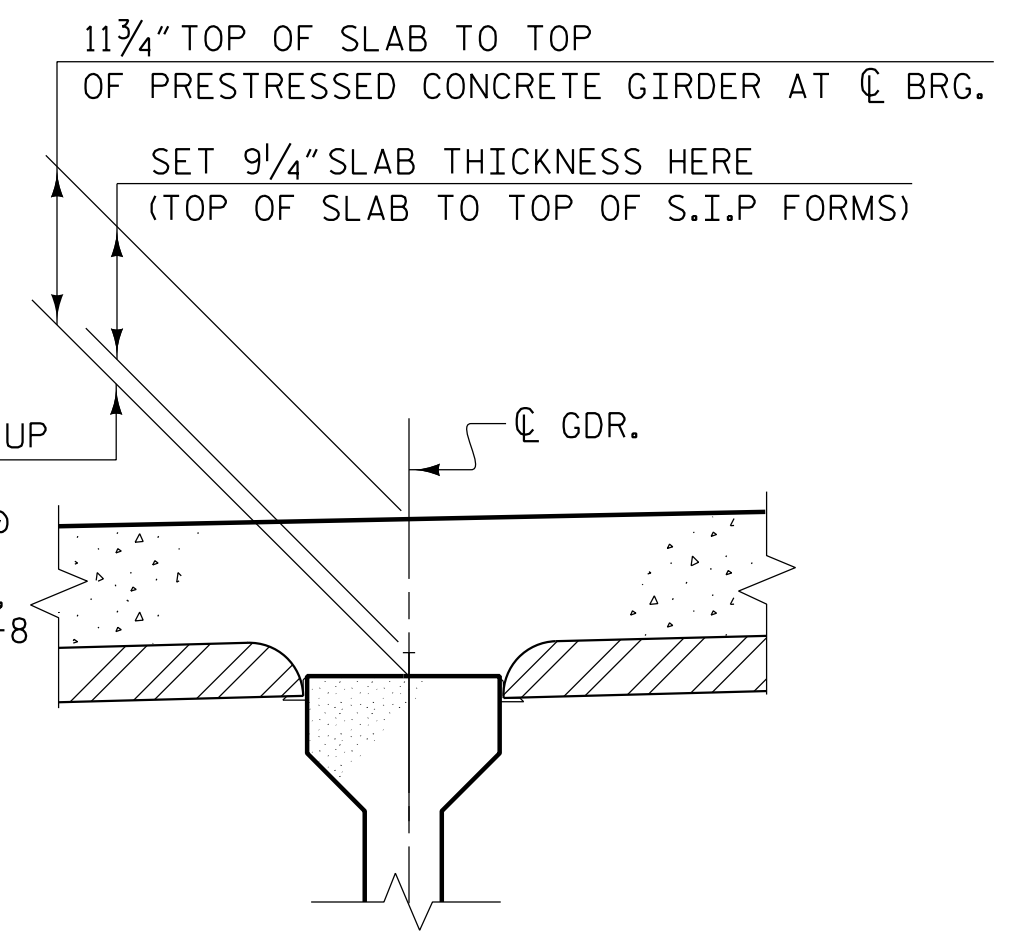
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DRAWN BY: W. B. ALLEN DATE: 9/19  
 CHECKED BY: Z. H. BROWN DATE: 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
  
 BEB2398D9220470



\* RADIAL DIMENSIONS  
 \*\* DIMENSIONS SHOWN ARE TO ARCS CONCENTRIC WITH C -L-. GIRDERS ARE LAID OUT ON CHORDS OF THESE CONCENTRIC ARCS THRU THE FILL FACE AT END BENTS AND CONTROL LINES AT INTERIOR BENTS.



TYPICAL HALF SECTIONS  
 (SHOWING INTERMEDIATE STEEL DIAPHRAGMS)

PLANS PREPARED BY:

NIV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NIV5.com  
 NC License # F-1333

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 TYPICAL SECTION

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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

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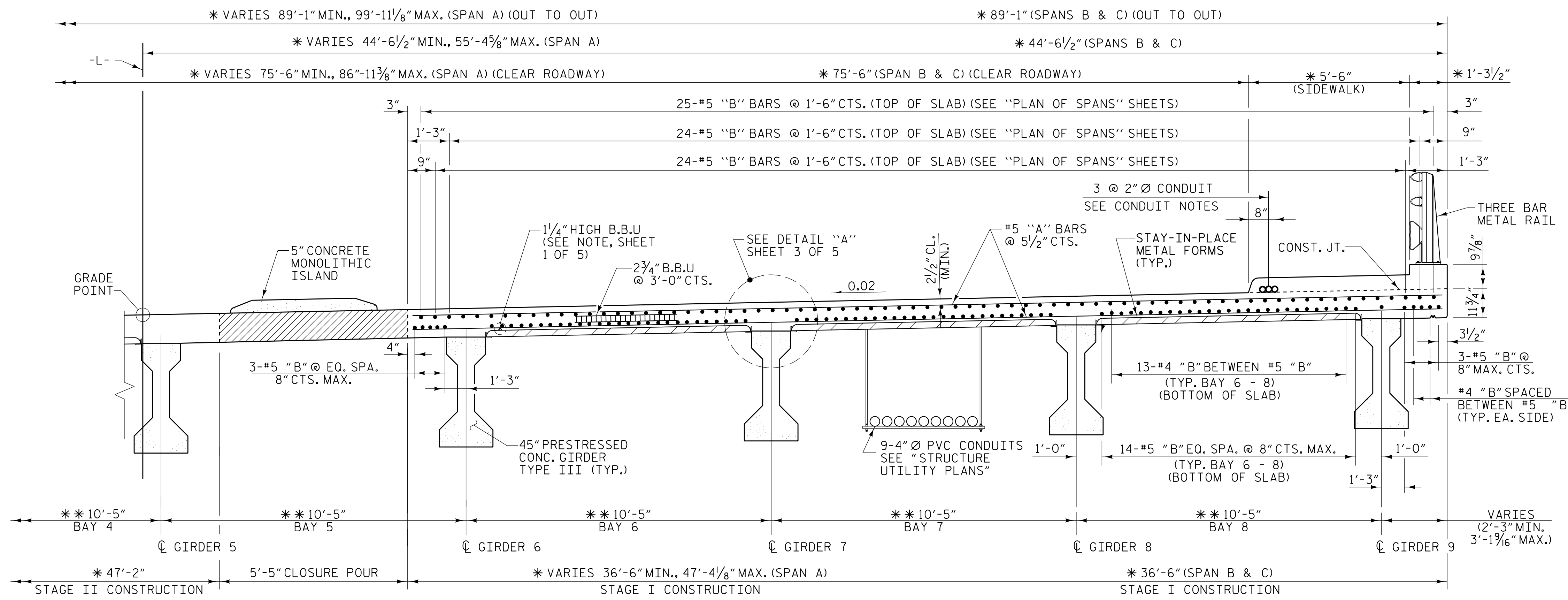
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
2			4			63

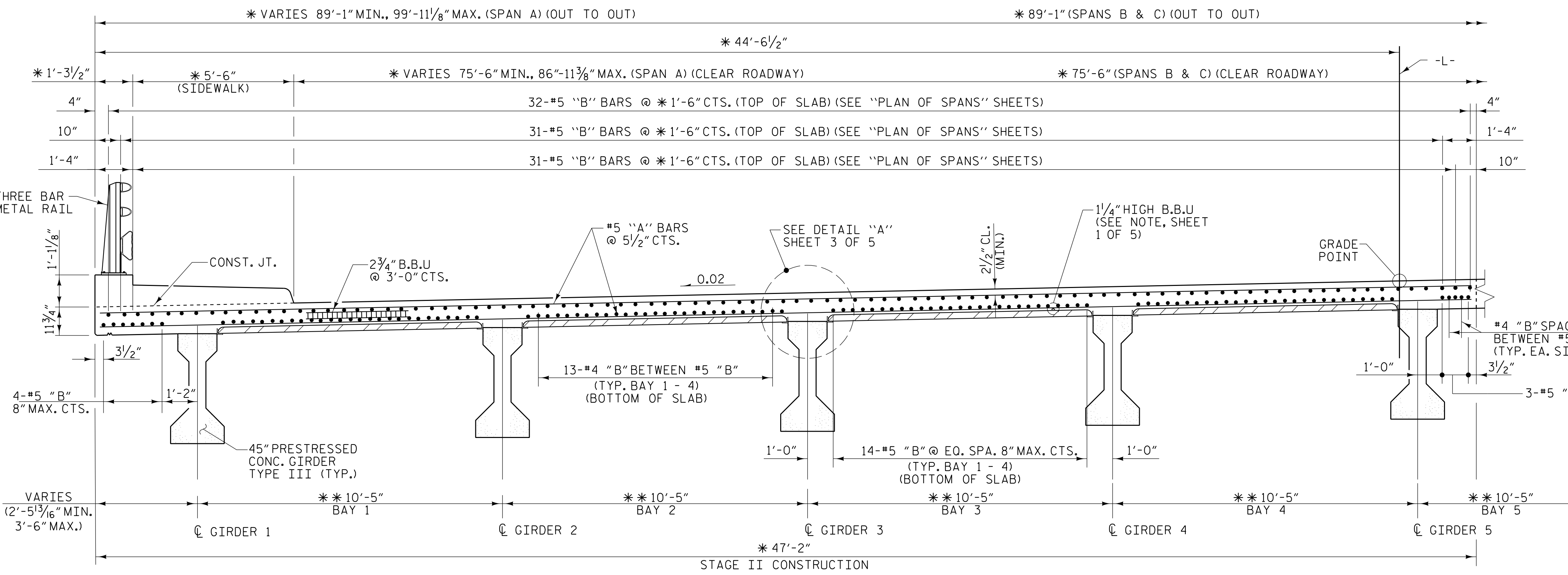
5/18/2023

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\* RADIAL DIMENSIONS  
 \*\* DIMENSIONS SHOWN ARE TO ARCS CONCENTRIC WITH C-L-. GIRDERS ARE LAID OUT ON CHORDS OF THESE CONCENTRIC ARCS THRU THE FILL FACE AT END BENTS AND CONTROL LINES AT INTERIOR BENTS.

CONDUIT NOTES:  
 INSTALL CONDUIT IN RIGHT SIDEWALK, FULL LENGTH OF BRIDGE AND APPROACH SLAB. TERMINATE CONDUIT 3' BEYOND APPROACH SLAB AND PLUG 3' BELOW TOP OF SLAB. SEE DETAIL, SHEET 5 OF 5.  
 CONDUIT TO BE SCHEDULE 40 PVC AND FASTENED SECURELY TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT. PROVIDE PULL STRING IN EACH CONDUIT, FULL LENGTH OF RUN AND ATTACH TO PLUG AT EACH END.  
 PROVIDE EXPANSION FITTING IN CONDUIT AT JOINT AT EACH END BENT.  
 NO SEPARATE PAYMENT WILL BE MADE FOR THE CONDUIT AS IT IS CONSIDERED INCIDENTAL TO THE DECK SLAB. INCLUDE ALL COSTS ASSOCIATED WITH THIS WORK IN THE PRICE FOR "REINFORCED CONCRETE DECK SLAB."



**TYPICAL HALF SECTIONS**

SHOWING LINK SLAB REINFORCING (FOR DIMENSIONS AND DETAILS NOT SHOWN, SEE SHEETS 1 & 2)

PLANS PREPARED BY:  
**NIV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 4 OF 5  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

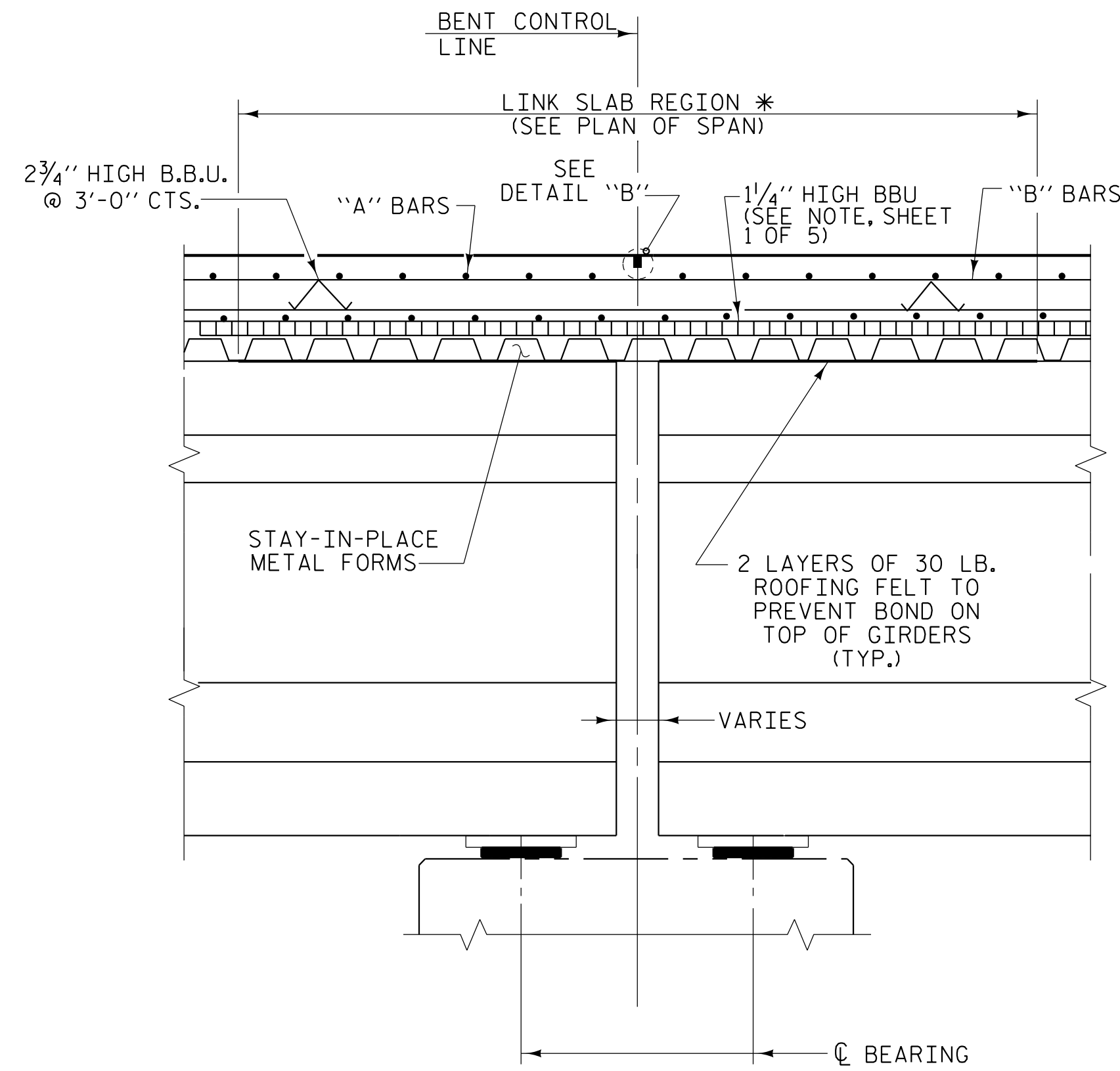
DocuSigned by:  
 Robert C. Larson  
 BEE239809220470  
 NORTH CAROLINA PROFESSIONAL SEAL  
 1414  
 ENGINEER  
 ROBERT C. LARSON  
 5/18/2023

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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

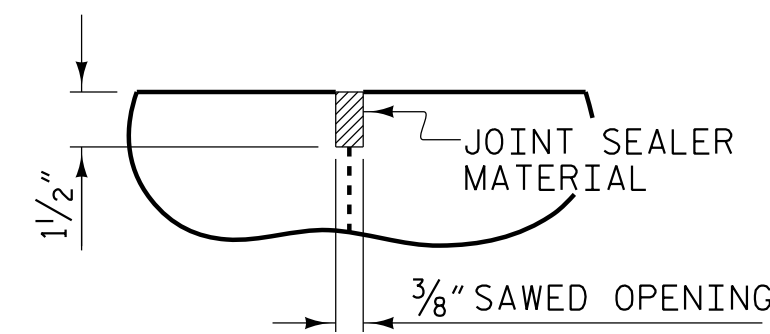
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

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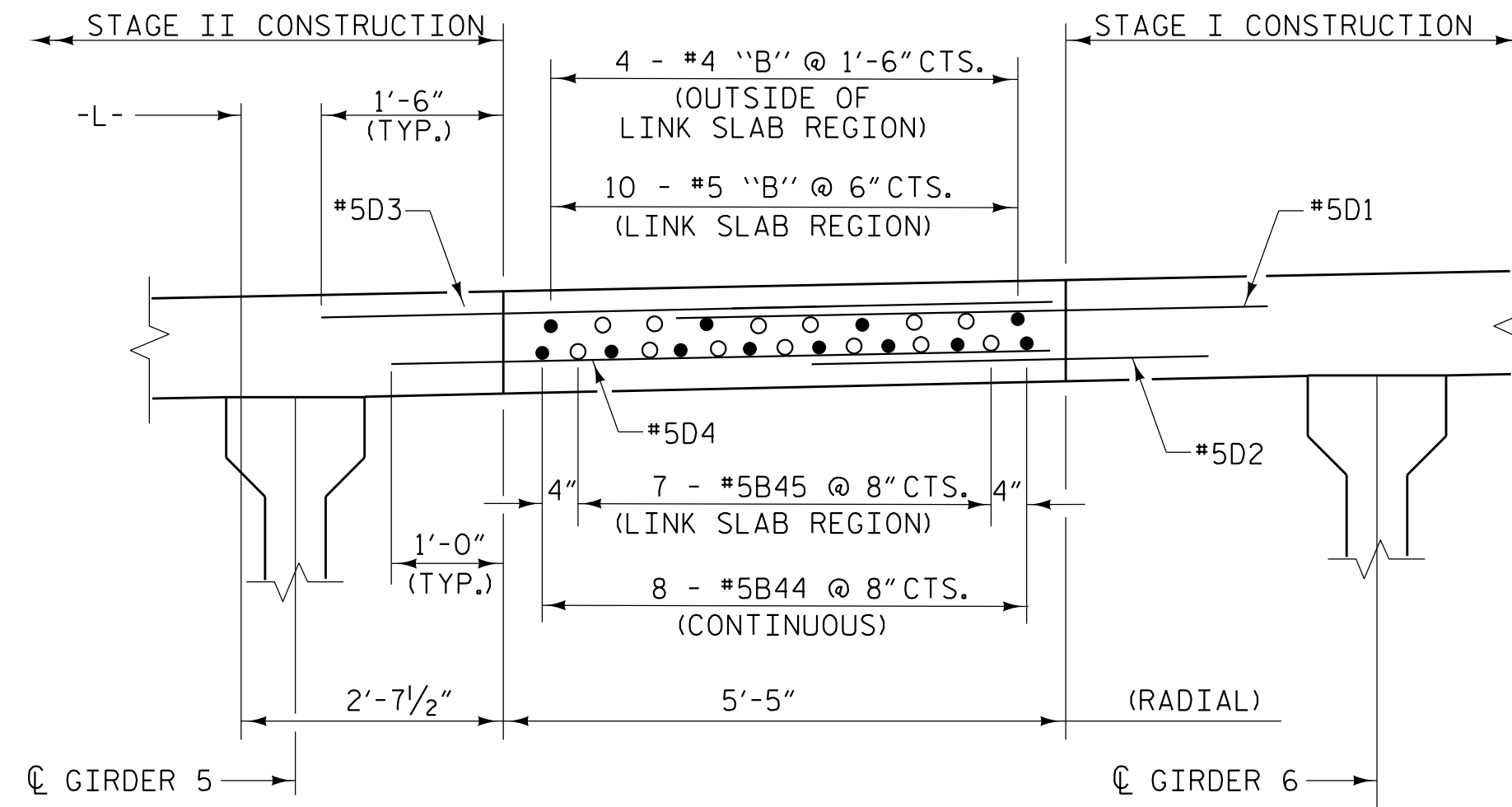
**SECTION AT BENT**

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



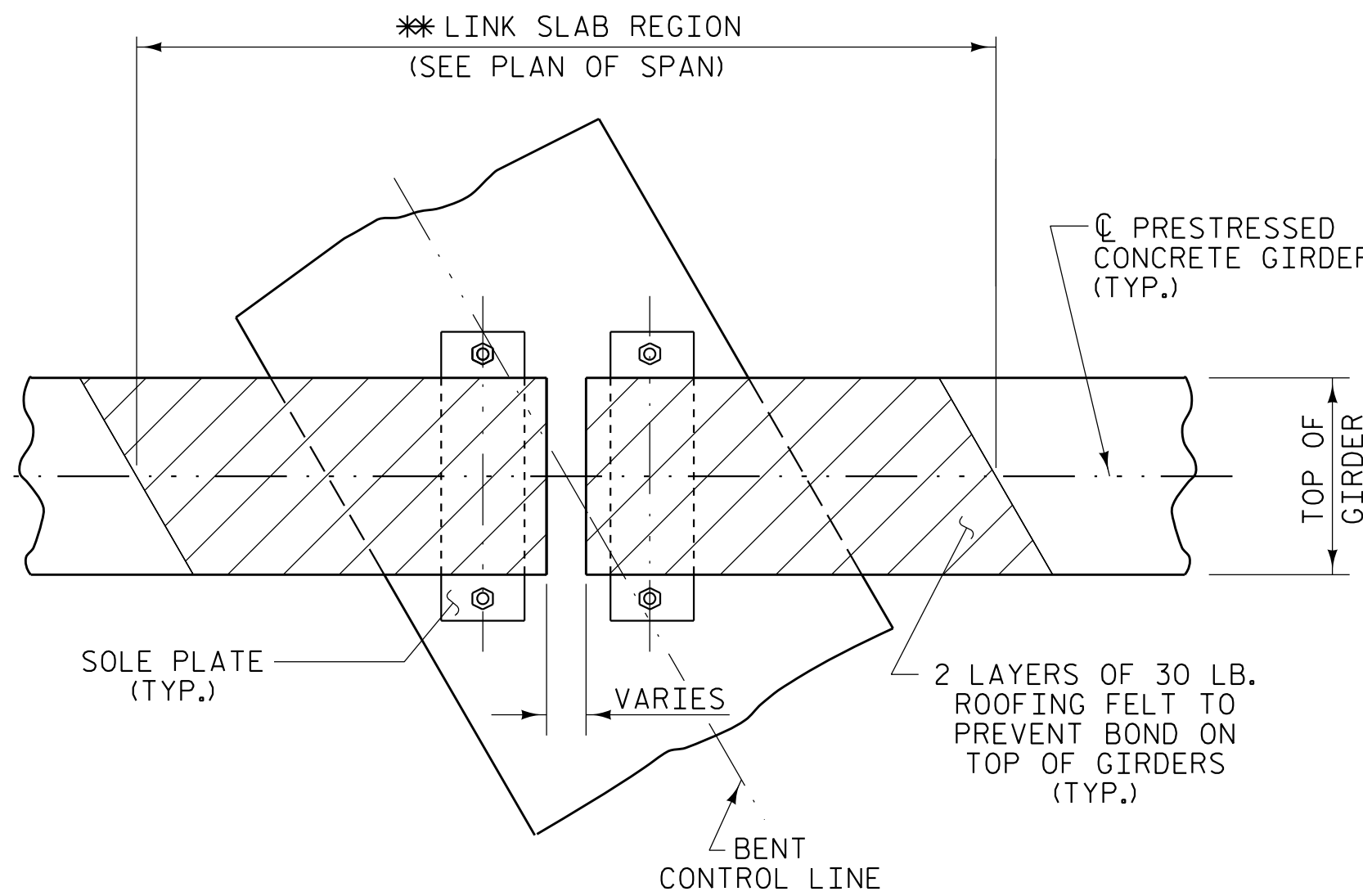
**DETAIL "B"**

A 1/2" DEEP, 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.



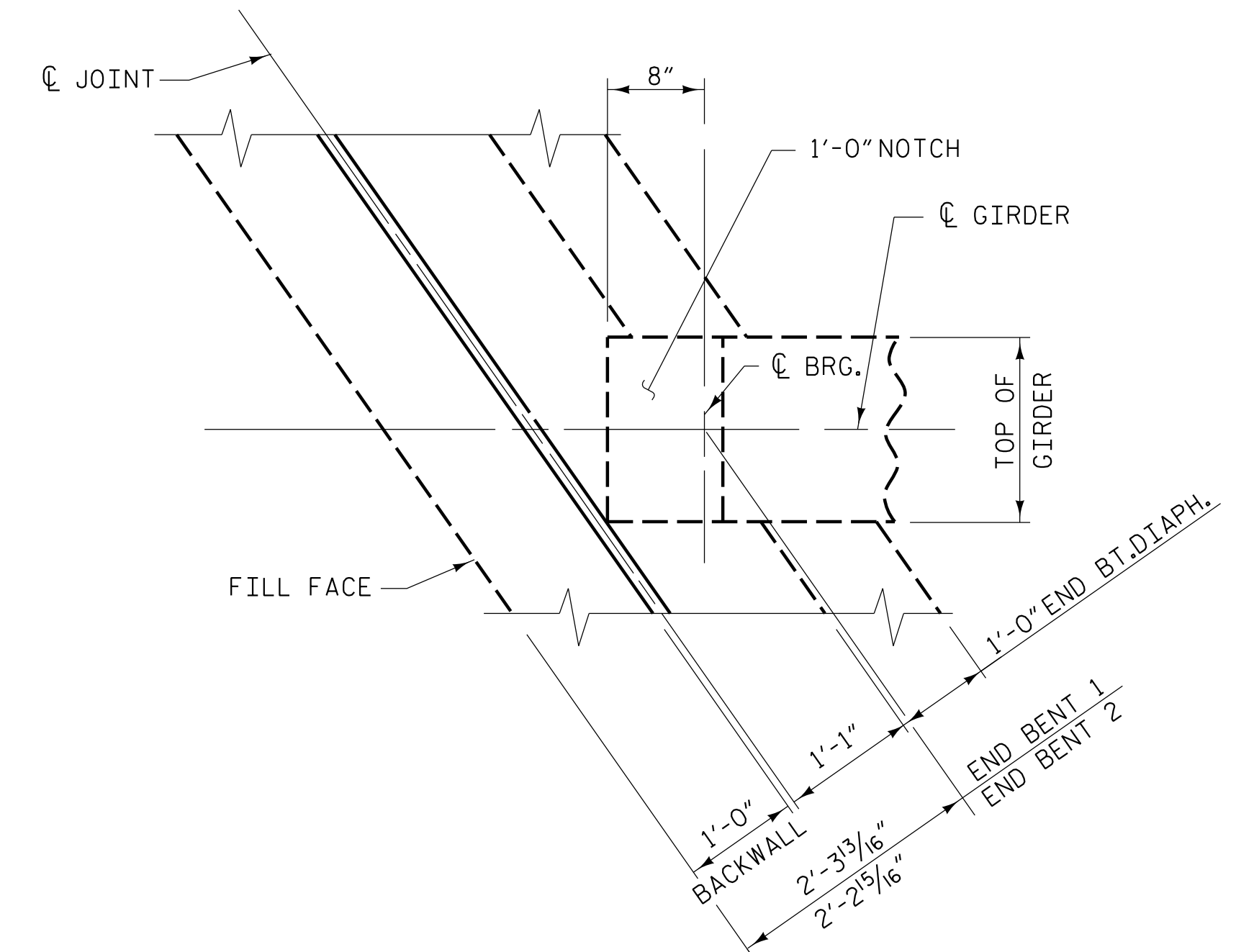
**CLOSURE POUR DETAIL**

SEE PLAN OF SPANS, SHEET 6 OF 6 FOR ADDITIONAL INFORMATION

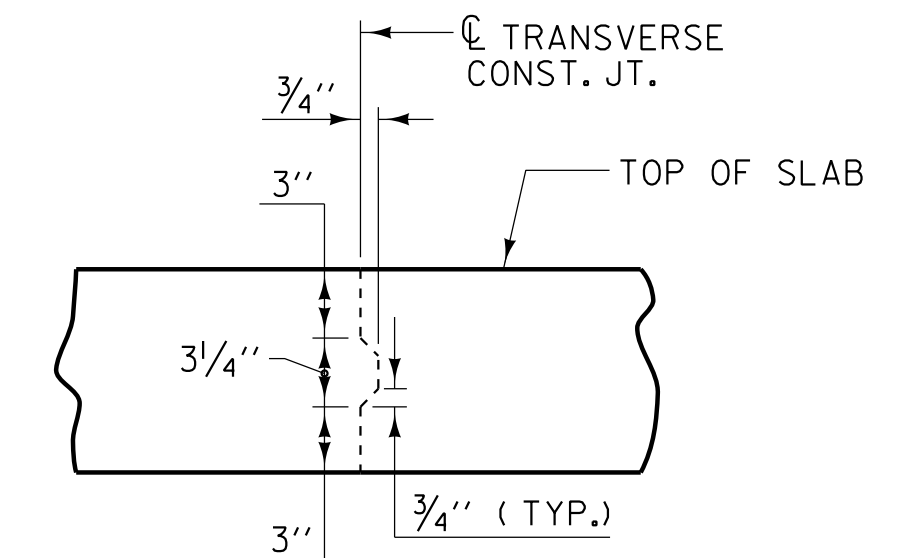


**PLAN OF GIRDERS AT BENT**

\*\* THE TOP OF THE BEAM 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.

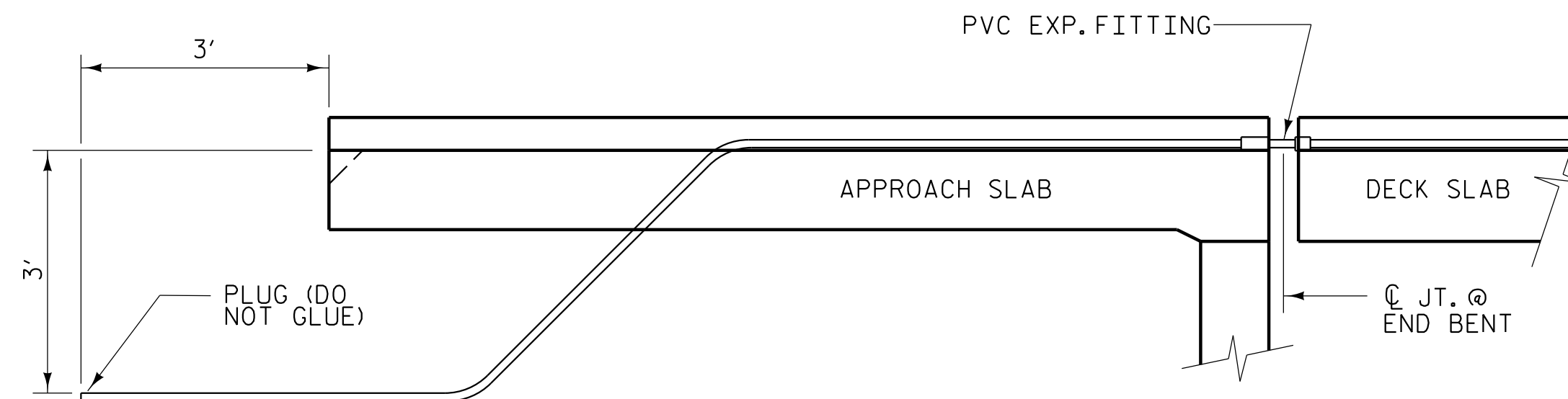


**PLAN OF GIRDER AT END BENT**



**TRANSVERSE CONSTRUCTION JOINT DETAIL**

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



**CONDUIT TERMINATION DETAIL**

(ELEVATION VIEW AT APPROACH SLAB)

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.nv5.com  
NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
ENGINEER  
14114

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 5 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-11
					TOTAL SHEETS 63

DRAWN BY: W. B. ALLEN DATE: 9/19  
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DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
 RCB2398D9220470

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5/18/2023

**NOTES**

FOR SIDEWALK DETAILS AND REINFORCING STEEL, SEE "SIDEWALK PLAN AND DETAILS" SHEETS.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEET 5 OF 5.

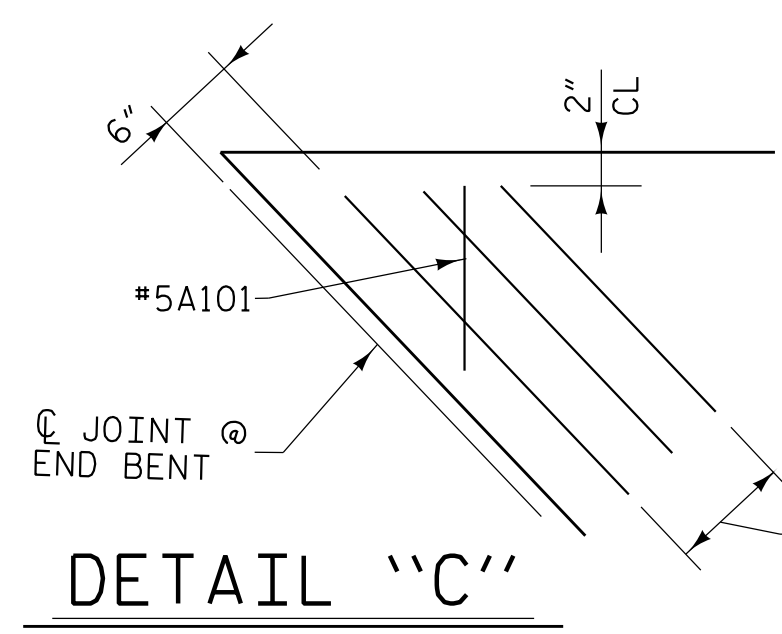
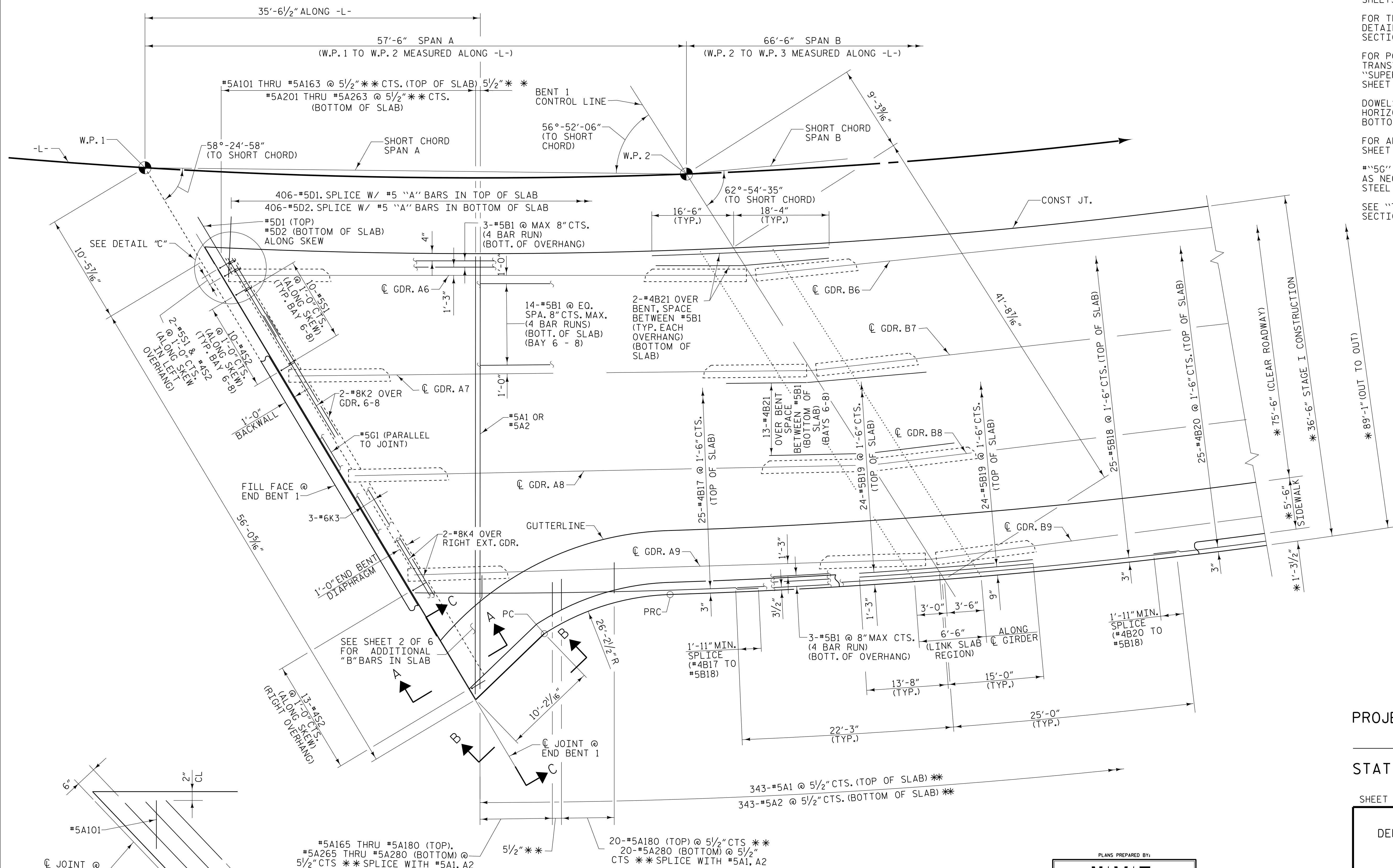
FOR POUR SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 3 OF 3.

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

FOR ARC OFFSETS FOR LEFT EDGE, SEE SHEET 6 OF 6.

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

SEE "TYPICAL SECTION" SHEETS FOR SECTIONS A-A, B-B, AND C-C.



**SPANS A & B**

- \* RADIAL DIMENSIONS
- \*\* SPACED AT 5/2" ALONG RIGHT EDGE OF SLAB AND APPROX. 5 3/16" ALONG LEFT EDGE (CONST. JOINT). BARS PLACED RADially

PLANS PREPARED BY:

**N|V|5**

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 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
 ENGINEER  
 14114

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 1 OF 6

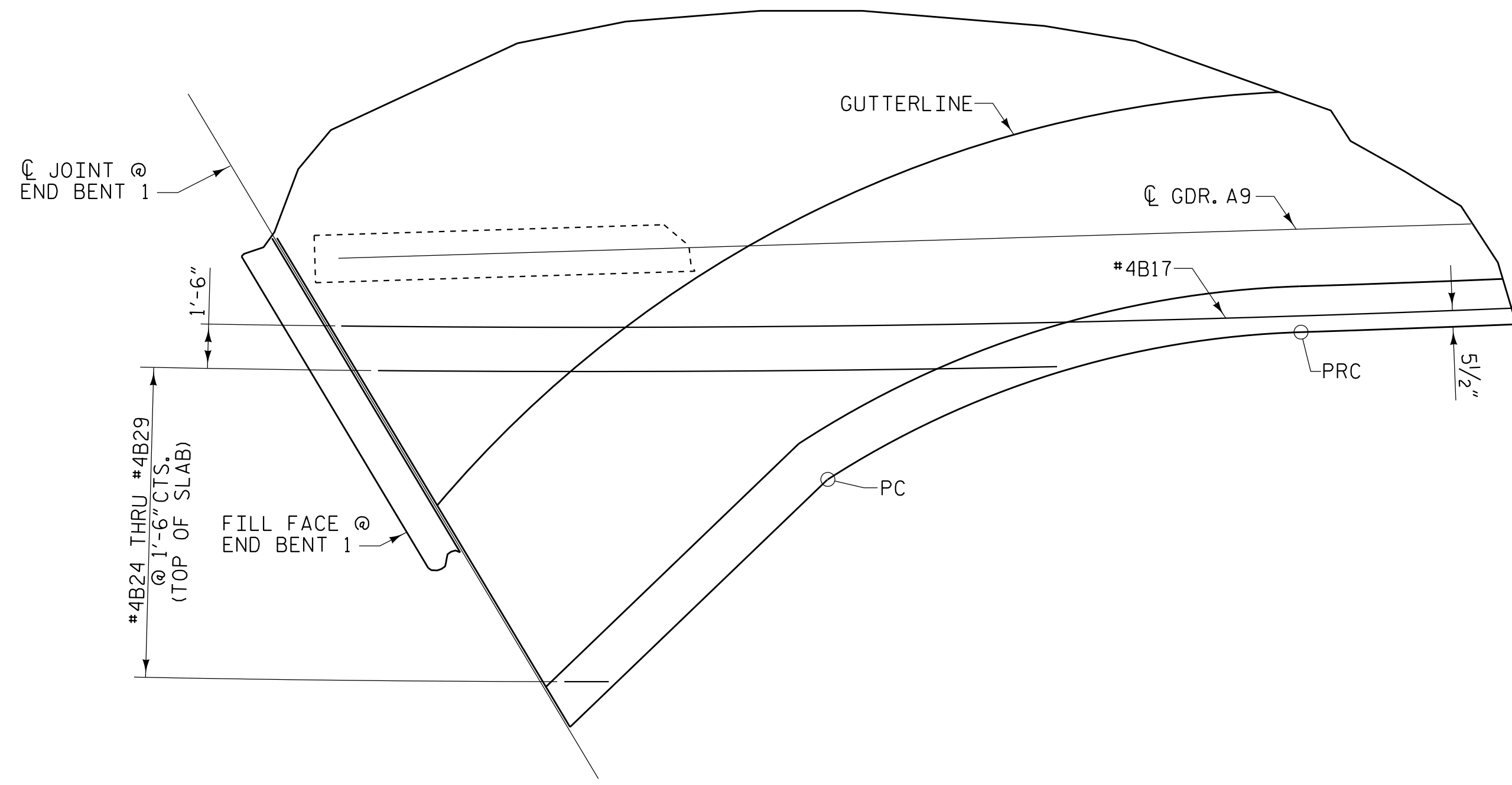
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPANS STAGE I					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-12
					TOTAL SHEETS 63

DRAWN BY: W. B. ALLEN DATE: 12/19  
 CHECKED BY: Z. H. BROWN DATE: 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

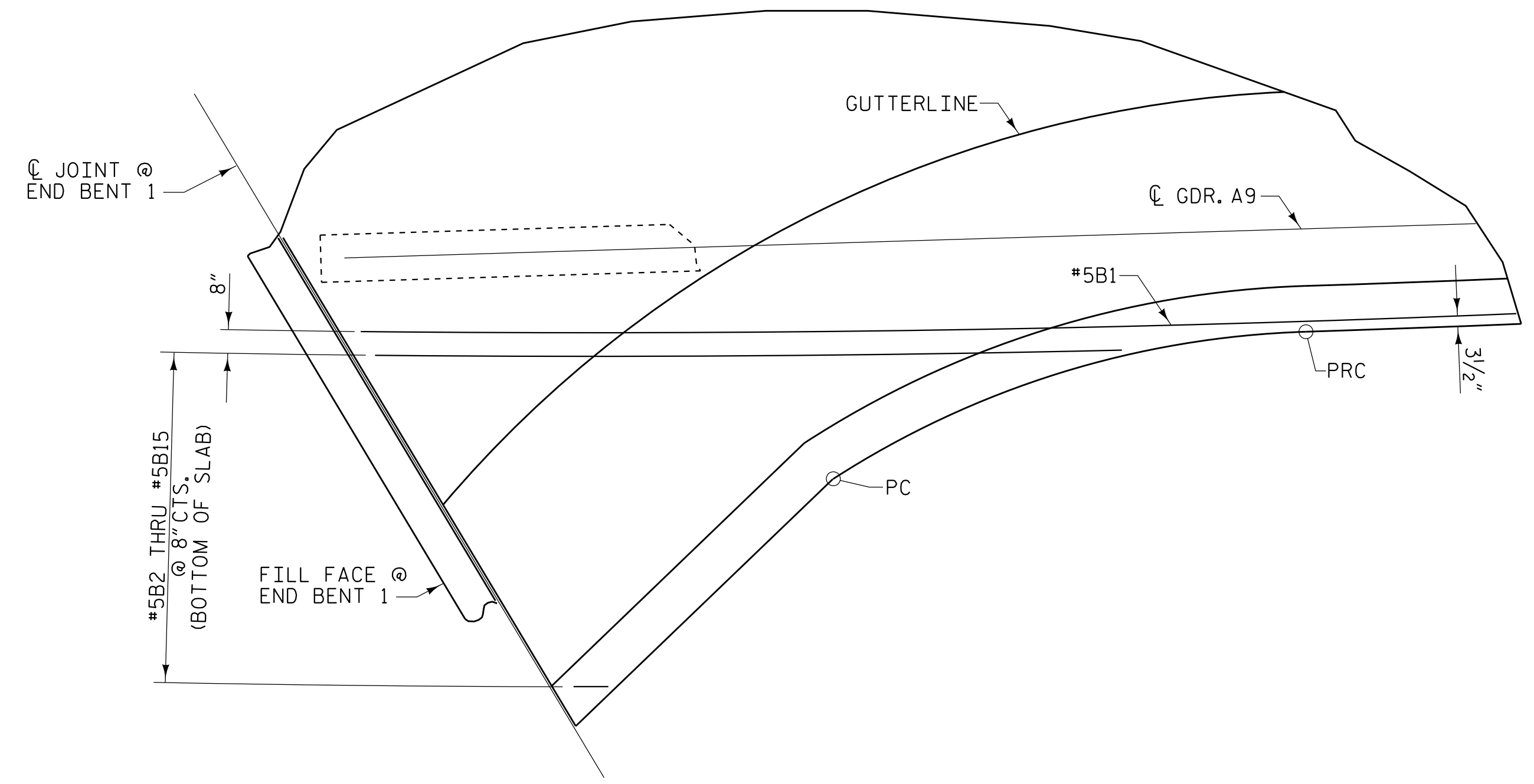
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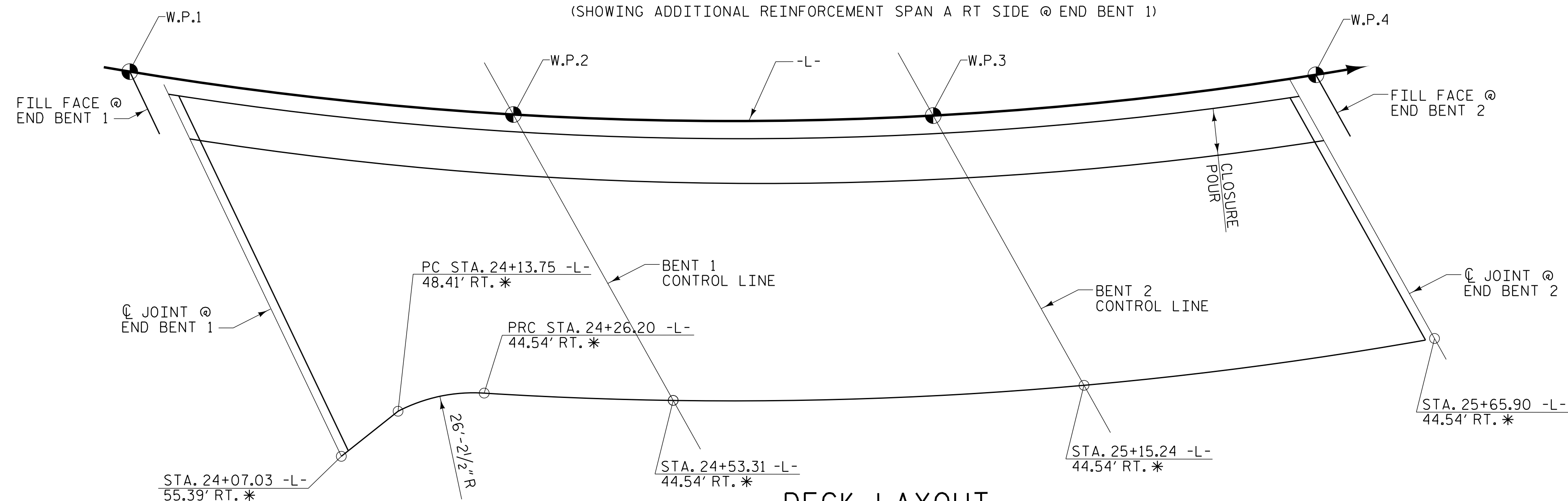
TOP OF SLAB REINFORCING STEEL



BOTTOM OF SLAB REINFORCING STEEL

**“B” BAR LAYOUT**

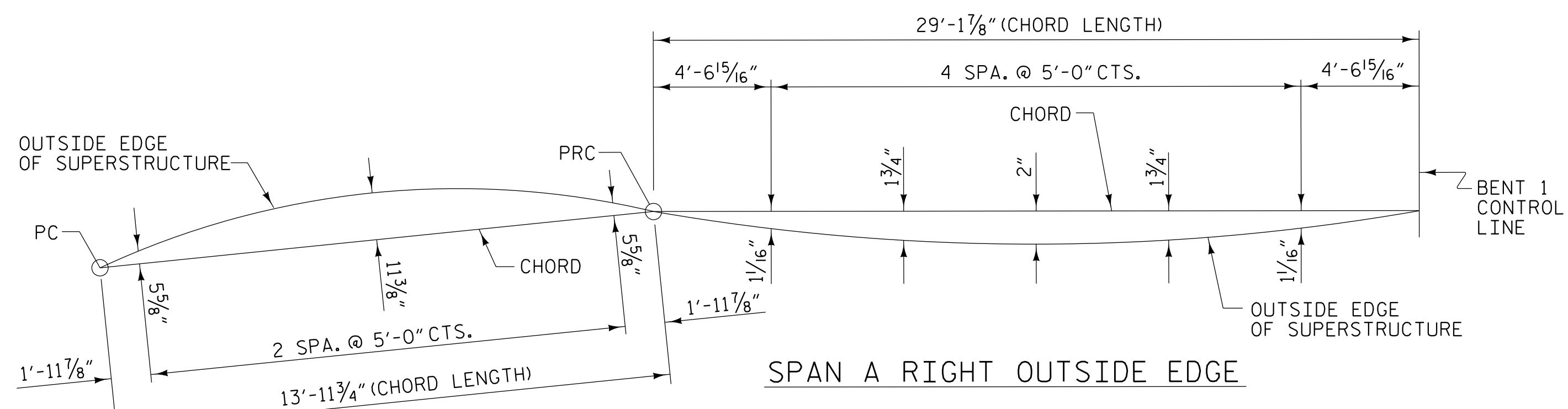
(SHOWING ADDITIONAL REINFORCEMENT SPAN A RT SIDE @ END BENT 1)



**DECK LAYOUT**

STAGE I CONSTRUCTION

\* NORMAL TO -L-



**SPAN A RIGHT OUTSIDE EDGE**

**ARC OFFSETS**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 2 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 PLAN OF SPANS  
 STAGE I**

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

TOTAL SHEETS: 63

PLANS PREPARED BY:

**N|V|5**

NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.nv5.com  
 NC License # F-1333

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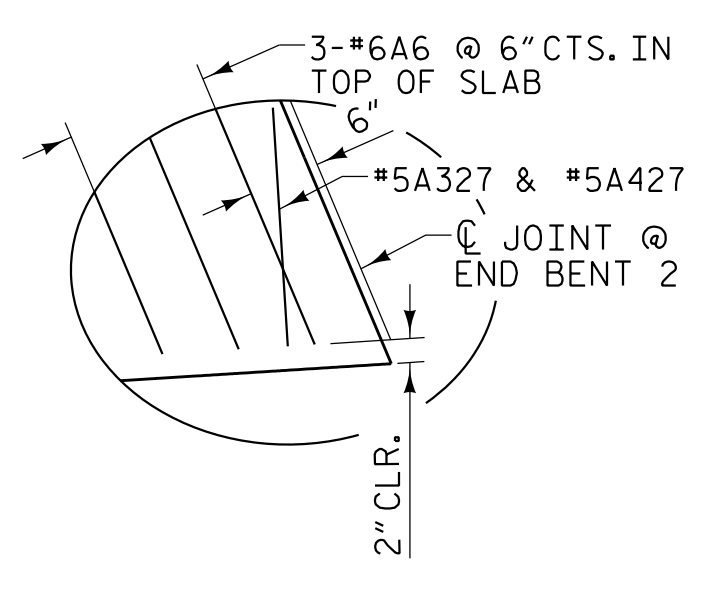
**ROBERT C. LARSON**  
 PROFESSIONAL ENGINEER  
 NO. 239809220470  
 5/18/2023

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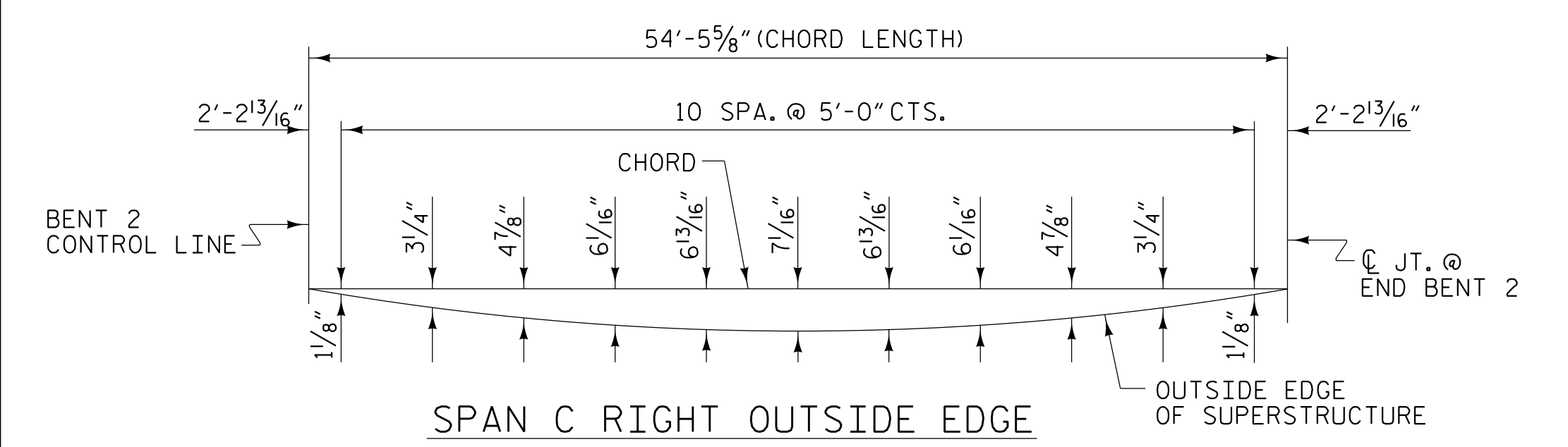
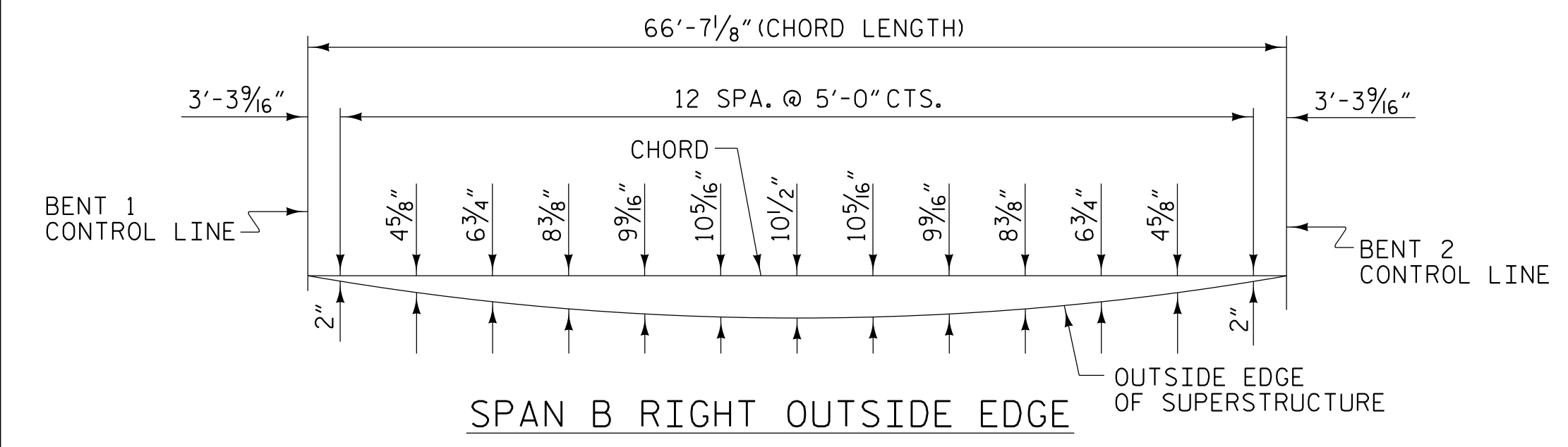
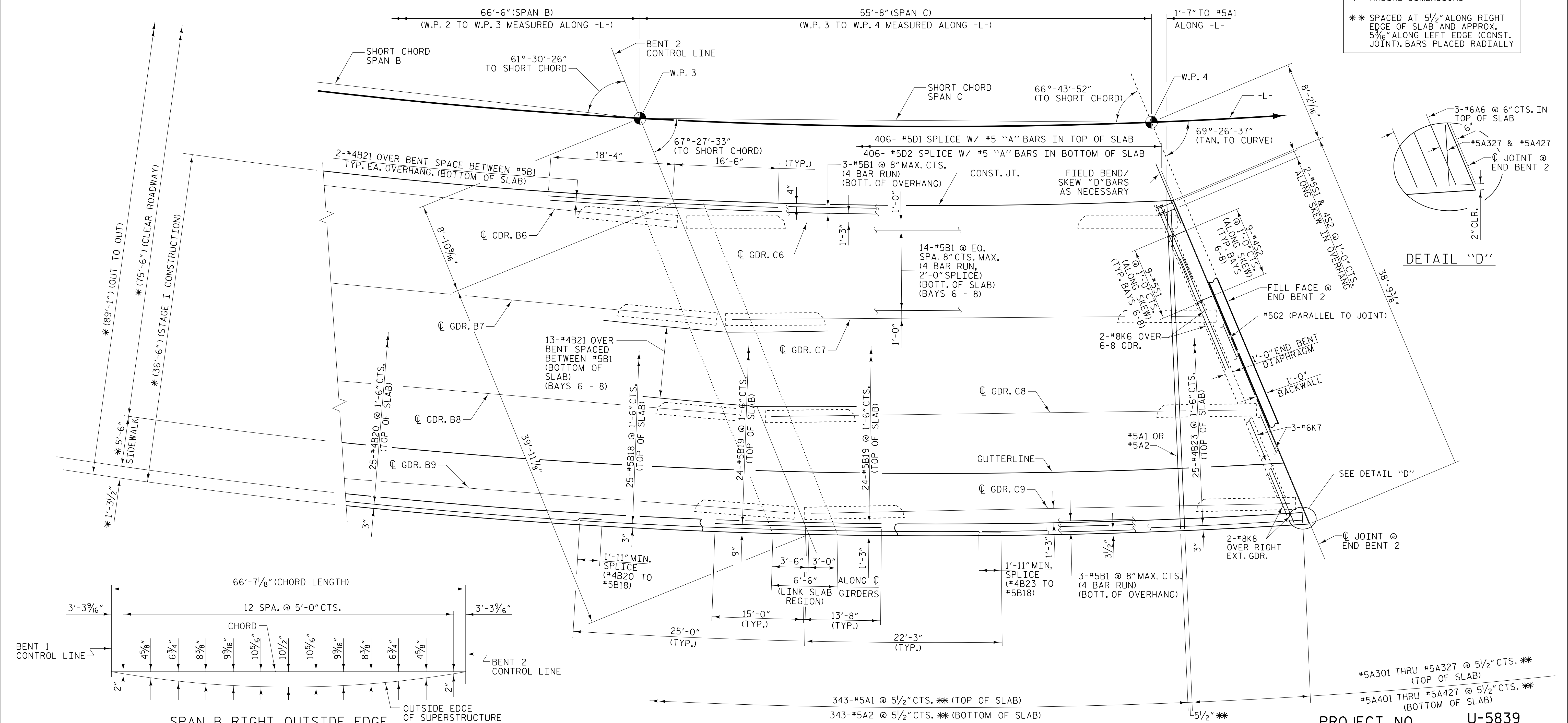
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 CHECKED BY: Z. H. BROWN DATE: 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

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\* RADIAL DIMENSIONS  
 \*\* SPACED AT 5/2" ALONG RIGHT EDGE OF SLAB AND APPROX. 5 3/6" ALONG LEFT EDGE (CONST. JOINT). BARS PLACED RADIALLY



DETAIL "D"



ARC OFFSETS

SPANS B & C

NOTES

- FOR SIDEWALK DETAILS AND REINFORCING STEEL, SEE "SIDEWALK PLAN AND DETAILS" SHEETS.
- FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEET 5 OF 5.
- FOR POUR SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 3 OF 3.
- DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.
- \*\*5G" BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.
- FOR ARC OFFSETS FOR LEFT EDGE, SEE SHEET 6 OF 6.

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ROBERT C. LARSON  
 ENGINEER  
 14114

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PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 3 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 PLAN OF SPANS  
 STAGE I**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

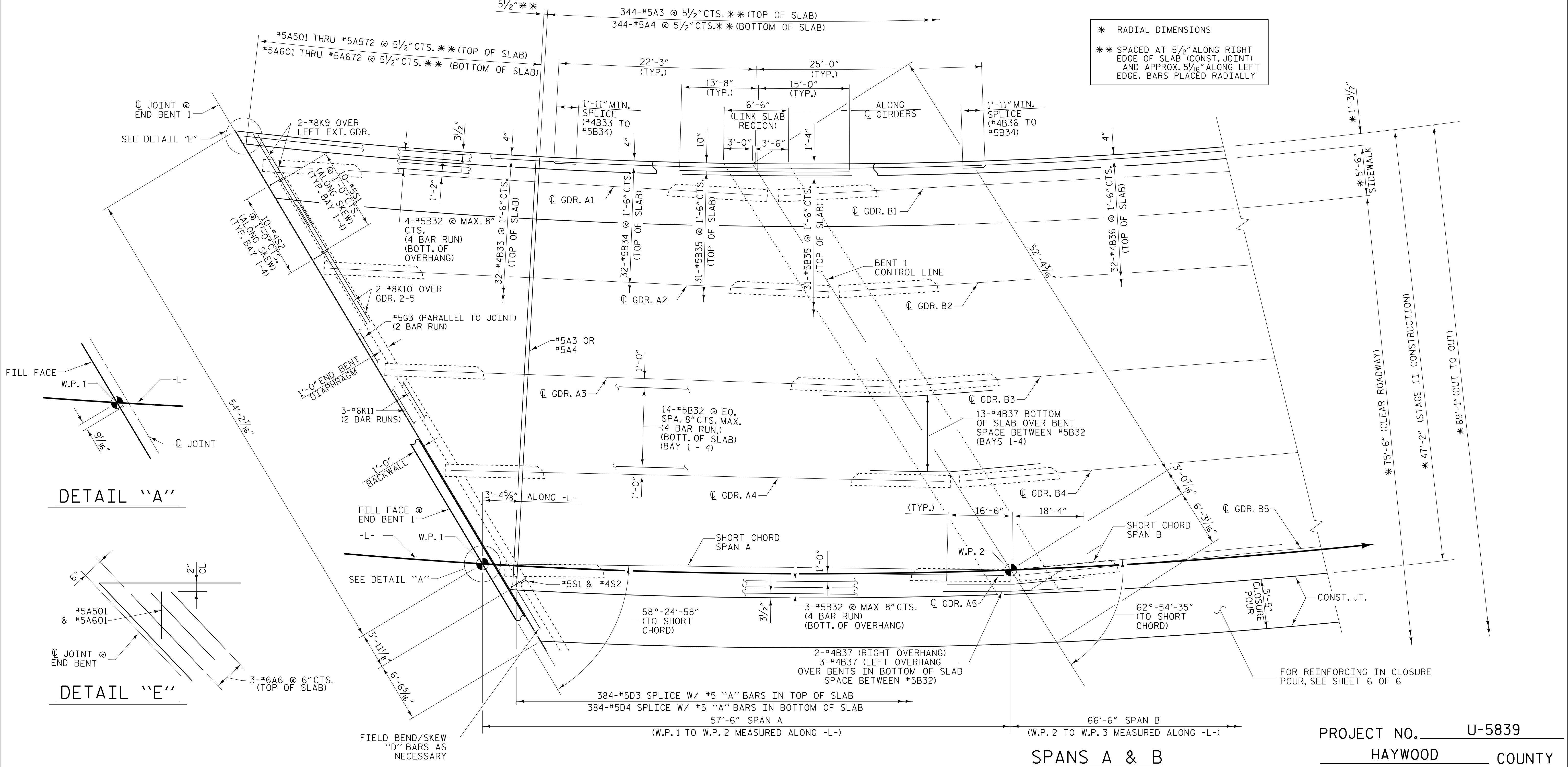
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 BEB2398D9220470

5/18/2023

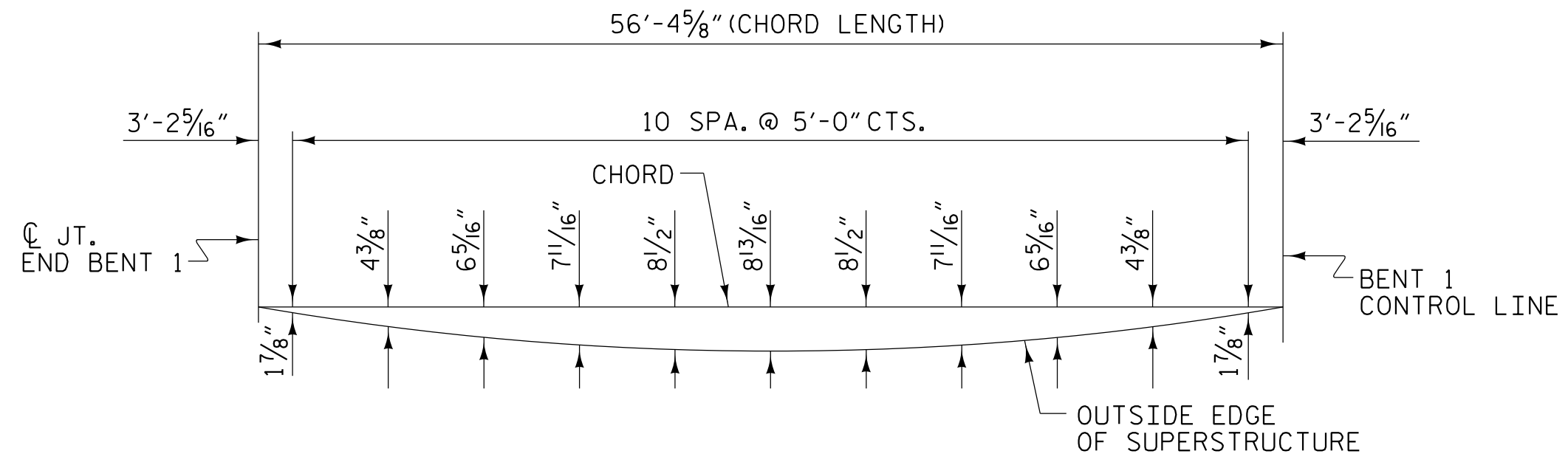
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\* RADIAL DIMENSIONS  
 \*\* SPACED AT 5/2" ALONG RIGHT EDGE OF SLAB (CONST. JOINT) AND APPROX. 5/16" ALONG LEFT EDGE. BARS PLACED RADIALLY

DETAIL "A"

DETAIL "E"



LEFT OUTSIDE EDGE  
 ARC OFFSETS

**NOTES**

FOR SIDEWALK DETAILS AND REINFORCING STEEL, SEE "SIDEWALK PLAN AND DETAILS" SHEETS.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEET 5 OF 5.

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

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FOR ARC OFFSETS FOR RIGHT EDGE, SEE SHEET 6 OF 6.

SPANS A & B

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 4 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 PLAN OF SPANS  
 STAGE II

REVISIONS				SHEET NO.			
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-15	
1			3			TOTAL SHEETS	
2			4			63	

PLANS PREPARED BY:

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DocuSigned by:

*Robert C. Larson*

BE239899220470

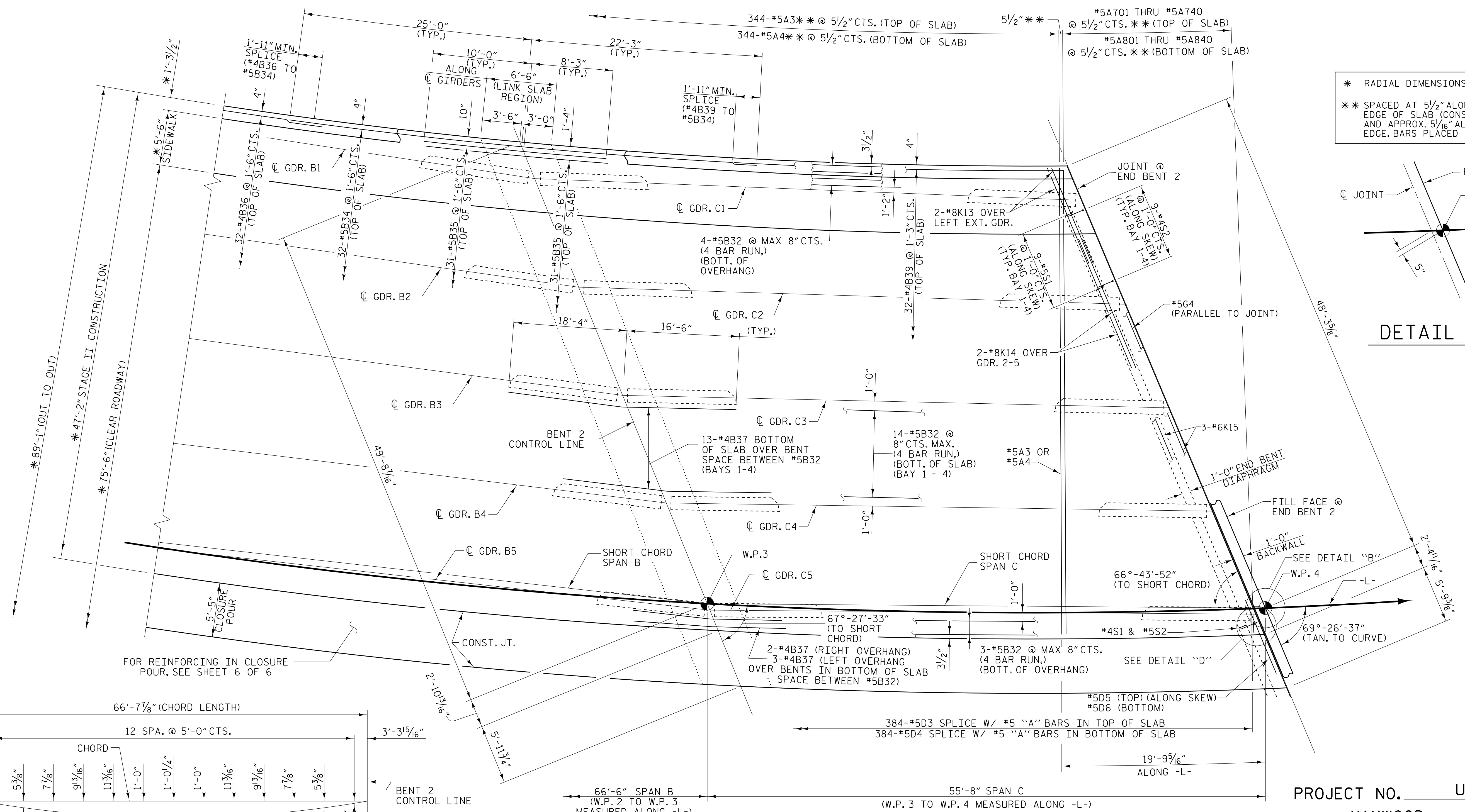
PROFESSIONAL SEAL  
 1414  
 ENGINEER  
 ROBERT C. LARSON

5/18/2023

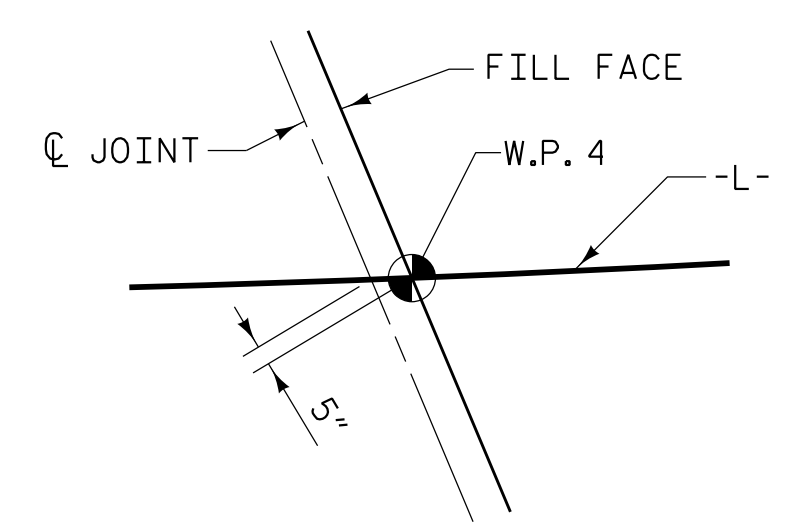
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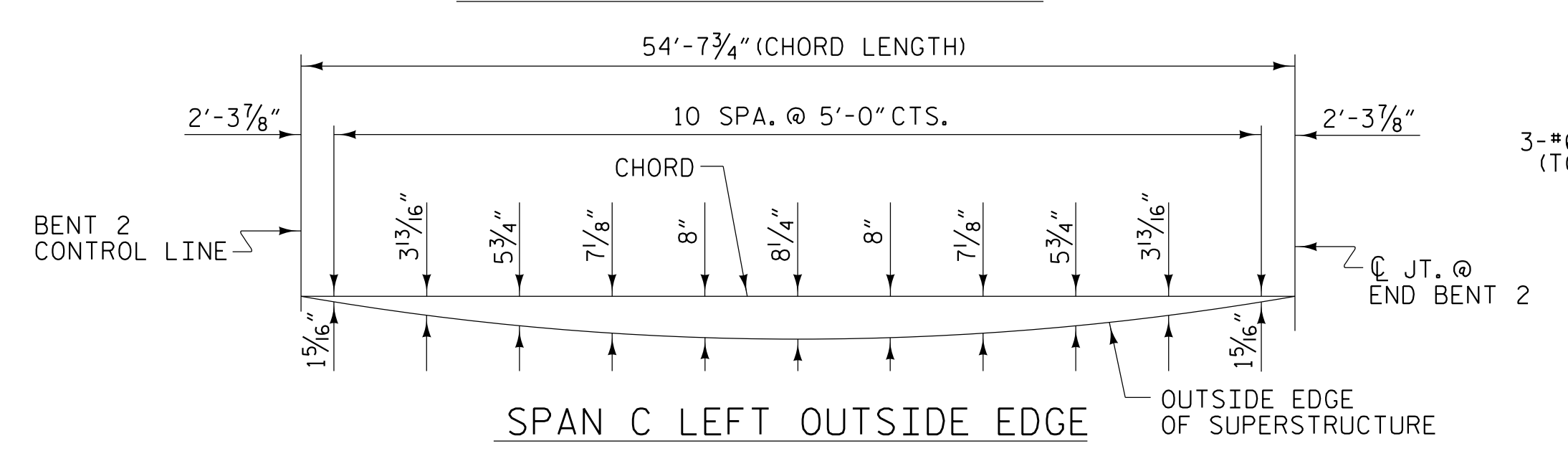
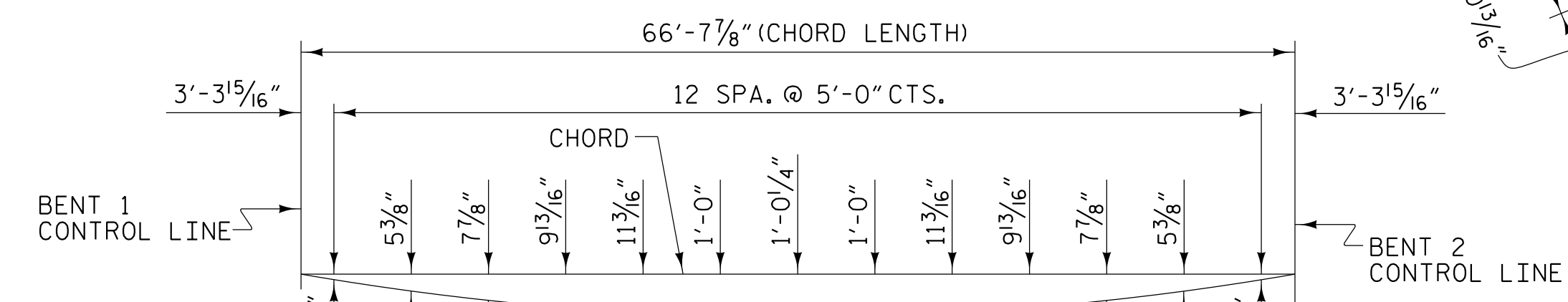




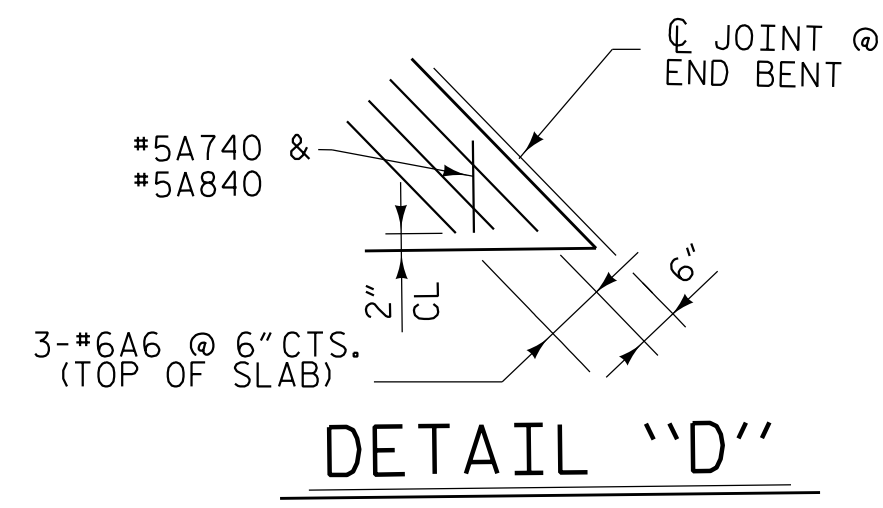
\* RADIAL DIMENSIONS  
 \*\* SPACED AT 5/2" ALONG RIGHT EDGE OF SLAB (CONST. JOINT) AND APPROX. 5/16" ALONG LEFT EDGE. BARS PLACED RADIALLY



DETAIL "B"



ARC OFFSETS



DETAIL "D"

NOTES

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- FOR ARC OFFSETS FOR RIGHT EDGE, SEE SHEET 6 OF 6.

SPANS B & C

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 CARY, NC 27518  
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 NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
 ENGINEER  
 5/18/2023

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 5 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 PLAN OF SPANS  
 STAGE II

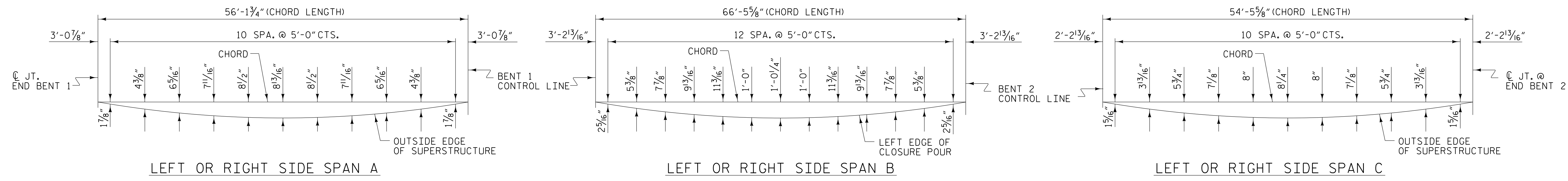
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NO.	BY:	DATE:	NO.	BY:	DATE:	S1-16	
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2			4			63	

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 CHECKED BY: Z. H. BROWN DATE: 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

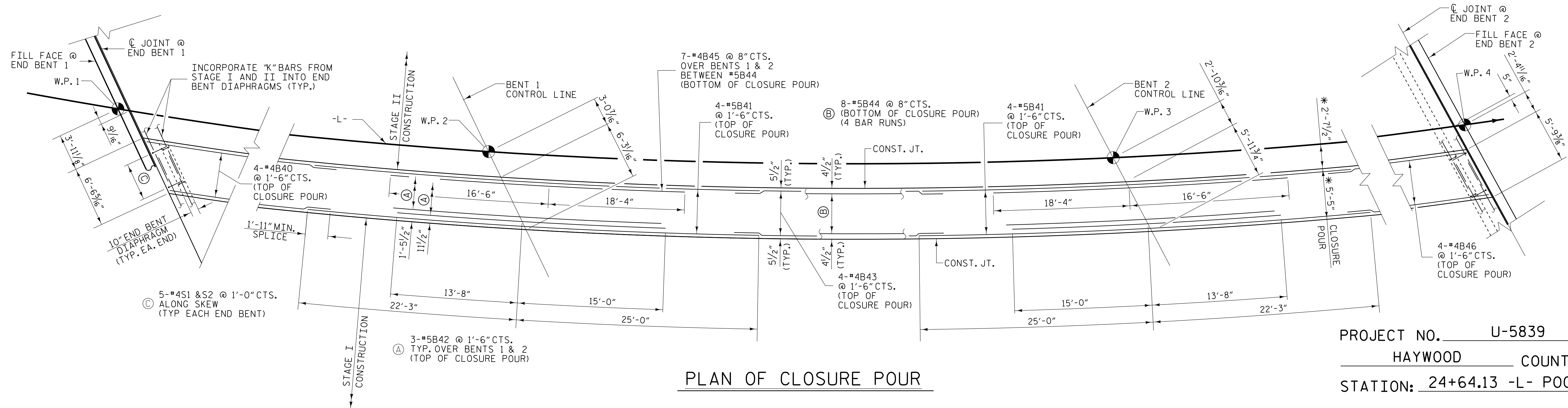
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\* RADIAL DIMENSIONS



ARC OFFSETS - EDGE OF CLOSURE POUR



PLAN OF CLOSURE POUR

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 6 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 PLAN OF SPANS  
 STAGE II

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 NV5 ENGINEERS & CONSULTANTS, INC.  
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 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
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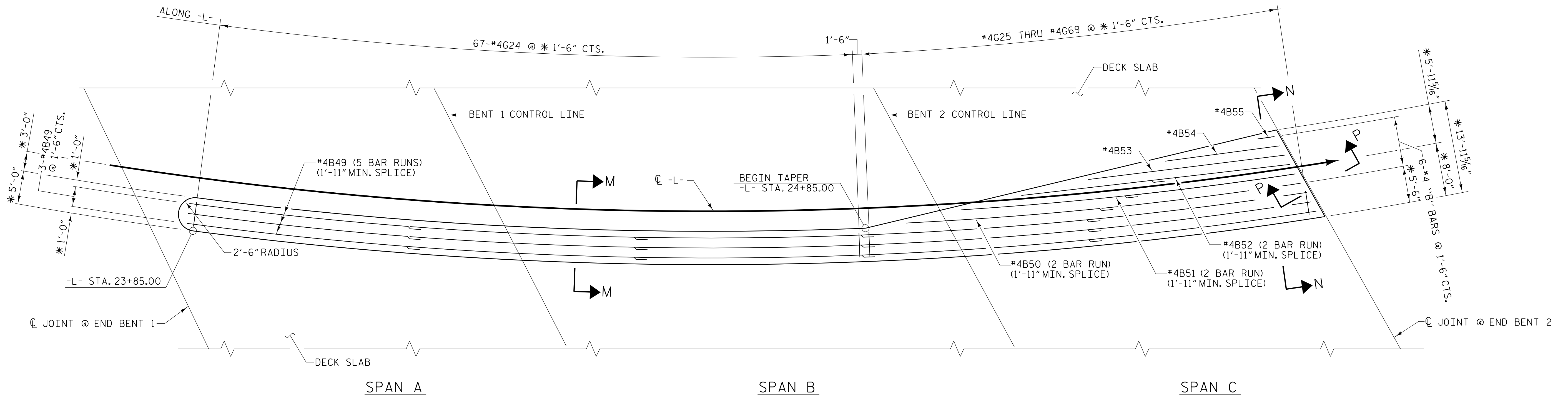
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 CHECKED BY : J. W. DAVIS DATE : 1/23  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	11-17
1			3			TOTAL SHEETS
2			4			63

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PLAN OF MONOLITHIC CONCRETE ISLAND

\* DENOTES RADIAL DIMENSION

NOTES

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

PAYMENT FOR THE MONOLITHIC CONCRETE ISLAND SHALL BE INCLUDED IN UNIT PRICE FOR "REINFORCED CONCRETE DECK SLAB"

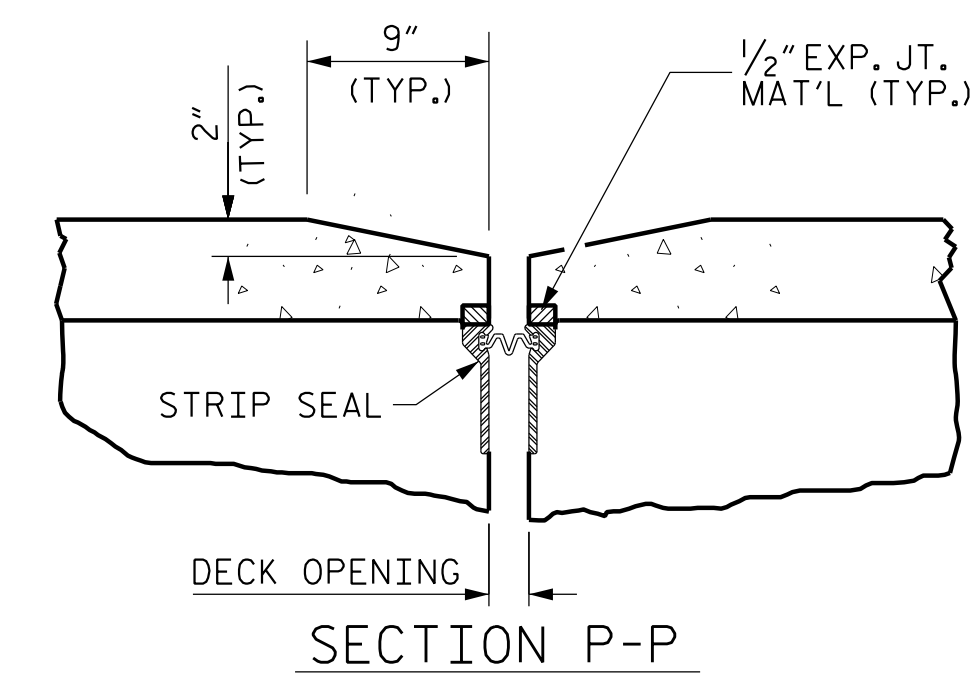
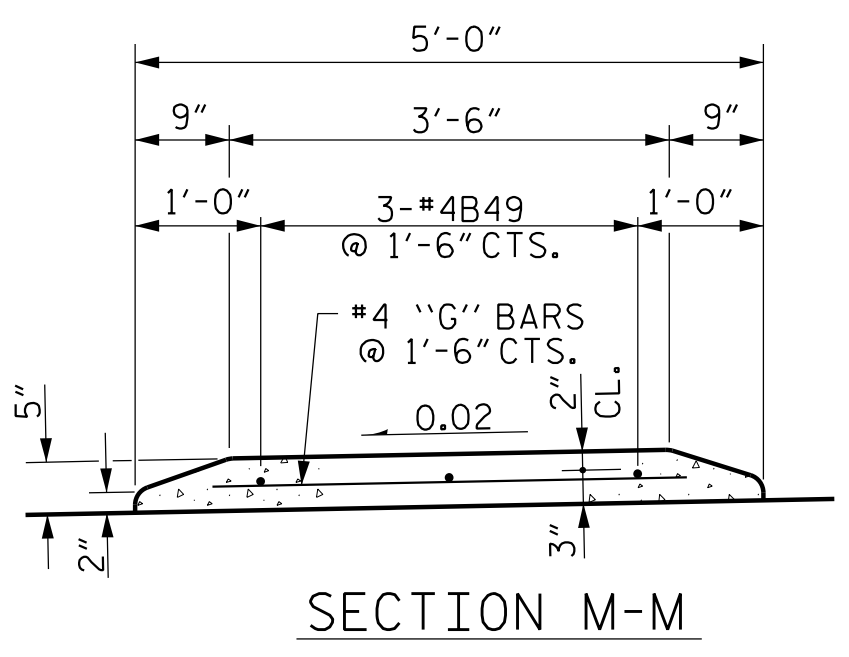
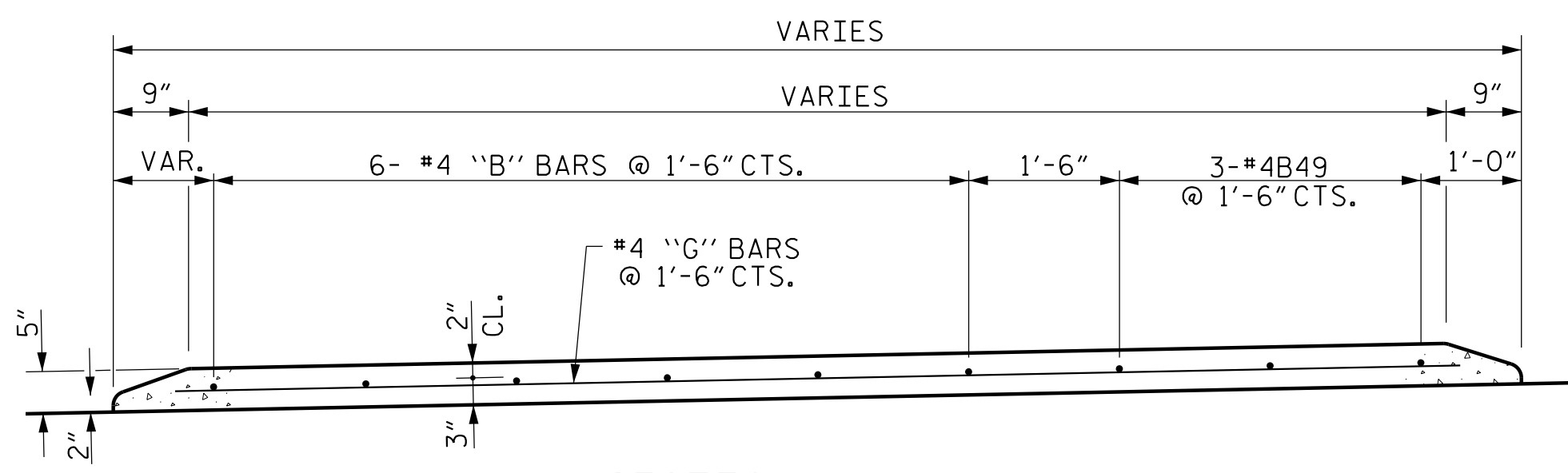
ALL REINFORCING STEEL IN THE MONOLITHIC CONCRETE ISLAND SHALL BE EPOXY COATED.

BILL OF MATERIAL											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B49	15	#4	STR	35'-8"	357	* G43	1	#4	STR	8'-4"	6
* B50	2	#4	STR	30'-9"	41	* G44	1	#4	STR	8'-6"	6
* B51	2	#4	STR	26'-3"	35	* G45	1	#4	STR	8'-9"	6
* B52	2	#4	STR	21'-3"	28	* G46	1	#4	STR	9'-0"	6
* B53	1	#4	STR	28'-8"	19	* G47	1	#4	STR	9'-2"	6
* B54	1	#4	STR	17'-4"	12	* G48	1	#4	STR	9'-5"	6
* B55	1	#4	STR	2'-6"	2	* G49	1	#4	STR	9'-7"	6
* G24	67	#4	STR	3'-8"	164	* G50	1	#4	STR	9'-10"	7
* G25	1	#4	STR	3'-9"	3	* G51	1	#4	STR	10'-0"	7
* G26	1	#4	STR	4'-0"	3	* G52	1	#4	STR	10'-3"	7
* G27	1	#4	STR	4'-3"	3	* G53	1	#4	STR	10'-5"	7
* G28	1	#4	STR	4'-7"	3	* G54	1	#4	STR	10'-7"	7
* G29	1	#4	STR	4'-10"	3	* G55	1	#4	STR	10'-9"	7
* G30	1	#4	STR	5'-1"	3	* G56	1	#4	STR	10'-11"	7
* G31	1	#4	STR	5'-4"	4	* G57	1	#4	STR	11'-1"	7
* G32	1	#4	STR	5'-8"	4	* G58	1	#4	STR	11'-3"	8
* G33	1	#4	STR	5'-11"	4	* G59	1	#4	STR	11'-5"	8
* G34	1	#4	STR	6'-2"	4	* G60	1	#4	STR	11'-6"	8
* G35	1	#4	STR	6'-5"	4	* G61	1	#4	STR	11'-8"	8
* G36	1	#4	STR	6'-9"	5	* G62	1	#4	STR	11'-10"	8
* G37	1	#4	STR	7'-0"	5	* G63	1	#4	STR	12'-0"	8
* G38	1	#4	STR	7'-3"	5	* G64	1	#4	STR	12'-2"	8
* G39	1	#4	STR	7'-6"	5	* G65	1	#4	STR	12'-4"	8
* G40	1	#4	STR	7'-8"	5	* G66	1	#4	STR	12'-6"	8
* G41	1	#4	STR	7'-11"	5	* G67	1	#4	STR	11'-3"	8
* G42	1	#4	STR	8'-1"	5	* G68	1	#4	STR	7'-4"	5
						* G69	1	#4	STR	3'-4"	2

\* EPOXY COATED REINF. STEEL 916 LBS.

CLASS AA CONCRETE 17.1 CU. YDS.

\* INDICATES EPOXY COATED REINF. STEEL



SECTIONS THRU MONOLITHIC CONCRETE ISLAND

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 MONOLITHIC CONCRETE ISLAND  
 PLAN AND DETAILS

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

TOTAL SHEETS 63

PLANS PREPARED BY:  
**N|V|5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
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 CARY, NC 27518  
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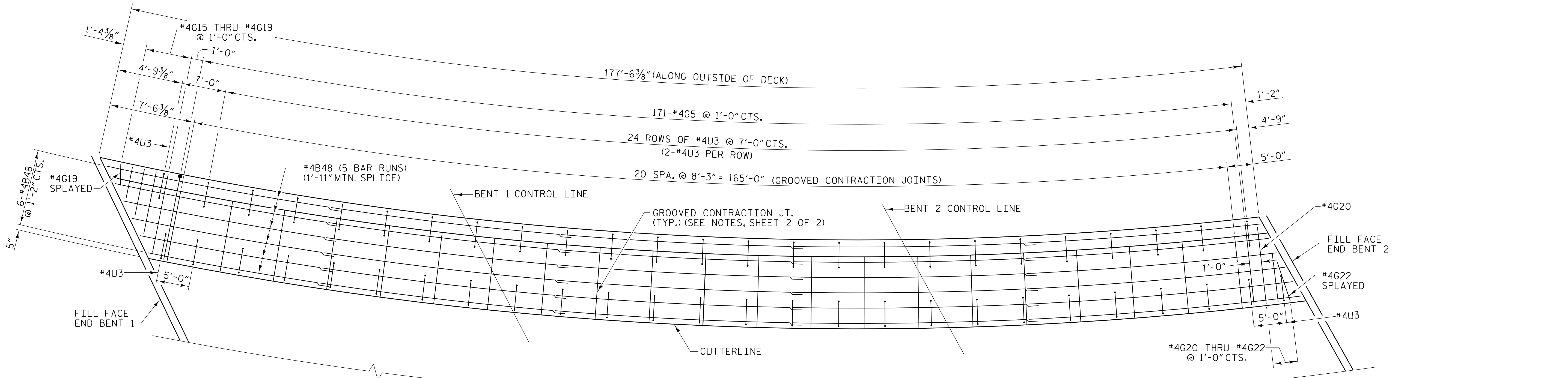
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 NORTH CAROLINA PROFESSIONAL ENGINEER  
 ROBERT C. LARSON  
 EB2398D9220470  
 1414  
 5/18/2023

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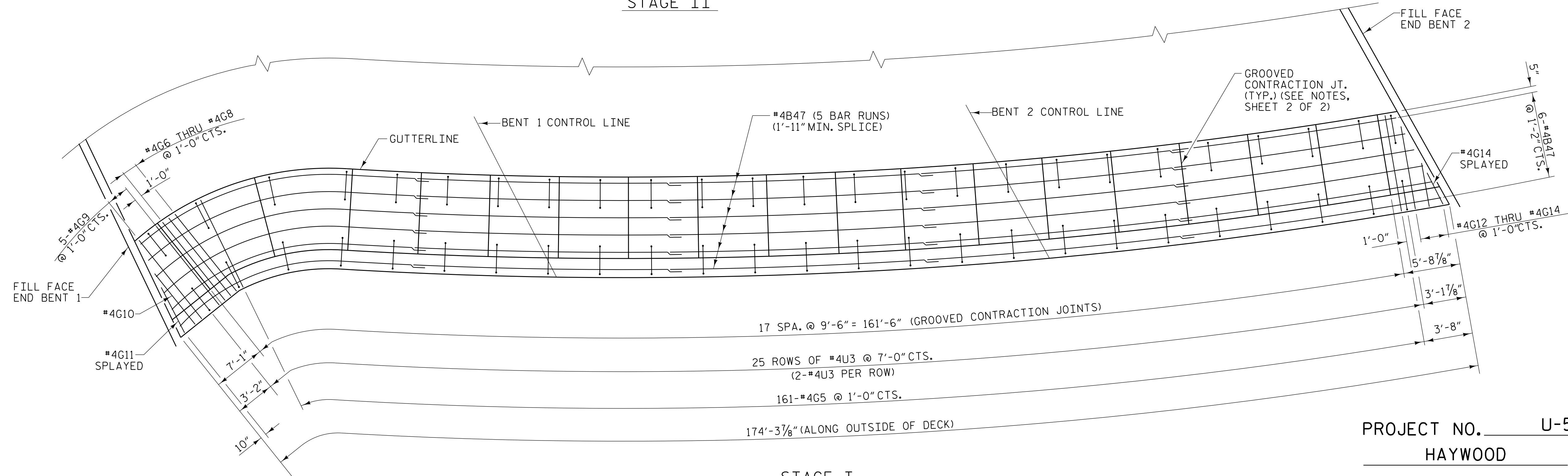
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 CHECKED BY: Z. H. BROWN DATE: 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
 BEB2398D9220470

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STAGE II



STAGE I

PLAN

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 SIDEWALK  
 PLAN AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
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 NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
 ENGINEER  
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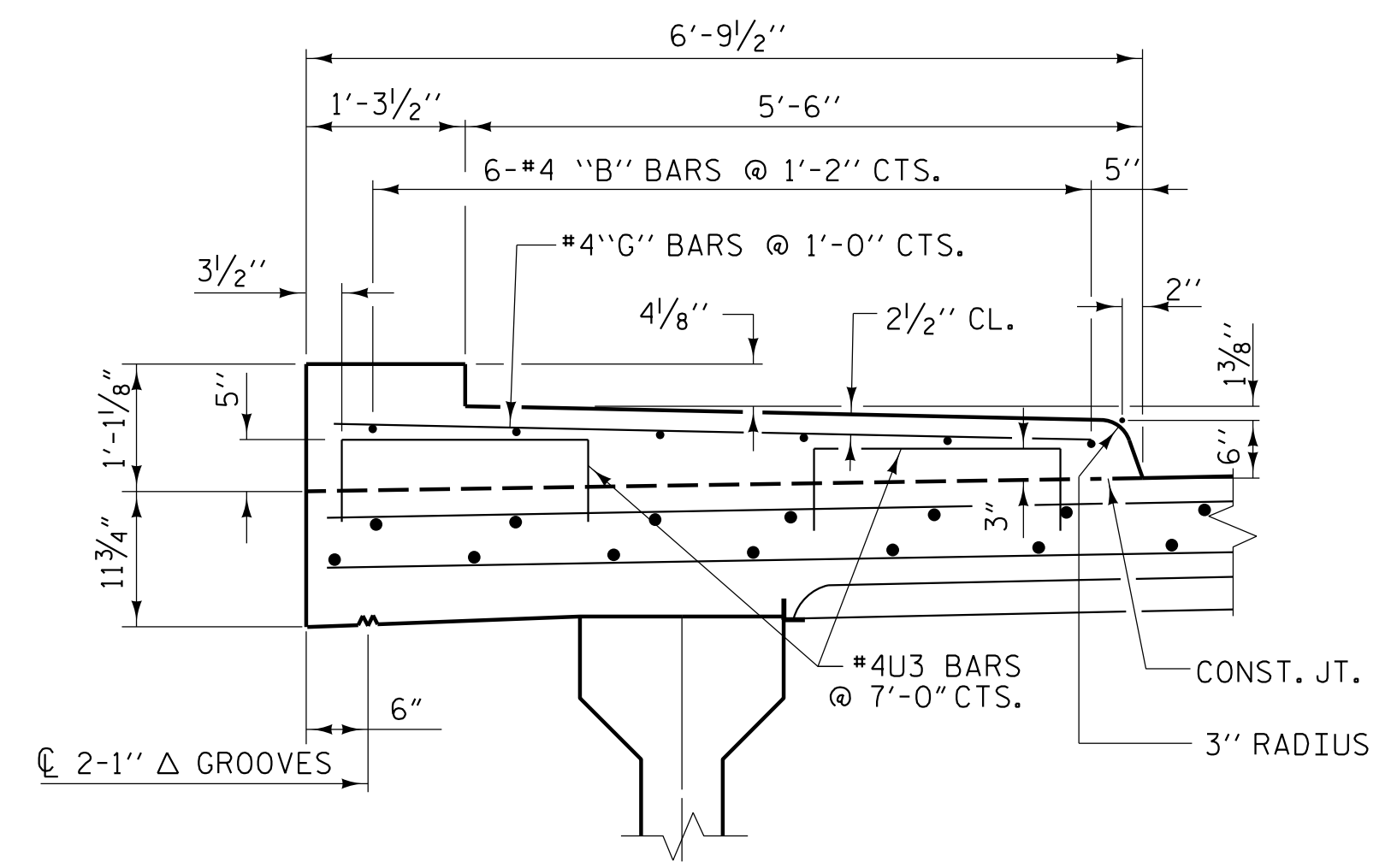
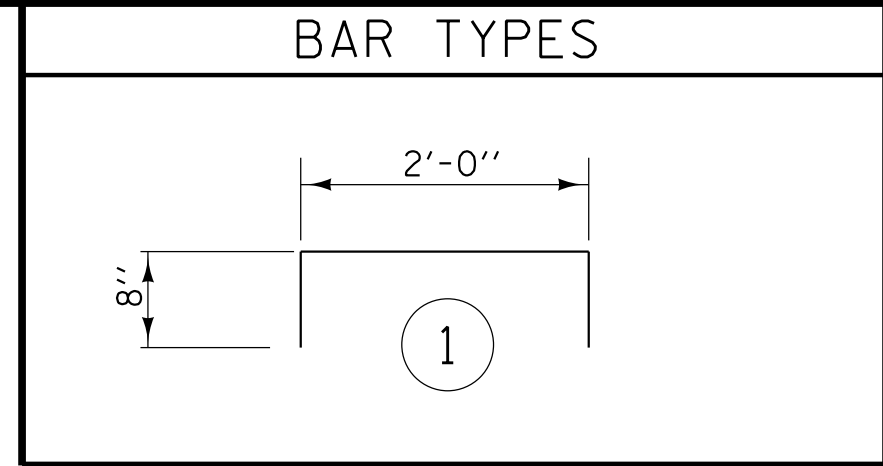
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DRAWN BY: W. B. ALLEN DATE: 10/19  
 CHECKED BY: Z. H. BROWN DATE: 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
  
 BEB2398D9220470...

BILL OF MATERIAL											
STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B47	30	#4	STR	36'-3"	726	* B48	30	#4	STR	37'-1"	743
* G5	161	#4	STR	6'-4"	681	* G5	171	#4	STR	6'-4"	723
* G6	1	#4	STR	6'-5"	4	* G15	1	#4	STR	6'-2"	4
* G7	1	#4	STR	6'-7"	4	* G16	1	#4	STR	4'-10"	3
* G8	1	#4	STR	6'-8"	4	* G17	1	#4	STR	3'-6"	2
* G9	5	#4	STR	6'-9"	23	* G18	1	#4	STR	2'-2"	1
* G10	1	#4	STR	5'-2"	3	* G19	1	#4	STR	2'-1"	1
* G11	1	#4	STR	4'-6"	3	* G20	1	#4	STR	6'-1"	4
* G12	1	#4	STR	6'-1"	4	* G21	1	#4	STR	3'-3"	2
* G13	1	#4	STR	3'-3"	2	* G22	1	#4	STR	2'-11"	2
* G14	1	#4	STR	2'-11"	2						
* U3	50	#4	1	3'-4"	111	* U3	51	#4	1	3'-4"	114
* EPOXY COATED REINF. STEEL 1567 LBS.						* EPOXY COATED REINF. STEEL 1599 LBS.					
CLASS AA CONCRETE ** 25.3 CU. YDS.						CLASS AA CONCRETE ** 31.8 CU. YDS.					

\* INDICATES EPOXY COATED REINF. STEEL  
 \*\* INCLUDES CONC. FOR END POSTS



**SECTION THRU SIDEWALK**

#4U3 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.  
 LEFT SIDE SHOWN, RIGHT SIDE SIMILAR.

**NOTES:**

SIDEWALK 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 3000 PSI.

ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

NO SEPARATE PAYMENT SHALL BE MADE FOR MATERIALS, LABOR AND INCIDENTALS REQUIRED FOR THIS CONSTRUCTION OF CONCRETE SIDEWALK AND CONCRETE MEDIAN AS DETAILED ON BRIDGE SPANS AND APPROACH SLABS. ALL COSTS FOR THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 925-10(B) OF THE STANDARD SPECIFICATIONS, THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**SIDEWALK  
 PLAN AND DETAILS**

PLANS PREPARED BY:  
**N|V|5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

DocuSigned by:  
  
 BEB239809220470  
 14114  
 ROBERT C. LARSON  
 5/18/2023

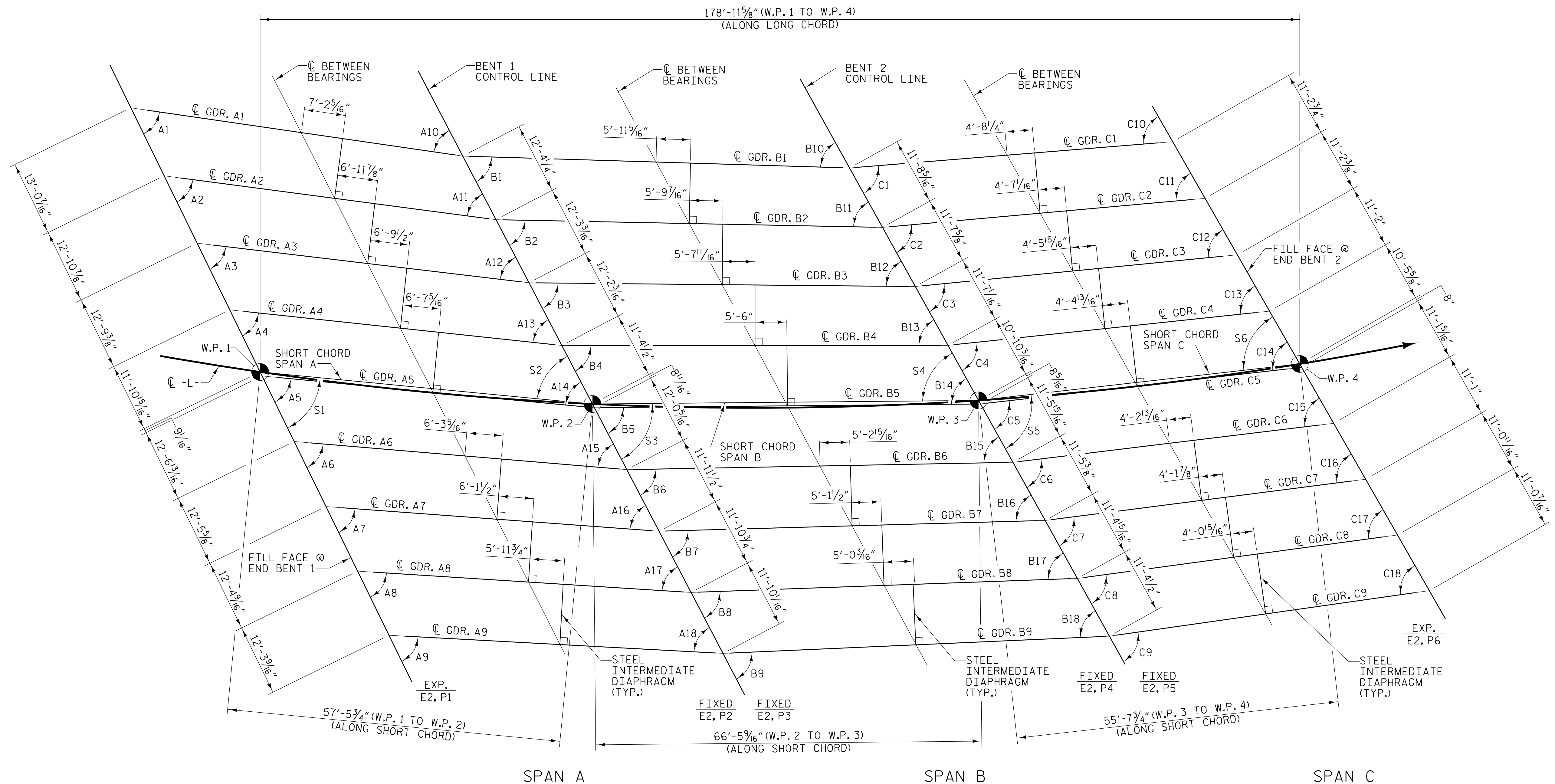
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 UNLESS ALL SIGNATURES COMPLETED**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-20
1			3			TOTAL SHEETS
2			4			63

DRAWN BY : W. B. ALLEN DATE : 10/19  
 CHECKED BY : Z. H. BROWN DATE : 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

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 BEB239809220470

5/17/2023 7:05:58 PM R:\Structures\3 span Bridge over RRY20 US5839\_SMU\_SW2\_410184.dgn



**FRAMING PLAN**

(END BENT DIAPHRAGMS NOT SHOWN)  
 (INTERMEDIATE DIAPHRAGMS NOT REQUIRED IN BAY 5 @ CLOSURE POUR)

**GIRDER SKEW ANGLES**

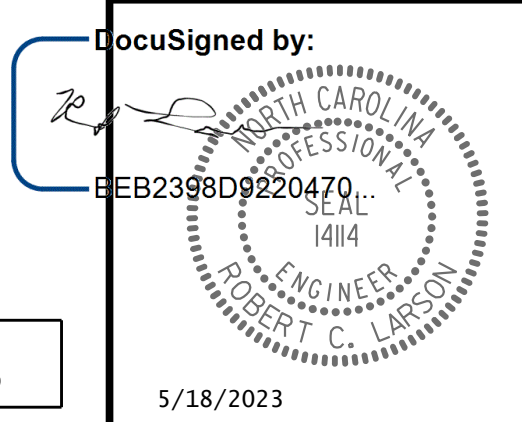
GIRDER No.	SPAN A				SPAN B				SPAN C																																													
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18
1	55°-38'-35"	56°-23'-40"	57°-06'-44"	57°-47'-53"	58°-27'-17"	59°-05'-02"	59°-41'-15"	60°-16'-02"	60°-49'-27"	54°-05'-42"	54°-50'-48"	55°-33'-52"	56°-15'-01"	56°-54'-25"	57°-32'-10"	58°-08'-23"	58°-43'-10"	59°-16'-35"	60°-36'-44"	61°-13'-58"	61°-49'-36"	62°-23'-45"	62°-56'-31"	63°-27'-59"	63°-58'-13"	64°-27'-19"	64°-55'-20"	59°-12'-35"	59°-49'-49"	60°-25'-27"	60°-59'-36"	61°-32'-22"	62°-03'-50"	62°-34'-04"	63°-03'-10"	63°-31'-11"	65°-37'-33"	66°-07'-10"	66°-35'-35"	67°-02'-52"	67°-29'-06"	67°-54'-20"	68°-18'-38"	68°-42'-03"	69°-04'-37"	64°-53'-52"	65°-23'-29"	65°-51'-53"	66°-19'-11"	66°-45'-25"	67°-10'-39"	67°-34'-57"	67°-58'-21"	68°-20'-56"

**SHORT CHORD ANGLES**

S1	58°-24'-58"
S2	56°-52'-06"
S3	62°-54'-35"
S4	61°-30'-26"
S5	67°-27'-33"
S6	66°-43'-52"

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 FRAMING PLAN



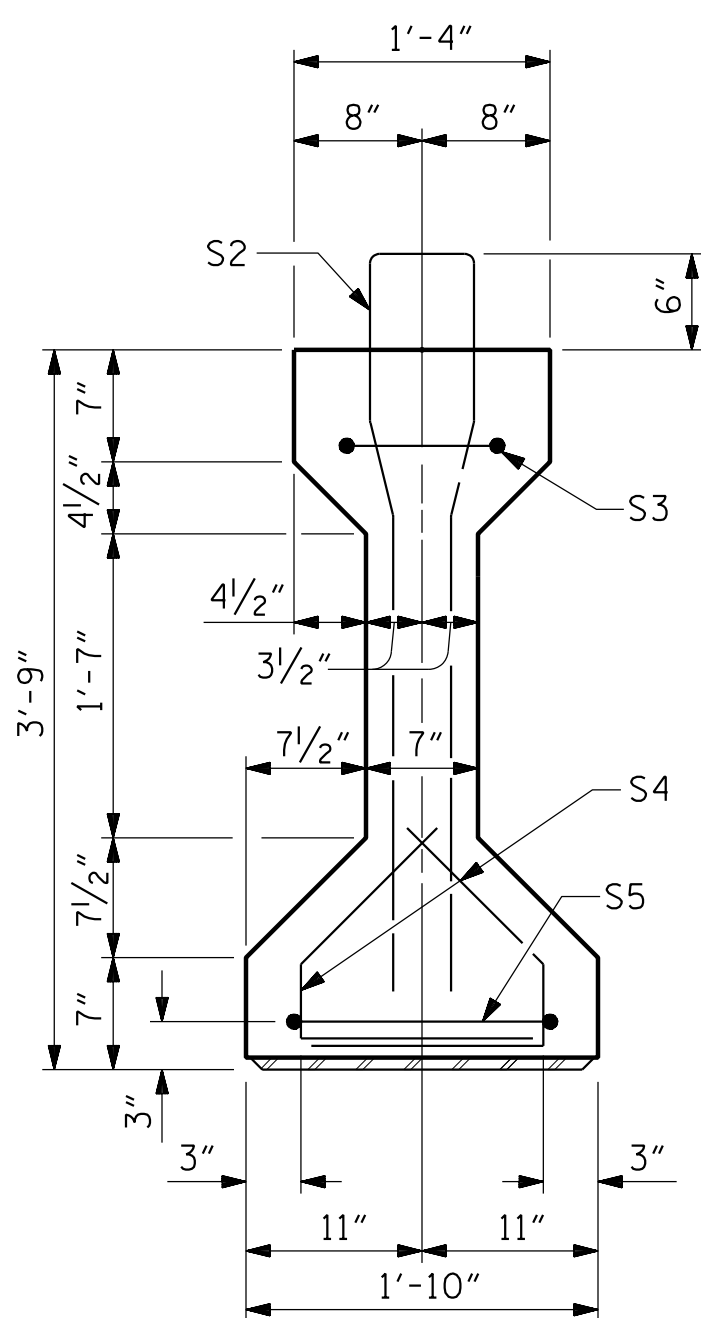
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NO.	BY:	DATE:	NO.	BY:	DATE:	S1-21
1			3			TOTAL SHEETS
2			4			63

DRAWN BY: W. B. ALLEN DATE: 9/19  
 CHECKED BY: Z. H. BROWN DATE: 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

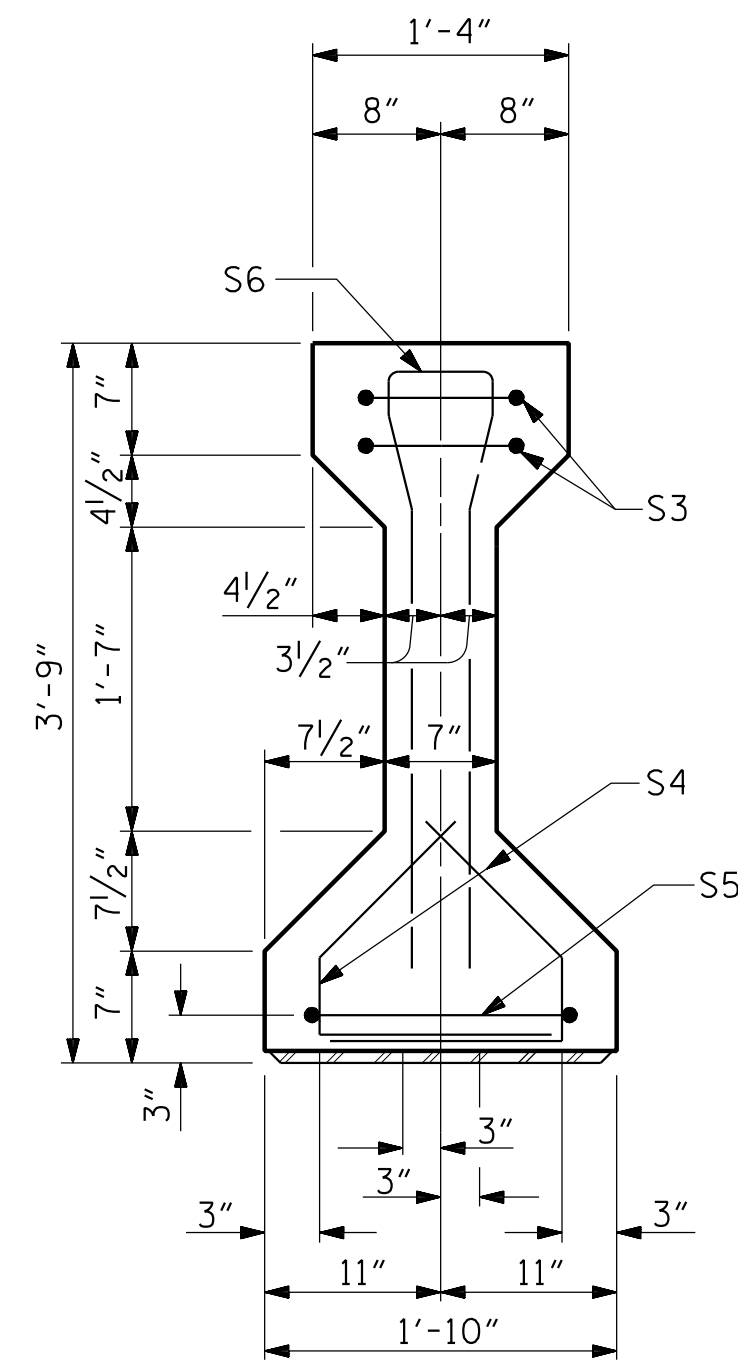
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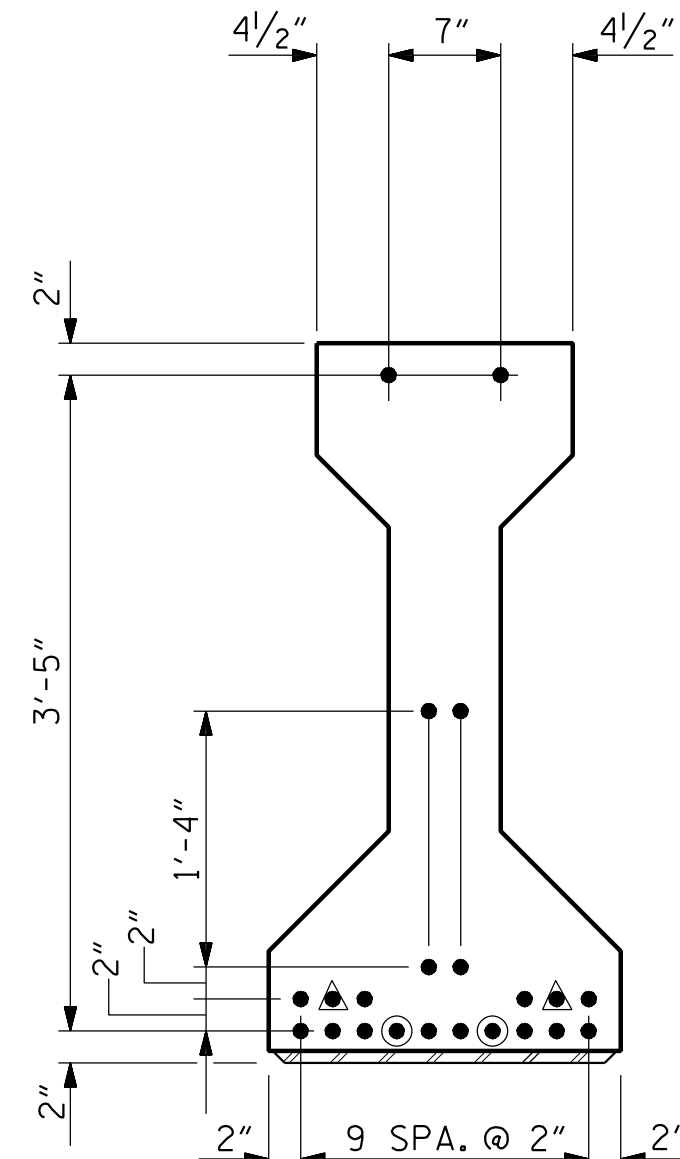
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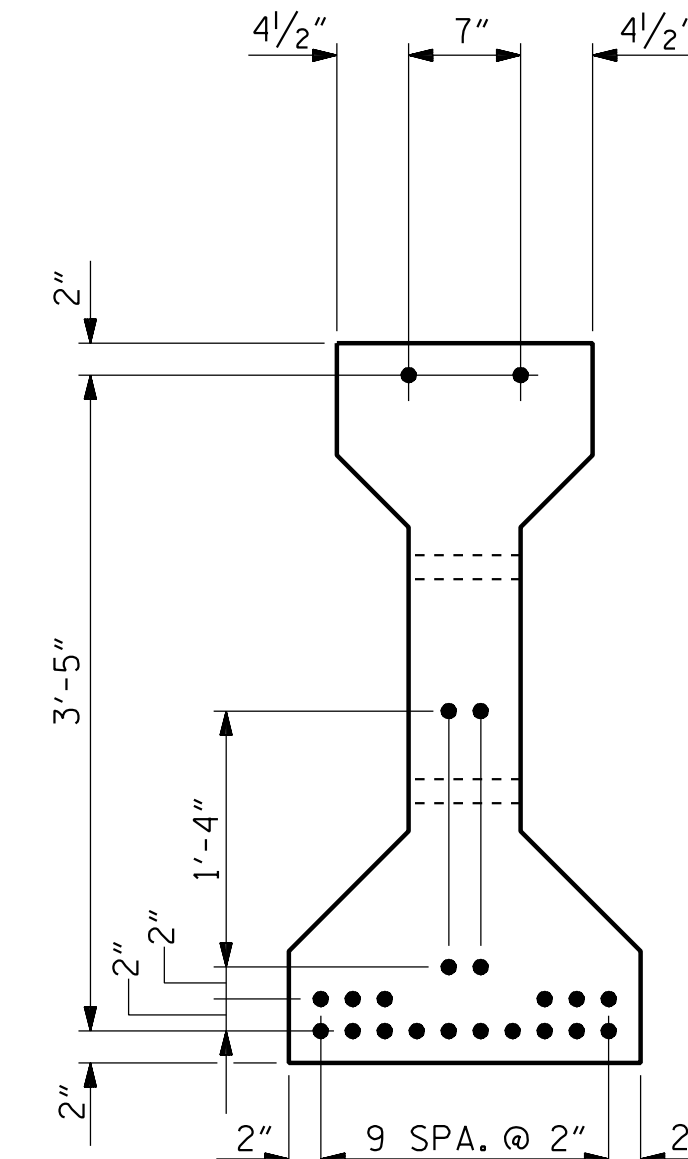
SECTION A-A



SECTION B-B



AT END OF GIRDER



AT CL OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

0.6" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

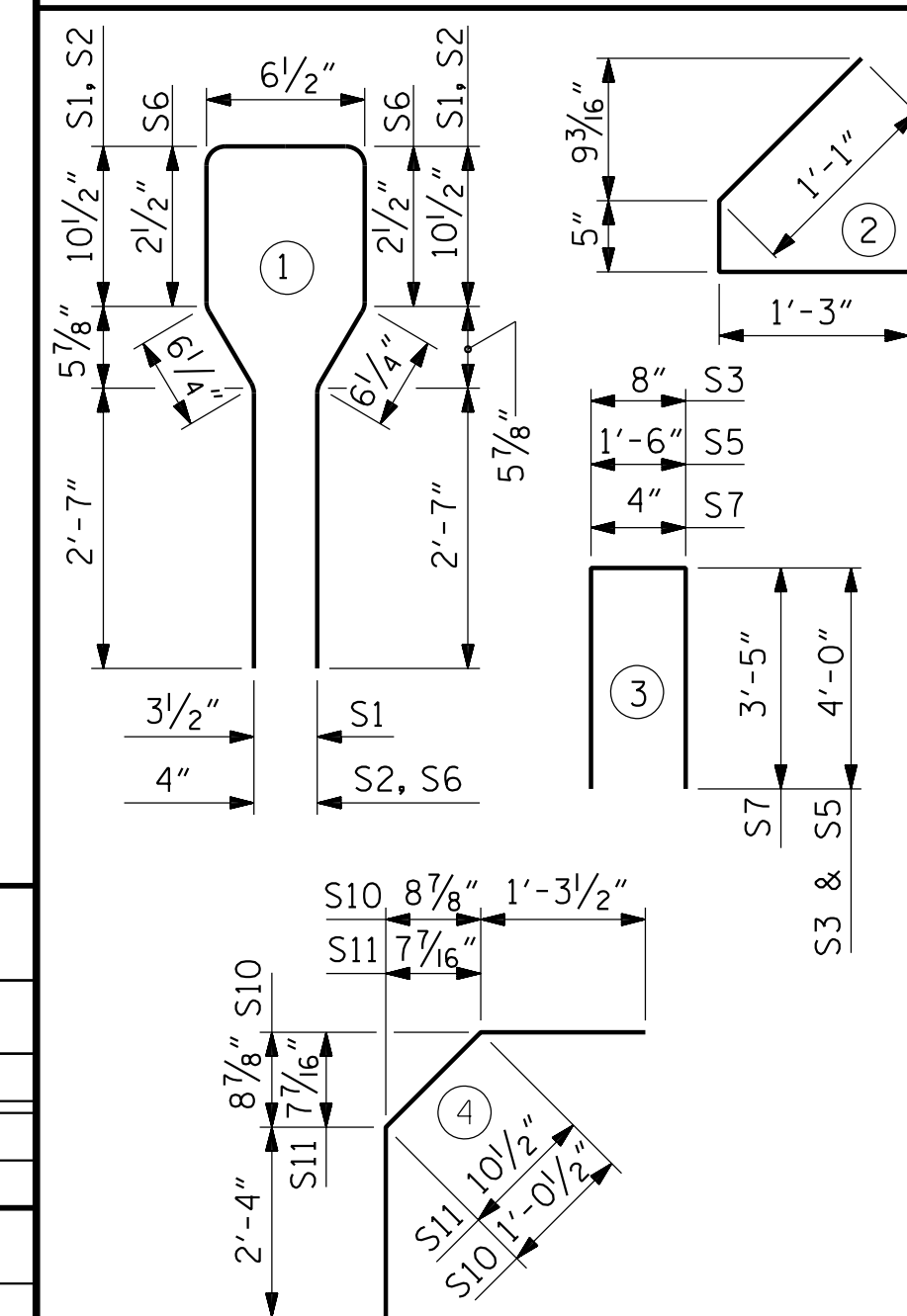
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	40	#4	1	8'-6"	227
S2	3	#6	1	8'-6"	38
S3	3	#4	3	8'-8"	17
S4	60	#4	2	2'-9"	110
S5	2	#4	3	9'-6"	13
S6	14	#6	1	7'-2"	151
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S9	5	#4	STR	14'-0"	47
S10	2	#6	4	4'-8"	14
S11	2	#6	4	4'-6"	14
S12	2	#6	STR	4'-0"	12

AG1, AG5  
AG6, AG9  
AG2-AG4  
AG7-AG8

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



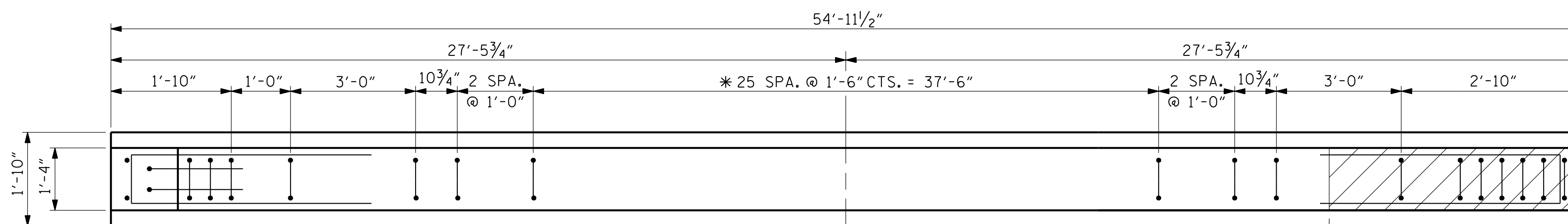
- FULLY BONDED STRAND
- ▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER.
- ◎ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF GIRDER.

DEBONDING LEGEND

	QUANTITIES FOR ONE GIRDER		
	REINFORCING STEEL LB.	6500 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
AG1, AG5, AG6, AG9	634	7.9	22
AG2-AG4, AG7-AG8	673	7.9	22

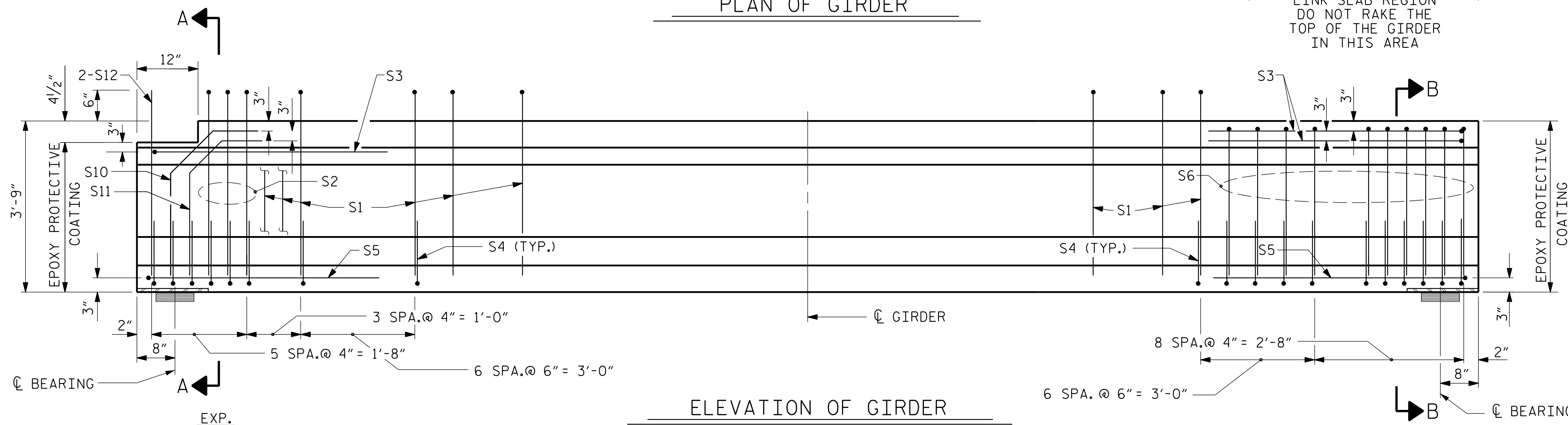
  

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
9	54'-11 1/2"	494'-7 1/2"



PLAN OF GIRDER

LINK SLAB REGION DO NOT RAKE THE TOP OF THE GIRDER IN THIS AREA



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATIONS ON SHEET 4 OF 6 FOR ADDITIONAL "S" BARS AND LOCATION OF FORMED HOLES)

\* S1 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO MISS 1/2" Ø FORMED HOLES.

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.nv5.com  
NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
ENGINEER  
14114

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 1 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
AASHTO TYPE III  
PRESTRESSED CONCRETE GIRDER  
FOR LINK SLAB  
(SPAN A)

REVISIONS

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

SHEET NO.  
S1-22  
TOTAL SHEETS  
63

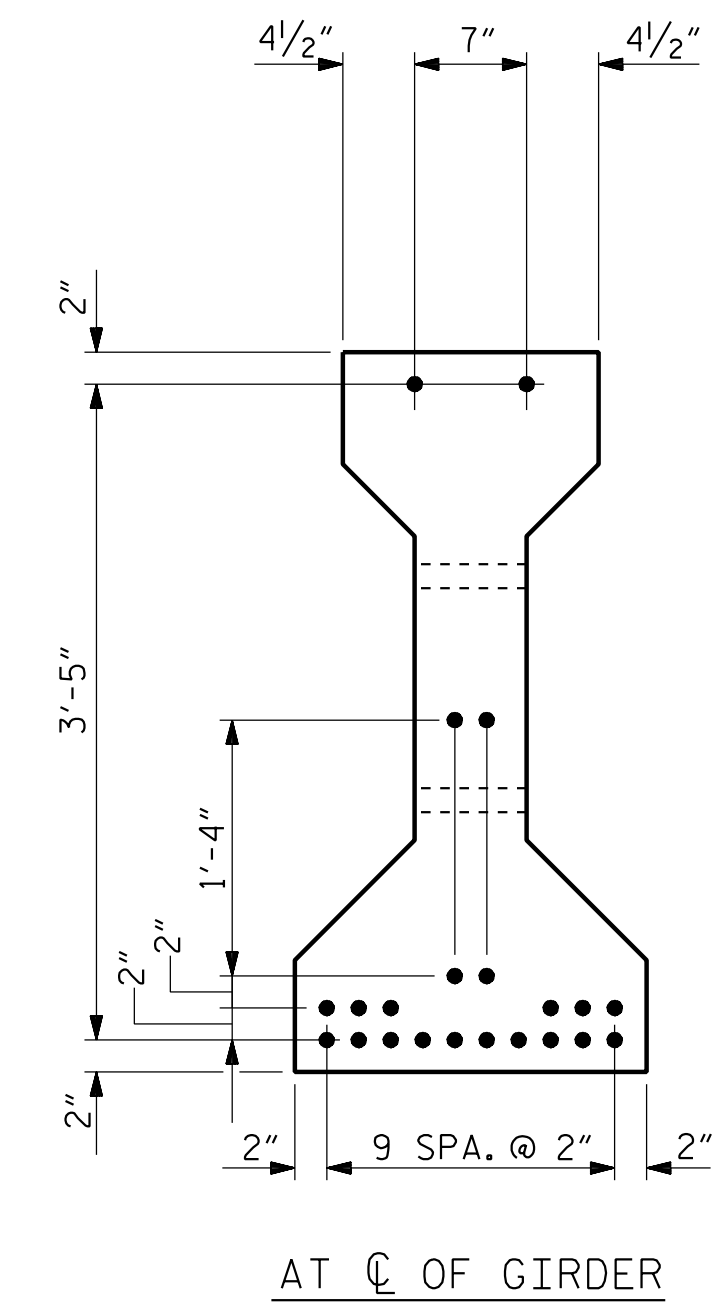
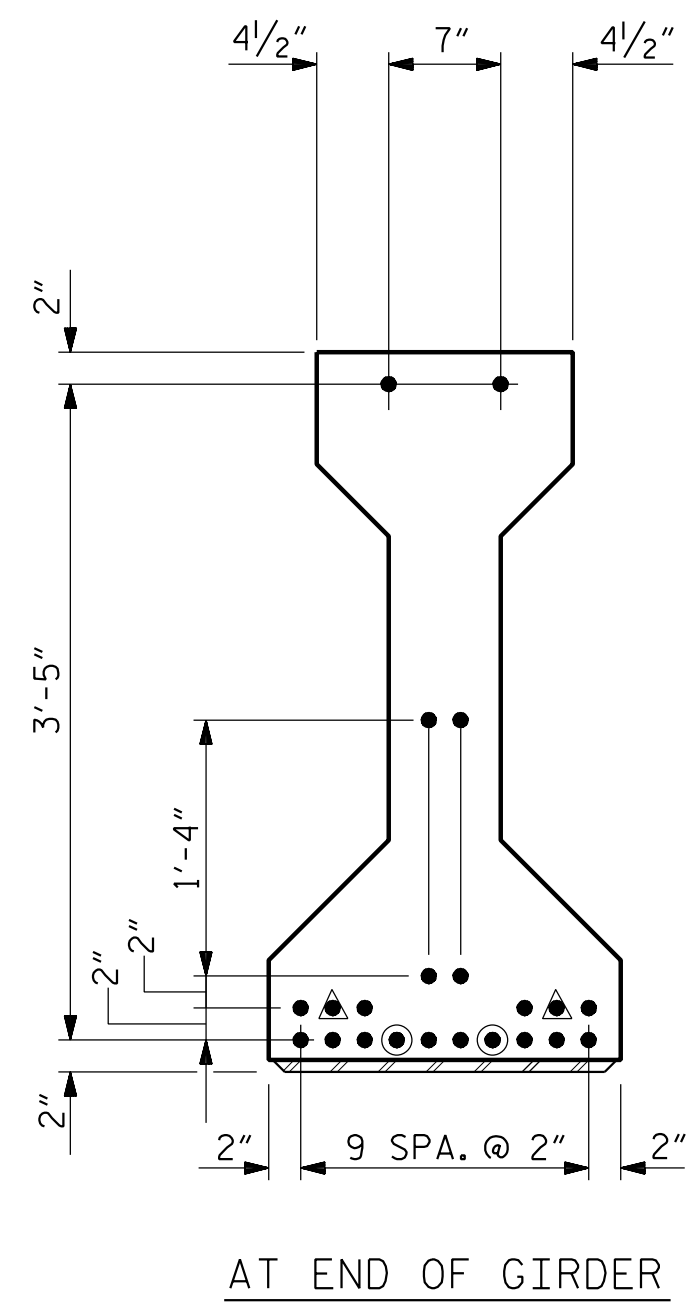
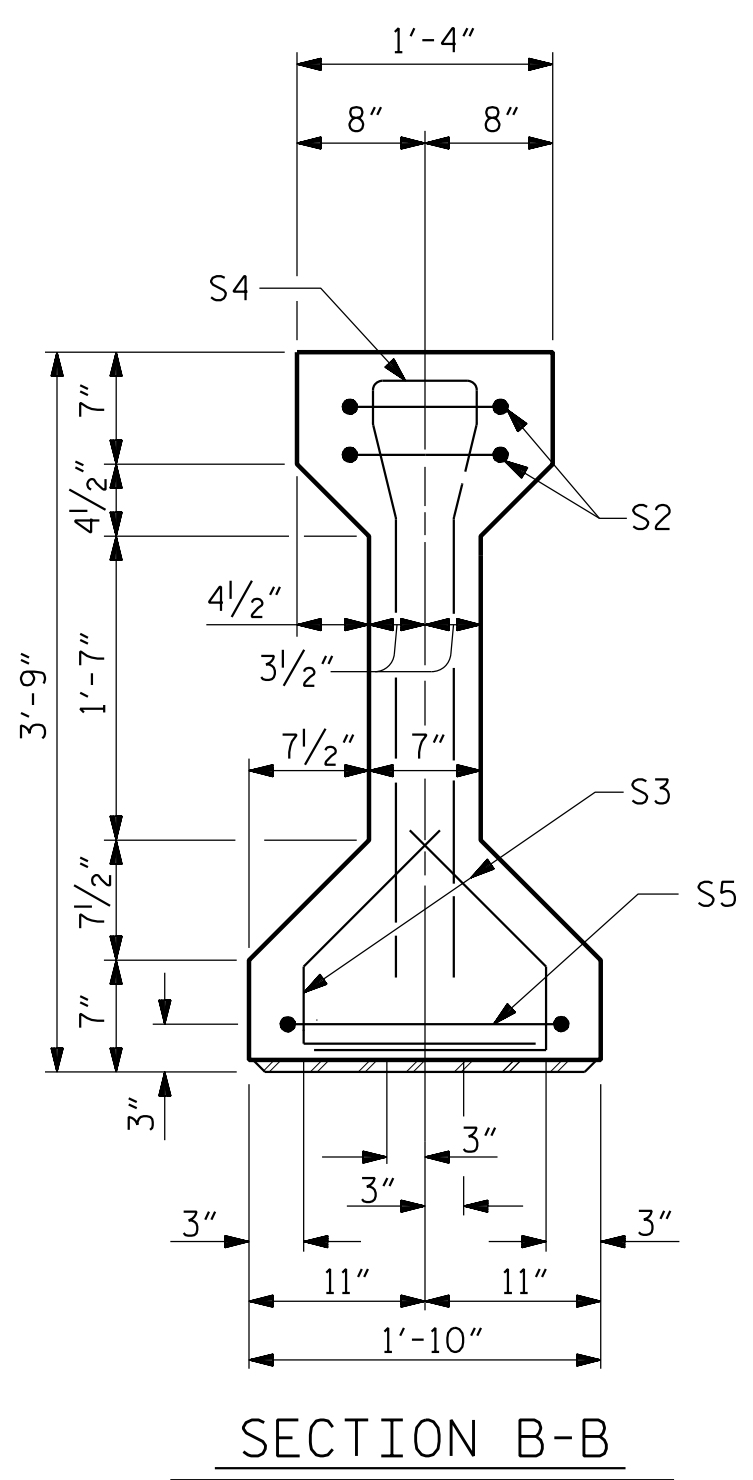
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DRAWN BY: W. B. ALLEN DATE: 9/19  
CHECKED BY: Z. H. BROWN DATE: 1/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

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R. C. LARSON  
BEB2388D9220470...

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UNLESS ALL SIGNATURES COMPLETED

5/18/2023



0.6" Ø LOW RELAXATION STRAND LAYOUT

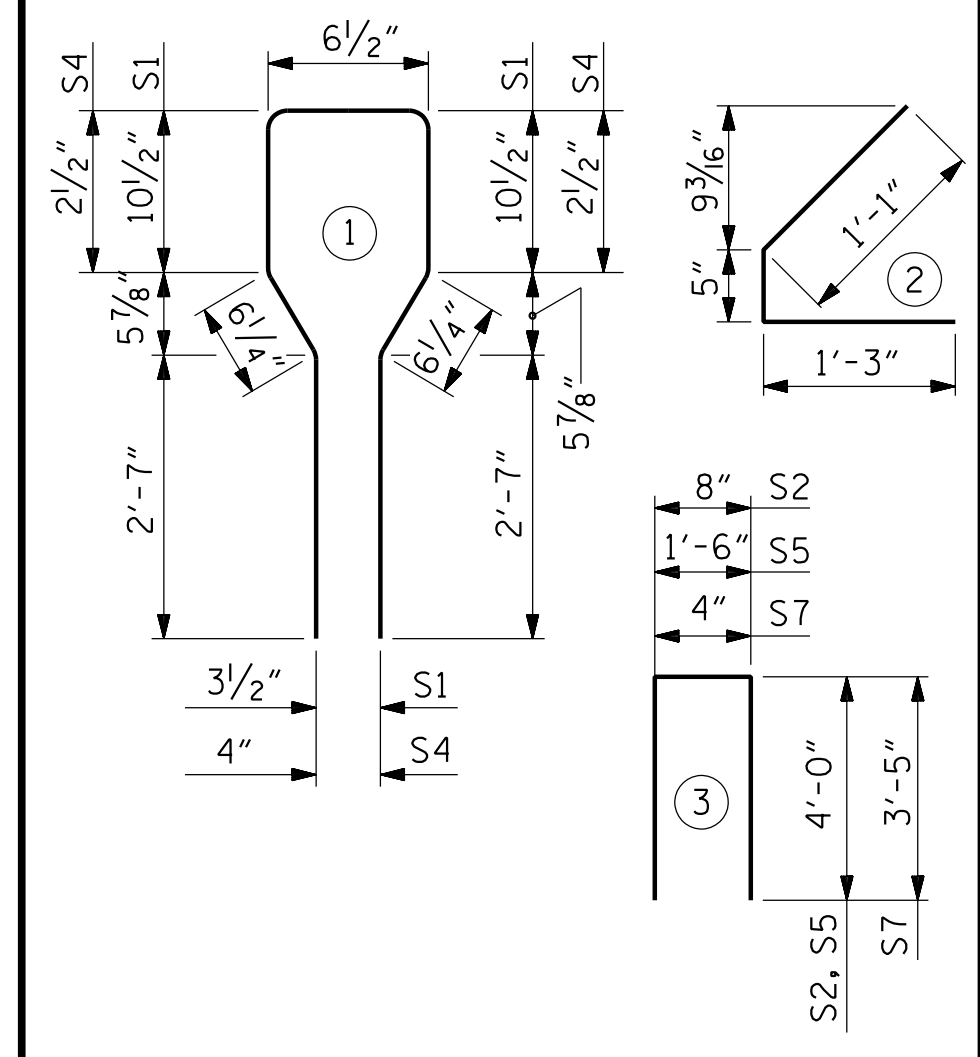
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	63	#4	1	8'-6"	358
S2	4	#4	3	8'-8"	23
S3	92	#4	2	2'-9"	169
S4	20	#6	1	7'-2"	215
S5	2	#4	3	9'-6"	13
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S9	5	#4	STR	14'-0"	47

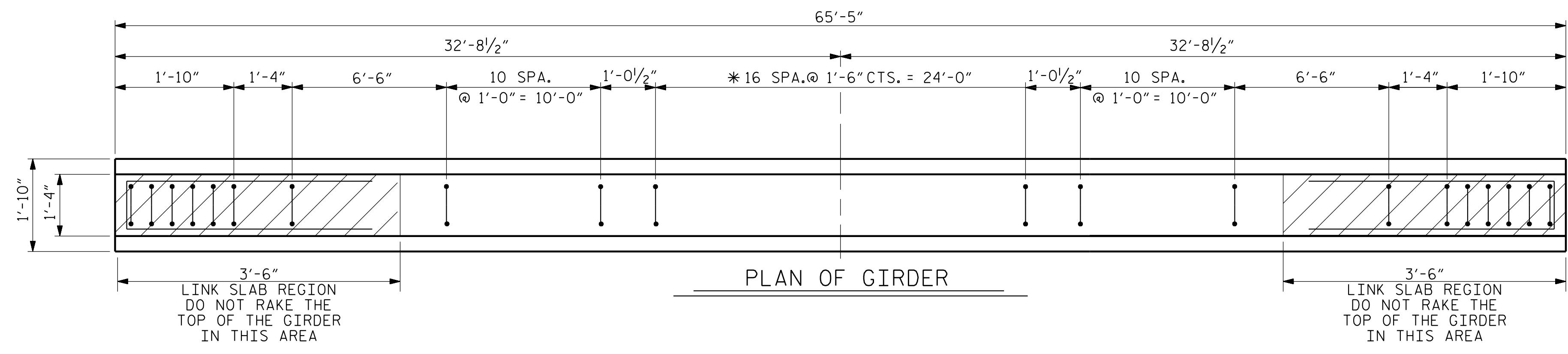
BG1, BG5  
BG6, BG9  
BG2-BG4  
BG7-BG8

BAR TYPES

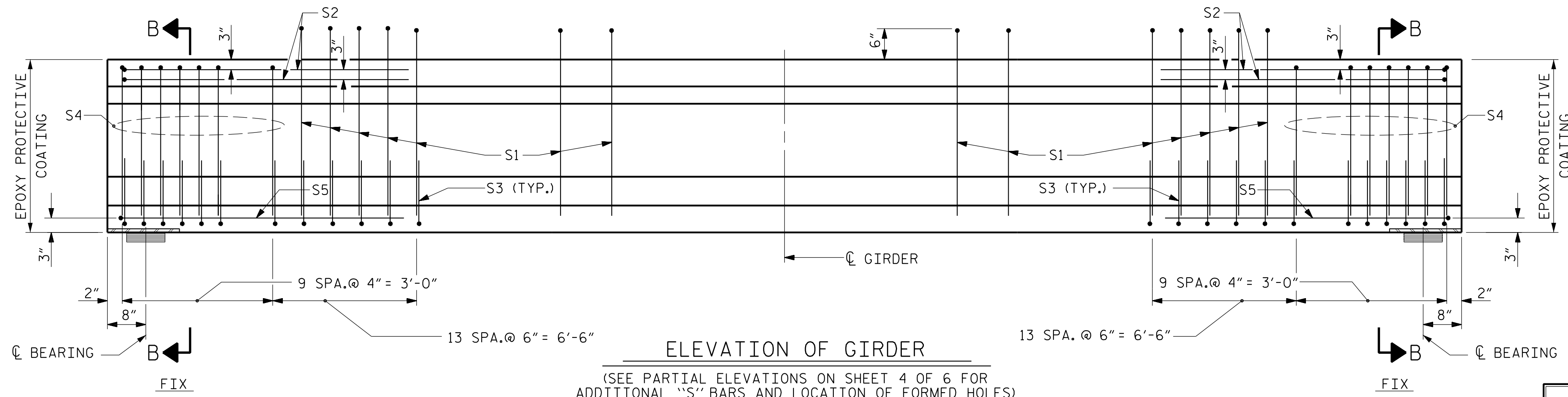
ALL BAR DIMENSIONS ARE OUT-TO-OUT



- FULLY BONDED STRAND
- ▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER.
- ◎ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF GIRDER.
- DEBONDING LEGEND



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATIONS ON SHEET 4 OF 6 FOR ADDITIONAL "S" BARS AND LOCATION OF FORMED HOLES)  
\* S1 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO MISS 1/2" Ø FORMED HOLES.

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	6500 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
BG1, BG5, BG6, BG9	816	9.4	22
BG2-BG4, BG7-BG8	855	9.4	22

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
9	65'-5"	588'-9"

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 2 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
AASHTO TYPE III  
PRESTRESSED CONCRETE GIRDER  
FOR LINK SLAB  
(SPAN B)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-23
1			3			TOTAL SHEETS
2			4			63

PLANS PREPARED BY:

**N|V|5**

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.NV5.com  
NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
14114

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5/18/2023

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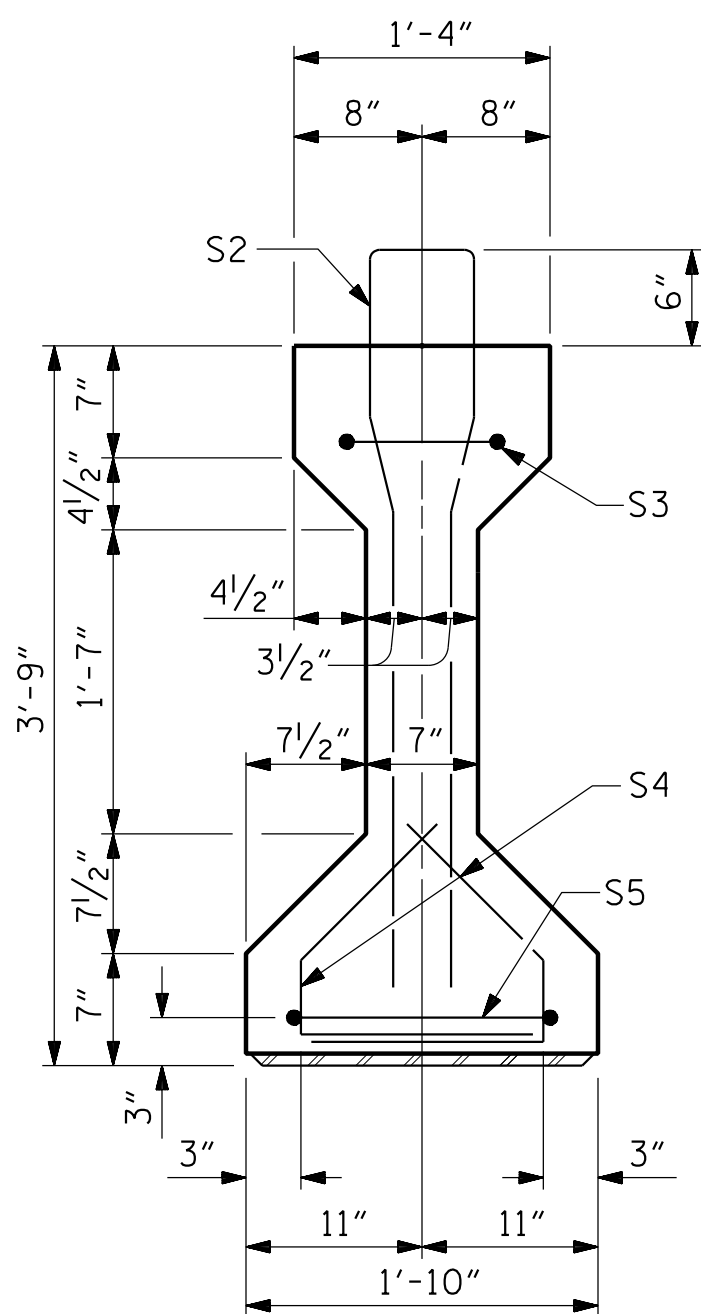
DRAWN BY: W. B. ALLEN DATE: 7/19  
CHECKED BY: Z. H. BROWN DATE: 1/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:

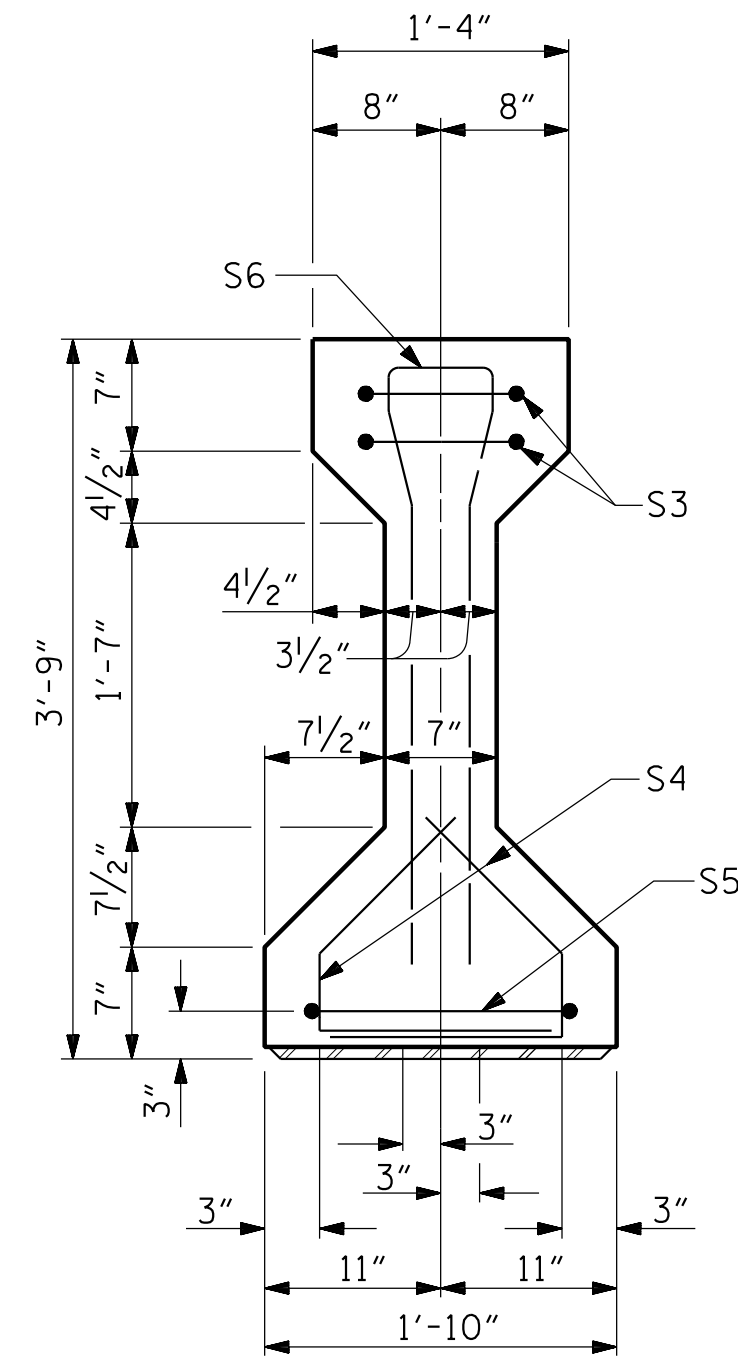
R. C. LARSON  
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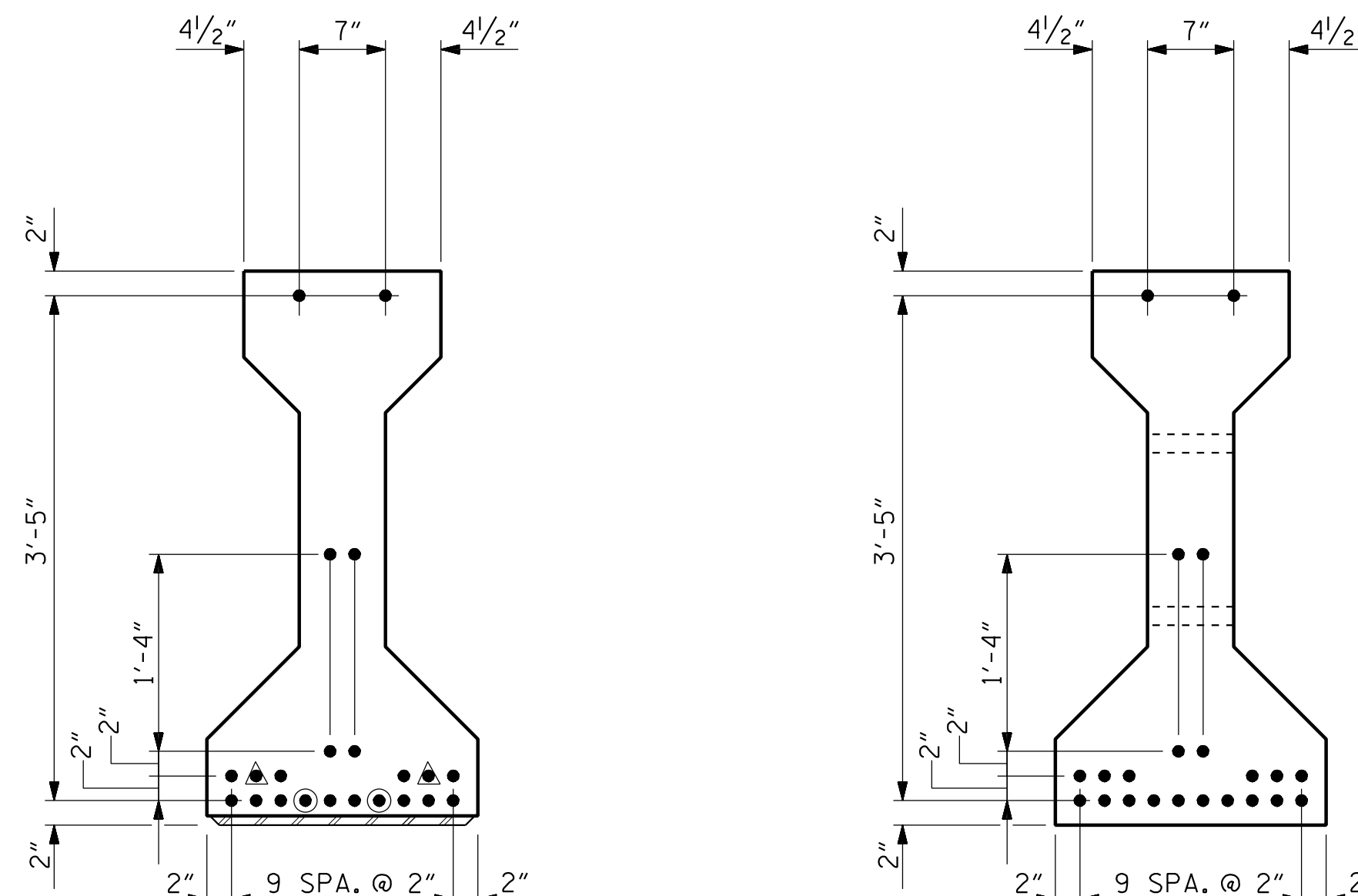




SECTION A-A



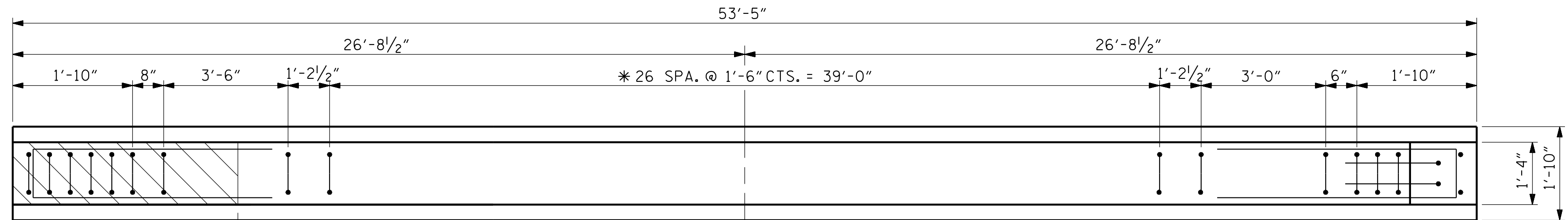
SECTION B-B



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

- FULLY BONDED STRAND
- ▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER.
- ◎ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF GIRDER.

