

09/08/09

TIP PROJECT: BR-0073

CONTRACT: C204795

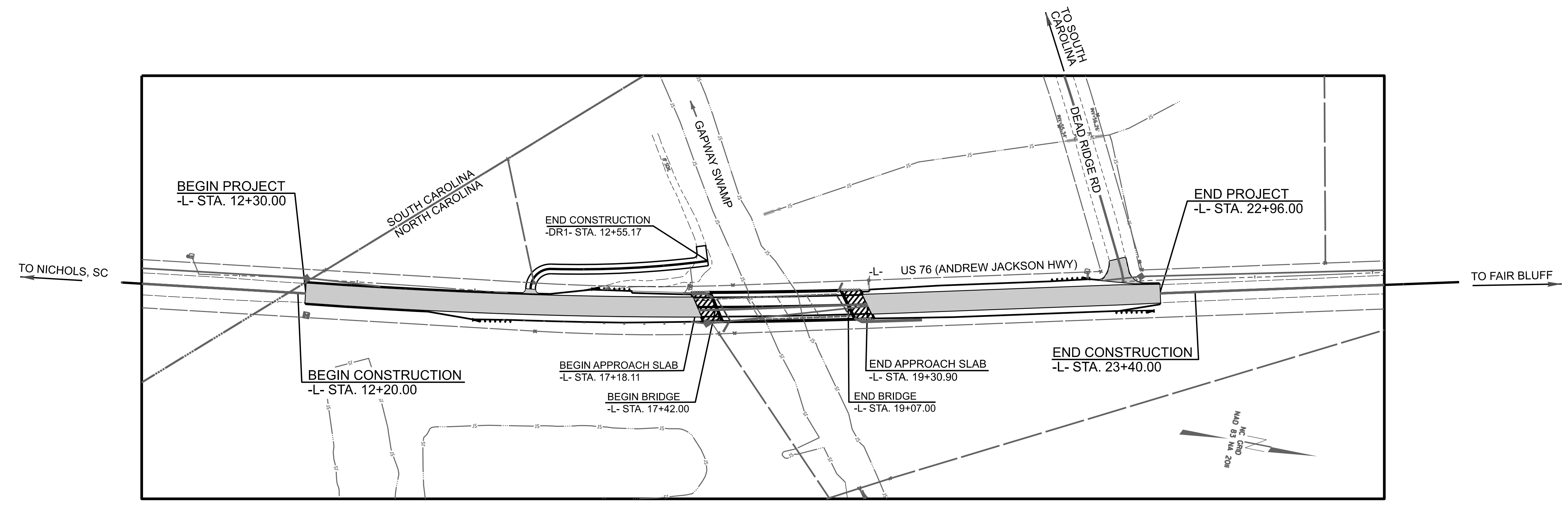
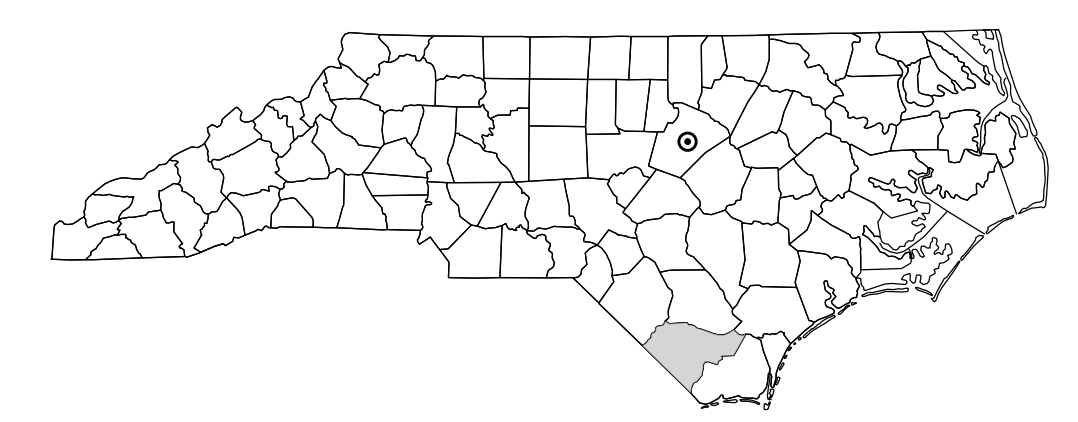
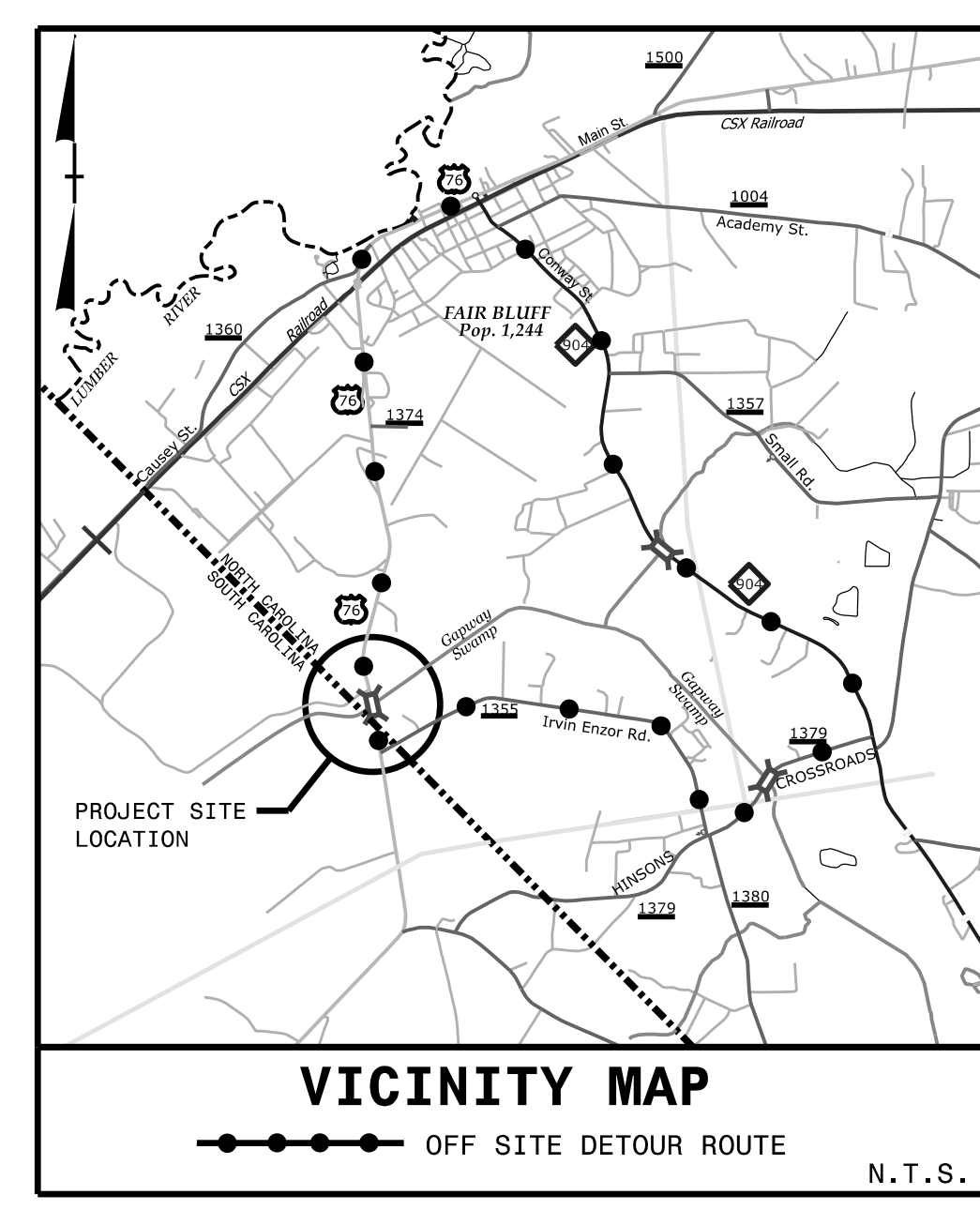
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

COLUMBUS COUNTY

LOCATION: BRIDGE NO. 230005 ON US 76 OVER GAPWAY SWAMP

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0073	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
67073.1.1		PE	
67073.2.1		R/W & UTIL.	
67073.3.1		CONST.	



STRUCTURES

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2023 = 1,057
 ADT 2045 = 1,400
 K = N/A
 D = N/A
 T = 9% *
 V = 60 MPH
 * TTST = 5% DUALS = 4%
 FUNC CLASS =
 PRINCIPAL ARTERIAL
 STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0073 = 0.171 MILES
 LENGTH STRUCTURES TIP PROJECT BR-0073 = 0.031 MILES
 TOTAL LENGTH TIP PROJECT BR-0073 = 0.202 MILES

Prepared for:
STRUCTURES MANAGEMENT UNIT
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

EMILY E. MURRAY, PE
 PROJECT ENGINEER

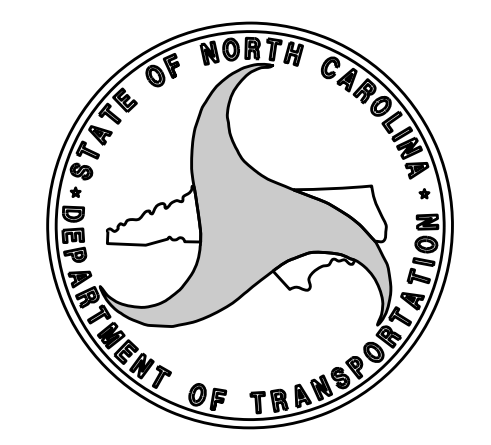
PATRICK N. HOLDER, PE
 PROJECT DESIGN ENGINEER

DAVID STUTTS, PE
 NCDOT CONTACT

LETTING DATE:
APRIL 18, 2023

Prepared in the Office of:

VOLKERT
 5430 Wade Park Blvd., Suite 410
 Raleigh, NC 27607
 Tel. 919-854-0344 Fax. 919-854-0355
 NC License No. F-0765



9/26/20

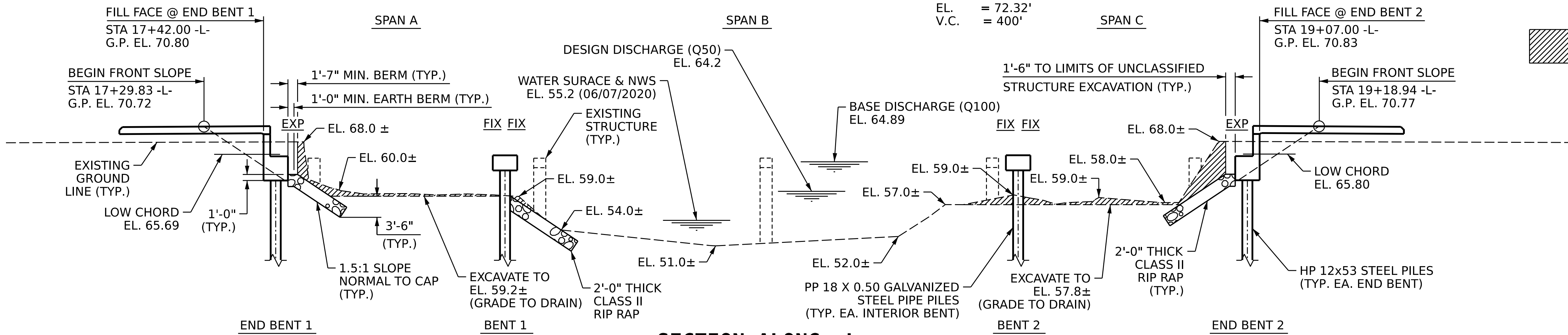
17+00 17+50 18+00 18+50 19+00 19+50

GRADE DATA

+1.0940% Δ -1.5431%

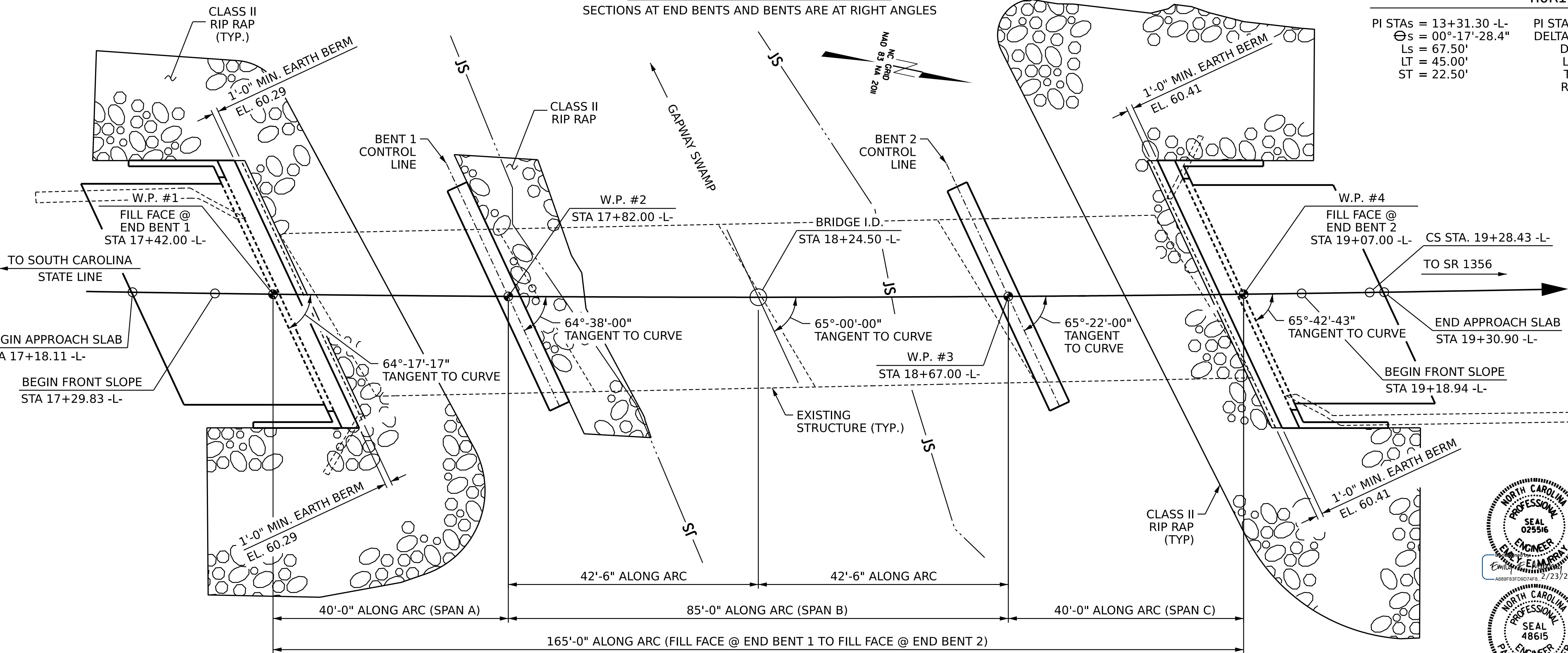
PI STA. = 18+62.00
 EL. = 72.32'
 V.C. = 400'

 UNCLASSIFIED
STRUCTURE
EXCAVATION



HORIZONTAL DATA

PI STAs = 13+31.30 -L-	PI STAc = 16+41.29 -L-	PI STAs = 19+50.93 -L-
$\Theta_s = 00^\circ-17'-28.4"$	DELTAc = $4^\circ-57'-30.2"$ (LT)	$\Theta_s = 00^\circ-17'-28.4"$
Ls = 67.50'	Dc = $0^\circ-51'-46.4"$	Ls = 67.50'
LT = 45.00'	Lc = 574.63'	LT = 45.00'
ST = 22.50'	Tc = 287.49'	ST = 22.50'
	Rc = 6640'	



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. **BR-0073**

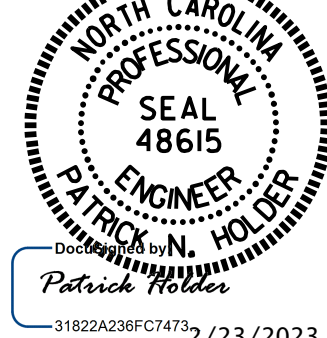
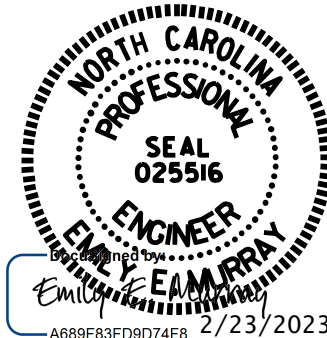
COLUMBUS COUNTY

STATION: **18+24.50 -L-**

SHEET 1 OF 5 REPLACES BRIDGE NO. 230005

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON US 76
 OVER GAPWAY SWAMP
 BETWEEN SR-1356 AND
 SOUTH CAROLINA STATE LINE

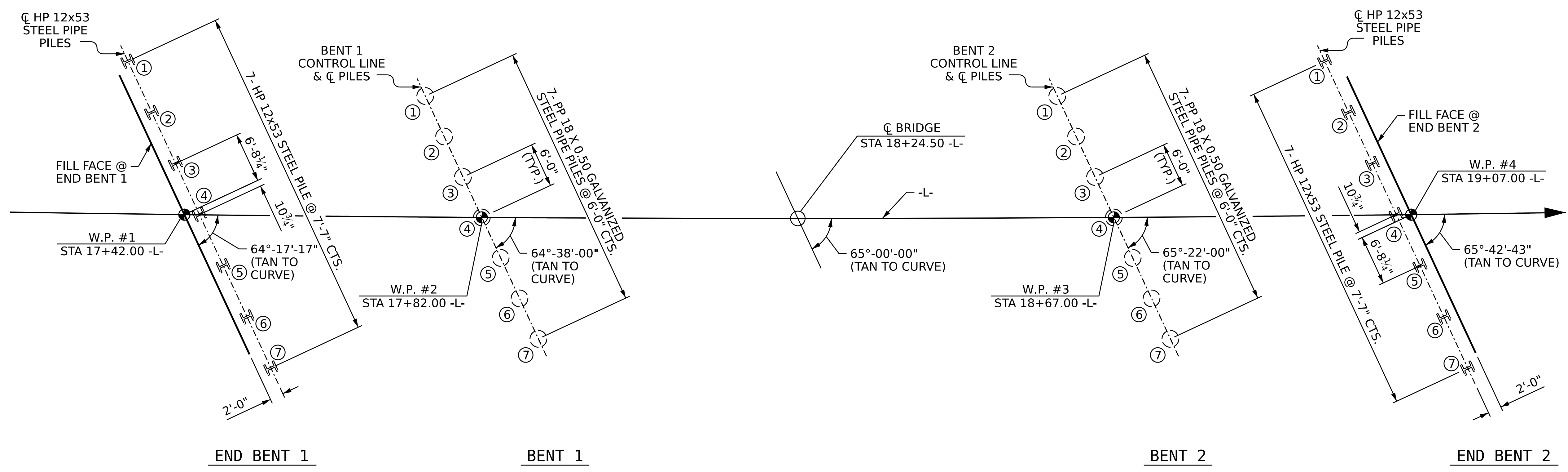


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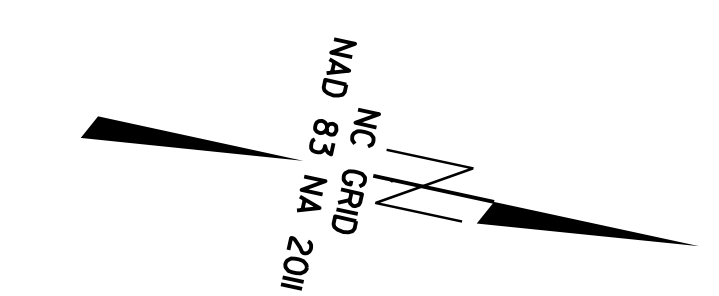
REVISIONS			SHEET NO.		
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-1
					TOTAL SHEETS
					38

DRAWN BY: **P. N. HOLDER** DATE: **03/22**
 CHECKED BY: **D. A. GLADDEN** DATE: **03/22**
 DESIGN ENGINEER OF RECORD: **P. N. HOLDER** DATE: **11/22**



FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILES)



NOTES

FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 60-110 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT NO. 1 AND BENT NO. 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

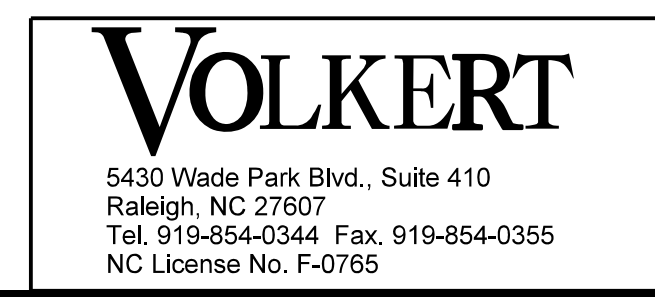
PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 2 OF 5



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON US 76
 OVER GAPWAY SWAMP
 BETWEEN SR-1356 AND
 SOUTH CAROLINA STATE LINE



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

DRAWN BY : A. Y. WU DATE : 10/22
 CHECKED BY : D. A. GLADDEN DATE : 11/22
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 11/22

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Exc Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-7	90	See Substructure Plans	55	N/A	N/A	150	14						
Bent 1, Piles 1-7	190		70	45	28.0	265							
Bent 2, Piles 1-7	190		70	44	30.0	265							
End Bent 2, Piles 1-7	90		55	N/A	N/A	150							

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

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

SUMMARY OF PDA/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
EB1	MAYBE	60	3		
B1	YES	75			
B2	YES	75			
EB2	MAYBE	60			

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) ## (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-7	90			0.60			
Bent 1, Piles 1-7	190			0.75		8	1.00
Bent 2, Piles 1-7	190			0.75		8	1.00
End Bent 2, Piles 1-7	90			0.60			

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

PROJECT NO. BR-0073


COLUMBUS COUNTY

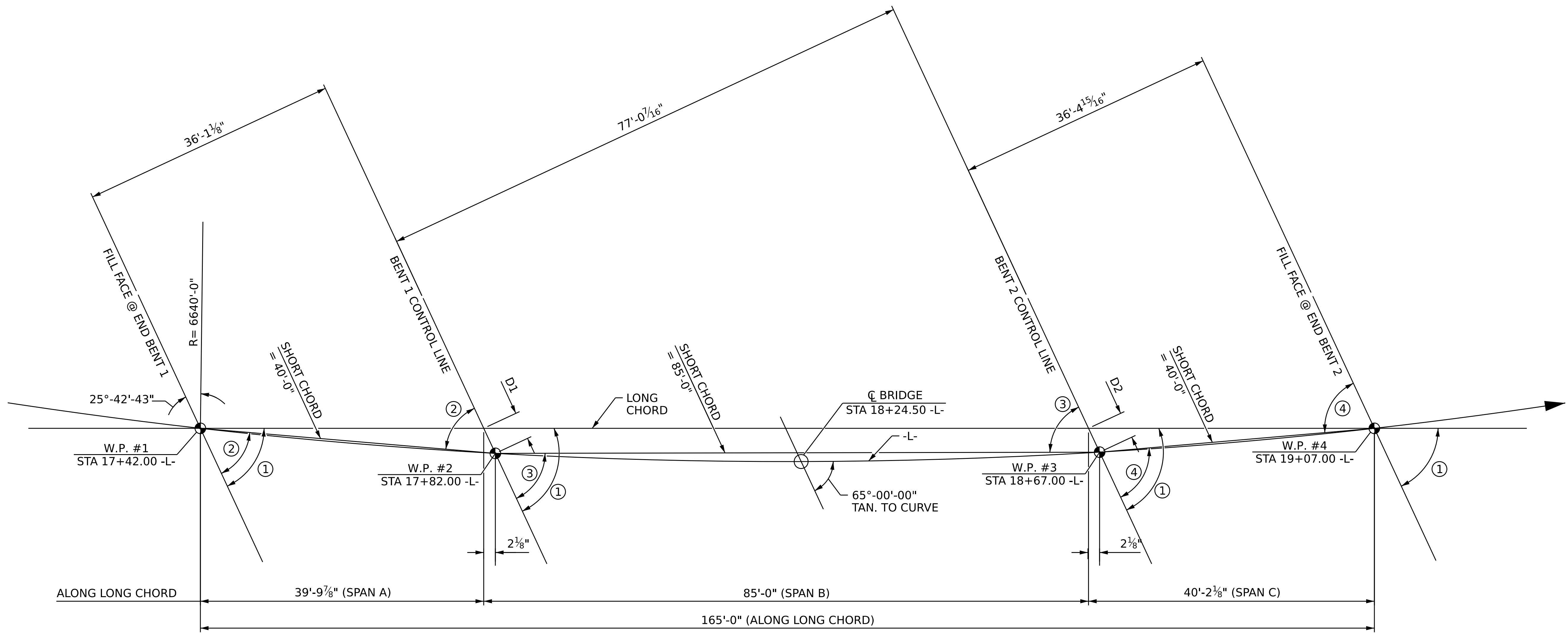
STATION: 18+24.50 -L-

SHEET 3 OF 5

NOTES:

- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Jinyoung Park PE#032171) on 12/1/2022.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for PDA Testing when PDAs may be required.

 Emily E. Murray 2/23/2023 SIGNATURE DATE	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		GENERAL DRAWING FOUNDATION PILE TABLES			SHEET NO. TOTAL SHEETS
	REVISIONS					
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	NO. 1	BY:	DATE:	NO. 3	BY:	DATE:
	2			4		



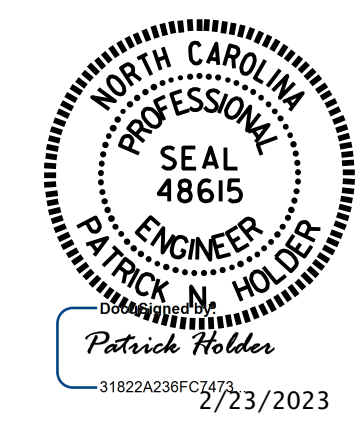
LONG CHORD LAYOUT

NOTE: ALL BENTS ARE PARALLEL.

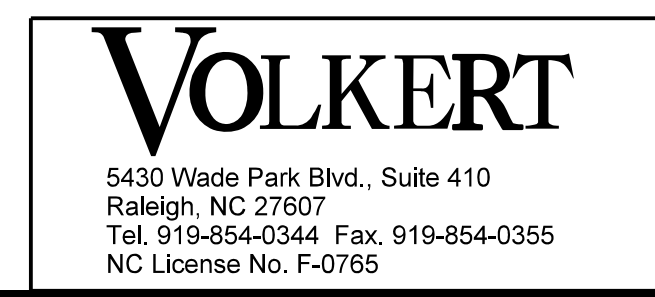
OFFSET	ANGLES	
	LONG CHORD	SHORT CHORD
D1 = 5"	① 65°-00'-00"	② 64°-27'-38"
D2 = 5"		③ 65°-00'-00"
		④ 65°-32'-22"

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 4 OF 5



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON US 76
 OVER GAPWAY SWAMP
 BETWEEN SR-1356 AND
 SOUTH CAROLINA STATE LINE

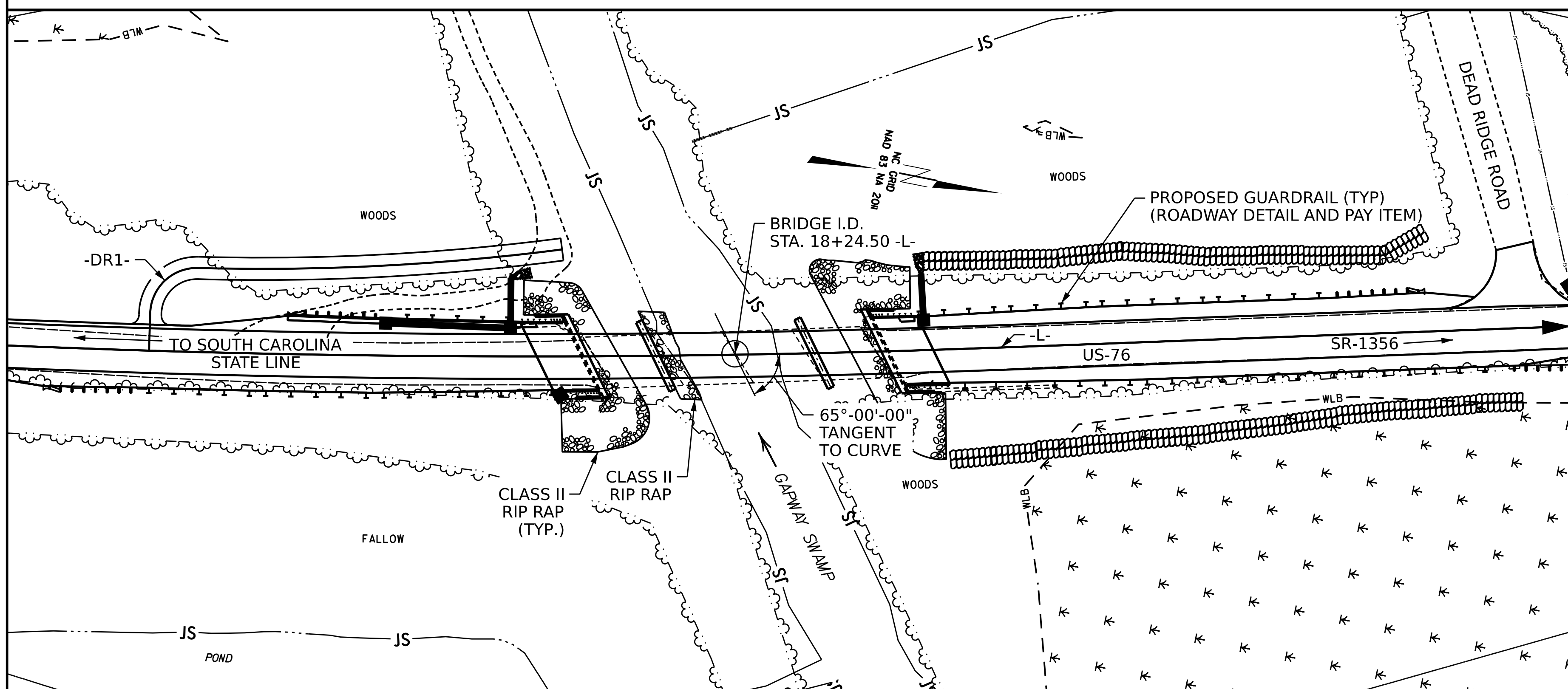


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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : A. Y. WU DATE : 10/22
 CHECKED BY : D. A. GLADDEN DATE : 11/22
 DESIGN ENGINEER OF RECORD : P. N. HOLDER DATE : 11/22

BM#1: RR SPIKE IN BASE OF 20" GUM TREE, STA 11+10.00 -BL-, ELEV. = 67.87, OFFSET 46' RT.



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS IN SEISMIC ZONE 2.

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.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

FOR INTERIOR BENTS 1 AND 2, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEETS FOR REQUIRED GALVANIZED LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

THE MATERIAL SHOWN IN THE HATCHED AREA ON SHEET 1 OF 5 SHALL BE EXCAVATED FOR A DISTANCE OF 45 FT LEFT AND 40 FT RIGHT AT END BENT 1 AND 35 FT EACH SIDE OF CENTERLINE ROADWAY AT END BENT 2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 4- 37'-6" REINFORCED CONCRETE DECK GIRDER SPANS WITH A CLEAR ROADWAY WIDTH OF 28'-2" AND REINFORCED CONCRETE DECK ON REINFORCED CONCRETE END BENTS AND BENTS ON TIMBER PILES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT.

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. 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.

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

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

ALL REMNANT PILES FROM THE EXISTING BRIDGE OR ANY PREVIOUS BRIDGES SHALL BE REMOVED. IN THE EVENT THAT A PILE CANNOT BE REMOVED COMPLETELY, THE PILE SHALL BE CUT OFF AT THE MUD LINE.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STA. 18+24.50 -L-	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	45" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR PP 18 X 0.50 GALVANIZED STEEL PILES	HP 12x53 STEEL PILES		PP 18 X 0.50 GALVANIZED STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	
										NO.	LIN. FT.			NO.	LIN. FT.	EACH	LIN. FT.							TONS
SUPERSTRUCTURE				LUMP SUM	6382	6963		LUMP SUM		15	802.27							325.42				LUMP SUM	LUMP SUM	
END BENT 1							47.7		8673			7		7	385						370	411		
BENT 1							25.1		4635				7			7	490							
BENT 2							25.0		4635				7			7	490							
END BENT 2							47.3		8645			7		7	385						344	382		
TOTAL	LUMP SUM	LUMP SUM	3	LUMP SUM	6382	6963	145.1	LUMP SUM	26588	15	802.27	14	14	14	770	14	980	14	325.42		714	793	LUMP SUM	LUMP SUM

HYDRAULIC DATA

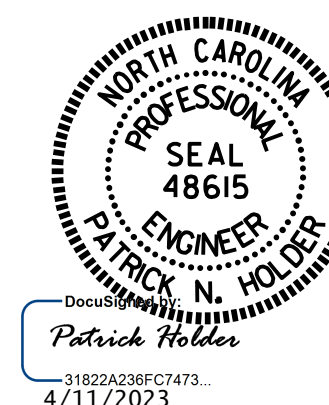
DESIGN DISCHARGE = 3100 C.F.S.
 FREQUENCY OF DESIGN FLOOD = 50 YRS.
 DESIGN HIGH WATER ELEVATION = 64.2 FT.
 DRAINAGE AREA = 46.9 SQ. MI.
 BASE DISCHARGE (Q100) = 3700 C.F.S.
 BASE HIGH WATER ELEVATION = 64.89 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 4900 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD = 500± YRS.
 OVERTOPPING FLOOD ELEVATION = 66.0 FT.
 OVERTOPPING OCCURS AT SAG STA. 25+33.10 -L-

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 5 OF 5

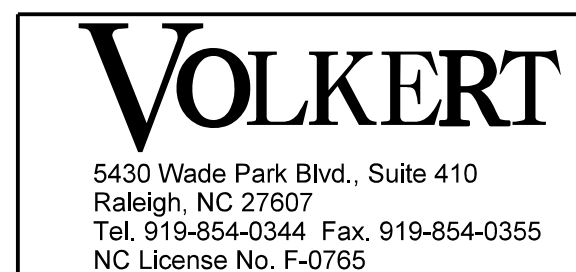


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE ON US 76
 OVER GAPWAY SWAMP
 BETWEEN SR-1356 AND
 SOUTH CAROLINA STATE LINE

DRAWN BY : P. N. HOLDER DATE : 03/22
 CHECKED BY : D. A. GLADDEN DATE : 03/22
 DESIGN ENGINEER OF RECORD : P. N. HOLDER DATE : 11/22



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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			38

LOAD FACTORS:

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

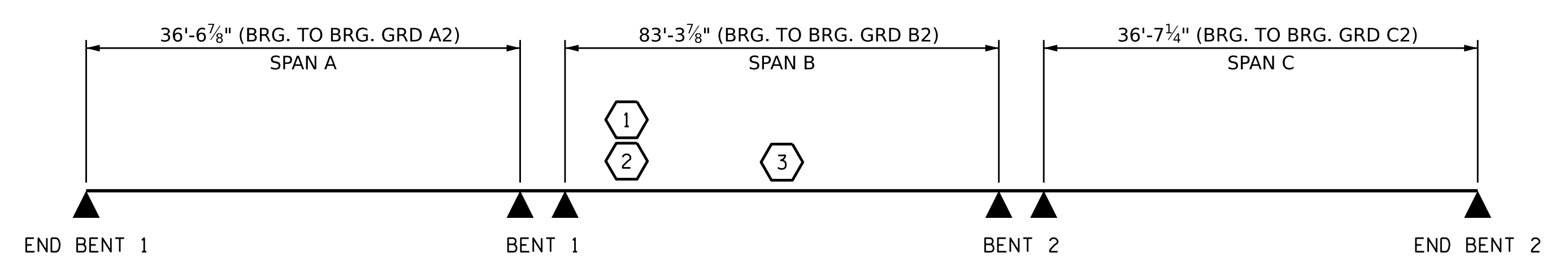
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.39	--	1.75	0.843	2.29	B	I	41.7	0.691	1.39	B	I	7.8	0.80	0.843	1.81	B	I	41.7		
	HL-93 (OPERATING)	N/A		1.84	--	1.35	0.843	2.97	B	I	41.7	0.691	1.84	B	I	7.8	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.83	65.88	1.75	0.843	3.09	B	I	41.7	0.691	1.83	B	I	7.8	0.80	0.843	2.45		I	41.7		
	HS-20 (OPERATING)	36.000		2.41	86.76	1.35	0.843	4.01	B	I	41.7	0.691	2.41	B	I	7.8	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.56	61.56	1.40	0.843	9.67	B	I	41.7	0.691	6.22	B	I	7.8	0.80	0.843	4.56	B	I	41.7	
		SNGARBS2	20.000		3.34	66.80	1.40	0.843	7.09	B	I	41.7	0.691	4.35	B	I	7.8	0.80	0.843	3.34	B	I	41.7	
		SNAGRIS2	22.000		3.14	69.08	1.40	0.843	6.66	B	I	41.7	0.691	4.02	B	I	7.8	0.80	0.843	3.14	B	I	41.7	
		SNCOTTS3	27.250		2.27	61.86	1.40	0.843	4.81	B	I	41.7	0.691	3.05	B	I	7.8	0.80	0.843	2.27	B	I	41.7	
		SNAGGRS4	34.925		1.87	65.31	1.40	0.843	3.97	B	I	41.7	0.691	2.49	B	I	7.8	0.80	0.843	1.87	B	I	41.7	
		SNS5A	35.550		1.83	65.06	1.40	0.843	3.89	B	I	41.7	0.691	2.51	B	I	7.8	0.80	0.843	1.83	B	I	41.7	
		SNS6A	39.950		1.67	66.72	1.40	0.843	3.55	B	I	41.7	0.691	2.27	B	I	7.8	0.80	0.843	1.67	B	I	41.7	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.04	67.32	1.40	0.843	4.32	B	I	41.7	0.691	2.73	B	I	7.8	0.80	0.843	2.04	B	I	41.7	
		TNT4A	33.075		2.04	67.47	1.40	0.843	4.34	B	I	41.7	0.691	2.66	B	I	7.8	0.80	0.843	2.04	B	I	41.7	
		TNT6A	41.600		1.66	69.06	1.40	0.843	3.53	B	I	41.7	0.691	2.34	B	I	7.8	0.80	0.843	1.66	B	I	41.7	
		TNT7A	42.000		1.66	69.72	1.40	0.843	3.54	B	I	41.7	0.691	2.29	B	I	7.8	0.80	0.843	1.66	B	I	41.7	
		TNT7B	42.000		1.71	71.82	1.40	0.843	3.63	B	I	41.7	0.691	2.17	B	I	7.8	0.80	0.843	1.71	B	I	41.7	
		TNAGRIT4	43.000		1.64	70.52	1.40	0.843	3.47	B	I	41.7	0.691	2.10	B	I	7.8	0.80	0.843	1.64	B	I	41.7	
		TNAGT5A	45.000		1.55	69.75	1.40	0.843	3.28	B	I	41.7	0.691	2.07	B	I	7.8	0.80	0.843	1.55	B	I	41.7	
TNAGT5B	45.000	③	1.53	68.85	1.40	0.843	3.25	B	I	41.7	0.691	1.99	B	I	7.8	0.80	0.843	1.53	B	I	41.7			

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.

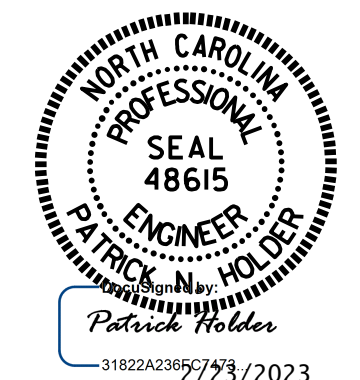
COMMENTS:
1.
2.
3.
4.

#	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	



PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

LRFR SUMMARY

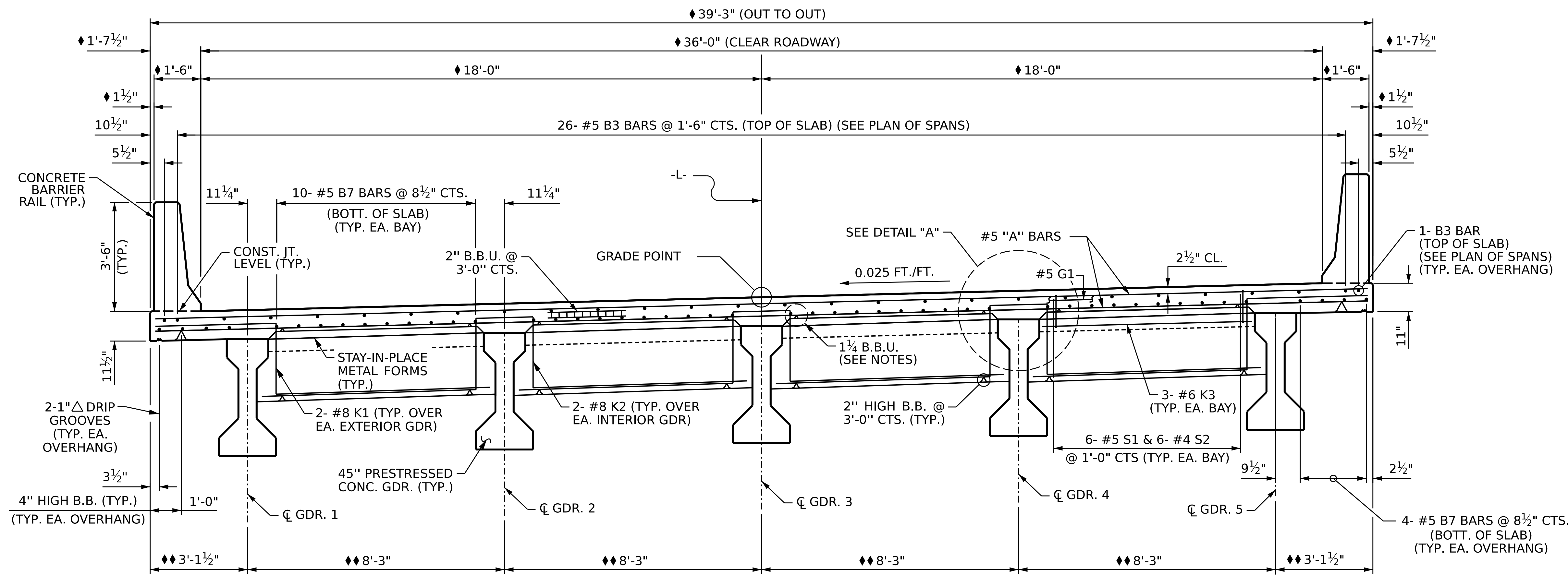


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 PRESTRESSED
 CONCRETE GIRDERS
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : PNH	DATE : 9/22
CHECKED BY : SN	DATE : 9/22
DRAWN BY : MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

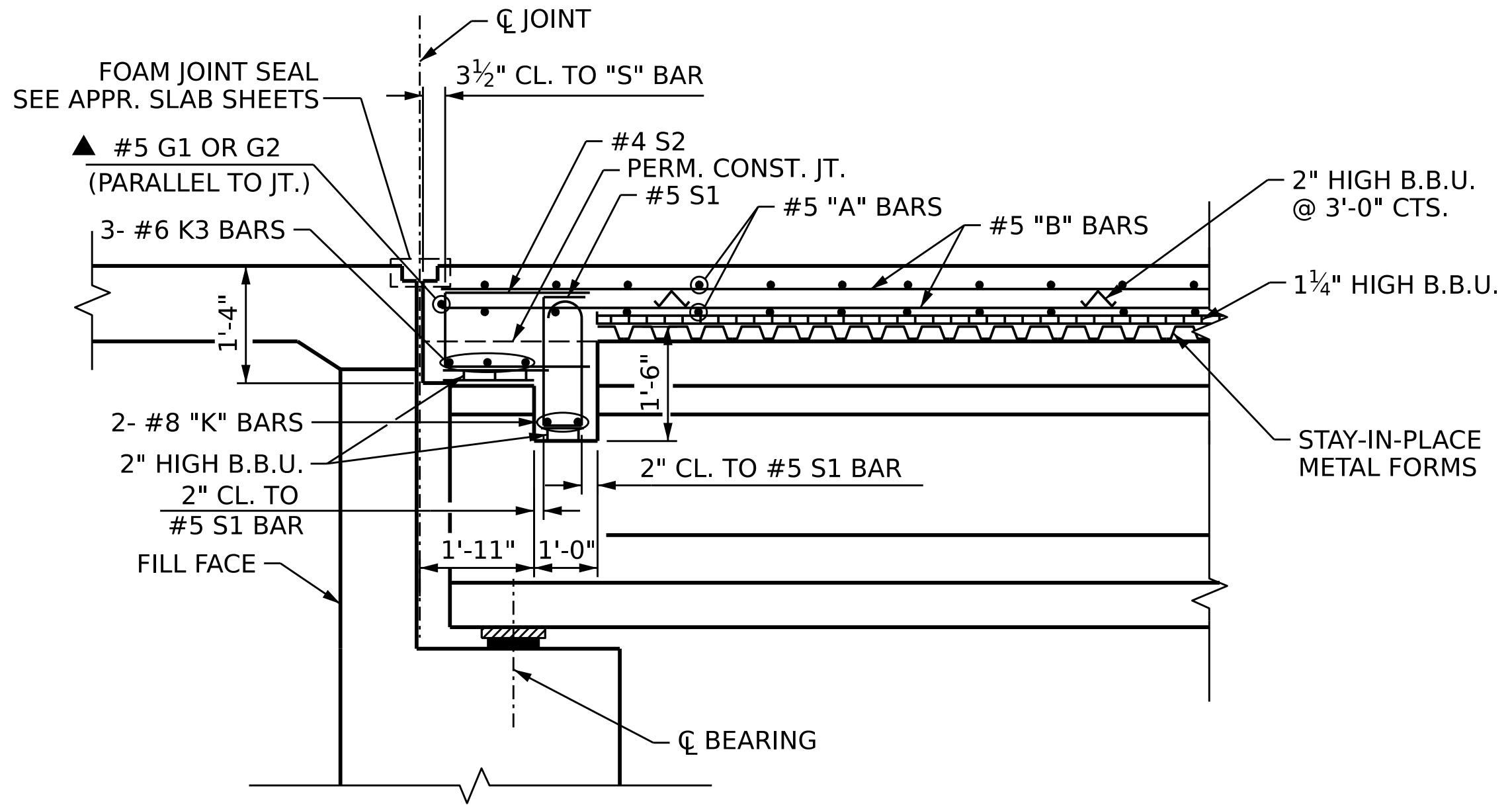
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 Raleigh, NC 27607
 Tel. 919-854-0344 Fax. 919-854-0355
 NC License No. F-0765

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	REVISIONS						SHEET NO. S-6 TOTAL SHEETS 38
	NO.	BY:	DATE:	NO.	BY:	DATE:	
	1			3			
	2			4			



TYPICAL SECTION AT END BENT

◆ RADIAL
◆◆ RADIAL THROUGH WORK POINT

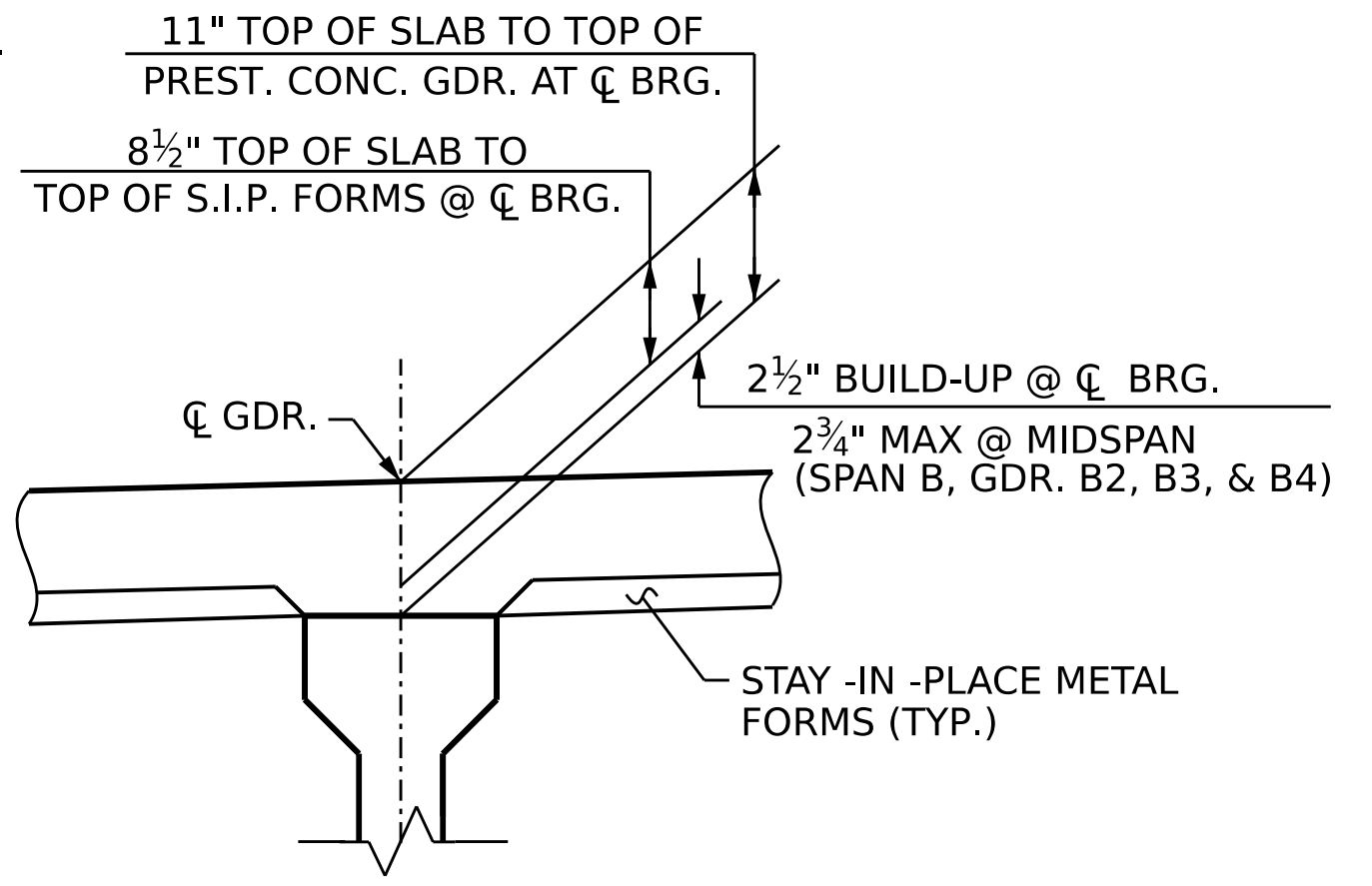


SECTION AT END BENT

▲ #5 G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

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.
- 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 3000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.
- METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO THE SUPPORT ANGLES WITHIN THE LINK SLAB AREAS. SEE "PLAN OF SPANS" SHEETS FOR LOCATION.
- FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDERS" SHEET.



DETAIL "A"

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION

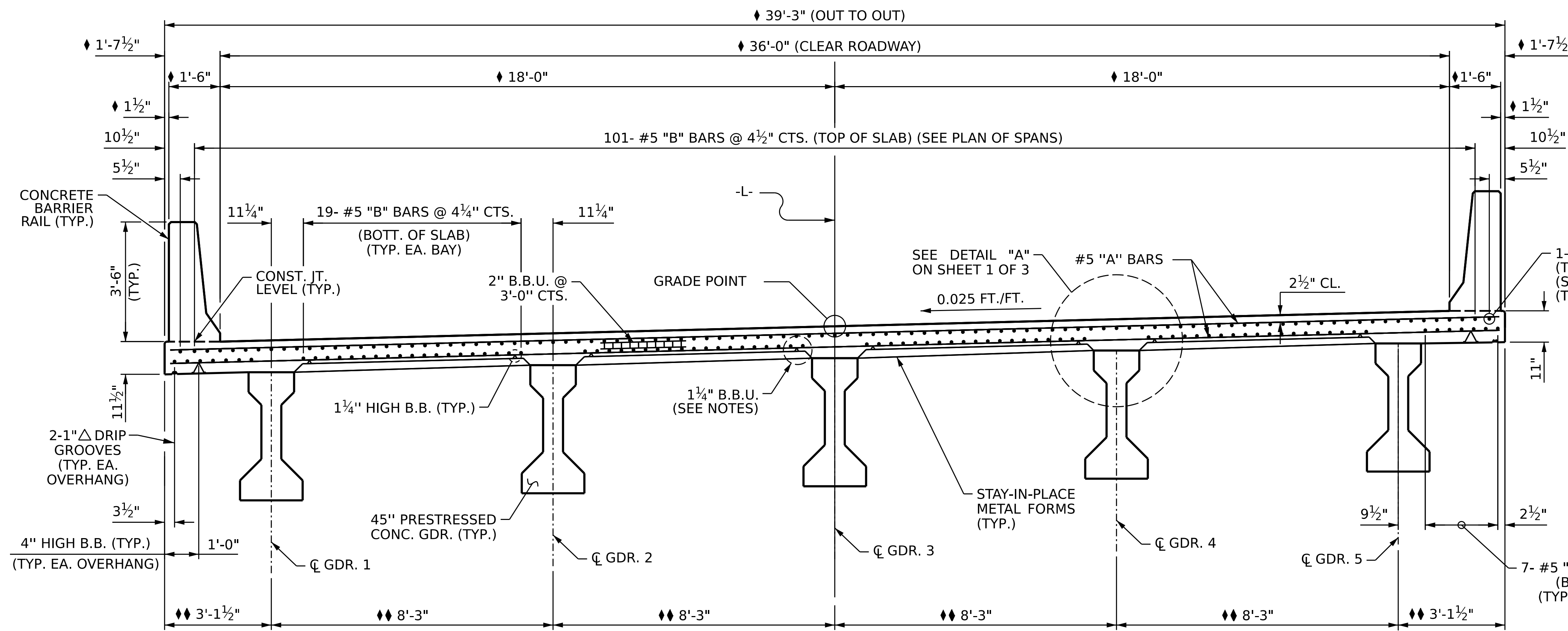
DRAWN BY : A. Y. WU DATE : 9/22
 CHECKED BY : D. A. GLADDEN DATE : 10/22
 DESIGN ENGINEER OF RECORD : P. N. HOLDER DATE : 11/22

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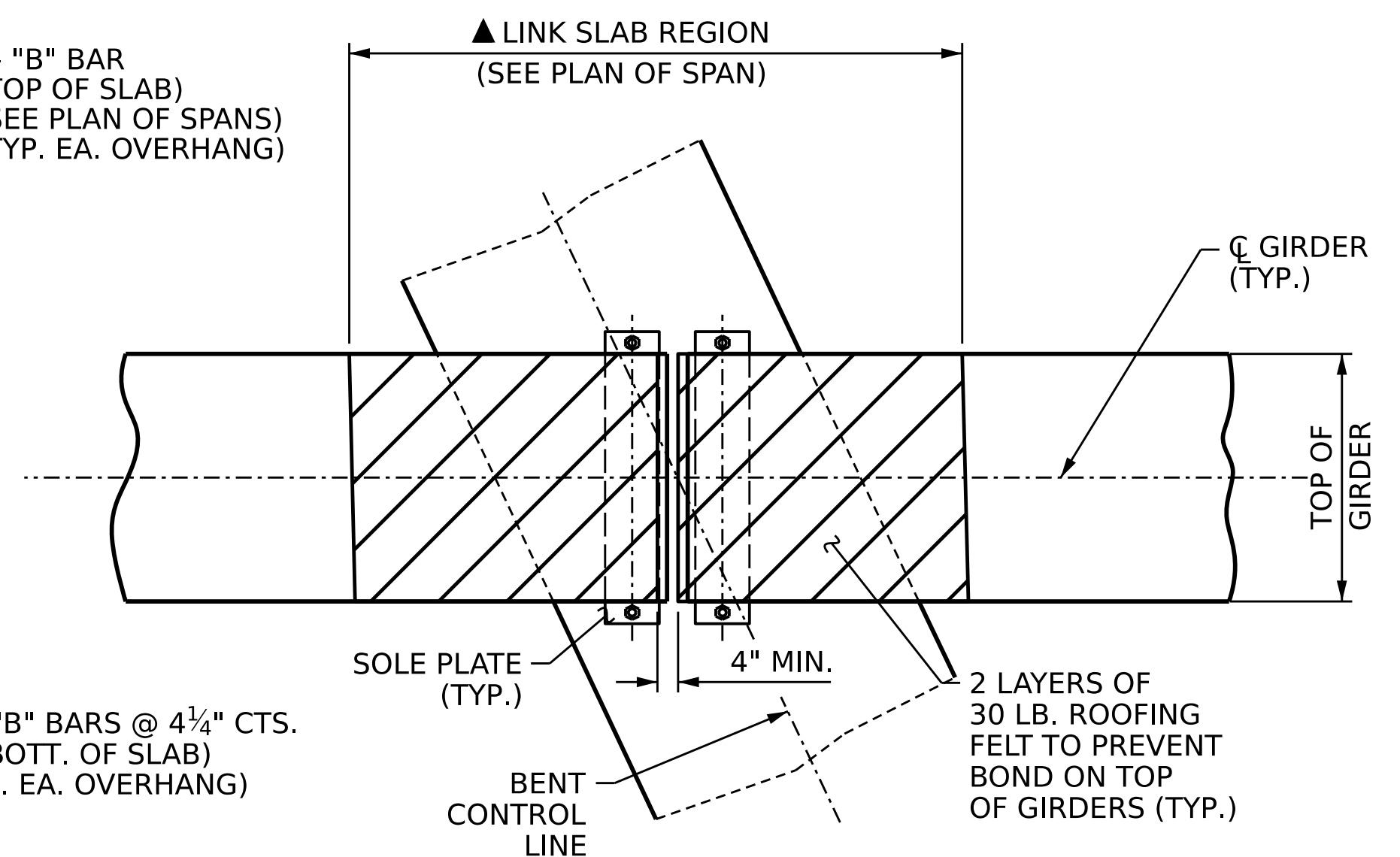
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 SIGNATURES COMPLETED

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

S-7
TOTAL SHEETS
38

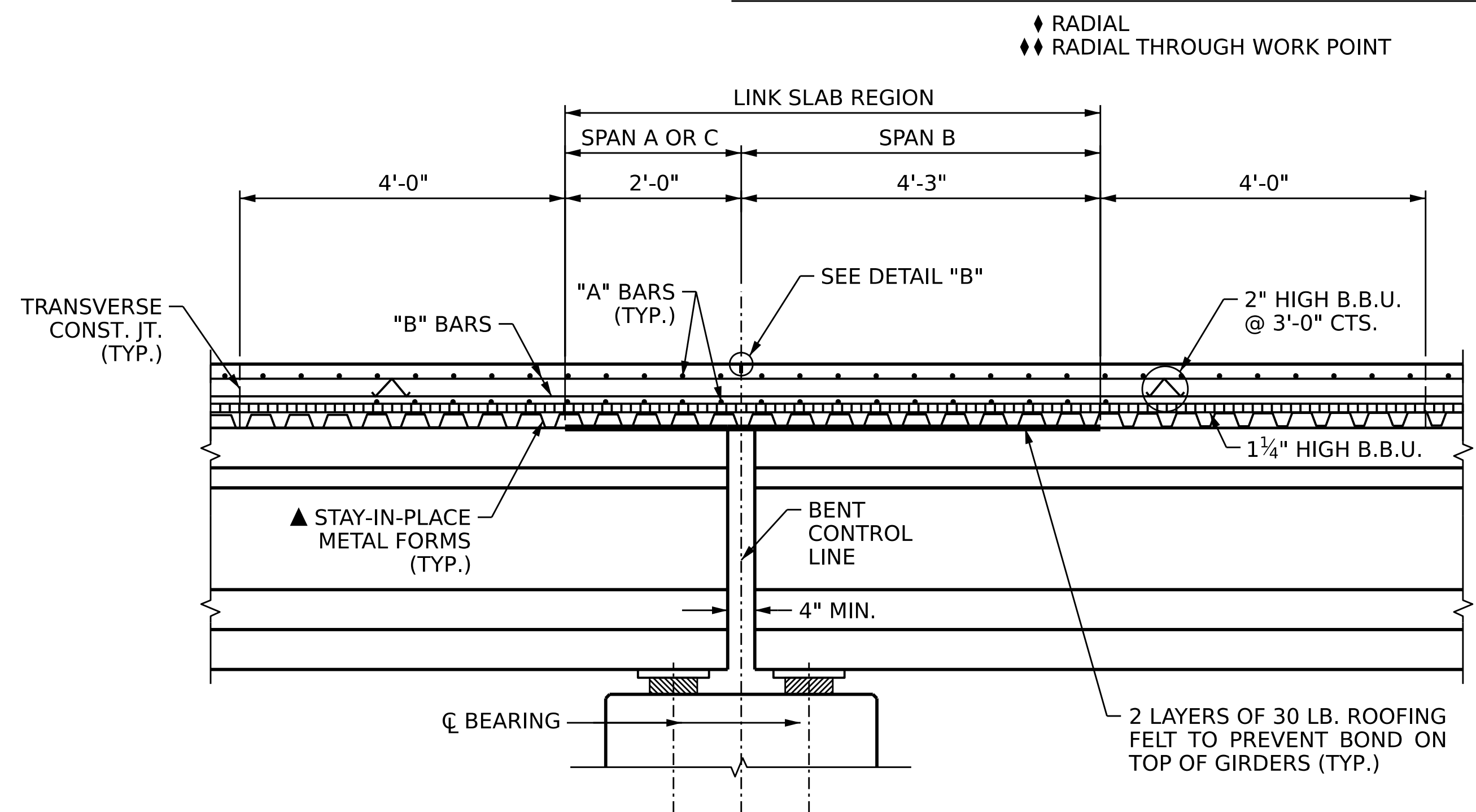


TYPICAL SECTION THROUGH LINK SLAB AT BENT



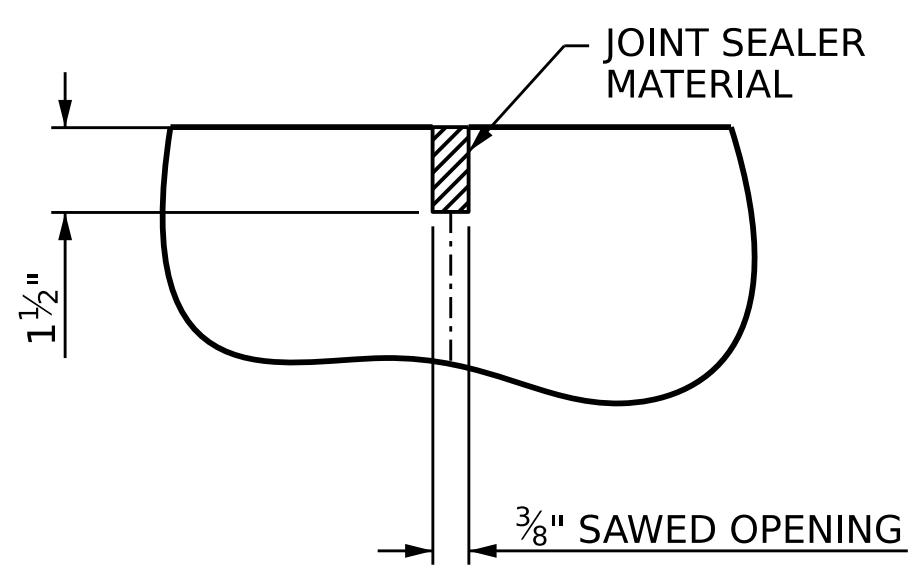
PLAN OF GIRDERS AT LINK SLAB BENT

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



SECTION AT LINK SLAB

▲ METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO THE SUPPORT ANGLES WITHIN THE LINK SLAB AREAS. SEE "PLAN OF SPANS" SHEETS FOR LOCATION.

