

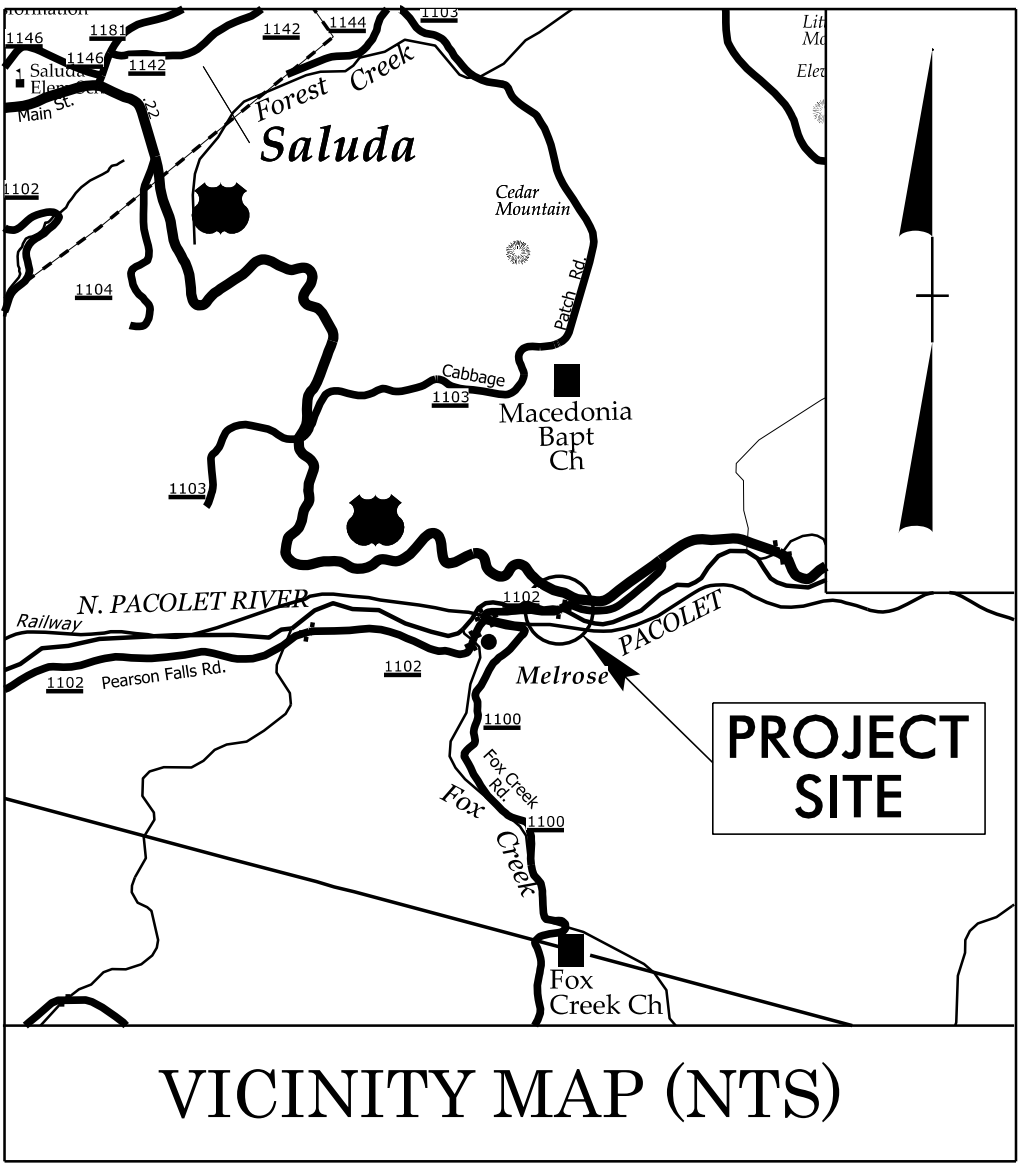
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BRIDGE PROJECT: BP14-R038

CONTRACT: DN01130



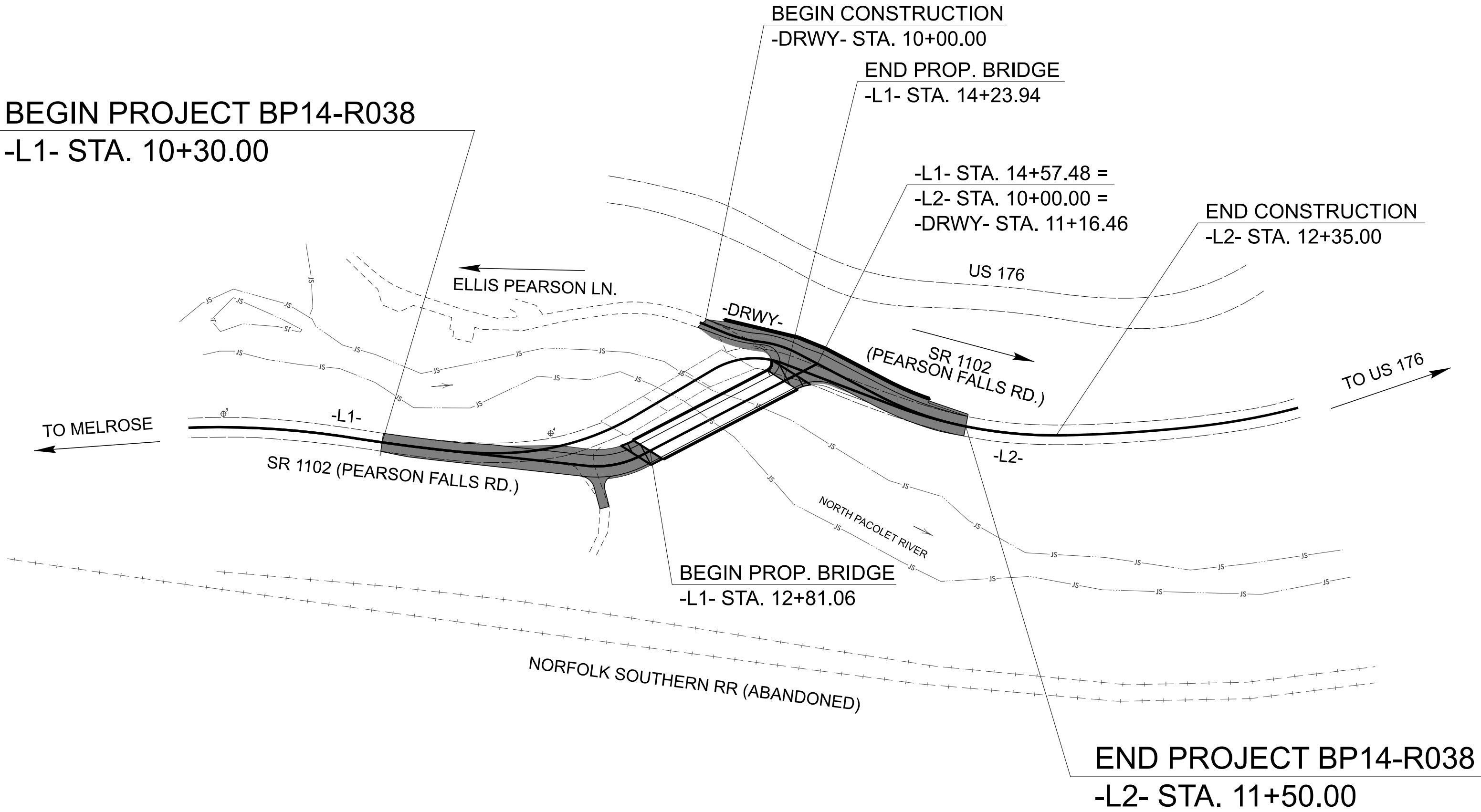
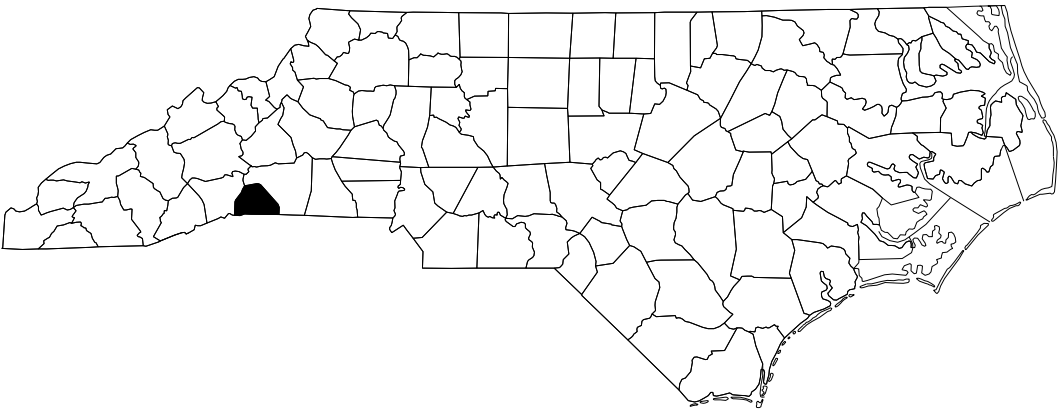
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

POLK COUNTY

LOCATION: *REPLACE BRIDGE #740009 ON SR 1102 (PEARSON FALLS ROAD) OVER NORTH PACOLET RIVER*

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP14-R038	11	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
BP14.R038.1		PE	
BP14.R038.2		ROW/UTILITY	
BP14.R038.3		CONSTRUCTION	



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT LENGTH

PROJECT LENGTHS FOR BRIDGE PROJECT BP14-R038:
LENGTH ROADWAY PROJECT BP14-R038 = 0.082 MILES
LENGTH STRUCTURES PROJECT BP14-R038 = 0.027 MILES
TOTAL LENGTH PROJECT BP14-R038 = 0.109 MILES
(PROJECT LENGTHS BASED ON -L1- AND -L2-)

NCDOT Contact: ZACH SHULER, P.E.
Prepared in the Office of:



2024 STANDARD SPECIFICATIONS

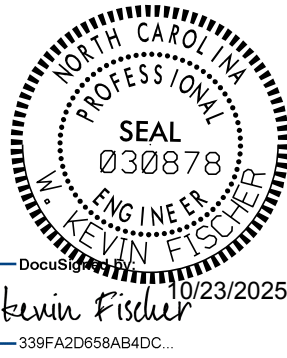
RIGHT OF WAY DATE:
MARCH 11, 2025

LETTING DATE:
JANUARY 13, 2026

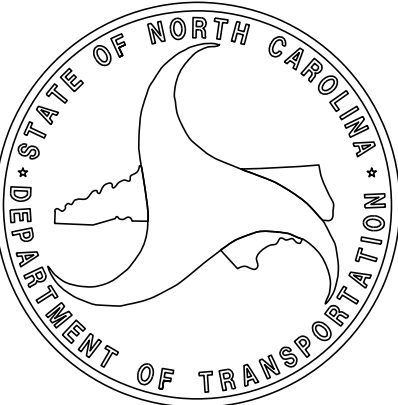
W. KEVIN FISCHER, PE
PROJECT ENGINEER

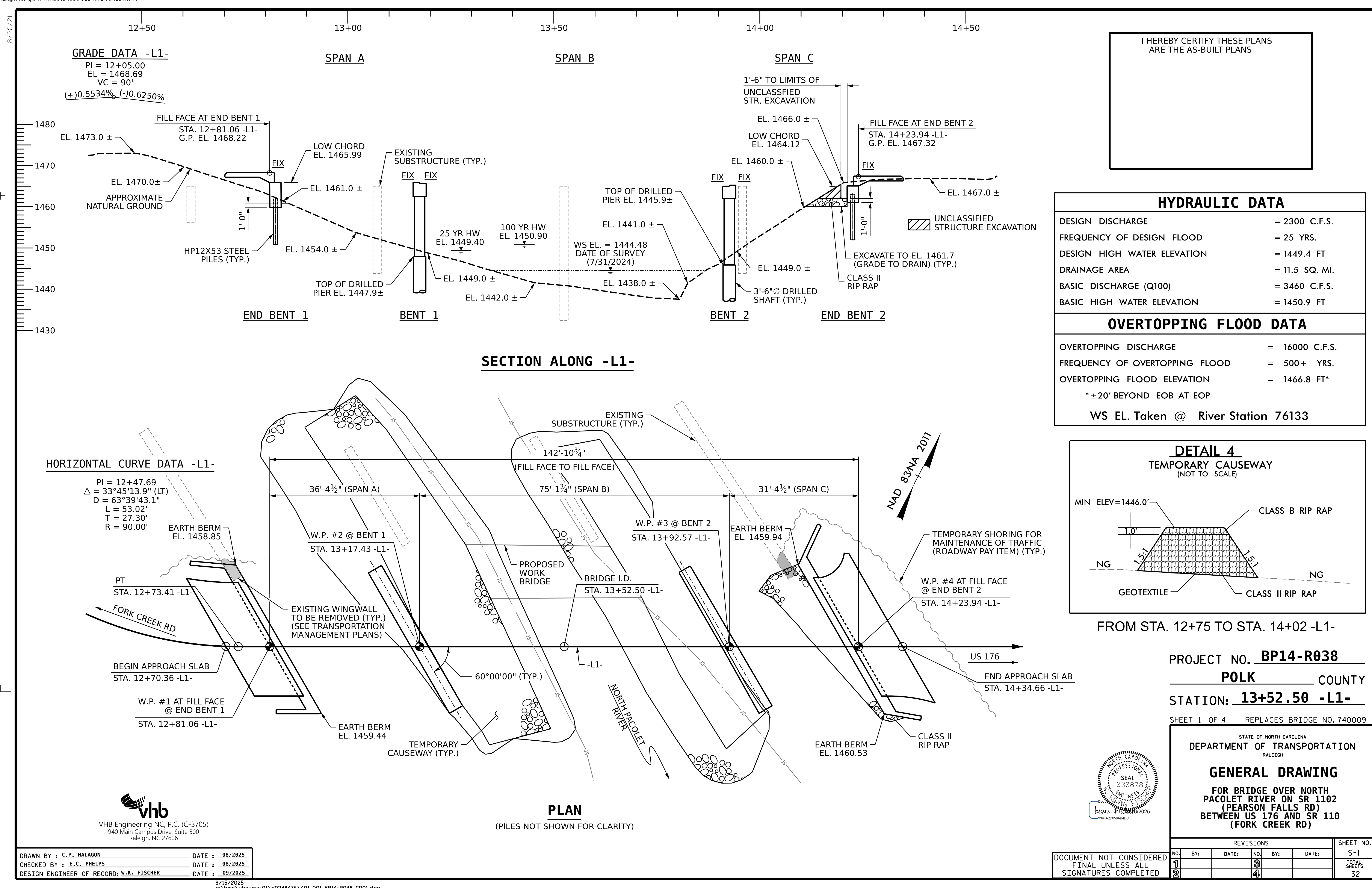
ELIZABETH PHELPS, PE
PROJECT DESIGN ENGINEER

STRUCTURES ENGINEER



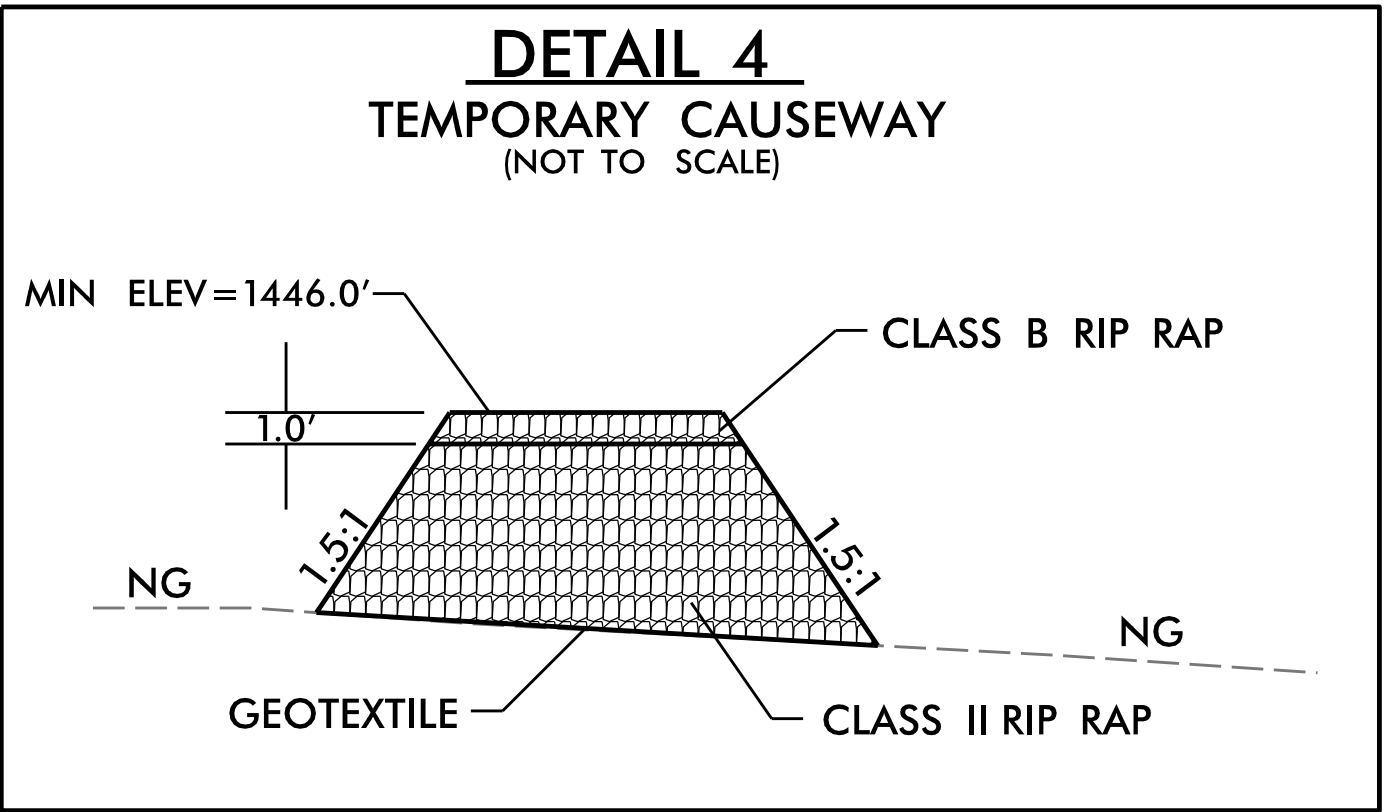
W. KEVIN FISCHER, PE
SIGNATURE:





I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

HYDRAULIC DATA		
DESIGN DISCHARGE	=	2300 C.F.S.
FREQUENCY OF DESIGN FLOOD	=	25 YRS.
DESIGN HIGH WATER ELEVATION	=	1449.4 FT
DRAINAGE AREA	=	11.5 SQ. MI.
BASIC DISCHARGE (Q100)	=	3460 C.F.S.
BASIC HIGH WATER ELEVATION	=	1450.9 FT
OVERTOPPING FLOOD DATA		
OVERTOPPING DISCHARGE	=	16000 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	=	500+ YRS.
OVERTOPPING FLOOD ELEVATION	=	1466.8 FT*
*±20' BEYOND EOB AT EOP		
WS EL. Taken @ River Station 76133		



FROM STA. 12+75 TO STA. 14+02 -L1-

PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 1 OF 4 REPLACES BRIDGE NO. 740009

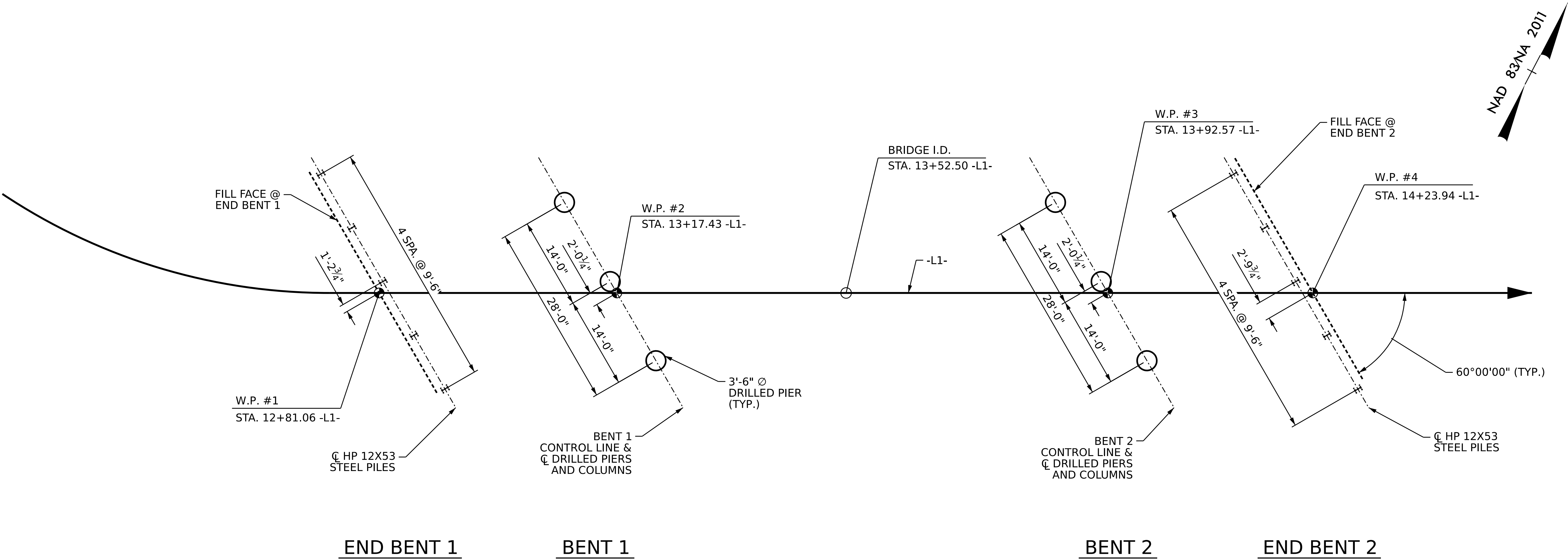
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE OVER NORTH
PACOLET RIVER ON SR 1102
(PEARSON FALLS RD)
BETWEEN US 176 AND SR 110
(FORK CREEK RD)



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

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DRAWN BY : C.P. MALAGON	DATE : 08/2025
CHECKED BY : E.C. PHELPS	DATE : 08/2025
DESIGN ENGINEER OF RECORD: W.K. FISCHER	DATE : 09/2025



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES

NOTES

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- FILL HOLES FOR PILE EXCAVATIONS AT END BENT NO. 1 AND END BENT NO. 2 WITH CONCRETE.
- IF WEATHERED ROCK IS ENCOUNTERED AFTER PILE EXCAVATION, DRIVE PILES TO THE REQUIRED DRIVING RESISTANCE BEFORE BACKFILLING HOLES WITH CONCRETE.
- IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 20,000 TO 35,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1 AND END 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.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- INSTALL PERMANENT STEEL CASINGS AT BENT NO. 1 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTRIBUTING ANY MATERIAL BELOW ELEVATION 1,439 FT.
- INSTALL PERMANENT STEEL CASINGS AT BENT NO. 2 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTRIBUTING ANY MATERIAL BELOW ELEVATION 1,432.5 FT.

PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

FOUNDATION
LAYOUT



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

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VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DRAWN BY : C.P. MALAGON	DATE : 08/2025
CHECKED BY : E.C. PHELPS	DATE : 08/2025
DESIGN ENGINEER OF RECORD: W.K. FISCHER	DATE : 09/2025

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")	Number of Piles per Line	Factored Resistance per Pile KIPS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-In Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent No. 1, Piles 1-3	3	132	See Substructure Plans	20			220					1448	4.4	7.8
End Bent No. 1, Piles 4-5	2	132	See Substructure Plans	20			220							
End Bent No. 2, Piles 1-3	3	122	See Substructure Plans	20			205					1445	4.9	11.4
End Bent No. 2, Piles 4-5	2	122	See Substructure Plans	20			205							
TOTAL QUANTITY:													27.9	57.6

* $RDR = \frac{\text{Factored Resistance} + \text{Factored Drag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \text{Nominal Drag Load Resistance} + \text{Nominal Resistance from Scourable Material}$

** 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.

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 KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent No. 1, Piles 1-3	132			0.6		
End Bent No. 1, Piles 4-5	132			0.6		
End Bent No. 2, Piles 1-3	122			0.6		
End Bent No. 2, Piles 4-5	122			0.6		

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

SUMMARY OF PILE ACCESSORIES
(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
End Bent No. 1, Piles 1-3				3
End Bent No. 1, Piles 4-5				2
End Bent No. 2, Piles 1-3				3
End Bent No. 2, Piles 4-5				2
TOTAL QUANTITY:				10

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION
(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Number of Piers per Line	Factored Resistance per Pier KIPS	Required Drilled Pier Tip Elevation FT	Required Tip Resistance per Pier KSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier LIN FT	Drilled Pier Length* per Pier LIN FT	Drilled Pier Length Not In Soil* per Pier LIN FT	Drilled Pier Length In Soil* per Pier LIN FT	Permanent Steel Casing Required? YES	Permanent Steel Casing Tip Elevation (Elevation Not To Extend Casing Below) FT	Permanent Steel Casing Length** per Pier LIN FT
Bent No. 1, Pier 1	1	540	1425.00	10	1437.00	9.6		13.4	9.6	Yes	1441.00	6.9
Bent No. 1, Piers 2-3	2	540	1418.00	10	1437.00	15		15	14.9	Yes	1437.00	10.9
Bent No. 2, Pier 1	1	525	1426.00	10	1430.00	6.5		6.5	13.4	Yes	1432.50	13.4
Bent No. 2, Piers 2-3	2	525	1419.00	10	1430.00	13.5		7.6	19.3	Yes	1426.60	19.3
TOTAL QUANTITY:								65.1	91.4			80.7

* Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "___ Dia. Drilled Piers" or "___ Dia. Drilled Piers Not in Soil" and "___ Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the NCDOT Standard Specifications. For bents with a not in soil pay item, drilled piers through air or water will be paid at the contract unit price for "___ Dia. Drilled Piers in Soil."

** Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation and is measured and paid for as "Permanent Steel Casing for ___ Dia. Drilled Pier" in accordance with Article 411-7 of the NCDOT Standard Specifications.

SUMMARY OF DRILLED PIER TESTING
(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) EACH	Crosshole Sonic Logging (CSL) EACH	Thermal Integrity Profiler (TIP) EACH	Shaft Inspection Device (SID) EACH	Pile Integrity Test (PIT) EACH
Bent No. 1, Piers 1-3		1			
Bent No. 2, Piers 1-3		1			
TOTAL QUANTITY:		2			

NOTES:

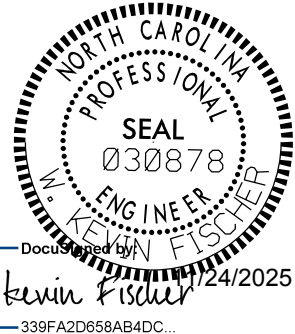
- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Michael J. Walko, #026917) on 07-11-2025.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer may adjust the quantity for DPT Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, TIPs, CSL Testing, SID Inspections and PITs when necessary.



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DESIGN ENGINEER OF RECORD: W.K. FISCHER DATE : 09/2025

11/21/2025
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PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

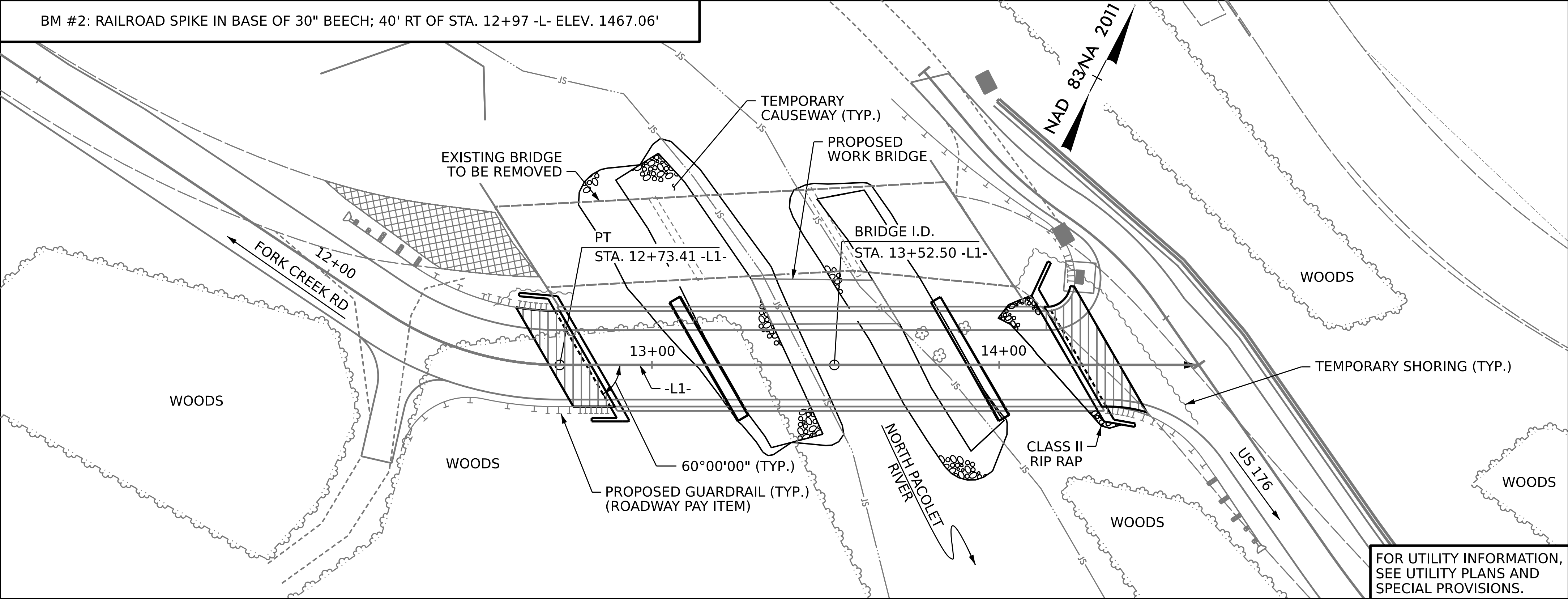
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED
PIER FOUNDATION
TABLES

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

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- LOCATION SKETCH -

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMP. ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	3'-6" Ø DRILLED PIERS NOT IN SOIL	3'-6" Ø DRILLED PIERS IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	LUMP SUM	CU. YDS	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE										LUMP SUM		
END BENT NO. 1									32.2		3,142	
BENT NO. 1				43.4	39.4	28.7	1		27.5		13,574	2,790
BENT NO. 2				21.7	52.0	52.0	1		27.8		13,297	2,708
END BENT NO. 2								LUMP SUM	23.2		3,043	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	65.1	91.4	80.7	2	LUMP SUM	110.7	LUMP SUM	33,056	5,498

TOTAL BILL OF MATERIAL (CONT'D)

TOTAL BILL OF MATERIAL (CONT'D)												
	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		2 BAR METAL RAIL	1'-2" x 2'-9½" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS	3'-0" x 2'-0" PRESTRESSED CONCRETE CORED SLABS		
	EA.	NO.	LIN. FT.	LIN FT.	LIN FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	NO.	LIN. FT.
SUPERSTRUCTURE				264.12	279.12			LUMP SUM	20	650	10	750
END BENT NO. 1	5	5	100									
BENT NO. 1												
BENT NO. 2												
END BENT NO. 2	5	5	100			35	40					
TOTAL	10	10	200	264.12	279.12	35	40	LUMP SUM	20	650	10	750

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 21 FT ± (LEFT) AND 5 FT ± (RIGHT) AT END BENT NO. 1 AND 20 FT ± (LEFT AND RIGHT) AT END BENT NO. 2 OF THE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE 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 THE DIFFERENCE BETWEEN THE EXISTING THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE BRIDGE IN ACCORDANCE TO ARTICLE 402-2 O THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE #740009 CONSISTING OF THREE (3) STEEL I-BEAM SPANS 1 @ 45'-3", 1 @ 45'-0", 1 @ 40'-8" WITH A CLEAR ROADWAY WIDTH OF 13'-5", WITH AN ASPHALT WEARING SURFACE, WITH SUBSTRUCTURES CONSISTING OF STEEL H-PILE ABUTMENTS AND STEEL H-PILE BENT CAPS WITH H-PILES INCASED IN CONCRETE SPREAD FOOTINGS LOCATED AT THE PROPOSED BRIDGE SHALL BE REMOVED. THE EXISTING BRIDGE IS CURRENTLY POSTED FOR A LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

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



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DESIGN ENGINEER OF RECORD: W.K. FISCHER DATE : 09/2025

9/15/2025
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cmalagon



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PROJECT NO. **BP14-R038**

POLK COUNTY

STATION: **13+52.50 -L1-**

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER NORTH
PACOLET RIVER ON SR 1102
(PEARSON FALLS RD)
BETWEEN US 176 AND SR 110
(FORK CREEK RD)

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

8/26/21

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)		MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ LL)	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ LL)	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD	HL-93 (INVENTORY)	N/A		1.531	--	1.75	0.261	2.42	35'	EL	16.920	0.657	1.53	35'	EL	6.769	0.80	0.261	2.23	35'	EL	16.920		
	HL-93 (OPERATING)	N/A		1.985	--	1.35	0.261	3.14	35'	EL	16.920	0.657	1.98	35'	EL	6.769	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000		1.745	62.819	1.75	0.261	3.17	35'	EL	20.307	0.657	1.74	35'	EL	6.769	0.80	0.261	2.94	35'	EL	20.307		
	HS-20 (OPERATING)	36.000		2.262	81.432	1.35	0.261	4.11	35'	EL	20.307	0.657	2.26	35'	EL	6.769	N/A	--	--	--	--	--		
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		4.240	57.234	1.40	0.261	6.92	35'	EL	16.920	0.657	4.24	35'	EL	6.769	0.80	0.261	5.09	35'	EL	16.920	
		SNGARBS2	20.000		3.289	65.784	1.40	0.261	5.81	35'	EL	20.307	0.657	3.29	35'	EL	6.769	0.80	0.261	4.31	35'	EL	20.307	
		SNAGRIS2	22.000		3.173	69.798	1.40	0.261	5.77	35'	EL	20.307	0.657	3.17	35'	EL	6.769	0.80	0.261	4.28	35'	EL	20.307	
		SNCOTTS3	27.250		2.142	58.380	1.40	0.261	3.46	35'	EL	16.920	0.657	2.14	35'	EL	6.769	0.80	0.261	2.55	35'	EL	16.920	
		SNAGGRS4	34.925		1.979	69.101	1.40	0.261	3.21	35'	EL	16.920	0.657	1.98	35'	EL	6.769	0.80	0.261	2.36	35'	EL	16.920	
		SNS5A	35.550		2.128	75.649	1.40	0.261	3.11	35'	EL	16.920	0.657	2.13	35'	EL	6.769	0.80	0.261	2.29	35'	EL	16.920	
		SNS6A	39.950		2.007	80.167	1.40	0.261	3.00	35'	EL	16.920	0.657	2.01	35'	EL	6.769	0.80	0.261	2.21	35'	EL	16.920	
		SNS7B	42.000		2.047	85.964	1.40	0.261	2.86	35'	EL	16.920	0.657	2.05	35'	EL	6.769	0.80	0.261	2.11	35'	EL	16.920	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.349	77.521	1.40	0.261	3.71	35'	EL	16.920	0.657	2.35	35'	EL	6.769	0.80	0.261	2.73	35'	EL	16.920	
		TNT4A	33.075		2.182	72.179	1.40	0.261	3.70	35'	EL	16.920	0.657	2.18	35'	EL	6.769	0.80	0.261	2.73	35'	EL	16.920	
		TNT6A	41.600		2.105	87.558	1.40	0.261	3.25	35'	EL	16.920	0.657	2.10	35'	EL	6.769	0.80	0.261	2.39	35'	EL	16.920	
		TNT7A	42.000		2.025	85.067	1.40	0.261	3.35	35'	EL	20.307	0.657	2.02	35'	EL	6.769	0.80	0.261	2.47	35'	EL	20.307	
		TNT7B	42.000		1.963	82.464	1.40	0.261	3.30	35'	EL	16.920	0.657	1.96	35'	EL	6.769	0.80	0.261	2.43	35'	EL	16.920	
		TNAGRIT4	43.000		1.901	81.727	1.40	0.261	3.29	35'	EL	20.307	0.657	1.90	35'	EL	6.769	0.80	0.261	2.44	35'	EL	20.307	
EMERGENCY VEHICLE (EV)	EV2	28.750		2.522	72.498	1.30	0.261	4.51	35'	EL	20.307	0.657	2.52	35'	EL	6.769	0.80	0.261	3.10	35'	EL	20.307		
	EV3	43.000		1.726	74.222	1.30	0.261	2.97	35'	EL	16.920	0.657	1.73	35'	EL	6.769	0.80	0.261	2.03	35'	EL	16.920		

LOAD FACTORS:

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

NOTES:

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

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

⬡# CONTROLLING LOAD RATING

⬡1 DESIGN LOAD RATING (HL-93)

⬡2 DESIGN LOAD RATING (HS-20)

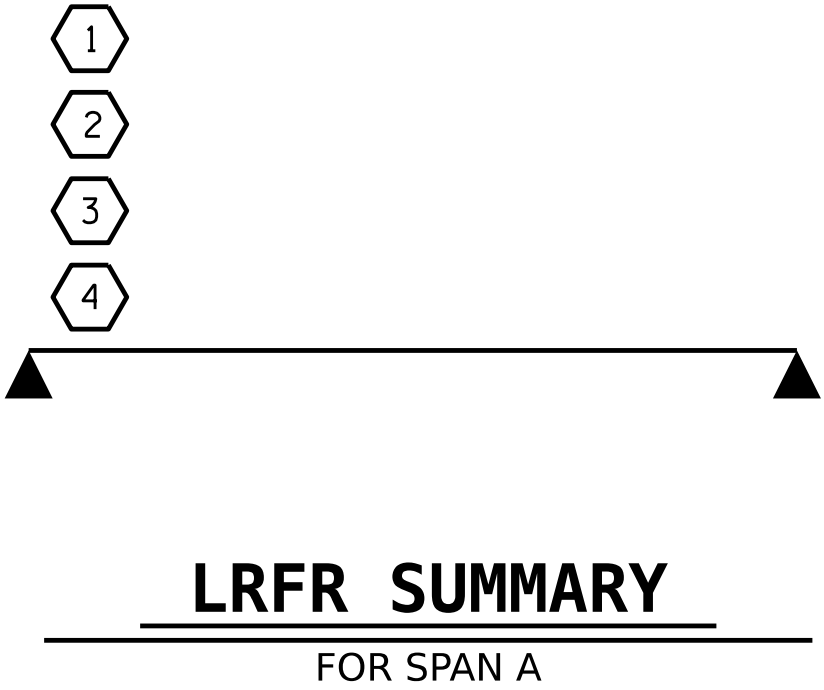
⬡3 LEGAL LOAD RATING * *

⬡4 EMERGENCY VEHICLE LOAD RATING **

* * SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
35' CORED SLAB UNIT
60° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS					SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-5
2			4			TOTAL SHEETS 32

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DRAWN BY : C.P. MALAGON	DATE : 08/2025
CHECKED BY : E.C. PHELPS	DATE : 08/2025
DESIGN ENGINEER OF RECORD: W.K. FISCHER	DATE : 09/2025

