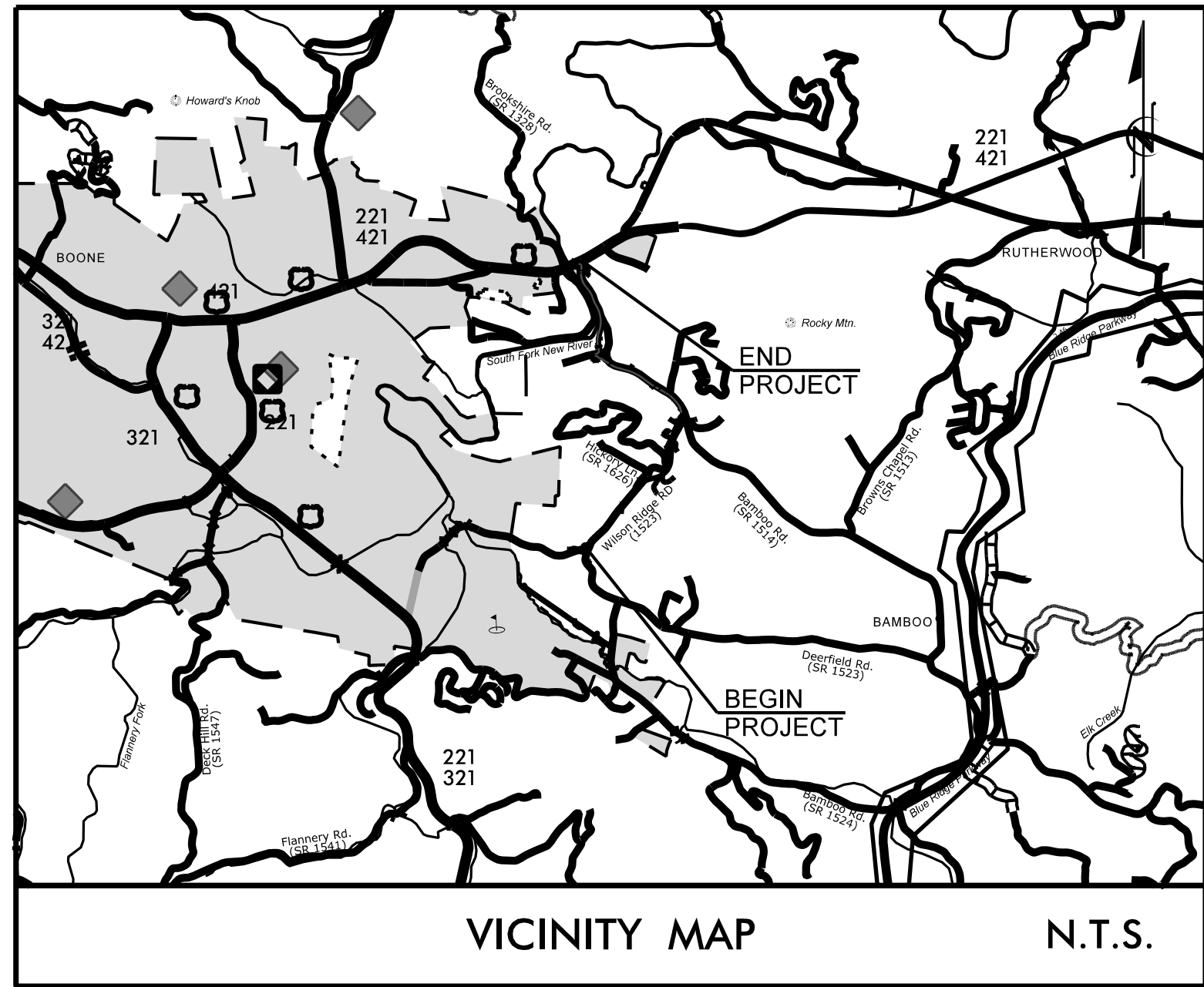


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PROJECT: U-5810

CONTRACT: C204504



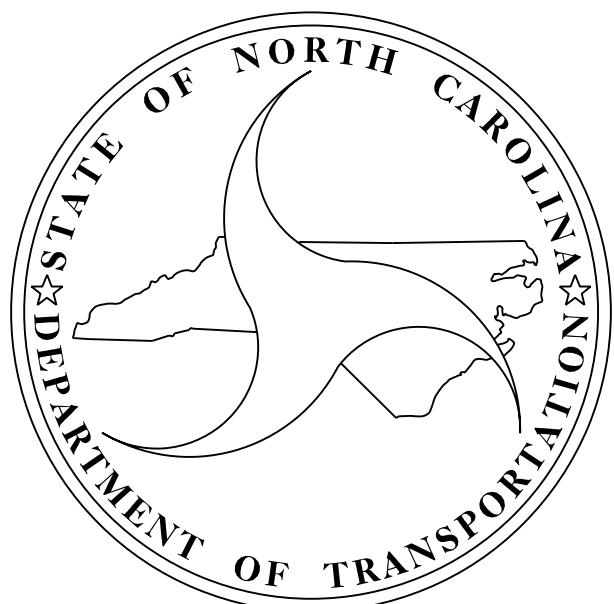
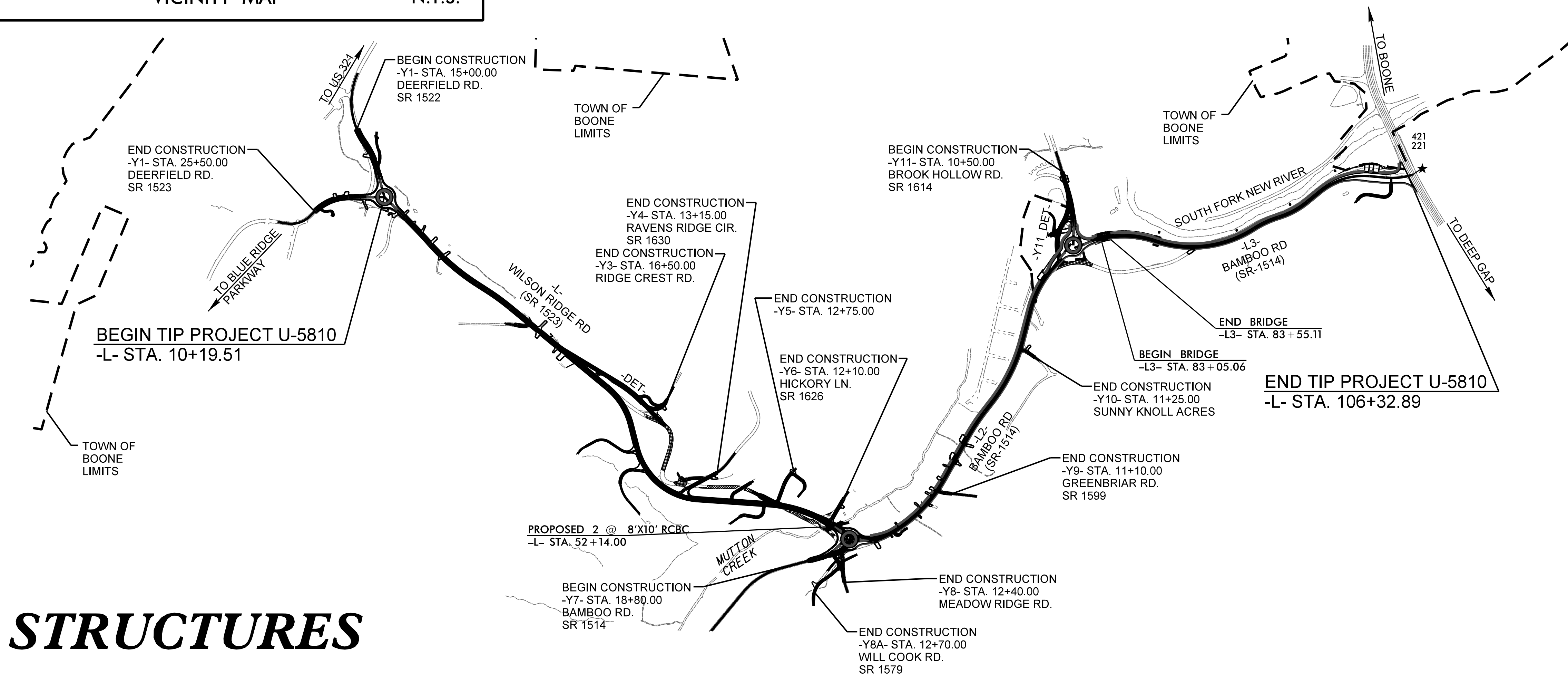
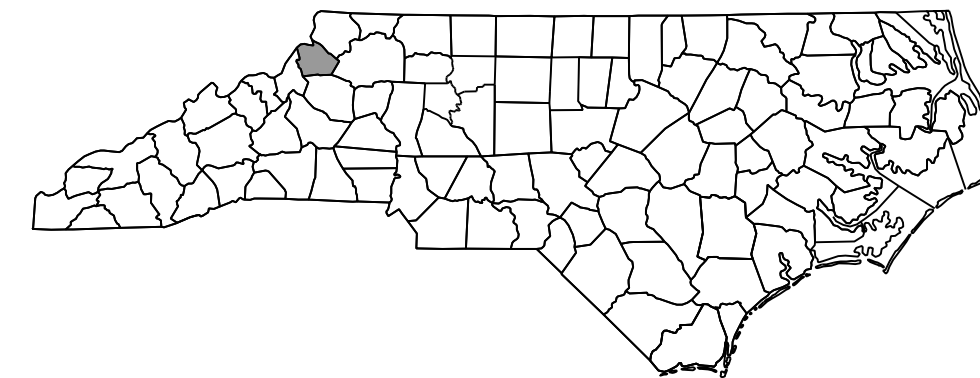
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

WATAUGA COUNTY

**LOCATION: SR 1514 (BAMBOO ROAD)/SR 1523 (WILSON RIDGE ROAD)
FROM SR 1522 (DEERFIELD ROAD) TO US421/US 221**

**TYPE OF WORK: GRADING, PAVING, WIDENING, DRAINAGE, STRUCTURES,
RETAINING WALL, SIGNALS, AND UTILITIES**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5810		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
44383.1.1		PE	
44383.2.1		RW	
44383.2.2		UTILITIES	
44383.3.1	443801	CONST.	



DESIGN DATA

ADT 2026 = 12,700
ADT 2046 = 17,800
V = 40 MPH
DHV = 9%
D = 60%
T = 4%*
* TTST = 2 % /* DUAL 2 %
FUNC CLASS = RURAL
MAJOR COLLECTOR
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5810 = 1.812 MILES
LENGTH STRUCTURE TIP PROJECT U-5810 = 0.009 MILES
TOTAL LENGTH TIP PROJECT U-5810 = 1.821 MILES

Prepared for the Office of:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2024 STANDARD SPECIFICATIONS

LETTING DATE :
AUGUST 18, 2026

Brandon McInnis, P.E.
PROJECT ENGINEER

Onidine J. Paitel, P.E.
PROJECT STRUCTURE ENGINEER

NCDOT CONTACT:
Hoang T. Dieu, P.E.

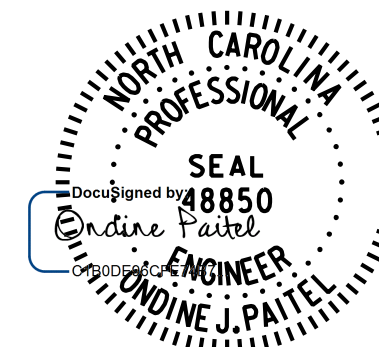
PLANS PREPARED BY:

RK&K

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8601 Six Forks Road, Forum 1 Suite 700
Raleigh, North Carolina 27615 | NC License No. F-0112

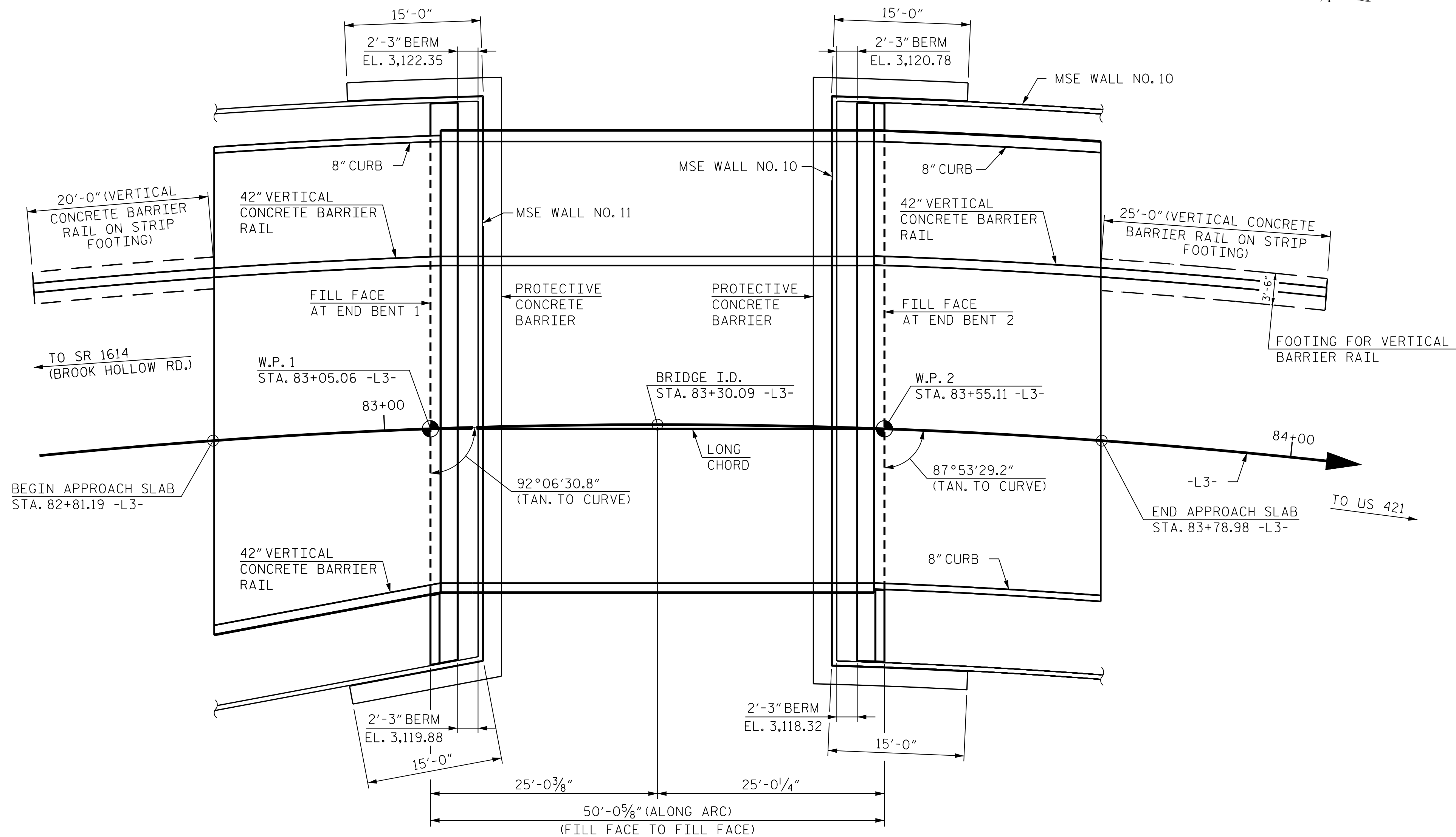
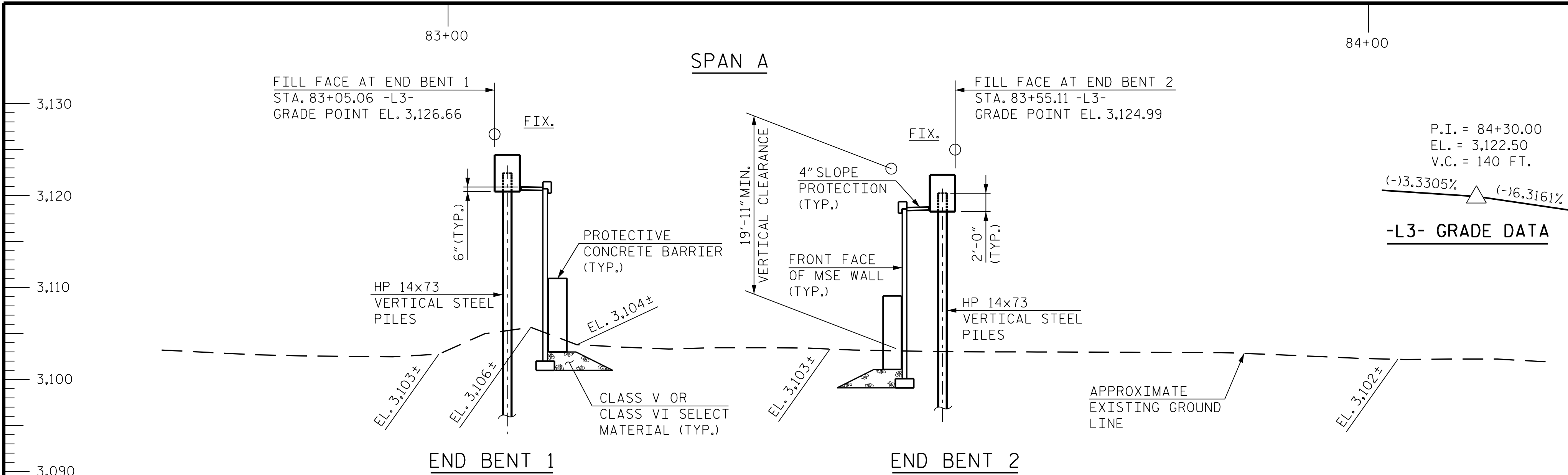
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4/16/2026

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2/6/2026 bgonfa



HORIZONTAL CURVE DATA -L3-

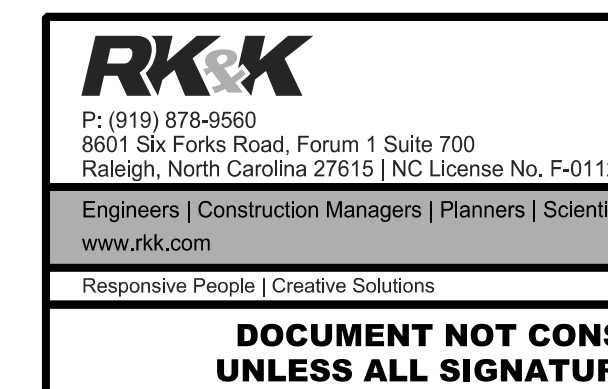
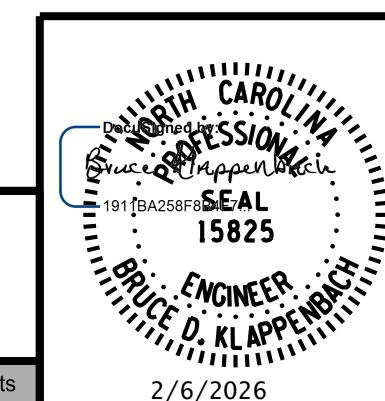
P.I. STA. 84+65.66 -L3-
Δ = 40°07'28.6" (RT.)
D = 8°25'33.1"
L = 476.21'
T = 248.34'
R = 680.00'

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 1 OF 5 BRIDGE NO. 940392

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1514
(BAMBOO RD) OVER RADFORD
QUARRIES BETWEEN
SR 1614 (BROOK HOLLOW RD)
AND US 421



DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

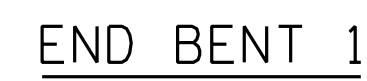
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
				TOTAL SHEETS	S-1
				30	

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND BRIDGE APPROACH FILL BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NO.1 AND END BENT NO.2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

INSTALL 3 SETTLEMENT HUBS AFTER CONSTRUCTING THE EMBANKMENT TO FINISHED GRADE AT END BENT NO.1 AND END BENT NO.2 IN THE SUBGRADE AT LOCATIONS CORRESPONDING TO THE CENTER OF THE APPROACH SLAB AND AT EACH CORNER OF THE END OF THE APPROACH SLAB. THE ENGINEER MAY RELEASE PILE DRIVING AFTER THE SETTLEMENT RATE IS LESS THAN 0.10" OVER 4 WEEKS. THE MONITORING PERIOD IS ESTIMATED TO BE 2 MONTHS.

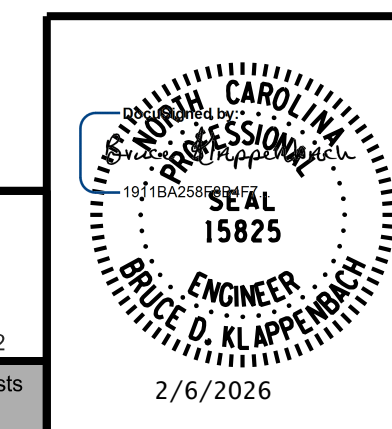


(DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES)

SHEET 2 OF 5

GENERAL DRAWING

FOUNDATION LAYOUT



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

DRAWN BY : B. H. GONFA DATE : JAN 2025
 CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
 DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

bgonfa 2/6/2026 R:\Structures\DCN\Final\Bridge\Final\U-5810_SMU_FL2_940392.dgn

SUMMARY OF PILE INFORMATION/INSTALLATION														
(BLANK ENTTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)														
	NUMBER OF PILES PER LINE	FACTORED RESISTANCE PER PILE	PILE CUT-OFF (TOP OF PILE) ELEVATION	ESTIMATED PILE LENGTH PER PILE	SCOUR CRITICAL ELEVATION	DRIVEN PILES			PREDRILLING FOR PILES *			DRILLED-IN PILES		
						MIN.PILE TIP (TIP NO HIGHER THAN) ELEV.	REQUIRED DRIVING RESISTANCE (RDR) ** PER PILE	TOTAL PILE REDRIVES QUANTITY	PREDRILLING LENGTH PER PILE	PREDRILLING ELEVATION (ELEV.NOT TO PREDRILL BELOW)	MAXIMUM PREDRILLING DIAMETER	PILE EXCAVATION BOTTOM OF HOLE) ELEV.	PILE EXCAVATION NOT IN SOIL PER PILE	PILE EXCAVATION IN SOIL PER PILE
		KIPS	FT.	FT.	FT.	FT.	KIPS	EA.	LIN.FT.	FT.	INCHES	FT.	LIN.FT.	LIN.FT.
END BENT 1	7	175	SEE SUBSTRUCTURE PLANS	60			510	-						
END BENT 2	7	175		60			510							

**DRILLING 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 = FACTORED RESISTANCE + FACTORED DRAG LOAD + FACTORED DEAD LOAD _____ + NOMINAL DRAG LOAD RESISTANCE + NOMINAL RESISTANCE FROM SCOURABLE MATERIAL
DYNAMIC RESISTANCE FACTOR

NOTES:

1. THE PILE FOUNDATION TABLES ARE BASED ON THE BRIDGE SUBSTRUCTURE DESIGN AND FOUNDATION RECOMMENDATIONS SEALED BY A NORTH CAROLINA PROFESSIONAL ENGINEER (THOMAS J. DAILY, PE*045672) ON 08/13/2025.
2. 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.
3. THE ENGINEER MAY ADJUST THE QUANTITY OF DPT TESTING AND PIPE PILE PLATES WHEN NECESSARY.

PILE DESIGN INFORMATION						
(BLANK ENTTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)						
	FACTORED AXIAL LOAD PER PILE	FACTORED DRAG LOAD PER PILE	FACTORED DEAD LOAD *	DYNAMIC RESISTANCE FACTOR	NOMINAL DRAG RESISTANCE PER PILE	NOMINAL SCOUR RESISTANCE PER PILE
	KIPS	KIPS	KIPS		KIPS	KIPS
END BENT 1, PILES 1-7	175	84	2	0.6	67	
END BENT 2, PILES 1-7	175	84	2	0.6	67	

*FACTORED DEAD LOAD IS FACTORED WEIGHT OF PILE ABOVE THE GROUND LINE.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 3 OF 5

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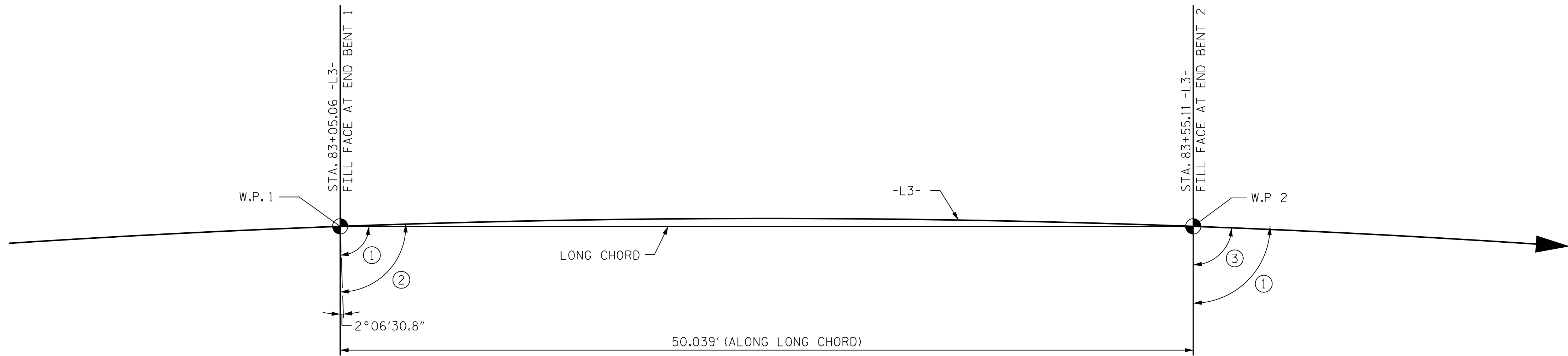
STATE OF NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
15825
BRUCE D. KLAPPENBACH

2/6/2026

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE FOUNDATION
TABLES

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



LONG CHORD LAYOUT
NOTE: END BENTS ARE PARALLEL

ANGLES

- ① 90°00'00" (TO LONG CHORD)
- ② 92°06'30.8" (TAN. TO CURVE)
- ③ 87°53'29.2" (TAN. TO CURVE)

HORIZONTAL CURVE DATA -L3-

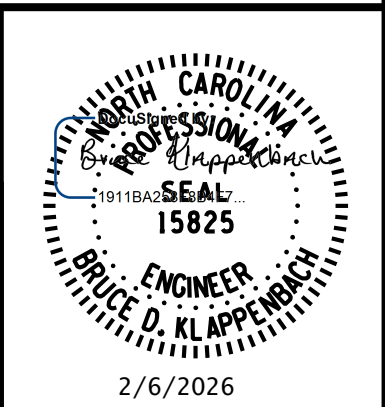
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 Δ = 40°07'28.6" (RT)
D = 8°25'33.1"
L = 476.21'
T = 248.34'
R = 680.00'

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
LONG CHORD LAYOUT

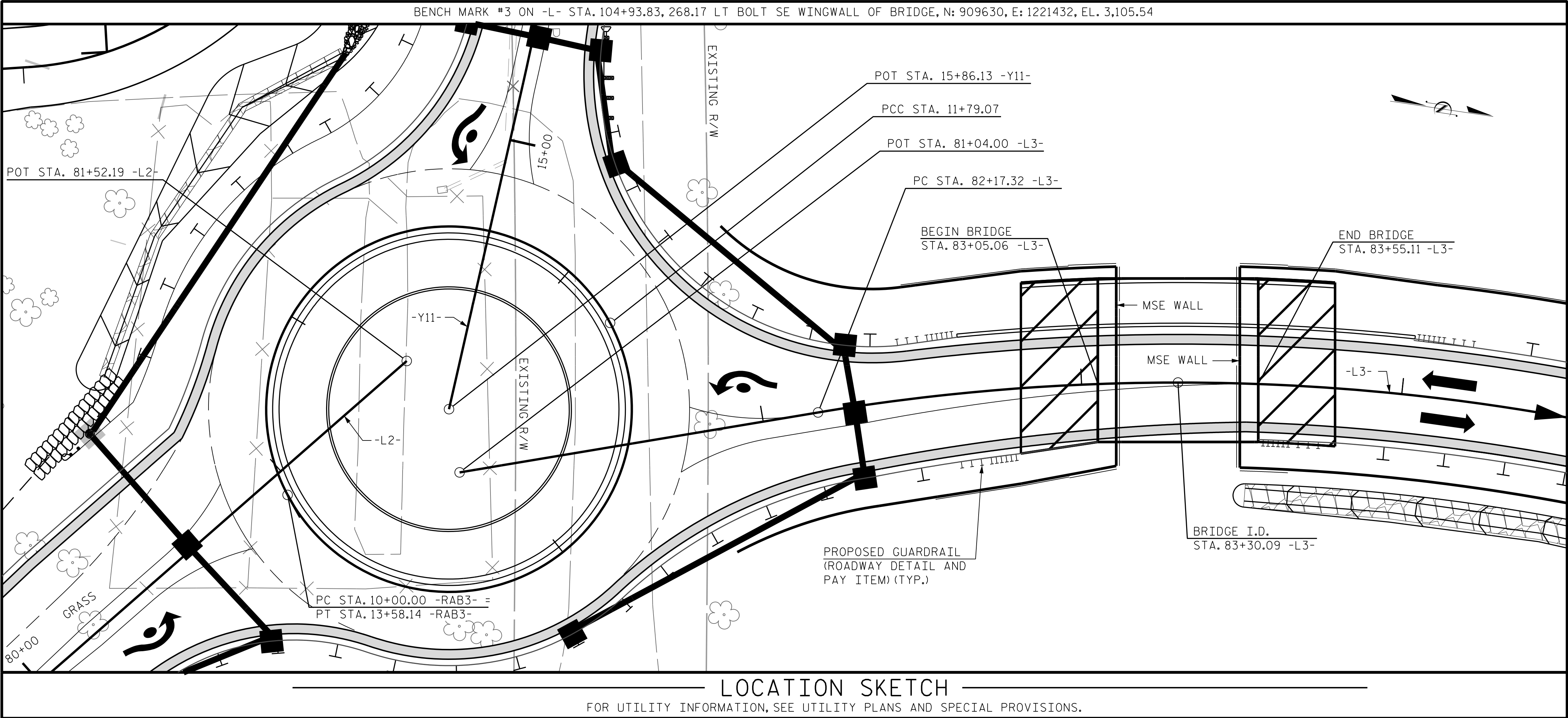
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			30

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2/6/2026
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TOTAL BILL OF MATERIAL																
	CONCRETE WEARING SURFACE	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 14 x 73 STEEL PILES	HP 14 X 73 STEEL PILES		TWO BAR METAL RAIL	VERTICAL CONCRETE BARRIER RAIL	1'-2" x 2'-9 3/4" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLABS	VERTICAL CONCRETE BARRIER RAIL ON STRIP FOOTING	PROTECTIVE CONCRETE BARRIER
	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	EA.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LUMP SUM	NO.	LIN. FT.	LIN. FT.
SUPERSTRUCTURE	2,278	3,098							40.29	170.98	47.79	-	LUMP SUM	17	812.46	45.00
END BENT 1			28.4		4,111	7	7	420				15.4				92.69
END BENT 2			28.8		4,101	7	7	420				15.4				92.17
TOTAL	2,278	3,098	57.2	LUMP SUM	8,212	14	14	840	40.29	170.98	47.79	30.8	LUMP SUM	17	812.46	184.86



GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

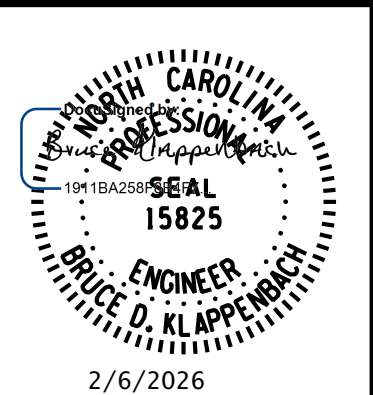
FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

FOR CORED SLAB AND BOX BEAM POST TENSIONING, SEE SPECIAL PROVISIONS.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
LOCATION SKETCH, TOTAL
BILL OF MATERIAL AND
GENERAL NOTES



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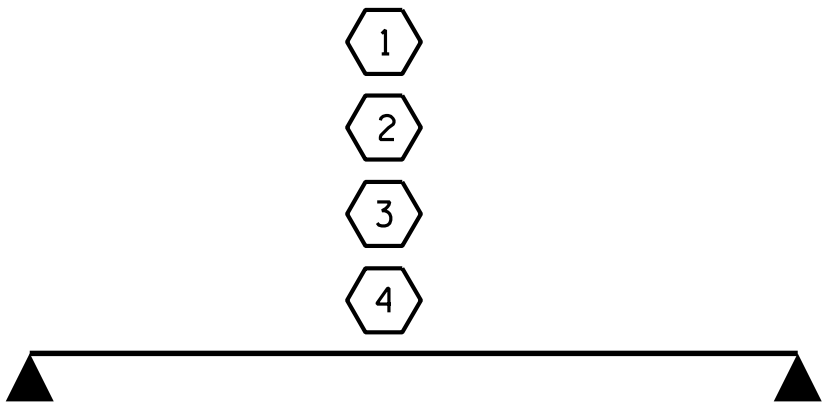
DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

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

TOTAL SHEETS
30

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2/6/2026
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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER	
							LIVE-LOAD FACTORS (γLL)	MOMENT				SHEAR				LIVE-LOAD FACTORS (γLL)	MOMENT							
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)
DESIGN LOAD		HL-93 (INVENTORY)	N/A	①	1.54	--	1.75	0.260	1.54	A	ER	23.4	0.286	3.43	A	ER	1.5	0.80	0.260	1.68	A	ER	23.4	--
		HL-93 (OPERATING)	N/A		2.00	--	1.35	0.260	2.00	A	ER	23.4	0.286	4.48	A	ER	1.5	N/A	--	--	--	--	--	--
		HS-20 (INVENTORY)	36.000	②	1.91	68.760	1.75	0.260	1.91	A	ER	23.4	0.286	4.11	A	ER	1.5	0.80	0.260	2.08	A	ER	23.4	--
		HS-20 (OPERATING)	36.000		2.47	88.920	1.35	0.260	2.47	A	ER	23.4	0.286	5.36	A	ER	1.5	N/A	--	--	--	--	--	--
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		4.16	56.160	1.4	0.260	4.77	A	ER	23.4	0.286	11.76	A	ER	1.5	0.80	0.260	4.16	A	ER	23.4	--
		SNGARBS2	20.000		3.31	66.200	1.4	0.260	3.80	A	ER	23.4	0.286	8.54	A	ER	1.5	0.80	0.260	3.31	A	ER	23.4	--
		SNAGRIS2	22.000		3.24	71.280	1.4	0.260	3.69	A	ER	23.4	0.286	8.01	A	ER	1.5	0.80	0.260	3.24	A	ER	23.4	--
		SNCOTTS3	27.250		2.08	56.680	1.4	0.260	2.38	A	ER	23.4	0.286	5.82	A	ER	1.5	0.80	0.260	2.08	A	ER	23.4	--
		SNAGGRS4	34.925		1.82	63.564	1.4	0.260	2.08	A	ER	23.4	0.286	4.97	A	ER	1.5	0.80	0.260	1.82	A	ER	23.4	--
		SNS5A	35.550		1.77	62.924	1.4	0.260	2.03	A	ER	23.4	0.286	5.12	A	ER	1.5	0.80	0.260	1.77	A	ER	23.4	--
		SNS6A	39.950		1.66	66.317	1.4	0.260	1.90	A	ER	23.4	0.286	4.73	A	ER	1.5	0.80	0.260	1.66	A	ER	23.4	--
		SNS7B	42.000	③	1.58	66.360	1.4	0.260	1.81	A	ER	23.4	0.286	4.73	A	ER	1.5	0.80	0.260	1.58	A	ER	23.4	--
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		2.03	66.990	1.4	0.260	2.33	A	ER	23.4	0.286	5.59	A	ER	1.5	0.80	0.260	2.03	A	ER	23.4	--
		TNT4A	33.075		2.05	67.804	1.4	0.260	2.36	A	ER	23.4	0.286	5.38	A	ER	1.5	0.80	0.260	2.05	A	ER	23.4	--
		TNT6A	41.600		1.72	71.552	1.4	0.260	1.97	A	ER	23.4	0.286	5.19	A	ER	1.5	0.80	0.260	1.72	A	ER	23.4	--
		TNT7A	42.000		1.75	73.500	1.4	0.260	2.00	A	ER	23.4	0.286	4.81	A	ER	1.5	0.80	0.260	1.75	A	ER	23.4	--
		TNT7B	42.000		1.82	76.440	1.4	0.260	2.09	A	ER	23.4	0.286	4.55	A	ER	1.5	0.80	0.260	1.82	A	ER	23.4	--
		TNAGRIT4	43.000		1.73	74.390	1.4	0.260	1.98	A	ER	23.4	0.286	4.38	A	ER	1.5	0.80	0.260	1.73	A	ER	23.4	--
		TNAGT5A	45.000		1.61	72.450	1.4	0.260	1.85	A	ER	23.4	0.286	4.46	A	ER	1.5	0.80	0.260	1.61	A	ER	23.4	--
		TNAGT5B	45.000		1.58	71.100	1.4	0.260	1.81	A	ER	23.4	0.286	4.15	A	ER	1.5	0.80	0.260	1.58	A	ER	23.4	--
EMERGENCY VEHICLE (EV)		EV2	28.750		2.37	68.138	1.3	0.260	2.93	A	ER	23.4	0.286	6.45	A	ER	1.5	0.80	0.260	2.37	A	ER	23.4	--
		EV3	43.000	④	1.53	65.790	1.3	0.260	1.89	A	ER	23.4	0.286	4.31	A	ER	1.5	0.80	0.260	1.53	A	ER	23.4	--



LRFR SUMMARY
FOR SPAN "A"

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.

2.

3.

4.