DEBONDING LEGEND



PLAN OF GIRDER

LINK SLAB REGION DO NOT RAKE THE TOP OF THE GIRDER IN THIS AREA

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	6500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
CG1, CG5, CG6, CG9	612	7.7	22
CG2-CG4, CG7-CG8	651	7.7	22

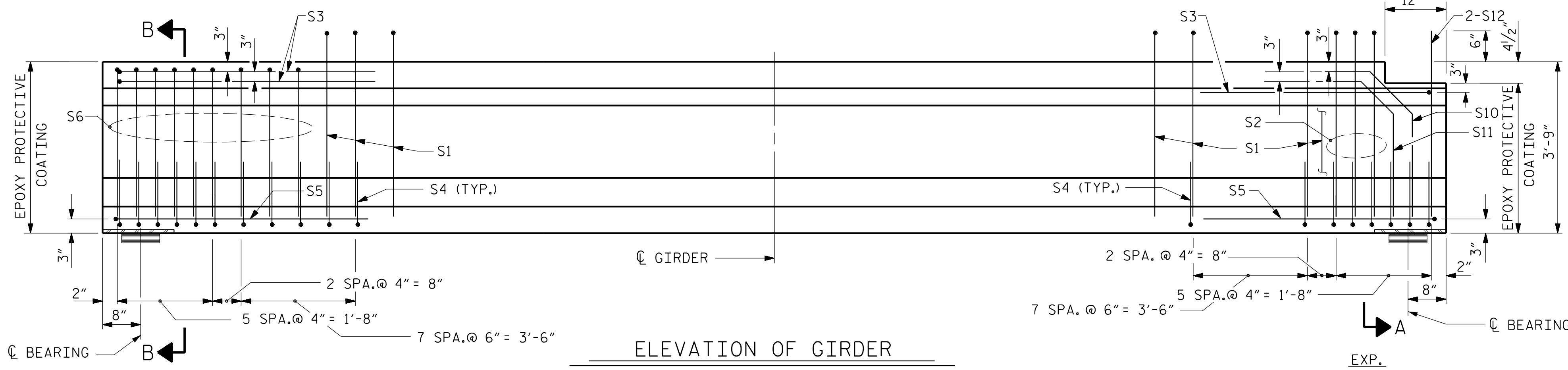
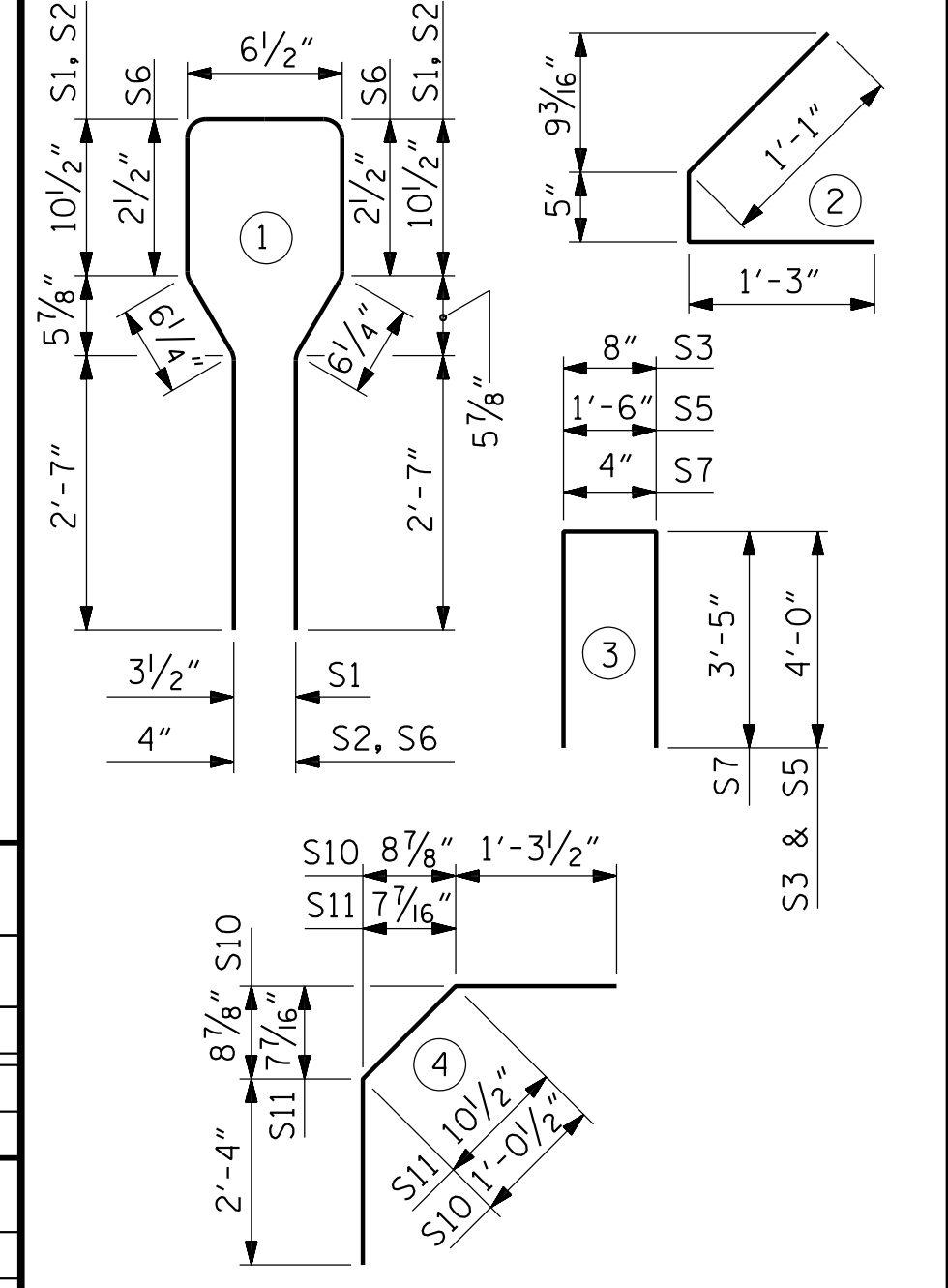
  

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
9	53'-5"	480'-9"

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	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	38	#4	1	8'-6"	216
S2	3	#6	1	8'-6"	38
S3	3	#4	3	8'-8"	17
S4	60	#4	2	2'-9"	110
S5	2	#4	3	9'-6"	13
S6	13	#6	1	7'-2"	140
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S9	4	#5	3	7'-2"	30
S10	2	#6	4	4'-8"	14
S11	2	#6	4	4'-6"	14
S12	2	#6	STR	4'-0"	12

BAR TYPES  
ALL BAR DIMENSIONS ARE OUT-TO-OUT



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATIONS ON SHEET 4 OF 6 FOR ADDITIONAL "S" BARS AND LOCATION OF FORMED HOLES)  
\* S1 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO MISS 1/2" Ø FORMED HOLES.

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.nv5.com  
NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
ENGINEER  
5/18/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 3 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

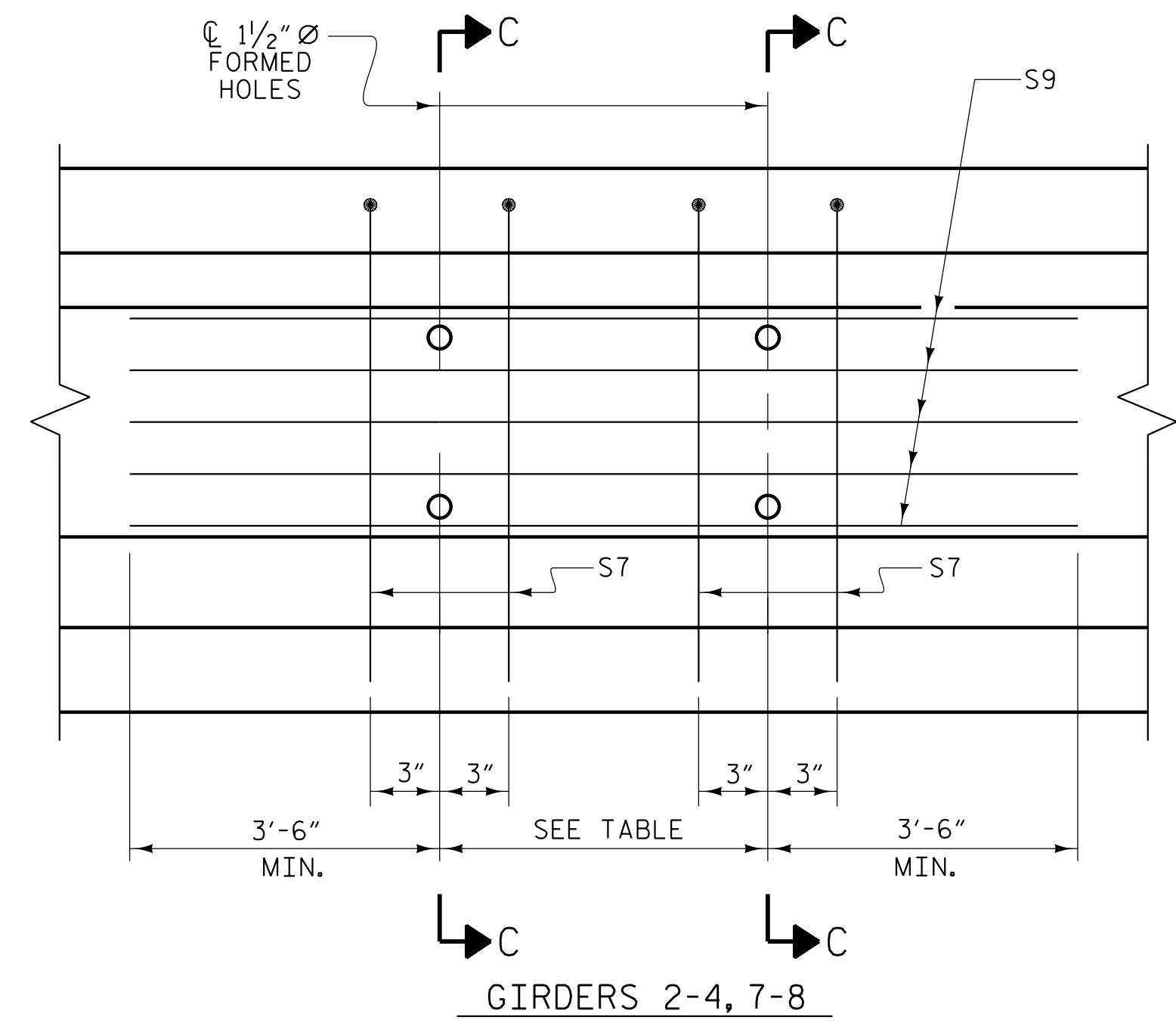
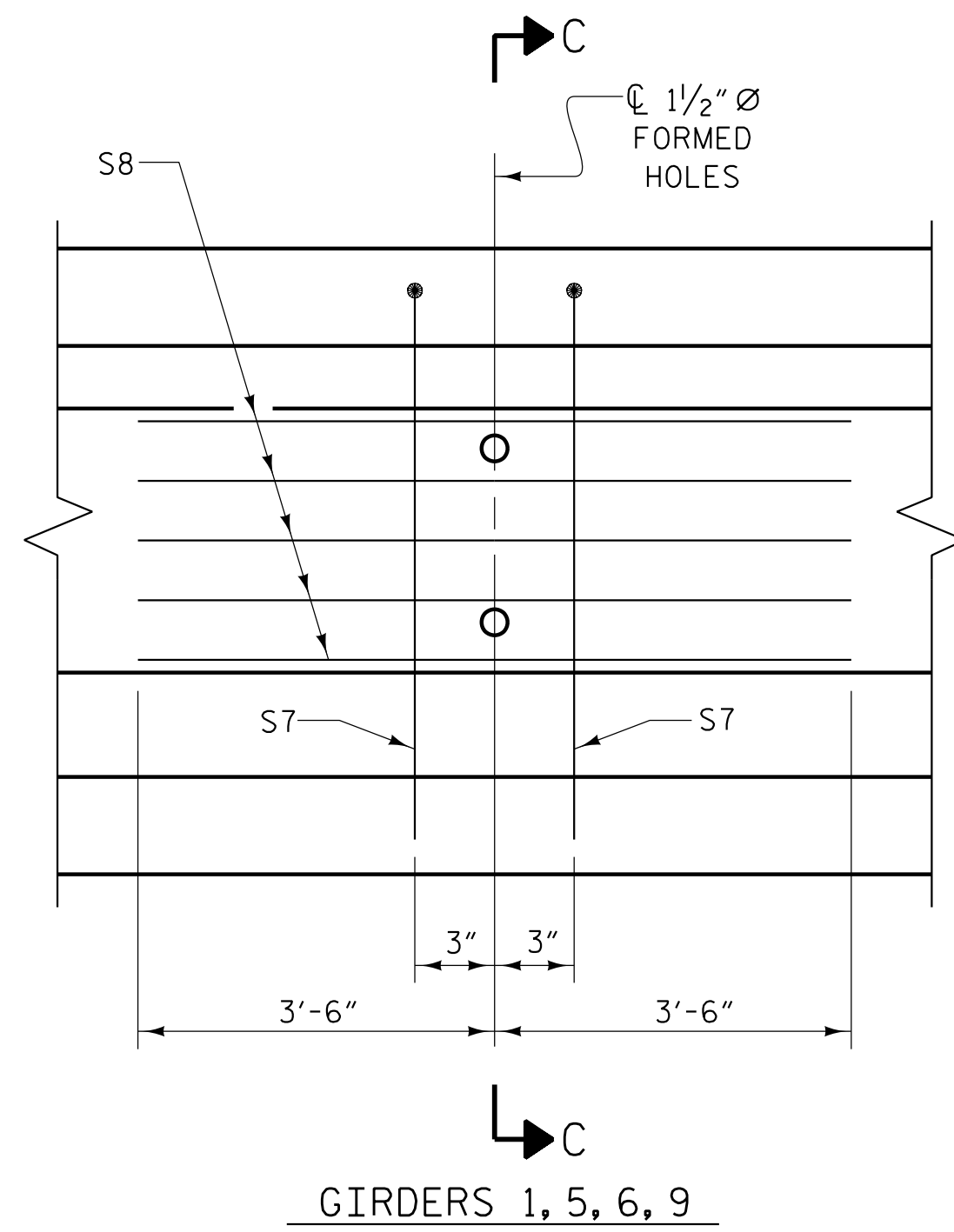
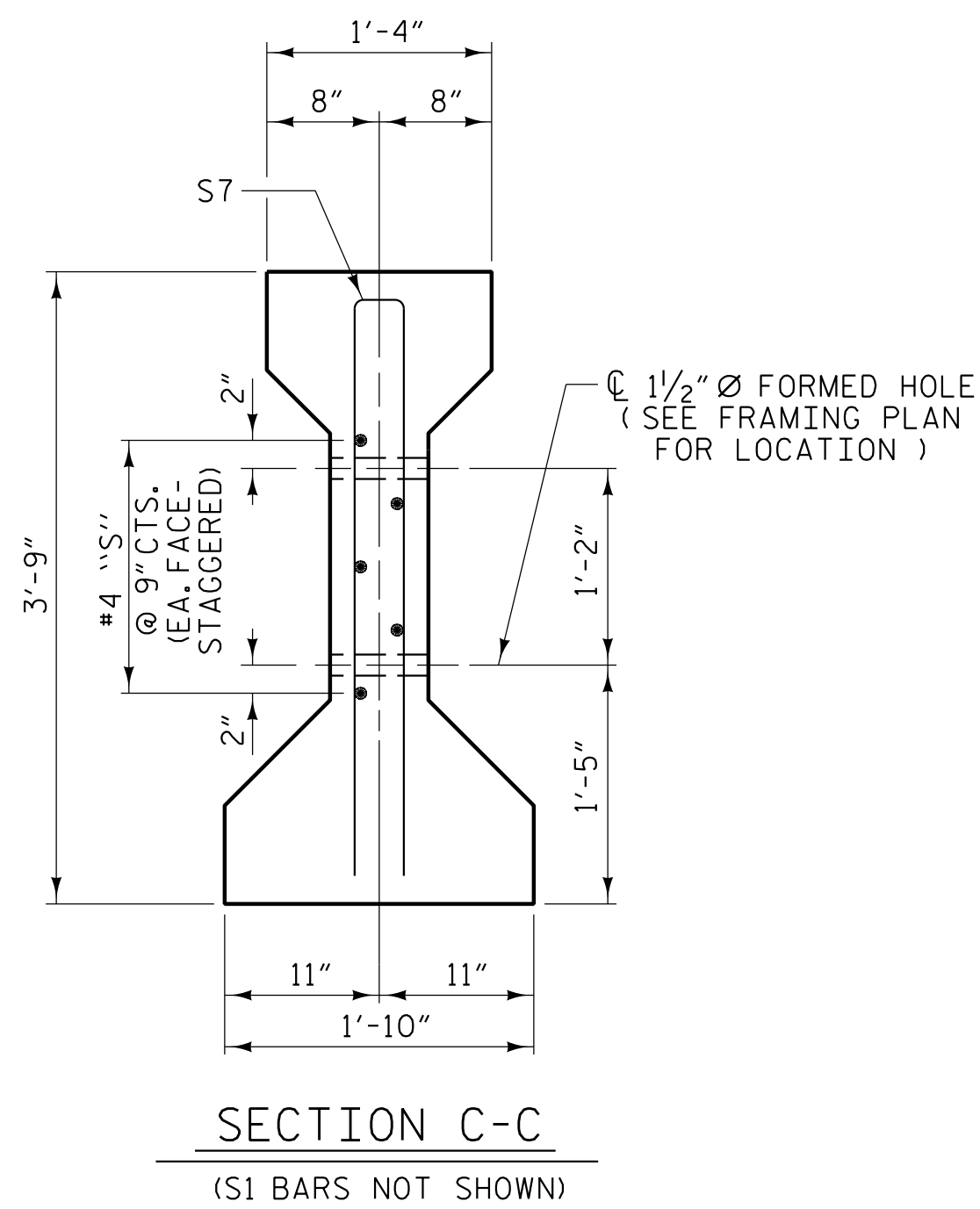
SUPERSTRUCTURE  
AASHTO TYPE III  
PRESTRESSED CONCRETE GIRDER  
FOR LINK SLAB  
(SPAN C)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-24
1			3			TOTAL SHEETS
2			4			61

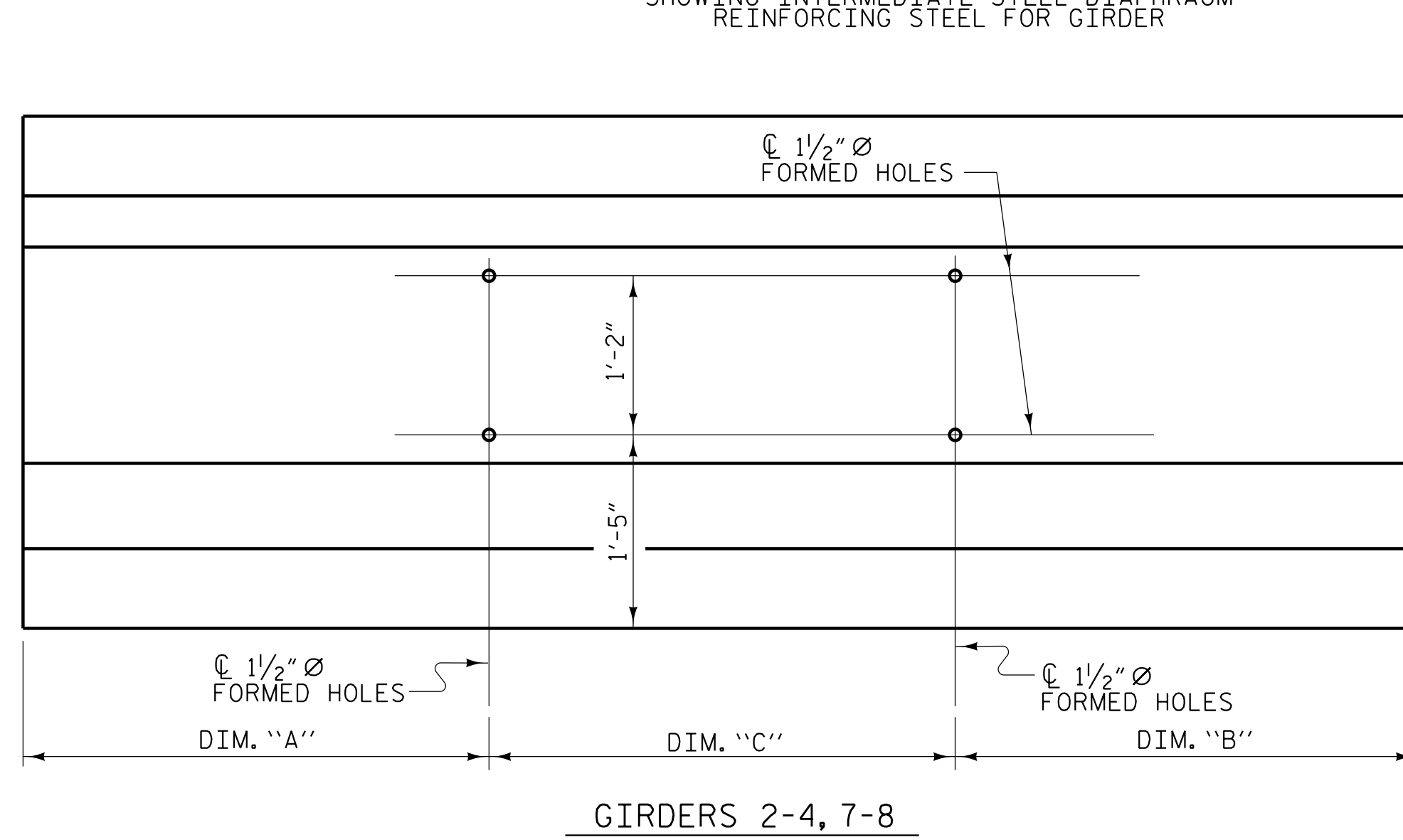
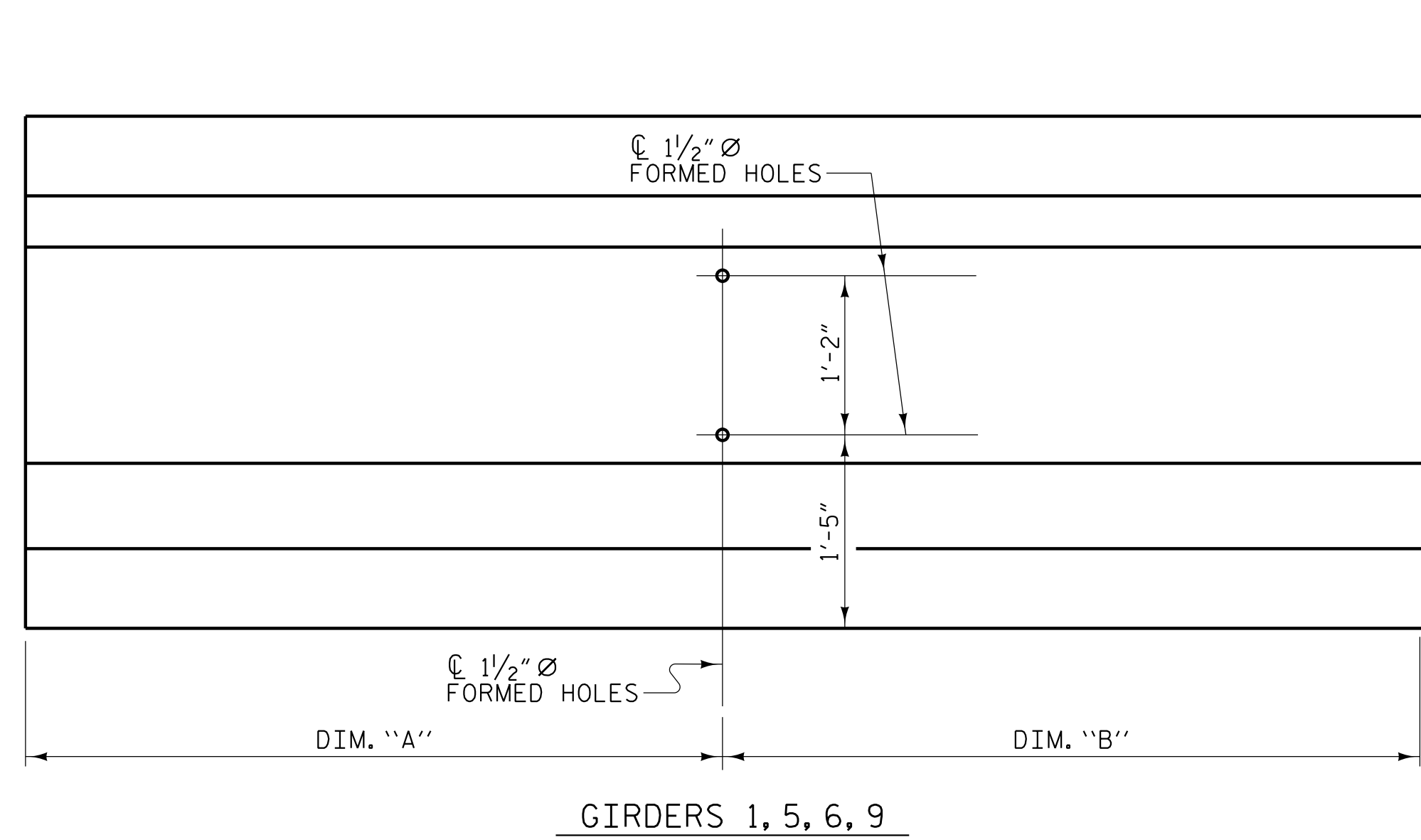
DRAWN BY: W. B. ALLEN DATE: 9/19  
CHECKED BY: Z. H. BROWN DATE: 1/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

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5/17/2023 7:00 PM R:\Structures\3 span Bridge over RRV24 US539\_SMU\_G3\_43084.dgn



**PARTIAL ELEVATION**  
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER



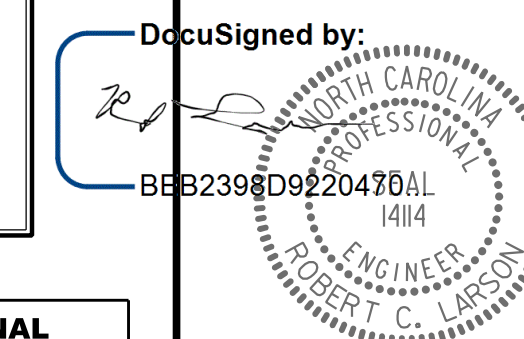
**BOLT HOLE PLACEMENT**

GDR. NO.	BOLT HOLE PLACEMENT DIMENSIONS								
	SPAN A			SPAN B			SPAN C		
	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "A"	DIM. "B"	DIM. "C"
1	34'-8 <sup>1</sup> / <sub>16</sub> "	20'-3 <sup>7</sup> / <sub>16</sub> "	-	38'-7 <sup>3</sup> / <sub>16</sub> "	26'-9 <sup>3</sup> / <sub>16</sub> "	-	31'-4 <sup>3</sup> / <sub>4</sub> "	22'-0 <sup>1</sup> / <sub>4</sub> "	-
2	27'-5 <sup>3</sup> / <sub>4</sub> "	20'-5 <sup>7</sup> / <sub>8</sub> "	6'-11 <sup>7</sup> / <sub>8</sub> "	32'-8 <sup>1</sup> / <sub>2</sub> "	26'-11 <sup>1</sup> / <sub>16</sub> "	5'-9 <sup>7</sup> / <sub>16</sub> "	26'-8 <sup>1</sup> / <sub>2</sub> "	22'-1 <sup>7</sup> / <sub>16</sub> "	4'-7 <sup>1</sup> / <sub>16</sub> "
3	27'-5 <sup>3</sup> / <sub>4</sub> "	20'-8 <sup>1</sup> / <sub>4</sub> "	6'-9 <sup>1</sup> / <sub>2</sub> "	32'-8 <sup>1</sup> / <sub>2</sub> "	27'-0 <sup>3</sup> / <sub>16</sub> "	5'-7 <sup>1</sup> / <sub>16</sub> "	26'-8 <sup>1</sup> / <sub>2</sub> "	22'-2 <sup>9</sup> / <sub>16</sub> "	4'-5 <sup>5</sup> / <sub>16</sub> "
4	27'-5 <sup>3</sup> / <sub>4</sub> "	20'-10 <sup>7</sup> / <sub>16</sub> "	6'-7 <sup>5</sup> / <sub>16</sub> "	32'-8 <sup>1</sup> / <sub>2</sub> "	27'-2 <sup>1</sup> / <sub>2</sub> "	5'-6"	26'-8 <sup>1</sup> / <sub>2</sub> "	22'-3 <sup>11</sup> / <sub>16</sub> "	4'-4 <sup>13</sup> / <sub>16</sub> "
5	27'-5 <sup>3</sup> / <sub>4</sub> "	27'-5 <sup>3</sup> / <sub>4</sub> "	-	32'-8 <sup>1</sup> / <sub>2</sub> "	32'-8 <sup>1</sup> / <sub>2</sub> "	-	26'-8 <sup>1</sup> / <sub>2</sub> "	26'-8 <sup>1</sup> / <sub>2</sub> "	-
6	33'-9 <sup>1</sup> / <sub>16</sub> "	21'-2 <sup>7</sup> / <sub>16</sub> "	-	37'-11 <sup>7</sup> / <sub>16</sub> "	27'-5 <sup>9</sup> / <sub>16</sub> "	-	30'-11 <sup>5</sup> / <sub>16</sub> "	22'-5 <sup>11</sup> / <sub>16</sub> "	-
7	27'-5 <sup>3</sup> / <sub>4</sub> "	21'-4 <sup>1</sup> / <sub>4</sub> "	6'-1 <sup>1</sup> / <sub>2</sub> "	32'-8 <sup>1</sup> / <sub>2</sub> "	27'-7"	5'-1 <sup>1</sup> / <sub>2</sub> "	26'-8 <sup>1</sup> / <sub>2</sub> "	22'-6 <sup>5</sup> / <sub>8</sub> "	4'-1 <sup>7</sup> / <sub>8</sub> "
8	27'-5 <sup>3</sup> / <sub>4</sub> "	21'-6"	5'-11 <sup>3</sup> / <sub>4</sub> "	32'-8 <sup>1</sup> / <sub>2</sub> "	27'-8 <sup>5</sup> / <sub>16</sub> "	5'-0 <sup>3</sup> / <sub>16</sub> "	26'-8 <sup>1</sup> / <sub>2</sub> "	22'-7 <sup>9</sup> / <sub>16</sub> "	4'-0 <sup>15</sup> / <sub>16</sub> "
9	27'-5 <sup>3</sup> / <sub>4</sub> "	27'-5 <sup>3</sup> / <sub>4</sub> "	-	32'-8 <sup>1</sup> / <sub>2</sub> "	32'-8 <sup>1</sup> / <sub>2</sub> "	-	26'-8 <sup>1</sup> / <sub>2</sub> "	26'-8 <sup>1</sup> / <sub>2</sub> "	-

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 4 OF 6

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



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-25
1			3			TOTAL SHEETS
2			4			63

DRAWN BY : W. B. ALLEN DATE : 9/19  
 CHECKED BY : Z. H. BROWN DATE : 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

DocuSigned by:  
 BEB239809220470AL

5/17/2023 7:40:01PM R:\Structures\3 span Bridge over RRV25 US5839\_SMU\_G4\_430864.dgn

**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.

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 5000 PSI.

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

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

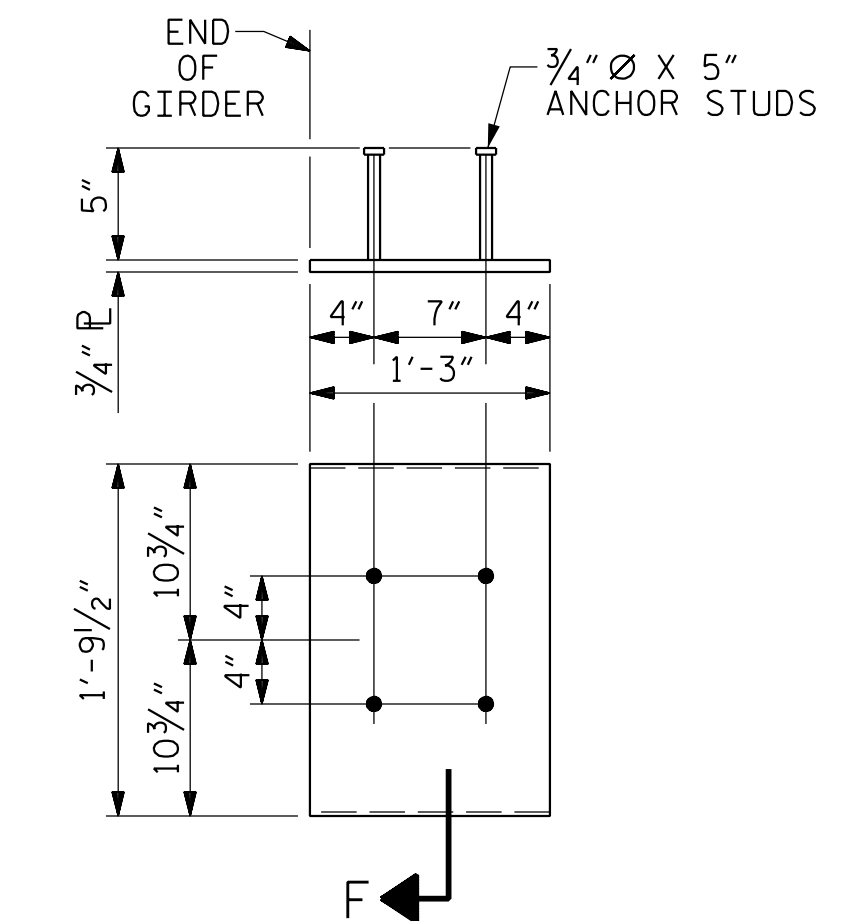
DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN A																						
0.6" Ø LOW RELAXATION		GIRDERS 1 & 9																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑		0.0	0.015	0.030	0.044	0.057	0.069	0.078	0.086	0.092	0.095	0.097	0.095	0.092	0.086	0.078	0.069	0.057	0.044	0.030	0.015	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0.0	0.005	0.009	0.014	0.019	0.022	0.026	0.029	0.031	0.032	0.032	0.032	0.031	0.029	0.026	0.022	0.019	0.014	0.009	0.005	0.0
FINAL CAMBER ↑		0.0	1/8"	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/16"	1 1/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	0.0
0.6" Ø LOW RELAXATION		GIRDERS 2 - 8																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑		0.0	0.015	0.030	0.044	0.057	0.069	0.078	0.086	0.092	0.095	0.097	0.095	0.092	0.086	0.078	0.069	0.057	0.044	0.030	0.015	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0.0	0.005	0.011	0.016	0.022	0.026	0.031	0.033	0.036	0.037	0.038	0.037	0.036	0.033	0.031	0.026	0.022	0.016	0.011	0.005	0.0
FINAL CAMBER ↑		0.0	1/8"	1/4"	5/16"	1/2"	9/16"	5/8"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	5/8"	9/16"	1/2"	5/16"	1/4"	1/8"	0.0	0.0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN B																						
0.6" Ø LOW RELAXATION		GIRDERS 1 & 9																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑		0.0	0.019	0.038	0.056	0.072	0.087	0.099	0.109	0.116	0.120	0.122	0.120	0.116	0.109	0.099	0.087	0.072	0.056	0.038	0.019	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0.0	0.010	0.019	0.029	0.038	0.046	0.053	0.058	0.063	0.065	0.066	0.065	0.063	0.058	0.053	0.046	0.038	0.029	0.019	0.010	0.0
FINAL CAMBER ↑		0.0	1/8"	1/4"	5/16"	3/8"	1/2"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	1/2"	3/8"	5/16"	1/4"	1/8"	0.0
0.6" Ø LOW RELAXATION		GIRDERS 2 - 8																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑		0.0	0.019	0.038	0.056	0.072	0.087	0.099	0.109	0.116	0.120	0.122	0.120	0.116	0.109	0.099	0.087	0.072	0.056	0.038	0.019	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0.0	0.011	0.022	0.034	0.045	0.054	0.063	0.068	0.074	0.076	0.078	0.076	0.074	0.068	0.063	0.054	0.045	0.034	0.022	0.011	0.0
FINAL CAMBER ↑		0.0	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	9/16"	1/2"	9/16"	9/16"	9/16"	1/2"	1/2"	9/16"	3/8"	5/16"	1/4"	3/16"	1/8"	0.0

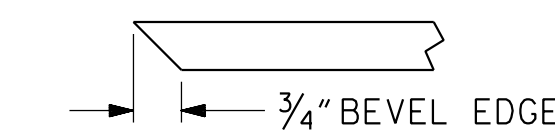
DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN C																						
0.6" Ø LOW RELAXATION		GIRDERS 1 & 9																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑		0.0	0.015	0.029	0.043	0.055	0.066	0.075	0.083	0.088	0.091	0.092	0.091	0.088	0.083	0.075	0.066	0.055	0.043	0.029	0.015	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0.0	0.004	0.008	0.012	0.017	0.020	0.023	0.025	0.028	0.028	0.029	0.028	0.025	0.023	0.020	0.017	0.012	0.008	0.004	0.0	0.0
FINAL CAMBER ↑		0.0	1/8"	1/4"	3/8"	1/2"	9/16"	5/8"	11/16"	3/4"	3/4"	3/4"	3/4"	11/16"	5/8"	9/16"	1/2"	3/8"	1/4"	1/8"	0.0	0.0
0.6" Ø LOW RELAXATION		GIRDERS 2 - 8																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑		0.0	0.015	0.029	0.043	0.055	0.066	0.075	0.083	0.088	0.091	0.092	0.091	0.088	0.083	0.075	0.066	0.055	0.043	0.029	0.015	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0.0	0.005	0.010	0.014	0.019	0.023	0.027	0.030	0.032	0.033	0.034	0.033	0.032	0.030	0.027	0.023	0.019	0.014	0.010	0.005	0.0
FINAL CAMBER ↑		0.0	1/8"	1/4"	5/16"	1/2"	9/16"	5/8"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	5/8"	9/16"	1/2"	1/16"	5/16"	1/4"	1/8"	0.0

\* INCLUDES FUTURE WEARING SURFACE.

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



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



**SECTION "F"**

(SEE NOTES)

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 5 OF 6

PLANS PREPARED BY:

**N|V|5**

NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
 ENGINEER  
 5/18/2023

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE**

**PRESTRESSED CONCRETE GIRDER DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-26
1			3			TOTAL SHEETS
2			4			63

(Sht. 2)

DRAWN BY : W. B. ALLEN DATE : 9/19  
 CHECKED BY : Z. H. BROWN DATE : 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

DocuSigned by:

ROBERT C. LARSON  
 BEB2398D0220470

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

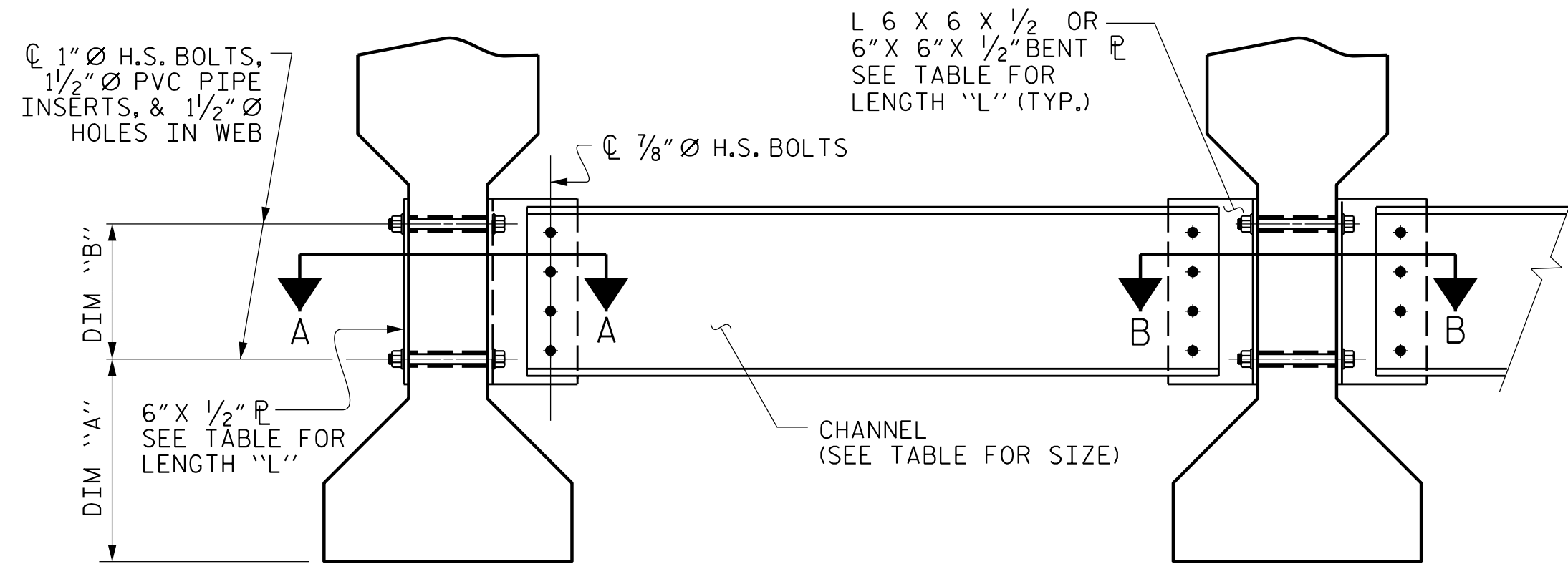
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

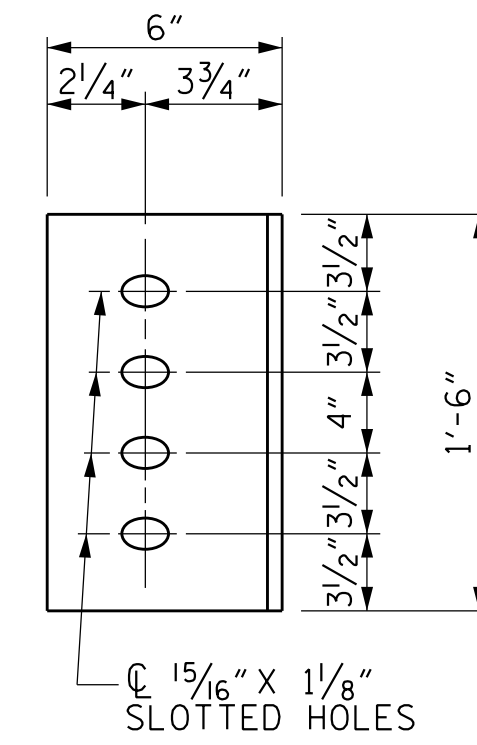
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

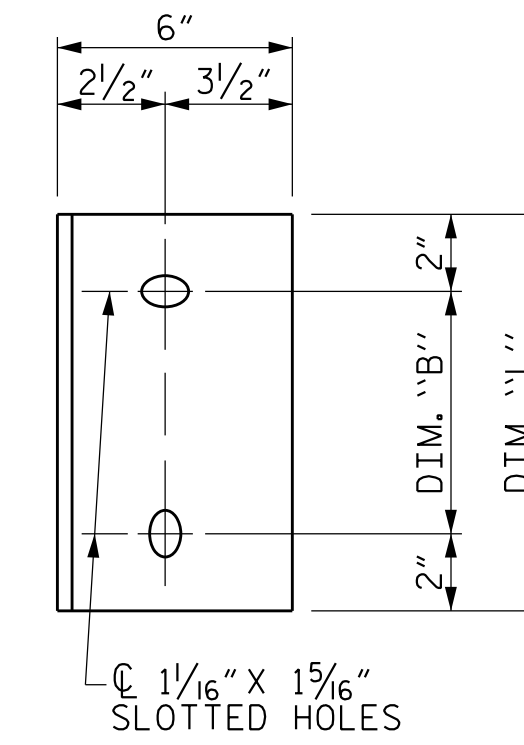
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



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



DIAPHRAGM FACE  
(TYPE III GDR.)



WEB FACE

CONNECTOR PLATE DETAILS

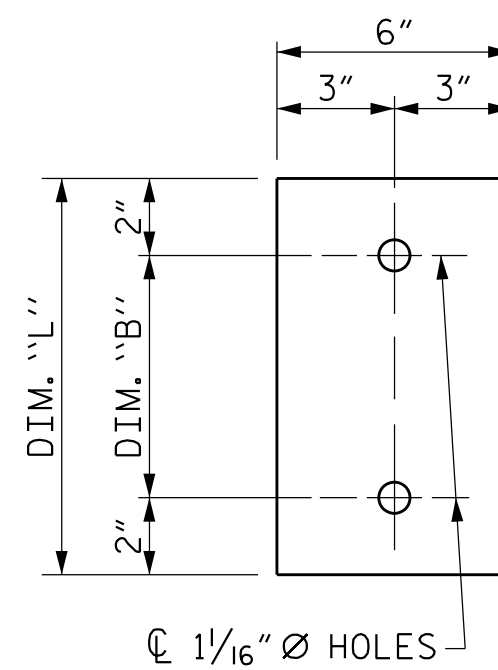
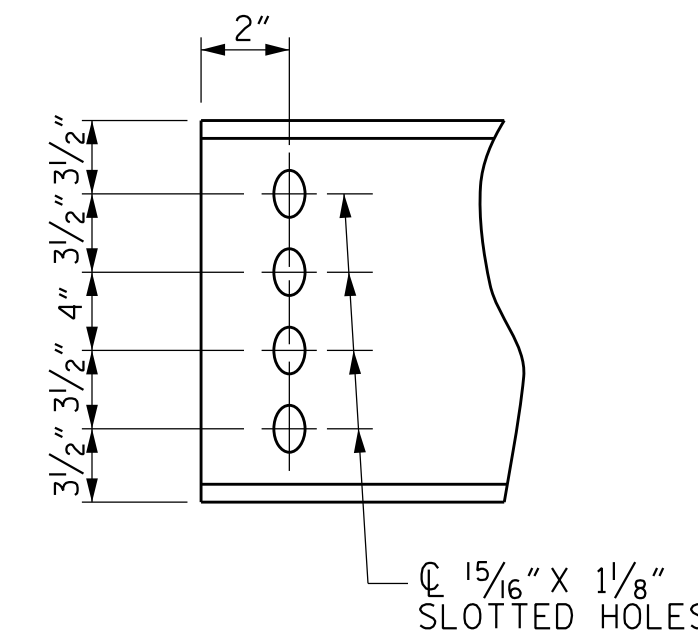
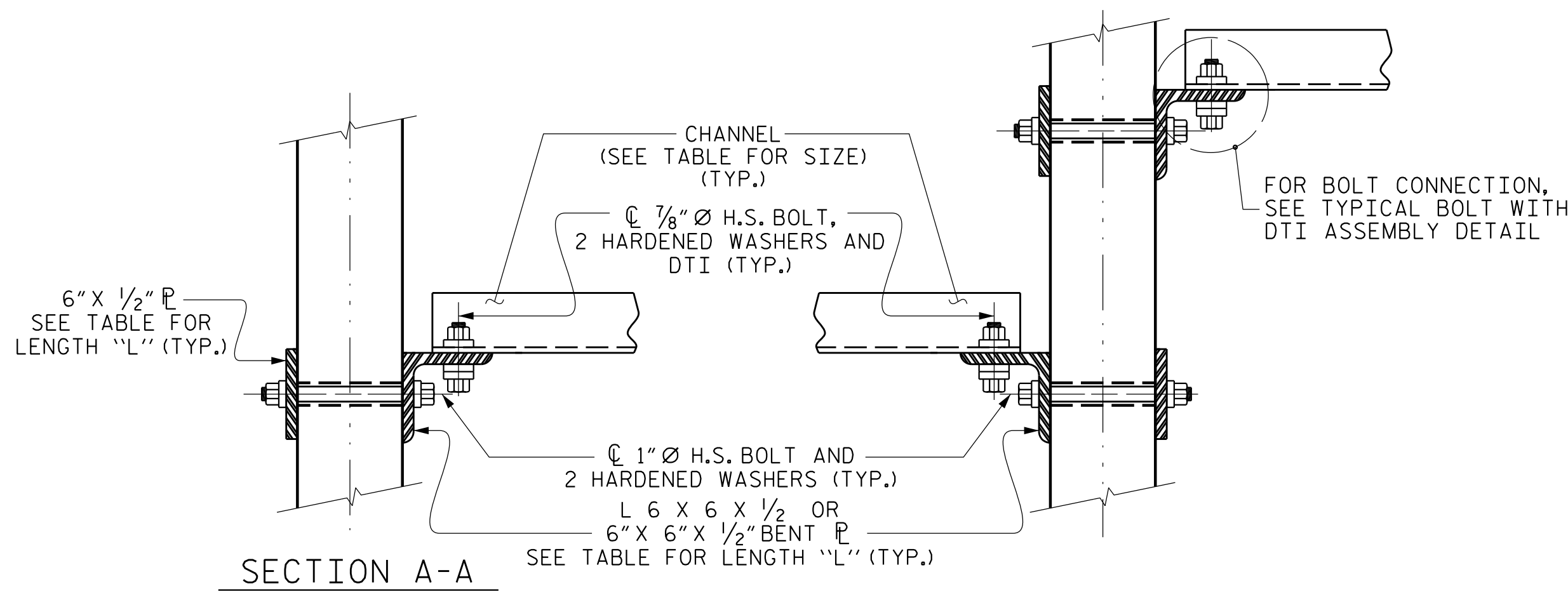


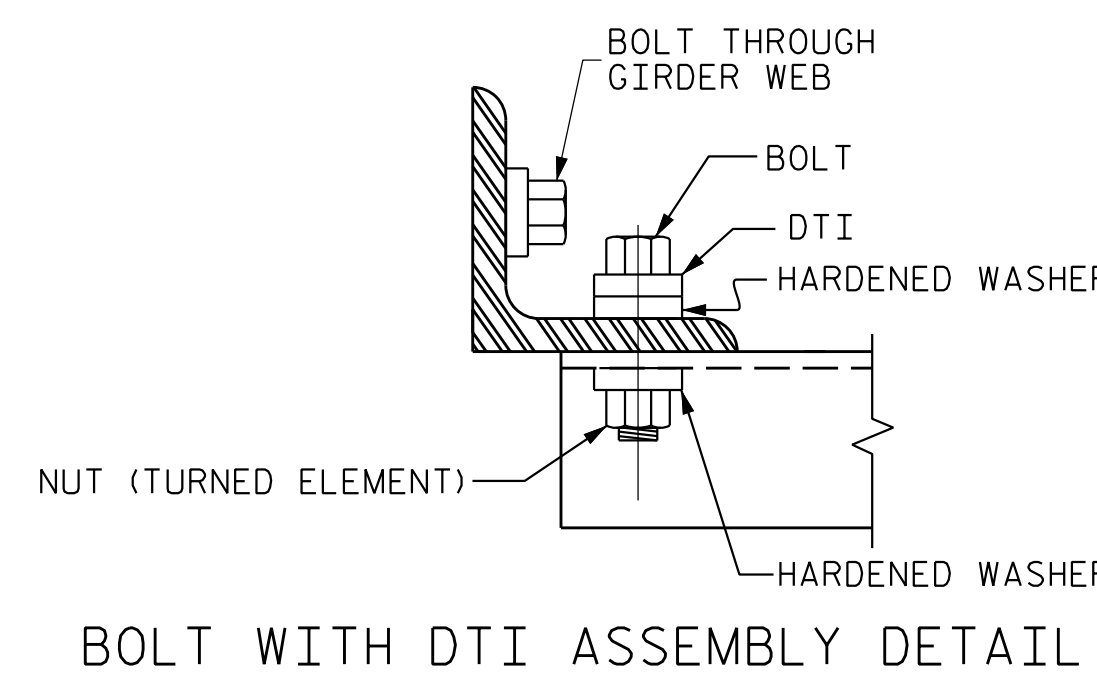
PLATE DETAILS



CHANNEL END  
(TYPE III GDR.)



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

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. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 6 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
INTERMEDIATE  
STEEL DIAPHRAGMS  
FOR TYPE II, III, & IV  
PRESTRESSED CONCRETE  
GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-27
1			3			TOTAL SHEETS
2			4			63

PLANS PREPARED BY:  
**NV5**  
NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.nv5.com  
NC License # F-1333

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:  
DocuSigned by:  
BEB2398D9220470  
5/18/2023

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : W. B. ALLEN DATE : 9/19  
CHECKED BY : Z. H. BROWN DATE : 1/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 12/22

DocuSigned by:  
R. C. LARSON  
BEB2398D9220470

NOTES

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

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

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

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

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

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

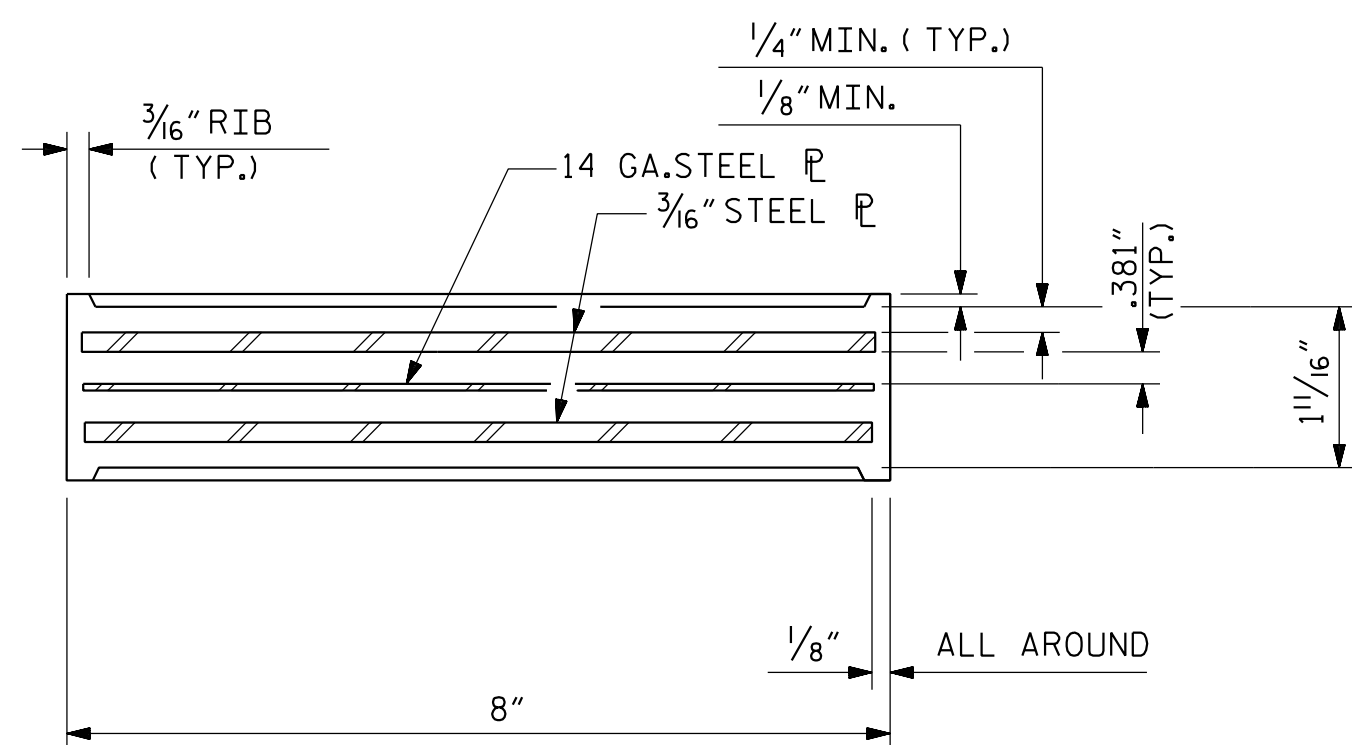
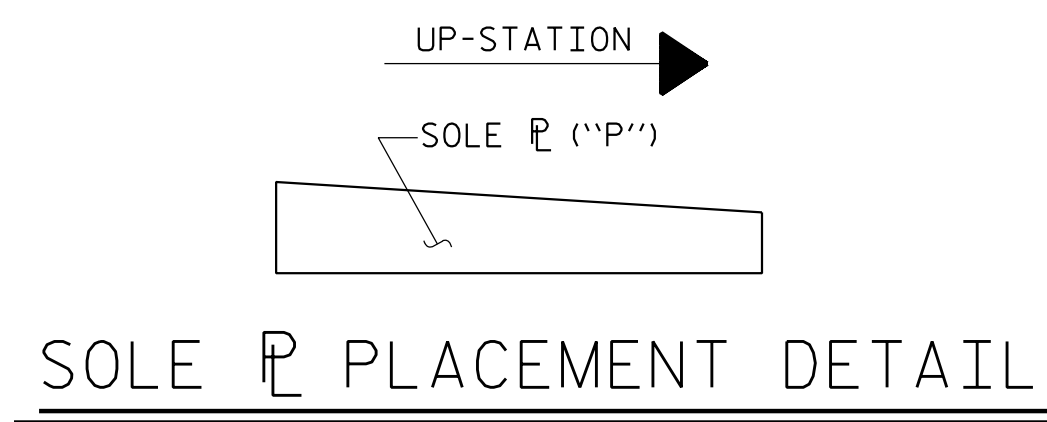
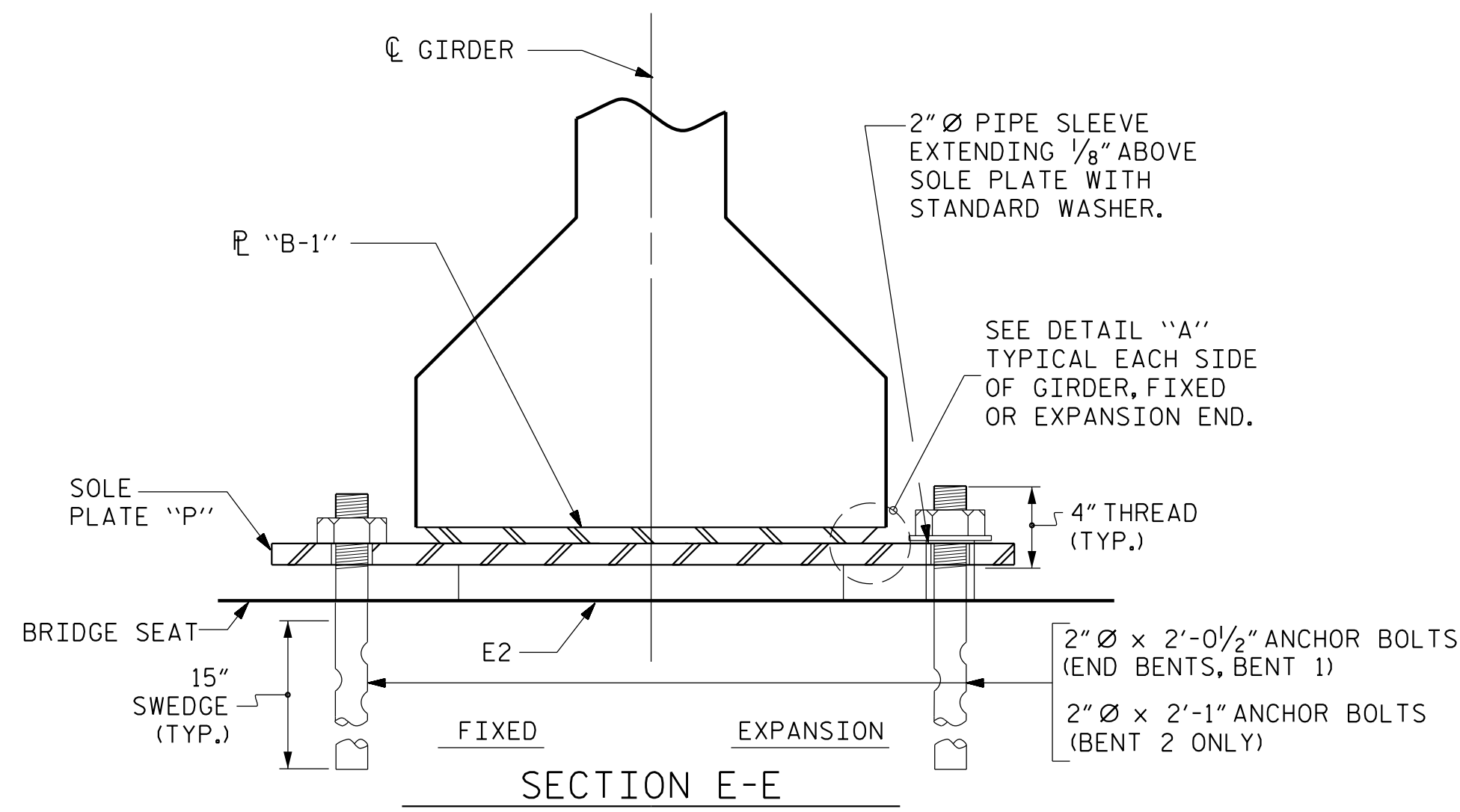
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

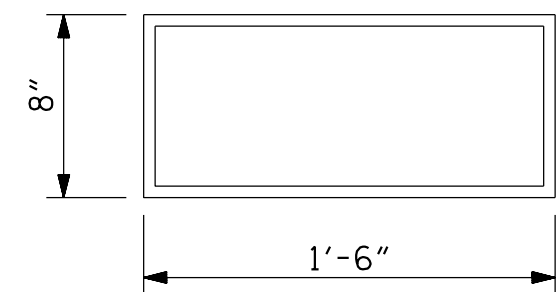
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

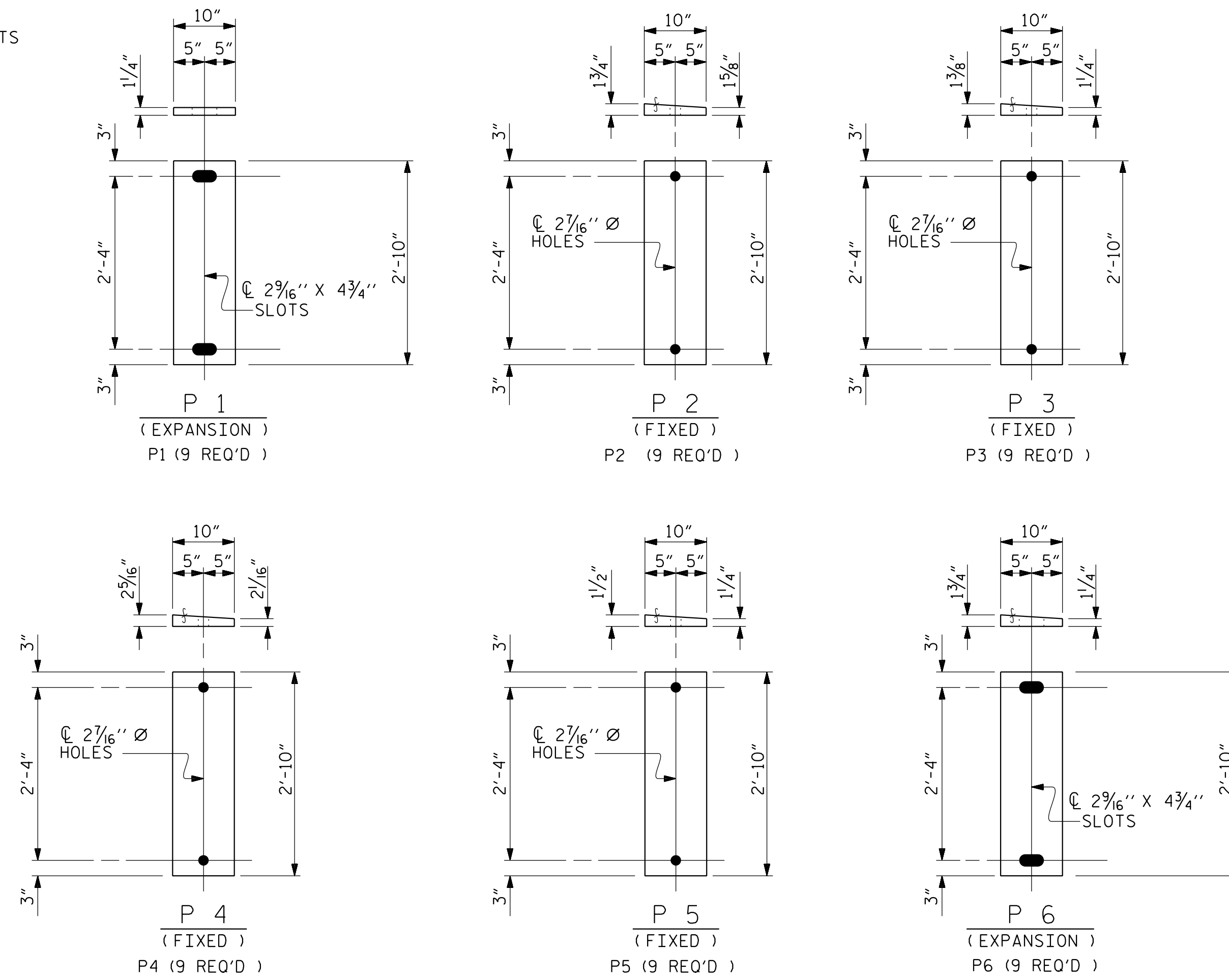
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



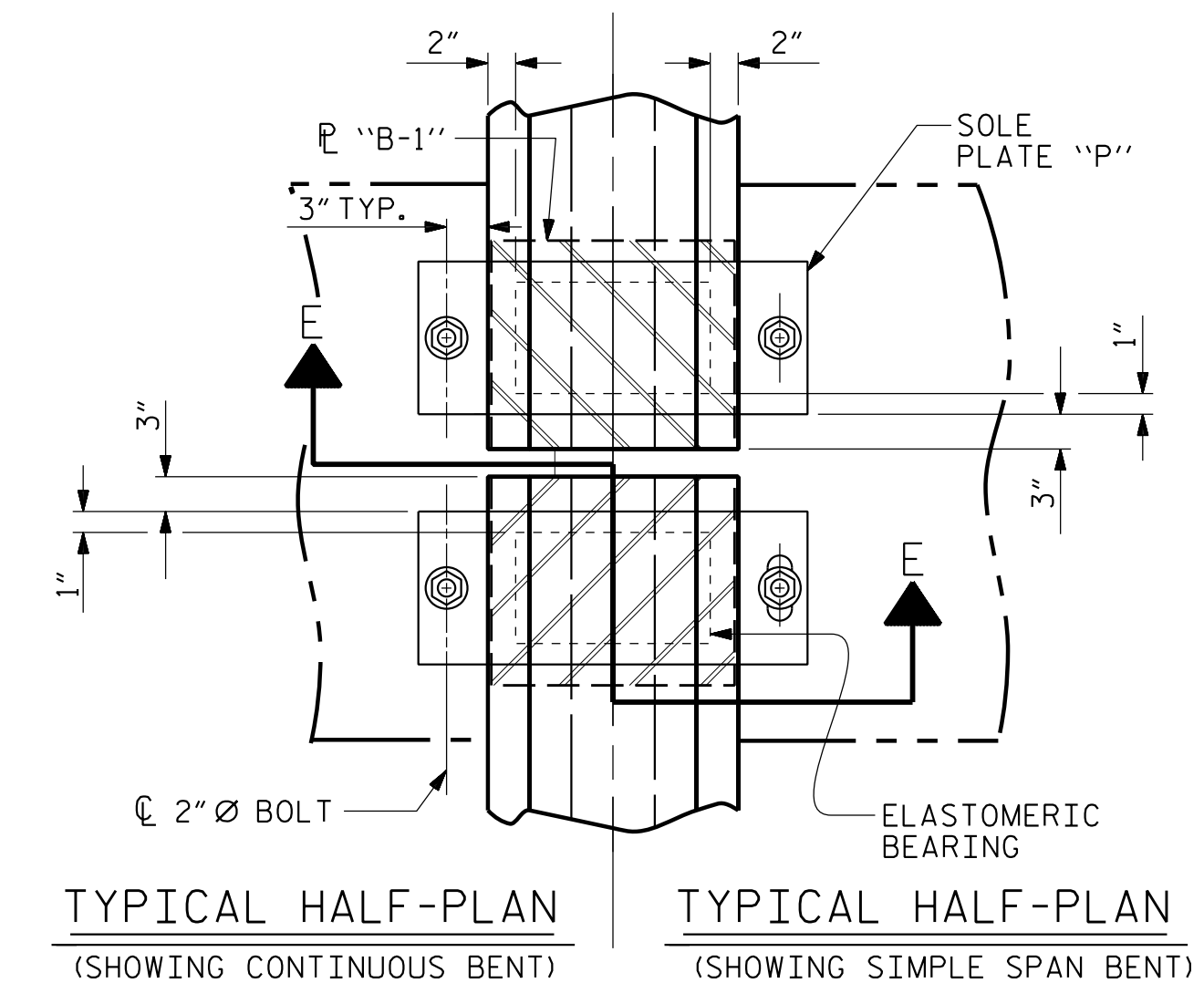
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (54 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE III



SOLE PLATE DETAILS ("P")

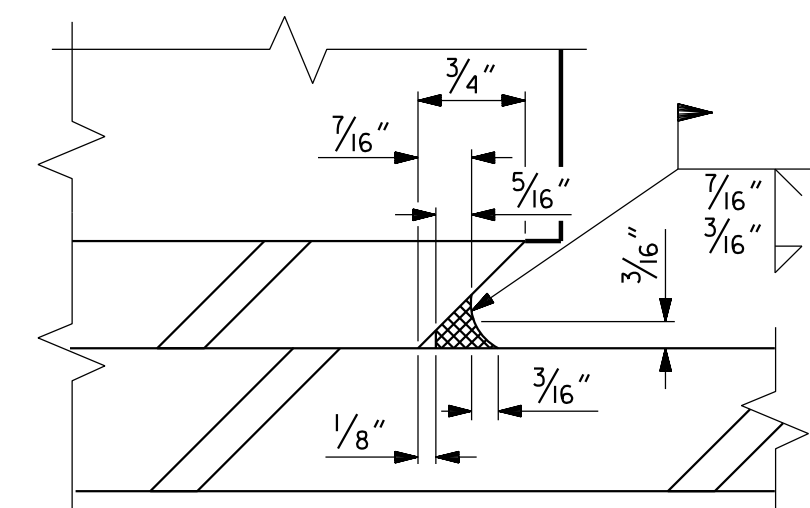


PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
ELASTOMERIC BEARING  
DETAILS  
PRESTRESSED CONCRETE GIRDER  
SUPERSTRUCTURE

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

S1-28  
TOTAL SHEETS  
63



DETAIL "A"

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	165 k

PLANS PREPARED BY:

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DocuSigned by:  
BEB2398D9220470  
1414  
ENGINEER  
ROBERT C. LARSON

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5/17/2023 7:40:27 PM R:\Structures\3 span Bridge over RRV28 US5839\_SMU\_BC\_430864.dgn

DRAWN BY : W. B. ALLEN DATE : 1/20  
CHECKED BY : Z. H. BROWN DATE : 8/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

DocuSigned by:  
BEB2398D9220470

5/18/2023

**NOTES**

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

**ALUMINUM RAILS**

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

**GENERAL NOTES**

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPliced AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 335.11 LIN. FT.

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DocuSigned by:

SEAL 14114

ENGINEER ROBERT C. LARSON

5/18/2023

PROJECT NO. U-5839

HAYWOOD COUNTY

STATION: 24+64.13 -L- POC

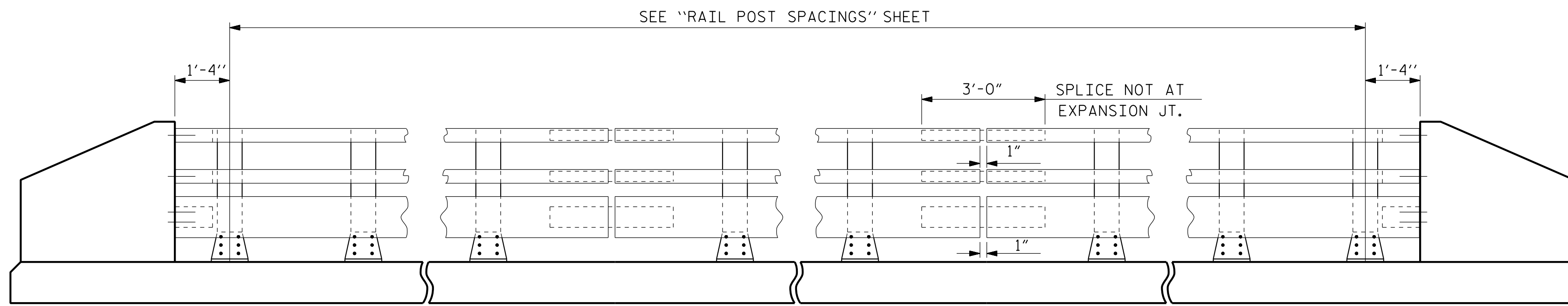
SHEET 1 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
**3 BAR METAL RAIL**

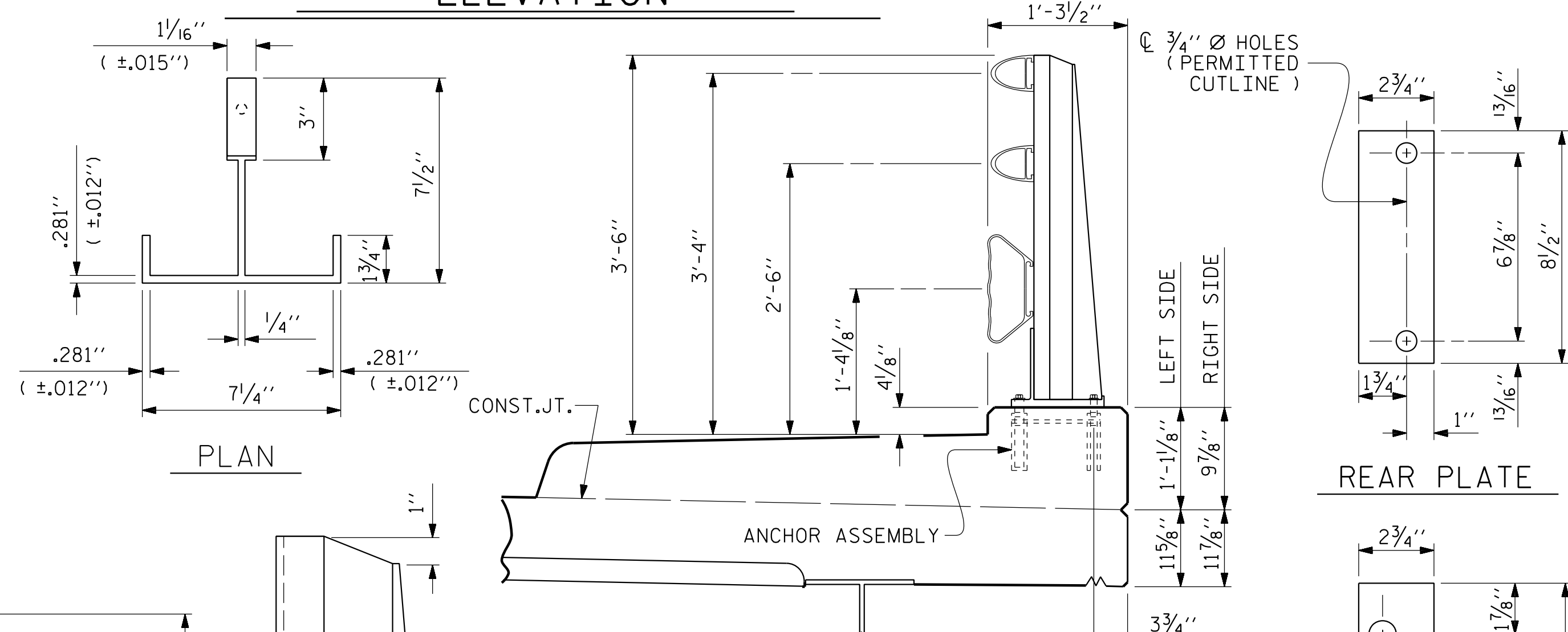
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					112

STD. NO. BMR5

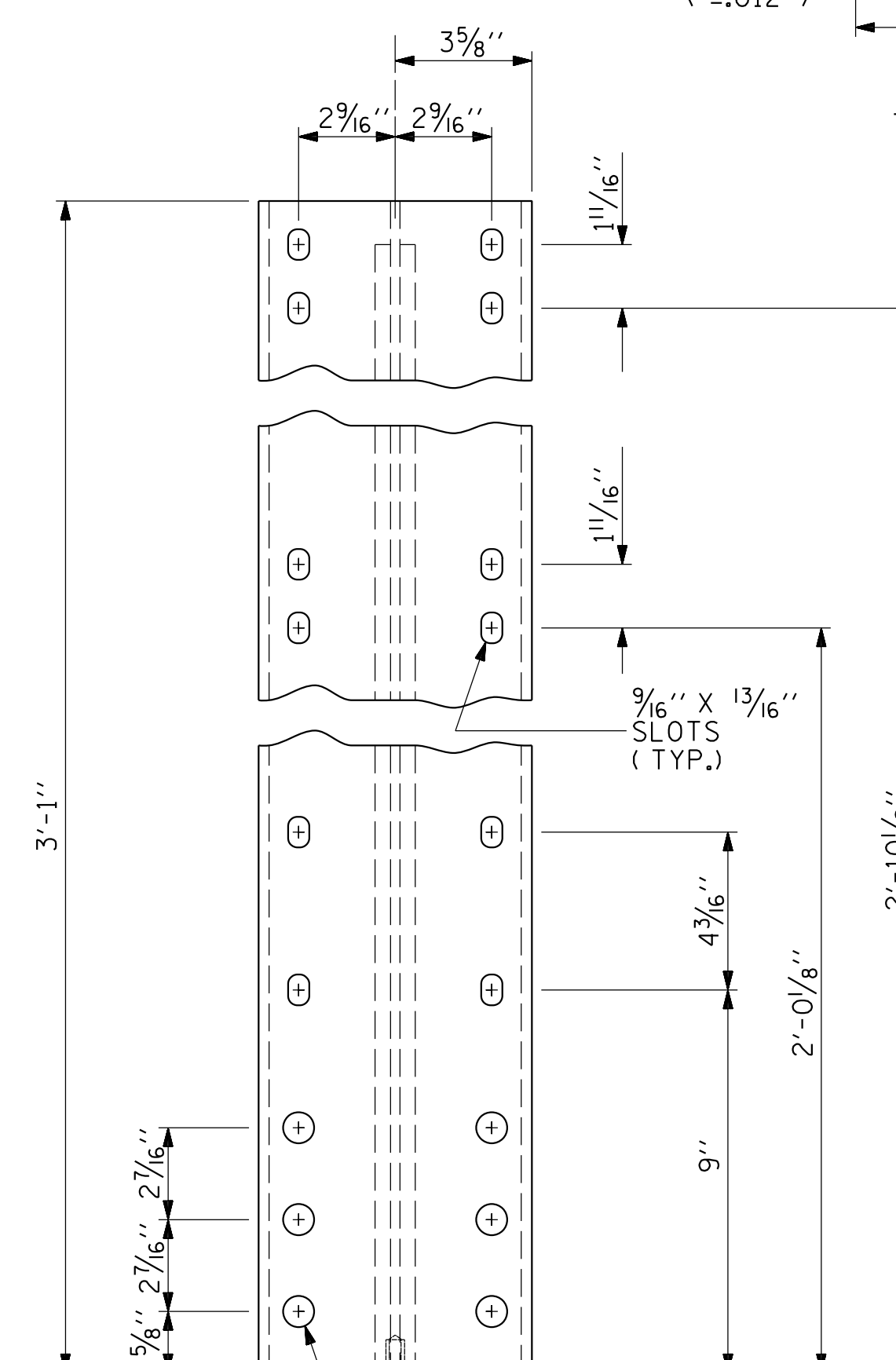


NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

**ELEVATION**

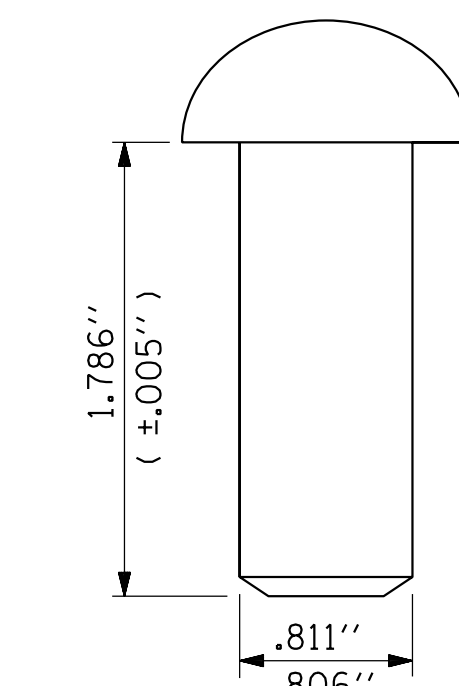


**PLAN**



**SECTION THRU RAIL**

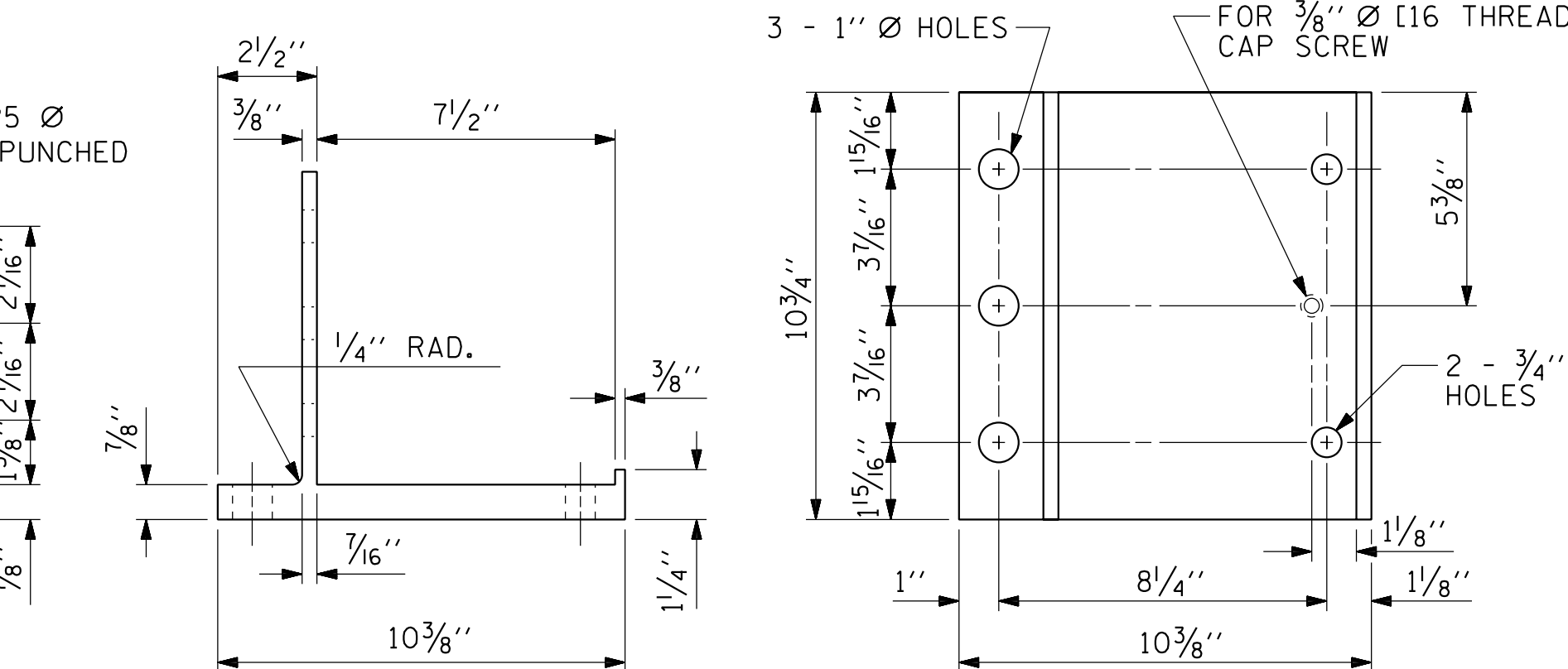
FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD. NO. BMR6



**RIVET DETAIL**

**SHIM DETAILS**

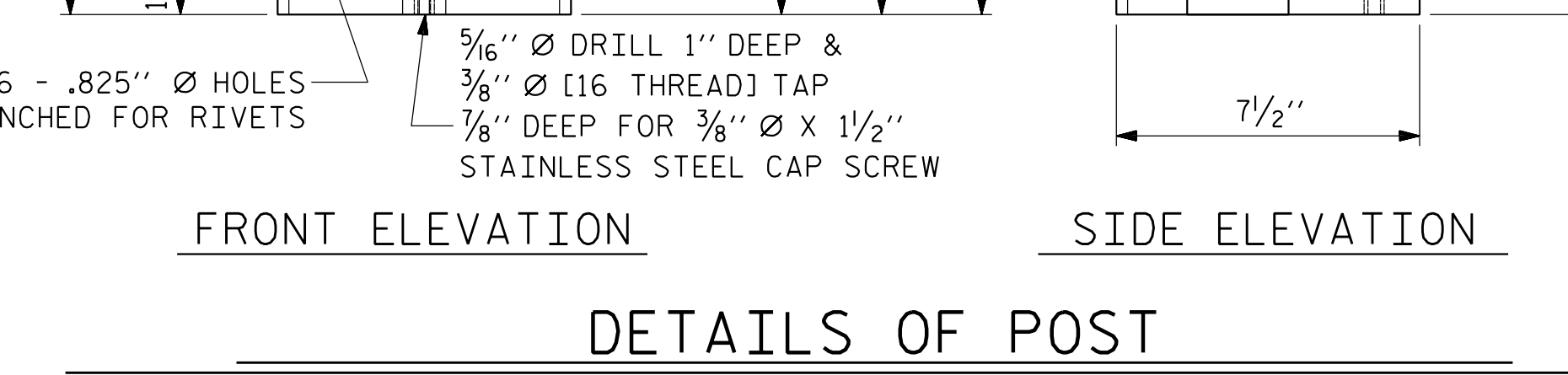
NOTE:  
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



**FRONT ELEVATION**

**SIDE ELEVATION**

**POST BASE DETAILS**



**FRONT ELEVATION**

**SIDE ELEVATION**

**DETAILS OF POST**

DRAWN BY: W. B. ALLEN DATE: 10/19  
CHECKED BY: Z. H. BROWN DATE: 1/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
SEAL 14114  
ENGINEER ROBERT C. LARSON  
5/18/2023

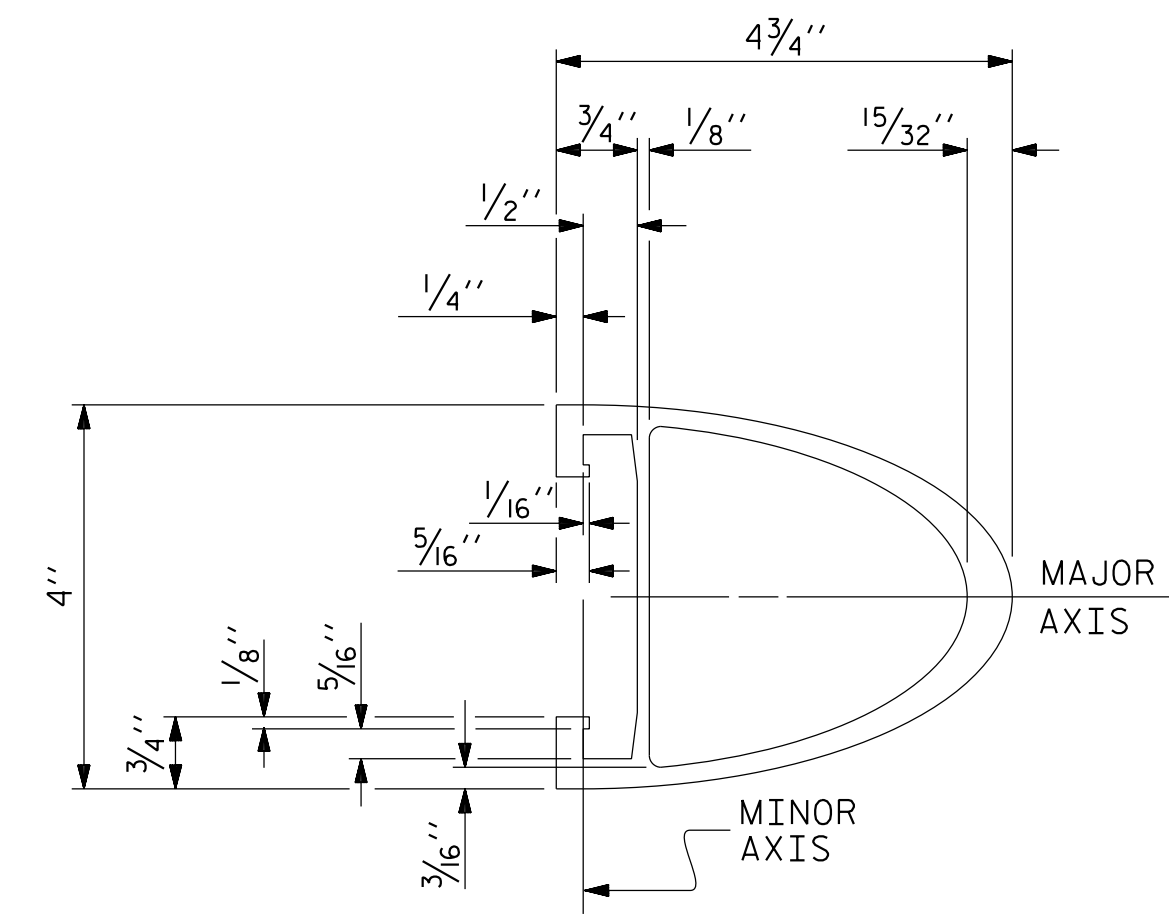
5/17/2023 7:40:23 PM R:\Structures\3 span Bridge over RR\29 US5839\_SML\_3\MR\_43084.dgn

**NOTES**

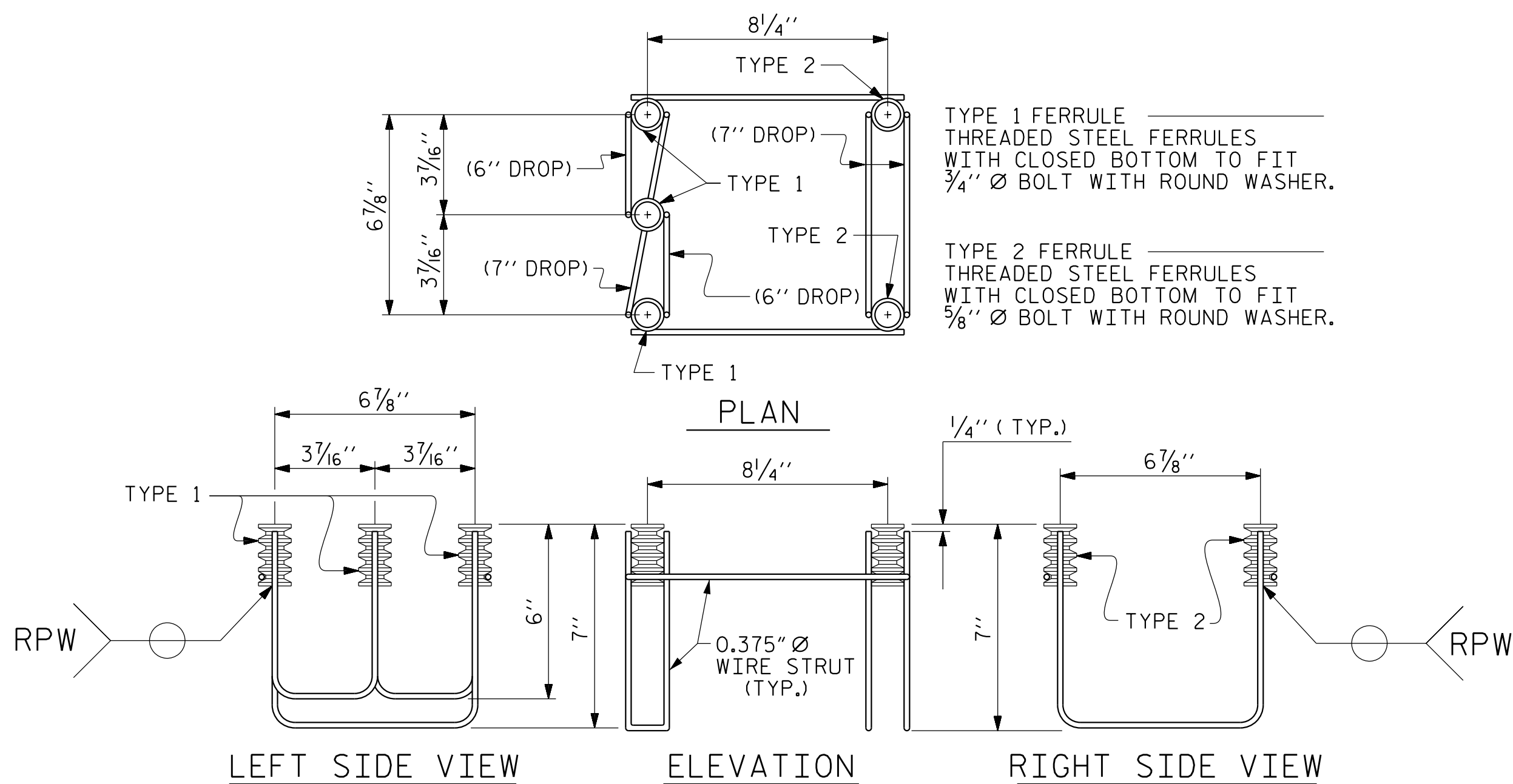
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 1/4" FOR 5/8" FERRULES.
- B. 3 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. 2 - 5/8" Ø X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- D. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- E. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- F. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- G. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

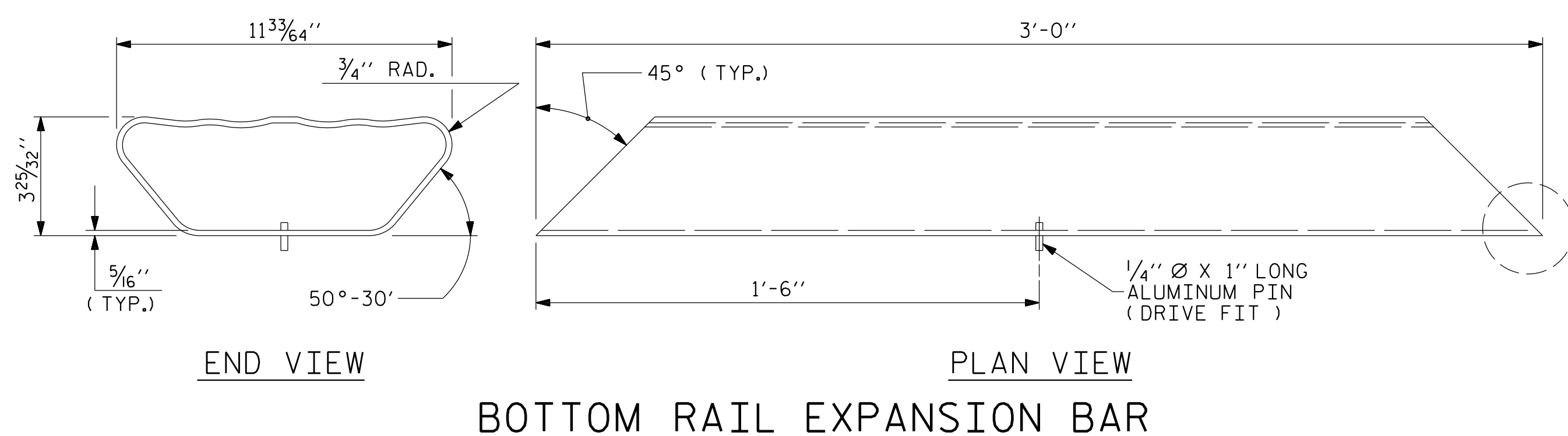


**TOP & MIDDLE RAIL SECTION**

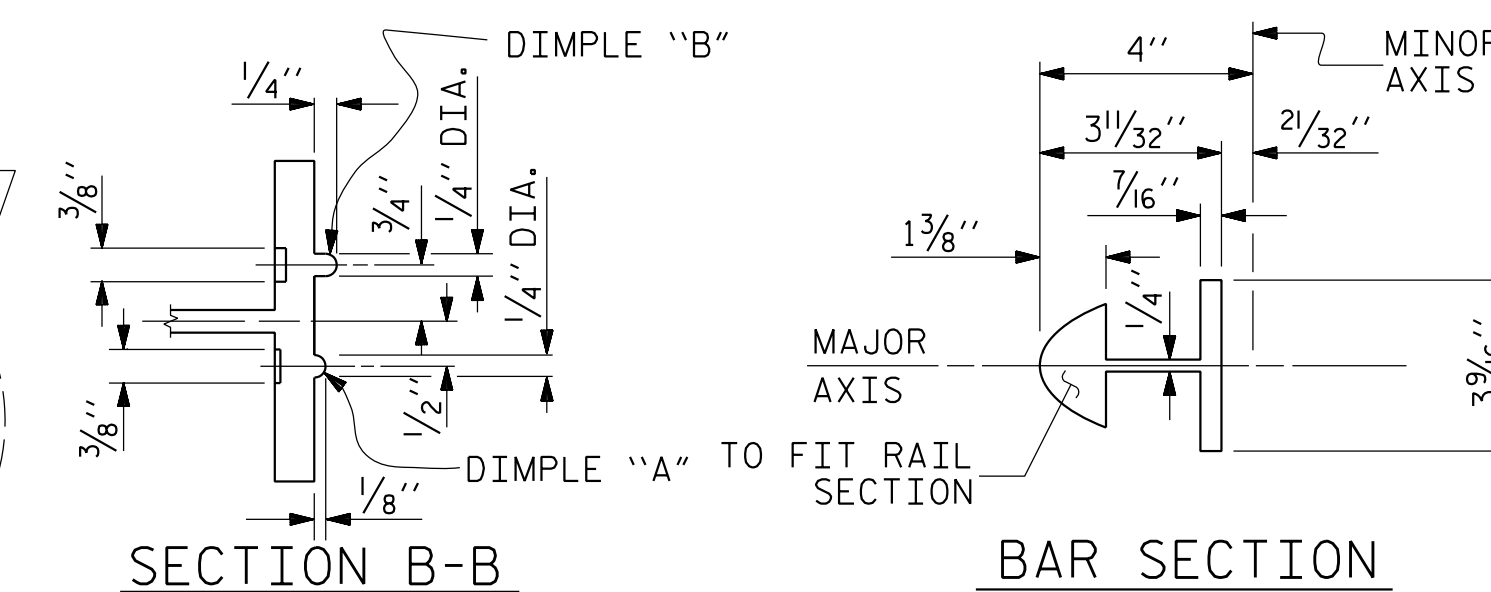
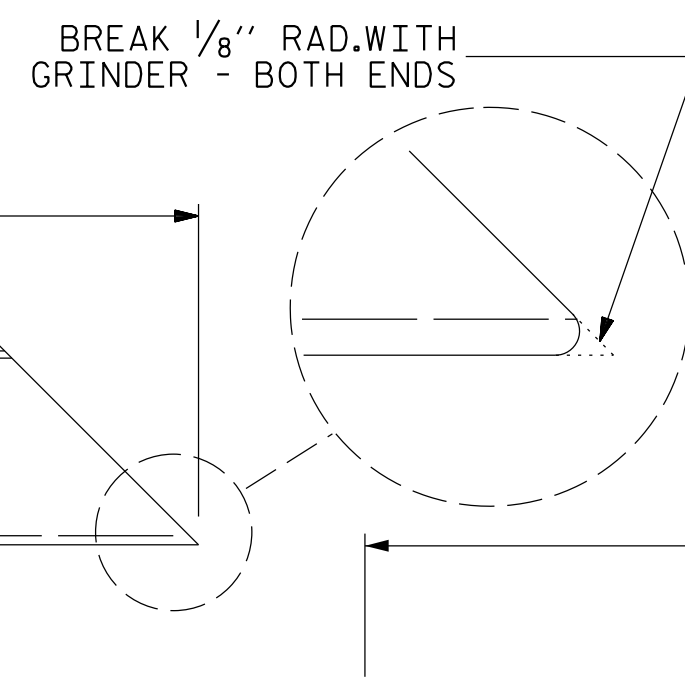


**5-BOLT METAL RAIL ANCHOR ASSEMBLY**

( 59 ASSEMBLIES REQUIRED )



**BOTTOM RAIL EXPANSION BAR**

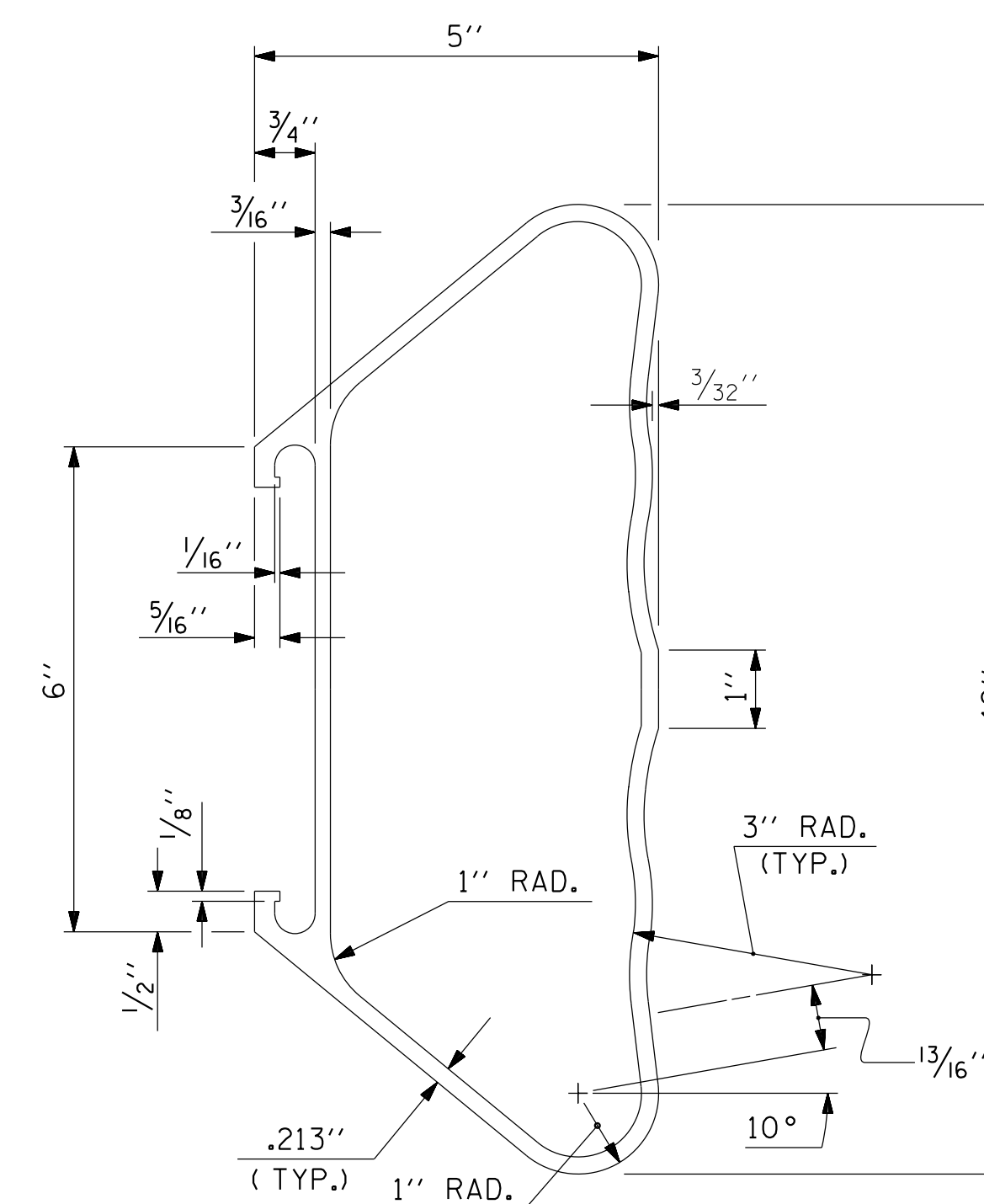


**SECTION B-B**

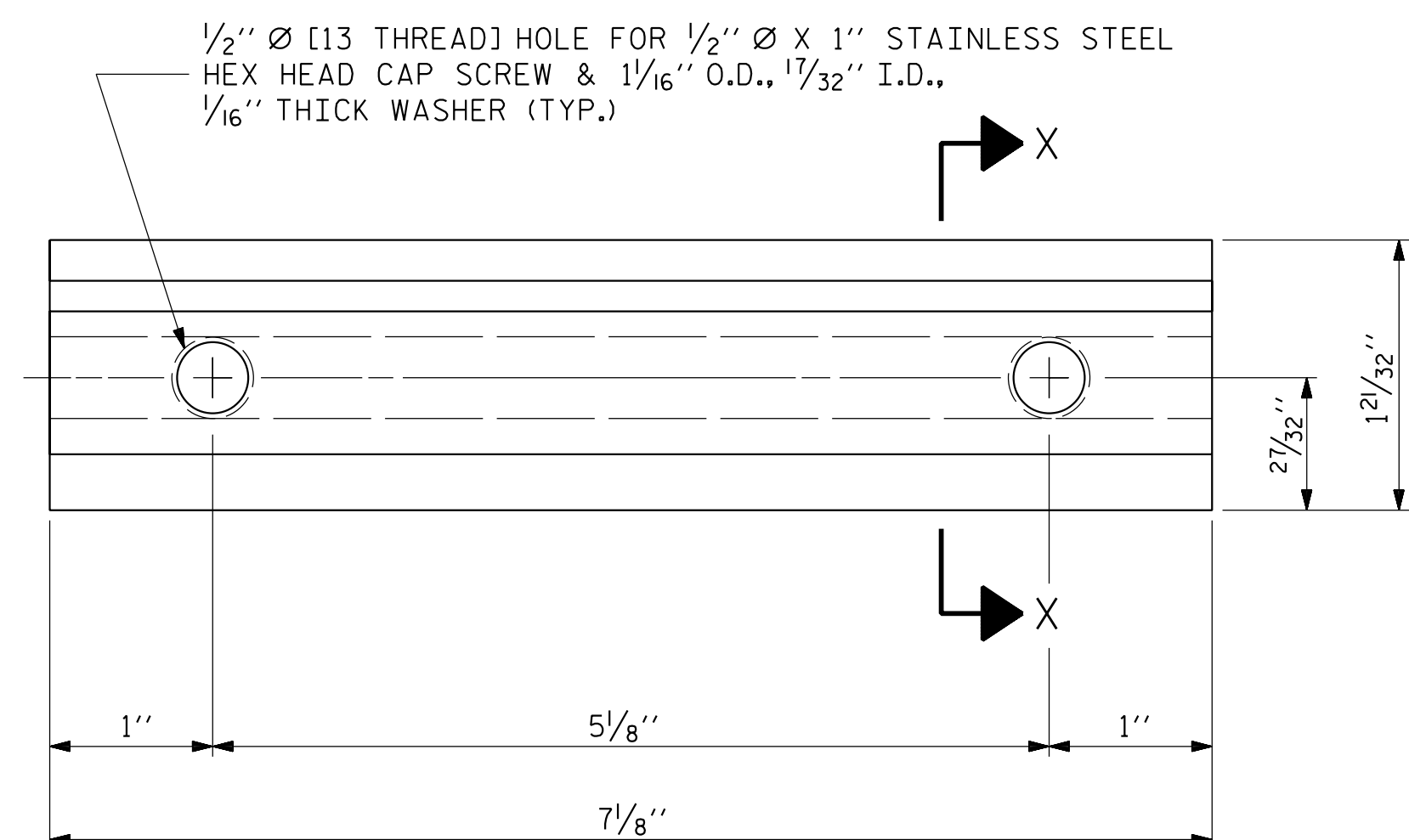
**BAR SECTION**

**BACK ELEVATION**

**TOP & MIDDLE RAIL EXPANSION BAR**

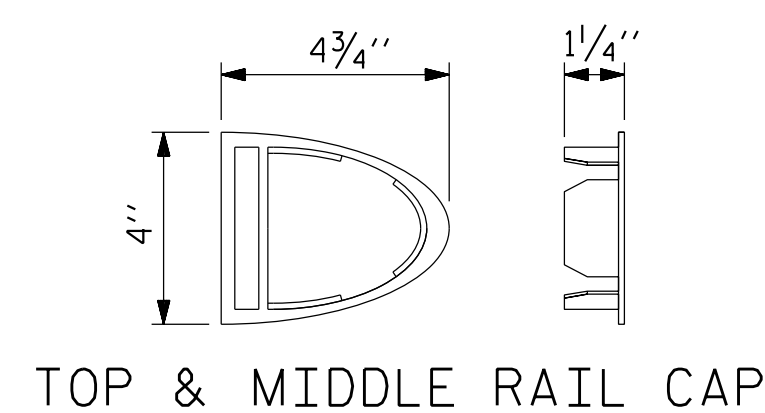


**BOTTOM RAIL SECTION**

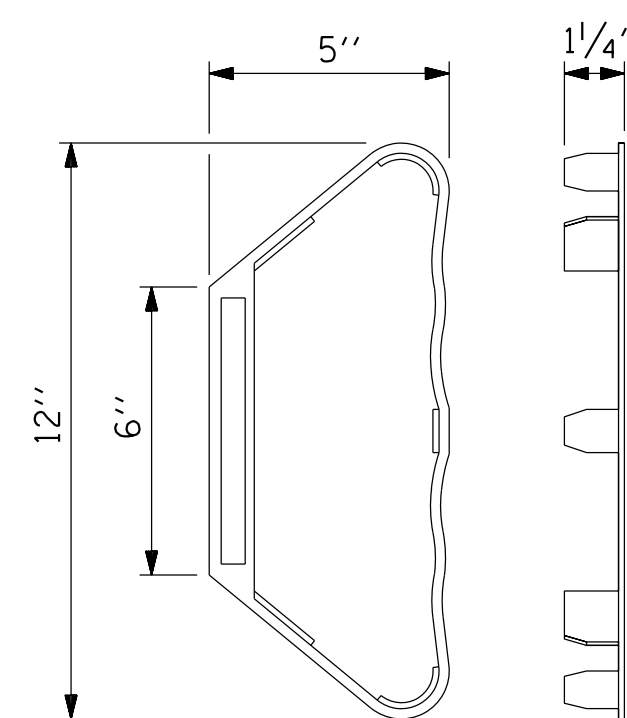


**CLAMP BAR DETAIL**

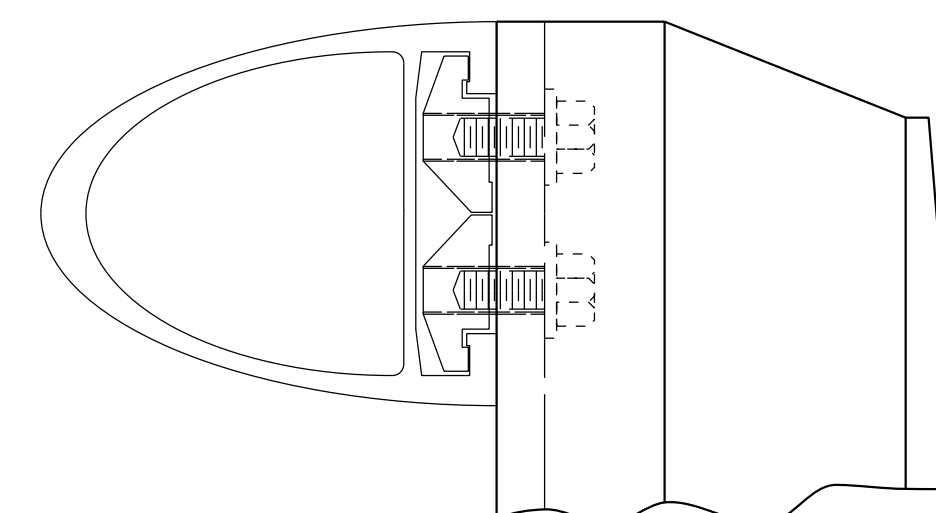
( 6 REQUIRED PER POST )



**TOP & MIDDLE RAIL CAP**



**BOTTOM RAIL CAP**



**CLAMP ASSEMBLY**

TOP RAIL SHOWN  
( MIDDLE & BOTTOM RAIL ARE SIMILAR )

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DocuSigned by:

BEB2398D9220470

SEAL 1414

ENGINEER ROBERT C. LARSON

5/18/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
**3 BAR METAL RAIL**

REVISIONS

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

SHEET NO.

S1-30

TOTAL SHEETS

63

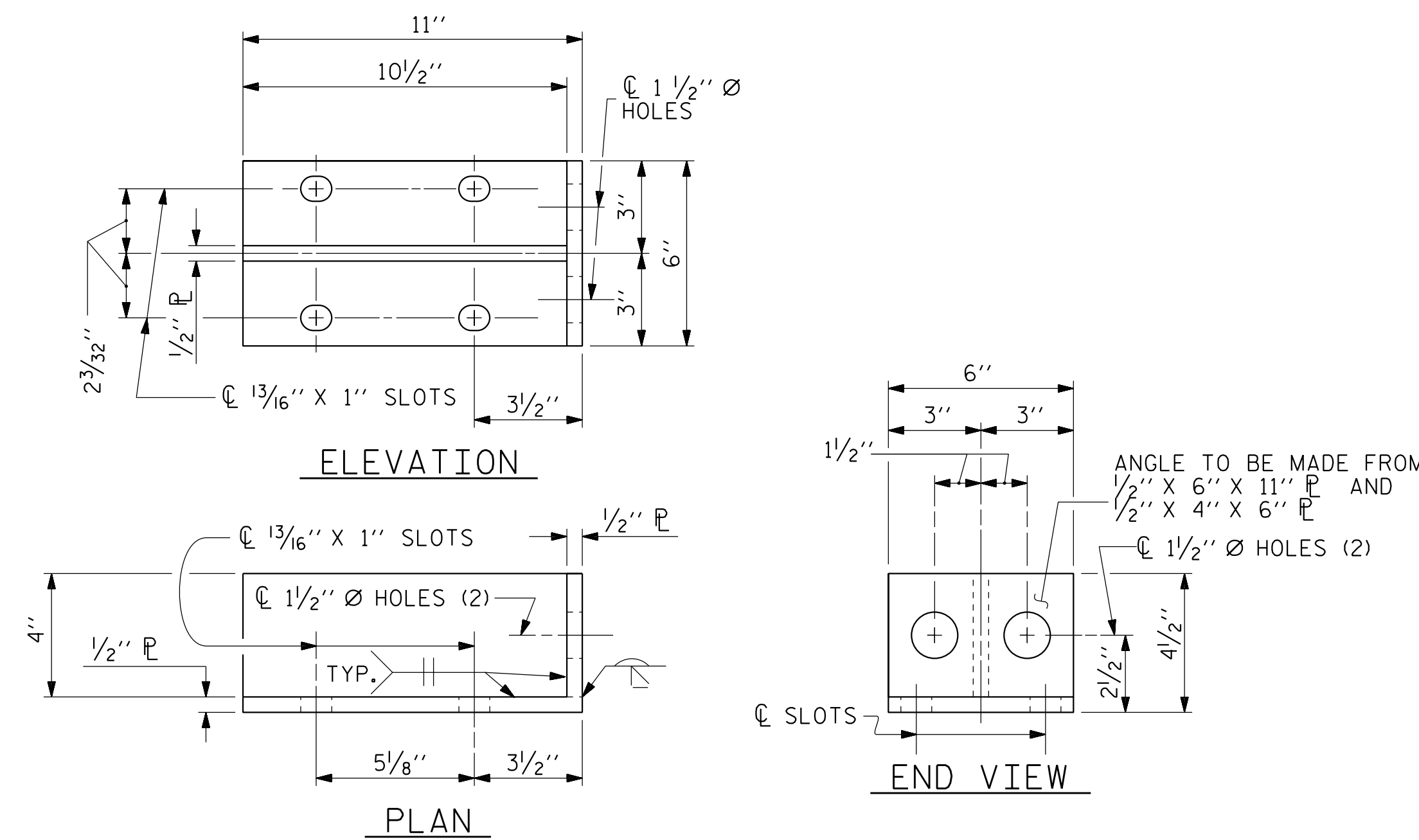
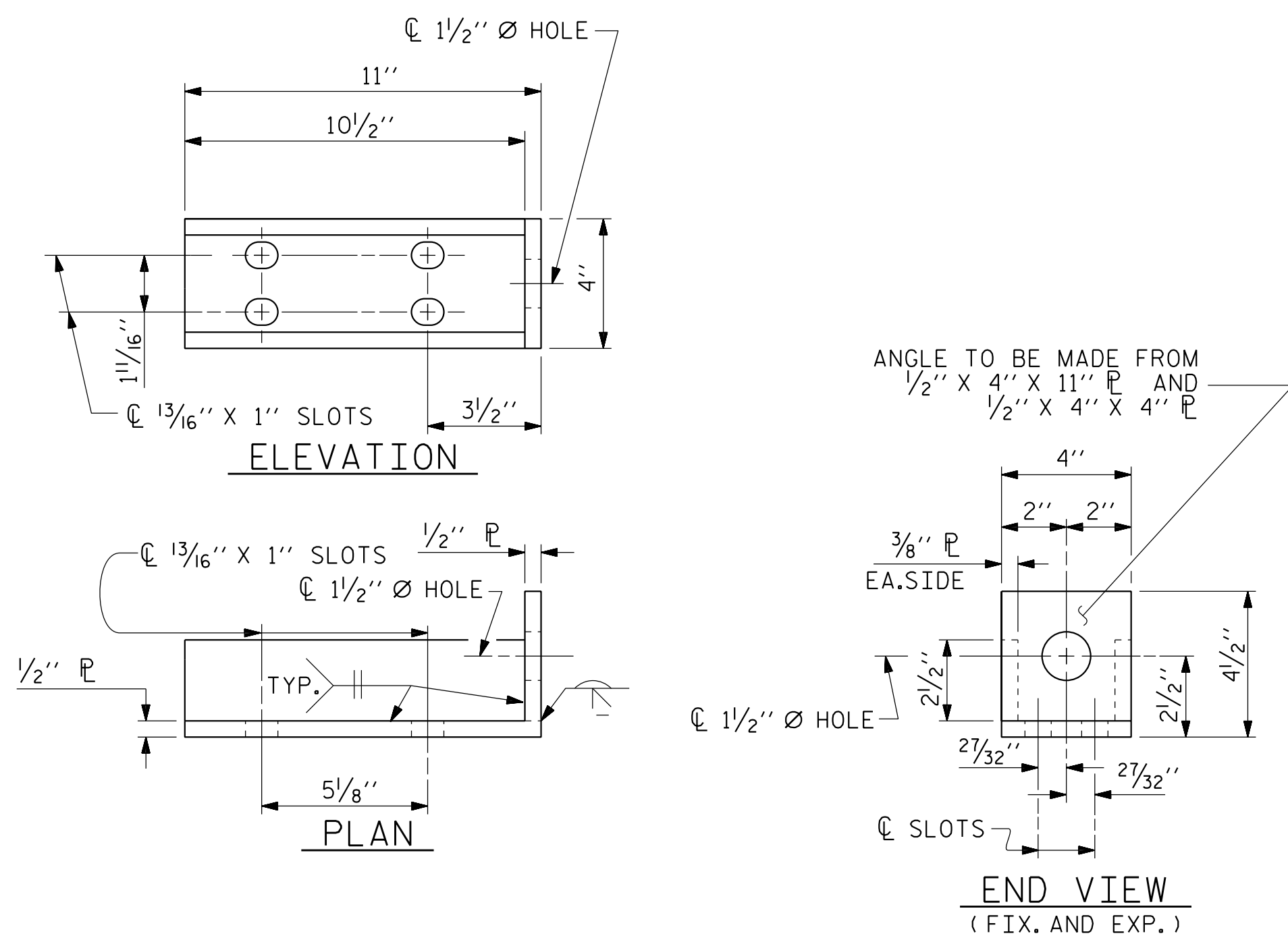
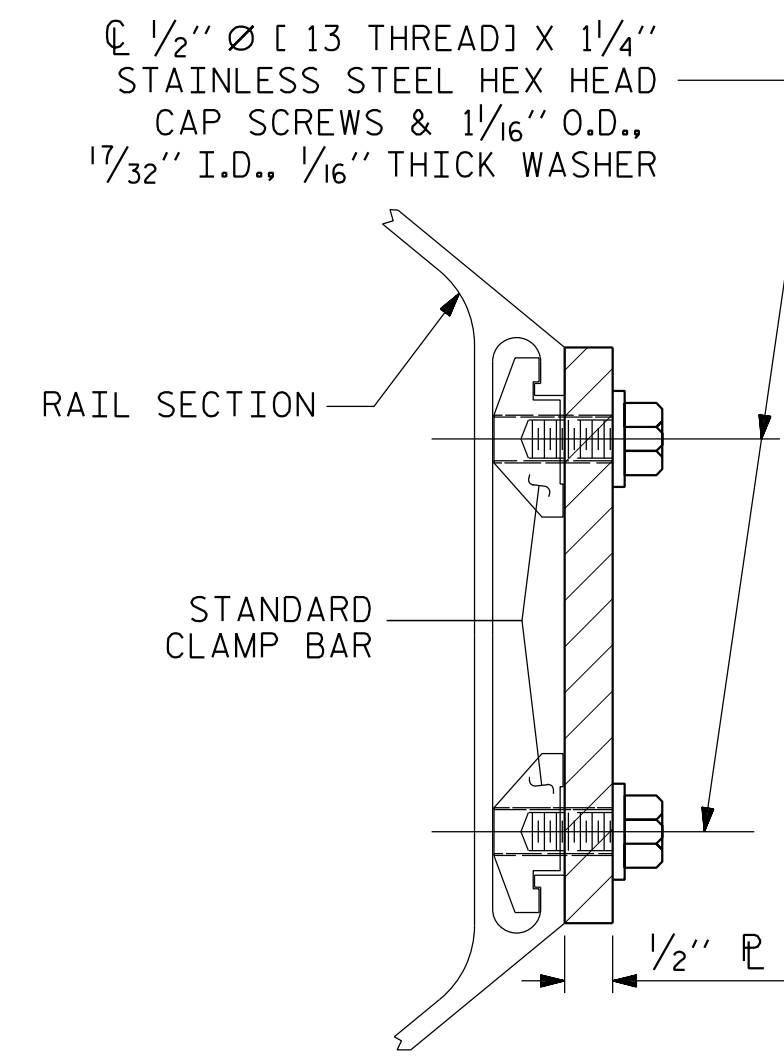
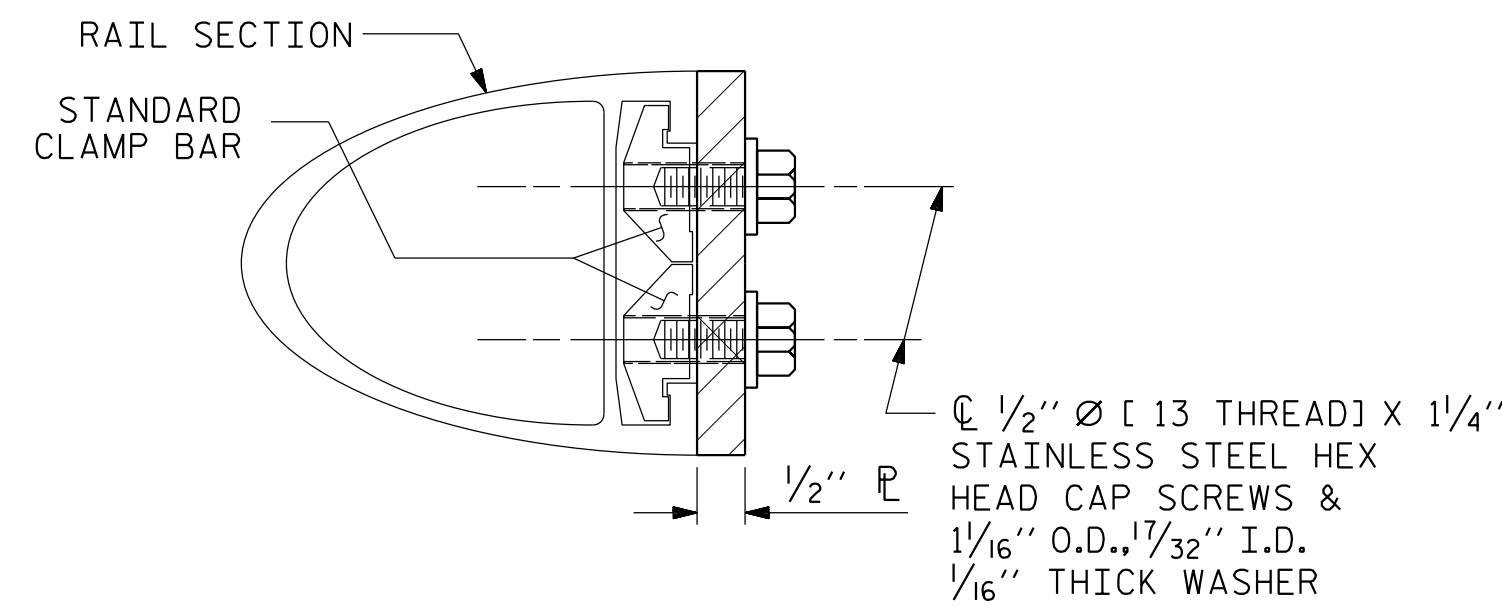
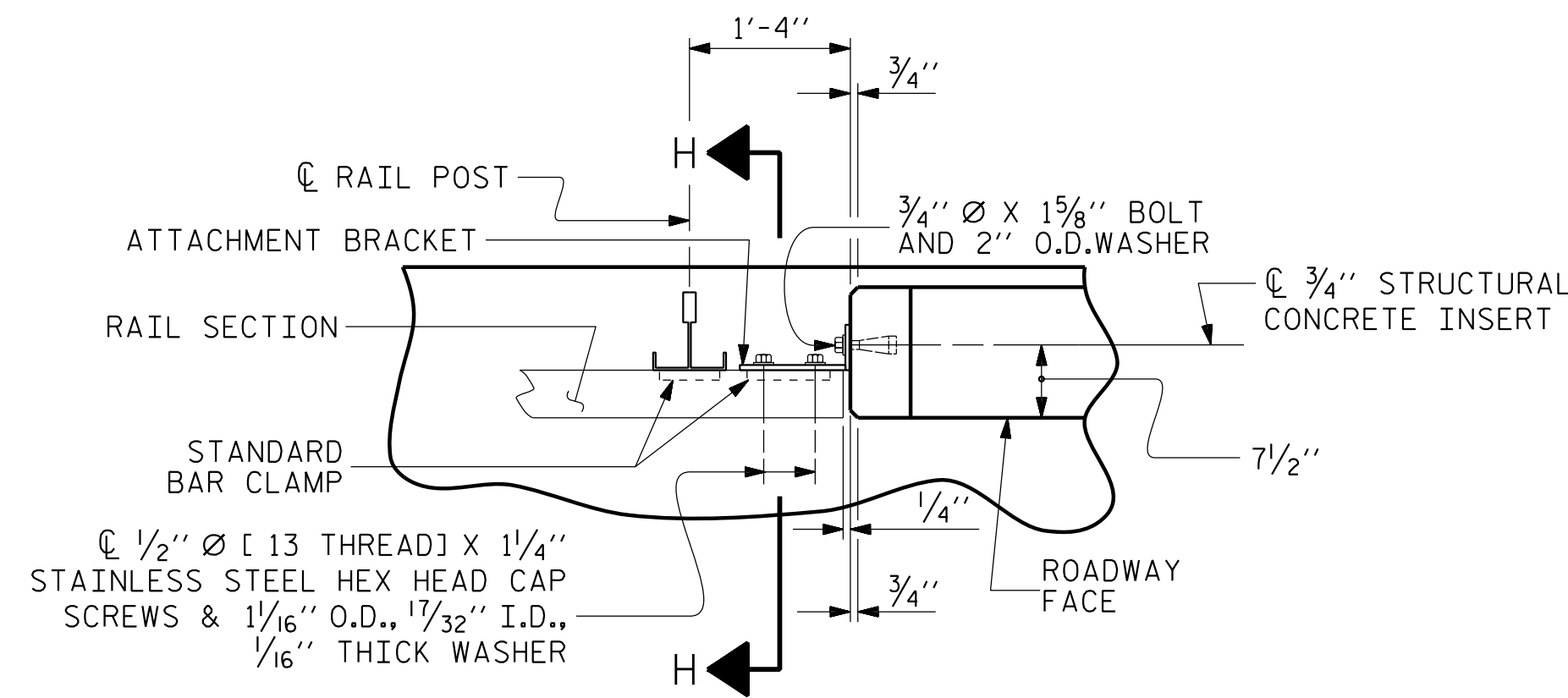
STD. NO. BMR6

5/17/2023 7:40:23 PM R:\Structures\3 span Bridge over RRV30 US5839\_SMU\_WR2\_43084.dgn

DRAWN BY: W. B. ALLEN DATE: 10/19  
CHECKED BY: Z. H. BROWN DATE: 1/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
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NOTES

METAL RAIL TO END POST CONNECTION

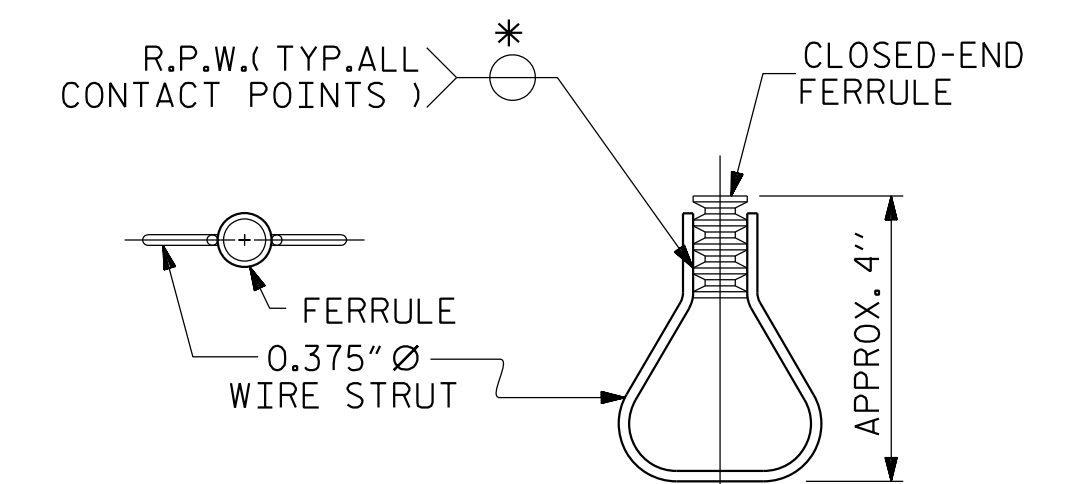
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 1/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 1/8" BOLT SHALL HAVE N. C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
  - D. STANDARD CLAMP BARS (STD. No. BMR 6).
- THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.
- THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.
- THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

NOTES

STRUCTURAL CONCRETE INSERT

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



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 3 OF 3

PLANS PREPARED BY:  
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DocuSigned by:  
ROBERT C. LARSON  
14114  
ENGINEER  
BEB2398D9220470...

5/18/2023

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD 3 BAR METAL RAIL					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					63

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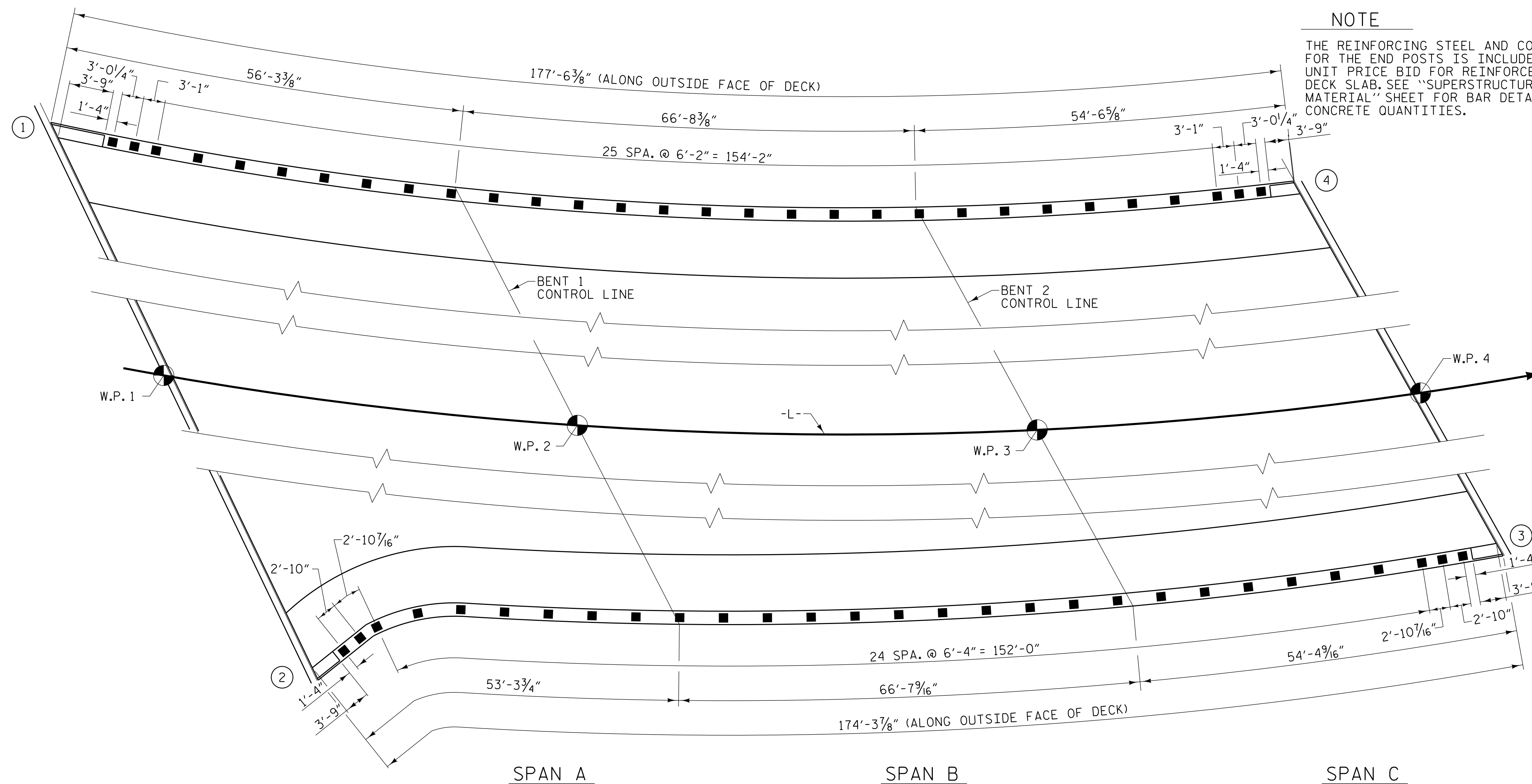
DRAWN BY: W. B. ALLEN DATE: 10/19  
CHECKED BY: Z. H. BROWN DATE: 1/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
ROBERT C. LARSON  
BEB2398D9220470...

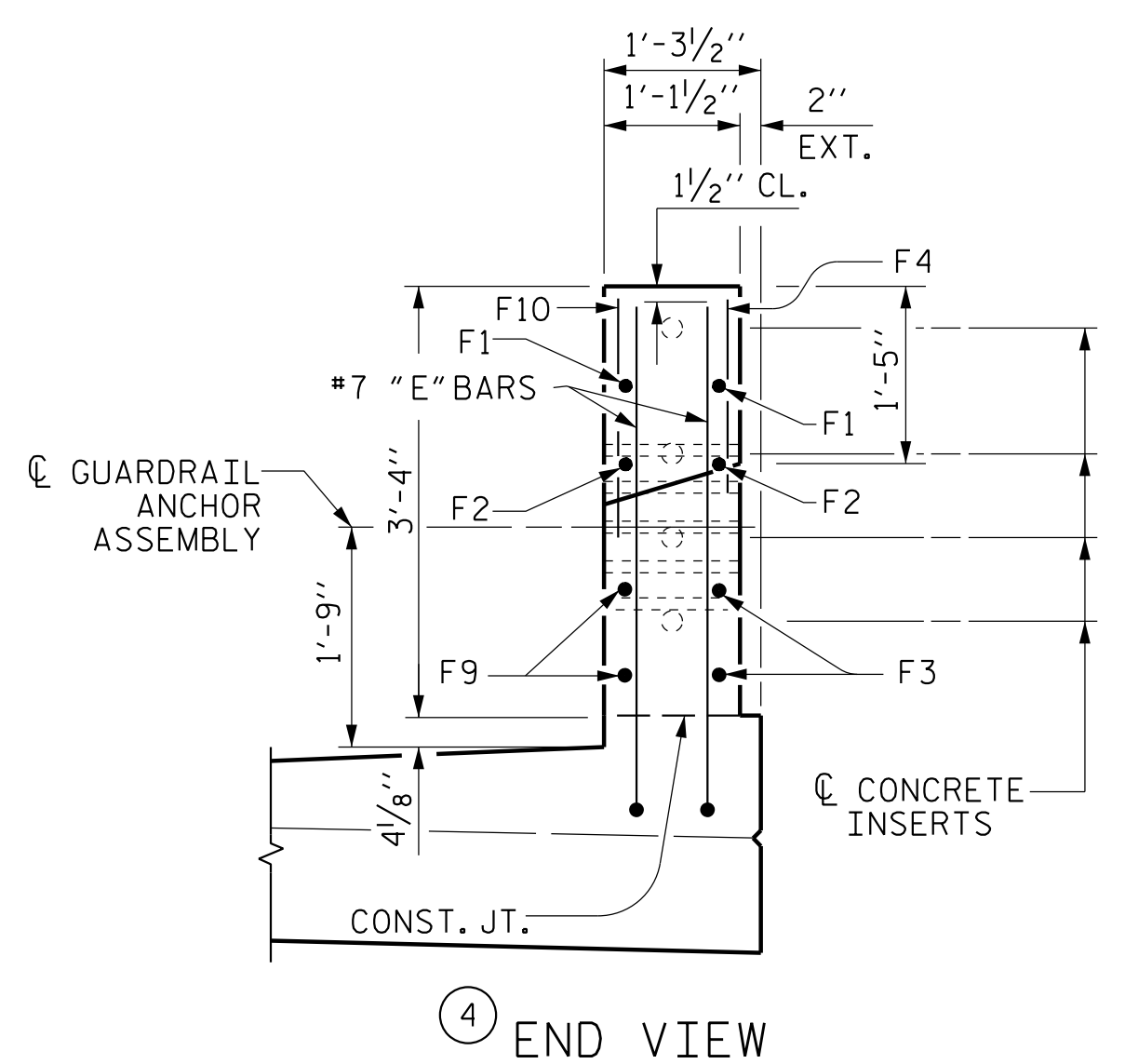


**NOTE**

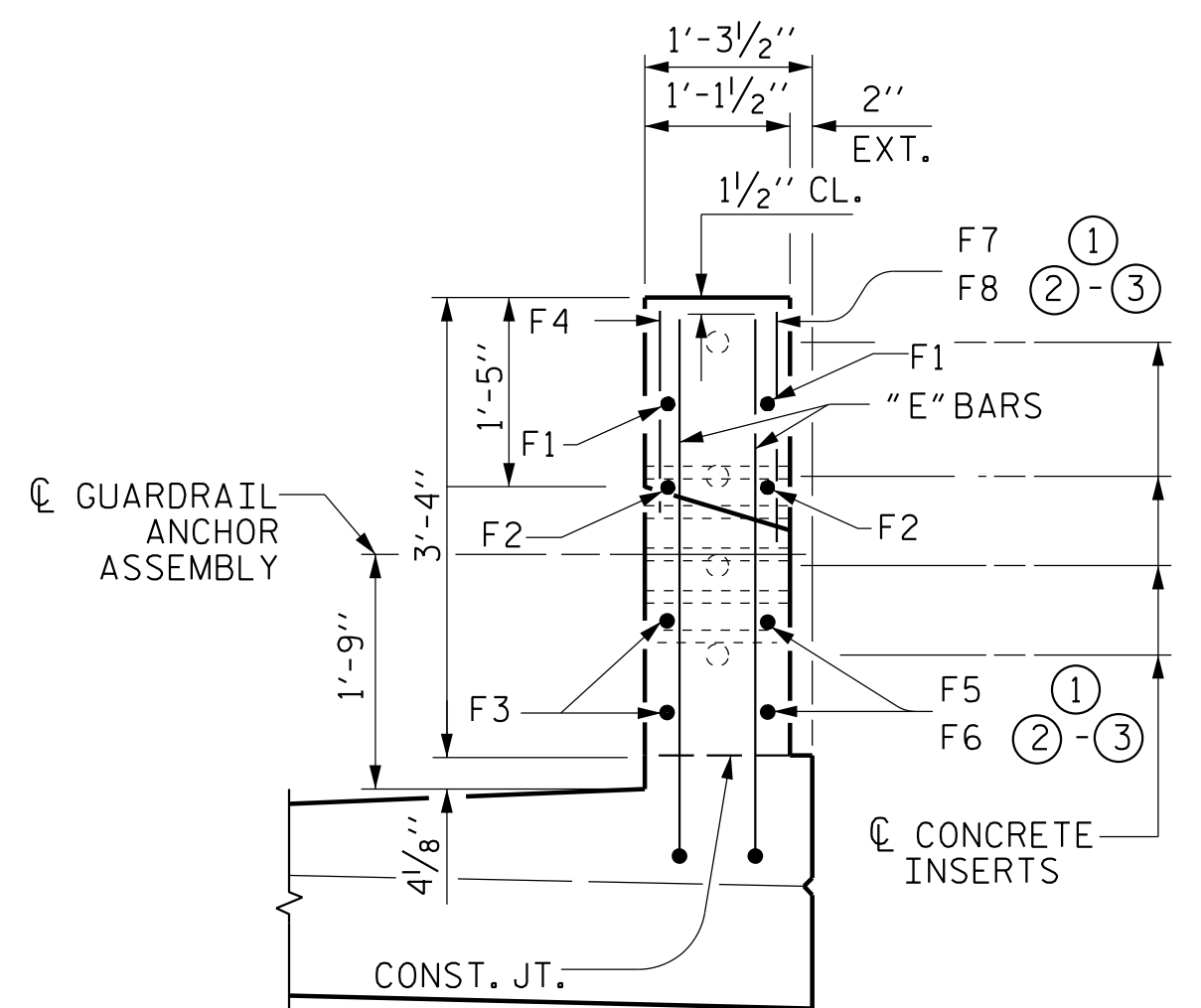
THE REINFORCING STEEL AND CONCRETE FOR THE END POSTS IS INCLUDED IN THE UNIT PRICE BID FOR REINFORCED CONCRETE DECK SLAB. SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET FOR BAR DETAILS AND CONCRETE QUANTITIES.



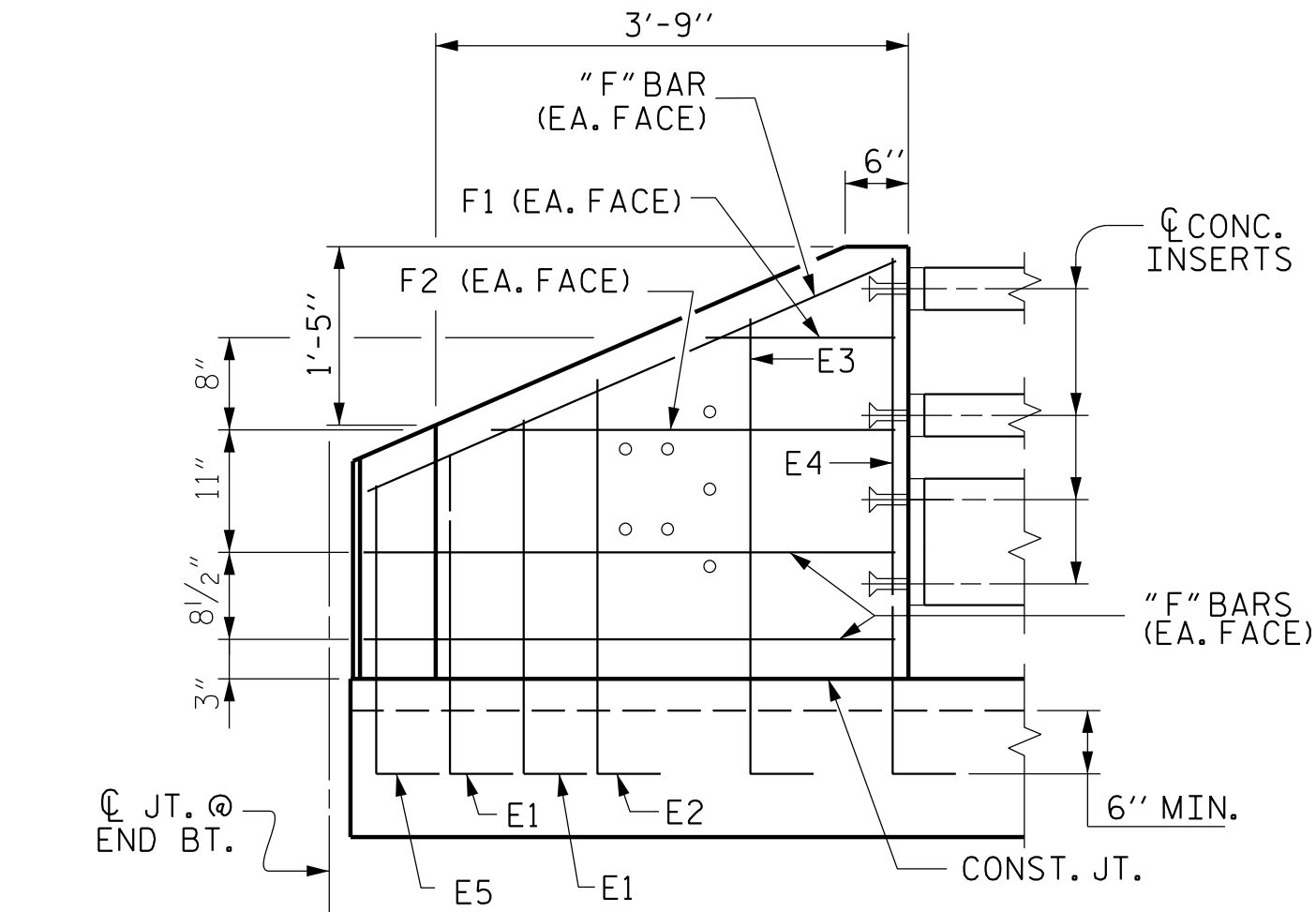
**PLAN OF RAIL POST SPACINGS**



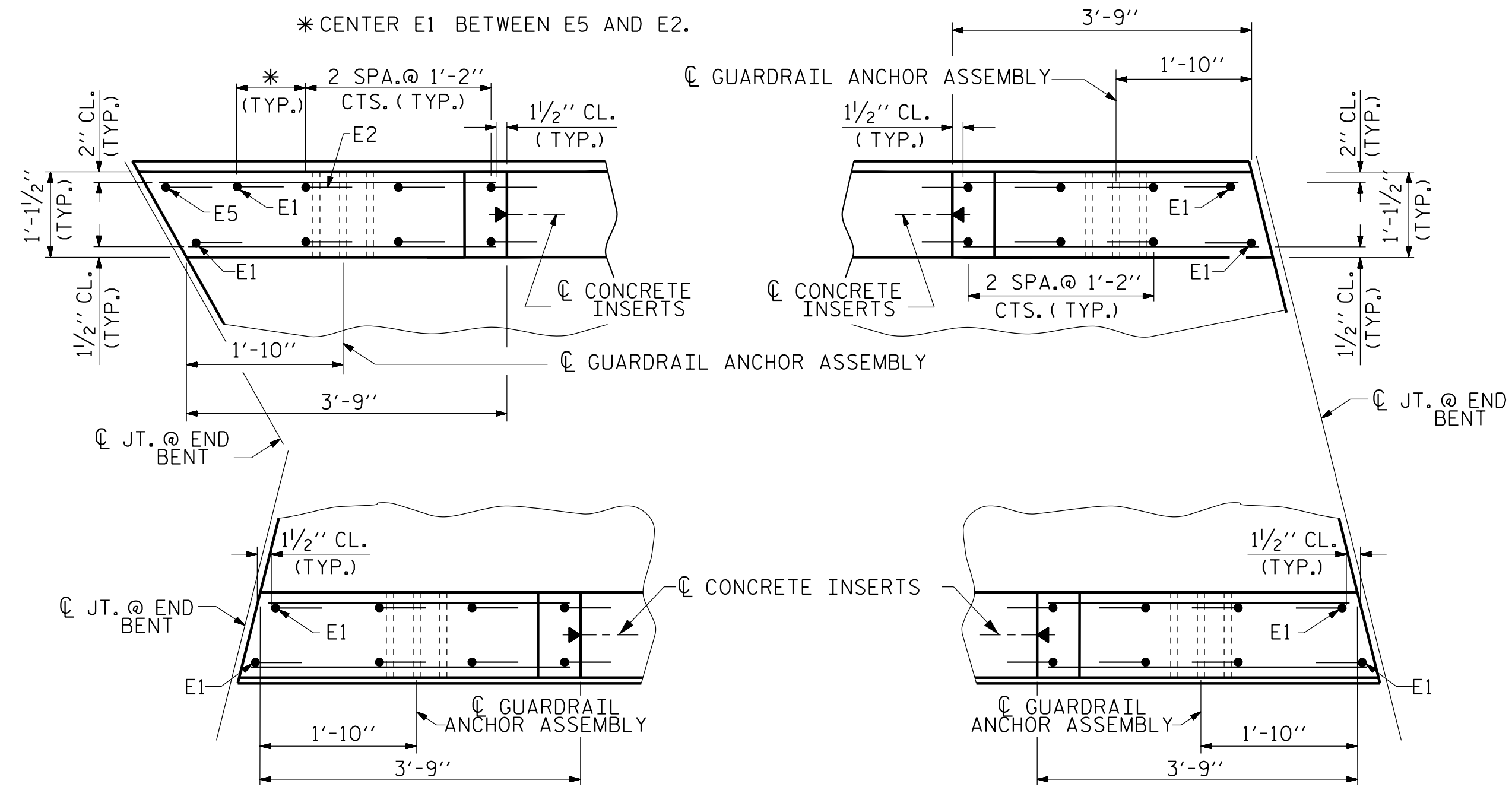
**4 END VIEW**



**1-3 END VIEW**



**ELEVATION**



**END POST DETAILS**

**PLAN**

PLANS PREPARED BY:

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PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

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

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					63

DocuSigned by:

*Robert C. Larson*

BEB2398D922047

SEAL 1414  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 ROBERT C. LARSON

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5/18/2023

5/17/2023 7:48:08 PM R:\Structures\3 span Bridge cover RRV\32 US5839\_SMU\_3MR4\_43084.dgn

DRAWN BY: W. B. ALLEN DATE: 10/19  
 CHECKED BY: Z. H. BROWN DATE: 1/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:

*Robert C. Larson*

BEB2398D922047

NOTES

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

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

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

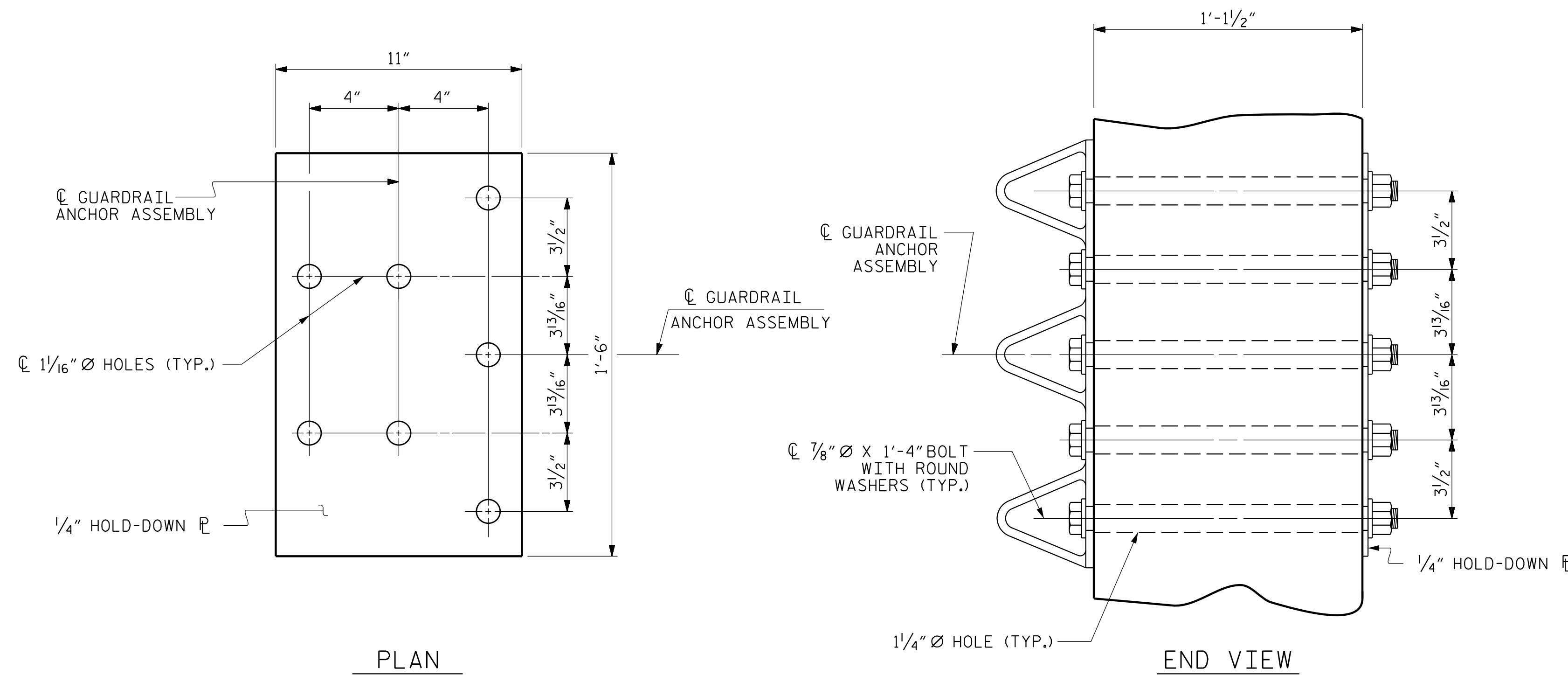
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

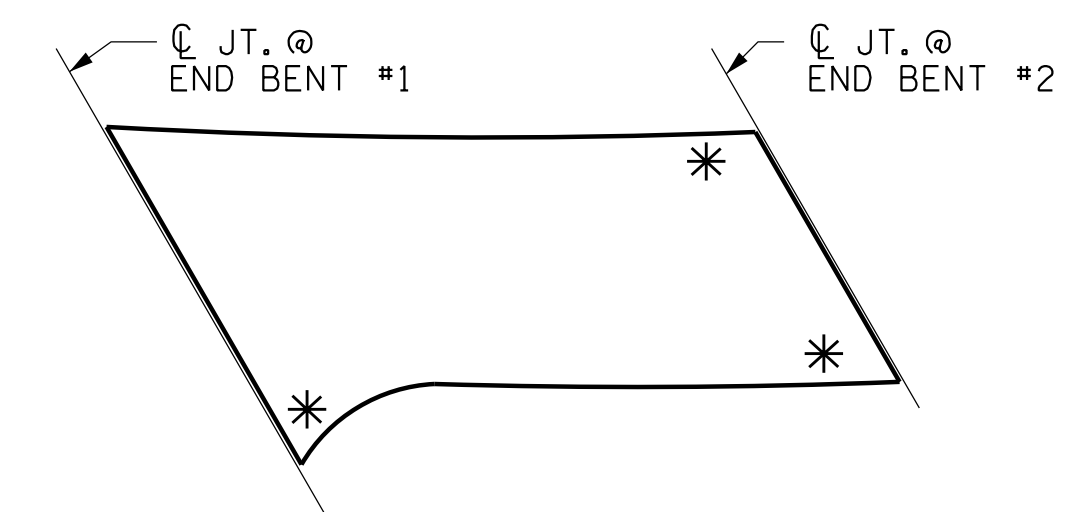
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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

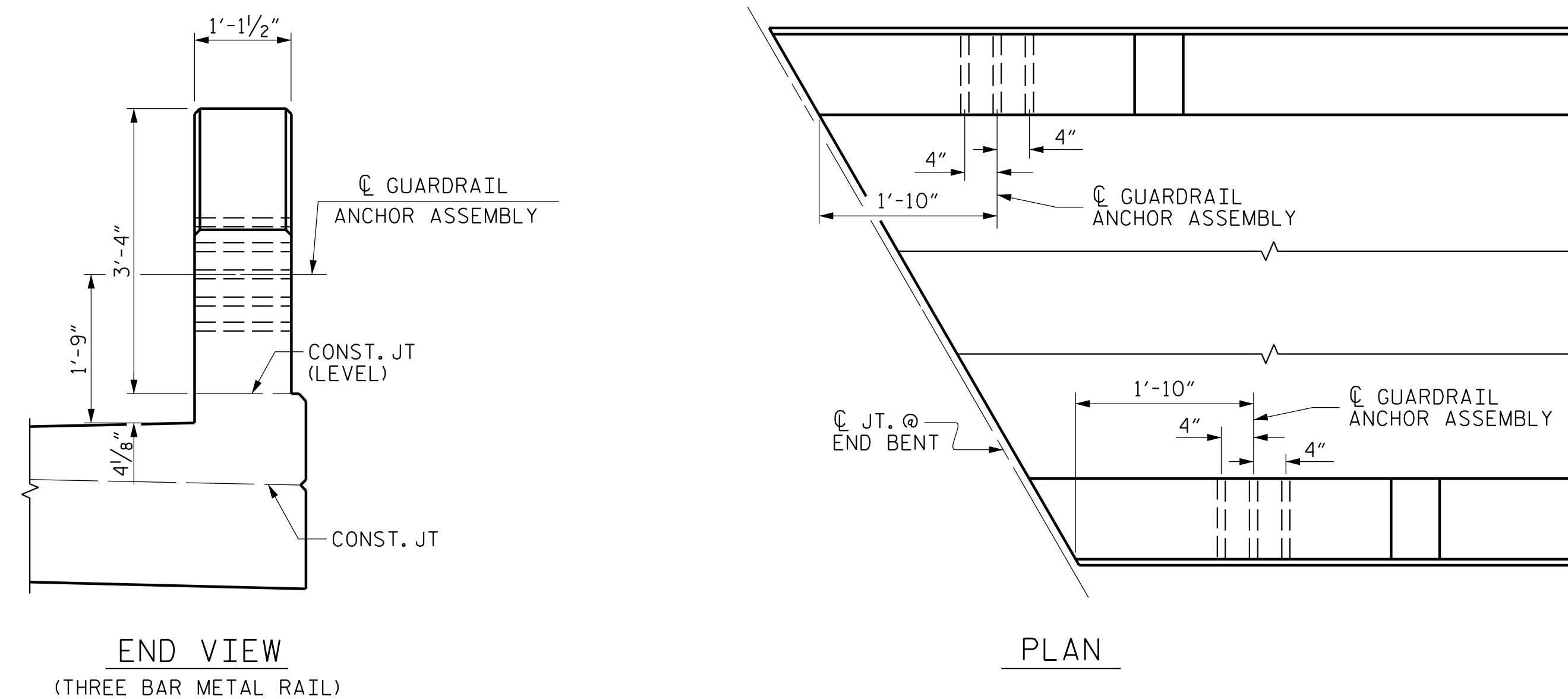


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

PLANS PREPARED BY:

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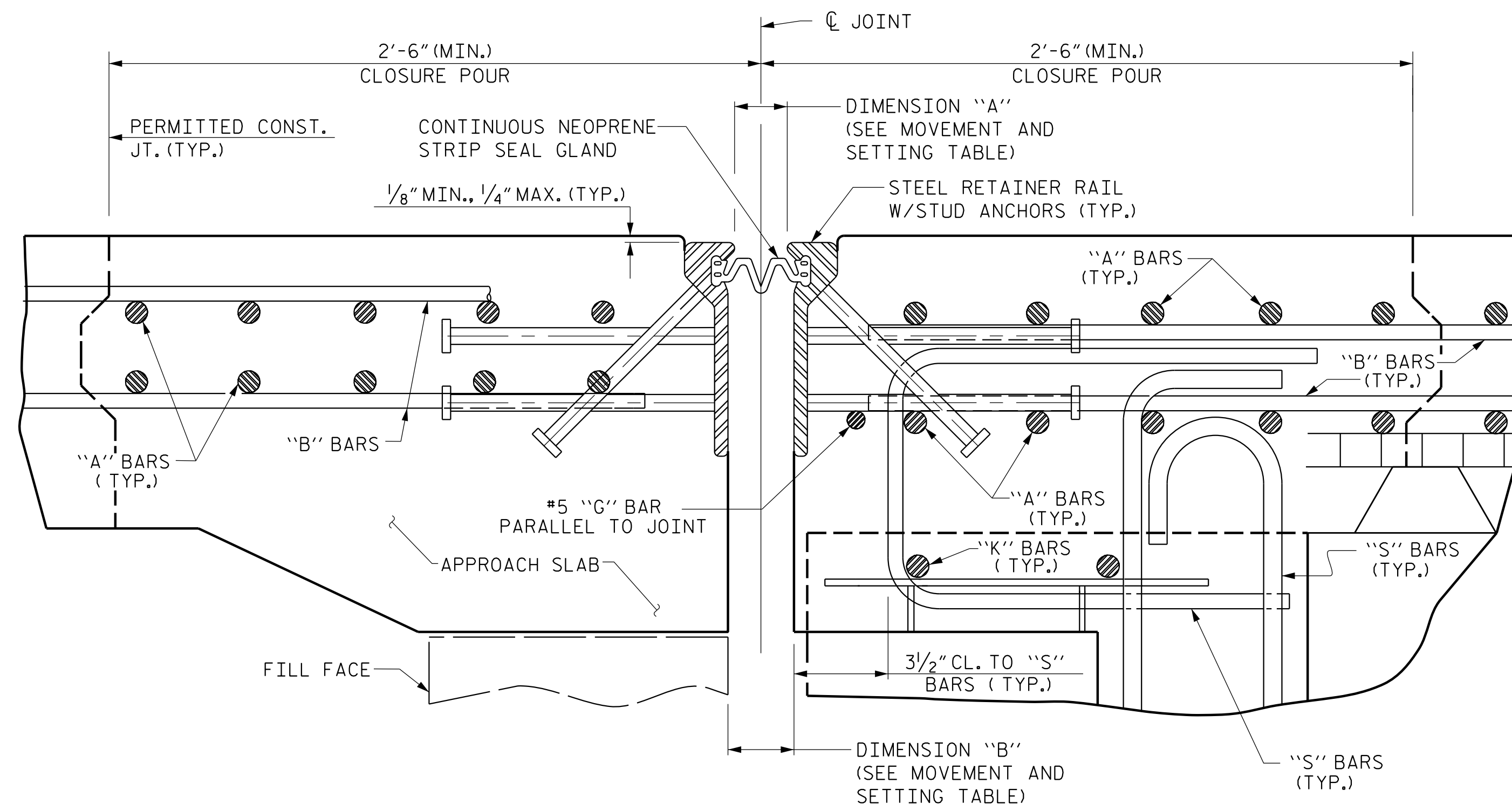
SEAL  
 1414  
 ENGINEER  
 ROBERT C. LARSON  
 NORTH CAROLINA PROFESSIONAL SEAL

5/18/2023

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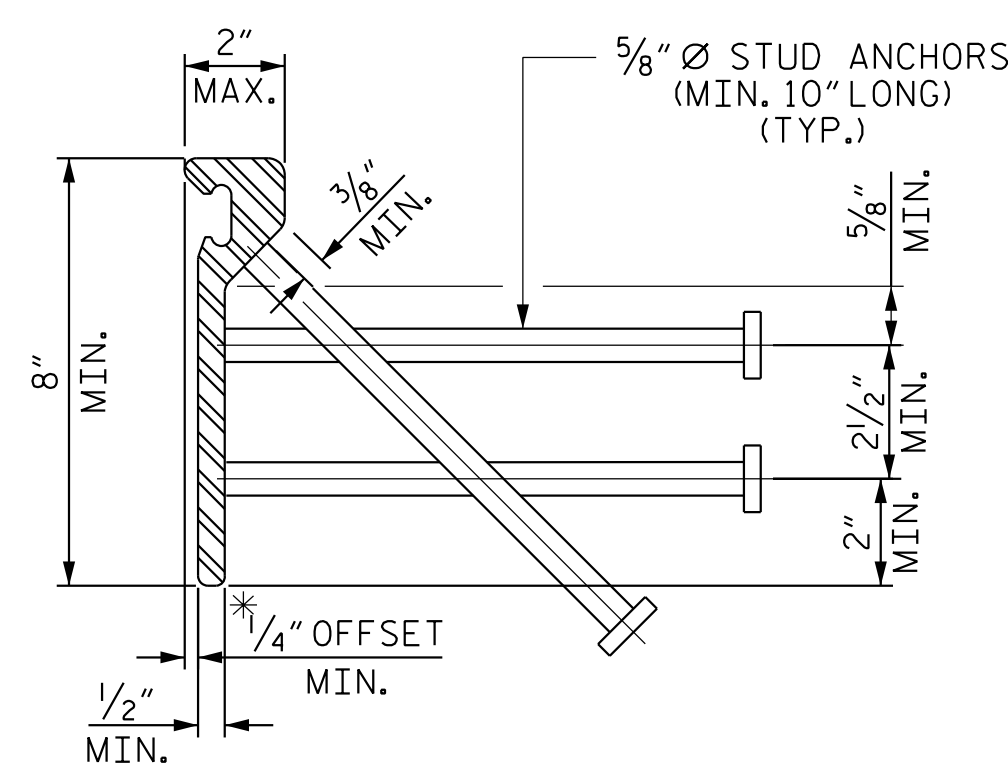
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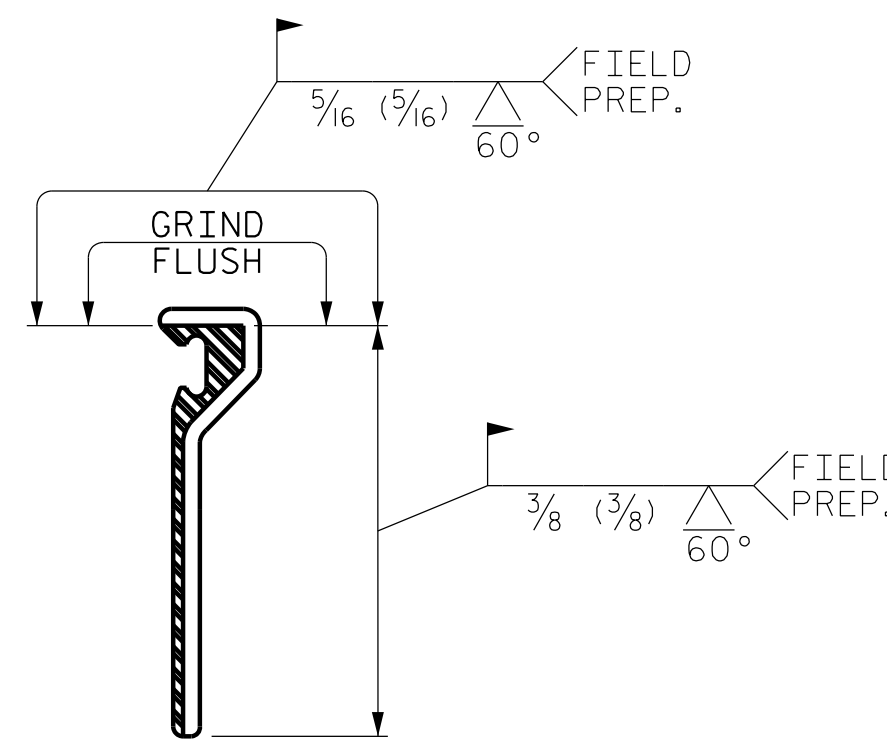
### STRIP SEAL EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

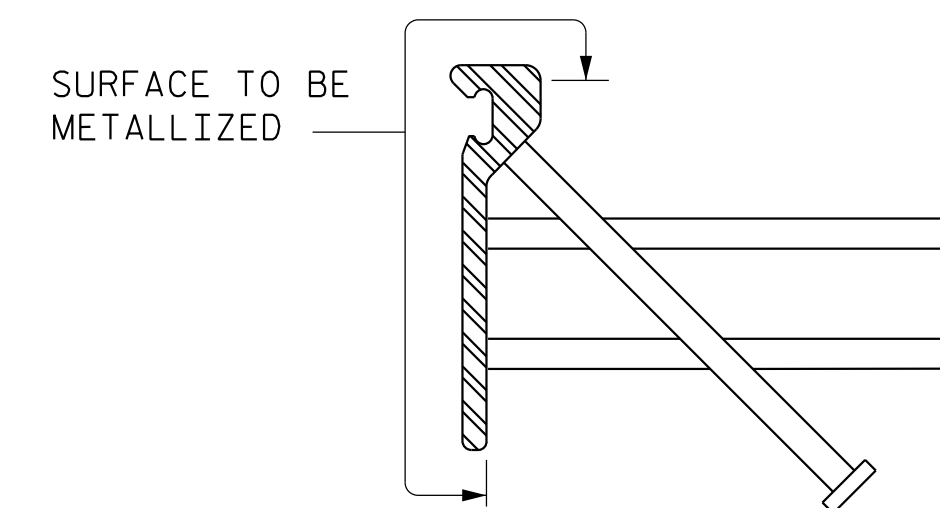


TYPICAL SECTION  
STEEL RETAINER RAIL

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



STEEL RETAINER RAIL  
(FIELD SPLICE DETAIL)



METALLIZING DETAIL

### JOINT INSTALLATION PROCEDURE:

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

### GENERAL NOTES

FOR STRIP SEAL EXPANSION JOINTS, SEE SPECIAL PROVISIONS.

