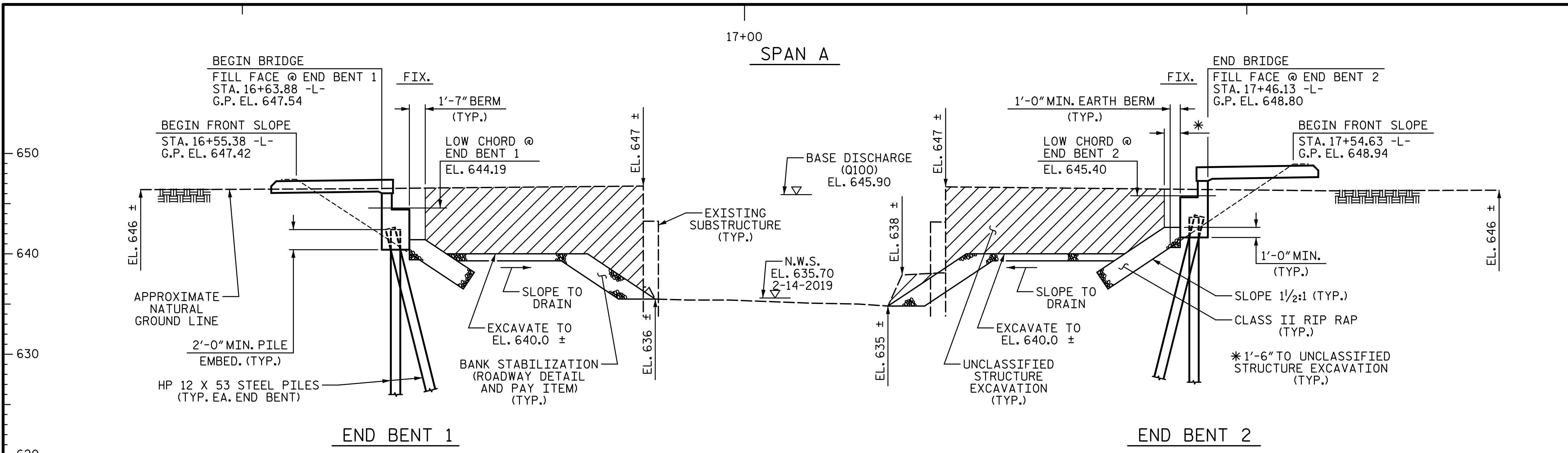


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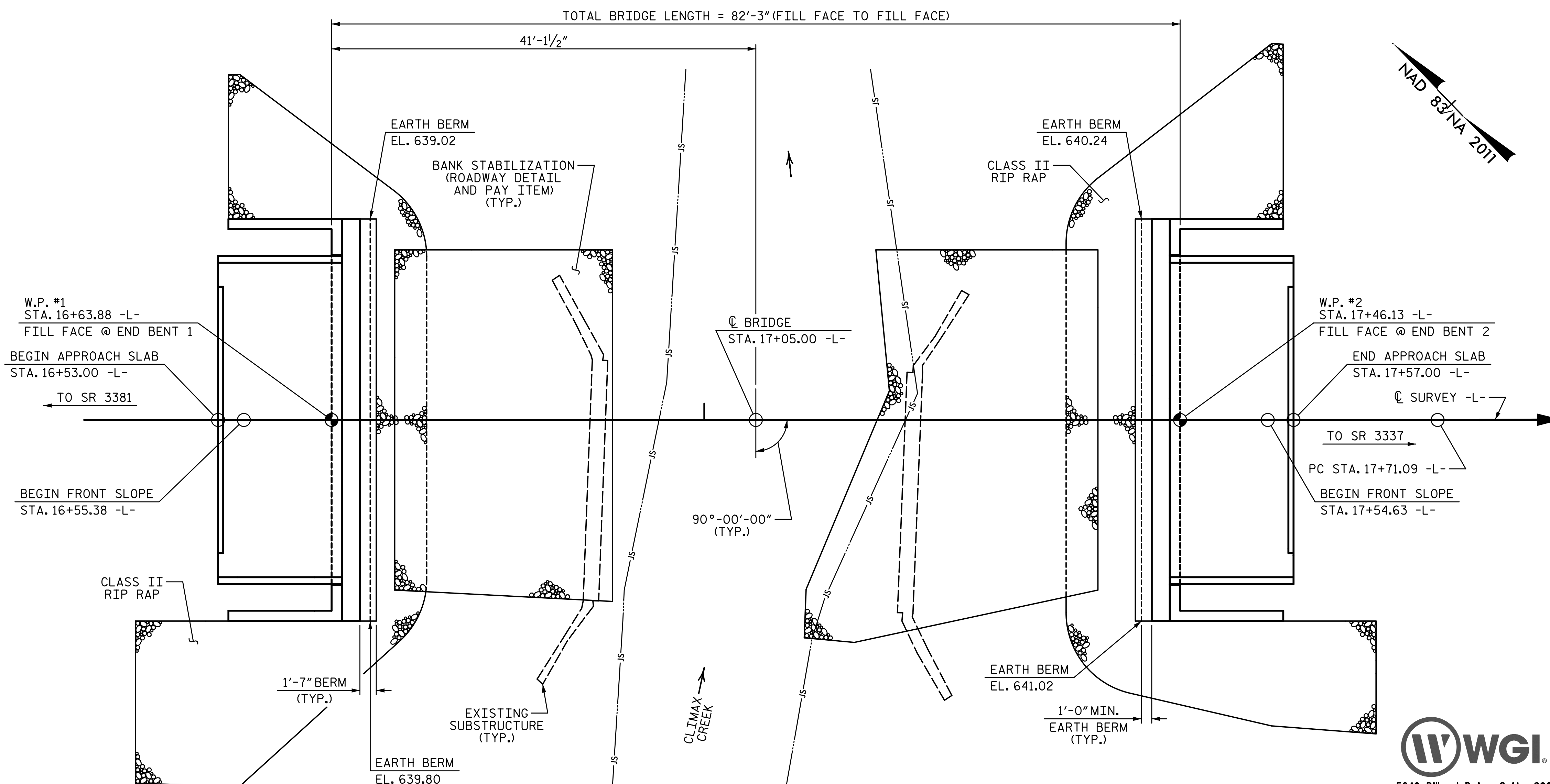
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and sealed by the individuals whose names and license
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4/11/2024 1:44:51 PM P:\Raleigh\Projects\2018\Division 7 (SEA)\17BP7R136 Gullford 267 Climax Ck\Structures\Drawings\Final\17BP7R136_SMU_GD.dgn



SECTION ALONG Q SURVEY -L-



PLAN (PILES NOT SHOWN IN PLAN VIEW)

GRADE DATA -L-

(-).0176%	(+).15706%
PVI STA. 15+20.00 EL. = 645.25 VC = 340'	
(+).15706%	(+).1750%
PVI STA. 20+30.00 EL. = 653.26 VC = 150'	

HYDRAULIC DATA:

DESIGN DISCHARGE	= 1942 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 643.8
DRAINAGE AREA	= 7.5 SQ. MI.
BASE DISCHARGE (Q 100)	= 2734 CFS
BASE HIGH WATER ELEVATION	= 645.9

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	= 3682 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500± YEAR
OVERTOPPING FLOOD ELEVATION	= 646.6 **
** OVERTOPPING OCCURS AT STA. 14+84.00 -L- AT SHOULDER POINT ON RT.	

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

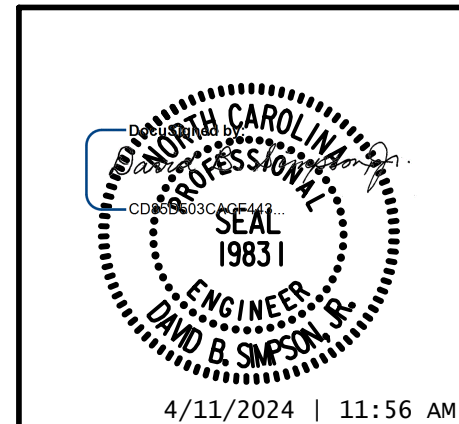
PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
STATION: 17+05.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE #267

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 3336
(COBLE CHURCH RD.)
OVER CLIMAX CREEK
BETWEEN SR 3381 AND SR 3337

DRAWN BY: T. BANKOVICH	DATE: 10-22
CHECKED BY: B.S. COX	DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			20

4/11/2024 | 11:56 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-7	100	642.10	15		630.1	170					630.1	14.0	56.0
End Bent 2, Piles 1-7	100	643.63	15		631.6	170					631.6	14.0	56.0

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

SUMMARY OF DYNAMIC PILE TESTING/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing				Pile Order Lengths	
End Bent/ Bent No	Dynamic Pile Testing Required? YES or MAYBE	Dynamic Pile Testing Test Pile Length FT	Total Dynamic Pile Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or DPT
End Bent 1, Piles 1-7	MAYBE		1		
End Bent 2, Piles 1-7	MAYBE				

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-7	97	0	0	0.60	0	0	1.00
End Bent 2, Piles 1-7	97	0	0	0.60	0	0	1.00
							1.00
							1.00
							1.00

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

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates 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	
End Bent 1, Piles 1-7				YES	
End Bent 2, Piles 1-7				YES	
TOTAL QTY:				14	

NOTES:

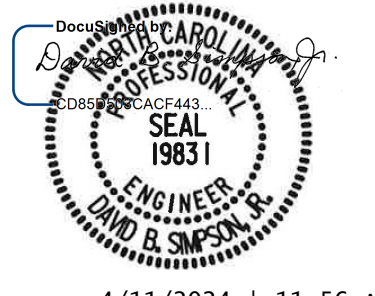
- The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Kenneth R. Bussey, Jr. and 038206) on 08-13-2021.
- Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
- The Engineer will determine the need for Dynamic Pile Testing and Pipe Pile Plates when Dynamic Pile Testing or plates may be required.

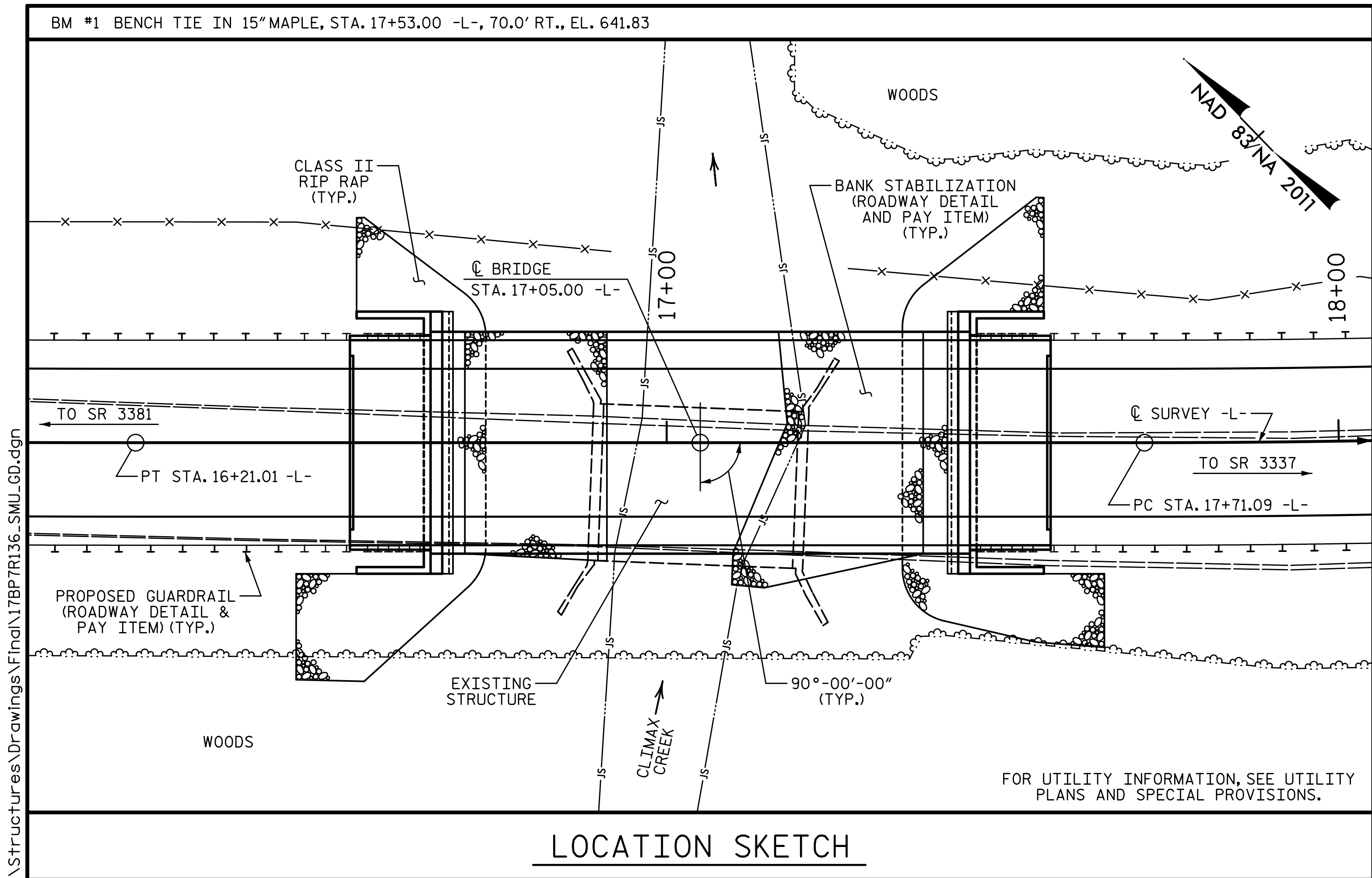
PROJECT NO. 17BP.7.R.136

GUILFORD COUNTY

STATION: 17+05.00 -L-

SHEET 2 OF 3

 4/11/2024 11:56 AM PDT	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH			PILE FOUNDATION TABLES							
	REVISIONS						SHEET NO. S-2				
SIGNATURE		DATE		NO.		BY:		DATE:		TOTAL SHEETS	
				1		3				20	
				2		4					



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 EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- THE MATERIAL SHOWN IN THE HATCHED AREA ON SHEET 1 OF 2 SHALL BE EXCAVATED FOR A DISTANCE OF 35 FT. LEFT AND 45 FT. RIGHT AT END BENT 1 AND 20 FT. LEFT AND 35 FT. RIGHT AT END BENT 2 FROM CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
- THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 32'-6" SHALL BE REMOVED. THE SUPERSTRUCTURE HAS A CLEAR ROADWAY WIDTH OF 20'-0" WITH REINFORCED CONCRETE DECK GIRDERS ON FULL HEIGHT REINFORCED CONCRETE ABUTMENTS. 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.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

LOCATION SKETCH

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIP. SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	DYNAMIC PILE TESTING	TWO BAR METAL RAIL	1'-2" X 2'-9/2" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAMS		
	LS	LS	LF	LF	LS	CY	LS	LB	EA	NO.	LF	EA	EA	LF	LF	TON	SY	LS	NO.	LF
SUPERSTRUCTURE							LS							145.00	160.00		LS		11	880.00
END BENT 1			56	14	LS	25.6		3,578	7	7	105	7				100	115			
END BENT 2			56	14	LS	25.6		3,578	7	7	105	7				125	140			
TOTAL	LS	LS	112	28	LS	51.2	LS	7,156	14	14	210	14	1	145.00	160.00	225	255	LS	11	880.00

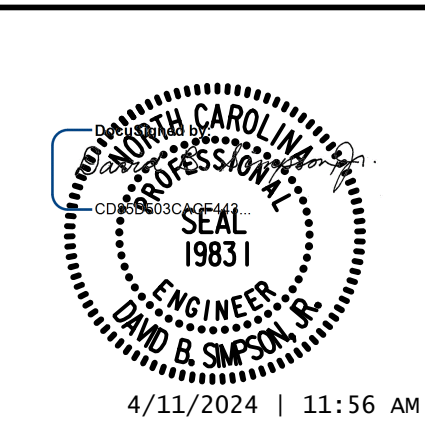
FOUNDATION NOTES:

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.
- DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE.
- STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 1 AND END BENT 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- DRILLED-IN PILES ARE REQUIRED FOR END BENT 1 AND END BENT 2. EXCAVATE HOLES AT PILE LOCATIONS TO A DEPTH OF 10 FEET BELOW THE BOTTOM OF CAP. AFTER INSTALLING PILES, BACKFILL EXCAVATED HOLES WITH CONCRETE, GROUT, OR FLOWABLE FILL. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 3336
 (COBLE CHURCH RD.)
 OVER CLIMAX CREEK
 BETWEEN SR 3381 AND SR 3337



LICENSURE NO. C-4434

4/11/2024 | 11:56 AM EDT

DRAWN BY: T. BANKOVICH	DATE: 10-22
CHECKED BY: B.S. COX	DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22

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

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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		
						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	1.155	--	1.75	0.273	1.72	80'	EL	39.250	0.502	1.51	80'	EL	7.850	0.80	0.273	1.15	80'	EL	39.250		
	HL-93 (OPERATING)	N/A		1.958	--	1.35	0.273	2.23	80'	EL	39.250	0.502	1.96	80'	EL	7.850	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.533	55.181	1.75	0.273	2.28	80'	EL	39.250	0.502	1.91	80'	EL	7.850	0.80	0.273	1.53	80'	EL	39.250		
	HS-20 (OPERATING)	36.000		2.473	89.021	1.35	0.273	2.96	80'	EL	39.250	0.502	2.47	80'	EL	7.850	N/A	--	--	--	--	--		
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.509	47.376	1.4	0.273	6.53	80'	EL	39.250	0.502	5.73	80'	EL	7.850	0.80	0.273	3.51	80'	EL	39.250	
		SNGARBS2	20.000		2.594	51.880	1.4	0.273	4.82	80'	EL	39.250	0.502	4.06	80'	EL	7.850	0.80	0.273	2.59	80'	EL	39.250	
		SNAGRIS2	22.000		2.448	53.85	1.4	0.273	4.55	80'	EL	39.250	0.502	3.76	80'	EL	7.850	0.80	0.273	2.45	80'	EL	39.250	
		SNCOTTS3	27.250		1.746	47.571	1.4	0.273	3.25	80'	EL	39.250	0.502	2.86	80'	EL	7.850	0.80	0.273	1.75	80'	EL	39.250	
		SNAGGRS4	34.925		1.451	50.667	1.4	0.273	2.70	80'	EL	39.250	0.502	2.36	80'	EL	7.850	0.80	0.273	1.45	80'	EL	39.250	
		SNS5A	35.550		1.419	50.453	1.4	0.273	2.64	80'	EL	39.250	0.502	2.38	80'	EL	7.850	0.80	0.273	1.42	80'	EL	39.250	
		SNS6A	39.950		1.299	51.885	1.4	0.273	2.42	80'	EL	39.250	0.502	2.17	80'	EL	7.850	0.80	0.273	1.30	80'	EL	39.250	
		SNS7B	42.000		1.237	51.941	1.4	0.273	2.30	80'	EL	39.250	0.502	2.13	80'	EL	7.850	0.80	0.273	1.24	80'	EL	39.250	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.583	52.231	1.4	0.273	2.94	80'	EL	39.250	0.502	2.59	80'	EL	7.850	0.80	0.273	1.58	80'	EL	39.250	
		TNT4A	33.075		1.589	52.550	1.4	0.273	2.96	80'	EL	39.250	0.502	2.53	80'	EL	7.850	0.80	0.273	1.59	80'	EL	39.250	
		TNT6A	41.600		1.296	53.907	1.4	0.273	2.41	80'	EL	39.250	0.502	2.25	80'	EL	7.850	0.80	0.273	1.30	80'	EL	39.250	
		TNT7A	42.000		1.301	54.625	1.4	0.273	2.42	80'	EL	39.250	0.502	2.21	80'	EL	7.850	0.80	0.273	1.30	80'	EL	39.250	
		TNT7B	42.000		1.341	56.333	1.4	0.273	2.49	80'	EL	39.250	0.502	2.08	80'	EL	7.850	0.80	0.273	1.34	80'	EL	39.250	
		TNAGRIT4	43.000		1.279	55.001	1.4	0.273	2.38	80'	EL	39.250	0.502	2.02	80'	EL	7.850	0.80	0.273	1.28	80'	EL	39.250	
		TNAGT5A	45.000		1.207	54.337	1.4	0.273	2.25	80'	EL	39.250	0.502	2.00	80'	EL	7.850	0.80	0.273	1.21	80'	EL	39.250	
		TNAGT5B	45.000	③	1.194	53.739	1.4	0.273	2.22	80'	EL	39.250	0.502	1.92	80'	EL	7.850	0.80	0.273	1.19	80'	EL	39.250	
EMERGENCY VEHICLE (EV)	EV2	28.750		2.214	63.644	1.3	0.273	3.73	80'	EL	39.250	0.502	3.03	80'	EL	7.850	0.80	0.273	2.21	80'	EL	39.250		
	EV3	43.000	④	1.452	62.446	1.3	0.273	2.45	80'	EL	39.250	0.502	2.04	80'	EL	7.850	0.80	0.273	1.45	80'	EL	39.250		

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:

-
-
-
-

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

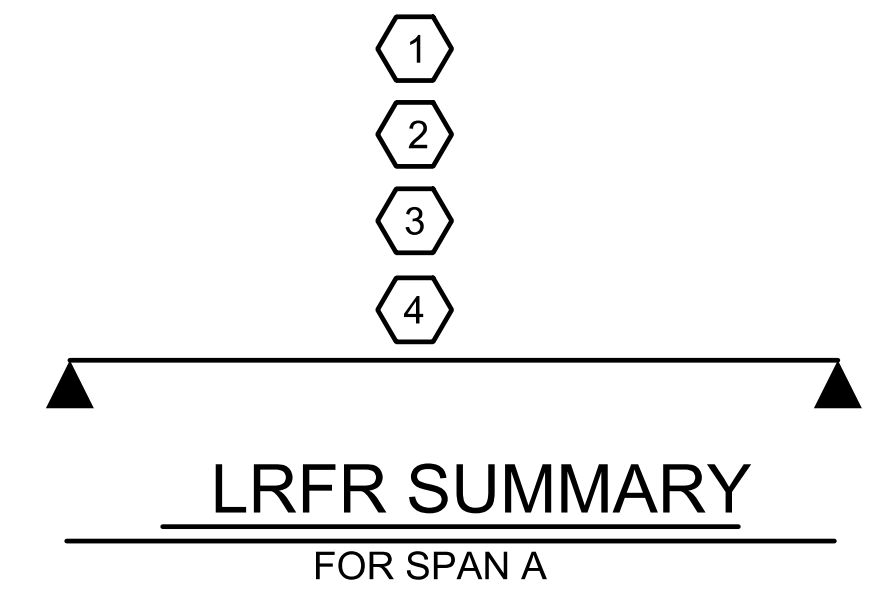
③ LEGAL LOAD RATING **

④ EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

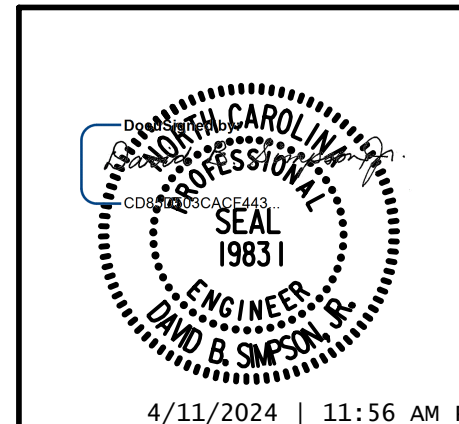
GIRDER LOCATION

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



PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-

DRAWN BY: T. BANKOVICH	DATE: 10-22
CHECKED BY: B.S. COX	DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22



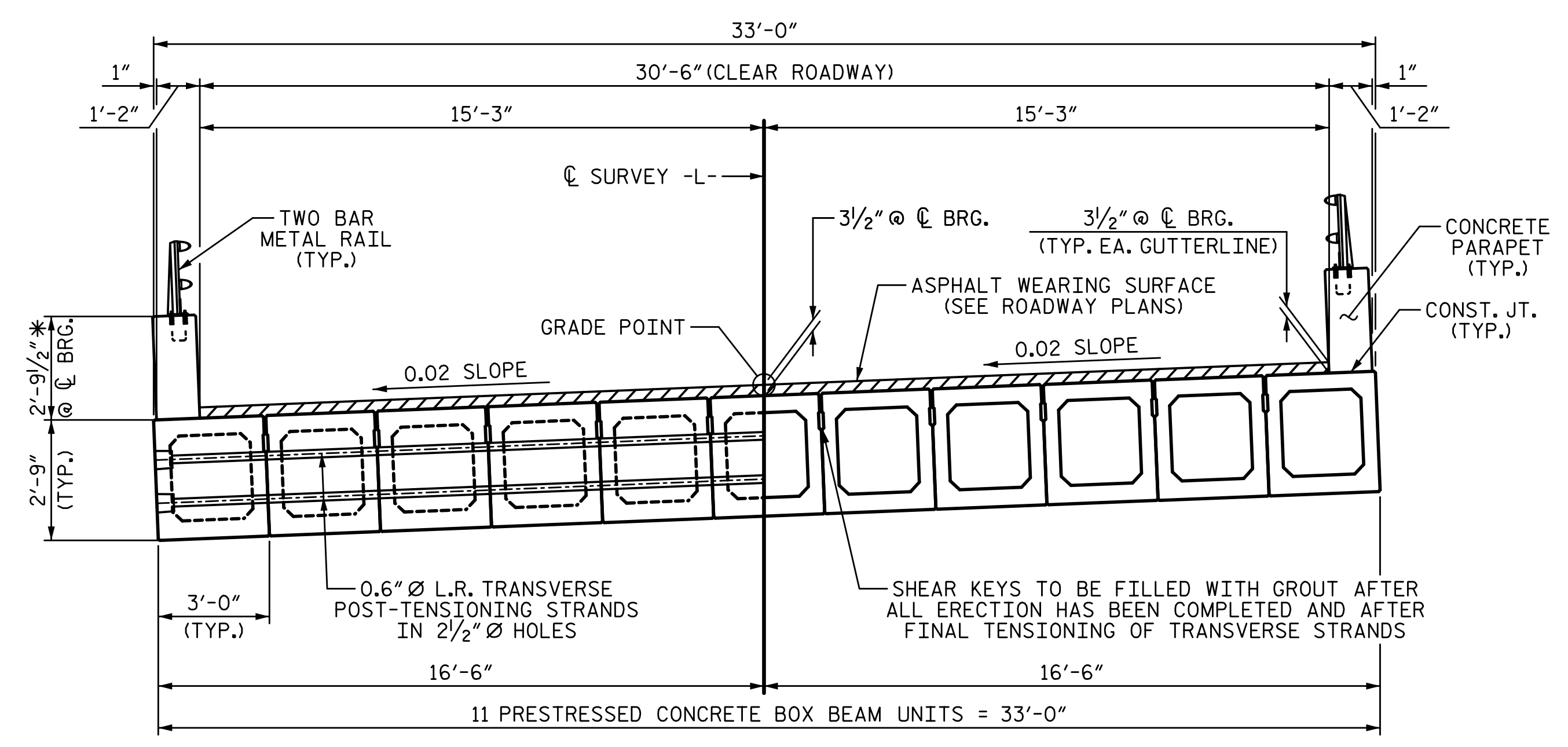
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

LRFR SUMMARY FOR
 80' BOX BEAM UNITS
 90° SKEW
 (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			20

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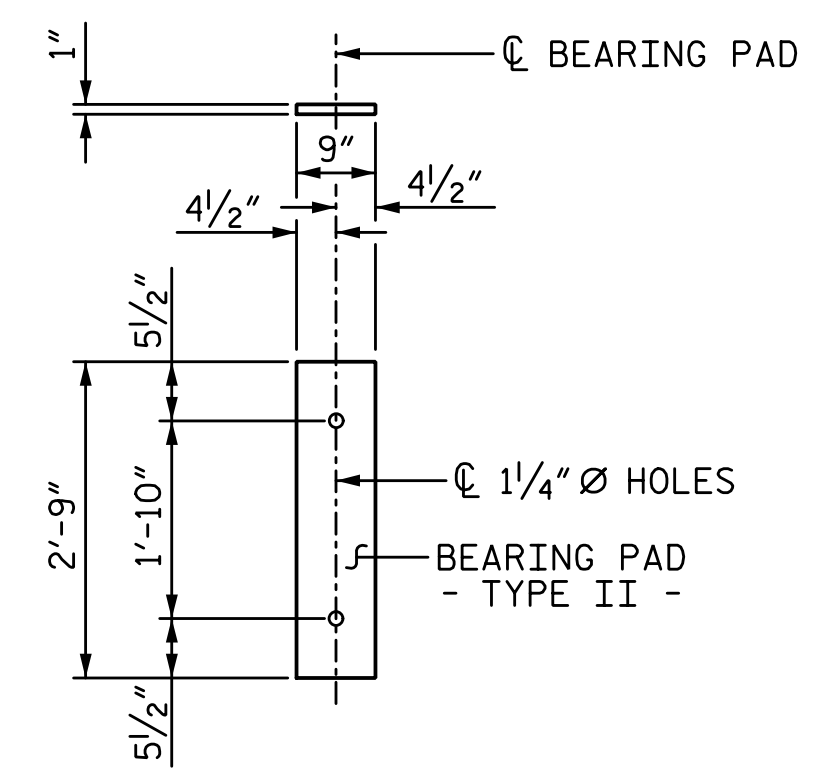


HALF SECTION
(AT INTERMEDIATE DIAPHRAGMS)

HALF SECTION
(THROUGH VOIDS)

TYPICAL SECTION

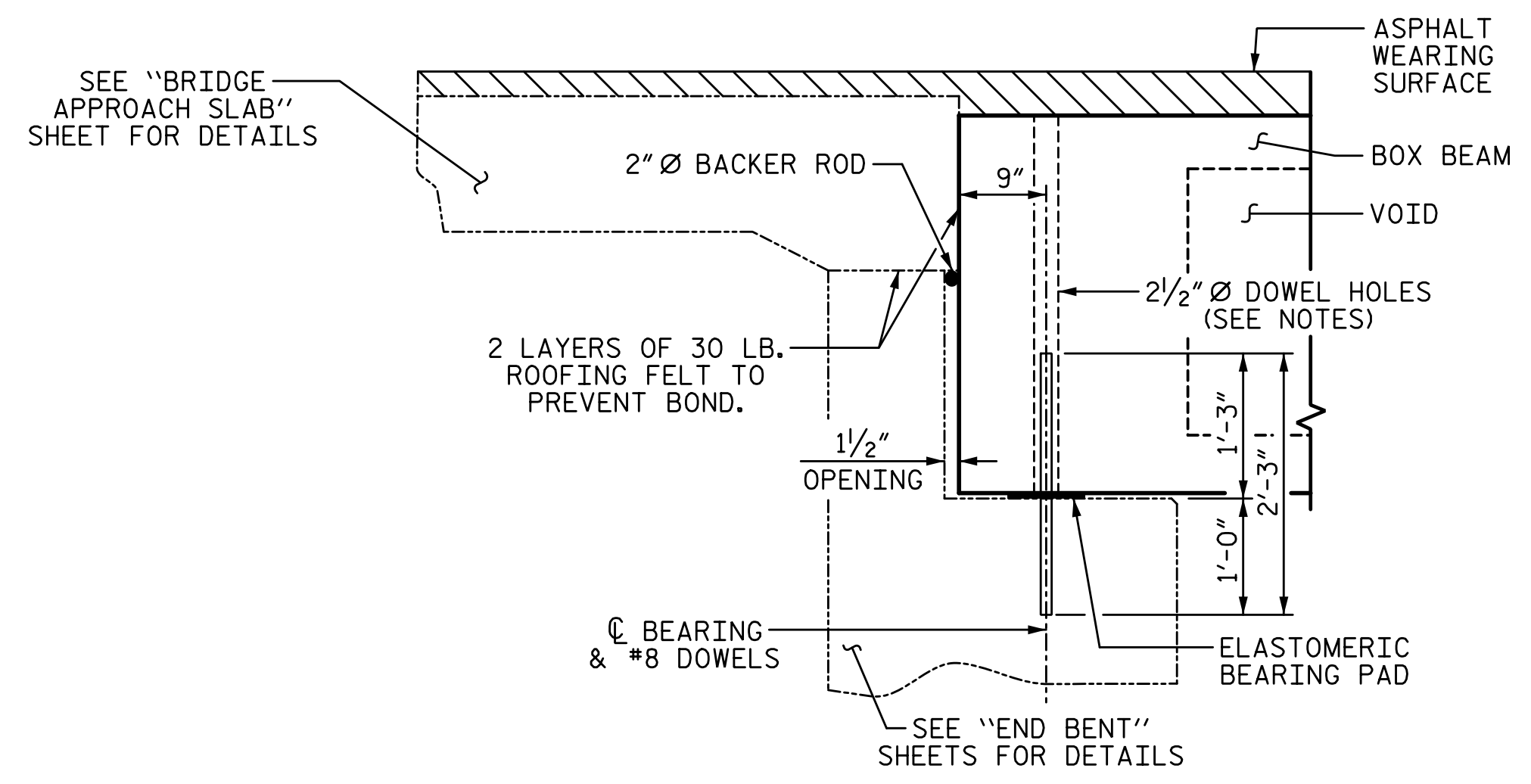
* - THE MAXIMUM CONCRETE PARAPET HEIGHTS AND ASPHALT THICKNESS ARE SHOWN. THE HEIGHT OF THE CONCRETE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE CONCRETE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR PARAPET HEIGHT DETAILS AND ASPHALT THICKNESS, SEE "CONCRETE PARAPET DETAILS" SHEET.



FIXED END
(TYPE II - 22 REQ'D)

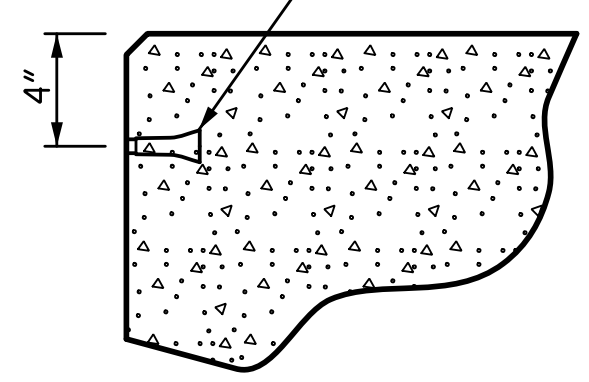
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



SECTION AT END BENT

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



THREADED INSERT DETAIL

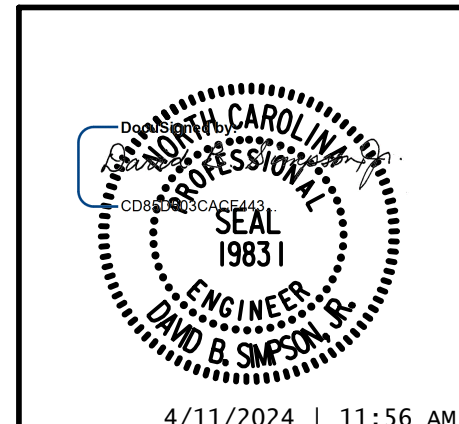
NOTES:

- 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 BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.
- FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.
- RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.
- THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM 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.
- THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.
- ALL REINFORCING STEEL IN CONCRETE PARAPETS SHALL BE EPOXY COATED.
- PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.
- APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.
- VERTICAL GROOVED 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 VERTICAL 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.
- THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.
- 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. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 3'-0" X 2'-9"
 PRESTRESSED CONCRETE
 BOX BEAM UNIT
 90° SKEW



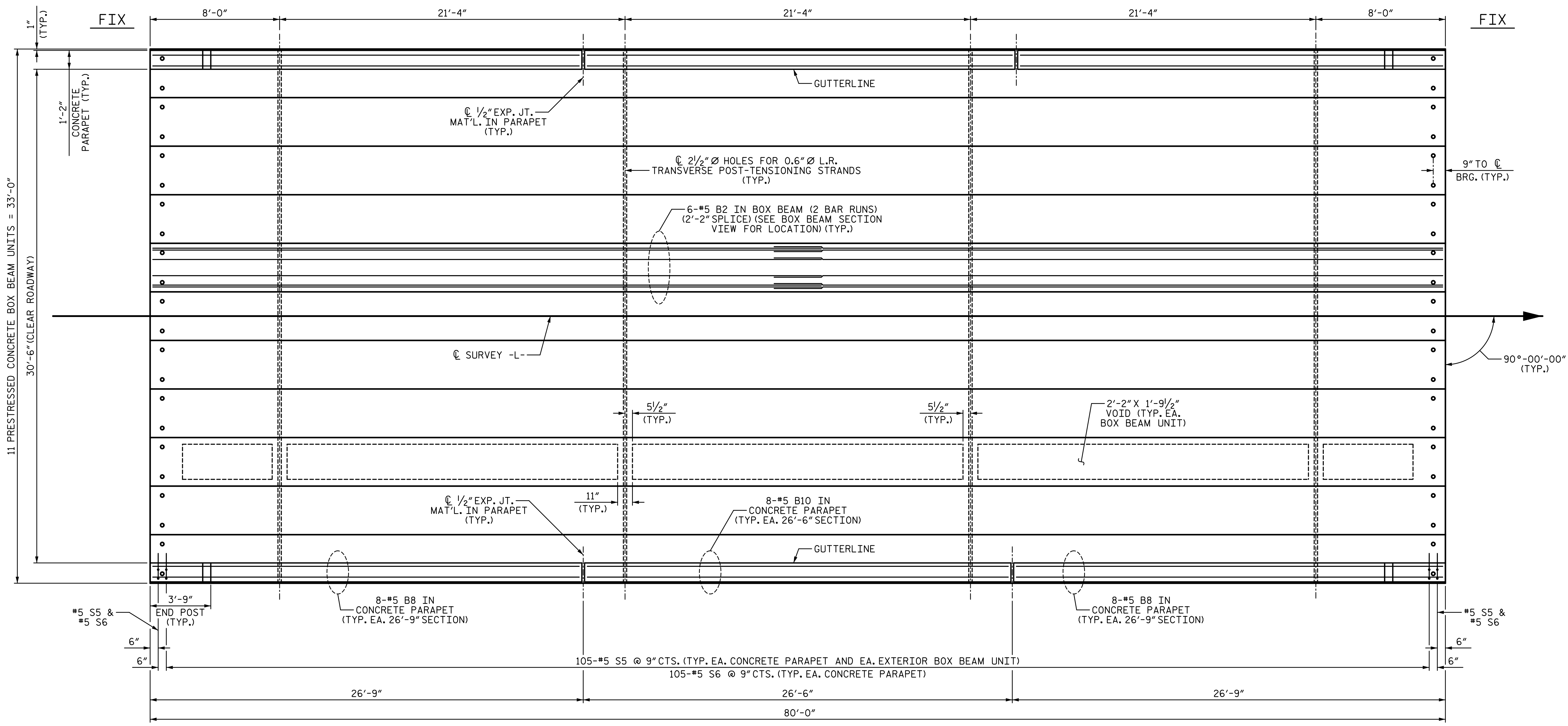
W WGI
 5640 Dillard Drive, Suite 200
 Cary, NC 27518
 LICENSURE NO. C-4434

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CHECKED BY: B.S. COX	DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22

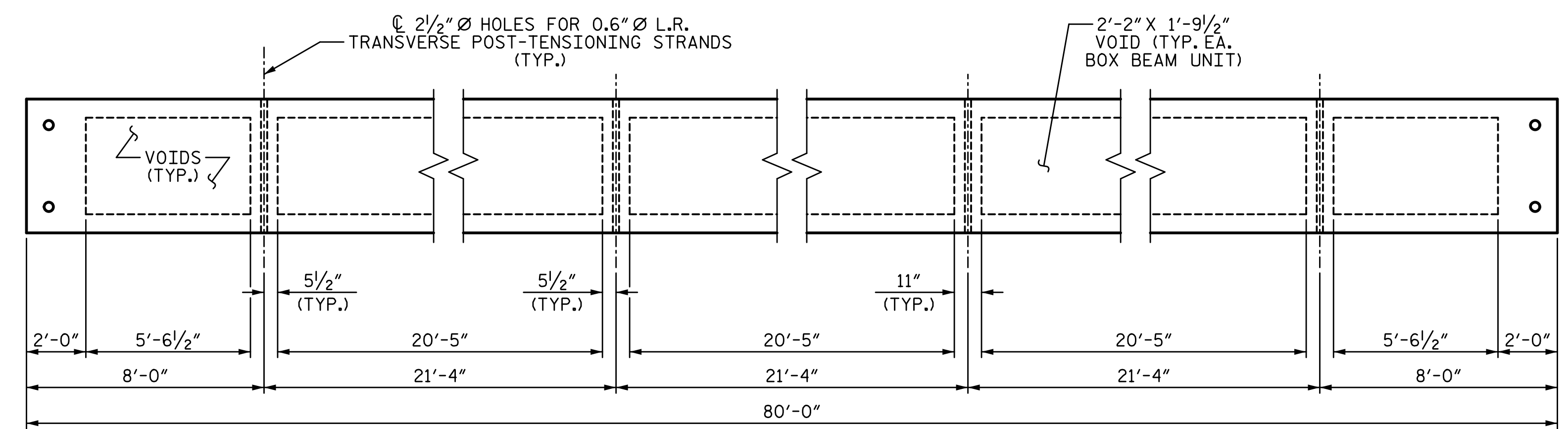
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2			4		

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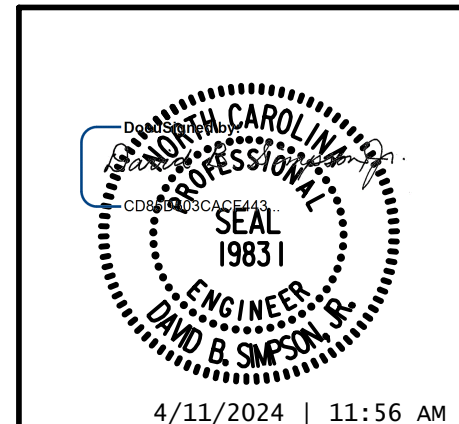
PLAN OF SPAN A



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN A
 (80'-0" UNIT)
 30'-6" CLEAR ROADWAY
 90° SKEW