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING ⬢#	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ LL)	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ LL)	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD	HL-93 (INVENTORY)	N/A	⬢1	1.23	--	1.75	0.210	1.23	75'	EL	36.9	0.310	3.05	75'	EL	6.900	0.80	0.210	1.91	75'	EL	36.900		
	HL-93 (OPERATING)	N/A		1.59	--	1.35	0.210	1.59	75'	EL	36.9	0.310	4.03	75'	EL	6.900	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	⬢2	1.61	57.96	1.75	0.210	1.61	75'	EL	36.9	0.310	3.90	75'	EL	6.900	0.80	0.210	2.5	75'	EL	36.900		
	HS-20 (OPERATING)	36.000		2.09	75.24	1.35	0.210	2.09	75'	EL	36.9	0.310	5.13	75'	EL	6.900	N/A	--	--	--	--	--		
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		4.57	61.70	1.4	0.210	4.57	75'	EL	36.9	0.310	12.14	75'	EL	6.900	0.80	0.210	5.66	75'	EL	36.900	
		SNGARBS2	20.000		3.01	60.20	1.4	0.210	3.01	75'	EL	36.9	0.310	7.39	75'	EL	6.900	0.80	0.210	3.73	75'	EL	36.900	
		SNAGRIS2	22.000		3.22	70.84	1.4	0.210	3.22	75'	EL	36.9	0.310	7.91	75'	EL	6.900	0.80	0.210	3.99	75'	EL	36.900	
		SNCOTTS3	27.250		2.27	61.86	1.4	0.210	2.27	75'	EL	36.9	0.310	5.93	75'	EL	6.900	0.80	0.210	2.82	75'	EL	36.900	
		SNAGGRS4	34.925		1.90	66.36	1.4	0.210	1.90	75'	EL	36.9	0.310	4.87	75'	EL	6.900	0.80	0.210	2.35	75'	EL	36.900	
		SNS5A	35.550		1.86	66.12	1.4	0.210	1.86	75'	EL	36.9	0.310	4.93	75'	EL	6.900	0.80	0.210	2.30	75'	EL	36.900	
		SNS6A	39.950		1.70	67.92	1.4	0.210	1.70	75'	EL	36.9	0.310	4.48	75'	EL	6.900	0.80	0.210	2.11	75'	EL	36.900	
		SNS7B	42.000		1.62	68.04	1.4	0.210	1.62	75'	EL	36.9	0.310	4.39	75'	EL	6.900	0.80	0.210	2.01	75'	EL	36.900	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.08	68.64	1.4	0.210	2.08	75'	EL	36.9	0.310	5.38	75'	EL	6.900	0.80	0.210	2.57	75'	EL	36.900	
		TNT4A	33.075		2.08	68.80	1.4	0.210	2.08	75'	EL	36.9	0.310	5.24	75'	EL	6.900	0.80	0.210	2.58	75'	EL	36.900	
		TNT6A	41.600		1.70	70.72	1.4	0.210	1.70	75'	EL	36.9	0.310	4.69	75'	EL	6.900	0.80	0.210	2.11	75'	EL	36.900	
		TNT7A	42.000		1.71	71.82	1.4	0.210	1.71	75'	EL	36.9	0.310	4.59	75'	EL	6.900	0.80	0.210	2.12	75'	EL	36.900	
		TNT7B	42.000		1.77	74.34	1.4	0.210	1.77	75'	EL	36.9	0.310	4.28	75'	EL	6.900	0.80	0.210	2.19	75'	EL	36.900	
		TNAGRIT4	43.000		1.68	72.24	1.4	0.210	1.68	75'	EL	36.9	0.310	4.14	75'	EL	6.900	0.80	0.210	2.09	75'	EL	36.900	
EMERGENCY VEHICLE (EV)	EV2	28.750		2.40	69.00	1.3	0.210	2.40	75'	EL	36.9	0.310	5.92	75'	EL	6.900	0.80	0.210	2.98	75'	EL	36.900		
	EV3	43.000	⬢4	1.57	67.51	1.3	0.210	1.57	75'	EL	36.9	0.310	3.91	75'	EL	6.900	0.80	0.210	1.95	75'	EL	36.900		

LOAD FACTORS:

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

NOTES:

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

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

⬡# CONTROLLING LOAD RATING

⬡1 DESIGN LOAD RATING (HL-93)

⬡2 DESIGN LOAD RATING (HS-20)

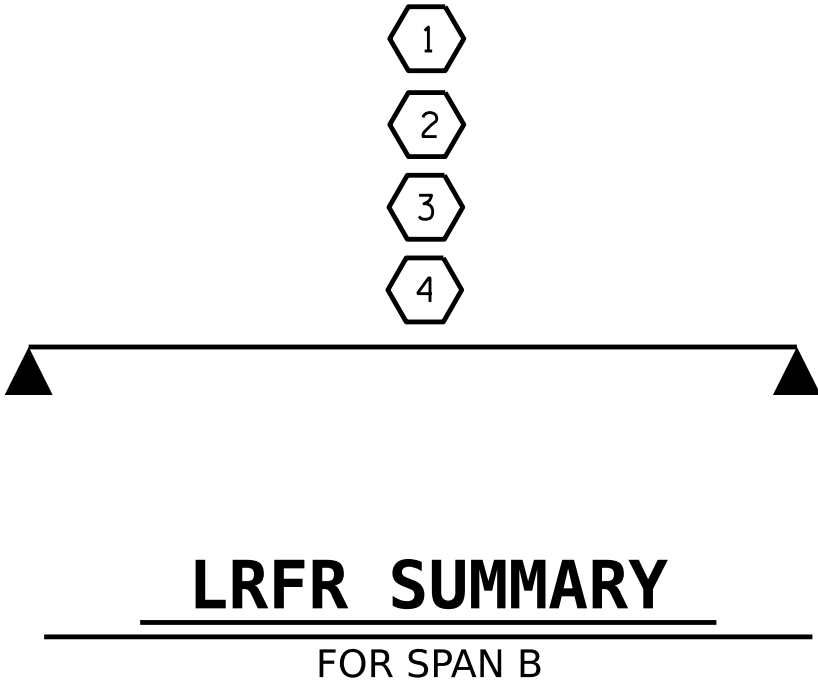
⬡3 LEGAL LOAD RATING **

⬡4 EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



PROJECT NO. **BP14-R038**

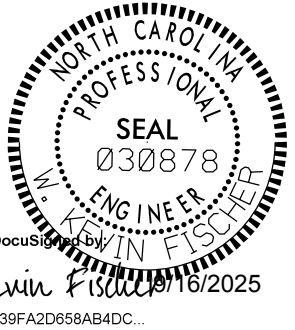
POLK COUNTY

STATION: **13+52.50 -L1-**

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR
75' CORED SLAB UNIT
60° SKEW
(NON-INTERSTATE TRAFFIC)



REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	
1			3		S-6
2			4		TOTAL SHEETS 32

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DRAWN BY : C.P. MALAGON	DATE : 08/2025
CHECKED BY : E.C. PHELPS	DATE : 08/2025
DESIGN ENGINEER OF RECORD: W.K. FISCHER	DATE : 09/2025

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING ⬡	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ LL)	MOMENT				SHEAR				LIVE-LOAD FACTORS (γ LL)	MOMENT								
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD	HL-93 (INVENTORY)	N/A	⬡1	1.202	--	1.75	0.256	2.04	30'	EL	14.423	0.655	1.20	30'	EL	1.442	0.80	0.256	1.75	30'	EL	14.423		
	HL-93 (OPERATING)	N/A		1.558	--	1.35	0.256	2.64	30'	EL	14.423	0.655	1.56	30'	EL	1.442	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	⬡2	1.365	49.124	1.75	0.256	2.82	30'	EL	11.538	0.655	1.36	30'	EL	1.442	0.80	0.256	2.45	30'	EL	11.538		
	HS-20 (OPERATING)	36.000		1.769	63.679	1.35	0.256	3.65	30'	EL	11.538	0.655	1.77	30'	EL	1.442	N/A	--	--	--	--	--		
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.333	45.002	1.4	0.256	5.76	30'	EL	14.423	0.655	3.33	30'	EL	1.442	0.80	0.256	3.95	30'	EL	14.423	
		SNGARBS2	20.000		2.581	51.624	1.4	0.256	5.04	30'	EL	11.538	0.655	2.58	30'	EL	1.442	0.80	0.256	3.50	30'	EL	11.538	
		SNAGRIS2	22.000		2.487	54.723	1.4	0.256	5.13	30'	EL	11.538	0.655	2.49	30'	EL	1.442	0.80	0.256	3.56	30'	EL	11.538	
		SNCOTTS3	27.250		1.684	45.891	1.4	0.256	2.89	30'	EL	14.423	0.655	1.68	30'	EL	1.442	0.80	0.256	1.99	30'	EL	14.423	
		SNAGGRS4	34.925		1.551	54.185	1.4	0.256	2.79	30'	EL	14.423	0.655	1.55	30'	EL	1.442	0.80	0.256	1.91	30'	EL	14.423	
		SNS5A	35.550		1.645	58.469	1.4	0.256	2.70	30'	EL	14.423	0.655	1.64	30'	EL	1.442	0.80	0.256	1.85	30'	EL	14.423	
		SNS6A	39.950		1.547	61.791	1.4	0.256	2.55	30'	EL	14.423	0.655	1.55	30'	EL	1.442	0.80	0.256	1.75	30'	EL	14.423	
		SNS7B	42.000		1.578	66.285	1.4	0.256	2.48	30'	EL	14.423	0.655	1.58	30'	EL	1.442	0.80	0.256	1.70	30'	EL	14.423	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.838	60.670	1.4	0.256	3.31	30'	EL	14.423	0.655	1.84	30'	EL	1.442	0.80	0.256	2.27	30'	EL	14.423	
		TNT4A	33.075		1.710	56.559	1.4	0.256	3.13	30'	EL	14.423	0.655	1.71	30'	EL	1.442	0.80	0.256	2.15	30'	EL	14.423	
		TNT6A	41.600		1.652	68.714	1.4	0.256	2.85	30'	EL	14.423	0.655	1.65	30'	EL	1.442	0.80	0.256	1.96	30'	EL	14.423	
		TNT7A	42.000		1.573	66.067	1.4	0.256	2.94	30'	EL	14.423	0.655	1.57	30'	EL	1.442	0.80	0.256	2.02	30'	EL	14.423	
		TNT7B	42.000		1.536	64.525	1.4	0.256	2.77	30'	EL	14.423	0.655	1.54	30'	EL	1.442	0.80	0.256	1.90	30'	EL	14.423	
		TNAGRIT4	43.000		1.486	63.900	1.4	0.256	2.87	30'	EL	14.423	0.655	1.49	30'	EL	1.442	0.80	0.256	1.97	30'	EL	14.423	
		TNAGT5A	45.000		1.594	71.736	1.4	0.256	2.79	30'	EL	14.423	0.655	1.59	30'	EL	1.442	0.80	0.256	1.92	30'	EL	14.423	
		TNAGT5B	45.000	⬡3	1.399	62.946	1.4	0.256	2.68	30'	EL	11.538	0.655	1.40	30'	EL	1.442	0.80	0.256	1.85	30'	EL	11.538	
EMERGENCY VEHICLE (EV)	EV2	28.750		2.472	71.072	1.3	0.256	3.95	30'	EL	11.538	0.655	2.64	30'	EL	1.442	0.80	0.256	2.47	30'	EL	11.538		
	EV3	43.000	⬡4	1.596	68.609	1.3	0.256	2.58	30'	EL	14.423	0.655	1.81	30'	EL	1.442	0.80	0.256	1.60	30'	EL	14.423		

LOAD FACTORS:

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

NOTES:

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

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

⬡# CONTROLLING LOAD RATING

⬡1 DESIGN LOAD RATING (HL-93)

⬡2 DESIGN LOAD RATING (HS-20)

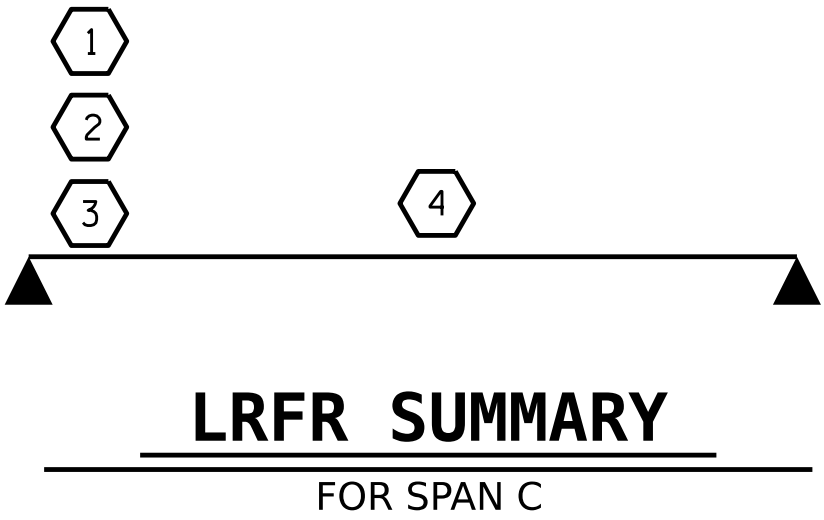
⬡3 LEGAL LOAD RATING * *

⬡4 EMERGENCY VEHICLE LOAD RATING **

* * SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
30' CORED SLAB UNIT
60° SKEW
(NON-INTERSTATE TRAFFIC)

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

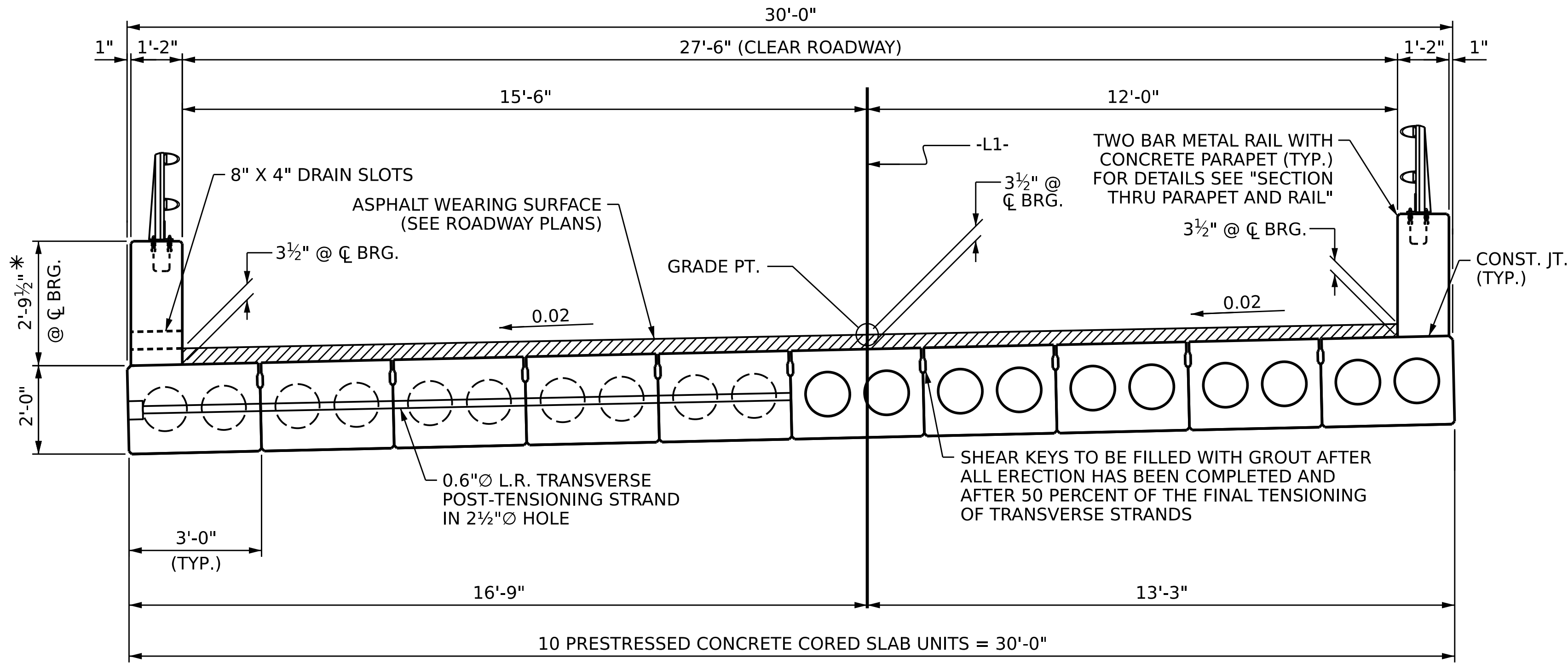
TOTAL SHEETS
32

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DRAWN BY : C.P. MALAGON DATE : 08/2025
CHECKED BY : E.C. PHELPS DATE : 08/2025
DESIGN ENGINEER OF RECORD: W.K. FISCHER DATE : 09/2025

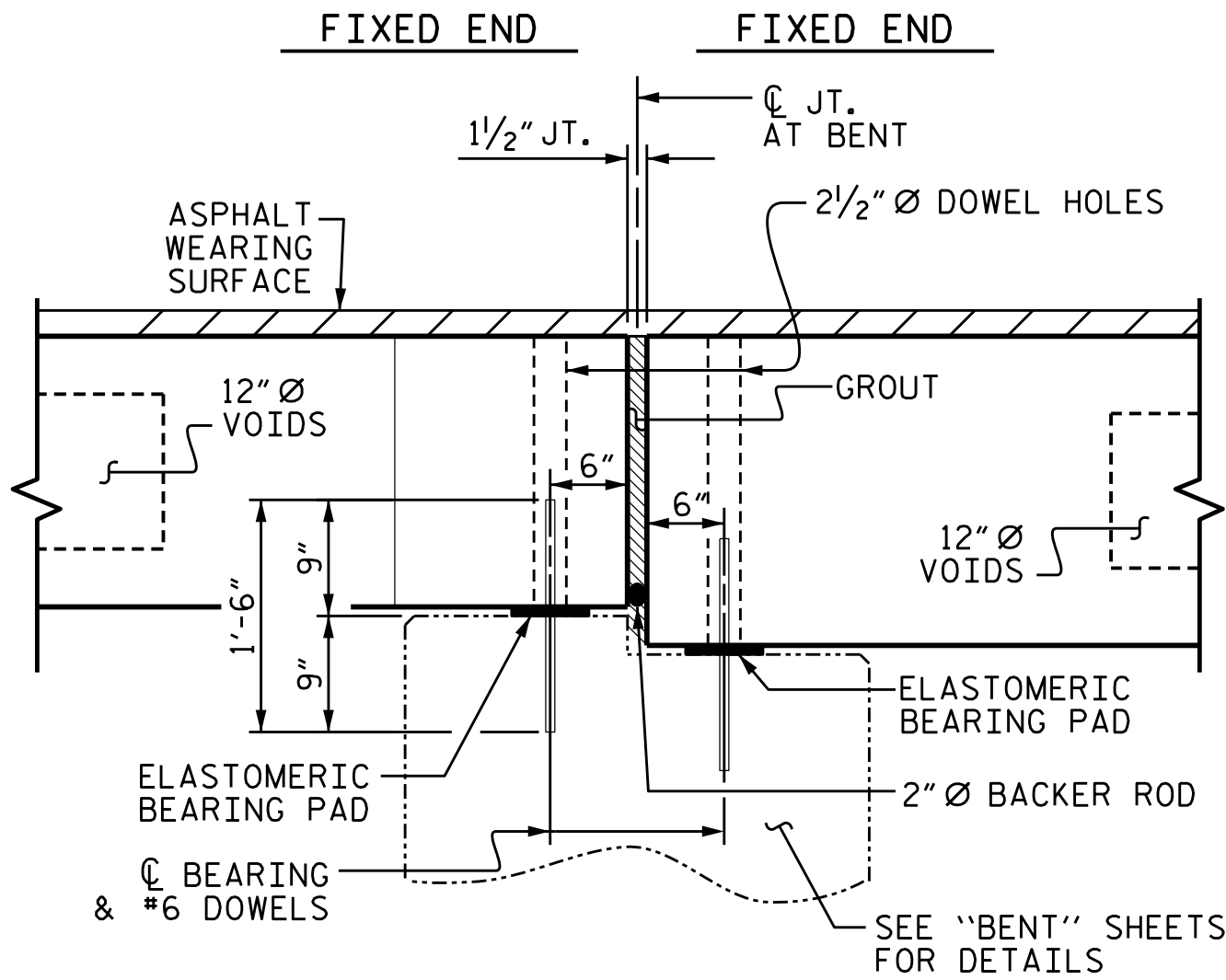


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

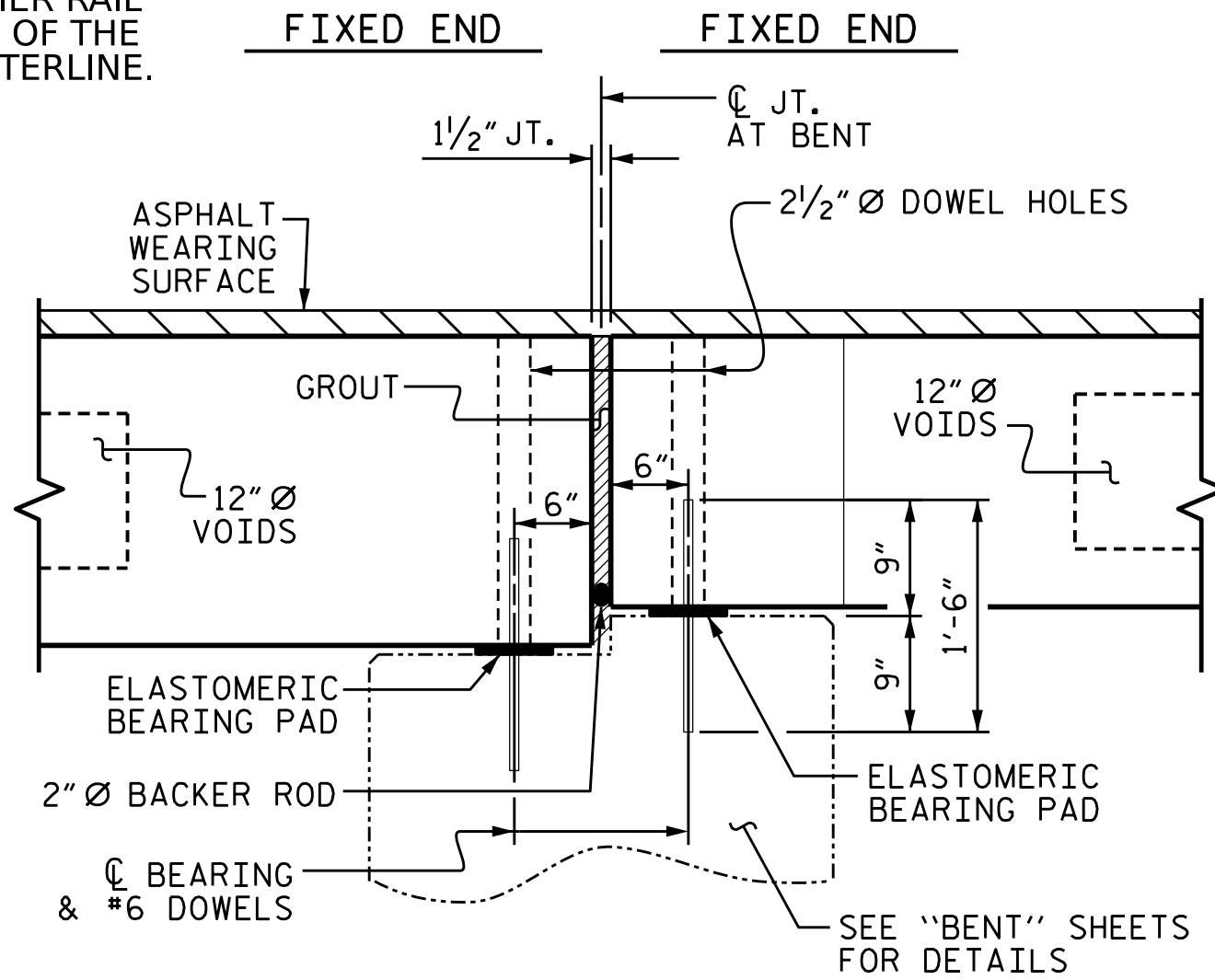
HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

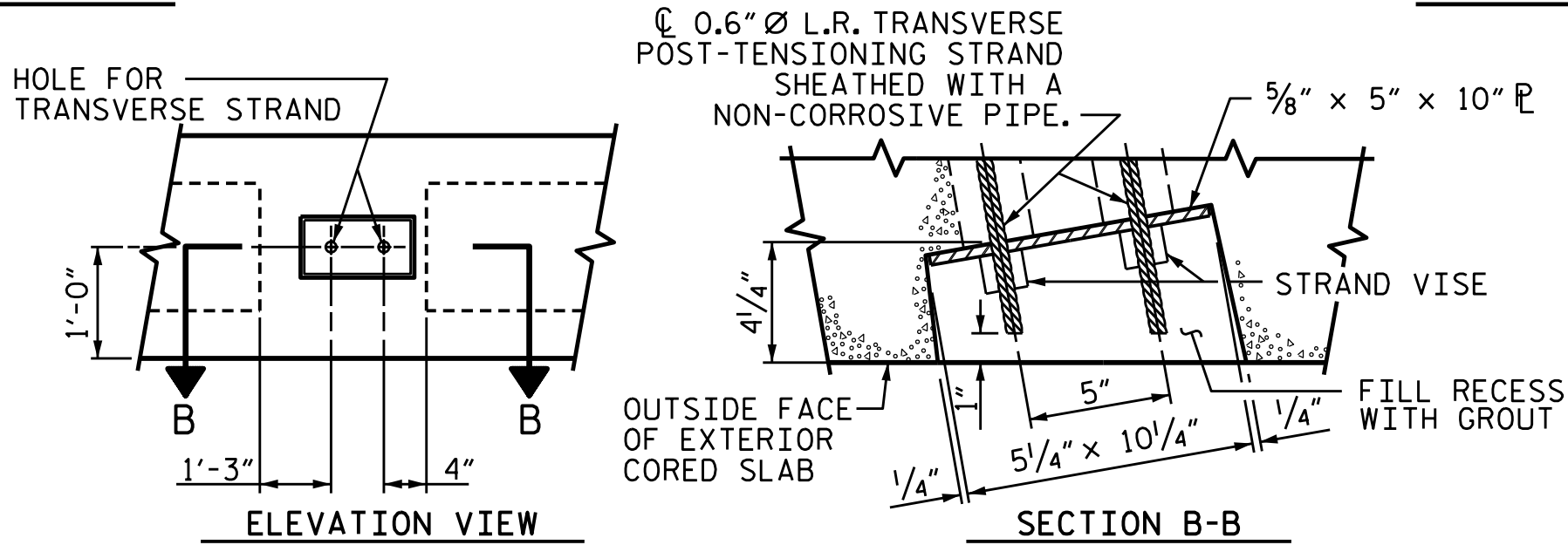
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE.



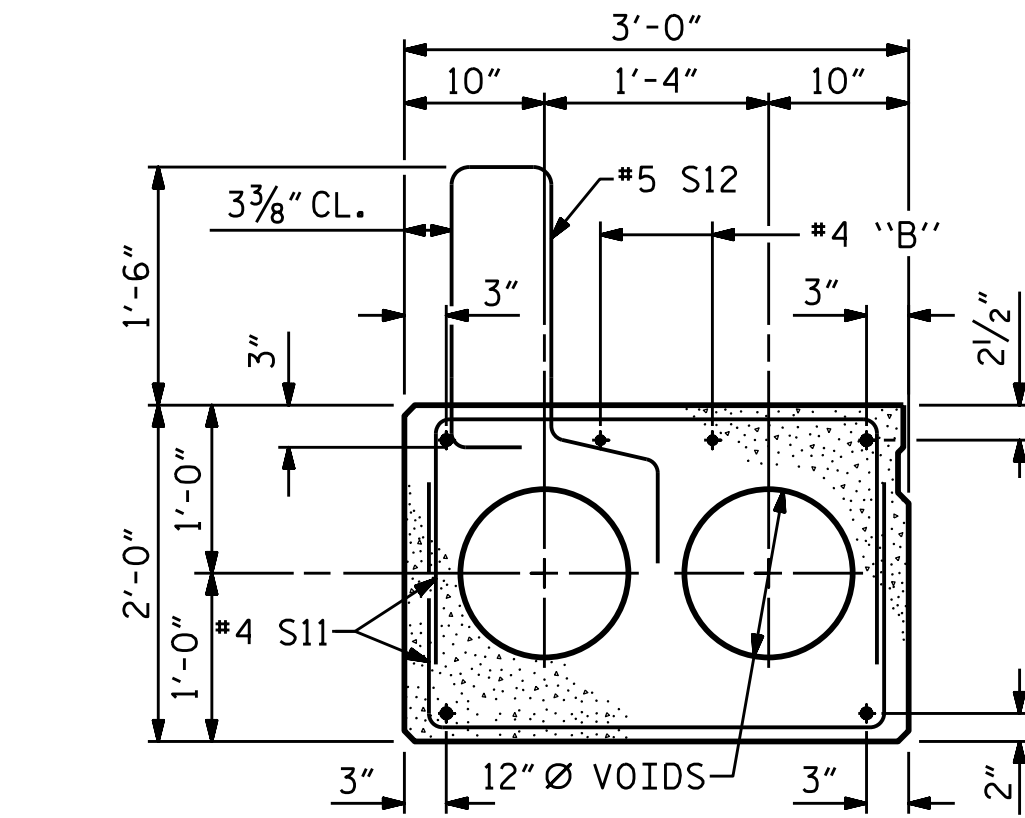
SECTION AT BENT 1



SECTION AT BENT 2

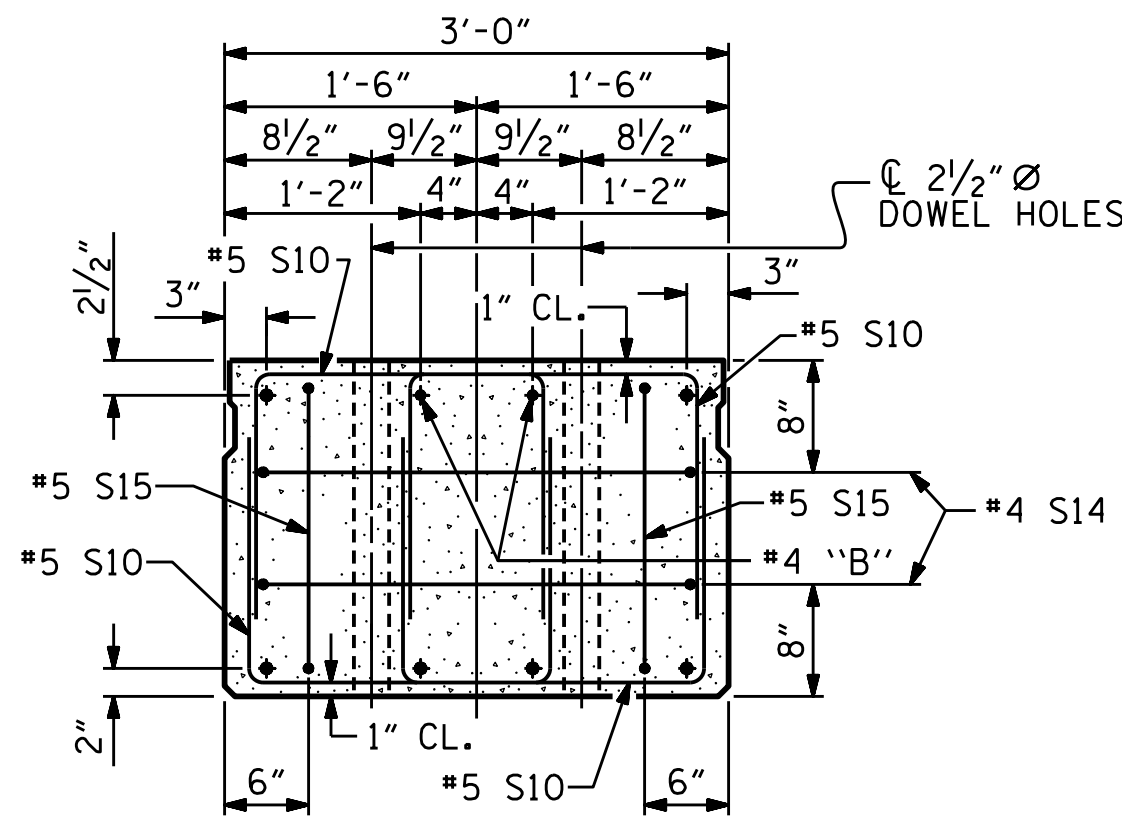


GROUTED RECESS AT END OF
POST-TENSIONED STRAND-CORED SLABS



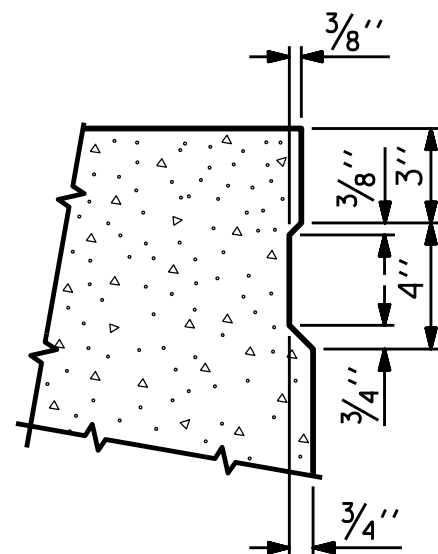
EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE
INTERIOR SLAB SECTION.)



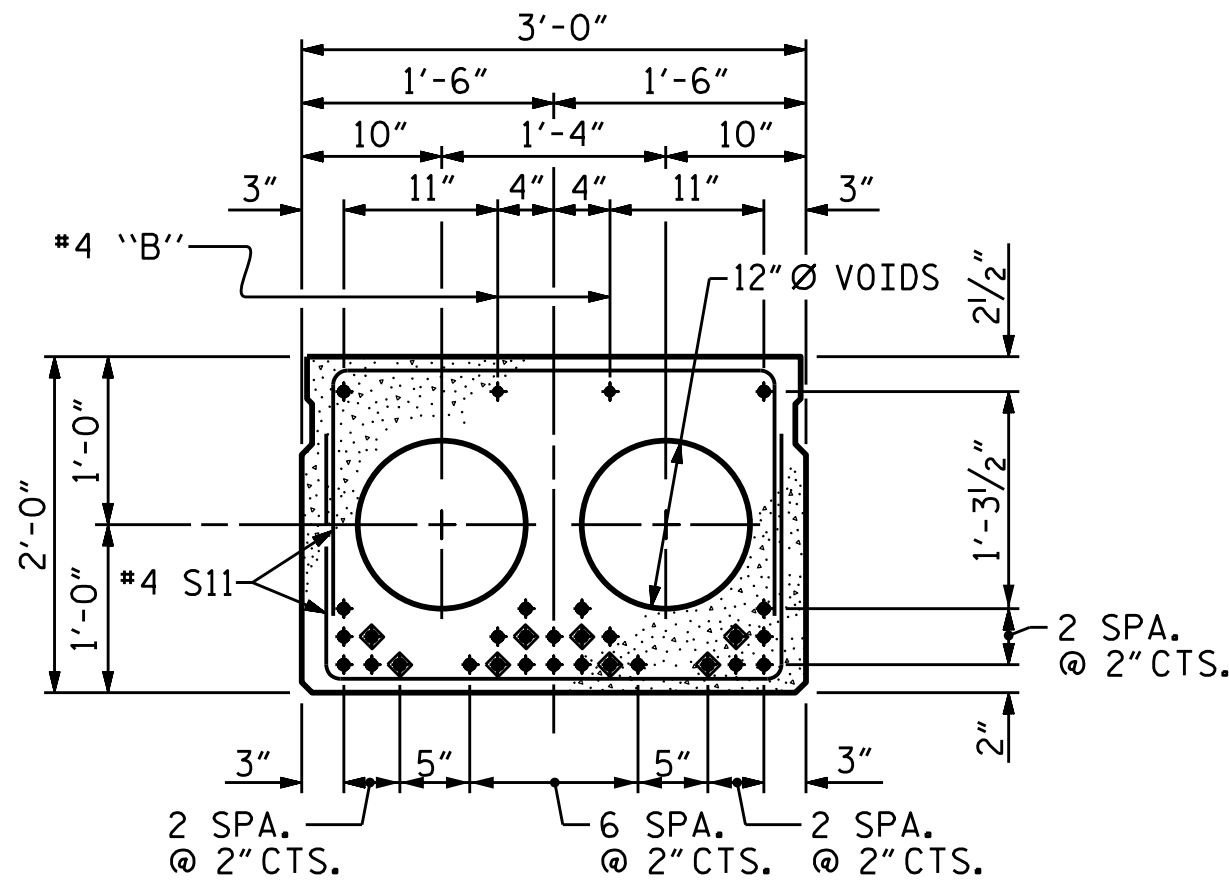
END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS
AND LOCATION OF DOWEL HOLES.
(STRAND LAYOUT NOT SHOWN.)
INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB
UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF
EXTERIOR CORED SLABS.



INTERIOR SLAB SECTION (75' UNIT)

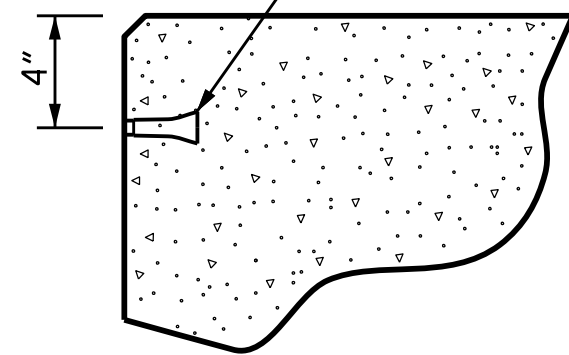
(28 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT

◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A
DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT.
SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

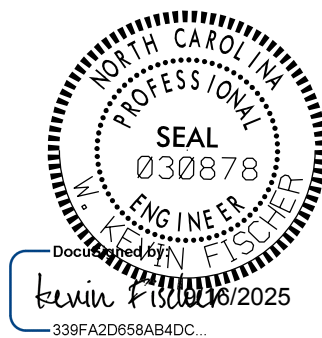
PERMITTED THREADED INSERT
CAST IN OUTSIDE FACE OF
EXTERIOR UNIT AND
RECESSED 3/8" SIZE TO BE
DETERMINED
BY CONTRACTOR.



THREADED INSERT DETAIL

PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 2 OF 7



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	
1			3		S-9
2			4		TOTAL SHEETS
					32

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SIGNATURES COMPLETED

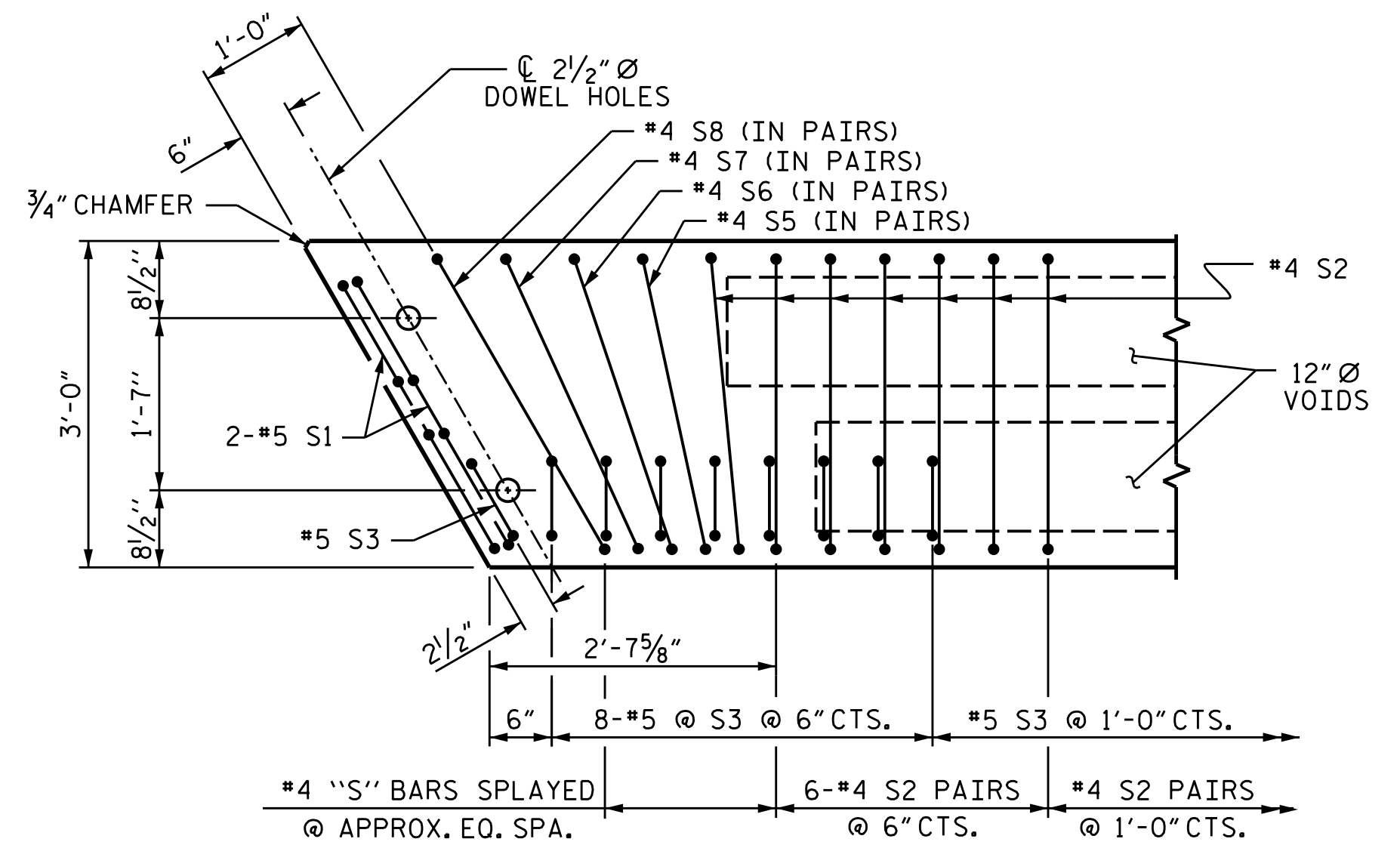
STD. NO. 24PCS4_30_60S



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9/15/2025
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(SIMILAR EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR
UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.



