

**TIP PROJECT: BR-0026**

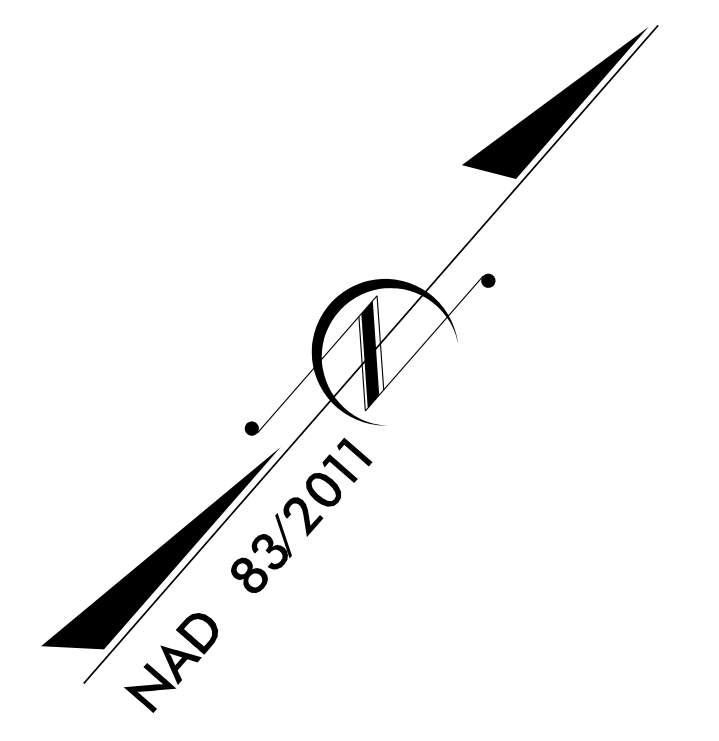
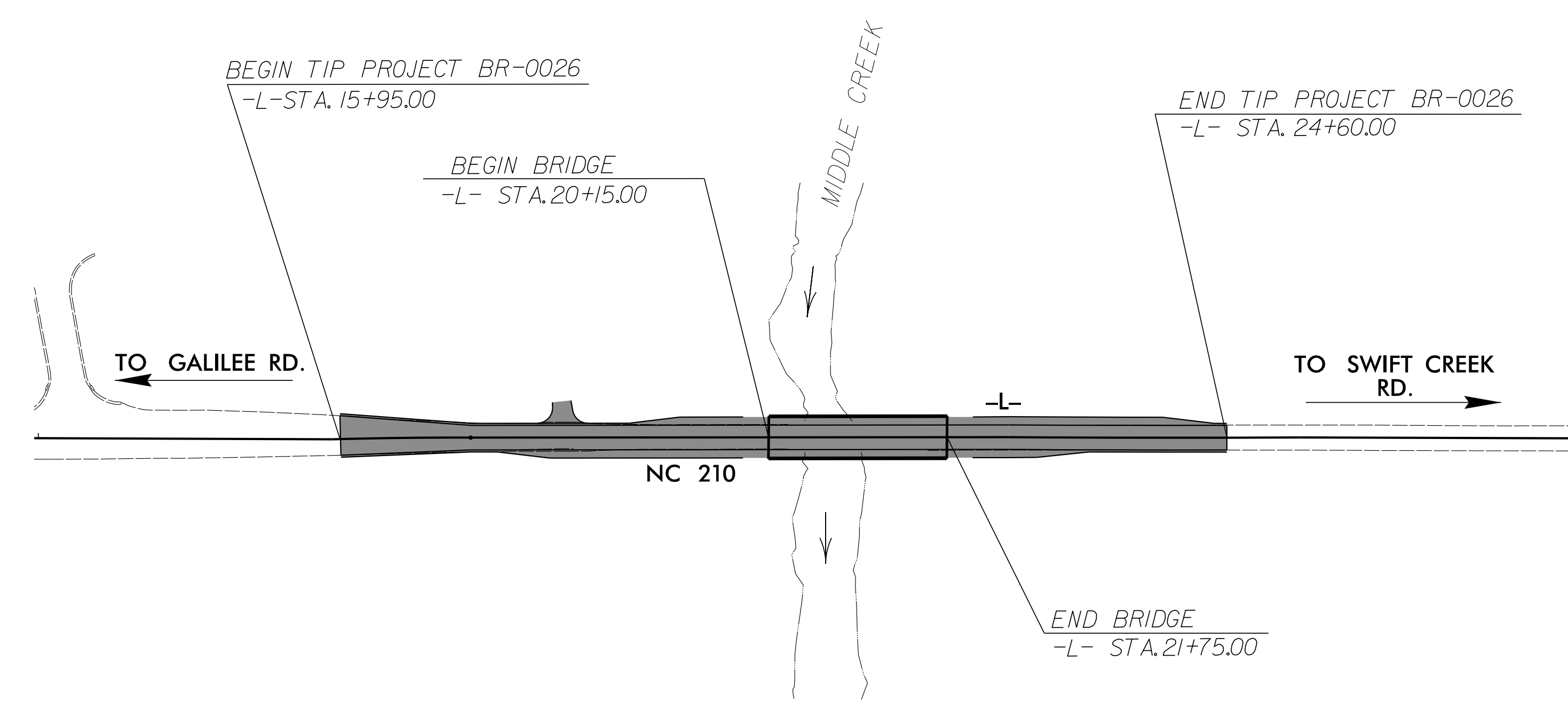
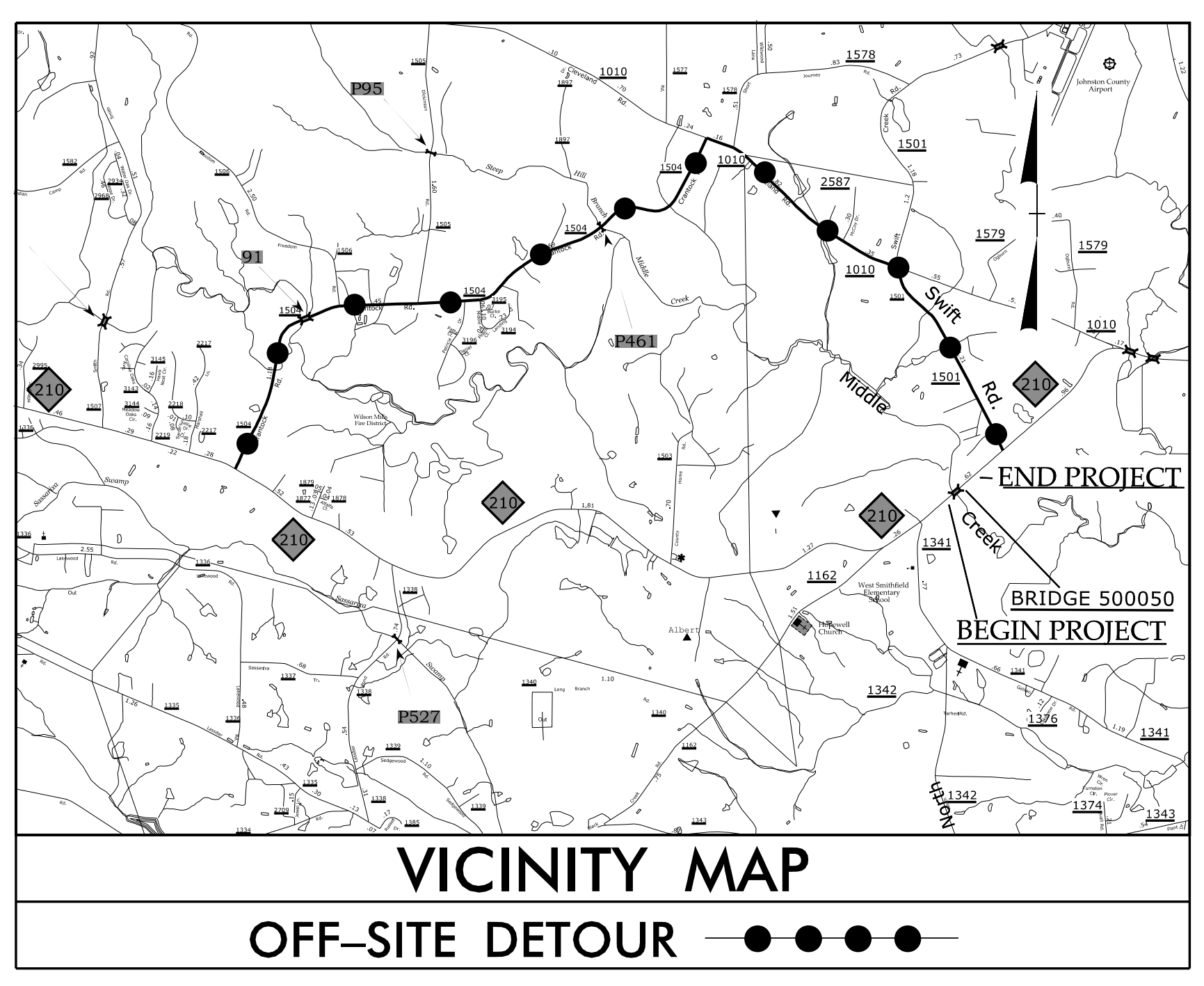
**CONTRACT: C204792**

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

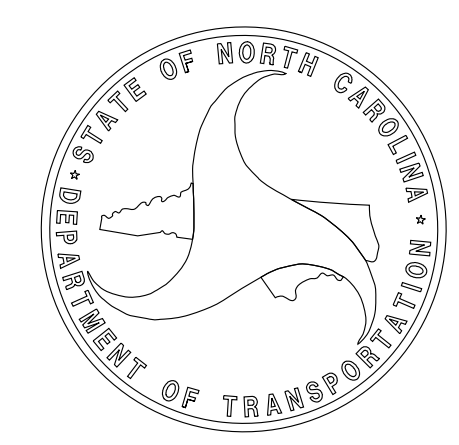
# JOHNSTON COUNTY

**LOCATION: REPLACE BRIDGE (500050) ON NC-210 OVER MIDDLE CREEK**  
**TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0026		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
67026.1.1		P.E.	
67026.2.1		RW & UTILITIES	
67026.3.1		CONST.	



## STRUCTURE



**DESIGN DATA**

ADT 2020 =	8,900
ADT 2045 =	14,000
K =	10%
D =	65%
T =	4%
V =	45 MPH
* TTST =	1% DUAL = 3%
FUNC CLASS =	MINOR ARTERIAL
REGIONAL TIER	

**PROJECT LENGTH**

LENGTH ROADWAY PROJECT =	0.134 MI
LENGTH STRUCTURE PROJECT =	0.030 MI
TOTAL LENGTH OF PROJECT =	0.164 MI

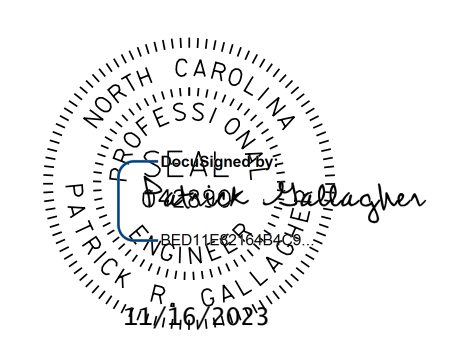
Prepared in the Office of:

2024 STANDARD SPECIFICATIONS

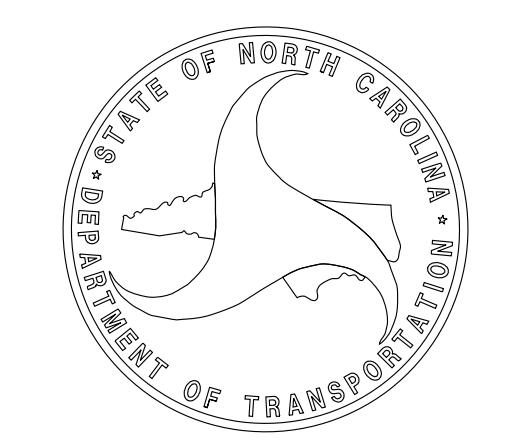
**LETTING DATE:**  
FEBRUARY 20, 2024

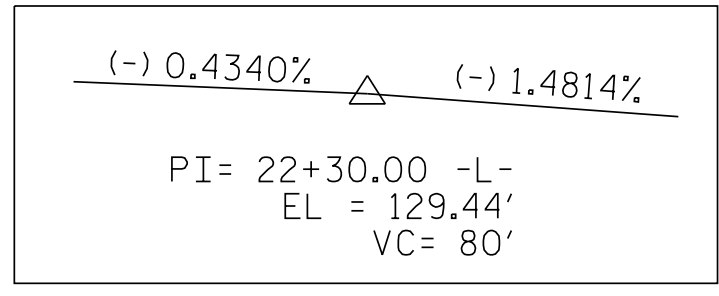
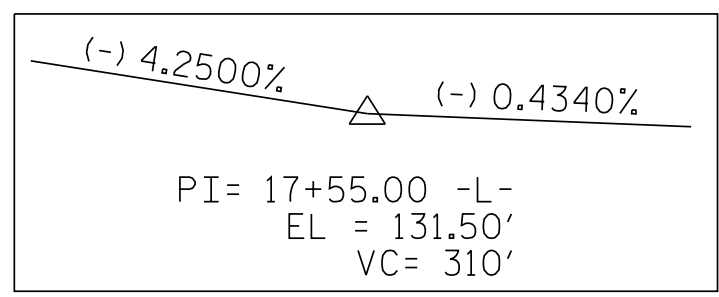
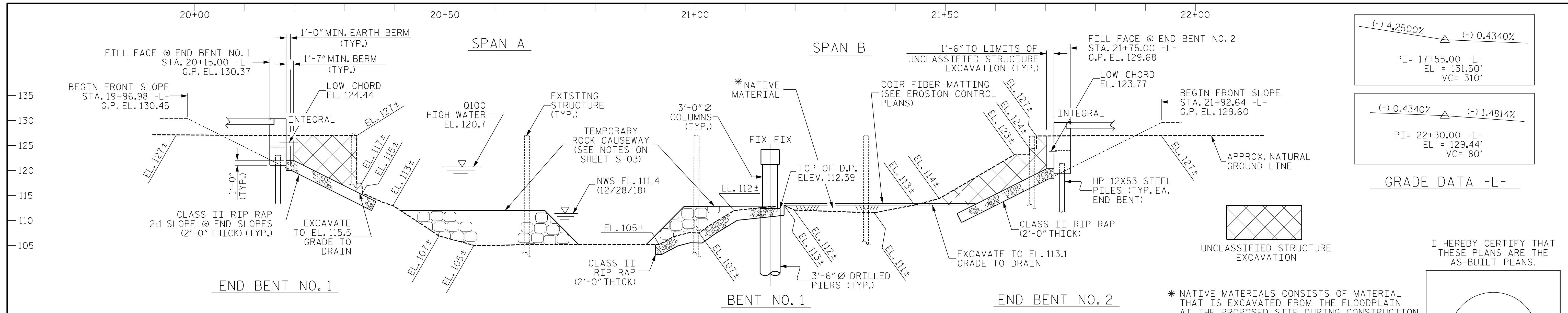
**PAUL GARRETT, PE**  
PROJECT ENGINEER

**PATRICK R. GALLAGHER, PE**  
PROJECT DESIGN ENGINEER

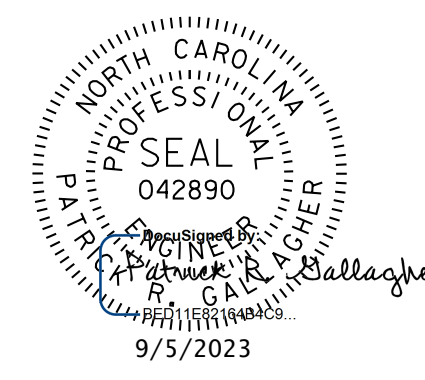
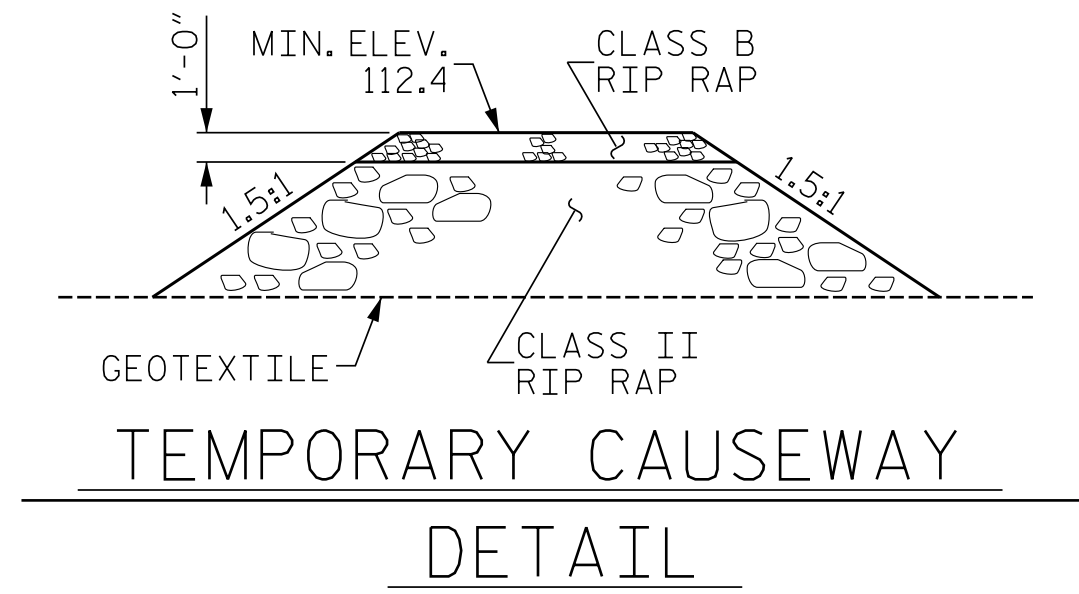
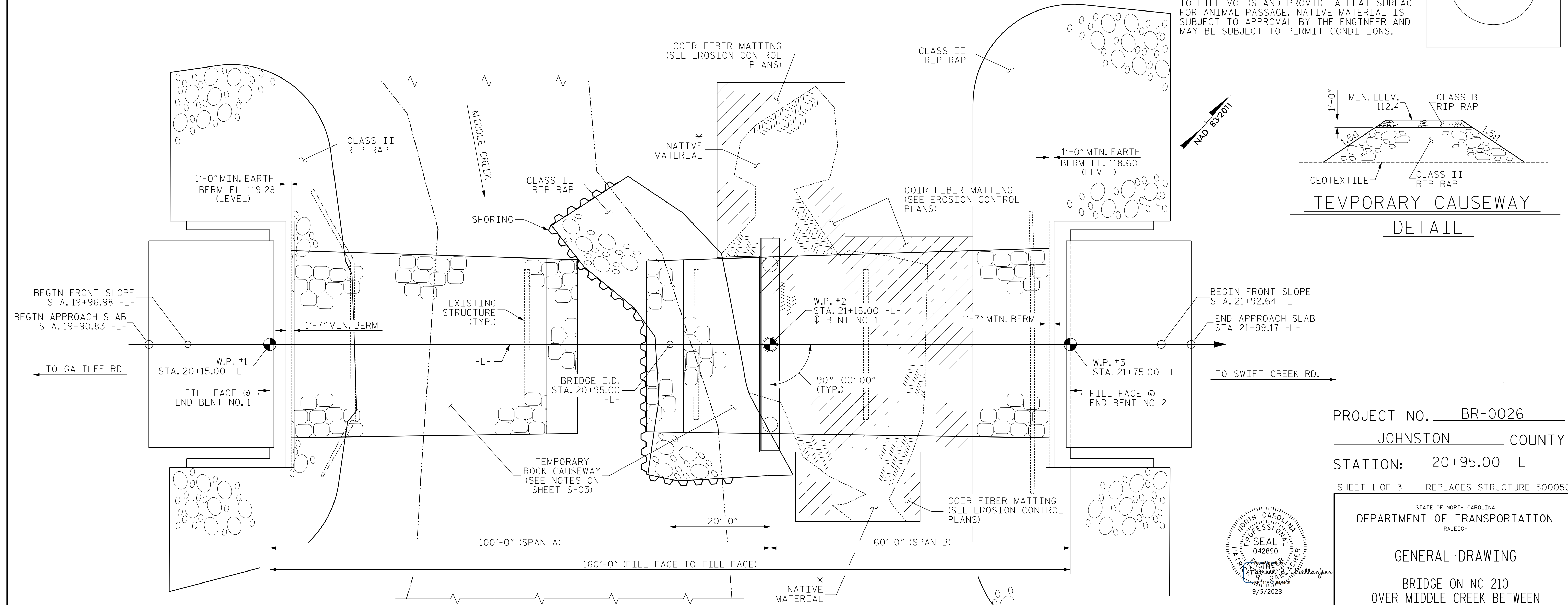
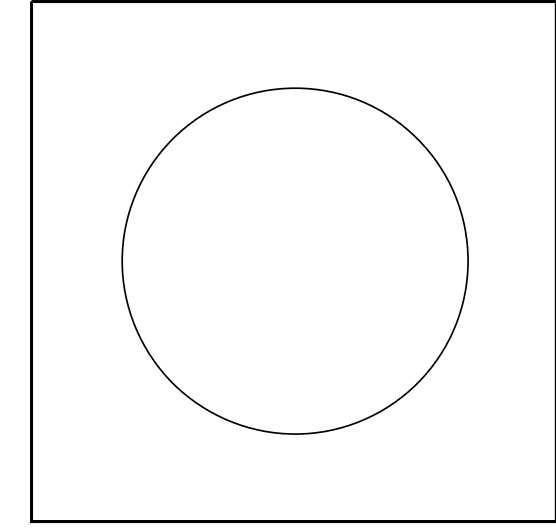


**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**





\* NATIVE MATERIALS CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE FLOODPLAIN AT THE PROPOSED SITE DURING CONSTRUCTION OR SIMILAR MATERIAL TO WHAT IS PRESENT ON THE FLOODPLAIN CAN BE BROUGHT IN FROM AN OFFSITE SOURCE. IF RIP RAP IS USED, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.



PROJECT NO. BR-0026  
JOHNSTON COUNTY  
STATION: 20+95.00 -L-  
SHEET 1 OF 3 REPLACES STRUCTURE 500050

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
GENERAL DRAWING  
BRIDGE ON NC 210  
OVER MIDDLE CREEK BETWEEN  
GALILEE RD. & SWIFT CREEK RD.

**DOCUMENT NOT CONSIDERED FINAL  
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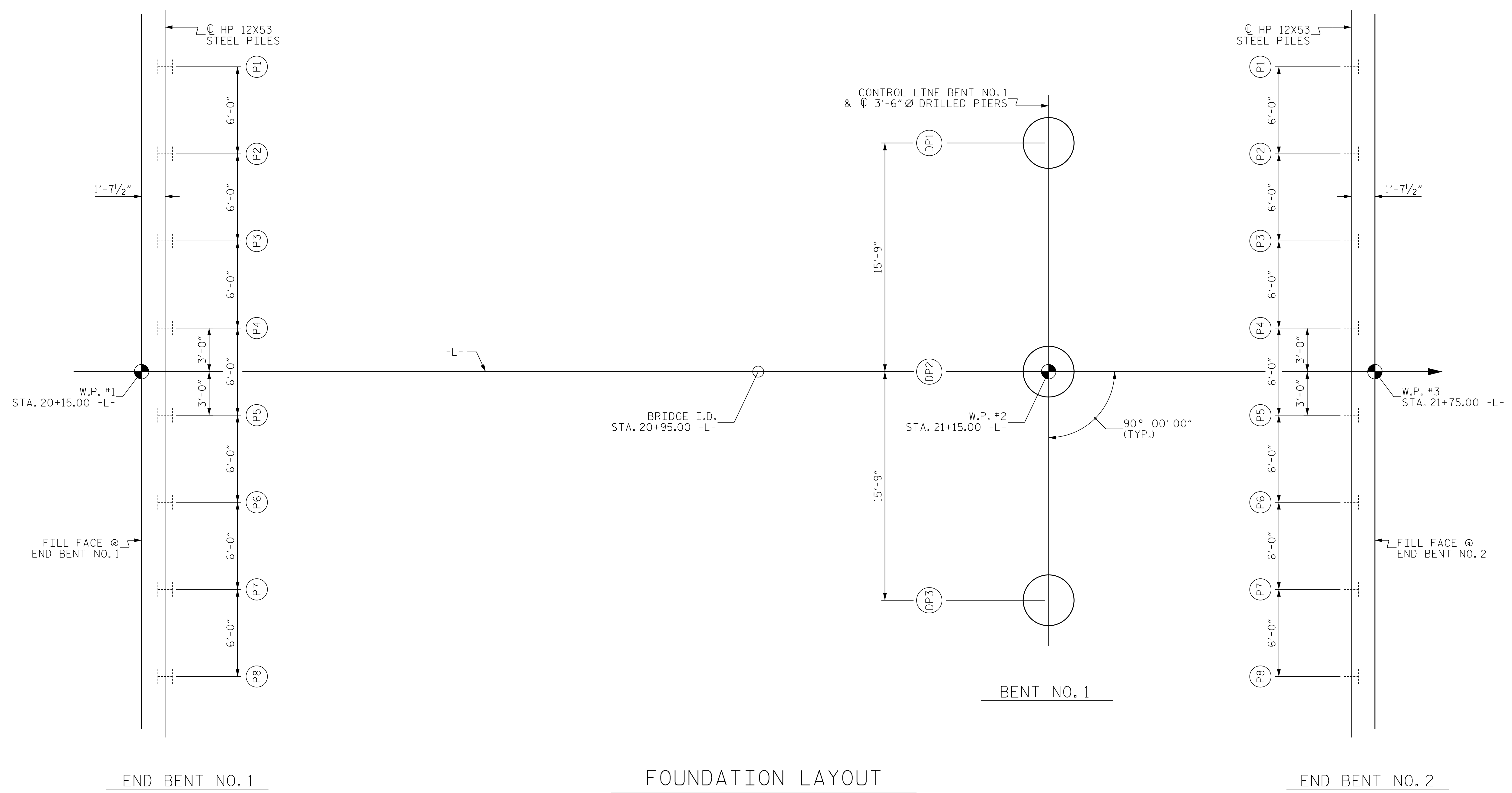
**JWT** Johnson, Mirmiran, & Thompson Inc.  
4700 Falls of Neuse Rd, Suite 100,  
Raleigh, NC, 27609  
License No: C-3097

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-01
1			3			TOTAL SHEETS
2			4			26

W:\Projects\2023\BR-0026\Structures\Plan\01-Plan\01-Plan.dwg  
 DATE: 03/17/23  
 TIME: 03:11 PM on Tuesday, August 22, 2023

DWN. BY: WDC DATE: 07/23  
CHKD. BY: PRG DATE: 07/23  
DES. EGR. OF RECORD: PRG DATE: 07/23

(PILES NOT SHOWN IN PLAN VIEW FOR CLARITY)



**FOUNDATION NOTES**

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 120 TONS PER PILE.

DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.1 AND END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRILLED-IN PILES ARE REQUIRED FOR INTEGRAL END BENT NO.1. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 110 FT. FILL THE BOTTOM 3 FT OF HOLES FOR PILE EXCAVATION WITH CONCRETE OR GROUT AND THE REST OF HOLES WITH CLASS II OR III SELECT MATERIAL THAT MEETS SECTION 1016 OF THE STANDARD SPECIFICATIONS. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 505 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 120 TSF.

PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT NO.1. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 99 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL DRILLED PIERS AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN 92 FT WITH THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 IS ELEVATION 97 FT. SCOUR CRITICAL ELEVATION IS USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

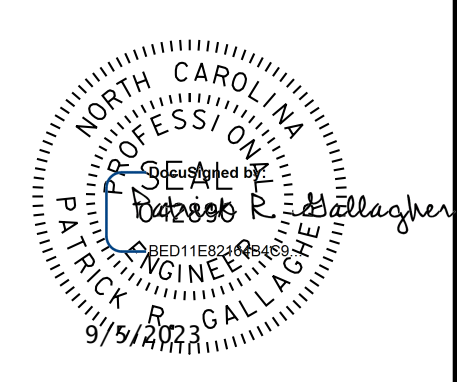
DO NOT USE SLURRY CONSTRUCTION FOR DRILLED PIERS AT BENT NO.1.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PIT MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR PIT. FOR PILE INTEGRITY TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES AND TESTING ARE NOT REQUIRED FOR DRILLED PIERS AT BENT NO.1.

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
 STATION: 20+95.00 -L-  
 SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**FOUNDATION LAYOUT**

BRIDGE ON NC 210  
 OVER MIDDLE CREEK BETWEEN  
 GALILEE RD. & SWIFT CREEK RD.

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

**JMT** Johnson, Mirmiran, & Thompson Inc.  
 4700 Falls of Neuse Rd, Suite 100,  
 Raleigh, NC, 27609  
 License No: C-3097

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-02
1			3			TOTAL SHEETS
2			4			26

W:\Projects\2023\BR-0026\Structures\Final Plans\401\_003\_BR0026\_SML\_FL\_502.dgn  
 DWN: 03/17/23 10:51 AM on Tuesday, August 22, 2023

DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23

**GENERAL NOTES**

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.  
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 40'-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.

THE EXISTING STRUCTURE CONSISTING OF A REINFORCED CONCRETE FLOOR ON I-BEAMS WITH 4 SPANS OF 34'-0", 33'-11", 33'-11" AND 34'-0", WITH RC ABUTMENT AT END BENT 1, AND RC POST AND BEAM AT END BENT 2, AND RC POST AND BEAM INTERIOR BENTS WIDENED WITH PPC PILES, WITH A CLEAR ROADWAY WIDTH OF 28'-0", AND LOCATED AT THE SITE OF PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 20+95.00 -L-."

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.

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

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

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18- EVALUATING SCOUR AT BRIDGES".

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 20+95.00 -L-. NO SEPARATE PAYMENT WILL BE MADE FOR THE TEMPORARY SHORING SHOWN IN THE PLANS. THE COST SHALL BE CONSIDERED INCIDENTAL TO THE TEMPORARY ACCESS.

NO MORE THAN ONE TEMPORARY CAUSEWAY WILL BE IN PLACE AT ANY GIVEN TIME, AND NO MORE THAN 50% OF RIVER CHANNEL CAN BE IMPACTED AT ANY GIVEN TIME WITH A CAUSEWAY.

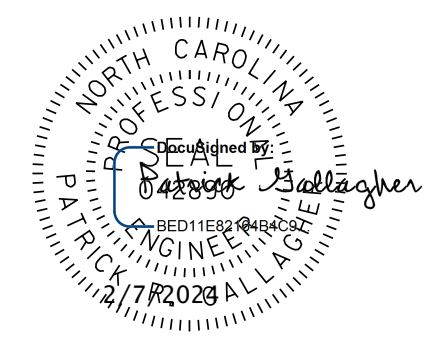
FOR NATIVE MATERIAL, SEE SPECIAL PROVISIONS.

PROJECT NO. BR-0026

JOHNSTON COUNTY

STATION: 20+95.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

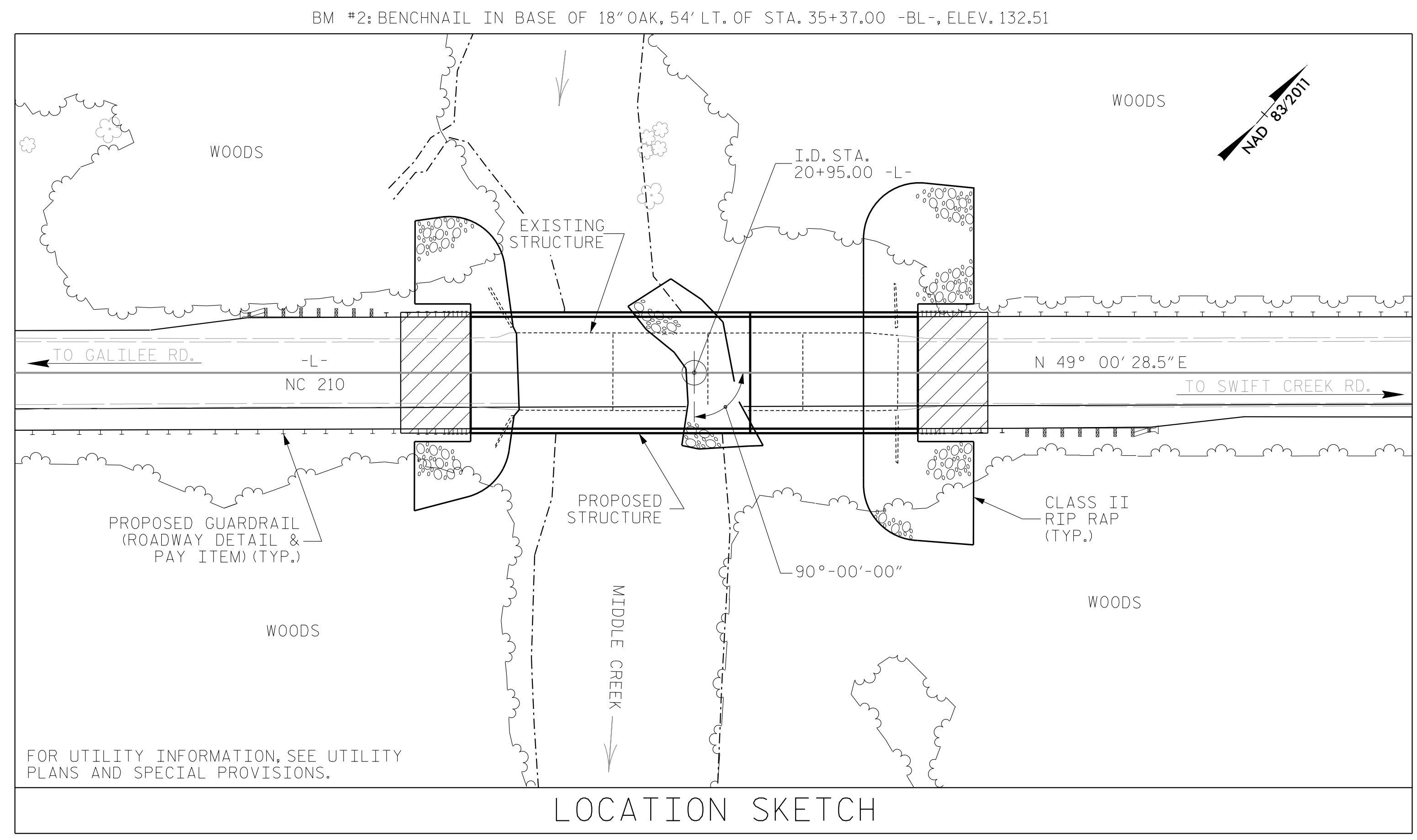
**GENERAL DRAWING**

BRIDGE ON NC 210  
 OVER MIDDLE CREEK BETWEEN  
 GALILEE RD. & SWIFT CREEK RD.

**DOCUMENT NOT CONSIDERED FINAL  
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 4700 Falls of Neuse Rd, Suite 100,  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-03
1			3			TOTAL SHEETS 26
2			4			



**HYDRAULIC DATA**

DESIGN DISCHARGE	=	7500	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	120.1	FT
BASE DISCHARGE	=	8900	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	120.7	FT
DRAINAGE AREA	=	130	SQ. MI.

**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE	=	14581	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	124.6	FT

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

**TOTAL BILL OF MATERIAL**

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	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	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	SID INSPECTIONS	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YARDS	LUMP SUM
SUPERSTRUCTURE											6,848	7,634		LUMP SUM
END BENT 1				59.0	28.0					LUMP SUM			35.0	
BENT 1						31.5	30.0	40.17	1				31.4	
END BENT 2										LUMP SUM			35.0	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	59.0	28.0	31.5	30.0	40.17	1	LUMP SUM	6,848	7,634	101.4	LUMP SUM

**TOTAL BILL OF MATERIAL**

	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIP. SETUP FOR HP 12x53 STEEL PILES	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	NATIVE MATERIAL
	LBS.	LBS.	NO. LIN. FT.	NO.	NO. LIN. FT.	EACH	LIN. FT.	TONS	SQ. YARDS	LUMP SUM	CU. YARDS
SUPERSTRUCTURE			10 789.17							LUMP SUM	
END BENT 1	4,889			8	8	120	8	316.67	300	273	
BENT 1	9,138	1,787							200	182	
END BENT 2	4,889			8	8	160	8	620	564		75.3
TOTAL	18,916	1,787	10 789.17	16	16	280	16	316.67	1,120	1,019	LUMP SUM 75.3

DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23

User: jmt/pt/pt  
 Date: 2/7/2024 7:08:08 AM  
 Done: 2/7/2024 7:08:08 AM  
 Time: 2/7/2024 7:08:08 AM

LOAD FACTORS:

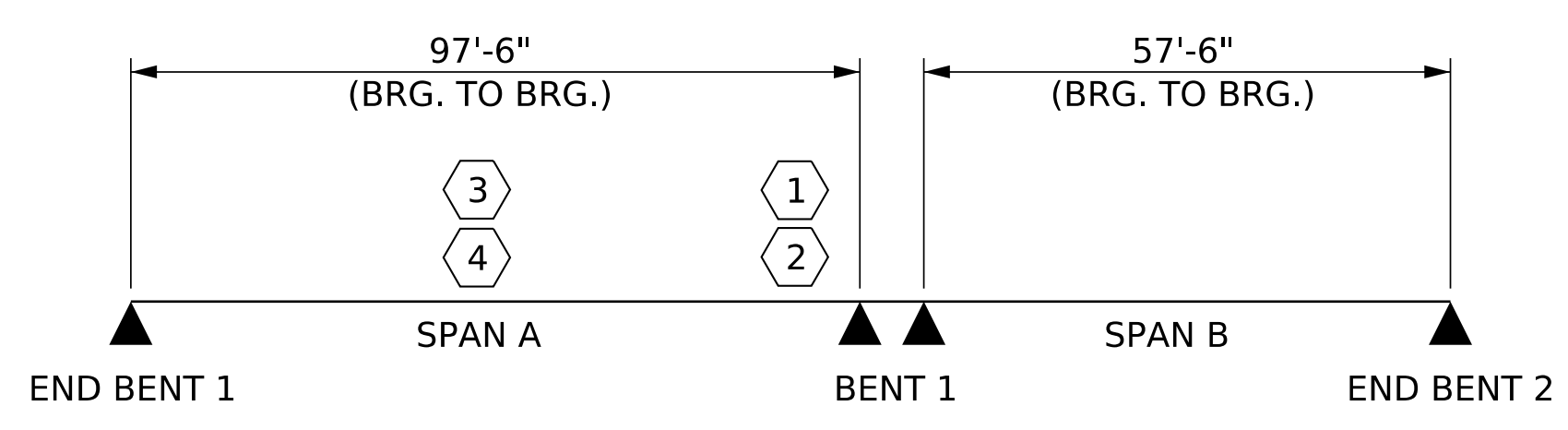
DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

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.

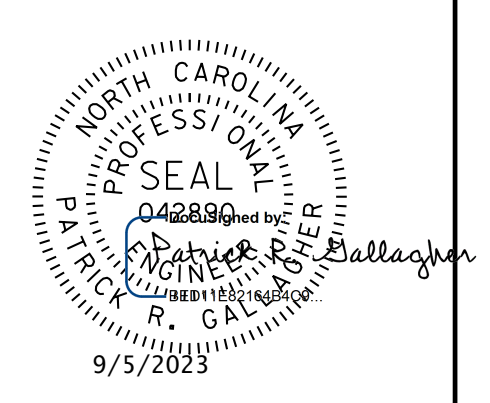
#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
4	EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	
GIRDER LOCATION	
I - INTERIOR GIRDER EL - EXTERIOR LEFT GIRDER ER - EXTERIOR RIGHT GIRDER	

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																							
LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									SERVICE III LIMIT STATE						COMMENT NUMBER		
						MOMENT					SHEAR				MOMENT								
						LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)
DESIGN LOAD	HL-93 (INVENTORY)	N/A	1	1.08	--	1.75	0.789	1.330	A	EL	48.75	0.914	1.080	A	I	97.5	0.80	0.726	1.140	A	I	48.75	
	HL-93 (OPERATING)	N/A		1.43	--	1.35	0.789	1.720	A	EL	48.75	0.914	1.430	A	I	97.5	N/A	--	--	--	--	--	
	HS-20 (INVENTORY)	36.000	2	1.48	53.28	1.75	0.789	1.850	A	EL	48.75	0.914	1.480	A	I	97.5	0.80	0.726	1.590	A	I	48.75	
	HS-20 (OPERATING)	36.000		1.95	70.20	1.35	0.789	2.400	A	EL	48.75	0.914	1.950	A	I	97.5	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH		3.79	51.17	1.40	0.789	5.530	A	EL	48.75	0.914	4.990	A	I	97.5	0.80	0.726	3.790	A	I	48.75	
		SNGARBS2	20.000		2.68	53.60	1.40	0.789	3.910	A	EL	48.75	0.914	3.530	A	I	97.5	0.80	0.726	2.680	A	I	48.75
		SNAGRIS2	22.000		2.55	56.10	1.40	0.789	3.720	A	EL	48.75	0.914	3.200	A	I	97.5	0.80	0.726	2.550	A	I	48.75
		SNCOTTS3	27.250		1.87	50.96	1.40	0.789	2.730	A	EL	48.75	0.914	2.410	A	I	97.5	0.80	0.726	1.870	A	I	48.75
		SNAGGRS4	34.925		1.53	53.44	1.40	0.789	2.240	A	EL	48.75	0.914	1.870	A	I	97.5	0.80	0.726	1.530	A	I	48.75
		SNS5A	35.550		1.50	53.33	1.40	0.789	2.190	A	EL	48.75	0.914	1.880	A	I	97.5	0.80	0.726	1.500	A	I	48.75
		SNS6A	39.950		1.37	54.73	1.40	0.789	1.990	A	EL	48.75	0.914	1.690	A	I	97.5	0.80	0.726	1.370	A	I	48.75
		SNS7B	42.000		1.25	52.50	1.40	0.789	1.820	A	EL	48.75	0.914	1.550	A	I	97.5	0.80	0.726	1.250	A	I	48.75
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.66	54.78	1.40	0.789	2.430	A	EL	48.75	0.914	2.020	A	I	97.5	0.80	0.726	1.660	A	I	48.75
		TNT4A	33.075		1.67	55.24	1.40	0.789	2.430	A	EL	48.75	0.914	2.120	A	I	97.5	0.80	0.726	1.670	A	I	48.75
		TNT6A	41.600		1.35	56.16	1.40	0.789	1.970	A	EL	48.75	0.914	1.730	A	I	97.5	0.80	0.726	1.350	A	I	48.75
		TNT7A	42.000		1.35	56.70	1.40	0.789	1.970	A	EL	48.75	0.914	1.700	A	I	97.5	0.80	0.726	1.350	A	I	48.75
		TNT7B	42.000		1.38	57.96	1.40	0.789	2.010	A	EL	48.75	0.914	1.620	A	I	97.5	0.80	0.726	1.380	A	I	48.75
		TNAGRIT4	43.000		1.32	56.76	1.40	0.789	1.930	A	EL	48.75	0.914	1.590	A	I	97.5	0.80	0.726	1.320	A	I	48.75
		TNAGT5A	45.000		1.25	56.25	1.40	0.789	1.830	A	EL	48.75	0.914	1.510	A	I	97.5	0.80	0.726	1.250	A	I	48.75
		TNAGT5B	45.000	3	1.24	55.80	1.40	0.789	1.820	A	EL	48.75	0.914	1.510	A	I	97.5	0.80	0.726	1.240	A	I	48.75
EMERGENCY VEHICLE (EV)	EV2	28.750		1.84	52.90	1.30	0.789	3.010	A	EL	48.75	0.914	2.400	A	I	97.5	0.80	0.726	1.840	A	I	48.75	
	EV3	43.000	4	1.21	52.03	1.30	0.789	1.990	A	EL	48.75	0.914	1.580	A	I	97.5	0.80	0.726	1.210	A	I	48.75	



LRFR SUMMARY

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
STATION: 20+95.00 -L-



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

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

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-04
1			3			TOTAL SHEETS
2			4			26

STD. NO. LRFR1

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CHKD. BY: PRG	DATE: 07/23	CHECKED BY: GM/DI	2/08	REV. 10/1/11	MAA/GM
DES. EGR. OF RECORD: PRG	DATE: 07/23			REV. 04/23	BNB/AAI

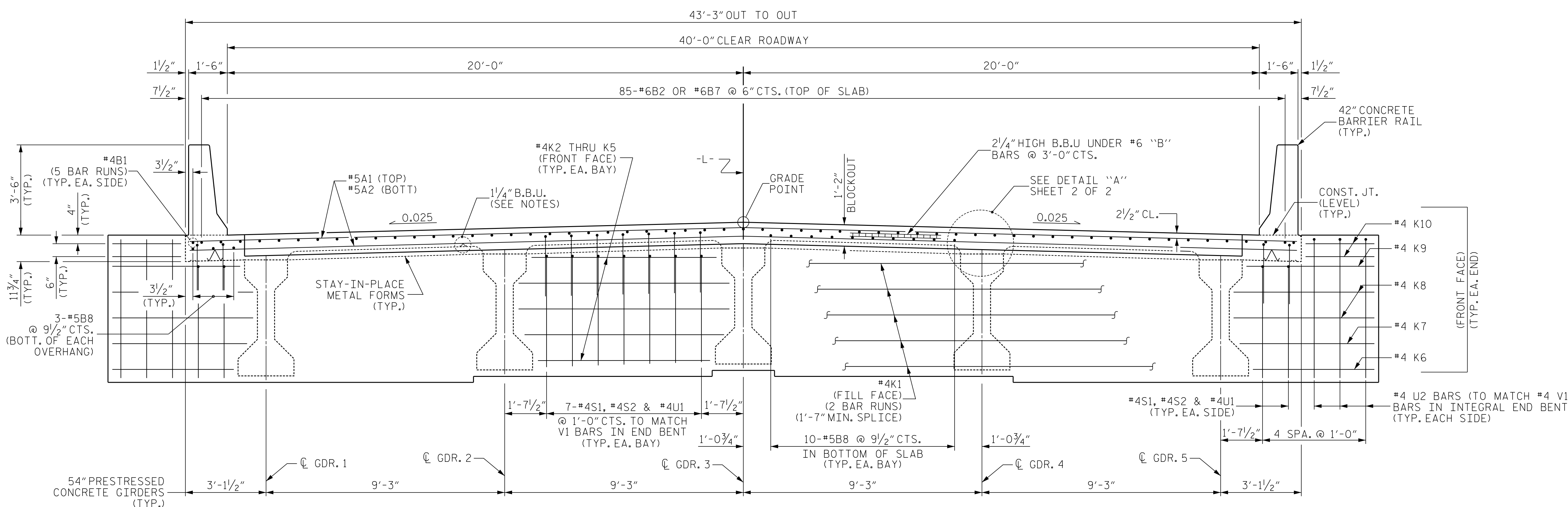
NOTES

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

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

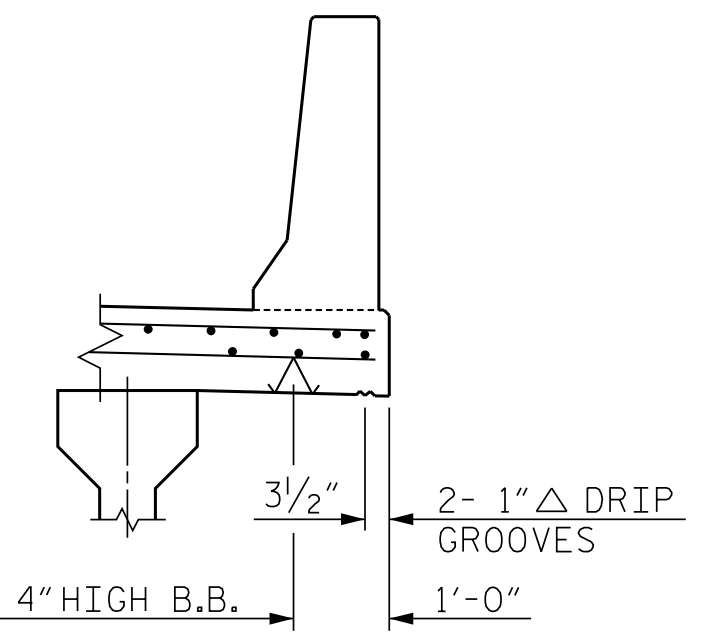
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

FOR 42" CONCRETE BARRIER RAIL REINFORCING STEEL AND DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET.



