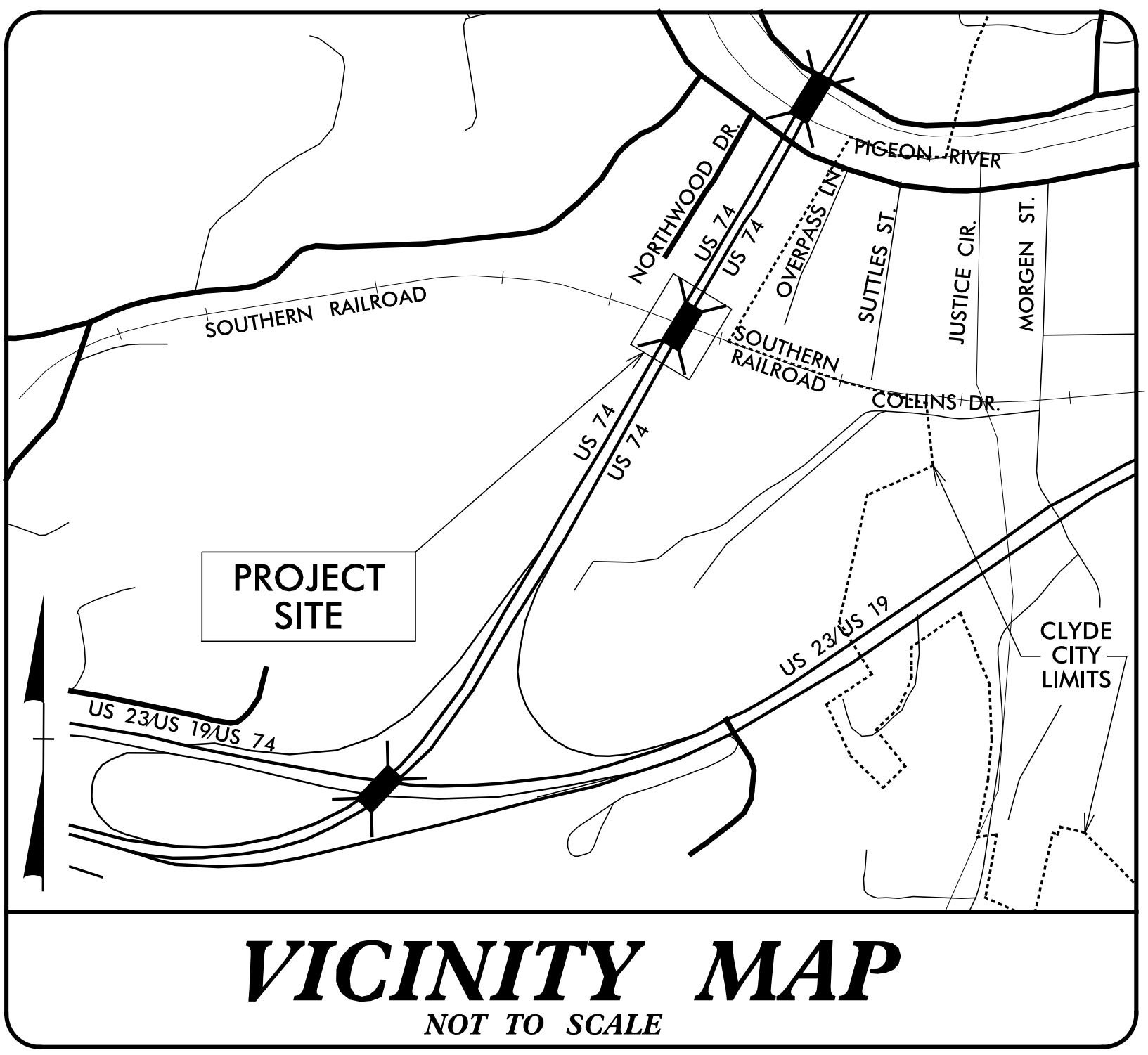


TIP PROJECT: B-5982

CONTRACT: C204925

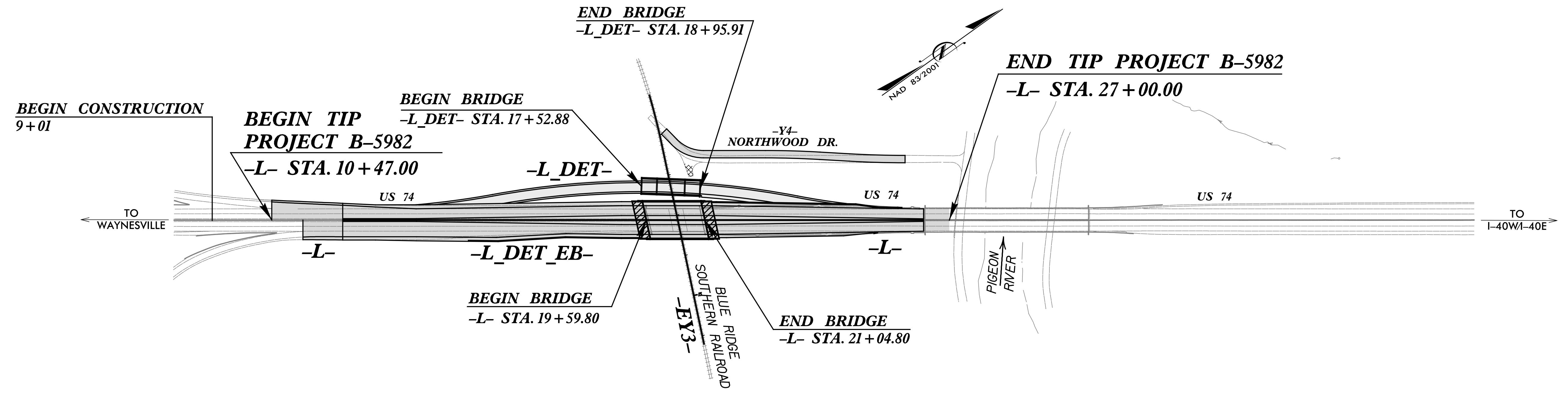
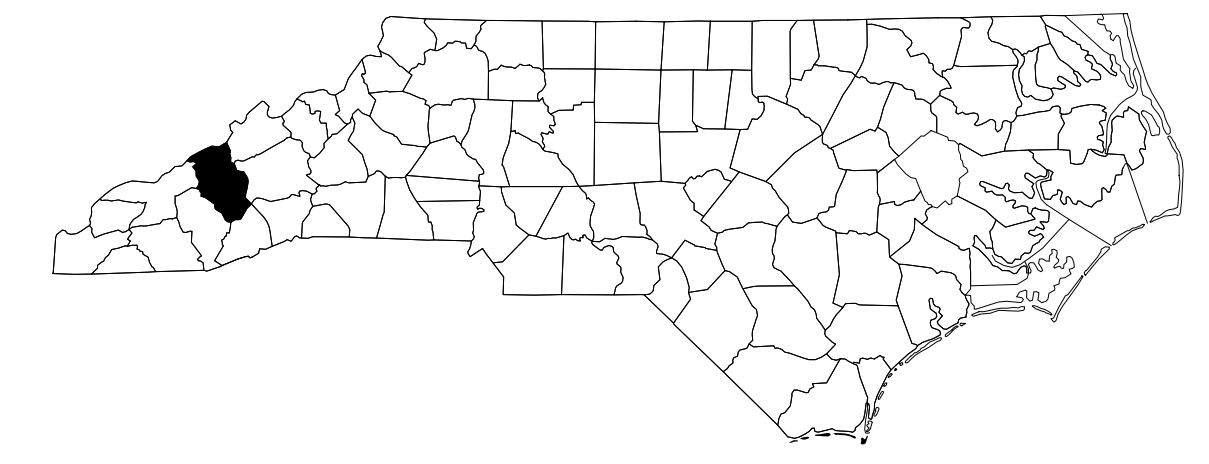
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
HAYWOOD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5982	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
47814.1.1		PE	
47814.2.1		RW, UTIL	
47814.3.1		CONST.	



LOCATION: TOWN OF CLYDE - REPLACE BRIDGE
430095 ON US 74 OVER BLUE RIDGE
SOUTHERN RAILROAD

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



STRUCTURES

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2022 =	34,000
ADT 2042 =	44,000
K =	8 %
D =	55 %
T =	9 % *
V =	65 MPH
* TTST =	5% DUAL 4%
FUNC CLASS =	FREWAY STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5982	=	0.286 MI.
LENGTH OF STRUCTURE TIP PROJECT B-5982	=	0.027 MI.
TOTAL LENGTH OF TIP PROJECT B-5982	=	0.313 MI.

Prepared for the North Carolina Department of Transportation
In the Office of:

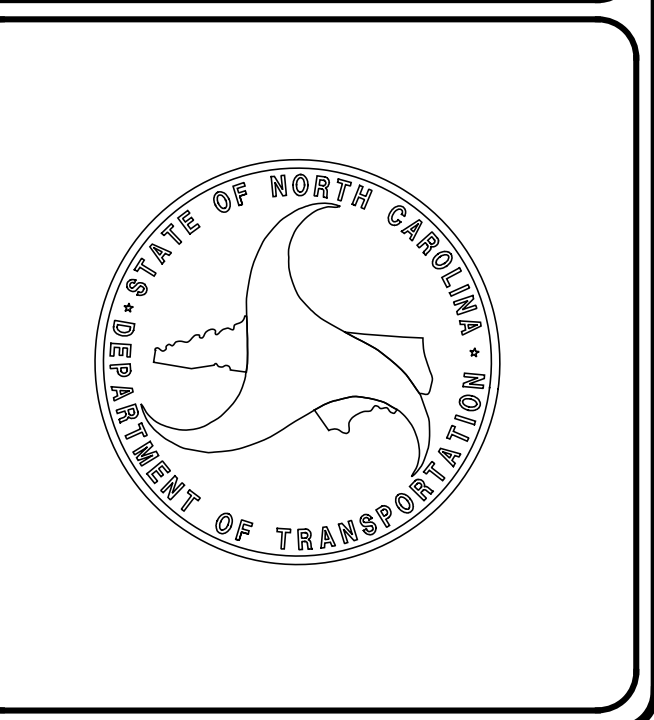
940 Main Campus Drive, Suite 500
Raleigh, NC 27605
NC License No. C-20705

2024 STANDARD SPECIFICATIONS

<p>LETTING DATE: AUGUST 20, 2024</p>	<p>KYLE F. SMIACH, PE PROJECT ENGINEER</p>
<p>NCDOT CONTACT</p>	<p>DAVID S. STUTTS, PE PROJECT ENGINEER-ROADWAY DESIGN</p>

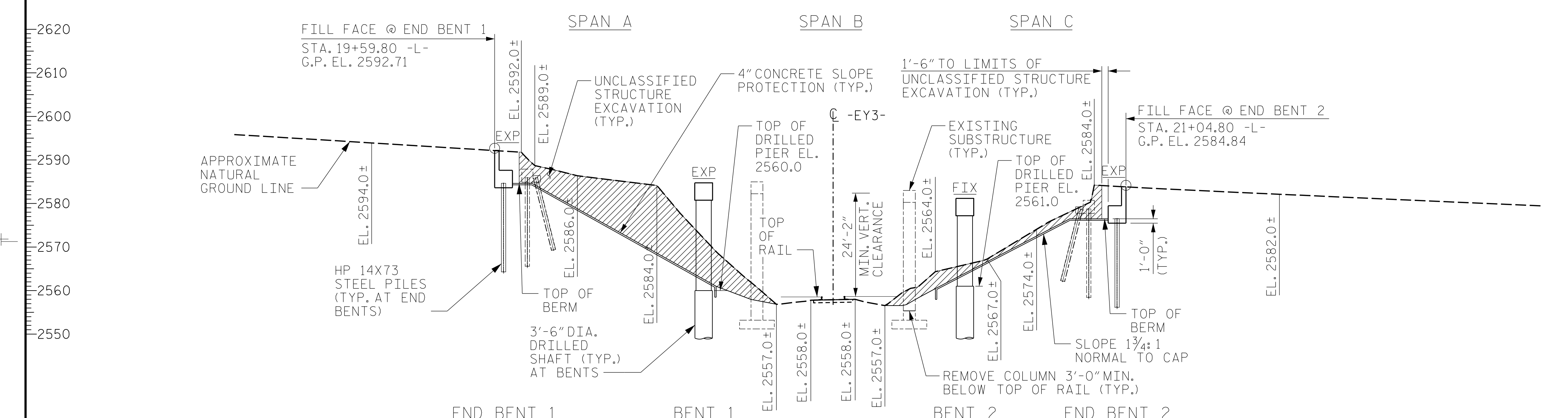
STRUCTURES ENGINEER

DocuSigned by:
Kyle Smiach
#E4A08988882415
SIGNATURE: _____ P.E.



8/26/21

19+00 19+50 20+00 20+50 21+00 21+50 22+00



GRADE DATA

PI = 22+66.77 -L-
EL = 2,574.45
VC = 610'

(-)5.9500% (-)1.4720%

-EY3-

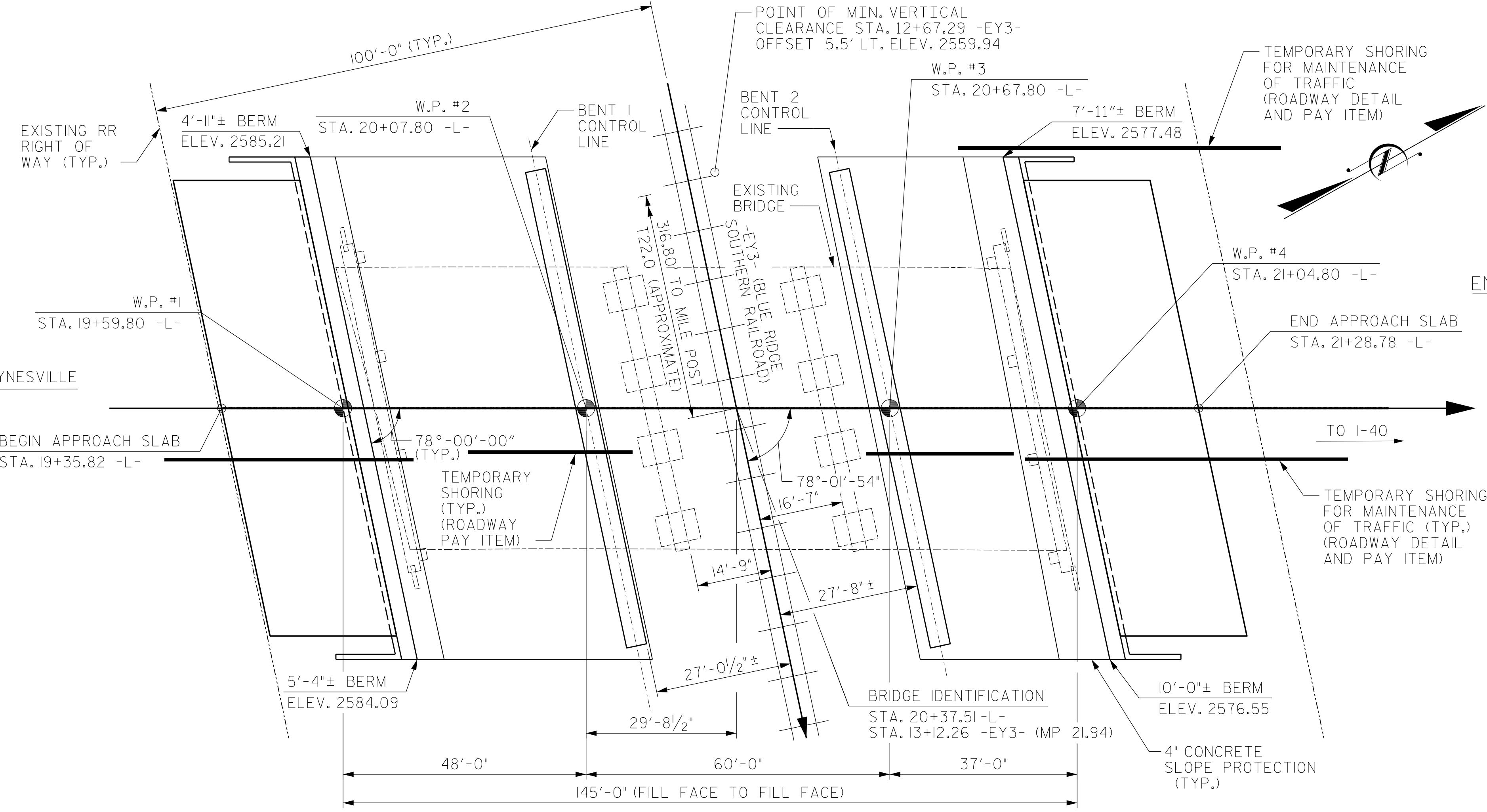
TOP OF RAIL ELEVATIONS
(LOOKING UPSTATION ALONG RAILROAD)

LEFT RAIL		RIGHT RAIL	
STATION	ELEVATION	STATION	ELEVATION
12+65.77	2559.98	12+63.44	2560.05
13+13.43	2558.62	13+11.10	2558.66
13+23.14	2558.34	13+20.81	2558.37
13+61.09	2557.14	13+58.76	2557.19

THE RAILROAD TRACK TOP RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE AS OF THE SURVEY PERFORMED DECEMBER 2021. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS.

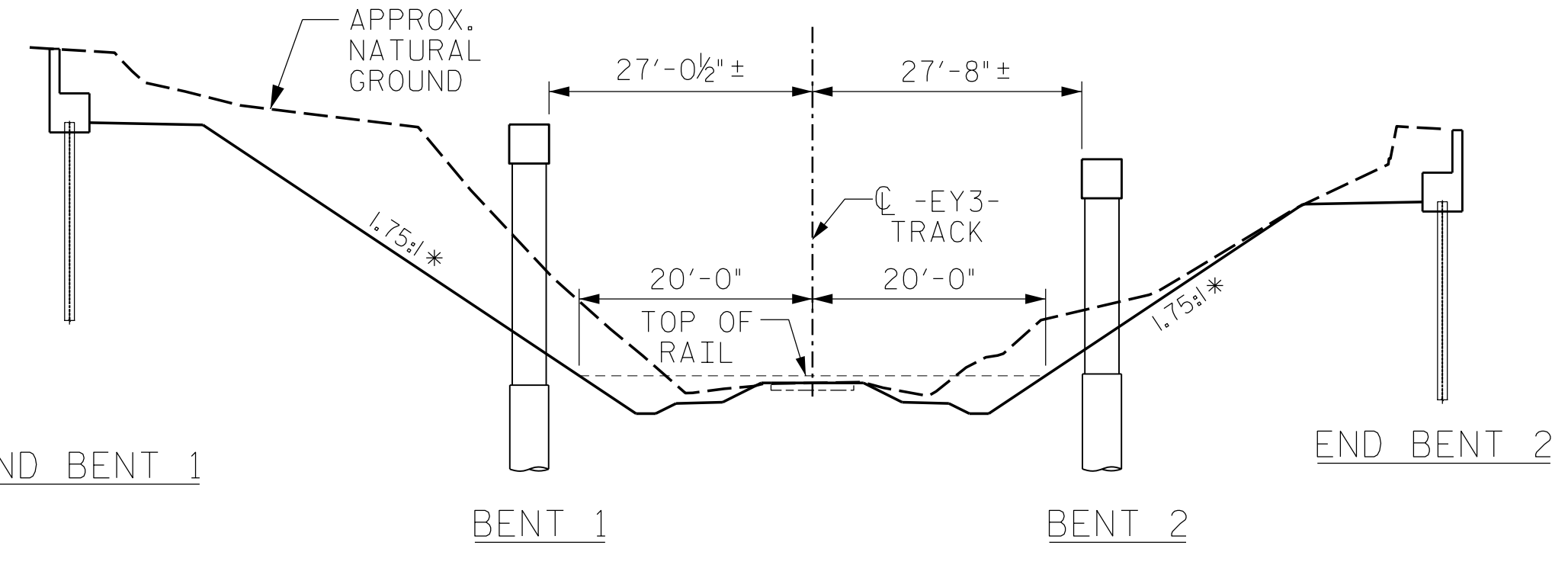
SECTION ALONG -L-

END BENTS AND BENTS ARE AT RIGHT ANGLES



PLAN

(PROPOSED PILES AND SHAFTS NOT SHOWN FOR CLARITY)



HORIZONTAL CLEARANCE - RAILROAD

(LOOKING DOWNSTATION TOWARDS MILE POST T22.0)
* SIDE SLOPES ARE NORMAL TO THE CAPS



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

DRAWN BY : E.C. PHELPS DATE : 12/2023
CHECKED BY : K.F. SMIACH DATE : 05/2024
DESIGN ENGINEER OF RECORD : K.F. SMIACH DATE : 05/2024

13-JUN-2024 17:01
\\vhb\qbl\proj\Roleigh\38811.03 NCDOT B-5982.Haywood\NCDOT\Structures\Drawings\400_001.B5982.SMU.GD01.dgn
ephelps AT 22233



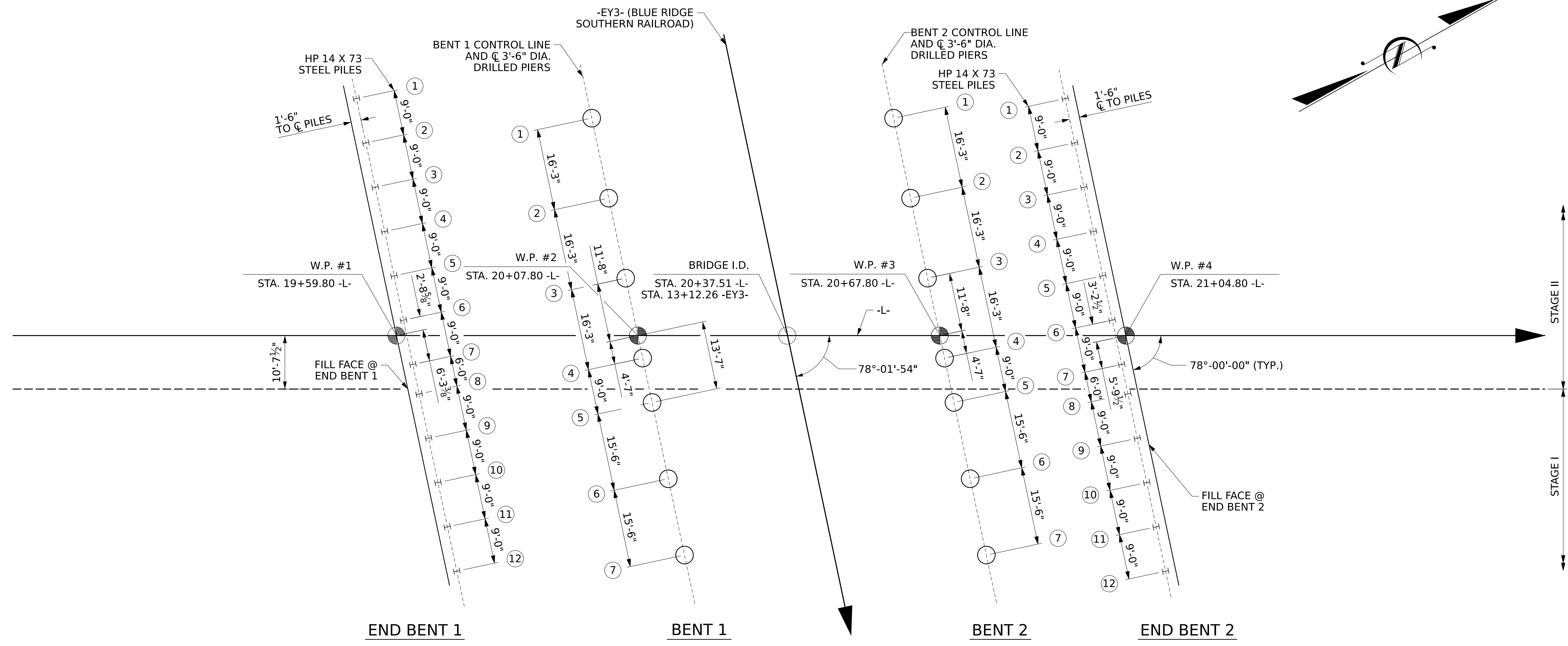
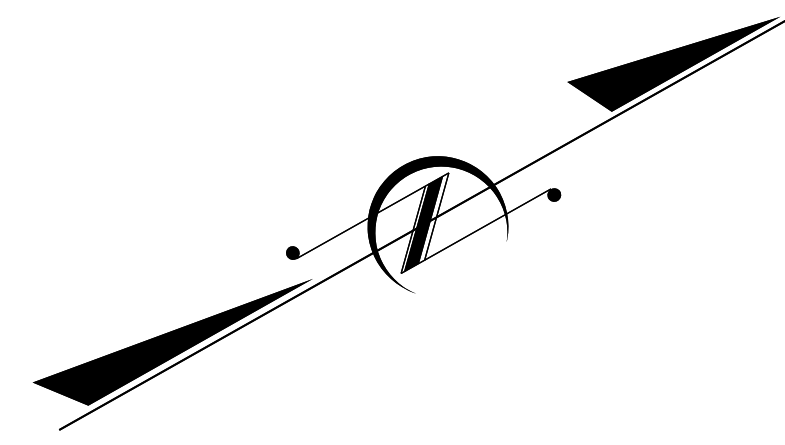
PROJECT NO. **B-5982**
HAYWOOD COUNTY
STATION: **20+37.51 -L-**
SHEET 1 OF 5 REPLACES MILE POST T21.94
MILE POST T21.94
REPLACES BRIDGE NO. 430095

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
**BLUE RIDGE SOUTHERN
RAILROAD ON US 74
BETWEEN WAYNESVILLE
AND I-40**

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	DATE:	S-1
1			3		TOTAL SHEETS
2			4		51



FOUNDATION LAYOUT

PROJECT NO. **B-5982**

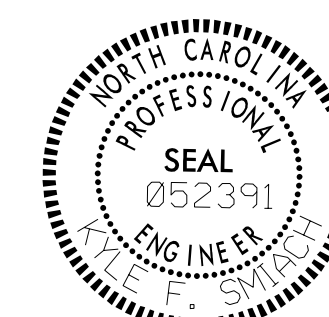
HAYWOOD COUNTY

STATION: **20+37.51 -L-**

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOUNDATION LAYOUT



DocuSigned by:
Kyle Smiach
8EA50D8988E475...

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			51



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

DRAWN BY : J.C. LASSITER	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile 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 1-6	70	See Substructure Plans	20								2566.0	12.1	5.5
END BENT 1, PILES 7-12	70		25								2560.6	4.0	19.0
END BENT 2, PILES 1-12	65		45	2548.0		110	2						

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

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
END BENT 1, PILES 1-6	70						
END BENT 1, PILES 7-12	70						
END BENT 2, PILES 1-12	65			0.60			

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

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	*** Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length* per Pier Lin FT	*** Drilled Pier Length Not In Soil* per Pier Lin FT	*** Drilled Pier Length In Soil* per Pier Lin FT	*** Permanent Steel Casing Required? YES or MAYBE	*** Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	*** Permanent Steel Casing Length** per Pier Lin FT
BENT 1, PIERS 1-4	325	2552.0	20		7.0		7.0	0.0			
BENT 1, PIERS 5-7	325	2540.0	20		7.0		7.0	7.0			
BENT 2, PIERS 1-4	300	2540.5	20		7.0		7.0	13.0			
BENT 2, PIERS 5-7	300	2530.2	20		7.0		16.0	15.0			
TOTAL QTY:							125.0	118.0			

*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 "___-inch Dia. Drilled Piers" or "___-inch Dia. Drilled Piers Not in Soil" and "___-inch Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the NCDOT Standard Specifications.

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

*** These columns have been updated to reflect the new quantities by Shane Clark, PE 029869

NOTES:

- The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Donald W. Brown, Jr., PE No. 028422) on 06-01-2023. The recommendations were modified due to finish grade changes and the columns identified with an "****" have been updated to reflect the new quantities by Shane Clark, PE 029869
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for PDA Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, CSL Testing, SID Inspections and PITs when these items may be required.

FOUNDATION RECOMMENDATIONS NOTES:

- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILE EXCAVATION AT END BENT NO. 1, PILES 1-6 SHALL HAVE A MINIMUM PENETRATION OF 12.1 FEET INTO WEATHERED ROCK AND/OR ROCK.
- PILE EXCAVATION AT END BENT NO. 1, PILES 7-12 SHALL HAVE A MINIMUM PENETRATION OF 4 FEET INTO WEATHERED ROCK AND/OR ROCK.
- FILL HOLES FOR PILE EXCAVATION AT END BENT NO.1 WITH CONCRETE.

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
END BENT 1, PILES 1-6			2		
END BENT 1, PILES 7-12					
END BENT 2, PILES 1-12	MAYBE				

*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.

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 Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
TOTAL QTY:					

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	*** Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
BENT 1, PIERS 1-4		MAYBE	98.0	MAYBE	
BENT 1, PIERS 5-7		MAYBE	110.0	MAYBE	
BENT 2, PIERS 1-4		MAYBE	111.0	MAYBE	
BENT 2, PIERS 5-7		MAYBE	144.0	MAYBE	
TOTAL QTY:			1598.0		


*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

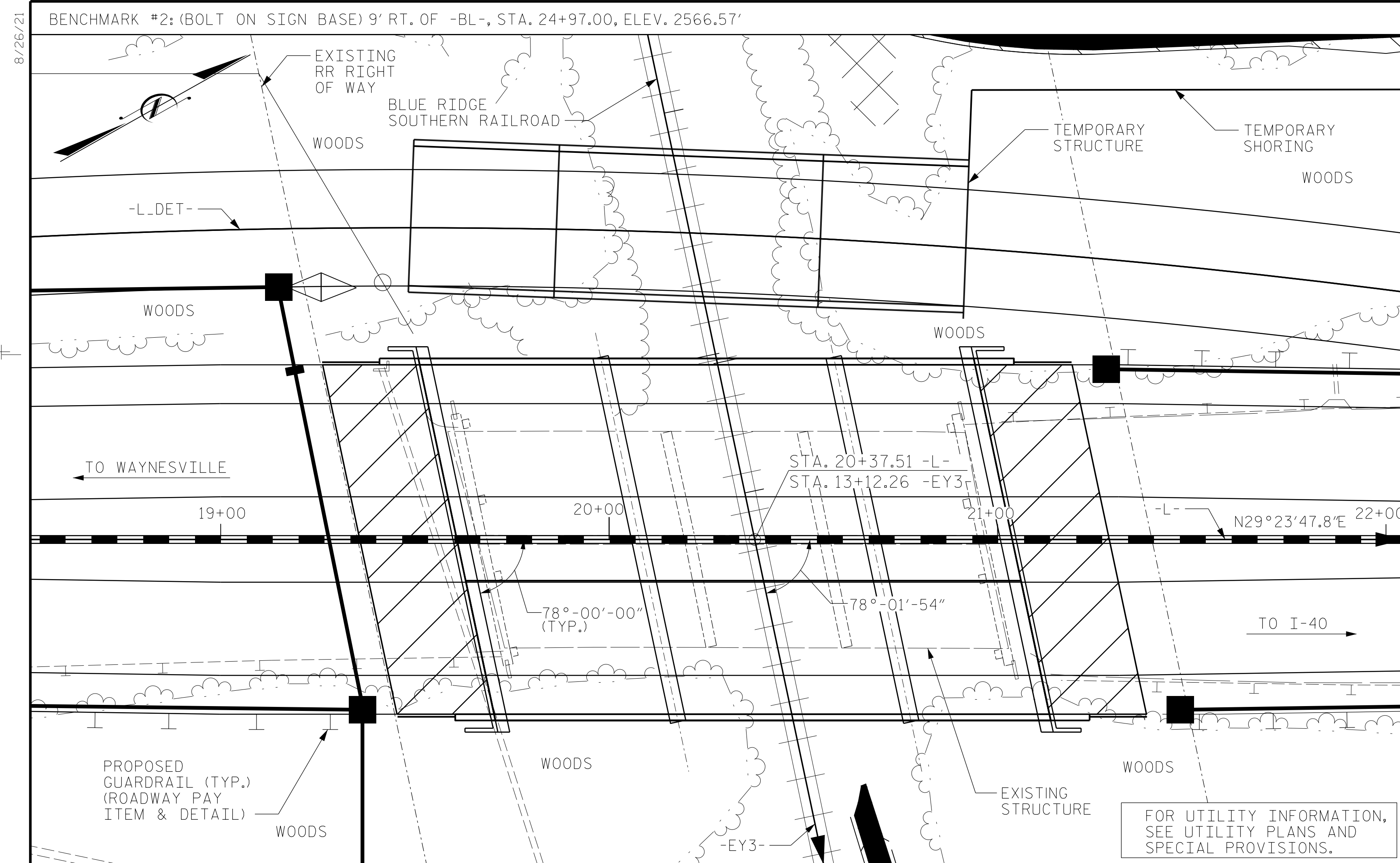
*** These columns have been updated to reflect the new quantities by Shane Clark, PE 029869

PROJECT NO. B-5982

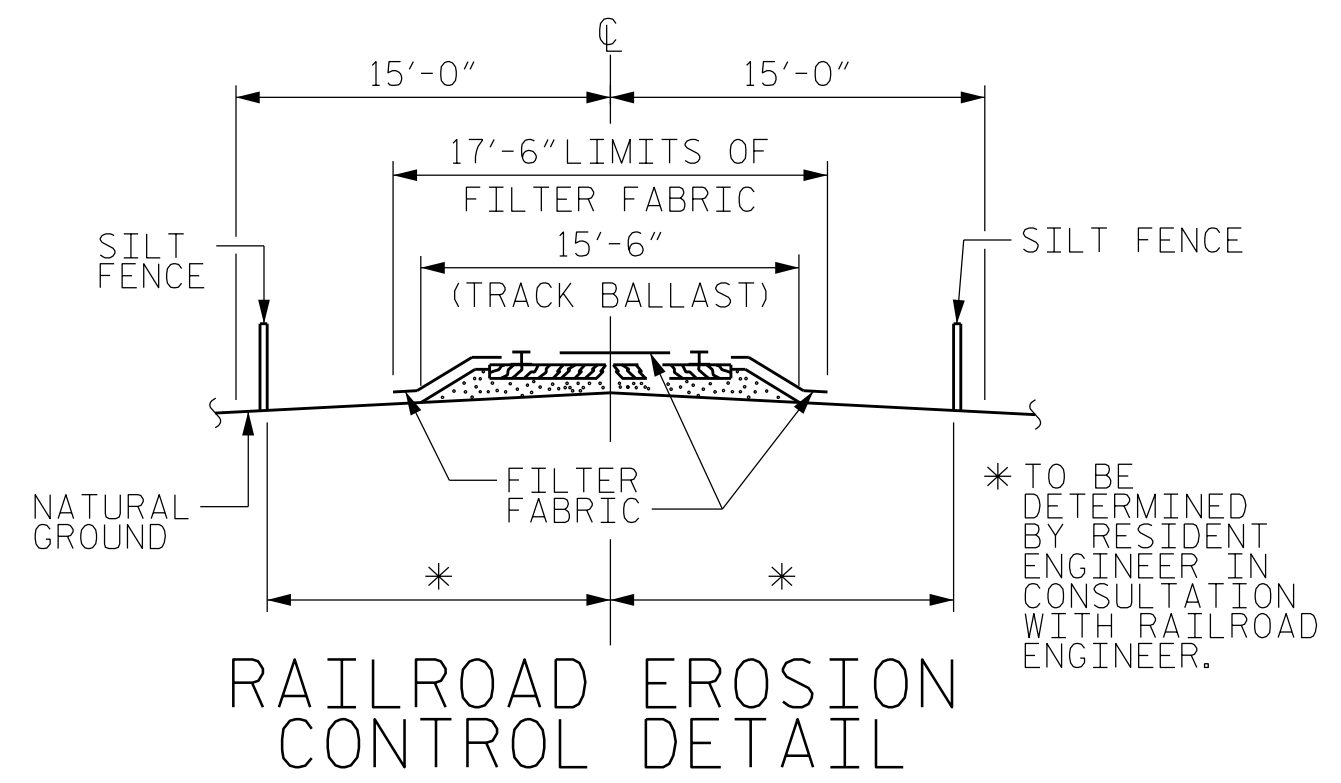
HAYWOOD COUNTY

STATION: 20+37.51 -L-

 Documented by: Kyle Smadi 052391 ENGINEER STATE OF NORTH CAROLINA	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		PILE AND DRILLED PIER FOUNDATION TABLES				SHEET NO. S-3
	SIGNATURE: _____ DATE: _____		REVISIONS				TOTAL SHEETS 51
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		NO. 1	BY:	DATE:	NO. 3	BY:	DATE:
		2			4		



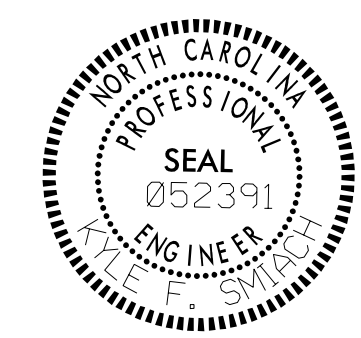
- LOCATION SKETCH -



NOTES

- RAILROAD EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO PERFORMING ANY WORK IN THE RAILROAD RIGHT-OF-WAY.
- ADDITIONAL EROSION CONTROL MEASURES FOR PROTECTION OF RAILROAD DITCHES MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.
- NO SEPARATE PAYMENT WILL BE MADE FOR RAILROAD EROSION CONTROL MEASURES.
- LIMITS OF SILT FENCE AND FILTER FABRIC PARALLEL TO THE RAILROAD SHALL EXTEND A MINIMUM OF 25'-0" OUTSIDE OF SUPERSTRUCTURE OR TOE OF SLOPE ON CONSTRUCTION. A GREATER LENGTH OF SILT FENCE OR FILTER FABRIC MAY BE REQUIRED IF SO DIRECTED BY THE ENGINEER.
- FILTER FABRIC TO BE NAILED TO TIMBER RAIL TIES WITH PRIME SOURCE "GRIP CAP" OR EQUIVALENT. FILTER FABRIC ON SHOULDER TO BE SECURED AS DIRECTED BY THE ENGINEER AND RAILROAD.

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 4 OF 5



DocuSigned by:
 Kyle Smiach
 8EA50D898BE475...

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
LOCATION SKETCH

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			51

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 : E.C. PHELPS	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

TOTAL BILL OF MATERIAL

	CONSTR., MAINTENANCE & REMOVAL OF TEMP. STRUCTURE AT STA. 20+37.51 -L-	REMOVAL OF EXISTING STRUCTURE AT STA. 20+37.51 -L-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-6" DIA. DRILLED PIERS IN SOIL	3'-6" DIA. DRILLED PIERS NOT IN SOIL	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STA 20+37.51 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	APPROX. 269,000 LBS. STRUCTURAL STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT	LIN. FT	LIN. FT	LIN. FT	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS	LBS	LUMP SUM
SUPERSTRUCTURE											13,320	15,557		LUMP SUM			LUMP SUM
END BENT 1				147.0	96.6								67.8		10,486		
BENT 1						21.0	49.0	2	2				102.4		27,901	5,347	
BENT 2						97.0	76.0	2	2				94.6		31,260	6,407	
END BENT 2													67.6		9,920		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	147.0	96.6	118.0	125.0	4	4	LUMP SUM	13,320	15,557	332.4	LUMP SUM	79,567	11,754	LUMP SUM

TOTAL BILL OF MATERIAL

	PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP 14X73 STEEL PILES		PILE REDRIVES	DYNAMIC PILE TESTING	CONCRETE BARRIER RAIL	CONCRETE MEDIAN BARRIER	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	ELECTRICAL CONDUIT SYSTEM FOR SIGNAL AT STA. 20+37.51 -L-
	EACH	NO.	LIN. FT.	EACH	EACH	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE						325.5	193.2		LUMP SUM	LUMP SUM	
END BENT 1	12	12	270					590			
BENT 1											
BENT 2											
END BENT 2	12	12	540					475			
TOTAL	24	24	810	2	2	325.5	193.2	1065	LUMP SUM	LUMP SUM	LUMP SUM

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE RAILROAD TRACK TOP OF RAIL ELEVATIONS ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

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

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.



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INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STA. 20+37.51 -L-".

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE HATCHED AREA IN THE SECTION VIEW OF SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 60 FT LEFT AND 50 FT RIGHT OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

STEEL SHEET PILING REQUIRED FOR SHORING SHALL BE HOT ROLLED.

TEMPORARY SHORING WILL BE REQUIRED IN THE AREA INDICATED IN THE PLAN VIEW, EXCEPT AS NOTED BELOW.

THE TEMPORARY SHORING AT THE BENTS SHOWN ON SHEETS S-1 MAY NOT BE REQUIRED PENDING CONTRACTOR ACCESS AND MEANS AND METHODS AND THE CONTRACTOR SHALL BID ACCORDINGLY BASED ON THEIR EXPECTED MEANS AND METHODS. TEMPORARY SHORING SHALL BE PAID AS A ROADWAY PAY ITEM.

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

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STA. 20+37.51 -L- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR THE AASHTO LRFD TEST LEVEL 3 (TL-3) CRASH TEST CRITERIA. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS (1@54'-0", 1@35'-0", 1@42'-6") WITH A REINFORCED CONCRETE DECK ON 8 STEEL BEAMS AND A CLEAR ROADWAY WIDTH OF 56 FT ON REINFORCED CONCRETE MULTI-COLUMN BENTS ON SPREAD FOOTINGS AND REINFORCED CONCRETE END BENTS ON STEEL H-PILES AND LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS. SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL SUBMIT A GIRDER ERECTION SEQUENCE TO THE ENGINEER FOR REVIEW AND APPROVAL.

PROJECT NO. **B-5982**

HAYWOOD COUNTY

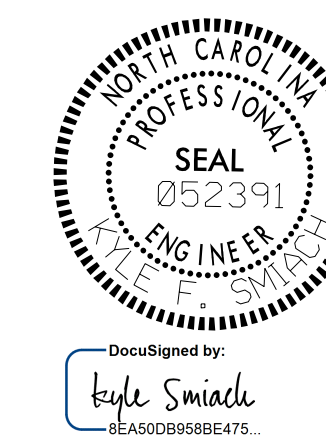
STATION: **20+37.51 -L-**

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

**FOR BRIDGE OVER
BLUE RIDGE SOUTHERN
RAILROAD ON US 74
BETWEEN WAYNESVILLE
AND I-40**



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

S-5
TOTAL SHEETS
51

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 II LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD	HL-93 (INVENTORY)	N/A	①	1.47	--	1.75	0.562	1.47	B	I	0.00	0.724	2.27	C	I	0.00	0.8	0.562	3.09	A	EL	41.45		
	HL-93 (OPERATING)	N/A		1.90	--	1.35	0.562	1.90	B	I	0.00	0.724	2.94	C	I	0.00	N/A	0.562	4.02	A	EL	41.45		
	HS-20 (INVENTORY)	36.000	②	2.84	102.16	1.75	0.562	2.84	B	I	0.00	0.724	3.56	C	I	0.00	0.8	0.527	5.52	B	I	30.00		
	HS-20 (OPERATING)	36.000		3.68	132.43	1.35	0.562	3.68	B	I	0.00	0.724	4.62	C	I	0.00	N/A	0.527	7.18	B	I	30.00		
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH		7.08	95.62	1.4	0.527	7.08	A	EL	41.45	0.555	8.25	A	I	41.45	0.8	0.527	7.52	B	I	30.00		
		SNGARBS2	20.000		4.93	98.67	1.4	0.527	4.93	A	EL	41.45	0.555	5.96	C	I	0.00	0.8	0.527	6.42	B	I	30.00	
		SNAGRIS2	22.000		4.51	99.13	1.4	0.527	4.51	A	EL	41.45	0.555	5.53	C	I	0.00	0.8	0.527	6.26	B	I	30.00	
		SNCOTTS3	27.250		3.46	94.22	1.4	0.527	3.46	A	EL	41.45	0.555	4.08	A	I	41.45	0.8	0.527	4.07	B	I	30.00	
		SNAGGRS4	34.925		2.79	97.39	1.4	0.527	2.79	A	EL	41.45	0.555	3.42	B	I	0.10	0.8	0.527	3.56	B	I	30.00	
		SNS5A	35.550		2.75	97.92	1.4	0.527	2.75	A	EL	41.45	0.555	3.46	B	I	0.10	0.8	0.527	3.47	B	I	30.00	
		SNS6A	39.950		2.51	100.17	1.4	0.527	2.51	A	EL	41.45	0.555	3.17	B	I	0.10	0.8	0.527	3.25	B	I	30.00	
	SNS7B	42.000		2.39	100.50	1.4	0.527	2.39	A	EL	41.45	0.555	3.11	B	I	0.10	0.8	0.527	3.10	B	I	30.00		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.02	99.73	1.4	0.527	3.02	A	EL	41.45	0.555	3.82	C	I	0.00	0.8	0.527	4.06	B	I	30.00	
		TNT4A	33.075		3.05	100.80	1.4	0.527	3.05	A	EL	41.45	0.555	3.71	C	I	0.00	0.8	0.527	4.01	B	I	30.00	
		TNT6A	41.600		2.51	104.35	1.4	0.527	2.51	A	EL	41.45	0.555	3.38	C	I	0.00	0.8	0.527	3.35	B	I	30.00	
		TNT7A	42.000		2.50	104.84	1.4	0.527	2.50	A	EL	41.45	0.555	3.24	C	I	0.00	0.8	0.527	3.43	B	I	30.00	
		TNT7B	42.000		2.54	106.50	1.4	0.527	2.54	A	EL	41.45	0.555	3.10	C	I	0.00	0.8	0.527	3.49	B	I	30.00	
		TNAGRIT4	43.000		2.38	102.52	1.4	0.527	2.38	A	EL	41.45	0.555	2.97	C	I	0.00	0.8	0.527	3.41	B	I	30.00	
TNAGT5A		45.000		2.31	103.88	1.4	0.527	2.31	A	EL	41.45	0.555	2.98	C	I	0.00	0.8	0.527	3.17	B	I	30.00		
TNAGT5B	45.000	③	2.24	101.01	1.4	0.527	2.24	A	EL	41.45	0.555	2.83	C	I	0.00	0.8	0.527	3.11	B	I	30.00			
EMERGENCY VEHICLE (EV)	EV2	28.750		3.73	107.17	1.4	0.527	3.73	A	EL	41.45	0.555	4.46	B	I	0.10	0.8	0.527	4.59	B	I	30.00		
	EV3	43.000	④	2.51	107.87	1.4	0.527	2.51	A	EL	41.45	0.555	3.00	B	I	0.10	0.8	0.527	2.98	B	I	30.00		
FATIGUE	HL-93 (INVENTORY)	γLL=0.75		4.93																				

LOAD FACTORS:

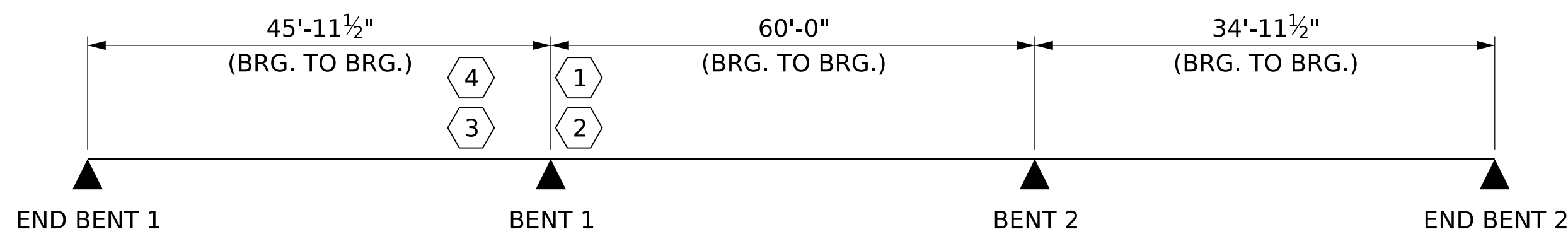
DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

NOTES:

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

ALLOWABLE STRESSES FOR SERVICE II 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	



LRFR SUMMARY

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**



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 Kyle Smiach
 8EA50B988E475...

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD

**LRFR SUMMARY FOR
 STEEL GIRDERS**

(NON-INTERSTATE TRAFFIC)

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	
				S-6
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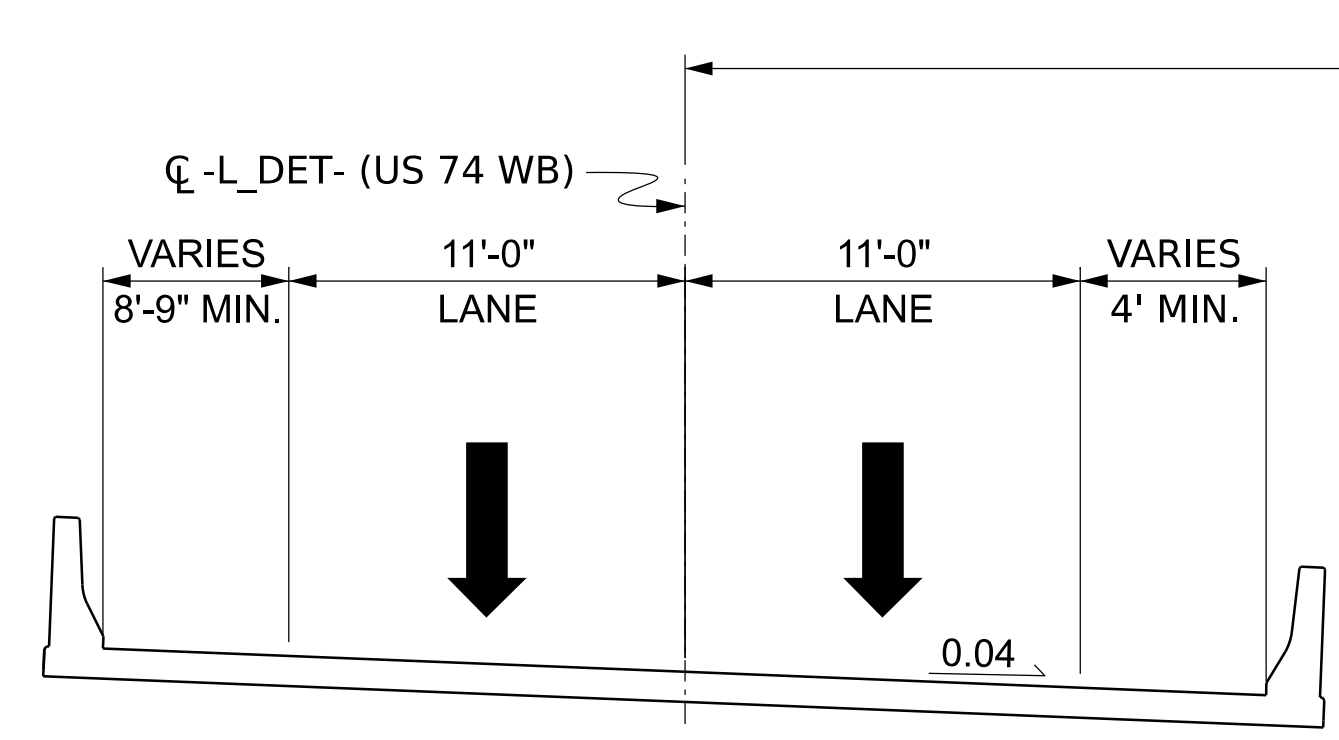
vhb
 VHB Engineering NC, P.C. (C-3705)
 940 Main Campus Drive, Suite 500
 Raleigh, NC 27606

DRAWN BY : **E.C. PHELPS** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**

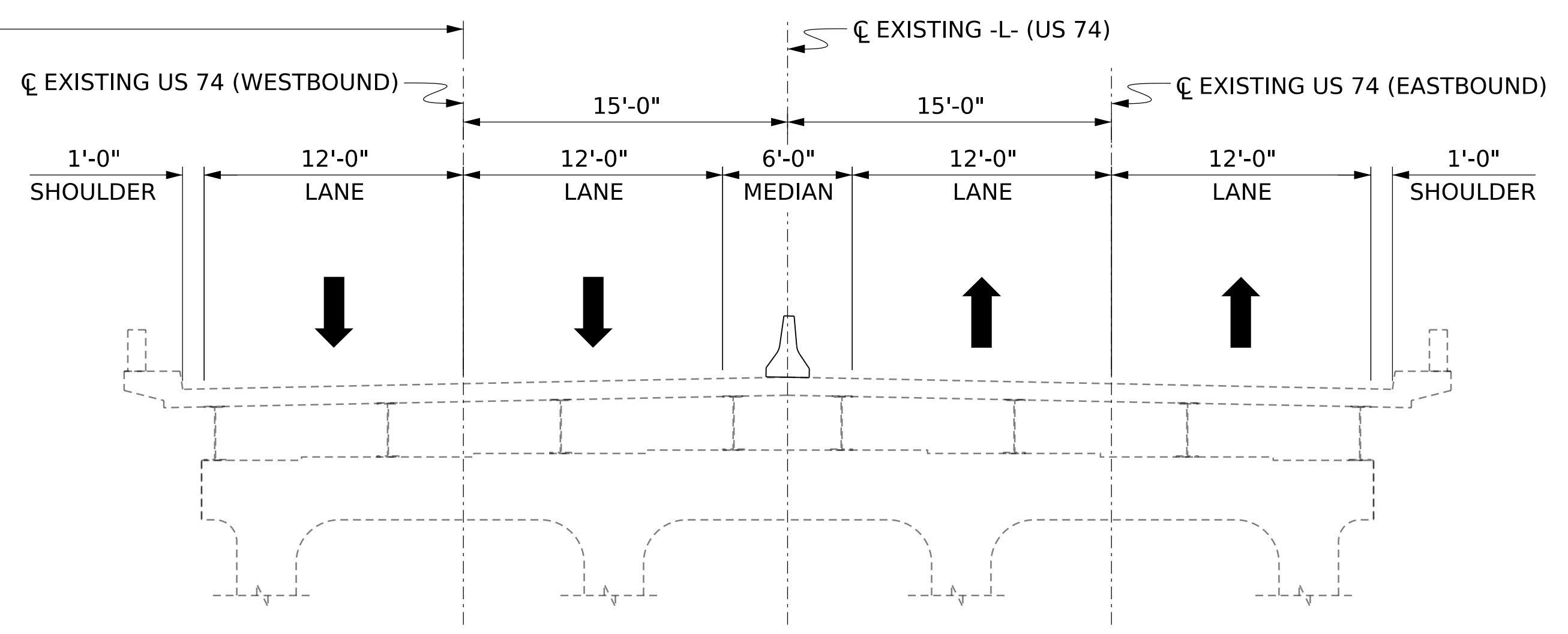
NOTES

FOR PHASING AND MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY ITEMS OF THE ANCHORED PORTABLE CONCRETE BARRIERS

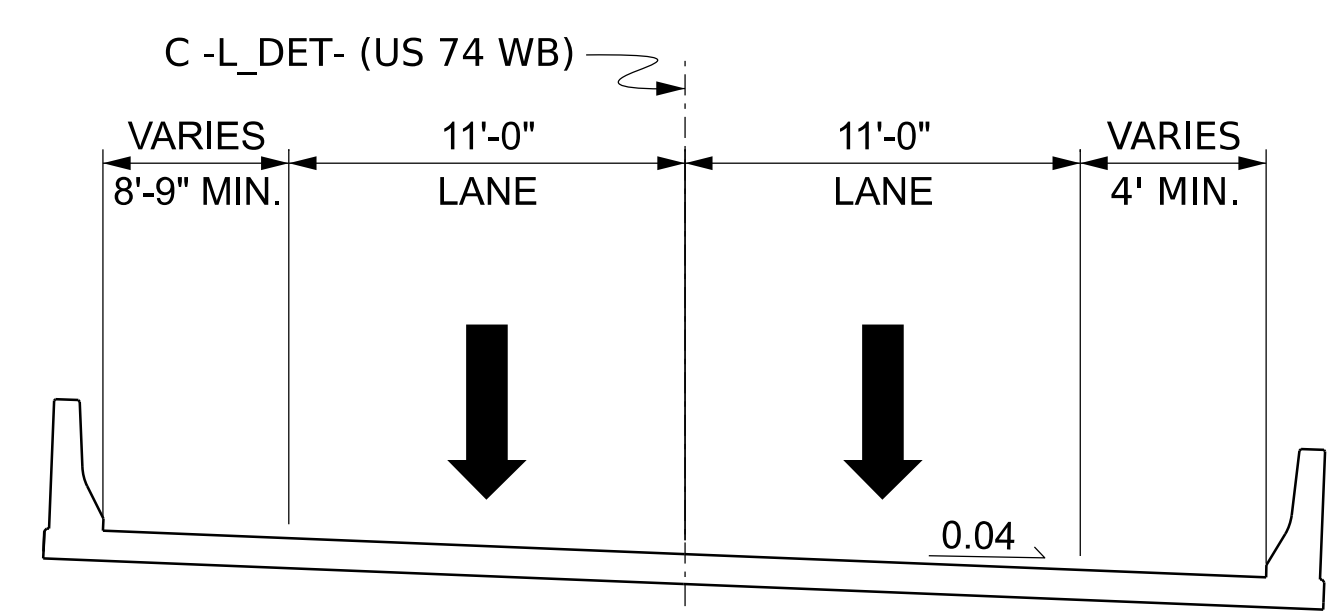


TEMPORARY BRIDGE
(DESIGNED BY OTHERS)

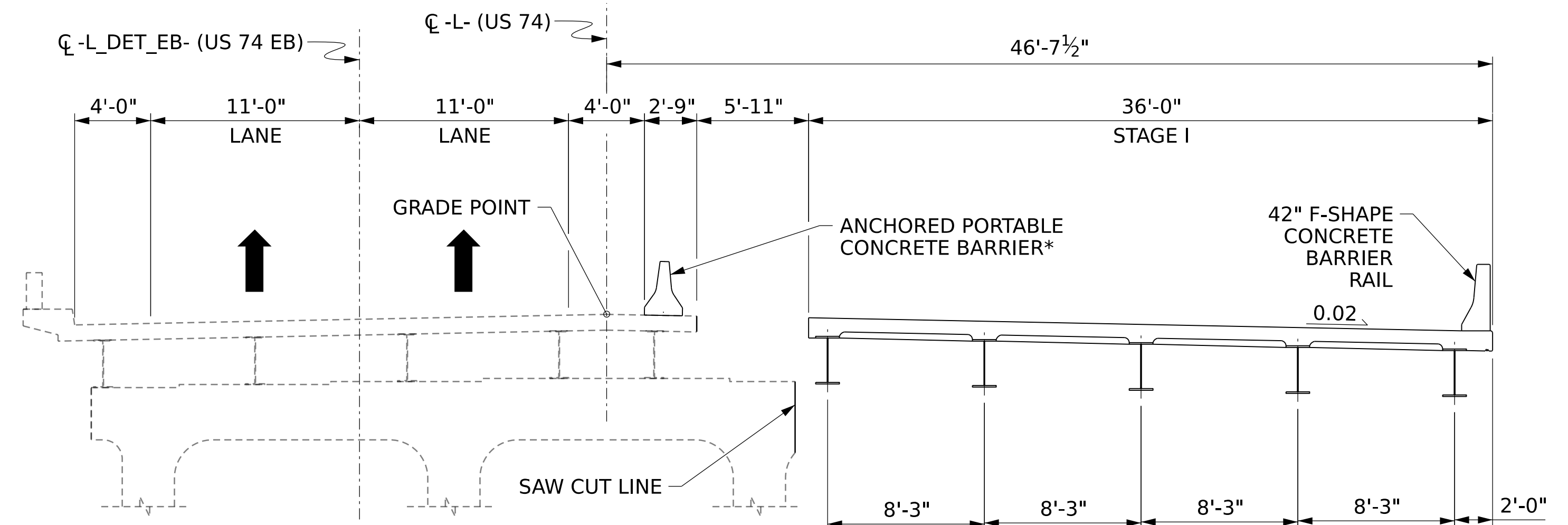


STAGE 0

CONSTRUCT TEMPORARY BRIDGE (DESIGNED BY OTHERS).
SHIFT WESTBOUND TRAFFIC TO TEMPORARY BRIDGE.



TEMPORARY BRIDGE
(DESIGNED BY OTHERS)



STAGE I

DEMOLISH THE EXISTING MEDIAN BARRIER AND A PORTION OF THE EXISTING STRUCTURE AS SHOWN.
SET TEMPORARY CONCRETE BARRIER.
SHIFT EASTBOUND TRAFFIC ON EXISTING STRUCTURE.
CONSTRUCT STAGE I OF PROPOSED BRIDGE.

*DUE TO PROXIMITY TO EXISTING GIRDER, USE ADHESIVE BONDED ANCHOR INSTALLATION

PROJECT NO. **B-5982**
HAYWOOD COUNTY
STATION: **20+37.51 -L-**

SHEET 1 OF 2

STATE OF NORTH CAROLINA
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RALEIGH

GENERAL DRAWING

CONSTRUCTION SEQUENCE



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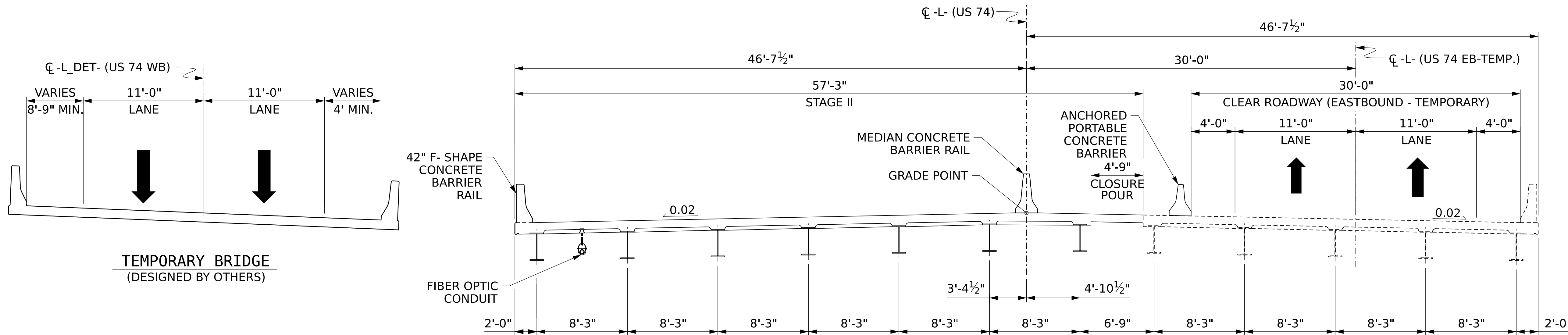
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TOTAL SHEETS
51



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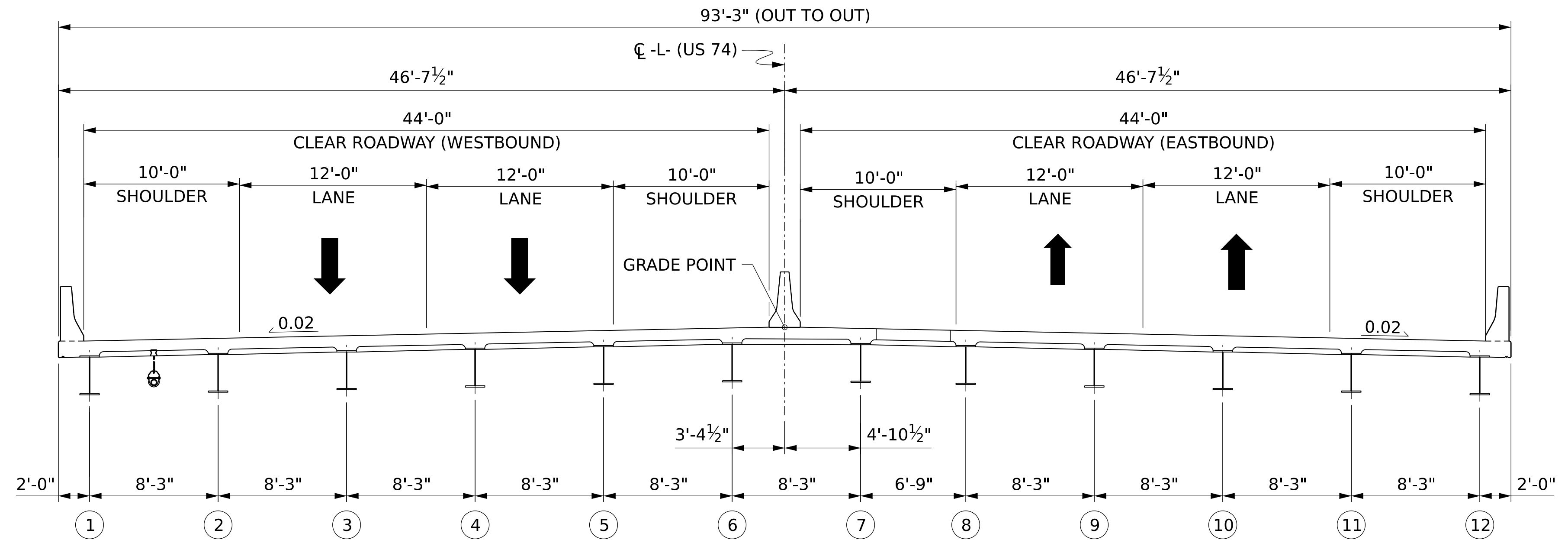
DRAWN BY : E.C. PHELPS	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024



TEMPORARY BRIDGE
(DESIGNED BY OTHERS)

NOTES
 FOR PHASING AND MAINTENANCE OF TRAFFIC,
 SEE TRAFFIC CONTROL PLANS.
 SEE TRAFFIC CONTROL PLANS FOR LOCATION AND
 PAY ITEMS OF THE ANCHORED PORTABLE
 CONCRETE BARRIER.

STAGE II
 SHIFT EASTBOUND TRAFFIC TO NEW STRUCTURE. COMPLETELY REMOVE
 EXISTING STRUCTURE. CONSTRUCT STAGE II OF PROPOSED BRIDGE.



FINAL
 REMOVE ANCHORED PORTABLE CONCRETE BARRIER.
 SHIFT TRAFFIC TO FINAL LANE CONFIGURATION.

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
CONSTRUCTION SEQUENCE



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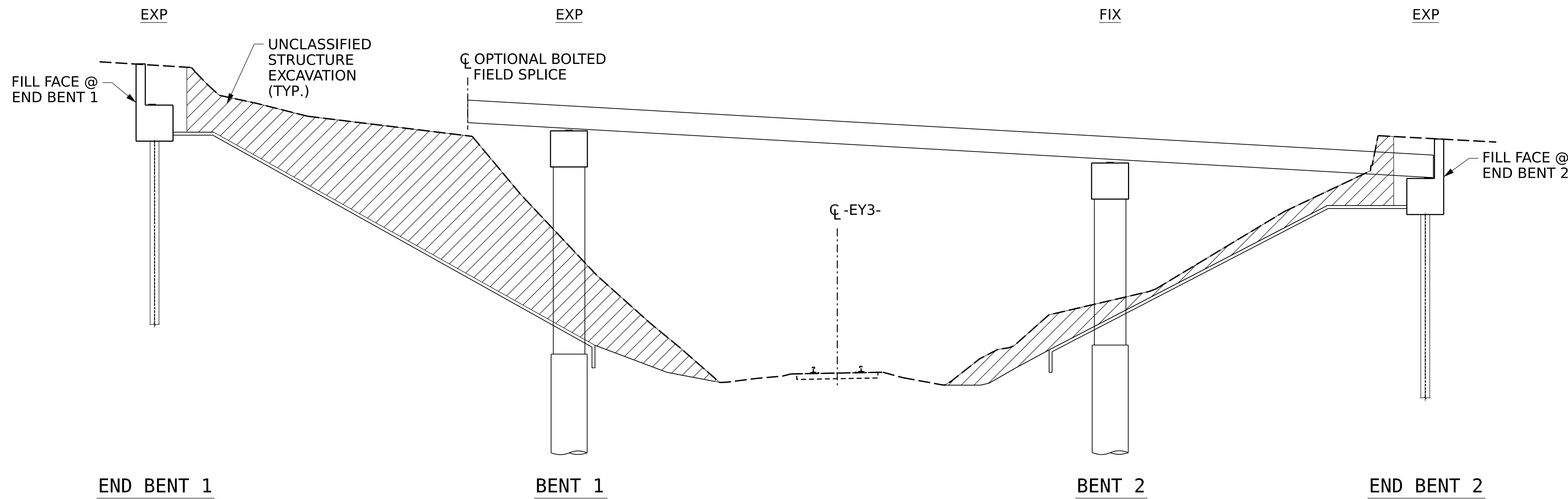
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NO.	BY:	DATE:	NO.	DATE:
1			3	
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S-8
 TOTAL SHEETS
 51

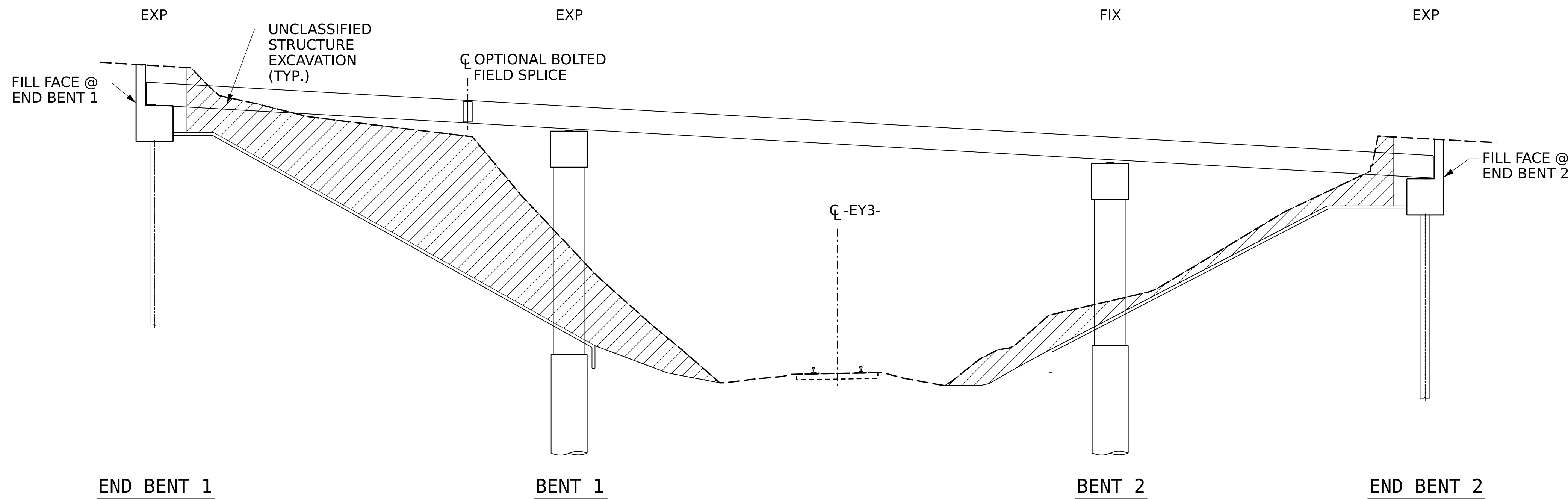


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 940 Main Campus Drive, Suite 500
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 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



GIRDER ERECTION - STEP 1



GIRDER ERECTION - STEP 2

NOTES

THE CONTRACTOR MAY SUBMIT AN ALTERNATE ERECTION METHOD TO THE ENGINEER FOR REVIEW AND APPROVAL.

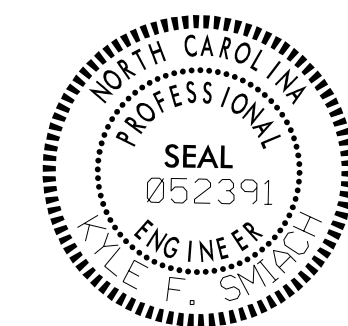
NO SEPARATE PAYMENT WILL BE MADE FOR PROVIDING A TEMPORARY BENT, TEMPORARY BRACING, OR OTHER MEANS OF TEMPORARY SUPPORT, AS NEEDED. THE COST FOR ALL MATERIALS, EQUIPMENT, TOOLS AND LABOR NECESSARY FOR THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE LUMP SUM BID PRICE FOR STRUCTURAL STEEL.

AT NO ADDITIONAL COST TO THE DEPARTMENT, THE CONTRACTOR MAY SPLICE THE GIRDERS ON GROUND BEFORE ERECTION.

DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT, AS REQUIRED, TO ENSURE STABILITY OF THE GIRDERS AND TO ENSURE PLUMBNESS OF THE GIRDERS IN THE FINAL CONDITION.

AT THE CONTRACTOR'S OPTION, THE OPTIONAL FIELD SPLICE MAY BE OMITTED, PROVIDED THE CONTRACTOR OBTAINS ALL PERMITS REQUIRED FOR TRANSPORTING THE LONGER PIECE LENGTHS.

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**



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 Kyle Smiach
 BEA50D8988E475...