⬡ CONTROLLING LOAD RATING

⬡1 DESIGN LOAD RATING (HL-93)

⬡2 DESIGN LOAD RATING (HS-20)

⬡3 LEGAL LOAD RATING **

⬡4 EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

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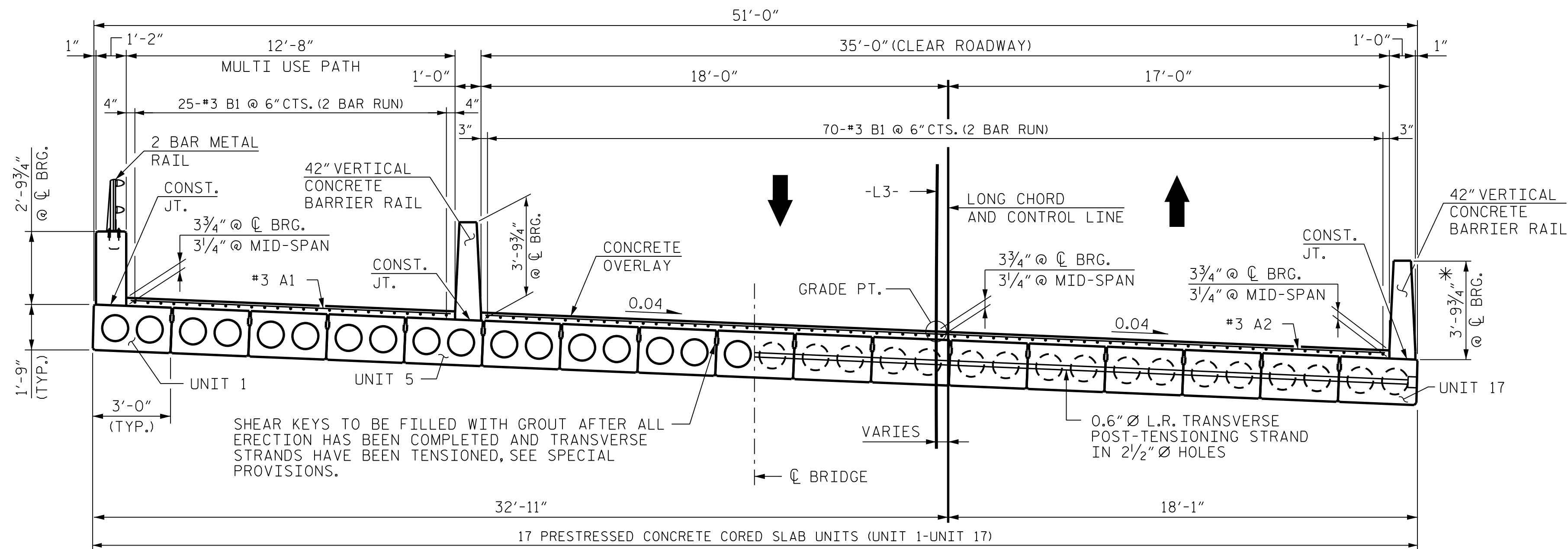
DOCUMENT NOT CONSIDERED FINAL
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STATE OF NORTH CAROLINA
PROFESSIONAL
SEAL
15825
ENGINEER
BRUCE D. KLAPPENBACH
2/6/2026

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR
PRESTRESSED CONCRETE
CORED SLAB UNIT
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-6 TOTAL SHEETS 30
2			4			

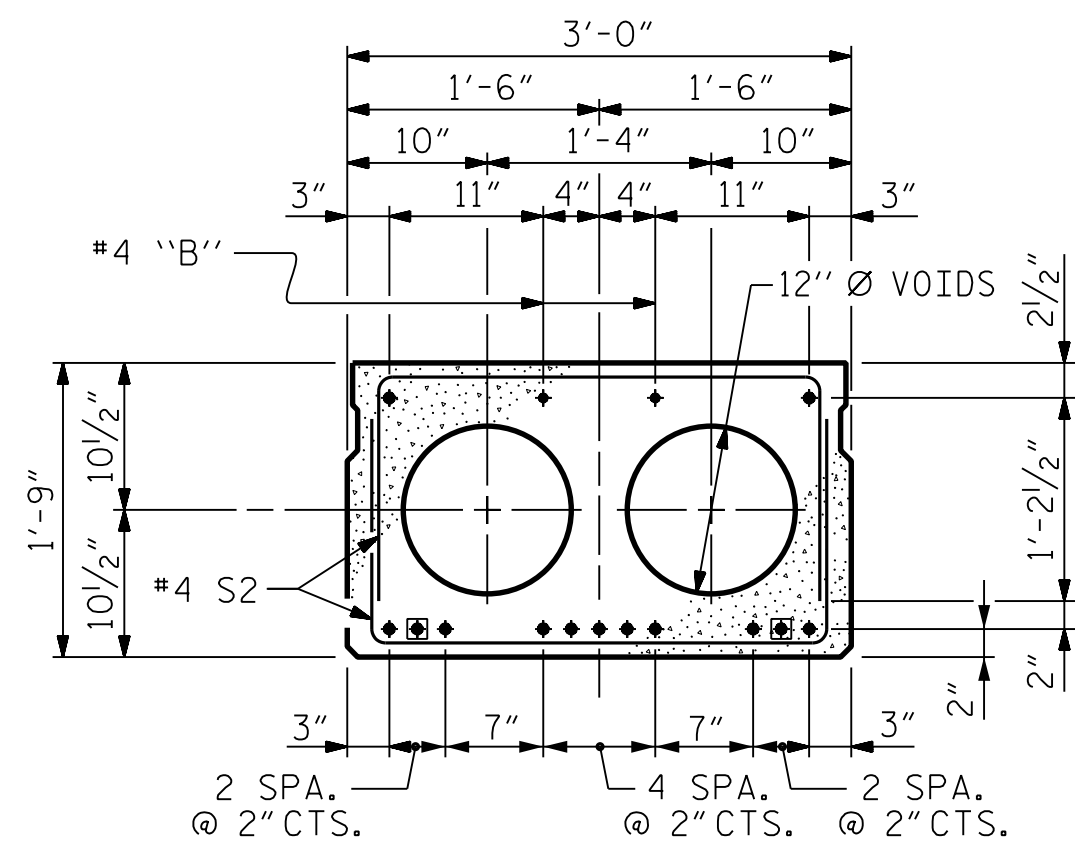


HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

* - THE MAXIMUM BARRIER RAIL AND PARAPET HEIGHT AND CONCRETE THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND PARAPET AND CONCRETE THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL AND PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND CONCRETE THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL AND "CONCRETE PARAPET AND END POST DETAIL" SHEET



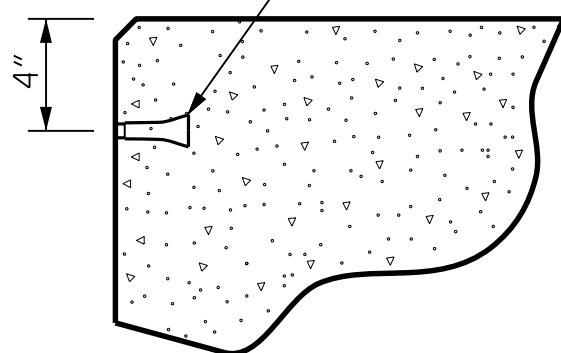
INTERIOR SLAB SECTION
(13 STRANDS REQUIRED)

0.6 Ø LOW RELAXATION STRAND LAYOUT

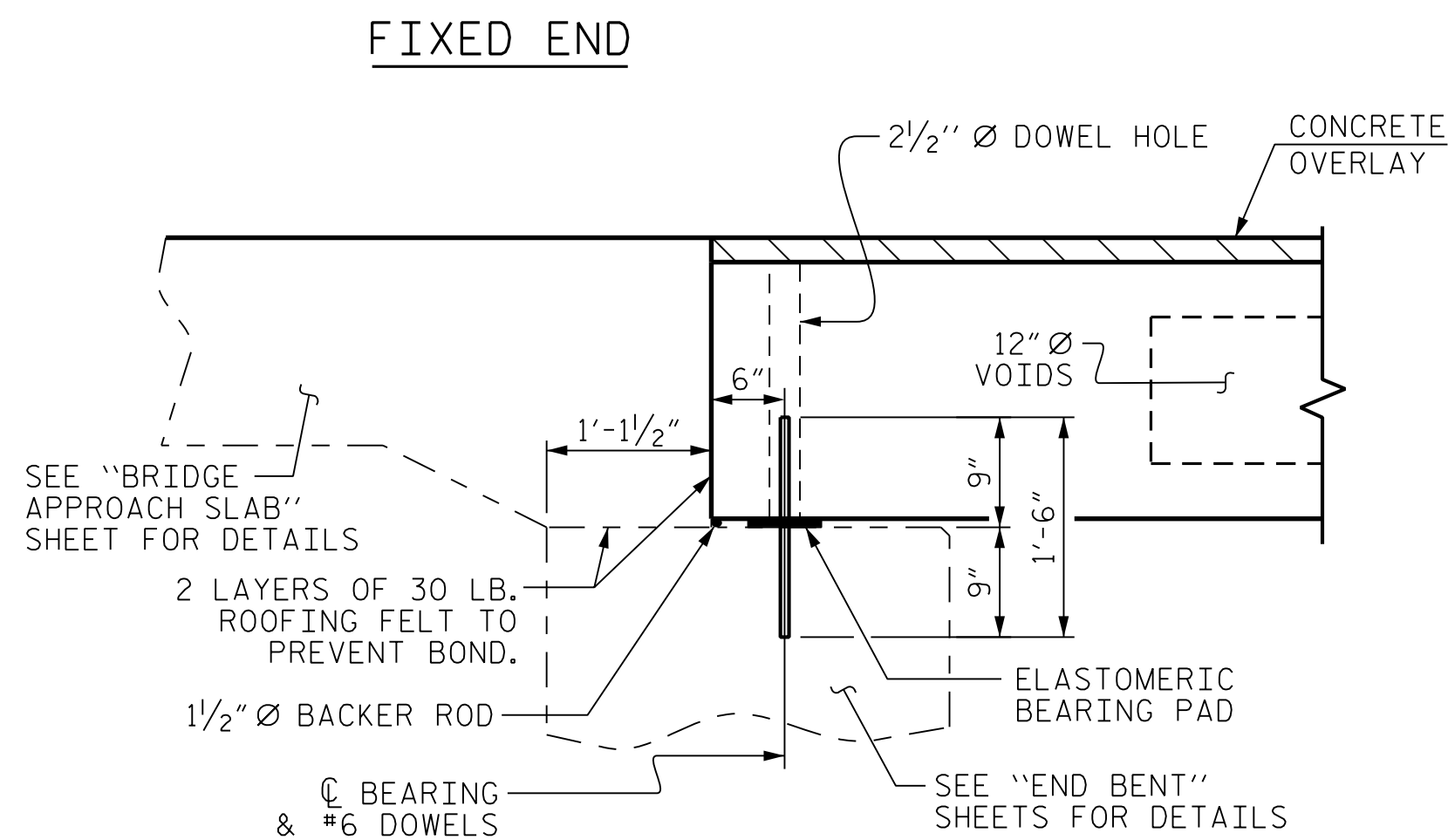
■ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

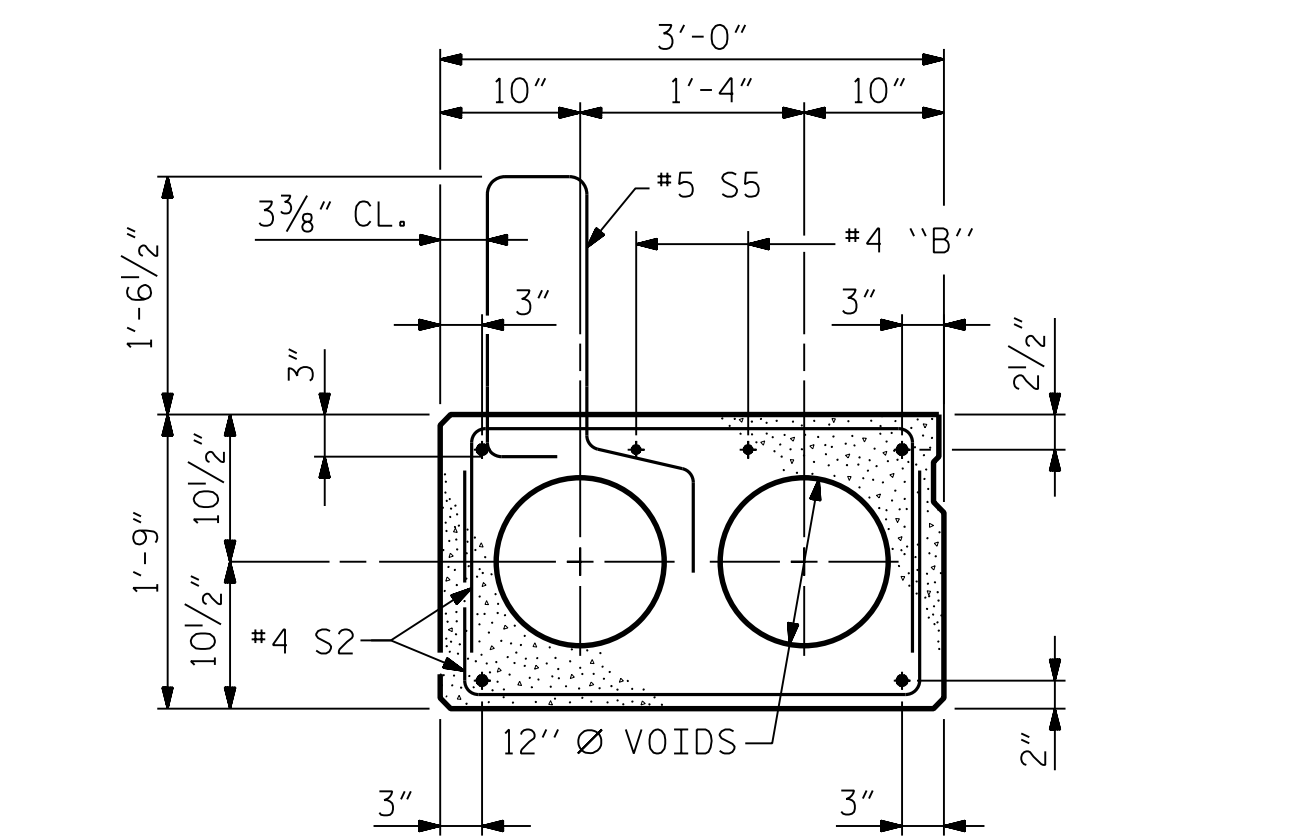
PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED 3/8" SIZE TO BE DETERMINED BY CONTRACTOR.



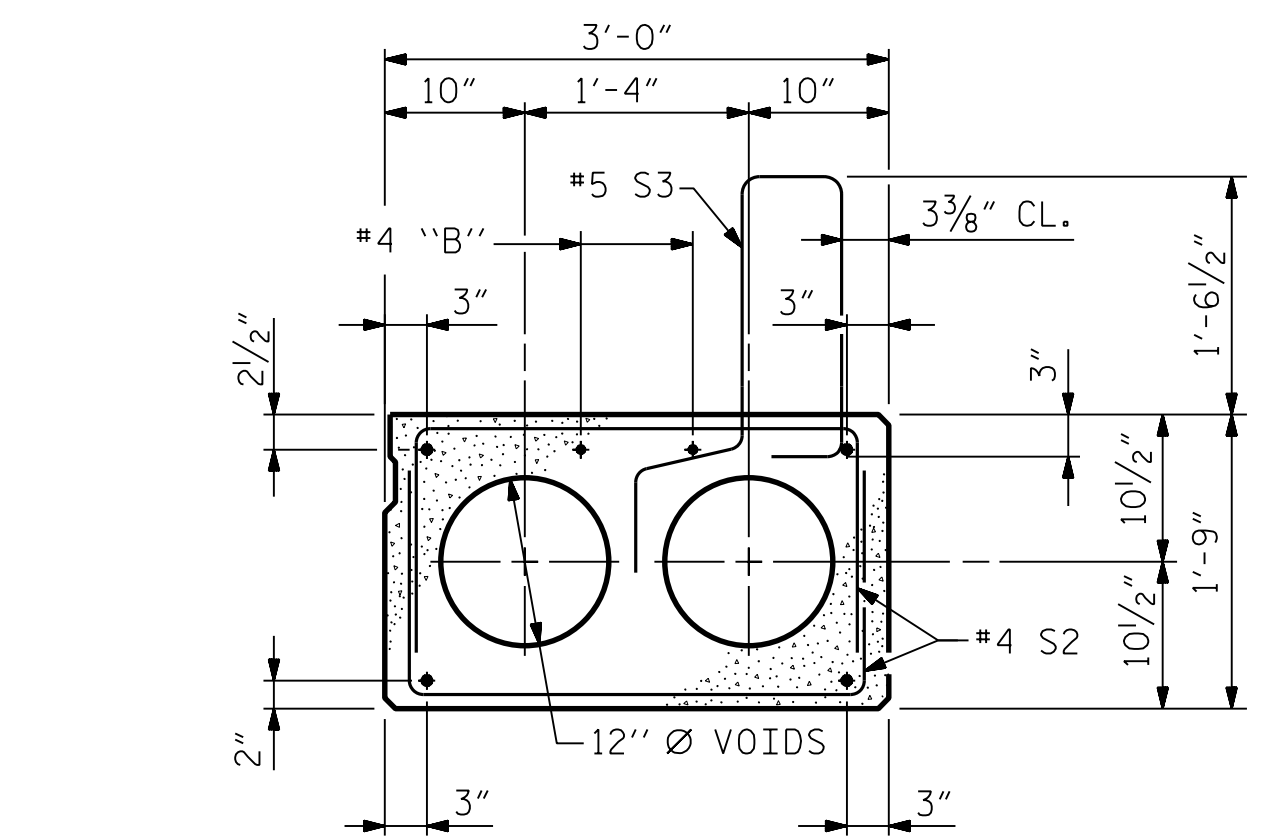
THREADED INSERT DETAIL



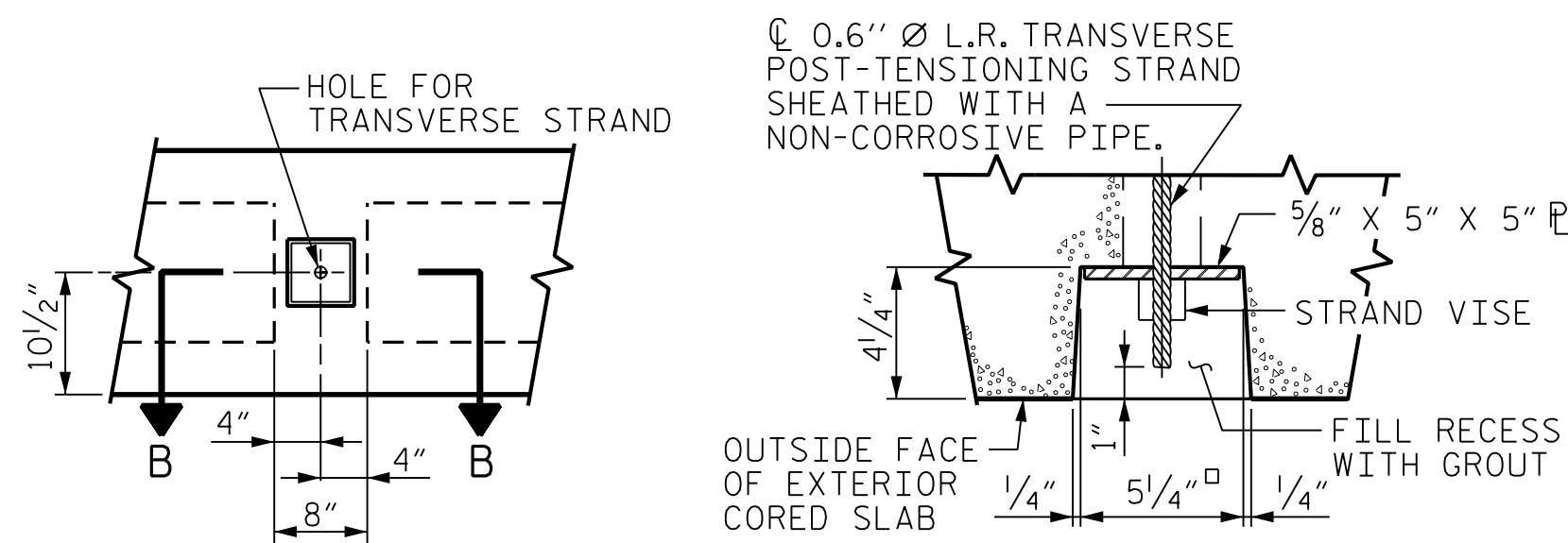
SECTION AT END BENT



EXT. SLAB SECTION (UNIT 1)
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



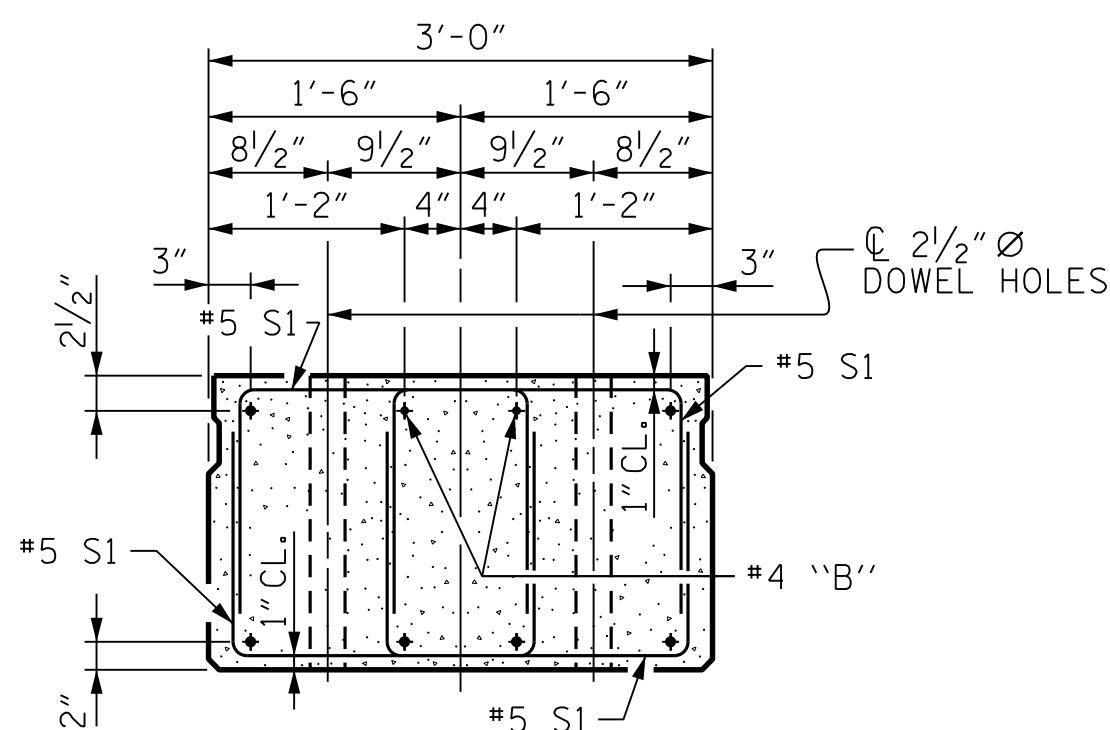
SLAB SECTION (UNIT 5 AND 17)
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



ELEVATION VIEW

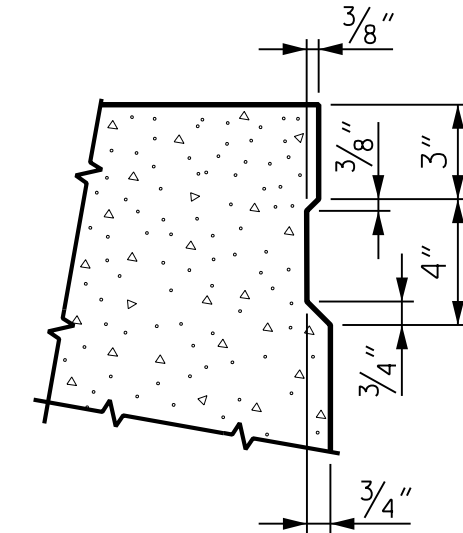
SECTION B-B

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



END ELEVATION

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



SHEAR KEY DETAIL

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

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15825
ENGINEER
BRUCE D. KLAPPENBACH
2/6/2026

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 1 OF 4

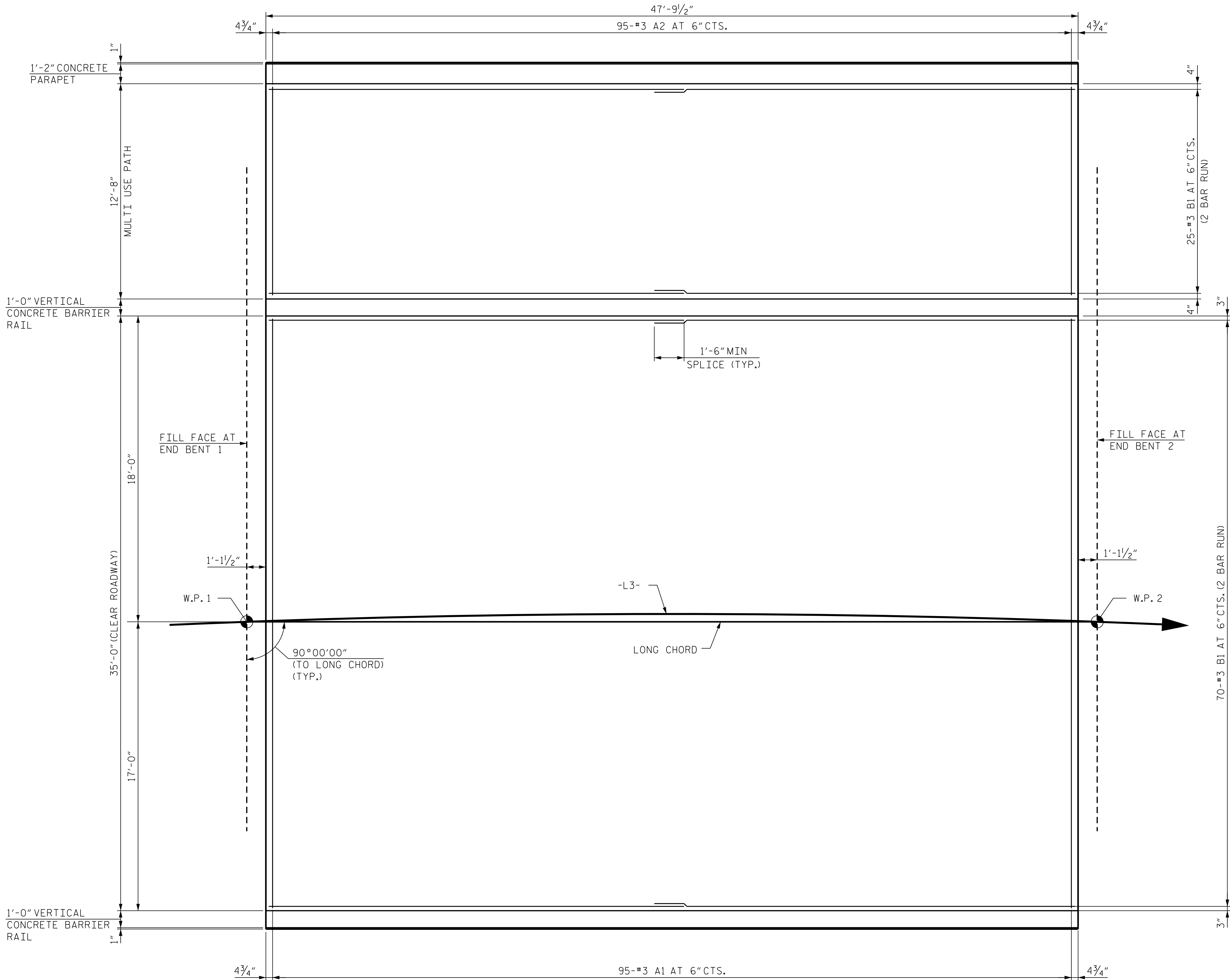
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

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

DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

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2/6/2026
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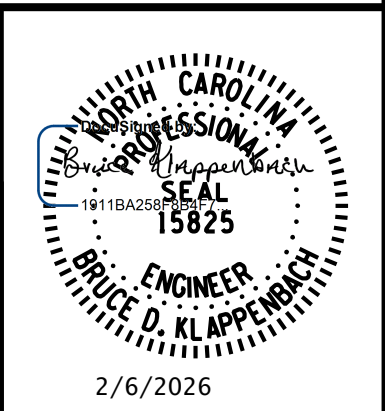


PLAN OF REINFORCED CONCRETE WEARING SURFACE

NOTE: PLACEMENT OF THE CONCRETE OVERLAY SHALL OCCUR AFTER CASTING THE CONCRETE PARAPET AND BARRIER RAILS. THE COST OF THE REINFORCING STEEL CAST WITH CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

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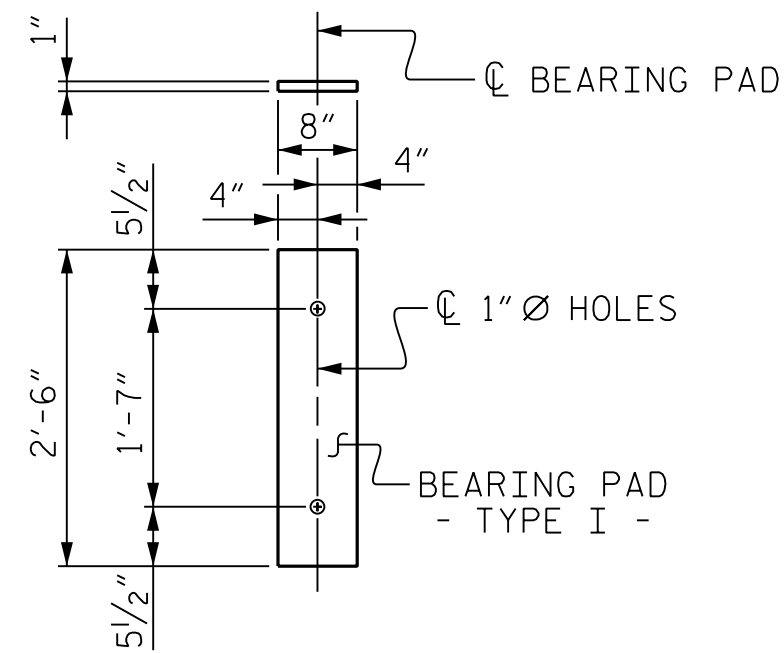


BILL OF MATERIAL					
FOR CONCRETE WEARING SURFACE					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	95	#3	STR.	34'-8	1,238
* A2	95	#3	STR.	12'-4"	441
* B1	190	#3	STR.	24'-6"	1,750
* EPOXY COATED REINFORCING STEEL				LBS.	3,429
CLASS AA CONCRETE				C. Y.	26.4
CONCRETE WEARING SURFACE				SQ. FT.	2,278

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 3 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
REINFORCING FOR CONCRETE WEARING SURFACE					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					TOTAL SHEETS 30



FIXED END
(TYPE I - 34 REQ' D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL *						
BAR	BARS FOR 1 UNIT (2 REQUIRED) (FOR UNIT 5 OR UNIT 17)	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
*B14	20	40	#5	STR	23'-6"	980
* S4	56	112	#5	2	7'-2"	837
* EPOXY COATED REINFORCING STEEL				LBS.		1,817
CLASS AA CONCRETE				CU.YDS.		12.4
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN.FT.		95.58

* NOTE: QUANTITIES FOR THE VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLAB ARE NOT INCLUDED. SEE BRIDGE APPROACH SLAB SHEET FOR DETAILS.

GUTTERLINE CONCRETE THICKNESS & RAIL HEIGHT		
	CONCRETE OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
47'-9 1/2" UNITS	3 1/4"	3'-9 1/4"

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 1'-9"
47'-9 1/2" CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	3/4" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/4" ↓
FINAL CAMBER	1/2" ↑

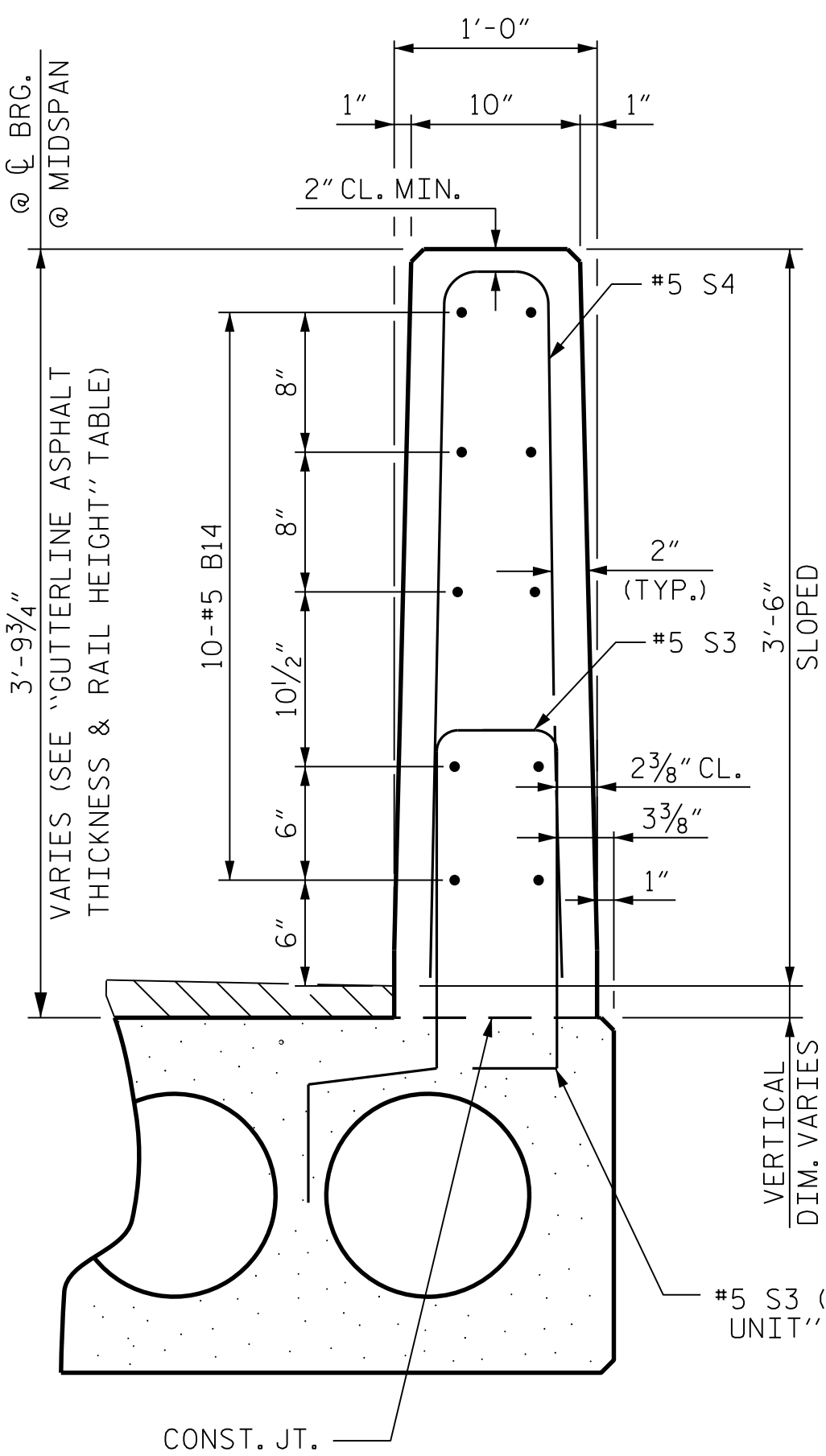
✱ INCLUDES FUTURE WEARING SURFACE

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
47'-9 1/2" UNIT			
EXTERIOR C.S.	2	47'-9 1/2"	95'-7"
INTERIOR C.S.	15	47'-9 1/2"	716'-10 1/2"
TOTAL	17		812'-5 1/2"

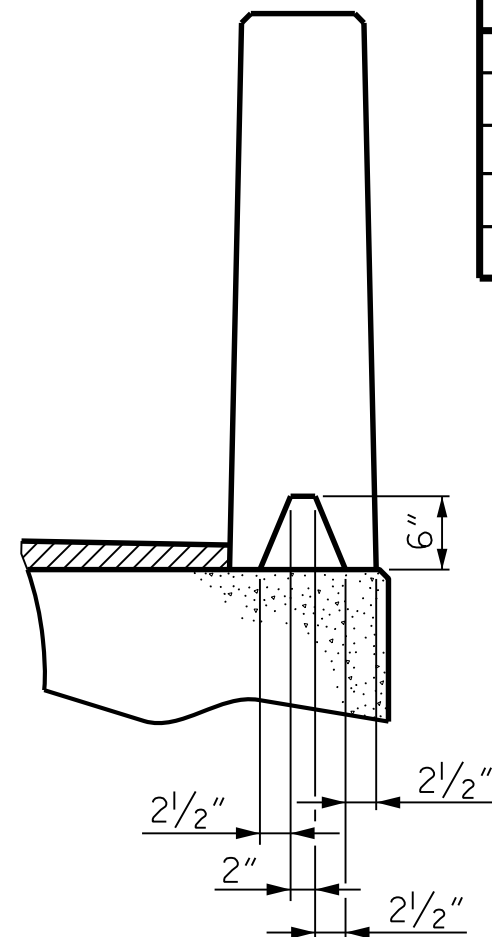
BILL OF MATERIAL FOR ONE 47'-9 1/2" CORED SLAB UNIT									
BAR	NUMBER	SIZE	TYPE	UNIT 1		UNIT 5 & 17		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
B7	4	#4	STR	24'-8"	66	24'-8	66	24'-8"	66
S1	8	#5	3	4'-3"	35	4'-3"	35	4'-3"	35
S2	100	#4	3	5'-4"	356	5'-4"	356	5'-4"	356
* S3	56	#5	1			5'-11"	346		
* S5	48	#5	4	6'-0"	300				
REINFORCING STEEL				LBS.	457	457		457	
* EPOXY COATED REINFORCING STEEL				LBS.	300	346			
6500 P.S.I. CONCRETE				CU. YDS.	6.9	6.9		6.9	
0.6" Ø L.R. STRANDS				No.	13	13		13	

CONCRETE RELEASE STRENGTH	
UNIT	PSI
47'-9 1/2" UNITS	4900

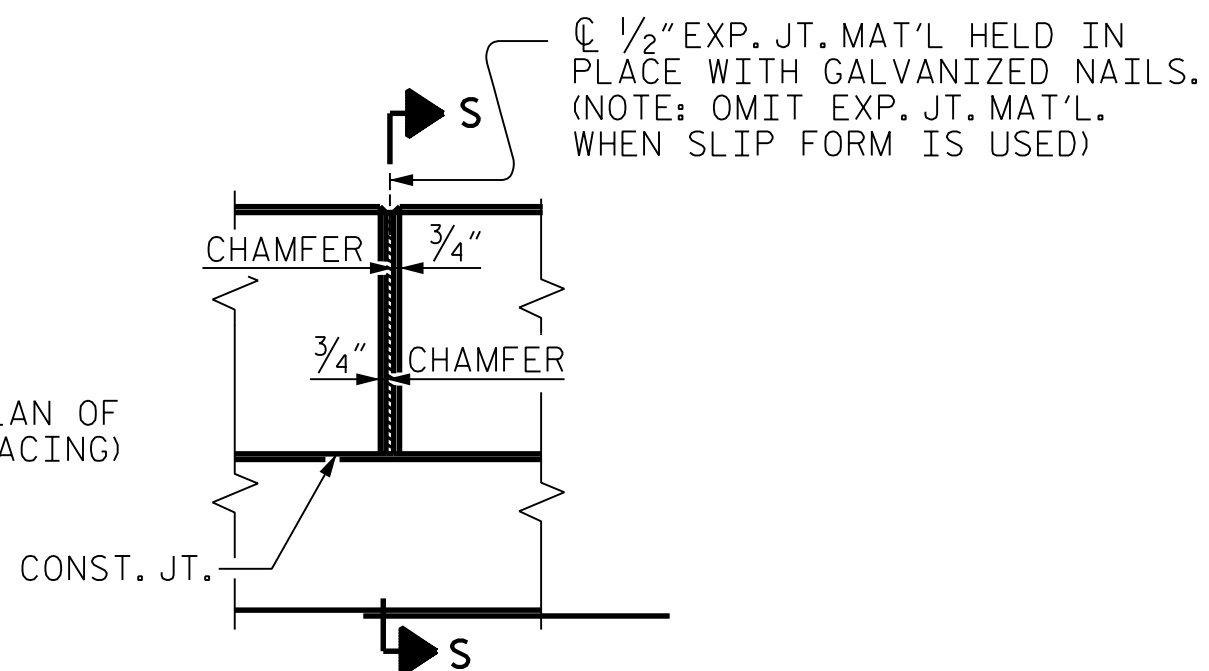
GRADE 270 STRANDS	
	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



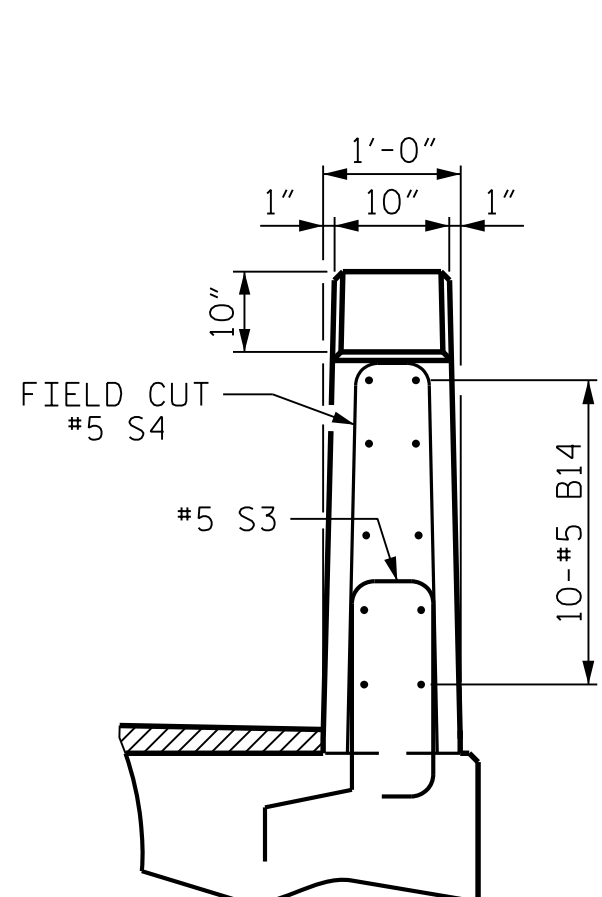
SECTION THRU RAIL



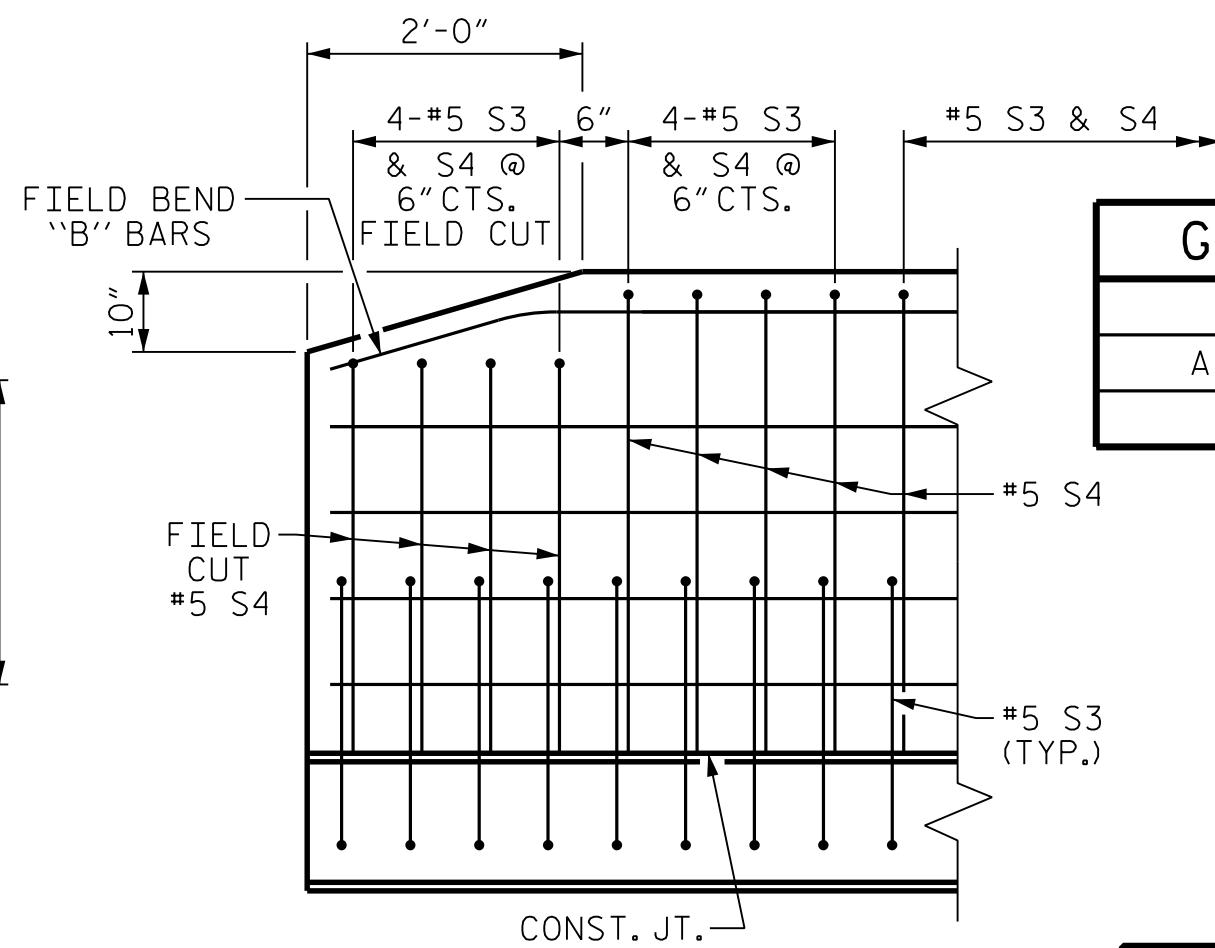
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

GROOVING BRIDGE FLOORS	
BRIDGE DECK	1,519 SQ. FT.
APPROACH SLAB	1,579 SQ. FT.
TOTAL	3,098 SQ. FT.