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

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

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

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

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

INSTALLED STEEL RETAINER RAILS SHALL FOLLOW THE ROADWAY SLOPE.

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

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

A TEMPORARY GLAND IS REQUIRED FOR STAGE I. NO SEPARATE PAYMENT WILL BE MADE FOR THE TEMPORARY GLANDS.

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

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

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

#### MOVEMENT AND SETTING AT JOINT

LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG C RDWY)	DIMENSION "A"			DIMENSION "B"		
			PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT 1	56°	9/16"	2 1/16"	2"	1 13/16"	2 9/16"	2 1/2"	2 5/16"
END BENT 2	69°	9/16"	2 1/16"	2"	1 13/16"	2 9/16"	2 1/2"	2 5/16"

DRAWN BY : J.M. DAVIS DATE : 1/23  
 CHECKED BY : R.C. LARSON DATE : 1/23  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

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 CARY, NC 27518  
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 ENGINEER  
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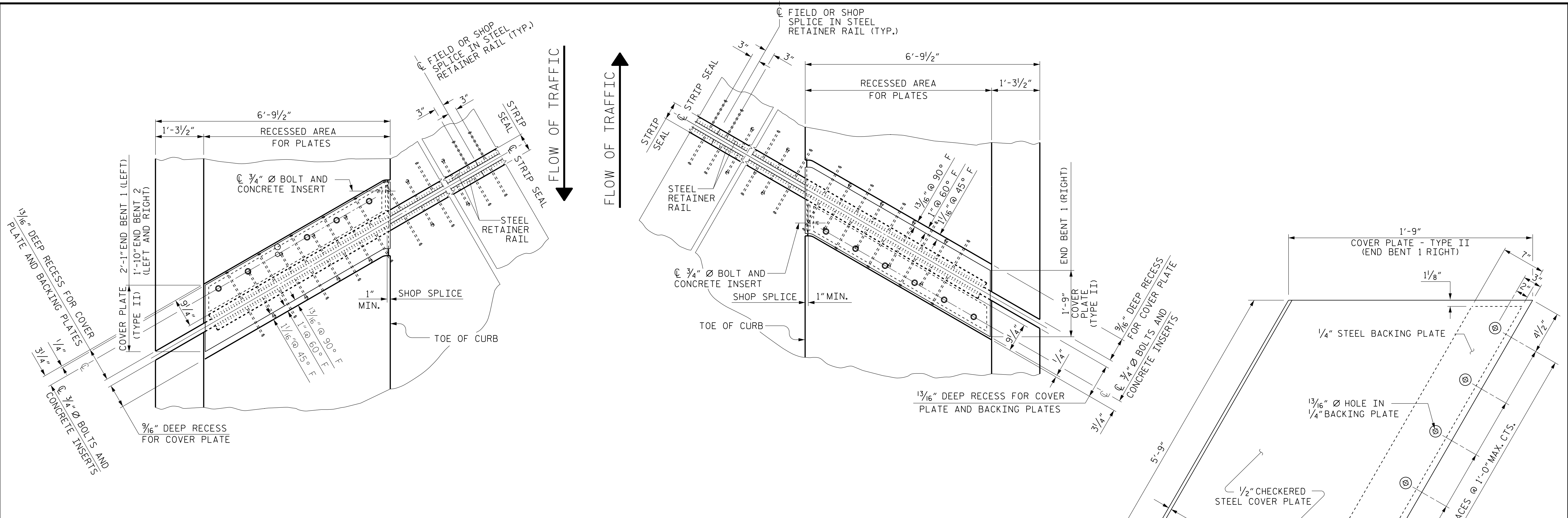
PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 1 OF 3

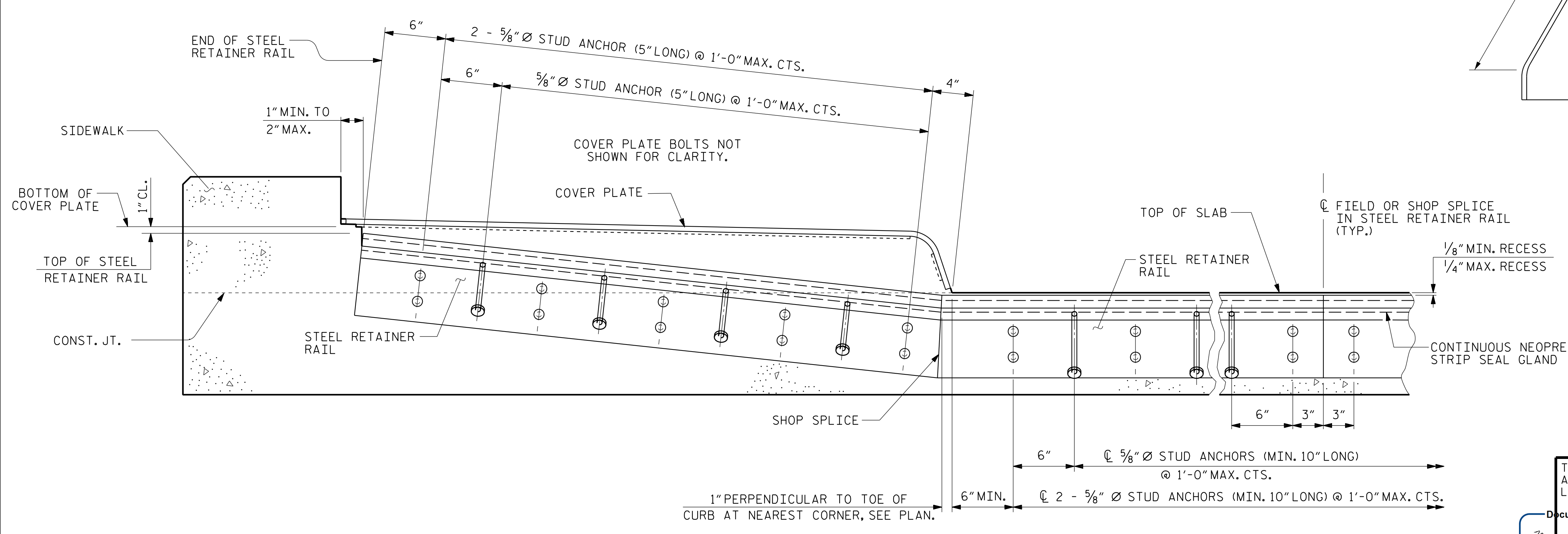
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 STRIP SEAL EXPANSION  
 JOINT DETAILS

REVISIONS						SHEET NO.
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1			3			63
2			4			

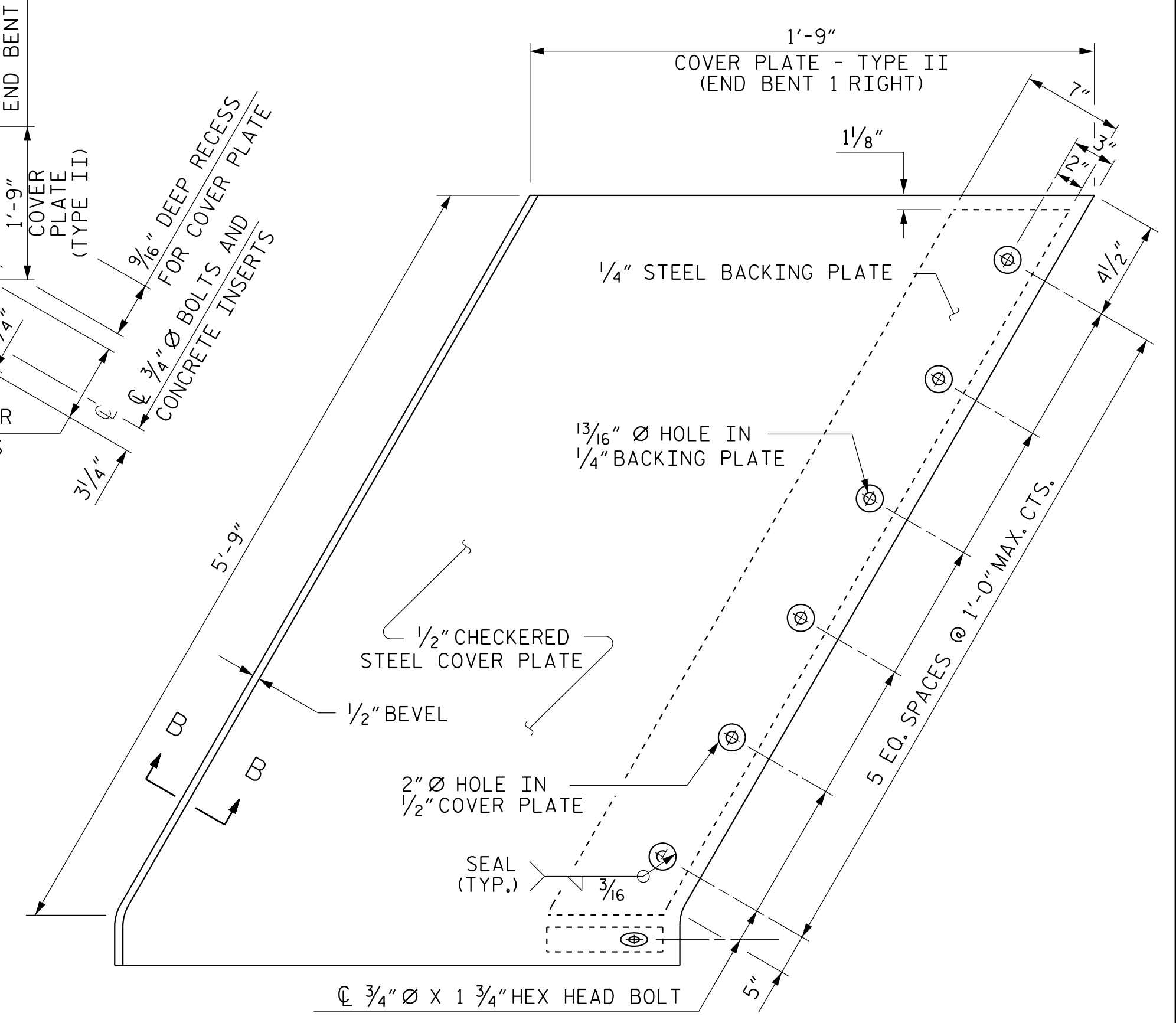
STD. NO. SSEJ1



PLAN OF STRIP SEAL EXPANSION JOINT



SECTION THRU SIDEWALK NORMAL TO JOINT



TYPE II - PLAN VIEW  
(1 REQ'D)  
COVER PLATE DETAILS

PROJECT NO. U-5839

HAYWOOD COUNTY

STATION: 24+64.13 -L- POC

SHEET 2 OF 3

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

REVISIONS				SHEET NO.	
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2			4		

TOTAL SHEETS: 63

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NORTH CAROLINA PROFESSIONAL SEAL 1414 ENGINEER

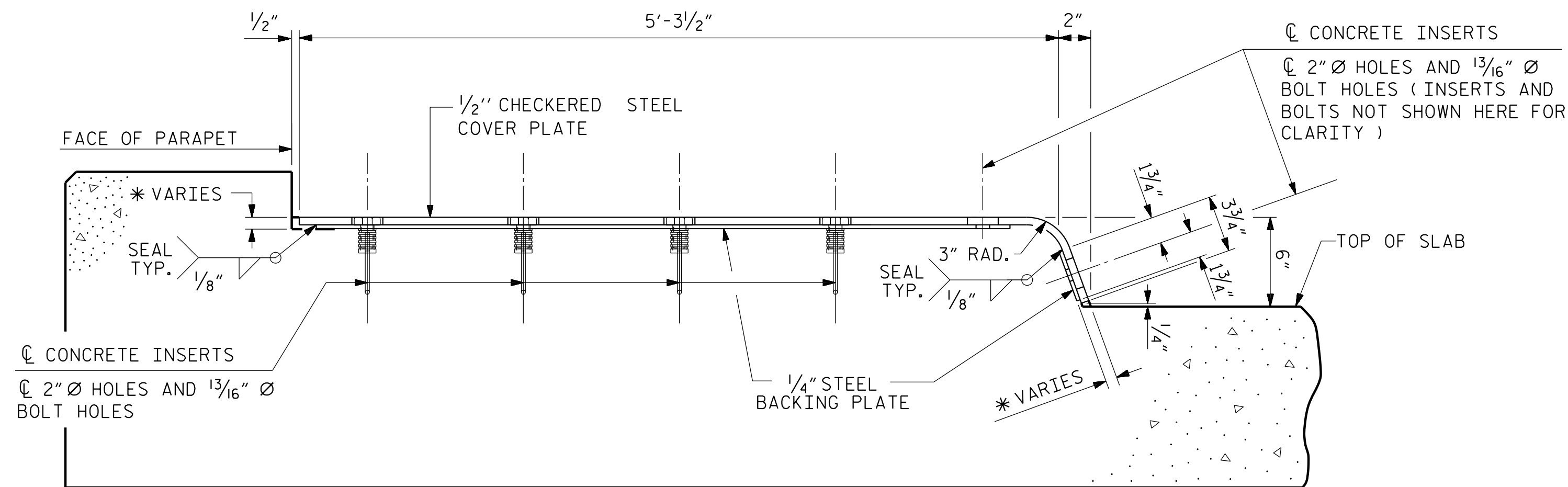
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STD. NO. SSEJ3 SHT 2



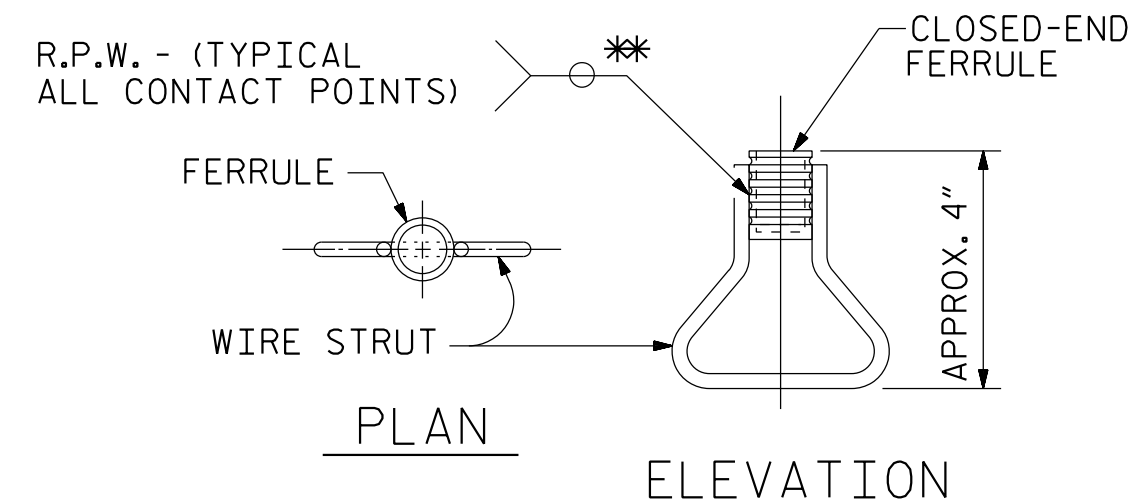
**END VIEW**

(NORMAL TO SIDEWALK)

\* CONCRETE RECESS DIMENSIONS:

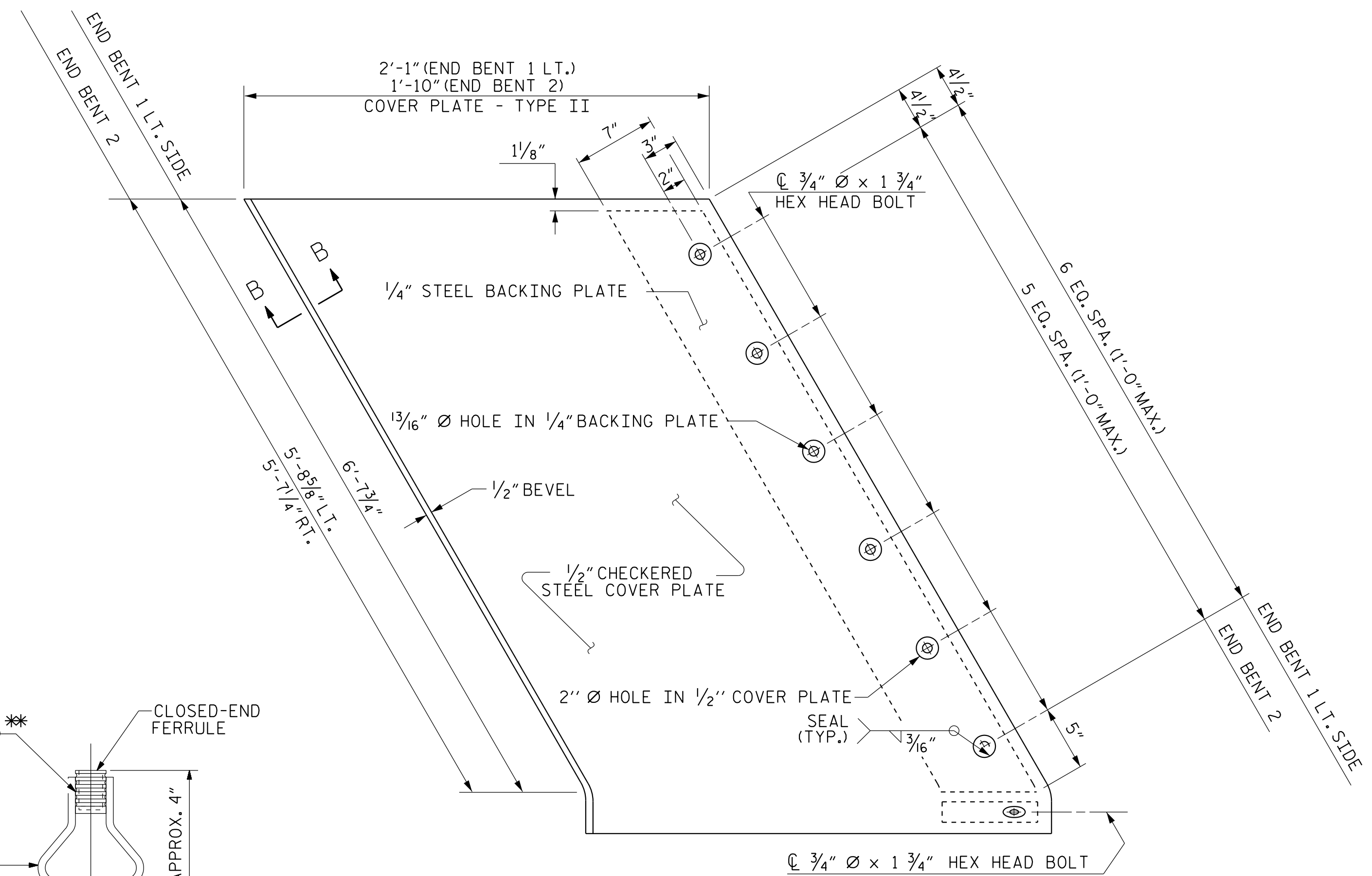
1 3/16" FOR THE SIDE OF THE JOINT HAVING THE 1/2" COVER PLATE WITH A 1/4" BACKING PLATE.

9/16" FOR THE SIDE OF THE JOINT HAVING ONLY THE 1/2" COVER PLATE.



**CONCRETE INSERT**

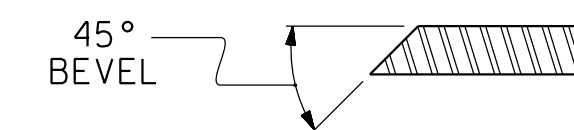
\*\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



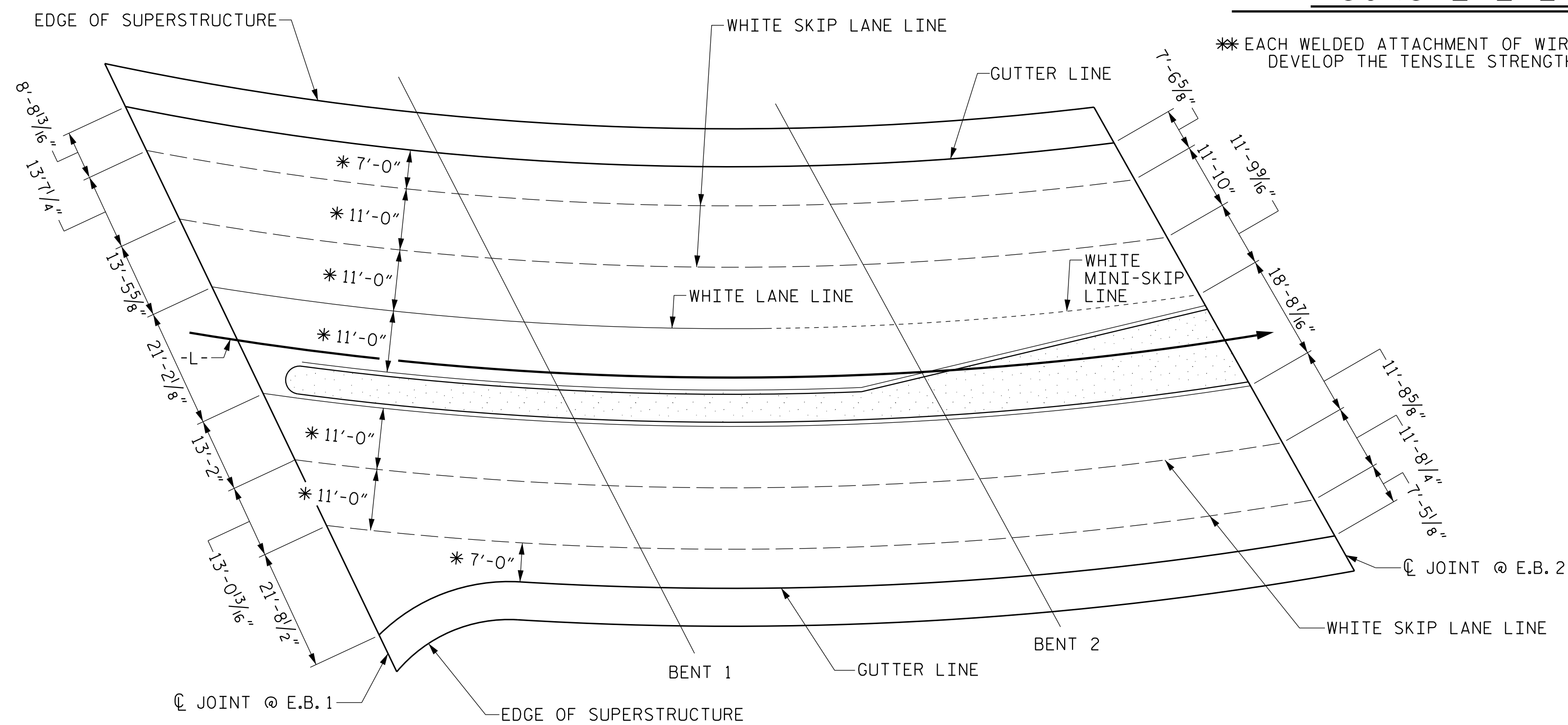
**TYPE II - PLAN VIEW**

(3 REQ'D)

**COVER PLATE DETAILS**



**SECTION B - B**



**PAVEMENT MARKING ALIGNMENT**

\* DENOTES RADIAL DIMENSION

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 3 OF 3

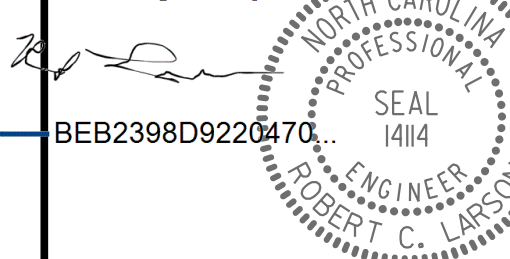
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**STANDARD STRIP SEAL EXPANSION JOINT DETAILS FOR SIDEWALK**

REVISIONS						SHEET NO.
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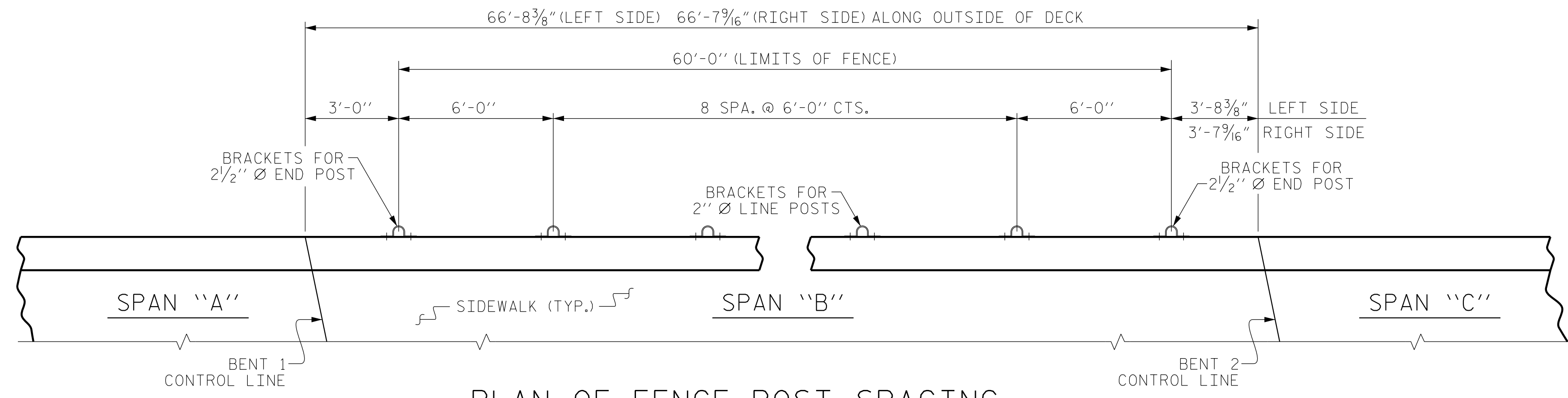


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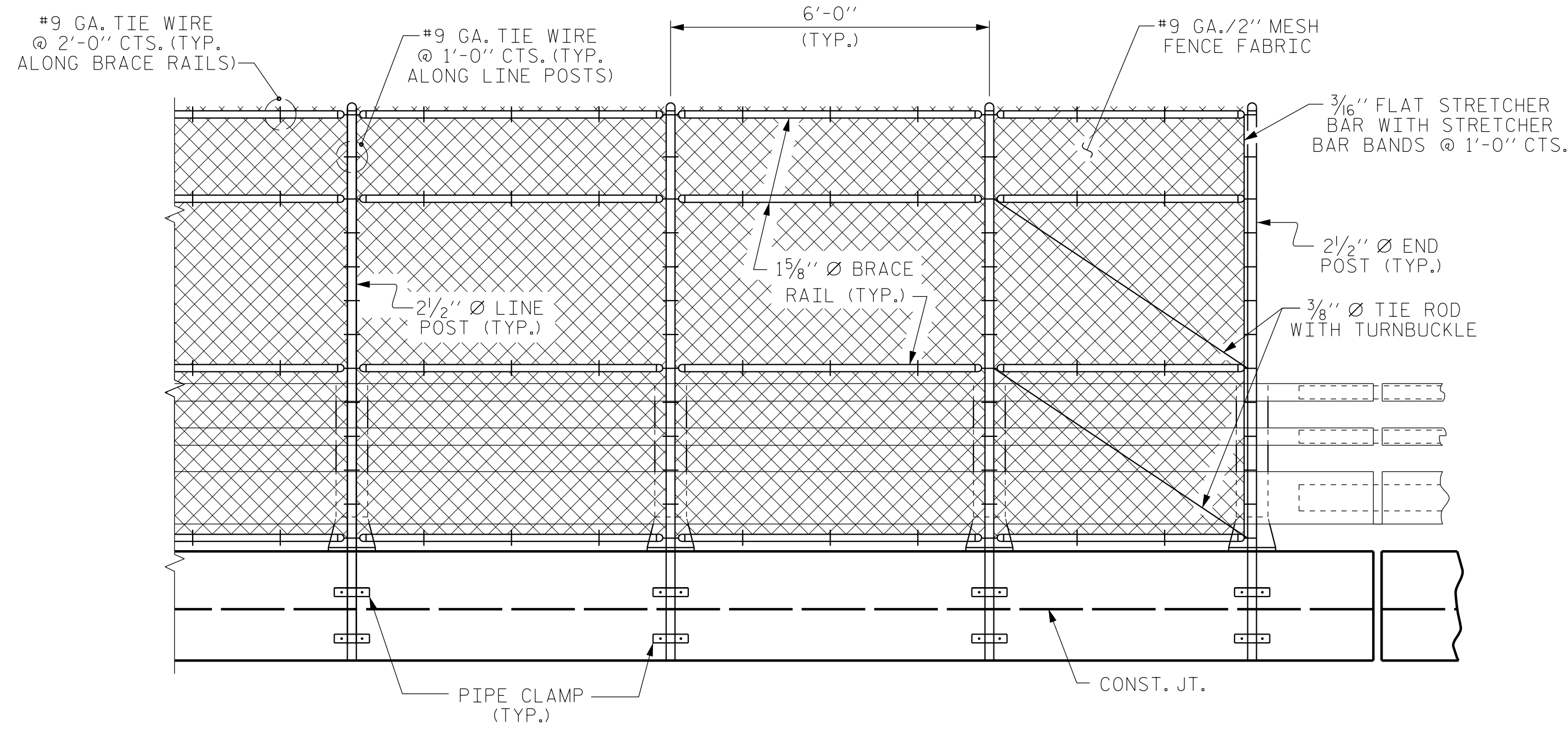
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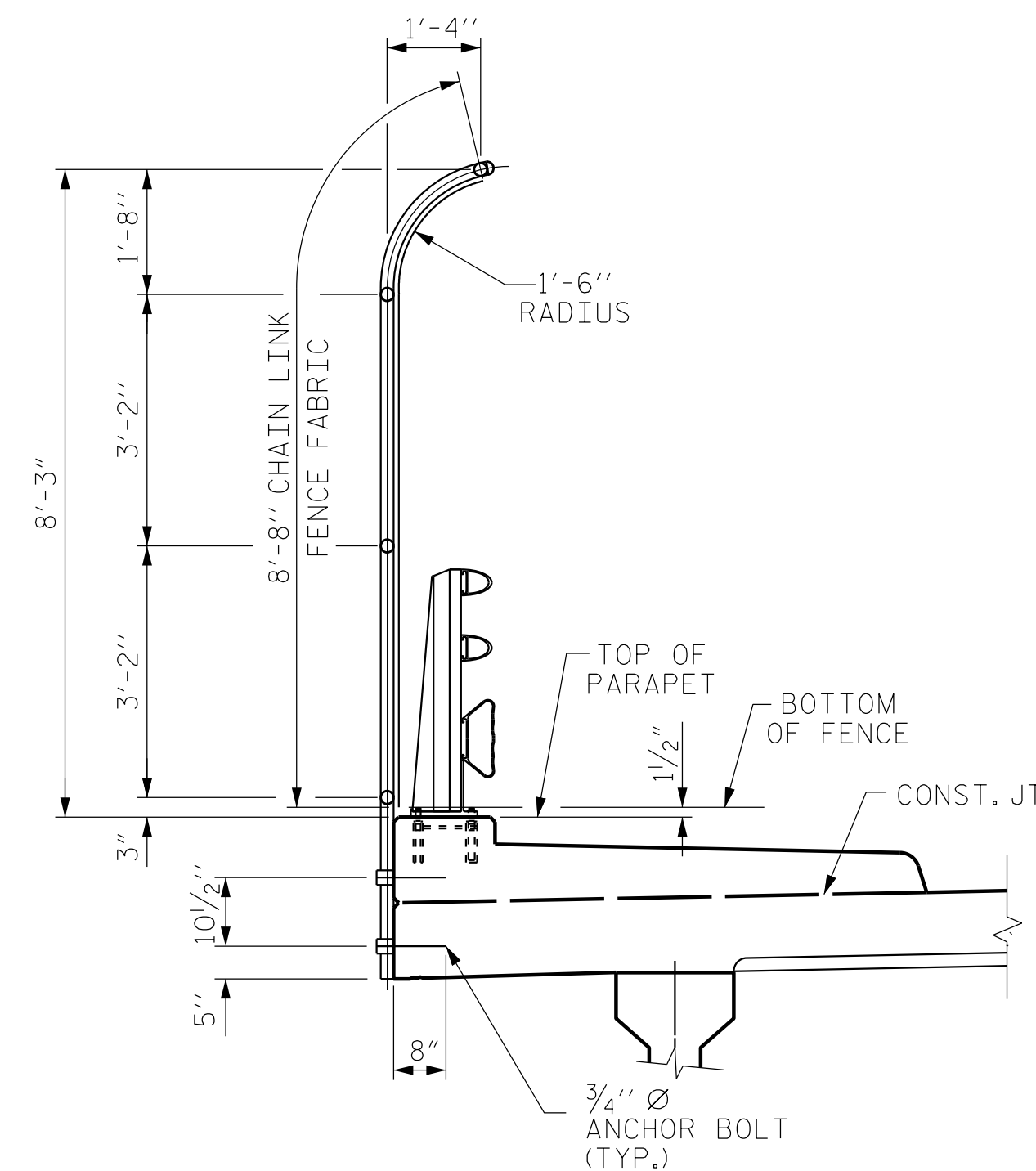


**PLAN OF FENCE POST SPACING**

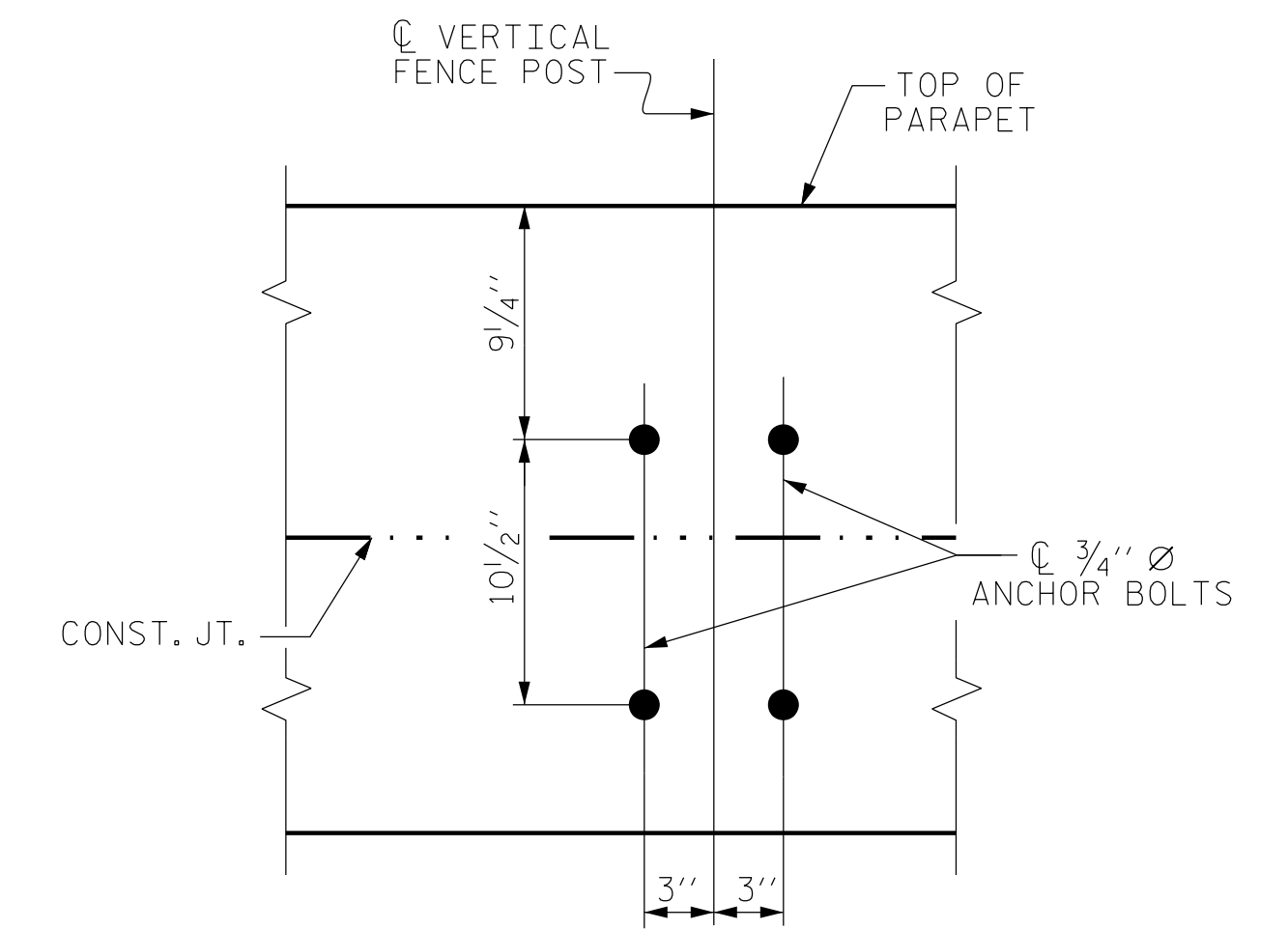
PAY LENGTH = 120.00 LIN. FT.



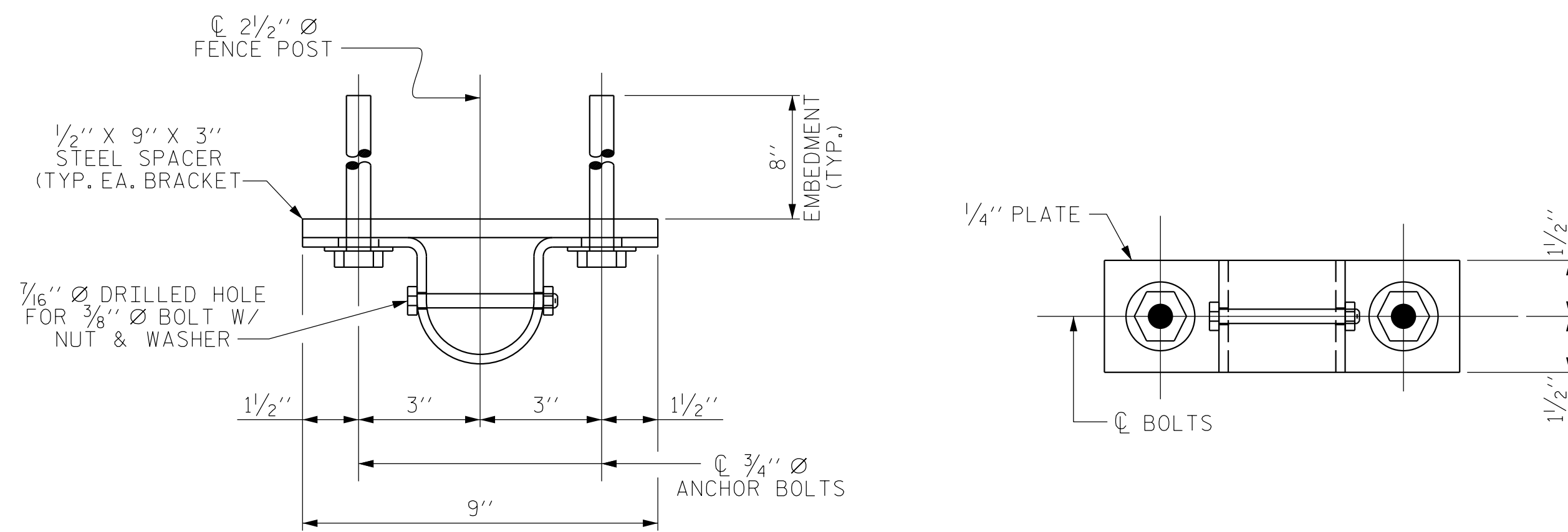
**PARTIAL ELEVATION**



**SECTION THRU FENCE**



**BOLT SETTING PLAN**



**PLAN**

**ELEVATION**

**PIPE CLAMP DETAILS**

**NOTES**

FOR BRIDGE MOUNTED CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.  
 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 3/4" 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.)  
 FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. SEE SPECIAL PROVISIONS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS. LEVEL ONE TESTING OF BONDING SYSTEM IS REQUIRED AND THE YIELD LOAD OF THE 3/4" Ø BOLTS IS 12 KIPS.  
 ALL FENCE MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS. GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC =  
15+58.95 -Y6- POC

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 BRIDGE MOUNTED  
 CHAIN LINK FENCE

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1			3			63
2			4			

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 CHECKED BY: Z. H. BROWN DATE: 4/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

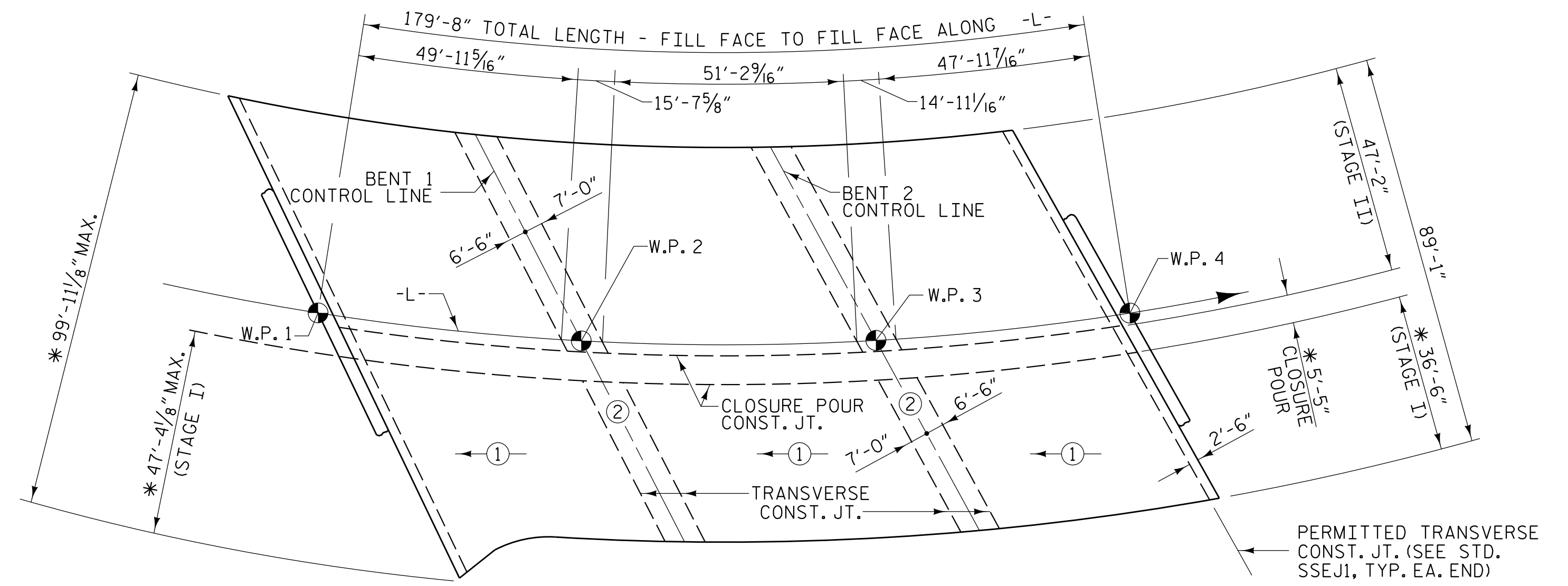
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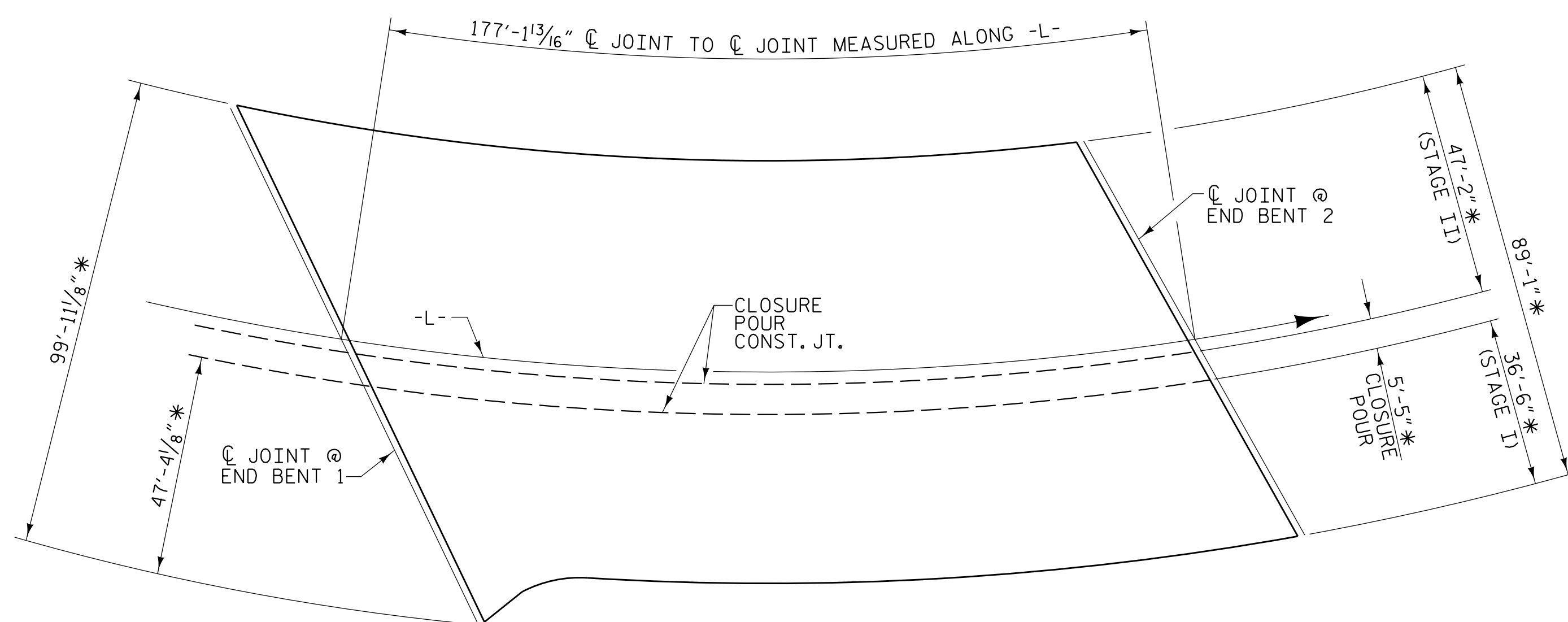




**POURING SEQUENCE SKETCH**

← ⊕ → INDICATES POUR SEQUENCE AND DIRECTION  
 NOTE: POUR ② CANNOT BE STARTED UNTIL BOTH ADJACENT POURS ① REACH MINIMUM OF 3000 PSI

\* RADIAL DIMENSIONS



**LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB**

(TOTAL SQ. FT. = 15900)  
 (STAGE I = 6575 SQ. FT.)  
 (STAGE II = 9325 SQ. FT. INCLUDES CLOSURE POUR)

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	* EPOXY COATED REINFORCING STEEL (LBS.)
STAGE I			
POUR 1	187.0		
POUR 2	34.4		
TOTAL, STAGE I	221.4	29,178	26,386
STAGE II			
POUR 1	233.7		
POUR 2	45.2		
CLOSURE POUR	35.6		
TOTAL, STAGE II	314.5	39,199	34,405
SIDEWALK	56.2		3166
END POSTS	1.8		-
MONO. CONC. ISLAND	17.1		916
TOTALS	611.0	68,377	64,873

GROOVING BRIDGE FLOORS		
APPROACH SLABS (STAGE I)	1819	SQ. FT.
APPROACH SLABS (STAGE II)	1754	SQ. FT.
TOTAL	3573	SQ. FT.
BRIDGE DECK (STAGE I)	4838	SQ. FT.
BRIDGE DECK (STAGE II)	6346	SQ. FT.
TOTAL	11,184	SQ. FT.

PLANS PREPARED BY:

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 CARY, NC 27518  
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 NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
 ENGINEER  
 5/18/2023

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PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE BILL OF MATERIAL**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-40
1			3			TOTAL SHEETS
2			4			63

DRAWN BY: W. B. ALLEN DATE: 1/20  
 CHECKED BY: Z. H. BROWN DATE: 2/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:

REB230829220470

NOTES

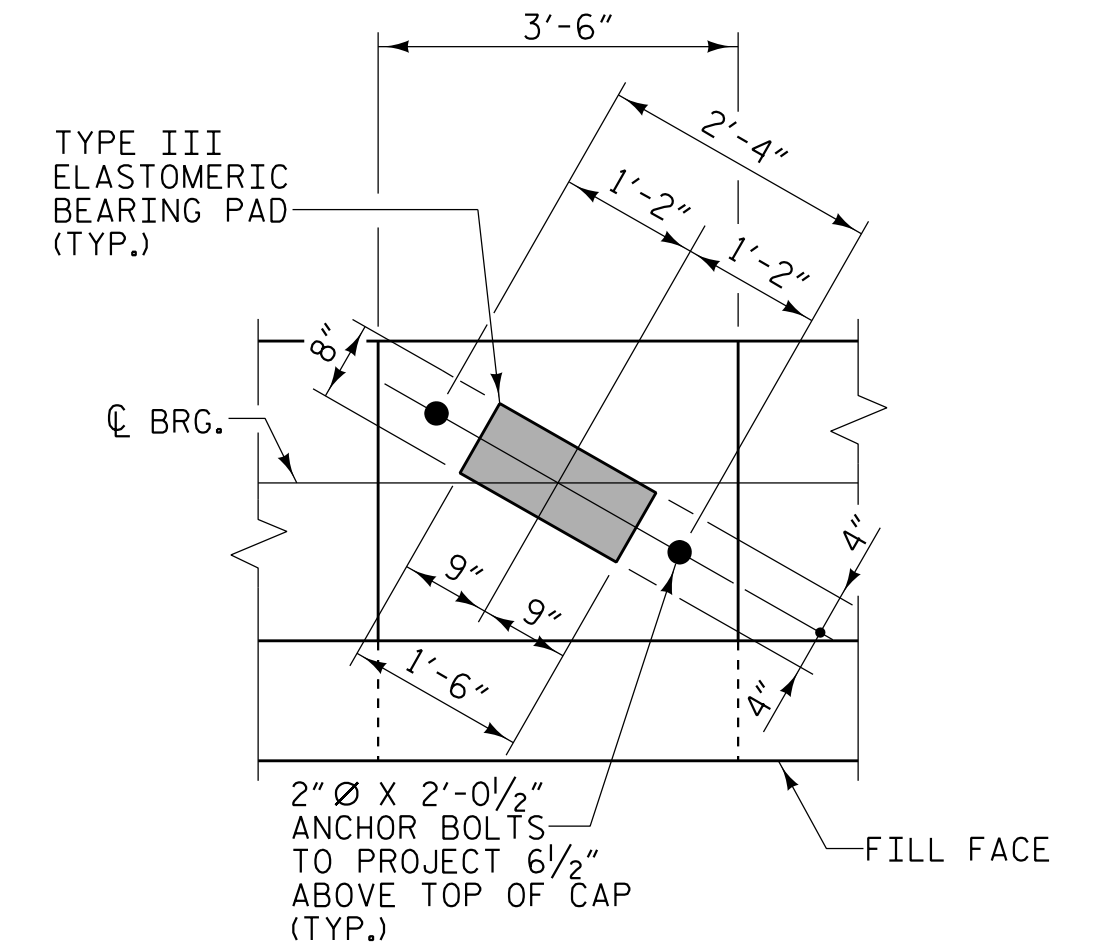
STIRRUPS AND U2 BARS IN THE CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREA OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

FOR "PILE SPLICE DETAILS", SEE END BENT 2.



DETAIL "A"  
(TYP. EACH GIRDER)

TOP OF PILE ELEVATIONS	
PILE NO.	ELEVATION
8	2651.02
9	2651.11
10	2651.23
11	2651.36
12	2651.48
13	2651.61
14	2651.73

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

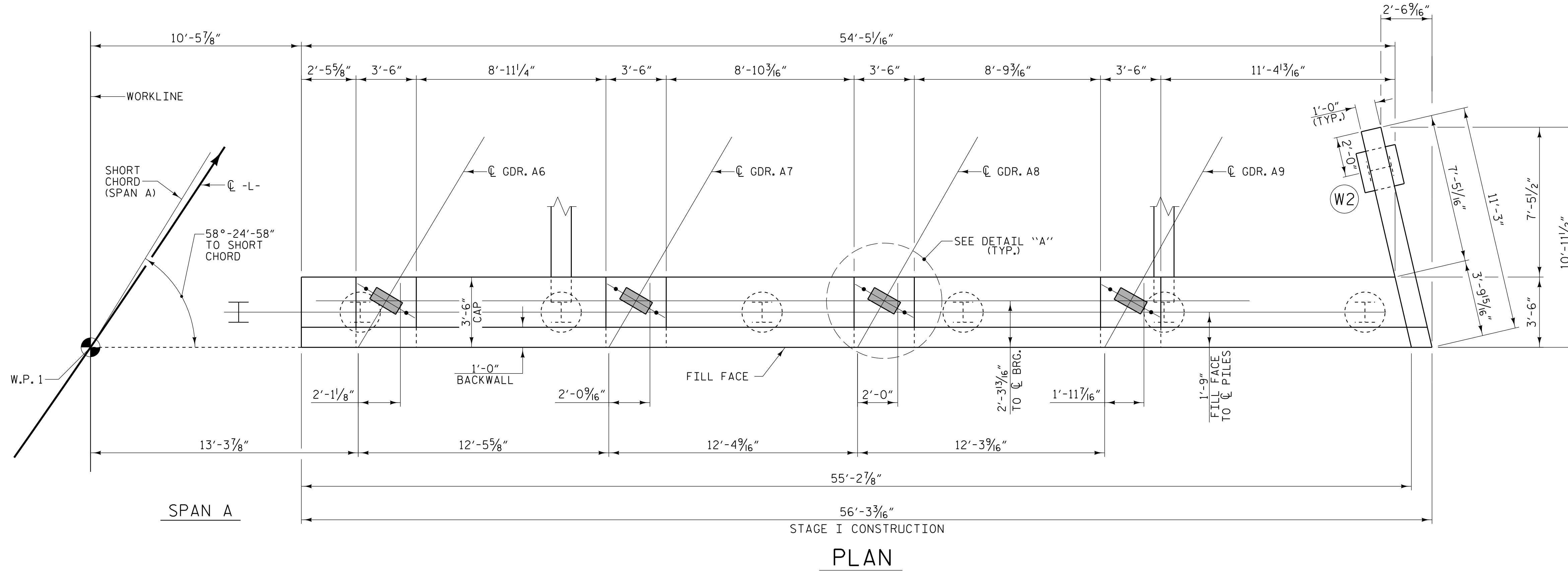
SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

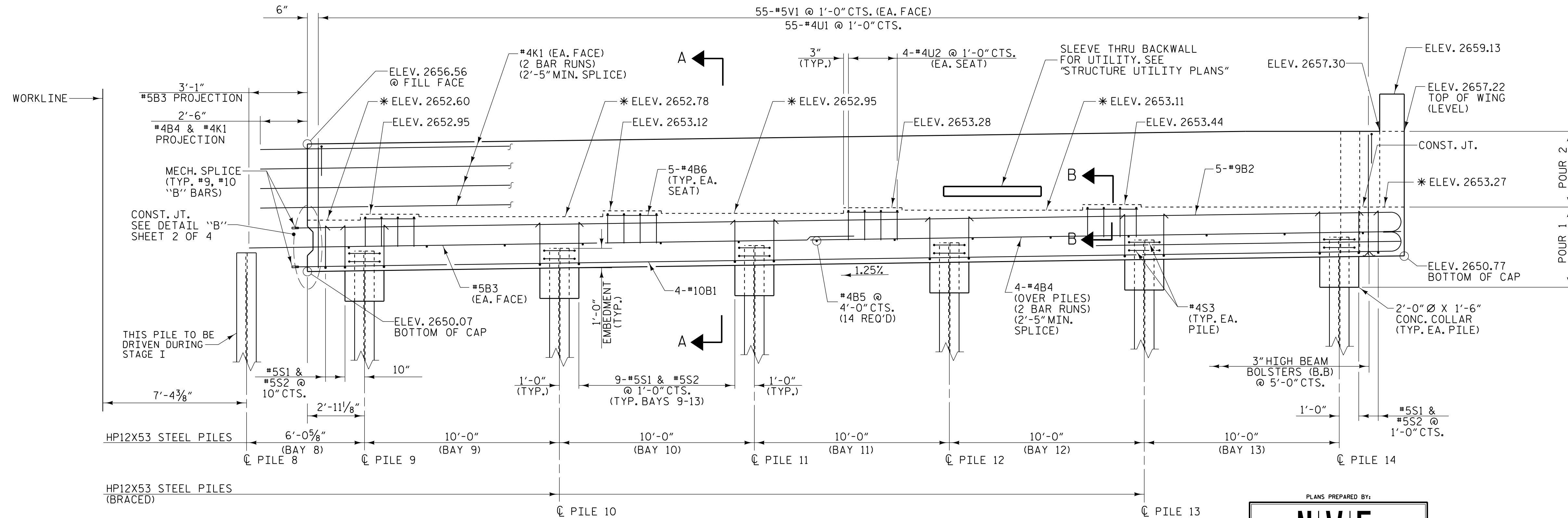
SUBSTRUCTURE  
 END BENT 1  
 STAGE I

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

SHEET NO. S1-41  
 TOTAL SHEETS 63



PLAN



ELEVATION

(FOR SECTIONS A-A AND B-B,  
 SEE SHEET 4 OF 4)

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A SHEET 4 OF 4.

PLANS PREPARED BY:

**NV5**

NV5 ENGINEERS & CONSULTANTS, INC.  
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*[Signature]*

BB239809220470

SEAL  
 1414  
 ENGINEER  
 ROBERT C. LARSON  
 NC License # 1414

5/18/2023

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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

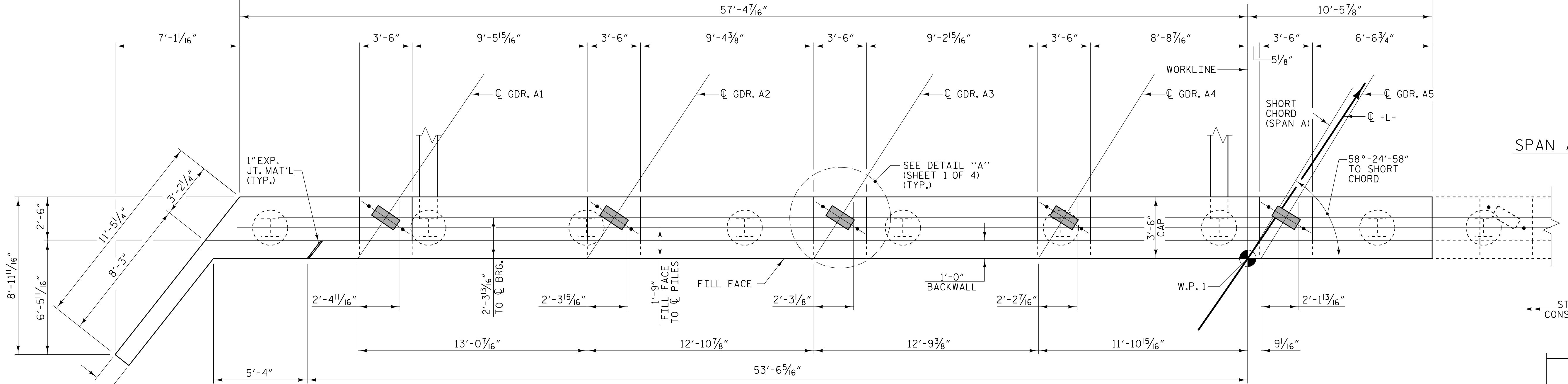
DocuSigned by:

*[Signature]*

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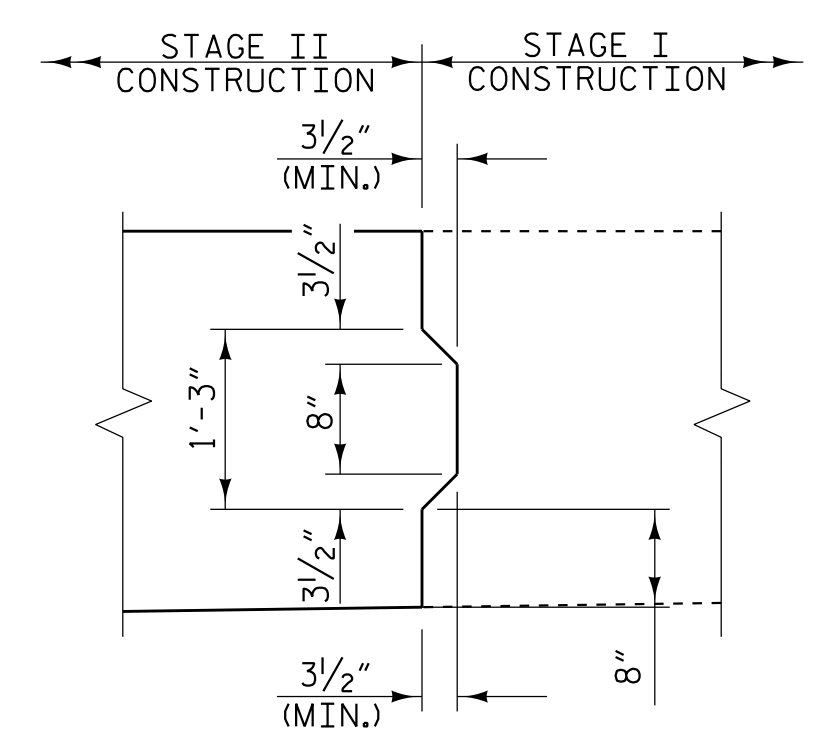
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67'-10 5/16" STAGE II CONSTRUCTION



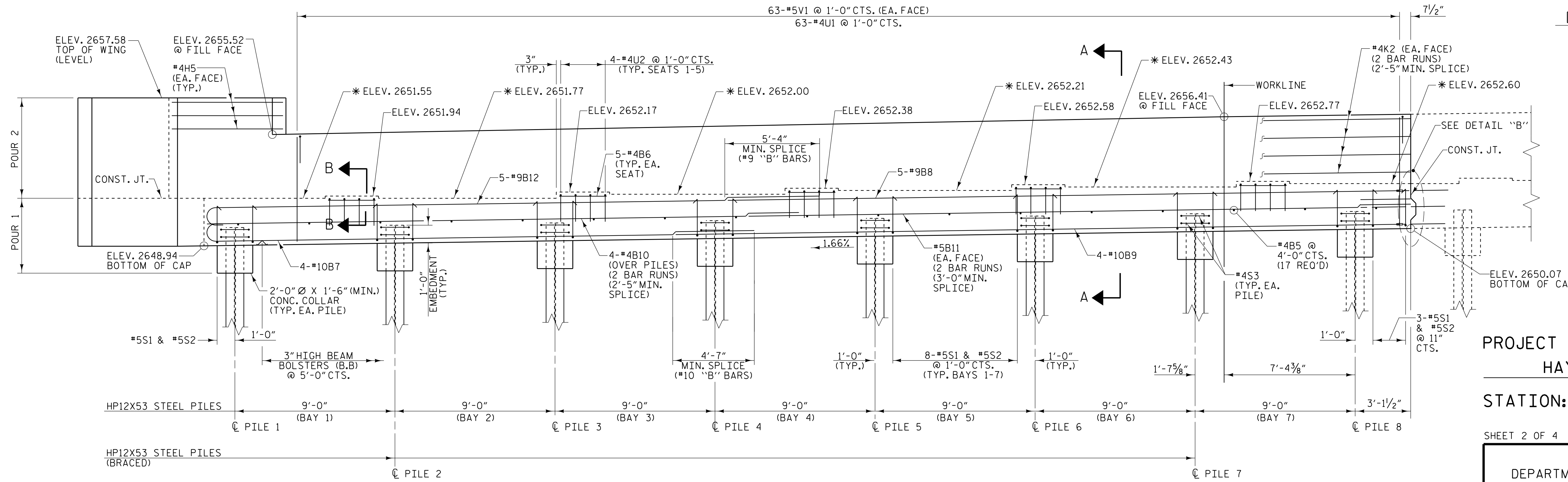
PLAN

SPAN A



DETAIL "B"

63-#5V1 @ 1'-0" CTS. (EA. FACE)  
63-#4U1 @ 1'-0" CTS.



TOP OF PILE ELEVATIONS	
PILE NO.	ELEVATION
1	2649.97
2	2650.12
3	2650.27
4	2650.42
5	2650.56
6	2650.71
7	2650.87

ELEVATION  
(FOR SECTIONS A-A AND B-B,  
SEE SHEET 4 OF 4)

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A SHEET 4 OF 4.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
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RALEIGH

SUBSTRUCTURE  
END BENT 1  
STAGE II

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Robert C. Larson

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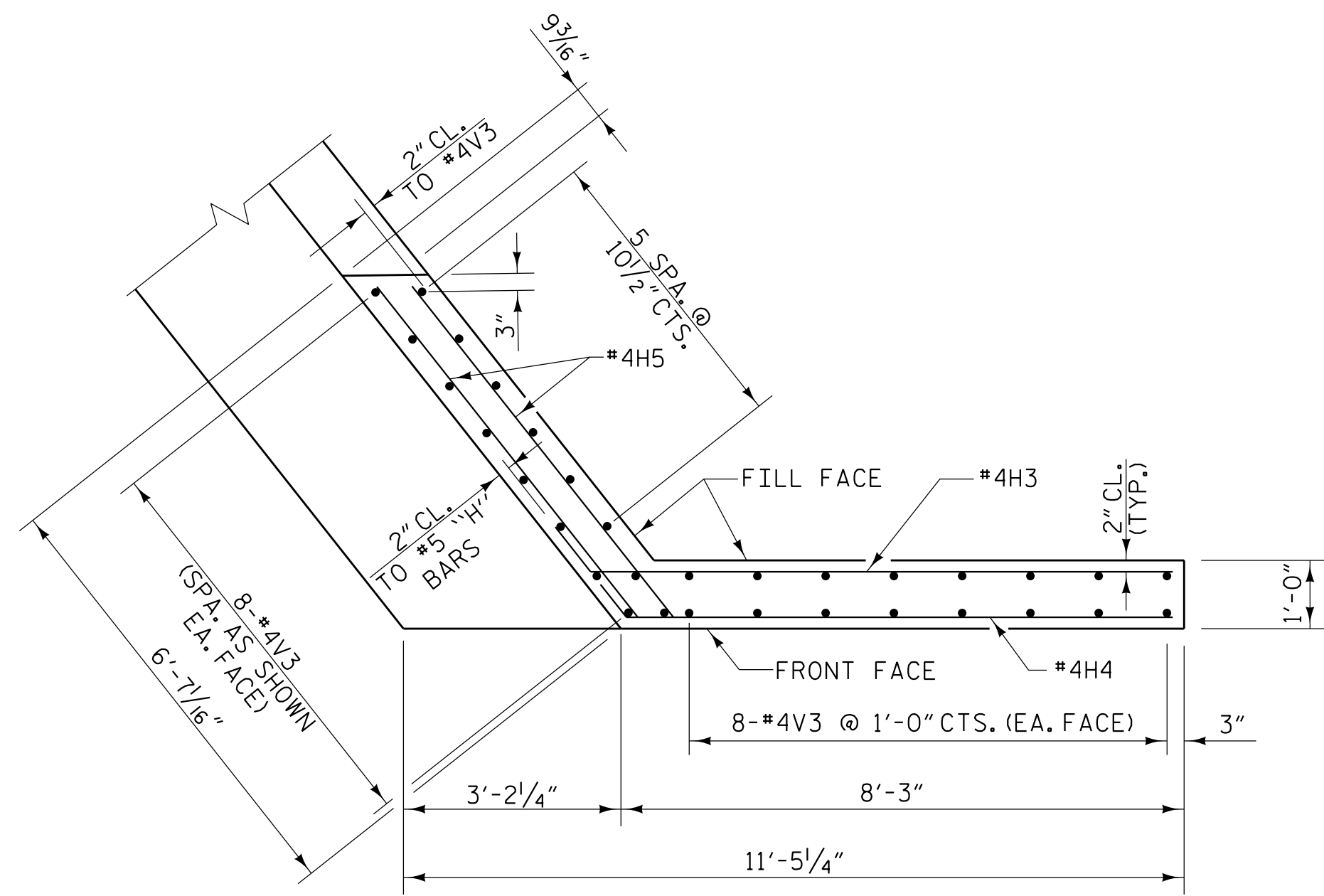
SEAL  
1414  
ENGINEER  
ROBERT C. LARSON  
5/18/2023

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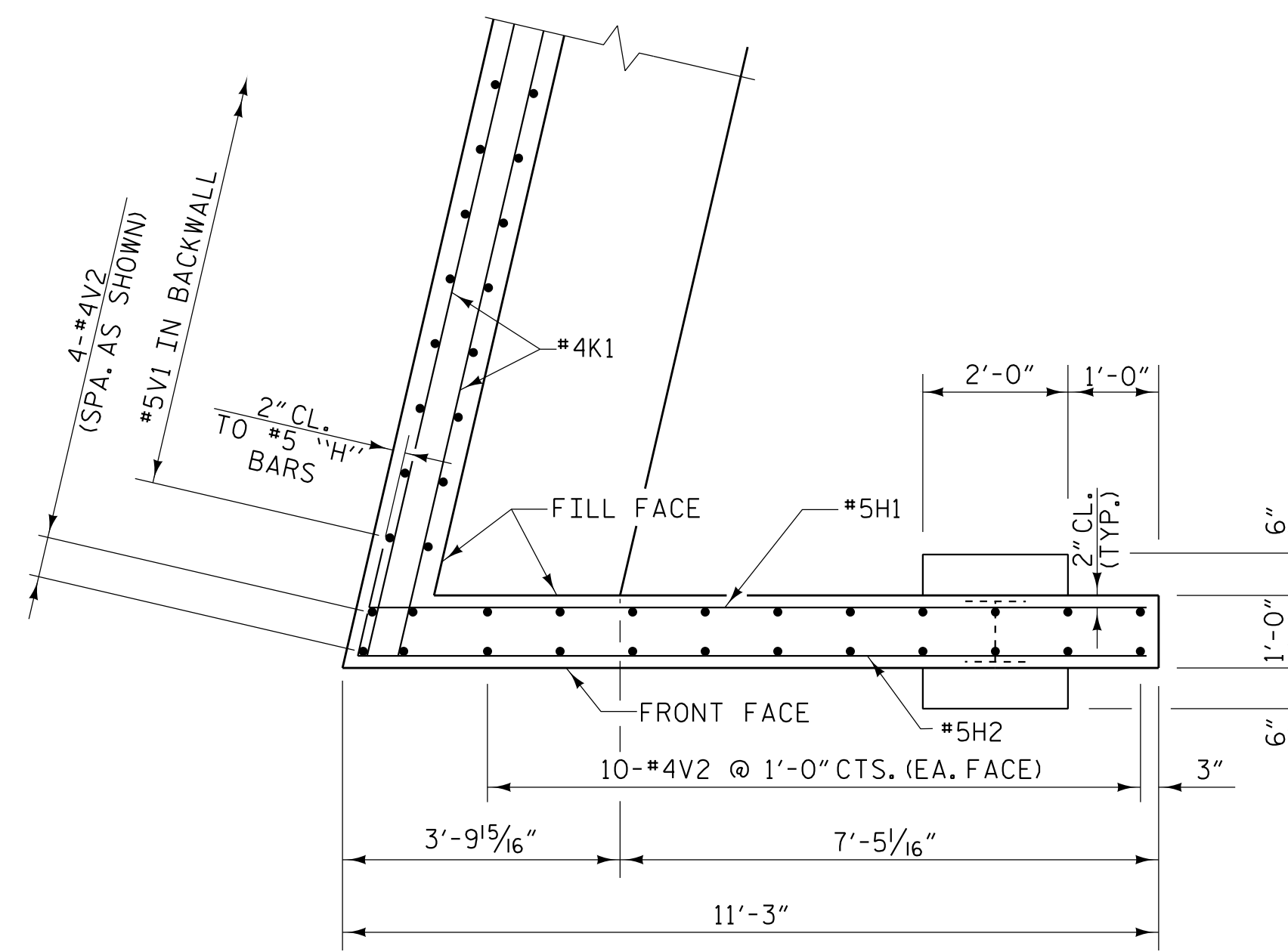
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-42	
1			3			TOTAL SHEETS	
2			4			63	

DRAWN BY: W. B. ALLEN DATE: 5/20  
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DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

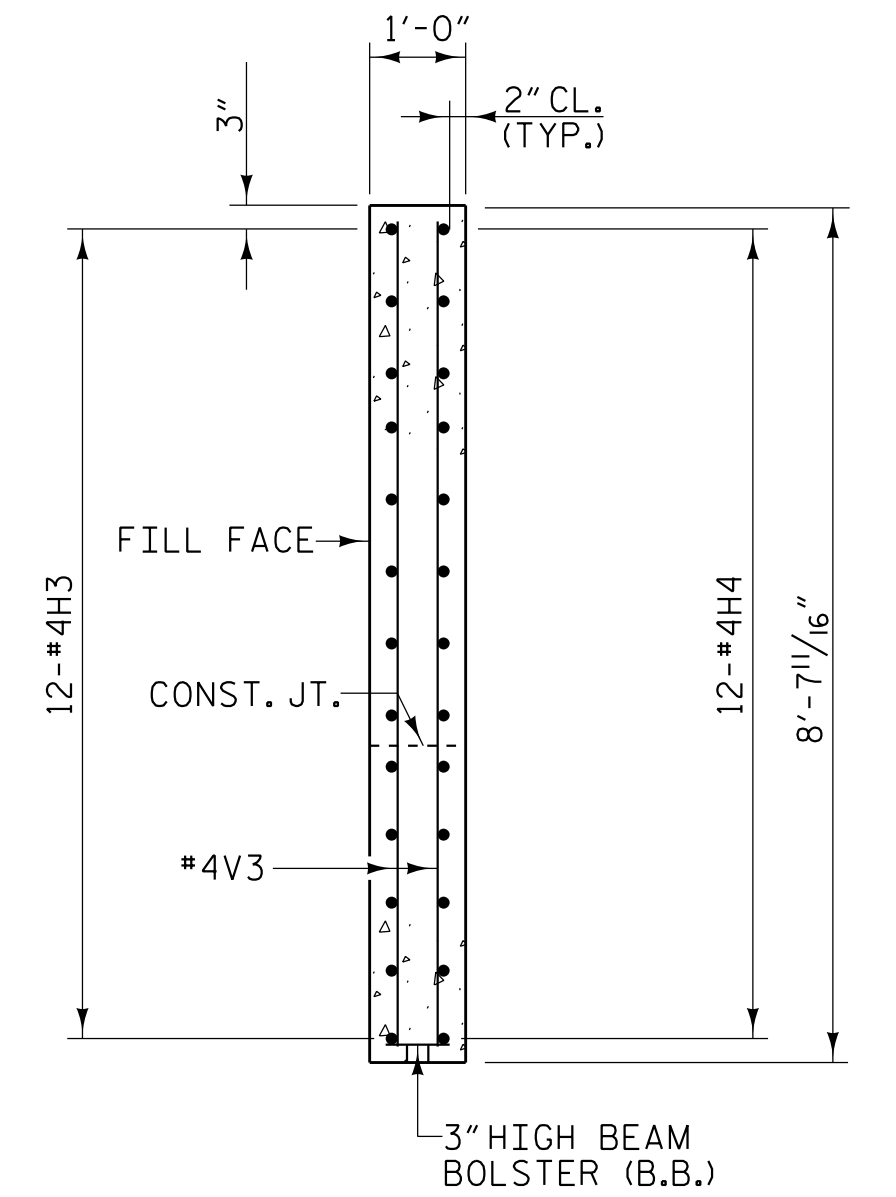
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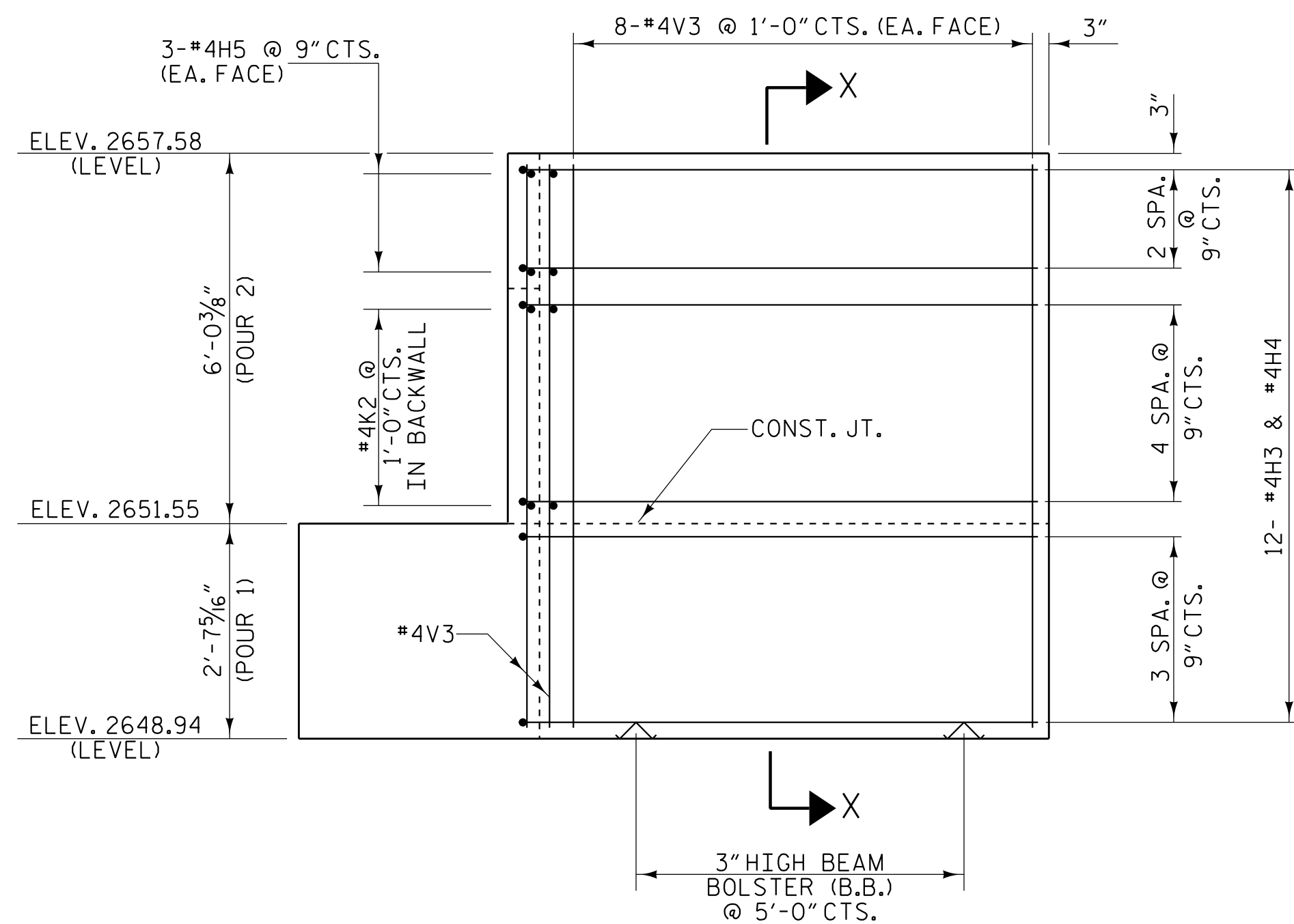
PLAN OF LEFT WING - W1  
(STAGE II CONSTRUCTION)



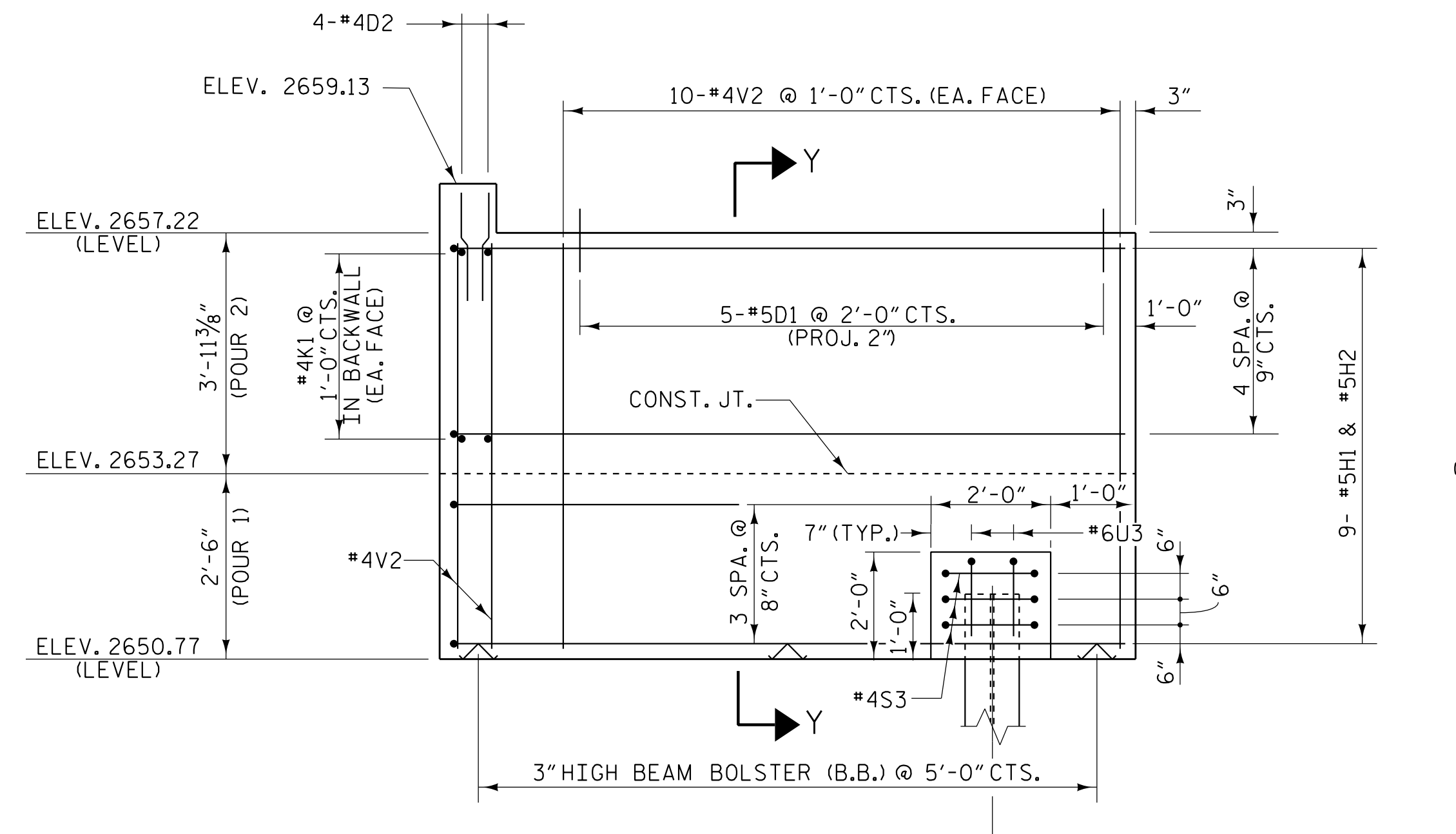
PLAN OF RIGHT WING - W2  
(STAGE I CONSTRUCTION)



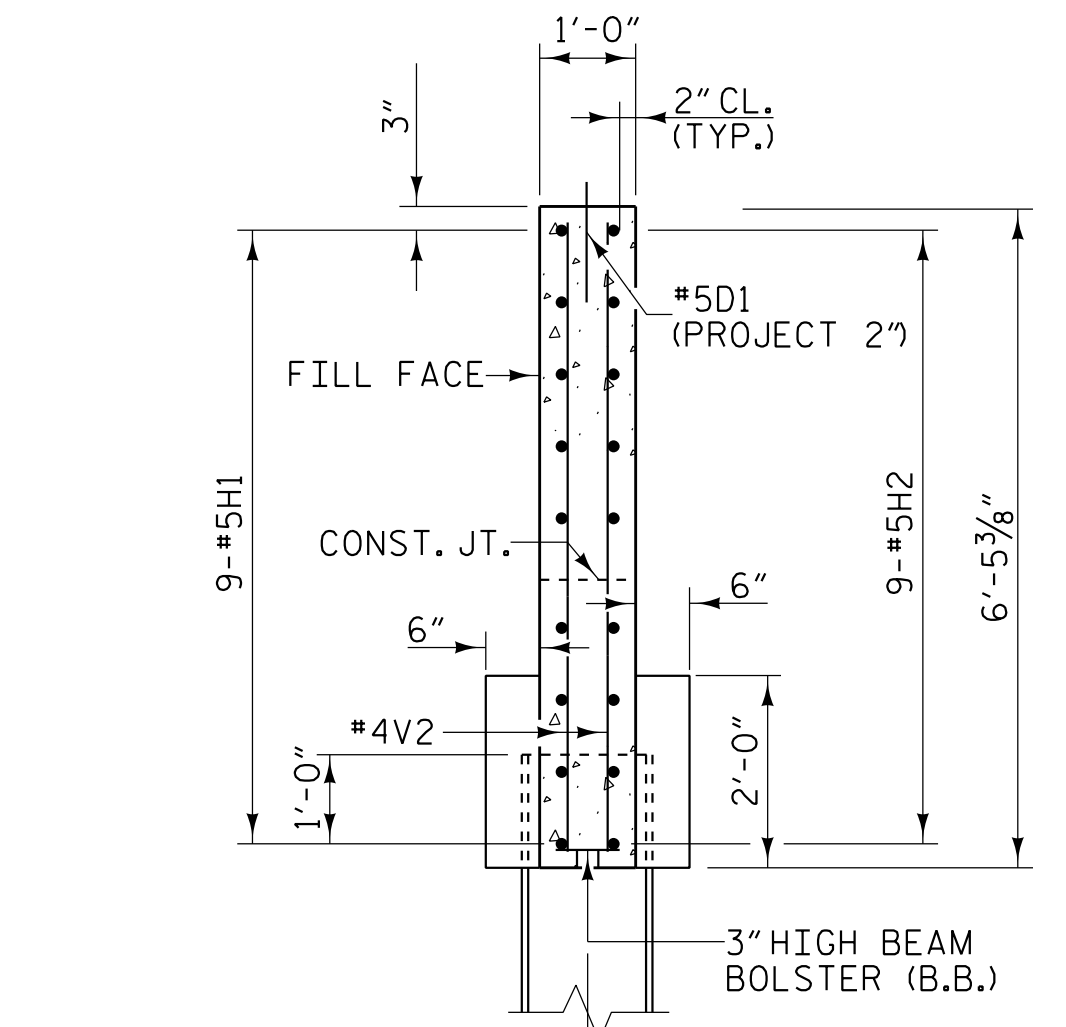
SECTION X-X



ELEVATION OF LEFT WING - W1  
(STAGE II CONSTRUCTION)



ELEVATION OF RIGHT WING - W2  
(STAGE I CONSTRUCTION)



SECTION Y-Y

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 3 OF 4

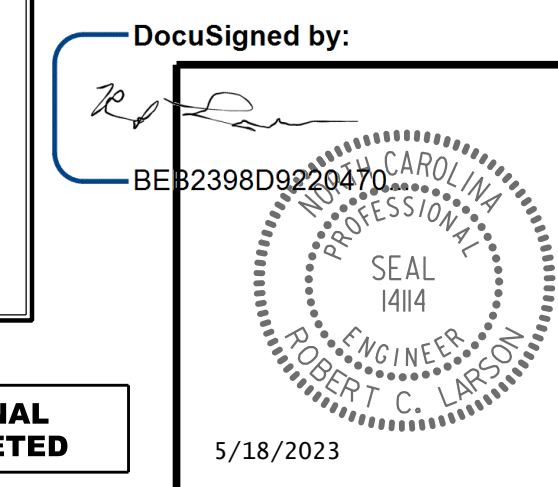
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 1  
WING DETAILS

REVISIONS

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

SHEET NO.  
S1-43  
TOTAL SHEETS  
63

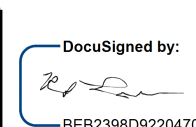


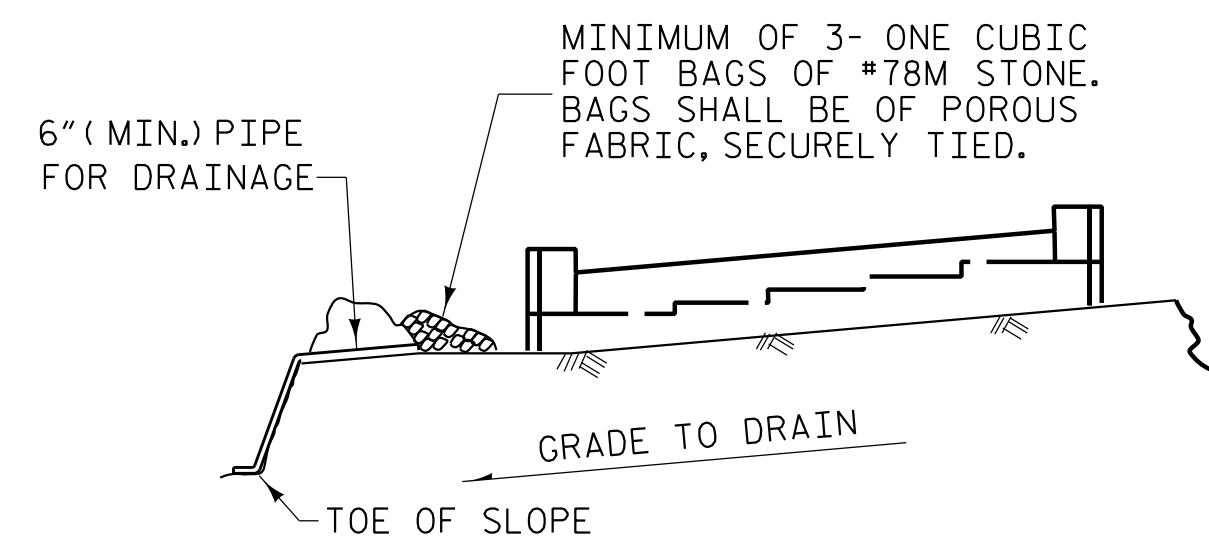
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5/18/2023

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DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23



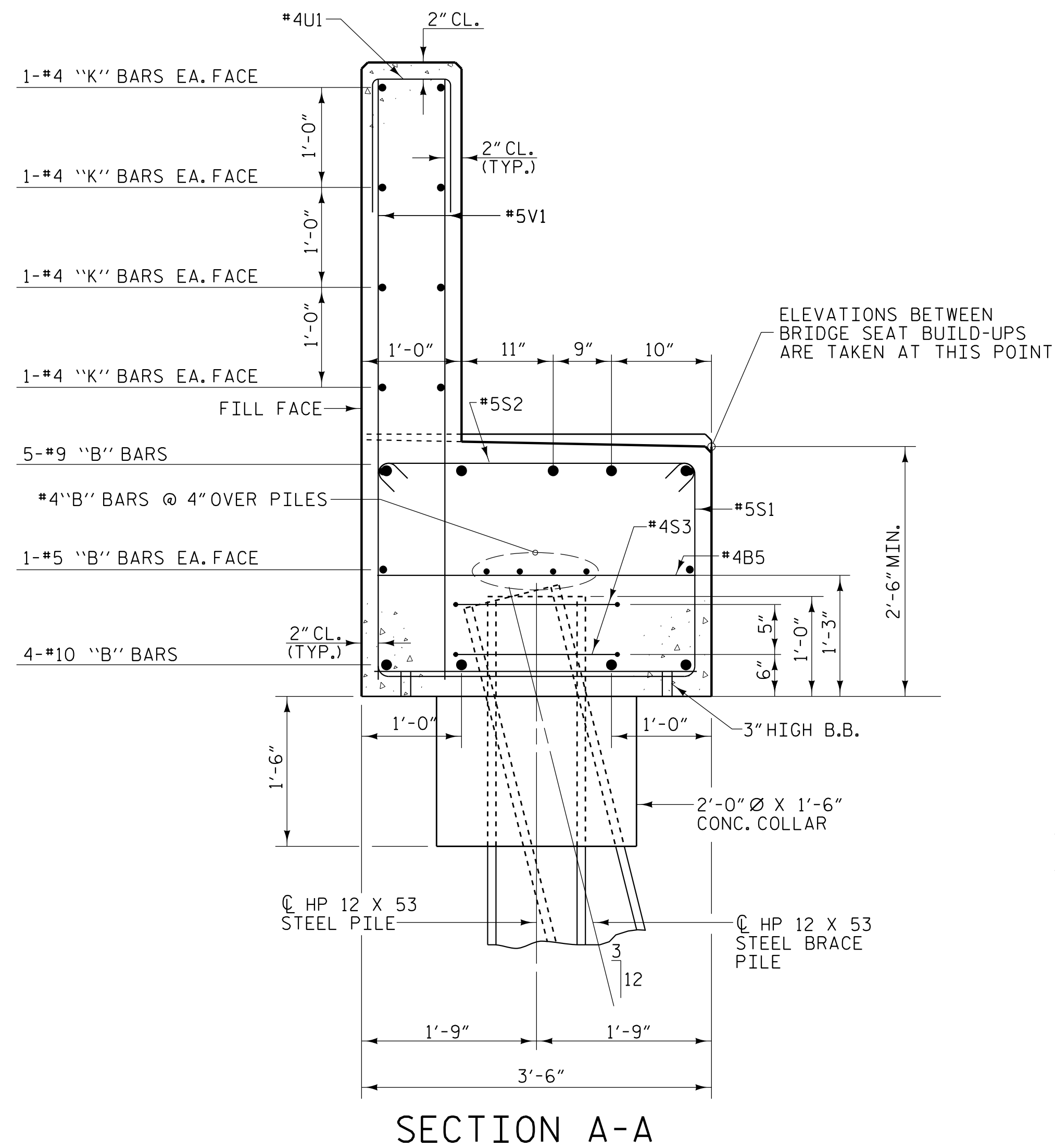


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

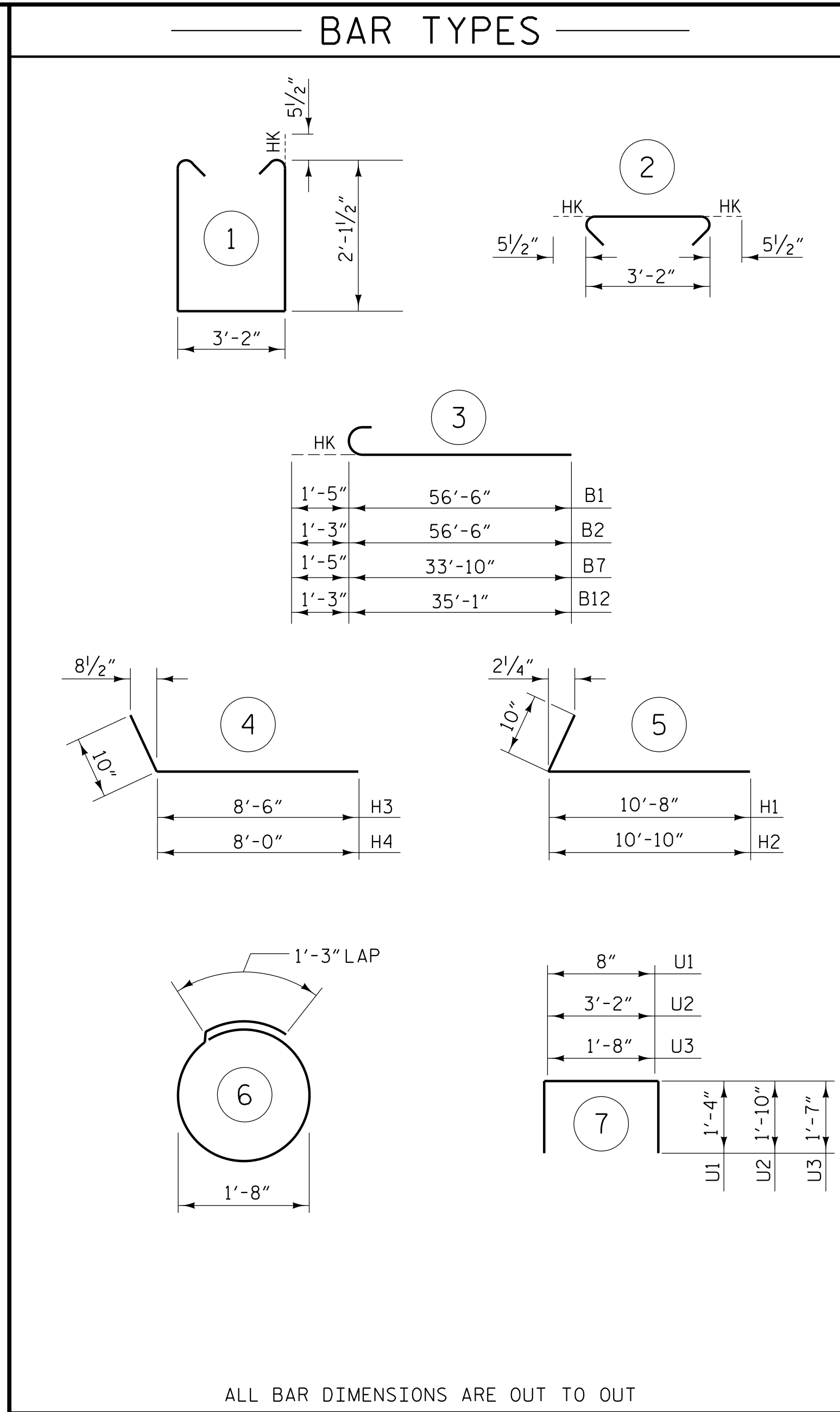
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

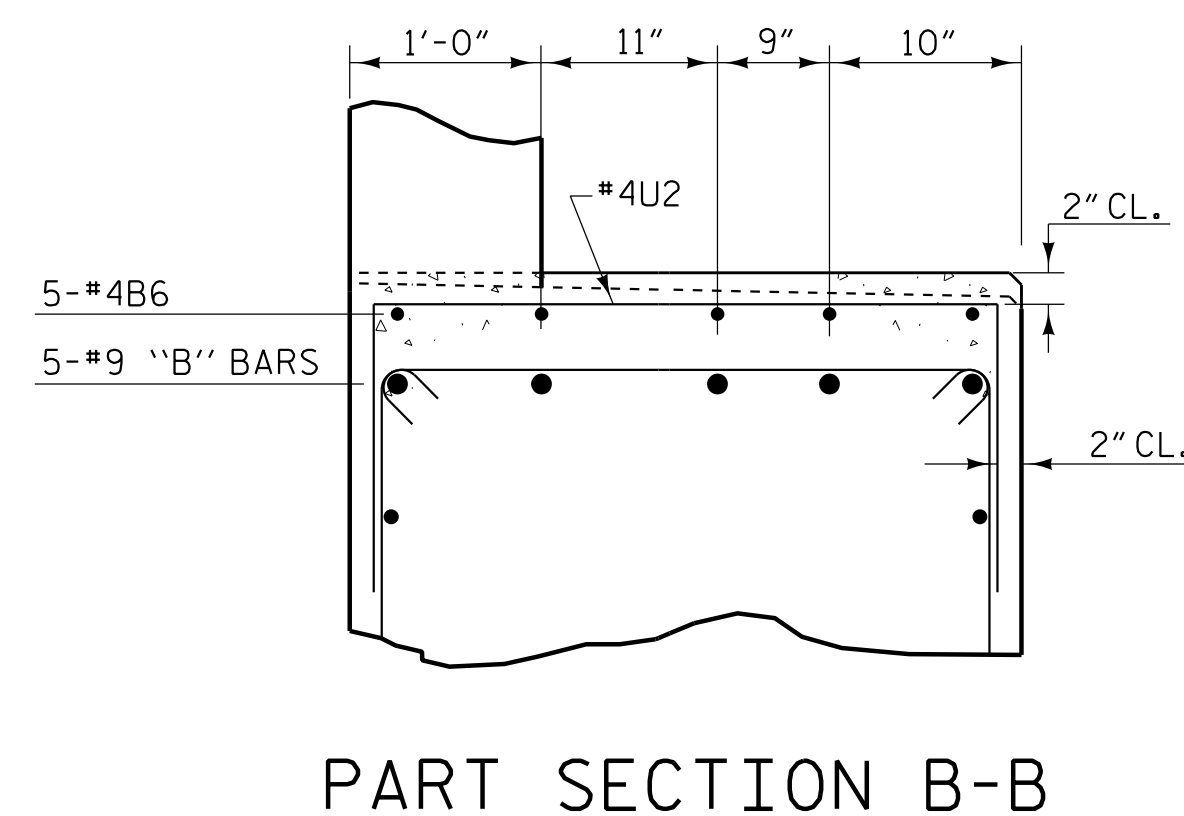
### TEMPORARY DRAINAGE AT END BENT



SECTION A-A



ALL BAR DIMENSIONS ARE OUT TO OUT



PART SECTION B-B

### BILL OF MATERIAL

END BENT 1-STAGE I						END BENT 1-STAGE II							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	4	#10	3	57'-11"	997	B5	17	#4	STR	3'-2"	36		
B2	5	#9	3	57'-9"	982	B6	25	#4	STR	3'-2"	53		
B3	2	#5	STR	59'-0"	123	B7	4	#10	3	35'-3"	607		
B4	8	#4	STR	30'-9"	164	B8	5	#9	STR	40'-6"	689		
B5	14	#4	STR	3'-2"	30	B9	4	#10	STR	41'-0"	706		
B6	20	#4	STR	3'-2"	42	B10	8	#4	STR	36'-3"	194		
						B11	4	#5	STR	36'-10"	154		
D1	5	#5	STR	1'-6"	8	B12	5	#9	3	36'-4"	618		
D2	4	#4	STR	3'-0"	8								
H1	9	#5	5	11'-6"	108	H3	12	#4	4	9'-4"	75		
H2	9	#5	5	11'-8"	110	H4	12	#4	4	8'-10"	71		
						H5	6	#4	STR	6'-2"	25		
K1	16	#4	STR	30'-6"	326	K2	16	#4	STR	36'-4"	388		
S1	49	#5	1	8'-4"	426	S1	59	#5	1	8'-4"	513		
S2	49	#5	2	4'-1"	209	S2	59	#5	2	4'-1"	251		
S3	15	#4	6	6'-6"	65	S3	16	#4	6	6'-6"	69		
U1	55	#4	7	3'-4"	122	U1	63	#4	7	3'-4"	140		
U2	16	#4	7	6'-10"	73	U2	20	#4	7	6'-10"	91		
U3	2	#6	7	4'-10"	15								
V1	110	#5	STR	6'-0"	688	V1	126	#5	STR	6'-0"	789		
V2	24	#4	STR	6'-1"	98	V3	32	#4	STR	8'-3"	176		
TOTAL REINFORCING STEEL						4594 LBS	TOTAL REINFORCING STEEL						5645 LBS
CLASS "A" CONCRETE - CU. YARDS						CLASS "A" CONCRETE - CU. YARDS							
POUR 1 (CAP, COLLARS, LOWER WINGS)						20.8 CU. YDS.	POUR 1 (CAP, COLLARS, LOWER WINGS)						25.7 CU. YDS.
POUR 2 (UPPER WINGS & BACKWALL)						9.6 CU. YDS.	POUR 2 (UPPER WINGS & BACKWALL)						10.7 CU. YDS.
TOTAL						30.4 CU. YDS.	TOTAL						36.4 CU. YDS.
PILE EXCAVATION IN SOIL - LIN. FT.						126	PILE EXCAVATION IN SOIL - LIN. FT.						126
PILE EXCAVATION NOT IN SOIL - LIN. FT.						42	PILE EXCAVATION NOT IN SOIL - LIN. FT.						42
HP 12 X 53 STEEL PILES							HP 12 X 53 STEEL PILES						
8 PILES REQUIRED - LIN. FEET						280	7 PILES REQUIRED - LIN. FEET						245
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES - EACH						8	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES - EACH						7

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1  
 DETAILS

REVISIONS

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

SHEET NO.

S1-44  
 TOTAL SHEETS  
 63

PLANS PREPARED BY:  
**N|V|5**  
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 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

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SEB2398D0220440  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 1414  
 ROBERT C. LARSON  
 5/18/2023

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**NOTES**

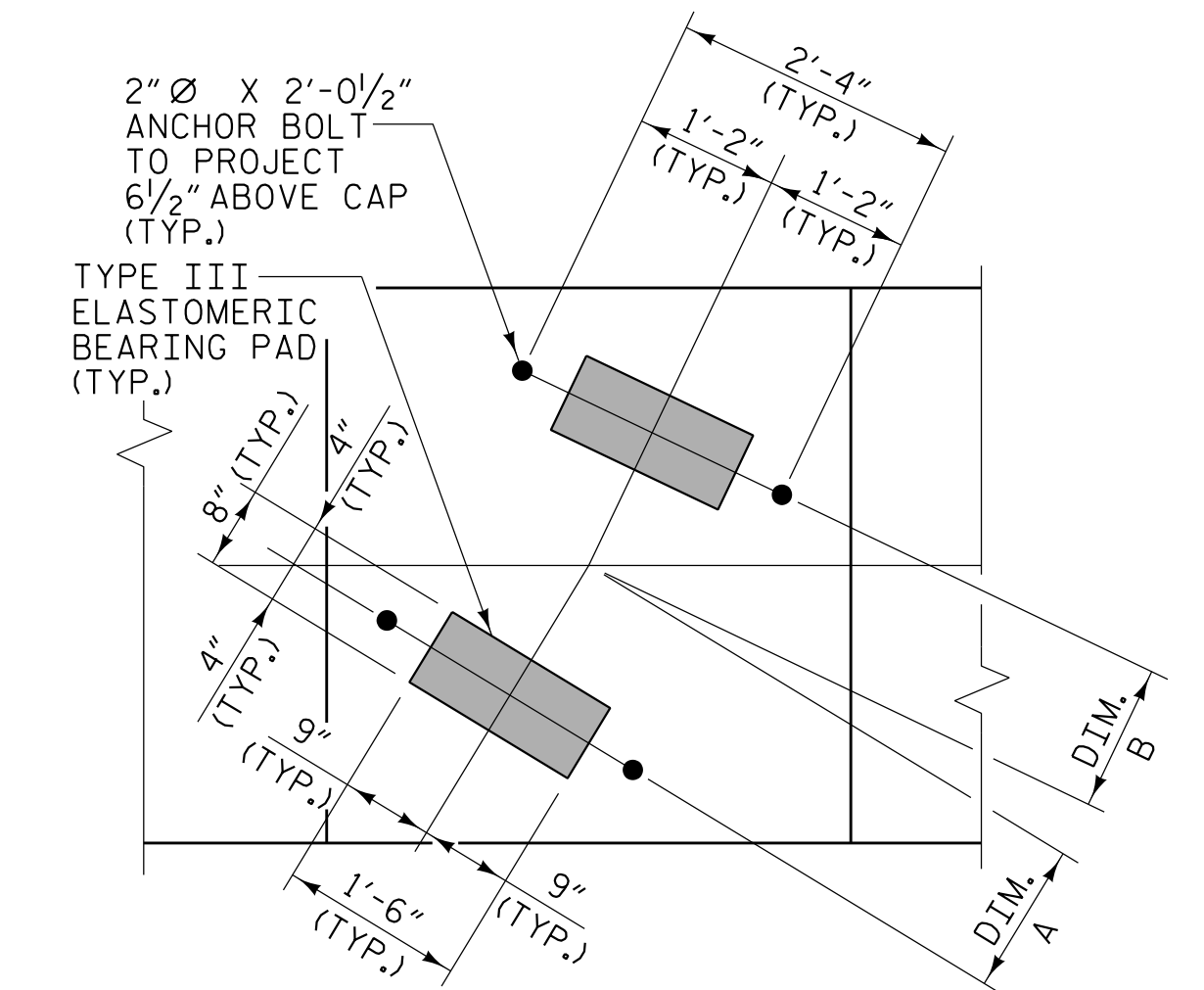
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.



**DETAIL "A"**  
(TYP. EACH GIRDER)

SPAN A		SPAN B	
GIRDER NO.	DIM. A	GIRDER NO.	DIM. B
GDR. A1	1'-3 <sup>5</sup> / <sub>8</sub> "	GDR. B1	1'-2 <sup>3</sup> / <sub>4</sub> "
GDR. A2	1'-2 <sup>5</sup> / <sub>8</sub> "	GDR. B2	1'-2 <sup>1</sup> / <sub>16</sub> "
GDR. A3	1'-2"	GDR. B3	1'-2 <sup>5</sup> / <sub>16</sub> "
GDR. A4	1'-1 <sup>5</sup> / <sub>8</sub> "	GDR. B4	1'-2 <sup>9</sup> / <sub>16</sub> "
GDR. A5	1'-1 <sup>1</sup> / <sub>16</sub> "	GDR. B5	1'-2 <sup>1</sup> / <sub>2</sub> "
GDR. A6	1'-1 <sup>3</sup> / <sub>4</sub> "	GDR. B6	1'-2 <sup>7</sup> / <sub>16</sub> "
GDR. A7	1'-2 <sup>3</sup> / <sub>16</sub> "	GDR. B7	1'-2 <sup>3</sup> / <sub>8</sub> "
GDR. A8	1'-2 <sup>3</sup> / <sub>4</sub> "	GDR. B8	1'-2 <sup>5</sup> / <sub>16</sub> "
GDR. A9	1'-3 <sup>3</sup> / <sub>16</sub> "	GDR. B9	1'-2 <sup>1</sup> / <sub>4</sub> "

DIM. A & B MEASURED ALONG C GIRDER

PROJECT NO. **U-5839**  
**HAYWOOD COUNTY**  
 STATION: **24+64.13 -L- POC**

SHEET 1 OF 4

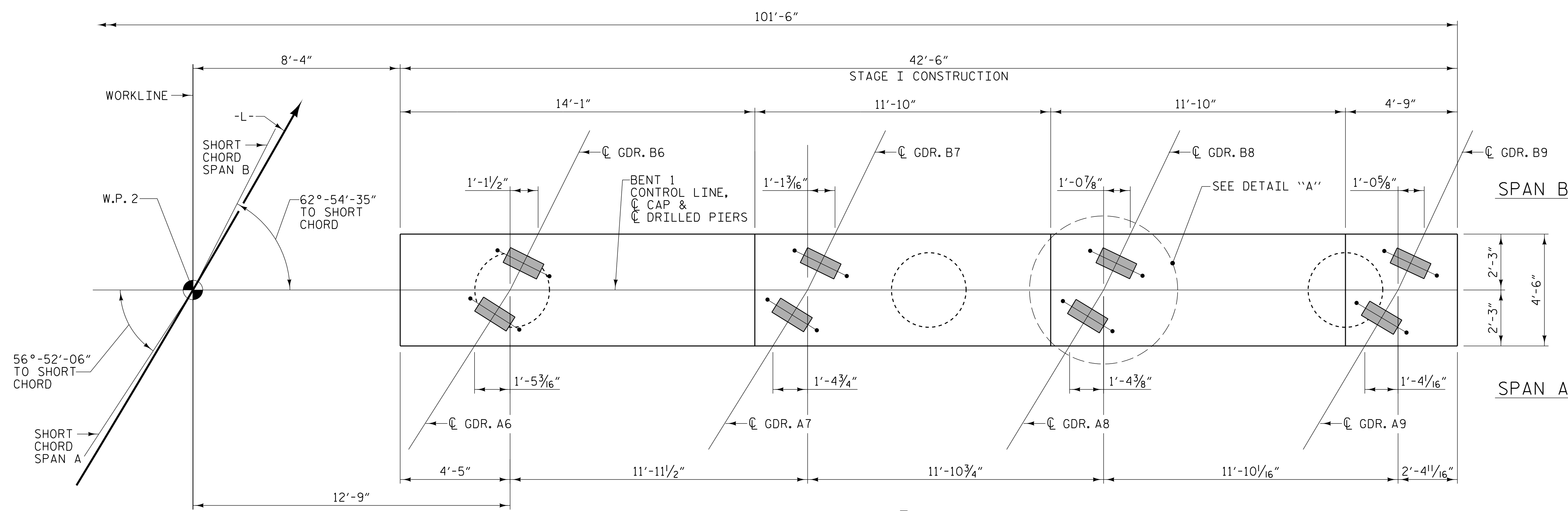
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 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**  
**BENT 1**  
**STAGE I**

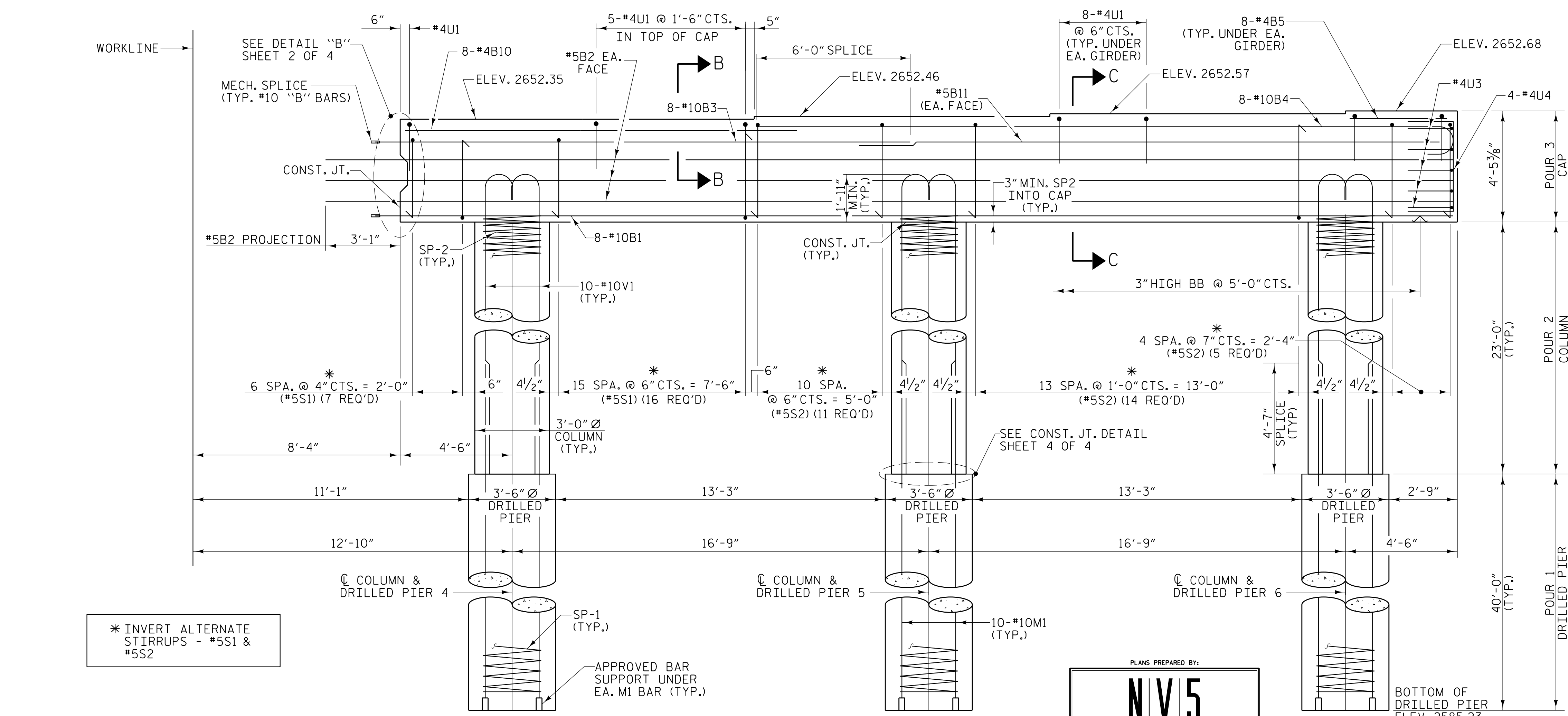
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

SHEET NO. **S1-45**  
 TOTAL SHEETS **63**

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 5/18/2023



**PLAN**



**ELEVATION**

(FOR SECTIONS B-B AND C-C, SEE SHEET 4 OF 4)

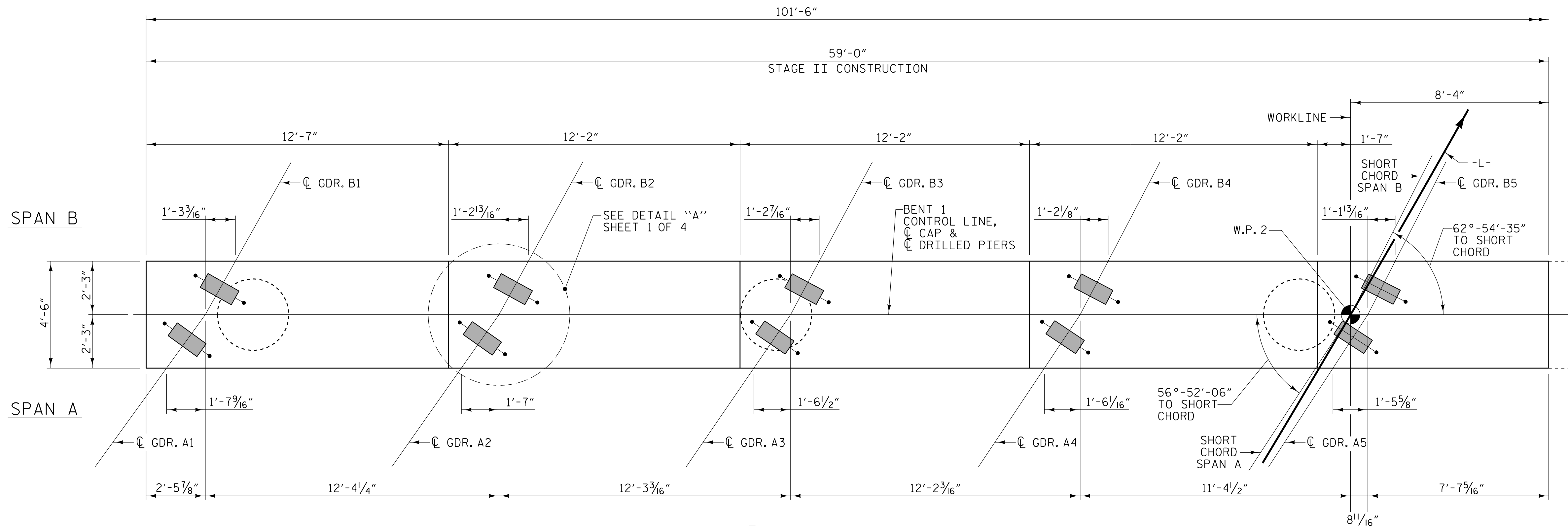
PLANS PREPARED BY:  
**NIV5**  
 NIV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NIV5.com  
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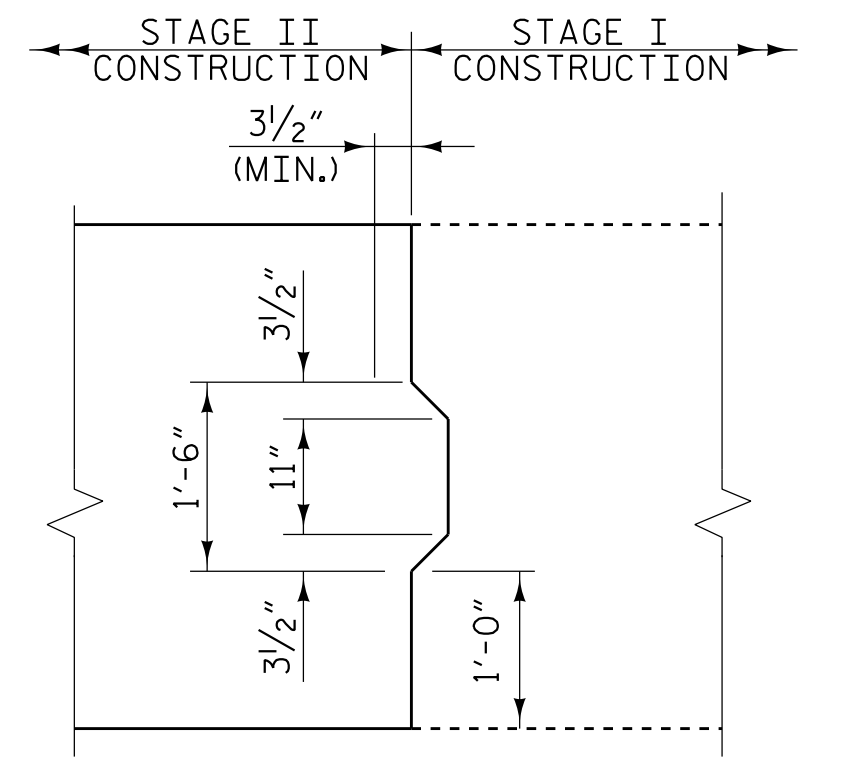
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 CHECKED BY: **Z. H. BROWN** DATE: **8/20**  
 DESIGN ENGINEER OF RECORD: **R. C. LARSON** DATE: **4/23**

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 BE02398D9220470

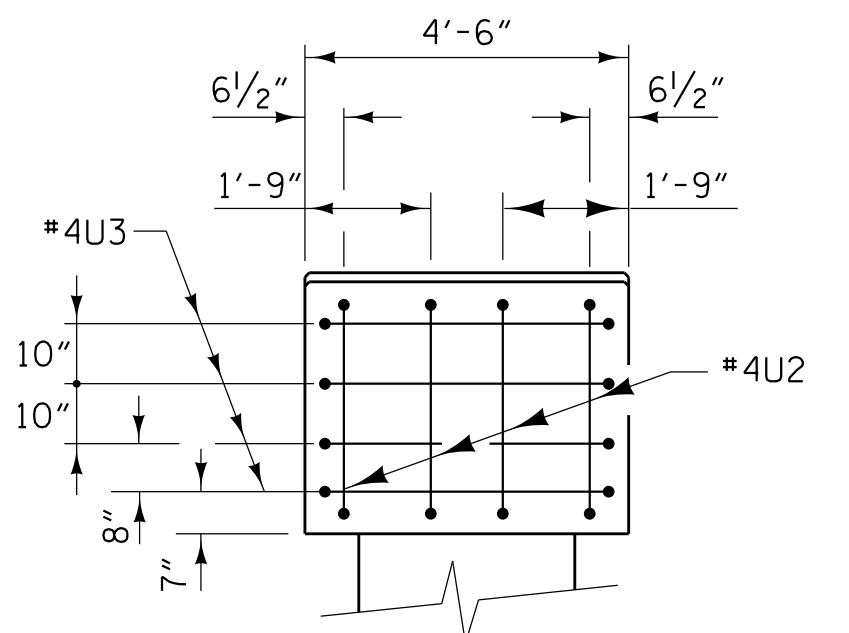
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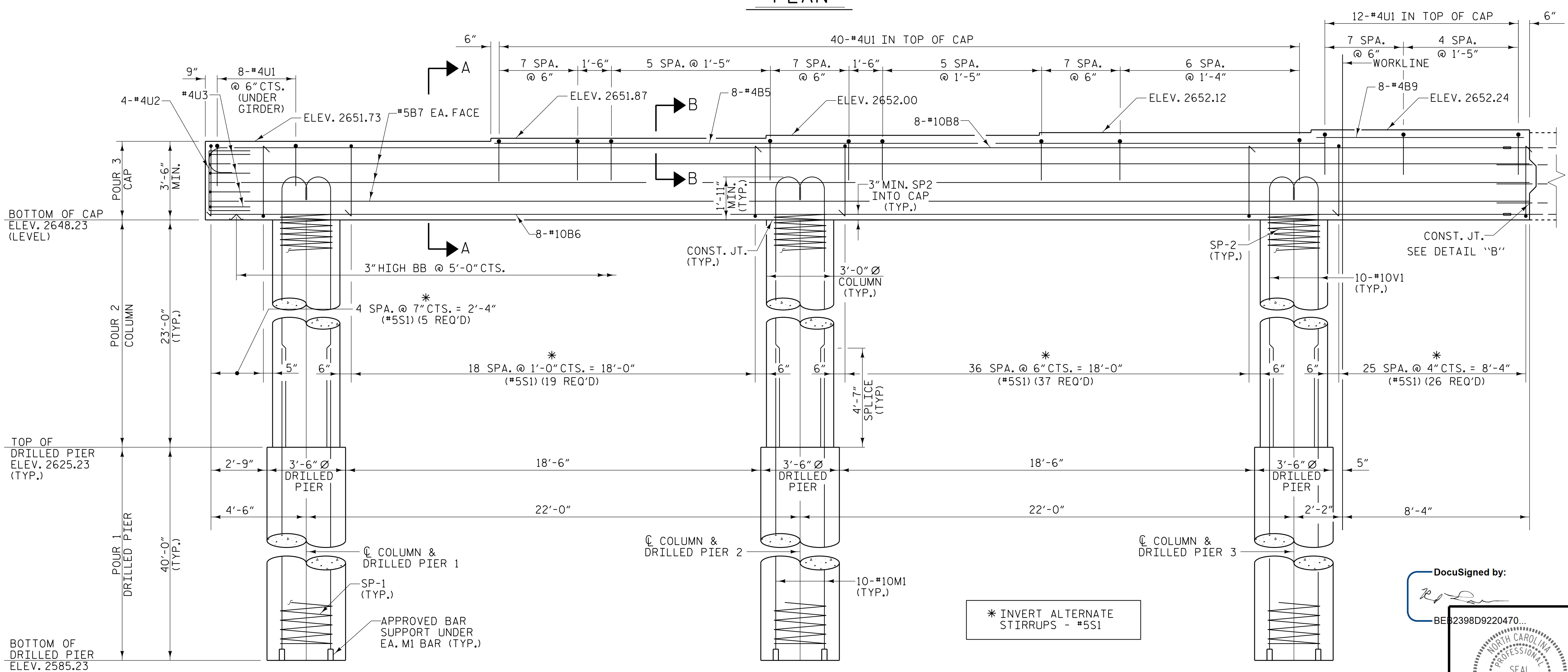
PLAN



DETAIL "B"



LEFT END ELEVATION



ELEVATION

(FOR SECTIONS A-A AND B-B, SEE SHEET 4 OF 4)

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HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 1  
 STAGE II

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

TOTAL SHEETS: 63

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5/18/2023

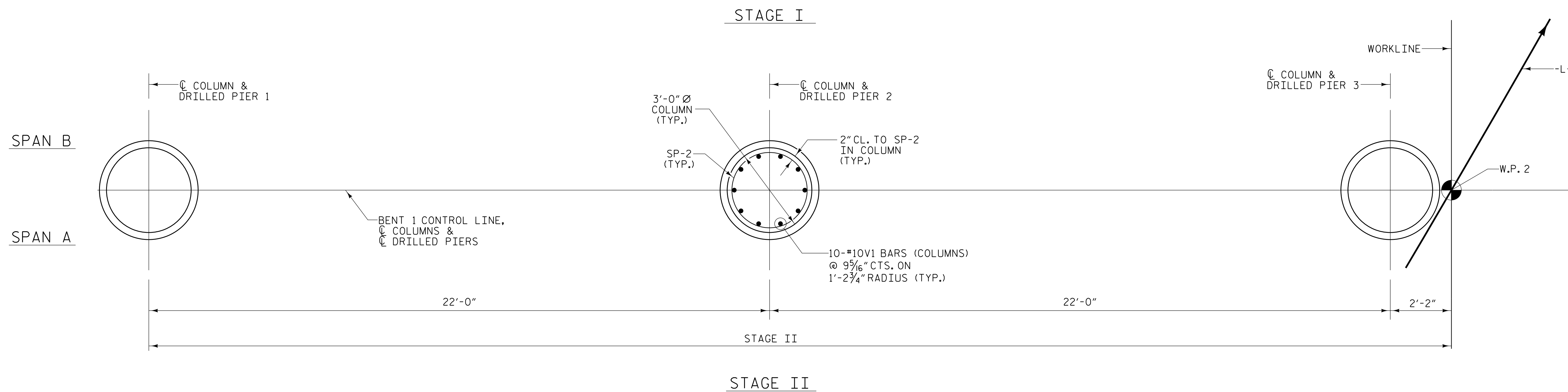
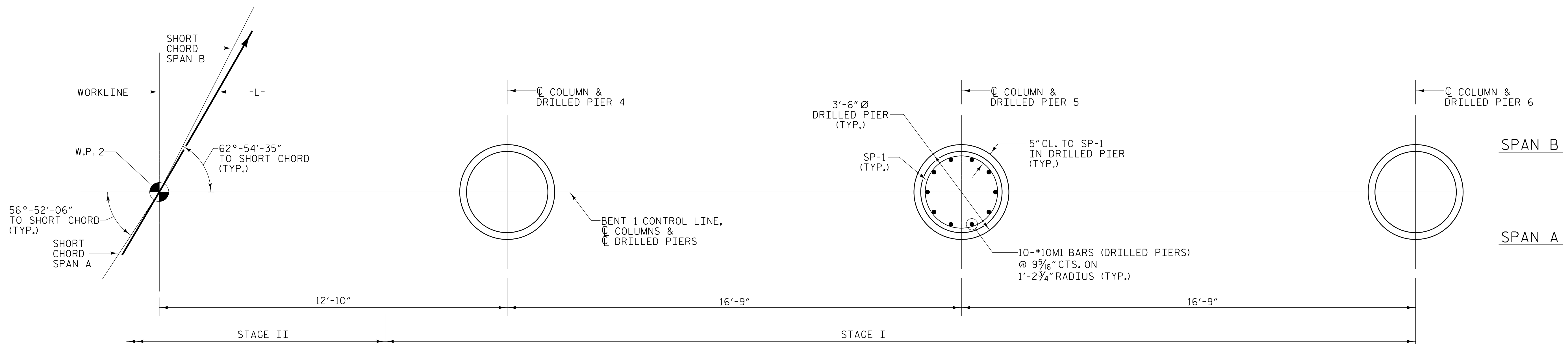
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**PLAN OF COLUMNS & DRILLED PIERS**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 BENT 1**

PLANS PREPARED BY:

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 NC License # F-1333

DocuSigned by:

*Robert C. Larson*

BEB2398D9220470...

NORTH CAROLINA  
 PROFESSIONAL  
 ENGINEER  
 SEAL  
 14114  
 ROBERT C. LARSON

5/18/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-47
1			3			TOTAL SHEETS
2			4			63

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 CHECKED BY: Z. H. BROWN DATE: 8/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:

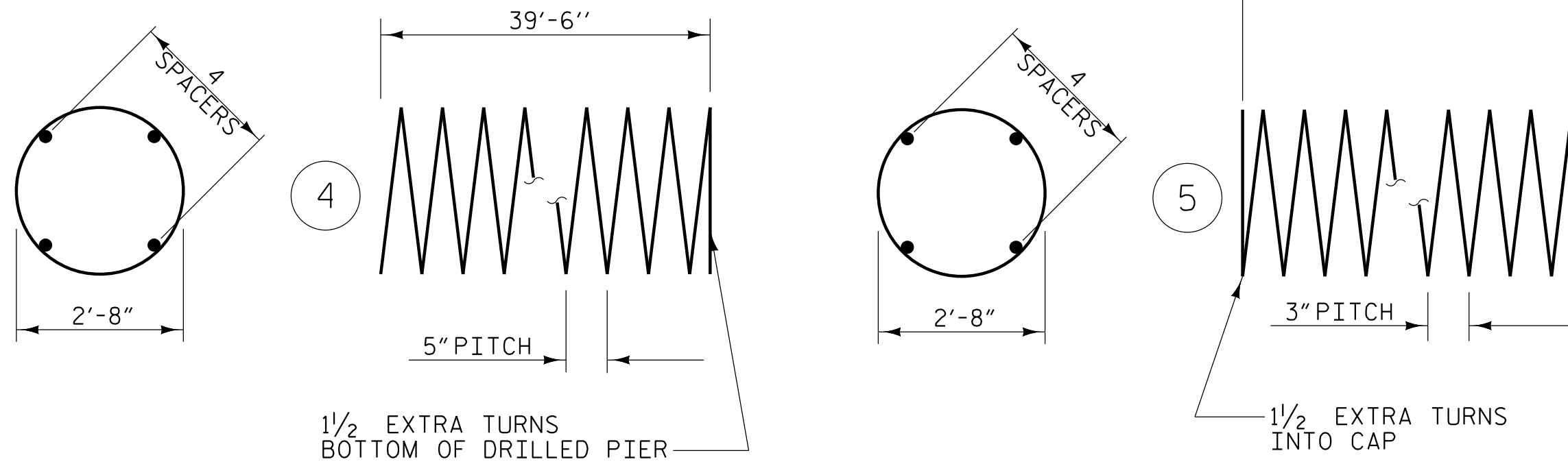
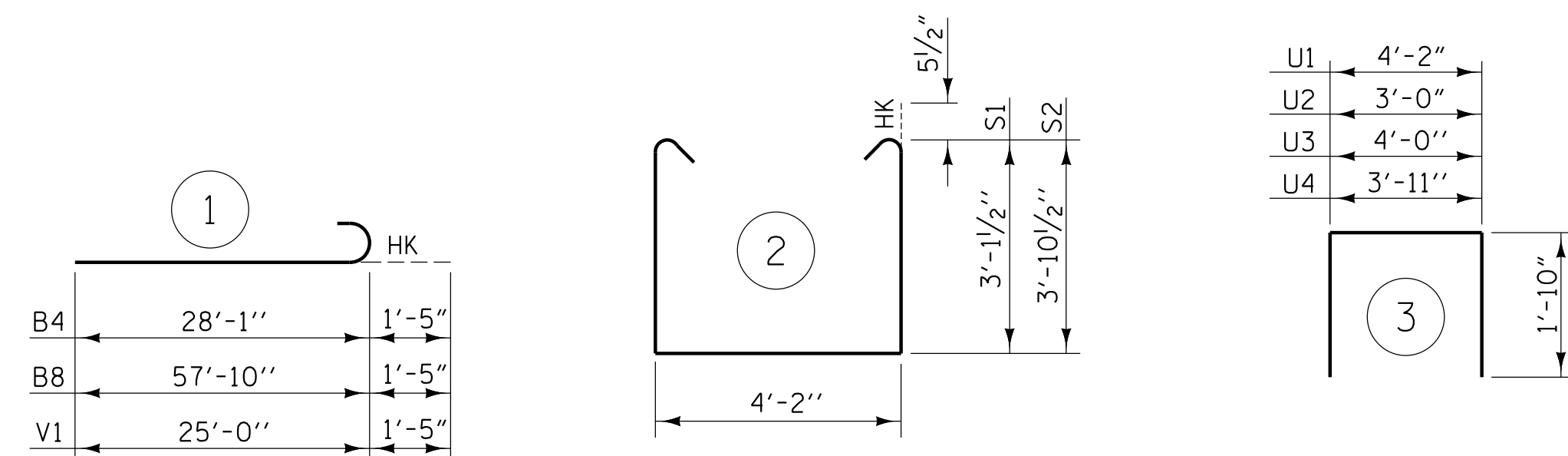
*Robert C. Larson*

BEB2398D9220470...

5/17/2023 7:41:02 PM R:\Structures\3 span Bridge over RR\47 US539\_SMU\_B3\_43084.dgn



BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

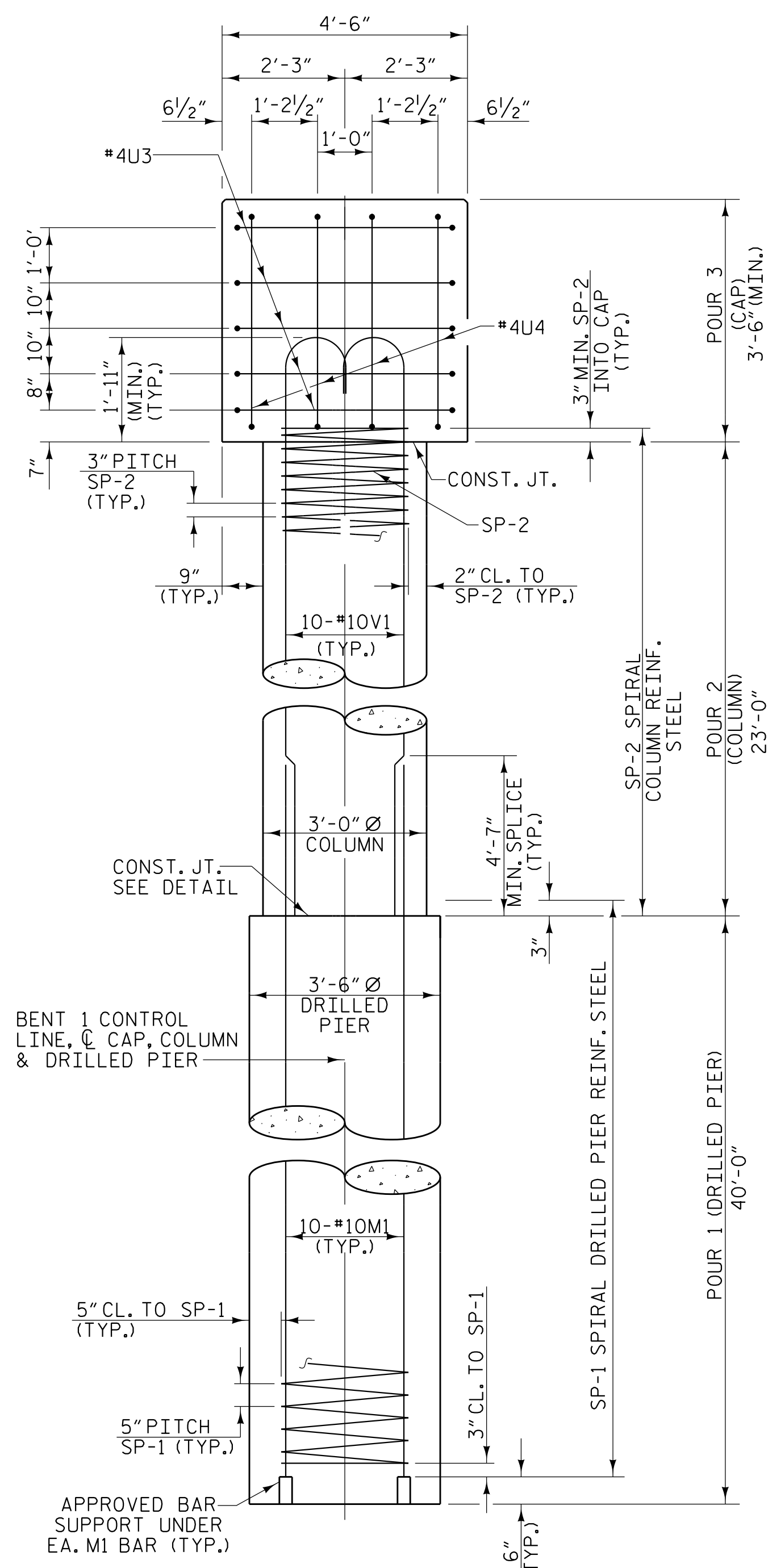
\*\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

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

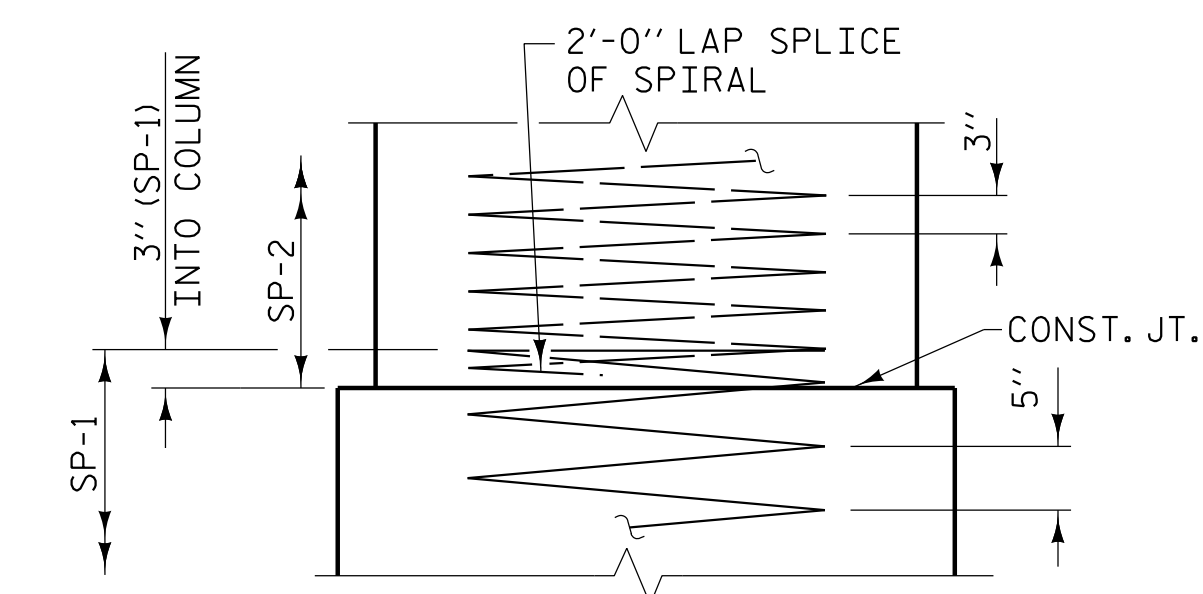
▲ NO SEPARATE PAYMENT WILL BE MADE FOR CSL TUBES. CSL TUBES WILL BE INCLUDED IN THE UNIT BID PRICE FOR DRILLED PIERS.

BILL OF MATERIAL

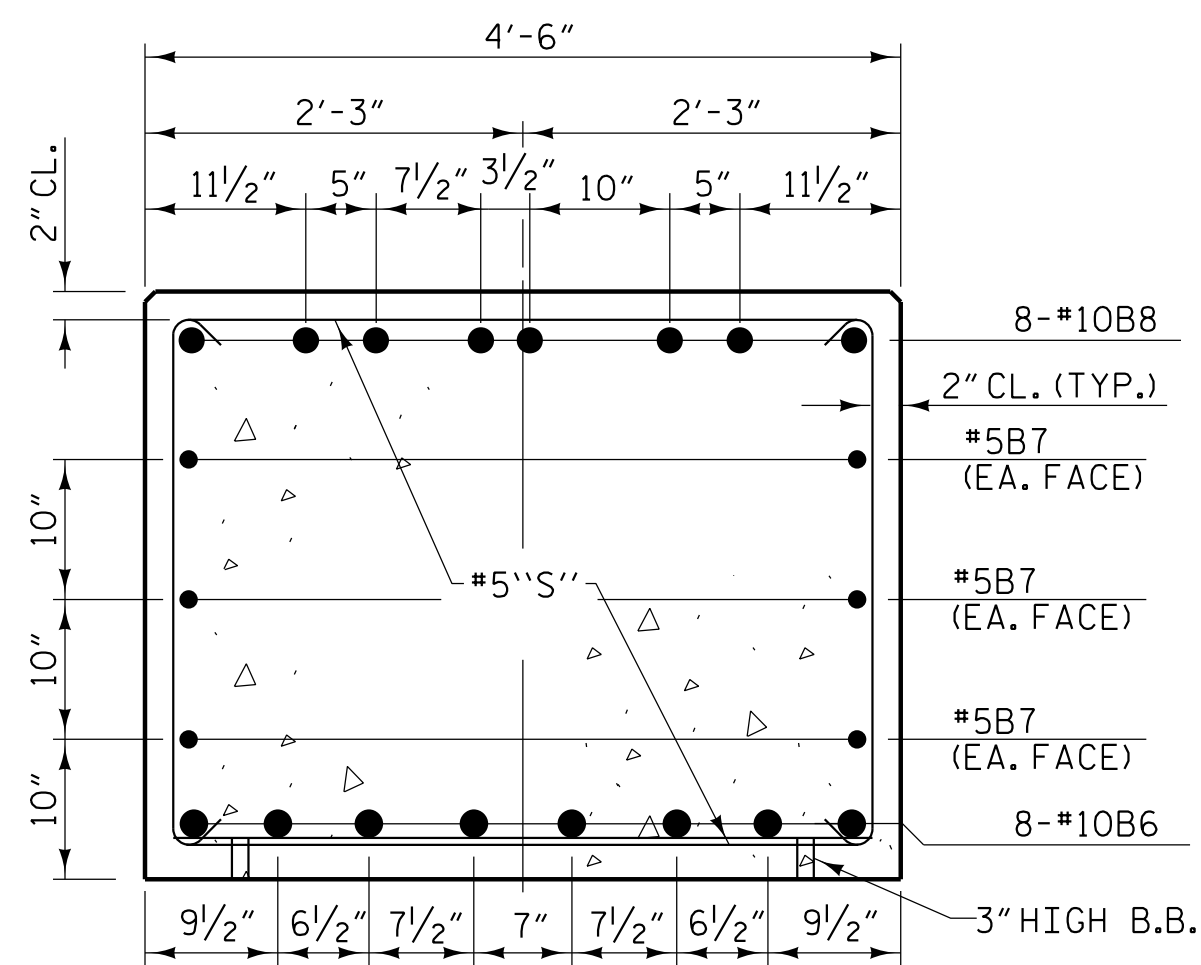
BENT 1 - STAGE I					BENT 1 - STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	STR	43'-3"	1489	B5	8	#4	STR	37'-10"	202
B2	6	#5	STR	45'-5"	284	B6	8	#10	STR	57'-10"	1991
B3	8	#10	STR	21'-3"	732	B7	6	#5	STR	58'-10"	368
B4	8	#10	1	29'-6"	1016	B8	8	#10	1	59'-3"	2040
B10	8	#4	STR	15'-6"	83	B9	8	#4	STR	9'-7"	51
B11	2	#5	STR	25'-1"	52						
M1	30	#10	STR	47'-1"	6078	M1	30	#10	STR	47'-1"	6078
S1	23	#5	2	11'-4"	272	S1	87	#5	2	11'-4"	1028
S2	30	#5	2	12'-10"	402	U1	60	#4	3	7'-10"	314
						U2	4	#4	3	6'-8"	18
						U3	4	#4	3	7'-8"	20
						U4	4	#4	3	7'-7"	20
V1	30	#10	1	26'-5"	3410	V1	30	#10	1	26'-5"	3410
TOTAL REINFORCING STEEL					14063 lbs.	TOTAL REINFORCING STEEL					15520 lbs.
SP-1	3	**	4	795'-2"	2488	SP-1	3	**	4	795'-2"	2488
SP-2	3	***	5	779'-8"	1562	SP-2	3	***	5	779'-8"	1562
SPIRAL COLUMN REINFORCING STEEL (SP) 4050LBS						SPIRAL COLUMN REINFORCING STEEL (SP) 4050LBS					
CLASS "A" CONCRETE - CU. YARDS						CLASS "A" CONCRETE - CU. YARDS					
POUR 2 - COLUMN					18.1 CU. YDS.	POUR 2 - COLUMN					18.1 CU. YDS.
POUR 3 - CAP					30.2 CU. YDS.	POUR 3 - CAP					36.9 CU. YDS.
TOTAL					48.3 CU. YDS.	TOTAL					55.0 CU. YDS.
DRILLED PIERS						DRILLED PIERS					
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)					42.8 C.Y.	DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)					42.8 C.Y.
3'-6" Ø DRILLED PIER IN SOIL					77.0 LIN. FT.	3'-6" Ø DRILLED PIER IN SOIL					77.0 LIN. FT.
3'-6" Ø DRILLED PIER NOT IN SOIL					43.0 LIN. FT.	3'-6" Ø DRILLED PIER NOT IN SOIL					43.0 LIN. FT.
▲ CSL TUBES					498.0 LIN. FT.	▲ CSL TUBES					498.0 LIN. FT.