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
GIRDER ERECTION SEQUENCE

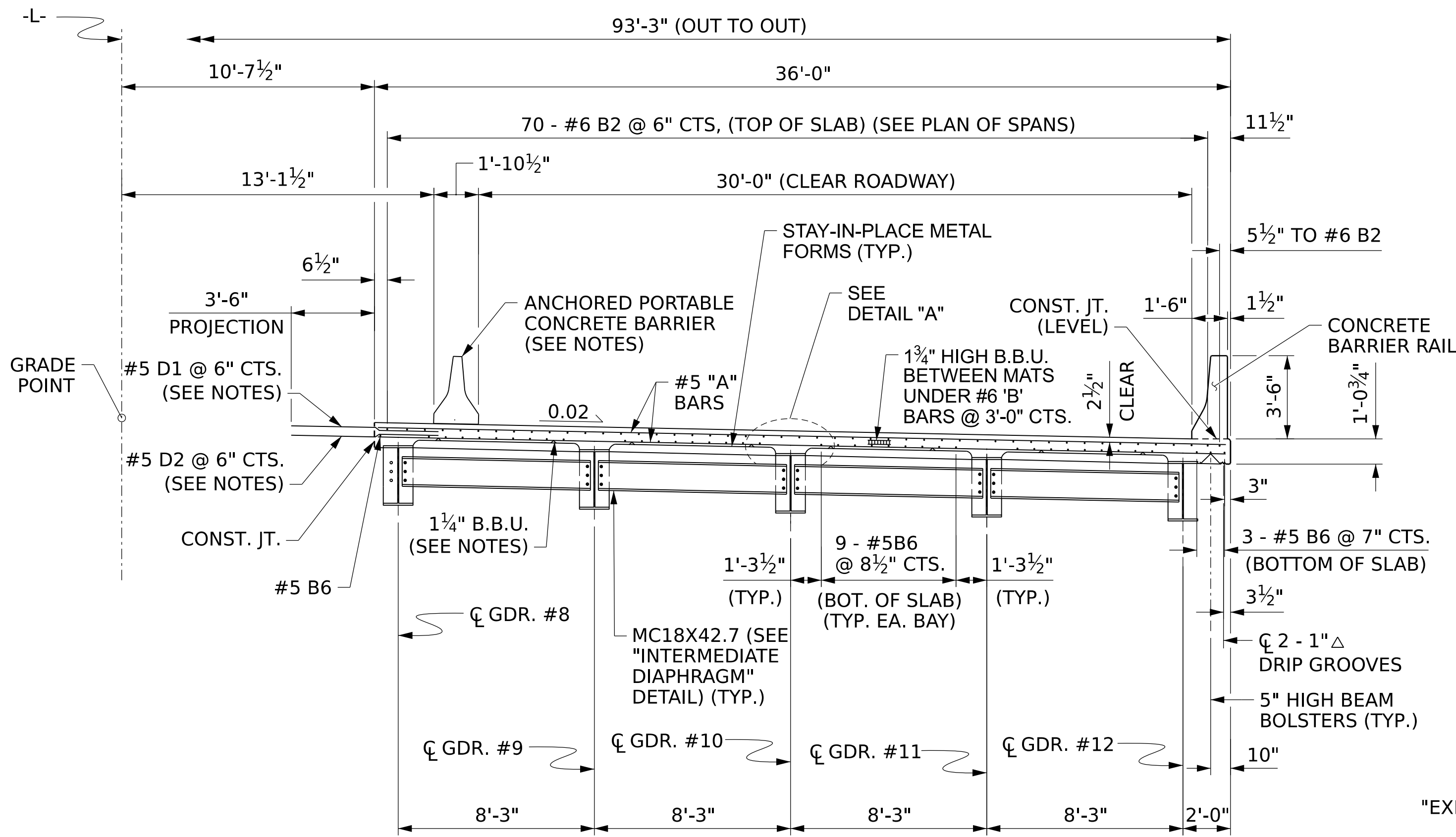
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NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
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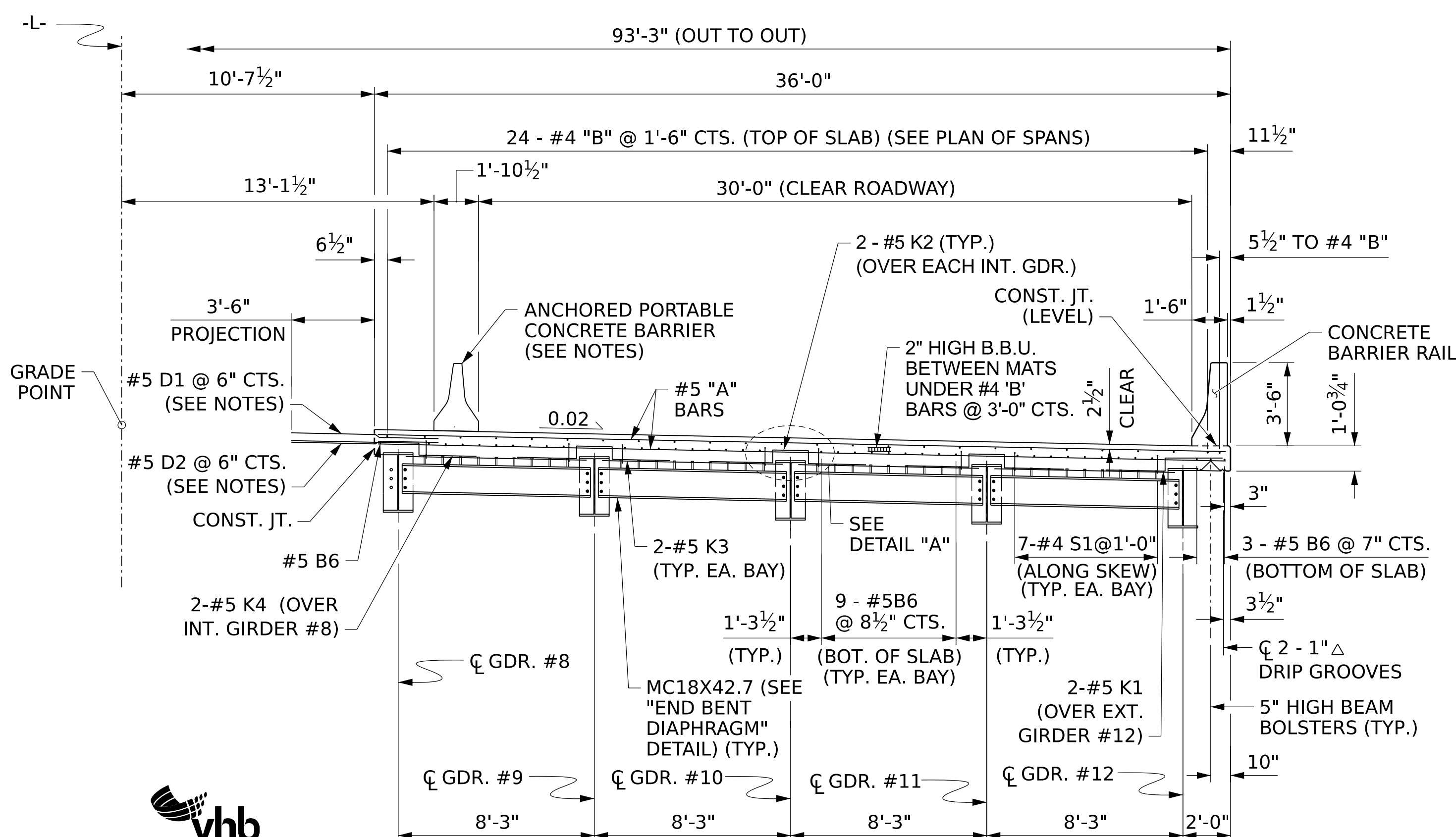


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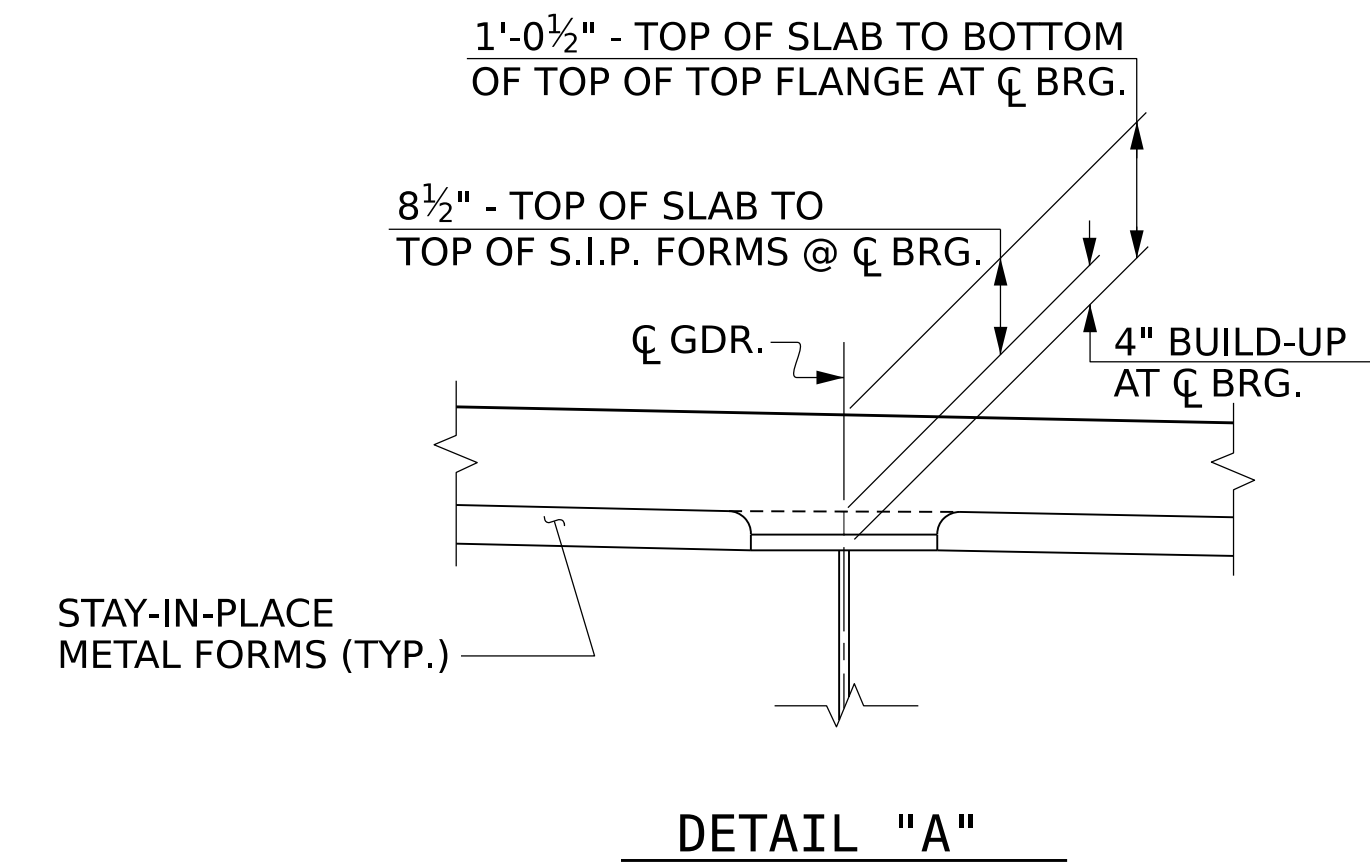
DRAWN BY : **D.E. MORRISSETTE** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



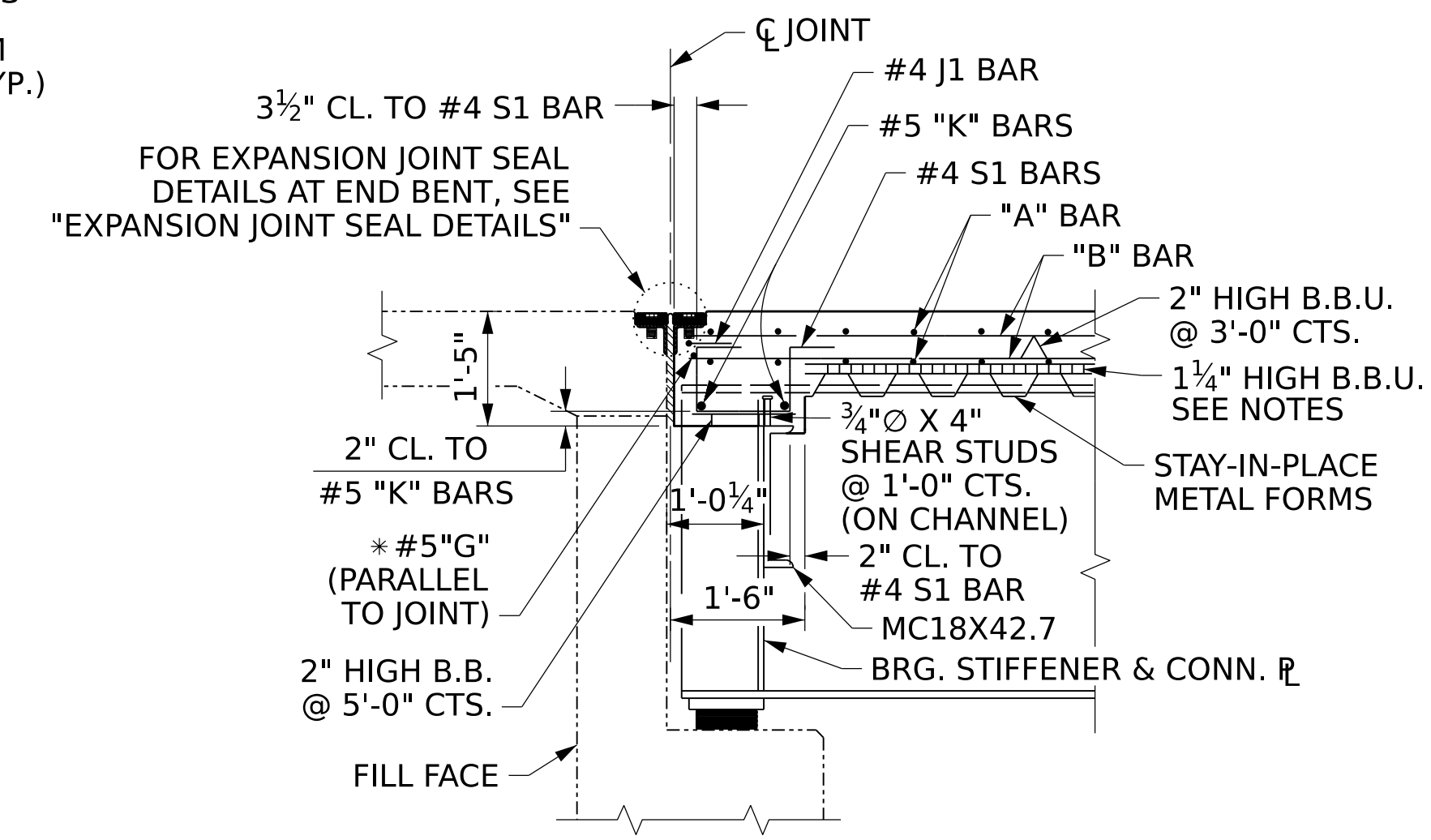
TYPICAL SECTION - STAGE I
(BENT DIAPHRAGMS SHOWN, INTERMEDIATE DIAPHRAGMS SIMILAR)



TYPICAL SECTION - STAGE I
(SHOWING END BENT DIAPHRAGMS)

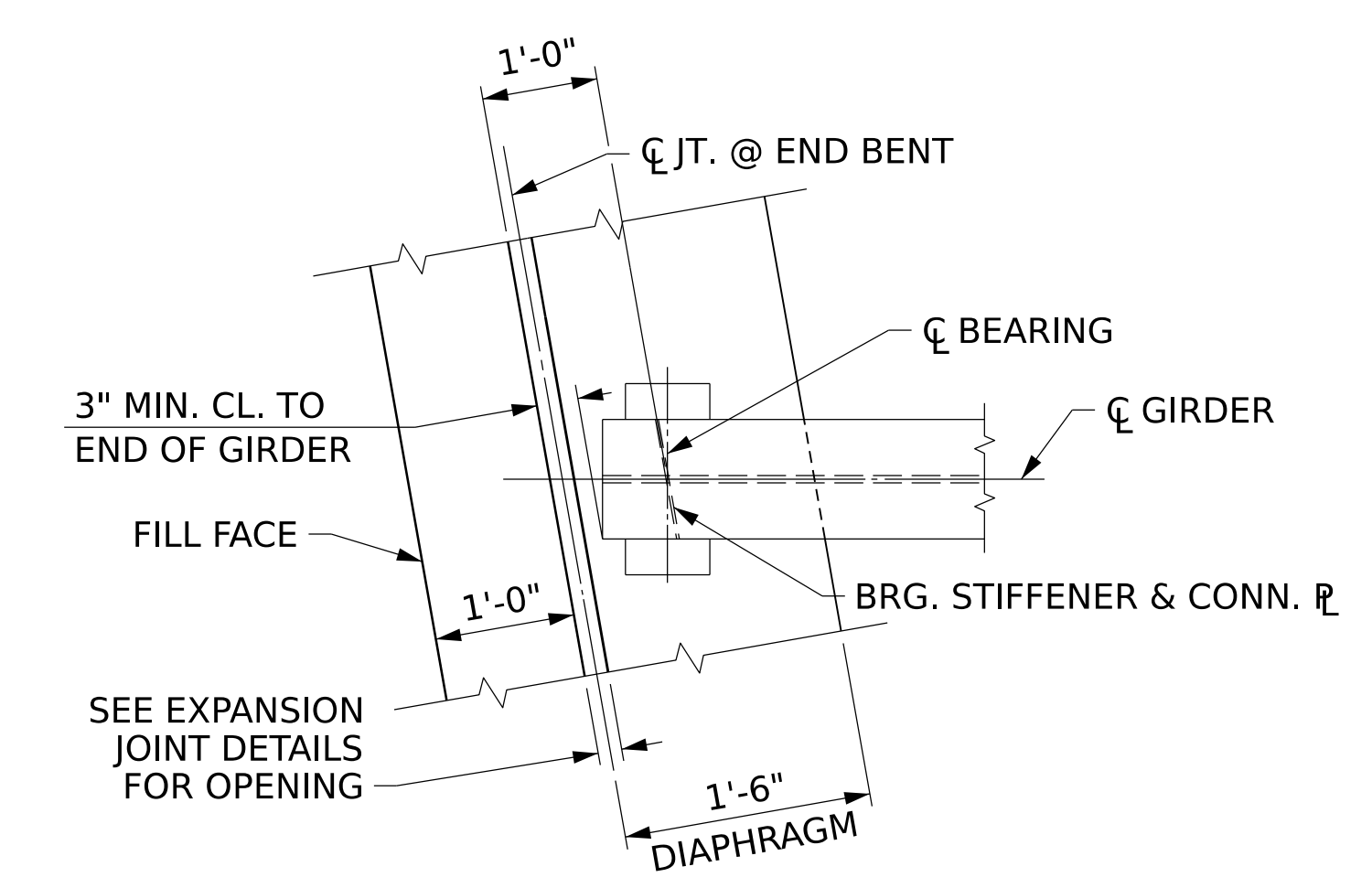


DETAIL "A"

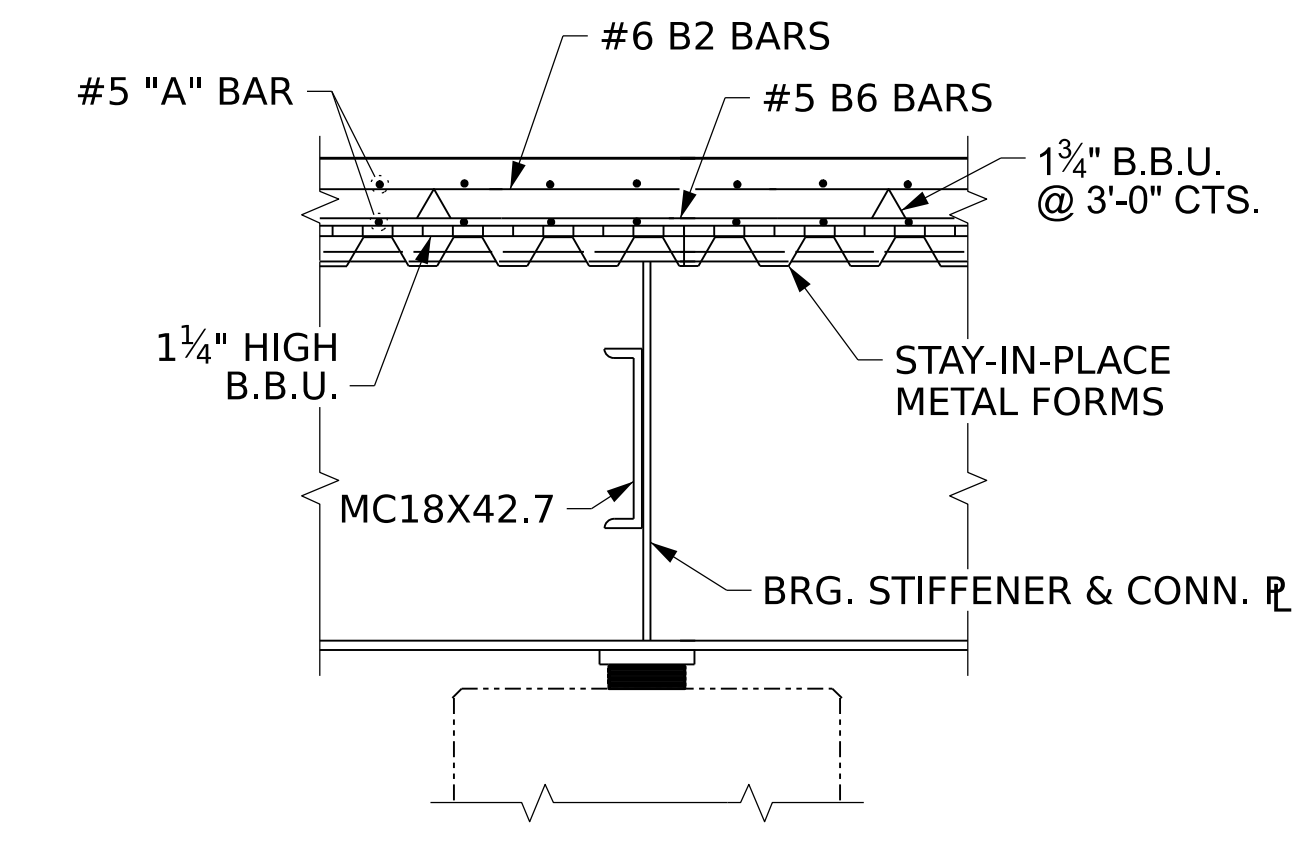


SECTION AT END BENT

*#5 "G" BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS (STAGE I OR II SHOWN)



END BENT JOINT DETAILS



SECTION AT BENT

(STAGE I OR II SHOWN)

NOTES

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

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

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARTY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.

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.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY ITEMS OF THE ANCHORED PORTABLE CONCRETE BARRIER.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.



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

DRAWN BY : E.C. PHELPS	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

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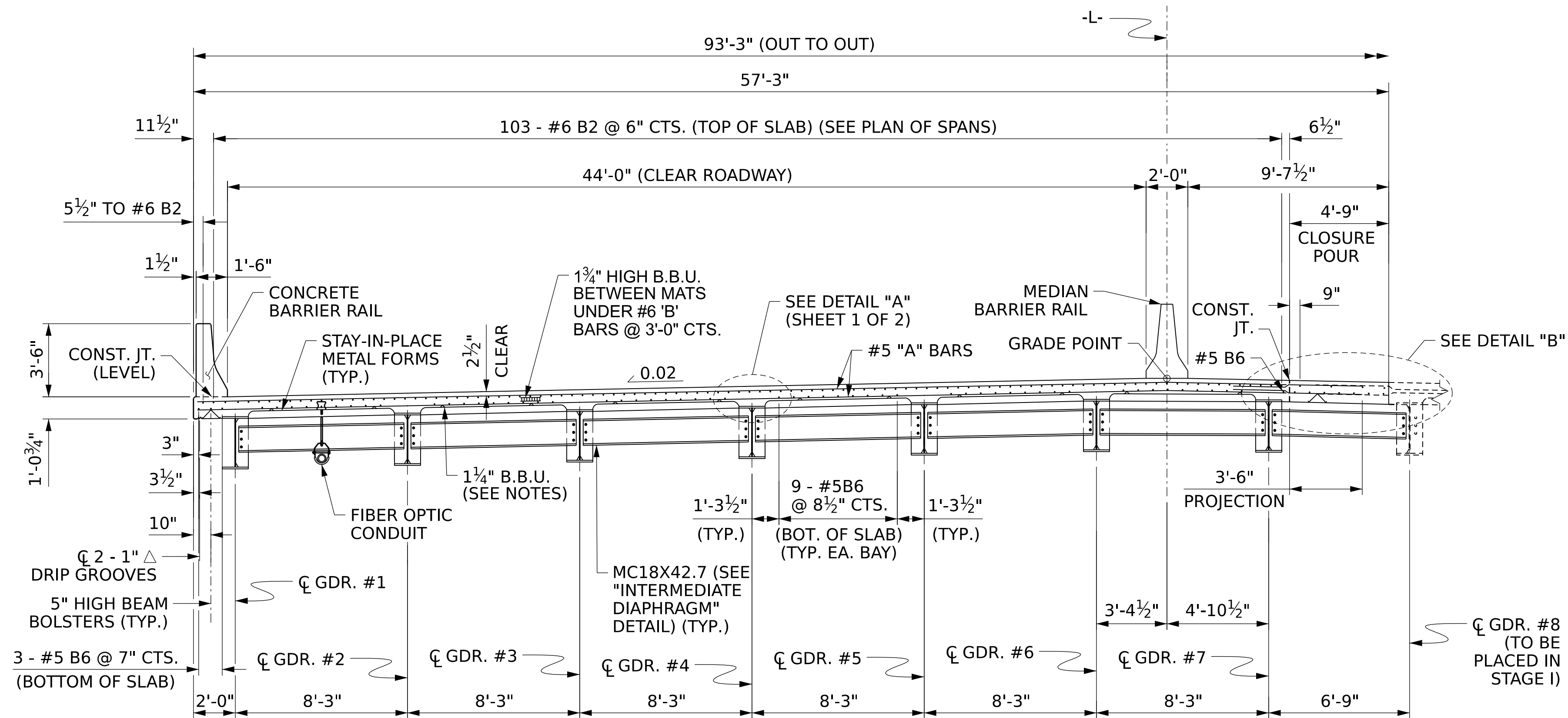
Designed by: Kyle Smiach

PROJECT NO. **B-5982**
HAYWOOD COUNTY
STATION: **20+37.51 -L-**
SHEET 1 OF 2

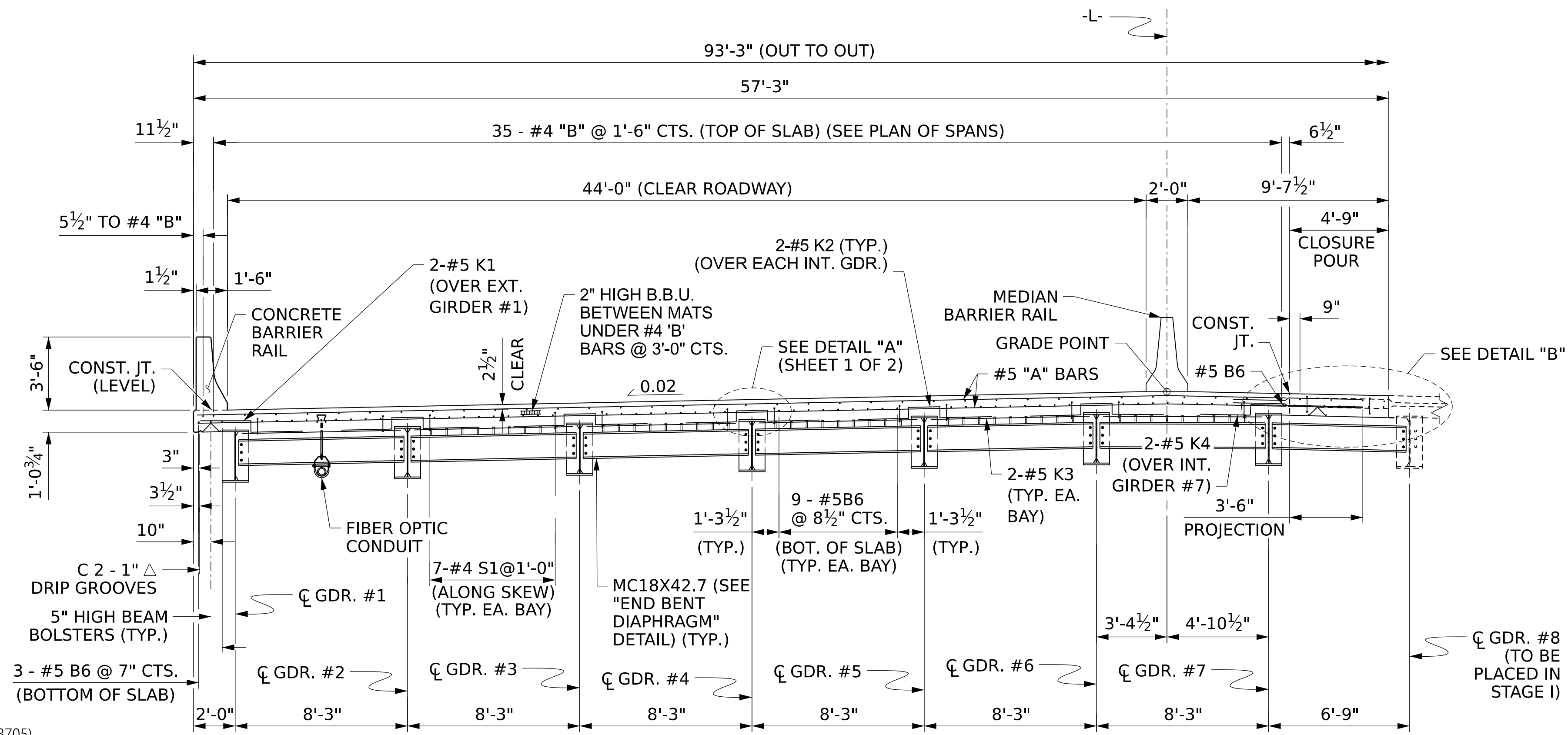
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
STAGE I

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

S-10
TOTAL SHEETS
51



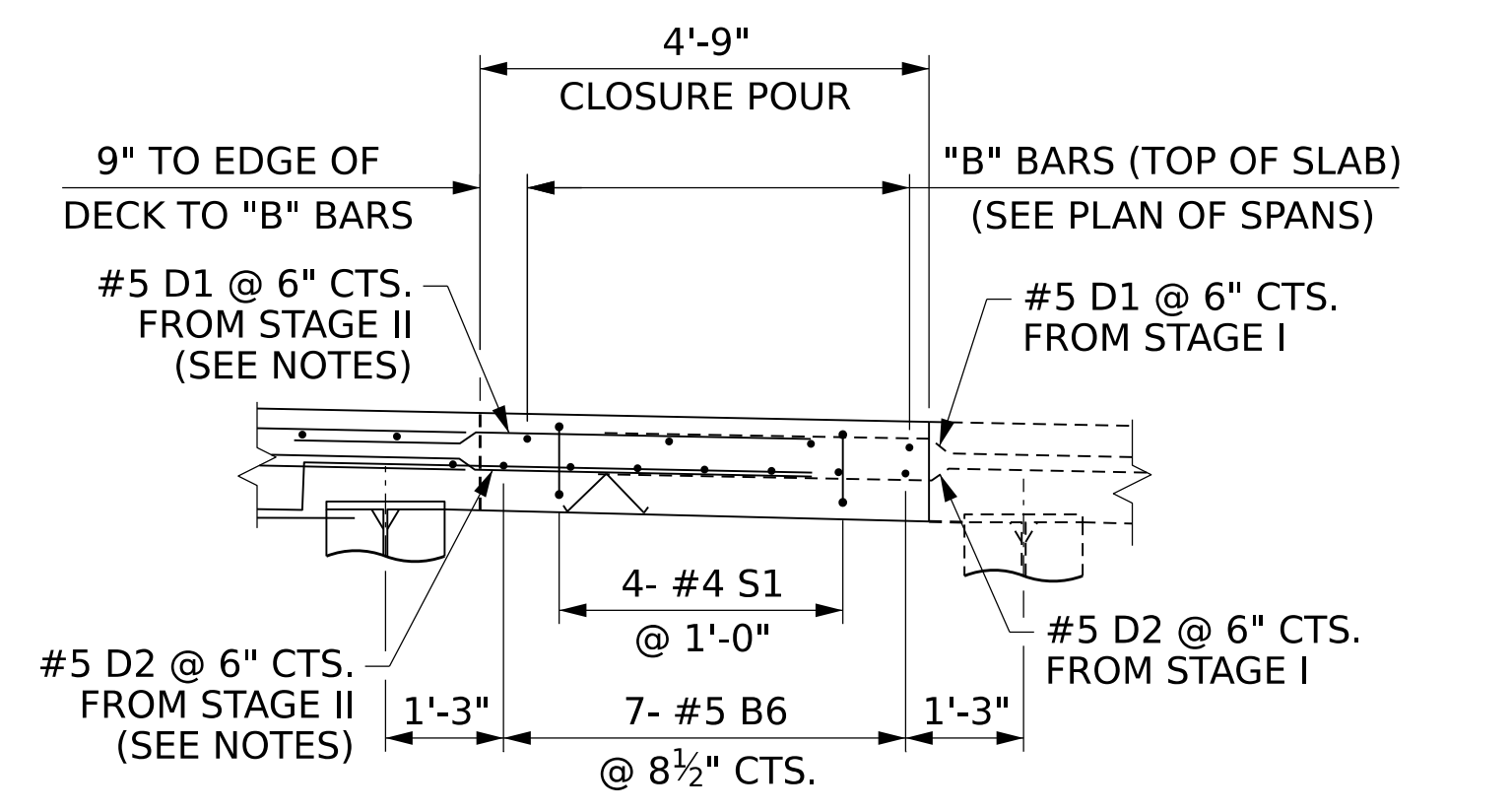
TYPICAL SECTION - STAGE II
(BENT DIAPHRAGMS SHOWN, INTERMEDIATE DIAPHRAGMS SIMILAR)



TYPICAL SECTION - STAGE II
(SHOWING END BENT DIAPHRAGMS)

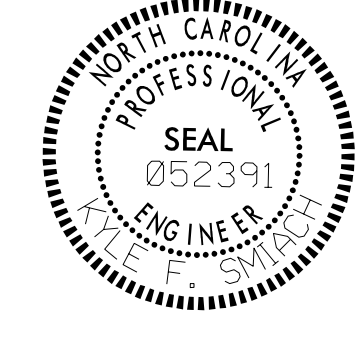
NOTES

- PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.
- DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.
- METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.
- BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.
- STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.
- SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY ITEMS OF THE ANCHORED PORTABLE CONCRETE BARRIER.
- THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.



DETAIL "B"
(SHOWING END BENT DIAPHRAGMS)

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET **2** OF **2**



STATE OF NORTH CAROLINA
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 RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
STAGE II

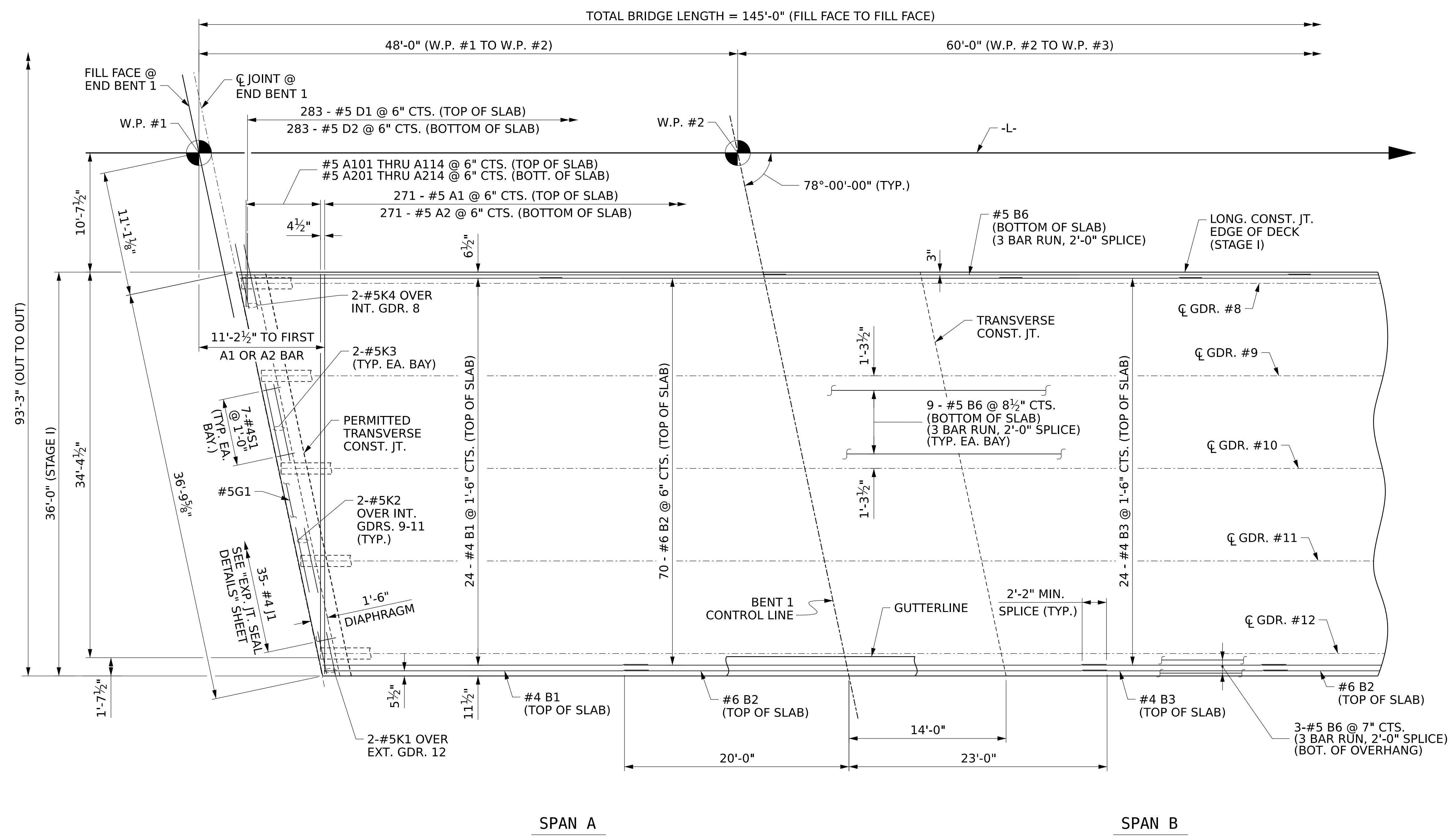
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NOTES:
 FOR POUR SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "BILL OF MATERIAL" SHEET.



PLAN OF SPANS - STAGE I

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 1 OF 4



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PLAN OF SPANS
STAGE I

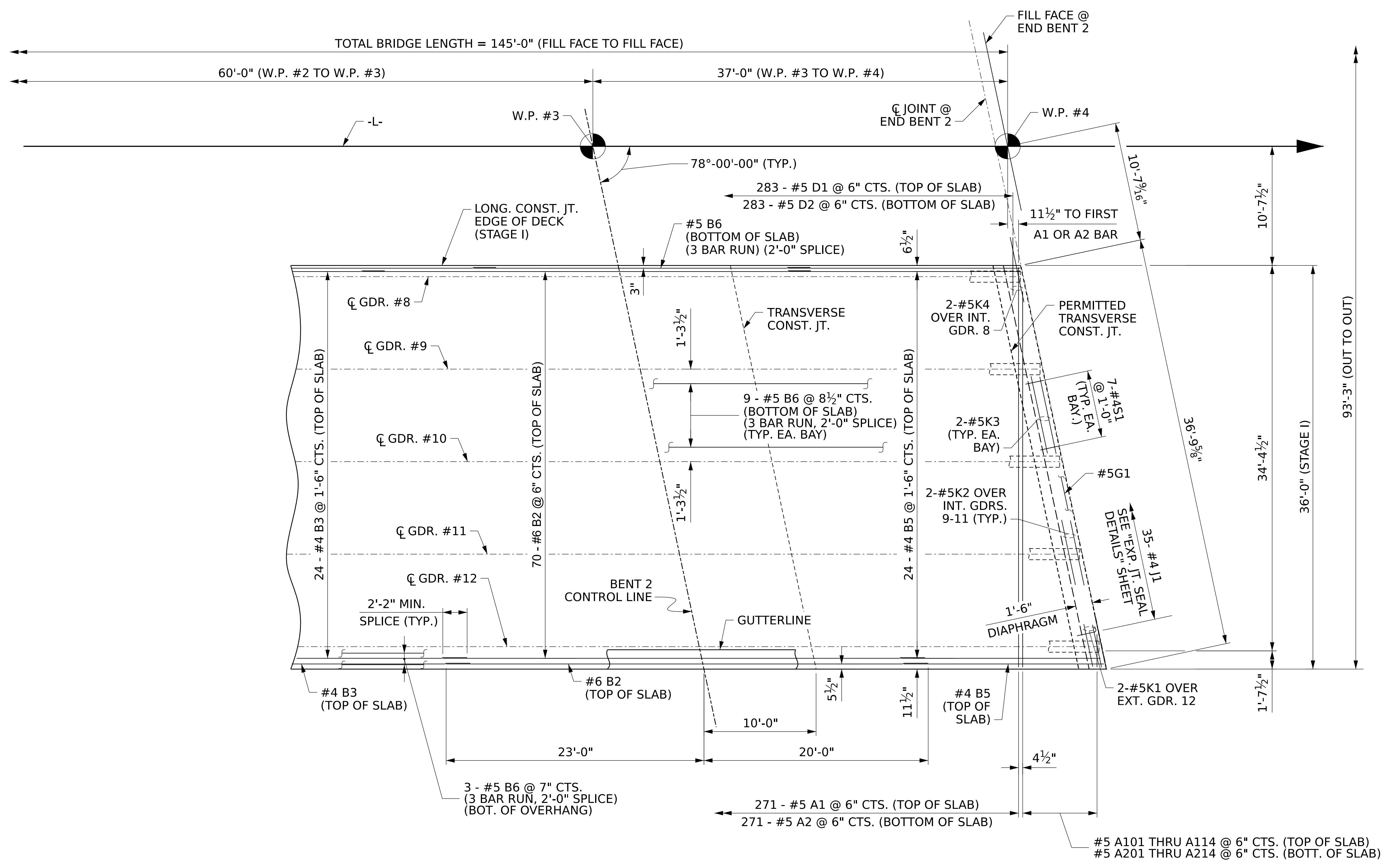
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PLAN OF SPANS - STAGE I

PROJECT NO. **B-5982**

HAYWOOD COUNTY

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SHEET 2 OF 4

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SUPERSTRUCTURE
PLAN OF SPANS
STAGE I



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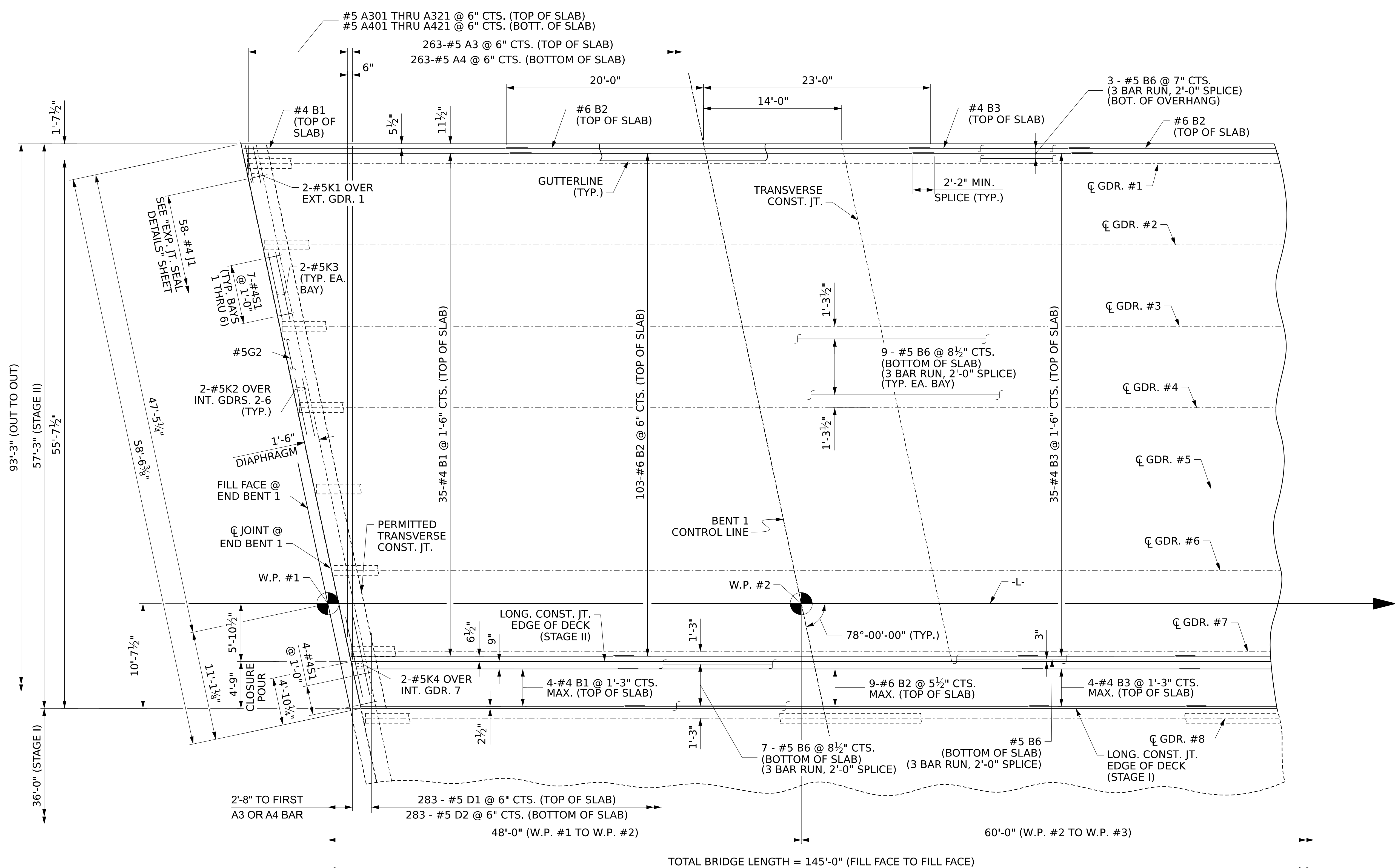
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PLAN OF SPANS - STAGE II

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 3 OF 4



STATE OF NORTH CAROLINA
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SUPERSTRUCTURE
PLAN OF SPANS
STAGE II

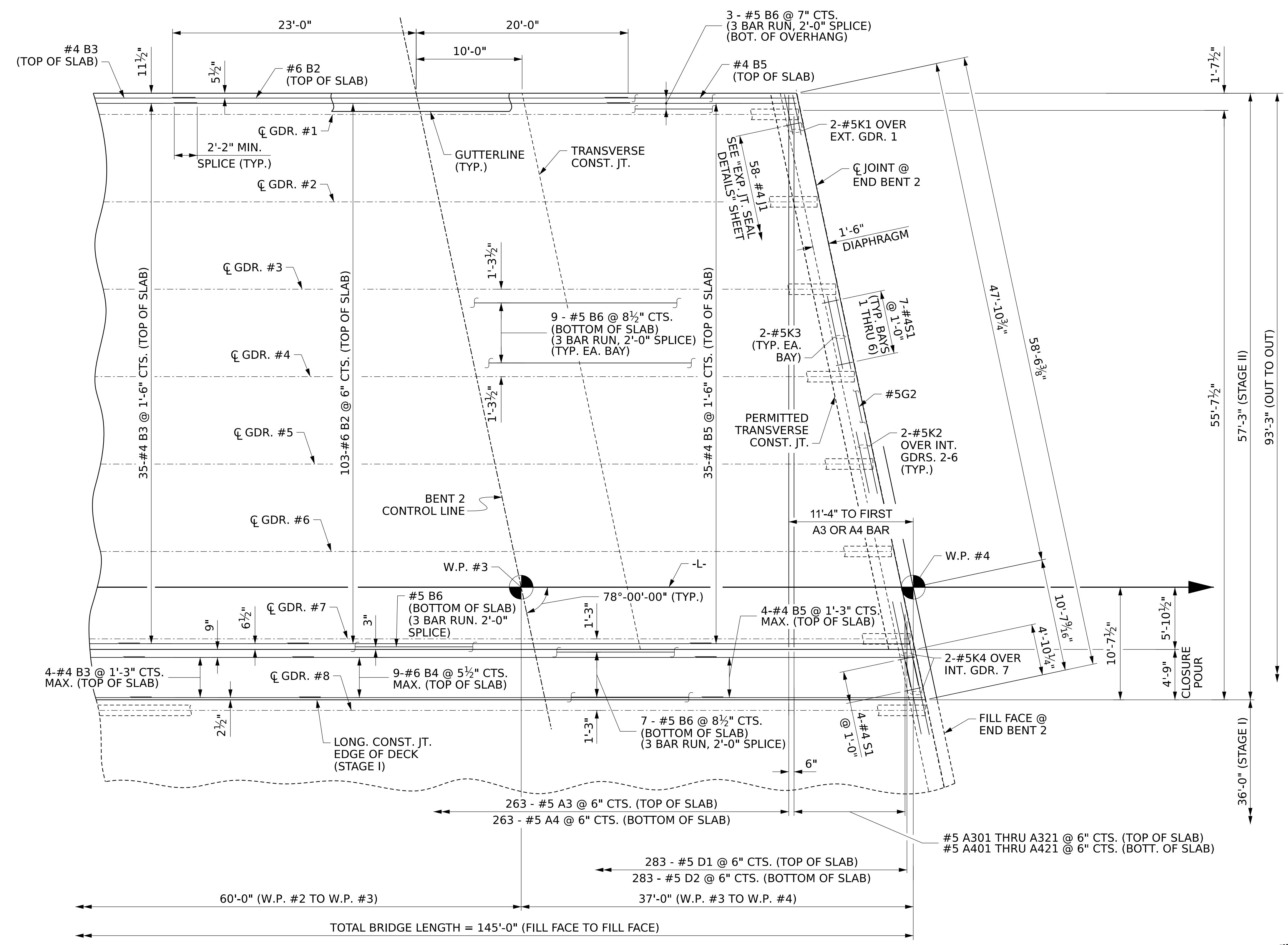
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 SHEET 4 OF 4

STATE OF NORTH CAROLINA
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PLAN OF SPANS
STAGE II



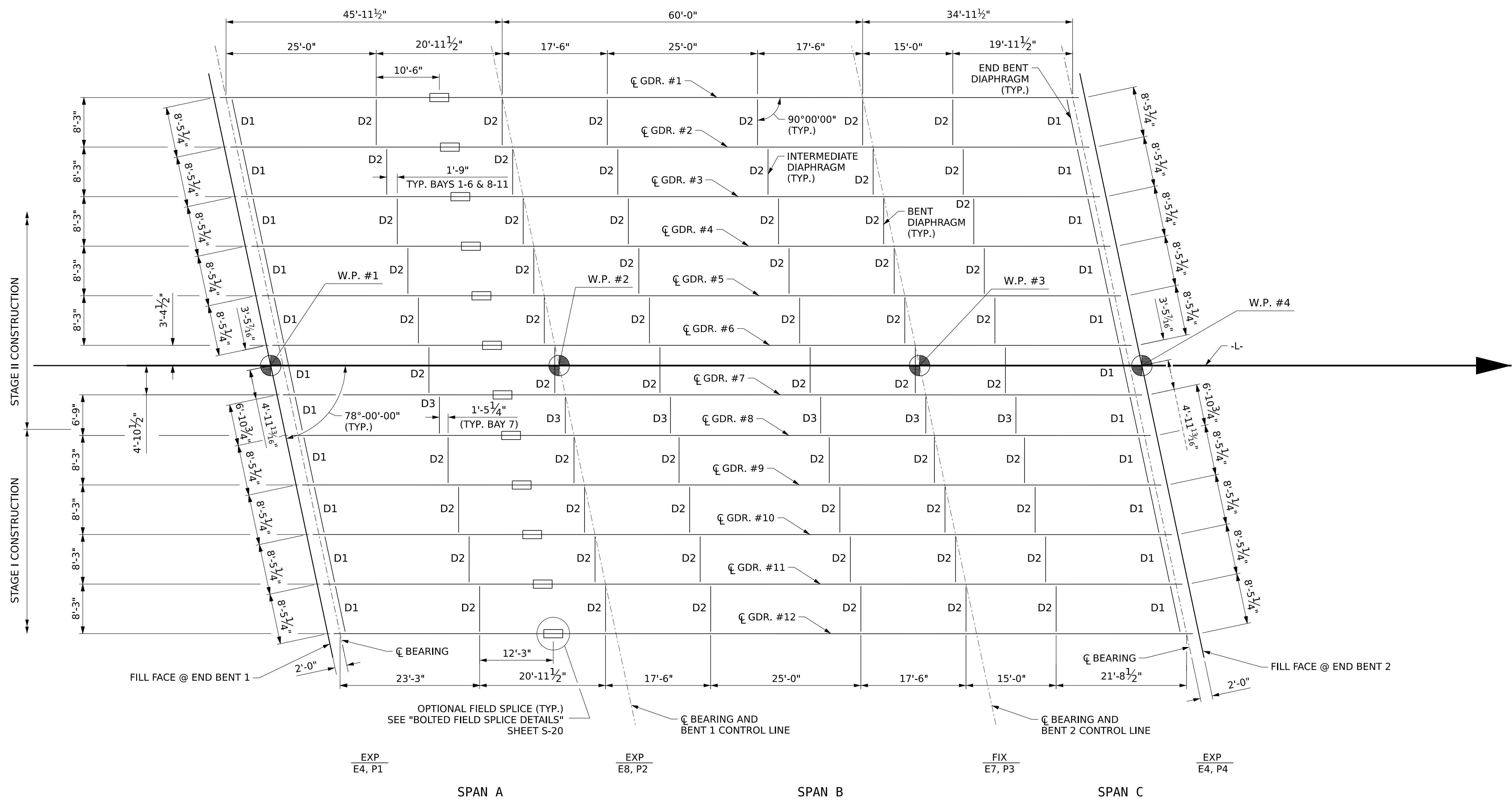
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FRAMING PLAN

SEE STRUCTURAL STEEL DETAILS SHEET 2 OF 4 FOR DIAPHRAGM TYPE DETAILS

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**

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FRAMING PLAN



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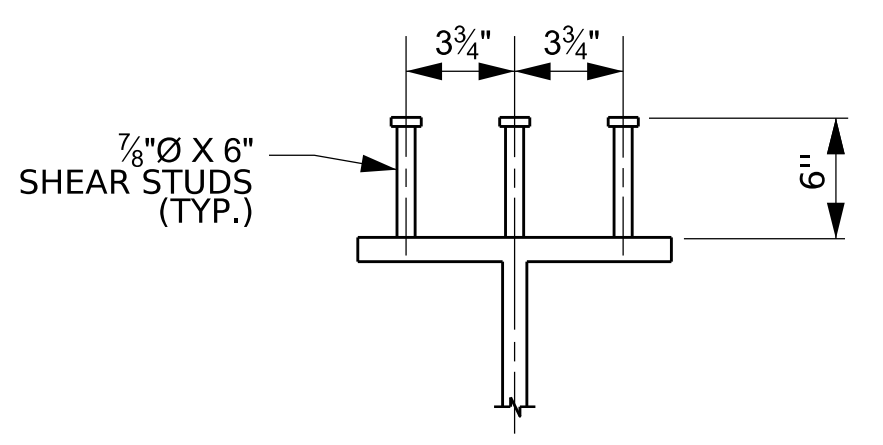
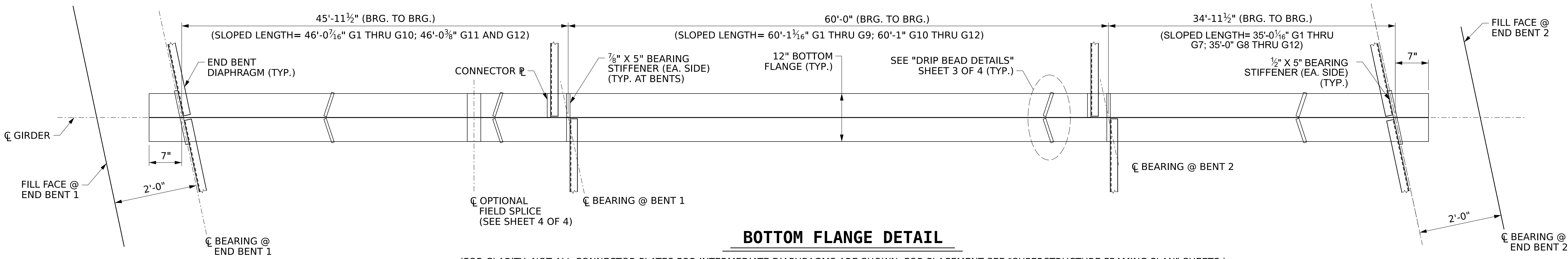
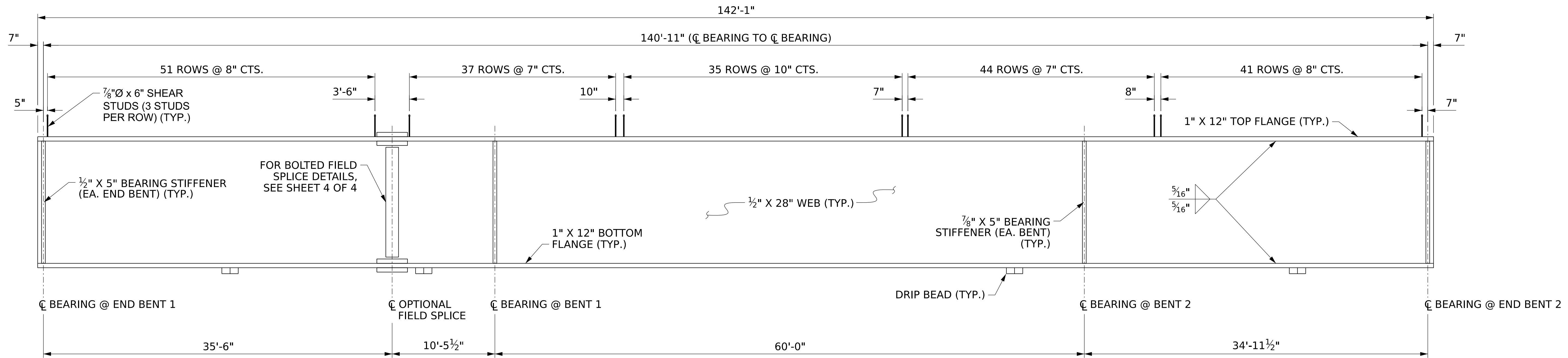
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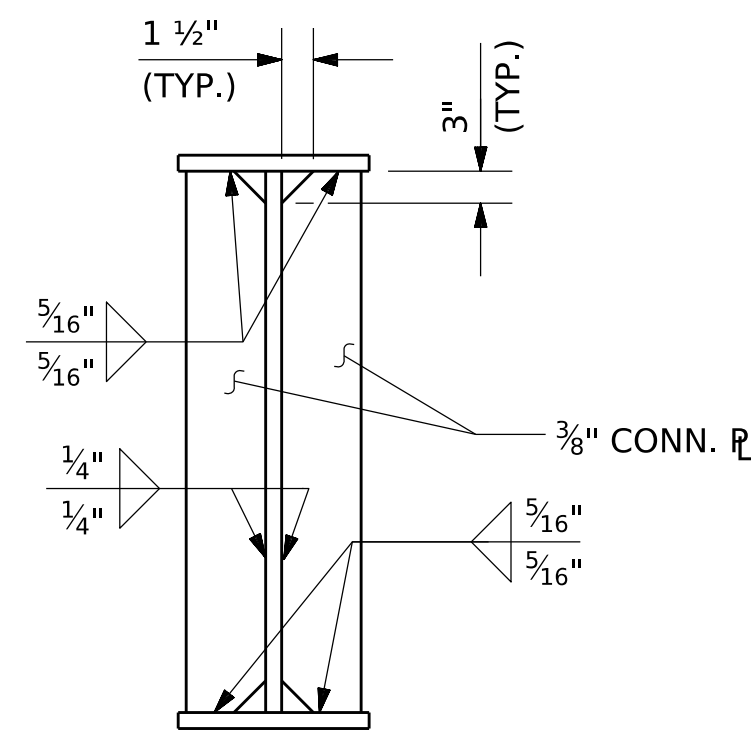
PROJECT NO. **B-5982**
HAYWOOD COUNTY
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 SHEET **1** OF **4**

STATE OF NORTH CAROLINA
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 RALEIGH
SUPERSTRUCTURE
STRUCTURAL STEEL
DETAILS

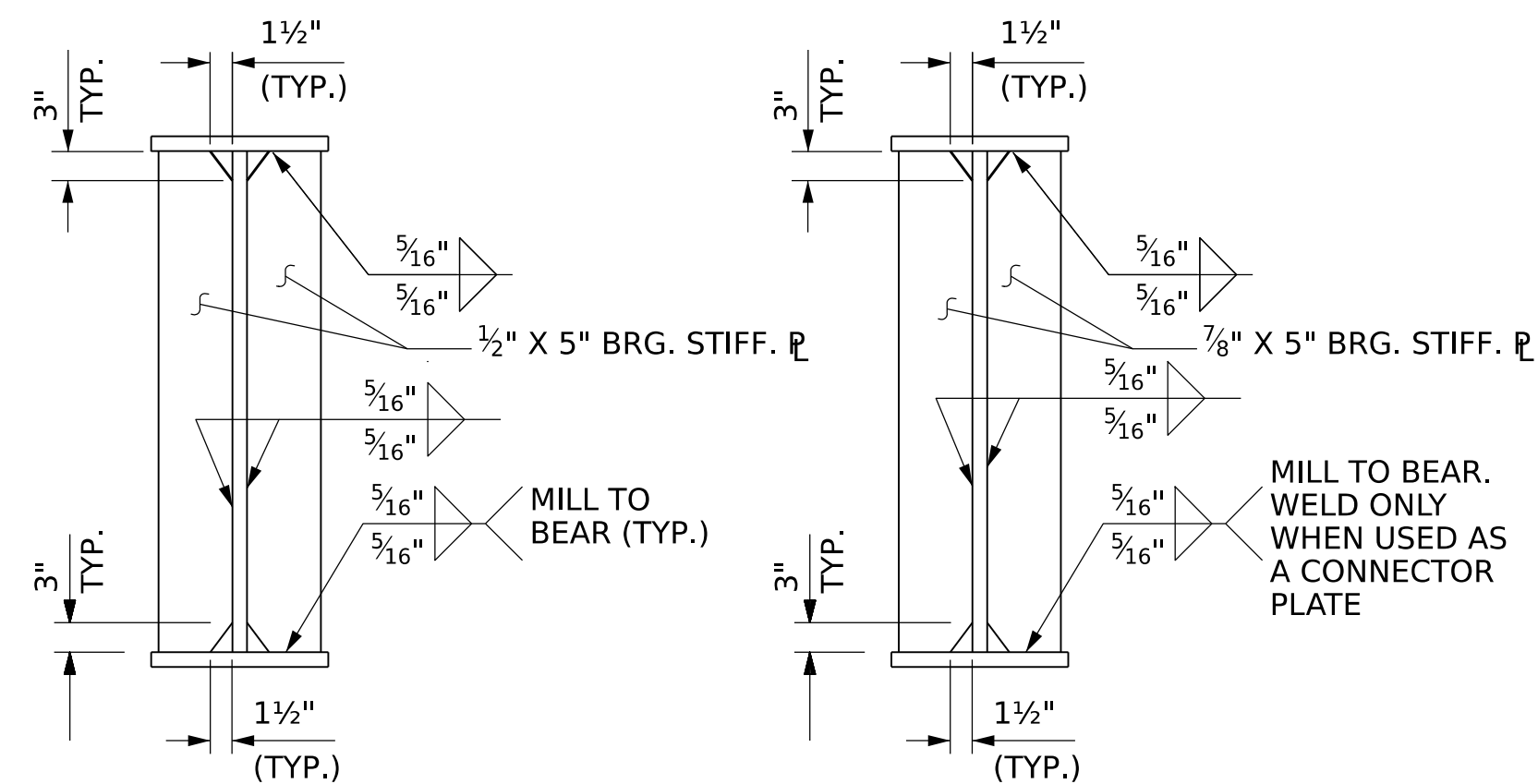
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CONNECTOR PLATE

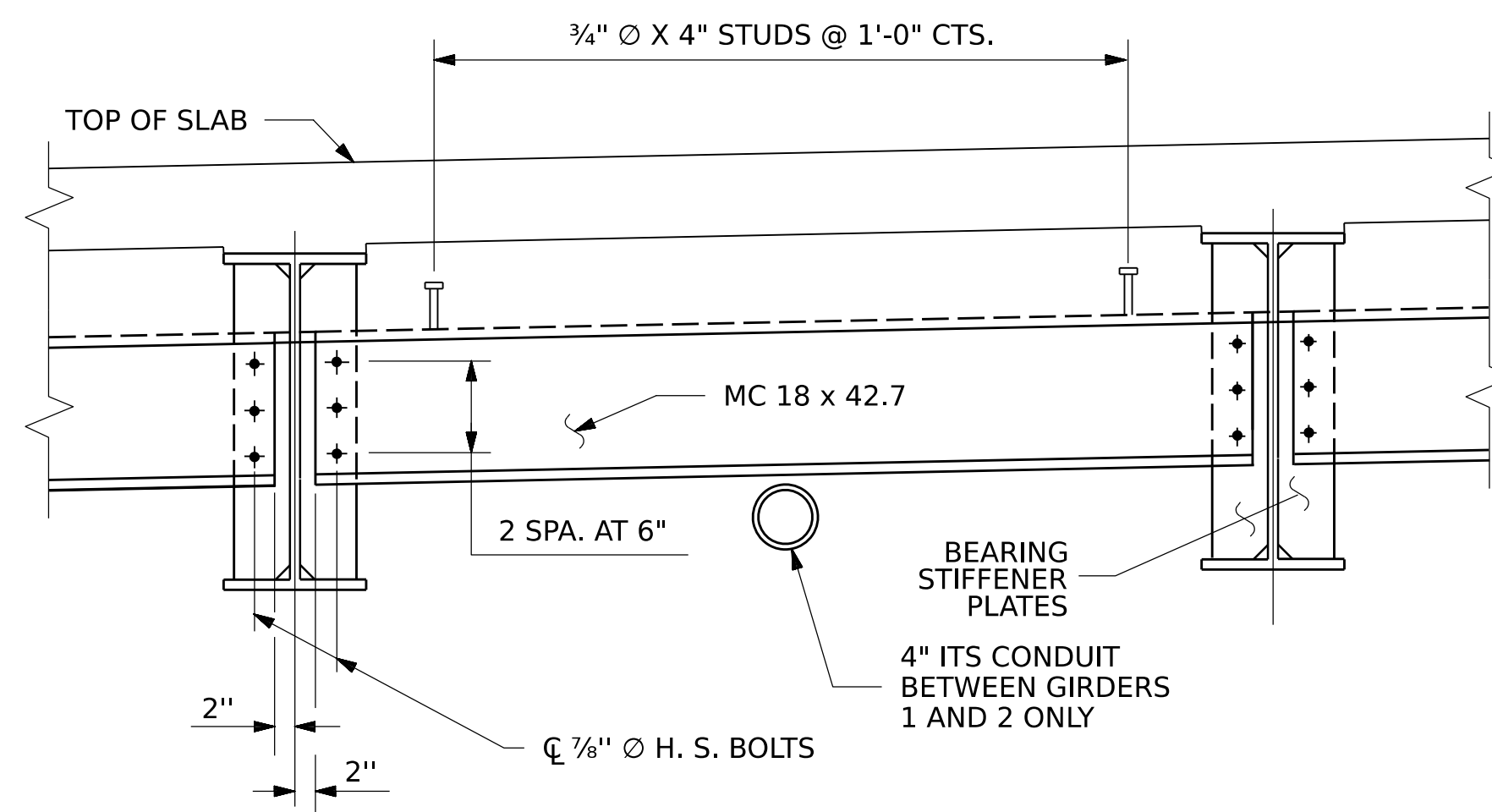


AT END BENTS

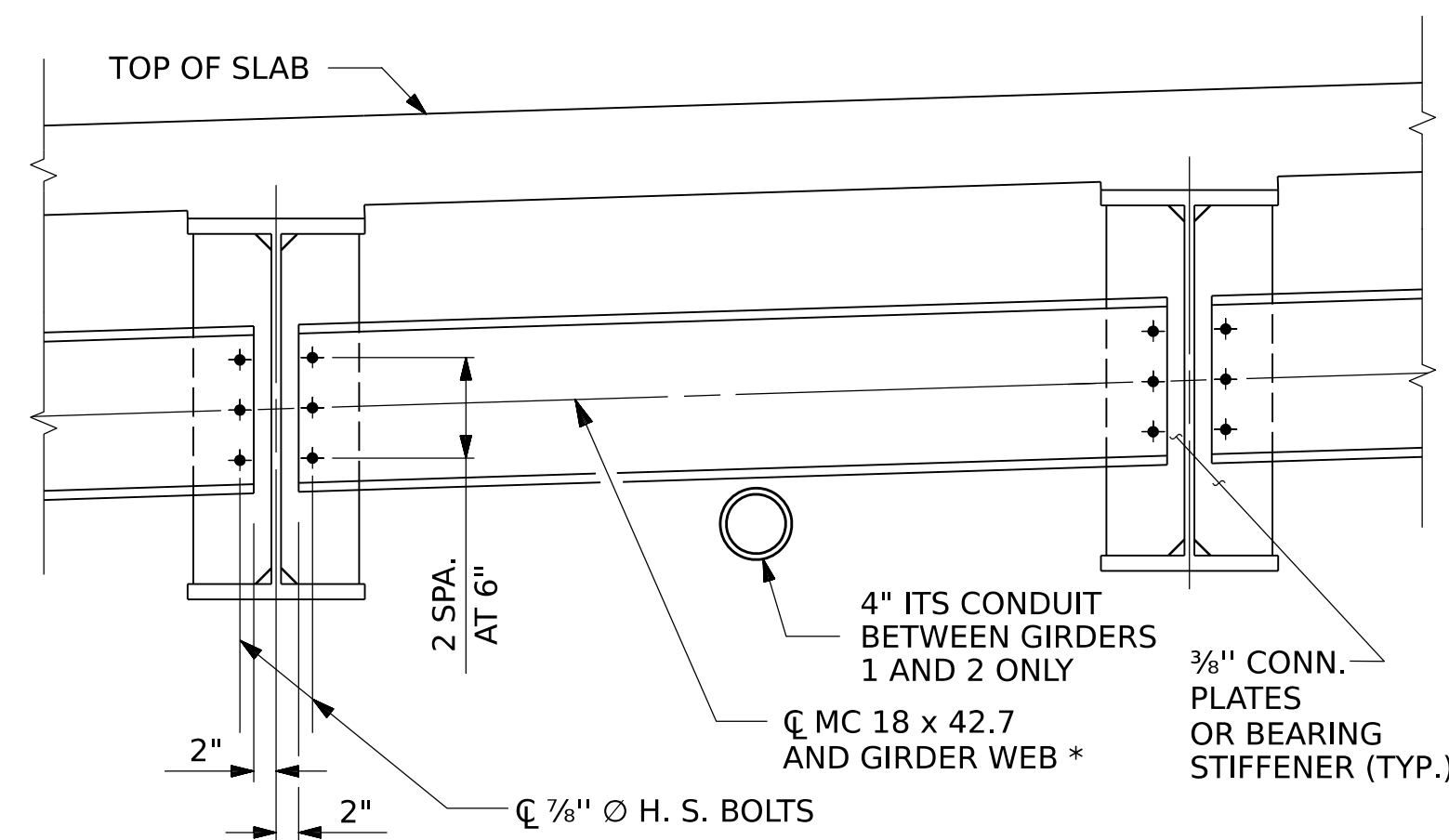
AT BENTS

BEARING STIFFENER

* BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE

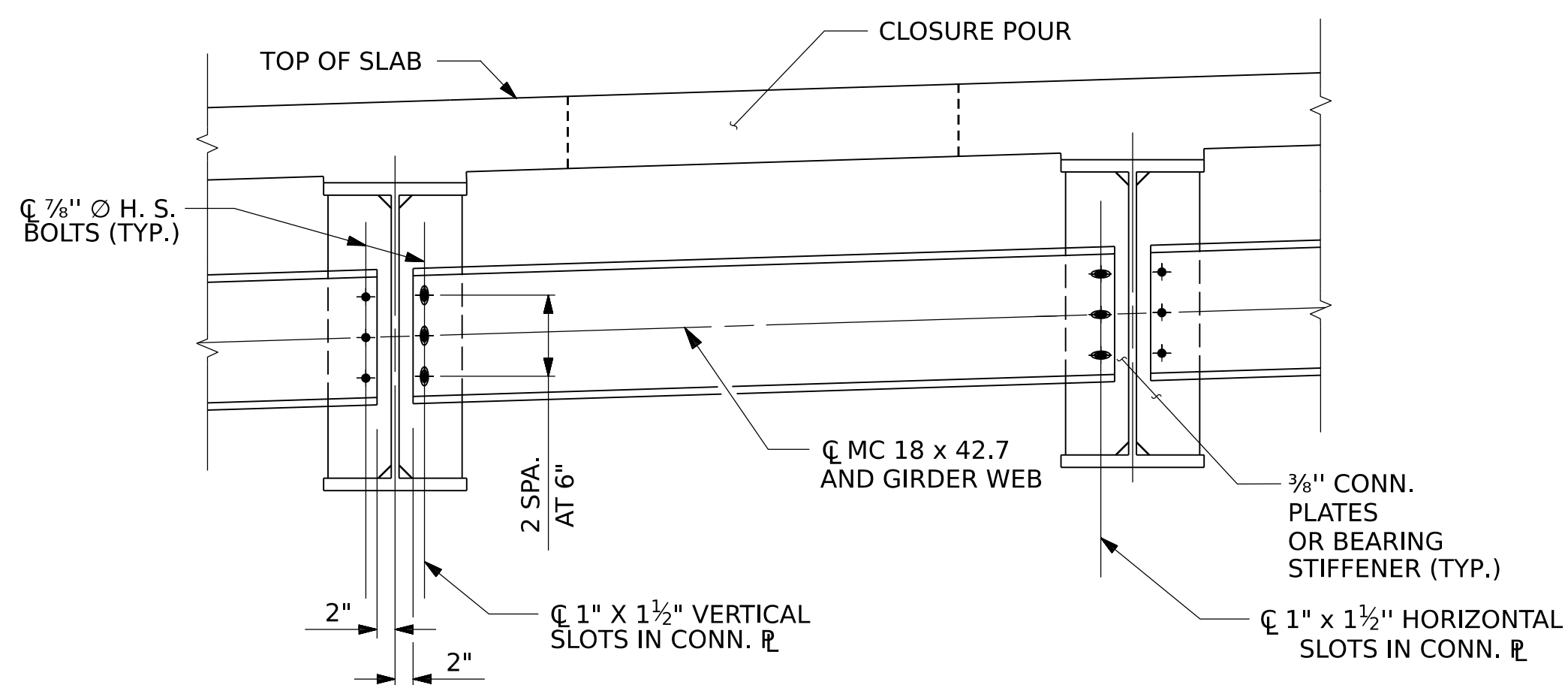


END BENT DIAPHRAGM (D1)

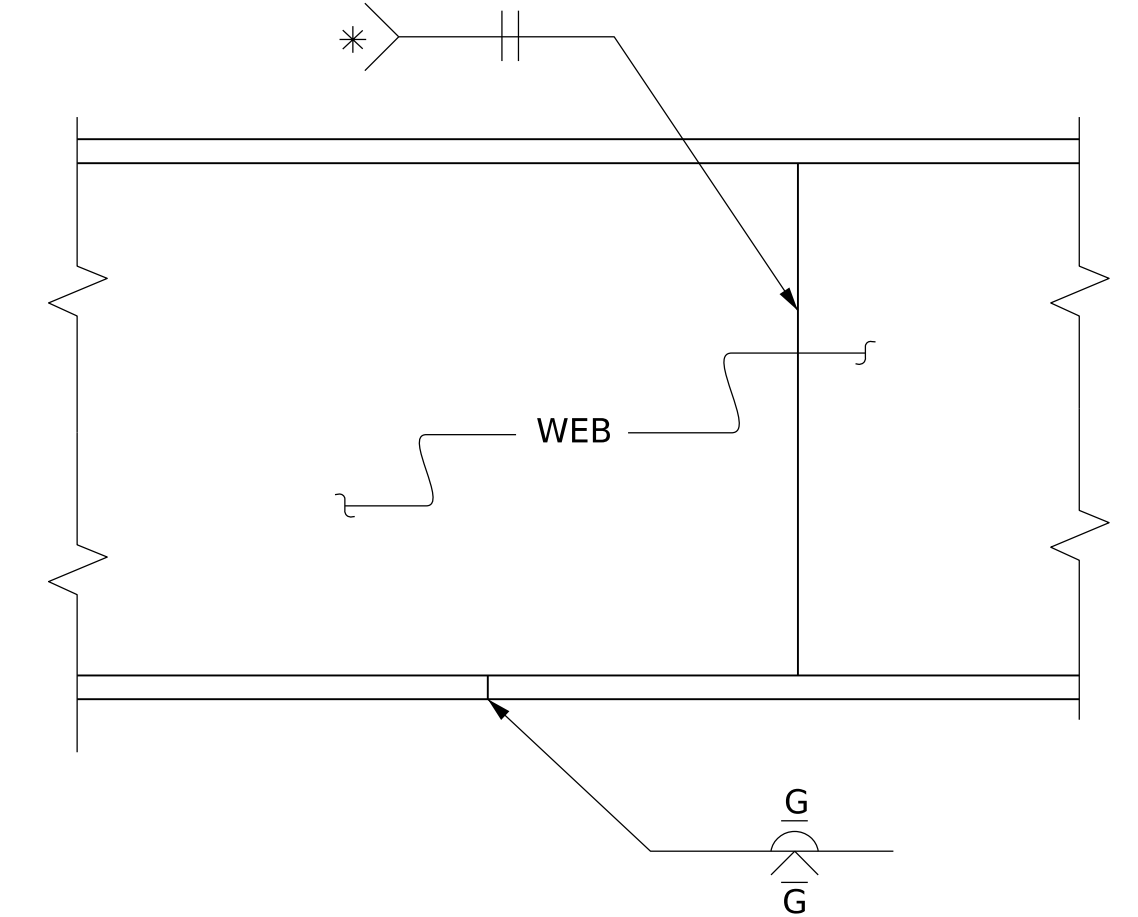


TYPICAL INTERMEDIATE AND BENT DIAPHRAGM (D2)

* NOTE: DIAPHRAGM IN BAY 1 MAY BE SHIFTED UP SLIGHTLY SO THAT CONDUIT REMAINS FULLY ABOVE THE BOTTOM OF THE BOTTOM FLANGE



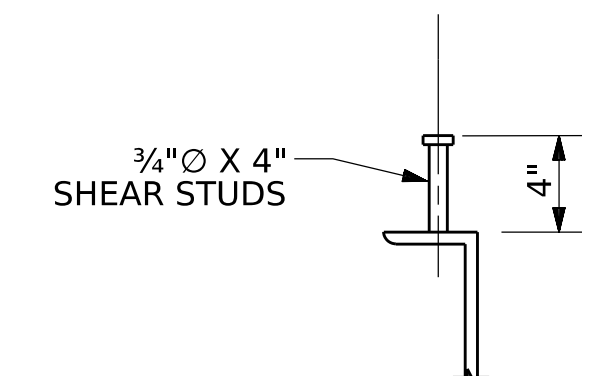
INTERMEDIATE AND BENT DIAPHRAGM IN CLOSURE BAY (D3)



ELEVATION

TYPICAL FLANGE AND WEB BUTT JOINT

* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS



END BENT DIAPHRAGM SHEAR STUD DETAILS



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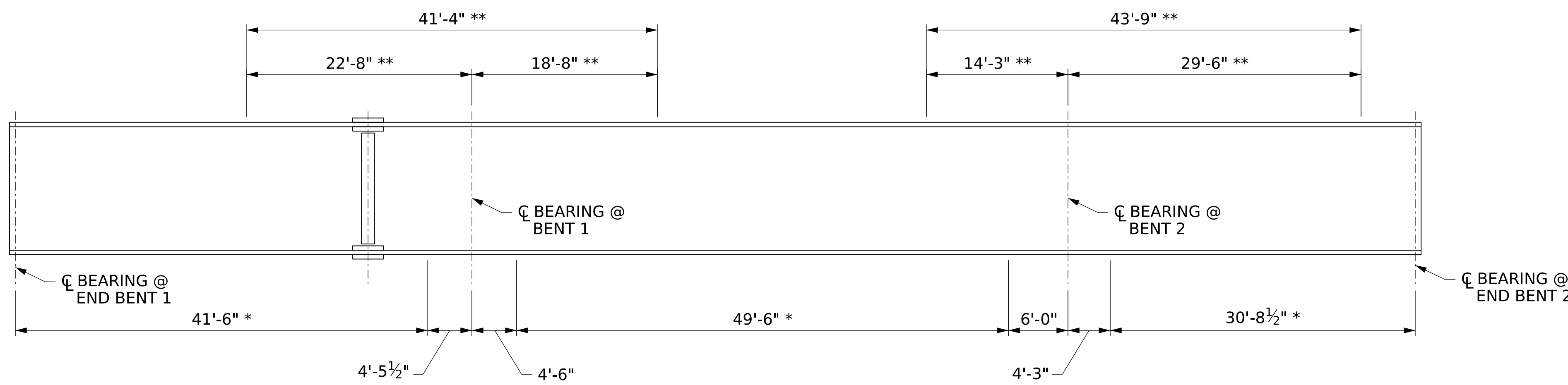
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SHEET **2** OF **4**

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
STRUCTURAL STEEL DETAILS

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TOTAL SHEETS
51



CHARPY V-NOTCH TEST FOR GIRDERS

* CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS, INCLUDING ALL WEB PLATES AND SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE TOP FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

** IN ADDITION TO THE NOTES ABOVE, NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTING IN THIS REGION.

STRUCTURAL STEEL NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS ARE SHOWN HORIZONTAL AND VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION. KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE AASHTO A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

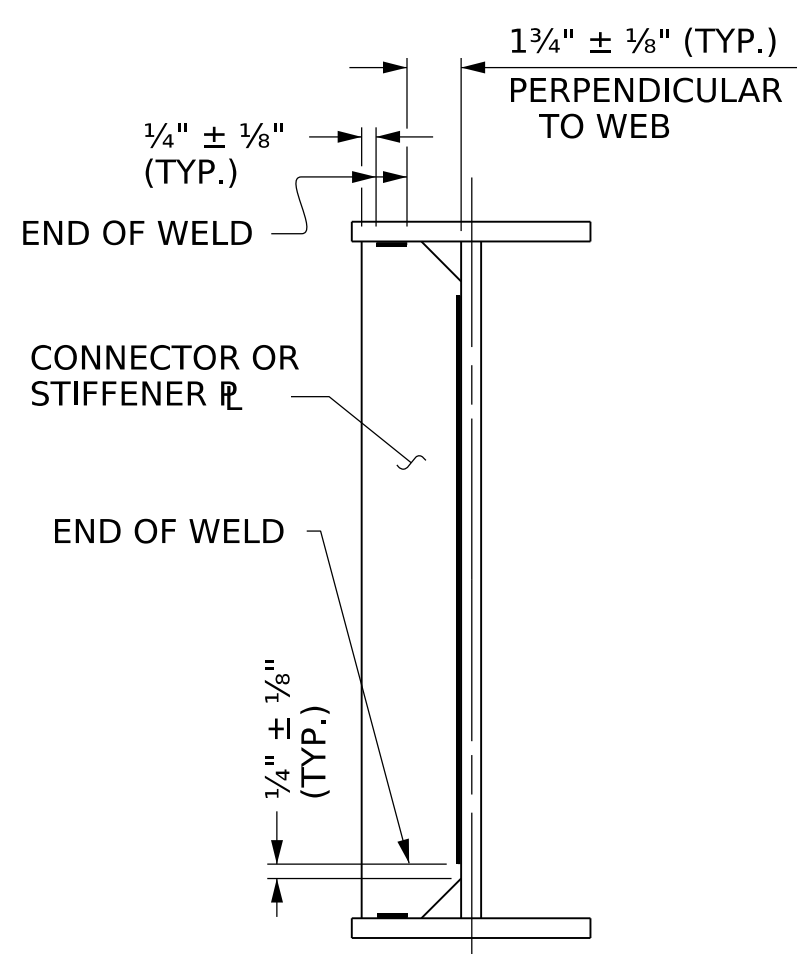
FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP, GIRDERS SHALL BE PLUMB AFTER FULL AMOUNT OF DEAD LOAD IS APPLIED.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

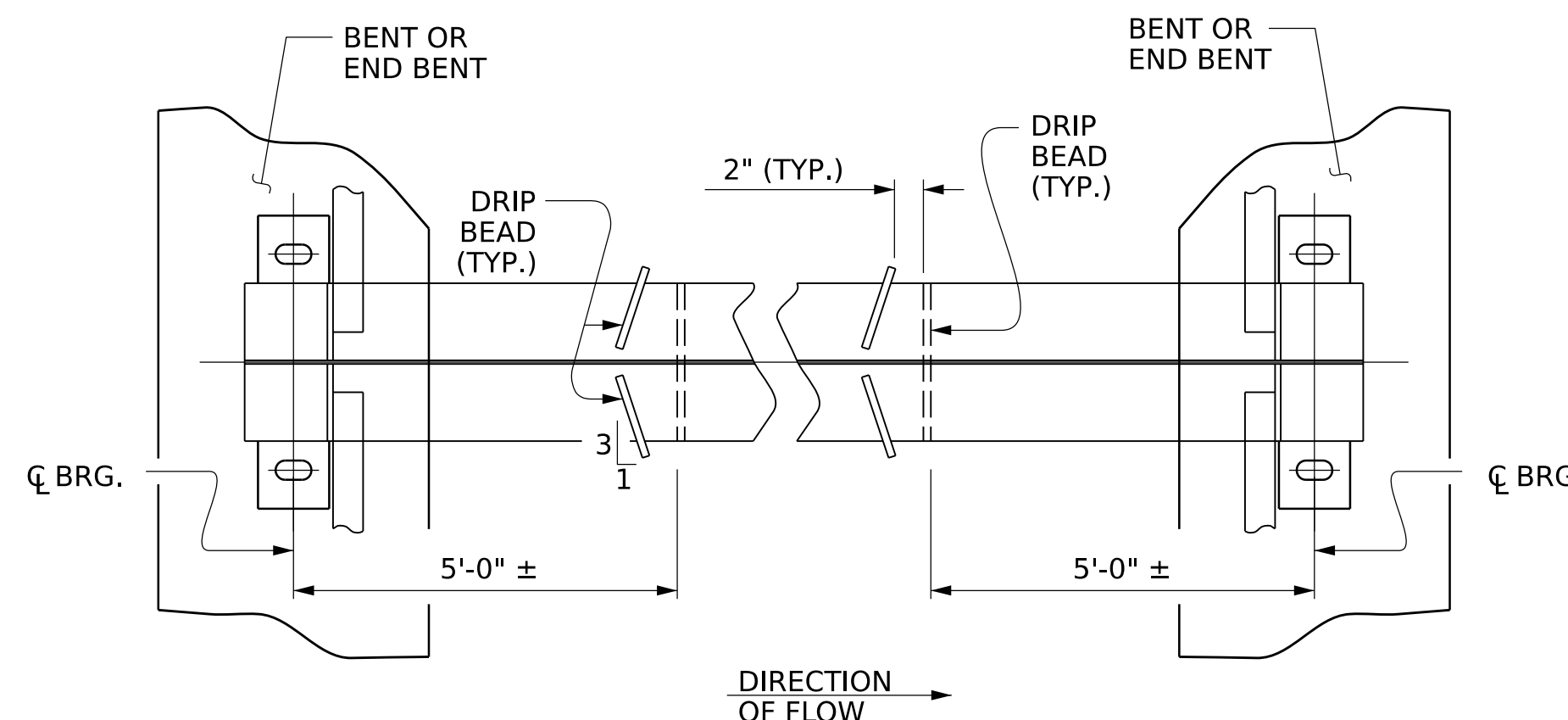
END OF GIRDERS SHALL BE PLUMB.