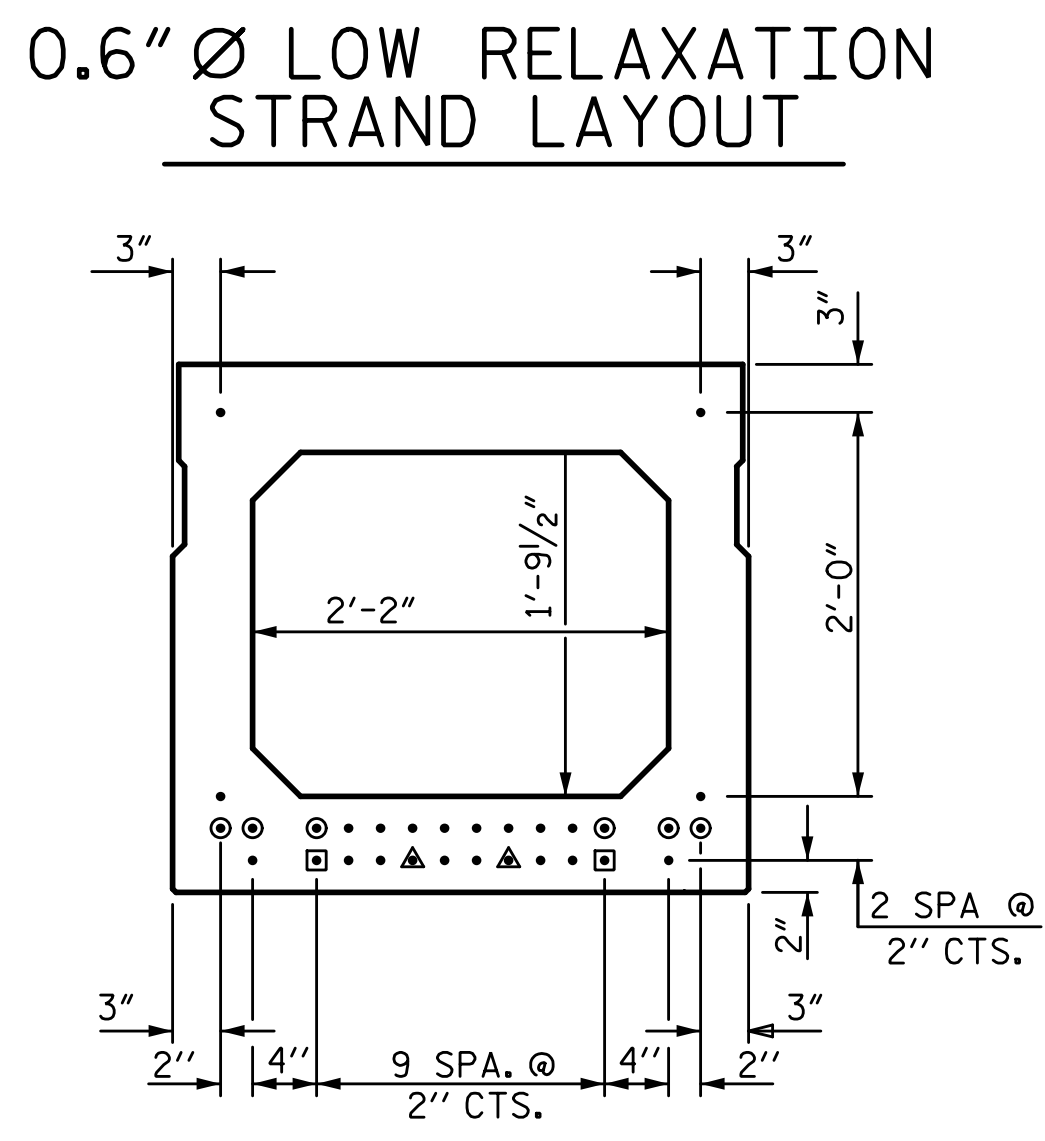
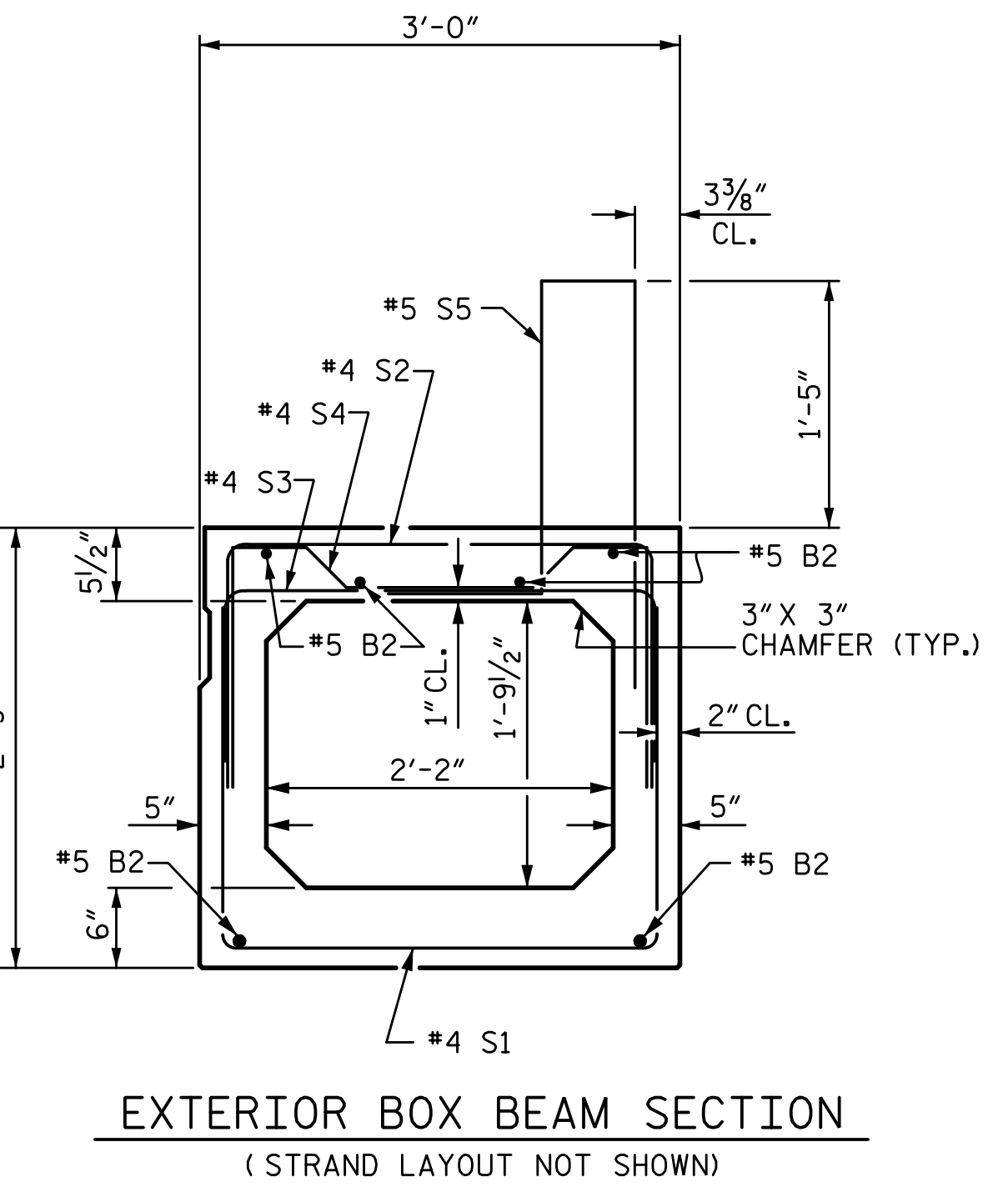
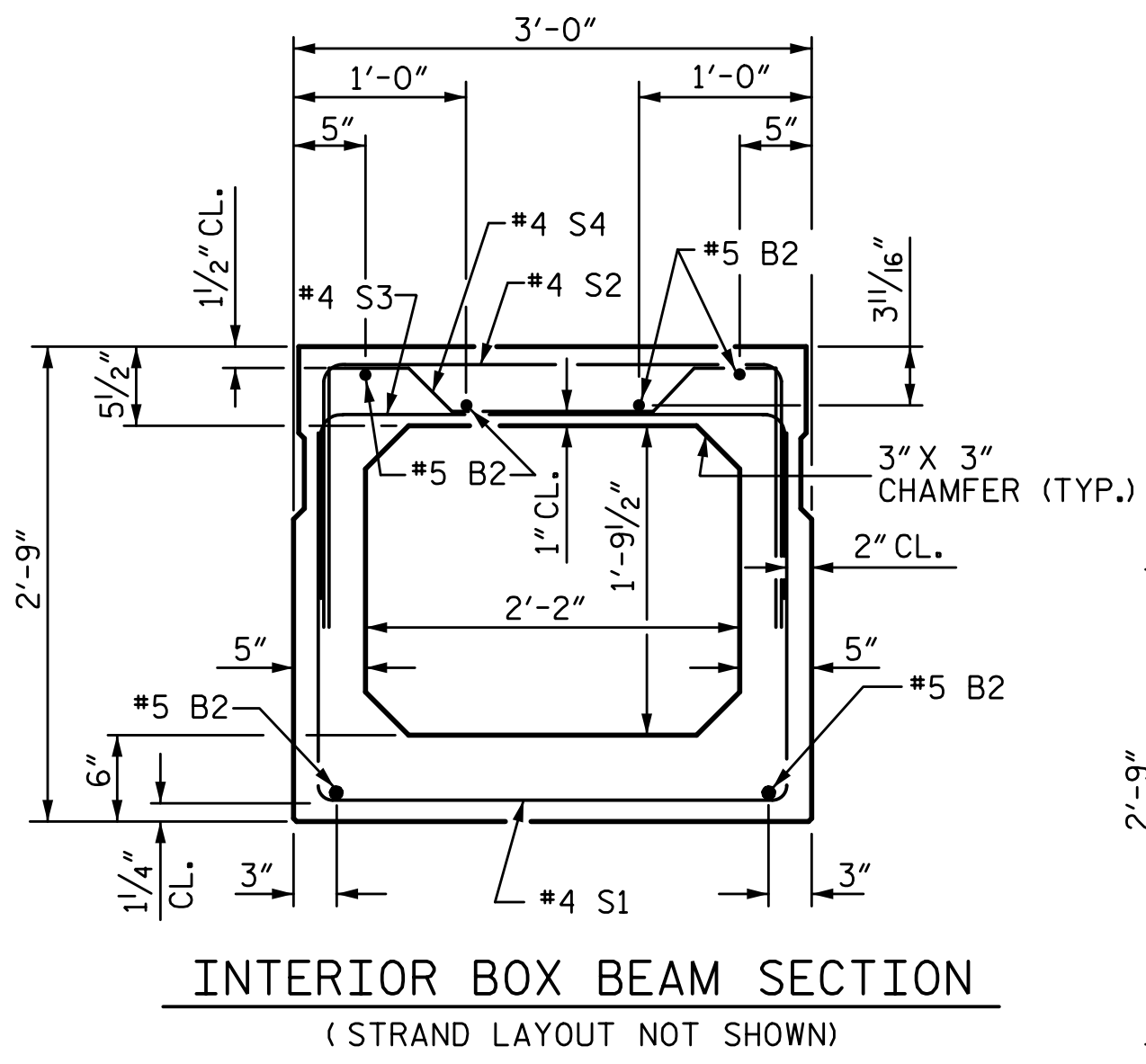
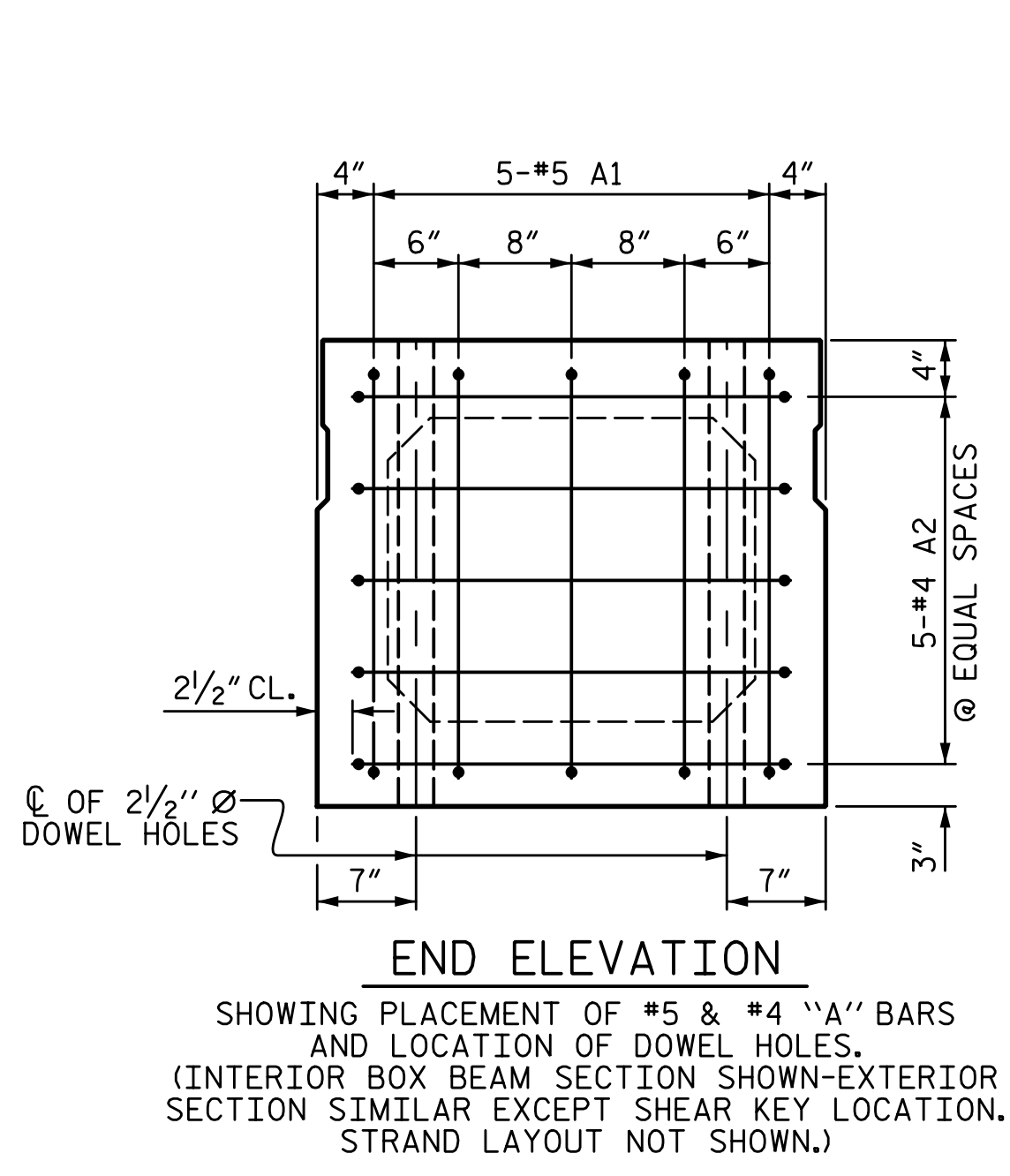
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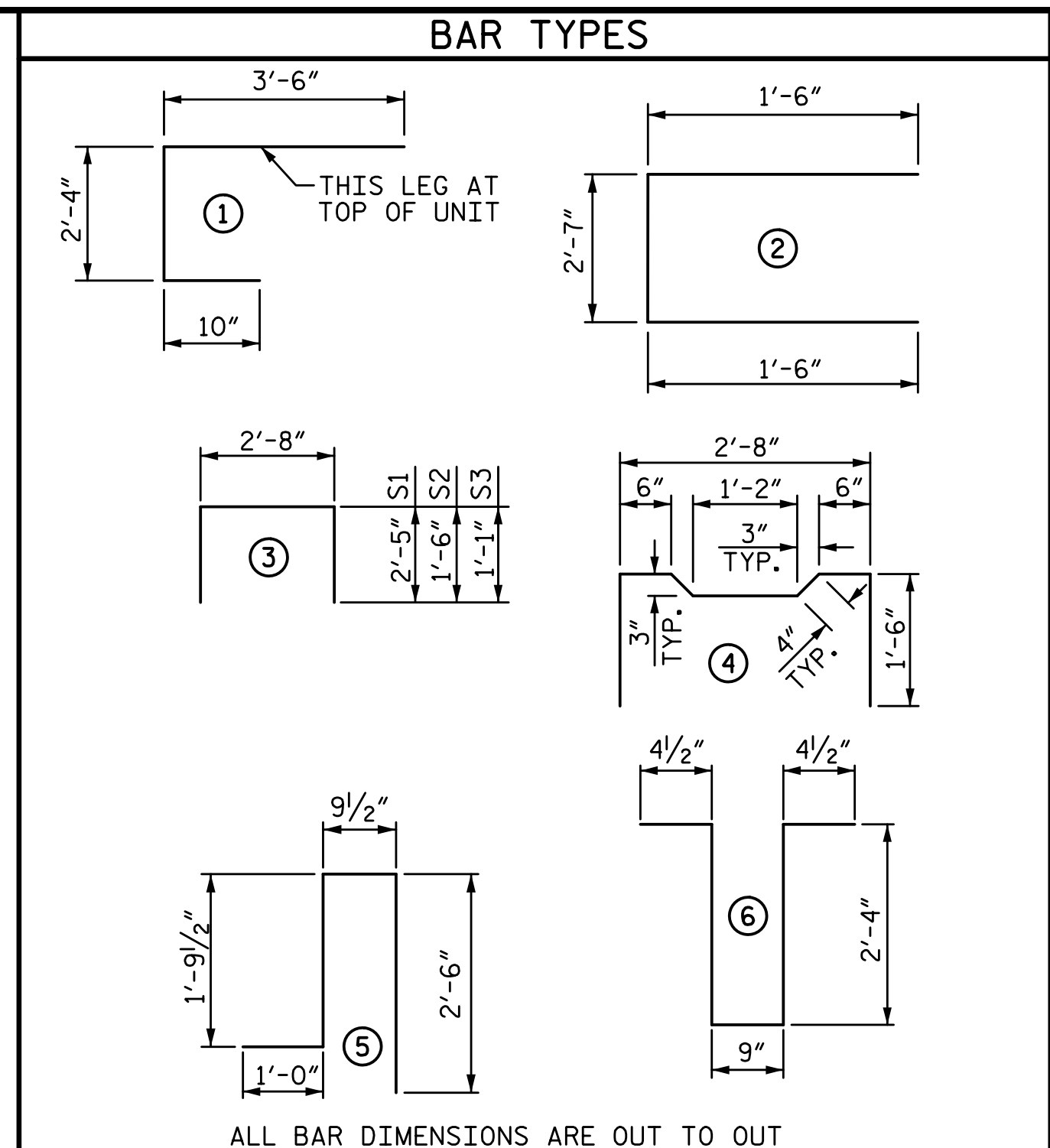
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TYPICAL STRAND LOCATION
(24 STRANDS REQUIRED)

DEBONDING LEGEND

- FULLY BONDED STRAND
 - STRAND DEBONDED FOR 4'-0" FROM END OF GIRDER
 - ▲ STRAND DEBONDED FOR 10'-0" FROM END OF GIRDER
 - ⊙ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STANDS IN THE BOX BEAM UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST.
- BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.



BILL OF MATERIAL FOR ONE BOX BEAM SECTION

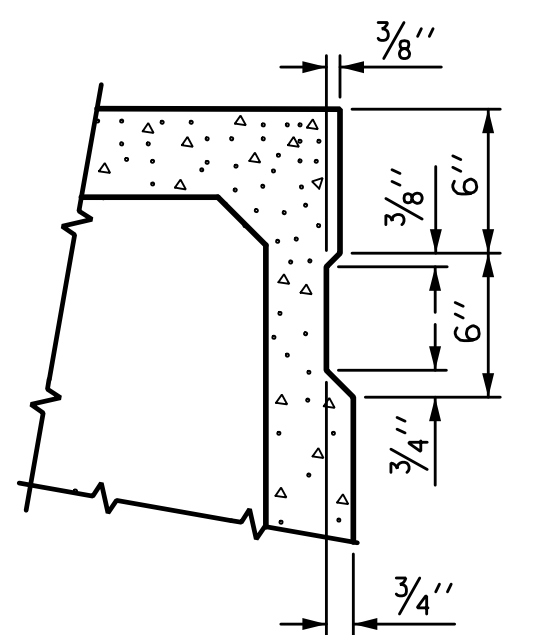
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-8"	70	6'-8"	70
A2	34	#4	2	5'-7"	127	5'-7"	127
B2	12	#5	STR	40'-11"	512	40'-11"	512
K1	12	#4	6	6'-2"	49	6'-2"	49
K2	8	#4	STR	2'-7"	14	2'-7"	14
S1	66	#4	3	7'-6"	331	7'-6"	331
S2	66	#4	3	5'-8"	250	5'-8"	250
S3	113	#4	3	4'-10"	365	4'-10"	365
S4	47	#4	4	5'-10"	183	5'-10"	183
* S5	107	#5	5	6'-1"	679	--	--
REINFORCING STEEL				1901	LBS.	1901	LBS.
* EPOXY COATED REINF. STEEL				679	LBS.		
8000 P.S.I. CONCRETE				14.2	CU. YDS.	14.1	CU. YDS.
0.6" Ø L.R. STRANDS				No. 24		No. 24	

GRADE 270 STRANDS

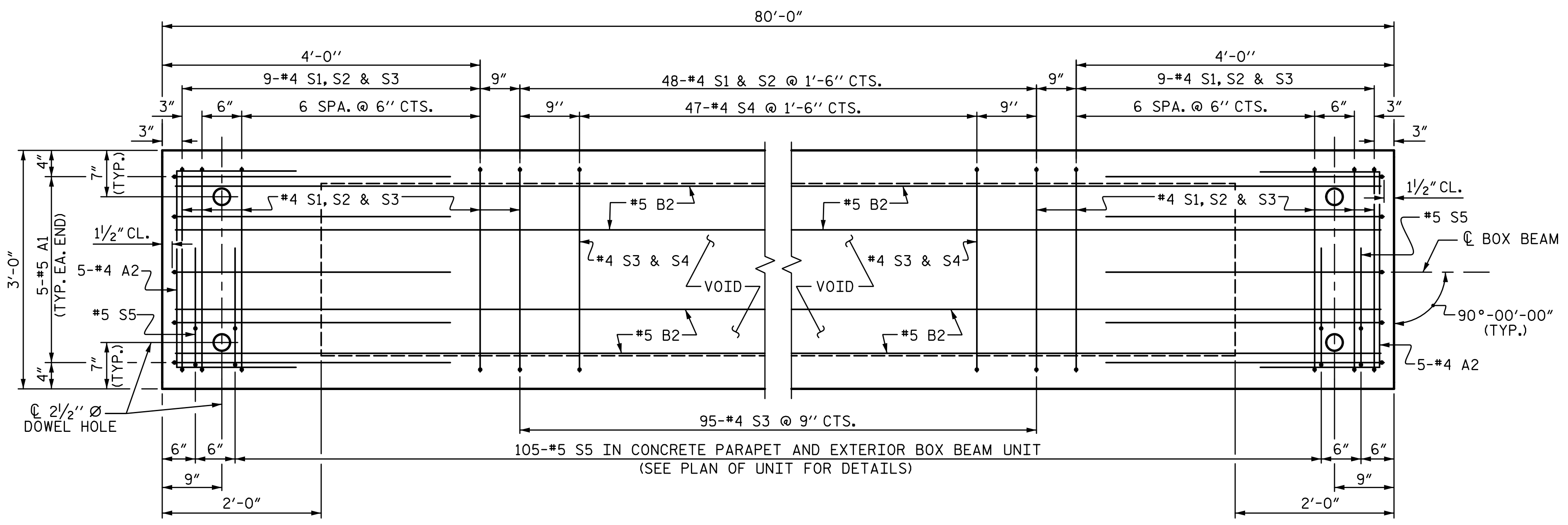
	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

BOX BEAM UNITS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	80'-0"	160'-0"
INTERIOR B.B.	9	80'-0"	720'-0"
TOTAL	11		880'-0"

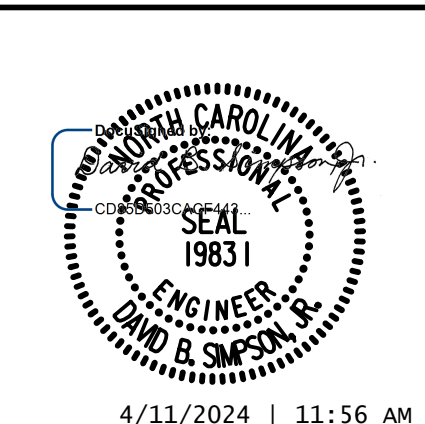


NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT". FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL". FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