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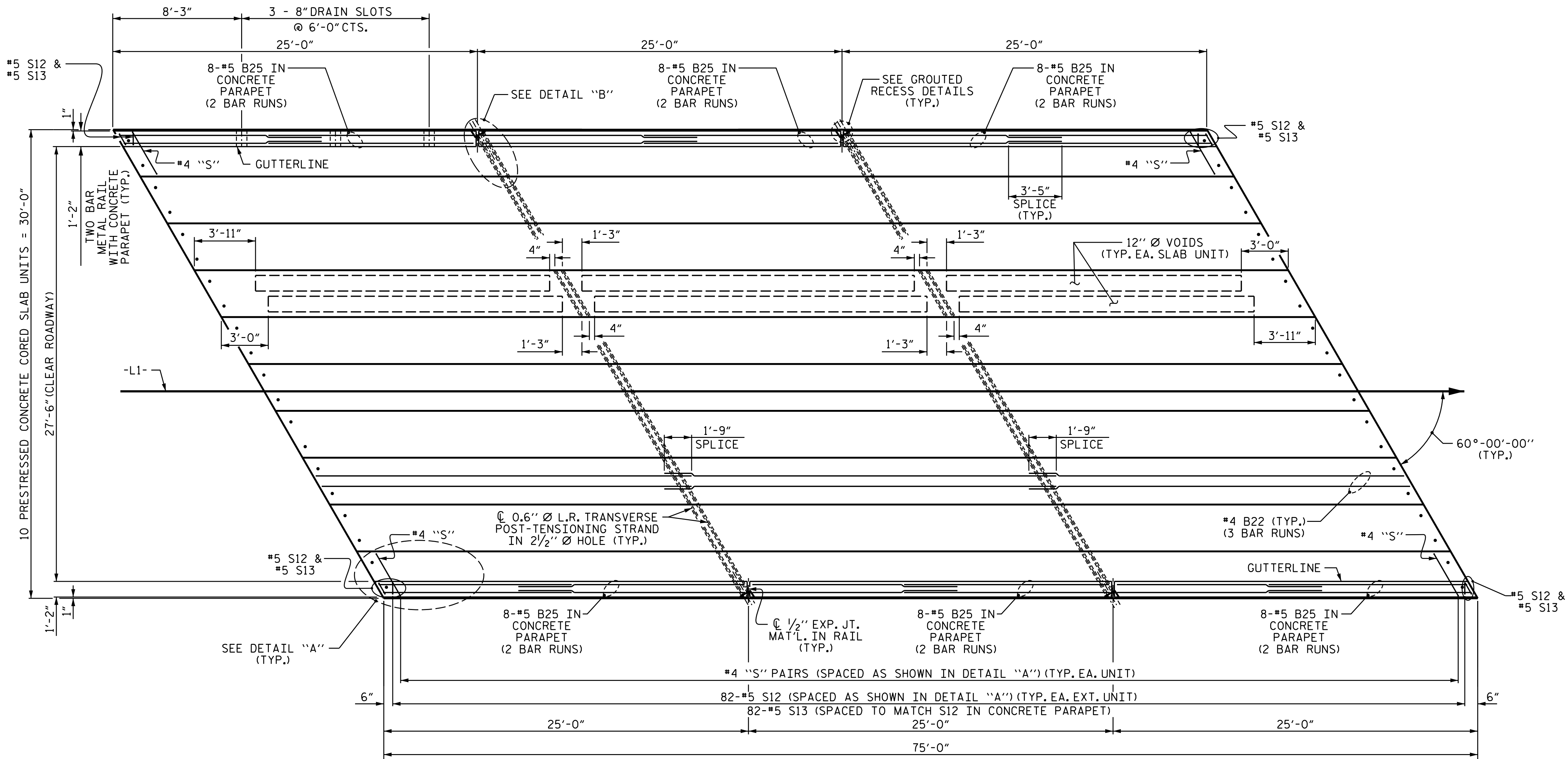
SHEET 3 OF 7

SPAN A
PLAN OF 35' UNIT
27'-6" CLEAR ROADWAY
60° SKEW

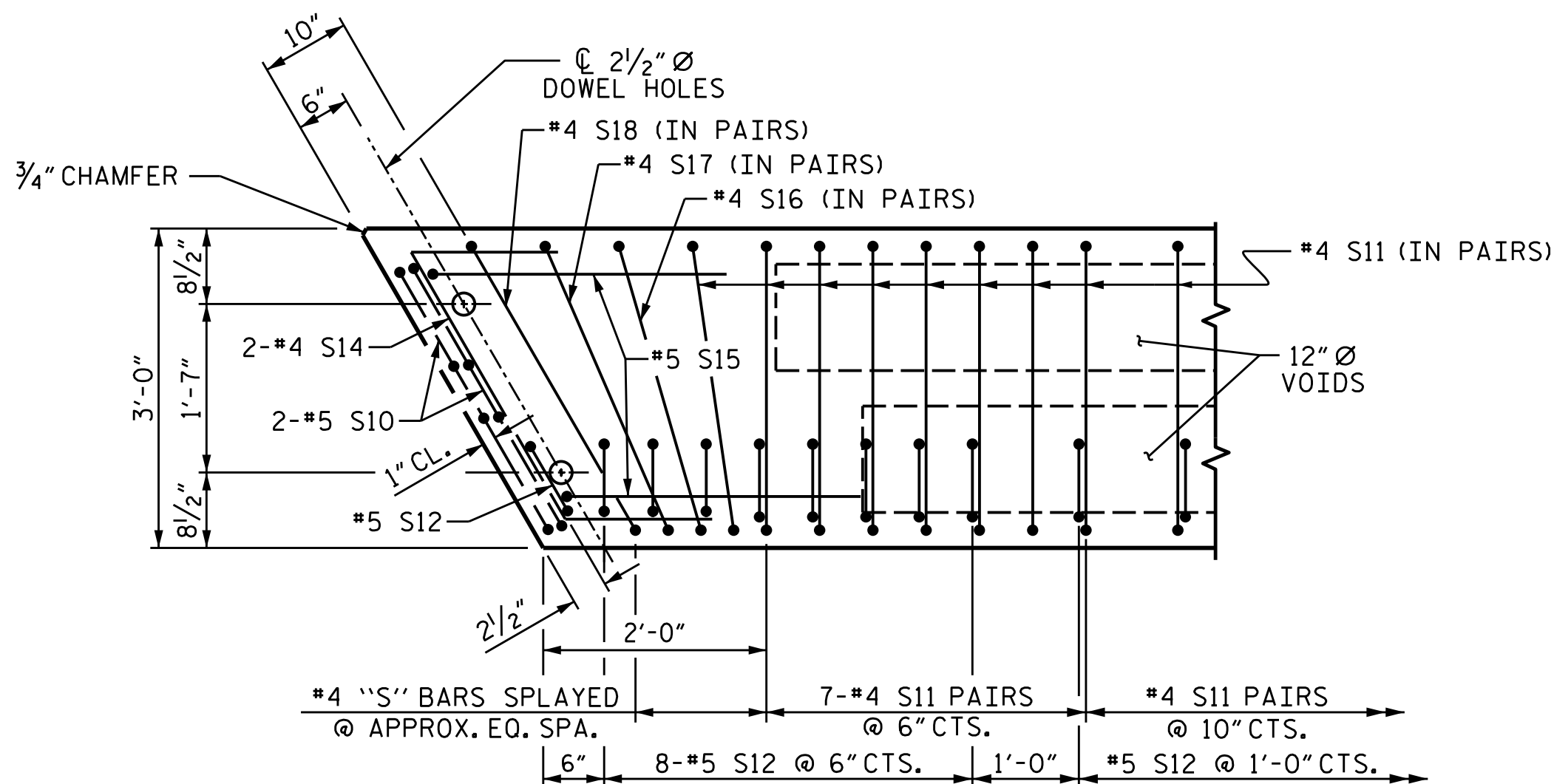
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			32

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STD.NO. 21" PCS_30_60S_35L

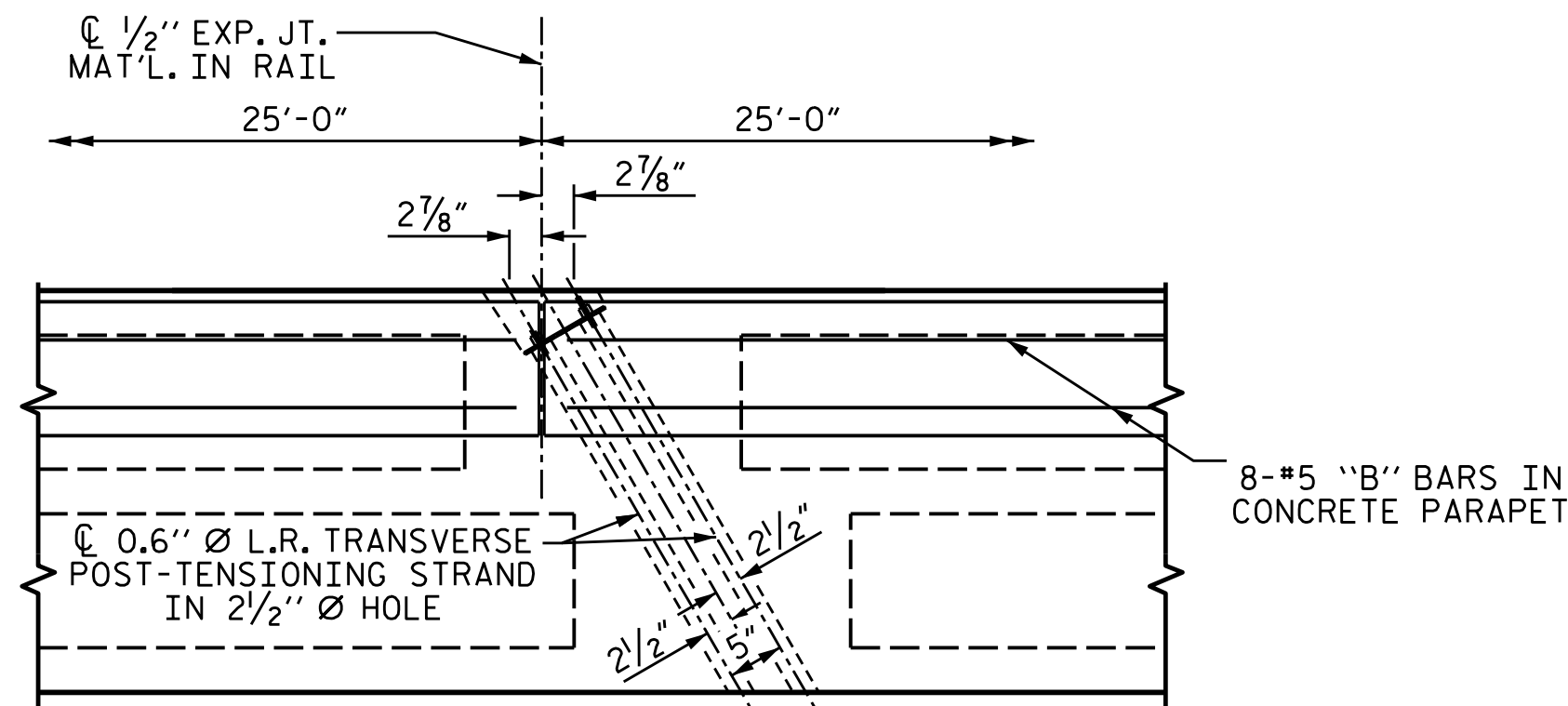


PLAN OF UNIT



DETAIL "A"

(SIMILAR EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR
UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

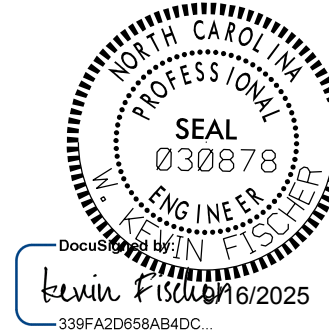
#4 S11 BARS MAY BE SHIFTED AS NECESSARY
TO MAINTAIN 1" CLEAR TO GROUDED RECESS AND
2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES



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SIGNATURES COMPLETED

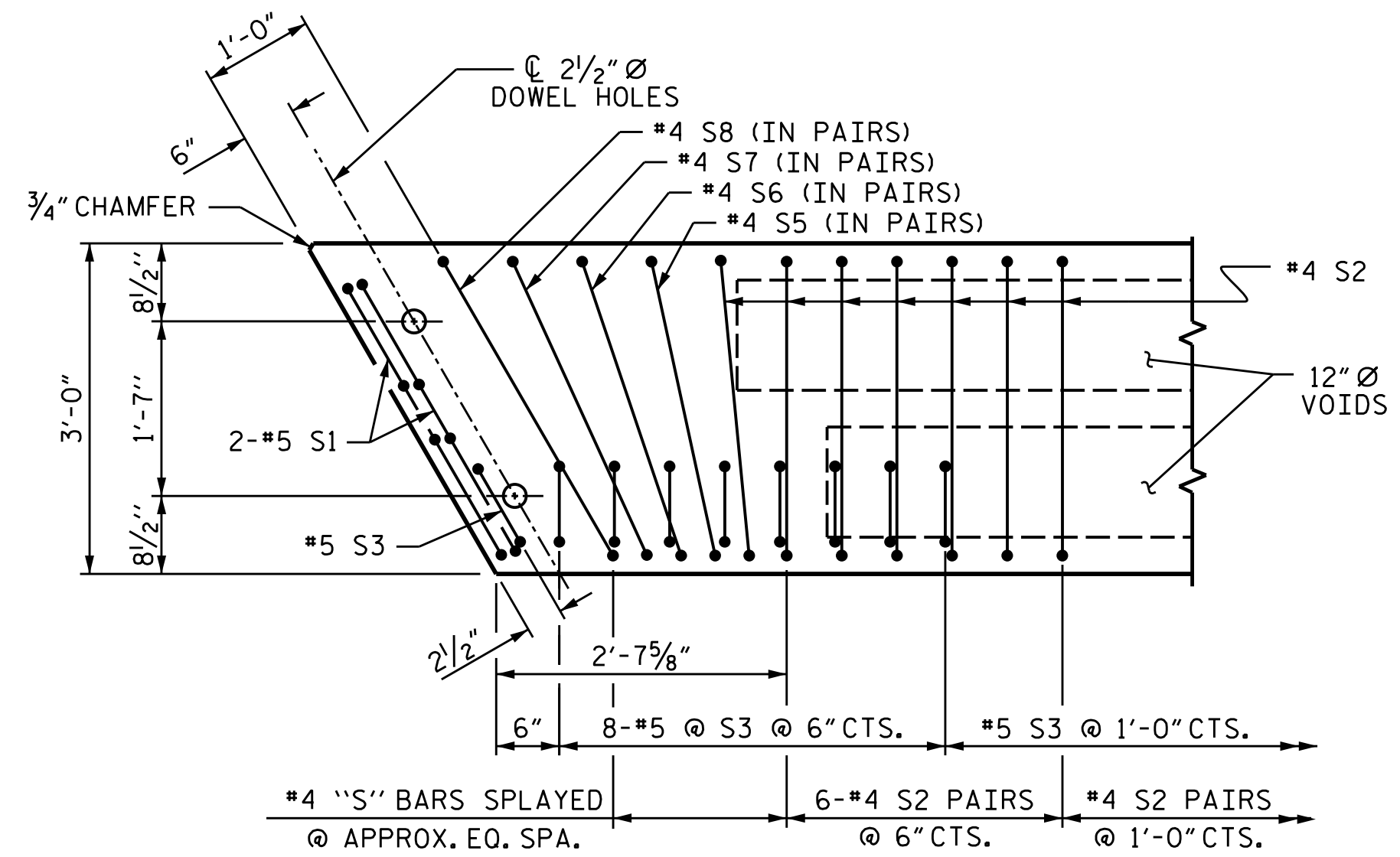
PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 4 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SPAN B
PLAN OF 75' UNIT
27'-6" CLEAR ROADWAY
60° SKEW

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	
1			3		S-11
2			4		TOTAL SHEETS
					32

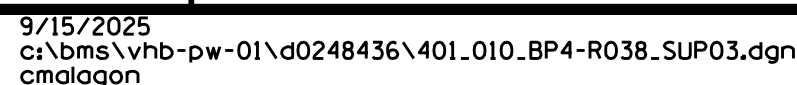


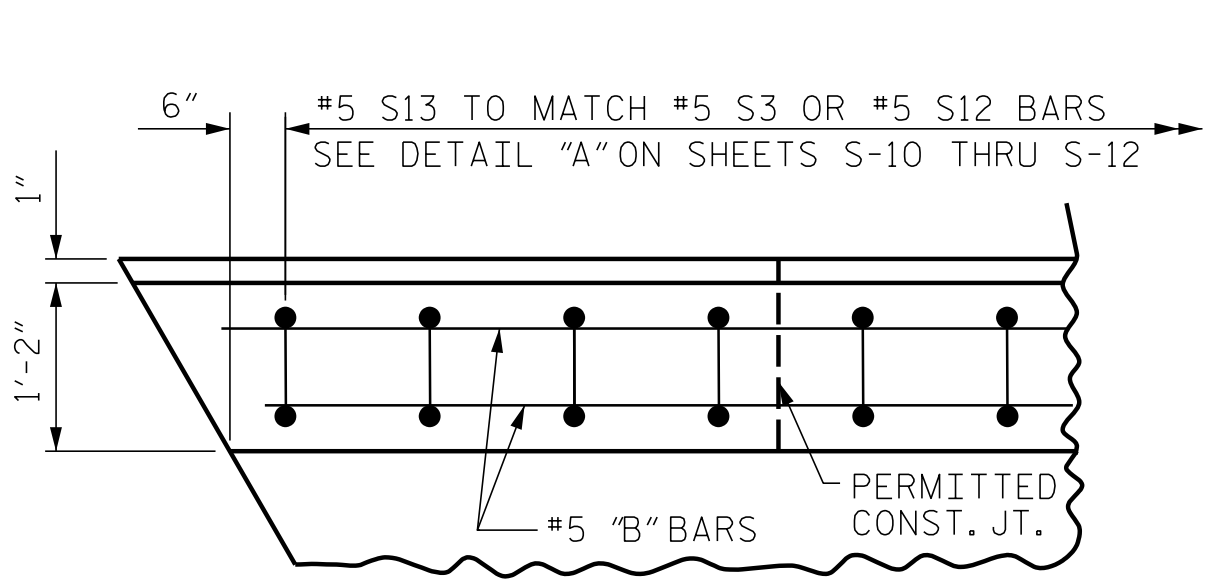
(SIMILAR EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR
UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.



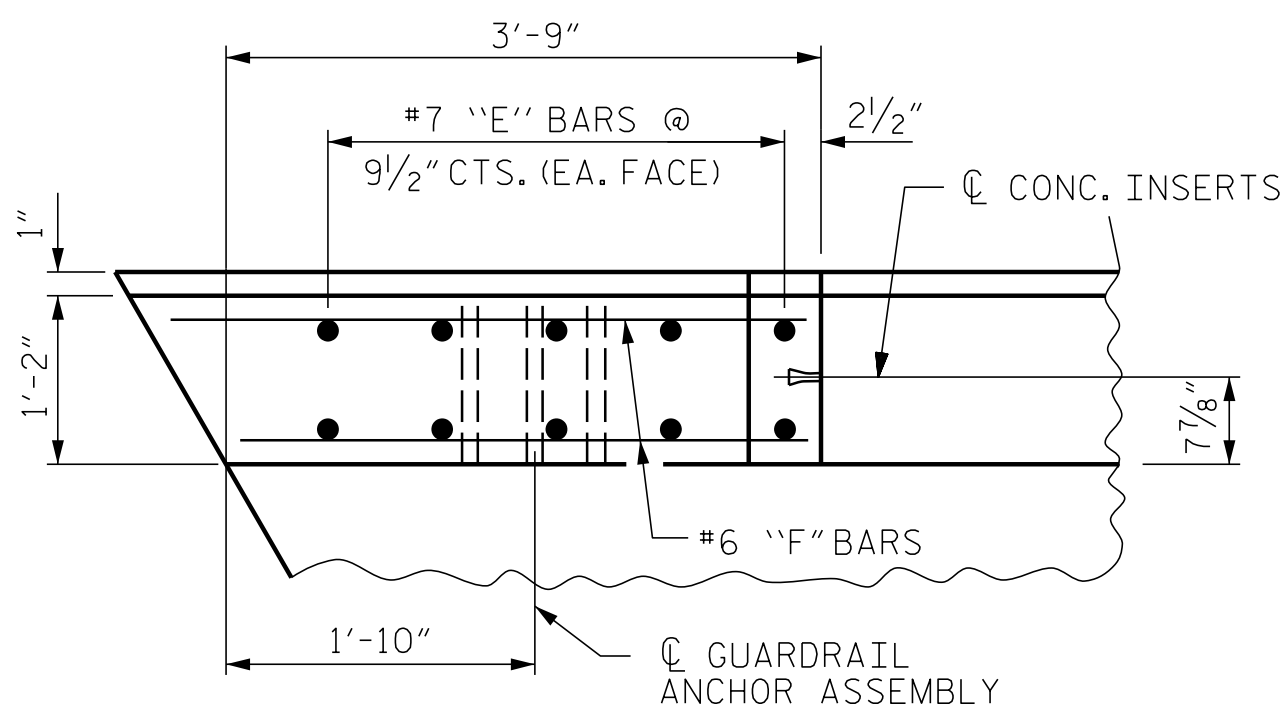
SPAN C
PLAN OF 30' UNIT
27'-6" CLEAR ROADWAY
60° SKEW

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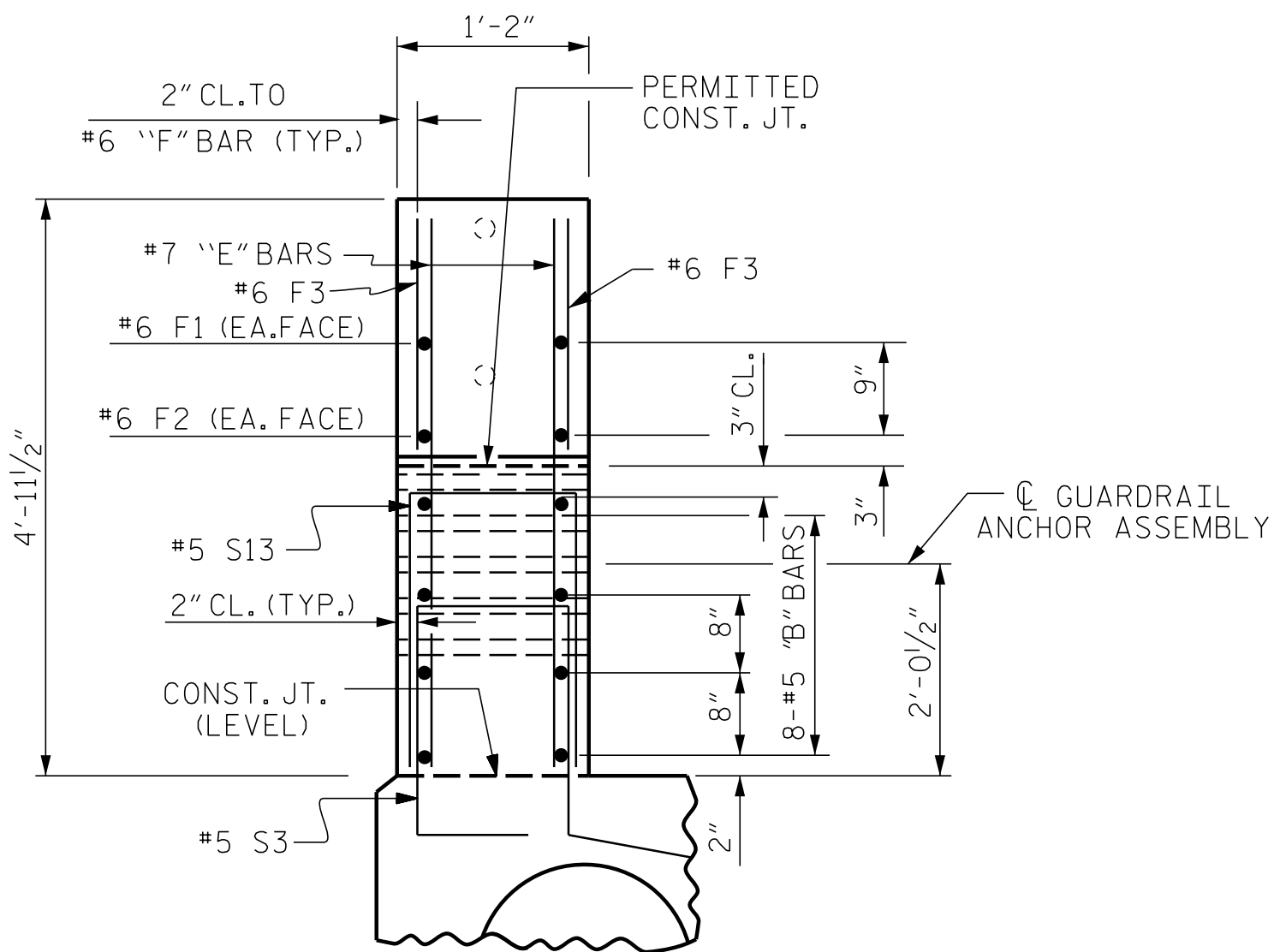




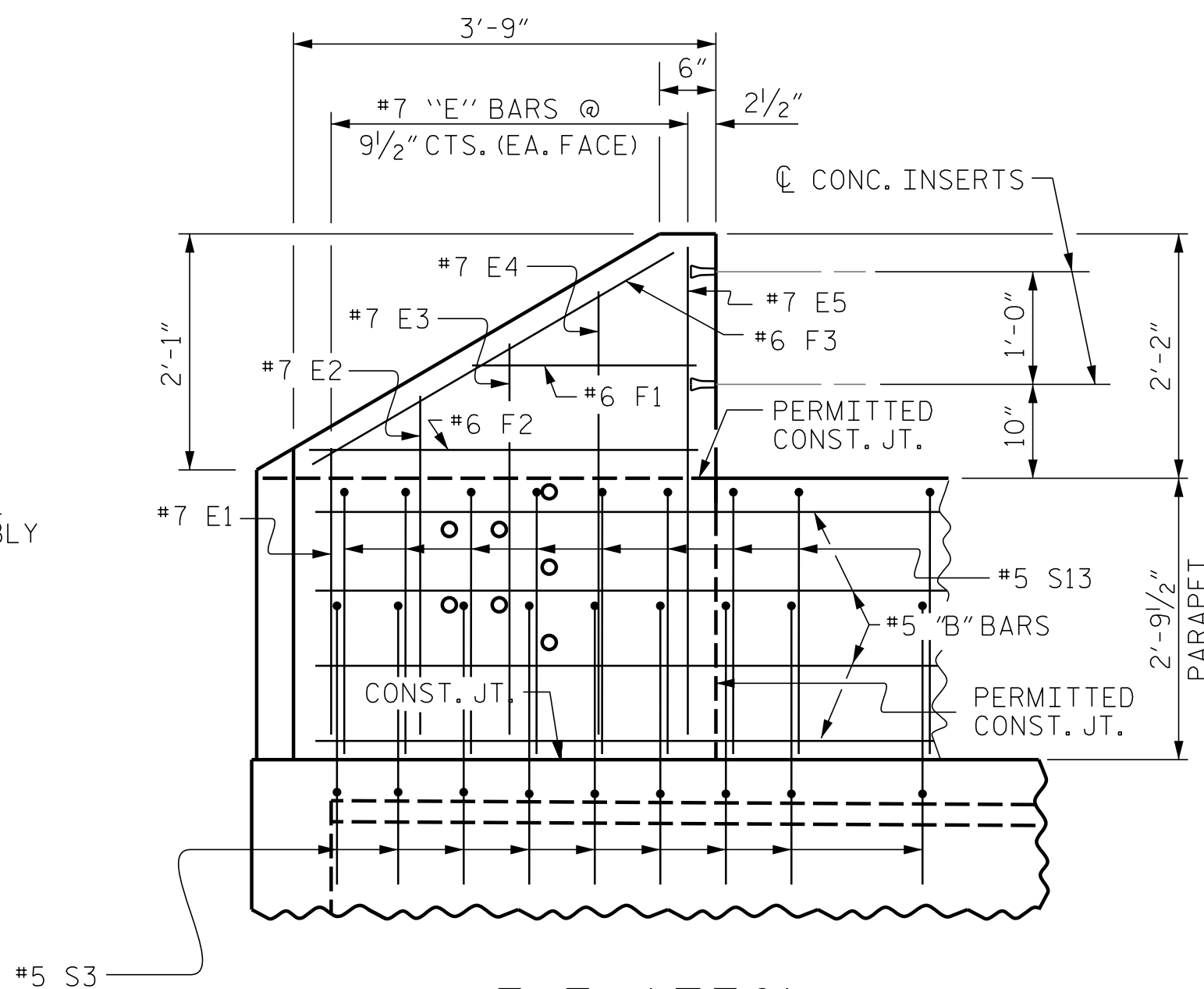
PLAN OF PARAPET



PLAN OF END POST

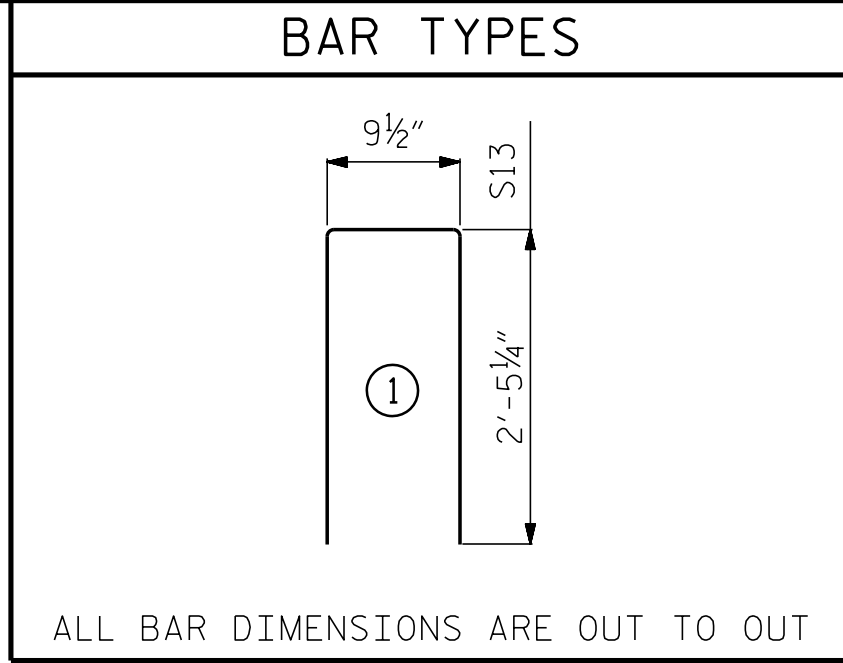


END VIEW

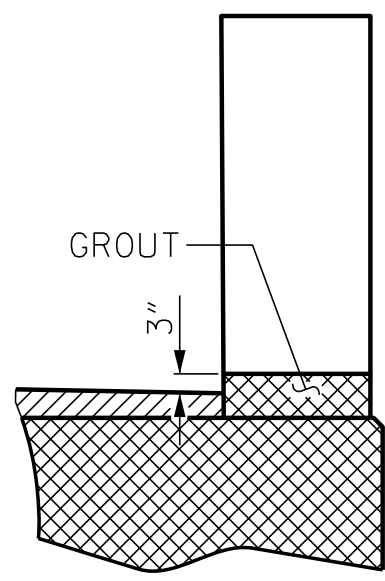


ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

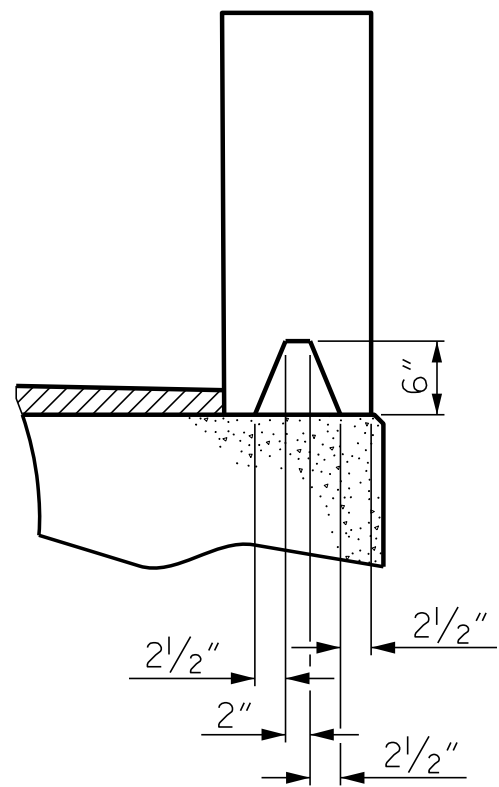


BILL OF MATERIAL FOR PARAPETS AND FOUR END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B9	16	#5	STR	29'-6"	492
* B10	64	#5	STR	10'-3"	684
* B25	96	#5	STR	14'-0"	1402
* E1	8	#7	STR	2'-9"	45
* E2	8	#7	STR	3'-3"	53
* E3	8	#7	STR	3'-9"	61
* E4	8	#7	STR	4'-3"	69
* E5	8	#7	STR	4'-8"	76
* F1	8	#6	STR	1'-10"	22
* F2	8	#6	STR	3'-0"	36
* F3	8	#6	STR	3'-4"	40
* S13	322	#5	1	5'-8"	1903
* EPOXY COATED REINFORCING STEEL					4883 LBS.
CLASS AA CONCRETE					34.5 CU.YDS.
TOTAL LIN FT. OF CONCRETE PARAPET					279.12 LIN.FT.



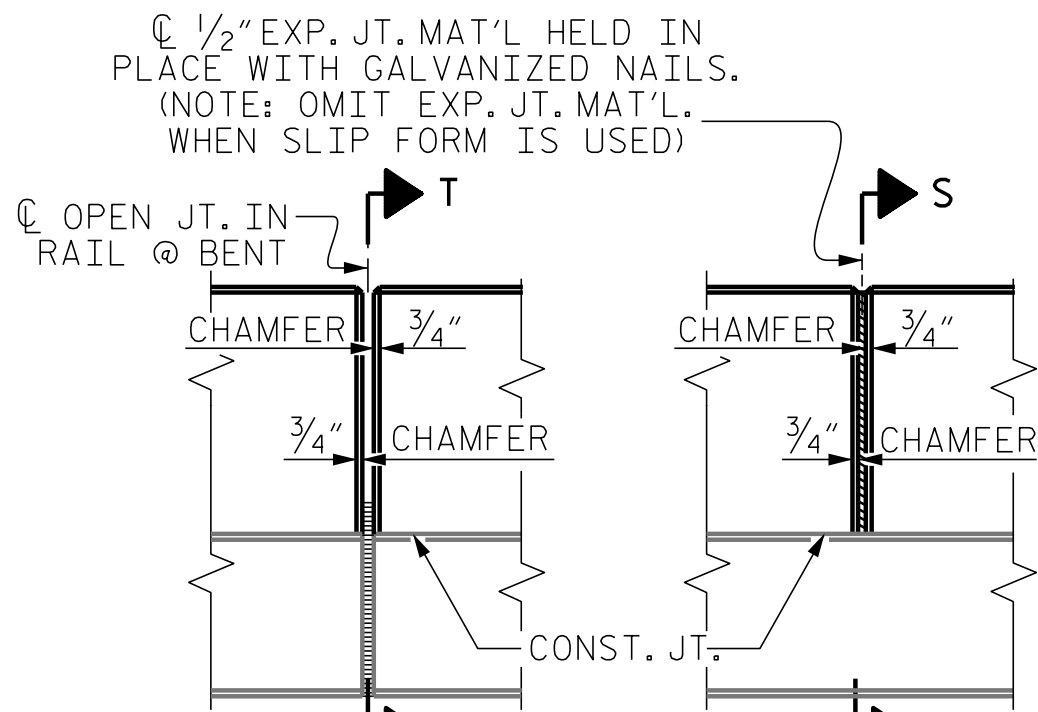
SECTION T-T

AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE
FOAM JOINT IS NOT USED)

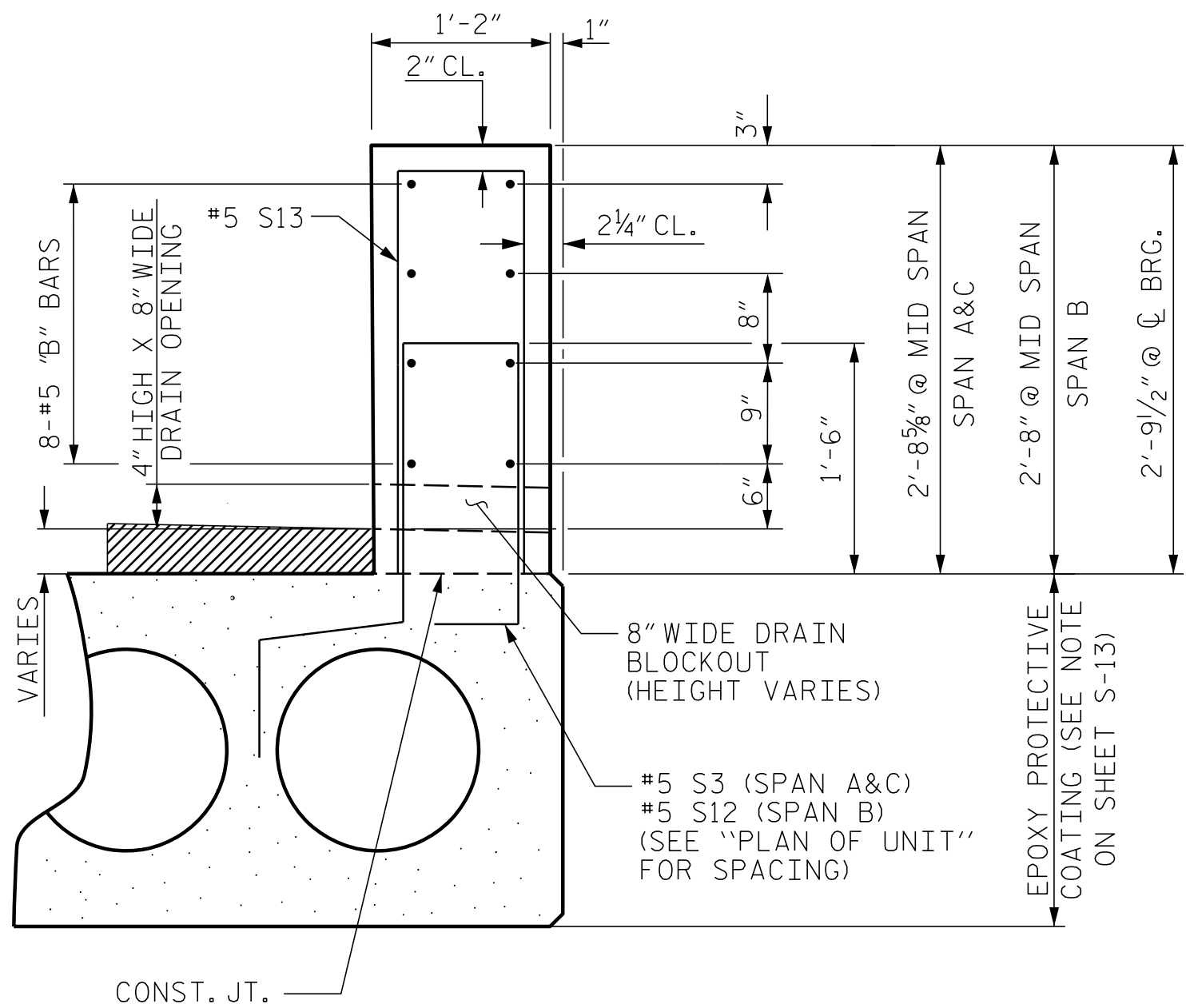


SECTION S-S

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



ELEVATION AT EXPANSION JOINTS



PARAPET SECTION

PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 7 OF 7

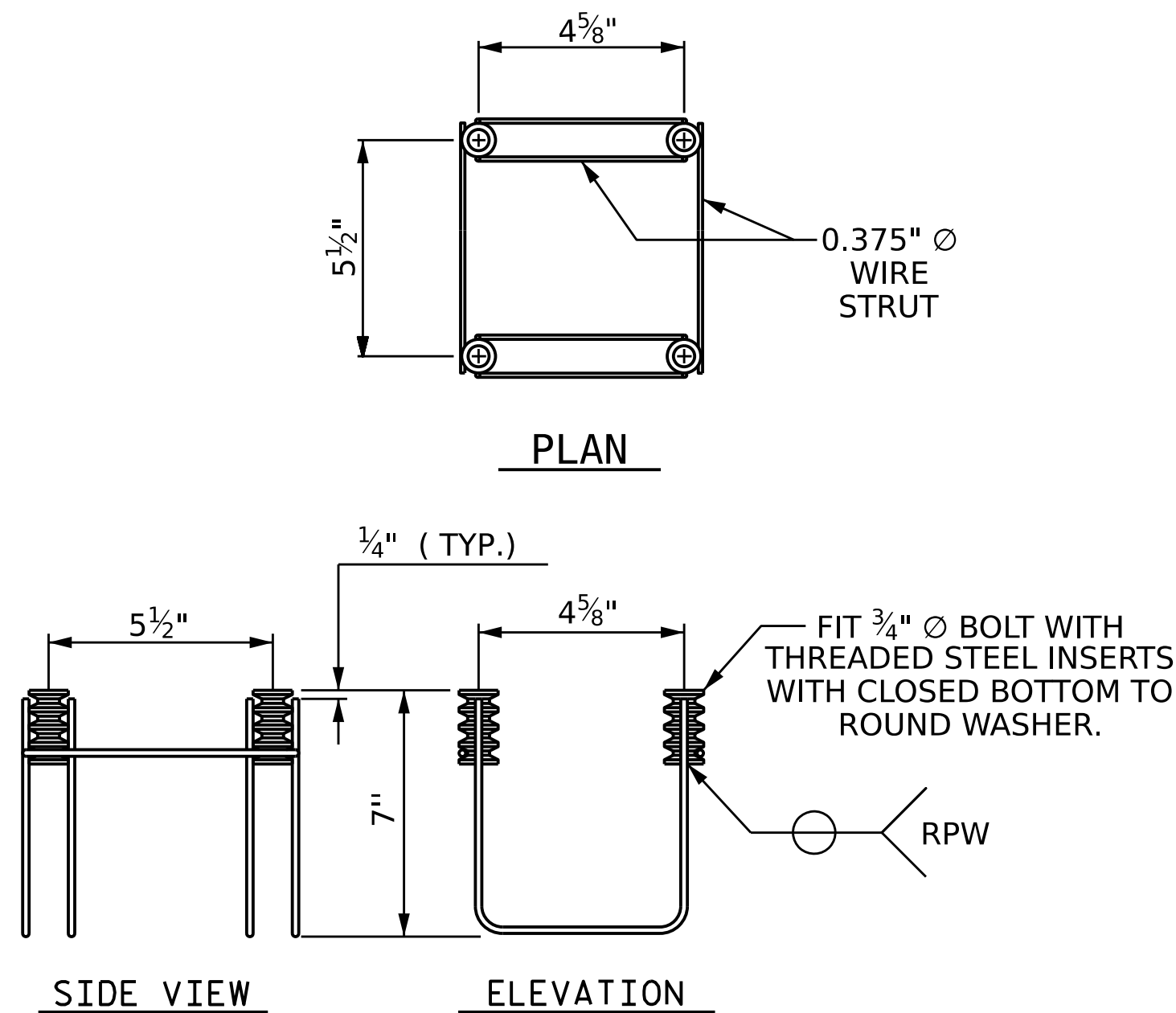


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
CONCRETE PARAPET DETAILS					
REVISIONS					SHEET NO.
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1			3		
2			4		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					S-14
					TOTAL SHEETS 32