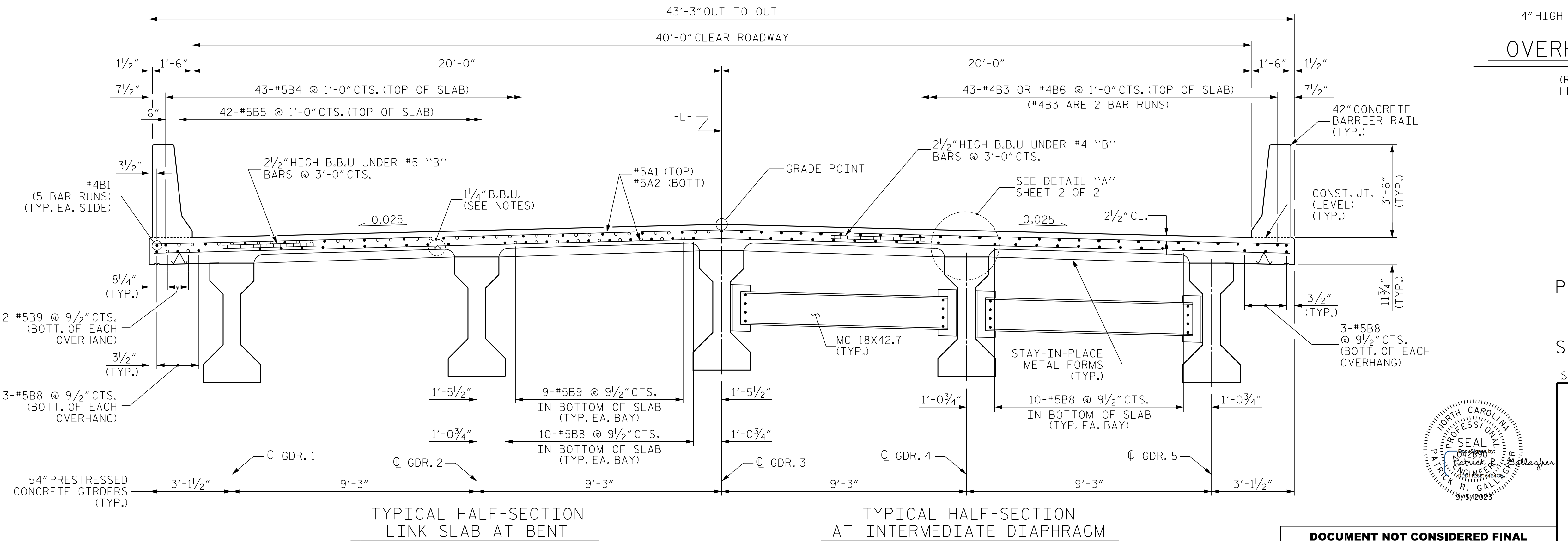
TYPICAL SECTION AT INTEGRAL END BENT DIAPHRAGM

SHOWING ABUTMENT WALL AT FILL FACE OF END BENTS, WINGS NOT SHOWN FOR CLARITY.

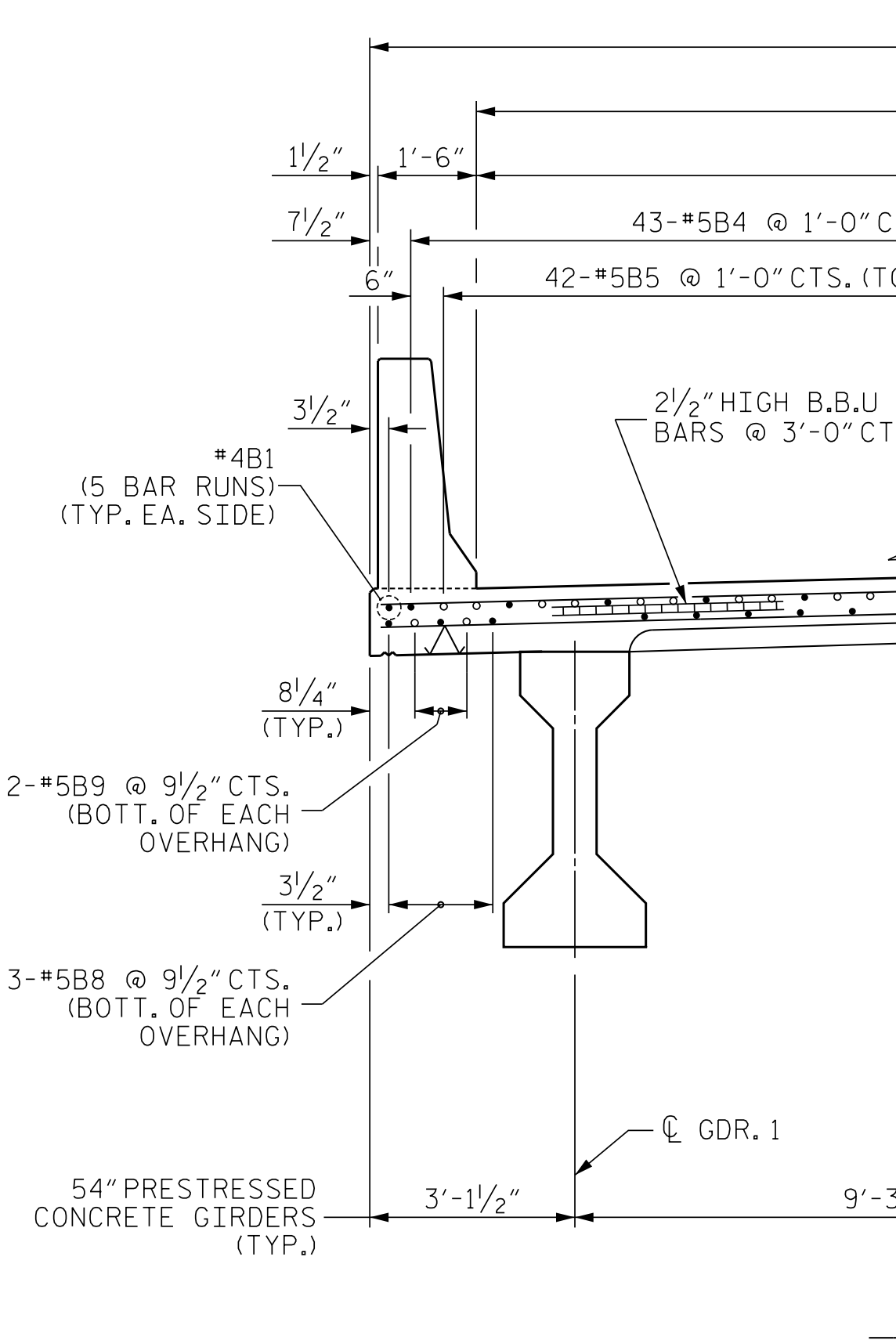


OVERHANG DETAIL

(RIGHT SIDE SHOWN, LEFT SIDE SIMILAR)



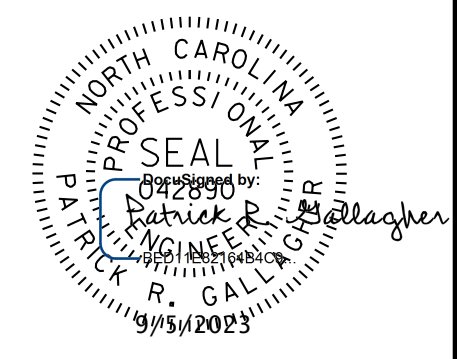
TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM



TYPICAL HALF-SECTION LINK SLAB AT BENT

TYPICAL SECTION

PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-  
 SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

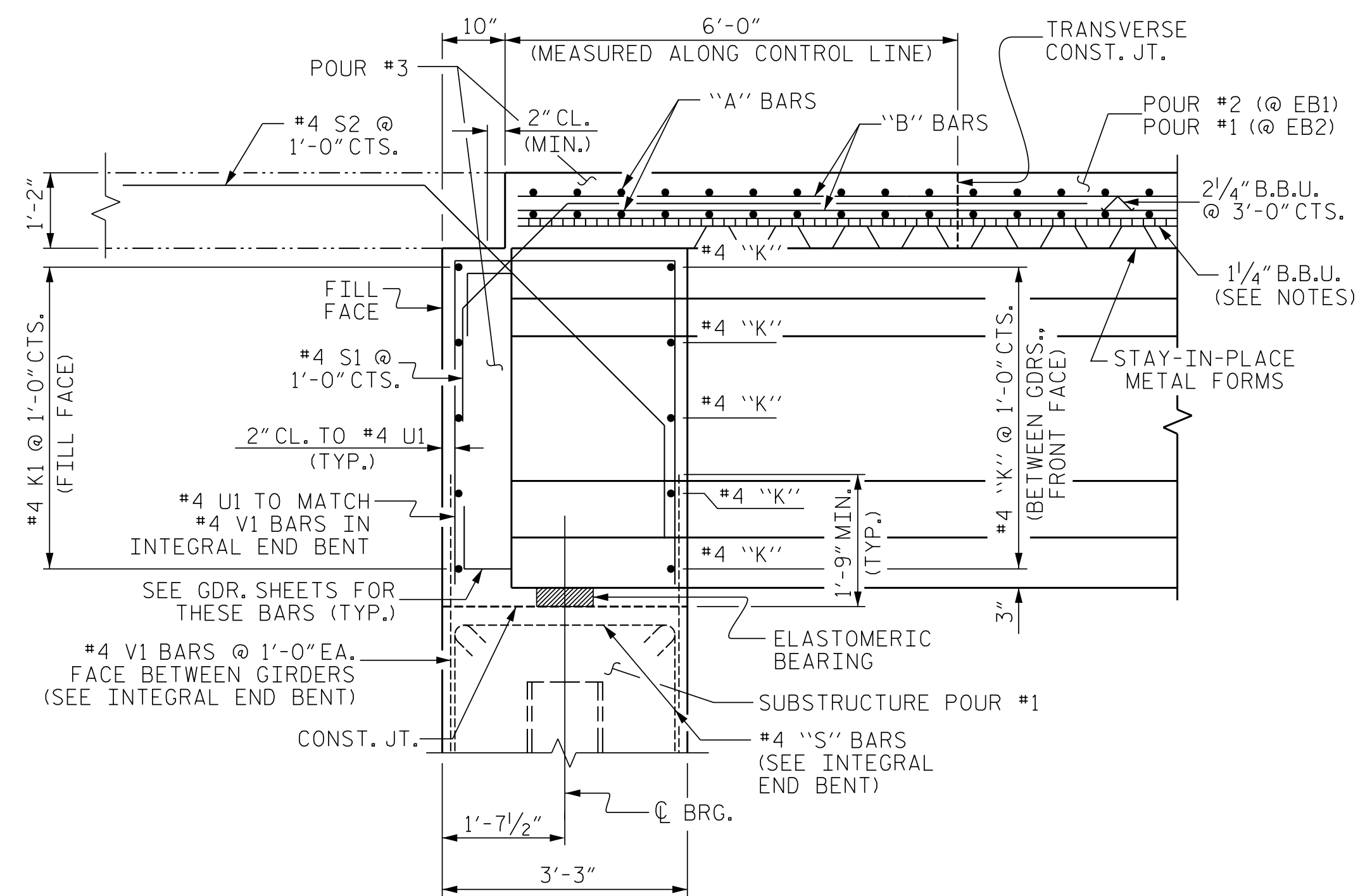
DOCUMENT NOT CONSIDERED FINAL  
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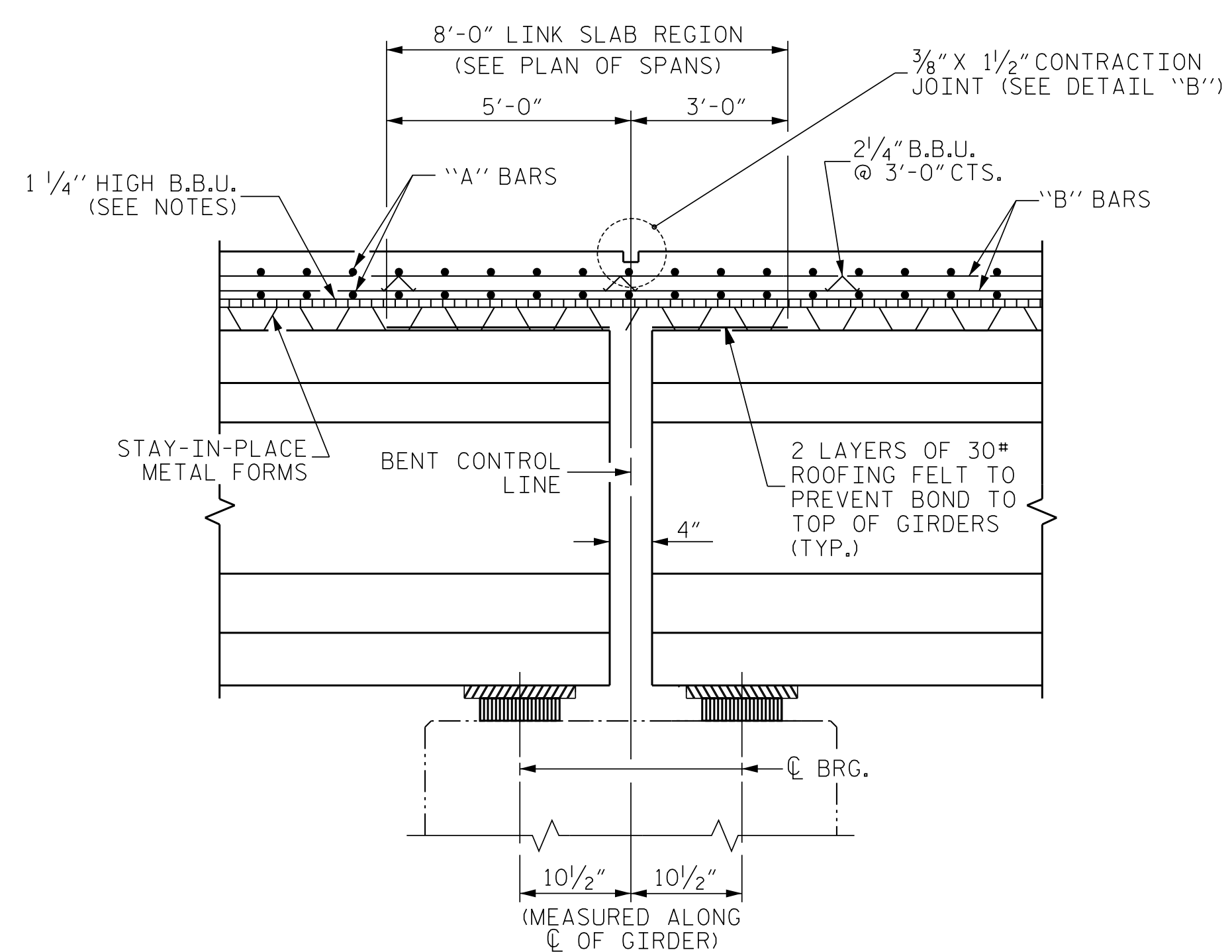
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-05	
1			3			TOTAL SHEETS 26	
2			4				

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 DATE: 03/11 PM on Tuesday, August 23, 2023

DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23



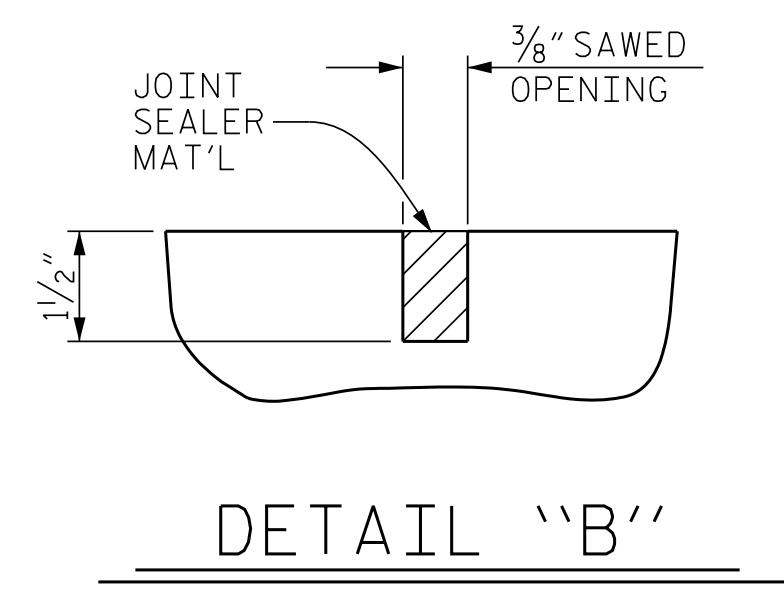
SECTION THRU INTEGRAL END BENT



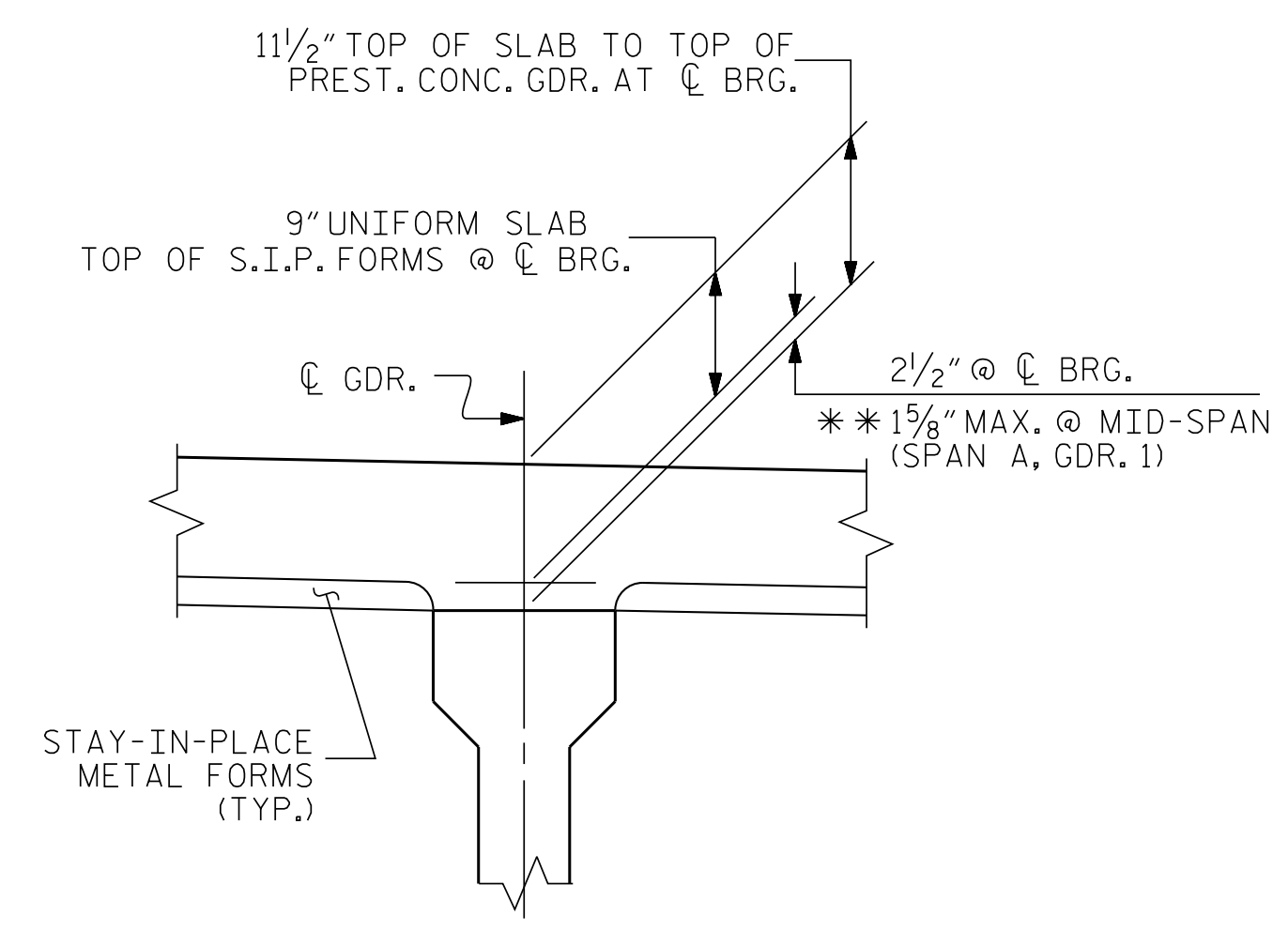
SECTION AT BENT

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

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

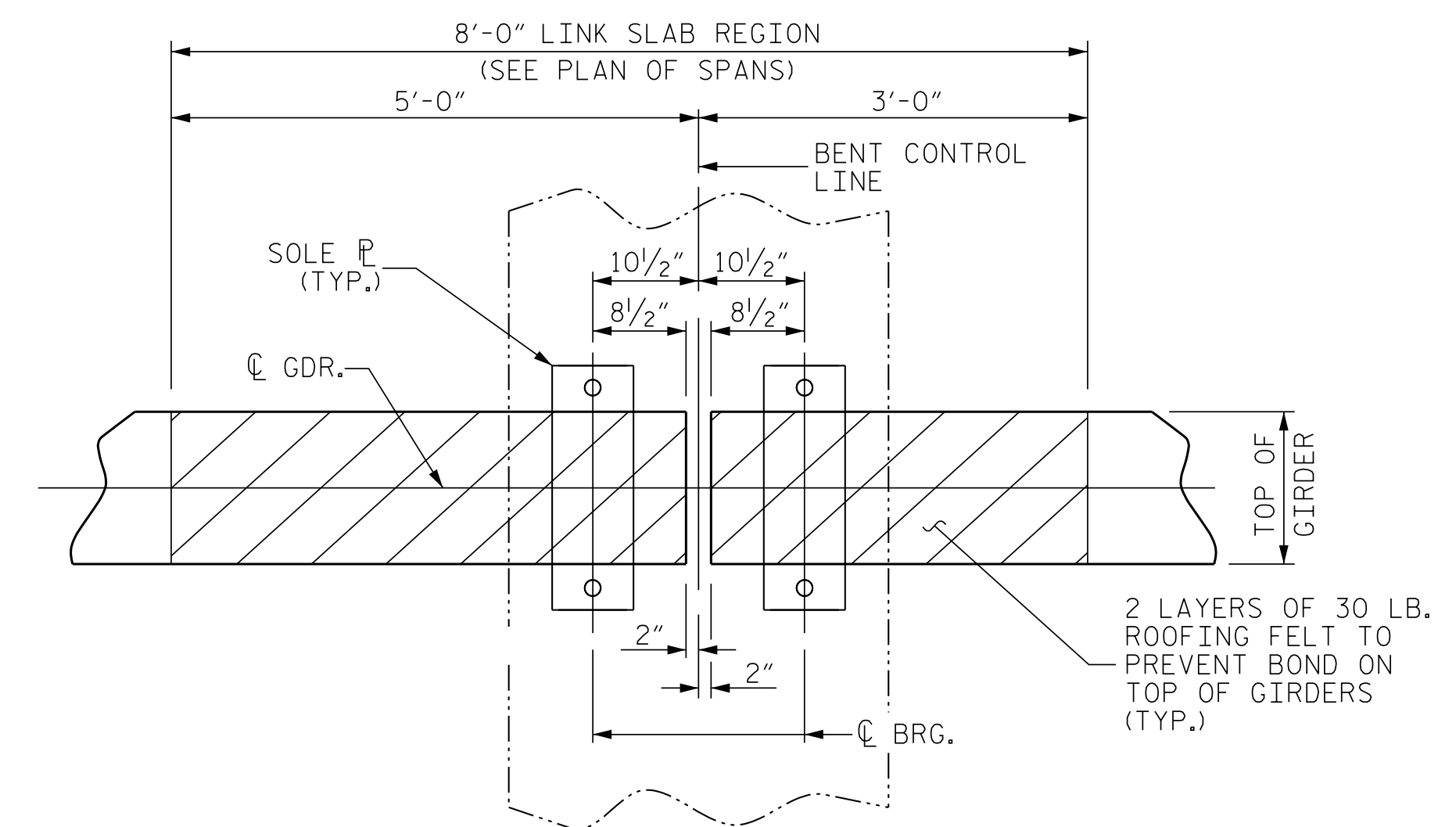


DETAIL "B"



DETAIL "A"

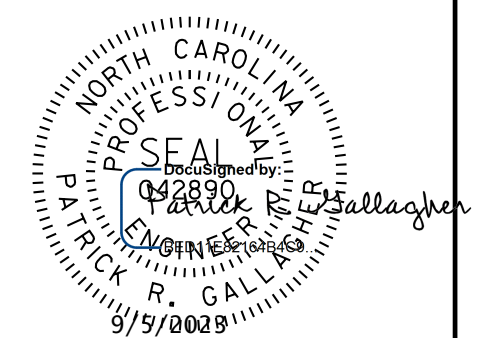
\*\* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.



PLAN AT BENT - LINK SLAB

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

PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-  
 SHEET 2 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
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SUPERSTRUCTURE  
 TYPICAL SECTION

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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			26

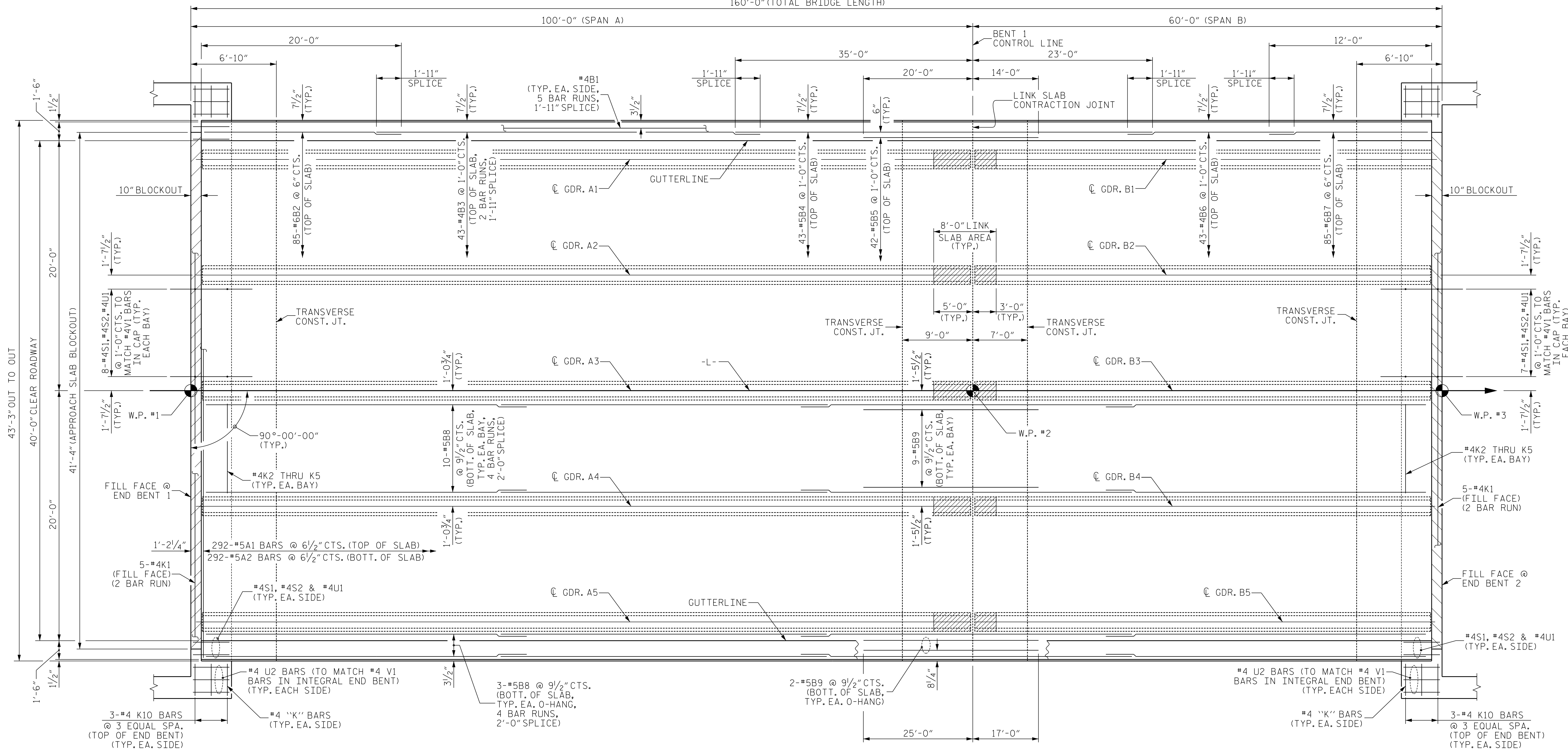
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 DATE: 03/17/23 PM on Tuesday, August 22, 2023

DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23

160'-0" (TOTAL BRIDGE LENGTH)

100'-0" (SPAN A)

60'-0" (SPAN B)

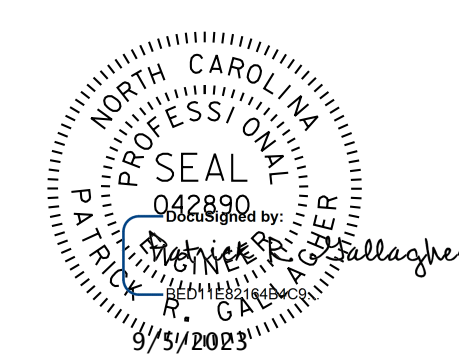


PLAN OF SPAN A

PLAN OF SPAN B

NOTE:  
FOR POUR SEQUENCE AND LOCATION  
OF CONSTRUCTION JOINTS, SEE  
SUPERSTRUCTURE "BILL OF MATERIAL"  
SHEET)

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
STATION: 20+95.00 -L-



STATE OF NORTH CAROLINA  
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RALEIGH

SUPERSTRUCTURE  
PLAN OF SPANS

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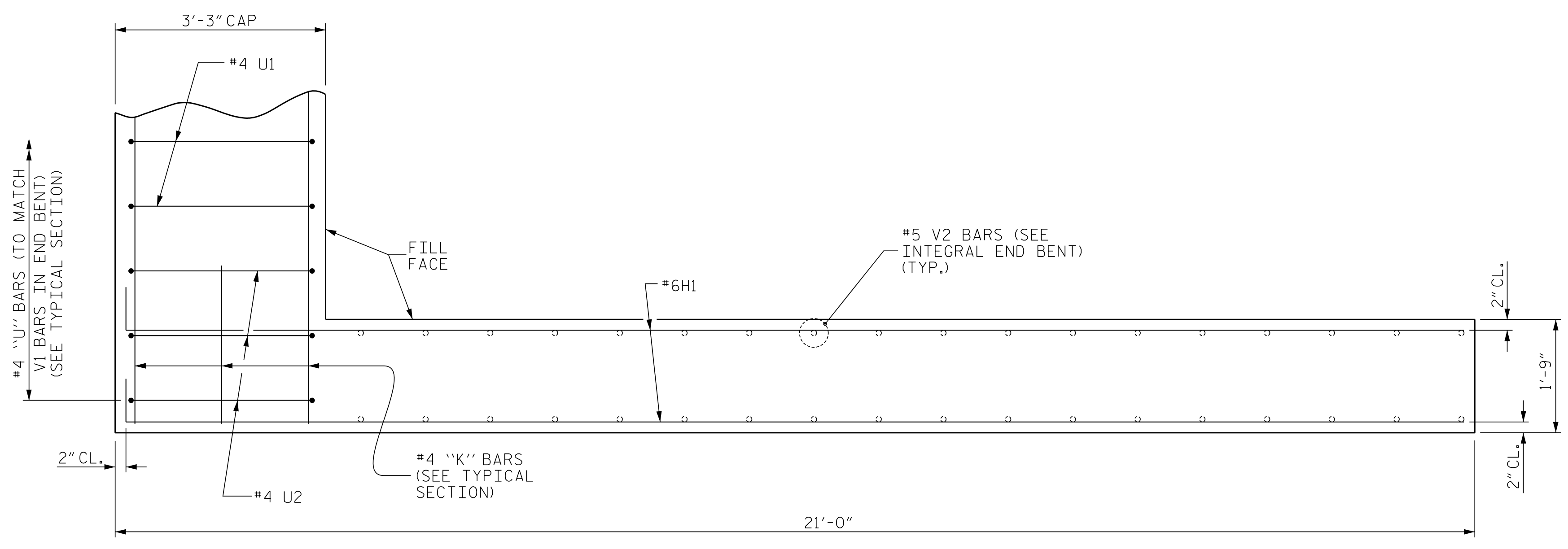
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DWN. BY: WDC DATE: 07/23  
CHKD. BY: PRG DATE: 07/23  
DES. EGR. OF RECORD: PRG DATE: 07/23

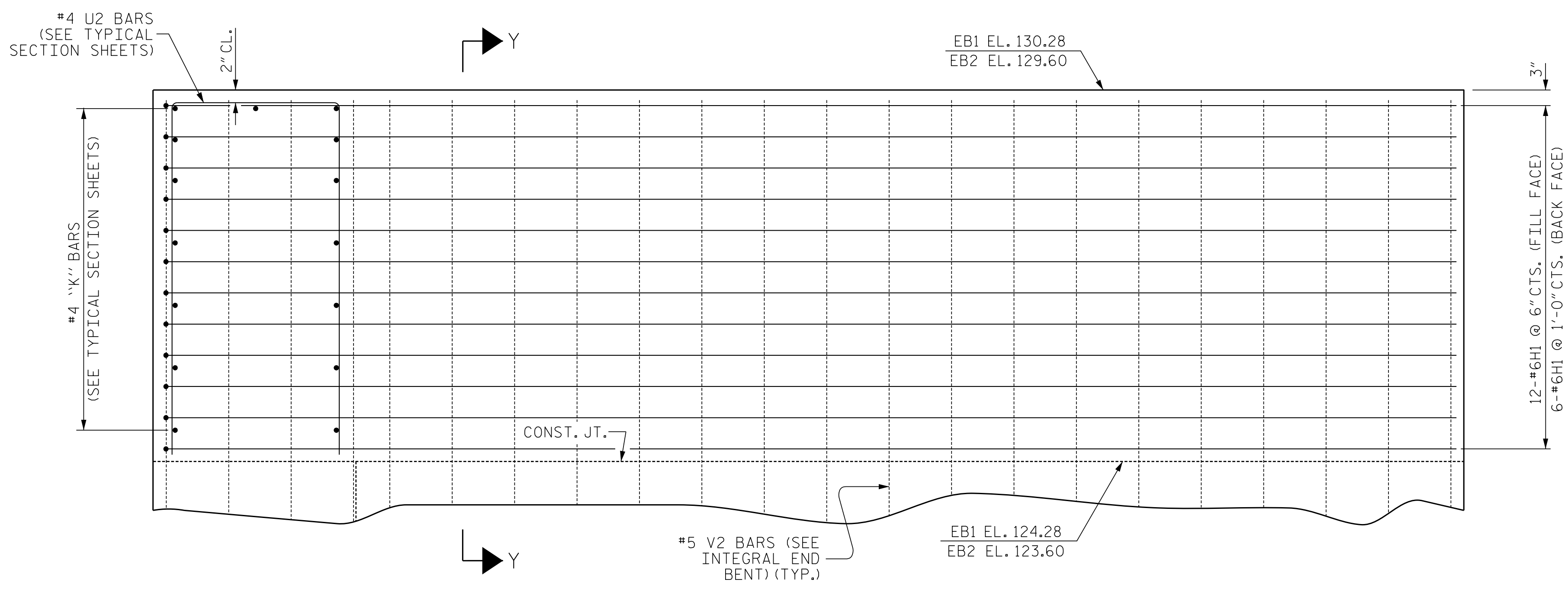
SHEET NO.  
S-07  
TOTAL SHEETS  
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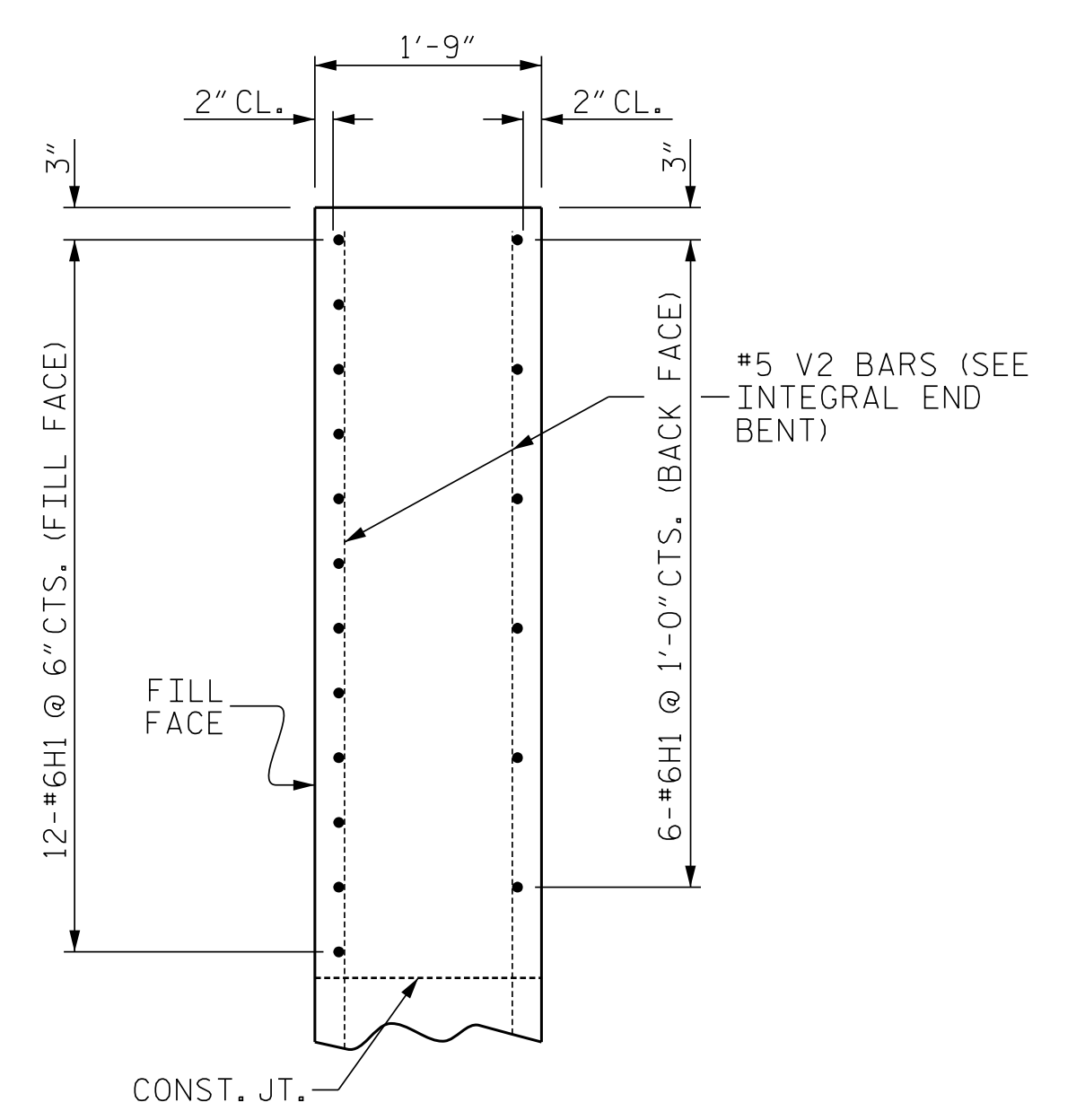




PLAN OF WING



ELEVATION

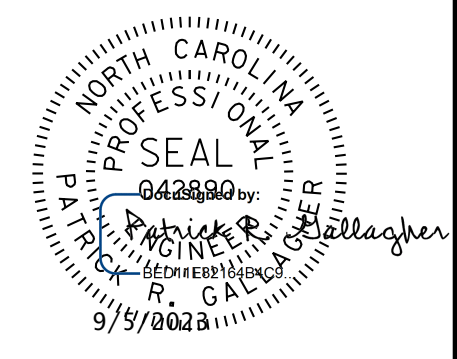


SECTION Y-Y

UPPER WINGS AT INTEGRAL END BENTS

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE END BENT WING DETAILS SHEET.  
WING W1 SHOWN, WING W2 SIMILAR.