DRAWN BY : <u>B. H. GONFA</u>	DATE : <u>JAN 2025</u>
CHECKED BY : <u>B. D. KLAPPENBACH</u>	DATE : <u>JAN 2025</u>
DESIGN ENGINEER OF RECORD : <u>B. D. KLAPPENBACH</u>	DATE : <u>JAN 2025</u>

NOTES

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

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M
BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL
SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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. A 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.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

PROJECT NO. U-5810
WATAUGA COUNTY
 STATION: 83+30.09 -L3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
 RALEIGH

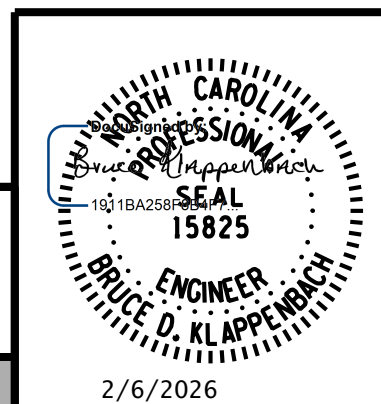
3'-0" X 1'-9"

PRESTRESSED CONCRETE
 CORED SLAB UNIT

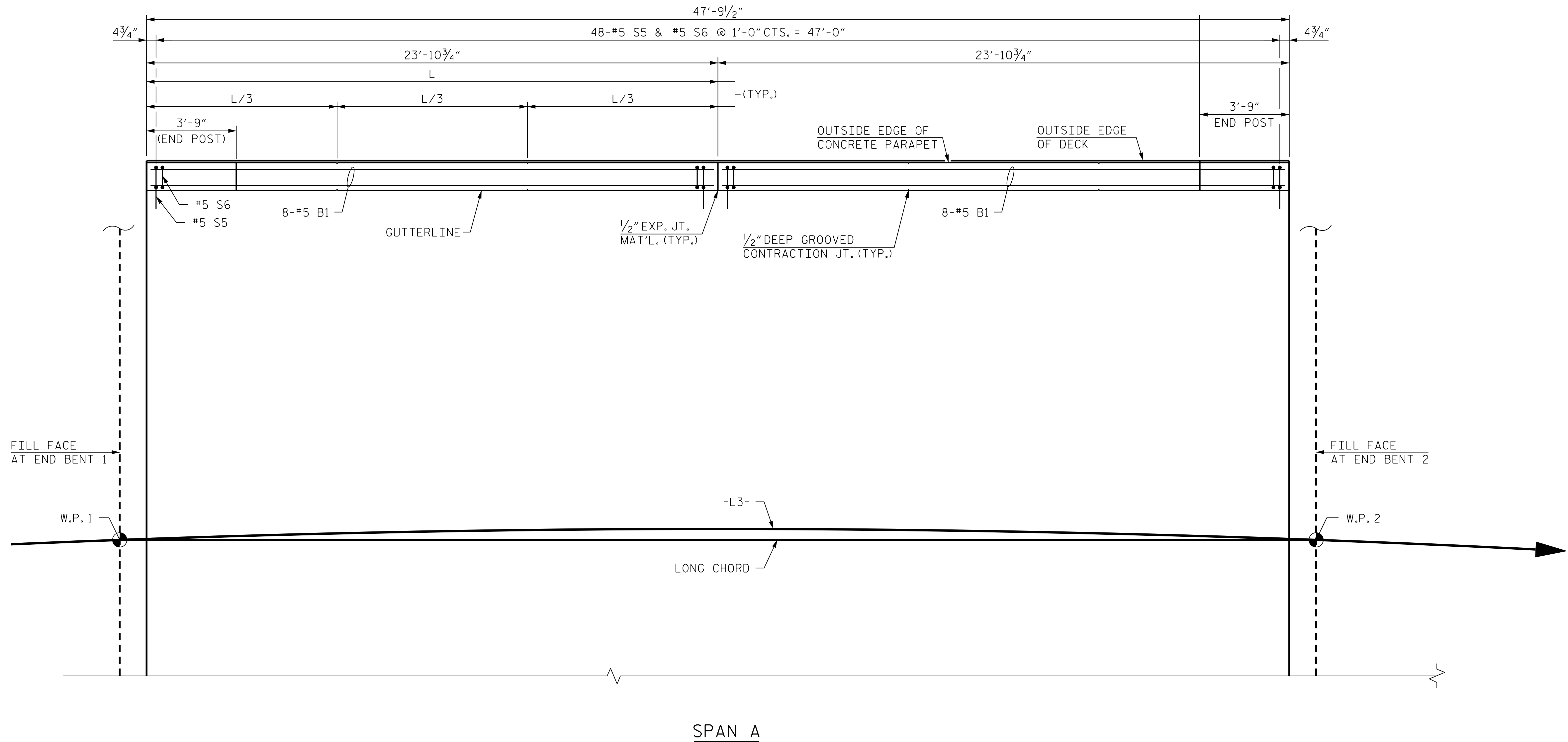
90° SKEW

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

	TOTAL SHEETS 30
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2/6/2026 bgonfa



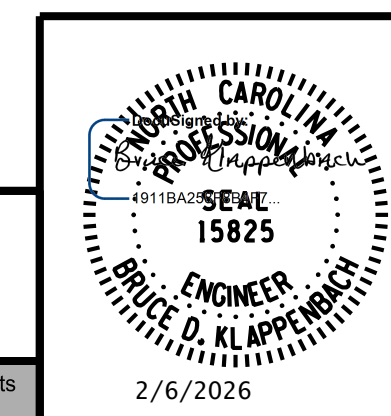
PLAN OF PARAPET - LEFT SIDE

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

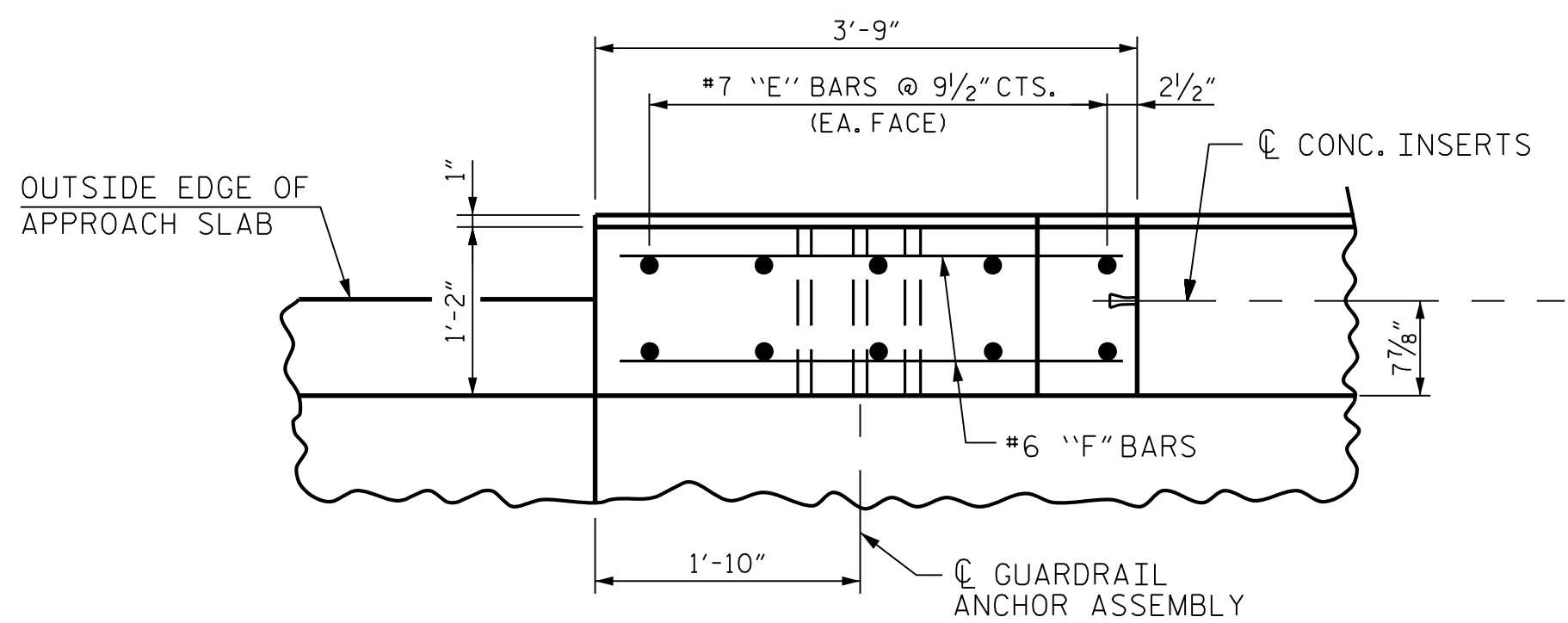
SHEET 1 OF 2

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DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

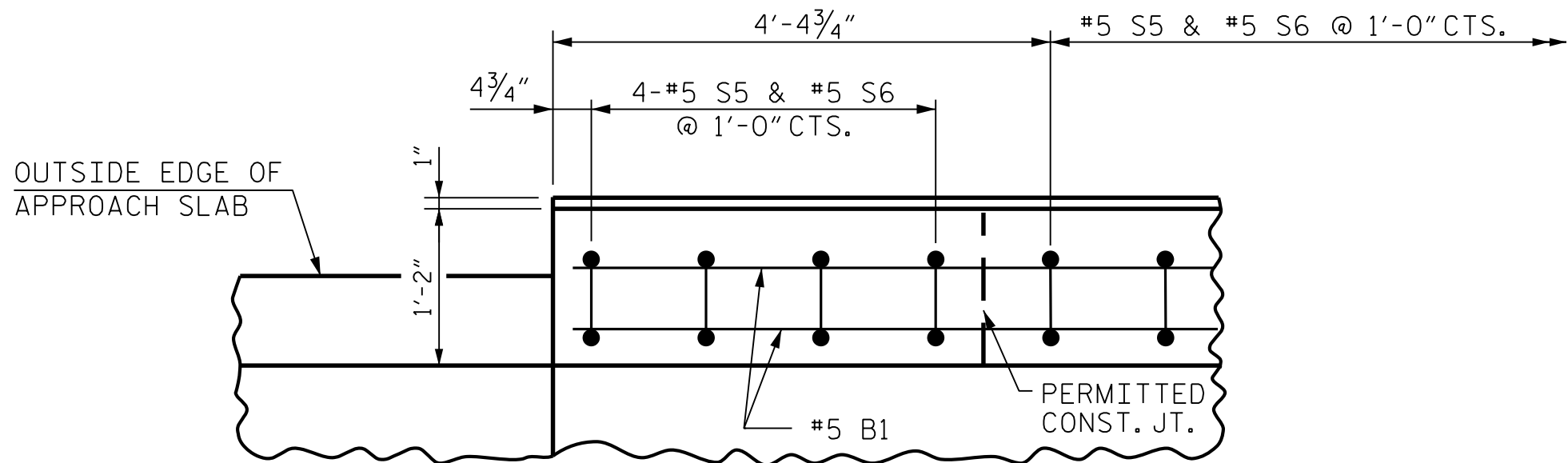
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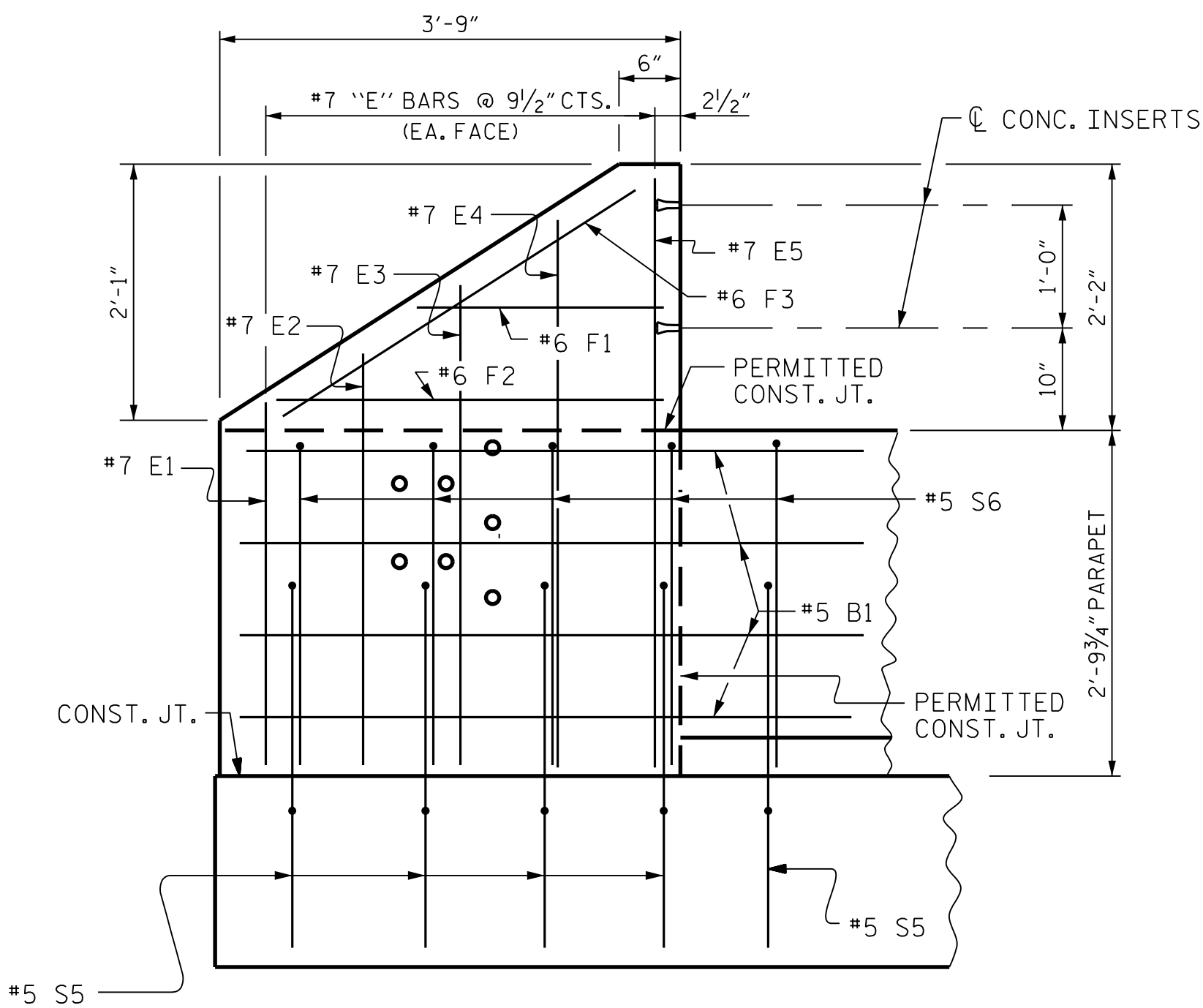
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE CONCRETE PARAPET PLAN					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					SHEET NO. S-11 TOTAL SHEETS 30



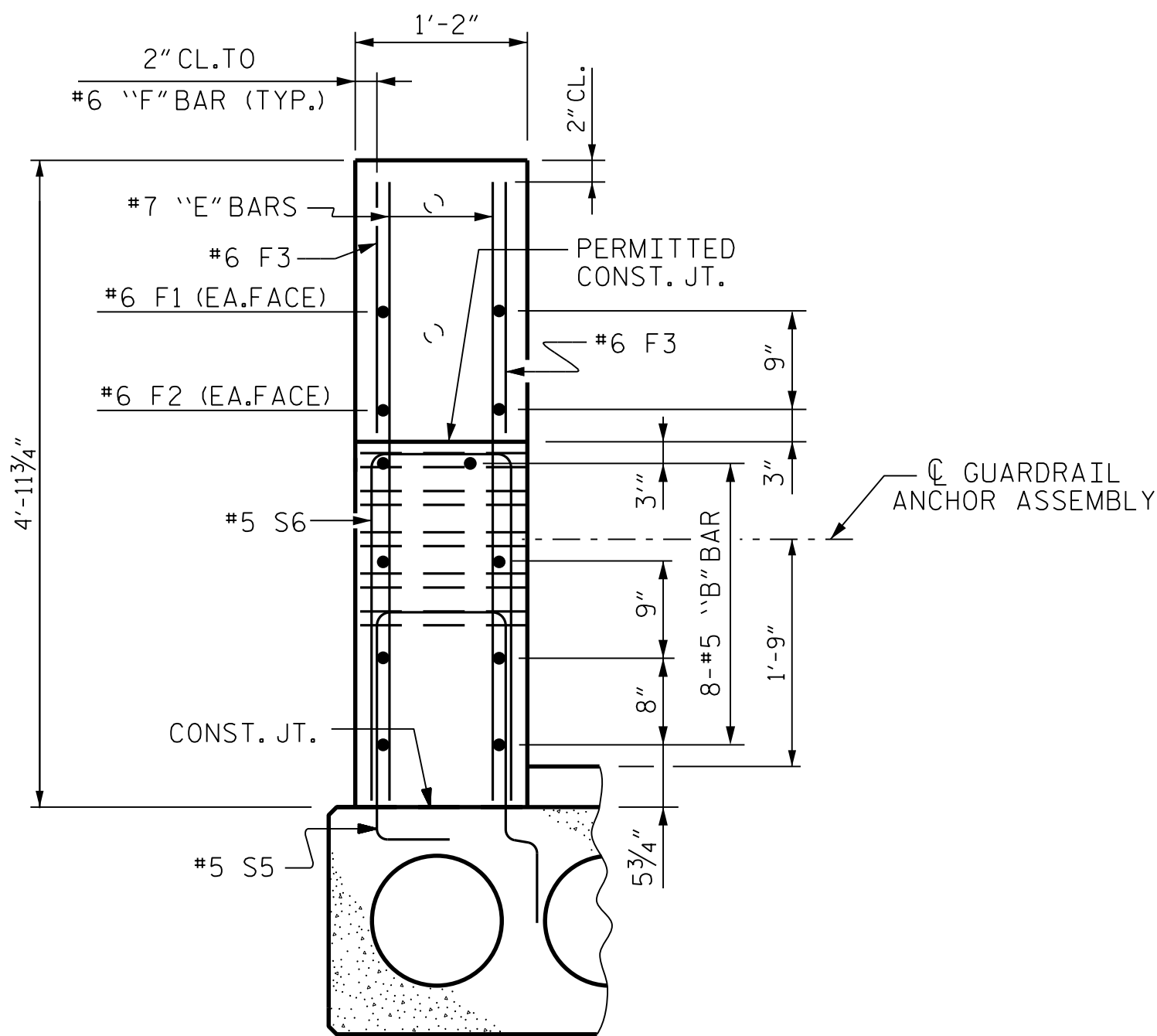
PLAN OF END POST



PLAN OF PARAPET



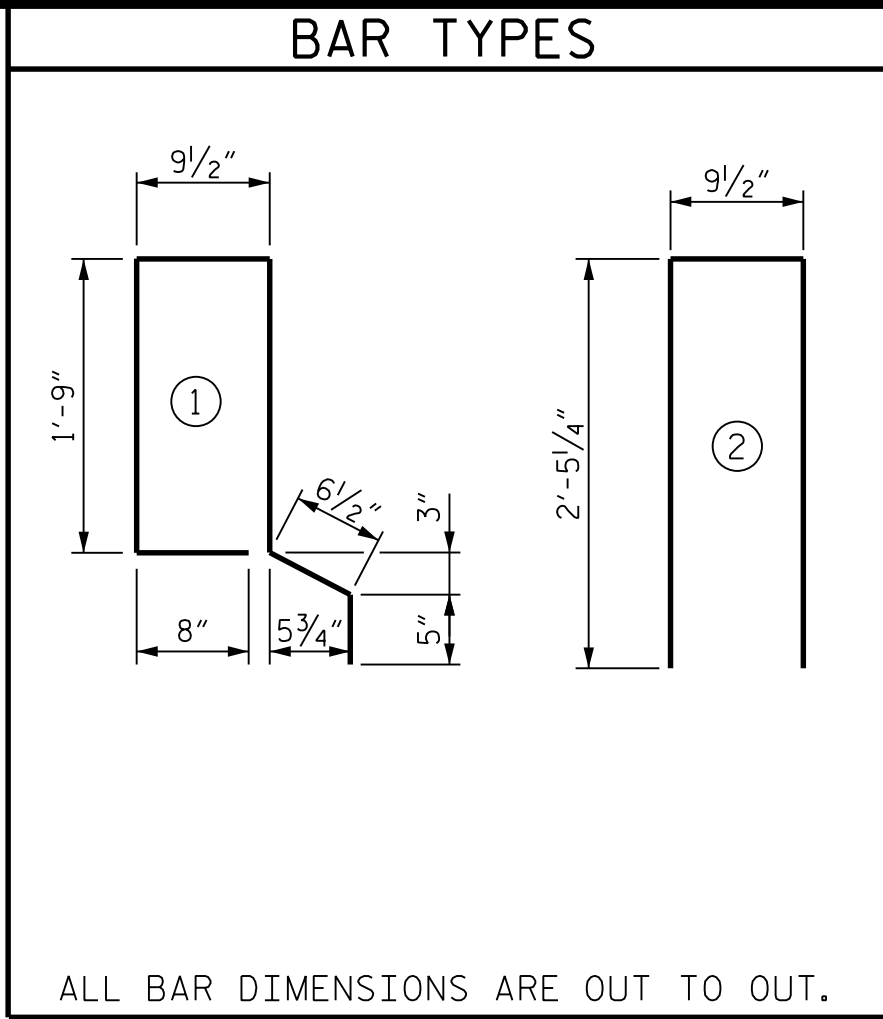
ELEVATION



END VIEW

PARAPET AND END POST FOR TWO BAR RAIL

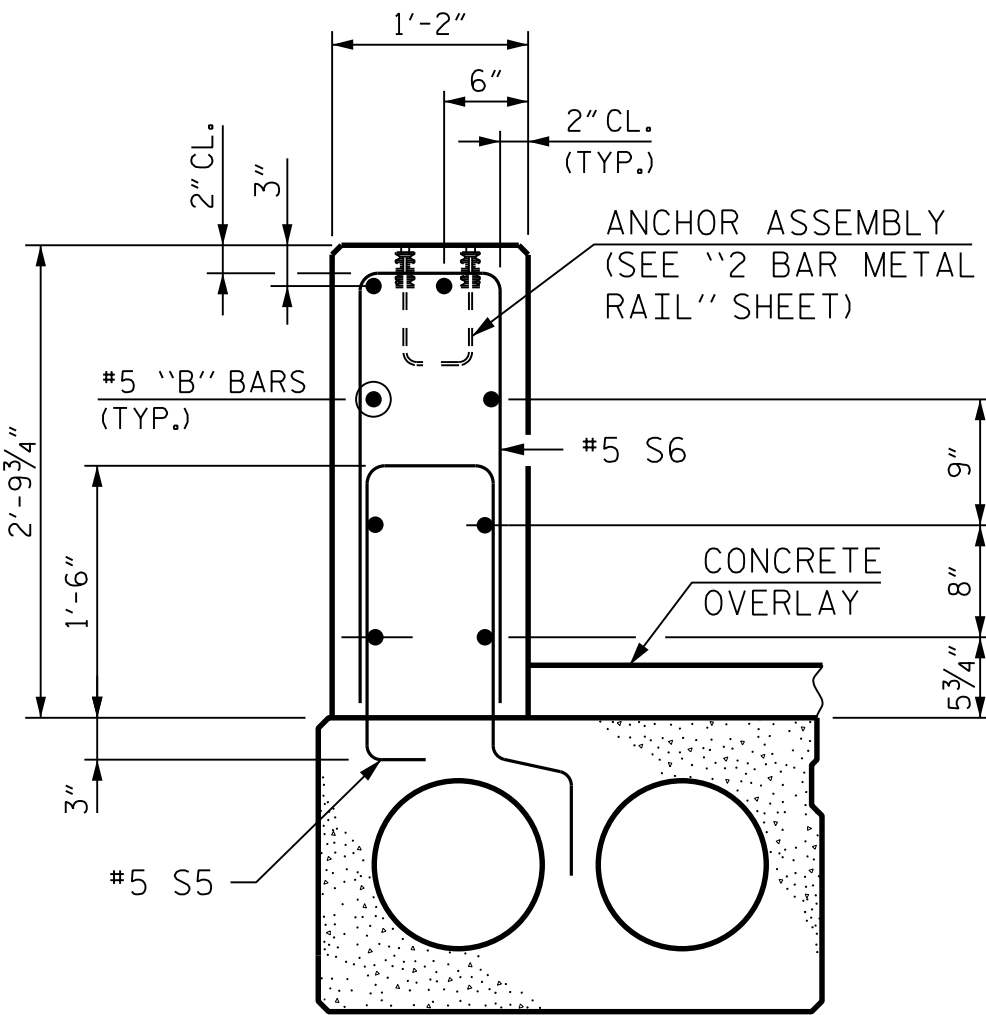
(LEFT SIDE)
END POST AT END BENT 1 SHOWN, END BENT 2 SIMILAR



BILL OF MATERIAL					
FOR CONCRETE PARAPET AND END POST					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	16	#5	STR.	23'-6"	392
*E1	4	#7	STR.	2'-9"	22
*E2	4	#7	STR.	3'-3"	27
*E3	4	#7	STR.	3'-9"	31
*E4	4	#7	STR.	4'-3"	35
*E5	4	#7	STR.	4'-7"	37
*F1	4	#6	STR.	1'-10"	11
*F2	4	#6	STR.	3'-0"	18
*F3	4	#6	STR.	3'-4"	20
*S5	48	#5	1	5'-11"	296
*S6	48	#5	2	5'-8"	284

* EPOXY COATED REINFORCING STEEL	1,173 LBS.
CLASS "AA" CONCRETE	6.2 CY
1'-2" X 2'-9 3/4" CONCRETE PARAPET	47.79 LIN. FT.

NOTE:
FOR CONCRETE PARAPET ON APPROACH SLAB, SEE BRIDGE APPROACH SLAB SHEETS S-24, S-25, AND S-26.

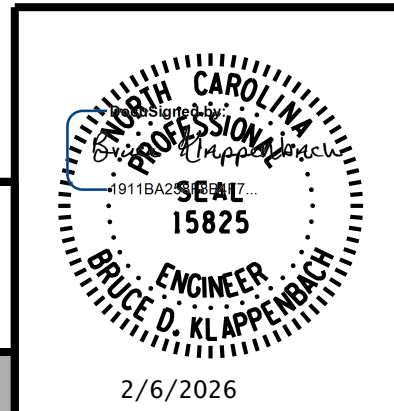


SECTION THROUGH PARAPET

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 2 OF 2

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SUPERSTRUCTURE CONCRETE PARAPET AND END POST DETAILS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					30

DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

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

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: ASTM A36 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO ASTM A123.

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

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

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD SHEET S-14.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

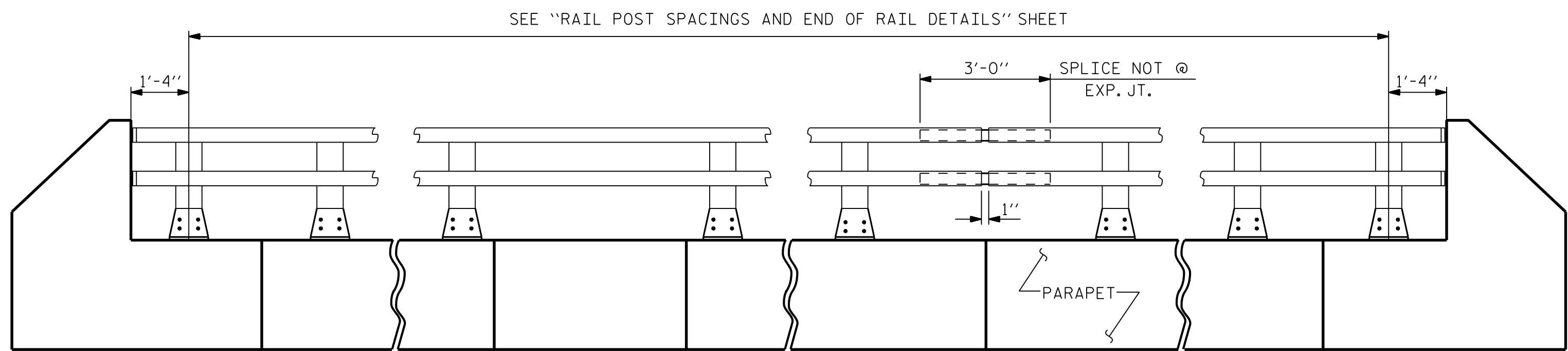
PROJECT NO. U-5810
WATAUGA COUNTY
 STATION: 83+30.09 -L3-

SHEET 1 OF 3

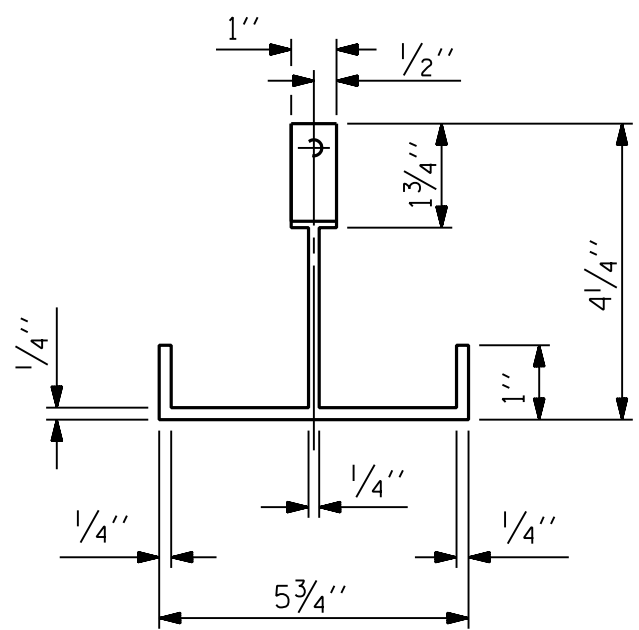
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

2 BAR METAL RAIL

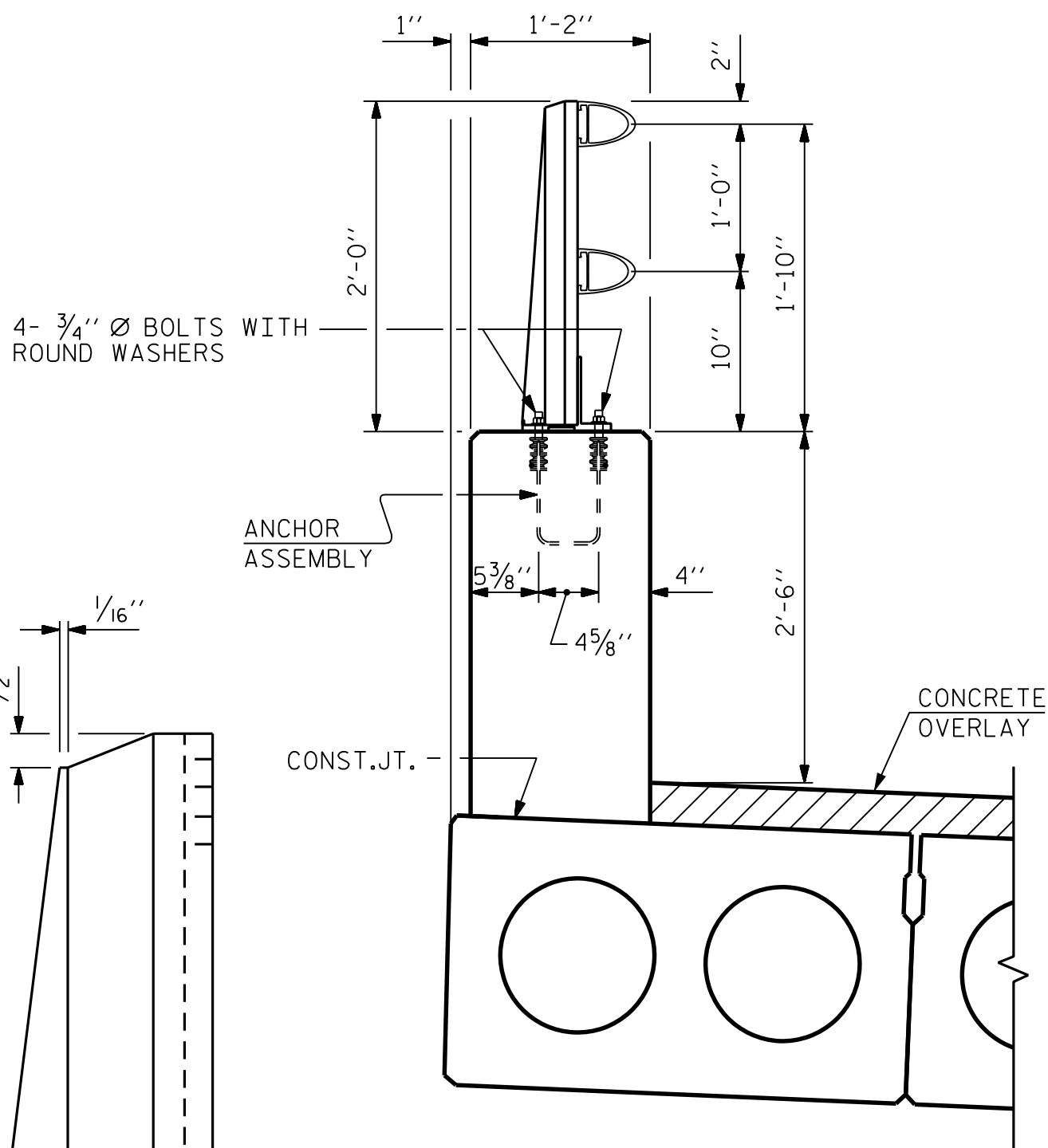
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			



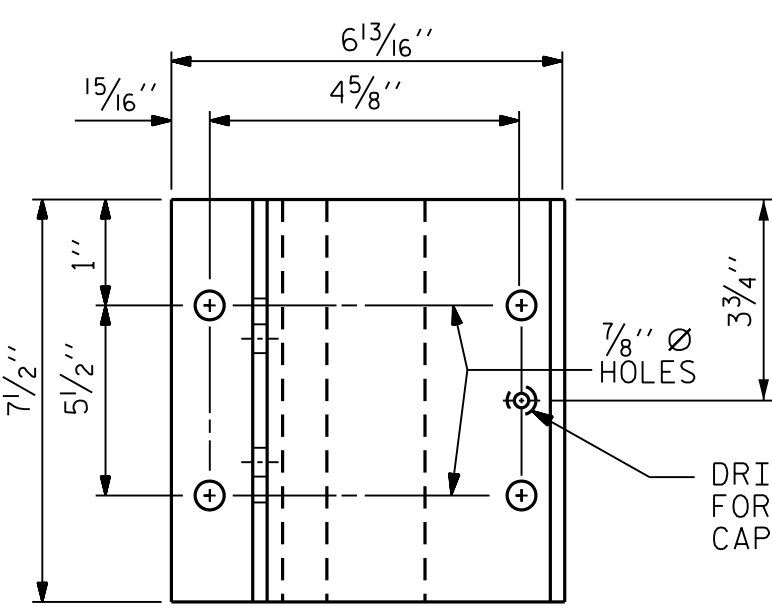
NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST,
SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.



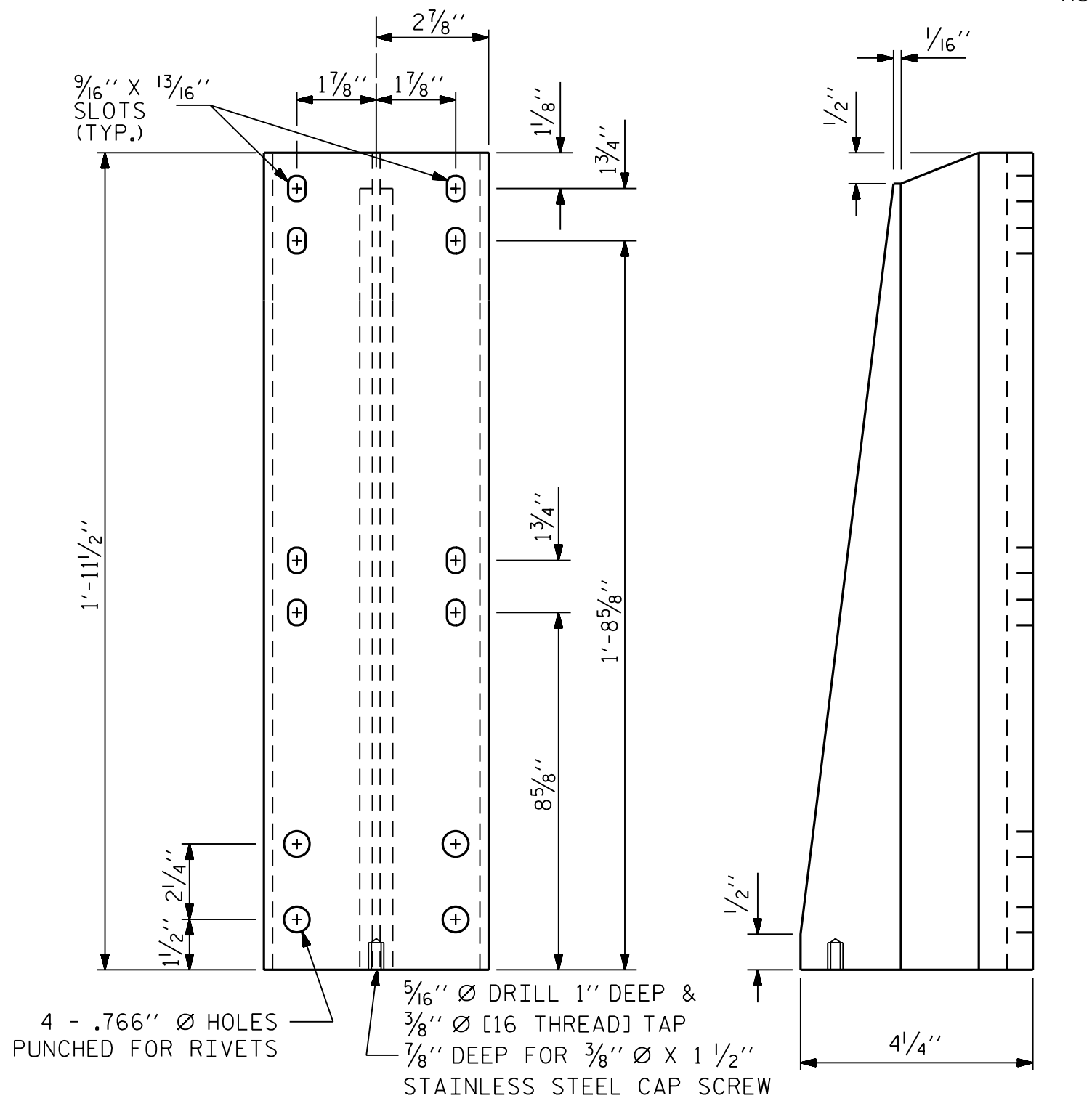
PLAN



SECTION THRU PARAPET
AND RAIL



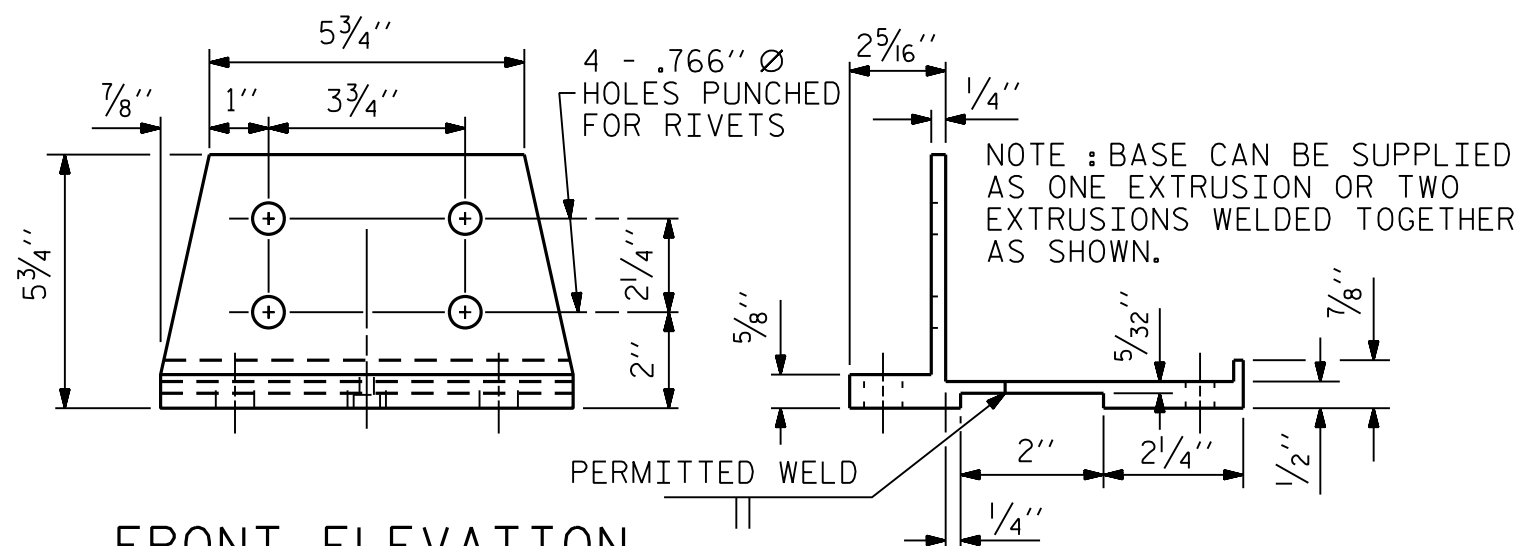
PLAN



FRONT ELEVATION

SIDE ELEVATION

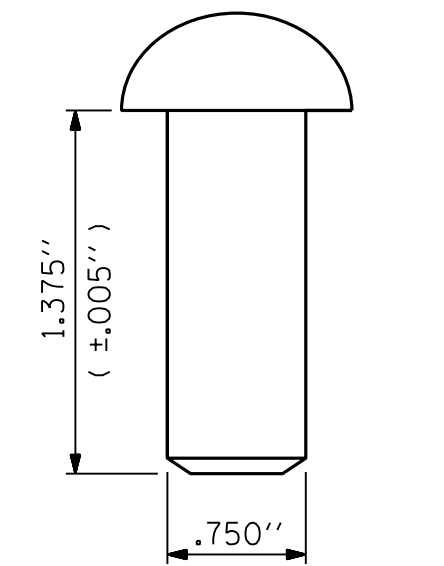
DETAILS OF POST



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS

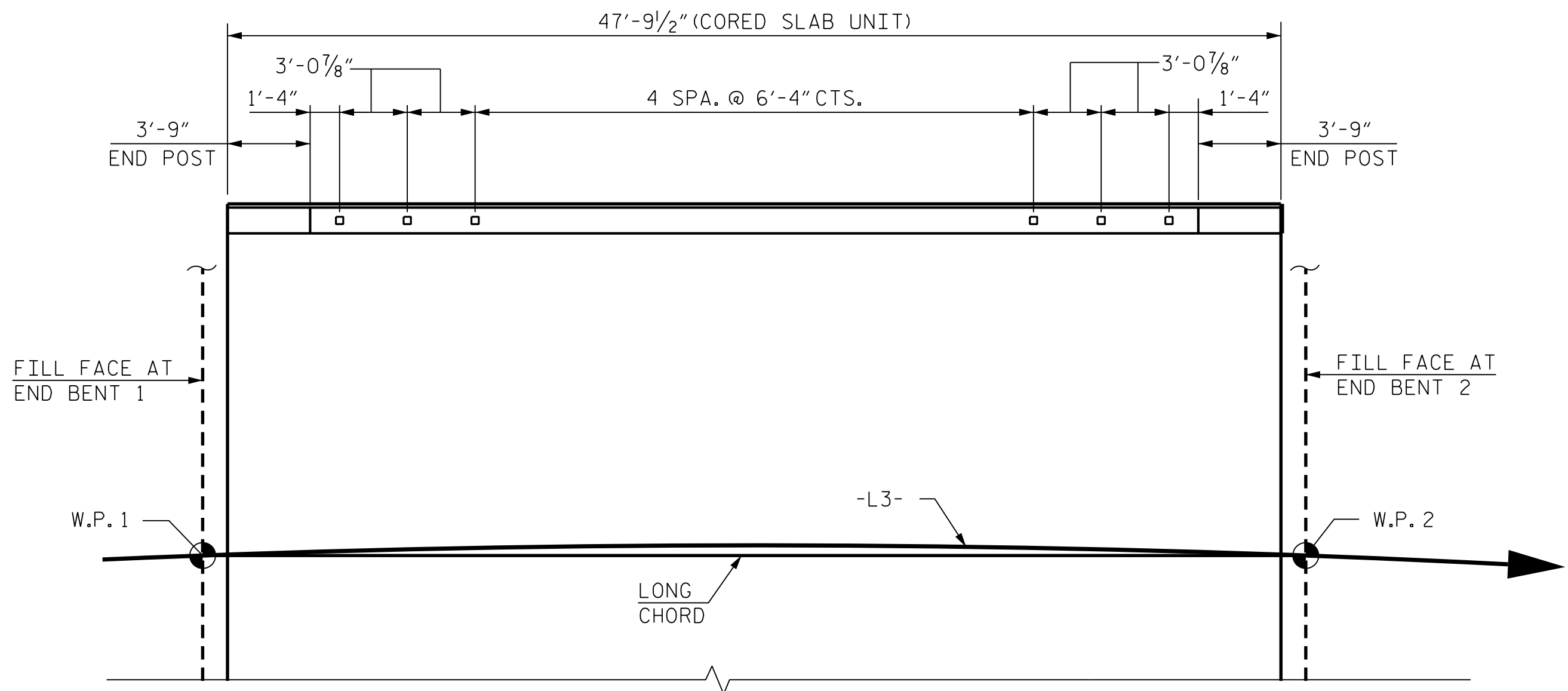


RIVET DETAIL

DRAWN BY : B. H. GONFA DATE : JAN 2025
 CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
 DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