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 GUILFORD COUNTY
 STATION: 17+05.00 -L-
 SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 3'-0" X 2'-9"
 PRESTRESSED CONCRETE
 BOX BEAM UNIT
 90° SKEW

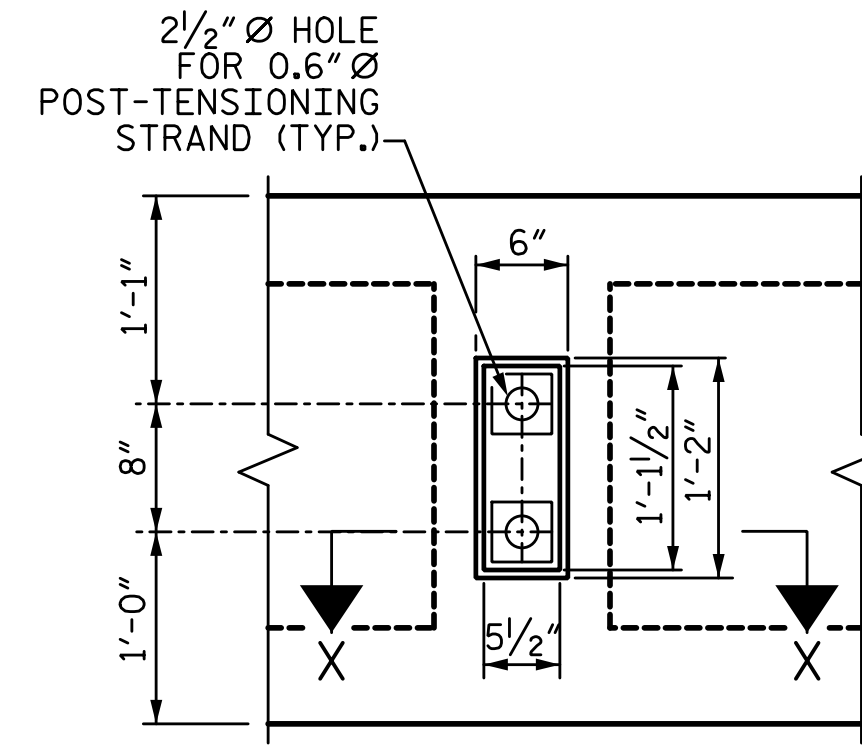
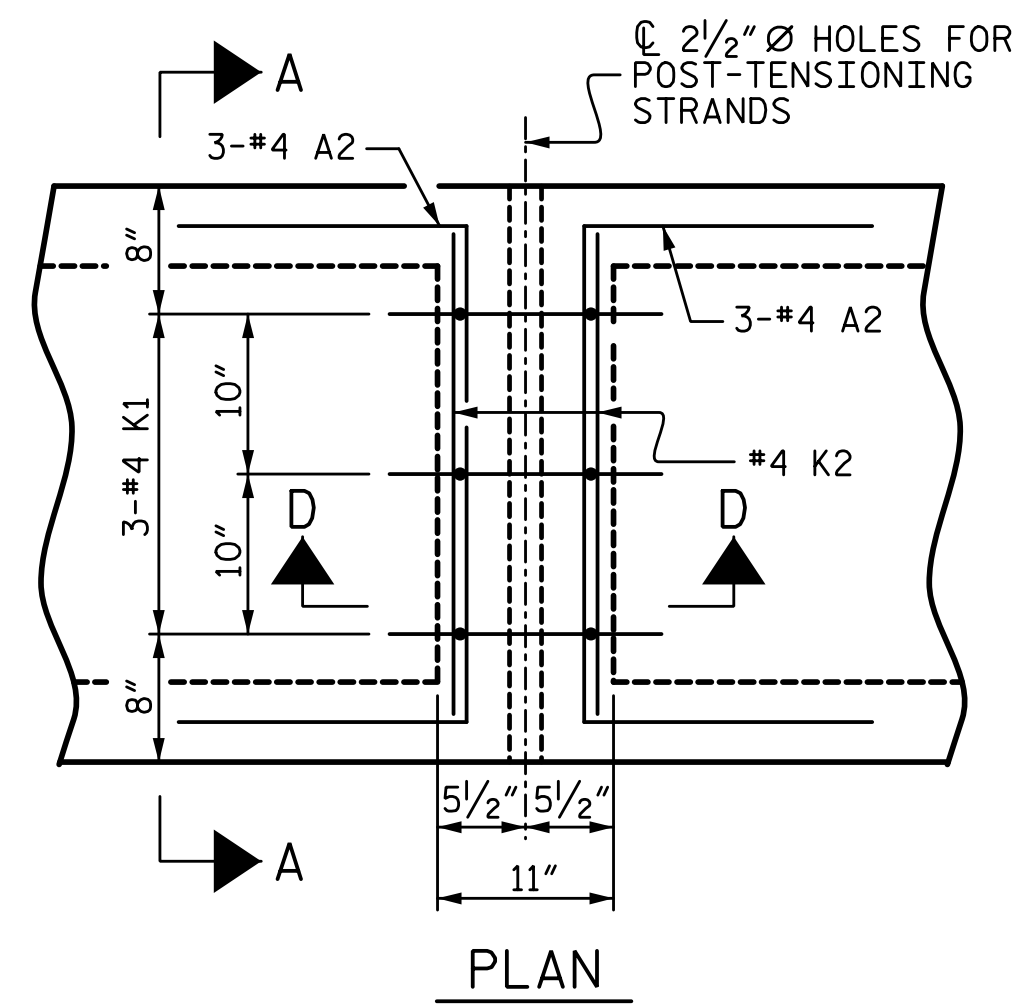
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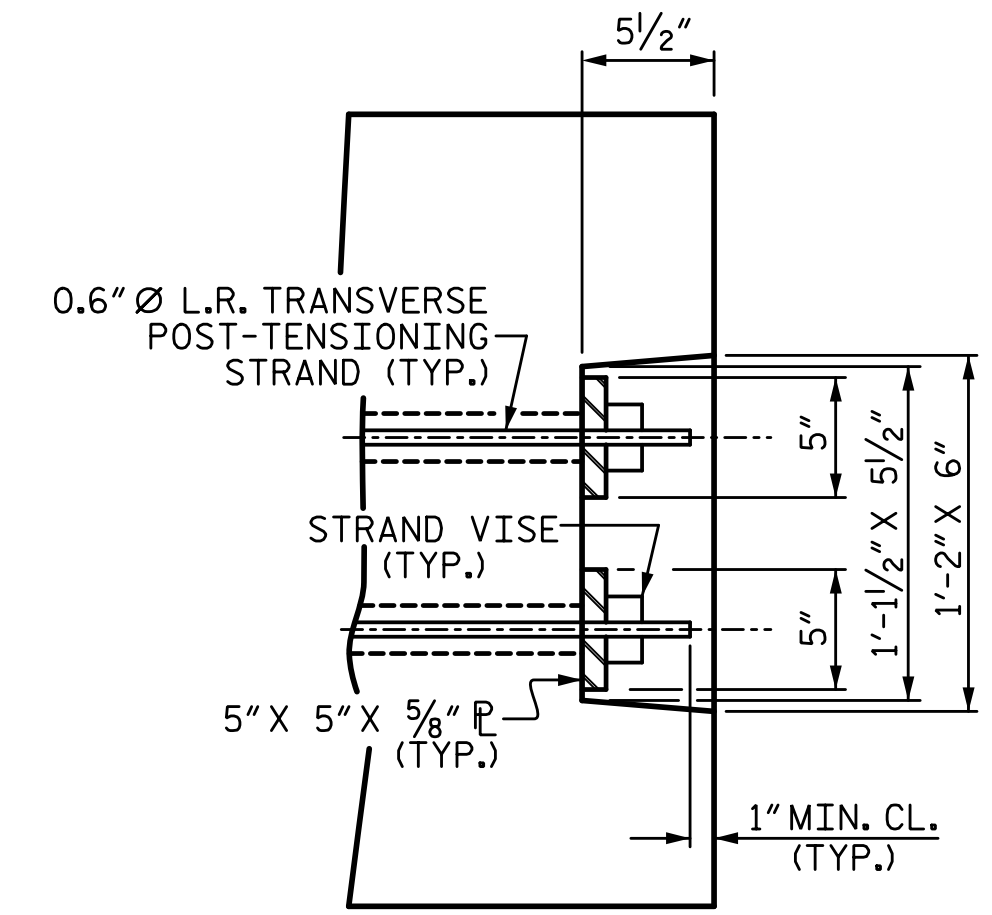
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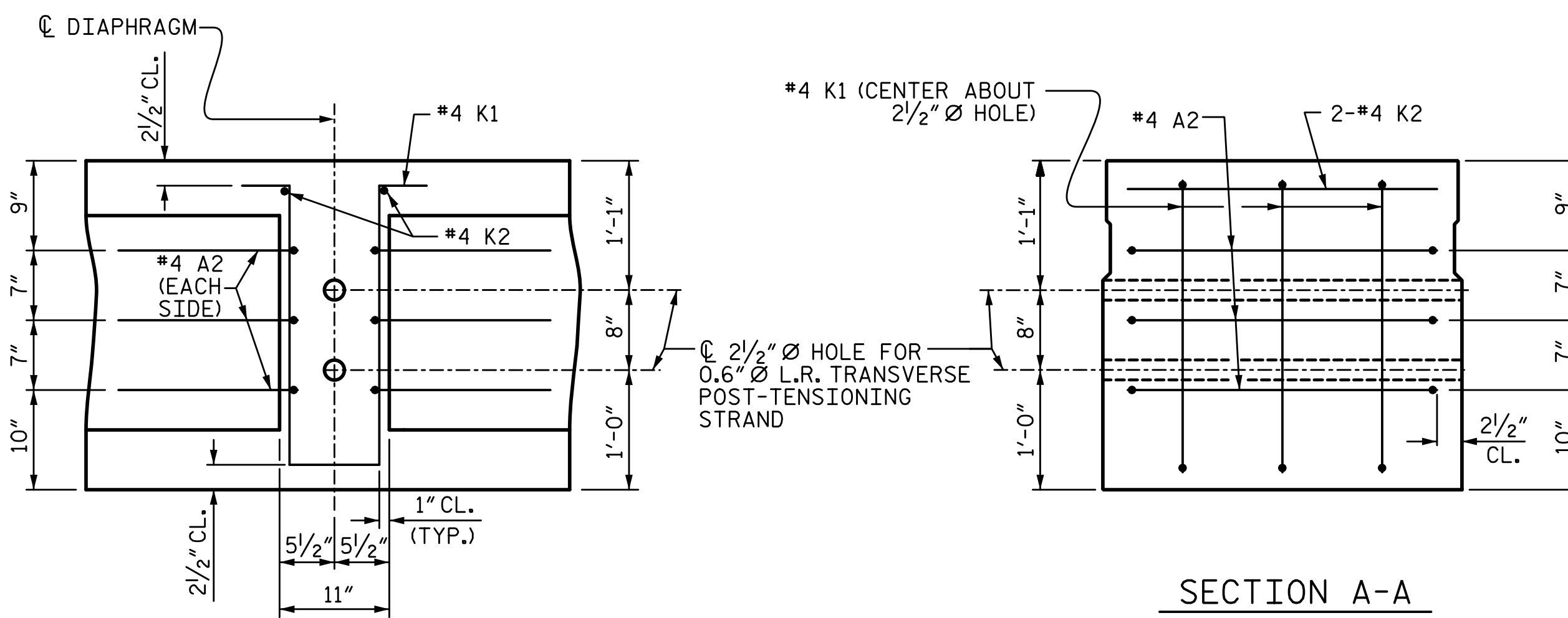
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VIEW Y-Y
SHOWING ELEVATION VIEW OF GROUDED RECESS



DETAIL "C"

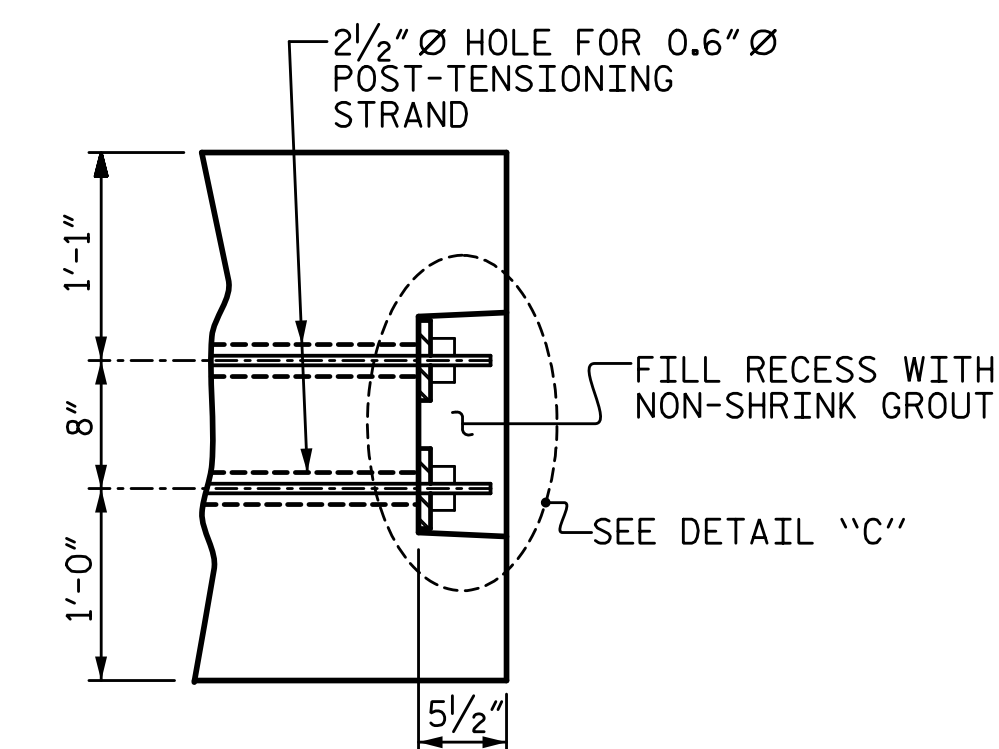


SECTION D-D

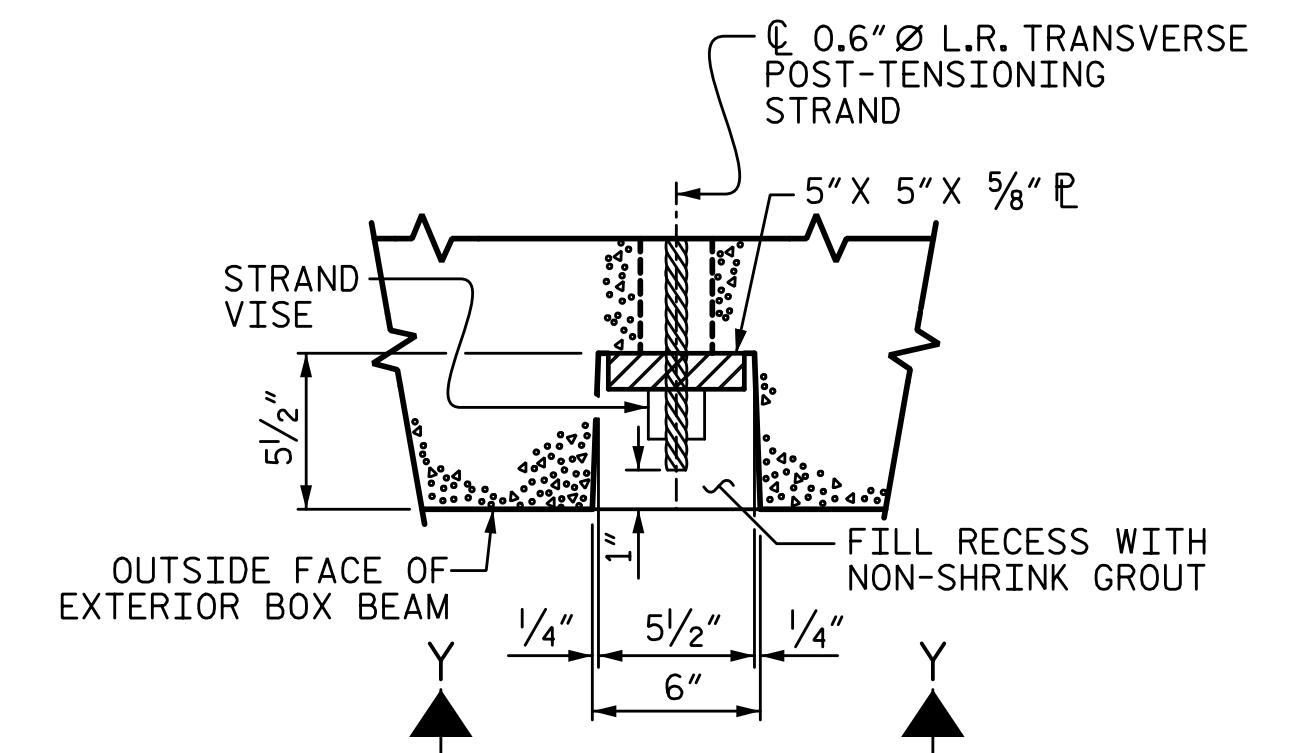
SECTION A-A
VOIDS NOT SHOWN

DOUBLE DIAPHRAGM DETAILS

*4 "S" BARS NOT SHOWN. *4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2 1/2" Ø HOLE.

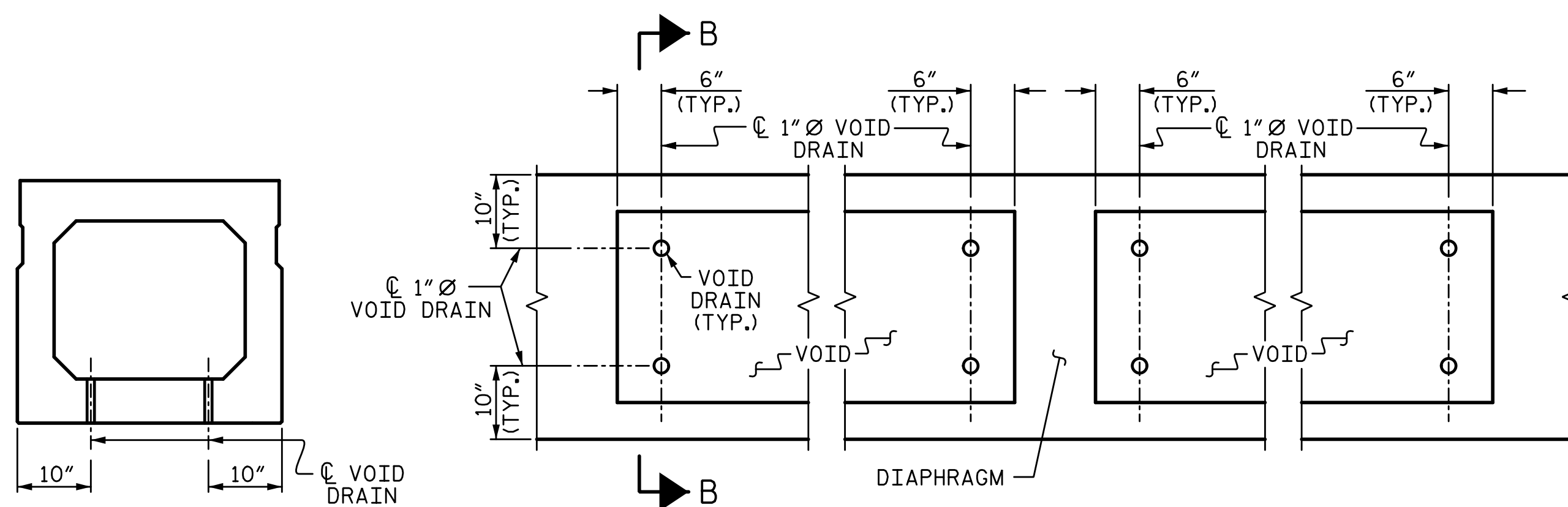


PART SECTION AT RECESS



SECTION X-X
SHOWING PLAN VIEW OF GROUDED RECESS

**GROUDED RECESS DETAIL AT
END OF POST-TENSIONED STRANDS
OF EXTERIOR BOX BEAM**



SECTION B-B

PART PLAN

VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

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

** INCLUDES FUTURE WEARING SURFACE

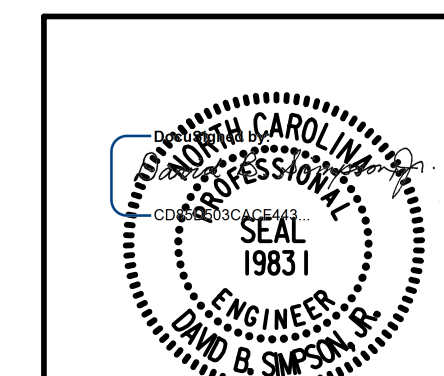
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GUILFORD COUNTY
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SHEET 4 OF 4