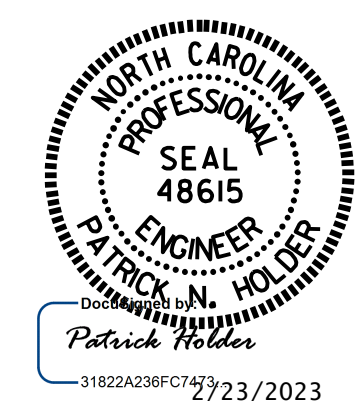


DETAIL "B"

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

DRAWN BY : A. Y. WU DATE : 9/22
 CHECKED BY : D. A. GLADDEN DATE : 10/22
 DESIGN ENGINEER OF RECORD : P. INL. HOLLIDAY DATE : 11/22

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COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

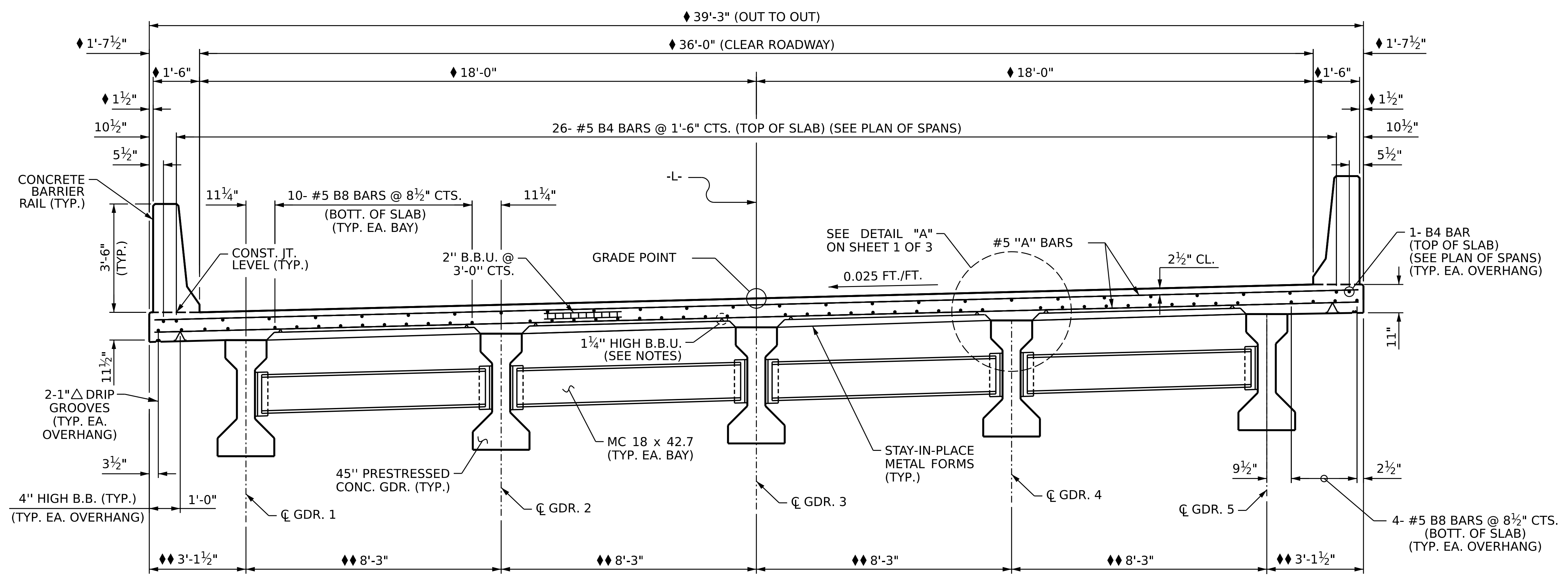
SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

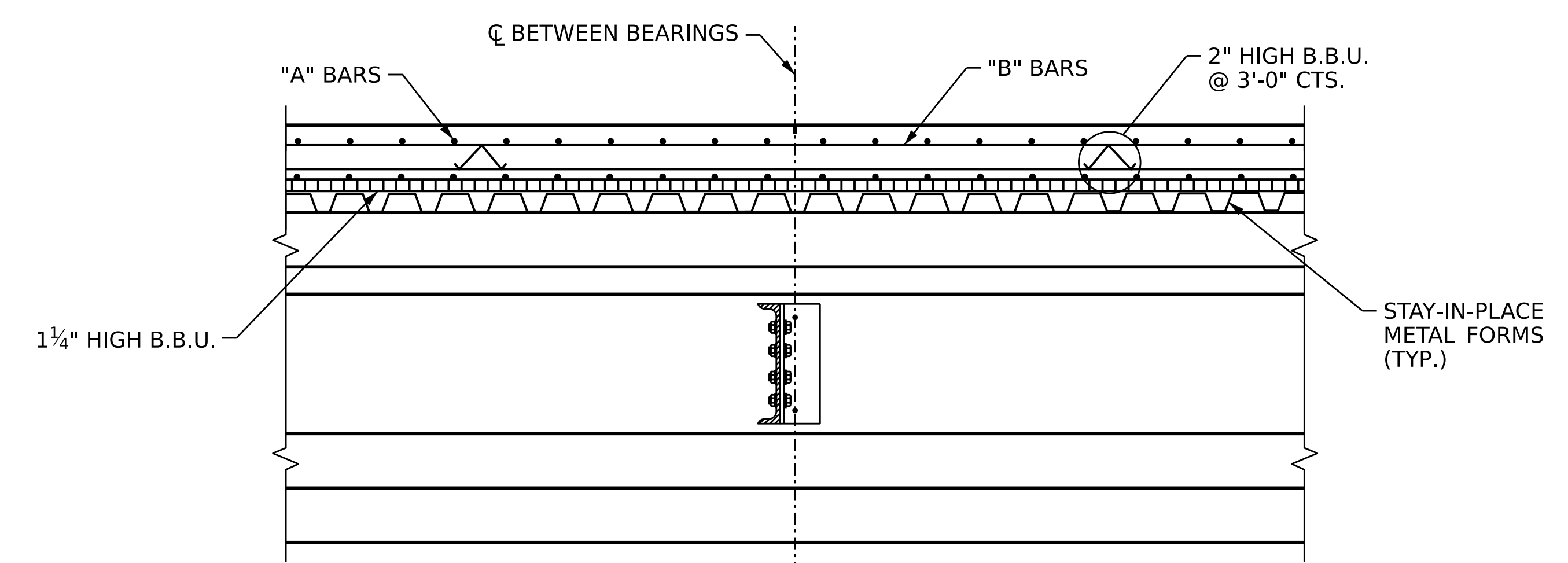
REVISIONS		SHEET NO.	
NO.	DATE	NO.	DATE
1		3	
2		4	

TOTAL SHEETS: 38



TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

◆ RADIAL
◆◆ RADIAL THROUGH WORK POINT



SECTION THRU INTERMEDIATE DIAPHRAGM

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**
 SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 TYPICAL SECTION**

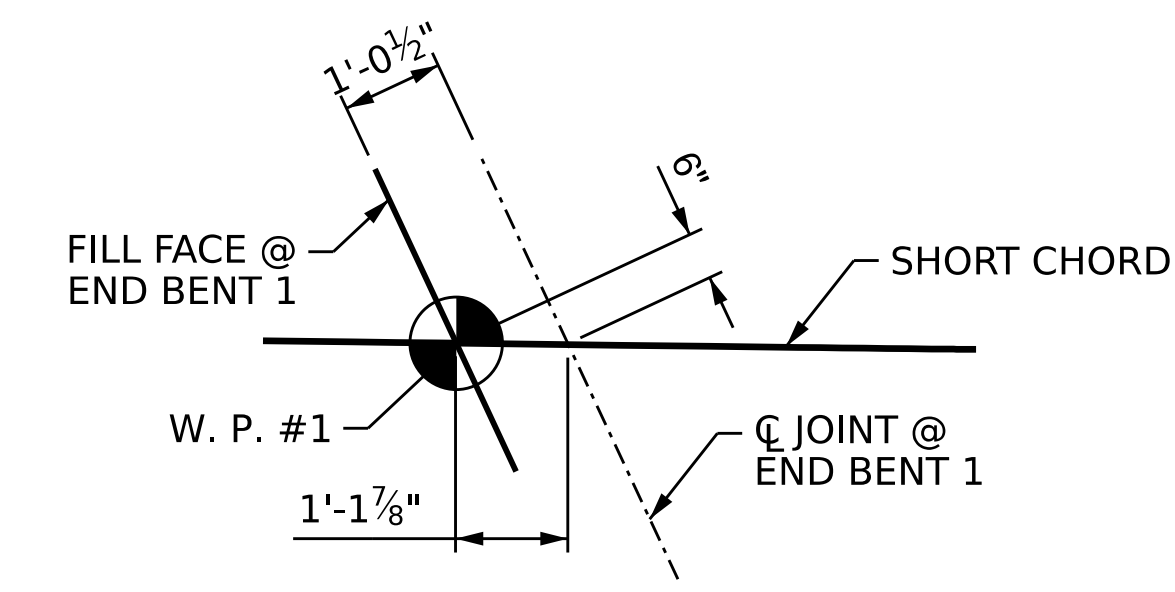
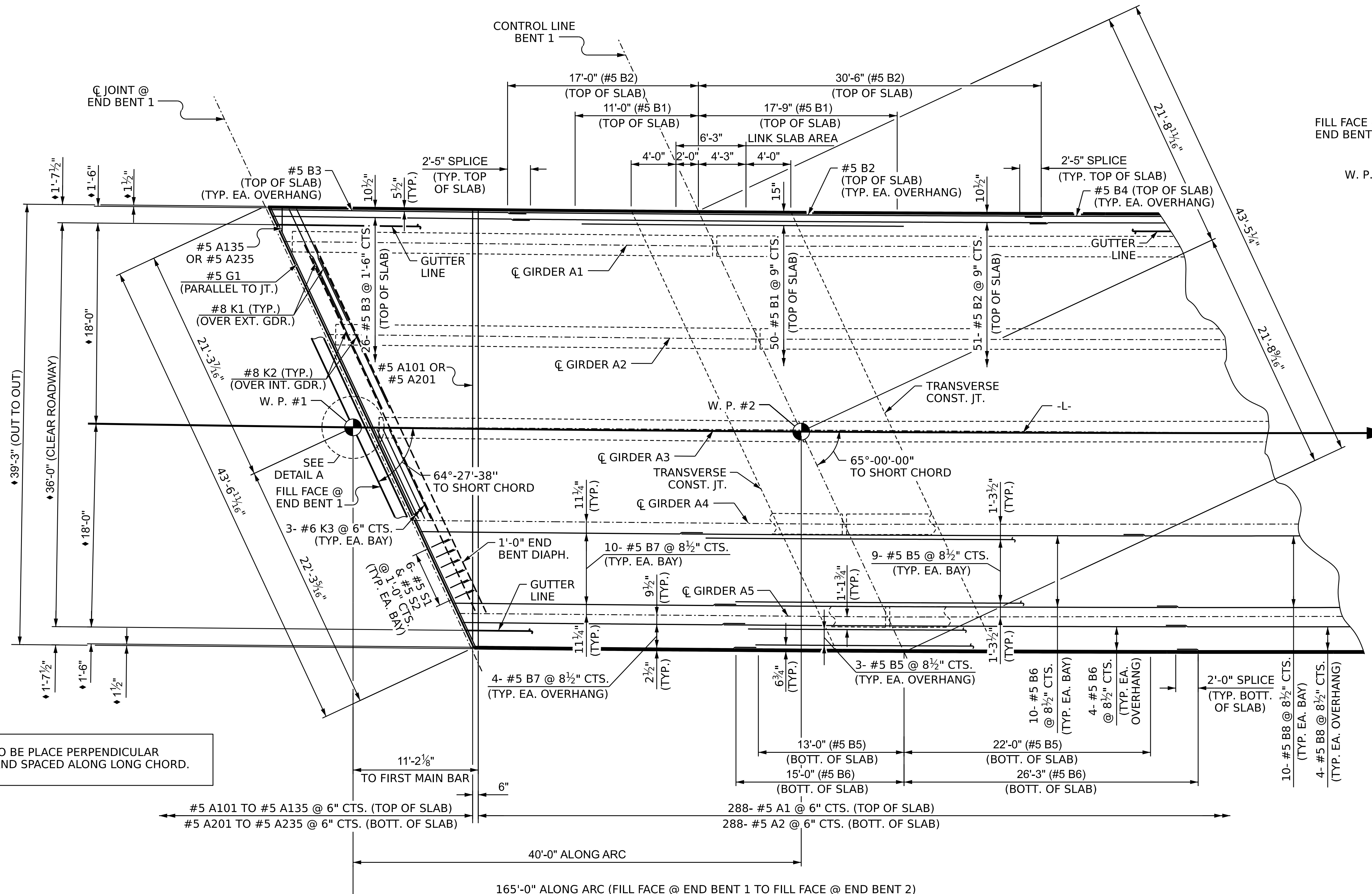


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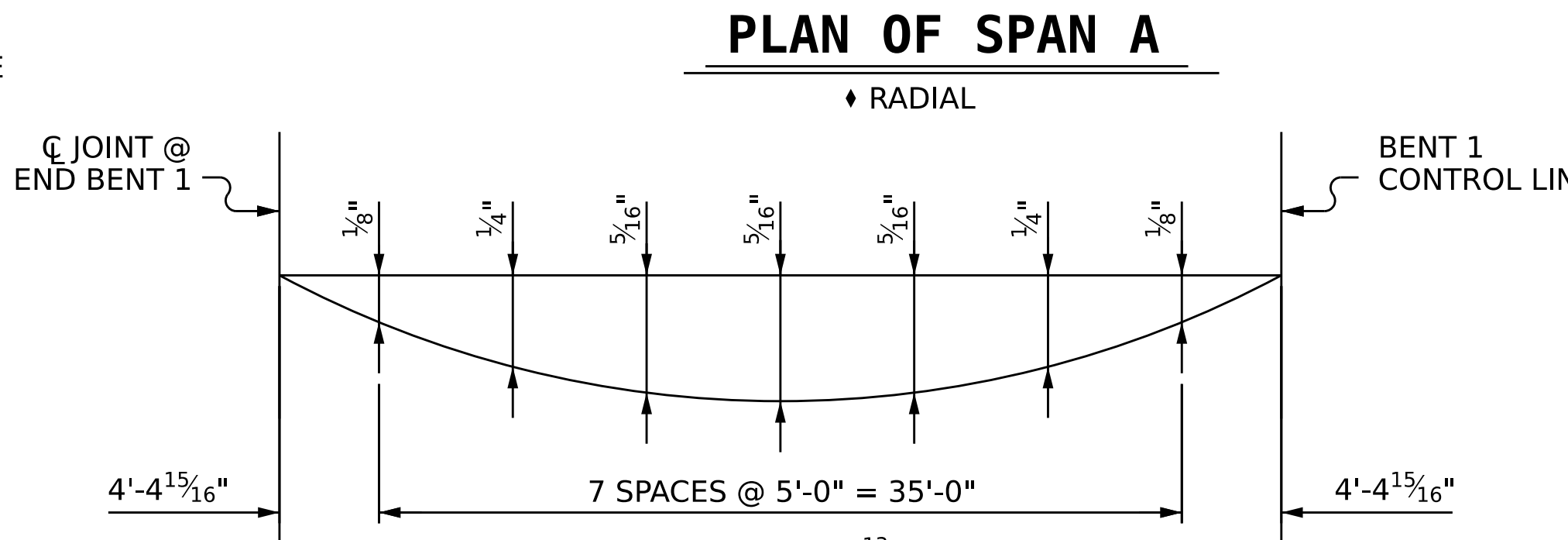
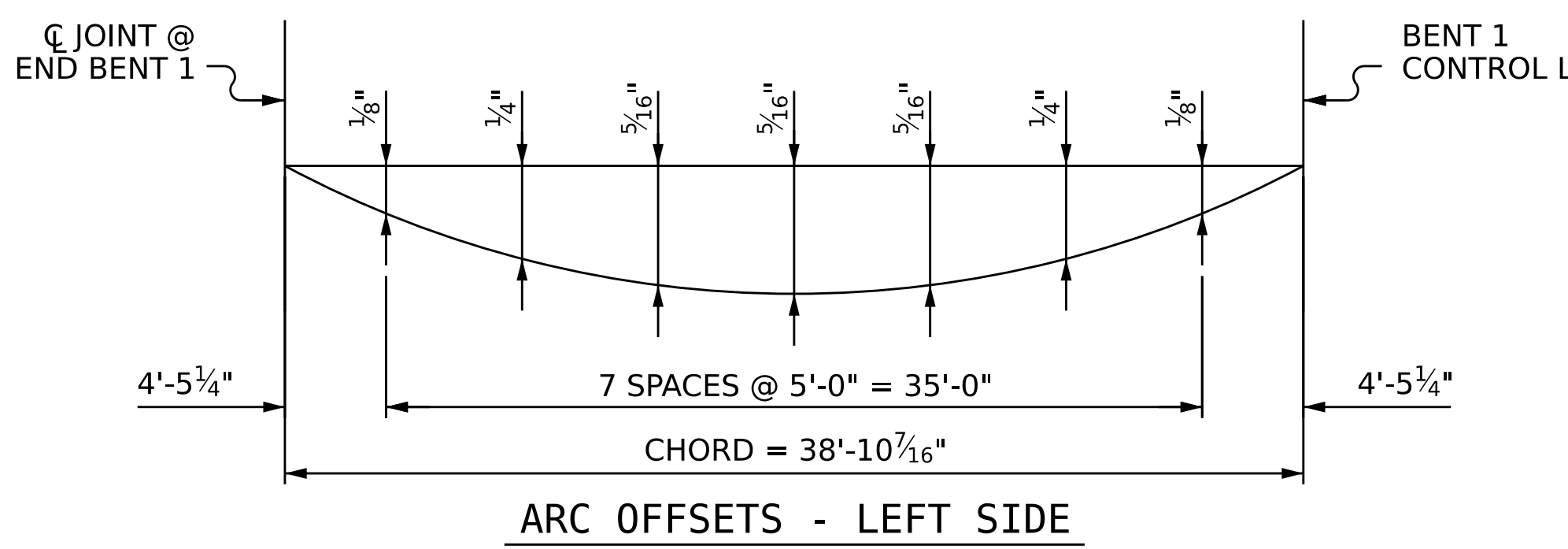
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			38

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 CHECKED BY: D. A. GLADDEN DATE: 10/22
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 11/22



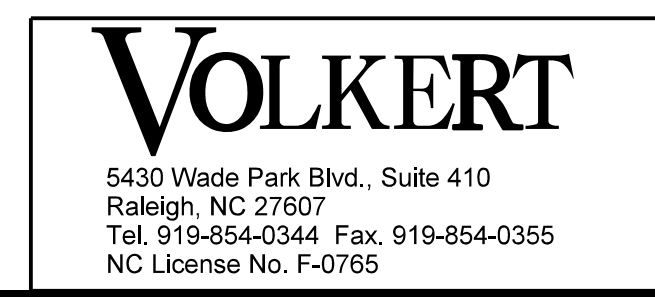
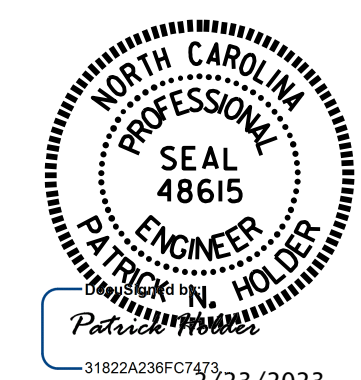
NOTE: "A" BARS TO BE PLACE PERPENDICULAR TO LONG CHORD AND SPACED ALONG LONG CHORD.

PLAN OF SPAN A



PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 1 OF 3

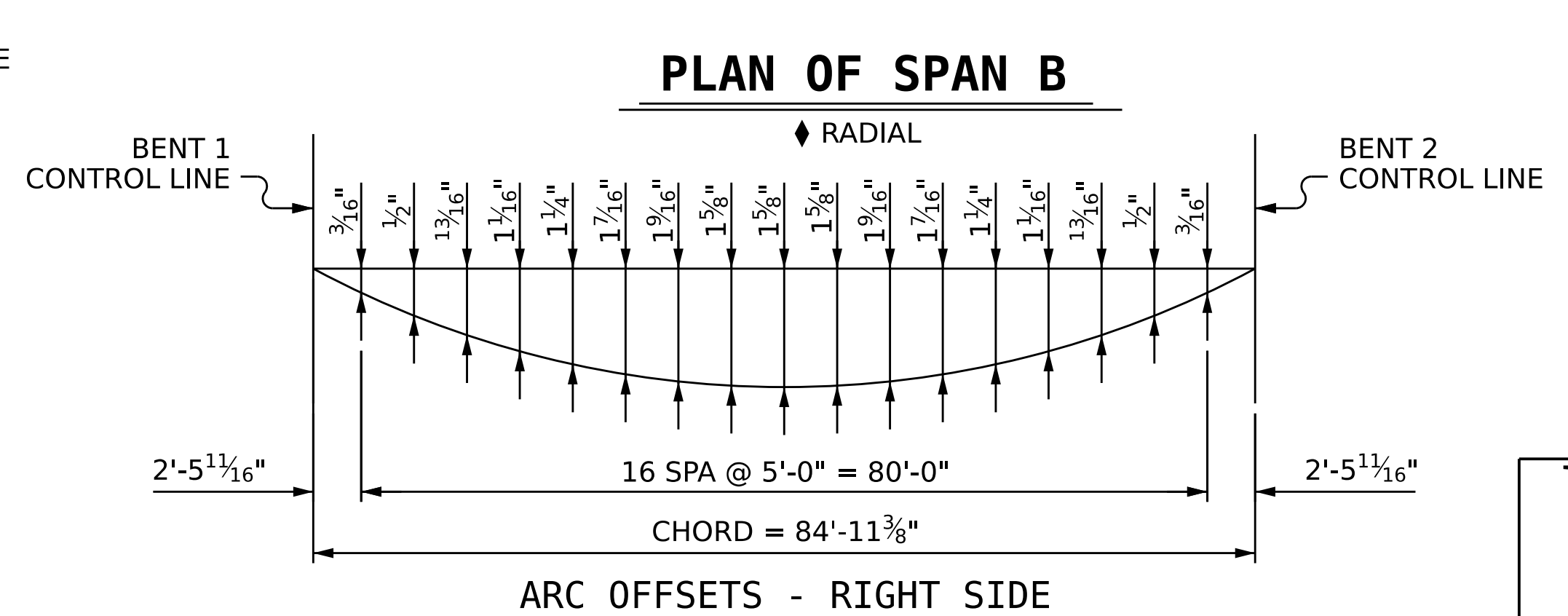
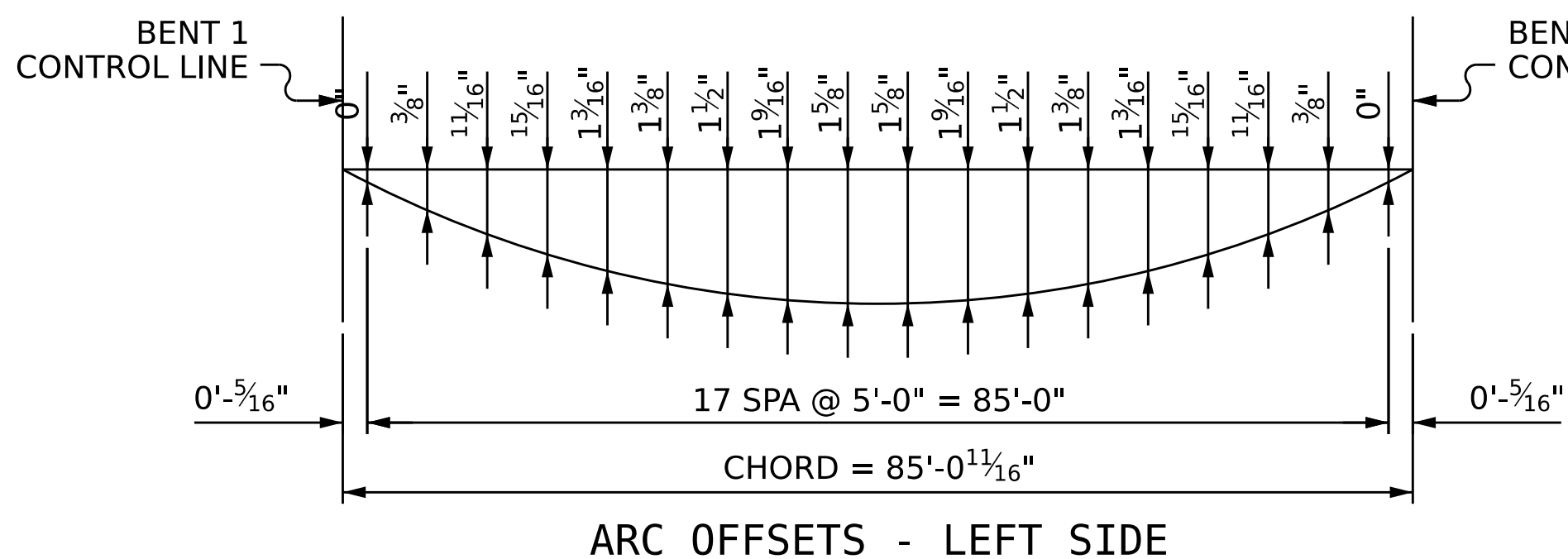
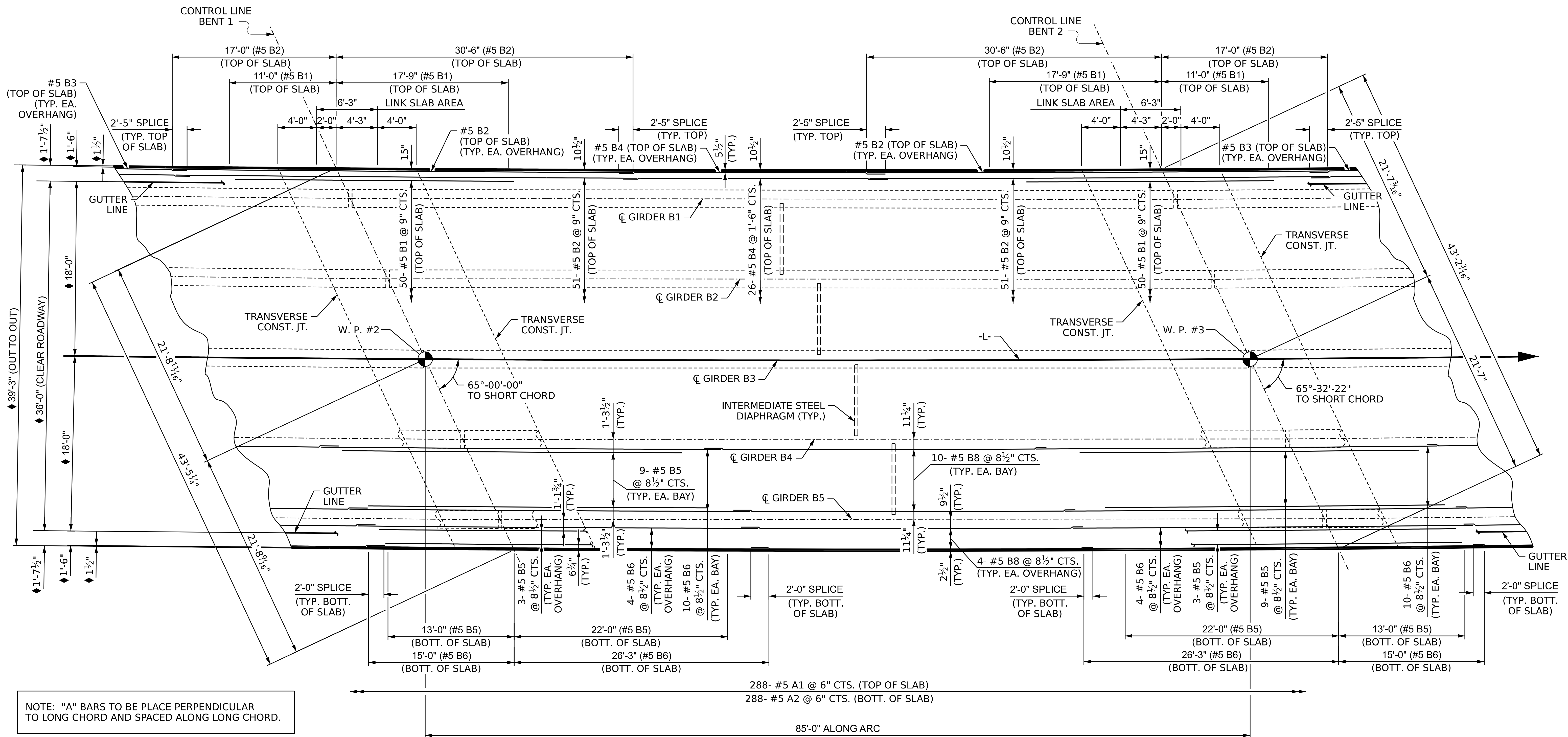


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN A

DRAWN BY: **A. Y. WU** DATE: **9/22**
 CHECKED BY: **D. A. GLADDEN** DATE: **10/22**
 DESIGN ENGINEER OF RECORD: **P. N. HOLDER** DATE: **11/22**

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NO.	BY:	DATE:	NO.
1			S-10
2			TOTAL SHEETS
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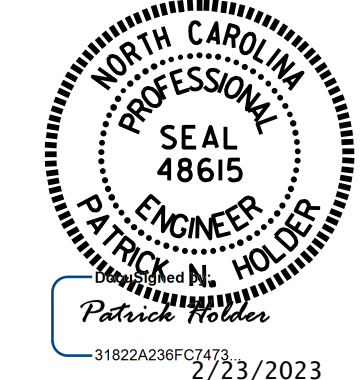
PLAN OF SPAN B

◆ RADIAL

DRAWN BY : A. Y. WU DATE : 9/22
 CHECKED BY : D. A. GLADDEN DATE : 10/22
 DESIGN ENGINEER OF RECORD : P. N. HOLDER DATE : 11/22

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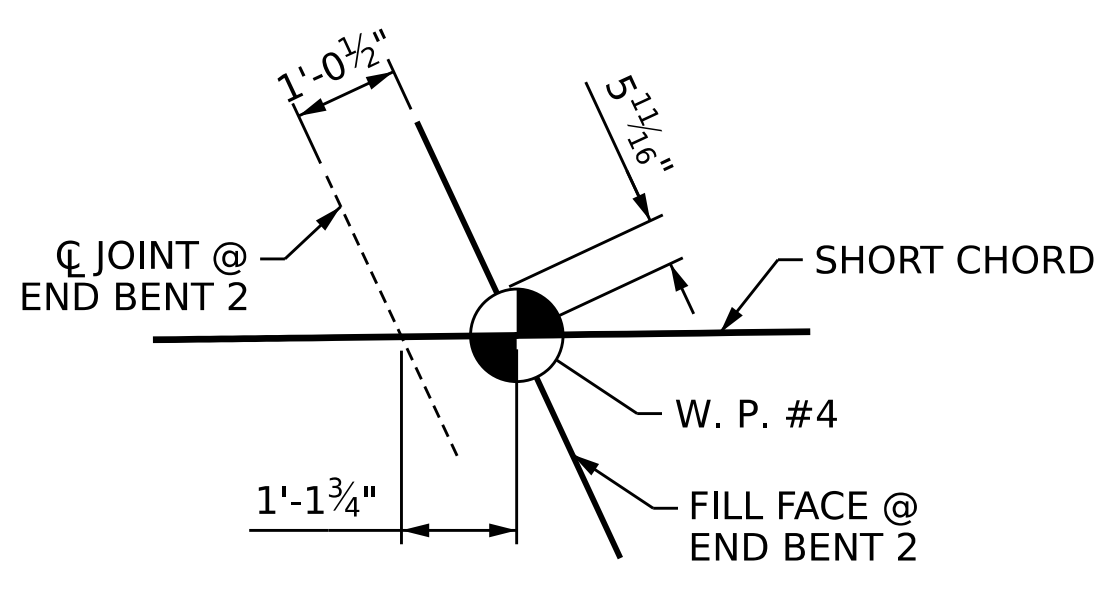
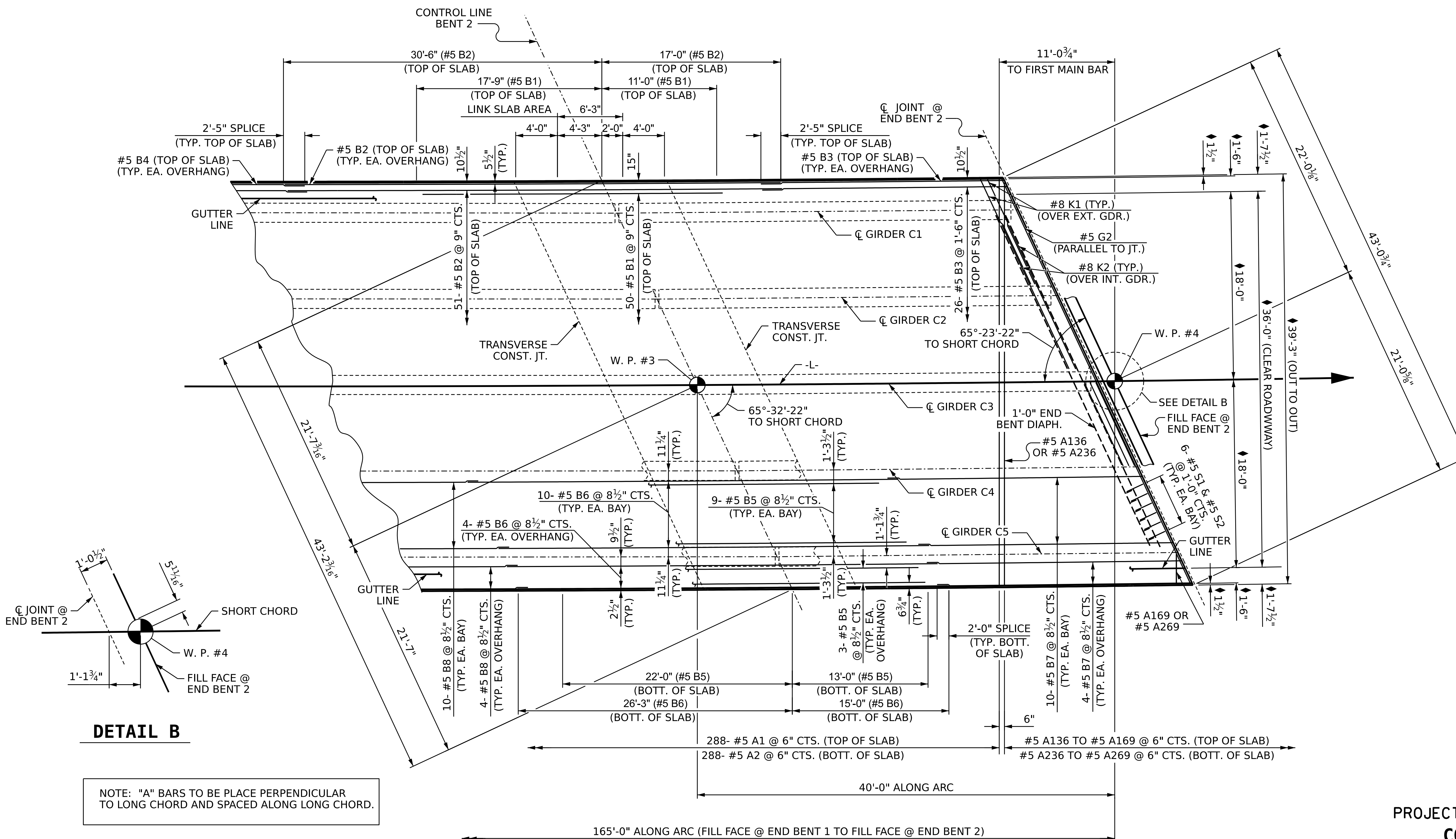
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

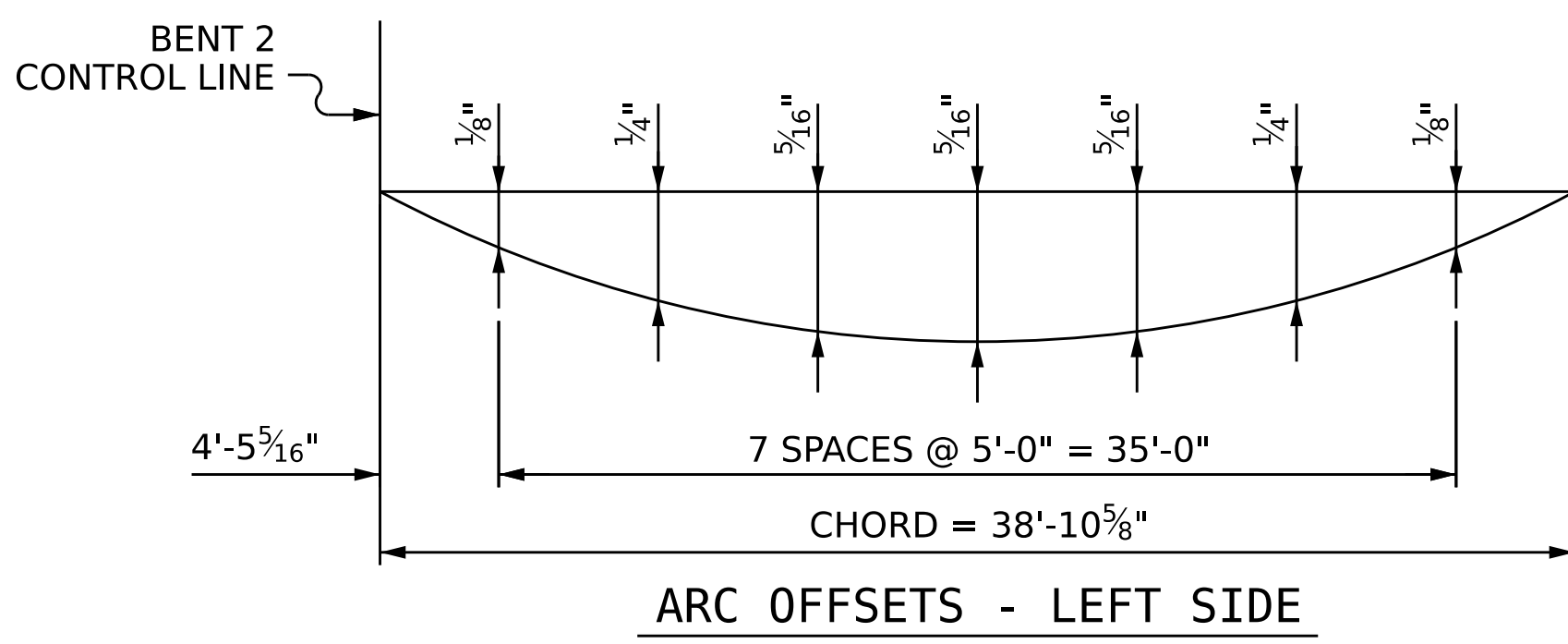
SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUPERSTRUCTURE PLAN OF SPAN B		SHEET NO. S-11
REVISIONS				
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	
TOTAL SHEETS				38

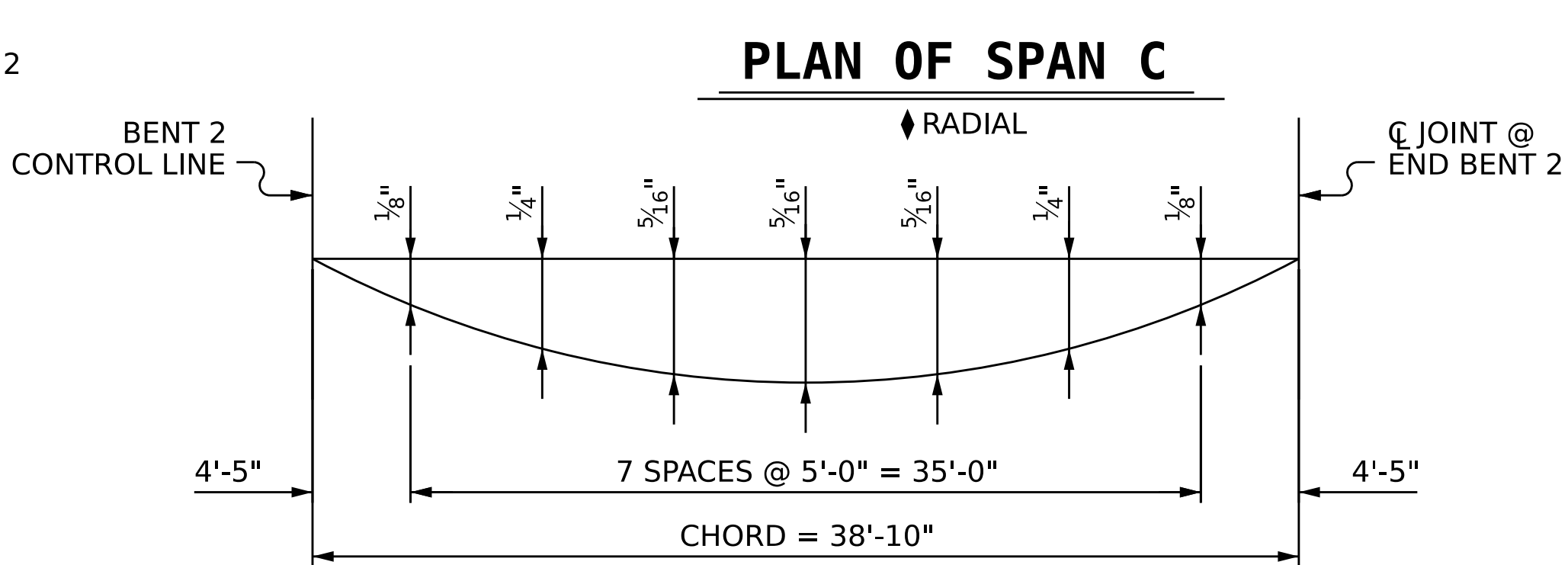


DETAIL B

NOTE: "A" BARS TO BE PLACED PERPENDICULAR TO LONG CHORD AND SPACED ALONG LONG CHORD.



ARC OFFSETS - LEFT SIDE



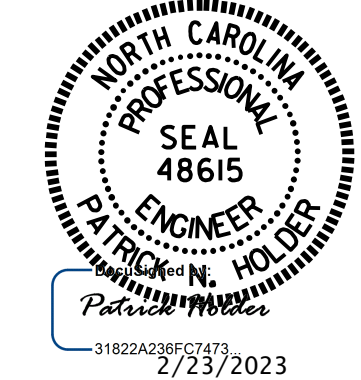
ARC OFFSETS - RIGHT SIDE

DRAWN BY : A. Y. WU DATE : 9/22
 CHECKED BY : D. A. GLADDEN DATE : 10/22
 DESIGN ENGINEER OF RECORD : P. N. HOLDER DATE : 11/22

2/13/2023
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 annle.wu

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PROJECT NO. BR-0073
COLUMBUS COUNTY
 STATION: 18+24.50 -L-

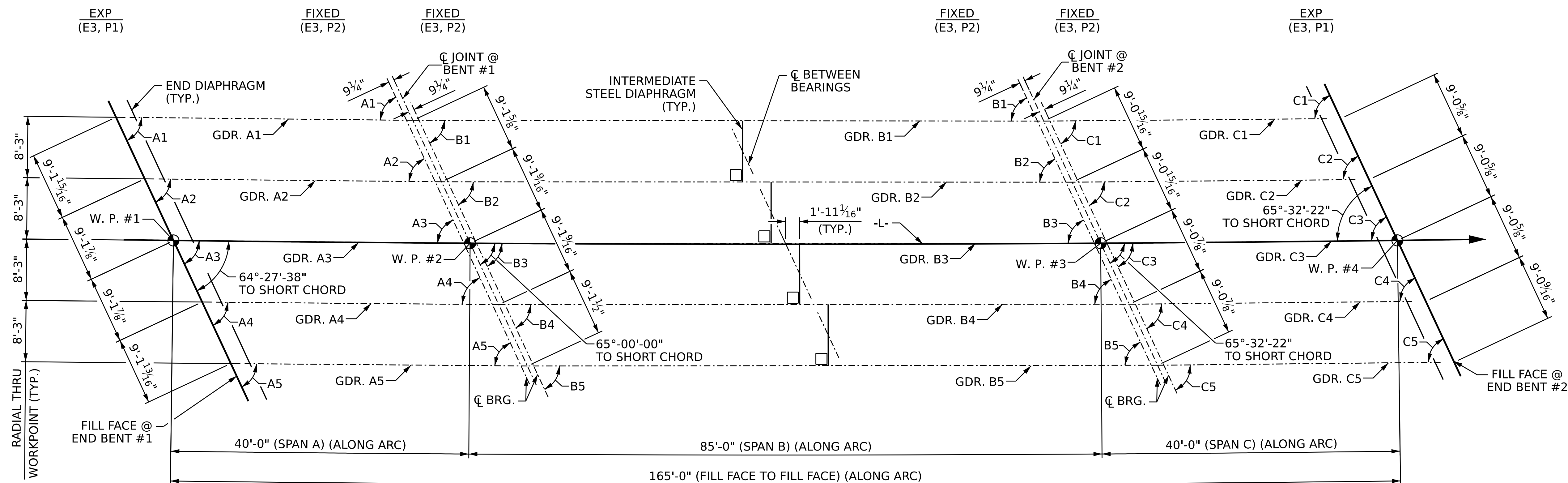
SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 PLAN OF SPAN C**

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

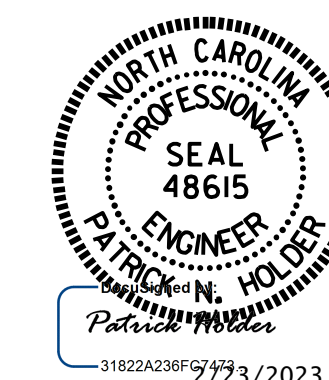
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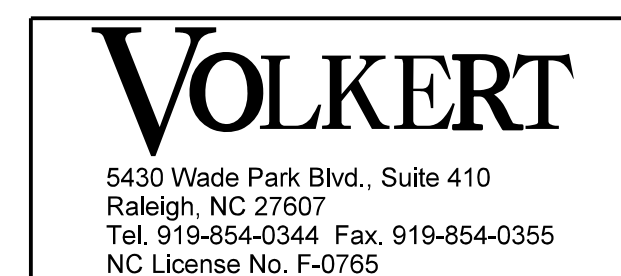
GIRDER LAYOUT

GIRDER SKEW ANGLES						
GIRDER NO.		SPAN A	SPAN B		SPAN C	
1	A1	64°-23'-33"	B1	64°-56'-00"	C1	65°-28'-28"
2	A2	64°-25'-36"	B2	64°-58'-00"	C2	65°-30'-25"
3	A3	64°-27'-38"	B3	65°-00'-00"	C3	65°-32'-21"
4	A4	64°-29'-41"	B4	65°-01'-59"	C4	65°-34'-18"
5	A5	64°-31'-43"	B5	65°-03'-58"	C5	65°-36'-14"

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**



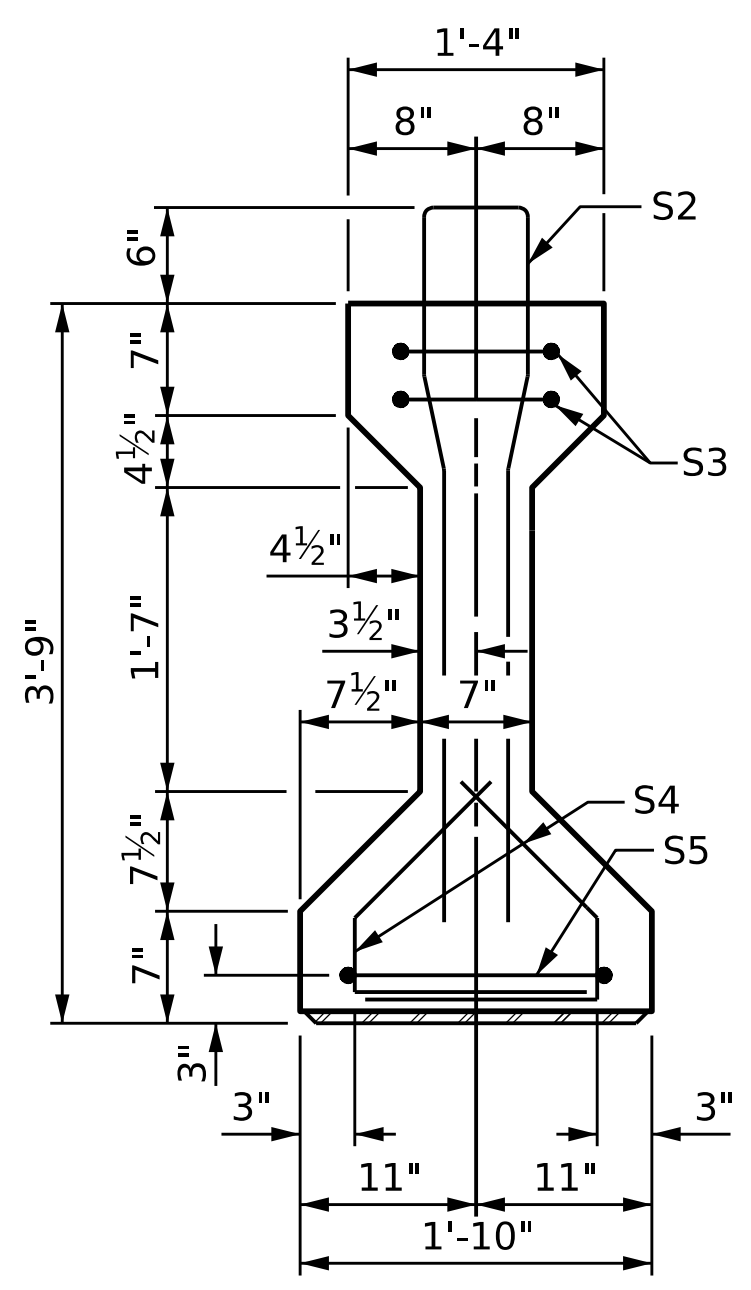
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
GIRDER LAYOUT



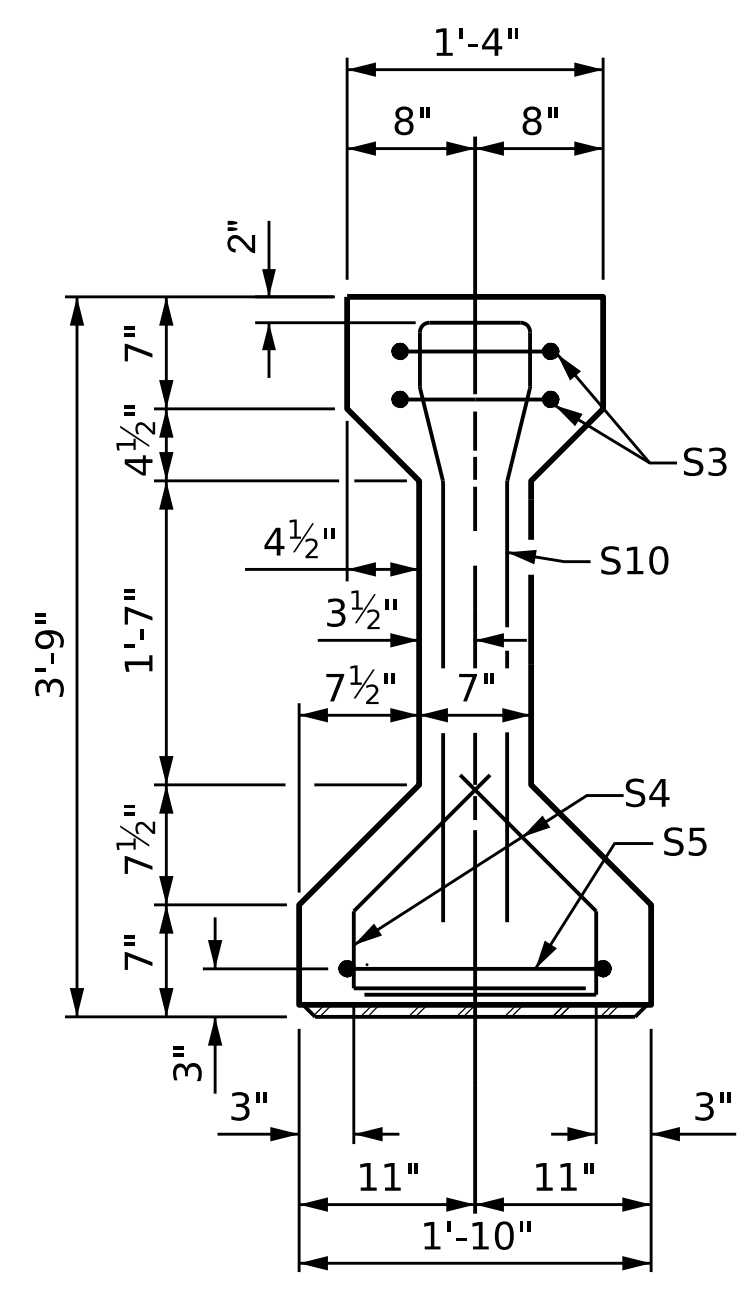
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1			3			TOTAL SHEETS
2			4			38

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 CHECKED BY : P. N. HOLDER DATE : 11/22
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 11/22

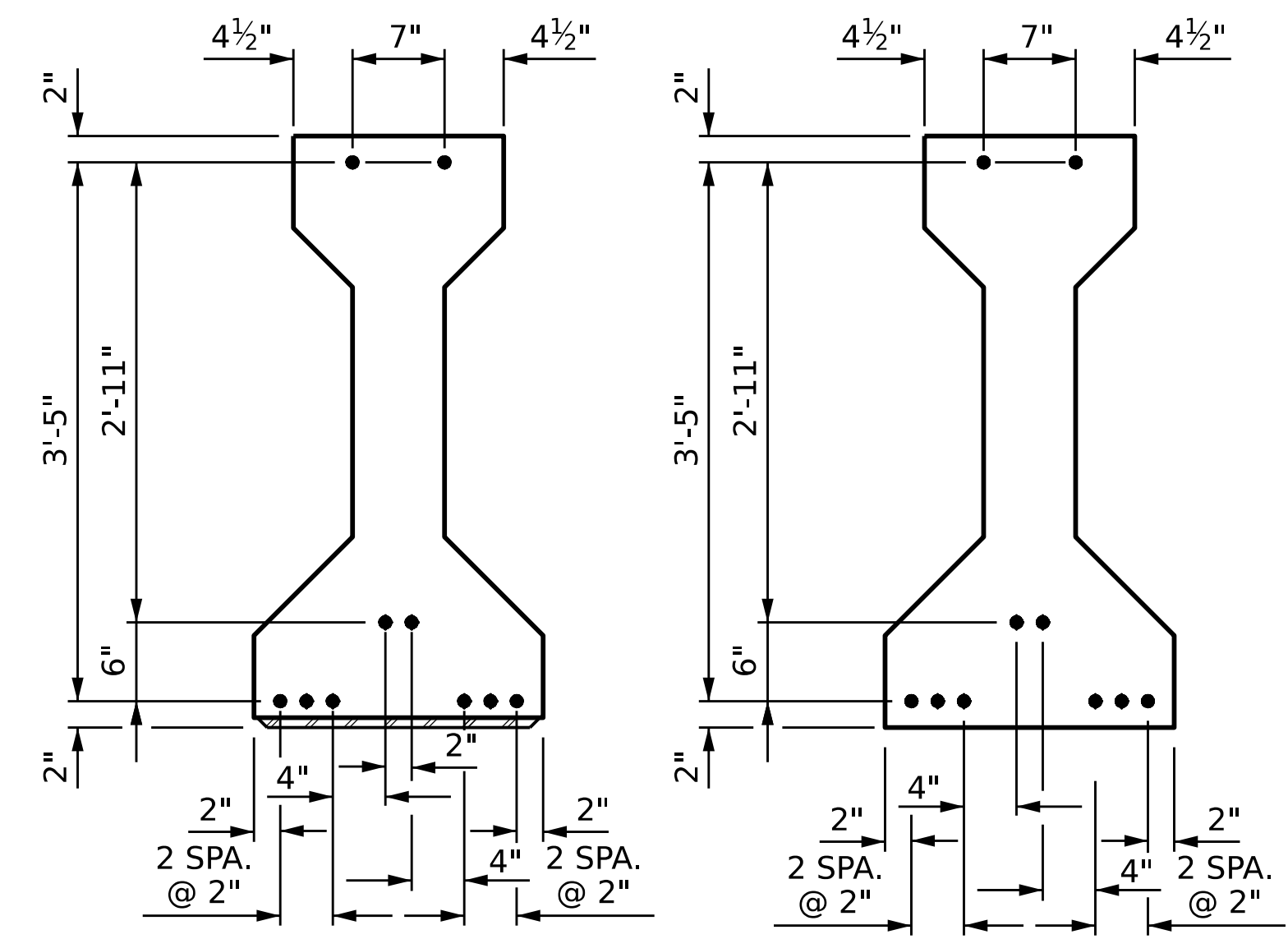


SECTION A-A

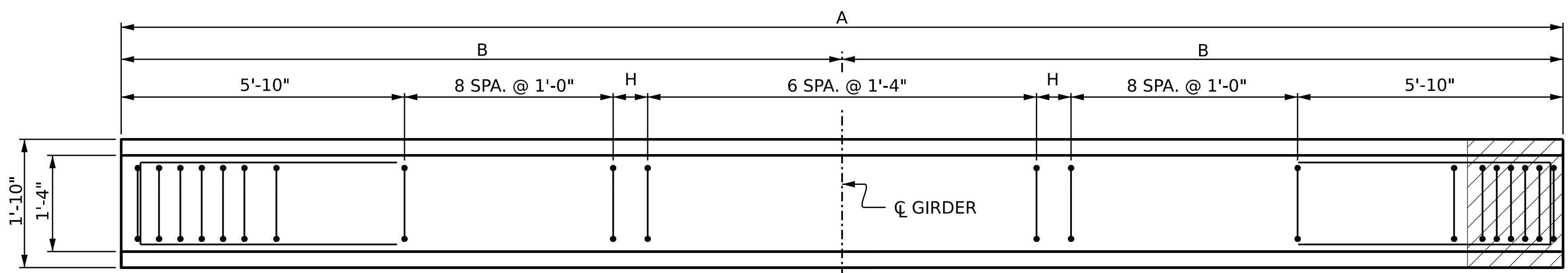


SECTION B-B

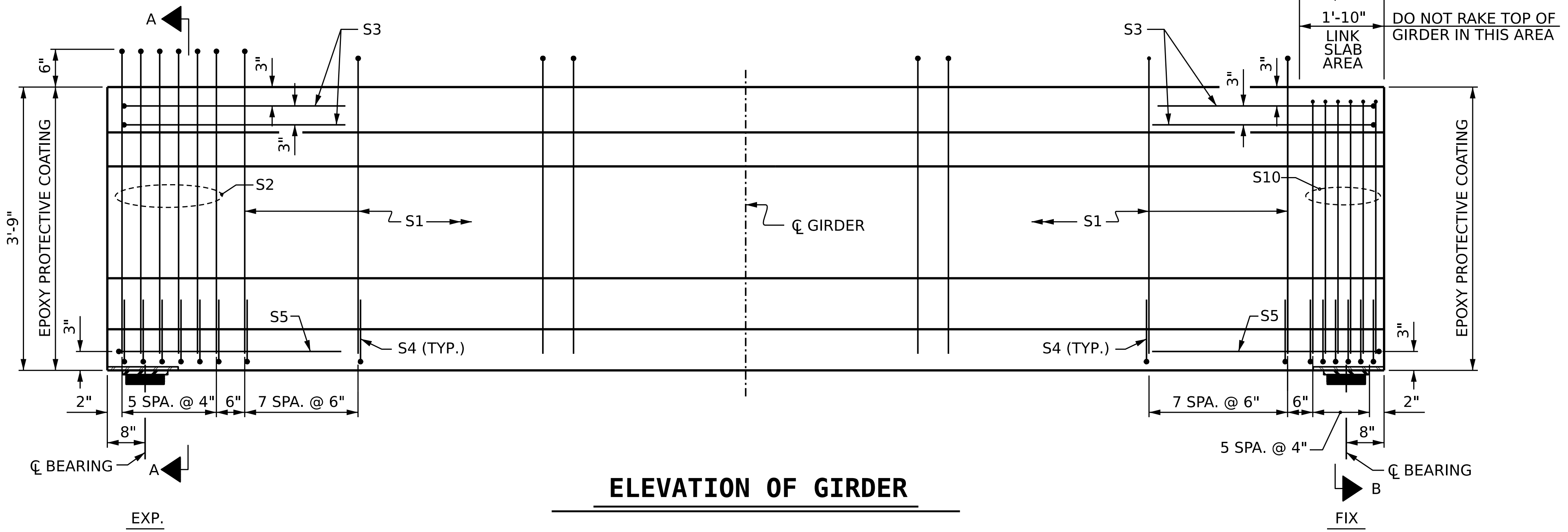
DEBONDING LEGEND
 • FULLY BONDED STRANDS