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
STATION: 20+95.00 -L-



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

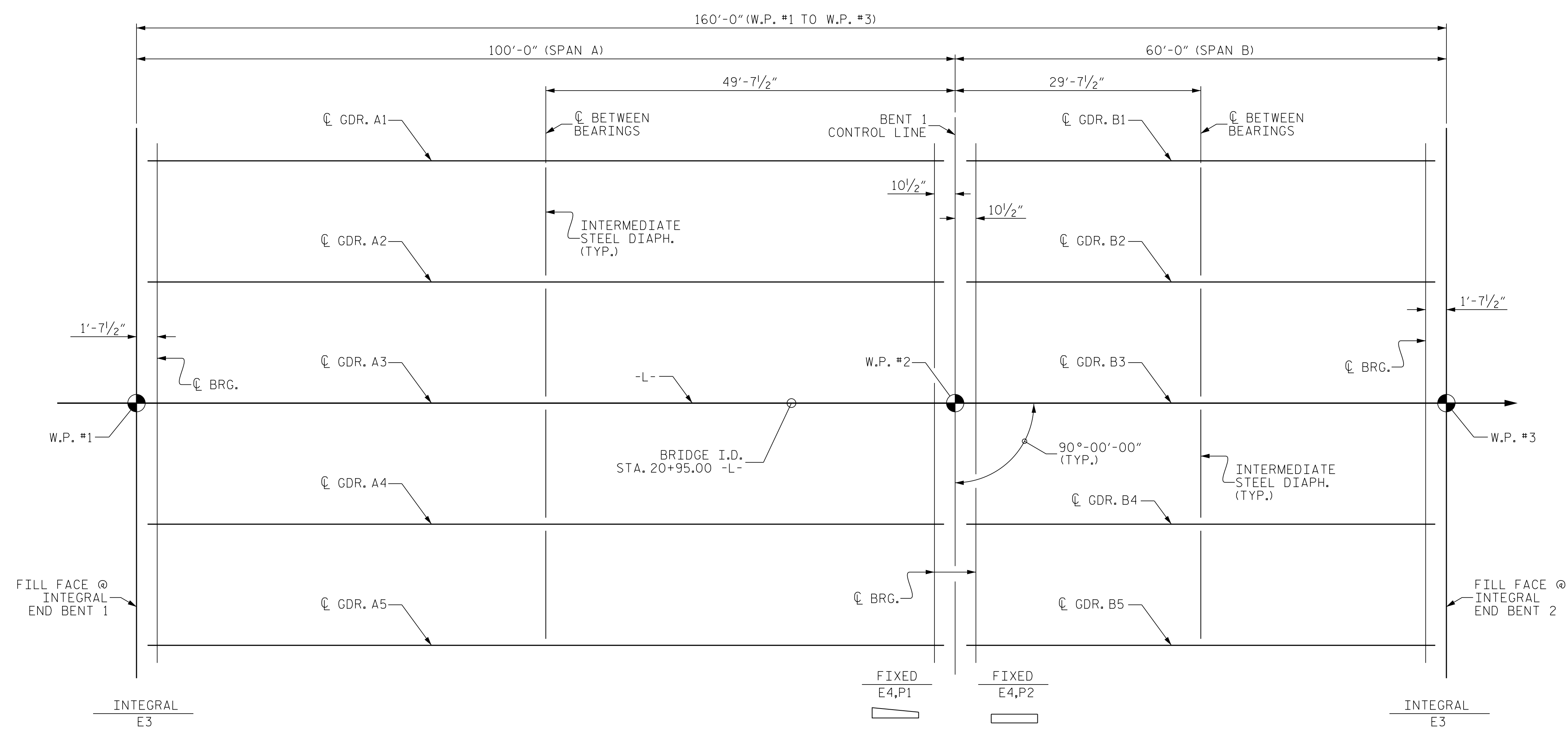
**DOCUMENT NOT CONSIDERED FINAL  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-08
1			3			TOTAL SHEETS
2			4			26

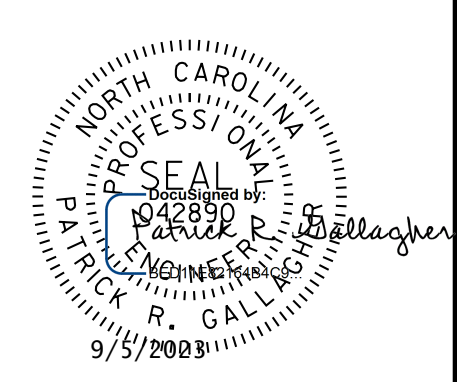
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 DWG: 03:51 PM on Tuesday, August 22, 2023  
 TIME:

DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23



### GIRDER LAYOUT

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
 STATION: 20+95.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 GIRDER LAYOUT

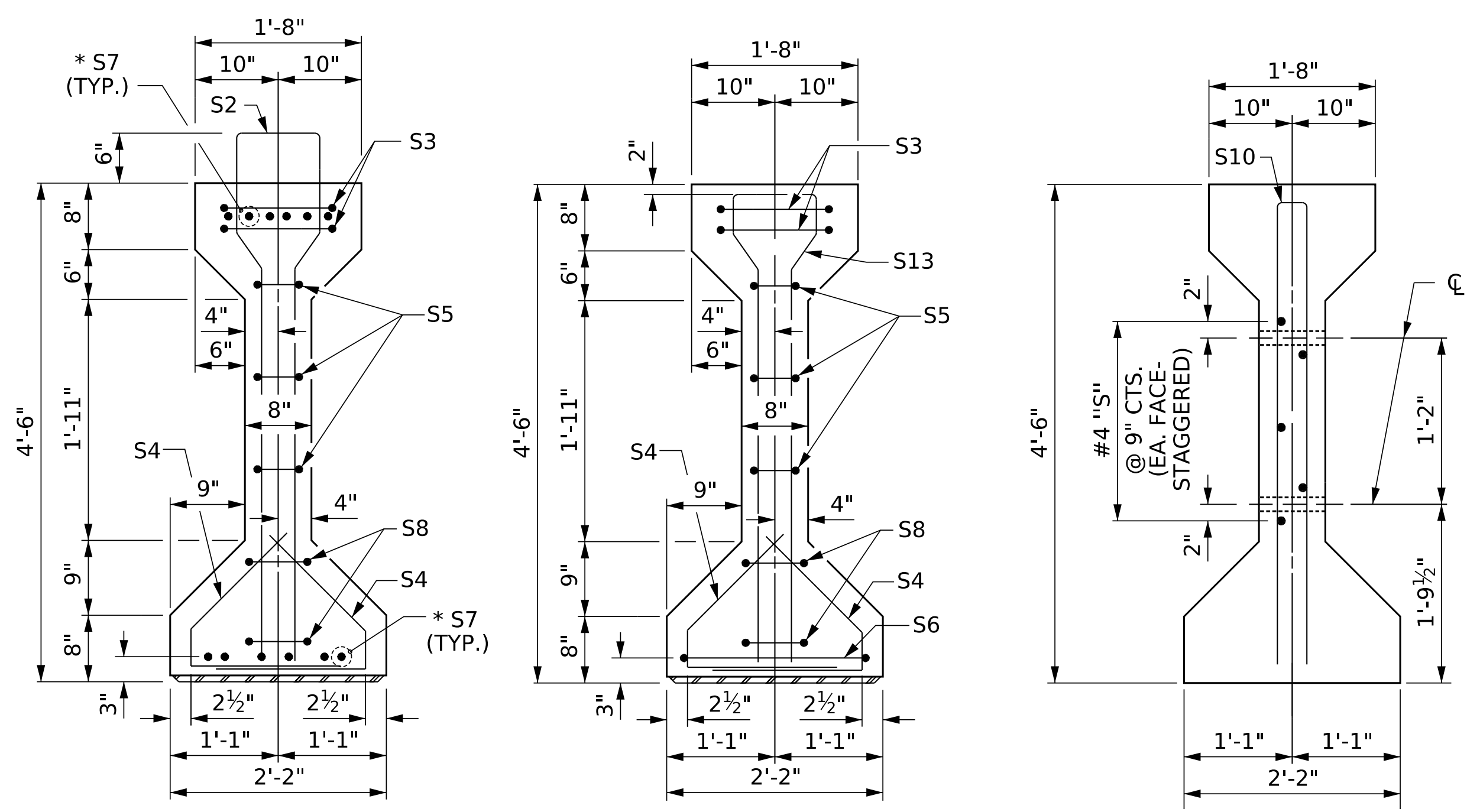
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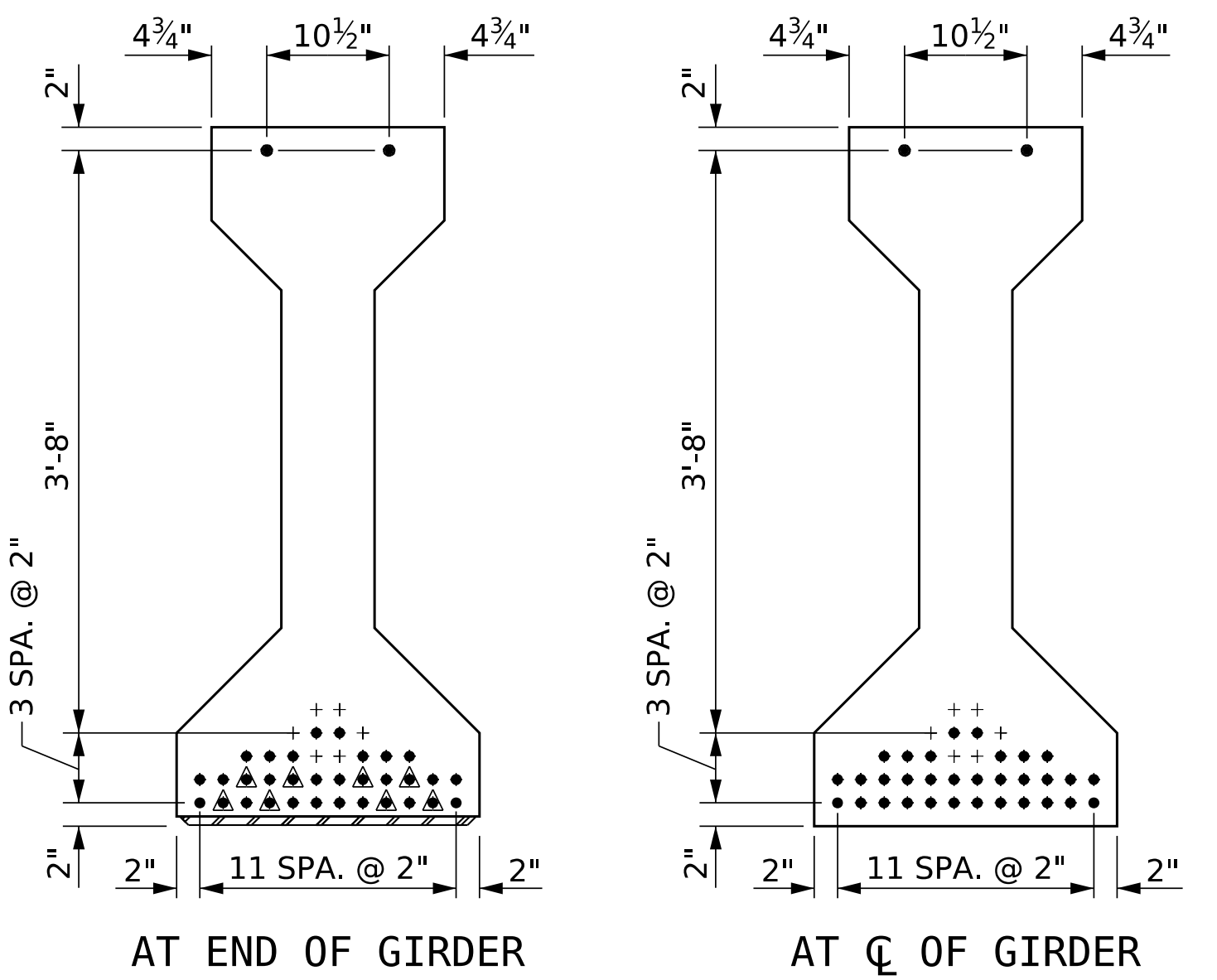
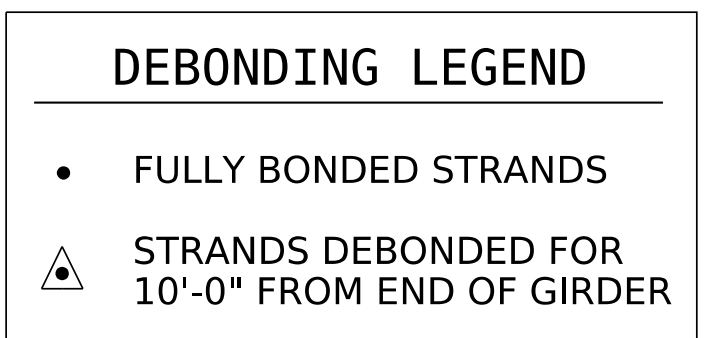
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-09
1			3			TOTAL SHEETS
2			4			26

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 DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23  
 TIME: 03:11 PM on Tuesday, August 23, 2023

DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23

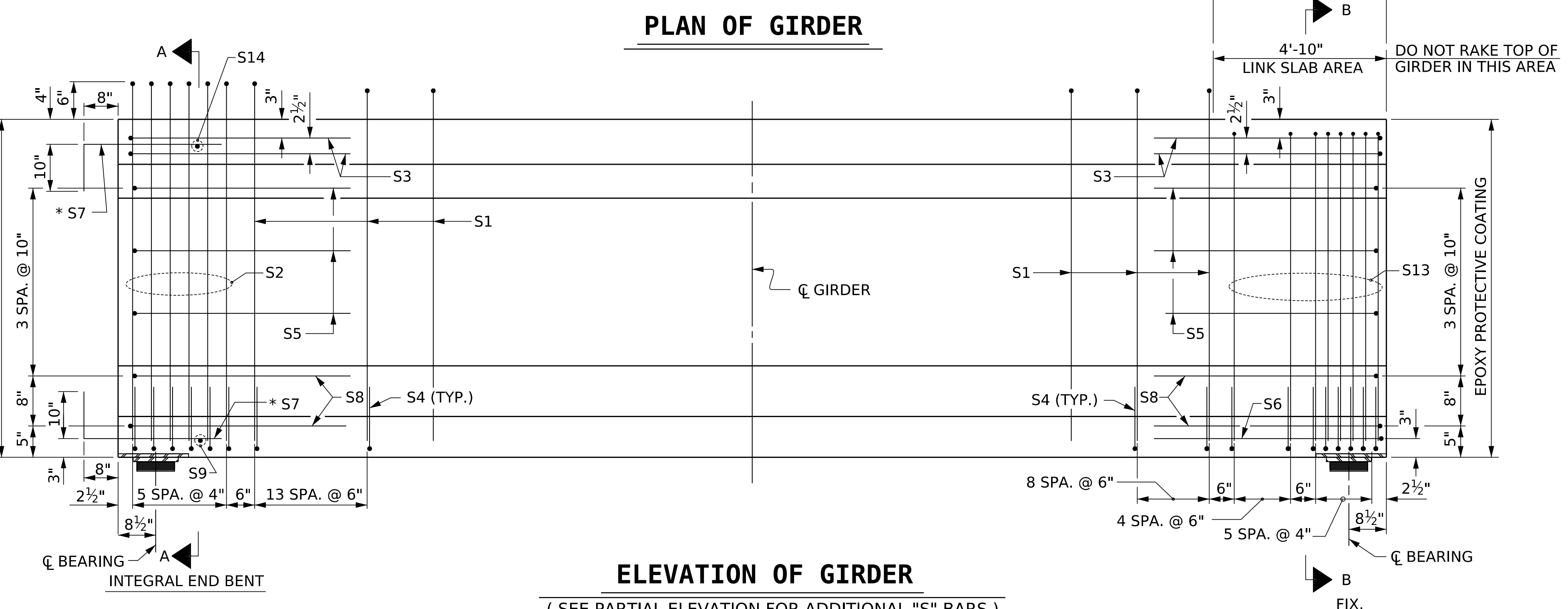
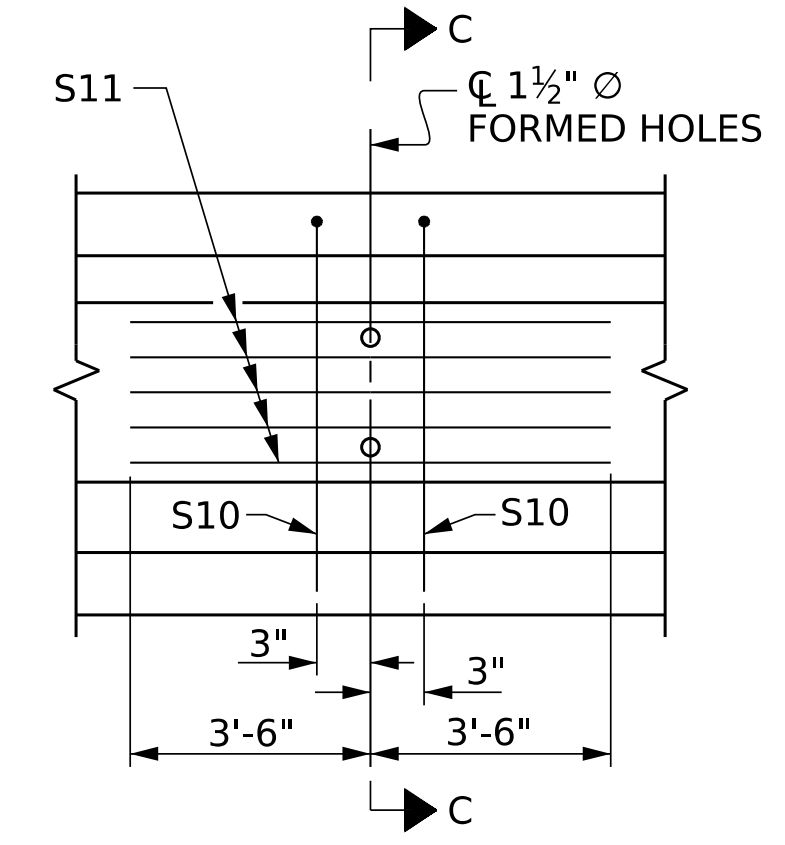
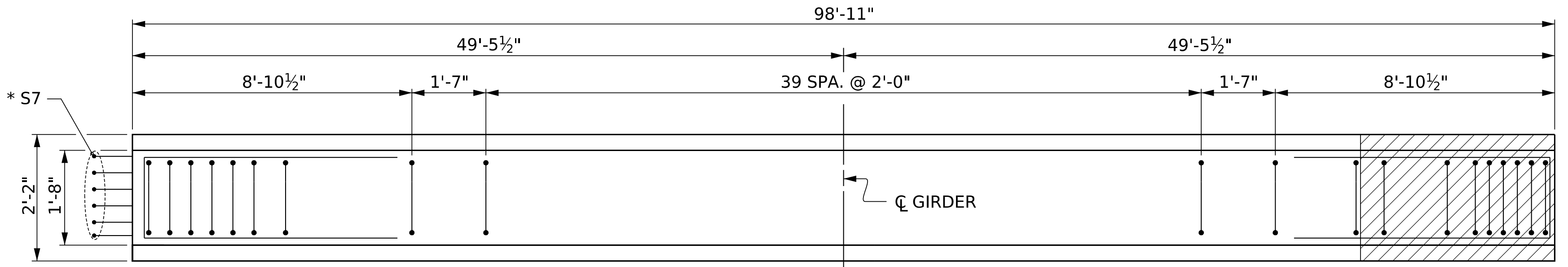


1 1/2" Ø FORMED HOLE  
 (SEE FRAMING PLAN  
 FOR LOCATION)



**0.6" Ø LOW RELAXATION STRAND LAYOUT**

\* FOR S7 BARS, SEE "DETAIL A" ON  
 PRESTRESSED CONCRETE GIRDER  
 DETAILS SHEET



**0.6" Ø L.R. GRADE 270 STRANDS**

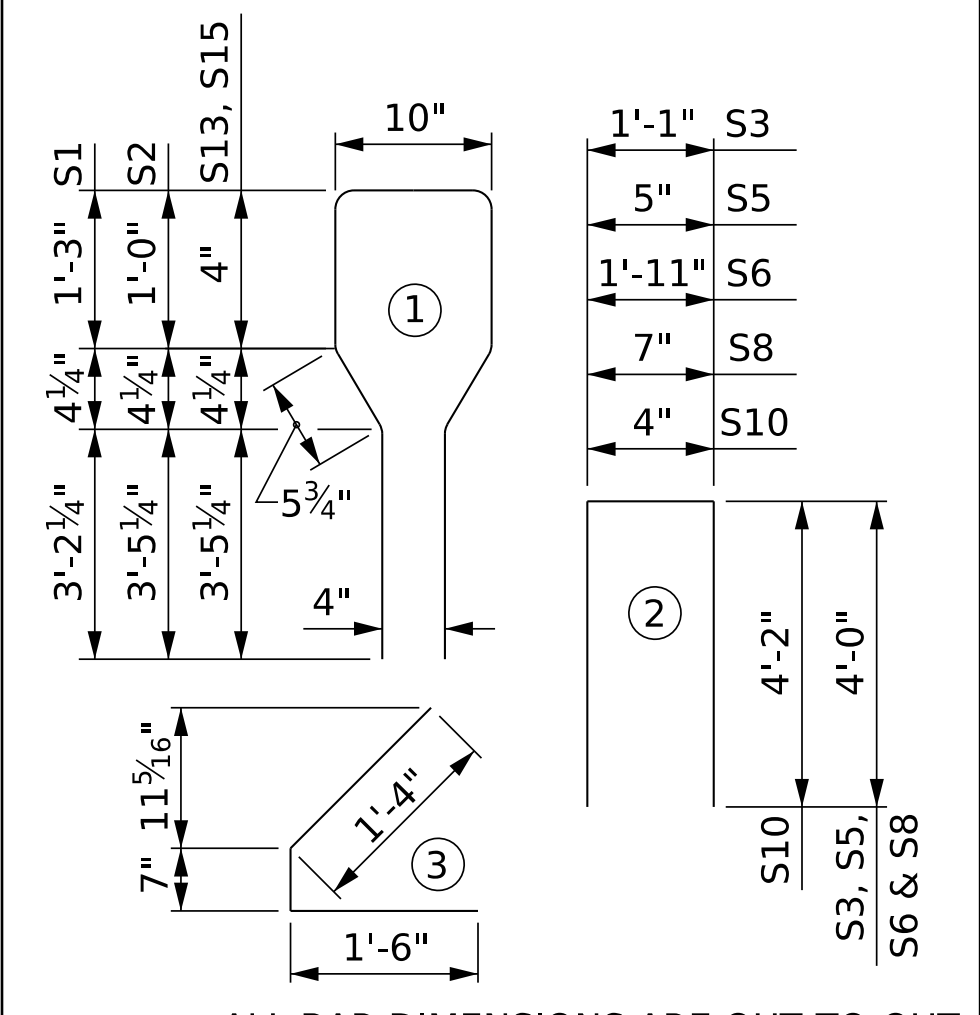
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

**REINFORCING STEEL FOR ONE GIRDER**

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	63	#4	1	10'-8"	449
S2	6	#6	1	10'-8"	96
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
* S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	11	#6	1	9'-4"	154
S14	1	#3	STR	1'-4"	1

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

**BAR TYPES**



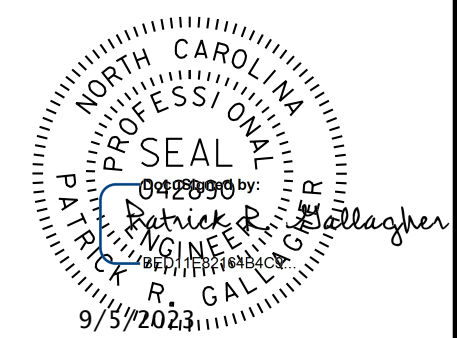
**QUANTITIES FOR ONE GIRDER**

REINFORCING STEEL LB.	8500 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
1,059	20.1	34

**GIRDERS REQUIRED**

NUMBER	LENGTH	TOTAL LENGTH
5	98'-11"	494'-7"

PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-



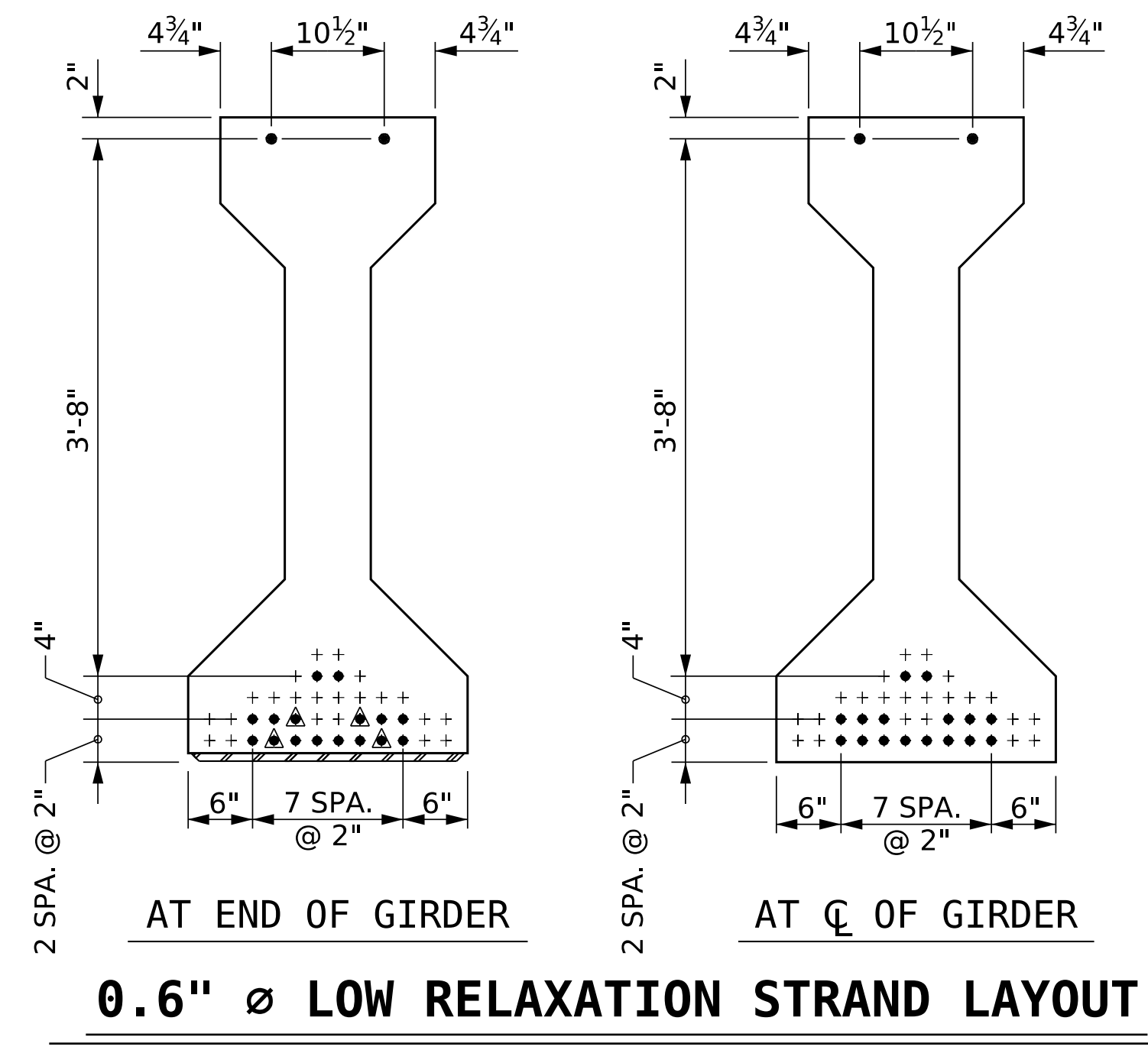
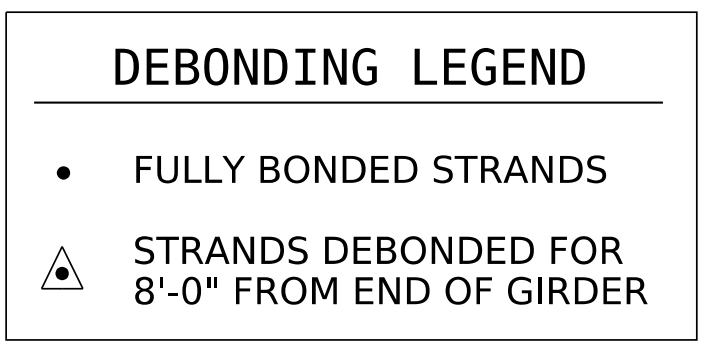
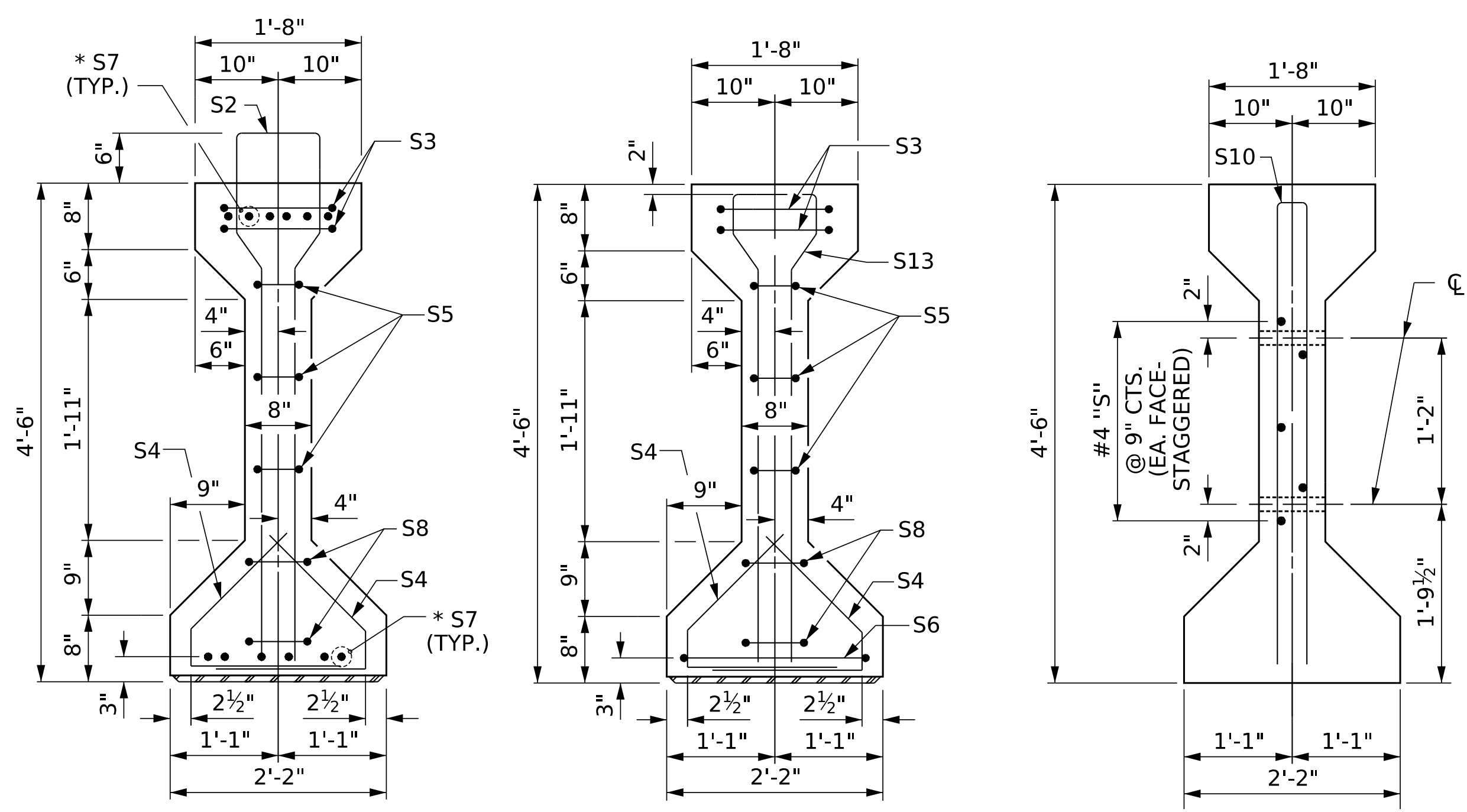
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**STANDARD  
 AASHTO TYPE IV  
 PRESTRESSED CONCRETE  
 GIRDER - LINK SLAB  
 (SPAN A)**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			26

WDC/PRG  
 DATE: 07/23  
 CHKD. BY: PRG  
 DATE: 07/23  
 DES. EGR. OF RECORD: PRG  
 DATE: 07/23  
 DRAWN BY: BNB 09/21  
 CHECKED BY: AAI 09/21

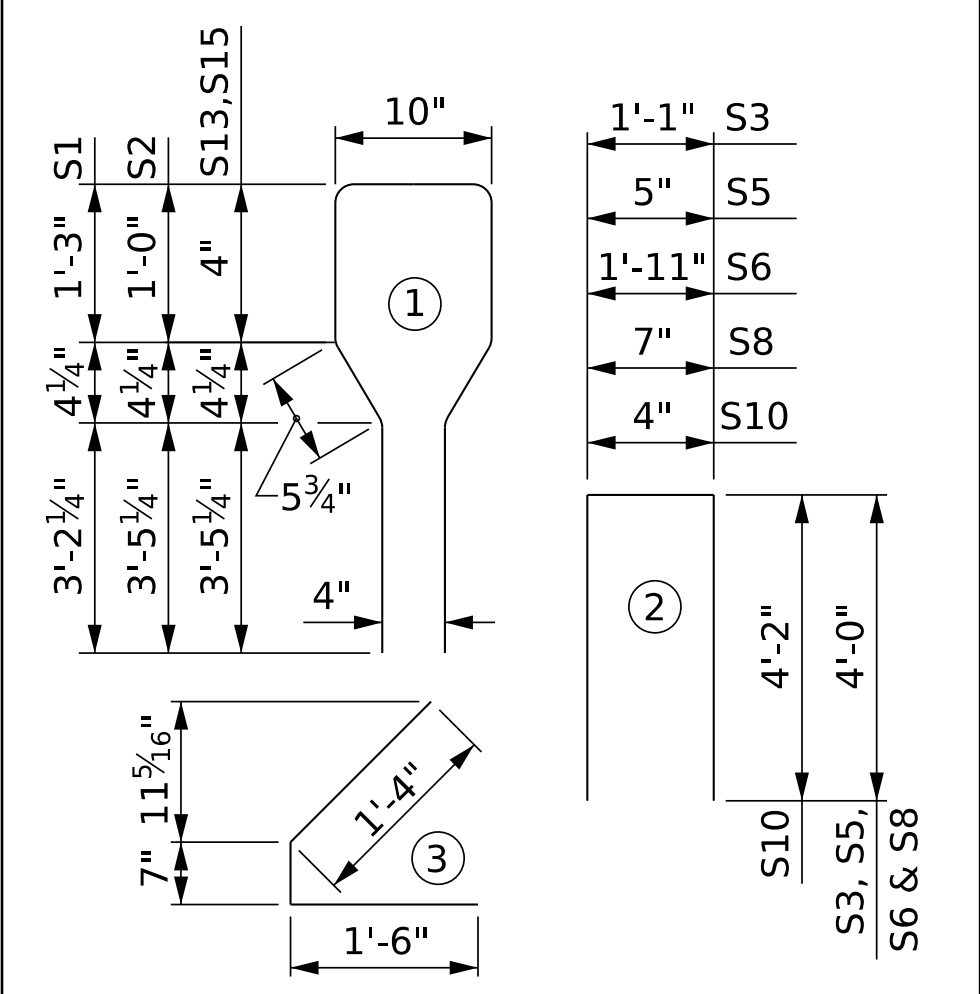


0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	42	#4	1	10'-8"	299	
S2	6	#6	1	10'-8"	96	
S3	4	#4	2	9'-1"	24	
S4	64	#4	3	3'-5"	146	
S5	6	#4	2	8'-5"	34	
S6	1	#4	2	9'-11"	7	
* S7	12	#5	STR	3'-8"	46	
S8	4	#4	2	8'-7"	23	
S9	1	#3	STR	1'-10"	1	
S10	2	#5	2	8'-8"	18	
S11	5	#4	STR	7'-0"	23	
S13	7	#6	1	9'-4"	98	
S14	1	#3	STR	1'-4"	1	

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

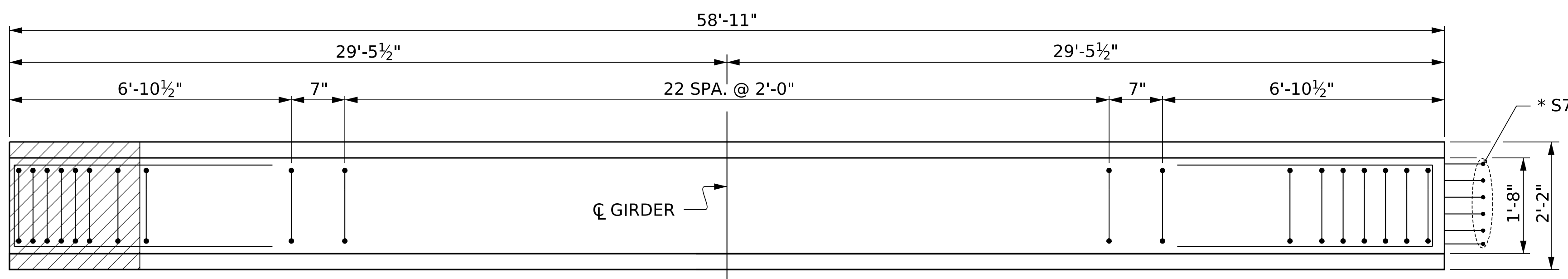
QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
822	12.0	18

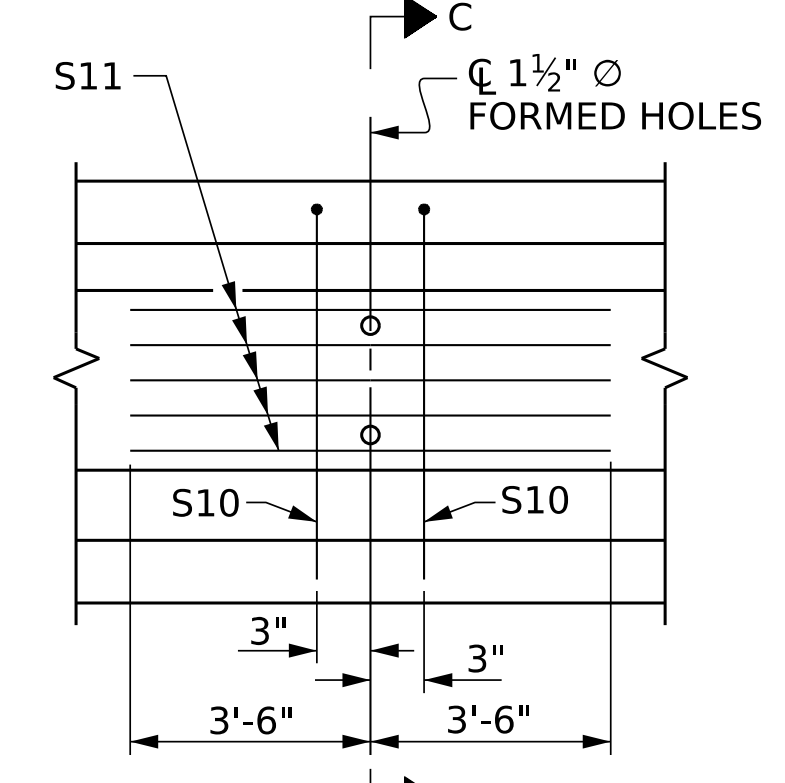
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	58'-11"	294'-7"

\* FOR S7 BARS, SEE "DETAIL A" ON PRESTRESSED CONCRETE GIRDER DETAILS SHEET



PLAN OF GIRDER

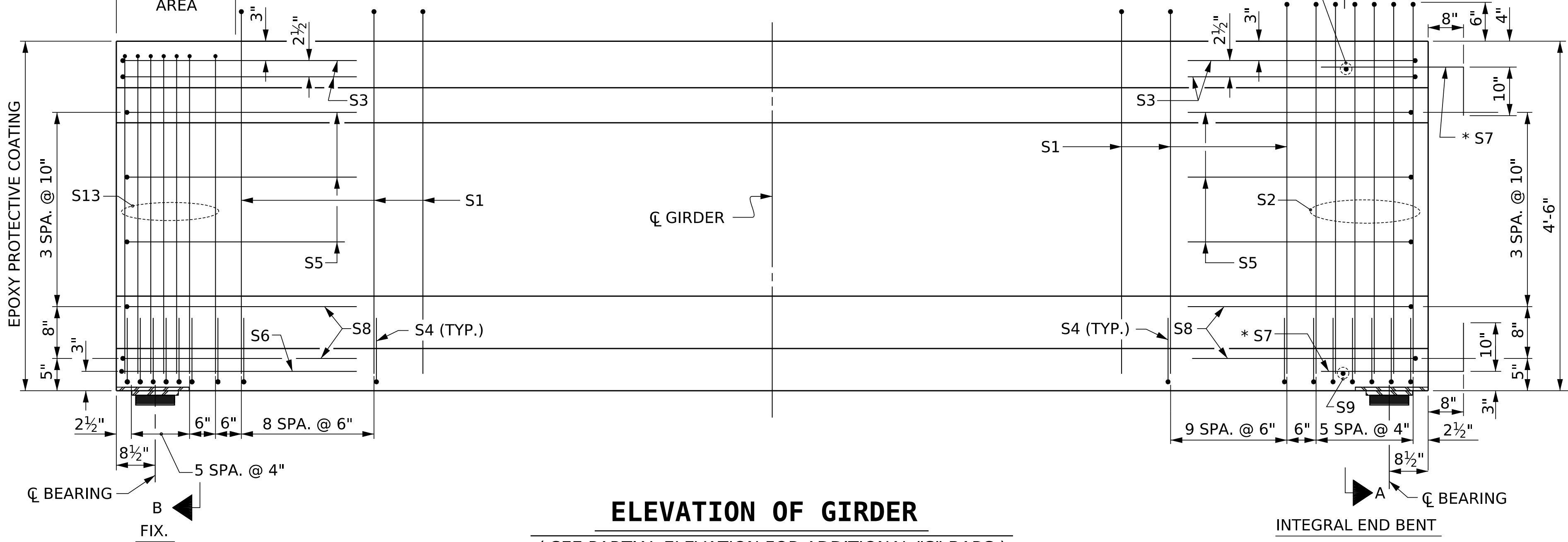


PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1 THRU 5

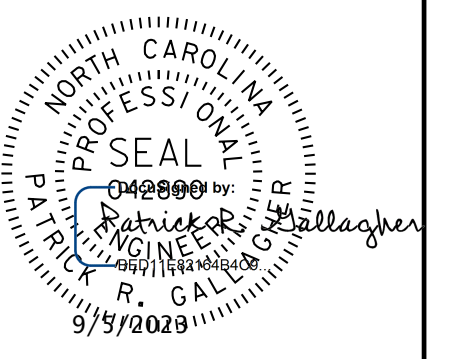
DO NOT RAKE TOP OF GIRDER IN THIS AREA

2'-10" LINK SLAB AREA

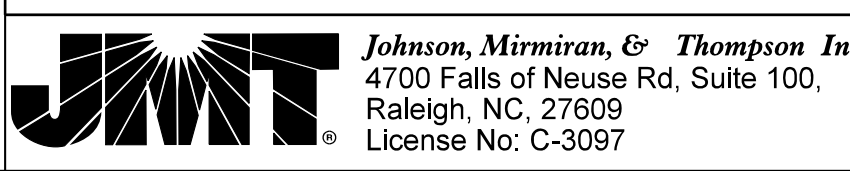


ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
AASHTO TYPE IV  
PRESTRESSED CONCRETE  
GIRDER - LINK SLAB  
(SPAN B)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS 26
2			4			

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 DATE: 03/17/2023 10:51 PM on Tuesday, August 22, 2023  
 TIME: 03:17 PM on Tuesday, August 22, 2023

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CHKD. BY: PRG	DATE: 07/23	CHECKED BY: AAI 09/21
DES. EGR. OF RECORD: PRG	DATE: 07/23	

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.