FOR DIAPHRAGMS IN THE CLOSURE POUR BAY (D3), NUTS ON BOLTS FOR CONNECTING DIAPHRAGM TO CONNECTOR PLATES SHALL BE LEFT LOOSE FOR PURPOSE OF ADJUSTMENT UNTIL BOTH SIDE OF THE SLAB HAVE BEEN POURED.

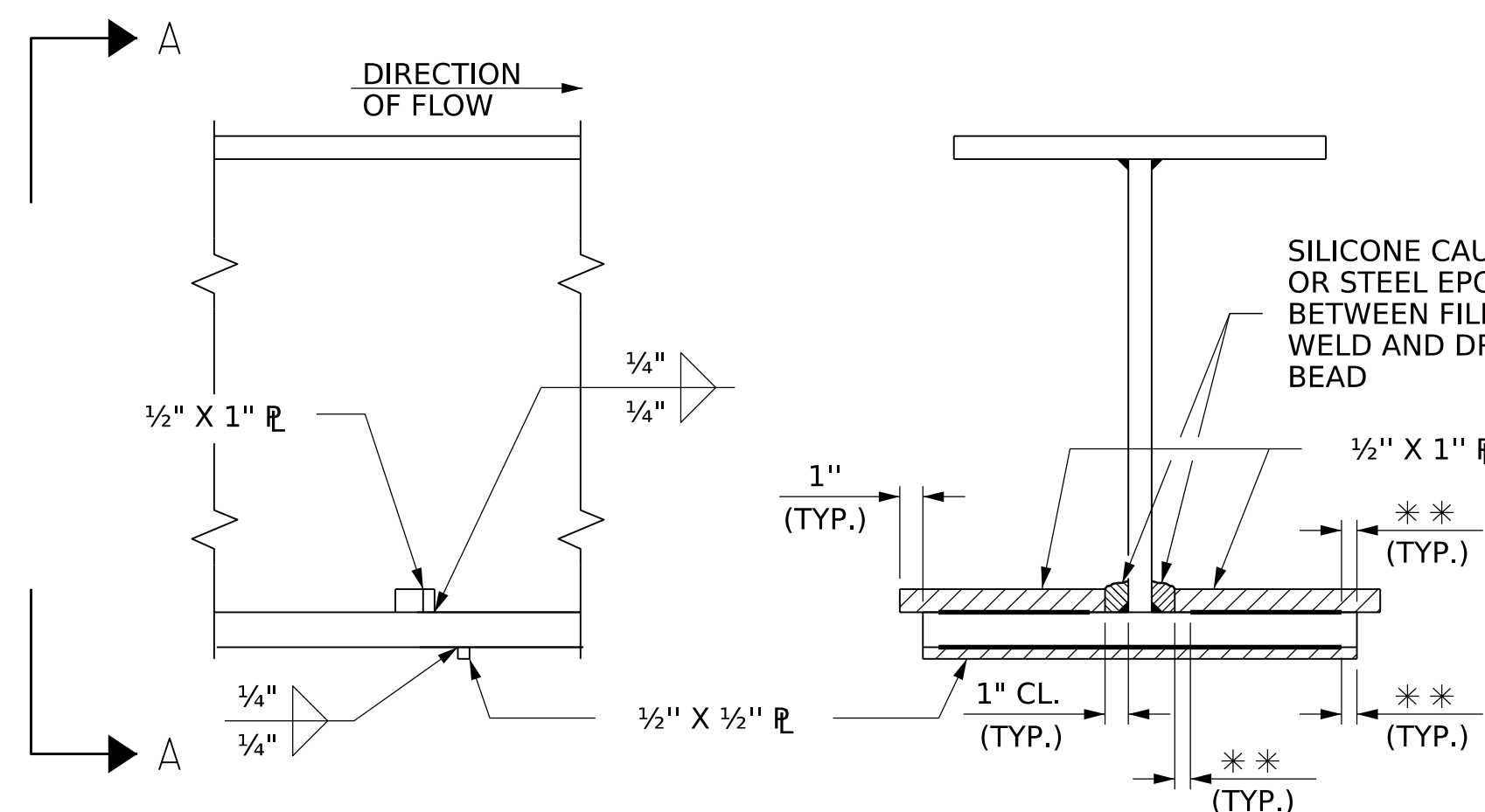
AT THE CONTRACTOR'S OPTION, THE OPTIONAL BOLTED FIELD SPLICE MAY BE OMITTED, PROVIDED THE CONTRACTOR OBTAINS ALL PERMITS REQUIRED FOR TRANSPORTING THE LONGER PIECE LENGTHS.



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS WELD TERMINATION DETAILS



PART PLAN - BOTTOM FLANGE



SECTION

VIEW A-A

** SEE 'WELD TERMINATION DETAILS' THIS SHEET

DRIP BEAD DETAILS

PROJECT NO. **B-5982**

HAYWOOD COUNTY

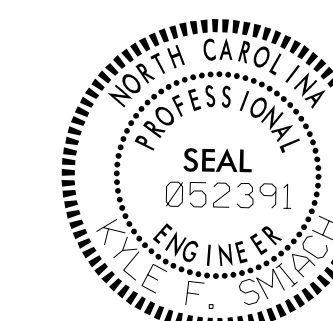
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SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS



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8EA50B9868E475...

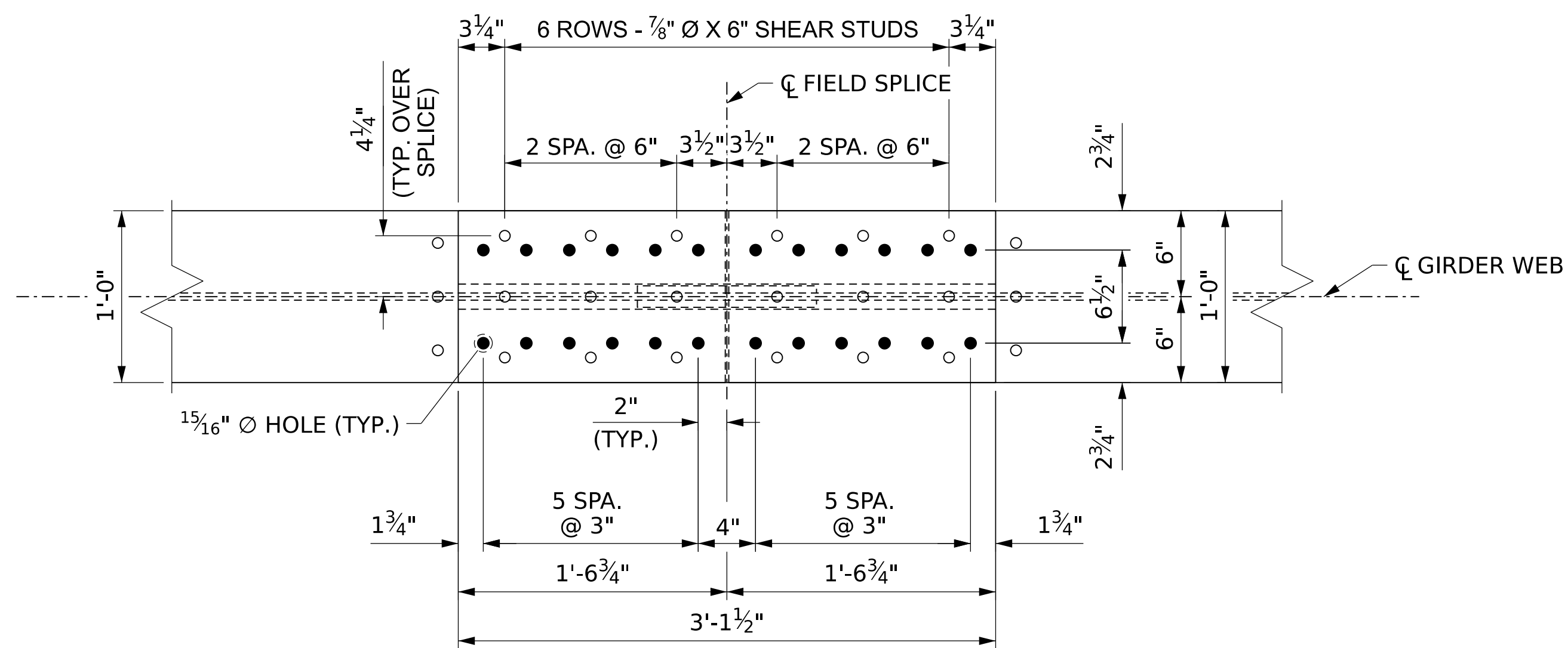
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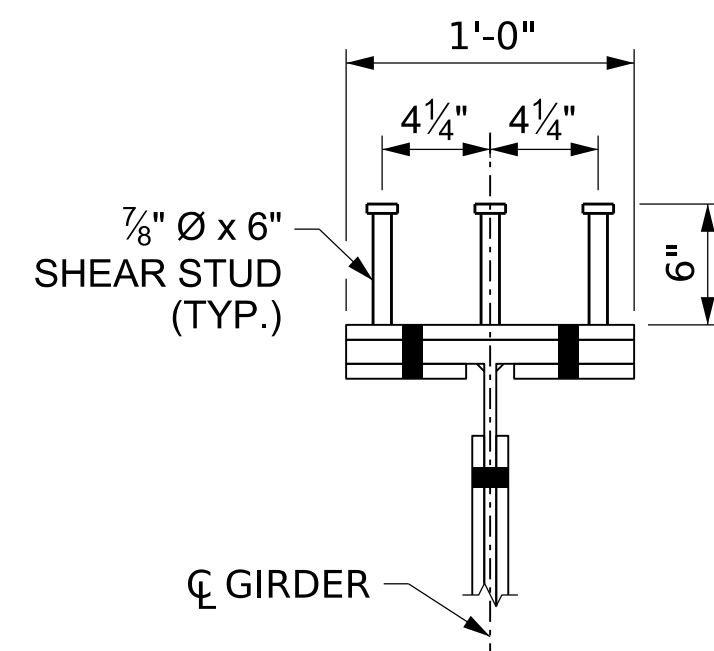
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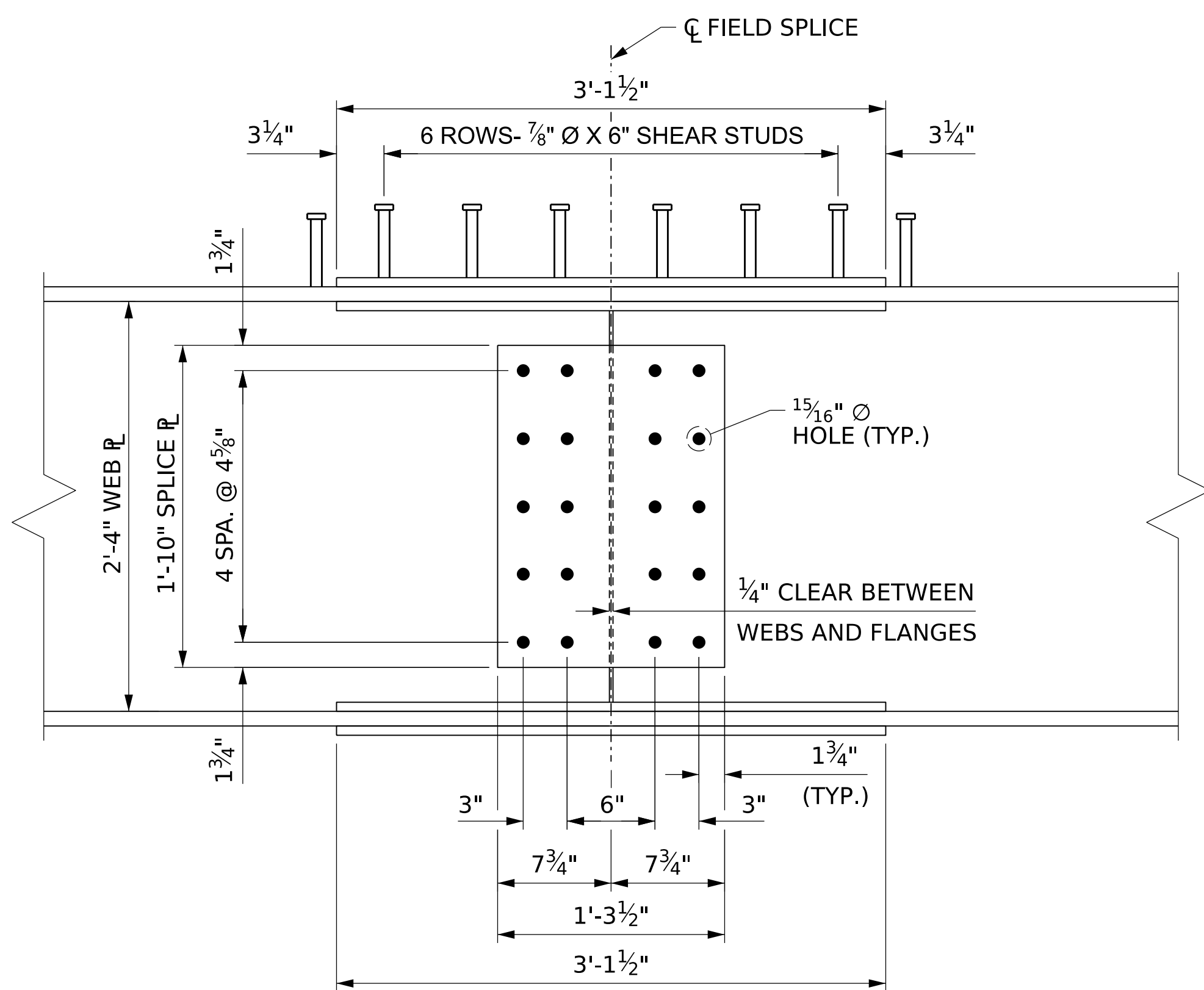
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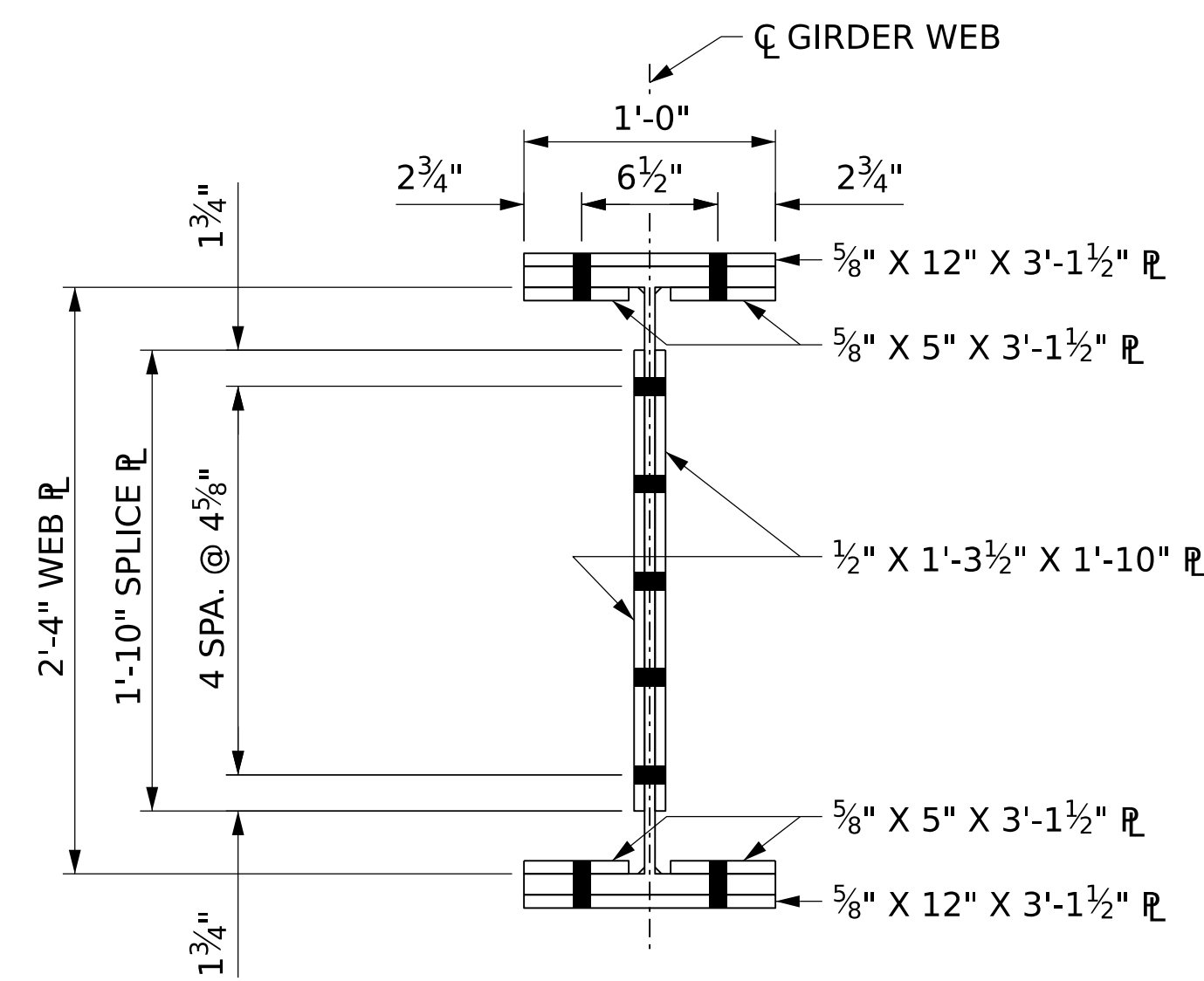
PLAN
(TOP FLANGE SHOWN; BOTTOM FLANGE MIRRORED)



SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE



ELEVATION



SECTION

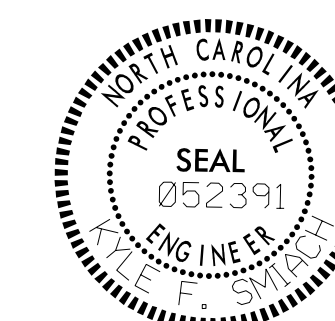
BOLTED FIELD SPLICE DETAILS

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 SHEET 4 OF 4

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SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS



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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.

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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 BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, 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.

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 STANDARD SPECIFICATIONS.

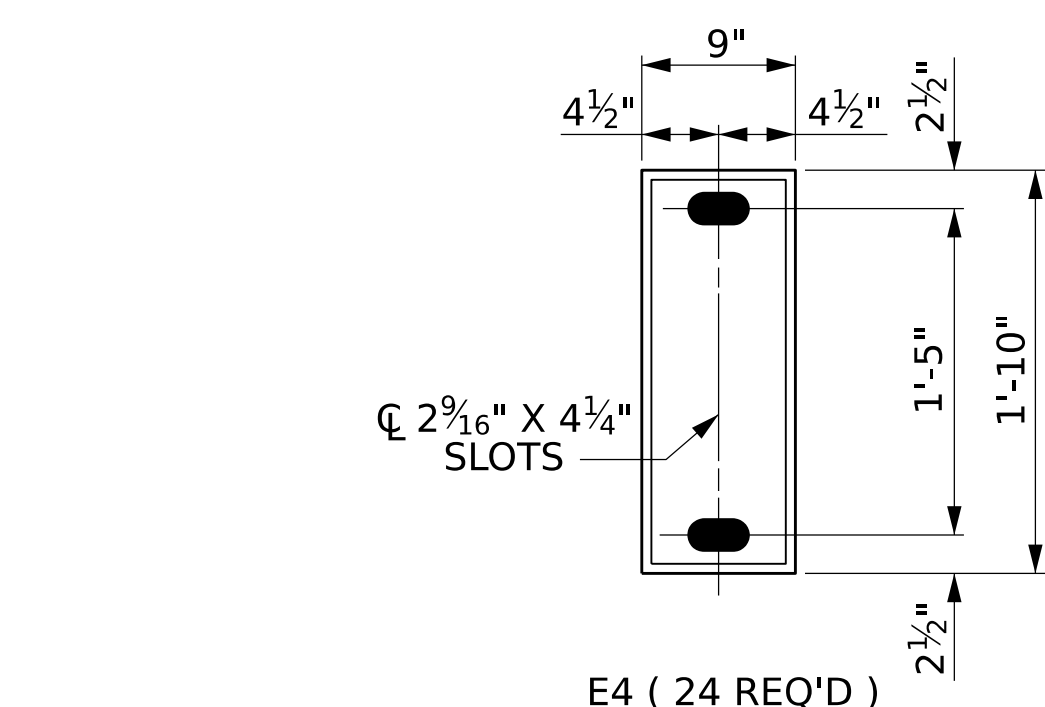
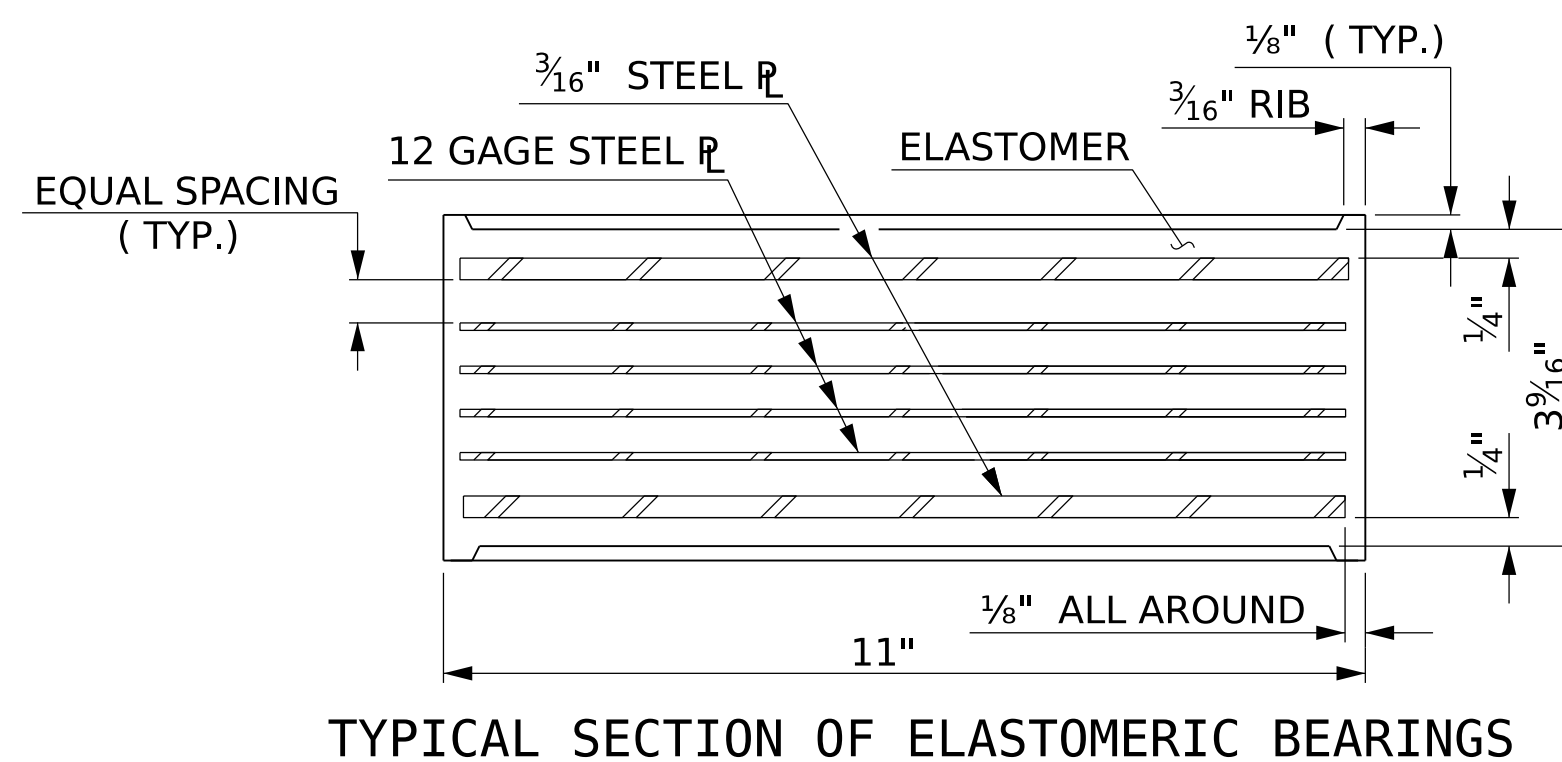
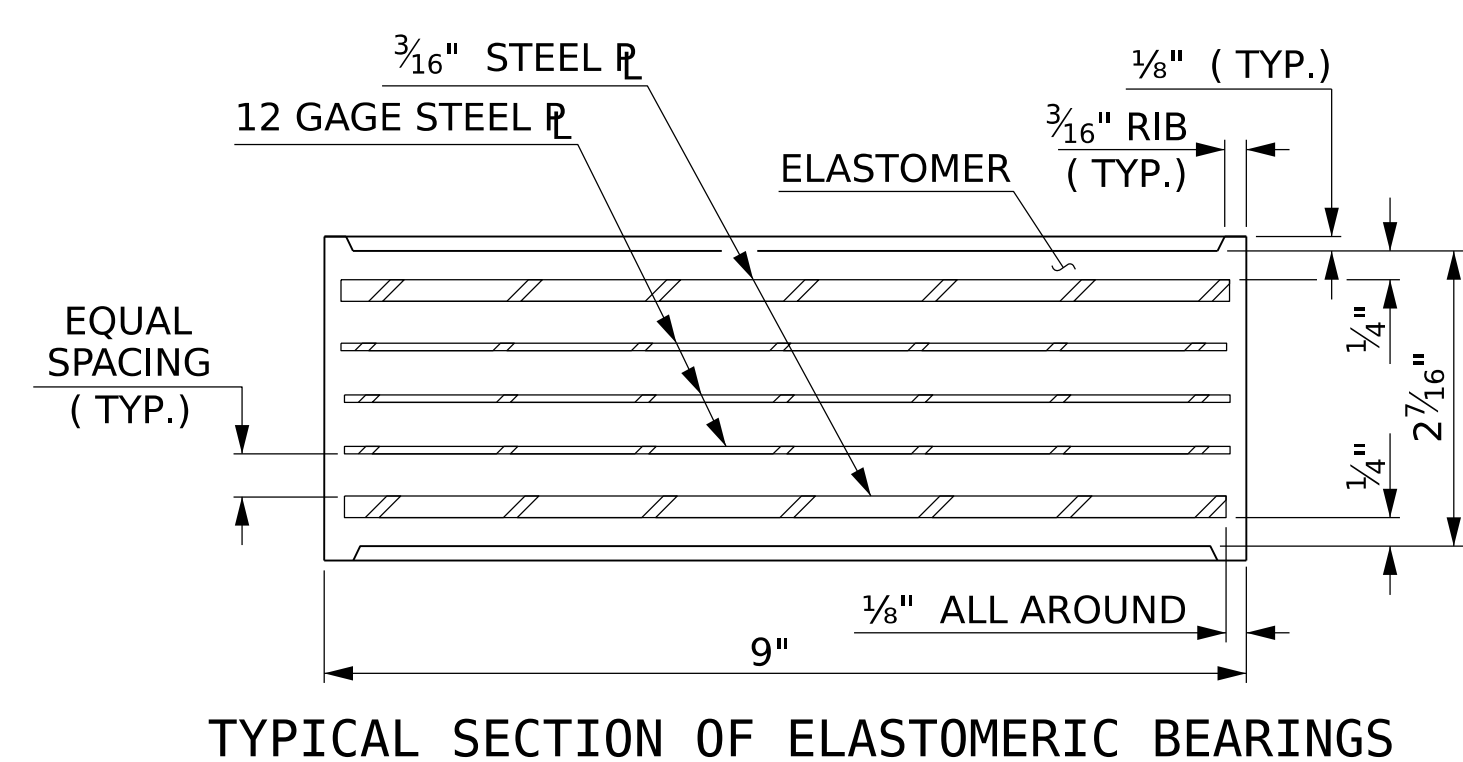
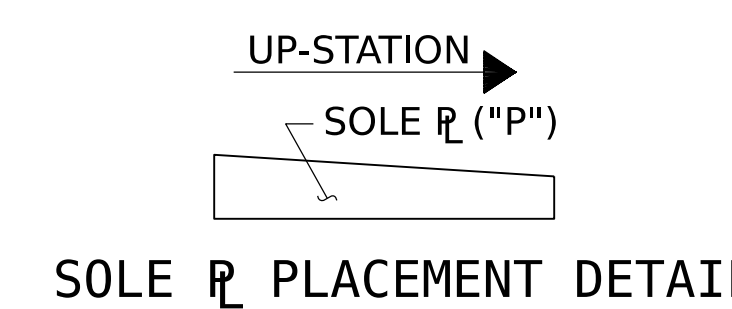
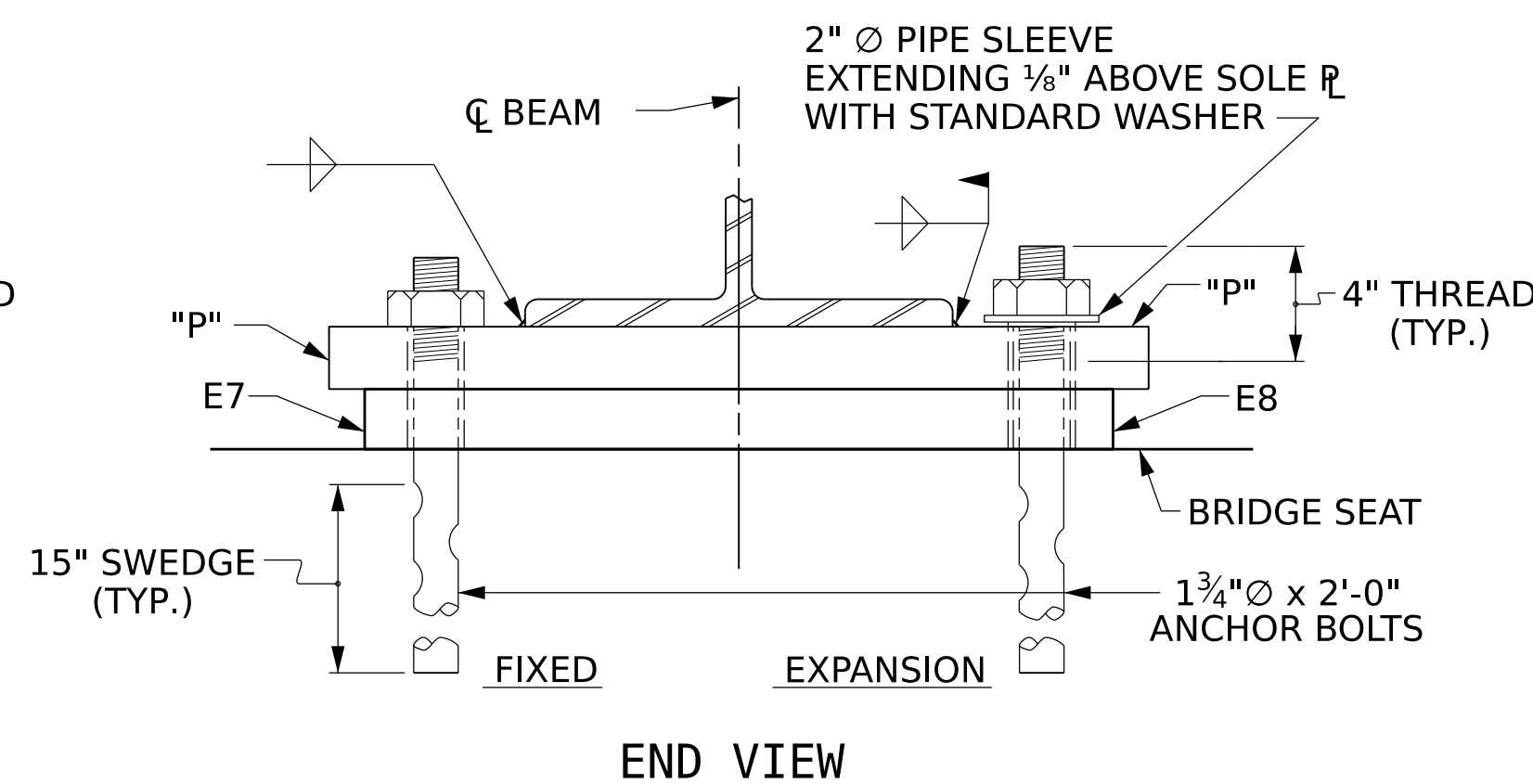
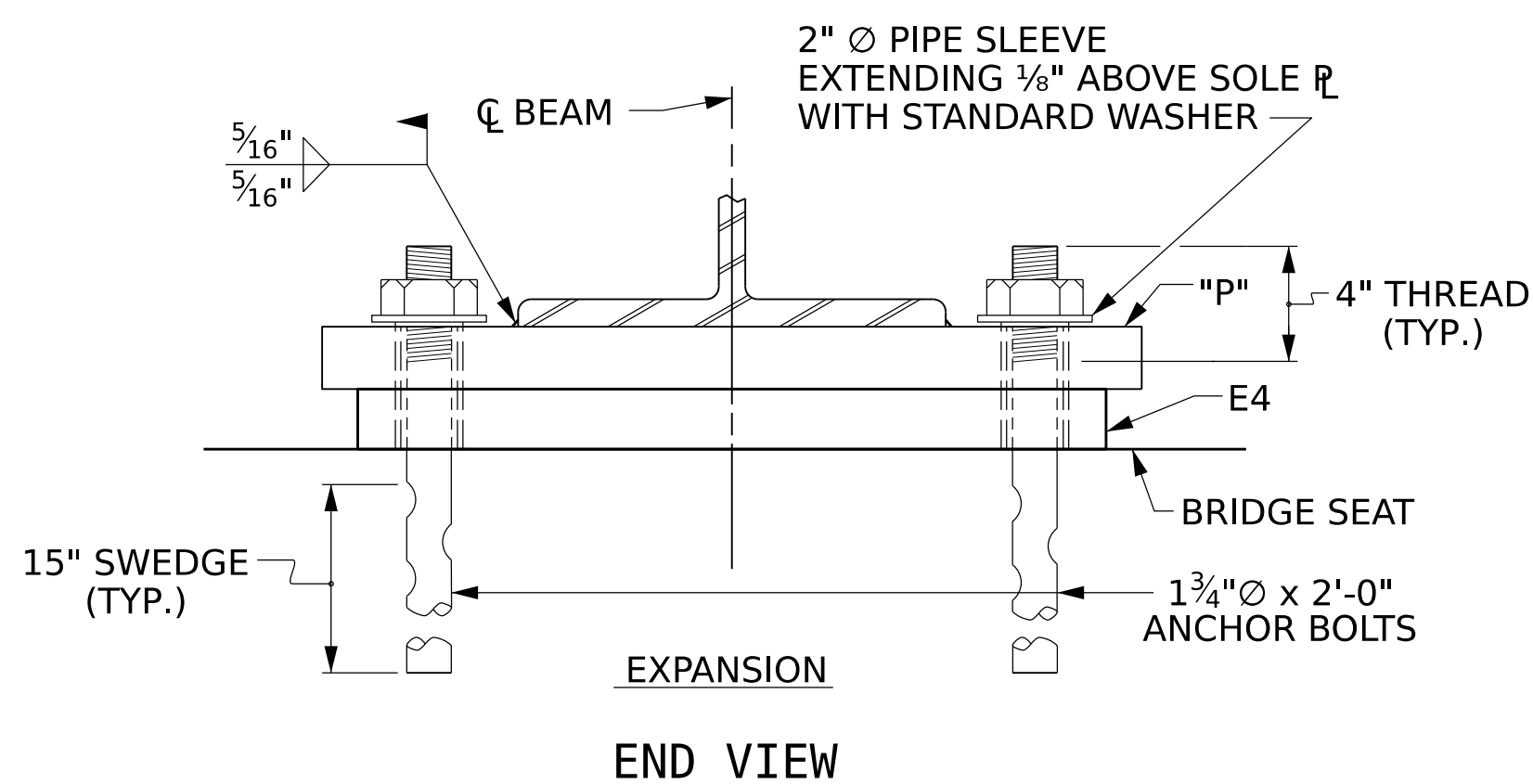
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED AND THE ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F(16° C).

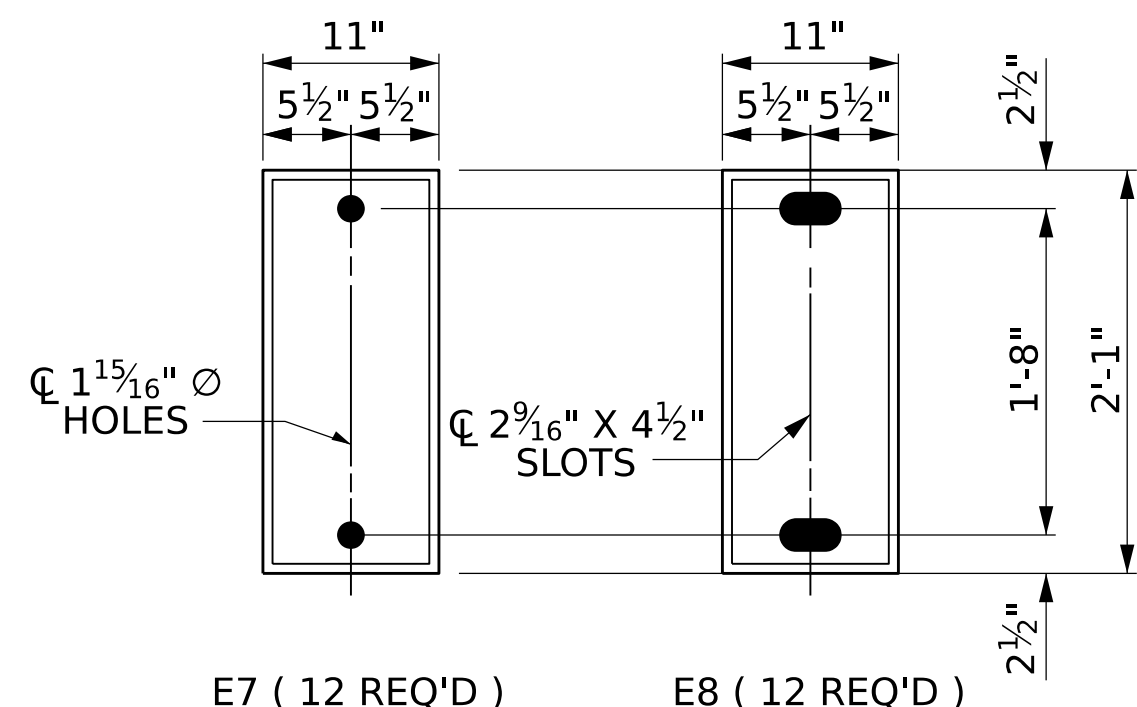
THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE II	180 k
TYPE IV	310 k

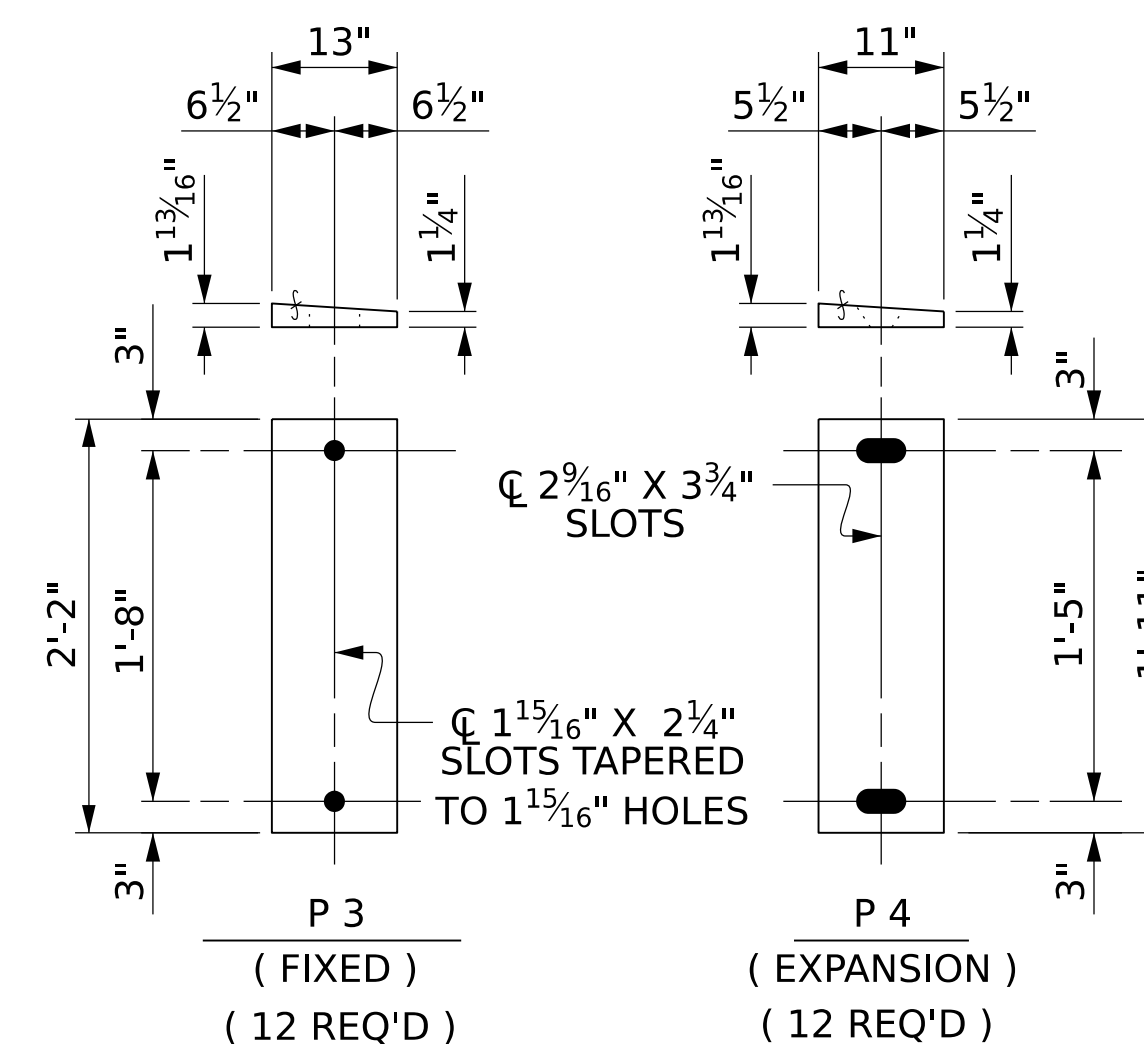
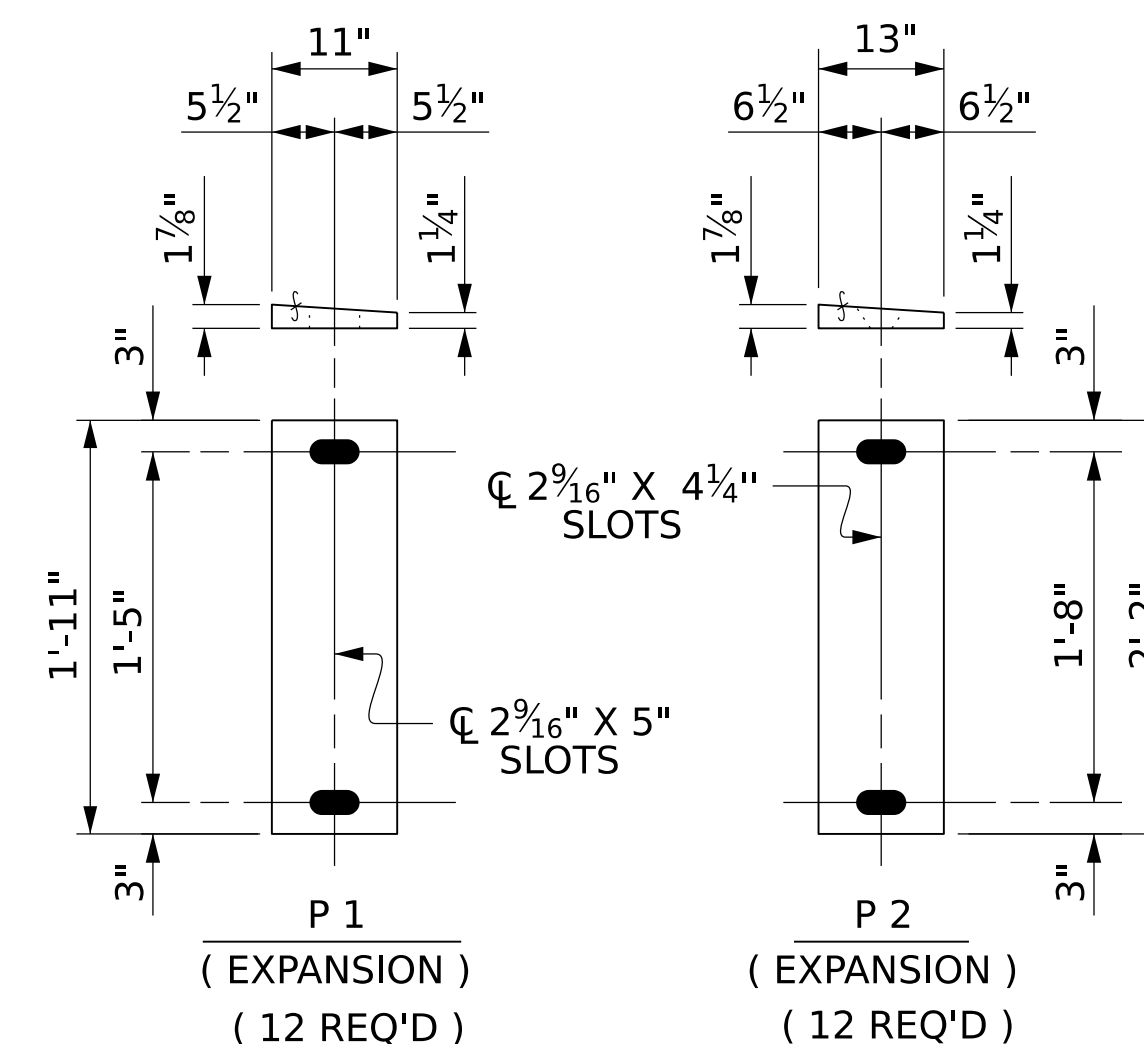
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HAYWOOD COUNTY
 STATION: **20+37.51 -L-**



PLAN VIEW OF ELASTOMERIC BEARING
TYPE II



PLAN VIEW OF ELASTOMERIC BEARING
TYPE IV



SOLE PLATE DETAILS ("P")



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD ELASTOMERIC BEARING DETAILS
 (STEEL SUPERSTRUCTURE)

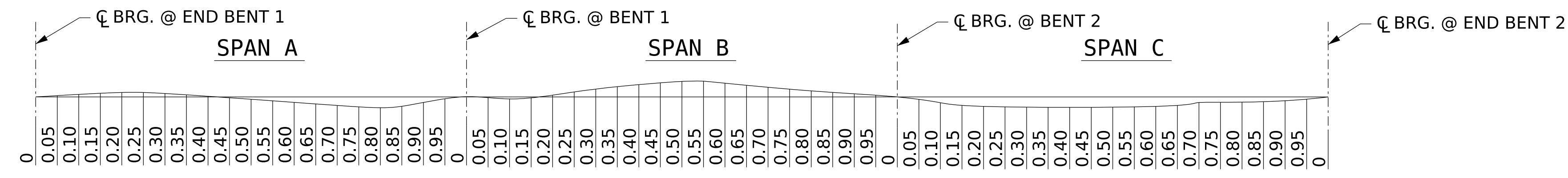


Designed by: **Kyle Smach**

8/26/21

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
GIRDERS 1 THRU 12 **																					
SPAN A																					
TWENTIETH POINTS	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.000	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.003	0.006	0.009	0.011	0.013	0.015	0.016	0.016	0.016	0.015	0.014	0.012	0.010	0.008	0.005	0.003	0.002	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.004	0.007	0.011	0.014	0.016	0.017	0.018	0.019	0.018	0.017	0.016	0.014	0.012	0.009	0.006	0.004	0.002	0.000	0.000	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.003	0.005	0.008	0.011	0.013	0.015	0.016	0.017	0.018	0.018	0.018	0.018	0.017	0.016	0.014	0.012	0.010	0.007	0.004	0.000
REQUIRED CAMBER ↑	0	0	0	0	1/16	1/16	0	0	0	0	0	0	-1/16	-1/16	-1/16	-1/16	-1/8	-1/8	-1/16	-1/16	0
SPAN B																					
TWENTIETH POINTS	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.000	0.001	0.002	0.003	0.003	0.004	0.005	0.005	0.006	0.006	0.006	0.006	0.005	0.005	0.004	0.003	0.002	0.001	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.003	0.007	0.012	0.018	0.023	0.028	0.033	0.036	0.038	0.039	0.039	0.037	0.034	0.030	0.026	0.020	0.014	0.009	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.003	0.008	0.014	0.021	0.028	0.034	0.039	0.043	0.046	0.047	0.046	0.044	0.041	0.036	0.030	0.024	0.017	0.010	0.005	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.006	0.012	0.017	0.021	0.025	0.028	0.030	0.032	0.033	0.033	0.033	0.032	0.030	0.028	0.025	0.021	0.017	0.012	0.006	0.000
REQUIRED CAMBER ↑	0	-1/16	-1/16	0	0	1/16	1/16	1/8	1/8	1/8	3/16	3/16	1/8	1/8	1/8	1/16	1/16	0	0	0	0
SPAN C																					
TWENTIETH POINTS	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	-0.001	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	-0.001	-0.002	-0.003	-0.003	-0.002	-0.002	-0.001	-0.001	0.000	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.002	0.004	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.007	0.006	0.004	0.002	0.000
REQUIRED CAMBER ↑	0	-1/16	-1/16	-1/8	-1/8	-1/8	-1/8	-1/8	-1/8	-1/8	-1/8	-1/8	-1/8	-1/8	-1/16	-1/16	-1/16	-1/16	-1/16	0	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
 ** GIRDERS 1 THROUGH 12 DEFLECTIONS VARY SLIGHTLY DUE TO VARIABLE SPACING AND BARRIER RAIL LOADS. THE MAGNITUDE OF THESE DIFFERENCES IS NEGLIGIBLE.
 BARRIER RAIL DEFLECTION SHOWN. MEDIAN BARRIER RAIL DEFLECTIONS SIMILAR.
 DEFLECTION DUE TO SLAB VARIES BETWEEN GIRDERS, BUT DOES NOT IMPACT THE REQUIRED CAMBER.
 ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).



SCHMATIC CAMBER ORDINATES
 SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DEAD LOAD DEFLECTIONS



DocuSigned by:
 Kyle Smiach
 8EAS008988E475...

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1			3	
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DRAWN BY : E.C. PHELPS	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

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.

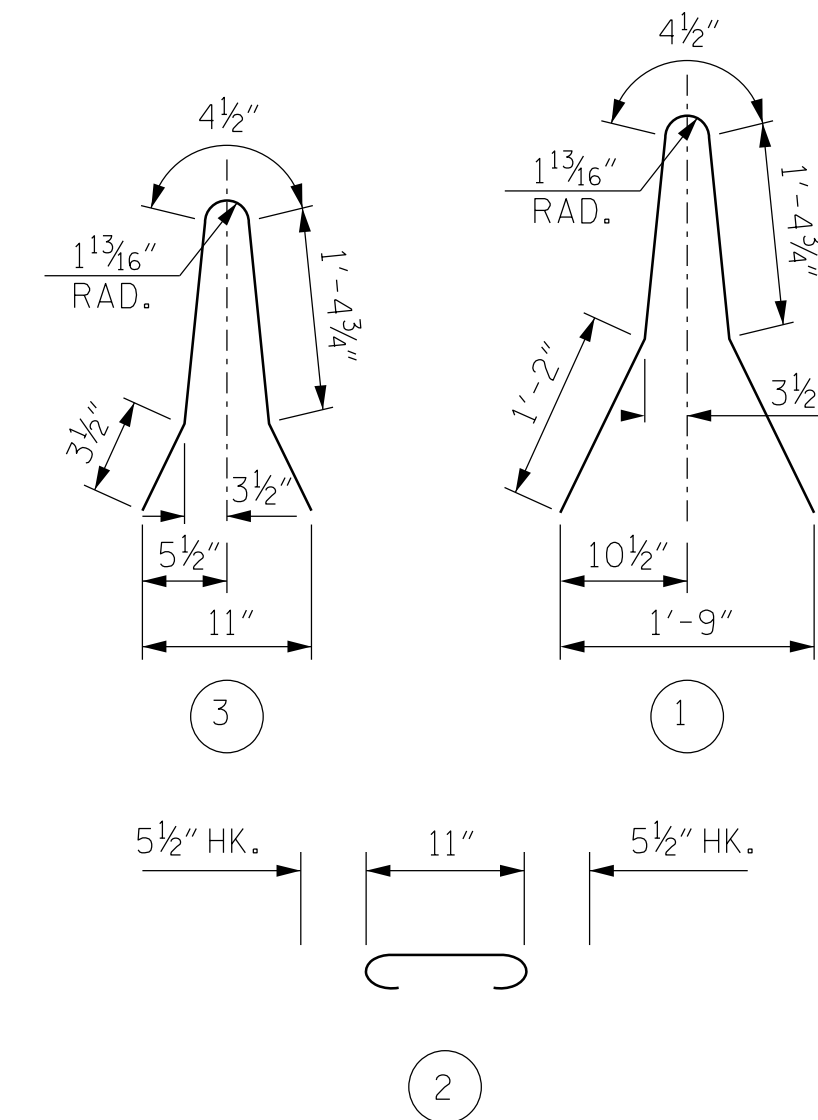
ALL REINFORCING STEEL IN MEDIAN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MEDIAN 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.

FOR APPROACH SLAB MEDIAN BARRIER RAIL, SEE "BRIDGE APPROACH SLAB BARRIER RAIL DETAIL" SHEET.

FOR EXPANSION JOINT DETAILS, SEE "EXPANSION JOINT SEAL DETAILS FOR MEDIAN BARRIER" SHEET.

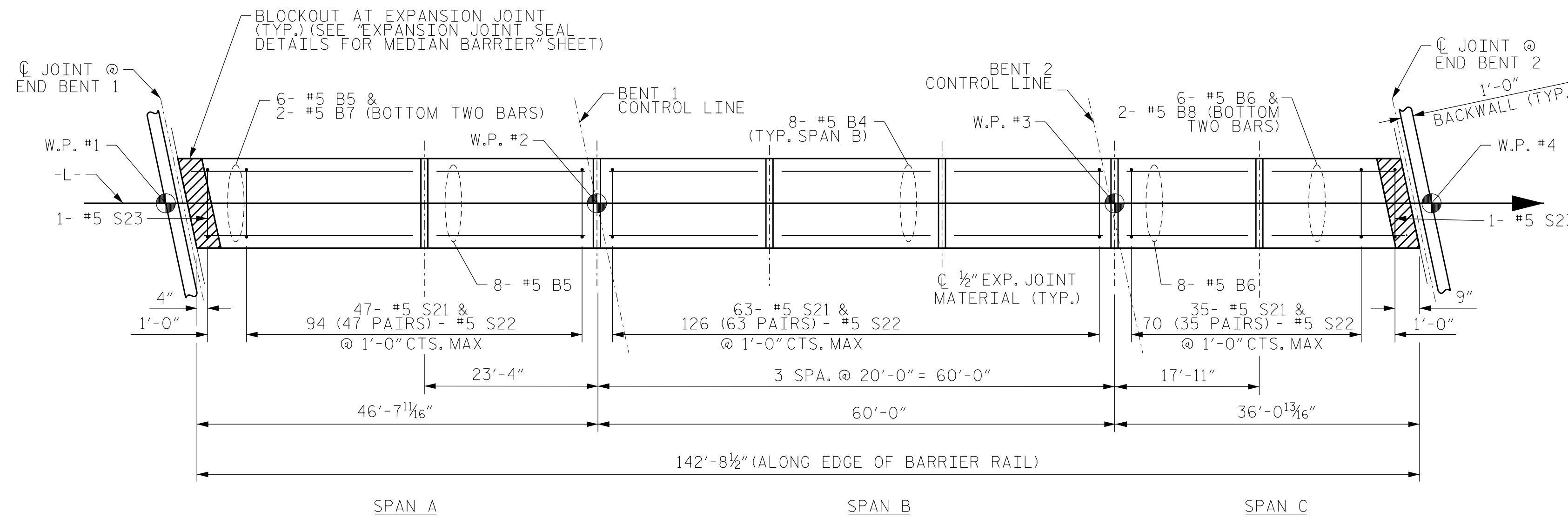
BAR TYPES



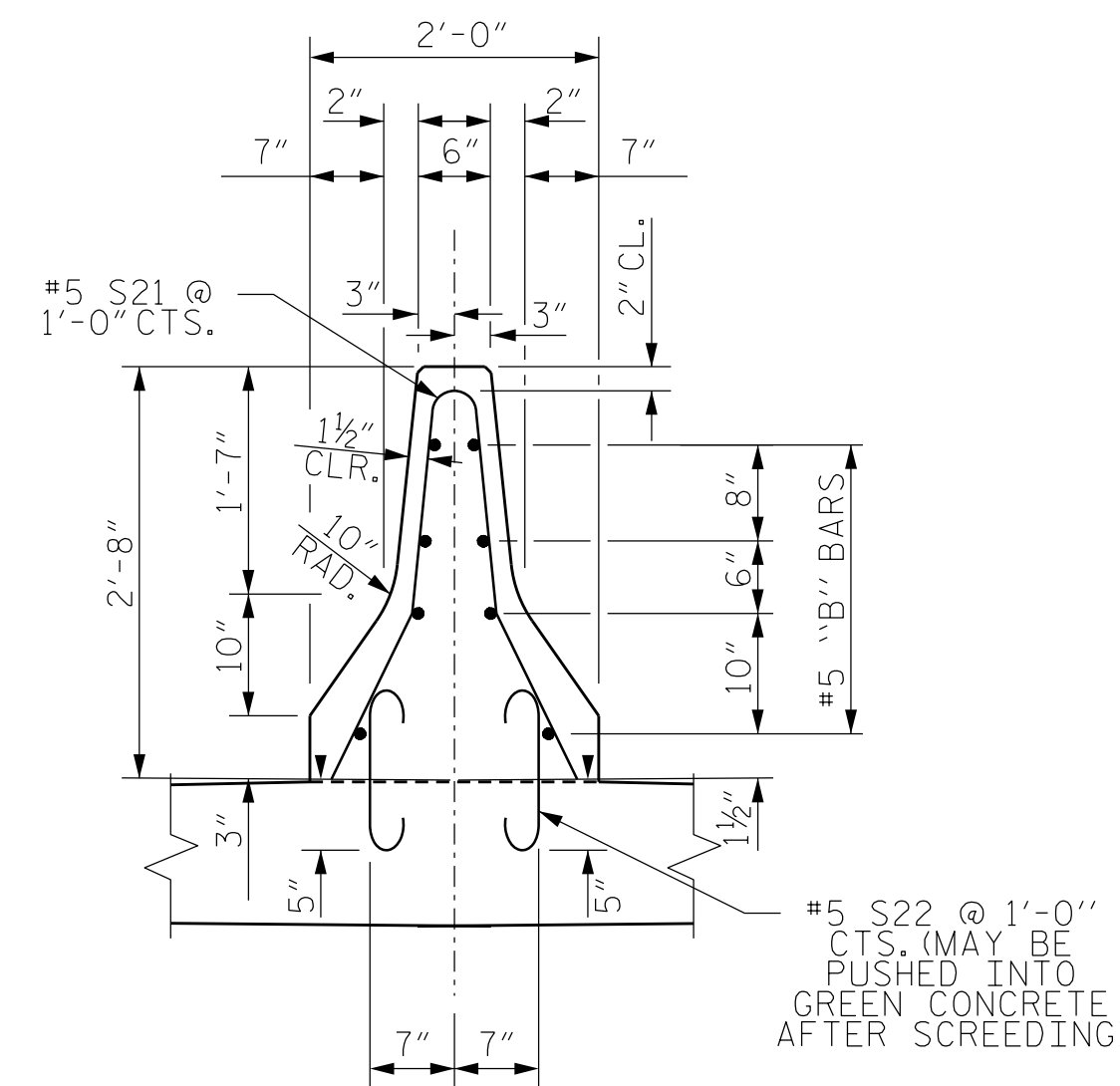
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

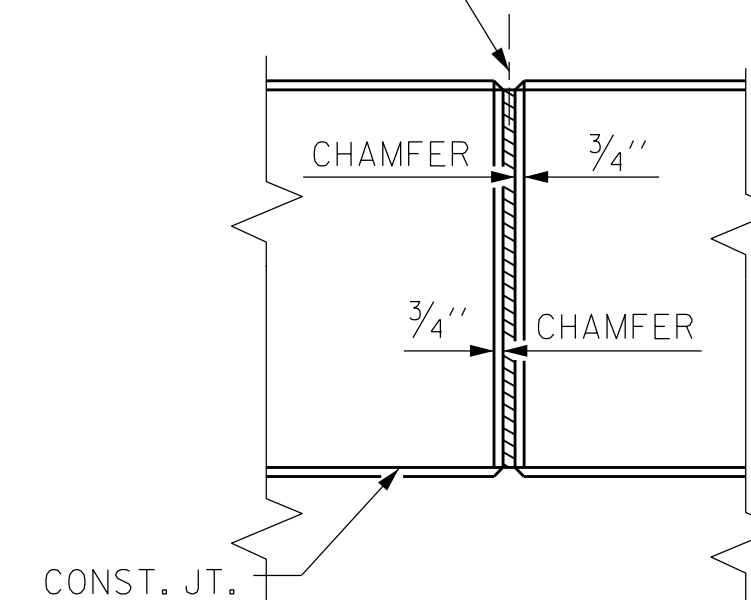
FOR MEDIAN BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B4	24	#5	STR	19'-7"	490
* B5	14	#5	STR	22'-11"	335
* B6	14	#5	STR	17'-5"	254
* B7	2	#5	STR	22'-1"	46
* B8	2	#5	STR	16'-6"	34
* S21	145	#5	1	5'-6"	832
* S22	290	#5	2	1'-10"	555
* S23	2	#5	3	3'-9"	8
* EPOXY COATED REINFORCING STEEL				2554	LBS.
CLASS AA CONCRETE				14.5	CU. YDS.
CONCRETE MEDIAN BARRIER RAIL				142.7	LIN. FT.



MEDIAN BARRIER RAIL PLAN



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



SECTION THRU RAIL

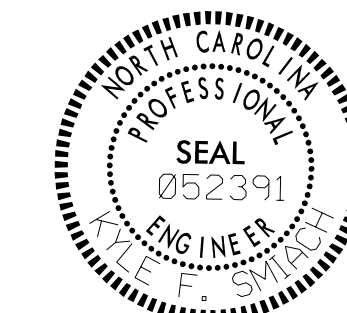
ELEVATION AT EXPANSION JOINTS

MEDIAN BARRIER RAIL DETAILS

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

MEDIAN CONCRETE BARRIER RAIL



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 Kyle Smiach
 8EA50D898BE475...

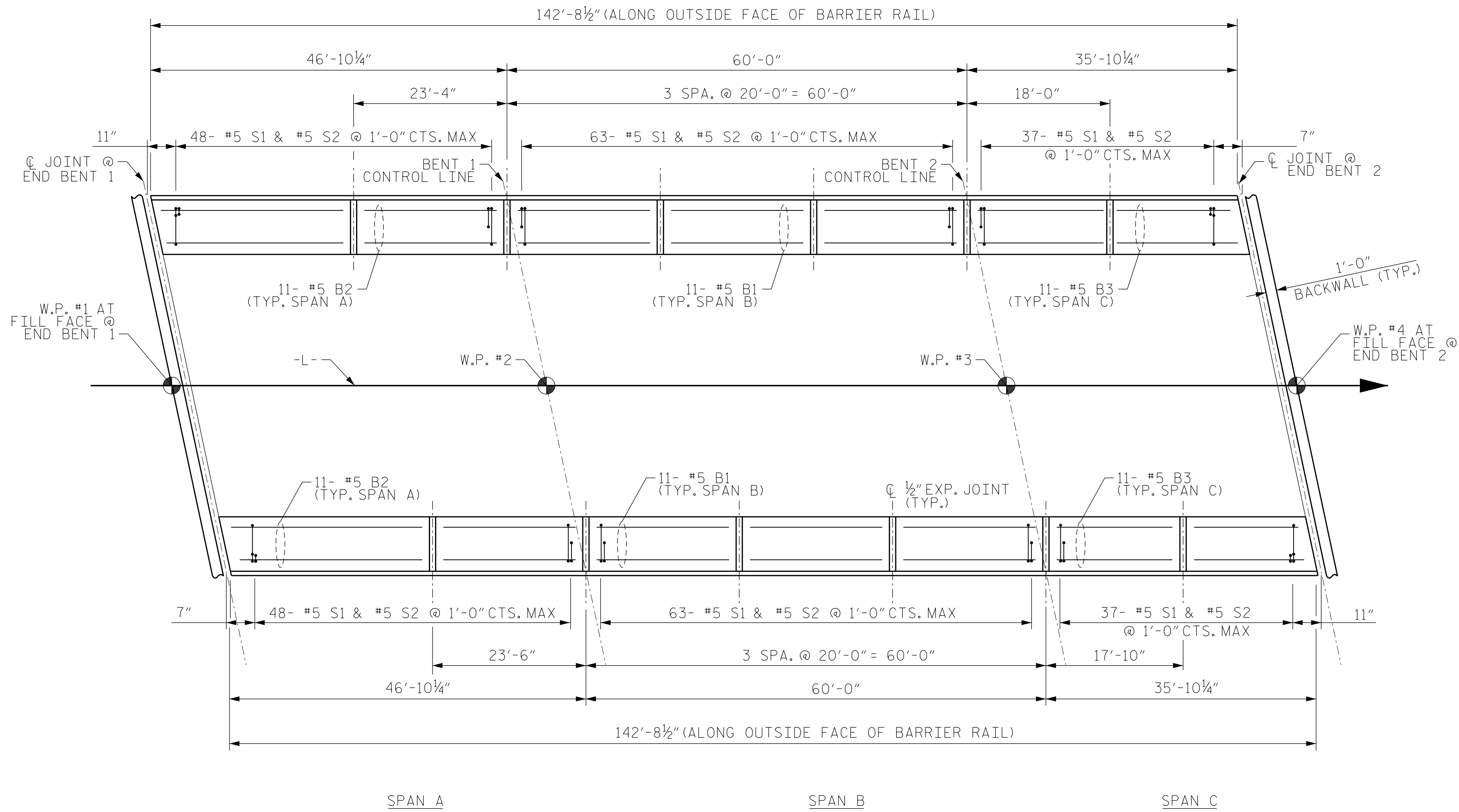
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2			4			TOTAL SHEETS 51

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

DRAWN BY : **D.E. MORRISSETTE** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



BARRIER RAIL PLAN

NOTES

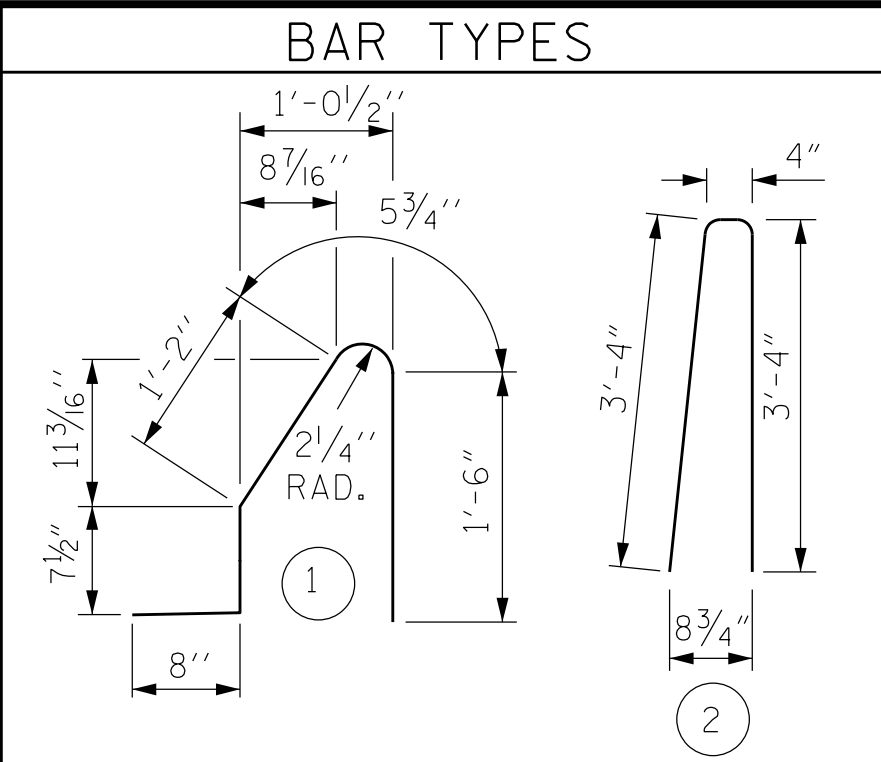
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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.

FOR APPROACH SLAB CONCRETE BARRIER RAIL, SEE "BRIDGE APPROACH SLAB BARRIER RAIL DETAIL" SHEET.

FOR EXPANSION JOINT DETAILS, SEE "EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL" SHEET.

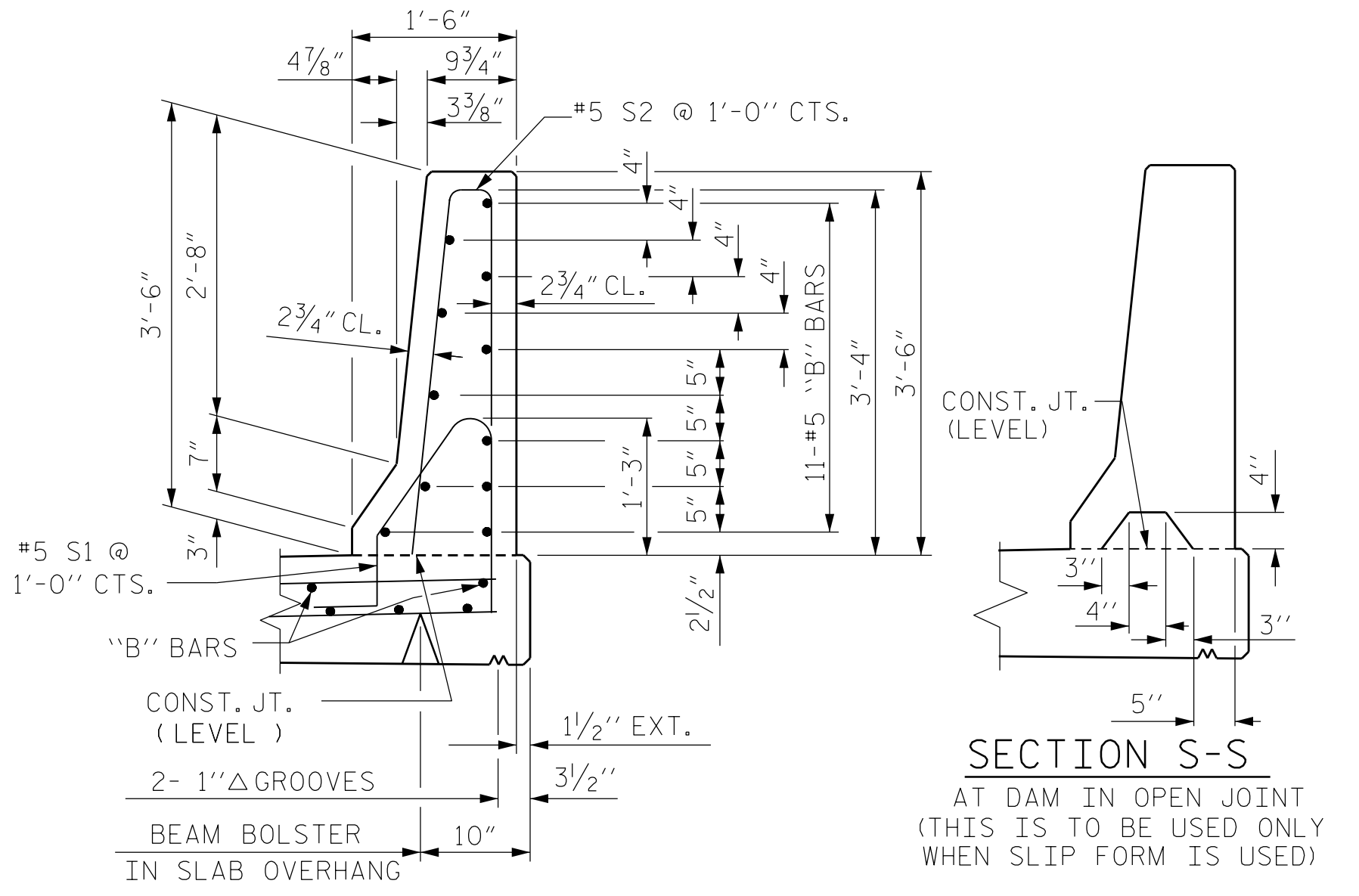


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

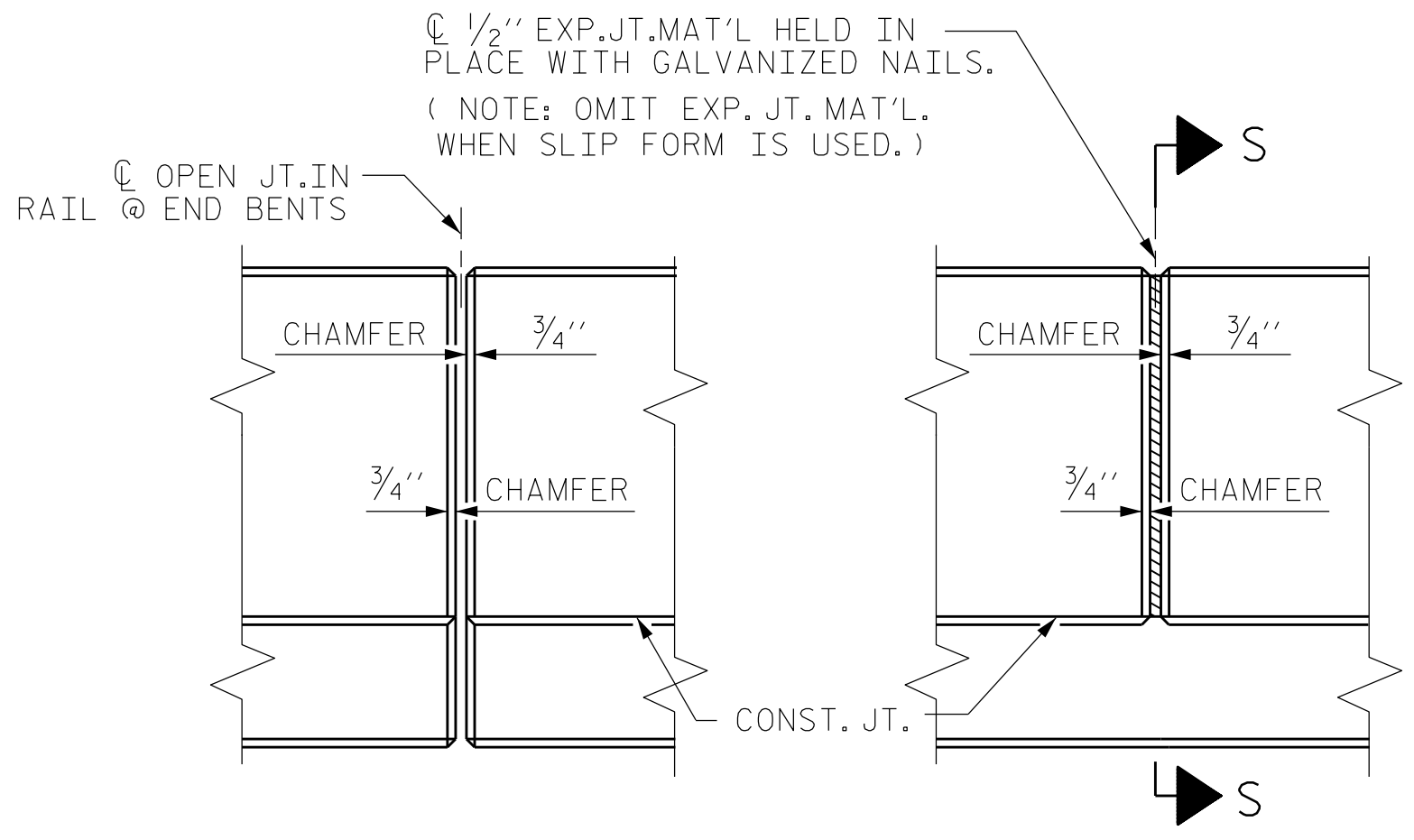
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	66	#5	STR	19'-7"	1348
* B2	44	#5	STR	23'-0"	1056
* B3	44	#5	STR	17'-6"	803
* S1	296	#5	1	4'-6"	1389
* S2	296	#5	2	7'-0"	2161
* EPOXY COATED REINFORCING STEEL				6757	LBS.
CLASS AA CONCRETE				39.2	CU. YDS.
CONCRETE BARRIER RAIL				285.5	LIN. FT.



SECTION THRU RAIL

SECTION S-S



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CONCRETE BARRIER RAIL



DocuSigned by:
 Kyle Smiach
 8EA50D8988E475...