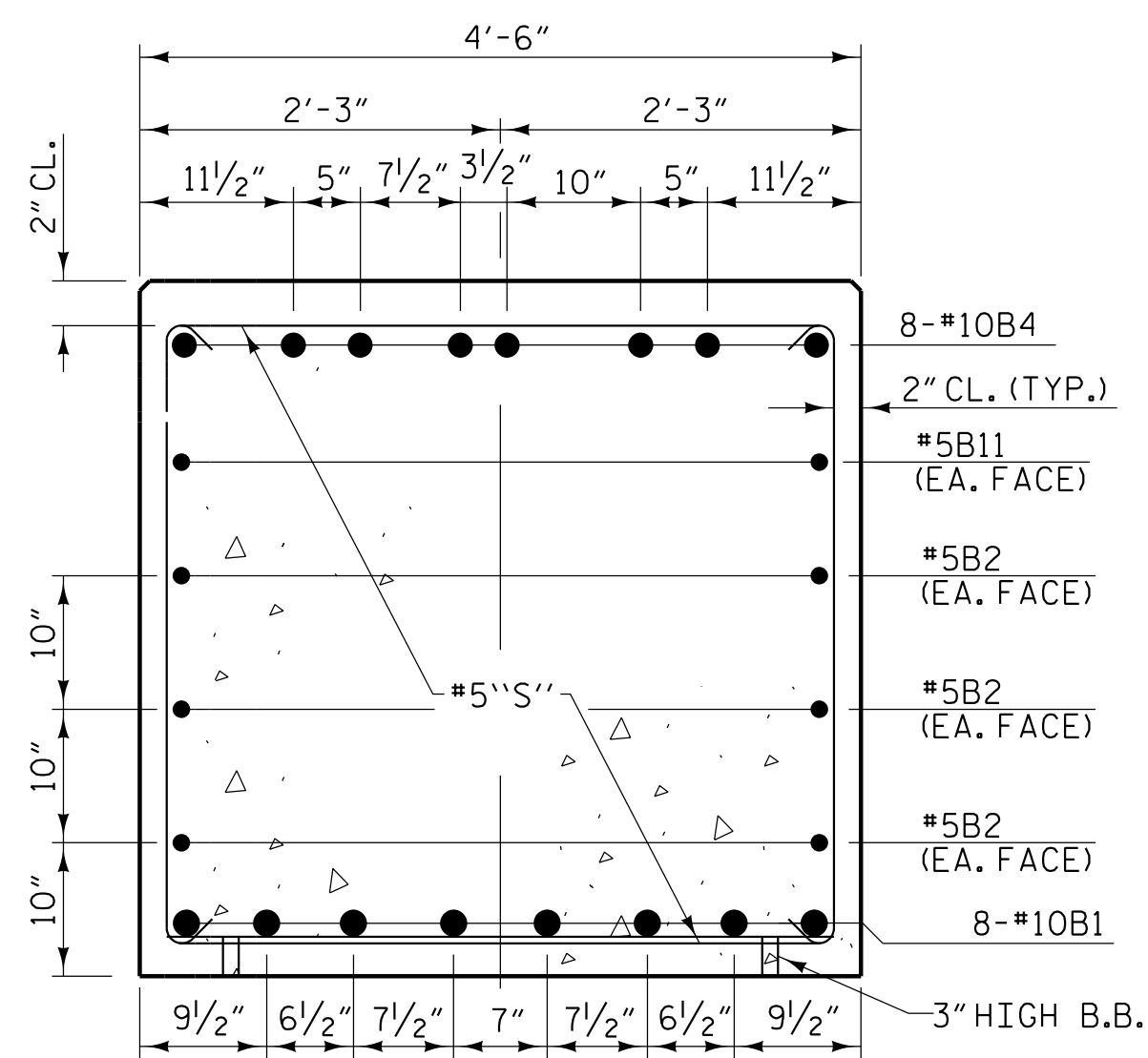
RIGHT END ELEVATION



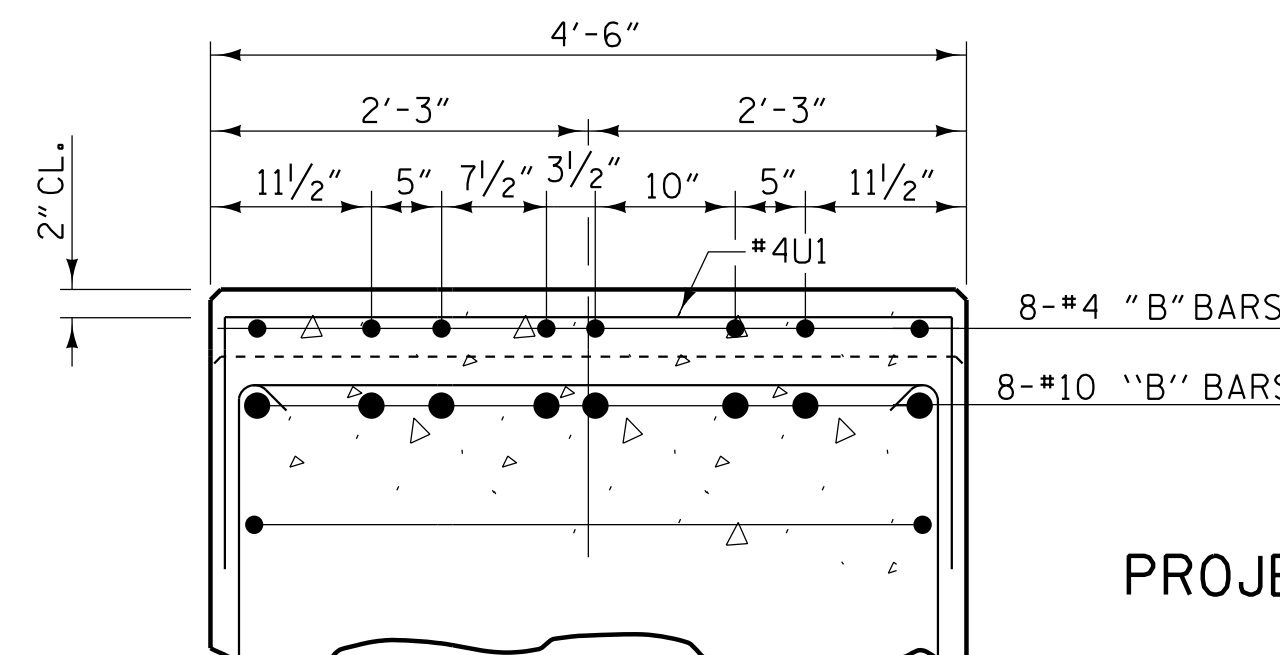
CONSTRUCTION JOINT DETAIL



SECTION A-A



SECTION C-C



SECTION B-B

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 1

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
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 www.NV5.com  
 NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
 ENGINEER  
 SEAL 14114  
 5/18/2023

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

TOTAL SHEETS: 63

DRAWN BY: W. B. ALLEN DATE: 5/20  
 CHECKED BY: Z. H. BROWN DATE: 8/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
 BEB2398D9220470

**NOTES**

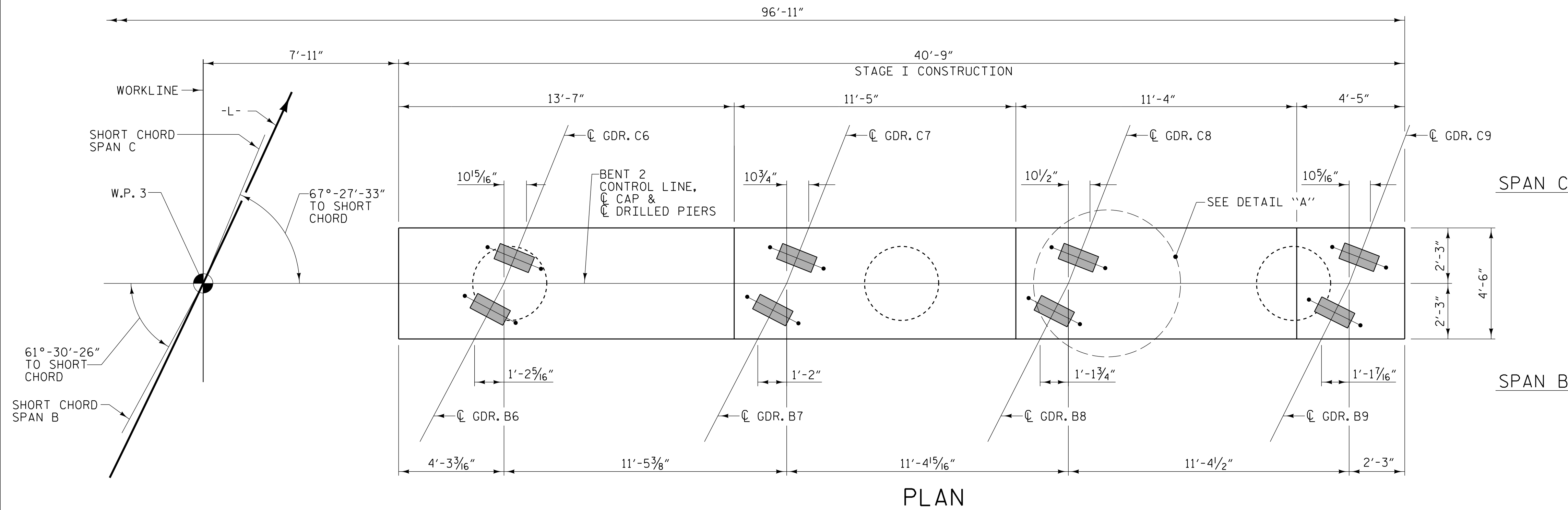
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

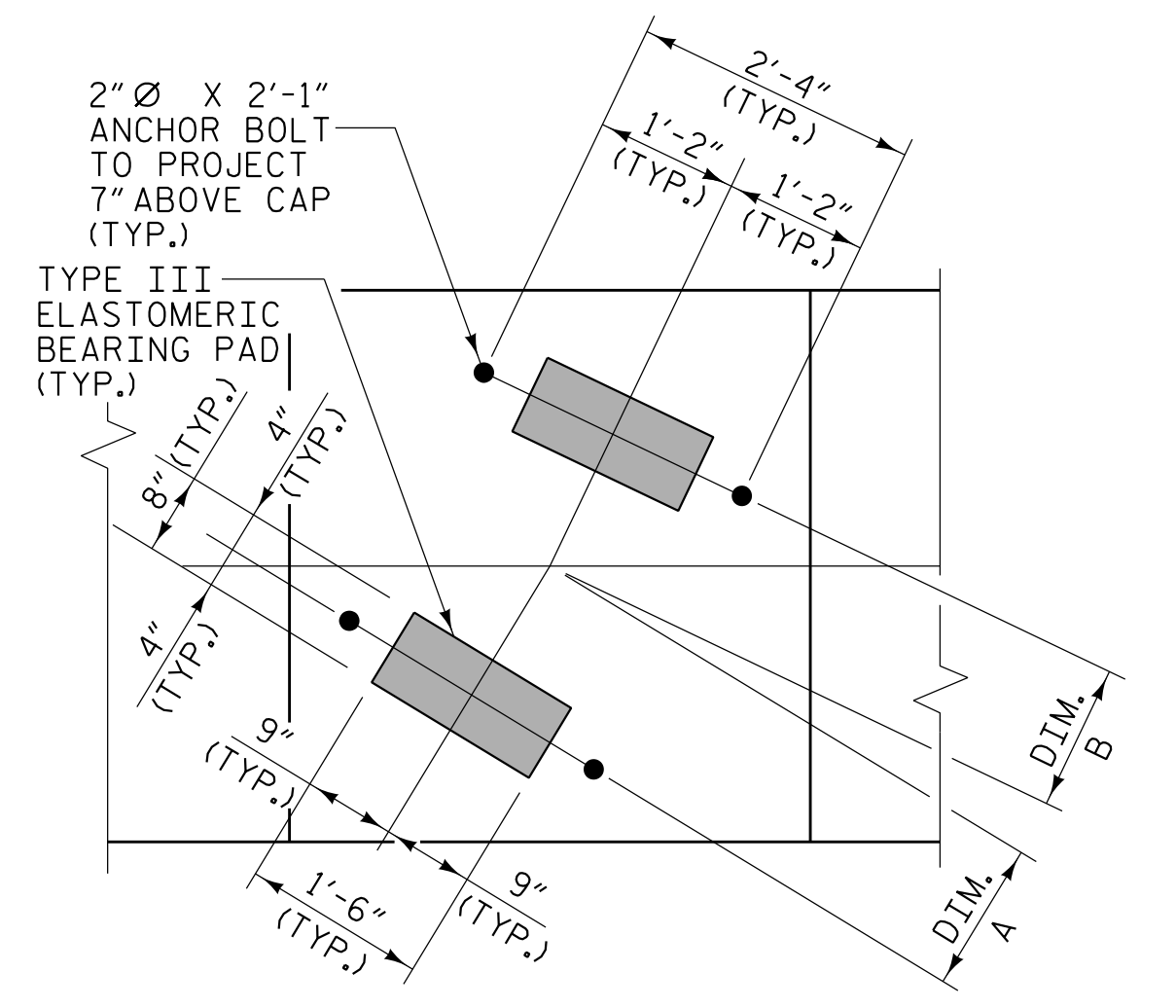
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.



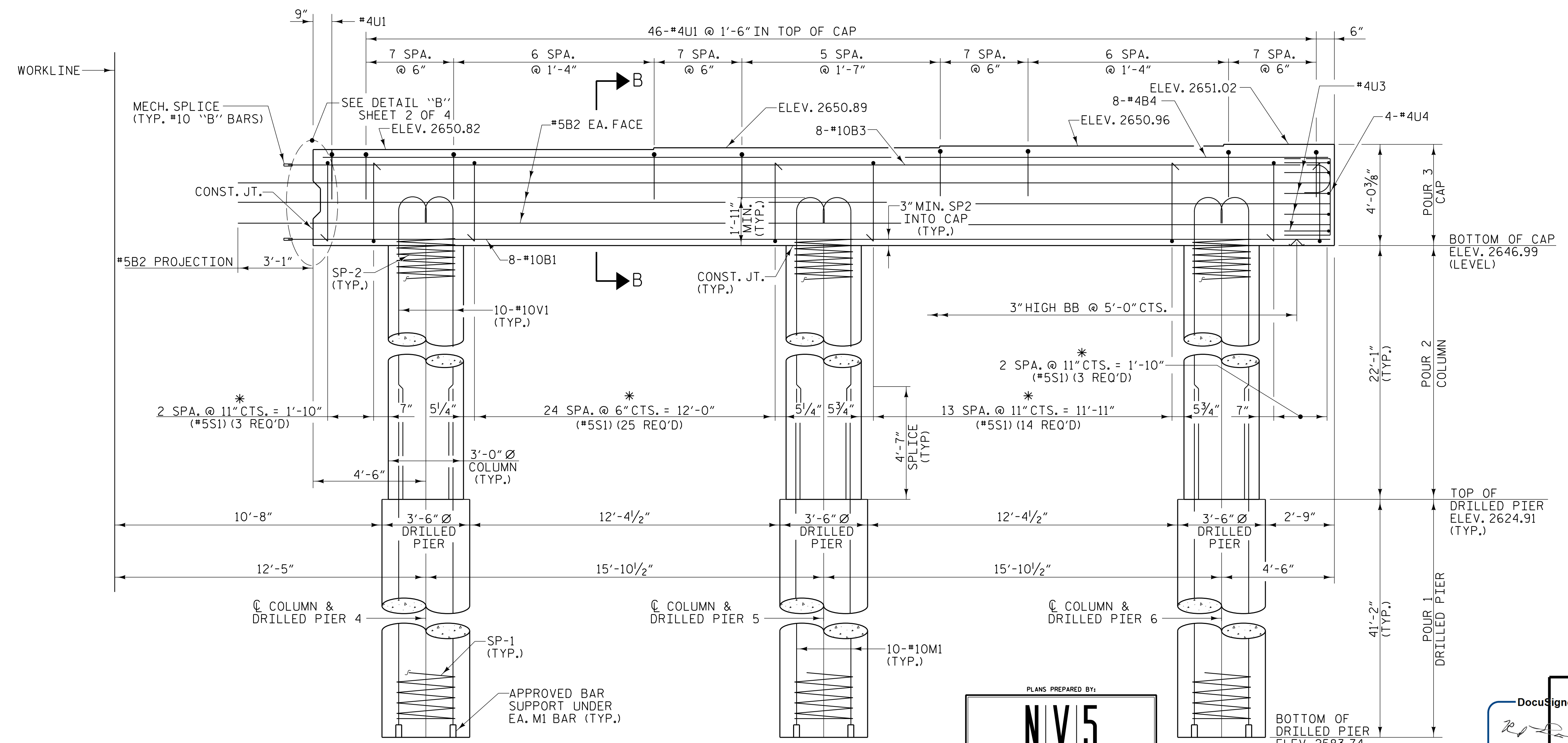
**PLAN**



**DETAIL "A"**  
(TYP. EACH GIRDER)

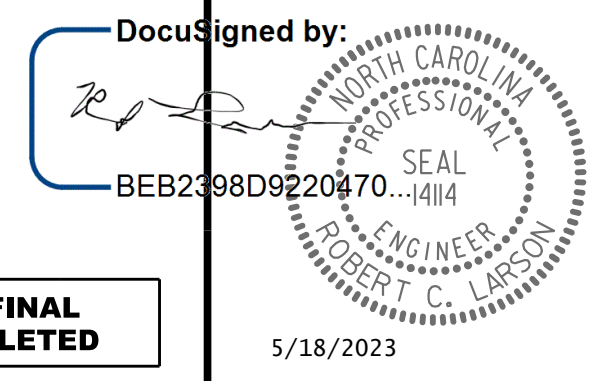
SPAN B		SPAN C	
GIRDER NO.	DIM. A	GIRDER NO.	DIM. B
GDR. B1	1'-3 <sup>3</sup> / <sub>4</sub> "	GDR. C1	1'-2 <sup>5</sup> / <sub>16</sub> "
GDR. B2	1'-2 <sup>5</sup> / <sub>16</sub> "	GDR. C2	1'-2 <sup>3</sup> / <sub>8</sub> "
GDR. B3	1'-2 <sup>7</sup> / <sub>16</sub> "	GDR. C3	1'-1 <sup>5</sup> / <sub>16</sub> "
GDR. B4	1'-2 <sup>1</sup> / <sub>8</sub> "	GDR. C4	1'-1 <sup>5</sup> / <sub>16</sub> "
GDR. B5	1'-2 <sup>1</sup> / <sub>8</sub> "	GDR. C5	1'-1 <sup>5</sup> / <sub>16</sub> "
GDR. B6	1'-2 <sup>1</sup> / <sub>4</sub> "	GDR. C6	1'-1 <sup>5</sup> / <sub>16</sub> "
GDR. B7	1'-2 <sup>5</sup> / <sub>8</sub> "	GDR. C7	1'-1 <sup>5</sup> / <sub>16</sub> "
GDR. B8	1'-3 <sup>1</sup> / <sub>8</sub> "	GDR. C8	1'-1 <sup>7</sup> / <sub>16</sub> "
GDR. B9	1'-3 <sup>3</sup> / <sub>4</sub> "	GDR. C9	1'-1 <sup>5</sup> / <sub>8</sub> "

DIM. A & B MEASURED ALONG C GIRDER



**ELEVATION**

(FOR SECTION B-B, SEE SHEET 4 OF 4)



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

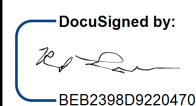
PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

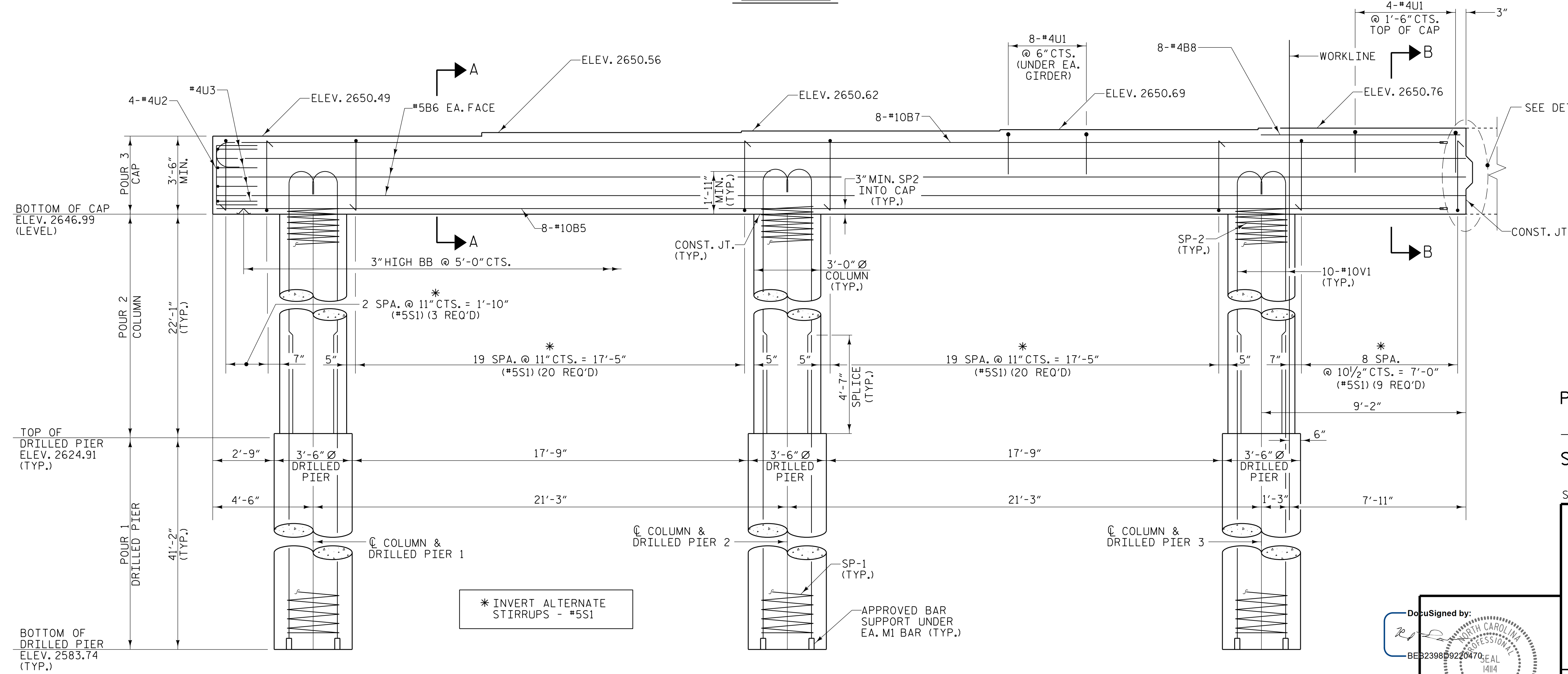
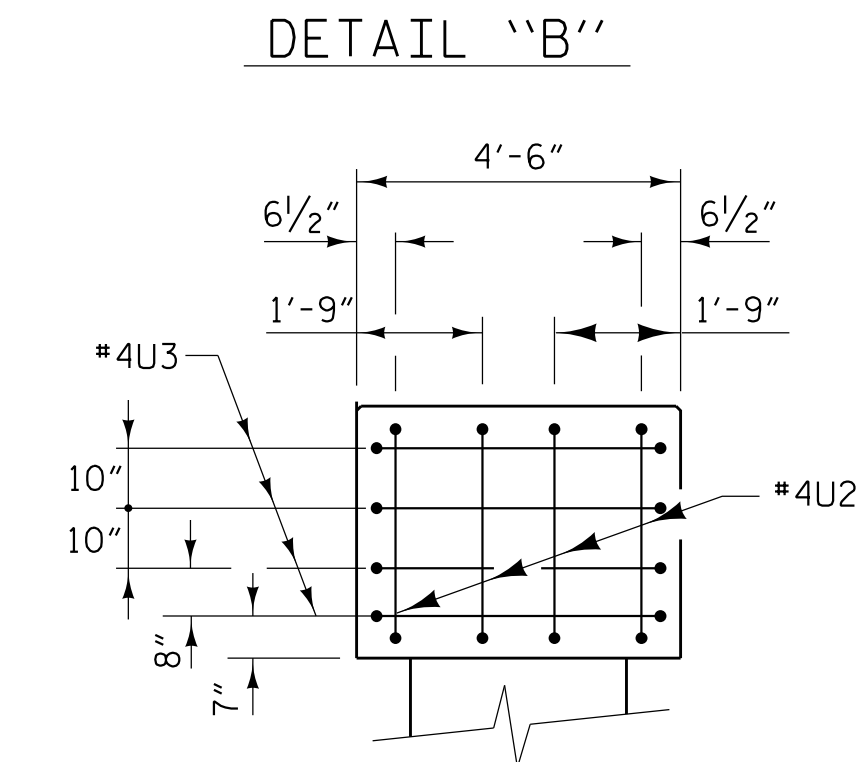
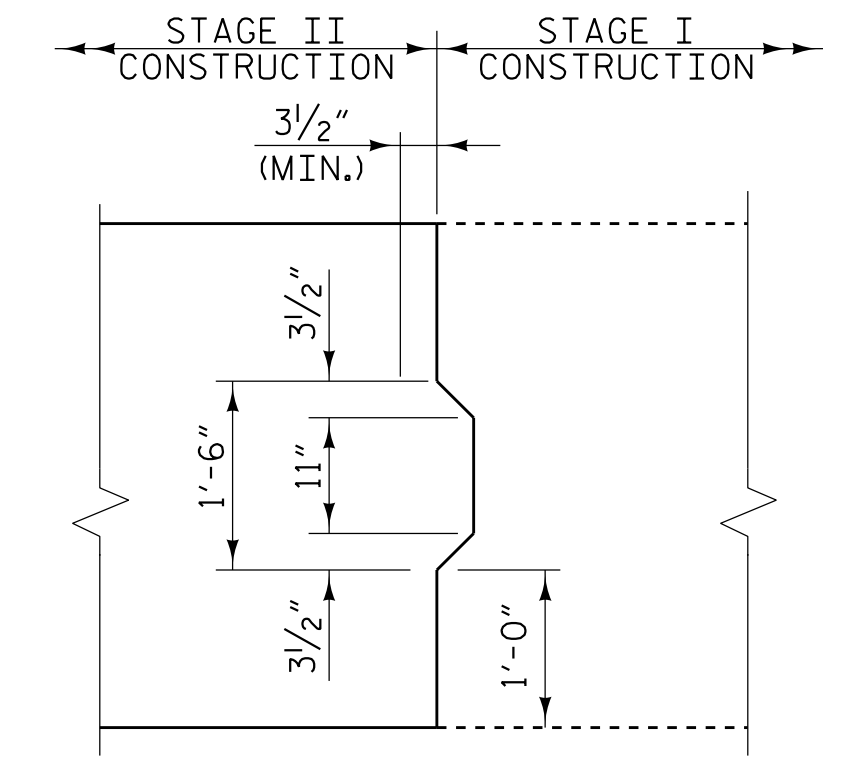
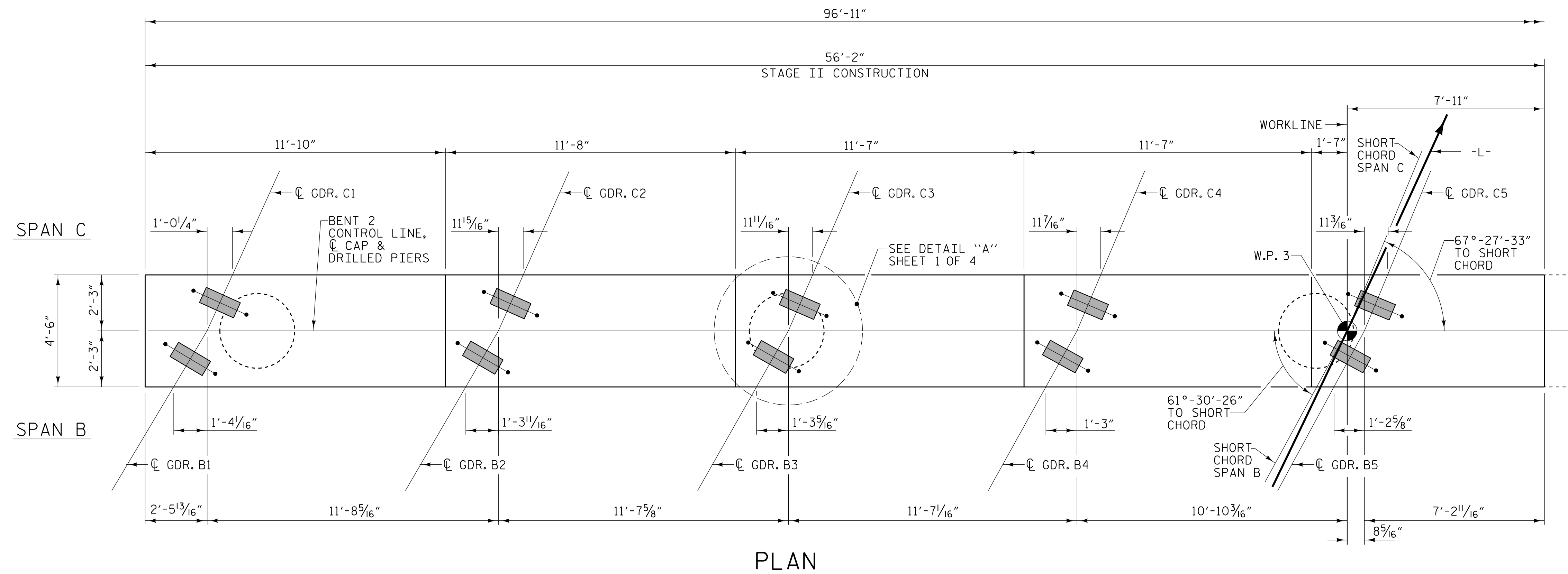
SHEET 1 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
**BENT 2**  
 STAGE I

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-49	
1			3			TOTAL SHEETS	
2			4			63	

5/17/2023 7:03 PM R:\Structures\3 span Bridge over RR\49 US839\_SMU\_B5\_43084.dgn

DRAWN BY: W. B. ALLEN DATE: 5/20  
 CHECKED BY: Z. H. BROWN DATE: 8/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23





PLANS PREPARED BY:

**NV5**

NV5 ENGINEERS & CONSULTANTS, INC.  
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NC License # F-1333

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 2  
 STAGE II

DocuSigned by:

*R. C. Larson*

BE23989220470

PROFESSIONAL ENGINEER  
 ROBERT C. LARSON  
 14114

5/18/2023

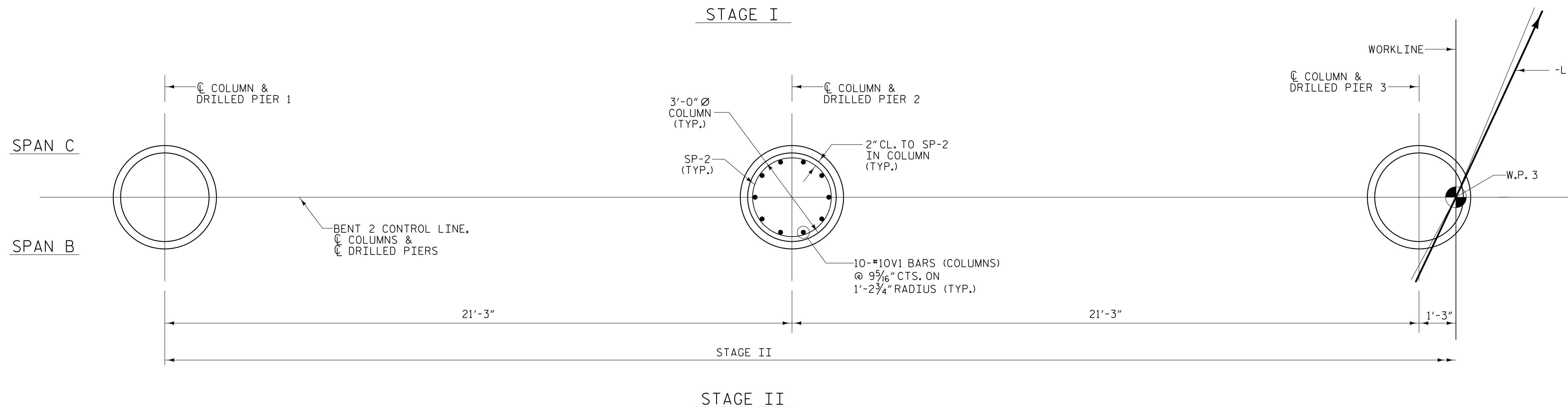
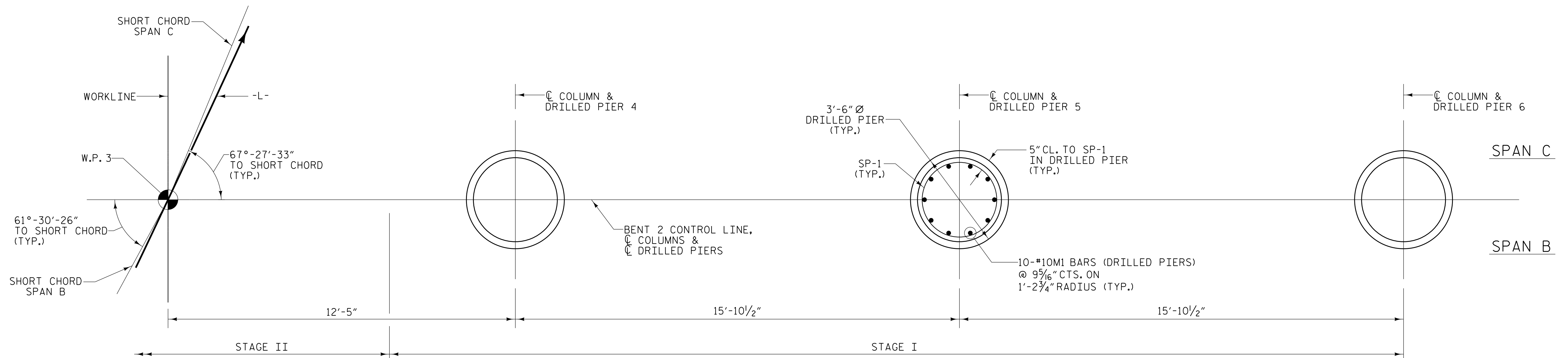
**ELEVATION**  
 (FOR SECTIONS A-A & B-B, SEE SHEET 4 OF 4)

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DRAWN BY: W. B. ALLEN DATE: 5/20  
 CHECKED BY: Z. H. BROWN DATE: 8/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

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PLAN OF COLUMNS & DRILLED PIERS

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

PLANS PREPARED BY:

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DocuSigned by:

*Robert C. Larson*

EEB2398D9220470

SEAL  
 14114  
 PROFESSIONAL ENGINEER  
 ROBERT C. LARSON  
 NC License # F-1333

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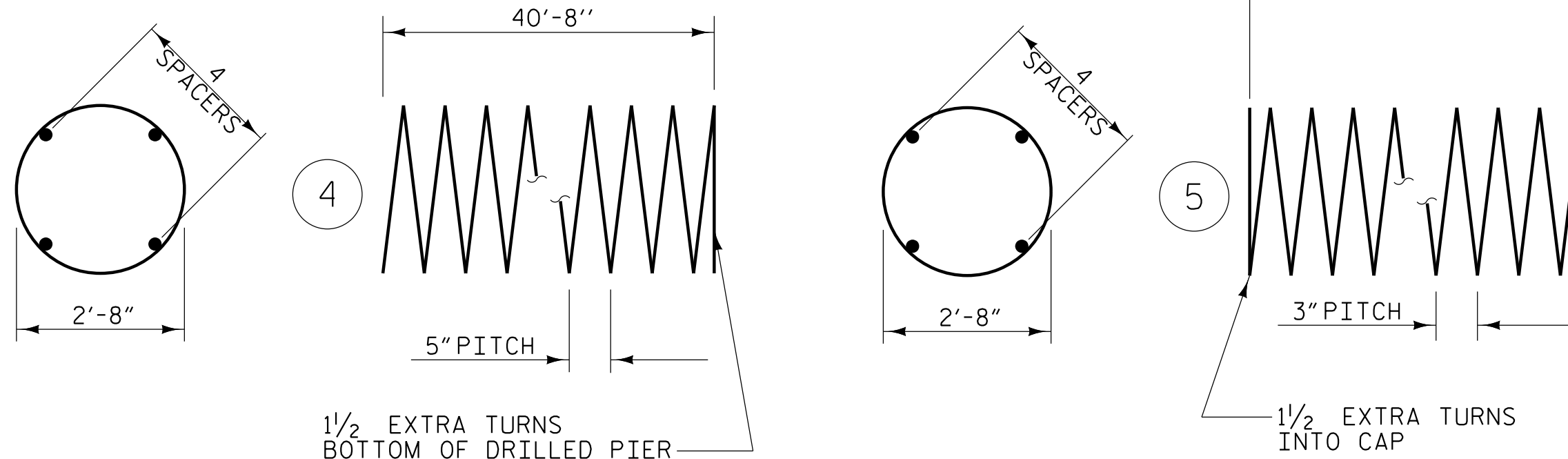
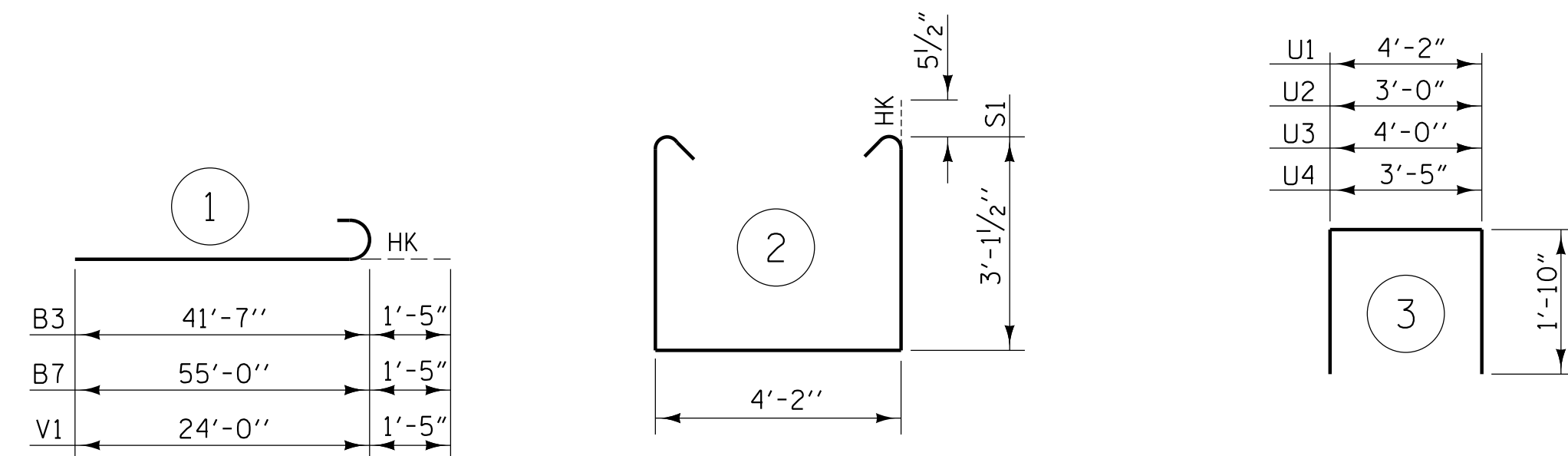
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 CHECKED BY: Z. H. BROWN DATE: 8/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

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*Robert C. Larson*  
 FEB2398D9220470

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BAR TYPES



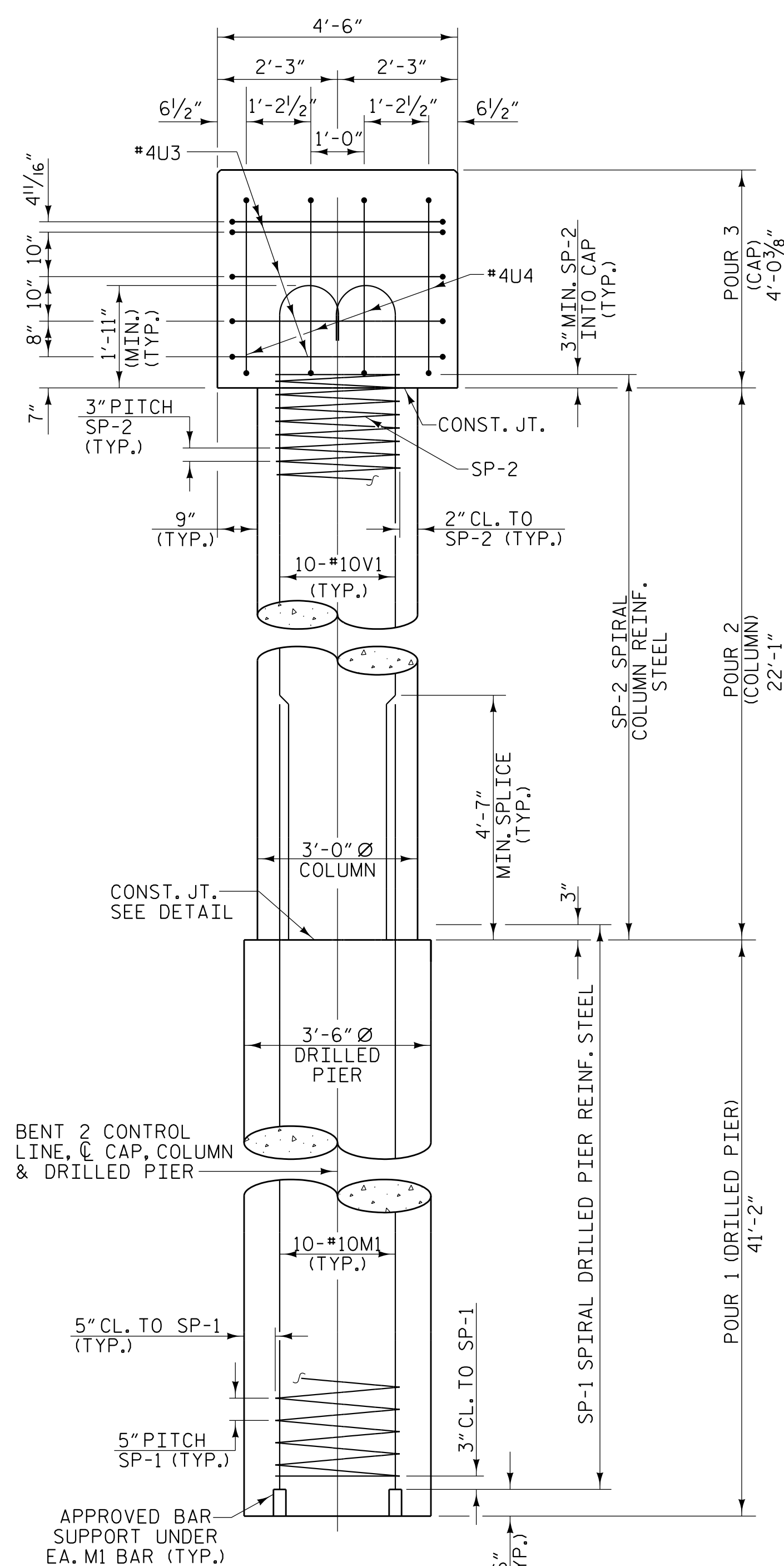
ALL BAR DIMENSIONS ARE OUT TO OUT

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

▲ NO SEPARATE PAYMENT WILL BE MADE FOR CSL TUBES. CSL TUBES WILL BE INCLUDED IN THE UNIT BID PRICE FOR DRILLED PIERS.

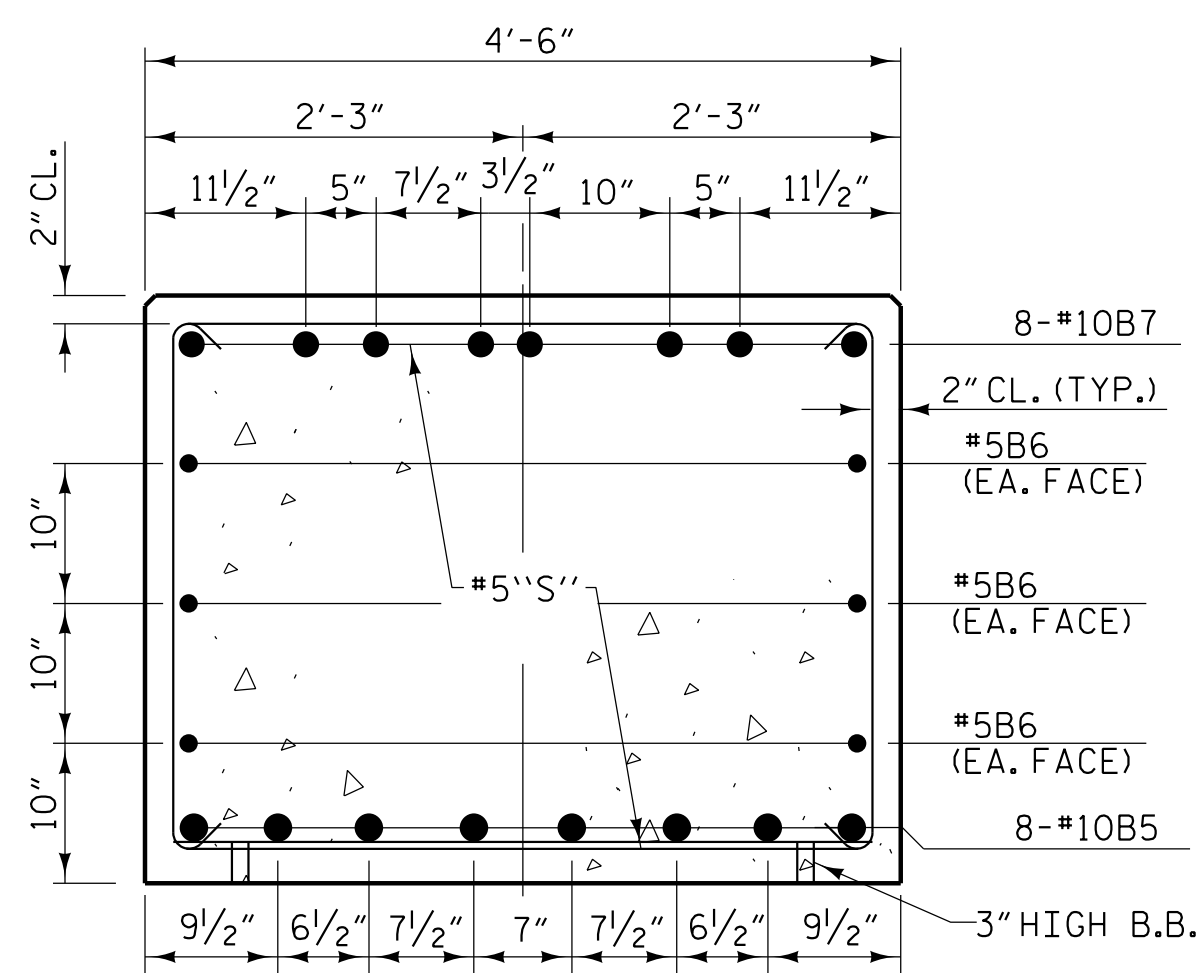
BILL OF MATERIAL

BENT 2 - STAGE I						BENT 2 - STAGE II							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	8	#10	STR	41'-7"	1431	B5	8	#10	STR	55'-0"	1893		
B2	6	#5	STR	43'-8"	273	B6	6	#5	STR	56'-0"	350		
B3	8	#10	1	43'-0"	1480	B7	8	#10	1	56'-5"	1942		
B4	8	#4	STR	40'-0"	214	B8	8	#4	STR	9'-2"	49		
M1	30	#10	STR	48'-3"	6229	M1	30	#10	STR	48'-3"	6229		
S1	45	#5	2	11'-4"	532	S1	52	#5	2	11'-4"	615		
U1	47	#4	3	7'-10"	246	U1	44	#4	3	7'-10"	230		
U3	5	#4	3	7'-8"	26	U2	4	#4	3	6'-8"	18		
U4	4	#4	3	6'-1"	16	U3	4	#4	3	7'-8"	20		
V1	30	#10	1	25'-5"	3281	V1	30	#10	1	25'-5"	3281		
TOTAL REINFORCING STEEL						13728 LBS	TOTAL REINFORCING STEEL						14627 LBS
SP-1	3	**	4	818'-3"	2560	SP-1	3	**	4	818'-3"	2560		
SP-2	3	***	5	749'-5"	1502	SP-2	3	***	5	749'-5"	1502		
SPIRAL COLUMN REINFORCING STEEL (SP) 4062 LBS						SPIRAL COLUMN REINFORCING STEEL (SP) 4062 LBS							
CLASS "A" CONCRETE - CU. YARDS						CLASS "A" CONCRETE - CU. YARDS							
POUR 2 - COLUMN						17.3 CU. YDS.	POUR 2 - COLUMN						17.3 CU. YDS.
POUR 3 - CAP						26.6 CU. YDS.	POUR 3 - CAP						34.0 CU. YDS.
TOTAL						43.9 CU. YDS.	TOTAL						51.3 CU. YDS.
DRILLED PIERS						DRILLED PIERS							
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)						44.0 C.Y.	DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)						44.0 C.Y.
3'-6" Ø DRILLED PIER IN SOIL						73.5 LIN. FT.	3'-6" Ø DRILLED PIER IN SOIL						73.5 LIN. FT.
3'-6" Ø DRILLED PIER NOT IN SOIL						50.0 LIN. FT.	3'-6" Ø DRILLED PIER NOT IN SOIL						50.0 LIN. FT.
▲ CSL TUBES						512.0 LIN. FT.	▲ CSL TUBES						512.0 LIN. FT.

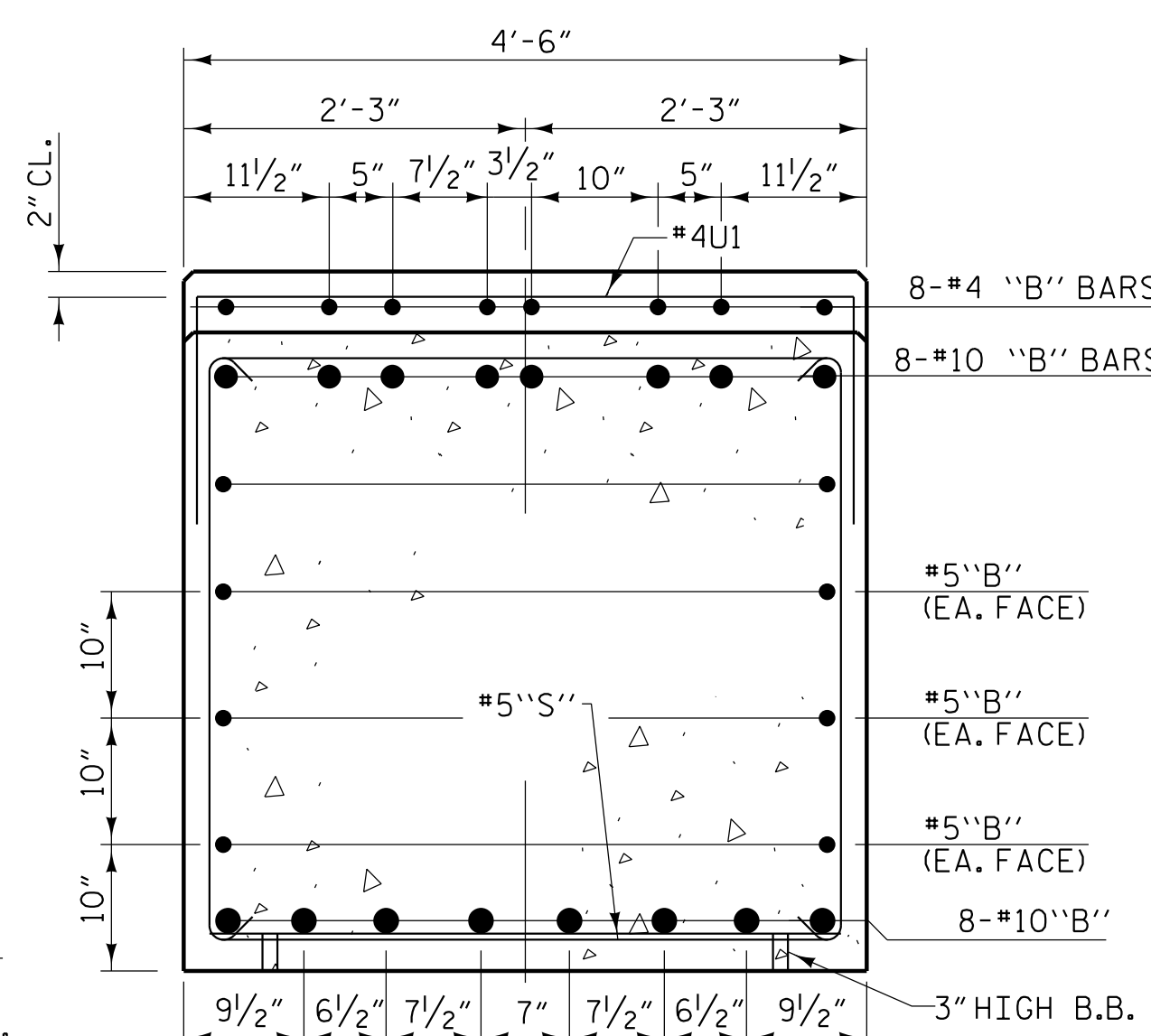


RIGHT END ELEVATION

CONSTRUCTION JOINT DETAIL



SECTION A-A



SECTION B-B

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
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 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

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PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 2

REVISIONS

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

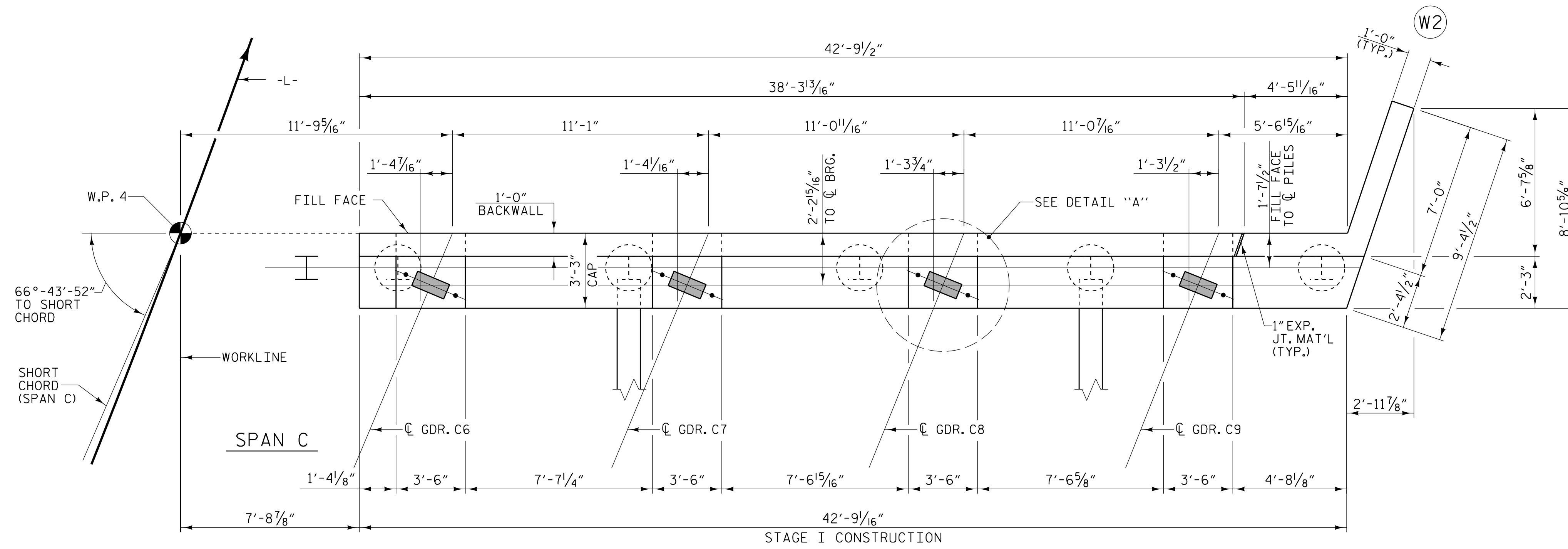
SHEET NO.

S1-52  
 TOTAL SHEETS  
 63

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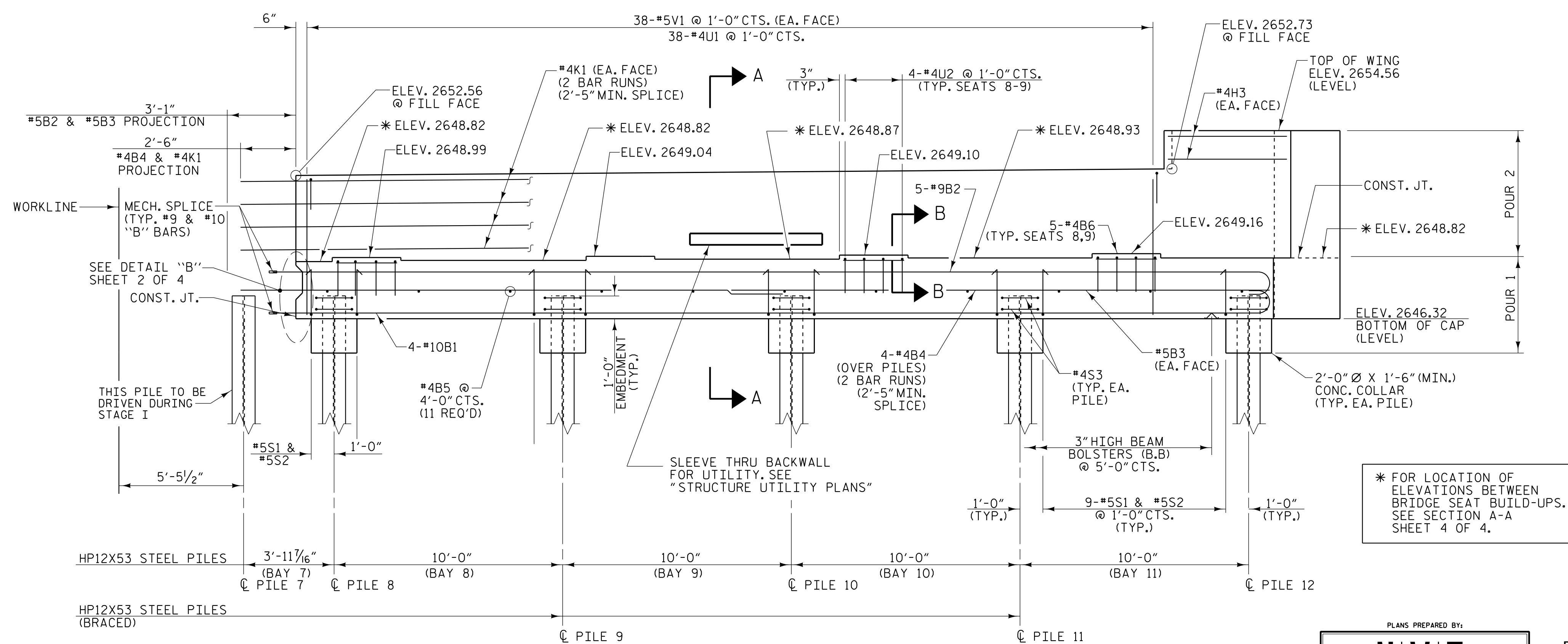
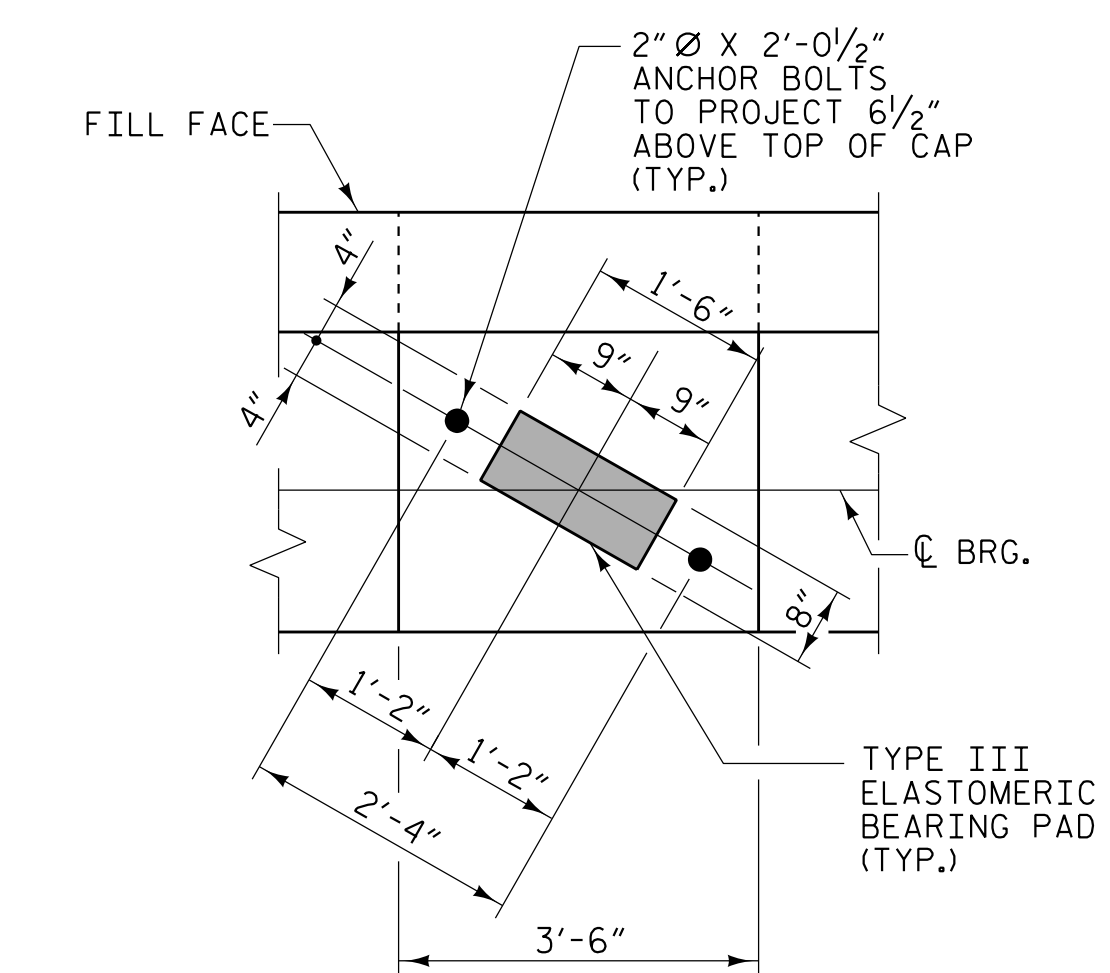
**NOTES**

STIRRUPS AND U2 BARS IN THE CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREA OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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



\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS. SEE SECTION A-A SHEET 4 OF 4.

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2  
 STAGE I

PLANS PREPARED BY:

**N|V|5**

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 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

DocuSigned by:

BEE2398D9220470

SEAL  
 1414  
 PROFESSIONAL ENGINEER  
 ROBERT C. LARSON

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-53
1			3			TOTAL SHEETS
2			4			63

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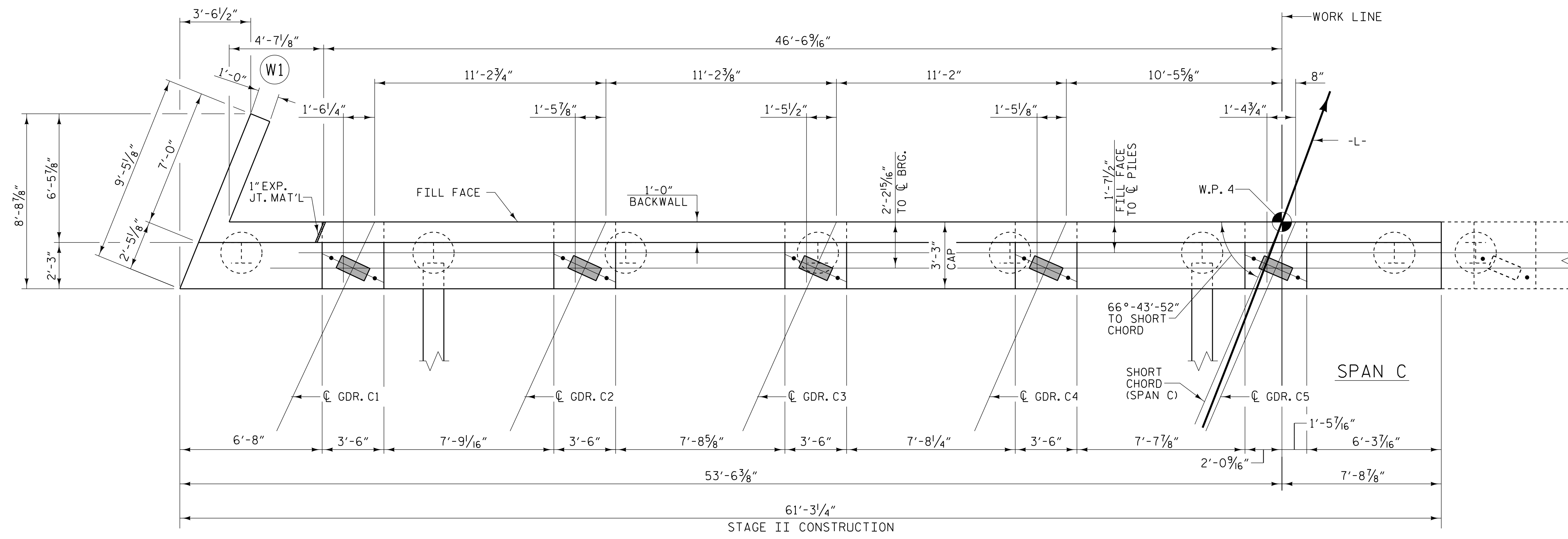
5/18/2023

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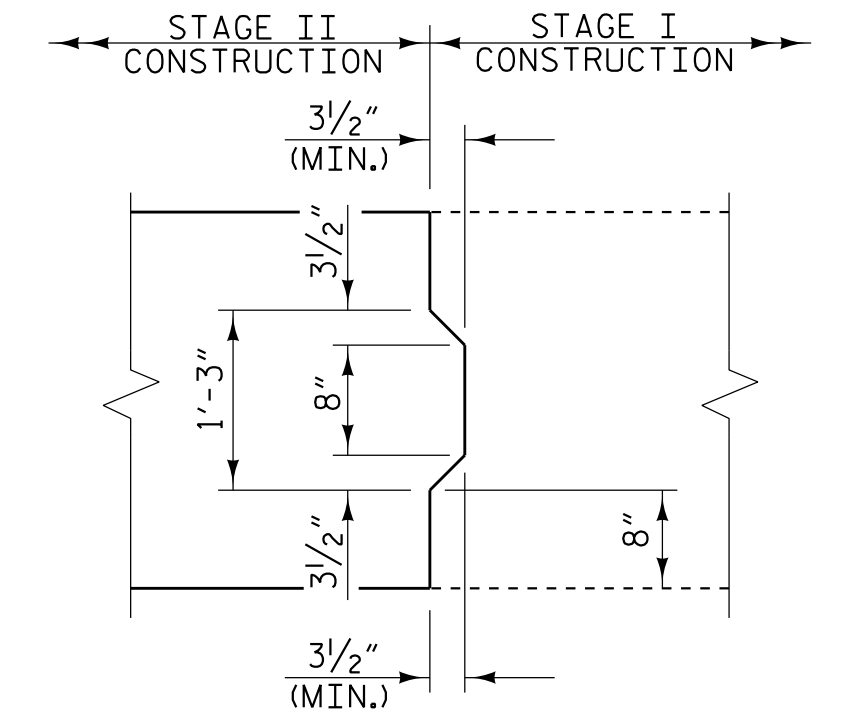
DRAWN BY : W. B. ALLEN DATE : 5/20  
 CHECKED BY : Z. H. BROWN DATE : 6/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 4/23

DocuSigned by:

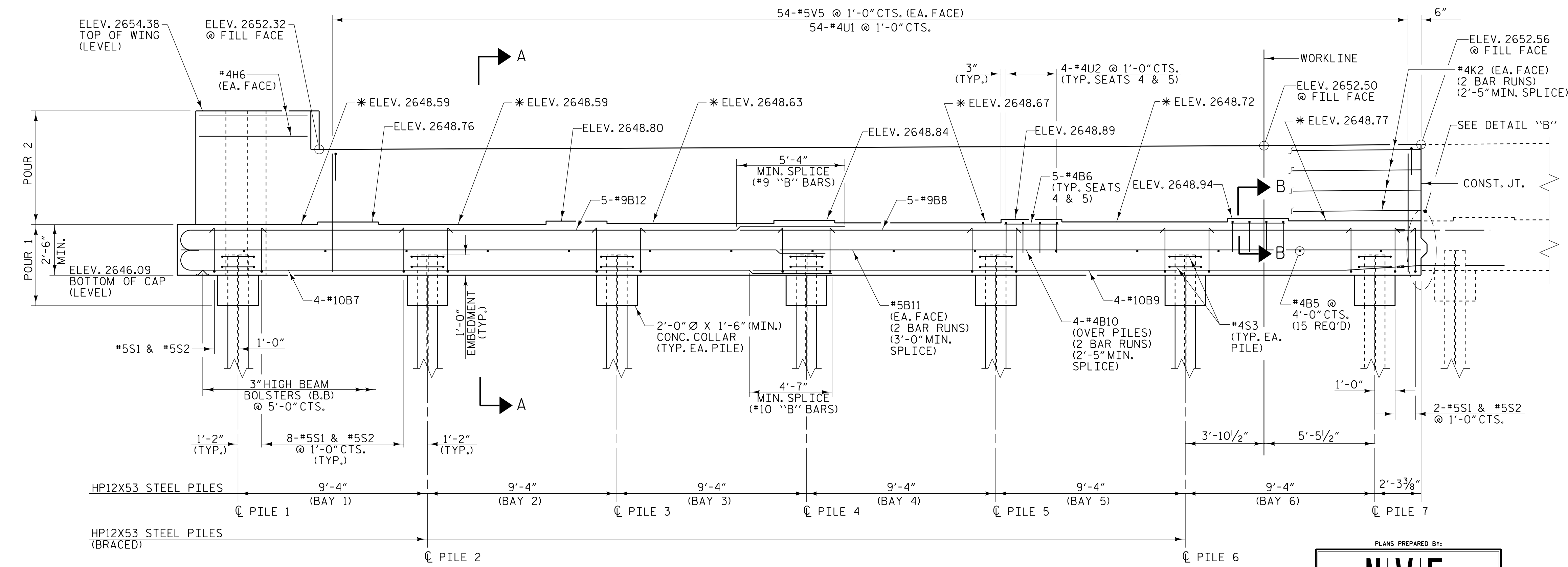
BEB2398D9220470



PLAN



DETAIL "B"



ELEVATION

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS. SEE SECTION A-A SHEET 4 OF 4.

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2  
 STAGE II

PLANS PREPARED BY:  
**NV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
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DocuSigned by:  
 BEB23809220470  
 SEAL  
 1414  
 ENGINEER  
 ROBERT C. LARSON  
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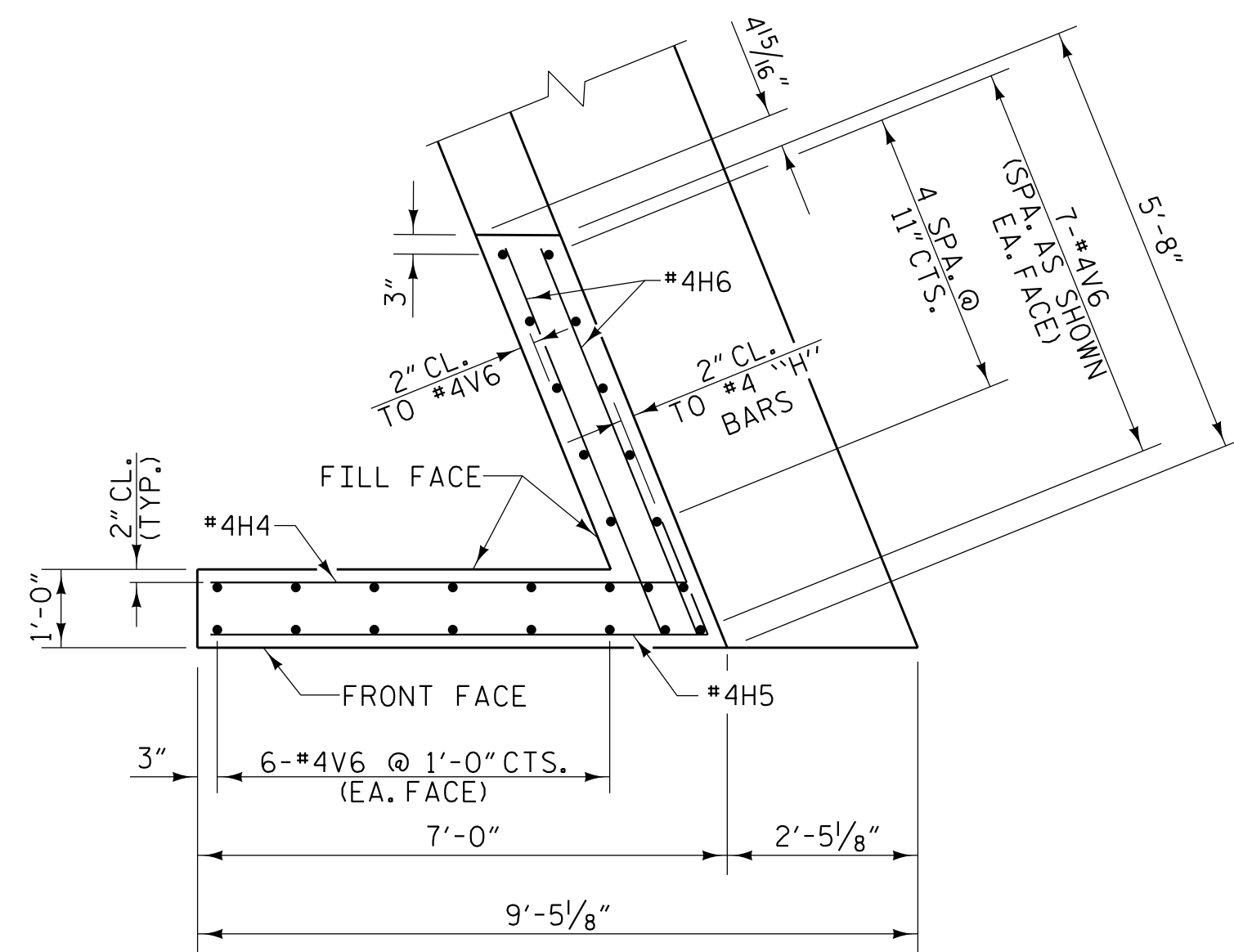
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

DRAWN BY: W. B. ALLEN DATE: 5/20  
 CHECKED BY: Z. H. BROWN DATE: 6/20  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

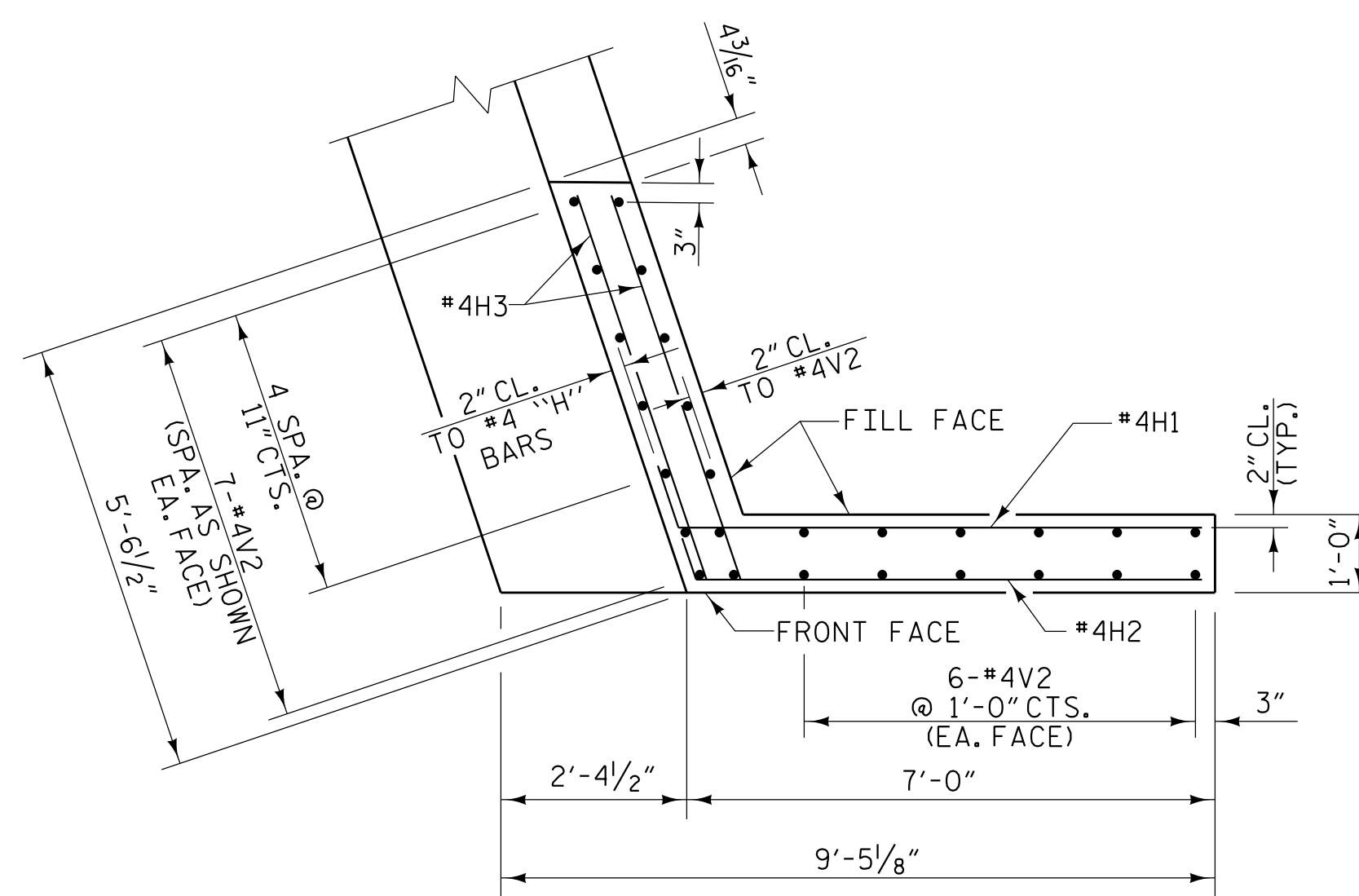
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5/18/2023

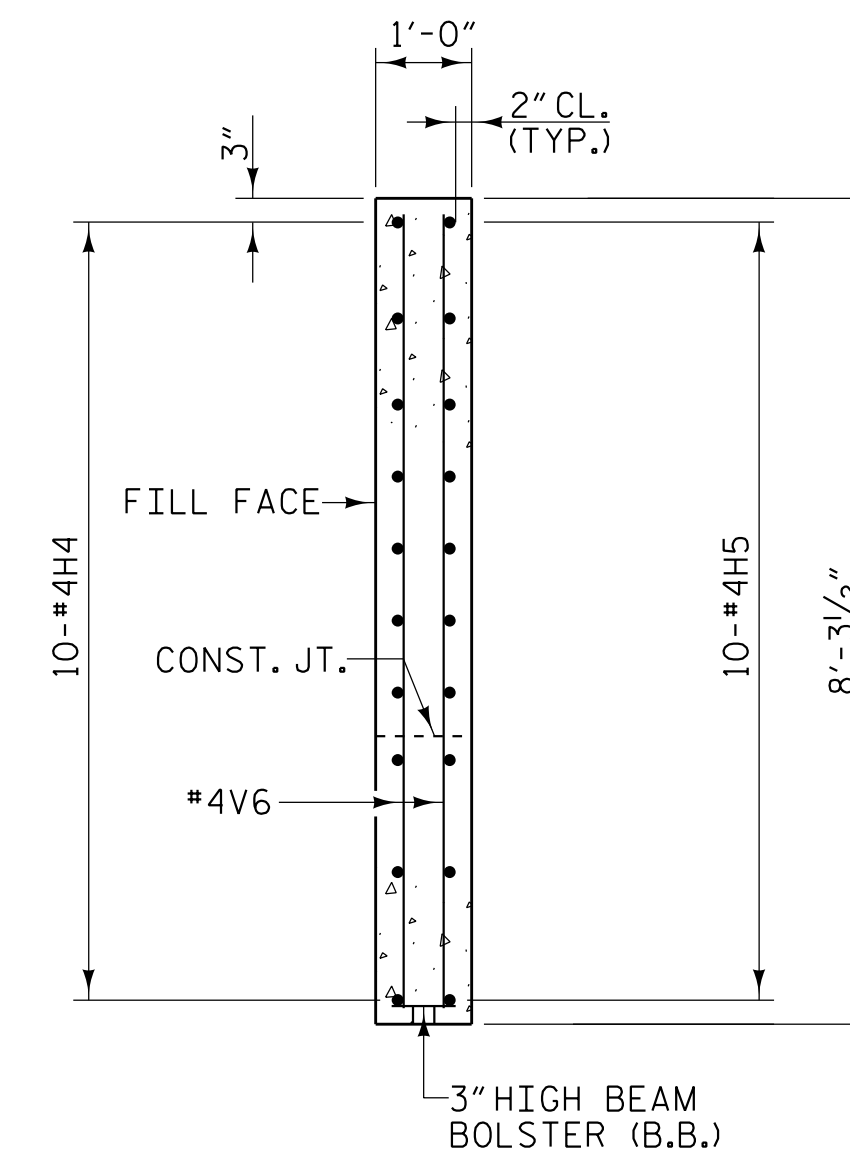
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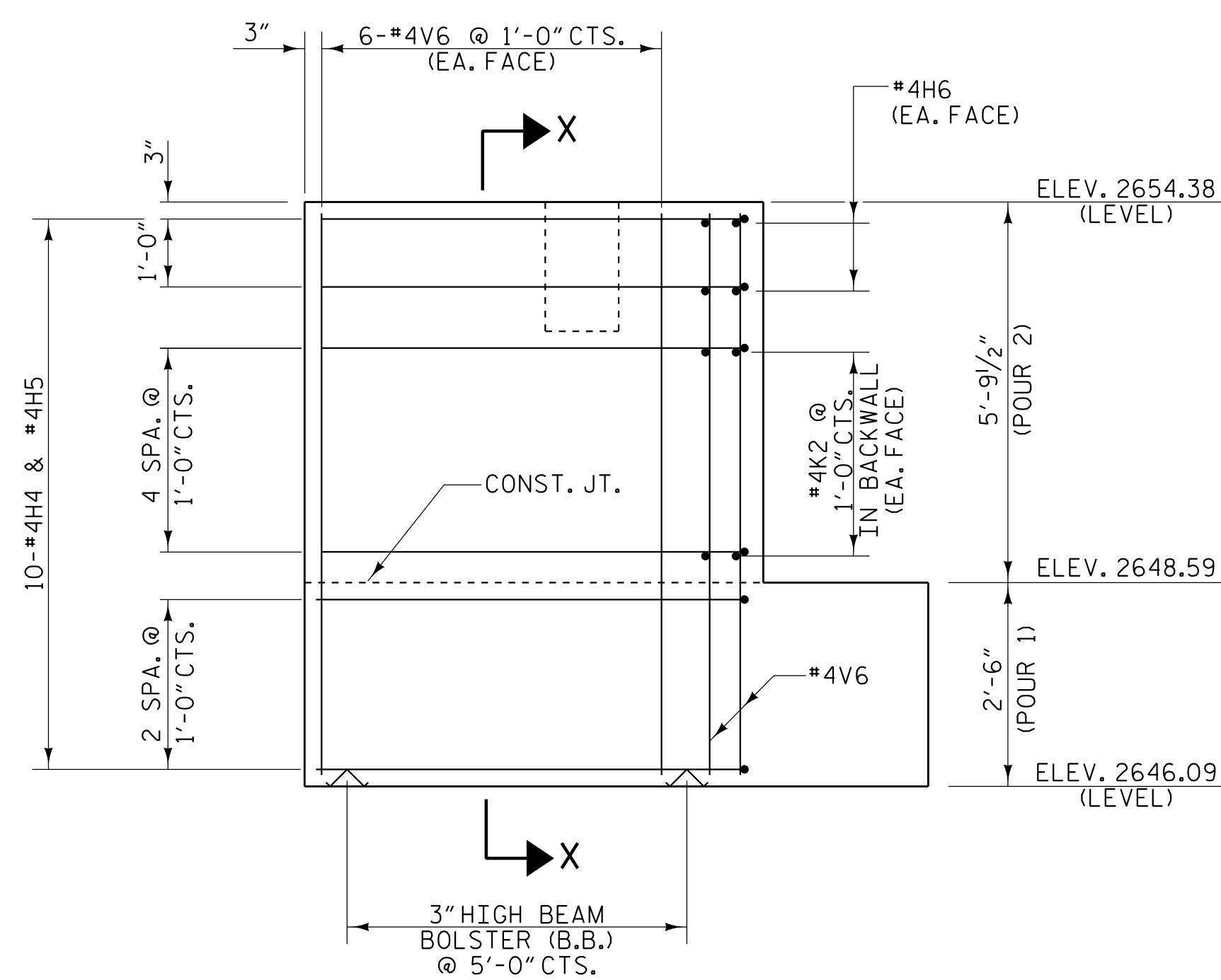
**PLAN OF LEFT WING - W1**  
(STAGE II CONSTRUCTION)



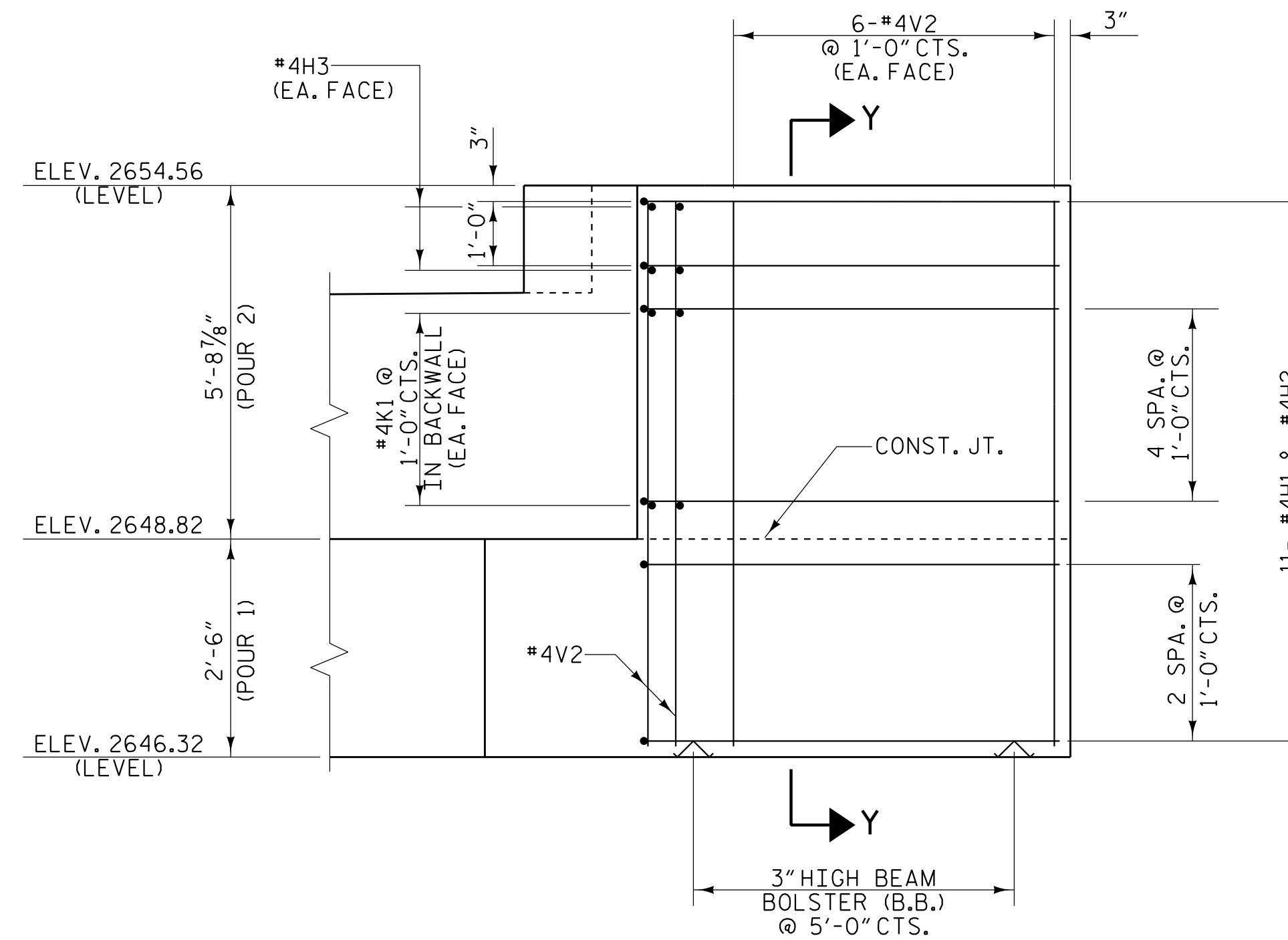
**PLAN OF RIGHT WING - W2**  
(STAGE I CONSTRUCTION)



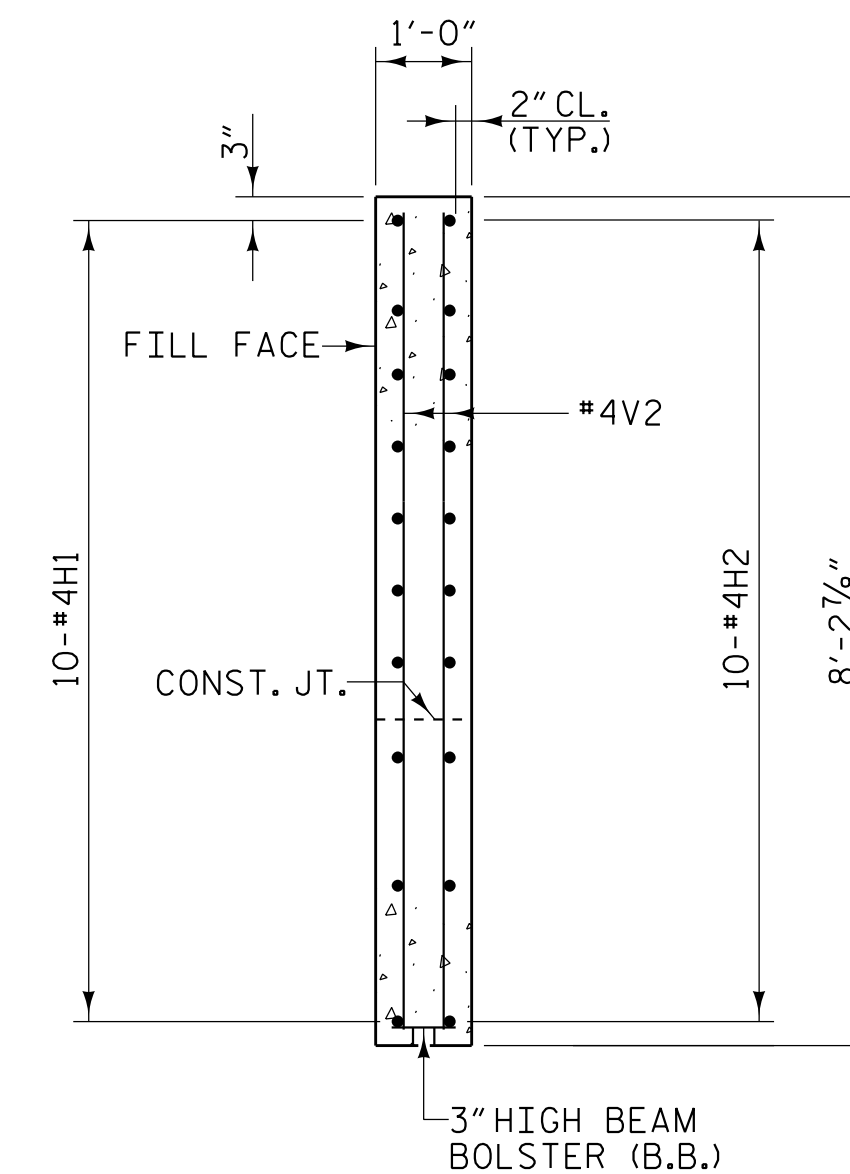
**SECTION X-X**



**ELEVATION OF LEFT WING - W1**  
(STAGE II CONSTRUCTION)



**ELEVATION OF RIGHT WING - W2**  
(STAGE I CONSTRUCTION)



**SECTION Y-Y**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2  
 WING DETAILS

REVISIONS

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

SHEET NO.  
 S1-55  
 TOTAL SHEETS  
 63

5/17/2023 7:06 PM R:\Structures\3 span Bridge over RRV55 US519 SMU.E7\_43084.dgn

DRAWN BY: W. B. ALLEN DATE: 6/20  
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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:  
 R. Larson  
 BEB2398D9220470...

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.nv5.com  
 NC License # F-1333

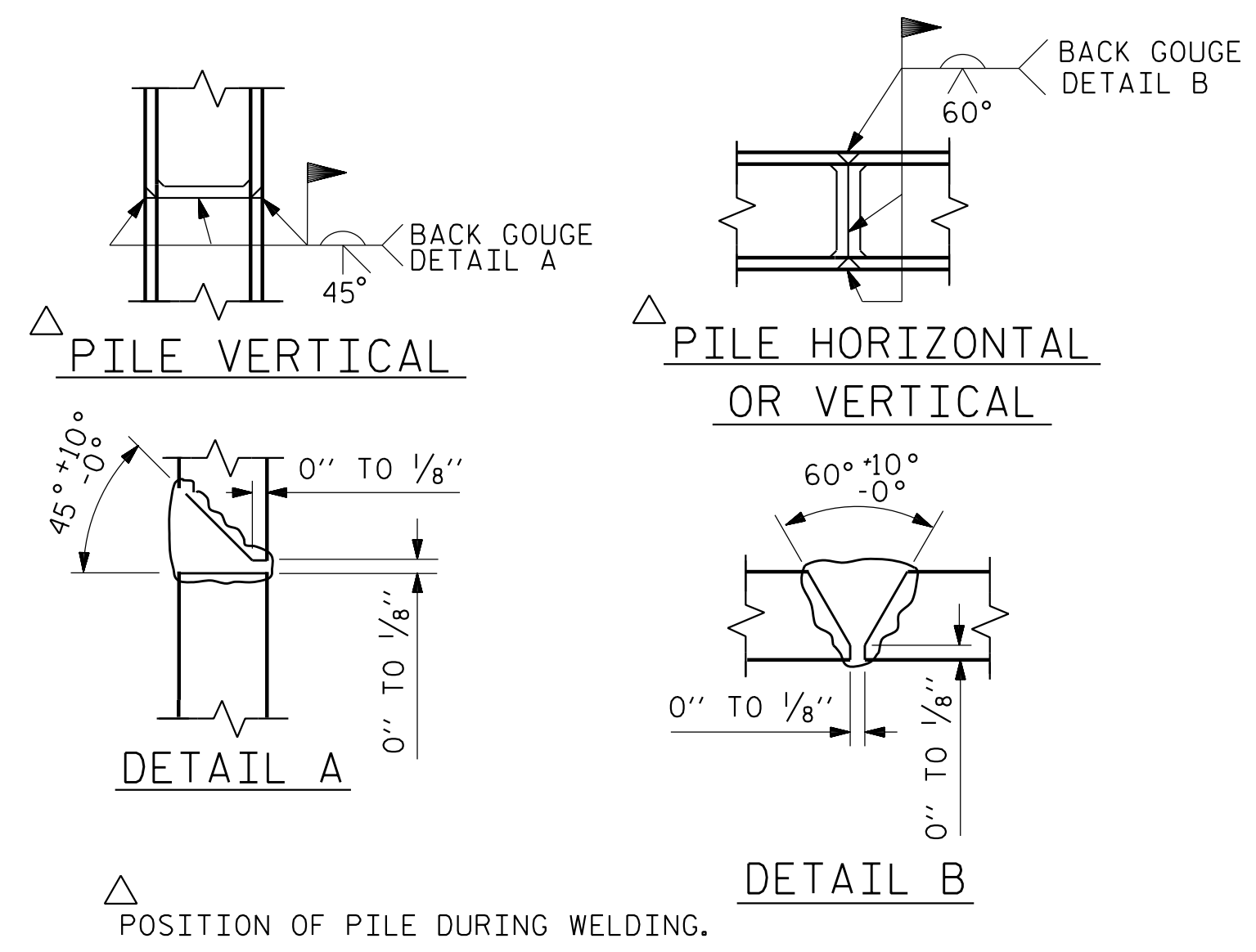
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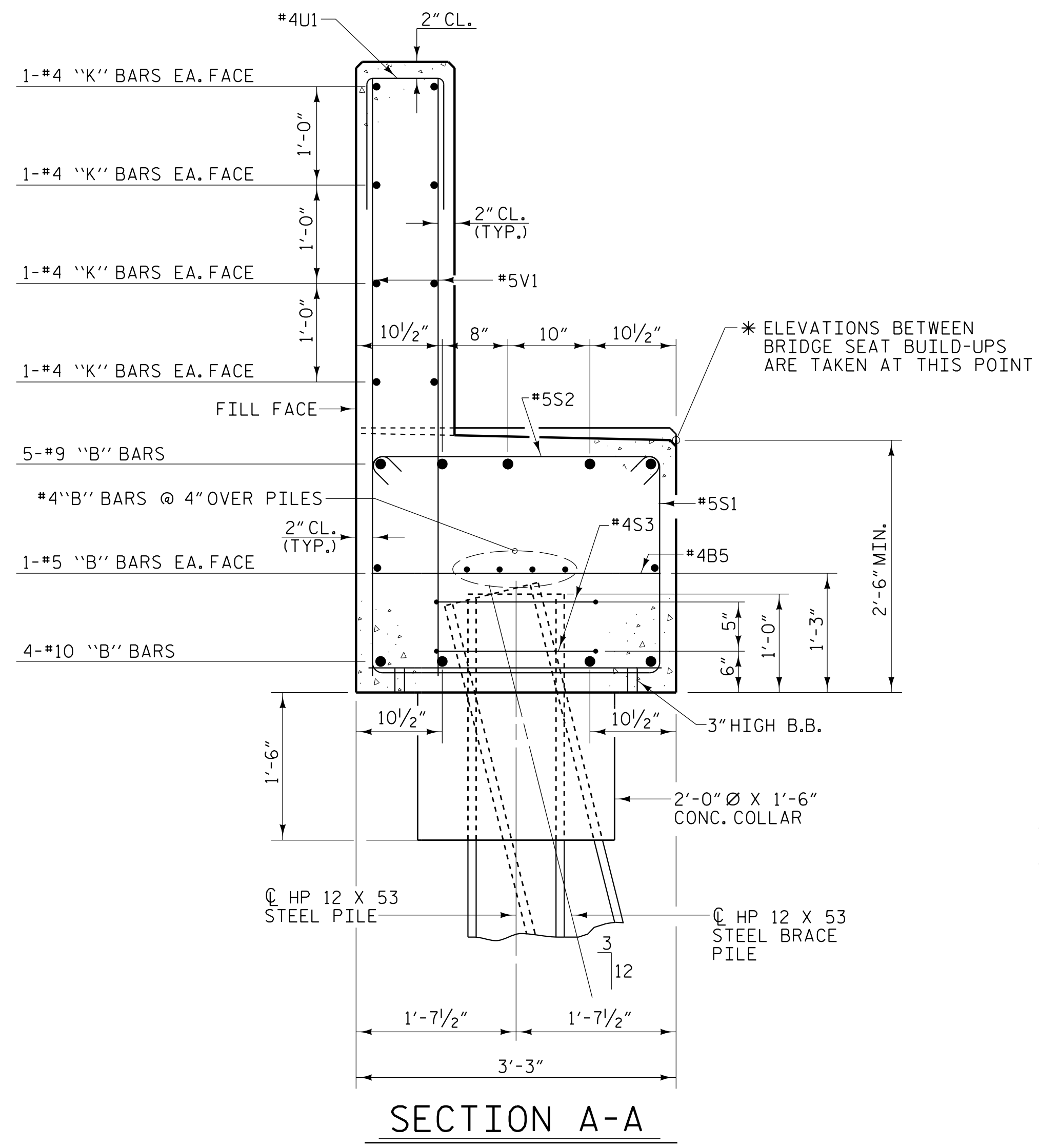
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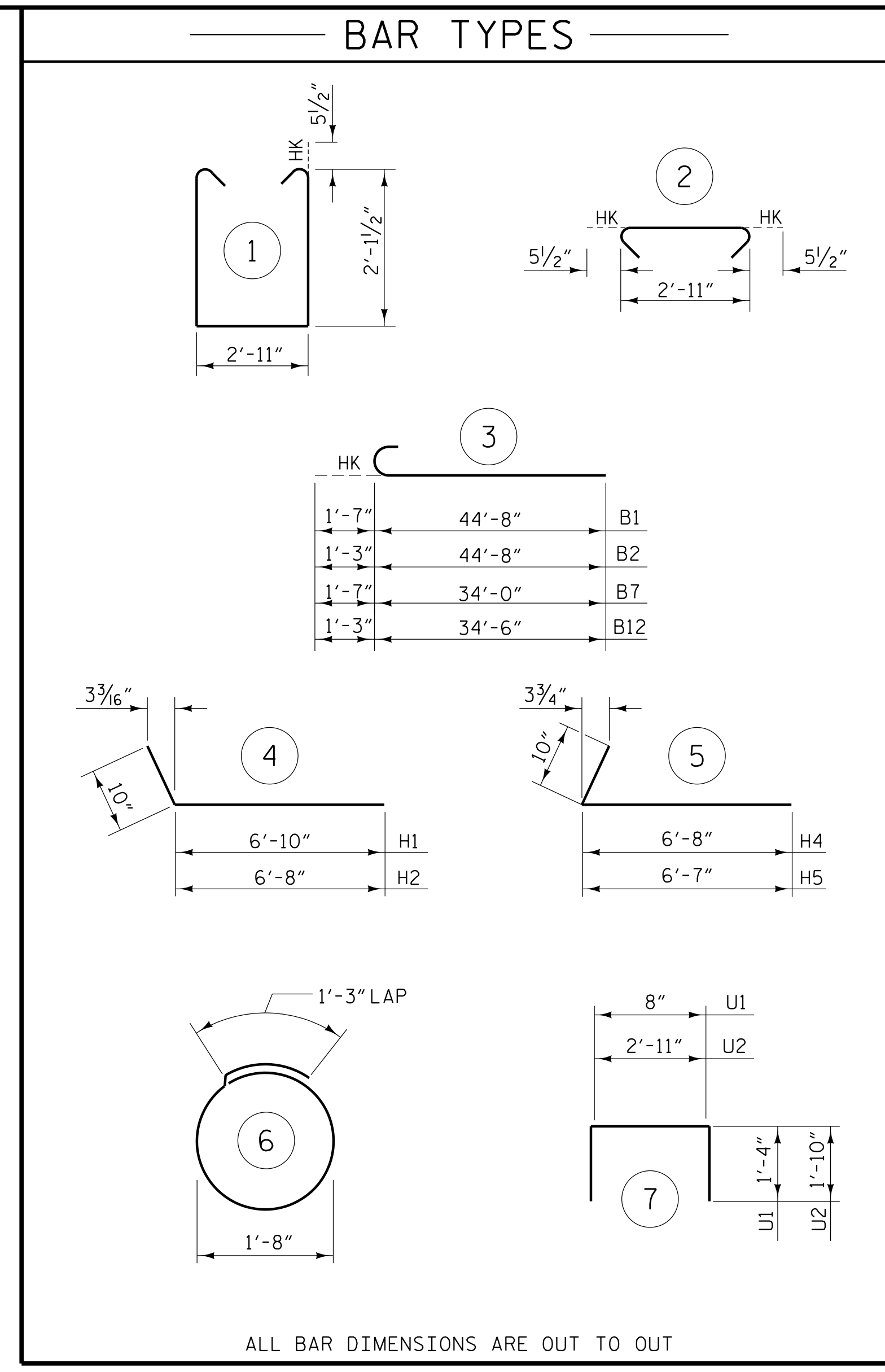




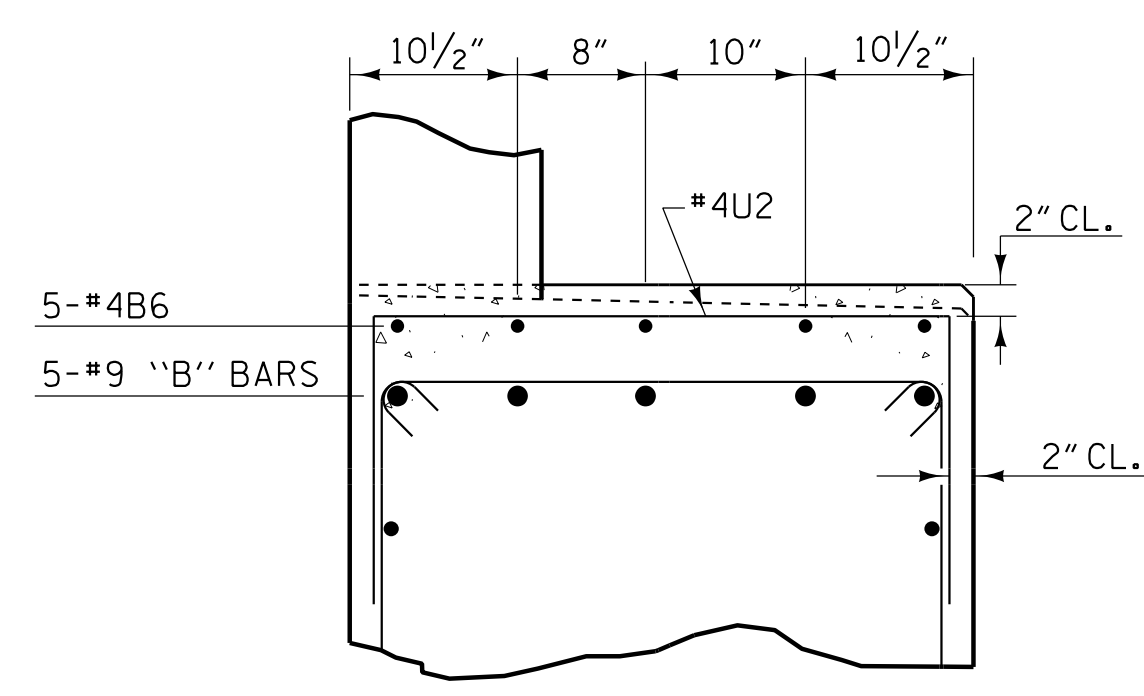
PILE SPLICE DETAILS



SECTION A-A



PART SECTION B-B



END BENT 2-STAGE I						END BENT 2-STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	3	46'-3"	796	B5	15	#4	STR	2'-11"	29
B2	5	#9	3	45'-11"	781	B6	10	#4	STR	3'-2"	14
B3	2	#5	STR	46'-9"	98	B7	4	#10	3	35'-7"	612
B4	8	#4	STR	24'-4"	130	B8	5	#9	STR	32'-0"	544
B5	11	#4	STR	2'-11"	21	B9	4	#10	STR	31'-9"	546
B6	10	#4	STR	3'-2"	21	B10	8	#4	STR	31'-9"	170
						B11	8	#5	STR	32'-0"	267
H1	10	#4	4	7'-8"	51	B12	5	#9	3	35'-9"	608
H2	10	#4	4	7'-6"	50						
H3	4	#4	STR	5'-2"	14	H4	10	#4	5	6'-6"	43
						H5	10	#4	5	7'-5"	50
K1	8	#4	STR	24'-4"	130	H6	4	#4	STR	5'-3"	14
S1	37	#5	1	8'-1"	312	K2	8	#4	STR	25'-3"	135
S2	37	#5	2	3'-10"	148						
S3	10	#4	6	6'-6"	43	S1	51	#5	1	8'-1"	430
						S2	51	#5	2	3'-10"	204
U1	38	#4	7	3'-4"	85	S3	14	#4	6	6'-6"	61
U2	8	#4	7	6'-7"	35						
V1	76	#5	STR	5'-10"	462	U1	54	#4	7	3'-4"	120
V2	26	#4	STR	7'-10"	136	U2	8	#4	7	6'-7"	35
						V5	108	#5	STR	5'-10"	657
						V6	26	#4	STR	7'-11"	137
TOTAL REINFORCING STEEL 3313 LBS.						TOTAL REINFORCING STEEL 4683 LBS.					
CLASS "A" CONCRETE - CU. YARDS						CLASS "A" CONCRETE - CU. YARDS					
POUR 1 (CAP, COLLARS, LOWER WINGS) 14.6 CU. YDS.						POUR 1 (CAP, COLLARS, LOWER WINGS) 20.5 CU. YDS.					
POUR 2 (UPPER WINGS & BACKWALL) 7.8 CU. YDS.						POUR 2 (UPPER WINGS & BACKWALL) 9.9 CU. YDS.					
TOTAL 22.4 CU. YDS.						TOTAL 30.4 CU. YDS.					
HP 12 X 53 STEEL PILES 6 PILES REQUIRED - LIN. FEET 330						HP 12 X 53 STEEL PILES 6 PILES REQUIRED - LIN. FEET 330					
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES - EACH 6						PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES - EACH 6					

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 4 OF 4  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
END BENT 2  
DETAILS

PLANS PREPARED BY:

**NV5**

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P: 919.851.1912 www.NV5.com  
NC License # F-1333

DocuSigned by:

BE32398D920470

STATE OF NORTH CAROLINA  
PROFESSIONAL ENGINEER  
SEAL 1414  
ROBERT C. LARSON

5/18/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-56
1			3			TOTAL SHEETS 63
2			4			

DRAWN BY: W. B. ALLEN DATE: 6/20  
CHECKED BY: Z. H. BROWN DATE: 6/20  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

DocuSigned by:

BE32398D920470

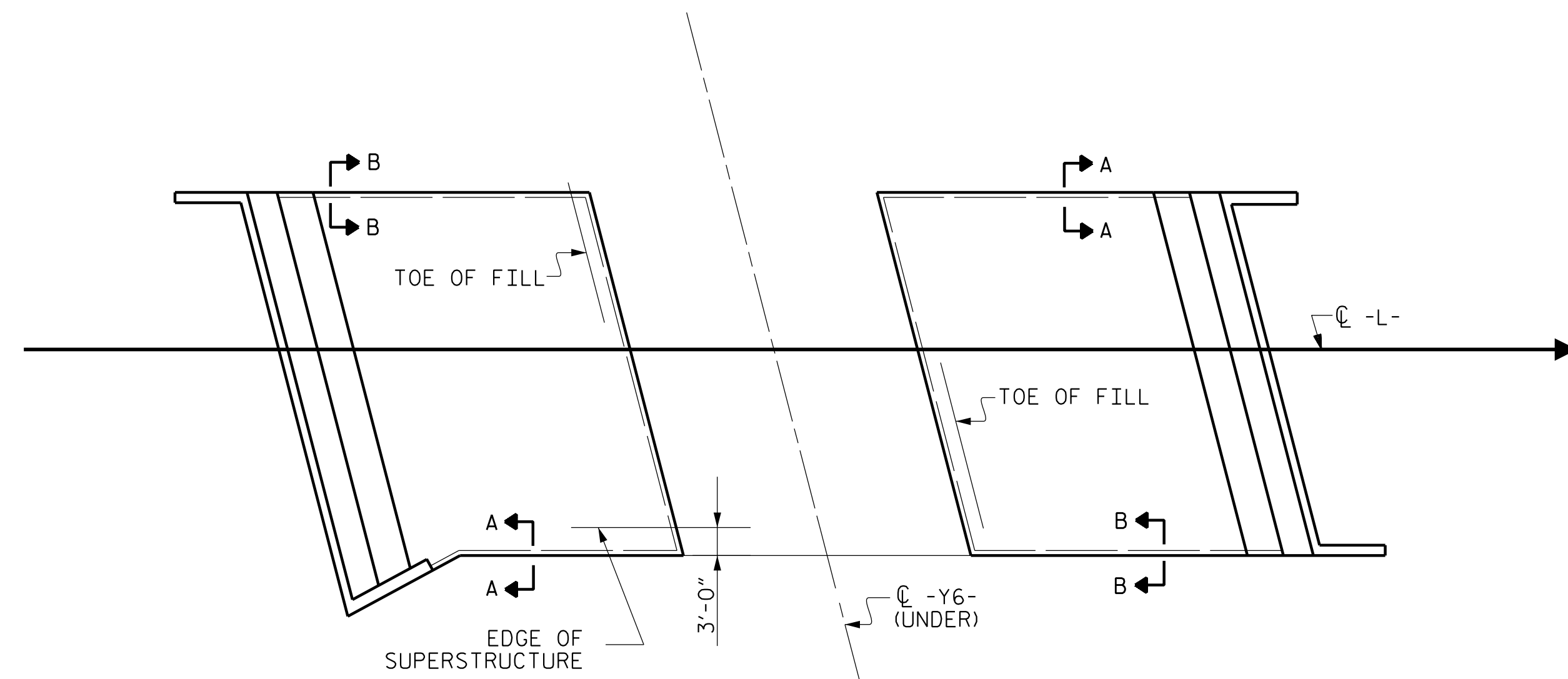
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**GENERAL NOTES**

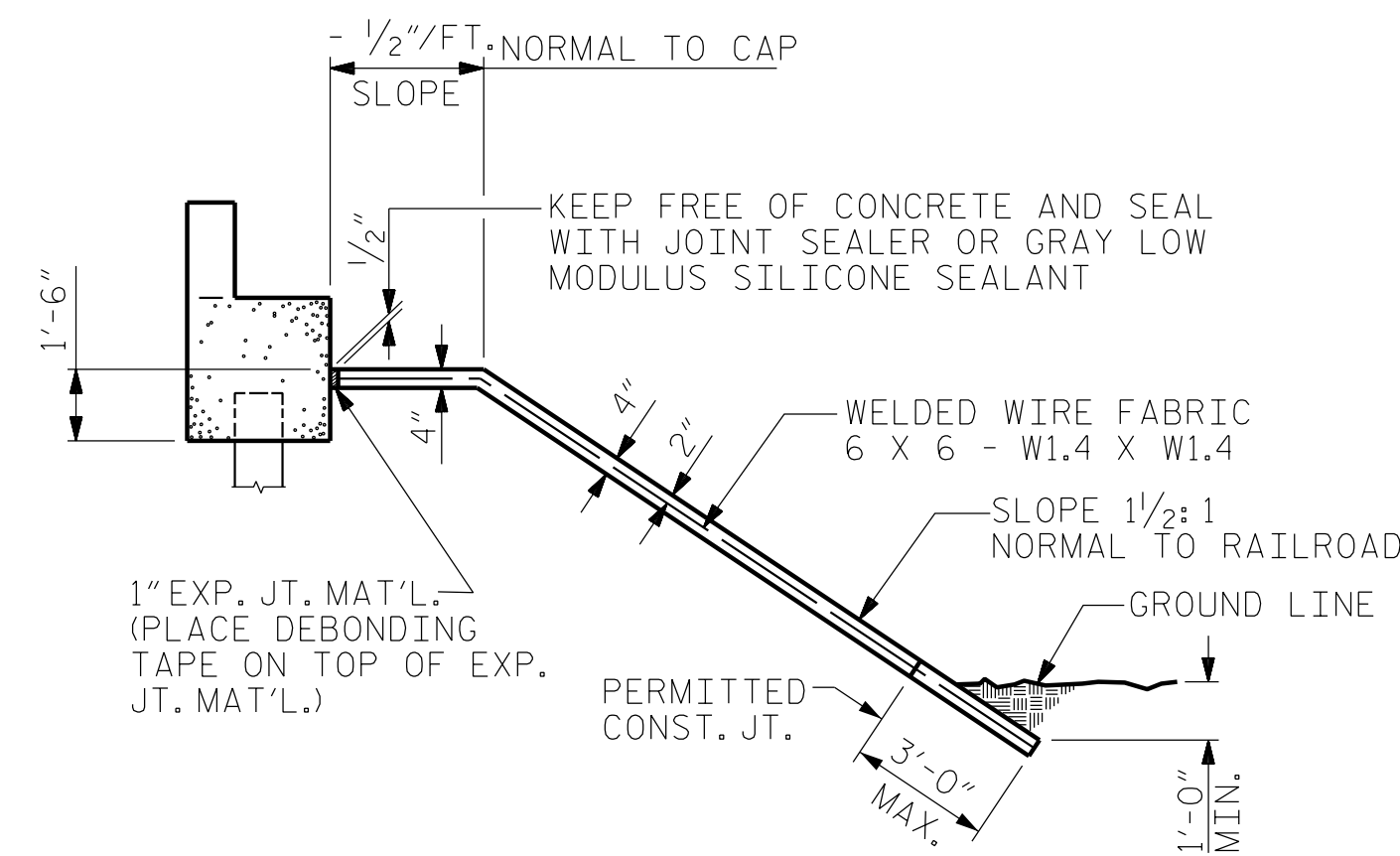
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 24+64.13 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	600	1080
END BENT 2	520	940

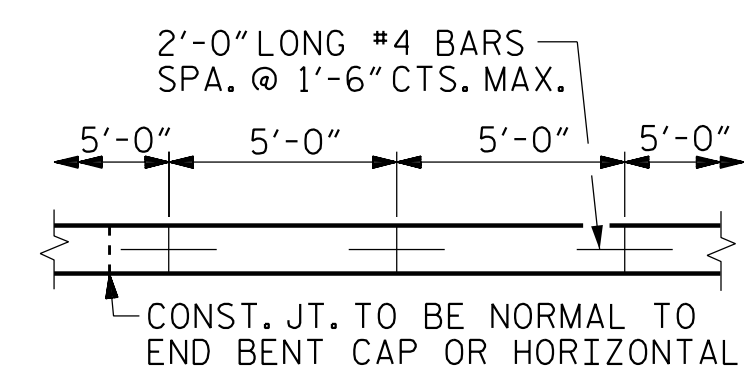
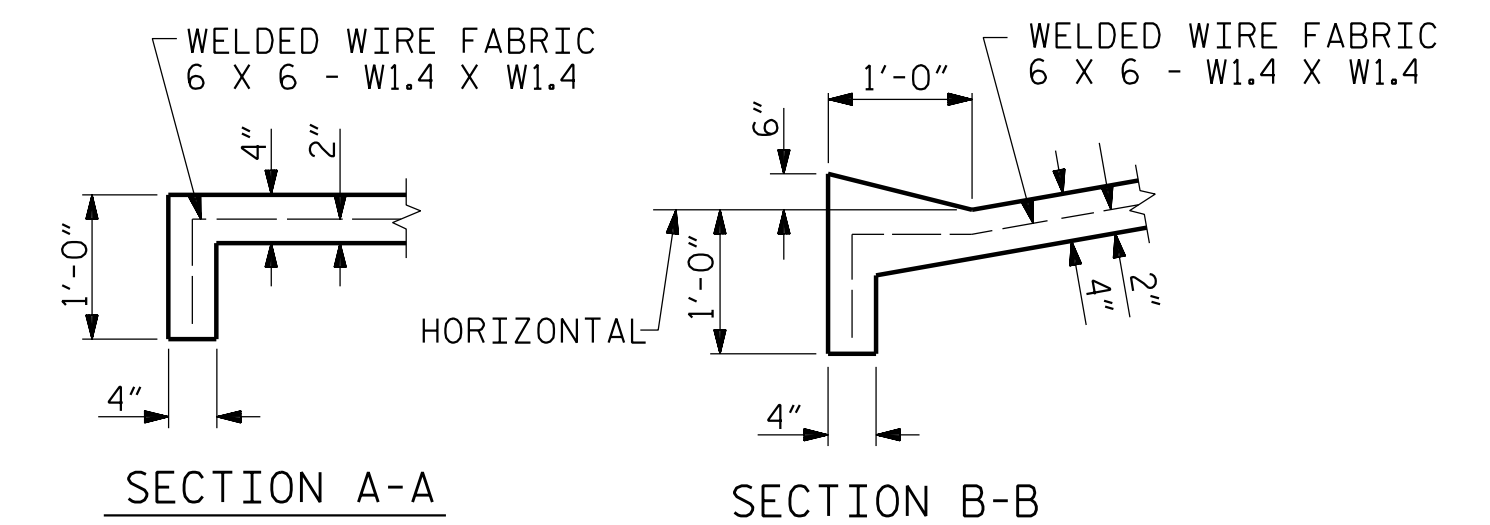
\* QUANTITY SHOWN IS BASED ON 5' POURS.



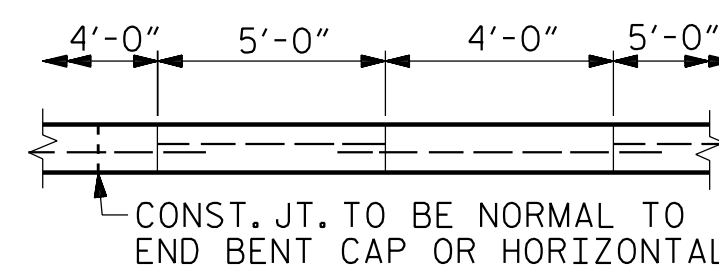
**PLAN**



**SECTION ALONG C-L SURVEY WHEN DITCH IS NOT PROVIDED**



**POURING DETAIL**



**OPTIONAL POURING DETAIL**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**STANDARD  
 SLOPE PROTECTION  
 DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

S1-57

PLANS PREPARED BY:

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 CARY, NC 27518  
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 NC License # F-1333

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

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5/18/2023

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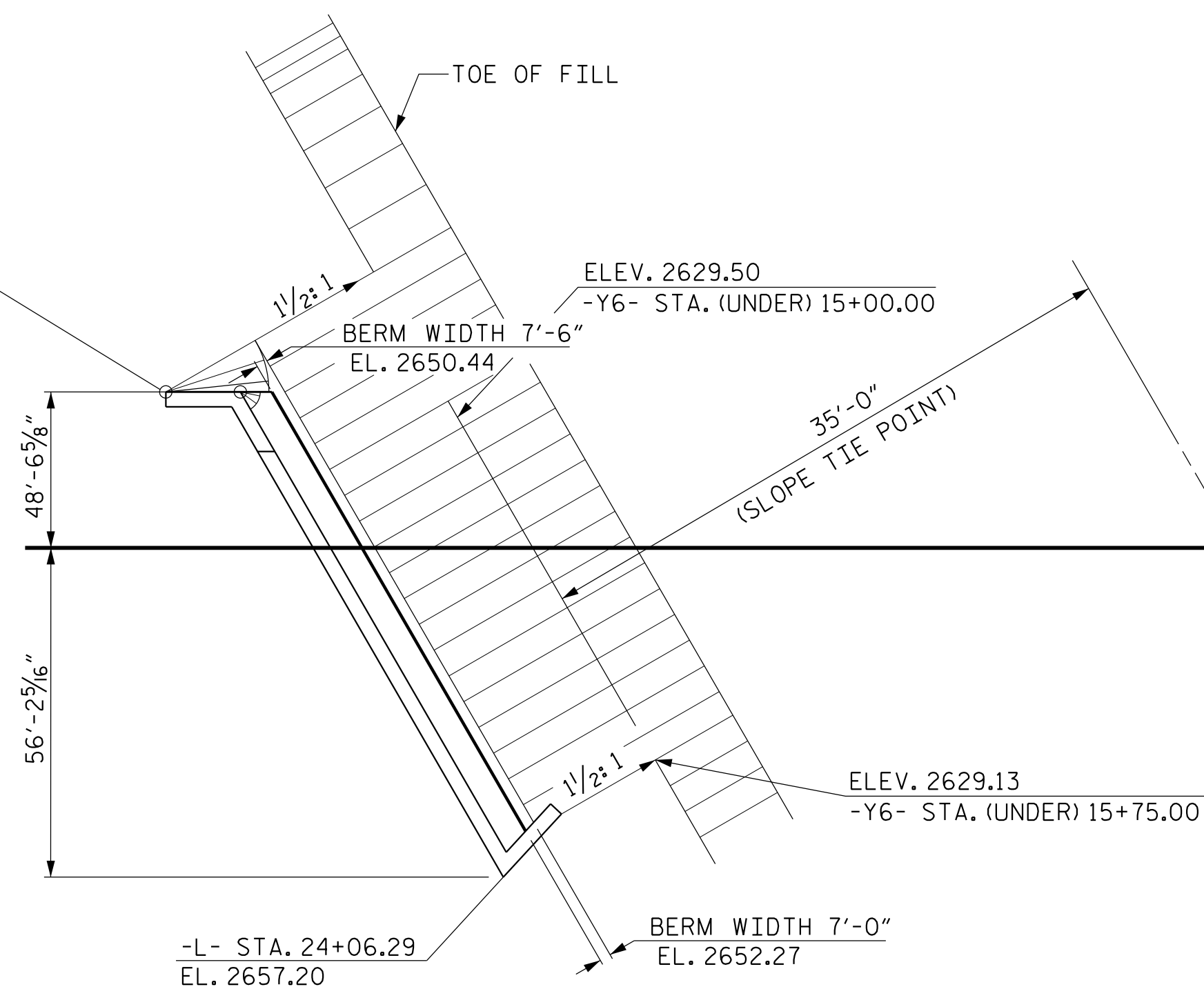
DESIGN ENGINEER OF RECORD : **R. C. LARSON**

ASSEMBLED BY : **W. B. ALLEN** DATE : 1/20  
 CHECKED BY : **Z. H. BROWN** DATE : 7/20

DRAWN BY : ELR 5/92 MAA/GM  
 CHECKED BY : GRP 6/92 REV. 12/21/11 MAA/TMG  
 REV. 1/16 MAA/THC  
 REV. 12/17

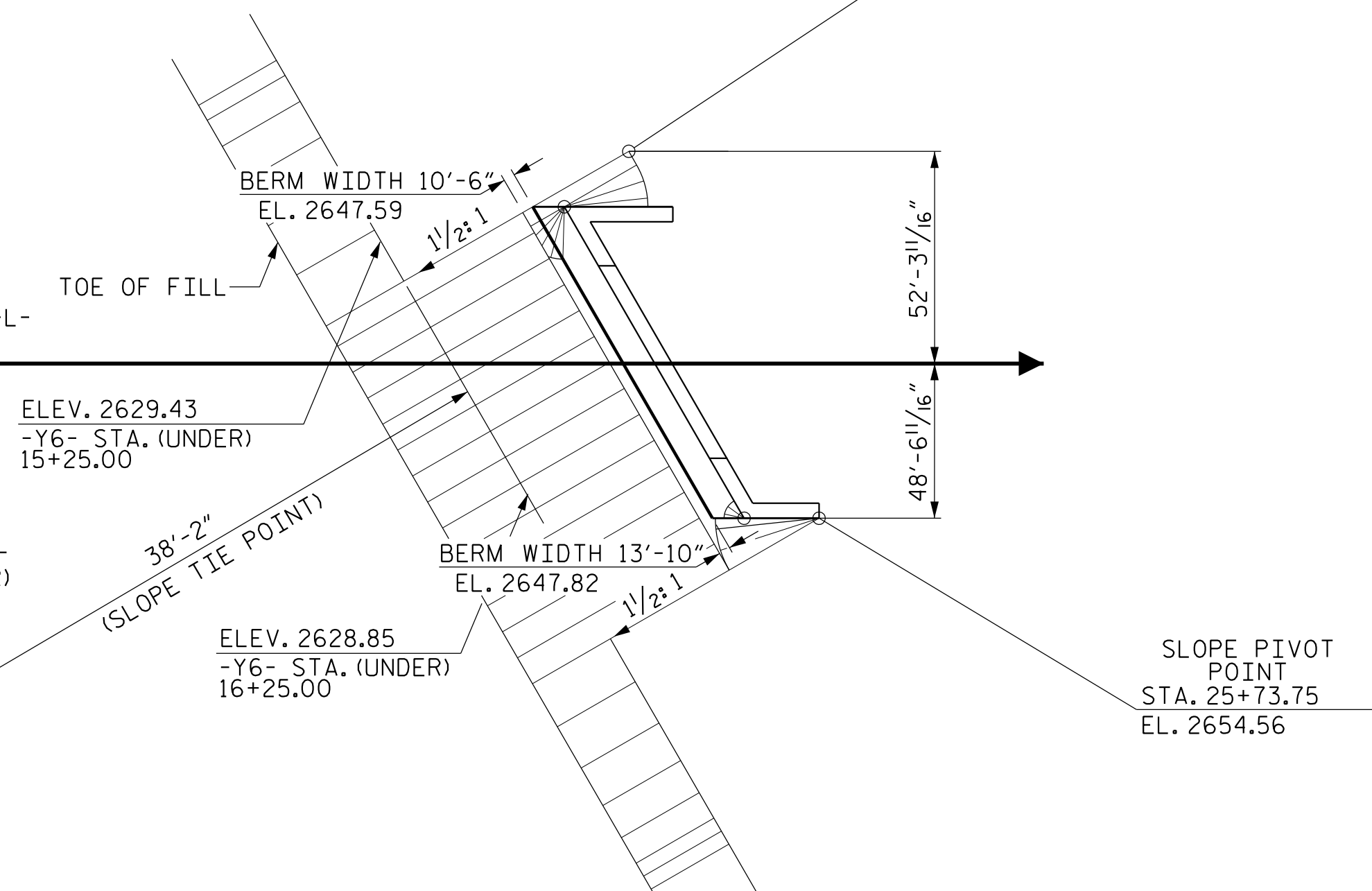
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SLOPE PIVOT POINT  
-L- STA. 23+27.21  
EL. 2657.58



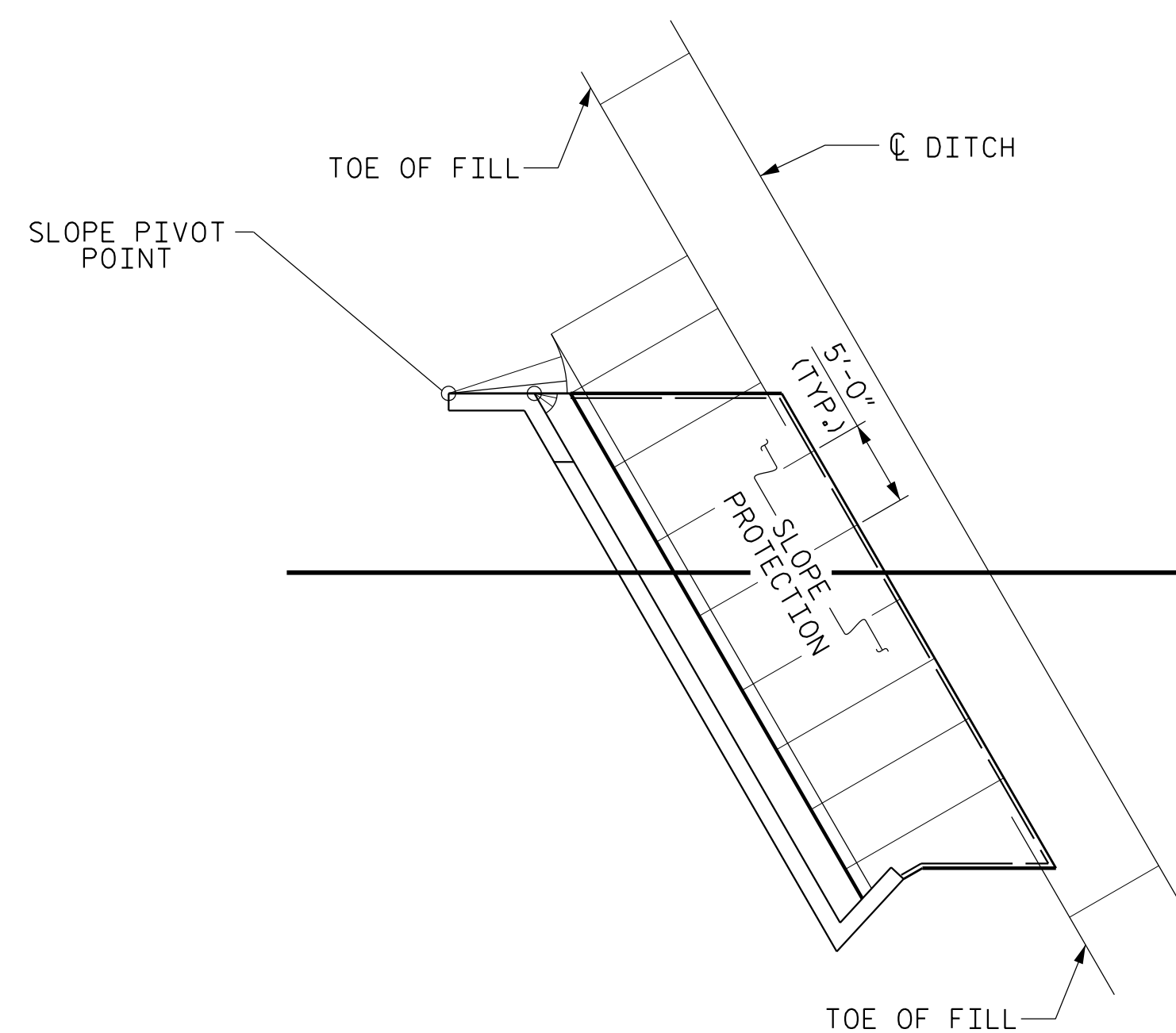
END BENT 1

SLOPE PIVOT POINT  
-L- STA. 25+36.57  
EL. 2654.38

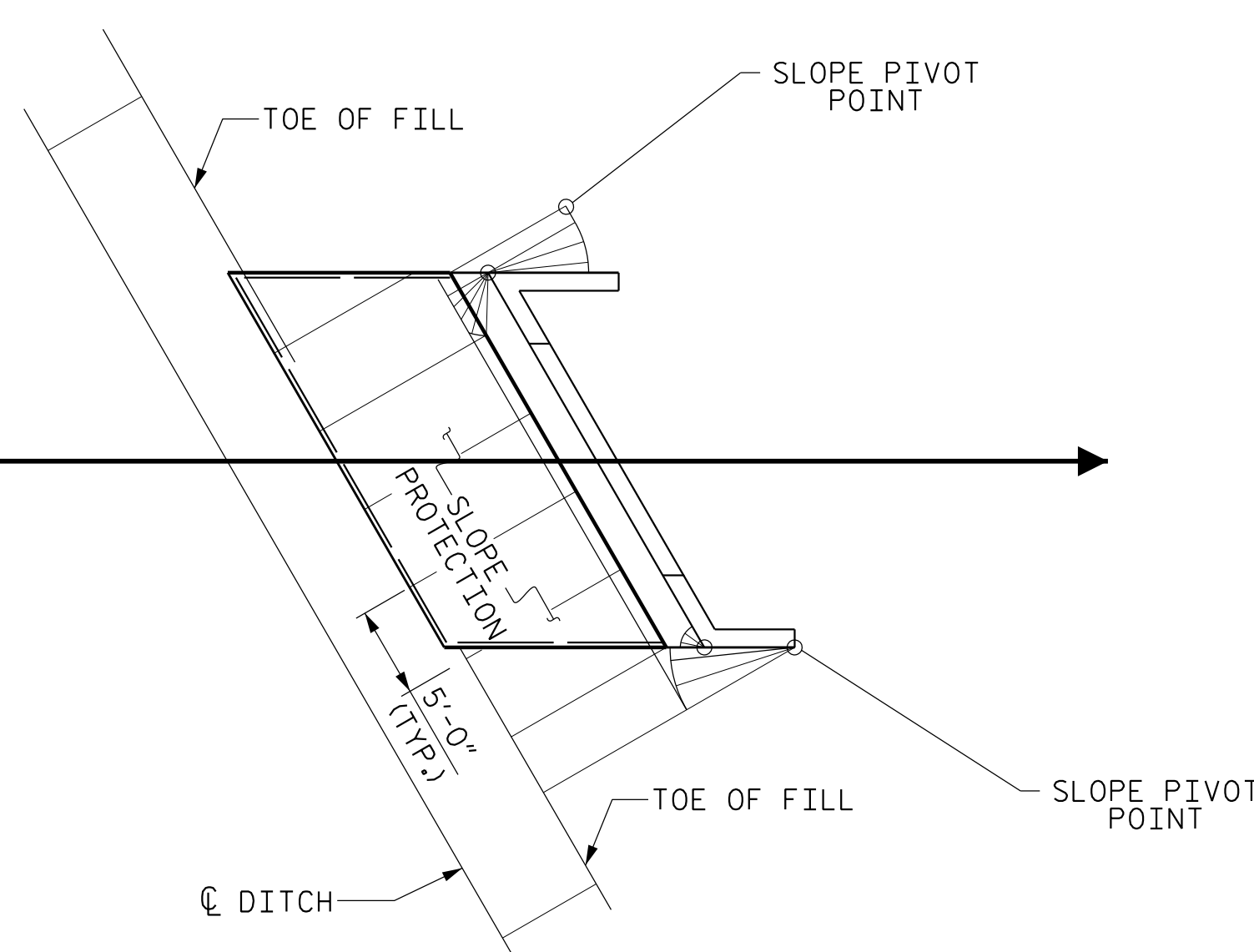


END BENT 2

PLAN - GRADING



END BENT 1



END BENT 2

PLAN - CONCRETE PLACEMENT

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
SLOPE PROTECTION  
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			63

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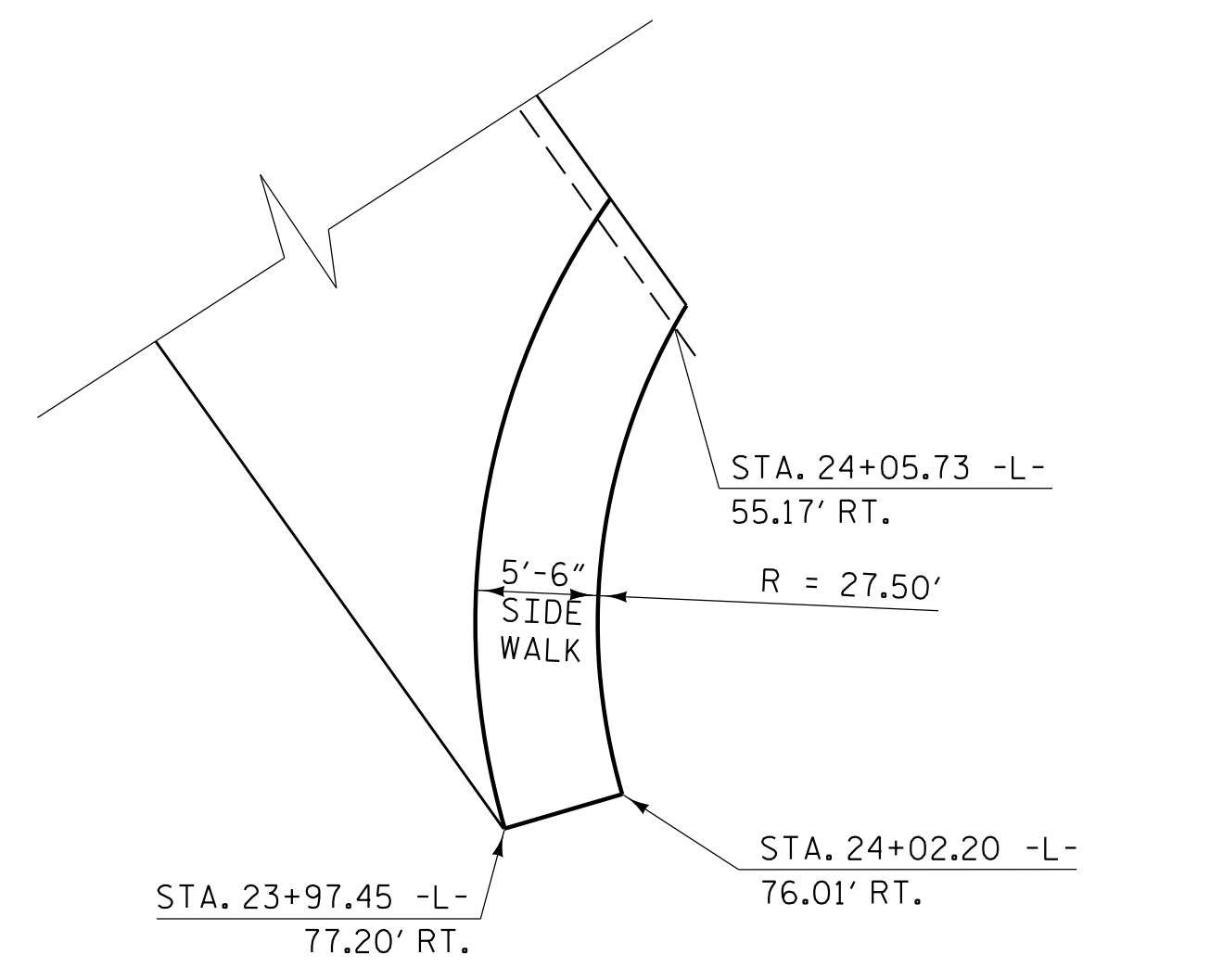
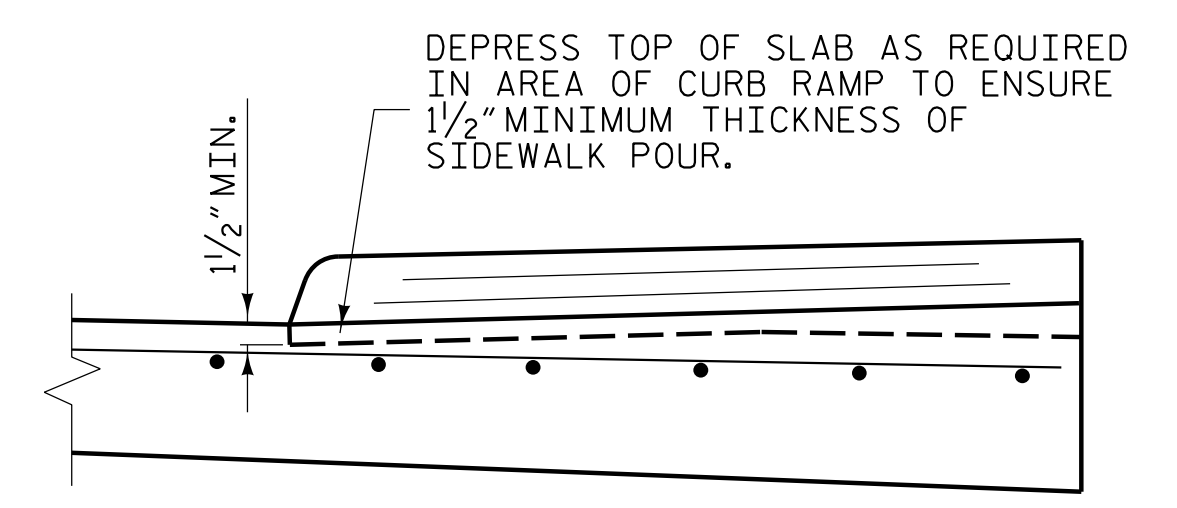
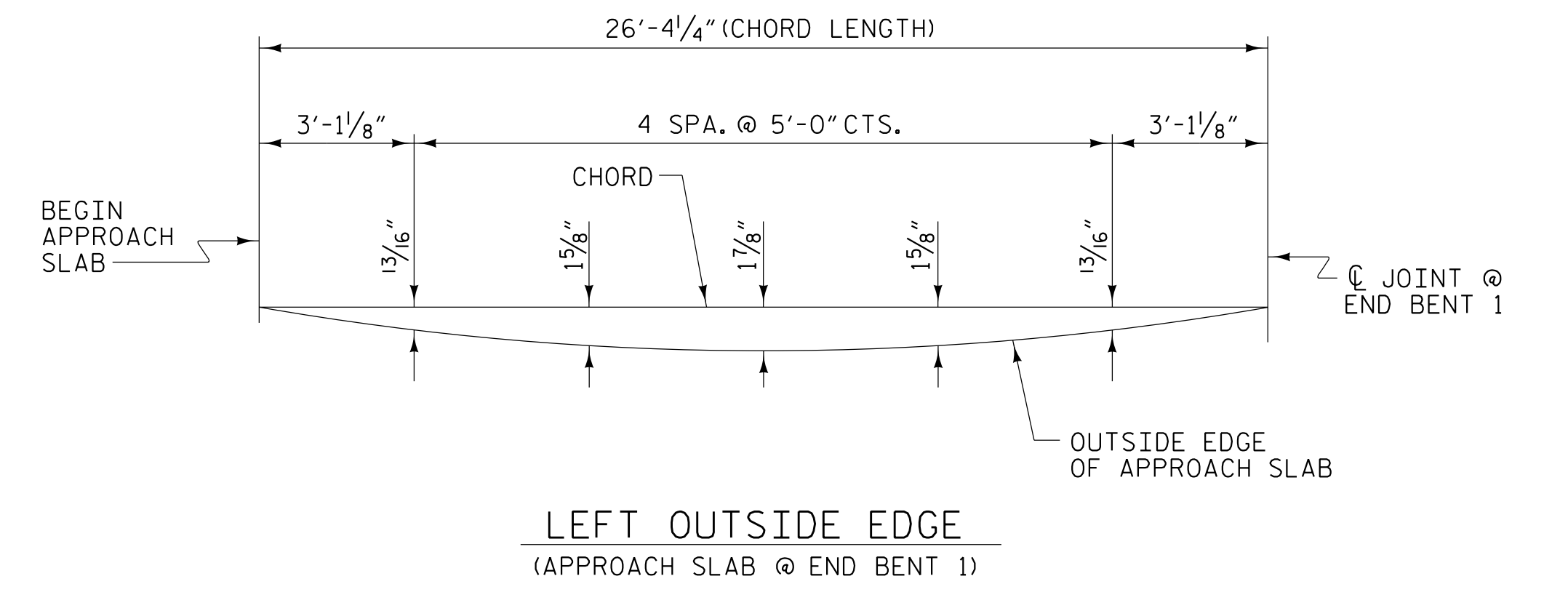
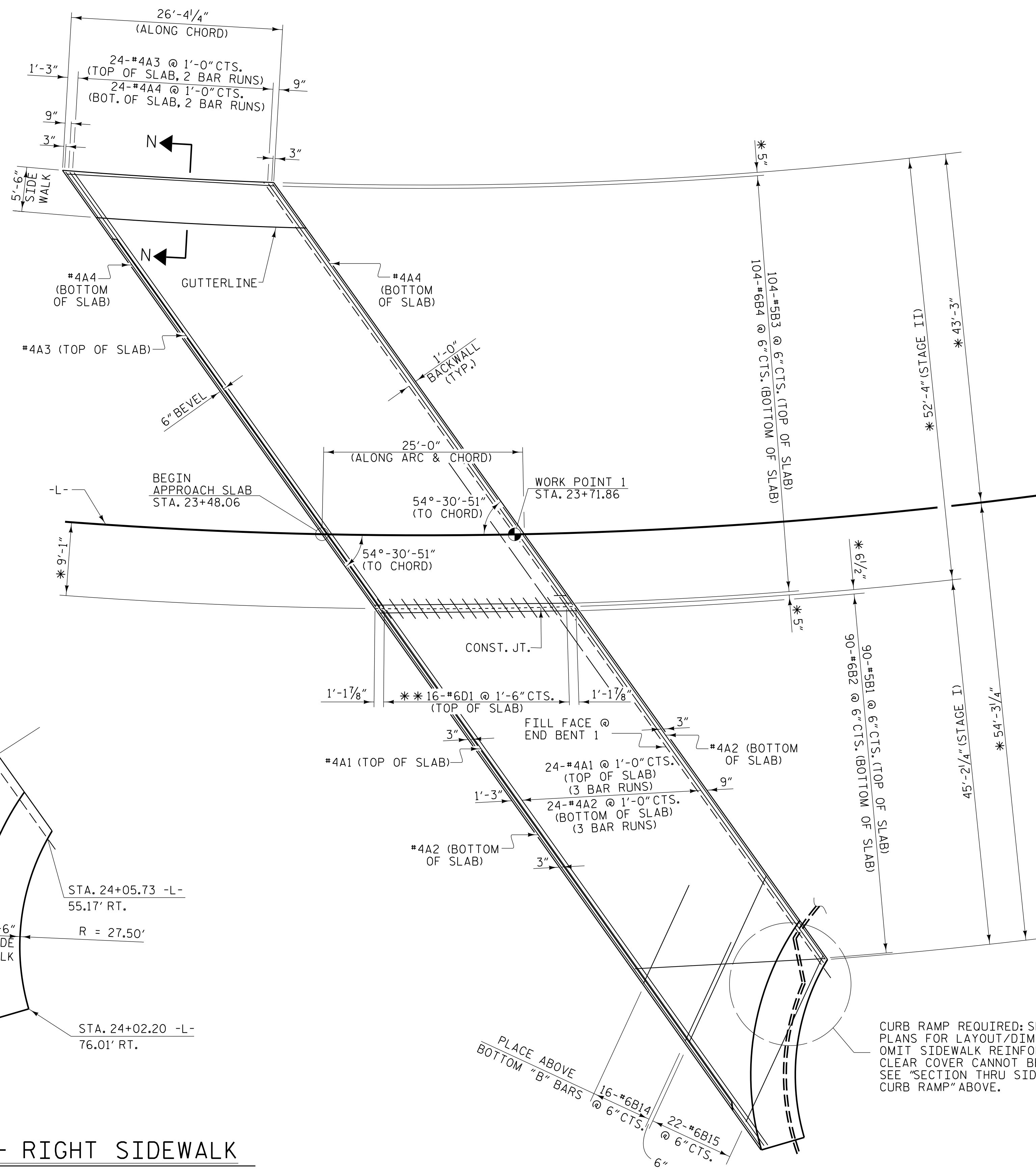
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DESIGN ENGINEER OF RECORD: **R. C. LARSON**

ASSEMBLED BY: **W. B. ALLEN** DATE: 1/20  
CHECKED BY: **Z. H. BROWN** DATE: 7/20

DRAWN BY: WJH 10/88	REV. 10/1/11	MAA/GM+
CHECKED BY: FCJ 10/88	REV. 1/16	MAA/TMC
	REV. 12/17	MAA/THG

DocuSigned by:  
BEB23980220470



**PLAN @ END BENT 1**

\* RADIAL DIMENSION

\*\* THE #6D1 BARS SHALL PROJECT 1'-6" INTO STAGE II CONSTRUCTION.

CURB RAMP REQUIRED: SEE ROADWAY PLANS FOR LAYOUT/DIMENSIONS. OMIT SIDEWALK REINFORCING WHERE CLEAR COVER CANNOT BE MAINTAINED. SEE "SECTION THRU SIDEWALK AT CURB RAMP" ABOVE.

\* PLACE ABOVE BOTTOM "B" BARS.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**PLAN OF  
 BRIDGE APPROACH SLAB**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

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 CARY, NC 27518  
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 NC License # F-1333

DocuSigned by:

*[Signature]*

SEAL  
 1414  
 PROFESSIONAL ENGINEER  
 ROBERT C. LARSON

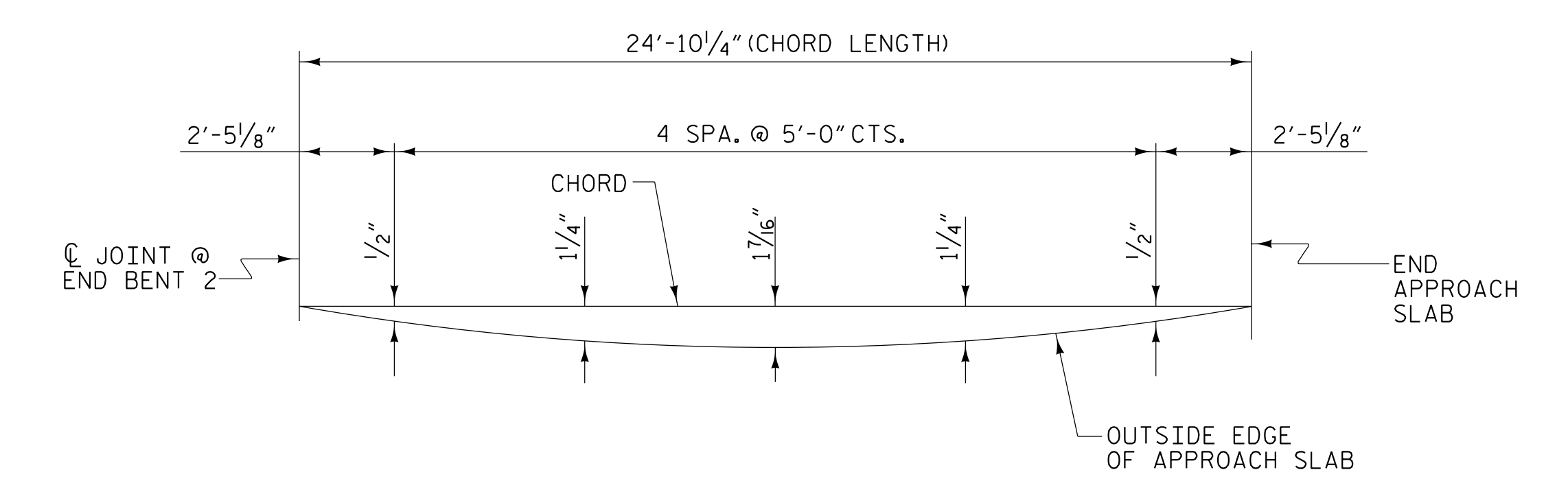
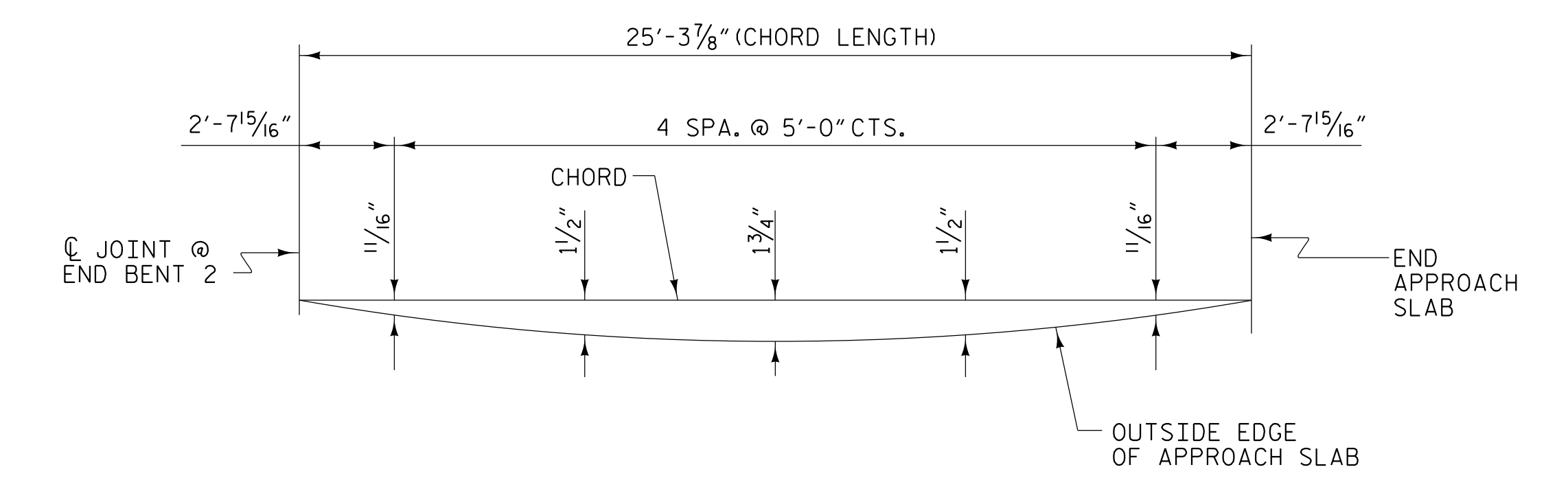
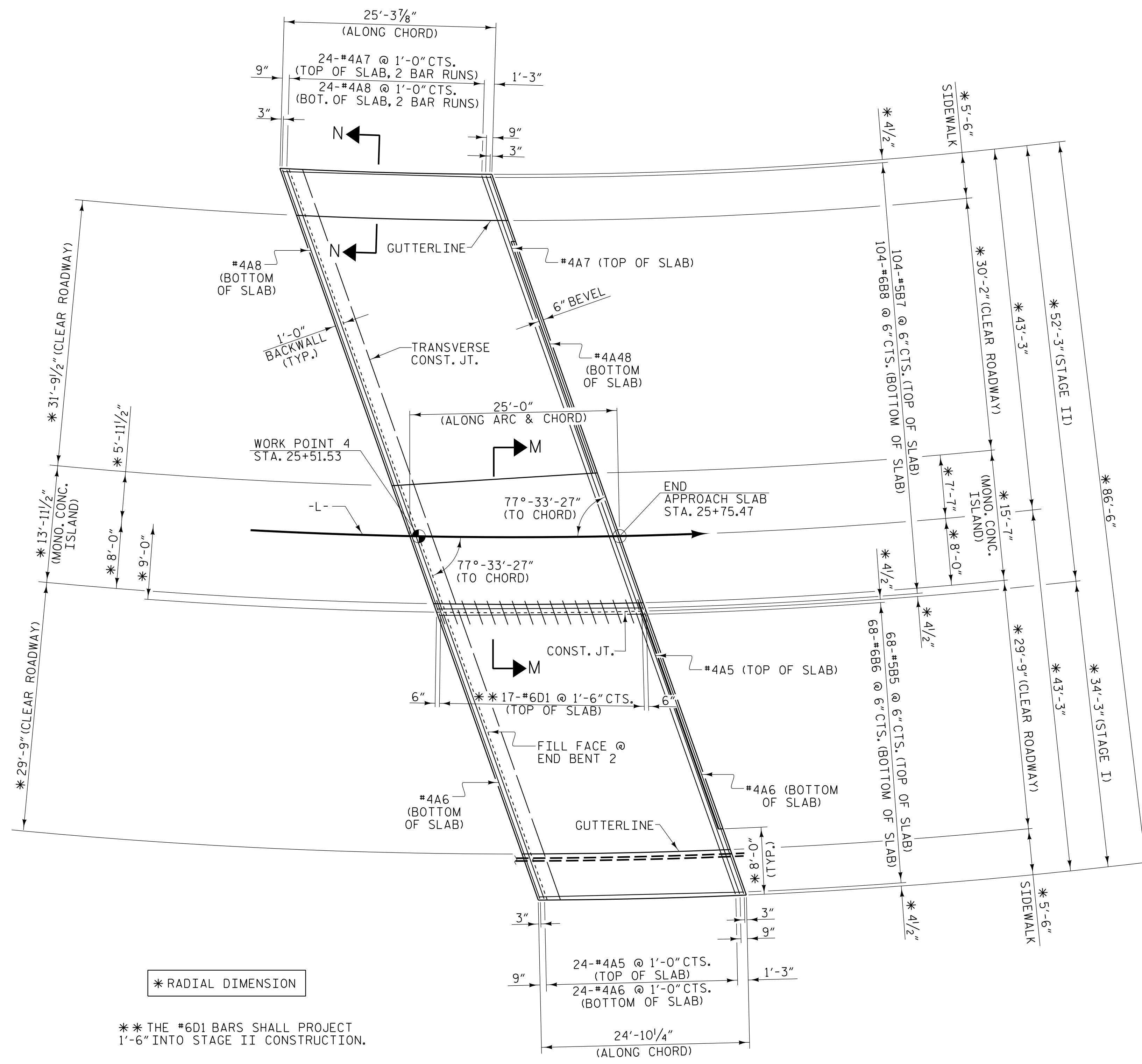
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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

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5/17/2023 7:48:08 PM R:\Structures\3\_spon Bridge cover RRV59\_U5839\_SMU\_ASI\_430864.dgn



\* RADIAL DIMENSION

\*\* THE #6D1 BARS SHALL PROJECT 1'-6\"/>

PLAN @ END BENT 2

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

PLAN OF  
 BRIDGE APPROACH SLAB

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NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
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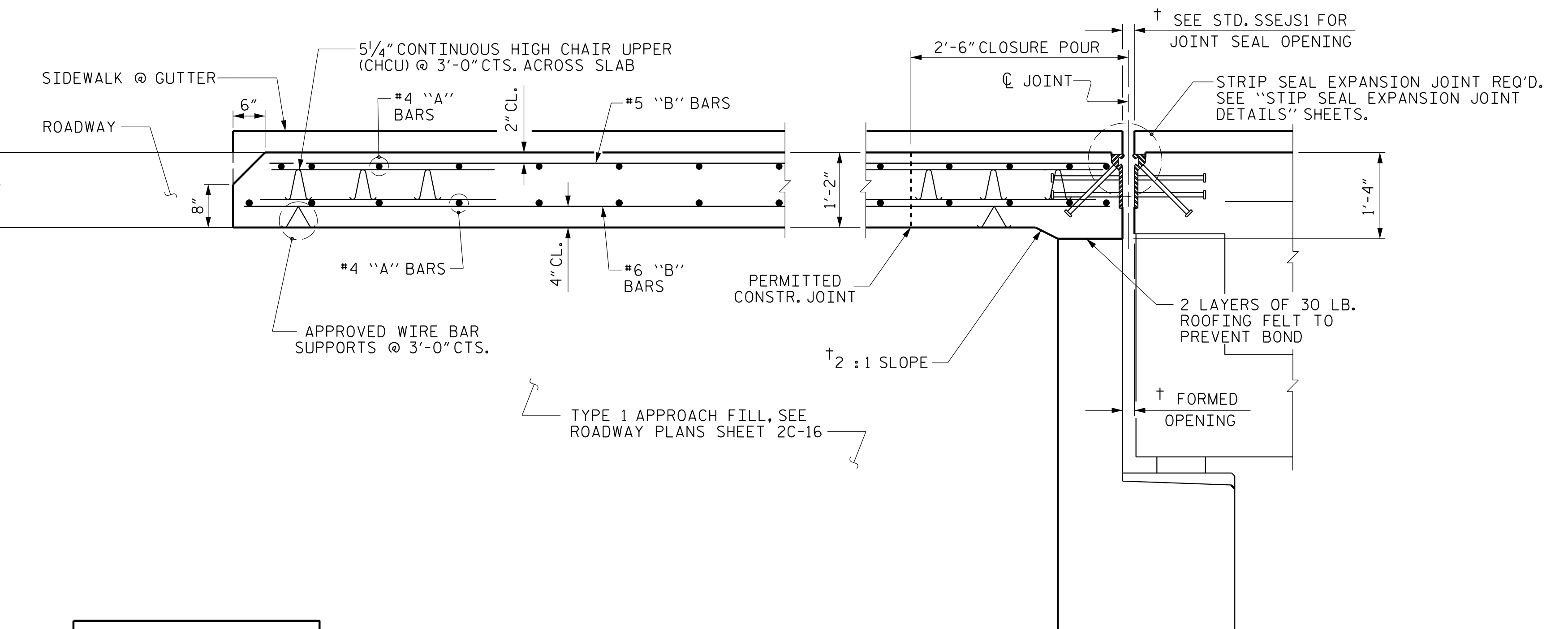
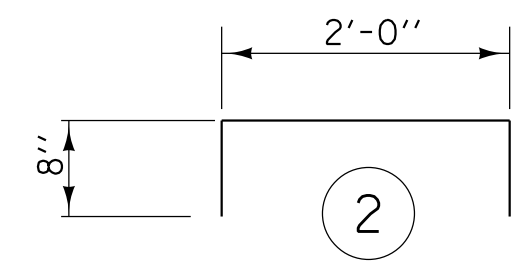
5/17/2023 7:08 PM RA:\Structures\3 span Bridge over RR\60\_USB39\_SMU\_A52\_430B4.dgn

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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

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 BEB2398D9220470...