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 6500 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 THE LINK SLAB AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION		SPAN A - GIRDERS A1 & A5																				
		BRG.	1/20	2/20	3/20	4/20	5/20	6/20	7/20	8/20	9/20	10/20	11/20	12/20	13/20	14/20	15/20	16/20	17/20	18/20	19/20	BRG.
CAMBER (GIRDER IN PLACE)	↑	0	0.034	0.068	0.100	0.129	0.154	0.176	0.193	0.206	0.214	0.216	0.214	0.206	0.193	0.176	0.154	0.129	0.100	0.068	0.034	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	-0.022	-0.043	-0.064	-0.084	-0.100	-0.117	-0.127	-0.137	-0.141	-0.144	-0.141	-0.137	-0.127	-0.117	-0.100	-0.084	-0.064	-0.043	-0.022	0
FINAL CAMBER	↑	0"	1/8"	5/16"	7/16"	9/16"	5/8"	11/16"	13/16"	13/16"	7/8"	7/8"	7/8"	13/16"	13/16"	11/16"	5/8"	9/16"	7/16"	5/16"	1/8"	0"

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION		SPAN A - GIRDERS A2, A3, A4																				
		BRG.	1/20	2/20	3/20	4/20	5/20	6/20	7/20	8/20	9/20	10/20	11/20	12/20	13/20	14/20	15/20	16/20	17/20	18/20	19/20	BRG.
CAMBER (GIRDER IN PLACE)	↑	0	0.034	0.068	0.100	0.129	0.154	0.176	0.193	0.206	0.214	0.216	0.214	0.206	0.193	0.176	0.154	0.129	0.100	0.068	0.034	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	-0.024	-0.049	-0.072	-0.096	-0.114	-0.132	-0.144	-0.156	-0.160	-0.164	-0.160	-0.156	-0.144	-0.132	-0.114	-0.096	-0.072	-0.049	-0.024	0
FINAL CAMBER	↑	0"	1/8"	1/4"	5/16"	3/8"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	1/2"	1/2"	3/8"	5/16"	1/4"	1/8"	0"	

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

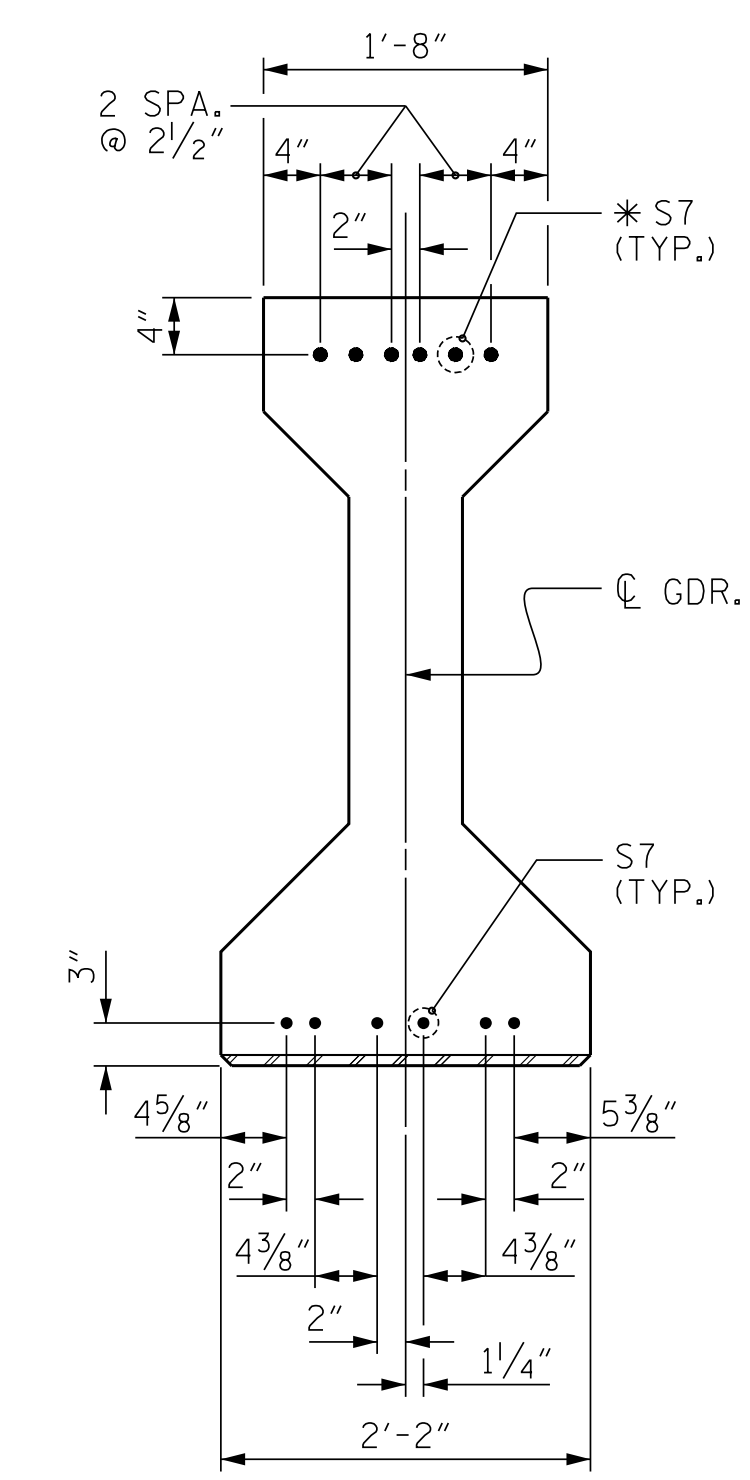
0.6" Ø LOW RELAXATION		SPAN B - GIRDERS B1 & B5																				
		BRG.	1/20	2/20	3/20	4/20	5/20	6/20	7/20	8/20	9/20	10/20	11/20	12/20	13/20	14/20	15/20	16/20	17/20	18/20	19/20	BRG.
CAMBER (GIRDER IN PLACE)	↑	0	0.007	0.013	0.020	0.025	0.031	0.035	0.038	0.041	0.042	0.043	0.042	0.041	0.038	0.035	0.031	0.025	0.020	0.013	0.007	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	-0.003	-0.005	-0.008	-0.010	-0.012	-0.014	-0.016	-0.017	-0.017	-0.018	-0.017	-0.017	-0.016	-0.014	-0.012	-0.010	-0.008	-0.005	-0.003	0
FINAL CAMBER	↑	0"	1/16"	1/8"	1/8"	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0"

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

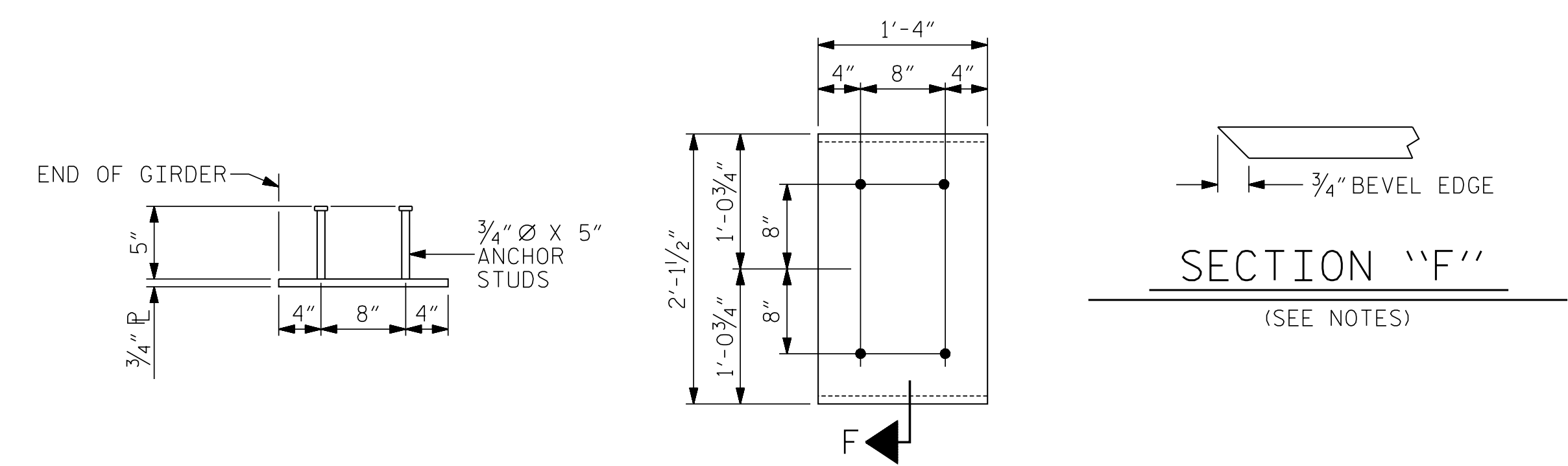
DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION		SPAN B - GIRDERS B2, B3, B4																				
		BRG.	1/20	2/20	3/20	4/20	5/20	6/20	7/20	8/20	9/20	10/20	11/20	12/20	13/20	14/20	15/20	16/20	17/20	18/20	19/20	BRG.
CAMBER (GIRDER IN PLACE)	↑	0	0.007	0.013	0.020	0.025	0.031	0.035	0.038	0.041	0.042	0.043	0.042	0.041	0.038	0.035	0.031	0.025	0.020	0.013	0.007	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	-0.003	-0.006	-0.009	-0.012	-0.014	-0.016	-0.018	-0.019	-0.020	-0.020	-0.020	-0.019	-0.018	-0.016	-0.014	-0.012	-0.009	-0.006	-0.003	0
FINAL CAMBER	↑	0"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/16"	3/16"	1/8"	1/8"	1/16"	0"

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

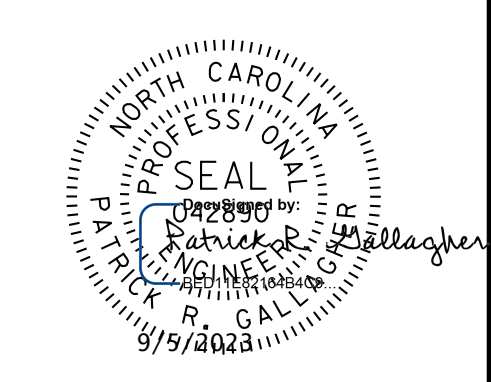


DETAIL "A"  
(FOR INTEGRAL END OF AASHTO TYPE IV GIRDERS)



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

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
STATION: 20+95.00 -L-



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

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 DES. EGR. OF RECORD: PRG DATE: 07/23

**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.

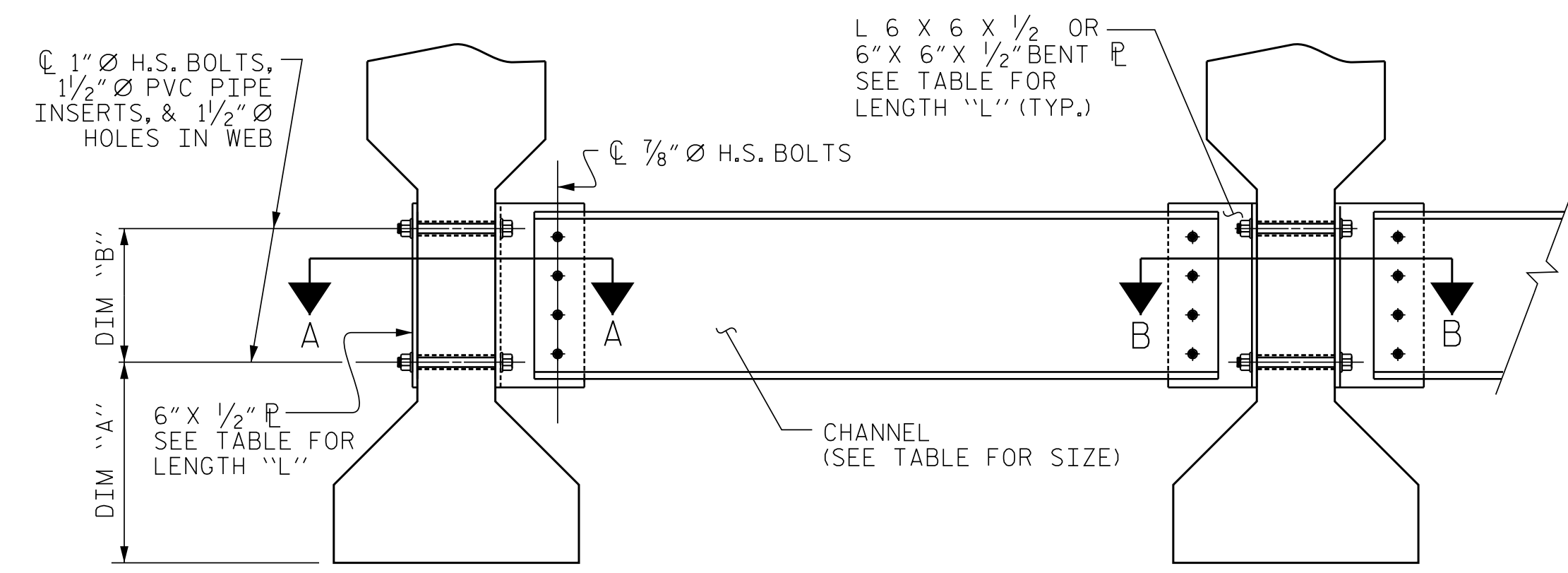
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

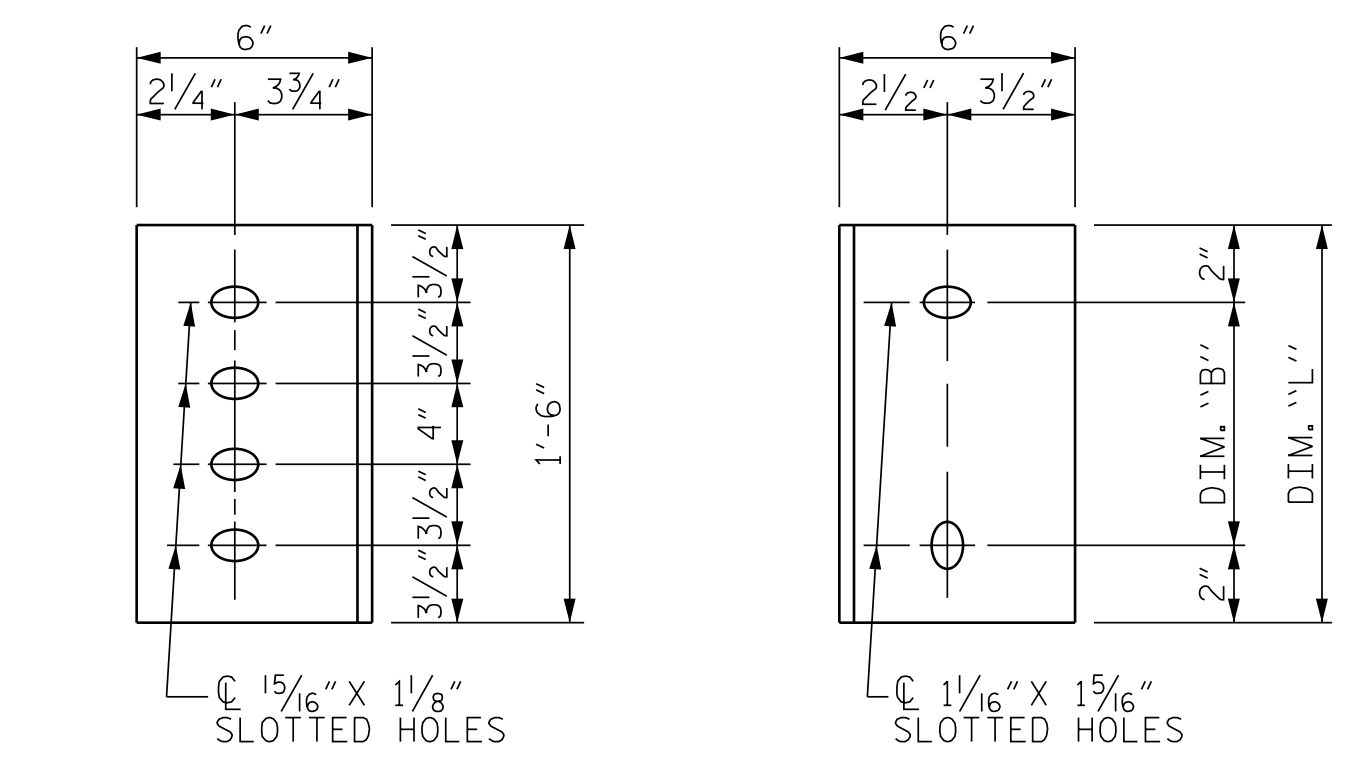
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

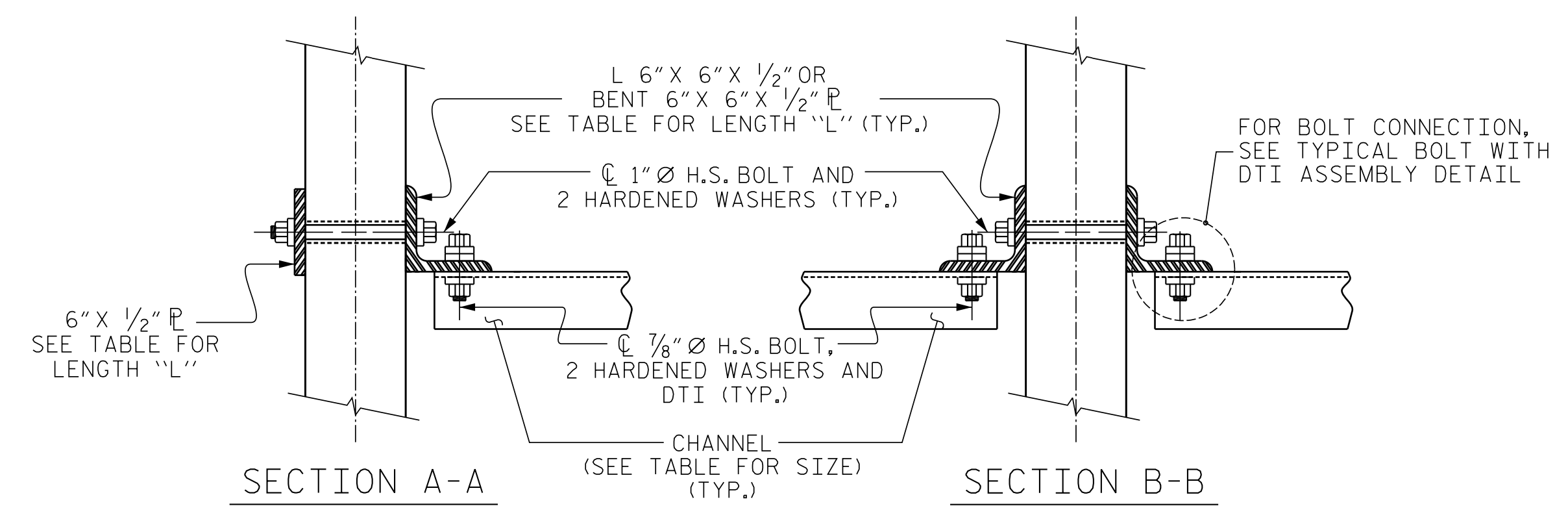
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



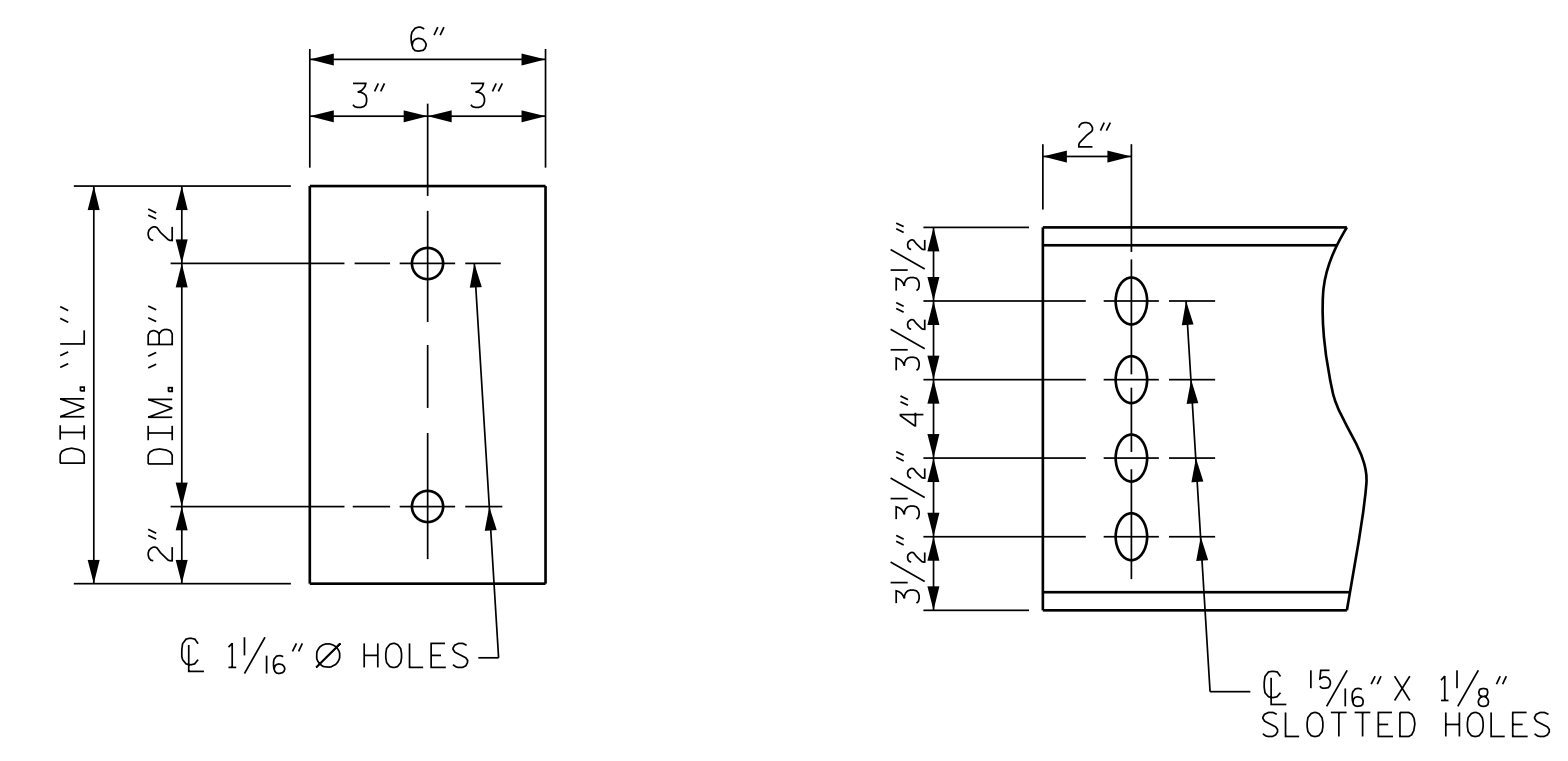
**EXTERIOR GIRDER**      **INTERIOR GIRDER**  
**PART SECTION AT INTERMEDIATE DIAPHRAGM**



**DIAPHRAGM FACE**      **WEB FACE**  
**CONNECTOR PLATE DETAILS**



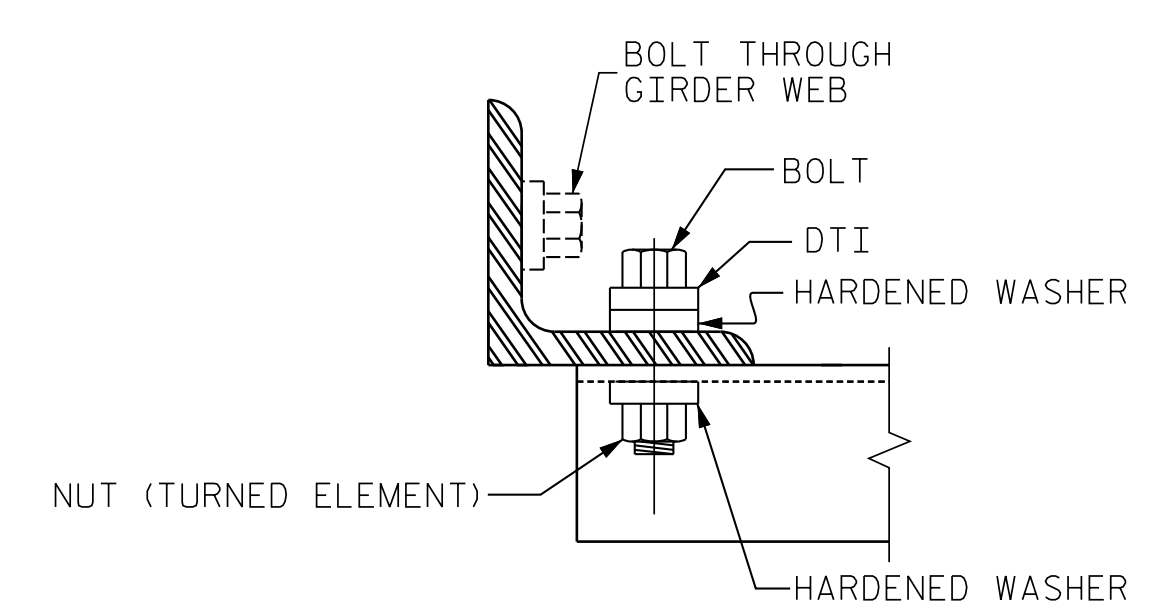
**SECTION A-A**      **SECTION B-B**  
**CONNECTION DETAILS**  
(FOR SKEW = 90°)



**PLATE DETAILS**      **CHANNEL END**

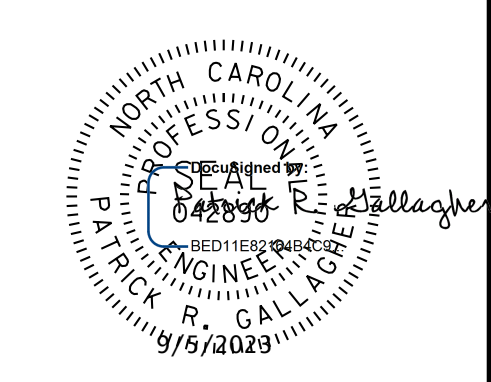
**TABLE**

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"



**BOLT WITH DTI ASSEMBLY DETAIL**

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
STATION: 20+95.00 -L-



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

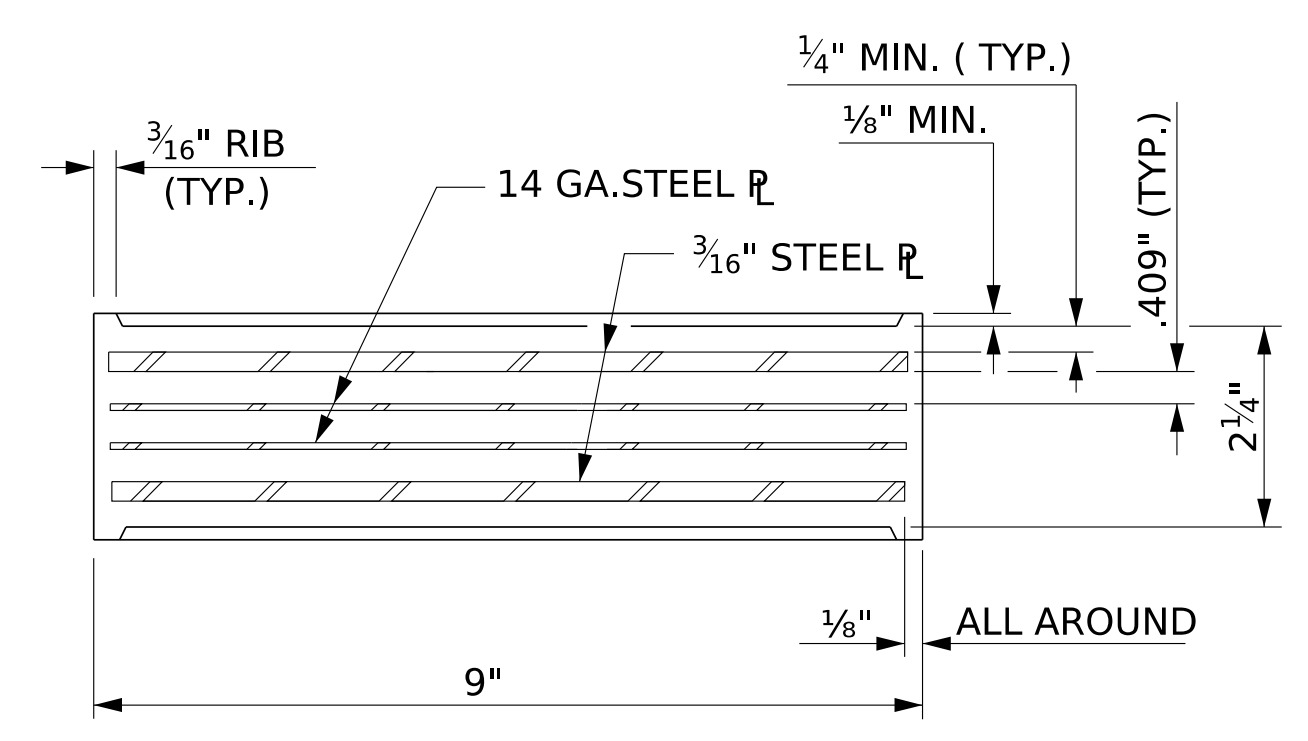
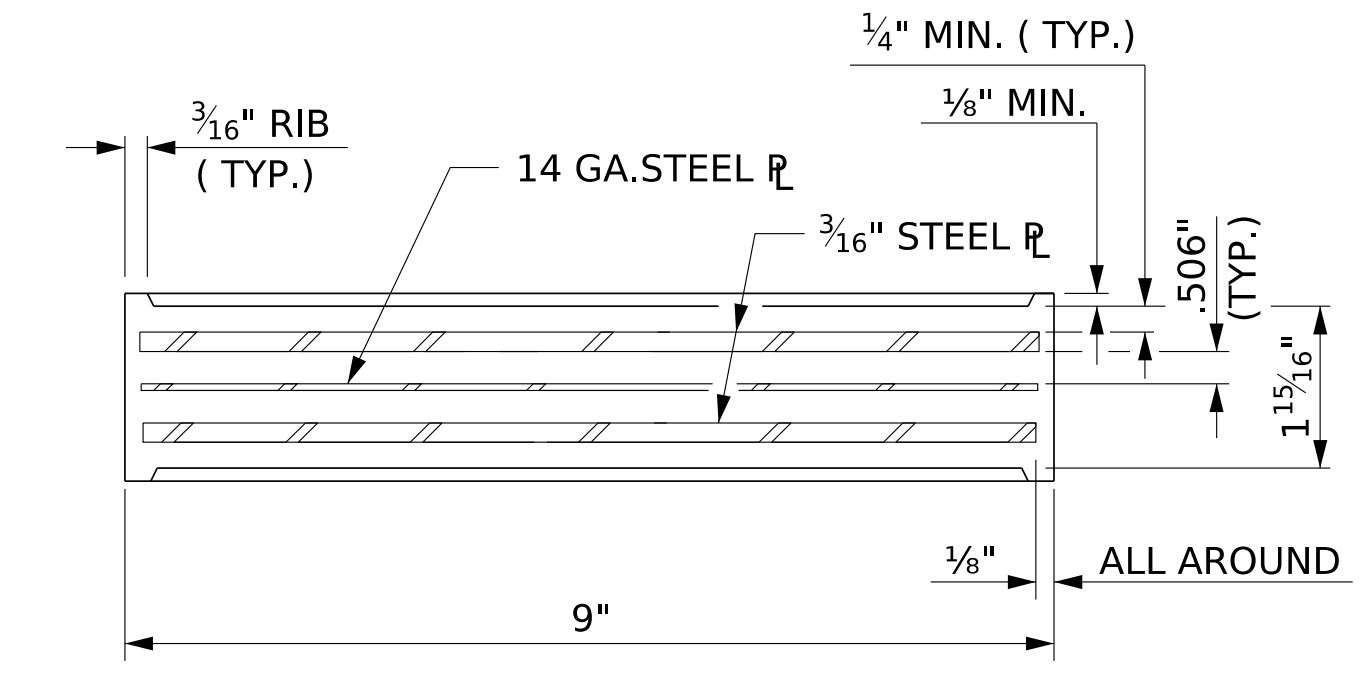
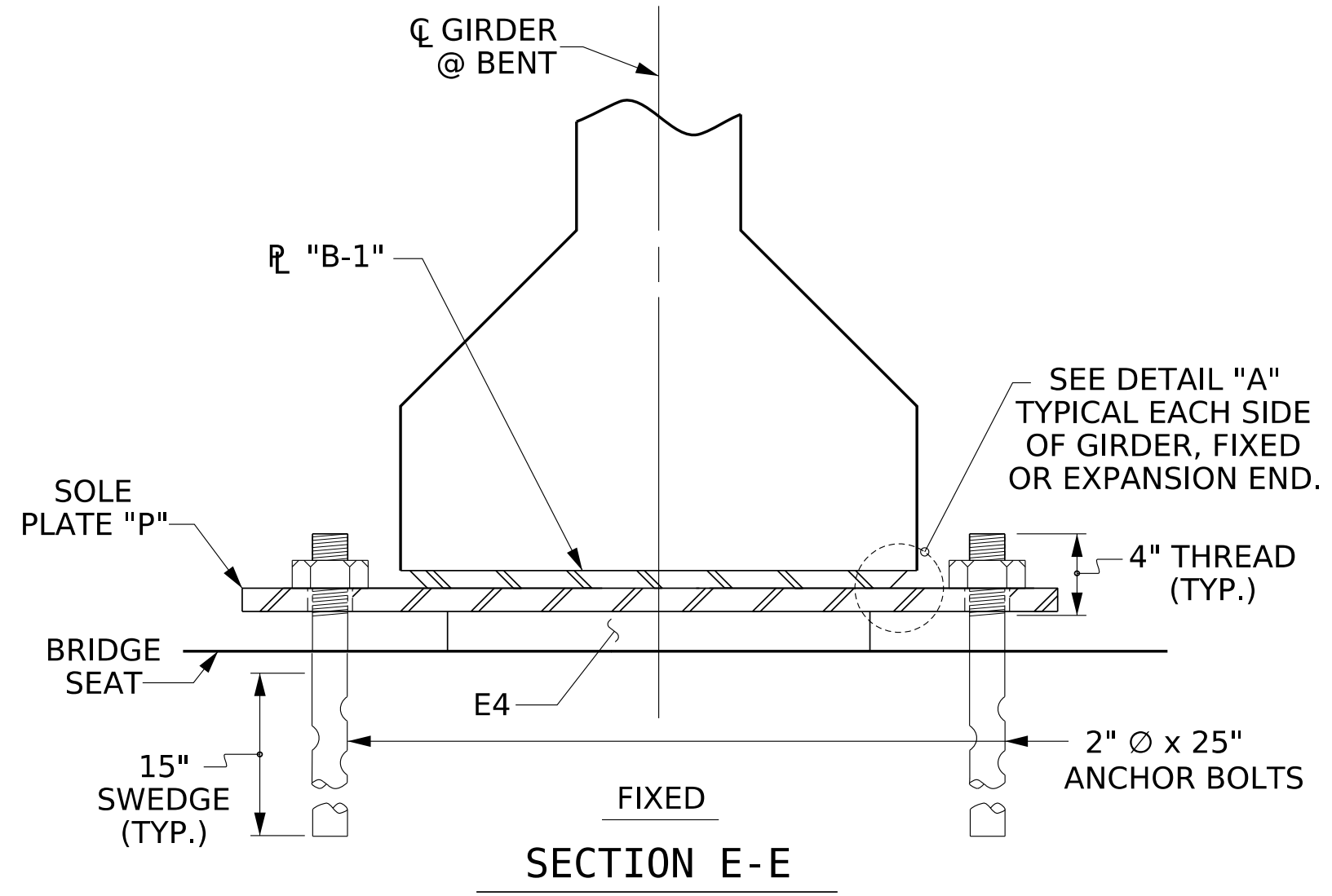
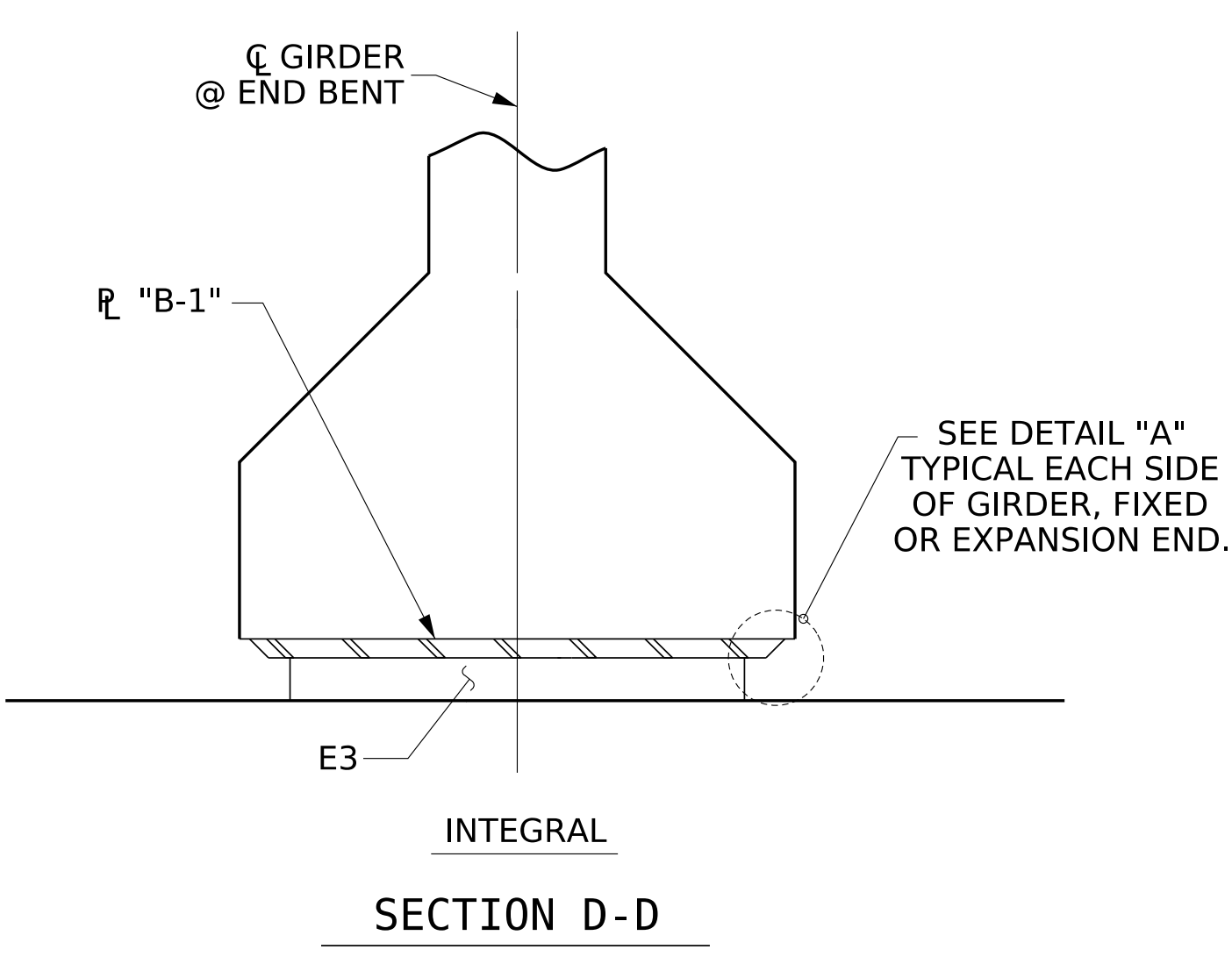
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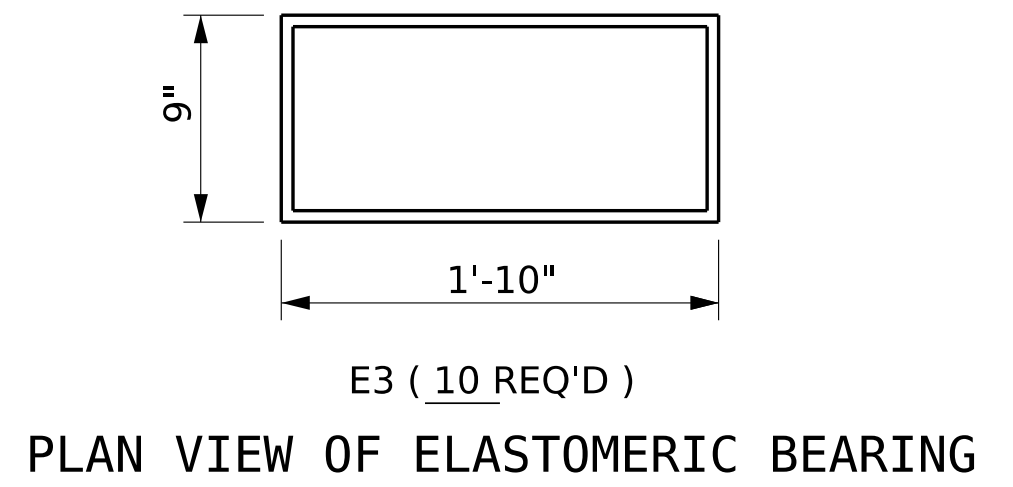
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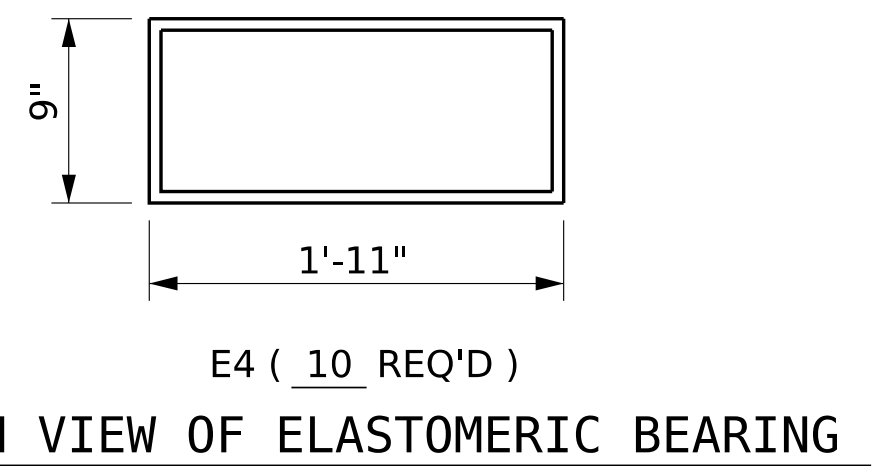
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k
TYPE V	365 k