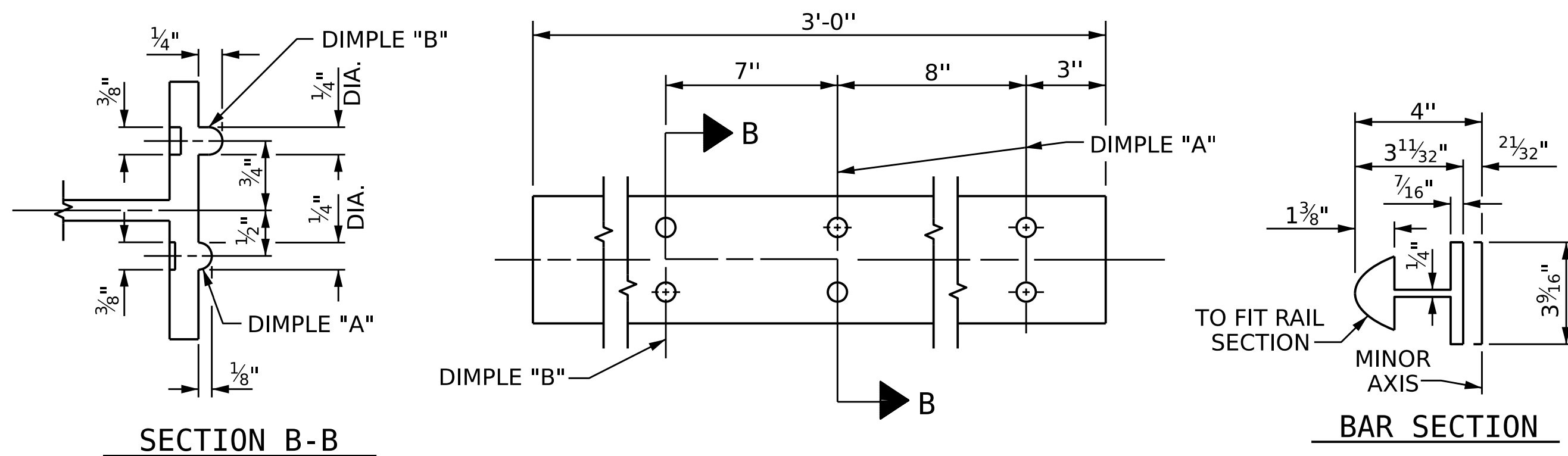
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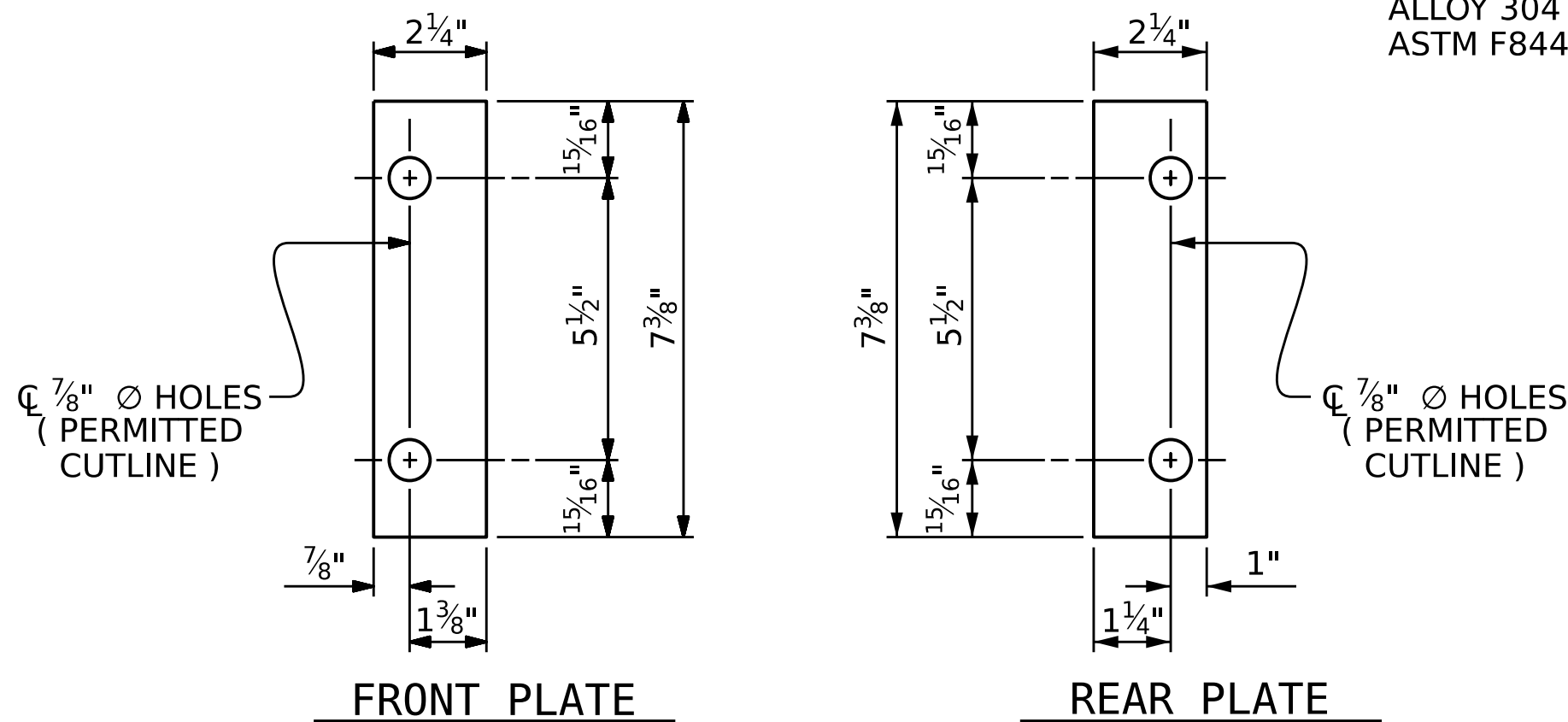


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(50 ASSEMBLIES REQUIRED)

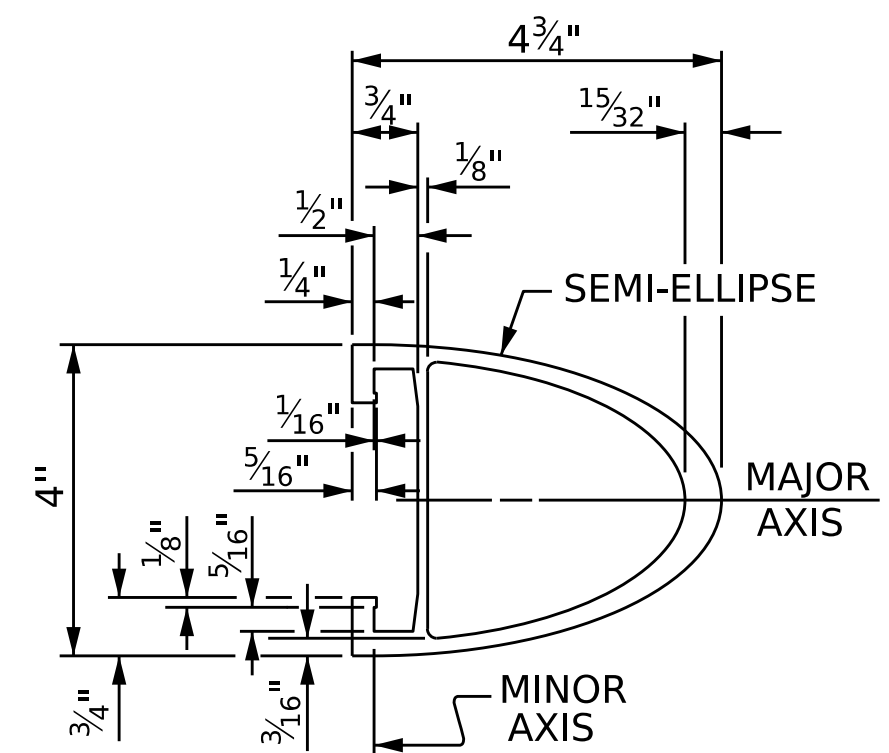


EXPANSION BAR DETAILS

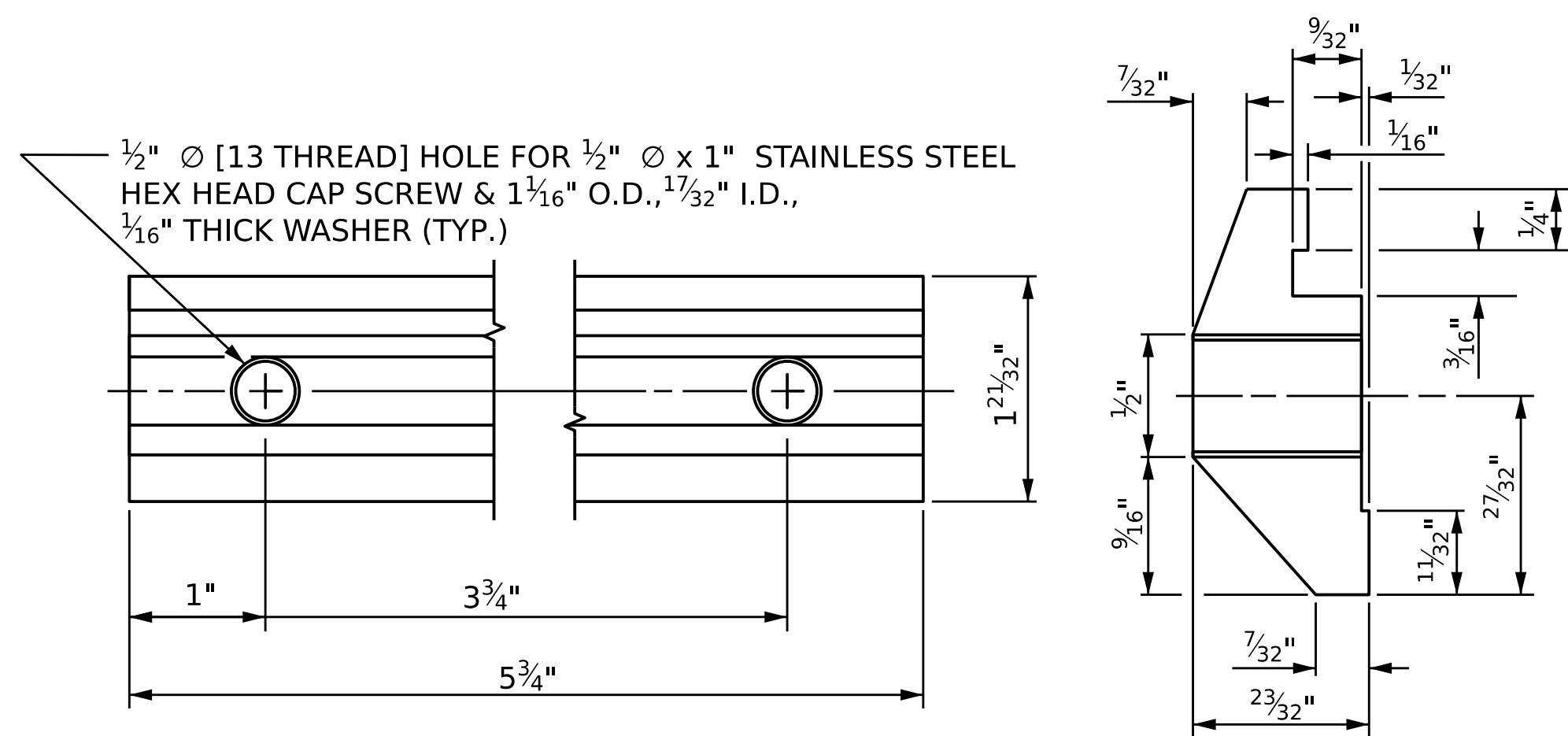


SHIM DETAILS

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

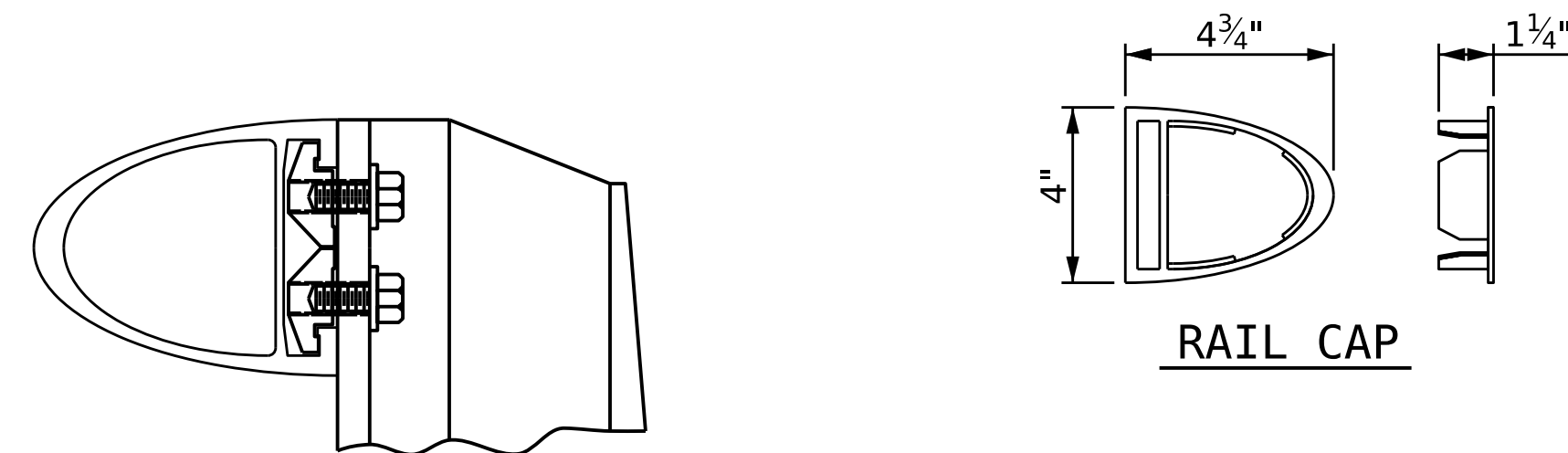


RAIL SECTION



CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR $\frac{3}{4}$ " FERRULES.
- B. $4 - \frac{3}{4}" \times 2\frac{1}{2}"$ BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE $\frac{3}{4}" \times 2\frac{1}{2}"$ GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A $\frac{1}{16}" \times$ WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF ASTM A123.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE $\frac{3}{4}$ " Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

PROJECT NO. **BP14-R038**

POLK COUNTY

STATION: 13+52.50 -L1-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO. S-16
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 32
2			4			

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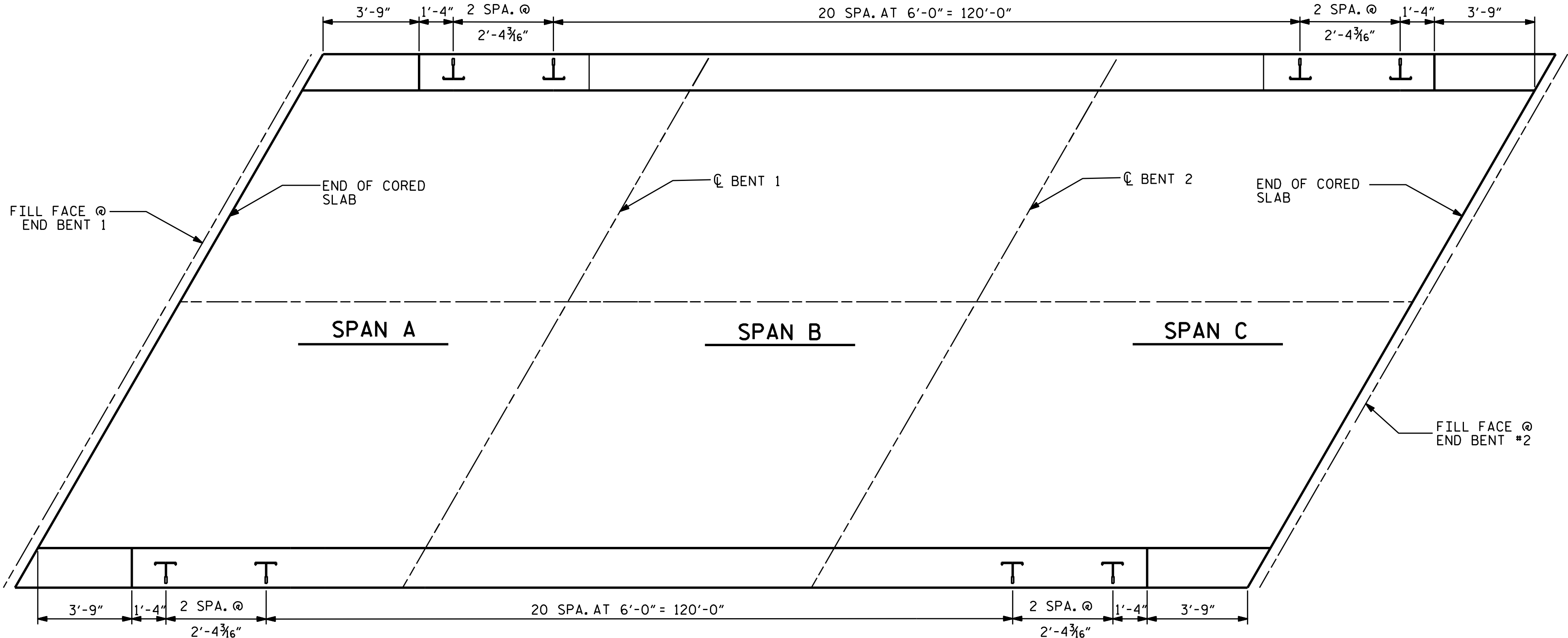


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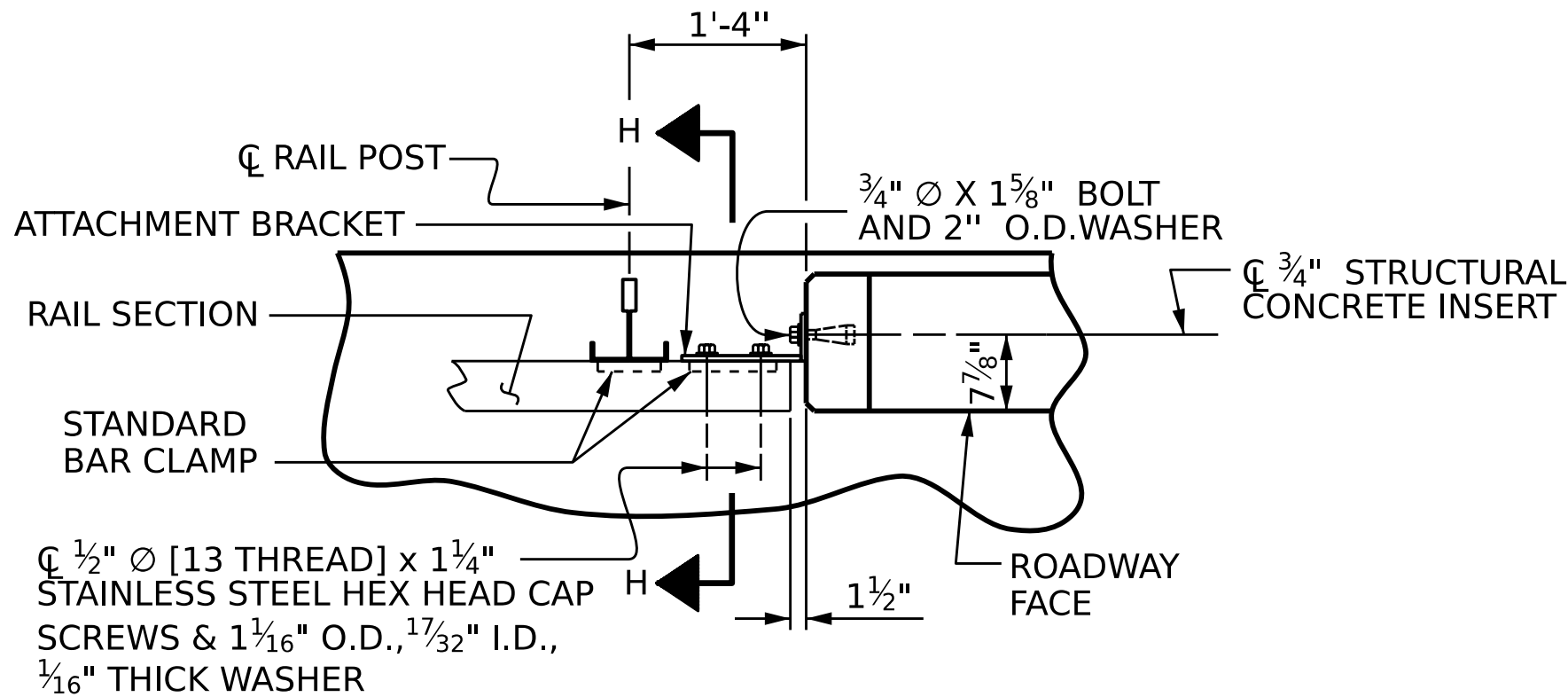
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 DESIGN ENGINEER OF RECORD: W.K. FISCHER DATE : 09/2025

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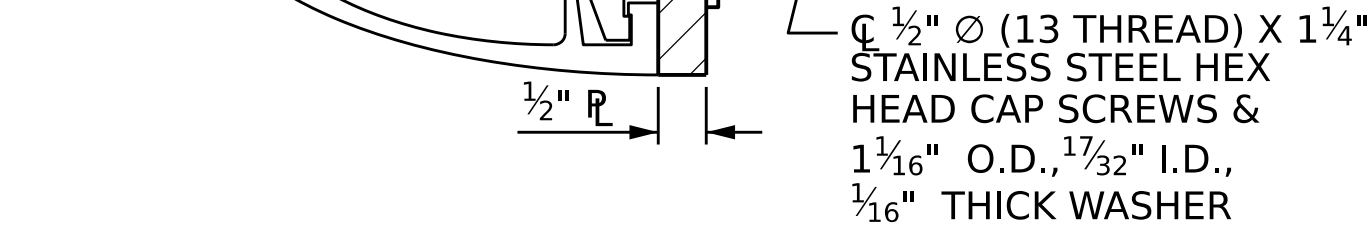
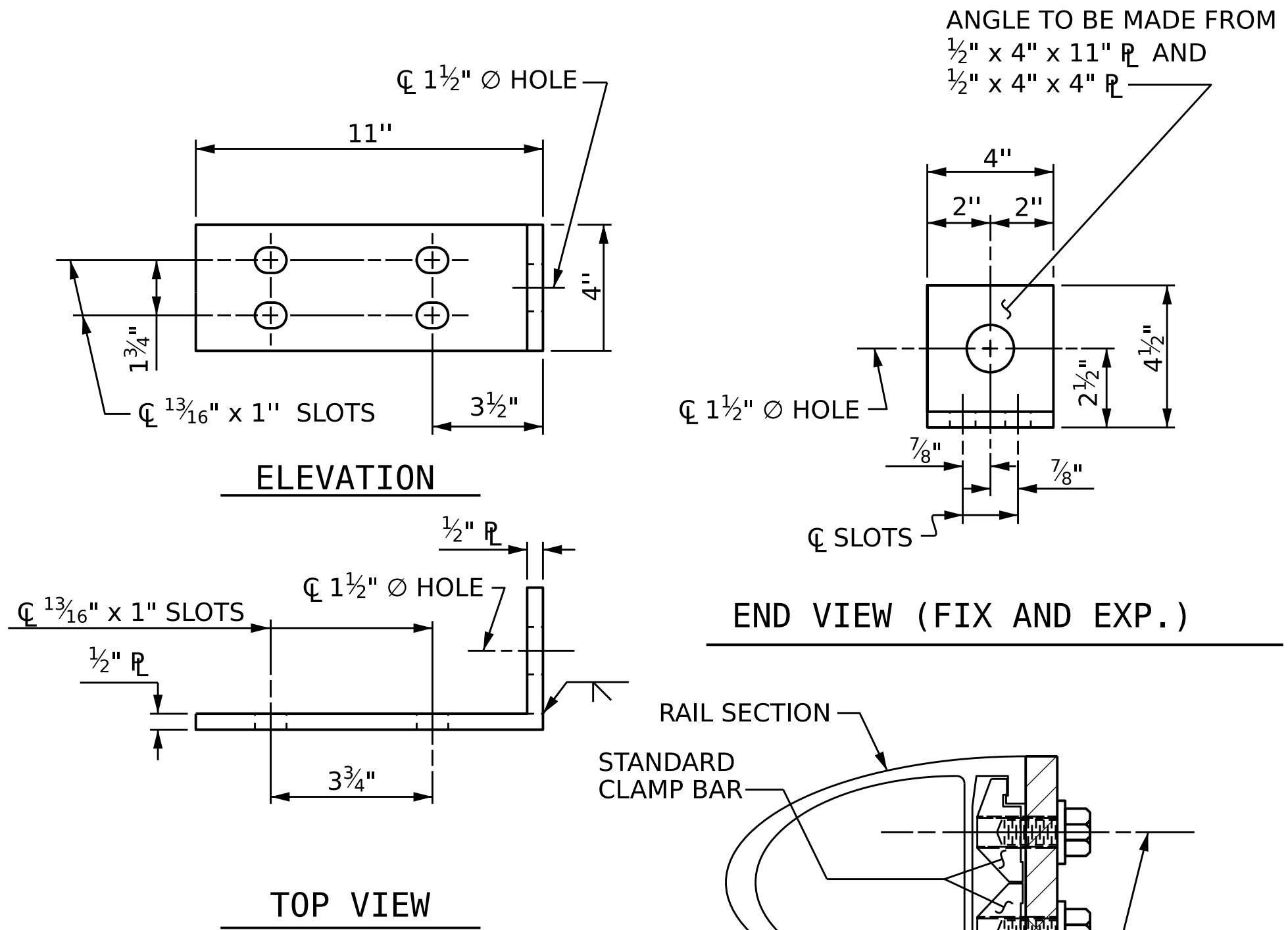
8/26/21



PLAN OF RAIL POST SPACINGS



PLAN - RAIL AND END POST



SECTION H-H (FIX)

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

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

- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".
- 1 - ¾" Ø x 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø x 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A ⅞" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

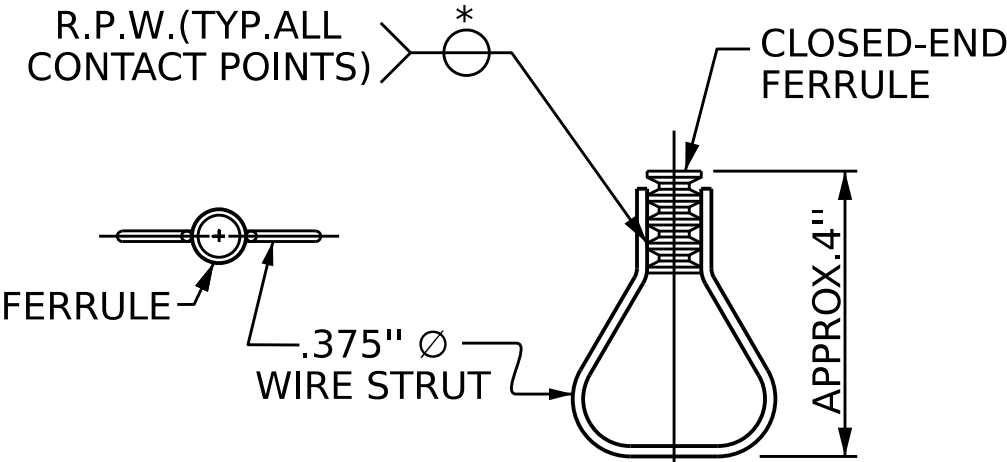
- ½" PLATES SHALL CONFORM TO ASTM A36 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾" Ø x 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾" Ø x 1⅝" BOLT SHALL HAVE N. C. THREADS.
- CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
- STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
- ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø x 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾" Ø x 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø x 1⅝" BOLT SHALL APPLY TO THE ¾" Ø x 6½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



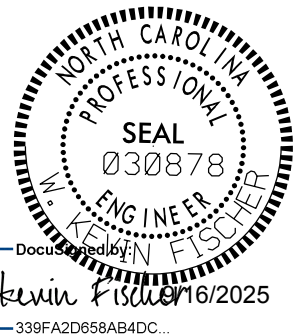
PLAN ELEVATION
STRUCTURAL CONCRETE INSERT

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

PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RAIL FTGH
STANDARD
**RAIL POST SPACINGS
AND
END OF RAIL DETAILS**
FOR ONE OR TWO BAR METAL RAILS



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

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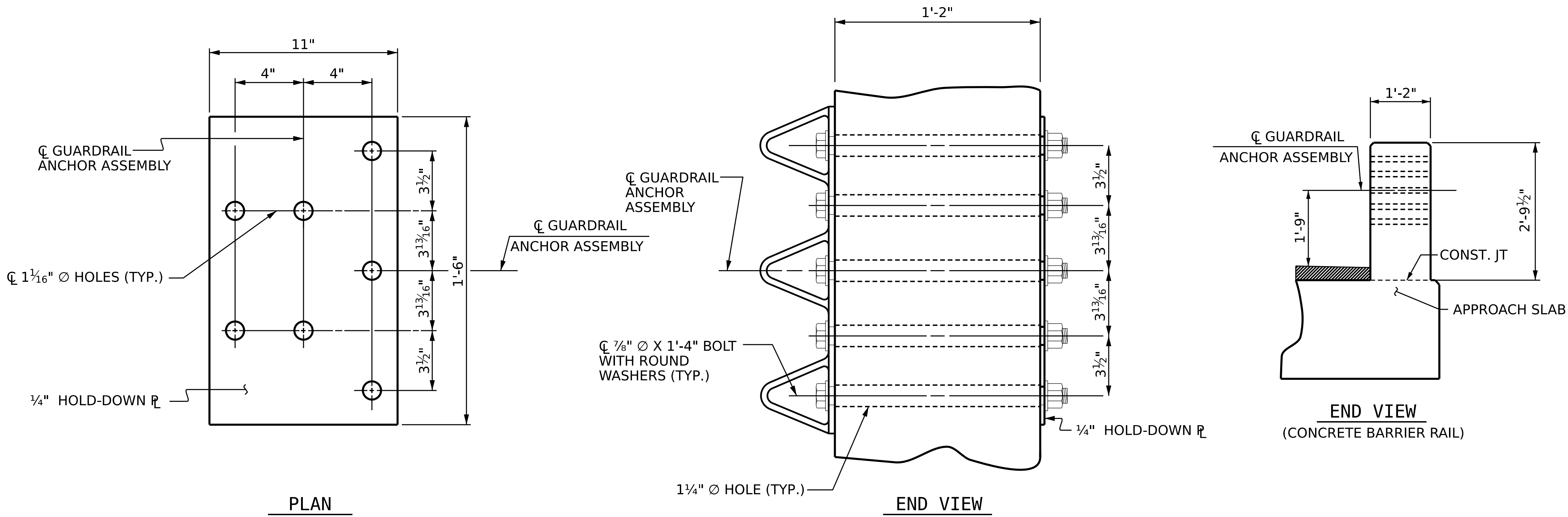
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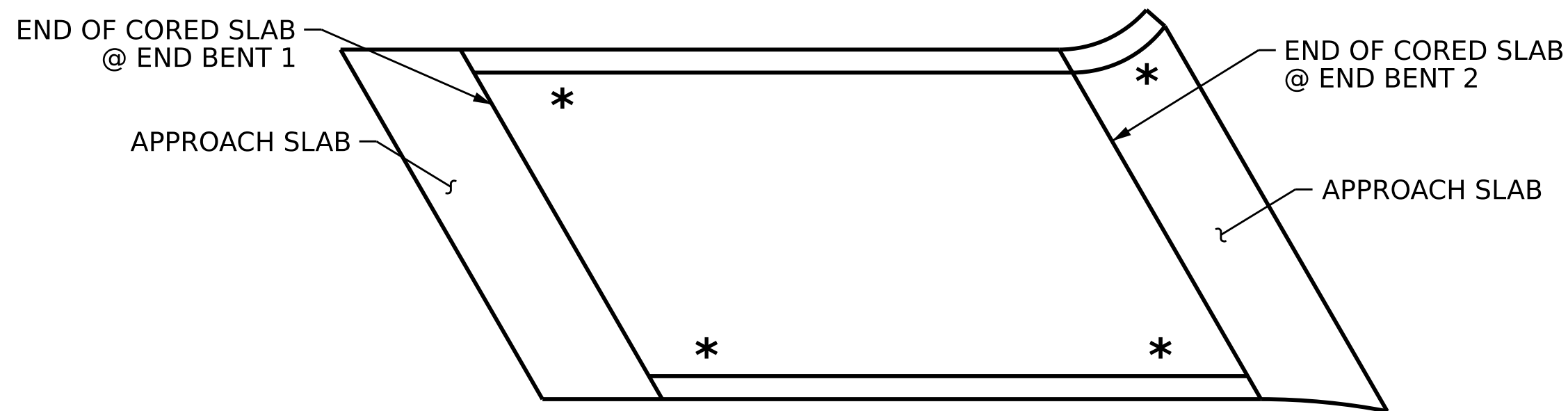
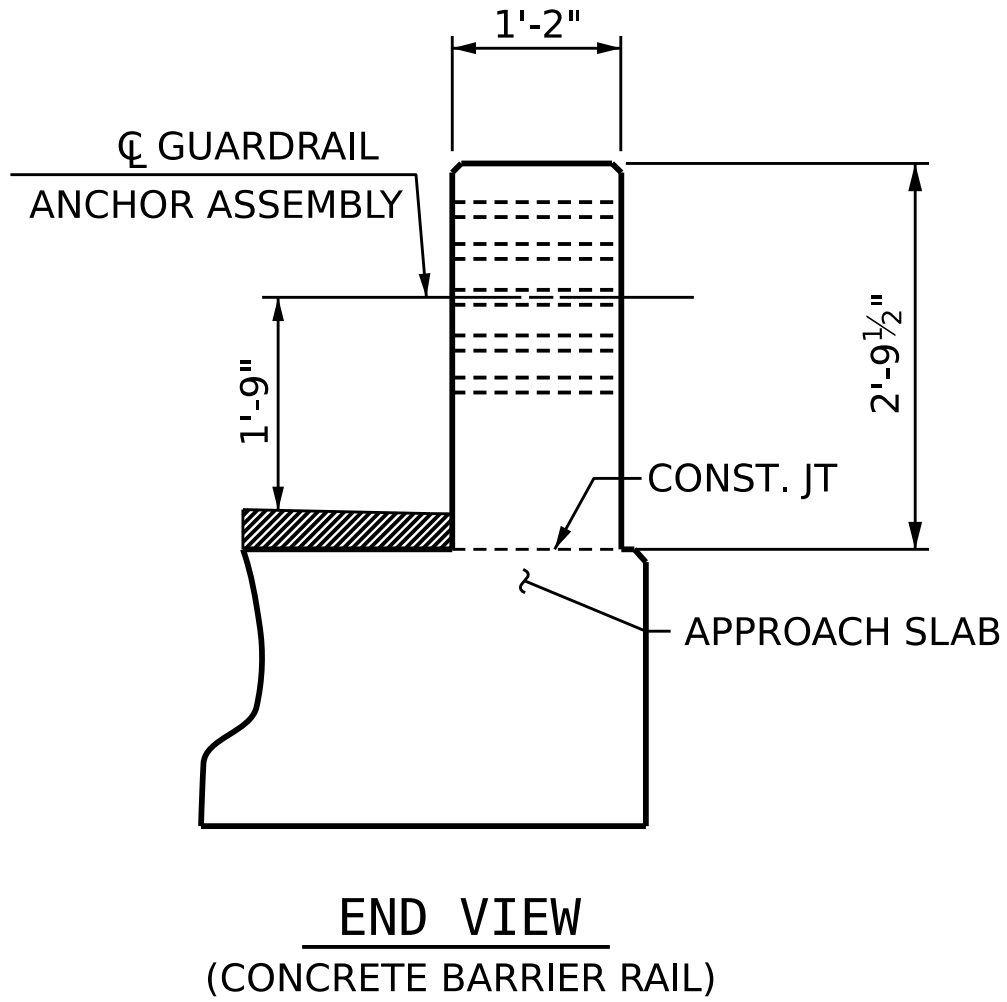
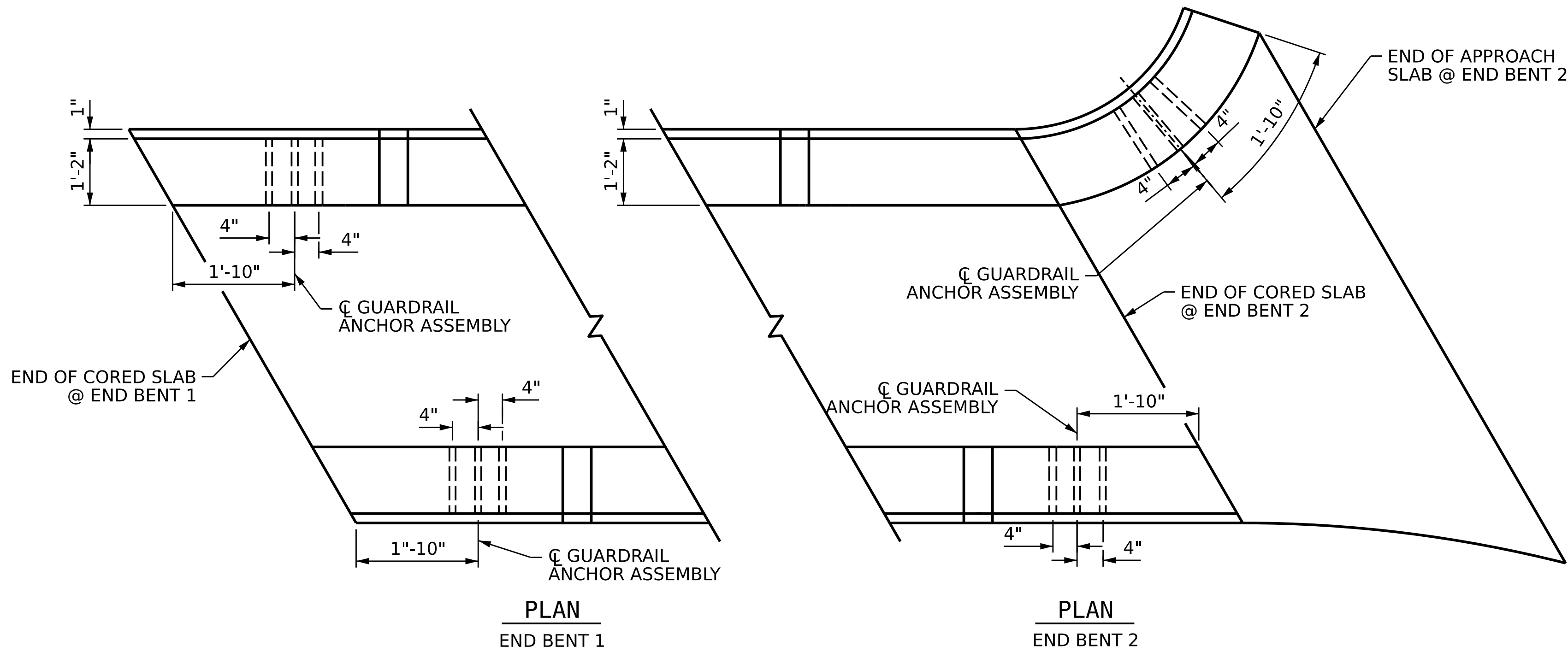
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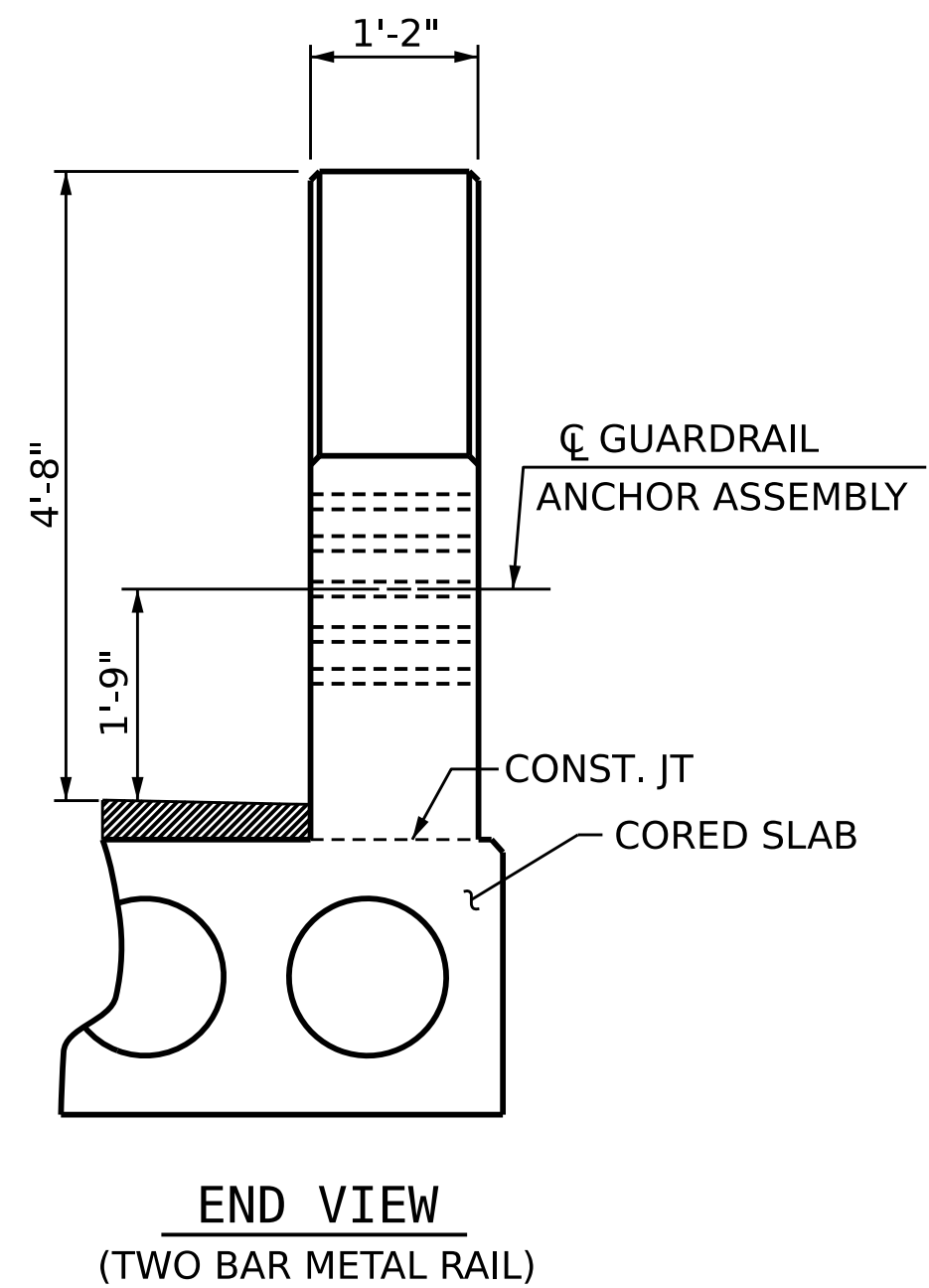