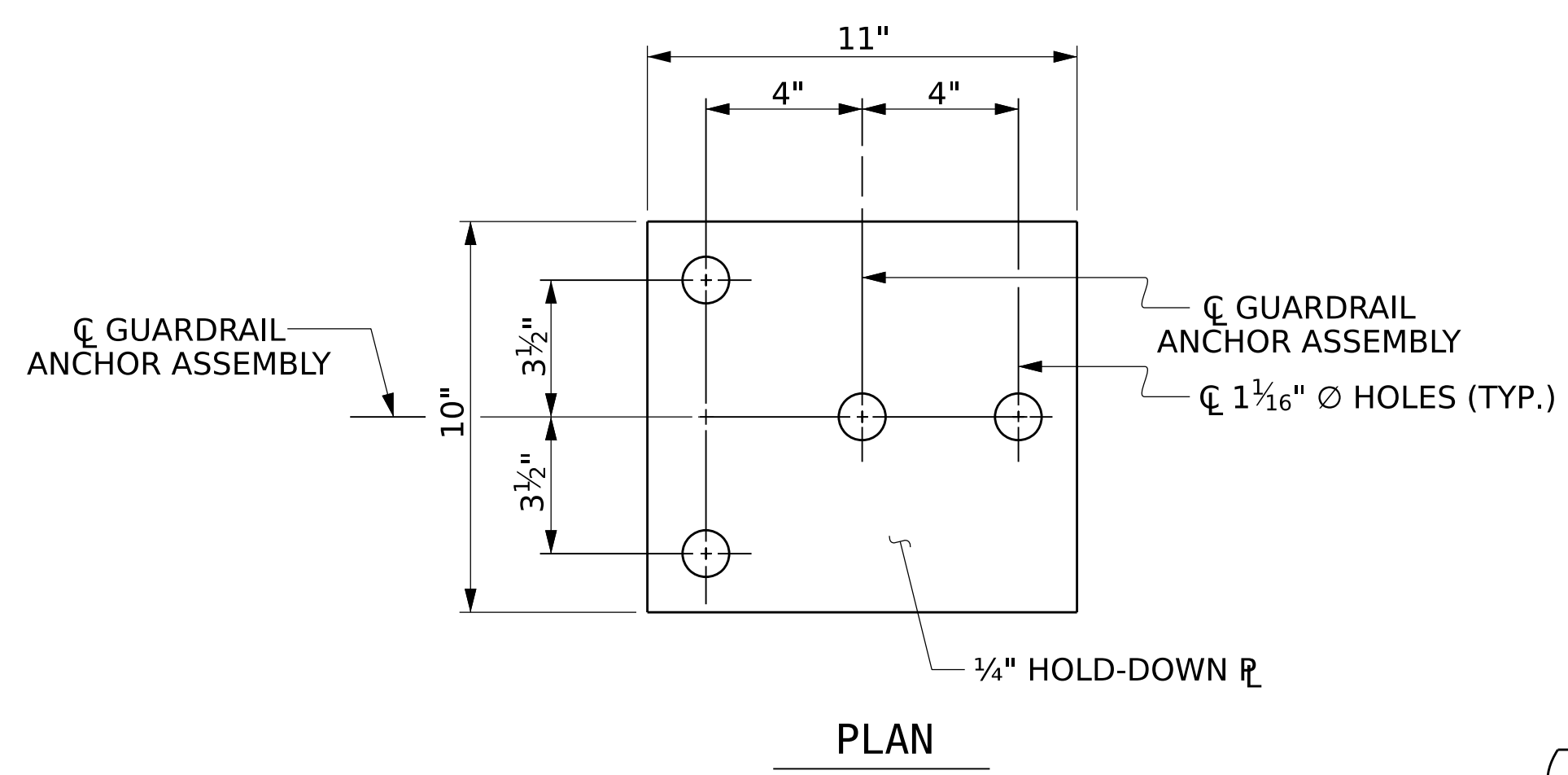
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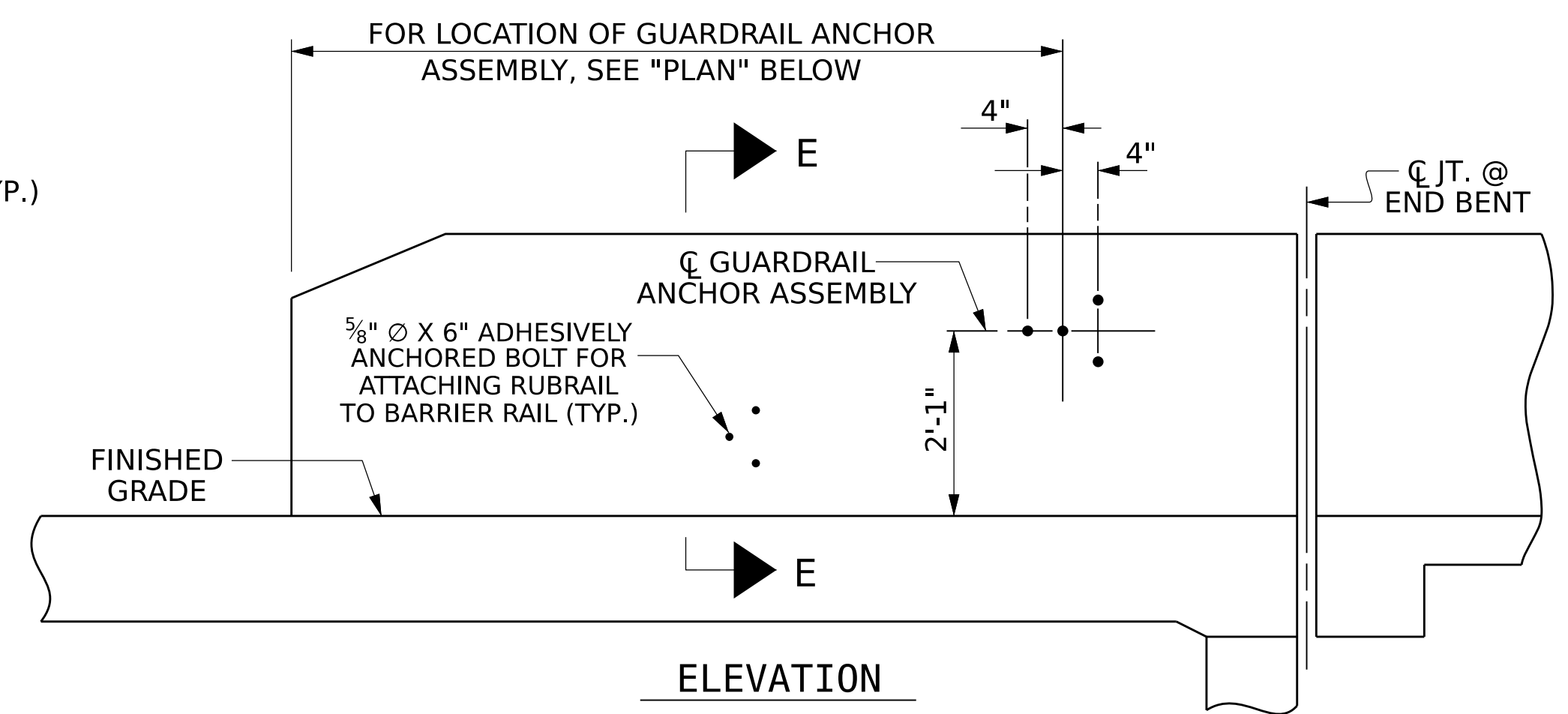
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 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**

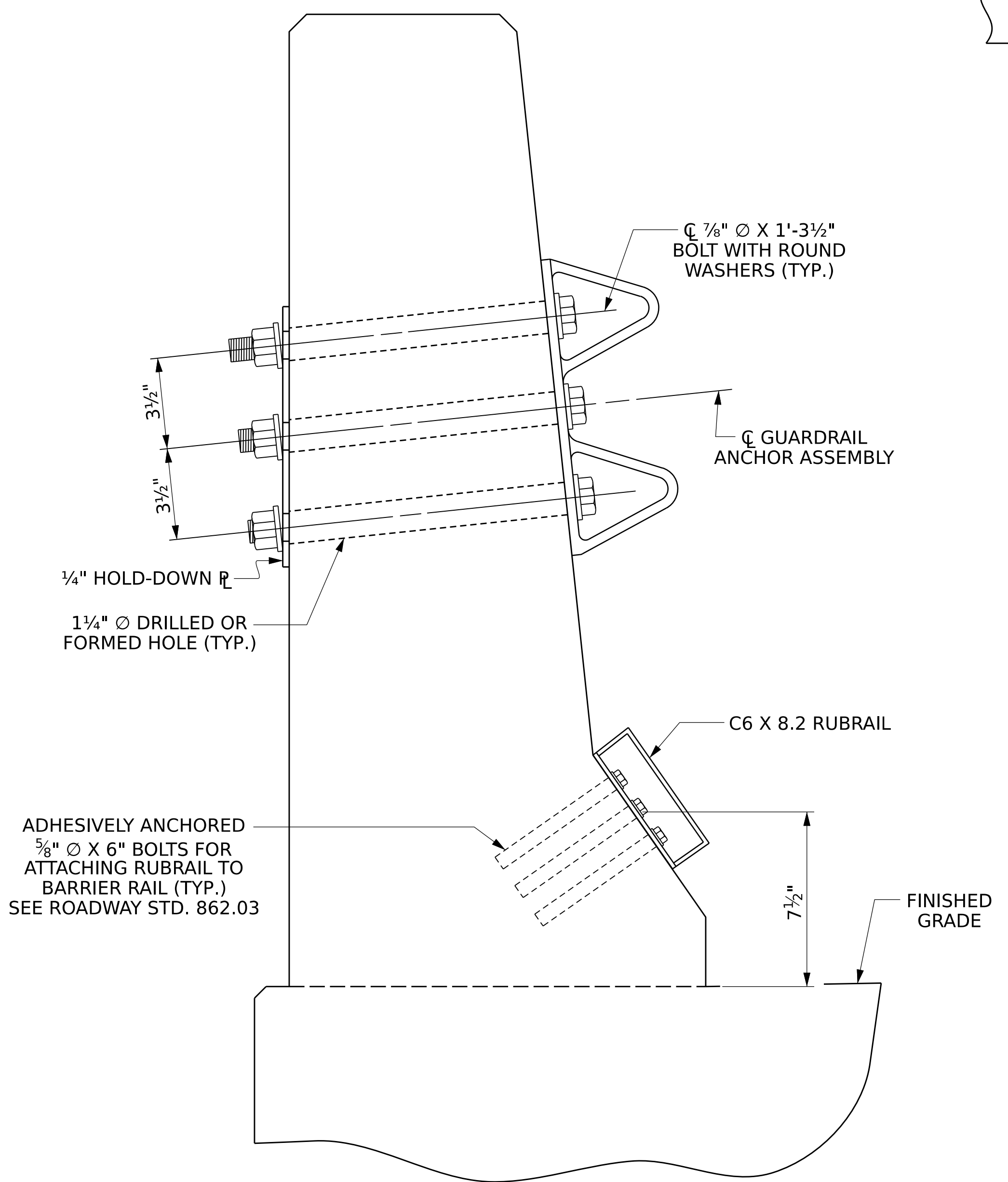




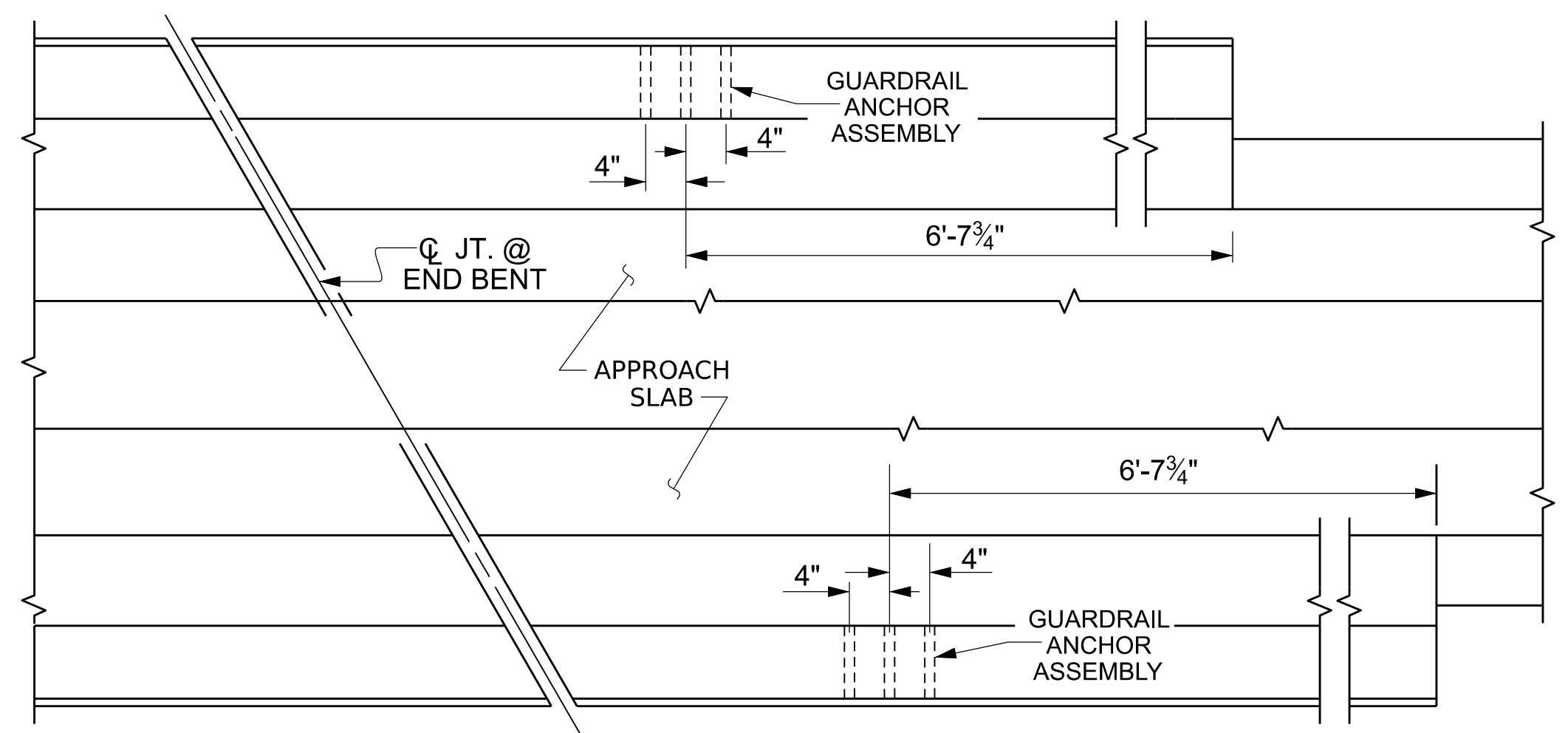
PLAN



ELEVATION



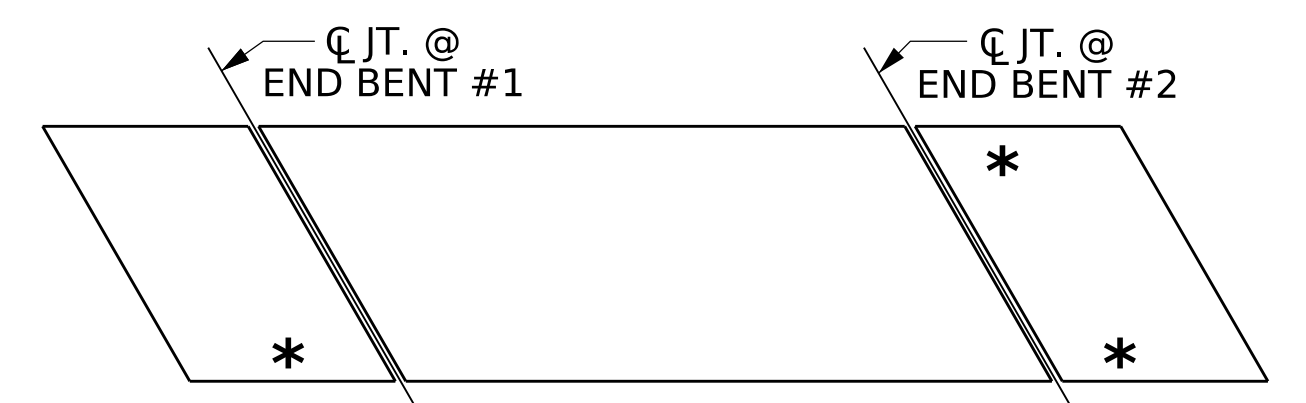
SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

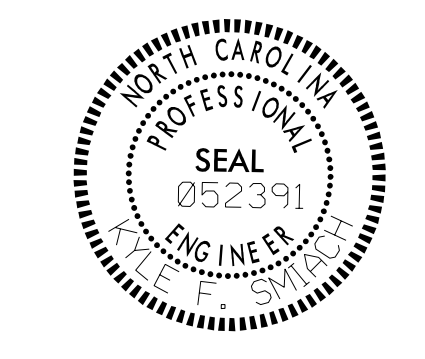
END BENT 2 SHOWN, END BENT 1 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

NOTES

- THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 3/4" HOLD-DOWN PLATE AND 4 - 7/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.
- THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.
- BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.
- AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.
- THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.
- THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.
- THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 5/8" 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.



DocuSigned by:
Kyle Smiach
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PROJECT NO. **B-5982**
HAYWOOD COUNTY
STATION: **20+37.51 -L-**

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE
FOR BARRIER RAIL

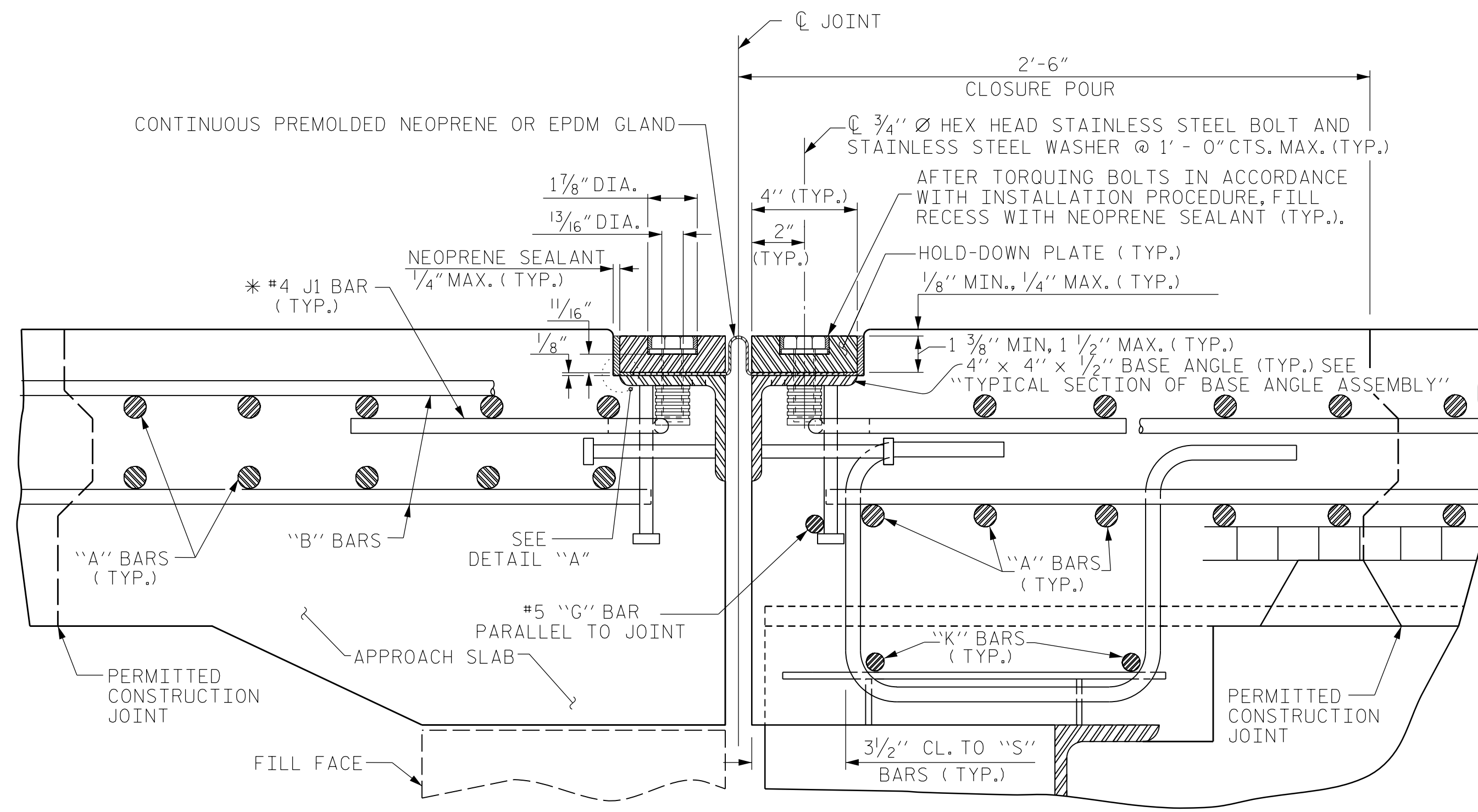
DRAWN BY : D.E. MORRISSETTE	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

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2			4		51

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INSTALLATION PROCEDURE

GENERAL NOTES



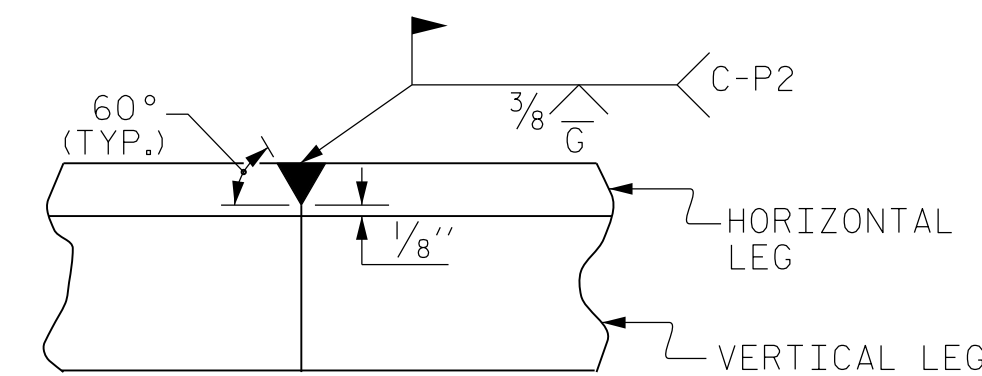
EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- STEEL SUPERSTRUCTURE

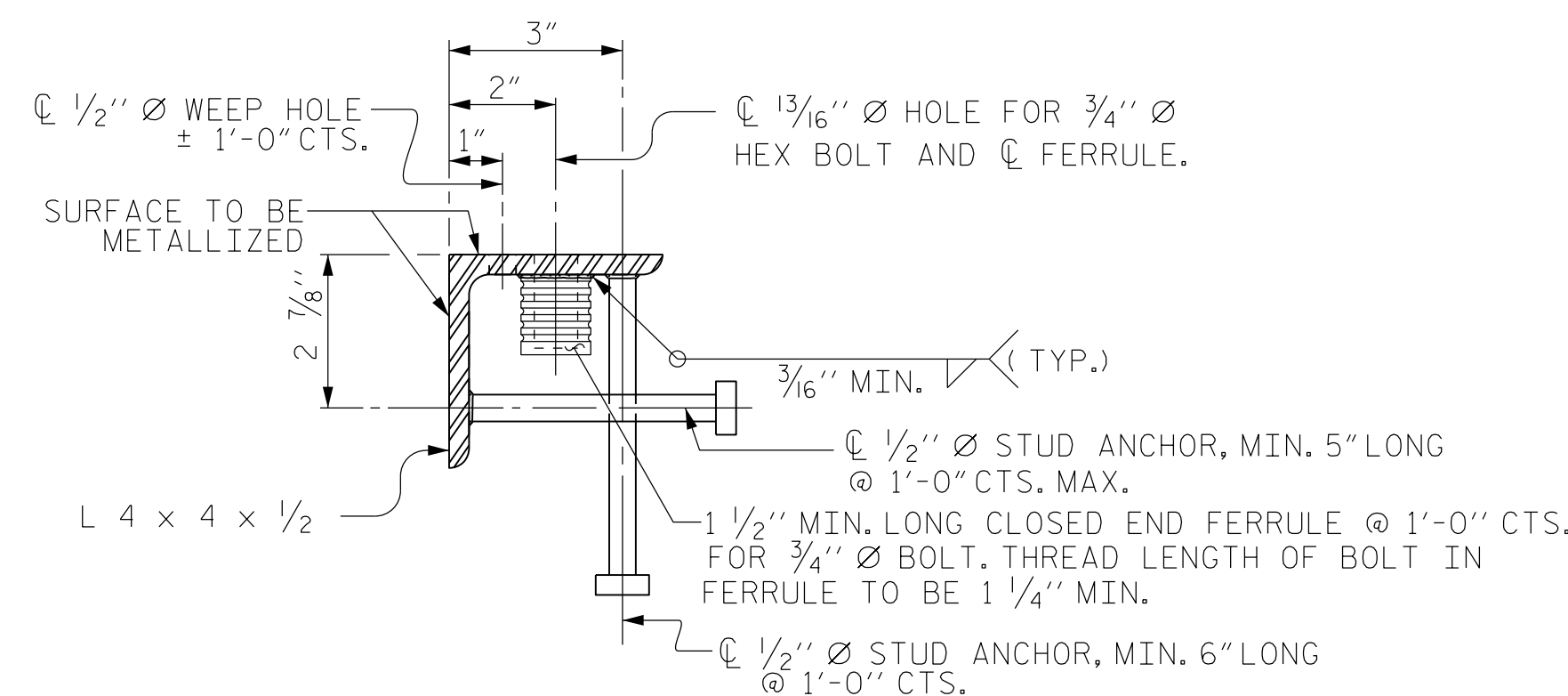
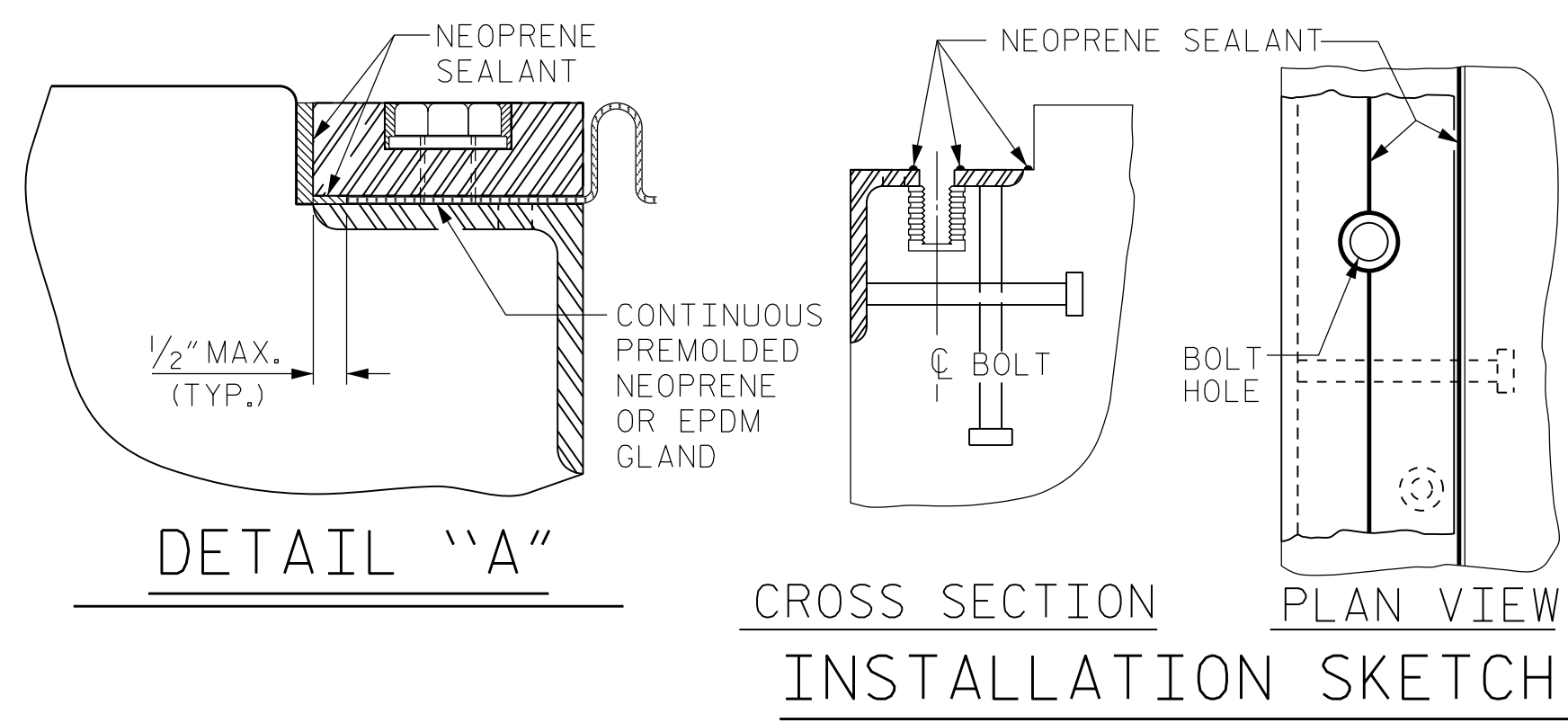
* THE QUANTITY OF #4 JI BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. JI BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF JI BARS SPECIFIED, ADDITIONAL JI BARS WILL NOT BE REQUIRED.

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 1/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.
13. A TEMPORARY GLAND IS REQUIRED FOR STAGE 1. NO SEPERATE PAYMENT WILL BE MADE FOR THE TEMPORARY GLAND(S).



DETAIL- FIELD WELD SPLICE OF BASE ANGLE



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

MOVEMENT AND SETTING AT JOINT					
BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG CL. RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT 1	78°	1 3/16"	1 3/16"	1 1/16"	1 3/16"
END BENT 2	78°	5/16"	1 1/2"	1 1/16"	1 3/8"

PROJECT NO. **B-5982**

HAYWOOD COUNTY

STATION: **20+37.51 -L-**

SHEET 1 OF 3



STATE OF NORTH CAROLINA
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RALEIGH
STANDARD
EXPANSION JOINT SEAL DETAILS

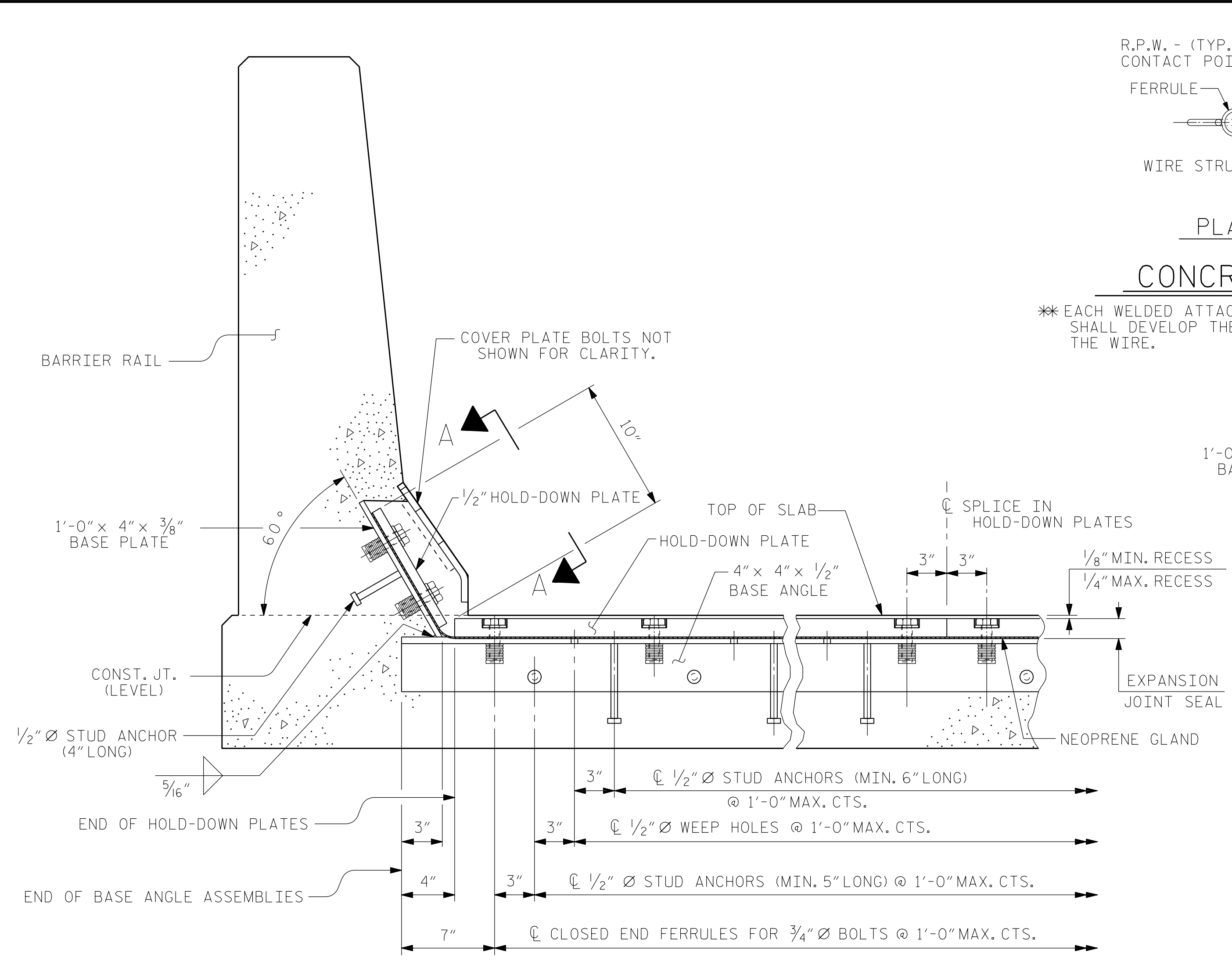
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2			4	

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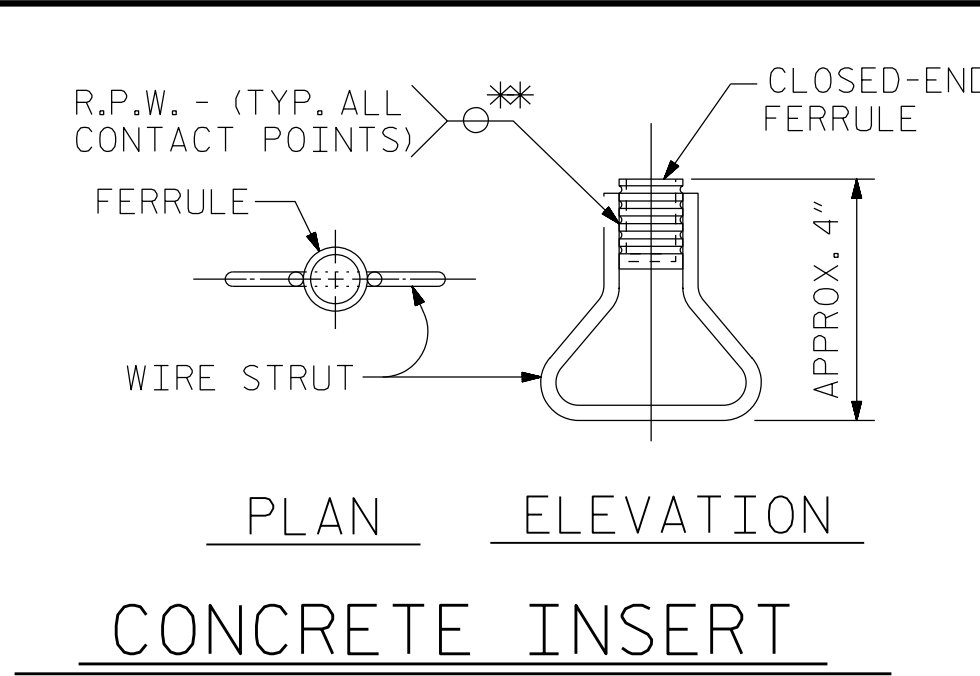
STD. NO. EJS1

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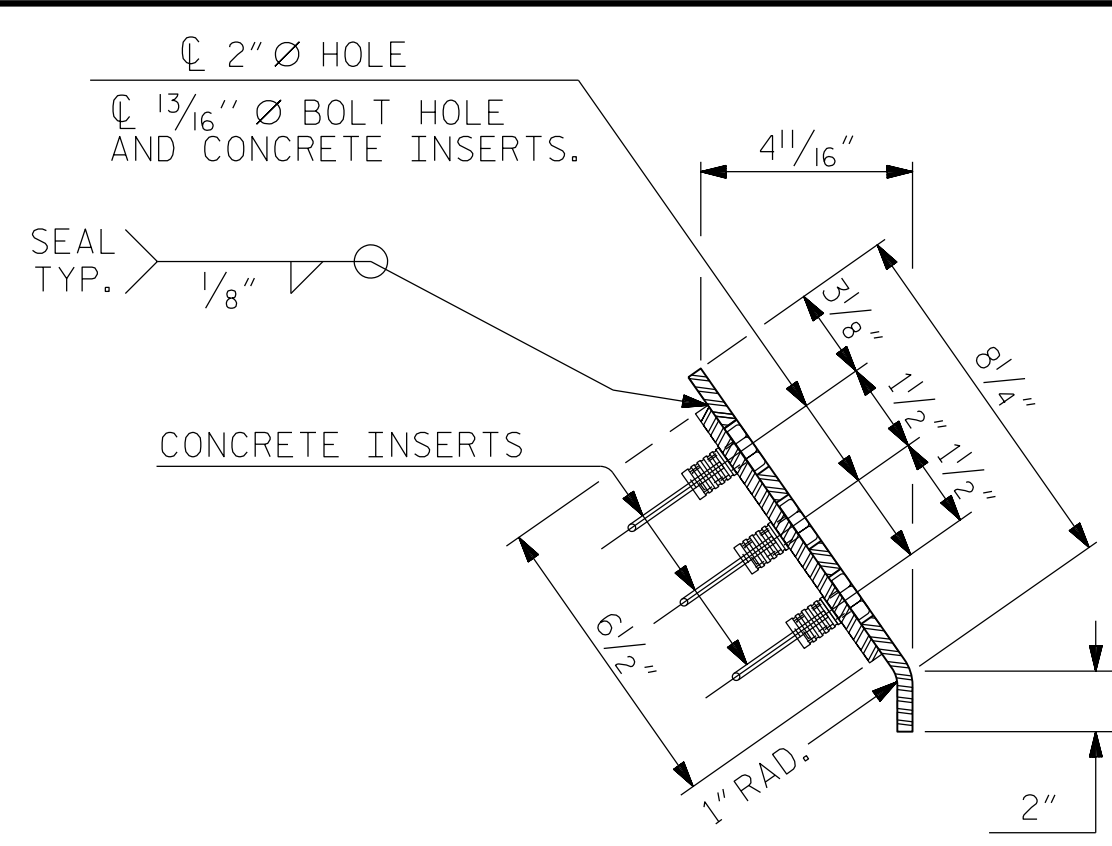


SECTION THRU RAIL NORMAL TO JOINT

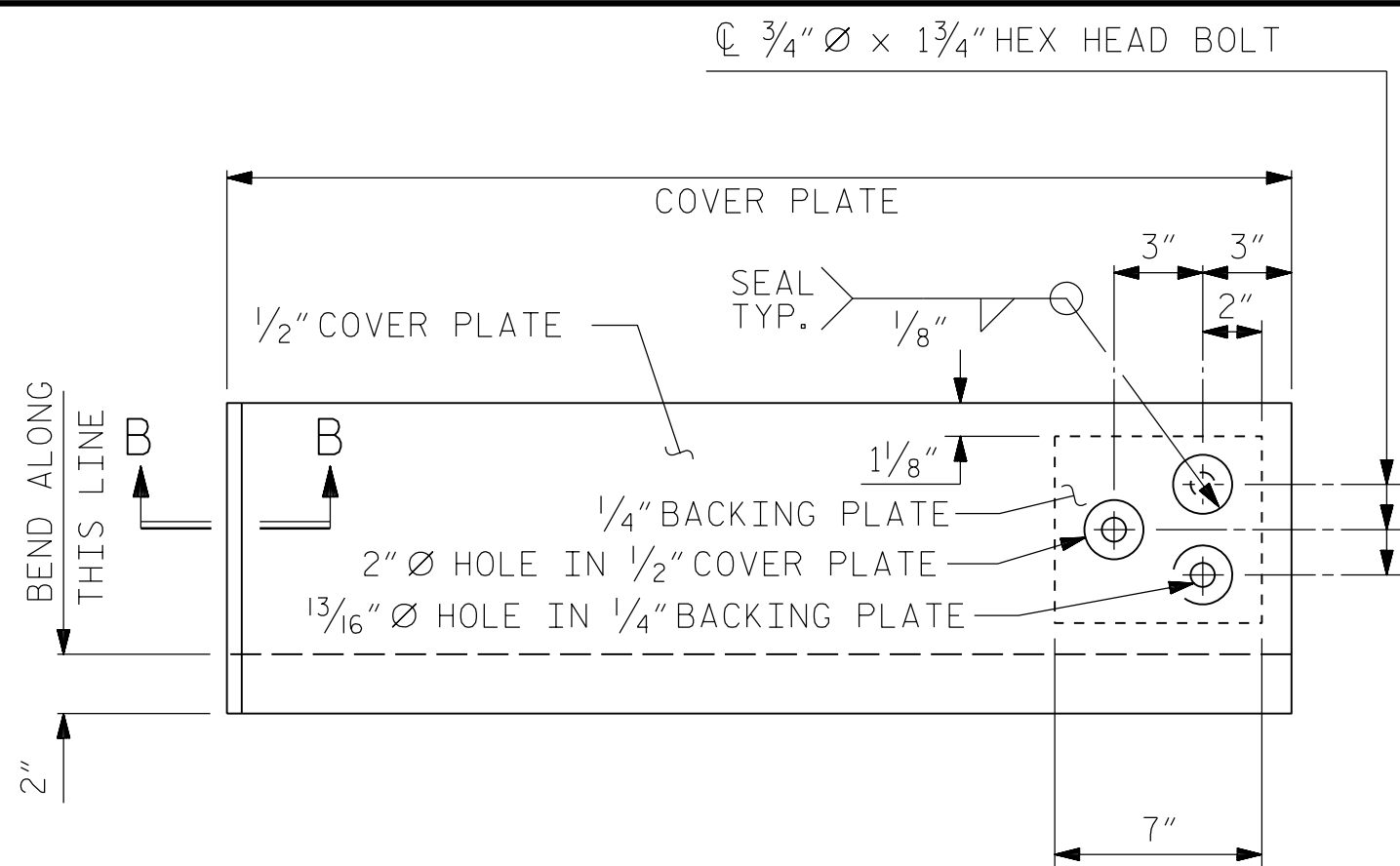


CONCRETE INSERT

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

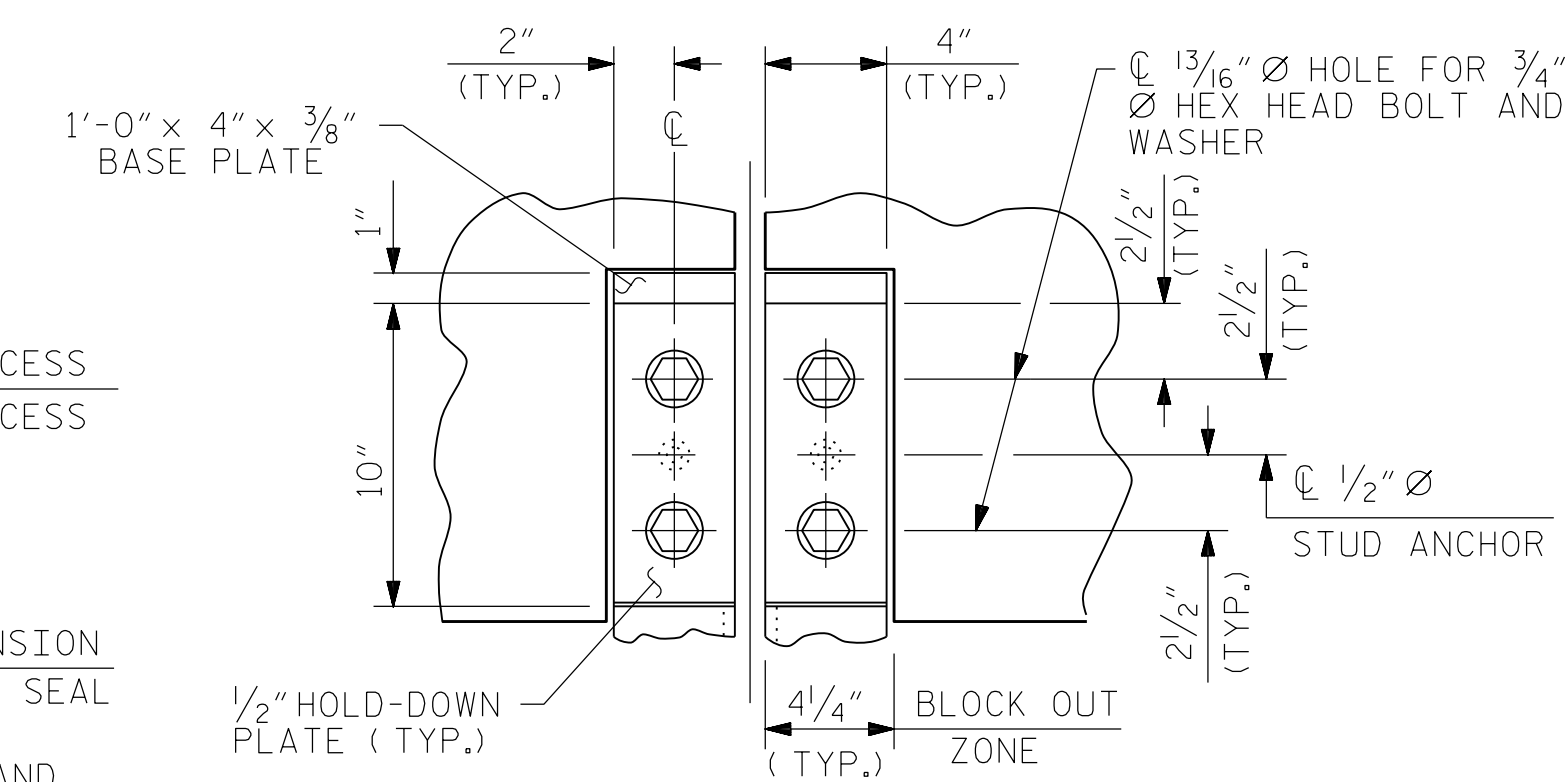


END VIEW

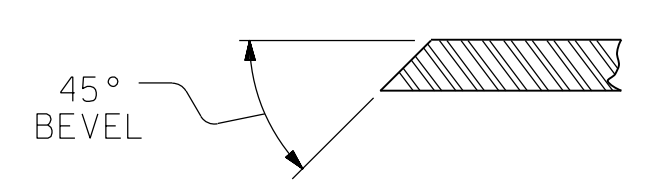


TYPE II - ELEVATION VIEW

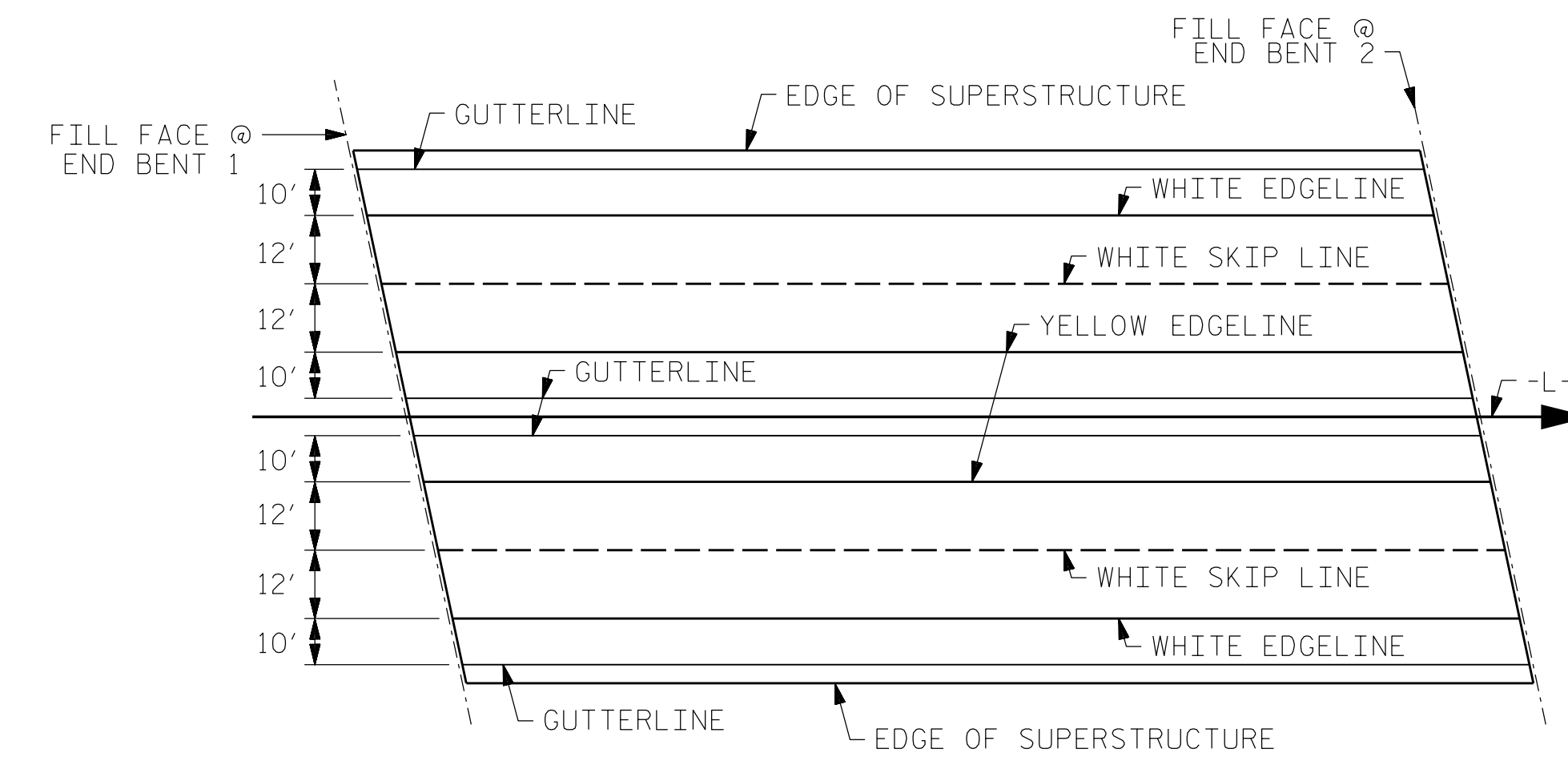
COVER PLATE DETAILS



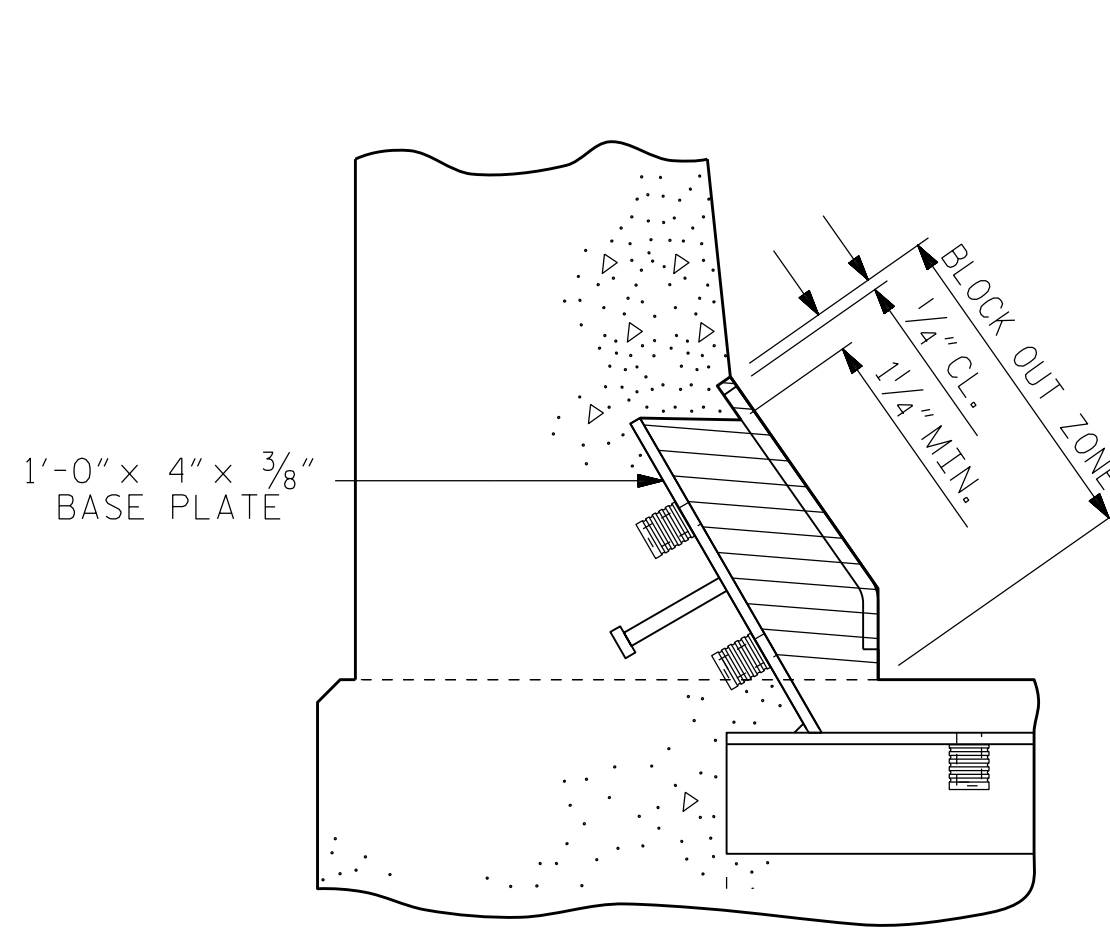
SECTION A - A



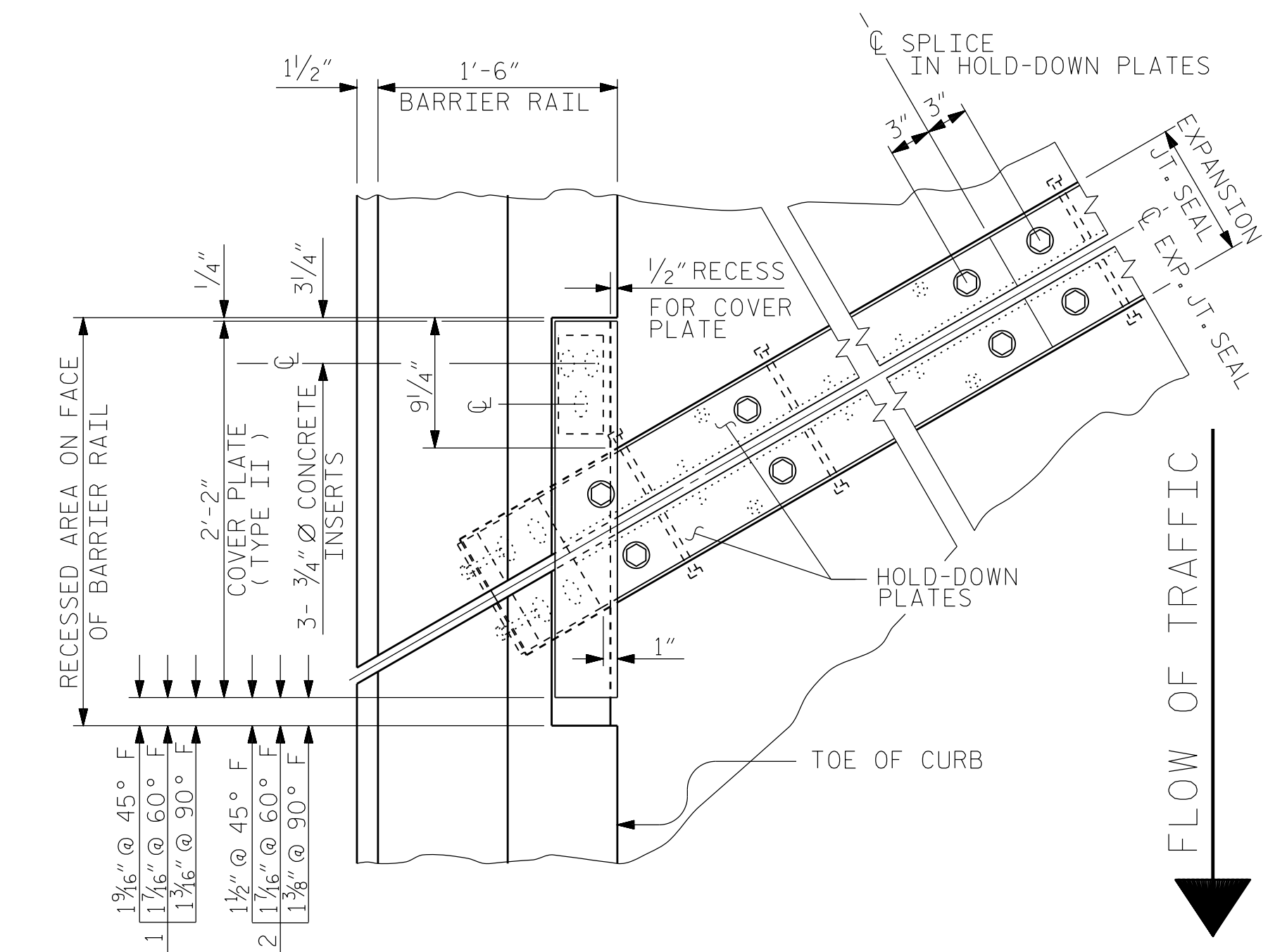
SECTION B - B



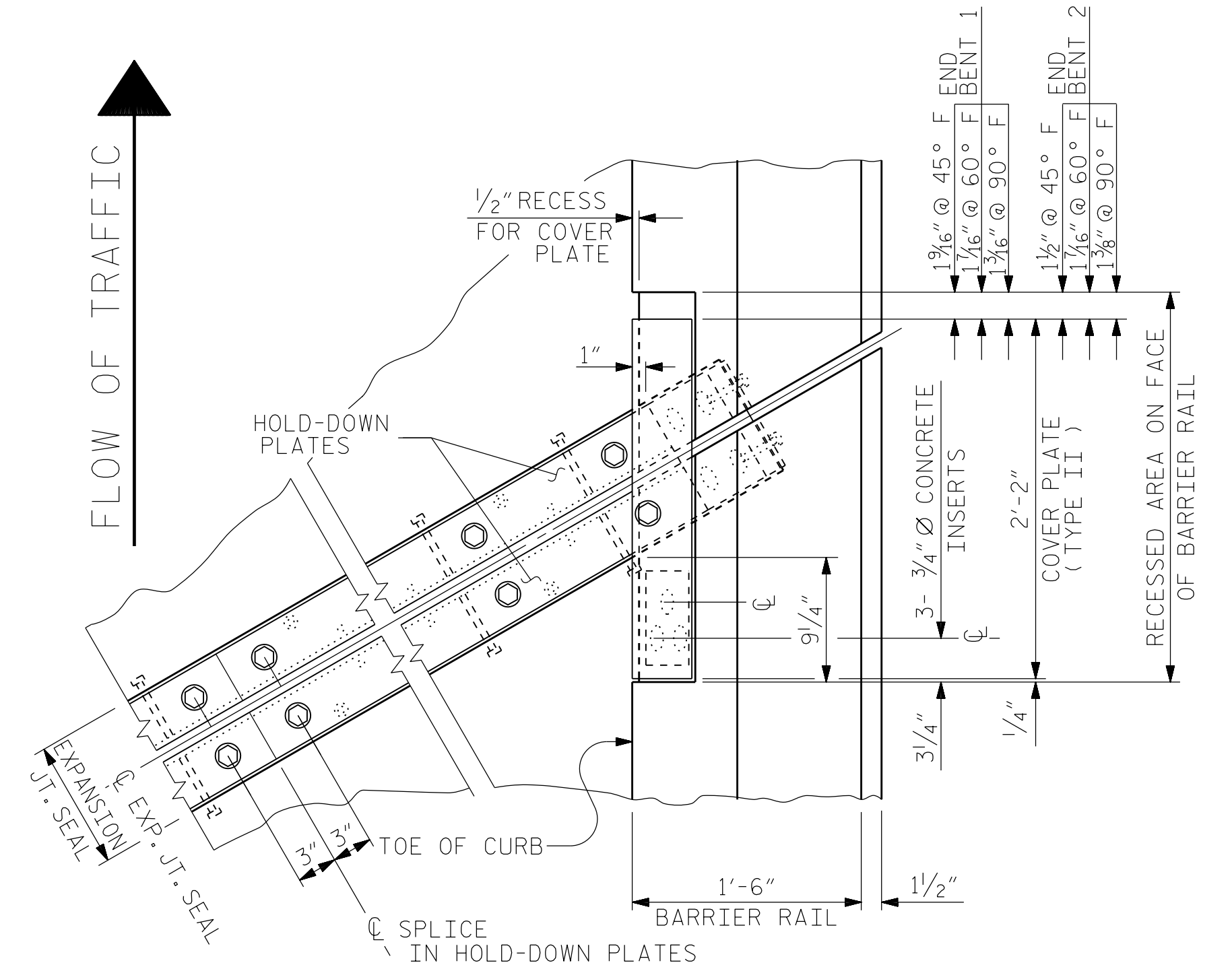
PAVEMENT MARKING ALIGNMENT



BLOCK OUT DETAIL
SEE "SECTION A - A" FOR OTHER DETAILS.



PLAN OF EXPANSION JOINT SEAL



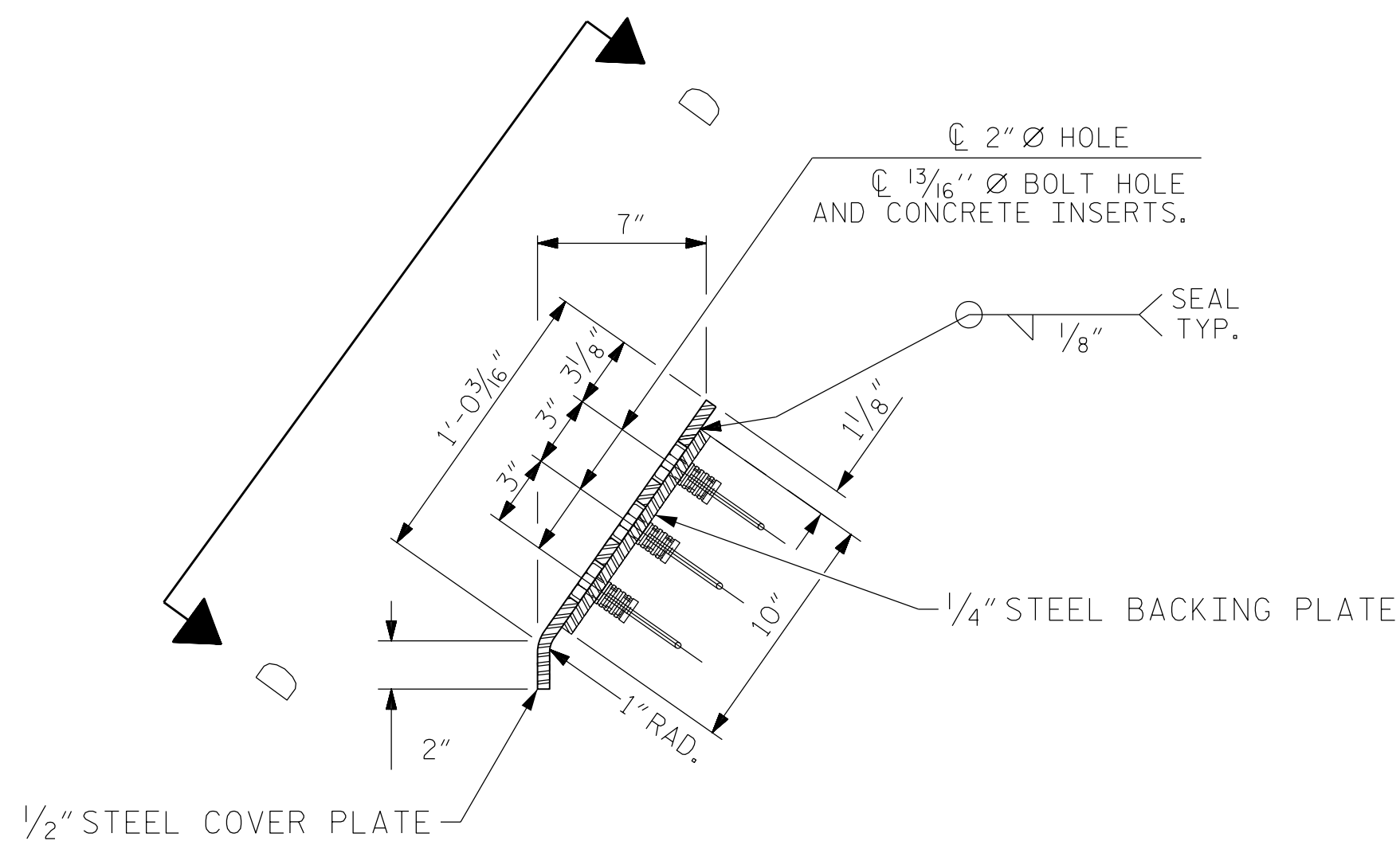
PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

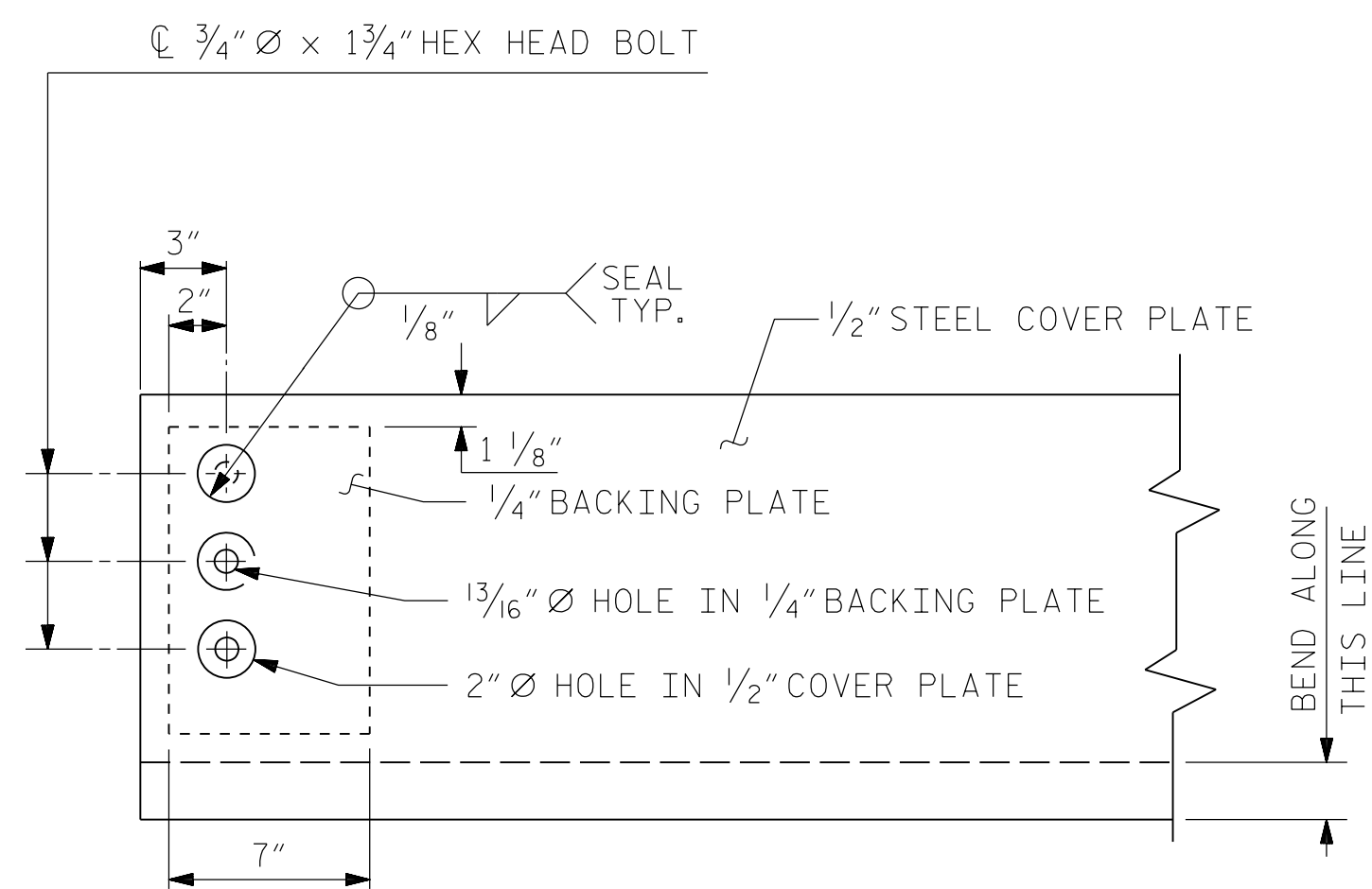
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2			4		

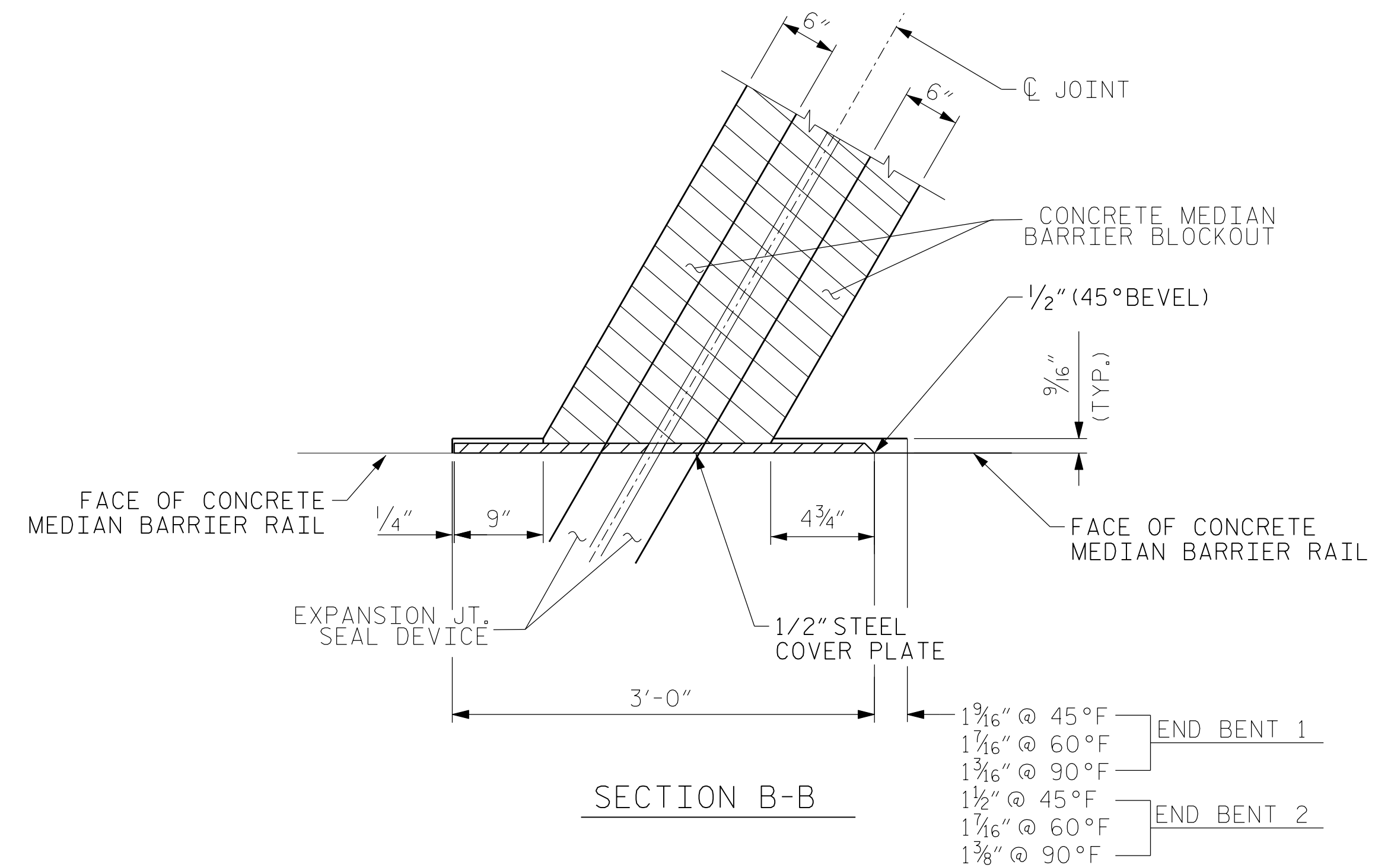
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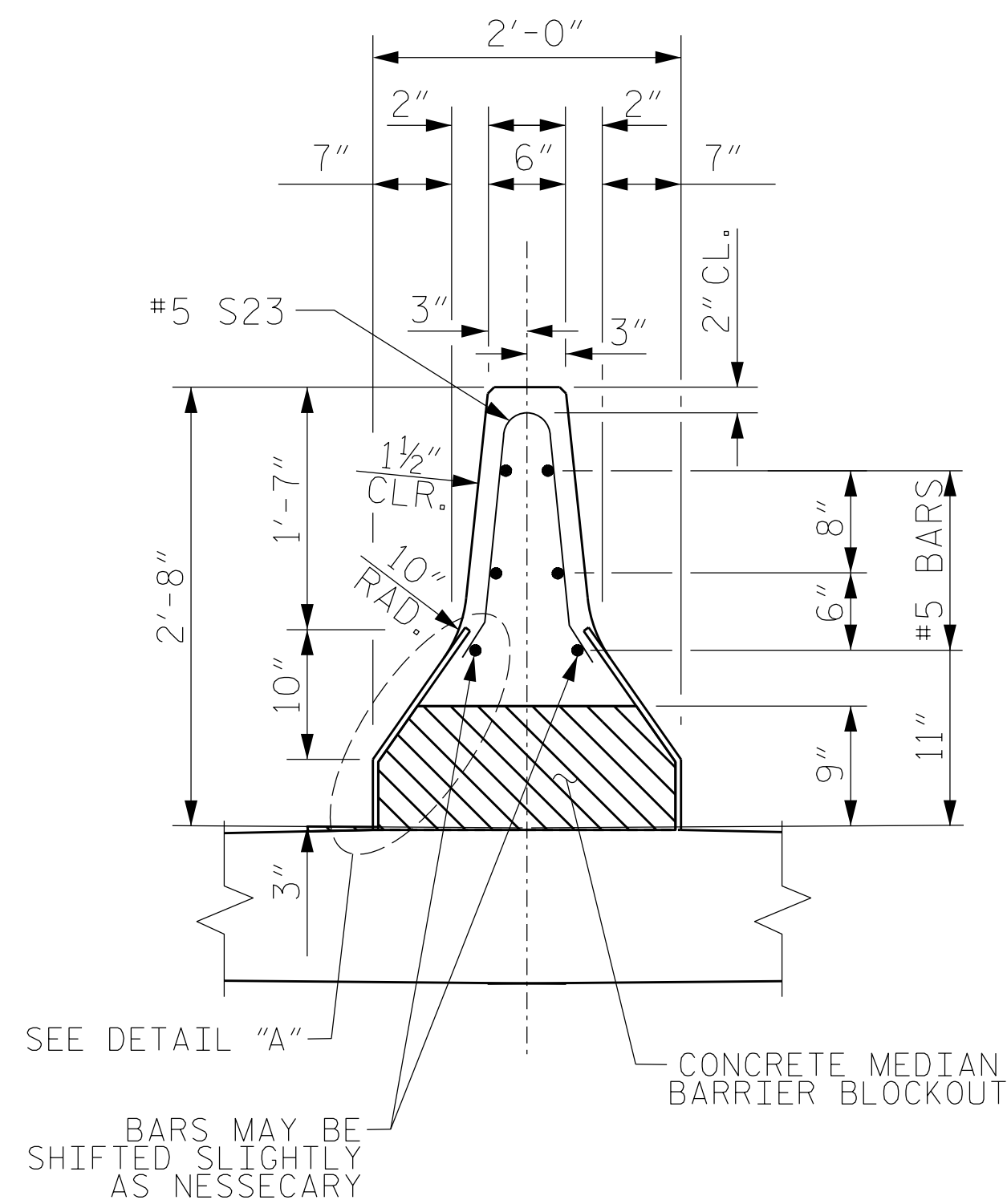
DETAIL "A"



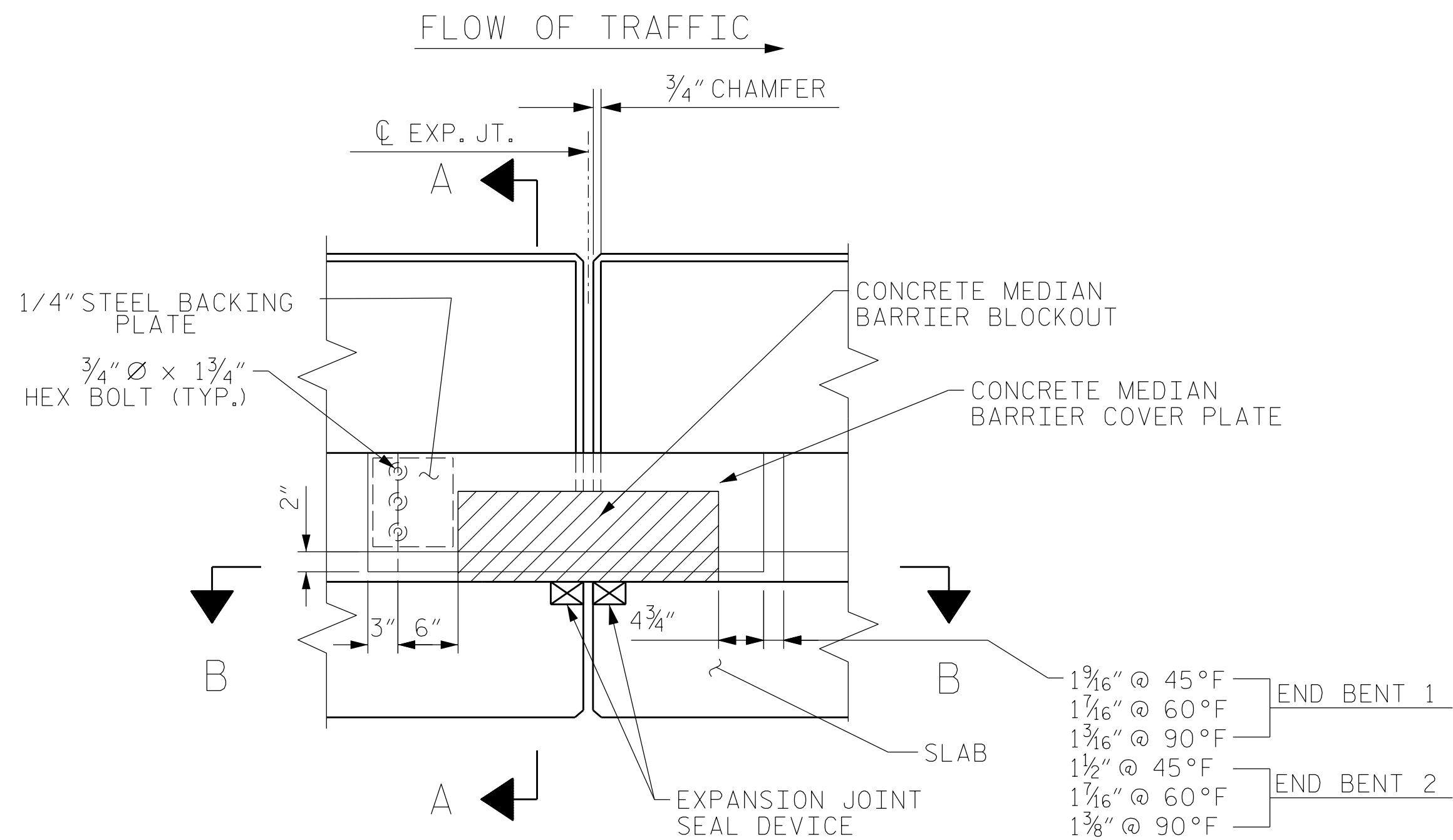
VIEW D-D



SECTION B-B



SECTION A-A



ELEVATION AT EXPANSION JOINTS

NOTE:

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "EXPANSION JOINT SEALS".