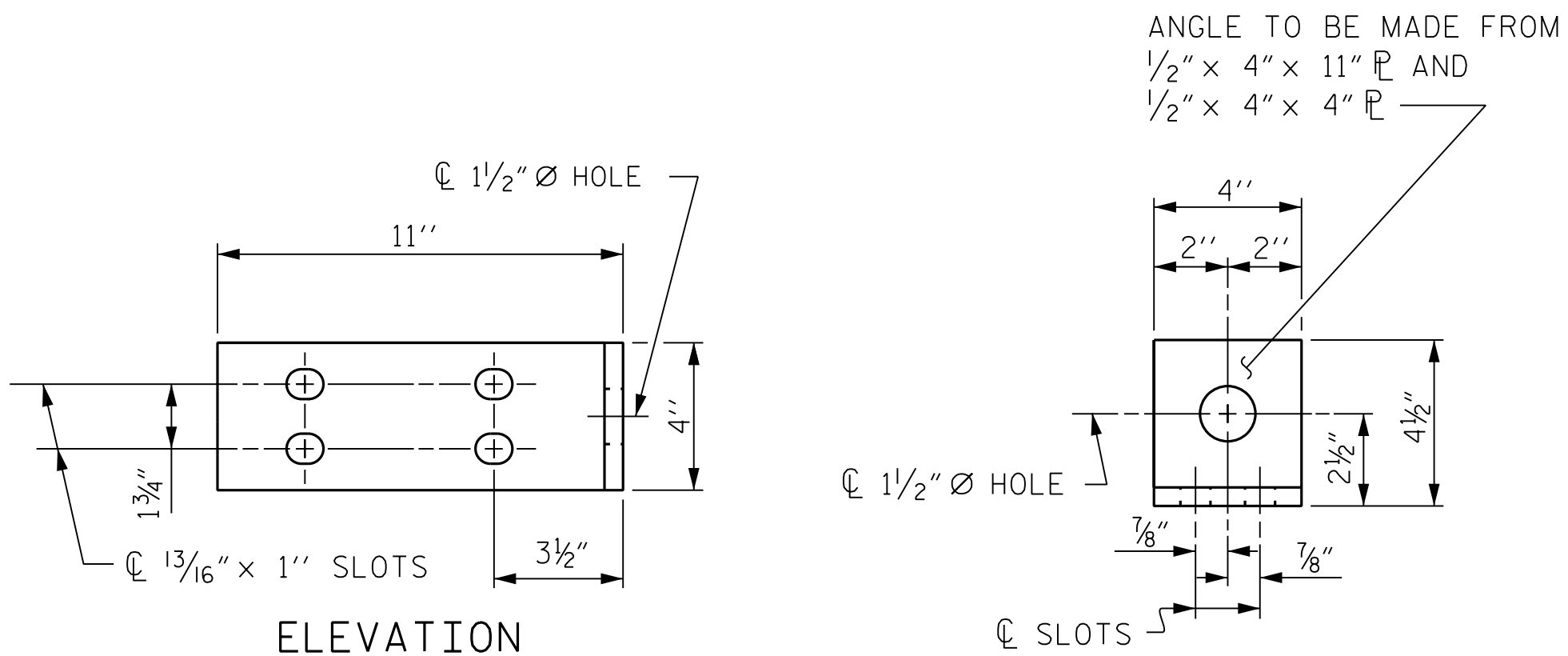
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2/6/2026

4/16/2026 R:\Structures\DCN\Final_Bridge\Final\U-5810_SML_2BMR3_940392.dgn opaitel



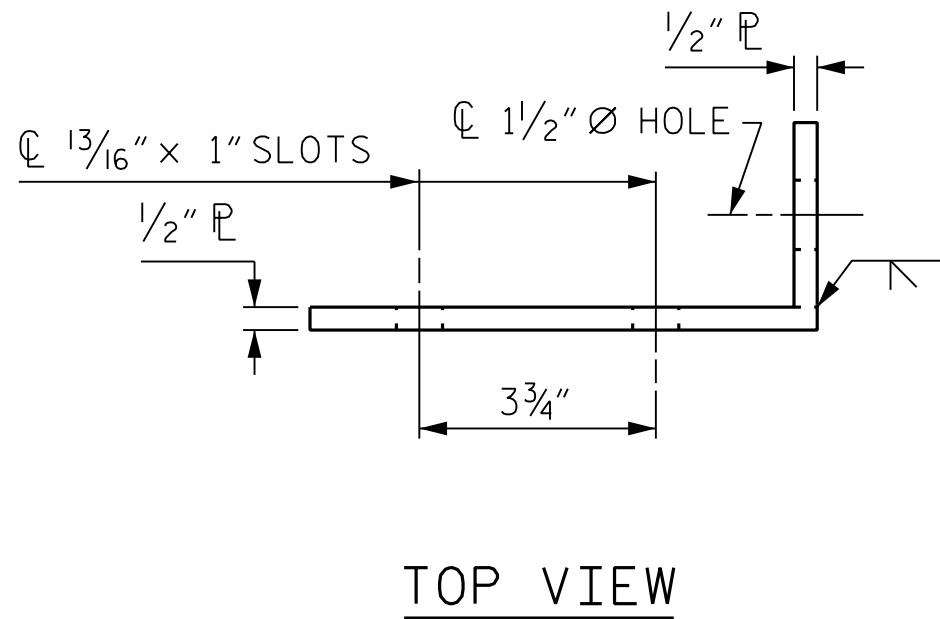
PLAN OF RAIL POST SPACINGS (LEFT SIDE)

9 ASSEMBLIES TOTAL (LEFT SIDE)

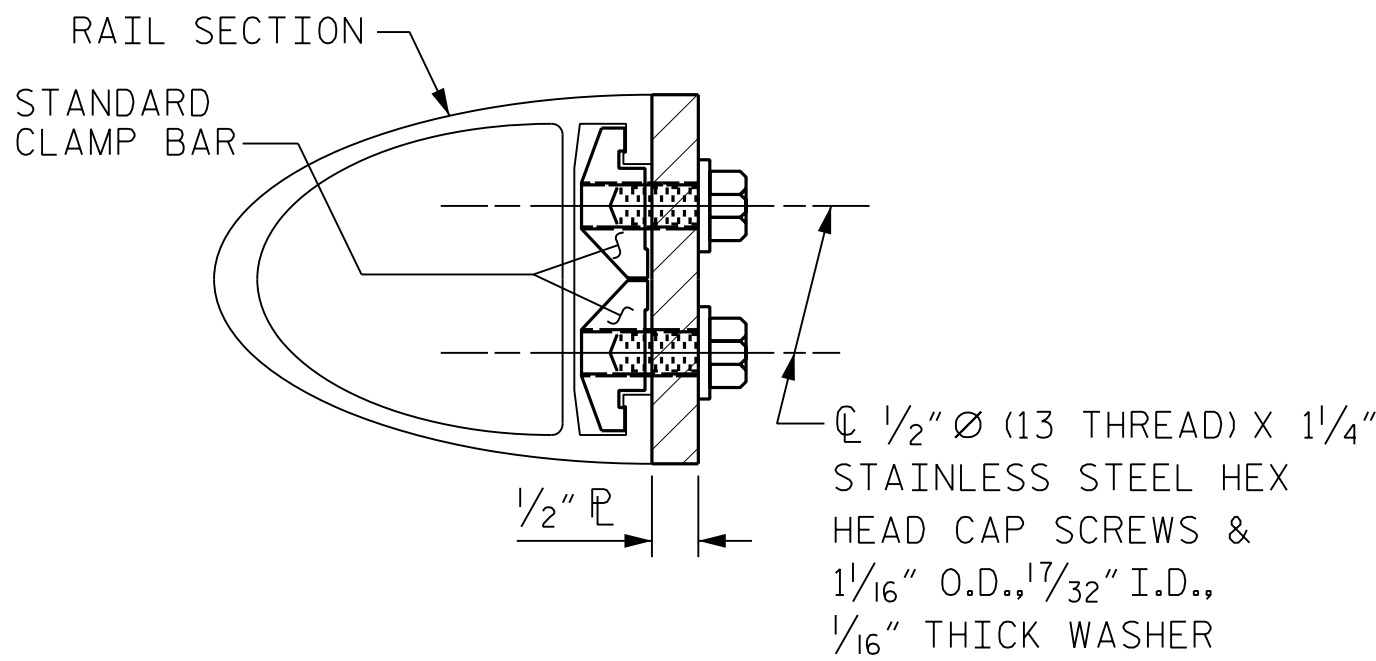


ELEVATION

END VIEW (FIX AND EXP.)



TOP VIEW



SECTION H-H (FIX)

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

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

- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
- 1 - 3/4" Ø x 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø x 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

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

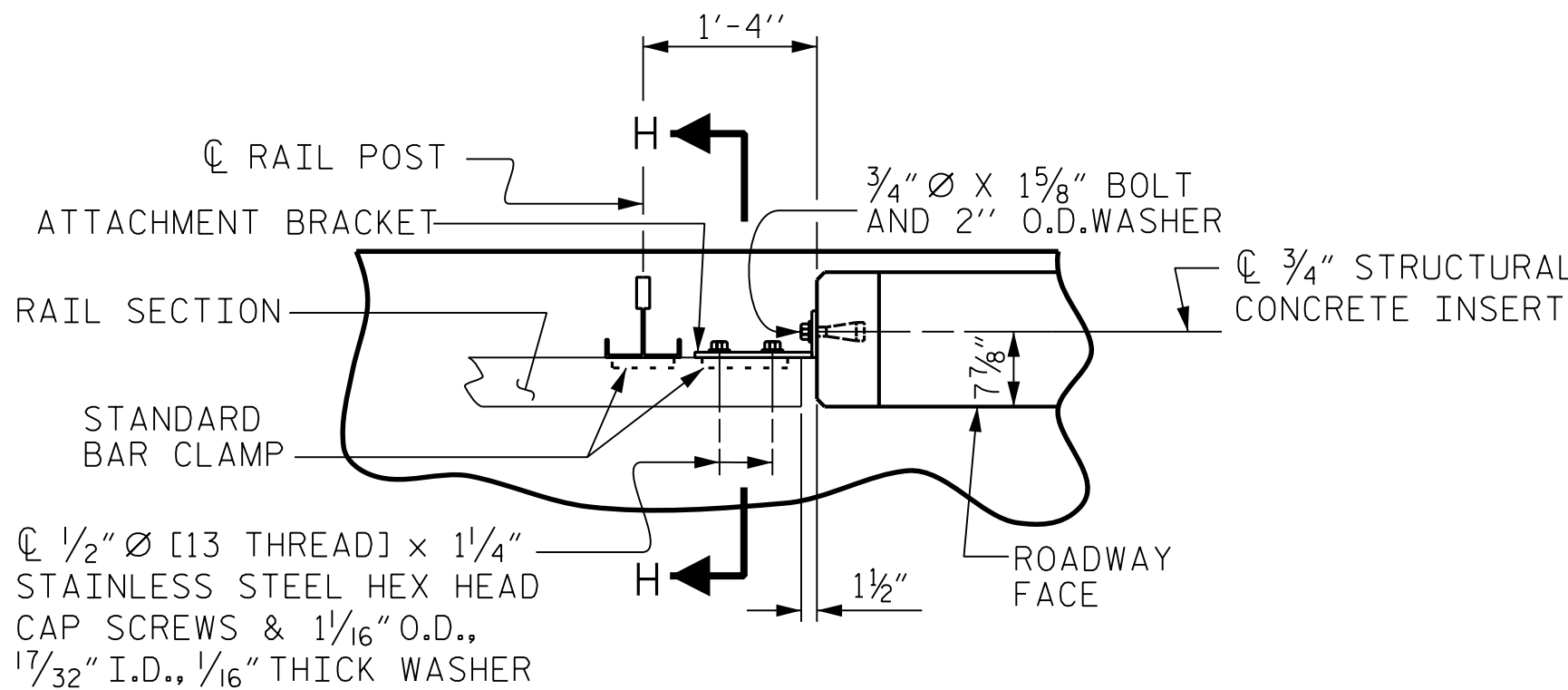
- 1/2" PLATES SHALL CONFORM TO ASTM A36 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø x 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø x 1 5/8" BOLT SHALL HAVE N. C. THREADS.
- CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
- STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
- 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

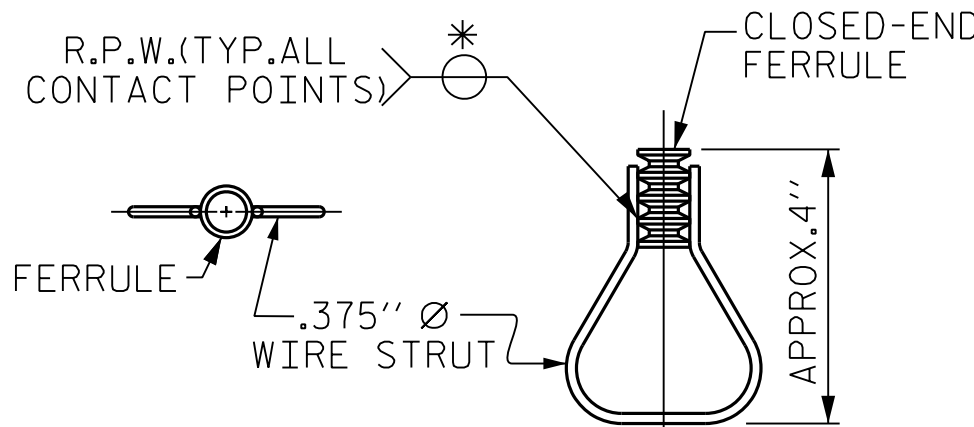
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø x 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø x 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø x 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø x 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
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2 BAR METAL RAIL
RAIL POST SPACINGS
AND
END OF RAIL DETAILS

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2			4			
TOTAL SHEETS						30

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SEAL
DESIGNED BY
48850
ENGINEER
PAITEL

4/16/2026

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STANDARD NO. BMR2

NOTES

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

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

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

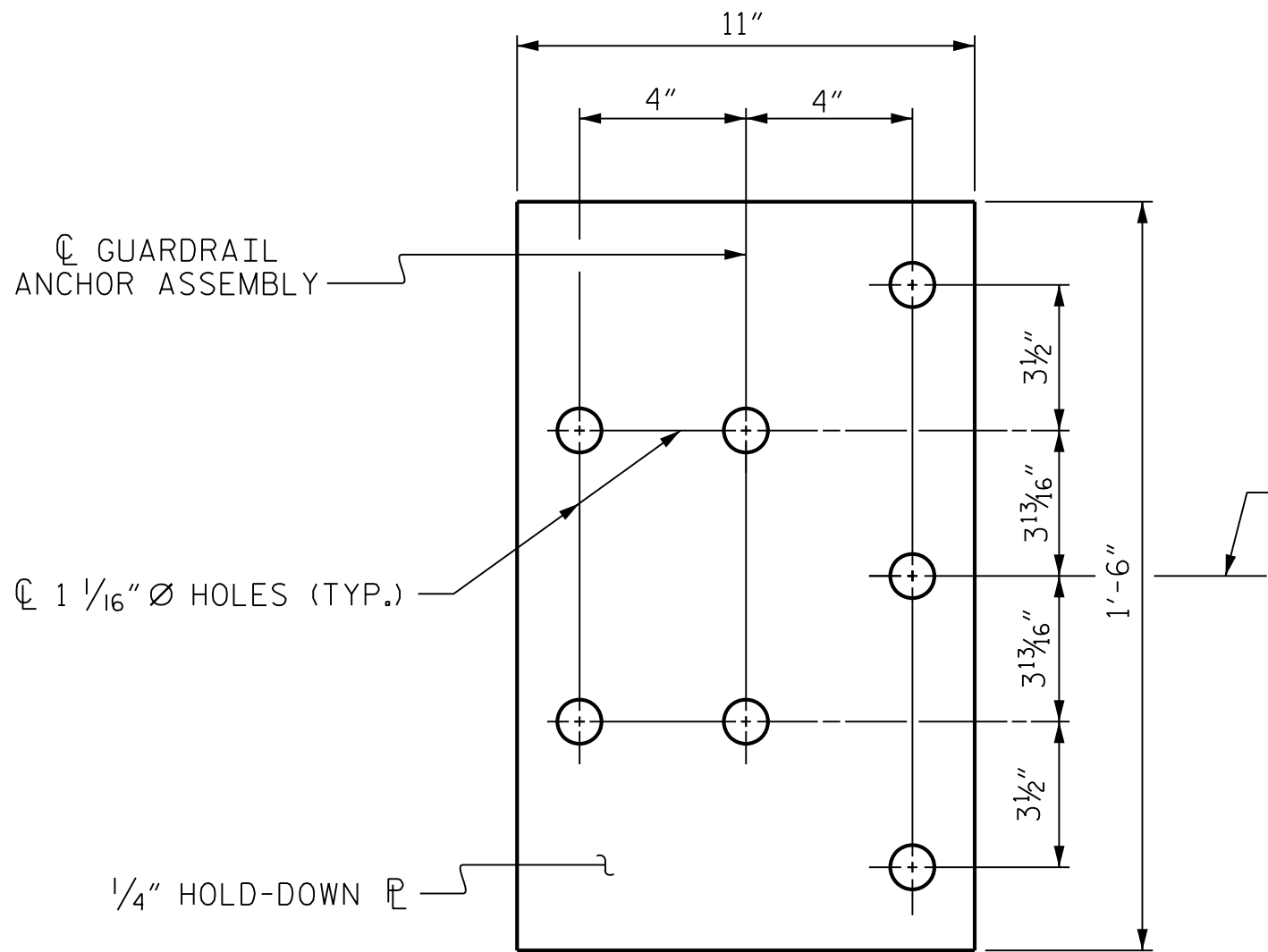
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

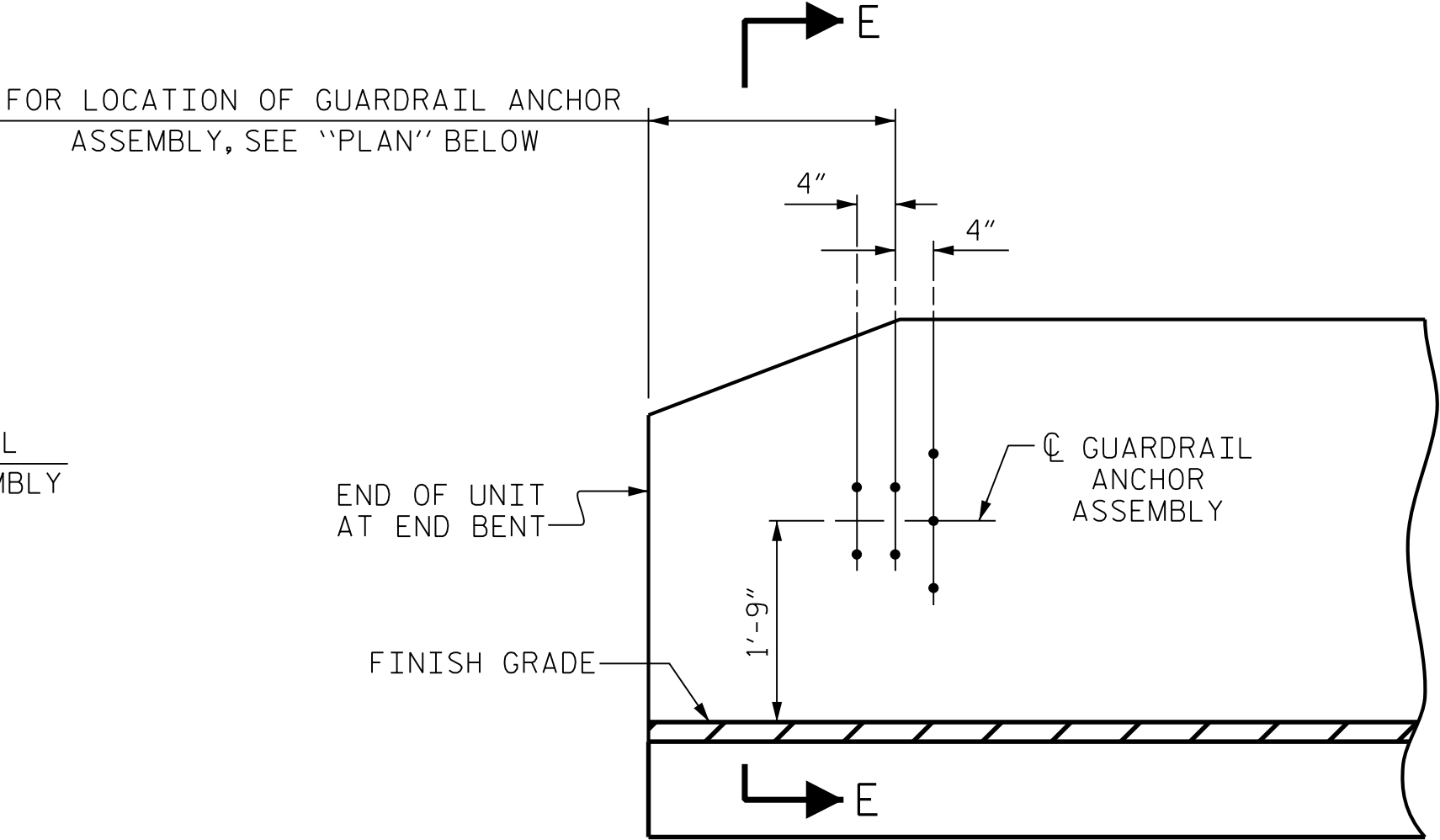
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

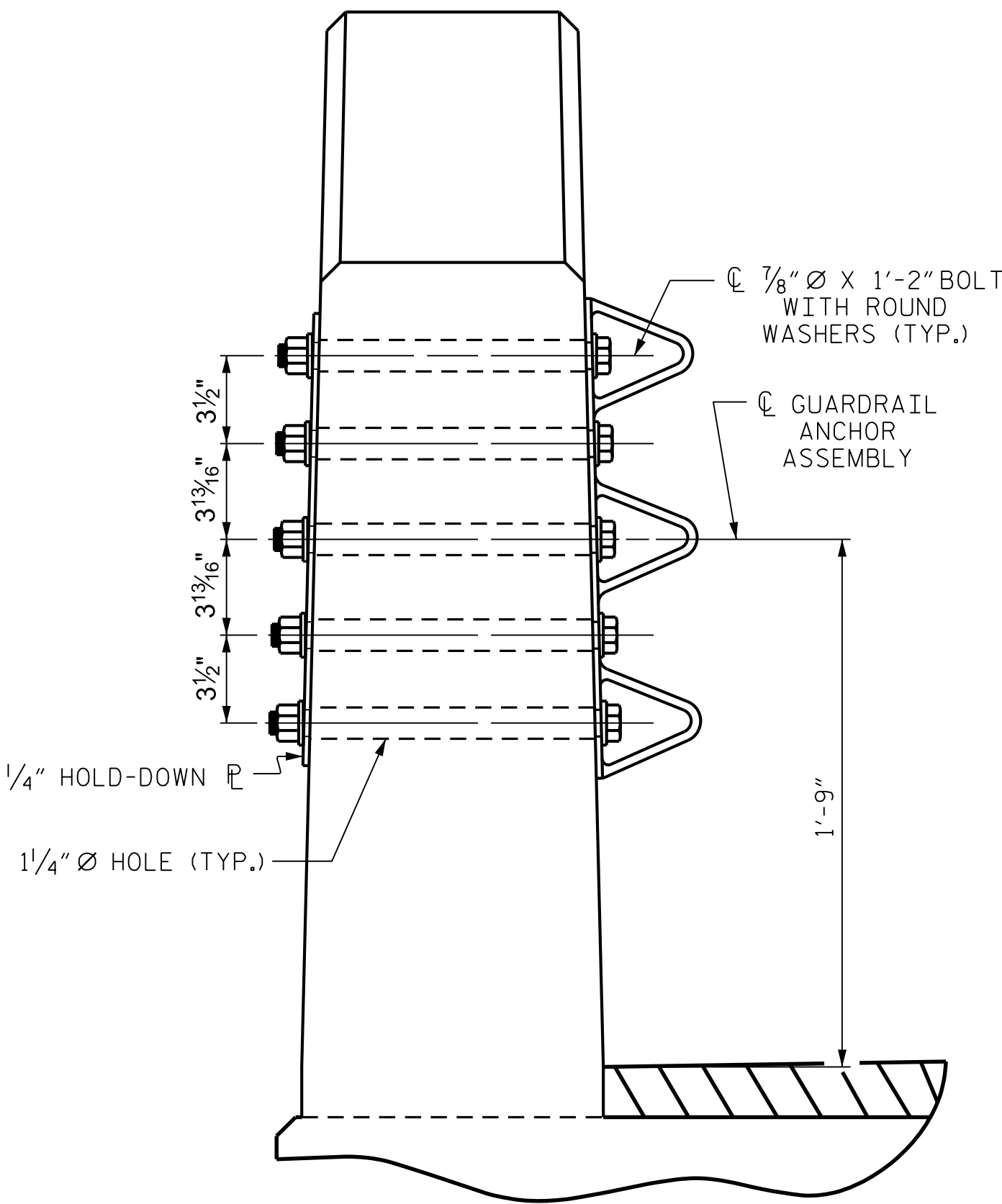
THE 1 5/64" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



PLAN

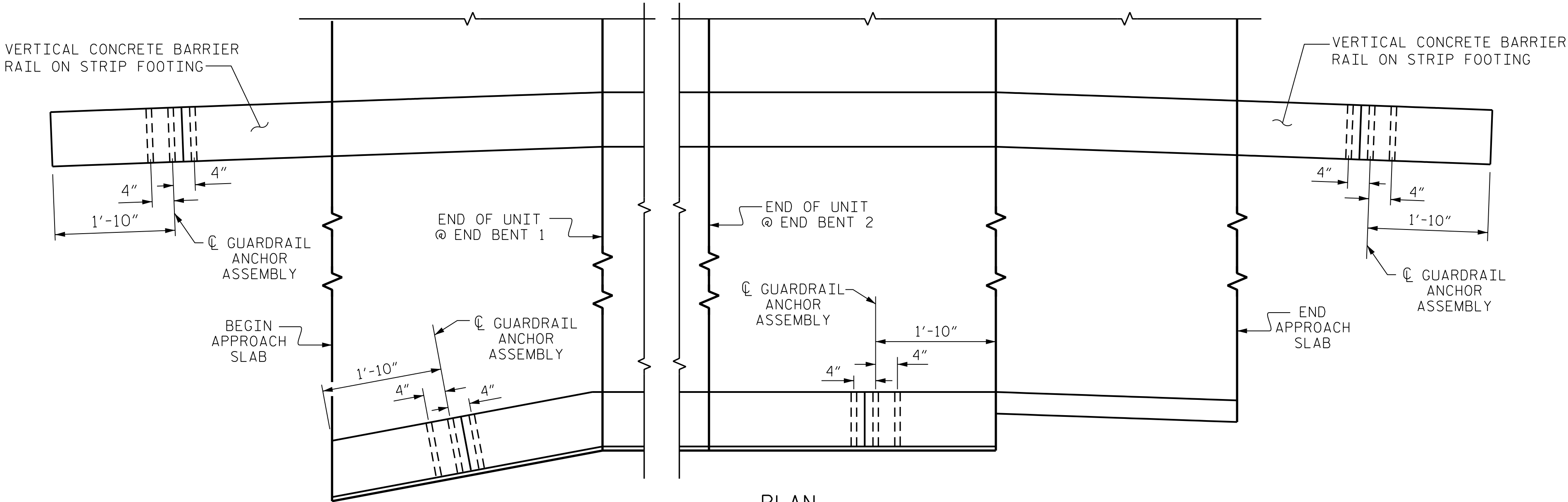


ELEVATION



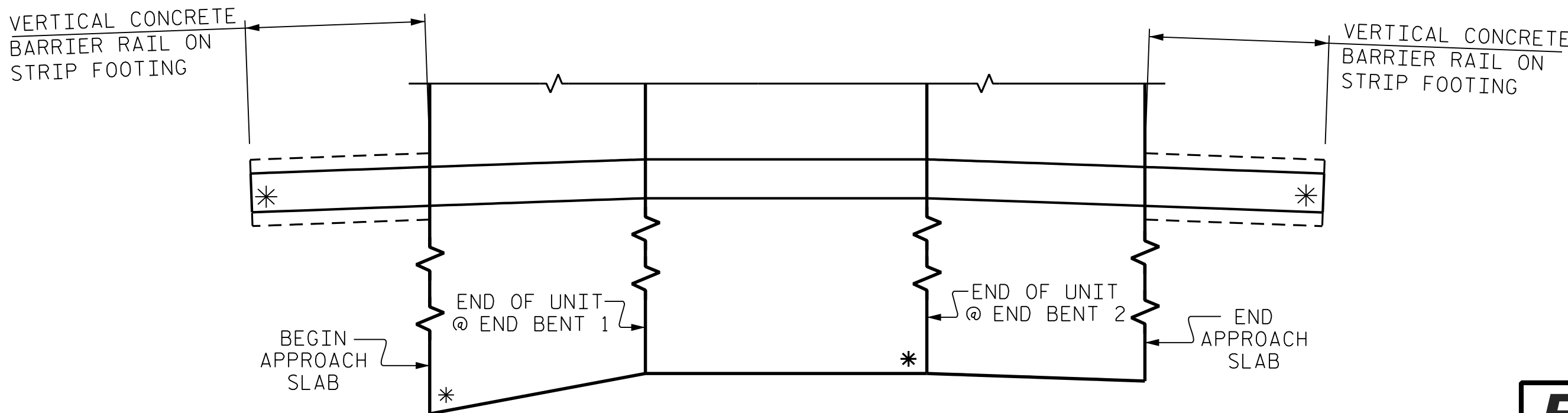
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE
DETAILS
FOR VERTICAL CONCRETE
BARRIER RAIL

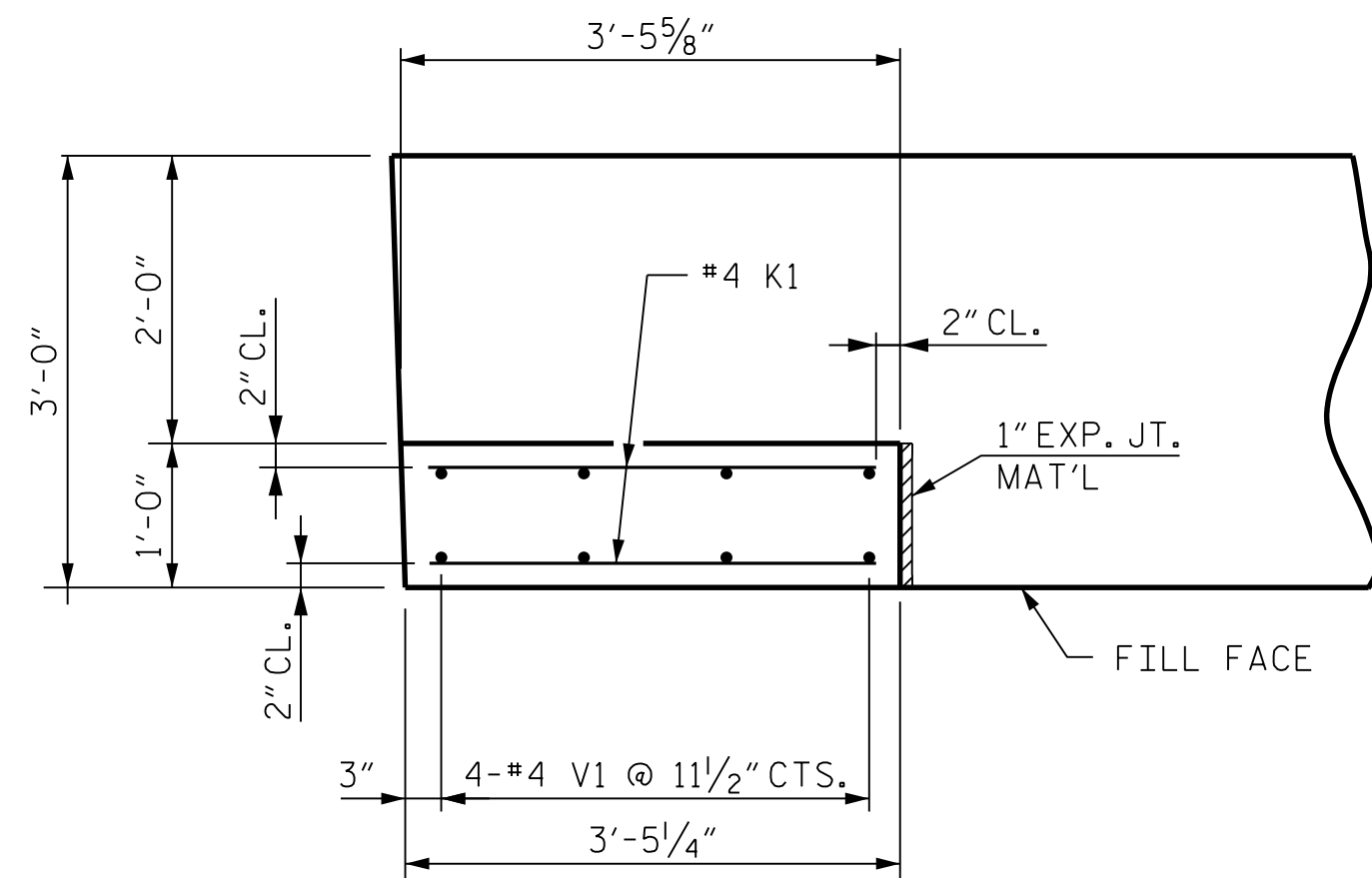
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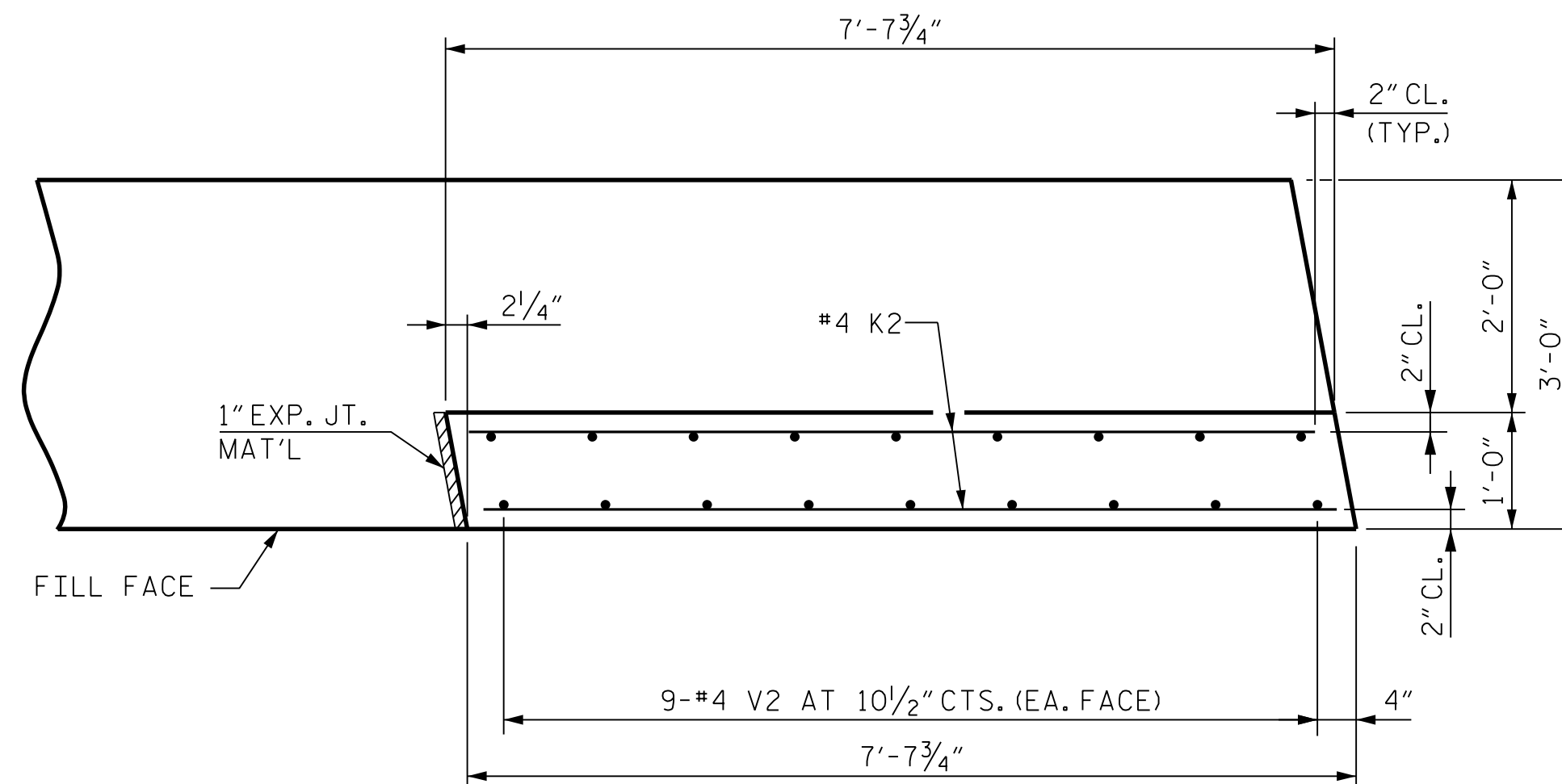
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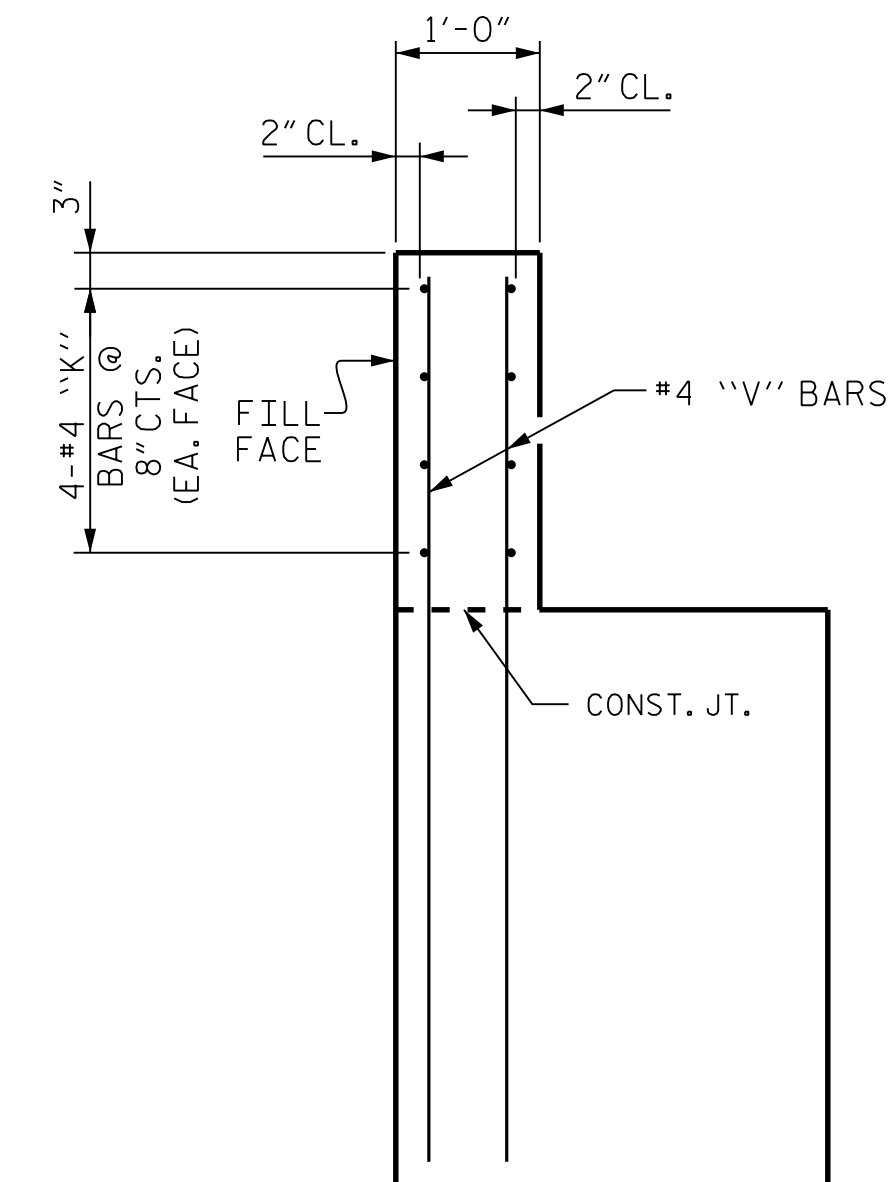
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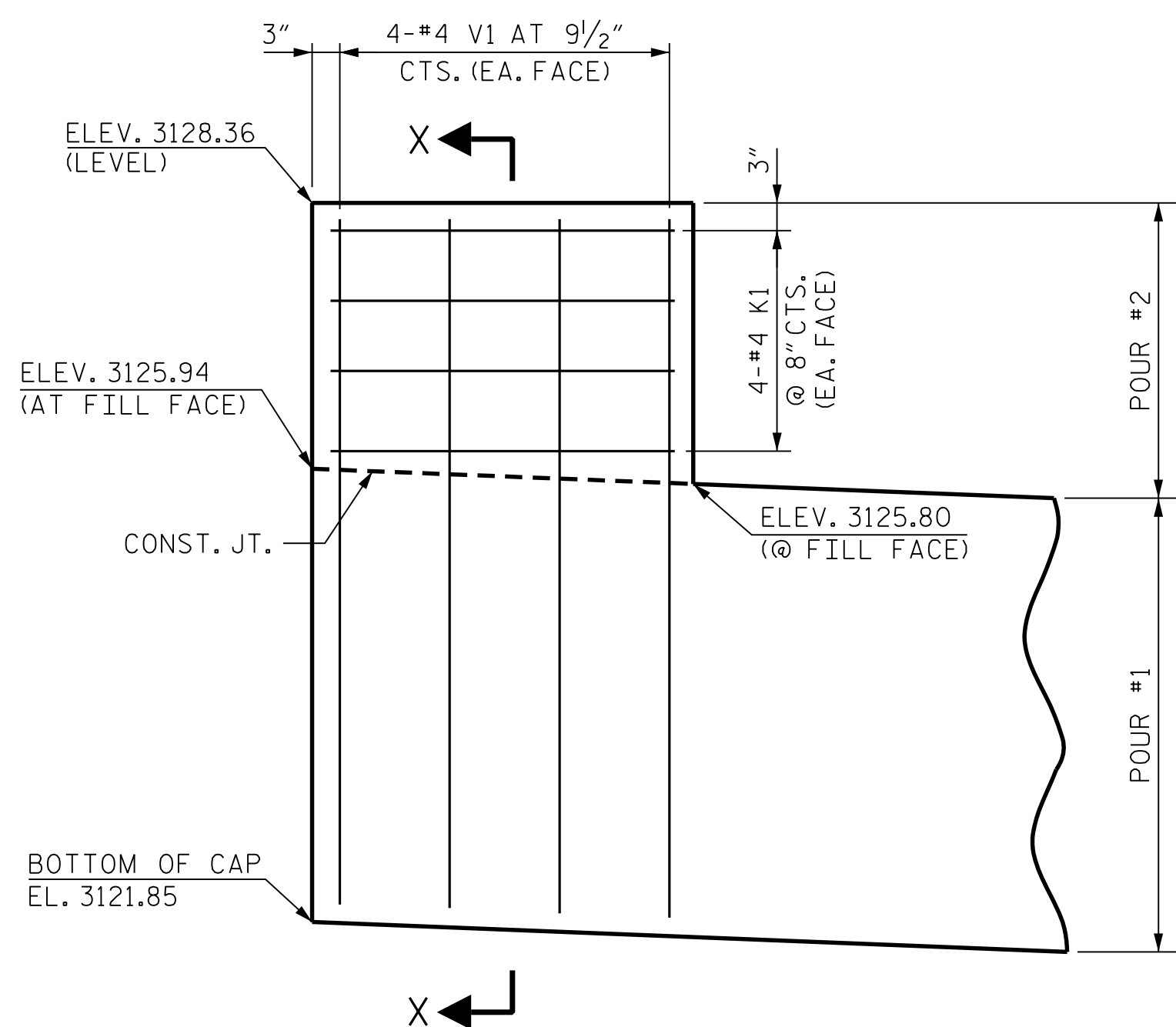
PLAN OF BACKWALL (W1)