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 3/4" HOLD DOWN PLATE AND 7 - 7/8" O BOLTS WITH NUTS AND WASHERS.

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

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

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

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

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

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

THE 1 1/4" O 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.

PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

**GUARDRAIL ANCHORAGE
DETAILS FOR TWO BAR
METAL RAIL**

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	
1			3		S-18
2			4		TOTAL SHEETS
					32

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STD. GRA3



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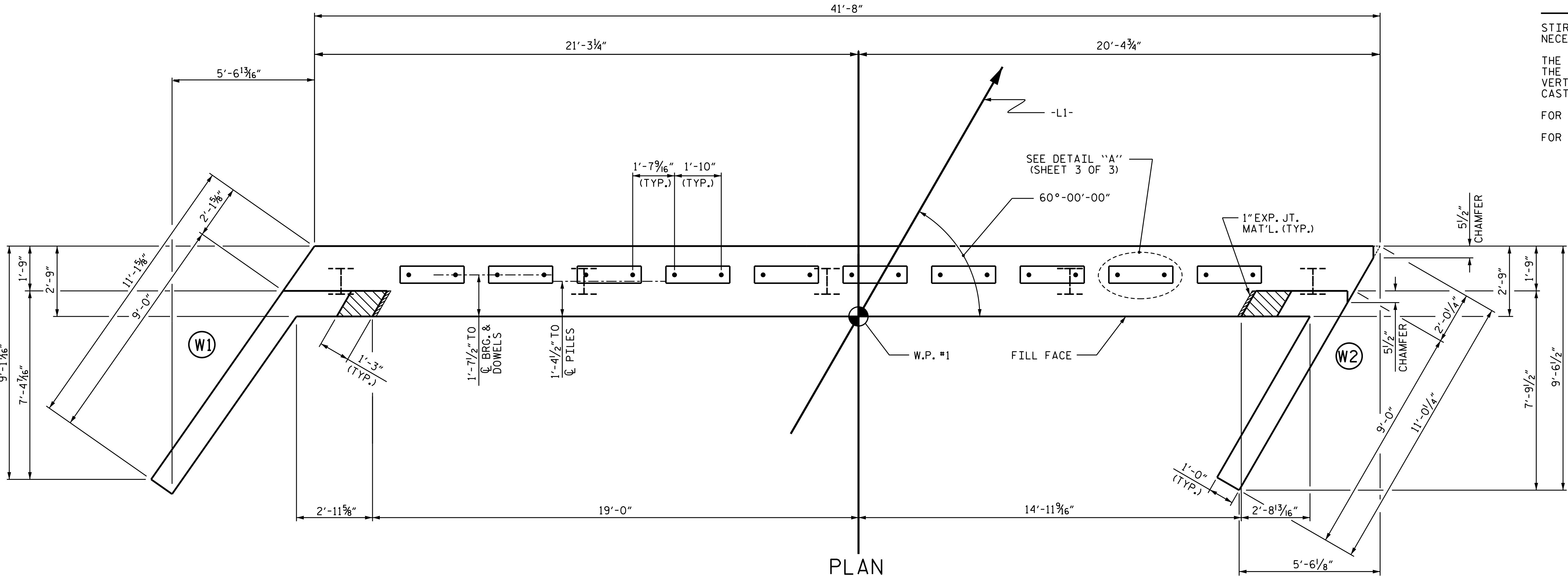
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

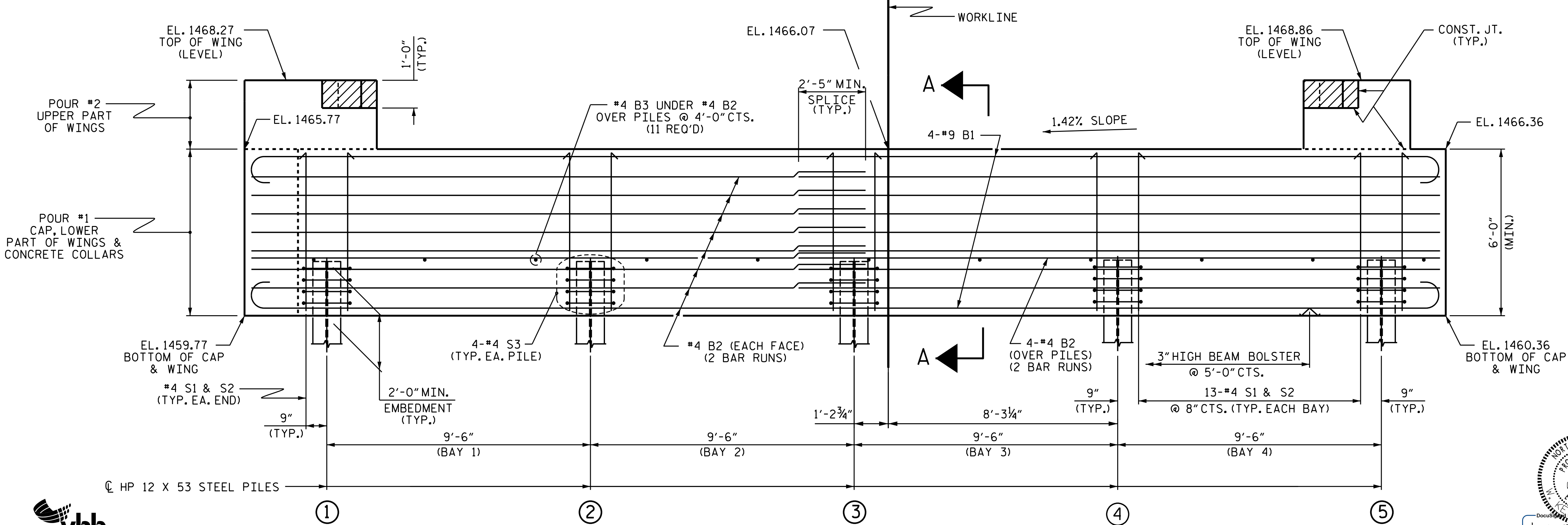
FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WING DETAILS, SEE SHEET 2 OF 3.



PLAN

TOP OF PILE ELEVATIONS	
①	1461.79
②	1461.92
③	1462.06
④	1462.19
⑤	1462.33



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 3 OF 3.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.



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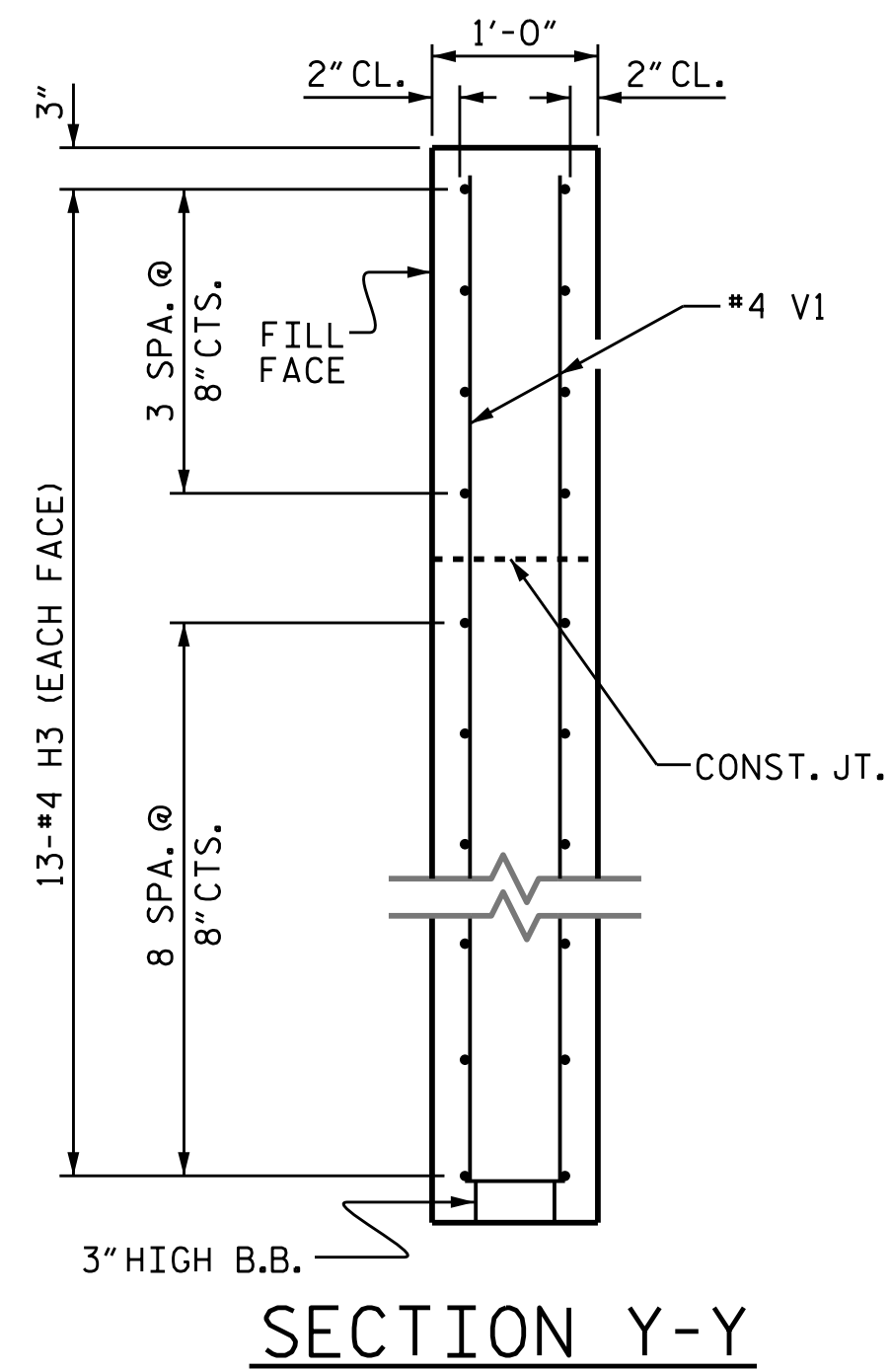
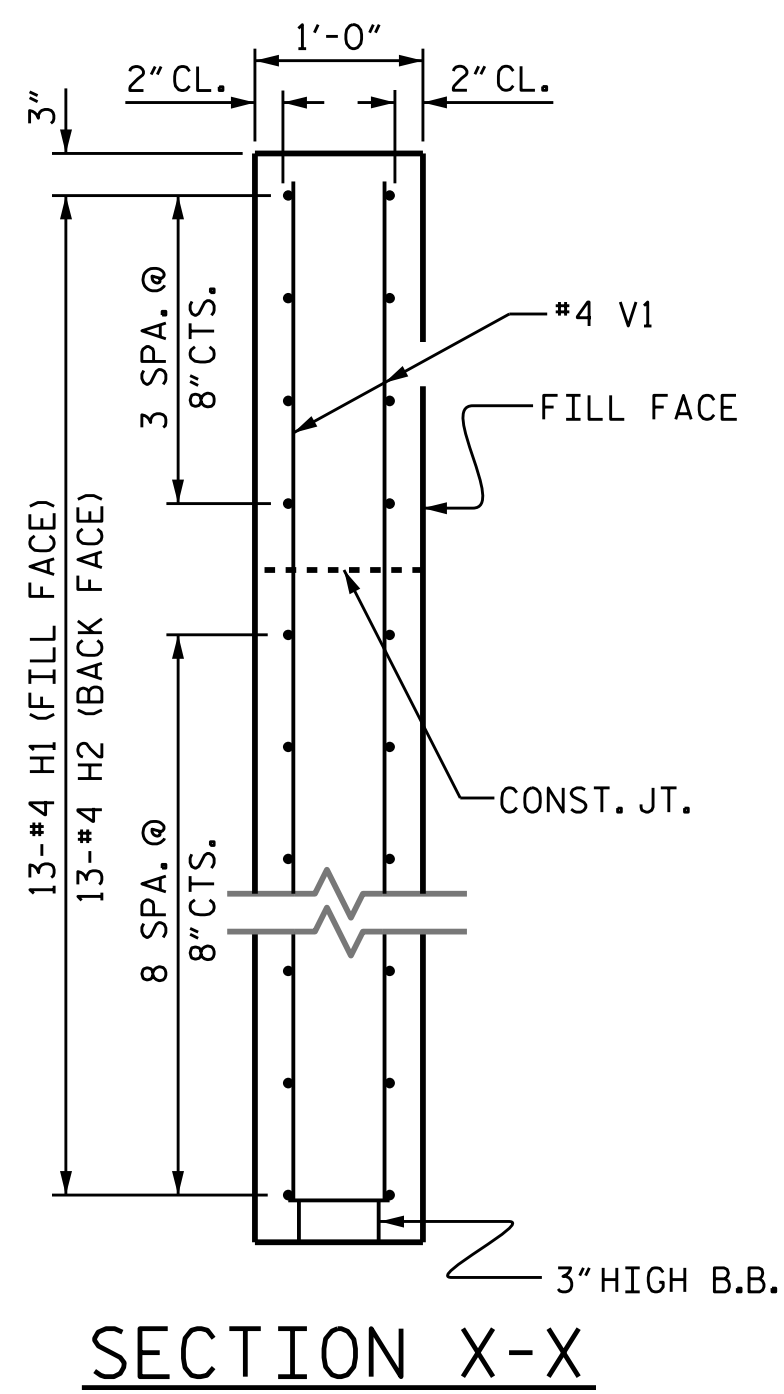


PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

SHEET 1 OF 3

STATE OF NORTH CAROLINA						SHEET NO. S-19 TOTAL SHEETS 32
DEPARTMENT OF TRANSPORTATION						
RALEIGH						
SUBSTRUCTURE						
END BENT 1						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED



SHEET 2 OF 3

SUBSTRUCTURE
END BENT 1
WING DETAILS

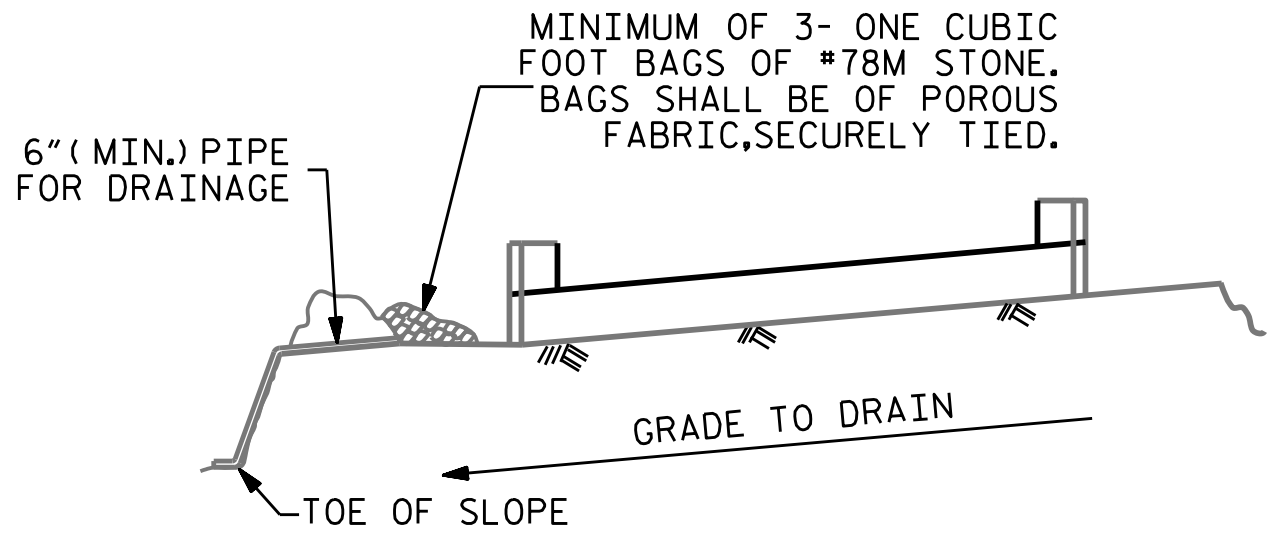
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 32
2			4			



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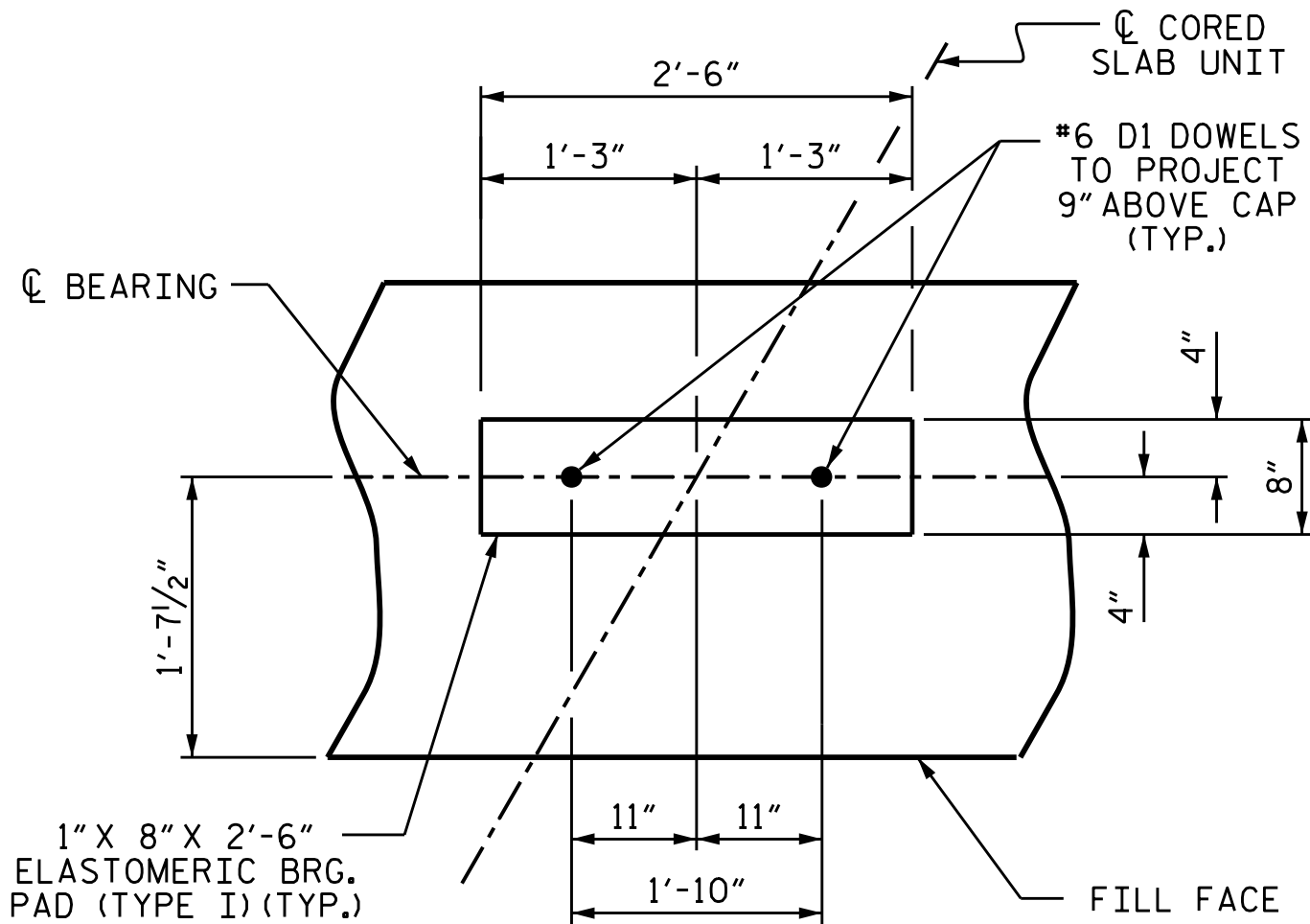


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

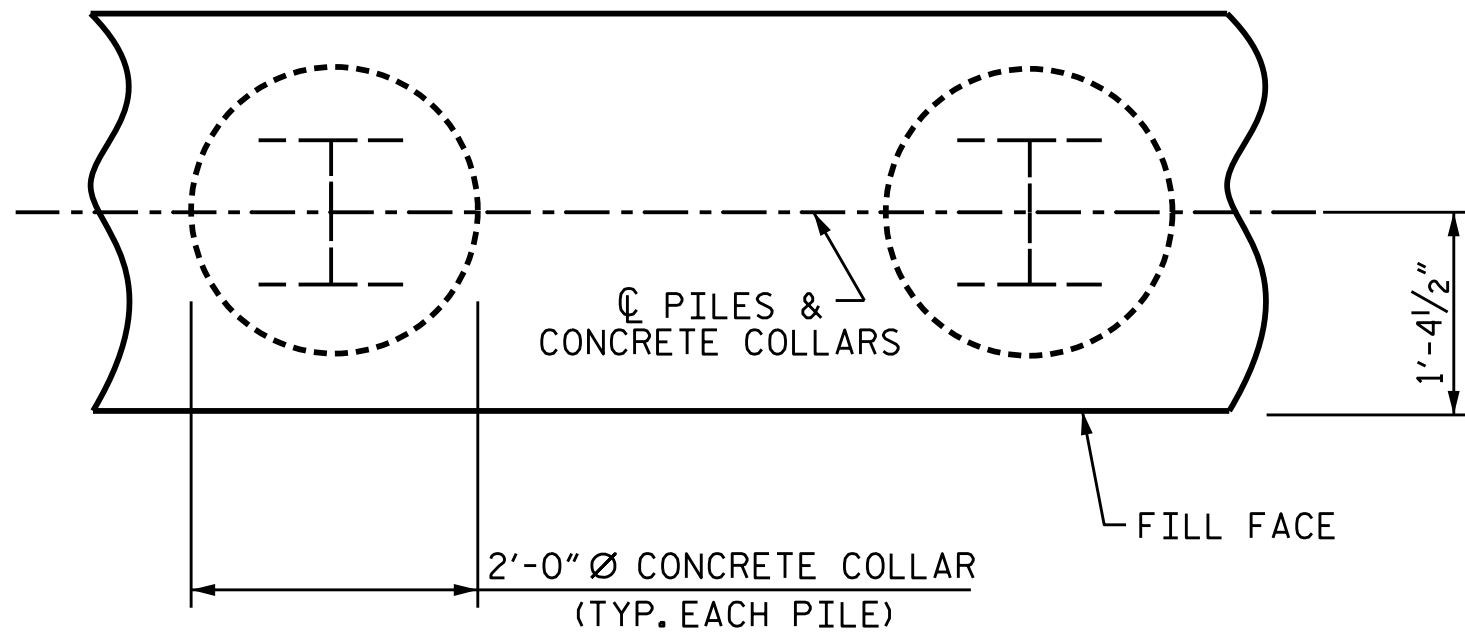
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

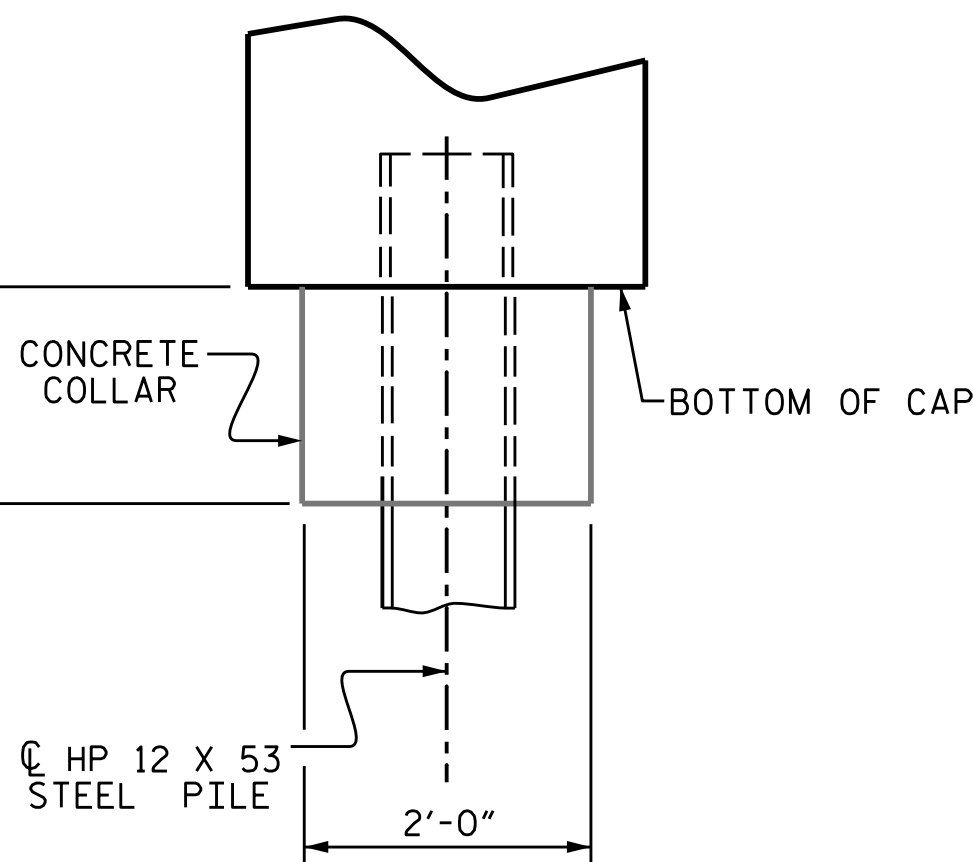
TEMPORARY DRAINAGE AT END BENT



DETAIL "A"



PLAN



ELEVATION

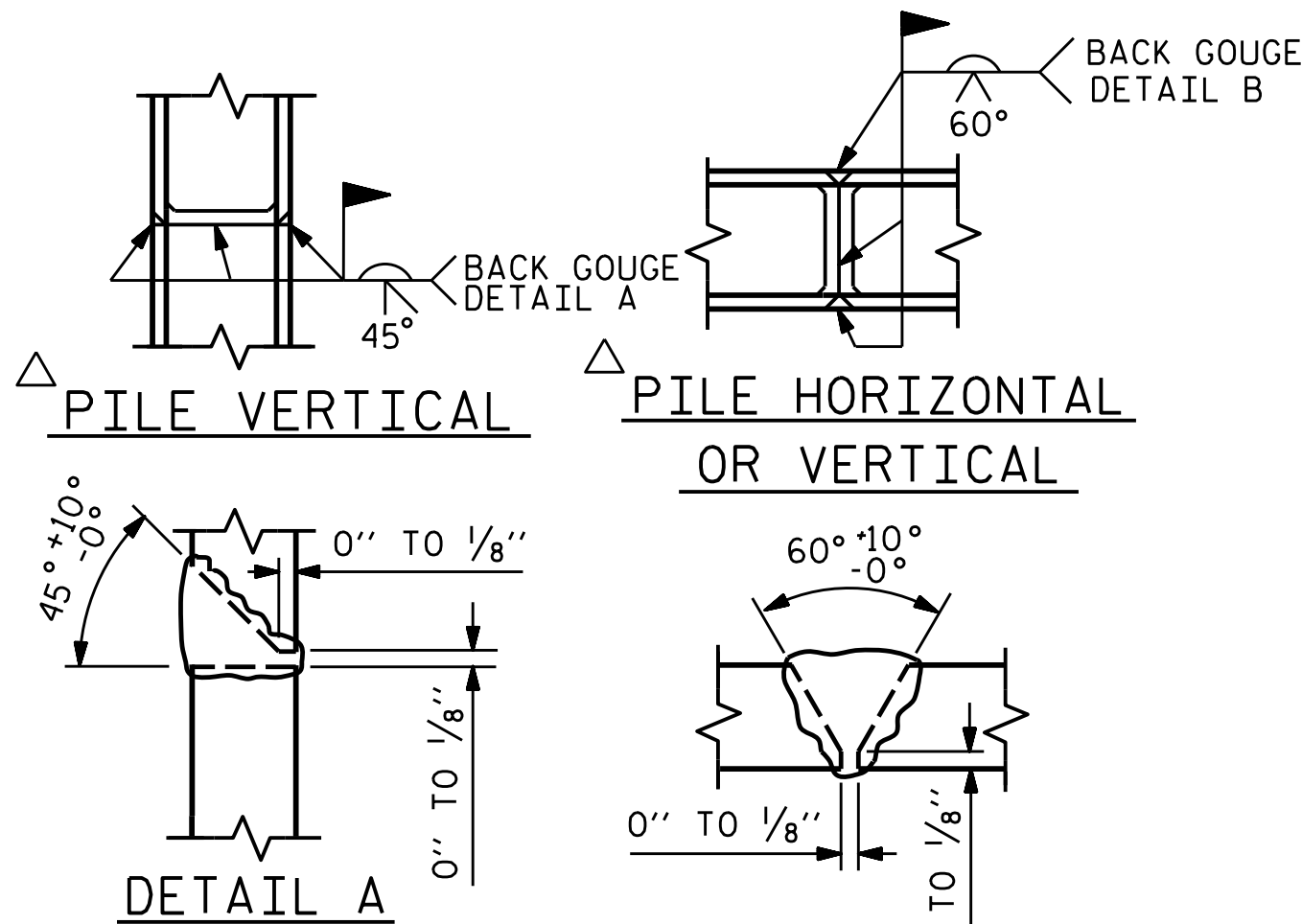
CORROSION PROTECTION FOR STEEL PILES DETAIL



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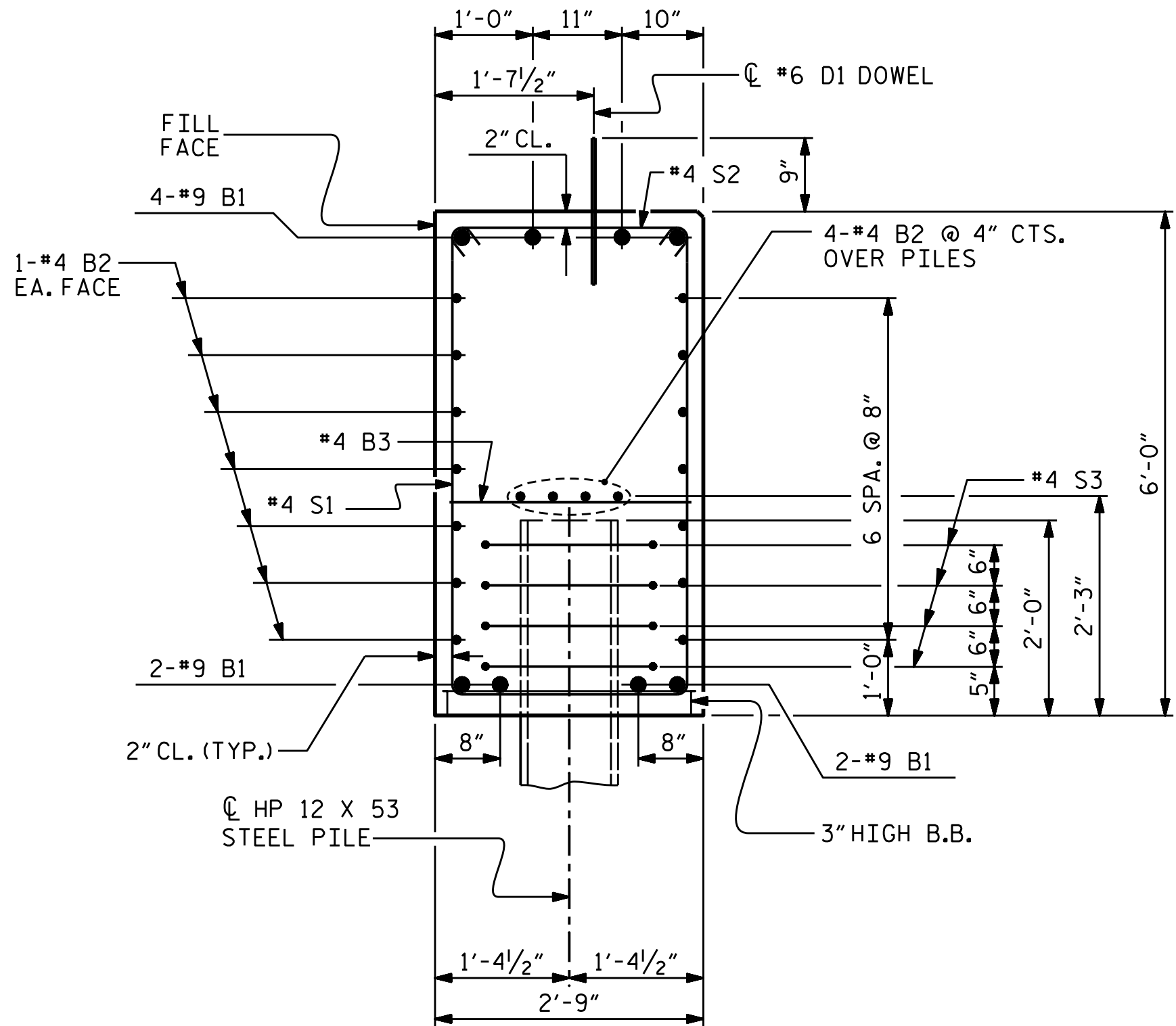
DRAWN BY : C.P. MALAGON DATE : 08/2025
CHECKED BY : E.C. PHELPS DATE : 08/2025
DESIGN ENGINEER OF RECORD: W.K. FISCHER DATE : 09/2025

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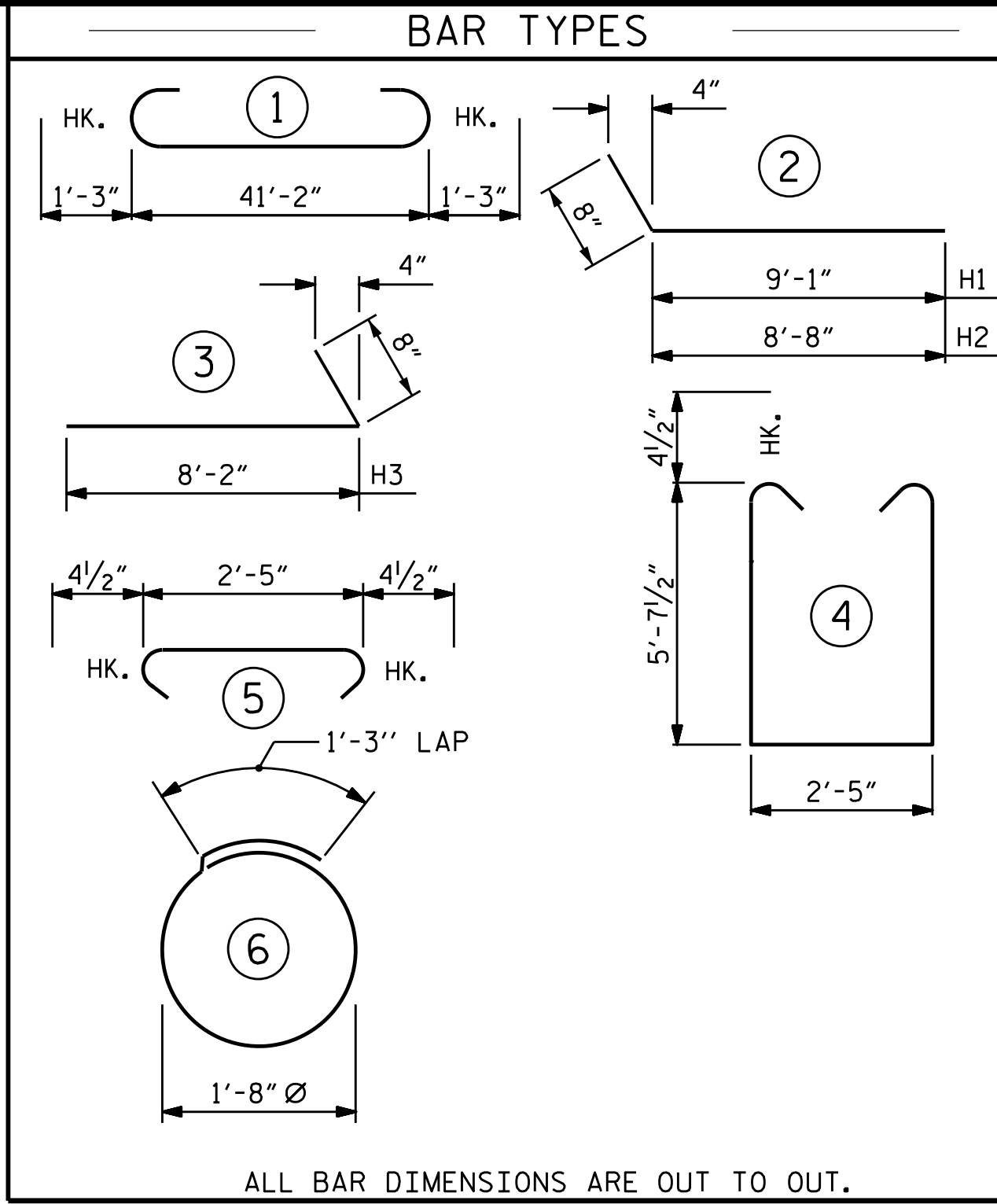
POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



BILL OF MATERIAL

FOR END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		43'-8"	1188
B2	36	#4	STR	21'-11"	527
B3	11	#4	STR	2'-5"	18
D1	20	#6	STR	1'-6"	45
H1	13	#4	2	9'-9"	85
H2	13	#4	2	9'-4"	81
H3	26	#4	3	8'-10"	153

K1	16	#4	STR	3'-3"	35
S1	54	#4	4	14'-5"	520
S2	54	#4	5	3'-2"	114
S3	20	#4	6	6'-6"	87
V1	53	#4	STR	8'-2"	289

REINFORCING STEEL (FOR ONE END BENT) 3142 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)
POUR #1 CAP, LOWER PART OF WINGS & COLLARS 30.0 C.Y.