TYPICAL SECTION OF ELASTOMERIC BEARINGS

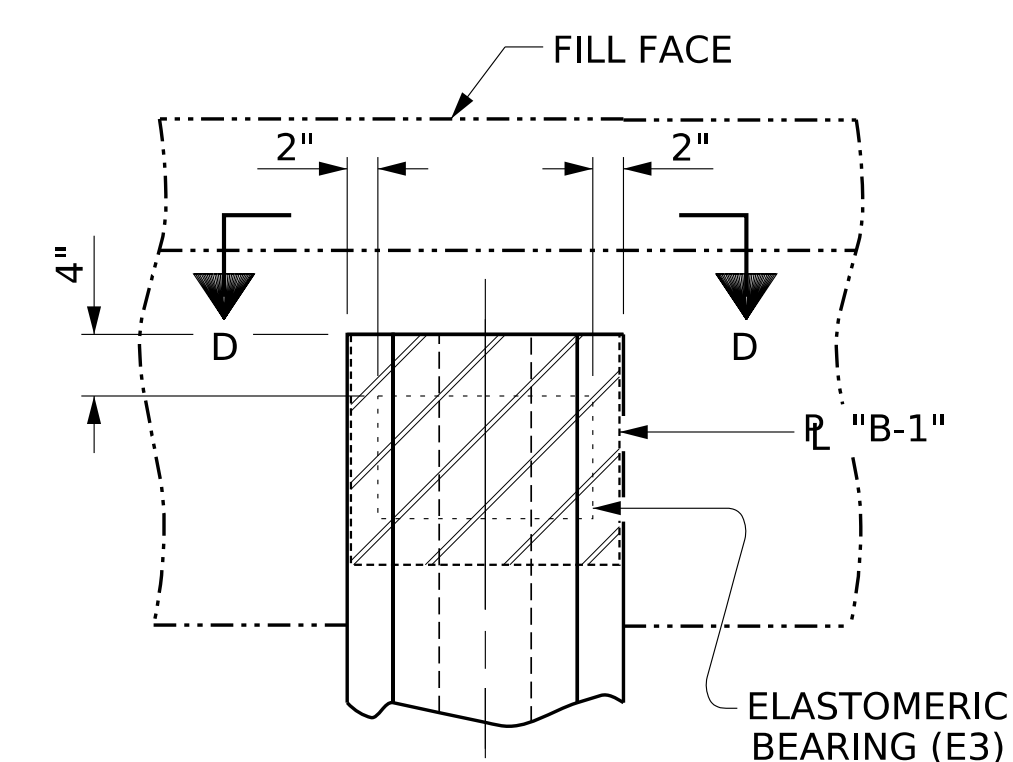
TYPICAL SECTION OF ELASTOMERIC BEARINGS



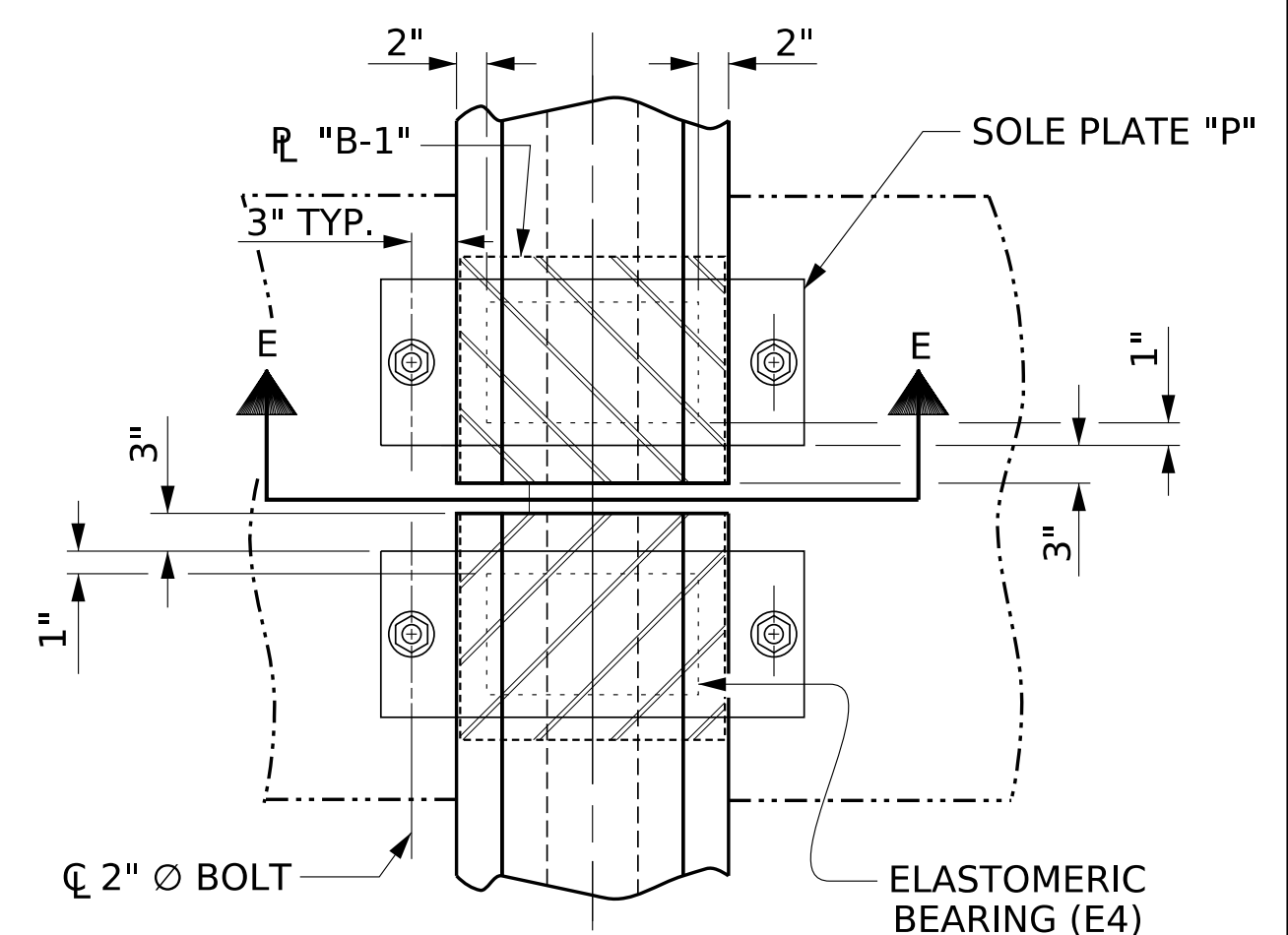
TYPE IV



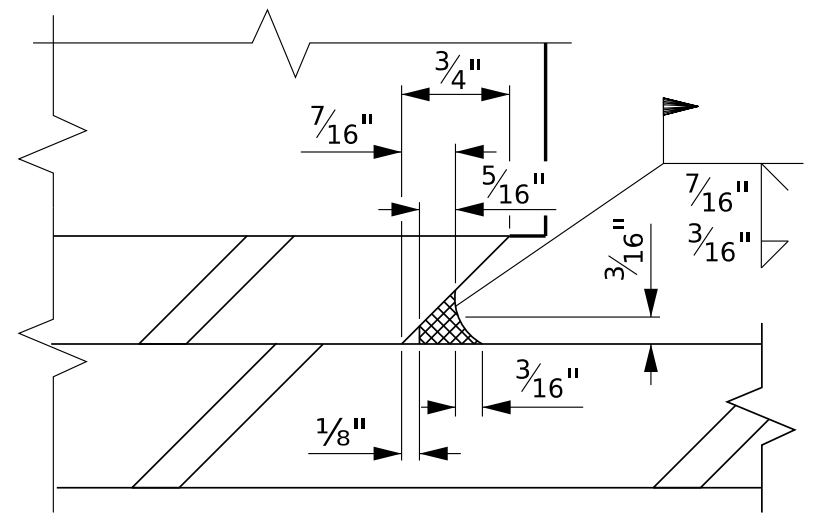
TYPE V



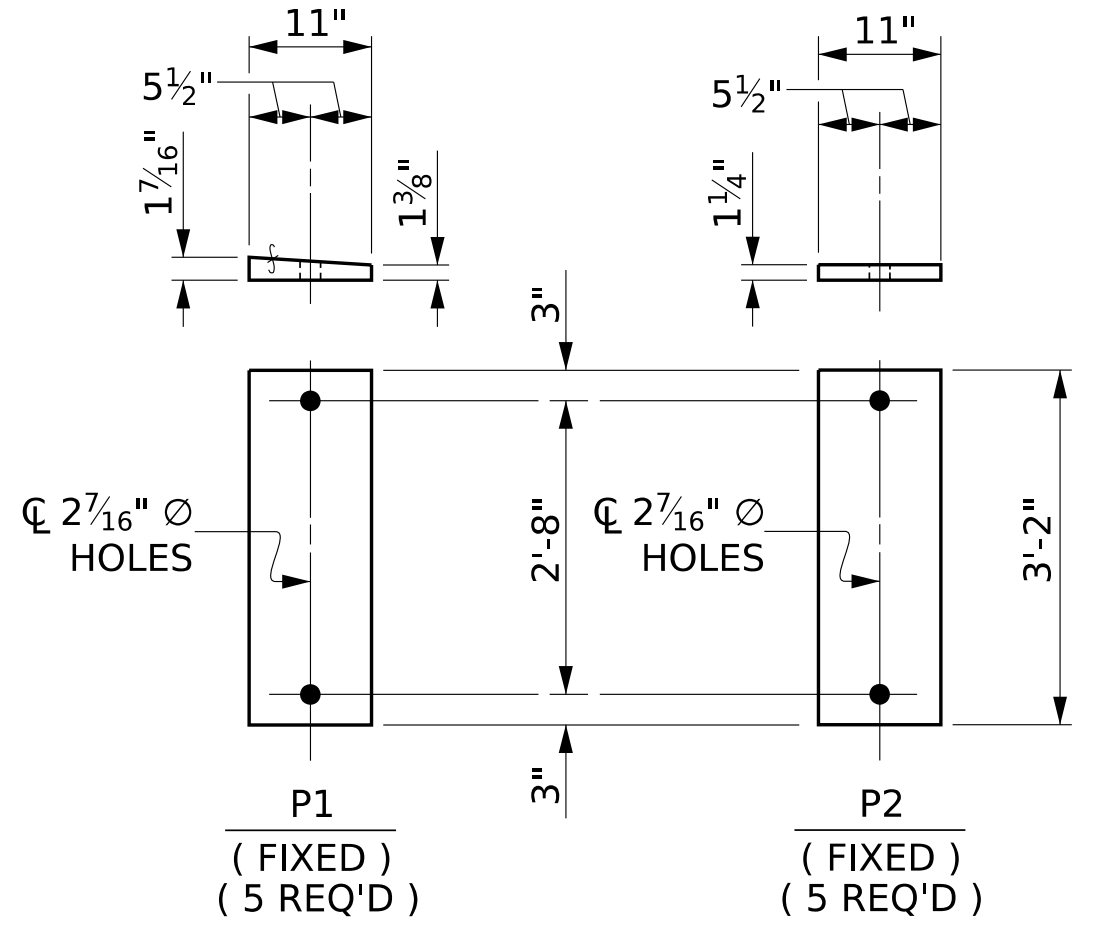
PLAN VIEW AT END BENTS



PLAN VIEW AT BENTS (SHOWING LINK SLAB BENT)



DETAIL "A"



SOLE PLATE DETAILS ( "P" )

**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.

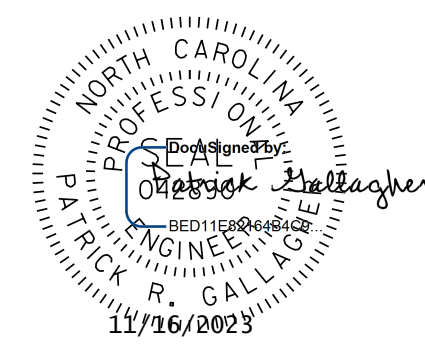
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-



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

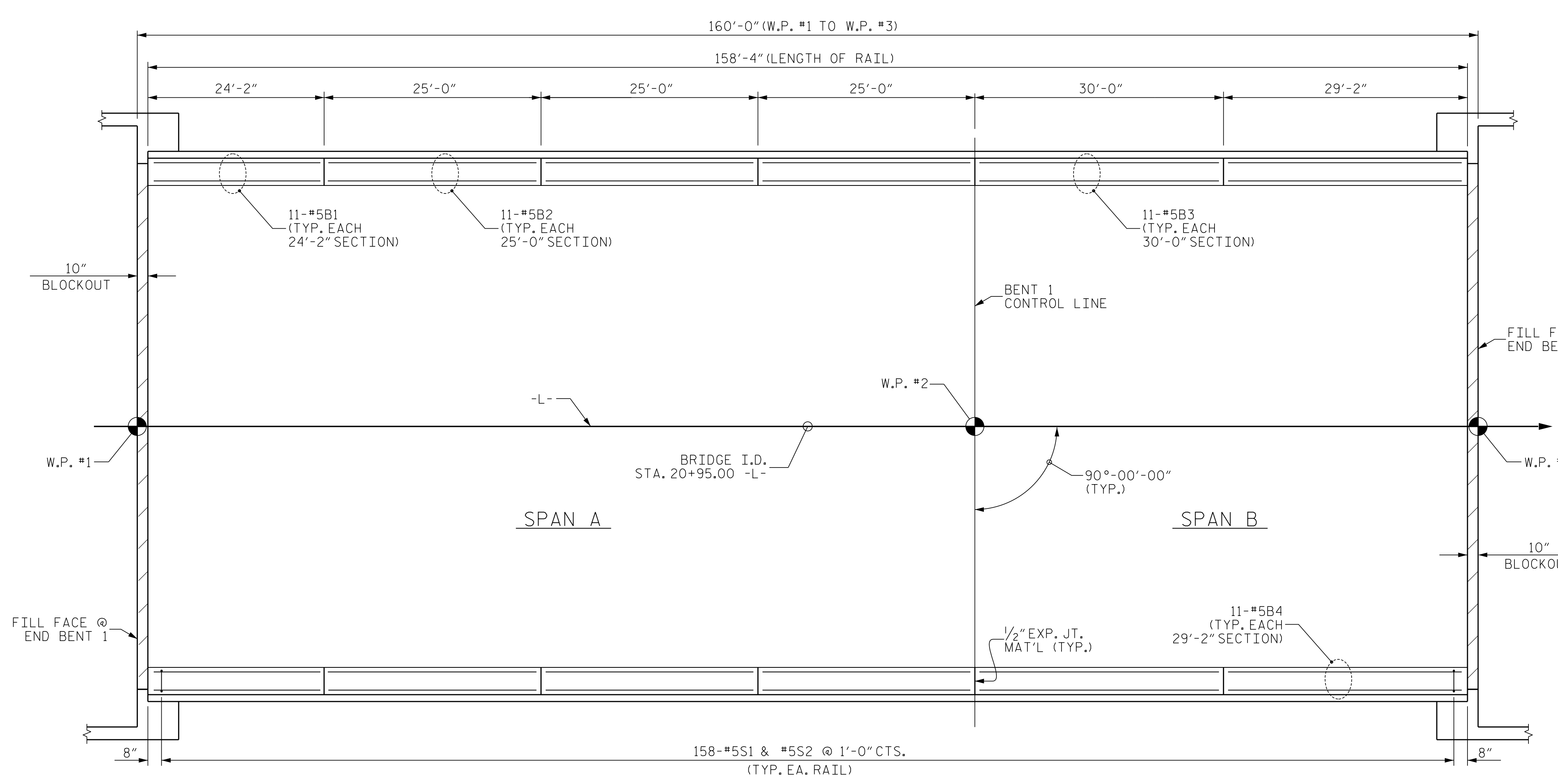
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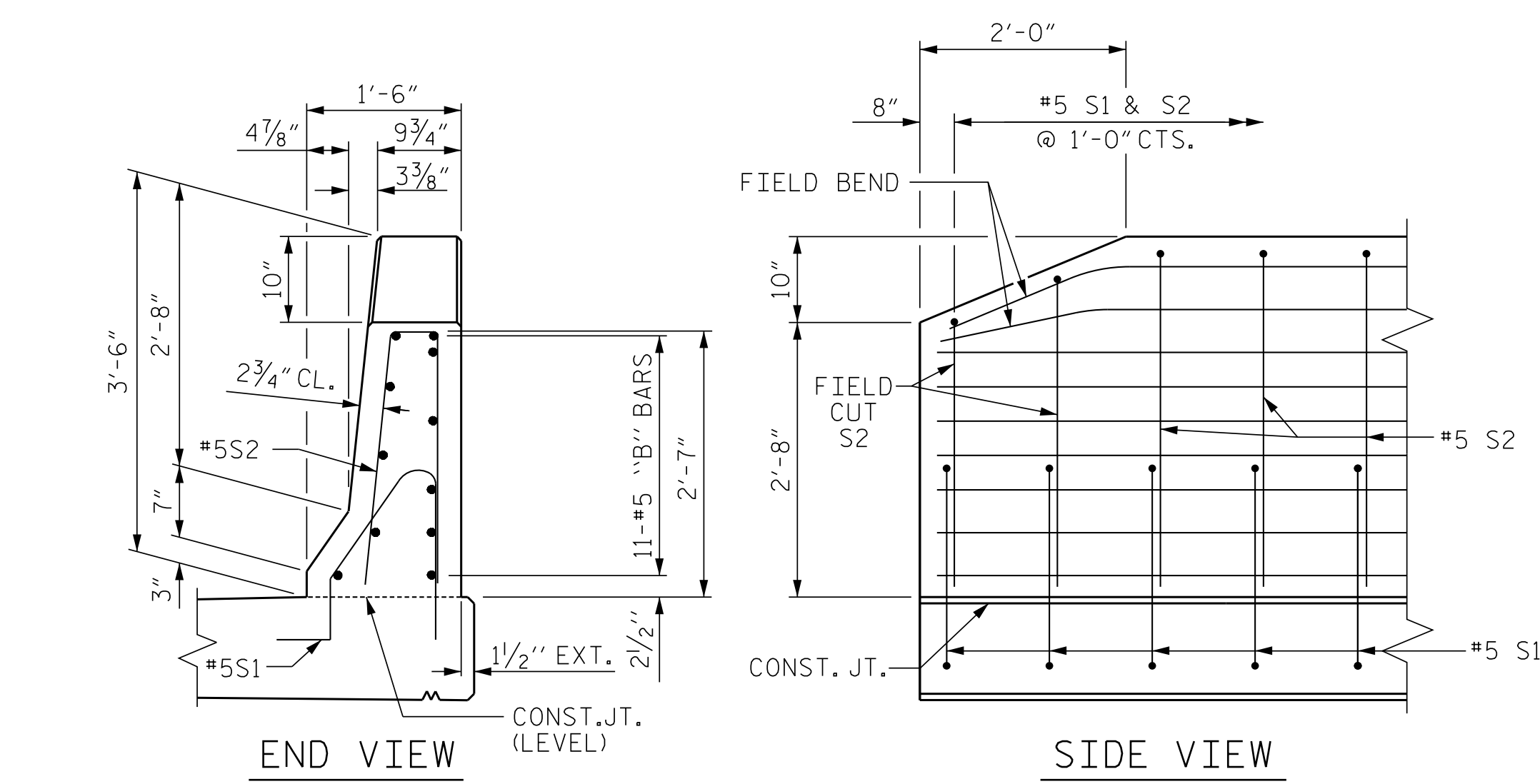
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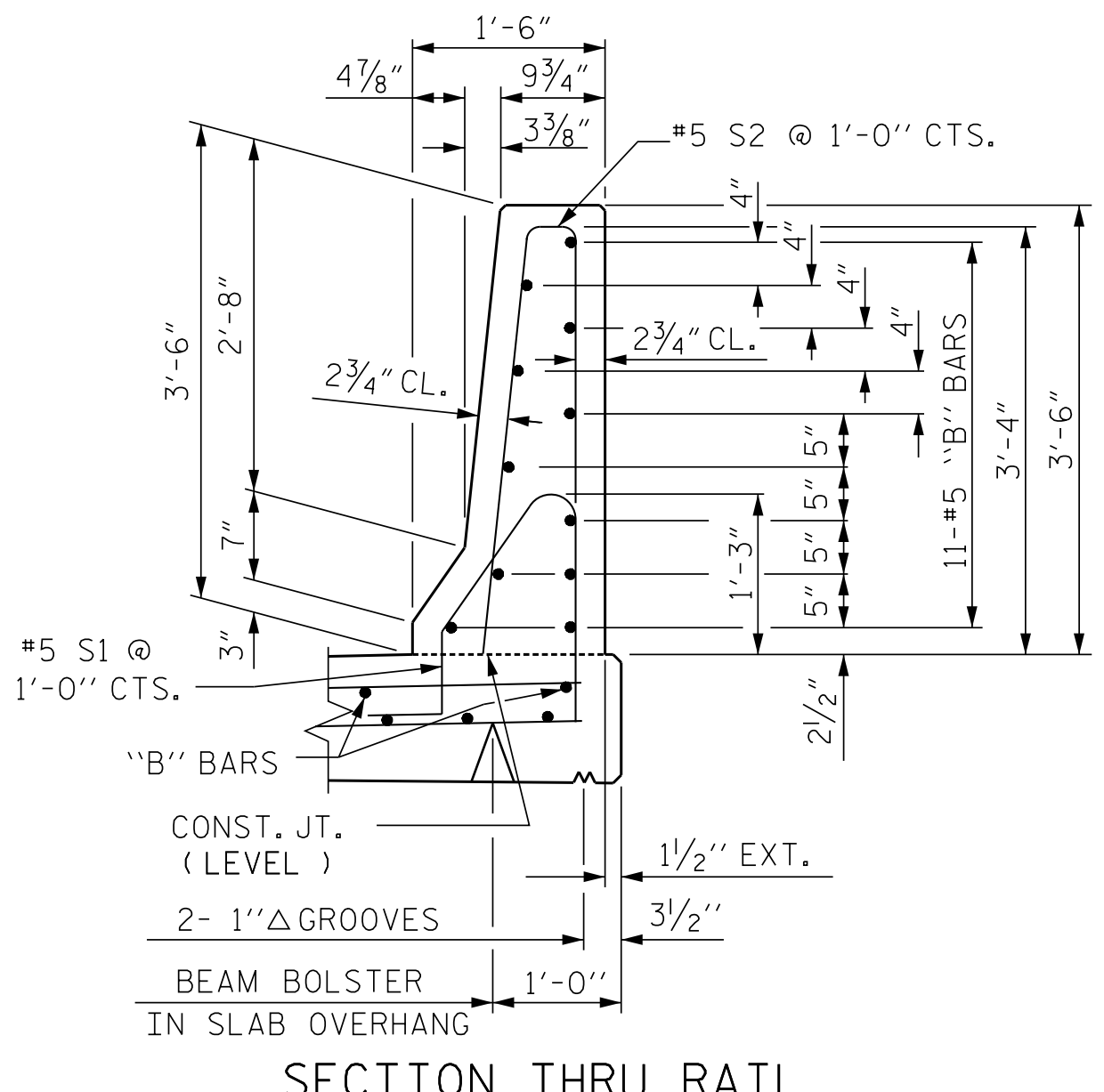
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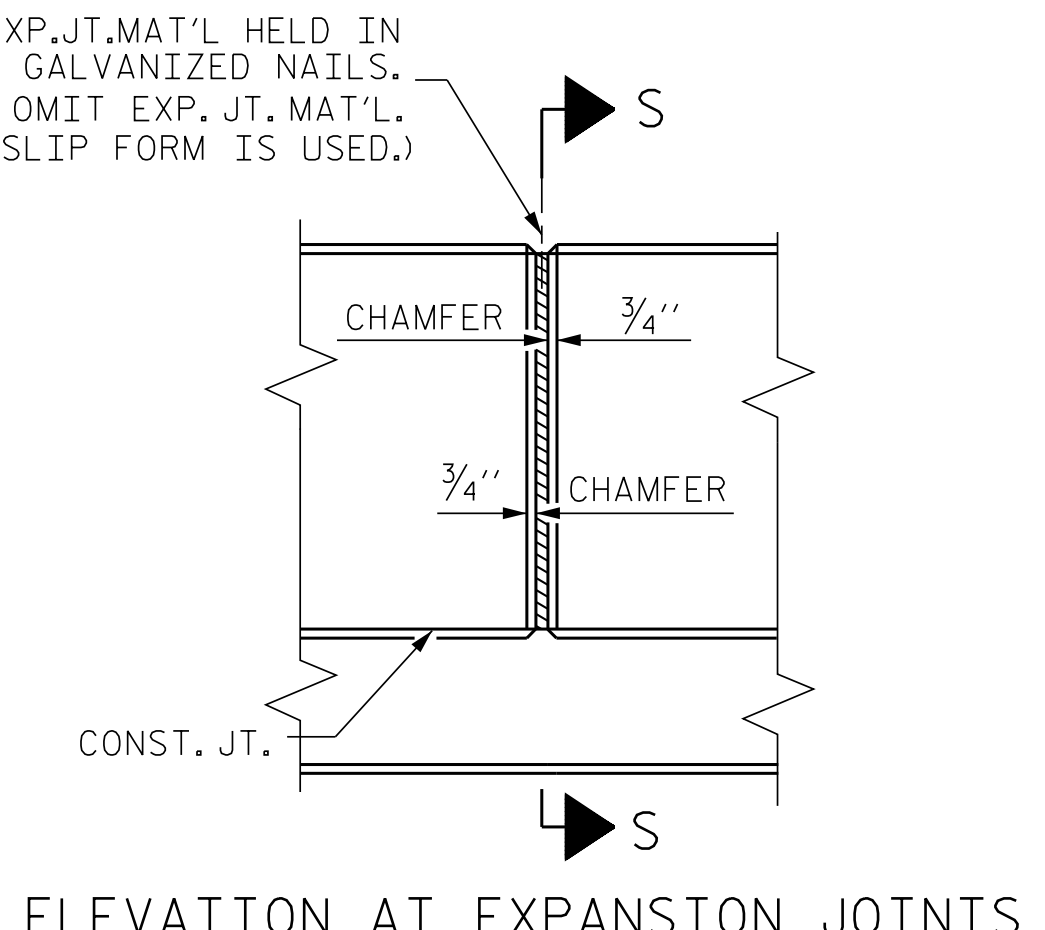
PLAN



END OF RAIL DETAILS



SECTION THRU RAIL



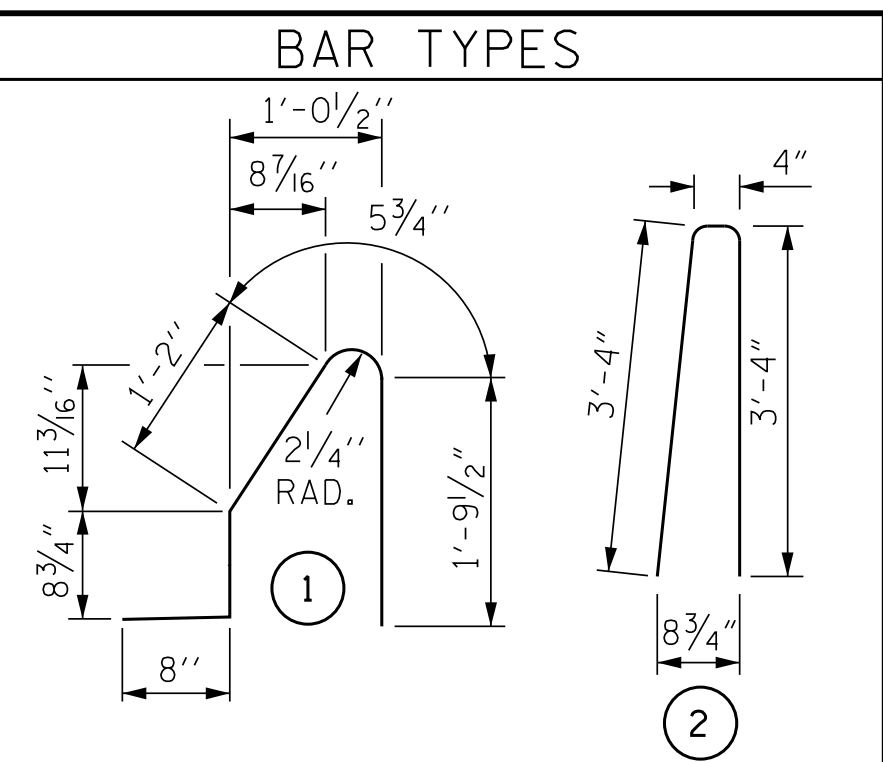
ELEVATION AT EXPANSION JOINTS

NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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



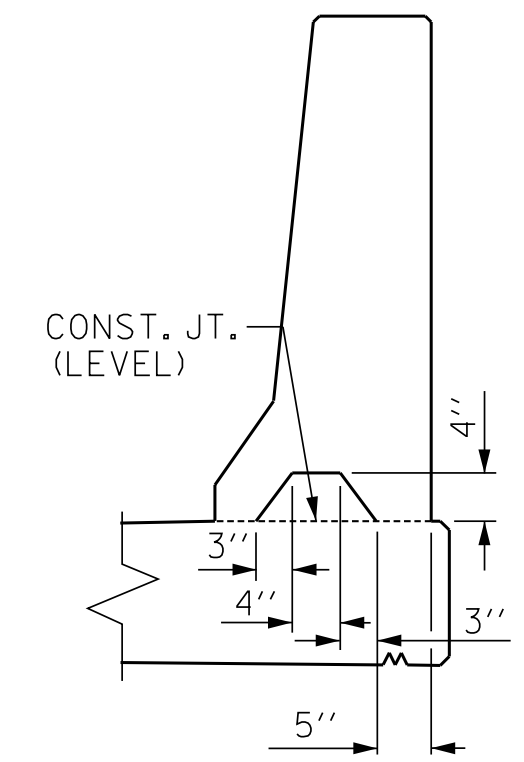
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	#5	STR	23'-10"	547
* B2	66	#5	STR	24'-8"	1698
* B3	22	#5	STR	29'-8"	681
* B4	22	#5	STR	28'-10"	662
* S1	316	#5	1	4'-10"	1593
* S2	316	#5	2	7'-0"	2307

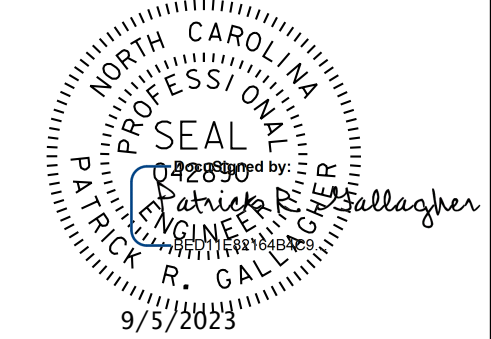
\* EPOXY COATED REINFORCING STEEL 7488 LBS.  
 CLASS AA CONCRETE 43.1 CU. YDS.  
 CONCRETE BARRIER RAIL 316.67 LIN. FT.



SECTION S-S

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

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



PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-

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

DRAWN BY : ARB 5/87	REV. 7/12	MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC
DWN. BY: WDC	DATE: 07/23	
CHKD. BY: PRG	DATE: 07/23	
DES. EGR. OF RECORD: PRG	DATE: 07/23	

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			26



NOTES

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

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

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

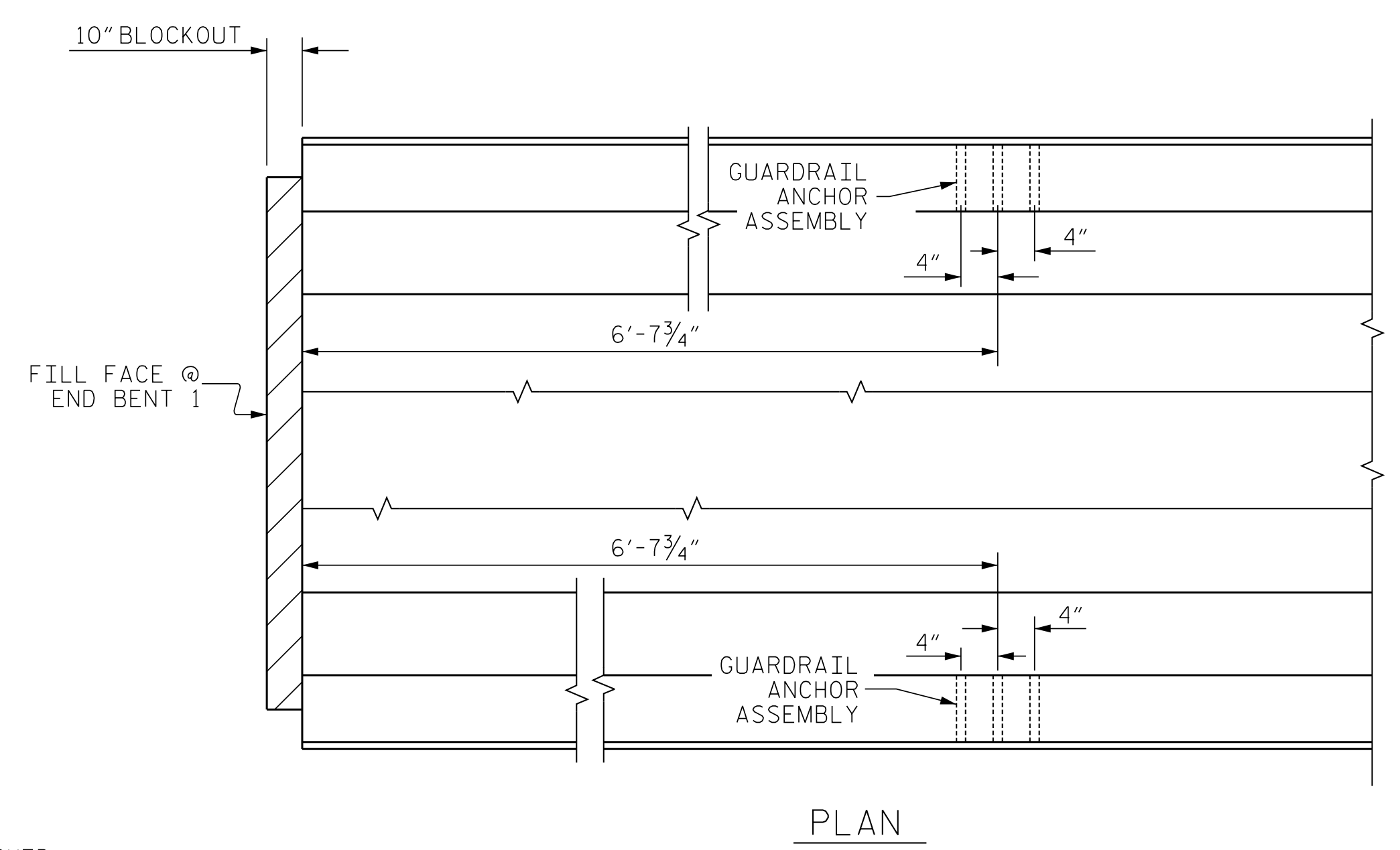
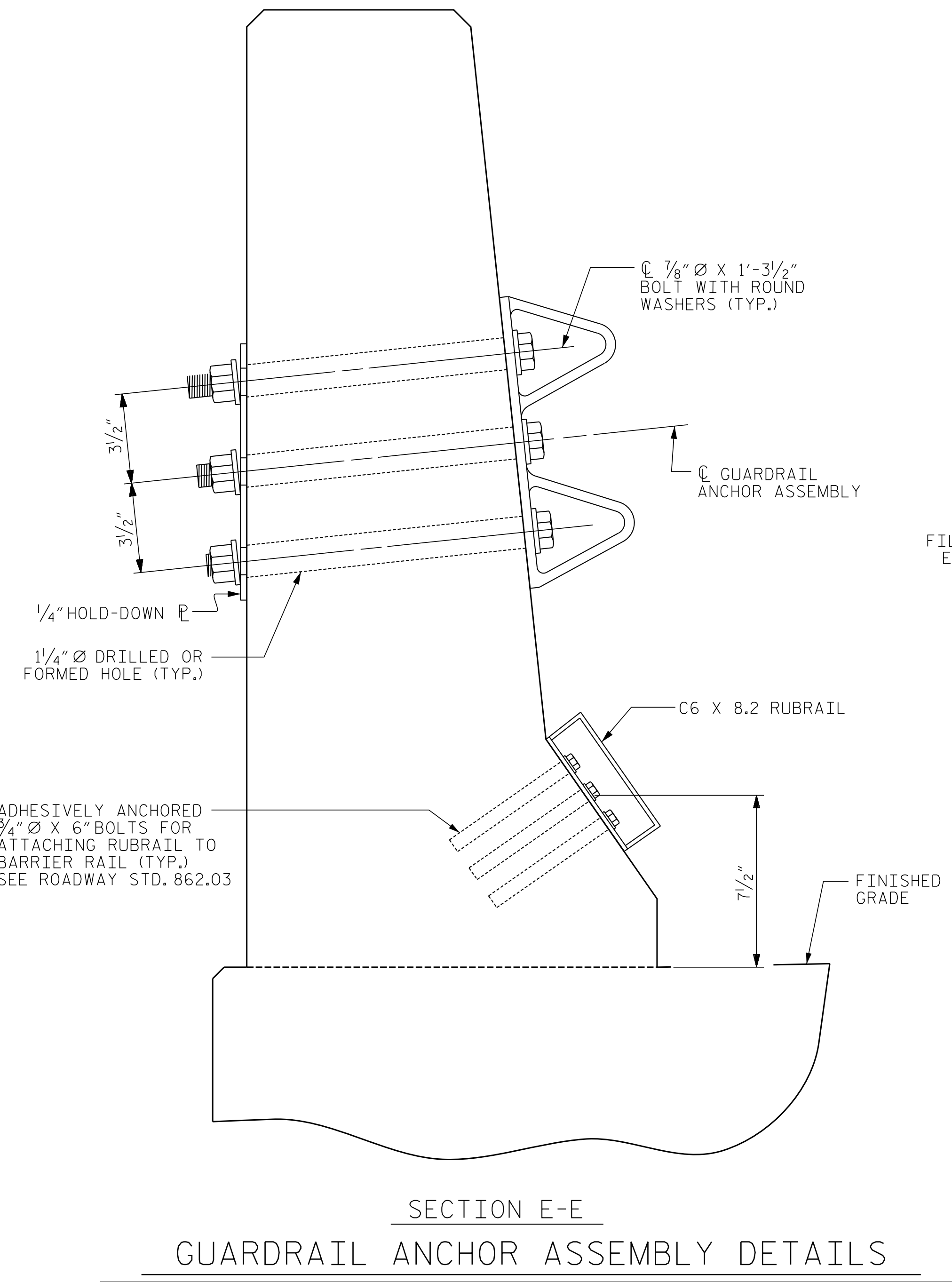
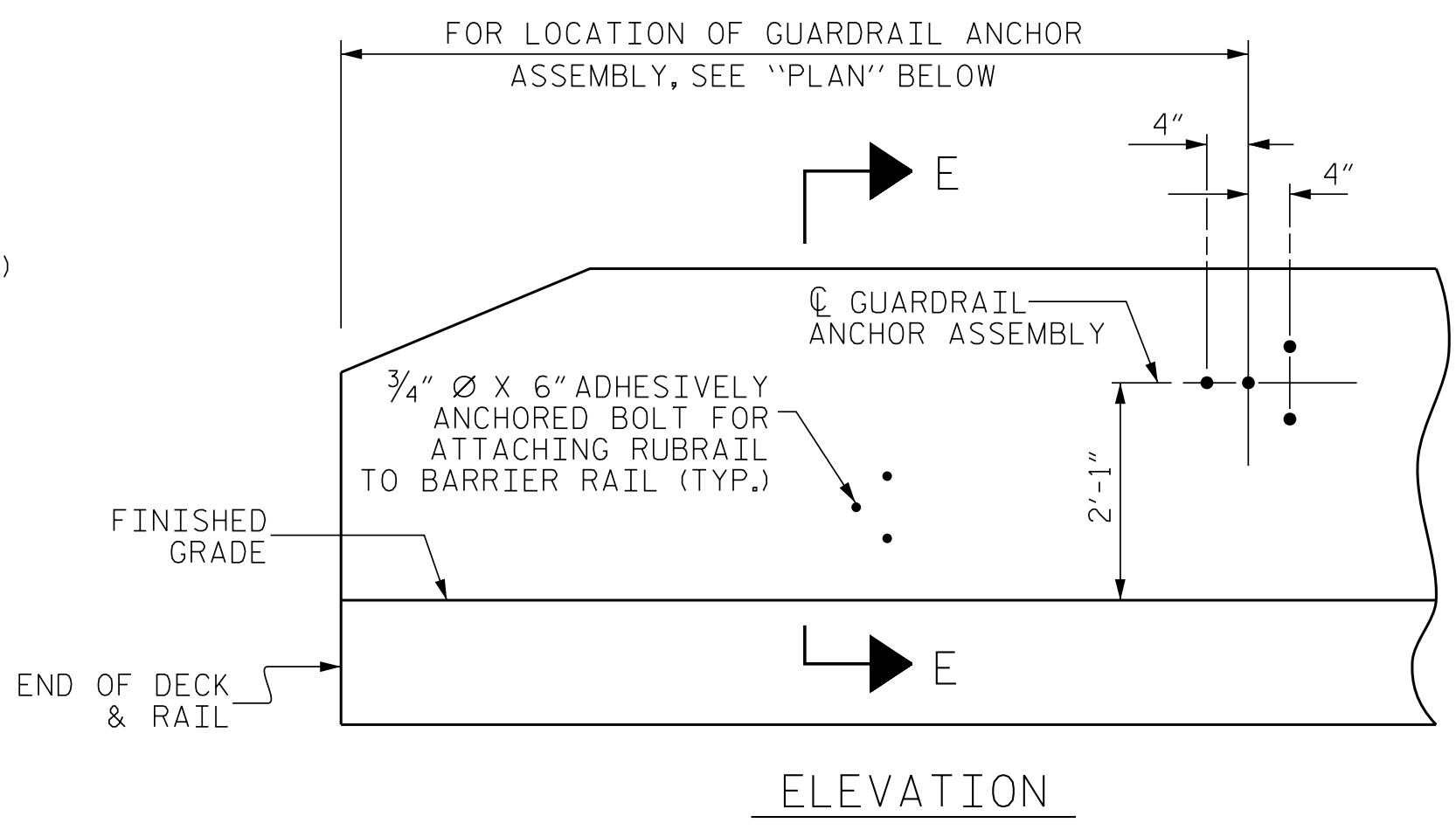
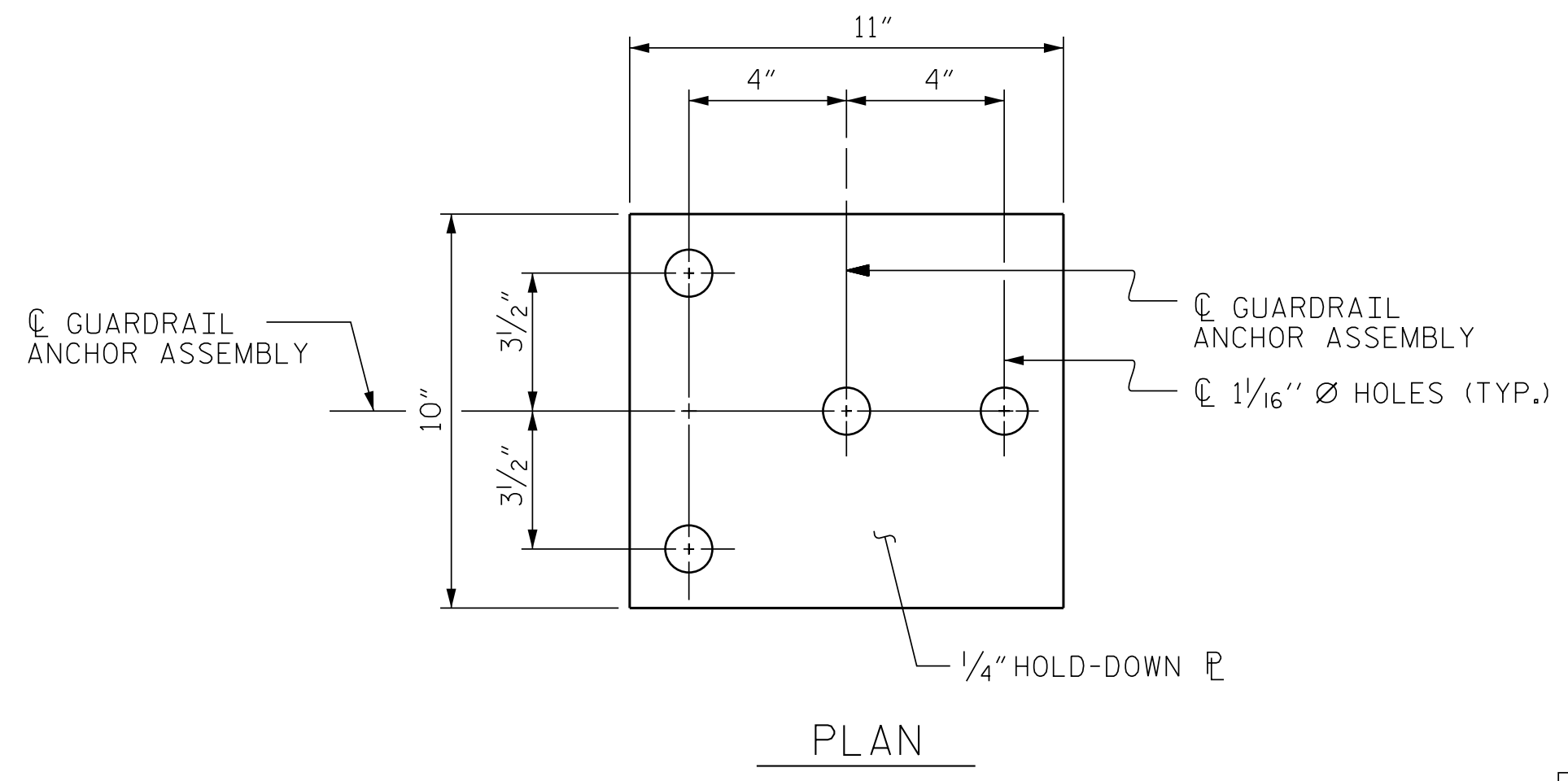
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

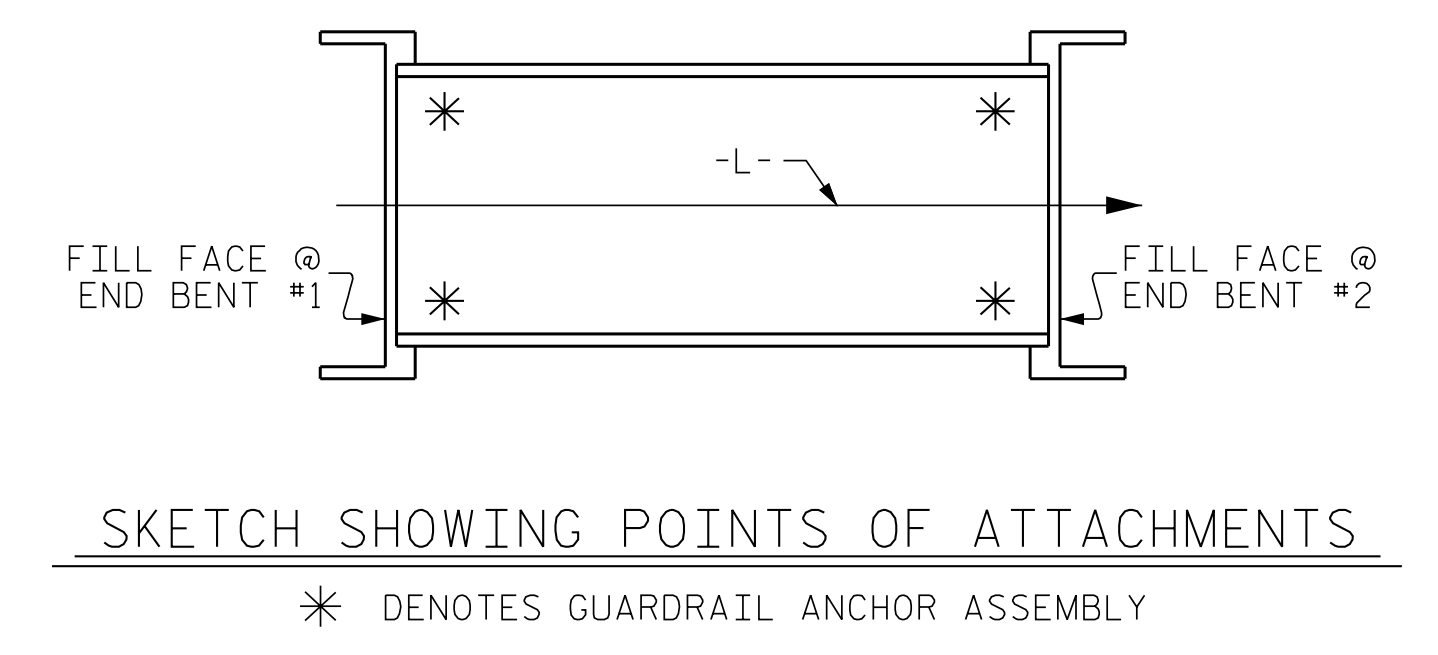
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

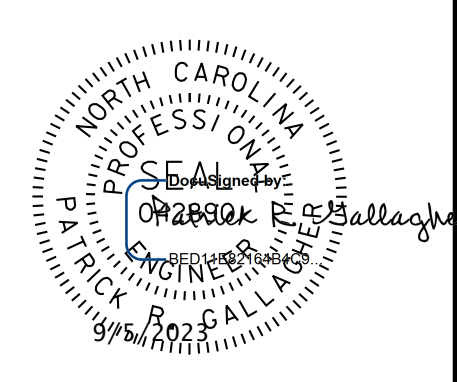
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR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



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



PROJECT NO. BR-0026  
JOHNSTON COUNTY  
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RALEIGH  
STANDARD  
GUARDRAIL ANCHORAGE  
FOR BARRIER RAIL