0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

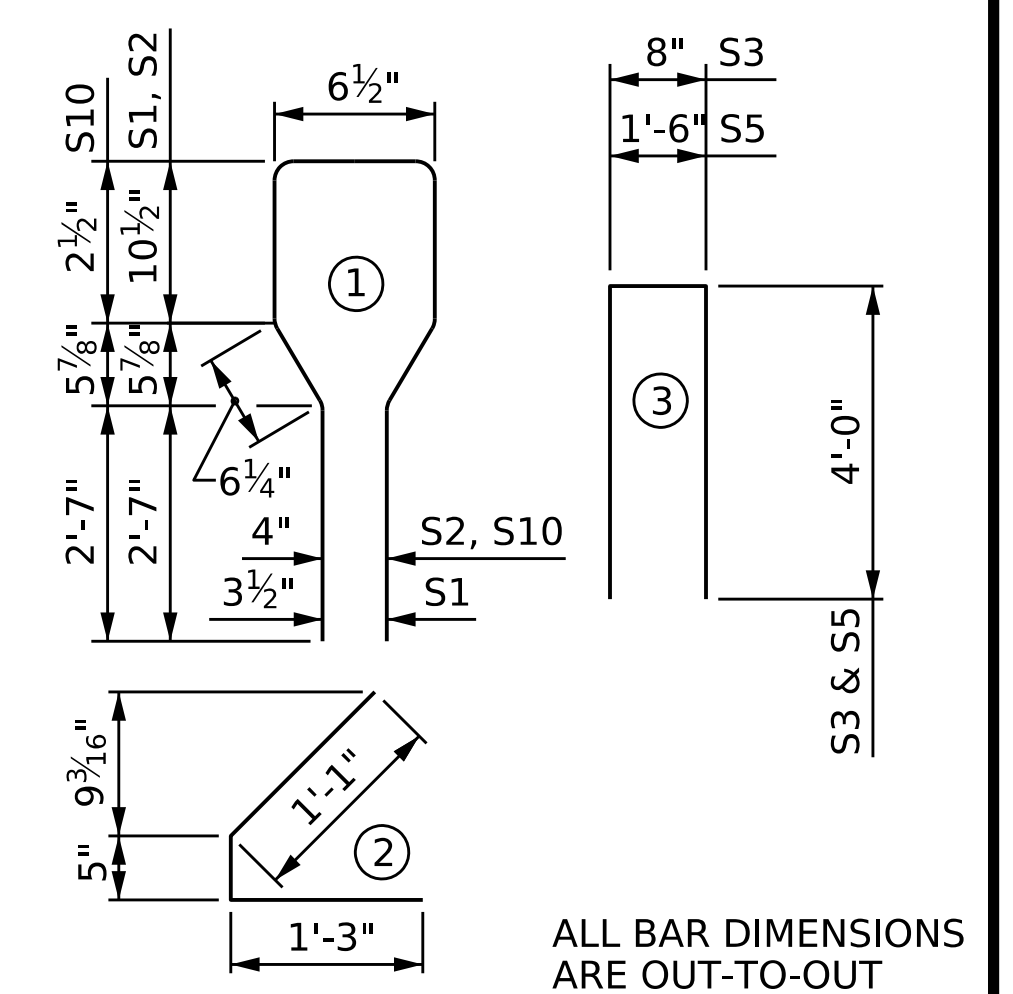


ELEVATION OF GIRDER

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

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	39	#4	1	8'-6"	221
S2	6	#6	1	8'-6"	77
S3	4	#4	3	8'-8"	23
S4	56	#4	2	2'-9"	103
S5	2	#4	3	9'-6"	13
S10	6	#6	1	7'-2"	65

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

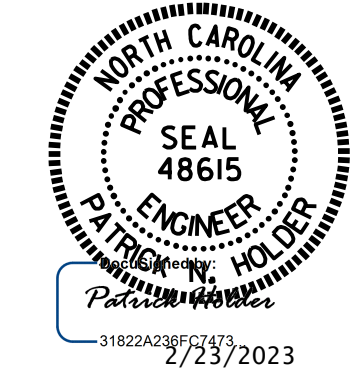
QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	5000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXT. GIRDER	502	5.5	10
INT. GIRDER	502	5.5	10

GIRDERS REQUIRED

GIRDER	A	B	H
A1	37'-11"	18'-11 1/2"	1'-1 1/2"
A2	37'-10 7/8"	18'-11 7/16"	1'-1 7/16"
A3	37'-10 3/4"	18'-11 3/8"	1'-1 3/8"
A4	37'-10 5/8"	18'-11 1/16"	1'-1 5/16"
A5	37'-10 1/2"	18'-11 1/4"	1'-1 1/4"

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**
 SHEET 1 OF 3



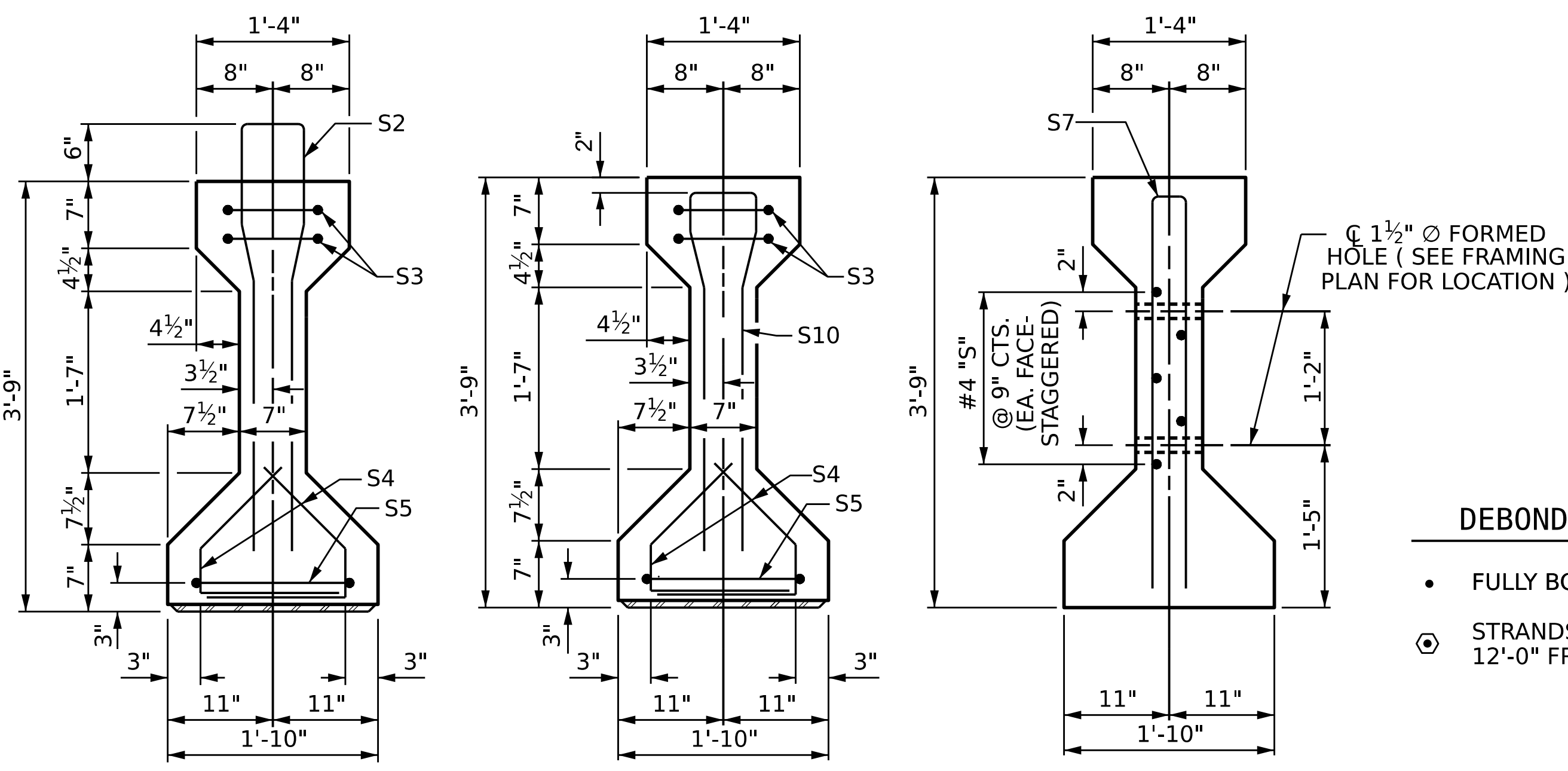
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER - LINK SLAB (SPAN A)

ASSEMBLED BY : PNH	DATE : 10-22
CHECKED BY : SN	DATE : 10-22
DRAWN BY : BNB 09/21	
CHECKED BY : AAI 09/21	

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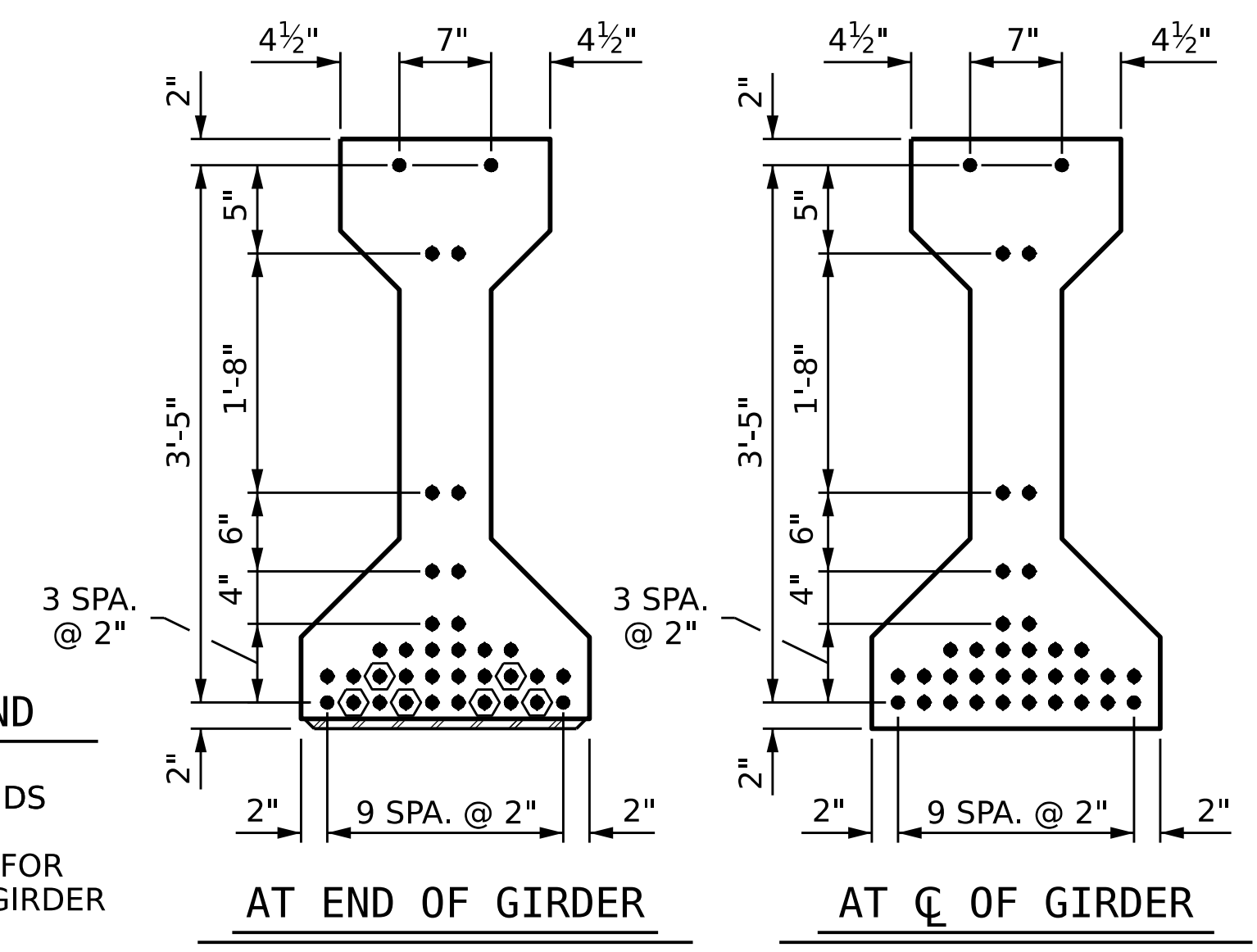
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NO.	BY:	DATE:	DATE:	
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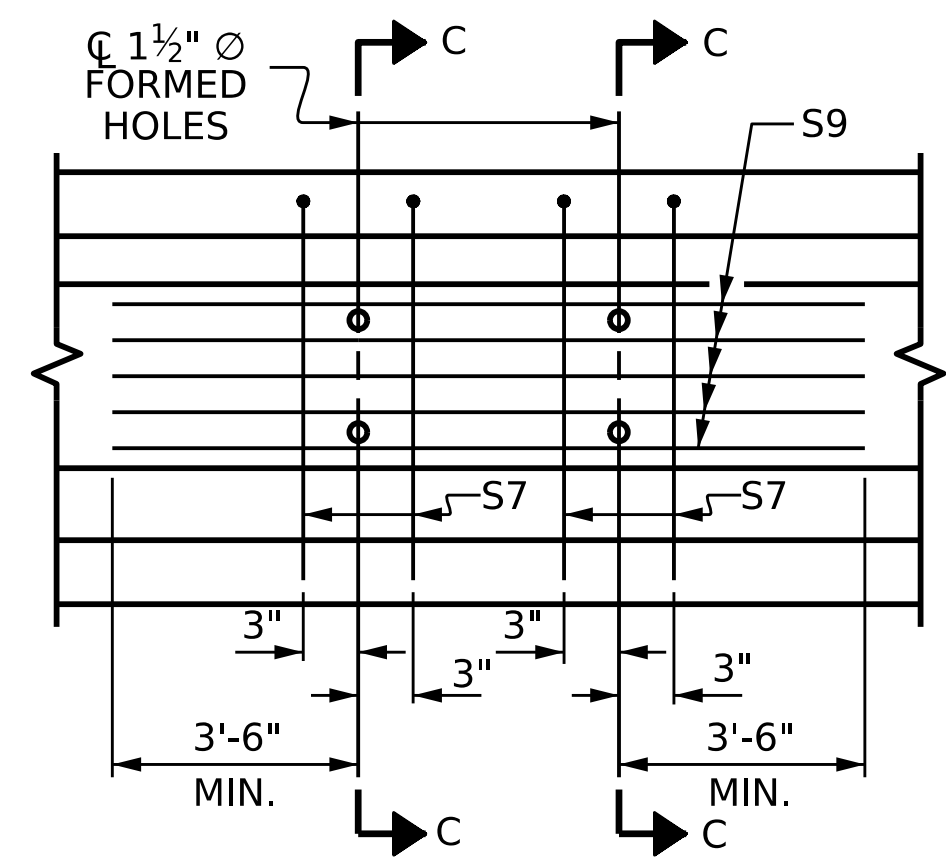
SECTION A-A **SECTION B-B** **SECTION C-C**
(S1 BARS NOT SHOWN)

DEBONDING LEGEND

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

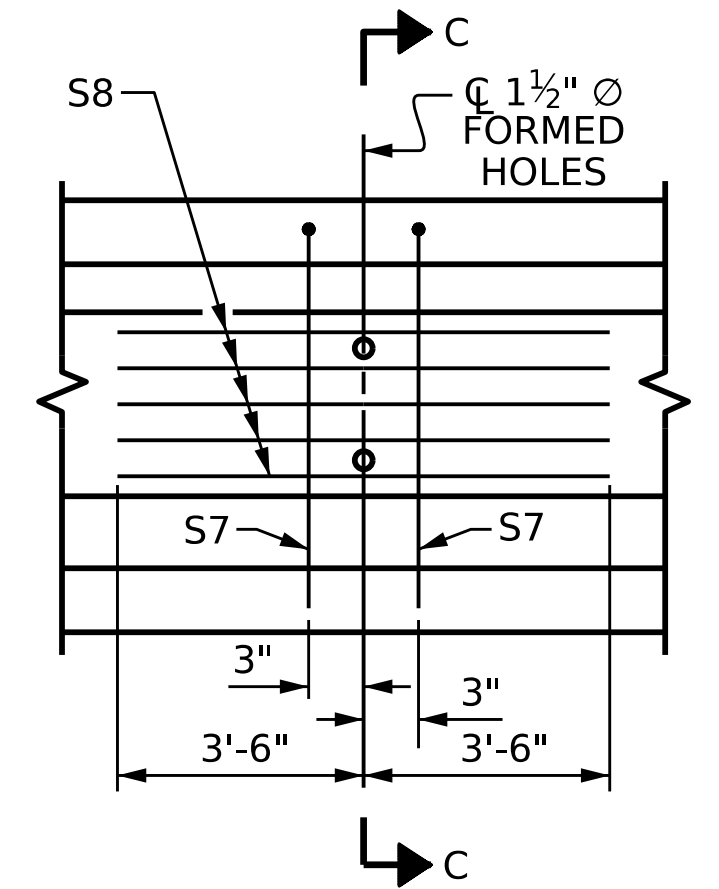


0.6" Ø LOW RELAXATION STRAND LAYOUT



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B2-B4 (FOR INTERIOR GDRS. WITH SKEW < 70° OR SKEW > 110°)



PARTIAL ELEVATION

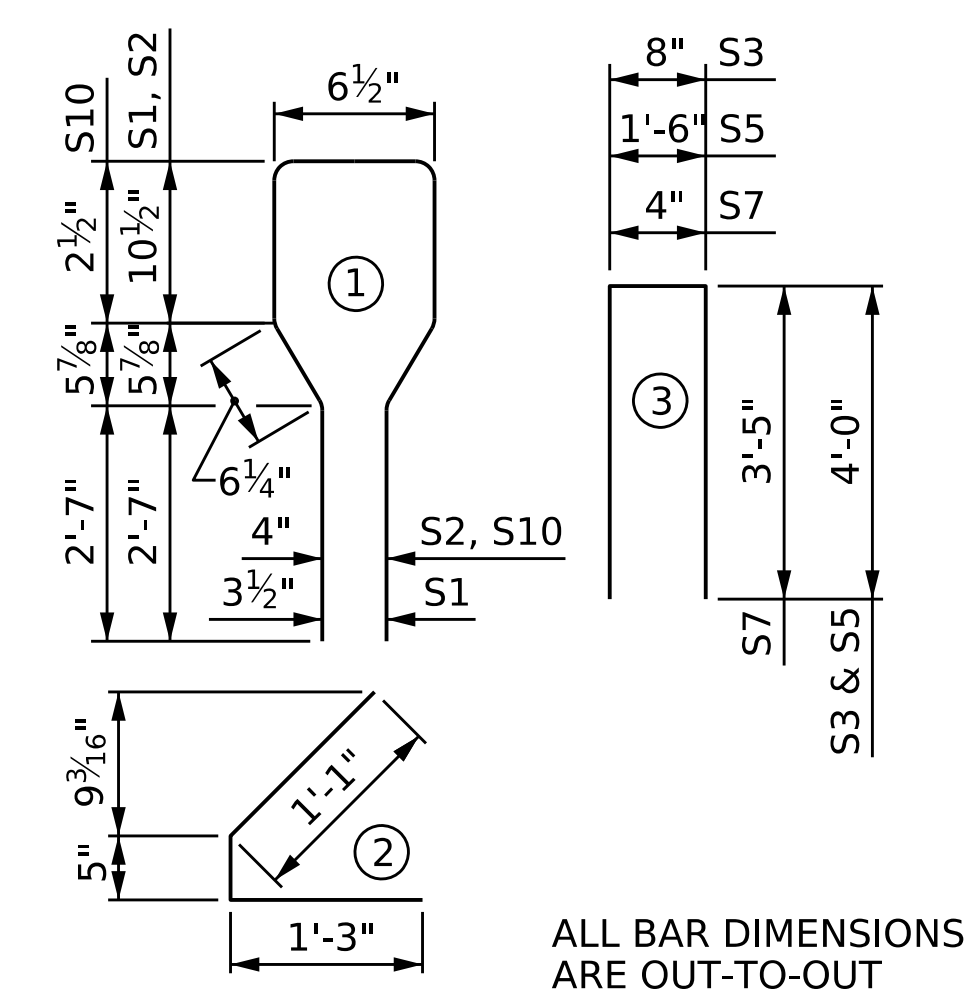
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B1 & B5 (FOR ALL EXTERIOR GIRDERS AND INTERIOR GIRDERS WITH 70° ≤ SKEW ≤ 110°)

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

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	65	#4	1	8'-6"	369
S3	4	#4	3	8'-8"	23
S4	56	#4	2	2'-9"	103
S5	2	#4	3	9'-6"	13
S7	2	#5	3	7'-2"	15
S7	4	#5	3	7'-2"	30
S8	5	#4	STR	7'-0"	23
S9	5	#4	STR	11'-1"	37
S10	20	#6	1	7'-2"	215

BAR TYPES



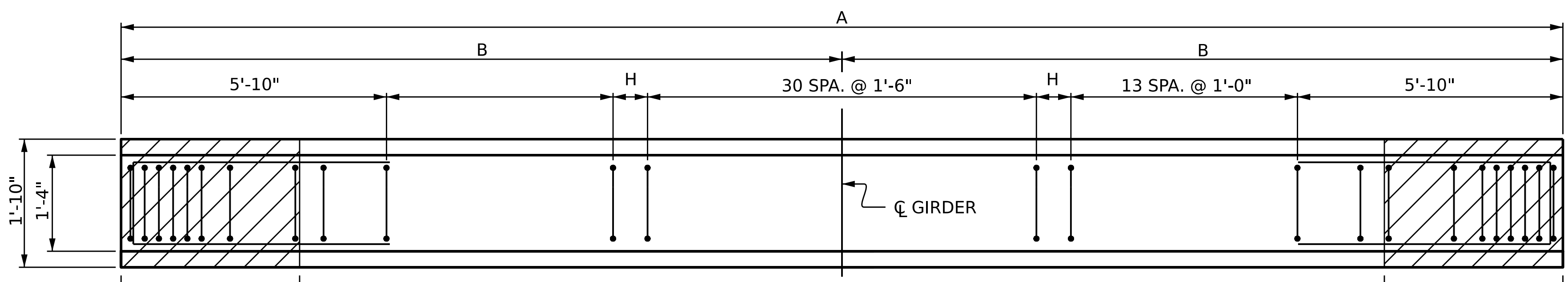
ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

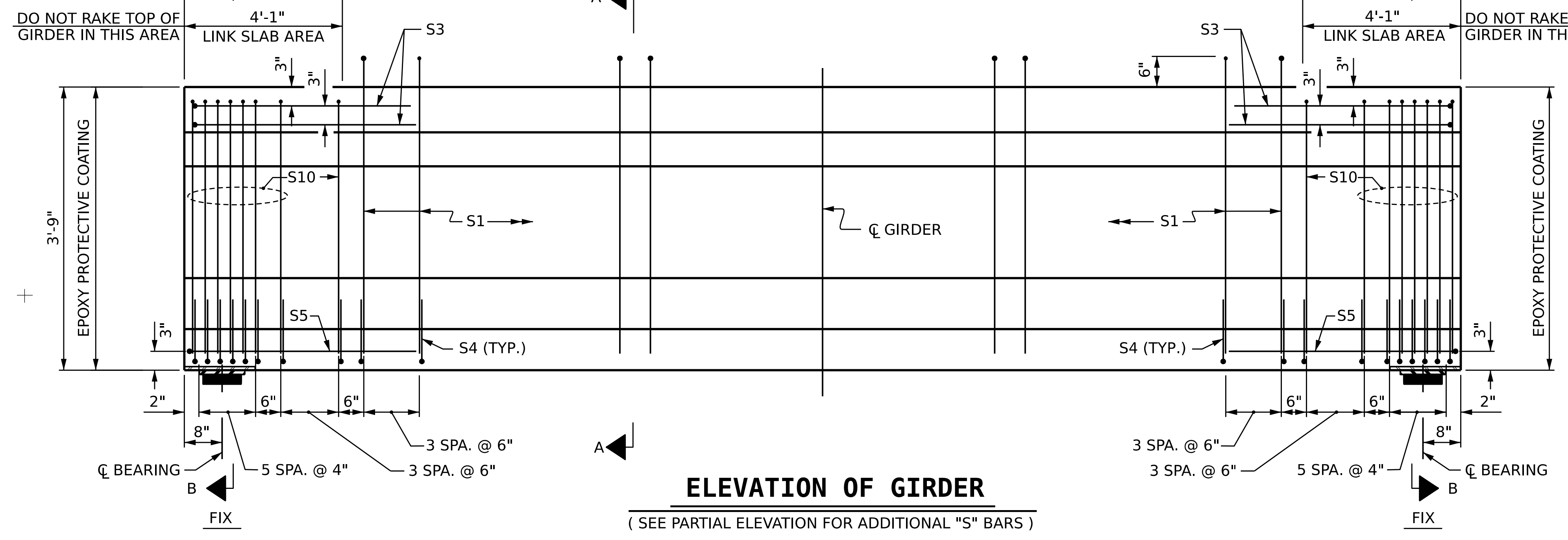
	REINFORCING STEEL	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXT. GIRDER	761	12.2	36
INT. GIRDER	790	12.2	36

GIRDERS REQUIRED

GIRDER	A	B	H
B1	84'-8 1/8"	42'-4 1/16"	1'-0 1/16"
B2	84'-7 7/8"	42'-3 15/16"	11 15/16"
B3	84'-7 5/8"	42'-3 13/16"	11 13/16"
B4	84'-7 3/8"	42'-3 11/16"	11 11/16"
B5	84'-7"	42'-3 1/2"	11 1/2"



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

ASSEMBLED BY : PNH	DATE : 10-22
CHECKED BY : SN	DATE : 10-22
DRAWN BY : BNB 09/21	
CHECKED BY : AAI 09/21	

VOLKERT
5430 Wade Park Blvd., Suite 410
Raleigh, NC 27607
Tel. 919-854-0344 Fax. 919-854-0355
NC License No. F-0765

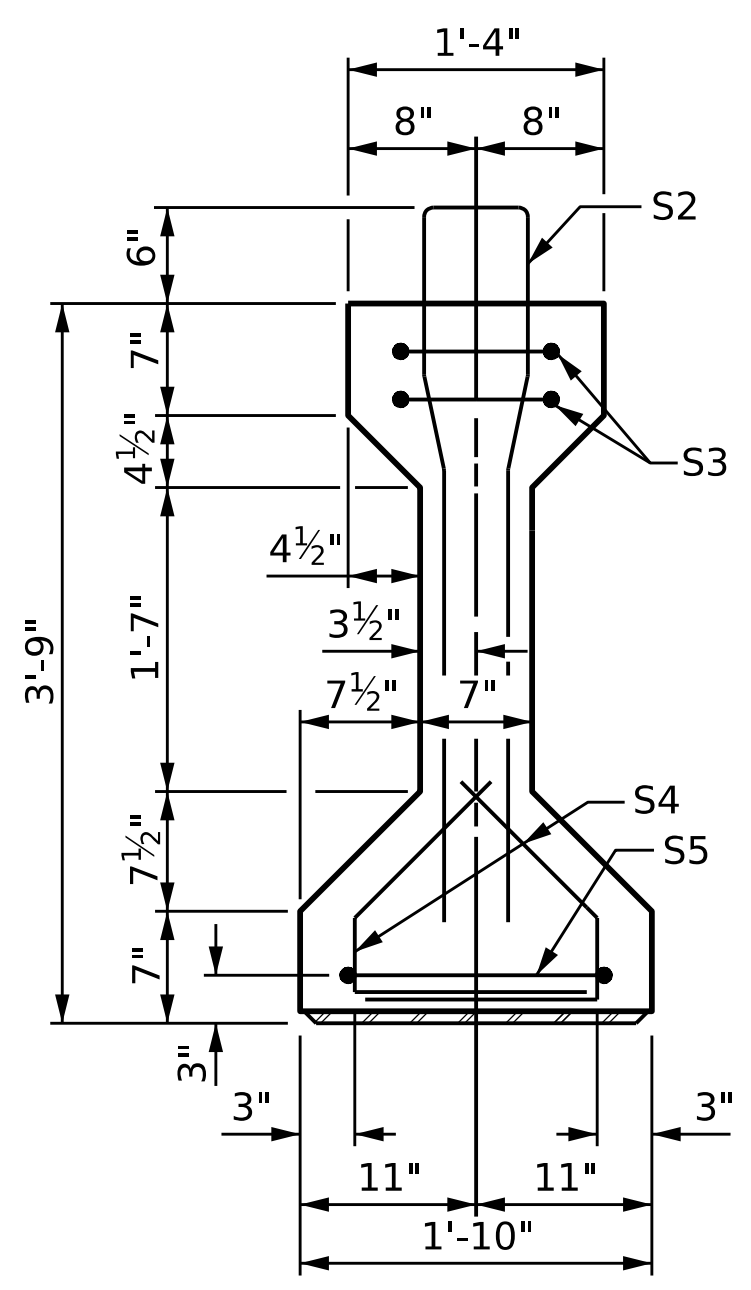


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

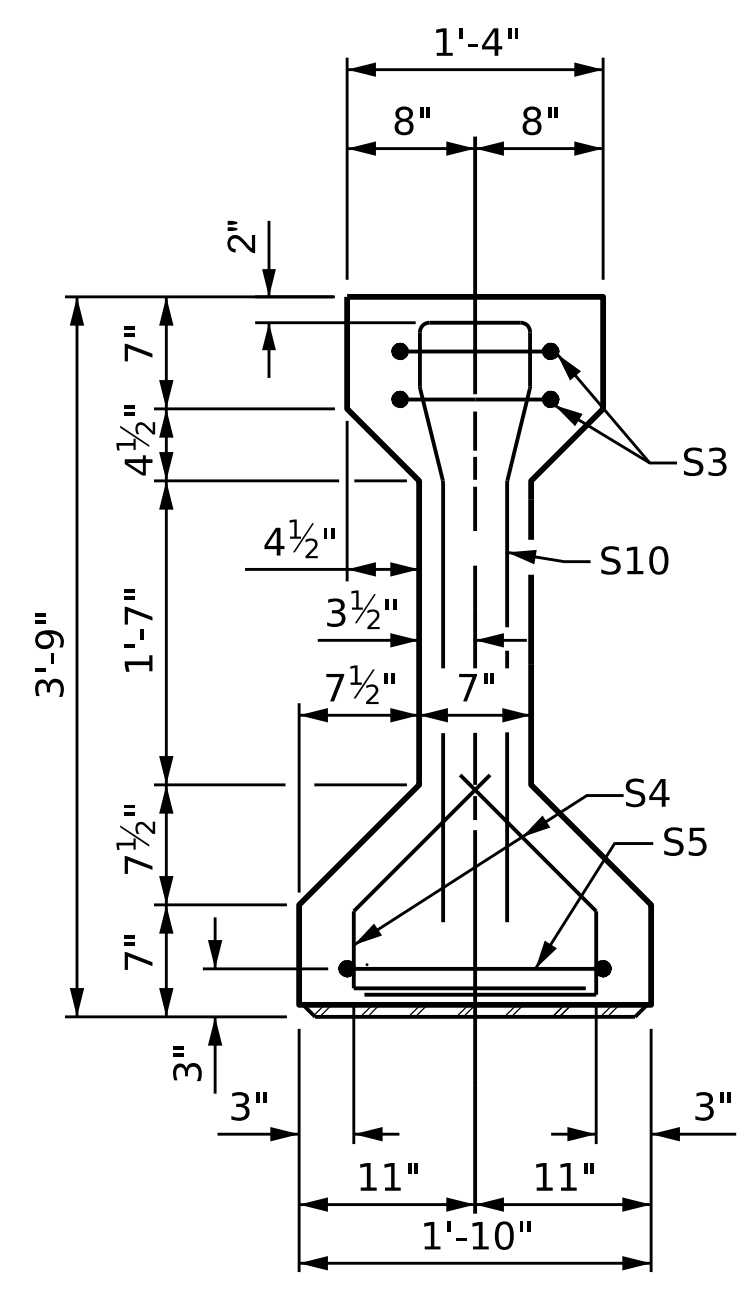
PROJECT NO. **BR-0073**
COLUMBUS COUNTY
STATION: **18+24.50 -L-**
SHEET 2 OF 3

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

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	S-15
1			3	TOTAL SHEETS 38
2			4	



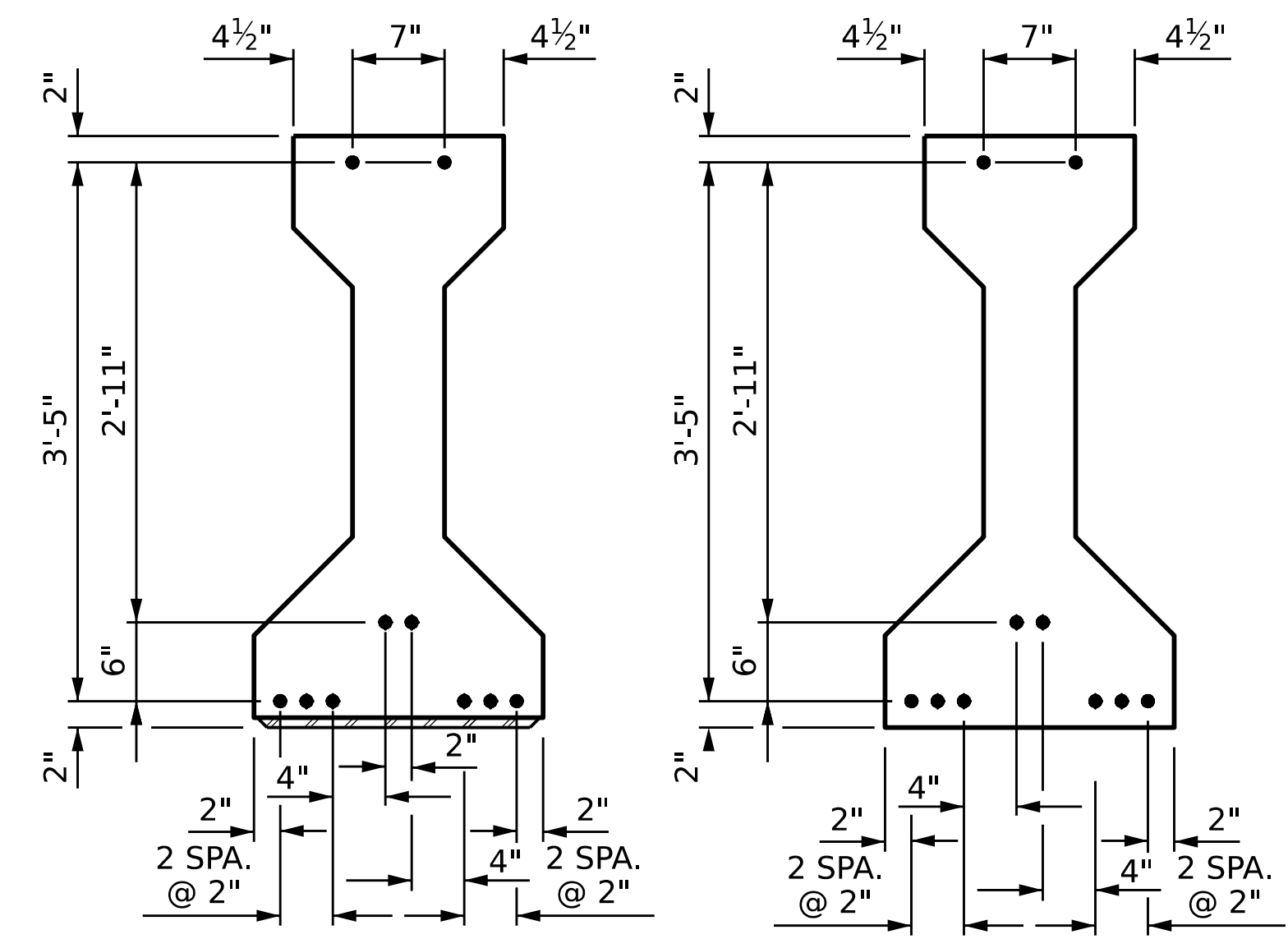
SECTION A-A



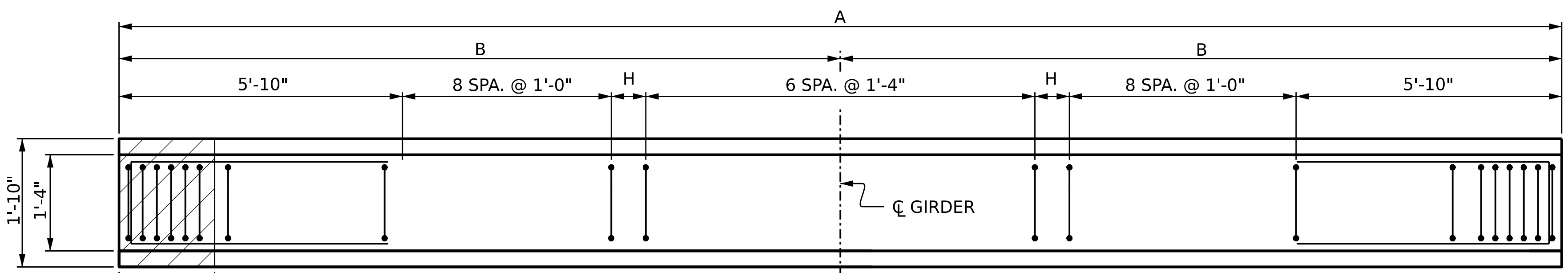
SECTION B-B

DEBONDING LEGEND

- FULLY BONDED STRANDS

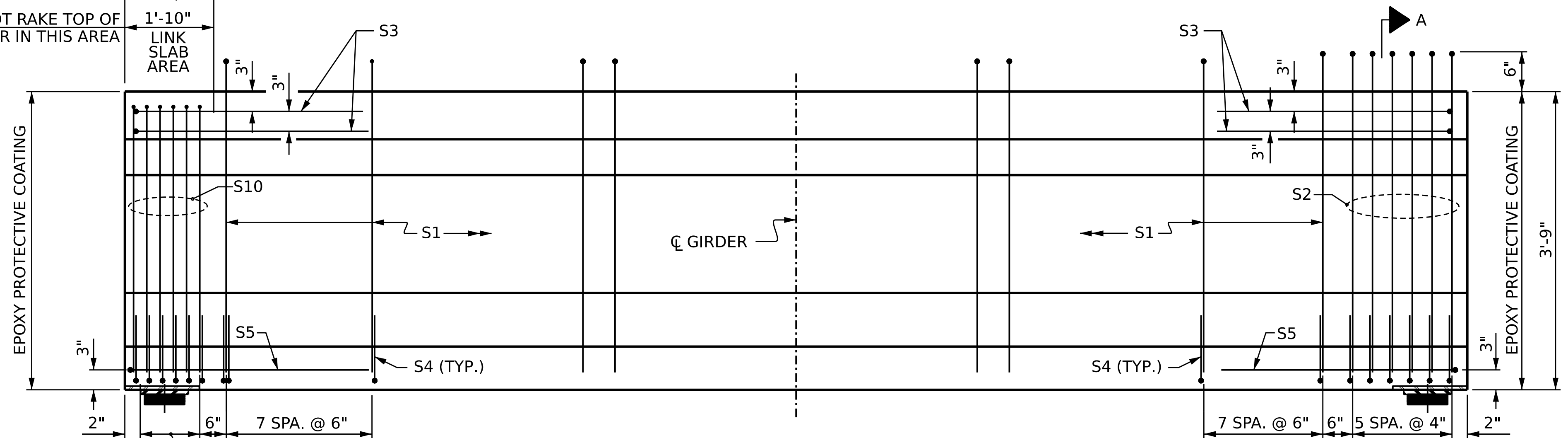


0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

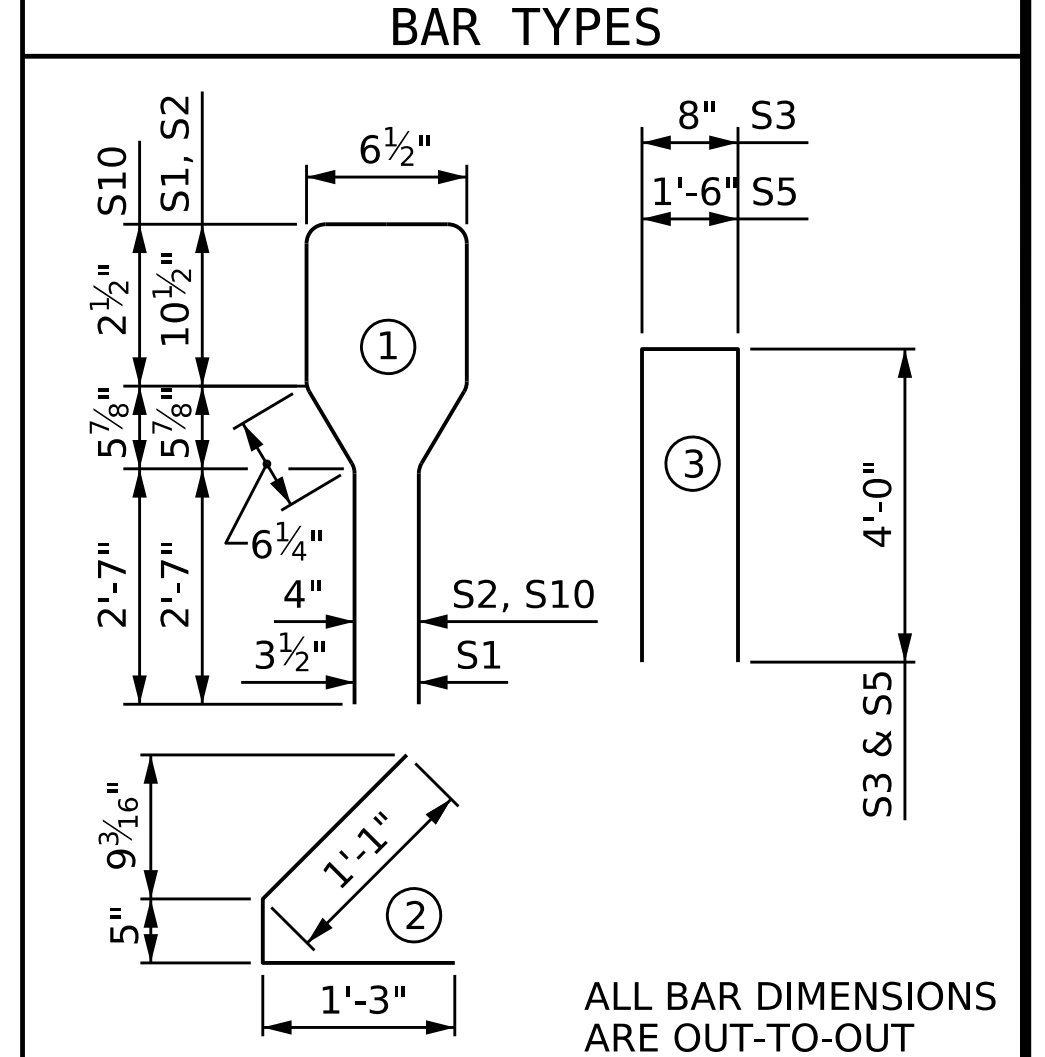
DO NOT RAKE TOP OF GIRDER IN THIS AREA



ELEVATION OF GIRDER

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

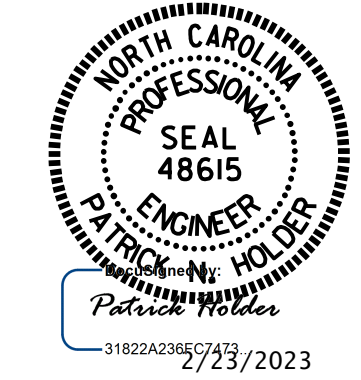
REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	39	#4	1	8'-6"	221
S2	6	#6	1	8'-6"	77
S3	4	#4	3	8'-8"	23
S4	56	#4	2	2'-9"	103
S5	2	#4	3	9'-6"	13
S10	6	#6	1	7'-2"	65



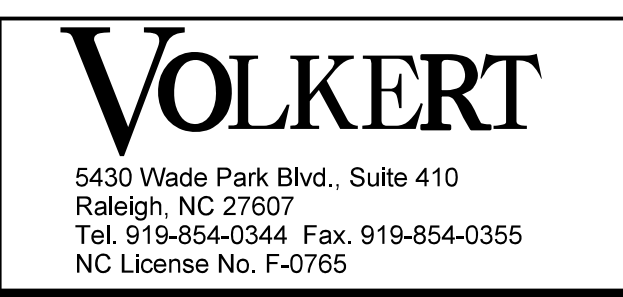
QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	5000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXT. GIRDER	520	5.5	10
INT. GIRDER	520	5.5	10

GIRDERS REQUIRED			
GIRDER	A	B	H
C1	37'-11 1/4"	18'-11 5/8"	1'-1 5/8"
C2	37'-11 1/4"	18'-11 5/8"	1'-1 5/8"
C3	37'-11 1/8"	18'-11 1/16"	1'-1 5/16"
C4	37'-11"	18'-11 1/2"	1'-1 1/2"
C5	37'-10 7/8"	18'-11 1/16"	1'-1 1/16"

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**
 SHEET 3 OF 3



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



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS: 38

ASSEMBLED BY : PNH DATE : 10-22
 CHECKED BY : SN DATE : 10-22
 DRAWN BY : BNB 09/21
 CHECKED BY : AAI 09/21

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

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

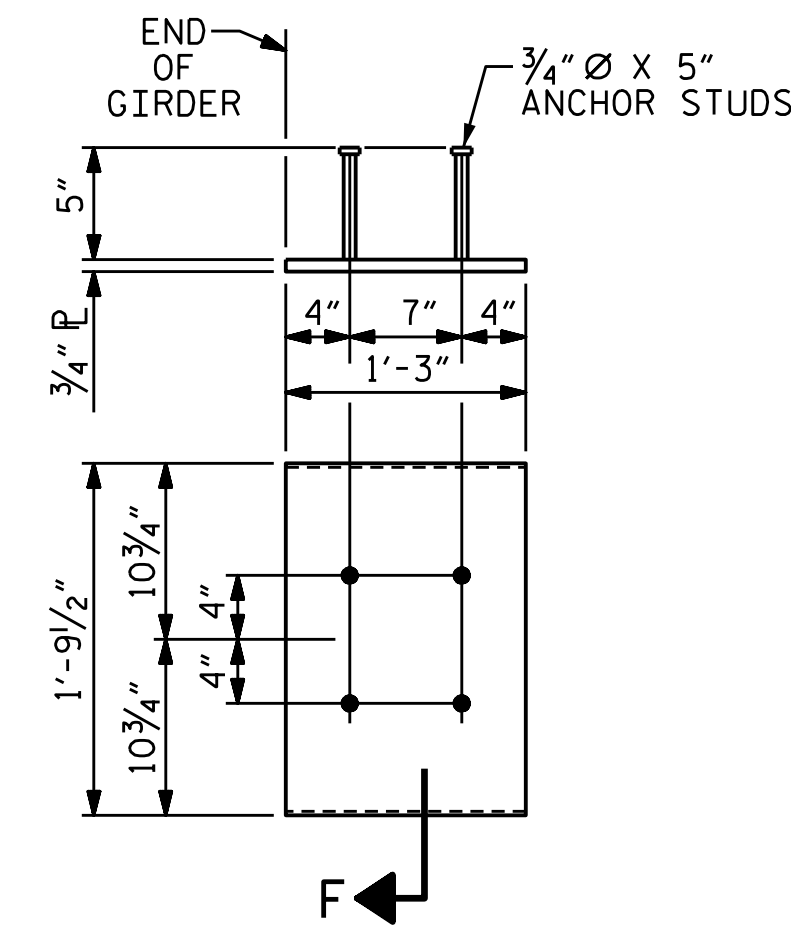
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI FOR SPANS A AND C AND 7000 PSI FOR SPAN B.

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

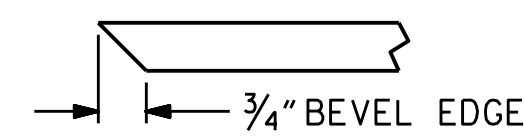
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4" AND LINK SLAB AREAS AS INDICATED, SHALL BE RAKED TO A DEPTH OF 1/4".

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

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



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



SECTION "F"
(SEE NOTES)

PROJECT NO. BR-0073
COLUMBUS COUNTY
STATION: 18+24.50 -L-



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

ASSEMBLED BY :	A. WU	DATE :	10/22
CHECKED BY :	D. A. GLADDEN	DATE :	11/22
DRAWN BY :	ELR 11/91	REV. 1/15	MAA/TMG
CHECKED BY :	GRP 11/91	REV. 2/15	MAA/TMG
		REV. 12/17	MAA/THC

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5430 Wade Park Blvd., Suite 410
Raleigh, NC 27607
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NC License No. F-0765

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SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			38

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.

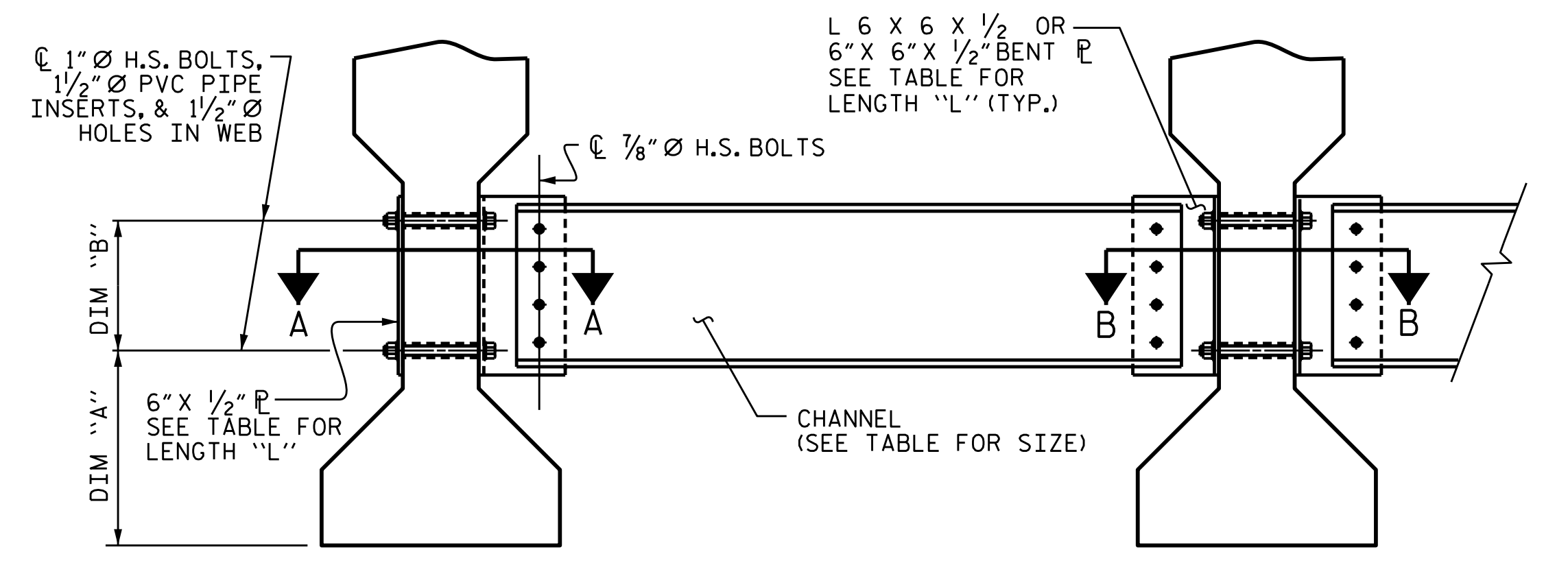
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

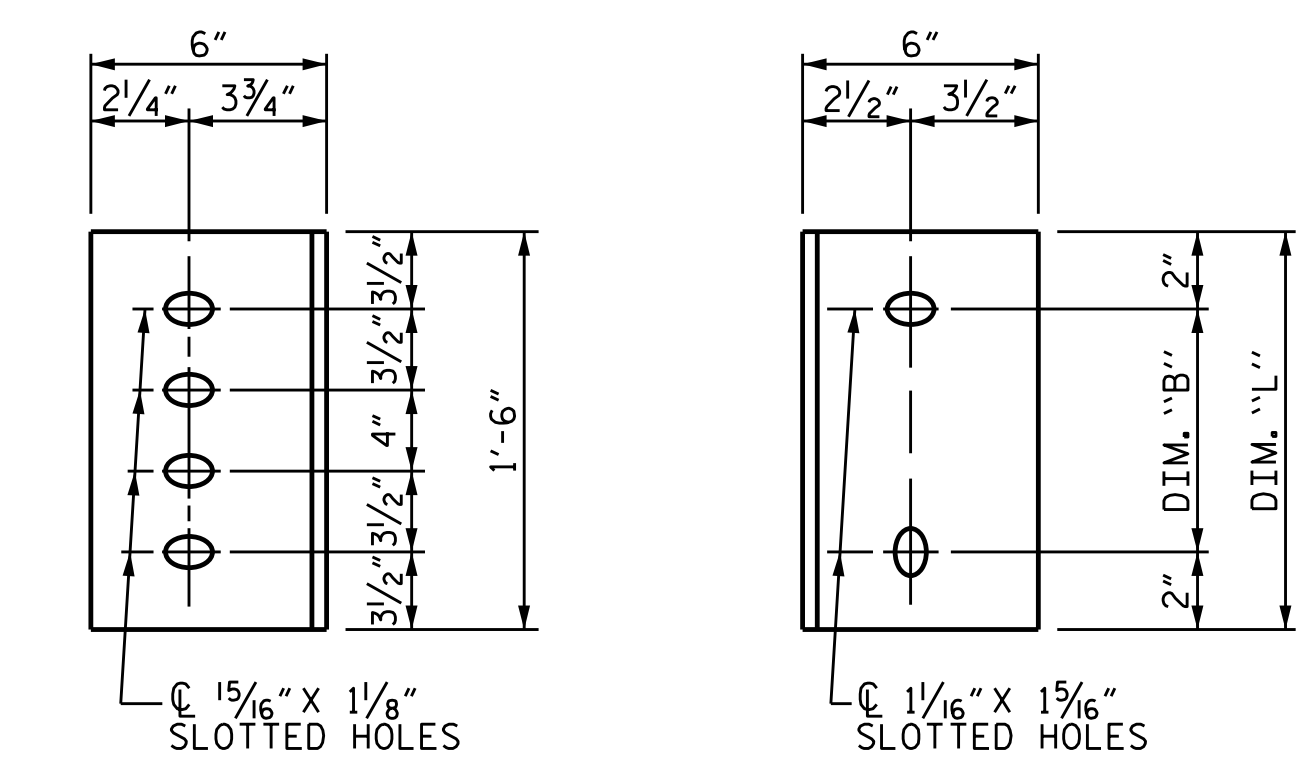
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

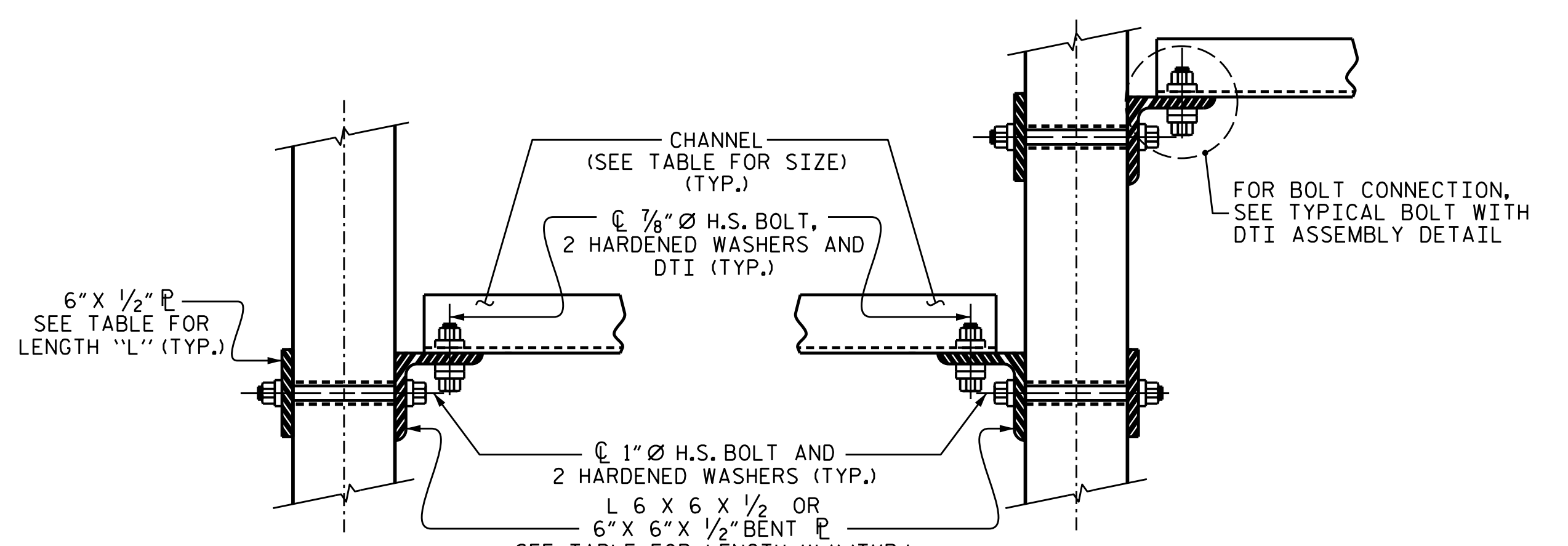
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



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



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



SECTION A-A
SECTION B-B
CONNECTION DETAILS

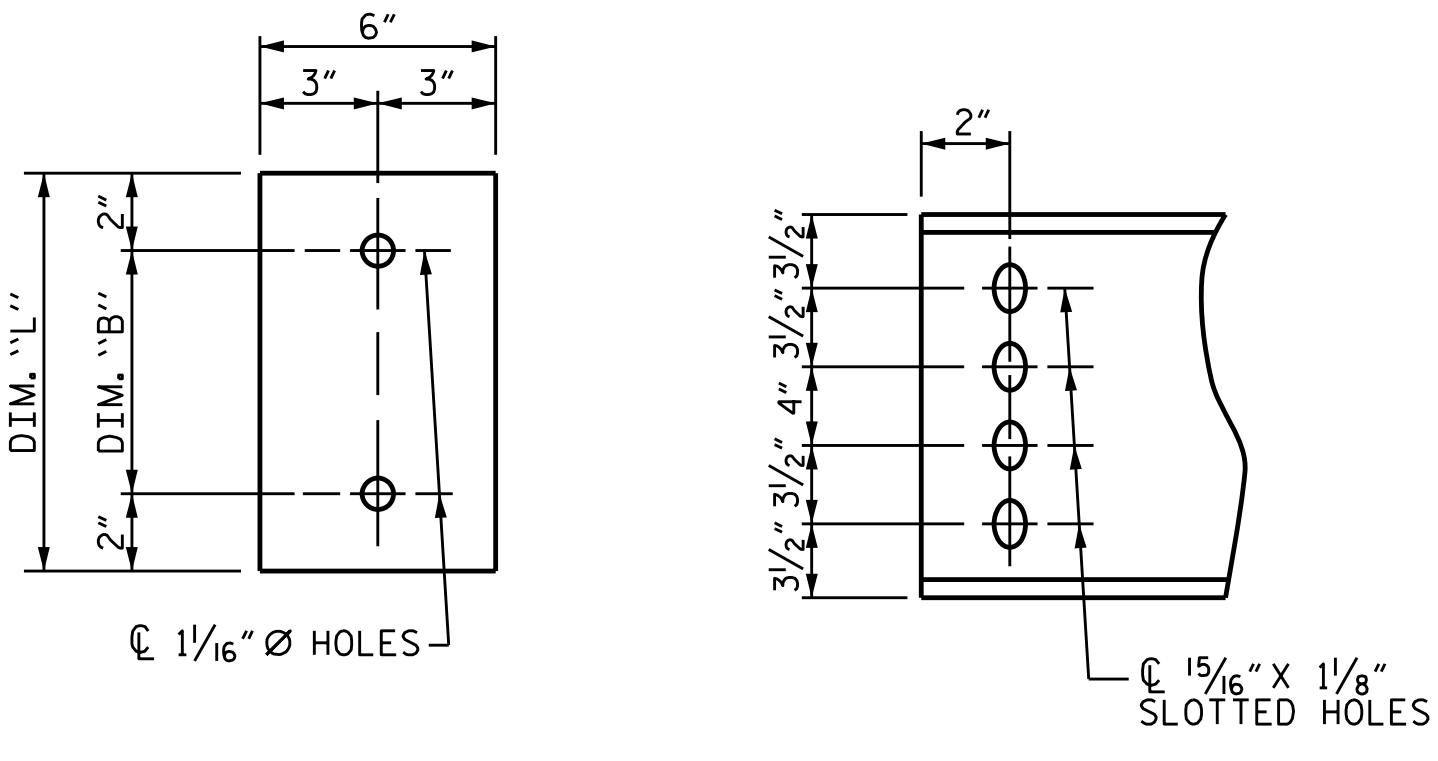
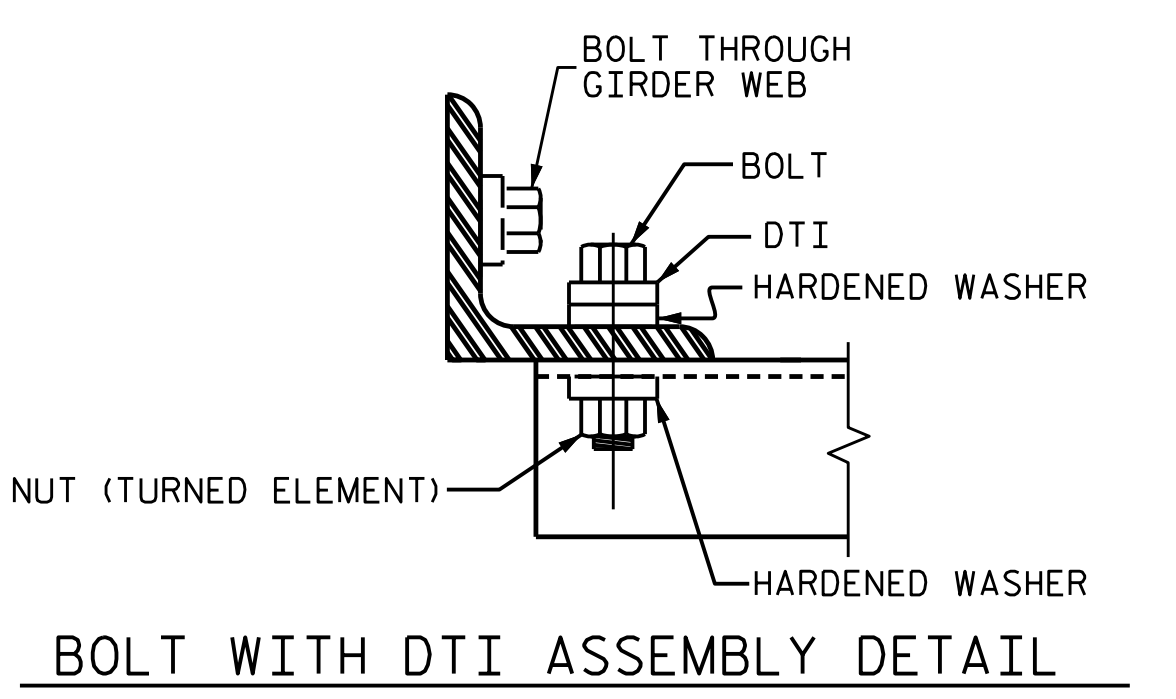


PLATE DETAILS
CHANNEL END
(TYPE III GDR.)

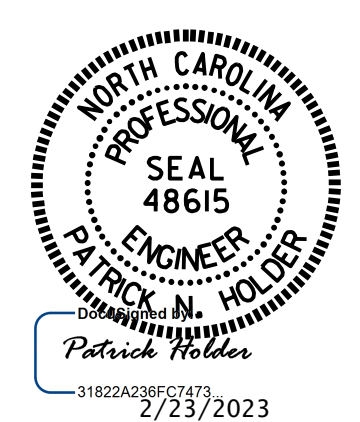


BOLT WITH DTI ASSEMBLY DETAIL

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. BR-0073
COLUMBUS COUNTY
 STATION: 18+24.50 -L-



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

ASSEMBLED BY : A. Y. WU	DATE : 10/22
CHECKED BY : D. A. GLADDEN	DATE : 11/22
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

VOLKERT
 5430 Wade Park Blvd., Suite 410
 Raleigh, NC 27607
 Tel. 919-854-0344 Fax. 919-854-0355
 NC License No. F-0765

NO.	REVISIONS			SHEET NO.
	BY:	DATE:	NO.	
1			3	S-18
2			4	TOTAL SHEETS 38

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.