POUR #2 UPPER PART OF WINGS 2.2 C.Y.

TOTAL CLASS A CONCRETE 32.2 C.Y.

PROJECT NO. **BP14-R038**

POLK COUNTY

STATION: **13+52.50 -L1-**

SHEET 3 OF 3

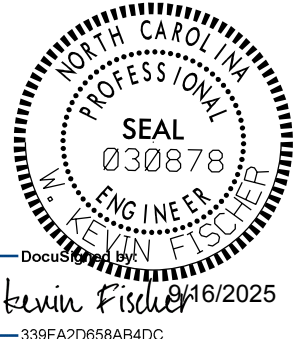
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

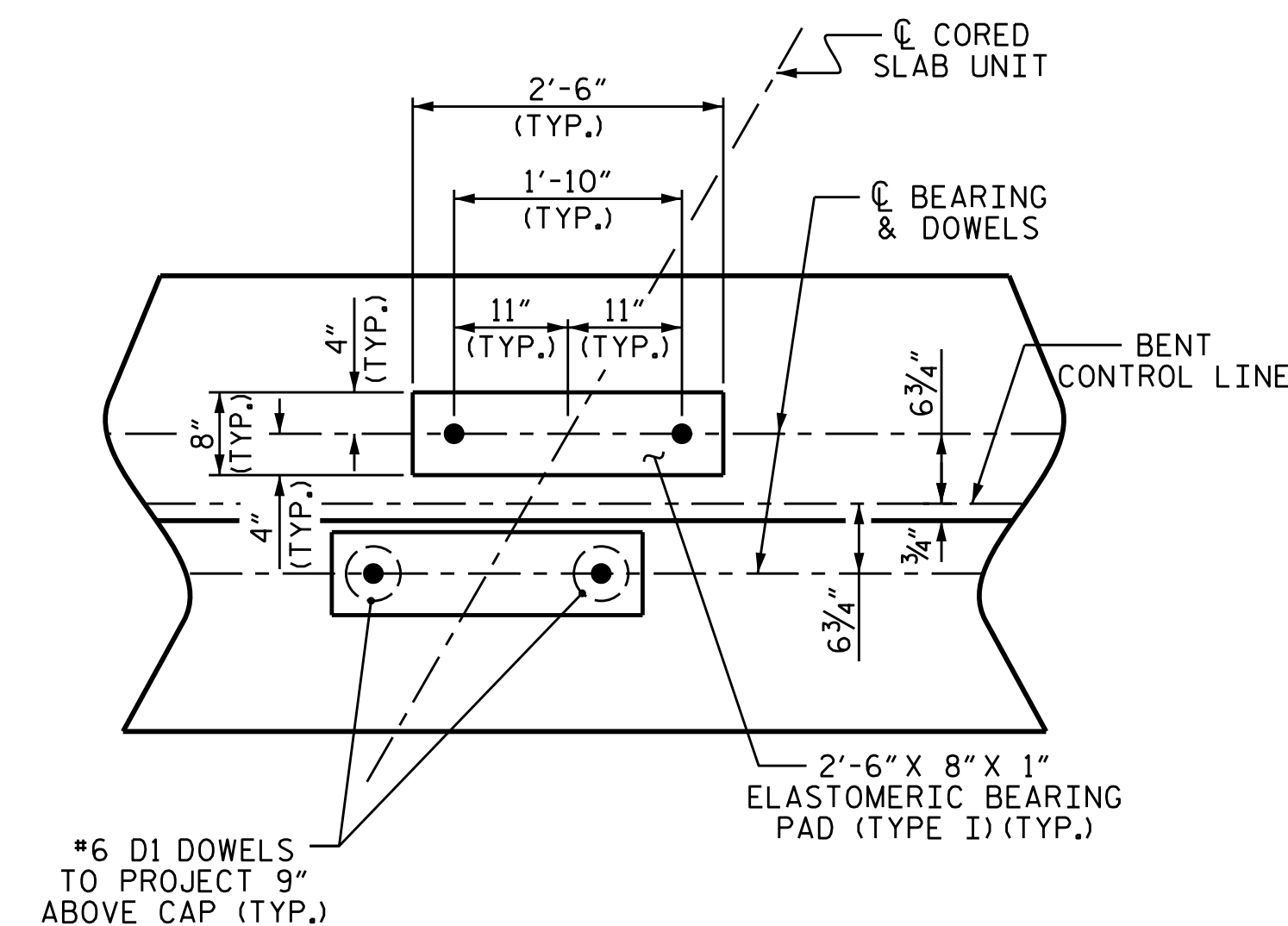
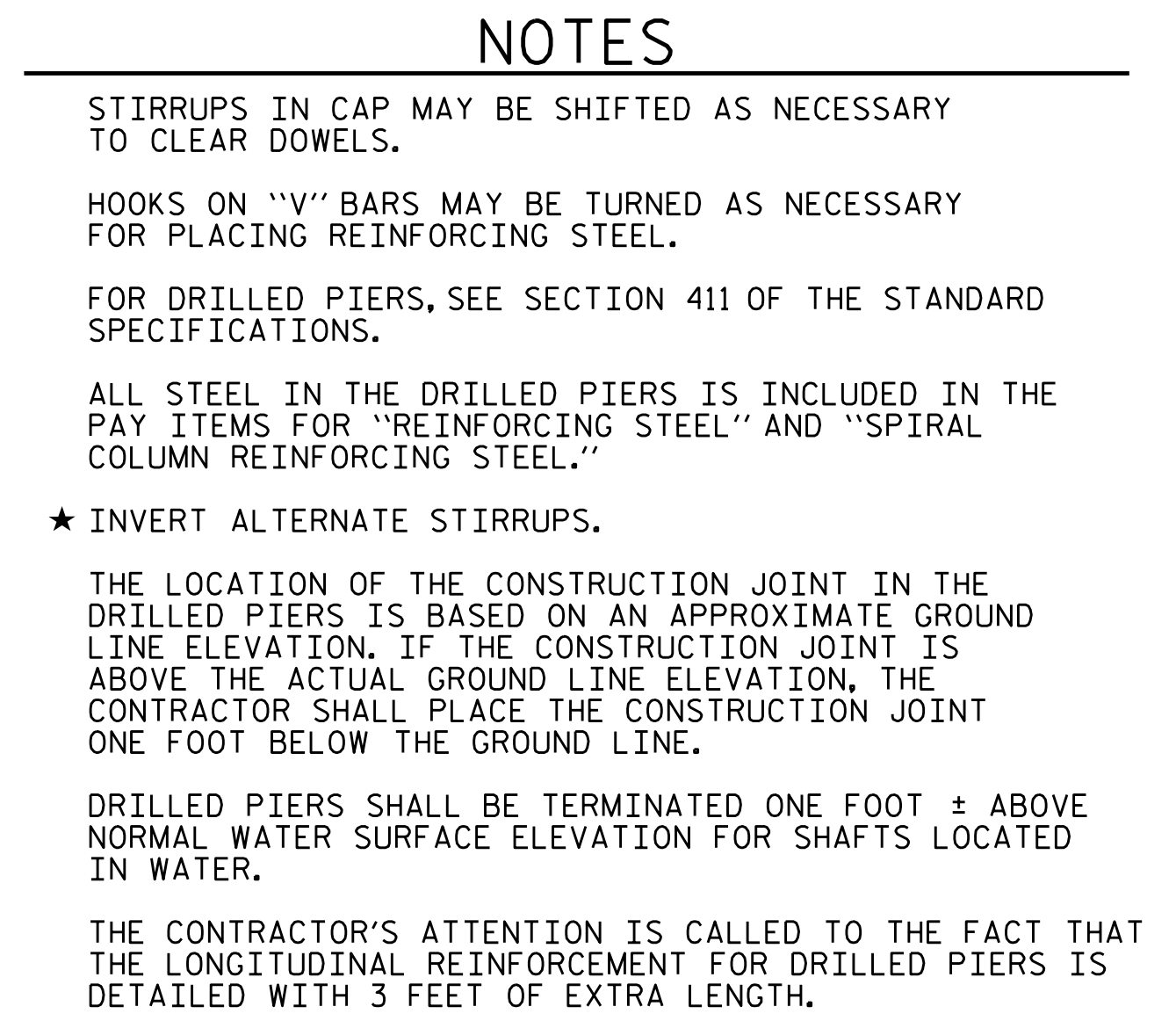
SUBSTRUCTURE

END BENT 1
DETAILS

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	
1			3		S-21
2			4		TOTAL SHEETS 32

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



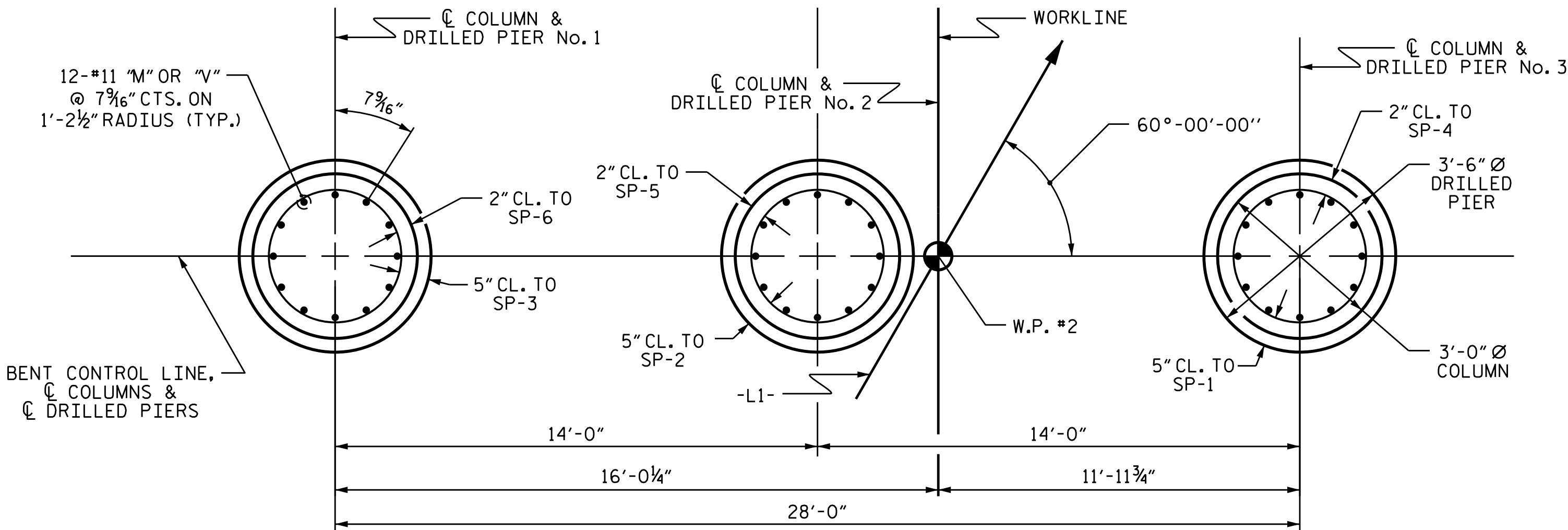


PROJECT NO. **BP14-R038**
POLK COUNTY
 STATION: **13+52.50 -L1-**

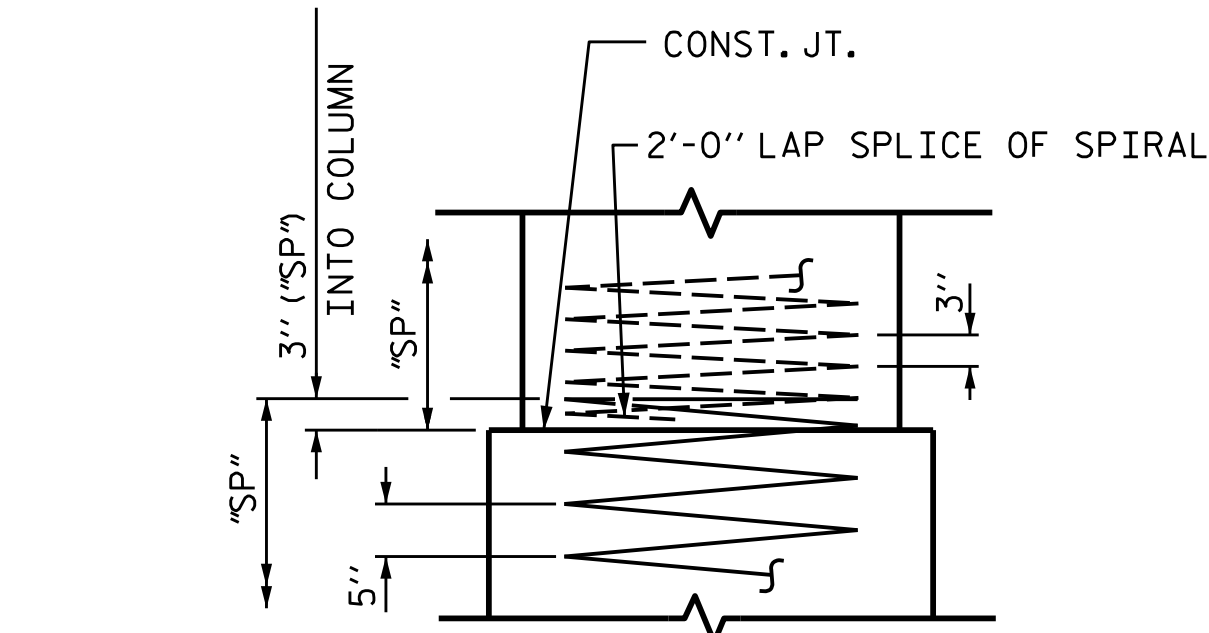
SUBSTRUCTURE
BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			32

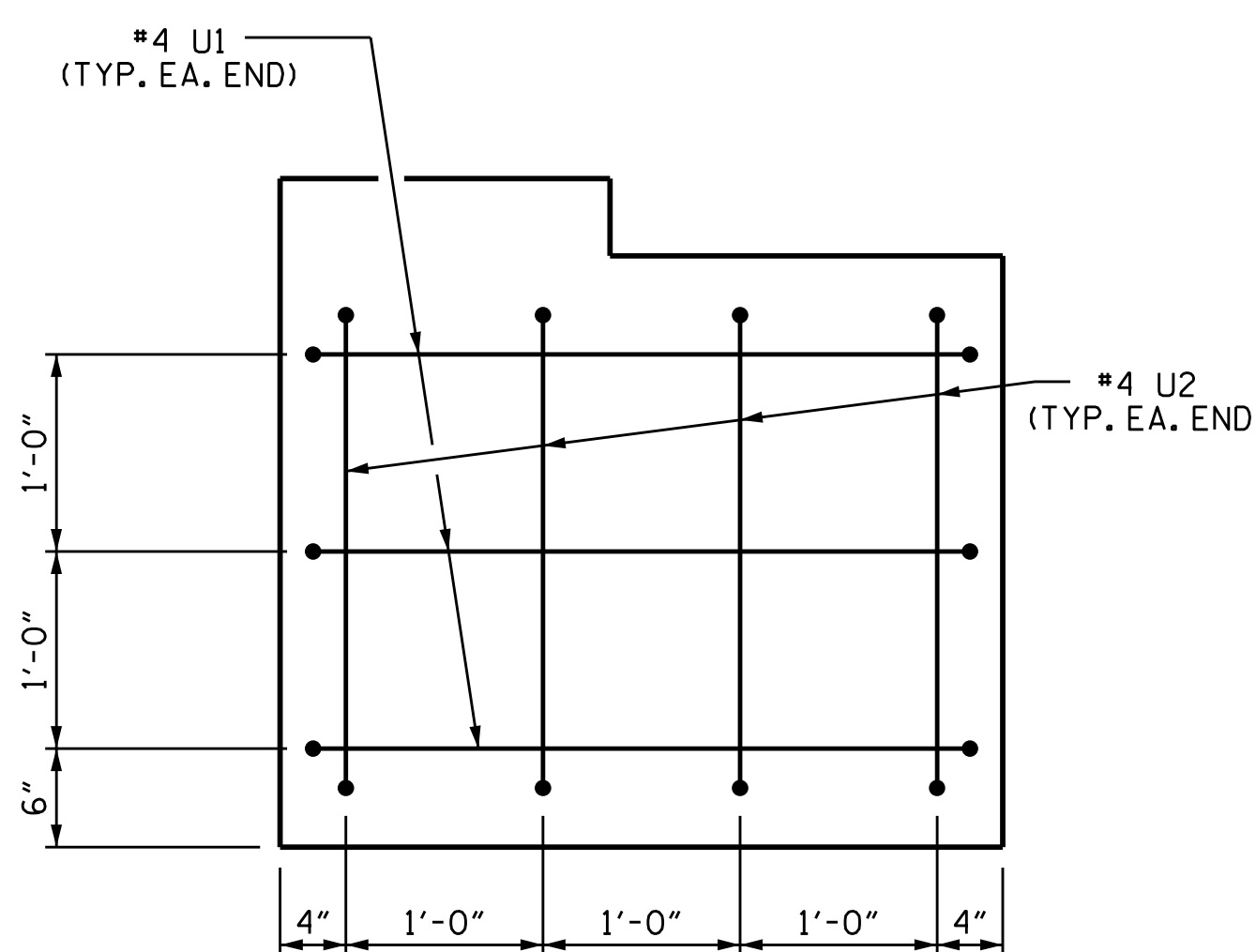
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PLAN OF DRILLED PIERS & COLUMNS



CONSTRUCTION JOINT DETAIL



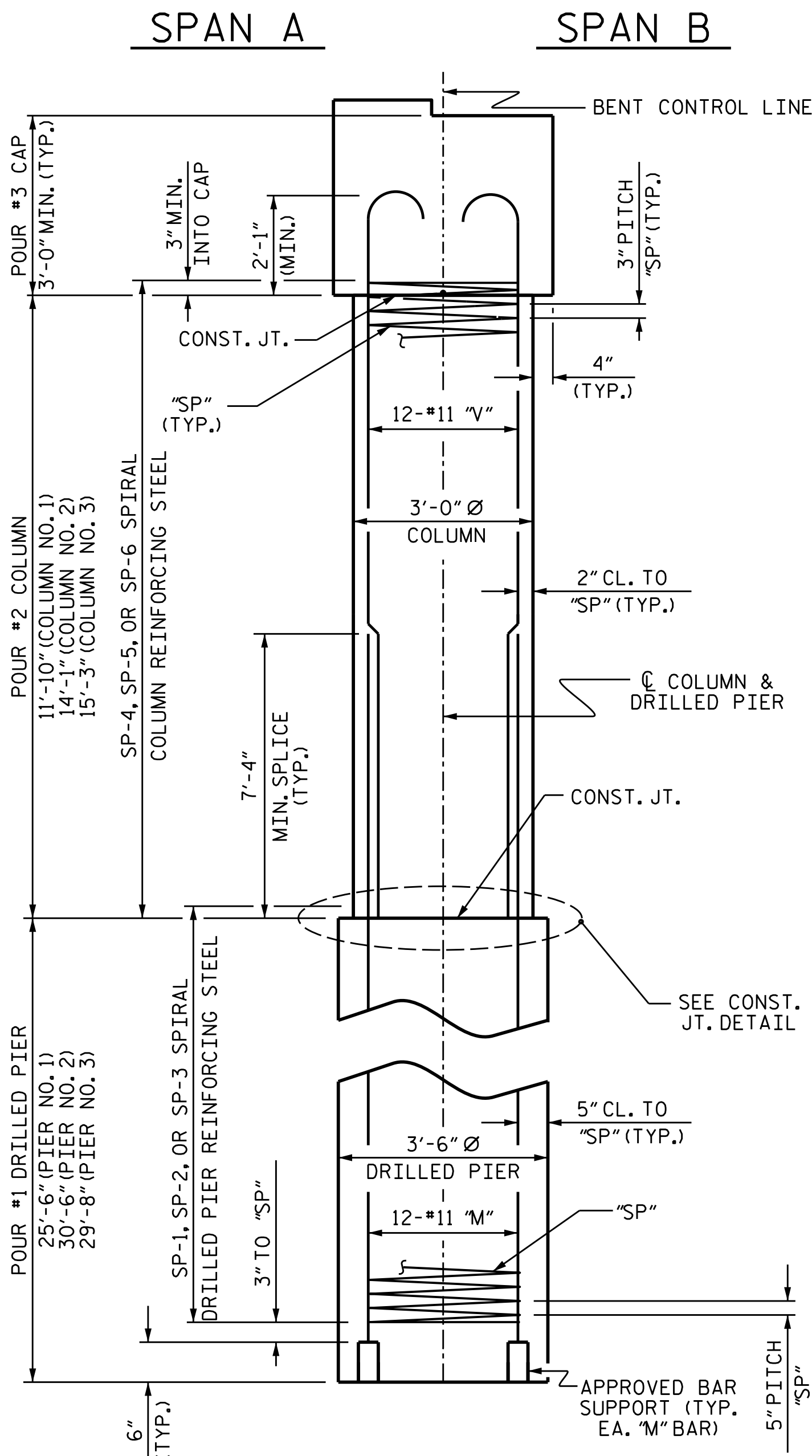
END OF CAP VIEW
(TYPICAL BOTH ENDS)



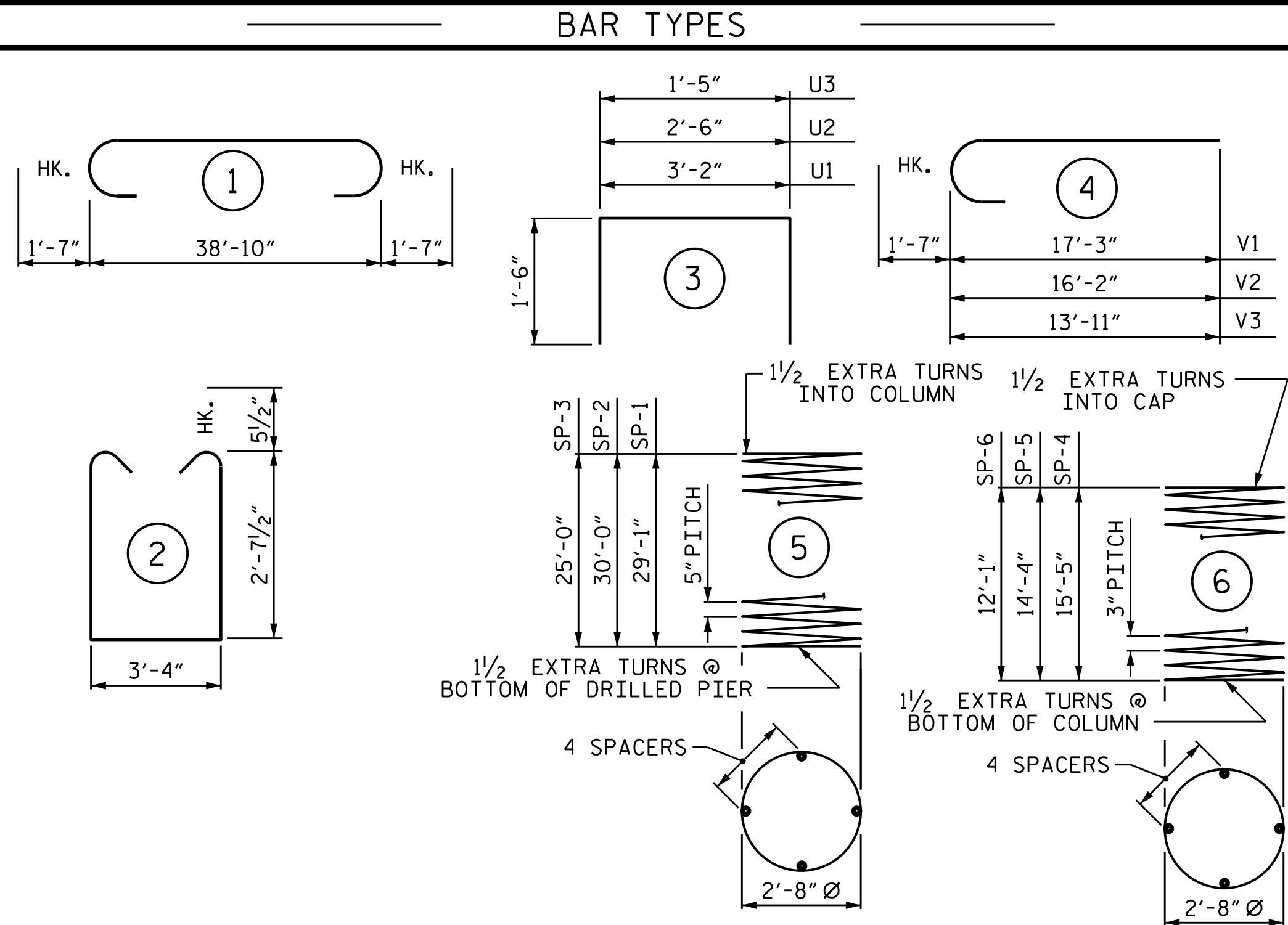
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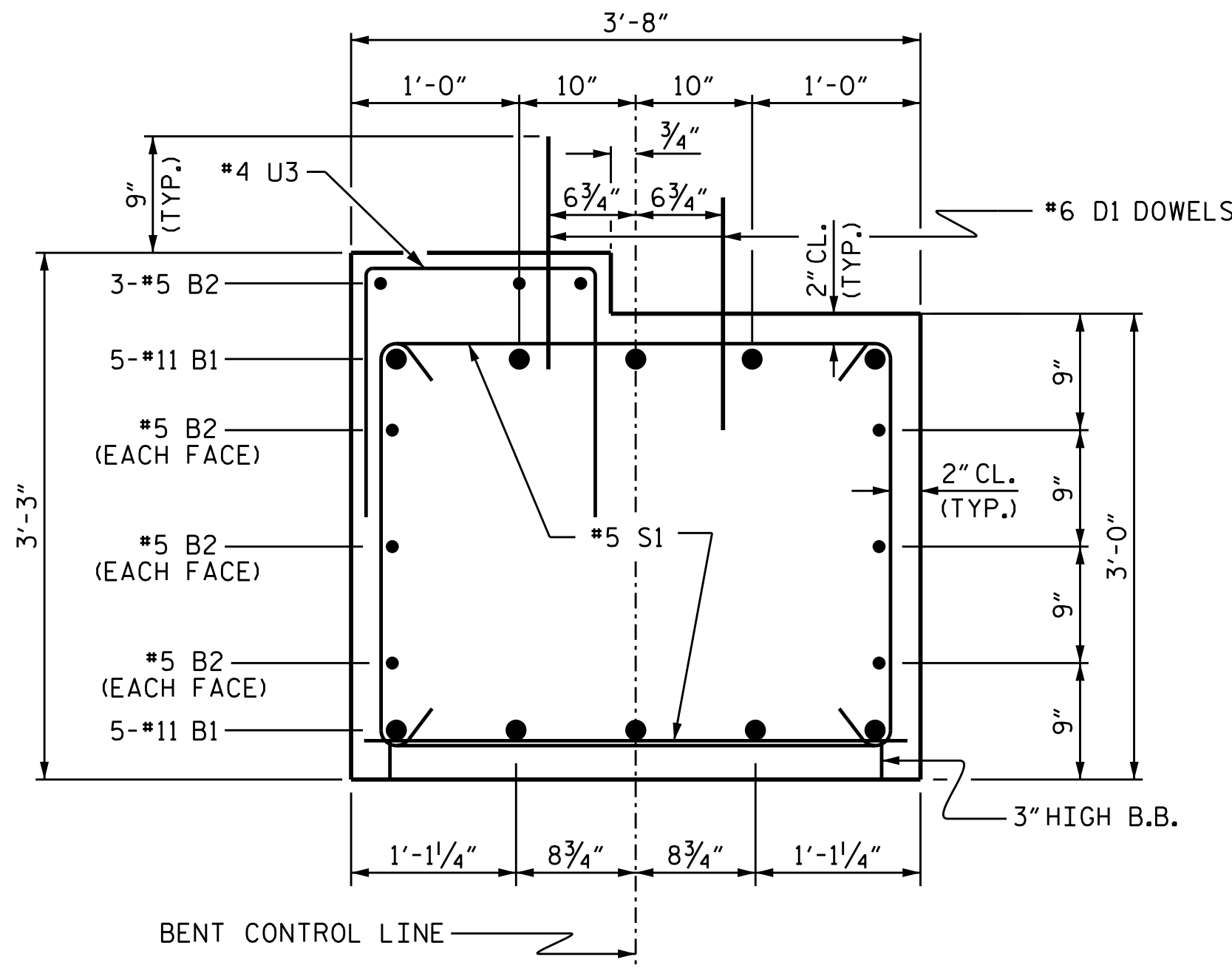
9/15/2025
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cmalagon



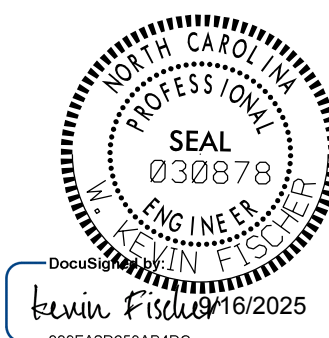
END ELEVATION



ALL BAR DIMENSIONS ARE OUT TO OUT



SECTION THRU CAP



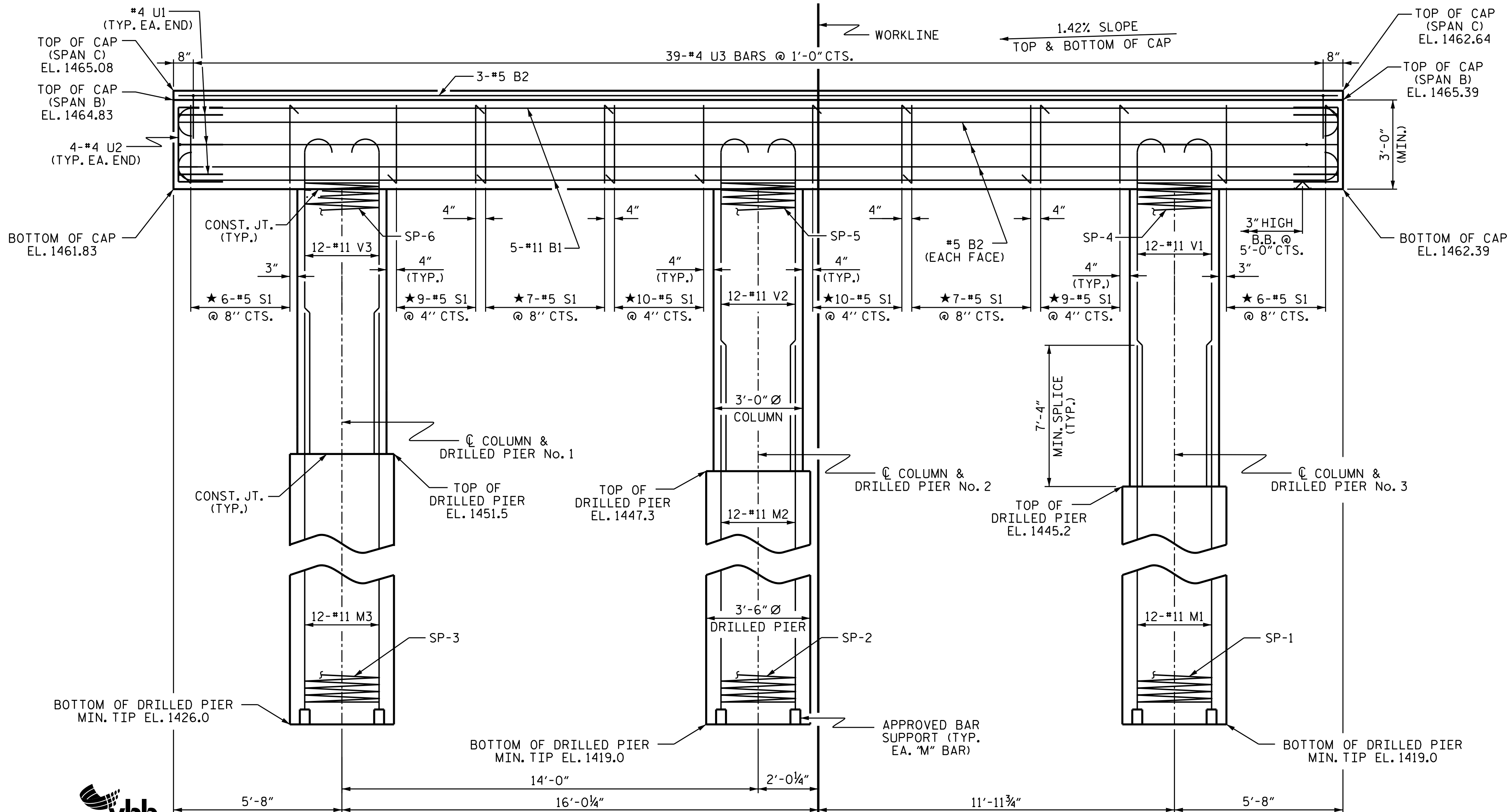
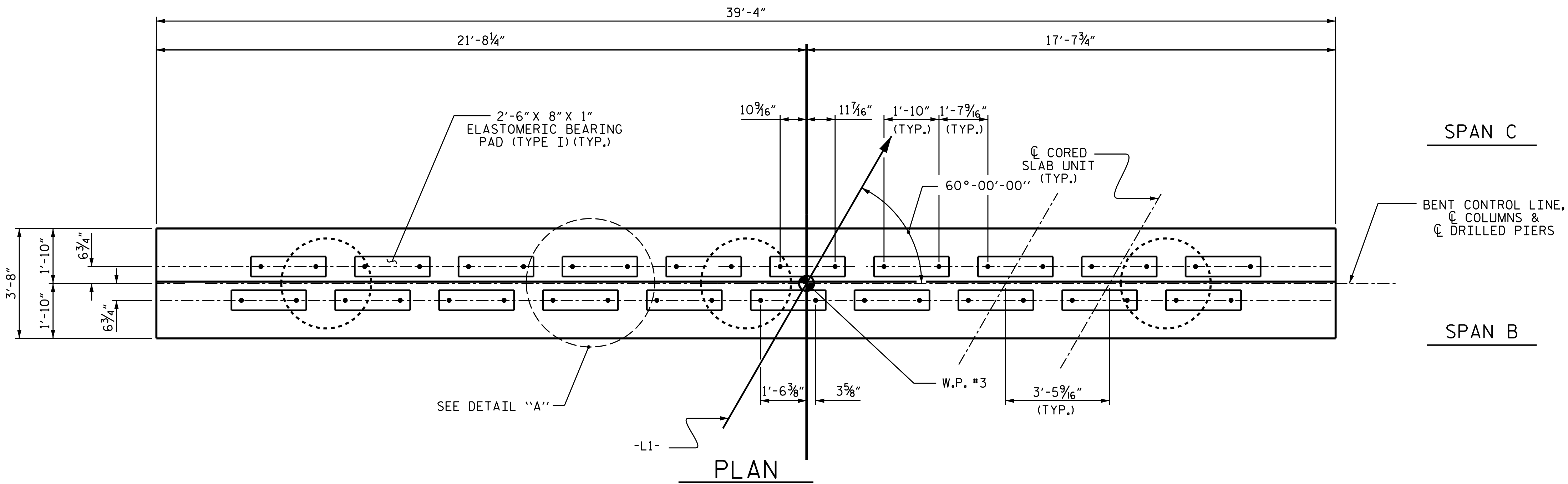
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

BILL OF MATERIAL					
FOR BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	42'-0"	2231
B2	9	#5	STR	39'-0"	366
D1	40	#6	STR	1'-6"	90
M1	12	#11	STR	36'-5"	2322
M2	12	#11	STR	37'-4"	2380
M3	12	#11	STR	32'-4"	2061
S1	64	#5	2	9'-6"	634
U1	6	#4	3	6'-2"	25
U2	8	#4	3	5'-6"	29
U3	39	#4	3	4'-5"	115
V1	12	#11	4	18'-10"	1201
V2	12	#11	4	17'-9"	1132
V3	12	#11	4	15'-6"	988
REINFORCING STEEL					13574 LBS.
SP-1	1	*	5	600'-5"	626
SP-2	1	*	5	616'-10"	643
SP-3	1	*	5	518'-2"	540
SP-4	1	**	6	536'-3"	358
SP-5	1	**	6	503'-3"	336
SP-6	1	**	6	429'-0"	287
SPIRAL COLUMN REINFORCING STEEL					2790 LBS.
* THE SP-1, SP-2 & SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-4, SP-5 & SP-6 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)					10.8 C.Y.
POUR #3 (CAP)					16.7 C.Y.
TOTAL CLASS A CONCRETE					27.5 C.Y.
DRILLED PIERS:					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)					33.7 C.Y.