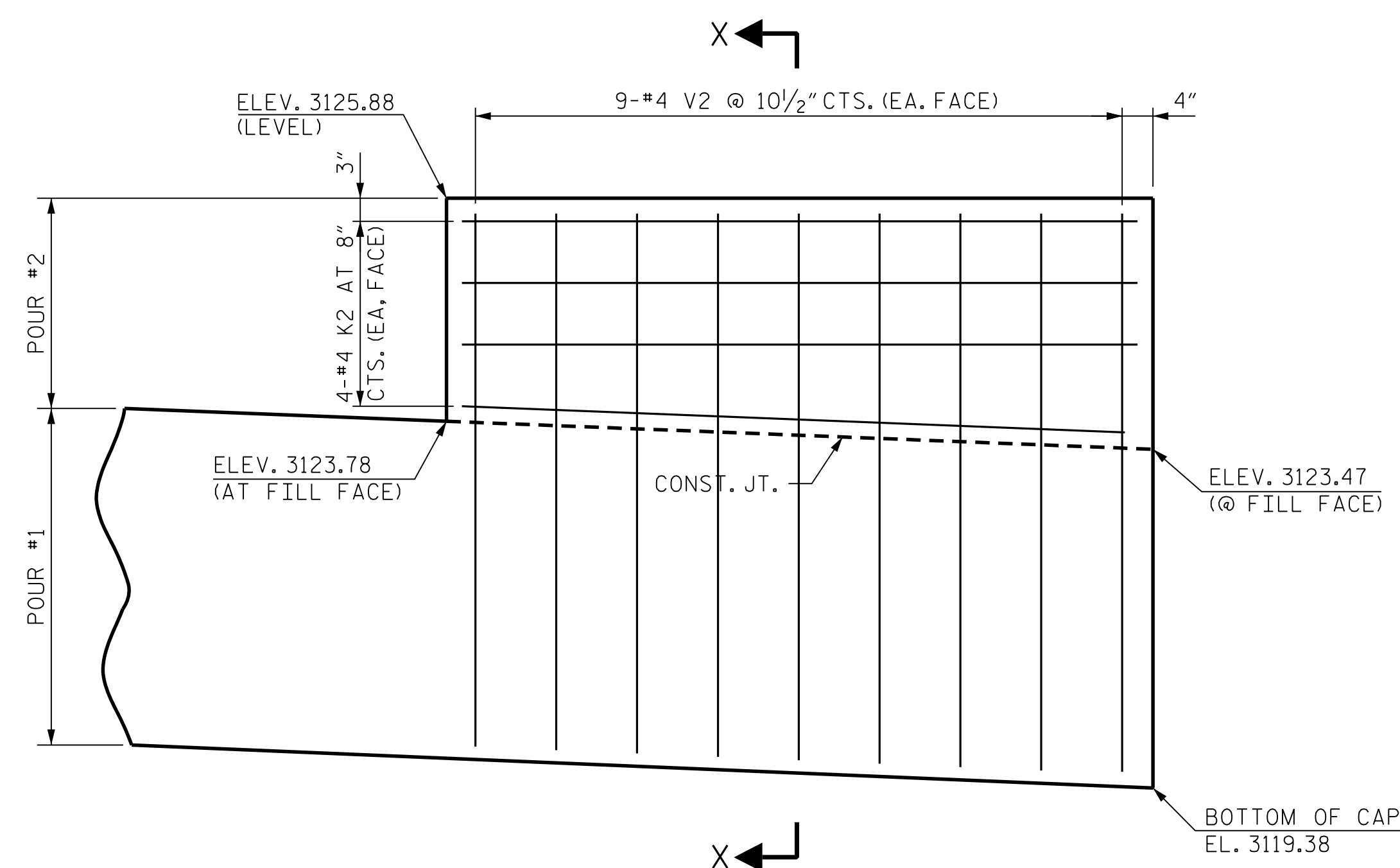
PLAN OF BACKWALL (W2)



SECTION X-X



ELEVATION OF BACKWALL (W1)

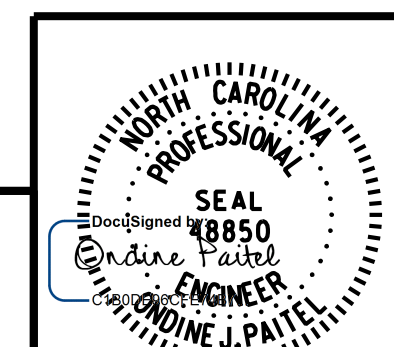


ELEVATION OF BACKWALL (W2)

BACKWALL DETAILS

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 2 OF 3

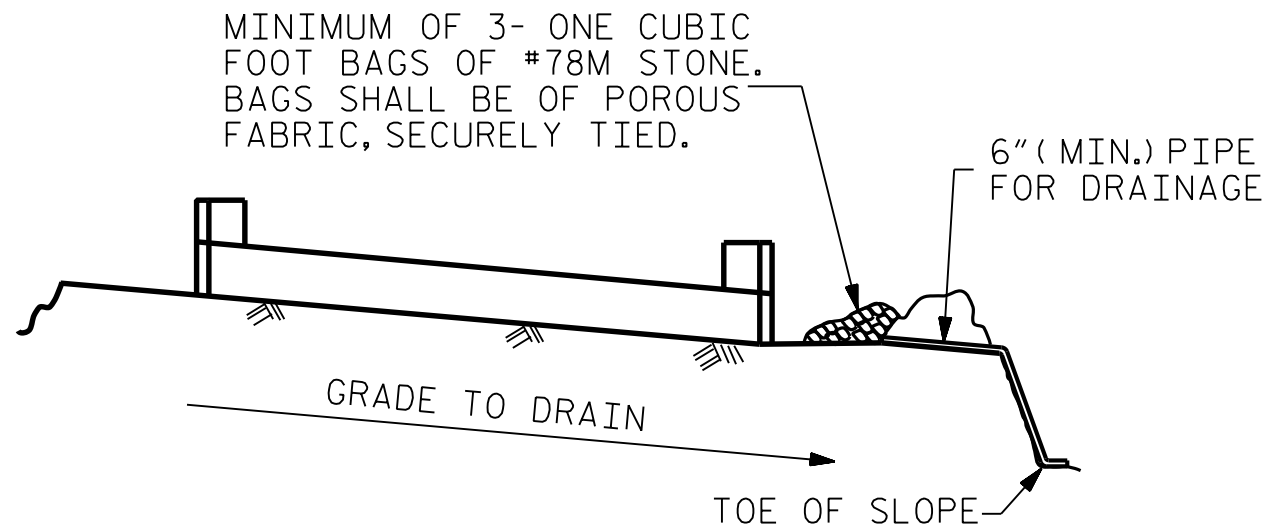


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1			3			S-18
2			4			

TOTAL SHEETS: 30

DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : JAN 2025

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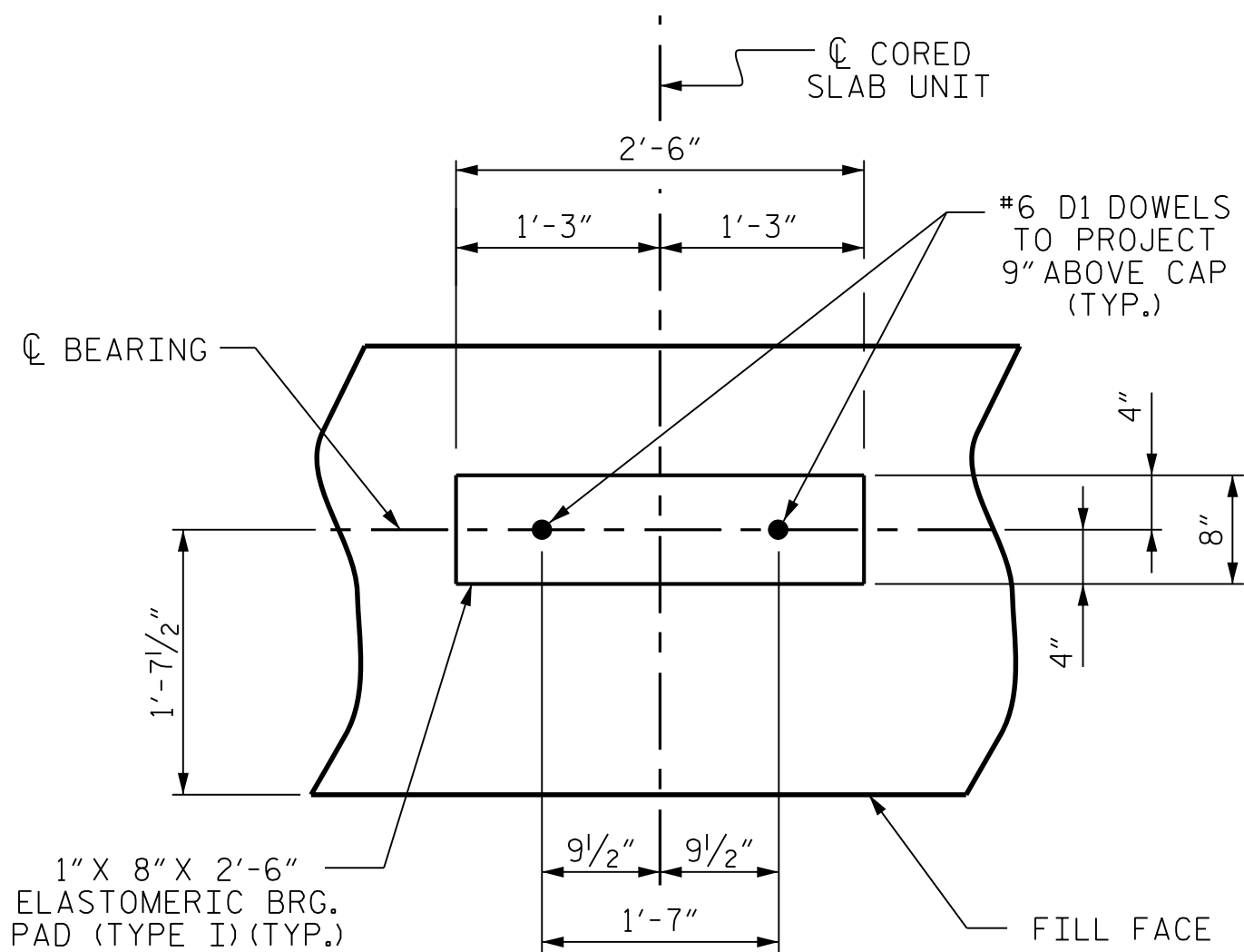


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

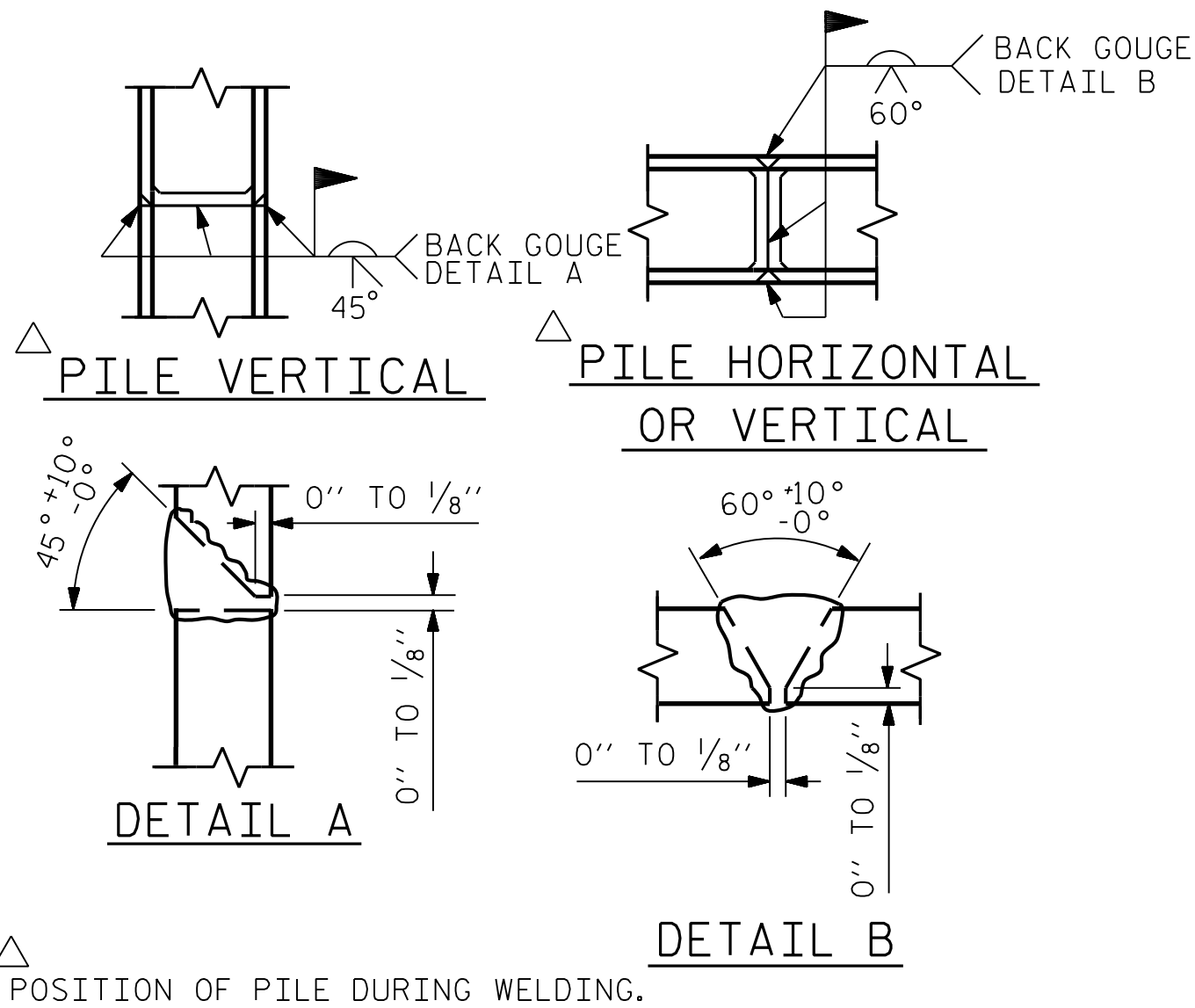
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

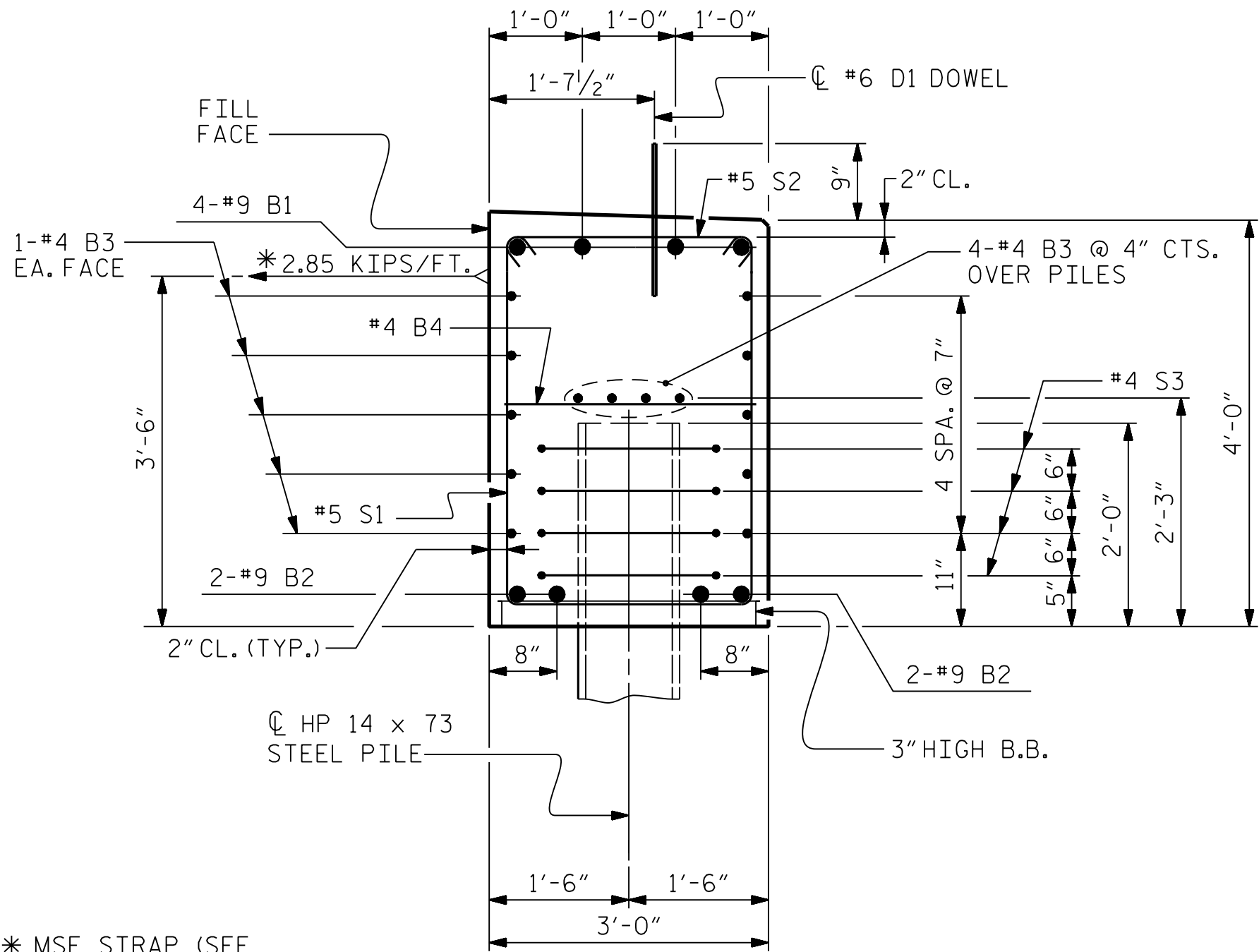
TEMPORARY DRAINAGE AT END BENT



DETAIL "A"



PILE SPLICE DETAILS



SECTION A-A

BAR TYPES		BILL OF MATERIAL FOR END BENT 1						
		BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
		B1	8	#9	1	34'-9"	945	
		B2	8	#9	1	34'-2"	929	
		B3	28	#4	STR	32'-1"	600	
		B4	15	#4	STR	2'-8"	27	
		D1	34	#6	STR	1'-6"	77	
		K1	8	#4	STR	3'-1"	16	
		K2	8	#4	STR	7'-3"	39	
		S1	82	#5	2	10'-10"	927	
		S2	82	#5	3	3'-7"	306	
		S3	28	#4	4	7'-7"	142	
		V1	8	#4	STR	6'-1"	33	
		V2	18	#4	STR	5'-10"	70	
		REINFORCING STEEL						4,111 LBS.
		CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)						
		POUR #1 CAP						27.4 C.Y.
		POUR #2 BACKWALLS						1.0 C.Y.
		TOTAL CLASS A CONCRETE						28.4 C.Y.

ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

END BENT 1
DETAILS

REVISIONS

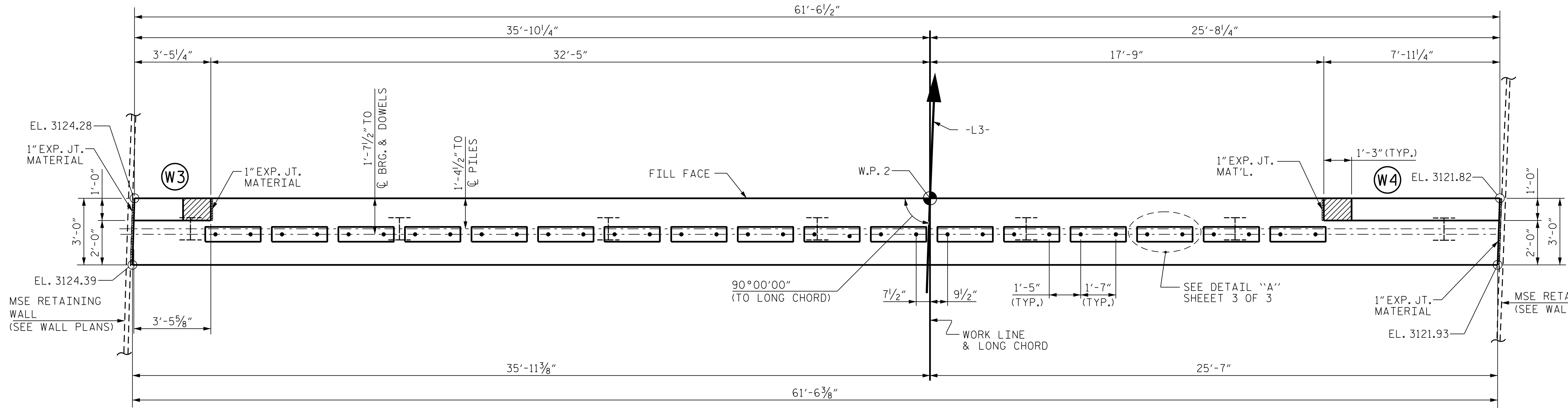
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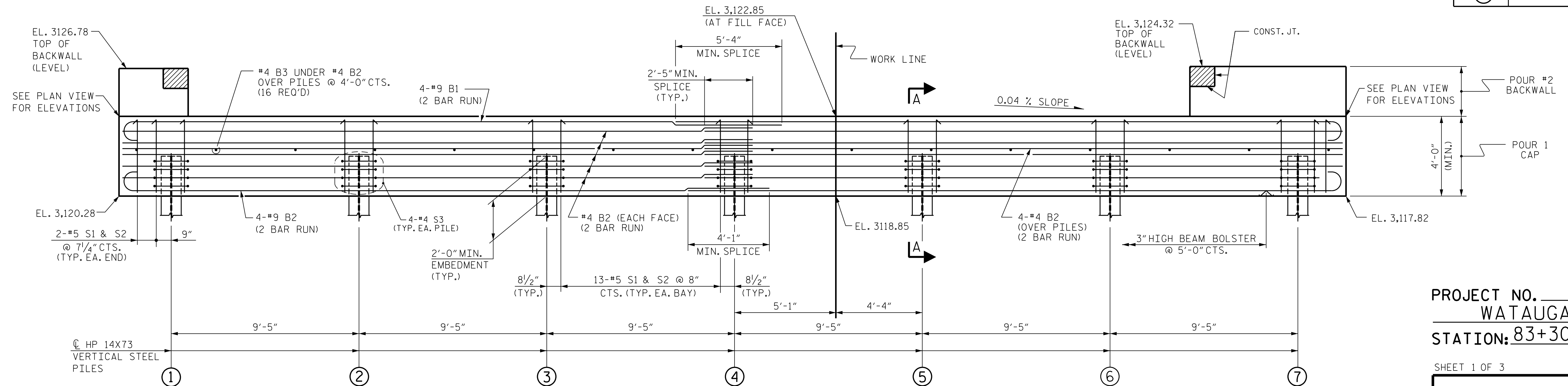
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PROFESSIONAL SEAL
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ENGINEER
BRUCE D. KLAPPENBACH
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PLAN



ELEVATION
FOR SECTION A-A, SEE SHEET 3 OF 3.

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR BACKWALL DETAILS, SEE SHEET 2 OF 3.

TOP OF PILE ELEVATIONS	
①	3,122.20
②	3,121.82
③	3,121.45
④	3,121.07
⑤	3,120.70
⑥	3,120.32
⑦	3,119.94

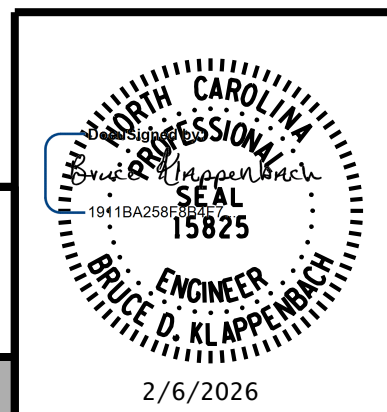
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SHEET 1 OF 3

STATE OF NORTH CAROLINA
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SUBSTRUCTURE

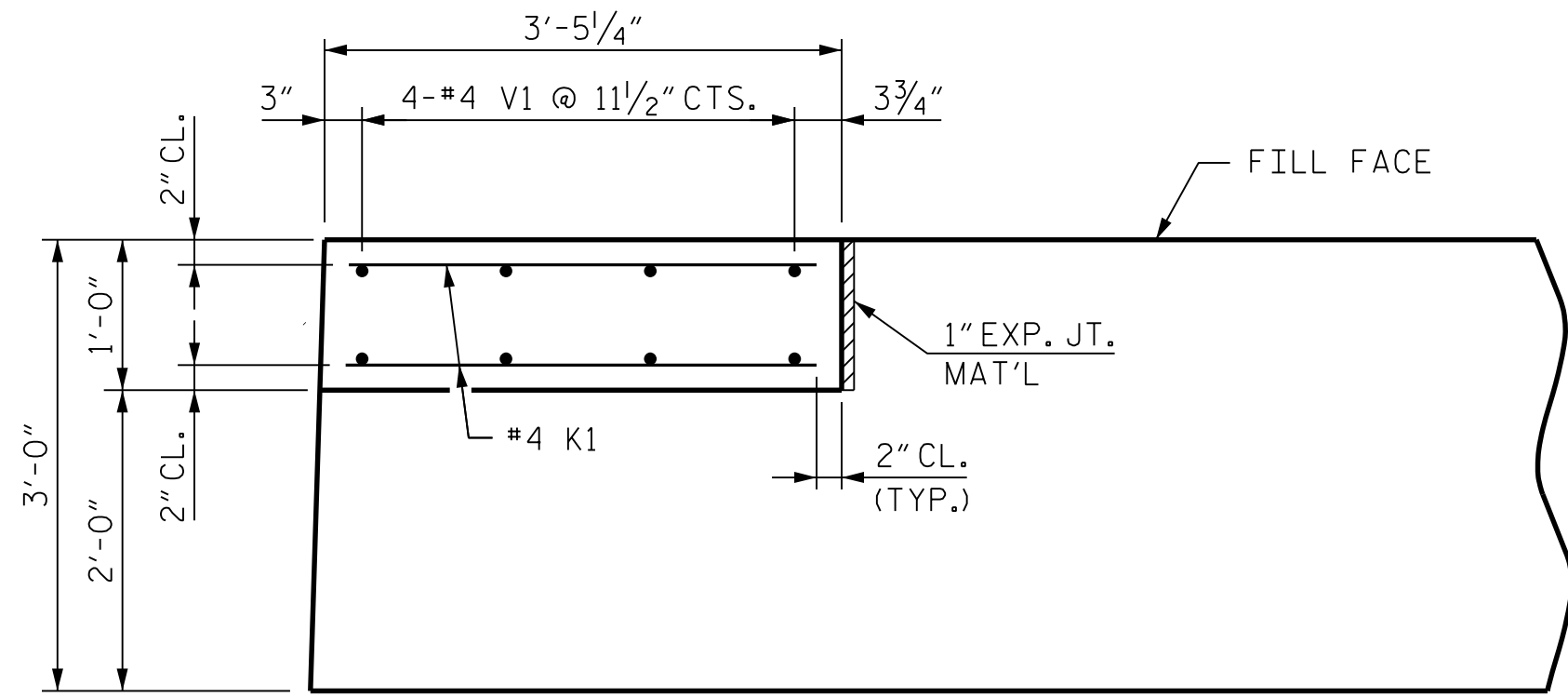
END BENT 2
PLAN AND ELEVATION



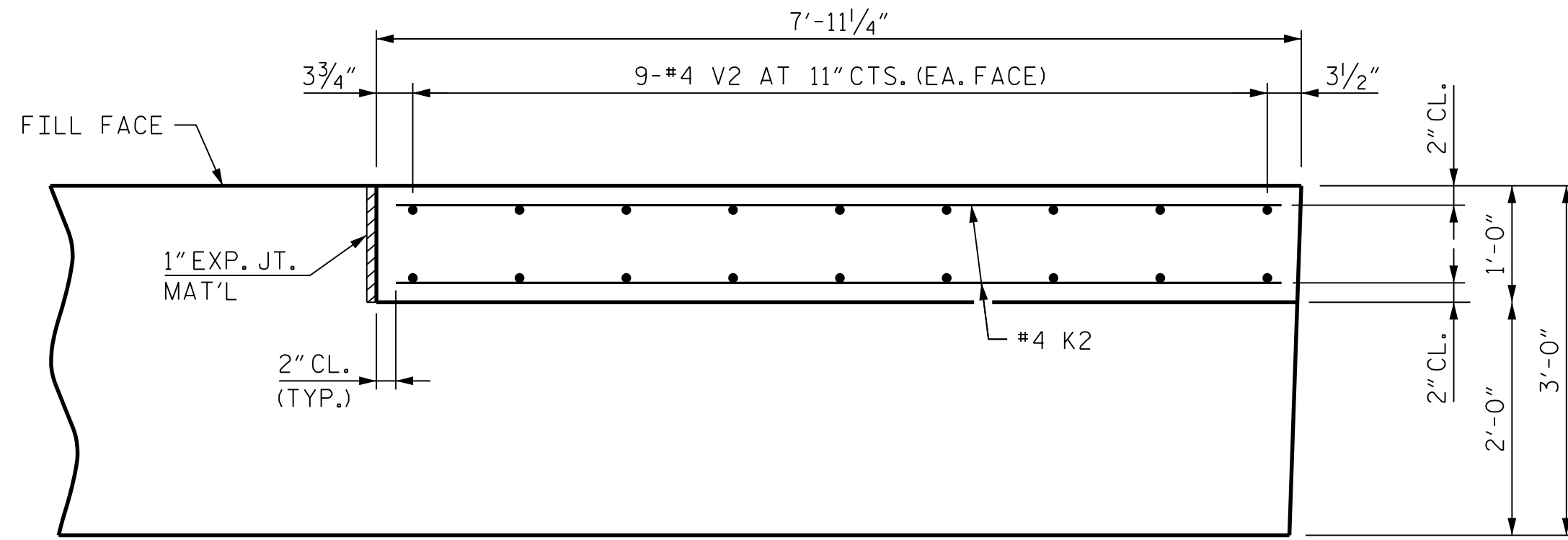
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2			4			
TOTAL SHEETS						30

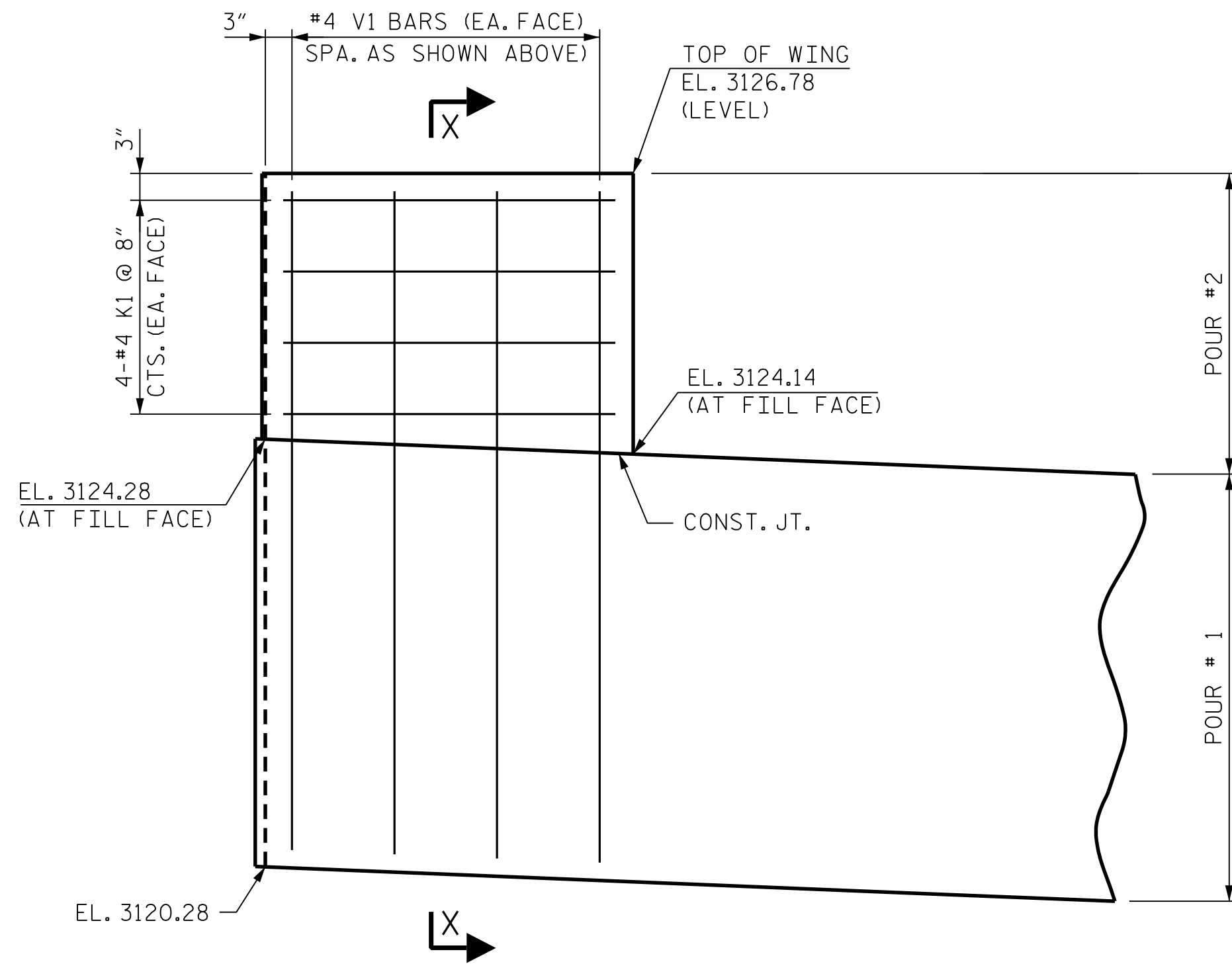
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2/6/2026
bgonfa



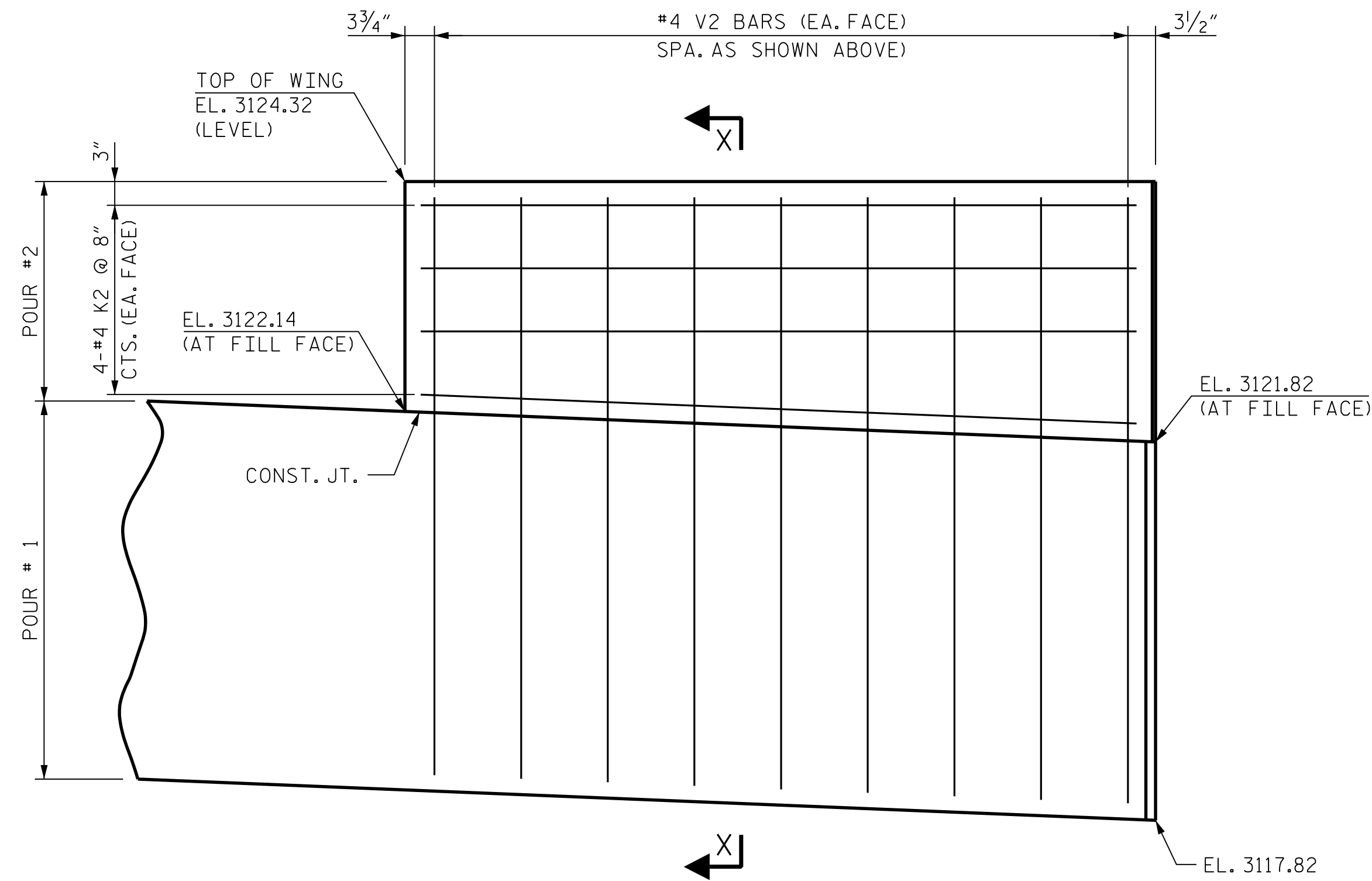
PLAN OF BACKWALL (W3)