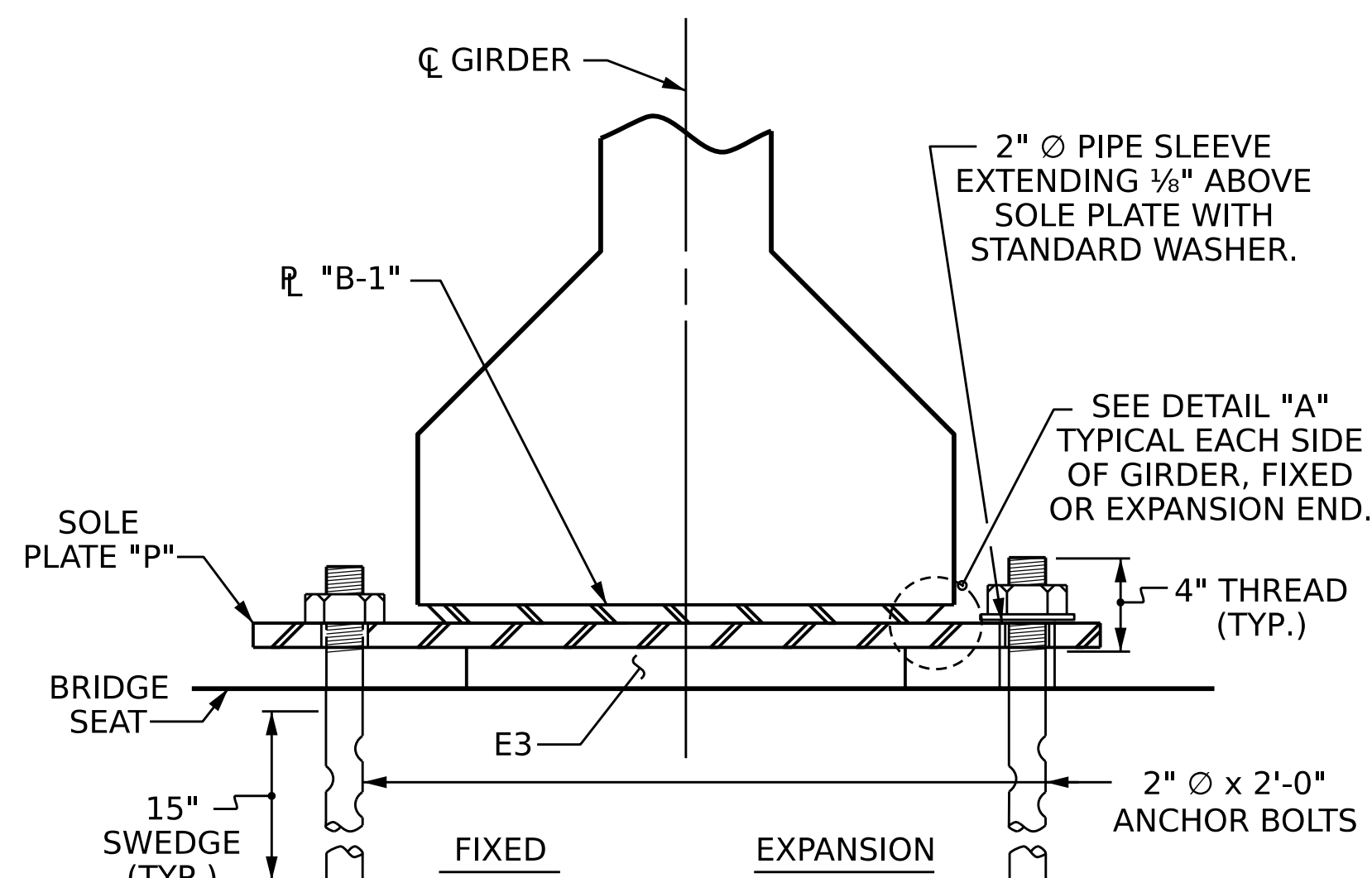
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

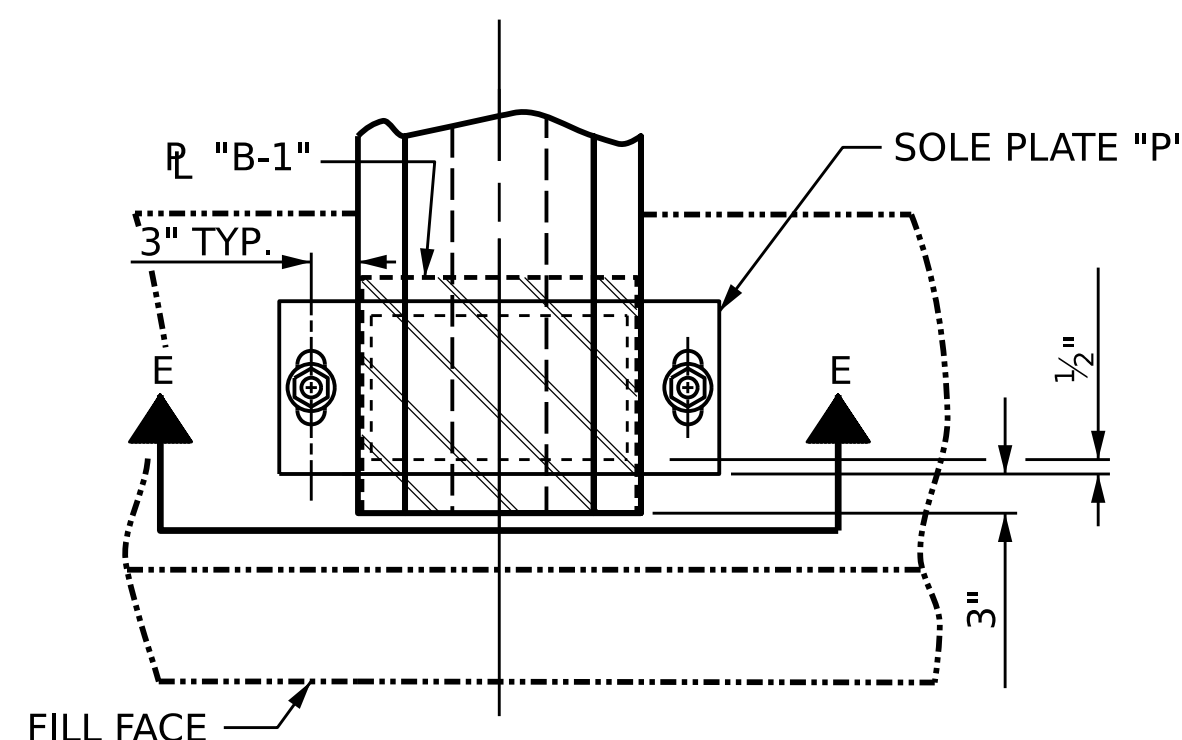
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

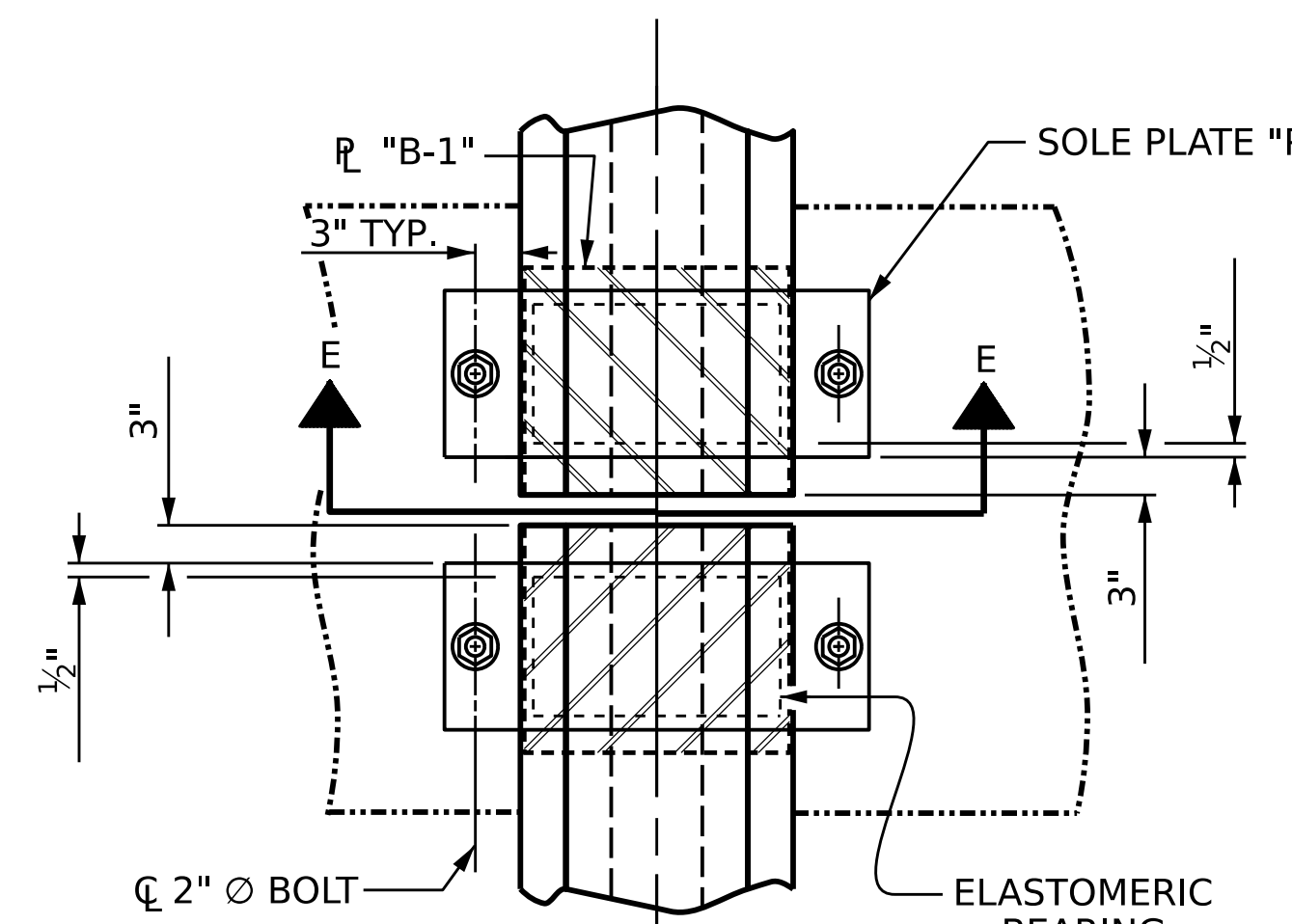
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



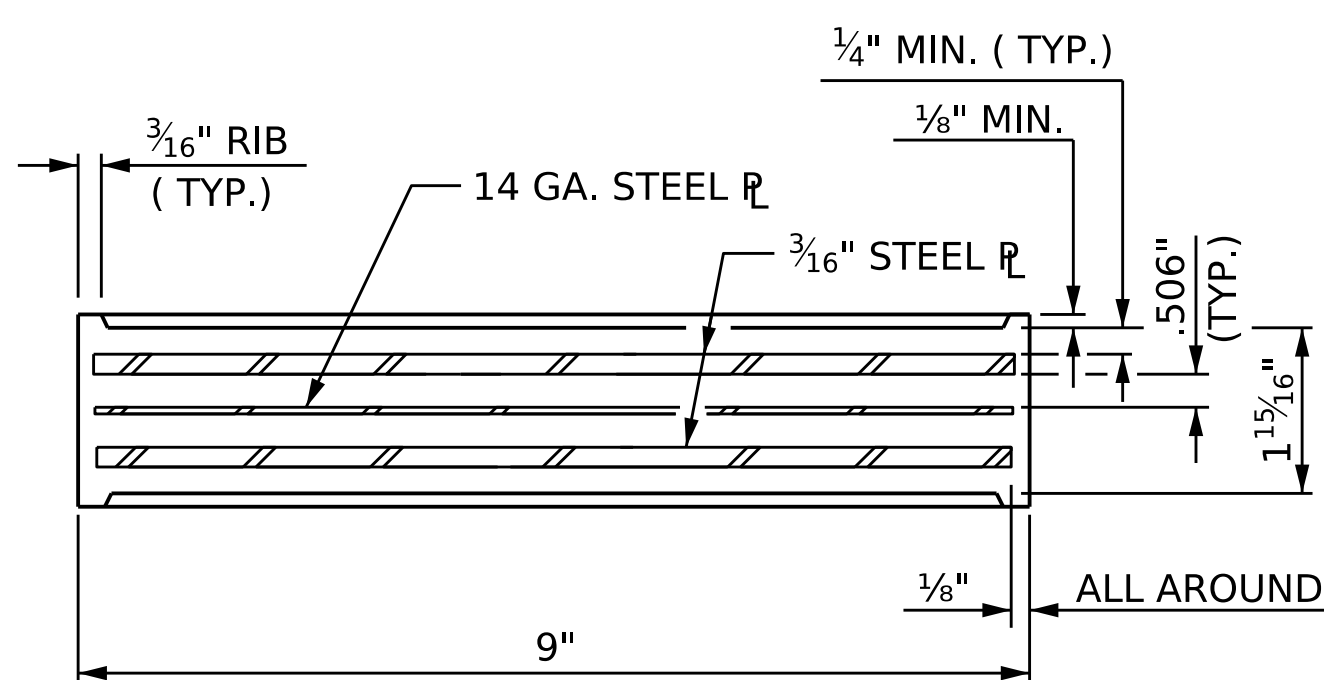
SECTION E-E



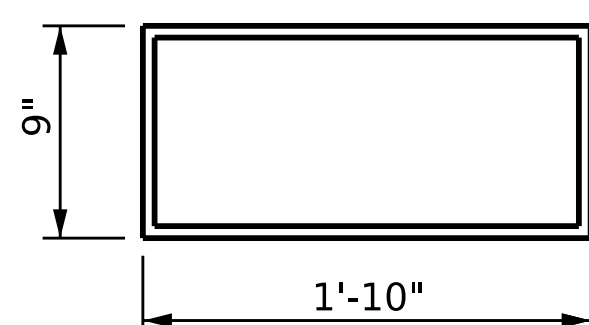
TYPICAL PLAN (SHOWING END BENT)



TYPICAL PLAN (SHOWING BENT)



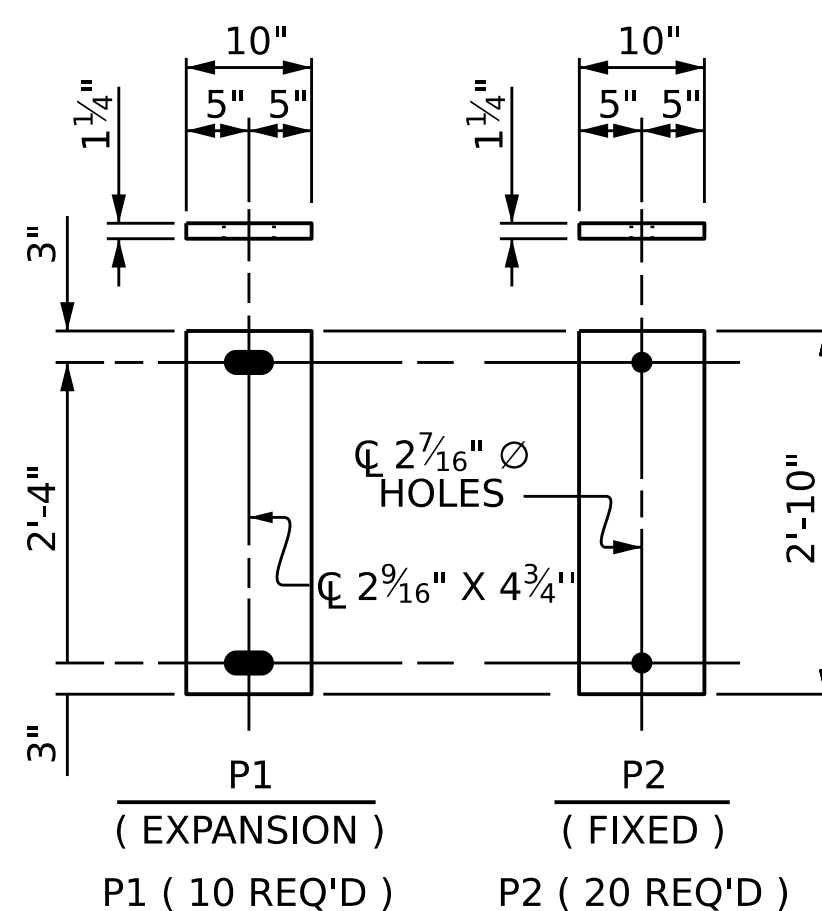
TYPICAL SECTION OF ELASTOMERIC BEARINGS



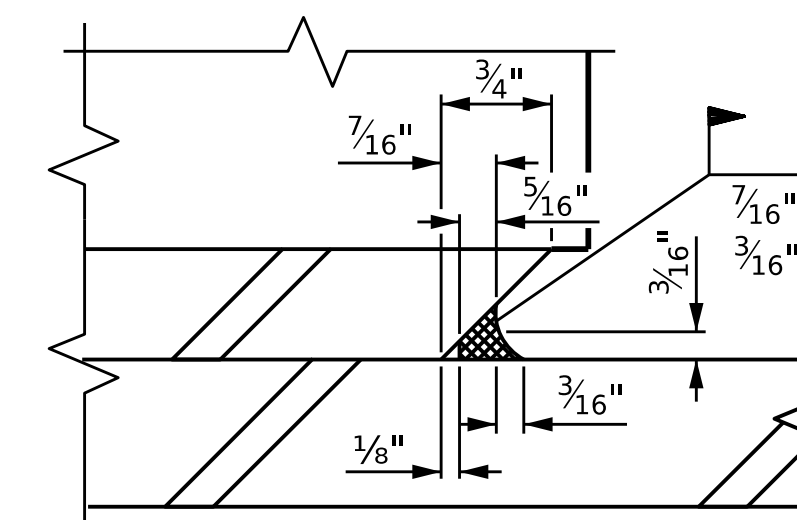
E3 (30 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



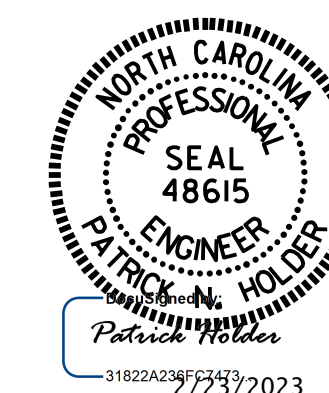
SOLE PLATE DETAILS ("P")



DETAIL "A"

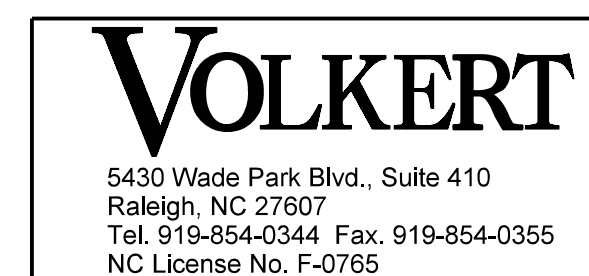
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**



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

ASSEMBLED BY : A. Y. WU	DATE : 10/22
CHECKED BY : P.N. HOLDER	DATE : 11/22
DRAWN BY : WJH 8/89	REV. 1/15 MAA/TMC
CHECKED BY : CRK 8/89	REV. 12/17 MAA/THC
	REV. 10/21 BNB/AAI



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

TOTAL SHEETS: 38

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN A & SPAN C																				
	GIRDERS 1 - 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.003	0.006	0.009	0.011	0.014	0.015	0.017	0.018	0.019	0.019	0.018	0.017	0.015	0.014	0.011	0.009	0.006	0.003	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.006	0.007	0.007	0.007	0.007	0.006	0.006	0.005	0.004	0.003	0.002	0.001	0.000
FINAL CAMBER	↑	0	0	1/16"	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	1/16"	0	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 1 & 5																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.033	0.066	0.096	0.123	0.149	0.170	0.187	0.199	0.207	0.209	0.207	0.199	0.187	0.170	0.149	0.123	0.096	0.066	0.033	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.024	0.048	0.070	0.093	0.111	0.129	0.141	0.152	0.158	0.160	0.158	0.152	0.141	0.129	0.111	0.093	0.070	0.048	0.024	0.000
FINAL CAMBER	↑	0	1/8"	3/16"	5/16"	3/8"	7/16"	1/2"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	3/16"	1/8"	0

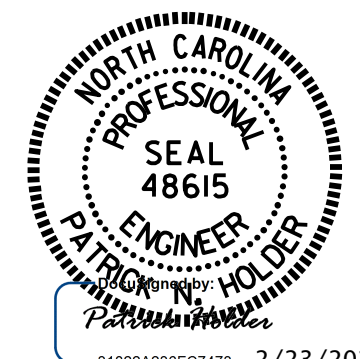
* INCLUDES FUTURE WEARING SURFACE ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT `` FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.6" Ø LOW RELAXATION	SPAN B																					
	GIRDERS 2 - 4																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.033	0.066	0.096	0.123	0.149	0.170	0.187	0.199	0.207	0.209	0.207	0.199	0.187	0.170	0.149	0.123	0.096	0.066	0.033	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.027	0.054	0.080	0.106	0.126	0.146	0.159	0.172	0.179	0.181	0.179	0.172	0.159	0.146	0.126	0.106	0.080	0.054	0.027	0.000
FINAL CAMBER	↑	0	1/16"	1/8"	3/16"	3/16"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	3/16"	3/16"	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).

PROJECT NO. BR-0073
COLUMBUS COUNTY
 STATION: 18+24.50 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE DEAD LOAD DEFLECTIONS					
REVISIONS					SHEET NO. S-20
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 38



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 SIGNATURES COMPLETED

ASSEMBLED BY : _____ PNH DATE : 11/22
 CHECKED BY : _____ SN DATE : 11/22
 DESIGN ENGINEER OF RECORD : _____ PNH DATE : 11/22

NOTES

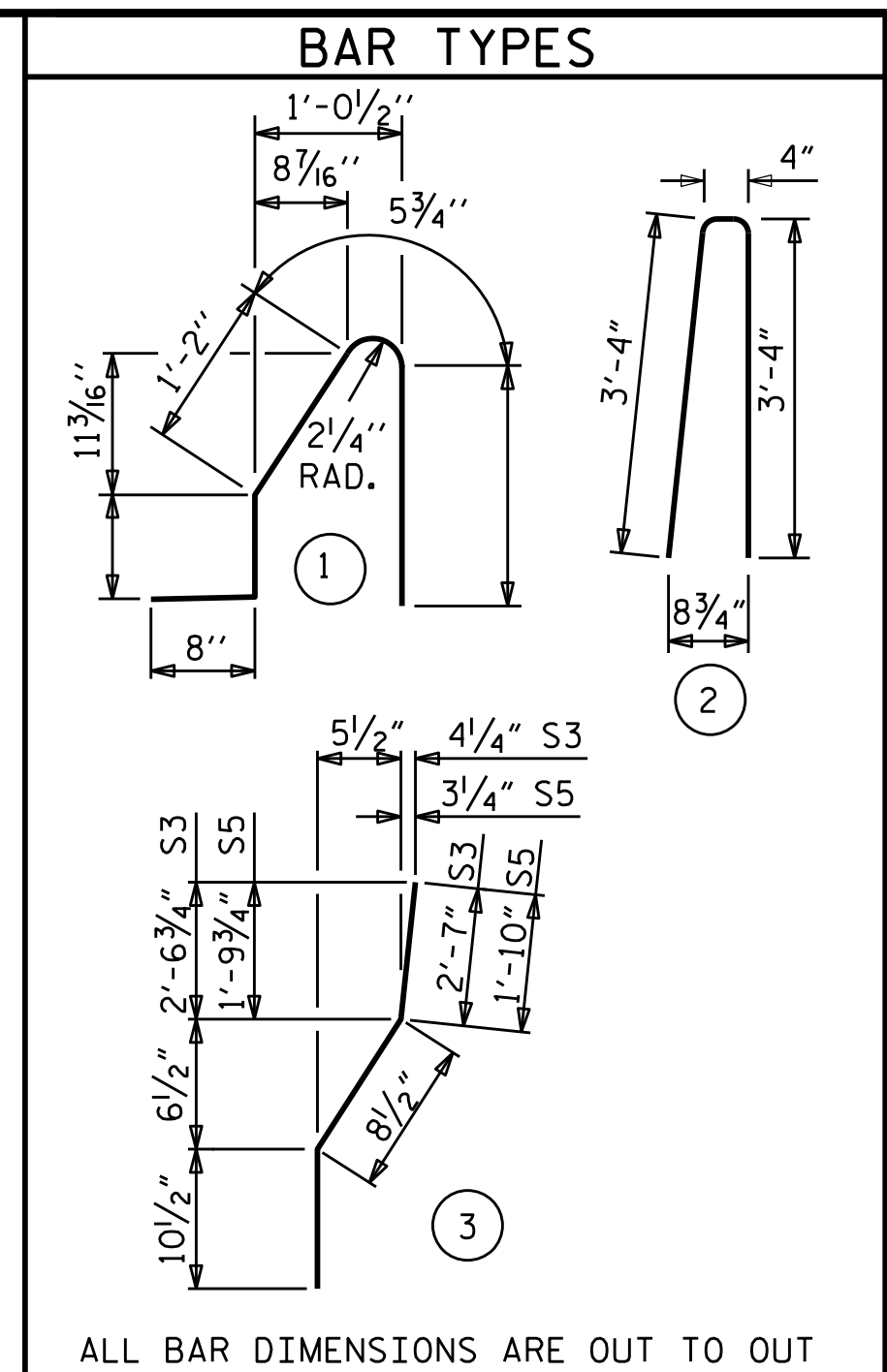
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWS PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

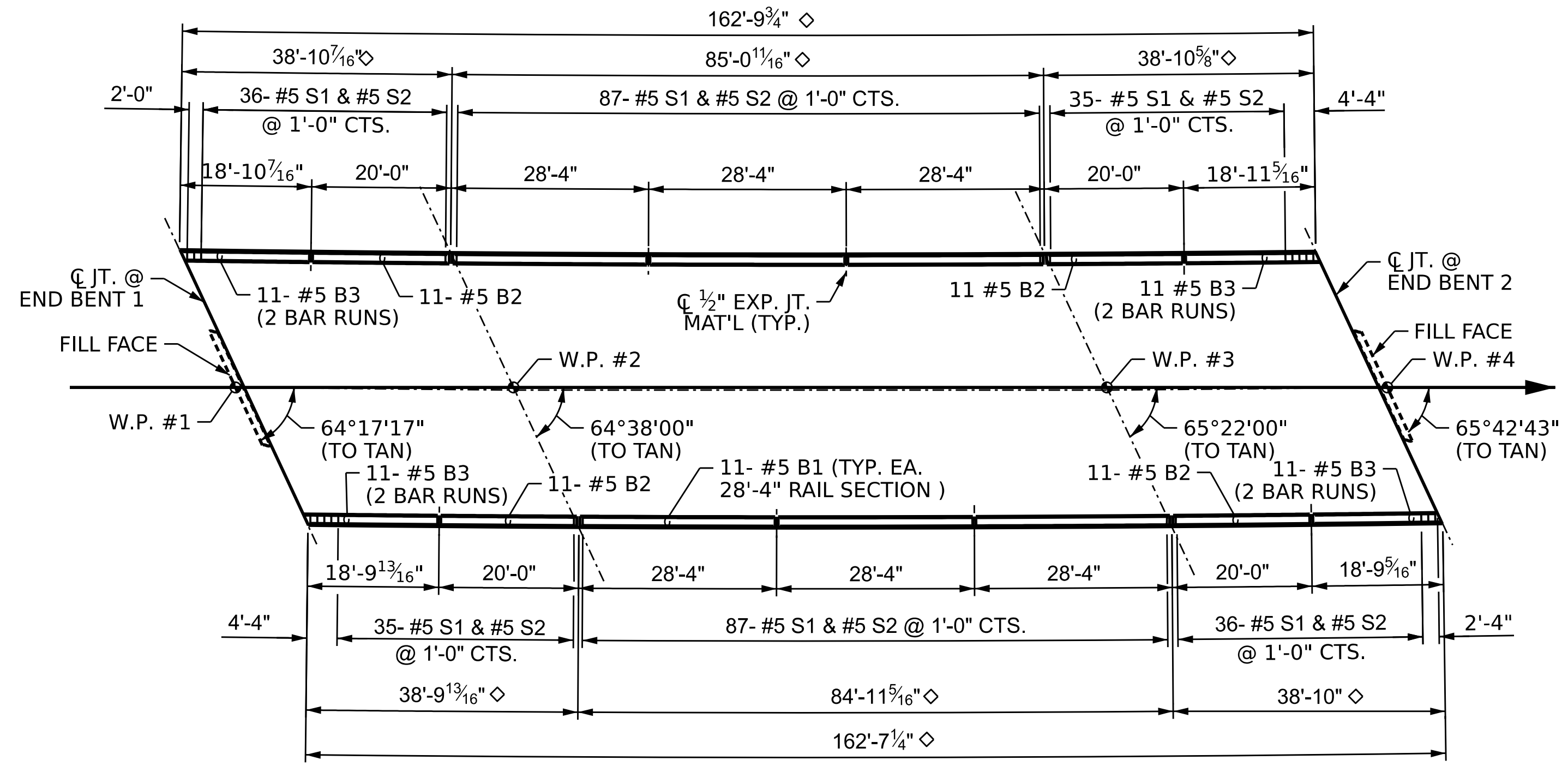
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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



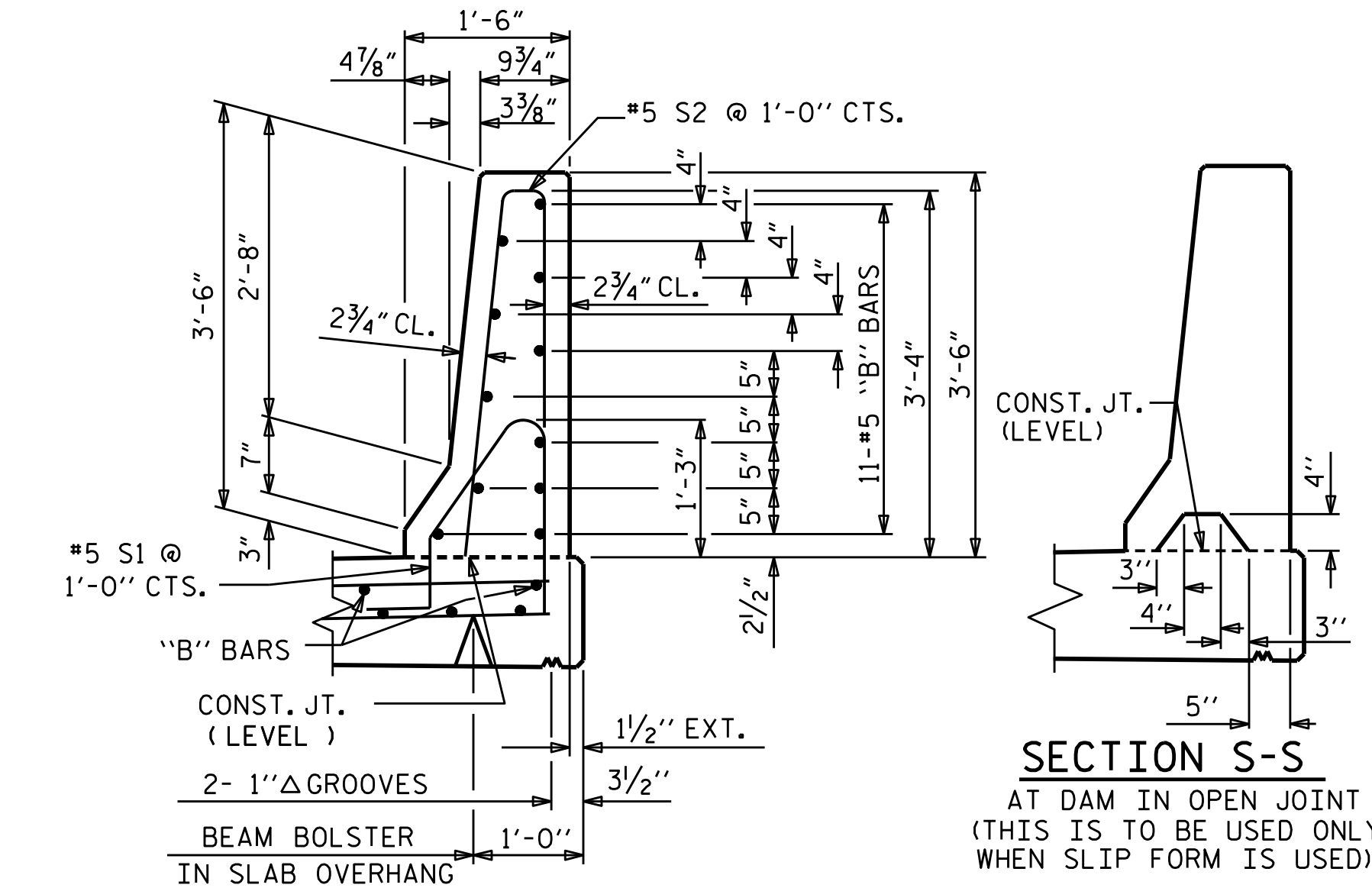
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

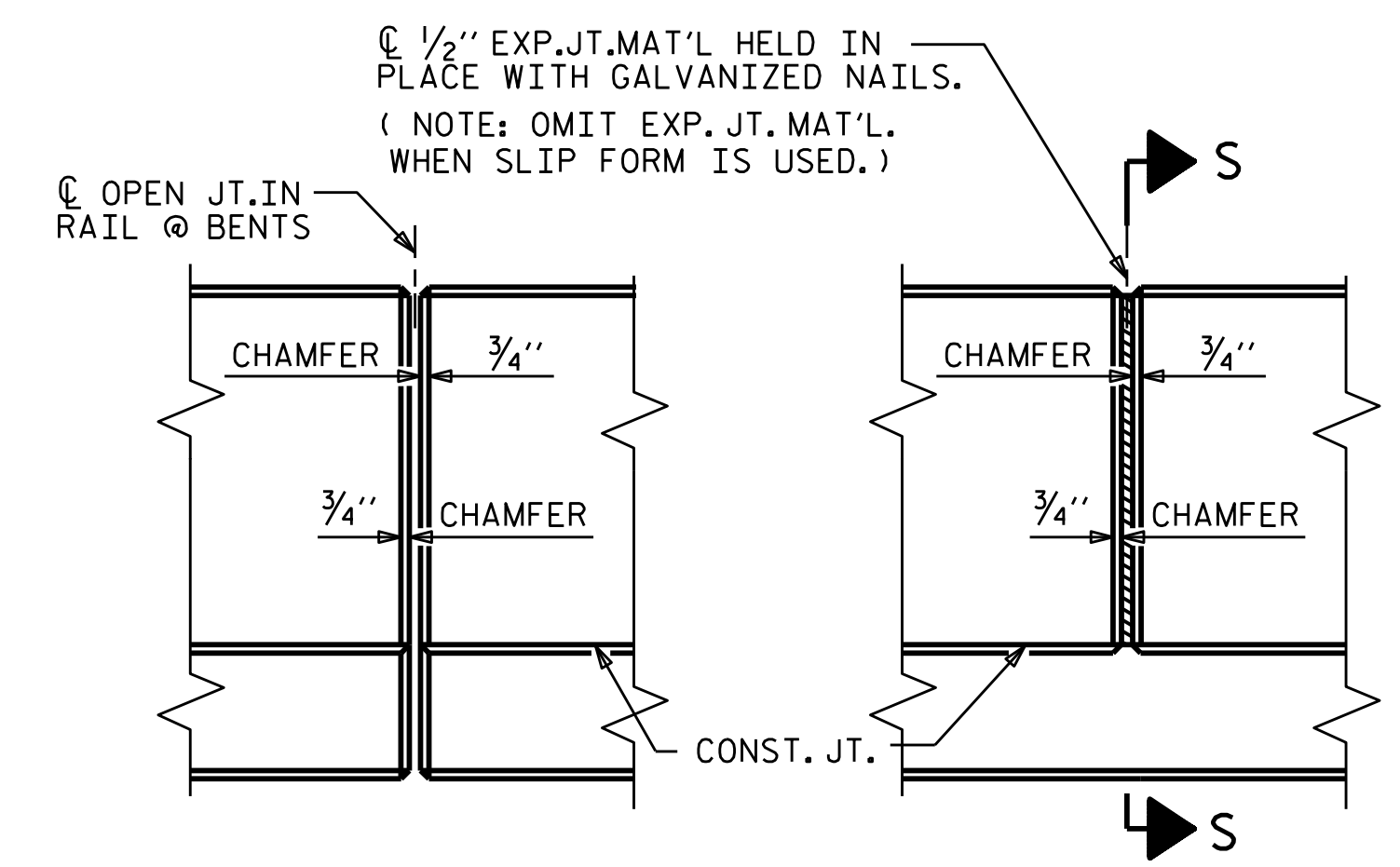
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	316	#5	1	4'-8"	1538
* S2	316	#5	2	7'-0"	2307
* S3	4	#5	3	4'-2"	17
* S4	4	#5	STR	4'-0"	17
* S5	8	#5	3	3'-5"	29
* S6	8	#5	STR	3'-3"	27
* B1	66	#5	STR	27'-10"	1916
* B2	44	#5	STR	19'-7"	899
* B3	88	#5	STR	11'-1"	1017
* EPOXY COATED REINFORCING STEEL					7767 LBS.
CLASS AA CONCRETE					44.2 CU. YDS.
CONCRETE BARRIER RAIL					325.42 LIN. FT.



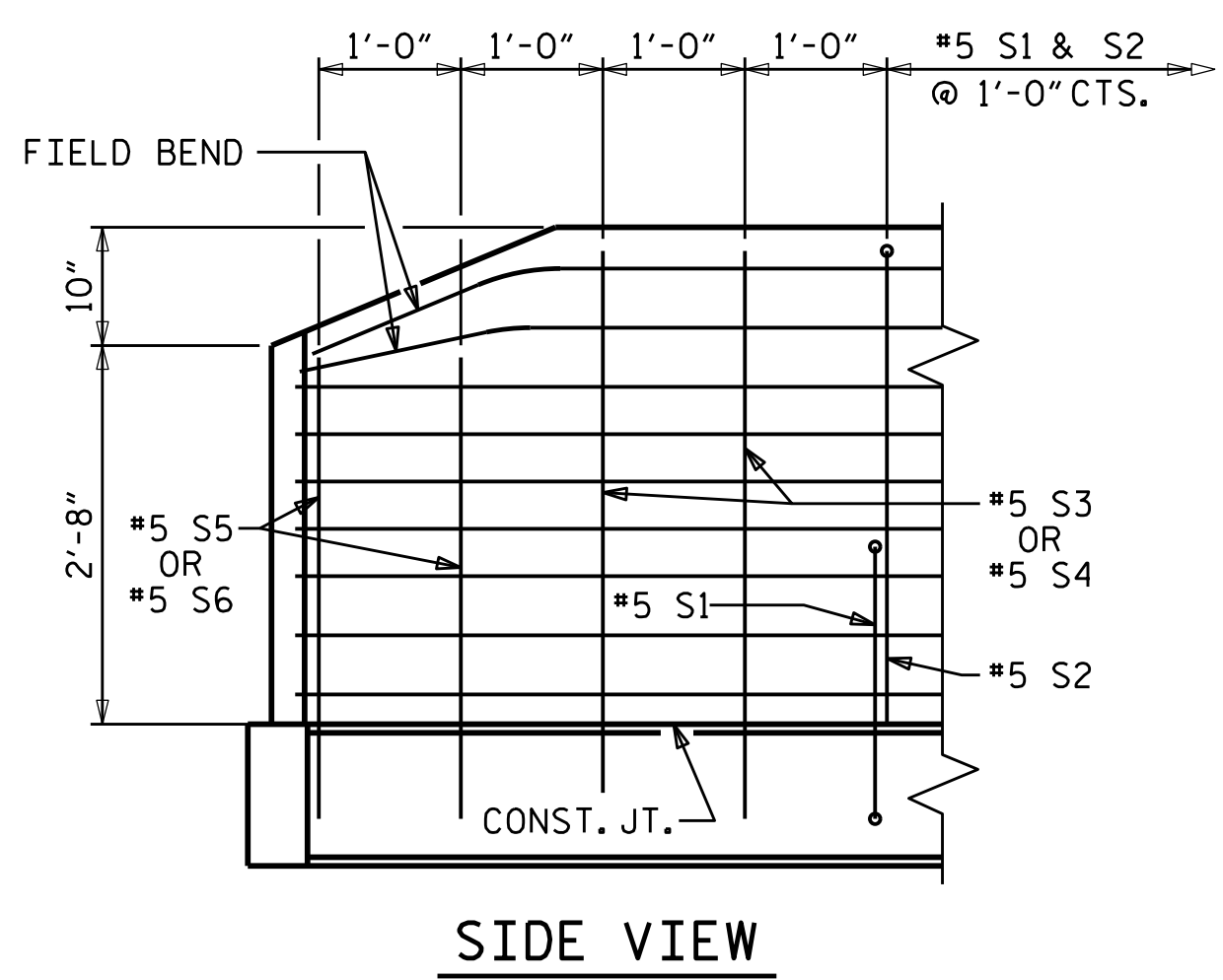
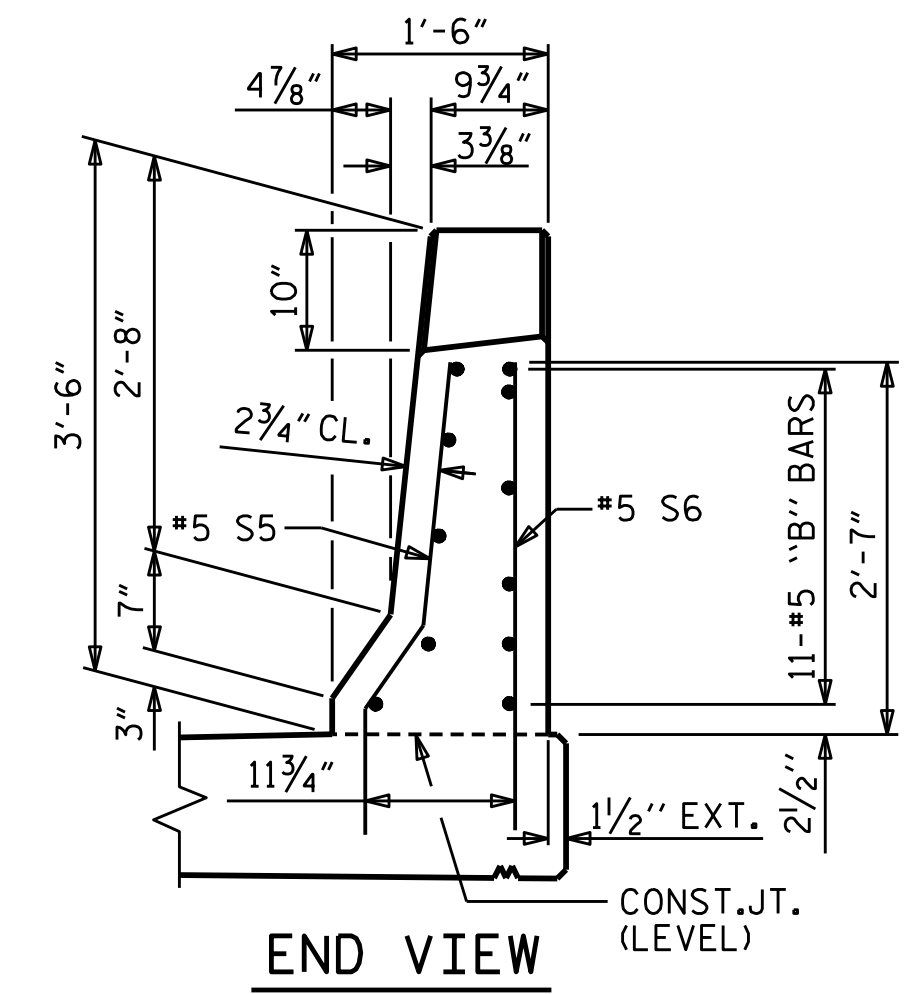
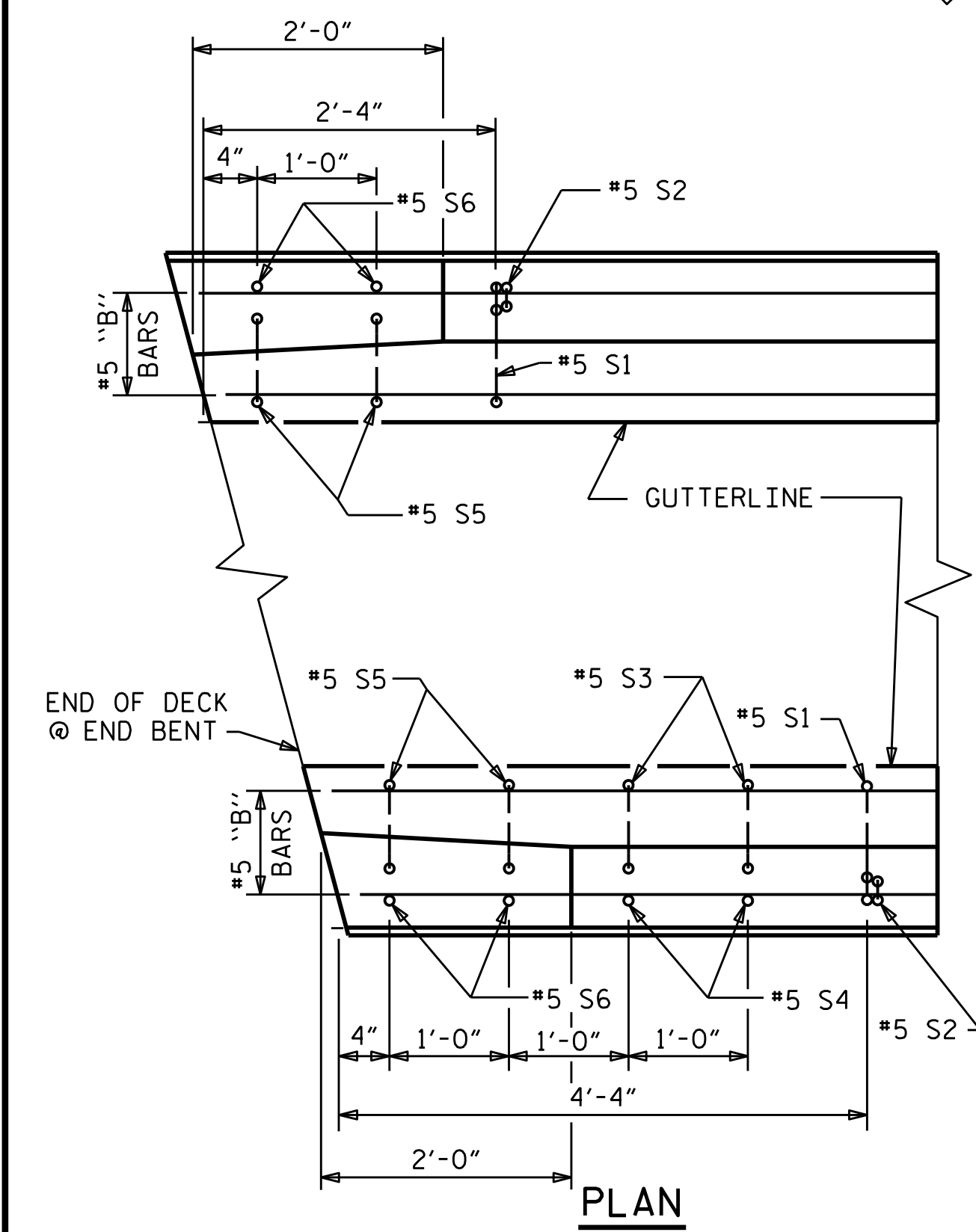
PLAN
ALL DIMENSIONS ARE ARC LENGTHS ALONG OUTSIDE EDGE OF DECK,
◊ C.J.T. TO C.J.T. ALONG OUTSIDE EDGE OF SUPERSTRUCTURE



SECTION THRU RAIL



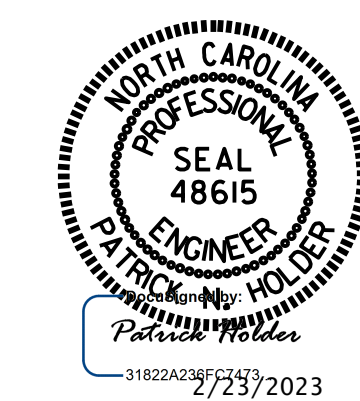
ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS



END OF RAIL DETAILS
FOR ADHESIVE ANCHORING AT SAWS JOINTS

ASSEMBLED BY : A. Y. WU DATE : 10/22
 CHECKED BY : D. A. GLADDEN DATE : 11/22
 DRAWN BY : ARB 5/87 MAA/GM
 CHECKED BY : SJD 9/87 REV. 7/12 MAA/GM
 REV. 6/13 MAA/GM
 REV. 12/17 MAA/THC

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PROJECT NO. BR-0073
COLUMBUS COUNTY
 STATION: 18+24.50 -L-

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			38

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD-DOWN PLATE AND 4 - 1/8" 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 1/8" 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.)

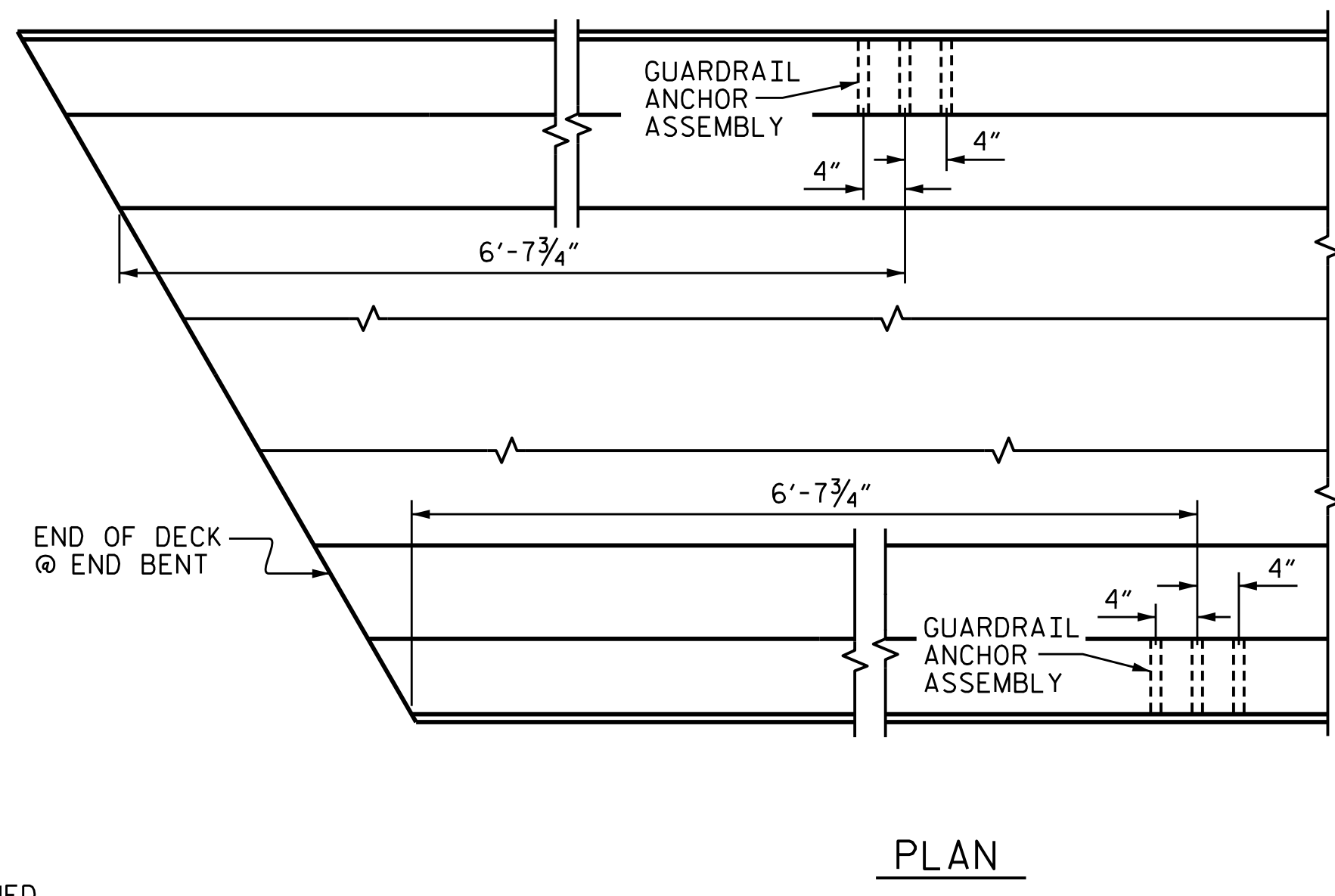
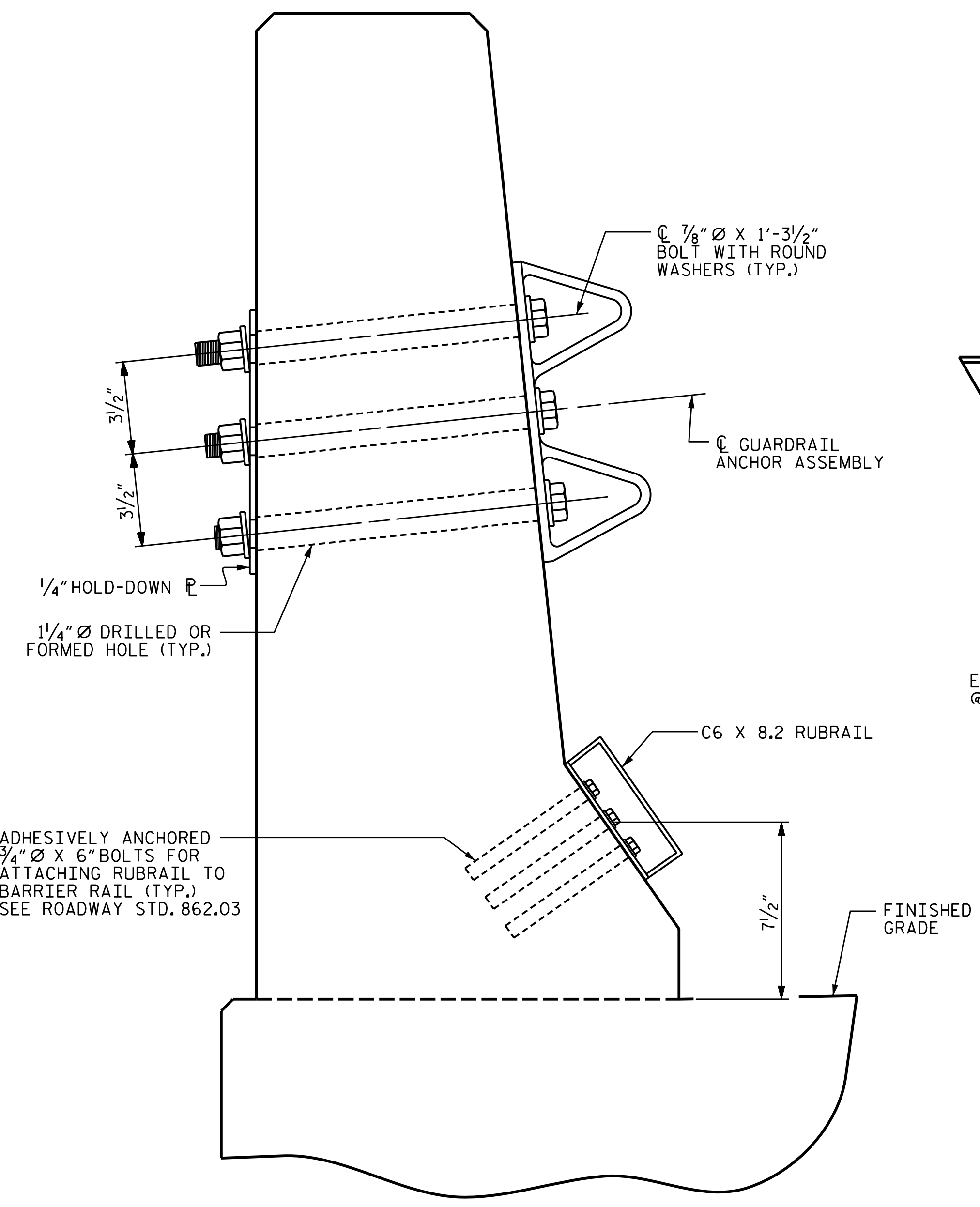
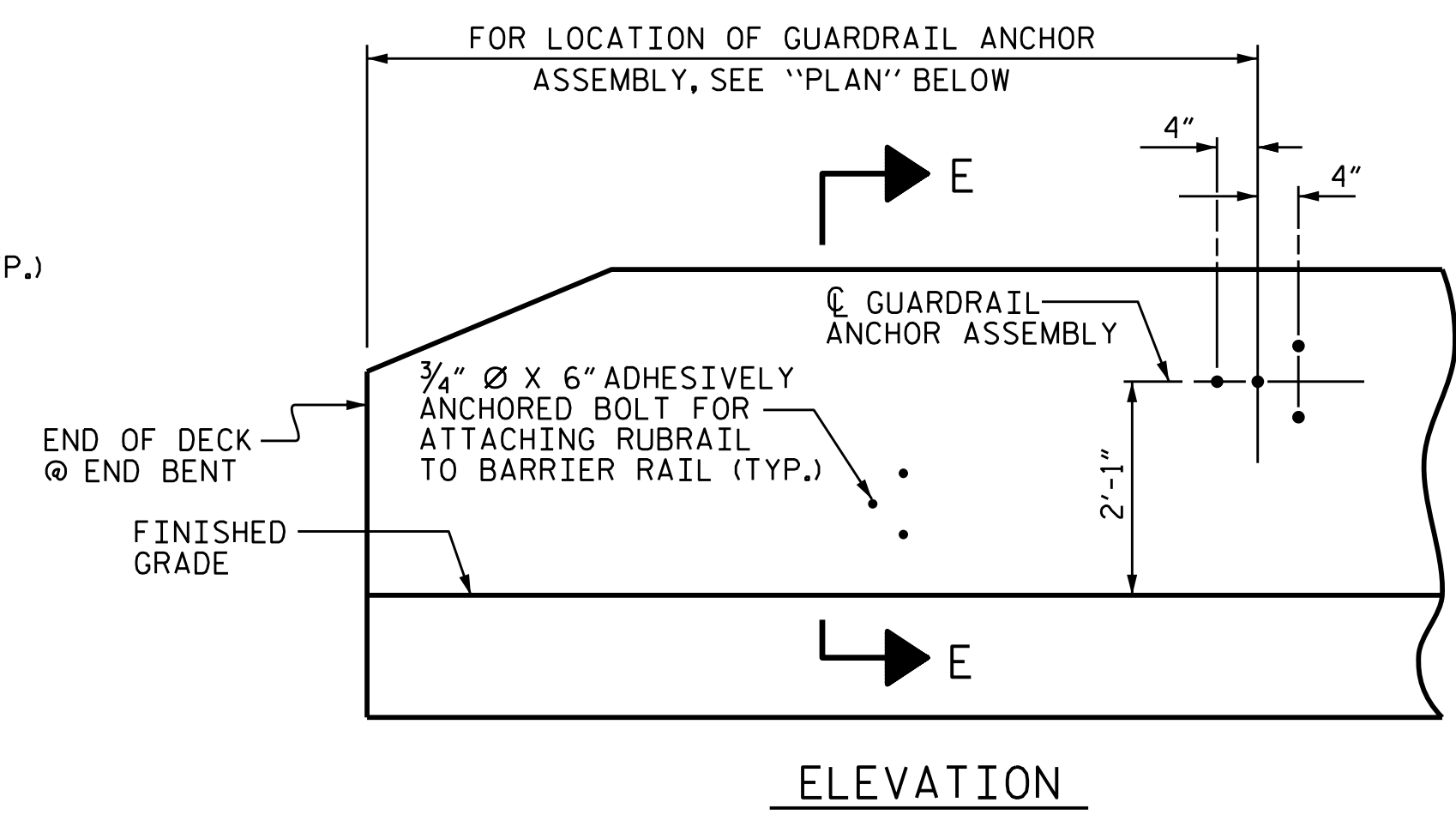
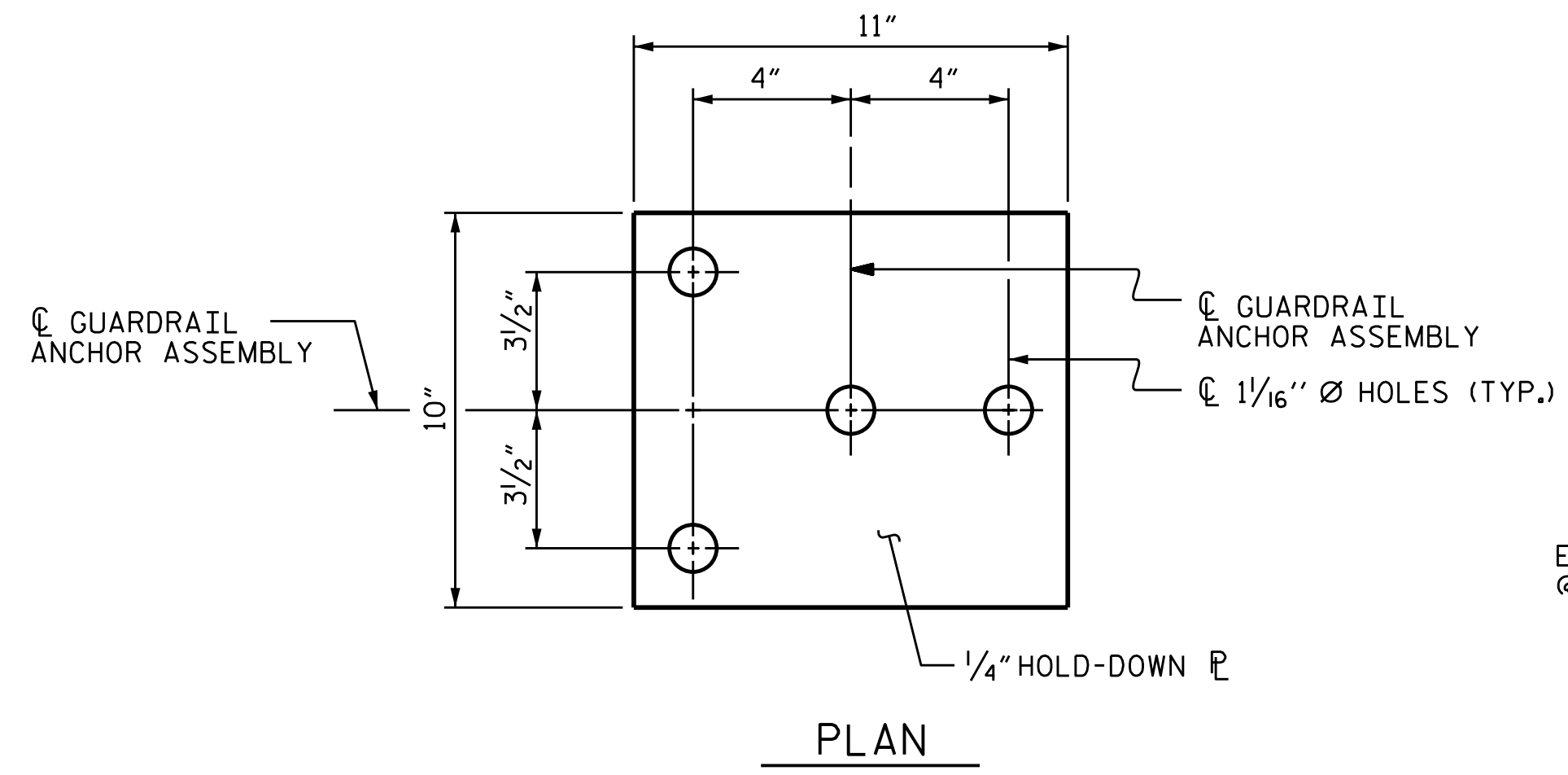
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

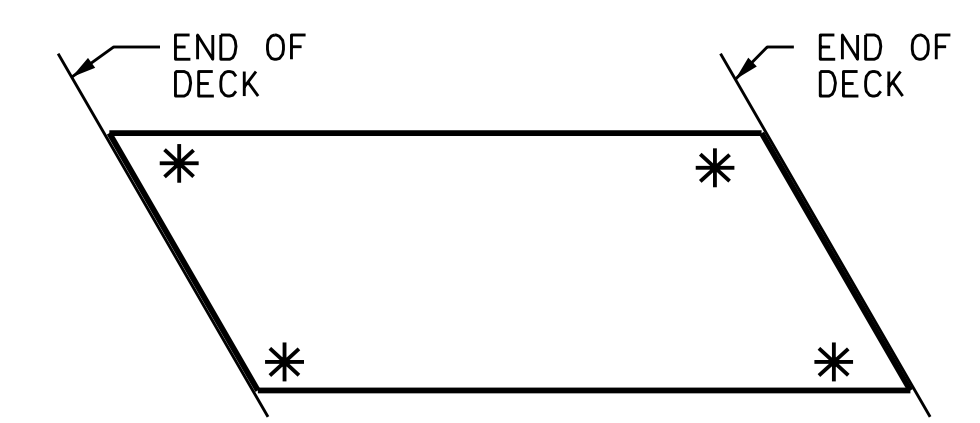
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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 BY ROTATION.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BR-0073
COLUMBUS COUNTY
STATION: 18+24.50 -L-



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

ASSEMBLED BY : A. Y. WU	DATE : 10/22
CHECKED BY : D. A. GLADDEN	DATE : 11/22
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

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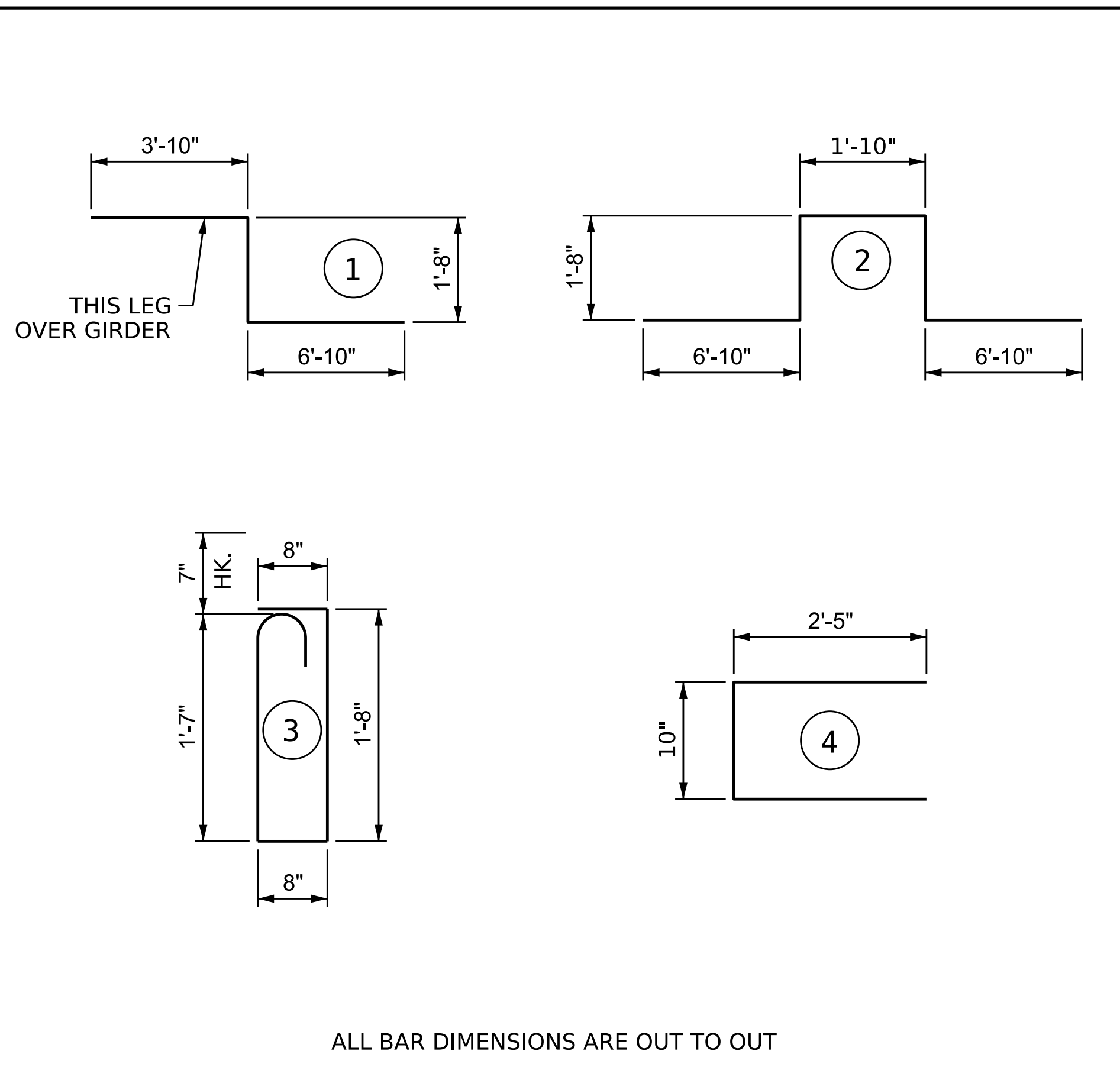
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			38

9/26/20

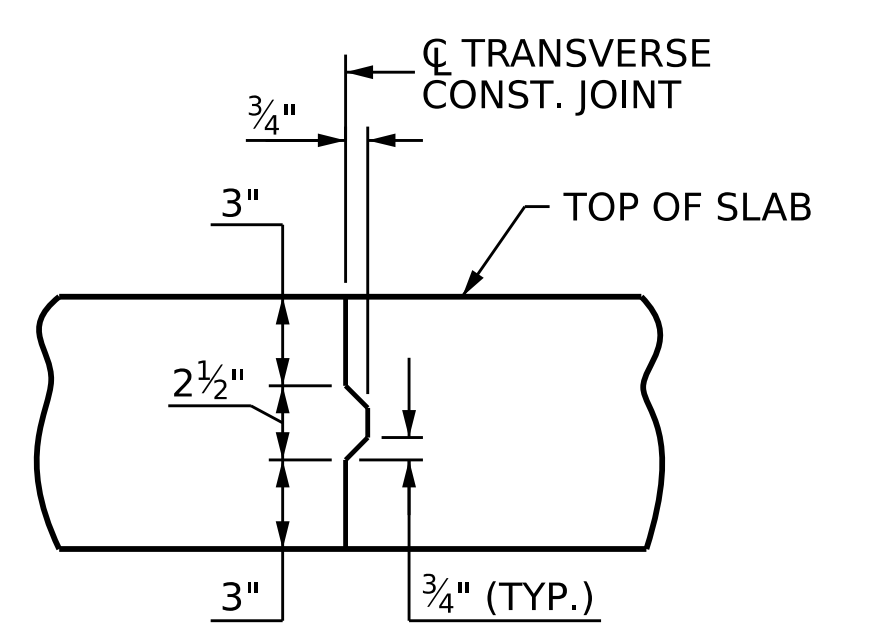
BILL OF MATERIAL

BAR TYPES

Table with columns: BAR, NO., SIZE, TYPE, LENGTH, WEIGHT. Lists 250+ items of reinforcing steel with their respective quantities and weights.