APPROACH SLAB BILL OF MATERIAL						APPROACH SLAB BILL OF MATERIAL						SIDEWALK BILL OF MATERIAL						SIDEWALK BILL OF MATERIAL											
END BENT 1 APPROACH SLAB (STAGE I)						END BENT 1 APPROACH SLAB (STAGE II)						END BENT 1 APPROACH SLAB (STAGE I)						END BENT 1 APPROACH SLAB (STAGE II)											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT						
* A1	78	#4	STR	28'-8"	1494	* A3	52	#4	STR	34'-0"	1181	* B12	8	#4	STR	15'-3"	81	* B9	4	#4	STR	25'-2"	67						
A2	78	#4	STR	23'-5"	1220	A4	52	#4	STR	33'-10"	1175							G1	24	#4	STR	5'-0"	80	G1	21	#4	STR	5'-0"	70
* B1	90	#5	STR	24'-0"	2253	* B3	104	#5	STR	23'-9"	2576							G2	1	#4	STR	4'-2"	3	G2	1	#4	STR	4'-2"	3
B2	90	#6	STR	24'-6"	3312	B4	104	#6	STR	24'-5"	3814	* U1	10	#4	2	3'-4"	22	G3	1	#4	STR	3'-0"	2	G3	1	#4	STR	3'-0"	2
B14	16	#6	STR	13'-6"	324													G4	2	#4	STR	1'-9"	2	G4	2	#4	STR	1'-9"	2
B15	22	#6	STR	22'-8"	747													G5	1	#4	STR	4'-7"	3	G5	1	#4	STR	4'-7"	3
* D1	16	#6	STR	3'-0"	72													G6	1	#4	STR	3'-3"	2	G6	1	#4	STR	3'-3"	2
																		G7	1	#4	STR	2'-0"	1	G7	1	#4	STR	2'-0"	1
																		G8	1	#4	STR	1'-11"	1	G8	1	#4	STR	1'-11"	1
																		U1	7	#4	2	3'-4"	16	U1	7	#4	2	3'-4"	16
REINFORCING STEEL				LBS.	5603	REINFORCING STEEL				LBS.	4989											LBS.	183					LBS.	167
* EPOXY COATED REINFORCING STEEL				LBS.	3819	* EPOXY COATED REINFORCING STEEL				LBS.	3757	* EPOXY COATED REINFORCING STEEL				LBS.	183	* EPOXY COATED REINFORCING STEEL				LBS.	167						
CLASS AA CONCRETE				C. Y.	60.7	CLASS AA CONCRETE				C. Y.	57.9	CLASS AA CONCRETE				C. Y.	2.7	CLASS AA CONCRETE				C. Y.	3.3						



BAR TYPES											
* B13	9	#4	STR	24'-7"	148						
* B14	1	#4	STR	7'-0"	5						
* G14	1	#4	STR	13'-1"	9						
* G15	1	#4	STR	13'-2"	9						
* G16	1	#4	STR	13'-3"	9						
* G17	1	#4	STR	13'-5"	9						
* G18	1	#4	STR	13'-6"	9						
* G19	1	#4	STR	13'-7"	9						
* G20	1	#4	STR	13'-8"	9						
* G21	1	#4	STR	13'-9"	9						
* G22	1	#4	STR	13'-10"	9						
* G23	1	#4	STR	13'-11"	9						
* G24	1	#4	STR	14'-0"	9						
* G25	1	#4	STR	14'-1"	9						
* G26	1	#4	STR	14'-2"	9						
* G27	1	#4	STR	12'-7"	8						
* G28	1	#4	STR	8'-6"	6						
* G29	1	#4	STR	4'-4"	3						
* G30	1	#4	STR	10'-4"	7						
* G31	1	#4	STR	6'-3"	4						
* G32	1	#4	STR	2'-2"	1						
* EPOXY COATED REINFORCING STEEL				LBS.	299						
CLASS AA CONCRETE				C. Y.	5.6						

**NOTES**

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

STAGE I APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE STAGE I BRIDGE DECK. STAGE II APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE STAGE II AND CLOSURE POUR OF 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.

FOR STRIP SEAL EXPANSION JOINTS, SEE SPECIAL PROVISIONS.

PAYMENT FOR SIDEWALK AND MONOLITHIC CONCRETE ISLAND SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR BRIDGE APPROACH SLAB.

ALL REINFORCING STEEL IN THE SIDEWALK AND MONOLITHIC CONCRETE ISLAND SHALL BE EPOXY COATED.

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

PROJECT NO. U-5839

HAYWOOD COUNTY

STATION: 24+64.13 -L- POC

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**BRIDGE APPROACH SLAB WITH FLEXIBLE PAVEMENT**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			63
2			4			

PLANS PREPARED BY:

**N|V|5**

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CARY, NC 27518  
P: 919.851.1912 www.NV5.com  
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DocuSigned by:

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SEAL 1414

ROBERT C. LARSON

10/19/2023

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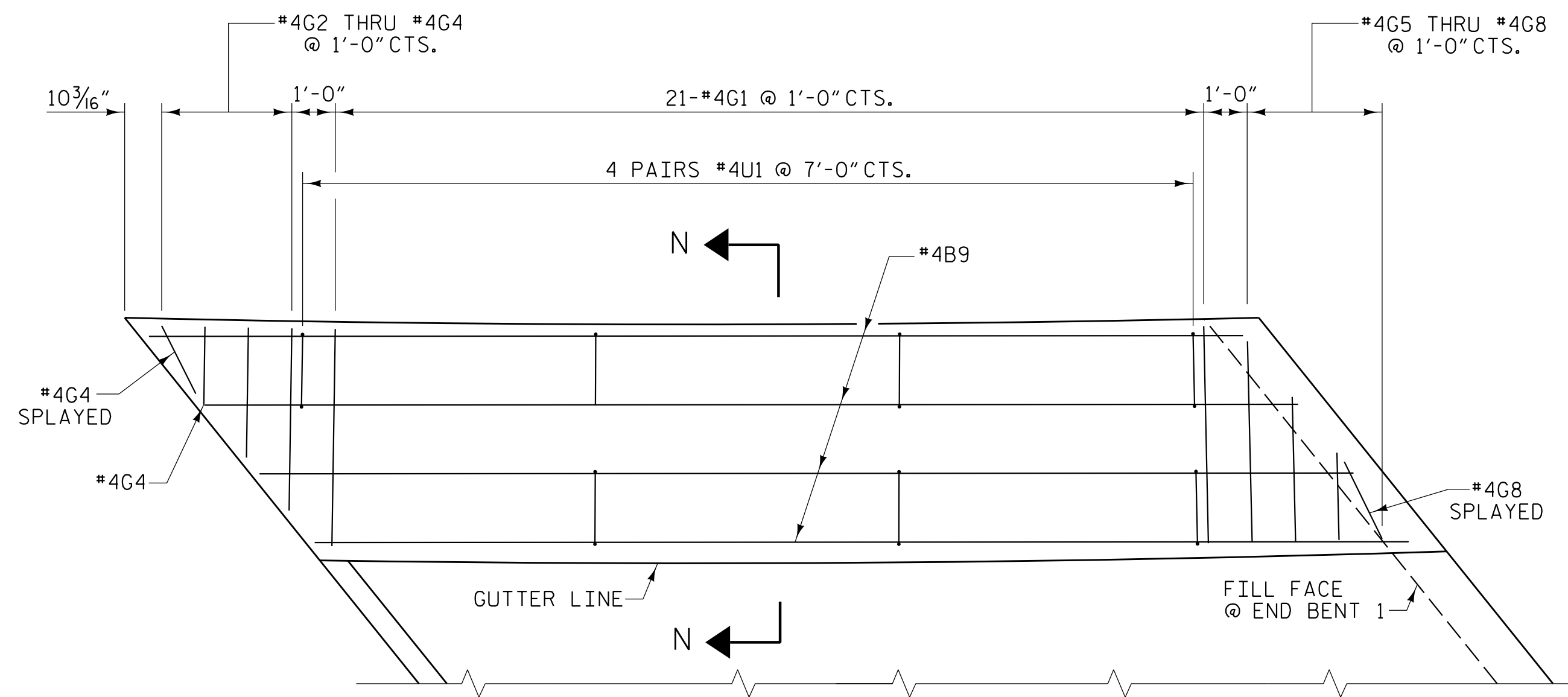
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CHECKED BY: Z. H. BROWN DATE: 5/20

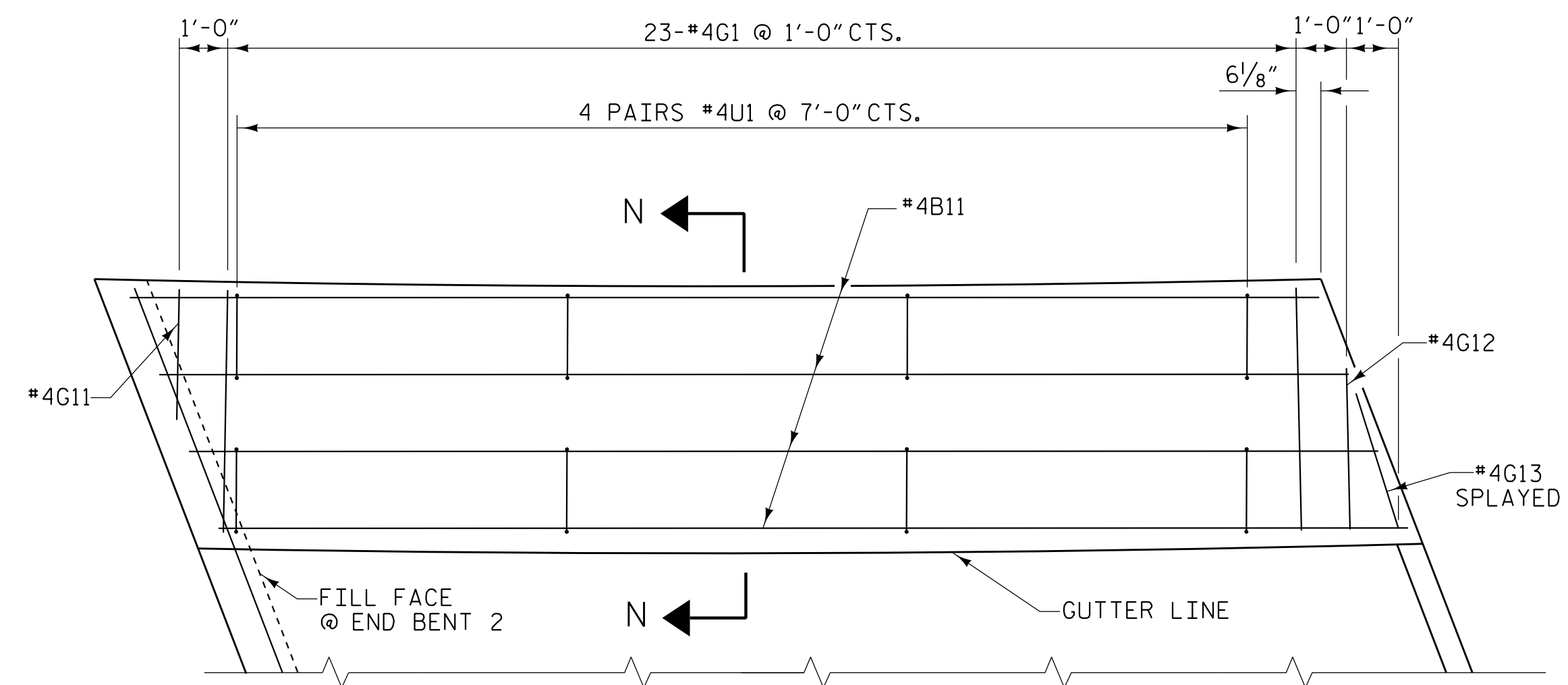
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 4/23

**SECTION THRU SLAB**  
(TYPE 1 - APPROACH FILL)

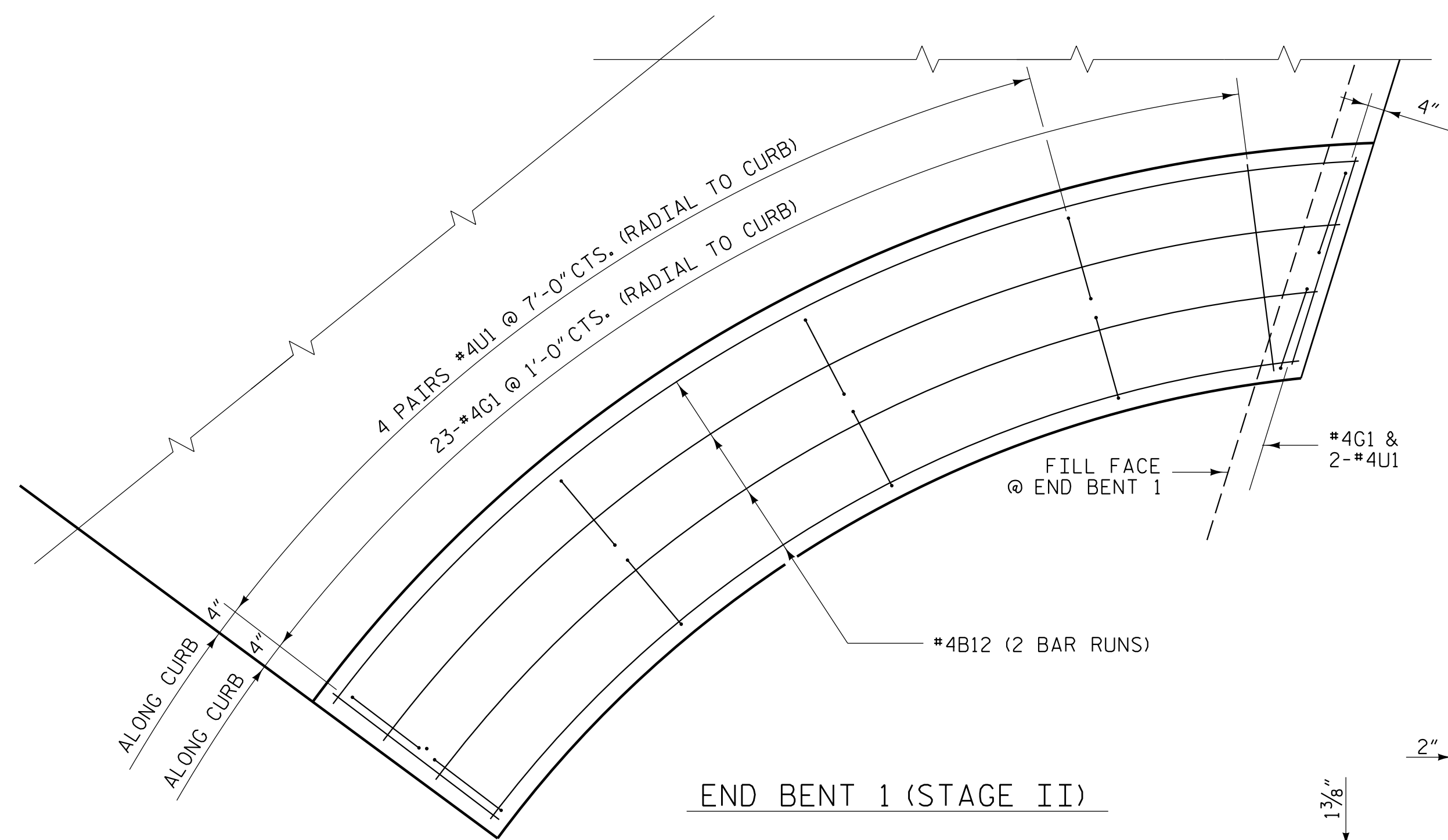
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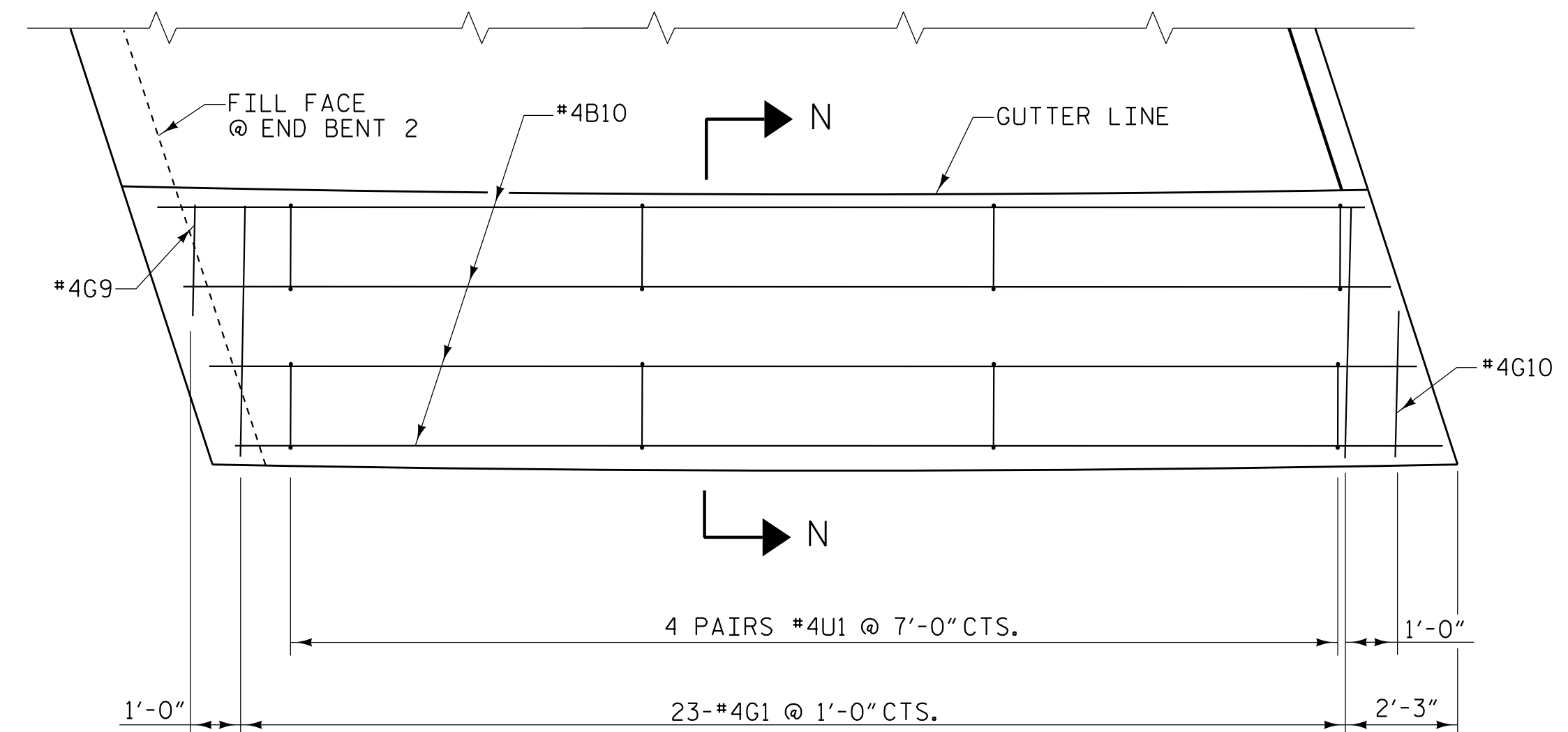
END BENT 1 (STAGE II)



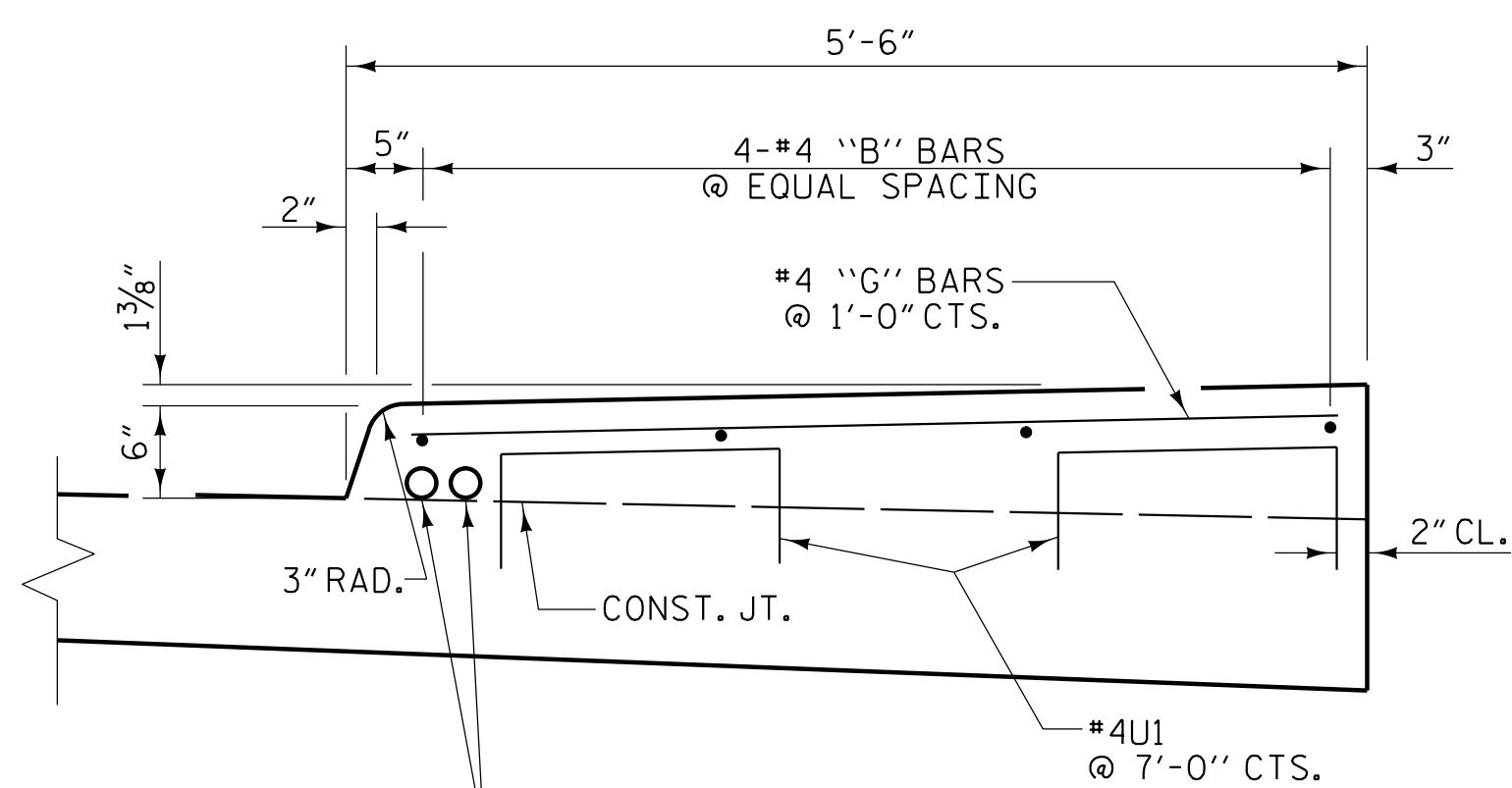
END BENT 2 (STAGE II)



END BENT 1 (STAGE II)



END BENT 2 (STAGE I)



SECTION N-N

DETAILS OF SIDEWALK ON APPROACH SLAB

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 24+64.13 -L- POC

SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH  
 SLAB DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-62	
1			3			TOTAL SHEETS	
2			4			63	

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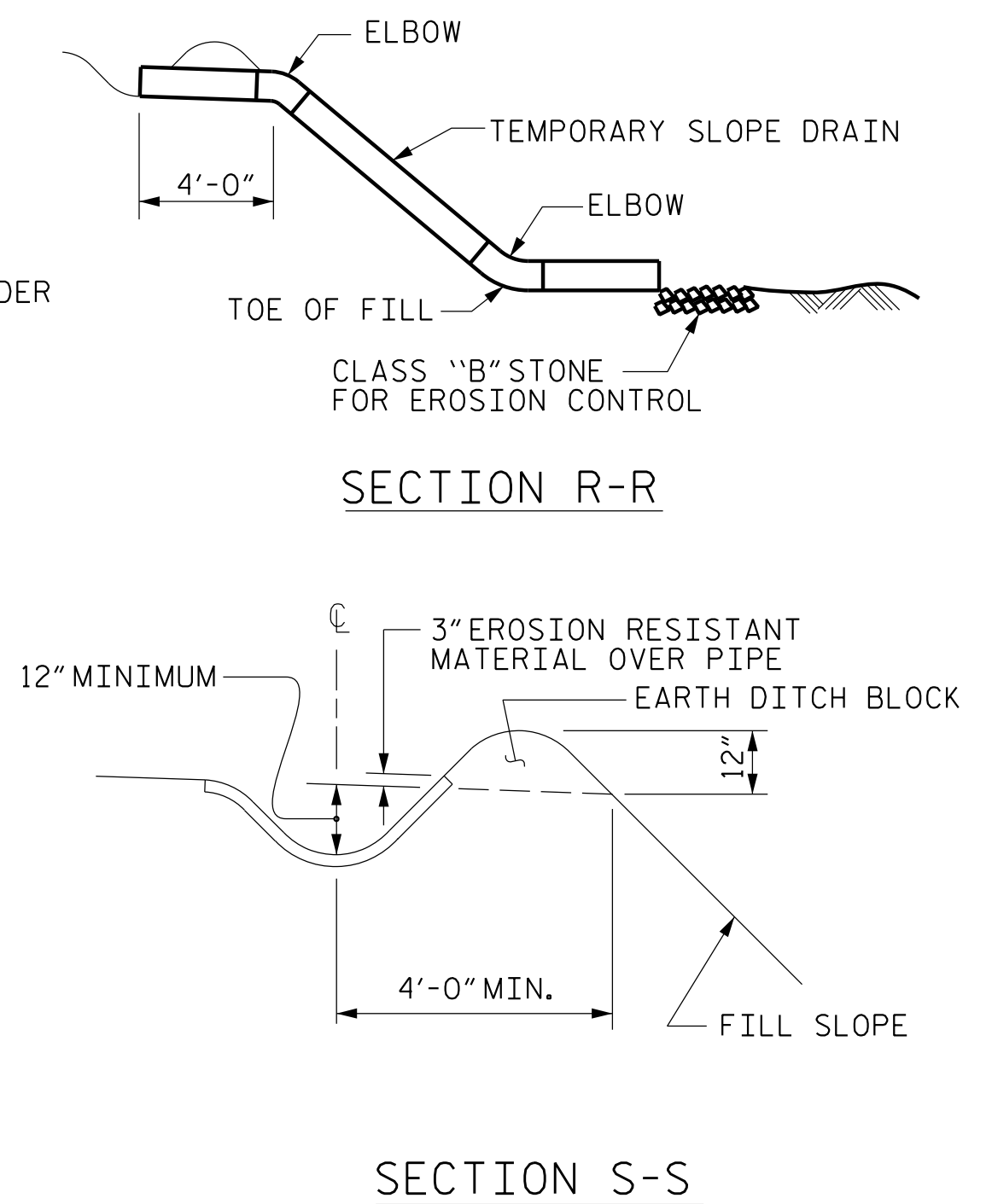
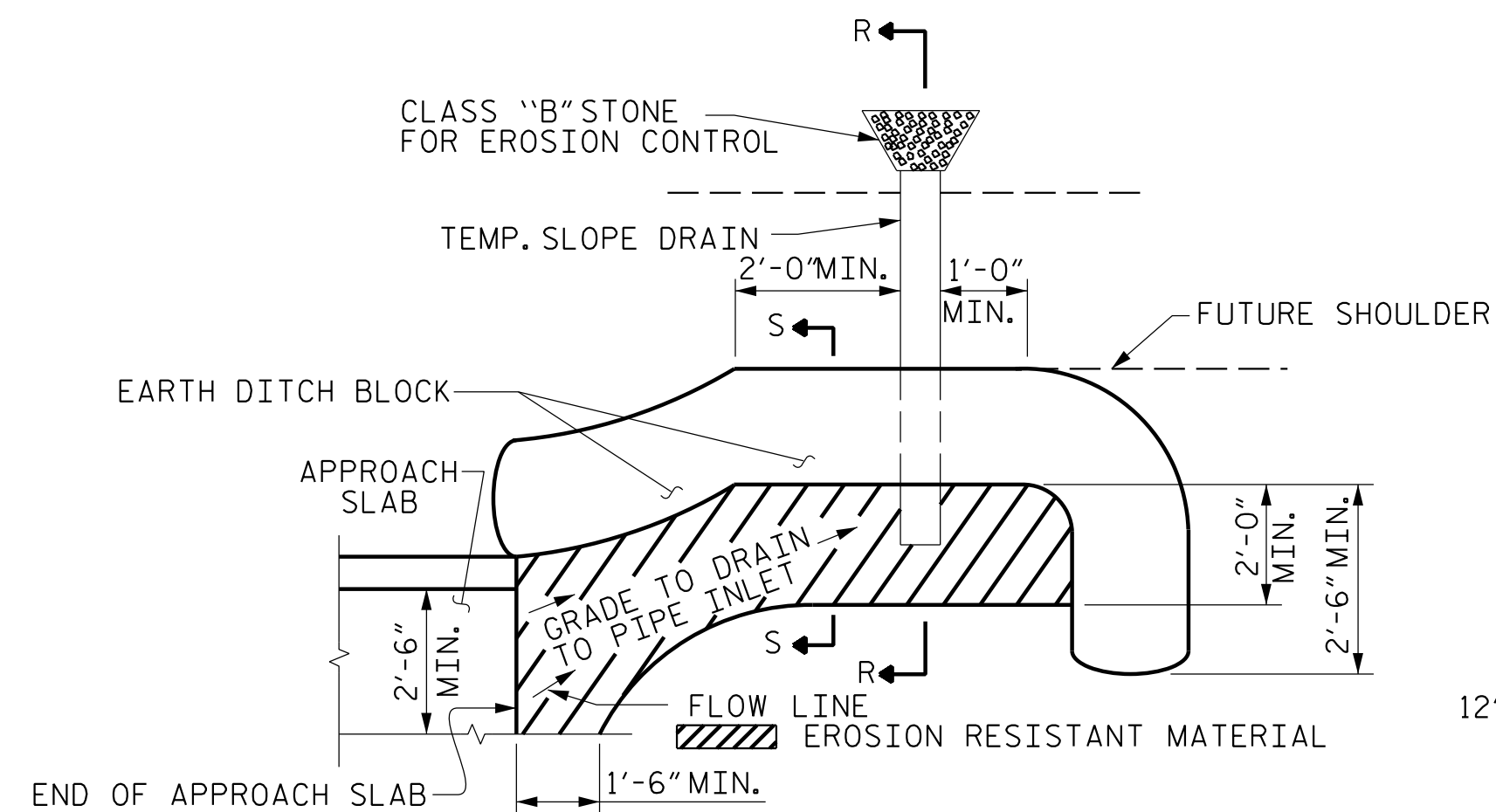
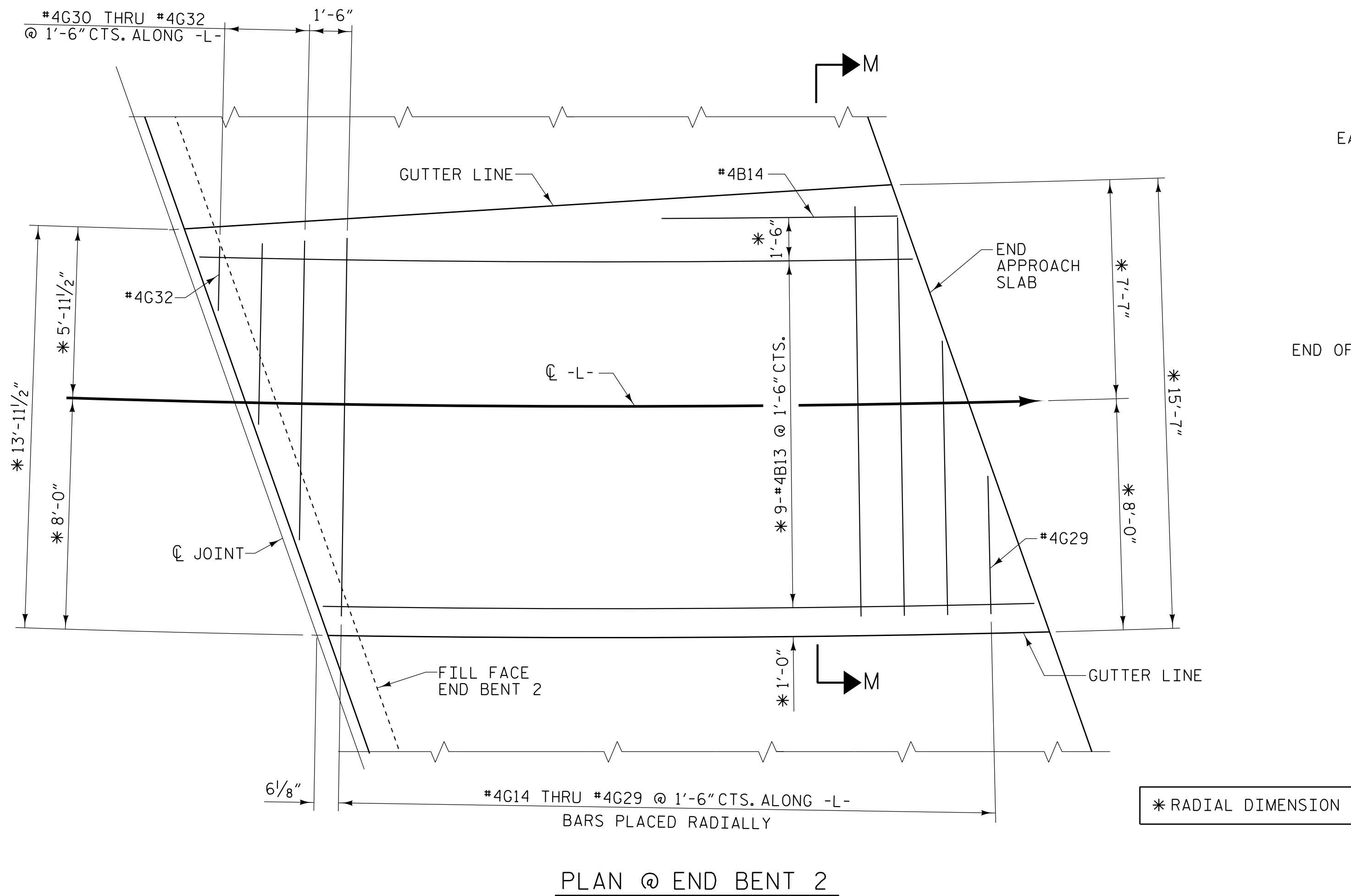
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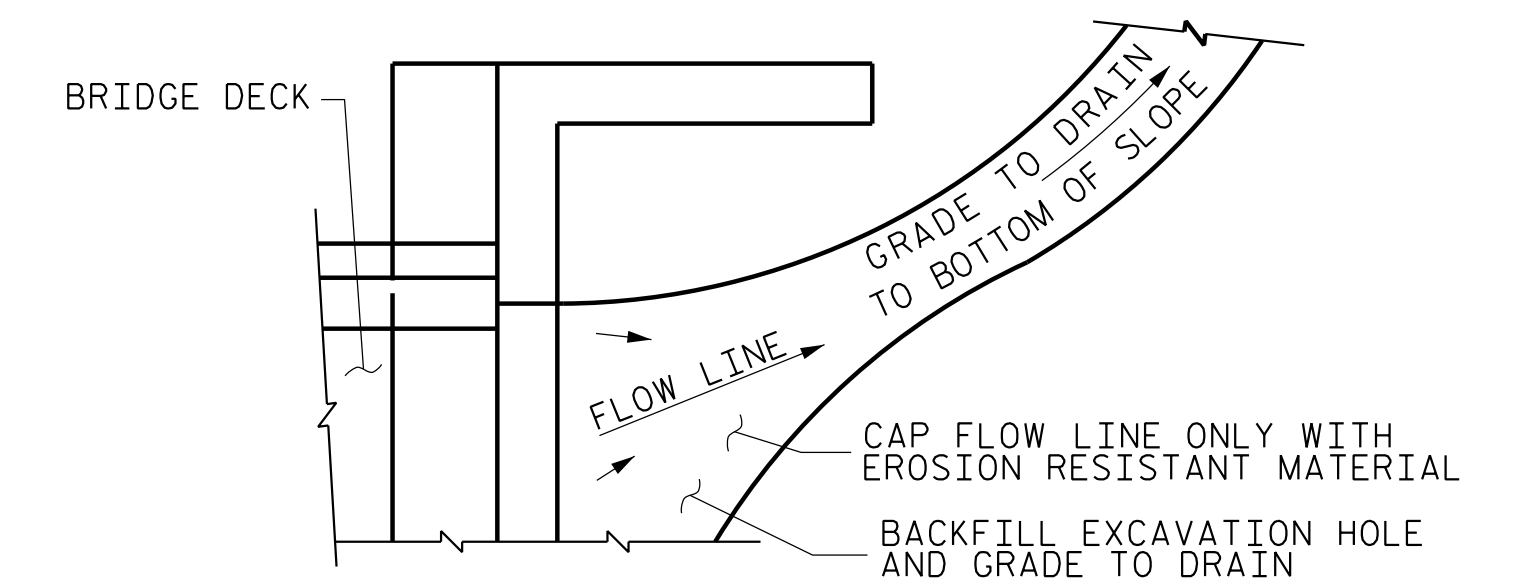
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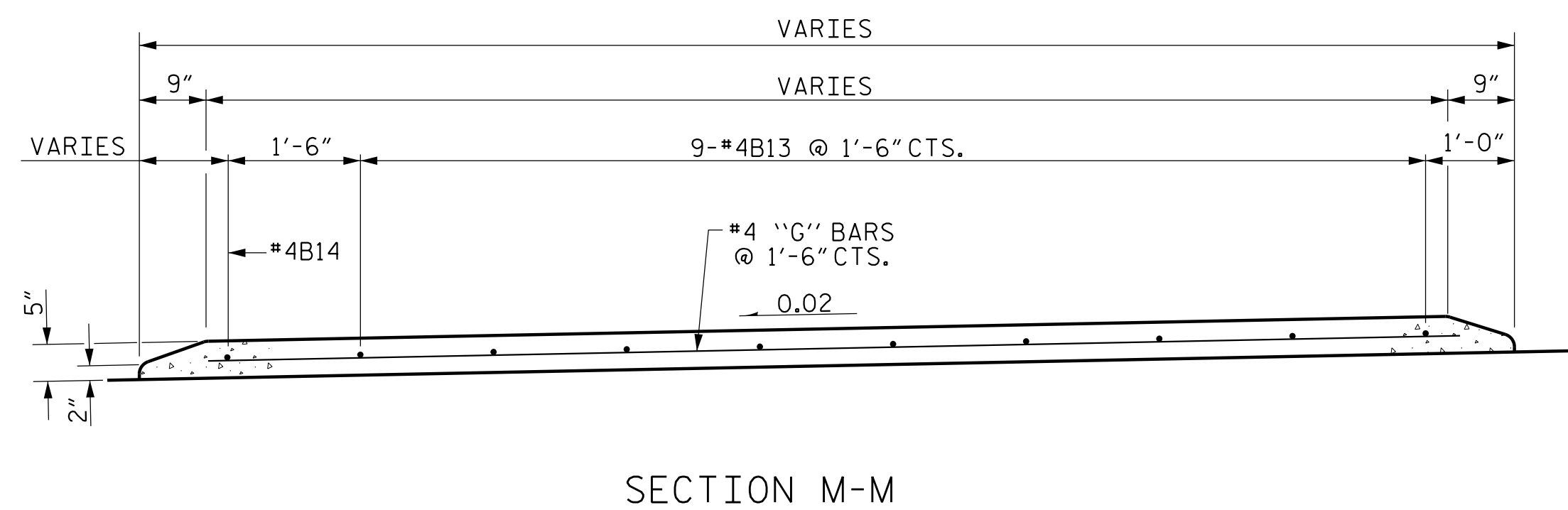
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**TEMPORARY BERM AND SLOPE DRAIN DETAILS**  
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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.



**DETAILS OF MONOLITHIC CONCRETE ISLAND ON APPROACH SLAB**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 24+64.13 -L- POC

SHEET 5 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**BRIDGE APPROACH SLAB DETAILS**

REVISIONS						SHEET NO.
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1			3			63
2			4			

PLANS PREPARED BY:

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NORTH CAROLINA  
PROFESSIONAL  
ENGINEER  
ROBERT C. LARSON  
NC License # F-1333

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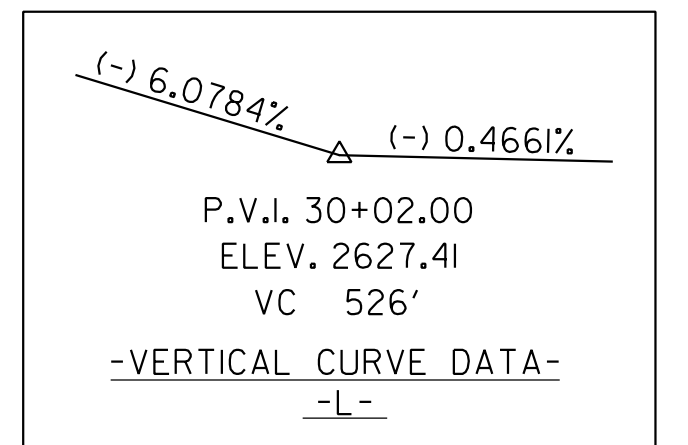
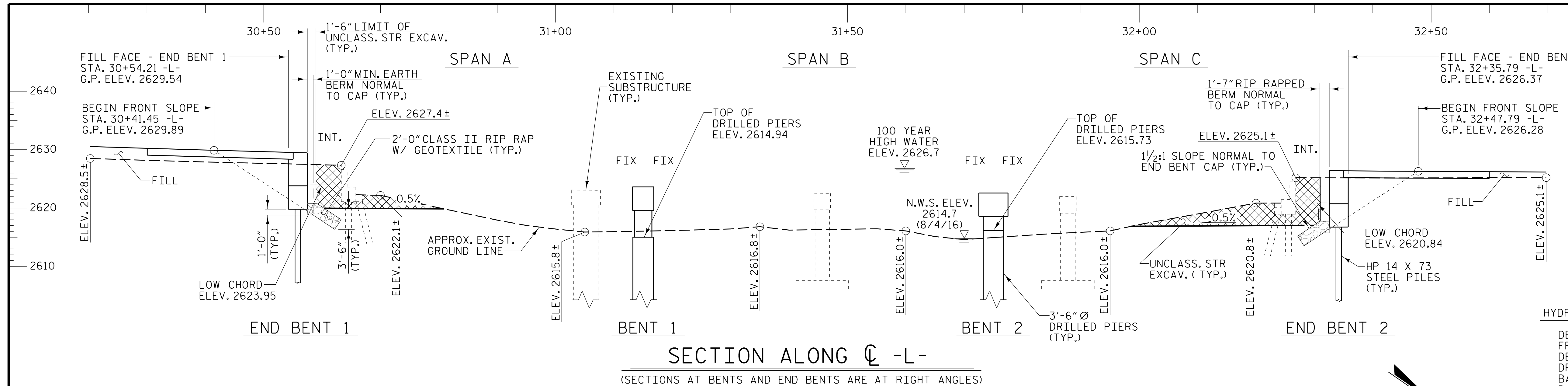
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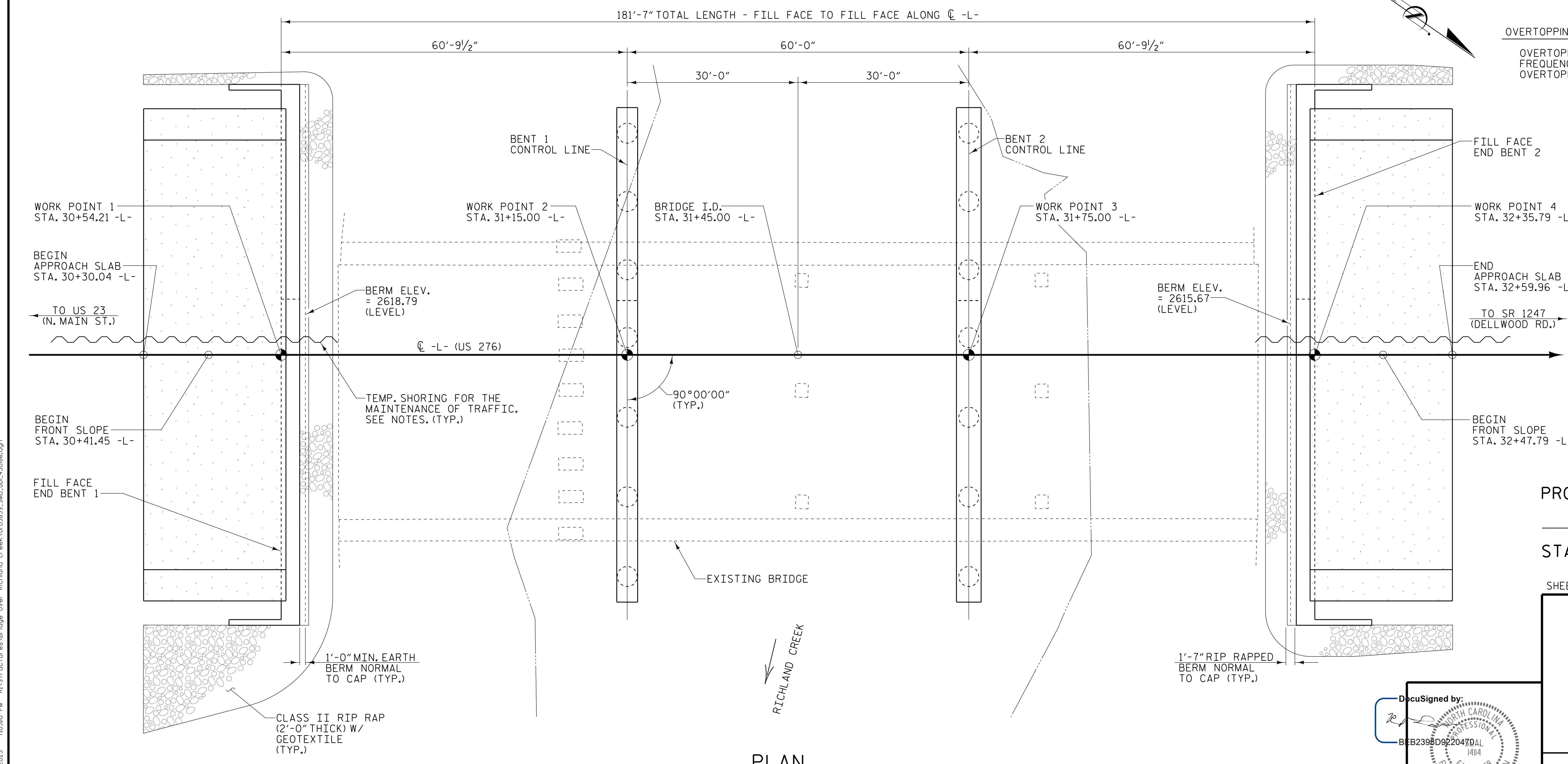


**HYDRAULIC DATA:**

DESIGN DISCHARGE -	7300 CFS
FREQUENCY OF DESIGN DISCHARGE -	50 YEAR
DESIGN HIGH WATER ELEVATION -	2625.4
DRAINAGE AREA -	44.7 SQ. MI.
BASE DISCHARGE (Q 100) -	8600 CFS
BASE HIGH WATER ELEVATION -	2626.7

**OVERTOPPING FLOOD DATA:**

OVERTOPPING DISCHARGE -	8250 CFS
FREQUENCY OF OVERTOPPING FLOOD -	< 100 YEAR
OVERTOPPING FLOOD ELEVATION -	2626.3



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PLANS PREPARED BY:

**NV5**

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PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 1 OF 3 REPLACES BRIDGE NO. 430186

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**  
FOR BRIDGE ON -L- US 276  
(RUSS AVE.) OVER RICHLAND  
CREEK BETWEEN US 23  
(N. MAIN ST.) AND SR 1247  
(DELLWOOD RD.)

DocuSigned by:

ROBERT C. LARSON  
14114  
5/19/2023

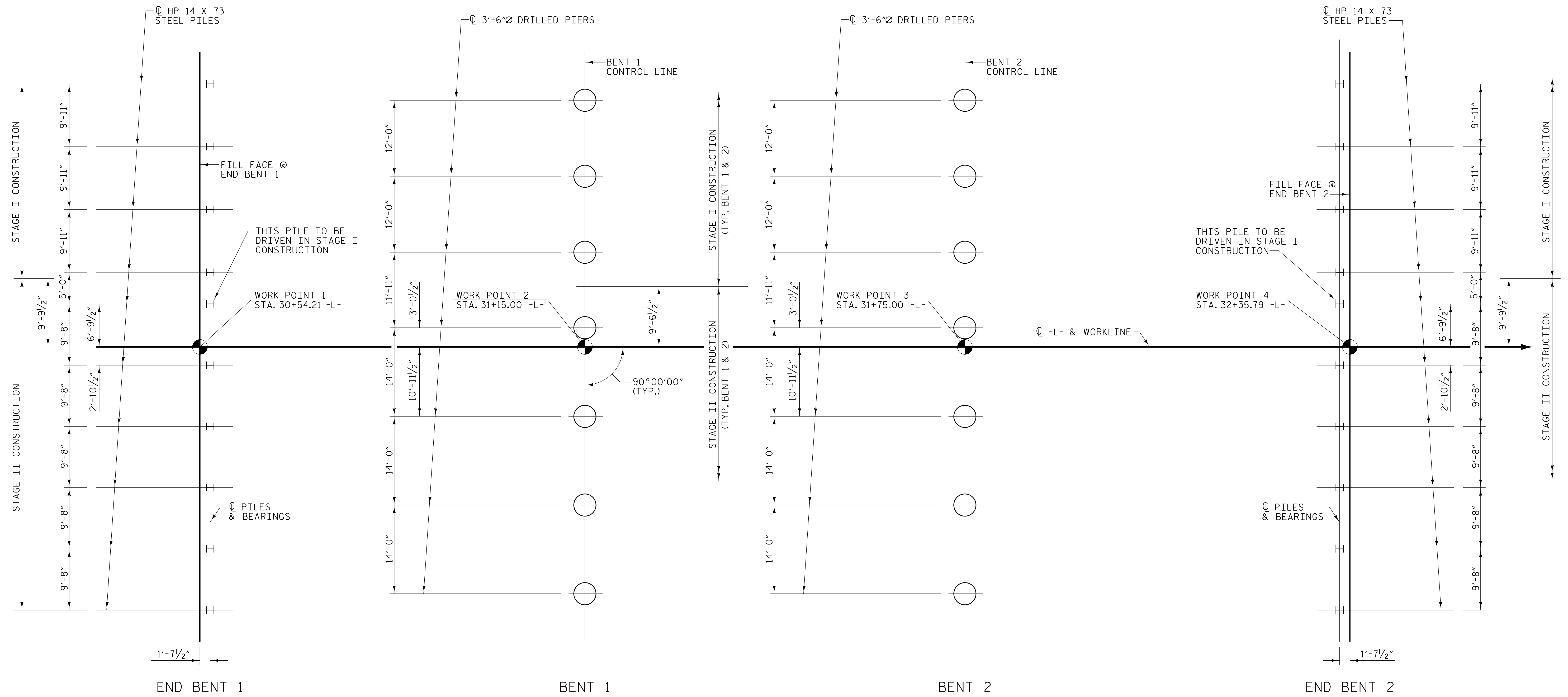
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DRAWN BY :	W. B. ALLEN	DATE :	4/19
CHECKED BY :	Z. H. BROWN	DATE :	4/19
DESIGN ENGINEER OF RECORD:	R. C. LARSON	DATE :	2/23

(NOTE: PILES NOT SHOWN FOR CLARITY)

REVISIONS				SHEET NO.		
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

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### FOUNDATION LAYOUT

#### NOTES

- ALL PILES ARE HP 14 X 73.
- DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF THE CAP.
- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 135 TONS PER PILE.
- DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 225 TONS PER PILE.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- DRILLED PIERS AT BENT NO.1 AND BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 289 TONS PER PIER
- CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 10 TSF.
- PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT NO.1 DO NOT EXTEND PERMANENT CASINGS BELOW 2590.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
- PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT NO.2 DO NOT EXTEND PERMANENT CASINGS BELOW 2580.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
- INSTALL DRILLED PIERS AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN 2581.0 FT. WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 11 FT. INTO WEATHERED ROCK AND ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

- INSTALL DRILLED PIERS AT BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 2572.0 FT. WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 11 FT. INTO WEATHERED ROCK AND ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 AND BENT NO.2 IS ELEVATION 2595.5 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
- CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON -L- US 276  
 (RUSS AVE.) OVER RICHLAND  
 CREEK BETWEEN US 23  
 (N. MAIN ST.) AND SR 1247  
 (DELLWOOD RD.)

PLANS PREPARED BY:  
**NV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
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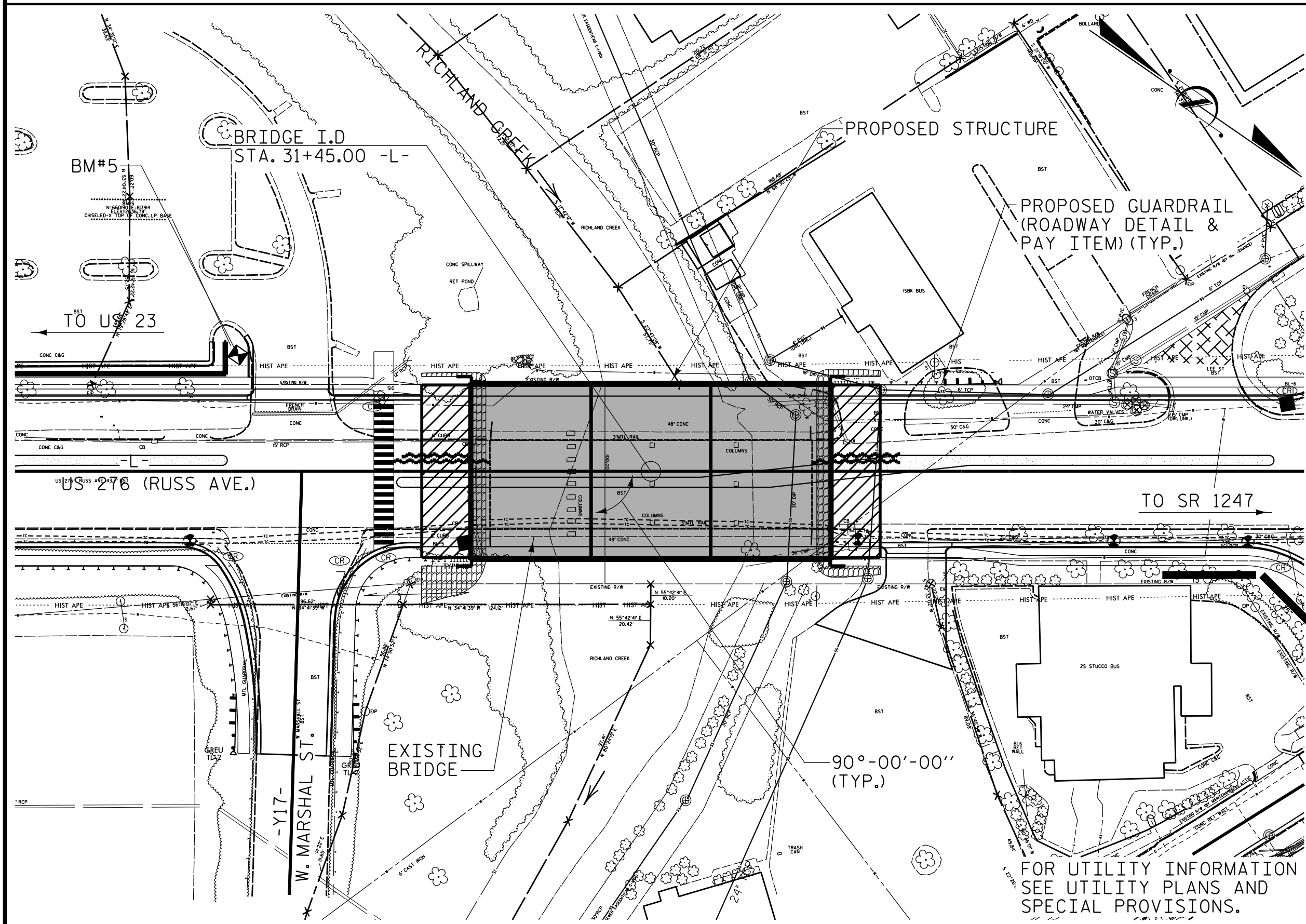
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1			3		
2			4		

TOTAL SHEETS: **49**

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BM #5: CHISELED-X TOP OF CONC. LP BASE; 58.32' LT STA. 29+37.84 -L- ELEV. 2636.78



LOCATION SKETCH

TOTAL BILL OF MATERIAL											
	REMOVAL OF EXISTING STRUCTURE AT STATION 31+45.00-L-	ASBESTOS ASSESSMENT	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 31+45.00-L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	LUMP SUM	SQ. FT.	SO. FT.	CU. YDS.
SUPERSTRUCTURE									16027	13,802	
END BENT 1											61.8
BENT 1			143.0	95.0	174.5						47.3
BENT 2			223.3	83.0	249.9						51.1
END BENT 2											61.7
TOTAL	LUMP SUM	LUMP SUM	366.3	178.0	424.4	1	1	LUMP SUM	16027	13,802	221.9

TOTAL BILL OF MATERIAL											
	BRIDGE APPROACH SLABS AT STATION 31+45.00-L-	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	45" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	HP 14 X 73 STEEL PILES	THREE BAR METAL RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	
	LUMP SUM	LBS.	LBS.	LIN. FT.	EACH	NO.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE	LUMP SUM			1790.00			344.83				LUMP SUM
END BENT 1		8712			10	400		120	135		
BENT 1		20,685	5683								
BENT 2		23,151	6806								
END BENT 2		8543			10	475		90	100		
TOTAL	LUMP SUM	61,091	12,489	1790.00	20	875	344.83	210	235		LUMP SUM

NOTES

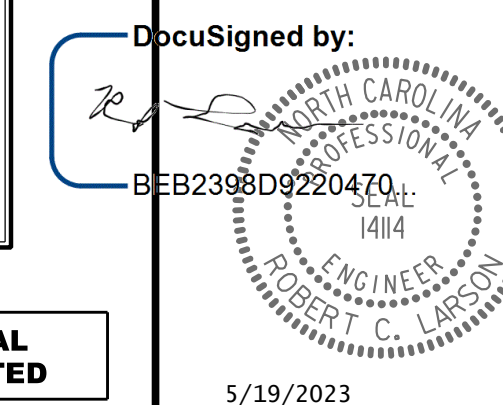
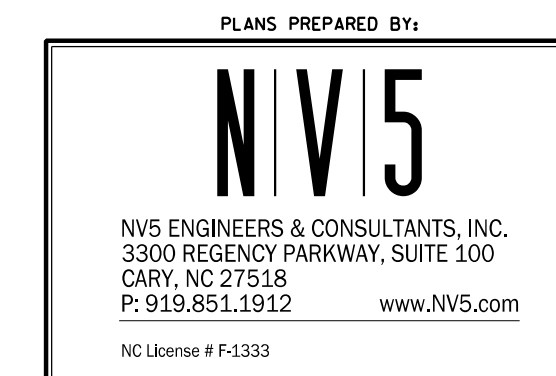
- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENT OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, 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.
- ALL PAVEMENT MARKING WILL BE IN ACCORDANCE WITH THE PAVEMENT MARKING PLANS AND SHALL PROVIDE FOR BICYCLES.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 50 FT EACH 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.

- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
- AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF 4 SPANS - 1 @ 40'-10", 1 @ 40'-5", 1 @ 40'-0", 1 @ 40'-5"; 44'-0" CLEAR ROADWAY WIDTH AND REINFORCED CONCRETE FLOOR ON PRESTRESSED CONCRETE GIRDERS AND LOCATED 25'± DOWNSTREAM FROM 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, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18- EVALUATING SCOUR AT BRIDGES."
- THE SCOUR CRITICAL ELEVATION FOR BENT(S) NO. 1 & 2 IS ELEVATION 2595.5. 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.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON -L- US 276  
 (RUSS AVE.) OVER RICHLAND  
 CREEK BETWEEN US 23  
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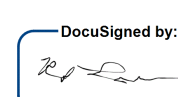


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1			3			TOTAL SHEETS
2			4			49

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 CHECKED BY : Z. H. BROWN DATE : 4/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 2/23



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

LOAD FACTORS:

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

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
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT					SHEAR					LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT								
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)				
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.37	--	1.75	0.824	1.84	A,B,C	I	29.20	0.960	1.37	A,B,C	I	11.30	0.80	0.824	1.89	A,B,C	I	29.20				
	HL-93 (OPERATING)	N/A		1.81	--	1.35	0.824	2.38	A,B,C	I	29.20	0.960	1.81	A,B,C	I	11.30	N/A	0.824	--	--	--	--				
	HS-20 (INVENTORY)	36.000	②	1.66	59.76	1.75	0.824	2.33	A,B,C	I	29.20	0.960	1.66	A,B,C	I	11.30	0.80	0.824	2.39	A,B,C	I	29.20				
	HS-20 (OPERATING)	36.000		2.18	78.48	1.35	0.824	3.01	A,B,C	I	29.20	0.960	2.18	A,B,C	I	11.30	N/A	0.824	--	--	--	--				
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.87	65.75	1.40	0.824	6.24	A,B,C	I	29.20	0.960	4.87	A,B,C	I	11.30	0.80	0.824	5.13	A,B,C	I	29.20			
		SNGARBS2	20.000		3.52	70.40	1.40	0.824	4.78	A,B,C	I	29.20	0.960	3.52	A,B,C	I	11.30	0.80	0.824	3.93	A,B,C	I	29.20			
		SNAGRIS2	22.000		3.29	72.38	1.40	0.824	4.59	A,B,C	I	29.20	0.960	3.29	A,B,C	I	11.30	0.80	0.824	3.77	A,B,C	I	29.20			
		SNCOTTS3	27.250		2.39	65.13	1.40	0.824	3.11	A,B,C	I	29.20	0.960	2.39	A,B,C	I	11.30	0.80	0.824	2.55	A,B,C	I	29.20			
		SNAGGRS4	34.925		2.02	70.55	1.40	0.824	2.65	A,B,C	I	29.20	0.960	2.02	A,B,C	I	11.30	0.80	0.824	2.18	A,B,C	I	29.20			
		SNS5A	35.550		2.06	73.23	1.40	0.824	2.59	A,B,C	I	29.20	0.960	2.06	A,B,C	I	11.30	0.80	0.824	2.13	A,B,C	I	29.20			
		SNS6A	39.950		1.90	75.91	1.40	0.824	2.40	A,B,C	I	29.20	0.960	1.90	A,B,C	I	11.30	0.80	0.824	1.97	A,B,C	I	29.20			
		SNS7B	42.000		1.88	78.96	1.40	0.824	2.28	A,B,C	I	29.20	0.960	1.90	A,B,C	I	11.30	0.80	0.824	1.88	A,B,C	I	29.20			
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.28	75.24	1.40	0.824	2.93	A,B,C	I	29.20	0.960	2.28	A,B,C	I	11.30	0.80	0.824	2.41	A,B,C	I	29.20			
		TNT4A	33.075		2.19	72.43	1.40	0.824	2.95	A,B,C	I	29.20	0.960	2.19	A,B,C	I	11.30	0.80	0.824	2.42	A,B,C	I	29.20			
		TNT6A	41.600		2.00	83.20	1.40	0.824	2.43	A,B,C	I	29.20	0.960	2.11	A,B,C	I	11.30	0.80	0.824	2.00	A,B,C	I	29.20			
		TNT7A	42.000		1.95	81.90	1.40	0.824	2.45	A,B,C	I	29.20	0.960	1.95	A,B,C	I	11.30	0.80	0.824	2.02	A,B,C	I	29.20			
		TNT7B	42.000		1.82	76.44	1.40	0.824	2.56	A,B,C	I	29.20	0.960	1.82	A,B,C	I	11.30	0.80	0.824	2.11	A,B,C	I	29.20			
		TNAGRIT4	43.000		1.77	76.11	1.40	0.824	2.42	A,B,C	I	29.20	0.960	1.77	A,B,C	I	11.30	0.80	0.824	1.99	A,B,C	I	29.20			
TNAGT5A	45.000		1.80	81.00	1.40	0.824	2.27	A,B,C	I	29.20	0.960	1.80	A,B,C	I	11.30	0.80	0.824	1.87	A,B,C	I	29.20					
TNAGT5B	45.000		③	1.68	75.60	1.40	0.824	2.24	A,B,C	I	29.20	0.960	1.68	A,B,C	I	11.30	0.80	0.824	1.84	A,B,C	I	29.20				

**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)

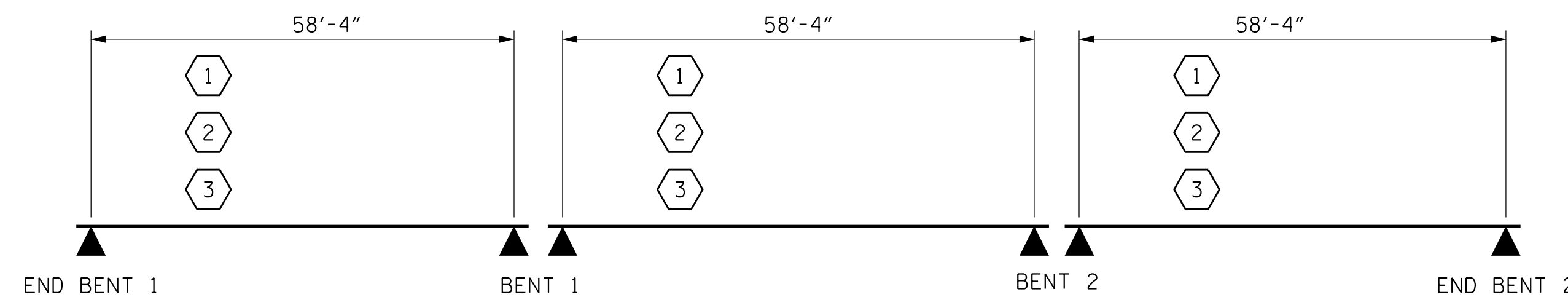
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-4
1			3			TOTAL SHEETS
2			4			49

PLANS PREPARED BY:

NV5

NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.nv5.com  
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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

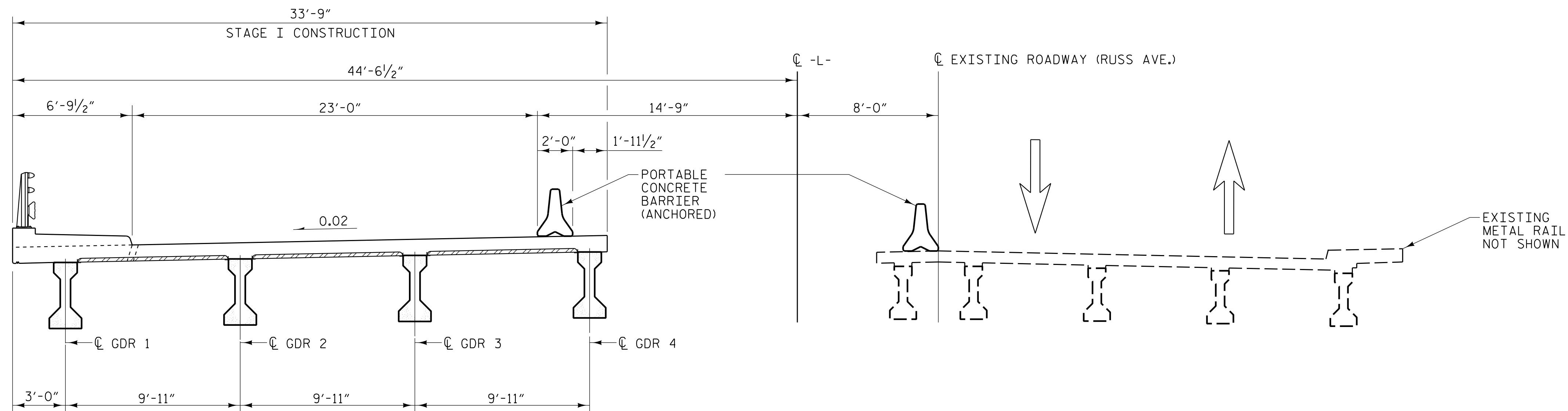
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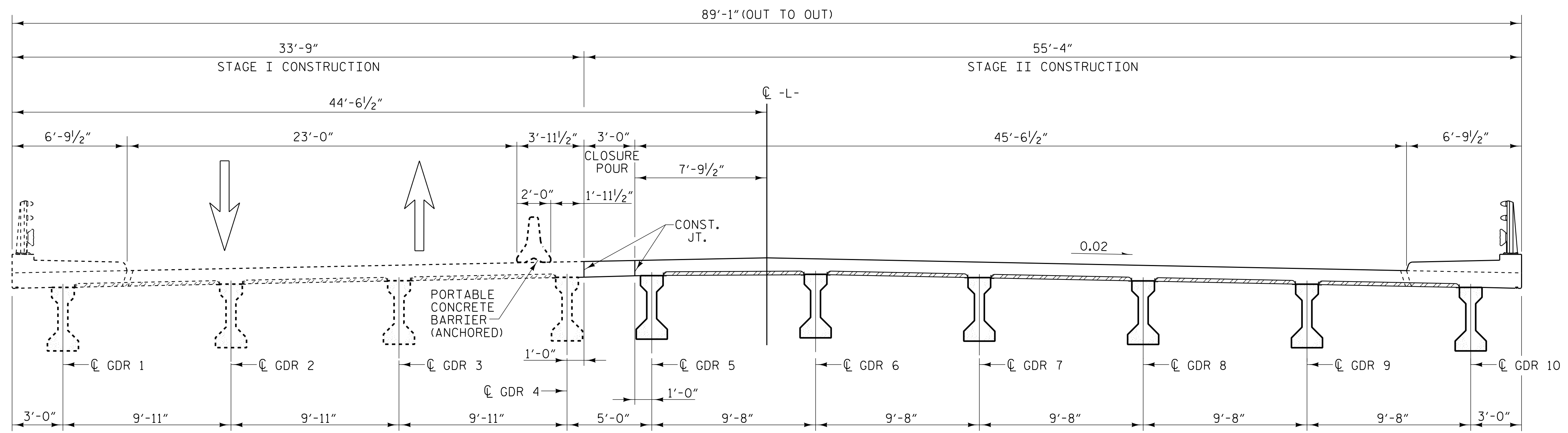
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DESIGN ENGINEER OF RECORD: <b>R. C. LARSON</b>	DATE: 2/23	
ASSEMBLED BY: <b>C. D. ROBINSON</b>	DATE: 7/19	
CHECKED BY: <b>Z. H. BROWN</b>	DATE: 7/19	
DRAWN BY: <b>MAA</b>	1/08	MAA/GM
CHECKED BY: <b>GM/DI</b>	2/08	MAA/GM
	REV. 11/12/08RR	MAA/THC
	REV. 10/1/11	
	REV. 12/17	



**STAGE I CONSTRUCTION**



**STAGE II CONSTRUCTION**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

**NOTES:**

FOR TRAFFIC PHASING, SEE TRAFFIC CONTROL PLANS.  
 THE PORTABLE CONCRETE BARRIER IS A TRAFFIC CONTROL PAY ITEM.  
 SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER.

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DocuSigned by:

*[Signature]*

BBB2398D9220470

STATE OF NORTH CAROLINA  
 PROFESSIONAL SEAL  
 14114  
 ENGINEER  
 ROBERT C. LARSON  
 5/19/2023

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**CONSTRUCTION STAGING SEQUENCE**

REVISIONS						SHEET NO.
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2			4			

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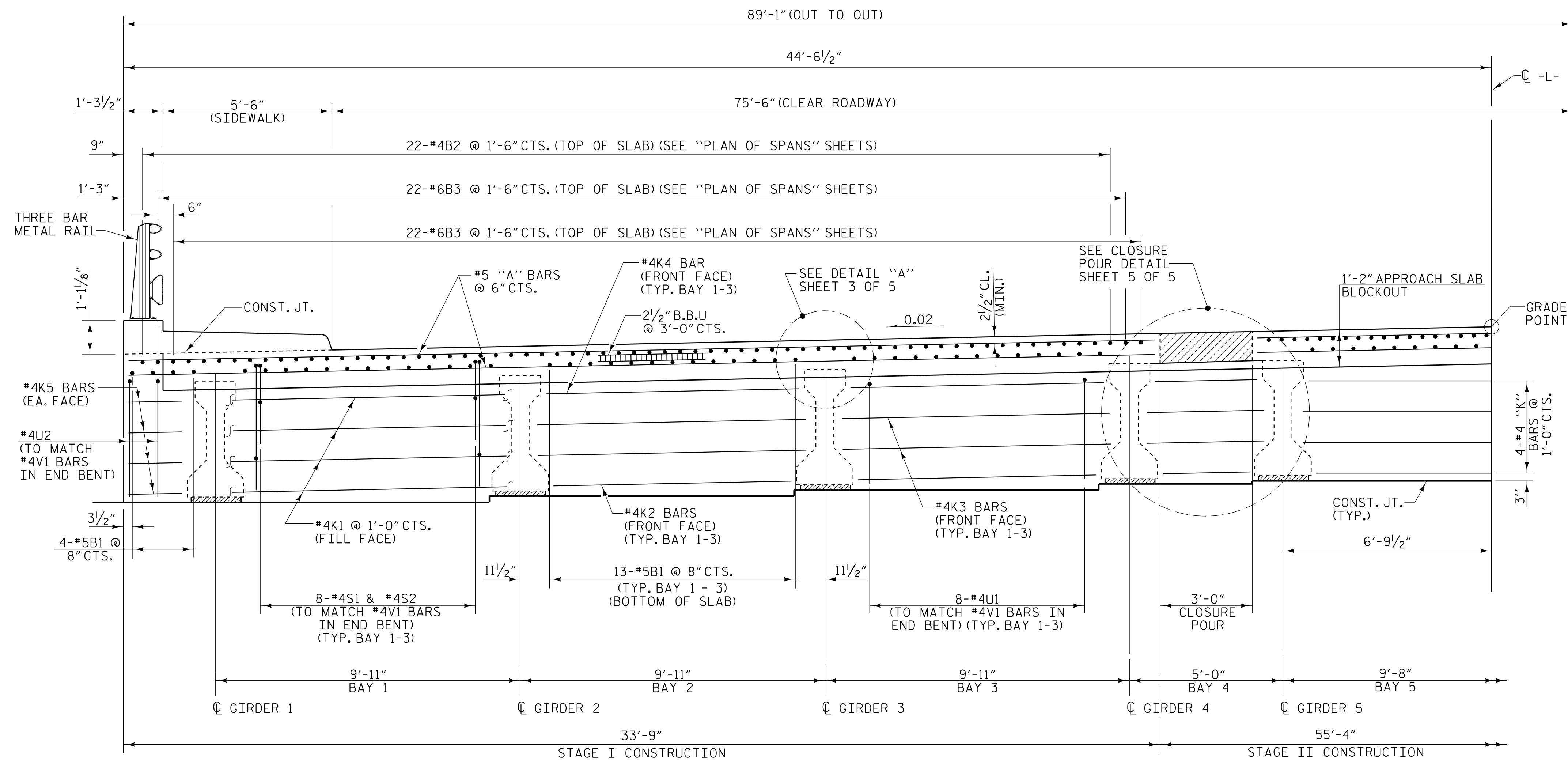
DRAWN BY: W. B. ALLEN DATE: 5/19  
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*[Signature]*

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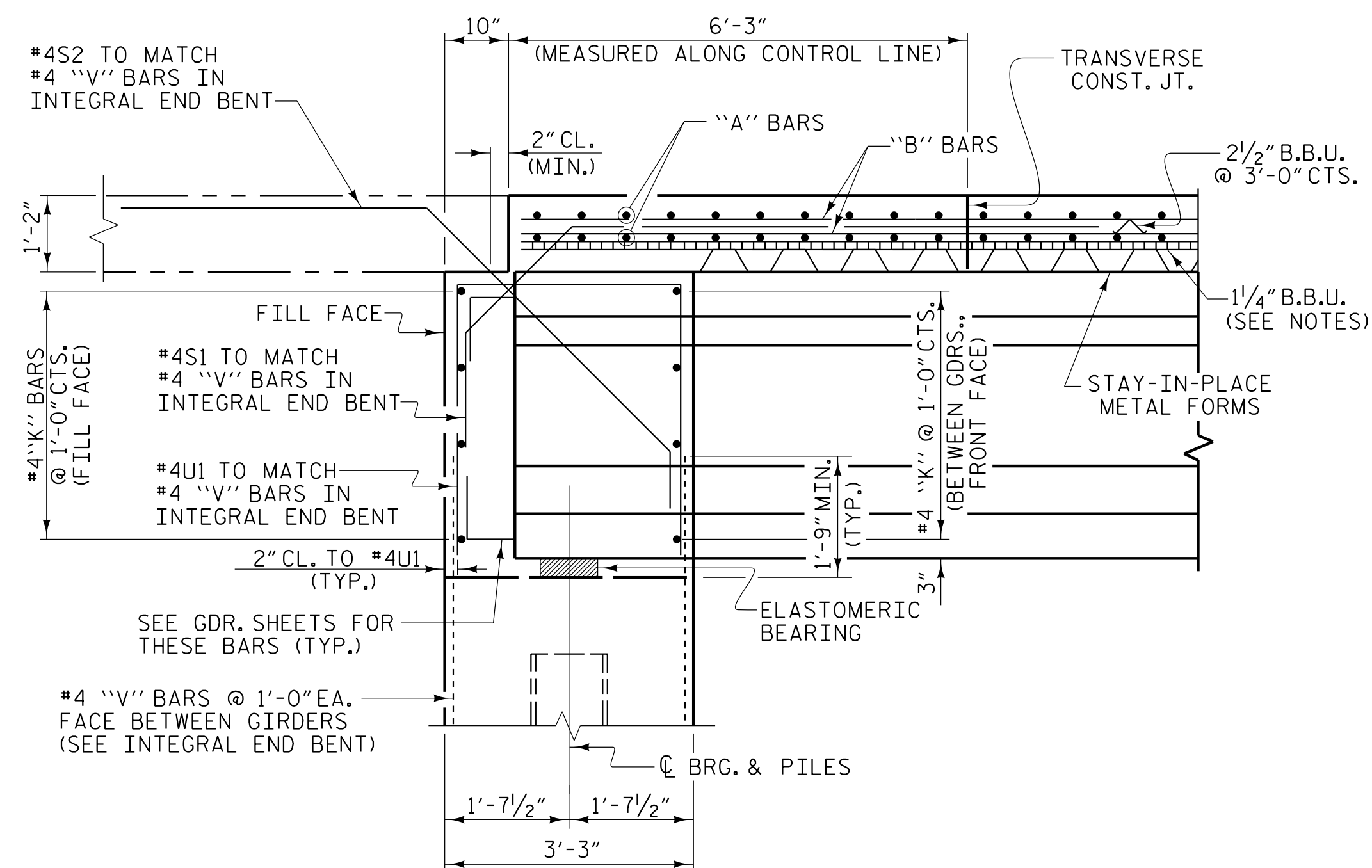
**TYPICAL HALF SECTION**  
(SHOWING INTEGRAL END BENT DIAPHRAGM)

**NOTES:**

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

LONGITUDINAL STEEL MAY BE SHIFTED AS NECESSARY TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS AND DRAIN PIPES IN THE DECK.

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.



**SECTION THRU INTEGRAL END BENTS**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 1 OF 5

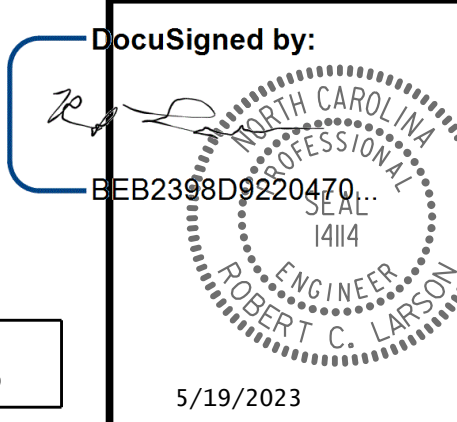
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
TYPICAL SECTION

REVISIONS

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

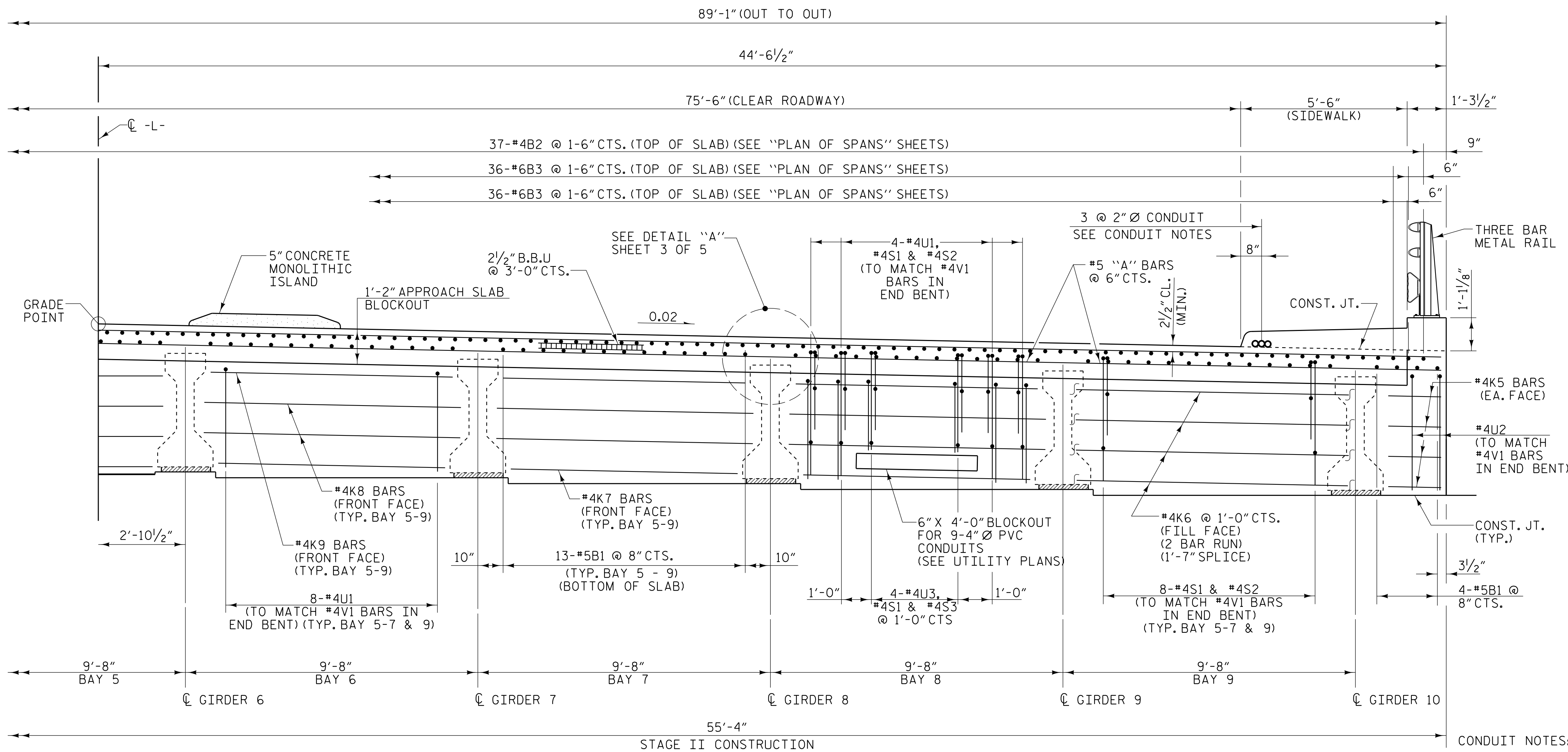
SHEET NO.  
S2-6  
TOTAL SHEETS  
49



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**TYPICAL HALF SECTION**  
(SHOWING INTEGRAL END BENT DIAPHRAGM)

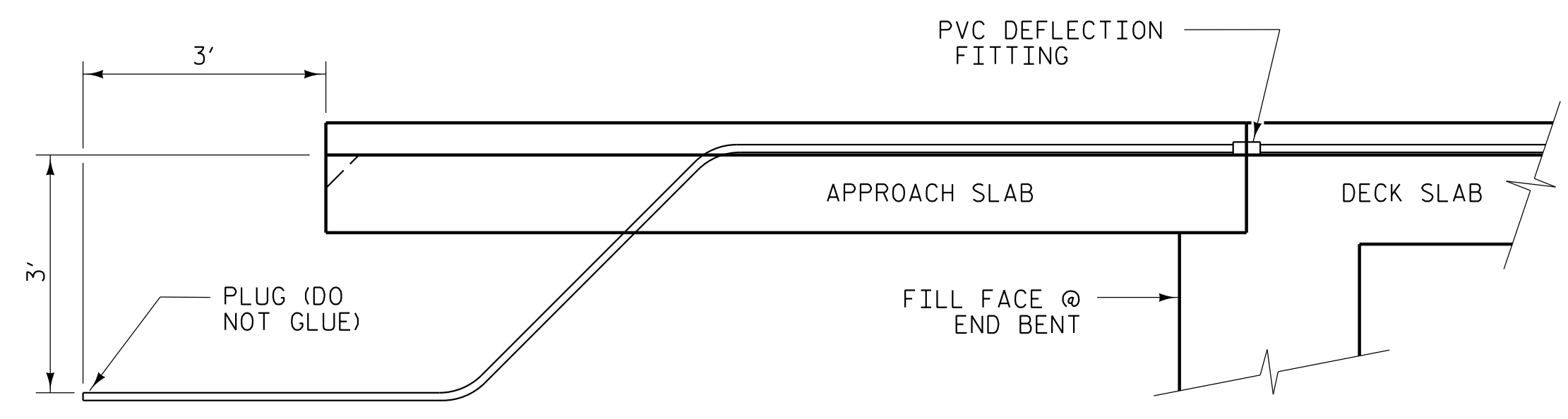
**CONDUIT NOTES:**

INSTALL CONDUIT IN RIGHT SIDEWALK, FULL LENGTH OF BRIDGE AND APPROACH SLAB. TERMINATE CONDUIT 3' BEYOND APPROACH SLAB AND PLUG 3' BELOW TOP OF SLAB. SEE DETAIL BELOW.

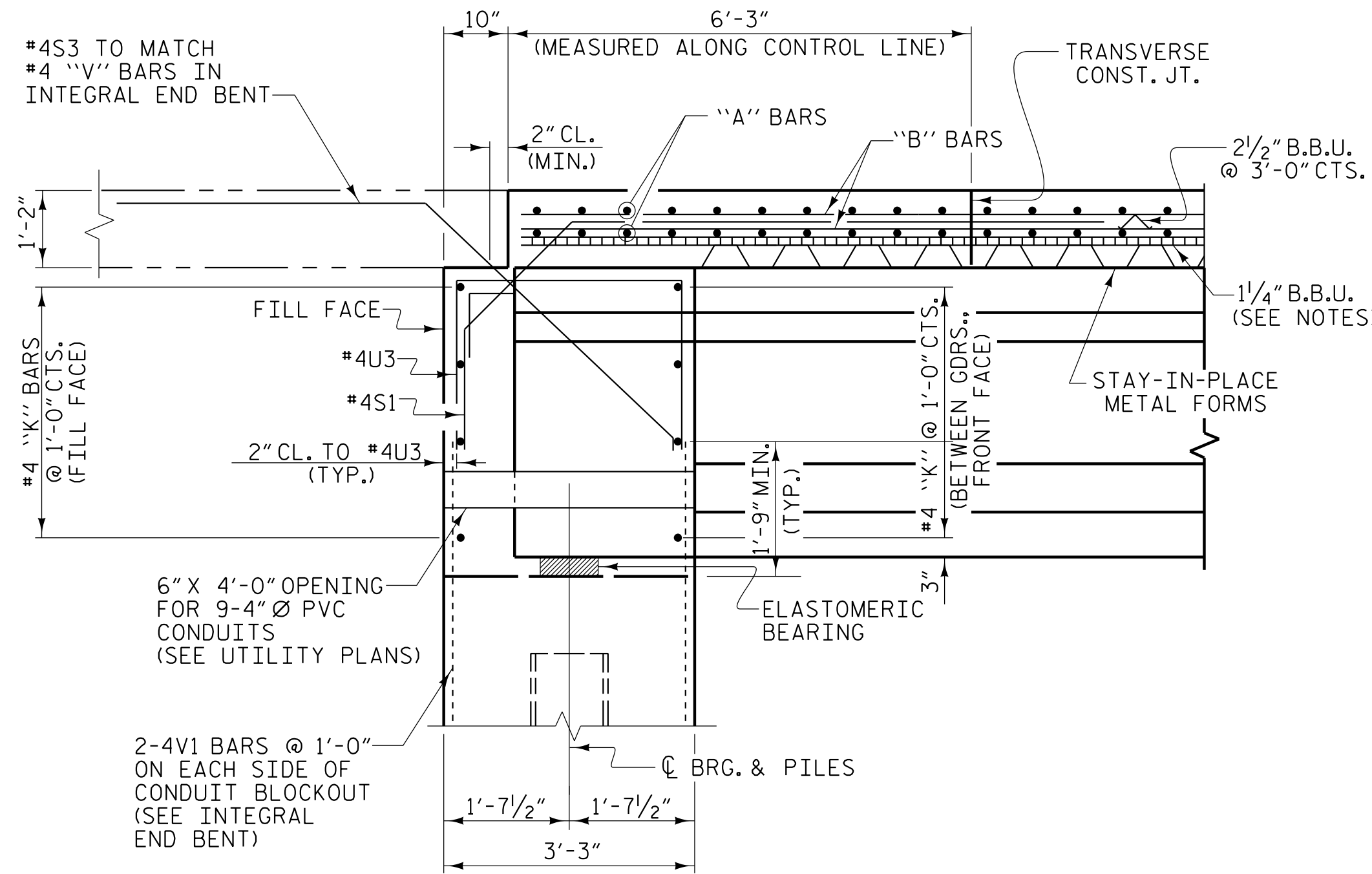
CONDUIT TO BE SCHEDULE 40 PVC AND FASTENED SECURELY TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT. PROVIDE PULL STRING IN EACH CONDUIT, FULL LENGTH OF RUN AND ATTACH TO PLUG AT EACH END.

PROVIDE DEFLECTION FITTING IN CONDUIT AT CONSTRUCTION JOINT AT EACH END BENT.

NO SEPARATE PAYMENT WILL BE MADE FOR THE CONDUIT AS IT IS CONSIDERED INCIDENTAL TO THE DECK SLAB. INCLUDE ALL COSTS ASSOCIATED WITH THIS WORK IN THE PRICE FOR "REINFORCED CONCRETE DECK SLAB."



**CONDUIT TERMINATION DETAIL**  
(ELEVATION VIEW AT APPROACH SLAB)



**SECTION THRU INTEGRAL END BENTS**  
(BAY 8)  
(SEE SHEET 1 OF 5 FOR SECTION AT BAYS 6, 7 & 9)

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE**  
**TYPICAL SECTION**

PLANS PREPARED BY:

**NV15**

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 NC License # F-1333

DocuSigned by:

**ROBERT C. LARSON**  
 PROFESSIONAL ENGINEER  
 14114

EEB2398D822047AL

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1			3			49
2			4			

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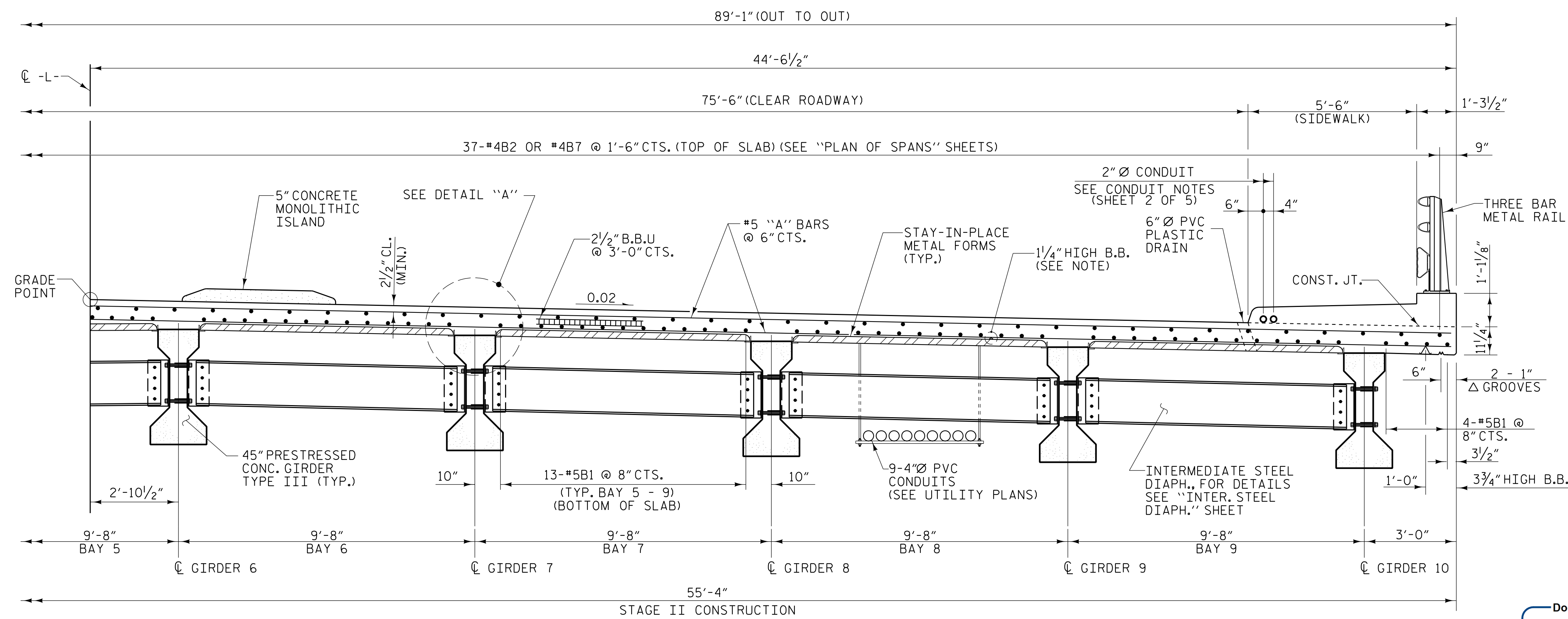
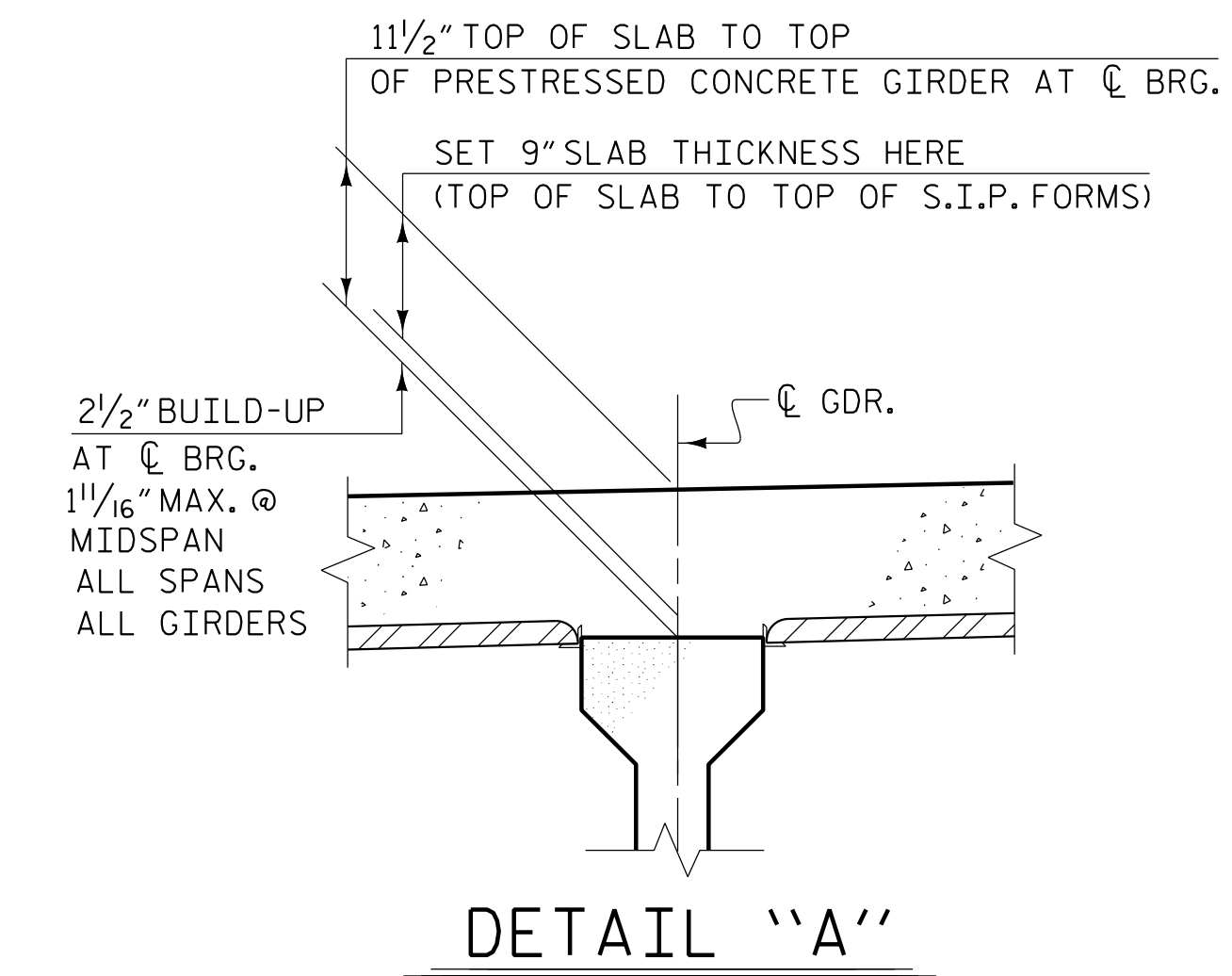
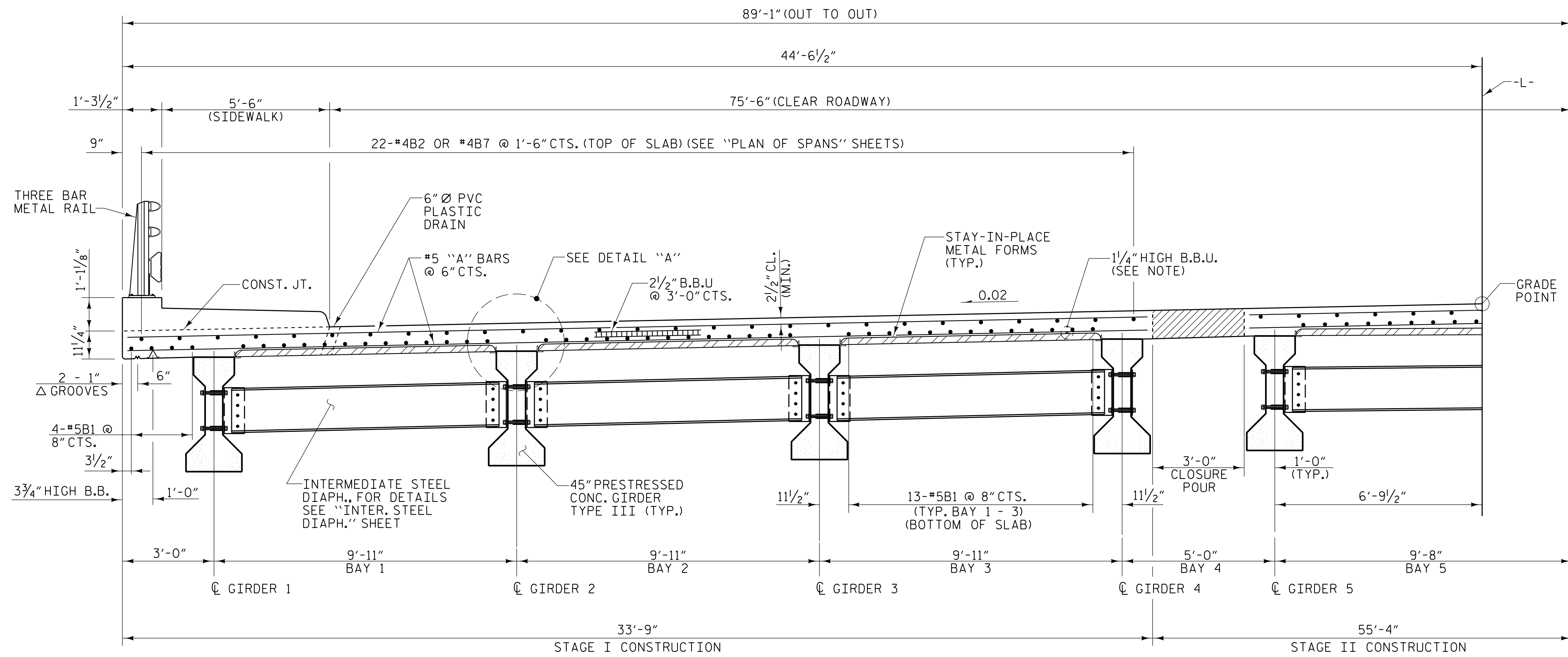
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CARY, NC 27518  
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PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 3 OF 5  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
TYPICAL SECTION

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BEB2398D9220470  
NORTH CAROLINA PROFESSIONAL ENGINEER  
ROBERT C. LARSON  
1414  
5/19/2023

**TYPICAL HALF SECTIONS**  
(SHOWING INTERMEDIATE STEEL DIAPHRAGMS)

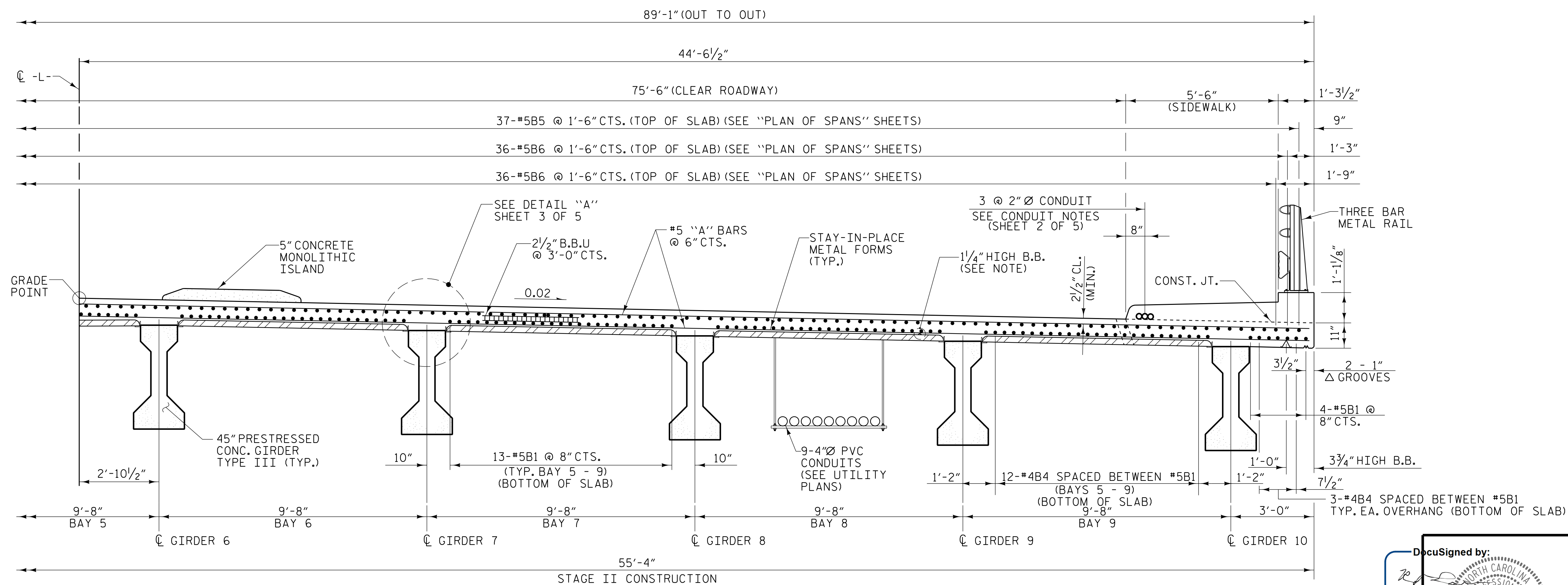
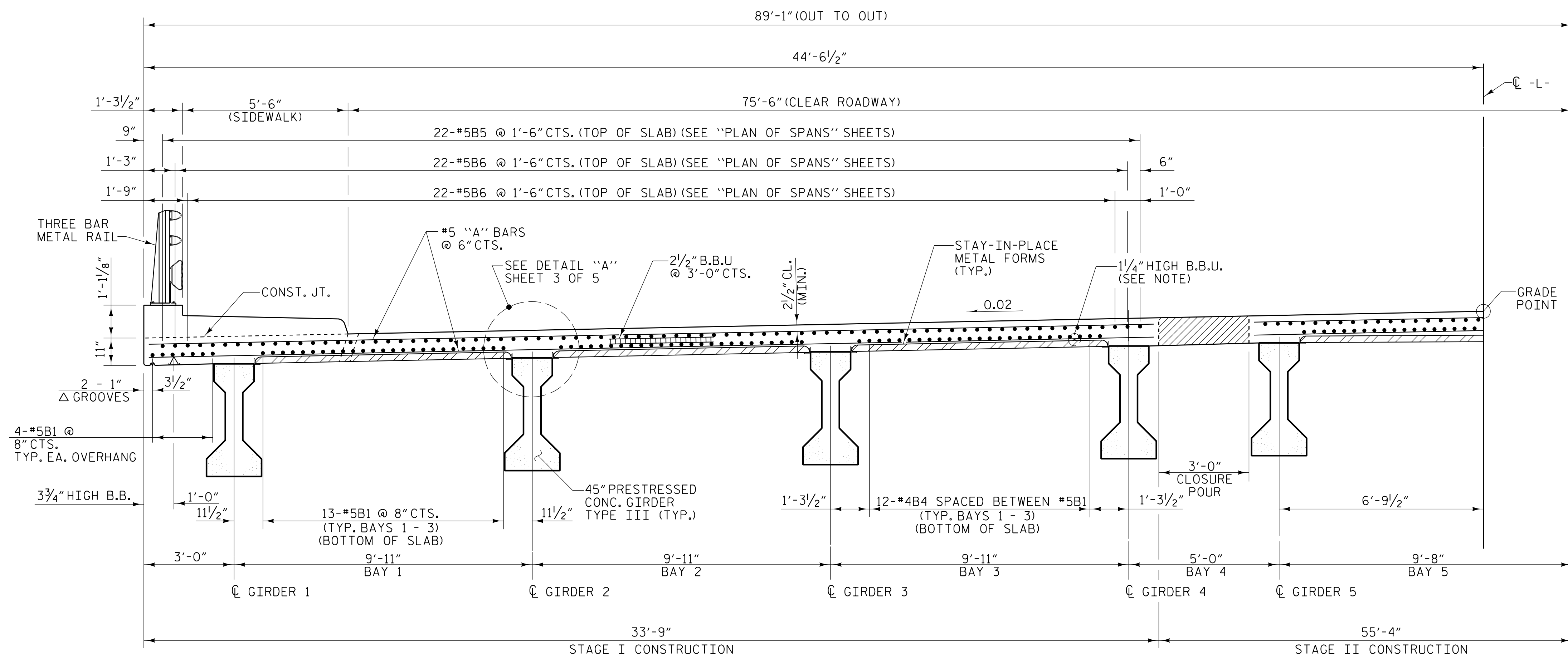
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-8	
1			3			TOTAL SHEETS	
2			4			49	

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**TYPICAL HALF SECTIONS**

(SHOWING LINK SLAB)

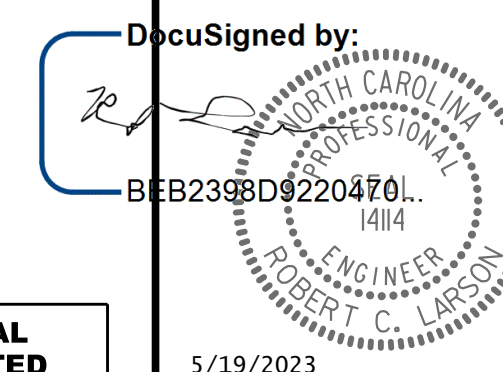


PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 4 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

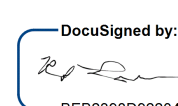
**SUPERSTRUCTURE  
TYPICAL SECTION**



5/19/2023

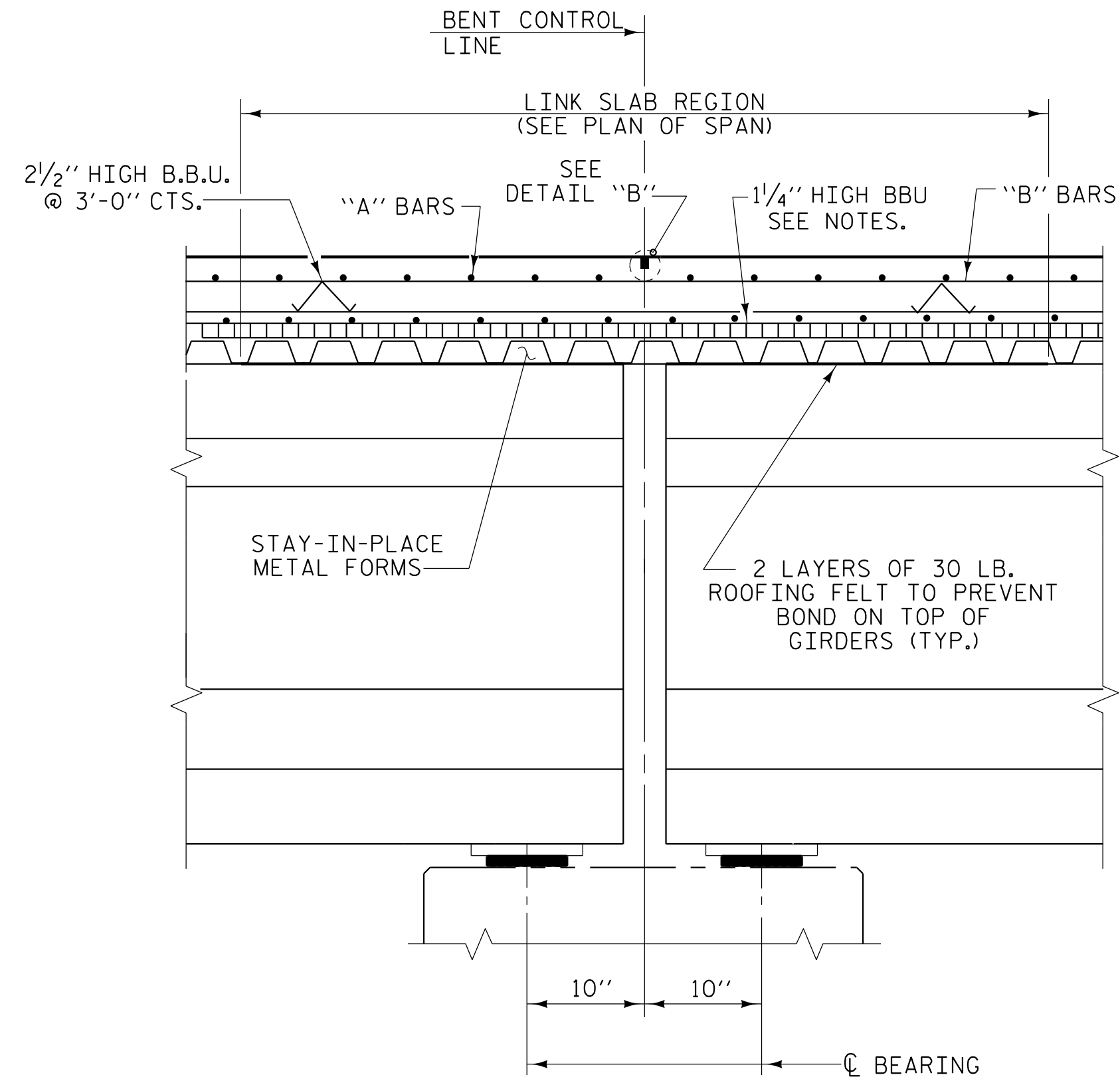
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DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 2/23

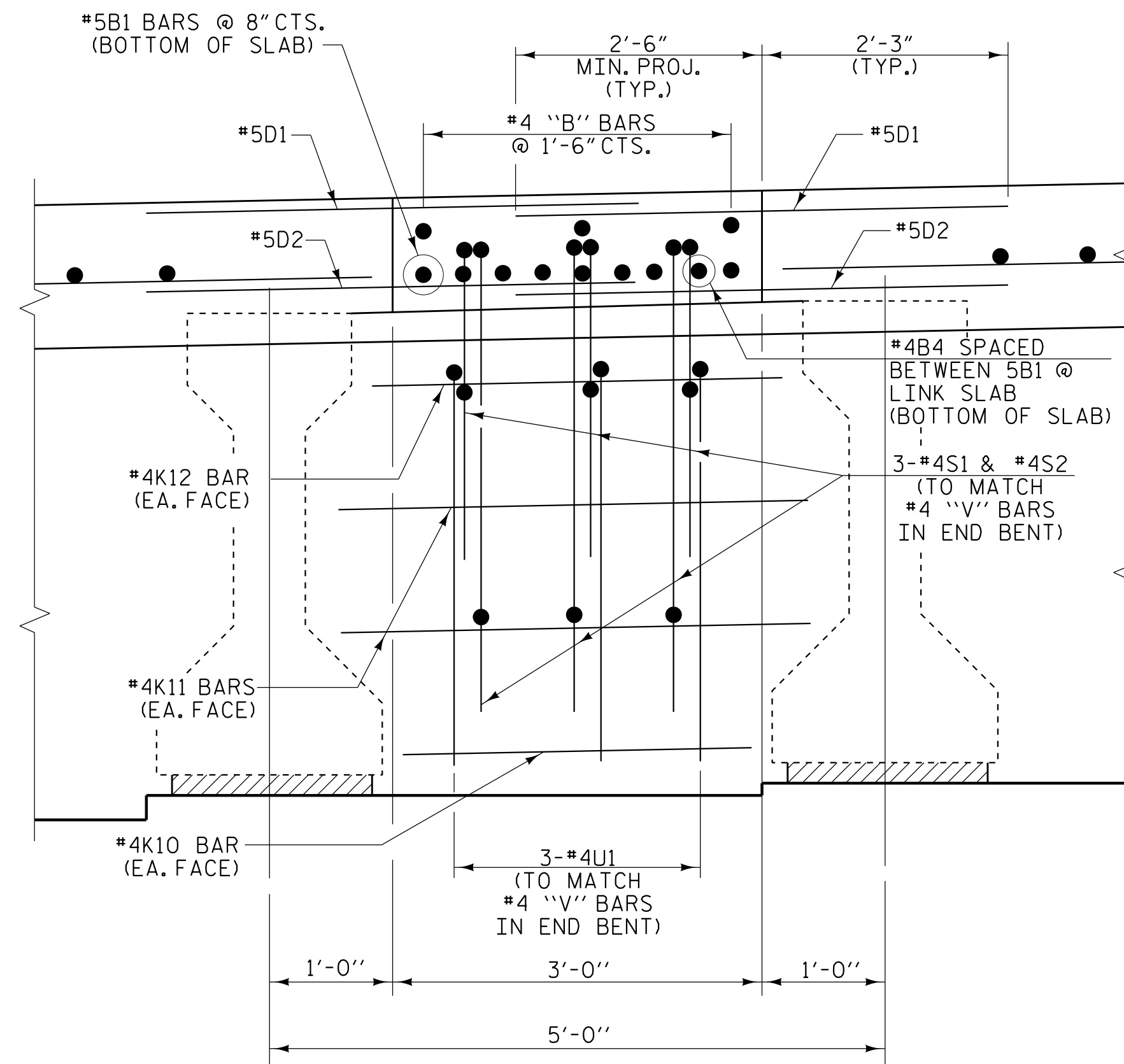


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-9
1			3			TOTAL SHEETS
2			4			49

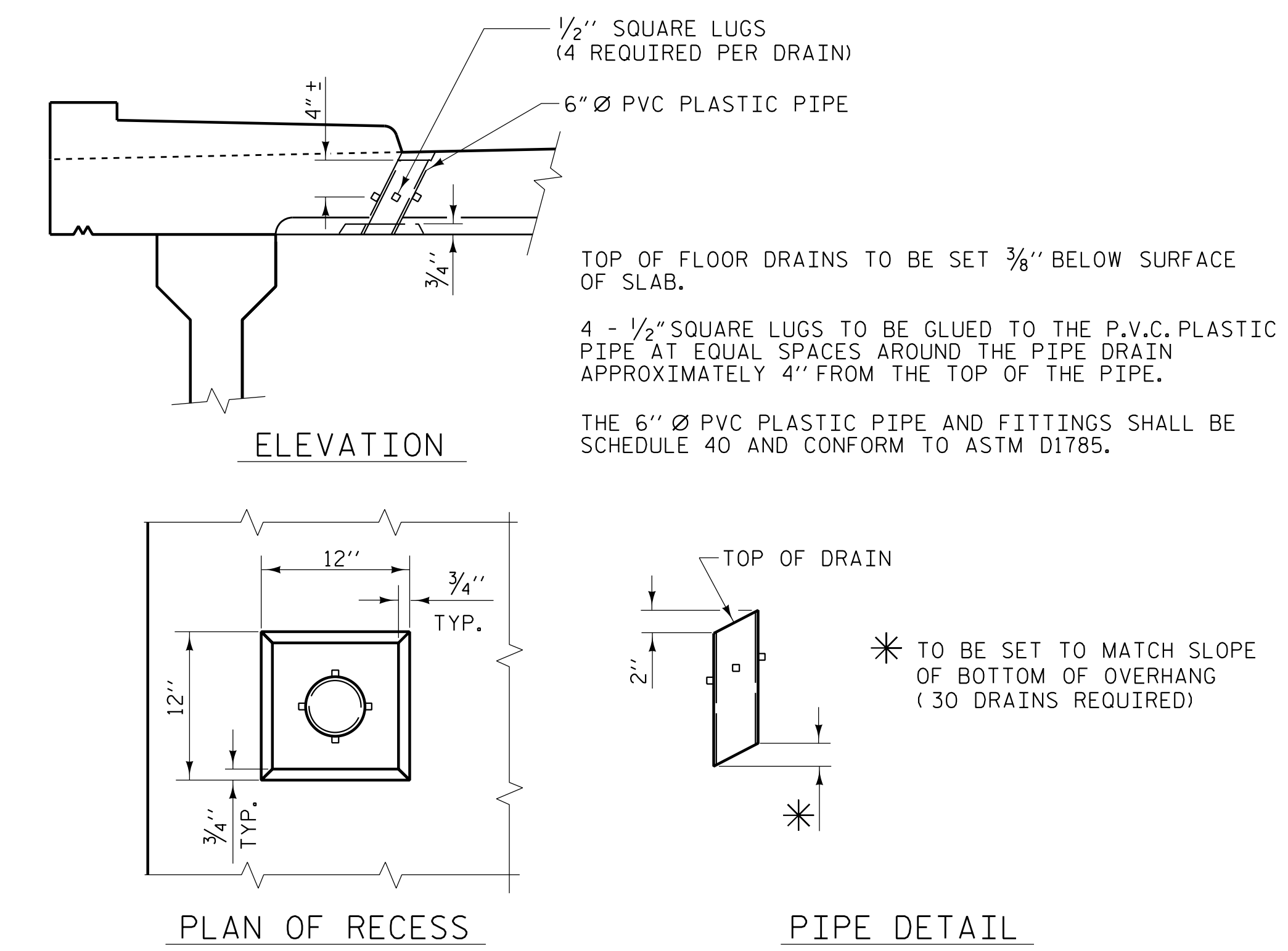
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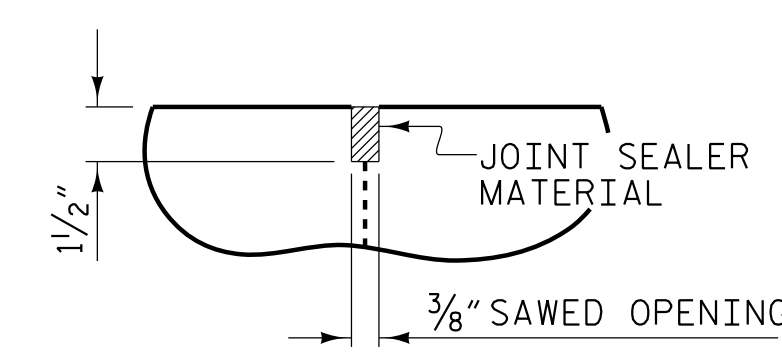
SECTION AT BENT



CLOSURE POUR DETAIL

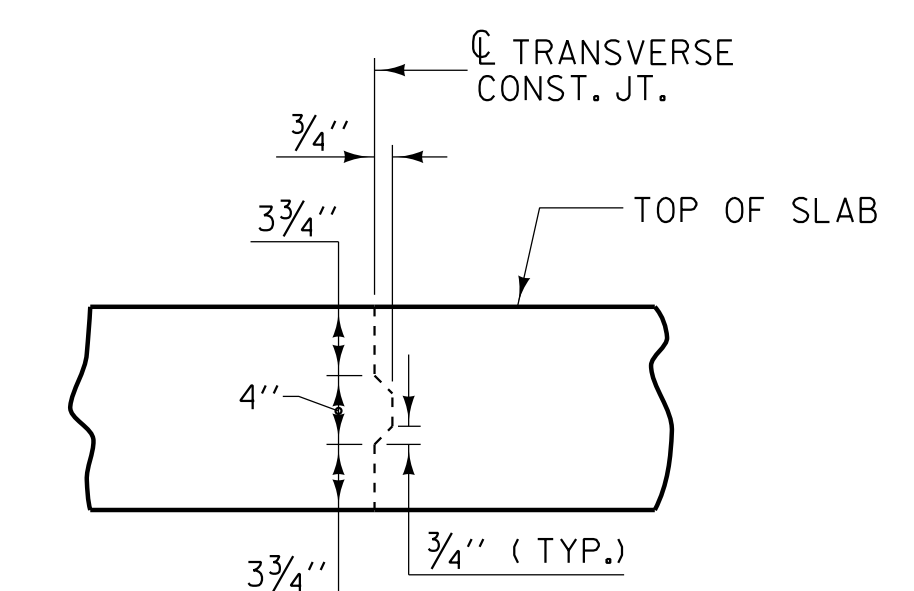


DRAIN DETAILS



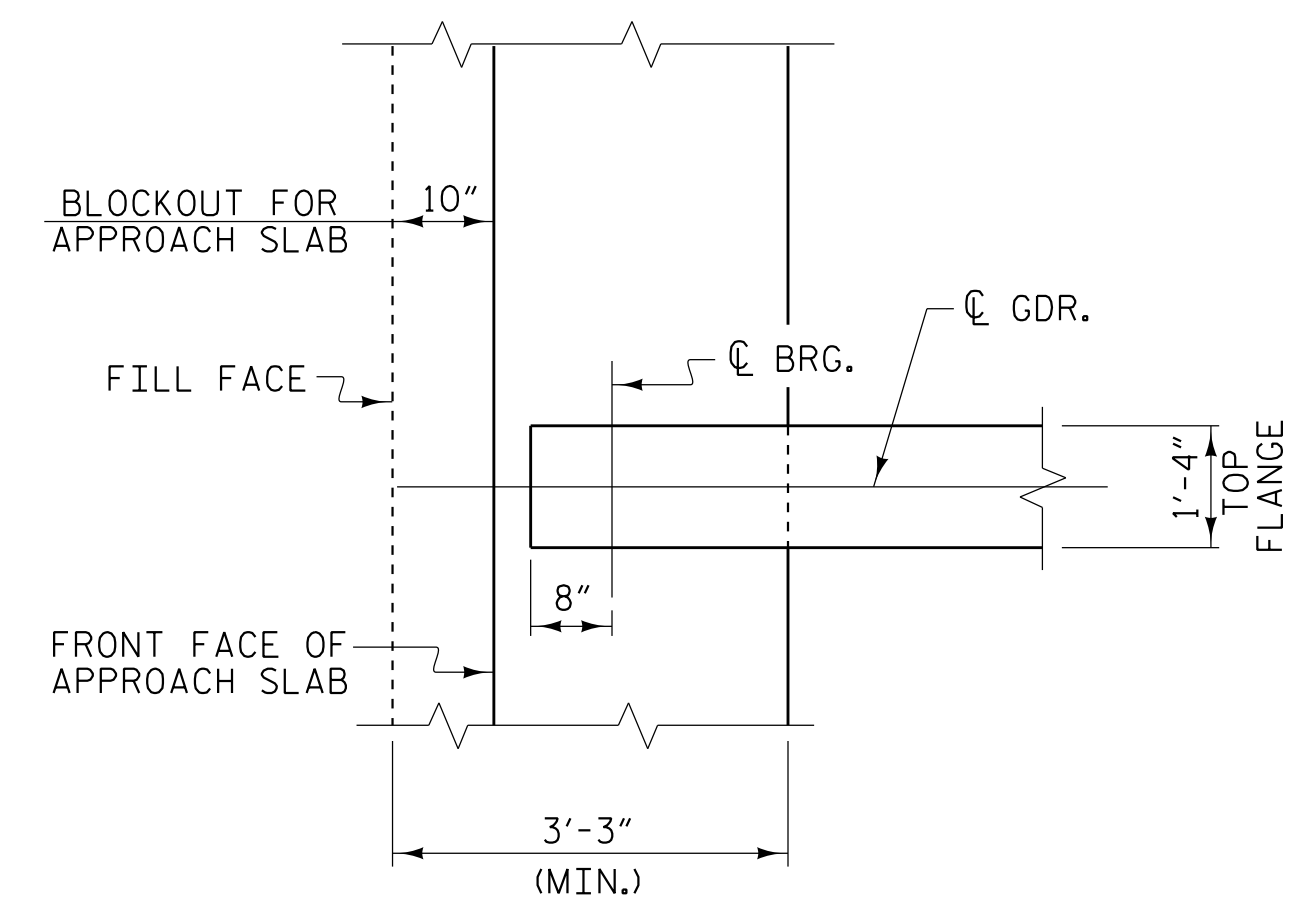
DETAIL "B"

A 1/2" DEEP 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.

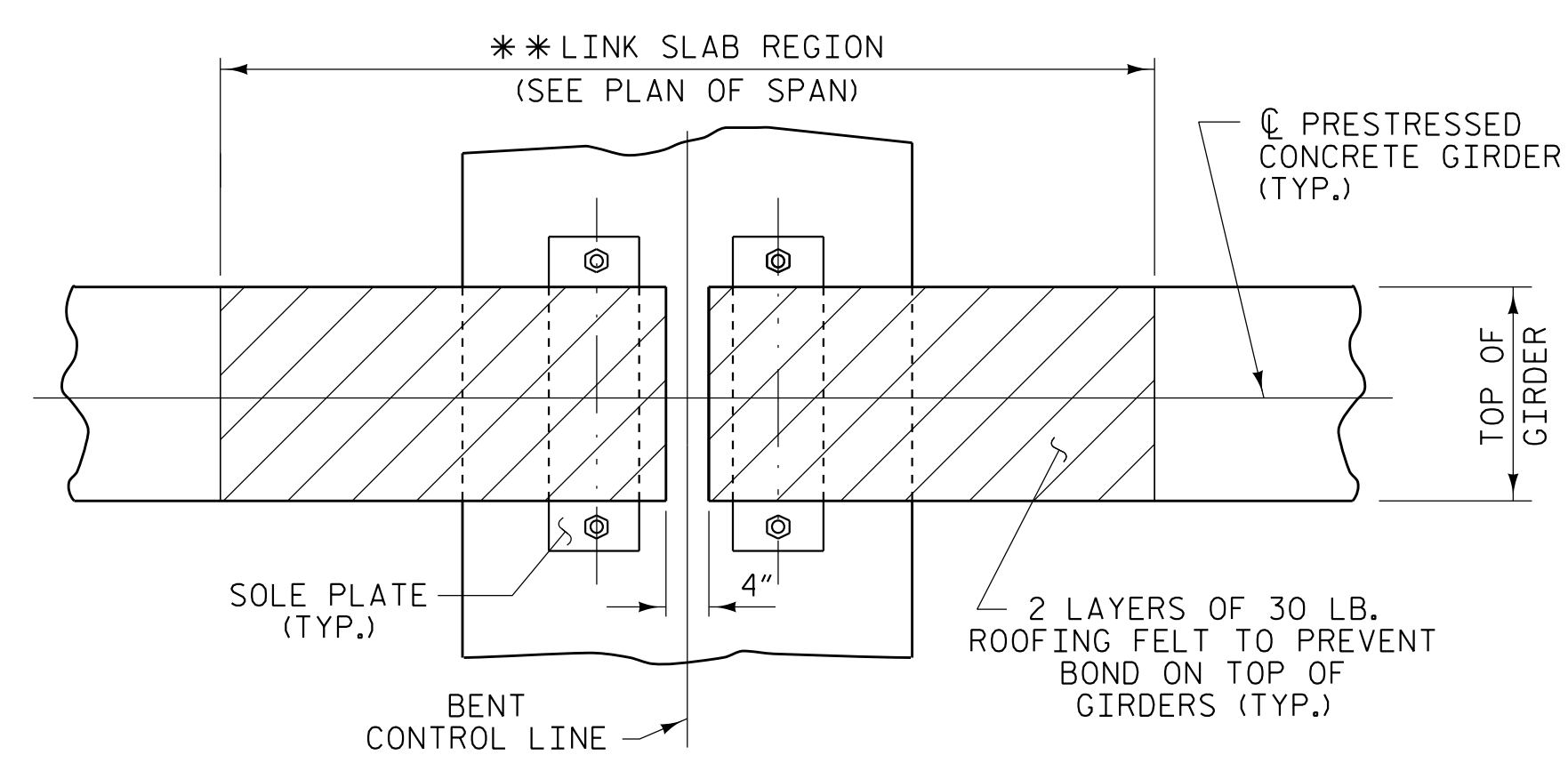


TRANSVERSE CONSTRUCTION JOINT DETAIL

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



PLAN OF GIRDER AT END BENT



PLAN OF GIRDERS AT BENT

\*\* THE TOP OF THE BEAM 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.

PLANS PREPARED BY:

**NV5**

NV5 ENGINEERS & CONSULTANTS, INC.  
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CARY, NC 27518  
P: 919.851.1912 www.NV5.com  
NC License # F-1333

DocuSigned by:

ROBERT C. LARSON

PROFESSIONAL ENGINEER  
14114

5/19/2023

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PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 5 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
TYPICAL SECTION

REVISIONS				SHEET NO.	
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1			3		
2			4		

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DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

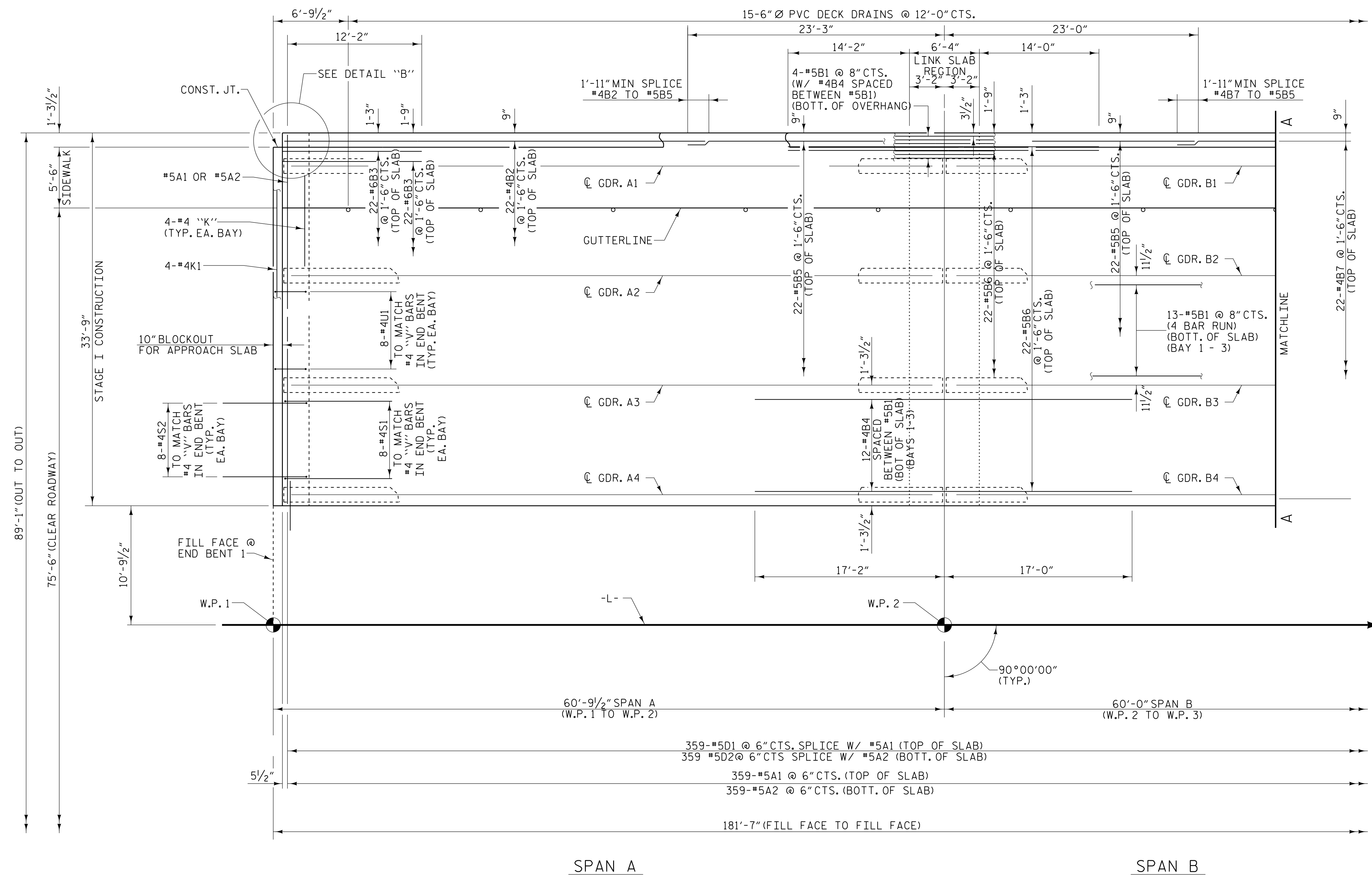
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ROBERT C. LARSON

**NOTE**

FOR SIDEWALK AND REINFORCING STEEL, SEE "SIDEWALK PLAN AND DETAILS" SHEET.

FOR POUR SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIALS."

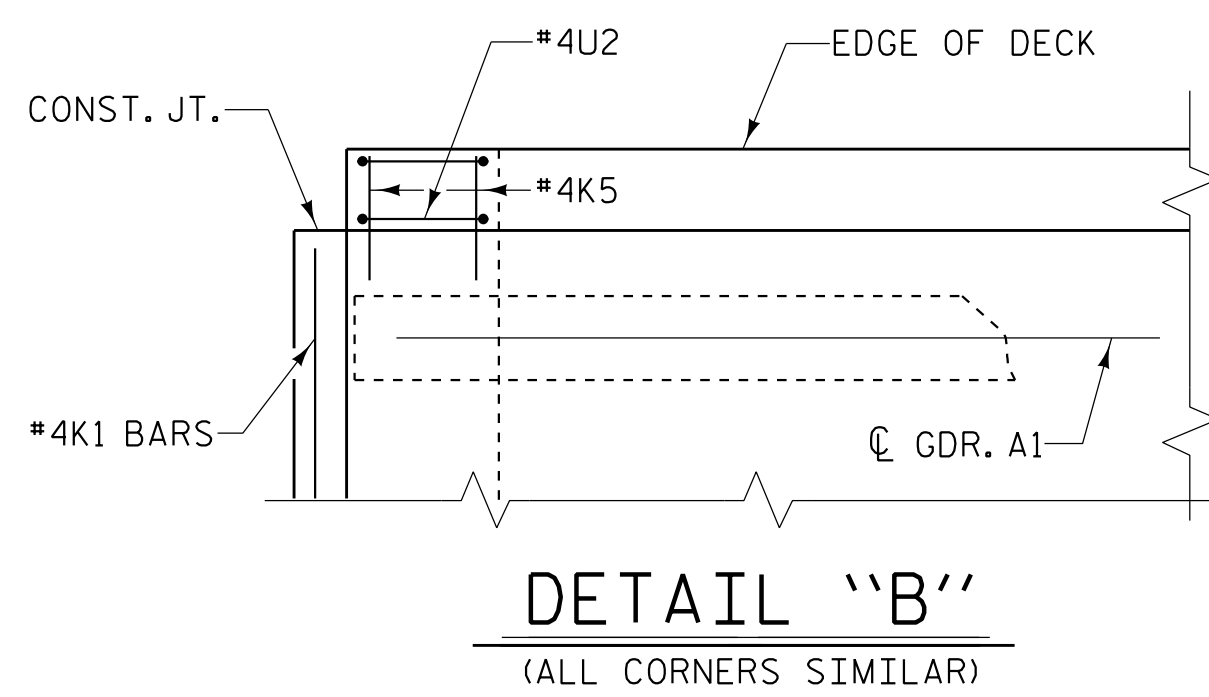
DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.



SPAN A

SPAN B

**PLAN OF SPANS A & B**  
STAGE I CONSTRUCTION



**DETAIL "B"**  
(ALL CORNERS SIMILAR)

PLANS PREPARED BY:

**NV5**

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.NV5.com  
NC License # F-1333

DocuSigned by:

*Robert C. Larson*

ROBERT C. LARSON  
PROFESSIONAL ENGINEER  
14114

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUPERSTRUCTURE**  
**PLAN OF SPANS**  
**STAGE I**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

DRAWN BY : W. B. ALLEN DATE : 5/19  
CHECKED BY : Z. H. BROWN DATE : 7/19  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 2/23

DocuSigned by:  
*Robert C. Larson*  
ROBERT C. LARSON  
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14114

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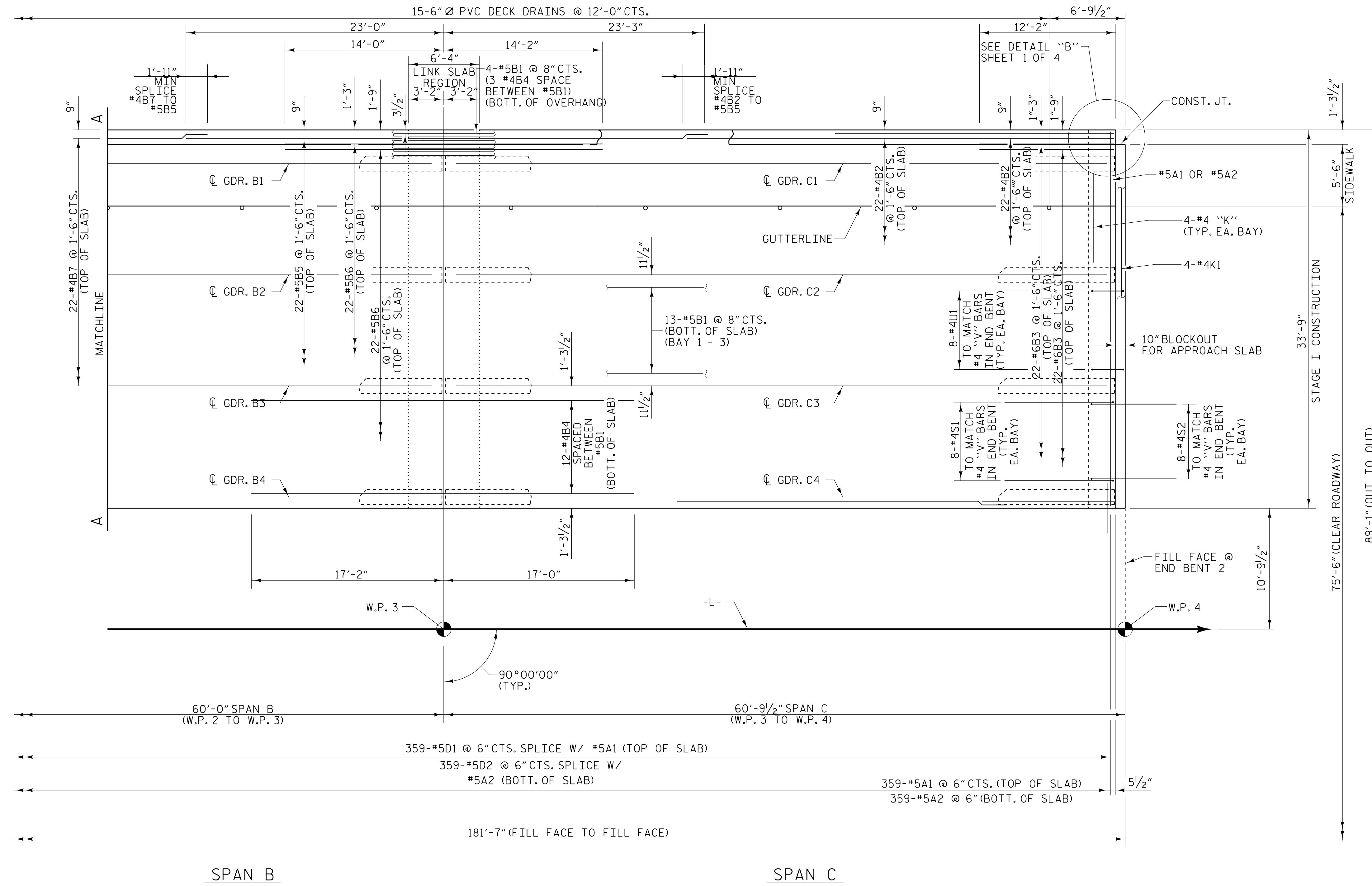
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**NOTE**

FOR SIDEWALK AND REINFORCING STEEL, SEE "SIDEWALK PLAN AND DETAILS" SHEET.

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



**PLAN OF SPANS B & C**  
STAGE I CONSTRUCTION

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE**  
**PLAN OF SPANS**  
 STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

PLANS PREPARED BY:

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 CARY, NC 27518  
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*[Signature]*

BE2398D9220470  
 1414  
 ENGINEER  
 ROBERT C. LARSON

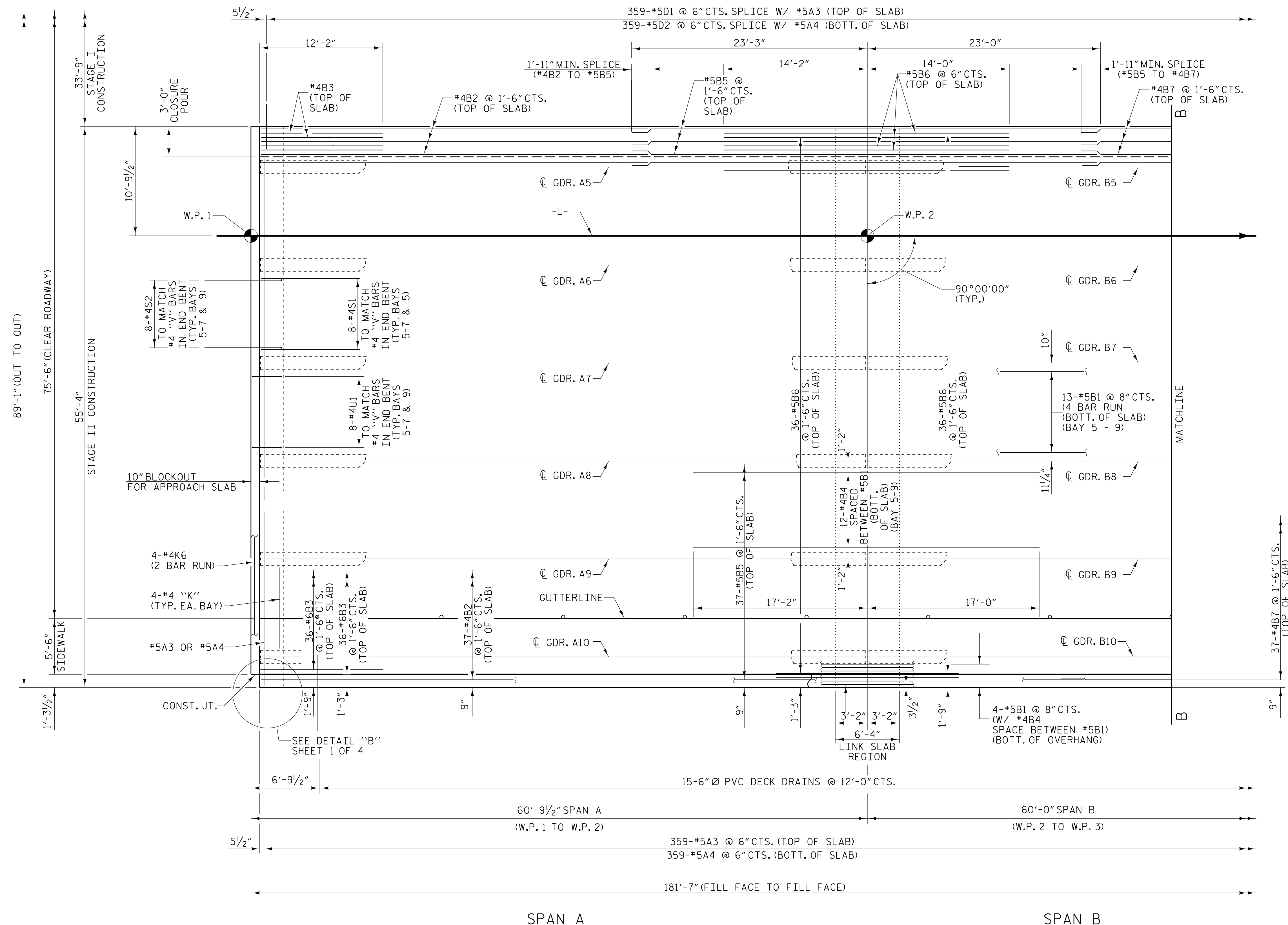
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*[Signature]*  
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**NOTE**

FOR LAYOUT OF "S" & "U" BARS IN BAY 8, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEET 2 OF 5.

CONCRETE AND REINFORCING STEEL IN THE CLOSURE POUR ARE INCLUDED IN THE STAGE II CONSTRUCTION QUANTITIES.

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

FOR POUR SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIALS."

**PLAN OF SPANS A & B**  
STAGE II CONSTRUCTION

PLANS PREPARED BY:

**NV5**

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DocuSigned by:

*Robert C. Larson*

PROFESSIONAL ENGINEER  
SEAL  
14114  
ROBERT C. LARSON  
5/19/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

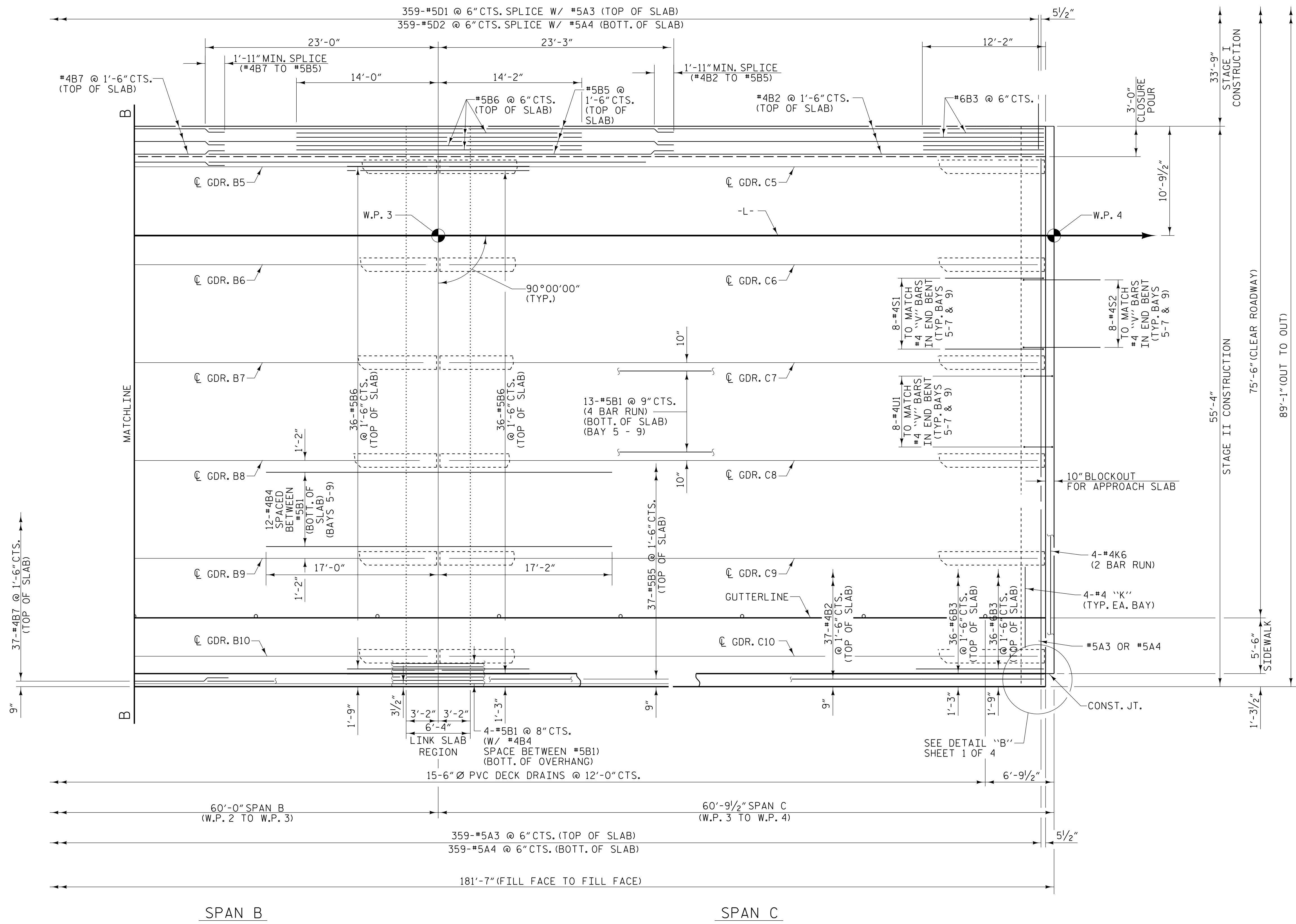
**SUPERSTRUCTURE**  
**PLAN OF SPANS**  
**STAGE II**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

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DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

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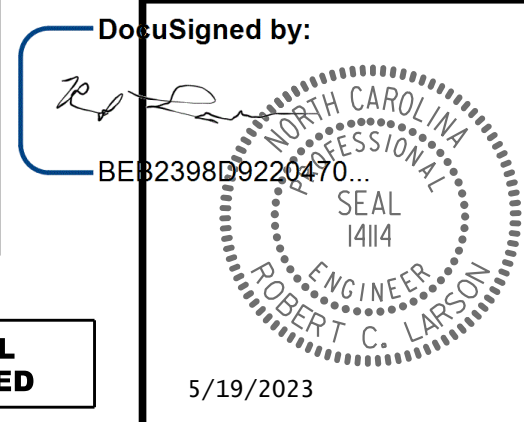


**NOTE**  
 FOR LAYOUT OF "S" & "U" BARS IN BAY 8, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEET 2 OF 5.  
 CONCRETE AND REINFORCING STEEL IN THE CLOSURE POUR ARE INCLUDED IN THE STAGE II CONSTRUCTION QUANTITIES.  
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 FOR POUR SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIALS."

**PLAN OF SPANS B & C**  
 STAGE II CONSTRUCTION

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

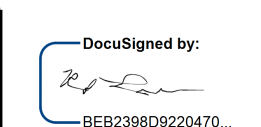
SHEET 4 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPANS  
 STAGE II



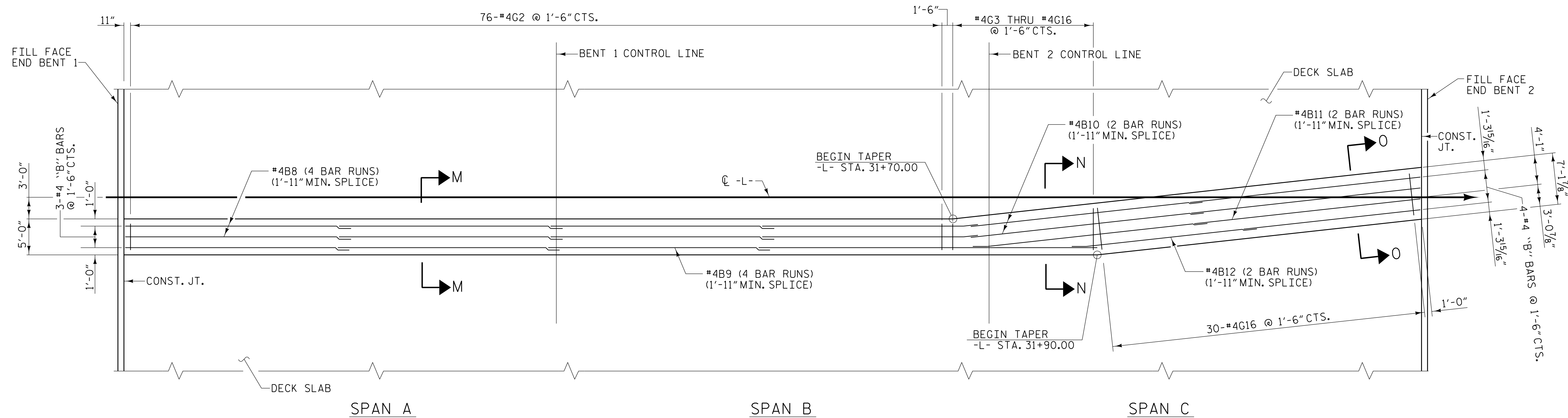
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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			49

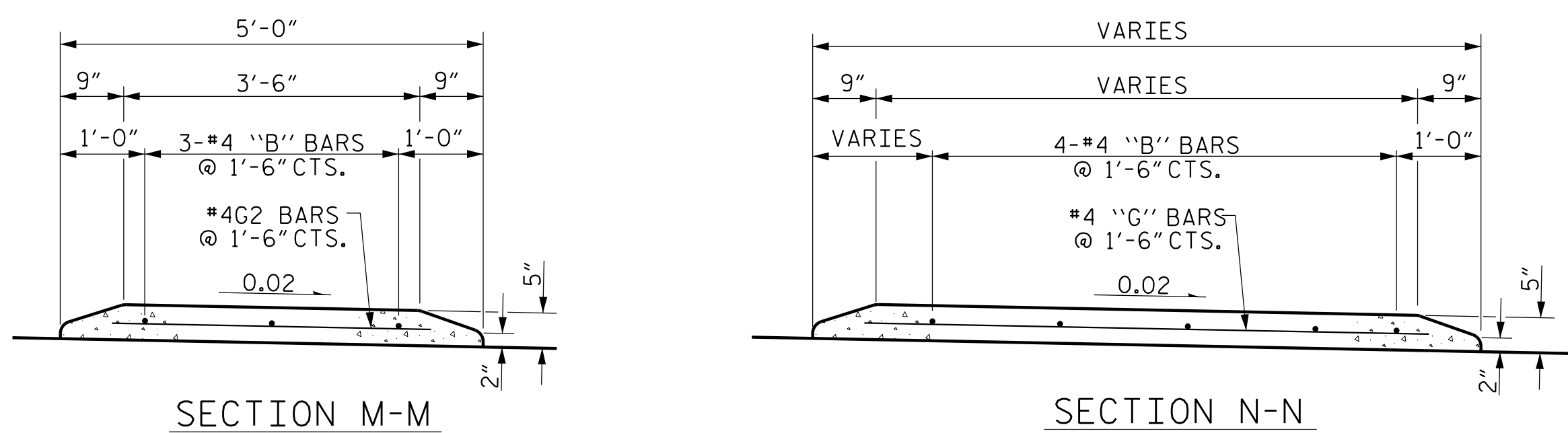
DRAWN BY: W. B. ALLEN DATE: 5/19  
 CHECKED BY: Z. H. BROWN DATE: 7/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23



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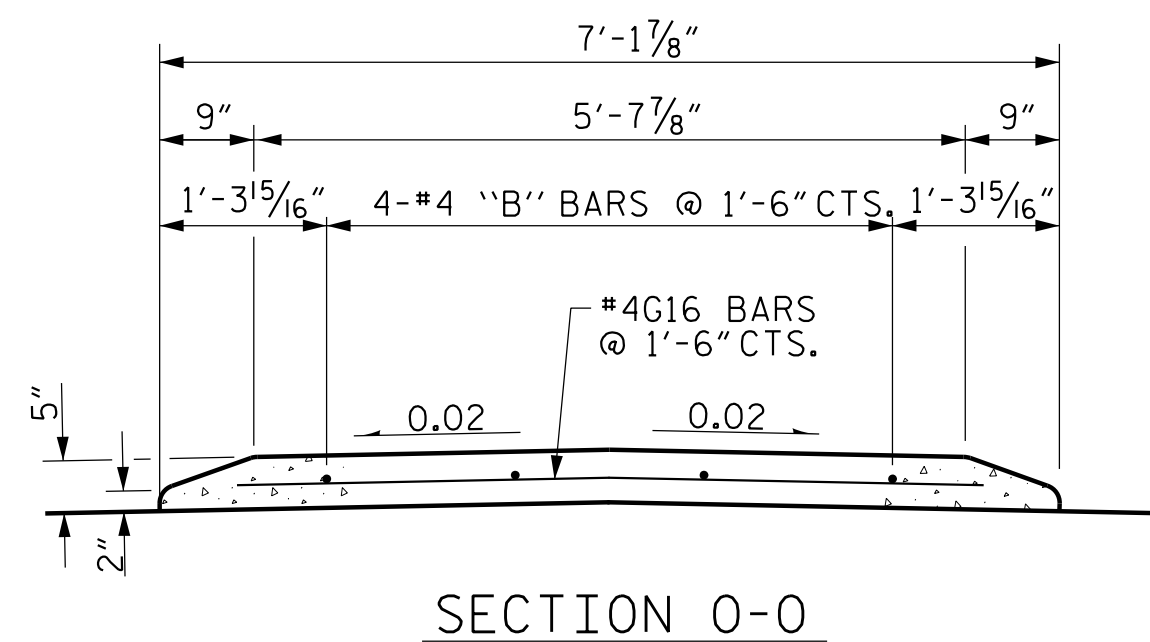


**PLAN OF MONOLITHIC CONCRETE ISLAND**



SECTION M-M

SECTION N-N



SECTION O-O

**SECTIONS THRU MONOLITHIC CONCRETE ISLAND**

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B8	8	#4	STR	31'-3"	167
* B9	4	#4	STR	35'-1"	94
* B10	4	#4	STR	32'-4"	86
* B11	2	#4	STR	32'-9"	44
* B12	2	#4	STR	24'-10"	33
* G2	76	#4	STR	3'-8"	186
* G3	1	#4	STR	3'-7"	2
* G4	1	#4	STR	3'-9"	3
* G5	1	#4	STR	3'-11"	3
* G6	1	#4	STR	4'-1"	3
* G7	1	#4	STR	4'-3"	3
* G8	1	#4	STR	4'-5"	3
* G9	1	#4	STR	4'-7"	3
* G10	1	#4	STR	4'-9"	3
* G11	1	#4	STR	4'-11"	3
* G12	1	#4	STR	5'-1"	3
* G13	1	#4	STR	5'-3"	4
* G14	1	#4	STR	5'-5"	4
* G15	1	#4	STR	5'-7"	4
* G16	31	#4	STR	5'-9"	119
* EPOXY COATED REINF. STEEL					770 LBS.
CLASS AA CONCRETE					14.5 CU. YDS.