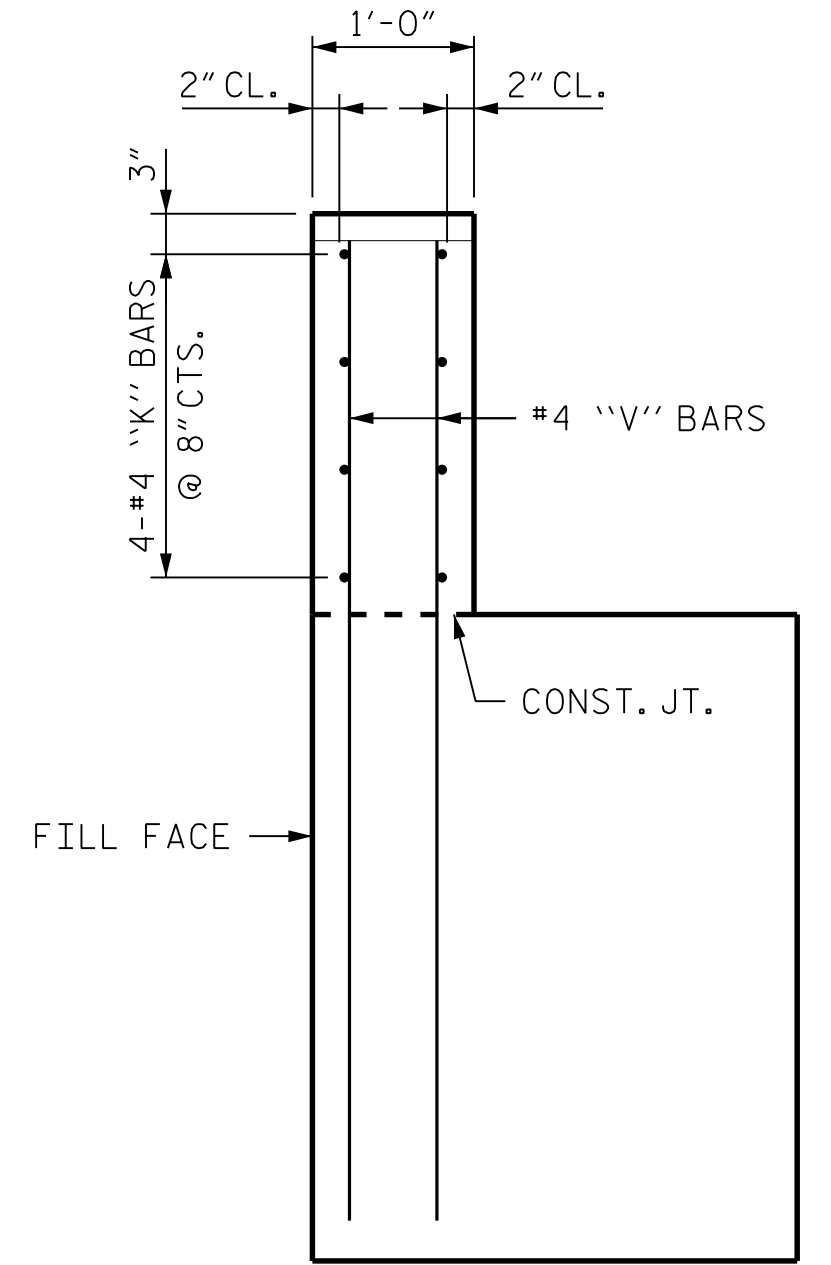
PLAN OF BACKWALL (W4)



ELEVATION OF BACKWALL (W3)



ELEVATION OF BACKWALL (W4)



SECTION X-X

"B" BARS IN LOWER PART OF CAP
NOT SHOWN FOR CLARITY

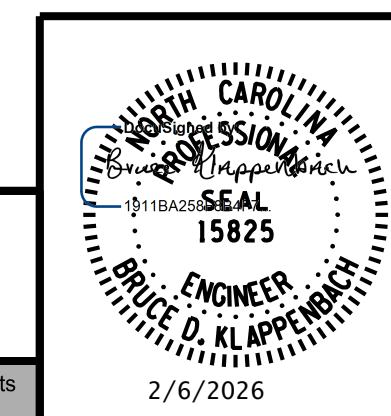
BACKWALL DETAILS

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 2 OF 3

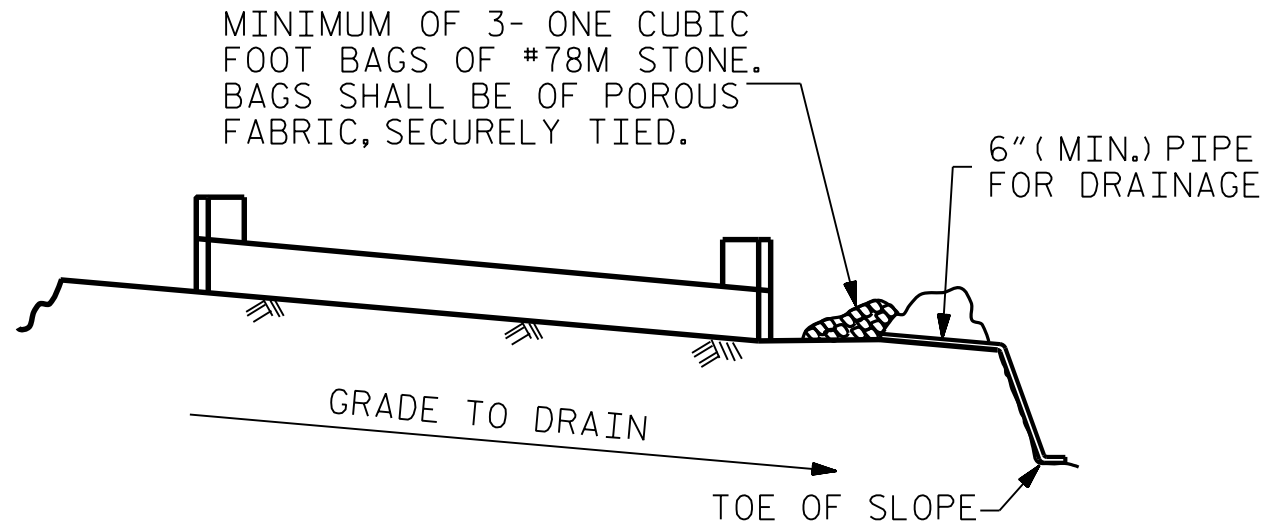
DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-21
2			4			
TOTAL SHEETS						30

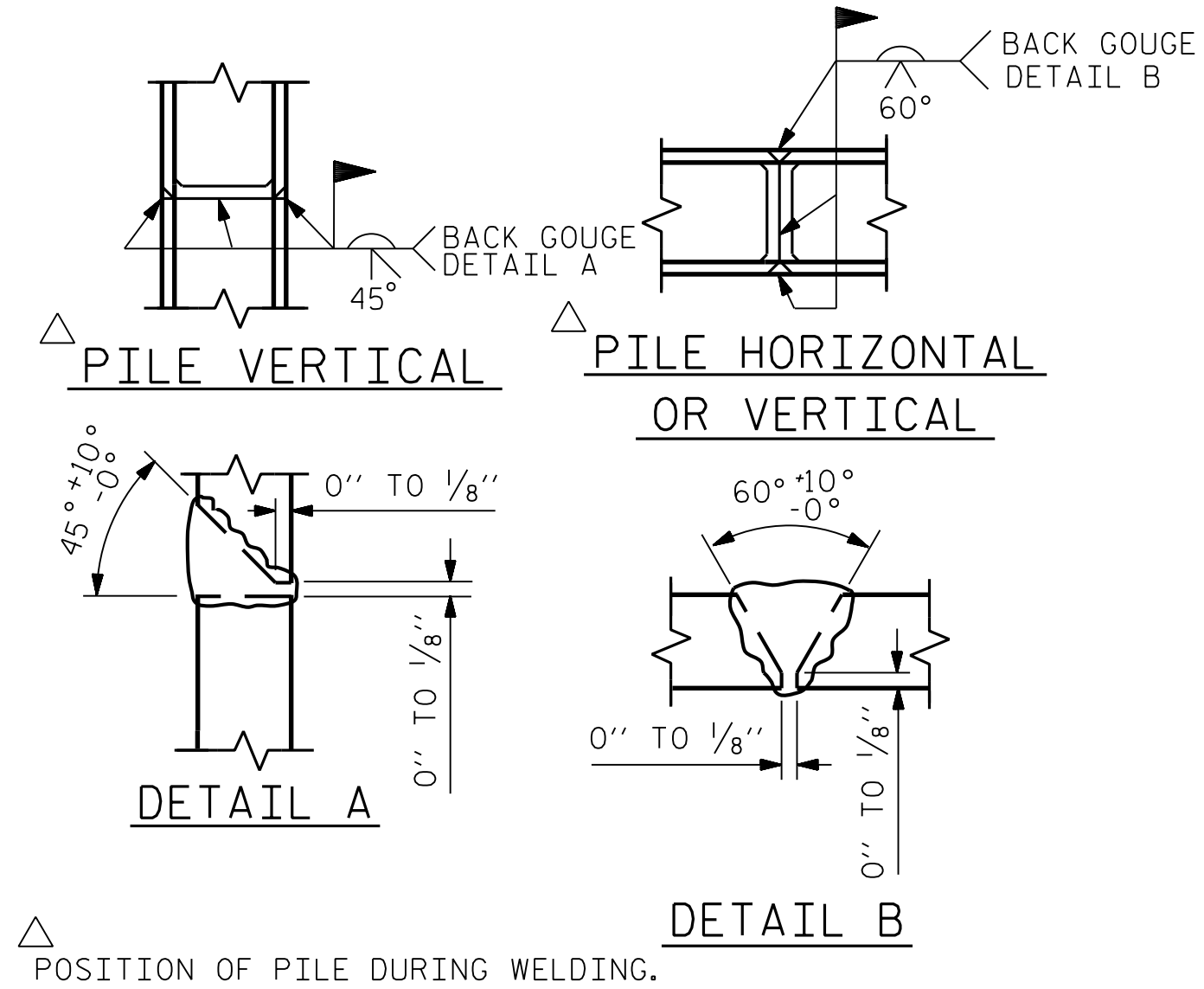
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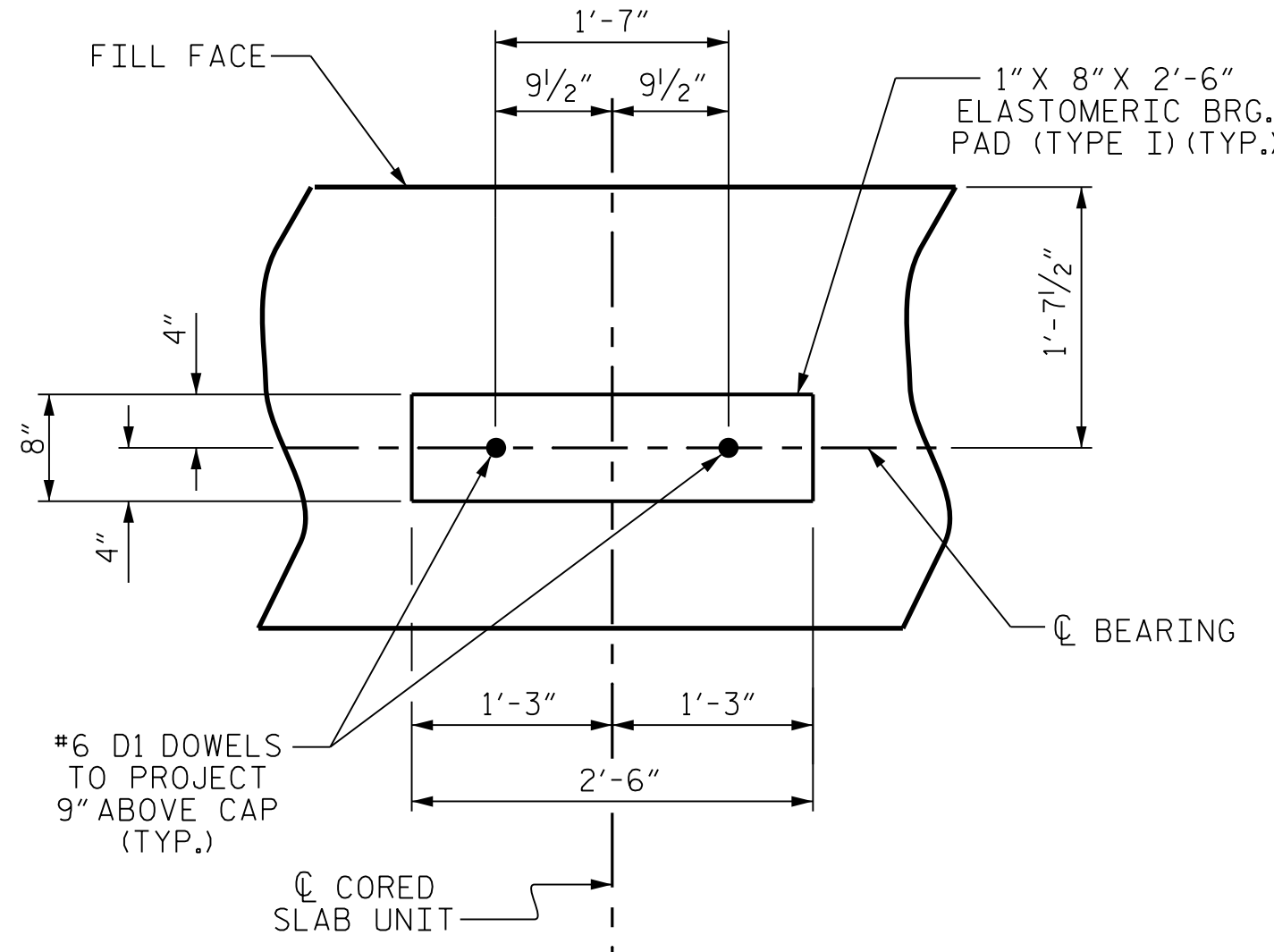
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

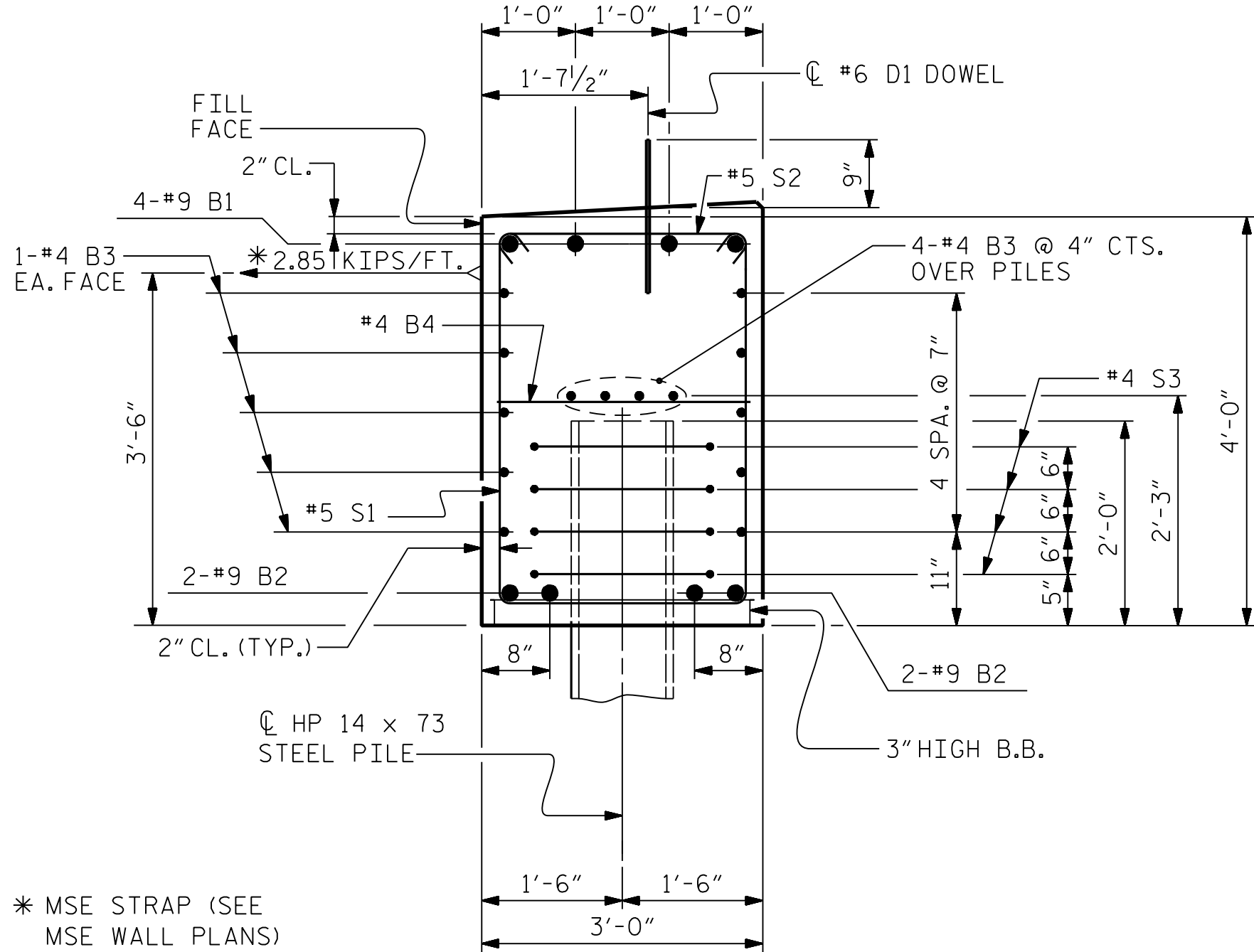
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.



PILE SPLICE DETAILS



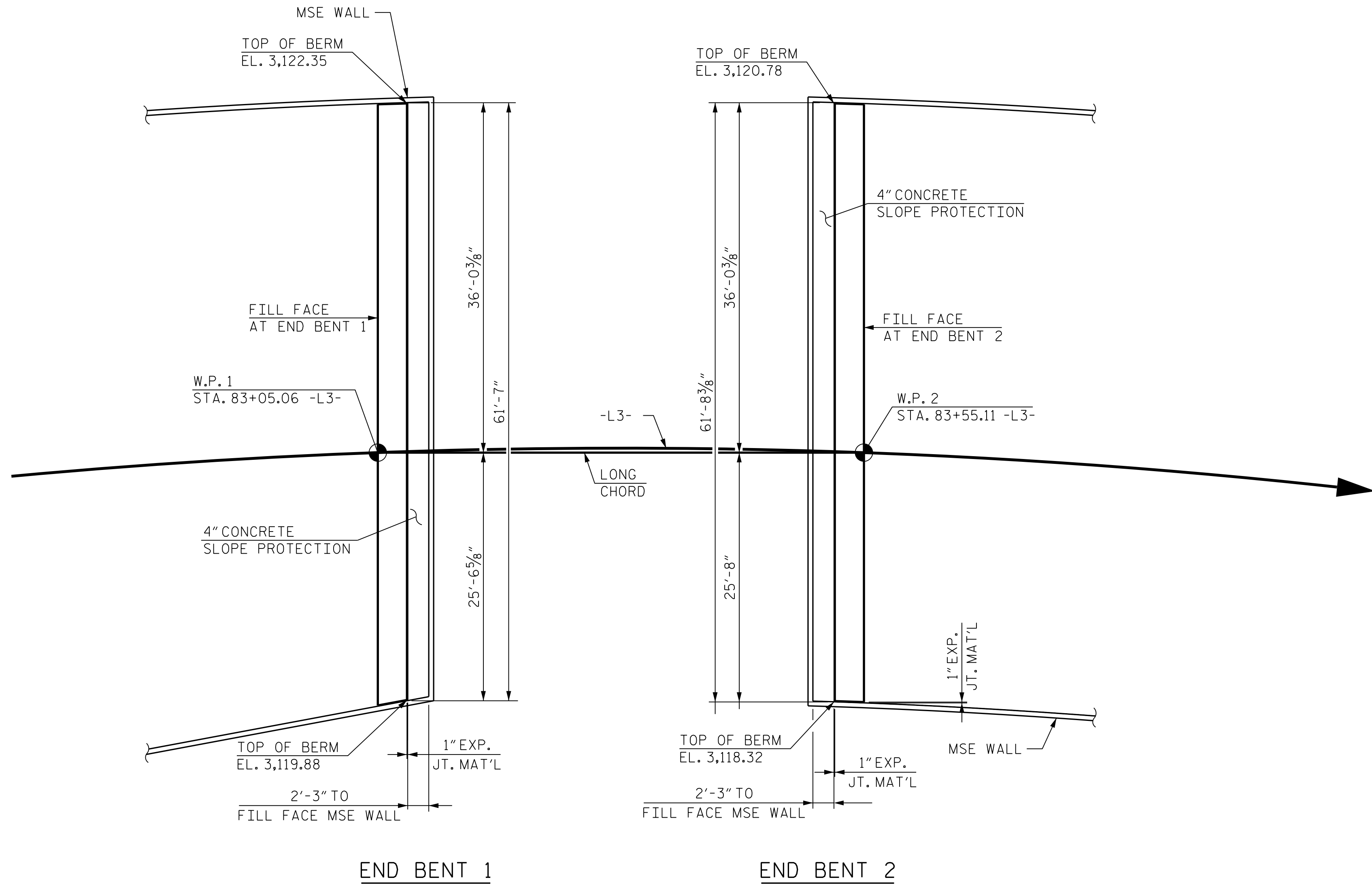
DETAIL "A"



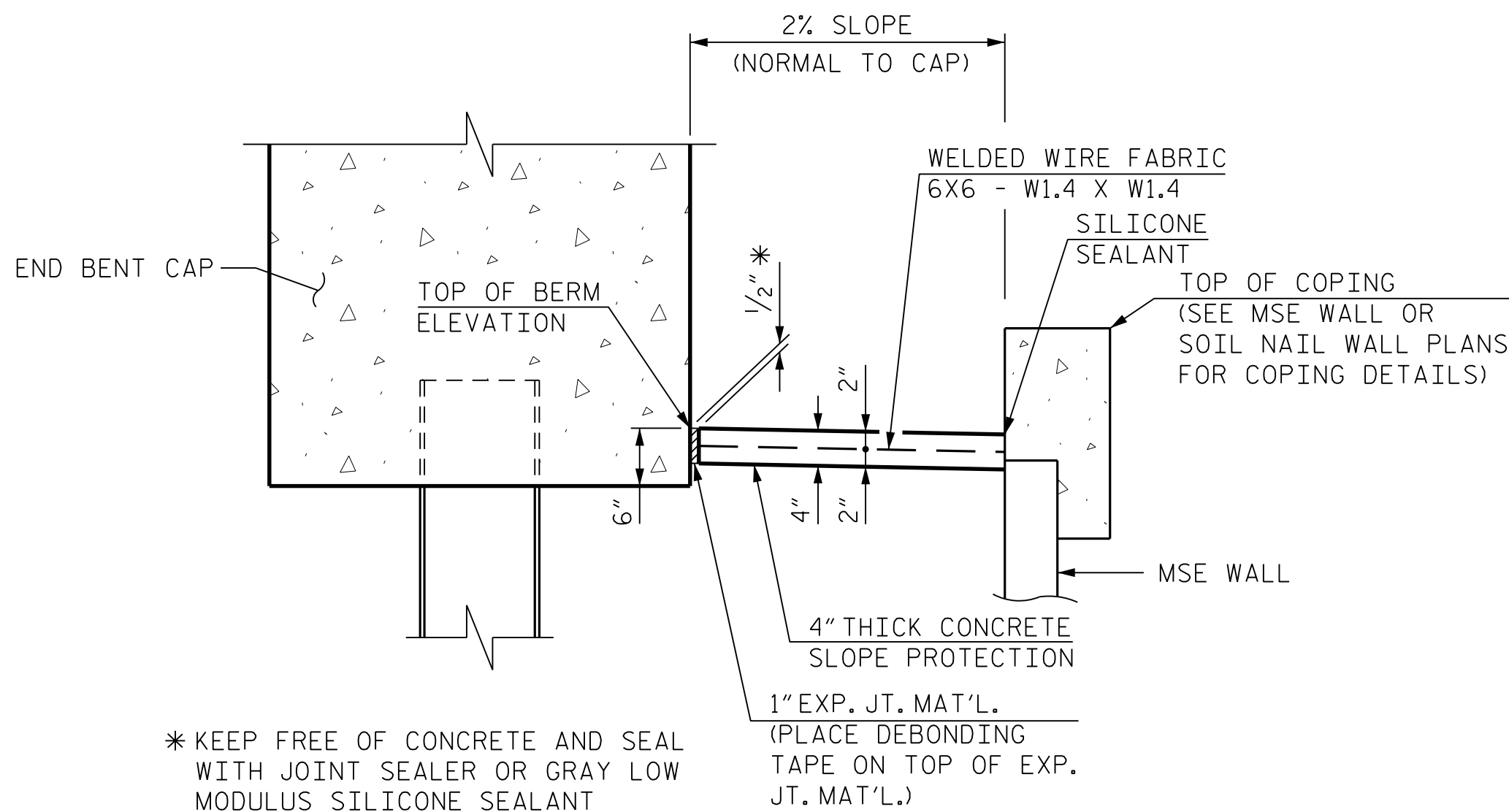
SECTION A-A

BAR TYPES				BILL OF MATERIAL					
				FOR END BENT 2					
				BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
				B1	8	#9	1	34'-7"	941
				B2	8	#9	1	33'-11"	923
				B3	28	#4	STR	31'-11"	597
				B4	16	#4	STR	2'-8"	29
				D1	34	#6	STR	1'-6"	77
				K1	8	#4	STR	3'-1"	16
				K2	8	#4	STR	7'-7"	41
				S1	82	#5	2	10'-10"	927
				S2	82	#5	3	3'-7"	306
				S3	28	#4	4	7'-7"	142
				V1	8	#4	STR	6'-1"	33
				V2	24	#4	STR	5'-9"	69
								</	

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PLAN



SECTION ALONG C ROADWAY

GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. 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. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 83+30.09 -L3-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	15.4	31.0
END BENT 2	15.4	31.0

* QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SLOPE PROTECTION DETAIL					
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS				S-23	
30					

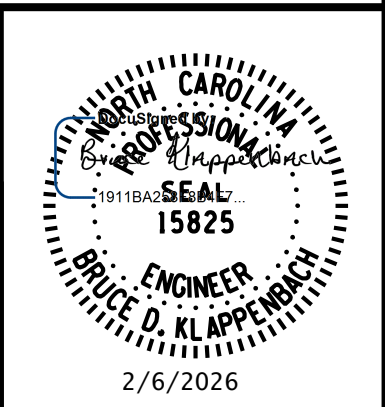
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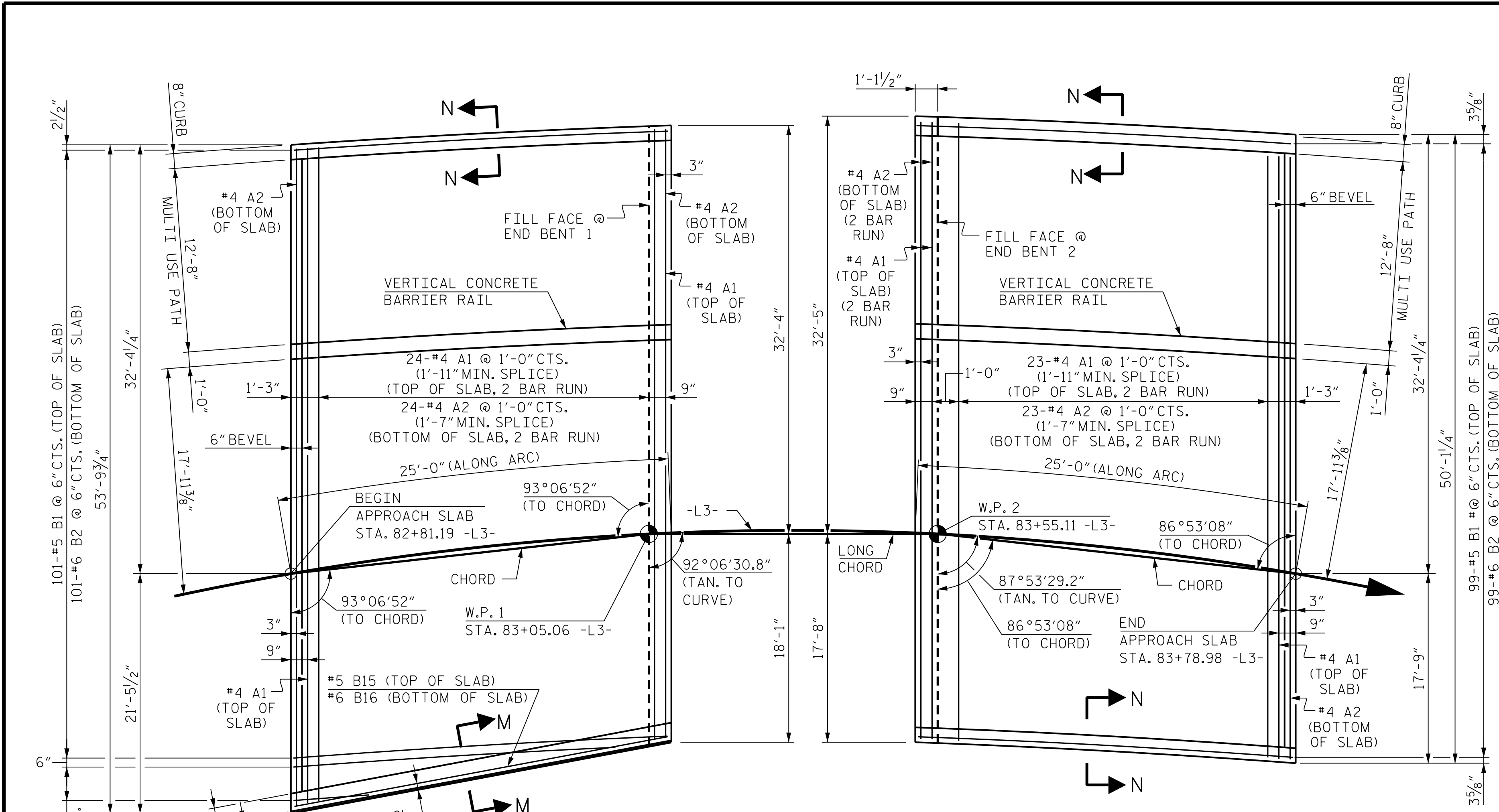
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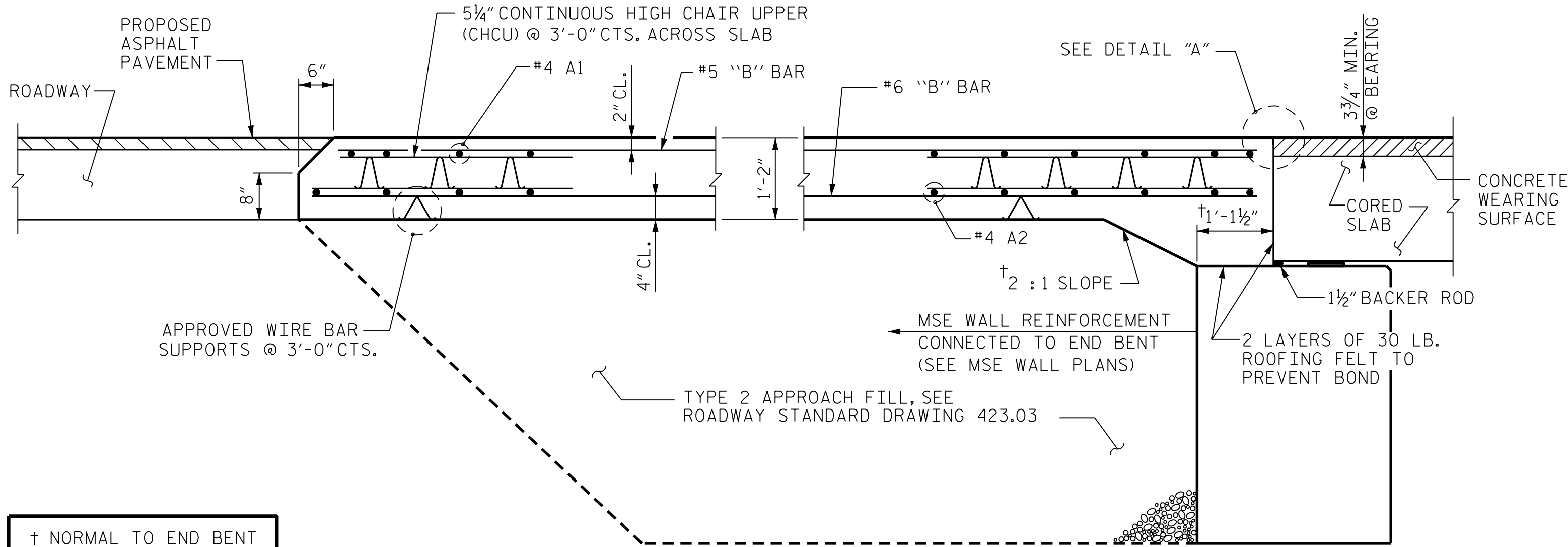
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PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS, UNLESS OTHERWISE NOTED
CHORD IS BETWEEN WORK POINT AND BEGIN/END APPROACH SLAB
"B" BARS ARE PLACED PARALLEL TO THE CHORD.



SECTION THRU SLAB

DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

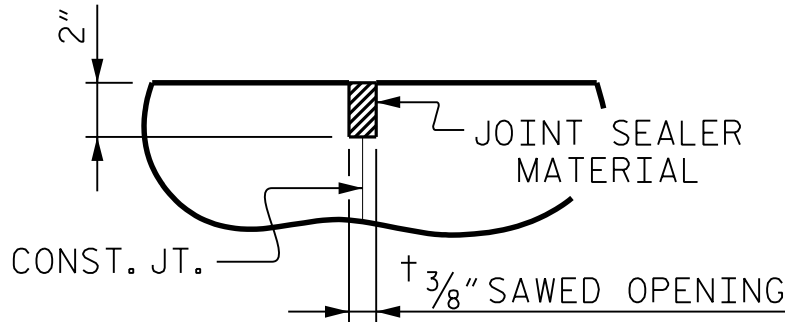
NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

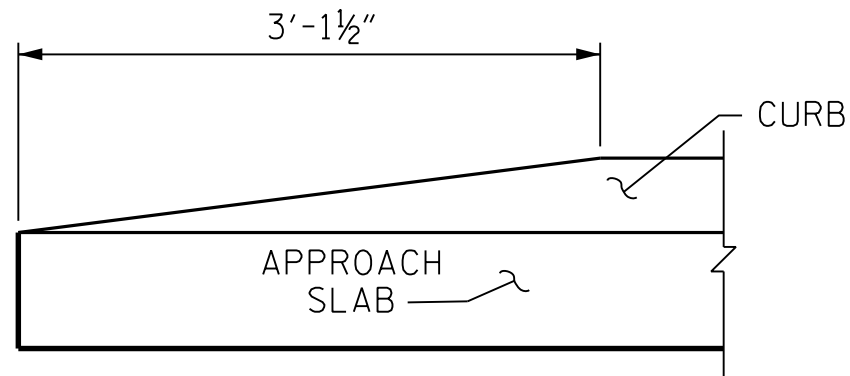
APPROACH SLABS SHALL BE POURED AFTER CONCRETE WEARING SURFACE IS POURED.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

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

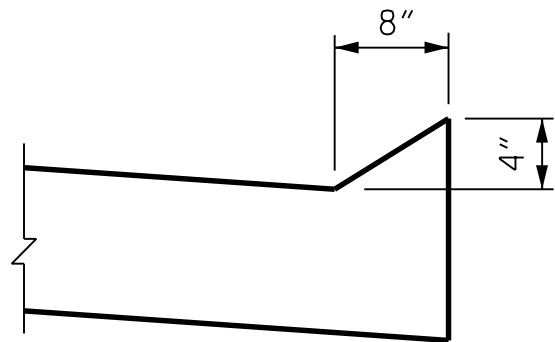


DETAIL "A"

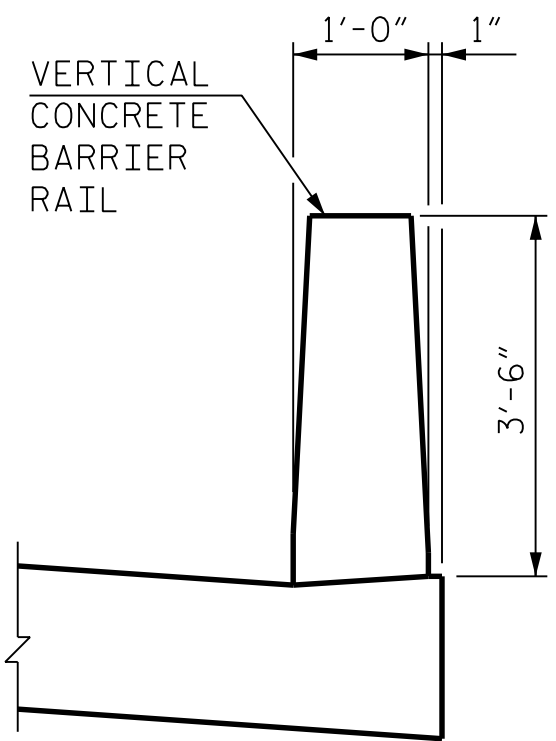


END OF CURB WITHOUT
SHOULDER BERM GUTTER

CURB DETAILS



SECTION N-N



SECTION M-M

BILL OF MATERIAL					
APPROACH SLAB AT END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR.	27'-9"	964
A2	52	#4	STR.	27'-7"	958
*B1	101	#5	STR.	24'-2"	2,546
B2	101	#6	STR.	24'-8"	3,742
*B3	1	#5	STR.	21'-3"	22
*B4	1	#5	STR.	17'-6"	18
*B5	1	#5	STR.	13'-10"	14
*B6	1	#5	STR.	10'-2"	11
*B7	1	#5	STR.	6'-6"	7
*B8	1	#5	STR.	2'-9"	3
B9	1	#6	STR.	21'-9"	33
B10	1	#6	STR.	18'-0"	27
B11	1	#6	STR.	14'-4"	22
B12	1	#6	STR.	10'-8"	16
B13	1	#6	STR.	7'-0"	11
B14	1	#6	STR.	3'-2"	5
*B15	1	#5	STR.	24'-6"	26
B16	1	#6	STR.	25'-0"	38
REINFORCING STEEL				LBS.	4,852
*EPOXY COATED REINFORCING STEEL				LBS.	3,611
CLASS AA CONCRETE				C. Y.	58.4
APPROACH SLAB AT END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR.	25'-10"	877
A2	52	#4	STR.	25'-8"	871
*B1	99	#5	STR.	24'-2"	2,495
B2	99	#6	STR.	24'-8"	3,668
REINFORCING STEEL				LBS.	4,539
*EPOXY COATED REINFORCING STEEL				LBS.	3,372
CLASS AA CONCRETE				C. Y.	56.1

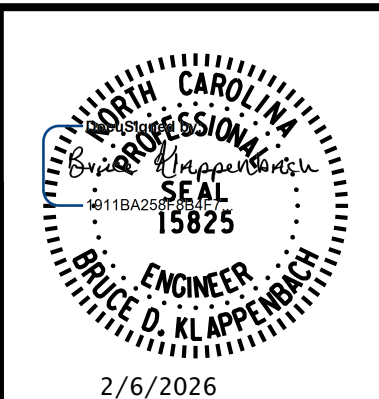
PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

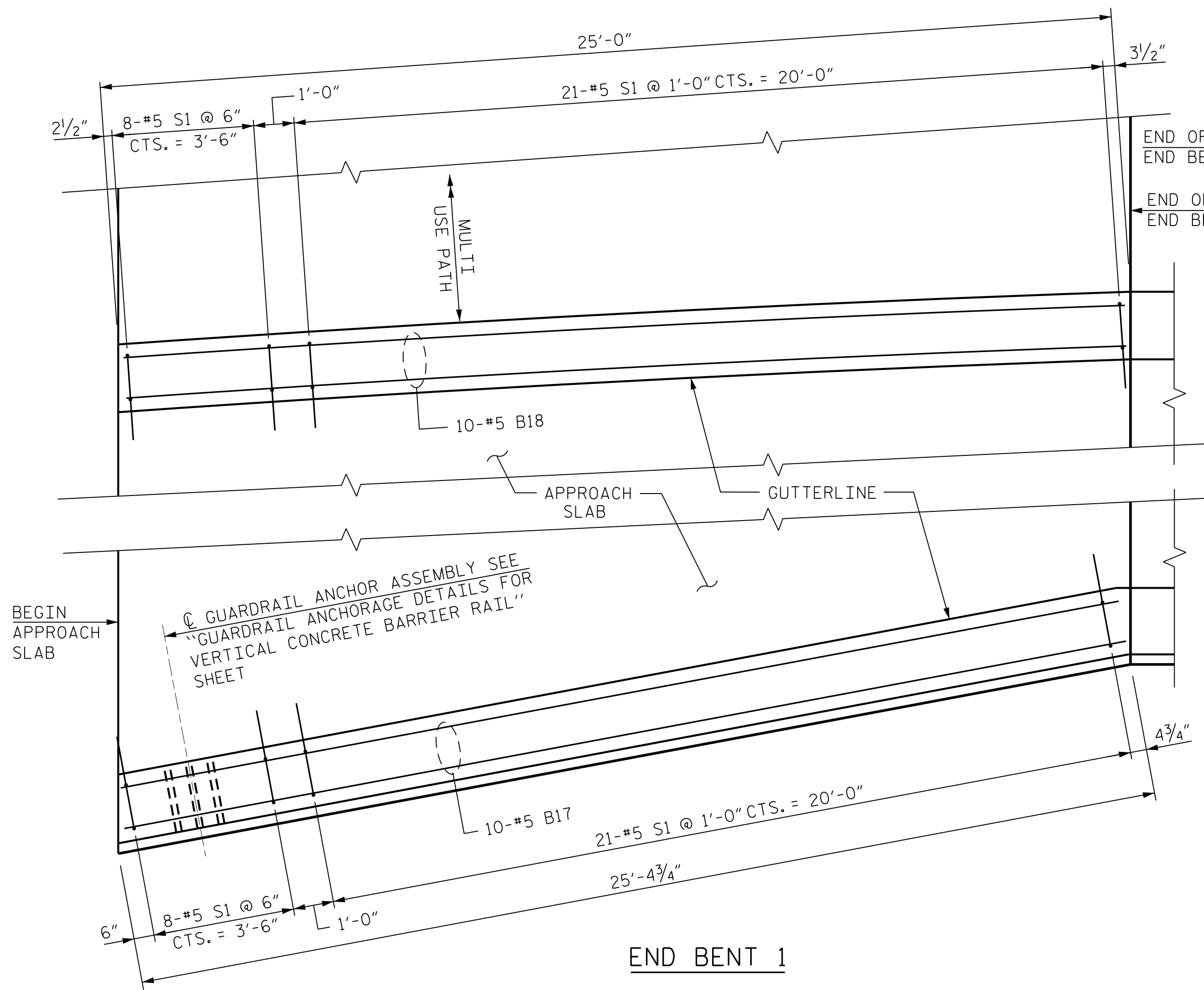
BRIDGE APPROACH
SLAB

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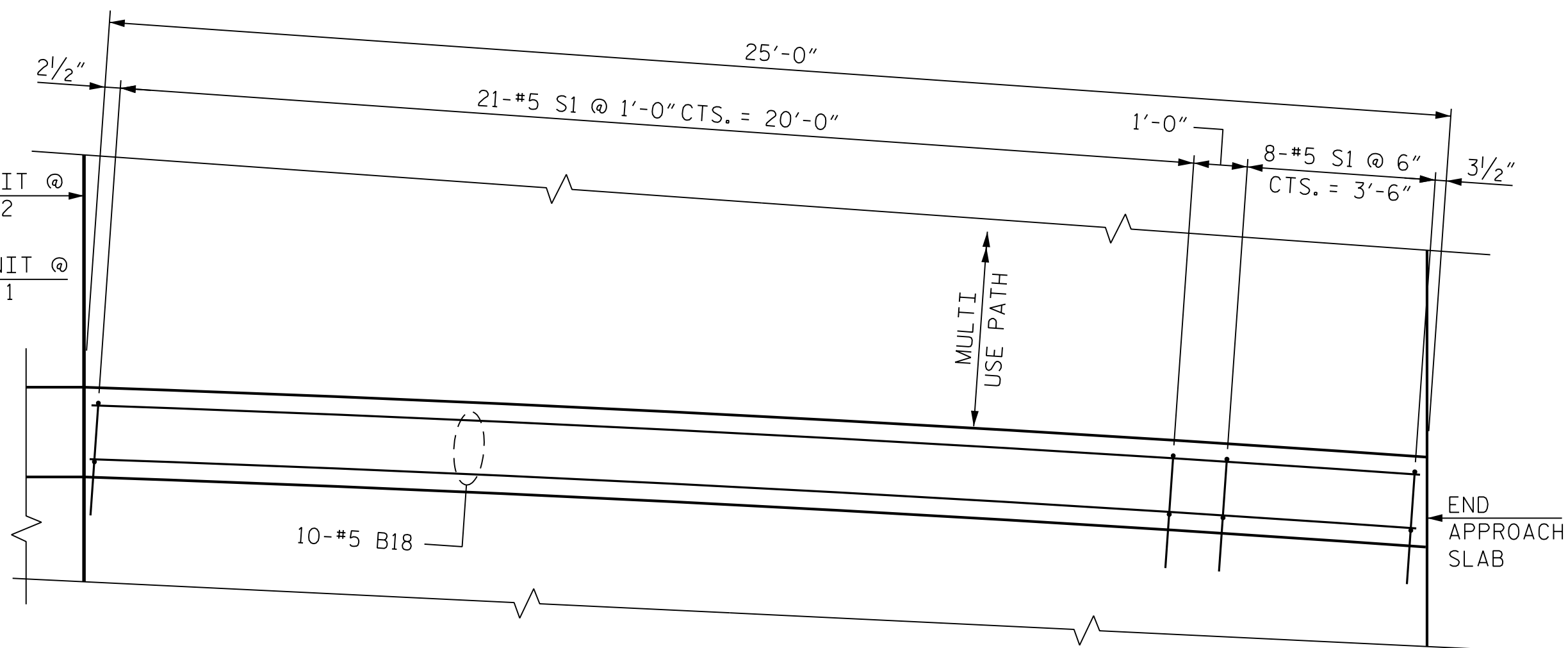
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			

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END BENT 1

PLAN OF VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLAB



END BENT 2

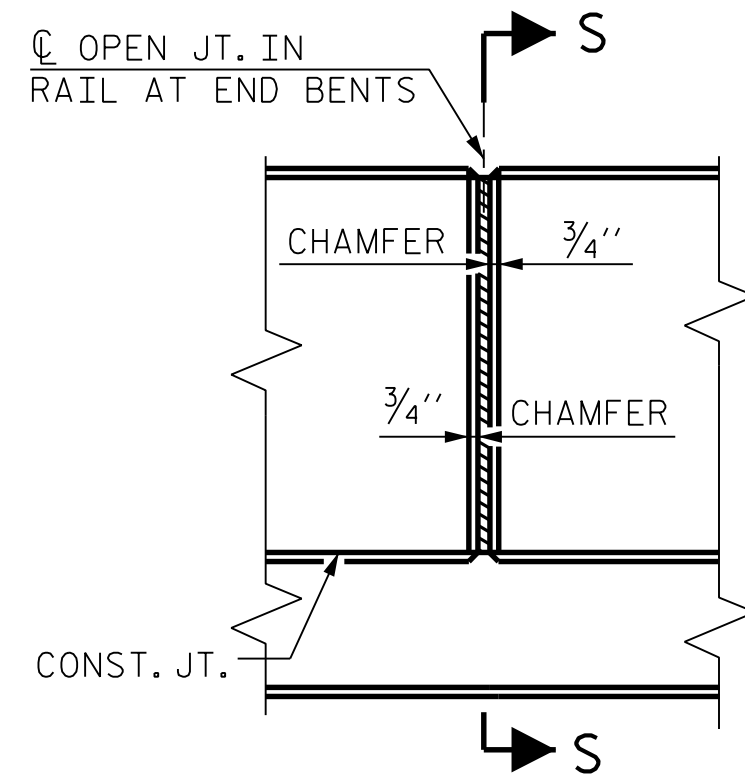
NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "VERTICAL CONCRETE BARRIER RAIL".