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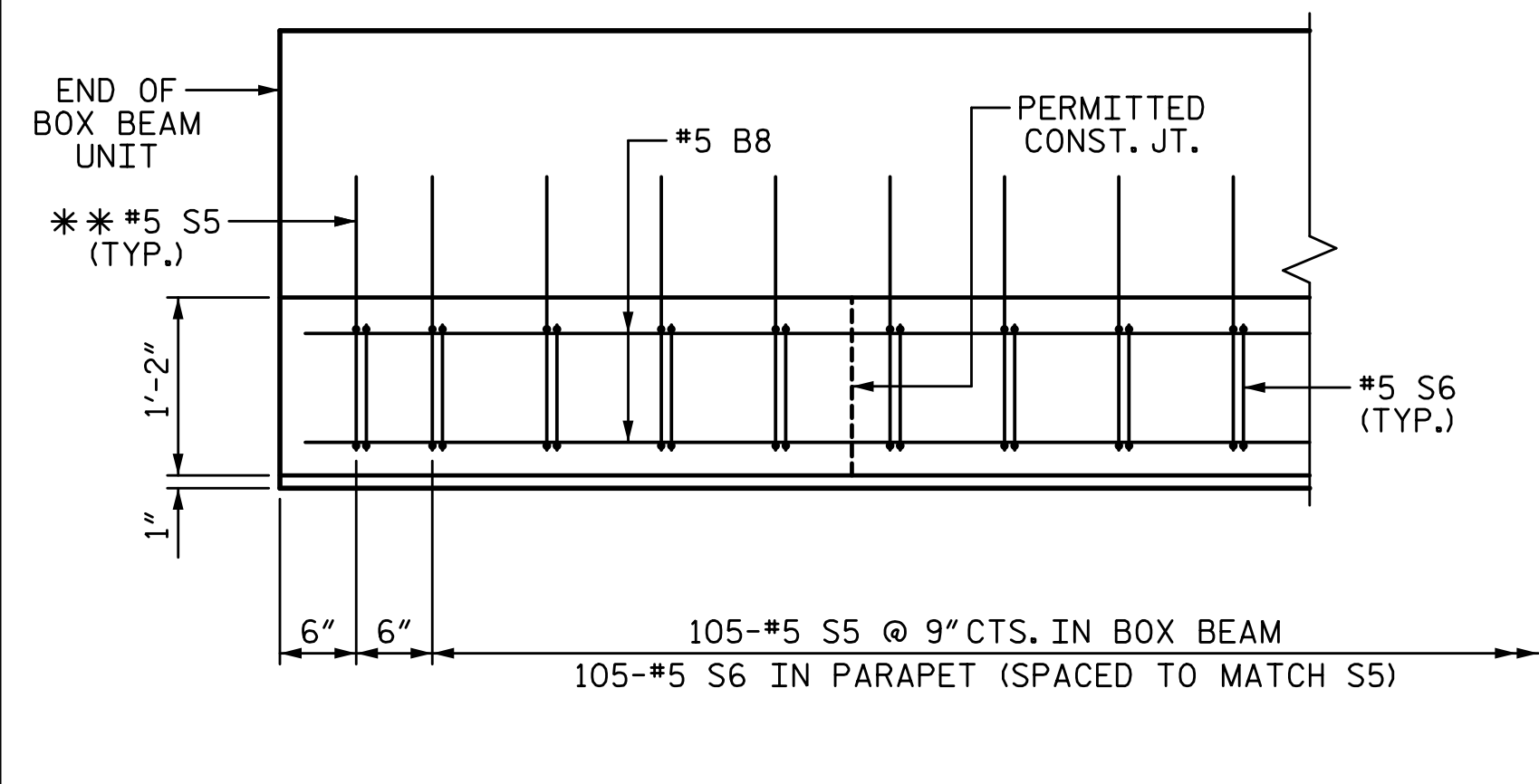
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
3'-0" X 2'-9"
PRESTRESSED CONCRETE
BOX BEAM UNIT
90° SKEW

DRAWN BY: T. BANKOVICH	DATE: 10-22
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DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22

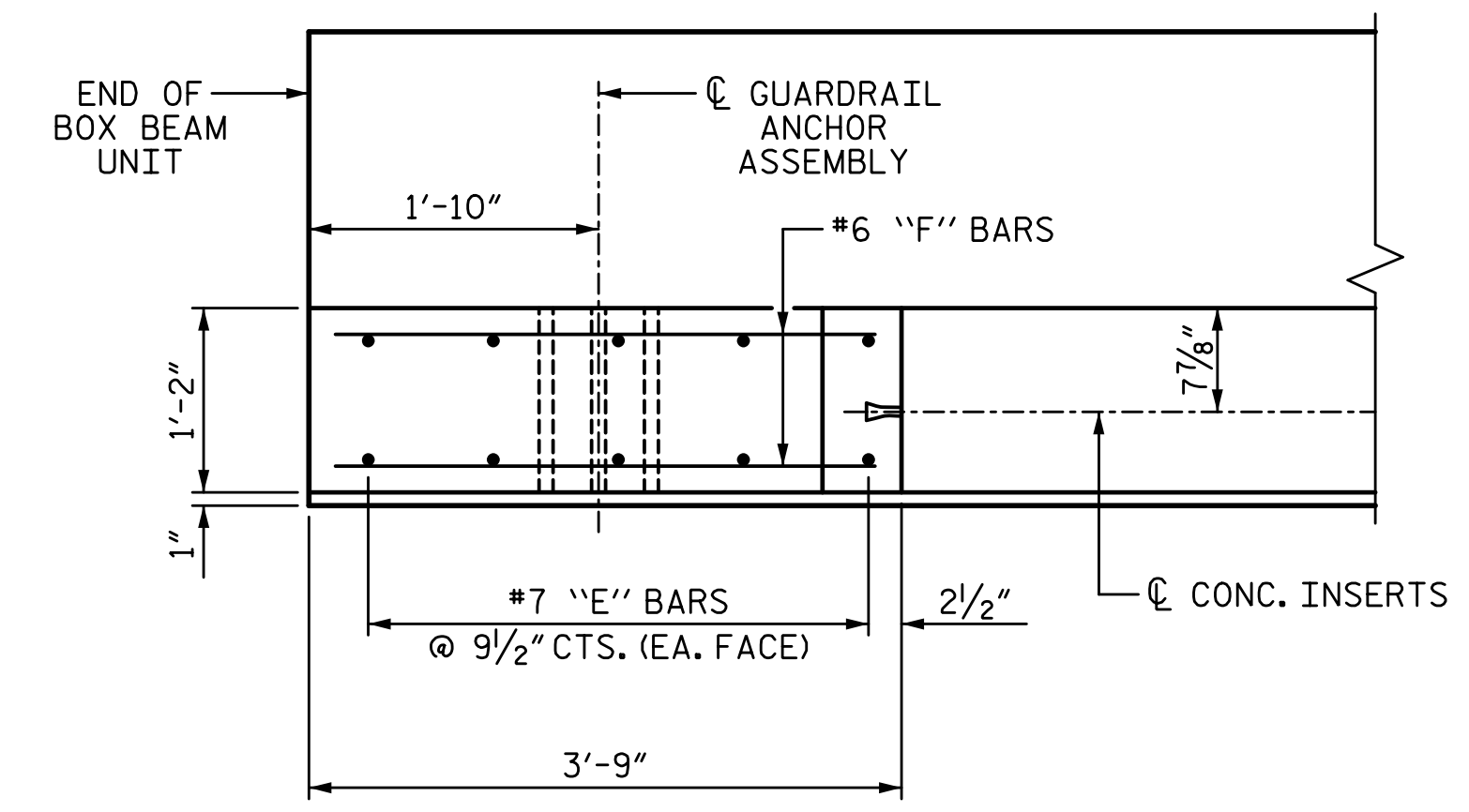
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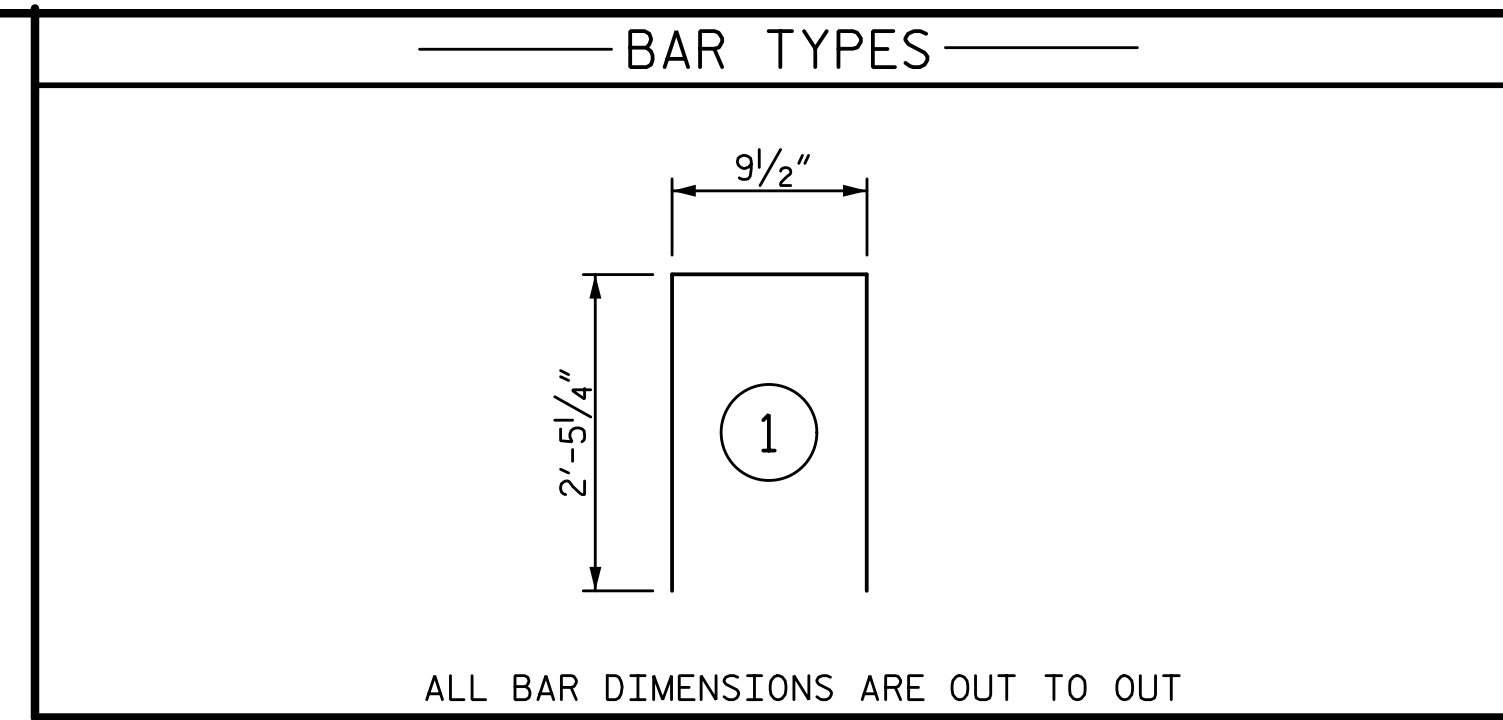
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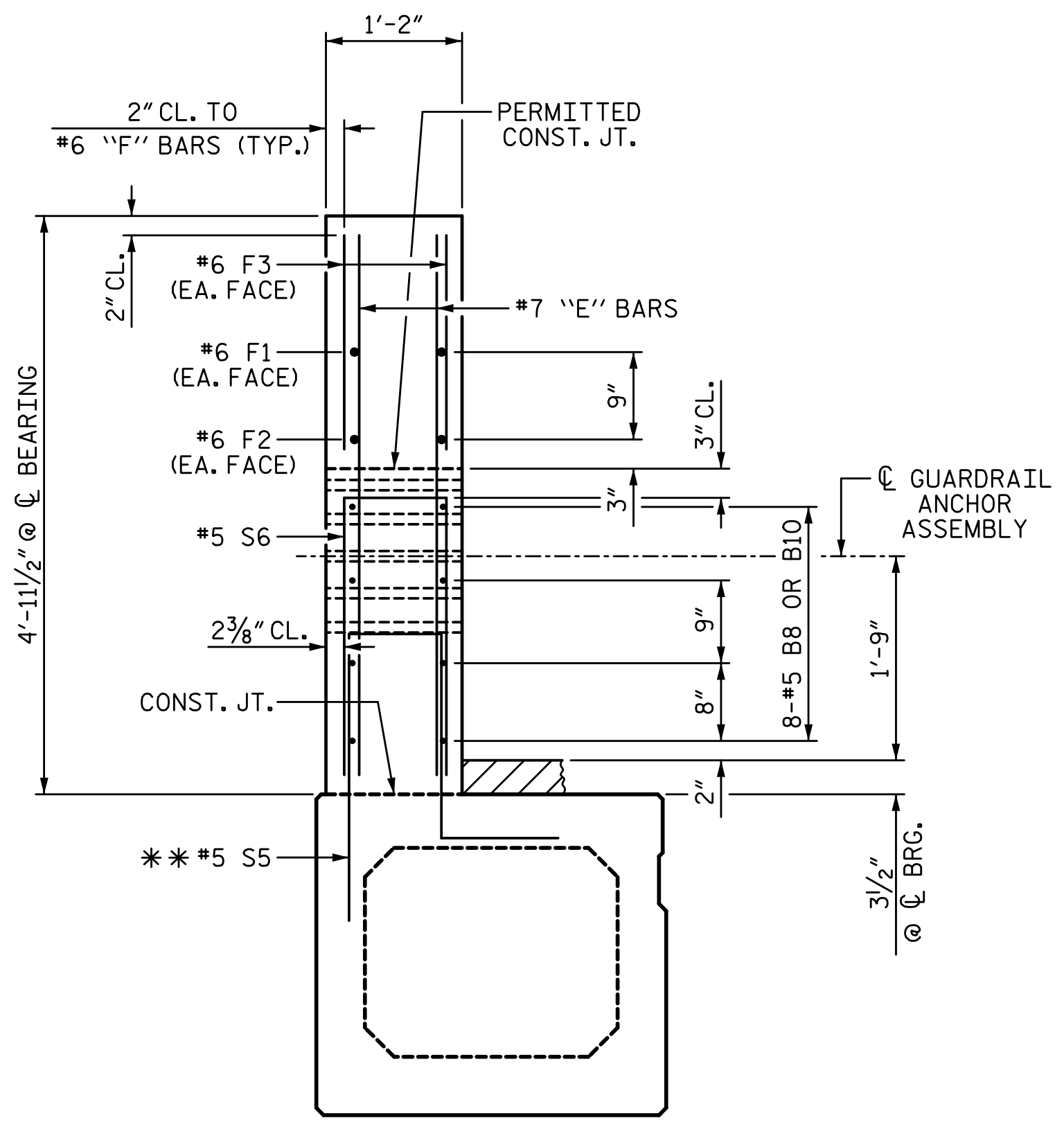
PLAN OF PARAPET



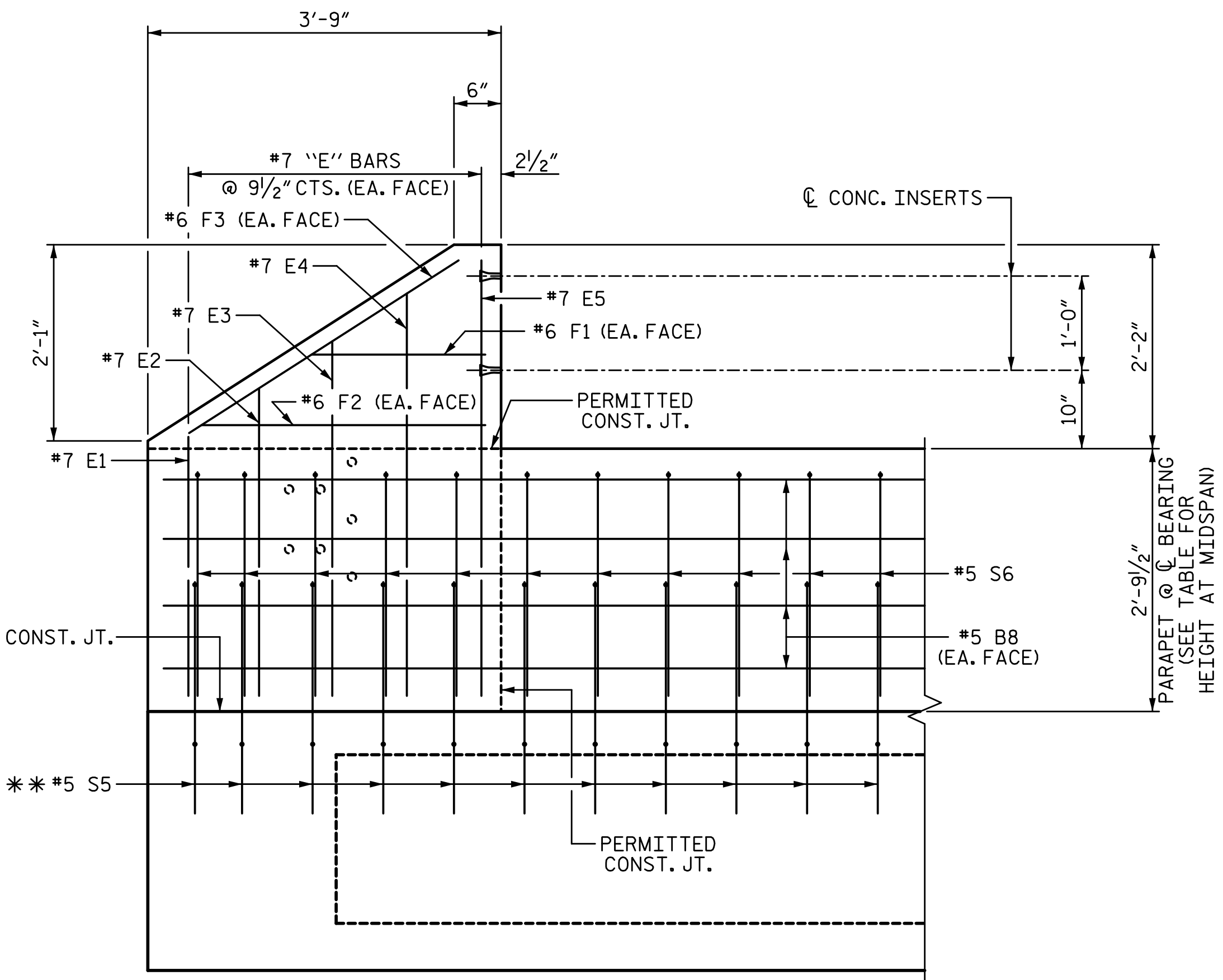
PLAN OF END POST



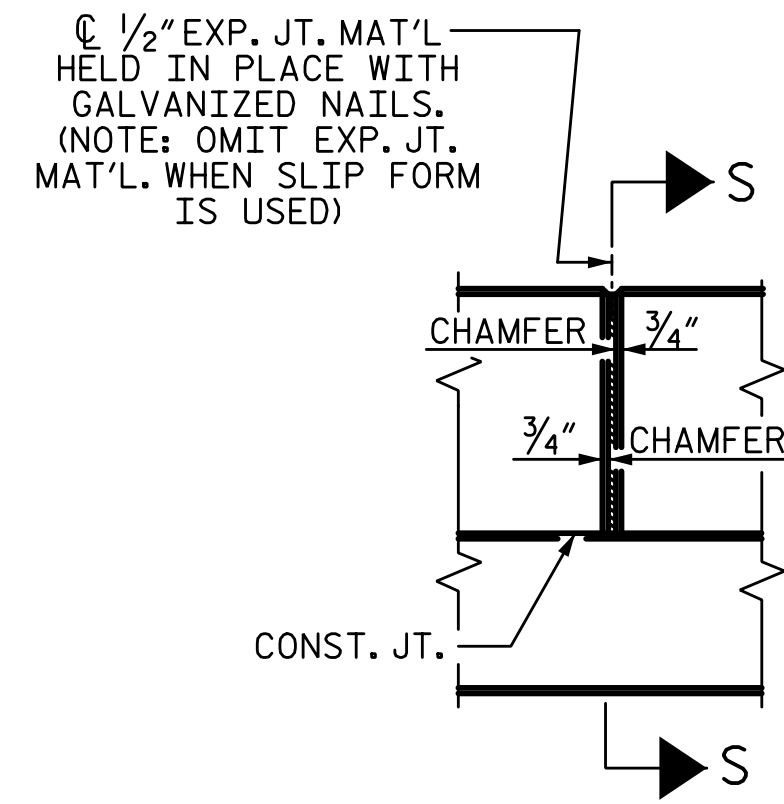
BILL OF MATERIAL					
PARAPET AND END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B8	32	#5	STR	26'-4"	879
*B10	16	#5	STR	26'-1"	435
*E1	8	#7	STR	2'-10"	46
*E2	8	#7	STR	3'-4"	55
*E3	8	#7	STR	3'-10"	63
*E4	8	#7	STR	4'-4"	71
*E5	8	#7	STR	4'-8"	76
*F1	8	#6	STR	1'-11"	23
*F2	8	#6	STR	3'-1"	37
*F3	8	#6	STR	4'-0"	48
*S6	214	#5	1	5'-8"	1265
*EPOXY COATED REINFORCING STEEL					2998 LB
CLASS AA CONCRETE					20.1 CY
1'-2" X 2'-9 1/2" CONCRETE PARAPET 160.0 LF					



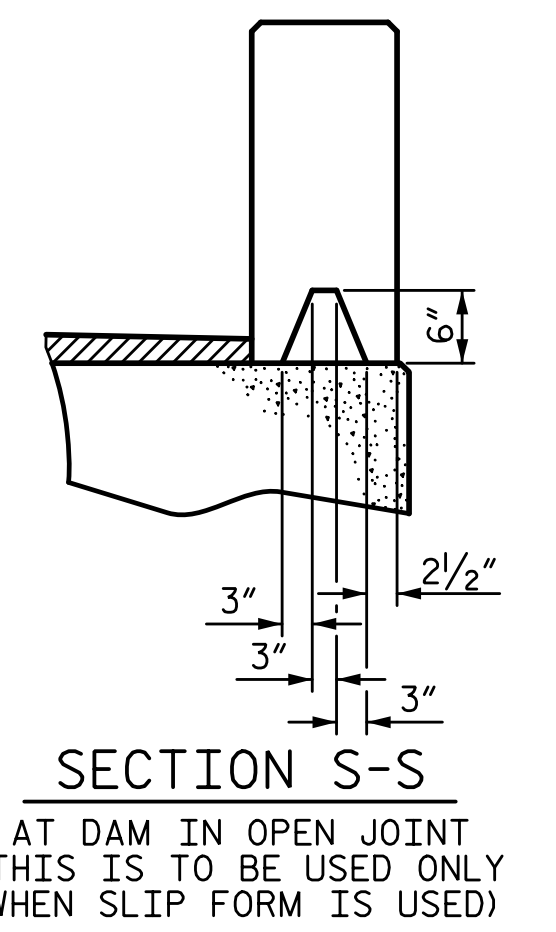
END VIEW



ELEVATION



ELEVATION AT EXPANSION JOINTS



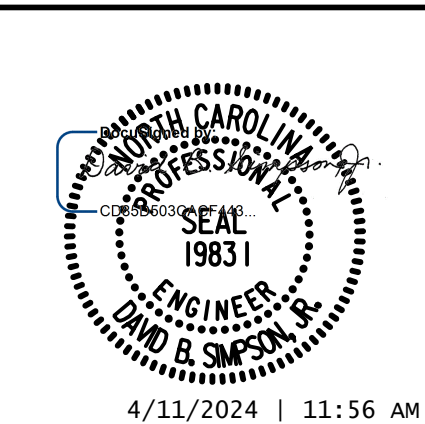
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)

PARAPET AND END POST FOR TWO BAR RAIL

** #5 S5 BARS ARE INCLUDED IN BILL OF MATERIAL FOR BOX BEAM

GUTTERLINE ASPHALT THICKNESS & PARAPET HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	PARAPET HEIGHT @ MID-SPAN
80' UNITS	2 1/4"	2'-8 1/4"

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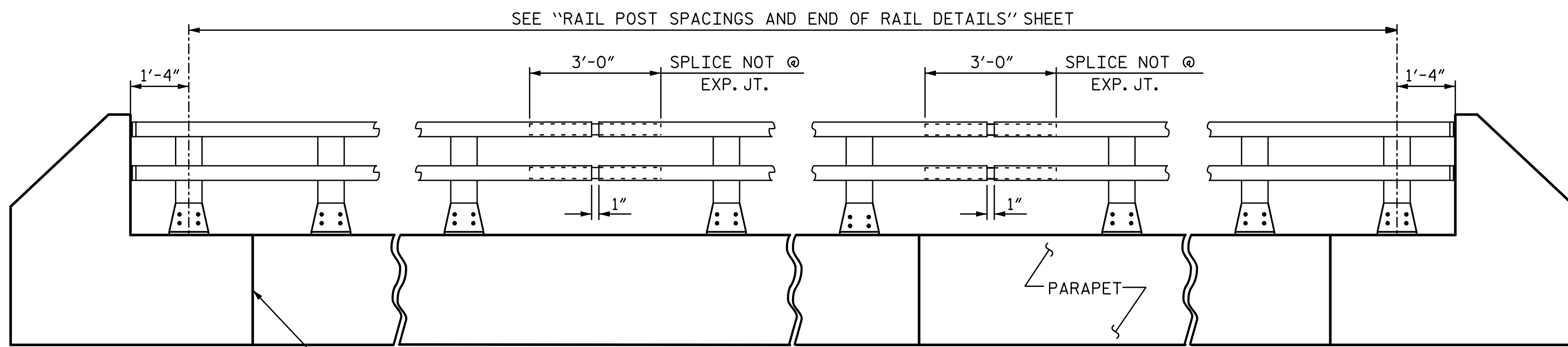
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 GUILFORD COUNTY
 STATION: 17+05.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 CONCRETE PARAPET
 DETAILS
 FOR 2 BAR METAL RAIL

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ELEVATION

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

NOTES:

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 LRFBIDGE 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.