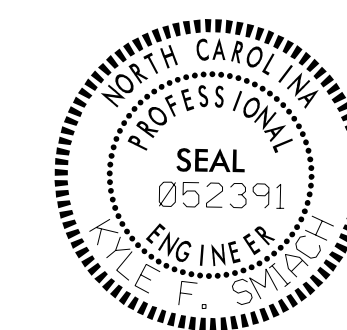
CONCRETE MEDIAN BARRIER



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ephelps AT Z2233



Designed by
Kyle Smach
05A008988E475

PROJECT NO. **B-5982**
HAYWOOD COUNTY
STATION: **20+37.51 -L-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
**EXPANSION JOINT
SEAL DETAILS
FOR MEDIAN BARRIER**

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1			3	
2			4	

S-28
TOTAL SHEETS
51

— SUPERSTRUCTURE BILL OF MATERIALS —

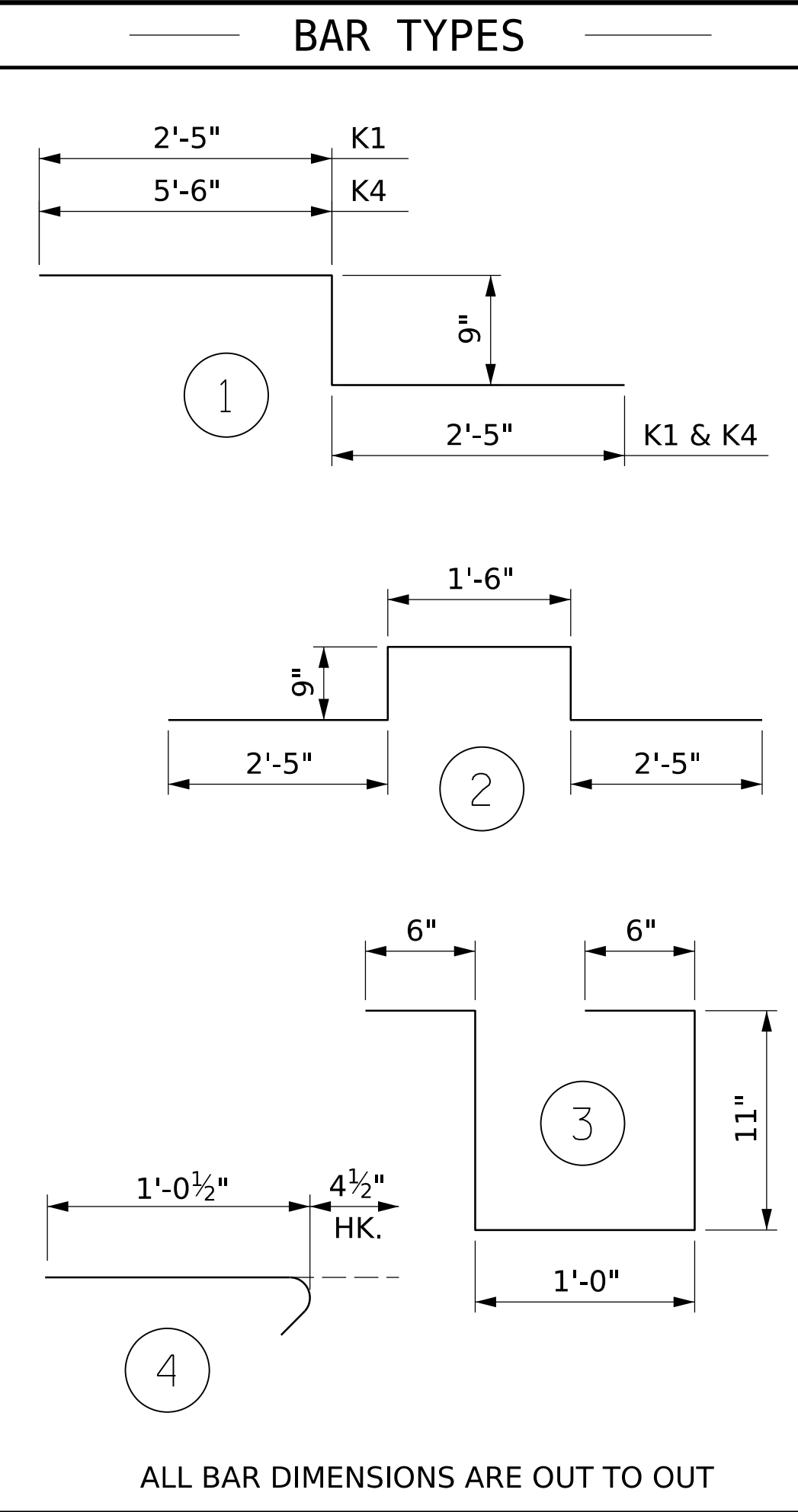
STAGE I			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	27.5	18,503	20,298
POUR #2	62.8		
POUR #3	56.4		
TOTAL	146.8	18,503	20,298

— SUPERSTRUCTURE BILL OF MATERIALS —

STAGE II			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	39.9	27,075	29,917
POUR #2	91.0		
POUR #3	81.7		
CLOSURE POUR	18.2		
TOTAL	230.8	27,075	29,917

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

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

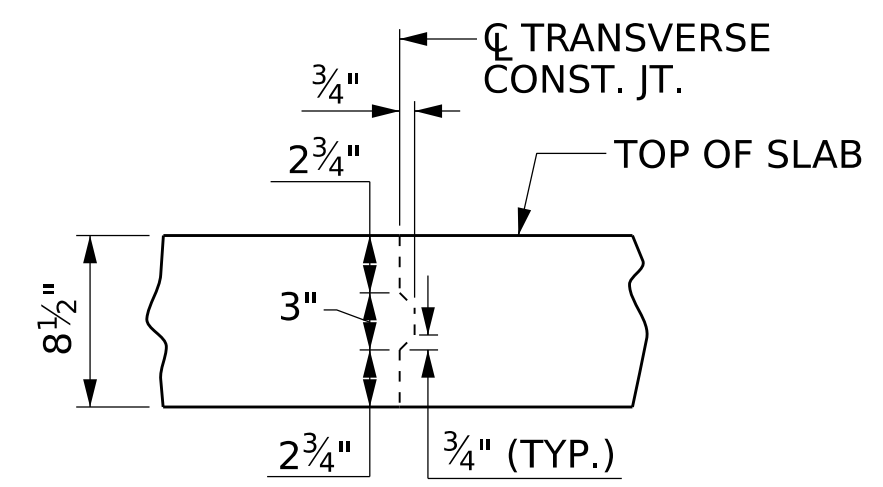


BILL OF MATERIAL

STAGE I												STAGE II											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	271	#5	STR	35'-7"	10058	* B1	25	#4	STR	28'-11"	483	* A3	263	#5	STR	52'-1"	14287	* B1	40	#4	STR	28'-11"	773
A2	271	#5	STR	35'-7"	10058	* B2	142	#6	STR	43'-0"	9171	A4	263	#5	STR	52'-1"	14287	* B2	226	#6	STR	43'-0"	14596
						* B3	25	#4	STR	18'-4"	306							* B3	40	#4	STR	18'-4"	490
* A101	2	#5	STR	33'-10"	71	* B5	25	#4	STR	17'-11"	299	* A301	2	#5	STR	49'-5"	103	* B5	40	#4	STR	17'-11"	479
* A102	2	#5	STR	31'-5"	66	B6	120	#5	STR	48'-9"	6102	* A302	2	#5	STR	47'-1"	98	B6	195	#5	STR	48'-9"	9661
* A103	2	#5	STR	29'-1"	61							* A303	2	#5	STR	44'-9"	93						
* A104	2	#5	STR	26'-9"	56	* D1	283	#5	STR	6'-2"	1820	* A304	2	#5	STR	42'-4"	88	* D1	283	#5	STR	6'-2"	1820
* A105	2	#5	STR	24'-5"	51	D2	283	#5	STR	6'-2"	1820	* A305	2	#5	STR	40'-0"	83	D2	283	#5	STR	6'-2"	1820
* A106	2	#5	STR	22'-1"	46							* A306	2	#5	STR	37'-8"	79						
* A107	2	#5	STR	19'-8"	41	* G1	2	#5	STR	36'-3"	76	* A307	2	#5	STR	35'-4"	74	* G2	2	#5	STR	53'-2"	111
* A108	2	#5	STR	17'-4"	36							* A308	2	#5	STR	33'-0"	69						
* A109	2	#5	STR	15'-0"	31	* K1	4	#5	1	5'-7"	23	* A309	2	#5	STR	30'-7"	64	* K1	4	#5	1	5'-7"	23
* A110	2	#5	STR	12'-8"	26	* K2	12	#5	2	7'-10"	98	* A310	2	#5	STR	28'-3"	59	* K2	20	#5	2	7'-10"	163
* A111	2	#5	STR	10'-3"	21	* K3	16	#5	STR	7'-11"	132	* A311	2	#5	STR	25'-11"	54	* K3	24	#5	STR	7'-11"	198
* A112	2	#5	STR	7'-11"	17	* K4	4	#5	1	8'-8"	36	* A312	2	#5	STR	23'-7"	49	* K4	4	#5	1	8'-8"	36
* A113	2	#5	STR	5'-7"	12							* A313	2	#5	STR	21'-2"	44						
* A114	2	#5	STR	3'-3"	7	* S1	56	#4	3	3'-10"	143	* A314	2	#5	STR	18'-10"	39	* S1	92	#4	3	3'-10"	236
A201	2	#5	STR	33'-10"	71	* J1	70	#4	4	1'-5"	66	* A315	2	#5	STR	16'-6"	34						
A202	2	#5	STR	31'-5"	66							* A316	2	#5	STR	14'-2"	30	* J1	116	#4	4	1'-5"	110
A203	2	#5	STR	29'-1"	61							* A317	2	#5	STR	11'-9"	25						
A204	2	#5	STR	26'-9"	56							* A318	2	#5	STR	9'-5"	20						
A205	2	#5	STR	24'-5"	51							* A319	2	#5	STR	7'-1"	15						
A206	2	#5	STR	22'-1"	46							* A320	2	#5	STR	4'-9"	10						
A207	2	#5	STR	19'-8"	41							* A321	2	#5	STR	2'-5"	5						
A208	2	#5	STR	17'-4"	36																		
A209	2	#5	STR	15'-0"	31																		
A210	2	#5	STR	12'-8"	26																		
A211	2	#5	STR	10'-3"	21																		
A212	2	#5	STR	7'-11"	17																		
A213	2	#5	STR	5'-7"	12																		
A214	2	#5	STR	3'-3"	7																		

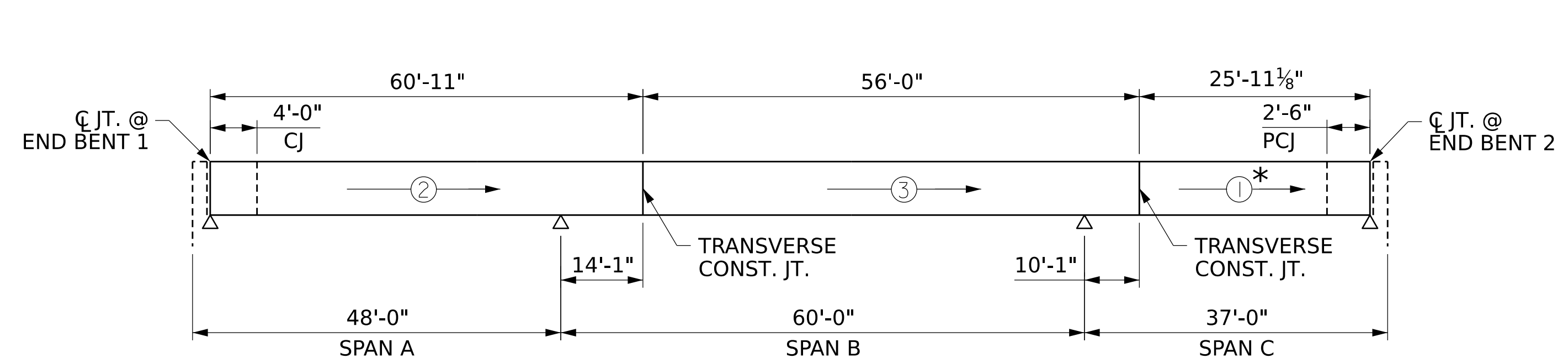
GROOVING BRIDGE FLOORS

BRIDGE DECK	11,621 SQ. FT.
APPROACH SLABS	3,936 SQ. FT.
TOTAL	15,557 SQ. FT.



TRANSVERSE CONSTRUCTION JOINT DETAIL

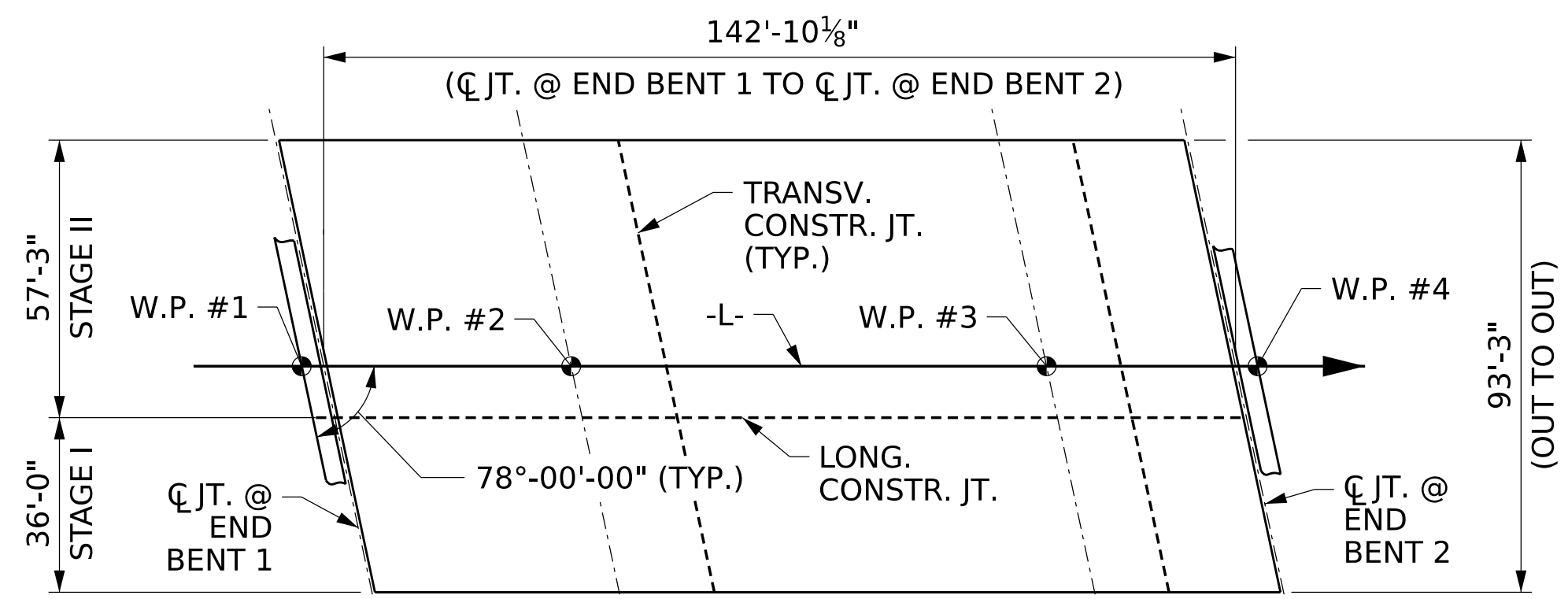
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.



POUR SEQUENCE

NOTE: IF THE CONTRACTOR PROPOSES AN ALTERNATE POUR SEQUENCE, THEY MUST DEMONSTRATE THAT THE SEQUENCE DOES NOT CAUSE UPLIFT AT THE END BENTS

- ⊕ = INDICATES POUR NUMBER AND DIRECTION OF POUR
- CJ = CONSTRUCTION JOINT
- PCJ = PERMITTED CONSTRUCTION JOINT (SEE EXP. JOINT SEAL DEATILS)
- * = IF THE CONTRACTOR CHOOSES TO REVERSE THE DIRECTION OF POUR #1, A CONSTRUCTION JOINT 4'-0" FROM THE JOINT SEAL SHALL BE REQUIRED.



LAYOUT FOR COMPUTING AREA
REINFORCING CONCRETE DECK SLAB
 (SQ. FT. = 13,320)

PROJECT NO. **B-5982**
HAYWOOD COUNTY
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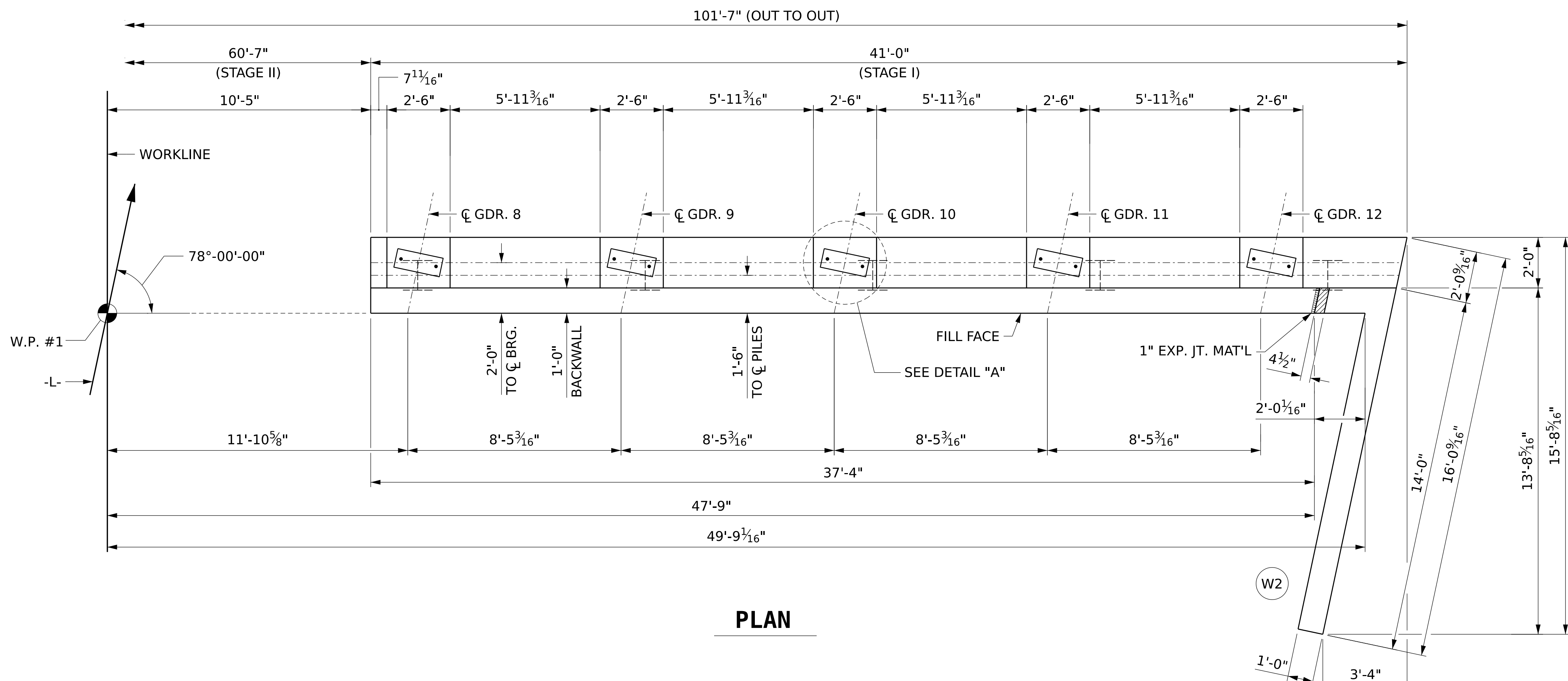
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL

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2			4	

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DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024



PLAN

NOTES:
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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.

EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

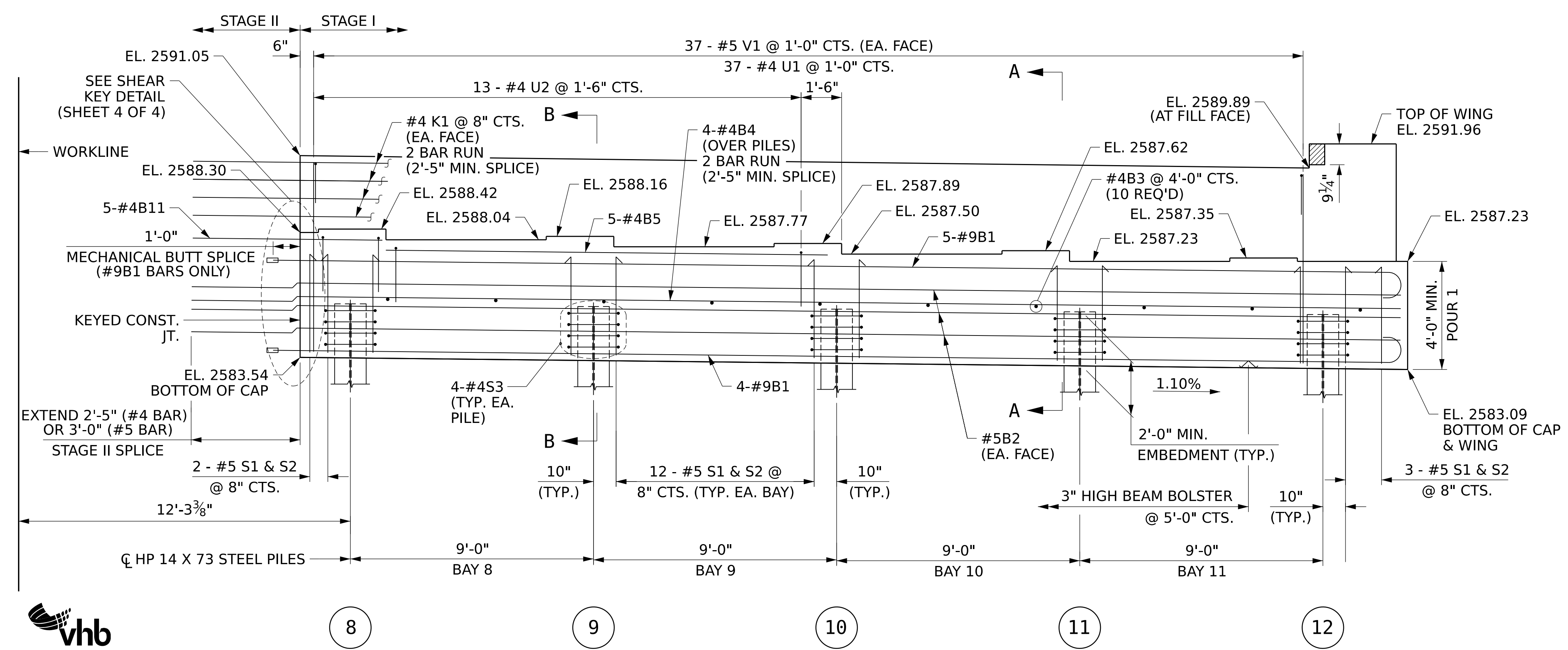
MECHANICAL COUPLERS SHALL BE USED TO JOIN THE #9 "B" BARS IN STAGE I WITH THE #9 "B" BARS IN STAGE II.

FOR MECHANICAL COUPLERS, SEE MECHANICAL BUTT SPLICES FOR REINFORCING STEEL IN STANDARD SPECIFICATIONS.

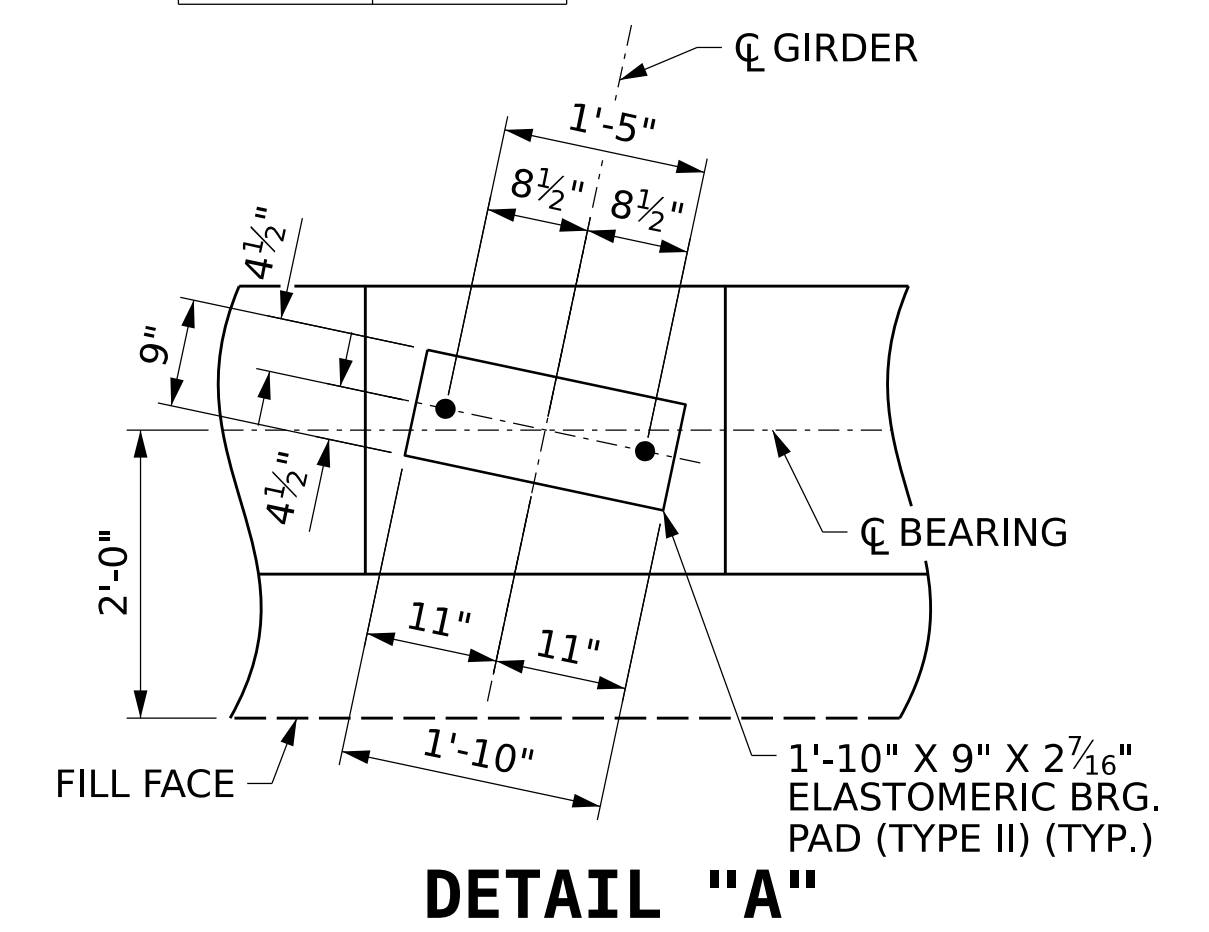
FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

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

TOP OF PILE ELEVATIONS	
8	2585.51
9	2585.42
10	2585.32
11	2585.22
12	2585.12



ELEVATION



DETAIL "A"

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 1 OF 4

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

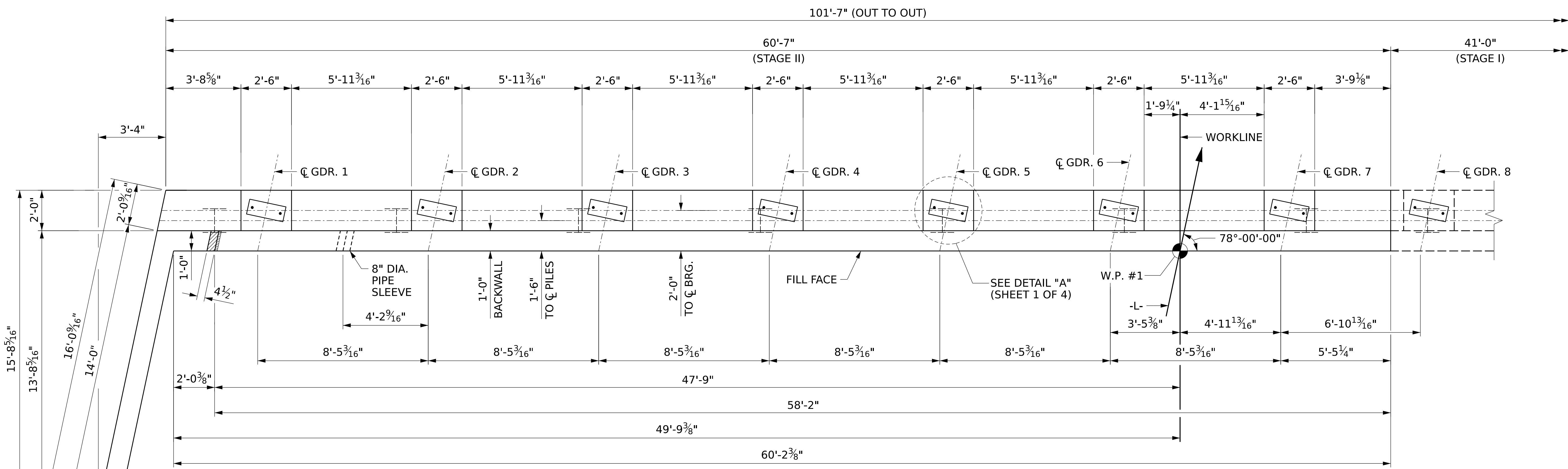


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1			3			TOTAL SHEETS
2			4			51

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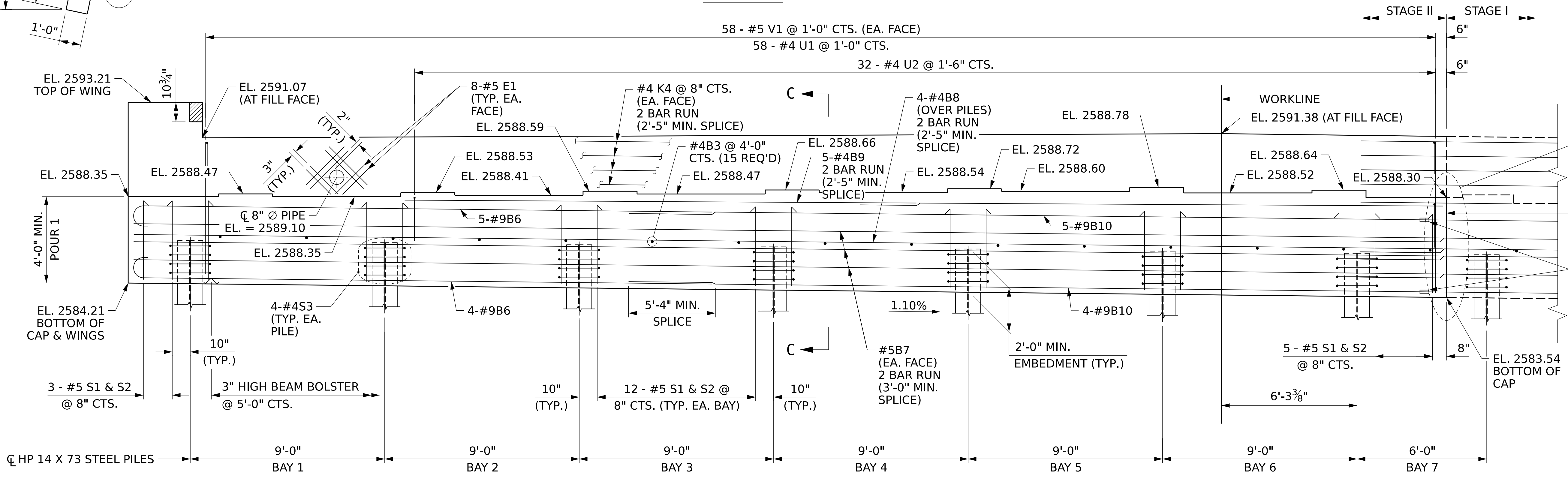
vhb
 VHB Engineering NC, P.C. (C-3705)
 940 Main Campus Drive, Suite 500
 Raleigh, NC 27606

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 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
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PLAN

TOP OF PILE ELEVATIONS	
①	2586.21
②	2586.11
③	2586.01
④	2585.91
⑤	2585.81
⑥	2585.71
⑦	2585.61



ELEVATION

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 1
STAGE II



DocuSigned by:
 Kyle Smack
 EA5008988E475...

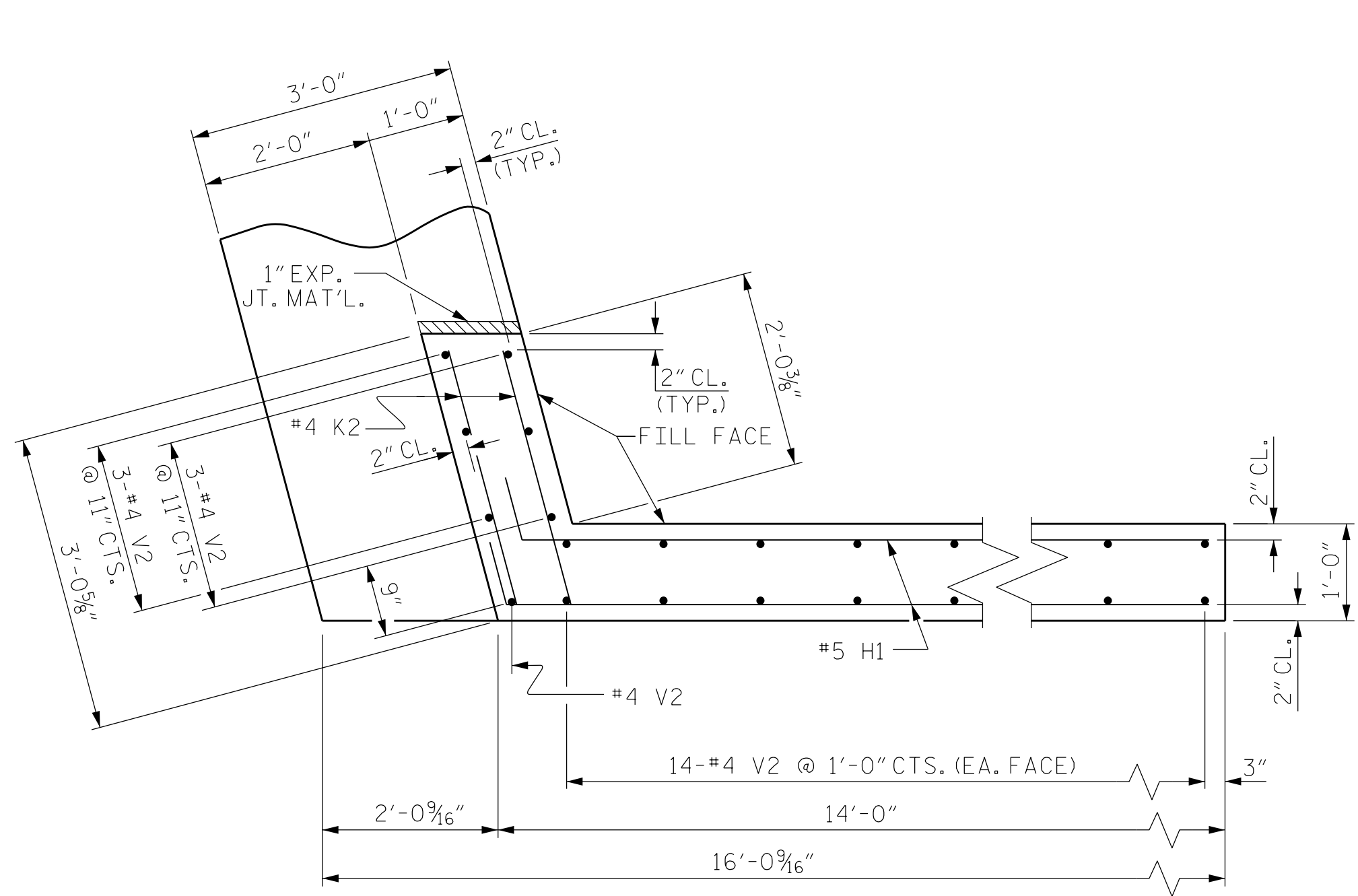
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 TOTAL SHEETS
 51

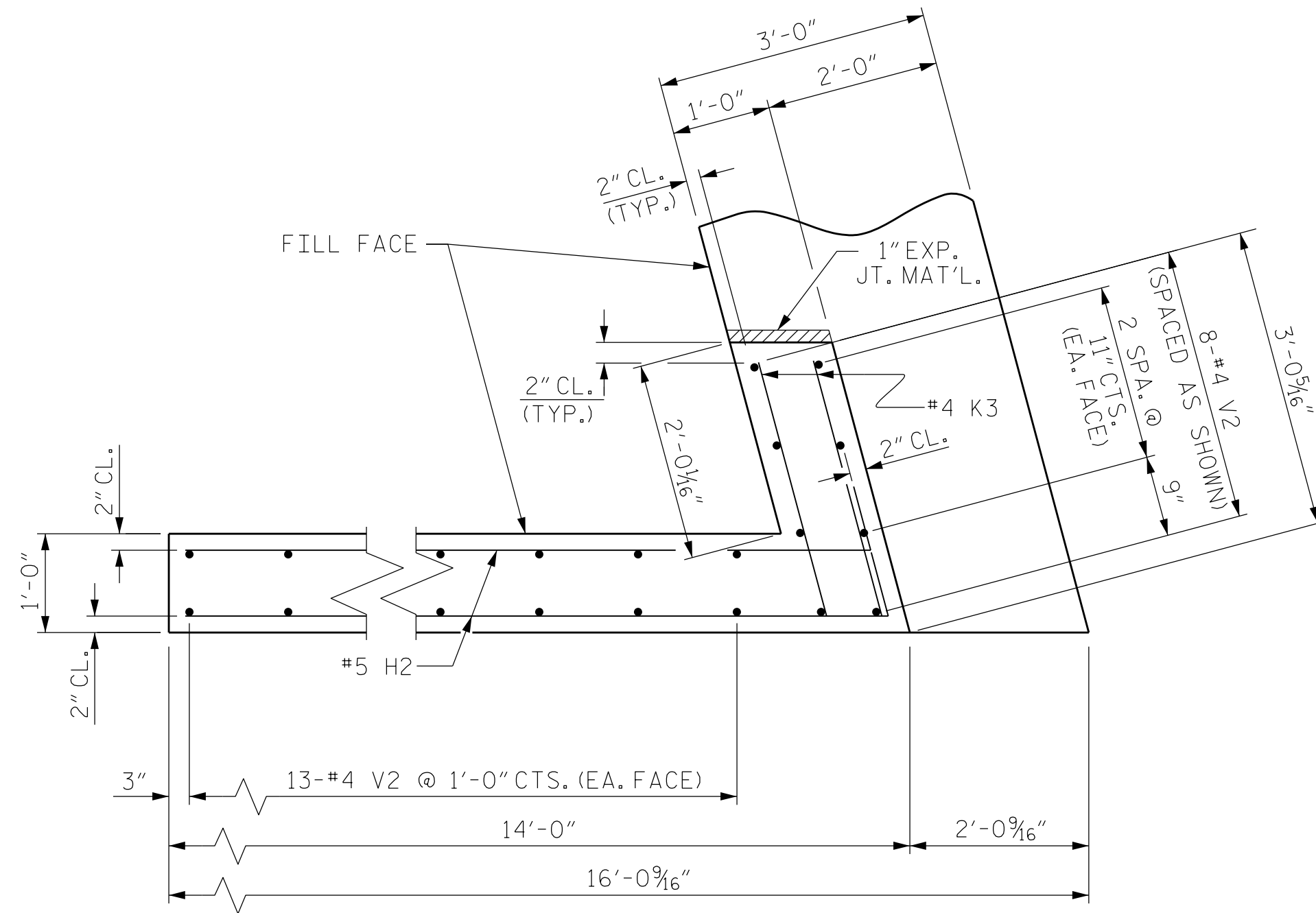
DRAWN BY : **E.C. PHELPS** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**





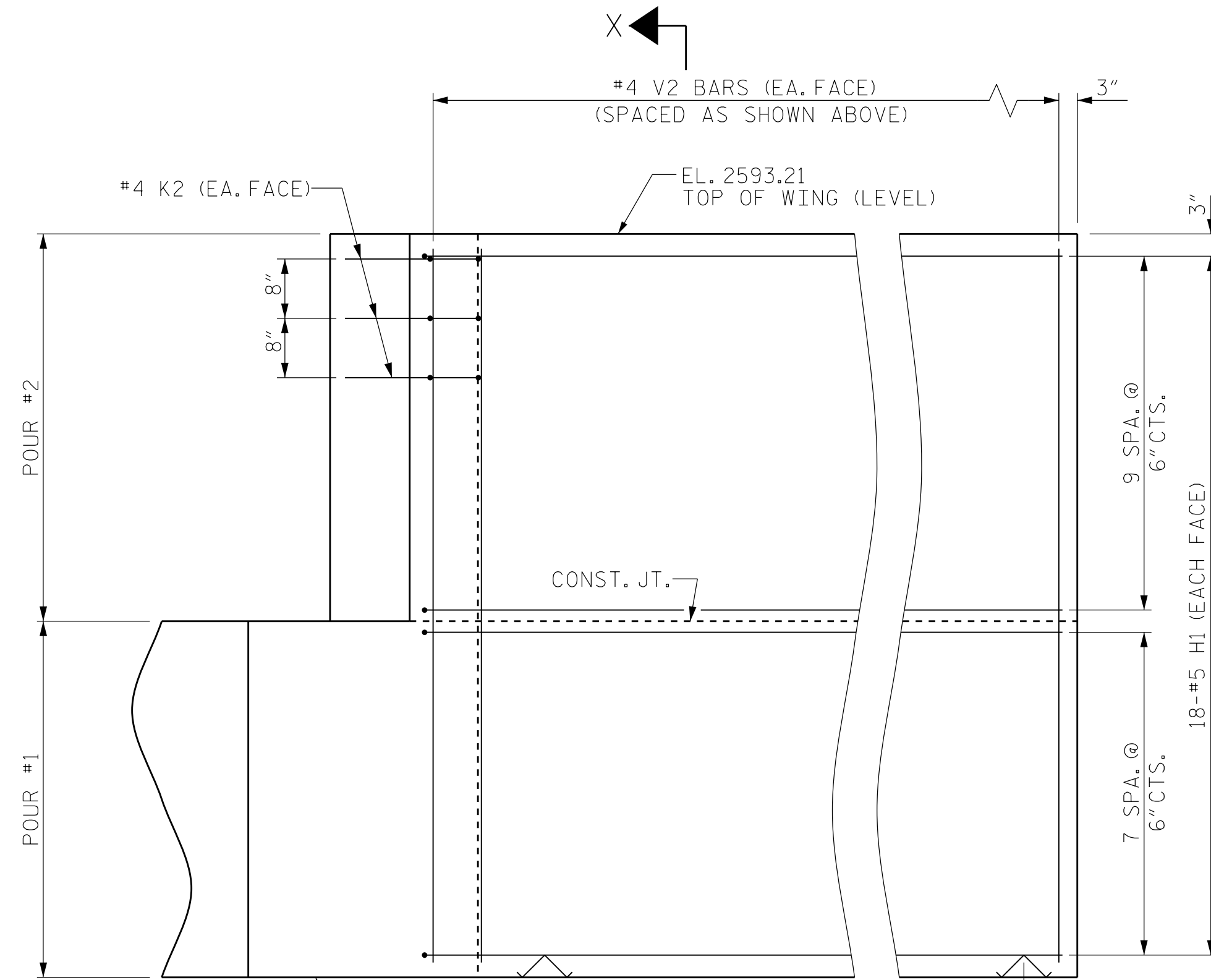
PLAN OF WING (W1)

STAGE II

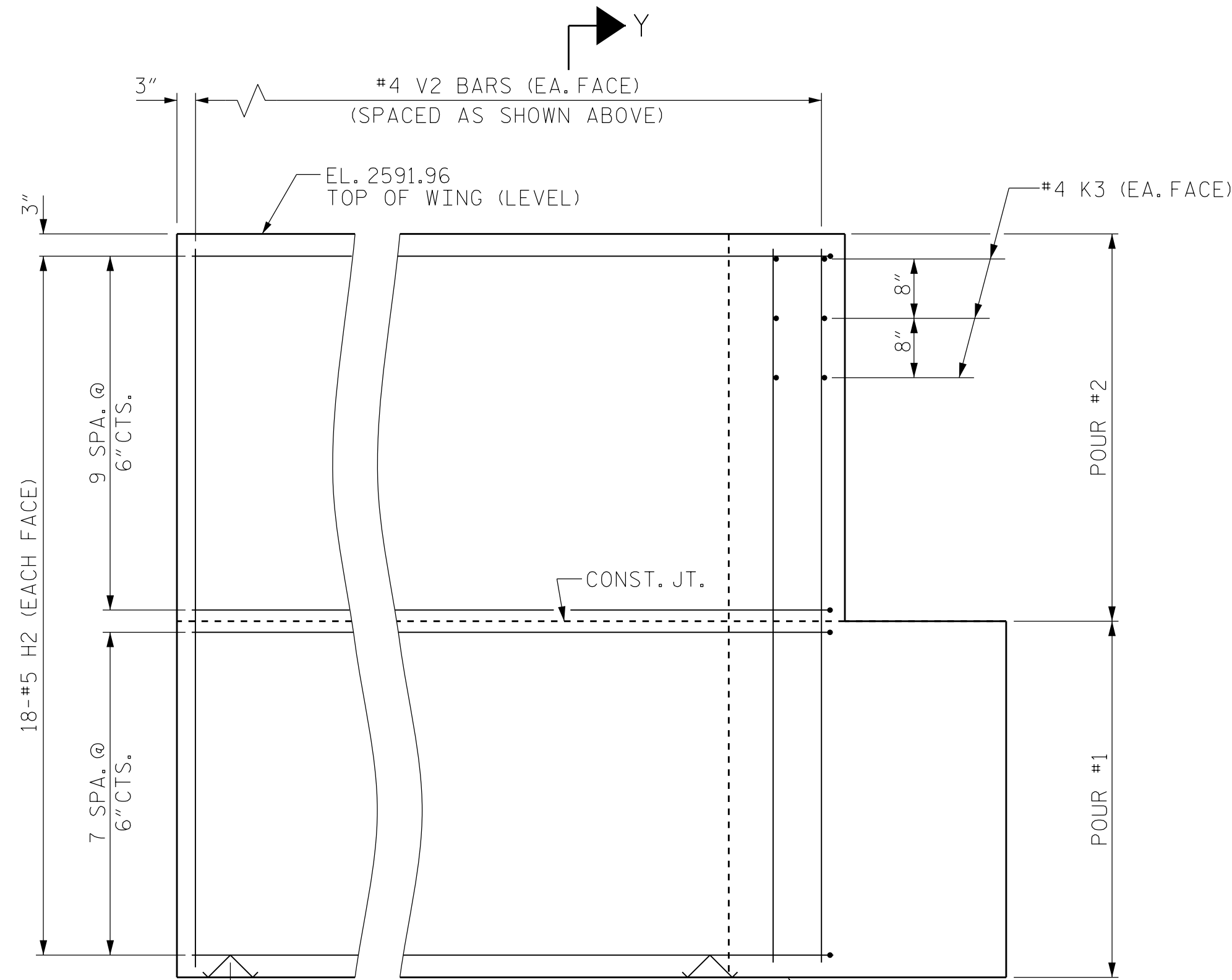


PLAN OF WING (W2)

STAGE I

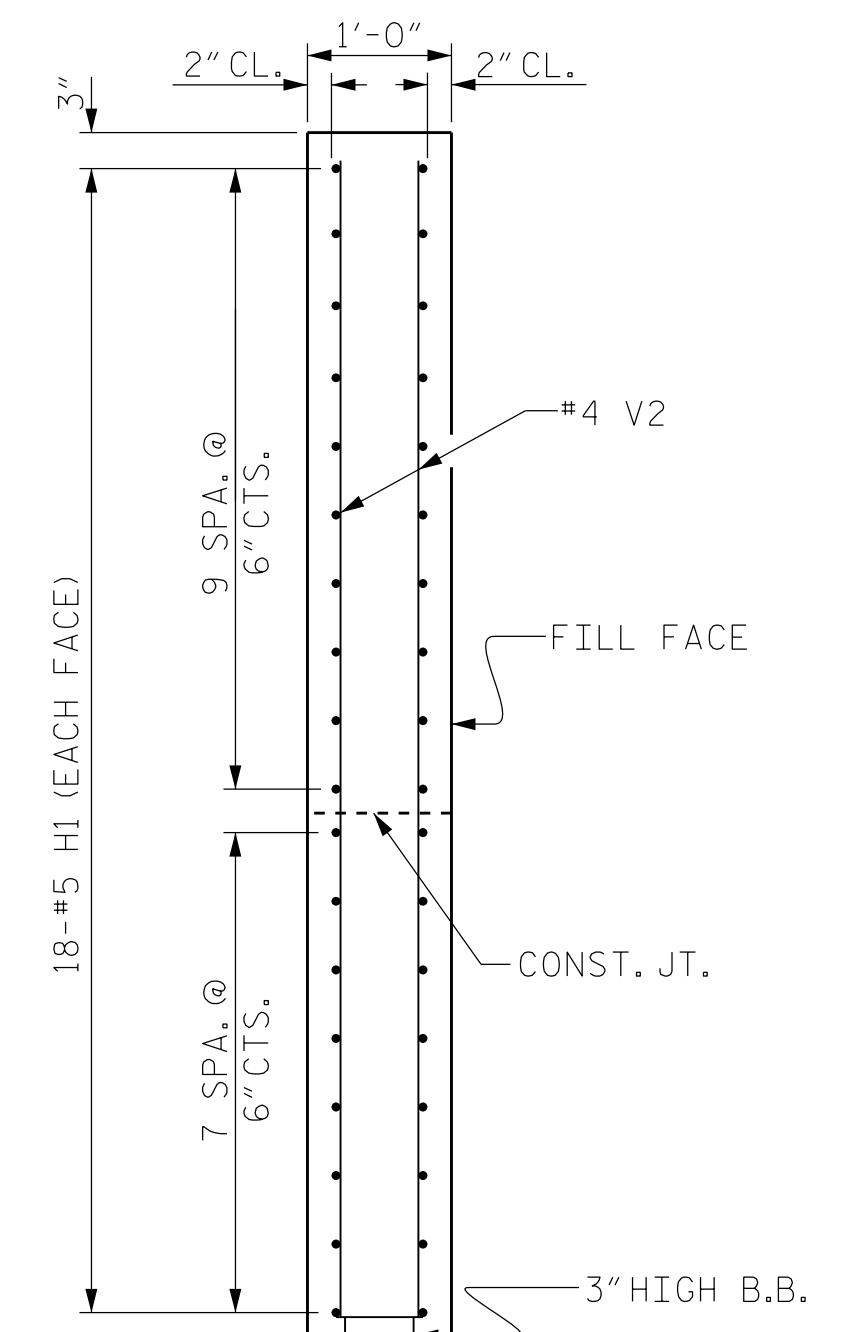


ELEVATION OF WING (W1)

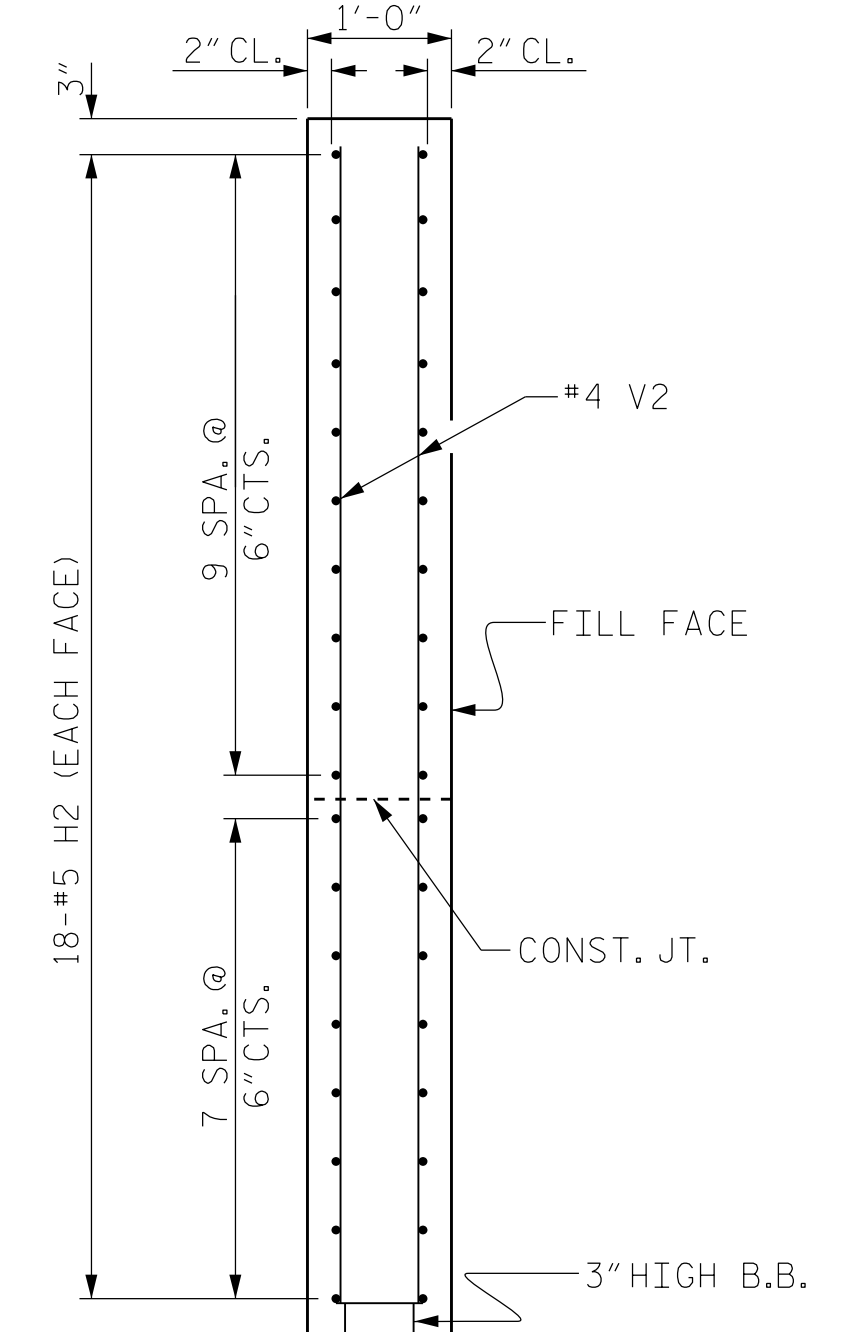


ELEVATION OF WING (W2)

WING DETAILS



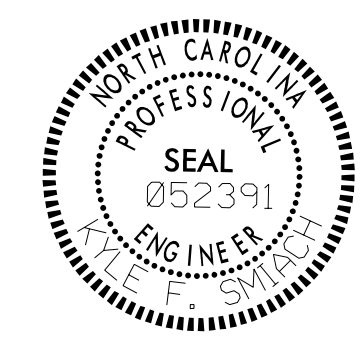
SECTION X-X



SECTION Y-Y

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
END BENT 1
STAGE I & II

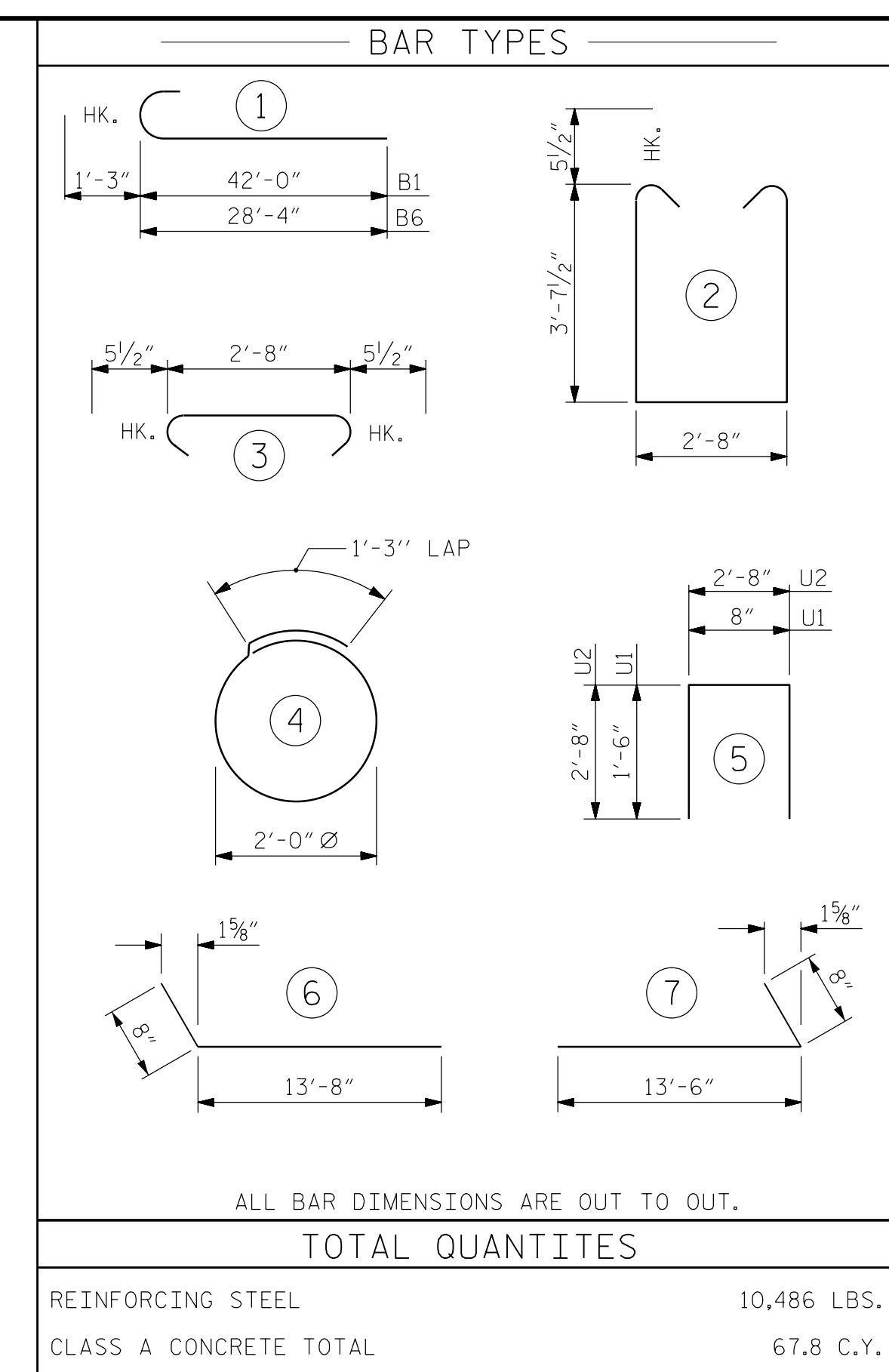
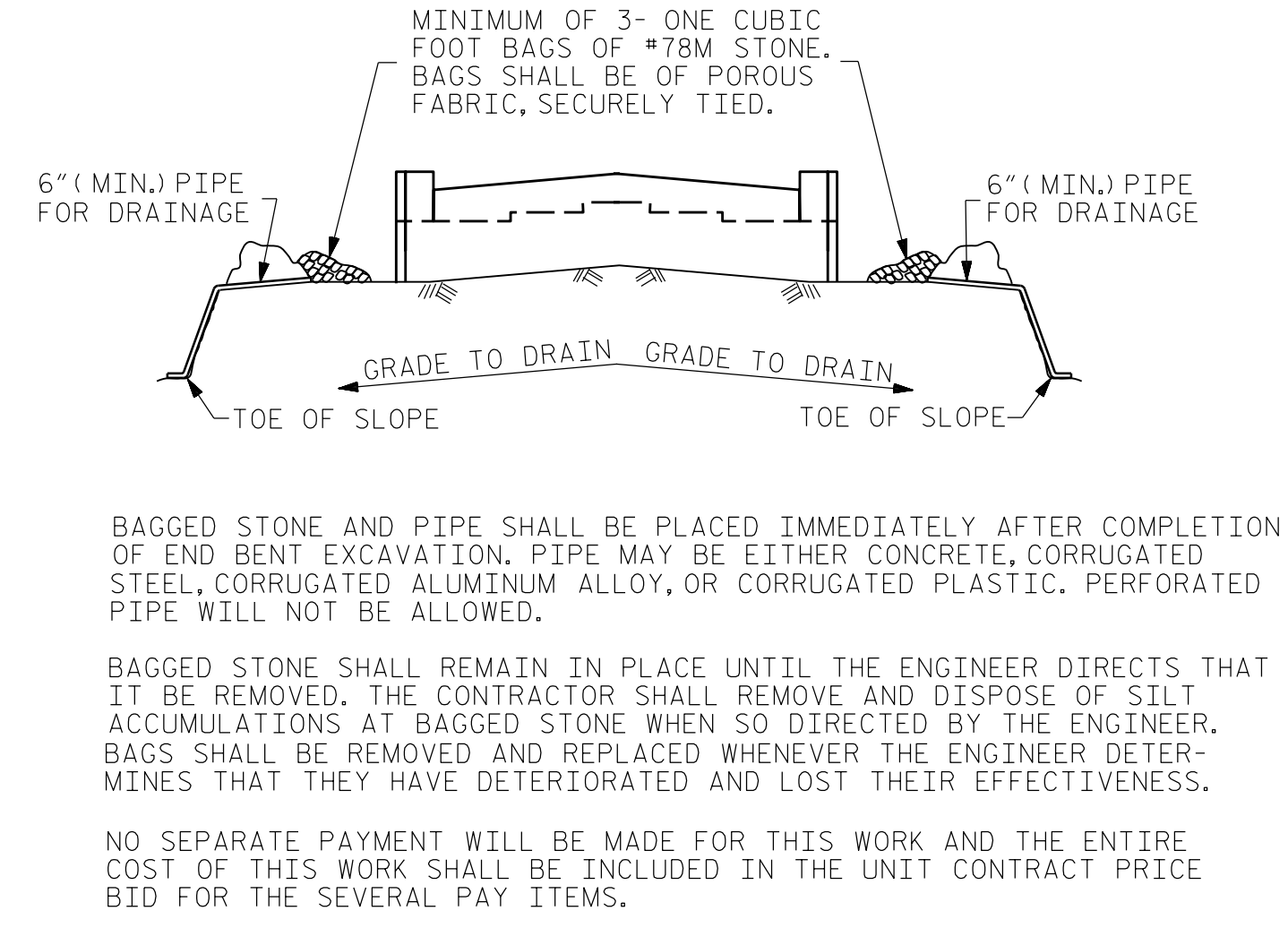
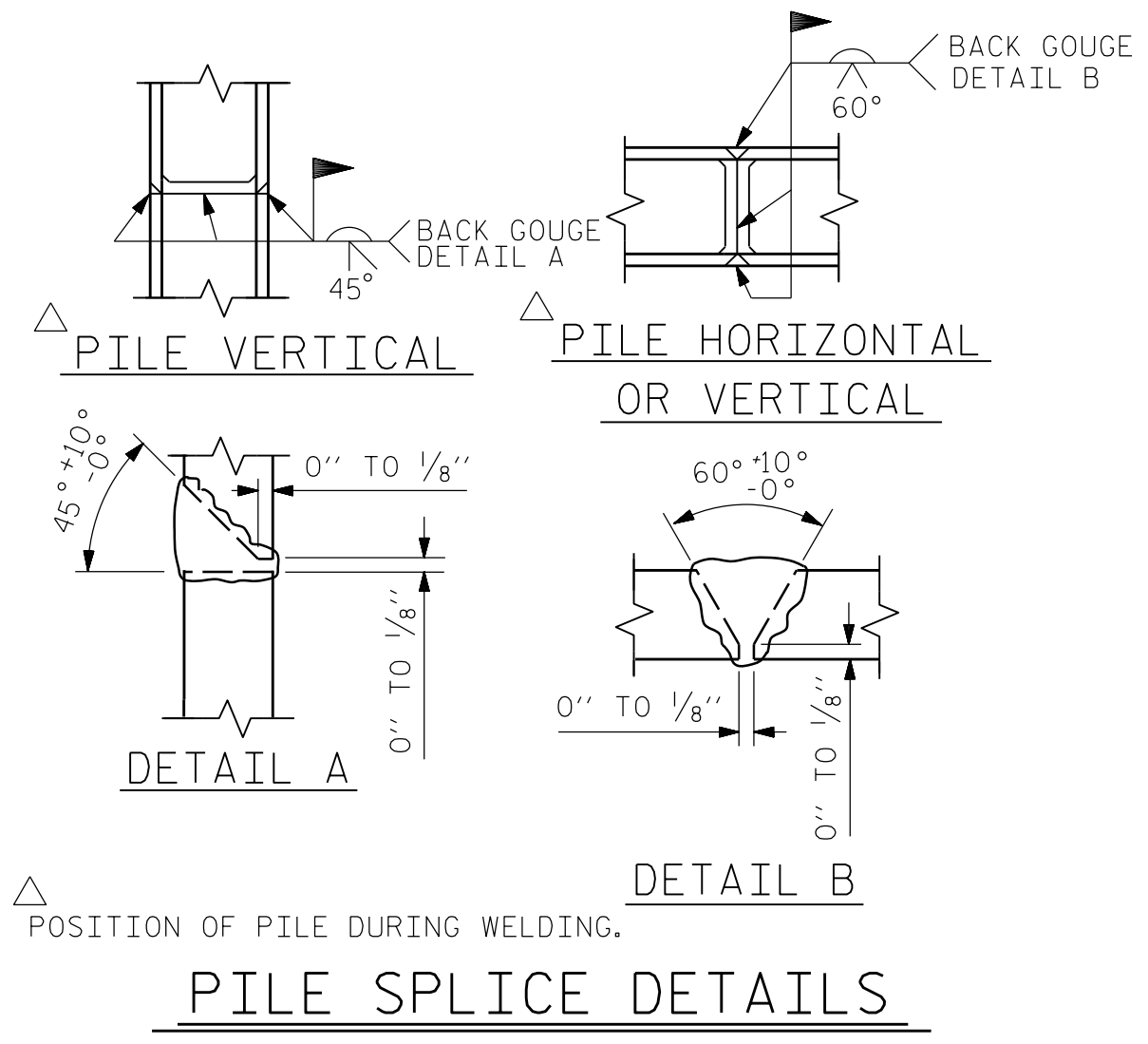


Designed by:
 Kyle Smach
 REA5008988E475

REVISIONS						SHEET NO. S-32 TOTAL SHEETS 51
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DRAWN BY : E.C. PHELPS	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

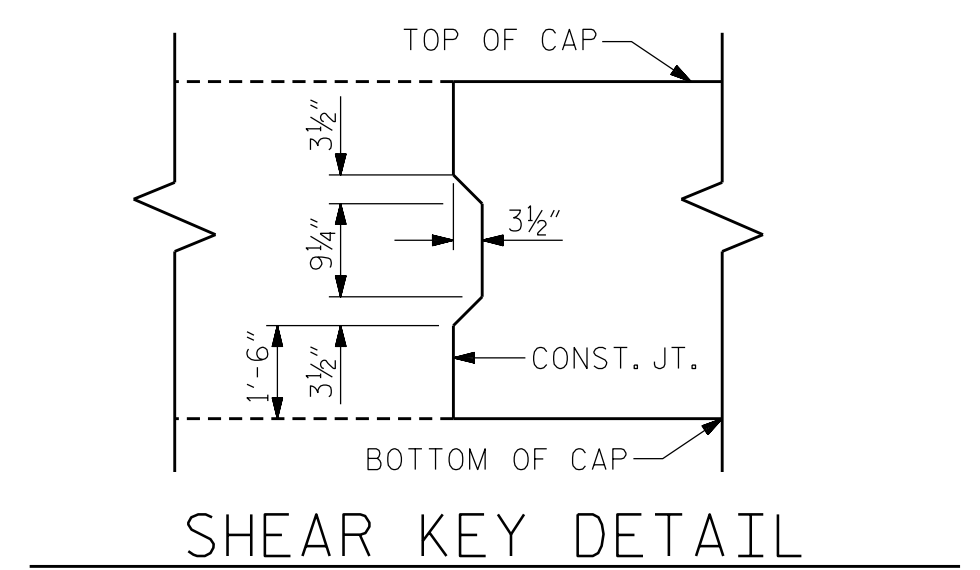
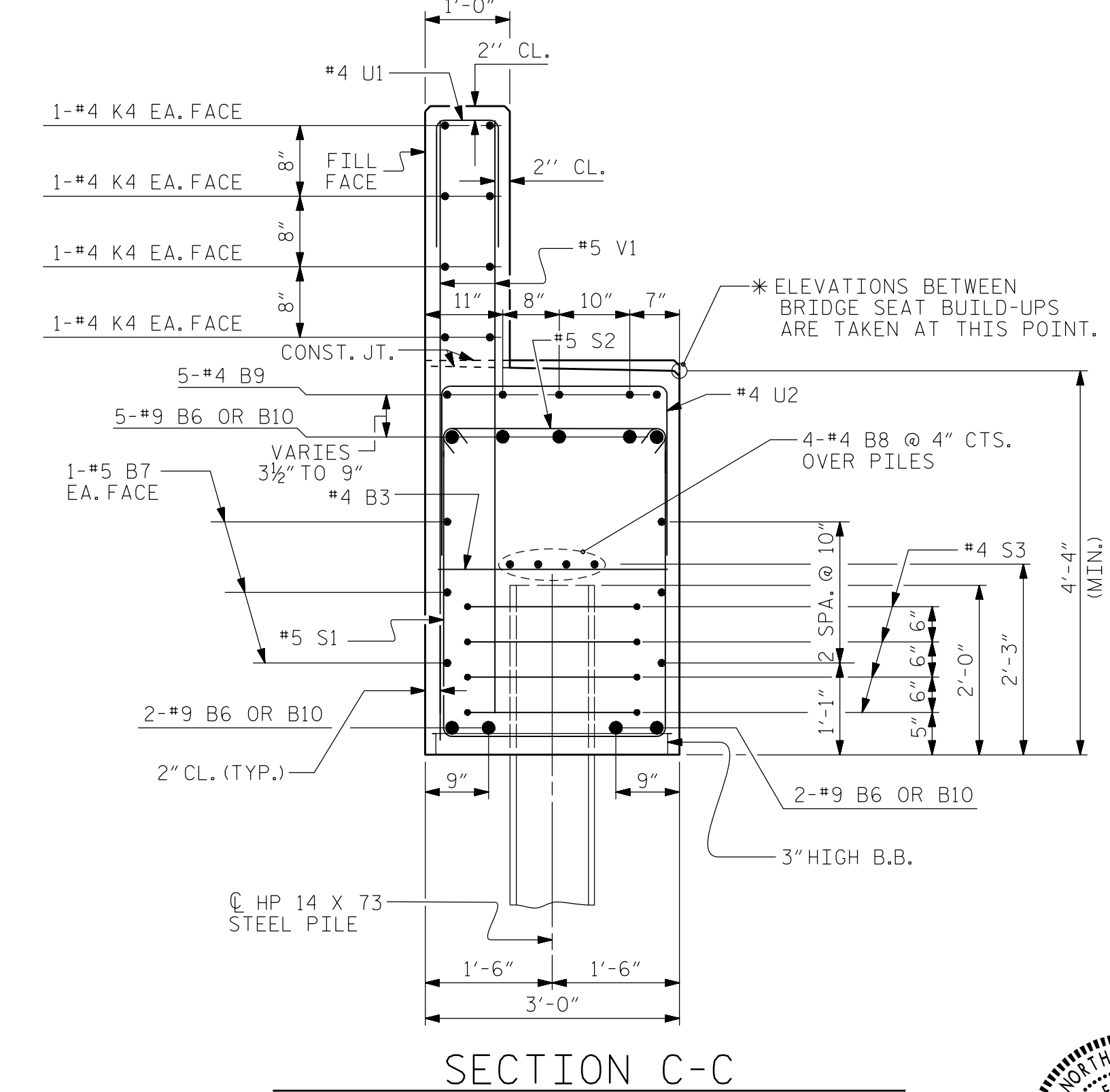
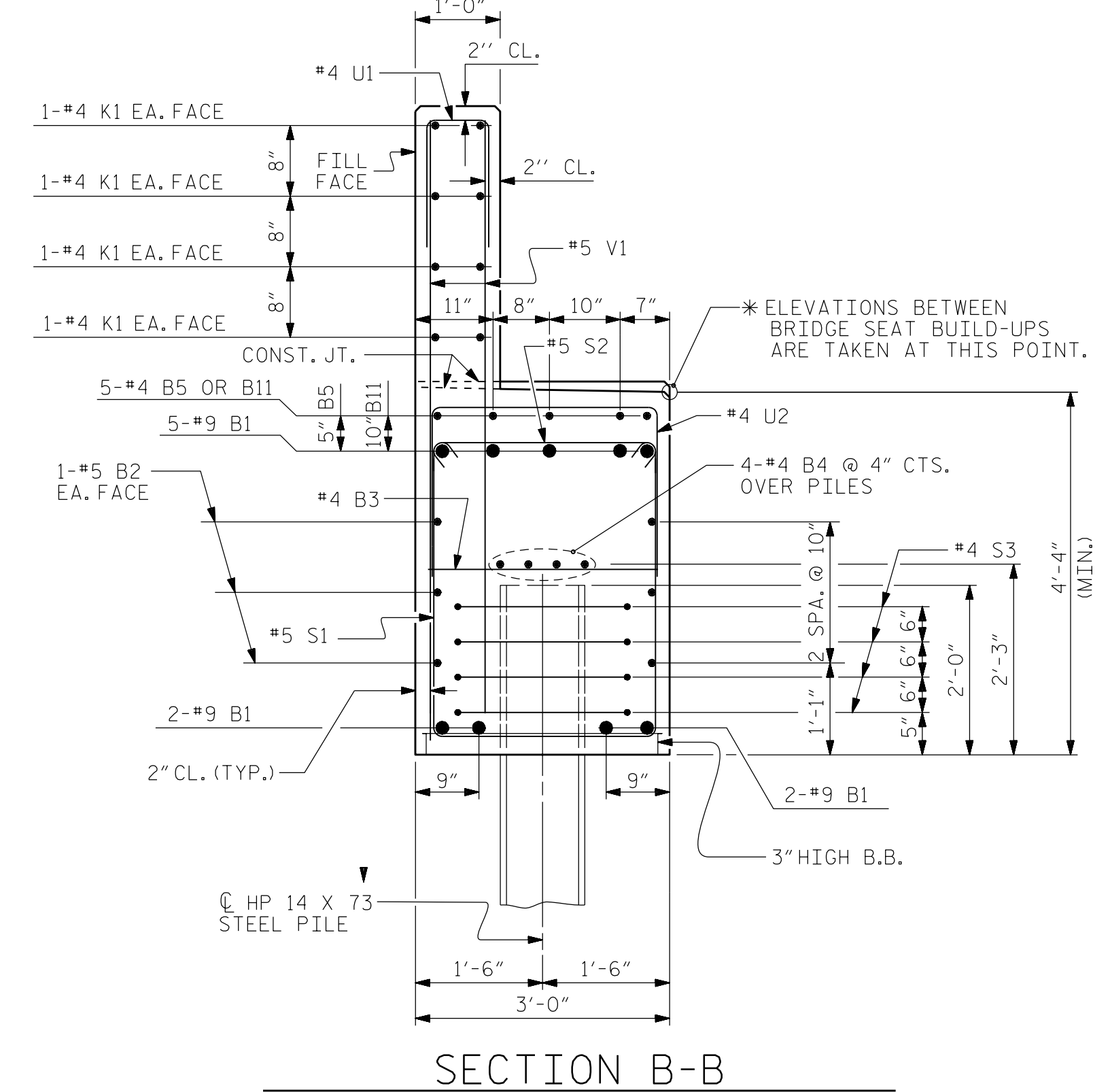
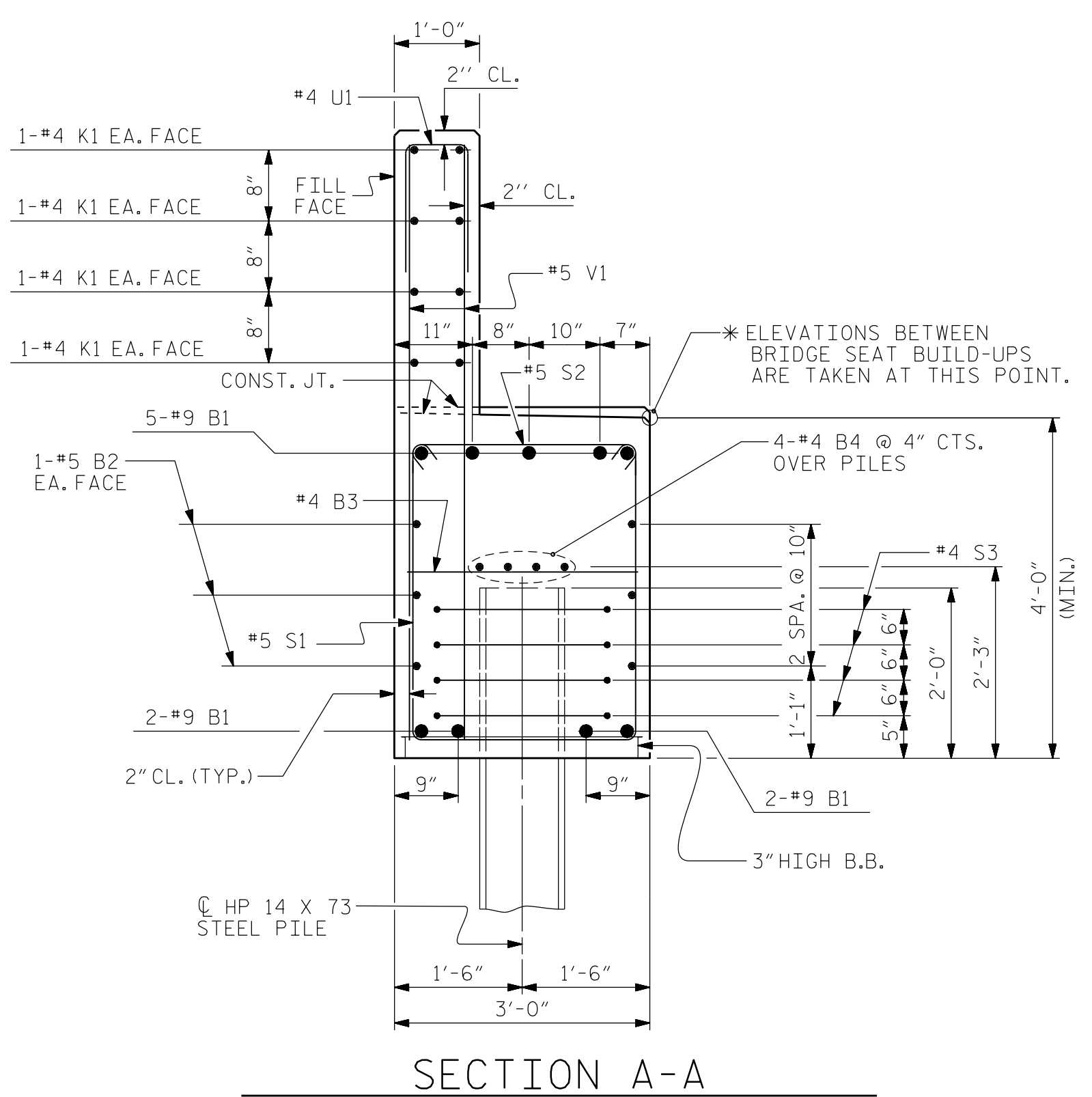




BILL OF MATERIAL

END BENT No. 1

STAGE I					STAGE II						
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	#9	1	43'-3"	1323	B6	9	#9	1	29'-7"	905
B2	6	#5	STR	44'-0"	275	B7	12	#5	STR	31'-9"	398
B3	10	#4	STR	2'-8"	18	B3	15	#4	STR	2'-8"	27
B4	8	#4	STR	22'-11"	122	B8	8	#4	STR	31'-6"	168
B5	5	#4	STR	16'-8"	56	B9	10	#4	STR	25'-3"	169
B11	5	#4	STR	5'-5"	18	B10	9	#9	STR	37'-0"	1132
H2	36	#5	7	14'-2"	532	H1	36	#5	6	14'-4"	538
K1	16	#4	STR	22'-9"	243	K4	8	#4	STR	31'-6"	168
K3	6	#4	STR	2'-8"	11	K2	6	#4	STR	2'-8"	11
S1	53	#5	2	10'-10"	599	S1	80	#5	2	10'-10"	904
S2	53	#5	3	3'-7"	198	S2	80	#5	3	3'-7"	299
S3	20	#4	4	7'-6"	100	S3	28	#4	4	7'-6"	140
U1	37	#4	5	3'-8"	91	U1	58	#4	5	3'-8"	142
U2	13	#4	5	8'-0"	69	U2	32	#4	5	8'-0"	171
V1	74	#5	STR	6'-3"	482	V1	116	#5	STR	6'-3"	756
V2	34	#4	STR	8'-6"	193	V2	35	#4	STR	8'-6"	199
						E1	16	#5	STR	1'-9"	29
REINFORCING STEEL (FOR ONE END BENT)					4330 LBS.	REINFORCING STEEL (FOR ONE END BENT)					6156 LBS.
CLASS A CONCRETE BREAKDOWN (STAGE I)						CLASS A CONCRETE BREAKDOWN (STAGE II)					
POUR #1 CAP, LOWER PART OF WINGS					22.4 C.Y.	POUR #1 CAP, LOWER PART OF WINGS					30.6 C.Y.
POUR #2 BACKWALL & UPPER PART OF WINGS					7.4 C.Y.	POUR #2 BACKWALL & UPPER PART OF WINGS					7.4 C.Y.
TOTAL CLASS A CONCRETE					29.8 C.Y.	TOTAL CLASS A CONCRETE					38.0 C.Y.



PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 1
 STAGE I & II



Designed by
 Kyle Smiach
 REA5008988E475

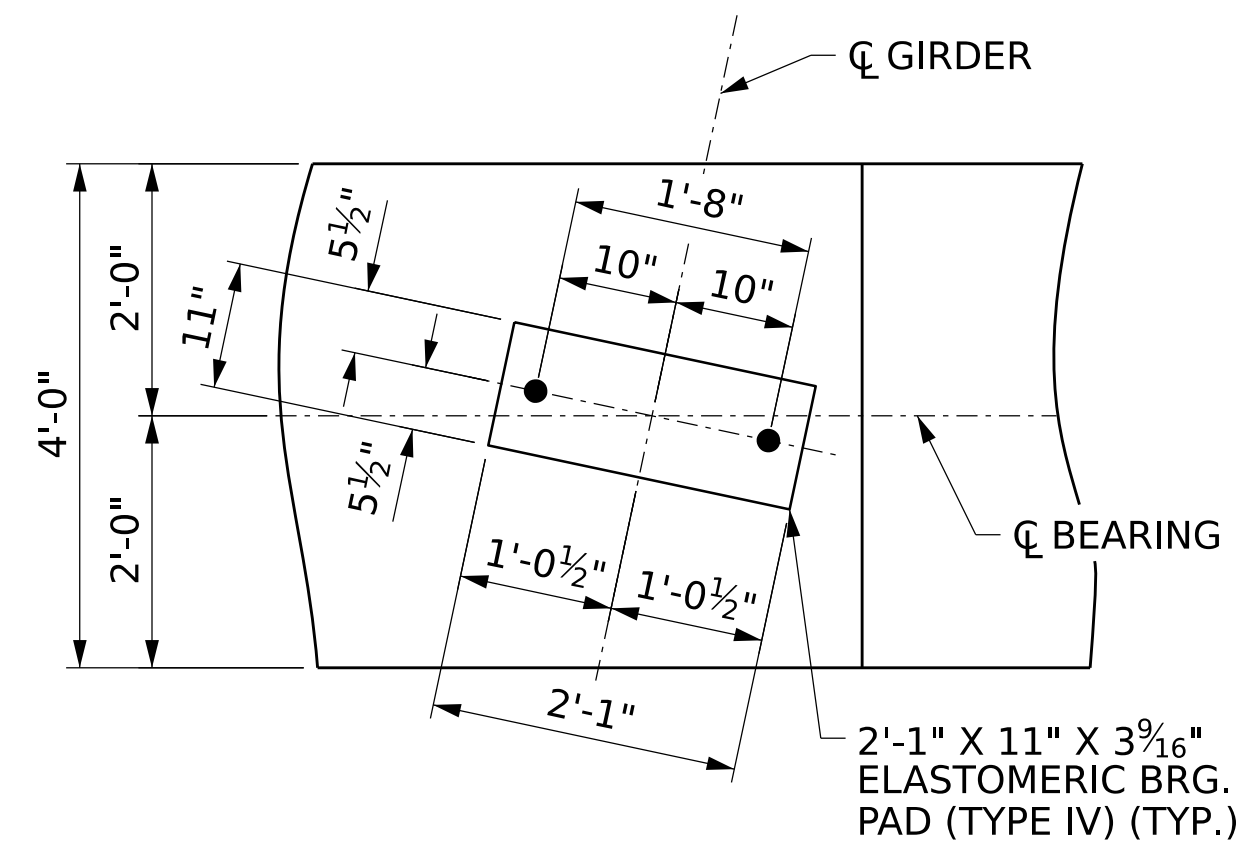
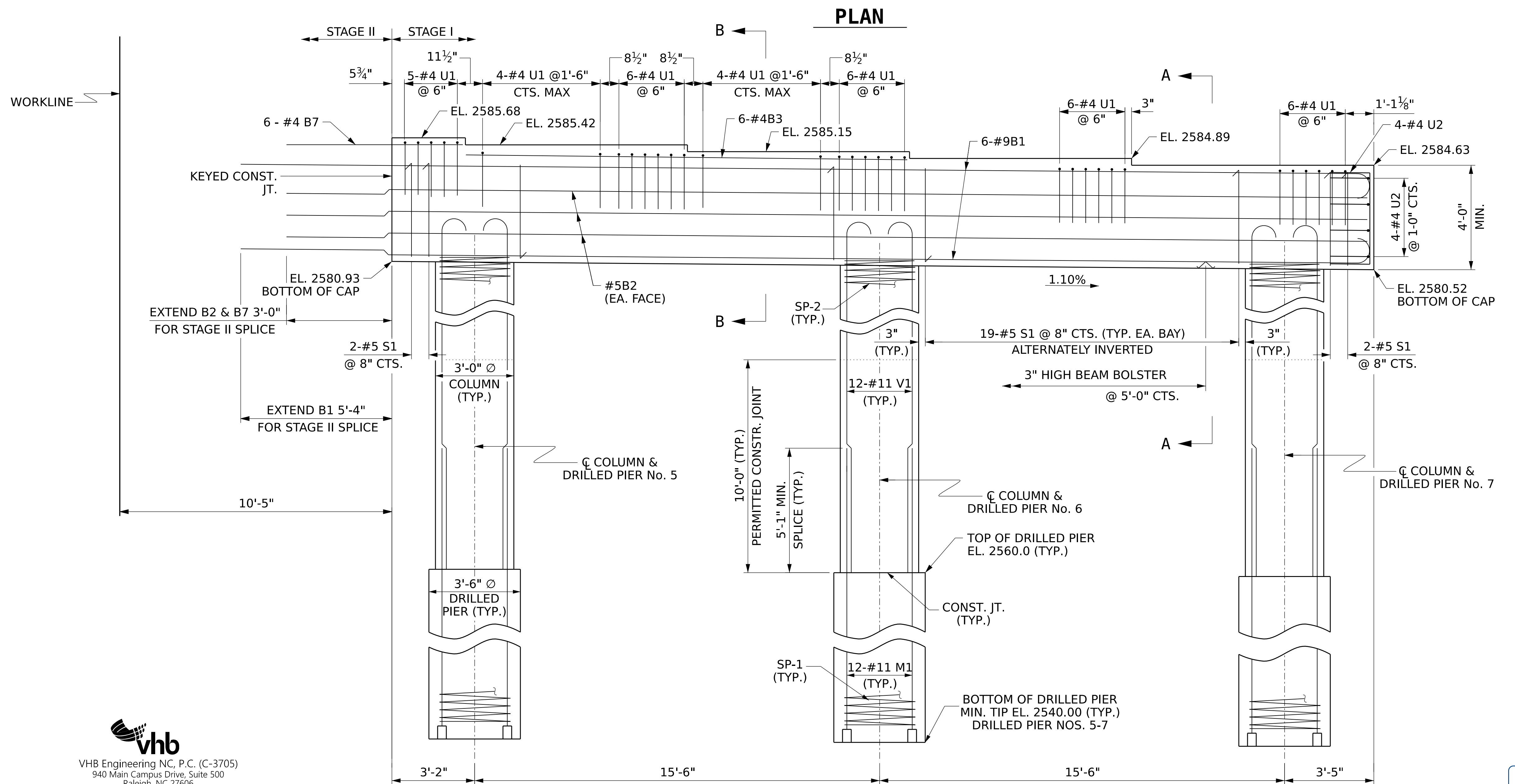
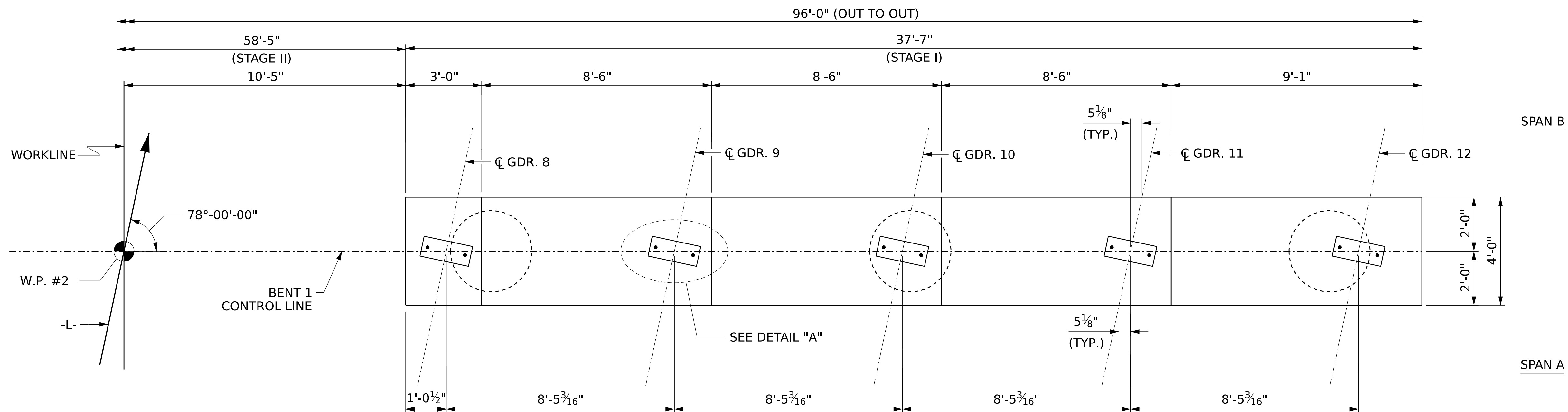
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NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

S-33
 TOTAL SHEETS
 51

DRAWN BY : **E.C. PHELPS** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**





NOTES:

STIRRUPS TO BE PLACED VERTICALLY AND INVERTED ALTERNATELY.

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

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

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

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

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

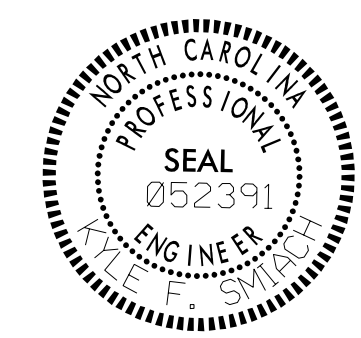
DETAIL "A"

PROJECT NO. **B-5982**

HAYWOOD COUNTY

STATION: **20+37.51 -L-**

SHEET 1 OF 4



STATE OF NORTH CAROLINA		DEPARTMENT OF TRANSPORTATION		RALEIGH	
SUBSTRUCTURE					
BENT 1					
STAGE I					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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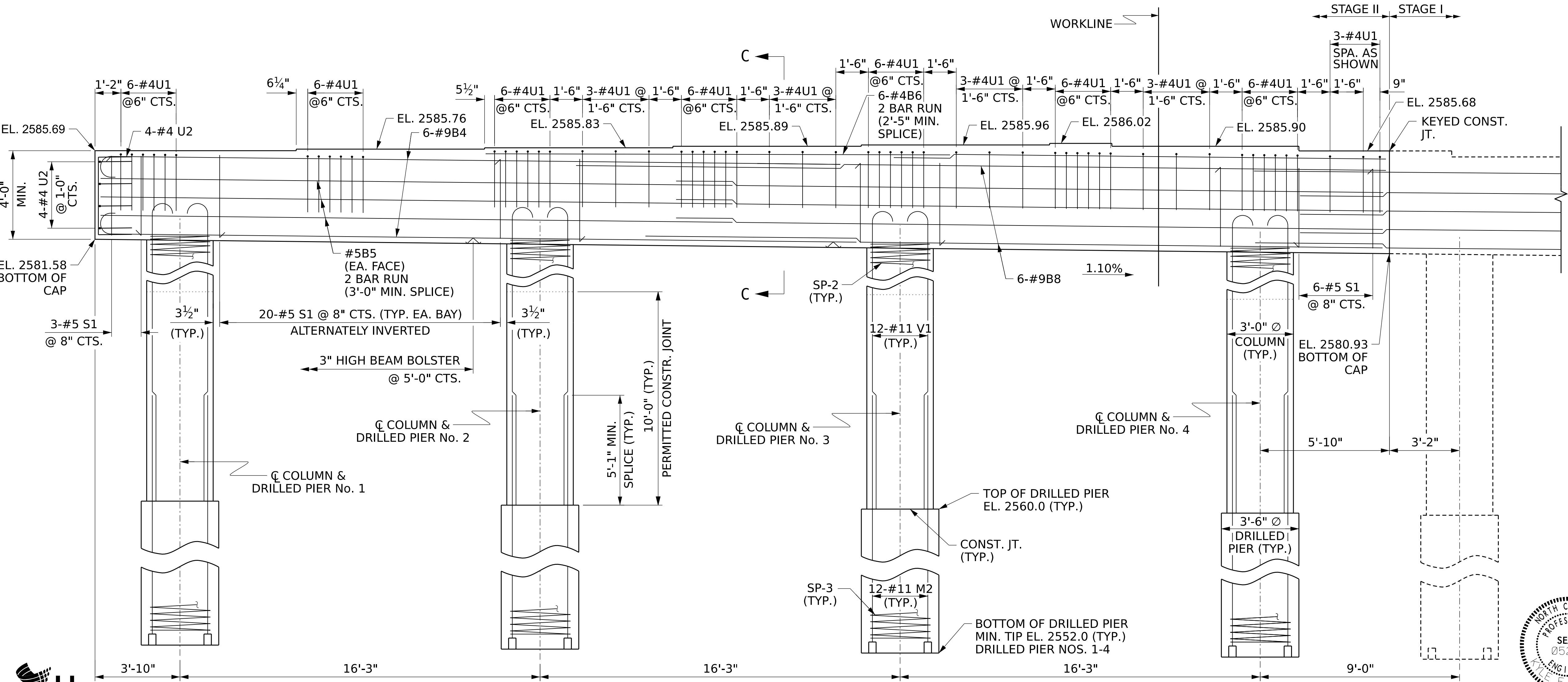
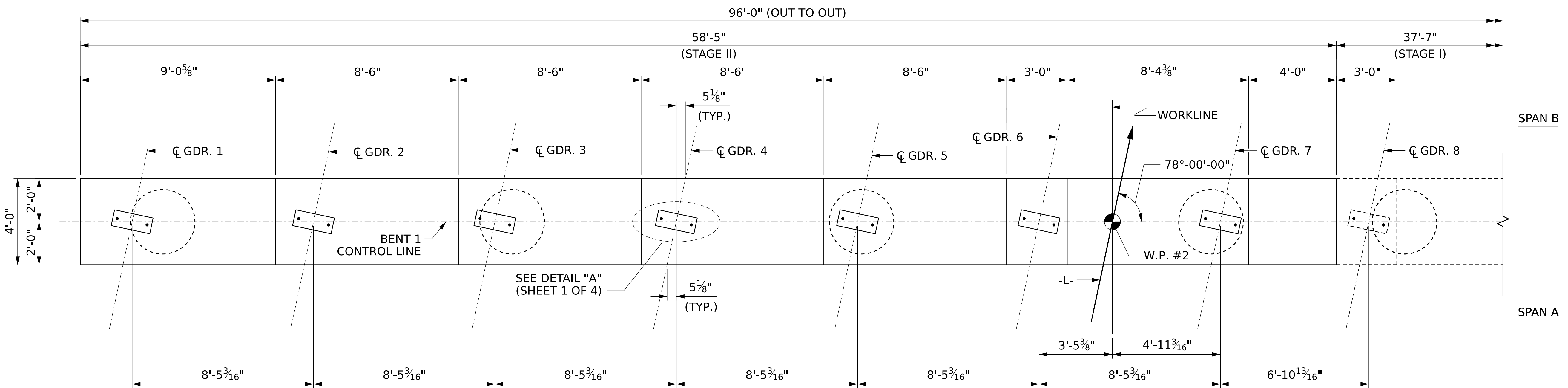
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DRAWN BY : **E.C. PHELPS** DATE : **12/2023**

CHECKED BY : **K.F. SMIACH** DATE : **05/2024**

DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**





PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
BENT 1
 STAGE II

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

S-35
 TOTAL SHEETS
 51

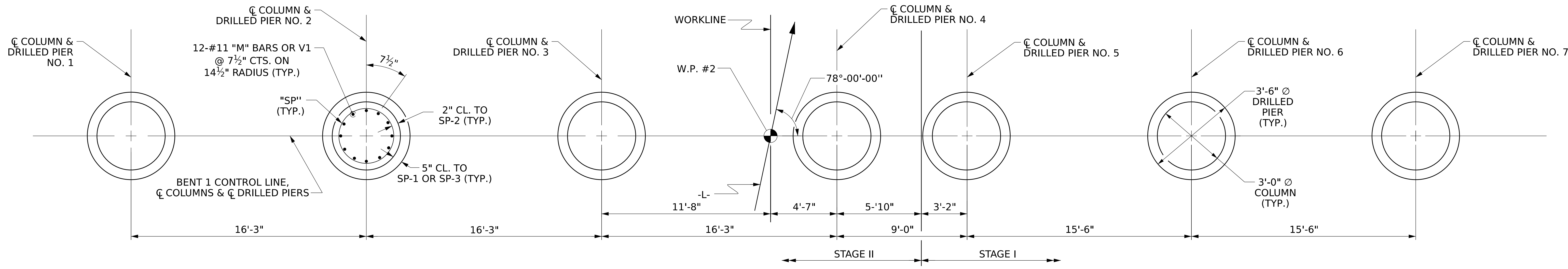
Seal of Professional Engineer
 KYLE S. SMITH
 SEAL
 052391
 ENGINEER
 KYLE F. SMITH

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

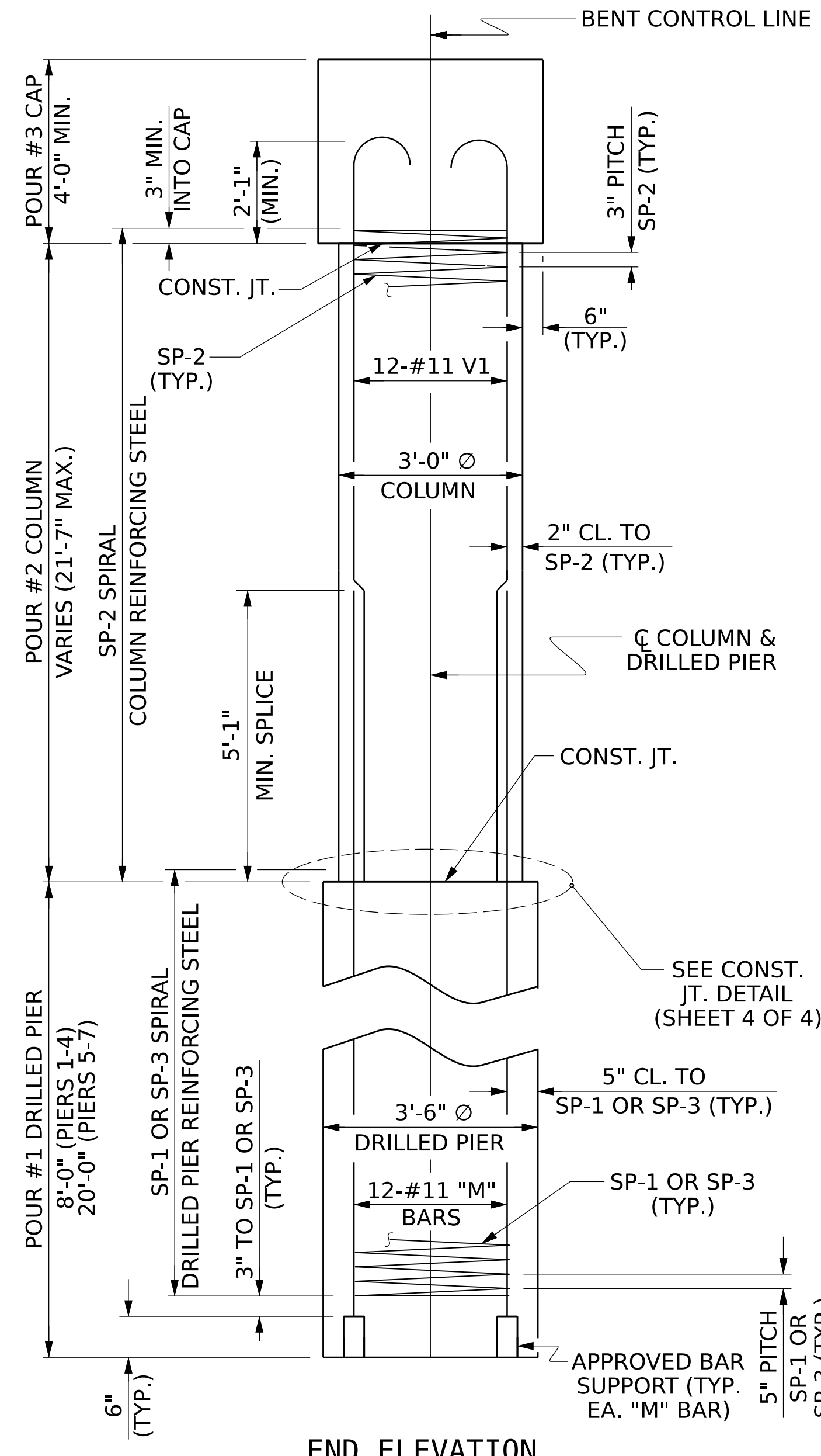
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 CHECKED BY: **K.F. SMIACH** DATE: **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE: **05/2024**

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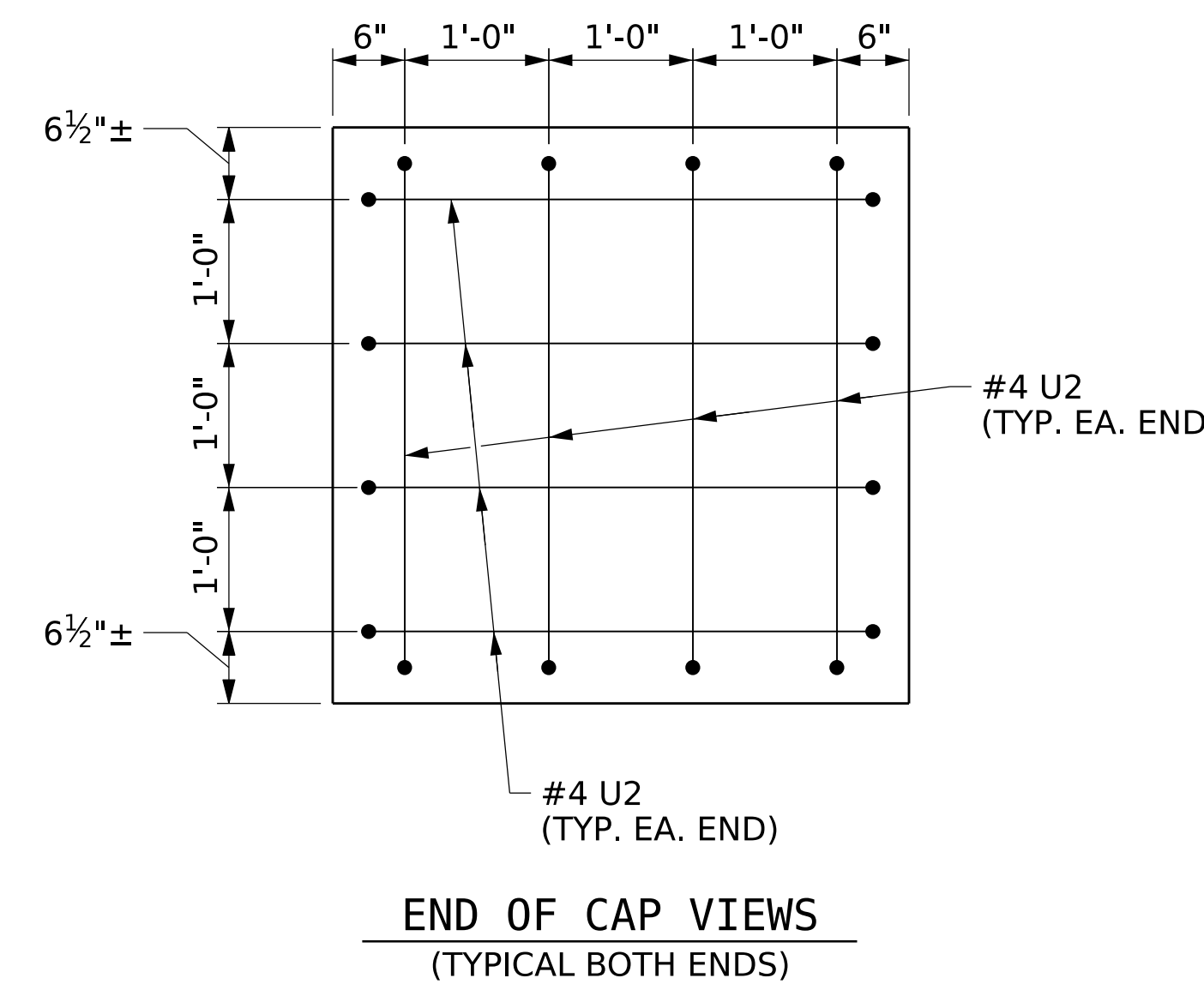
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PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION



END OF CAP VIEWS (TYPICAL BOTH ENDS)

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

DRAWN BY : E.C. PHELPS	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET **3** OF **4**

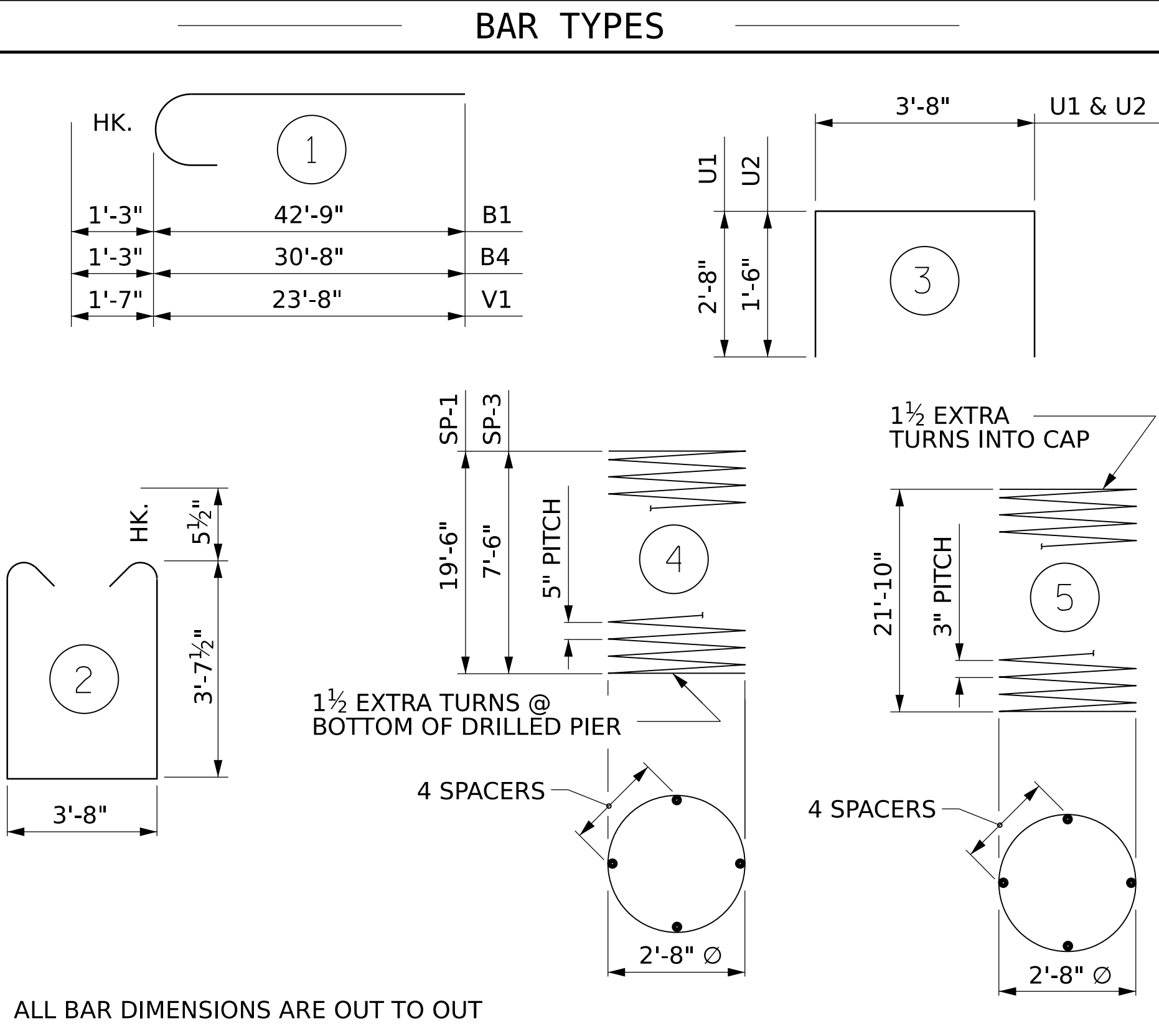
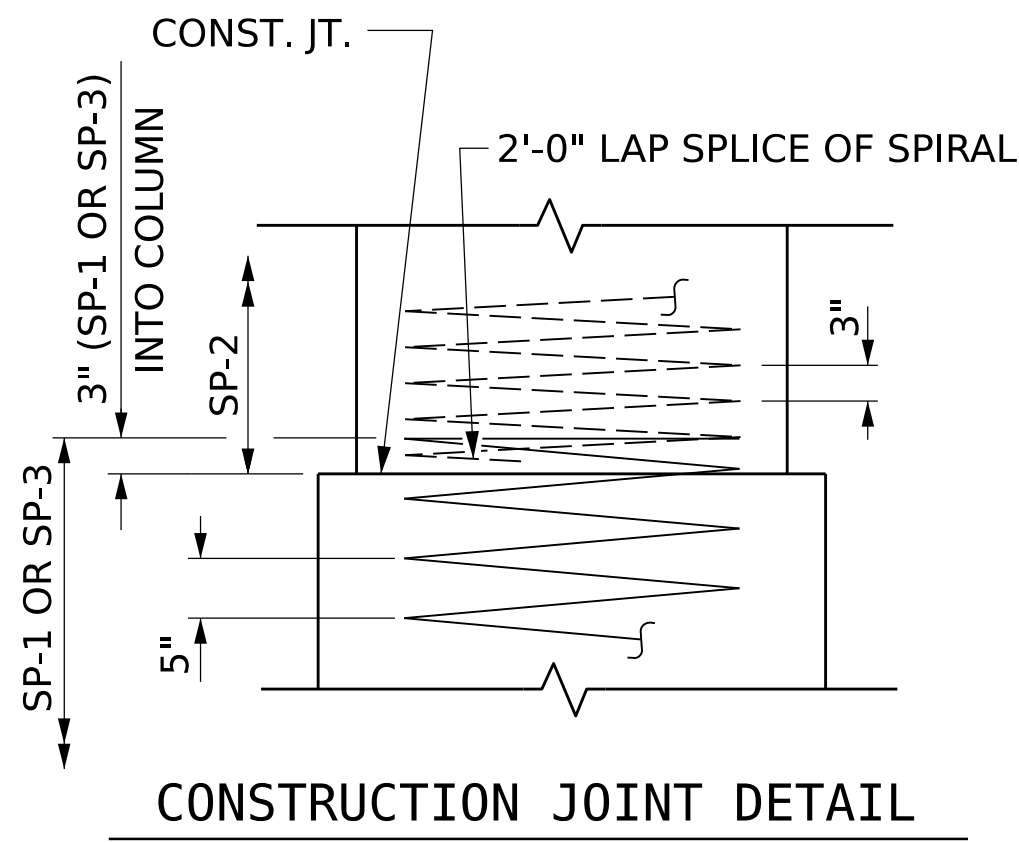


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
BENT 1 DETAILS
STAGE I & II

REVISIONS				SHEET NO.
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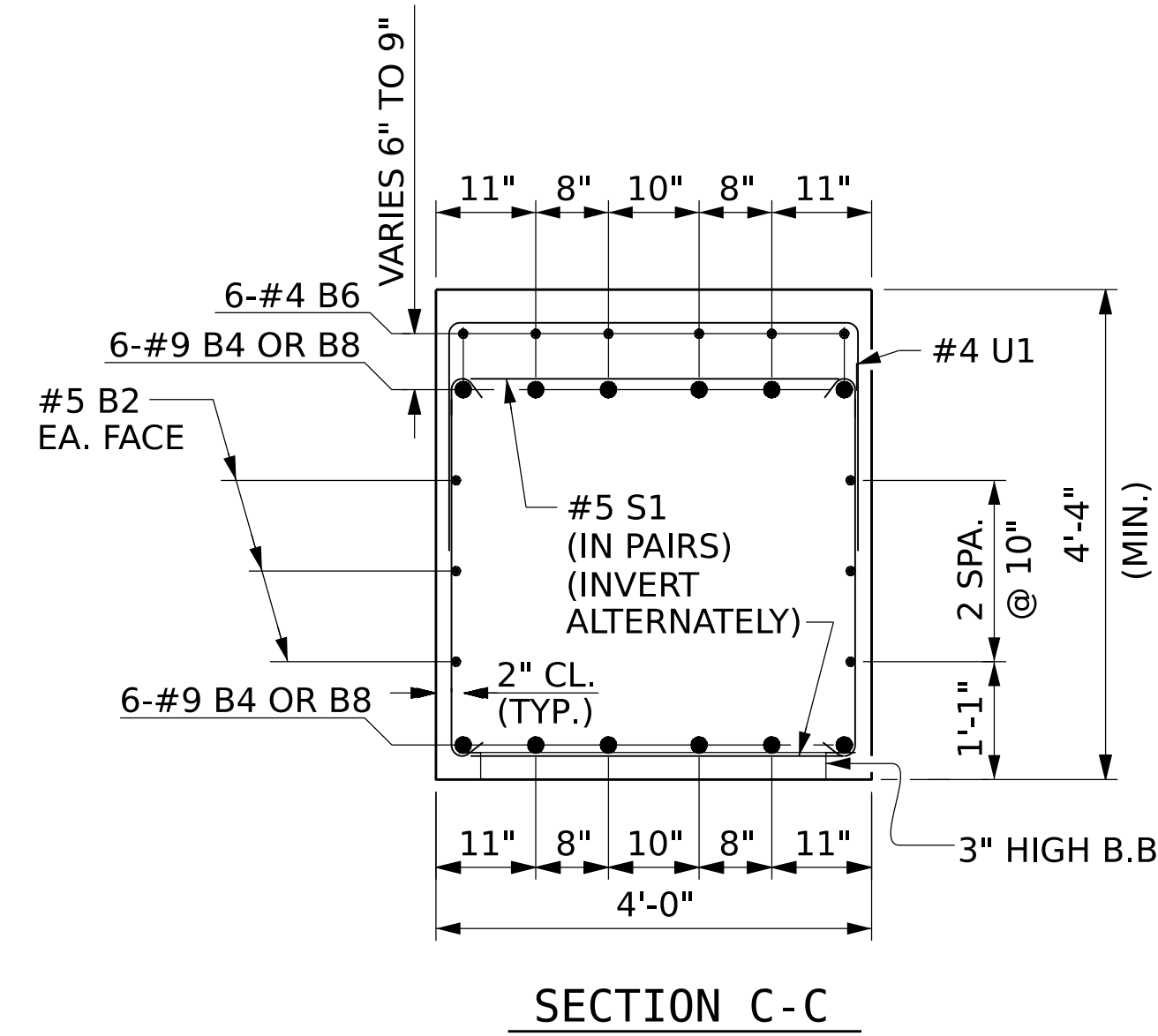
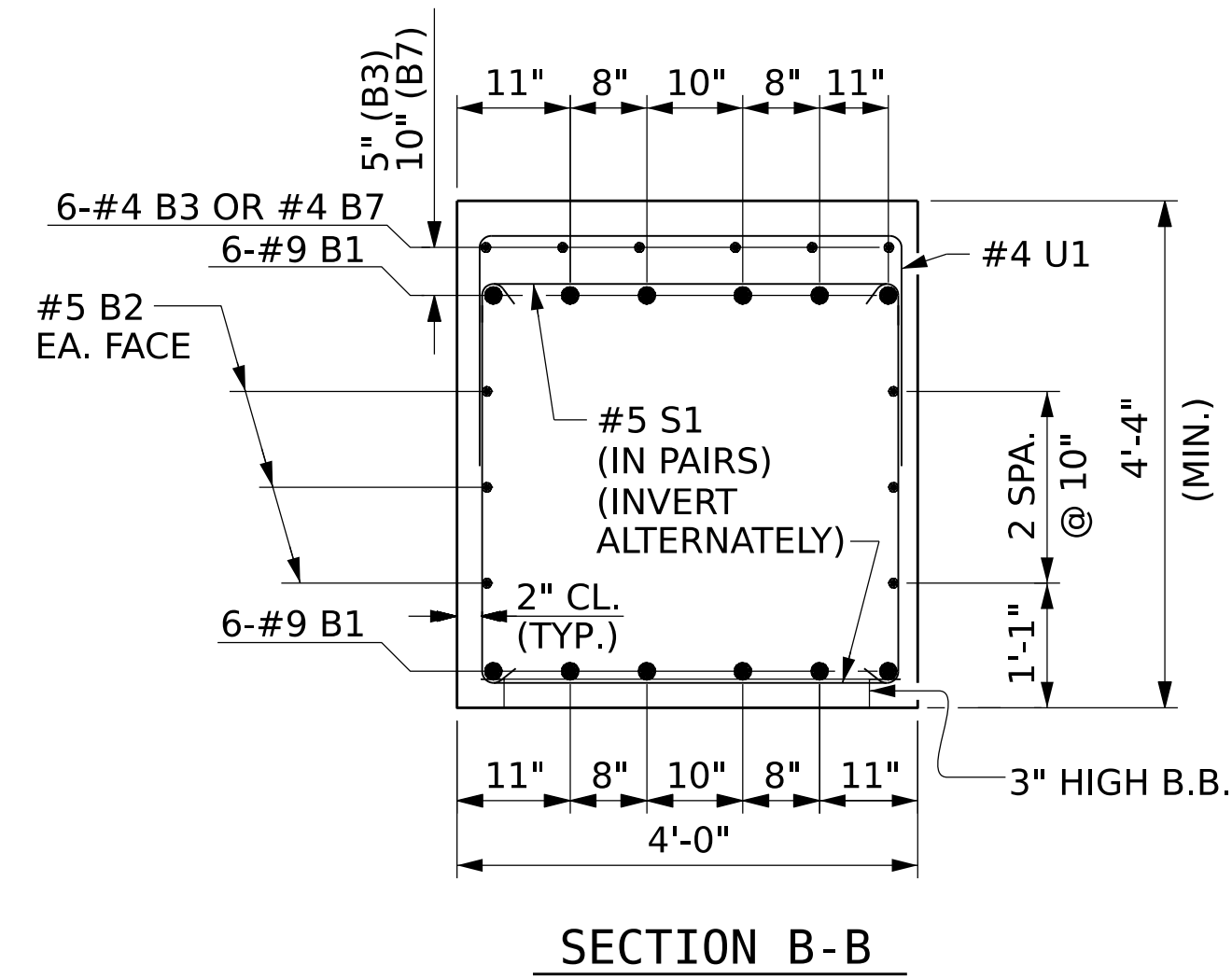
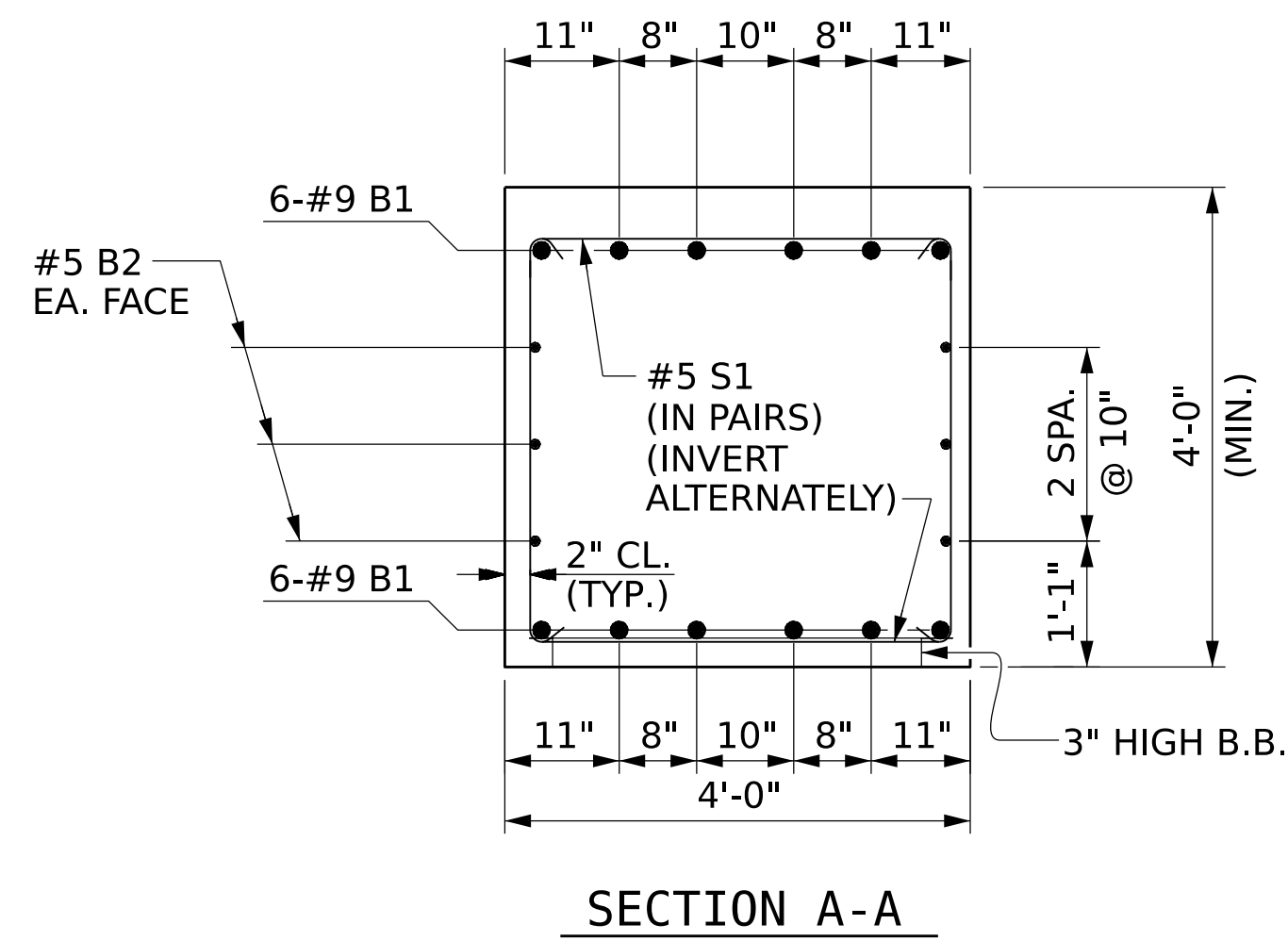
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TOTAL SHEETS	51
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ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL											
STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	44'-0"	1795	B4	12	#9	1	31'-11"	1302
B2	6	#5	STR	40'-5"	253	B5	12	#5	STR	30'-6"	382
B3	6	#4	STR	16'-9"	67	B6	12	#4	STR	21'-6"	172
B7	6	#4	STR	6'-0"	24	B8	12	#9	STR	32'-11"	1343
S1	42	#5	2	11'-10"	518	S1	69	#5	2	11'-10"	852
U1	37	#4	3	9'-0"	222	U1	57	#4	3	9'-0"	343
U2	8	#4	3	6'-8"	36	U2	8	#4	3	6'-8"	36
V1	36	#11	1	25'-3"	4830	V1	48	#11	1	25'-3"	6439
M1	36	#11	STR	27'-8"	5291	M2	48	#11	STR	15'-8"	3995
REINFORCING STEEL (STAGE I)						REINFORCING STEEL (STAGE II)					
13037 LBS.						14864 LBS.					
SP-1	3	*	4	398'-10"	1248	SP-3	4	*	4	161'-0"	672
SP-2	3	**	5	732'-11"	1469	SP-2	4	**	5	732'-11"	1958
SPIRAL COLUMN REINFORCING STEEL						SPIRAL COLUMN REINFORCING STEEL					
2717 LBS.						2630 LBS.					
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR						* THE SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR						** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (STAGE I)						CLASS A CONCRETE BREAKDOWN (STAGE II)					
POUR #2 (COLUMNS)				16.3 C.Y.		POUR #2 (COLUMNS)				22.3 C.Y.	
POUR #3 (CAP)				24.2 C.Y.		POUR #3 (CAP)				39.6 C.Y.	
TOTAL CLASS A CONCRETE				40.5 C.Y.		TOTAL CLASS A CONCRETE				61.9 C.Y.	
DRILLED PIERS: (STAGE I)						DRILLED PIERS: (STAGE II)					
DRILLED PIER CONCRETE				21.4 C.Y.		DRILLED PIER CONCRETE				11.4 C.Y.	



PROJECT NO. **B-5982**

HAYWOOD COUNTY

STATION: **20+37.51 -L-**

SHEET 4 OF 4



DocuSigned by:
Kyle Smach
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
BENT 1 DETAILS
STAGE I & II

REVISIONS

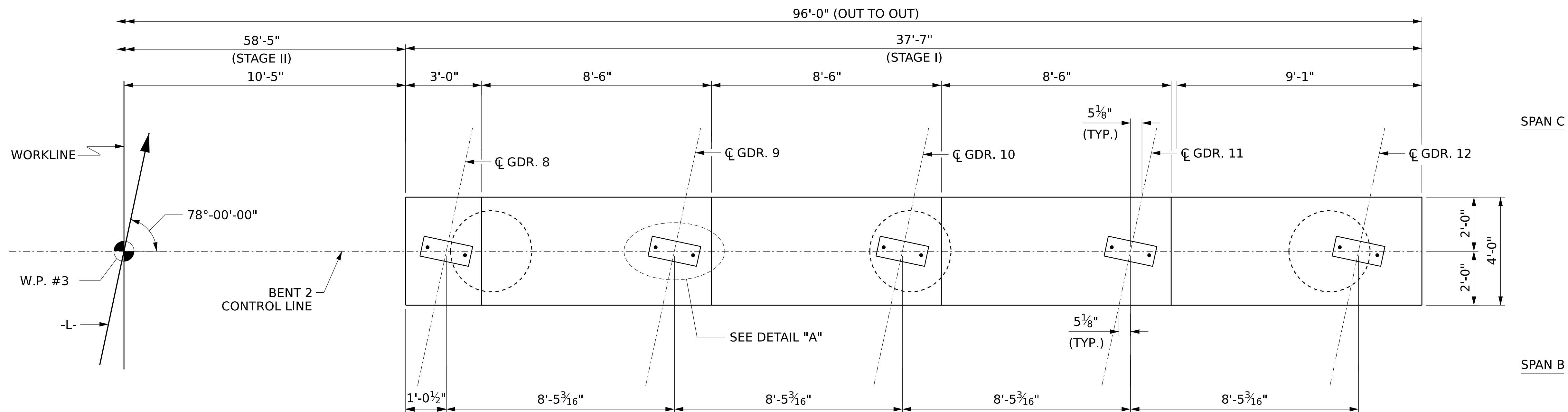
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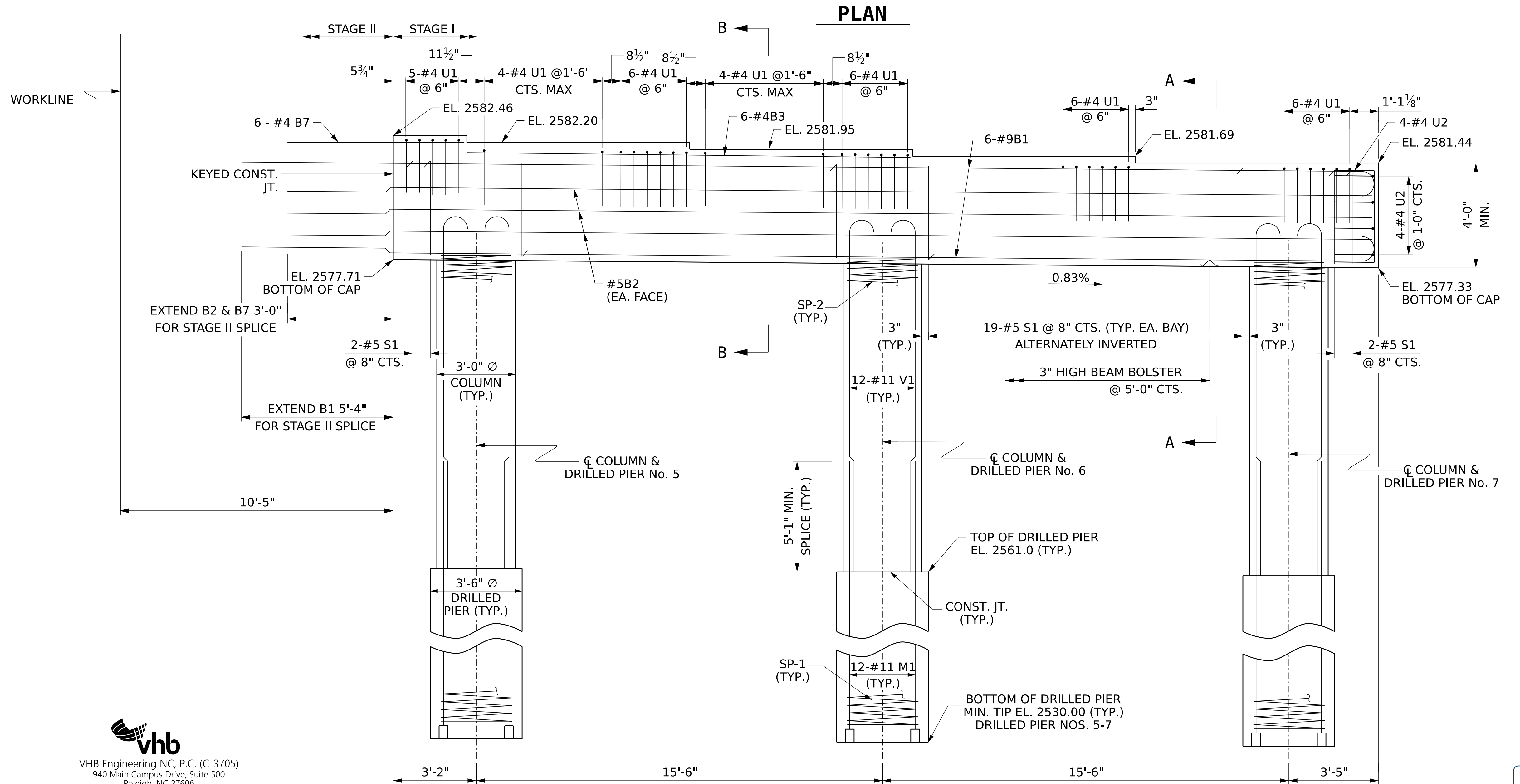
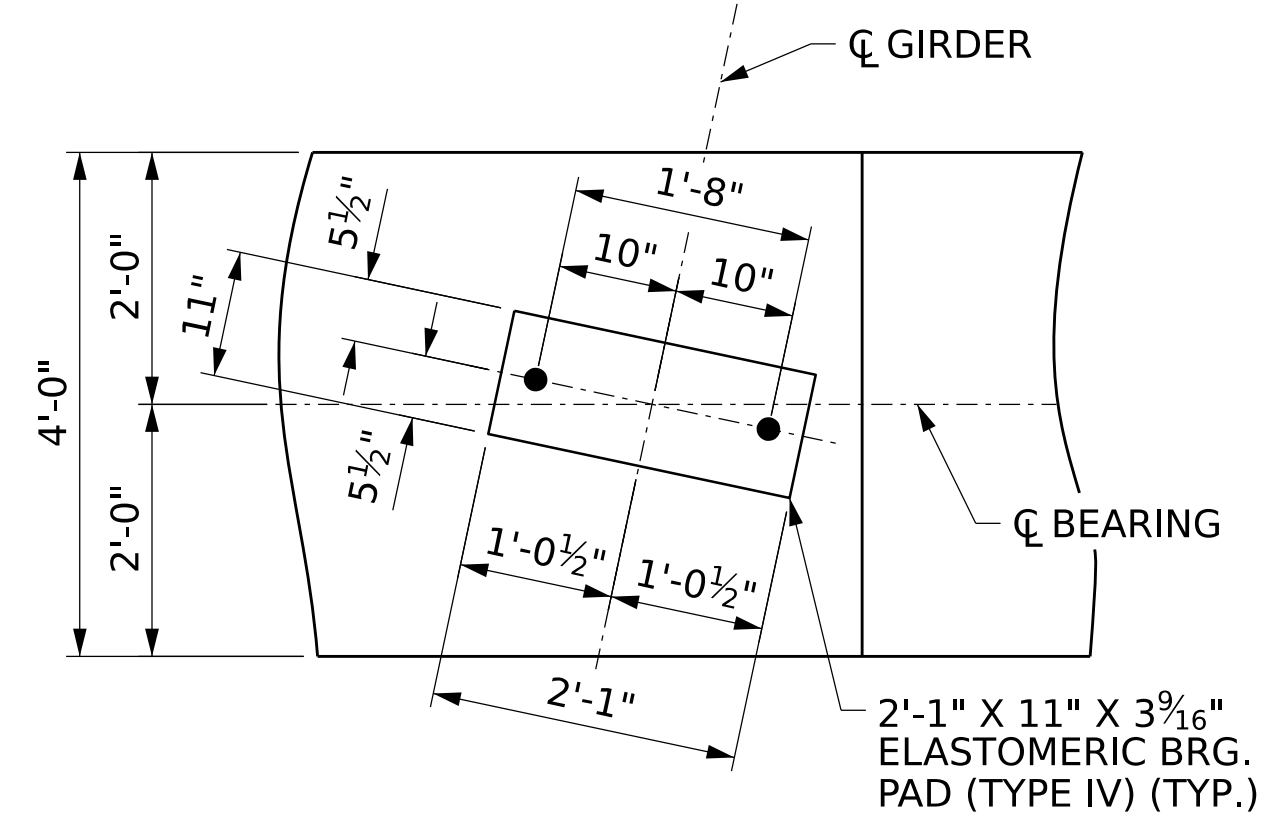
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DRAWN BY : **E.C. PHELPS** DATE : **12/2023**
CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



NOTES:

- STIRRUPS TO BE PLACED VERTICALLY AND INVERTED ALTERNATELY.
- STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
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DETAIL "A"

PROJECT NO. **B-5982**

HAYWOOD COUNTY

STATION: **20+37.51 -L-**

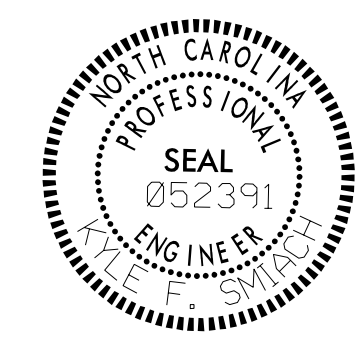
SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

STAGE I



Designed by: Kyle Smack

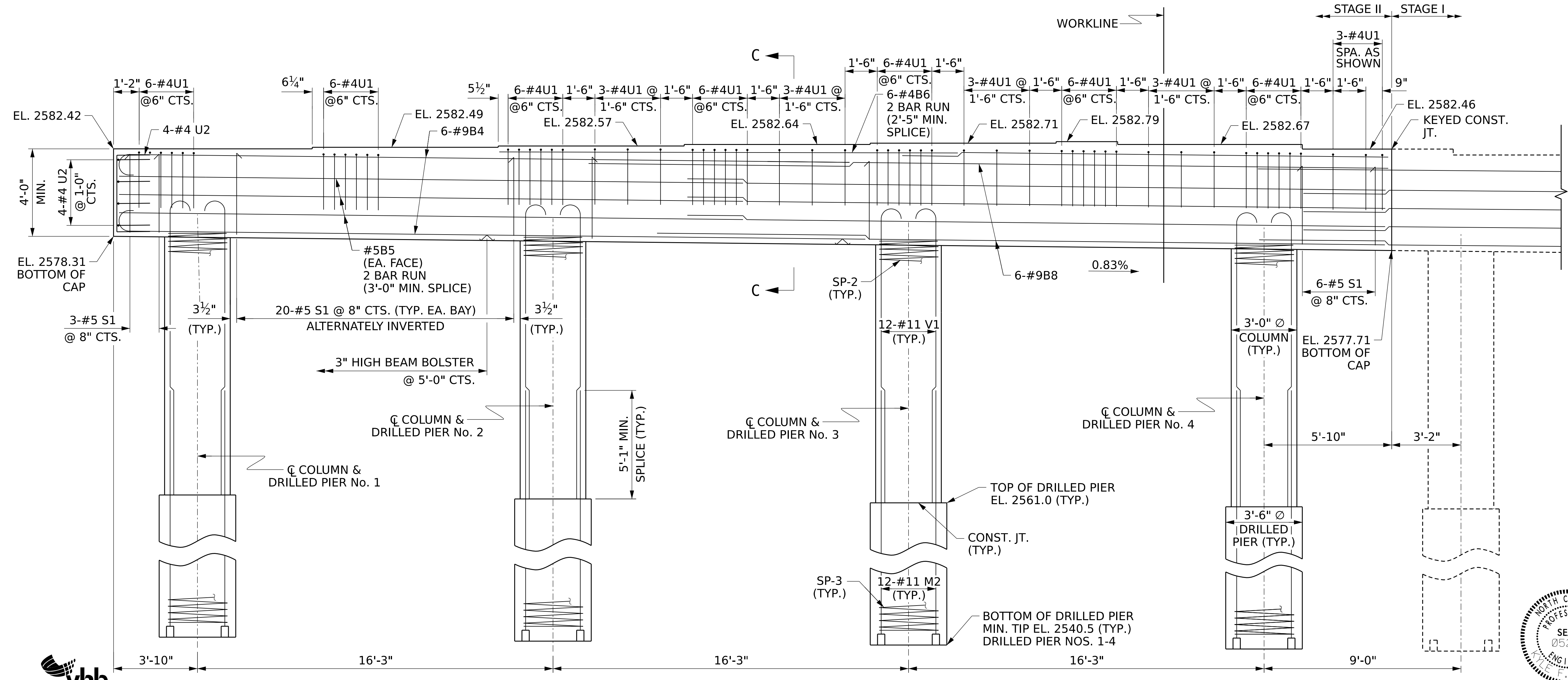
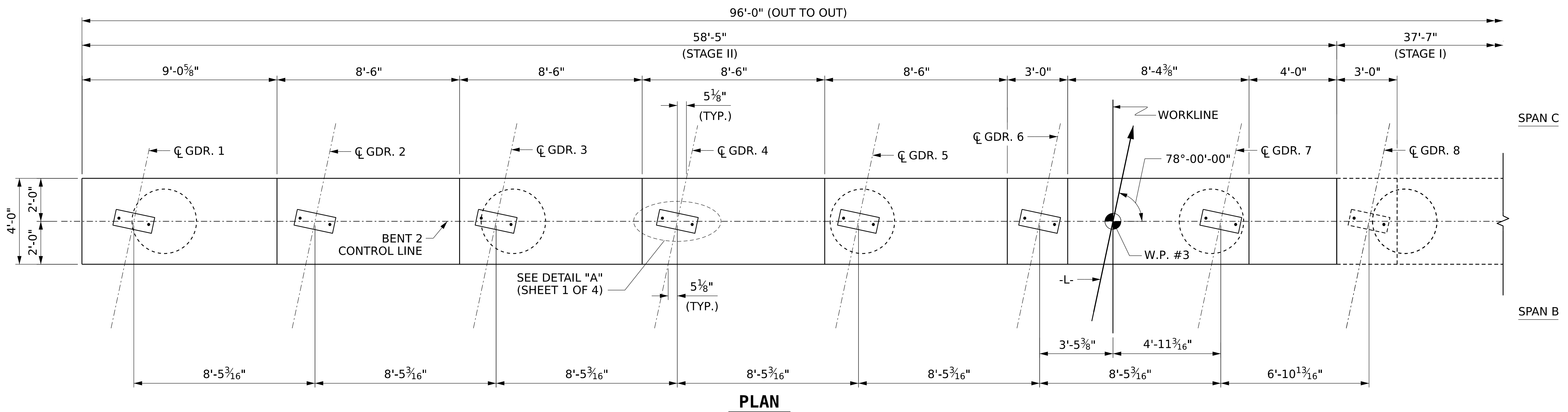
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S-38
TOTAL SHEETS
51

DRAWN BY : **E.C. PHELPS** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
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PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
BENT 2
STAGE II



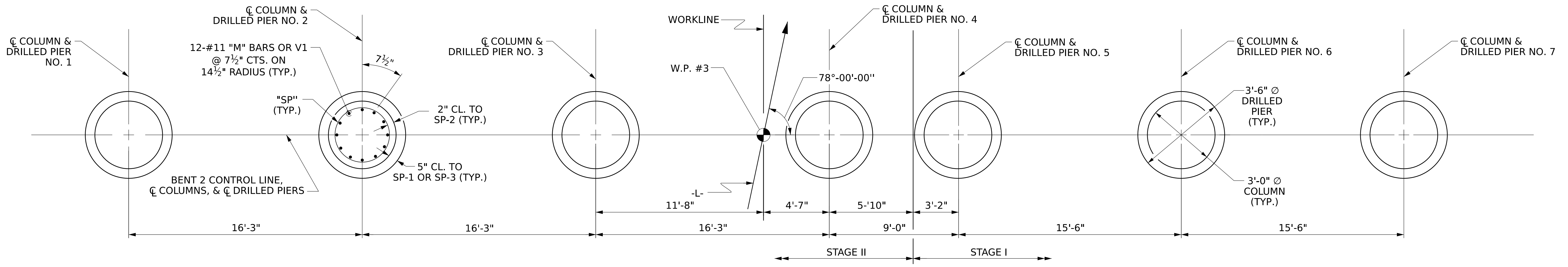
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 Kyle Smiach
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Drawn by: **E.C. PHELPS** DATE: **12/2023**
 Checked by: **K.F. SMiach** DATE: **05/2024**
 Design Engineer of Record: **K.F. SMiach** DATE: **05/2024**

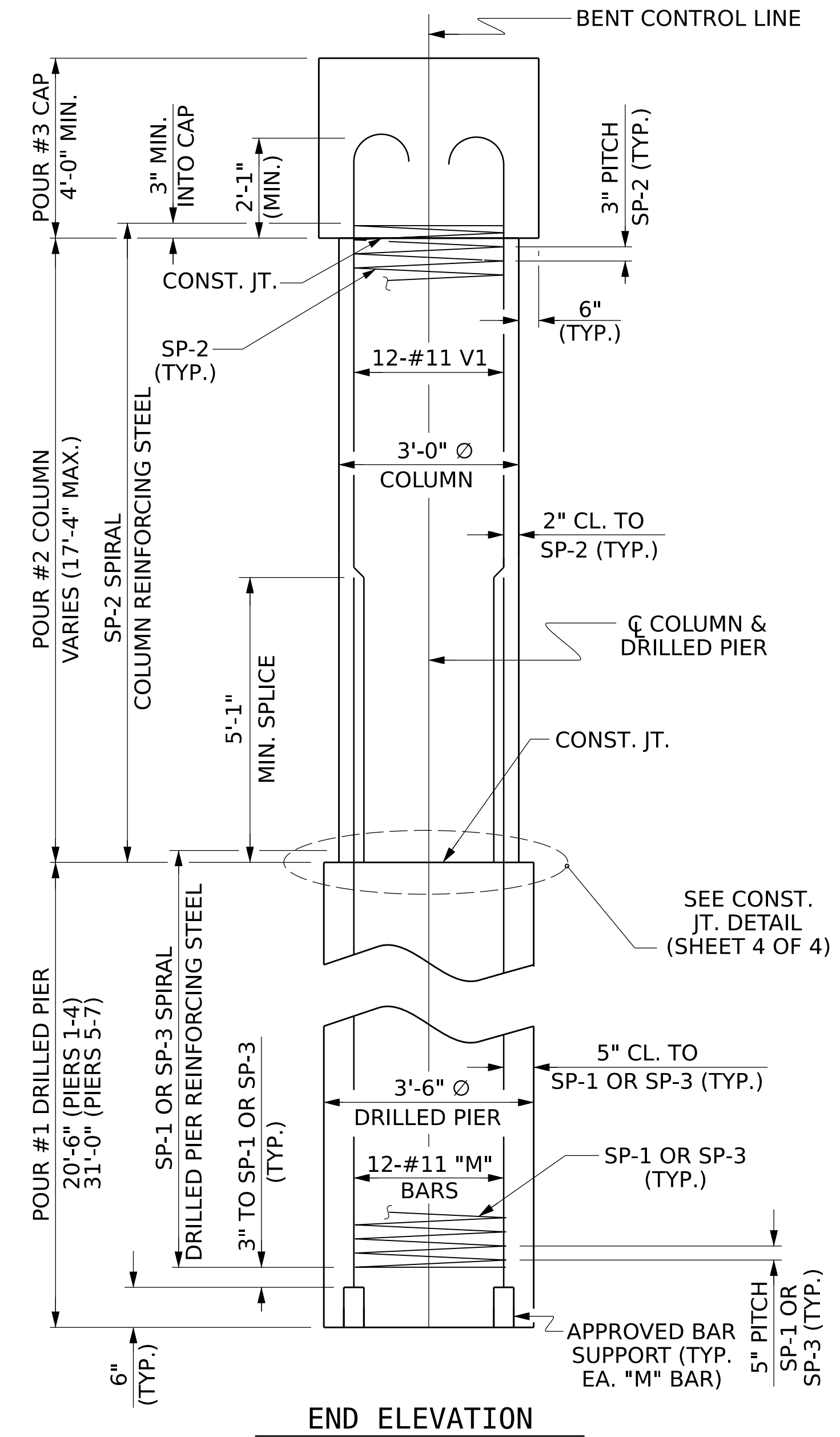
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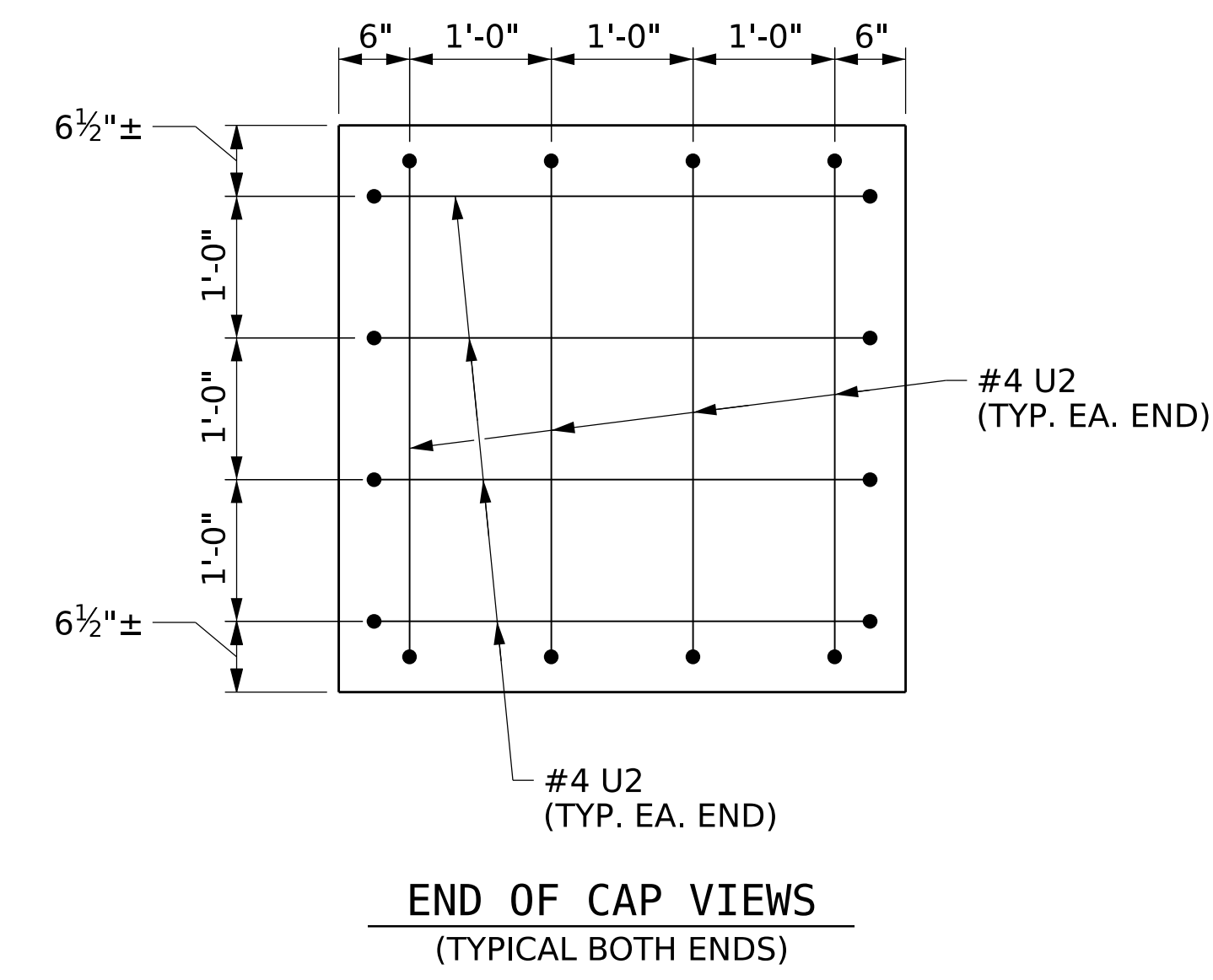
S-39
 TOTAL SHEETS
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PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION



END OF CAP VIEWS (TYPICAL BOTH ENDS)



DRAWN BY : E.C. PHELPS	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

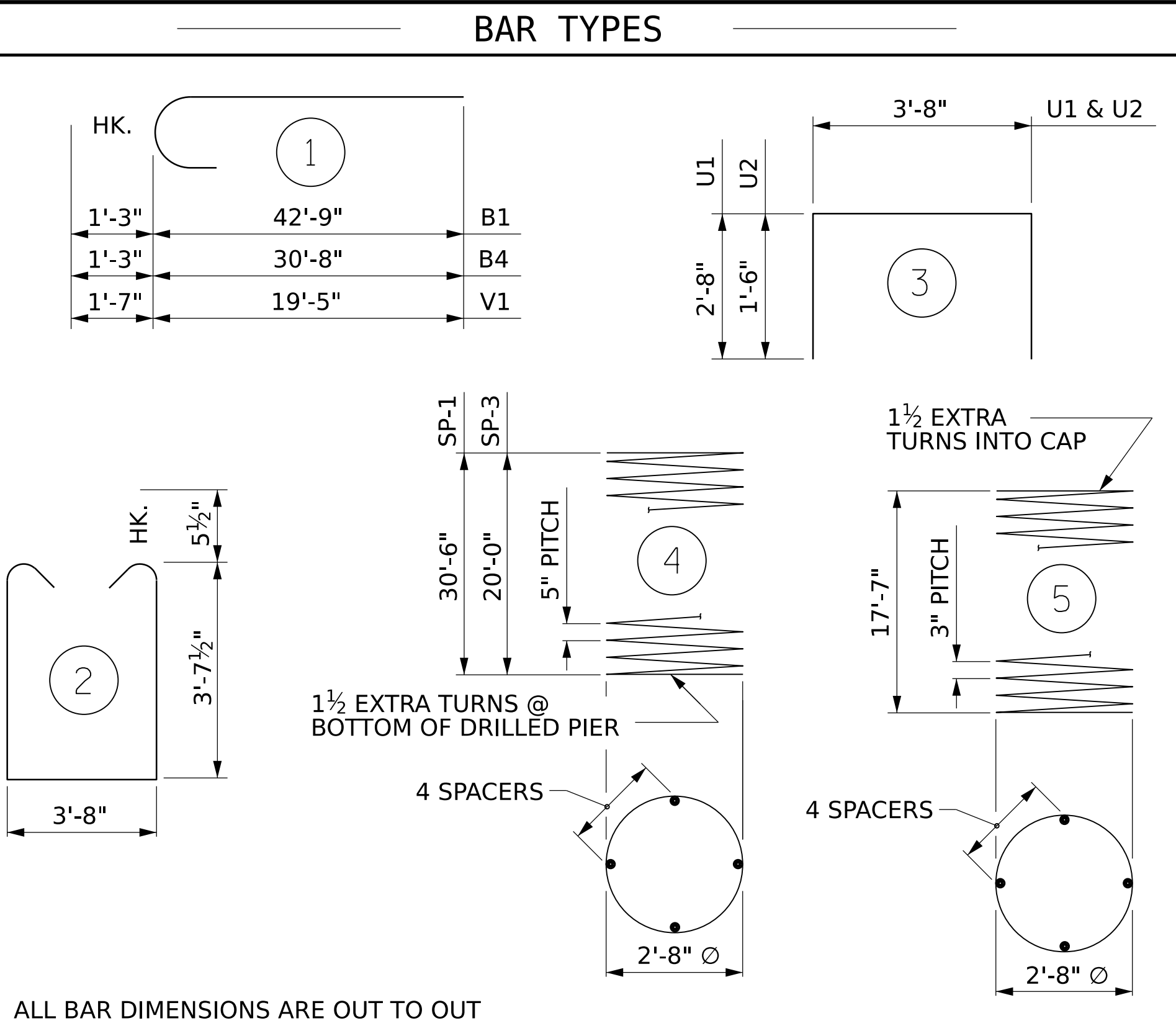
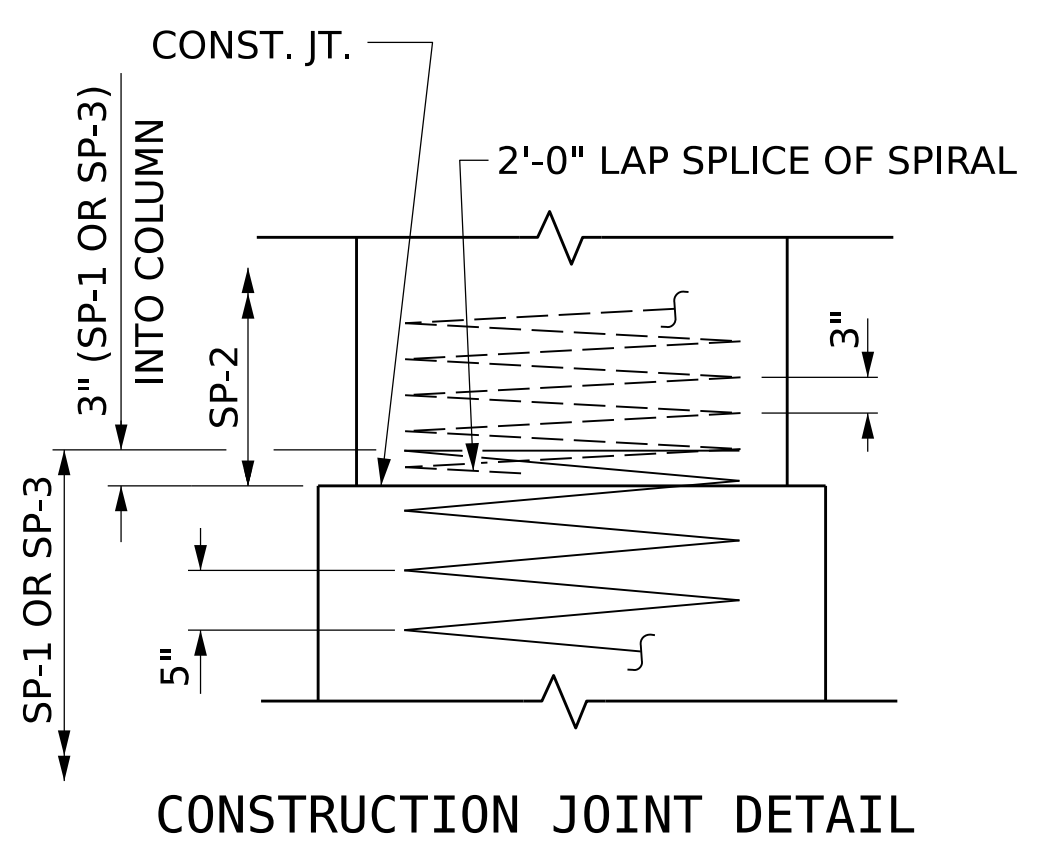
PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET **3** OF **4**



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
BENT 2 DETAILS
STAGE I & II

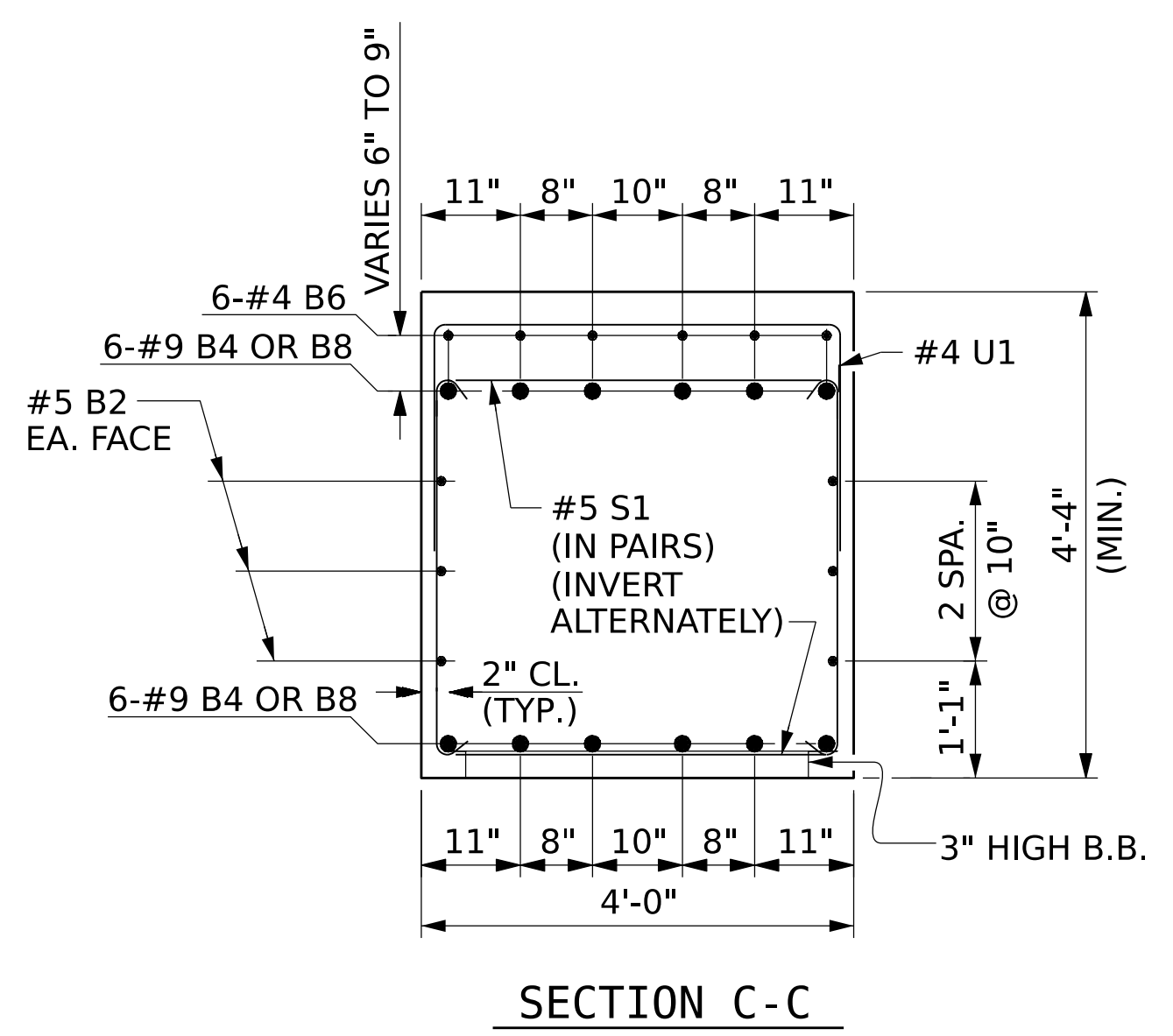
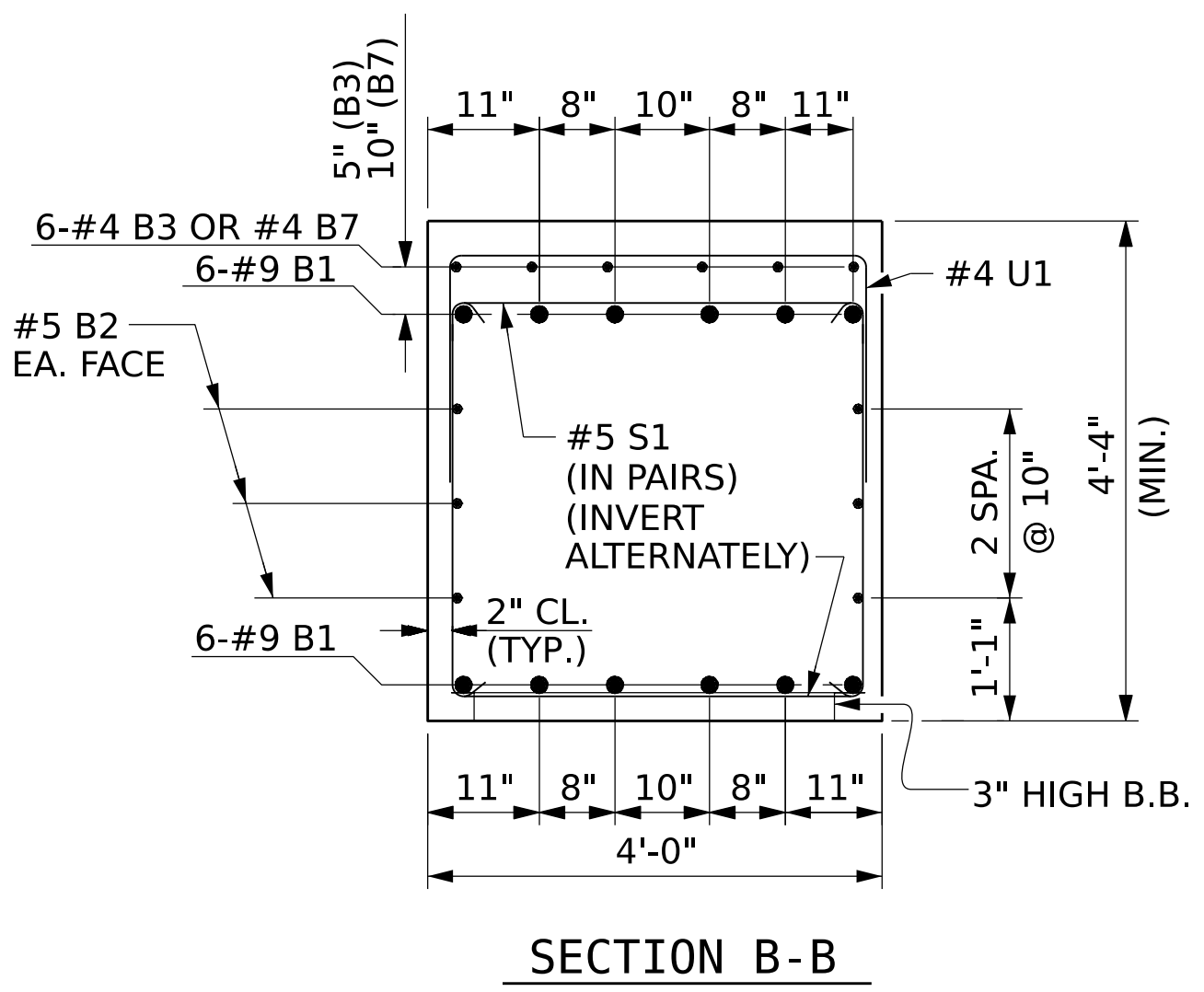
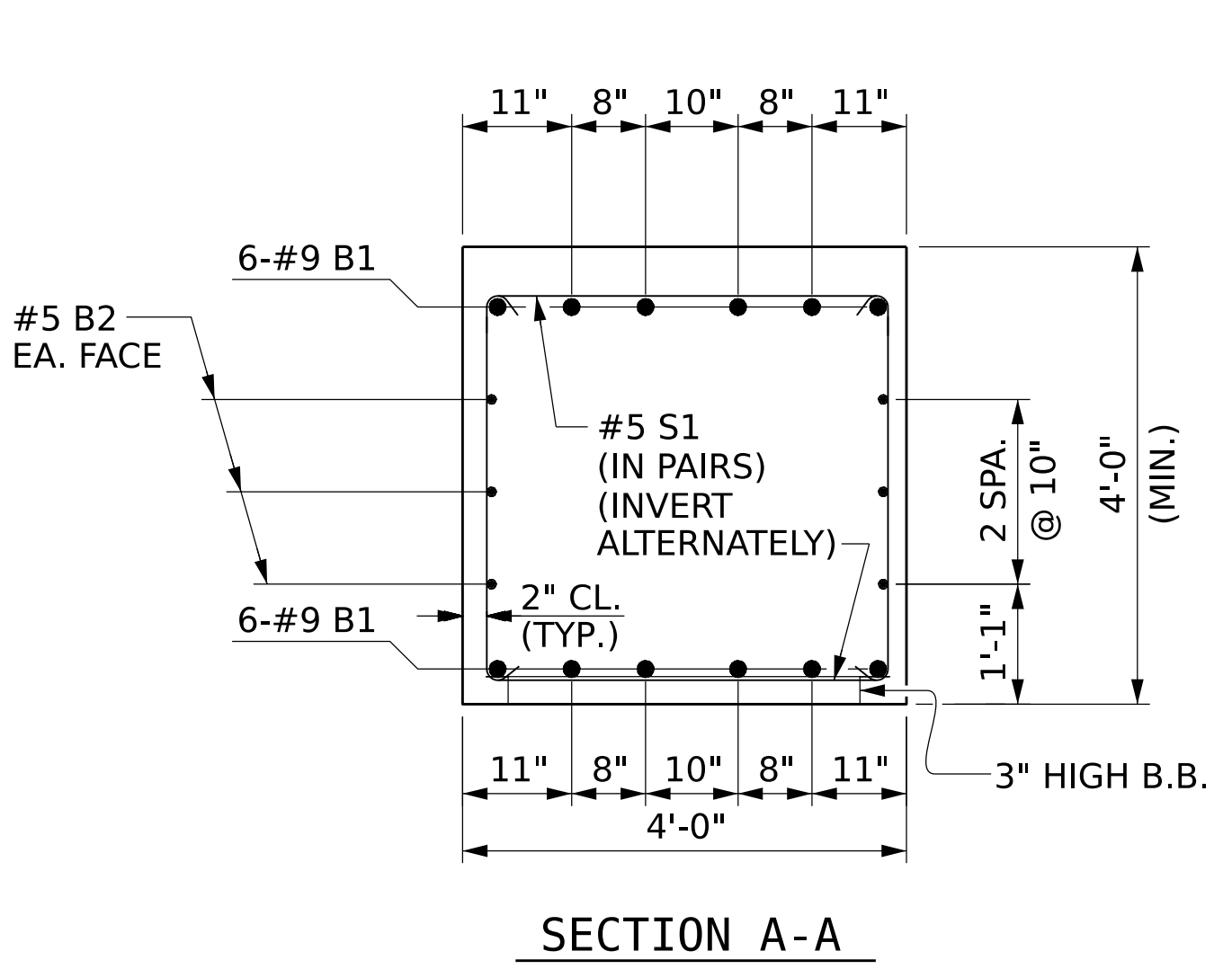
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			51

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ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL											
STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	44'-0"	1795	B4	12	#9	1	31'-11"	1302
B2	6	#5	STR	40'-5"	253	B5	12	#5	STR	30'-6"	382
B3	6	#4	STR	16'-9"	67	B6	12	#4	STR	21'-6"	172
B7	6	#4	STR	6'-0"	24	B8	12	#9	STR	32'-11"	1343
S1	42	#5	2	11'-10"	518	S1	69	#5	2	11'-10"	852
U1	37	#4	3	9'-0"	222	U1	57	#4	3	9'-0"	343
U2	8	#4	3	6'-8"	36	U2	8	#4	3	6'-8"	36
V1	36	#11	1	21'-0"	4017	V1	48	#11	1	21'-0"	5356
M1	36	#11	STR	38'-7"	7380	M2	48	#11	STR	28'-1"	7162
REINFORCING STEEL (STAGE I)						REINFORCING STEEL (STAGE II)					
14312 LBS.						16948 LBS.					
SP-1	3	*	4	616'-10"	1930	SP-3	4	*	4	408'-9"	1705
SP-2	3	**	5	592'-8"	1188	SP-2	4	**	5	592'-8"	1584
SPIRAL COLUMN REINFORCING STEEL						SPIRAL COLUMN REINFORCING STEEL					
3118 LBS.						3289 LBS.					
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR						* THE SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR						** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (STAGE I)						CLASS A CONCRETE BREAKDOWN (STAGE II)					
POUR #2 (COLUMNS) 13.0 C.Y.						POUR #2 (COLUMNS) 17.8 C.Y.					
POUR #3 (CAP) 24.2 C.Y.						POUR #3 (CAP) 39.6 C.Y.					
TOTAL CLASS A CONCRETE 37.2 C.Y.						TOTAL CLASS A CONCRETE 57.4 C.Y.					
DRILLED PIERS: (STAGE I)						DRILLED PIERS: (STAGE II)					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS) 24.4 C.Y.						DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS) 16.1 C.Y.					



PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 4 OF 4



DocuSigned by:
 Kyle Smach
 BEA50D898BE475...

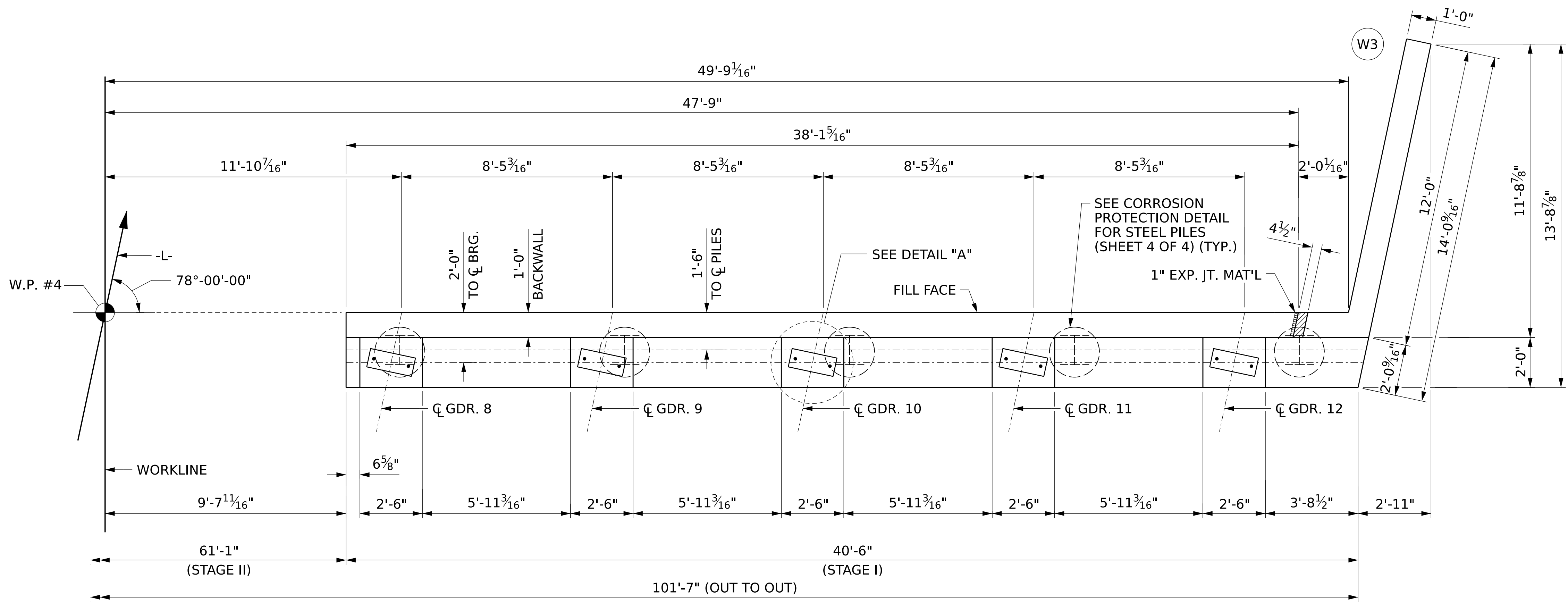
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
BENT 2 DETAILS
STAGE I & II

REVISIONS				SHEET NO.
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1			3	
2			4	

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DRAWN BY : **E.C. PHELPS** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**

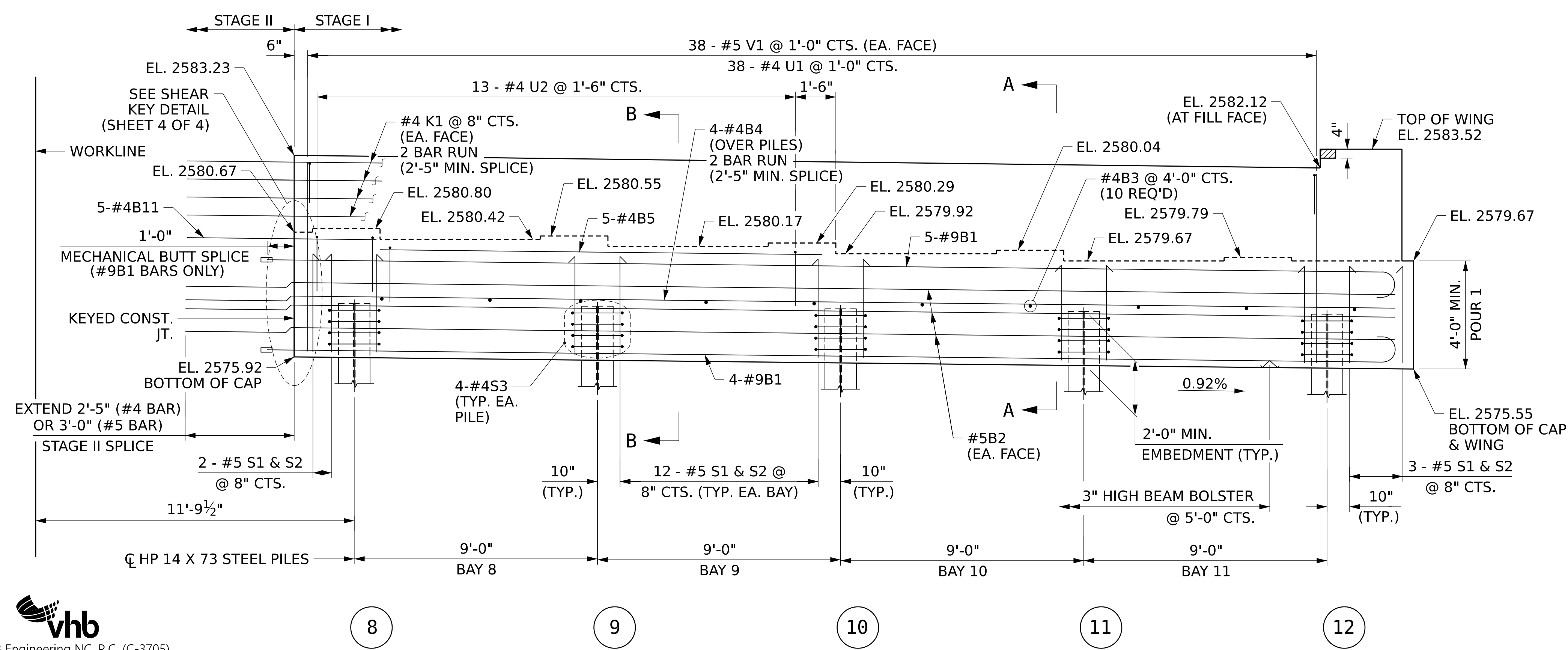




PLAN

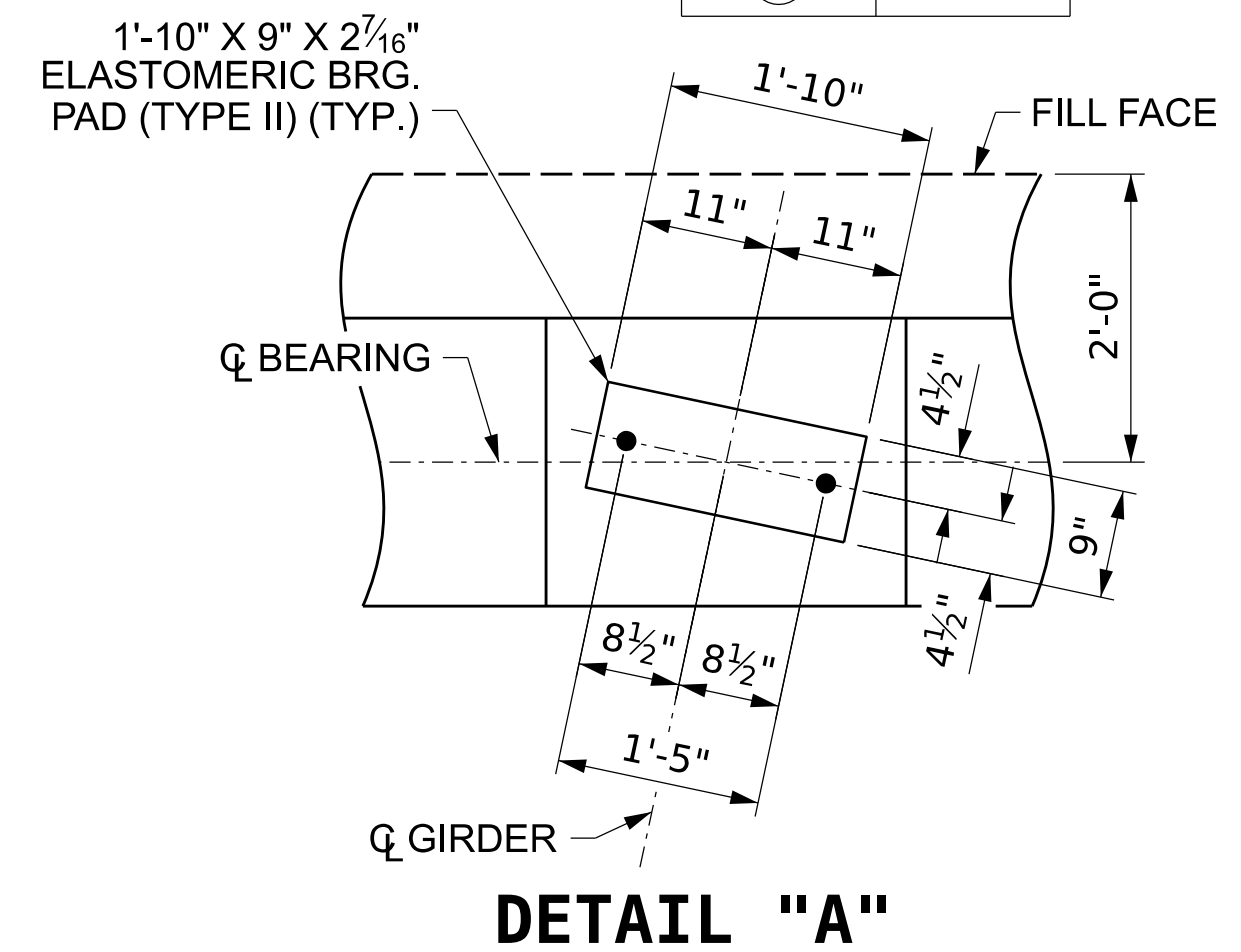
NOTES:
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWS AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
MECHANICAL COUPLERS SHALL BE USED TO JOIN THE #9 "B" BARS IN STAGE I WITH THE #9 "B" BARS IN STAGE II.
FOR MECHANICAL COUPLERS, SEE MECHANICAL BUTT SPLICES FOR REINFORCING STEEL IN STANDARD SPECIFICATIONS.
FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.
FOR SECTION A-A AND SECTION B-B, SEE SHEET 4 OF 4.

TOP OF PILE ELEVATIONS	
8	2577.90
9	2577.82
10	2577.74
11	2577.66
12	2577.57



ELEVATION

CONCRETE COLLARS NOT SHOWN FOR CLARITY.



PROJECT NO. **B-5982**

HAYWOOD COUNTY

STATION: **20+37.51 -L-**

SHEET 1 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
STAGE I

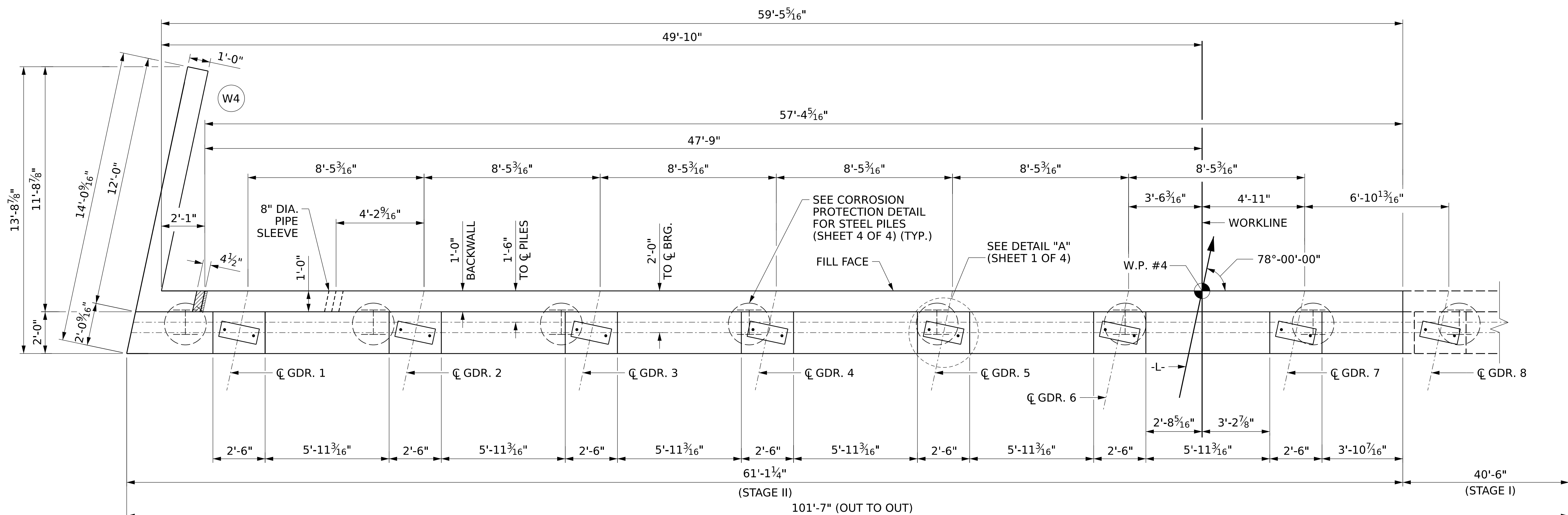
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
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2			4	

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S-42
TOTAL SHEETS
51

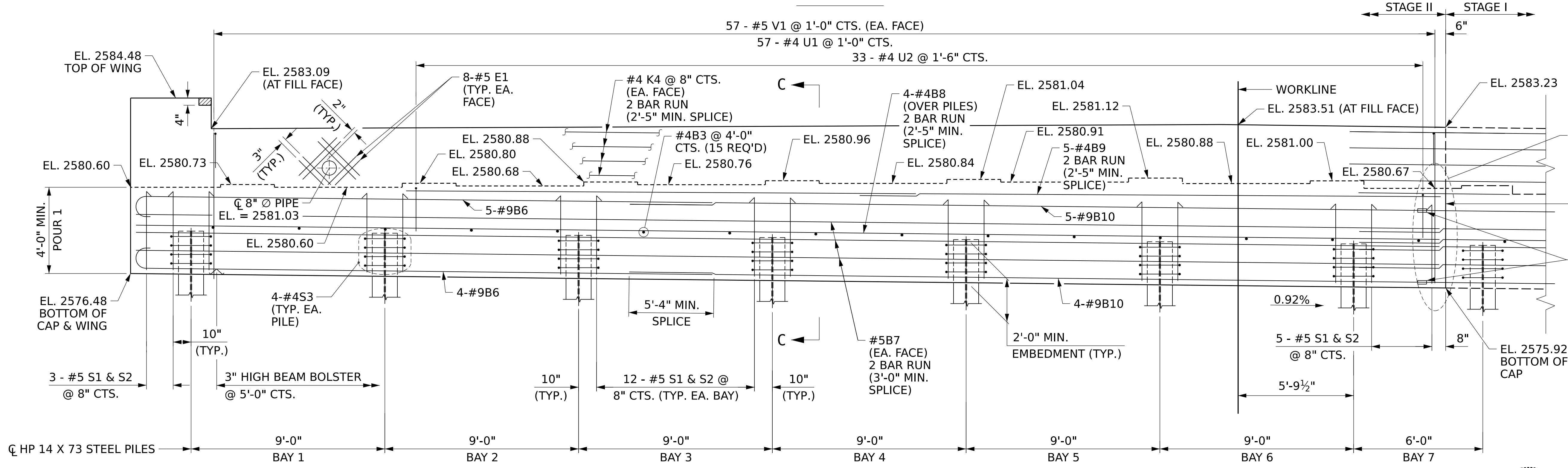
vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DRAWN BY : **E.C. PHELPS** DATE : **12/2023**
CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



TOP OF PILE ELEVATIONS	
①	2578.48
②	2578.40
③	2578.32
④	2578.23
⑤	2578.15
⑥	2578.07
⑦	2577.99

PLAN



ELEVATION

CONCRETE COLLARS NOT SHOWN FOR CLARITY.

PROJECT NO. **B-5982**

HAYWOOD COUNTY

STATION: **20+37.51 -L-**

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
STAGE II



Designed by
Kyle Smack
05A5008988E475...

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2			4	

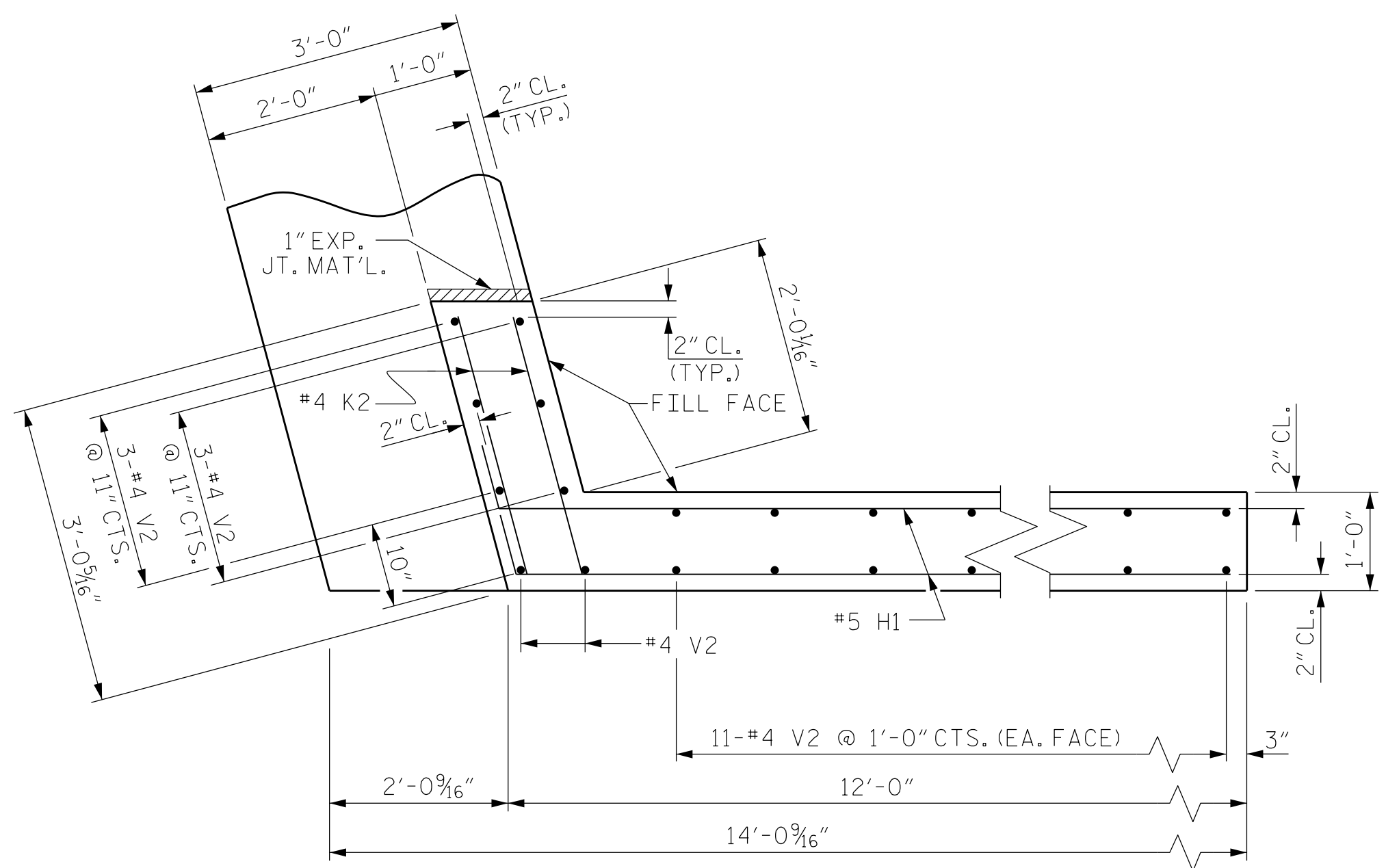
S-43
TOTAL SHEETS
51

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CHECKED BY : **K.F. SMIACH** DATE : **05/2024**

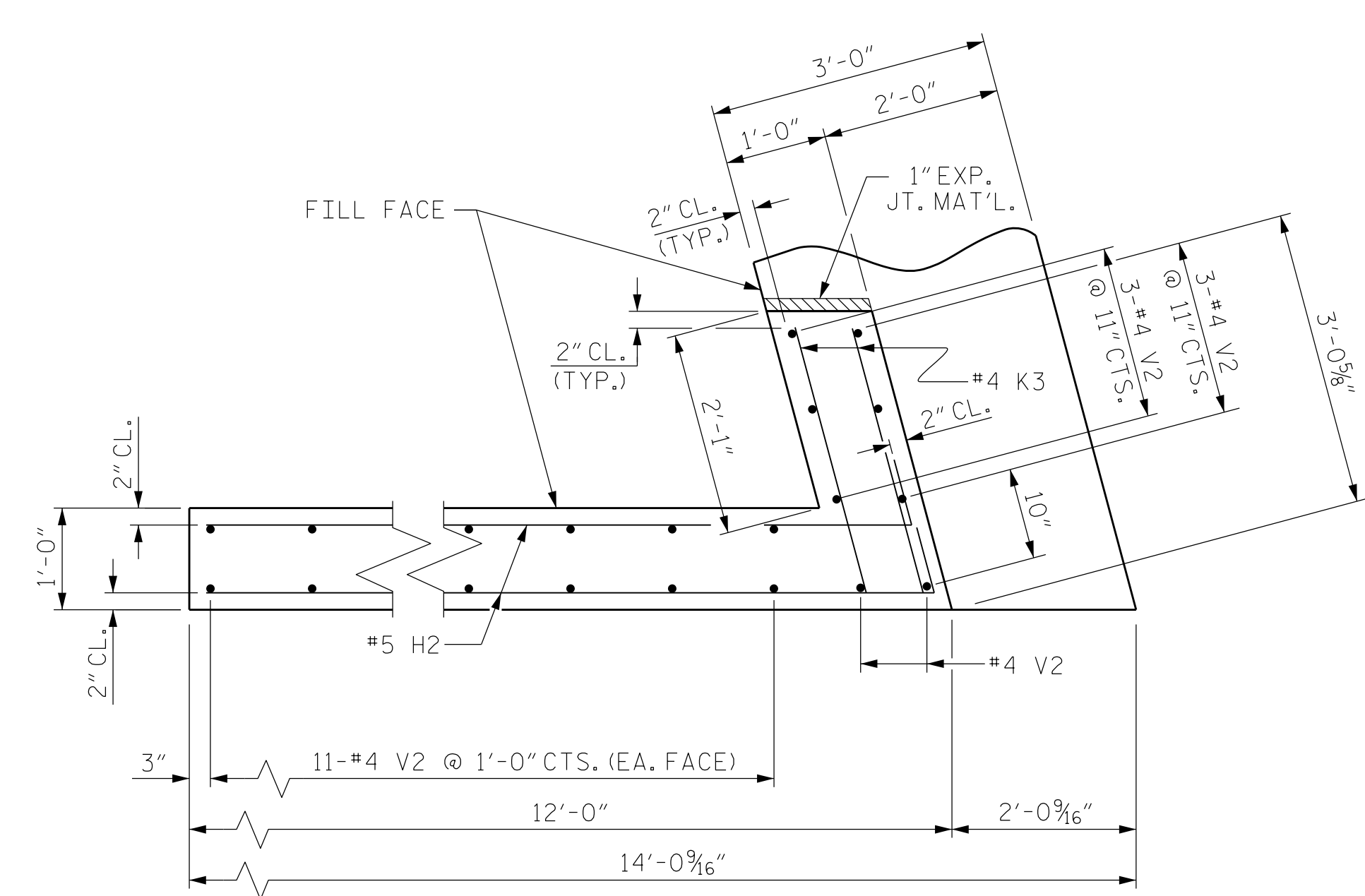
DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**





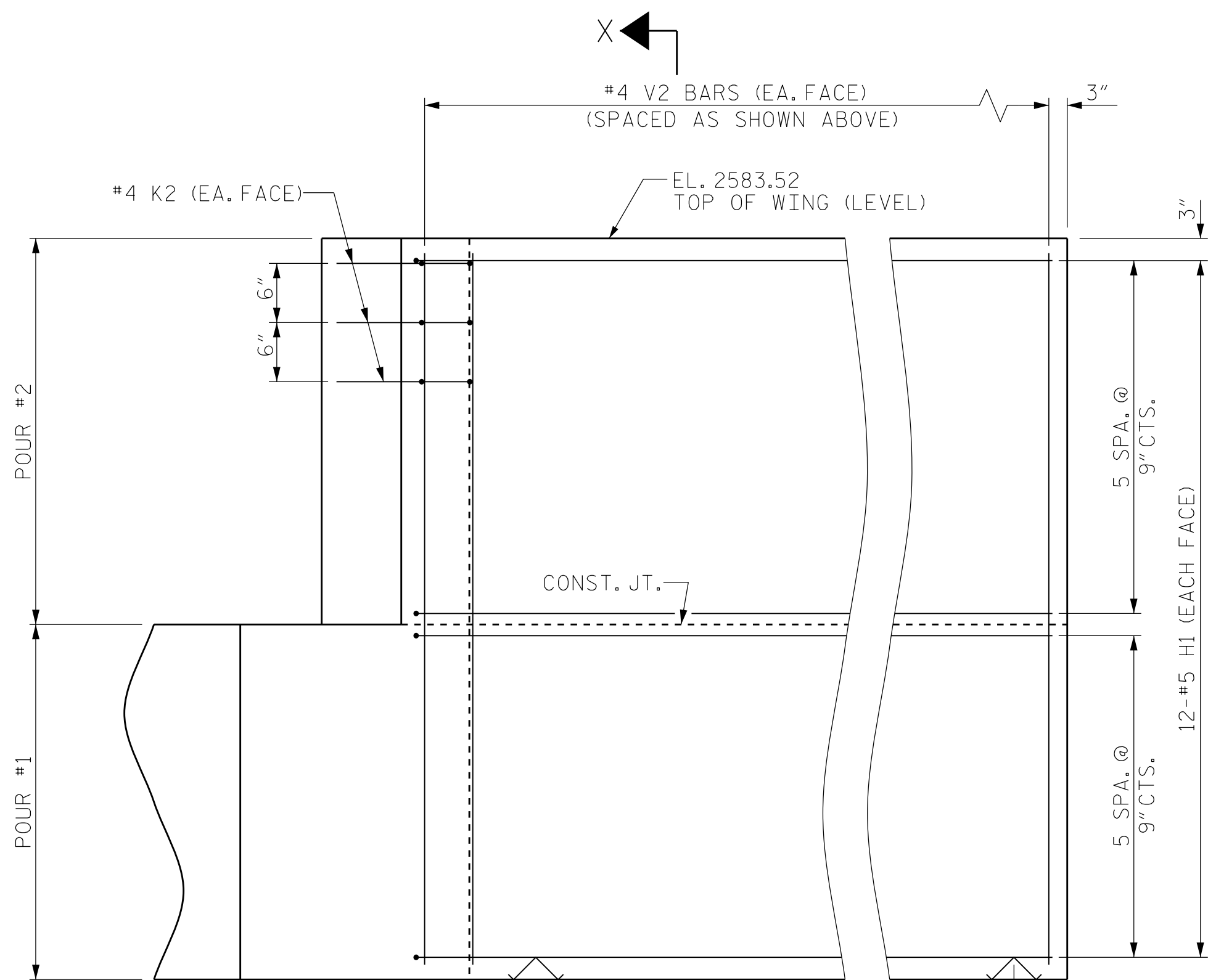
PLAN OF WING (W3)

STAGE I

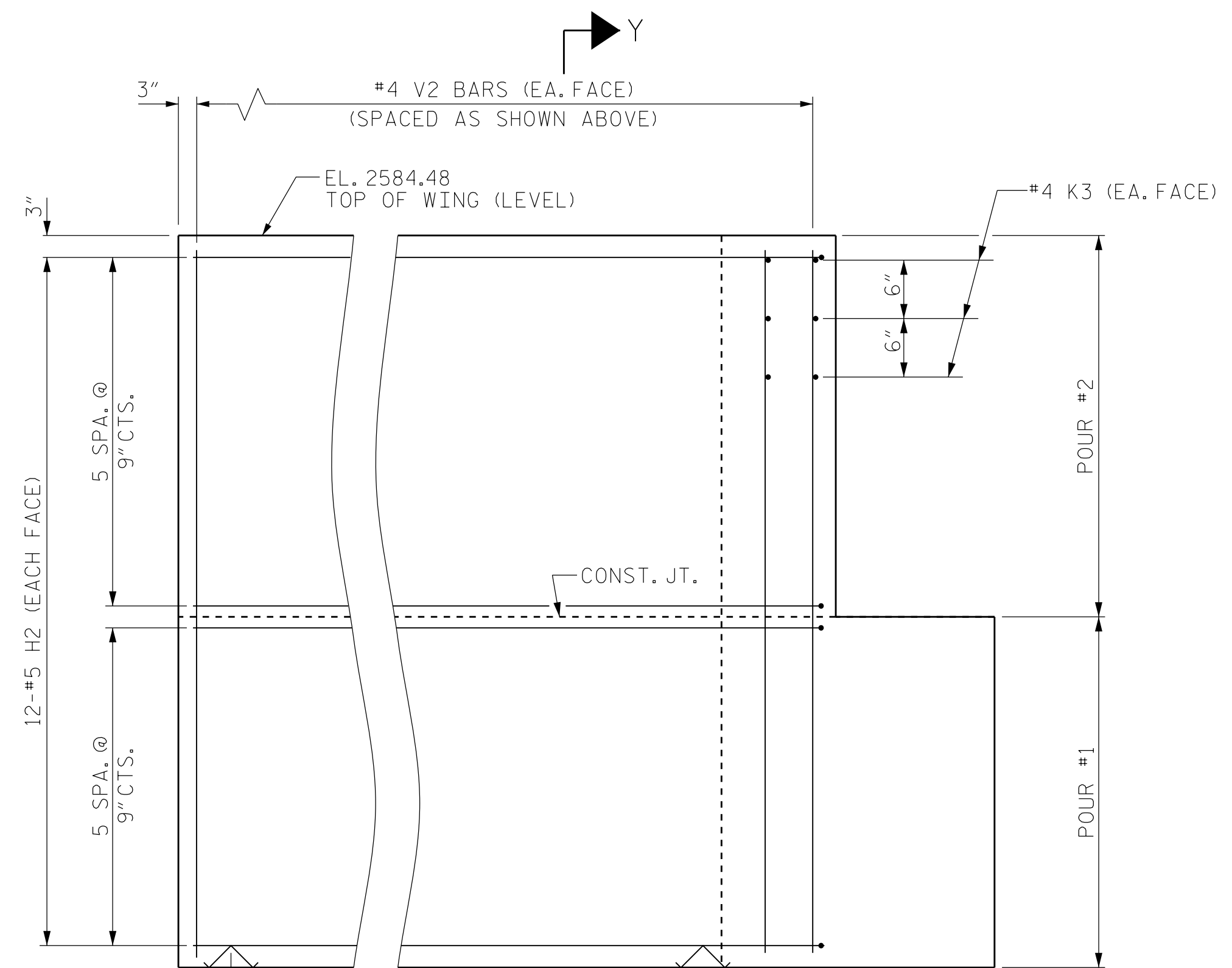


PLAN OF WING (W4)

STAGE II

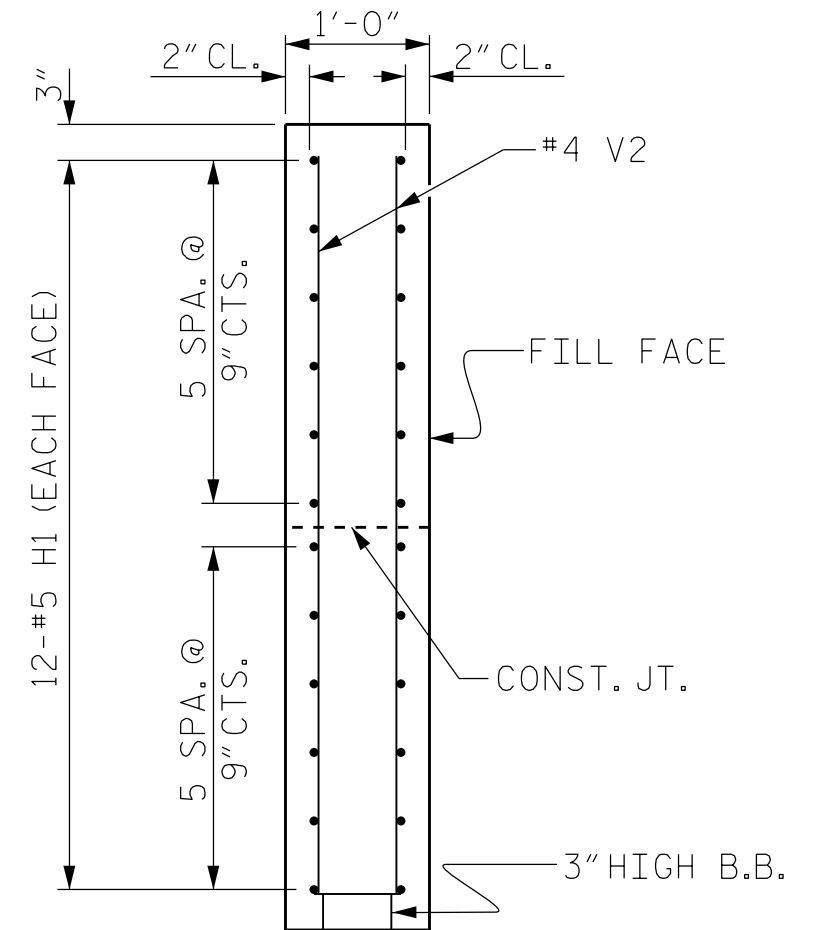


ELEVATION OF WING (W3)

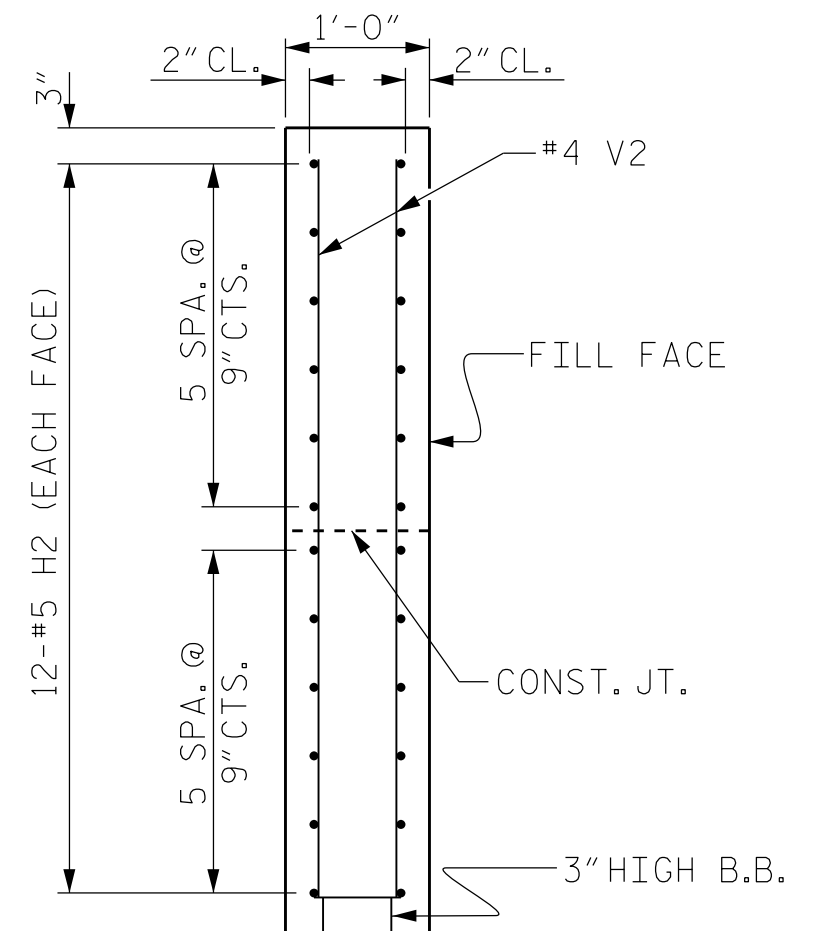


ELEVATION OF WING (W4)

WING DETAILS



SECTION X-X



SECTION Y-Y

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 2
STAGE I & II



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 Kyle Smiach
 8EA5008988E475...

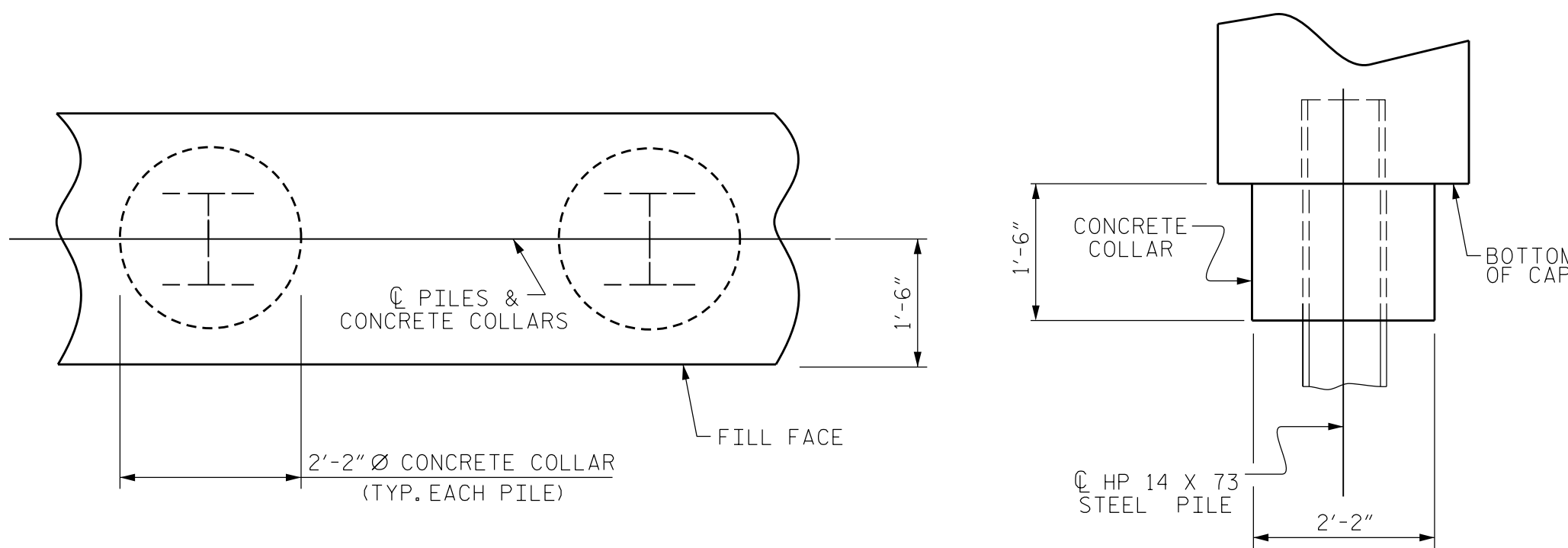
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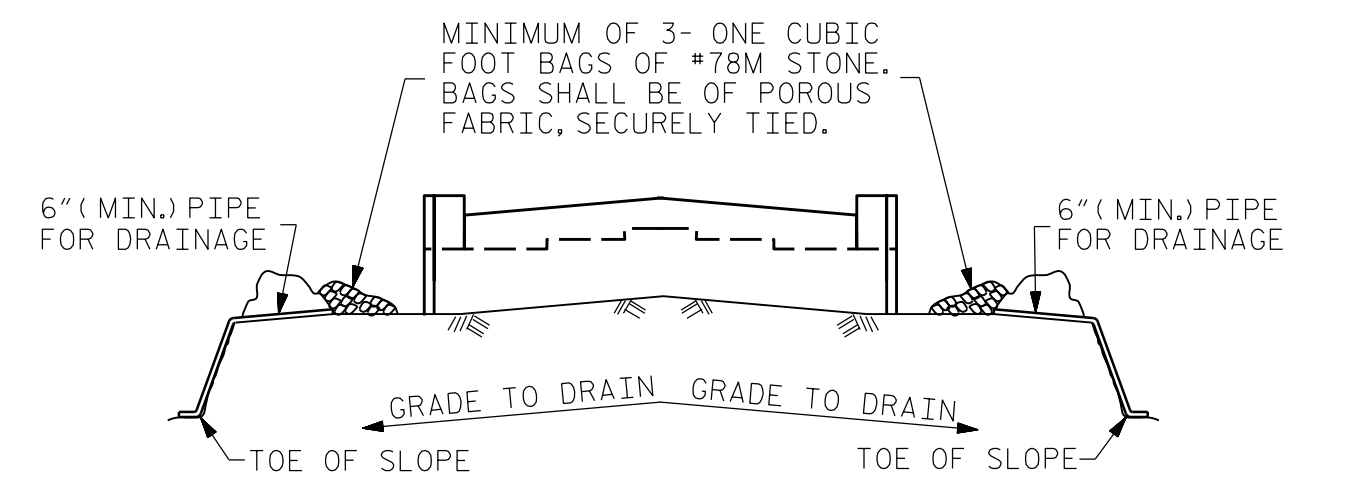
S-44
 TOTAL SHEETS
 51

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 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



PLAN
ELEVATION
CORROSION PROTECTION FOR STEEL PILES DETAIL



MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

6" (MIN.) PIPE FOR DRAINAGE

6" (MIN.) PIPE FOR DRAINAGE

GRADE TO DRAIN

GRADE TO DRAIN

TOE OF SLOPE

TOE OF SLOPE

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

1: 41'-6" length, 28'-2" width, HK.

2: 3'-7 1/2" height, 2'-8" width, HK.

3: 2'-8" length, 5/2" width, HK.

4: 2'-0" diameter, 1'-3" lap.

5: 2'-8" height, 1'-6" width, 8" U1, 2'-8" U2.

6: 11'-8" length, 1 1/8" height, 8" width.

7: 11'-6" length, 1 1/8" height, 8" width.

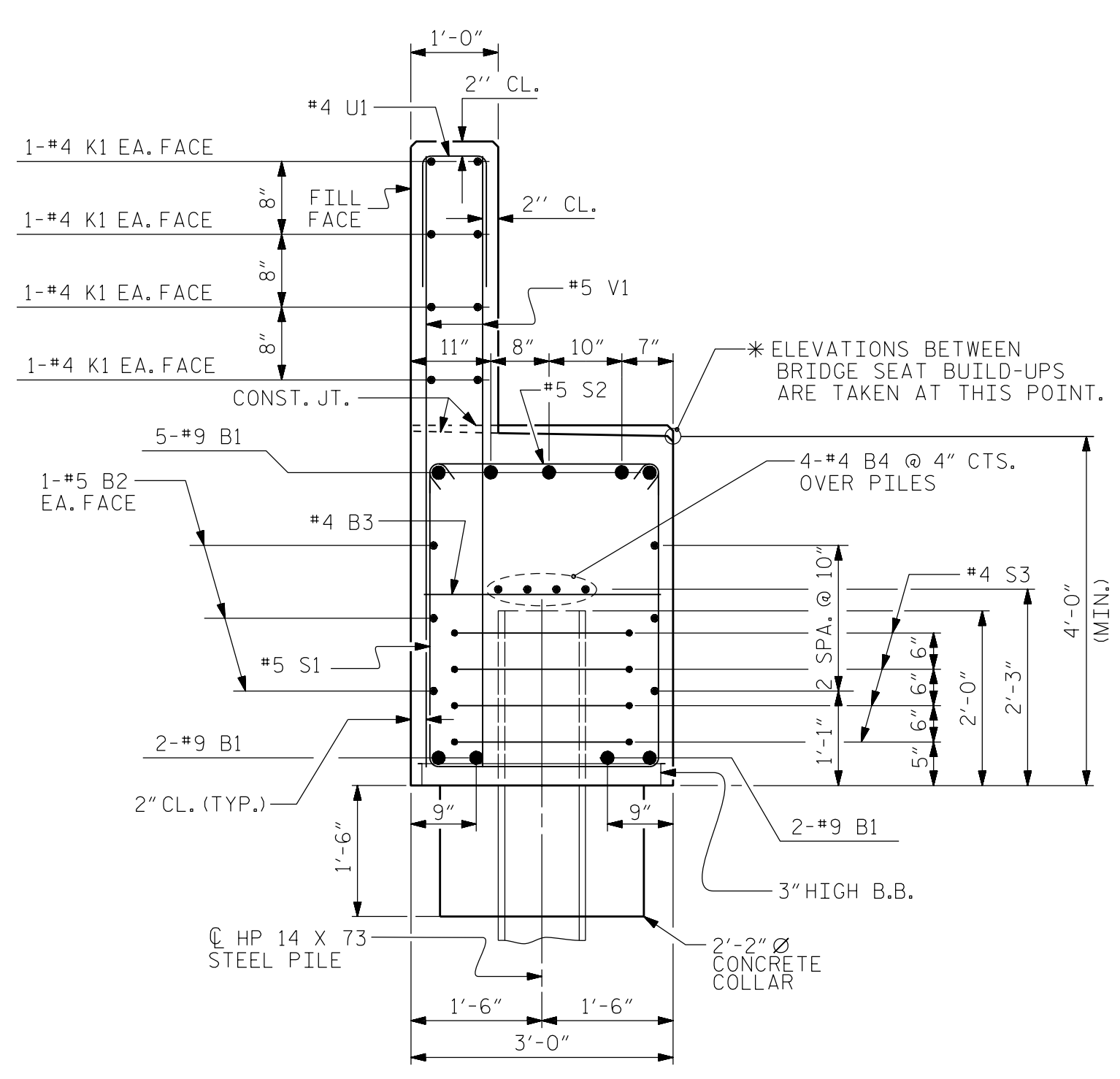
ALL BAR DIMENSIONS ARE OUT TO OUT.

TOTAL QUANTITIES

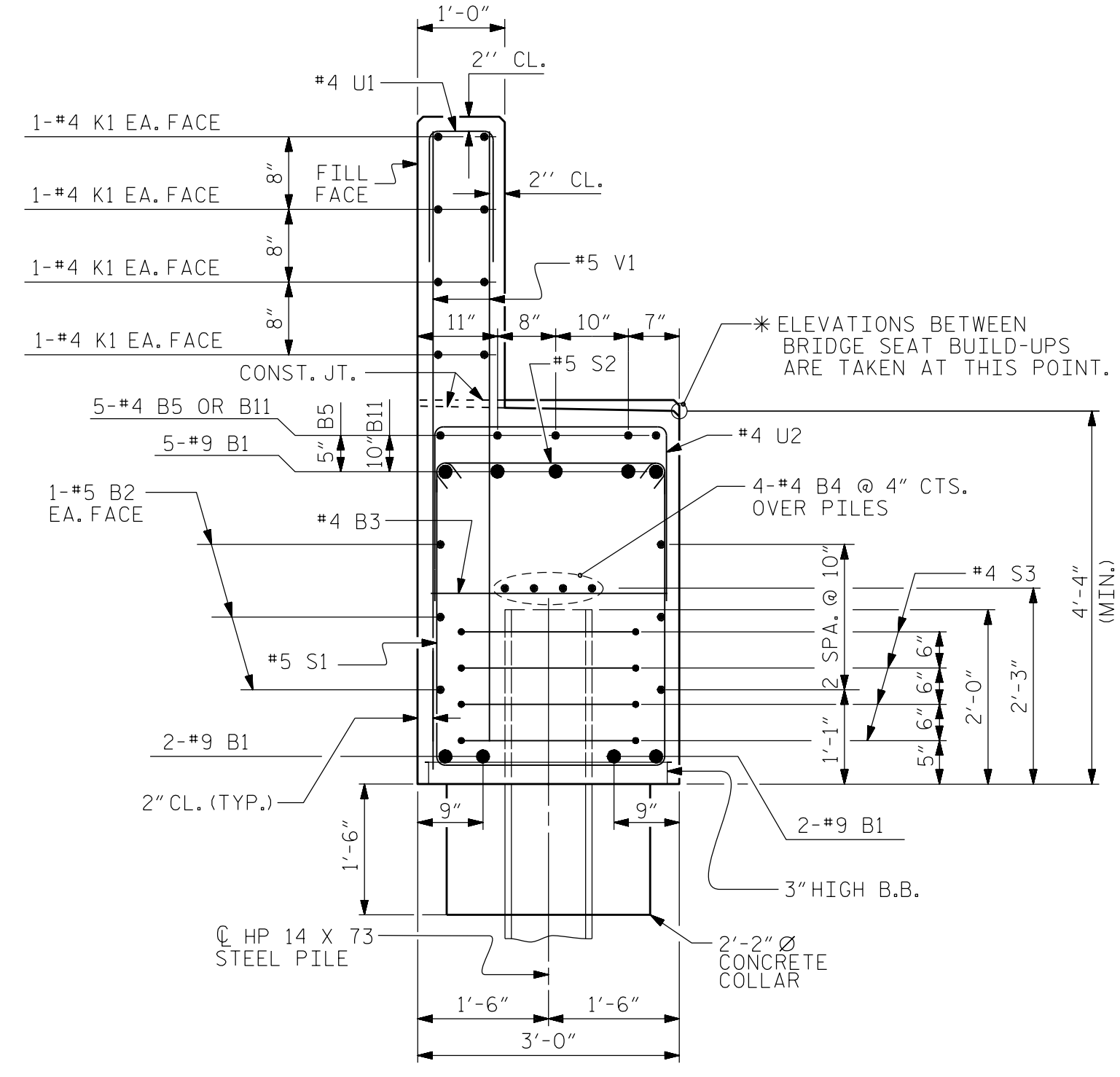
REINFORCING STEEL (FOR ONE END BENT)	4059 LBS.	REINFORCING STEEL (FOR ONE END BENT)	5861 LBS.
CLASS A CONCRETE BREAKDOWN (STAGE I)		CLASS A CONCRETE BREAKDOWN (STAGE II)	
POUR #1 CAP, LOWER PART OF WINGS & COLLARS	22.9 C.Y.	POUR #1 CAP, LOWER PART OF WINGS & COLLARS	31.9 C.Y.
POUR #2 BACKWALL & UPPER PART OF WINGS	5.5 C.Y.	POUR #2 BACKWALL & UPPER PART OF WINGS	7.2 C.Y.
TOTAL CLASS A CONCRETE	28.5 C.Y.	TOTAL CLASS A CONCRETE	39.1 C.Y.

BILL OF MATERIAL
END BENT No. 2

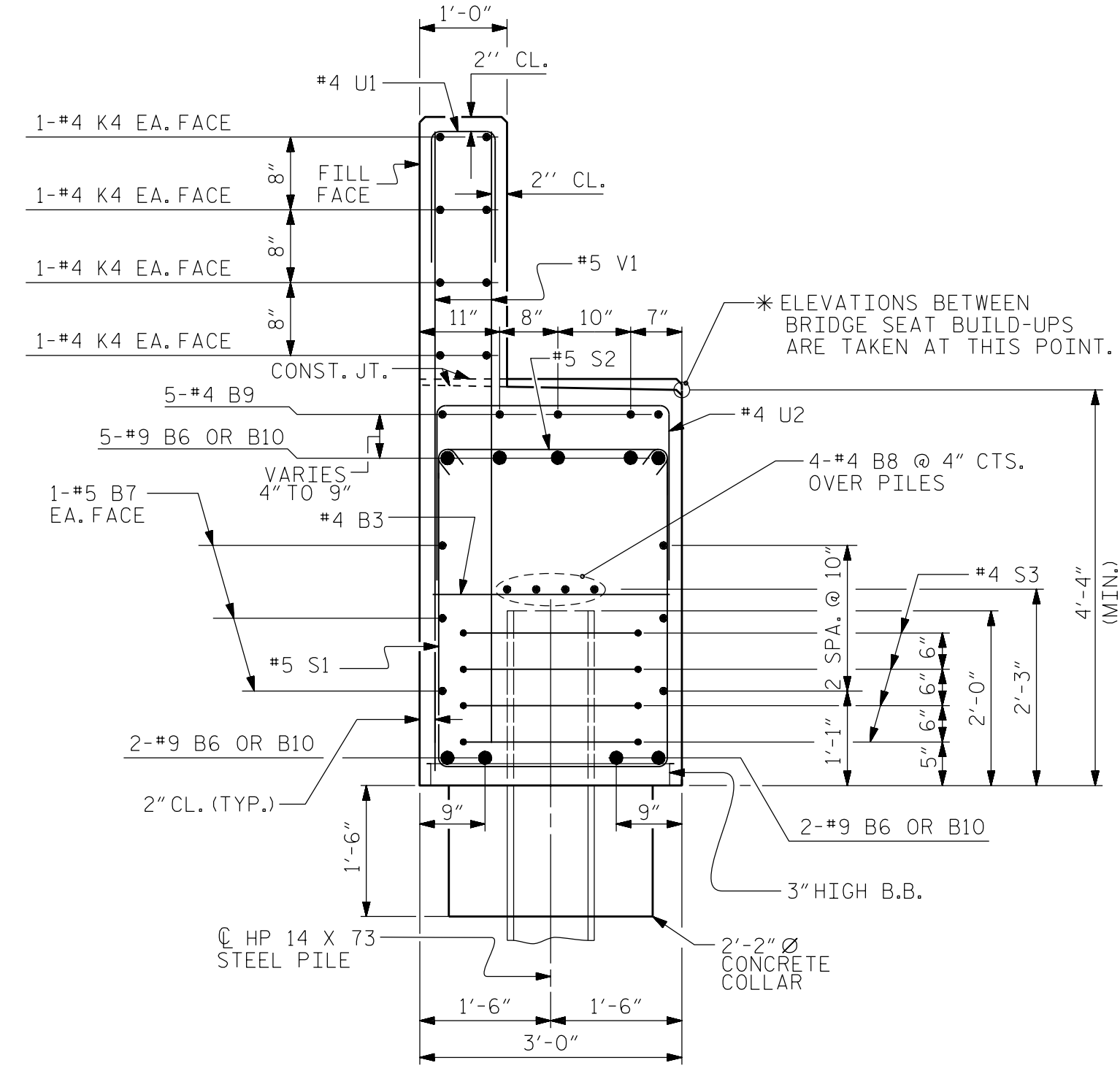
STAGE I					STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	#9	1	42'-9"	1308	B6	9	#9	1	29'-7"	905
B2	6	#5	STR	44'-0"	275	B7	12	#5	STR	32'-0"	401
B3	10	#4	STR	2'-8"	18	B3	15	#4	STR	2'-8"	27
B4	8	#4	STR	22'-11"	123	B8	8	#4	STR	31'-9"	170
B5	5	#4	STR	16'-8"	56	B9	10	#4	STR	25'-3"	169
B11	5	#4	STR	5'-9"	19	B10	9	#9	STR	37'-0"	1132
H1	24	#5	6	12'-4"	309	H2	24	#5	7	12'-2"	305
K1	16	#4	STR	22'-11"	245	K4	8	#4	STR	31'-6"	168
K2	6	#4	STR	2'-8"	11	K3	6	#4	STR	2'-8"	11
S1	53	#5	2	10'-10"	599	S1	80	#5	2	10'-10"	904
S2	53	#5	3	3'-7"	198	S2	80	#5	3	3'-7"	299
S3	20	#4	4	7'-6"	100	S3	28	#4	4	7'-6"	140
U1	38	#4	5	3'-8"	93	U1	57	#4	5	3'-8"	140
U2	13	#4	5	8'-0"	69	U2	33	#4	5	8'-0"	176
V1	76	#5	STR	6'-2"	489	V1	114	#5	STR	6'-2"	733
V2	29	#4	STR	7'-7"	147	V2	30	#4	STR	7'-7"	152
						E1	16	#5	STR	1'-9"	29
REINFORCING STEEL (FOR ONE END BENT)					4059 LBS.	REINFORCING STEEL (FOR ONE END BENT)					5861 LBS.
CLASS A CONCRETE BREAKDOWN (STAGE I)						CLASS A CONCRETE BREAKDOWN (STAGE II)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					22.9 C.Y.	POUR #1 CAP, LOWER PART OF WINGS & COLLARS					31.9 C.Y.
POUR #2 BACKWALL & UPPER PART OF WINGS					5.5 C.Y.	POUR #2 BACKWALL & UPPER PART OF WINGS					7.2 C.Y.
TOTAL CLASS A CONCRETE					28.5 C.Y.	TOTAL CLASS A CONCRETE					39.1 C.Y.



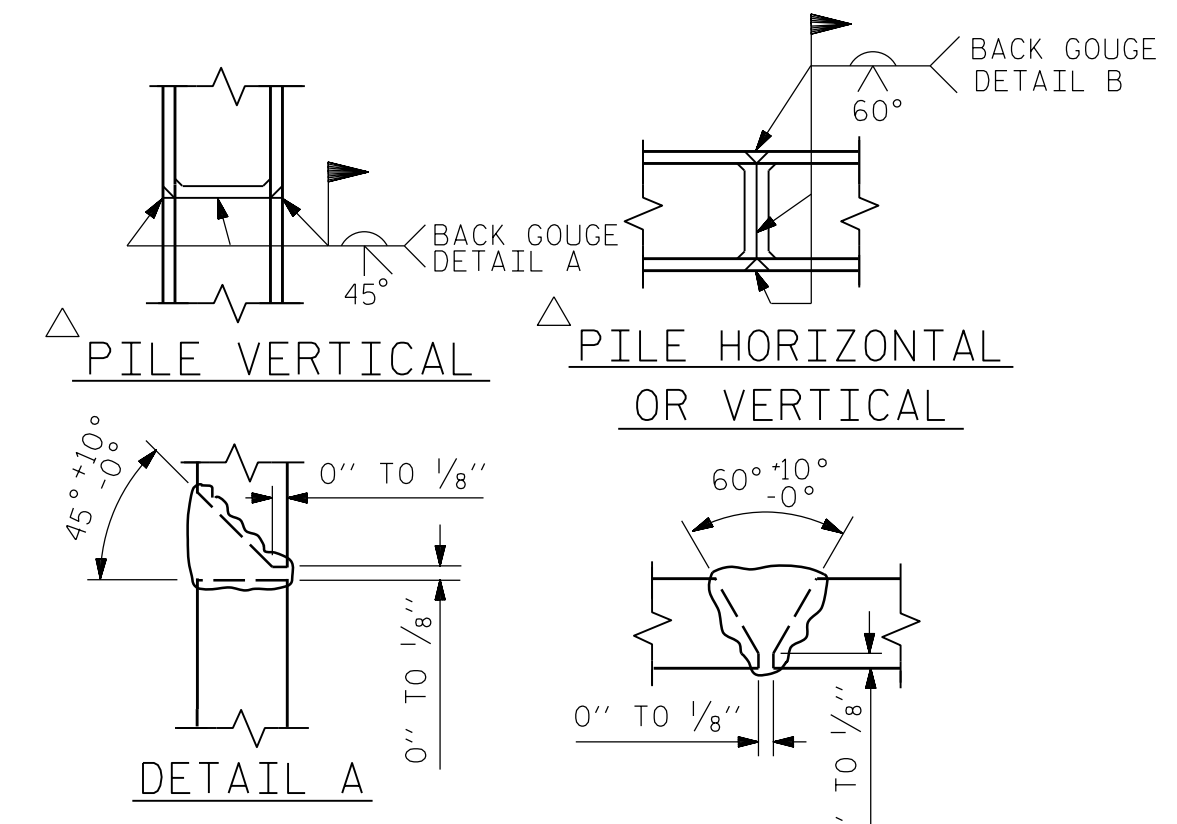
SECTION A-A



SECTION B-B



SECTION C-C



PILE SPLICE DETAILS

PROJECT NO. **B-5982**
HAYWOOD COUNTY
STATION: **20+37.51 -L-**
SHEET 4 OF 4

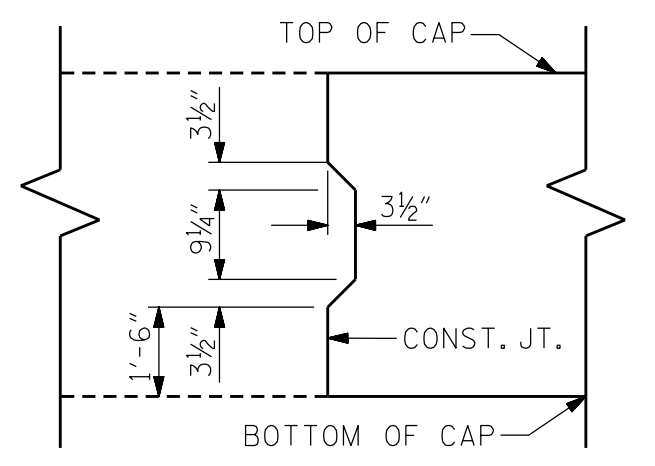


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 2
STAGE I & II

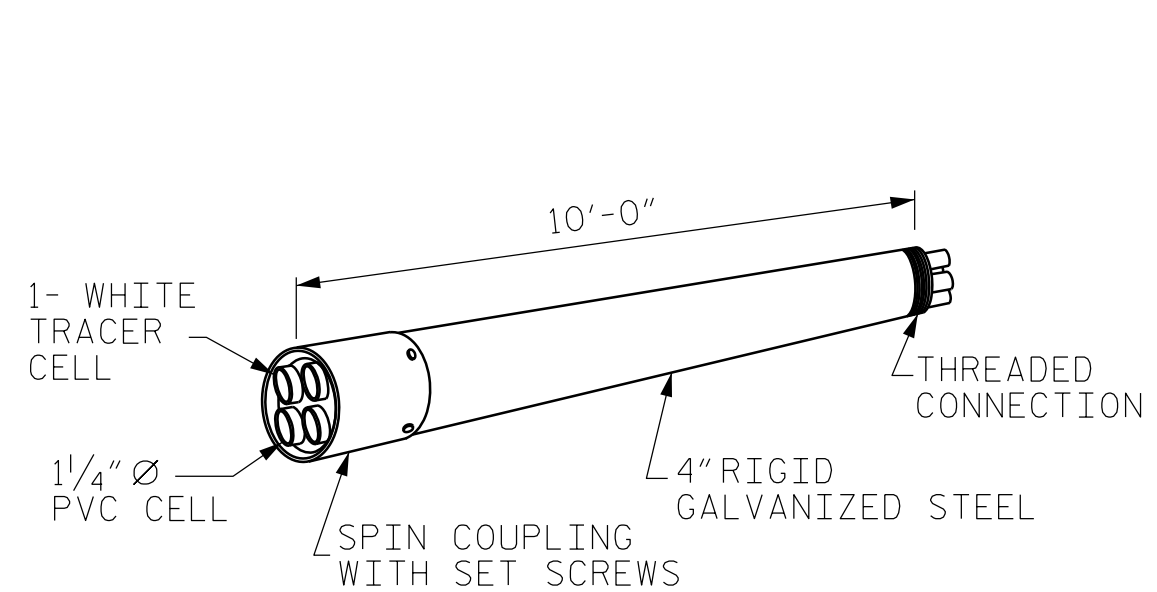
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940 Main Campus Drive, Suite 500
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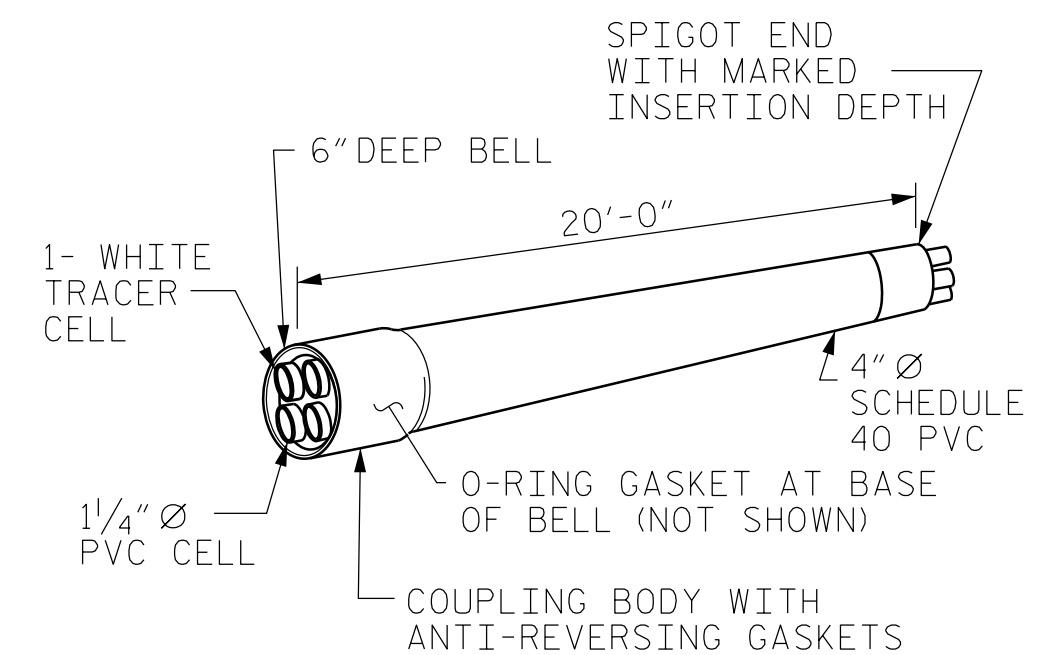
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CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



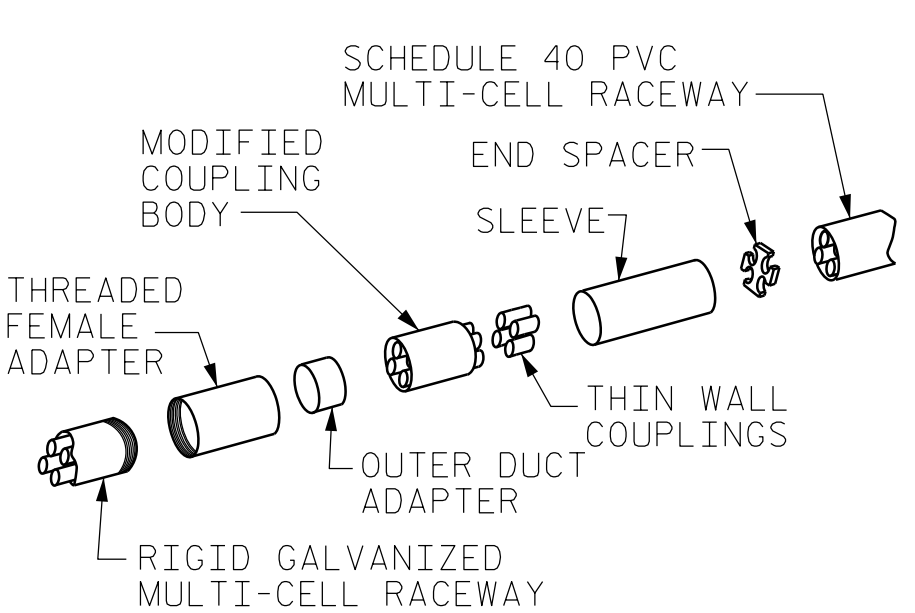
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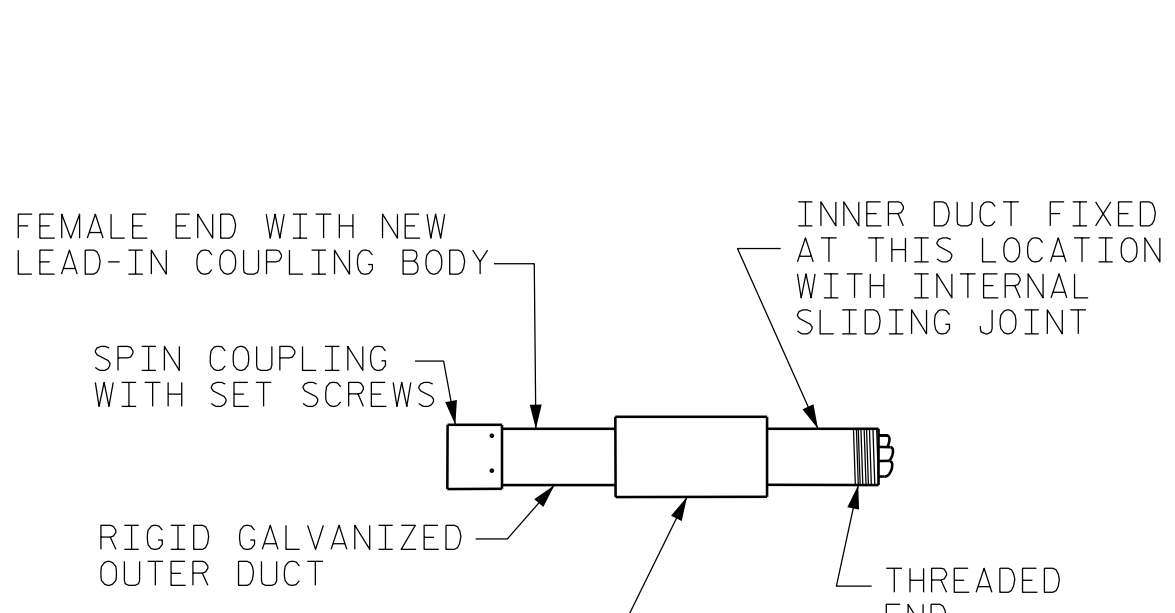
RIGID GALVANIZED (RGC) MULTI-CELL RACEWAY



SCHEDULE 40 PVC MULTI-CELL RACEWAY



TRANSITION ADAPTER



EXPANSION JOINT FITTING

NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE TOTAL QUANTITY OF CONDUIT NEEDED TO COMPLETE THE WORK AND THAT THE CONDUIT(S) ARE PLACED AT THE NOTED DIMENSION AND ABOVE THE BOTTOM OF THE GIRDER.

THE INSTALLATION OF THE CONDUIT SYSTEM SHALL BE PAID FOR AS LUMP SUM. THE PRICE SHALL INCLUDE ALL CONDUIT, HANGERS, STABILIZERS, EXPANSION JOINTS, CONCRETE INSERTS, PVC SLEEVES AND ALL NECESSARY HARDWARE TO COMPLETE THE WORK.

THE CONTRACTOR SHALL FIELD VERIFY THAT THE CONDUIT SYSTEM IS NOT IN CONFLICT WITH THE GUARDRAIL POSTS.

SEE DETAIL "C" FOR HANGER ASSEMBLY INSTALLATION.

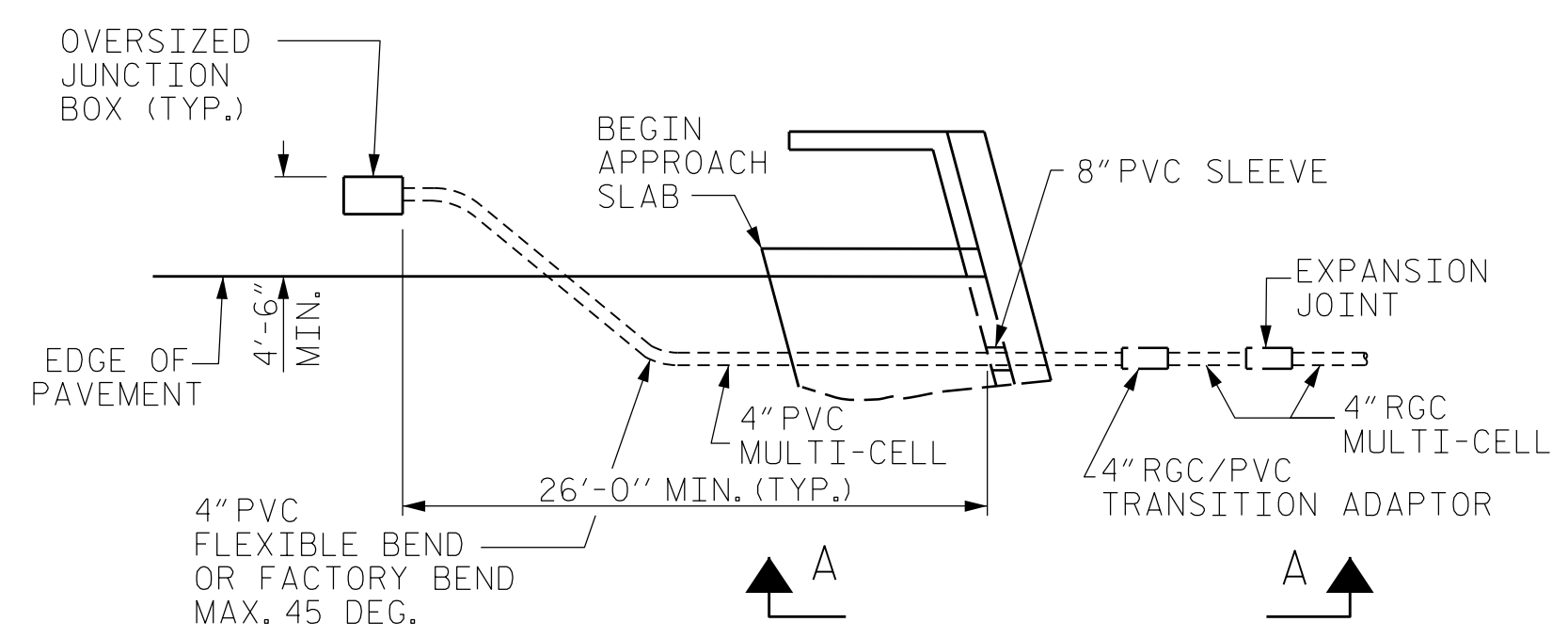
INSTALL SLEEVES PARALLEL TO GIRDERS. SEE DETAIL "B" FOR SLEEVE INSTALLATION.