\* INDICATES EPOXY COATED REINF. STEEL

**NOTES**

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

PAYMENT FOR THE MONOLITHIC CONCRETE ISLAND SHALL BE INCLUDED IN UNIT PRICE FOR "REINFORCED CONCRETE DECK SLAB"

ALL REINFORCING STEEL IN THE MONOLITHIC CONCRETE ISLAND SHALL BE EPOXY COATED.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**MONOLITHIC  
 CONCRETE ISLAND  
 PLAN AND DETAILS**

PLANS PREPARED BY:  
**NV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

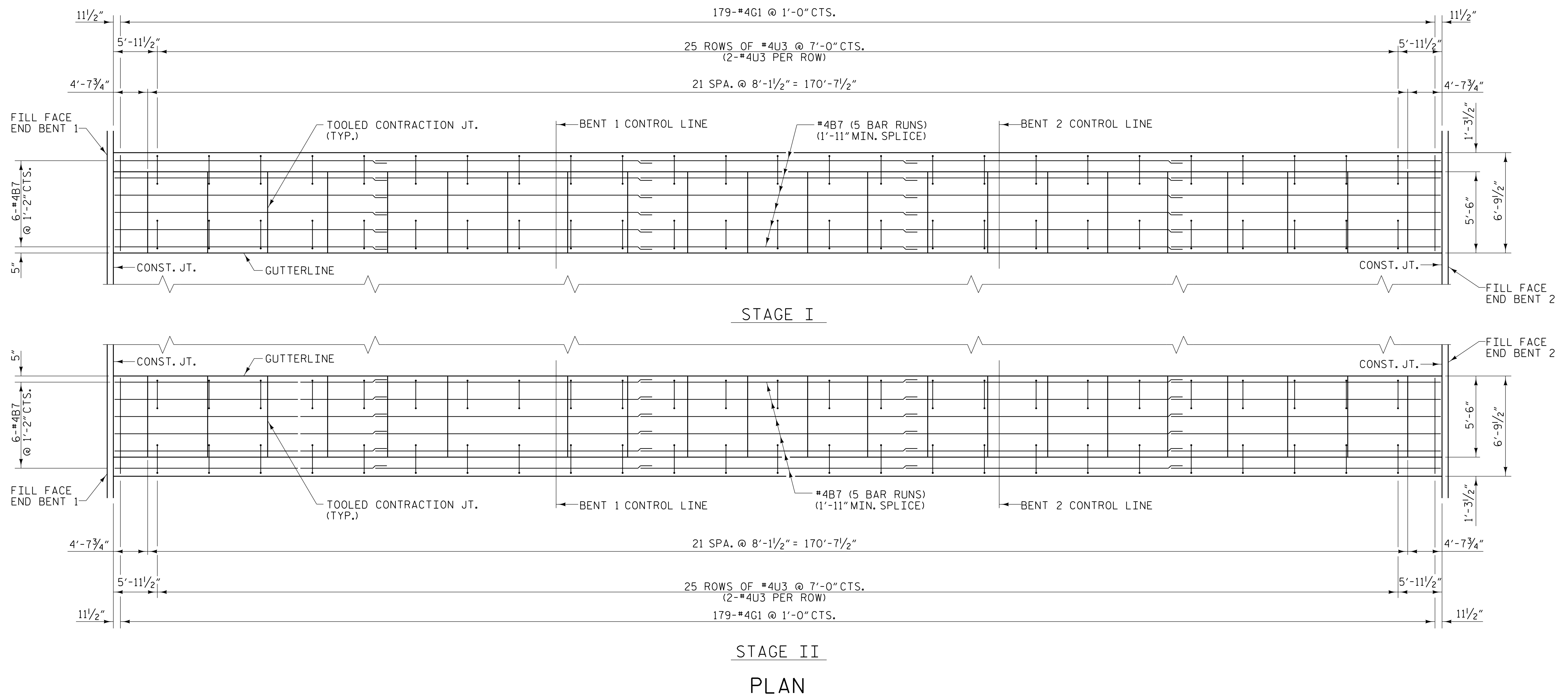
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 5/19/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

DRAWN BY: W. B. ALLEN DATE: 5/19  
 CHECKED BY: Z. H. BROWN DATE: 7/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

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**NOTES:**

SIDEWALK 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 3000 PSI.

ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

NO SEPARATE PAYMENT SHALL BE MADE FOR MATERIALS, LABOR AND INCIDENTALS REQUIRED FOR THIS CONSTRUCTION OF CONCRETE SIDEWALK AND CONCRETE MEDIAN AS DETAILED ON BRIDGE SPANS AND APPROACH SLABS. ALL COSTS FOR THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

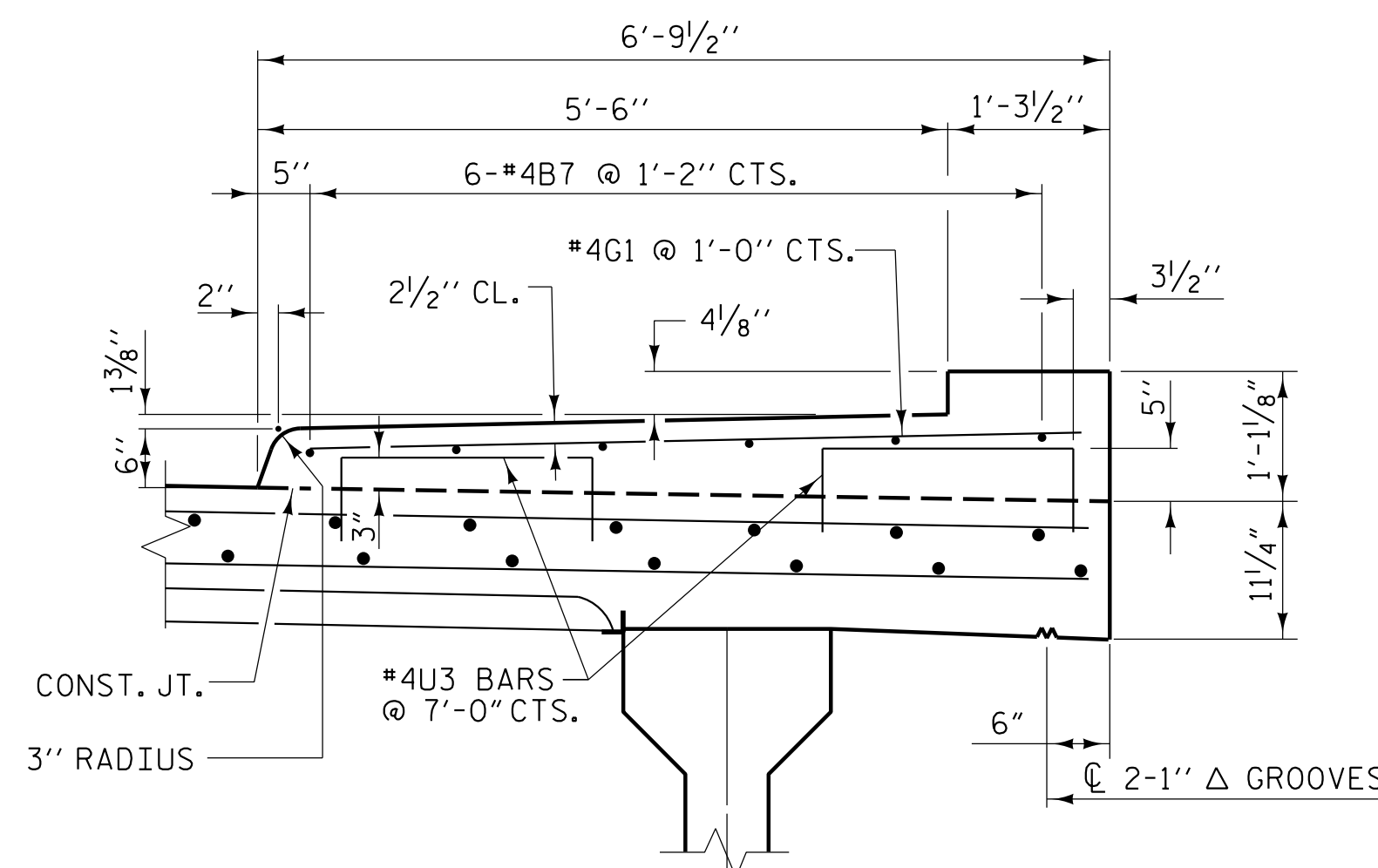
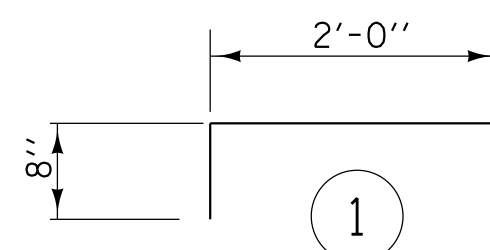
GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 925-10(B) OF THE STANDARD SPECIFICATIONS, THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B7	30	#4	STR	37'-6"	752	* B7	30	#4	STR	37'-6"	752
* G1	179	#4	STR	6'-0"	717	* G1	179	#4	STR	6'-0"	717
* U3	50	#4	1	3'-4"	111	* U3	50	#4	1	3'-4"	111
* EPOXY COATED REINF. STEEL					1580 LBS.	* EPOXY COATED REINF. STEEL					1580 LBS.
CLASS AA CONCRETE					** 31.8 CU. YDS.	CLASS AA CONCRETE					** 31.8 CU. YDS.

\* INDICATES EPOXY COATED REINF. STEEL  
 \*\* INCLUDES CONC. FOR END POSTS

**BAR TYPES**



**SECTION THRU SIDEWALK**

\*\* #4U3 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

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**NV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
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 CARY, NC 27518  
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**SIDEWALK  
 PLAN AND DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-16
1			3			TOTAL SHEETS
2			4			49

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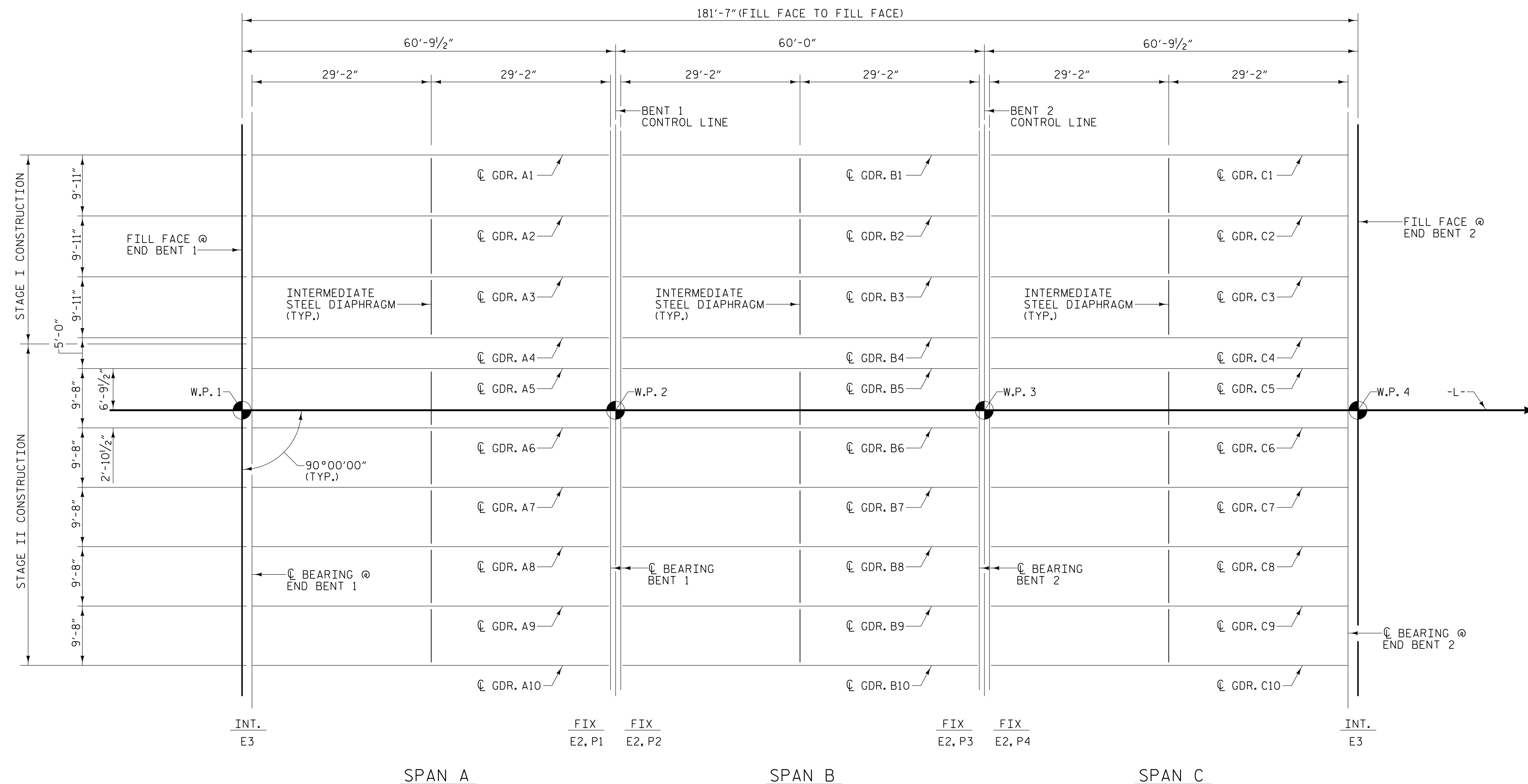
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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

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NOTES

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



FRAMING PLAN

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

PLANS PREPARED BY:

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*[Signature]*

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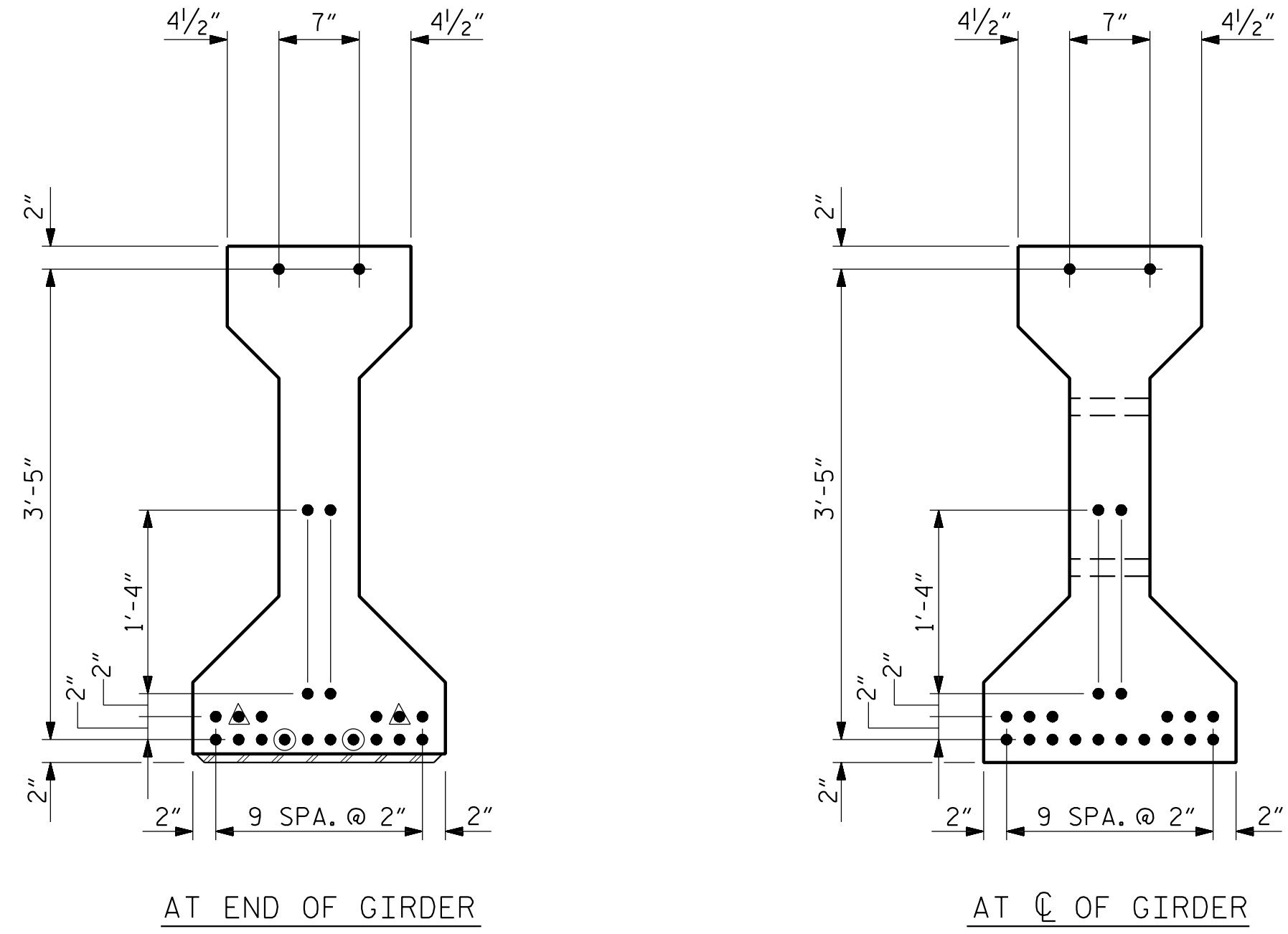
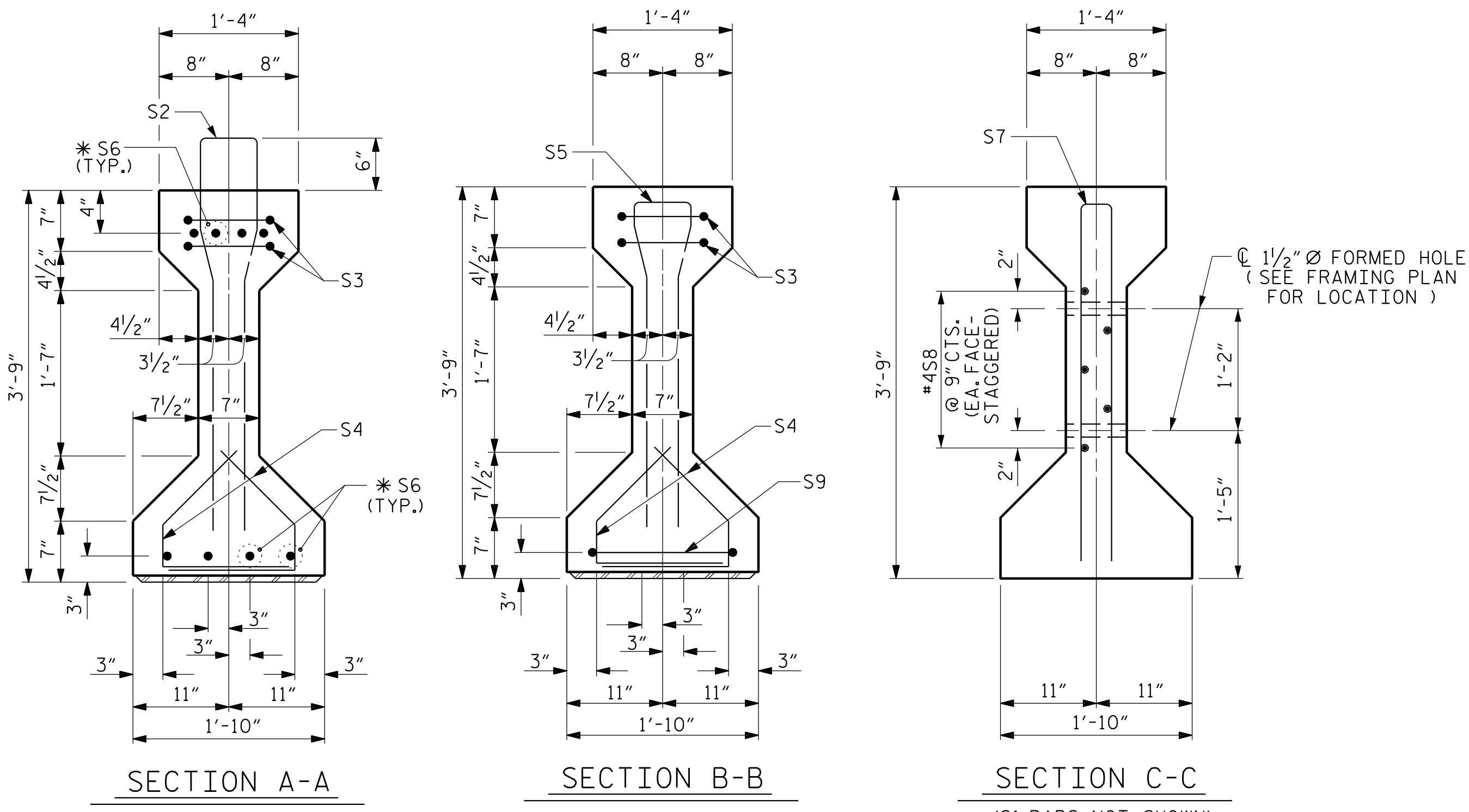
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*[Signature]*

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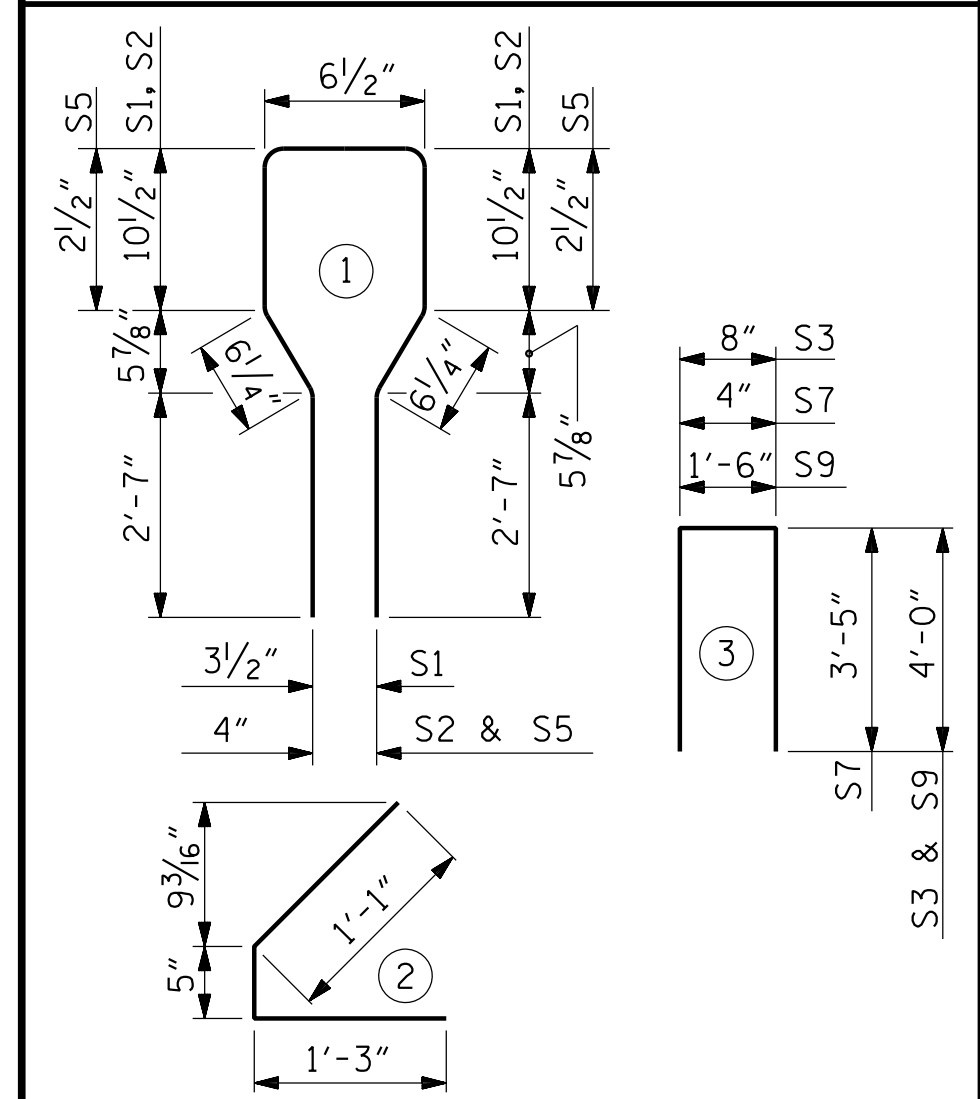
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	48	#4	1	8'-6"	273
S2	6	#6	1	8'-6"	77
S3	4	#4	3	8'-8"	23
S4	60	#4	2	2'-9"	110
S5	8	#6	1	7'-2"	86
*S6	8	#5	STR	3'-8"	31
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S9	1	#4	3	9'-6"	6
S10	1	#3	STR	1'-0"	1

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

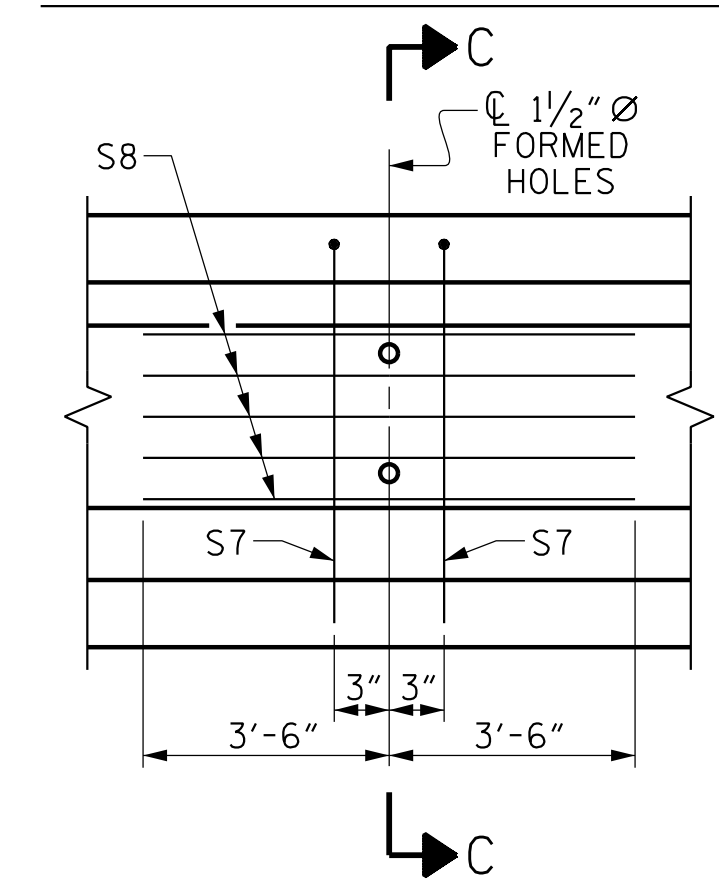
**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT-TO-OUT



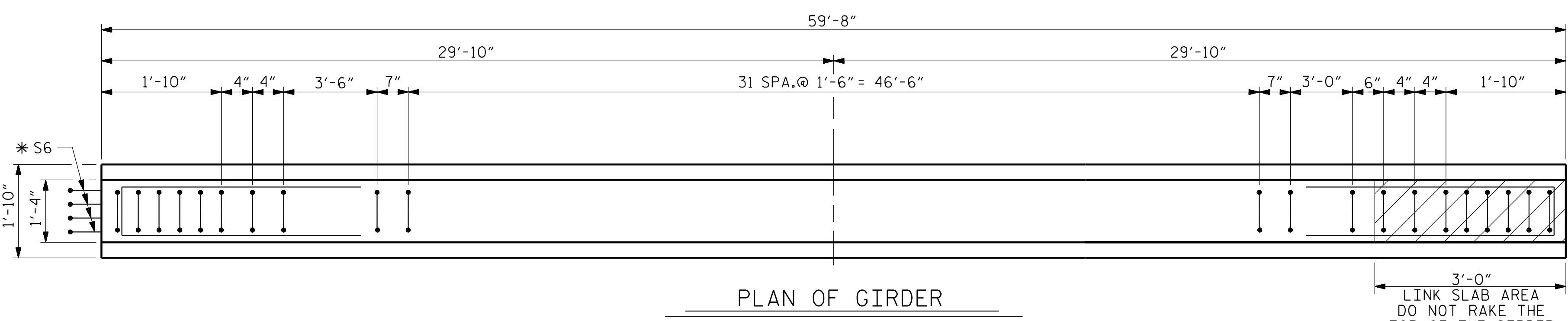
- FULLY BONDED STRAND
- ▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER.
- ◎ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF GIRDER.

**DEBONDING LEGEND**



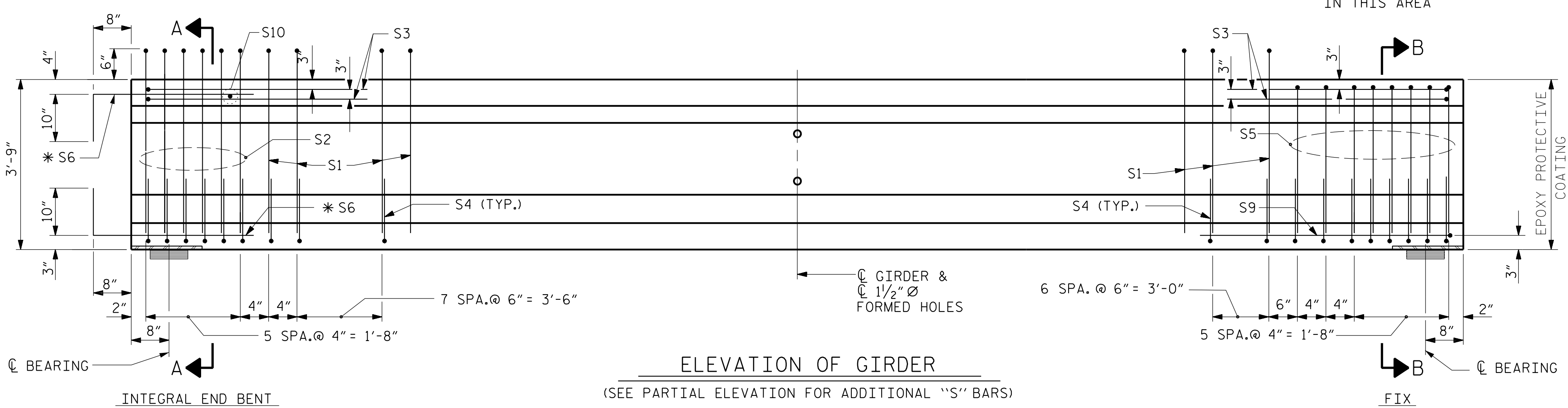
**PARTIAL ELEVATION**

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS



**PLAN OF GIRDER**

LINK SLAB AREA DO NOT RAKE THE TOP OF THE GIRDER IN THIS AREA



**ELEVATION OF GIRDER**

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

**QUANTITIES FOR ONE GIRDER**

	REINFORCING STEEL LB.	6500 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
GIRDERS 1-10	645	8.6	22

**GIRDERS REQUIRED**

NUMBER	LENGTH	TOTAL LENGTH
20	59'-8"	1193'-4"

PROJECT NO. U-5839

HAYWOOD COUNTY

STATION: 31+45.00 -L- POT

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
AASHTO TYPE III  
PRESTRESSED CONCRETE GIRDER  
FOR LINK SLAB  
(SPANS A AND C)

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

TOTAL SHEETS: 49

PLANS PREPARED BY:

**NV5**

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ENGINEER  
SEAL  
14114

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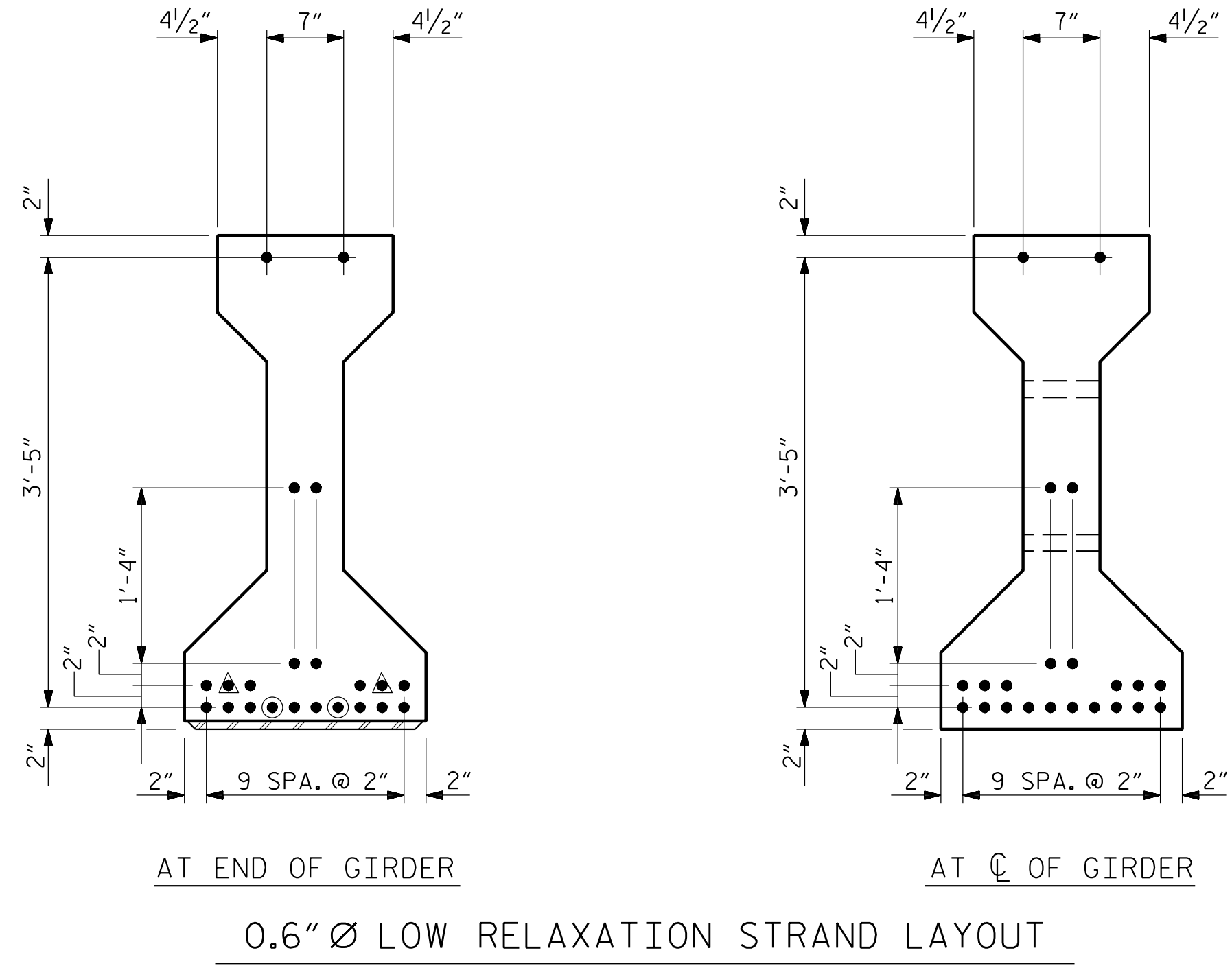
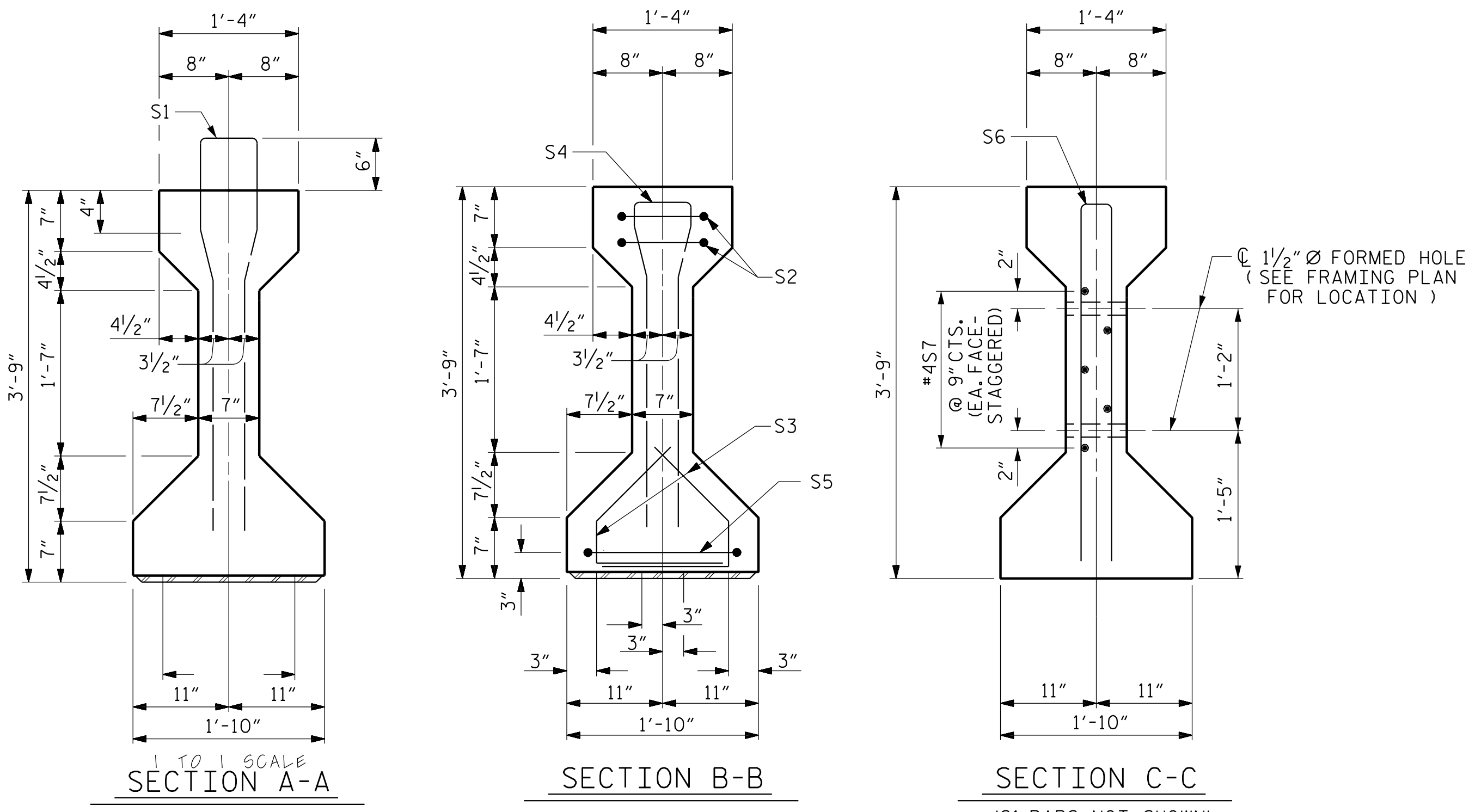
5/19/2023

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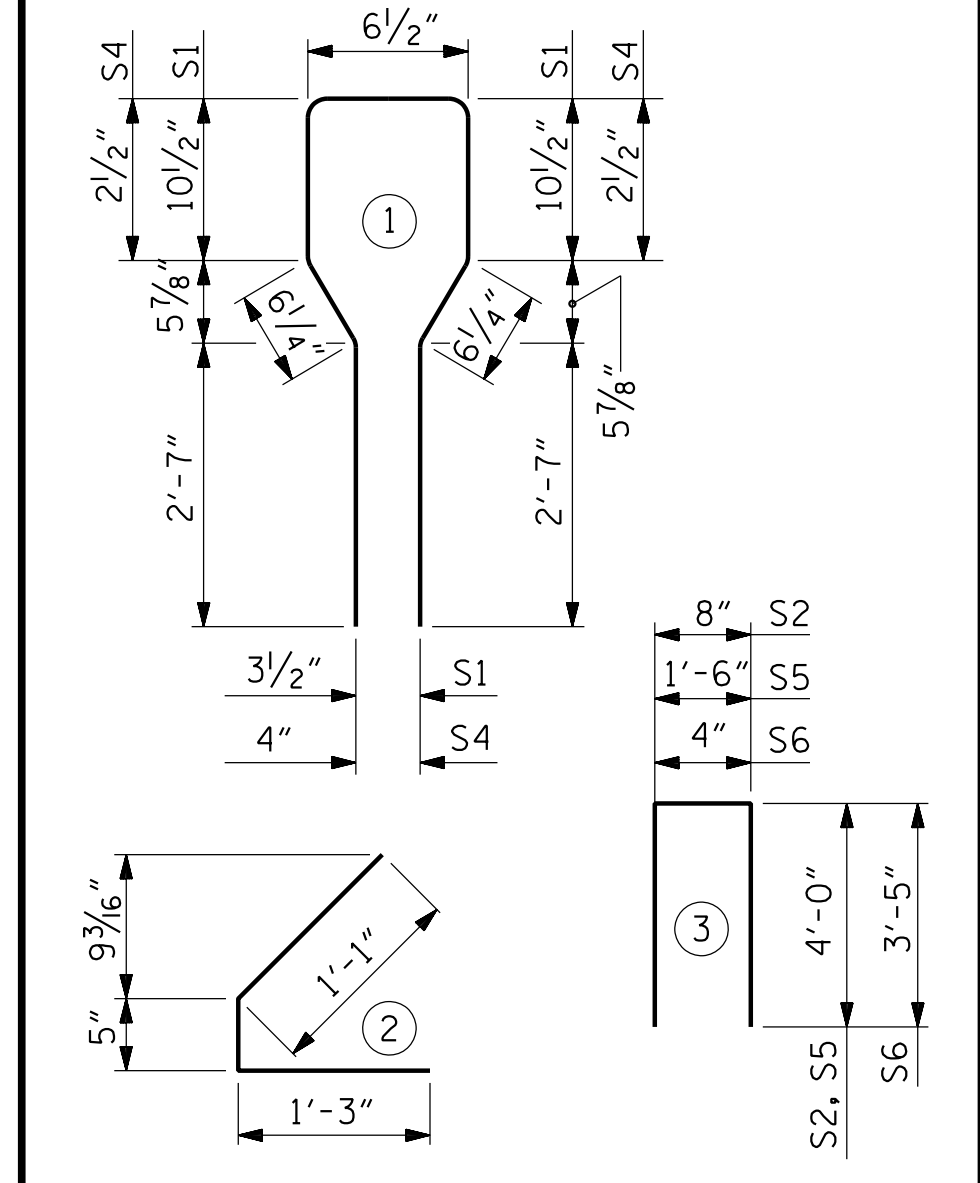
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0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

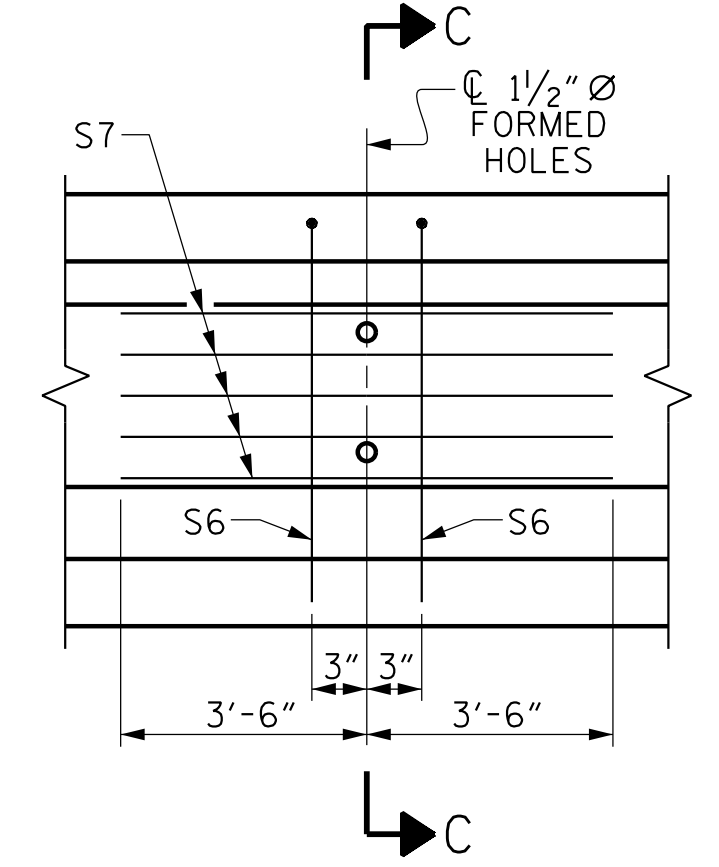
REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	46	#4	1	8'-6"	261
S2	4	#4	3	8'-8"	23
S3	60	#4	2	2'-9"	110
S4	16	#6	1	7'-2"	172
S5	2	#4	3	9'-6"	13
S6	2	#5	3	7'-2"	15
S7	5	#4	STR	7'-0"	23

BAR TYPES  
ALL BAR DIMENSIONS ARE OUT-TO-OUT

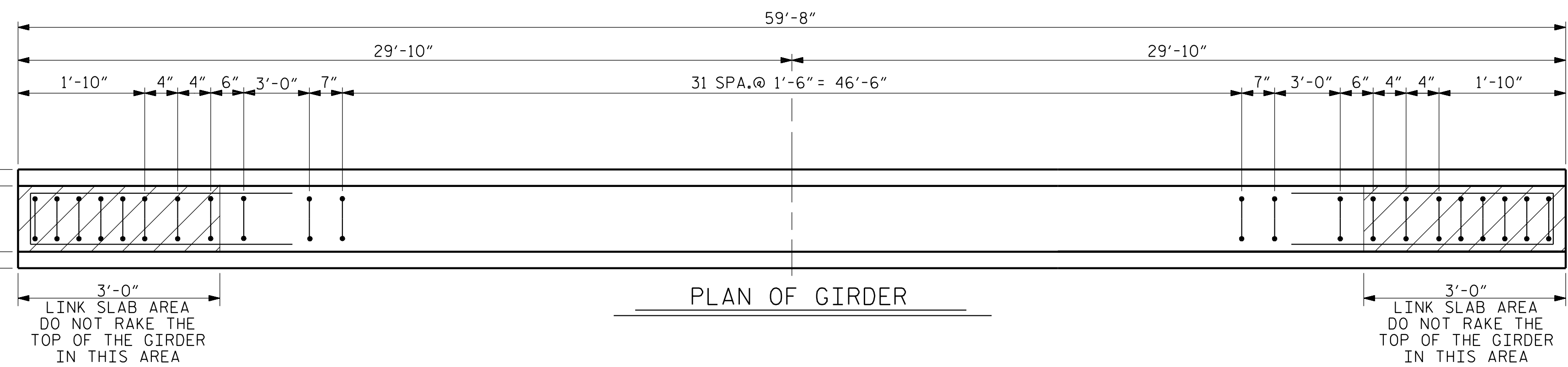


- FULLY BONDED STRAND
- ▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER.
- ◎ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF GIRDER.

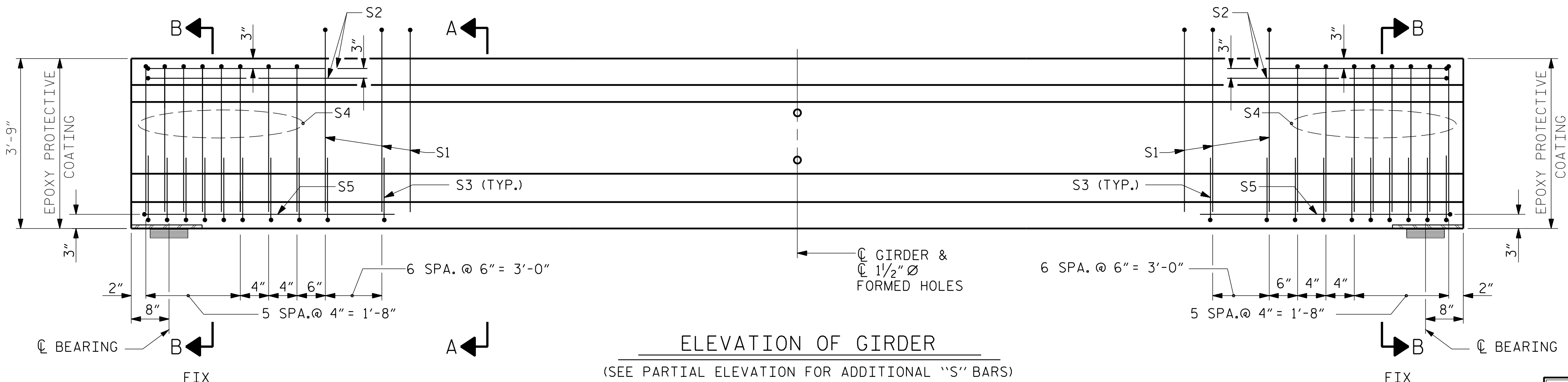
DEBONDING LEGEND



PARTIAL ELEVATION  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS



PLAN OF GIRDER



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

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	6500 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
GIRDERS 1 - 10	617	8.6	22

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
10	59'-8"	596'-8"

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
AASHTO TYPE III  
PRESTRESSED CONCRETE GIRDER  
FOR LINK SLAB  
(SPAN B)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-19
1			3			TOTAL SHEETS
2			4			49

PLANS PREPARED BY:  
**NV5**  
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ROBERT C. LARSON  
PROFESSIONAL SEAL  
14114  
EEB2398D9220470  
5/19/2023

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DRAWN BY: W. B. ALLEN DATE: 7/19  
CHECKED BY: Z. H. BROWN DATE: 7/19  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

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R. C. LARSON  
PROFESSIONAL SEAL  
14114  
EEB2398D9220470

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NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

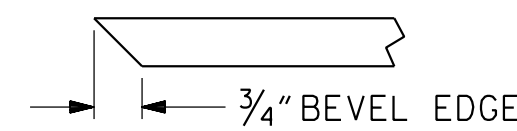
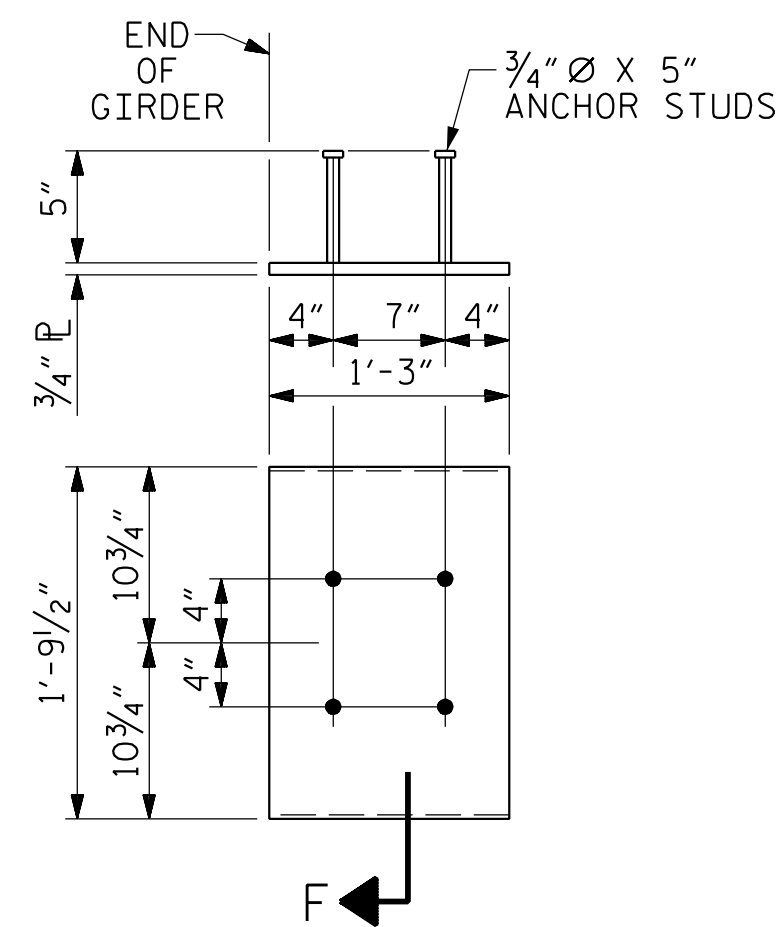
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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 5000 PSI.

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

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



SECTION "F"  
(SEE NOTES)

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPANS A, B & C

0.6" Ø LOW RELAXATION TWENTIETH POINTS	GIRDERS 1 - 10																				
	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.017	0.034	0.050	0.064	0.077	0.088	0.097	0.103	0.107	0.109	0.107	0.103	0.097	0.088	0.077	0.064	0.050	0.034	0.017	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.006	0.012	0.018	0.025	0.029	0.034	0.037	0.040	0.041	0.043	0.041	0.040	0.037	0.034	0.029	0.025	0.018	0.012	0.006	0.0
FINAL CAMBER ↑	0.0	1/8"	1/4"	3/8"	1/2"	5/8"	3/4"	11/16"	3/4"	13/16"	13/16"	13/16"	3/4"	11/16"	5/8"	9/16"	1/2"	3/8"	1/4"	1/8"	0.0

\* INCLUDES FUTURE WEARING SURFACE.

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

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 PRESTRESSED CONCRETE GIRDER  
 DETAILS

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			49

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*Robert C. Larson*

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 14114  
 ENGINEER  
 ROBERT C. LARSON

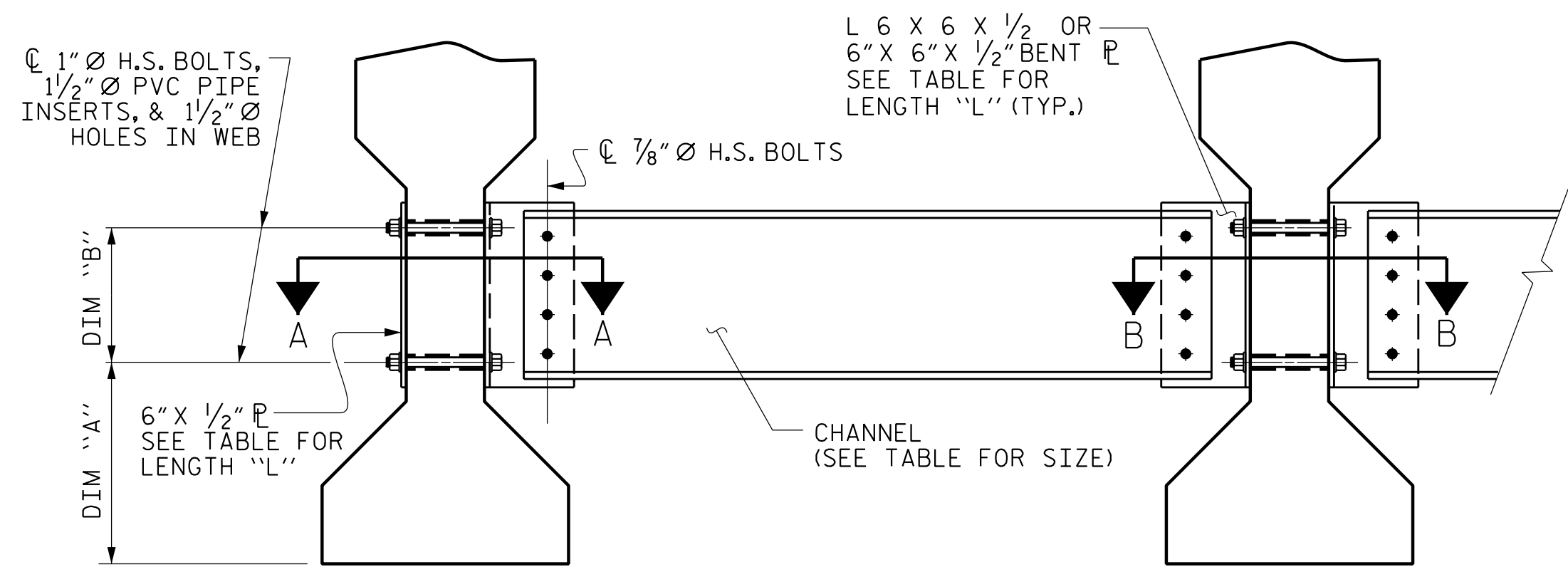
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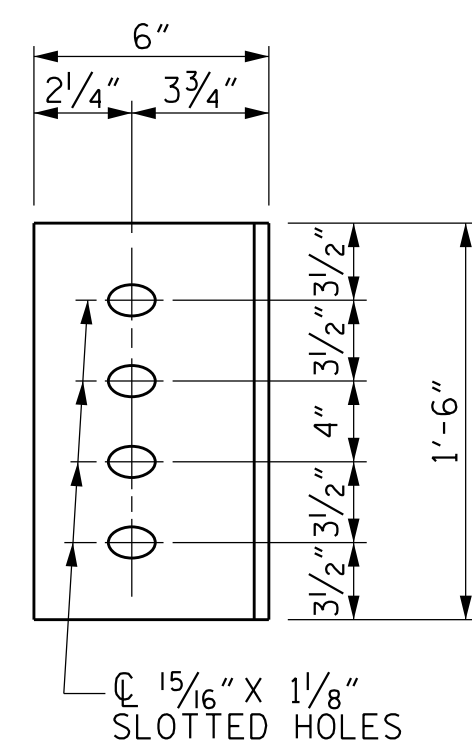
DRAWN BY : W. B. ALLEN DATE : 5/19  
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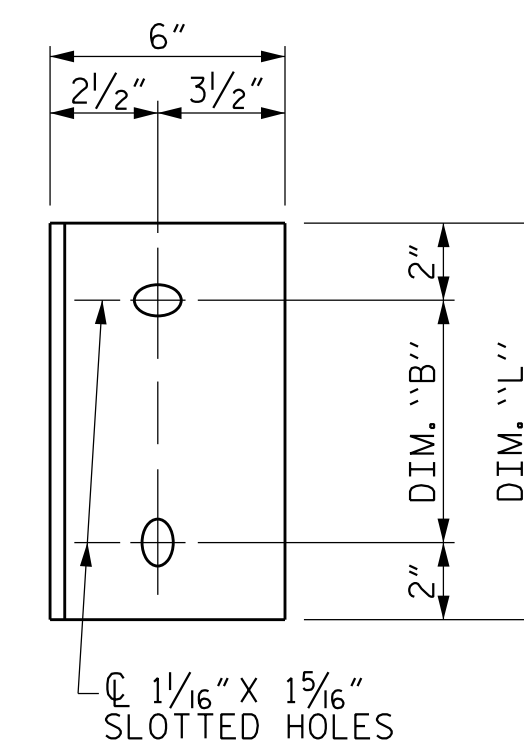


EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE



WEB FACE

CONNECTOR PLATE DETAILS

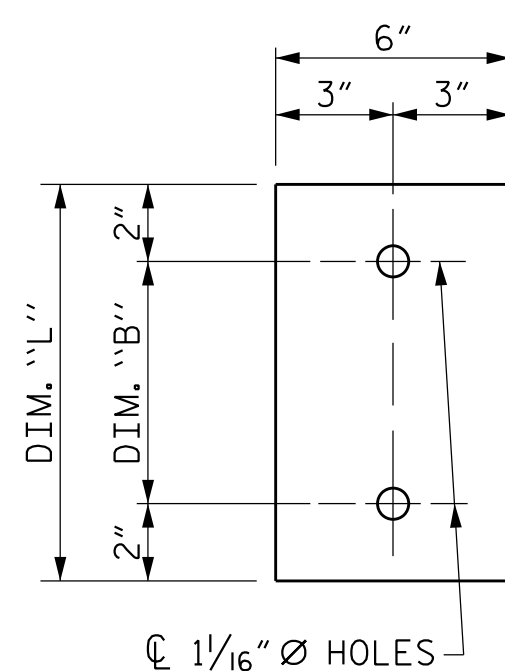
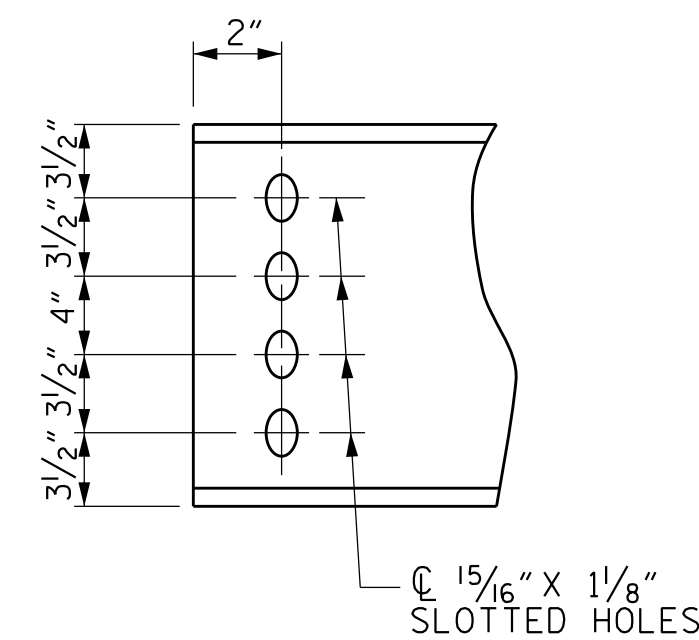


PLATE DETAILS



CHANNEL END

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  $\frac{1}{4}$  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.

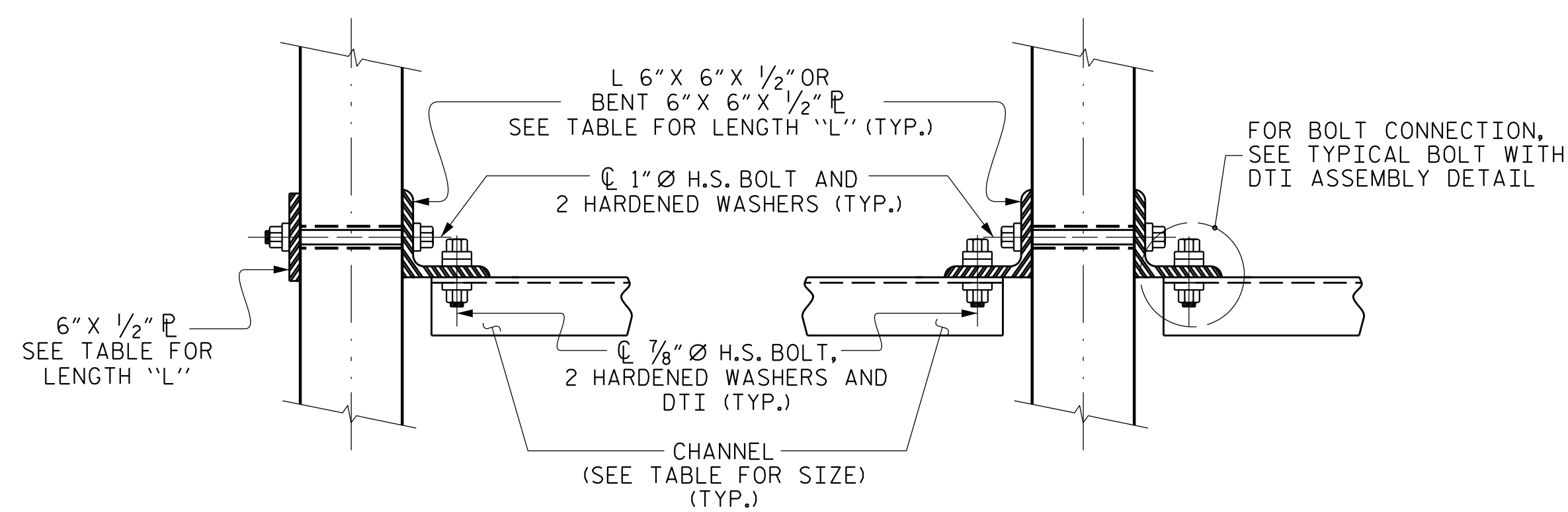
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST  $\frac{1}{4}"$  PROJECTION BEYOND THE NUT.

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.

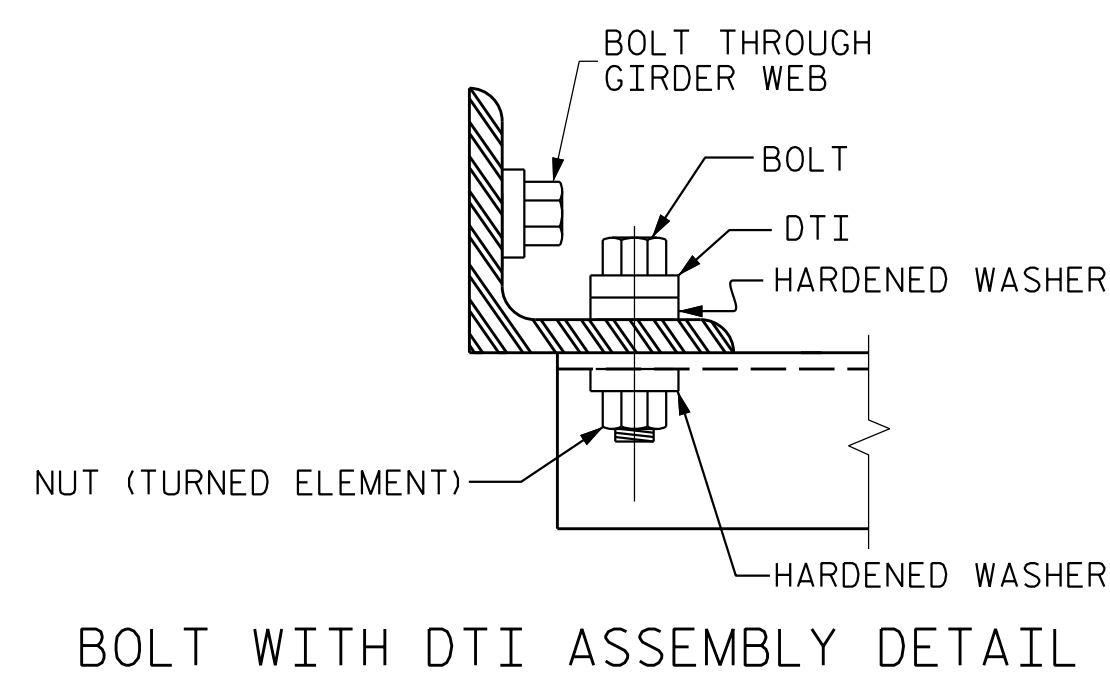
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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



SECTION A-A SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

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. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 4 OF 4

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:	S2-21
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2			4			49

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ASSEMBLED BY : W. B. ALLEN	DATE : 5/19
CHECKED BY : Z. H. BROWN	DATE : 7/19
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

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 BEB23880920470

**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.

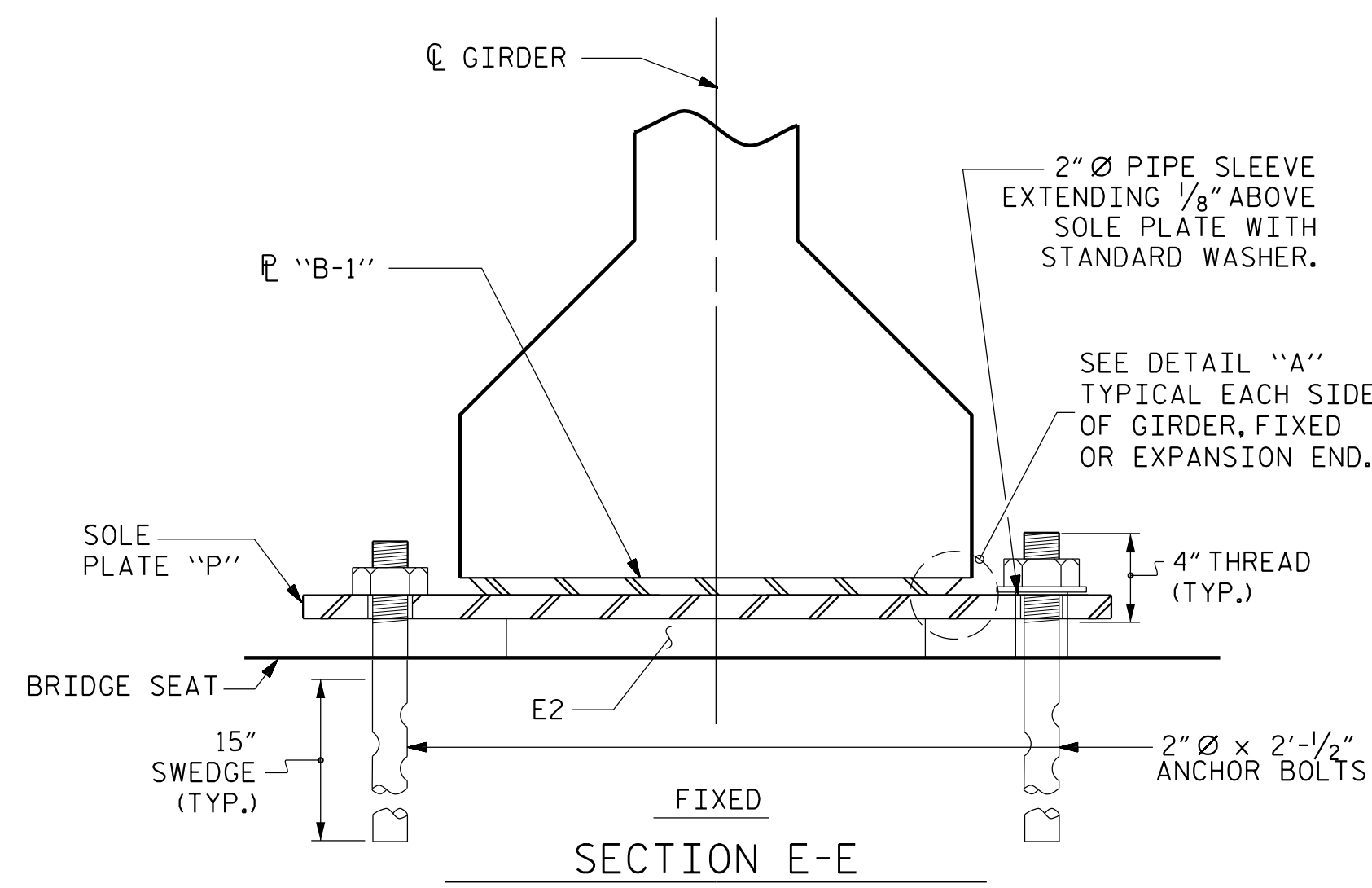
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

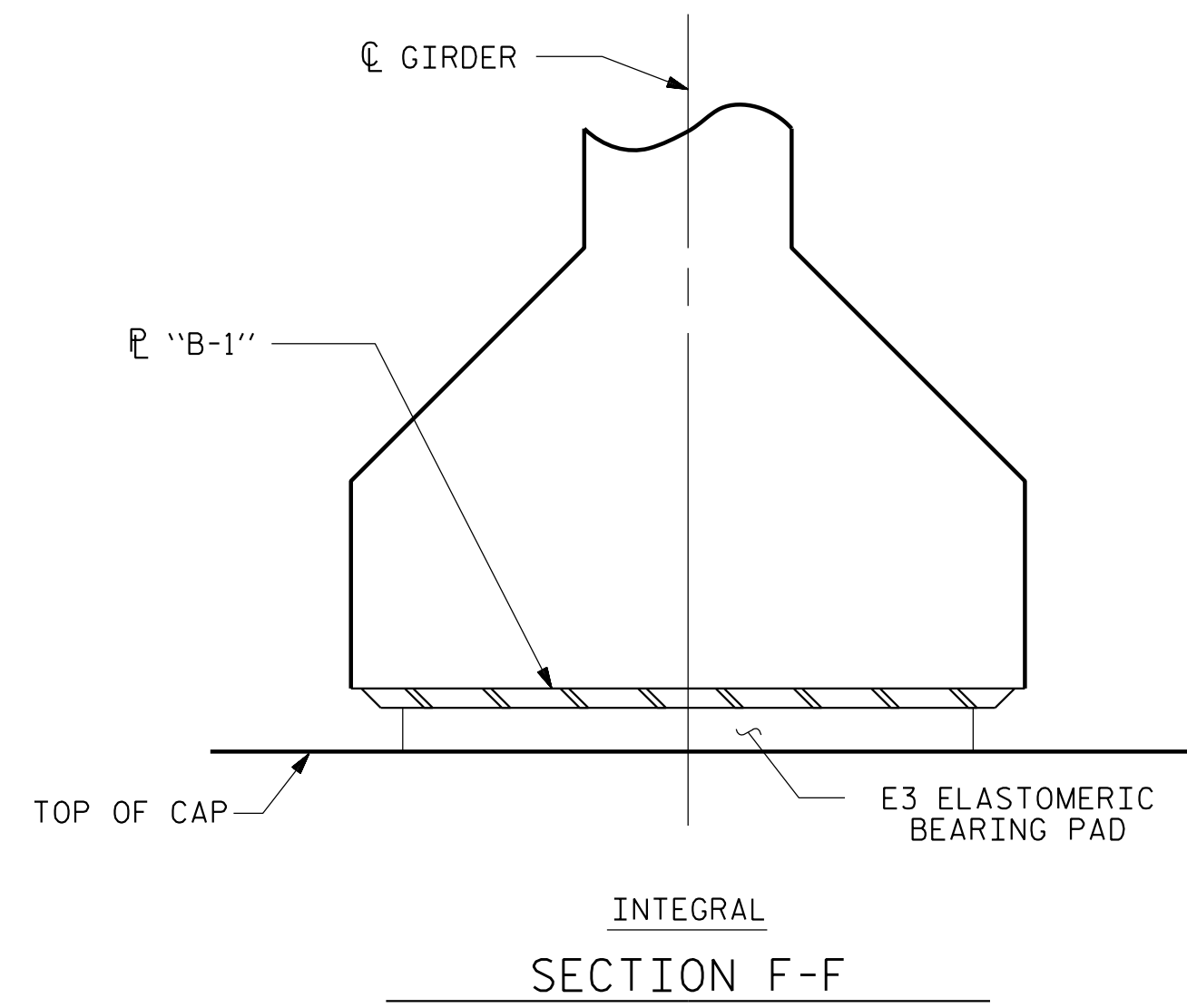
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

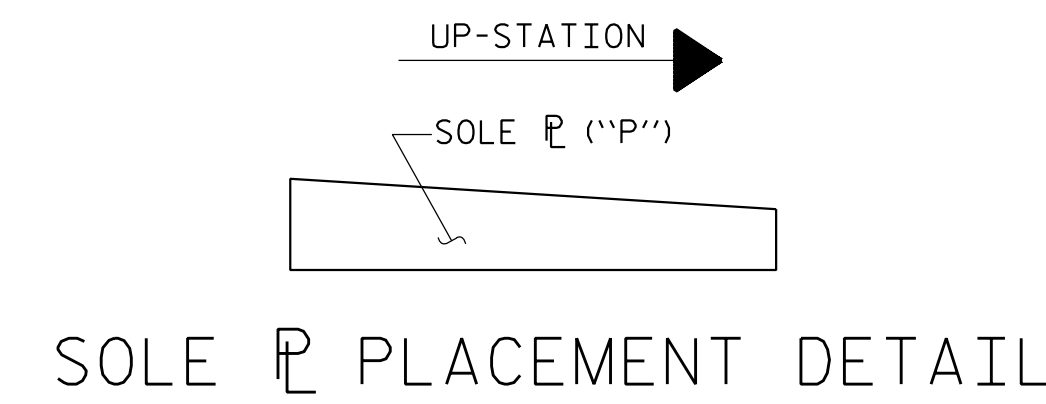
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



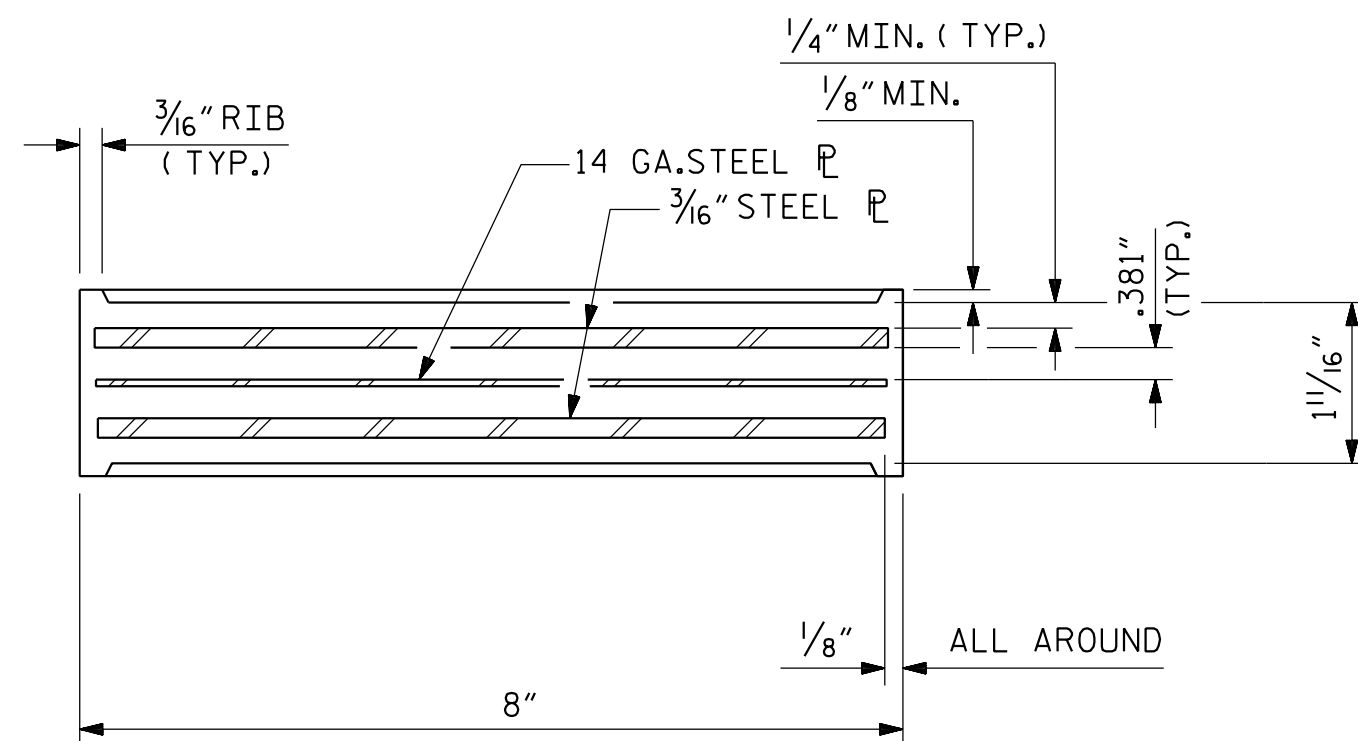
SECTION E-E



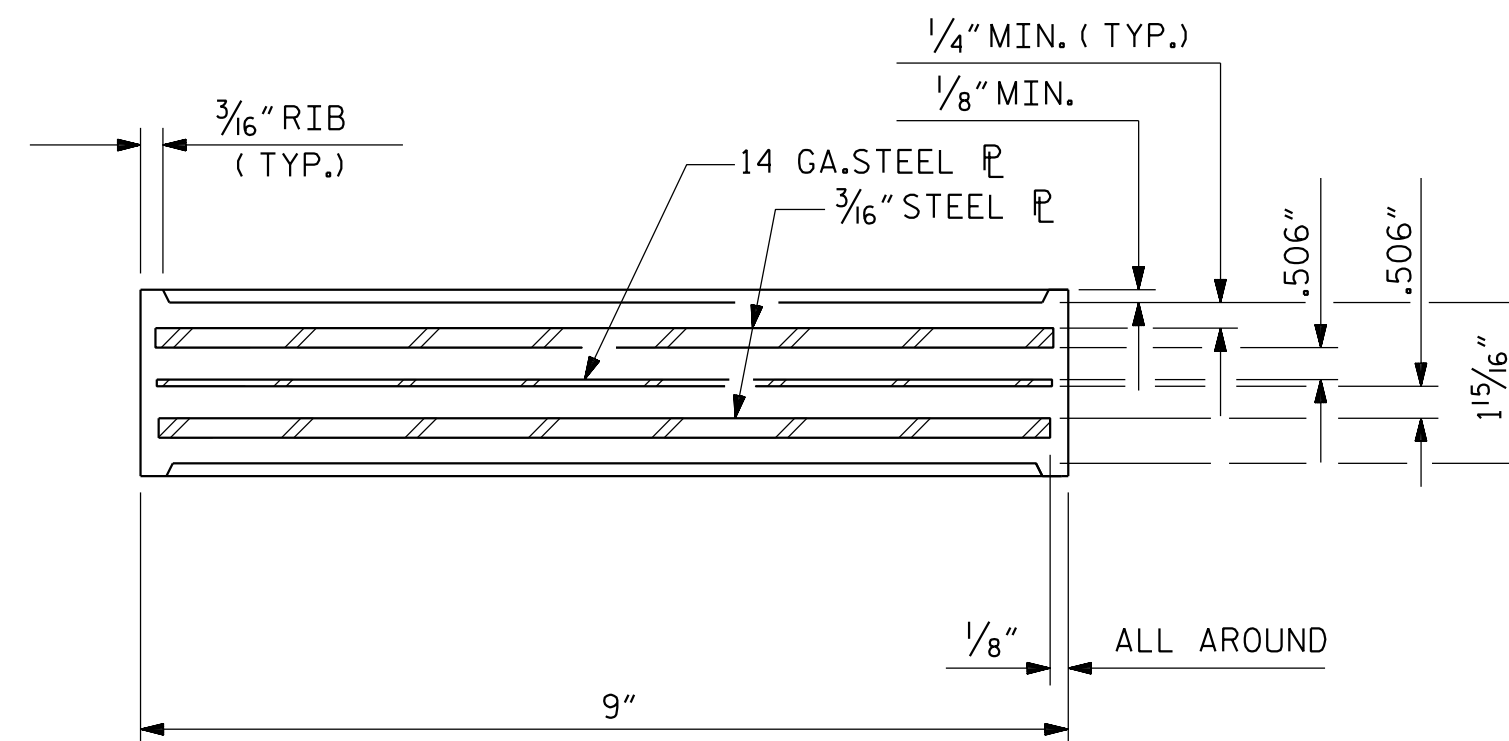
SECTION F-F



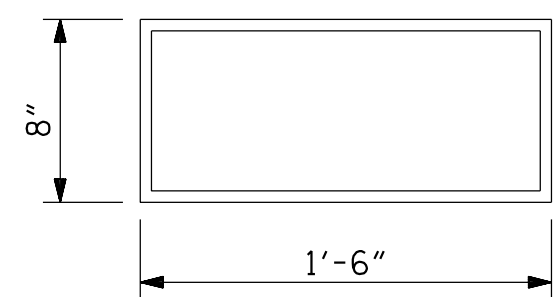
SOLE PLATE "P" PLACEMENT DETAIL



TYPICAL SECTION OF ELASTOMERIC BEARINGS



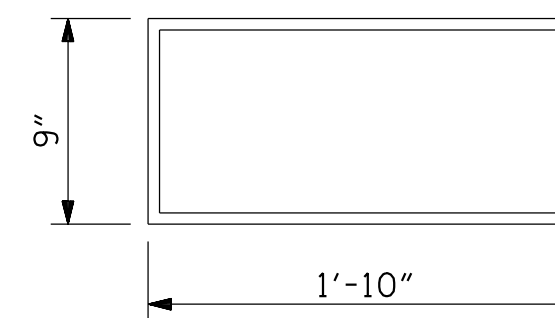
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (40 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

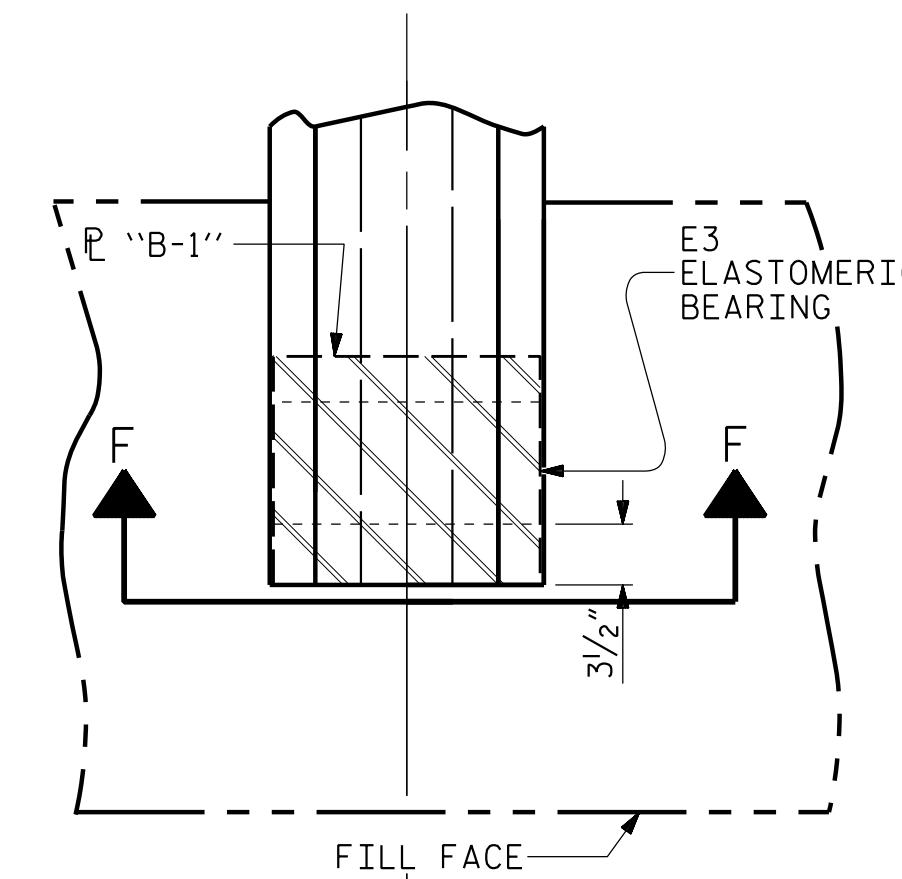
TYPE III



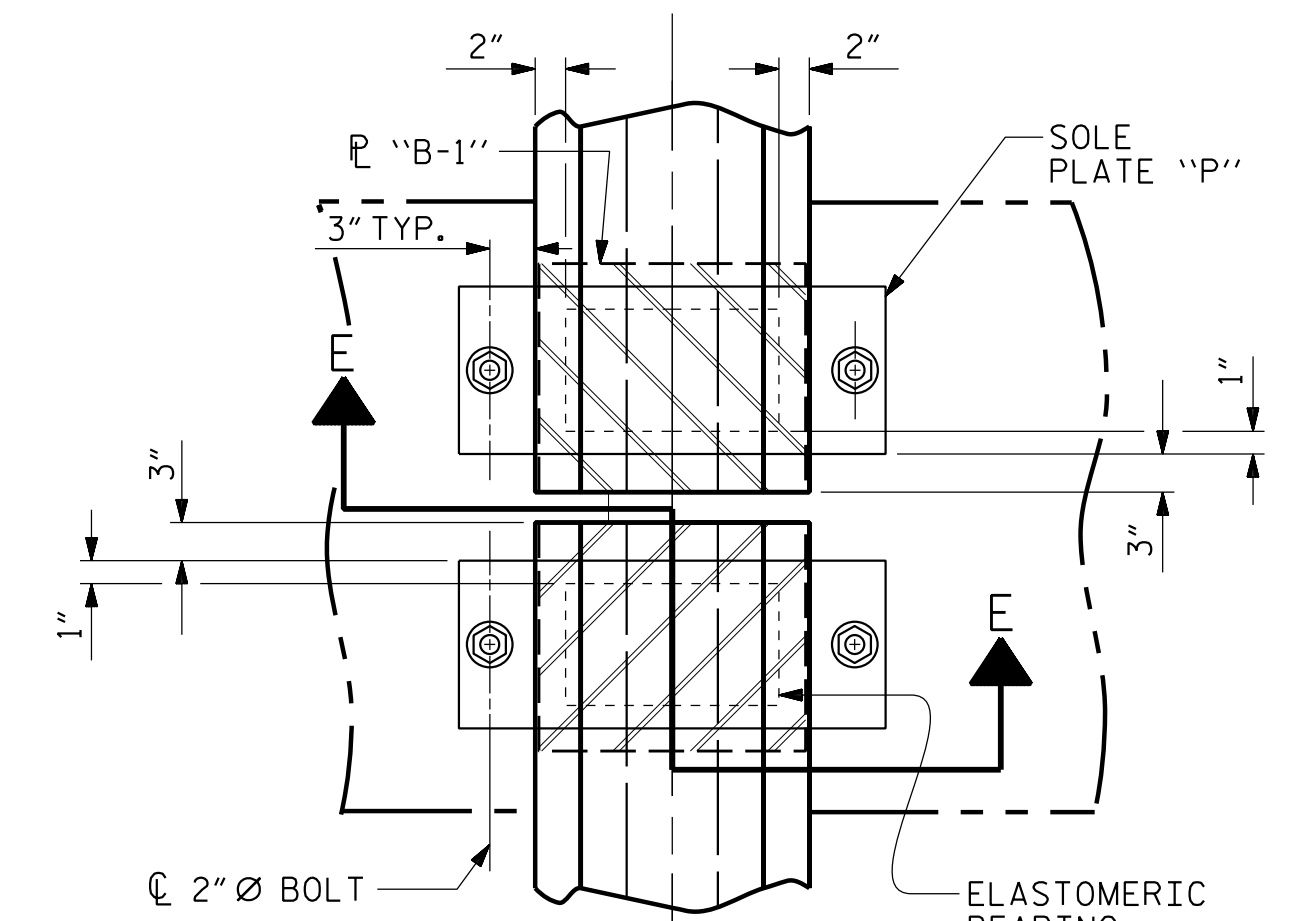
E3 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

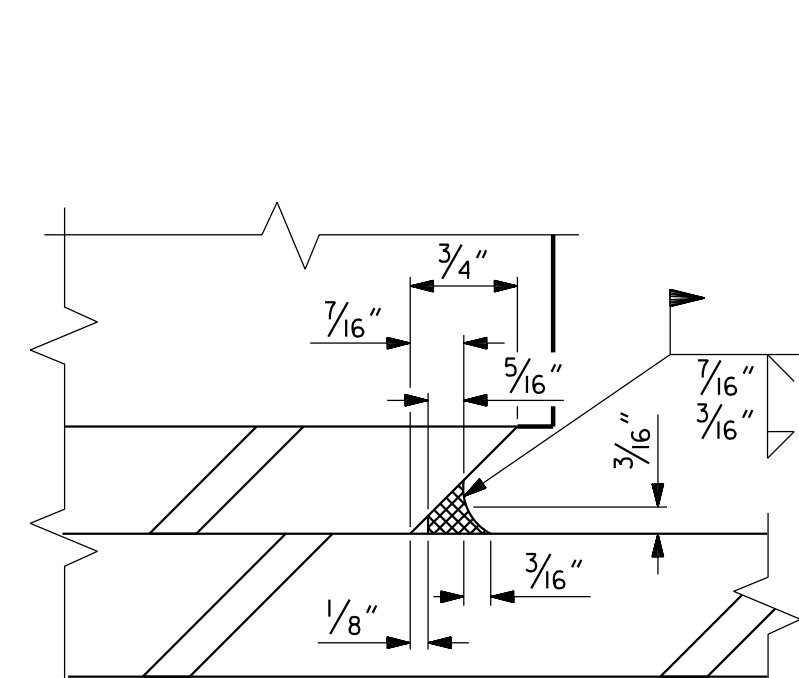
TYPE IV



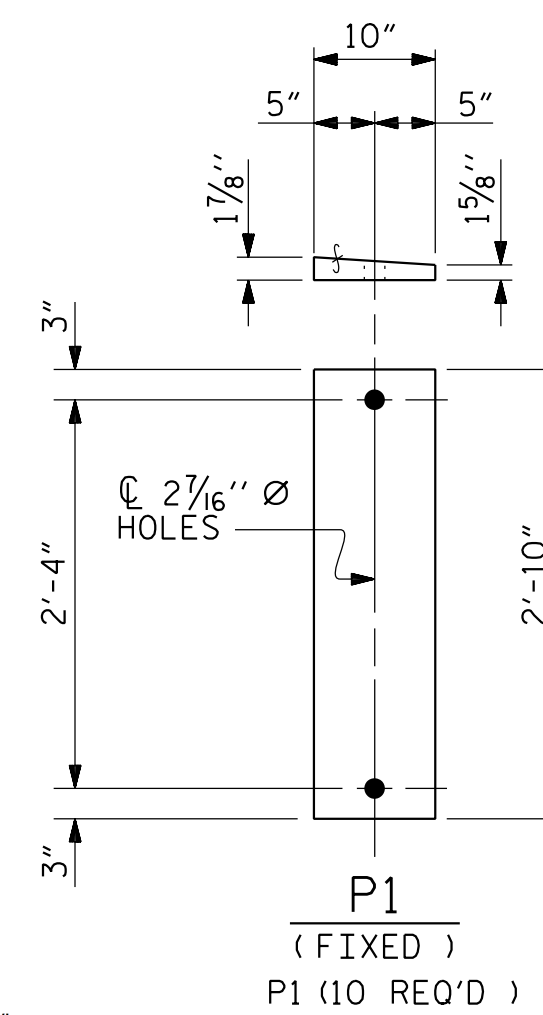
TYPICAL HALF-PLAN (SHOWING END BENT)



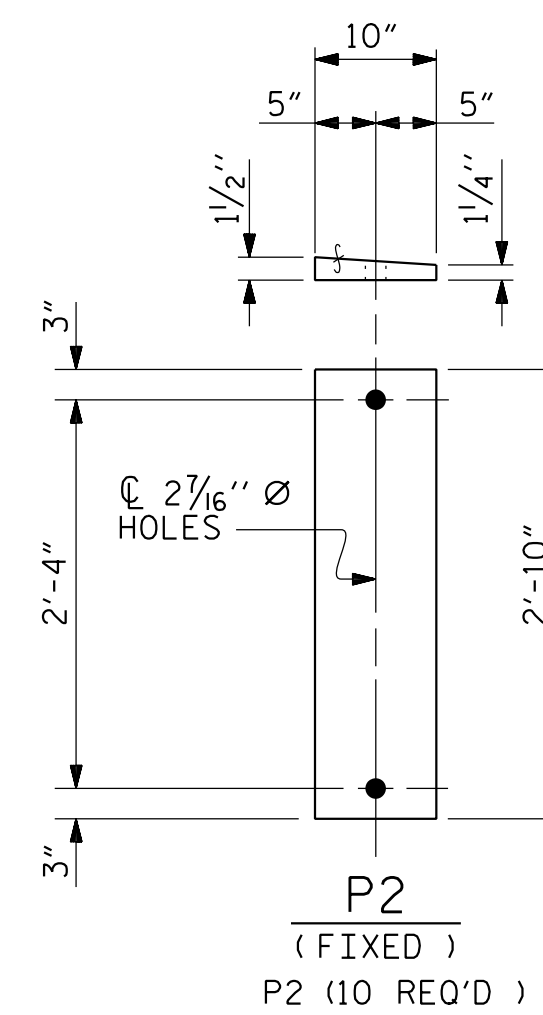
TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT)



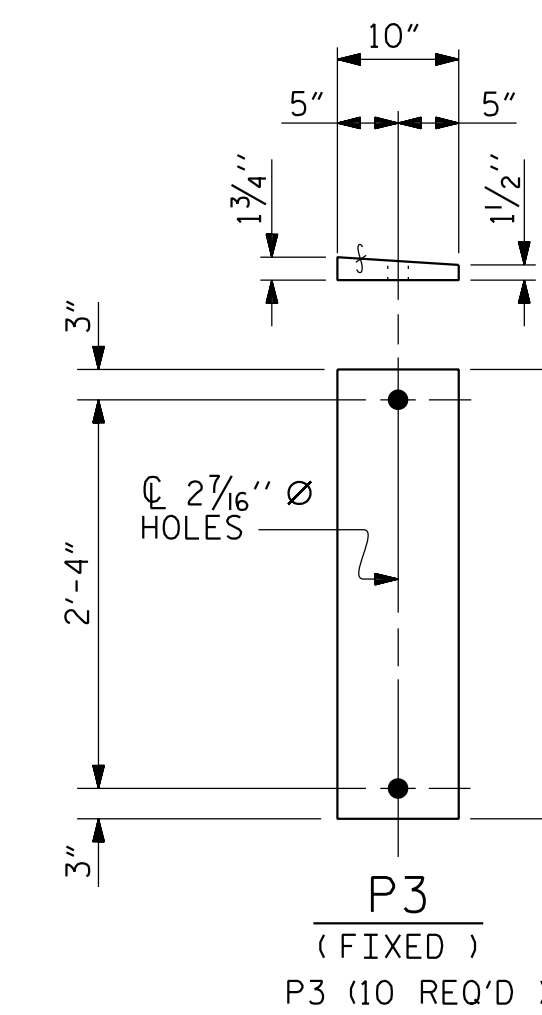
DETAIL "A"



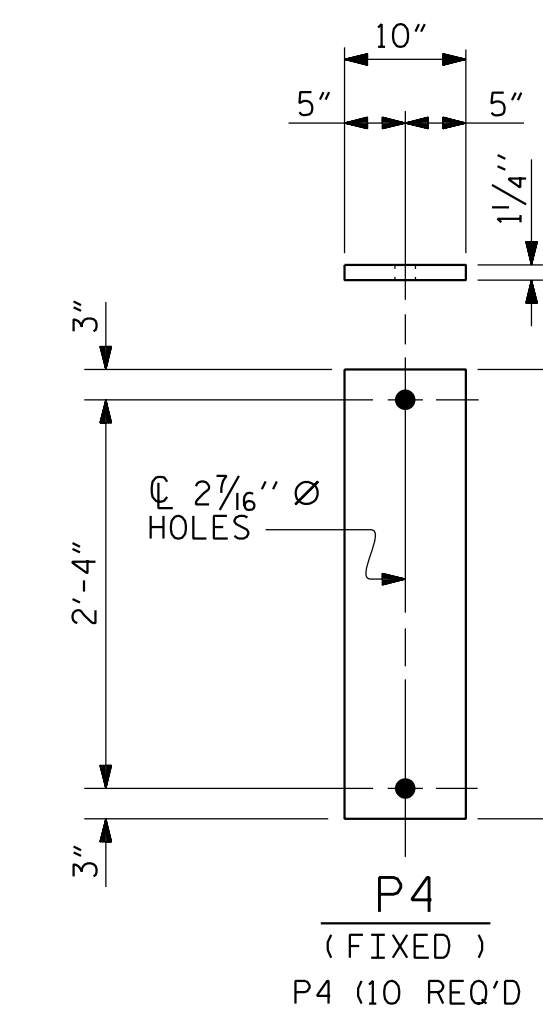
P1 (10 REQ'D)



P2 (10 REQ'D)



P3 (10 REQ'D)



P4 (10 REQ'D)

SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k
TYPE IV	225 k

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

5/18/2023 12:32:46 PM RA:\Structures\Bridges over Richard Creek\22 U5839-SMU.BC\_43086.dgn

DESIGN ENGINEER OF RECORD : R. C. LARSON	DATE : 2/23
ASSEMBLED BY : W. B. ALLEN	DATE : 5/19
CHECKED BY : Z. H. BROWN	DATE : 7/19
DRAWN BY : WJH 8/89	REV. 6/13
CHECKED BY : CRK 8/89	REV. 1/15
	REV. 12/17

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 NORTH CAROLINA PROFESSIONAL ENGINEER  
 ROBERT C. LARSON  
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
**ELASTOMERIC BEARING  
 DETAILS**  
 PRESTRESSED CONCRETE GIRDER  
 SUPERSTRUCTURE

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

SHEET NO. **S2-22**  
 TOTAL SHEETS 49

**NOTES**

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

**ALUMINUM RAILS**

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

**GENERAL NOTES**

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 344'-10" LIN. FT.

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

DocuSigned by:



5/19/2023

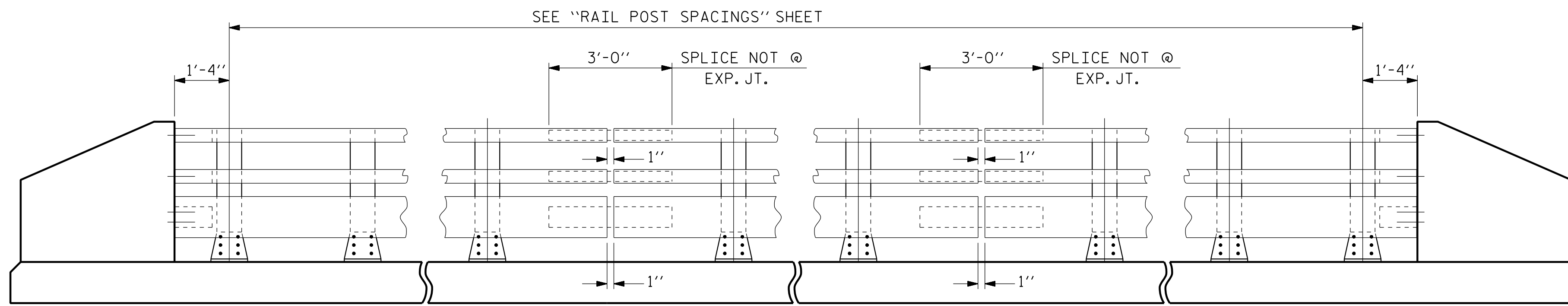
PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**3 BAR METAL RAIL**

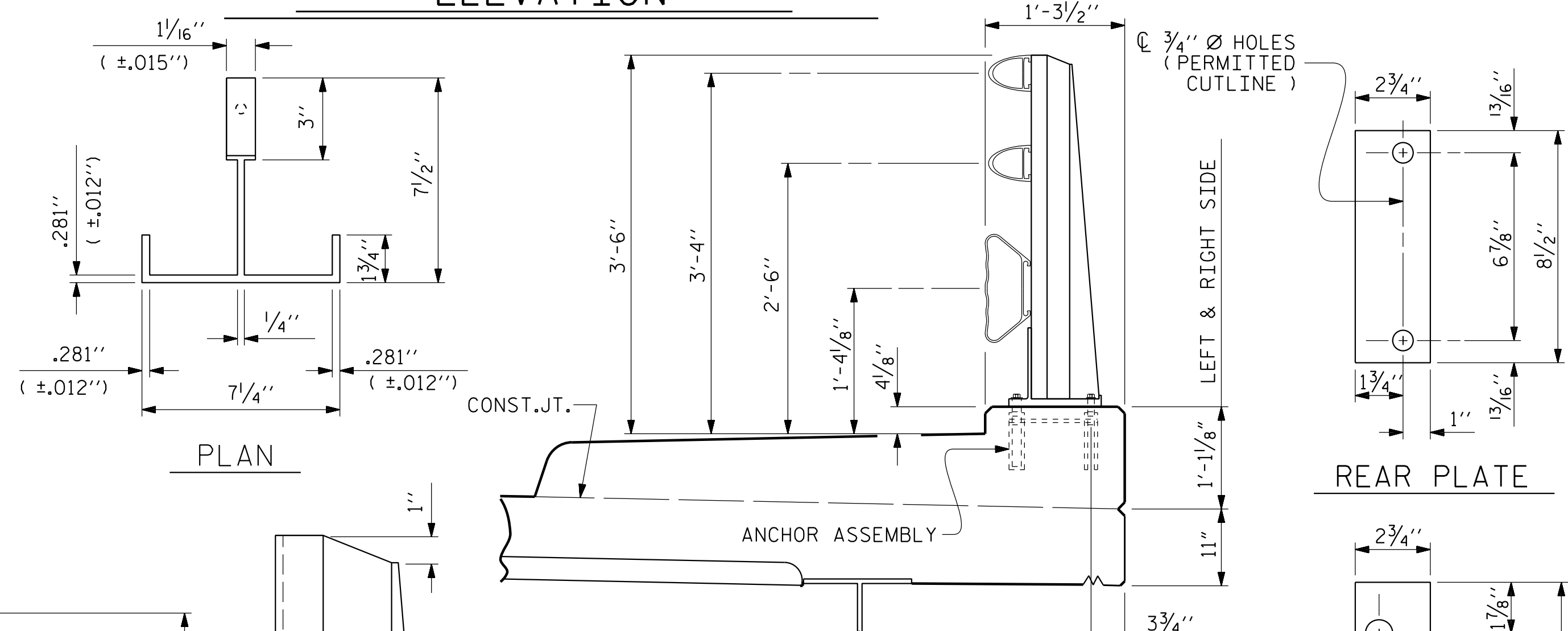
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

STD. NO. BMR5



NOTE:  
 FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

**ELEVATION**



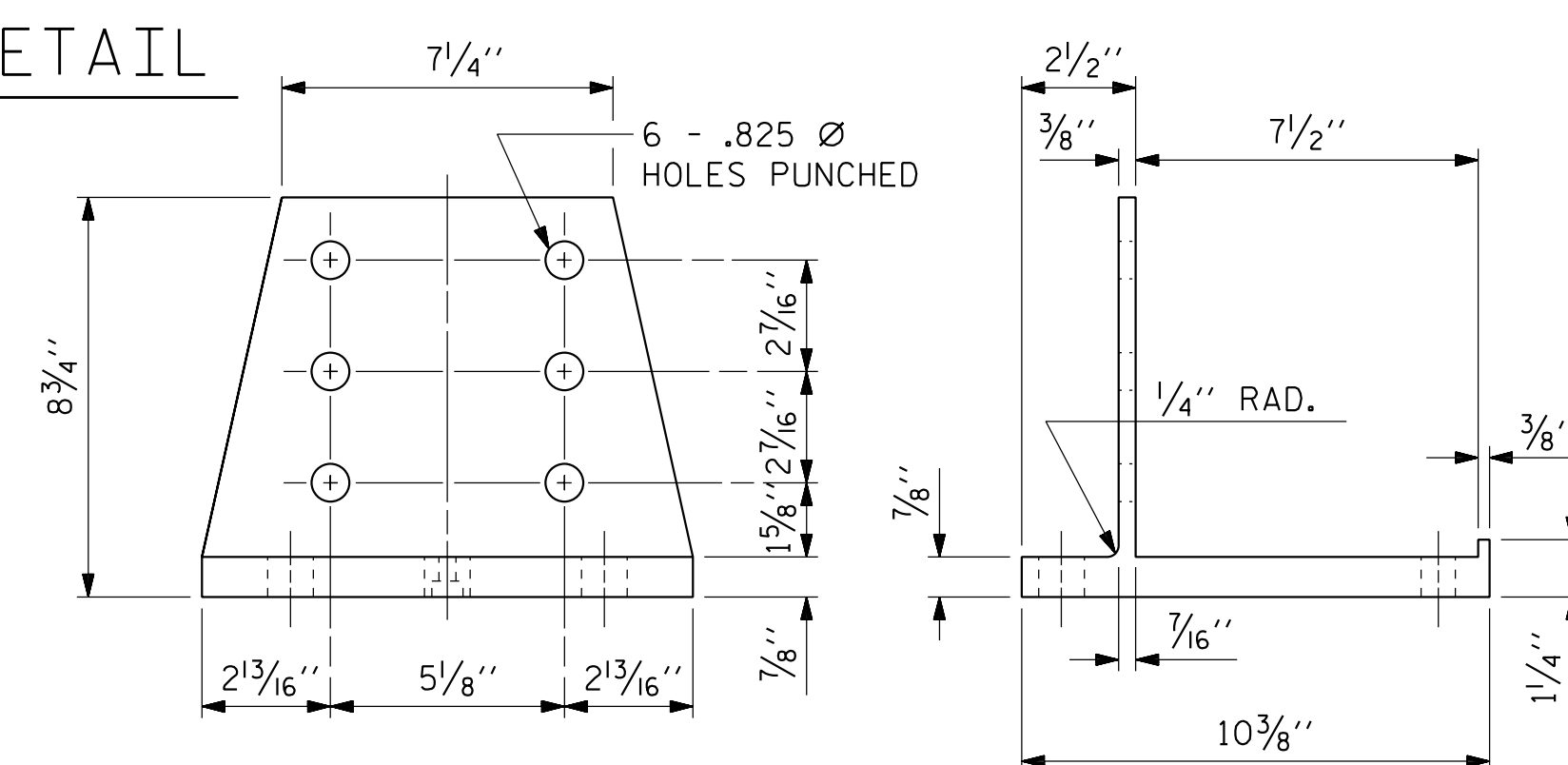
**SECTION THRU RAIL**

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD. NO. BMR6

**SHIM DETAILS**

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

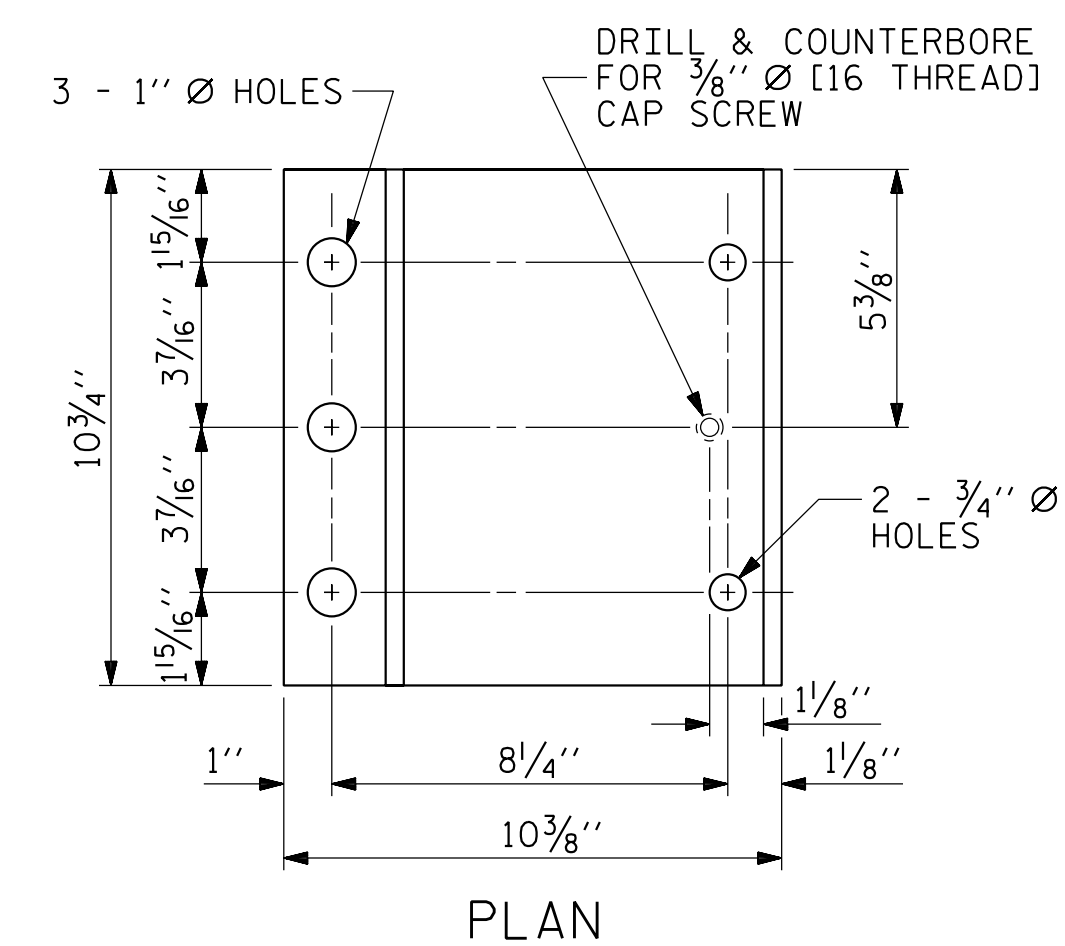
**RIVET DETAIL**



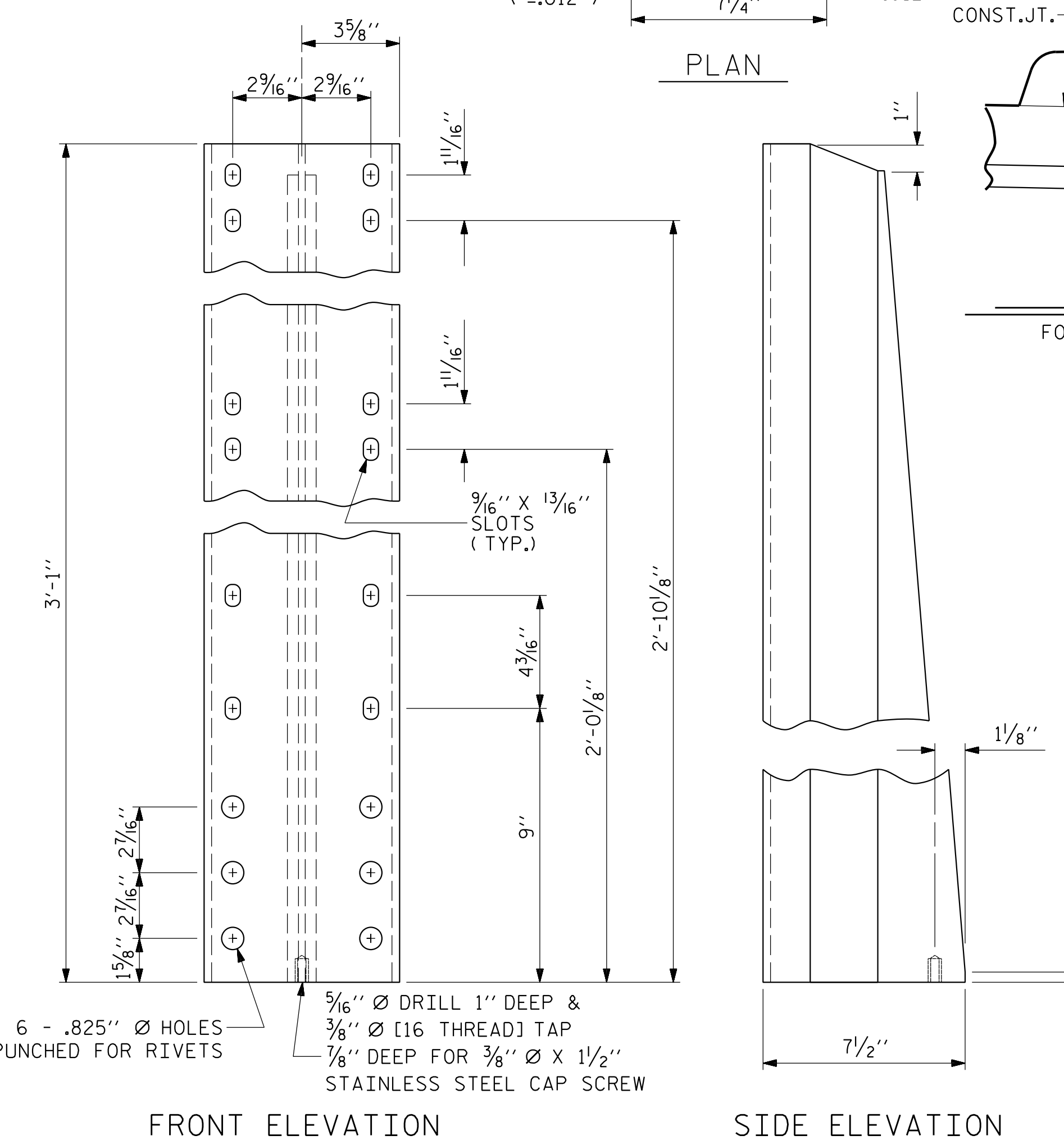
**FRONT ELEVATION**

**SIDE ELEVATION**

**POST BASE DETAILS**



**PLAN**



**FRONT ELEVATION**

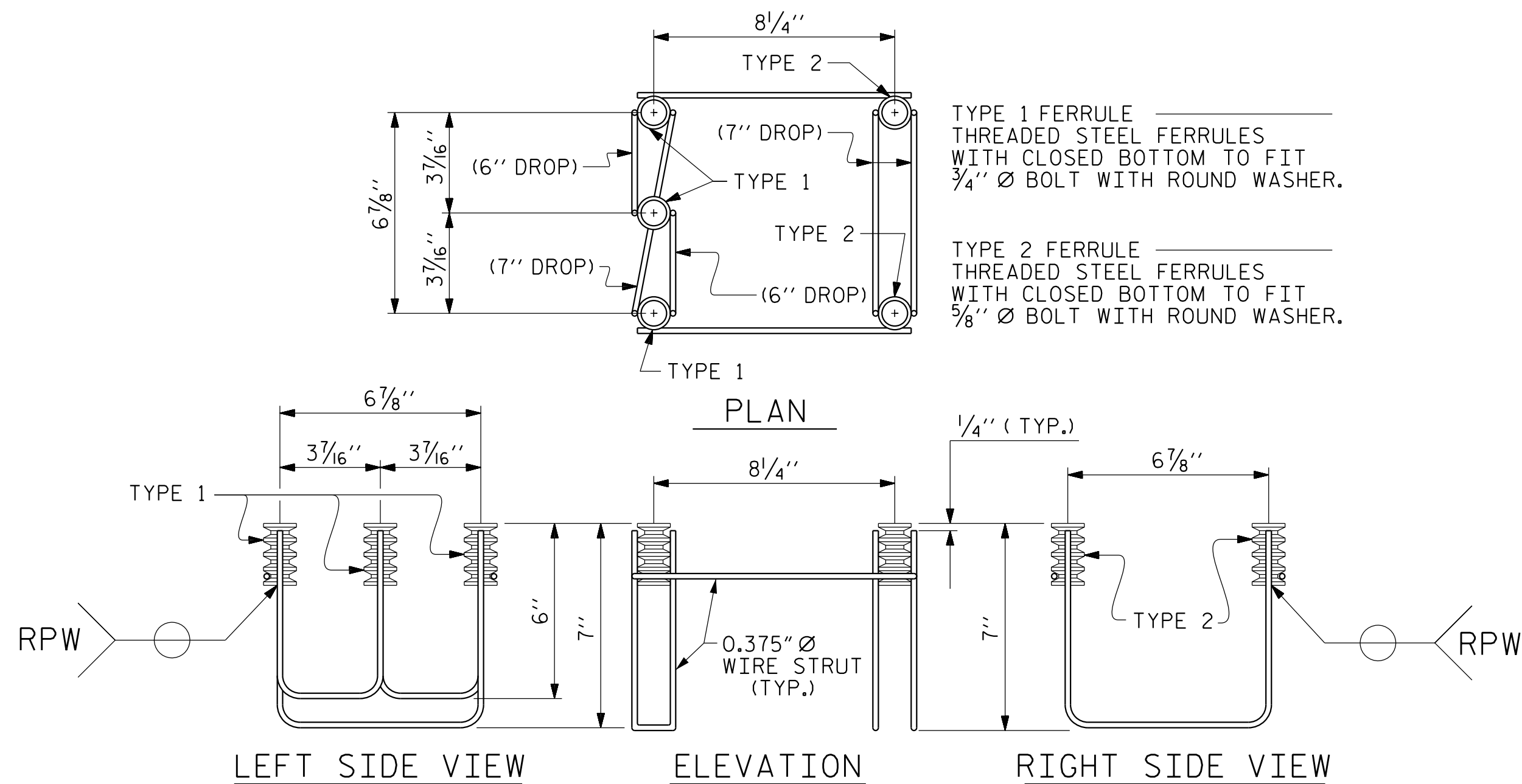
**SIDE ELEVATION**

**DETAILS OF POST**

DESIGN ENGINEER OF RECORD : <b>R. C. LARSON</b>	DATE : 2/23
ASSEMBLED BY : <b>W. B. ALLEN</b>	DATE : 5/19
CHECKED BY : <b>Z. H. BROWN</b>	DATE : 7/19
DRAWN BY : <b>JMB 1/88</b>	REV. 5/1/06 TLA/GM
CHECKED BY : <b>GGH 1/88</b>	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

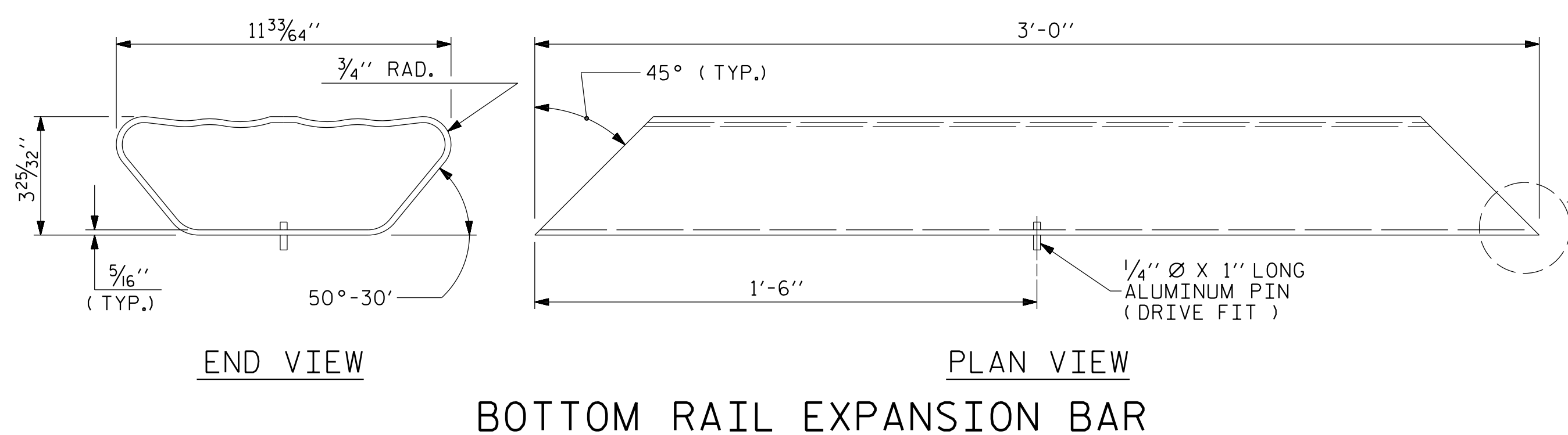
DocuSigned by:  
 Robert C. Larson  
 BEB2398D9220470

5/18/2023 10:50:08 AM R:\Structures\Bridges over Richard Creek\23 U5839-SMU-3MR1-43086.dgn

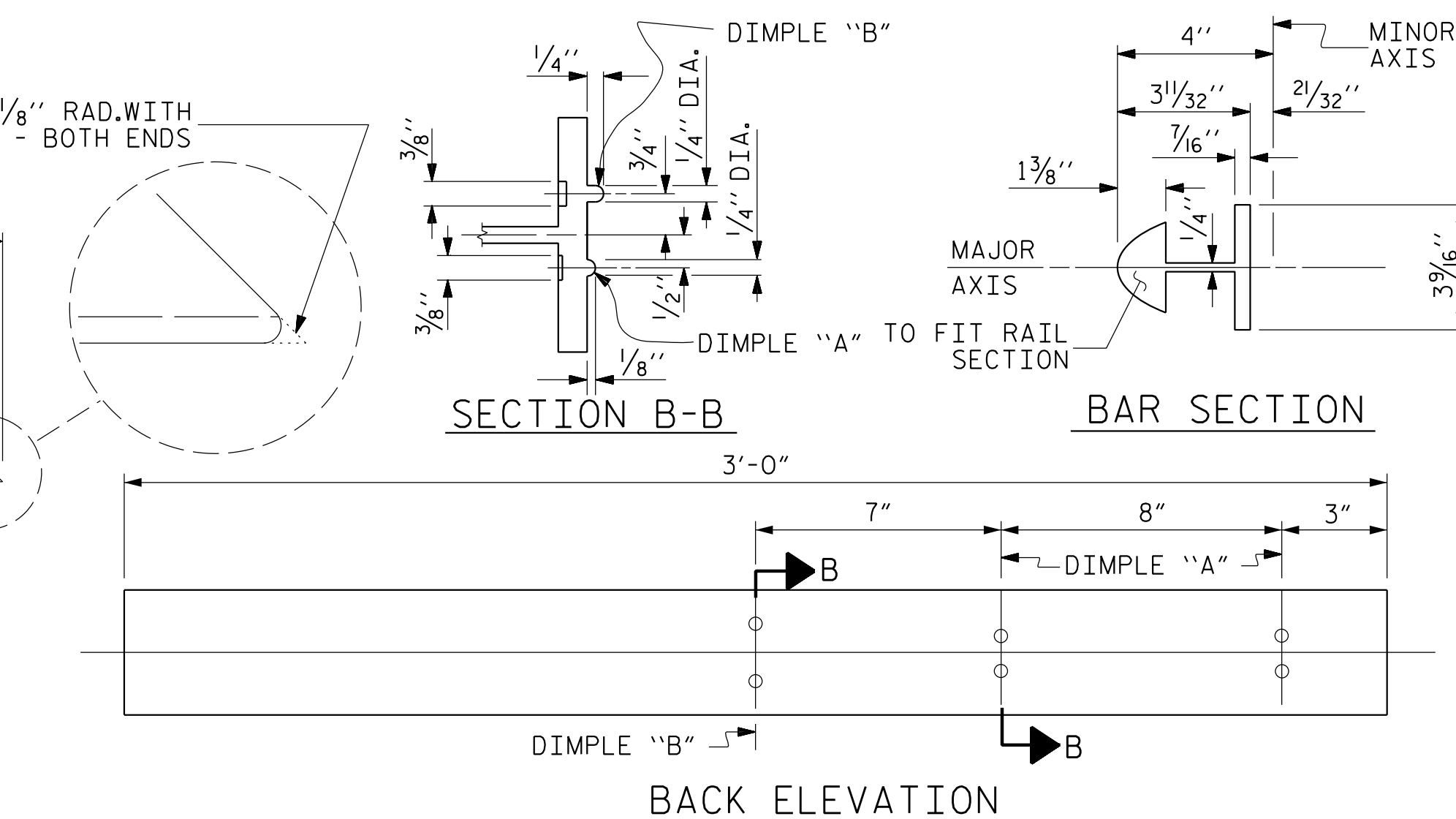
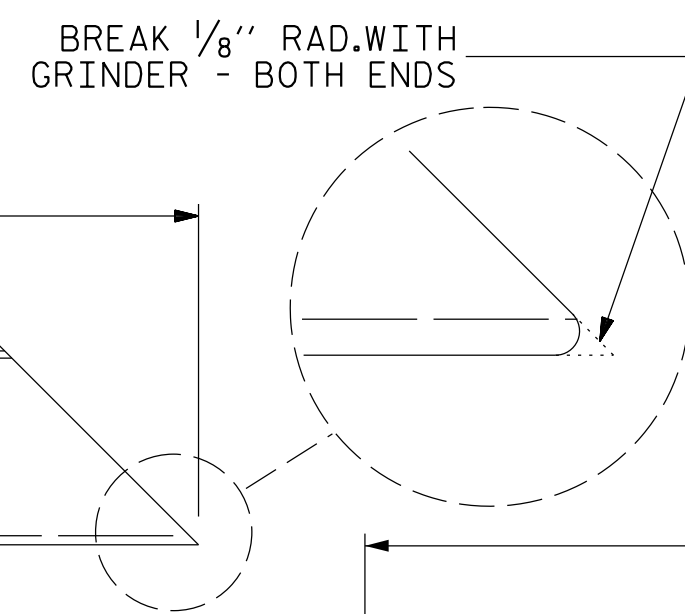


**5-BOLT METAL RAIL ANCHOR ASSEMBLY**

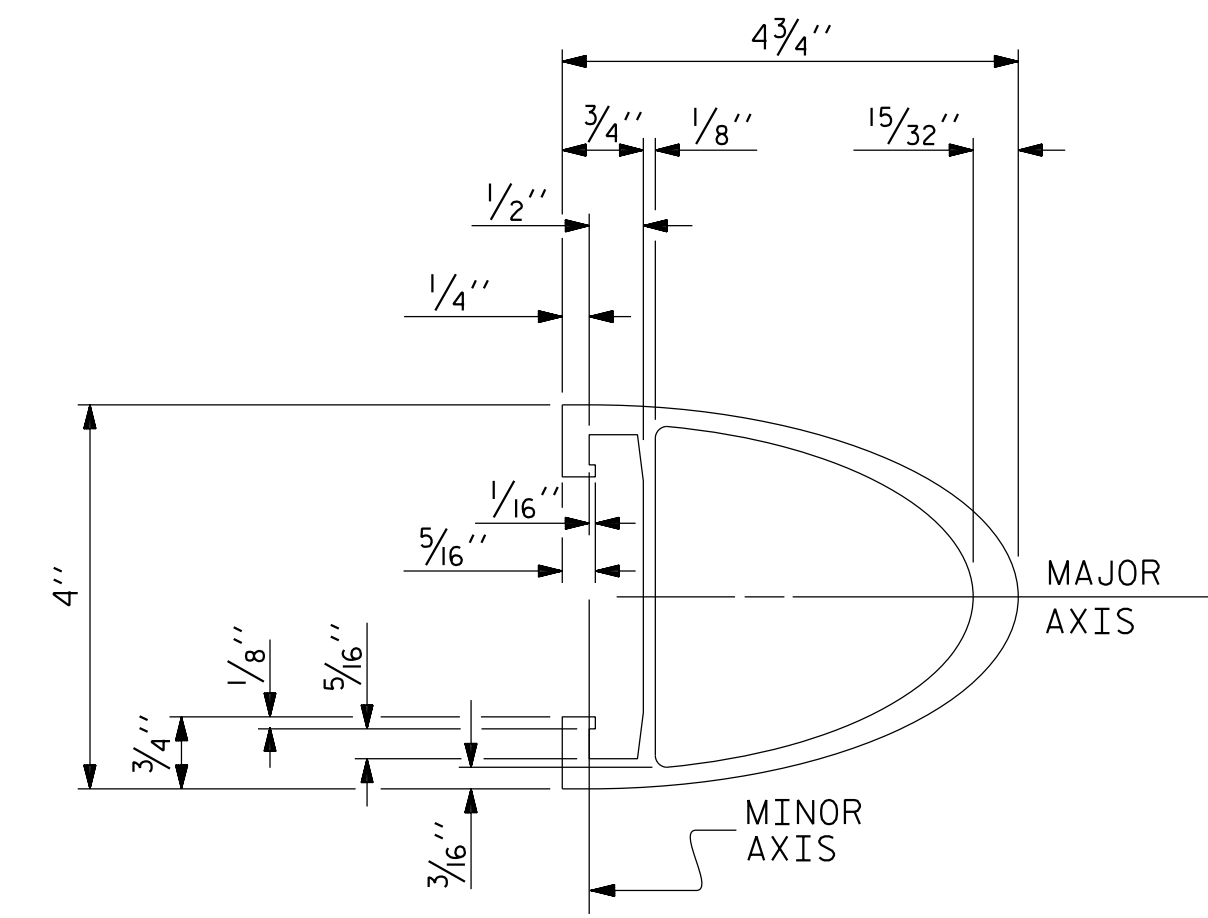
( 58 ASSEMBLIES REQUIRED )



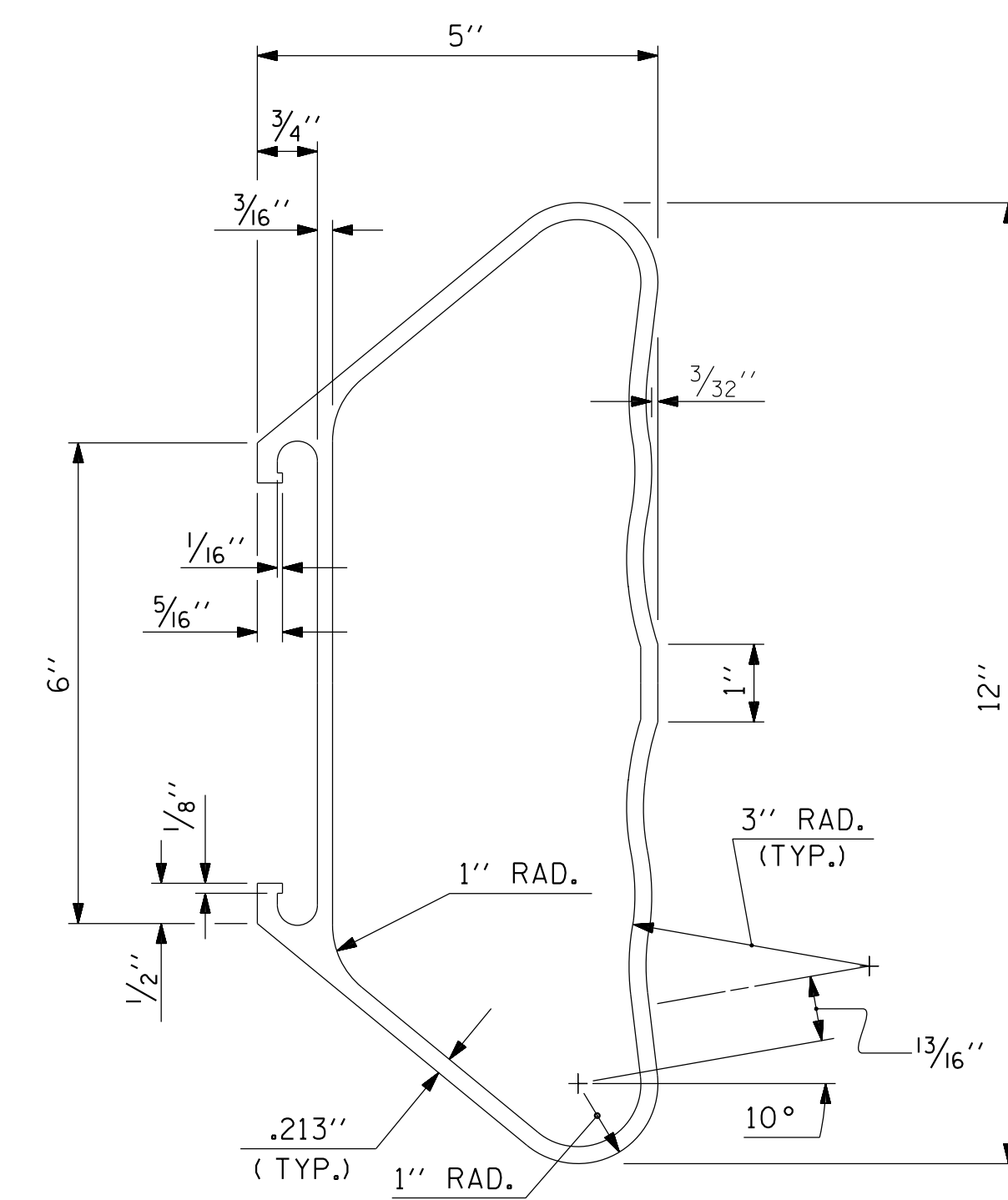
**BOTTOM RAIL EXPANSION BAR**



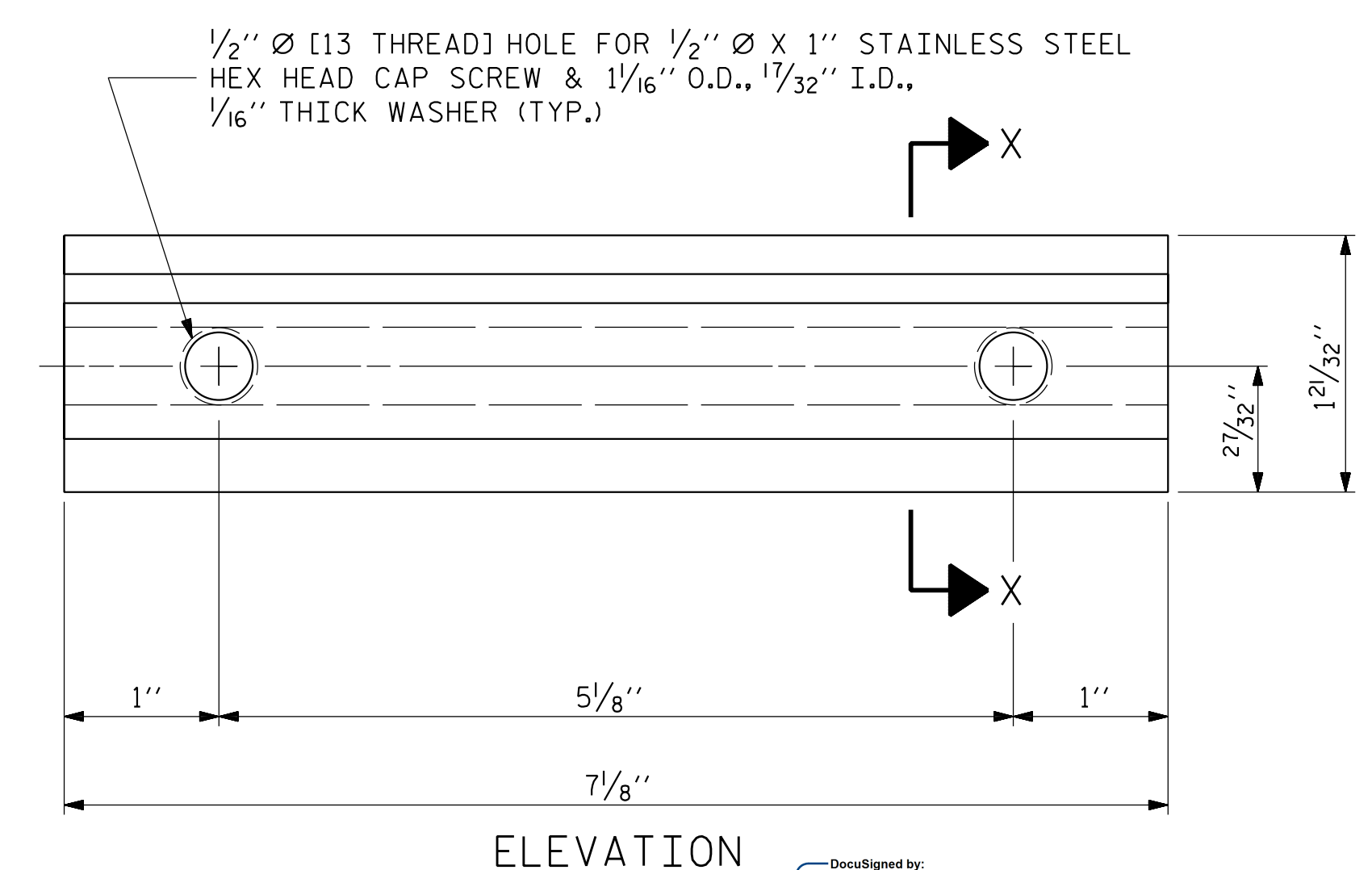
**TOP & MIDDLE RAIL EXPANSION BAR**



**TOP & MIDDLE RAIL SECTION**

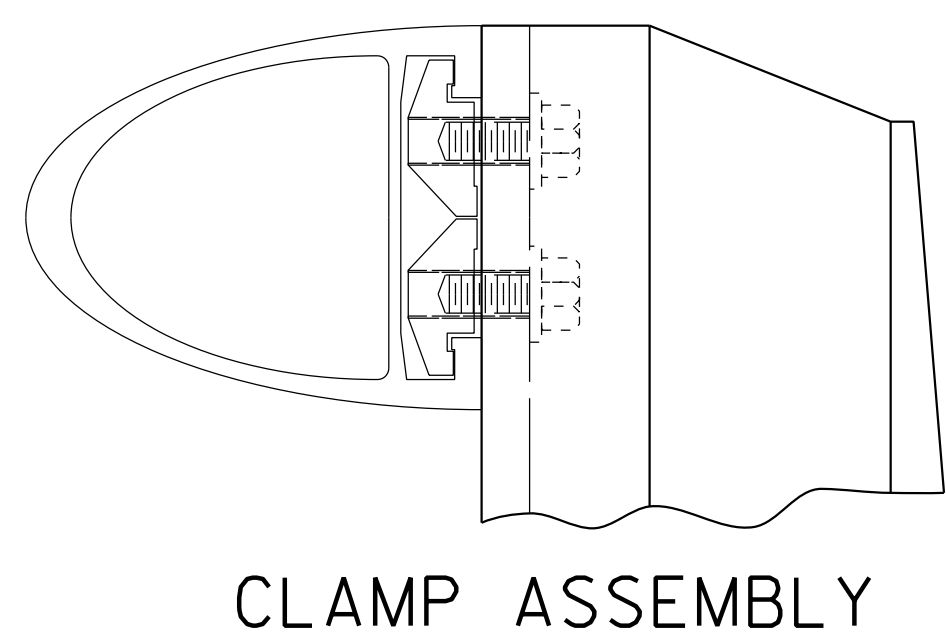
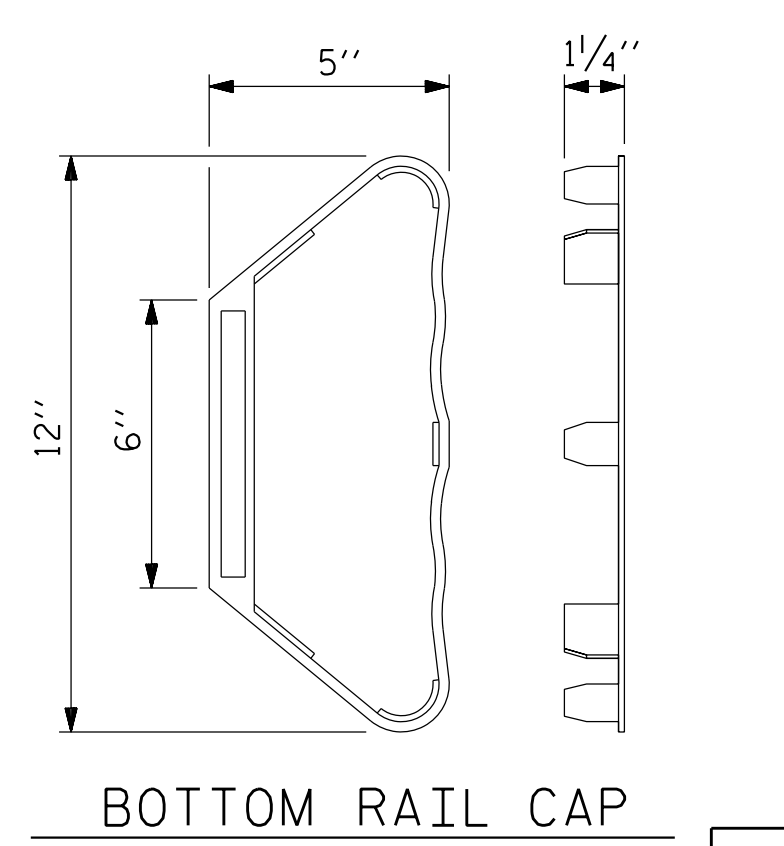
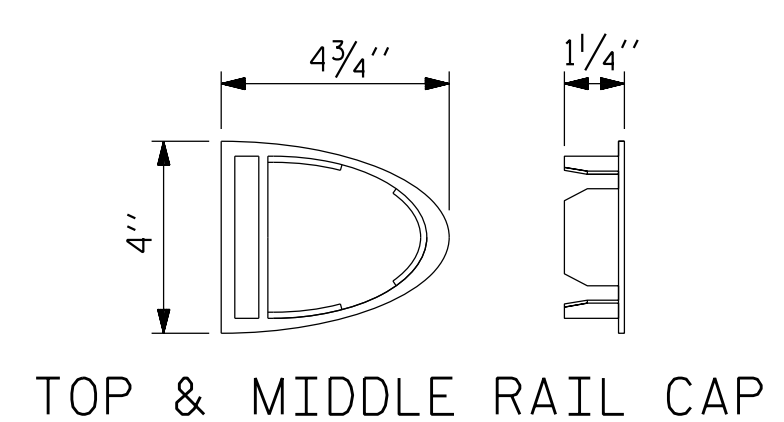
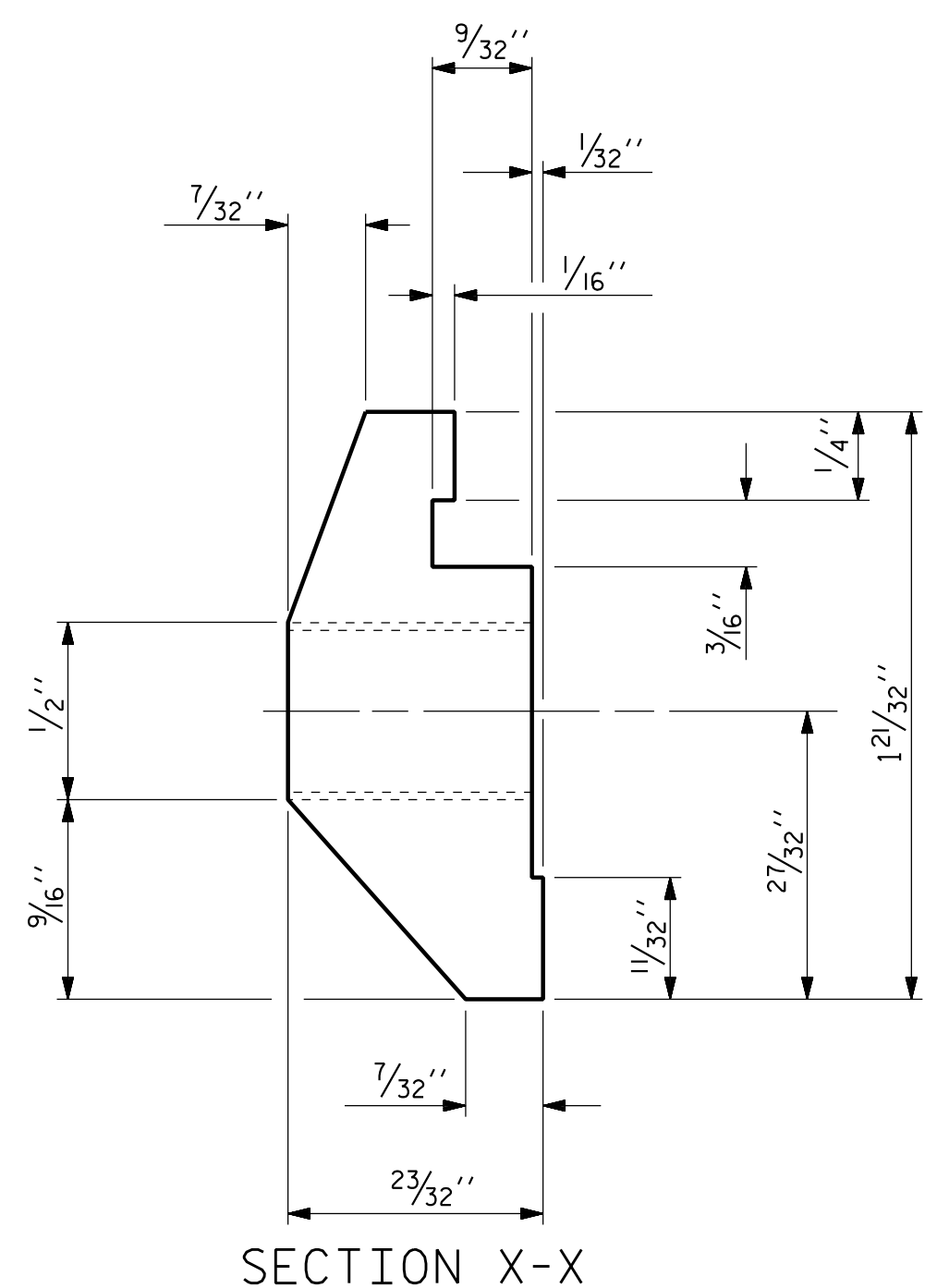


**BOTTOM RAIL SECTION**



**CLAMP BAR DETAIL**

( 6 REQUIRED PER POST )



PLANS PREPARED BY:

**NVI5**

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.nv5.com  
NC License # F-1333

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

DocuSigned by:

Robert C. Larson

SEAL 1414

ENGINEER

ROBERT C. LARSON

5/19/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

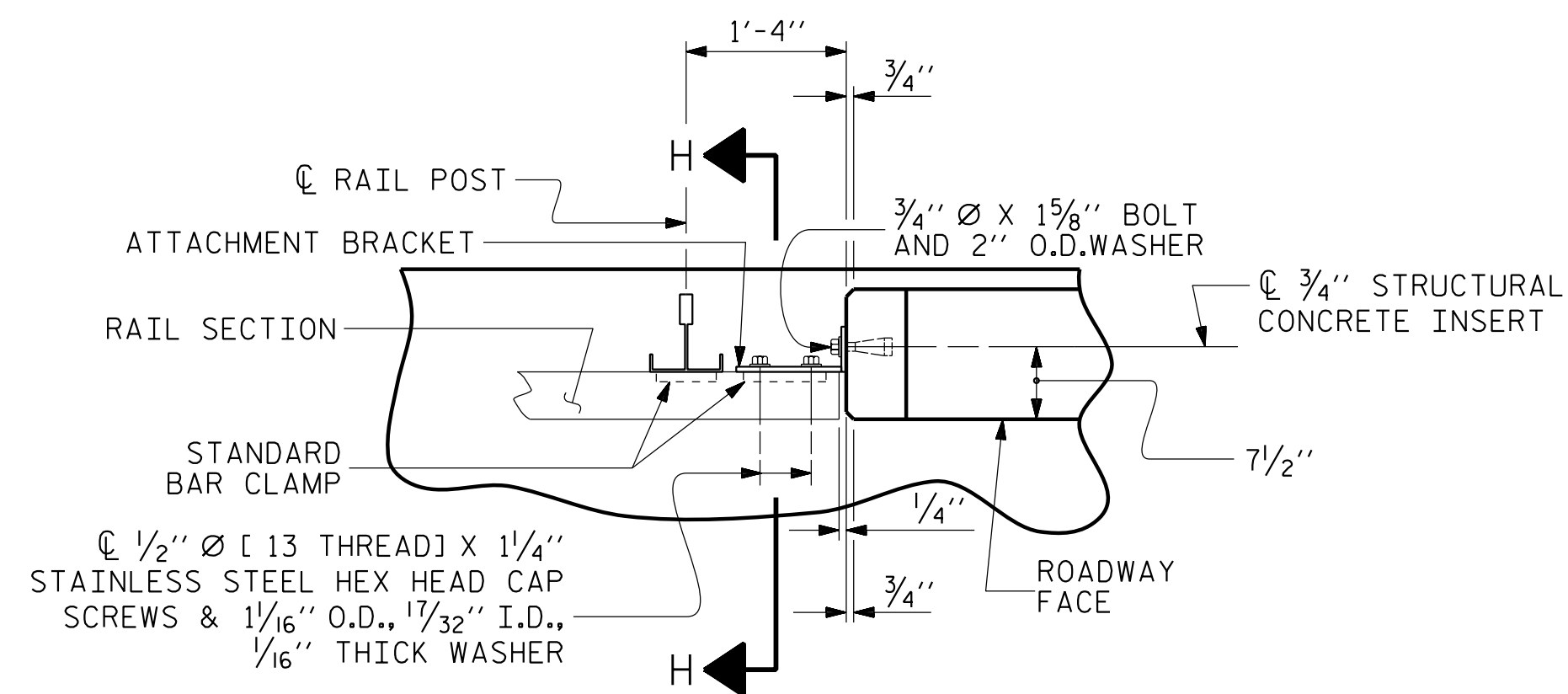
STANDARD  
**3 BAR METAL RAIL**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-24
1			3			TOTAL SHEETS
2			4			49

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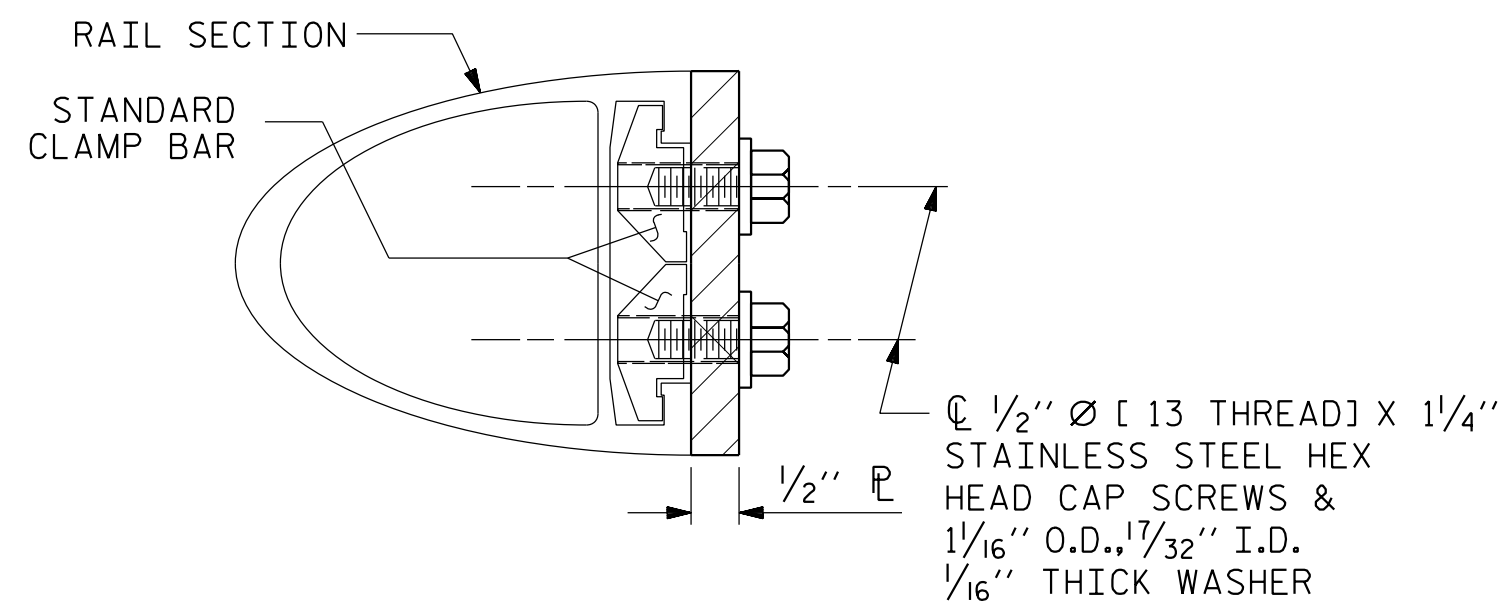
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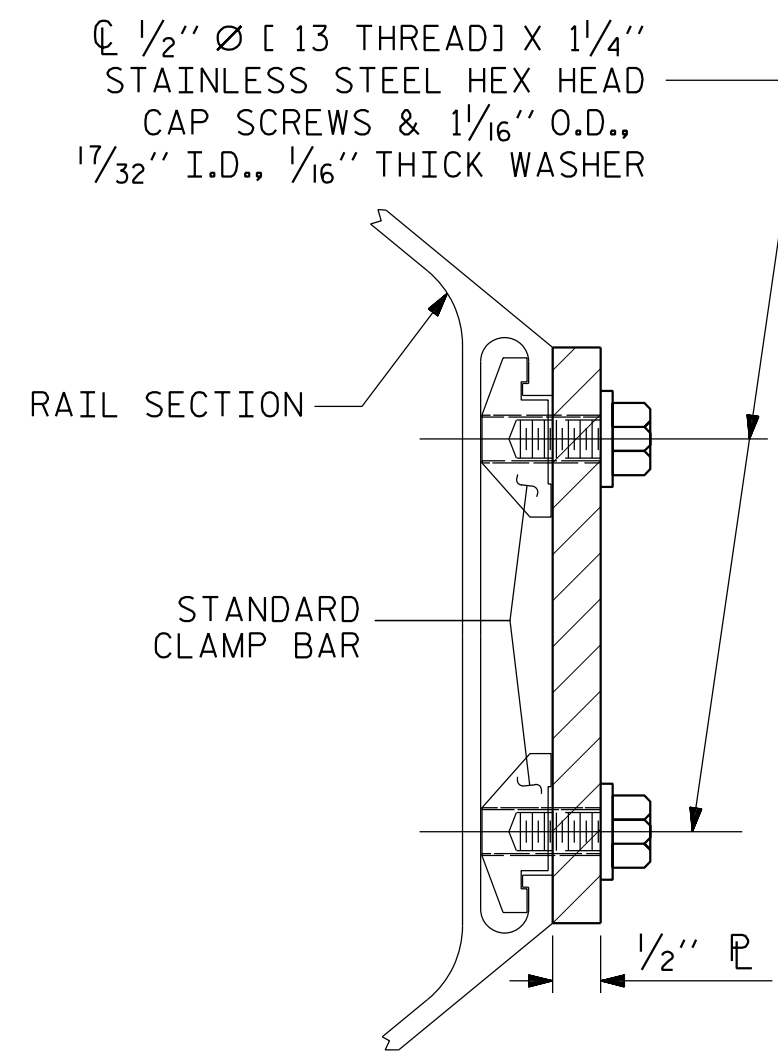
**PLAN OF RAIL AND END POST**

(STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)



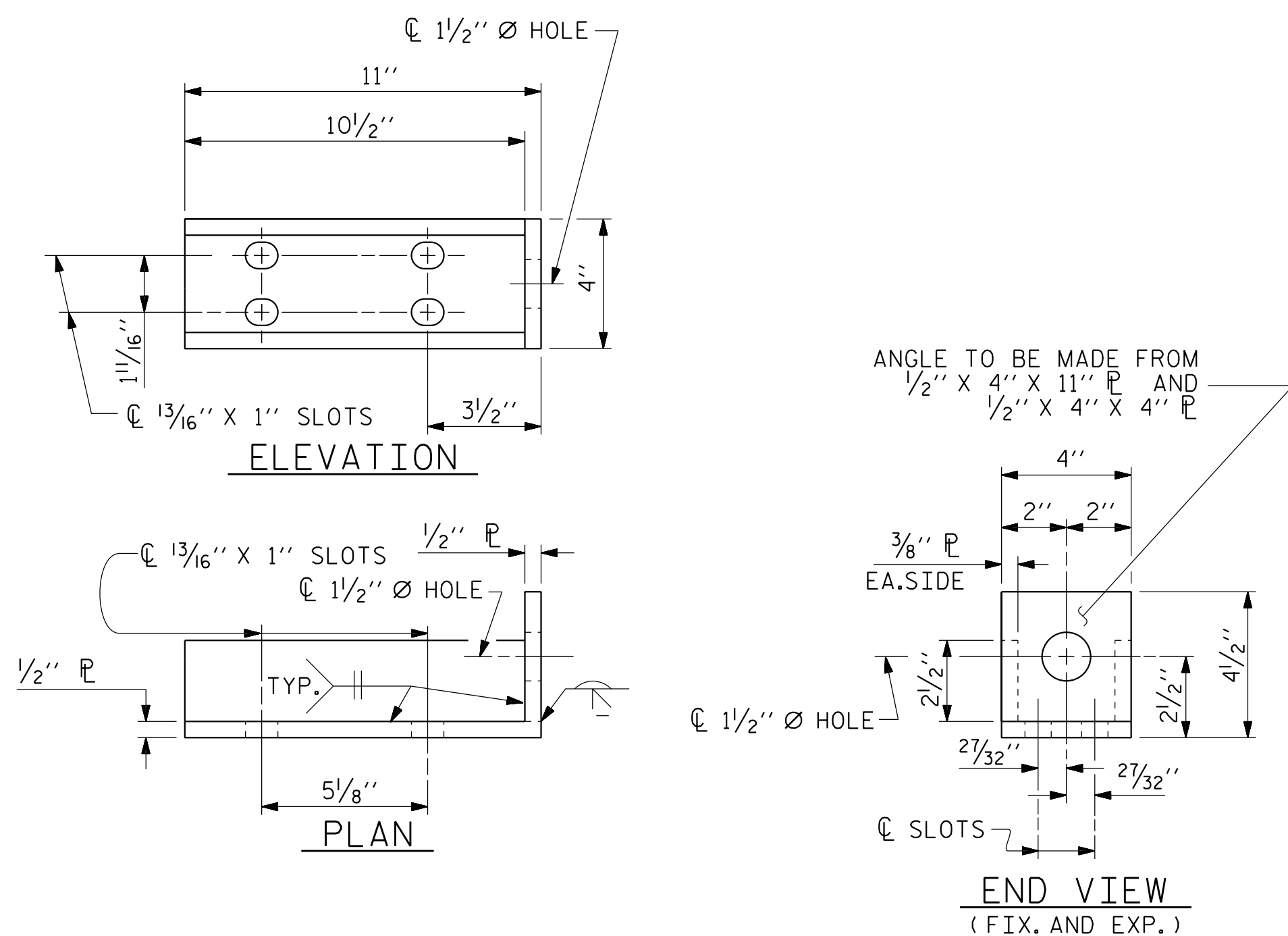
**SECTION H-H**

(FOR TOP & MIDDLE RAIL)



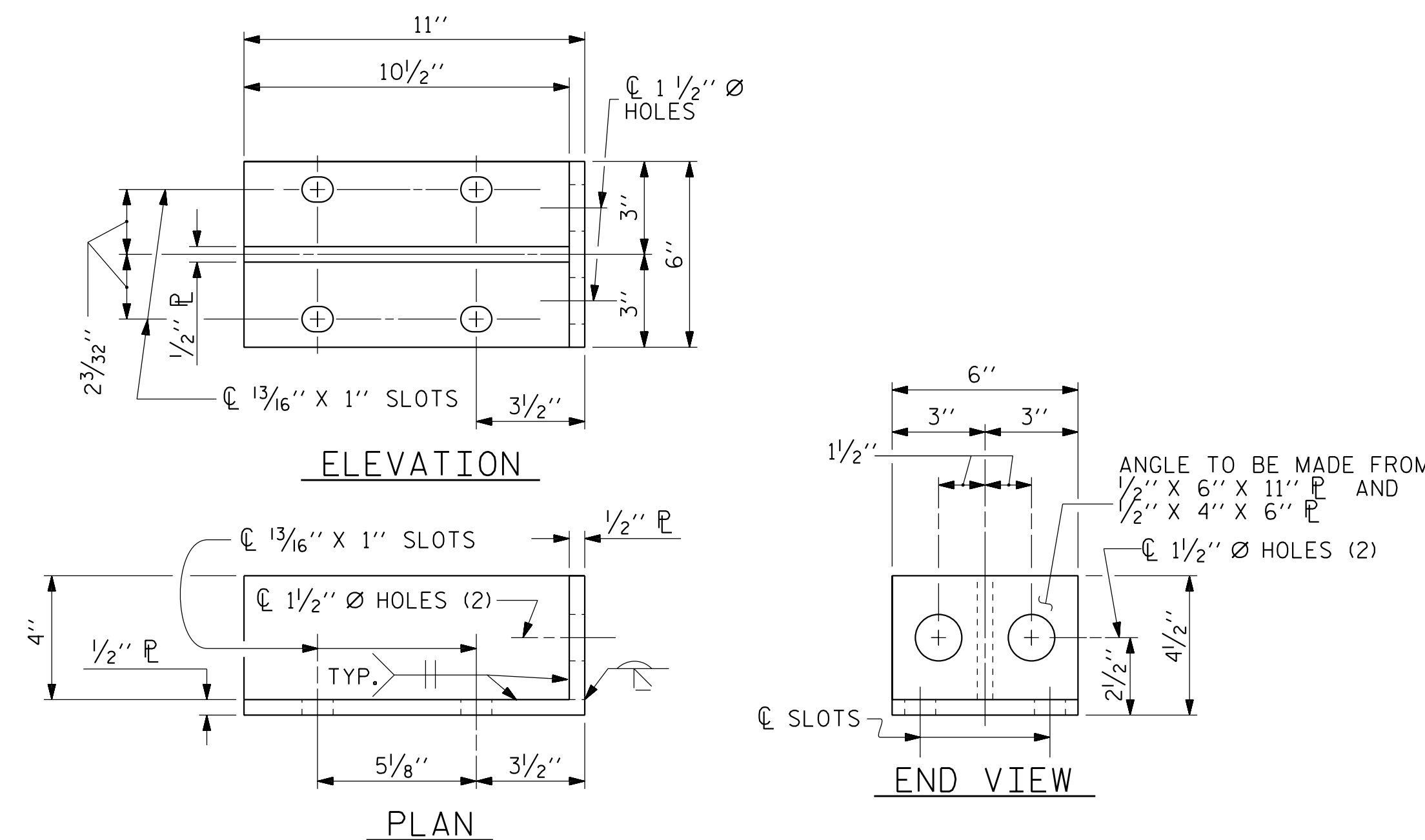
**SECTION H-H**

(FOR BOTTOM RAIL)



**DETAILS FOR ATTACHMENT BRACKET**

(TOP & MIDDLE RAIL ONLY)



**DETAILS FOR ATTACHMENT BRACKET**

(BOTTOM RAIL ONLY)

**NOTES**

**METAL RAIL TO END POST CONNECTION**

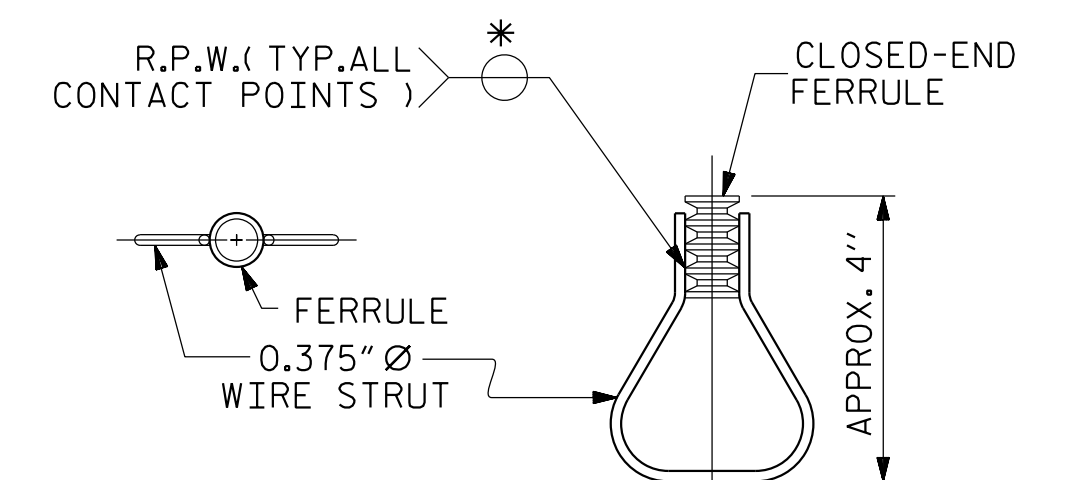
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
  - A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 1/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 1/8" BOLT SHALL HAVE N. C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
  - D. STANDARD CLAMP BARS (STD. No. BMR 6).
- THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.
- THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.
- THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

**NOTES**

**STRUCTURAL CONCRETE INSERT**

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



**PLAN ELEVATION**

**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 3 OF 3

PLANS PREPARED BY:  
**NV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

DocuSigned by:  
 BEB2398D9220470  
 NORTH CAROLINA PROFESSIONAL SEAL  
 1414  
 ENGINEER  
 ROBERT C. LARSON

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**STANDARD  
 3 BAR METAL RAIL**

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 49

STD. NO. BMR7

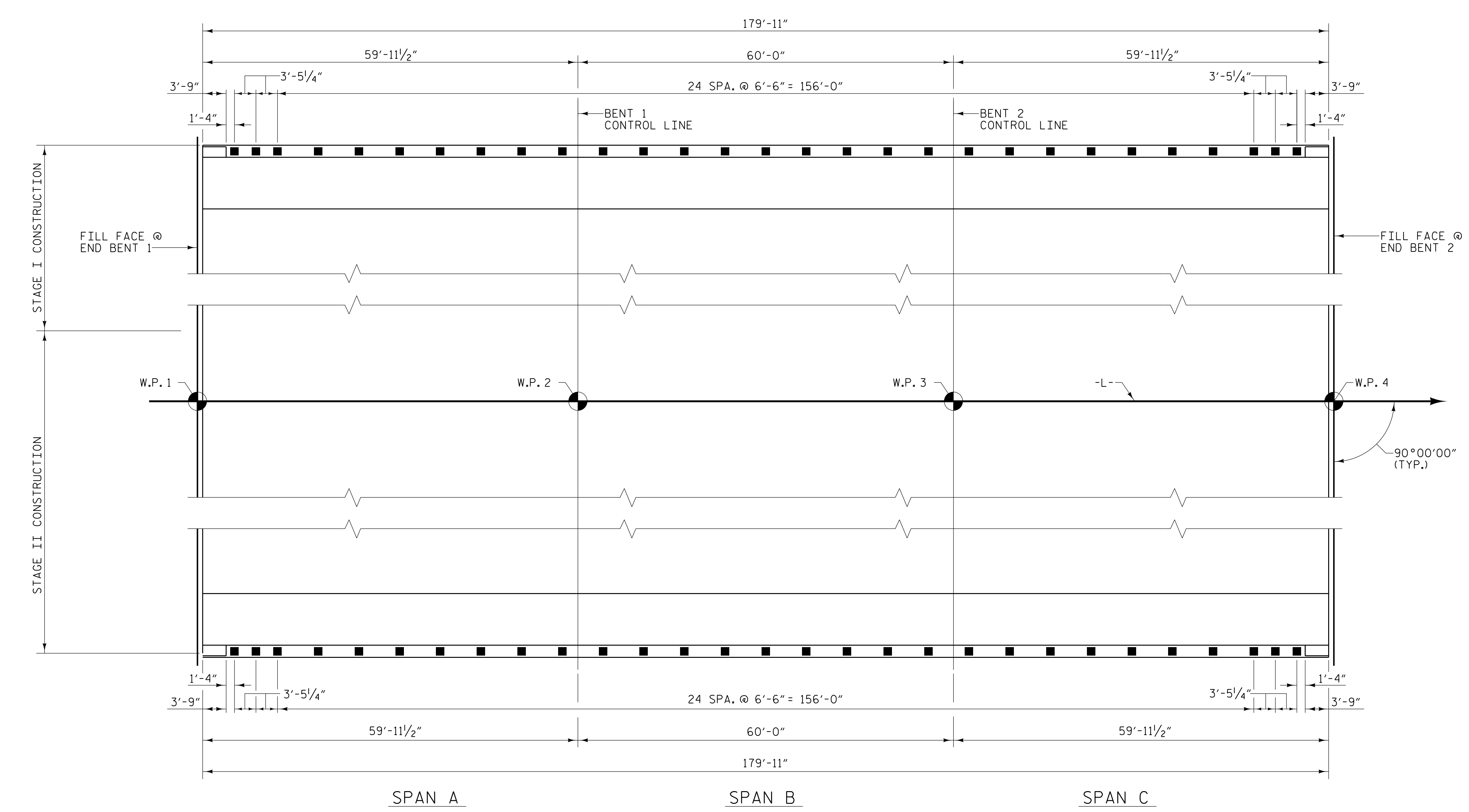
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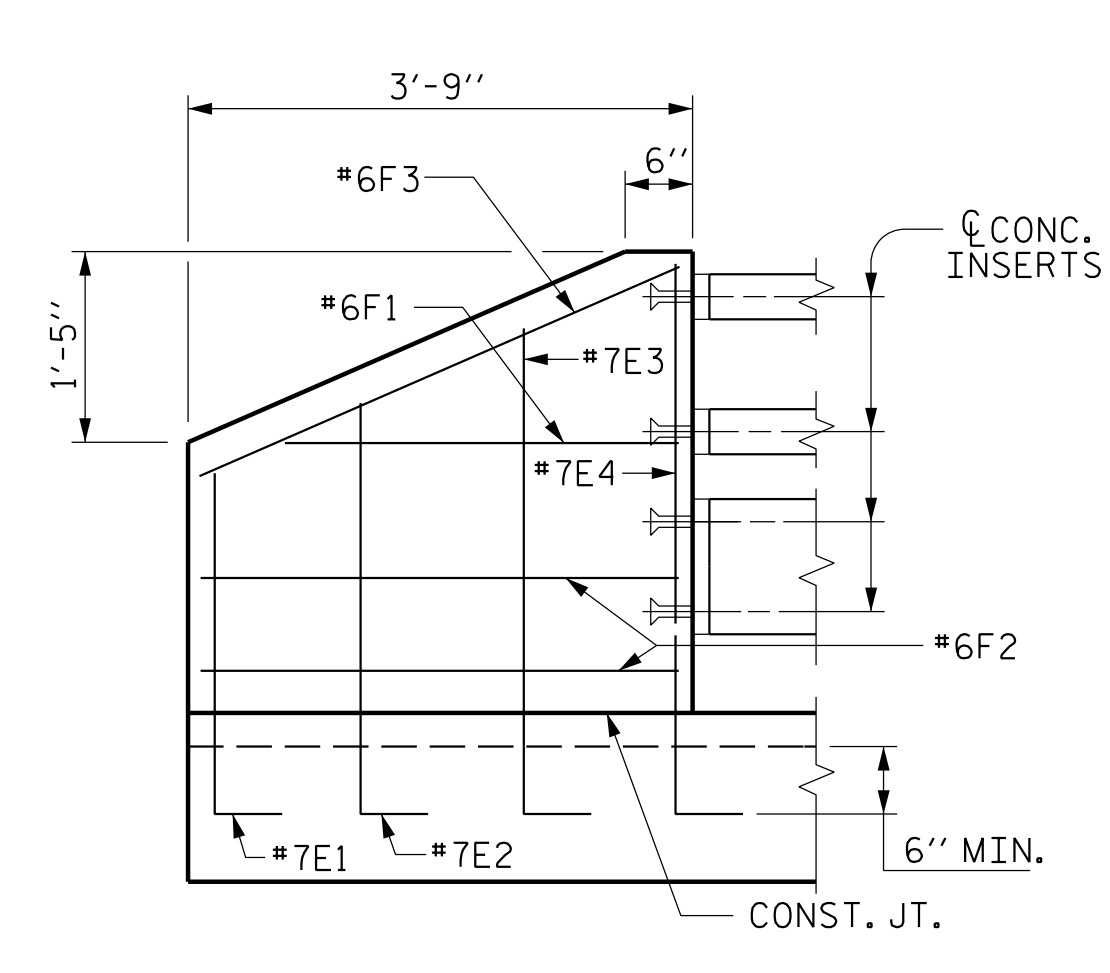
DESIGN ENGINEER OF RECORD : <b>R. C. LARSON</b>	DATE : 2/23
ASSEMBLED BY : <b>W. B. ALLEN</b>	DATE : 5/19
CHECKED BY : <b>Z. H. BROWN</b>	DATE : 7/19
DRAWN BY : <b>JMB</b> 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : <b>GGH</b> 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

DocuSigned by:  
 BEB2398D9220470

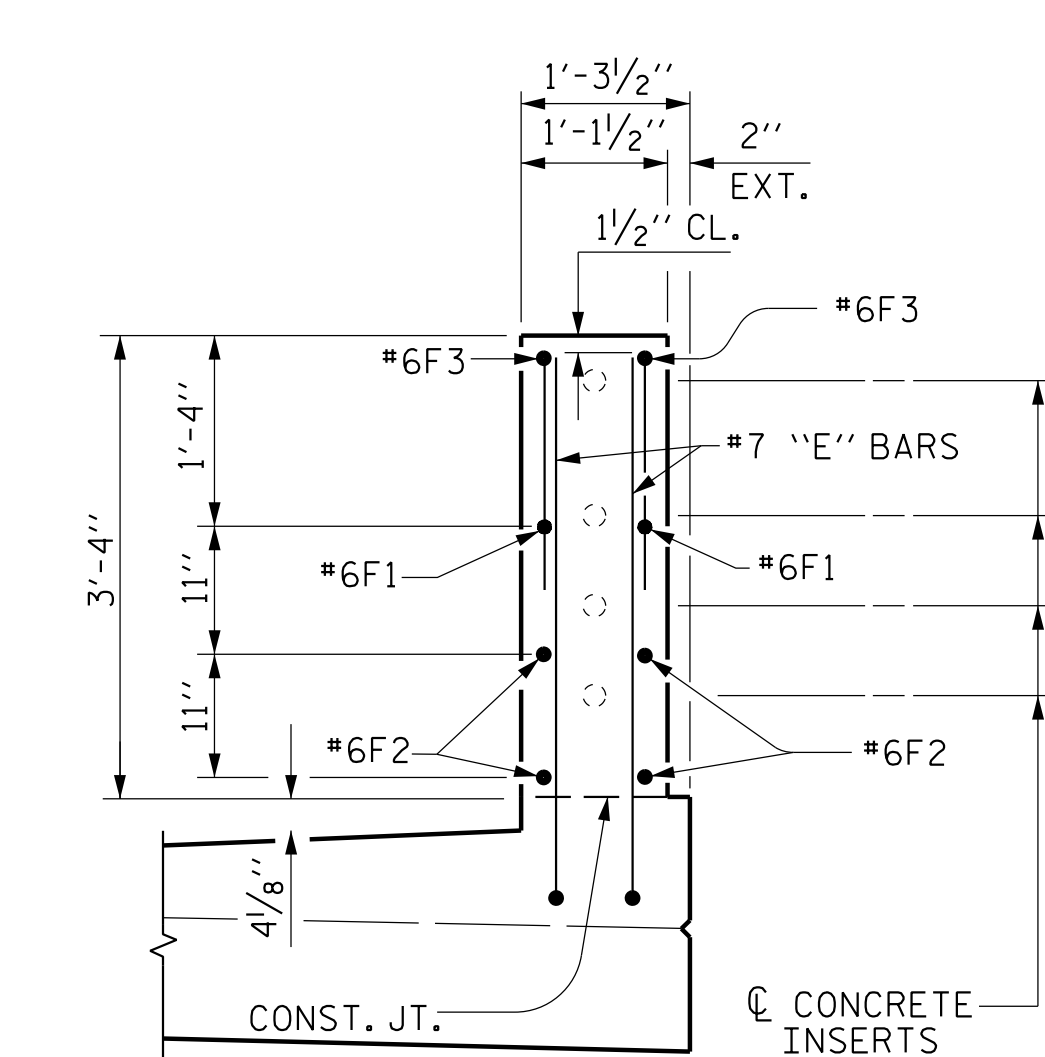
**NOTE**  
 THE REINFORCING STEEL AND CONCRETE FOR THE END POSTS IS INCLUDED IN THE UNIT PRICE BID FOR REINFORCED CONCRETE DECK SLAB. SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET FOR BAR DETAILS AND CONCRETE QUANTITIES.