ALUMINUM RAILS:

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.

GALVANIZED STEEL RAILS:

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

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 A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES:

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 "RAIL POST SPACING AND END OF RAIL DETAILS" SHEET.

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.

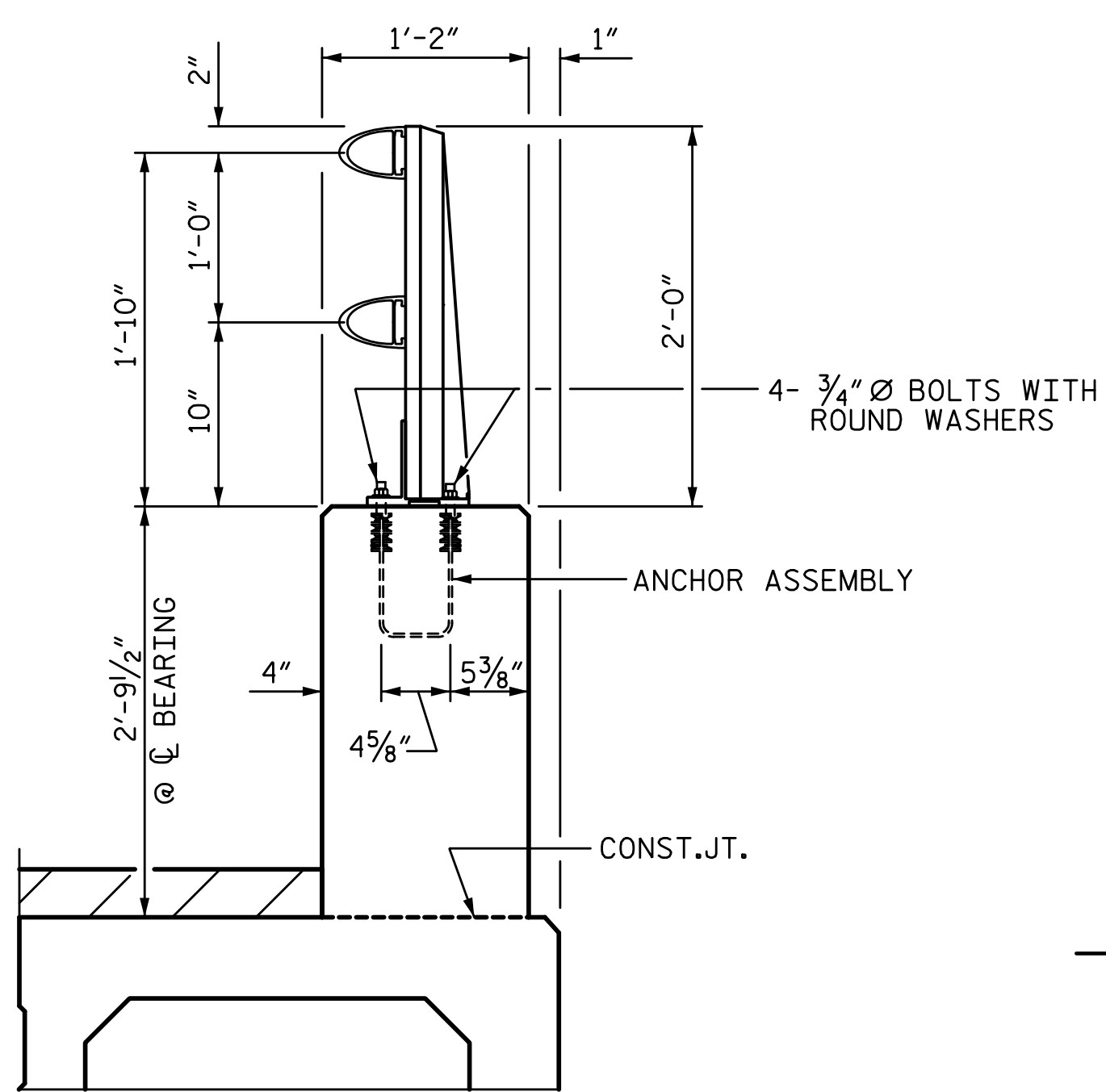
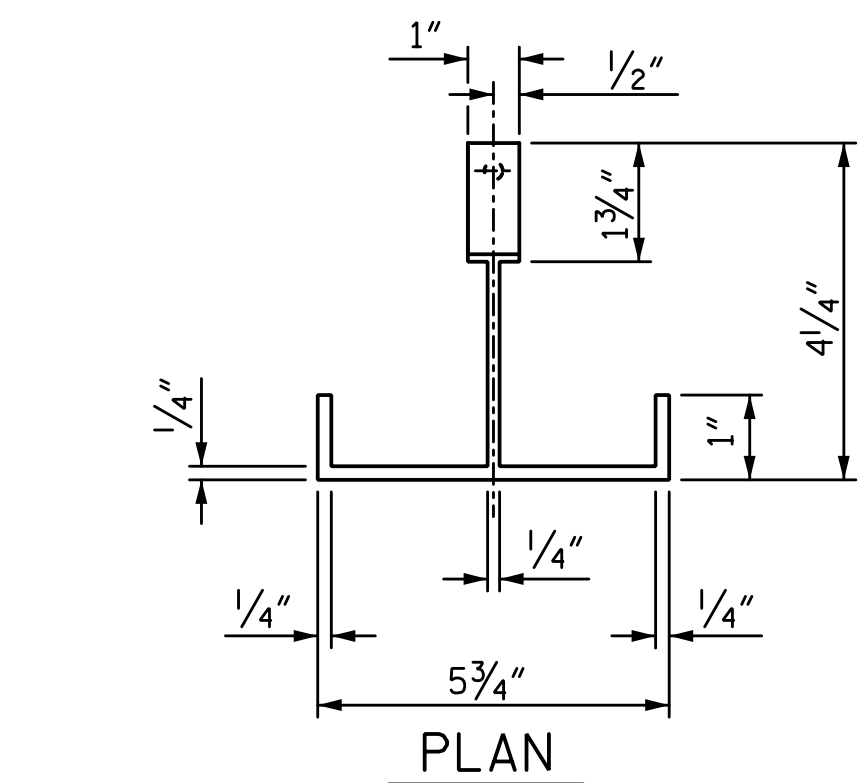
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

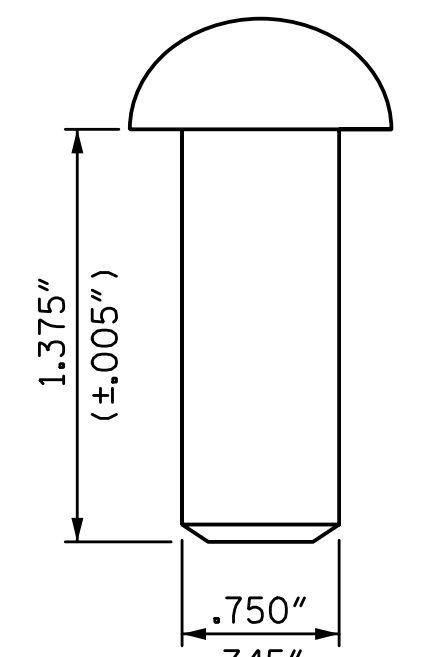
ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

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

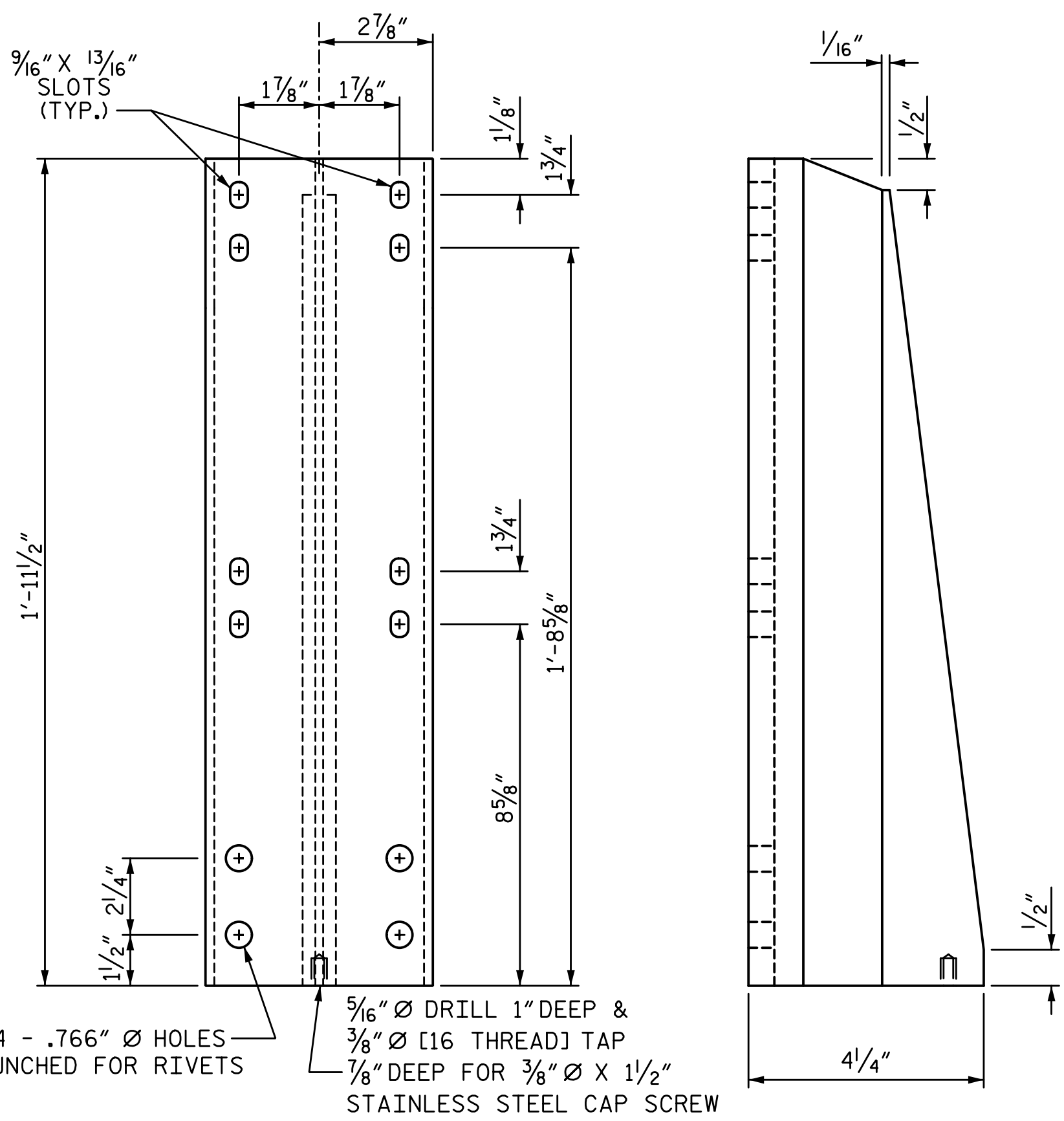
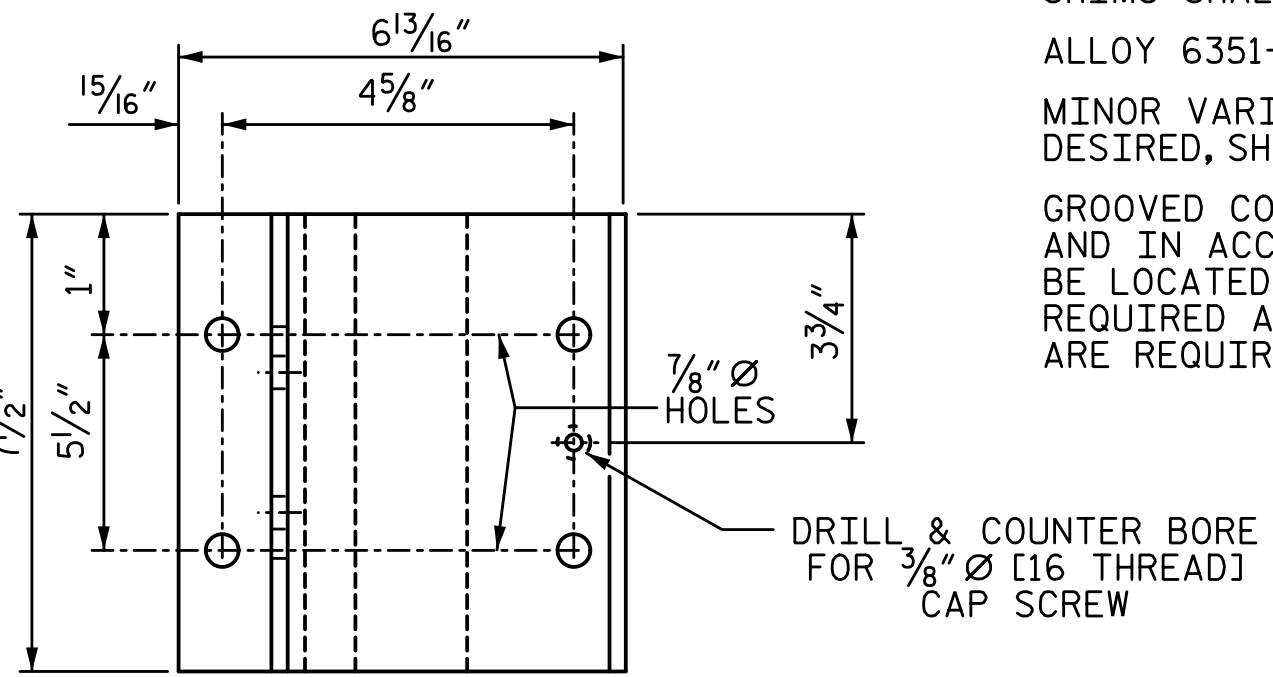
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT 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.



RIVET DETAIL



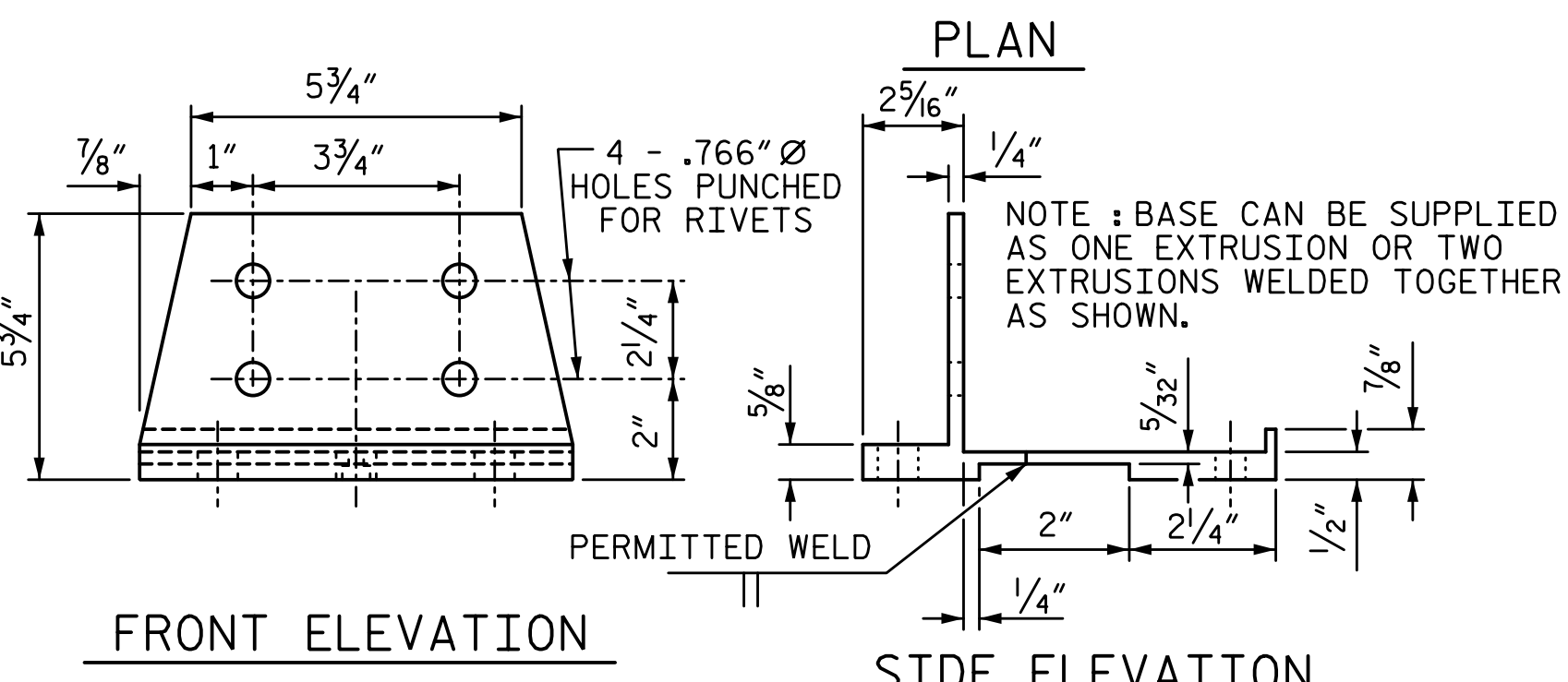
SECTION THRU PARAPET AND RAIL



FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



FRONT ELEVATION

SIDE ELEVATION

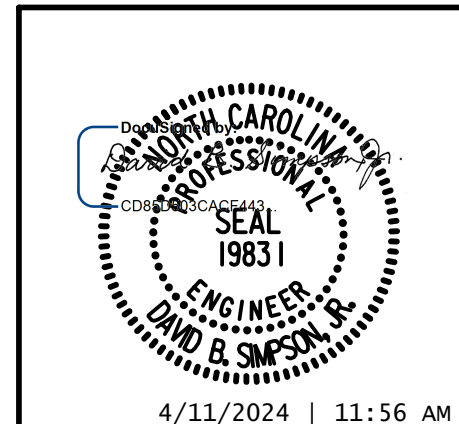
POST BASE DETAILS

PAY LENGTH = 145.00 LF

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-

SHEET 1 OF 2

DRAWN BY: T. BANKOVICH DATE: 10-22
 CHECKED BY: B.S. COX DATE: 10-22
 DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 10-22



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE

2 BAR METAL RAIL

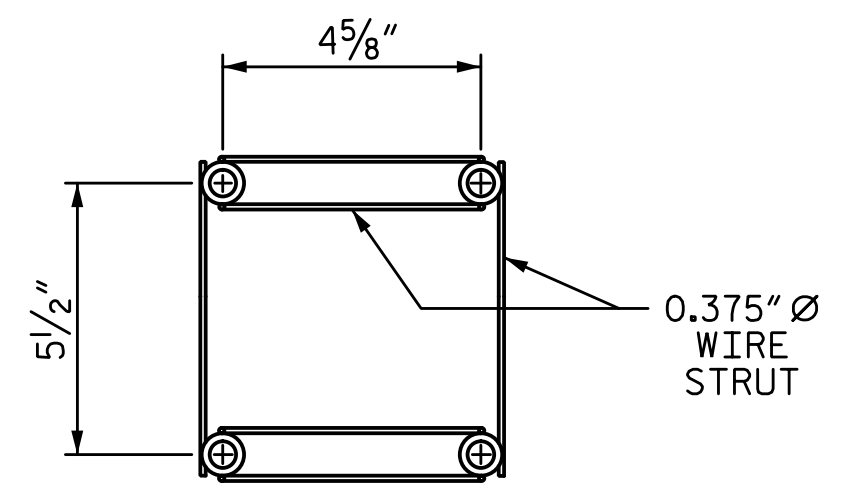
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			20