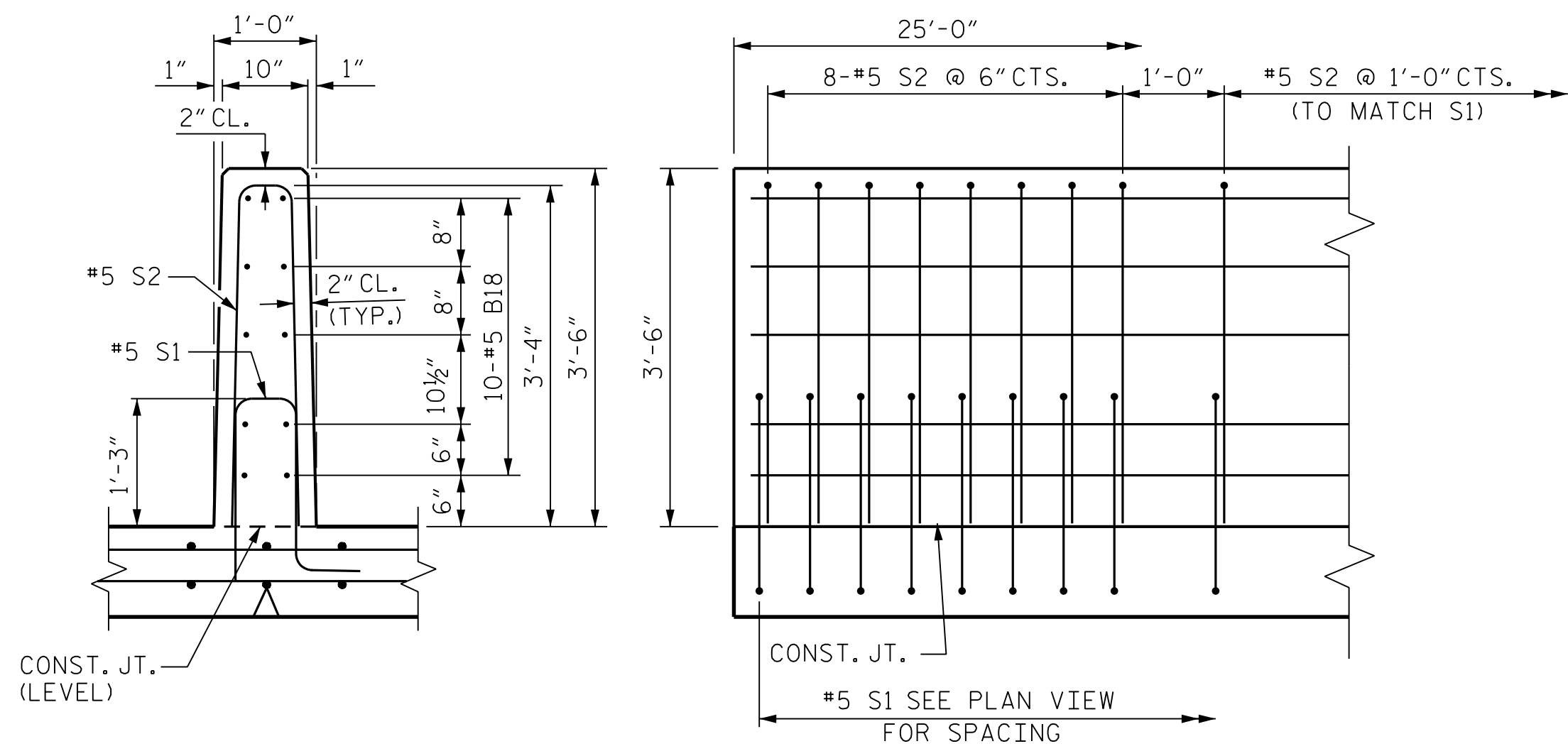
THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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



ELEVATION AT EXPANSION JOINT BARRIER RAIL DETAILS

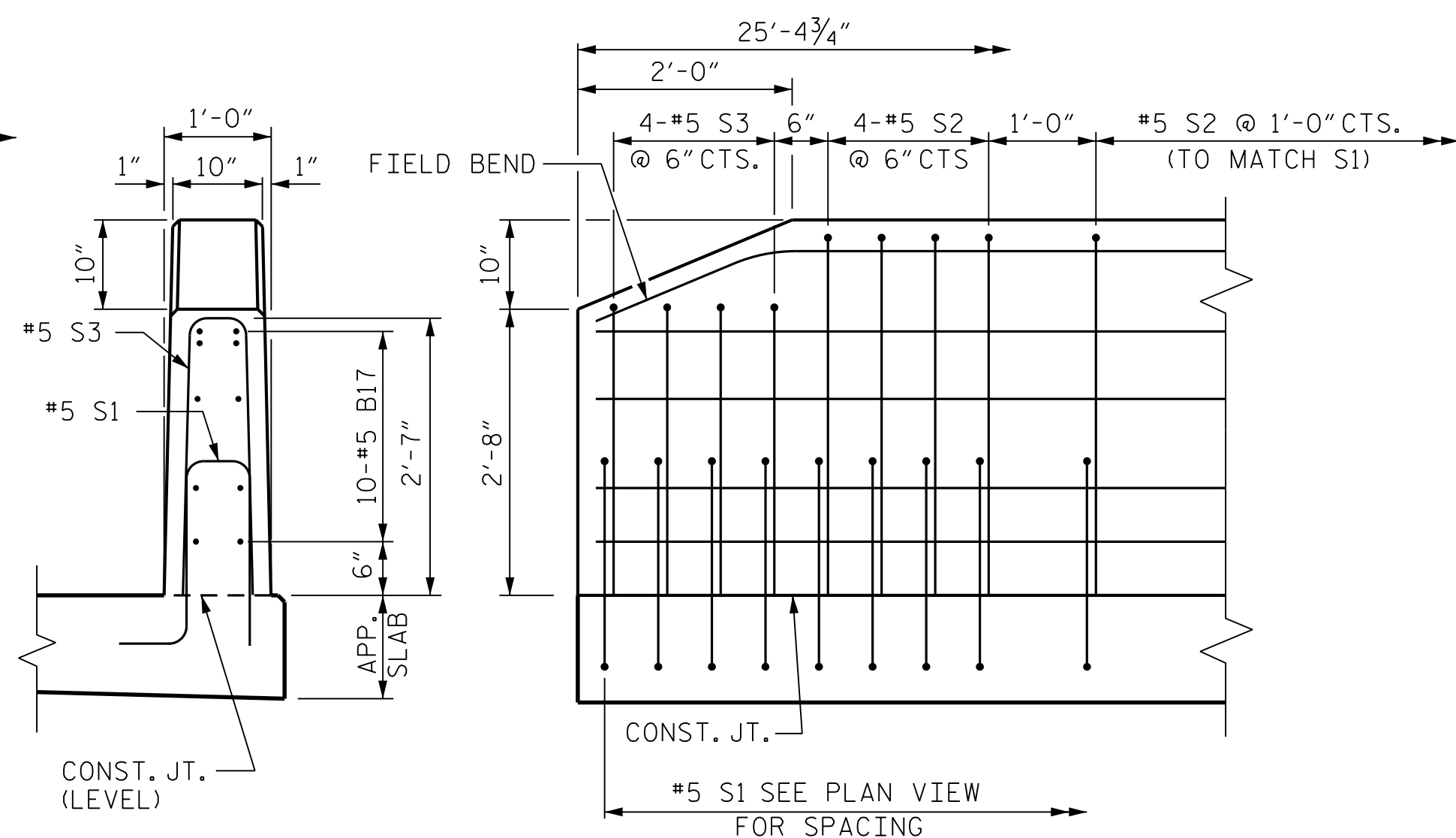


SECTION THRU RAIL

SIDE VIEW

END OF RAIL DETAILS

(APPROACH SLAB 1, LEFT SIDE)
(APPROACH SLAB 2, LEFT SIDE SIMILAR)

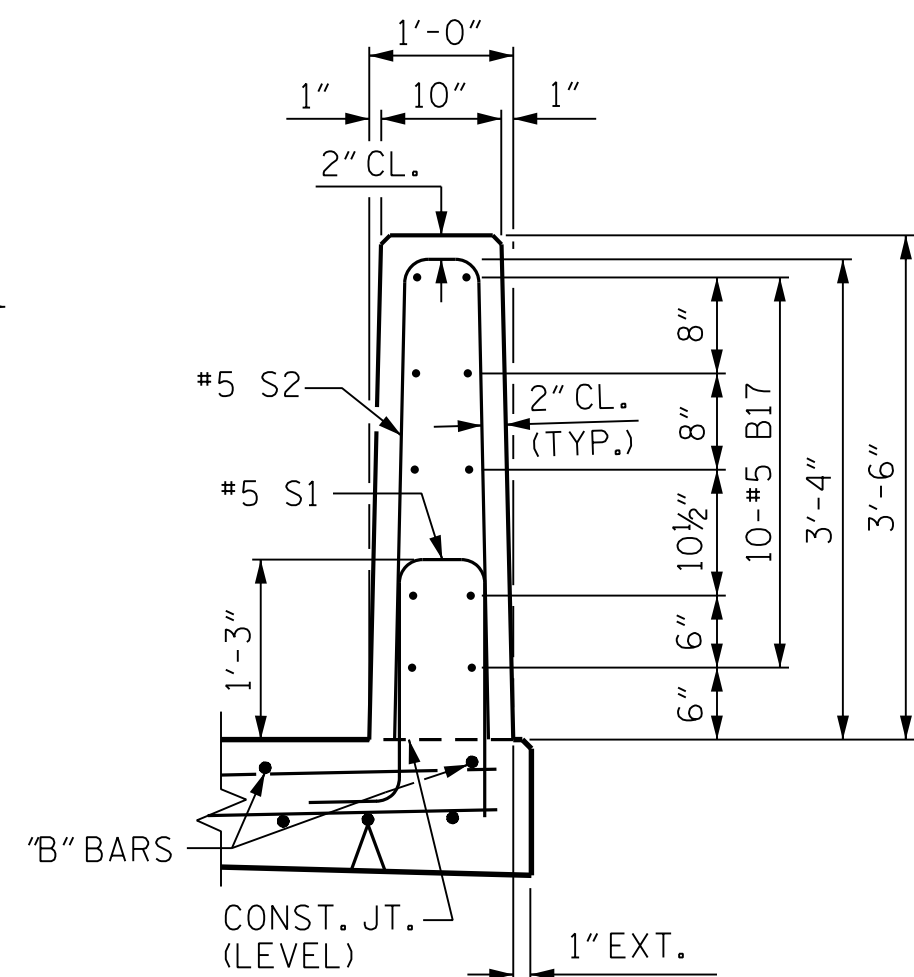


END VIEW

SIDE VIEW

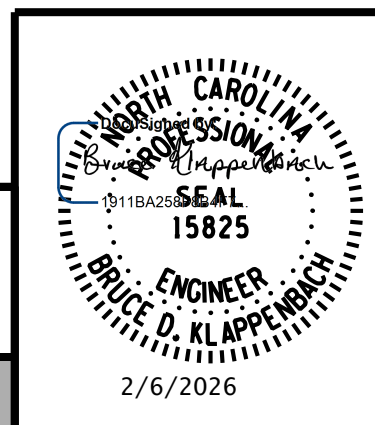
END OF RAIL DETAILS

(APPROACH SLAB 1, RIGHT SIDE)

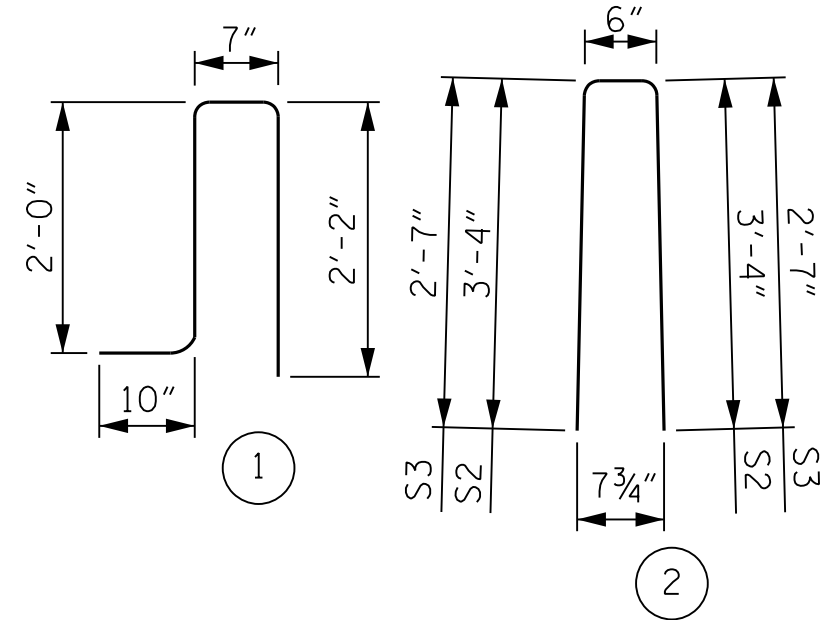


SECTION THRU RAIL

APPROACH SLAB 1, RIGHT SIDE



BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

VERTICAL CONCRETE BARRIER RAIL (APPROACH SLAB 1, RIGHT SIDE)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B17	10	#5	STR.	25'-0"	261
*S1	29	#5	1	5'-7"	169
*S2	25	#5	2	7'-2"	187
*S3	4	#5	2	5'-8"	24

EPOXY COATED *REINFORCING STEEL	LBS.	641
CLASS AA CONCRETE	C. Y.	3.1

VERTICAL CONCRETE BARRIER RAIL	LIN. FT.	25.4
-----------------------------------	----------	------

VERTICAL CONCRETE BARRIER RAIL (APPROACH SLAB 1, LEFT SIDE)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B18	10	#5	STR.	24'-7"	256
*S1	29	#5	1	5'-7"	169
*S2	29	#5	2	7'-2"	217

EPOXY COATED *REINFORCING STEEL	LBS.	642
CLASS AA CONCRETE	C. Y.	3.0

VERTICAL CONCRETE BARRIER RAIL	LIN. FT.	25.0
-----------------------------------	----------	------

VERTICAL CONCRETE BARRIER RAIL (APPROACH SLAB 2, LEFT SIDE)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B18	10	#5	STR.	25'-7"	256
*S1	29	#5	1	5'-7"	169
*S2	29	#5	2	7'-2"	217

EPOXY COATED *REINFORCING STEEL	LBS.	642
CLASS AA CONCRETE	C. Y.	3.0

VERTICAL CONCRETE BARRIER RAIL	LIN. FT.	25.0
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PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 - L3-

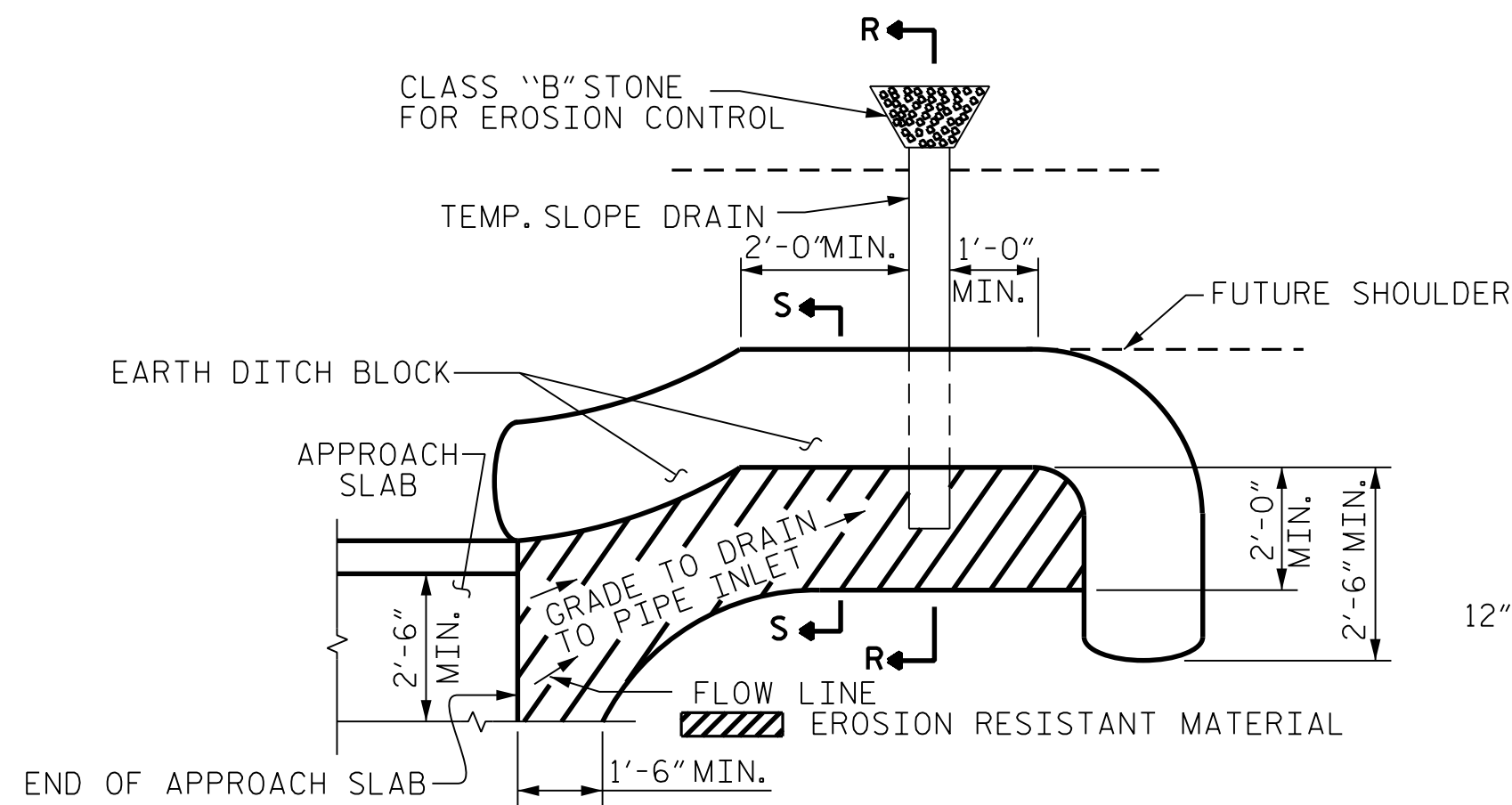
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

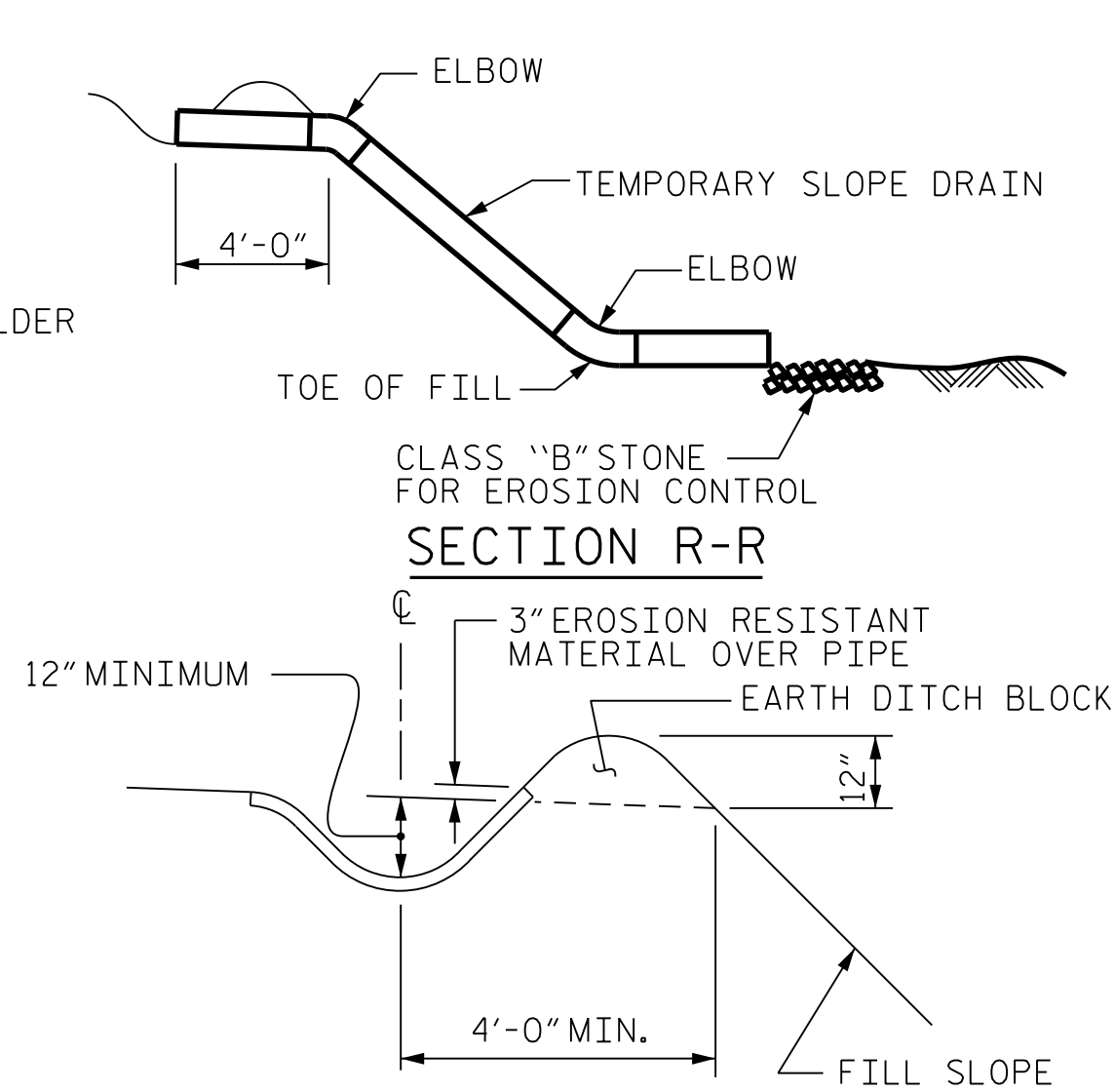
BRIDGE APPROACH SLAB DETAIL

REVISIONS						SHEET NO. S-25
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			

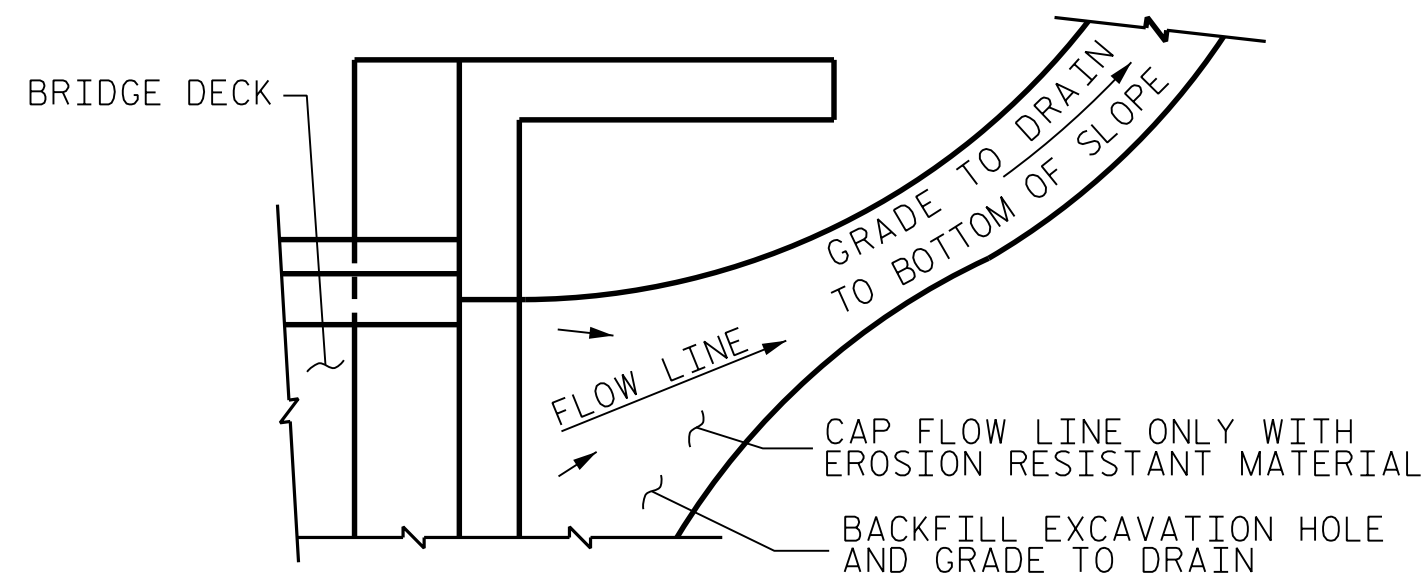
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PLAN VIEW



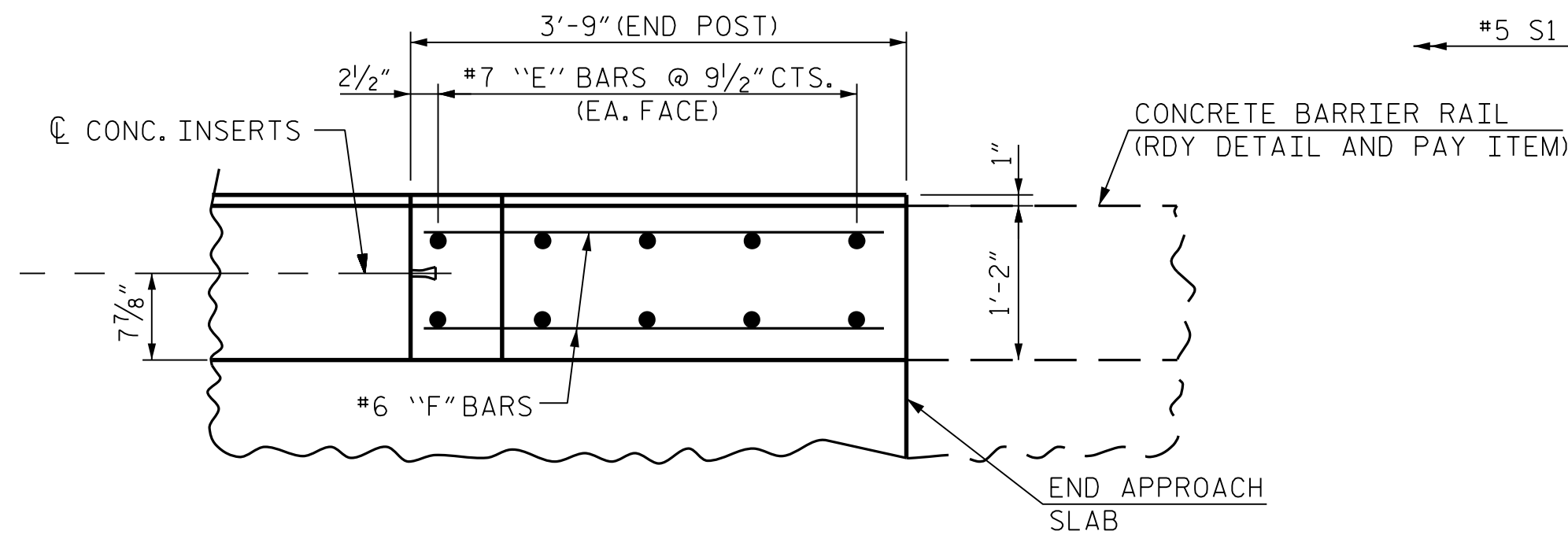
SECTION S-S



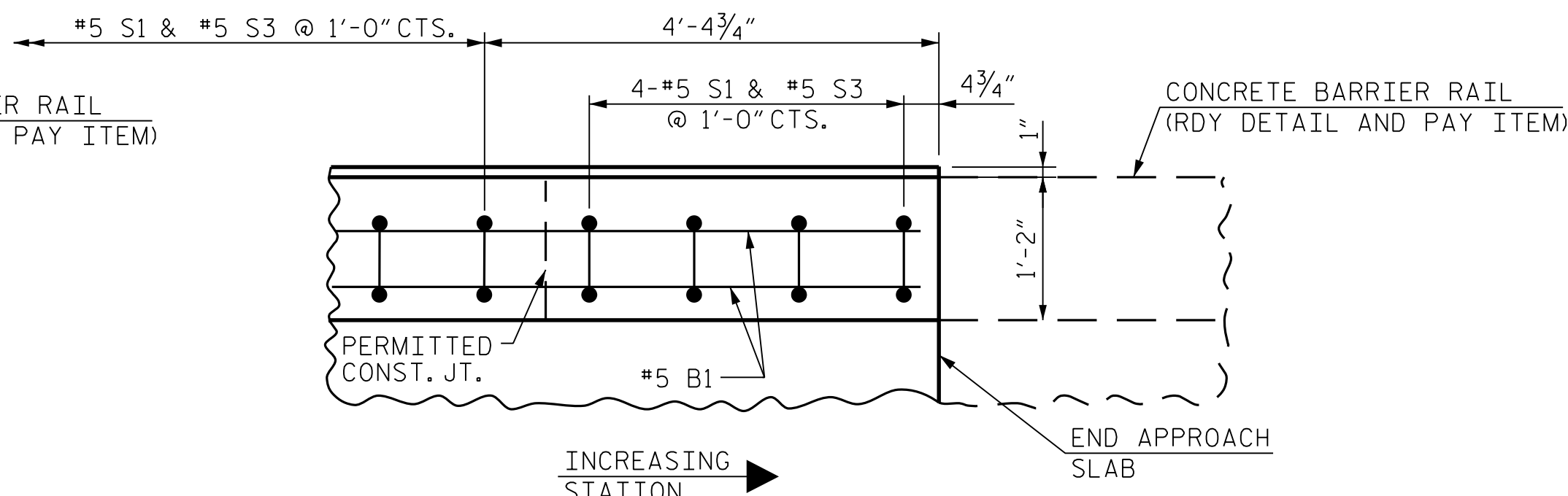
TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



PLAN OF END POST



PLAN OF PARAPET

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB
DETAIL AND
END POST DETAILS

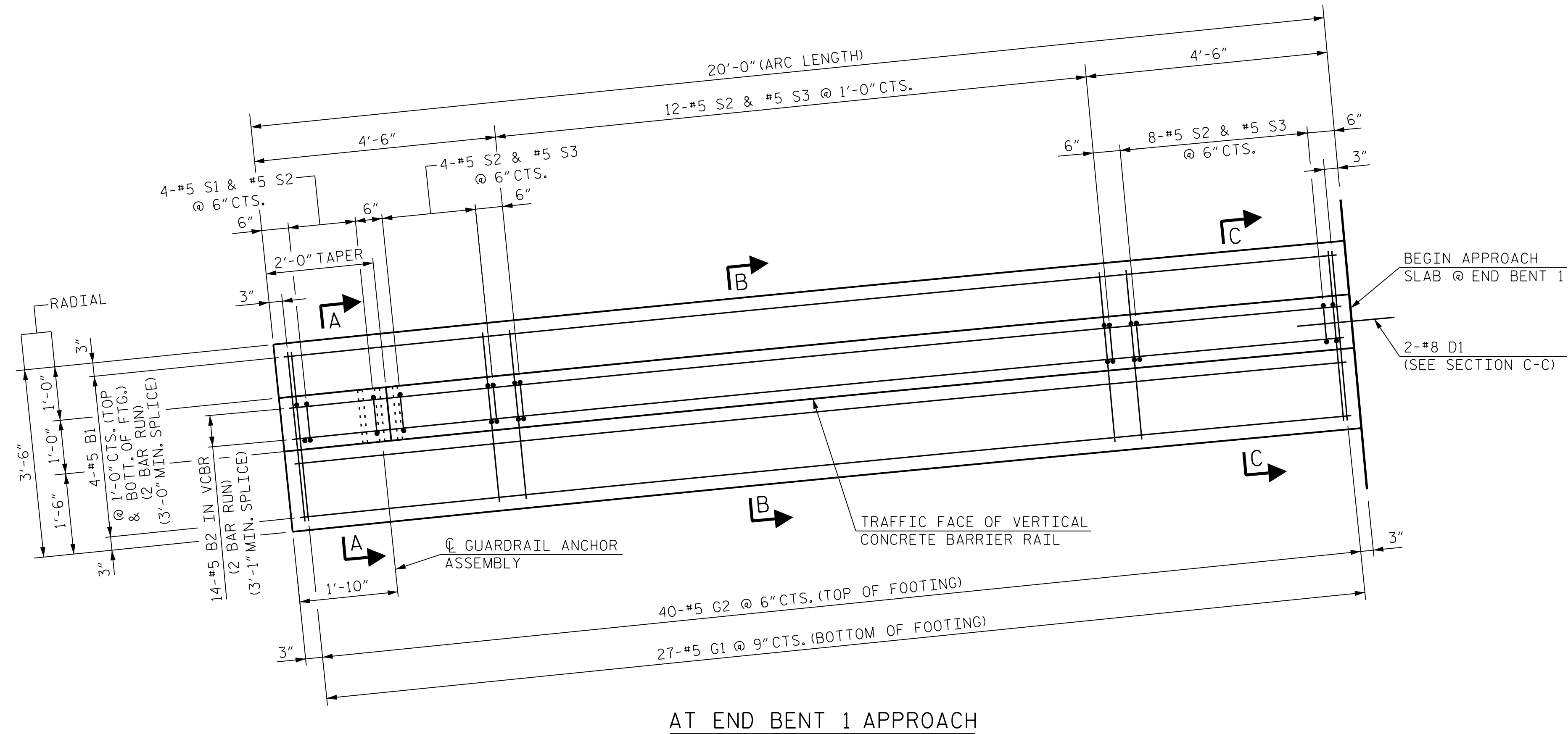
DRAWN BY : B. H. GONFA DATE : JAN 2025
CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

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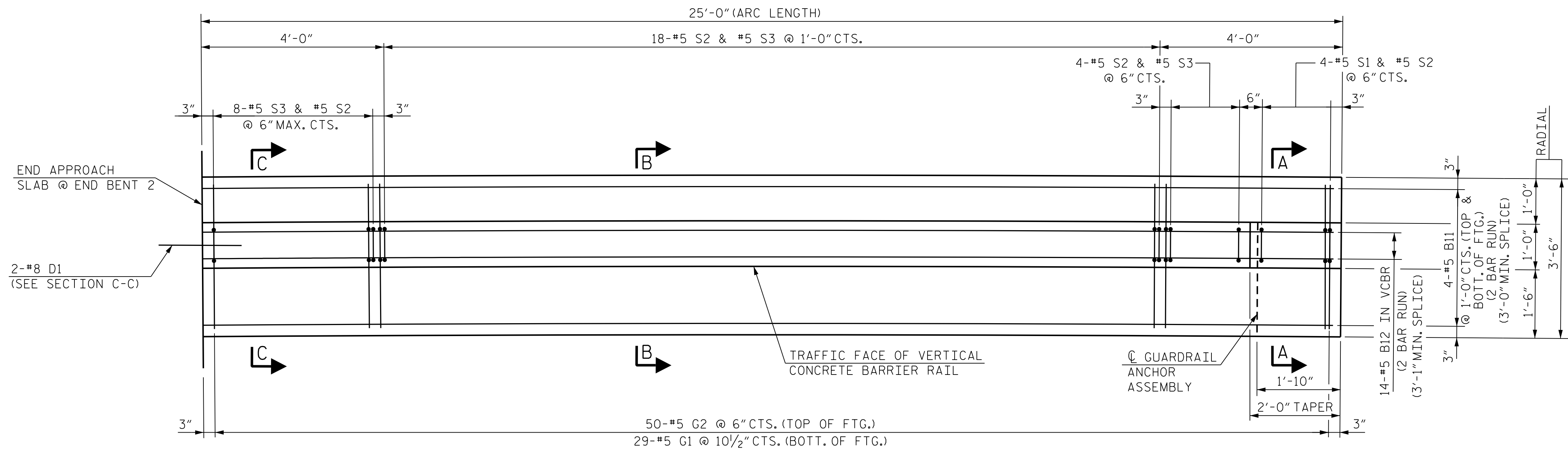
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
ENGINEER
BRUCE D. KLAPPENBACH
15825
2/6/2026

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-26
2			4			
TOTAL SHEETS						30

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AT END BENT 1 APPROACH



AT END BENT 2 APPROACH

PLAN OF VERTICAL CONCRETE BARRIER RAIL AND STRIP FOOTING

NOTES:

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

FOR DETAILS AND LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "GUARDRAIL ANCHOR ASSEMBLY DETAILS" SHEET.

FOR SECTION VIEWS A-A, B-B, AND C-C, SEE SHEET 2 OF 2.