ALL BAR DIMENSIONS ARE OUT TO OUT



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

Table: SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS. Columns: BAR SIZE, SUPERSTRUCTURE (Epoxy Coated/Uncoated), APPROACH SLABS (Epoxy Coated/Uncoated), PARAPETS AND BARRIER RAILS.



PROJECT NO. BR-0073 COLUMBUS COUNTY STATION: 18+24.50 -L-

DEPARTMENT OF TRANSPORTATION SUPERSTRUCTURE BILL OF MATERIAL SHEET 1 OF 2

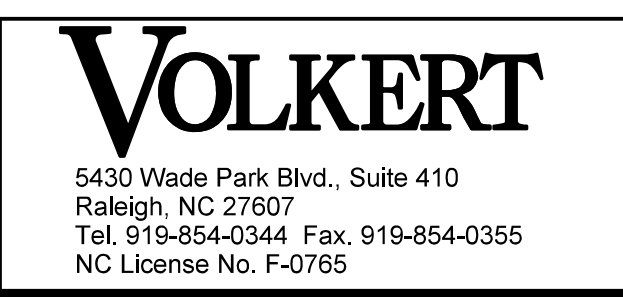
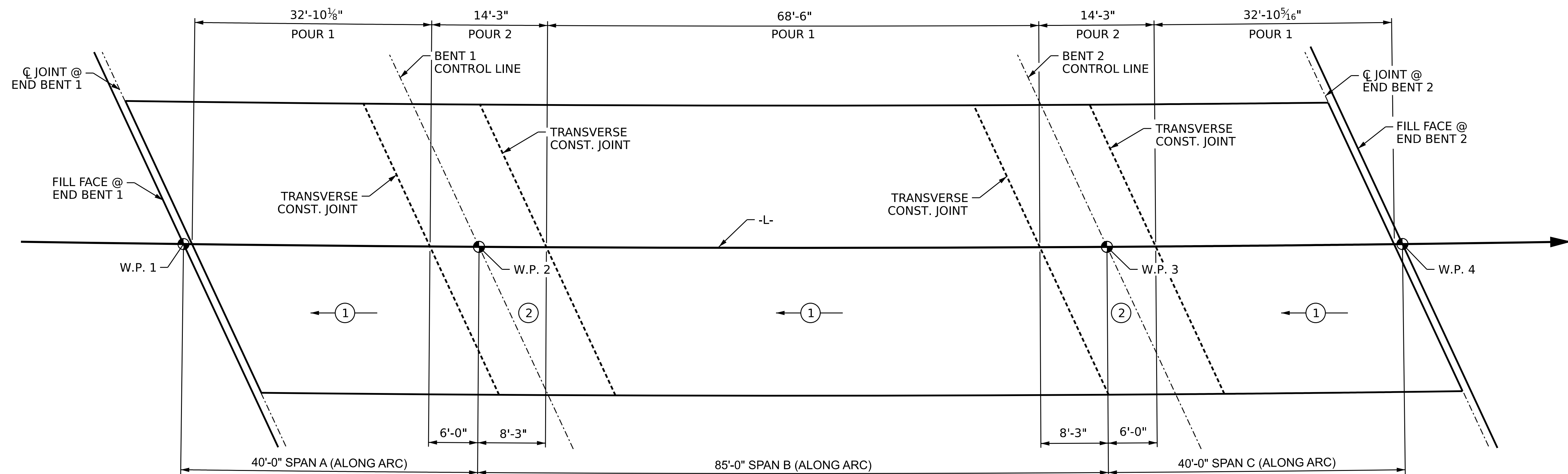


Table: REVISIONS and SHEET NO. columns. Revisions 1-4, SHEET NO. S-23 TOTAL SHEETS 38.

DRAWN BY: A. Y. WU DATE: 10/22 CHECKED BY: D. A. GLADDEN DATE: 10/22 DESIGN ENGINEER OF RECORD: P.N. HOLDER DATE: 11/22

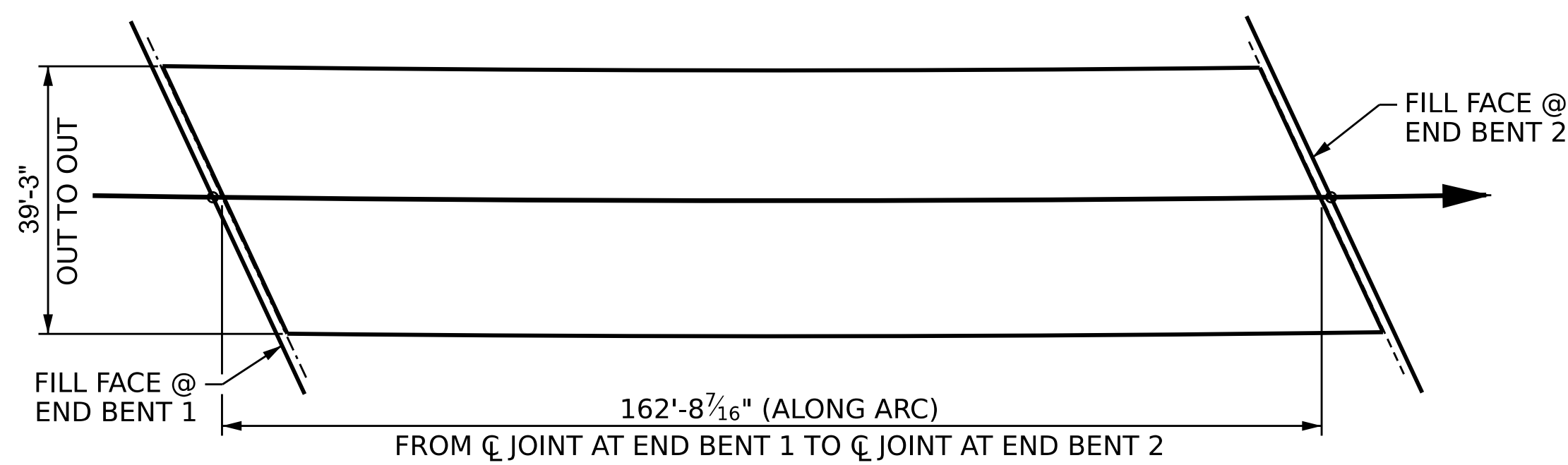


POURING SEQUENCE

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

ALL DIMENSIONS ARE MEASURED ALONG SHORT CHORD FROM WORK POINT TO WORK POINT UNLESS OTHERWISE NOTED.

← # → INDICATES POUR NUMBER AND POUR DIRECTION

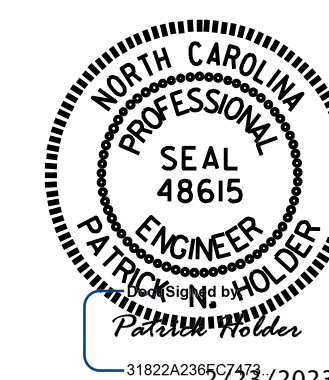


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 6,382)

SUPERSTRUCTURE BILL OF MATERIAL			
SPANS A, B, & C	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	163.9		
POUR 2	34.7		
TOTAL **	198.6	24,802	25,298

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1643 SQ.FT.
BRIDGE DECK	5320 SQ.FT.
TOTAL	6963 SQ.FT.



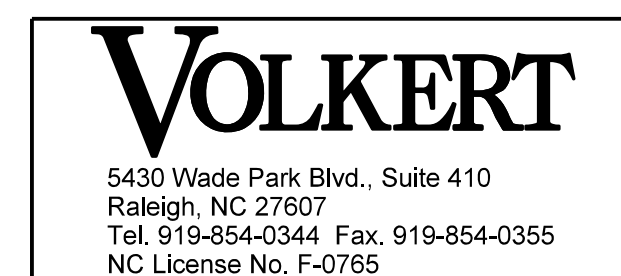
PROJECT NO. **BR-0073**
COLUMBUS COUNTY
STATION: **18+24.50 -L-**

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

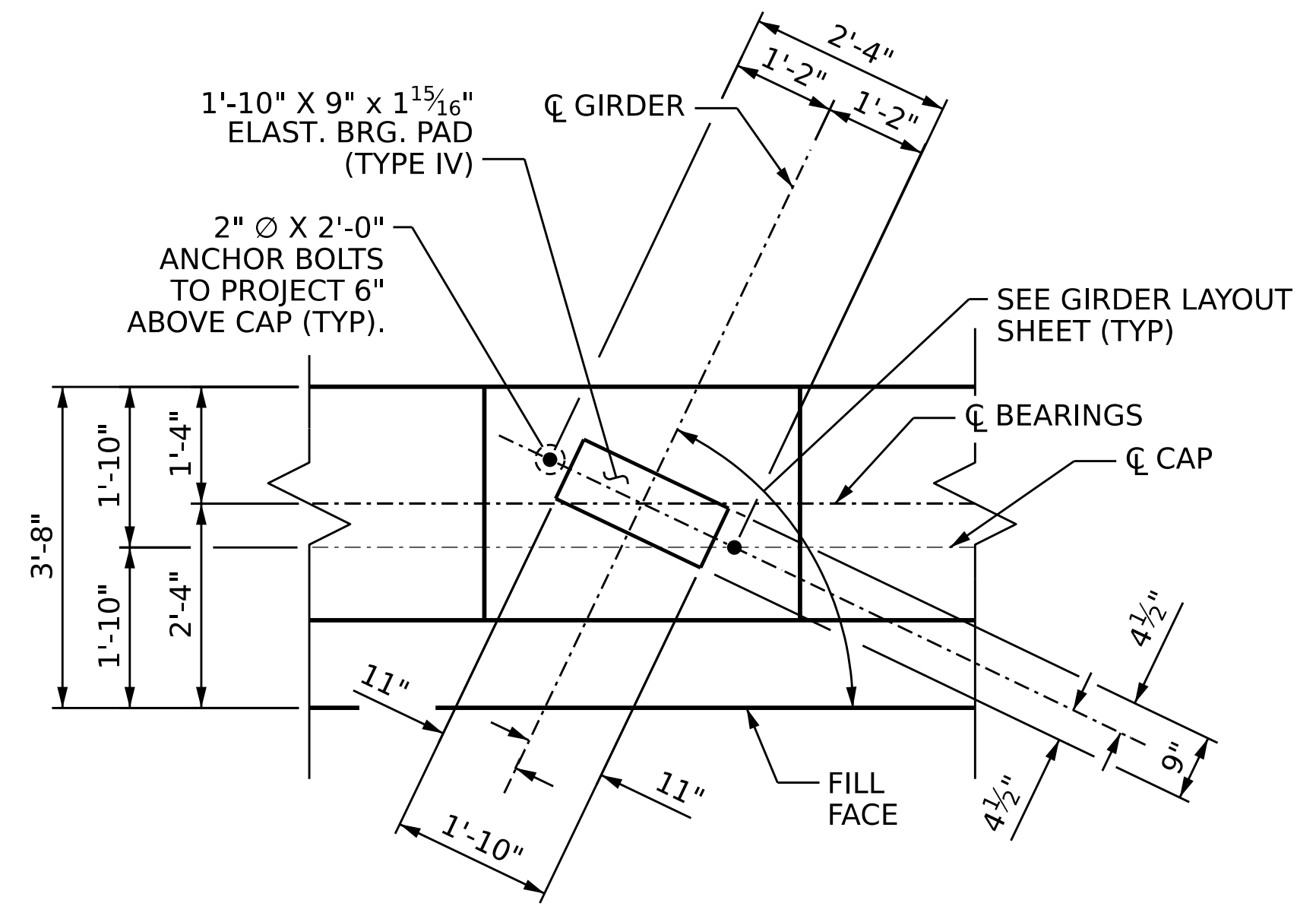
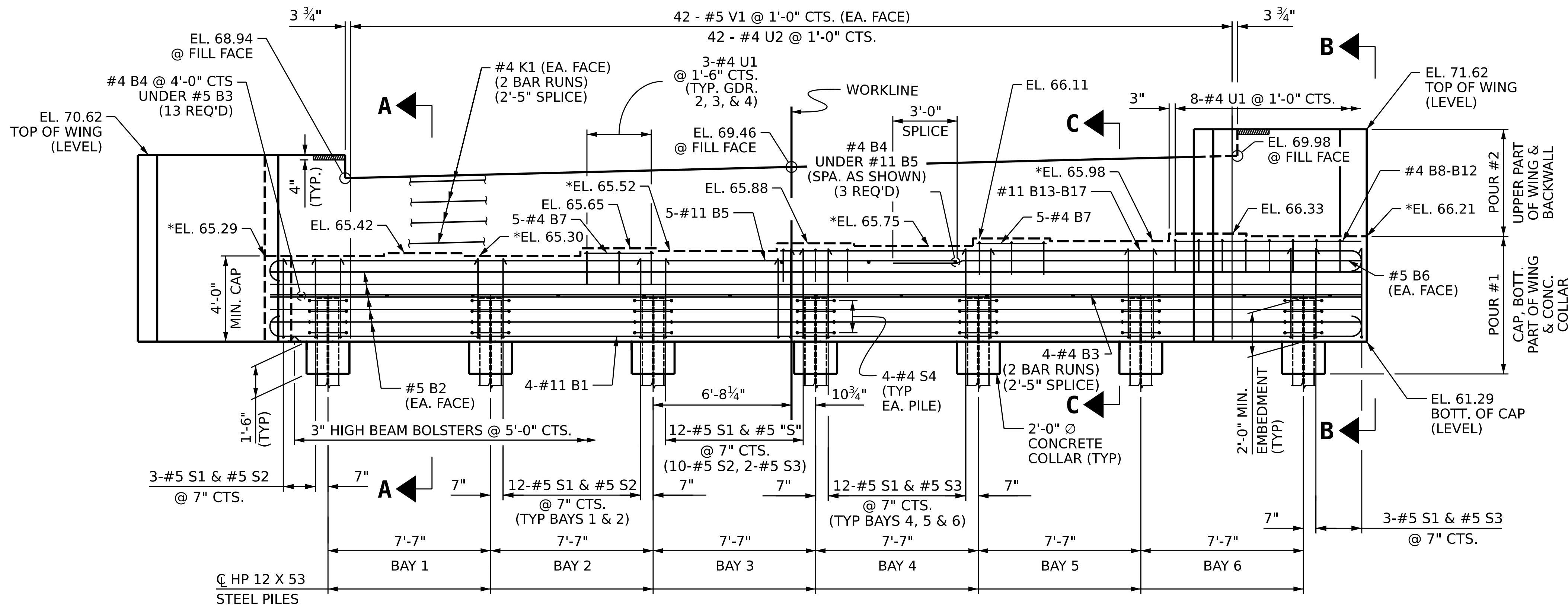
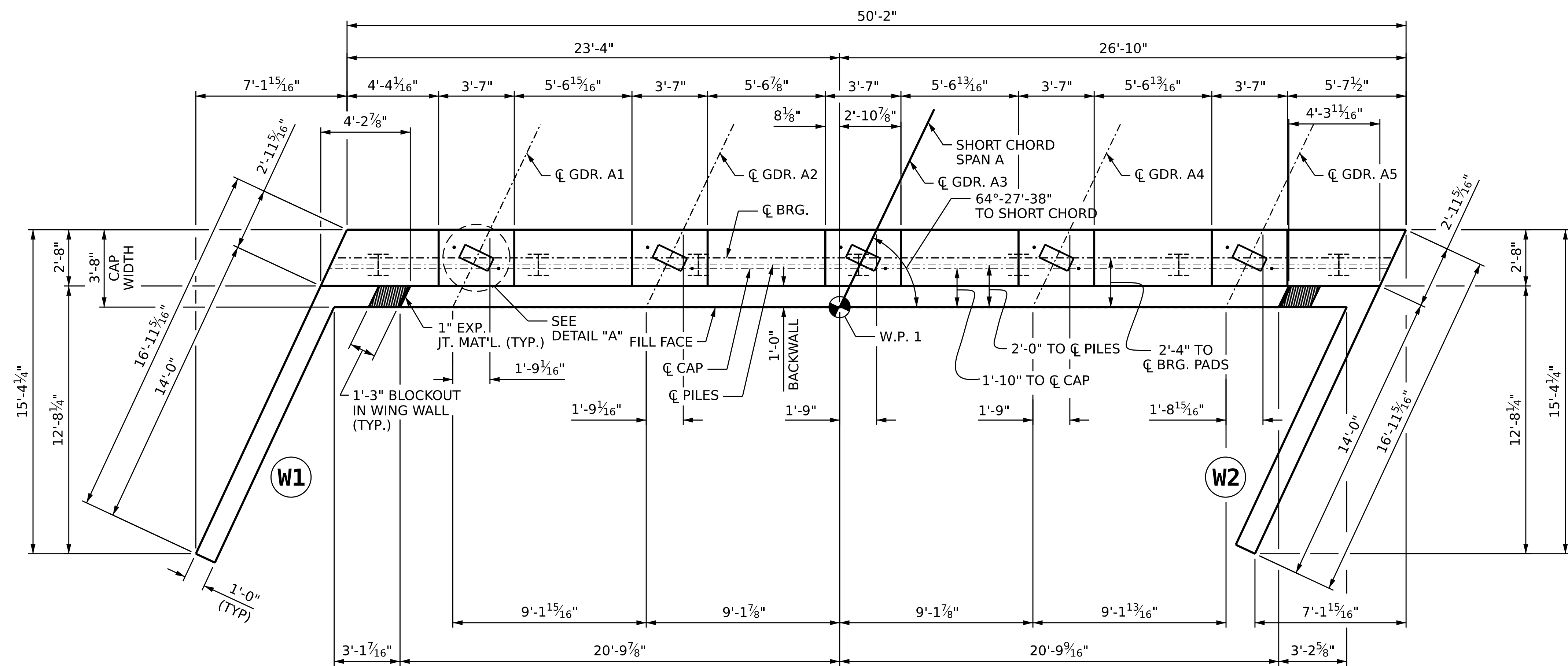
SUPERSTRUCTURE BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			38



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DRAWN BY: A. Y. WU DATE: 10/22
CHECKED BY: D. A. GLADDEN DATE: 10/22
DESIGN ENGINEER OF RECORD: P.N. HOLDER DATE: 11/22



NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #5 V1 BARS AND ANCHOR BOLTS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY DRAINAGE AND EROSION CONTROL AT THE END BENT.

FOR SECTIONS A-A, B-B, AND C-C, SEE SHEET 3 OF 3.

* THE TOP SURFACE AREAS OF THE CAP EXCEPT THE BRIDGE SEATS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE AT THE RATE OF 2%.

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

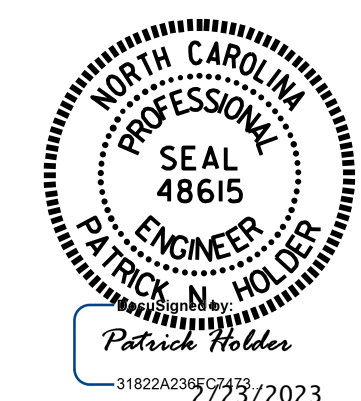
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

PROJECT NO. **BR-0073**

COLUMBUS COUNTY

STATION: **18+24.50 -L-**

SHEET 1 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
END BENT 1**

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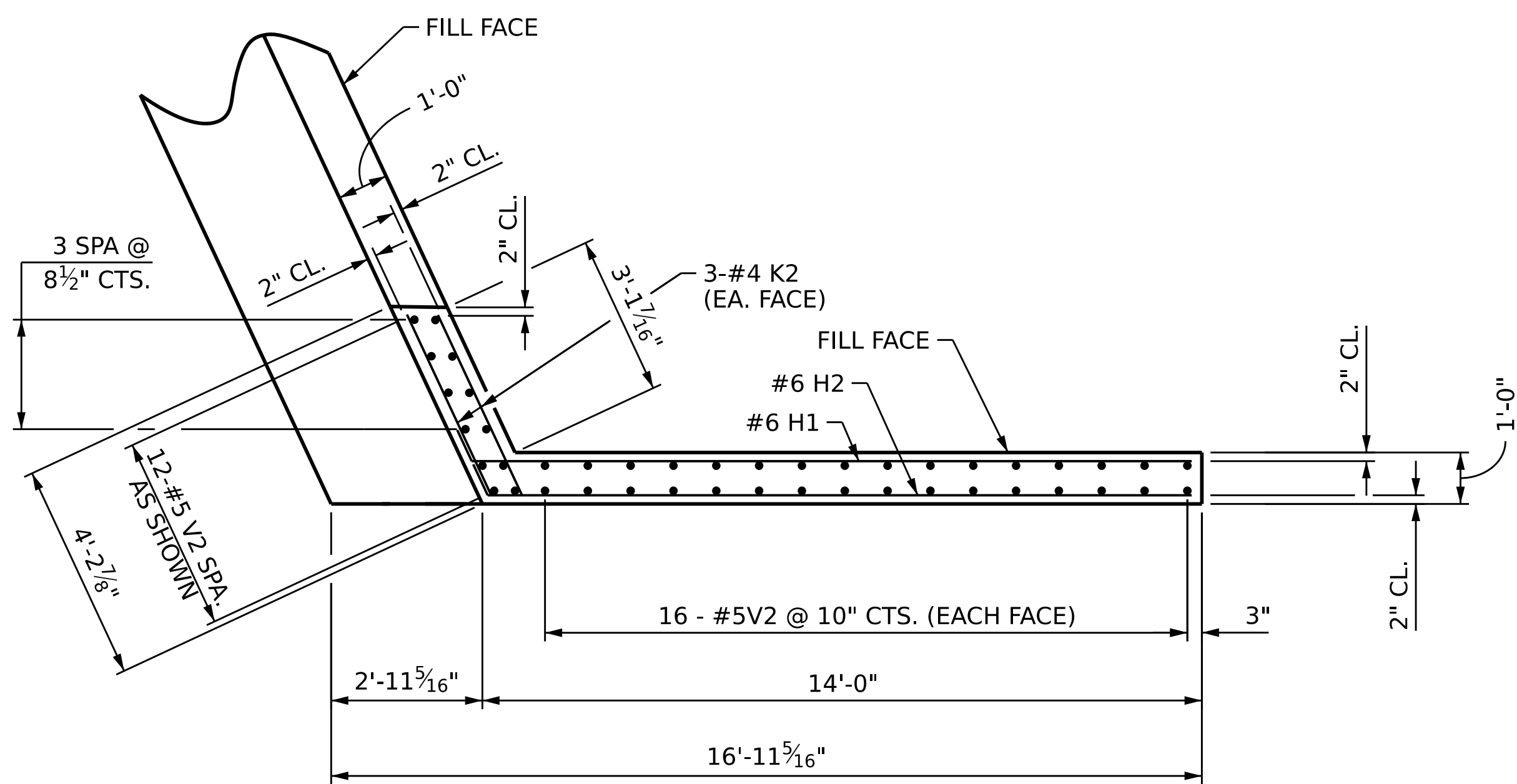
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

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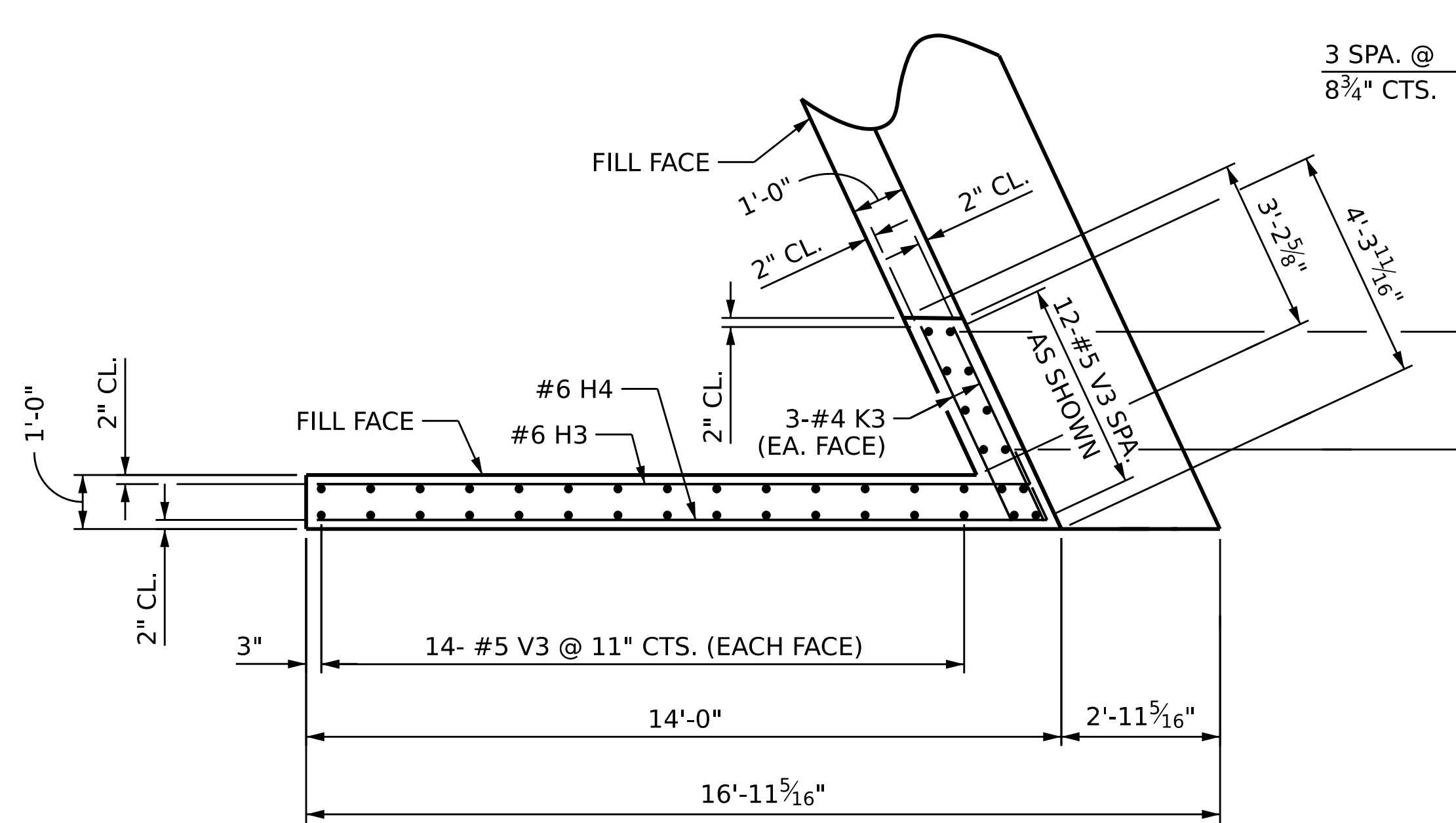
DRAWN BY: **B.H. BARNHILL** DATE: **09/22**

CHECKED BY: **D. GLADDEN** DATE: **11/22**

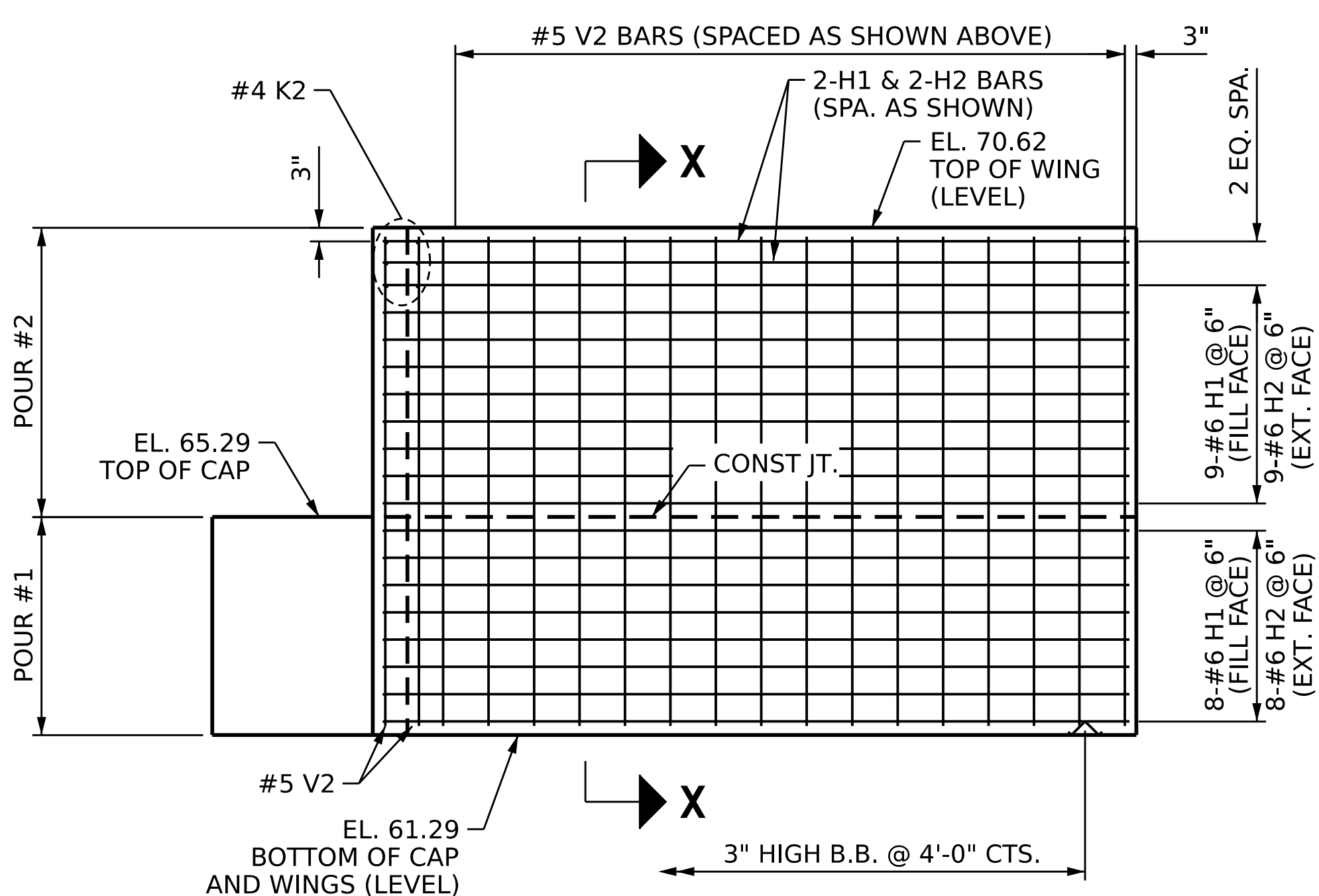
DESIGN ENGINEER OF RECORD: **P. N. HOLDER** DATE: **11/22**



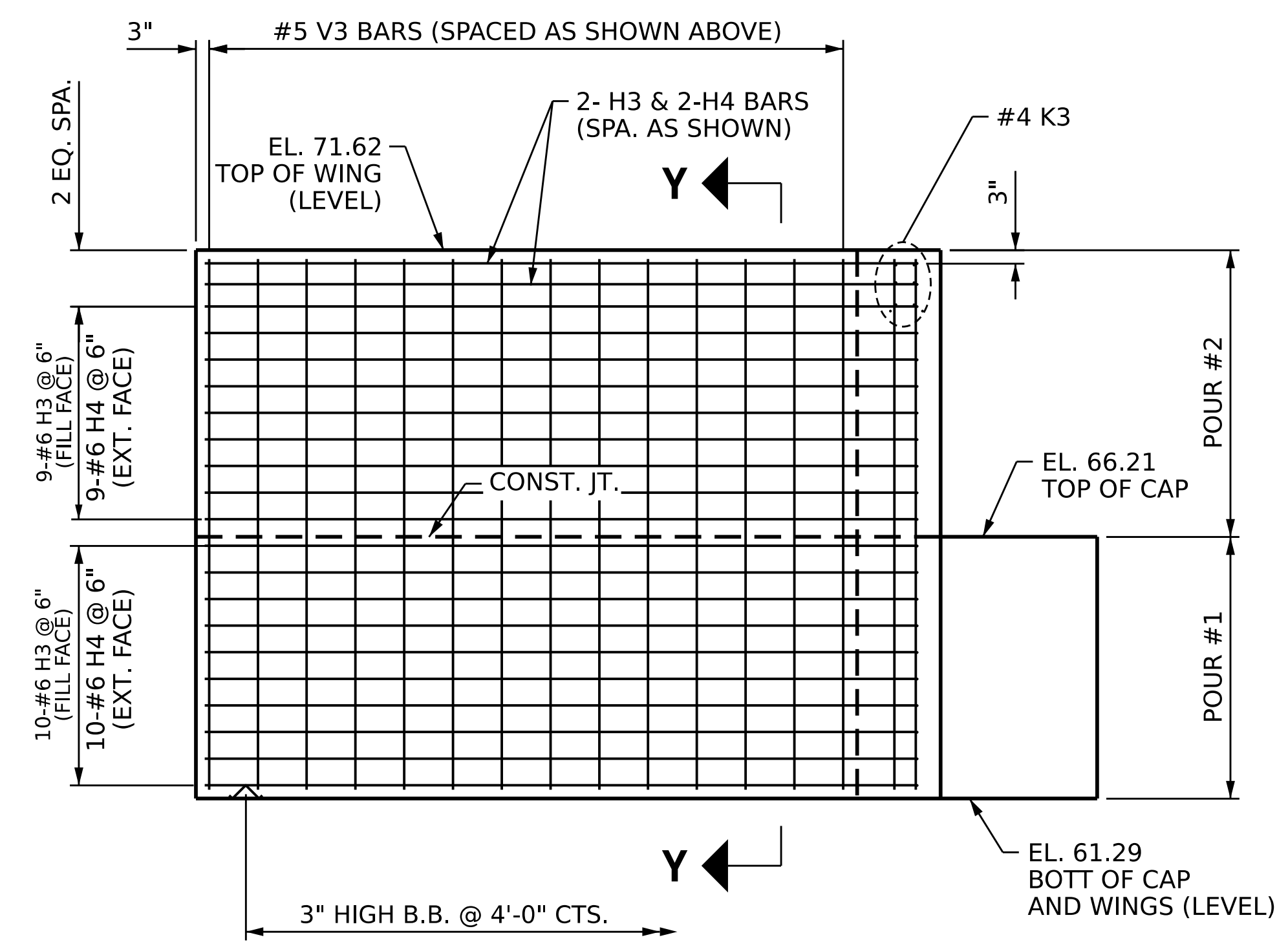
PLAN OF WING 1



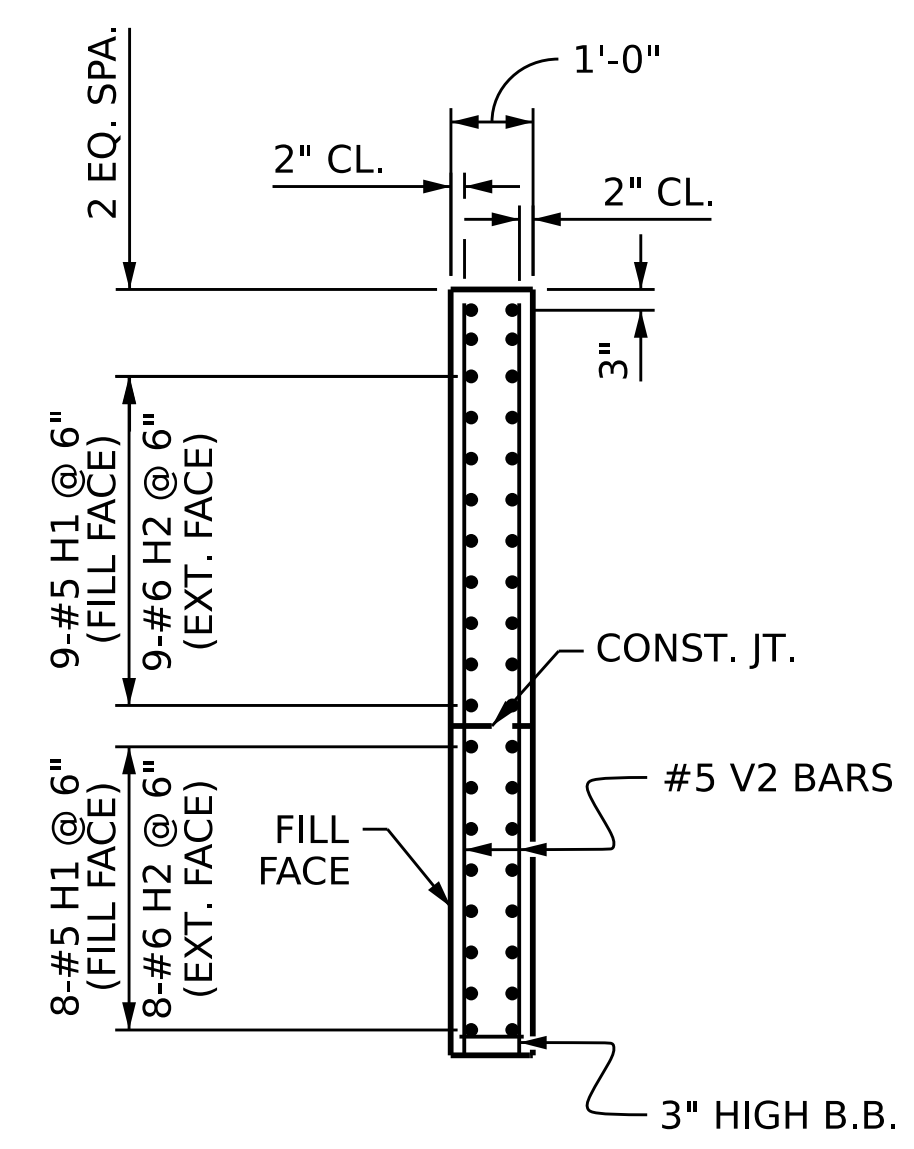
PLAN OF WING 2



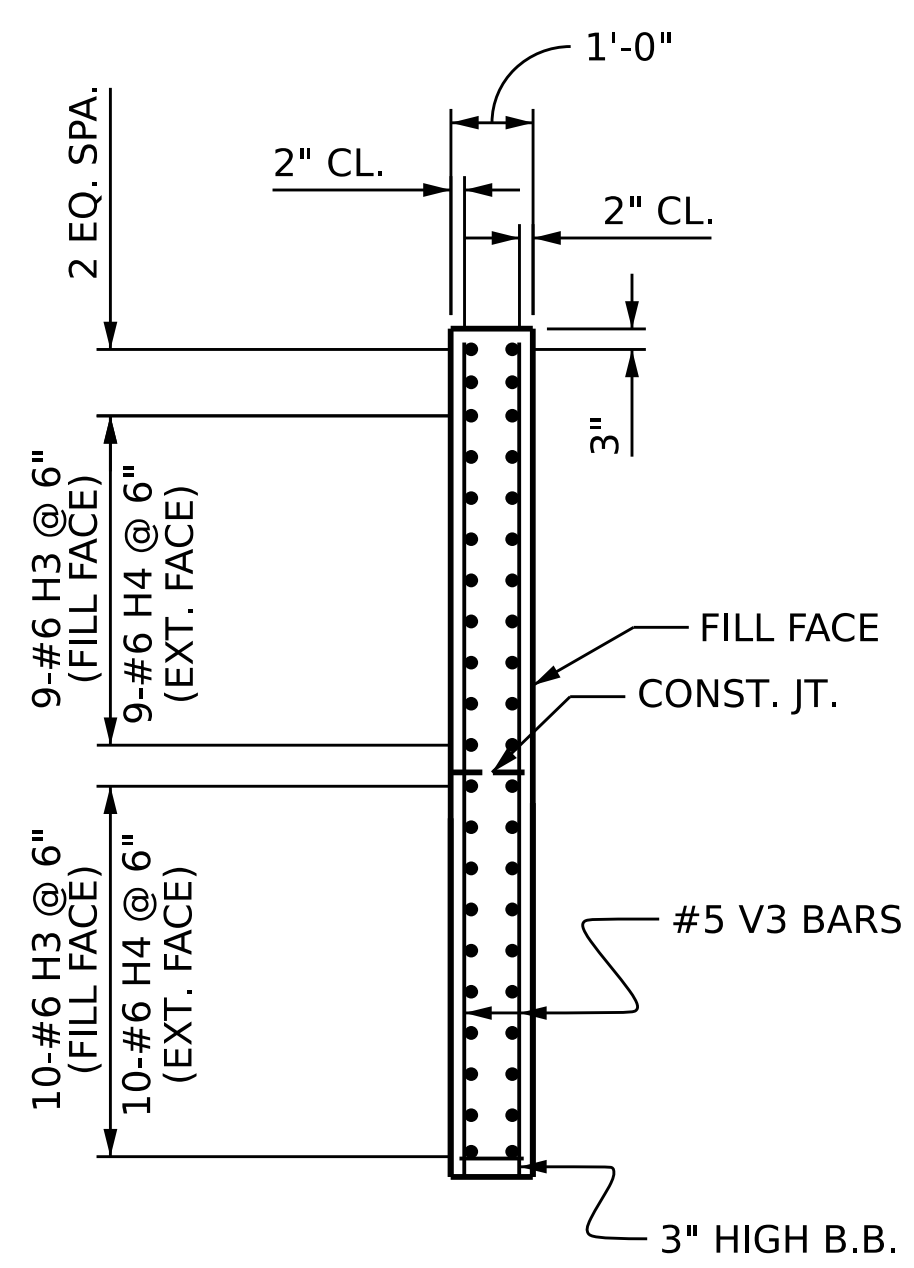
ELEVATION OF WING 1



ELEVATION OF WING 2



SECTION X-X

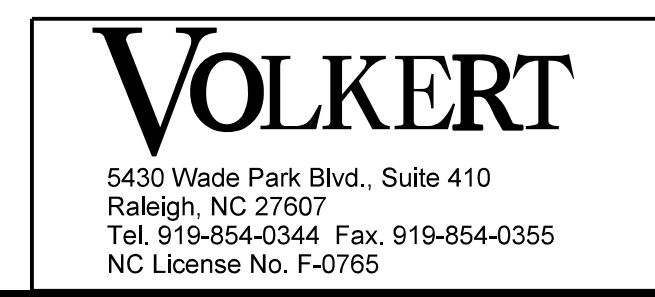
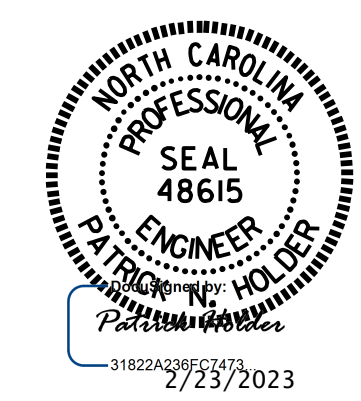


SECTION Y-Y

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 2 OF 3

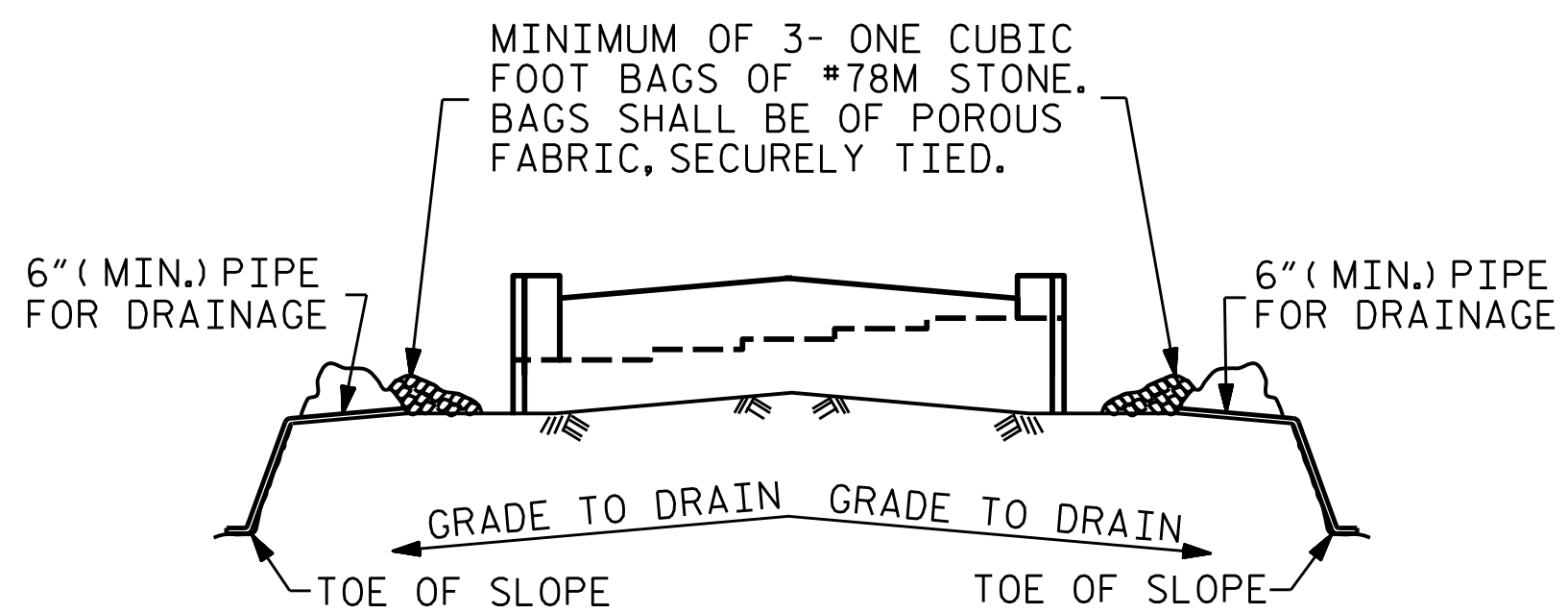
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
END BENT 1



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REVISIONS		SHEET NO.	
NO.	DATE	NO.	DATE
1		3	
2		4	
		TOTAL SHEETS: 38	

DRAWN BY: **B. H. BARNHILL** DATE: **10/22**
 CHECKED BY: **D. GLADDEN** DATE: **11/22**
 DESIGN ENGINEER OF RECORD: **P. N. HOLDER** DATE: **11/22**



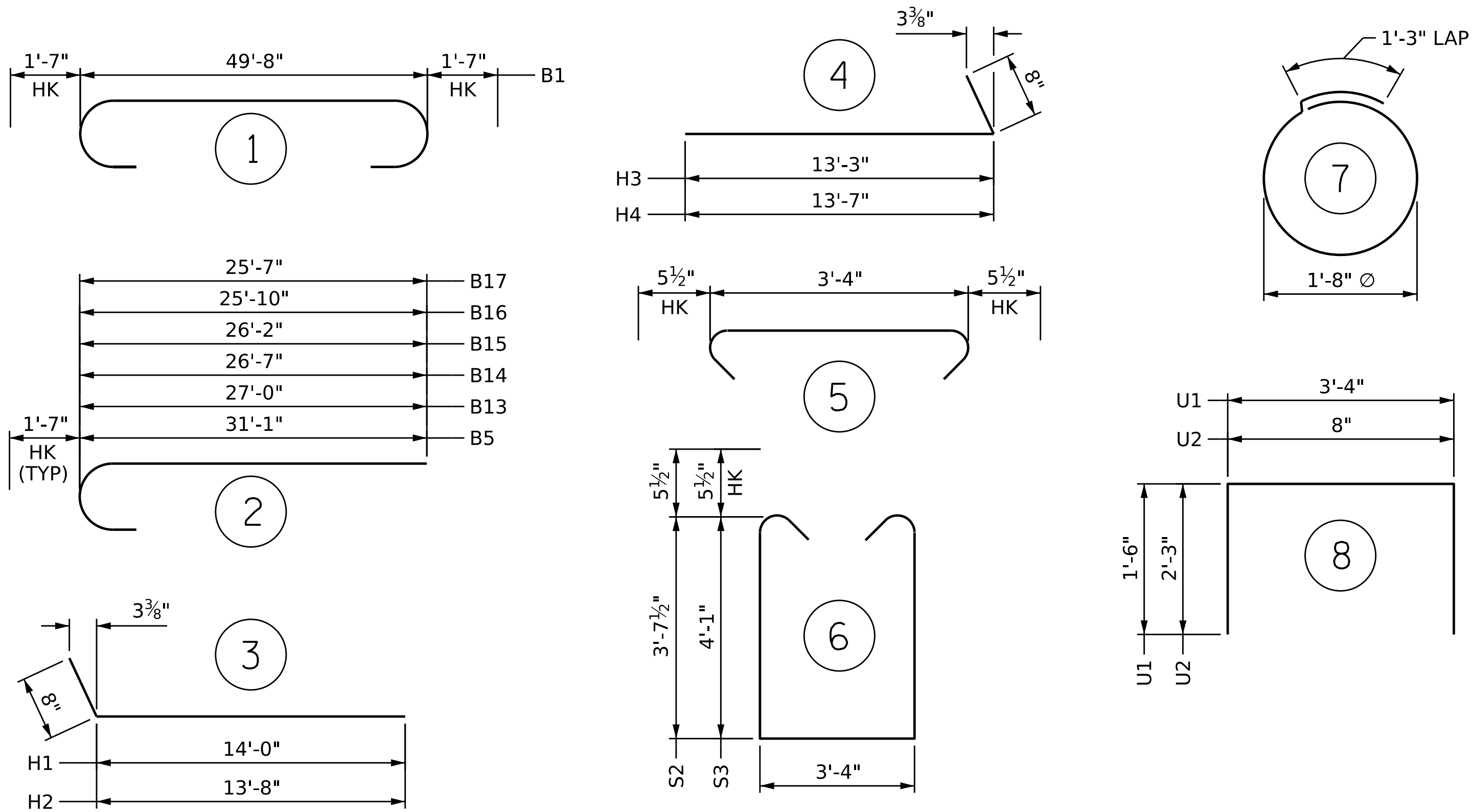
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

BAR TYPES



BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#11	1	52'-10"	1123
B2	10	#5	STR	49'-10"	520
B3	8	#4	STR	26'-2"	140
B4	16	#4	STR	3'-4"	36
B5	5	#11	2	32'-8"	868
B6	2	#5	STR	21'-10"	46
B7	10	#4	STR	3'-3"	22
B8	1	#4	STR	8'-8"	6
B9	1	#4	STR	8'-3"	6
B10	1	#4	STR	7'-10"	5
B11	1	#4	STR	7'-6"	5
B12	1	#4	STR	7'-3"	5
B13	1	#11	2	28'-7"	152
B14	1	#11	2	28'-2"	150
B15	1	#11	2	27'-9"	147
B16	1	#11	2	27'-5"	146
B17	1	#11	2	27'-2"	144
H1	19	#6	3	14'-8"	419
H2	19	#6	3	14'-4"	409
H3	21	#6	4	13'-11"	439
H4	21	#6	4	14'-3"	449
K1	16	#4	STR	26'-2"	280
K2	6	#4	STR	3'-9"	15
K3	6	#4	STR	3'-11"	16
S1	78	#5	5	4'-3"	346
S2	37	#5	6	11'-6"	444
S3	41	#5	6	12'-5"	531
S4	28	#4	7	6'-6"	122
U1	17	#4	8	6'-4"	72
U2	42	#4	8	5'-2"	145
V1	84	#5	STR	7'-3"	635
V2	44	#5	STR	9'-0"	413
V3	40	#5	STR	10'-0"	417

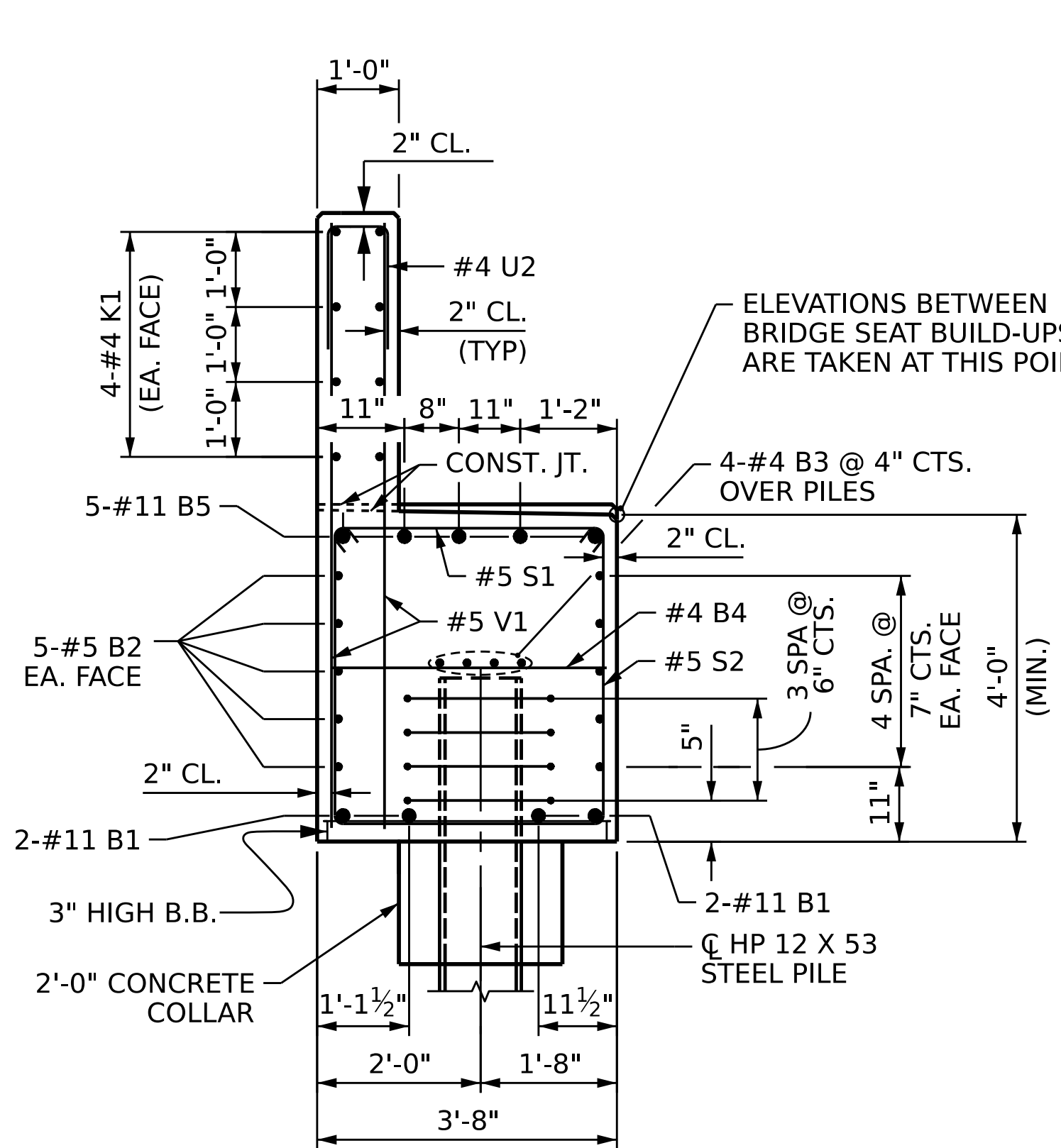
REINFORCING STEEL 8669 LBS.