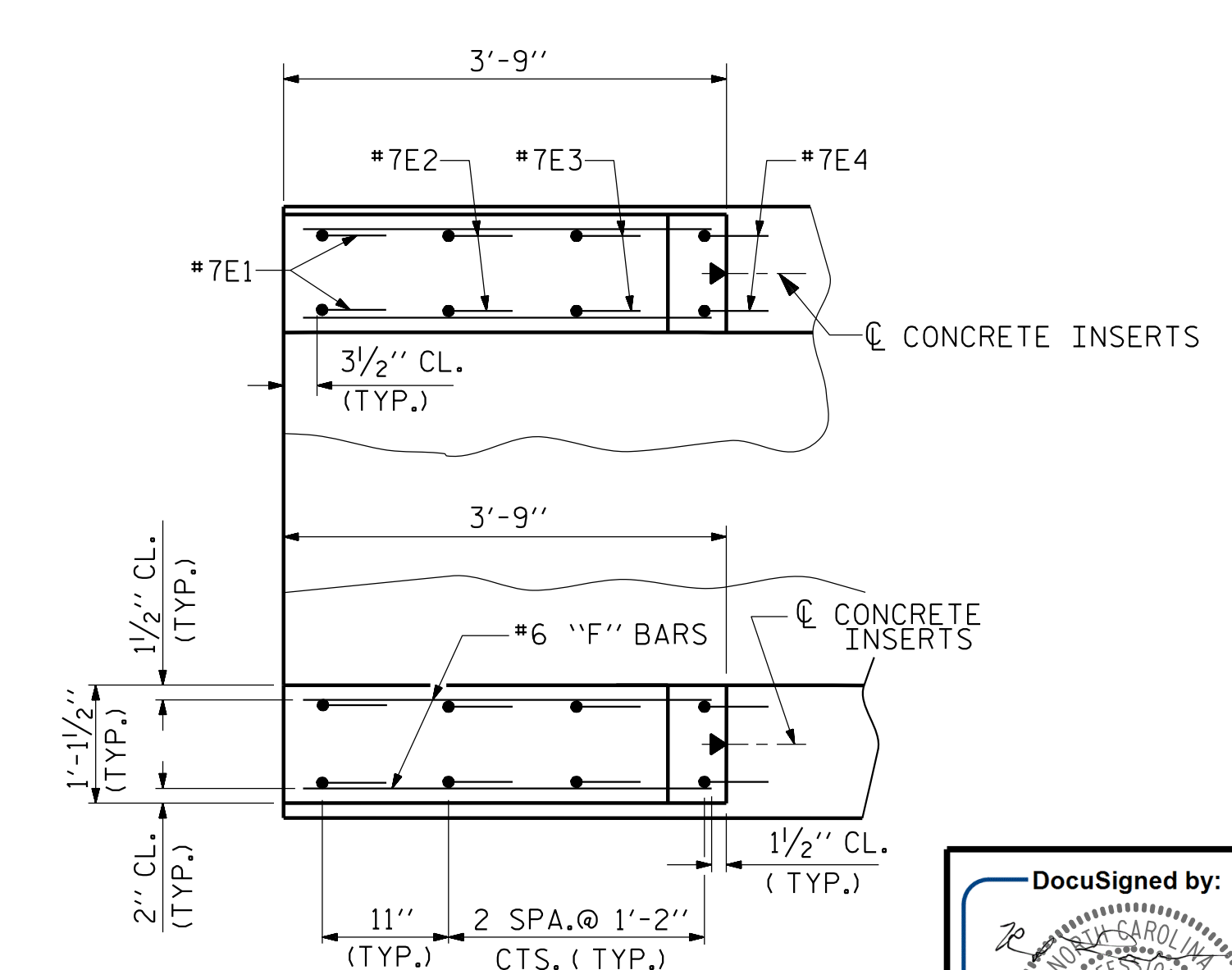
**PLAN OF RAIL POST SPACINGS**



**ELEVATION**



**END VIEW  
 END POST DETAILS**



**PLAN**

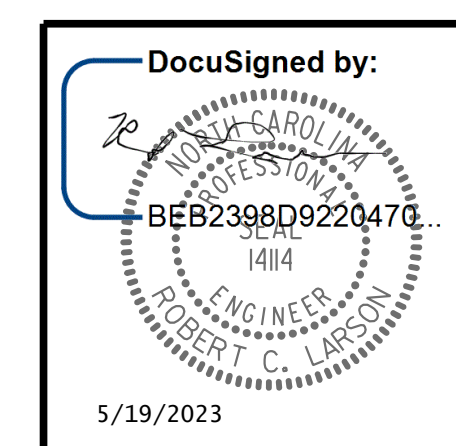
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PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			



5/17/2023 7:03:25 PM R:\Structures\Bridges over Richard Creek\Y6 U5839\_SML3M4\_43086.dgn

DRAWN BY: W. B. ALLEN DATE: 5/19  
 CHECKED BY: Z. H. BROWN DATE: 7/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

NOTES

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

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

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

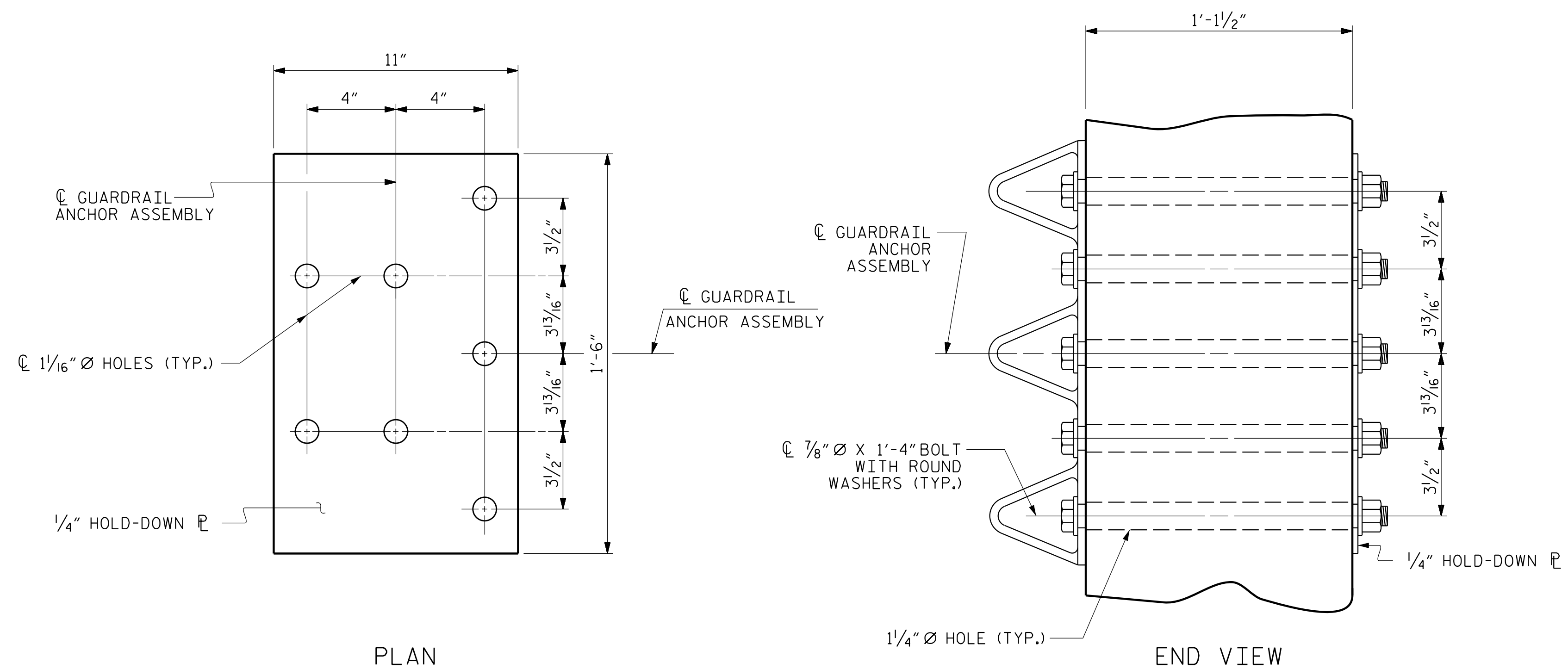
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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

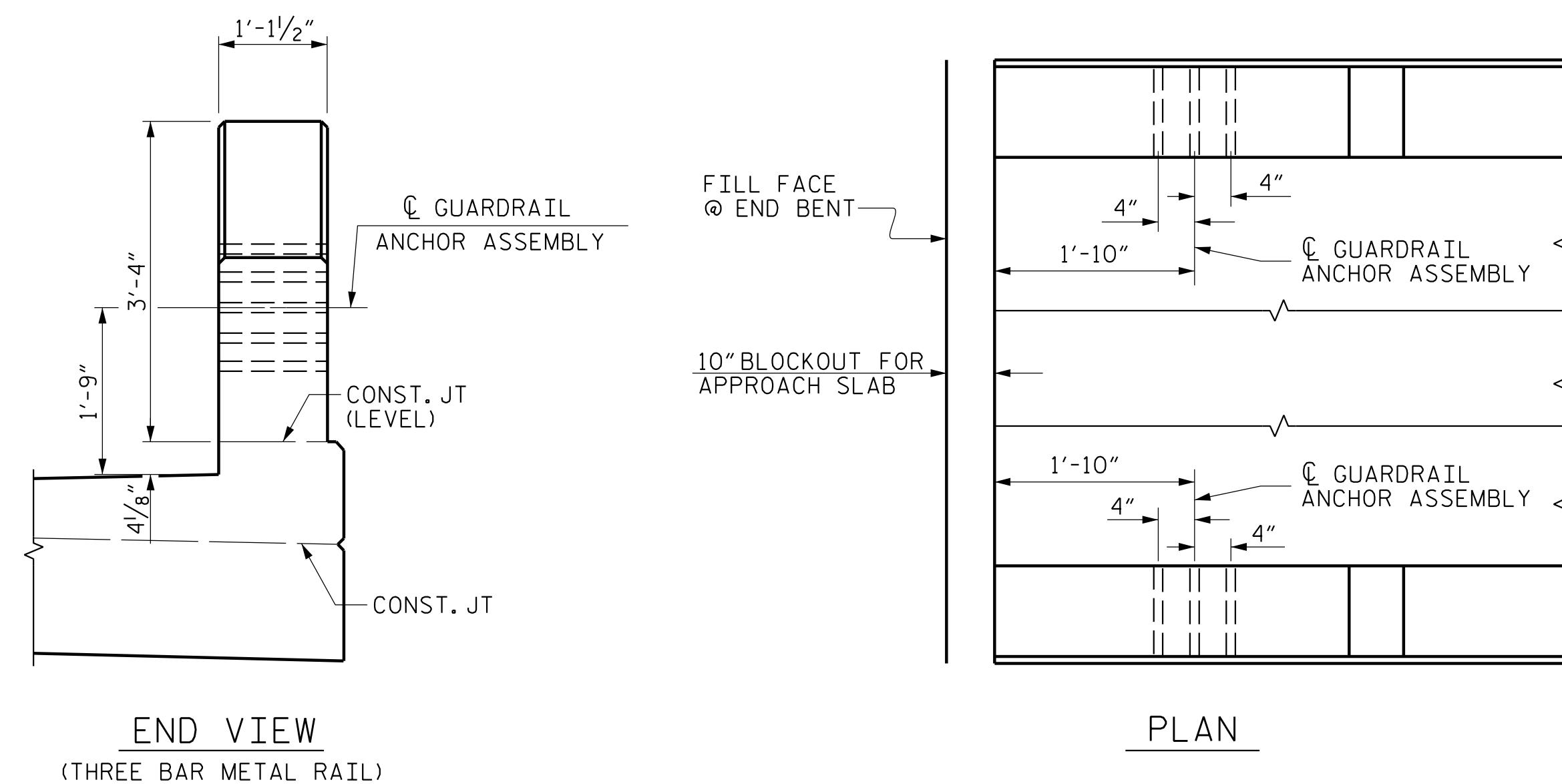


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

PLANS PREPARED BY:

**NV5**

NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
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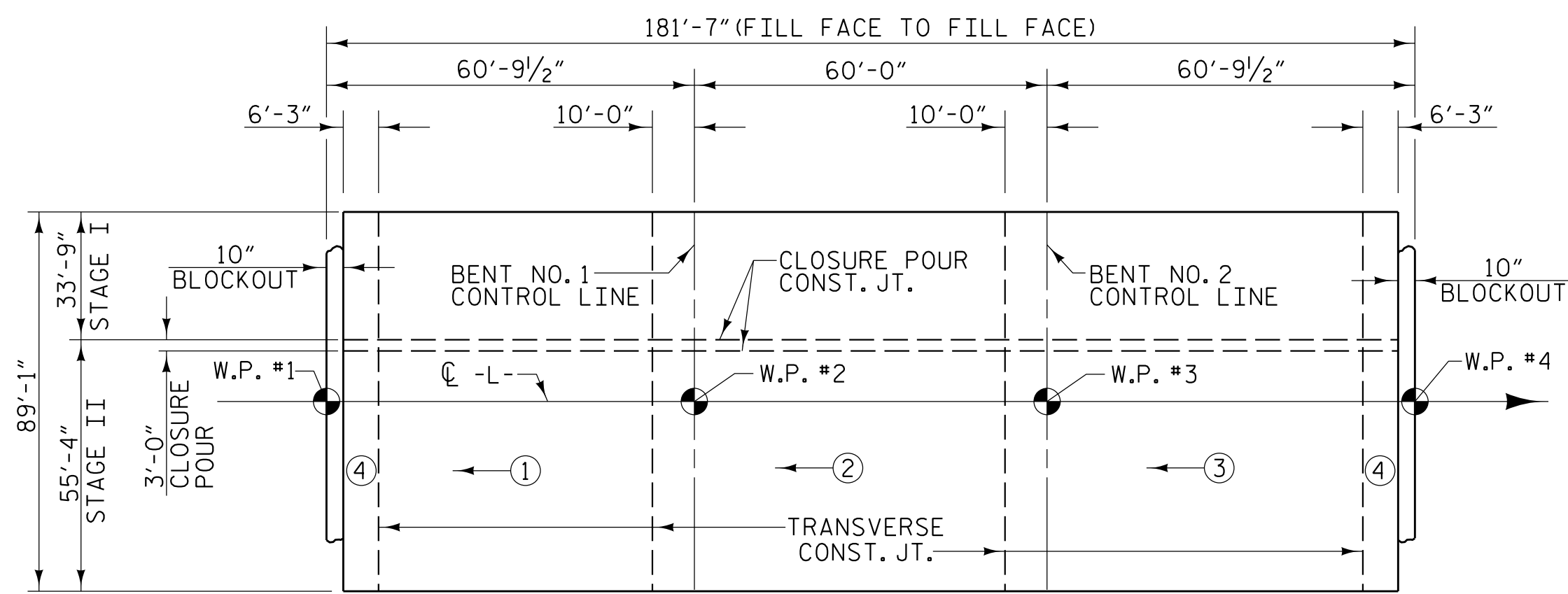
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 BEB23980822047A  
 5/19/2023

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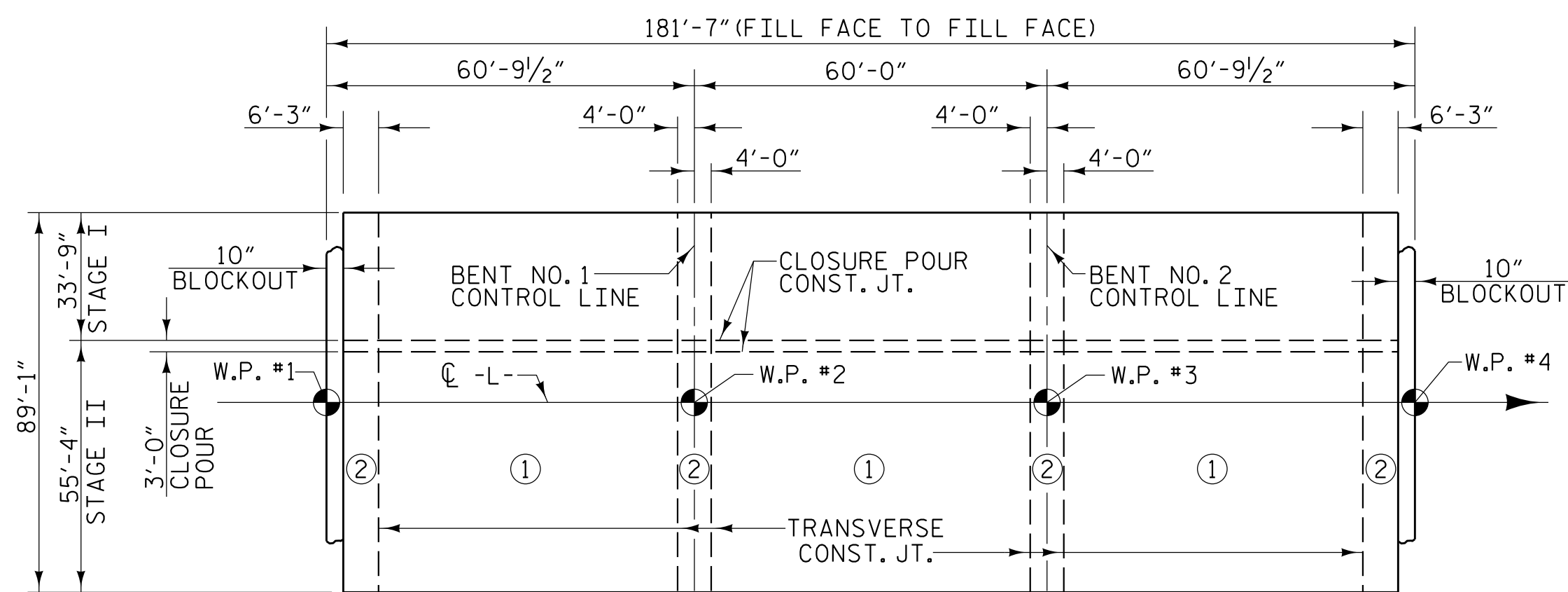
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DESIGN ENGINEER OF RECORD :	R. C. LARSON	DATE :	2/23
ASSEMBLED BY :	W. B. ALLEN	DATE :	5/19
CHECKED BY :	Z. H. BROWN	DATE :	7/19
DRAWN BY :	MAA 5/10	REV. 1/15	MAA/TMG
CHECKED BY :	GM 5/10	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC



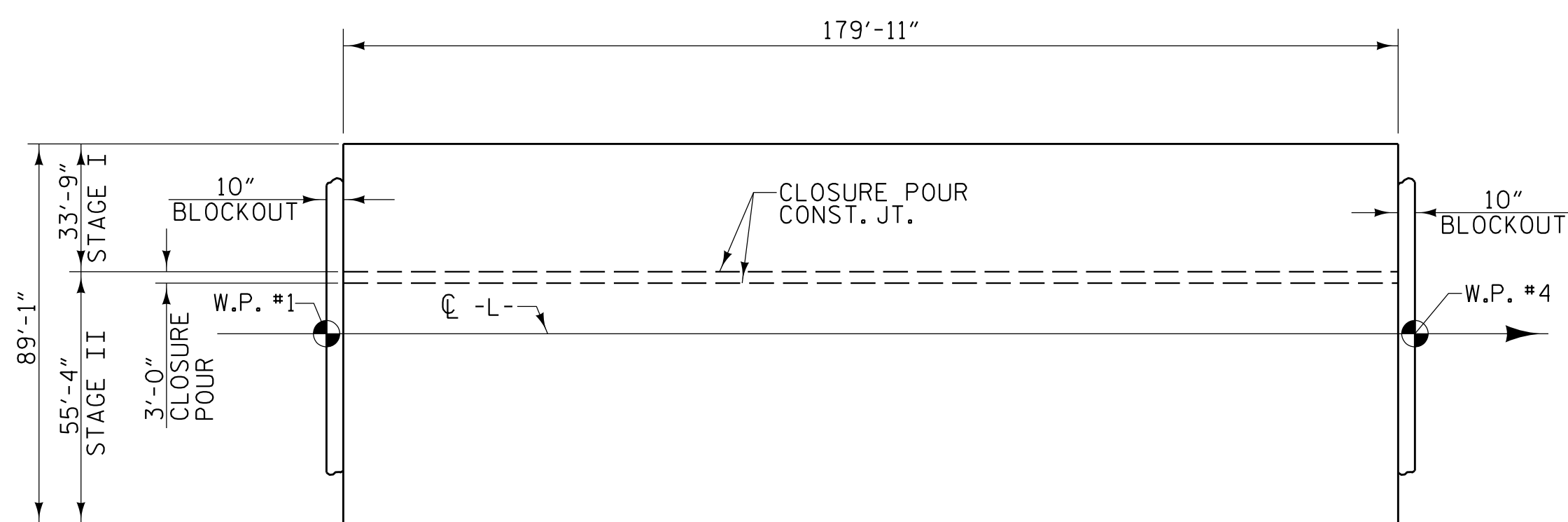
### POURING SEQUENCE SKETCH

⊕ INDICATES POUR SEQUENCE NUMBER & DIRECTION



### OPTIONAL POURING SEQUENCE SKETCH

⊕ INDICATES POUR SEQUENCE NUMBER  
NOTE: POUR 2 CANNOT BE STARTED UNTIL BOTH ADJACENT POURS REACH MINIMUM OF 3000 PSI



### LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(TOTAL SQ. FT. = 16027)

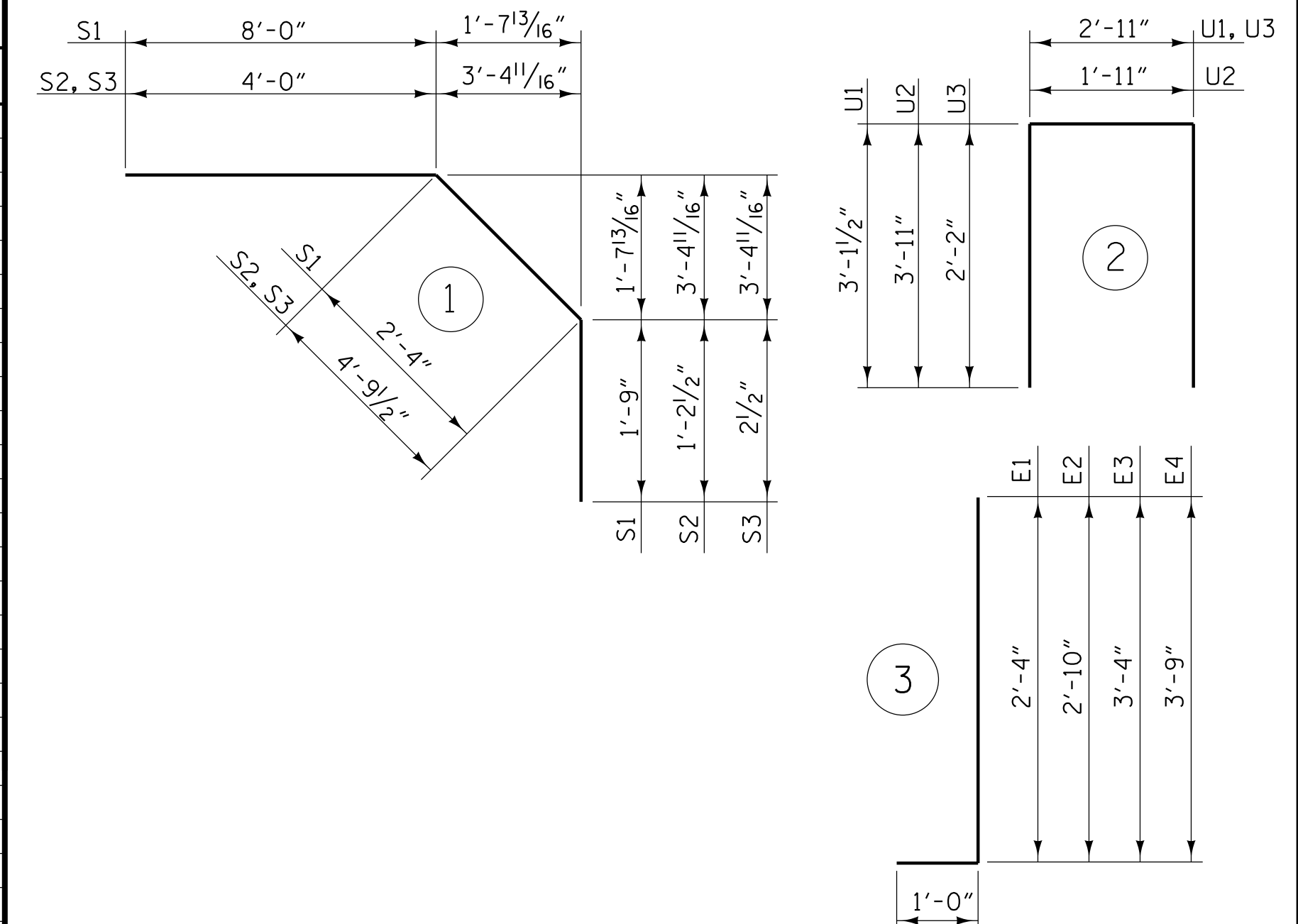
(STAGE I = 6072 SQ. FT.)  
(STAGE II = 9955 SQ. FT.)

### REINFORCING BAR SCHEDULE

STAGE I					STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	359	#5	STR	33'-5"	12512	*A3	359	#5	STR	52'-0"	19471
A2	359	#5	STR	33'-5"	12512	A4	359	#5	STR	52'-0"	19471
B1	172	#5	STR	46'-5"	8327	B1	292	#5	STR	46'-5"	14136
*B2	44	#4	STR	38'-5"	1129	*B2	74	#4	STR	38'-5"	1950
*B3	88	#6	STR	12'-0"	1586	*B3	144	#6	STR	12'-0"	2595
B4	78	#4	STR	34'-2"	1780	B4	132	#4	STR	34'-2"	3013
*B5	44	#5	STR	46'-3"	2123	*B5	74	#5	STR	46'-3"	3570
*B6	88	#5	STR	28'-2"	2585	*B6	144	#5	STR	28'-2"	4230
*B7	22	#4	STR	17'-10"	262	B7	37	#4	STR	17'-10"	441
*D1	359	#5	STR	4'-9"	1779	*D1	359	#5	STR	4'-9"	1779
D2	359	#5	STR	4'-9"	1779	D2	359	#5	STR	4'-9"	1779
*E1	4	#7	3	3'-4"	27	*E1	4	#7	3	3'-4"	27
*E2	4	#7	3	3'-10"	31	*E2	4	#7	3	3'-10"	31
*E3	4	#7	3	4'-4"	35	*E3	4	#7	3	4'-4"	35
*E4	4	#7	3	4'-9"	39	*E4	4	#7	3	4'-9"	39
*F1	4	#6	STR	3'-0"	18	*F1	4	#6	STR	3'-0"	18
*F2	8	#6	STR	3'-6"	42	*F2	8	#6	STR	3'-6"	42
*F3	4	#6	STR	3'-9"	23	*F3	4	#6	STR	3'-9"	23
K1	8	#4	STR	32'-4"	173	K5	16	#4	STR	1'-9"	19
K2	6	#4	STR	7'-9"	31	K6	16	#4	STR	26'-3"	281
K3	12	#4	STR	8'-9"	70	K7	8	#4	STR	7'-6"	40
K4	6	#4	STR	8'-3"	33	K8	16	#4	STR	8'-5"	90
K5	16	#4	STR	1'-9"	19	K9	8	#4	STR	8'-0"	43
						K10	2	#4	STR	2'-10"	4
*S1	48	#4	1	12'-1"	387	*S1	80	#4	1	12'-1"	646
*S2	48	#4	1	10'-0"	321	*S2	72	#4	1	10'-0"	481
						*S3	8	#4	1	9'-0"	48
						U1	78	#4	2	9'-2"	478
						U2	4	#4	2	9'-9"	26
						U3	8	#4	2	7'-3"	39
REINFORCING STEEL					LBS. 25044	REINFORCING STEEL					LBS. 39873
EPOXY COATED REINFORCING STEEL					LBS. 22899	EPOXY COATED REINFORCING STEEL					LBS. 34985

\* INDICATES EPOXY COATED REINFORCING STEEL

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

### SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	*EPOXY COATED REINFORCING STEEL (LBS.)
STAGE I	224.0	25044	22899
** STAGE II	368.5	39873	34985
SIDEWALK	62.0		3160
END POSTS	1.6		-
MONO. CONC. ISLAND	14.5		770
TOTALS	670.6	64917	61814

\*\* CONCRETE AND REINFORCING STEEL IN THE CLOSURE POUR ARE INCLUDED IN THE STAGE II CONSTRUCTION QUANTITIES.

### POUR SEQUENCE BREAKDOWN

SPANS A, B & C	CLASS AA CONCRETE (CU. YDS.)	
	STAGE I	STAGE II
POUR #1	47.1	72.8
POUR #2	64.7	99.9
POUR #3	68.7	106.0
POUR #4	43.5	67.3
CLOSURE POUR		23.0
SIDEWALK	31.4	31.4
END POSTS	0.8	0.8
MONO. CONC. ISLAND		14.5
TOTALS	256.2	415.7

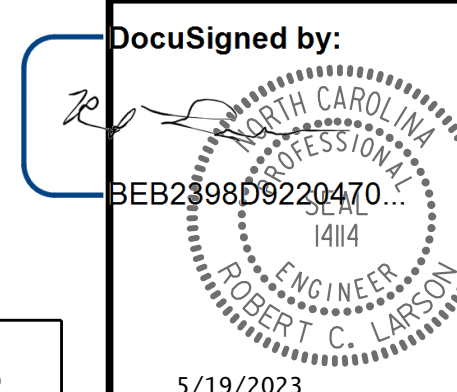
### GROOVING BRIDGE FLOORS

APPROACH SLABS (STAGE I)	1230	SO. FT.
APPROACH SLABS (STAGE II)	1688	SO. FT.
TOTAL	2918	SO. FT.
BRIDGE DECK (STAGE I)	4555	SO. FT.
BRIDGE DECK (STAGE II)	6329	SO. FT.
TOTAL	10,884	SO. FT.

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

### SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

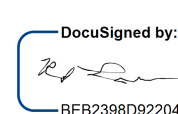
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			



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

SHEET NO. **S2-28**  
TOTAL SHEETS 49

DRAWN BY: W. B. ALLEN DATE: 5/19  
CHECKED BY: Z. H. BROWN DATE: 7/19  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23



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5/19/2023

**NOTES**

#4V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN THE CAP.

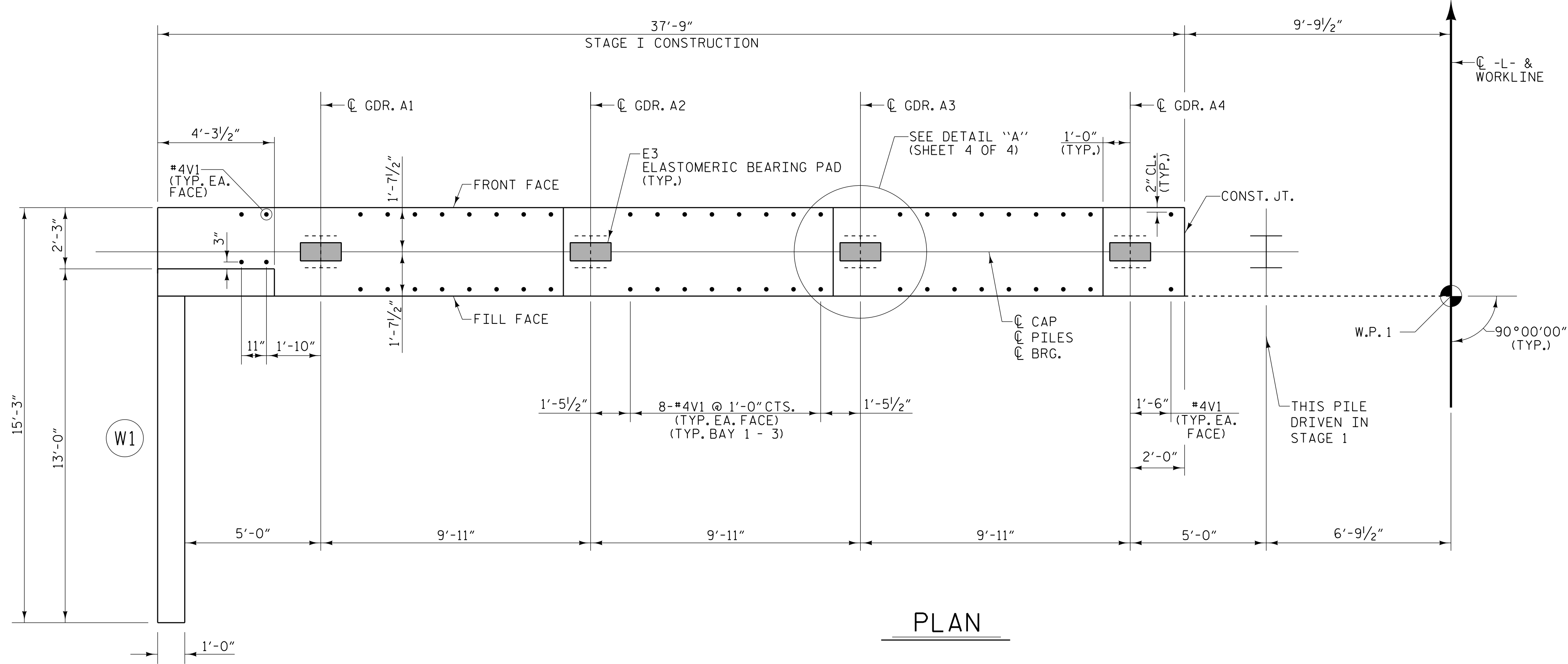
THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1), EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR SECTION A-A AND SECTION B-B, SEE SHEET 4 OF 4.

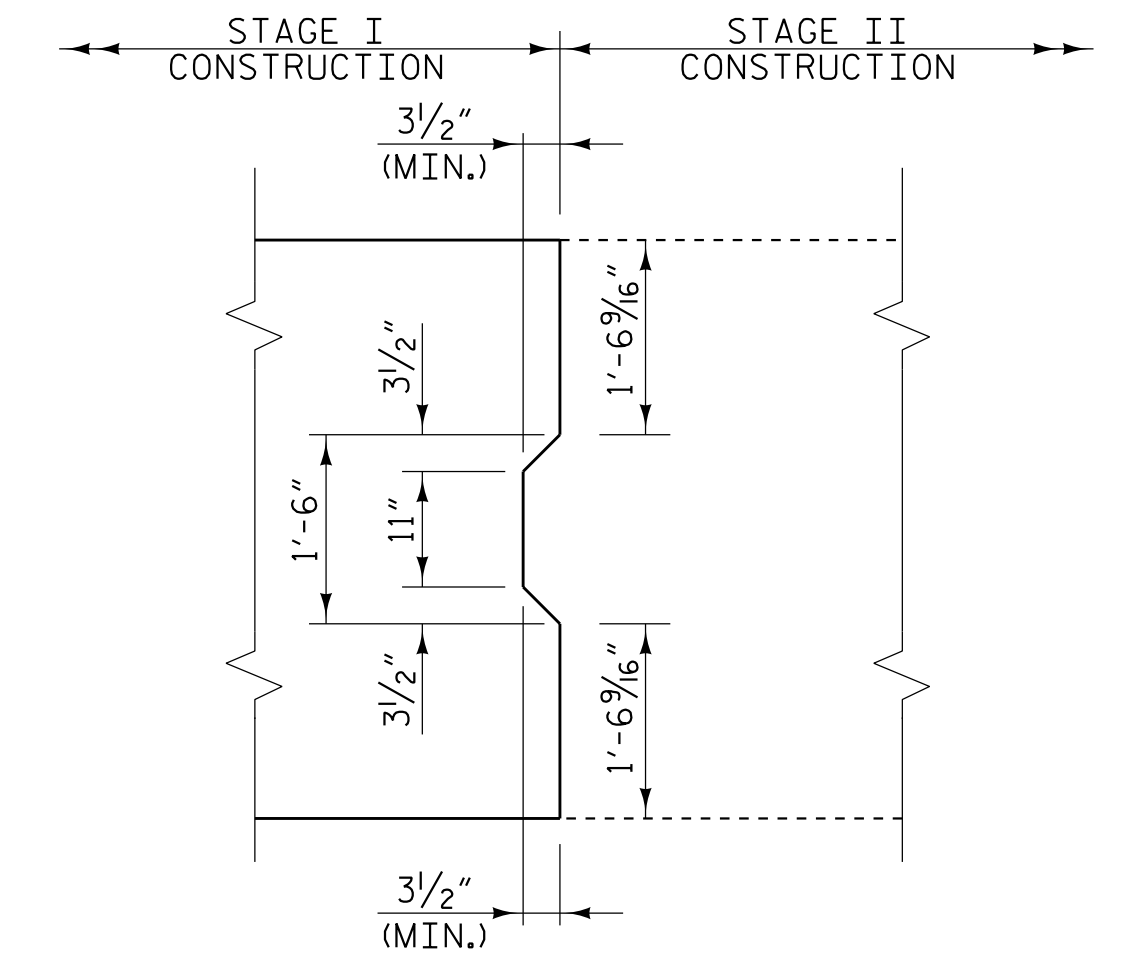
SEE "GENERAL DRAWING FOUNDATION LAYOUT" FOR ADDITIONAL NOTES FOR DRIVING PILES.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL SEE "SUBSTRUCTURE END BENT 1" SHEET 4 OF 4.

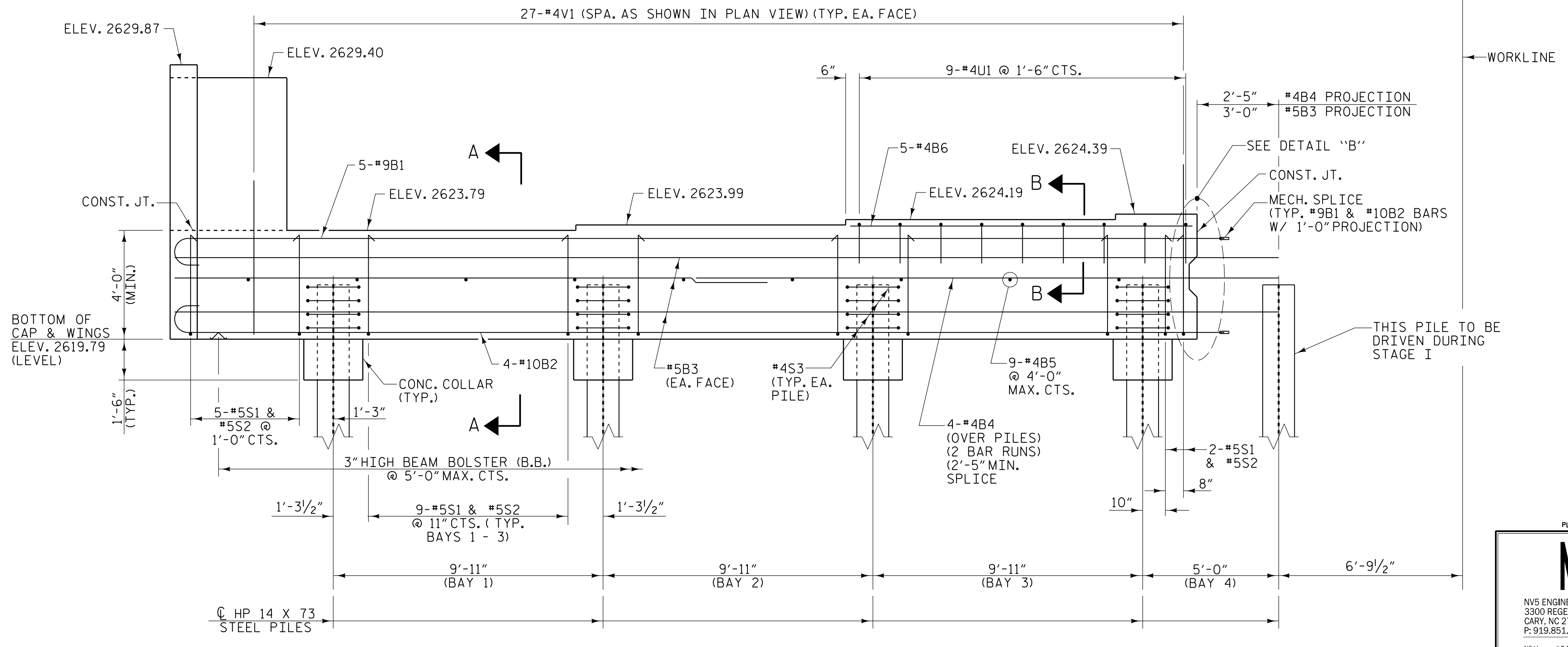
FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 2" SHEET 4 OF 4.



**PLAN**



**DETAIL "B"**



**ELEVATION**

PLANS PREPARED BY:

**NV5**

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 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

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REVISIONS

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

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PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

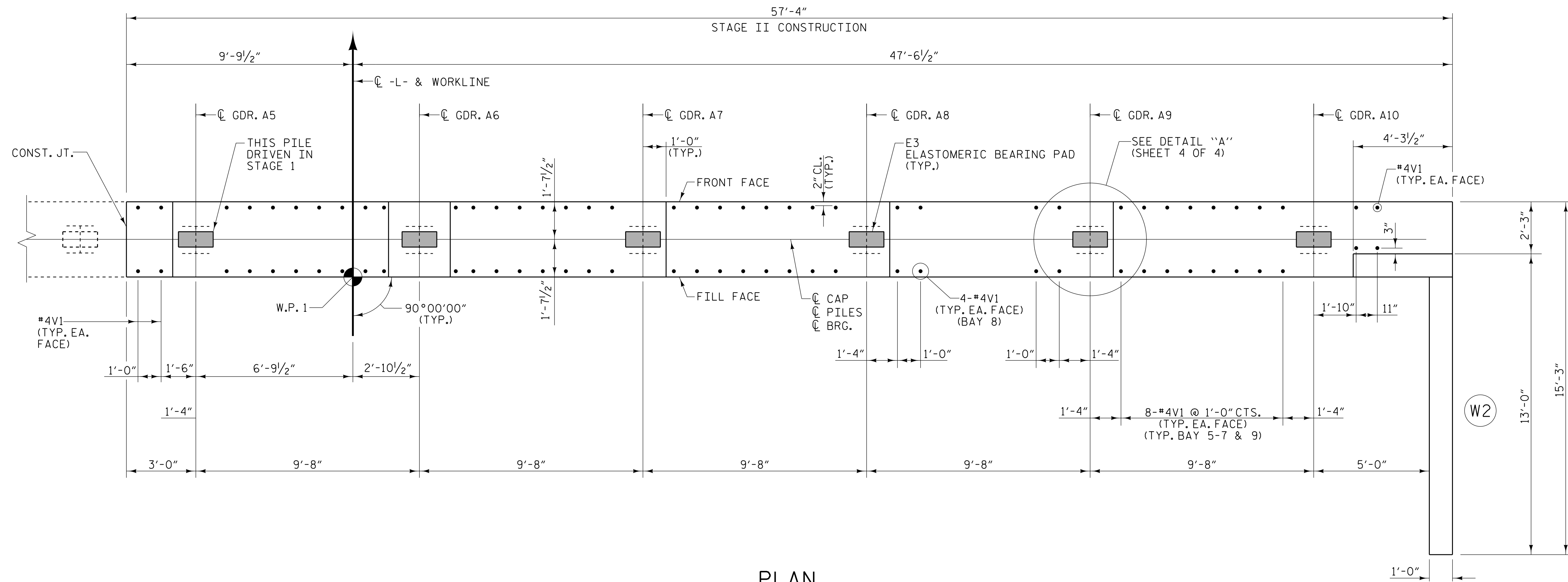
**SUBSTRUCTURE  
 INTEGRAL END BENT 1  
 STAGE I**

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S2-29
2			4			TOTAL SHEETS 49

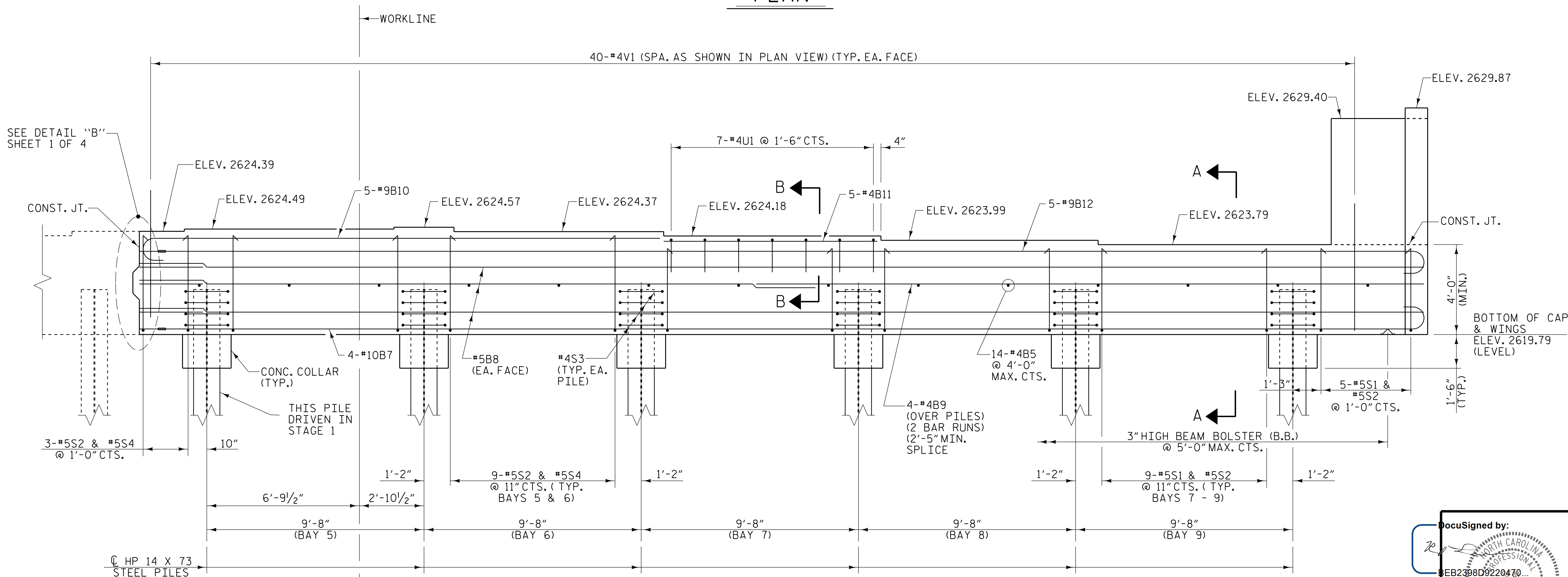
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DRAWN BY: W. B. ALLEN DATE: 10/19  
 CHECKED BY: Z. H. BROWN DATE: 11/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

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PLAN



ELEVATION



PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

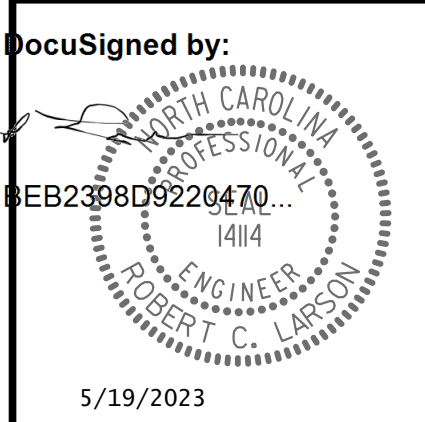
SHEET 2 OF 4  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL END BENT 1  
 STAGE II

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

TOTAL SHEETS 49

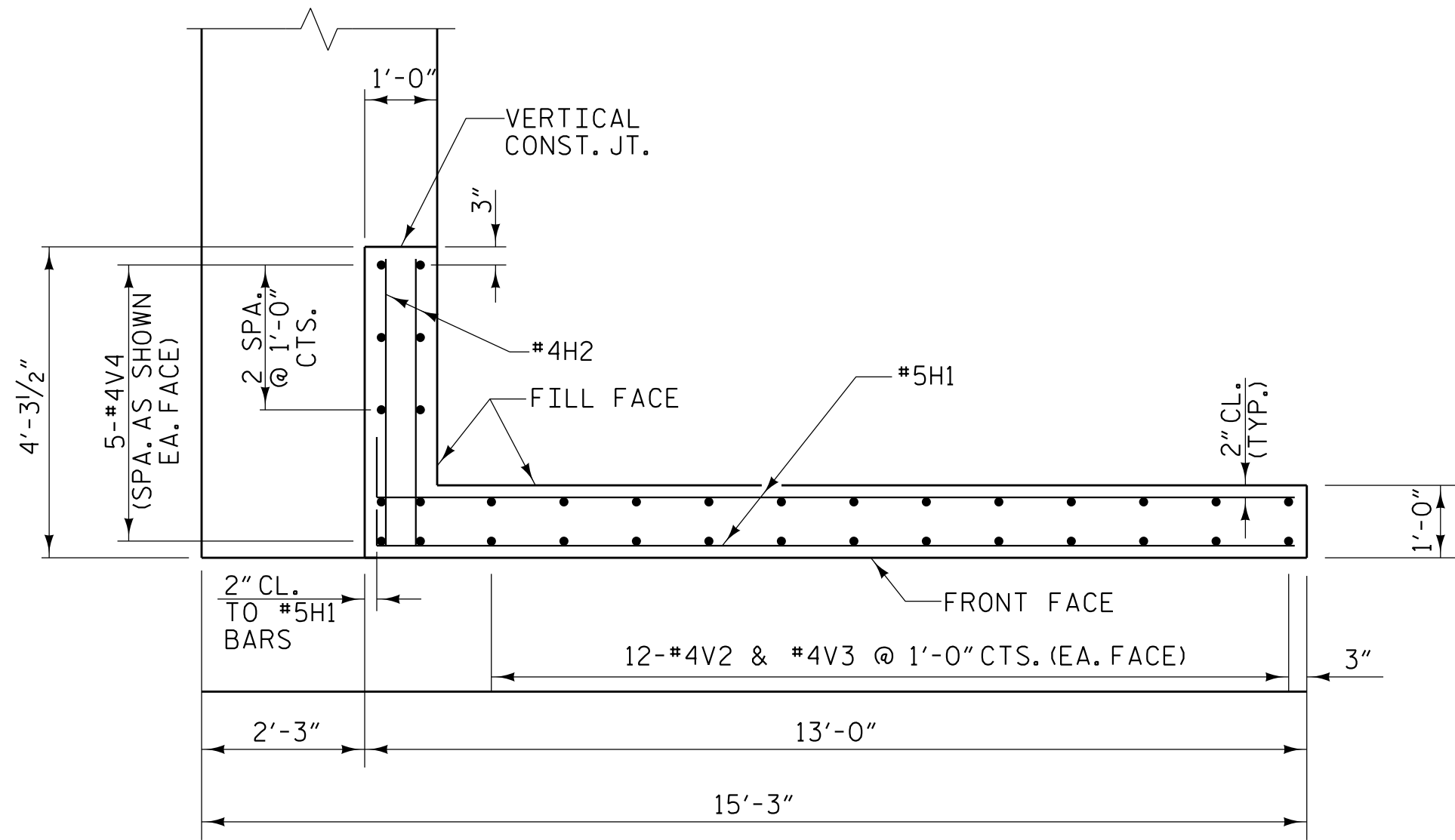
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 CHECKED BY : Z. H. BROWN DATE : 11/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 2/23

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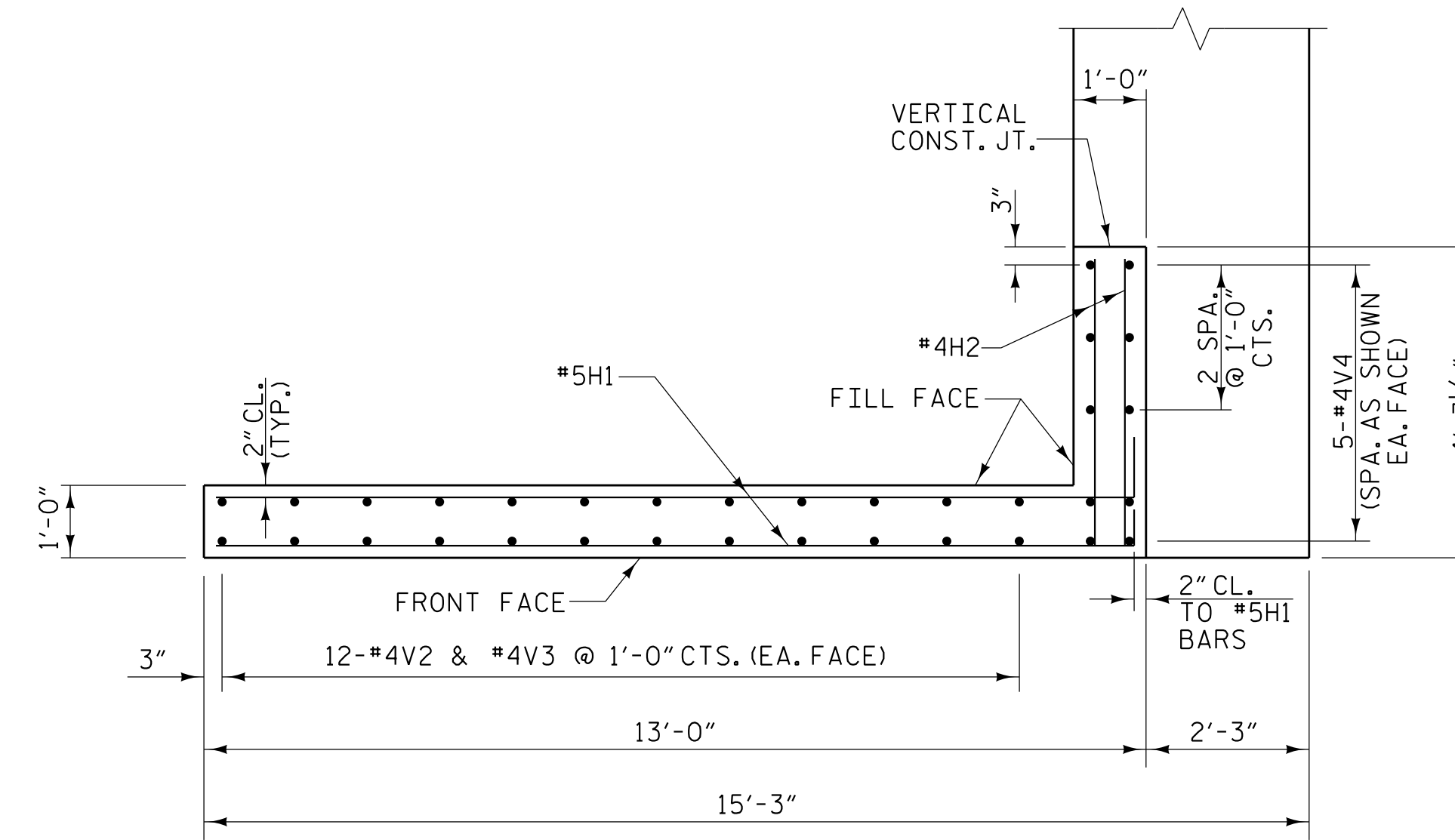


5/19/2023

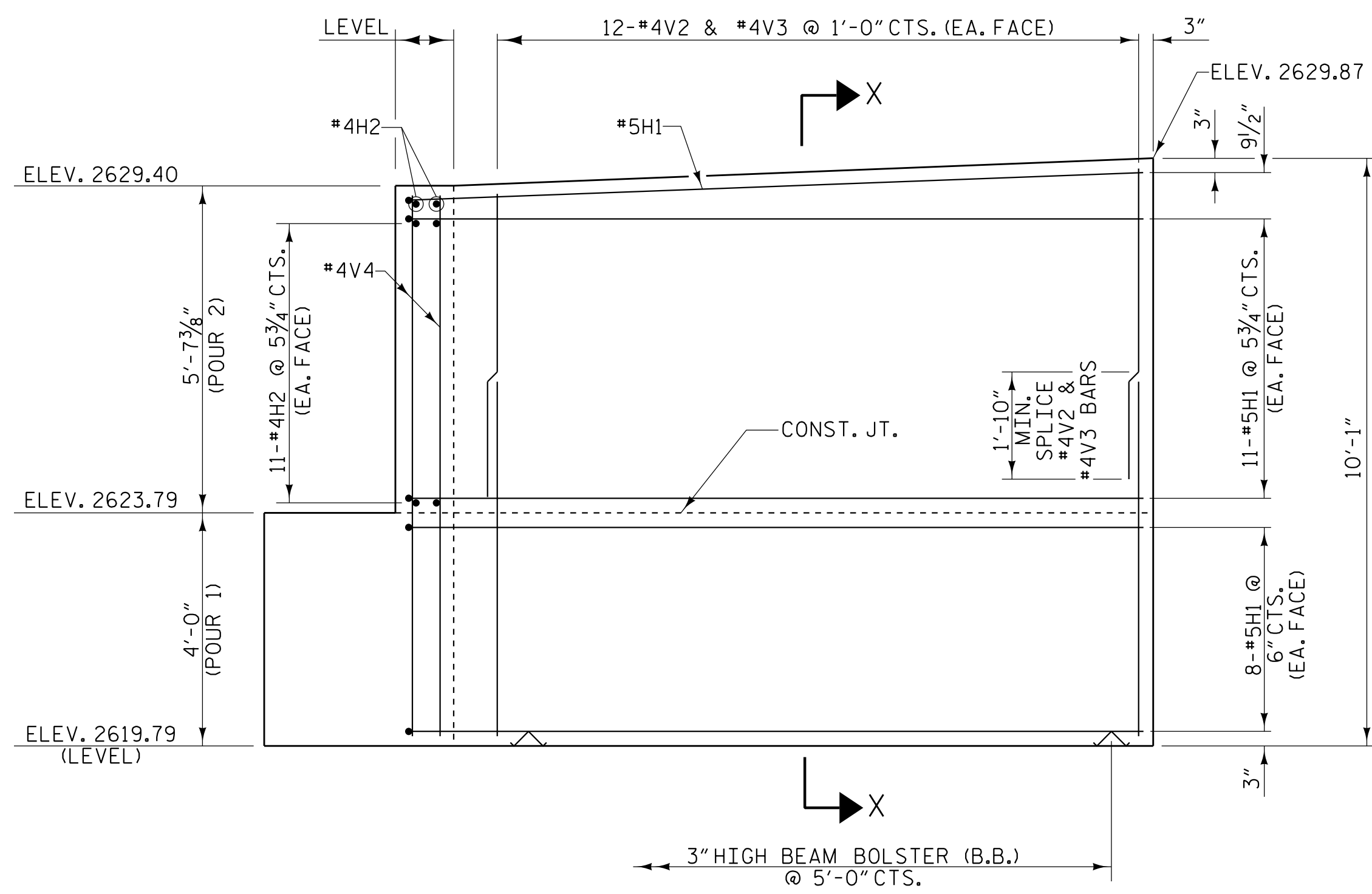
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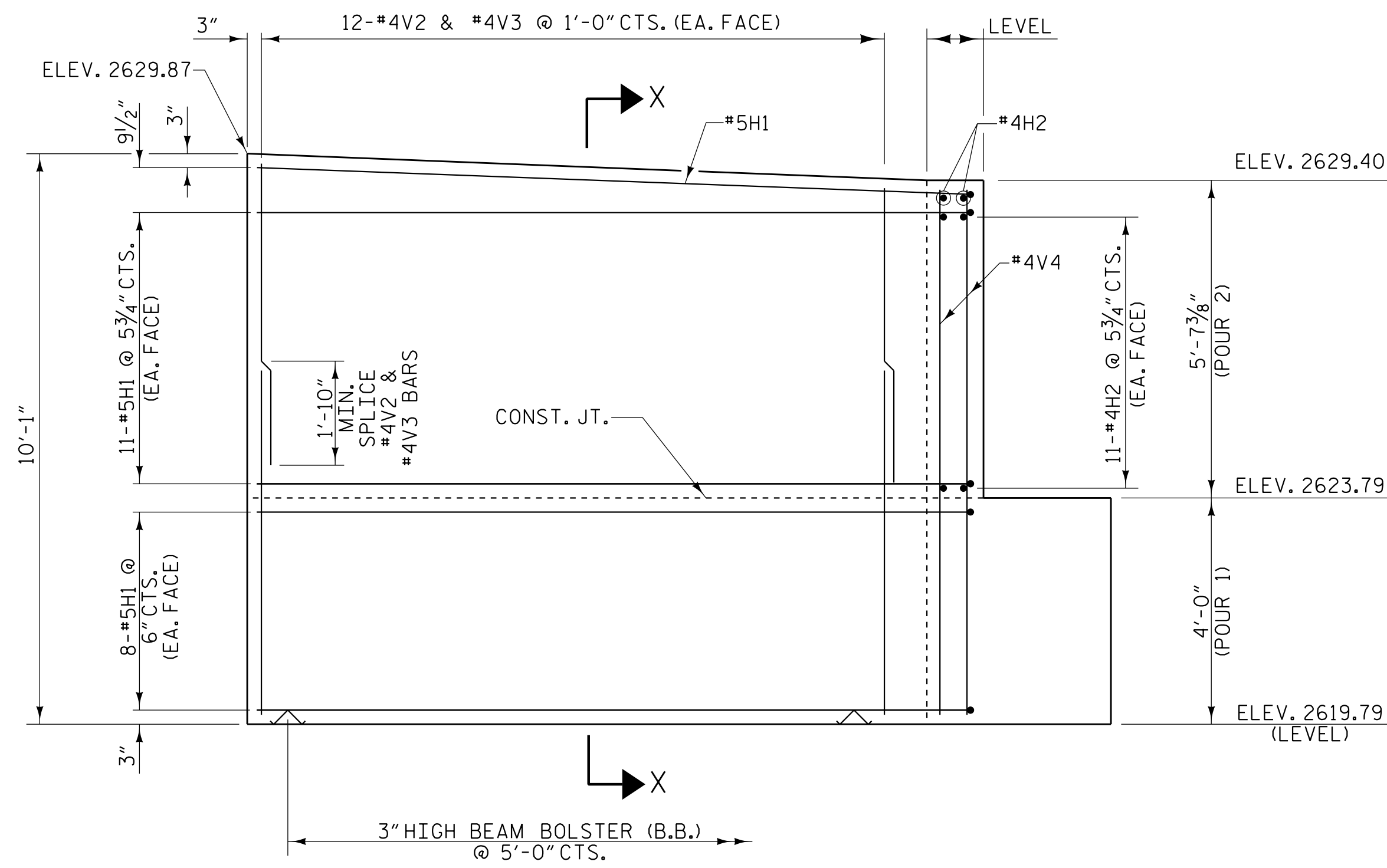
**PLAN OF LEFT WING - W1**  
(STAGE I CONSTRUCTION)



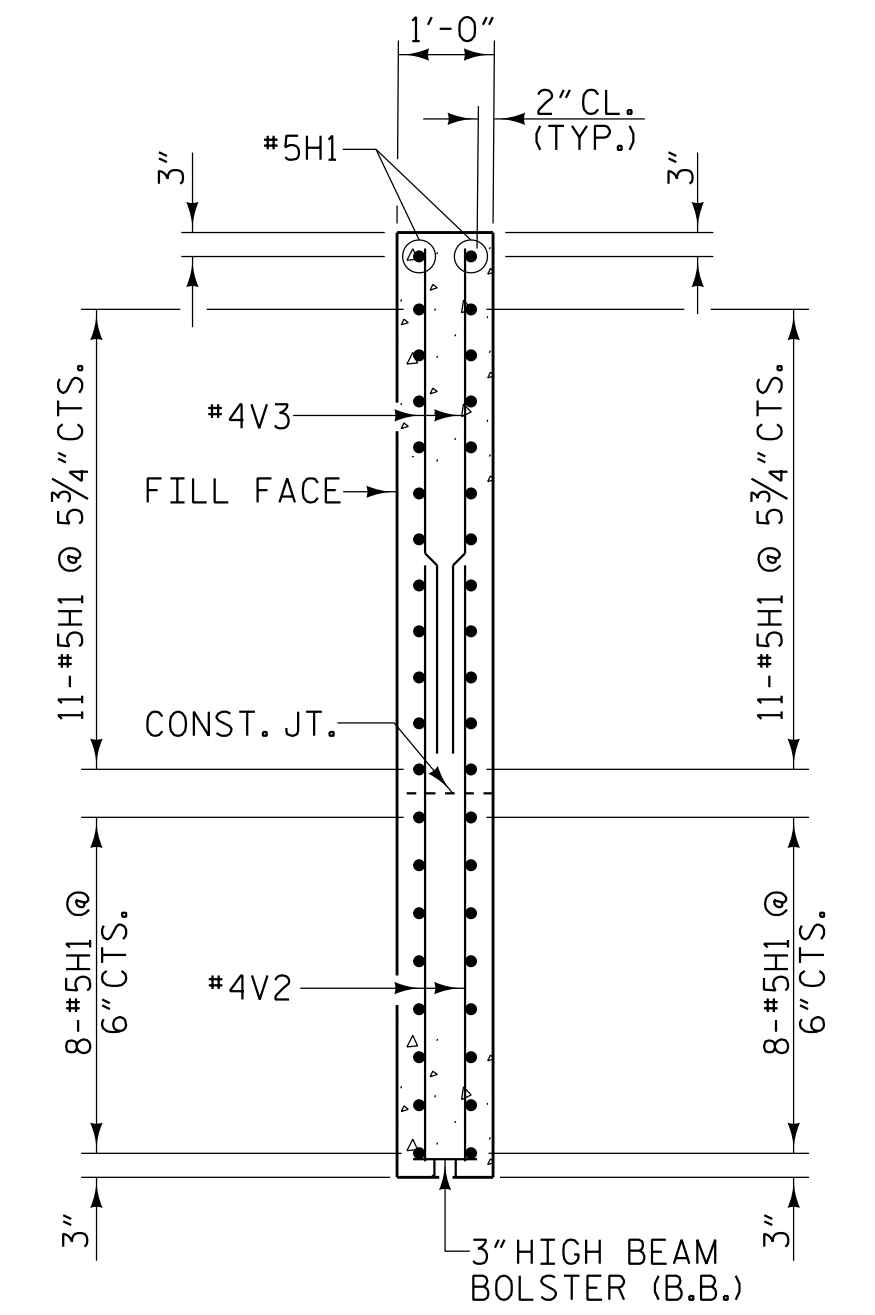
**PLAN OF RIGHT WING - W2**  
(STAGE II CONSTRUCTION)



**ELEVATION OF LEFT WING - W1**  
(STAGE I CONSTRUCTION)



**ELEVATION OF RIGHT WING - W2**  
(STAGE II CONSTRUCTION)



**SECTION X-X**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 3 OF 4

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-31
1			3			TOTAL SHEETS
2			4			49

PLANS PREPARED BY:

**NV5**

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DocuSigned by:

*Robert C. Larson*

PROFESSIONAL ENGINEER  
 NORTH CAROLINA  
 BEB2398D9220470...  
 1414

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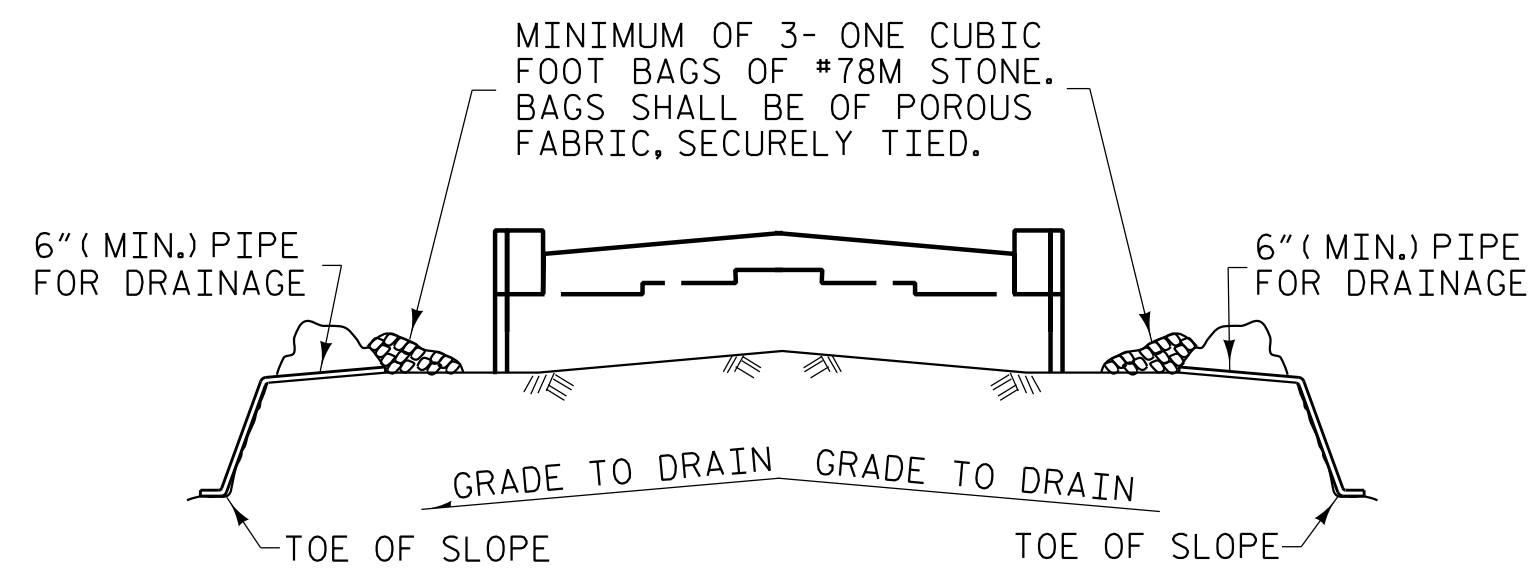
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 CHECKED BY: Z. H. BROWN DATE: 11/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

DocuSigned by:

*Robert C. Larson*

PROFESSIONAL ENGINEER  
 NORTH CAROLINA  
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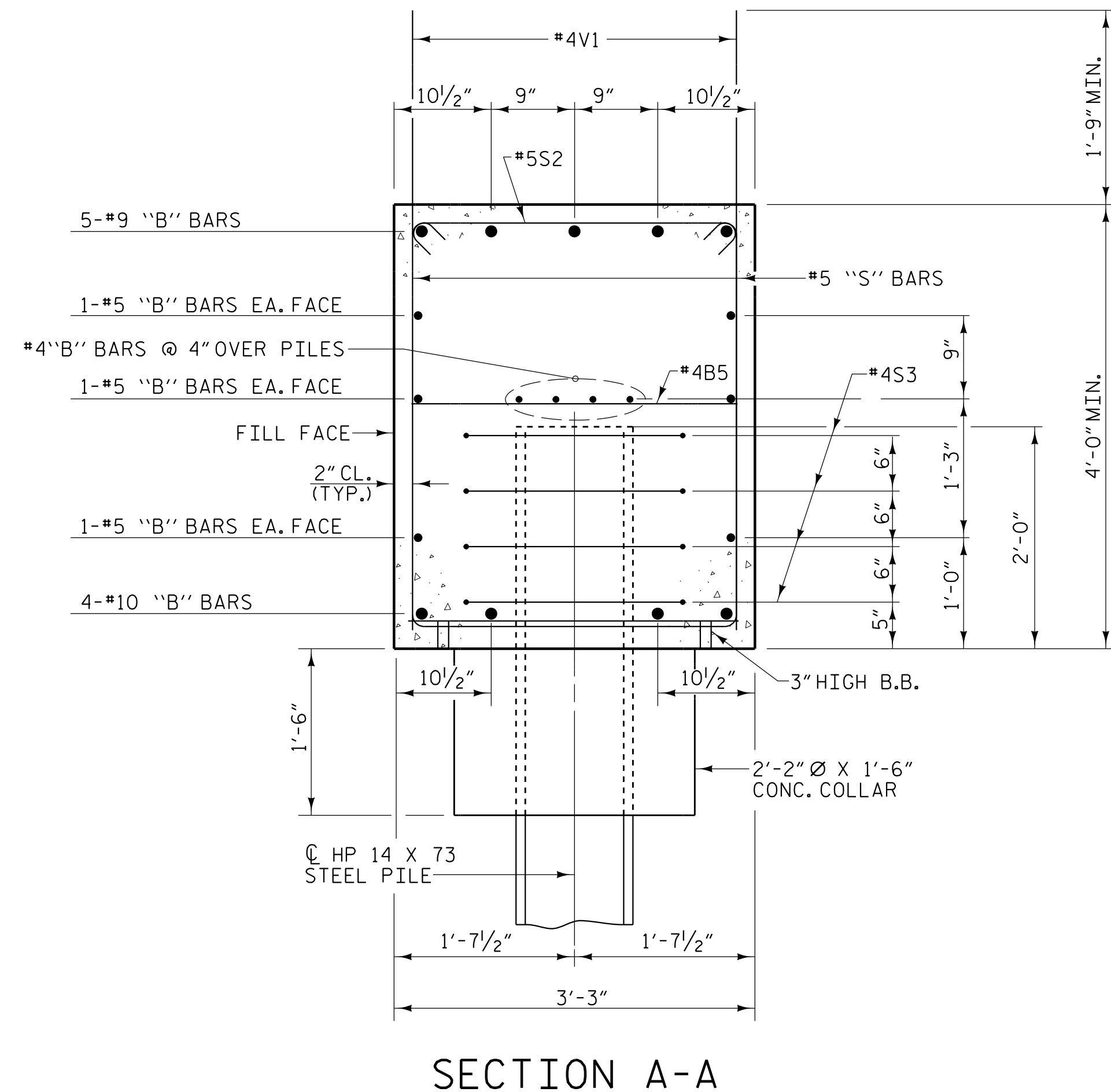


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

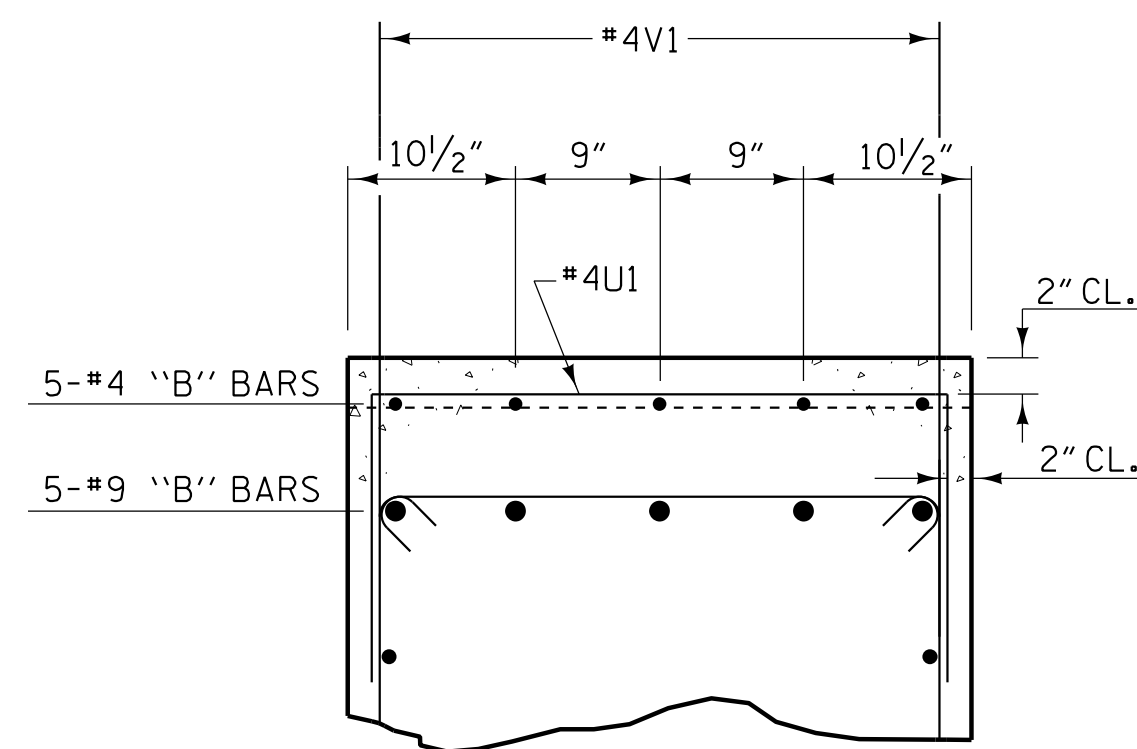
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

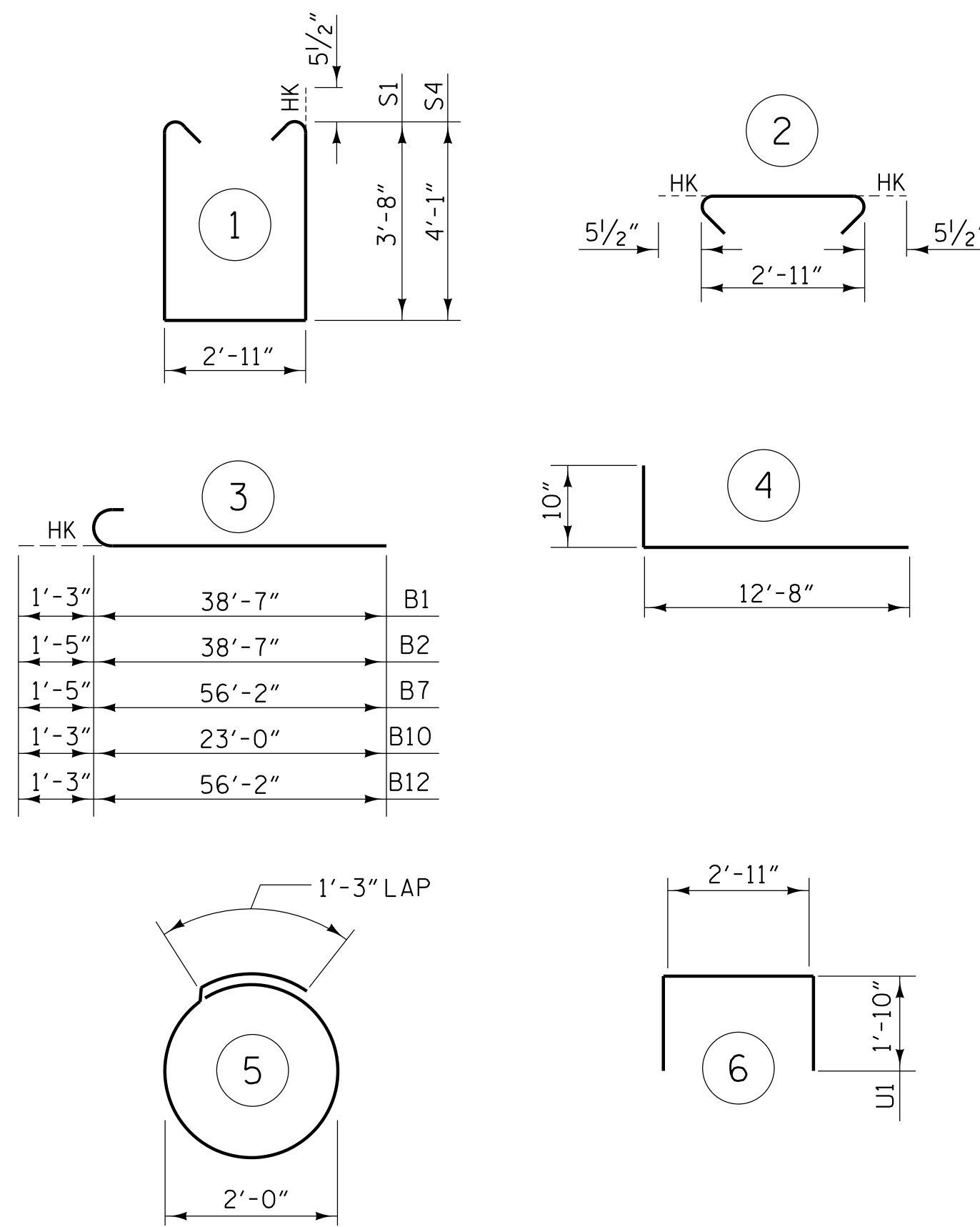


SECTION A-A



PART SECTION B-B

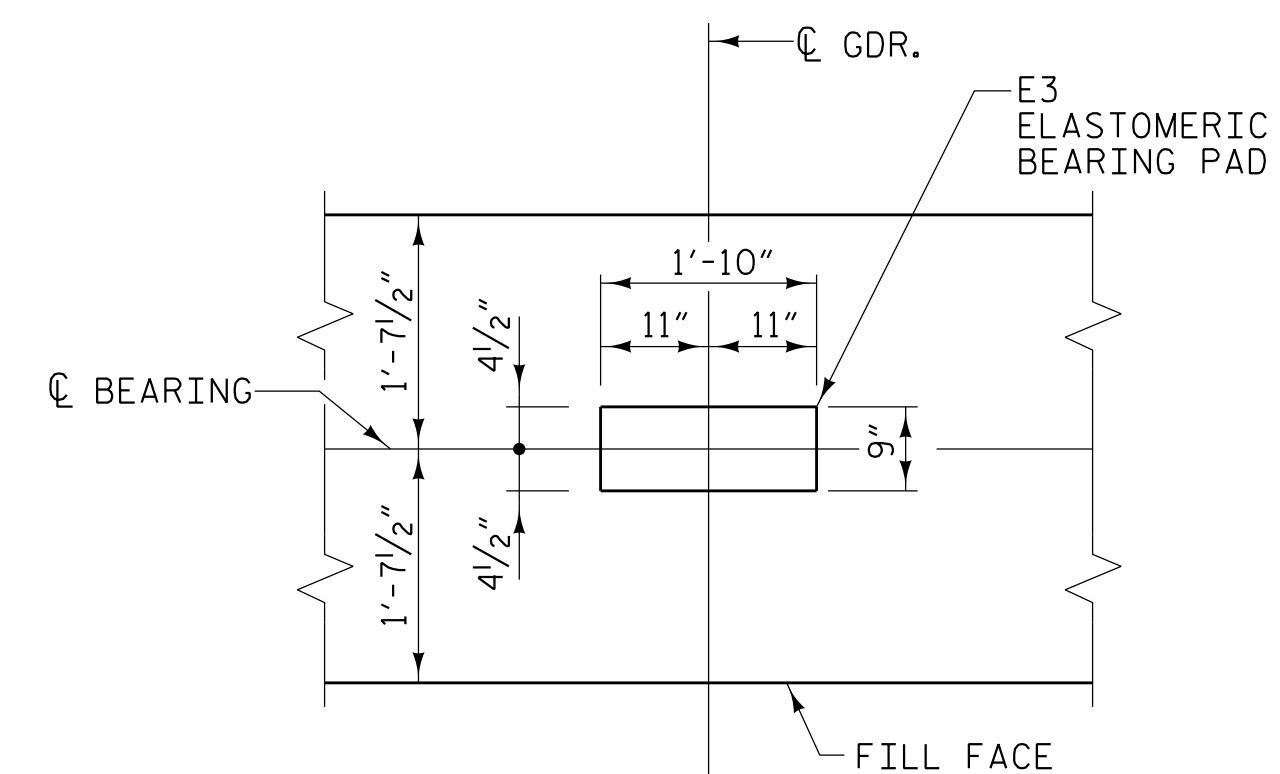
### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

### BILL OF MATERIAL

END BENT 1-STAGE I						END BENT 1-STAGE II							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	5	#9	3	39'-10"	677	B5	14	#4	STR	2'-11"	27		
B2	4	#10	3	40'-0"	688	B7	4	#10	3	57'-7"	991		
B3	6	#5	STR	40'-7"	254	B8	6	#5	STR	57'-0"	357		
B4	8	#4	STR	21'-3"	114	B9	8	#4	STR	29'-11"	160		
B5	9	#4	STR	2'-11"	18	B10	5	#9	3	24'-3"	412		
B6	5	#4	STR	12'-7"	42	B11	5	#4	STR	9'-6"	32		
						B12	5	#9	3	57'-5"	976		
H1	40	#5	4	13'-6"	563								
H2	24	#4	STR	3'-11"	63	H1	40	#5	4	13'-6"	563		
						H2	24	#4	STR	3'-11"	63		
S1	34	#5	1	11'-2"	396								
S2	34	#5	2	3'-10"	136	S1	32	#5	1	11'-2"	373		
S3	16	#4	5	7'-7"	81	S2	53	#5	2	3'-10"	212		
						S3	24	#4	5	7'-7"	122		
U1	9	#4	6	6'-7"	40	S4	21	#5	1	12'-0"	263		
V1	54	#4	STR	6'-4"	228	U1	7	#4	6	6'-7"	31		
V2	24	#4	STR	6'-3"	100								
V3	24	#4	STR	5'-3"	84	V1	80	#4	STR	6'-4"	338		
V4	10	#4	STR	9'-3"	62	V2	24	#4	STR	6'-3"	100		
						V3	24	#4	STR	5'-3"	84		
						V4	10	#4	STR	9'-3"	62		
TOTAL REINFORCING STEEL						3546 lbs.	TOTAL REINFORCING STEEL						5166 lbs.
CLASS "A" CONCRETE - CU. YARDS							CLASS "A" CONCRETE - CU. YARDS						
POUR 1							POUR 1						
(CAP, COLLARS, LOWER WINGS)						21.9 cu. yds.	(CAP, COLLARS, LOWER WINGS)						33.3 cu. yds.
POUR 2							POUR 2						
(UPPER WINGS)						3.3 cu. yds.	(UPPER WINGS)						3.3 cu. yds.
TOTAL						25.2 cu. yds.	TOTAL						36.6 cu. yds.
HP 14 X 73 STEEL PILES							HP 14 X 73 STEEL PILES						
5 PILES REQUIRED - LIN. FEET						200	5 PILES REQUIRED - LIN. FEET						200
PILE DRIVING EQUIPMENT SETUP FOR							PILE DRIVING EQUIPMENT SETUP FOR						
HP 14 X 73 STEEL PILES - EACH						5	HP 14 X 73 STEEL PILES - EACH						5



DETAIL "A"

PLANS PREPARED BY:

**NV5**

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
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NC License # F-1333

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DocuSigned by:

ROBERT C. LARSON  
PROFESSIONAL ENGINEER  
14114  
BEB2398D9220470L

5/19/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 4 OF 4

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

REVISIONS

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

SHEET NO.  
S2-32  
TOTAL SHEETS  
49

5/17/2023 7:03:28 PM R:\Structures\Bridge over Richard Creek\32 U5839\_SMU E4\_43086.dgn

DRAWN BY: W. B. ALLEN DATE: 10/19  
CHECKED BY: Z. H. BROWN DATE: 11/19  
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

DocuSigned by:  
R. C. LARSON  
BEB2398D9220470L



**NOTES**

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

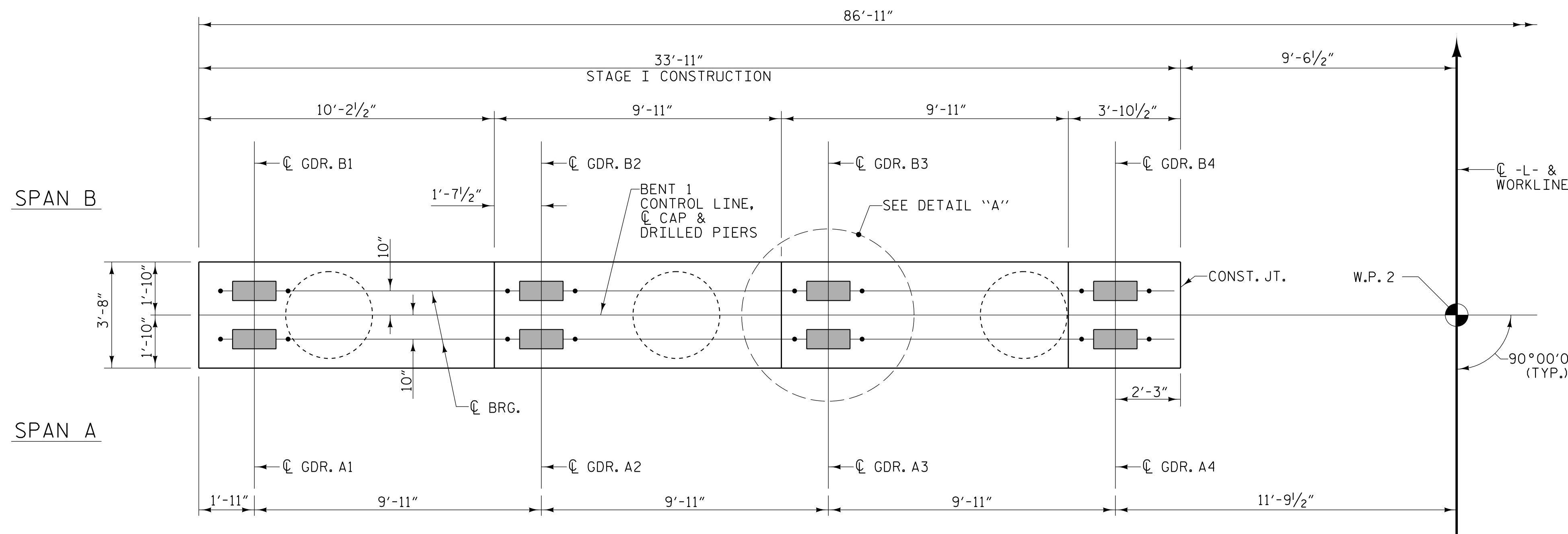
HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

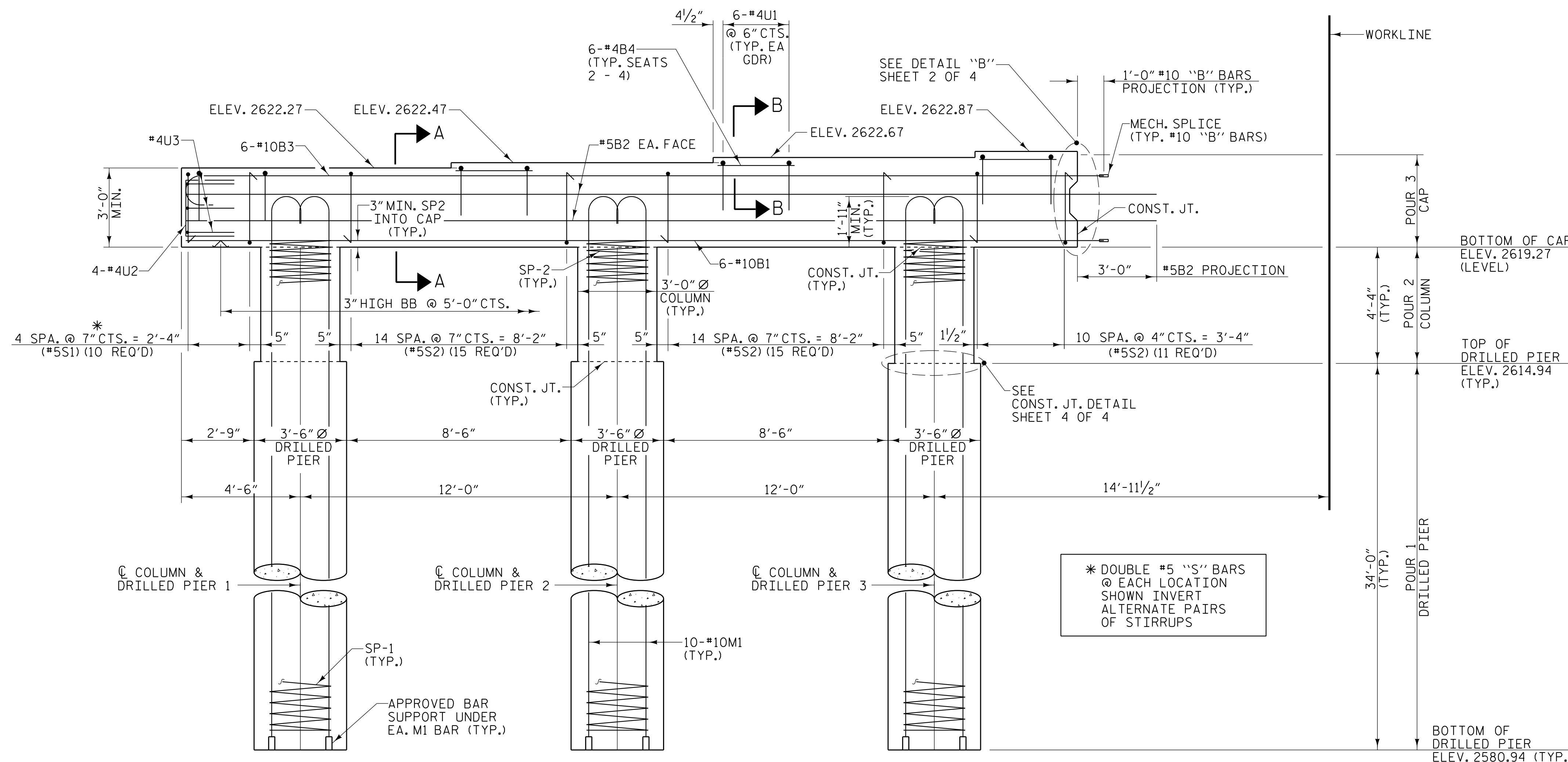
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIER WILL NOT BE PERMITTED.

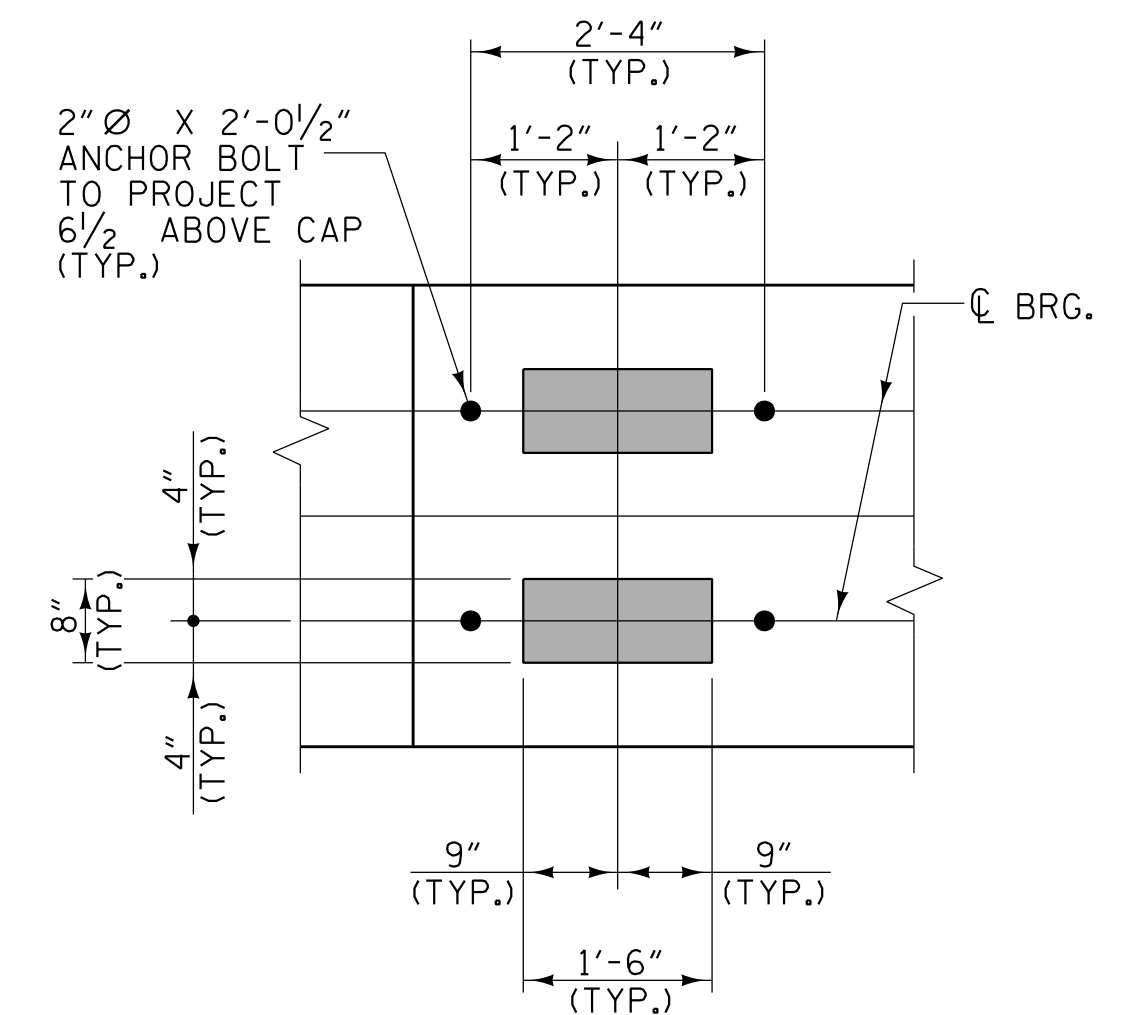
THE LOCATION OF CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE GROUND, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1' BELOW THE GROUND LINE.



**PLAN**



**ELEVATION**



**DETAIL "A"**  
(TYP. EACH GIRDER)

PLANS PREPARED BY:

**NV5**

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NC License # F1333

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**  
**BENT 1**  
**STAGE I**

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

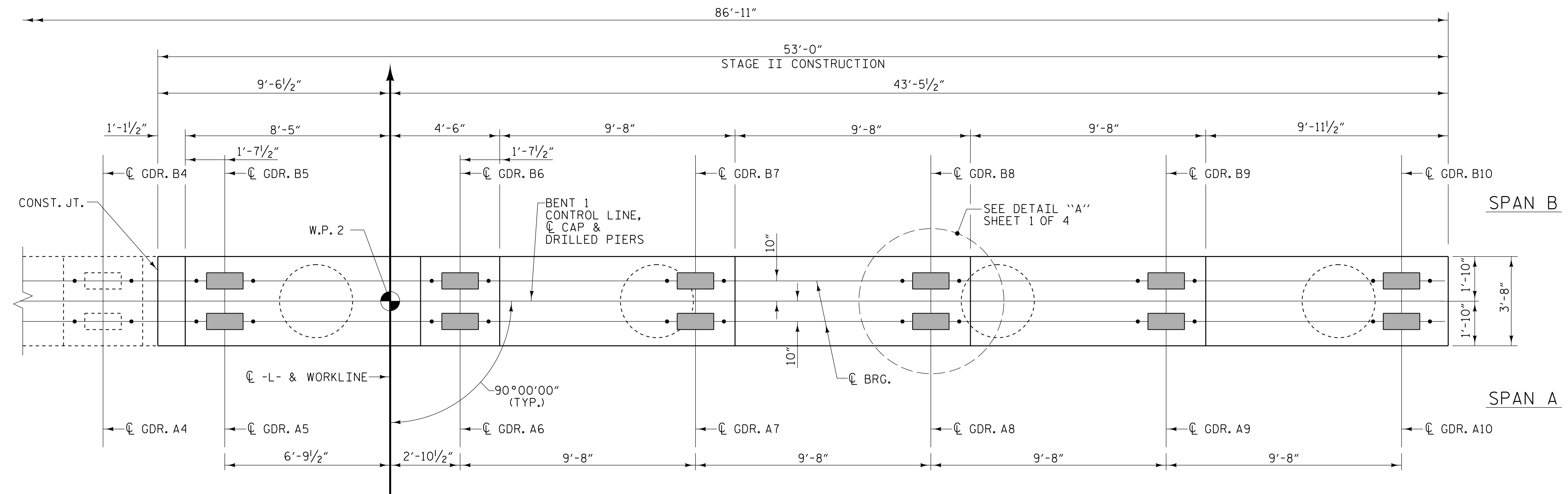
TOTAL SHEETS: 49

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 BEB2398D9220470  
 5/19/2023

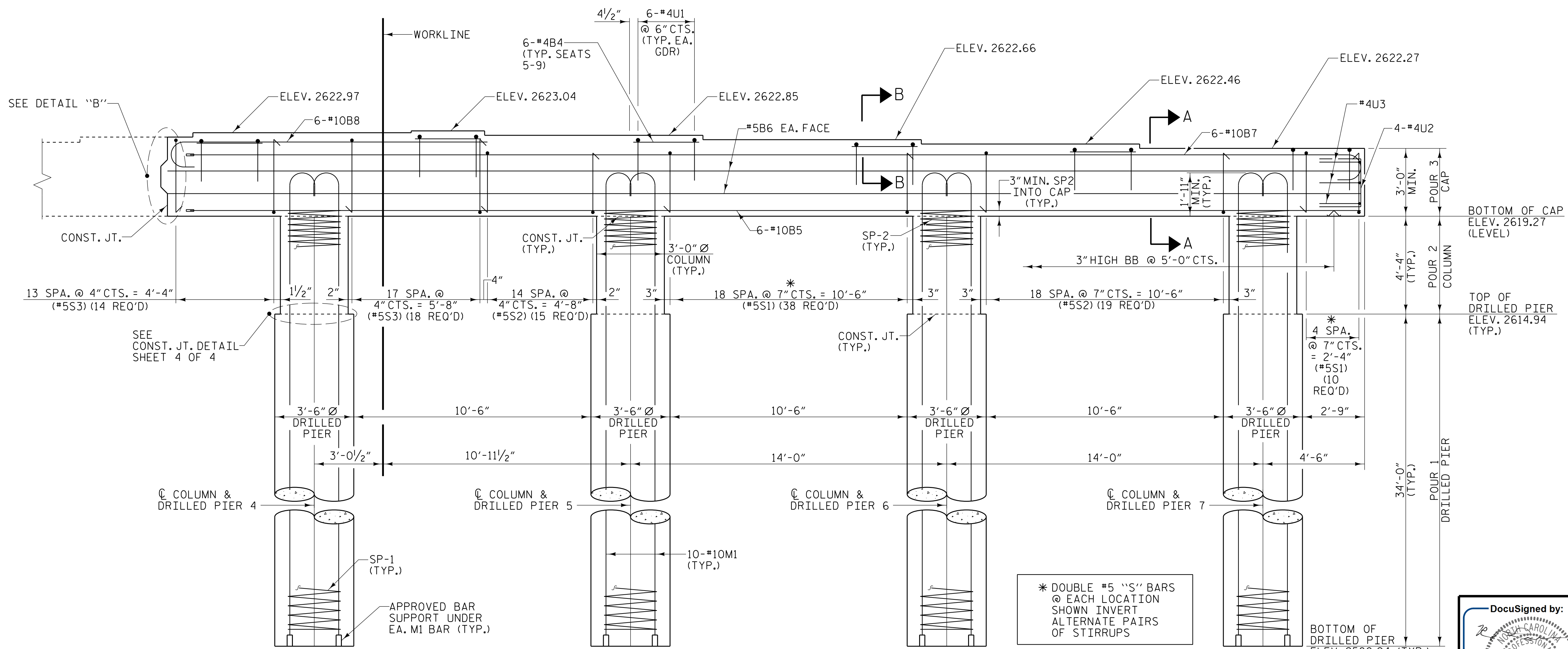
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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

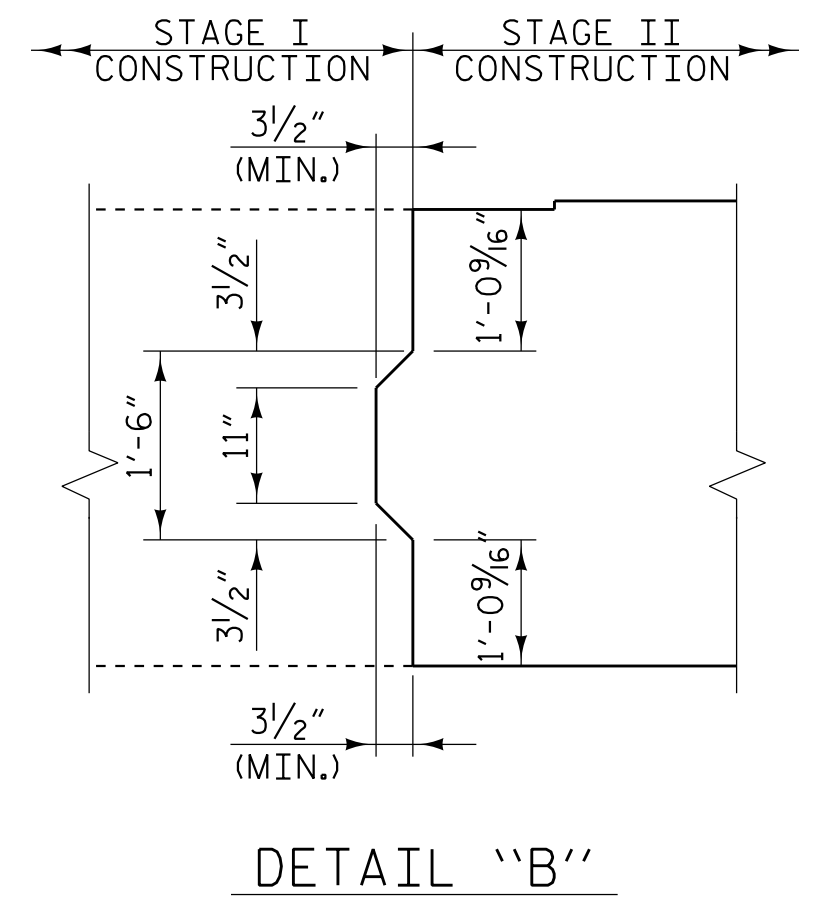
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PLAN



ELEVATION



DETAIL "B"

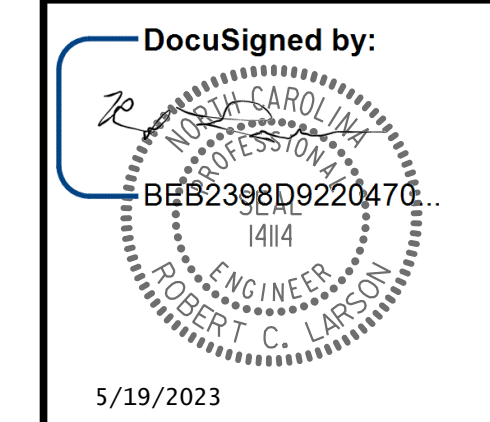


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**NIV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 ORY, NC 27638 P: 919.851.1912 www.NIV5.com  
 NC License # F-1333

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 2 OF 4

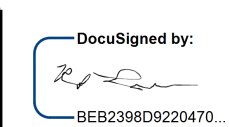
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S2-34 TOTAL SHEETS 49
SUBSTRUCTURE BENT 1 STAGE II						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

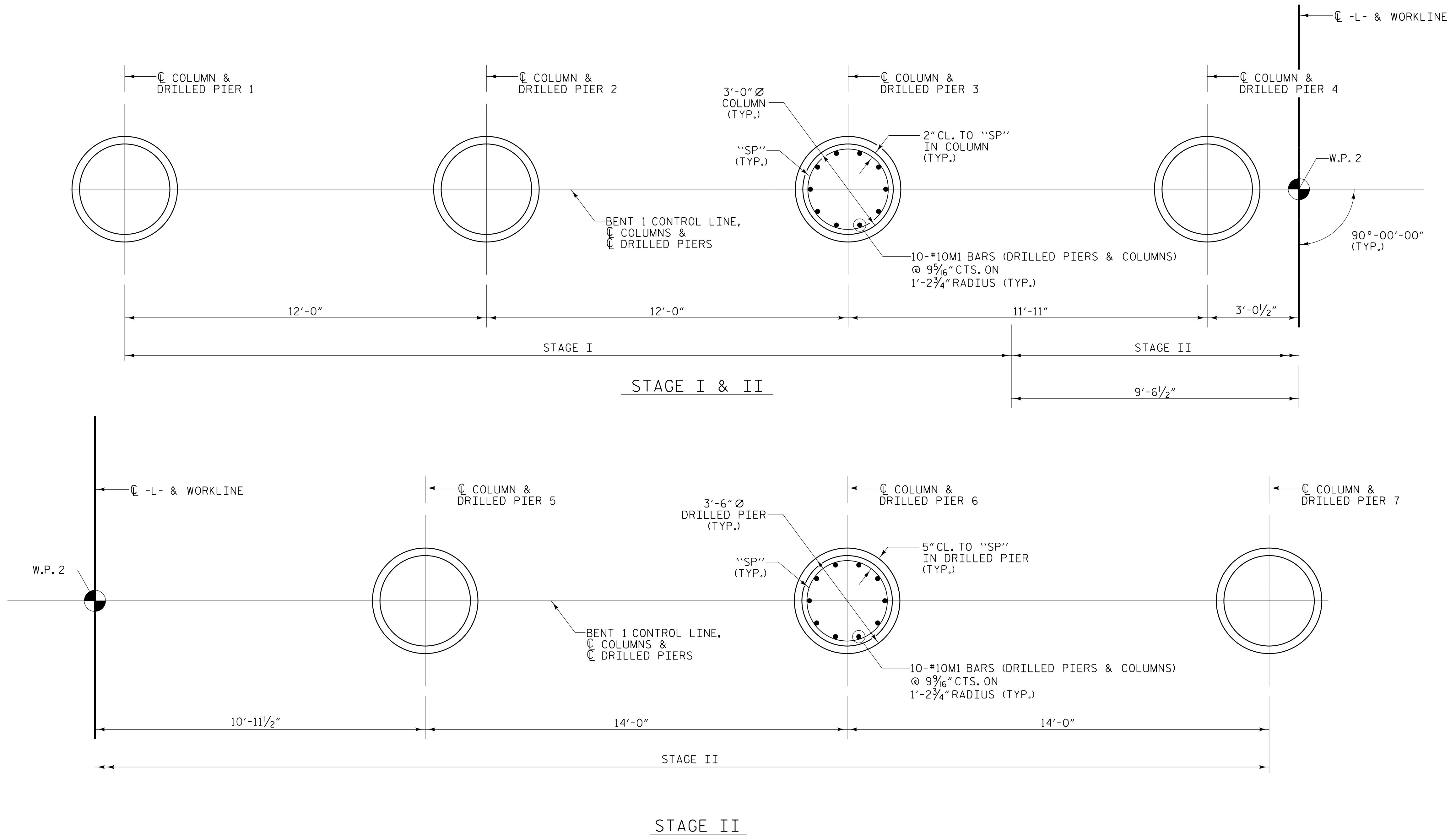


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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23





**PLAN OF COLUMNS & DRILLED PIERS**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT 1

PLANS PREPARED BY:  
**NV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
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DocuSigned by:  
 [Signature]  
 NORTH CAROLINA PROFESSIONAL SEAL  
 ENGINEER  
 ROBERT C. LARSON  
 14114  
 BEB2398D9220470  
 5/19/2023

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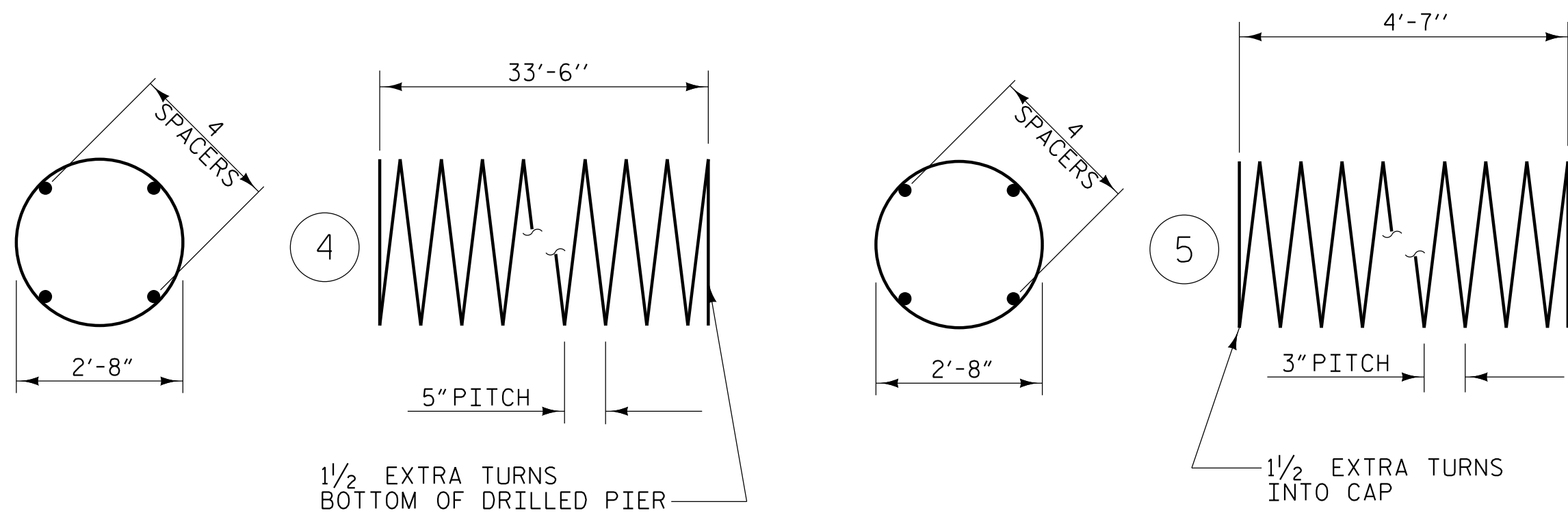
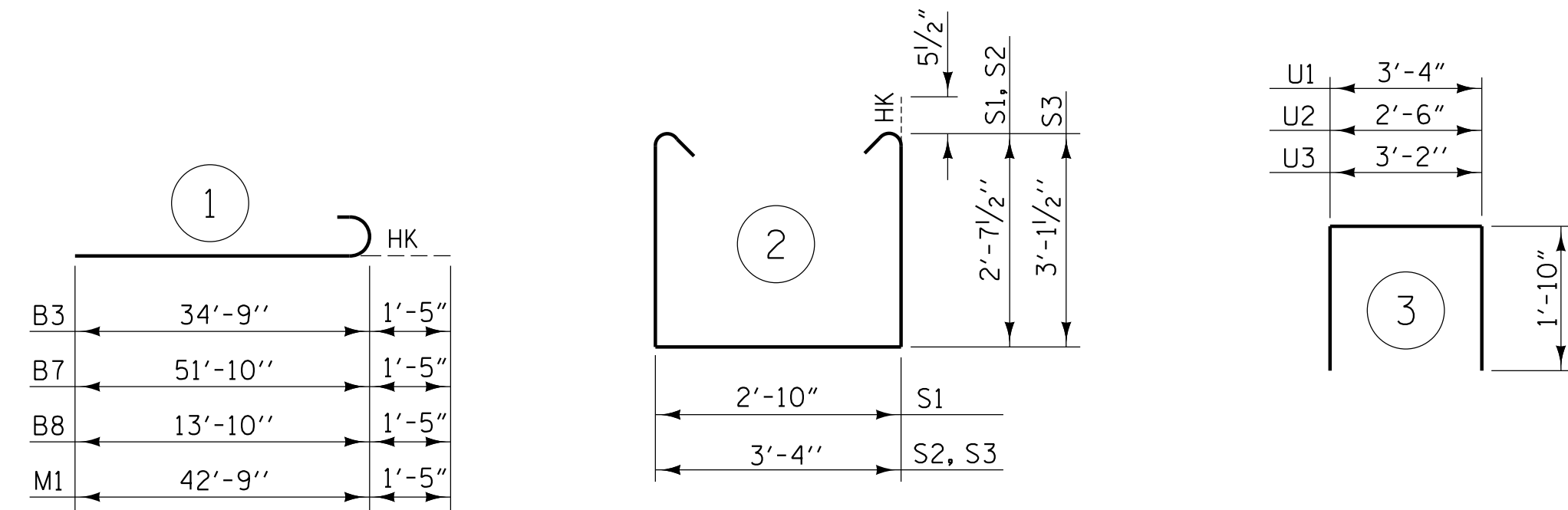
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-35
1			3			TOTAL SHEETS
2			4			49

DRAWN BY: W. B. ALLEN DATE: 10/19  
 CHECKED BY: Z. H. BROWN DATE: 11/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

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 [Signature]  
 BEB2398D9220470

5/17/2023 7:03:30 PM RA:\Structures\Bent1\Bent1.dwg

BAR TYPES



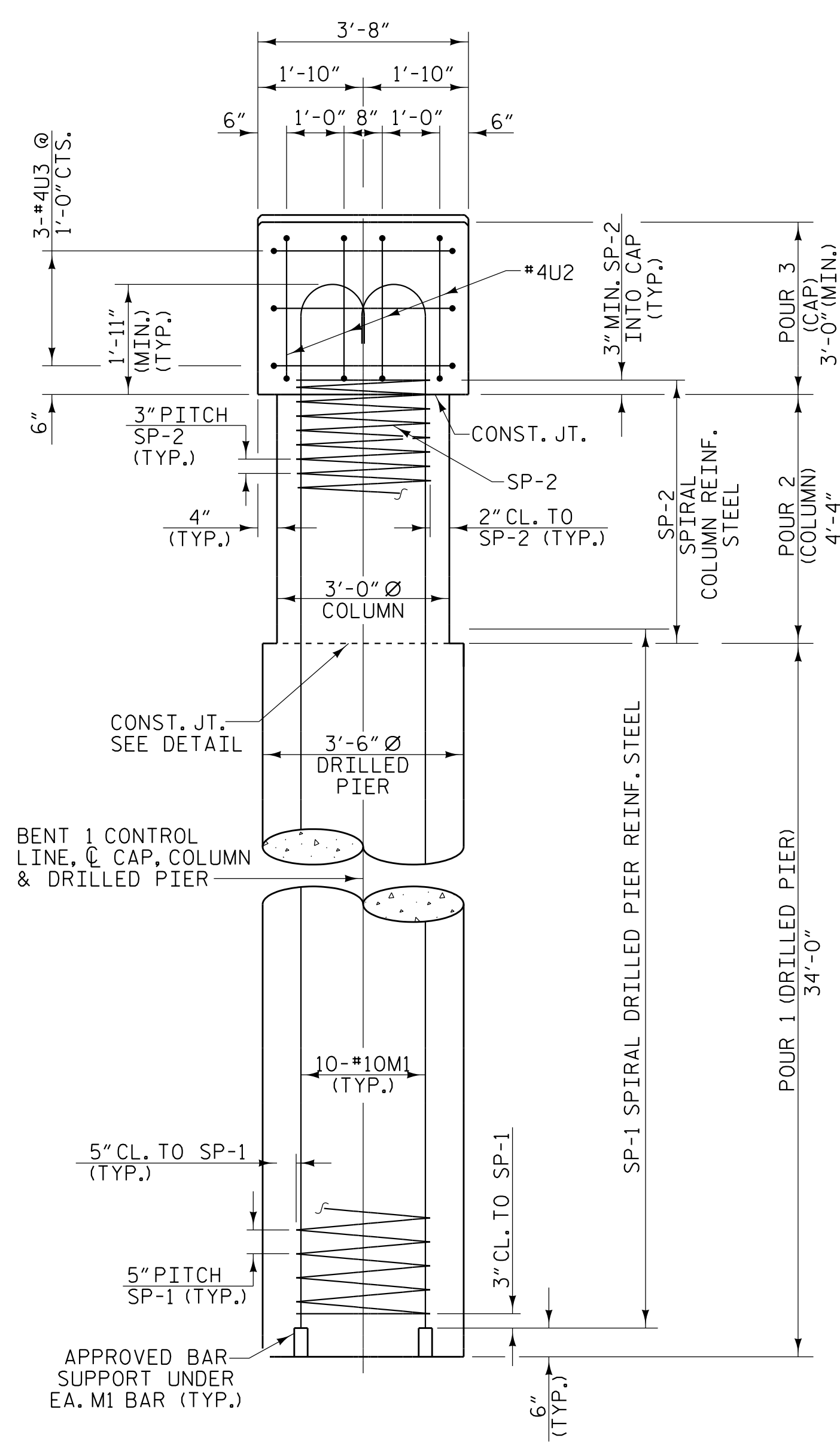
ALL BAR DIMENSIONS ARE OUT TO OUT

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

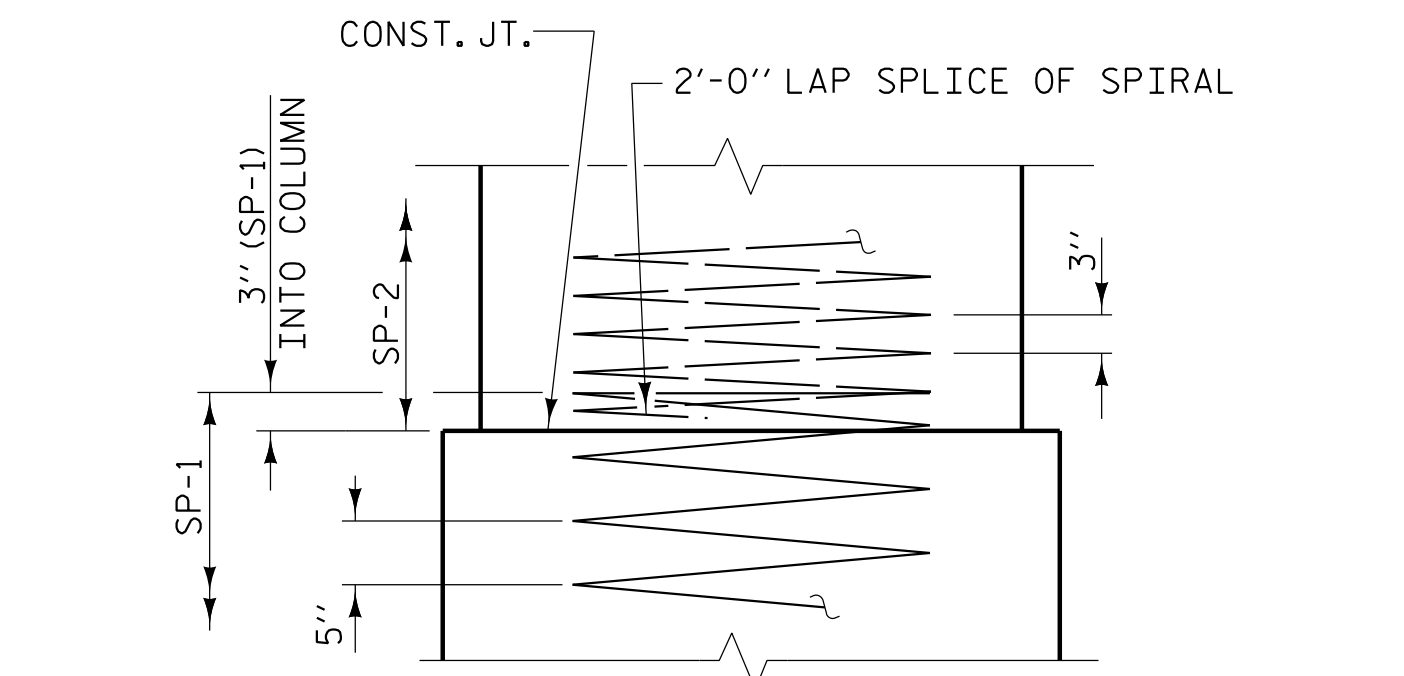
▲ NO SEPARATE PAYMENT WILL BE MADE FOR CSL TUBES. CSL TUBES WILL BE INCLUDED IN THE UNIT BID PRICE FOR DRILLED PIERS.

BILL OF MATERIAL

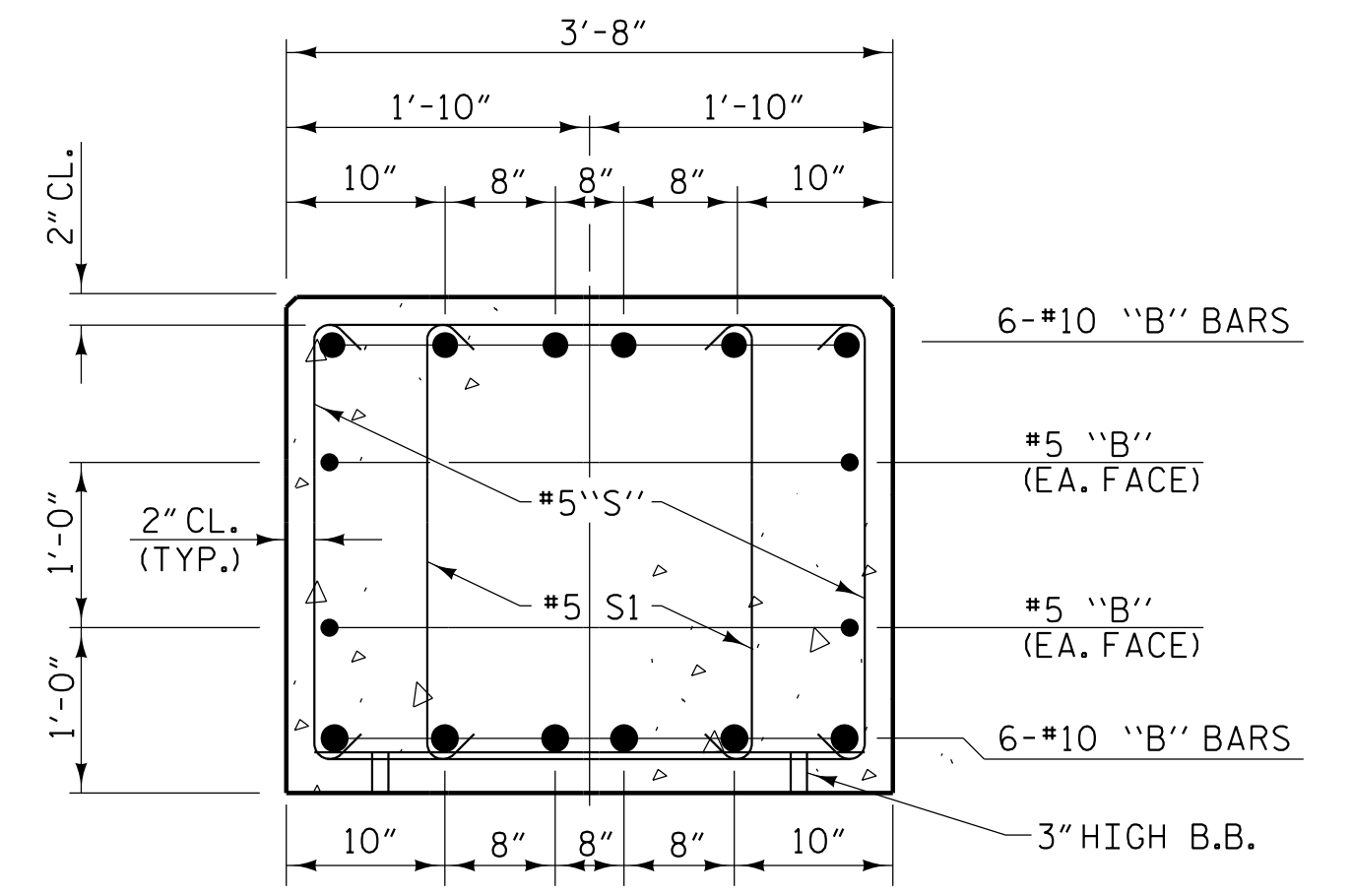
BENT 1 - STAGE I						BENT 1 - STAGE II							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	6	#10	STR	34'-9"	897	B4	30	#4	STR	2'-11"	58		
B2	4	#5	STR	36'-9"	153	B5	6	#10	STR	51'-10"	1338		
B3	6	#10	1	36'-2"	934	B6	4	#5	STR	52'-10"	220		
B4	18	#4	STR	2'-11"	35	B7	6	#10	1	53'-3"	1375		
						B8	6	#10	1	15'-3"	394		
M1	30	#10	1	44'-2"	5701	M1	40	#10	1	44'-2"	7602		
S1	10	#5	2	9'-0"	94	S1	48	#5	2	9'-0"	451		
S2	41	#5	2	9'-6"	406	S2	34	#5	2	9'-6"	337		
U1	24	#4	3	7'-0"	112	S3	32	#5	2	10'-6"	350		
U2	4	#4	3	6'-2"	16	U1	36	#4	3	7'-0"	168		
U3	3	#4	3	6'-10"	14	U2	4	#4	3	6'-2"	16		
						U3	3	#4	3	6'-10"	14		
TOTAL REINFORCING STEEL						8362 lbs.	TOTAL REINFORCING STEEL						12323 lbs.
SP-1	3	**	4	673'-7"	2108	SP-1	4	**	4	673'-7"	2810		
SP-2	3	***	5	163'-8"	328	SP-2	4	***	5	163'-8"	437		
SPIRAL COLUMN REINFORCING STEEL (SP)						2436 LBS	SPIRAL COLUMN REINFORCING STEEL (SP)						3247 LBS
CLASS "A" CONCRETE - CU. YARDS							CLASS "A" CONCRETE - CU. YARDS						
POUR 2 - COLUMN						3.4 CU. YDS.	POUR 2 - COLUMN						4.5 CU. YDS.
POUR 3 - CAP						14.9 CU. YDS.	POUR 3 - CAP						24.5 CU. YDS.
TOTAL						18.3 CU. YDS.	TOTAL						29.0 CU. YDS.
DRILLED PIERS							DRILLED PIERS						
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)						36.3 C.Y.	DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)						48.5 C.Y.
3'-6" Ø DRILLED PIER IN SOIL						61.3 LIN. FT.	3'-6" Ø DRILLED PIER IN SOIL						81.7 LIN. FT.
3'-6" Ø DRILLED PIER NOT IN SOIL						40.7 LIN. FT.	3'-6" Ø DRILLED PIER NOT IN SOIL						54.3 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER						74.8 LIN. FT.	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER						99.7 LIN. FT.
▲ CSL TUBES						426.0 LIN FT.	▲ CSL TUBES						568.0 LIN FT.