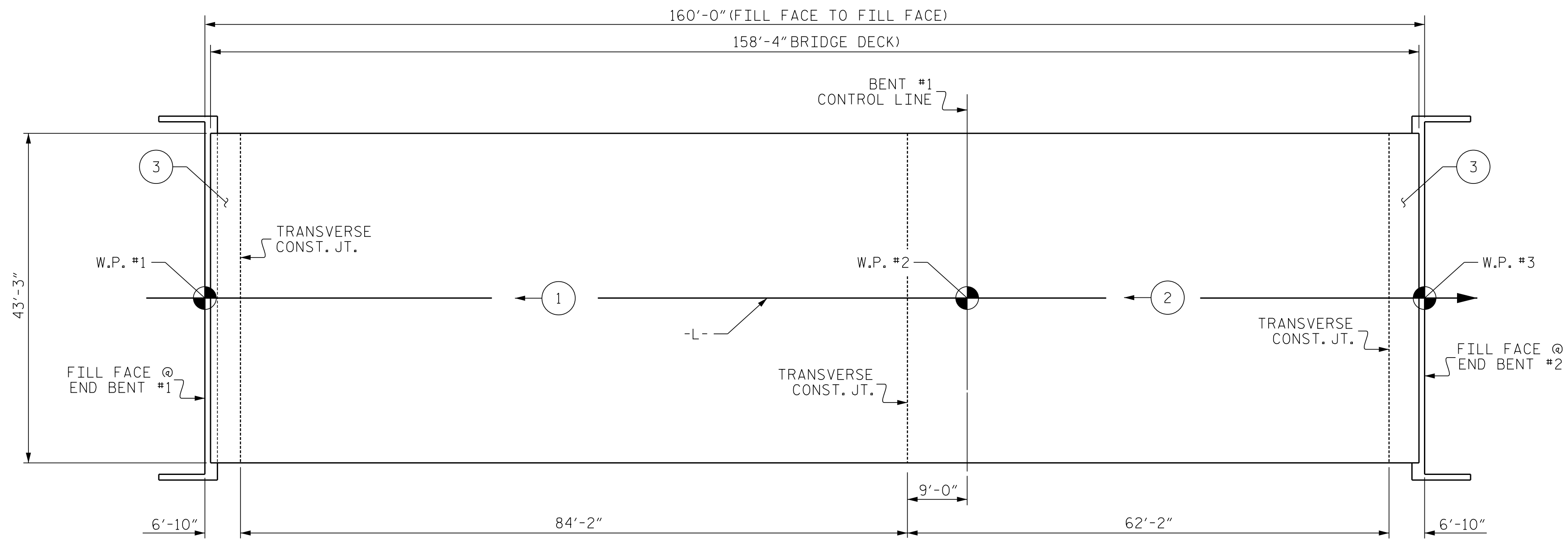
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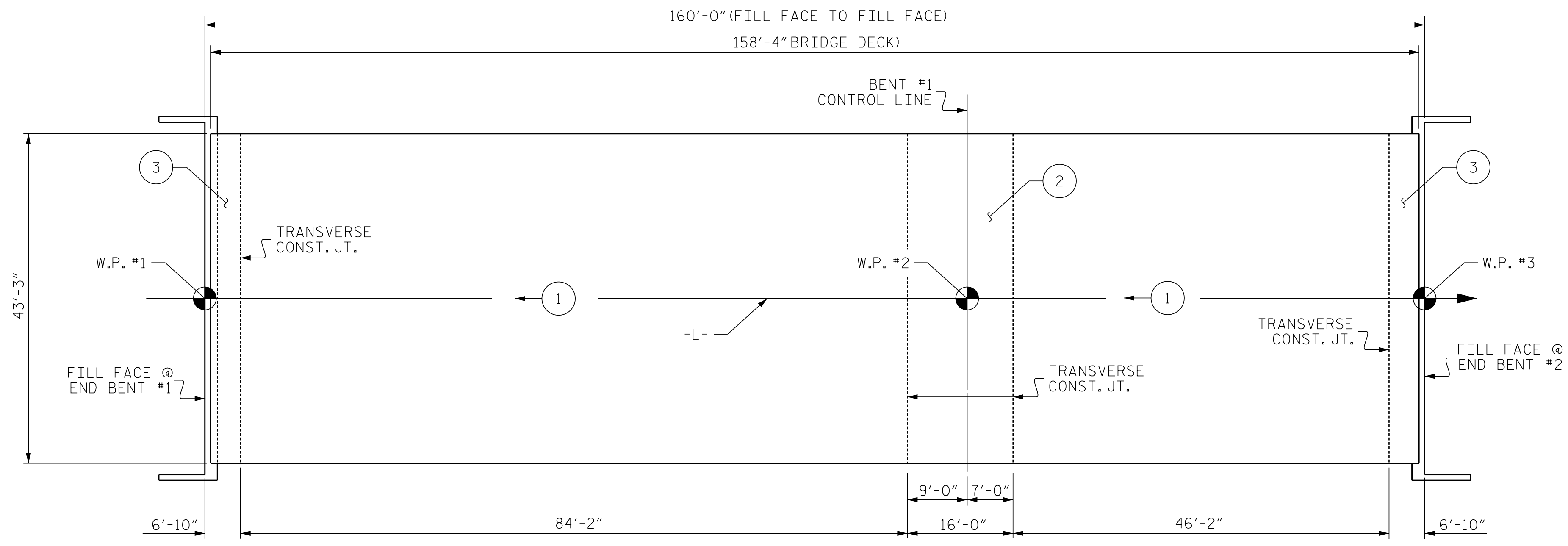
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
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2			4			26

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CHKD. BY: PRG	DATE: 07/23	CHECKED BY: GM	5/06	REV. 6/13	MAA/GM
DES. EGR. OF RECORD: PRG	DATE: 07/23			REV. 12/17	MAA/THC

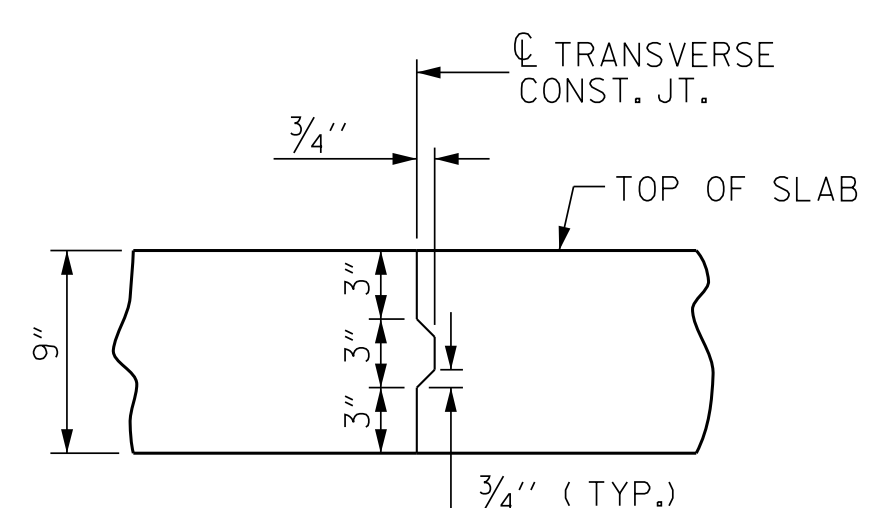


POURING SEQUENCE AND LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB  
(TOTAL = 6,848 SQ. FT.)



OPTIONAL POURING SEQUENCE

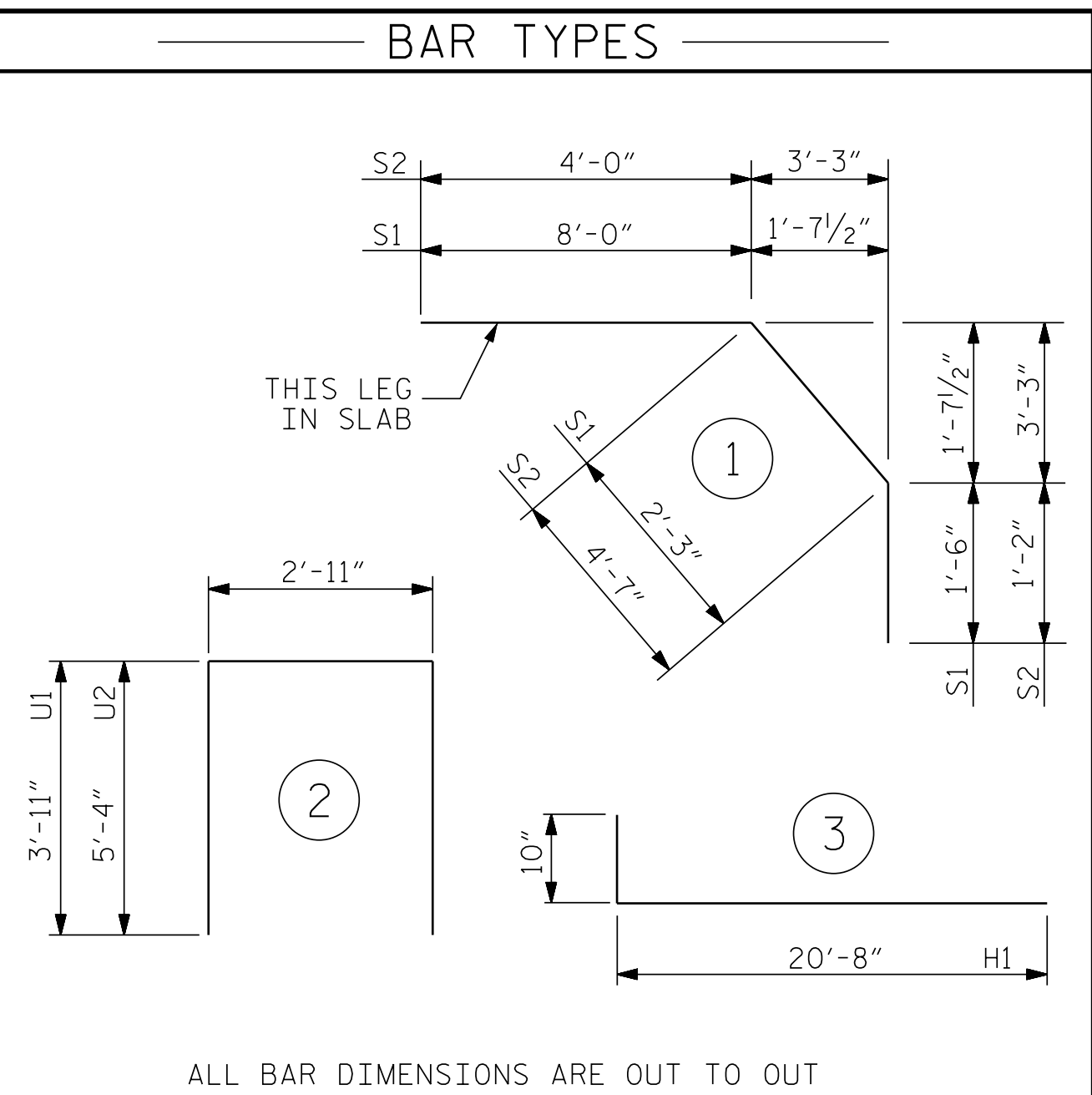
POUR ② SHALL NOT BE STARTED UNTIL BOTH ADJACENT POURS ① REACH A MINIMUM OF 3000 PSI.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

BILL OF MATERIAL					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	292	#5	STR	42'-11"	13071
A2	292	#5	STR	42'-11"	13071
* B1	10	#4	STR	33'-2"	222
* B2	85	#6	STR	19'-10"	2532
* B3	86	#4	STR	25'-0"	1436
* B4	43	#5	STR	58'-0"	2601
* B5	42	#5	STR	34'-0"	1489
* B6	43	#4	STR	28'-0"	804
* B7	85	#6	STR	11'-10"	1511
B8	184	#5	STR	41'-0"	7868
B9	40	#5	STR	42'-0"	1752
H1	72	#6	3	21'-6"	2325
K1	20	#4	STR	22'-3"	297
K2	8	#4	STR	7'-3"	39
K3	16	#4	STR	8'-3"	88
K4	8	#4	STR	7'-9"	41
K5	8	#4	STR	6'-9"	36
K6	4	#4	STR	4'-8"	12
K7	4	#4	STR		14
K8	8	#4	STR	5'-5"	29
K9	4	#4	STR	4'-11"	13
K10	8	#4	STR	2'-8"	14
* S2	64	#4	1	11'-9"	502
* S3	64	#4	1	9'-9"	417
U1	64	#4	2	10'-9"	460
U2	12	#4	2	13'-7"	109
REINFORCING STEEL					26,165 LBS.
* EPOXY COATED REINFORCING STEEL					24,585 LBS.



SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE ( CU. YDS. )	REINFORCING STEEL ( LBS. )	EPOXY COATED REINFORCING STEEL ( LBS. )
POUR 1	117.1	—	—
POUR 2	86.5	—	—
POUR 3	98.6	—	—
TOTALS**	302.2	26,165	24,585

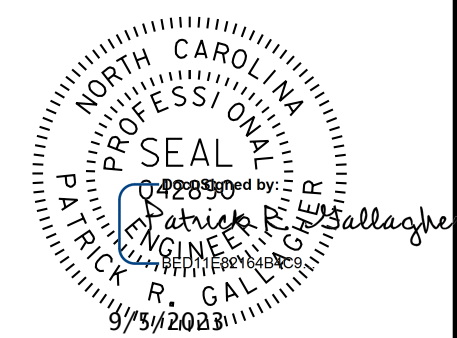
\*\* QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1788 SQ.FT.
BRIDGE DECK	5846 SQ.FT.
TOTAL	7634 SQ.FT.

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
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
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RALEIGH  
SUPERSTRUCTURE  
BILL OF MATERIAL

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1			3			TOTAL SHEETS 26
2			4			

WDC/UPG: V:\VNC\Structures\0317-AB-40 - Johnston 50 BR-0026\Structures\Final Plans\40\_L033\_BR0026-SMKL\_BML-ST.dgn  
 DATE: 03/17/23 PM on Tuesday, August 22, 2023

DWN. BY: WDC DATE: 07/23  
CHKD. BY: PRG DATE: 07/23  
DES. EGR. OF RECORD: PRG DATE: 07/23

### NOTES

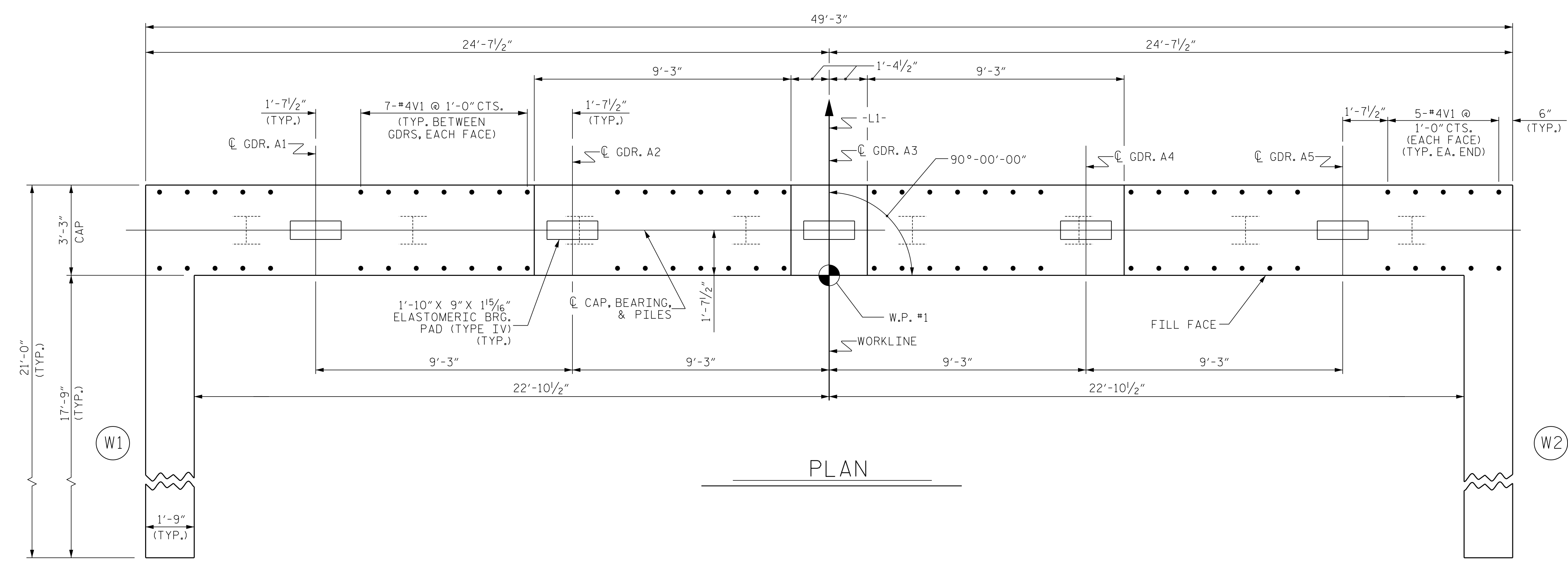
STIRRUPS IN THE CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

SEE THE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT DETAIL.

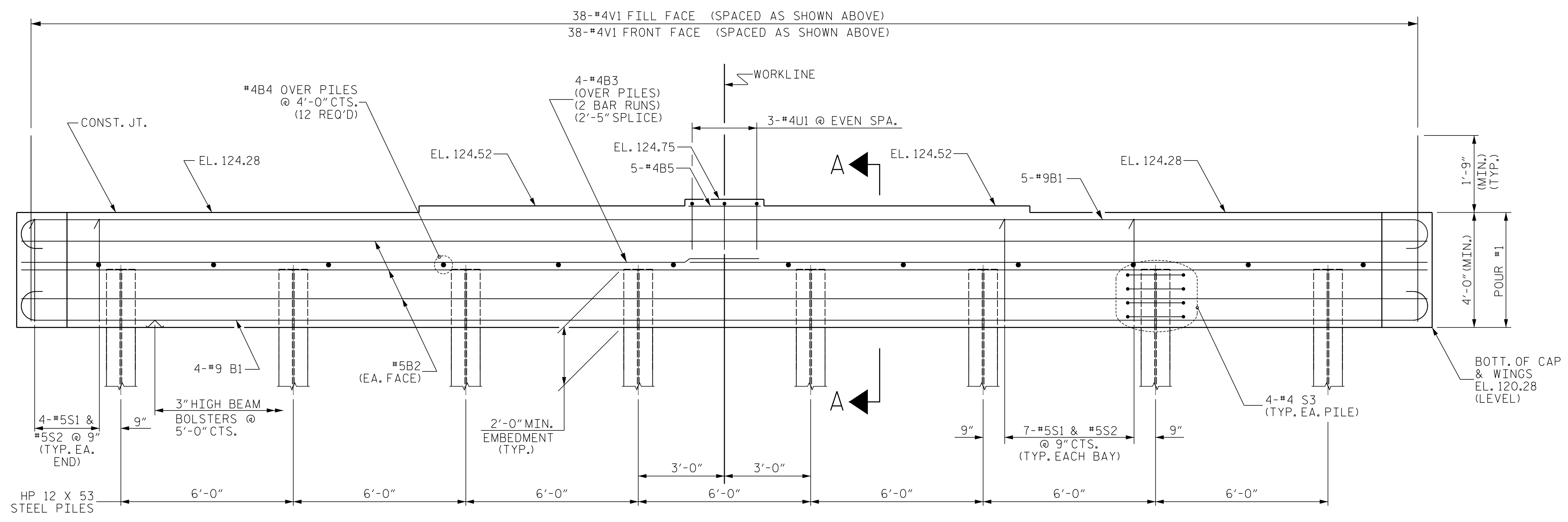
THE UPPER PART OF INTEGRAL PORTION AND WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE. SEE SUPERSTRUCTURE PLAN OF SPANS.

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

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

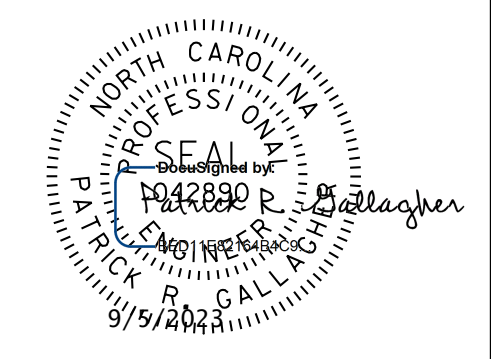


PLAN



ELEVATION

CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.



PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-  
 SHEET 1 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 1					
SHEET NO. S-18					
TOTAL SHEETS 26					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

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 2024/05/03  
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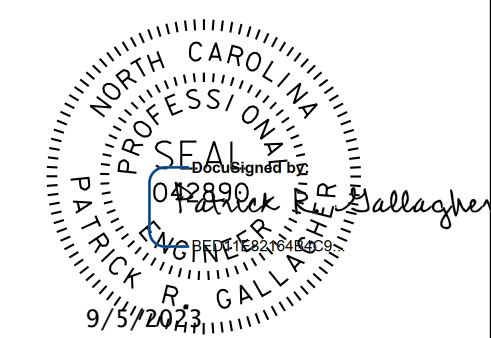
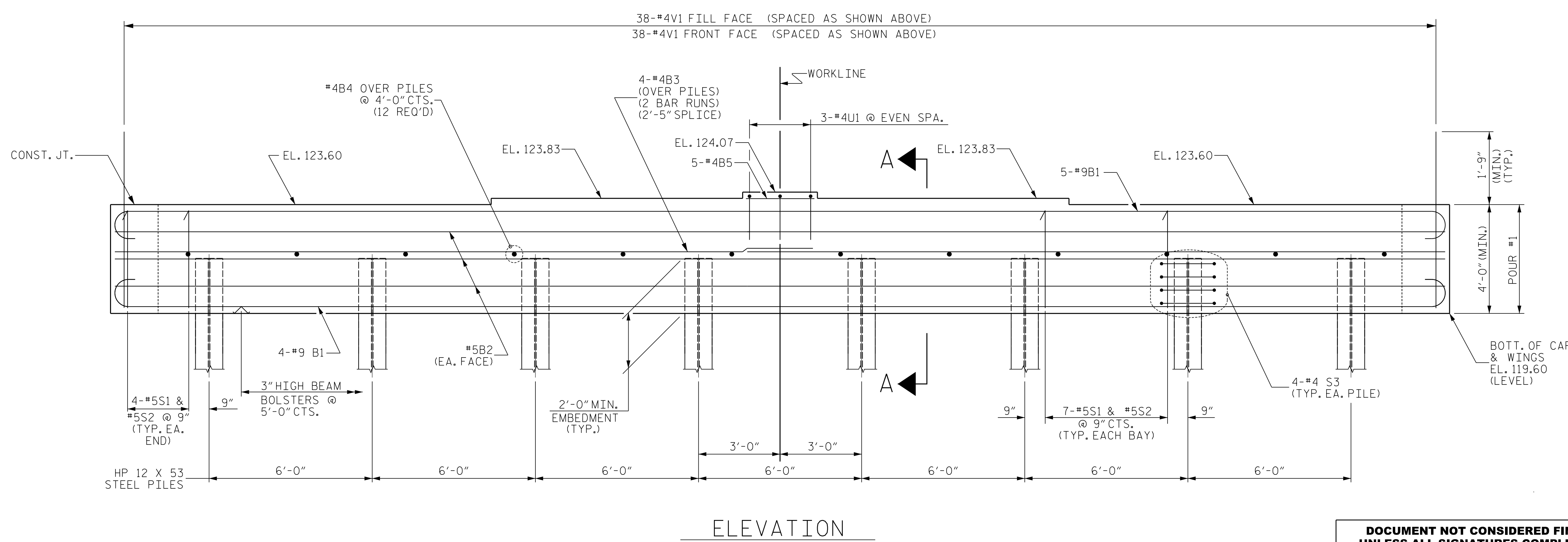
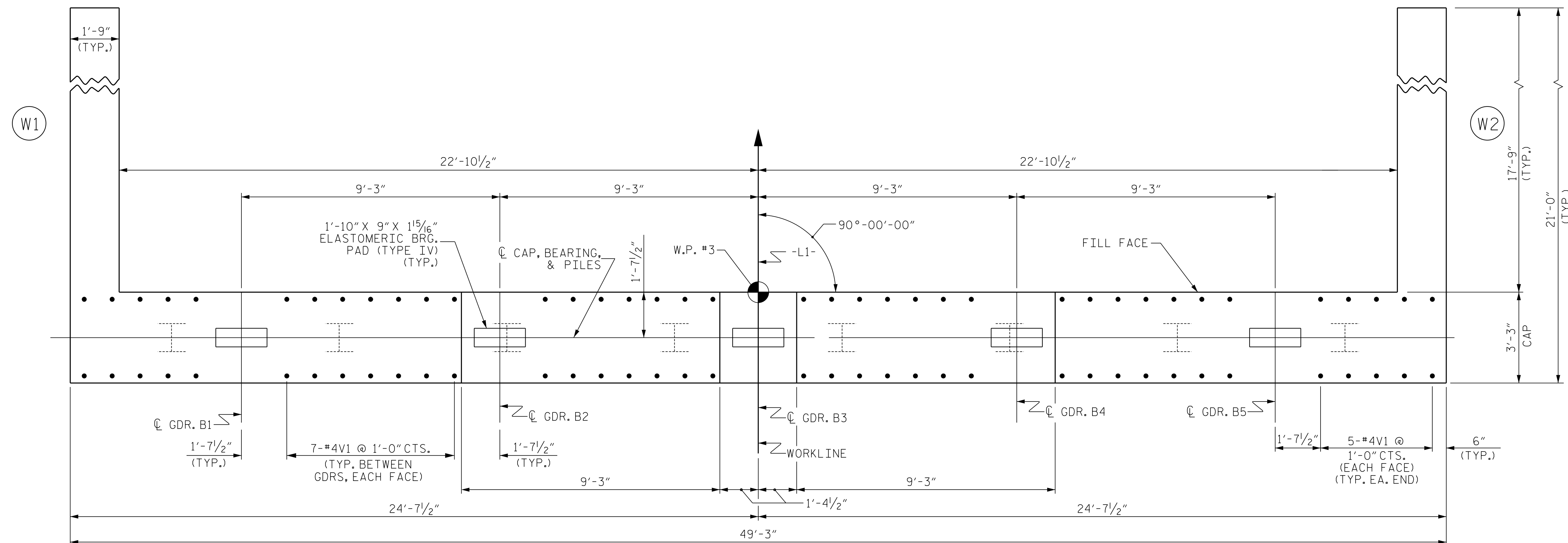
DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23

### NOTES

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

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

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



PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
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 SHEET 2 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-19
					TOTAL SHEETS 26

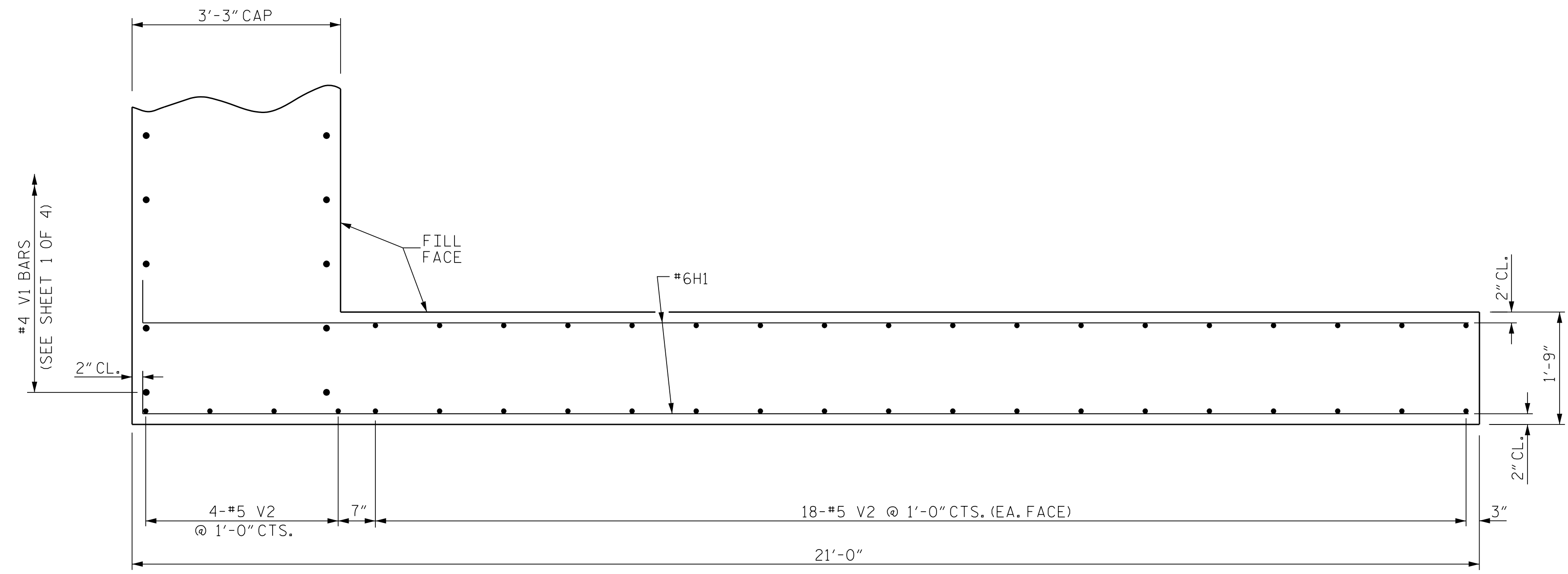
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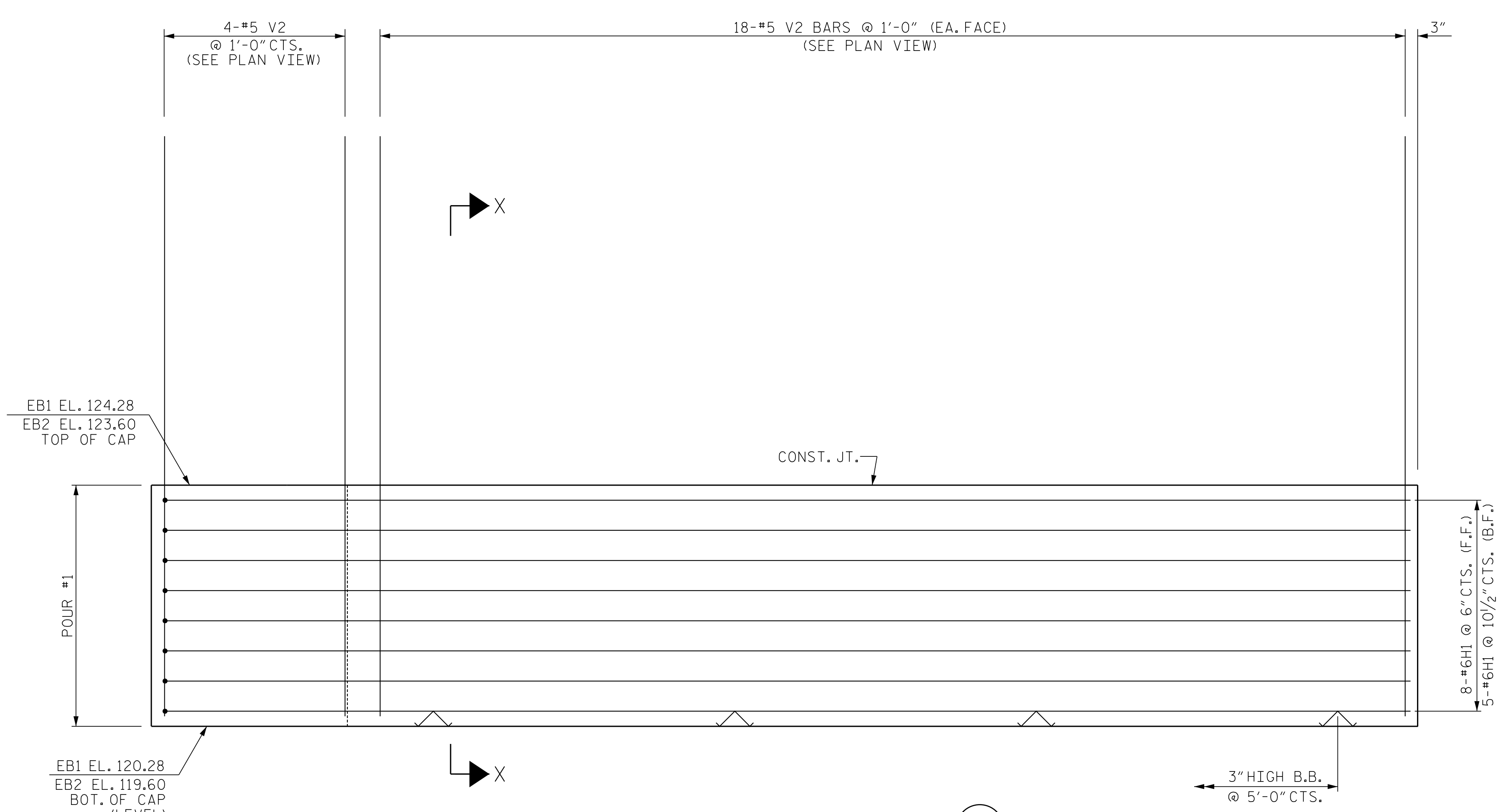
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

WDC/PRG  
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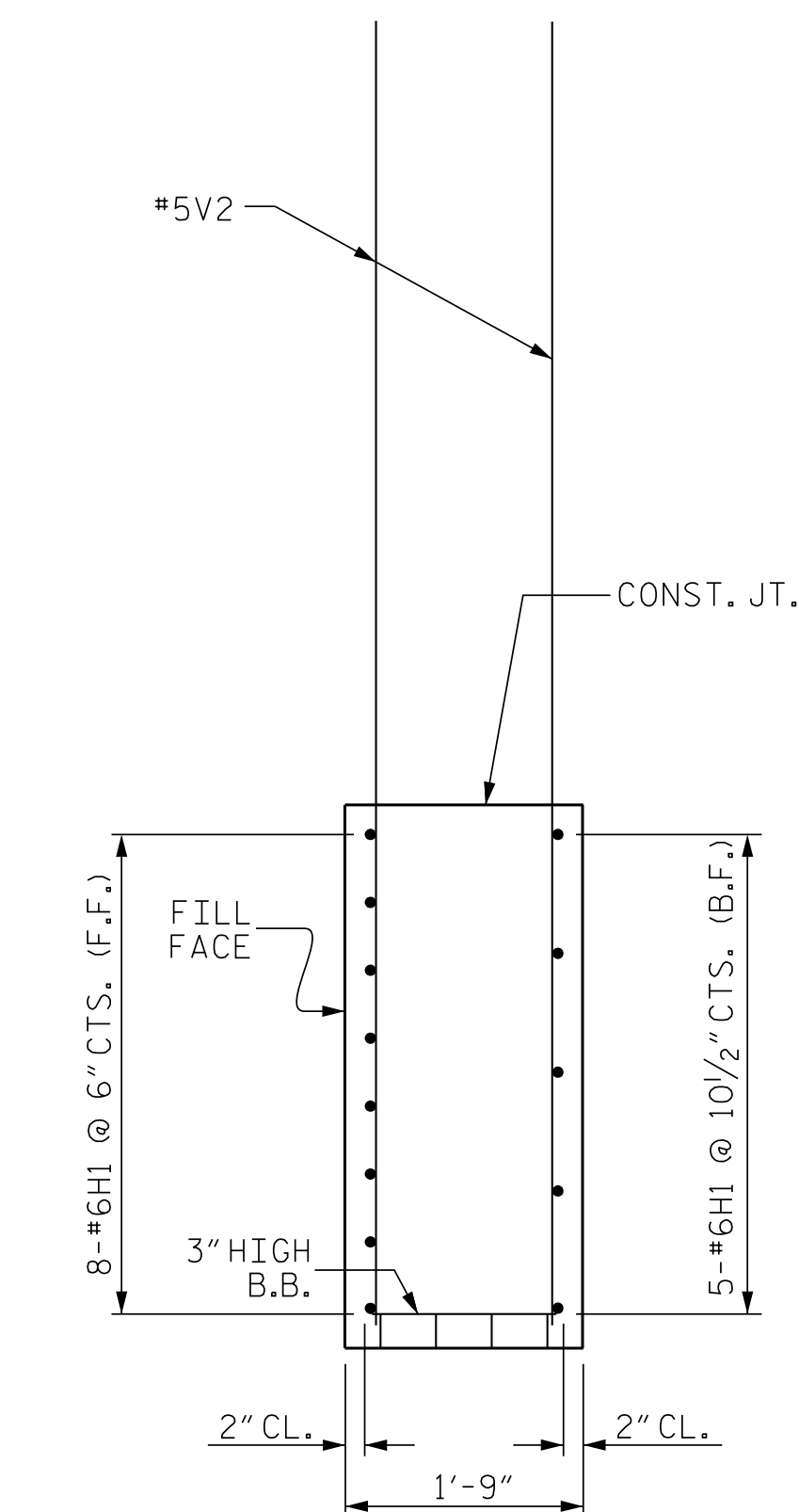
DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23



PLAN OF WING (W1)  
(WING (W2) SIMILAR)

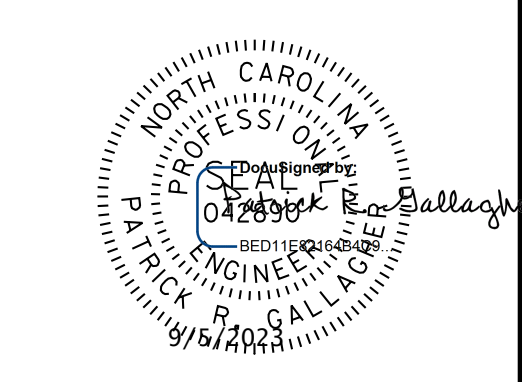


ELEVATION OF WING (W1)  
(WING (W2) SIMILAR)



SECTION X-X

PROJECT NO. BR-0026  
JOHNSTON COUNTY  
STATION: 20+95.00 -L-  
SHEET 3 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT  
WING DETAILS

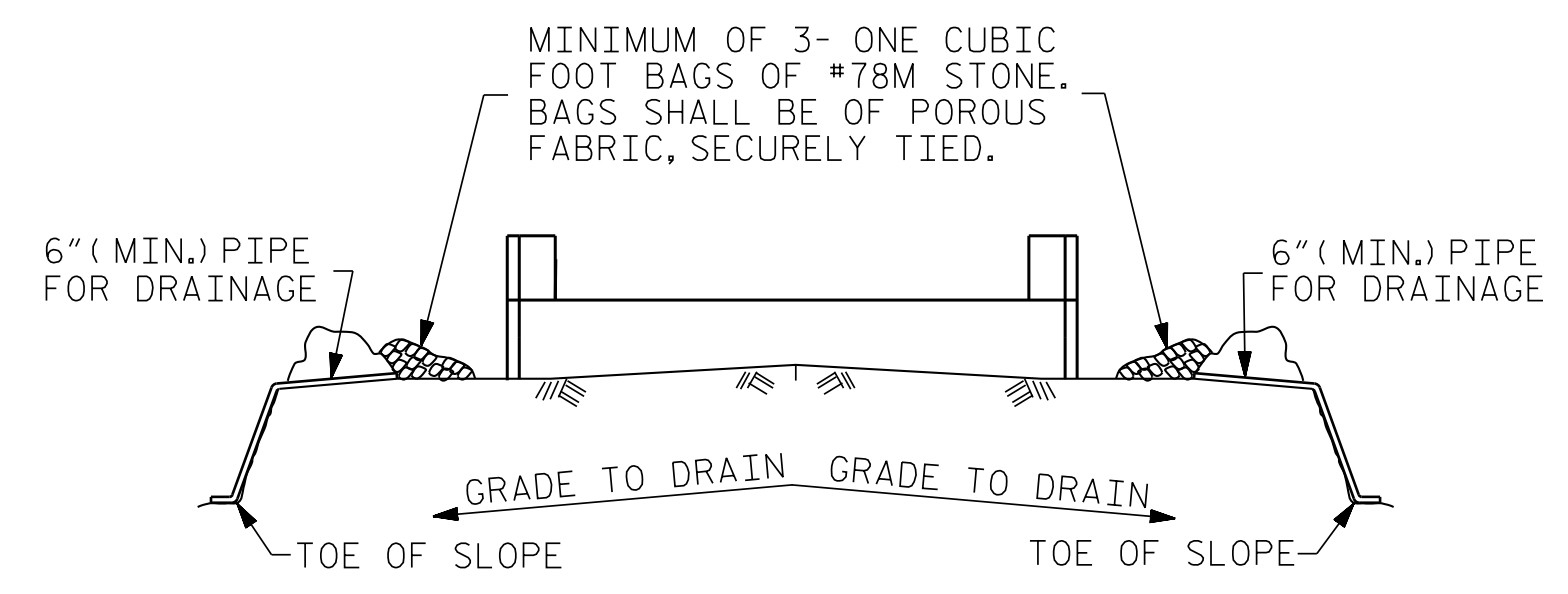
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1			3			TOTAL SHEETS
2			4			26

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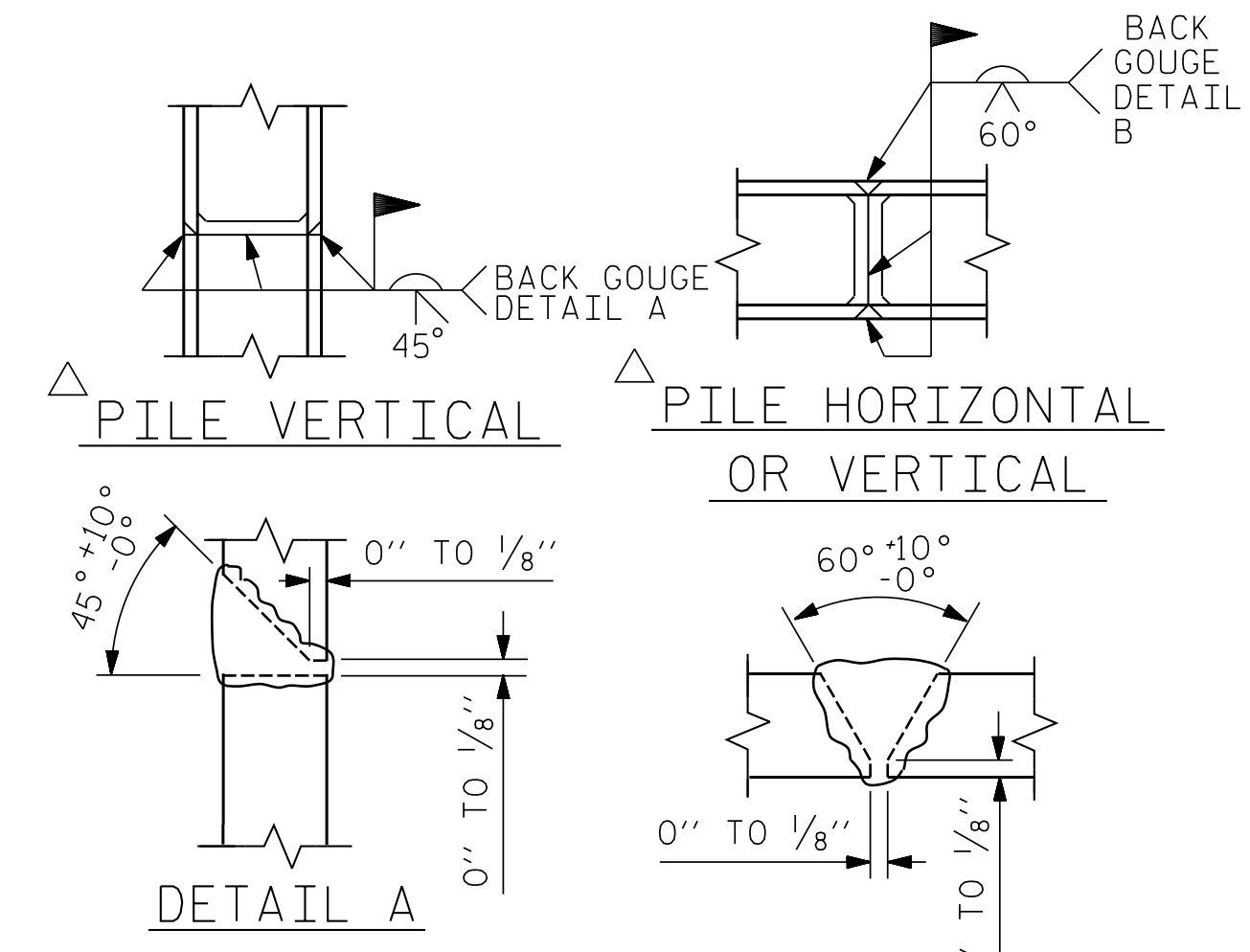


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

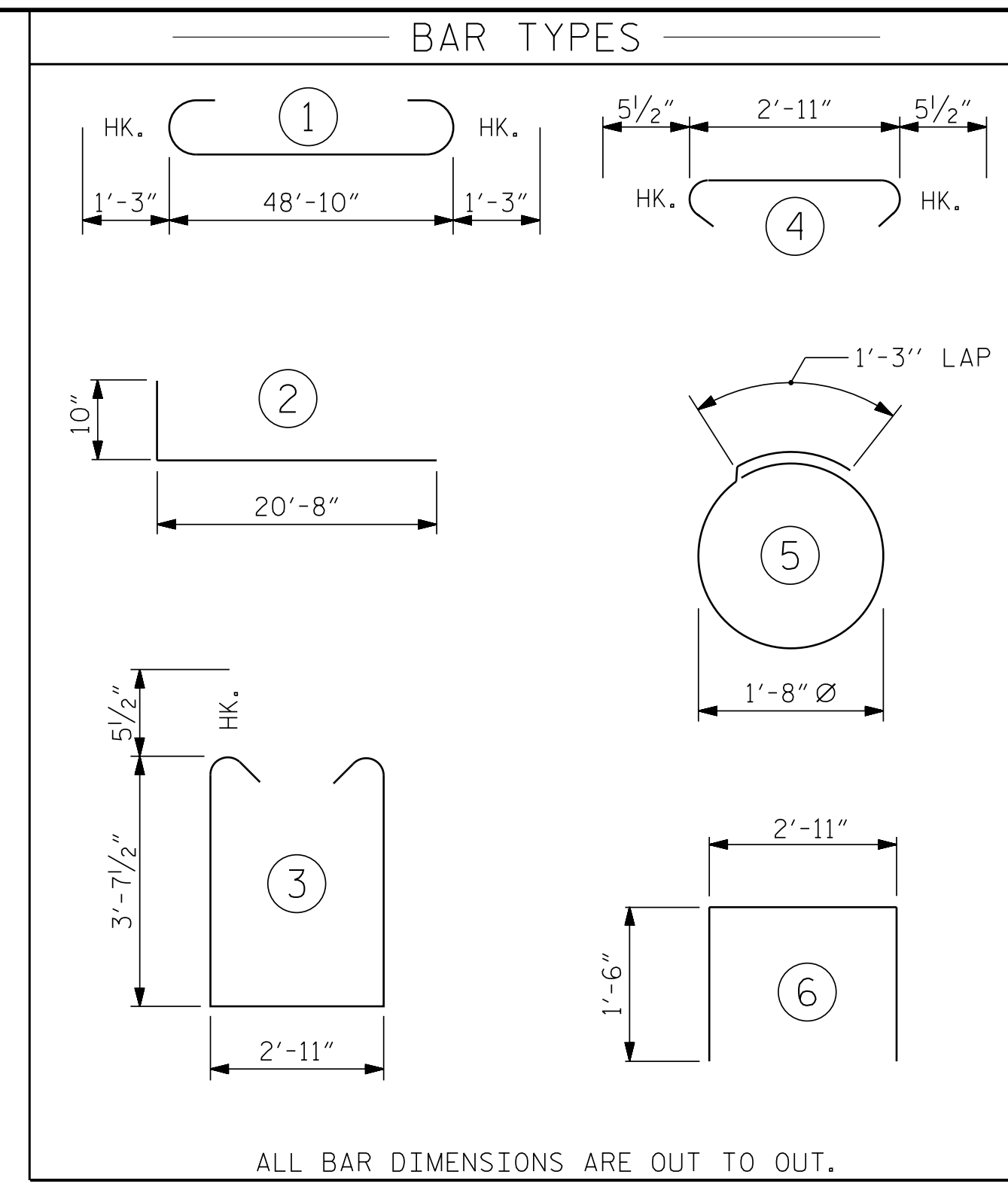
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**

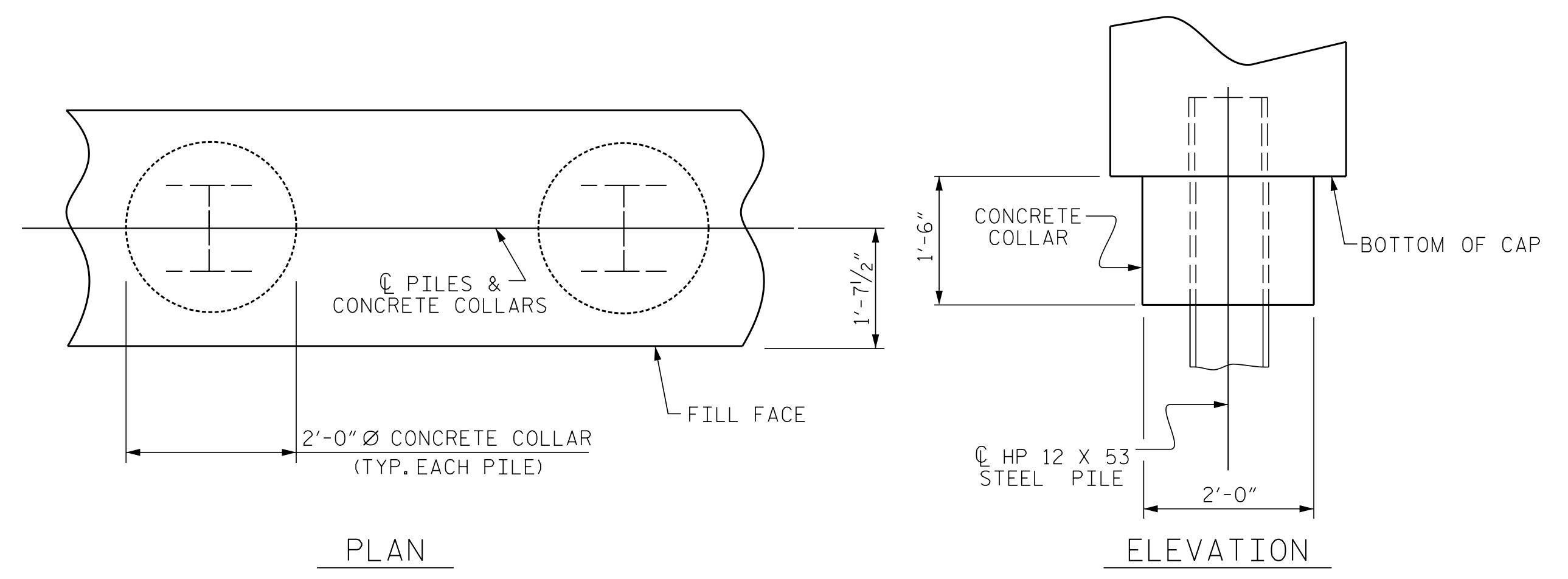


POSITION OF PILE DURING WELDING.