CLASS A CONCRETE

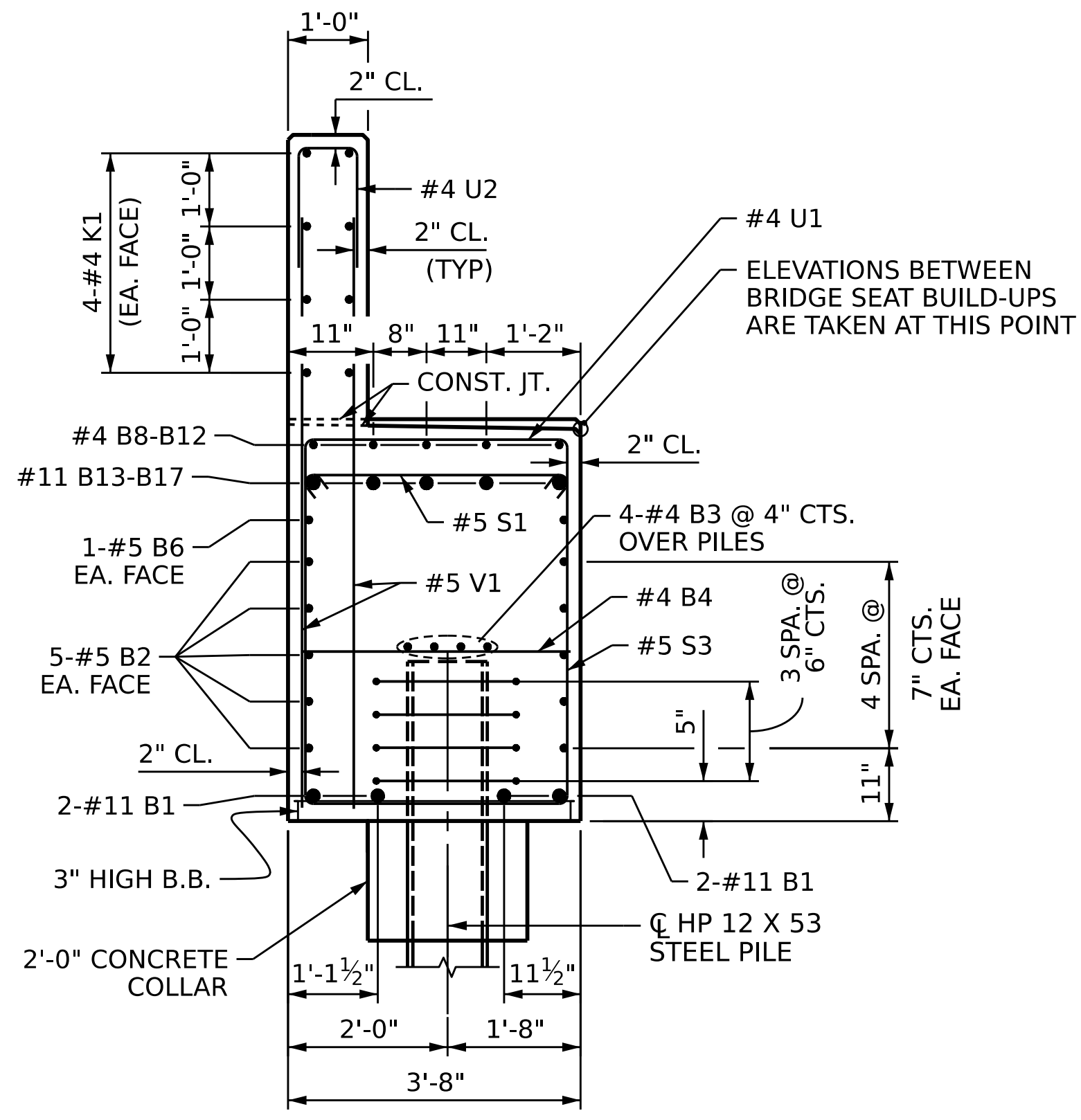
POUR #1 (CAP, COLLARS, & LOWER PART OF WINGS) 35.8 C.Y.

POUR #2 (BACKWALL & UPPER PART OF WINGS) 12.6 C.Y.

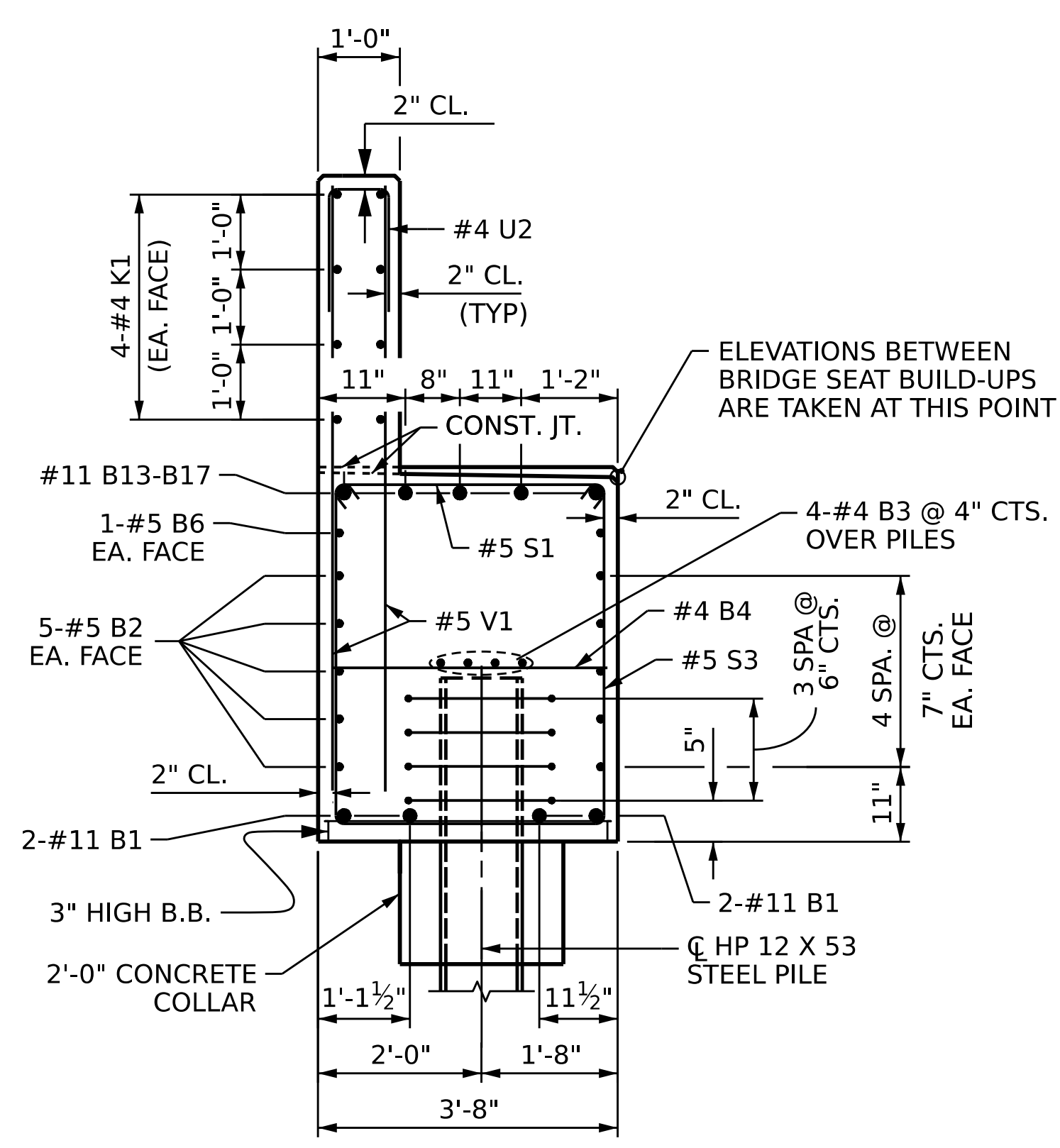
TOTAL CLASS A CONCRETE 48.4 C.Y.



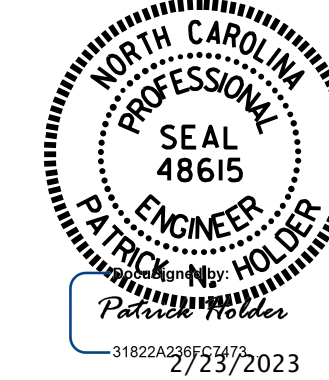
SECTION A-A



SECTION B-B



SECTION C-C



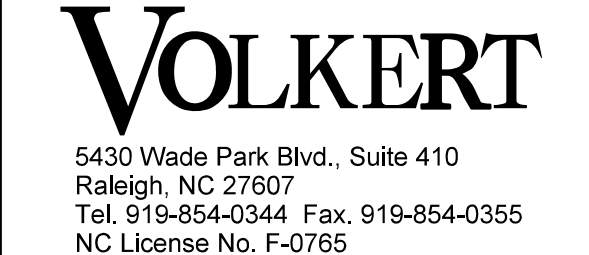
PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 1

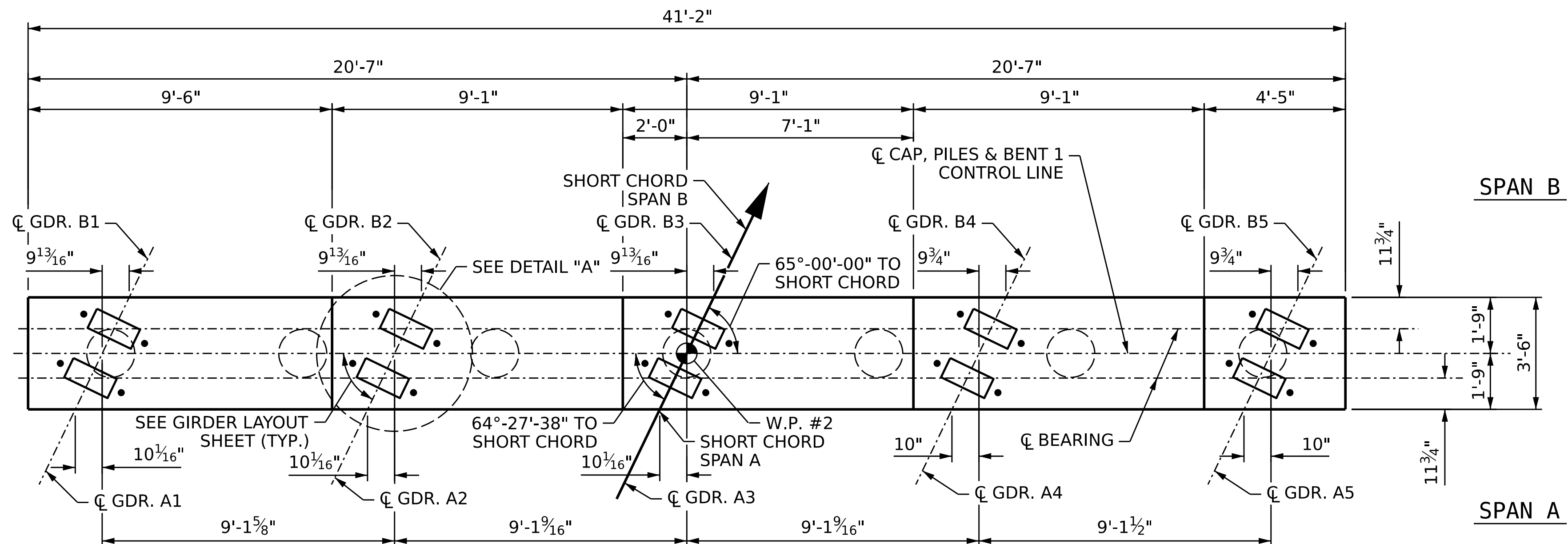
DRAWN BY: B. H. BARNHILL DATE: 10/22
 CHECKED BY: D. A. GLADDEN DATE: 11/22
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 11/22



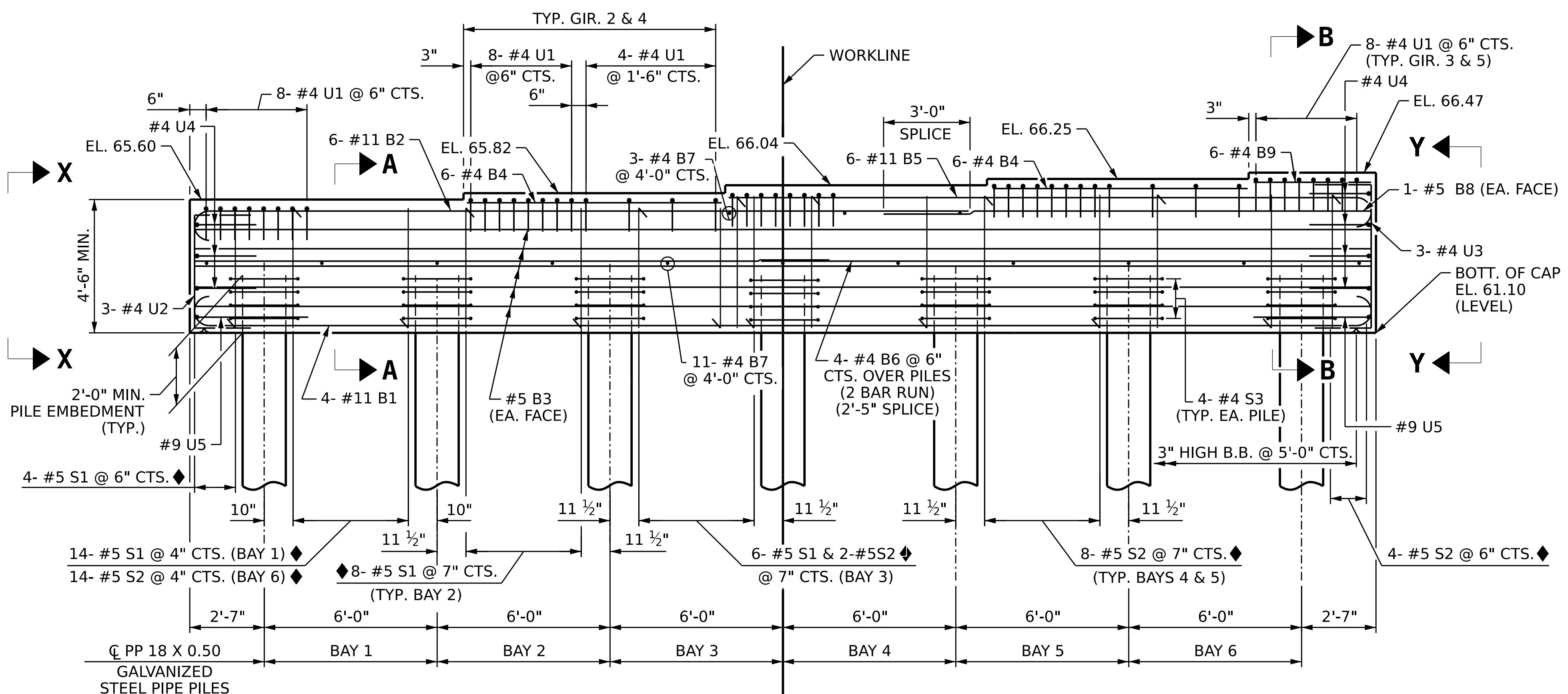
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS 38



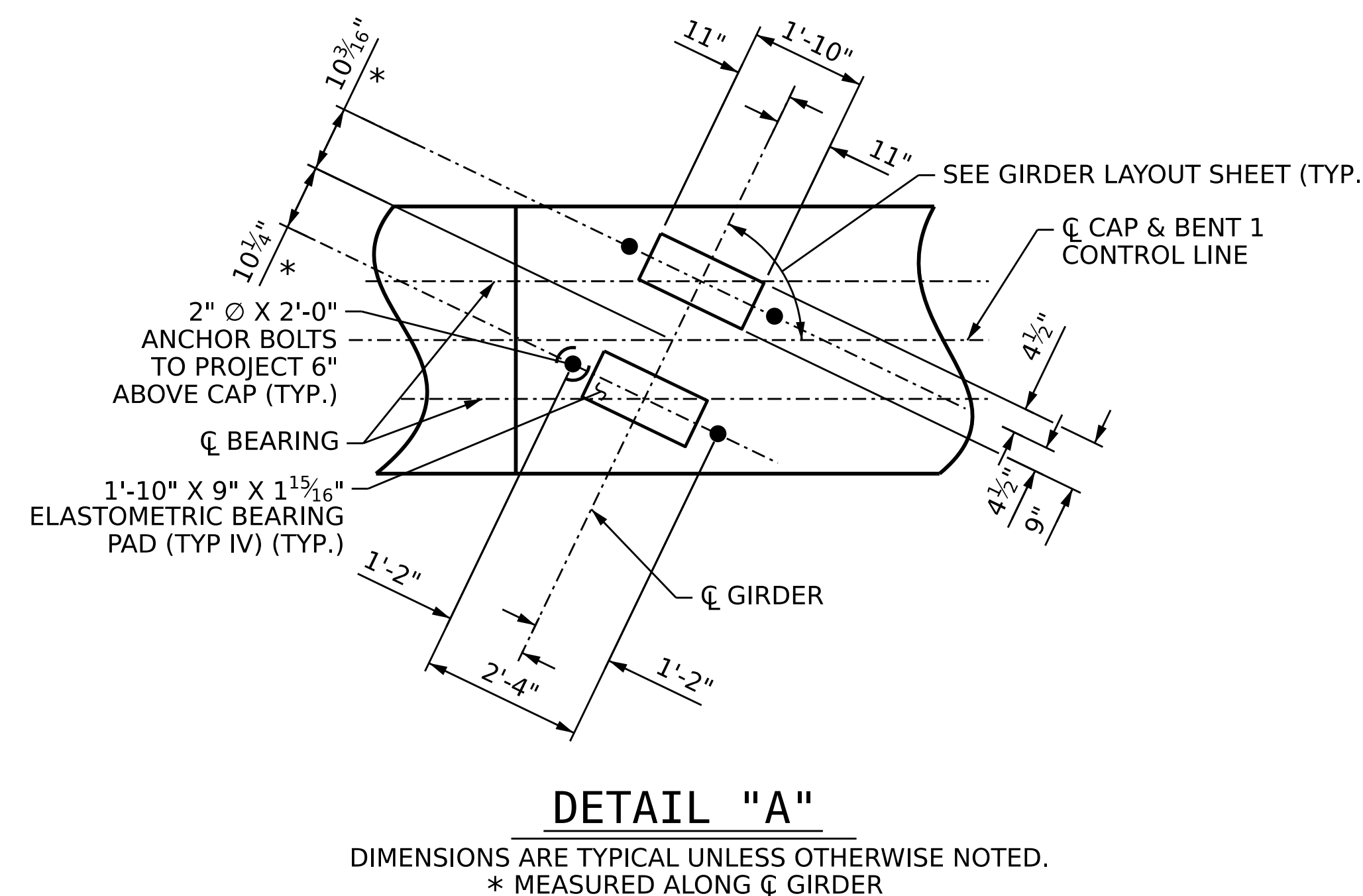
PLAN



ELEVATION

NOTES:

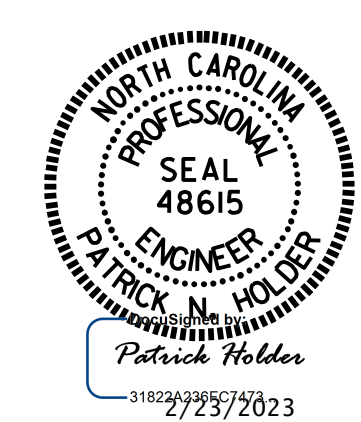
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y, SEE SHEET 2 OF 2.
- GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 26 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.
- FOR PP 18 X 0.50 GALVANIZED STEEL PIPE PILE DETAILS, SEE "18" STEEL PIPE PILE" SHEET.
- ◆ INVERT ALTERNATE STIRRUPS AS SHOWN.



DETAIL "A"

DIMENSIONS ARE TYPICAL UNLESS OTHERWISE NOTED. * MEASURED ALONG C/G GIRDER

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**
 SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

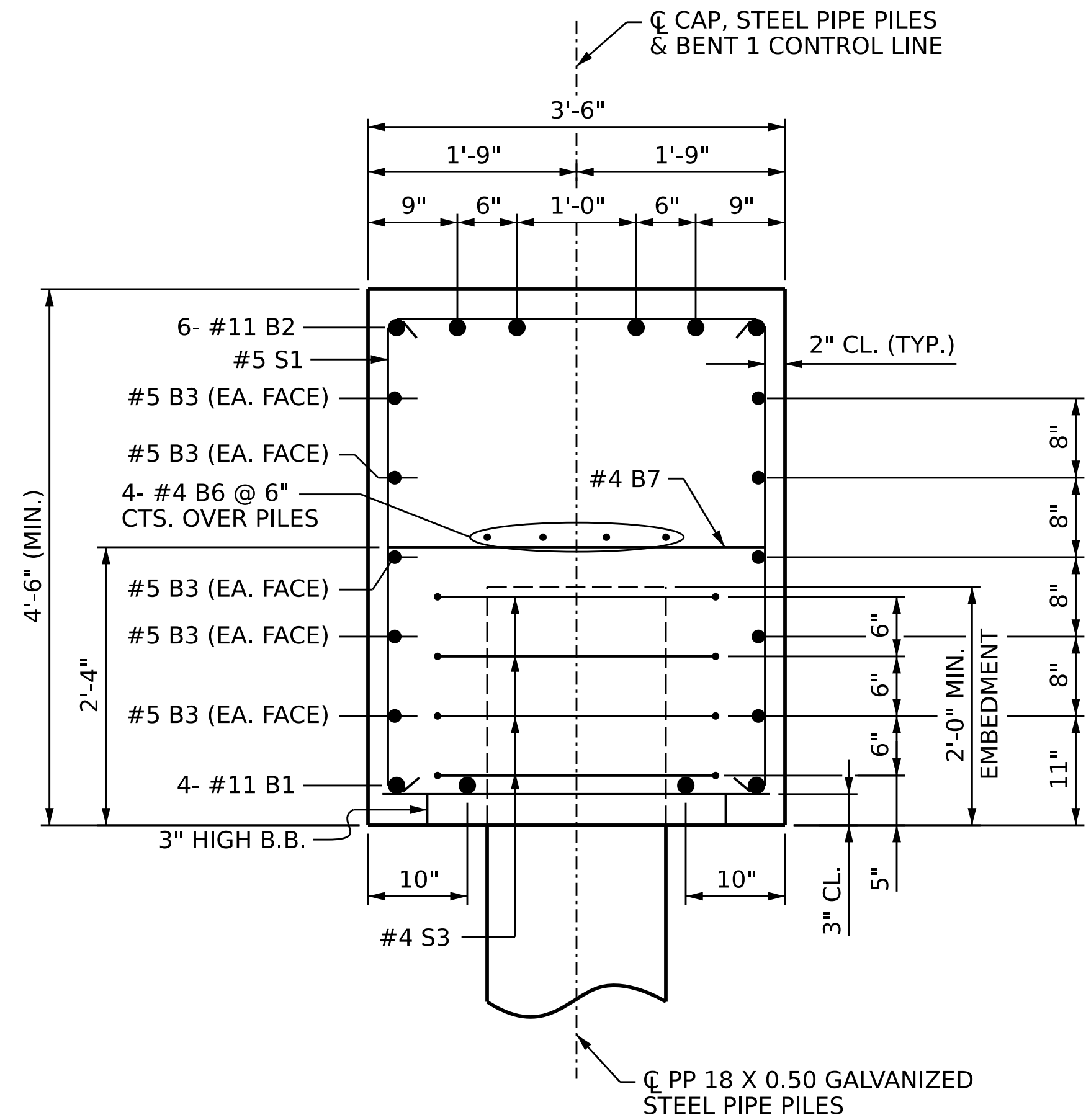
SUBSTRUCTURE
BENT 1

VOLKERT
 5430 Wade Park Blvd., Suite 410
 Raleigh, NC 27607
 Tel. 919-854-0344 Fax. 919-854-0355
 NC License No. F-0765

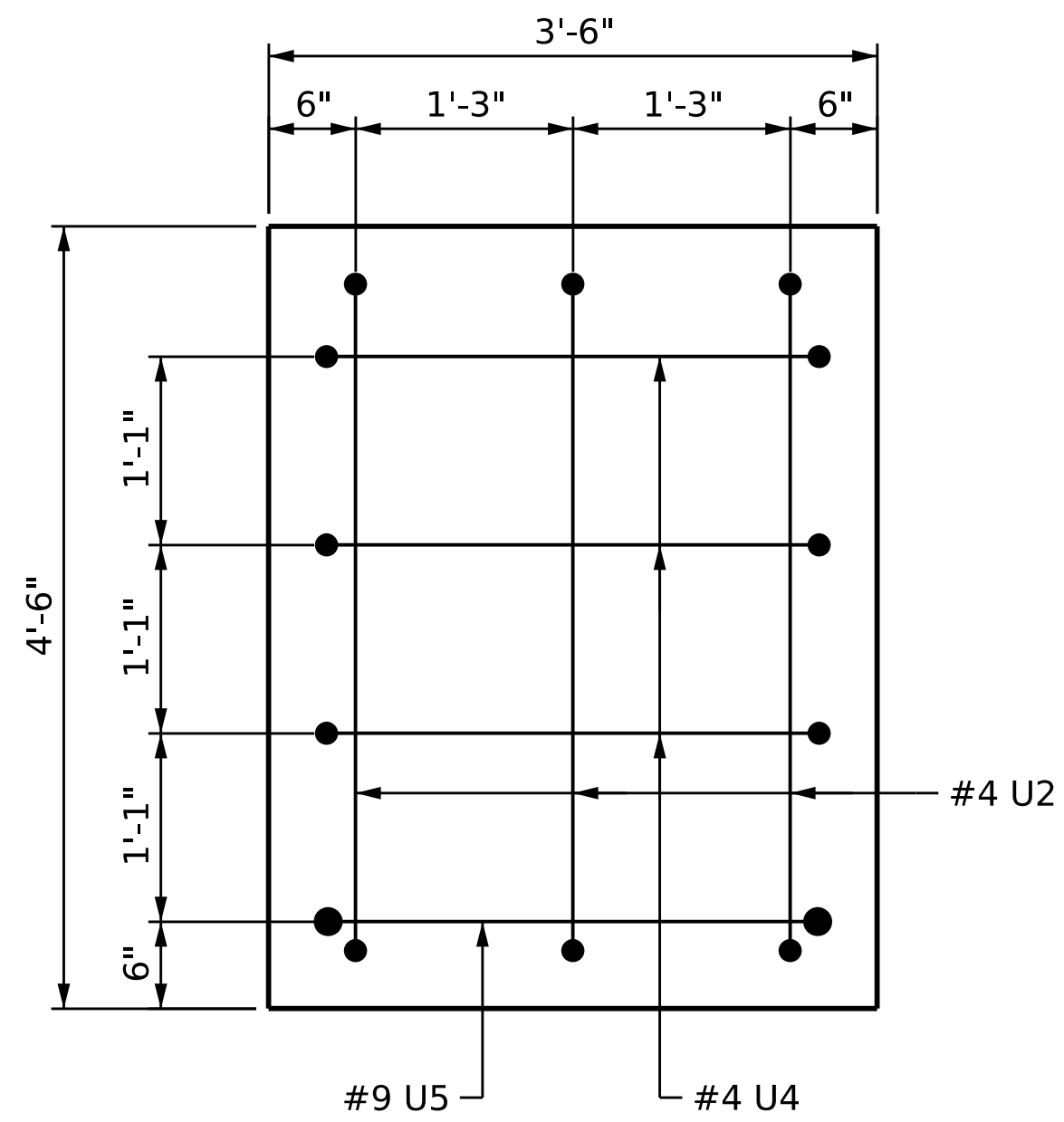
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			38

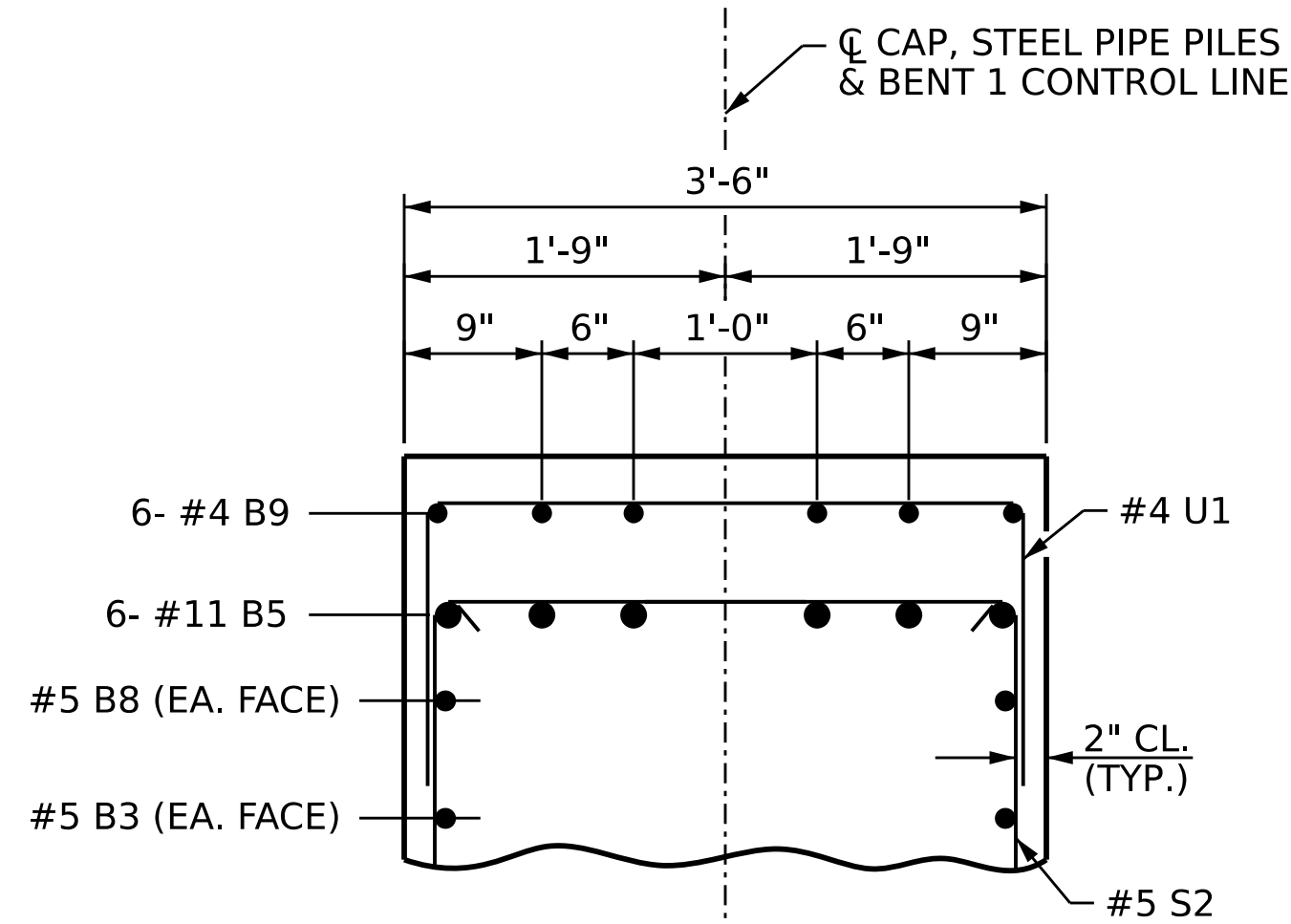
DRAWN BY : A. Y. WU DATE : 10/22
 CHECKED BY : B. H. BARNHILL DATE : 11/22
 DESIGN ENGINEER OF RECORD : P. N. HOLDER DATE : 11/22



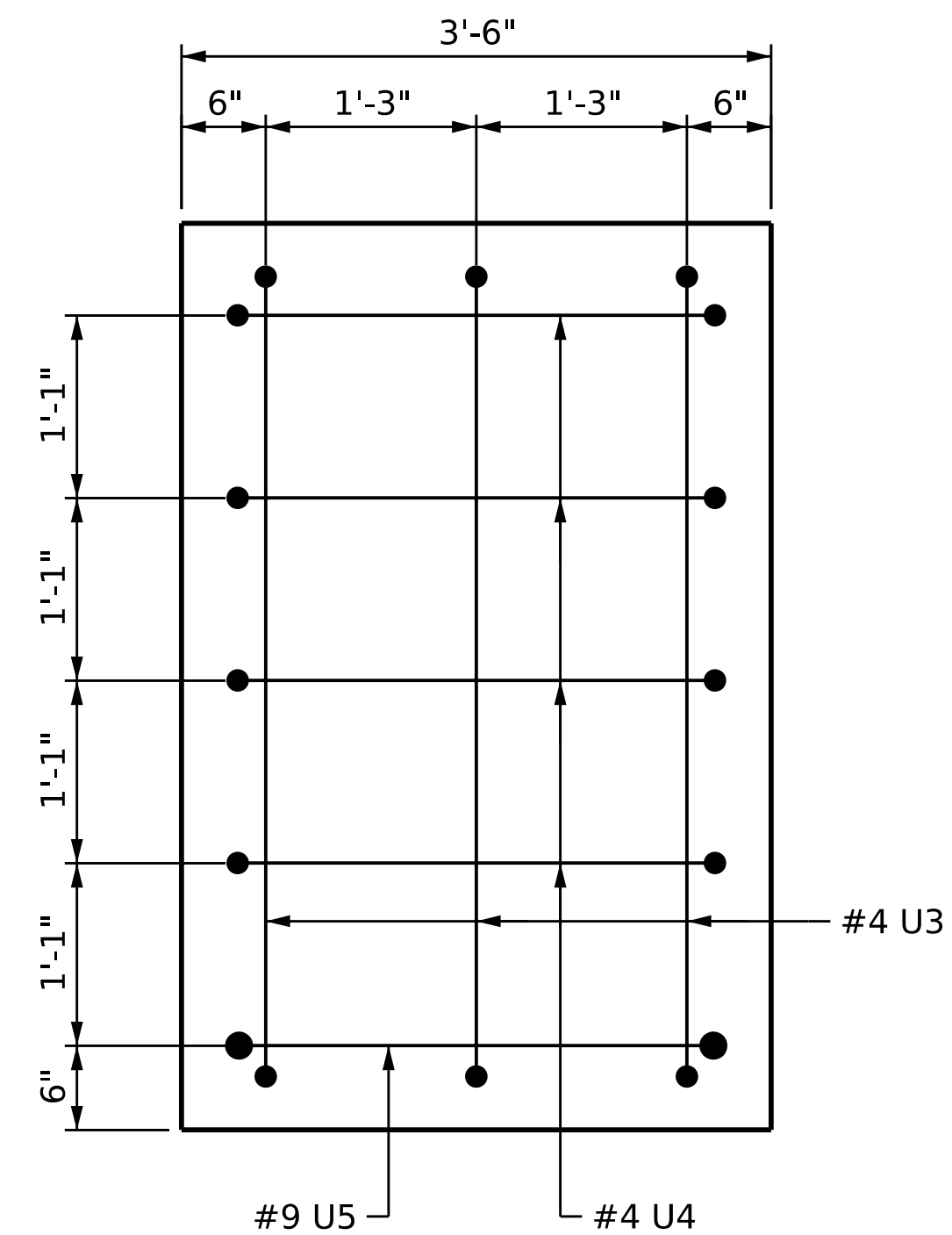
SECTION A-A



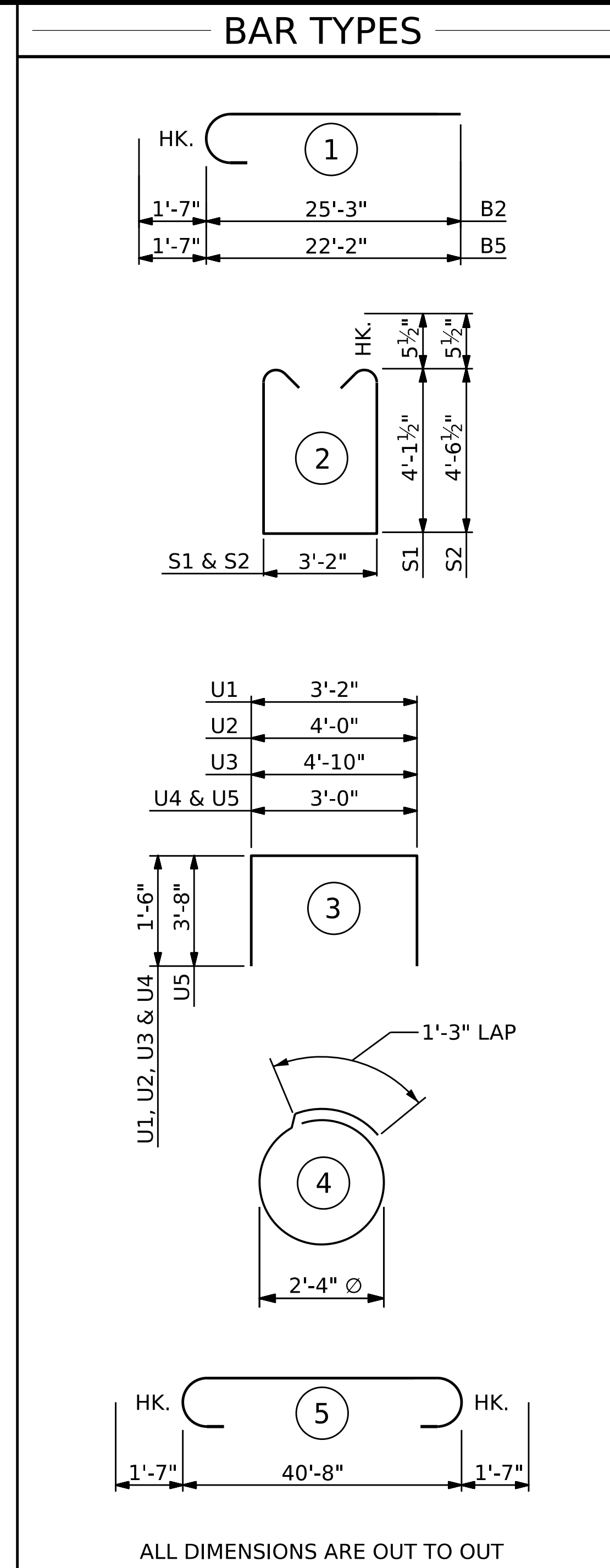
VIEW X-X



PARTIAL SECTION B-B



VIEW Y-Y



ALL DIMENSIONS ARE OUT TO OUT

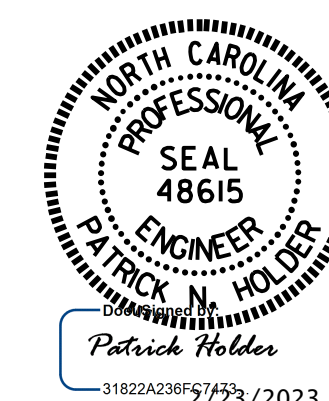
BILL OF MATERIAL

BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#11	5	43'-10"	932
B2	6	#11	1	26'-10"	855
B3	10	#5	STR	40'-8"	424
B4	12	#4	STR	8'-9"	70
B5	6	#11	1	23'-9"	757
B6	8	#4	STR	22'-10"	122
B7	14	#4	STR	3'-2"	30
B8	2	#5	STR	17'-1"	36
B9	6	#4	STR	4'-1"	16
S1	32	#5	2	12'-4"	412
S2	36	#5	2	13'-2"	494
S3	28	#4	4	8'-7"	161
U1	48	#4	3	6'-2"	198
U2	3	#4	3	7'-0"	14
U3	3	#4	3	7'-10"	16
U4	7	#4	3	6'-0"	28
U5	2	#9	3	10'-4"	70

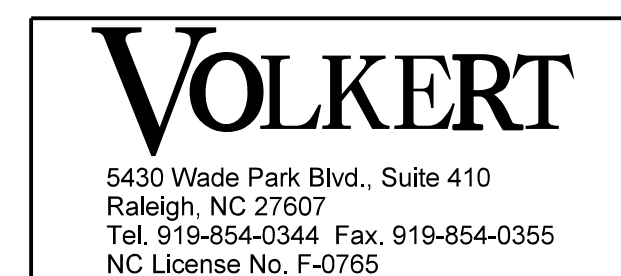
REINFORCING STEEL 4635 LBS.
 CLASS A CONCRETE CAP 25.1 CU. YDS.
 NOTE: CONCRETE DISPLACED BY GALVANIZED STEEL PIPE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 2 OF 2



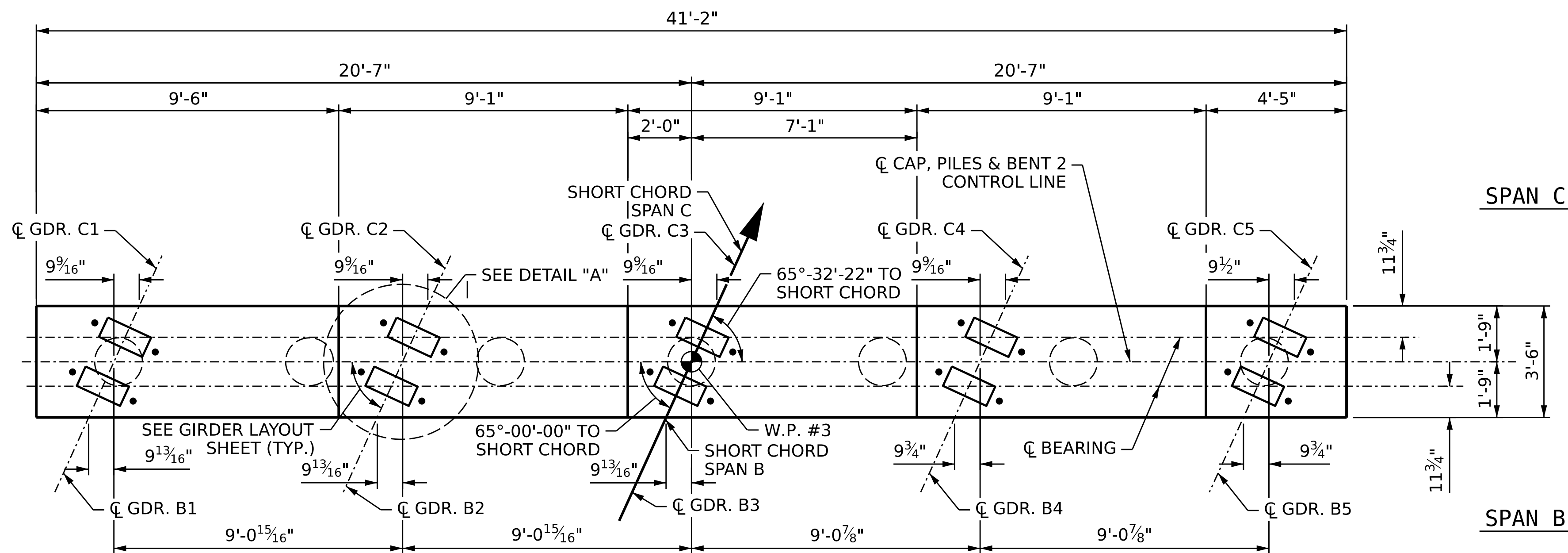
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
BENT 1



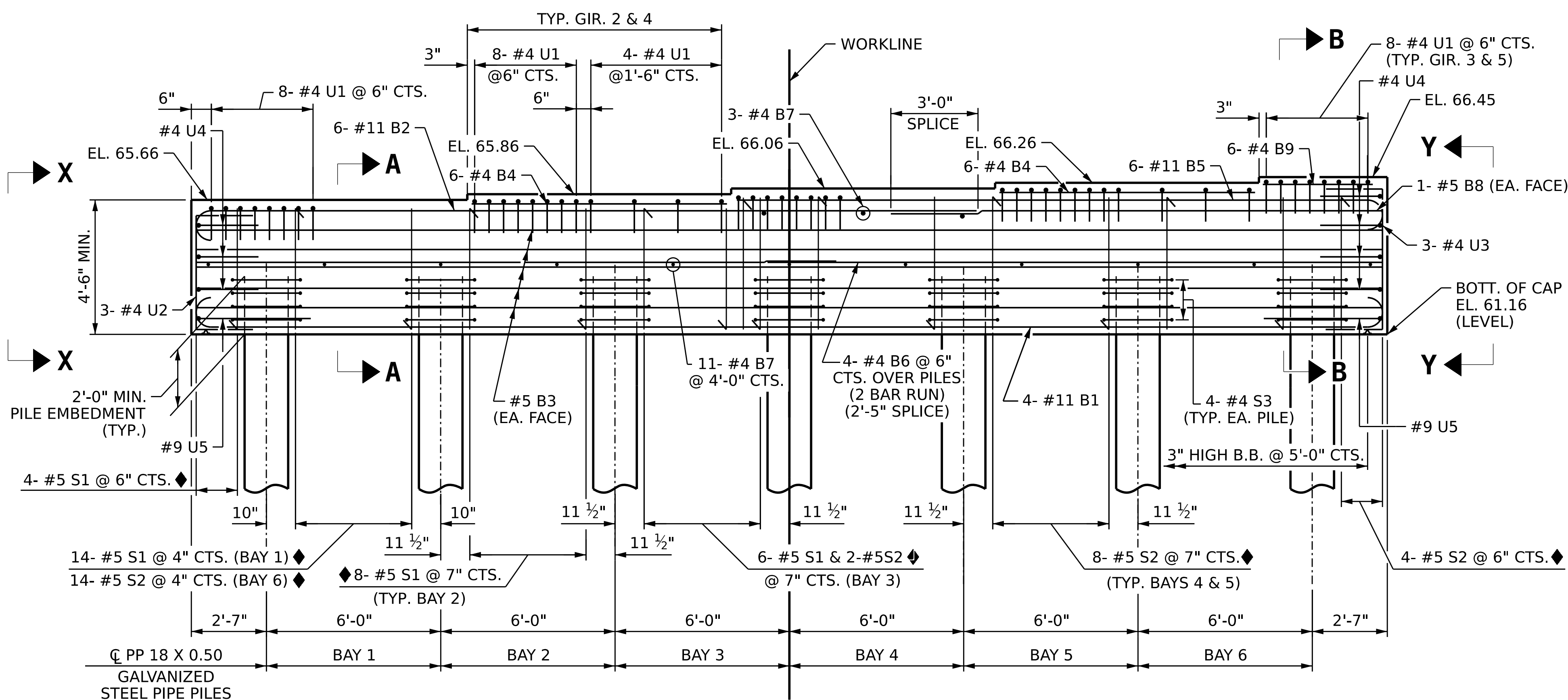
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY: A. Y. WU DATE: 10/22
 CHECKED BY: B. H. BARNHILL DATE: 11/22
 DESIGN ENGINEER OF RECORD: P.N.HOLDER DATE: 11/22



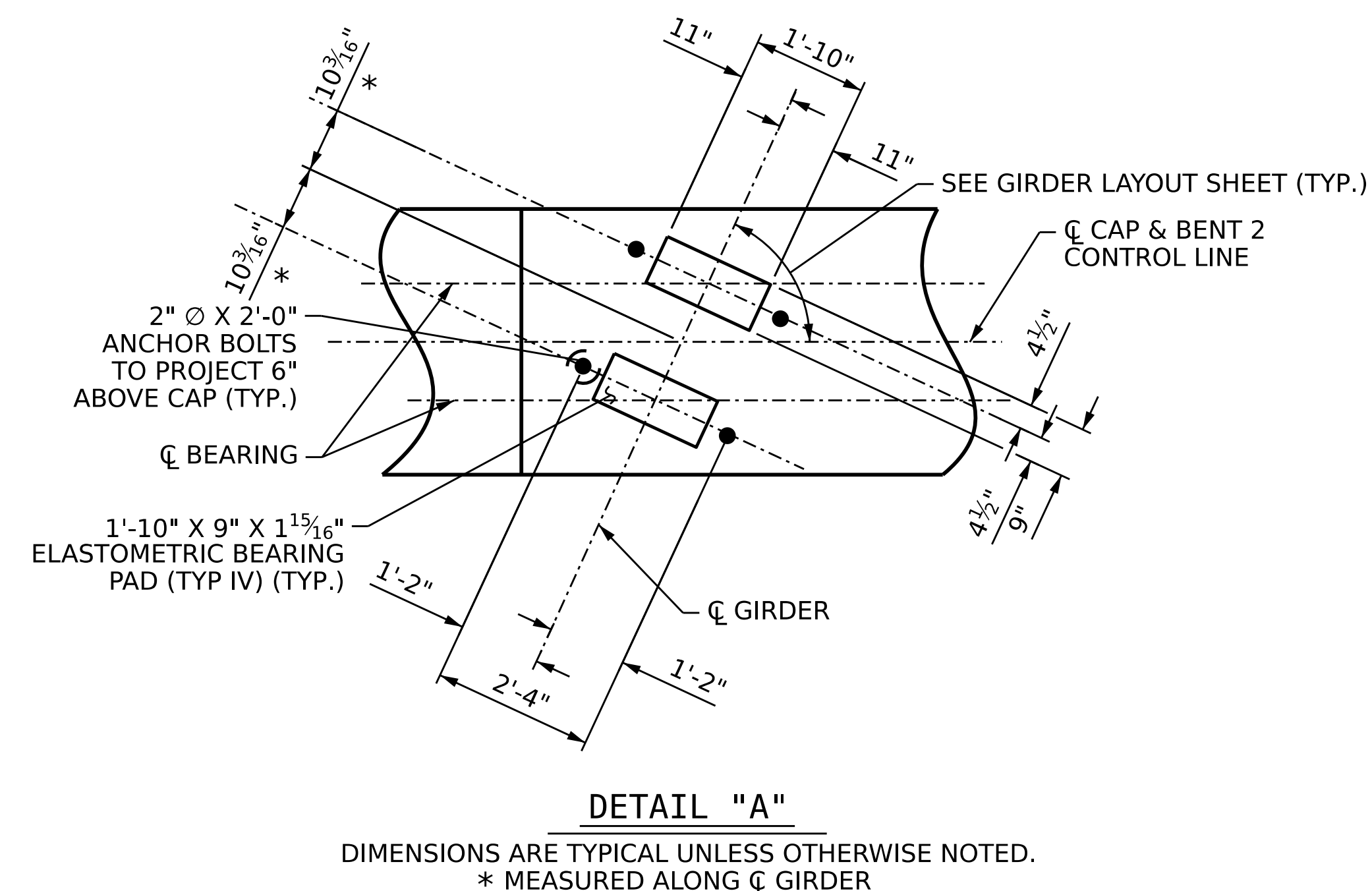
PLAN



ELEVATION

NOTES:

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y, SEE SHEET 2 OF 2.
- GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 26 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.
- FOR PP 18 X 0.50 GALVANIZED STEEL PIPE PILE DETAILS, SEE "18" STEEL PIPE PILE" SHEET.
- ◆ INVERT ALTERNATE STIRRUPS AS SHOWN.



DETAIL "A"

DIMENSIONS ARE TYPICAL UNLESS OTHERWISE NOTED. * MEASURED ALONG Q GIRDER

PROJECT NO. BR-0073

COLUMBUS COUNTY

STATION: 18+24.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

SUBSTRUCTURE BENT 2

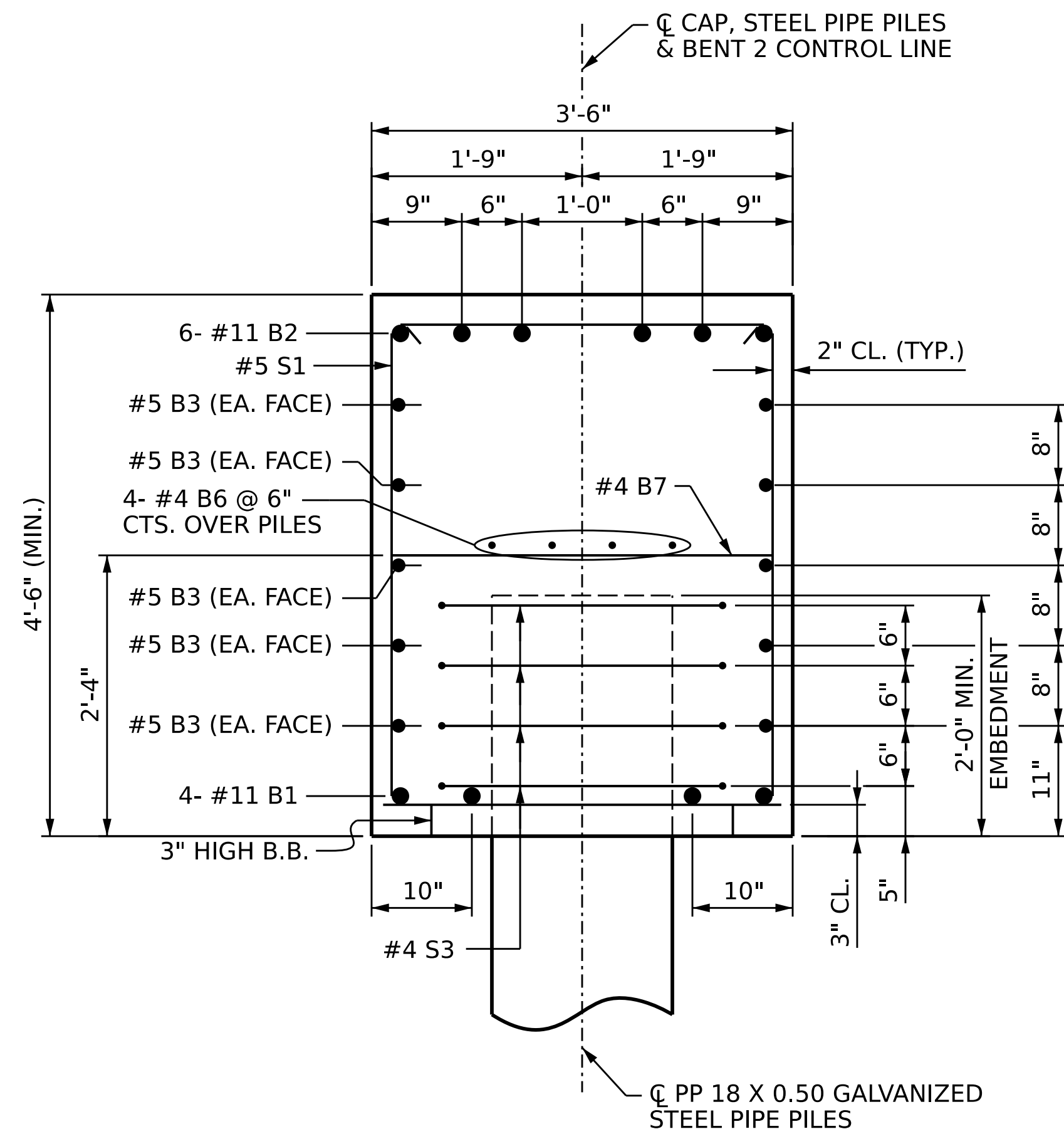


5430 Wade Park Blvd., Suite 410 Raleigh, NC 27607 Tel. 919-854-0344 Fax. 919-854-0355 NC License No. F-0765

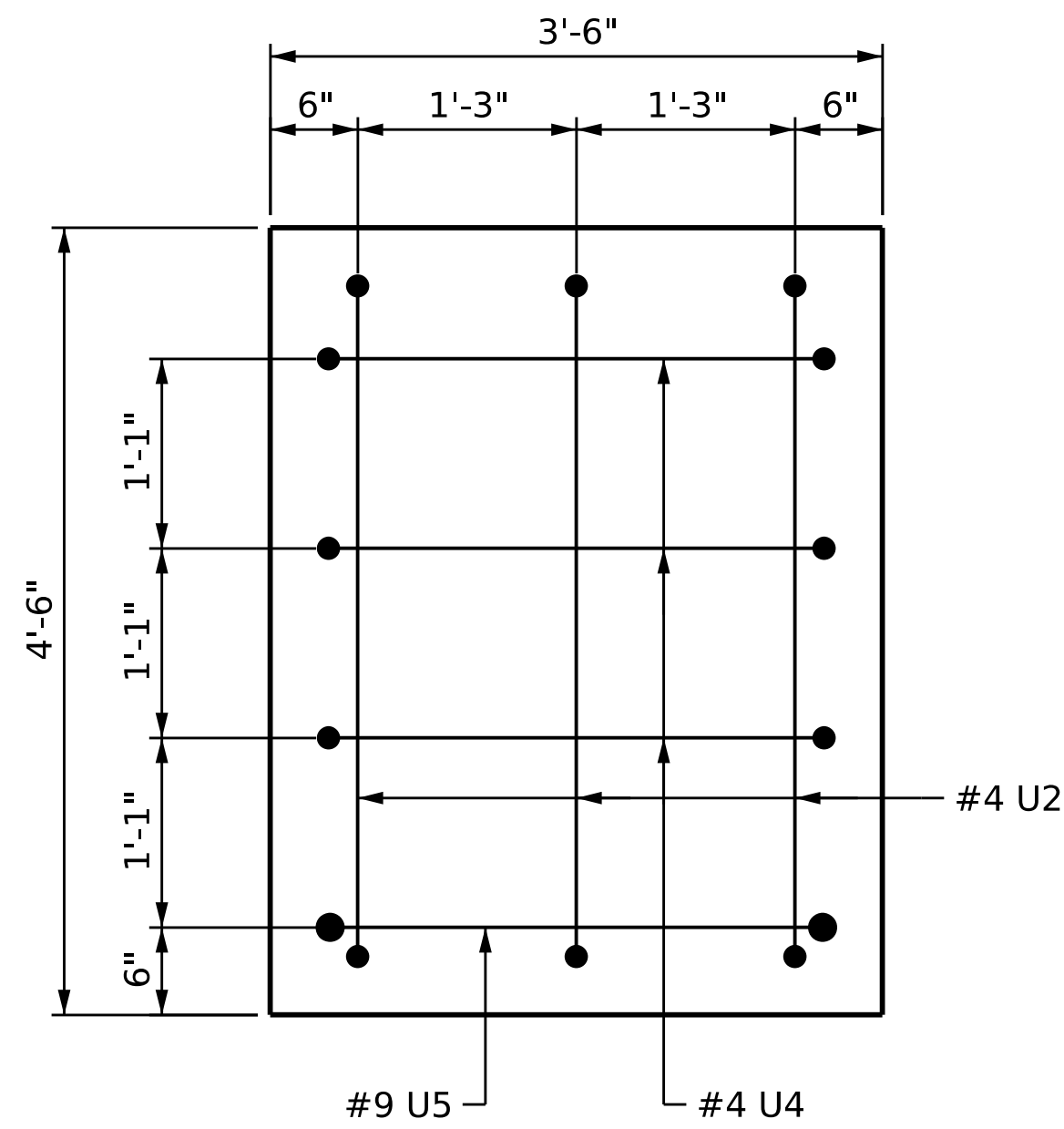
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	S-30
1			3	TOTAL SHEETS
2			4	38

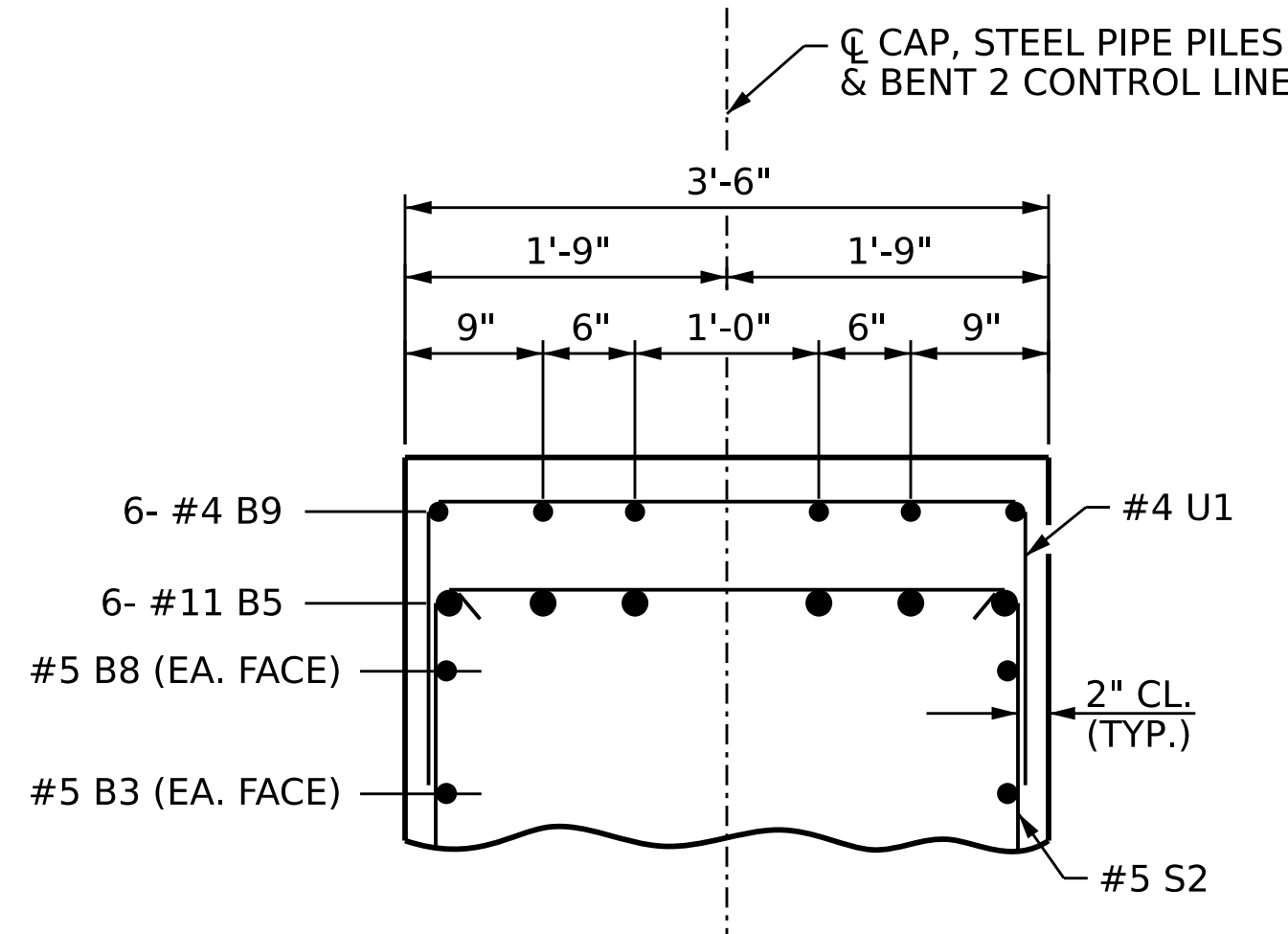
DRAWN BY: A. Y. WU DATE: 10/22
 CHECKED BY: B. H. BARNHILL DATE: 11/22
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 11/22



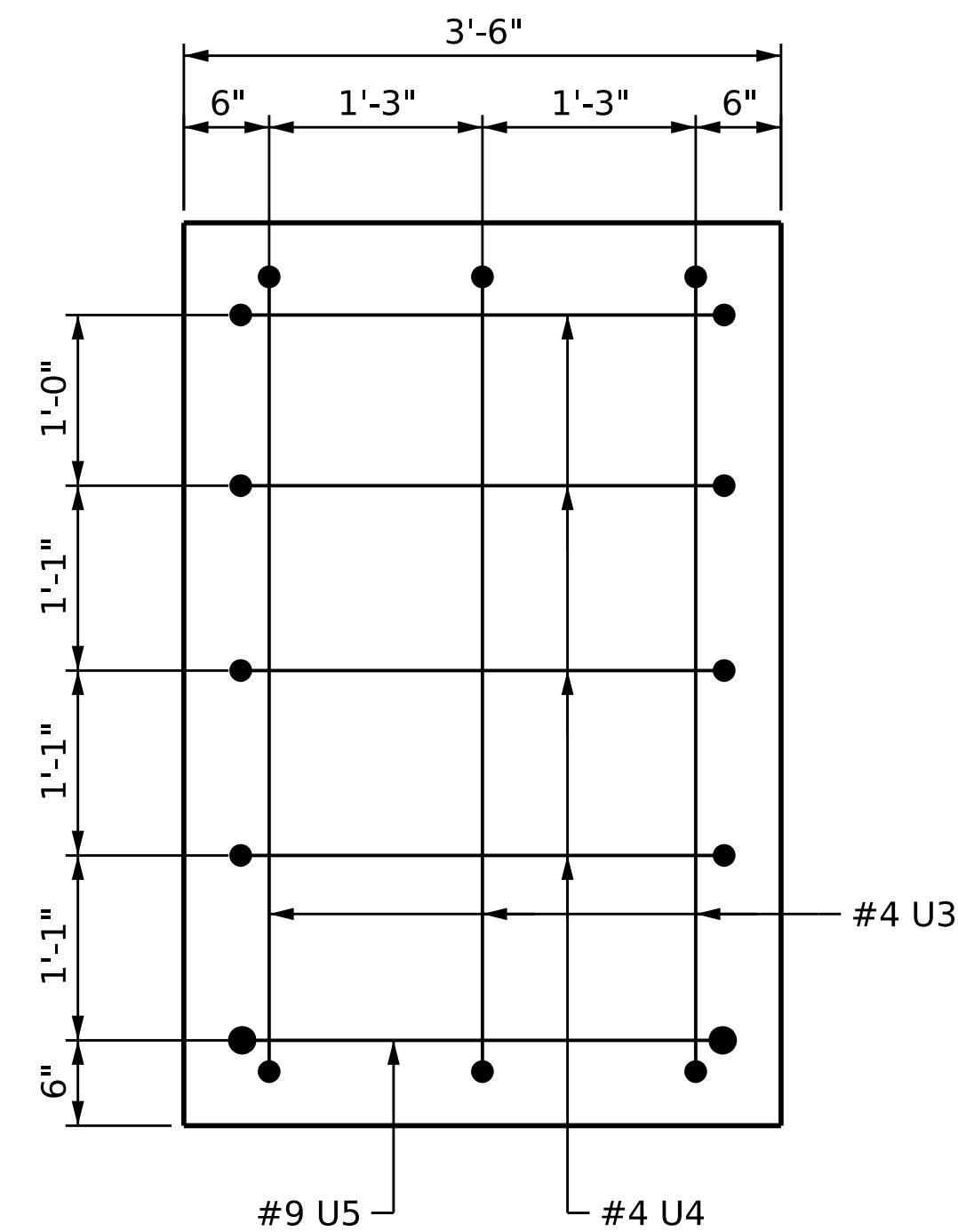
SECTION A-A



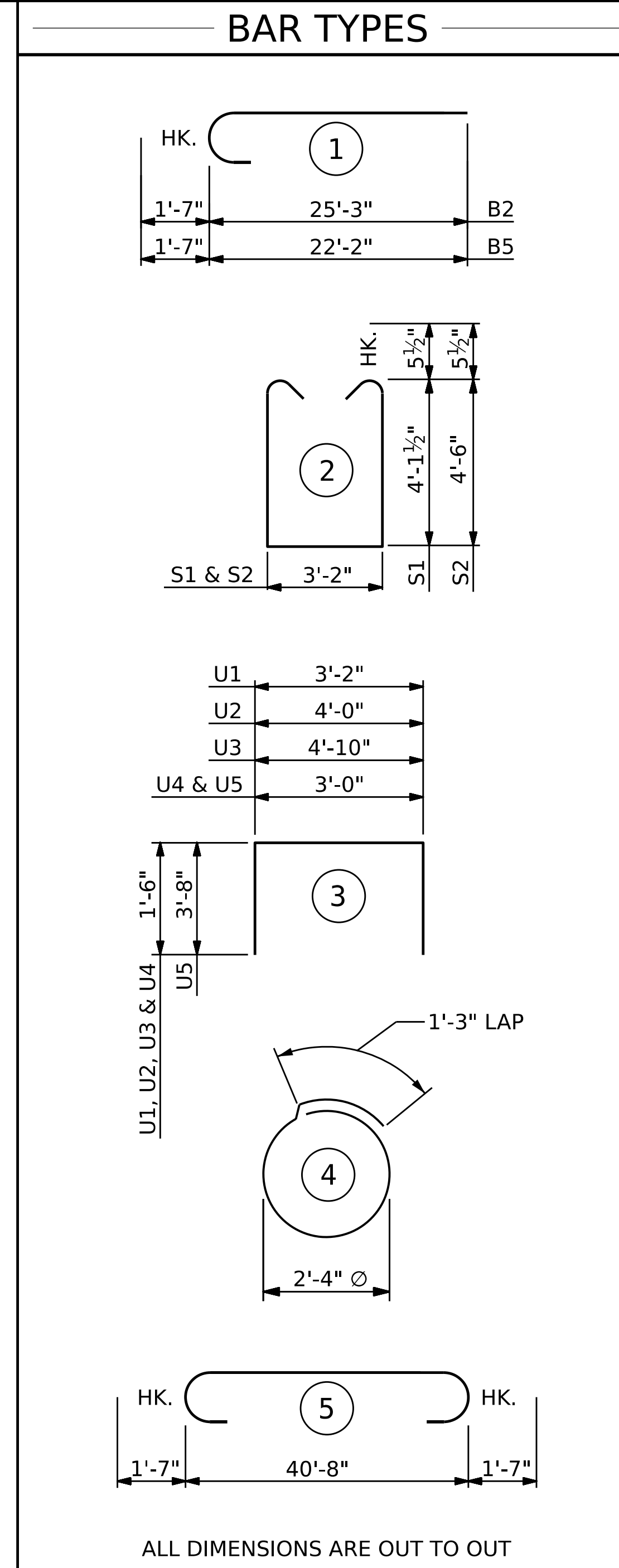
VIEW X-X



PARTIAL SECTION B-B



VIEW Y-Y



ALL DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

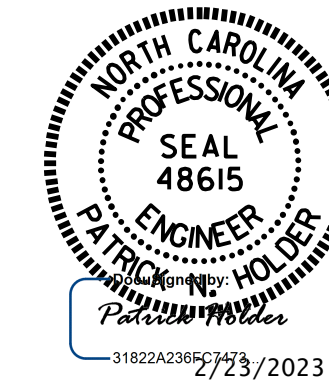
BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#11	5	43'-10"	932
B2	6	#11	1	26'-10"	855
B3	10	#5	STR	40'-8"	424
B4	12	#4	STR	8'-9"	70
B5	6	#11	1	23'-9"	757
B6	8	#4	STR	22'-10"	122
B7	14	#4	STR	3'-2"	30
B8	2	#5	STR	17'-1"	36
B9	6	#4	STR	4'-1"	16
S1	32	#5	2	12'-4"	412
S2	36	#5	2	13'-1"	491
S3	28	#4	4	8'-7"	161
U1	48	#4	3	6'-2"	198
U2	3	#4	3	7'-0"	14
U3	3	#4	3	7'-10"	16
U4	7	#4	3	6'-0"	28
U5	2	#9	3	10'-4"	70

REINFORCING STEEL 4632 LBS.
 CLASS A CONCRETE CAP 25.0 CU. YDS.
 NOTE: CONCRETE DISPLACED BY GALVANIZED STEEL PIPE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.