PROJECT NO. **BP14-R038**
POLK COUNTY
STATION: **13+52.50 -L1-**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-23
2			4			TOTAL SHEETS 32

STD. NO. DP_BT_30_60S_>50'



NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

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

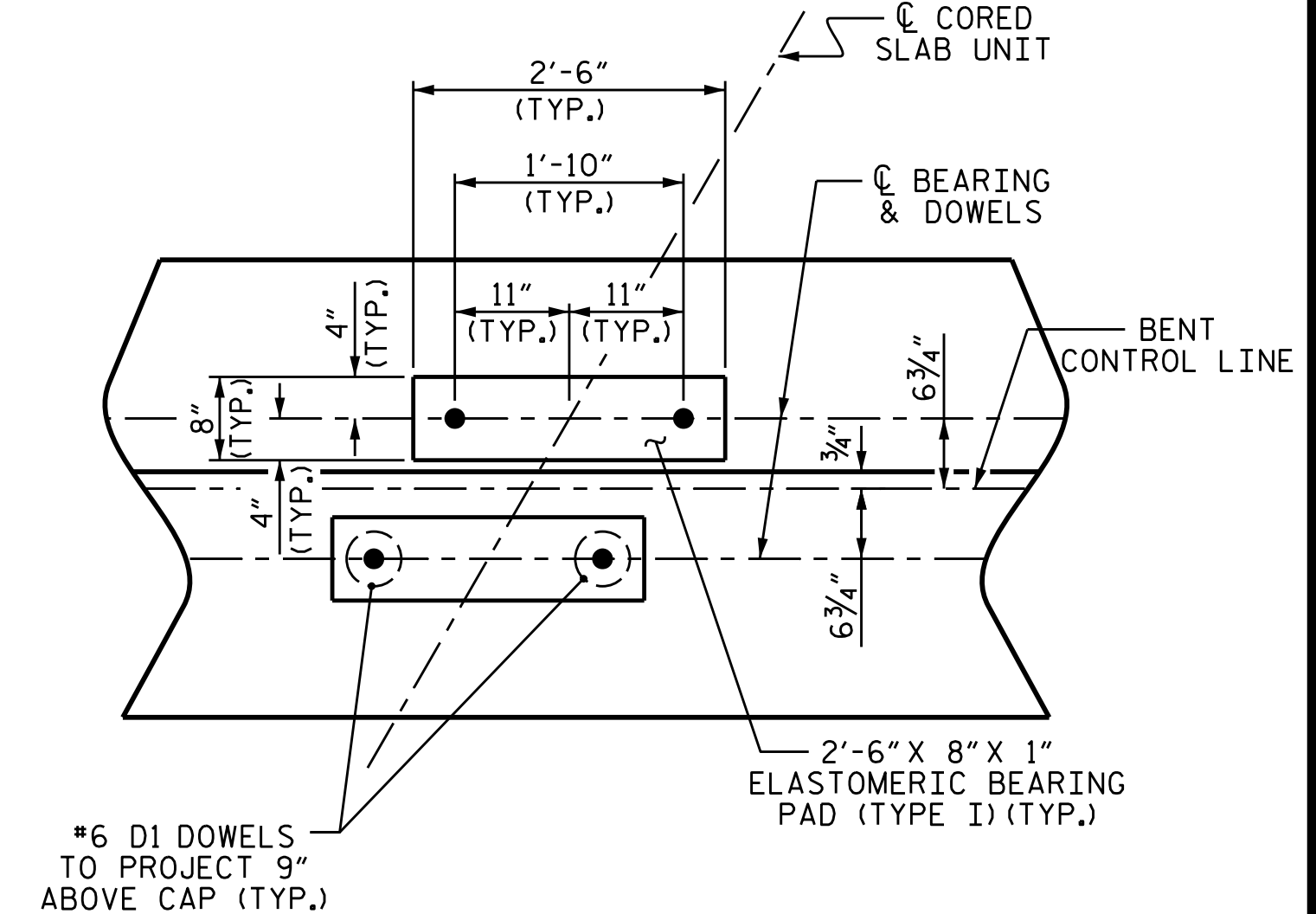
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

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

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

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

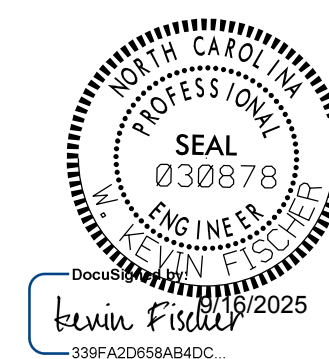


PROJECT NO. **BP14-R038**

POLK COUNTY

STATION: **13+52.50 -L1-**

SHEET 1 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

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SIGNATURES COMPLETED

SHEET NO.
S-24
TOTAL
SHEETS
32

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DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

PLAN OF DRILLED PIERS & COLUMNS

CONSTRUCTION JOINT DETAIL

END OF CAP VIEW

END ELEVATION

ALL BAR DIMENSIONS ARE OUT TO OUT

SECTION THRU CAP

REINFORCING STEEL 13297 LBS.

SPIRAL COLUMN
REINFORCING STEEL 2708 LBS.

CLASS A CONCRETE BREAKDOWN

DRILLED PIERS:

PROJECT NO. **BP14-R038**

POLK

COUNTY

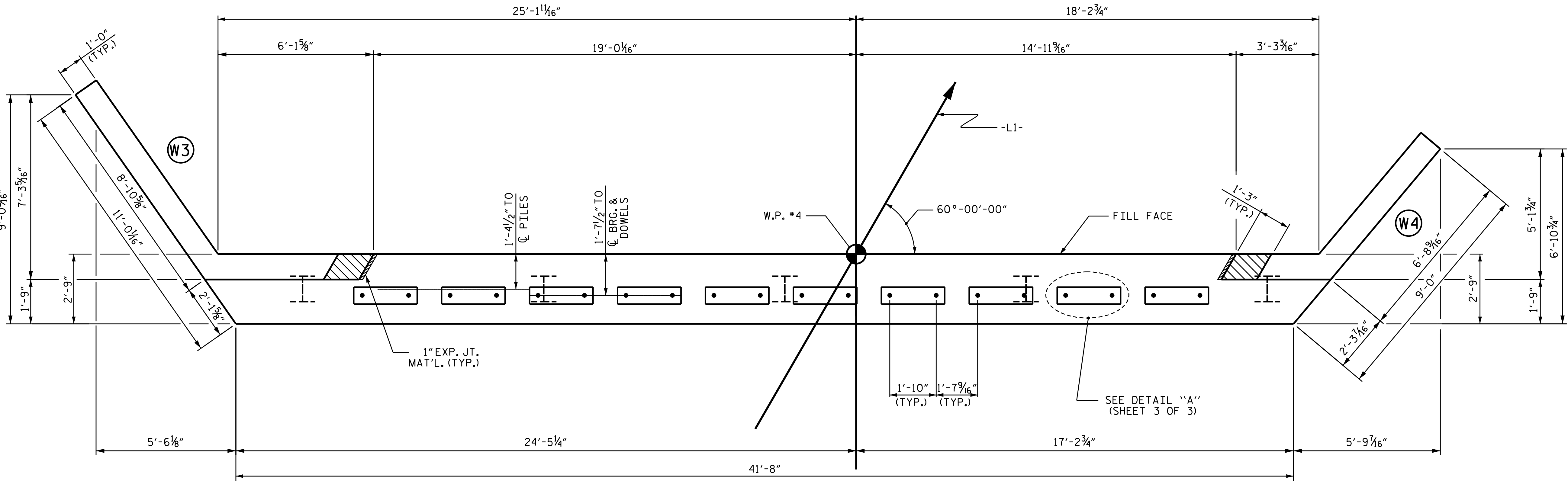
STATION: 13+52.50 -L1-

SHEET 2 OF 2

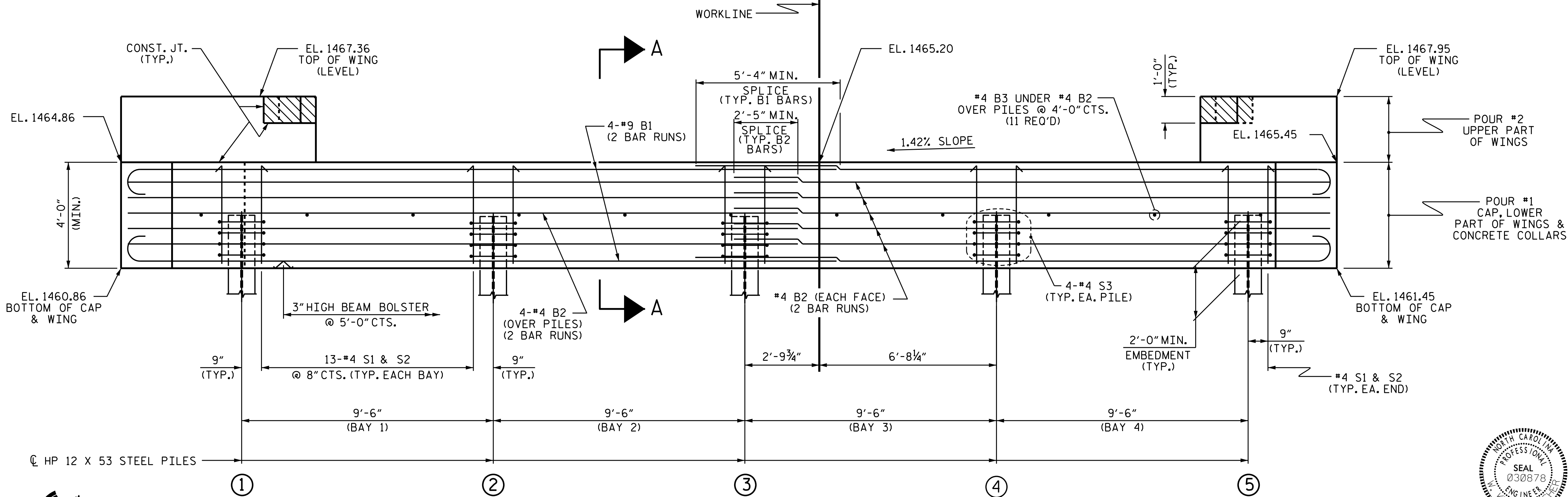
SUBSTRUCTURE

BENT 2

STD. NO. DP_BT_30_60S_>50'



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 3 OF 3.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WING DETAILS, SEE SHEET 2 OF 3.

TOP OF PILE ELEVATIONS

①	1462.89
②	1463.03
③	1463.16
④	1463.30
⑤	1463.43

PROJECT NO. **BP14-R038**

POLK COUNTY

STATION: **13+52.50 -L1-**

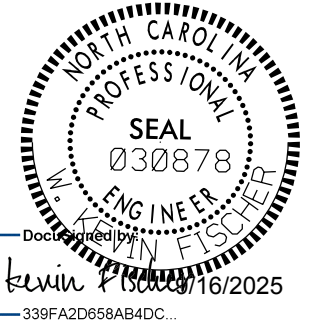
SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

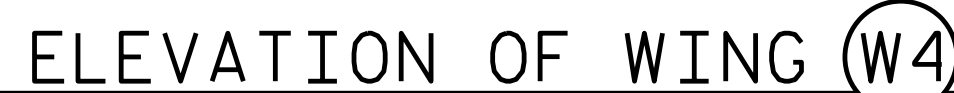
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1			3		S-26
2			4		TOTAL SHEETS 32

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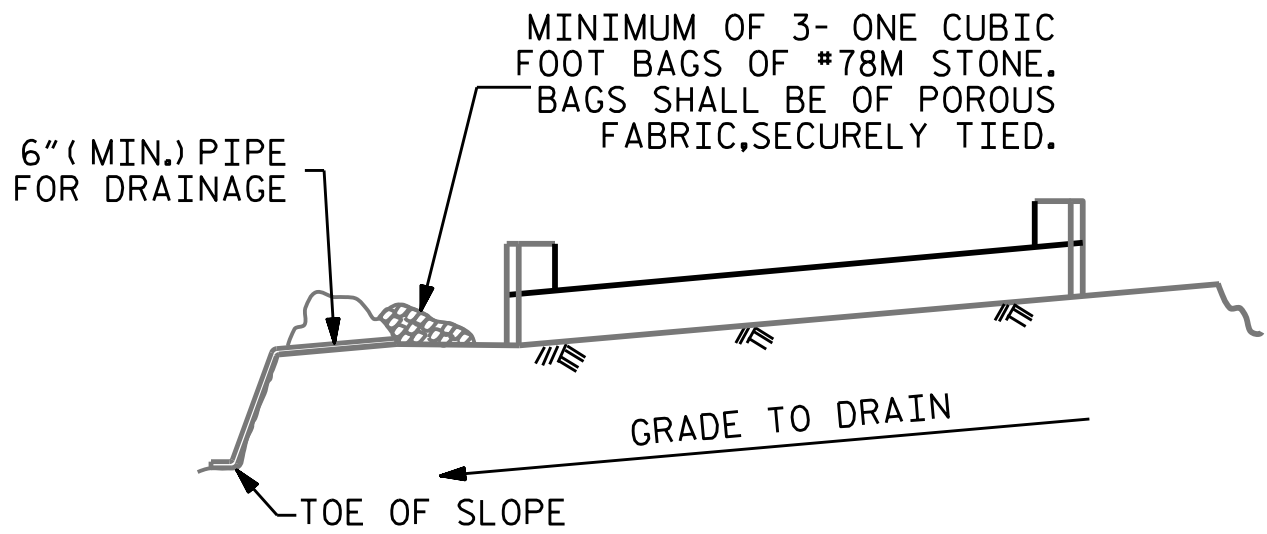
SHEET 2 OF 3

SUBSTRUCTURE
END BENT 2
WING DETAILS

REVISIONS						SHEET NO. S-27
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 32
2			4			

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED



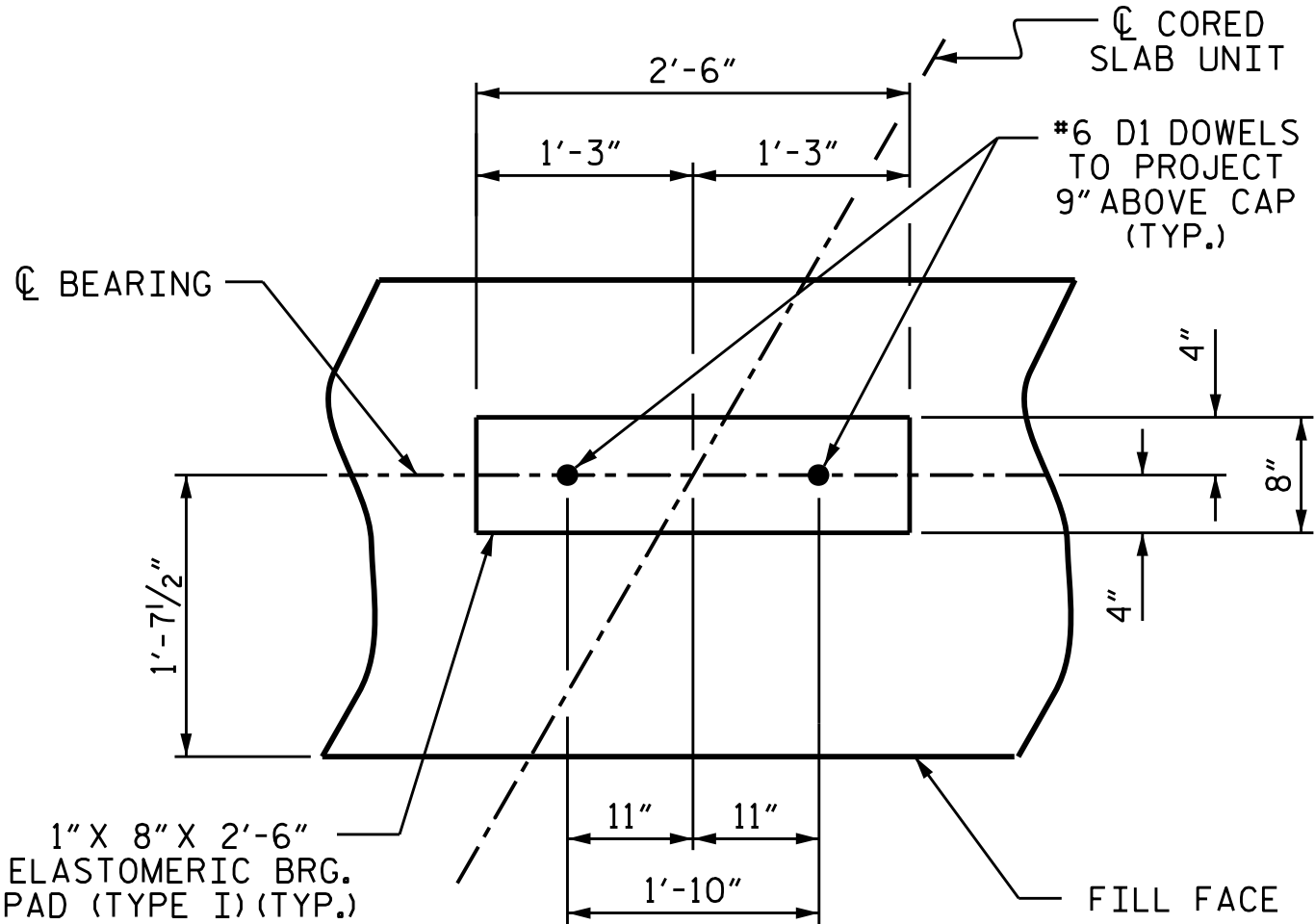


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

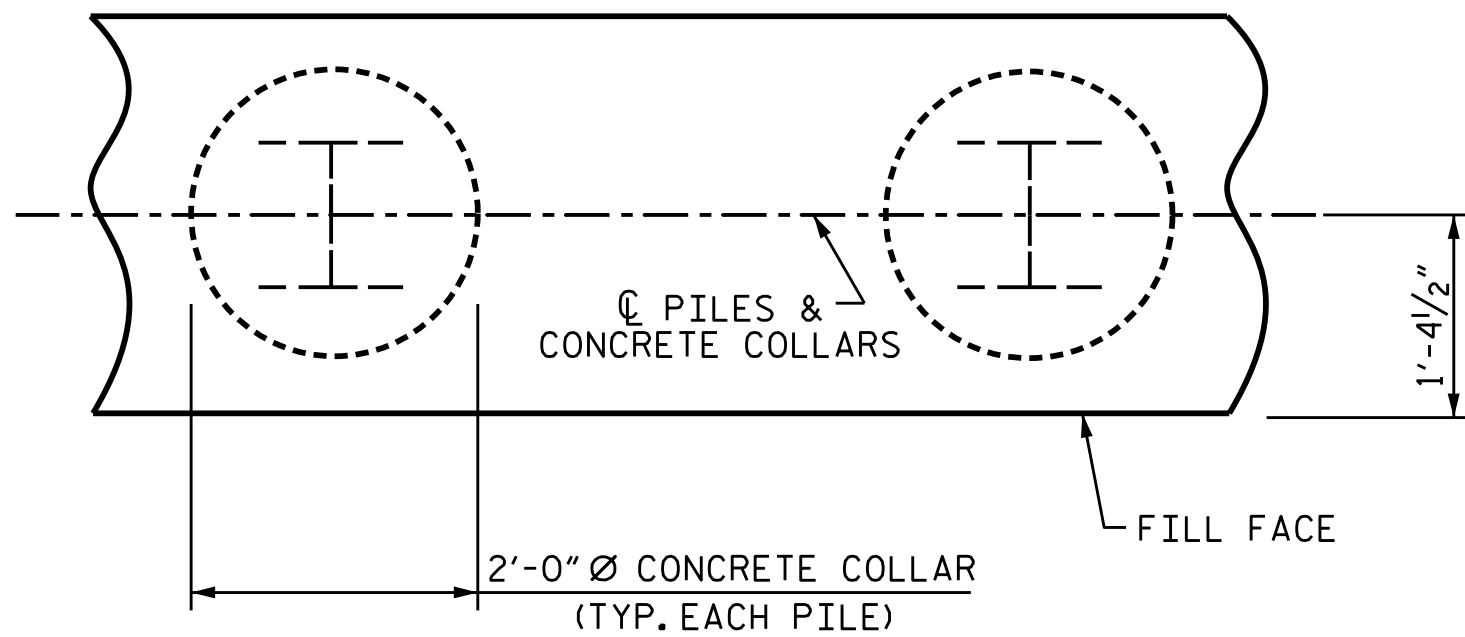
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NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

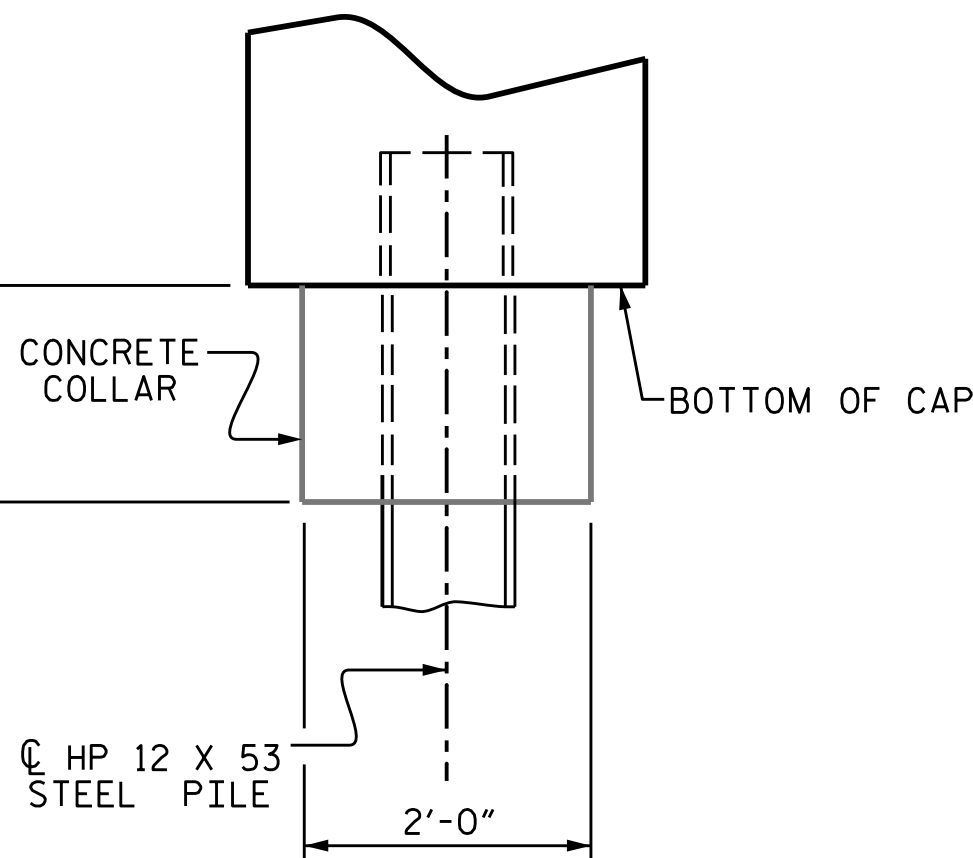
TEMPORARY DRAINAGE AT END BENT



DETAIL "A"



PLAN



ELEVATION

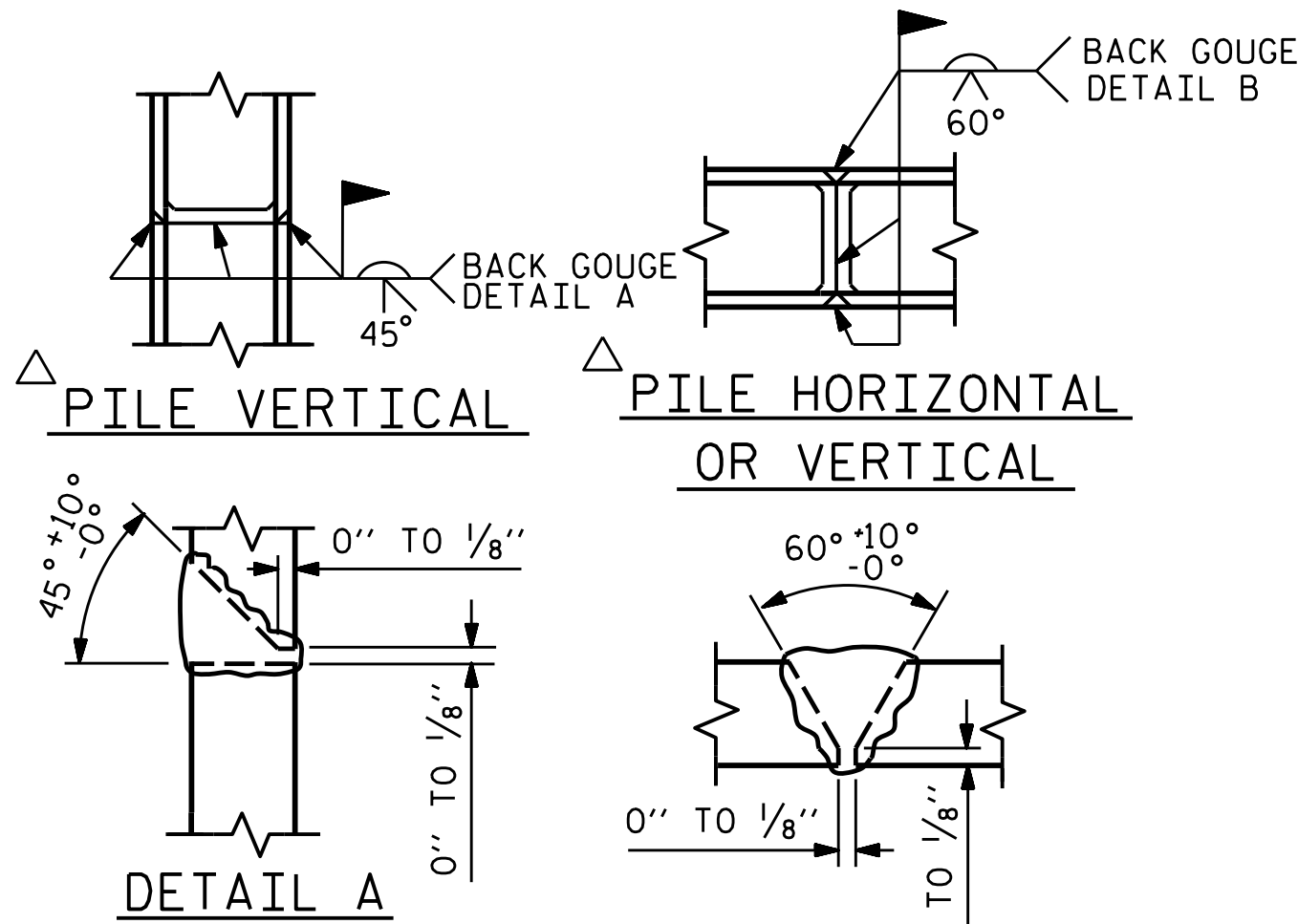
CORROSION PROTECTION FOR STEEL PILES DETAIL



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940 Main Campus Drive, Suite 500
Raleigh, NC 27606

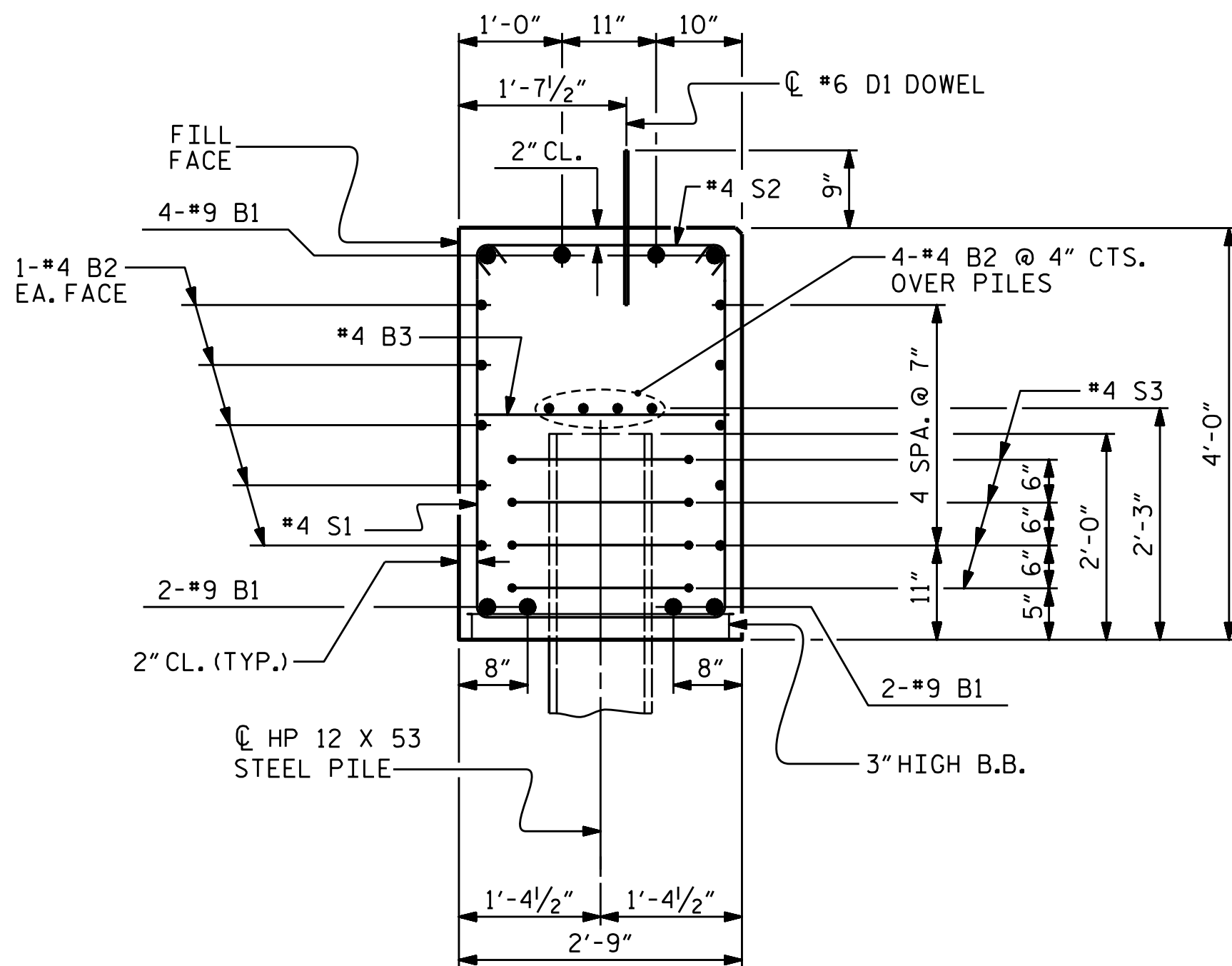
DRAWN BY : C.P. MALAGON	DATE : 08/2025
CHECKED BY : E.C. PHELPS	DATE : 08/2025
DESIGN ENGINEER OF RECORD: W.K. FISCHER	DATE : 09/2025

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POSITION OF PILE DURING WELDING.

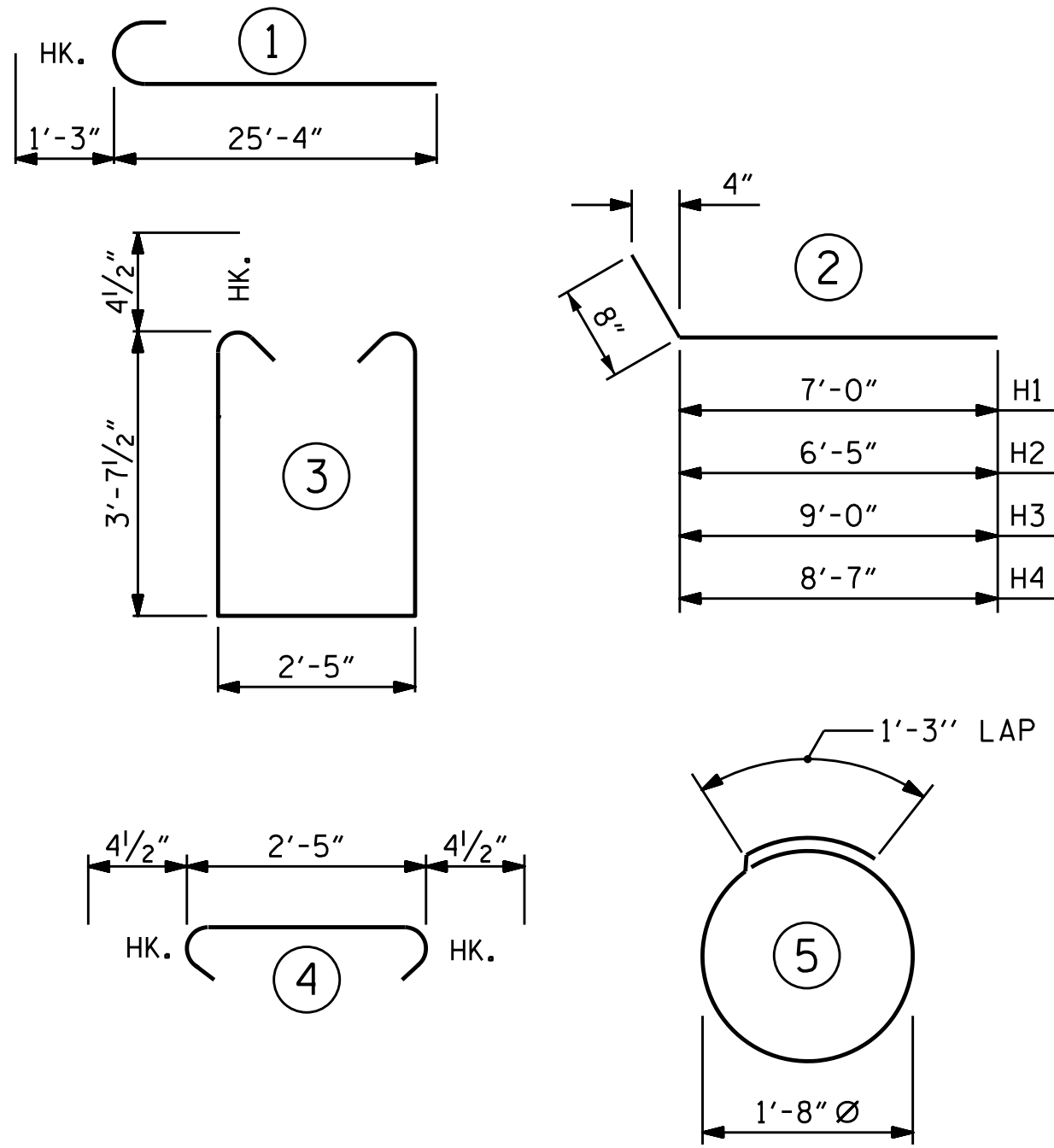
PILE SPLICE DETAILS



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9		26'-7"	1446
B2	28	#4	STR	23'-11"	447
B3	11	#4	STR	2'-5"	18
D1	20	#6	STR	1'-6"	45
H1	10	#4	2	7'-8"	51
H2	10	#4	2	7'-1"	47
H3	10	#4	2	9'-8"	65
H4	10	#4	2	9'-3"	62
K1	8	#4	STR	3'-10"	20
K2	4	#4	STR	6'-8"	18
K3	4	#4	STR	5'-10"	16

S1	54	#4	4	10'-5"	376
S2	54	#4	5	3'-2"	114
S3	20	#4	6	6'-6"	87

V1	56	#4	STR	6'-2"	231
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REINFORCING STEEL (FOR ONE END BENT) 3043 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 20.8 C.Y.

POUR #2 UPPER PART OF WINGS 2.4 C.Y.

TOTAL CLASS A CONCRETE 23.2 C.Y.

PROJECT NO. **BP14-R038**

POLK

COUNTY

STATION: **13+52.50 -L1-**

SHEET 3 OF 3

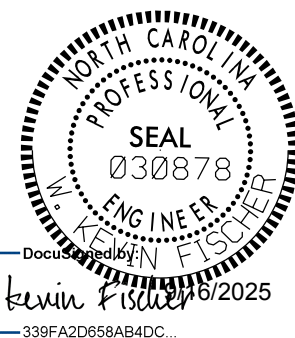
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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

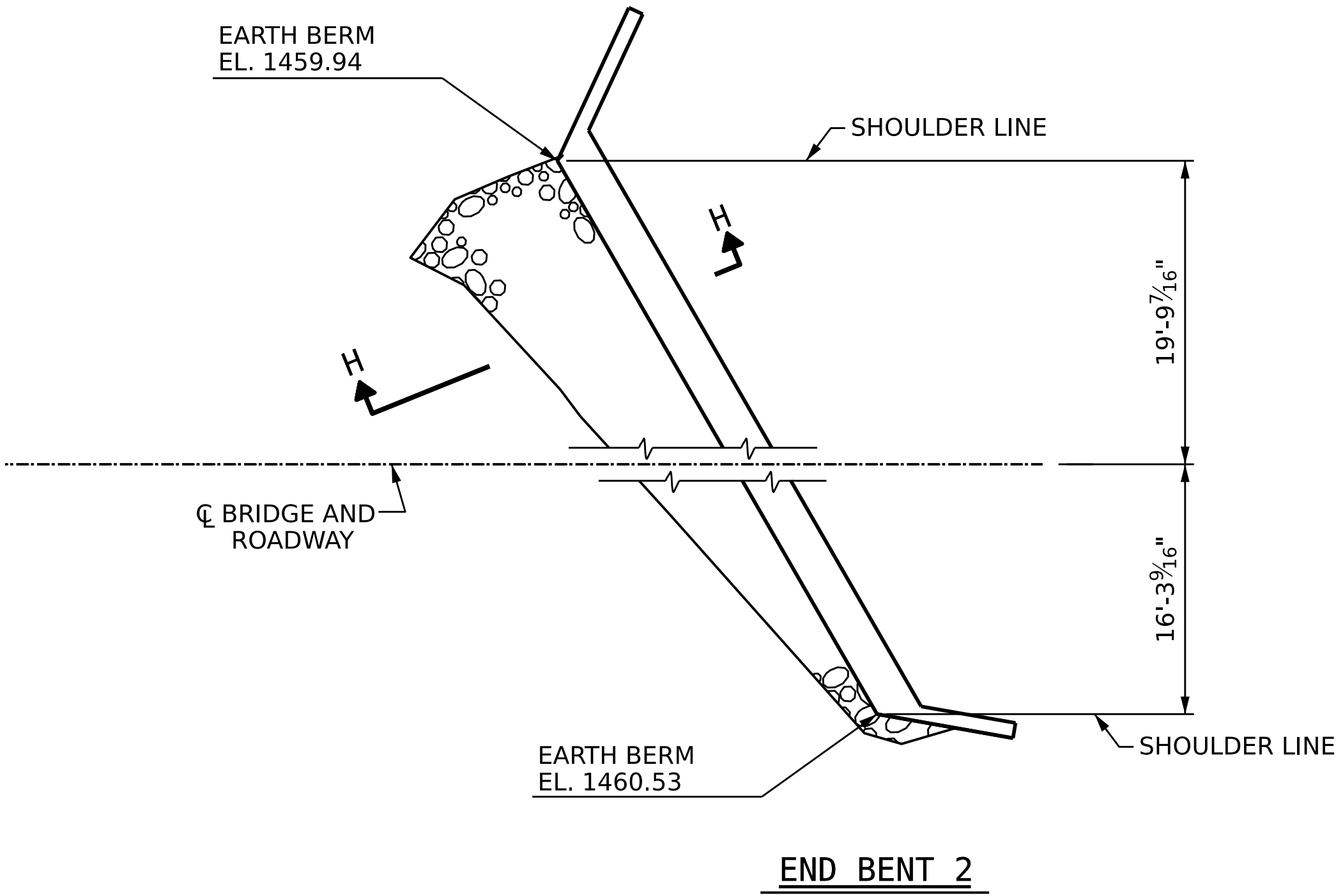
END BENT 2
DETAILS

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

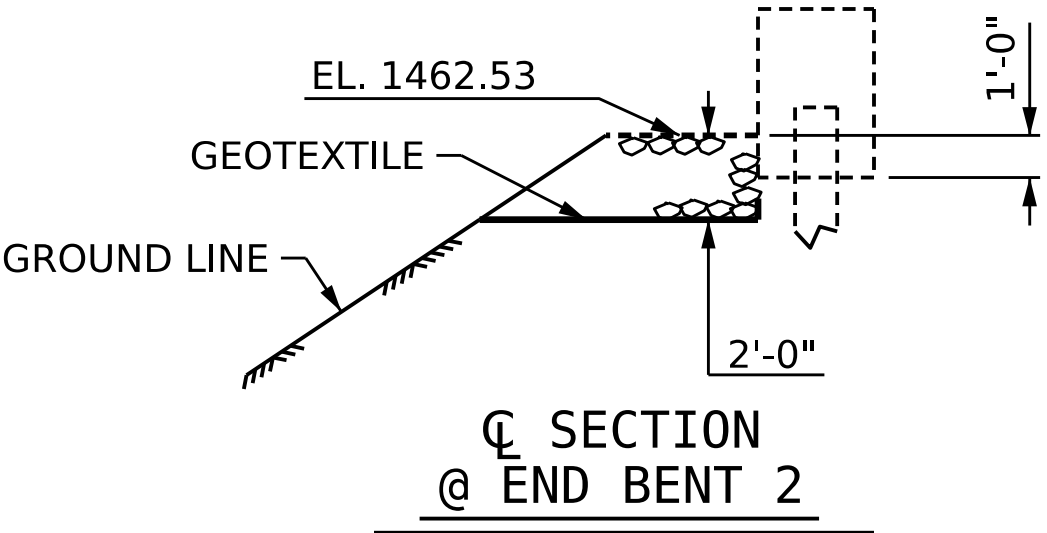
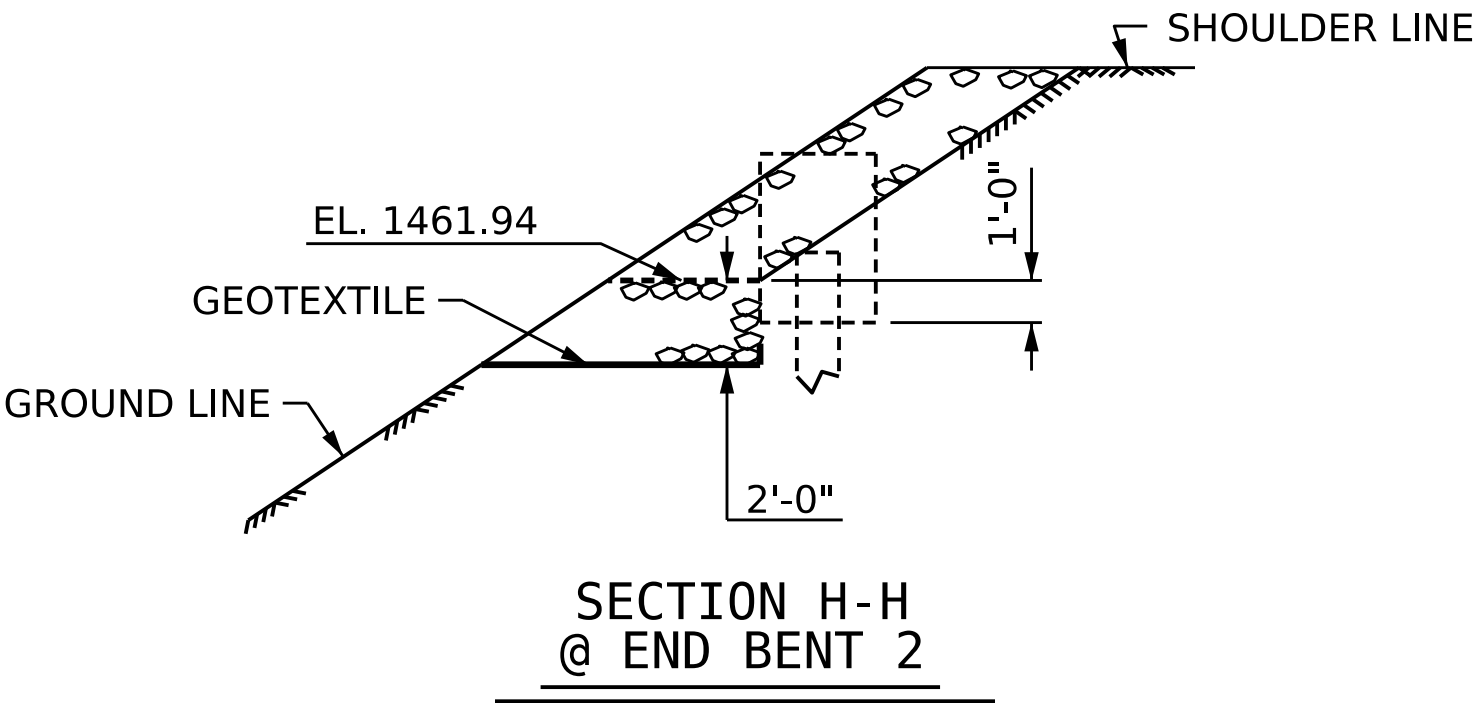
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NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+52.50 -L1-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 2	35	40