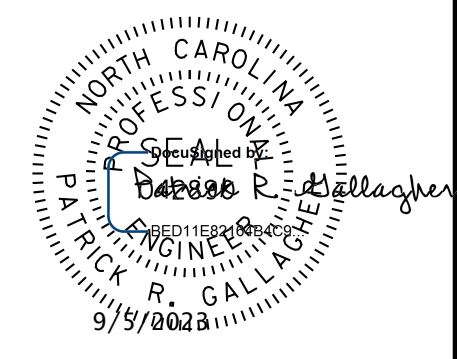
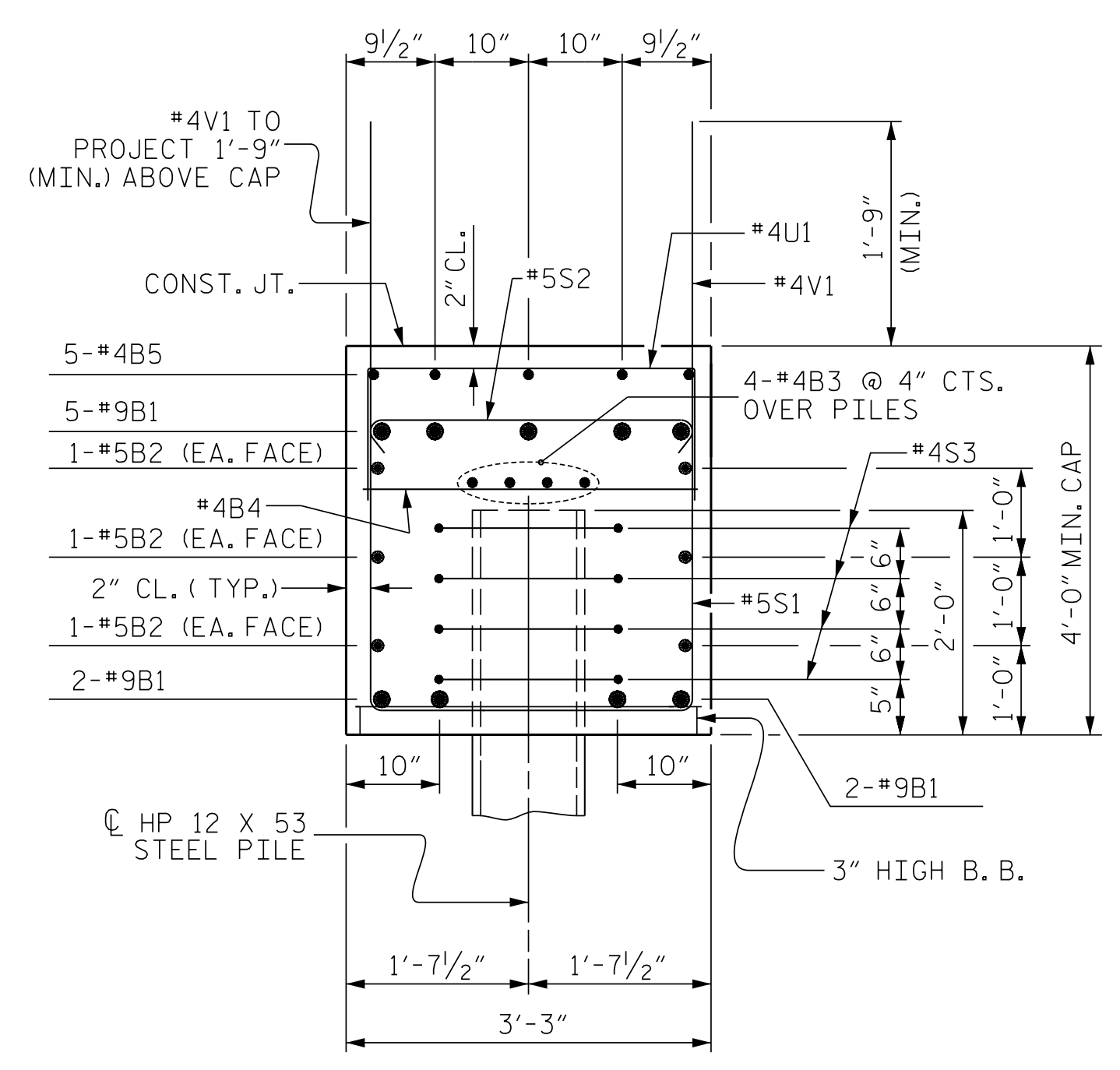
**PILE SPLICE DETAILS**



BILL OF MATERIAL FOR ONE END BENT					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	#9		51'-4"	1571
B2	6	#5	STR	48'-11"	306
B3	8	#4	STR	25'-8"	137
B4	12	#4	STR	2'-11"	23
B5	5	#4	STR	2'-5"	8
H1	26	#6		21'-6"	710
S1	57	#5		11'-1"	659
S2	57	#5		3'-10"	228
S3	32	#4		6'-6"	139
U1	3	#4		5'-11"	12
V1	76	#4	STR	5'-10"	296
V2	80	#5	STR	9'-7"	800
REINFORCING STEEL					4889 LBS.
CLASS A CONCRETE					
POUR #1 CAP, LOWER PART OF WINGS, & COLLARS					35.0 C.Y.
HP 12 X 53 STEEL PILES					
END BENT NO. 1	NO: 8			LIN. FT. = 120	
END BENT NO. 2	NO: 8			LIN. FT. = 160	
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					NO: 8
PILE EXCAVATION IN SOIL					
END BENT NO. 1				LIN. FT. = 59.0	
PILE EXCAVATION NOT IN SOIL					
END BENT NO. 1				LIN. FT. = 28.0	



**CORROSION PROTECTION FOR STEEL PILES DETAIL**  
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



PROJECT NO. BR-0026  
JOHNSTON COUNTY  
STATION: 20+95.00 -L-  
SHEET 4 OF 4

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

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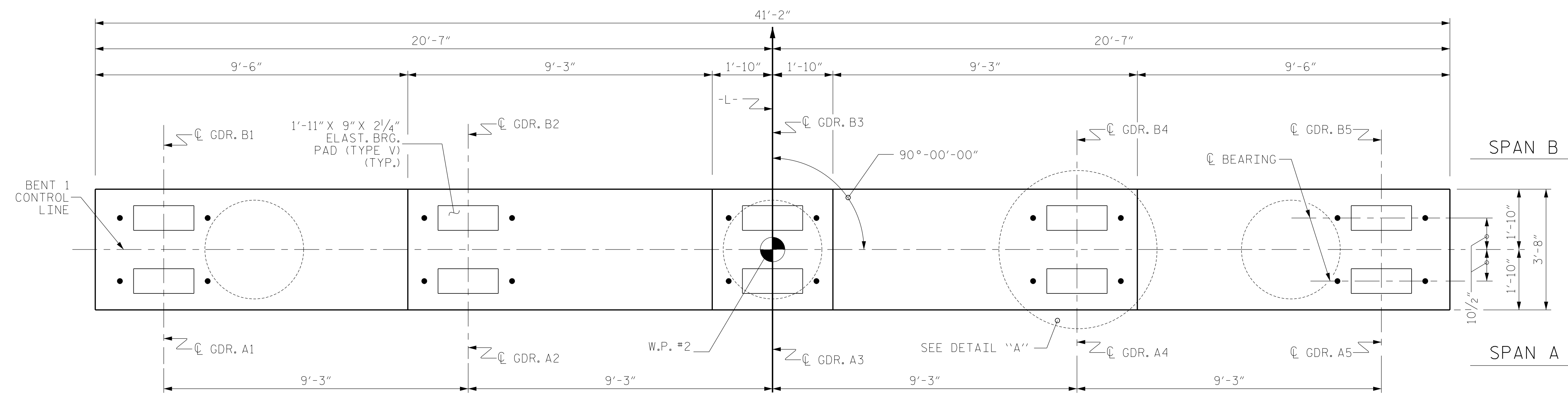
SHEET NO. S-21  
TOTAL SHEETS 26

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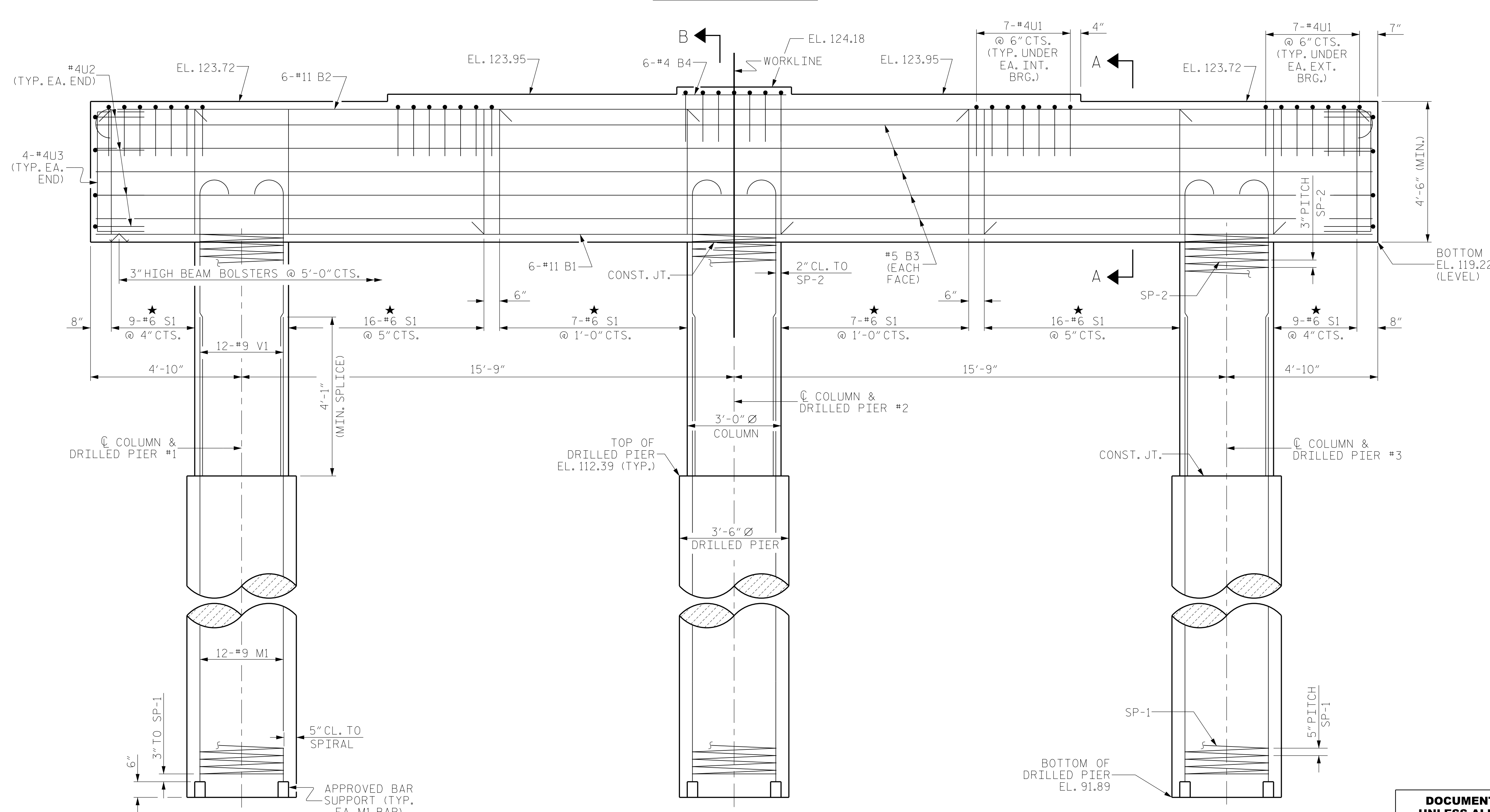
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NOTES

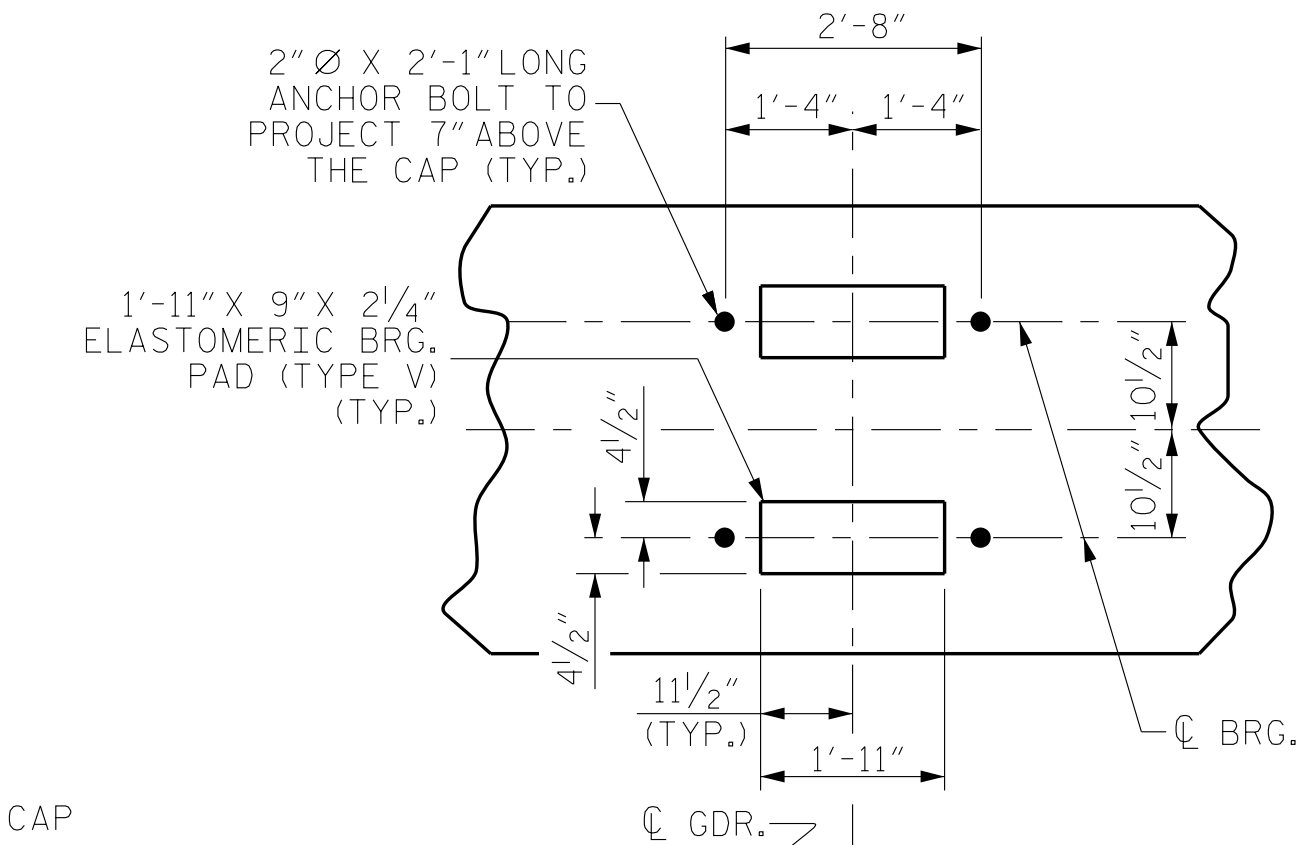
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."
- ★ INVERT ALTERNATE STIRRUP PAIRS.
- DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- FOR SECTION A-A AND PARTIAL SECTION B-B, SEE SHEET 2 OF 2.



PLAN



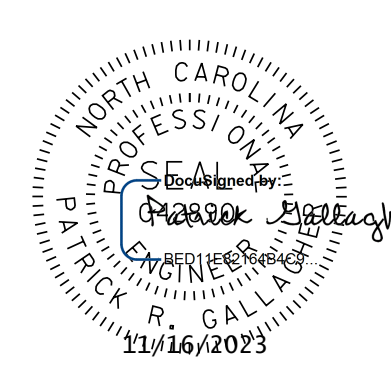
ELEVATION



DETAIL A

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-  
 SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT 1

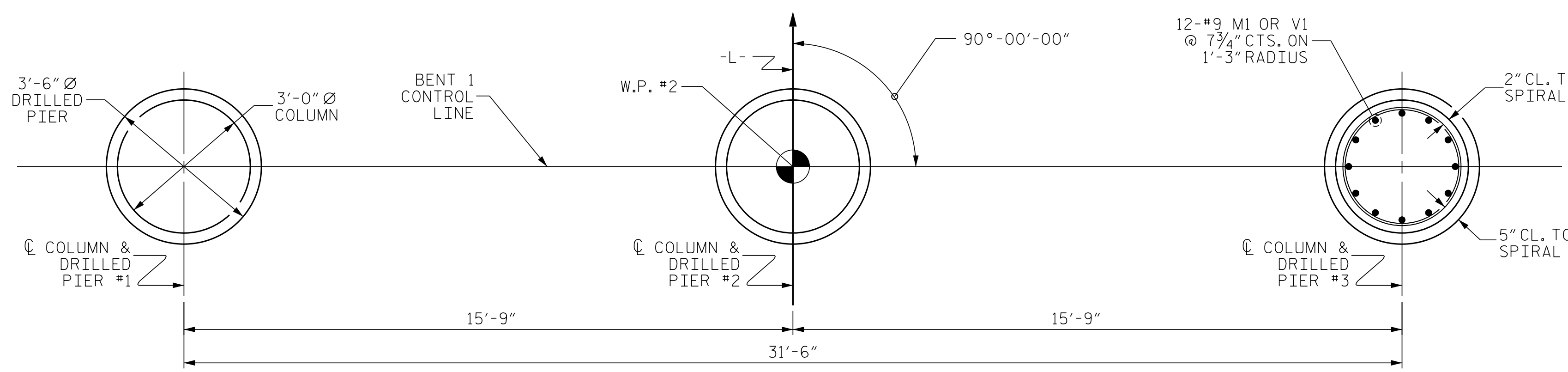
DOCUMENT NOT CONSIDERED FINAL  
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22	
1			3			TOTAL SHEETS 26	
2			4				

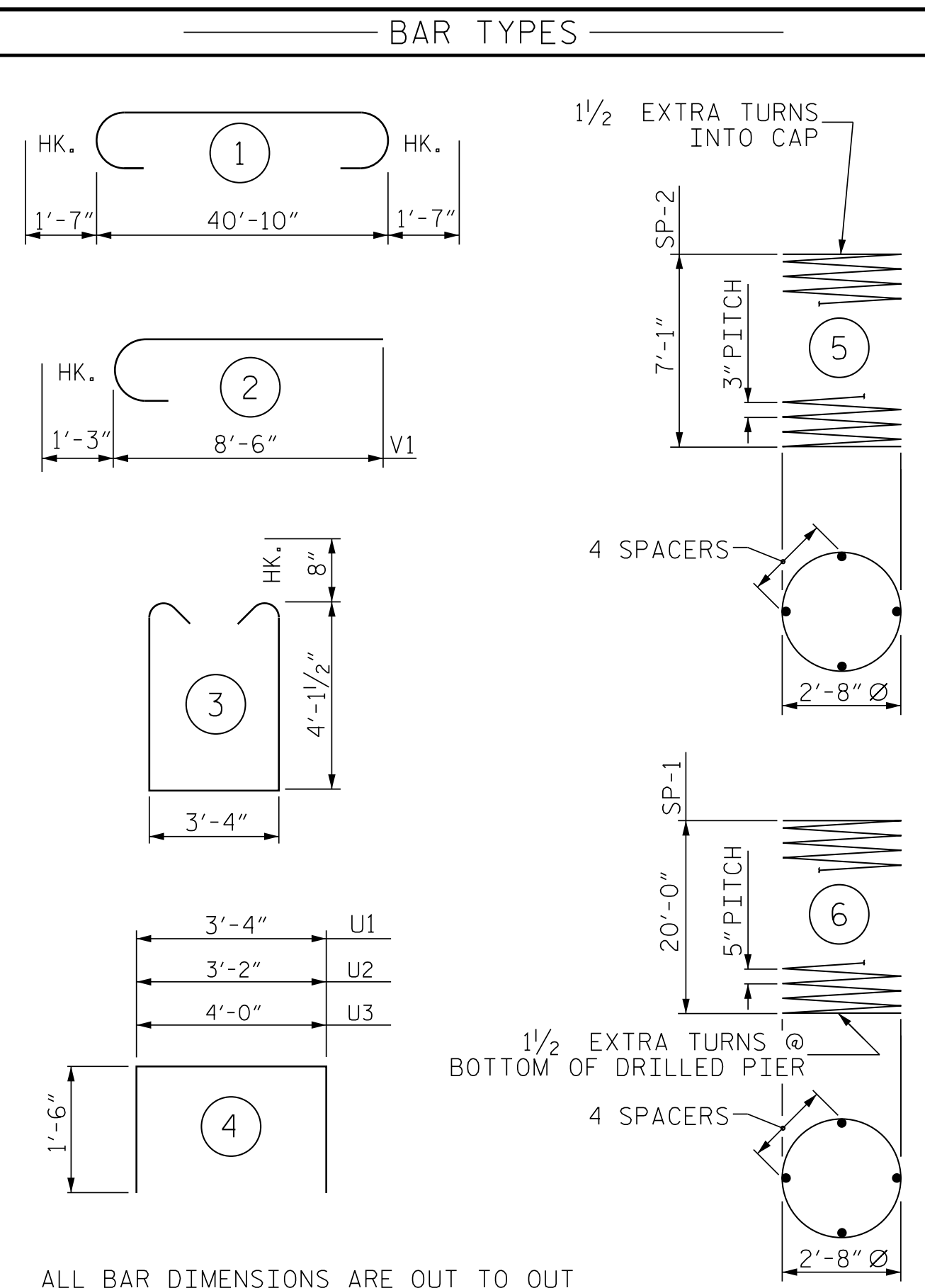
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DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23

(INFORMATION SHOWN IS TYPICAL FOR EACH COLUMN AND DRILLED PIER U.N.O.)

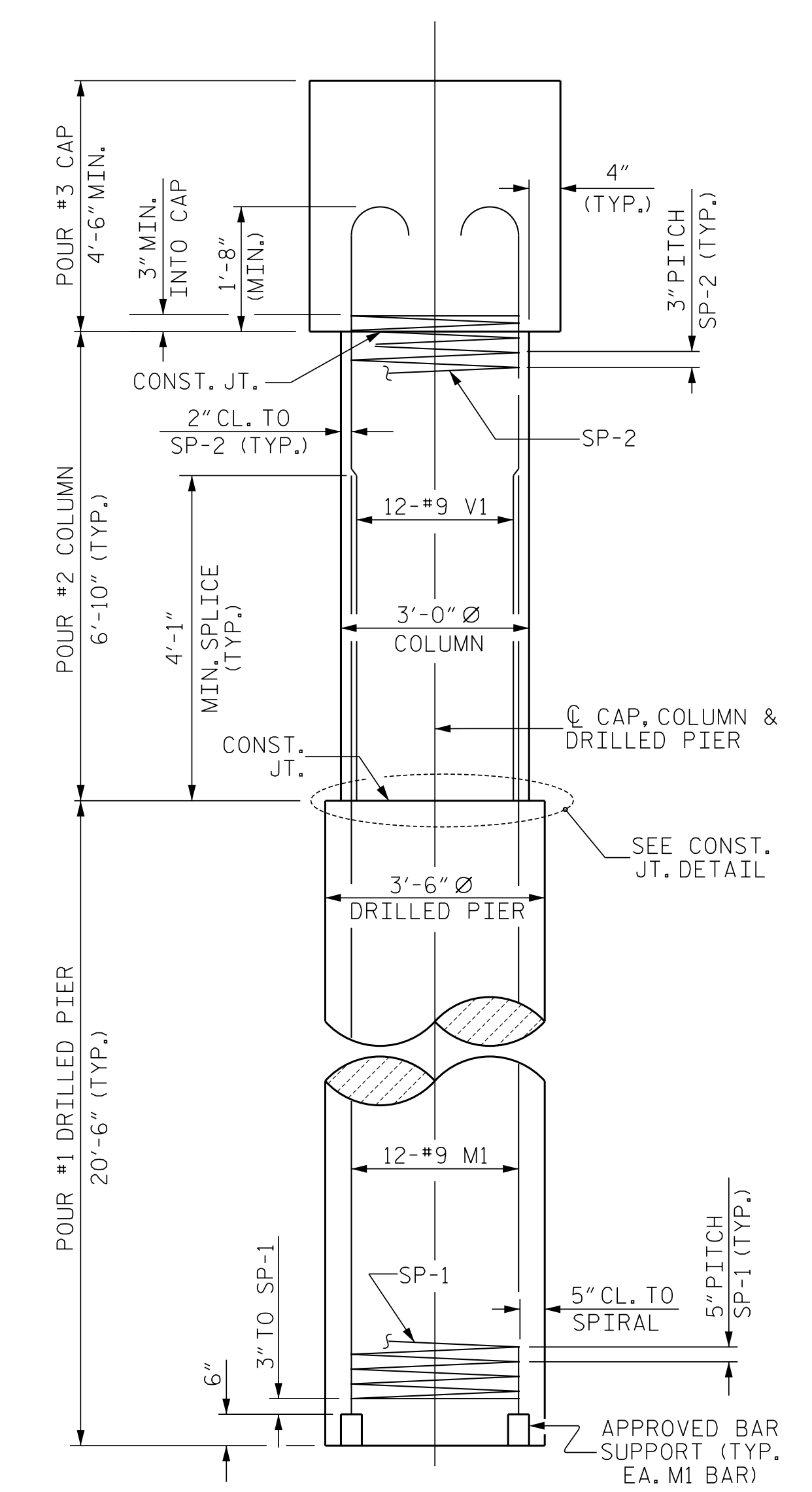


**PLAN OF COLUMNS AND DRILLED PIERS**  
(INFORMATION SHOWN IS TYPICAL FOR EACH COLUMN AND DRILLED PIER U.N.O.)

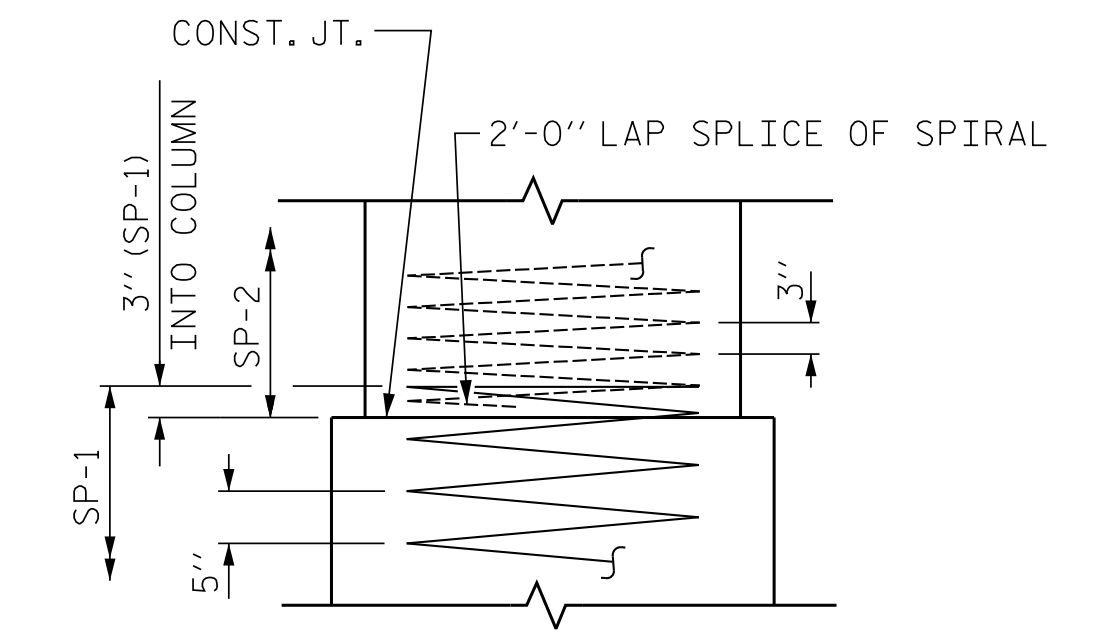


ALL BAR DIMENSIONS ARE OUT TO OUT

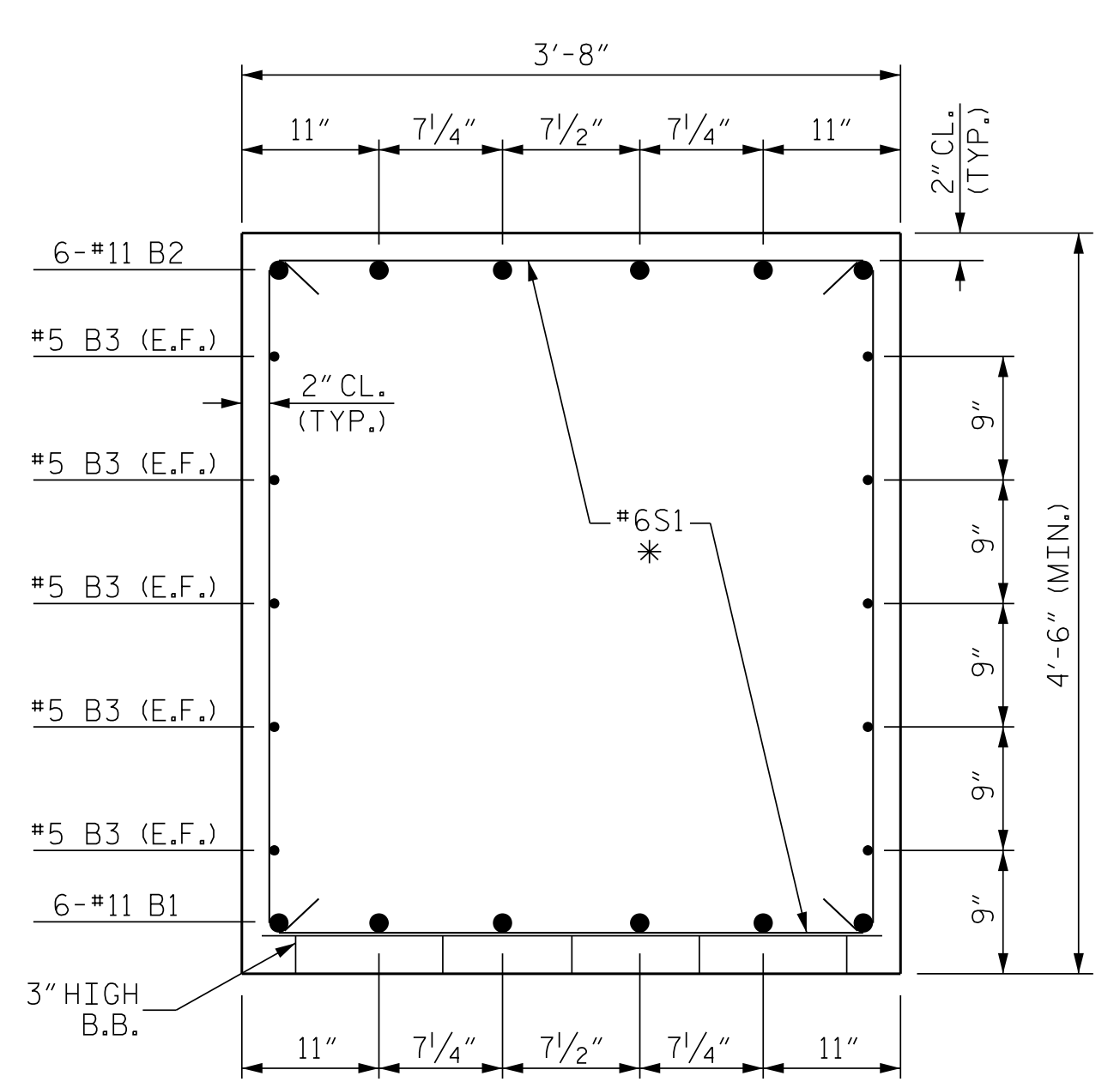
BILL OF MATERIAL					
BENT NO. 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	11	STR	40'-10"	1302
B2	6	11	1	44'-0"	1403
B3	10	5	STR	40'-10"	426
B4	6	4	STR	3'-4"	13
M1	36	9	STR	27'-1"	3315
S1	64	6	3	12'-11"	1242
U1	35	4	4	6'-4"	148
U2	12	4	4	6'-2"	49
U3	10	4	4	7'-0"	47
V1	36	9	2	9'-9"	1193
REINFORCING STEEL (LBS.)					9,138
SP-1	3	**	5	412'-7"	1291
SP-2	3	*	6	247'-7"	496
SPIRAL COLUMN REINFORCING STEEL (LBS.)					1,787
*THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
**THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)					5.4
POUR #3 (CAP)					26.0
TOTAL CLASS A CONCRETE (C.Y.)					31.4
DRILLED PIERS:					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS) (C.Y.)					21.9
3'-6" DRILLED PIER NOT IN SOIL (L.F.)					30.0
3'-6" DRILLED PIER IN SOIL (L.F.)					31.5
PERMANENT STEEL CASING FOR 3'-6" DRILLED PIERS (L.F.)					40.17
SID INSPECTIONS (EA.)					1



**END ELEVATION**

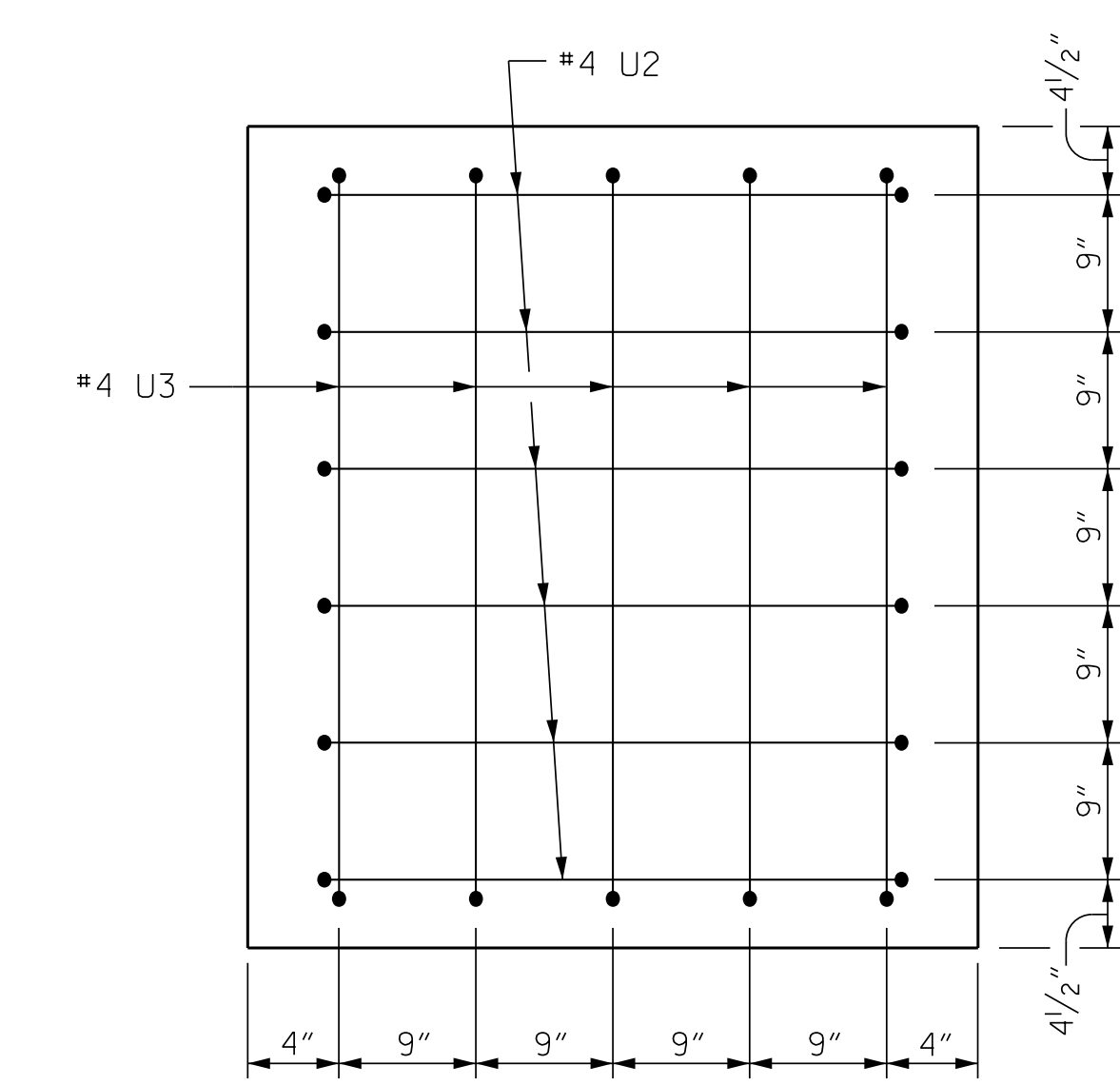


**CONSTRUCTION JOINT DETAIL**

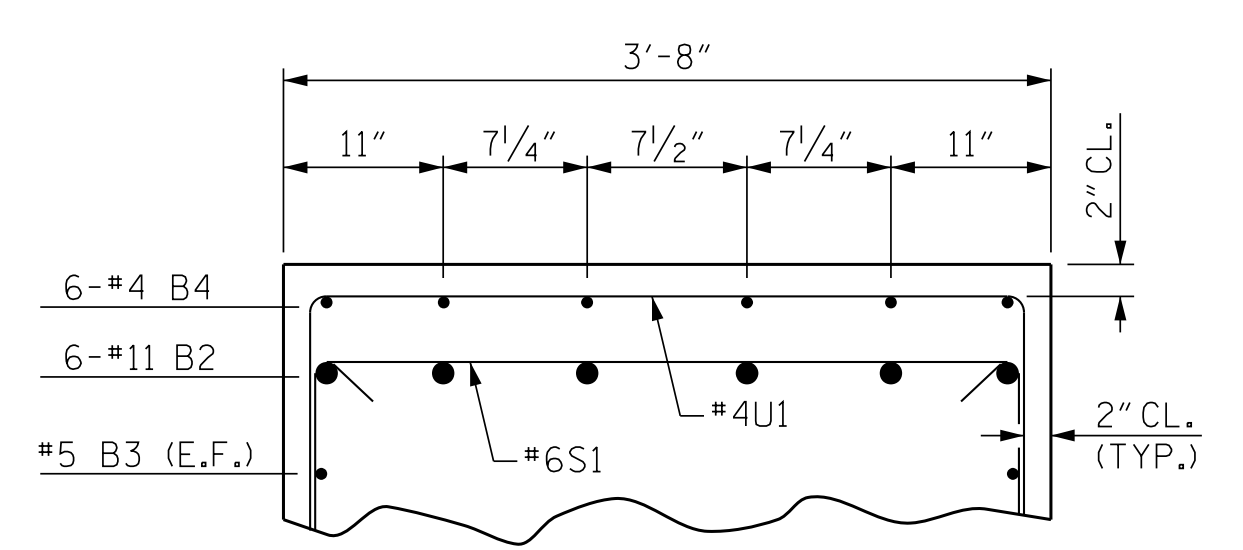


**SECTION A-A**

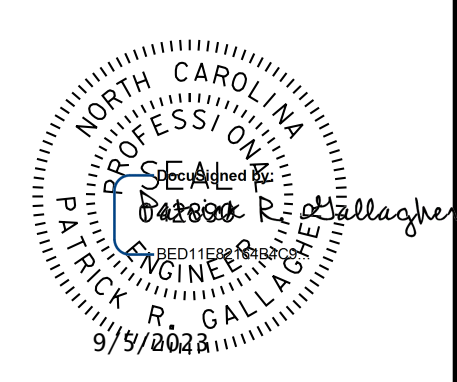
\* INVERT ALTERNATE STIRRUPS



**END OF CAP**  
(TYP. EA. END)



**SECTION B-B**



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PROJECT NO. BR-0026  
JOHNSTON COUNTY  
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SHEET 2 OF 2