DRAWN BY : A. Y. WU DATE : 10/22
 CHECKED BY : B. H. BARNHILL DATE : 11/22
 DESIGN ENGINEER OF RECORD : P.N.HOLDER DATE : 11/22



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. BR-0073
COLUMBUS COUNTY
 STATION: 18+24.50 -L-

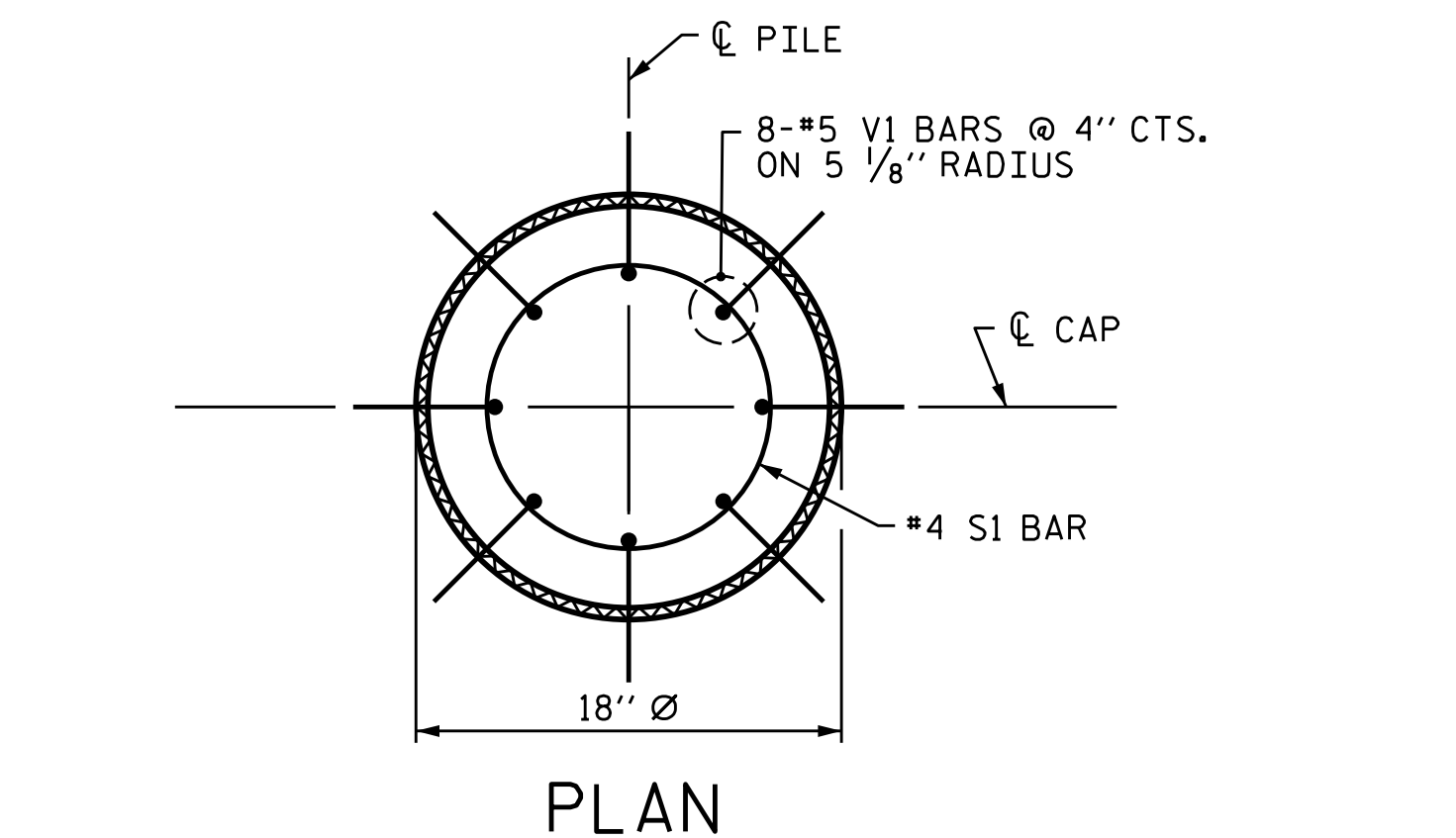
SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

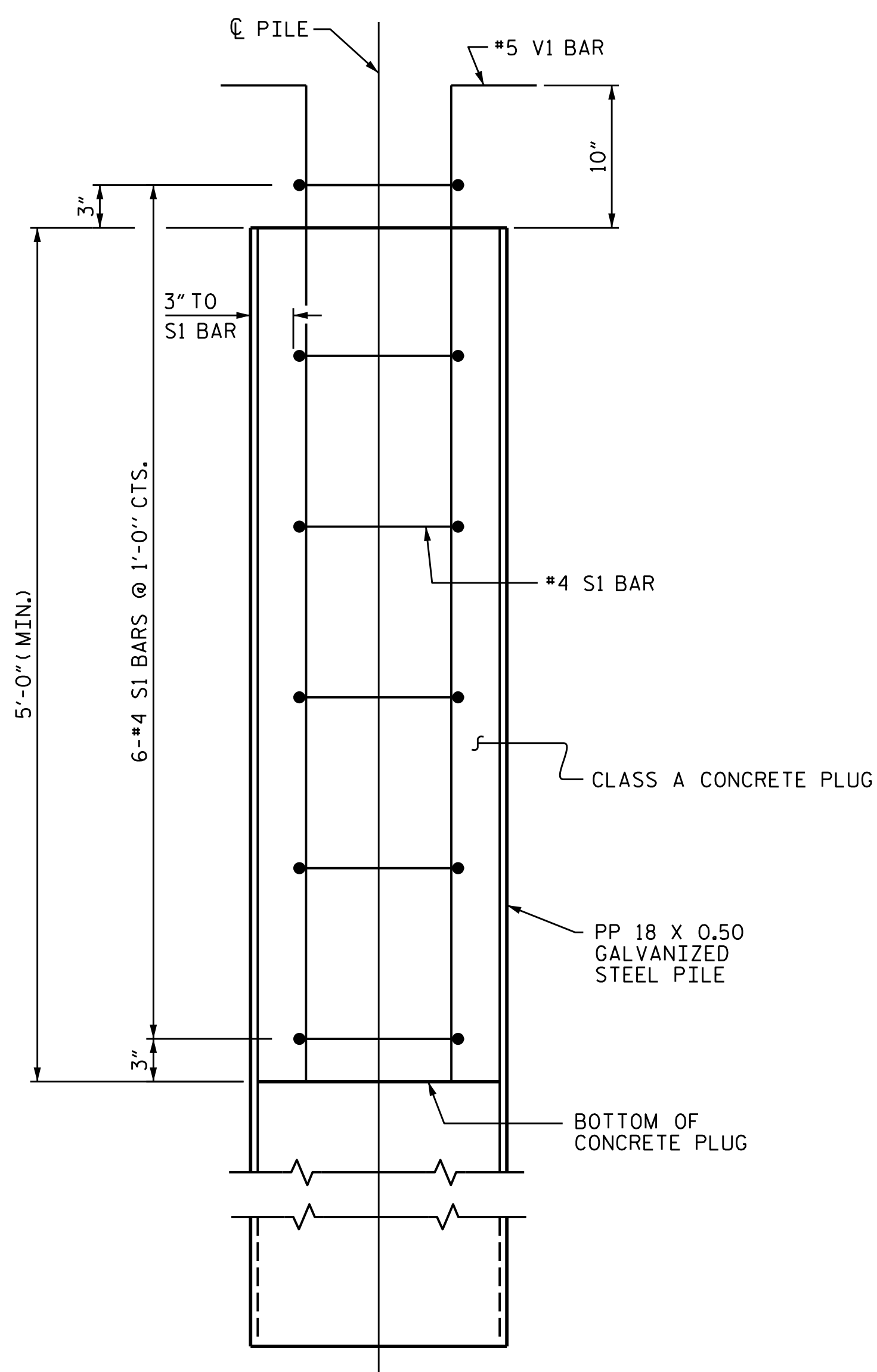
SUBSTRUCTURE
BENT 2

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

S-31
TOTAL SHEETS
38

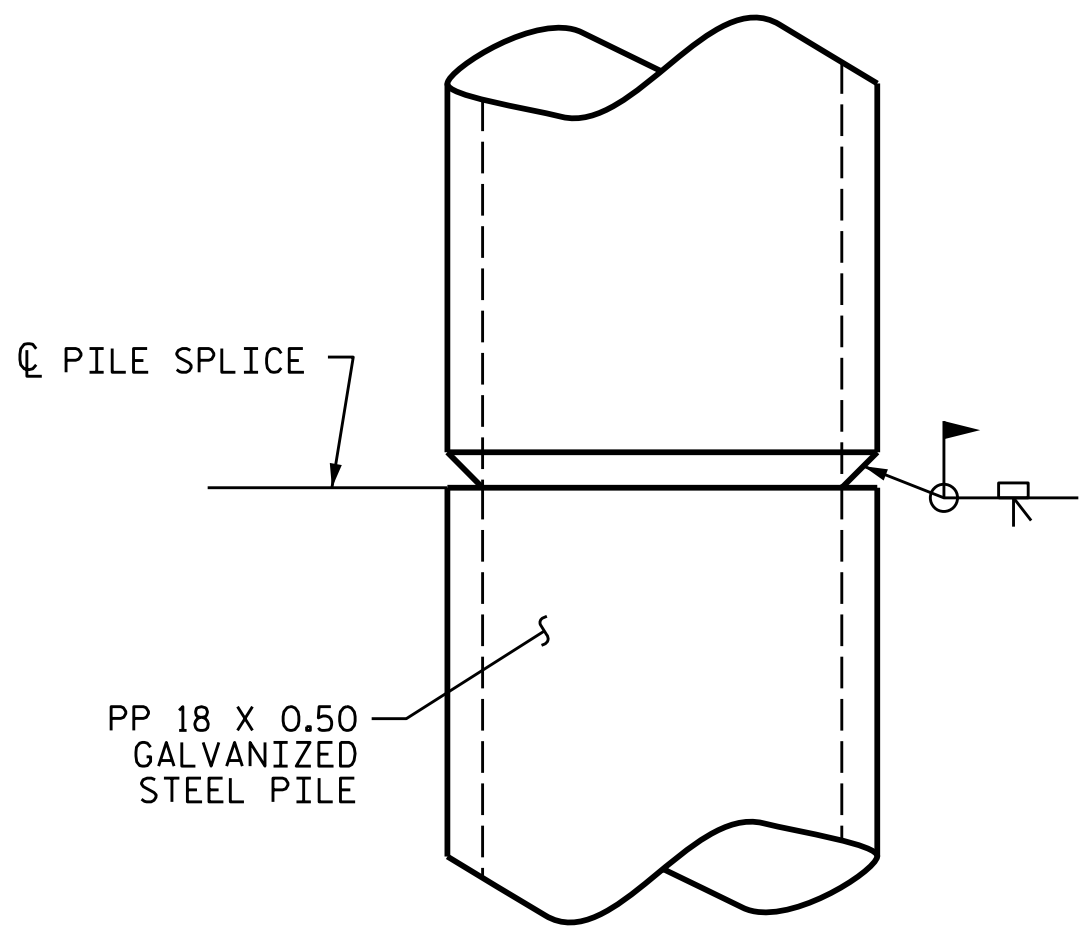


PLAN



ELEVATION

PP 18 X 0.50 GALVANIZED STEEL PILE
(OPEN END)



PIPE PILE SPLICE DETAIL

NOTES

PIPE PILES SHALL BE IN ACCORDANCE WITH SECTION 1084 OF THE STANDARD SPECIFICATIONS.

GALVANIZE STEEL PIPE PILES IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

REMOVE AND REPLACE OR REPAIR TO THE SATISFACTION OF THE ENGINEER PILES THAT ARE DAMAGED, DEFORMED OR COLLAPSED DURING INSTALLATION OR DRIVING.

PILE SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

FOR OPEN END PIPE PILES, REMOVE ENOUGH SOIL AND WATER FROM INSIDE THE PILES TO CONSTRUCT THE CONCRETE PLUG WITHOUT FOULING THE CONCRETE.

FORM THE CONCRETE PLUG SUCH THAT THE REINFORCING STEEL OR CONCRETE DOES NOT MOVE AND THE CLEARANCE FROM THE REINFORCING STEEL TO THE INSIDE OF THE PILE IS MAINTAINED AFTER CONCRETE PLACEMENT. DO NOT PLACE CONCRETE IN THE BENT CAP UNTIL THE CONCRETE PLUG HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

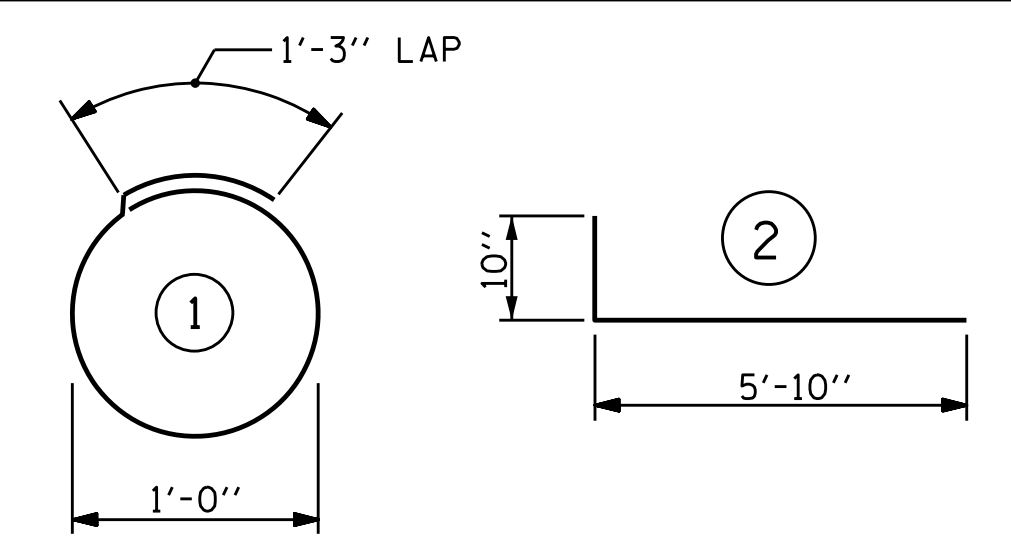
THE REINFORCING STEEL, CLASS A CONCRETE, AND GALVANIZING ARE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER LINEAR FOOT FOR PP 18 X 0.50 GALVANIZED STEEL PILES.

BILL OF MATERIAL FOR ONE
PP 18 X 0.50 GALVANIZED STEEL PILE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	6	#4	1	4'-5"	18
V1	8	#5	2	6'-8"	56
REINFORCING STEEL =				74	lbs

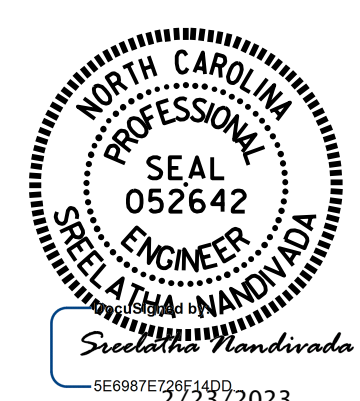
CLASS A CONCRETE
5'-0" MINIMUM PLUG 0.3 CY

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. BR-0073
COLUMBUS COUNTY
STATION: 18+24.50 -L-



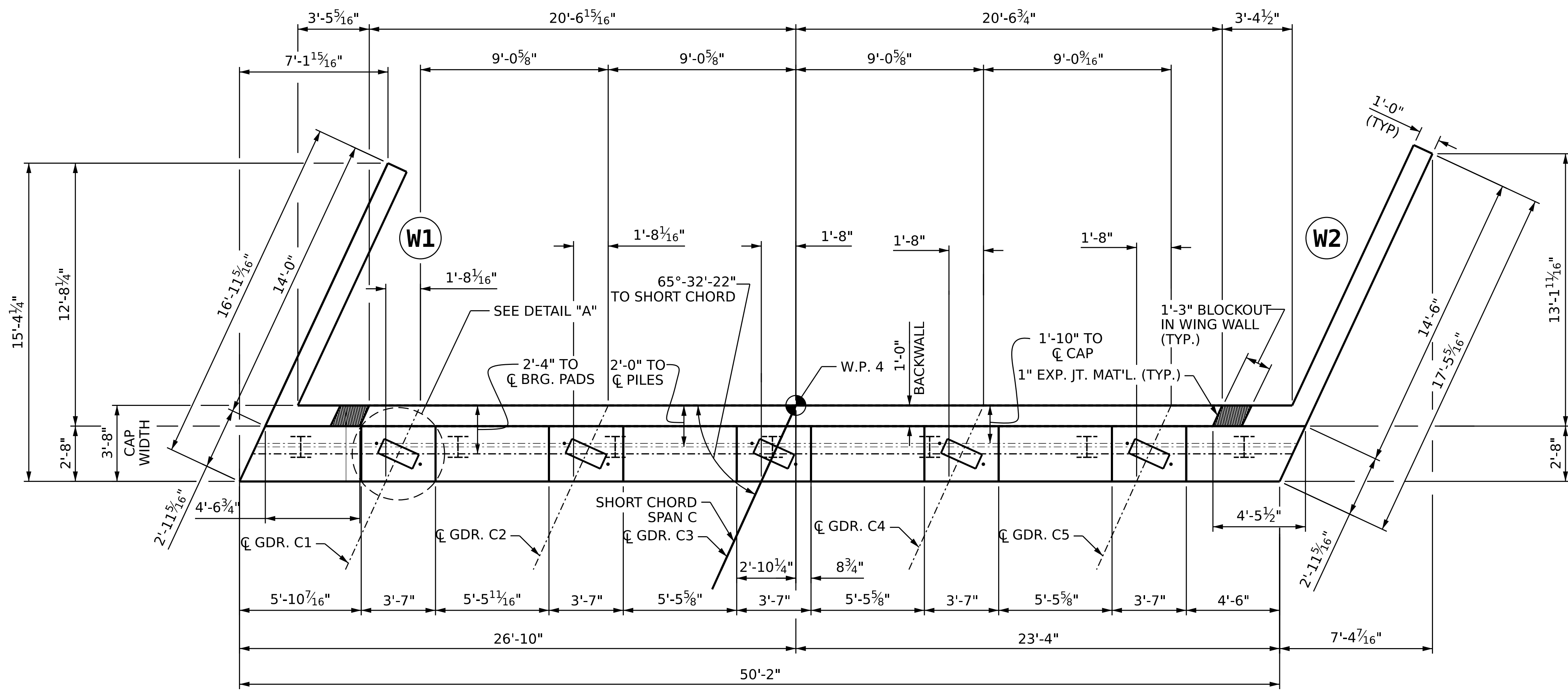
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
18" STEEL PIPE PILE

ASSEMBLED BY : A. Y. WU	DATE : 11/22
CHECKED BY : P. N. HOLDER	DATE : 11/22
DRAWN BY : RWW 1/01	REV. 5/1/06R MAA/KMM
CHECKED BY : LES 1/01	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

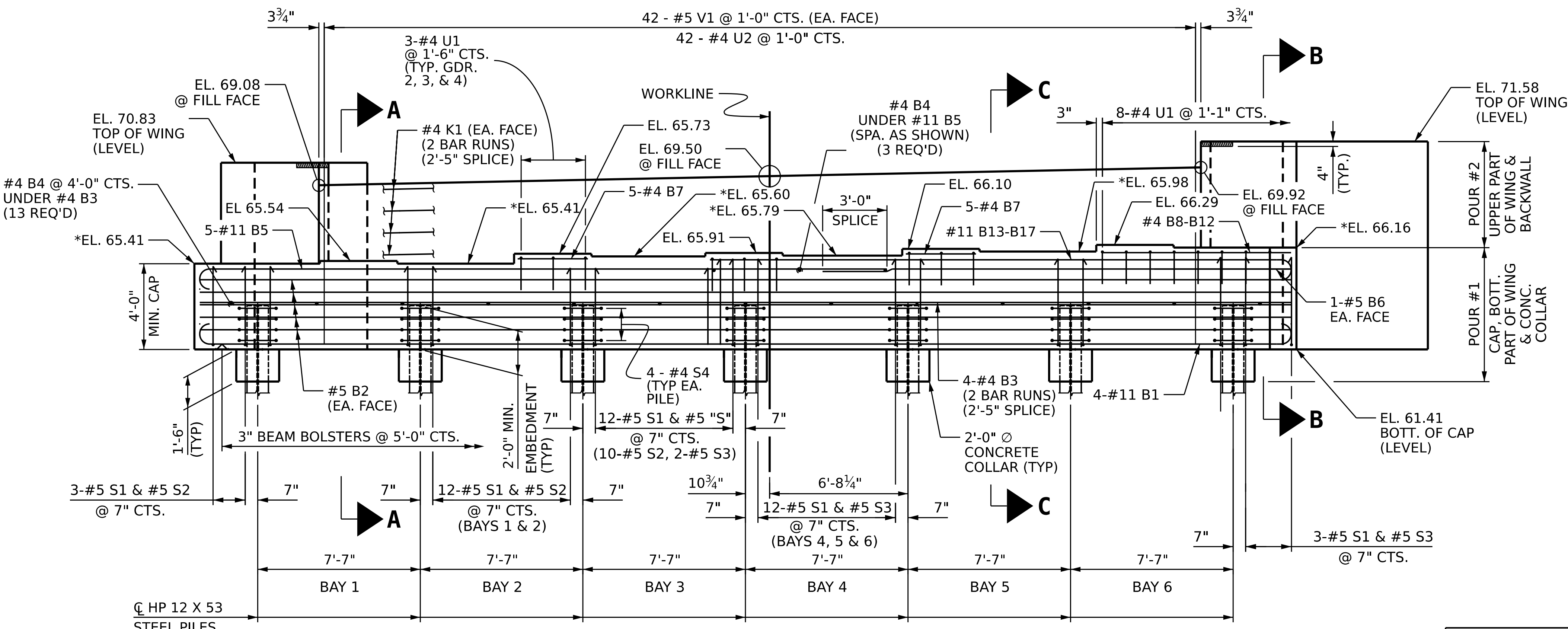
VOLKERT
5430 Wade Park Blvd., Suite 410
Raleigh, NC 27607
Tel. 919-854-0344 Fax. 919-854-0355
NC License No. F-0765

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			38

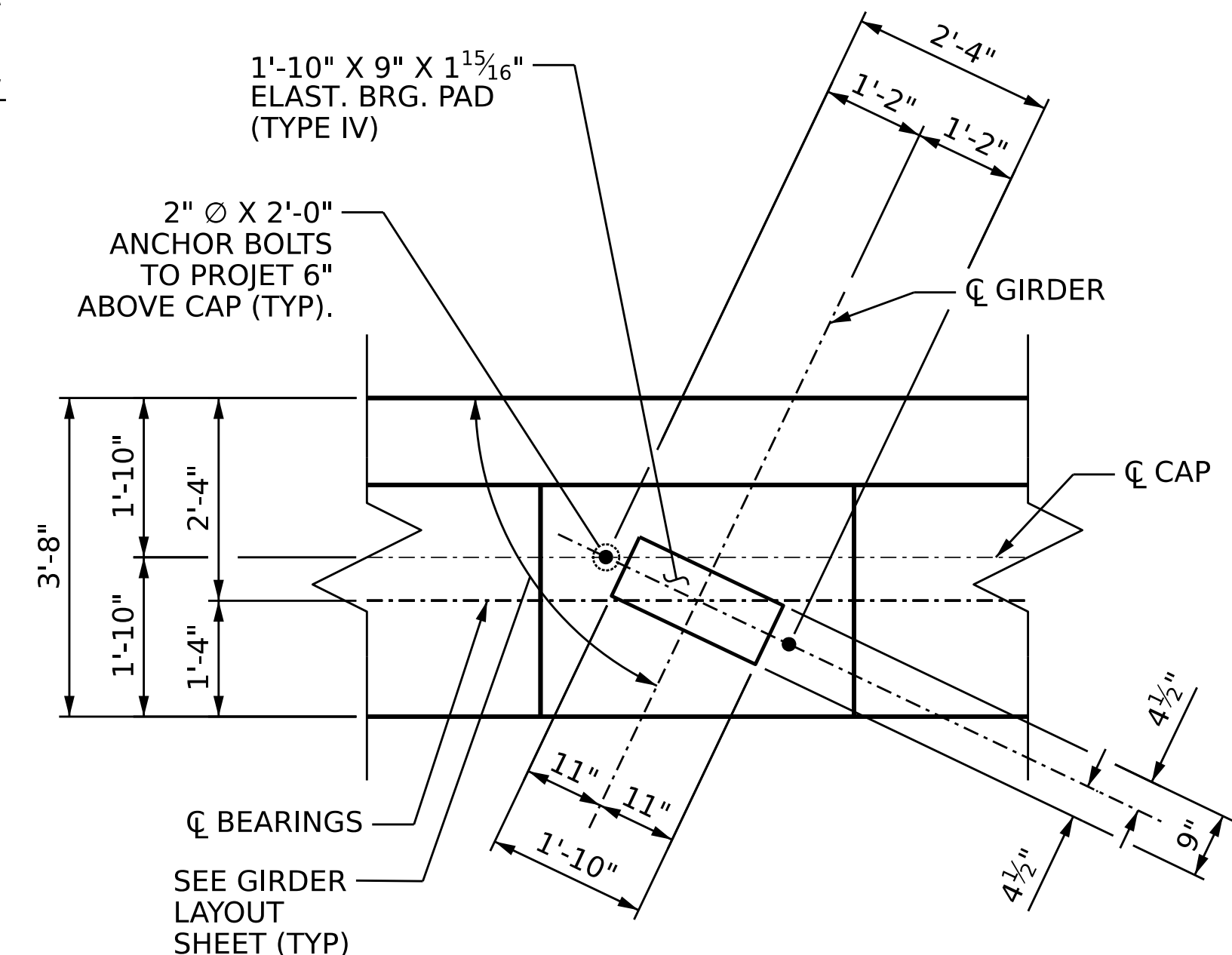


PLAN



ELEVATION

NOTES:
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #5 V1 BARS AND ANCHOR BOLTS.
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY DRAINAGE AND EROSION CONTROL AT THE END BENT.
 FOR SECTIONS A-A, B-B, AND C-C, SEE SHEET 3 OF 3.
 THE TOP SURFACE AREAS OF THE CAP EXCEPT THE BRIDGE SEATS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE AT THE RATE OF 2%.
 THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
 BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.



DETAIL "A"

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**
 SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 2

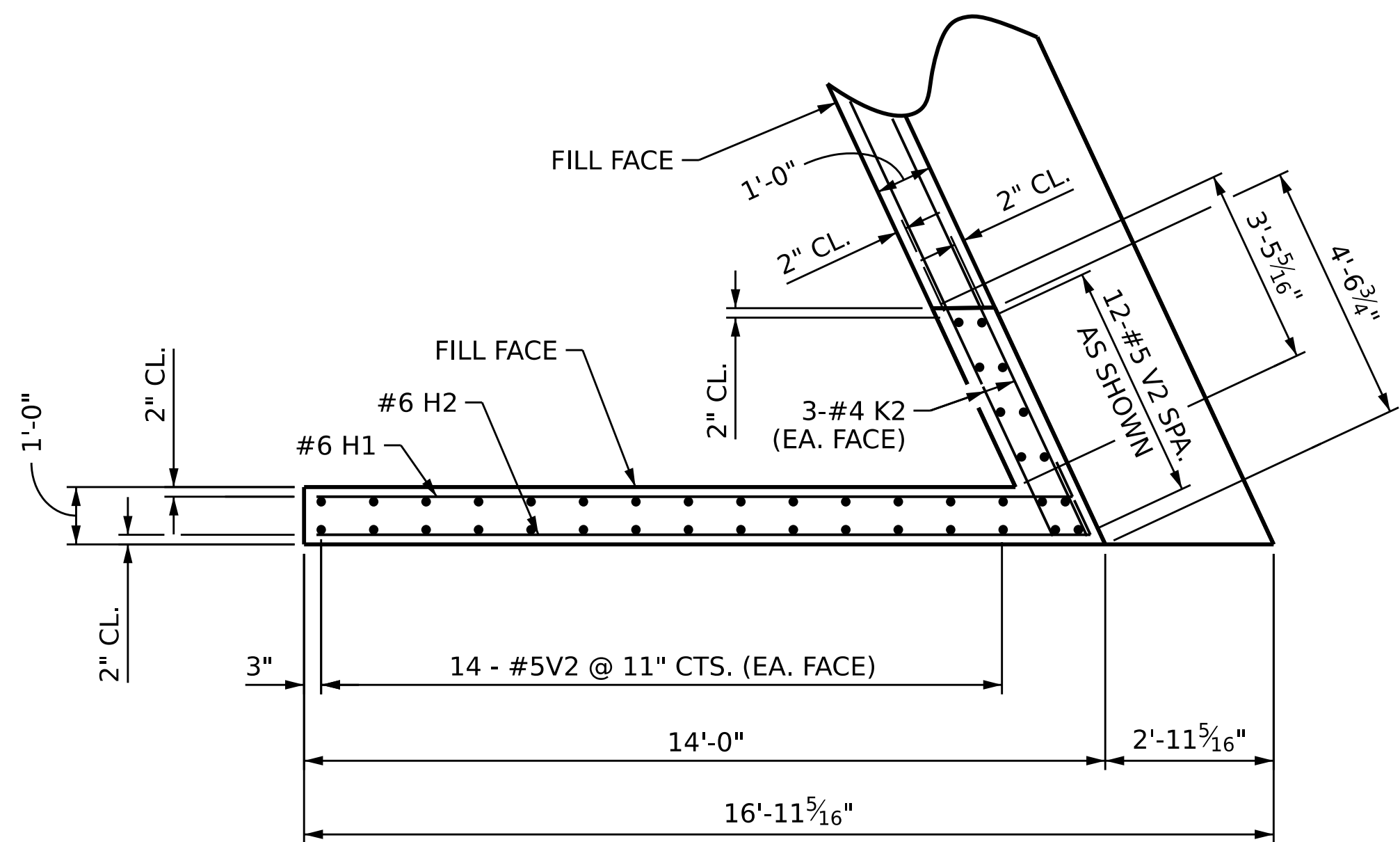
DRAWN BY: **B.H. BARNHILL** DATE: **09/22**
 CHECKED BY: **D. GLADDEN** DATE: **11/22**
 DESIGN ENGINEER OF RECORD: **P. N. HOLDER** DATE: **11/22**

VOLKERT
 5430 Wade Park Blvd., Suite 410
 Raleigh, NC 27607
 Tel. 919-854-0344 Fax. 919-854-0355
 NC License No. F-0765

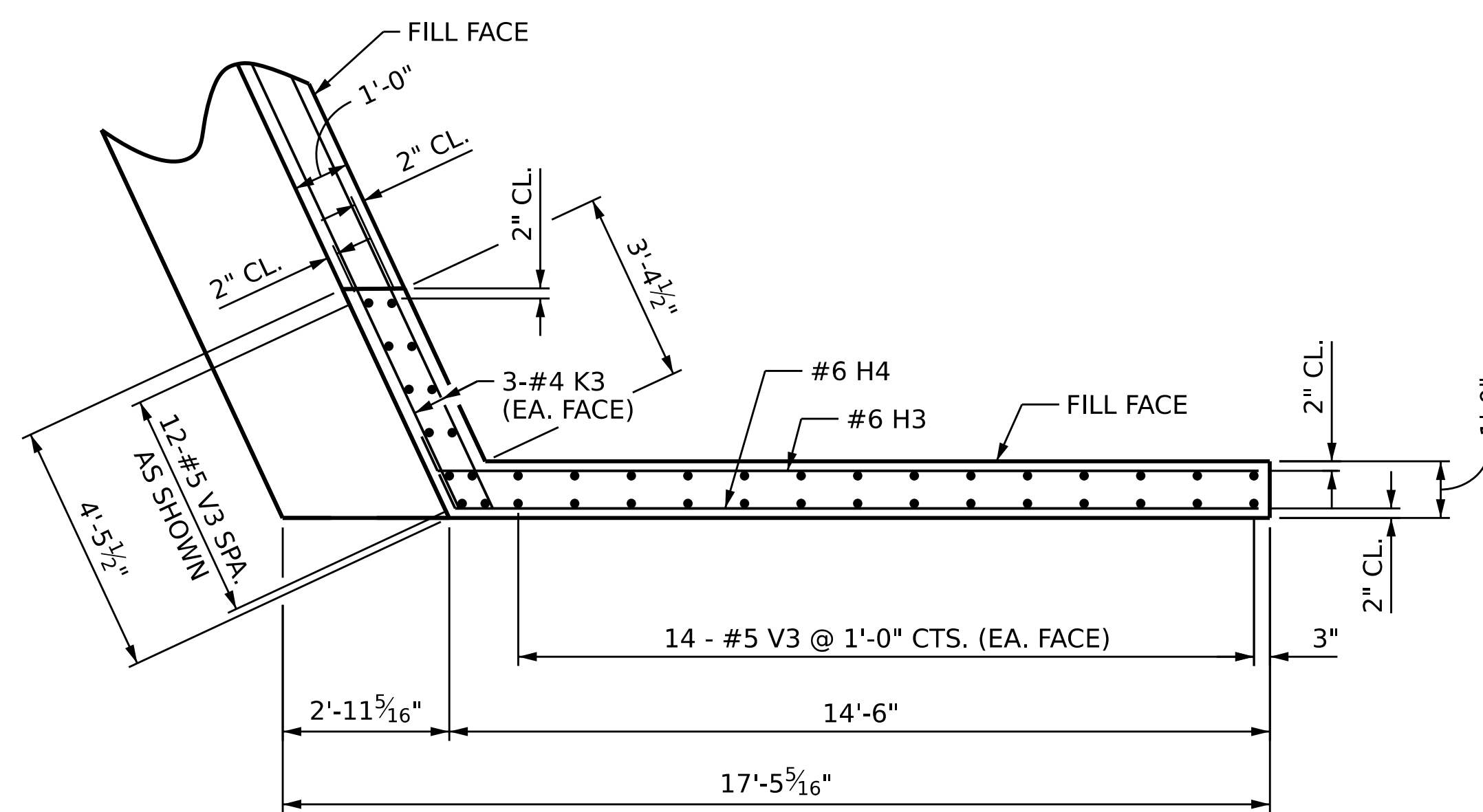
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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

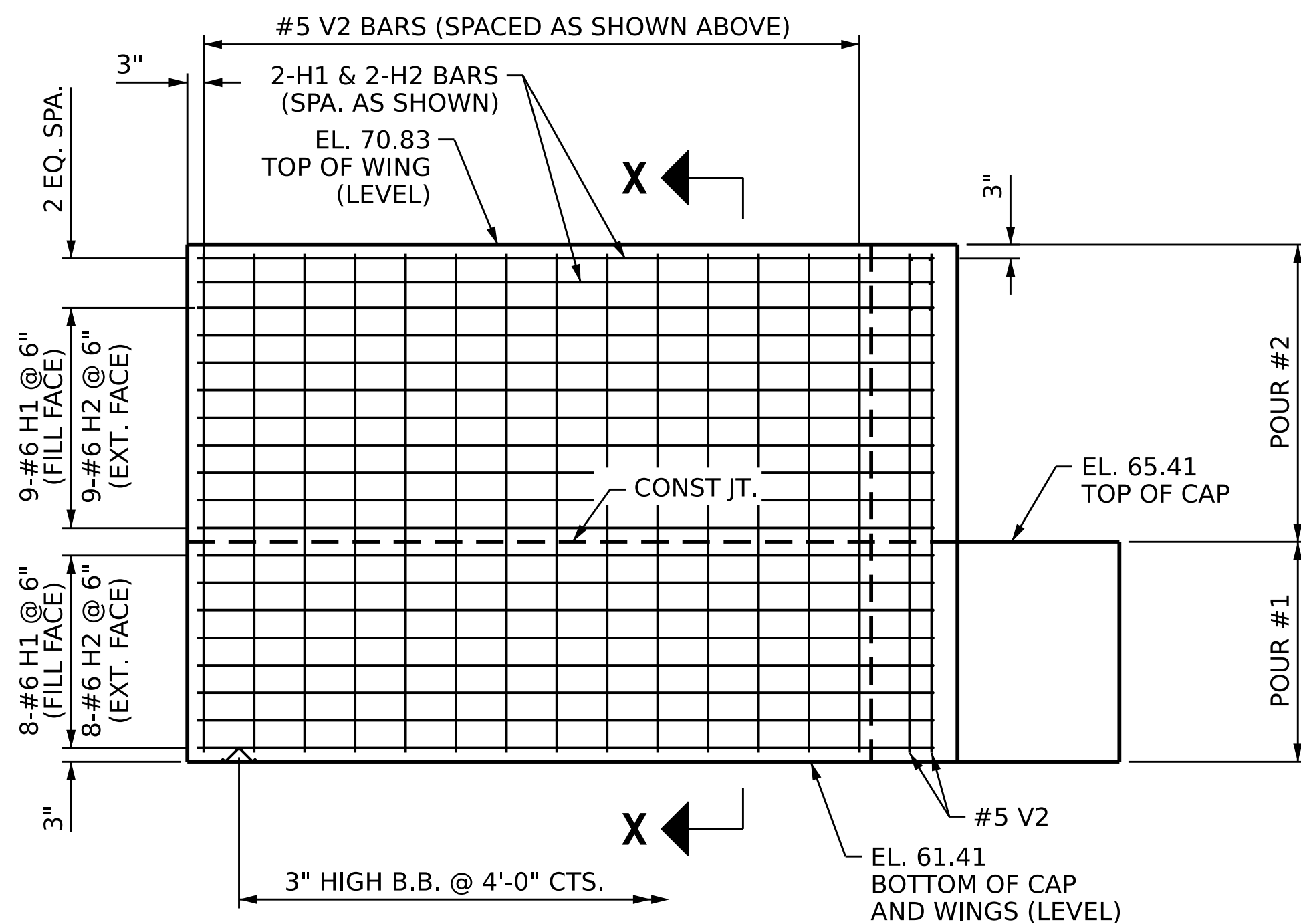
TOTAL SHEETS: **38**



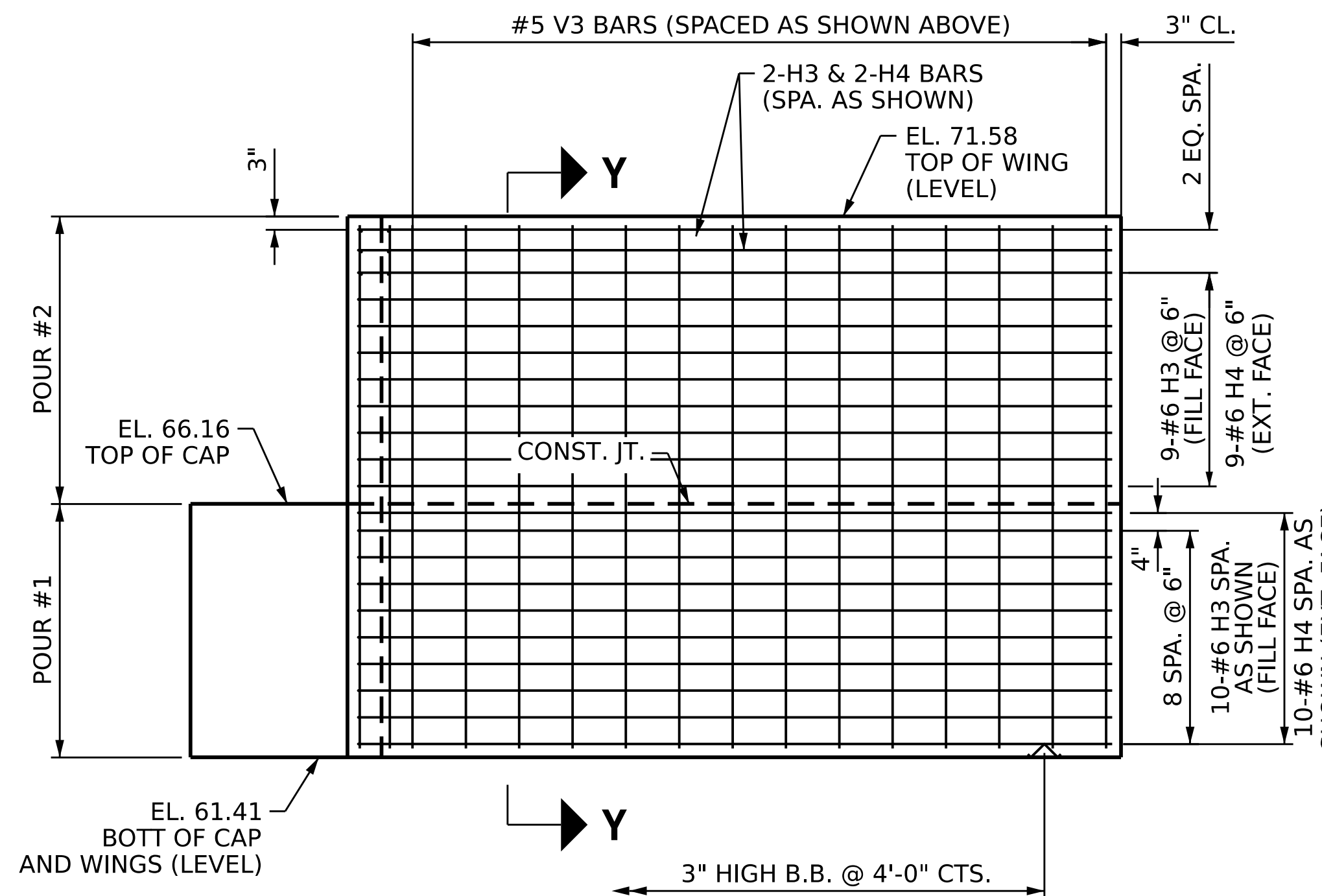
PLAN OF WING 1



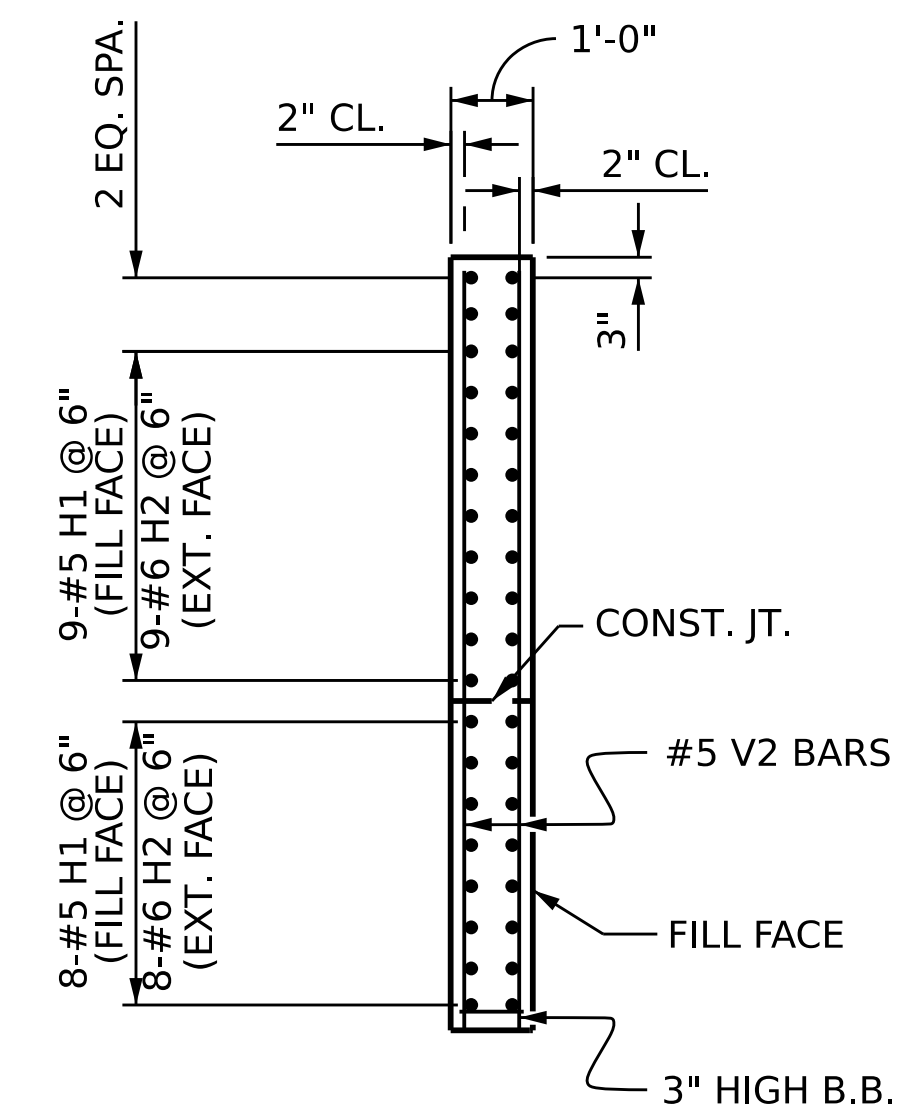
PLAN OF WING 2



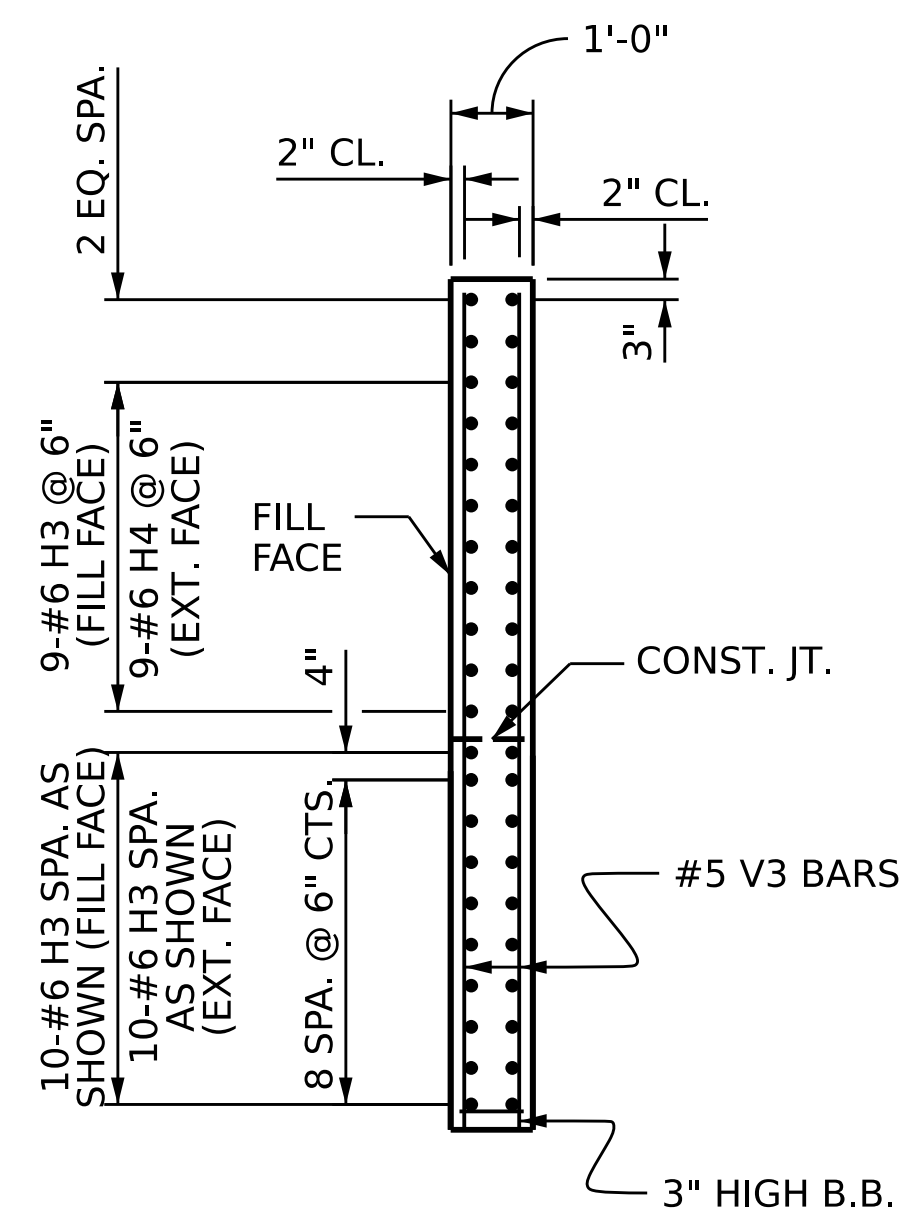
ELEVATION OF WING 1



ELEVATION OF WING 2



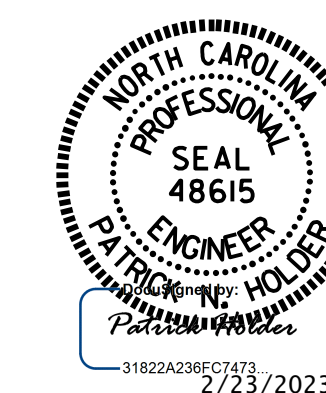
SECTION X-X



SECTION Y-Y

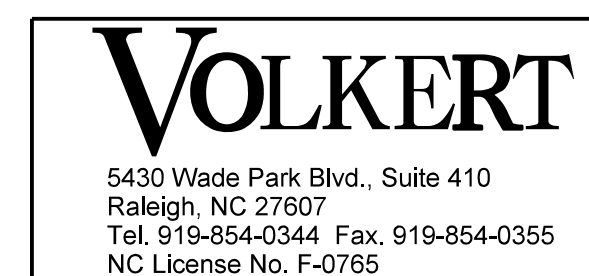
PROJECT NO. **BR-0073**
COLUMBUS COUNTY
 STATION: **18+24.50 -L-**

SHEET 2 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

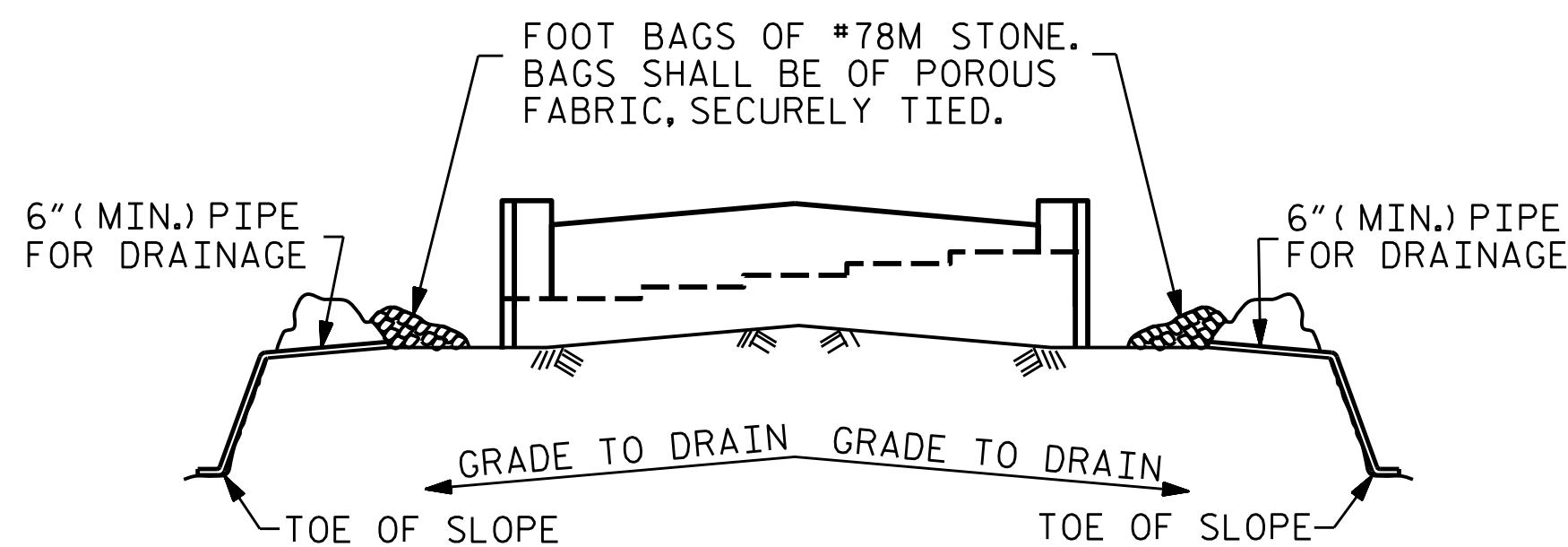
SUBSTRUCTURE
END BENT 2



DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS		SHEET NO.	
NO.	DATE	NO.	DATE
1		3	
2		4	
		TOTAL SHEETS	
		38	

DRAWN BY: **B. H. BARNHILL** DATE: **10/22**
 CHECKED BY: **D. GLADDEN** DATE: **11/22**
 DESIGN ENGINEER OF RECORD: **P. N. HOLDER** DATE: **11/22**



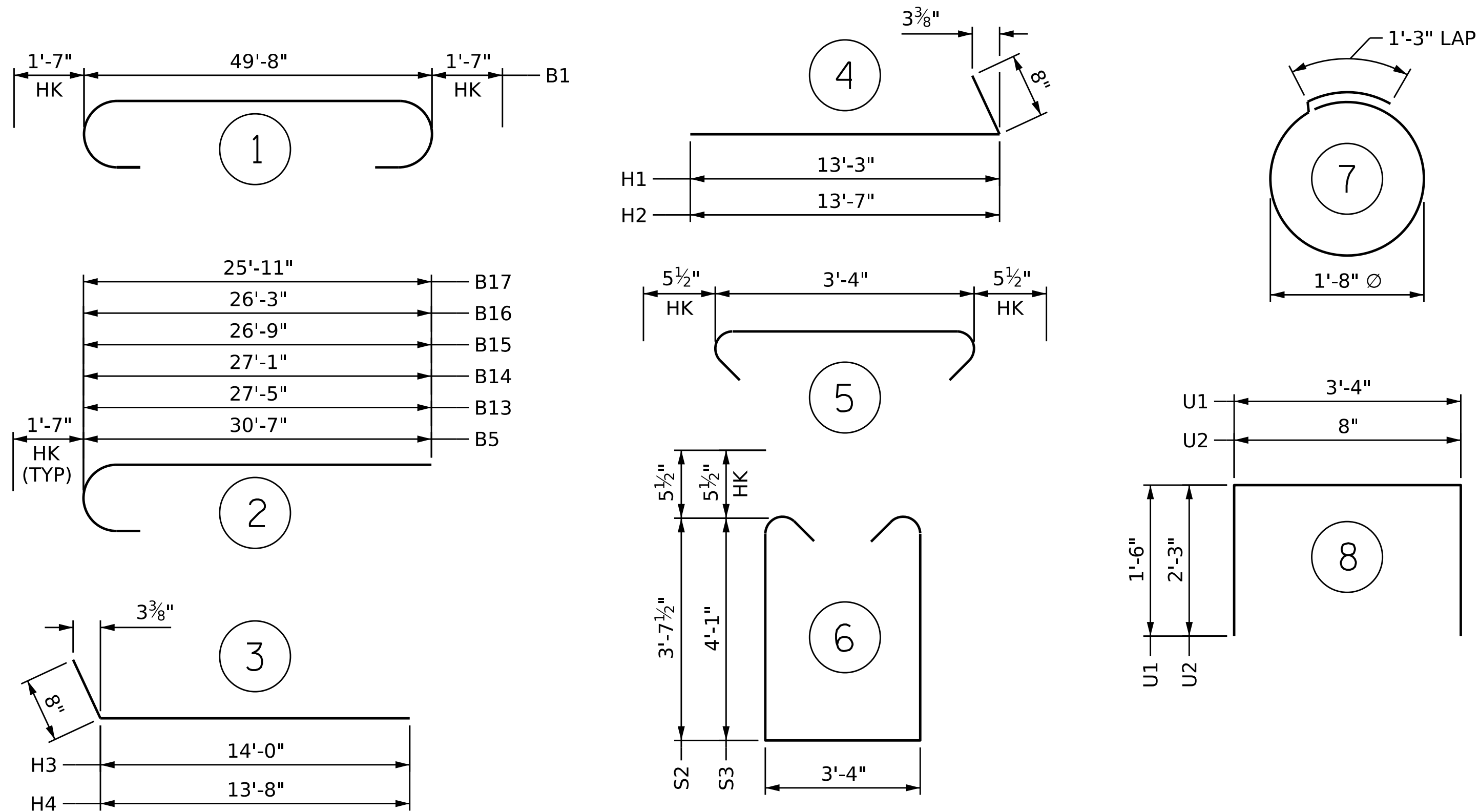
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

BAR TYPES



BILL OF MATERIAL

END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#11	1	52'-10"	1123
B2	10	#5	STR	49'-10"	520
B3	8	#4	STR	26'-2"	140
B4	16	#4	STR	3'-4"	36
B5	5	#11	2	32'-2"	855
B6	2	#5	STR	22'-2"	46
B7	10	#4	STR	3'-3"	22
B8	1	#4	STR	9'-3"	6
B9	1	#4	STR	9'-0"	6
B10	1	#4	STR	8'-8"	6
B11	1	#4	STR	8'-2"	5
B12	1	#4	STR	7'-10"	5
B13	1	#11	2	29'-0"	154
B14	1	#11	2	28'-8"	152
B15	1	#11	2	28'-4"	151
B16	1	#11	2	27'-11"	148
B17	1	#11	2	27'-6"	146
H1	19	#6	3	13'-11"	397
H2	19	#6	3	14'-3"	407
H3	21	#6	4	14'-8"	463
H4	21	#6	4	14'-4"	452
K1	16	#4	STR	26'-2"	280
K2	6	#4	STR	4'-2"	17
K3	6	#4	STR	4'-1"	16
S1	78	#5	5	4'-3"	346
S2	37	#5	6	11'-6"	444
S3	41	#5	6	12'-5"	531
S4	28	#4	7	6'-6"	122
U1	17	#4	8	6'-4"	72
U2	42	#4	8	5'-2"	145
V1	84	#5	STR	7'-4"	642
V2	40	#5	STR	9'-1"	379
V3	40	#5	STR	9'-10"	410

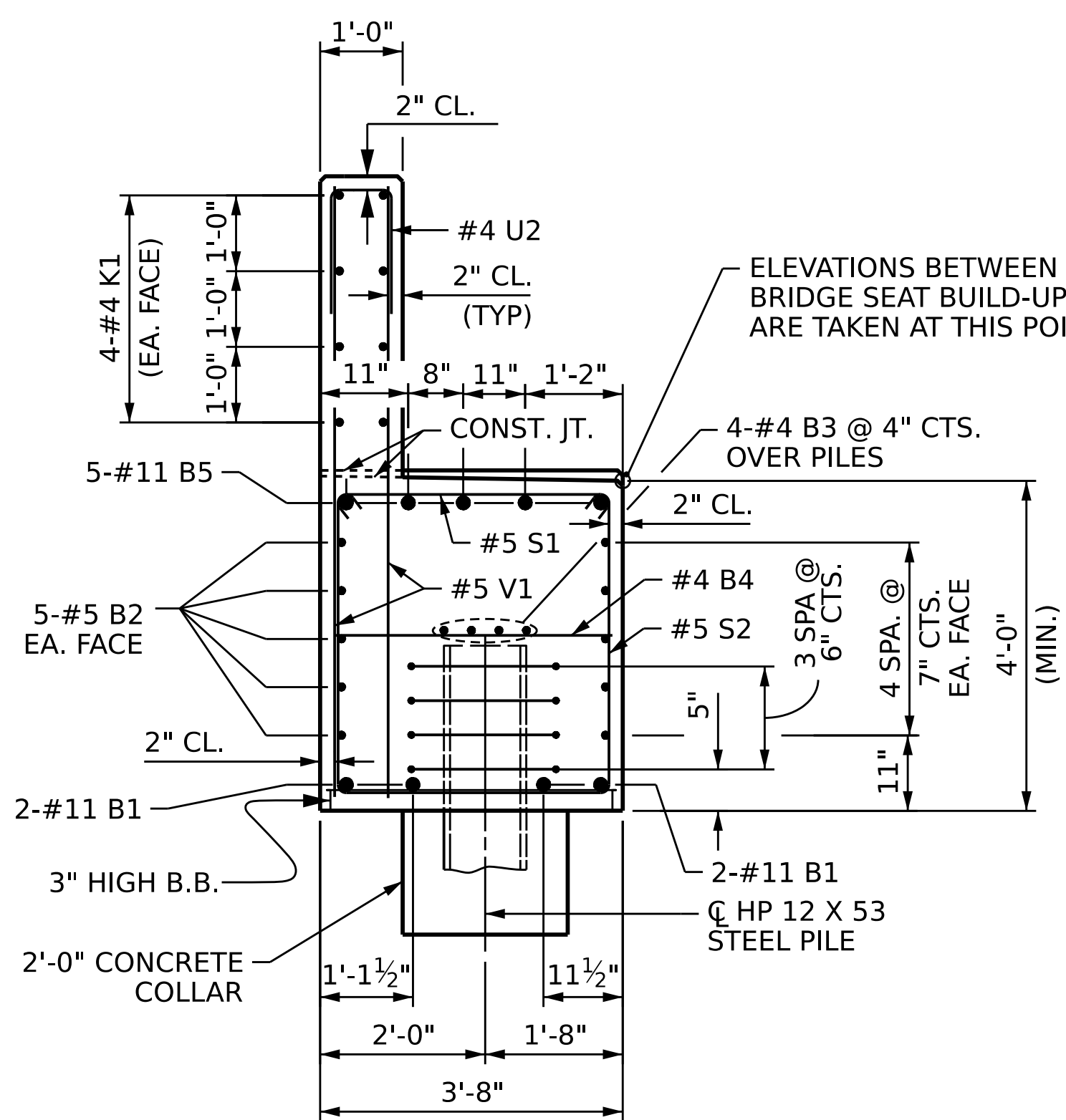
REINFORCING STEEL 8643 LBS.