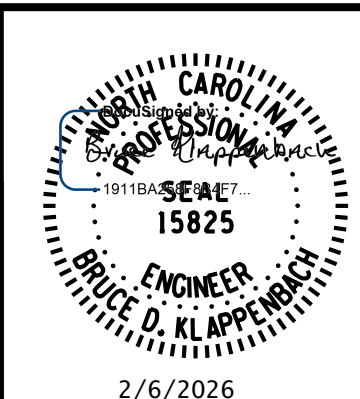
FOR VERTICAL CONCRETE BARRIER RAIL ON STRIP FOOTING, SEE SPECIAL PROVISIONS.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

VERTICAL CONCRETE
BARRIER RAIL ON
STRIP FOOTING DETAILS

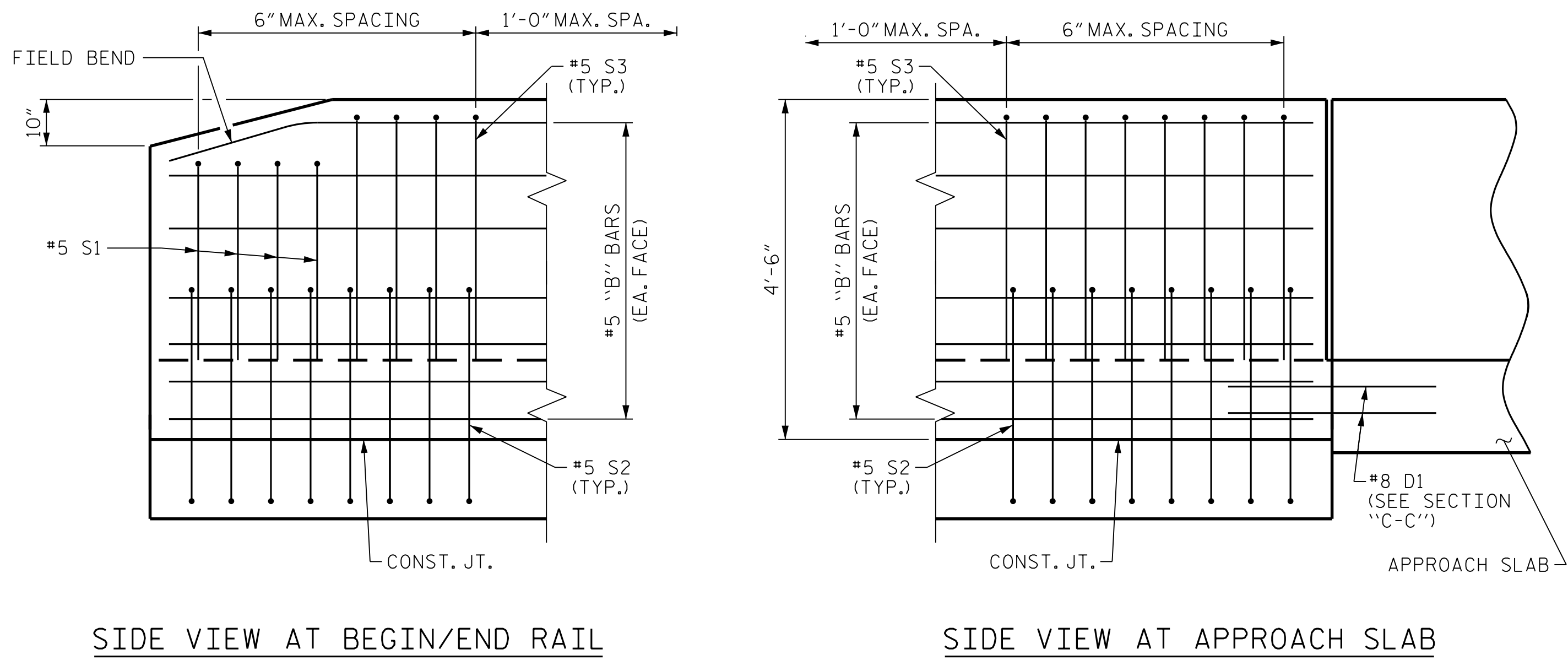
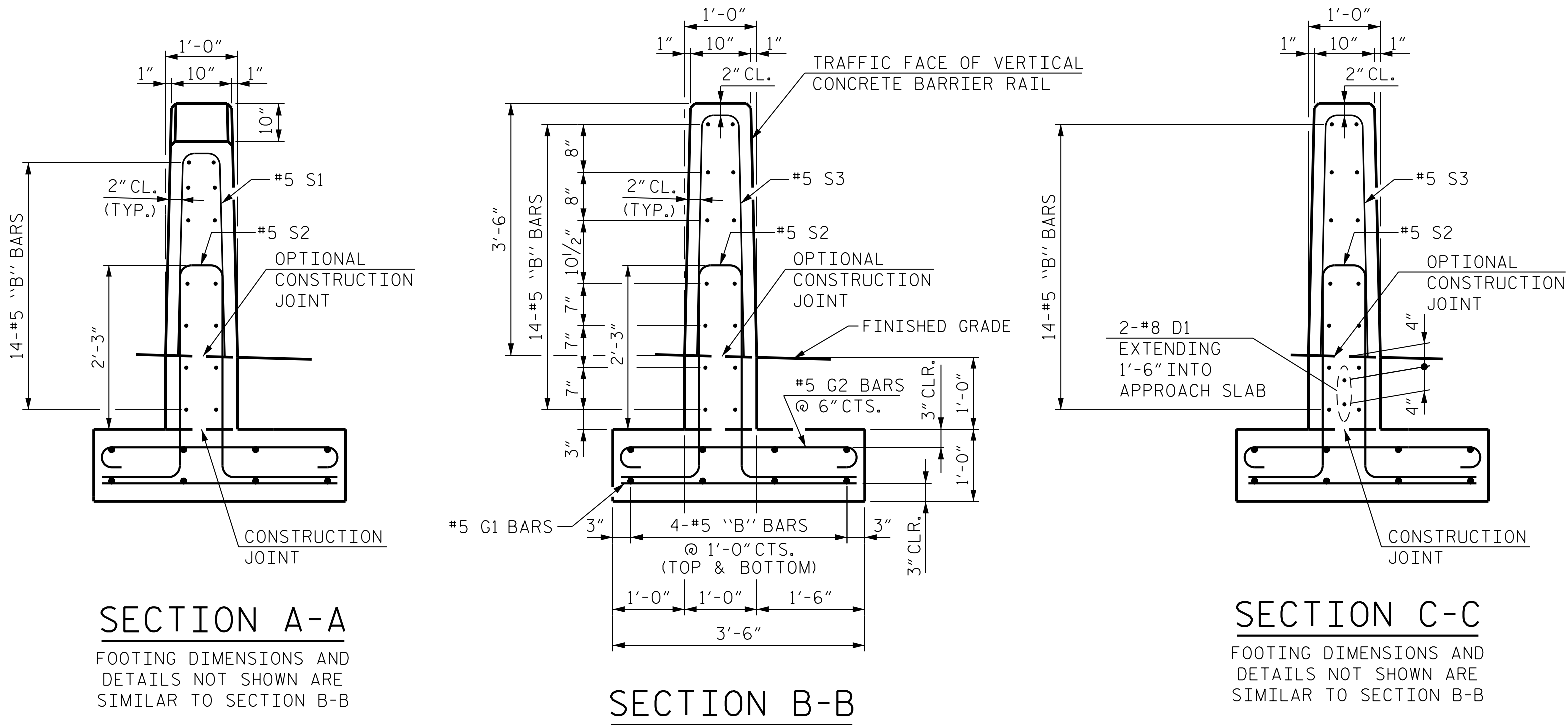


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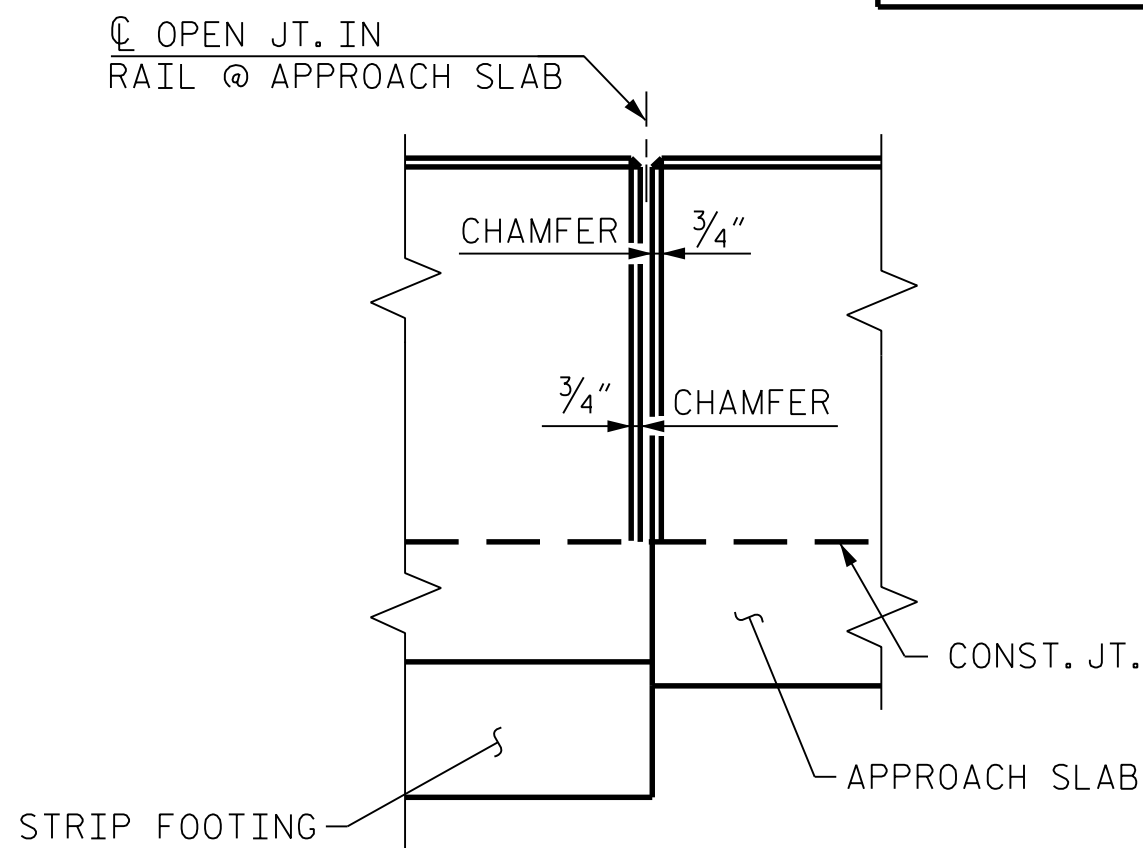
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CHECKED BY : B. D. KLAPPENBACH DATE : JAN 2025
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH DATE : JAN 2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-27
2			4			
TOTAL SHEETS						30

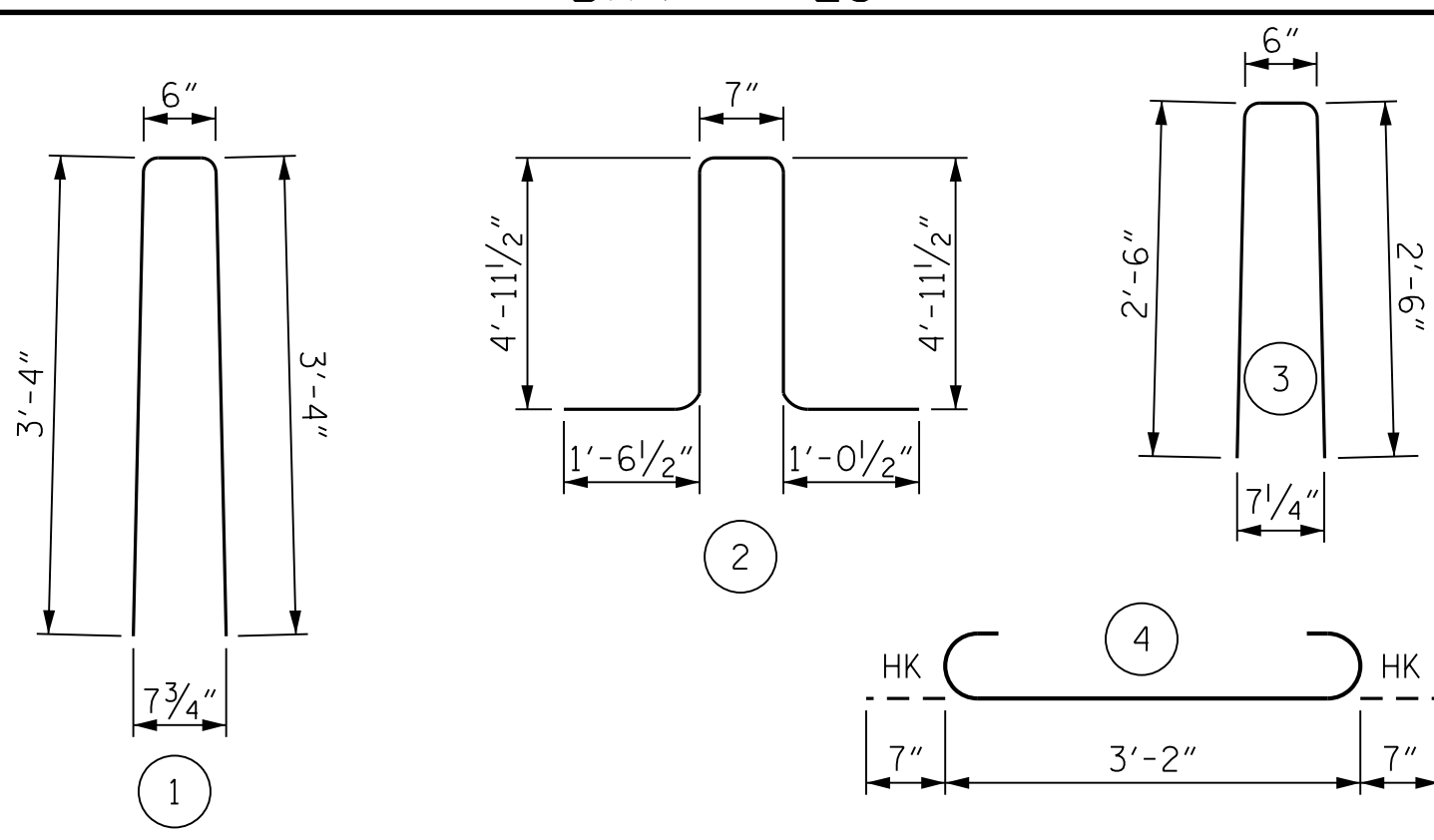
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DETAILS AT END OF RAIL



BARRIER RAIL DETAILS

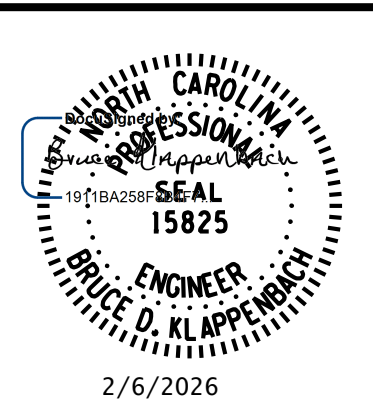
BAR TYPES											
											
ALL BAR DIMENSIONS ARE OUT TO OUT.											
BILL OF MATERIAL											
FOR VERTICAL CONCRETE BARRIER RAIL ON STRIP FOOTING AT END BENT 1						FOR VERTICAL CONCRETE BARRIER RAIL ON STRIP FOOTING AT END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#5	STR.	11'-4"	189	B11	16	#5	STR.	13'-10"	231
* B2	28	#5	STR.	11'-5"	333	* B12	28	#5	STR.	13'-11"	406
D1	2	#8	STR.	3'-0"	16	D1	2	#8	STR.	3'-0"	16
G1	27	#5	STR.	3'-2"	89	G1	29	#5	STR.	3'-2"	96
G2	40	#5	4	4'-4"	181	G2	50	#5	4	4'-4"	226
* S1	4	#5	3	5'-6"	23	* S1	4	#5	3	5'-6"	23
* S2	28	#5	2	13'-1"	382	* S2	34	#5	2	13'-1"	464
* S3	24	#5	1	7'-2"	179	* S3	30	#5	1	7'-2"	224
REINFORCING STEEL					475	REINFORCING STEEL					569 LBS.
* EPOXY COATED REINFORCING STEEL					917	* EPOXY COATED REINFORCING STEEL					1,117 LBS.
CLASS AA CONCRETE					5.7 CU. YDS.	CLASS AA CONCRETE					7.2 CU. YDS.
VERTICAL CONCRETE BARRIER RAIL ON STRIP FOOTING						VERTICAL CONCRETE BARRIER RAIL ON STRIP FOOTING					45.00 LIN. FT.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

VERTICAL CONCRETE
BARRIER RAIL ON
STRIP FOOTING DETAILS

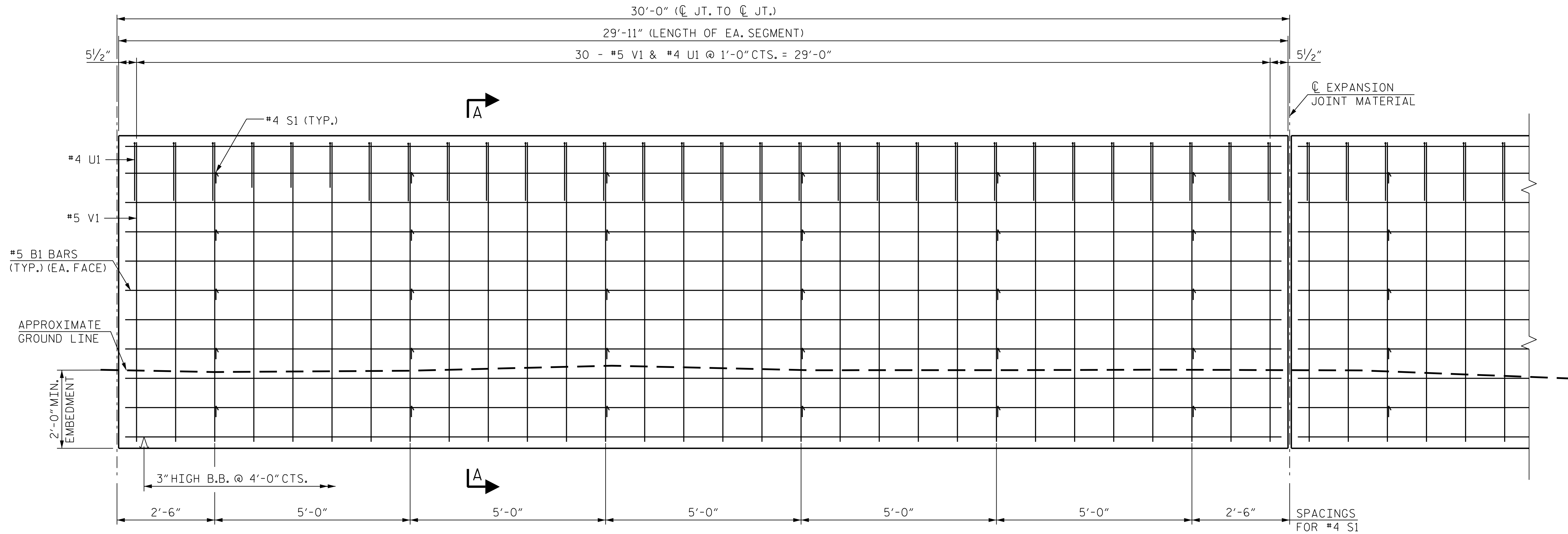


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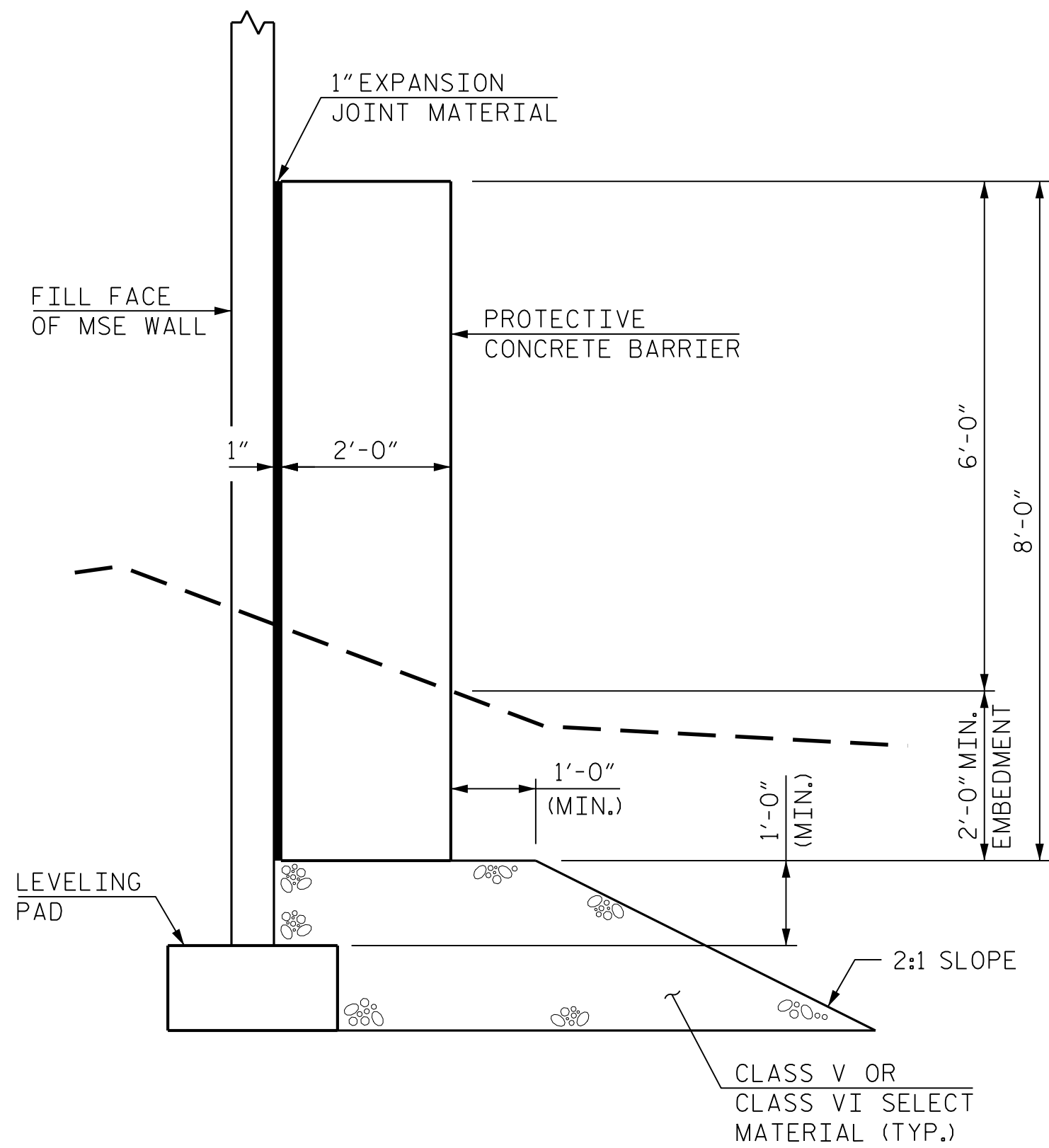
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NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			

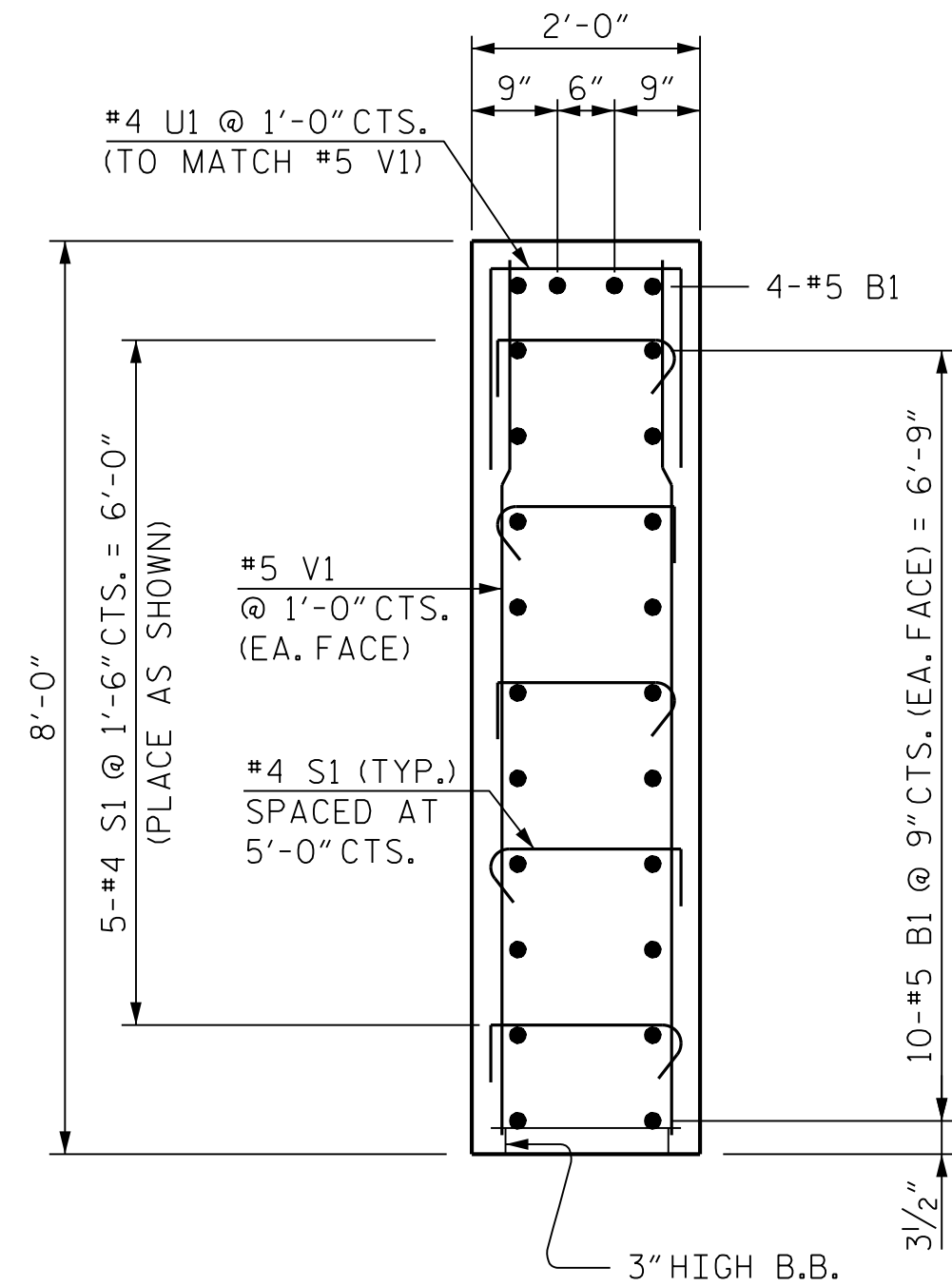
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ELEVATION

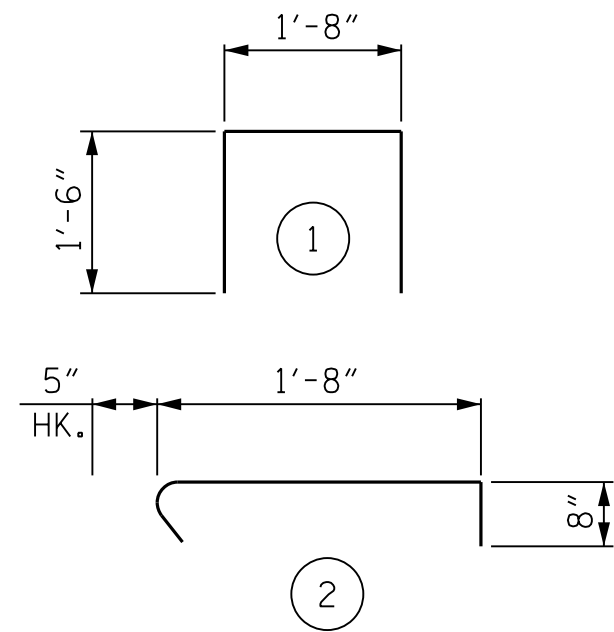


SECTION AT END BENT



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR 1 - 30' SEGMENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	24	#5	STR.	29'-7"	741
* S1	24	#4	2	2'-9"	44
* U1	30	#4	1	4'-8"	94
* V1	60	#5	STR.	7'-7"	475

* EPOXY COATED REINFORCING STEEL	1,354 LBS.
CLASS AA CONCRETE	17.7 CU. YDS.
CLASS V OR CLASS VI SELECT MATERIAL	0.21 CY./FT.

TOTAL LINEAR FT. OF PROTECTIVE CONCRETE BARRIER AT WALL NO.10 & 11	
AT MSE WALL NO.10 PROTECTIVE CONCRETE BARRIER	92.69 LIN. FT.
AT MSE WALL NO.11 PROTECTIVE CONCRETE BARRIER	92.17 LIN. FT.
TOTAL PROTECTIVE CONCRETE BARRIER	184.86 LIN. FT.

NOTES:

FOR LIMITS OF PROTECTIVE CONCRETE BARRIER, SEE SHEET 1 OF 5 OF THE GENERAL DRAWING (SHEET S-1).

FOR PROTECTIVE CONCRETE BARRIER, SEE SPECIAL PROVISION.

FOR SEGMENTS THAT REQUIRE A LENGTH LESS THAN WHAT IS DETAILED, THE AREA OF REINFORCING PER FOOT SHALL BE EQUAL TO OR BETTER THAN WHAT IS DETAILED IN THESE PLANS.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

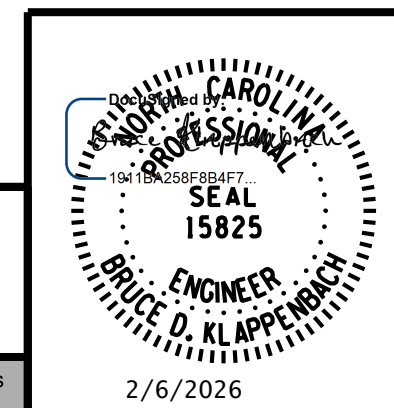
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PROTECTIVE CONCRETE
BARRIER
FOR MSE WALL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-29
2			4			
TOTAL SHEETS						30

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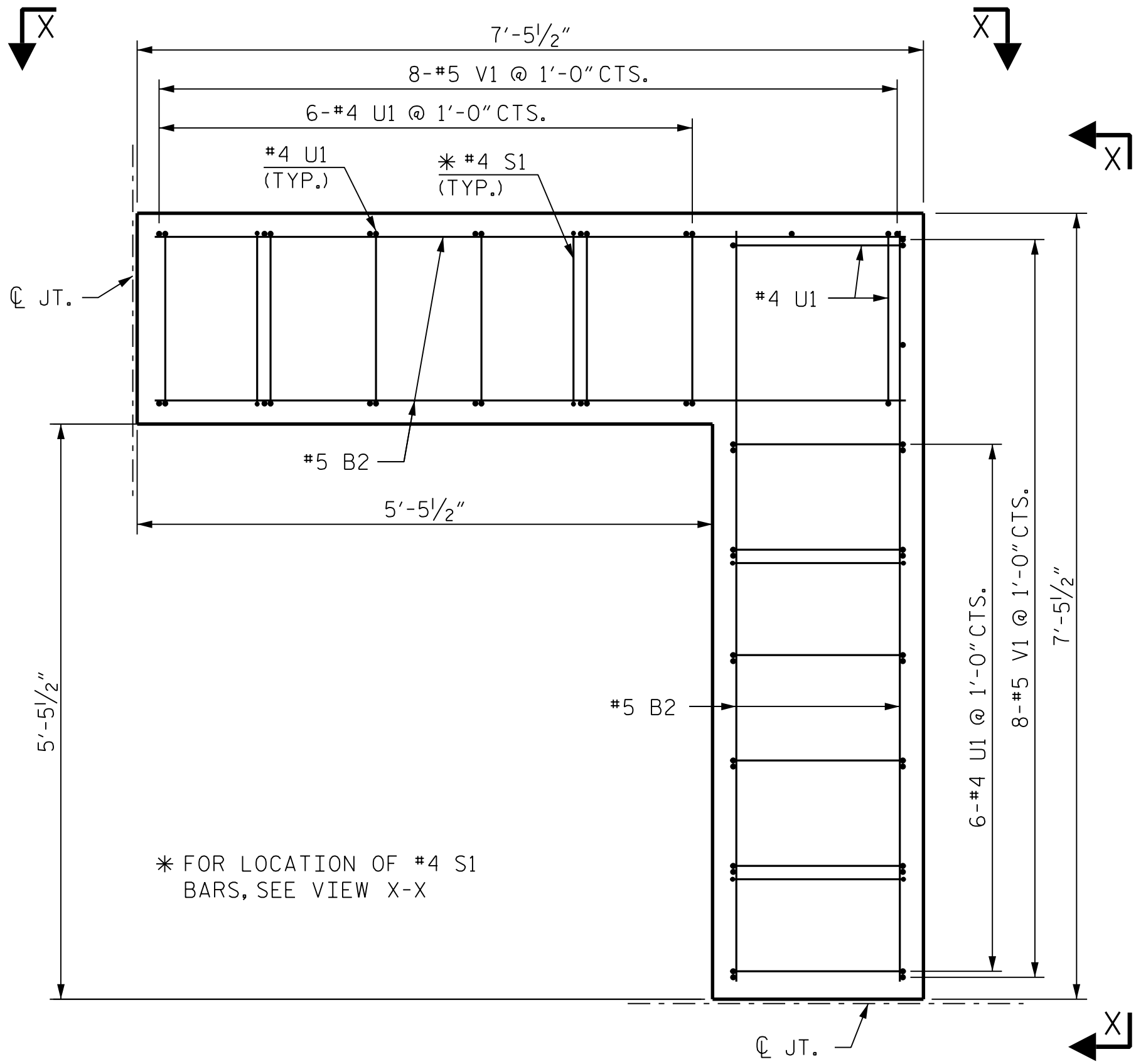


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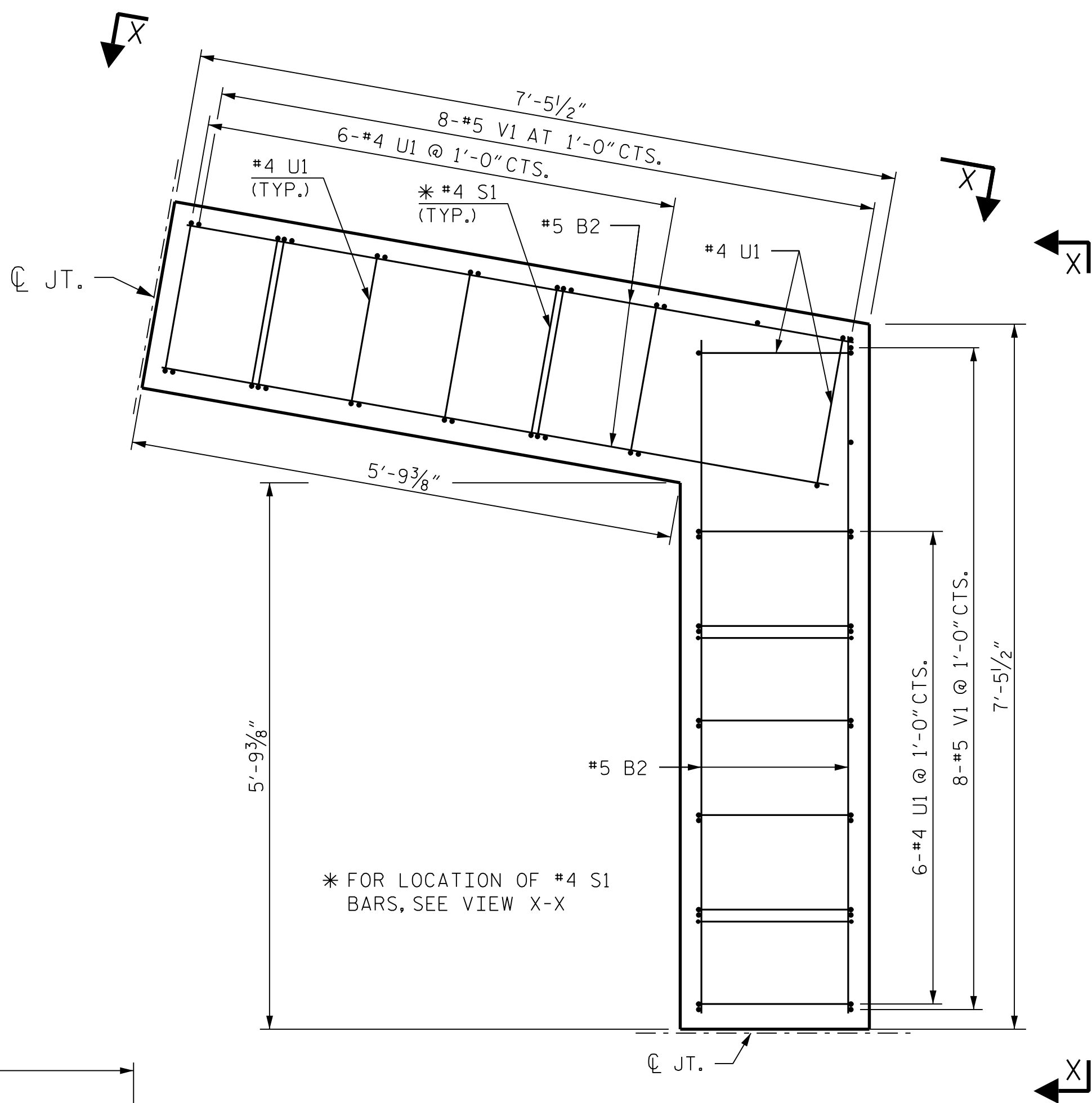
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DRAWN BY : B. H. GONFA
CHECKED BY : B. D. KLAPPENBACH
DESIGN ENGINEER OF RECORD : B. D. KLAPPENBACH

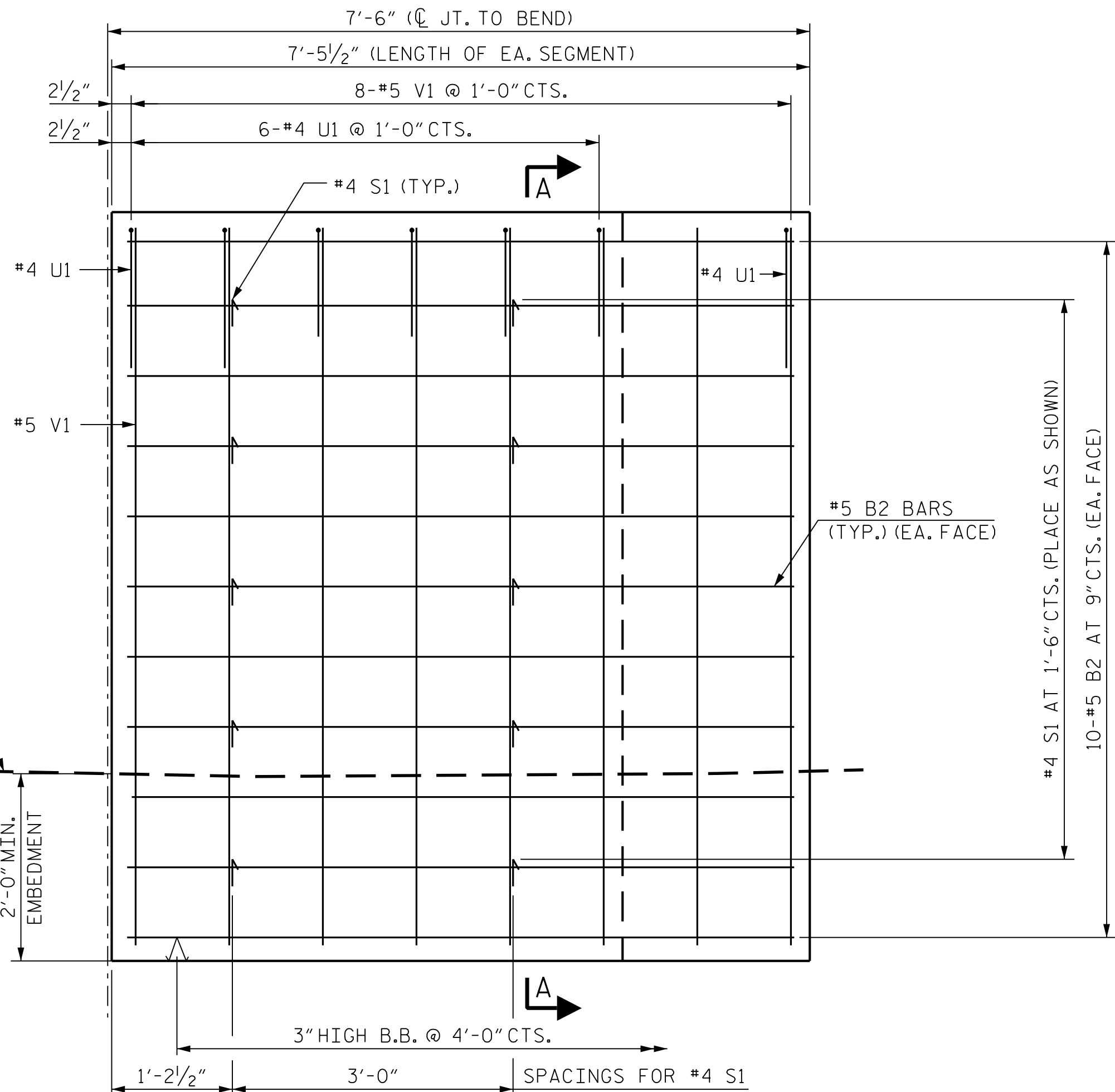
DATE : JAN 2025
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TYPICAL CORNER PLAN
(FOR 90 DEGREE TURN)

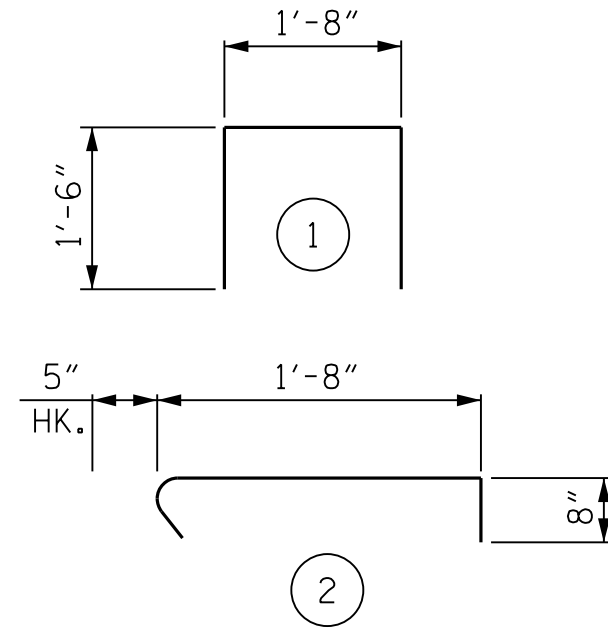


TYPICAL CORNER PLAN
(OTHER THAN 90 DEGREE TURN)



VIEW X-X

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR 1 - CORNER SEGMENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B2	48	#5	STR.	7'-1"	355
* S1	20	#4	2	2'-9"	37
* U1	14	#4	1	4'-8"	44
* V1	28	#5	STR.	7'-7"	221

*EPOXY COATED REINFORCING STEEL 657 LBS.
CLASS AA CONCRETE 13.7 CU. YDS.
CLASS V OR CLASS VI SELECT MATERIAL 0.21 CY./FT.

NOTES:

FOR SECTION A-A, SEE SHEET 1 OF 2.

FOR ADDITIONAL NOTES, SEE SHEET 1 OF 2.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 83+30.09 -L3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PROTECTIVE CONCRETE
BARRIER
FOR MSE WALL

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

TOTAL
SHEETS
30



2/6/2026

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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 3/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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