PROVIDE TRANSITION ADAPTOR (AND EXPANSION JOINT) FOR CONDUIT AT END BENT 1 (AND END BENT 2).

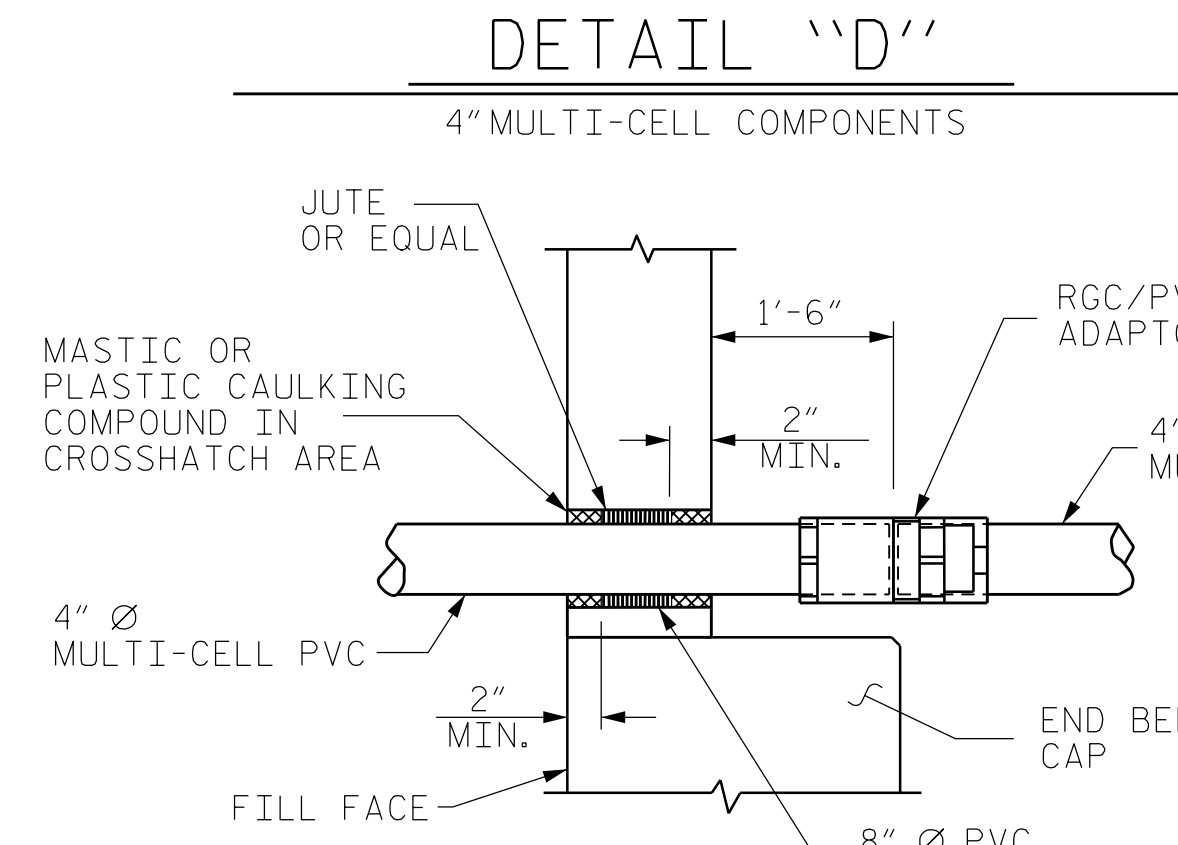
INSTALL STABILIZER'S MIDWAY BETWEEN DECK EXPANSION JOINTS. STABILIZER CAN NOT BE USED INSTEAD OF A HANGER ASSEMBLY.

THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF 5/8" AND A PULL FORCE OF 1260 lbs.

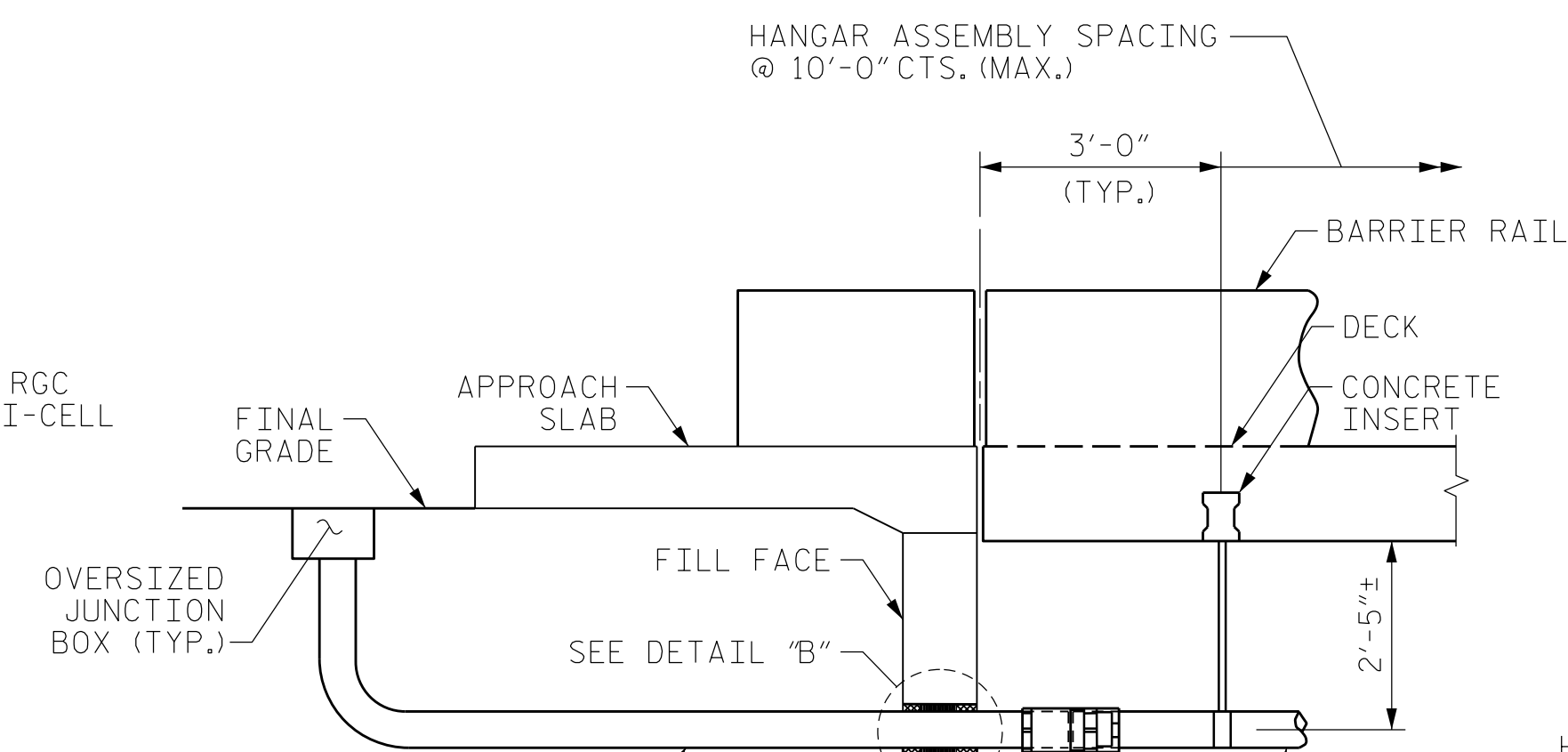
FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.



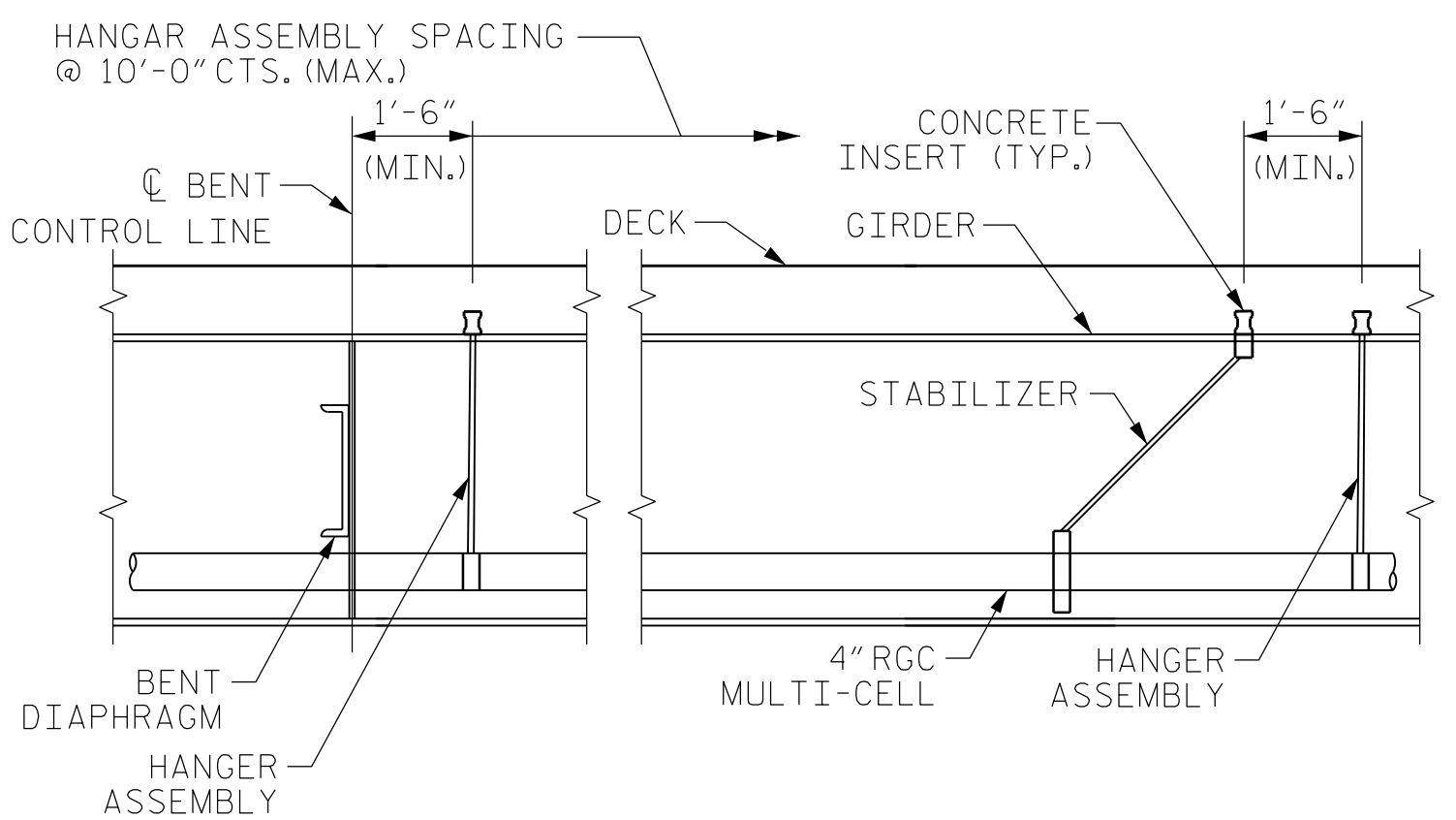
DETAIL "A" TERMINATION OF CONDUIT AT WING WALL



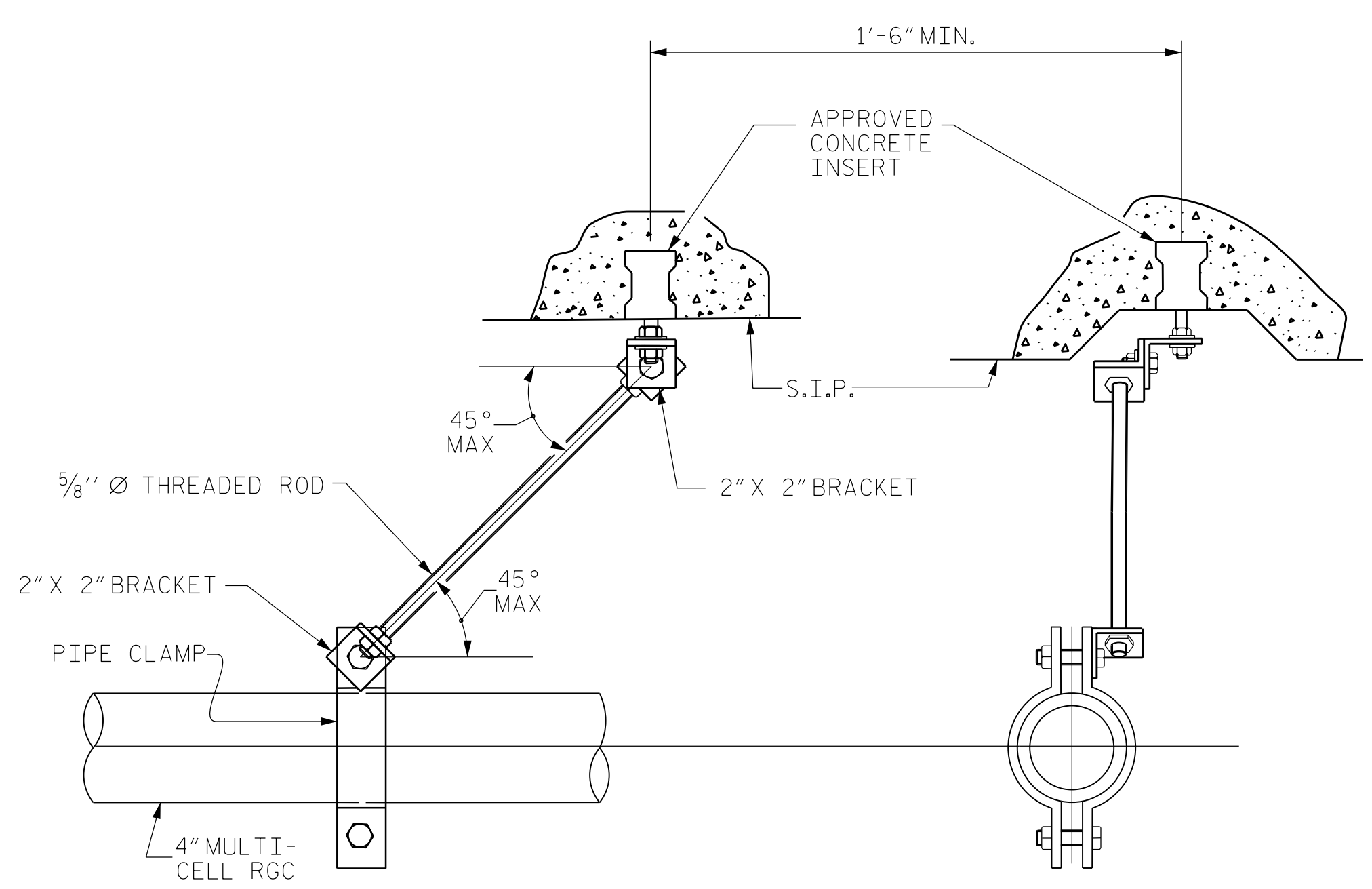
DETAIL "B" PVC SLEEVE INSTALLATION & RGC/PVC ADAPTOR AT BACKWALL.



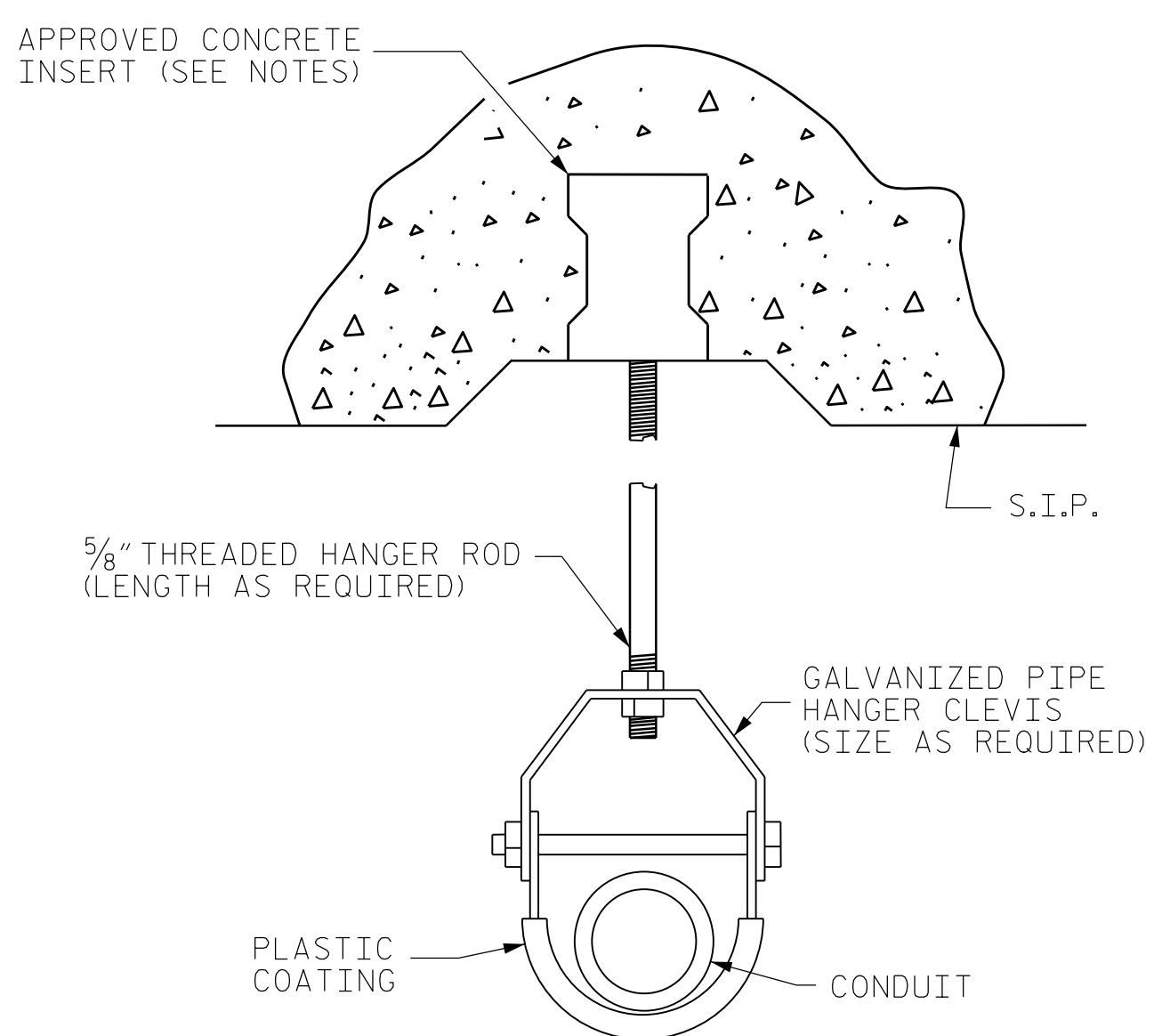
VIEW "A-A"



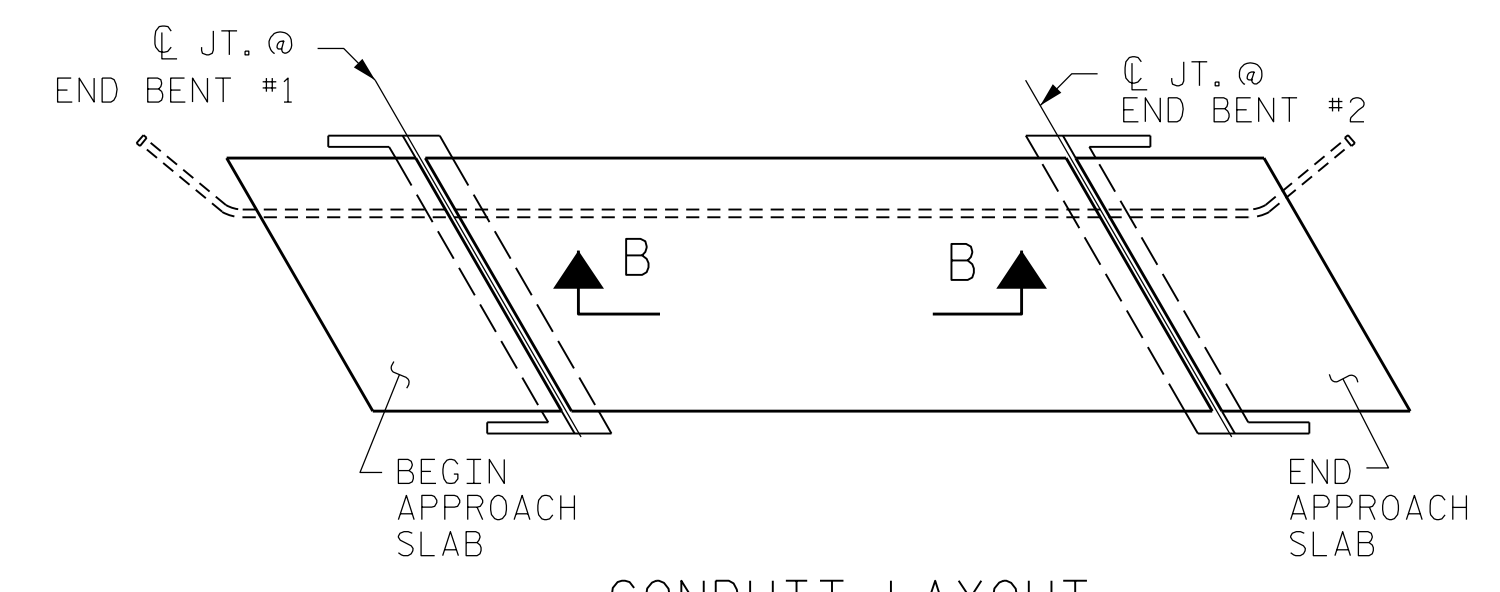
VIEW "B-B"



DETAIL "E" STABILIZER



DETAIL "C" HANGER ASSEMBLY



CONDUIT LAYOUT

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

ELECTRICAL CONDUIT DETAILS

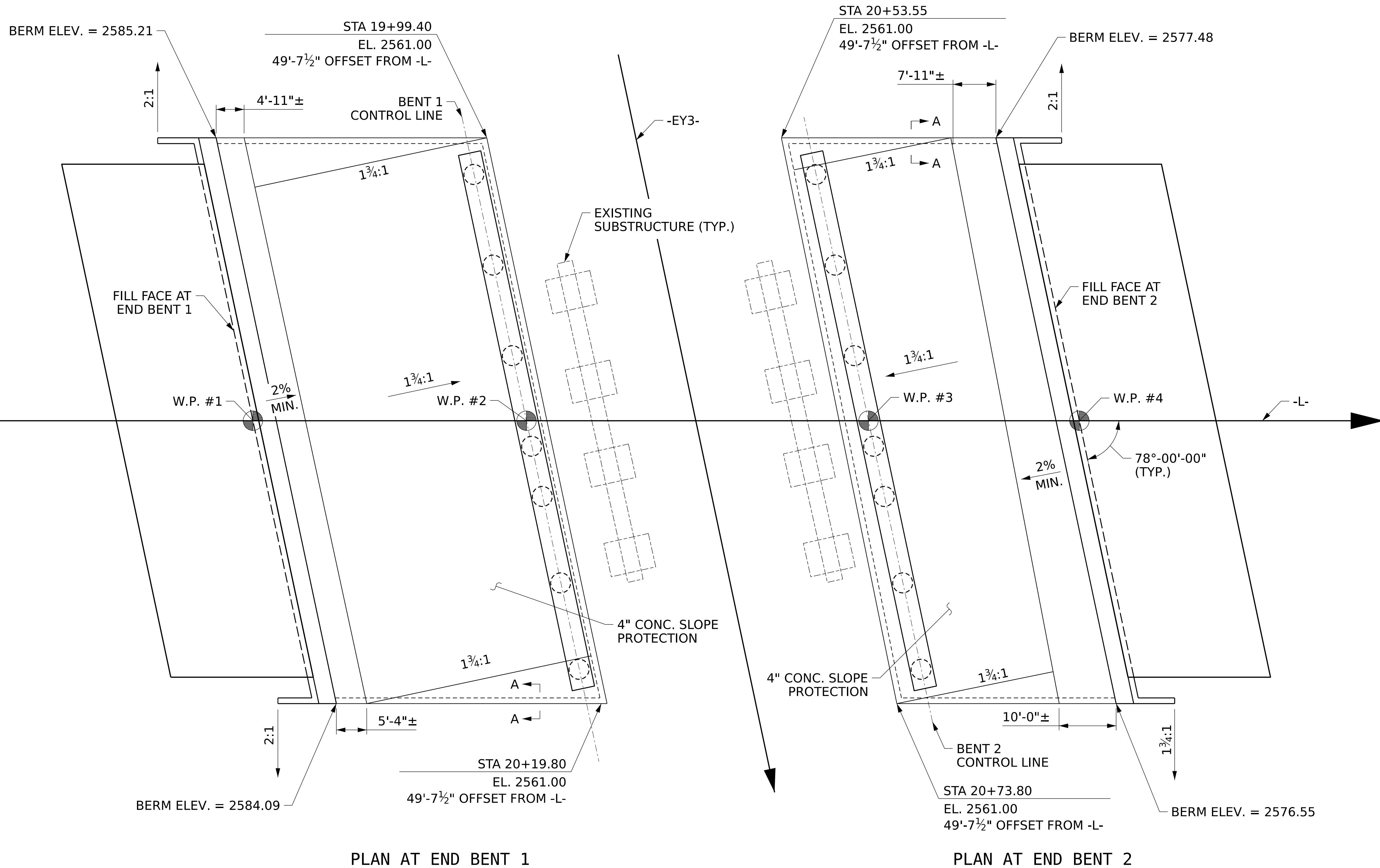
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
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DRAWN BY : **D.E. MORRISSETTE** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



ELECTRIC CONDUIT DETAILS

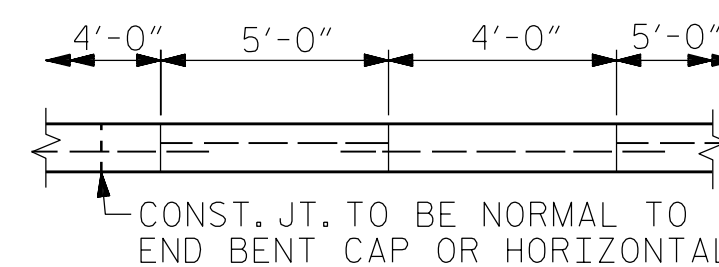
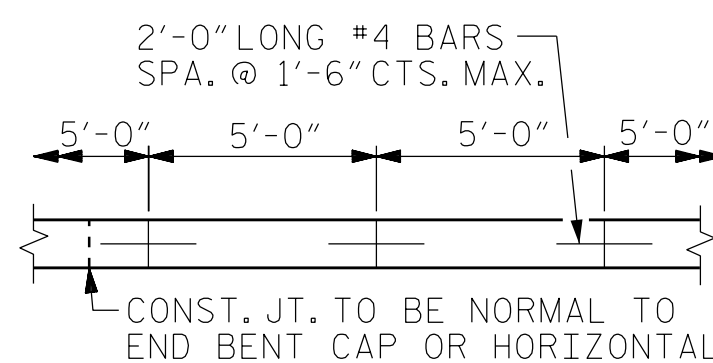
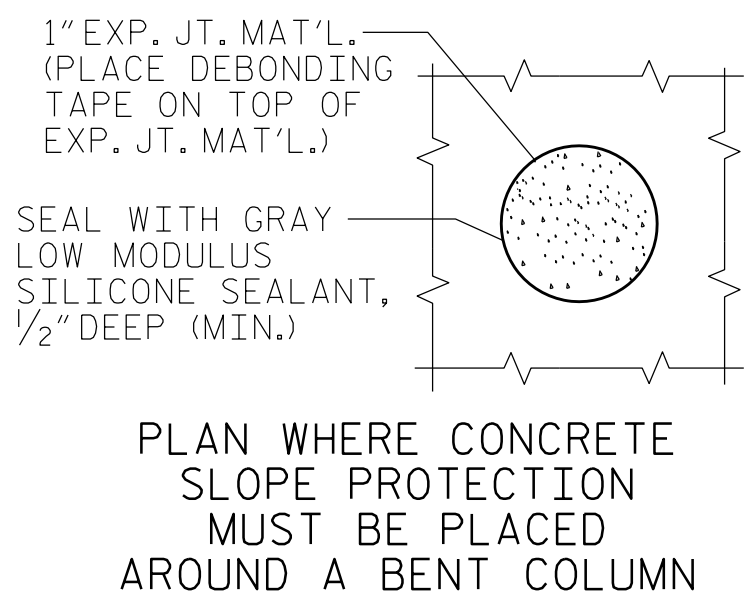
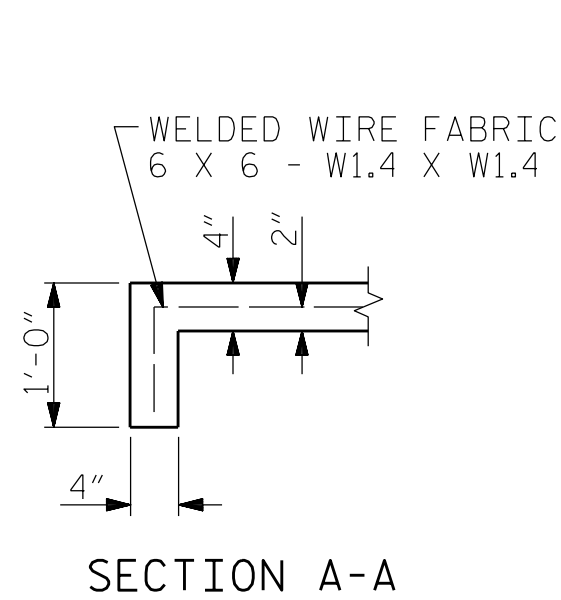
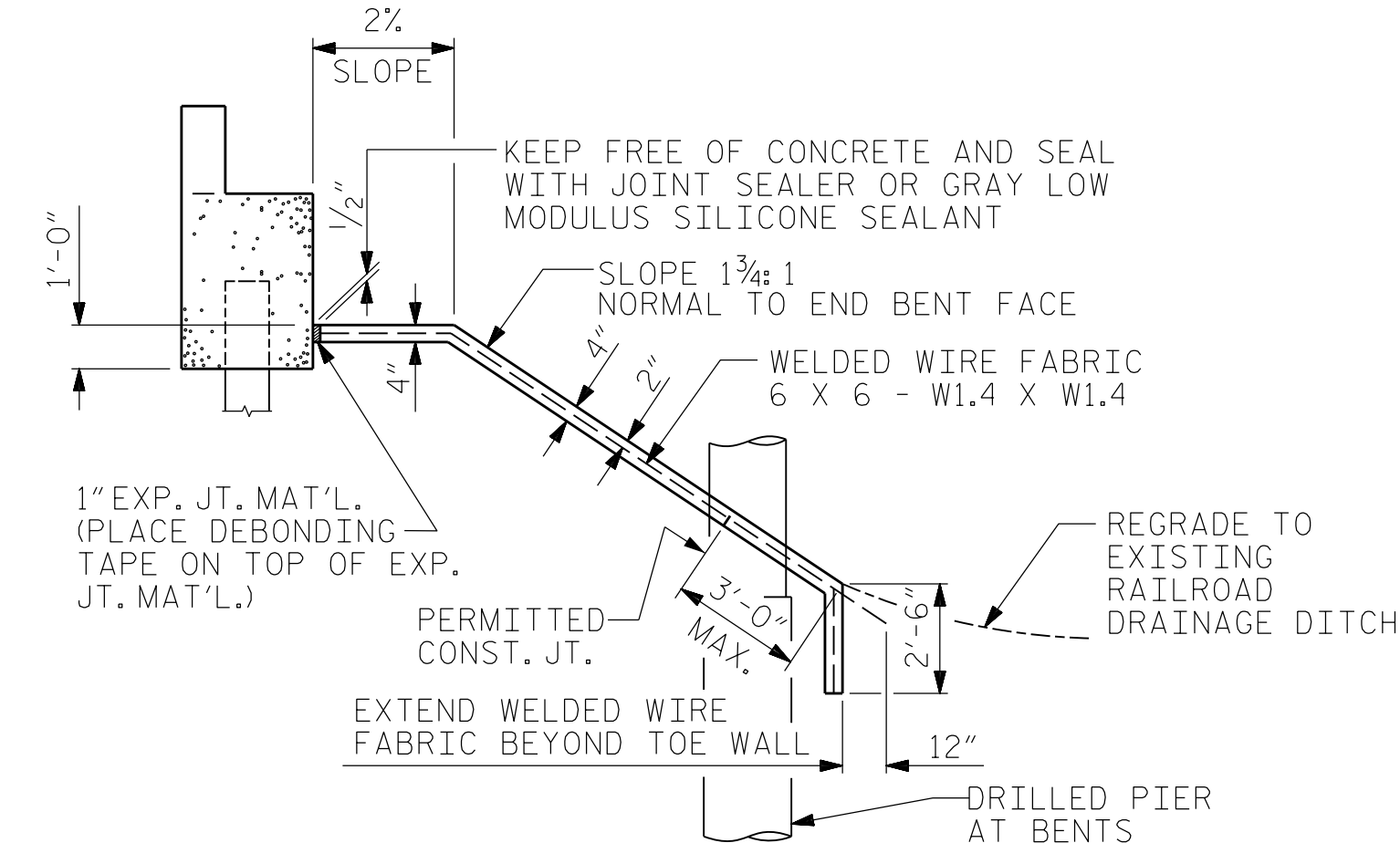


PLAN OF SLOPE PROTECTION

GENERAL NOTES

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

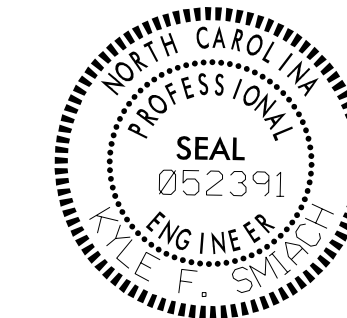
BRIDGE @ STA. 20+37.51 -L-	4 INCH SLOPE PROTECTION	WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	590	1080
END BENT 2	475	870



PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SLOPE PROTECTION
 DETAILS**



NO.		BY:		DATE:		NO.		BY:		DATE:		SHEET NO.
1						3						S-47
2						4						TOTAL SHEETS 51

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

DRAWN BY : **D.E. MORRISSETTE** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**

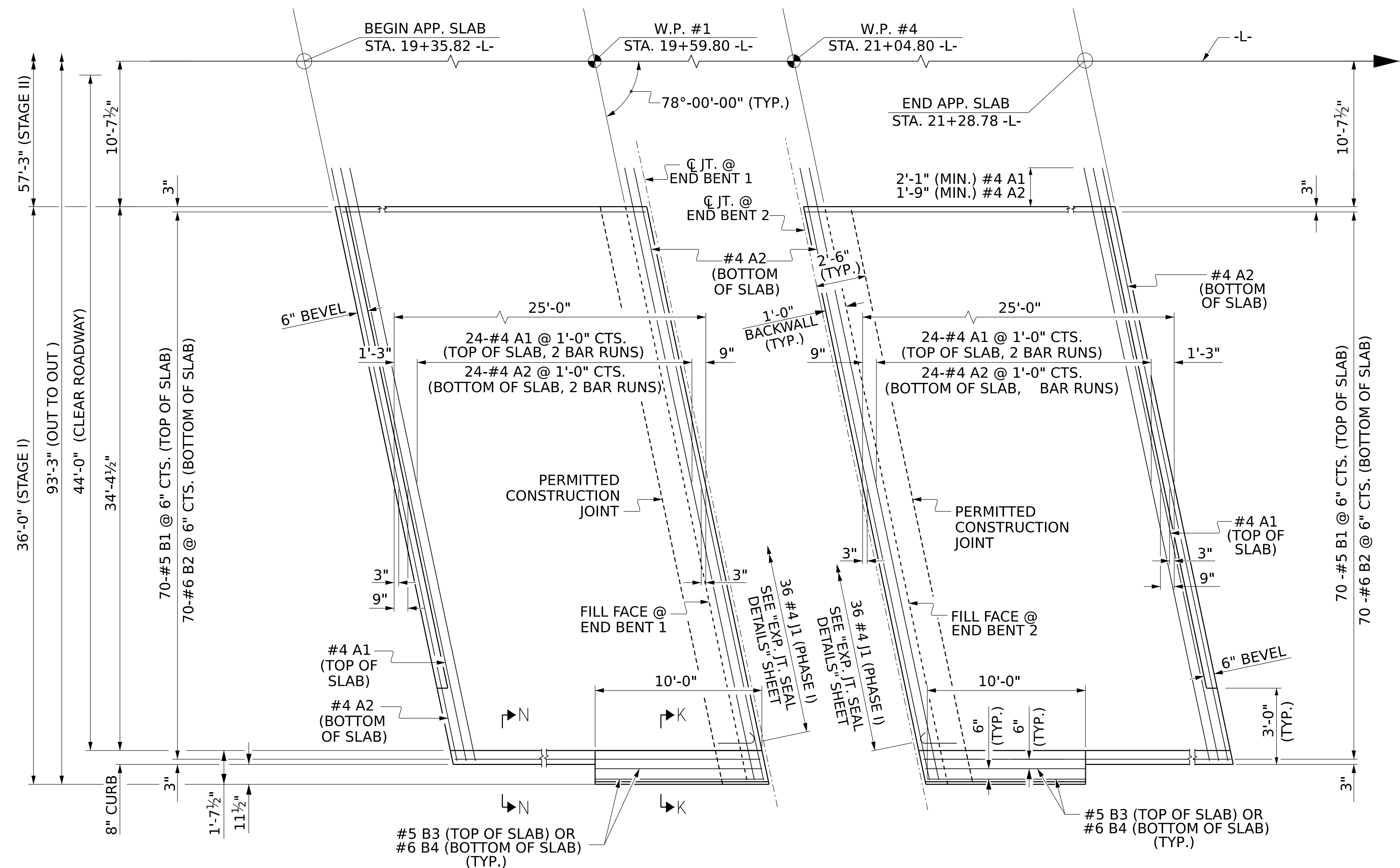
NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

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

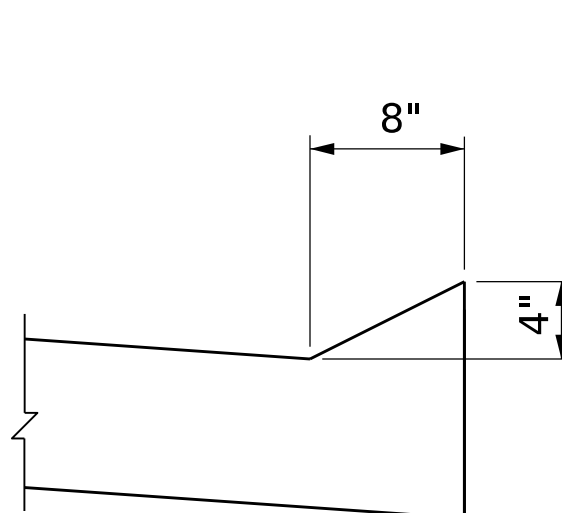
FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.



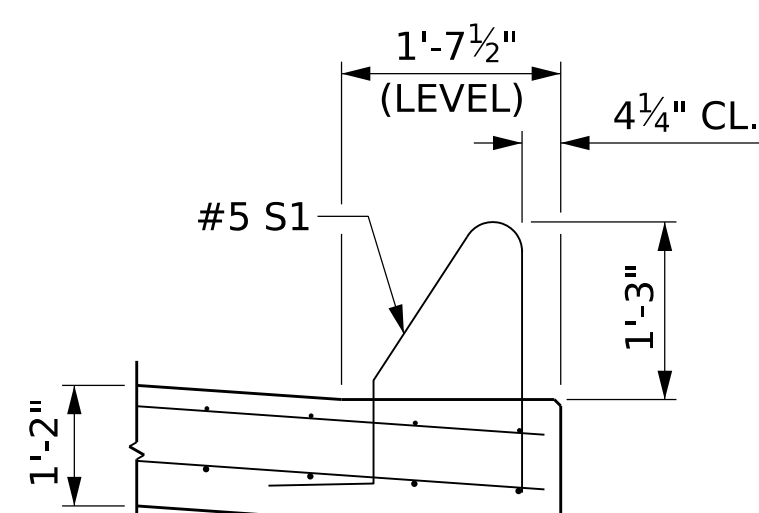
PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION N-N



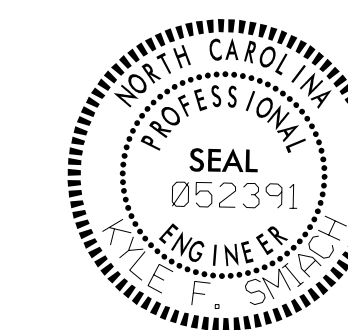
SECTION K-K



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

DRAWN BY : J.C. LASSITER	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 05/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 05/2024

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DocuSigned by:
Kyle Smiach
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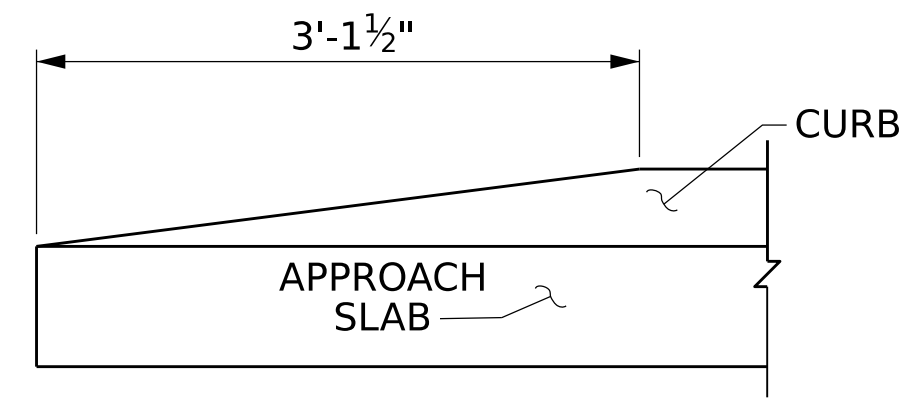
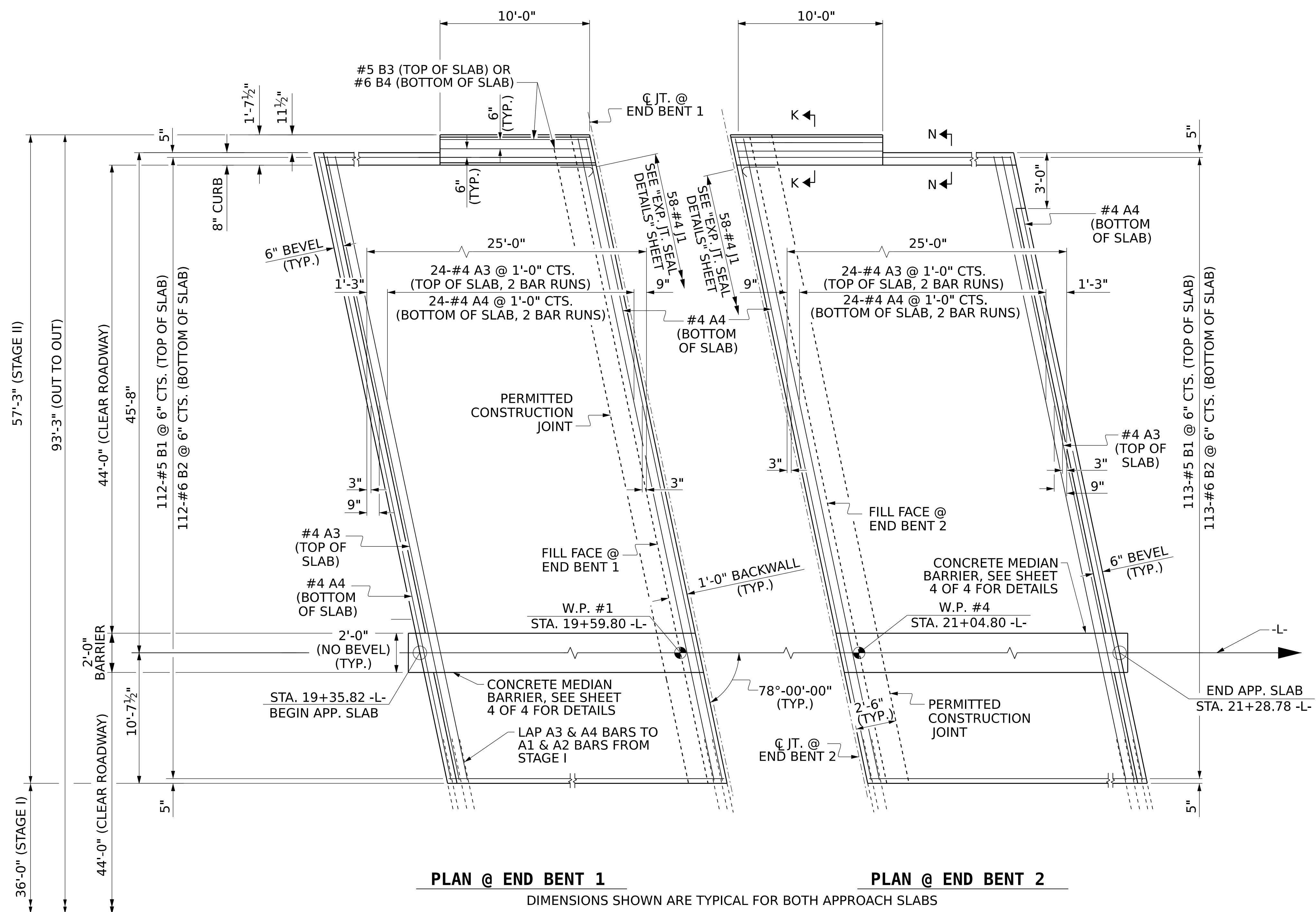
PROJECT NO. **B-5982**
HAYWOOD COUNTY
STATION: **20+37.51 -L-**

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
**BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT**
STAGE I

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

S-48
TOTAL SHEETS: 51

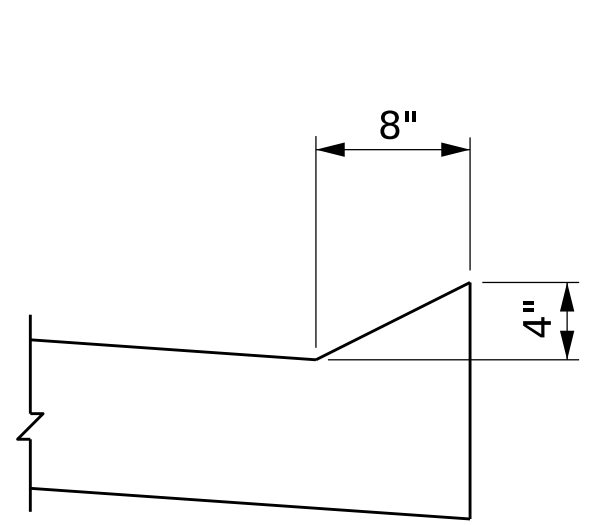


END OF CURB WITHOUT SHOULDER BERM GUTTER

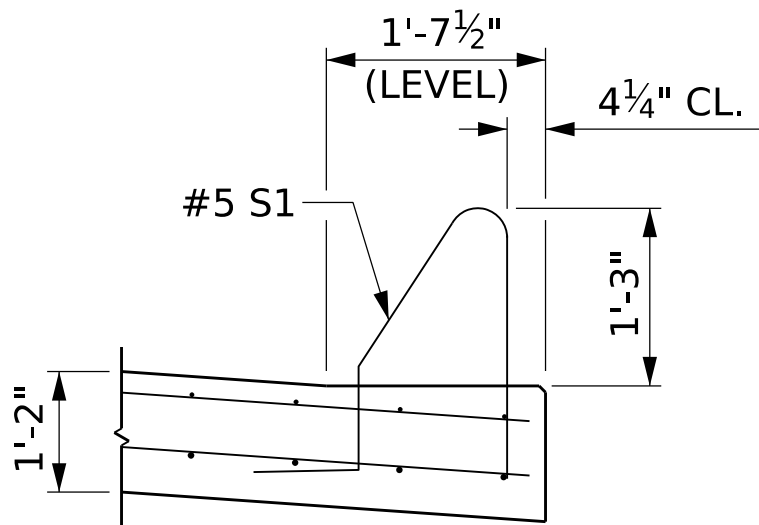
CURB DETAILS

PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION N-N



SECTION K-K



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

DRAWN BY : **J.C. LASSITER** DATE : **12/2023**
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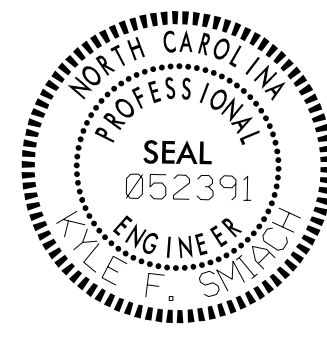
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PROJECT NO. **B-5982**

HAYWOOD COUNTY

STATION: **20+37.51 -L-**

SHEET **2** OF **4**

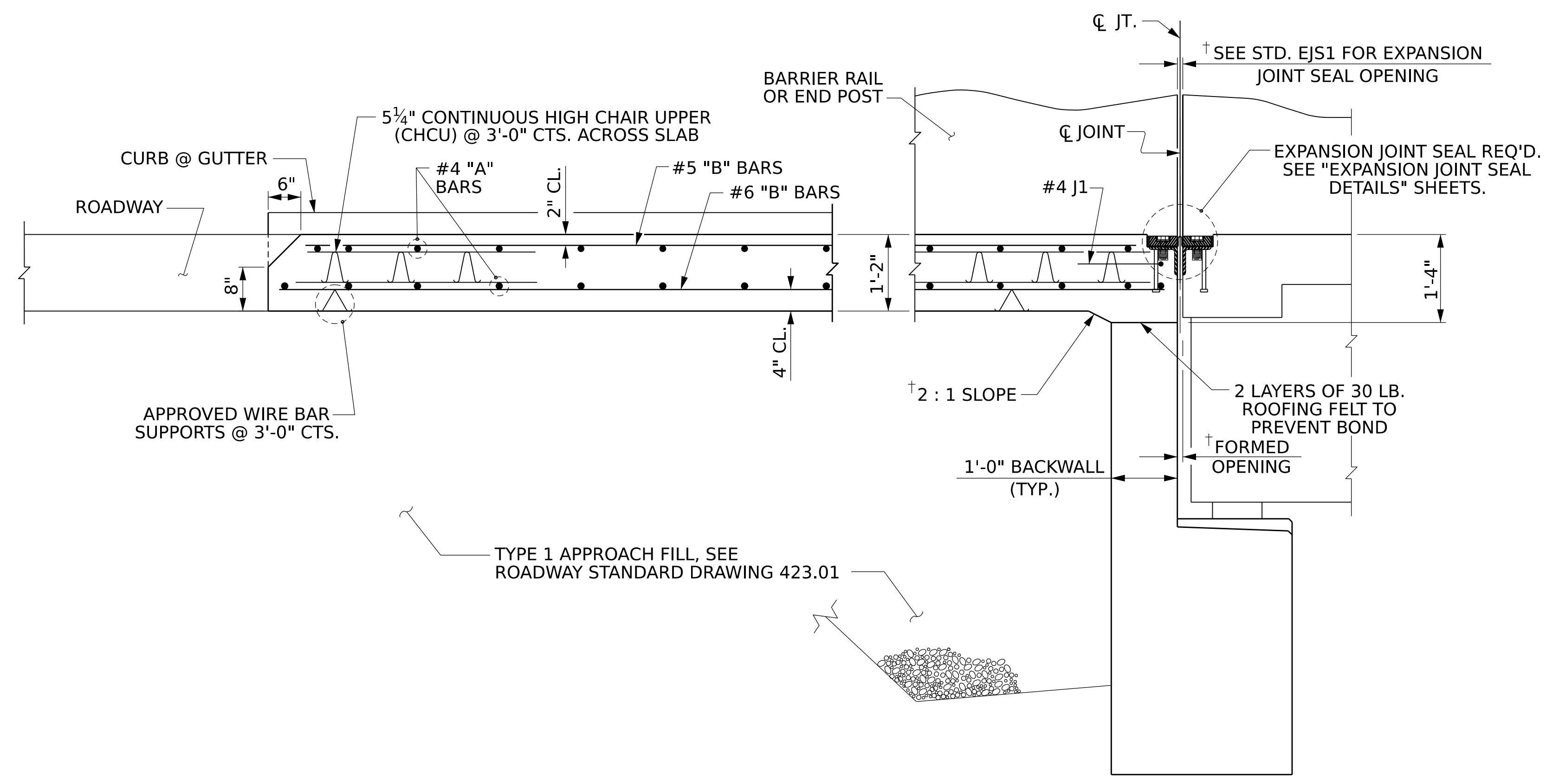


Designed by:
Kyle Smiach
05A5008988E475

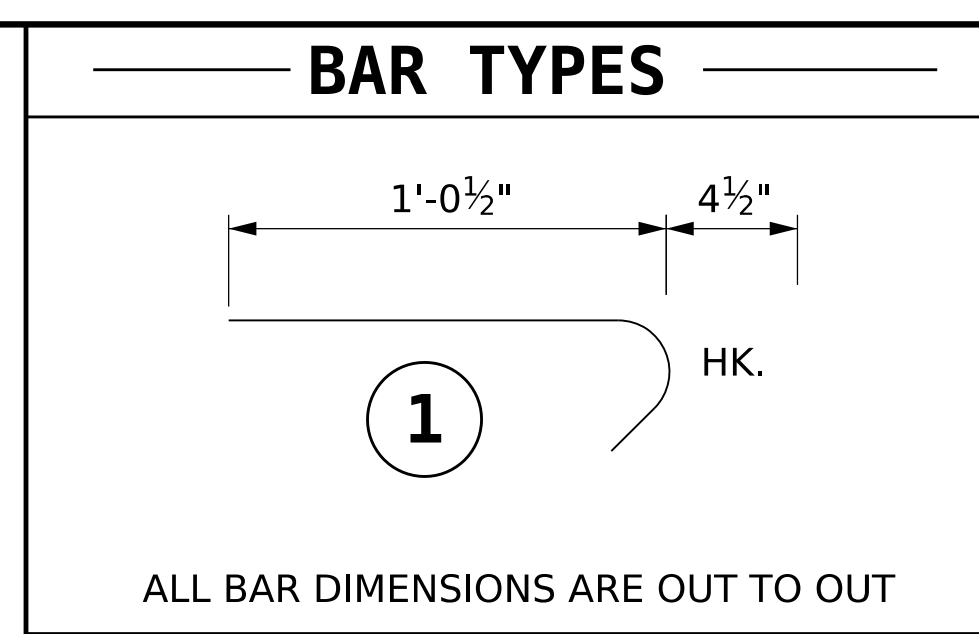
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT
STAGE II

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

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SECTION THRU SLAB



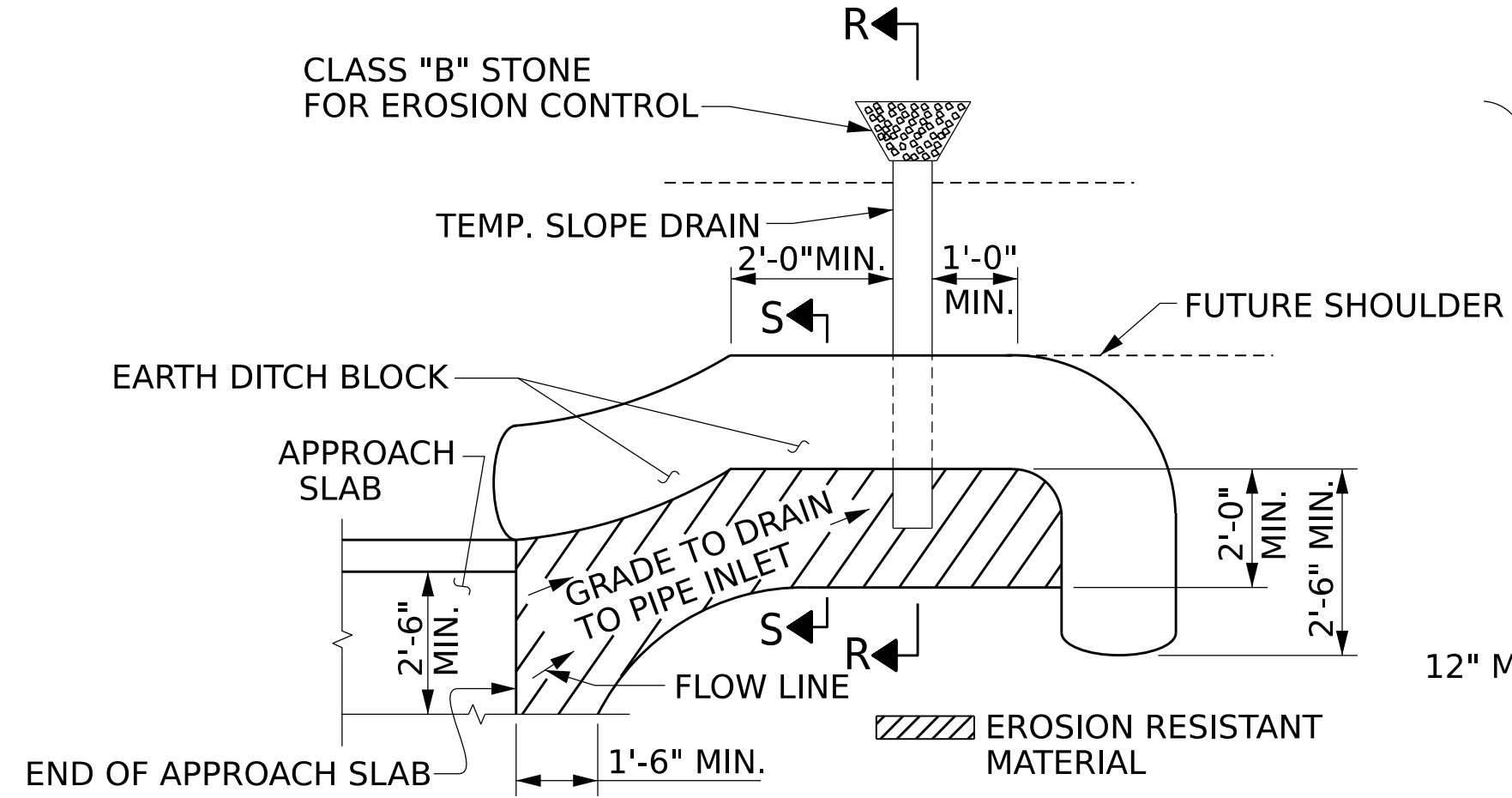
BILL OF MATERIAL						
FOR ONE APPROACH SLAB (2 REQ'D)						
STAGE I						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	50	#4	STR	19'-8"	657	
A2	52	#4	STR	19'-4"	672	
* B1	70	#5	STR	24'-2"	1764	
B2	70	#6	STR	24'-8"	2593	
* B3	2	#5	STR	9'-8"	20	
B4	2	#6	STR	9'-8"	29	
* J1	36	#4	1	1'-5"	34	
REINFORCING STEEL **				LBS.	3294	
* EPOXY COATED REINFORCING STEEL **				LBS.	2475	
CLASS AA CONCRETE				C.Y.	38.5	
STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A3	50	#4	STR	30'-6"	1019	
A4	52	#4	STR	30'-2"	1048	
* B1	112	#5	STR	24'-2"	2823	
B2	112	#6	STR	24'-8"	4150	
* B3	2	#5	STR	9'-8"	20	
B4	2	#6	STR	9'-8"	29	
* J1	58	#4	1	1'-5"	55	
REINFORCING STEEL **				LBS.	5227	
* EPOXY COATED REINFORCING STEEL **				LBS.	3917	
CLASS AA CONCRETE				C.Y.	61.6	

SPLICE LENGTHS

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

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 4 OF 4.

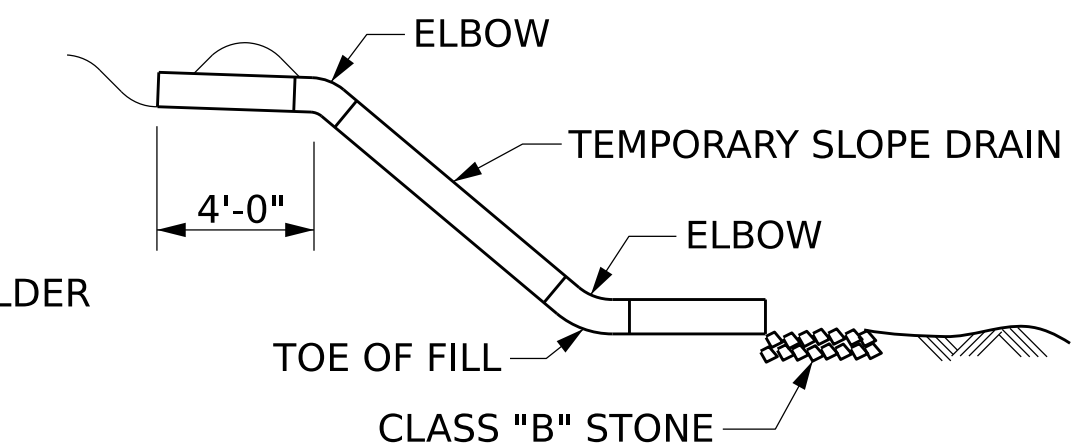
THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIALS IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



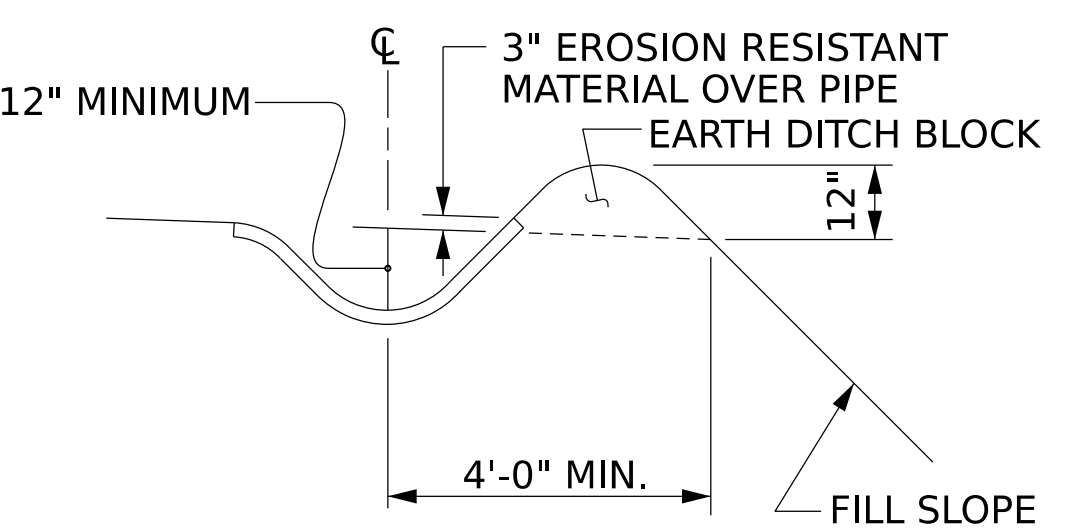
PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

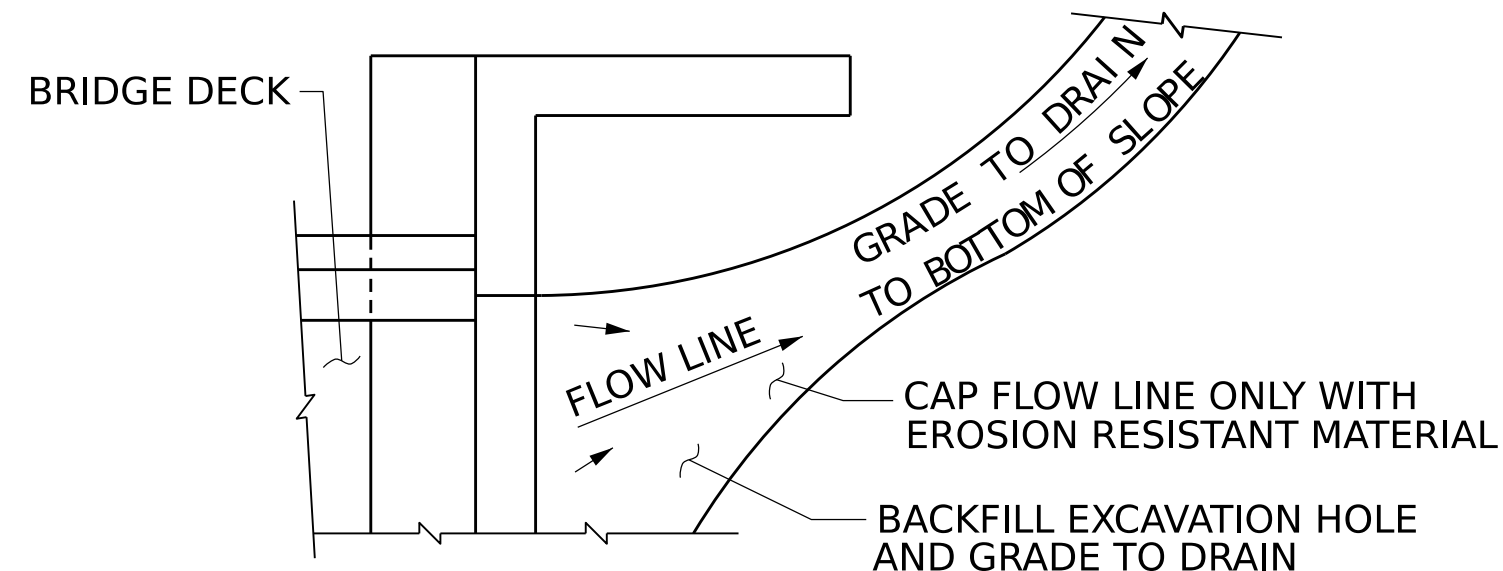
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION R-R



SECTION S-S



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



DRAWN BY : J.C. LASSITER	DATE : 12/2023
CHECKED BY : K.F. SMIACH	DATE : 03/2024
DESIGN ENGINEER OF RECORD: K.F. SMIACH	DATE : 03/2024



Designed by: Kyle Smiach

PROJECT NO. **B-5982**

HAYWOOD COUNTY

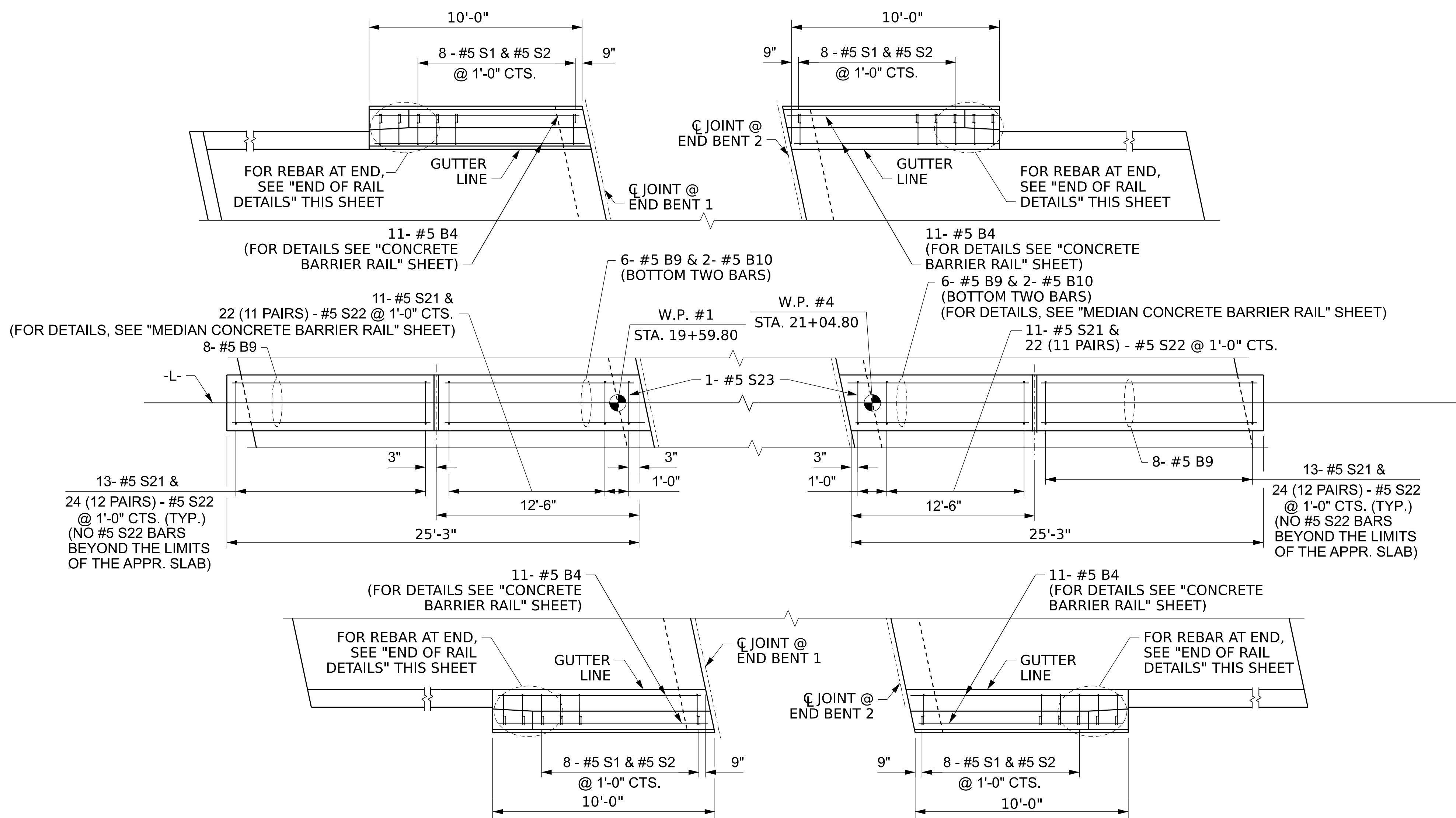
STATION: **20+37.51 -L-**

SHEET 3 OF 4

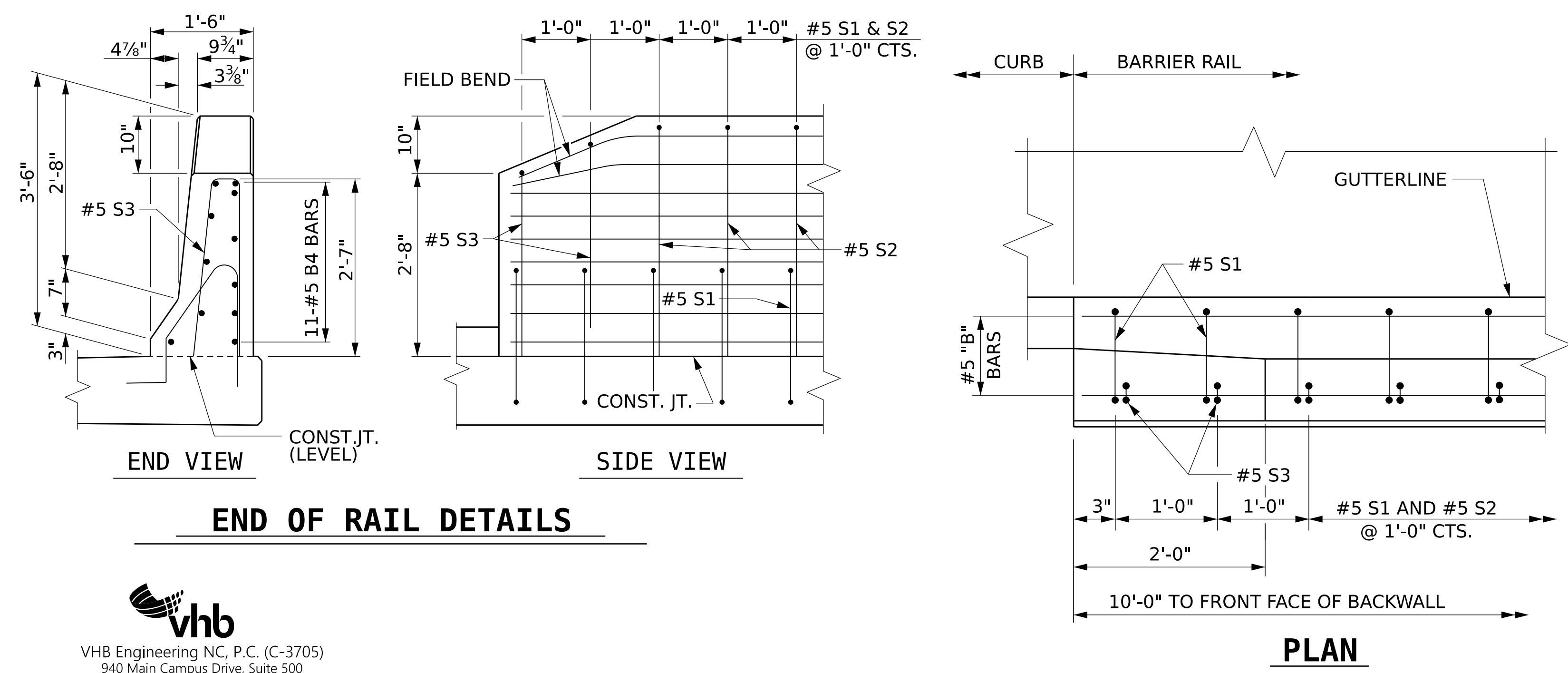
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB DETAILS

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-50
2			4			51

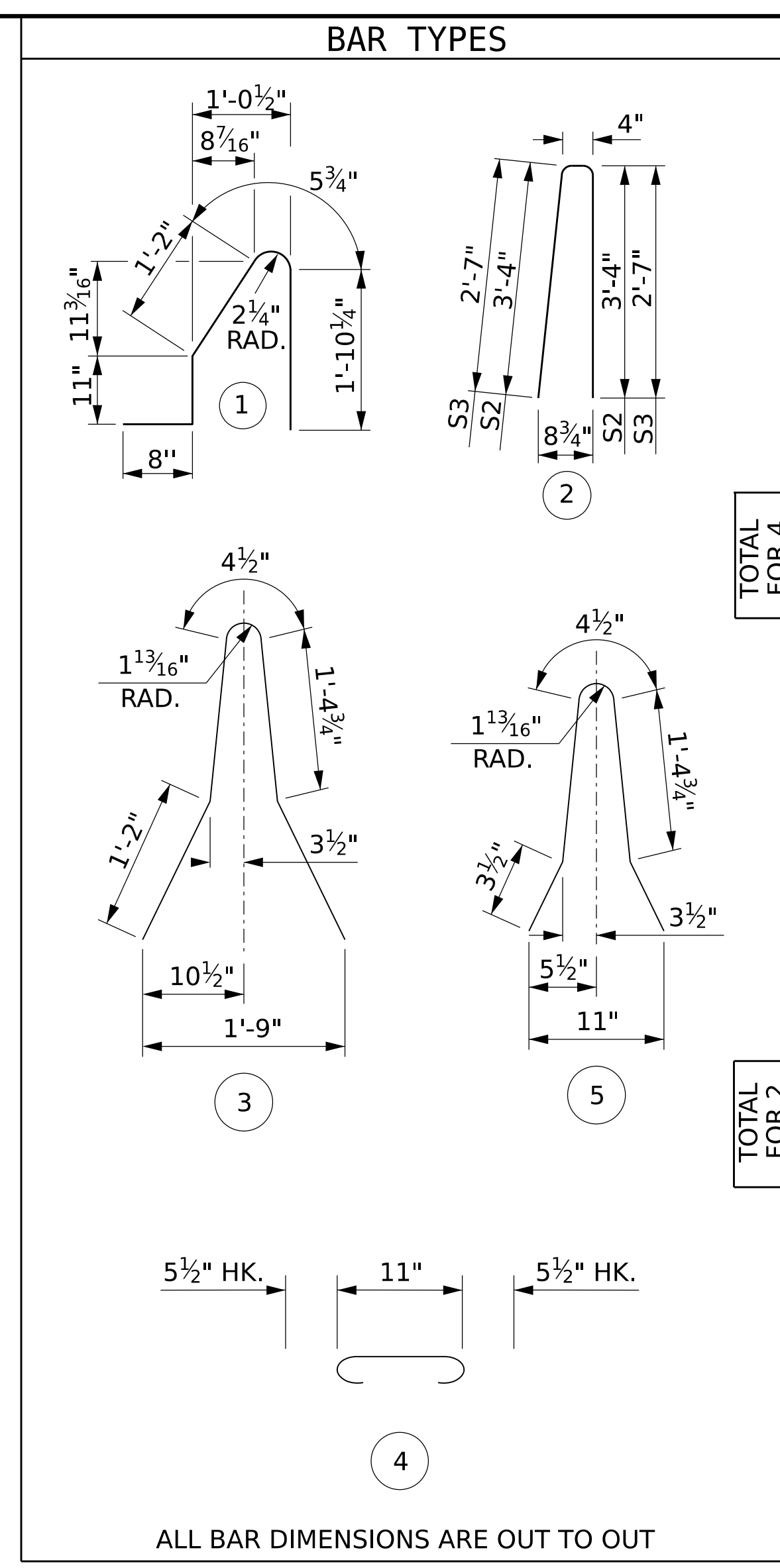


PLAN OF BARRIER RAILS AT APPROACH SLABS



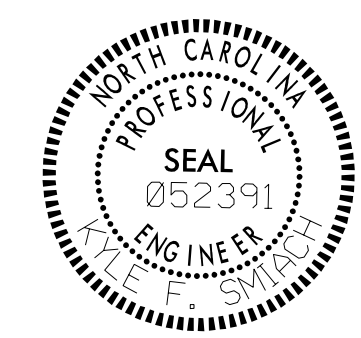
END OF RAIL DETAILS

PLAN



BILL OF MATERIAL					
CONCRETE BARRIER RAIL					
BARS FOR 1 APP. SLAB CONCRETE BARRIER RAIL CORNER (TYP. FOR 4 CORNERS)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B4	11	#5	STR	9'-8"	111
* S1	10	#5	1	5'-1"	53
* S2	8	#5	2	7'-0"	58
* S3	2	#5	2	5'-6"	11
TOTAL FOR 4					
* EPOXY COATED REINFORCING STEEL			932	LBS.	
CLASS AA CONCRETE			5.5	CU. YDS.	
CONCRETE BARRIER RAIL			40.0	LIN. FT.	
BILL OF MATERIAL					
MEDIAN CONCRETE BARRIER RAIL					
BARS FOR 1 APP. SLAB MEDIAN BARRIER RAIL (TYP. 2 SIDES)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B9	14	#5	STR	12'-3"	179
* B10	2	#5	STR	11'-4"	24
* S21	24	#5	3	5'-6"	138
* S22	46	#5	4	1'-10"	88
* S23	1	#5	5	3'-9"	4
TOTAL FOR 2					
* EPOXY COATED REINFORCING STEEL			866	LBS.	
CLASS AA CONCRETE			5.2	CU. YDS.	
MEDIAN BARRIER RAIL			50.5	LIN. FT.	

PROJECT NO. **B-5982**
HAYWOOD COUNTY
 STATION: **20+37.51 -L-**
 SHEET 4 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BRIDGE APPROACH SLAB BARRIER RAIL DETAIL

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

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S-51	TOTAL SHEETS	51
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DRAWN BY : **D.E. MORRISSETTE** DATE : **12/2023**
 CHECKED BY : **K.F. SMIACH** DATE : **05/2024**
 DESIGN ENGINEER OF RECORD: **K.F. SMIACH** DATE : **05/2024**



STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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