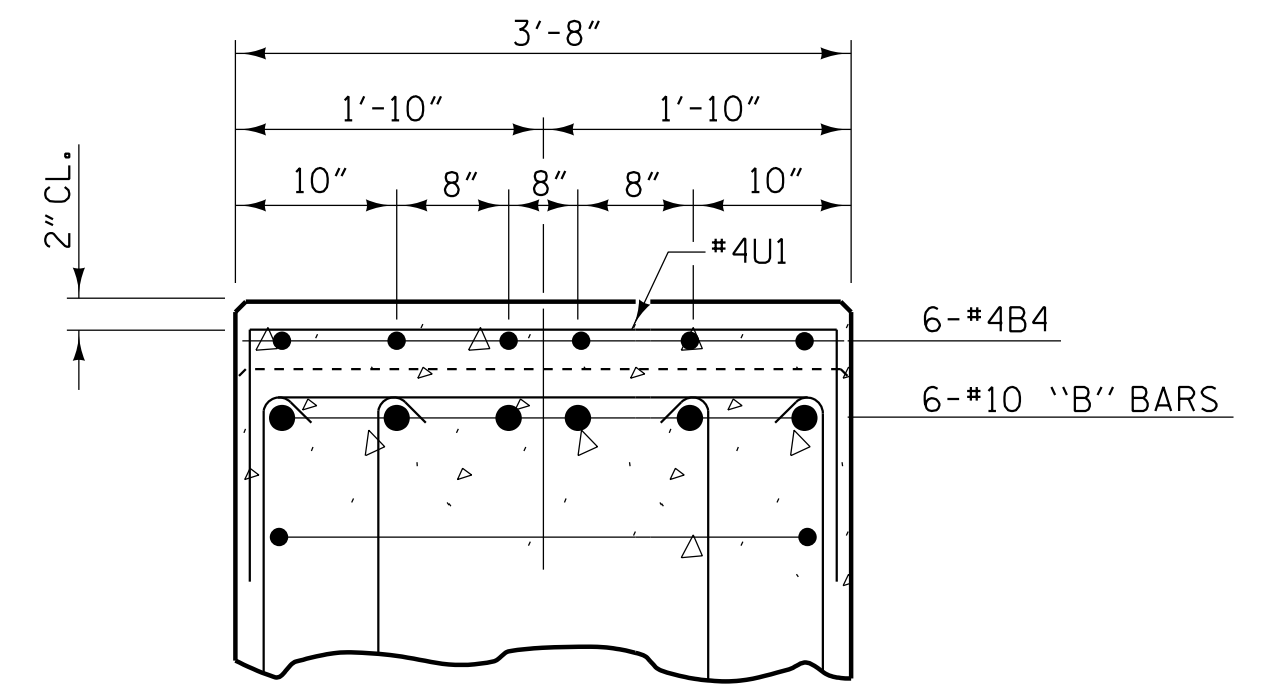
END ELEVATION



CONSTRUCTION JOINT DETAIL



SECTION A-A



SECTION B-B

5/17/2023 7:03:30 PM R:\Structures\Bent 1\Richmond Creek\16 U5839\_SMU B4\_43086.dgn

DRAWN BY : W. B. ALLEN DATE : 10/19  
 CHECKED BY : Z. H. BROWN DATE : 11/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 2/23

DocuSigned by:  
 BEB2398D9220470

PLANS PREPARED BY:  
**NV5**  
 NV5 ENGINEERS & CONSULTANTS, INC.  
 3300 REGENCY PARKWAY, SUITE 100  
 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-1333

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 BEB2398D9220470  
 5/19/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
**BENT 1**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

**NOTES**

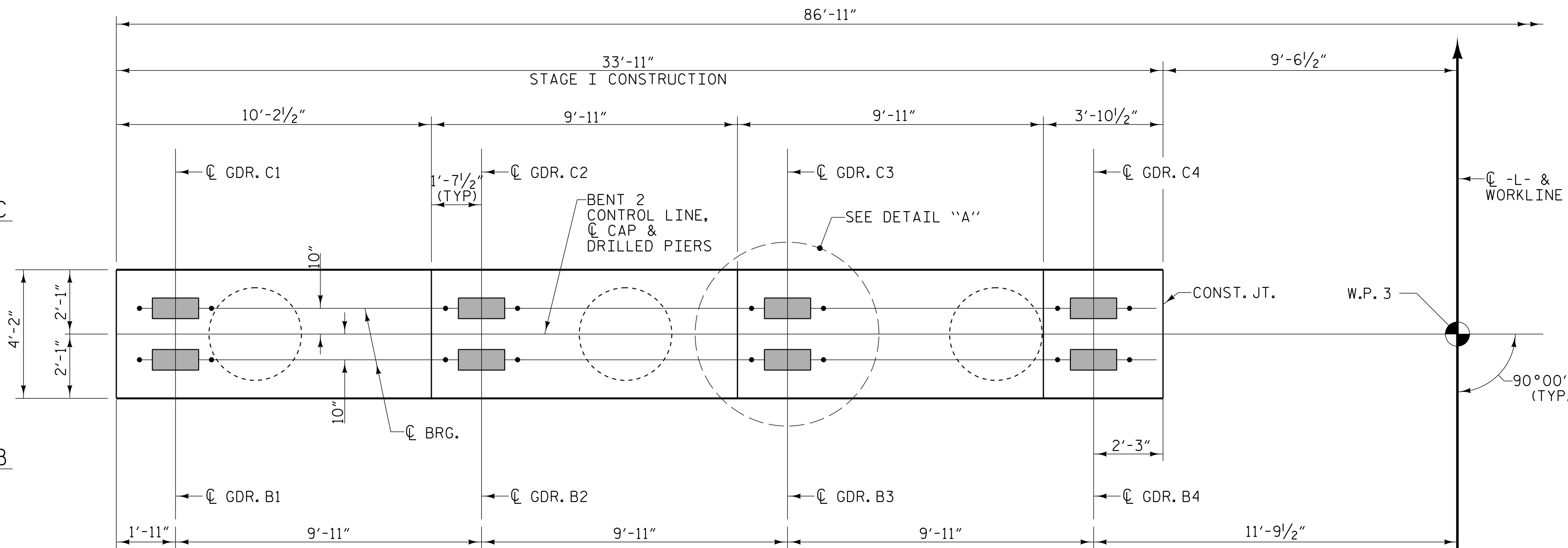
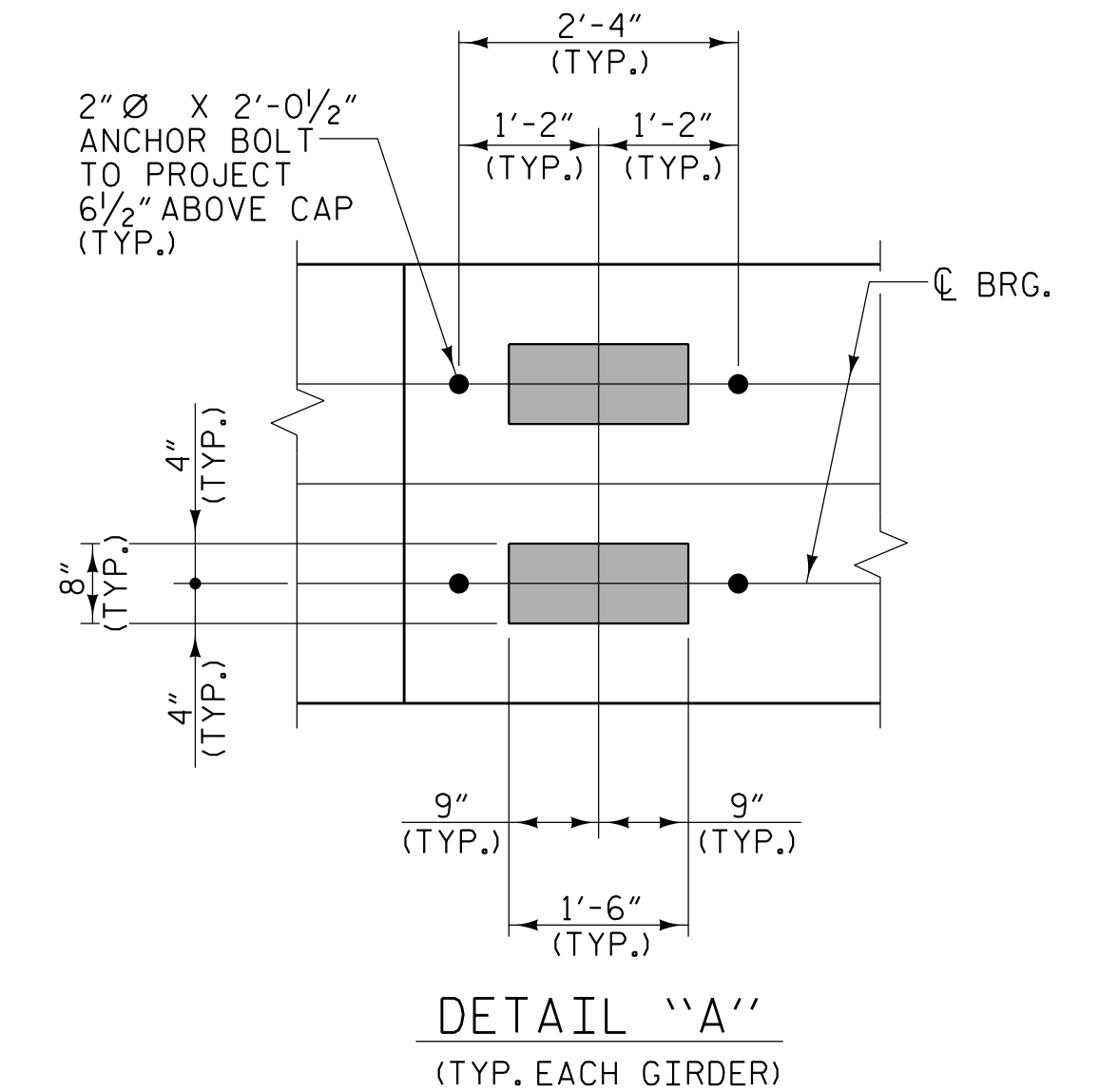
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

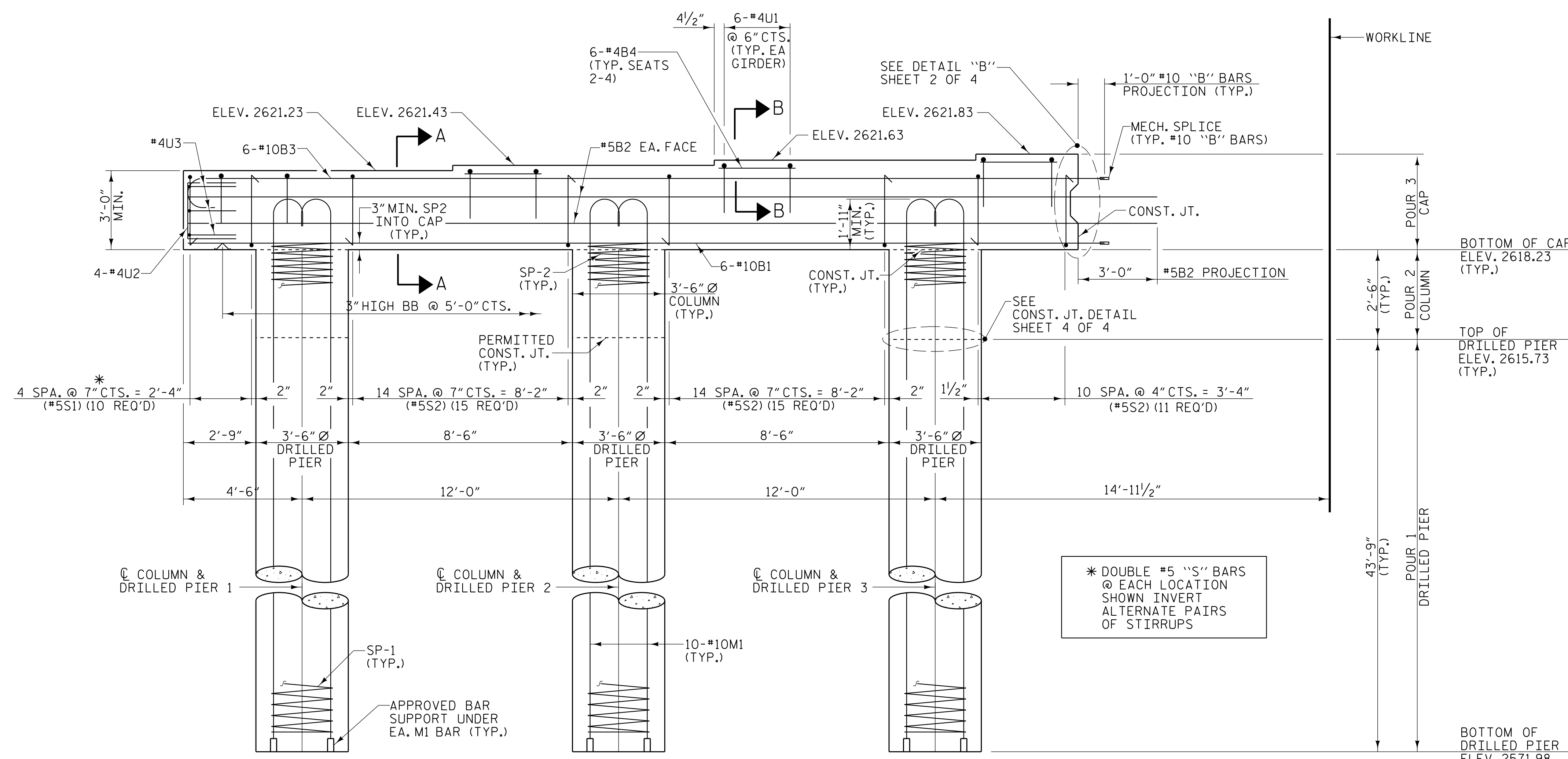
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

SPLICING OF LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED



**PLAN**



**ELEVATION**

PLANS PREPARED BY:

NV5 ENGINEERS & CONSULTANTS, INC.  
3300 REGENCY PARKWAY, SUITE 100  
DURHAM, NC 27618  
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NC License # F1333

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
**BENT 2**  
 STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

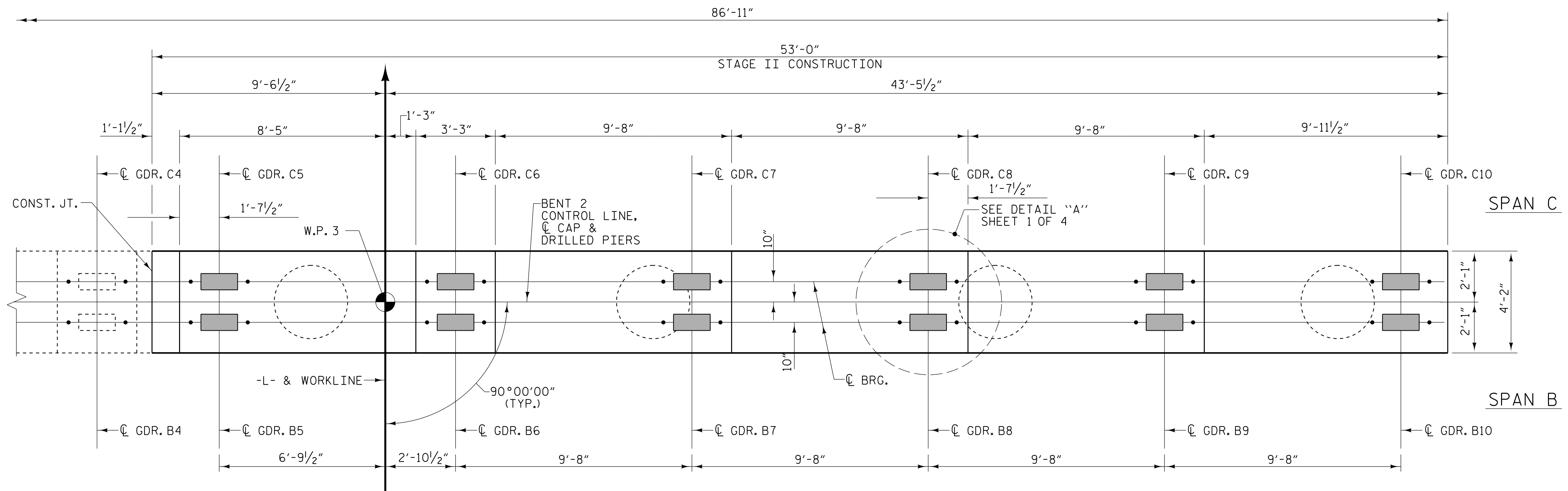
DocuSigned by:

BEB239809220470...  
 5/19/2023

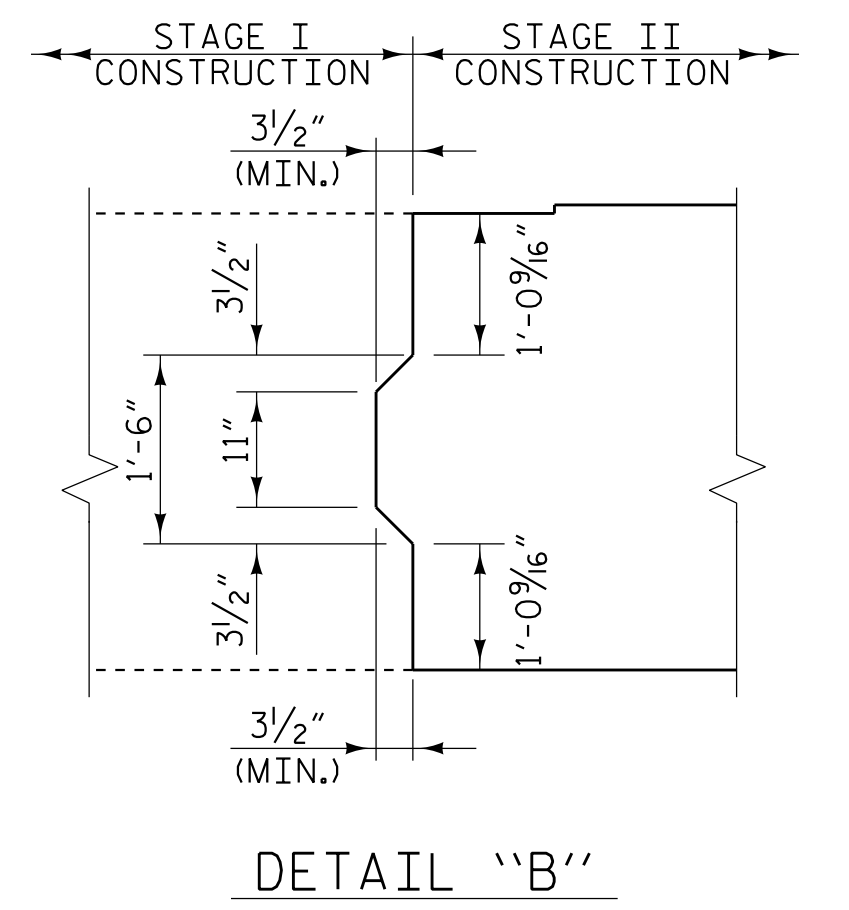
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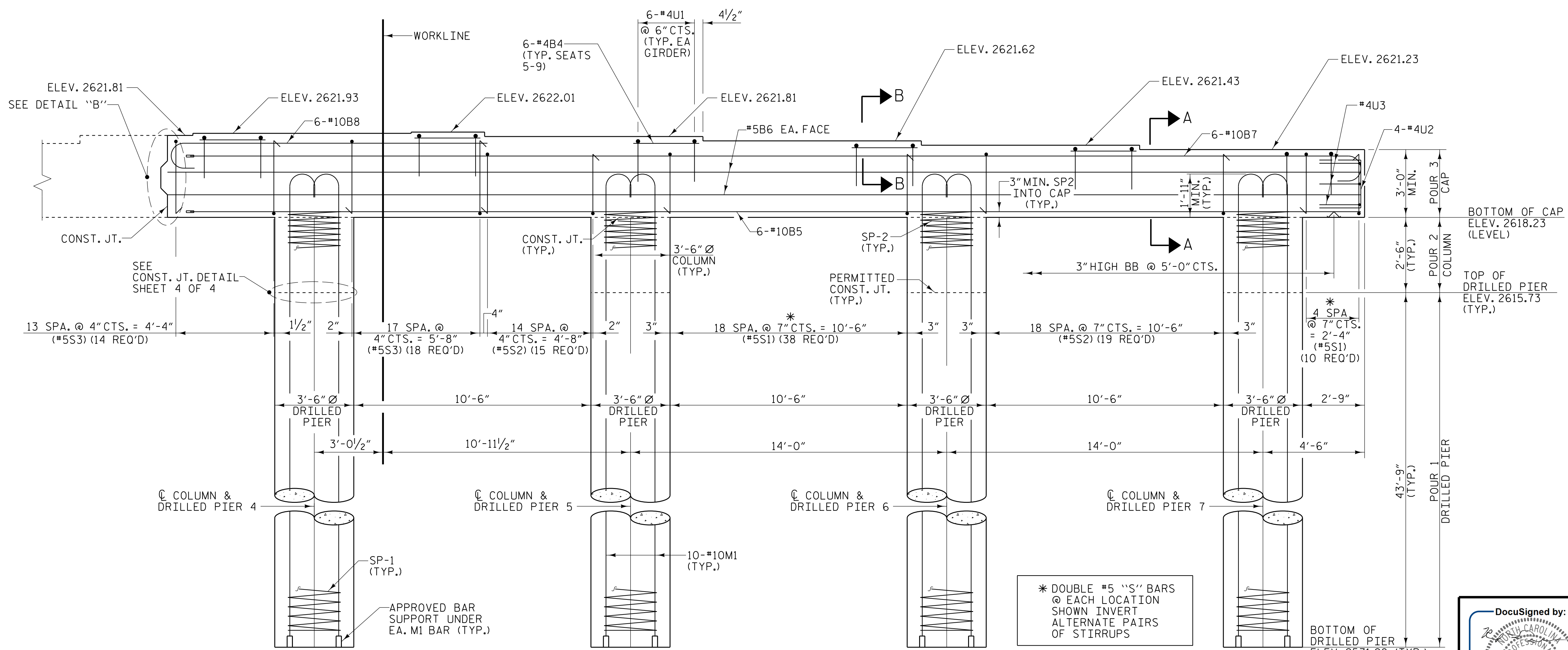
5/17/2023 7:03:51 PM R:\Structures\Bent2\Bent2.dgn



PLAN



DETAIL 'B'



ELEVATION

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 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-5333

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
**BENT 2**  
 STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

DocuSigned by:

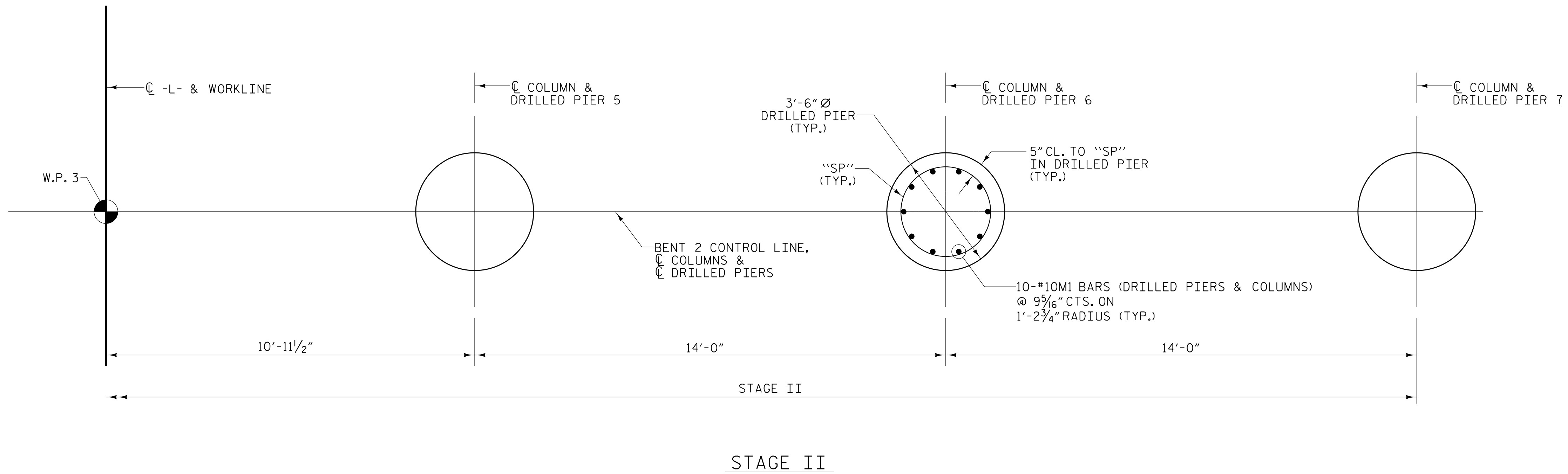
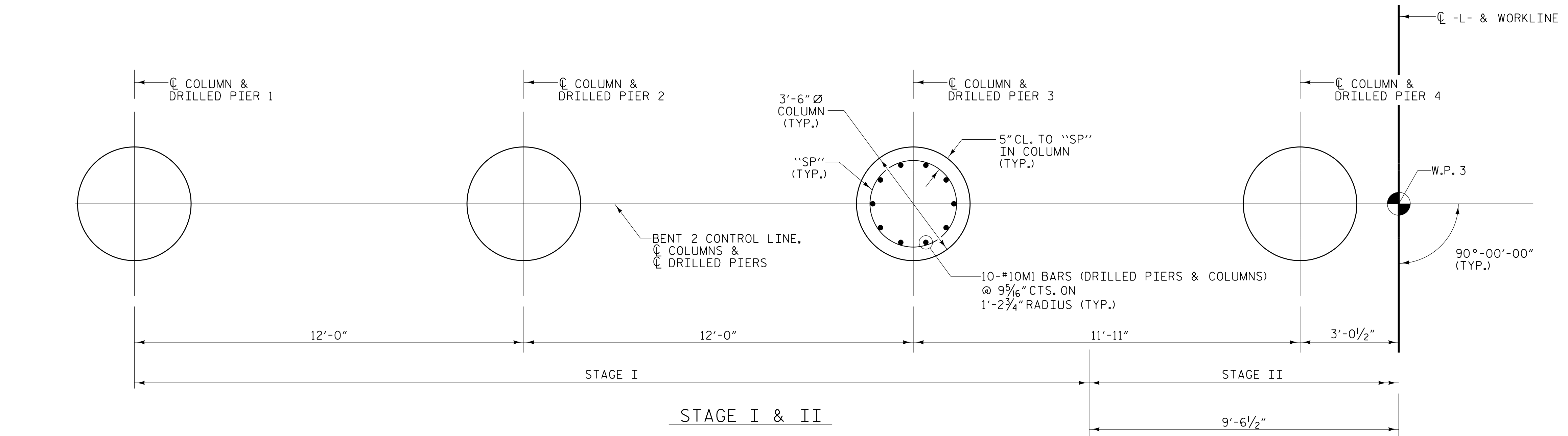
ROBERT C. LARSON  
 PROFESSIONAL ENGINEER  
 BEB2398D9220470  
 14114

5/19/2023

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**PLAN OF COLUMNS & DRILLED PIERS**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
**BENT 2**

PLANS PREPARED BY:

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3300 REGENCY PARKWAY, SUITE 100  
CARY, NC 27518  
P: 919.851.1912 www.NV5.com  
NC License # F-1333

DocuSigned by:

*Robert C. Larson*

BE2398D9220470AL  
14114  
ENGINEER  
ROBERT C. LARSON

5/19/2023

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REVISIONS						SHEET NO.
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1			3			49
2			4			

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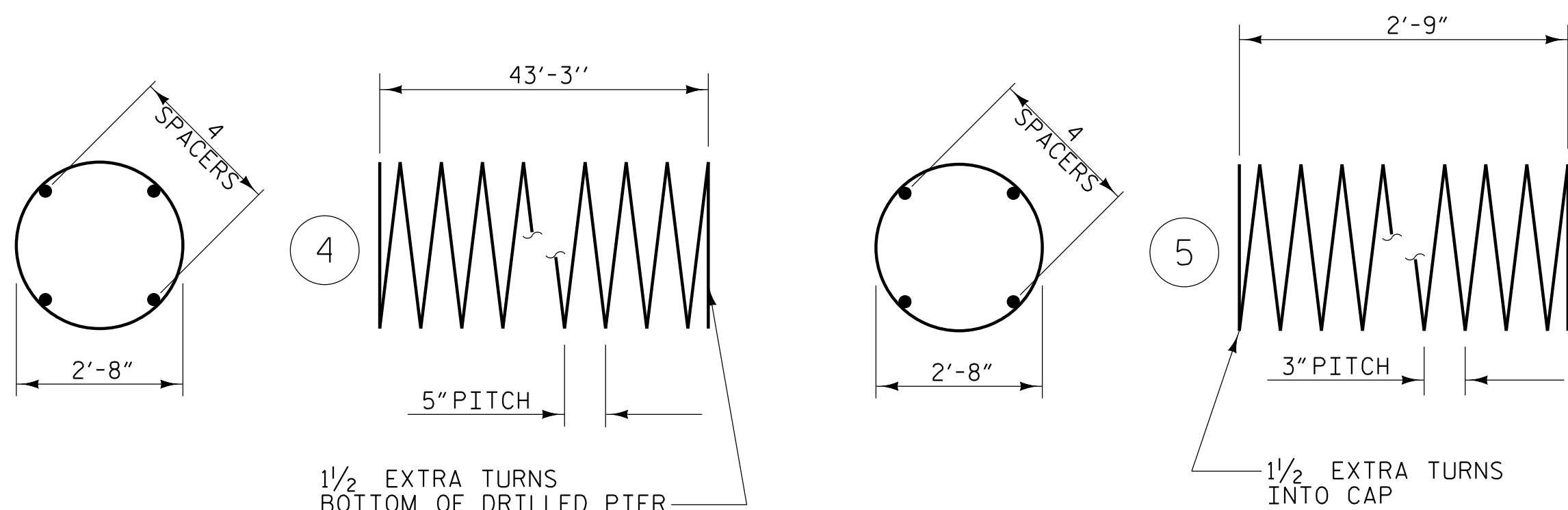
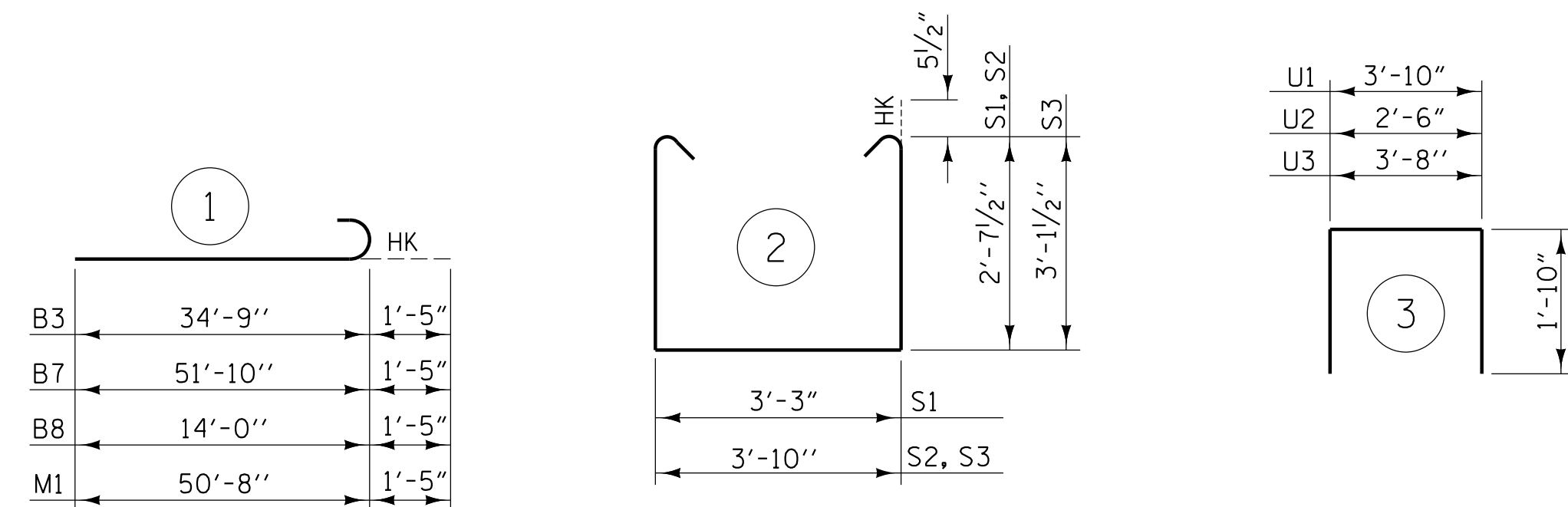
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*Robert C. Larson*

BE2398D9220470

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BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

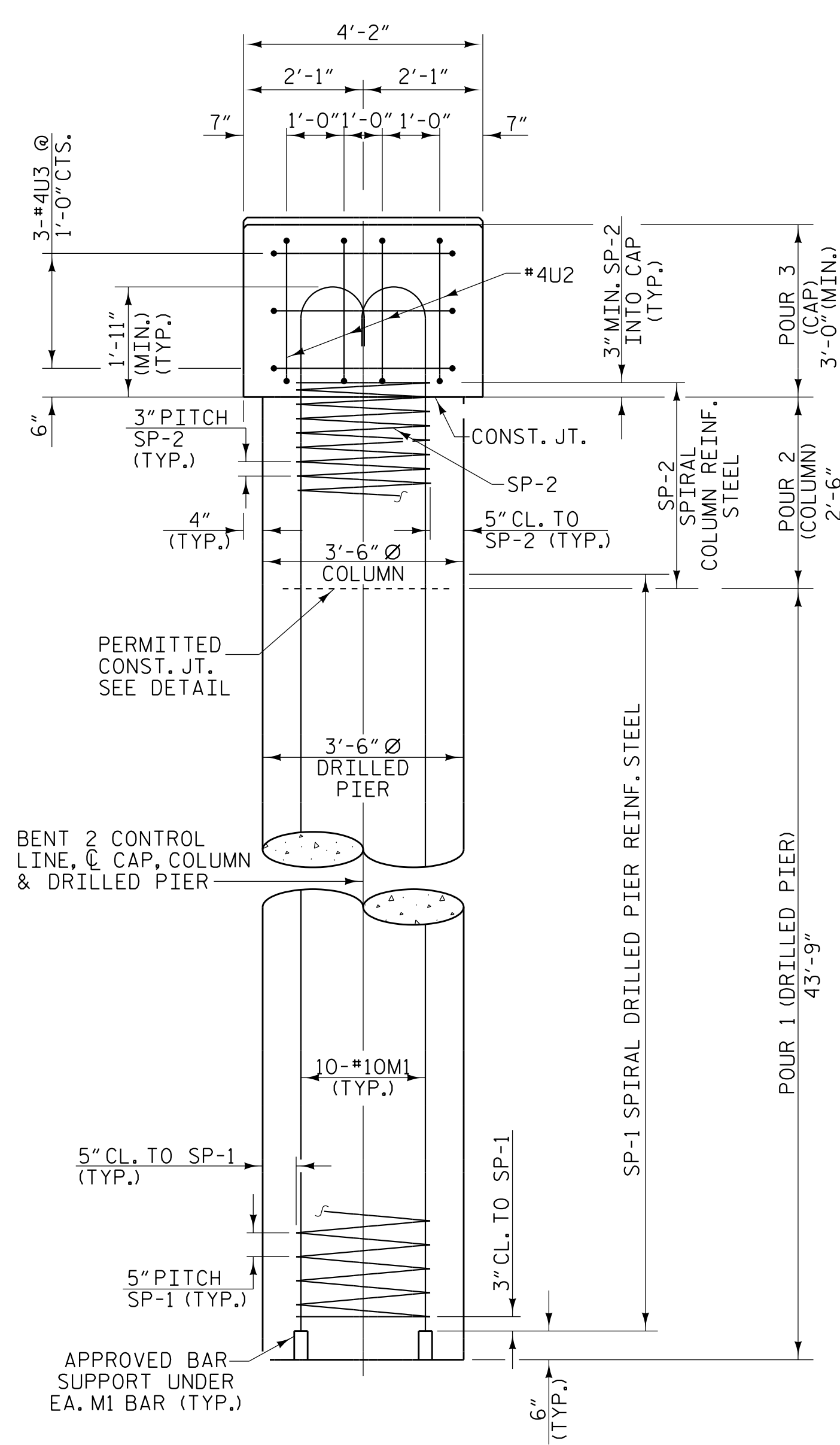
\*\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.  
 \*\*\* THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

▲ NO SEPARATE PAYMENT WILL BE MADE FOR CSL TUBES. CSL TUBES WILL BE INCLUDED IN THE UNIT BID PRICE FOR DRILLED PIERS.

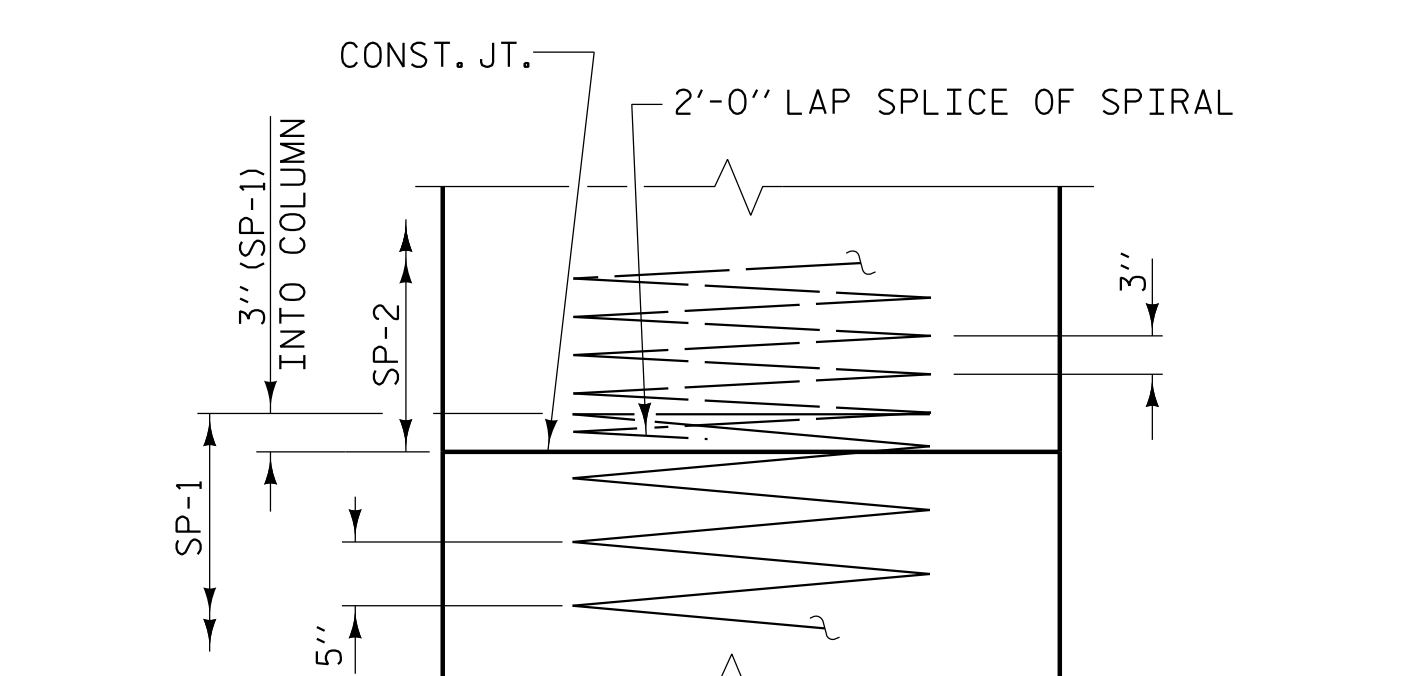
SPlicing OF LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED

BILL OF MATERIAL

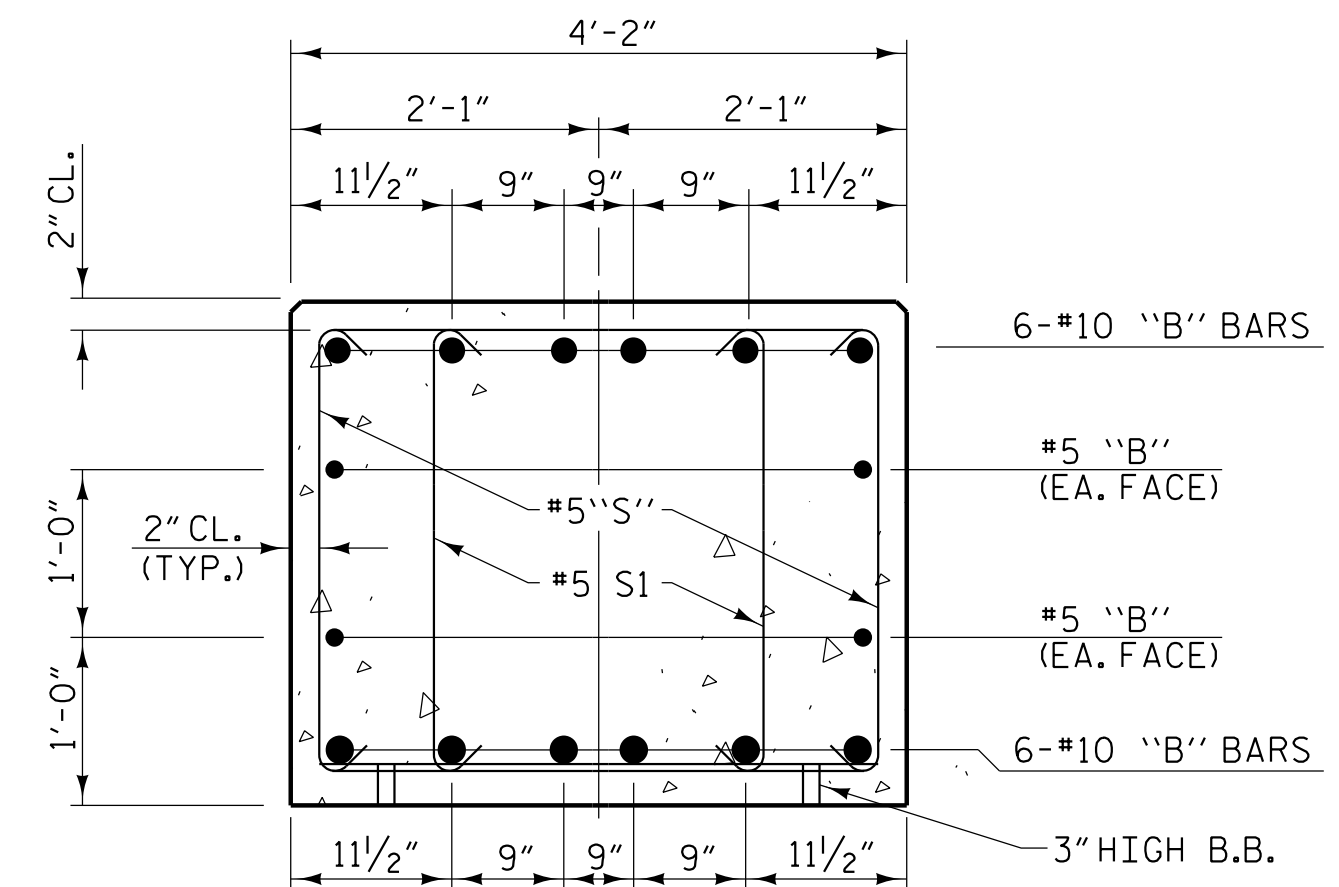
BENT 2 - STAGE I						BENT 2 - STAGE II							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	6	#10	STR	34'-9"	897	B4	30	#4	STR	2'-11"	58		
B2	4	#5	STR	36'-9"	153	B5	6	#10	STR	51'-10"	1338		
B3	6	#10	1	36'-2"	934	B6	4	#5	STR	52'-10"	220		
B4	18	#4	STR	2'-11"	35	B7	6	#10	1	53'-3"	1375		
						B8	6	#10	1	15'-3"	394		
M1	30	#10	1	52'-1"	6723	M1	40	#10	1	52'-1"	8965		
S1	10	#5	2	9'-5"	98	S1	48	#5	2	9'-5"	471		
S2	41	#5	2	10'-0"	428	S2	34	#5	2	10'-0"	355		
						S3	32	#5	2	11'-0"	367		
U1	24	#4	3	7'-0"	112	U1	36	#4	3	7'-0"	168		
U2	4	#4	3	6'-2"	16	U2	4	#4	3	6'-2"	16		
U3	3	#4	3	6'-10"	14	U3	3	#4	3	6'-10"	14		
TOTAL REINFORCING STEEL						9410 LBS.	TOTAL REINFORCING STEEL						13741 LBS.
SP-1	3	**	4	866'-0"	2710	SP-1	4	**	4	866'-0"	3613		
SP-2	3	***	5	103'-2"	207	SP-2	4	***	5	103'-2"	276		
SPIRAL COLUMN REINFORCING STEEL (SP) 2917 LBS.						SPIRAL COLUMN REINFORCING STEEL (SP) 3889 LBS.							
CLASS "A" CONCRETE - CU. YARDS						CLASS "A" CONCRETE - CU. YARDS							
POUR 2 - COLUMN						2.7 CU. YDS.	POUR 2 - COLUMN						3.6 CU. YDS.
POUR 3 - CAP						16.9 CU. YDS.	POUR 3 - CAP						27.9 CU. YDS.
TOTAL						19.6 CU. YDS.	TOTAL						31.5 CU. YDS.
DRILLED PIERS						DRILLED PIERS							
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)						46.8 C.Y.	DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)						62.4 C.Y.
3'-6" Ø DRILLED PIER IN SOIL						95.7 LIN. FT.	3'-6" Ø DRILLED PIER IN SOIL						127.6 LIN. FT.
3'-6" Ø DRILLED PIER NOT IN SOIL						35.6 LIN. FT.	3'-6" Ø DRILLED PIER NOT IN SOIL						47.4 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER						107.1 LIN. FT.	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER						142.8 LIN. FT.
▲ CSL TUBES						543.0 LIN FT.	▲ CSL TUBES						724.0 LIN FT.



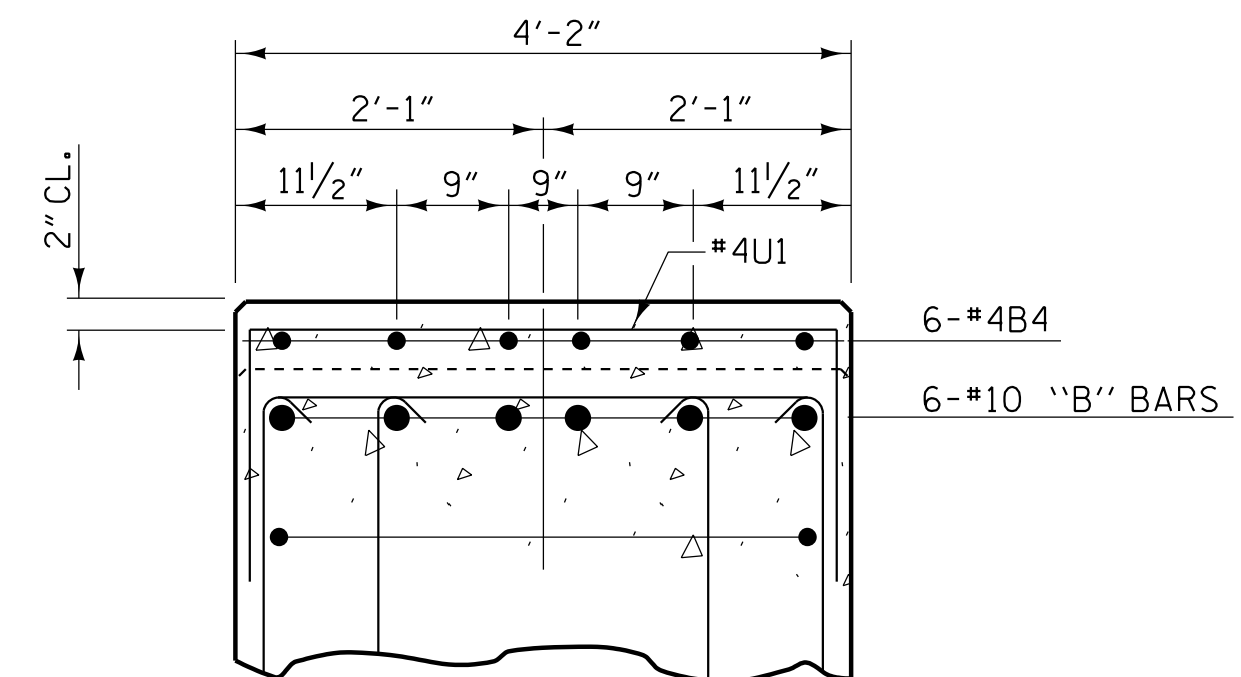
END ELEVATION



CONSTRUCTION JOINT DETAIL



SECTION A-A



SECTION B-B

5/17/2023 7:03:32 PM R:\Structures\Bent 2\U5839\_SMU.BB\_43086.dgn

DRAWN BY : W. B. ALLEN DATE : 10/19  
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 NORTH CAROLINA PROFESSIONAL ENGINEER  
 ROBERT C. LARSON  
 14114  
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PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
**BENT 2**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			



**NOTES**

#4V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN THE CAP.

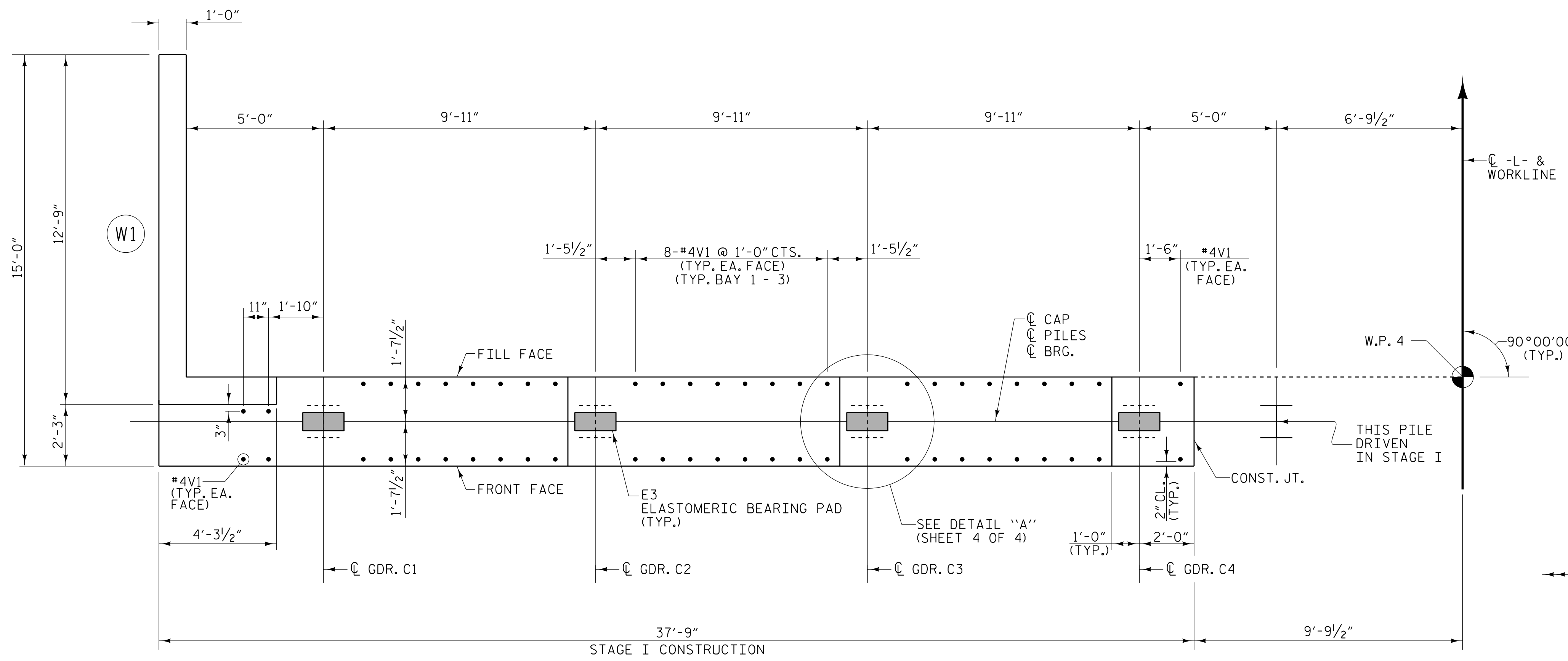
THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1), EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR SECTION A-A AND SECTION B-B, SEE SHEET 4 OF 4.

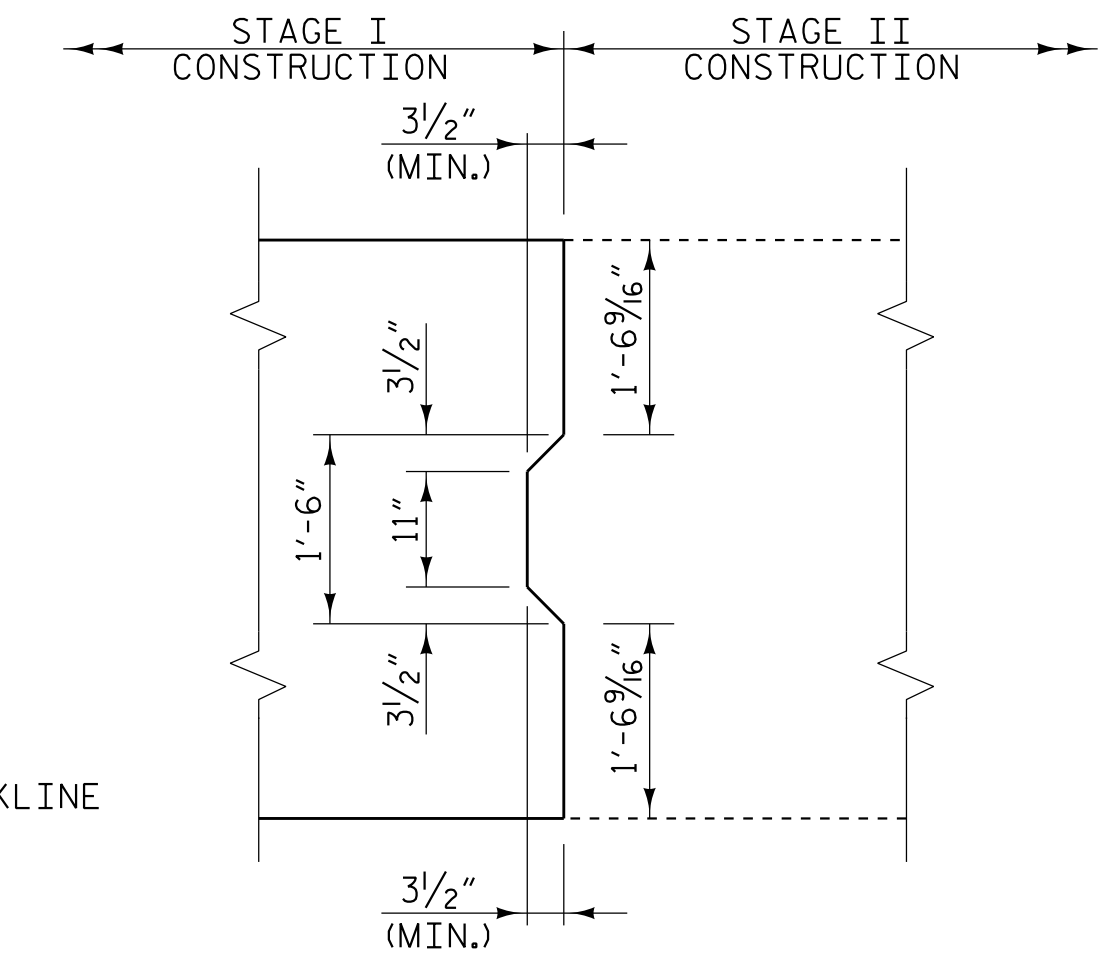
SEE "GENERAL DRAWING FOUNDATION LAYOUT" FOR ADDITIONAL NOTES FOR DRIVING PILES.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL SEE "SUBSTRUCTURE END BENT 1" SHEET 4 OF 4.

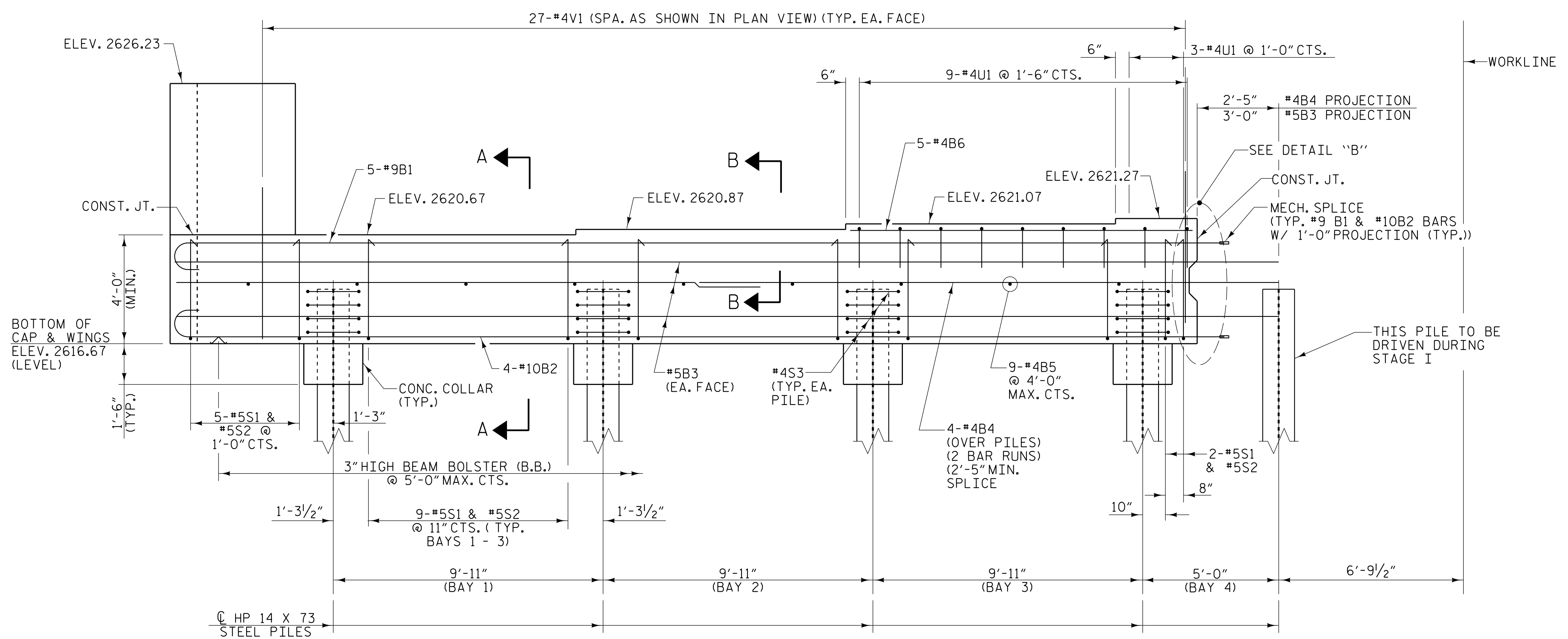
FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 2" SHEET 4 OF 4.



**PLAN**



**DETAIL "B"**



**ELEVATION**



PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

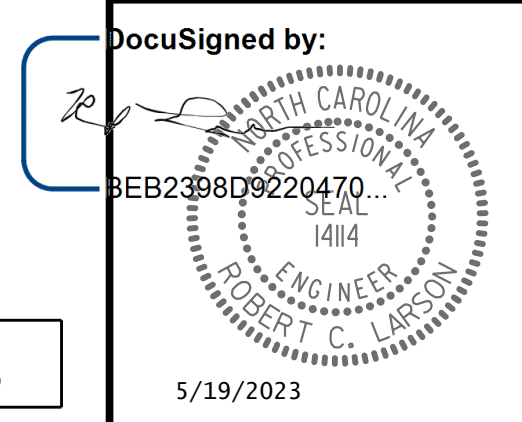
SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 INTEGRAL END BENT 2  
 STAGE I**

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

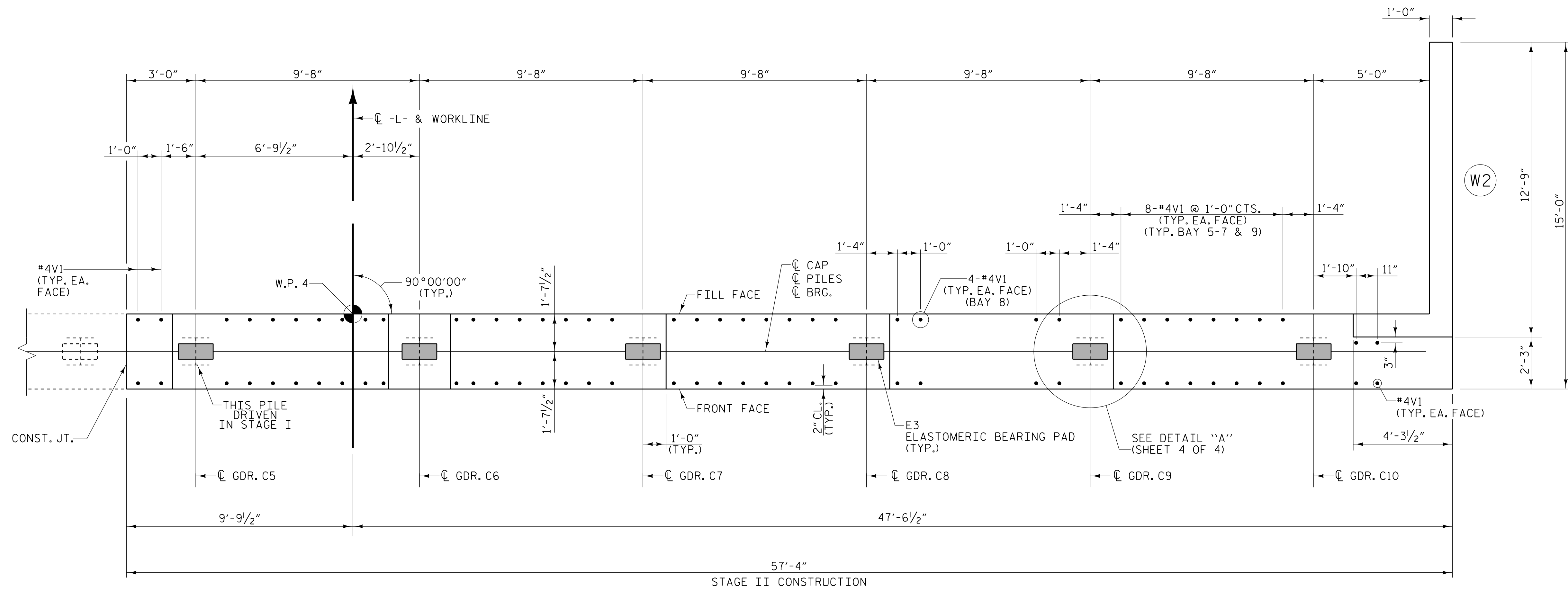
TOTAL SHEETS: 49



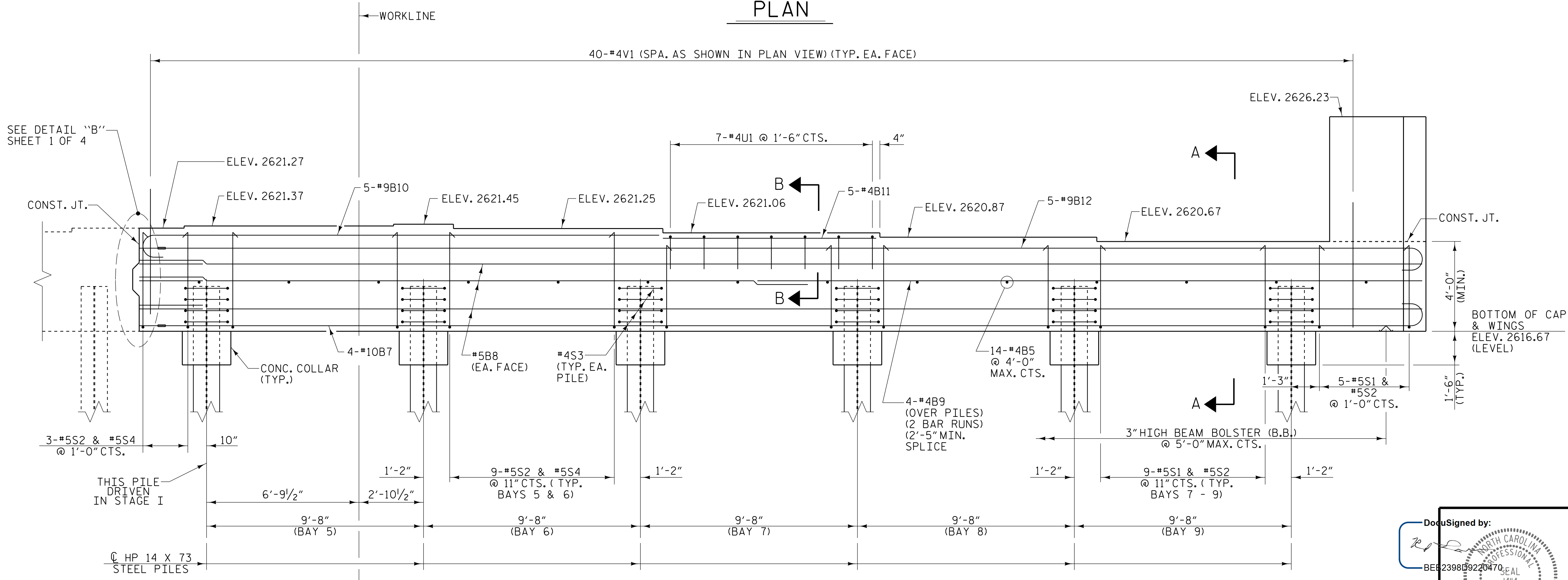
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 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23



PLAN

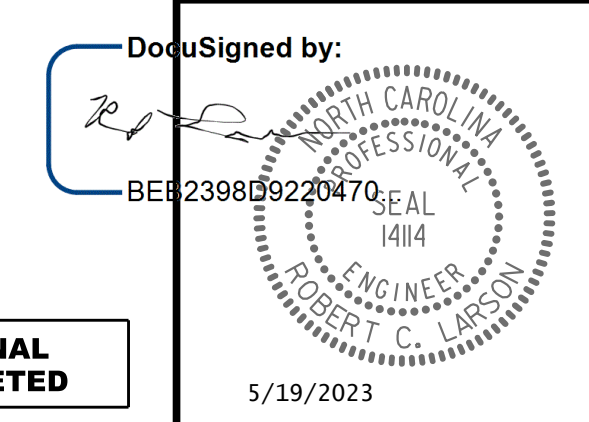


ELEVATION



PROJECT NO. U-5839  
 HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 2 OF 4  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL END BENT 2  
 STAGE II



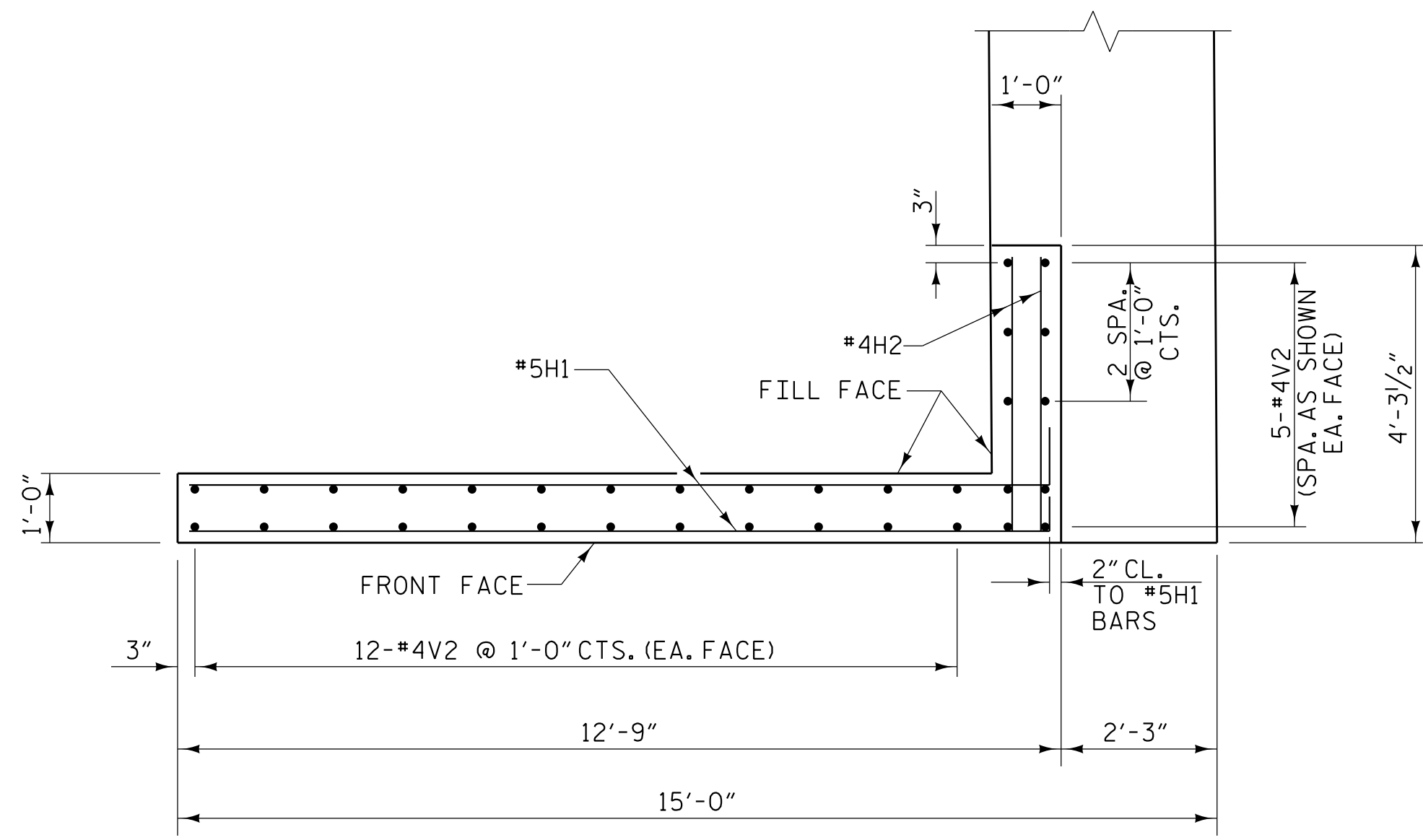
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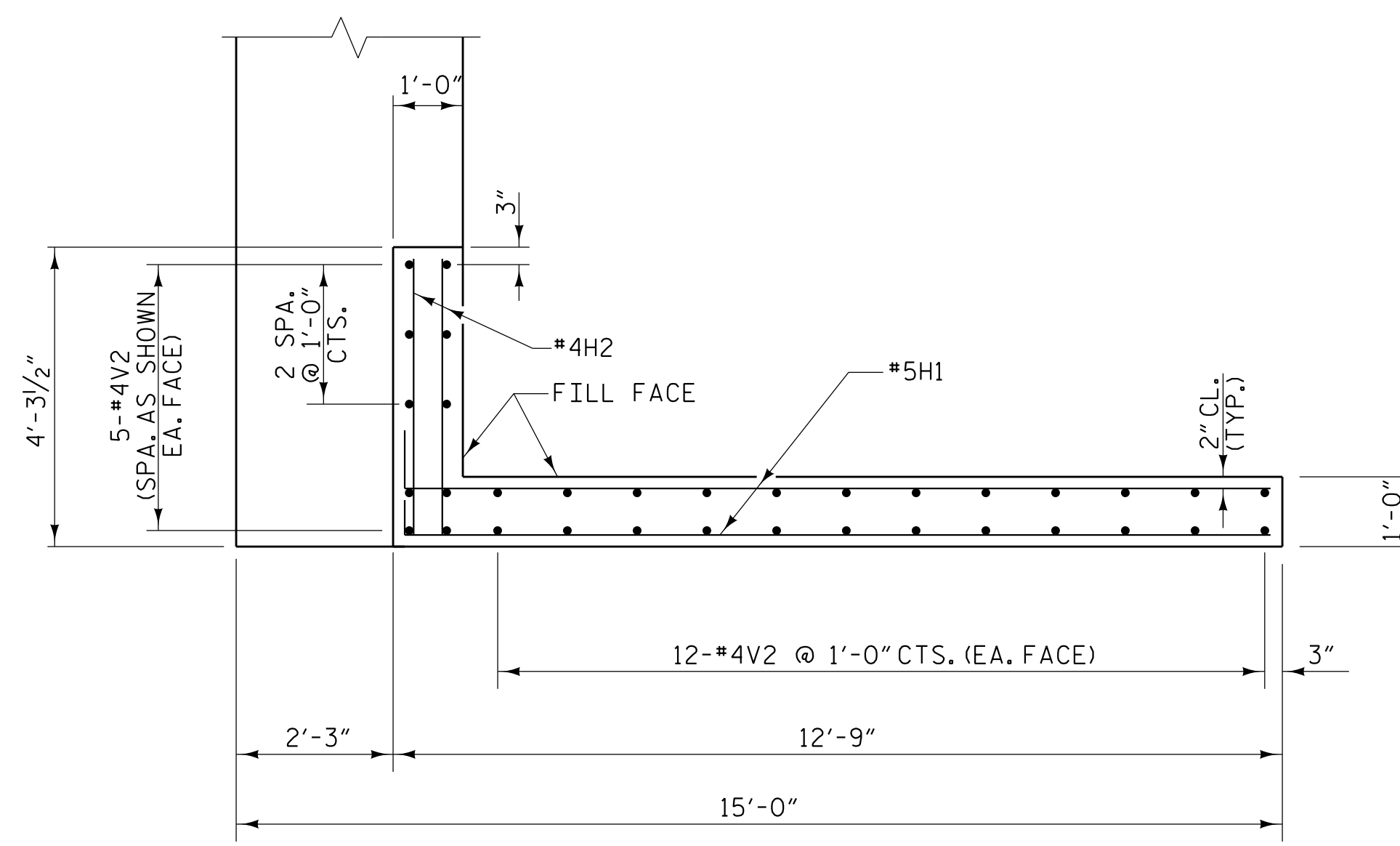
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-42	
1			3			TOTAL SHEETS	
2			4			49	

5/19/2023

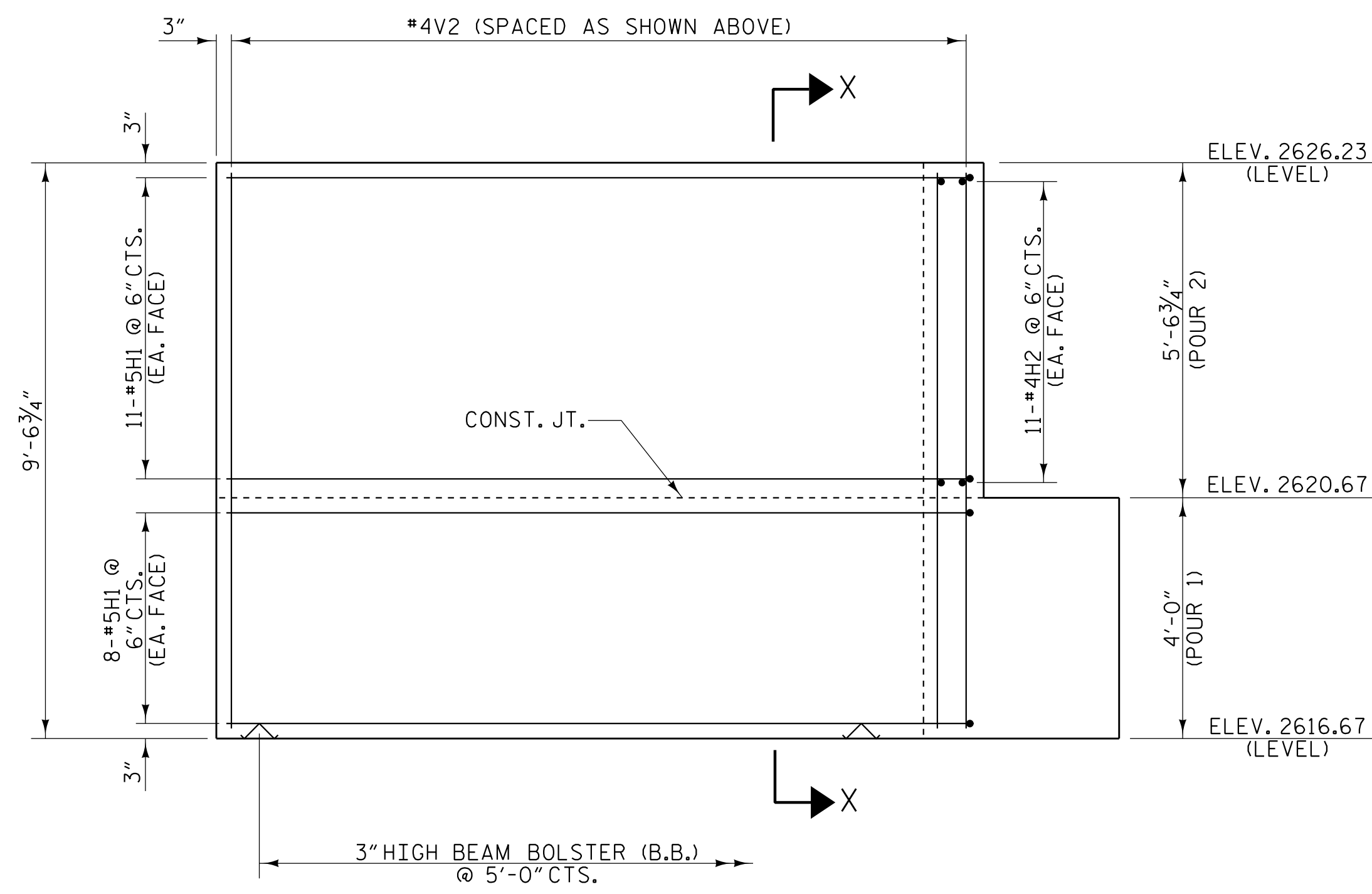
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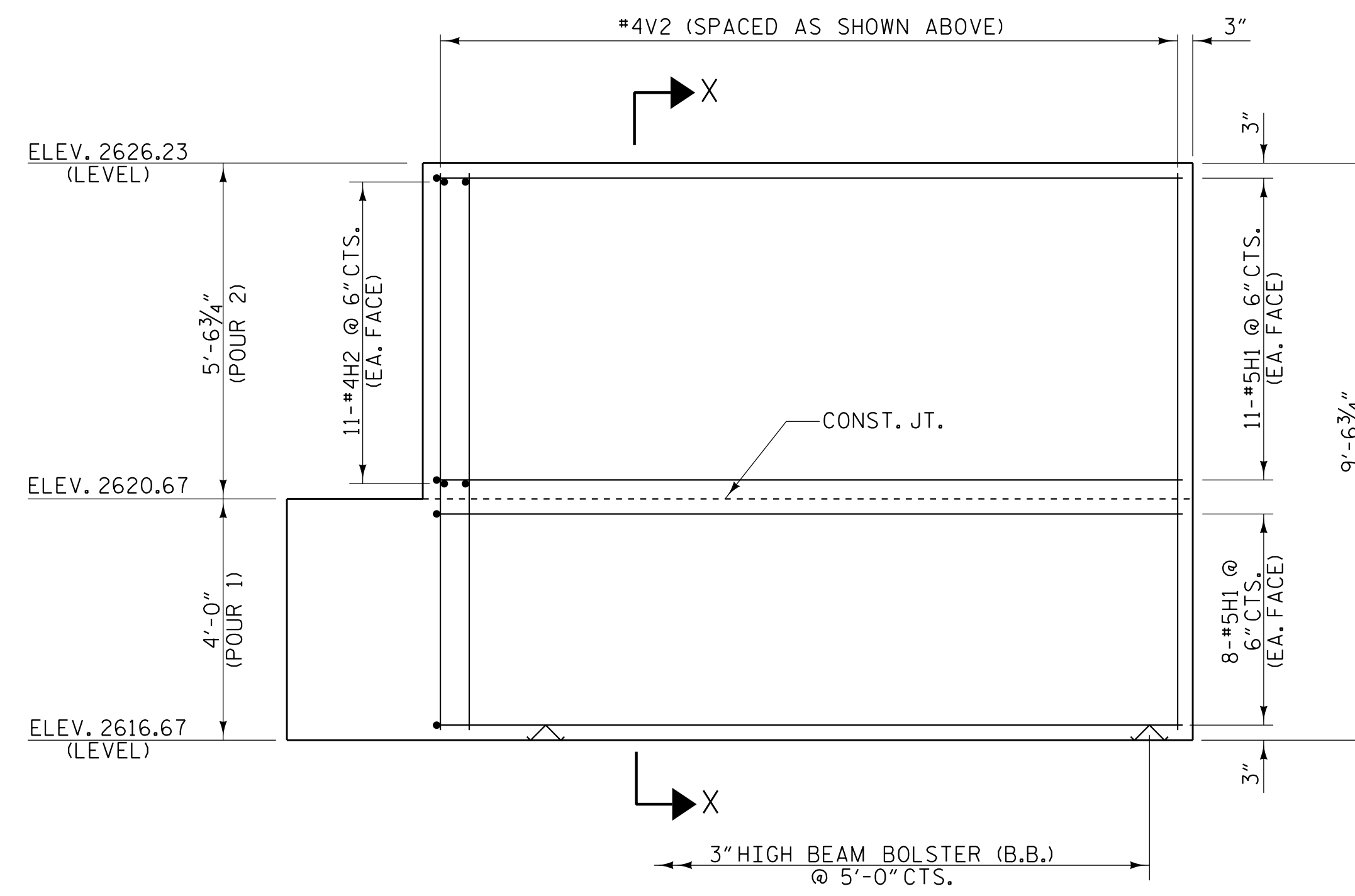
**PLAN OF LEFT WING - W1**  
(STAGE I CONSTRUCTION)



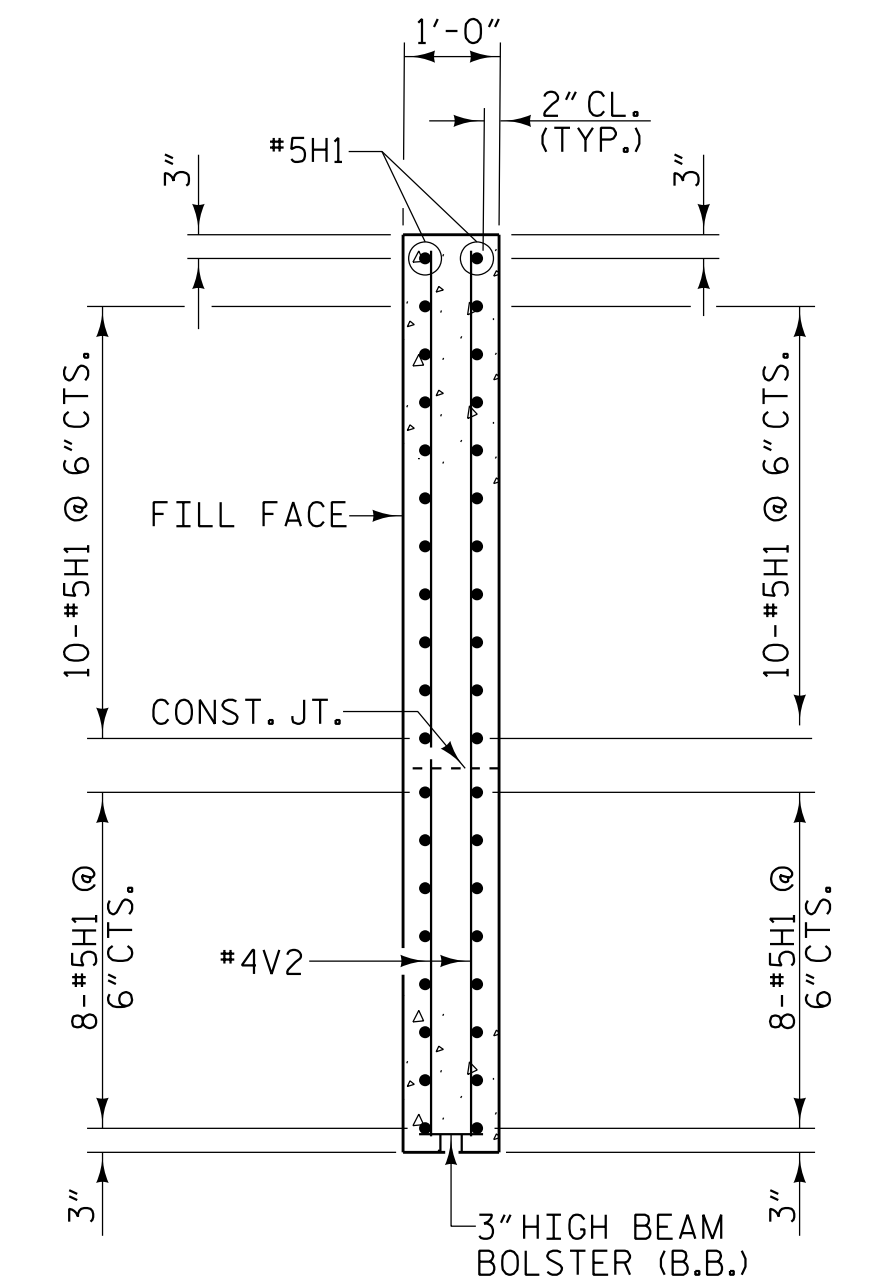
**PLAN OF RIGHT WING - W2**  
(STAGE II CONSTRUCTION)



**ELEVATION OF LEFT WING - W1**  
(STAGE I CONSTRUCTION)



**ELEVATION OF RIGHT WING - W2**  
(STAGE II CONSTRUCTION)



**SECTION X-X**

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 3 OF 4

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-43
1			3			TOTAL SHEETS
2			4			49

PLANS PREPARED BY:

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 P: 919.851.1912 www.NV5.com  
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*[Signature]*

PROFESSIONAL ENGINEER  
 NORTH CAROLINA  
 ROBERT C. LARSON  
 14114  
 BEB2398D9220470...

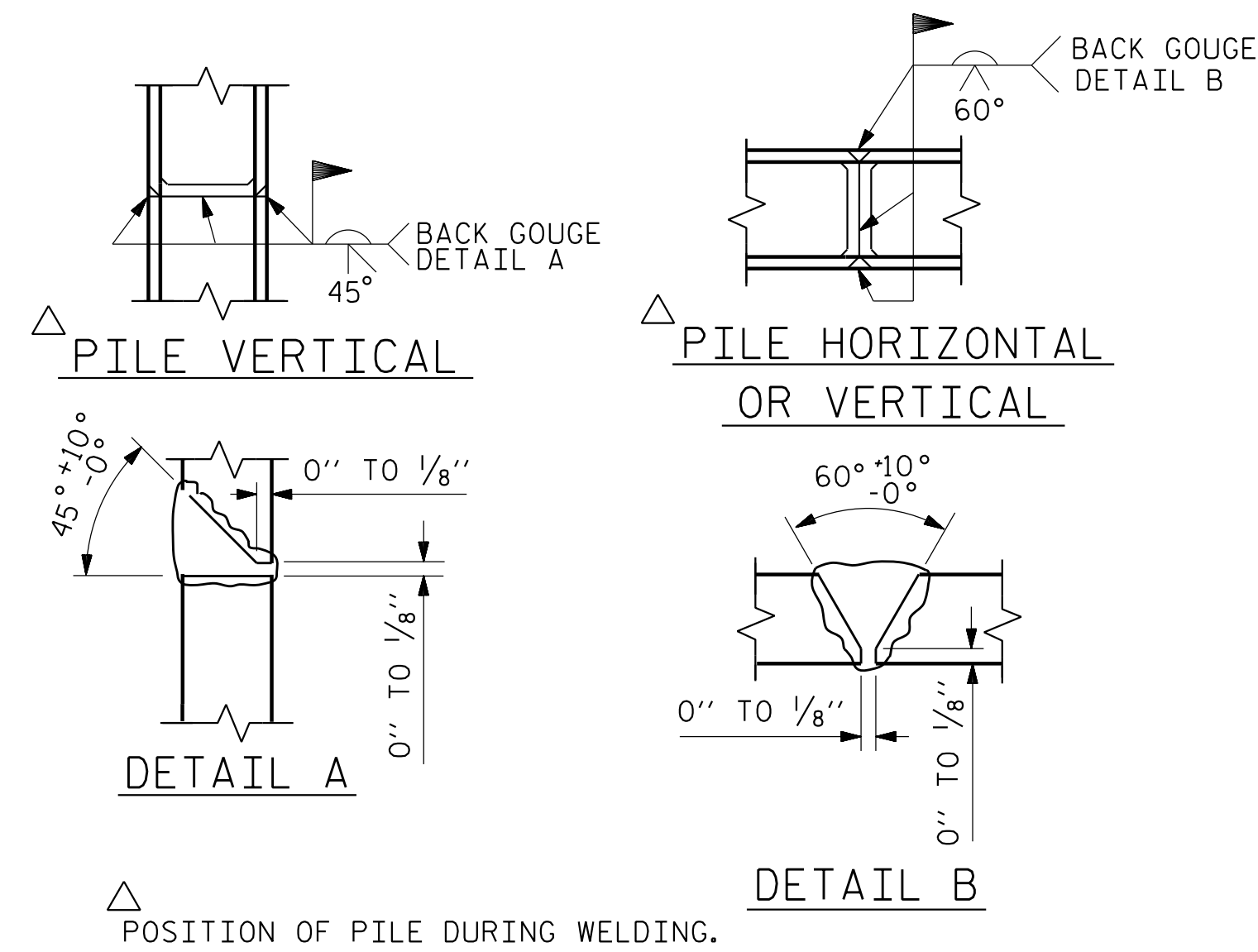
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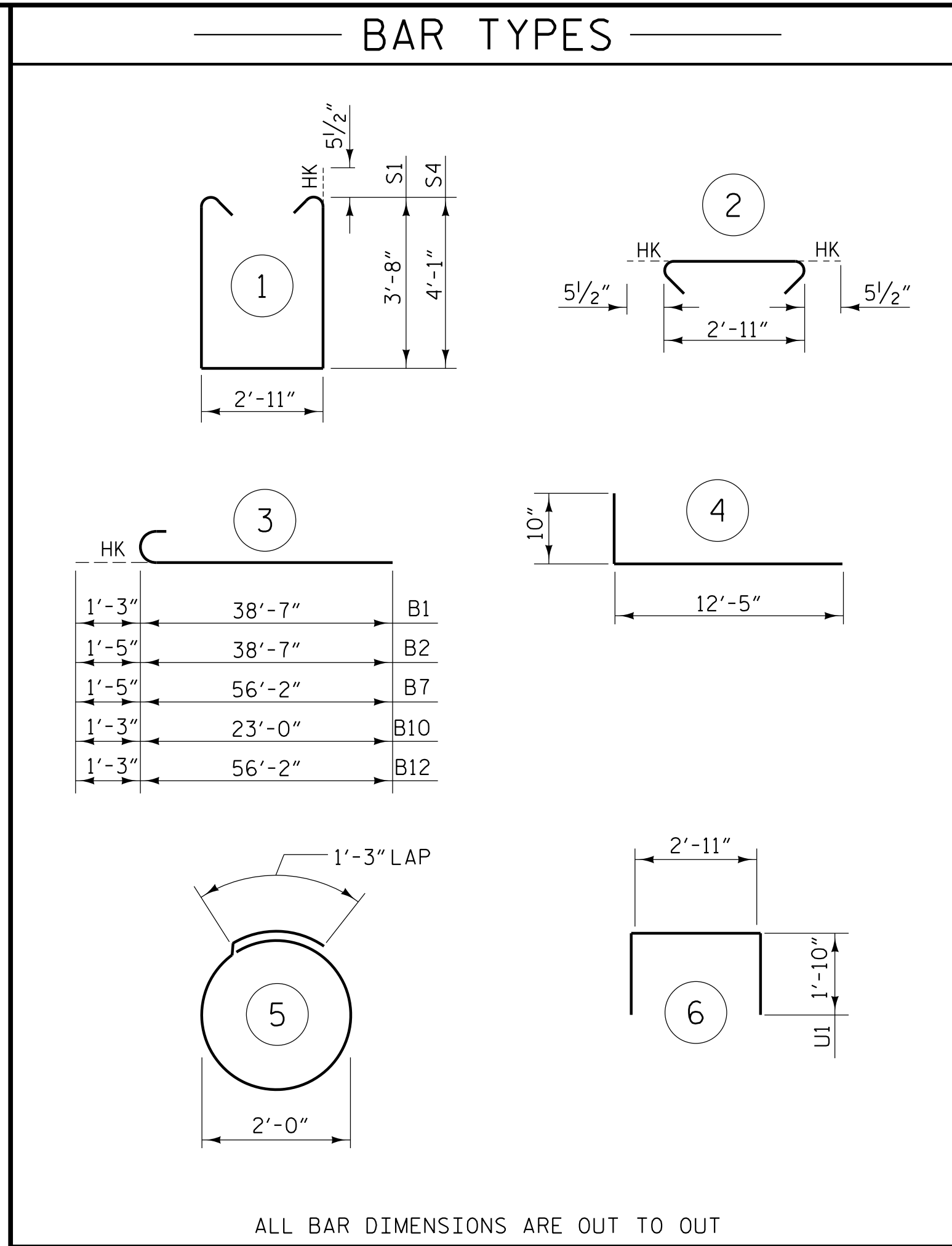
DRAWN BY: W. B. ALLEN DATE: 10/19  
 CHECKED BY: Z. H. BROWN DATE: 11/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

DocuSigned by:  
*[Signature]*  
 BEB2398D9220470...



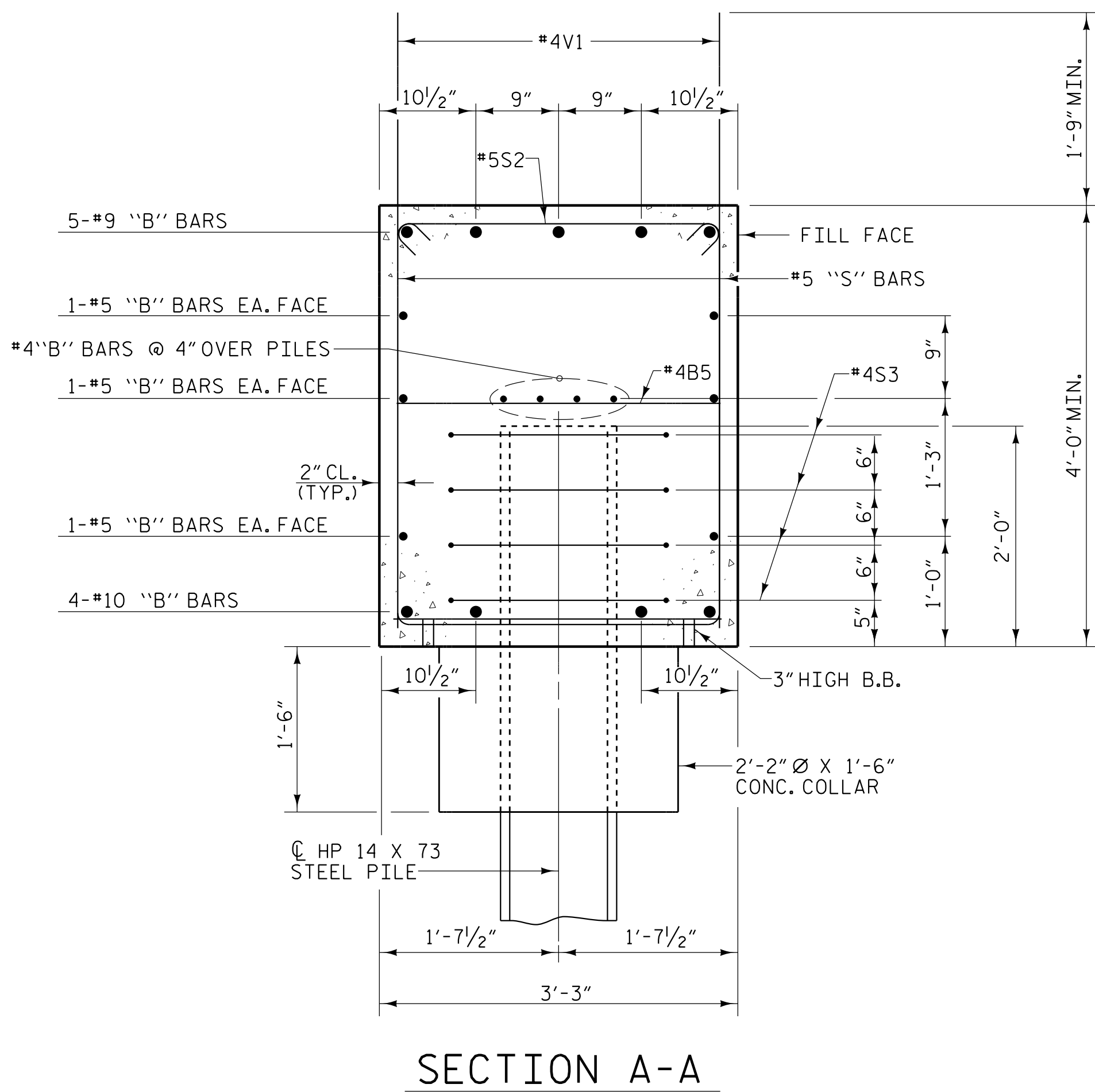
**PILE SPLICE DETAILS**

△ POSITION OF PILE DURING WELDING.

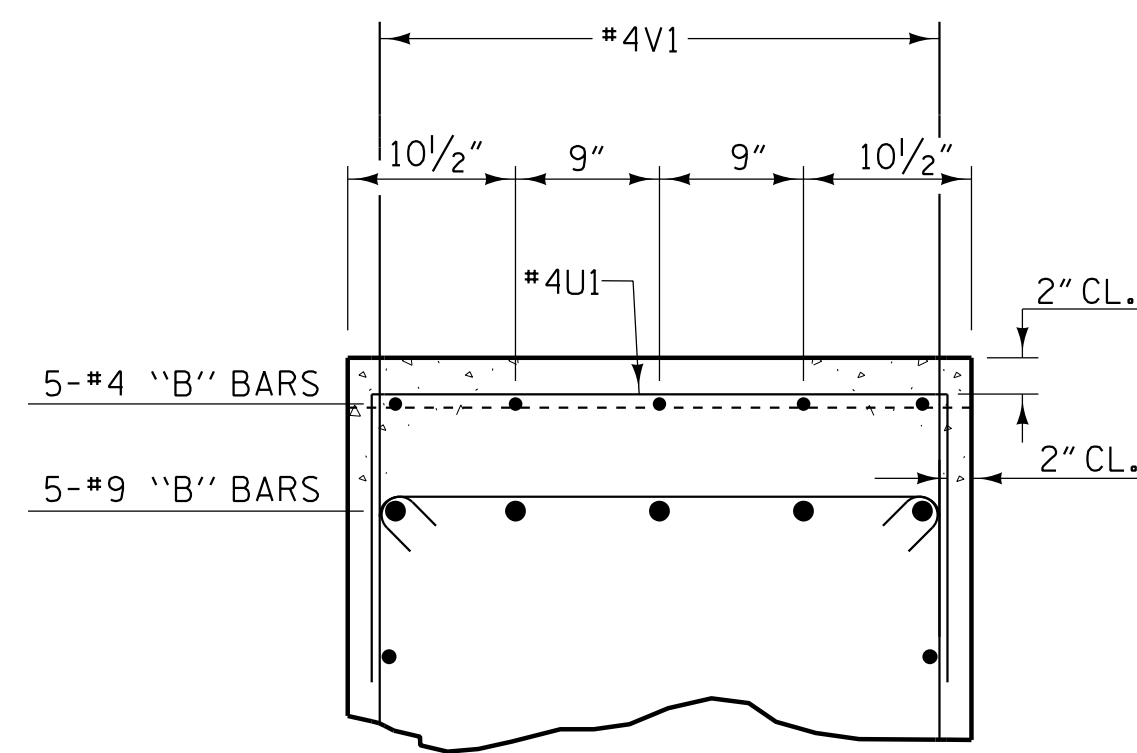


**BILL OF MATERIAL**

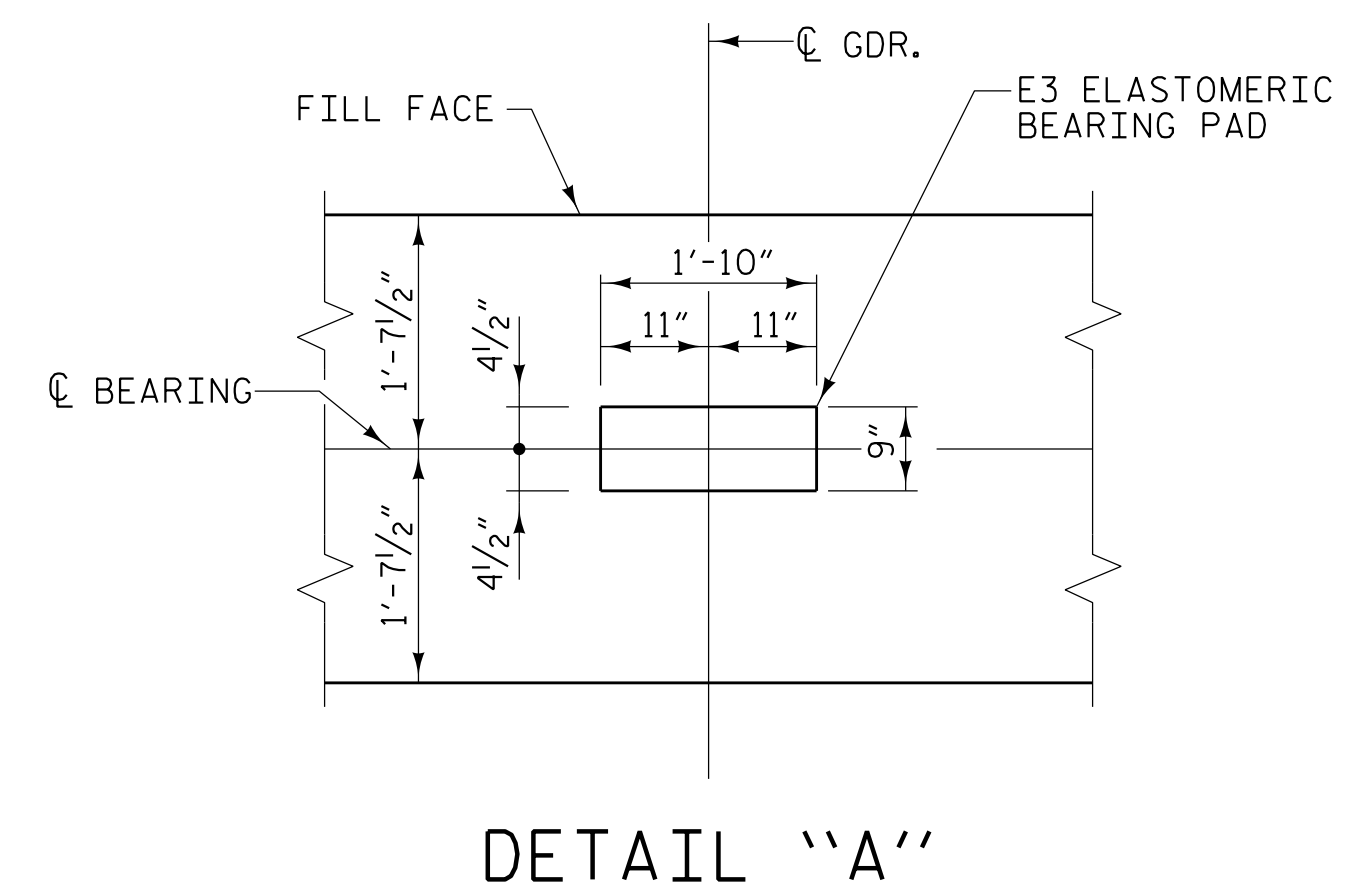
END BENT 2-STAGE I						END BENT 2-STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	3	39'-10"	677	B5	14	#4	STR	2'-11"	27
B2	4	#10	3	40'-0"	688	B7	4	#10	3	57'-7"	991
B3	6	#5	STR	40'-7"	254	B8	6	#5	STR	57'-0"	357
B4	8	#4	STR	21'-3"	114	B9	8	#4	STR	29'-11"	160
B5	9	#4	STR	2'-11"	18	B10	5	#9	3	24'-3"	412
B6	5	#4	STR	12'-7"	42	B11	5	#4	STR	9'-6"	32
H1	38	#5	4	13'-3"	525	B12	5	#9	STR	57'-5"	976
H2	22	#4	STR	3'-11"	58	H1	38	#5	4	13'-3"	525
						H2	22	#4	STR	3'-11"	58
S1	34	#5	1	11'-2"	396						
S2	34	#5	2	3'-10"	136	S1	32	#5	1	11'-2"	373
S3	16	#4	5	7'-7"	81	S2	53	#5	2	3'-10"	212
						S3	24	#4	5	7'-7"	122
						S4	21	#5	1	12'-0"	263
U1	9	#4	6	6'-7"	40						
V1	54	#4	STR	6'-3"	225	U1	7	#4	6	6'-7"	31
V2	34	#4	STR	9'-2"	208						
						V1	80	#4	STR	6'-3"	334
						V2	34	#4	STR	9'-2"	208
<b>TOTAL REINFORCING STEEL</b> 3462 LBS.						<b>TOTAL REINFORCING STEEL</b> 5081 LBS.					
CLASS "A" CONCRETE - CU. YARDS						CLASS "A" CONCRETE - CU. YARDS					
POUR 1 (CAP, COLLARS, LOWER WINGS) 21.8 CU. YDS.						POUR 1 (CAP, COLLARS, LOWER WINGS) 33.3 CU. YDS.					
POUR 2 (UPPER WINGS) 3.3 CU. YDS.						POUR 2 (UPPER WINGS) 3.3 CU. YDS.					
<b>TOTAL</b> 25.1 CU. YDS.						<b>TOTAL</b> 36.6 CU. YDS.					
HP 14 X 73 STEEL PILES 5 PILES REQUIRED - LIN. FEET 200						HP 14 X 73 STEEL PILES 5 PILES REQUIRED - LIN. FEET 275					
PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES - EACH 5						PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES - EACH 5					



**SECTION A-A**



**PART SECTION B-B**



**DETAIL "A"**

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NC License # F-1333

DocuSigned by:

*Robert C. Larson*

BE2398D9220470

PROFESSIONAL SEAL  
ROBERT C. LARSON  
ENGINEER  
14114  
5/19/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 INTEGRAL END BENT 2  
 DETAILS**

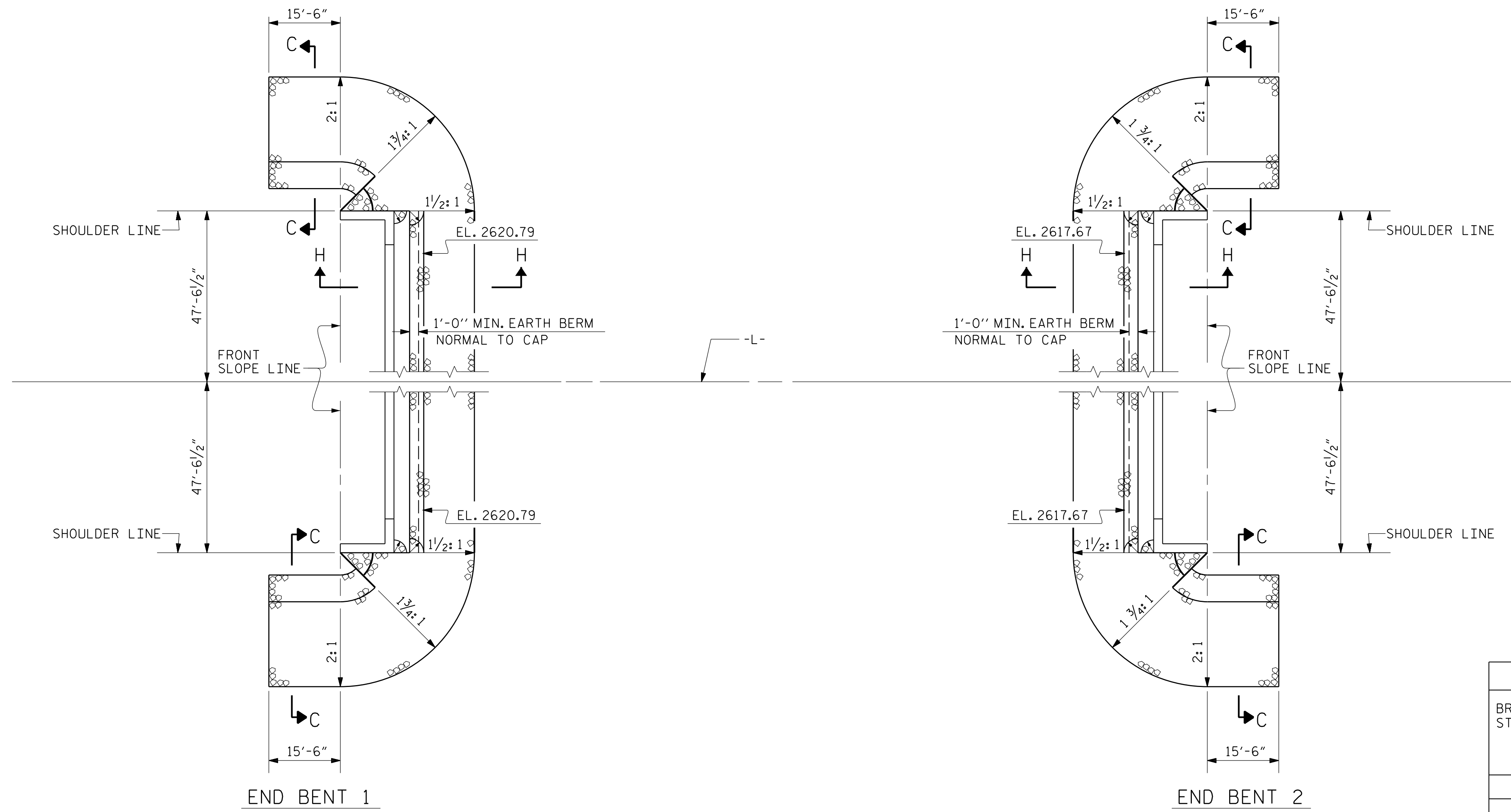
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			2
2			4			49

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 CHECKED BY: Z. H. BROWN DATE: 11/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

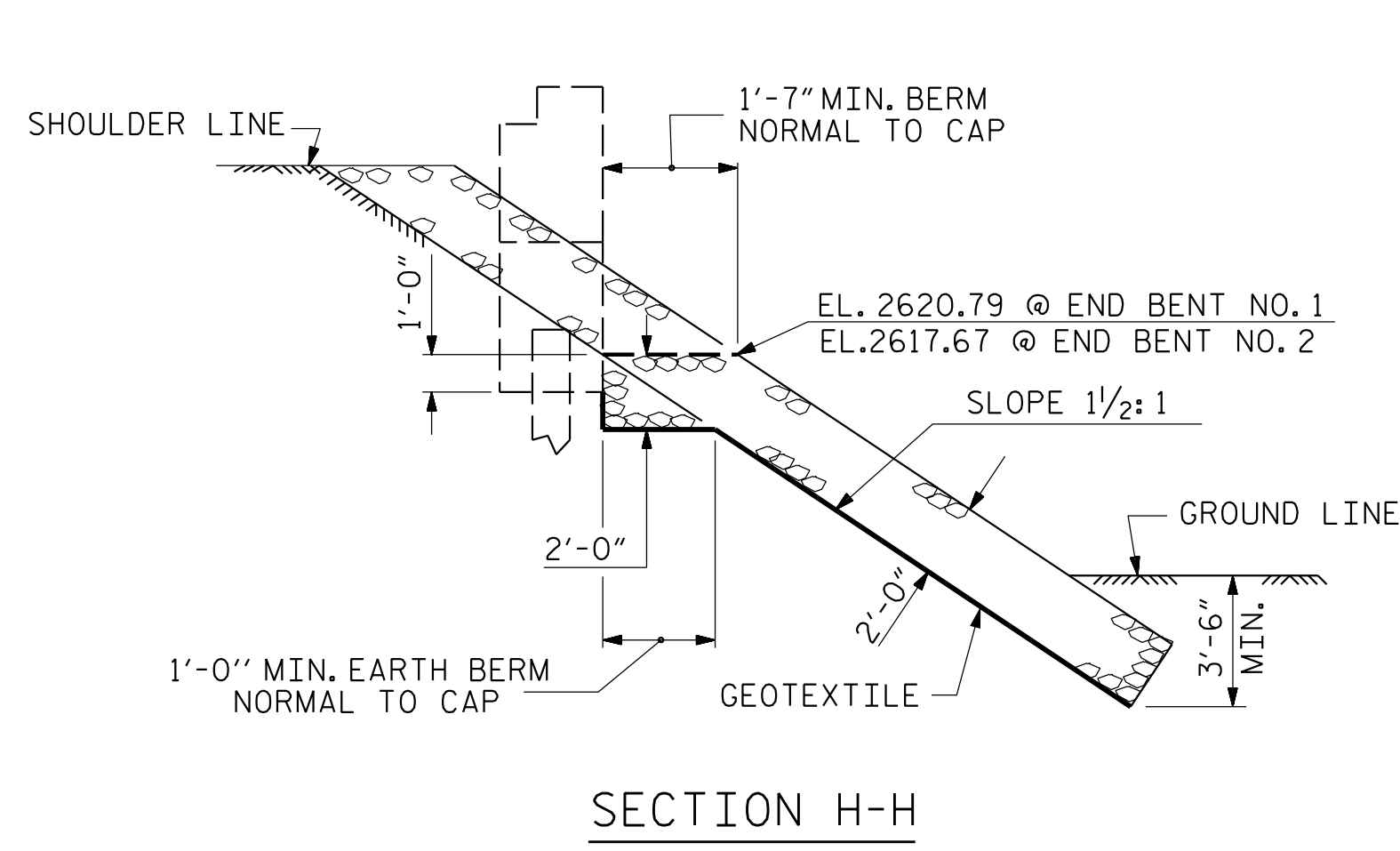
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NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

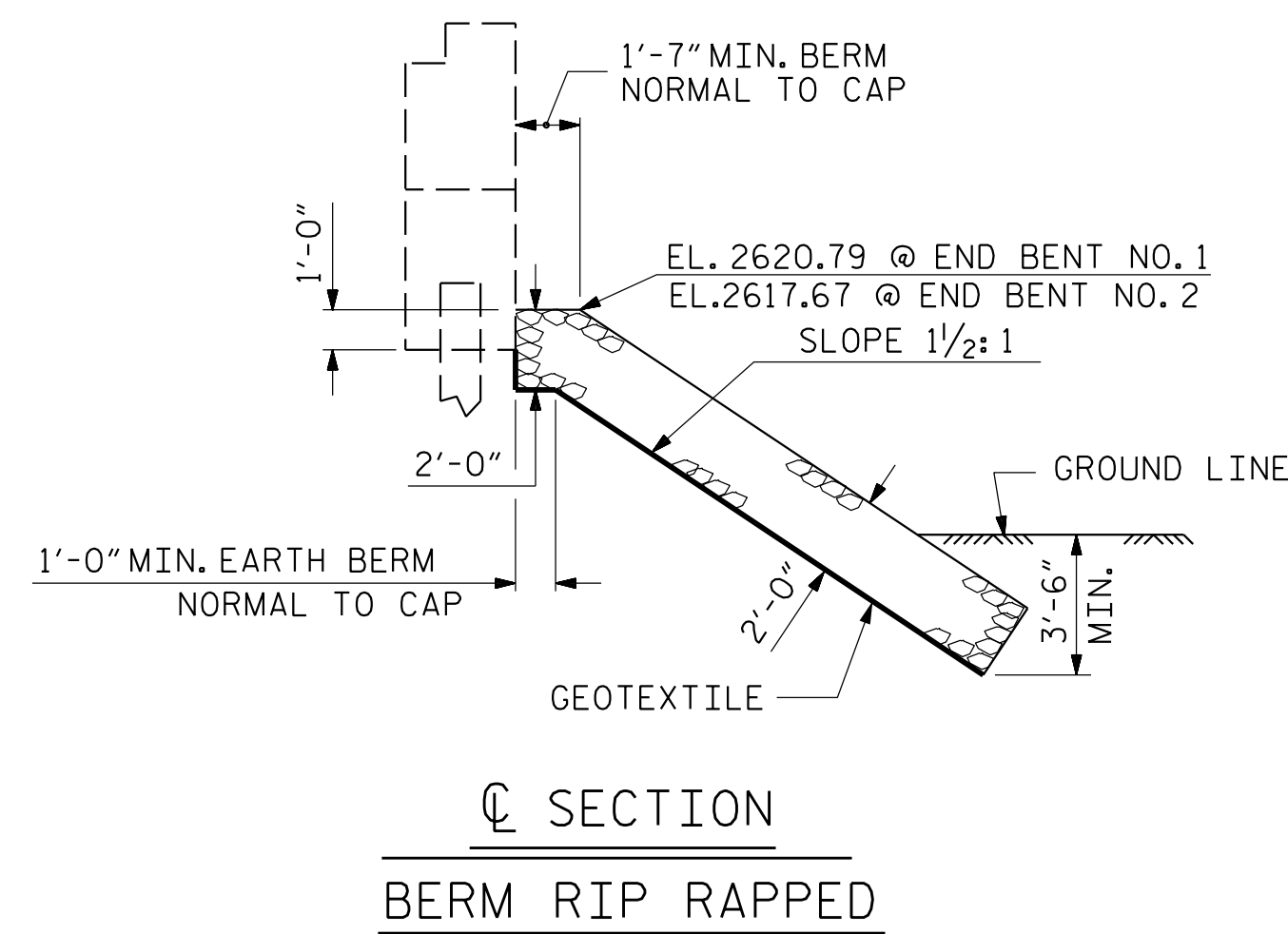


ESTIMATED QUANTITIES		
BRIDGE @ STA. 31+45.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	120	135
END BENT 2	90	100

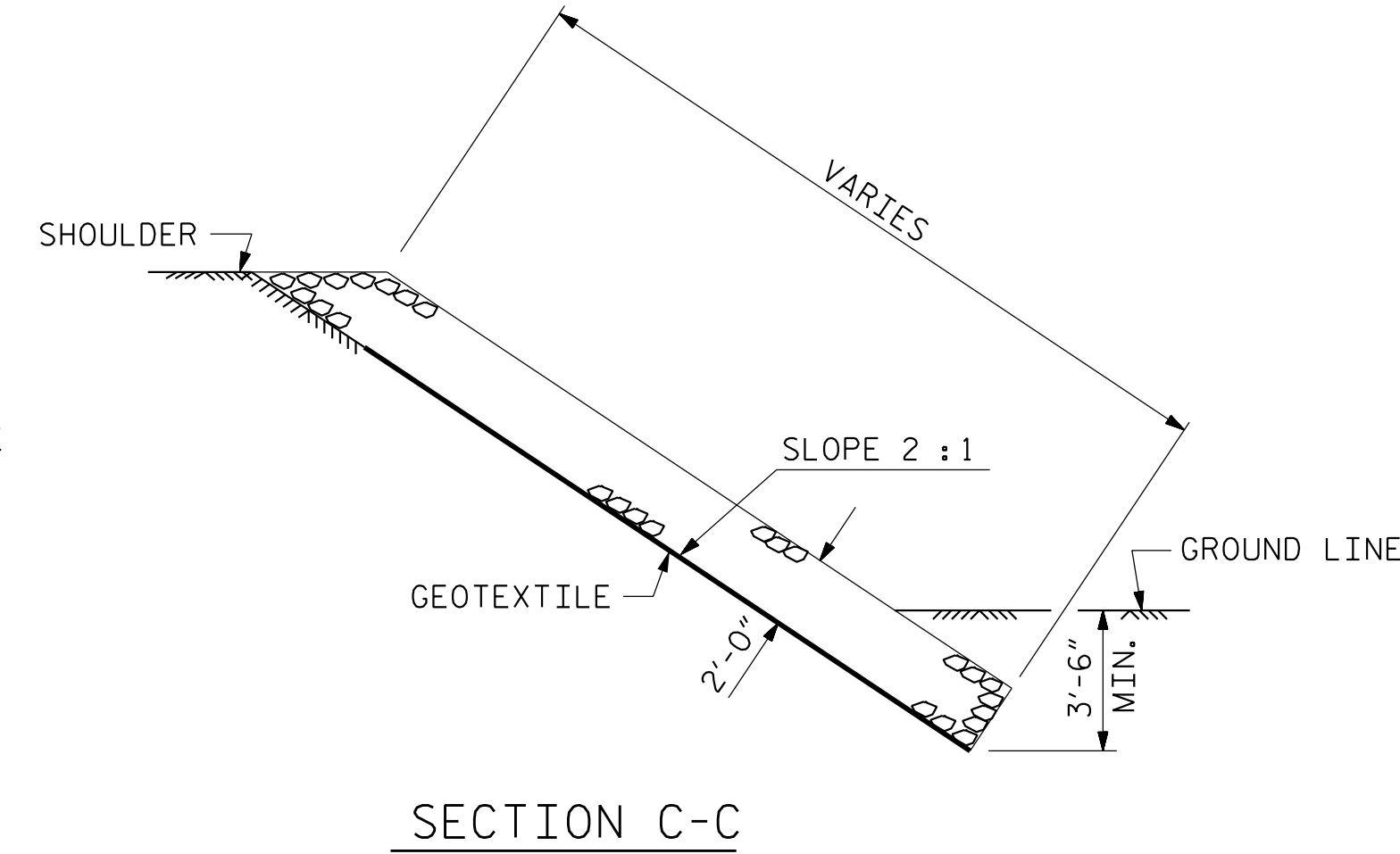
SHOULDER RIP RAP IS HIGHER THAN BERM RIP RAP



SECTION H-H



SECTION C-C  
BERM RIP RAPPED



SECTION C-C

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			49

5/19/2023

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CARY, NC 27518  
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NC License # F-1333

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

DocuSigned by:  
Robert C. Larson  
Professional Engineer  
Seal 1414  
BEB23980222470

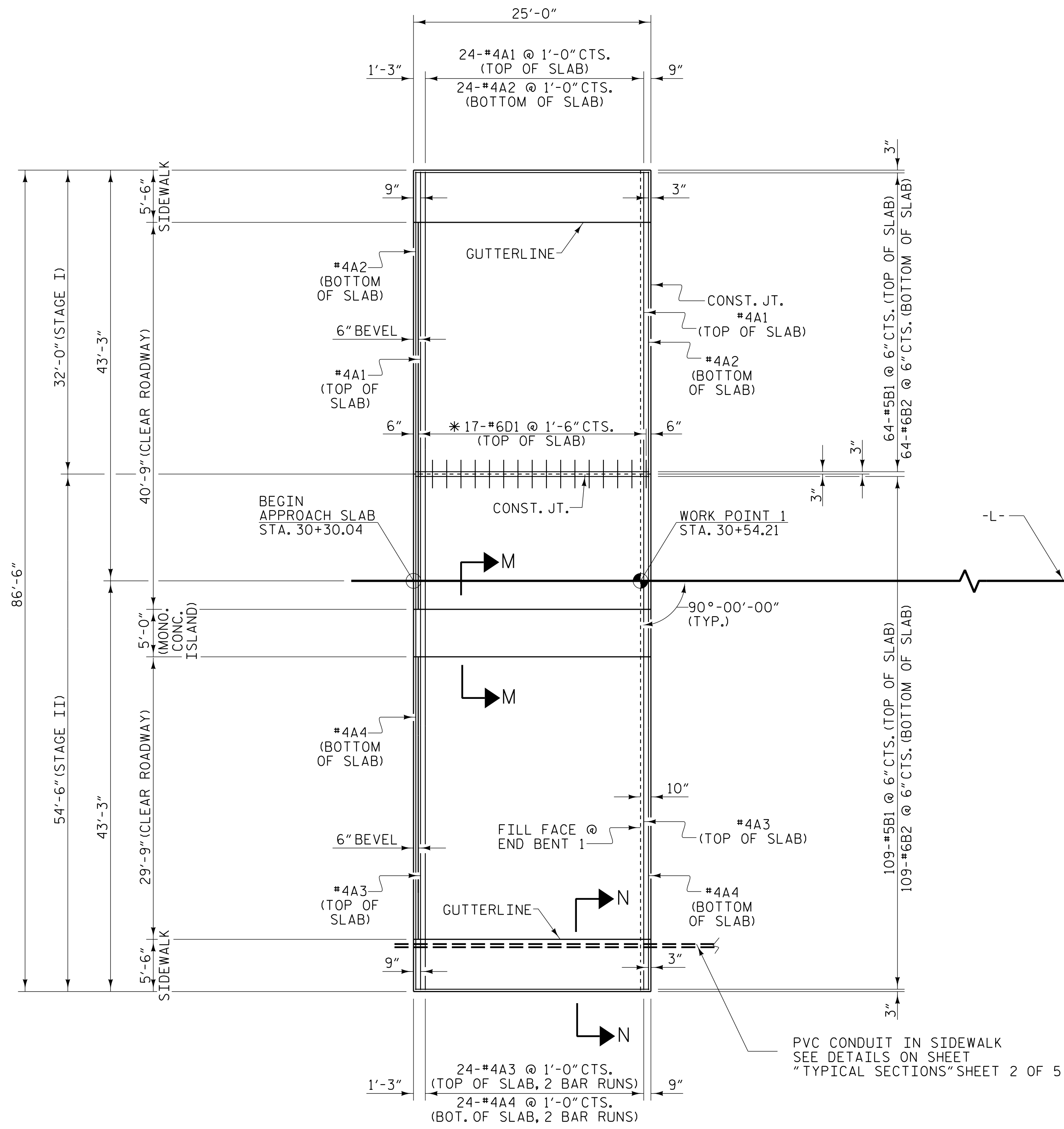
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DESIGN ENGINEER OF RECORD : R. C. LARSON	DATE : 2/23	
ASSEMBLED BY : W. B. ALLEN	DATE : 7/19	
CHECKED BY : Z. H. BROWN	DATE : 7/19	
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/11	MAA/GM
	REV. 12/17	MAA/THC

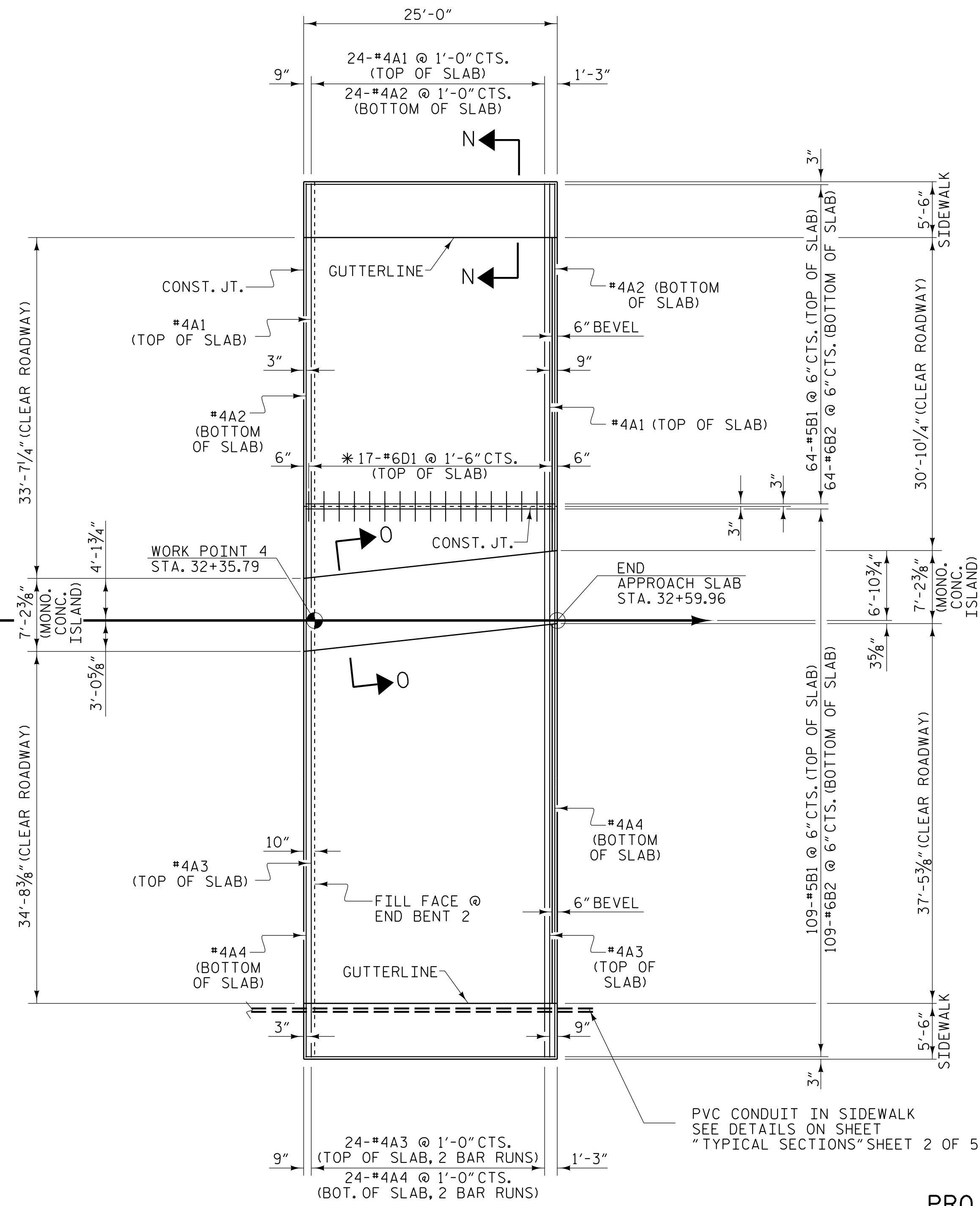
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**PLAN @ END BENT 1**



**PLAN @ END BENT 2**

\* THE #6D1 BARS SHALL PROJECT 1'-6" INTO STAGE II CONSTRUCTION.

DIMENSIONS ARE TYPICAL FOR BOTH APPROACH SLABS

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

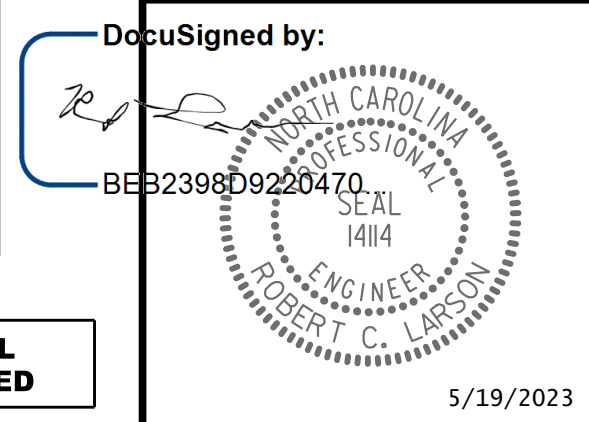
SHEET 1 OF 4

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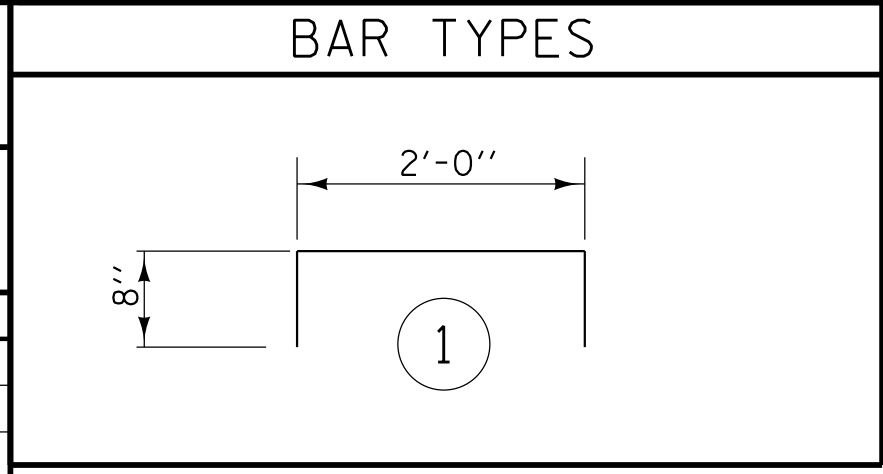
**BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

5/19/2023

APPROACH SLAB BILL OF MATERIAL						SIDEWALK BILL OF MATERIAL						APPROACH SLAB BILL OF MATERIAL						SIDEWALK BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D) (STAGE I)						FOR ONE APPROACH SLAB (2 REQ'D) (STAGE I)						FOR ONE APPROACH SLAB (2 REQ'D) (STAGE II)						FOR ONE APPROACH SLAB (2 REQ'D) (STAGE II)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	31'-8"	550	* B3	4	#4	STR	24'-8"	66	* A3	52	#4	STR	28'-1"	976	* B3	4	#4	STR	24'-8"	66
A2	26	#4	STR	31'-8"	550	* G1	25	#4	STR	5'-0"	84	A4	52	#4	STR	27'-11"	970	* G1	25	#4	STR	5'-0"	84
* B1	64	#5	STR	24'-2"	1613	* U1	8	#4	1	3'-4"	18	* B1	109	#5	STR	24'-2"	2747	* U1	8	#4	1	3'-4"	18
B2	64	#6	STR	24'-8"	2371							B2	109	#6	STR	24'-8"	4038						
* D1	17	#6	STR	3'-0"	77																		
REINFORCING STEEL LBS. 2921						REINFORCING STEEL LBS. 5009						REINFORCING STEEL LBS. 5009						REINFORCING STEEL LBS. 5009					
* EPOXY COATED REINFORCING STEEL LBS. 2240						* EPOXY COATED REINFORCING STEEL LBS. 168						* EPOXY COATED REINFORCING STEEL LBS. 3723						* EPOXY COATED REINFORCING STEEL LBS. 168					
CLASS AA CONCRETE C. Y. 36.6						CLASS AA CONCRETE C. Y. 3.1						CLASS AA CONCRETE C. Y. 56.5						CLASS AA CONCRETE C. Y. 3.1					

MONOLITHIC CONC. ISLAND BILL OF MATERIAL						MONOLITHIC CONC. ISLAND BILL OF MATERIAL					
FOR END BENT 1						FOR END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B4	3	#4	STR	24'-8"	49	* B5	4	#4	STR	24'-9"	66
* G2	17	#4	STR	3'-8"	42	* G3	16	#4	STR	5'-9"	61
* EPOXY COATED REINFORCING STEEL LBS. 91						* EPOXY COATED REINFORCING STEEL LBS. 127					
CLASS AA CONCRETE C. Y. 1.8						CLASS AA CONCRETE C. Y. 2.6					



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

**NOTES**

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

STAGE I APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE STAGE I BRIDGE DECK. STAGE II APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE STAGE II AND CLOSURE POUR OF BRIDGE DECK.

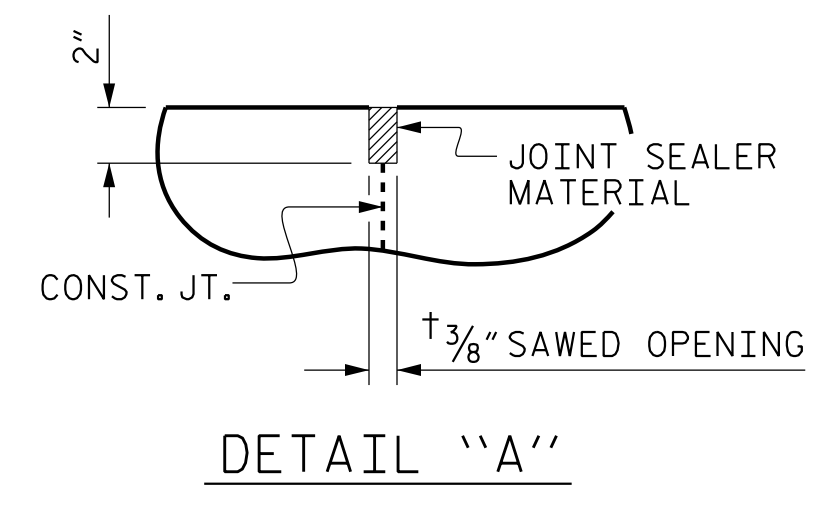
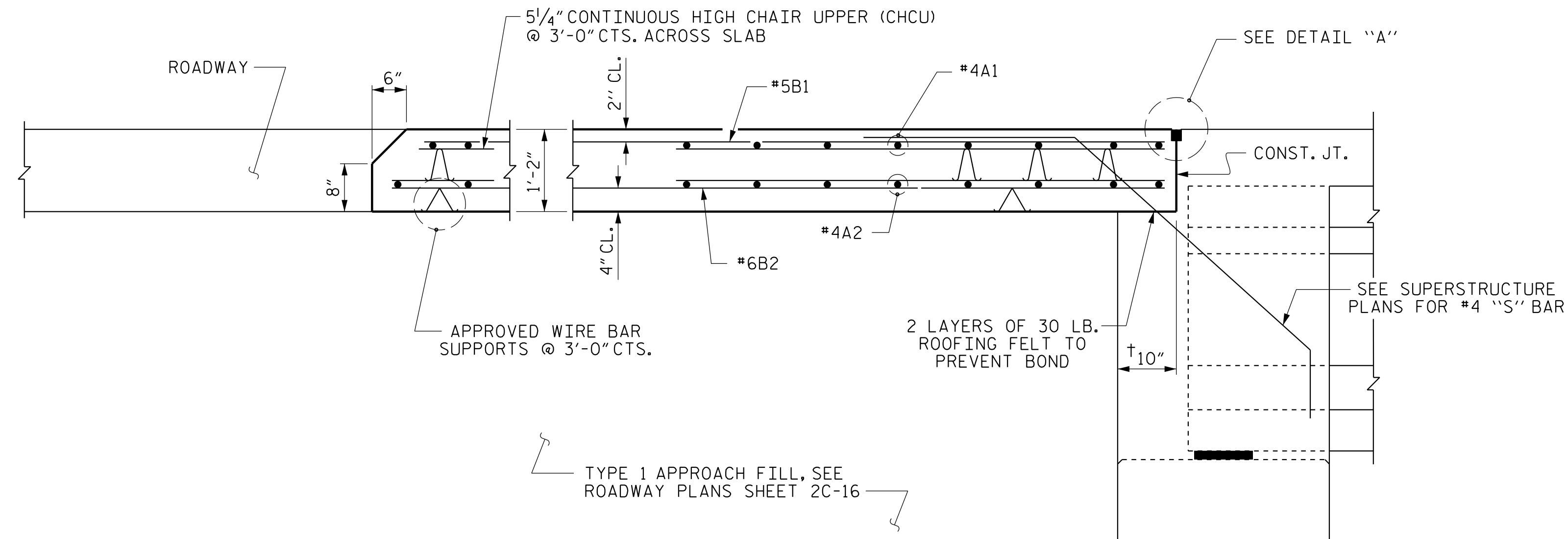
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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

AT THE CONTRACTORS OPTION, "TYPE 1A - ALTERNATE APPROACH FILL" (ROADWAY STD. 423.02) MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT IN LIEU OF "TYPE 1 - APPROACH FILL". SEE SHEET 3 OF 4 FOR DETAILS.

PAYMENT FOR SIDEWALK AND MONOLITHIC CONCRETE ISLAND SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR BRIDGE APPROACH SLAB.

ALL REINFORCING STEEL IN THE SIDEWALK AND MONOLITHIC CONCRETE ISLAND SHALL BE EPOXY COATED.



† NORMAL TO END BENT

**SECTION THRU SLAB**  
(TYPE 1 - APPROACH FILL)

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DocuSigned by:

*Robert C. Larson*

BEB2398D9220470...

**NORTH CAROLINA PROFESSIONAL ENGINEER**  
SEAL 1414  
ROBERT C. LARSON  
10/19/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
STATION: 31+45.00 -L- POT

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

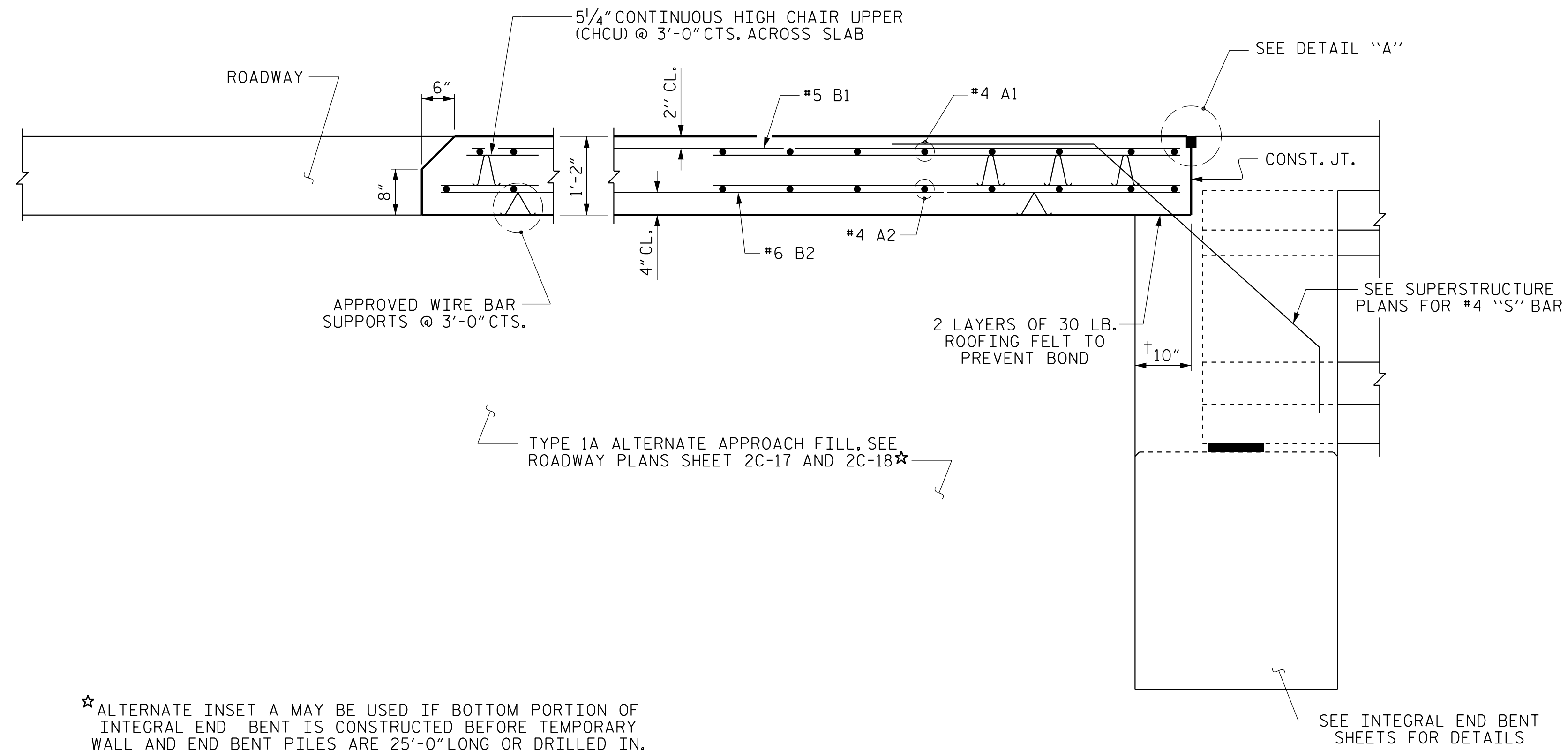
**BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			

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CHECKED BY: Z. H. BROWN DATE: 7/19  
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★ ALTERNATE INSET A MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

### SECTION THRU SLAB

(TYPE 1A - ALTERNATE APPROACH FILL)

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 CARY, NC 27518  
 P: 919.851.1912 www.NV5.com  
 NC License # F-13333

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 3 OF 4

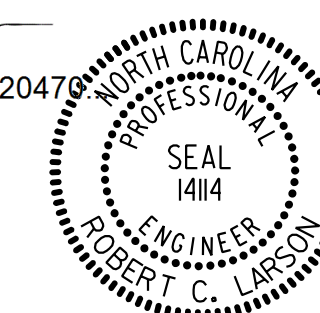
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 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

## BRIDGE APPROACH SLAB DETAILS

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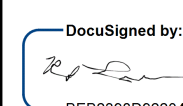
10/19/2023

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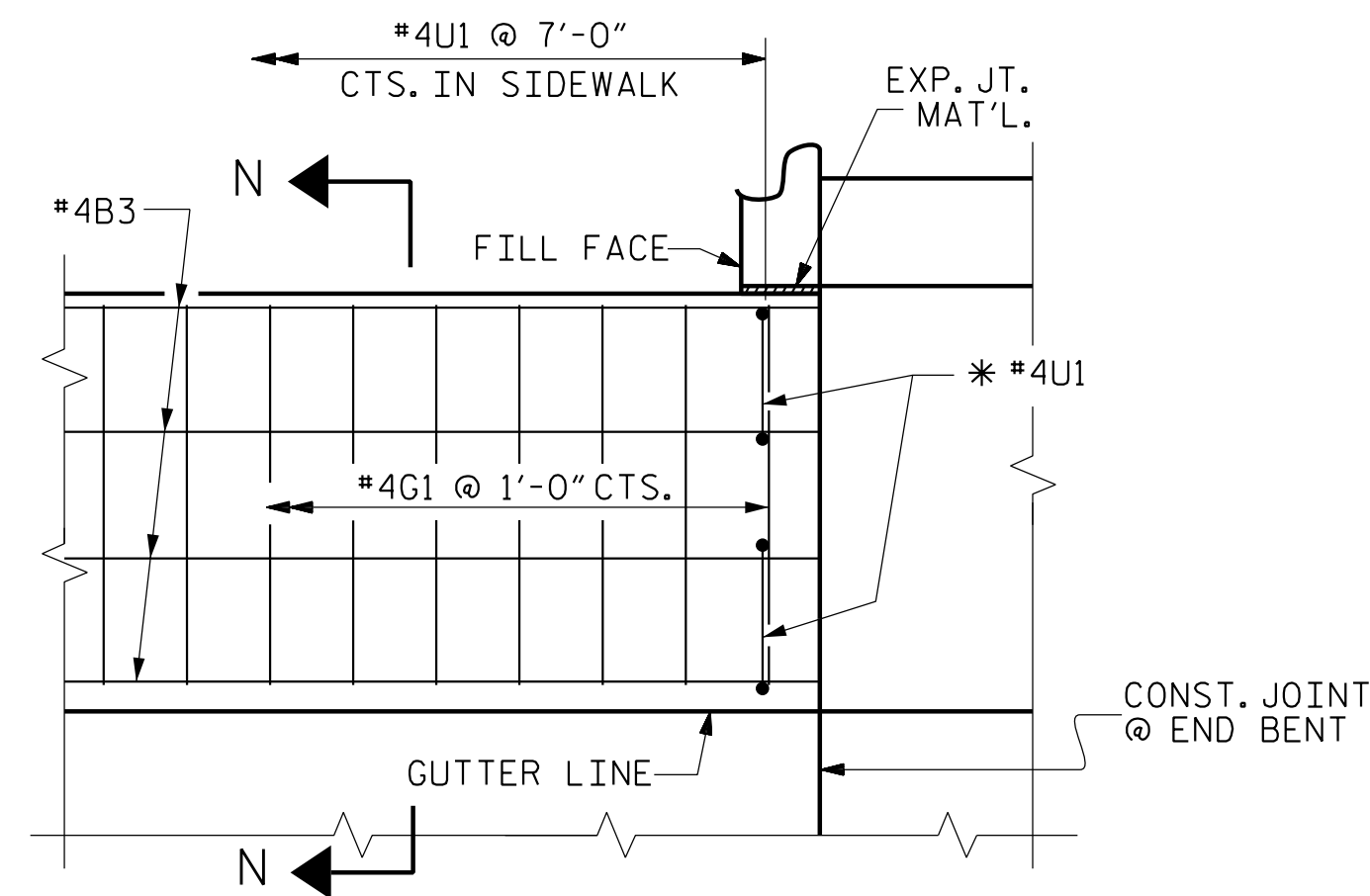
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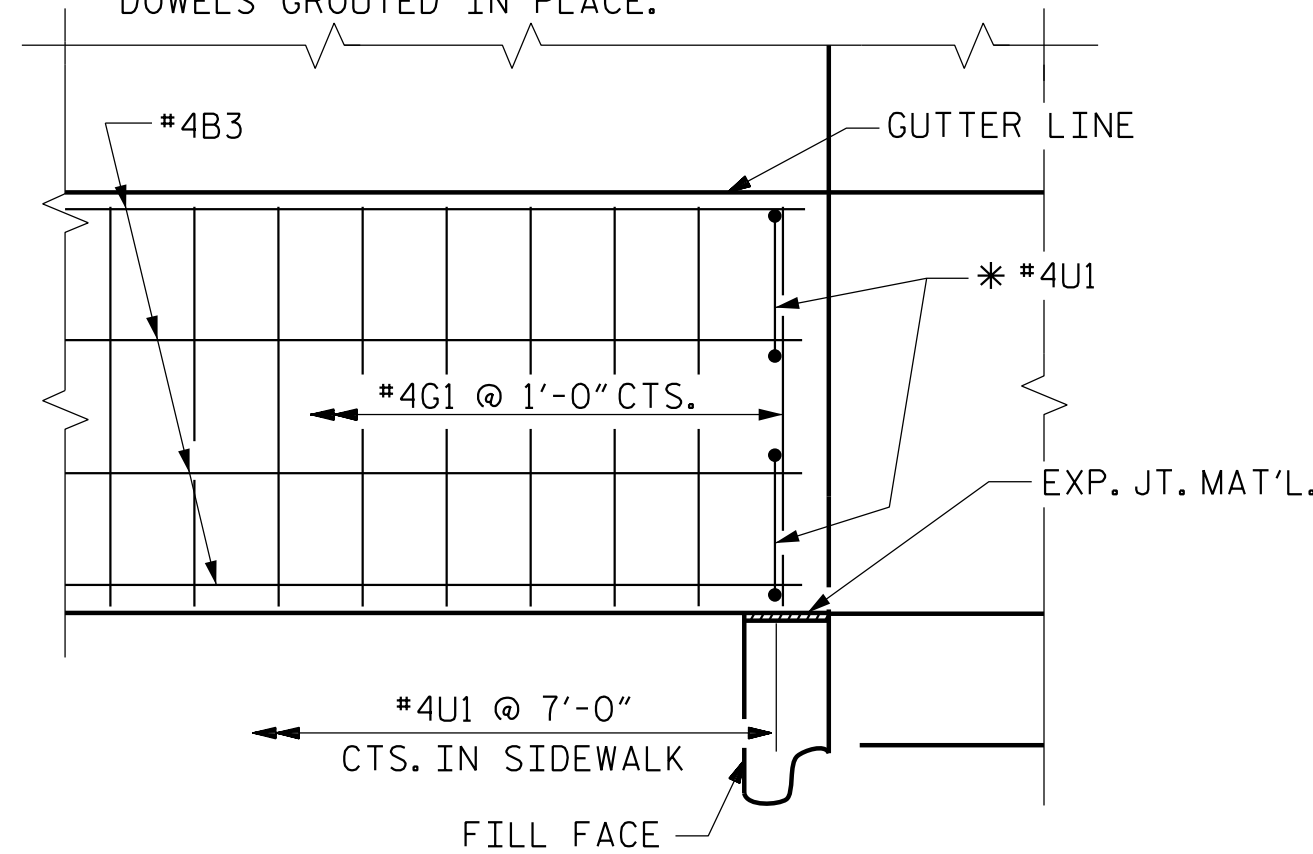
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 CHECKED BY: Z. H. BROWN DATE: 7/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/23

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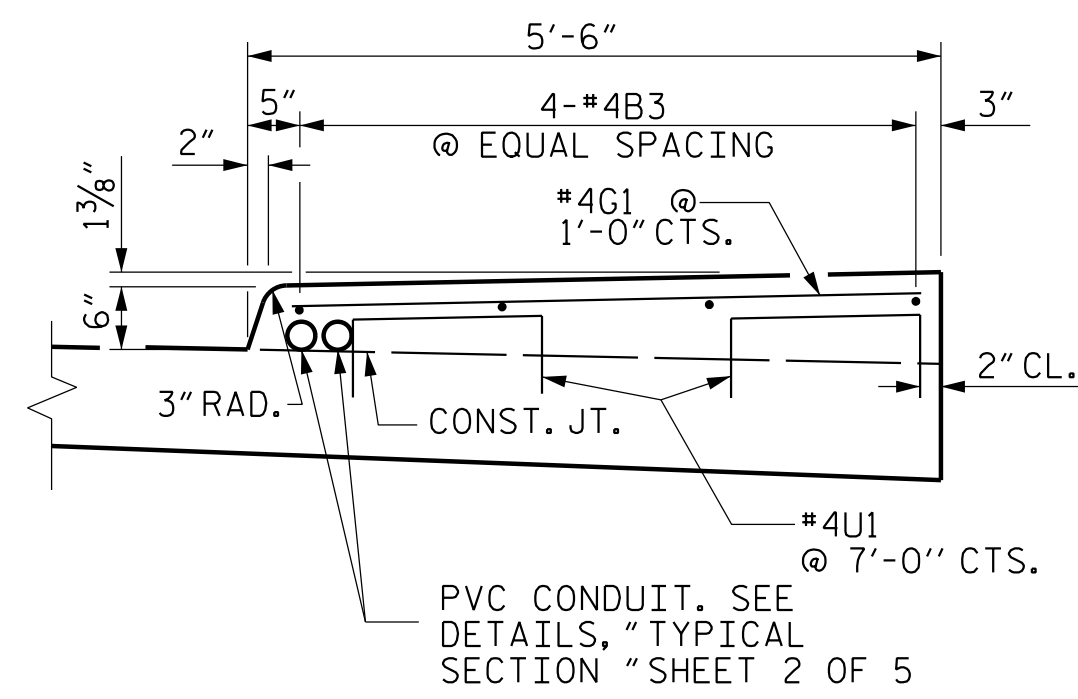


\* THESE BARS ARE TO BE PLACED AFTER SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE DOWELS GROUTED IN PLACE.



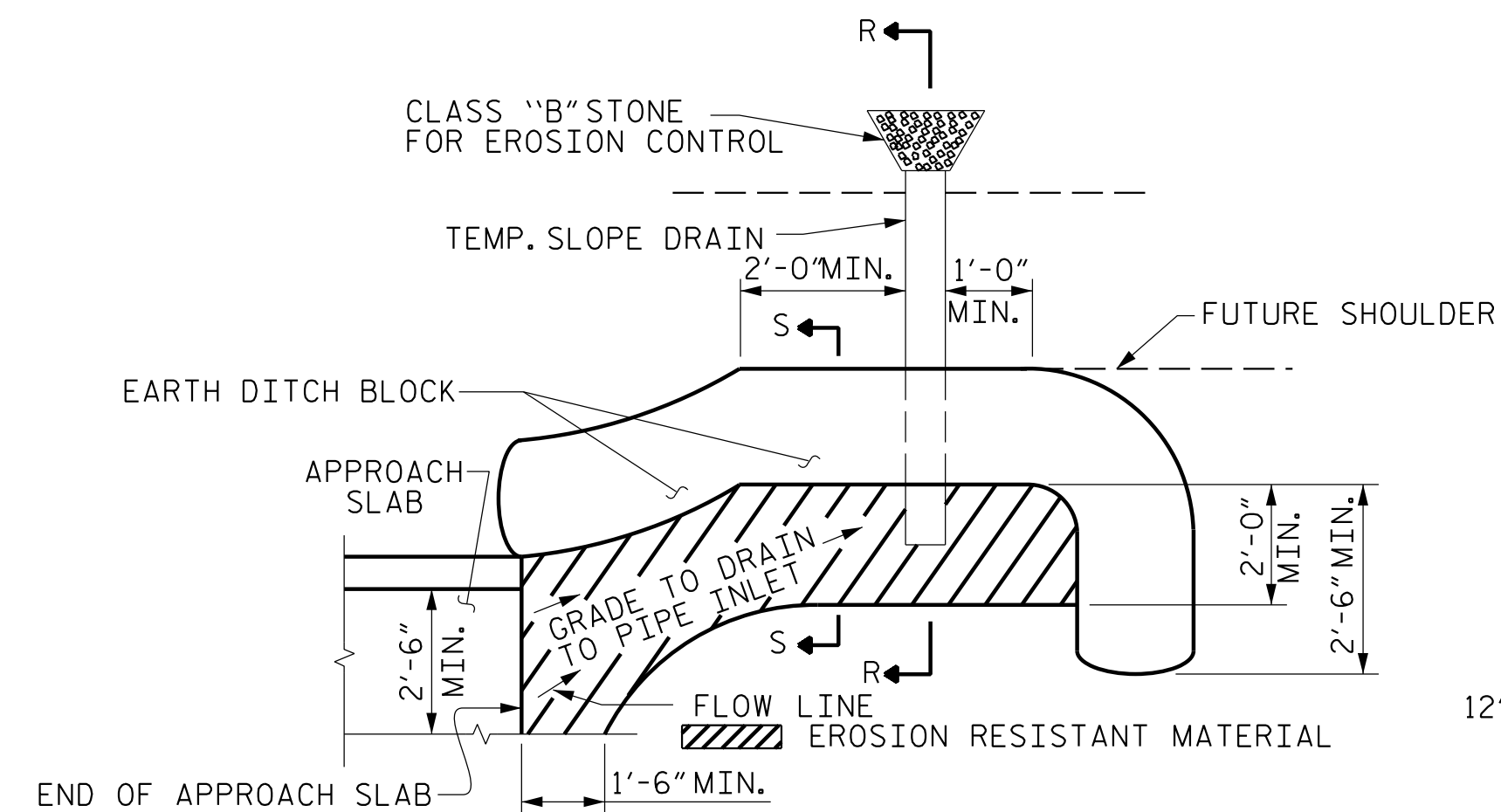
PLAN

**DETAILS OF SIDEWALK ON APPROACH SLAB**



SECTION N-N

**SIDEWALK DETAILS**

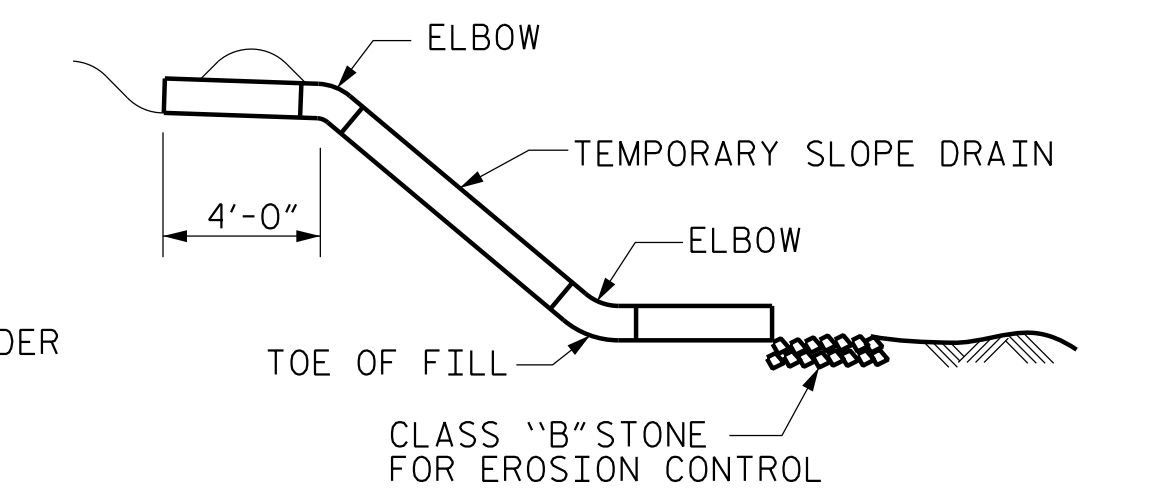


PLAN VIEW

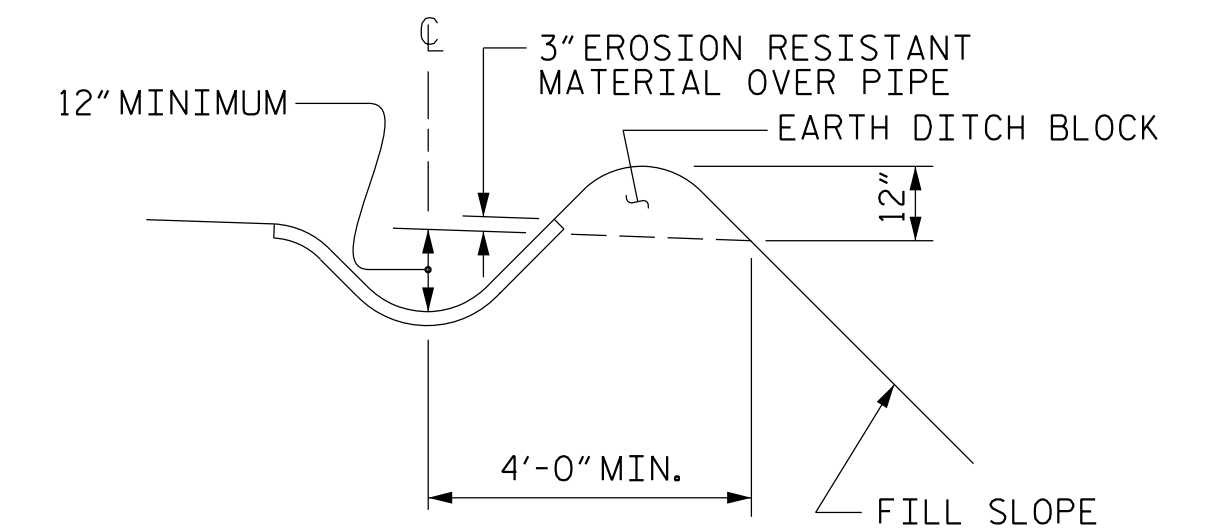
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

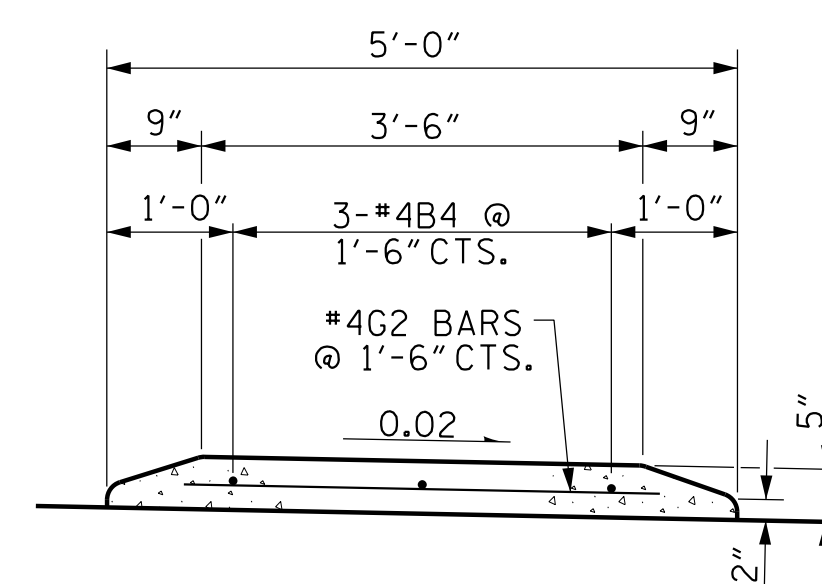
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



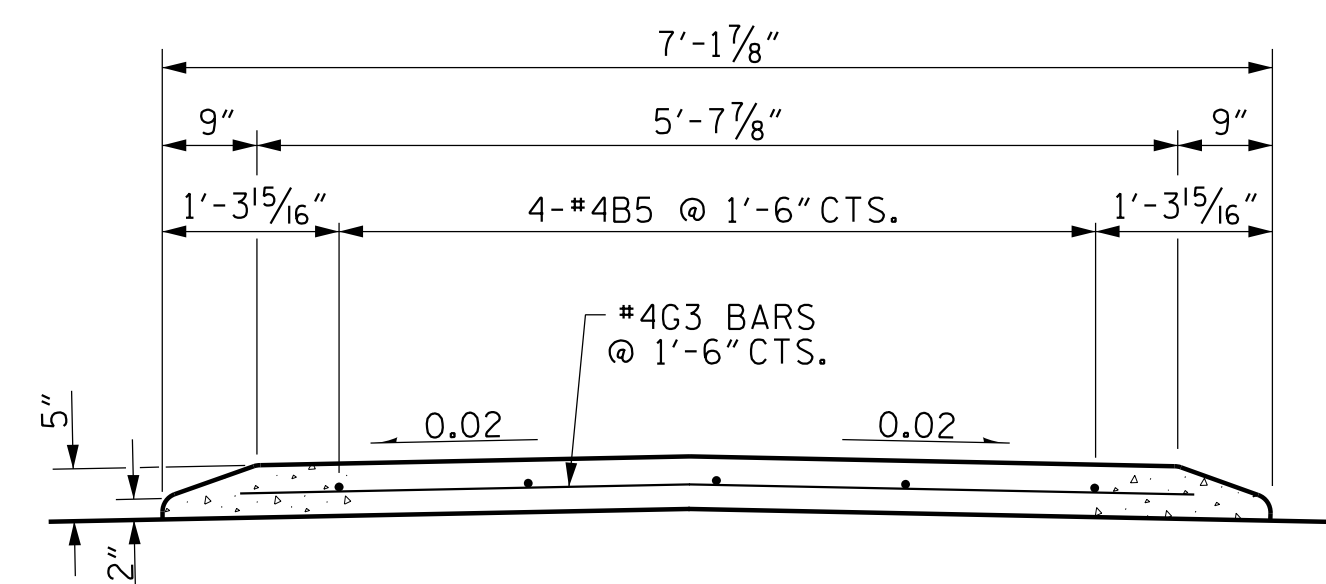
SECTION R-R



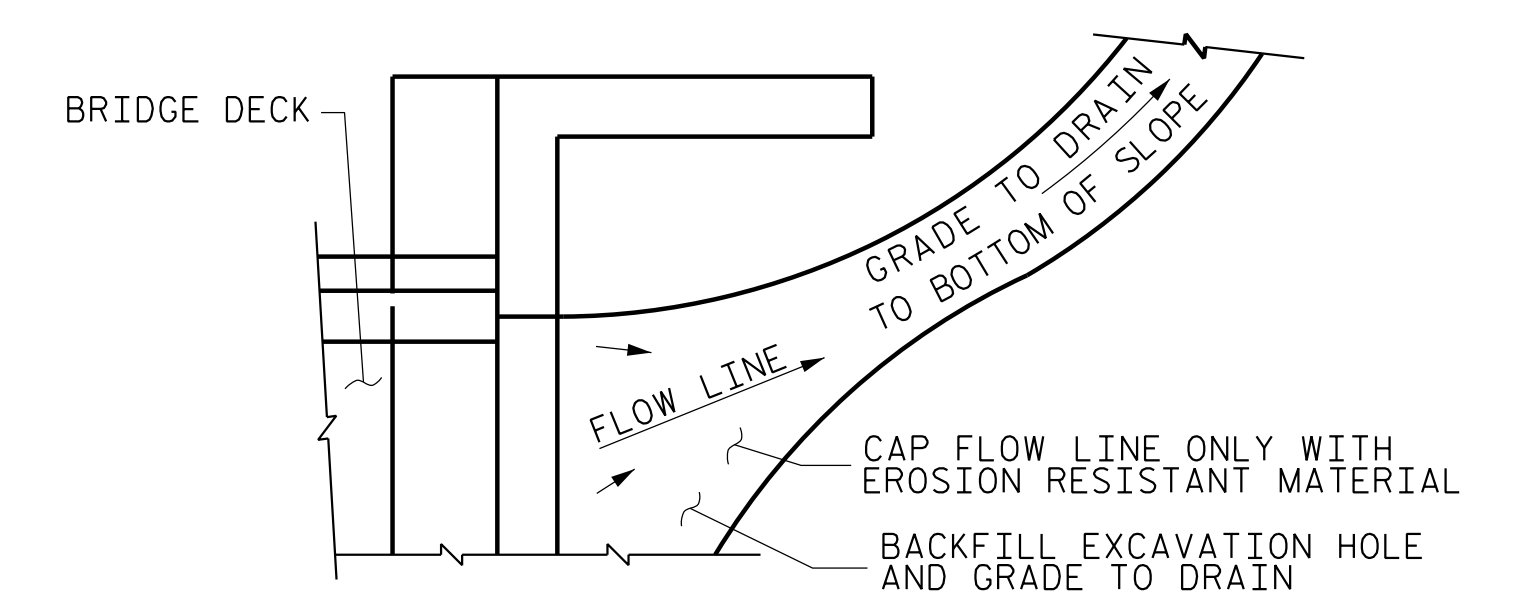
SECTION S-S



SECTION M-M

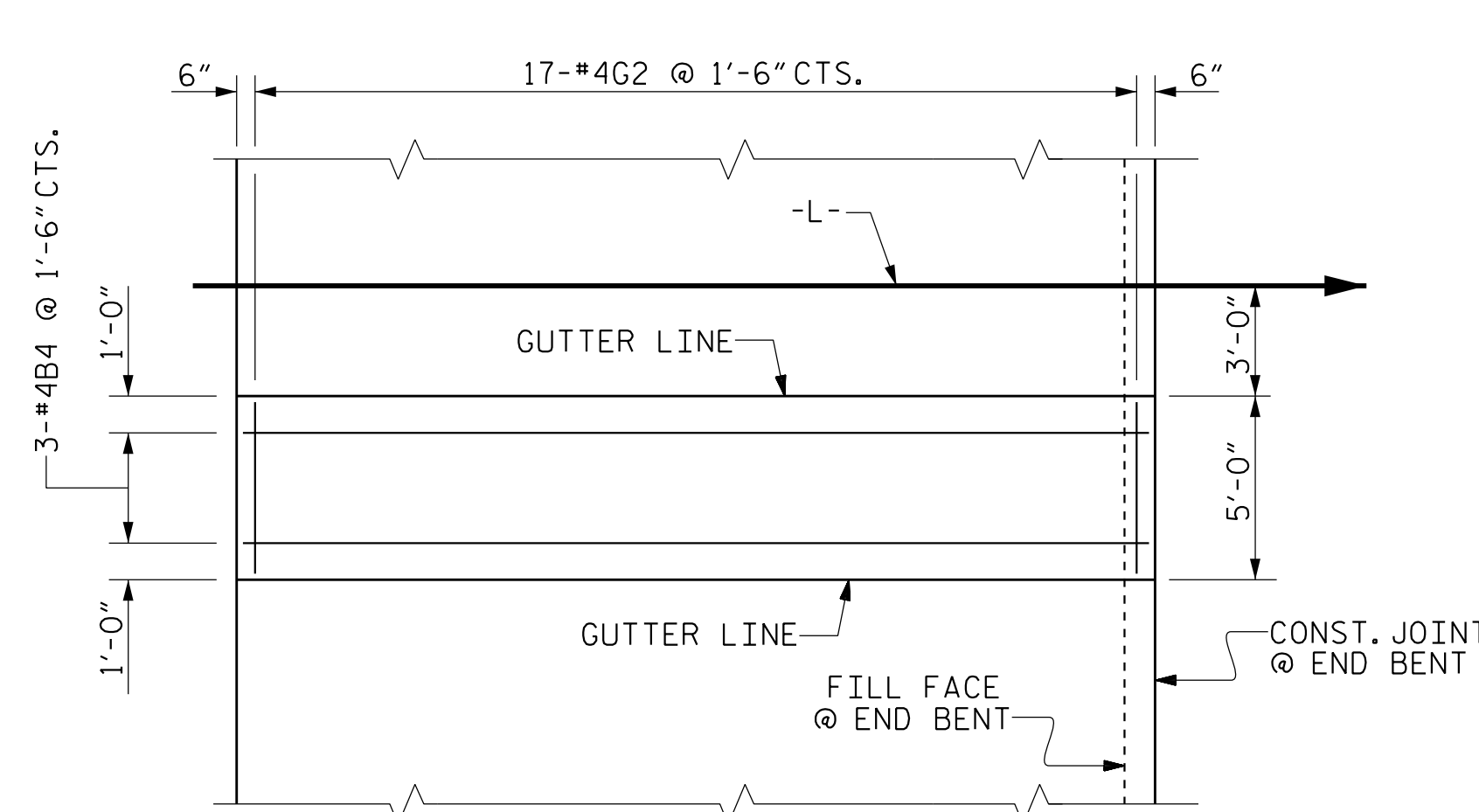


SECTION O-O

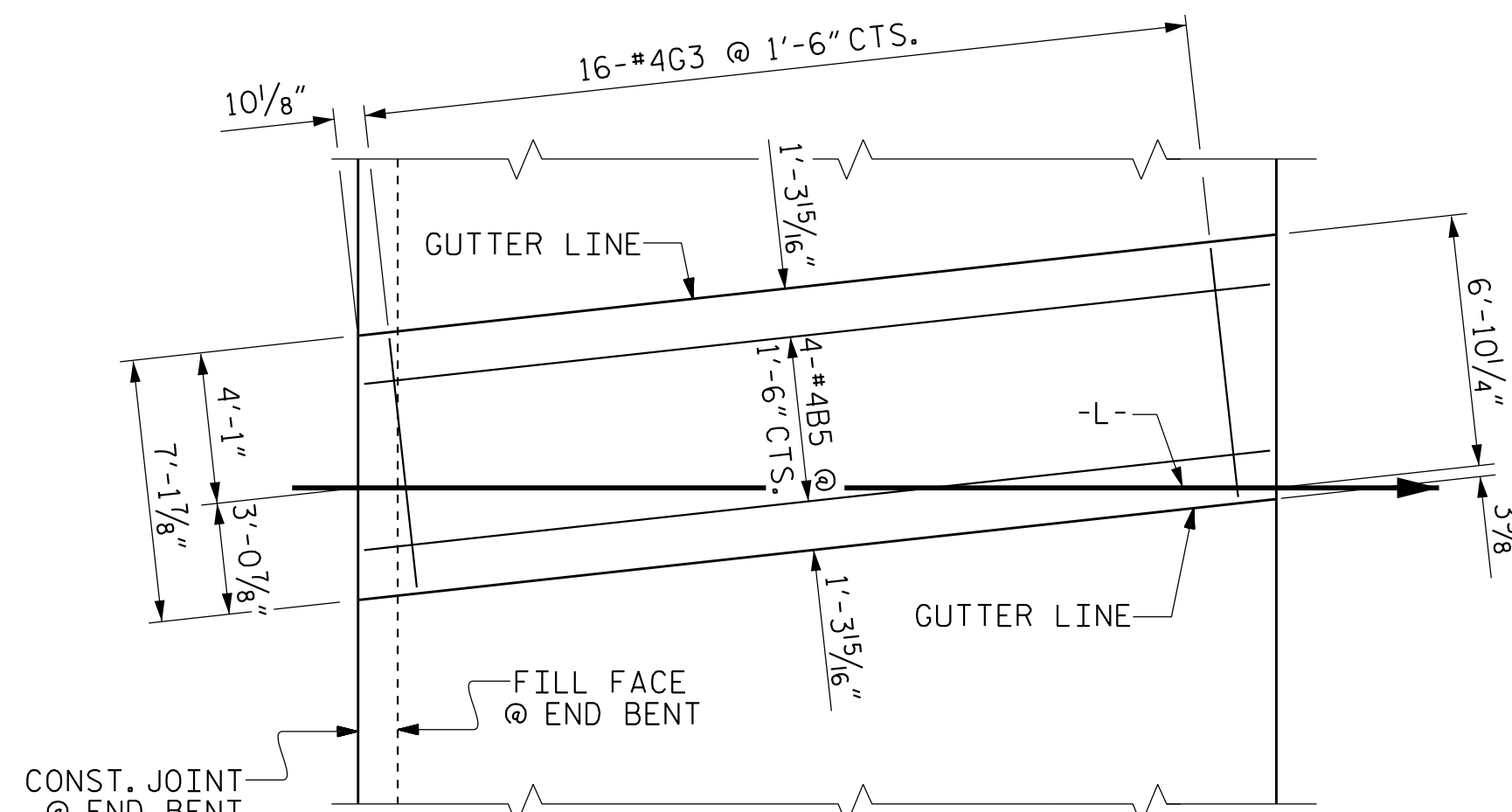


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

**TEMPORARY DRAINAGE DETAIL**



PLAN @ END BENT 1



PLAN @ END BENT 2

**DETAILS OF MONOLITHIC CONCRETE ISLAND ON APPROACH SLAB**

PLANS PREPARED BY:

**NV5**

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NC License # F-1333

DocuSigned by:

ROBERT C. LARSON  
PROFESSIONAL SEAL  
14114  
ENGINEER  
5/19/2023

PROJECT NO. U-5839  
HAYWOOD COUNTY  
 STATION: 31+45.00 -L- POT

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**BRIDGE APPROACH SLAB DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			49
2			4			49

DRAWN BY : W. B. ALLEN DATE : 5/19  
 CHECKED BY : Z. H. BROWN DATE : 7/19  
 DESIGN ENGINEER OF RECORD: R. C. LARSON DATE : 2/23

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

5/17/2023 7:03:37 PM R:\Structures\Bridges over Richard Creek\19 U5839-SMU.AS4.43086.dgn

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "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  $\frac{3}{16}$ " 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  $\frac{1}{16}$ " INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

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

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

### SPECIAL NOTES:

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

# ENGLISH

JANUARY, 1990

STD. NO. SN