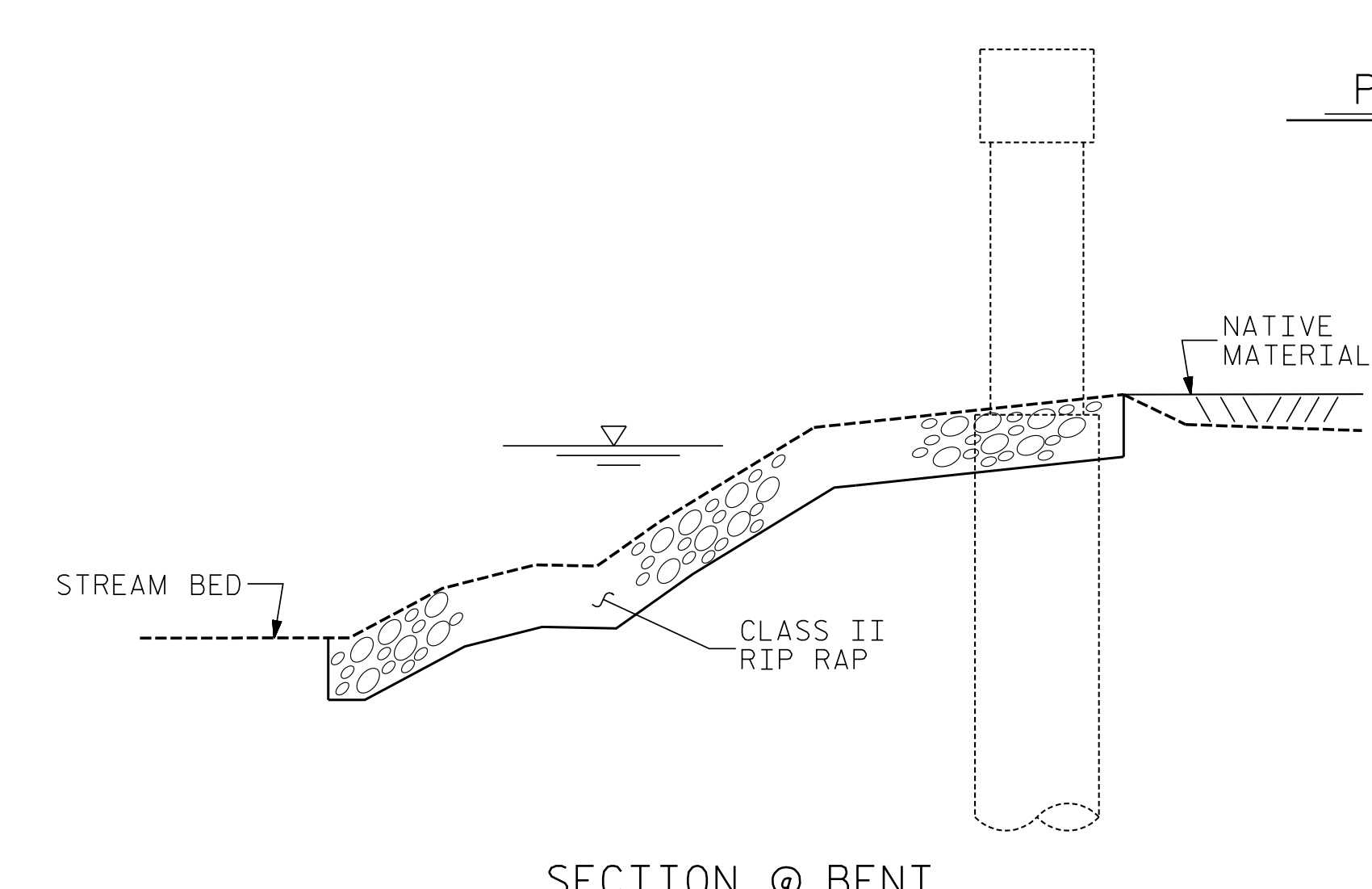
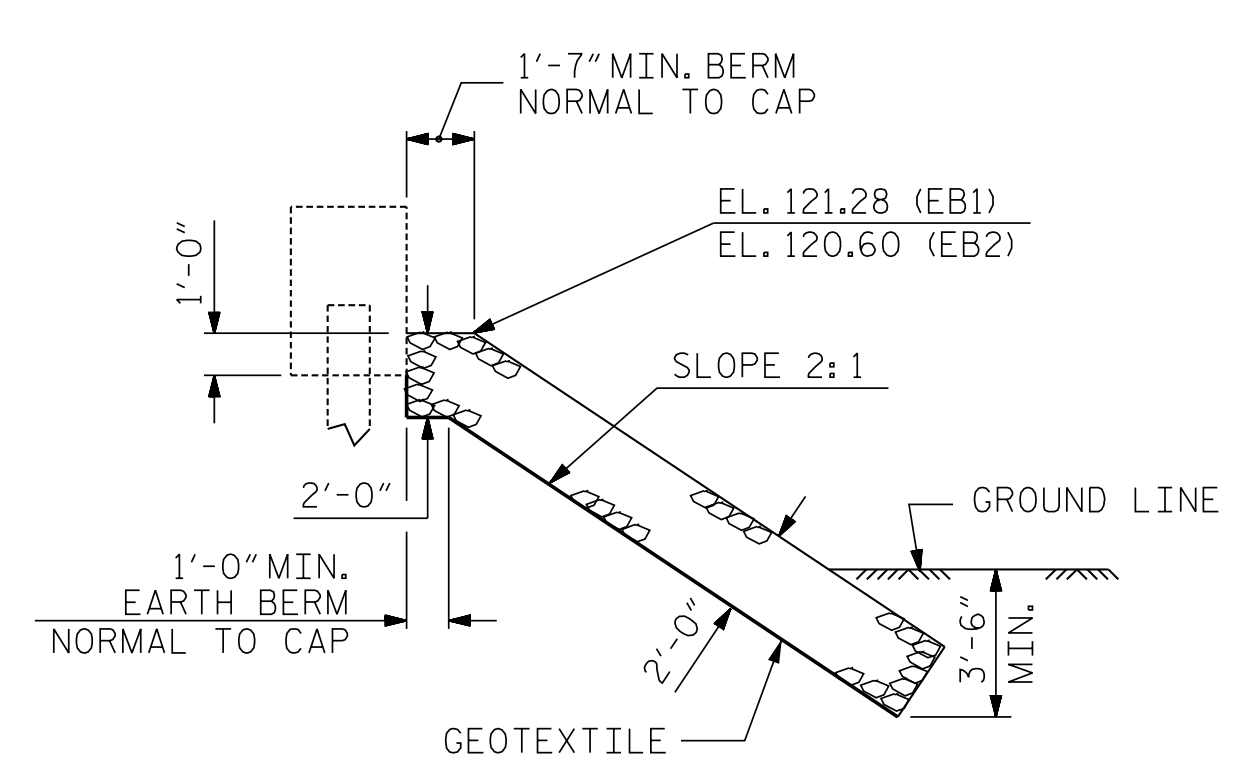
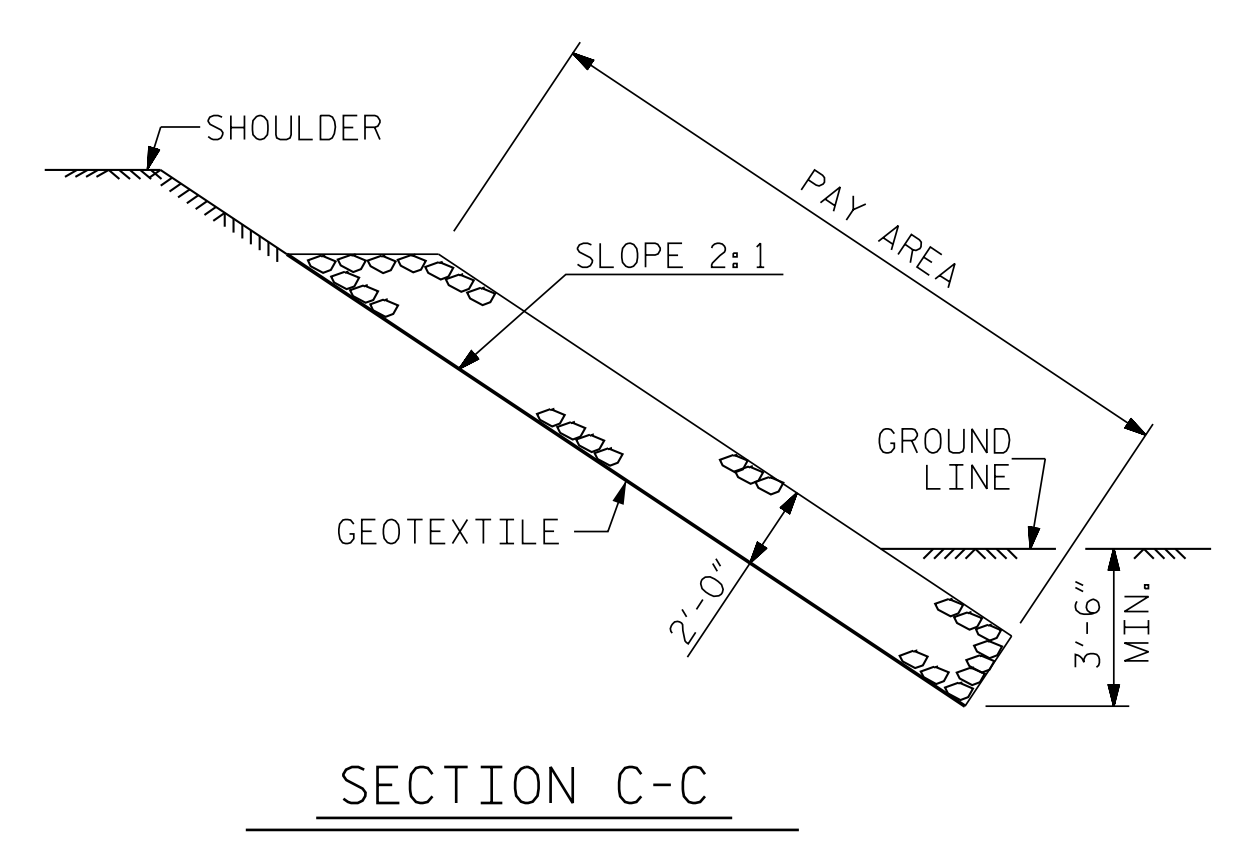
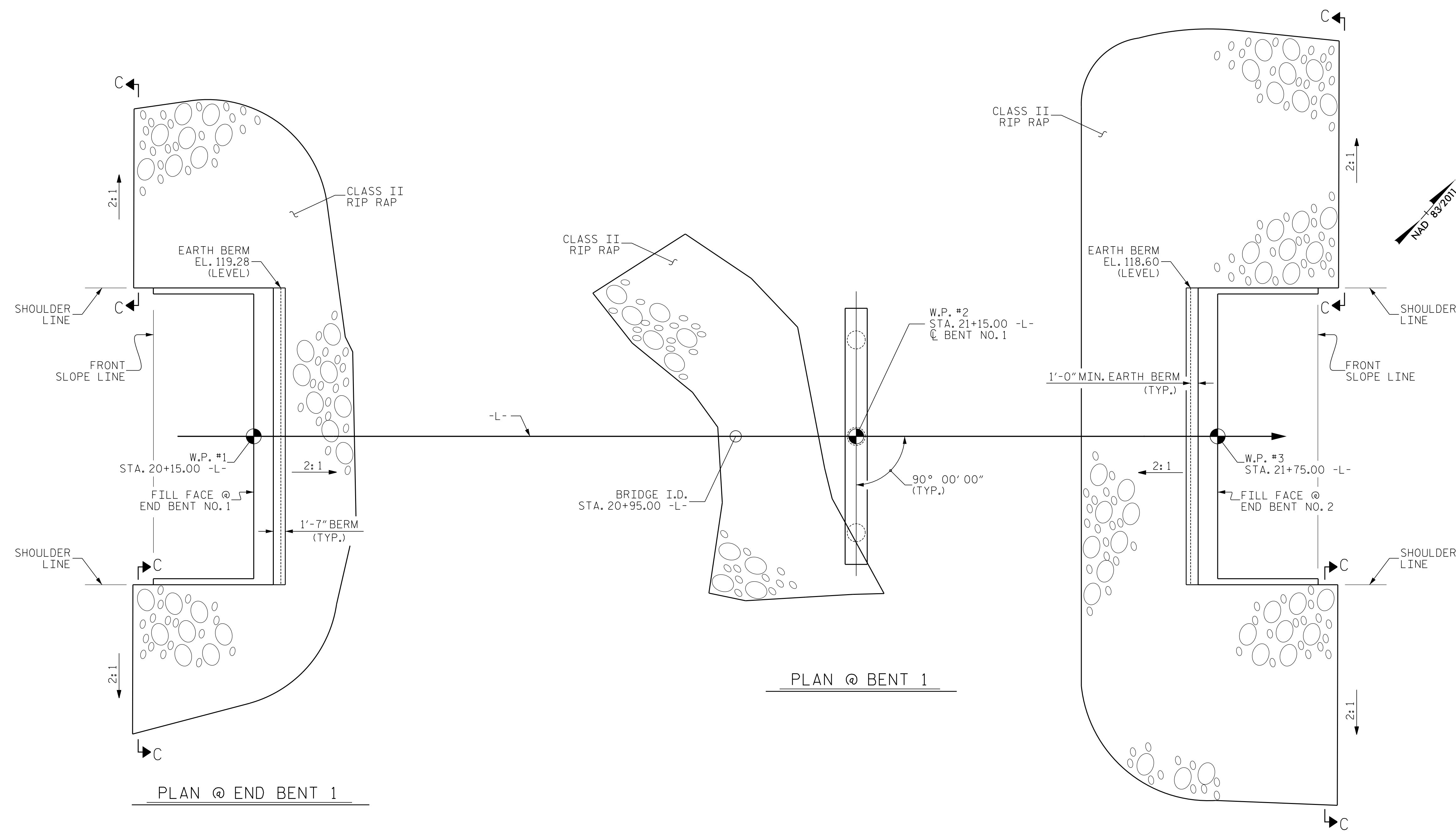
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SUBSTRUCTURE BENT 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-23	TOTAL SHEETS 26
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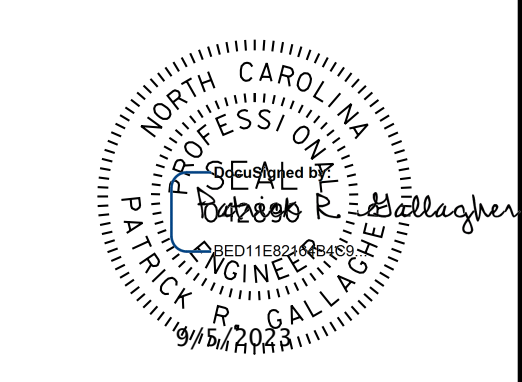
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 DWN. BY: WDC DATE: 07/23  
 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23



ESTIMATED QUANTITIES		
BRIDGE @ STA. 20+95.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	300	273
BENT 1	200	182
END BENT 2	620	564
TOTAL	1120	1019



PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 RIP RAP DETAILS

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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			26

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 CHKD. BY: PRG DATE: 07/23  
 DES. EGR. OF RECORD: PRG DATE: 07/23

SECTION @ END BENTS  
 (END BENT 1 SHOWN, END BENT 2 SIMILAR)

SECTION @ BENT

PLAN @ END BENT 1

PLAN @ BENT 1

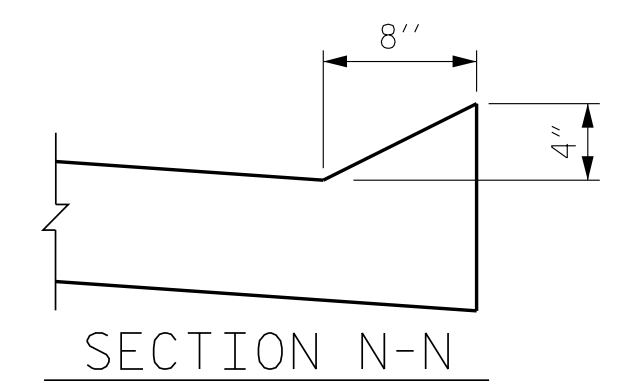
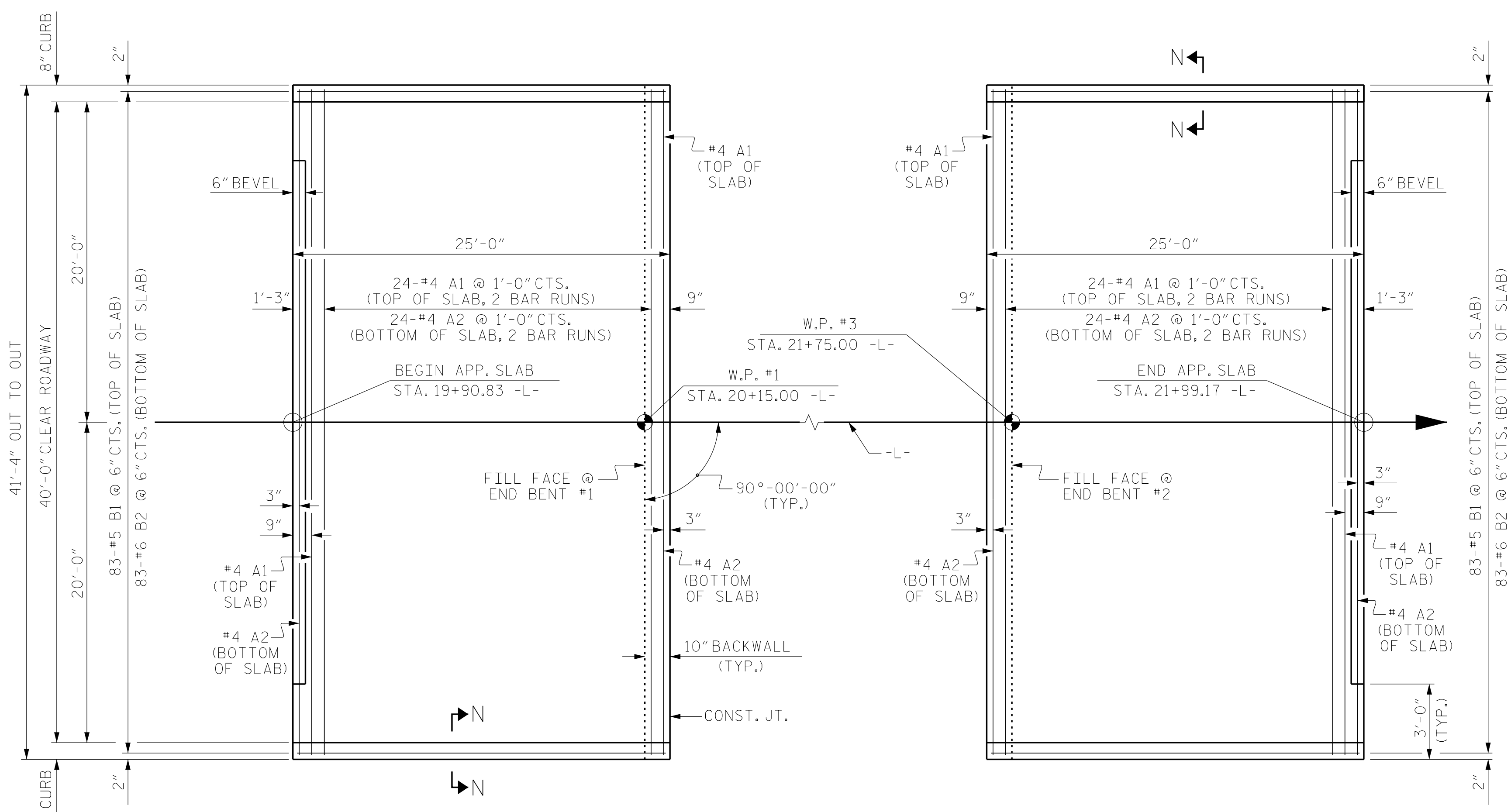
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NOTES

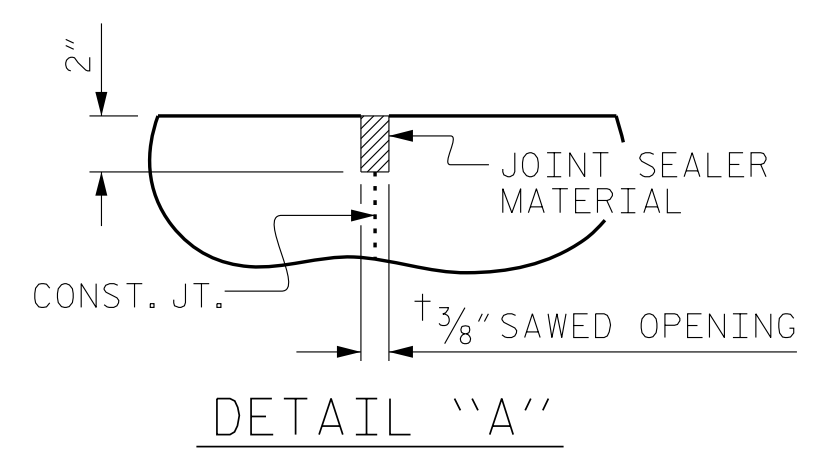
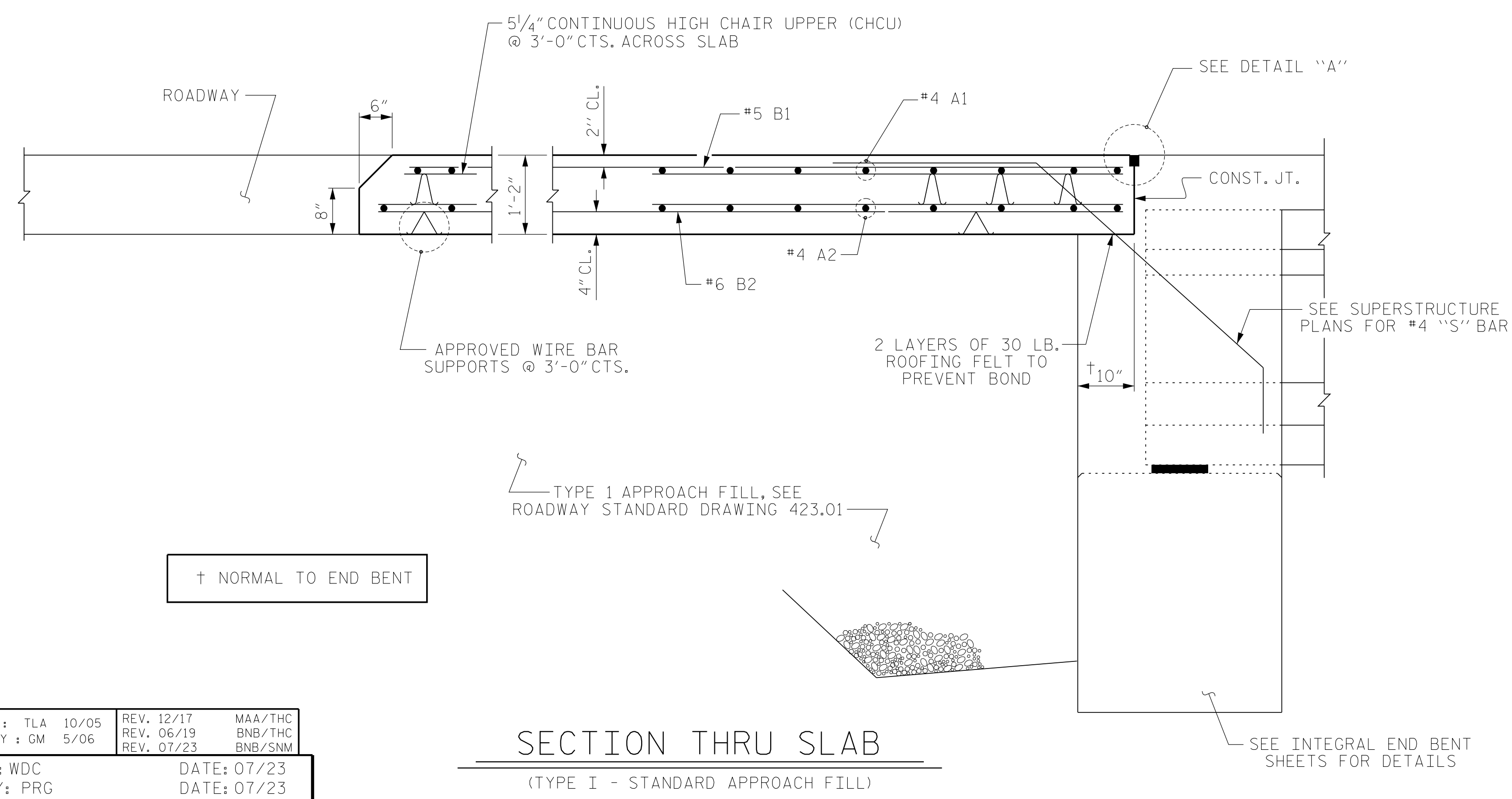
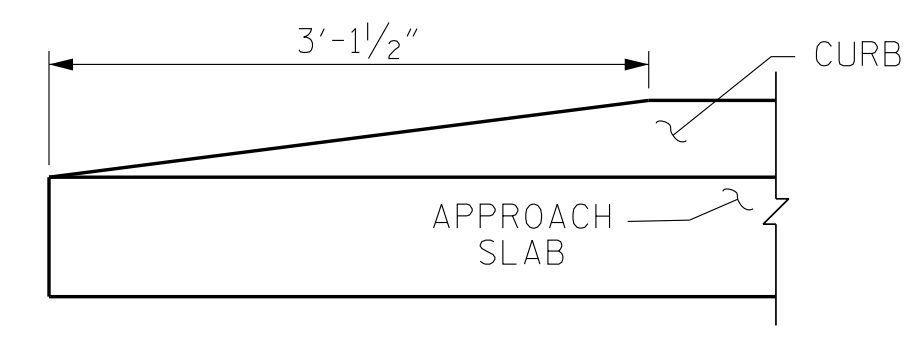
FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.  
 APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.  
 AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED, SEE ROADWAY PLANS.  
 THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

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

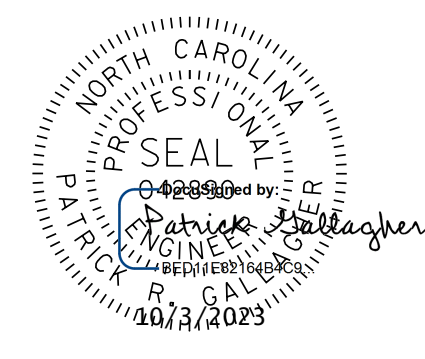
BILL OF MATERIAL						
APPROACH SLAB AT EB #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	52	#4	STR	21'-6"	747	
A2	52	#4	STR	21'-5"	744	
*B1	83	#5	STR	24'-2"	2092	
B2	83	#6	STR	24'-8"	3075	
REINFORCING STEEL					LBS.	3819
*EPOXY COATED REINFORCING STEEL					LBS.	2839
CLASS AA CONCRETE					C. Y.	44.7
APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	52	#4	STR	21'-6"	747	
A2	52	#4	STR	21'-5"	744	
*B1	83	#5	STR	24'-2"	2092	
B2	83	#6	STR	24'-8"	3075	
REINFORCING STEEL					LBS.	3819
*EPOXY COATED REINFORCING STEEL					LBS.	2839
CLASS AA CONCRETE					C. Y.	44.7



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



PROJECT NO. BR-0026  
 JOHNSTON COUNTY  
 STATION: 20+95.00 -L-  
 SHEET 1 OF 2



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

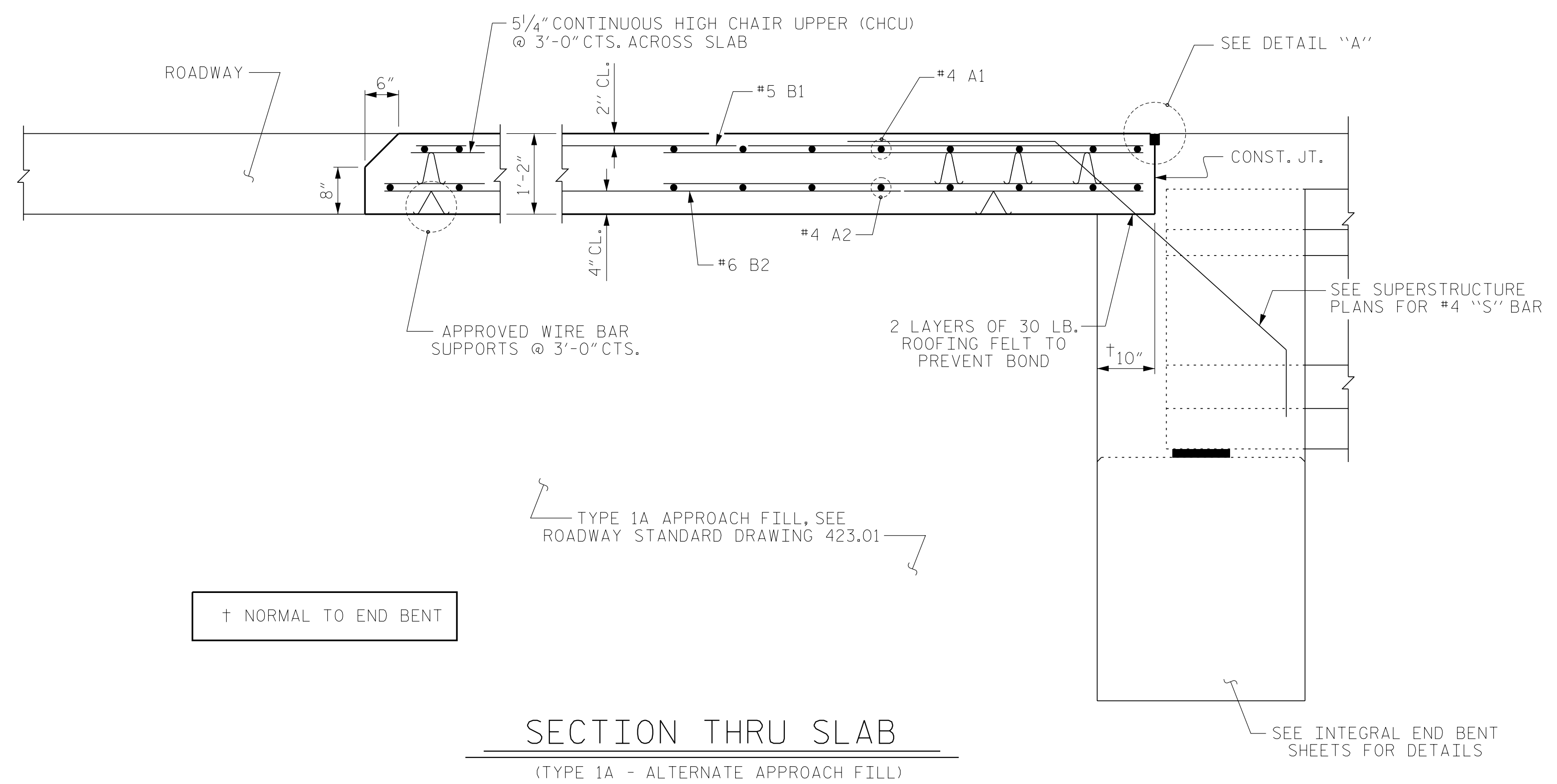
DOCUMENT NOT CONSIDERED FINAL  
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-25	
1			3			TOTAL SHEETS 26	
2			4				

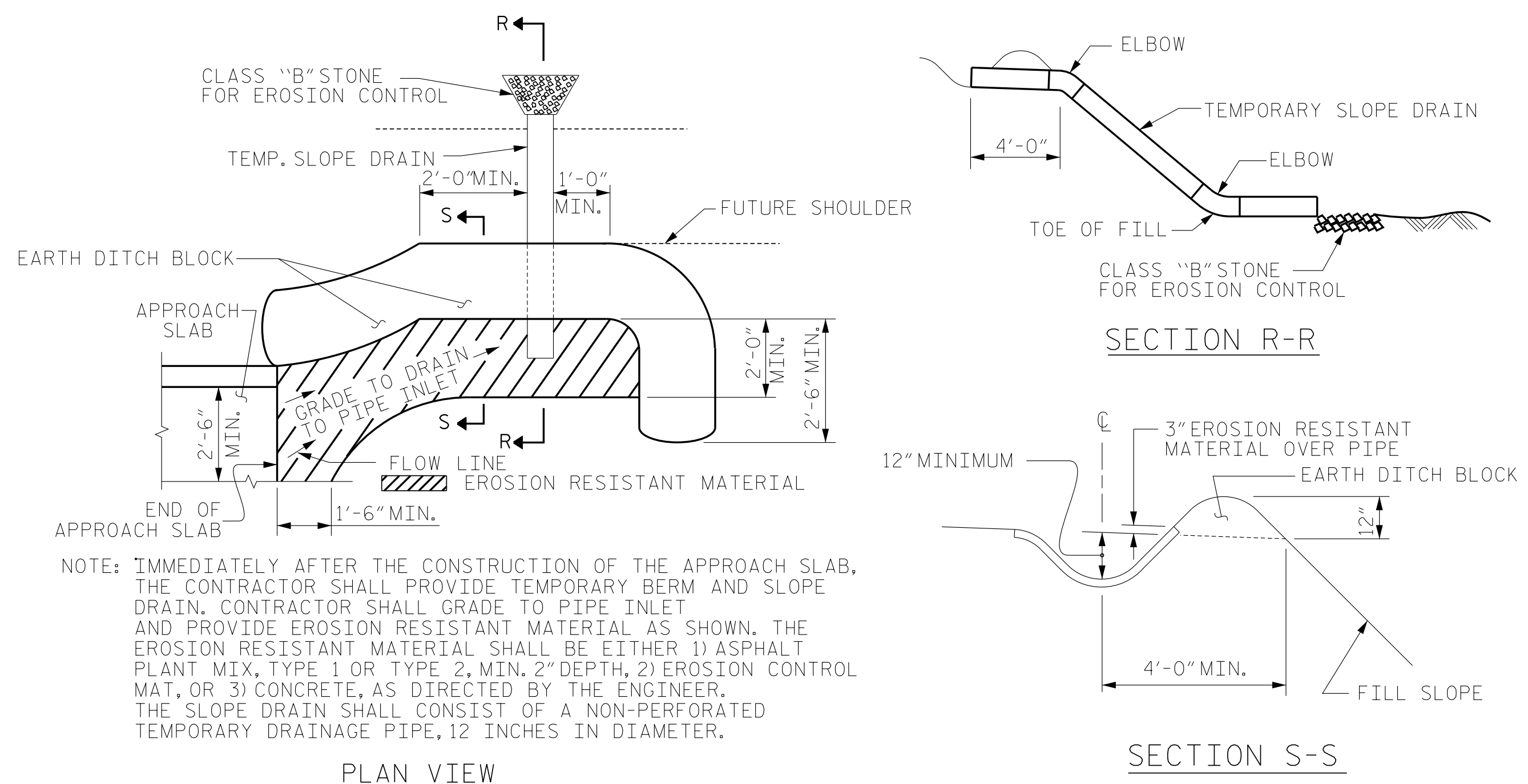
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 TIME: 05:03 PM

DRAWN BY : TLA	10/05	REV. 12/17	MAA/THC
CHECKED BY : GM	5/06	REV. 06/19	BNB/THC
		REV. 07/23	BNB/SNM
DWN. BY: WDC	DATE: 07/23		
CHKD. BY: PRG	DATE: 07/23		
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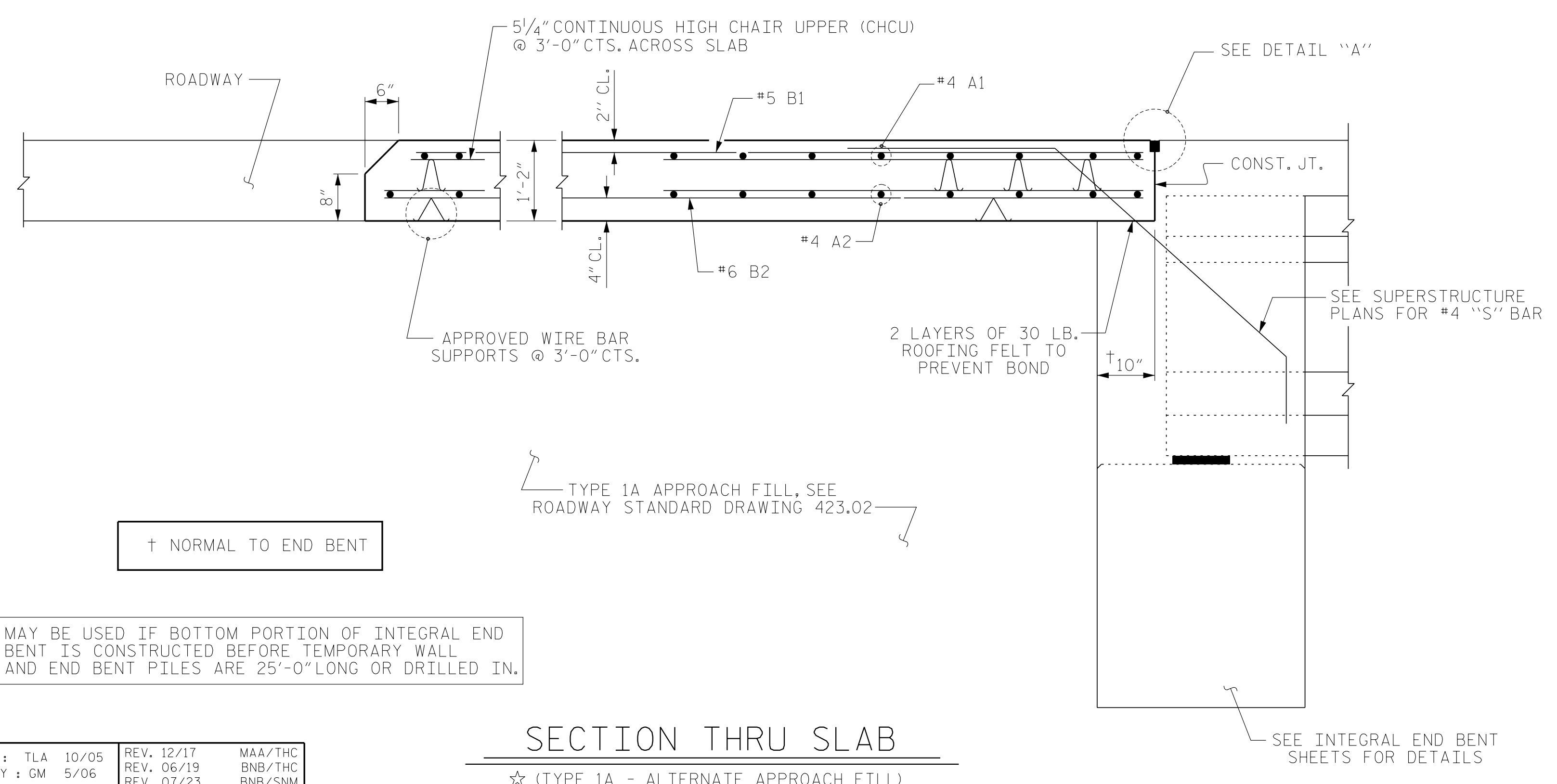


† NORMAL TO END BENT

SECTION THRU SLAB  
(TYPE 1A - ALTERNATE APPROACH FILL)

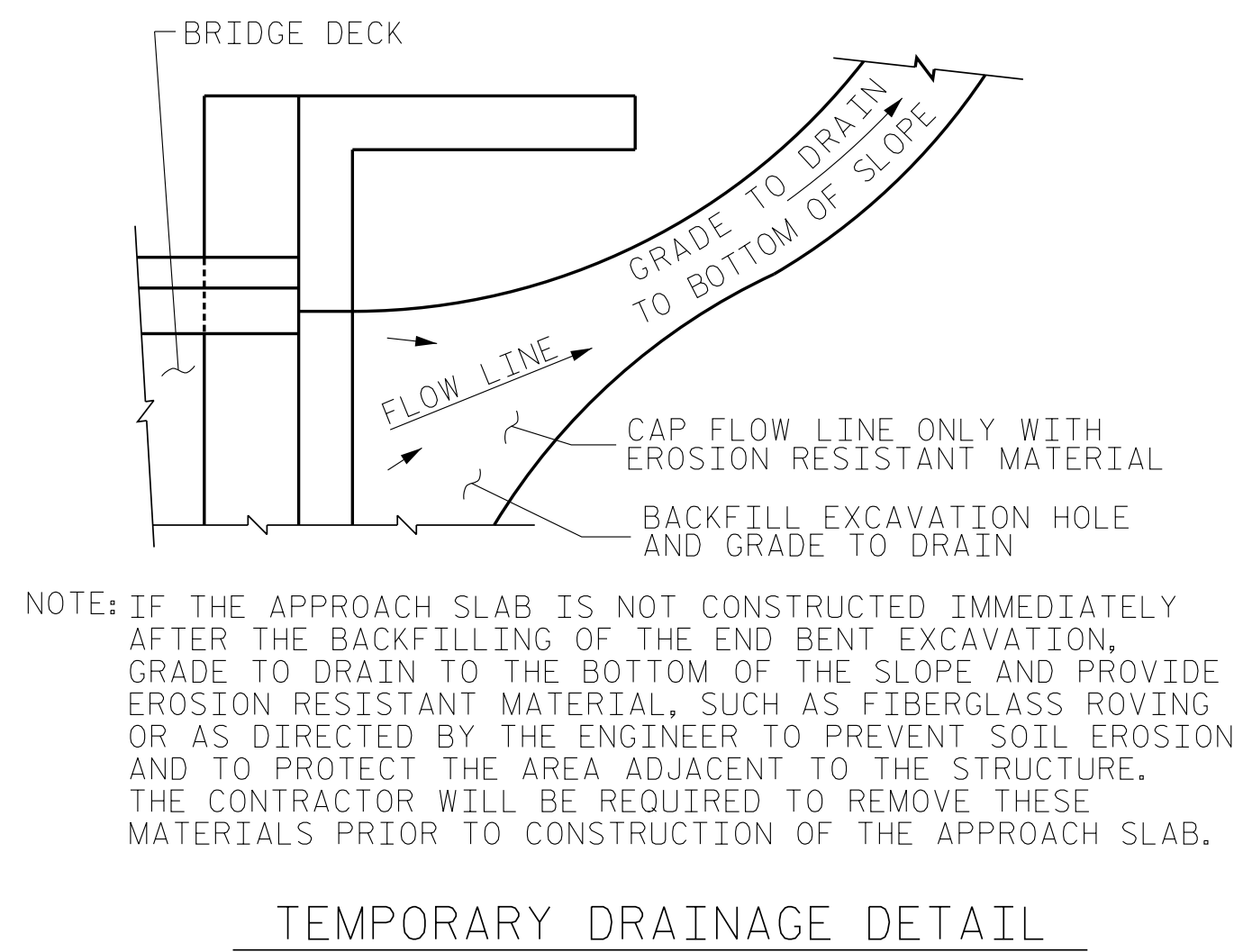


TEMPORARY BERM AND SLOPE DRAIN DETAILS  
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



† NORMAL TO END BENT

SECTION THRU SLAB  
(TYPE 1A - ALTERNATE APPROACH FILL)



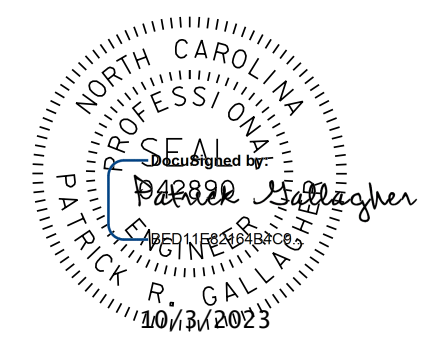
TEMPORARY DRAINAGE DETAIL

☆ 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.

DRAWN BY : TLA	10/05	REV. 12/17	MAA/THC
CHECKED BY : GM	5/06	REV. 06/19	BNB/THC
		REV. 07/23	BNB/SNM
DWN. BY: WDC	DATE: 07/23		
CHKD. BY: PRG	DATE: 07/23		
DES. EGR. OF RECORD: PRG	DATE: 07/23		

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JOHNSTON COUNTY  
STATION: 20+95.00 -L-  
SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-26					TOTAL SHEETS 26

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

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

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

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

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" 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.