CLASS A CONCRETE

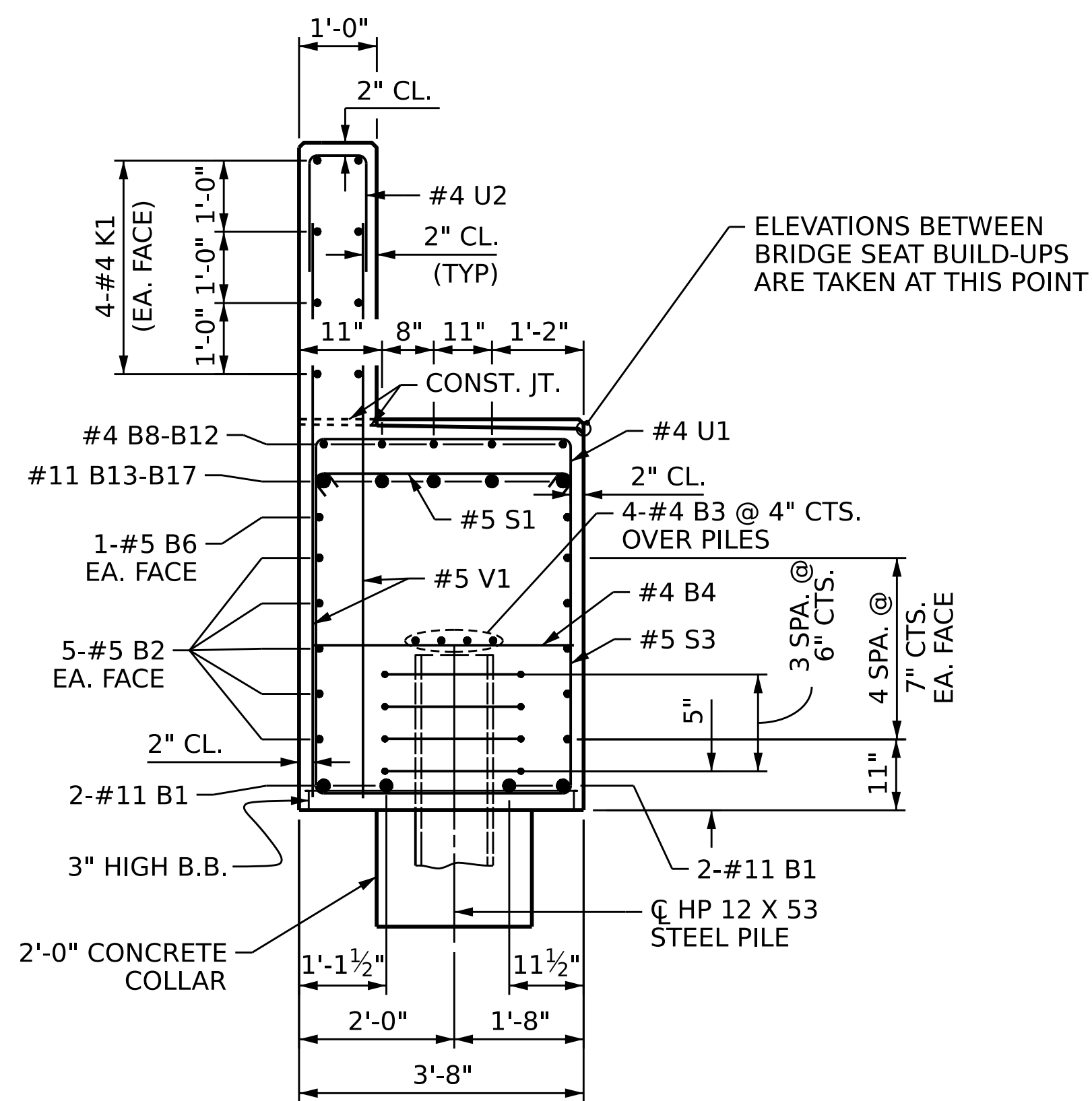
POUR #1 (CAP, COLLARS, & LOWER PART OF WINGS) 35.3 C.Y.

POUR #2 (BACKWALL & UPPER PART OF WINGS) 12.9 C.Y.

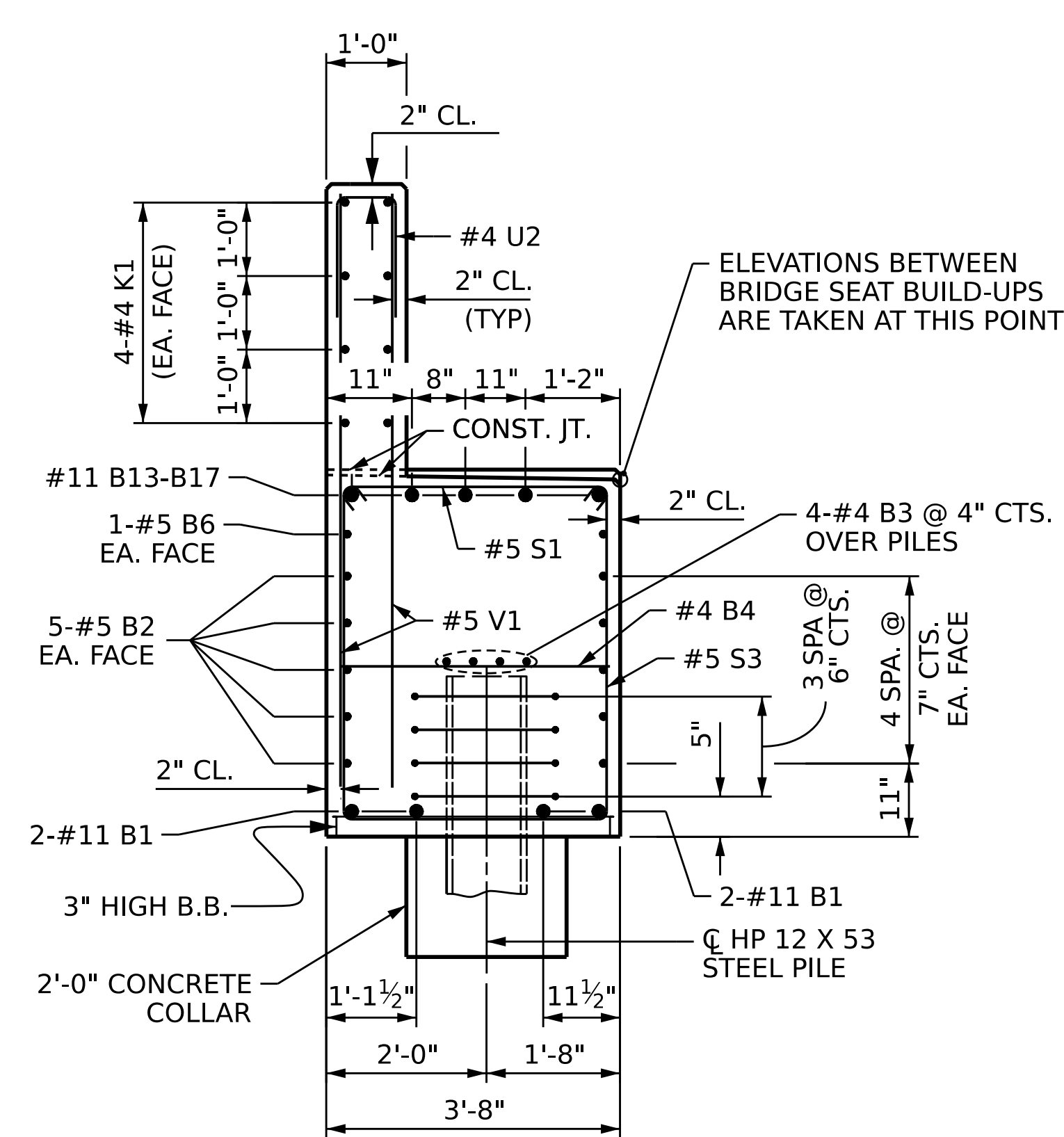
TOTAL CLASS A CONCRETE 48.1 C.Y.



SECTION A-A



SECTION B-B



SECTION C-C

PROJECT NO. **BR-0073**

COLUMBUS COUNTY

STATION: **18+24.50 -L-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
END BENT 2**



VOLKERT

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Raleigh, NC 27607
Tel. 919-854-0344 Fax. 919-854-0355
NC License No. F-0765

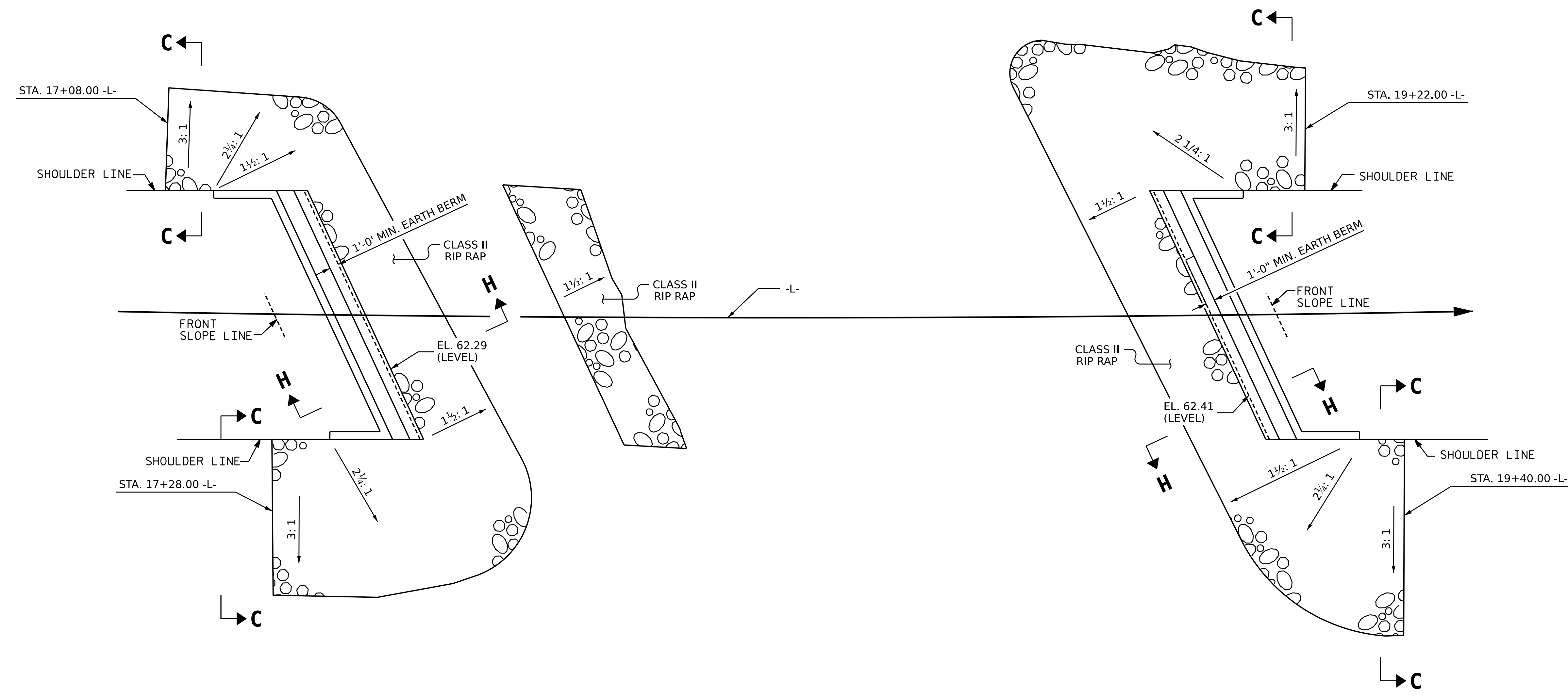
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS 38

DRAWN BY: B.H. BARNHILL DATE: 10/22
CHECKED BY: D. GLADDEN DATE: 11/22
DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 11/22

NOTES:
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

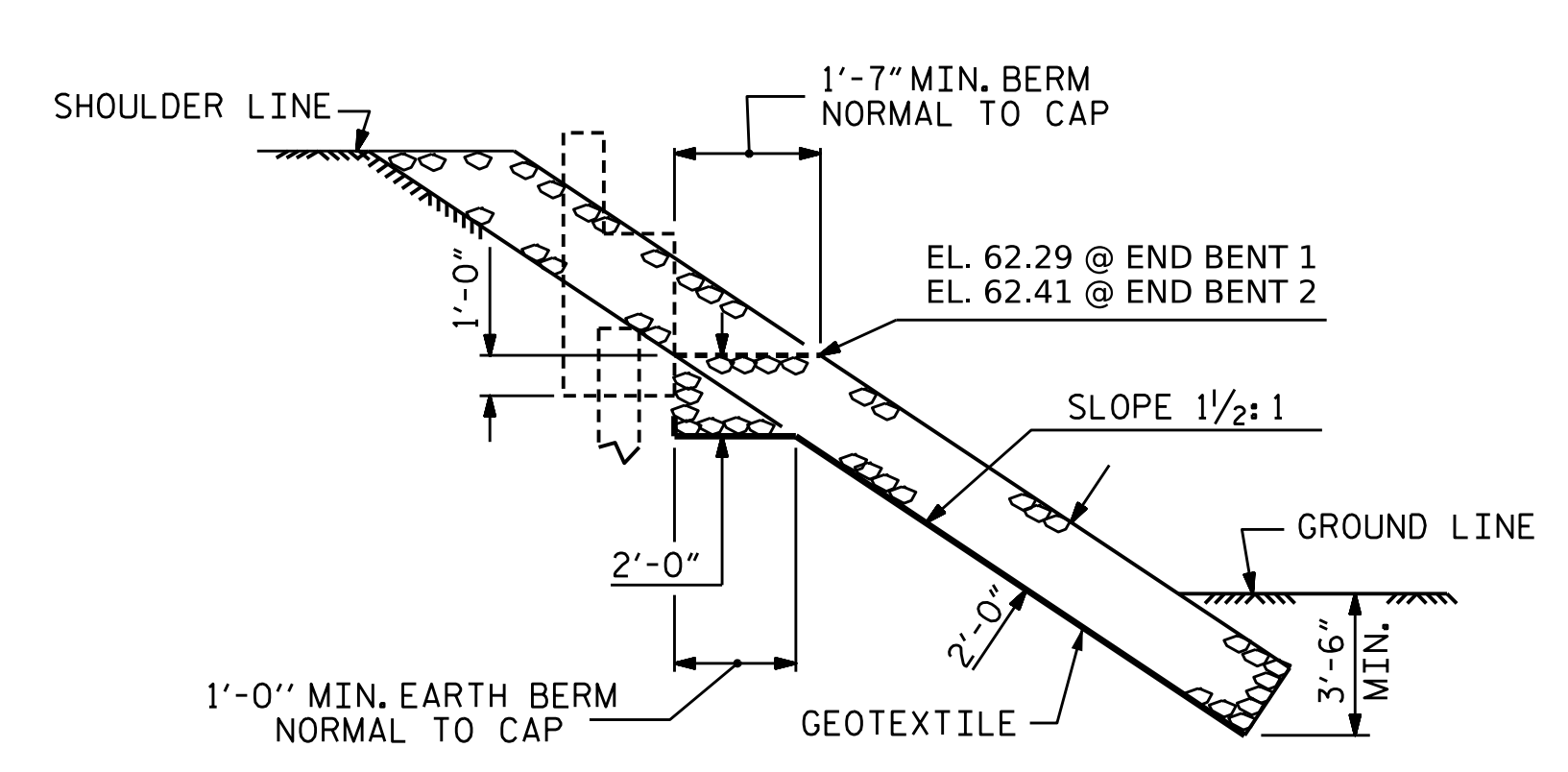


RIP RAP AT END BENT 1

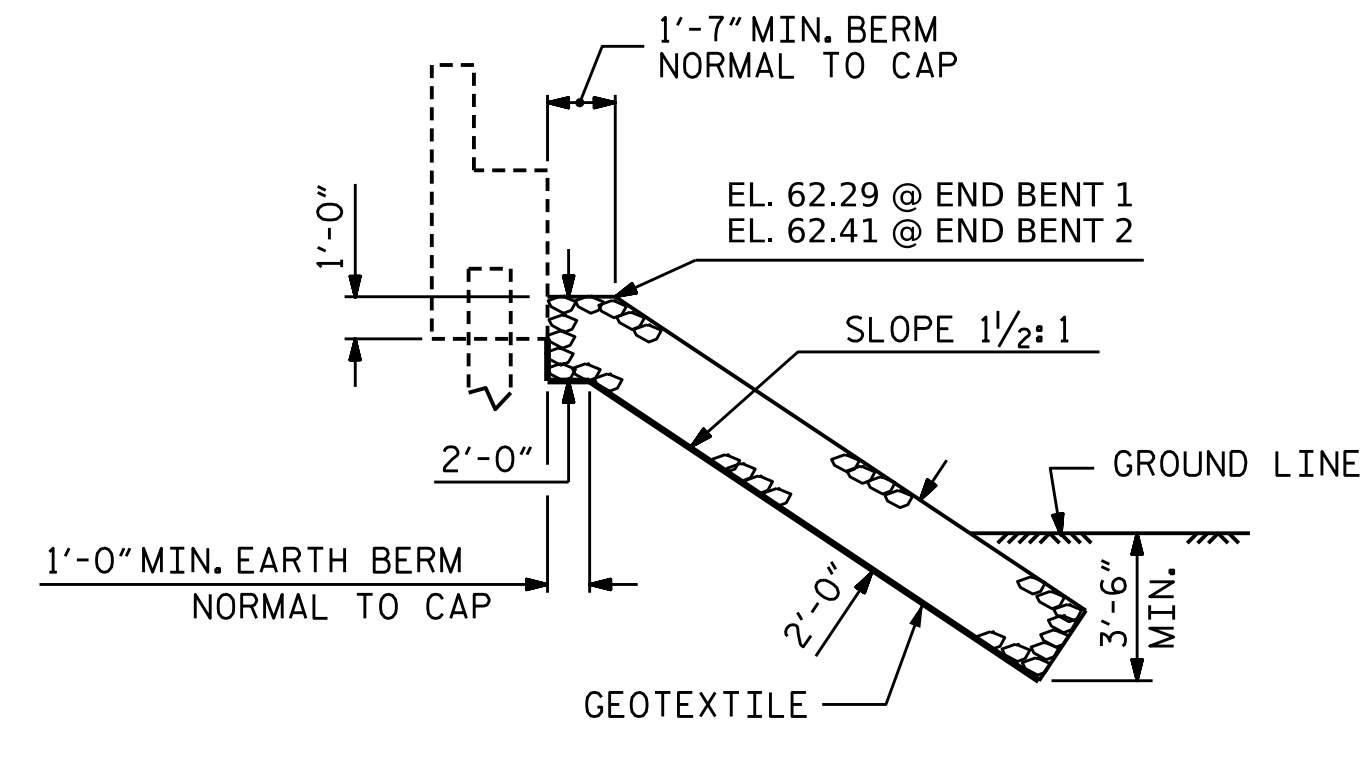
RIP RAP AT END BENT 2

ESTIMATED QUANTITIES		
BRIDGE @ STA. 18+24.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	370	411
END BENT 2	344	382

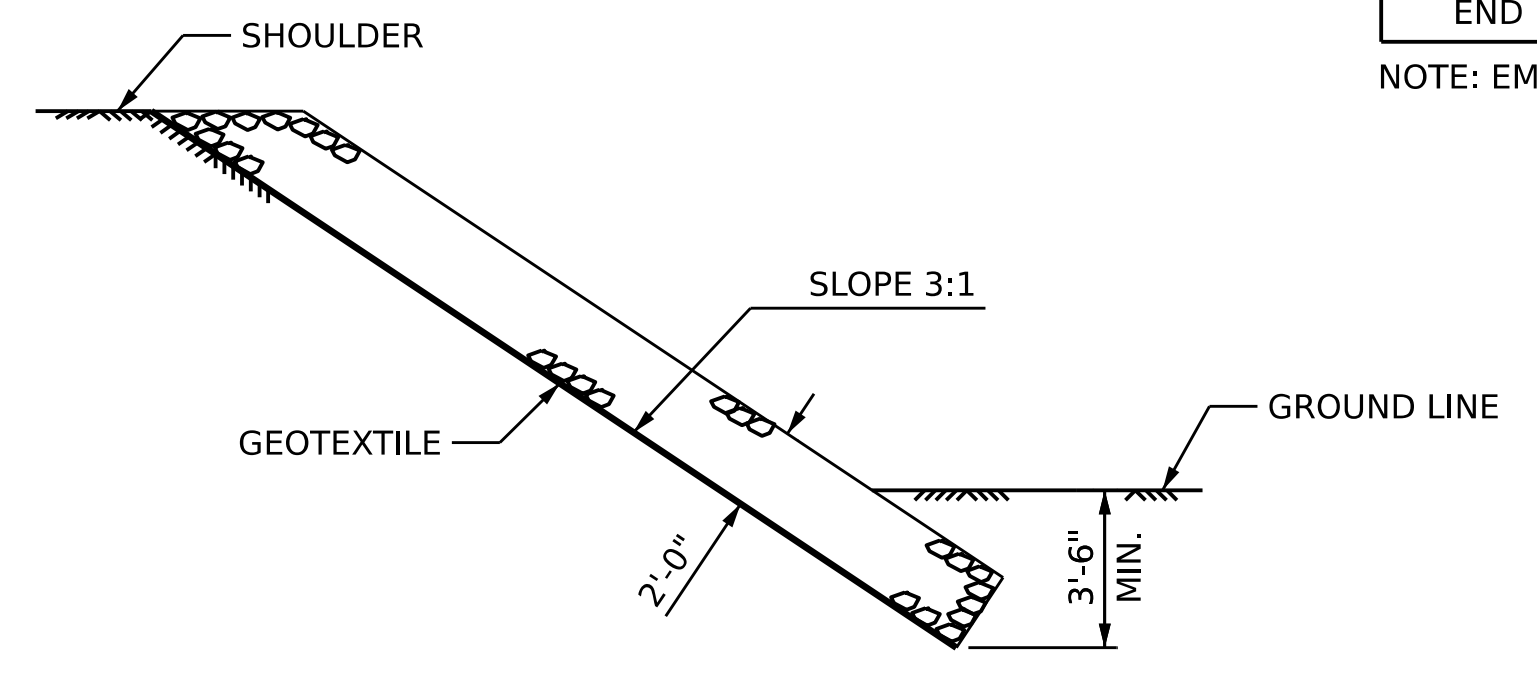
NOTE: EMBANKMENT RIP RAP INCLUDED IN END BENT 1 QUANTITIES.



SECTION H-H



SECTION C-C
BERM RIP RAPPED



SECTION C-C

PROJECT NO. **BR-0073**
COLUMBUS COUNTY
STATION: **18+24.50 -L-**



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

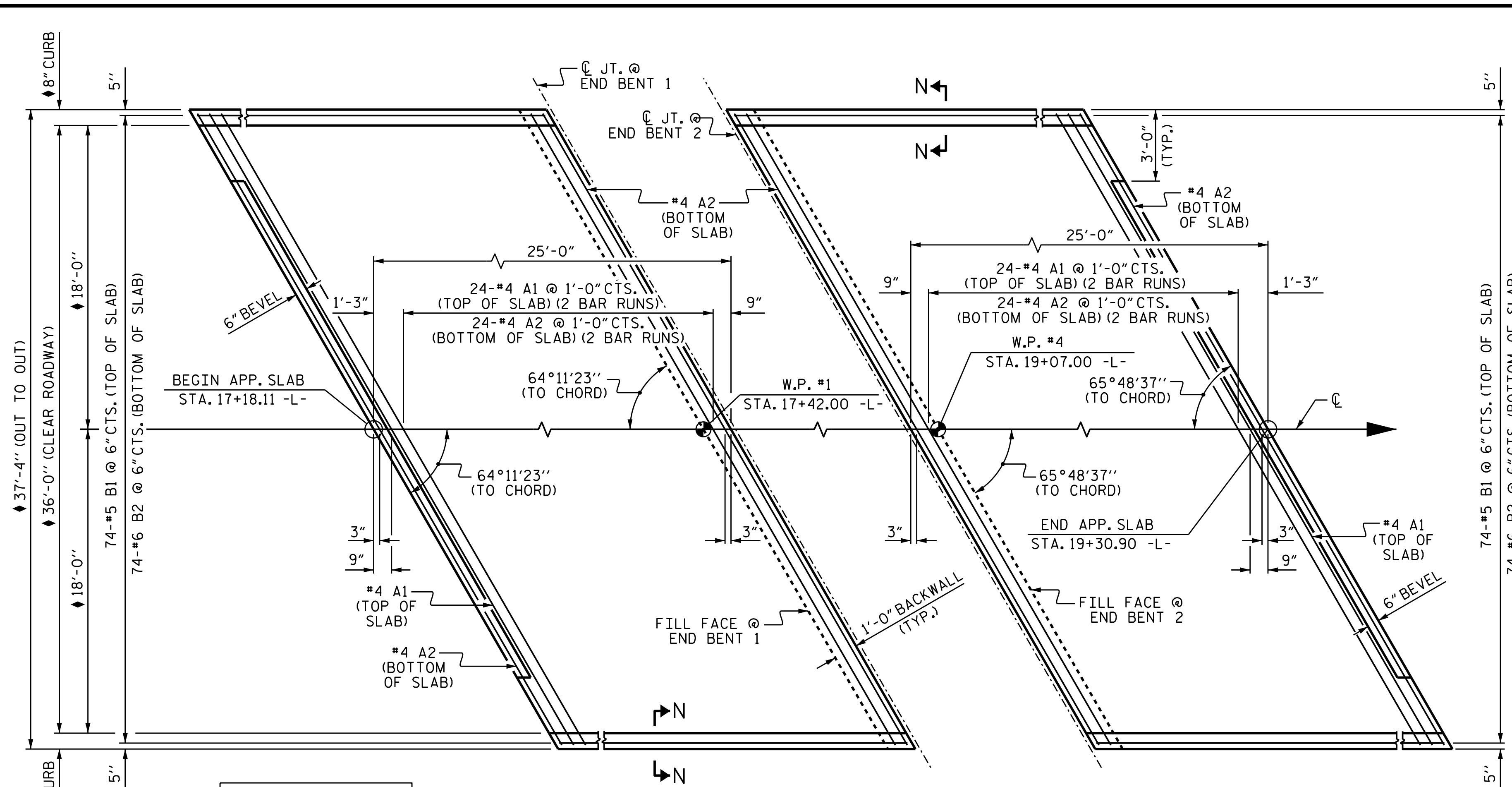
STANDARD
RIP RAP DETAILS

ASSEMBLED BY : D. A. GLADDEN	DATE : 5/22
CHECKED BY : P. N. HOLDER	DATE : 11/22
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

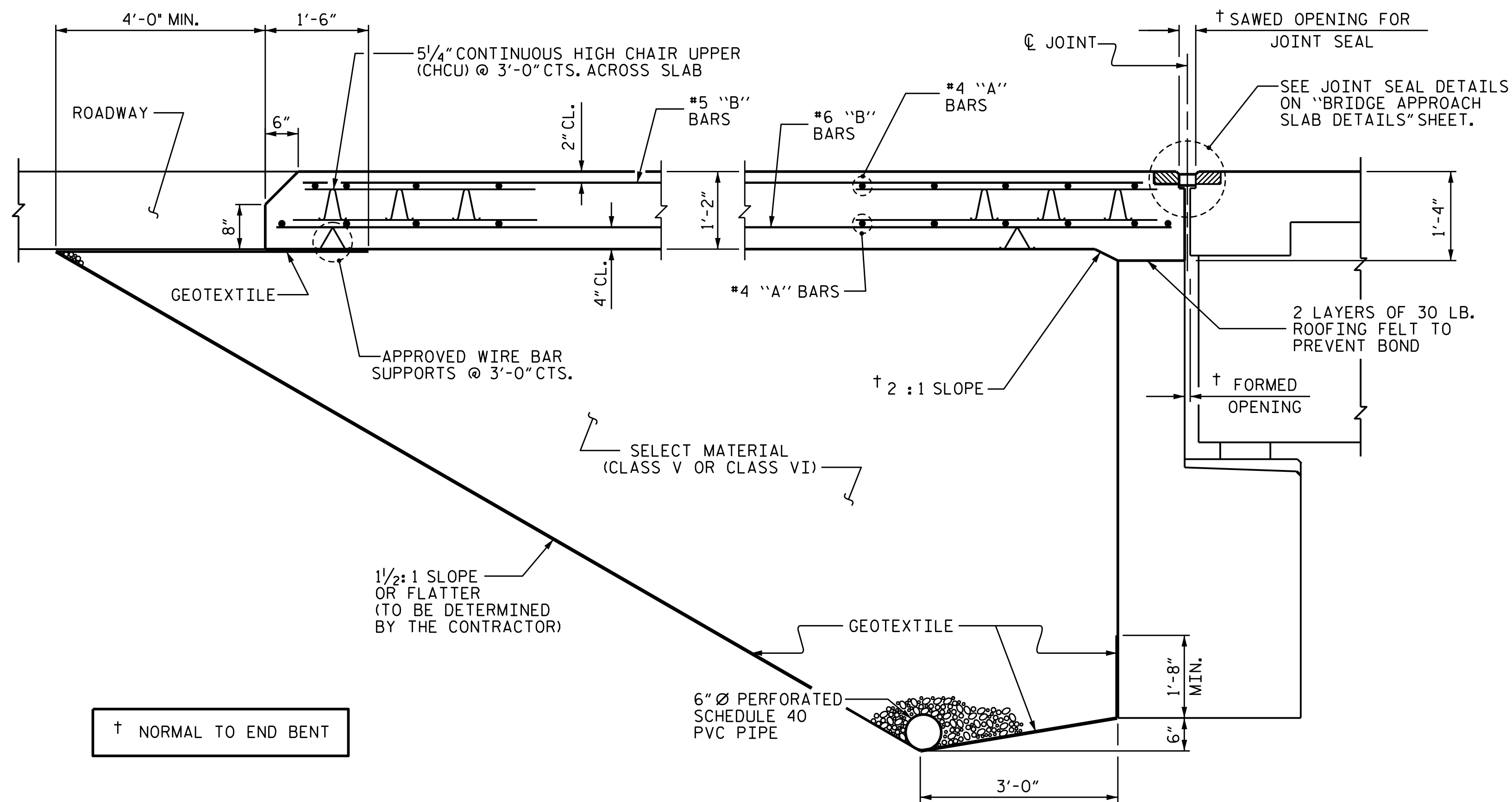
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NC License No. F-0765

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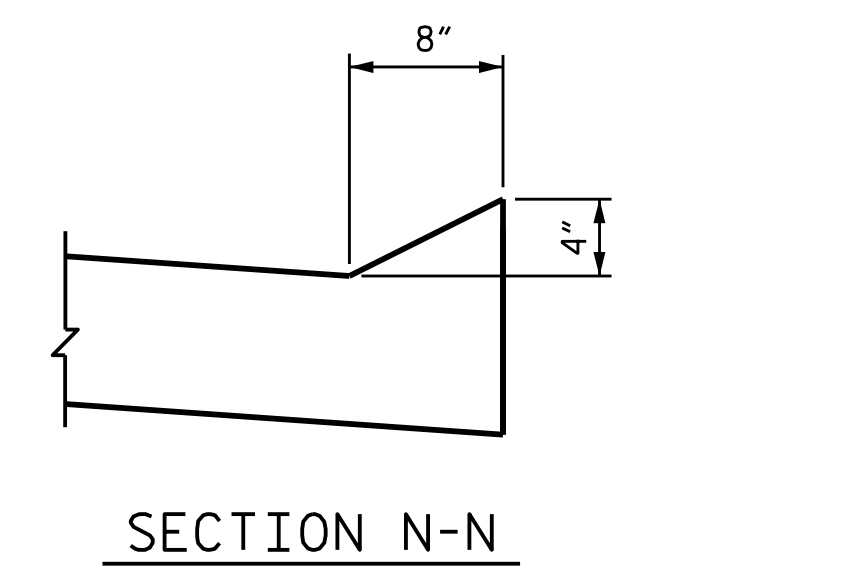
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			38



PLAN @ END BENT 1 PLAN @ END BENT 2
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)



SECTION N-N
CURB DETAILS
END OF CURB WITHOUT SHOULDER BERM GUTTER

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

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

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

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

THE JOINT SHALL BE SAWS PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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.

ARC OFFSETS ARE NEGLIGIBLE AND THUS OMITTED FROM DRAWING.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL					
APPROACH SLAB AT EB 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	21'-7"	721
A2	52	#4	STR	21'-5"	744
*B1	74	#5	STR	23'-10"	1840
B2	74	#6	STR	24'-6"	2723
REINFORCING STEEL				LBS.	3467
*EPOXY COATED REINFORCING STEEL				LBS.	2561
CLASS AA CONCRETE				C. Y.	40.4
APPROACH SLAB AT EB 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	21'-7"	721
A2	52	#4	STR	21'-5"	744
*B1	74	#5	STR	23'-10"	1840
B2	74	#6	STR	24'-6"	2723
REINFORCING STEEL				LBS.	3467
*EPOXY COATED REINFORCING STEEL				LBS.	2561
CLASS AA CONCRETE				C. Y.	40.4

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

ASSEMBLED BY : D. A. GLADDEN	DATE : 4/22
CHECKED BY : S. NANDIVADA	DATE : 10/22
DRAWN BY : EEM 3/95	REV. 6/13 MAA/GM
CHECKED BY : VAP 3/95	REV. 12/17 MAA/THC
	REV. 06/19 BNB/THC

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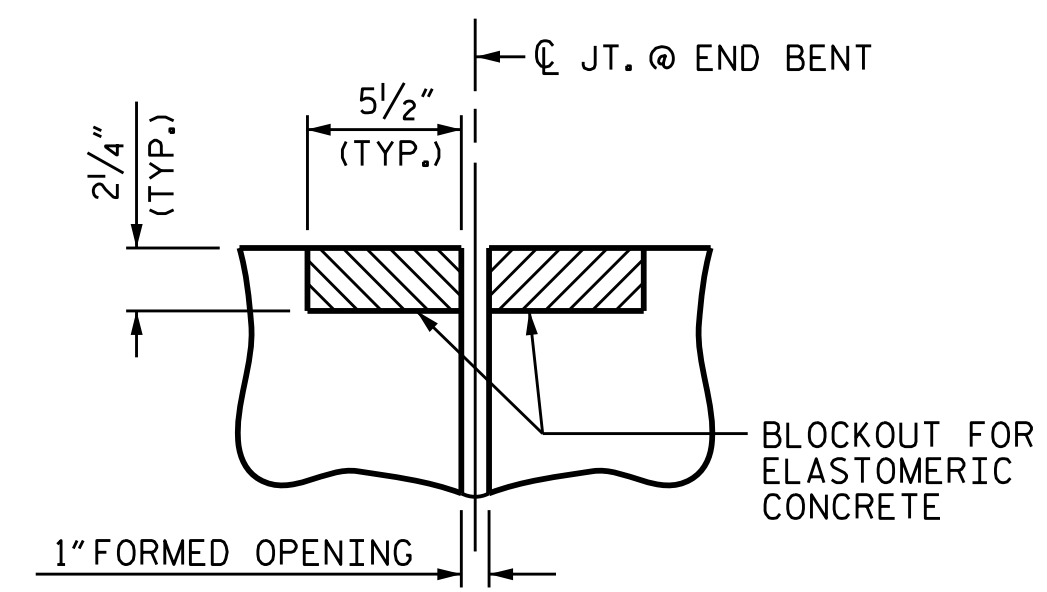


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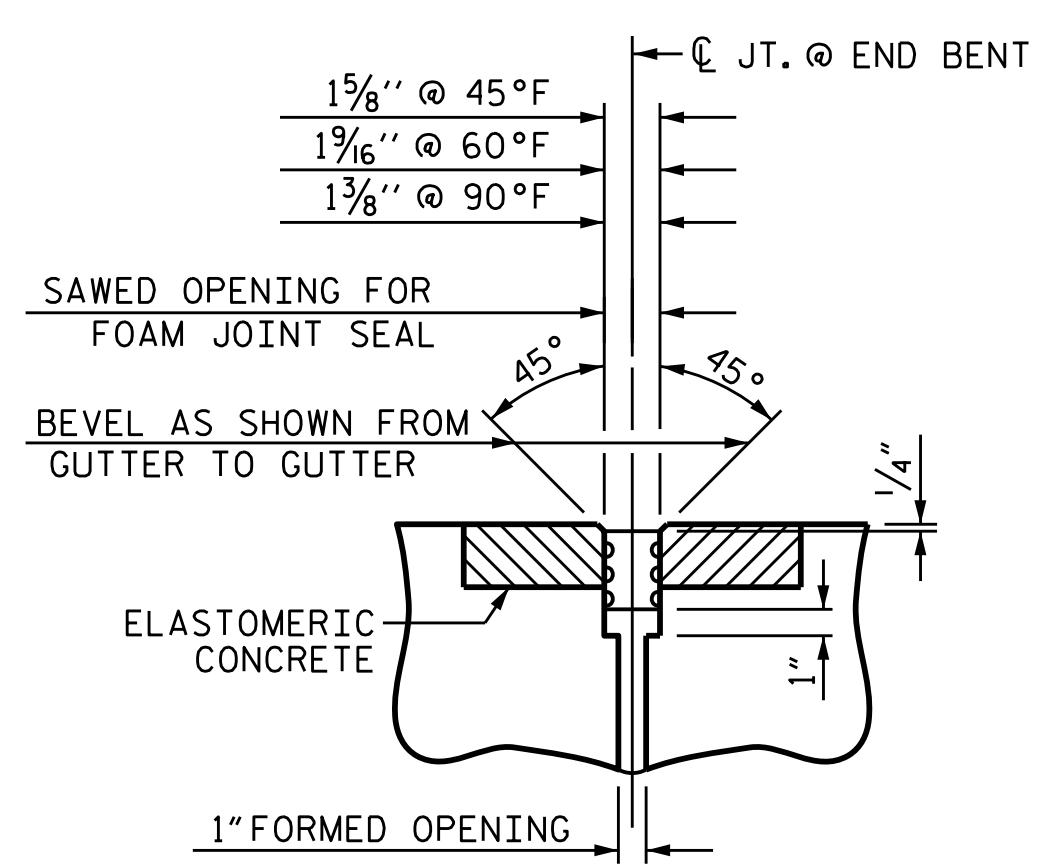
PROJECT NO. BR-0073
COLUMBUS COUNTY
STATION: 18+24.50 -L-

SHEET 1 OF 2
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT

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



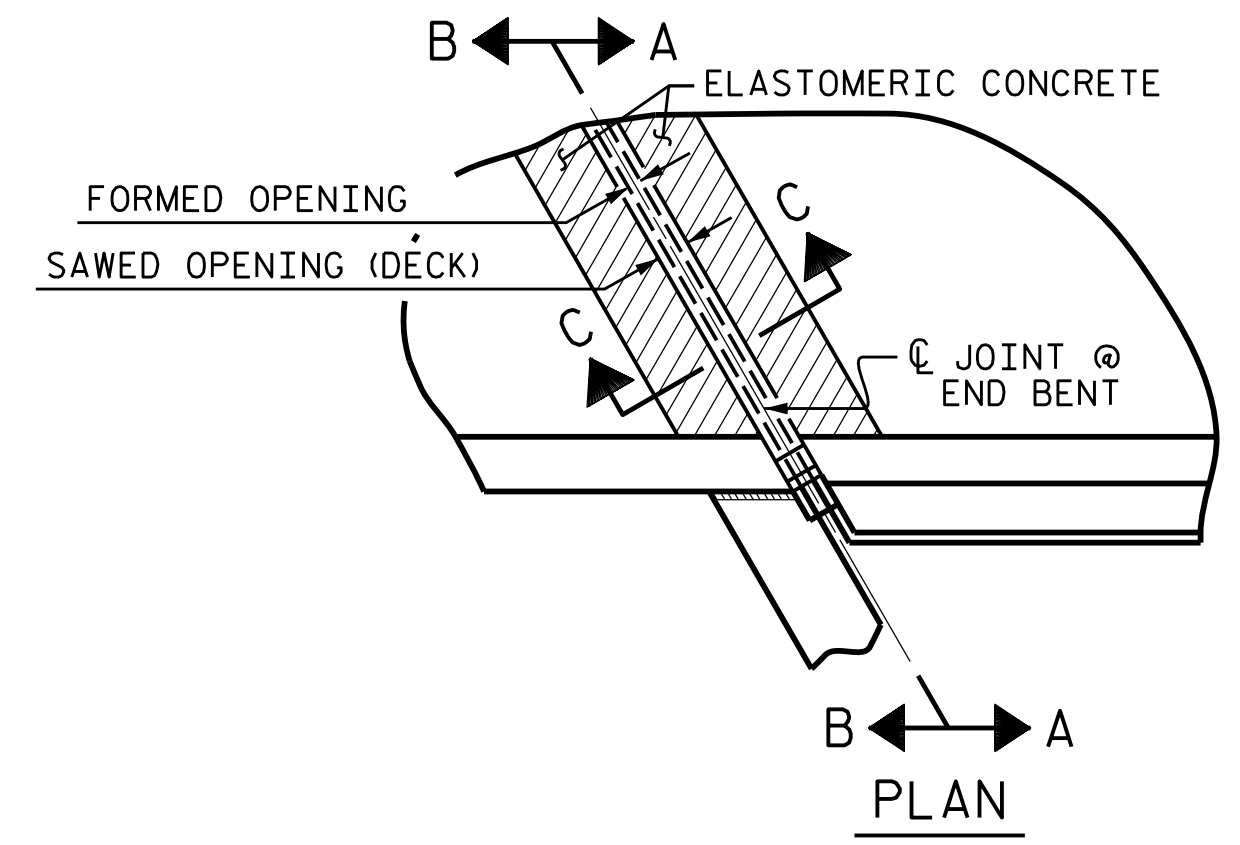
SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)



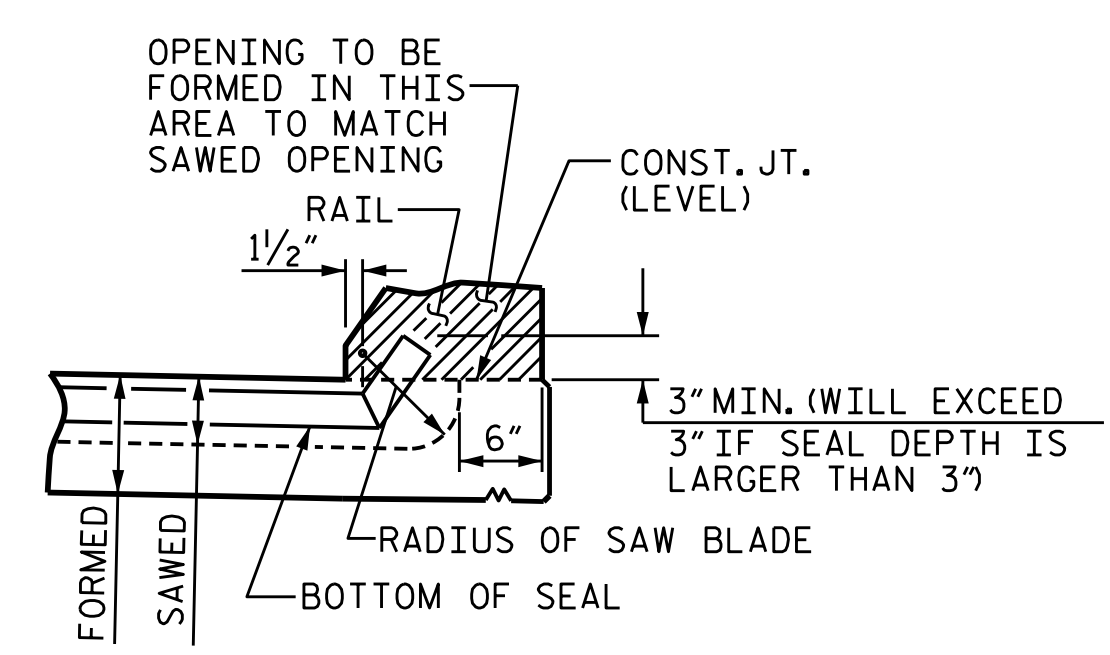
SECTION C-C
FOAM JOINT SEAL
(EXPANSION)

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.9
2	6.9
TOTAL	13.8

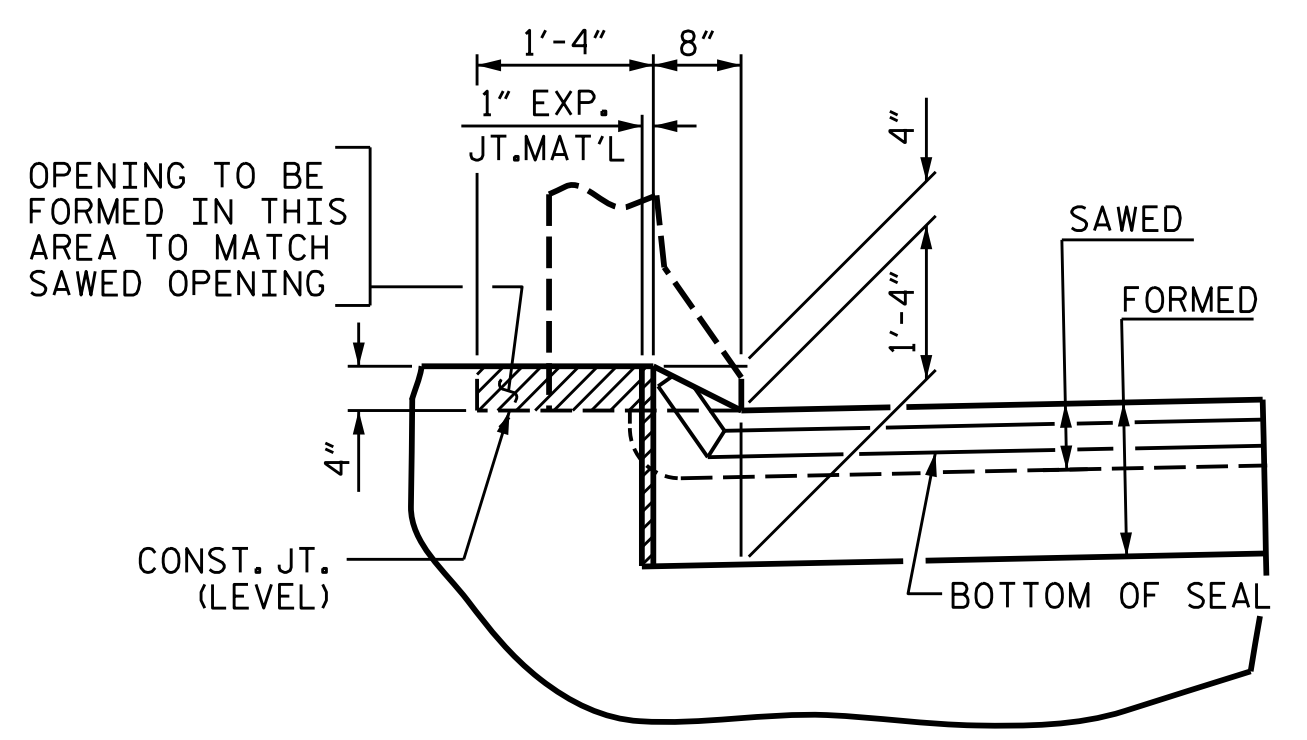
* BASED ON THE MINIMUM BLOCKOUT SHOWN.



PLAN



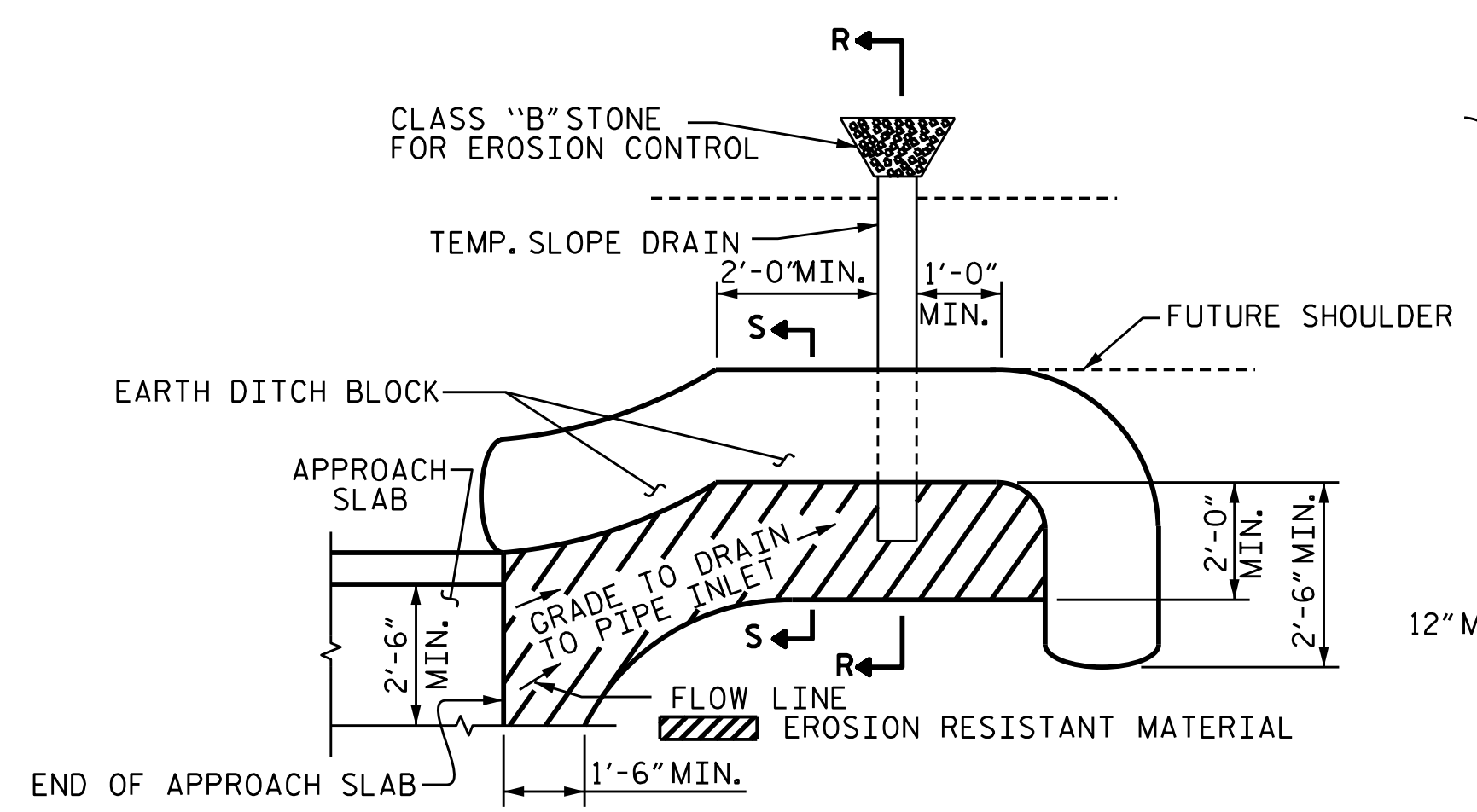
SECTION A-A



SECTION B-B

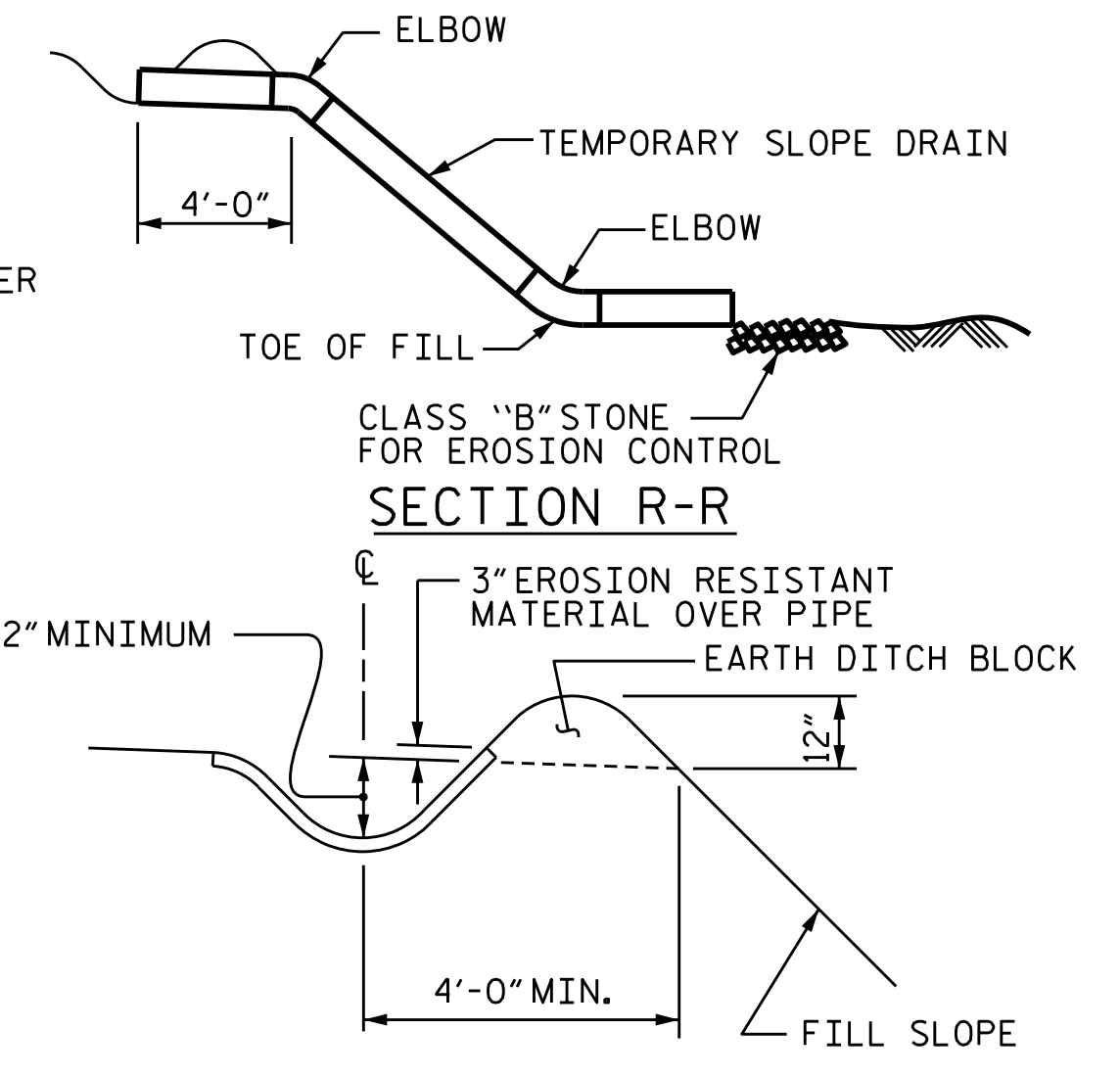
JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.



PLAN VIEW

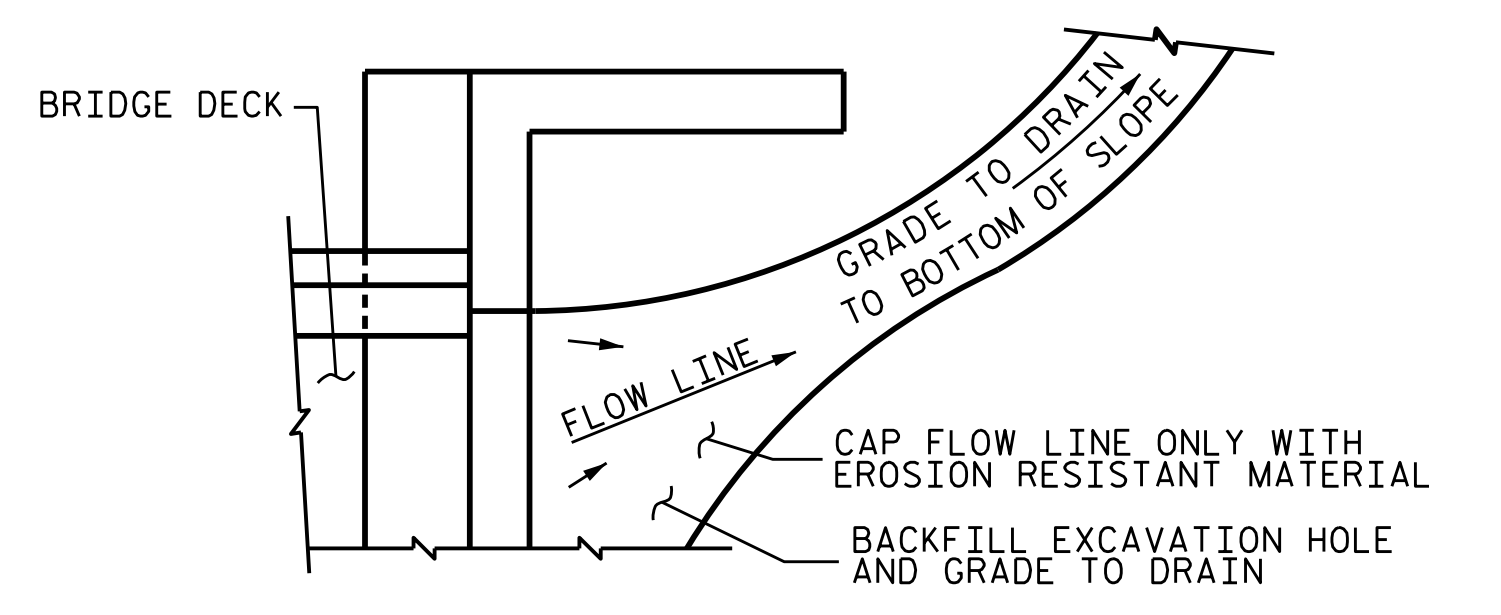
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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.



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

TEMPORARY DRAINAGE DETAIL

PROJECT NO. BR-0073
COLUMBUS COUNTY
STATION: 18+24.50 -L-

SHEET 2 OF 2

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



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

ASSEMBLED BY :	D. A. GLADDEN	DATE :	4/22
CHECKED BY :	S. NANDIVADA	DATE :	10/22
DRAWN BY :	FCJ 11/88	REV. 6/13	MAA/GM
CHECKED BY :	ARB 11/88	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC

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.
- 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 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