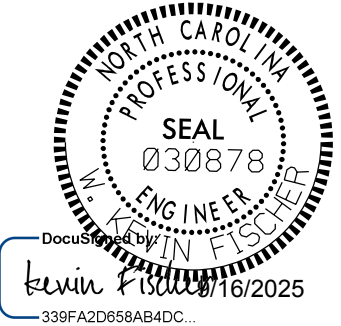
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POLK COUNTY
STATION: **13+52.50 -L1-**

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RIP RAP DETAILS

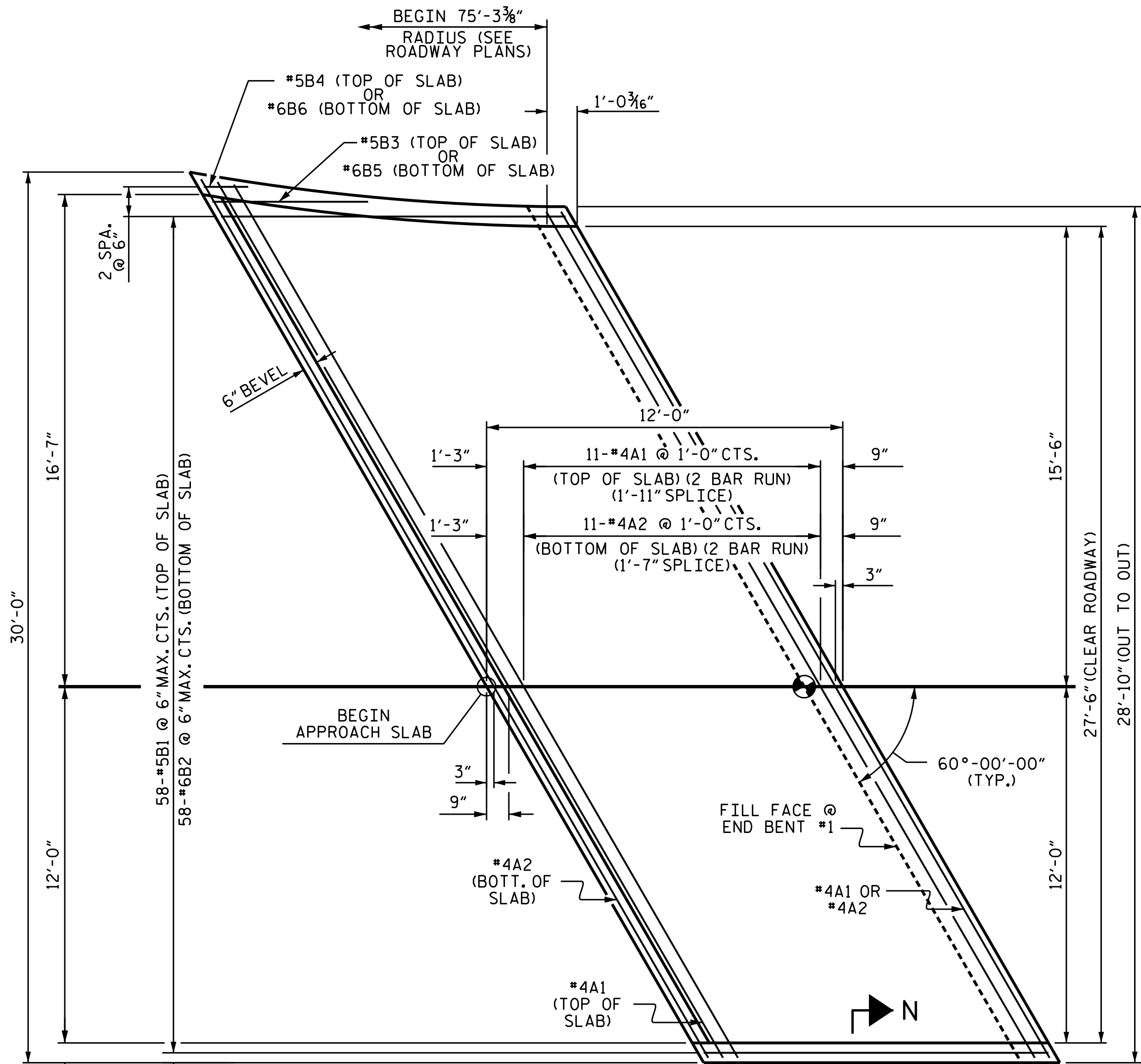
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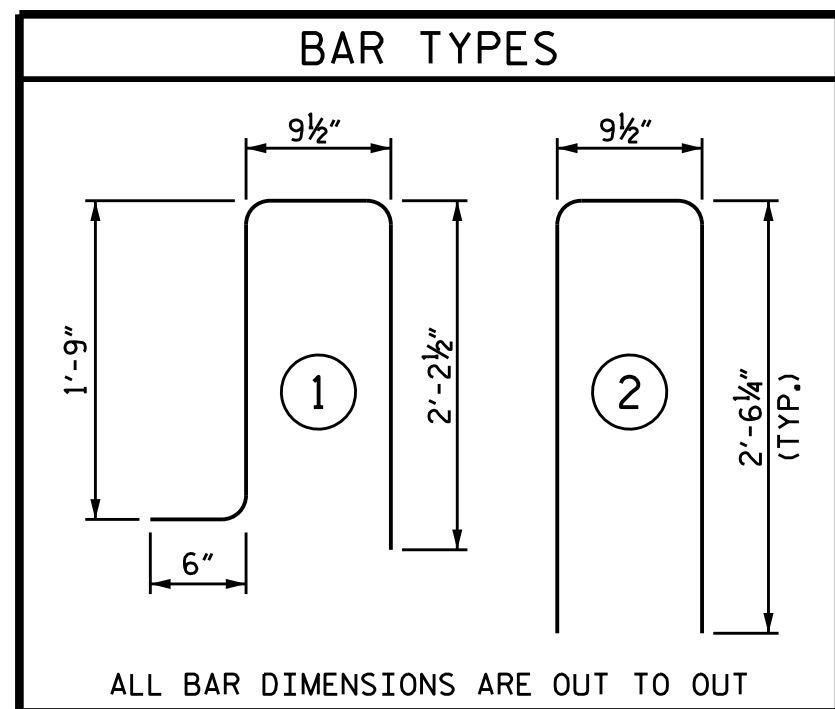


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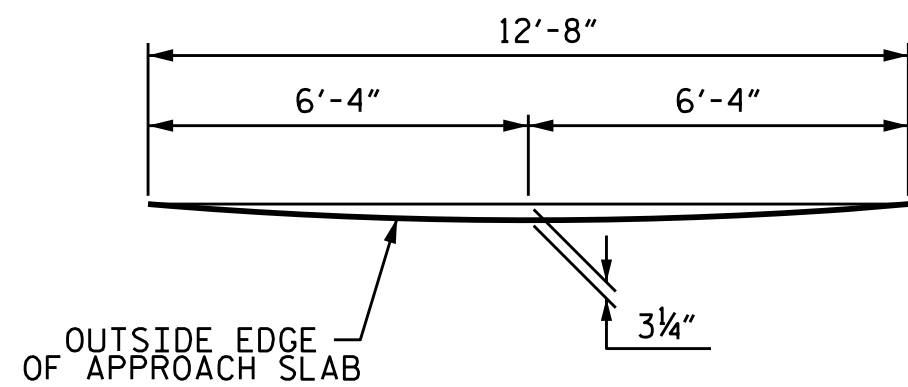
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PLAN @ END BENT #1

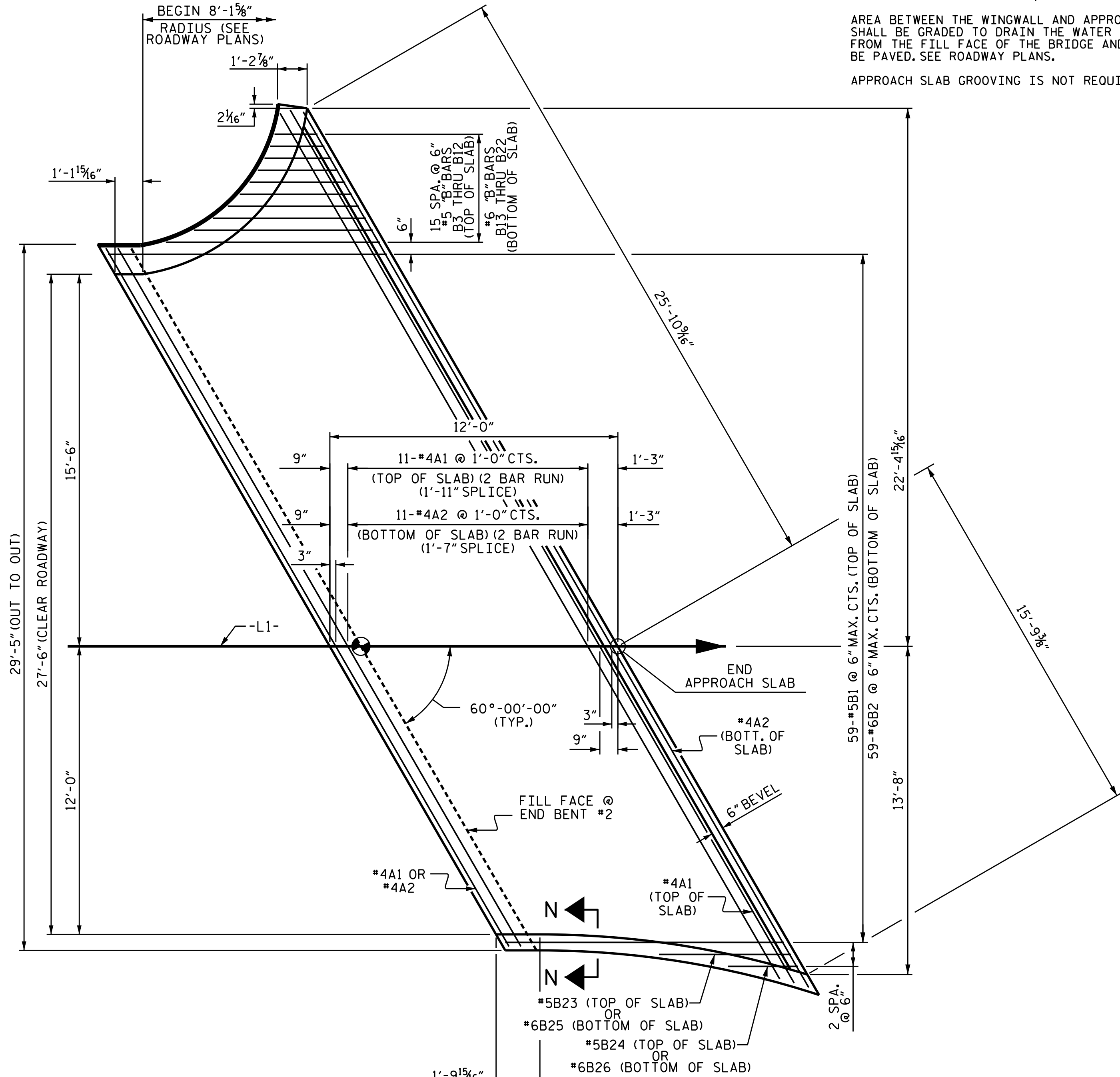


SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

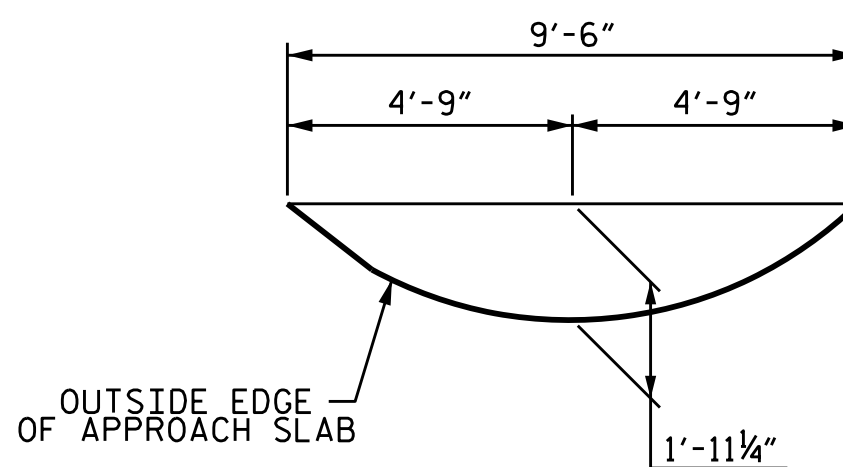


LEFT SIDE

ARC OFFSETS @ END BENT #1

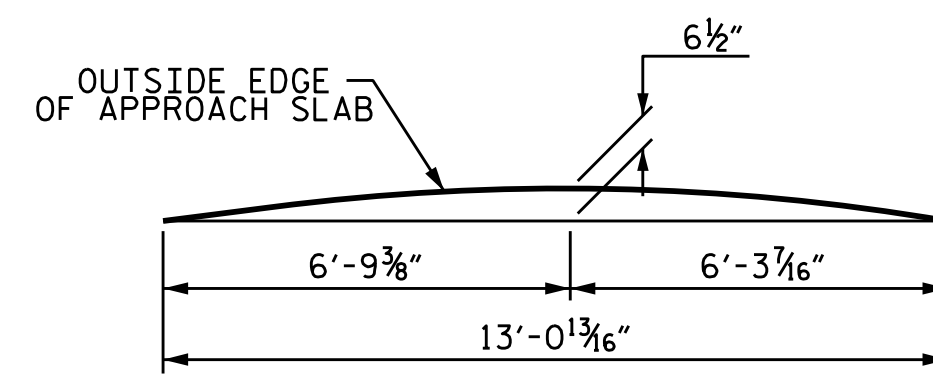


PLAN @ END BENT #2



LEFT SIDE

ARC OFFSETS @ END BENT #2



RIGHT SIDE

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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.

APPROACH SLAB GROOVING IS NOT REQUIRED.

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	*4	STR	18'-1"	314
A2	26	*4	STR	17'-11"	311
* B1	58	*5	STR	11'-1"	670
B2	58	*6	STR	11'-7"	1009
* B3	1	*5	STR	4'-9"	5
* B4	1	*5	STR	1'-6"	2
B5	1	*6	STR	5'-3"	8
B6	1	*6	STR	1'-6"	2

REINFORCING STEEL	LBS.	1330
* EPOXY COATED REINFORCING STEEL	LBS.	991

CLASS AA CONCRETE	C. Y.	17.5
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APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	*4	STR	22'-1"	384
A2	26	*4	STR	21'-11"	381
* B1	59	*5	STR	11'-1"	682
B2	59	*6	STR	11'-7"	1026
* B3	1	*5	STR	8'-5"	9
* B4	1	*5	STR	7'-2"	7
* B5	1	*5	STR	6'-0"	6
* B6	1	*5	STR	5'-1"	5
* B7	1	*5	STR	4'-4"	5
* B8	1	*5	STR	3'-8"	4
* B9	1	*5	STR	3'-1"	3
* B10	1	*5	STR	2'-7"	3
* B11	1	*5	STR	2'-1"	2
* B12	1	*5	STR	1'-8"	2
B13	1	*6	STR	8'-11"	13
B14	1	*6	STR	7'-8"	12
B15	1	*6	STR	6'-6"	10
B16	1	*6	STR	5'-7"	8
B17	1	*6	STR	4'-10"	7
B18	1	*6	STR	4'-2"	6
B19	1	*6	STR	3'-7"	5
B20	1	*6	STR	3'-1"	5
B21	1	*6	STR	2'-7"	4
B22	1	*6	STR	2'-2"	3
* B23	1	*5	STR	5'-0"	5
* B24	1	*5	STR	2'-5"	3
B25	1	*6	STR	5'-6"	8
B26	1	*6	STR	2'-11"	4
* B27	1	*5	STR	11'-0"	11
* B28	1	*5	STR	10'-5"	11

REINFORCING STEEL	LBS.	1492
* EPOXY COATED REINFORCING STEEL	LBS.	1315

CLASS AA CONCRETE	C. Y.	20.3
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PROJECT NO. **BP14-R038**

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STATION: **13+52.50 -L1-**

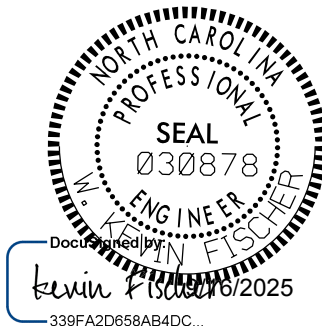
SHEET 1 OF 3

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BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
(SUB-REGIONAL TIER)
60° SKEW

REVISIONS					SHEET NO.
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1			3		S-30
2			4		TOTAL SHEETS 32

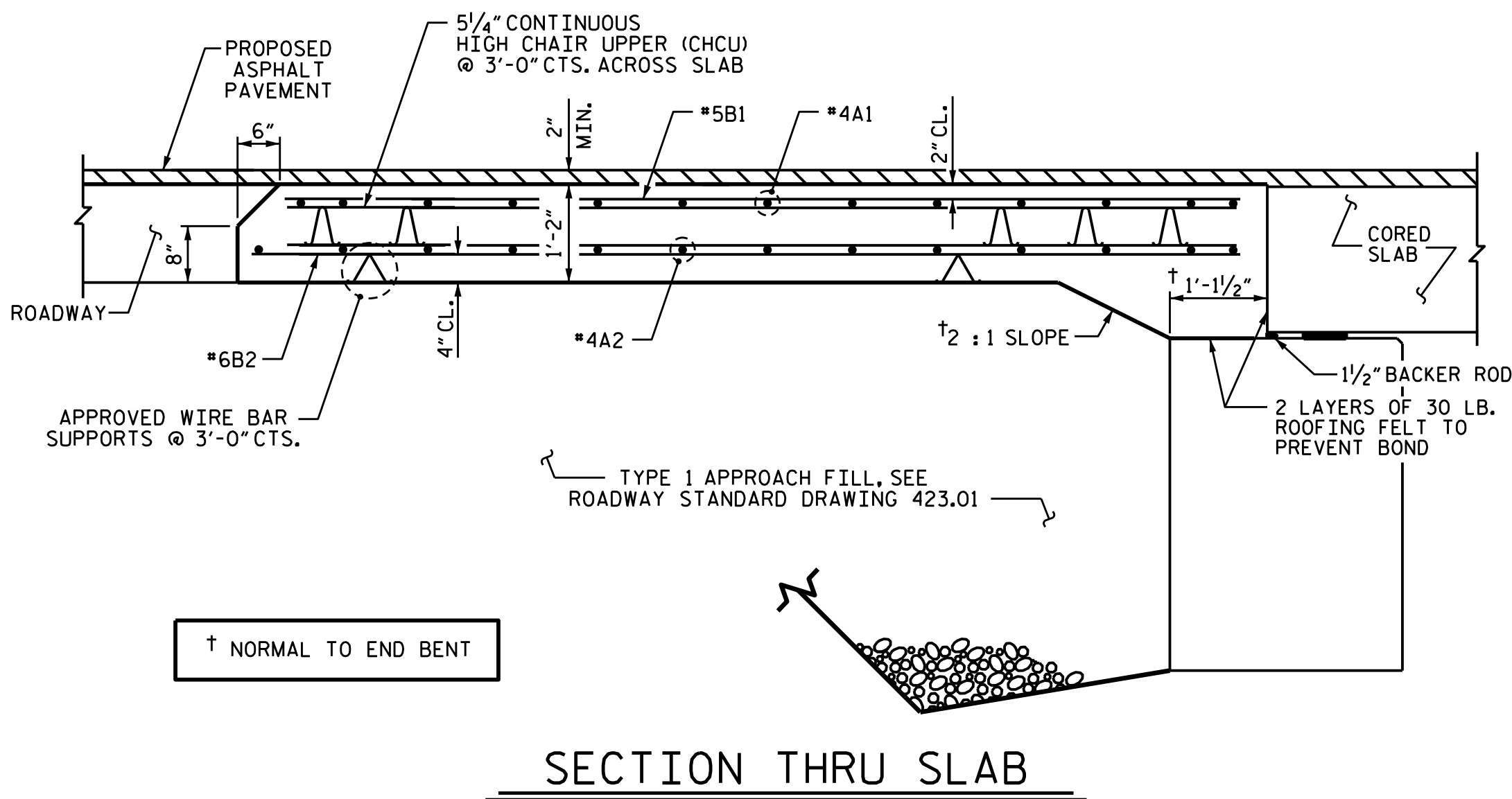
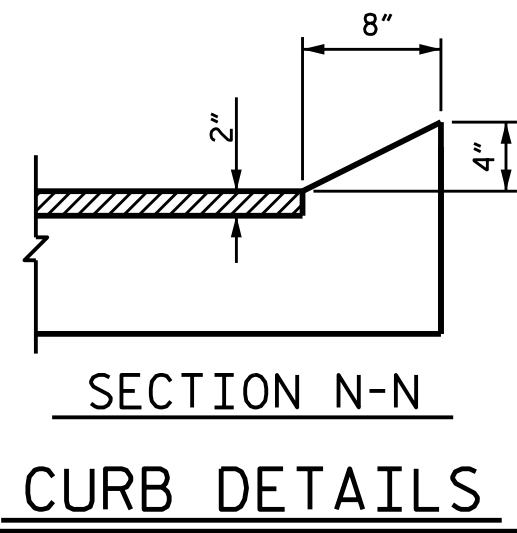
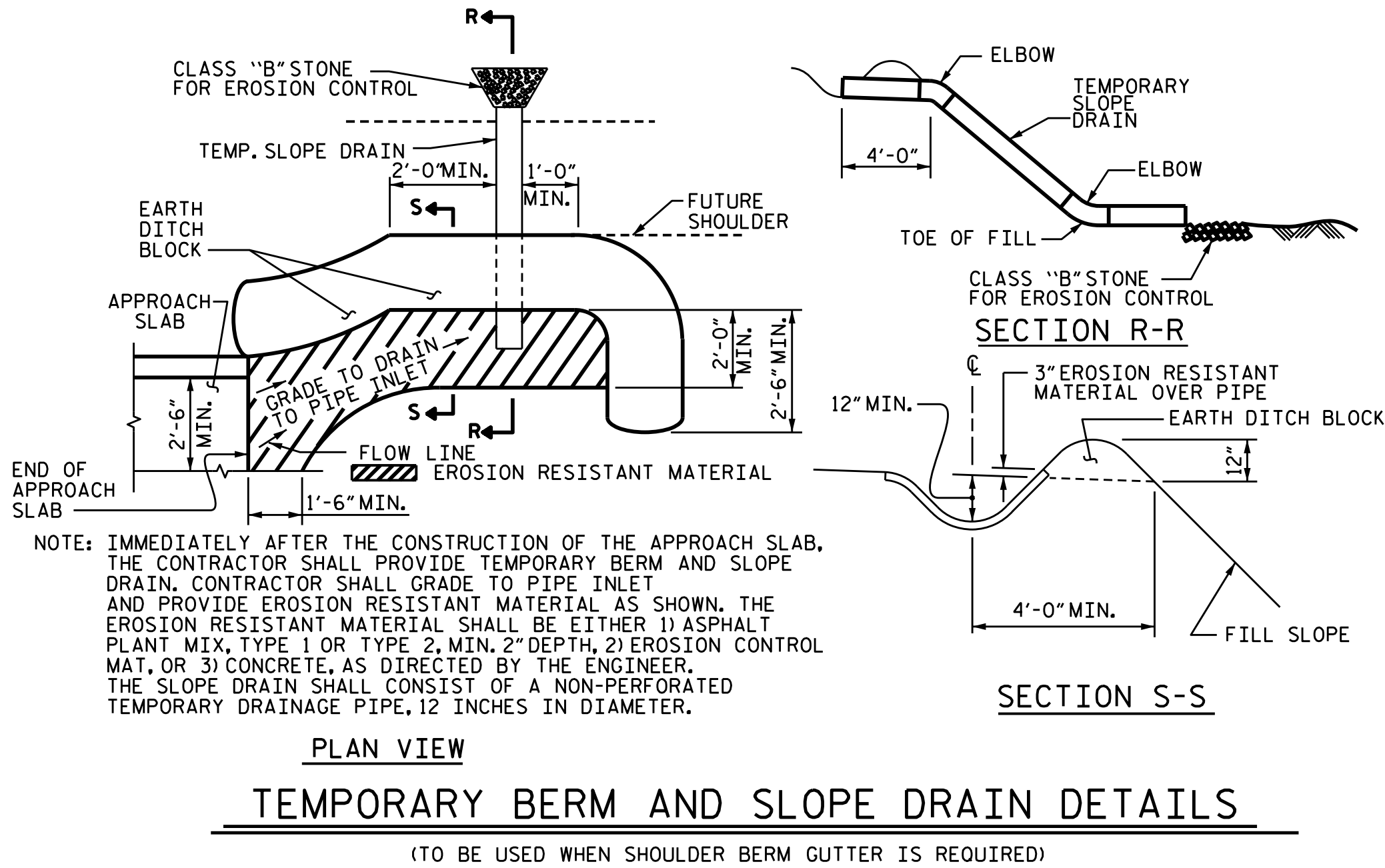
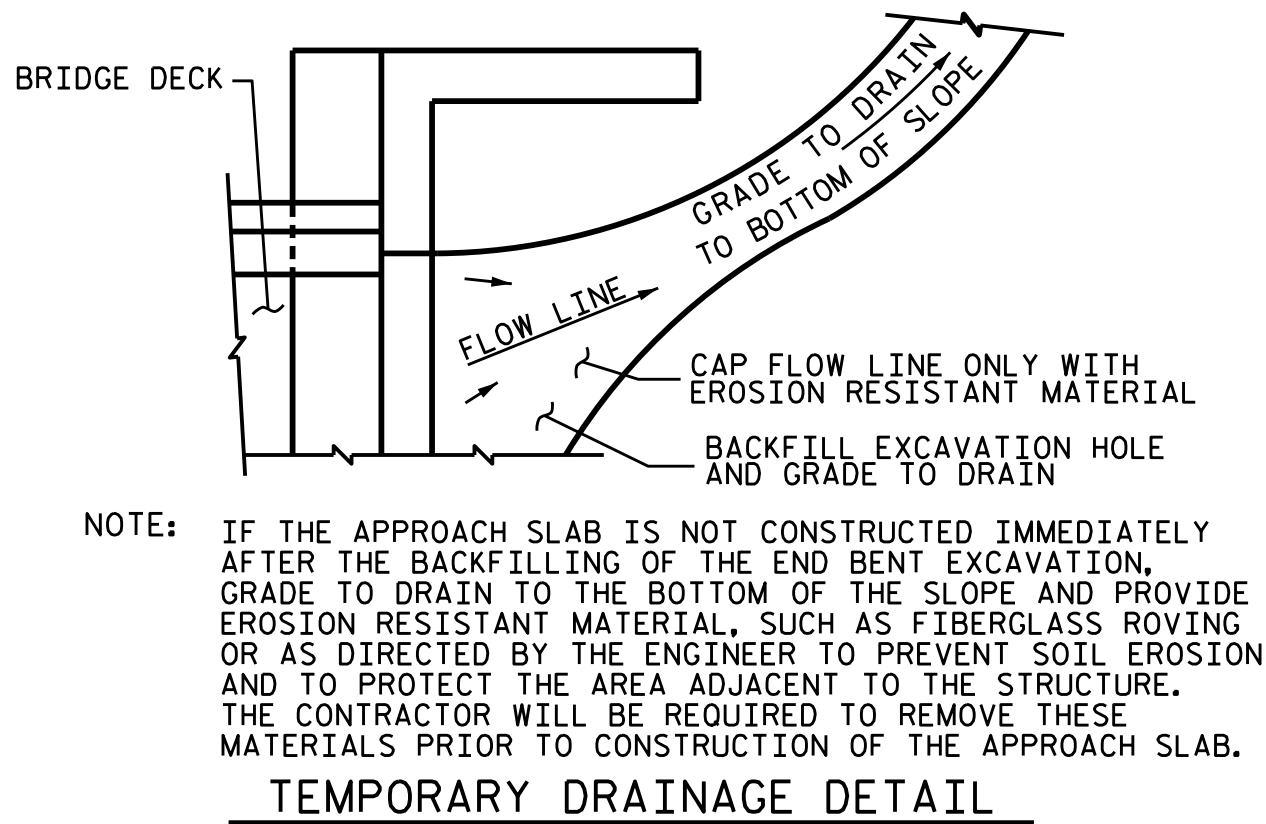
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PROJECT NO. **BP14-R038**

POLK COUNTY

STATION: **13+52.50 -L1-**

SHEET 2 OF 3

STATE OF NORTH CAROLINA
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RALEIGH

**BRIDGE APPROACH
SLAB DETAILS**

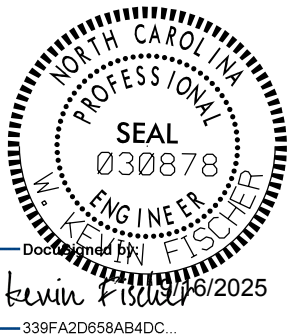
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2			4			TOTAL SHEETS
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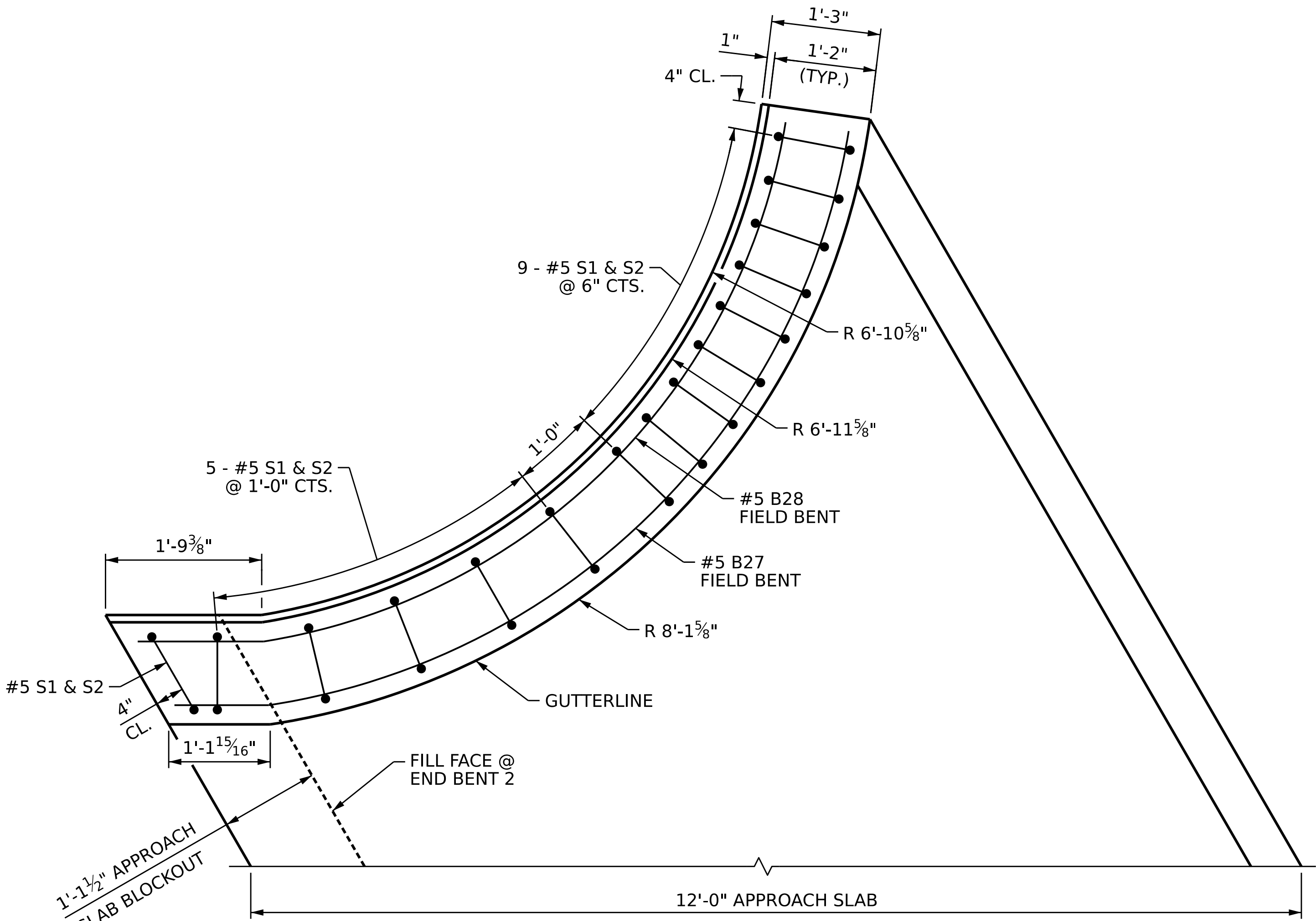
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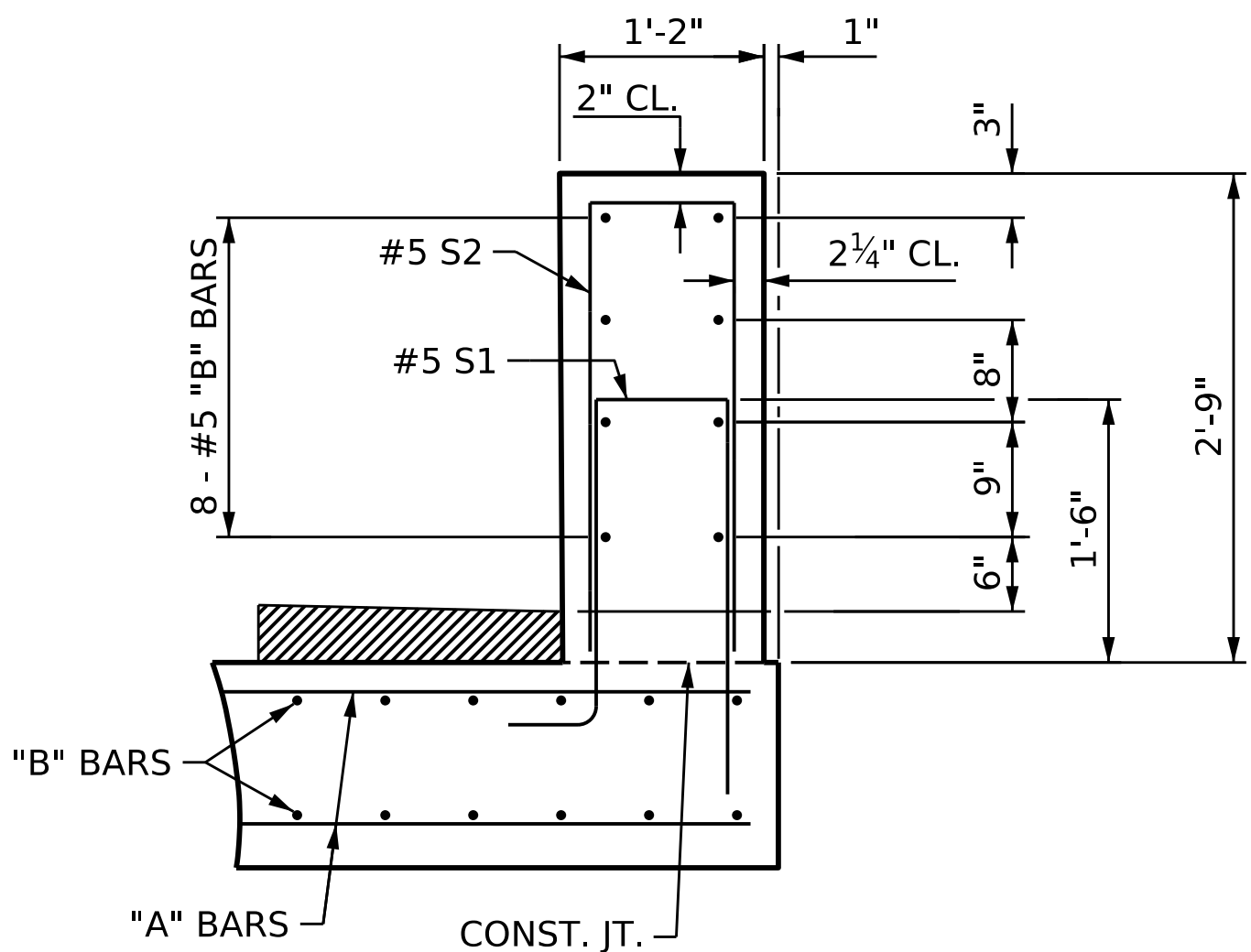
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PLAN @ END BENT 2



BARRIER SECTION

NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

#5 "S" BARS MAY BE SHIFTED AS NECESSARY TO CLEAR EXPANSION JOINTS IN RAIL.

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT THE BARRIER RAIL. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR BRIDGE APPROACH SLABS.

FOR GUARDRAIL ANCHORAGE DETAIL, SEE SHEET S-18.

PROJECT NO. **BP14-R038**

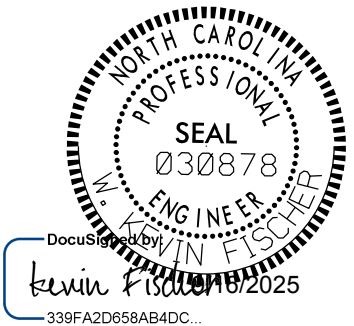
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STATION: **13+52.50 -L1-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA
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BRIDGE APPROACH SLAB DETAILS



REVISIONS						SHEET NO.
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1			3			S-32
2			4			TOTAL SHEETS 32

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STANDARD NOTES

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7⁄8" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7⁄8" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7⁄8" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - 7⁄8"Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1⁄16" OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.