LICENSURE NO. C-4434

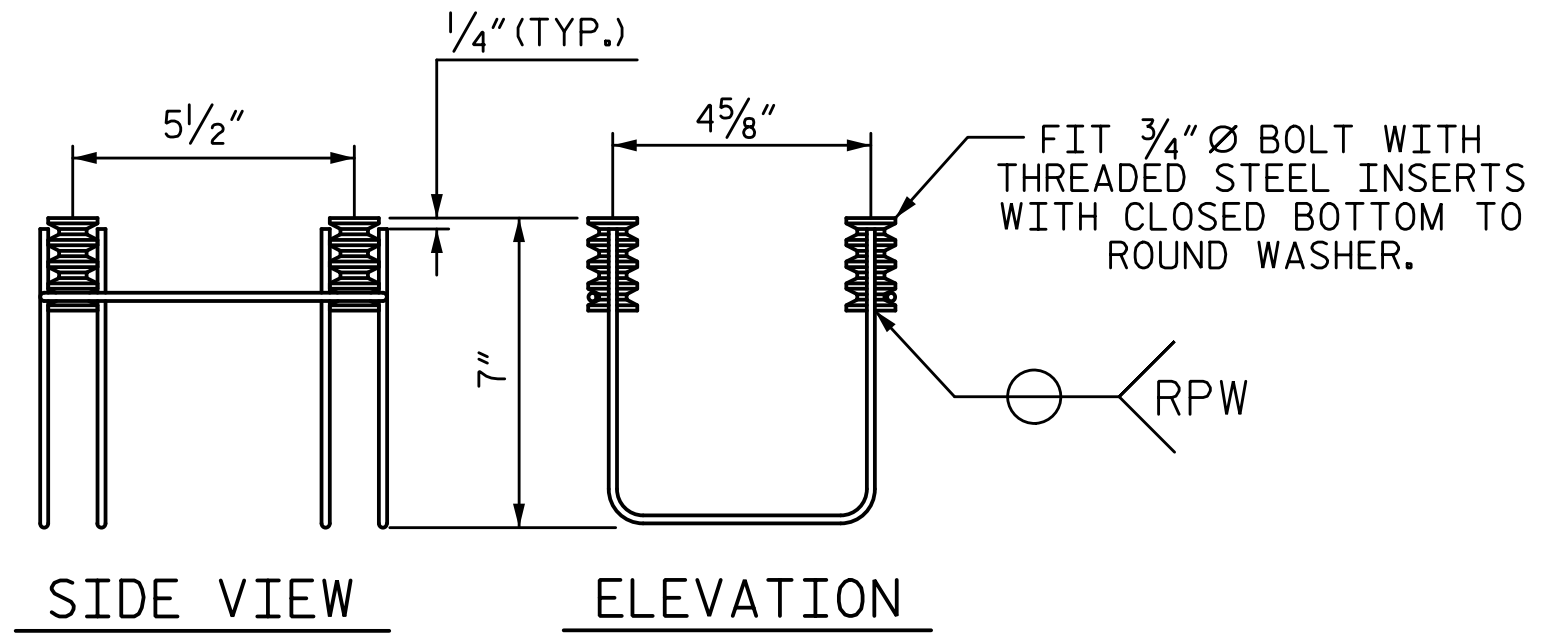
4/11/2024 | 11:56 AM EST

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PLAN



SIDE VIEW ELEVATION

STRUCTURAL CONCRETE ANCHOR ASSEMBLY NOTES:

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

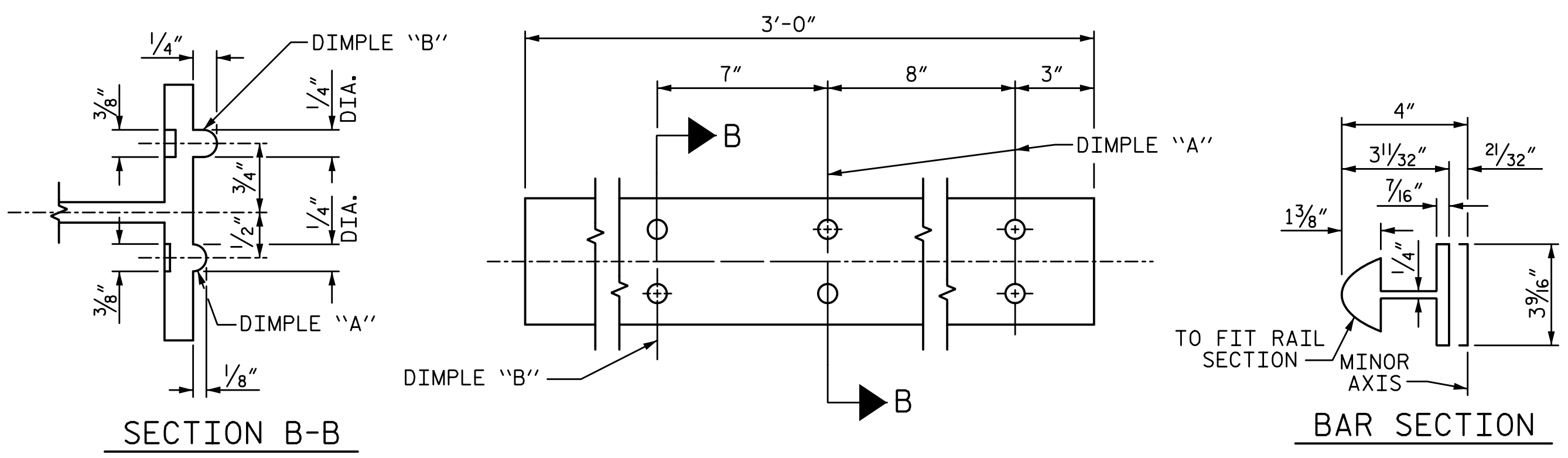
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

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

4-BOLT METAL RAIL ANCHOR ASSEMBLY

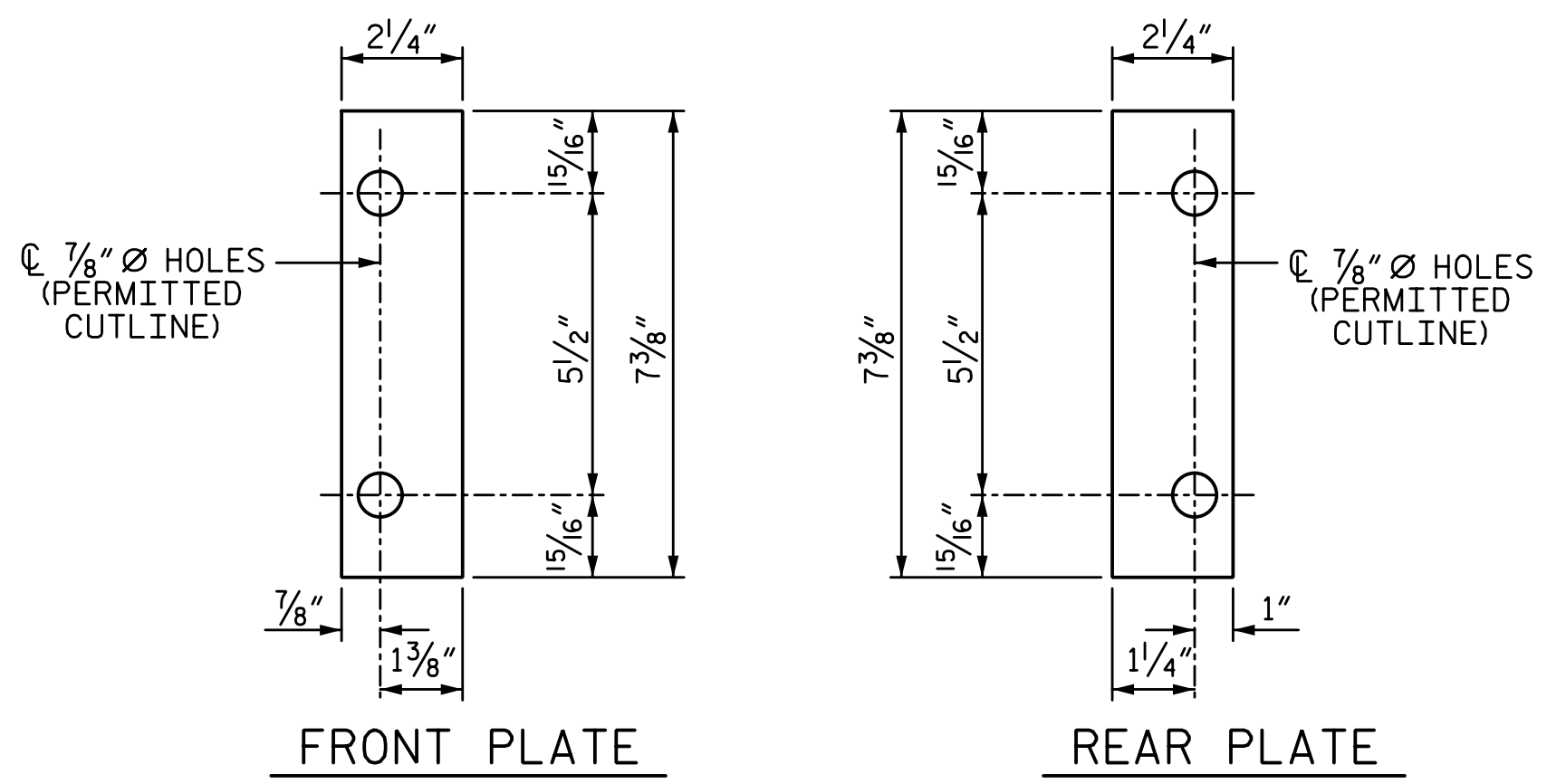
(34 ASSEMBLIES REQUIRED)



SECTION B-B

EXPANSION BAR DETAILS

BAR SECTION

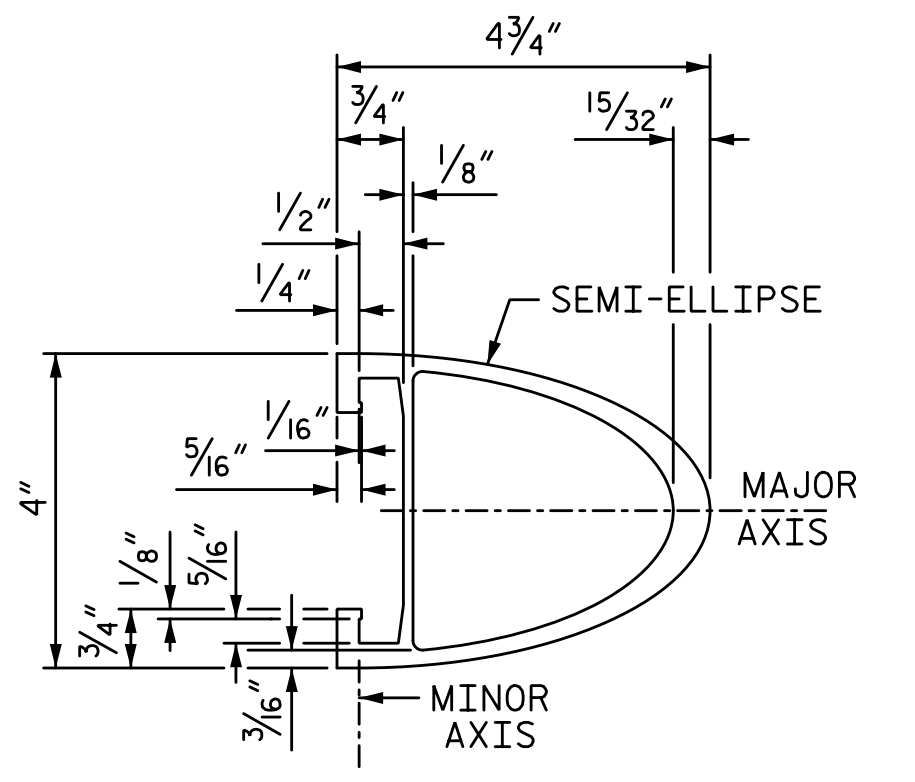


FRONT PLATE

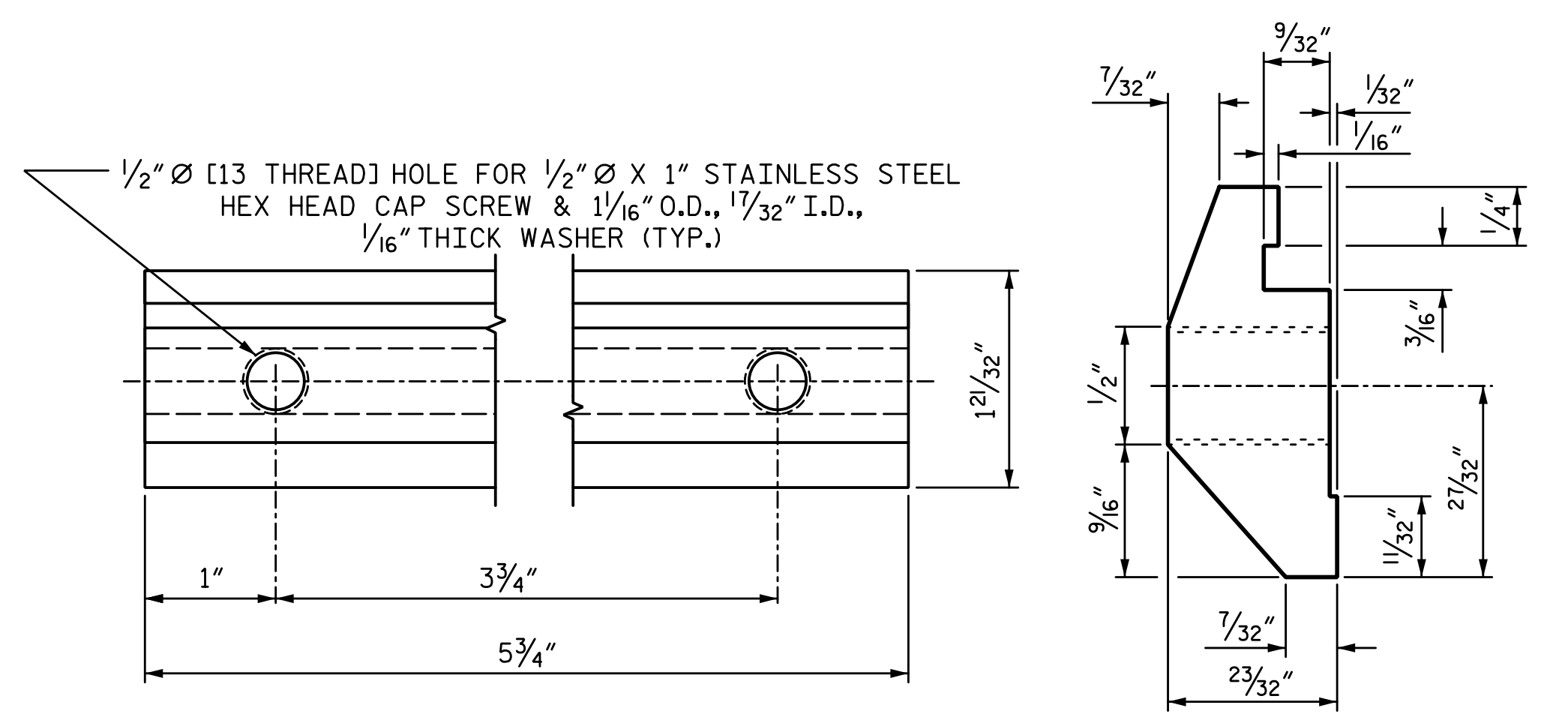
REAR PLATE

SHIM DETAILS

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

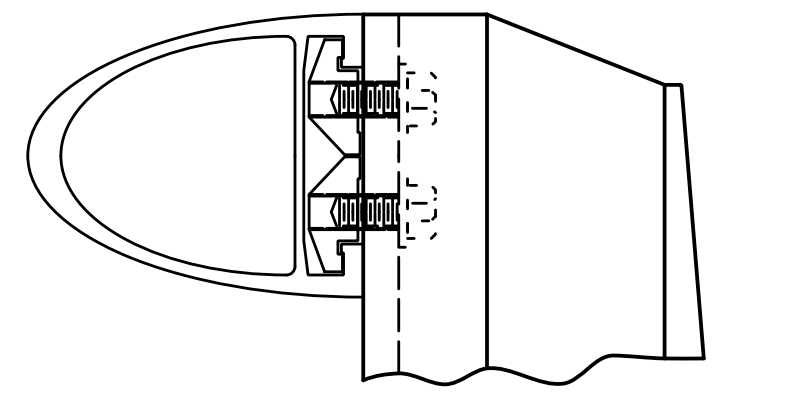


RAIL SECTION

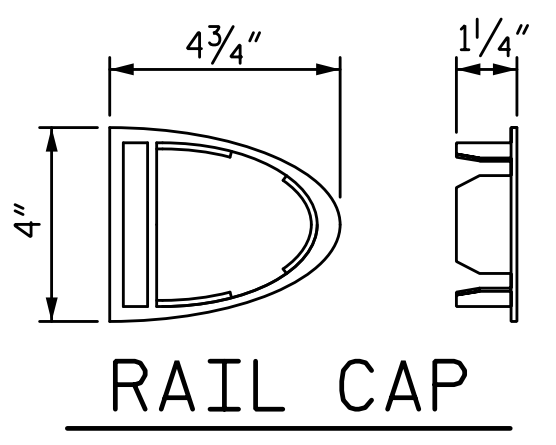


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
STATION: 17+05.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
2 BAR METAL RAIL

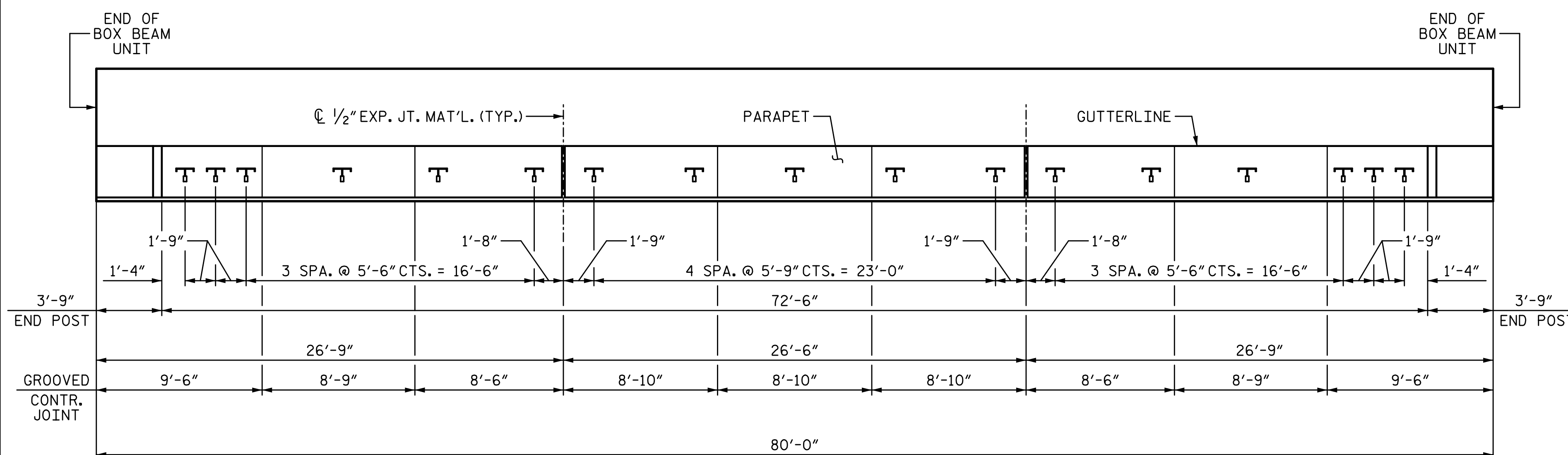
DRAWN BY: T. BANKOVICH	DATE: 10-22
CHECKED BY: B.S. COX	DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22

WVGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

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PLAN OF RAIL POST SPACING
(RIGHT EXTERIOR UNIT SHOWN, LEFT EXTERIOR UNIT SIMILAR)

STRUCTURAL CONCRETE INSERT NOTES:

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
 - B. 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.)
 - C. 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 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

METAL RAIL TO END POST CONNECTION NOTES:

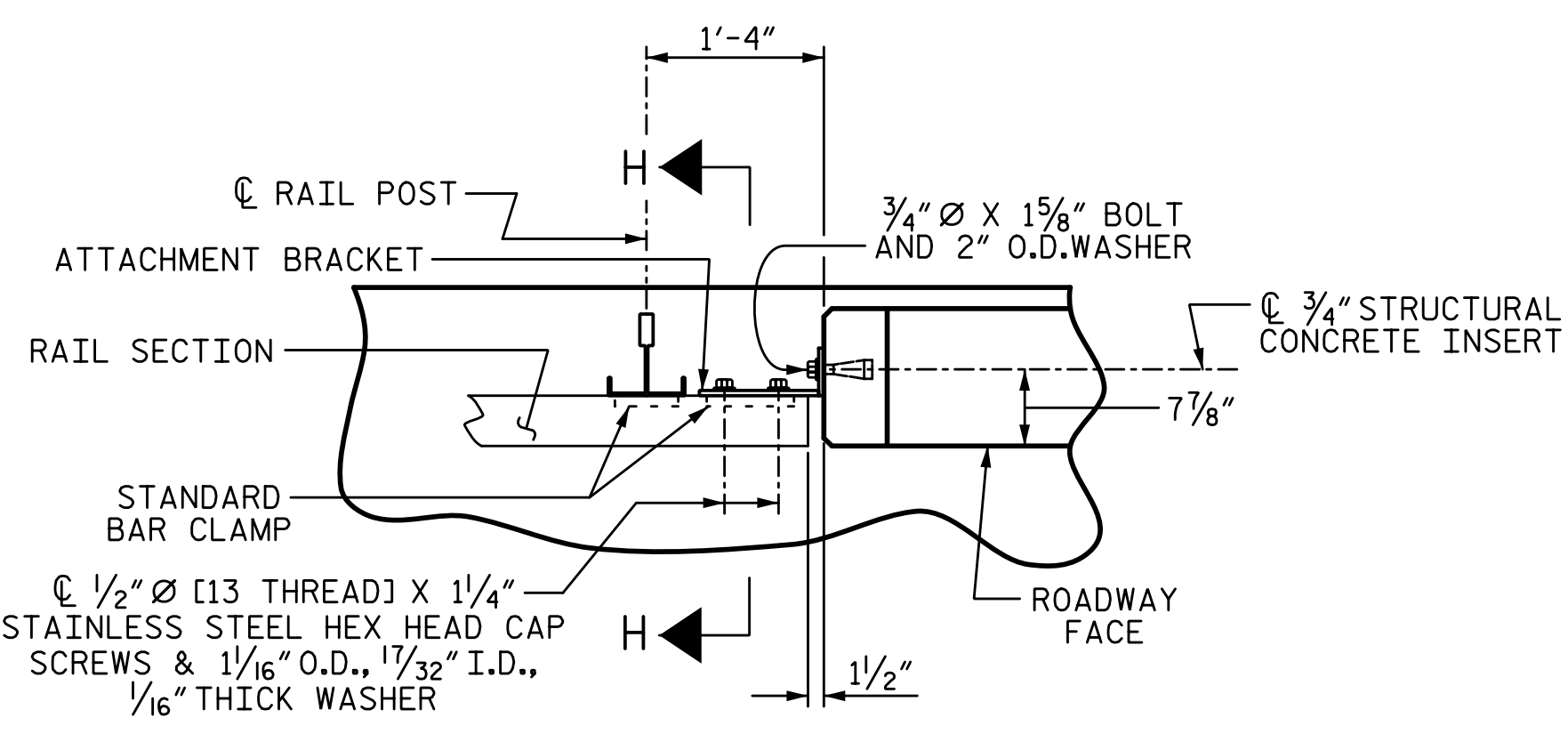
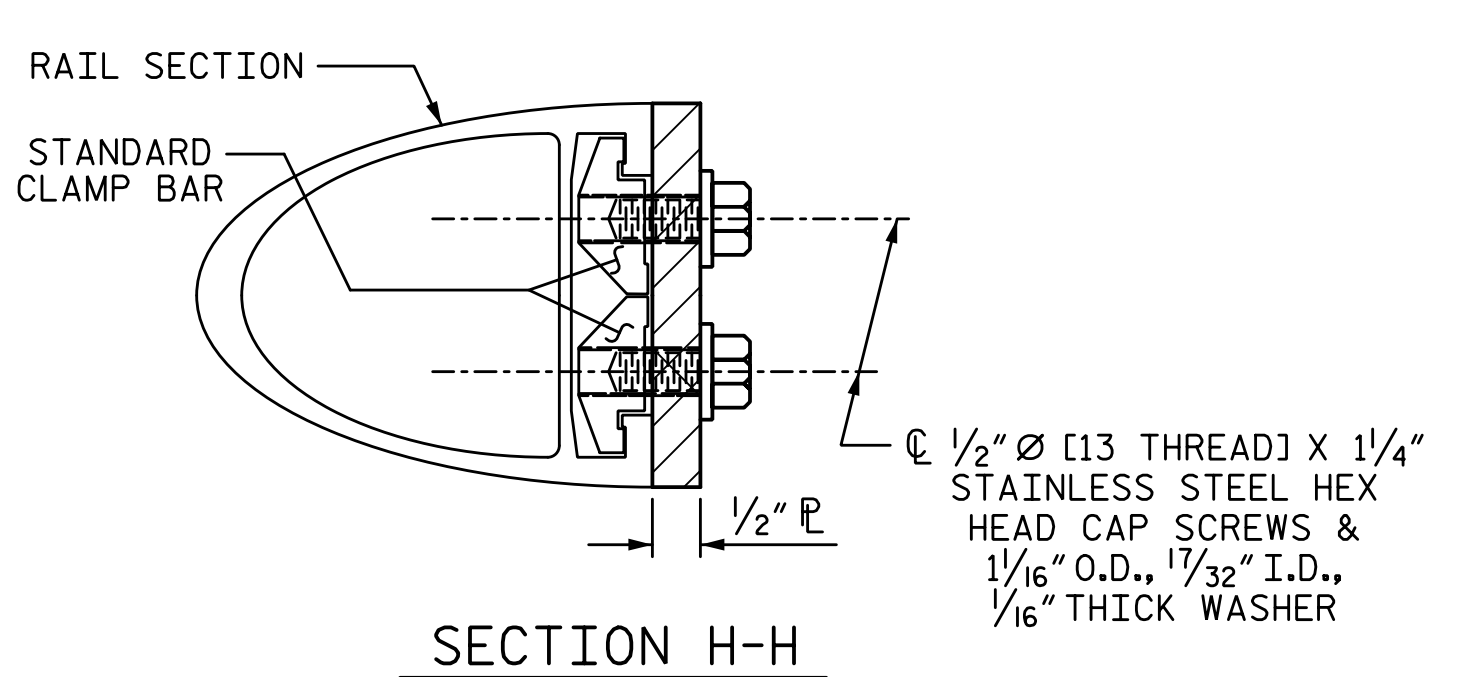
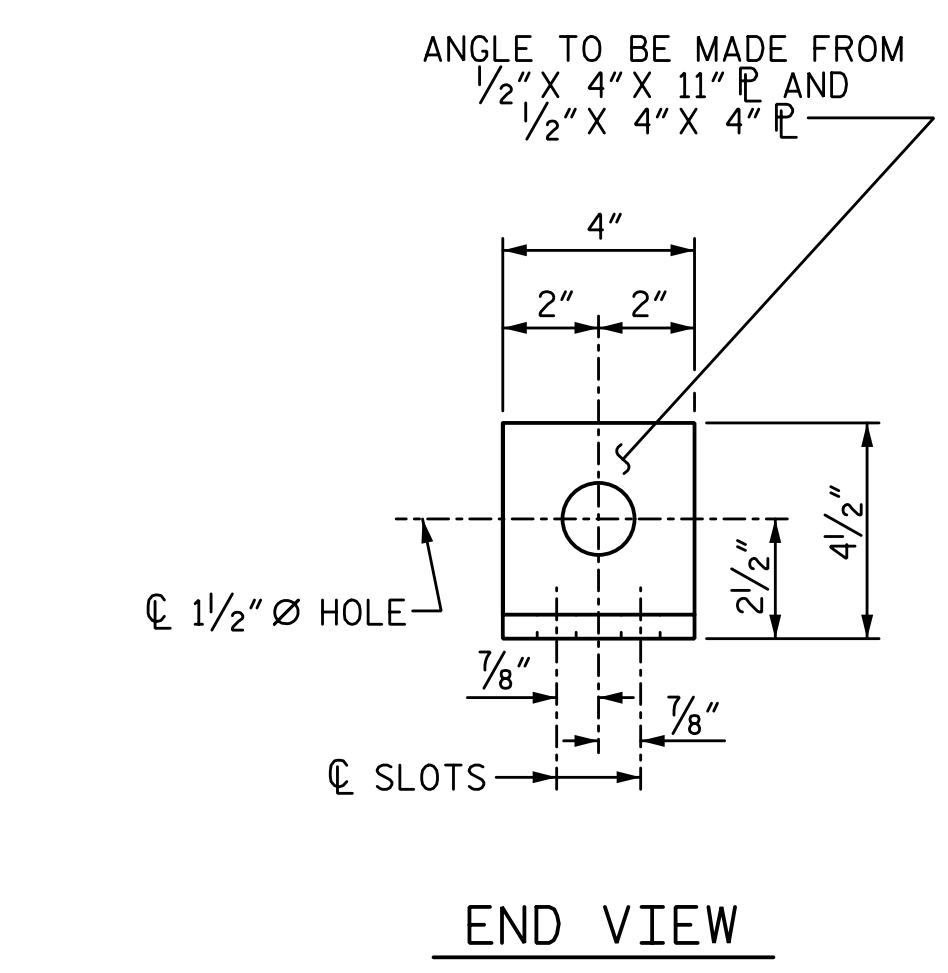
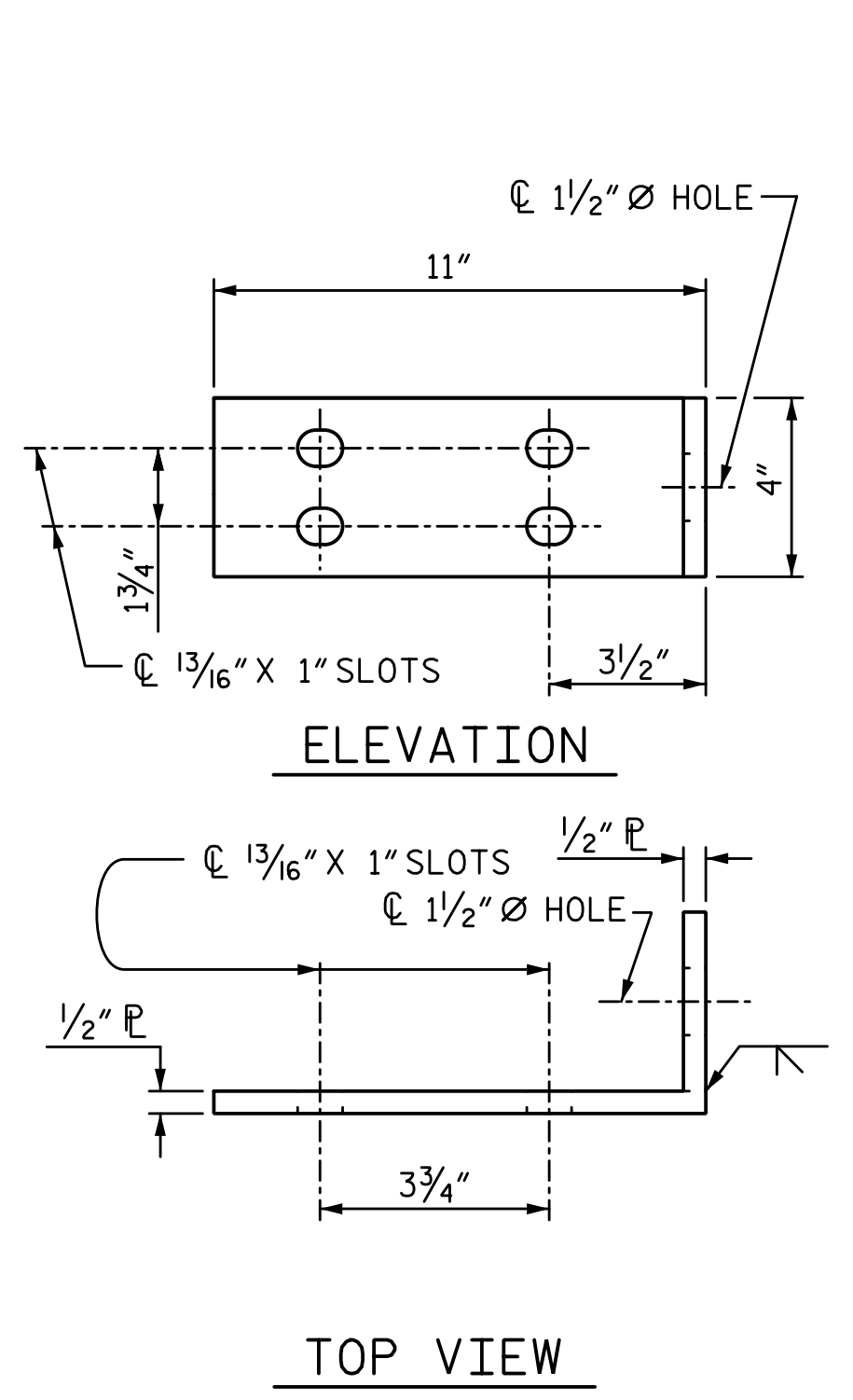
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 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.
 - C. 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.
 - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 - E. 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.

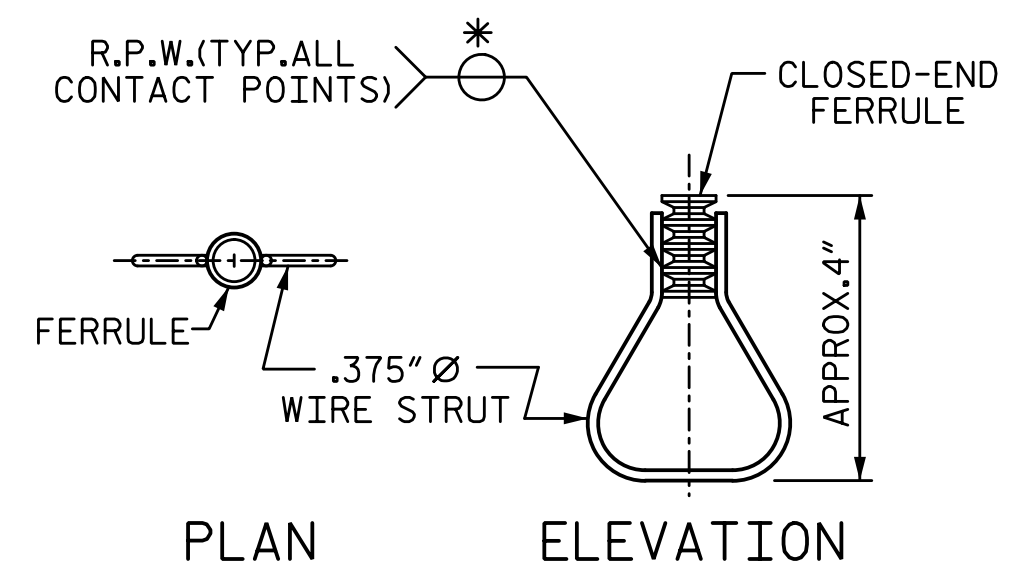
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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



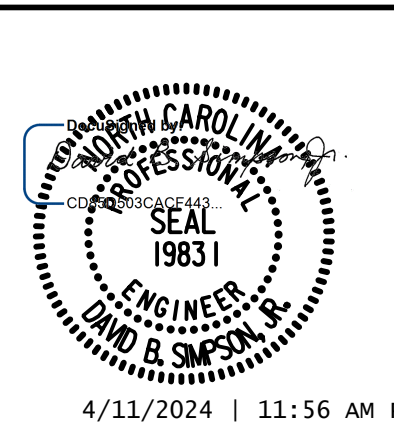
STRUCTURAL CONCRETE INSERT

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

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
STATION: 17+05.00 -L-

DETAILS FOR ATTACHING METAL RAILS TO END POST

DRAWN BY: T. BANKOVICH DATE: 10-22
CHECKED BY: B.S. COX DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 10-22

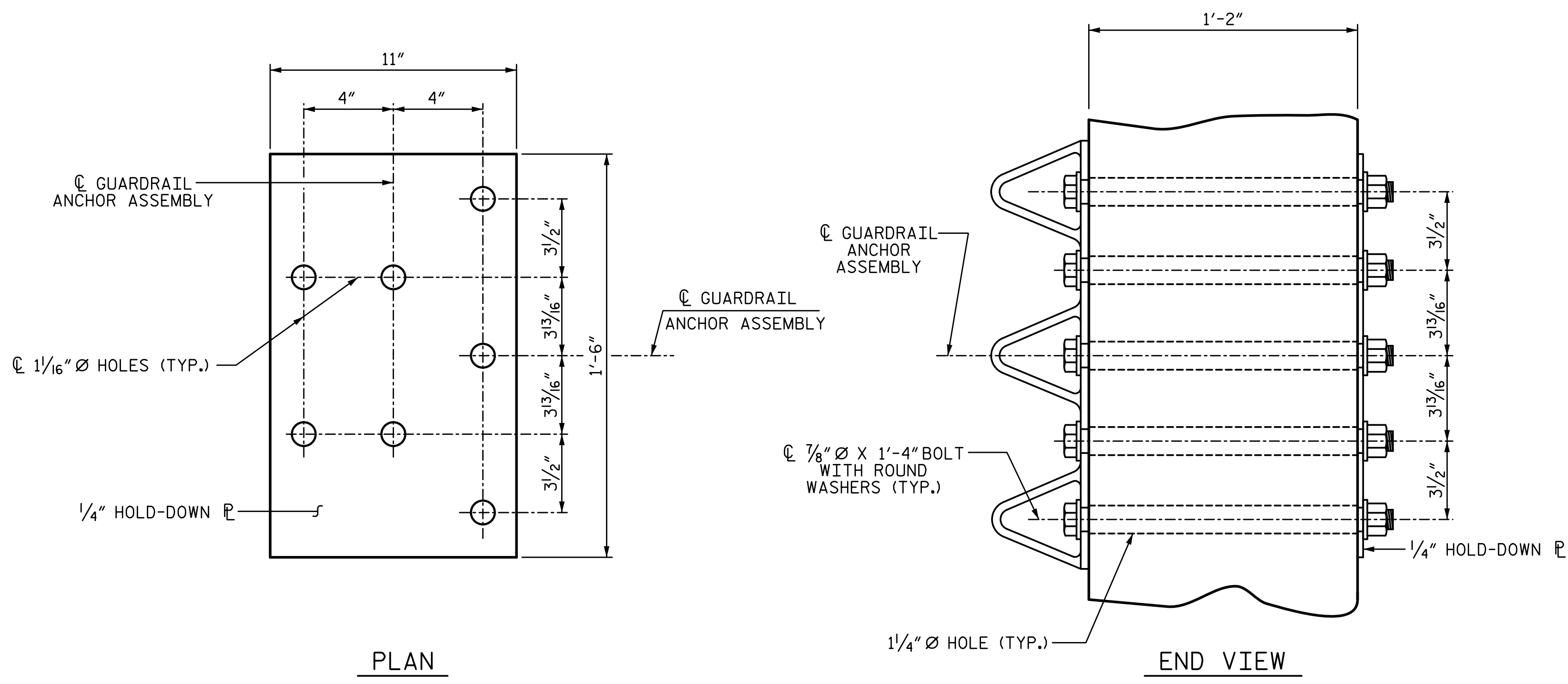


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
RAIL POST SPACING
AND
END OF RAIL DETAILS
FOR TWO BAR METAL RAILS

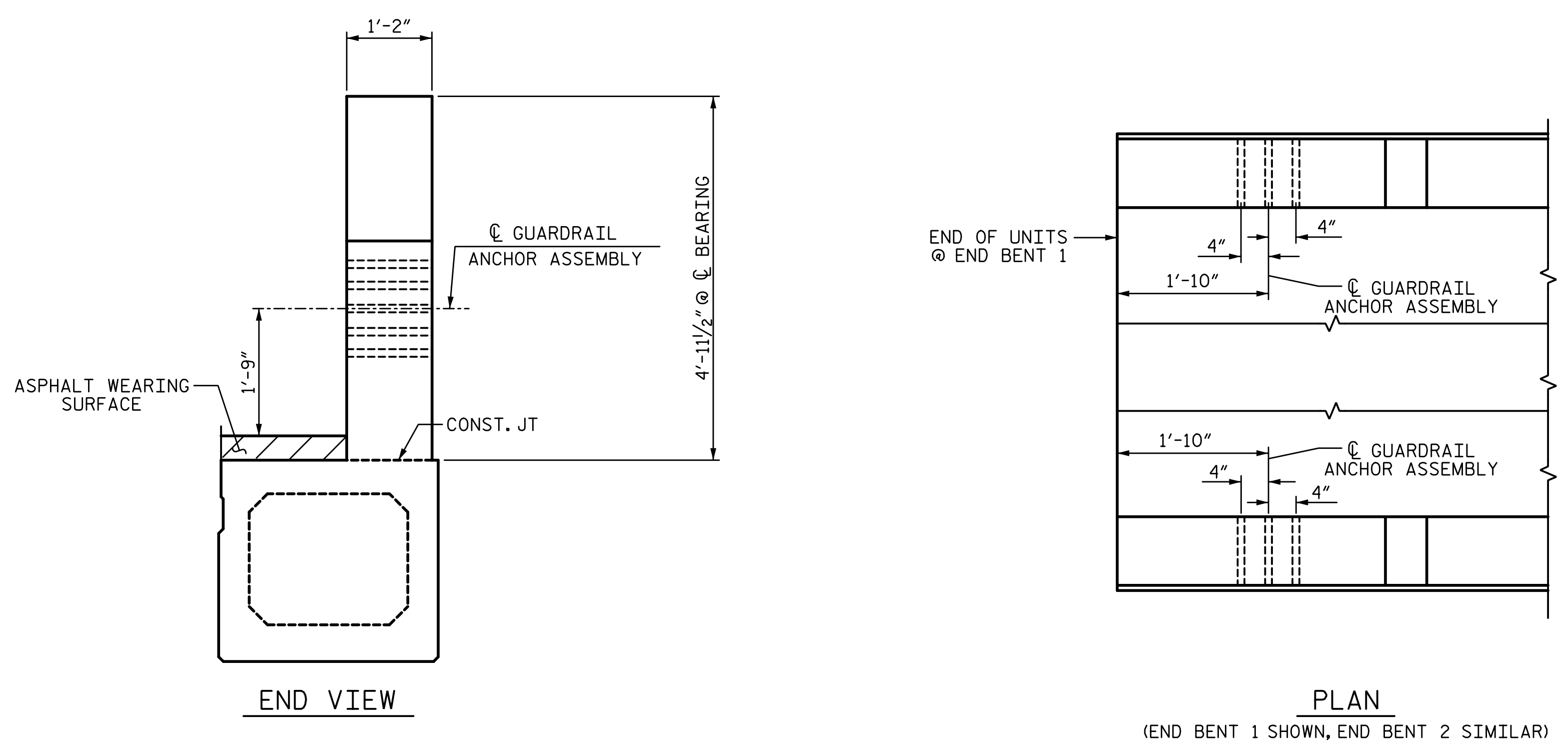
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2			4			20

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GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF GUARDRAIL ANCHOR AT END POST

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 THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

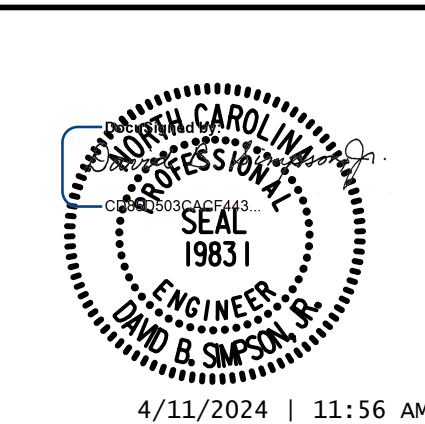
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SKETCH SHOWING POINTS OF ATTACHMENT
* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
STATION: 17+05.00 -L-

DRAWN BY: T. BANKOVICH	DATE: 10-22
CHECKED BY: B.S. COX	DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22

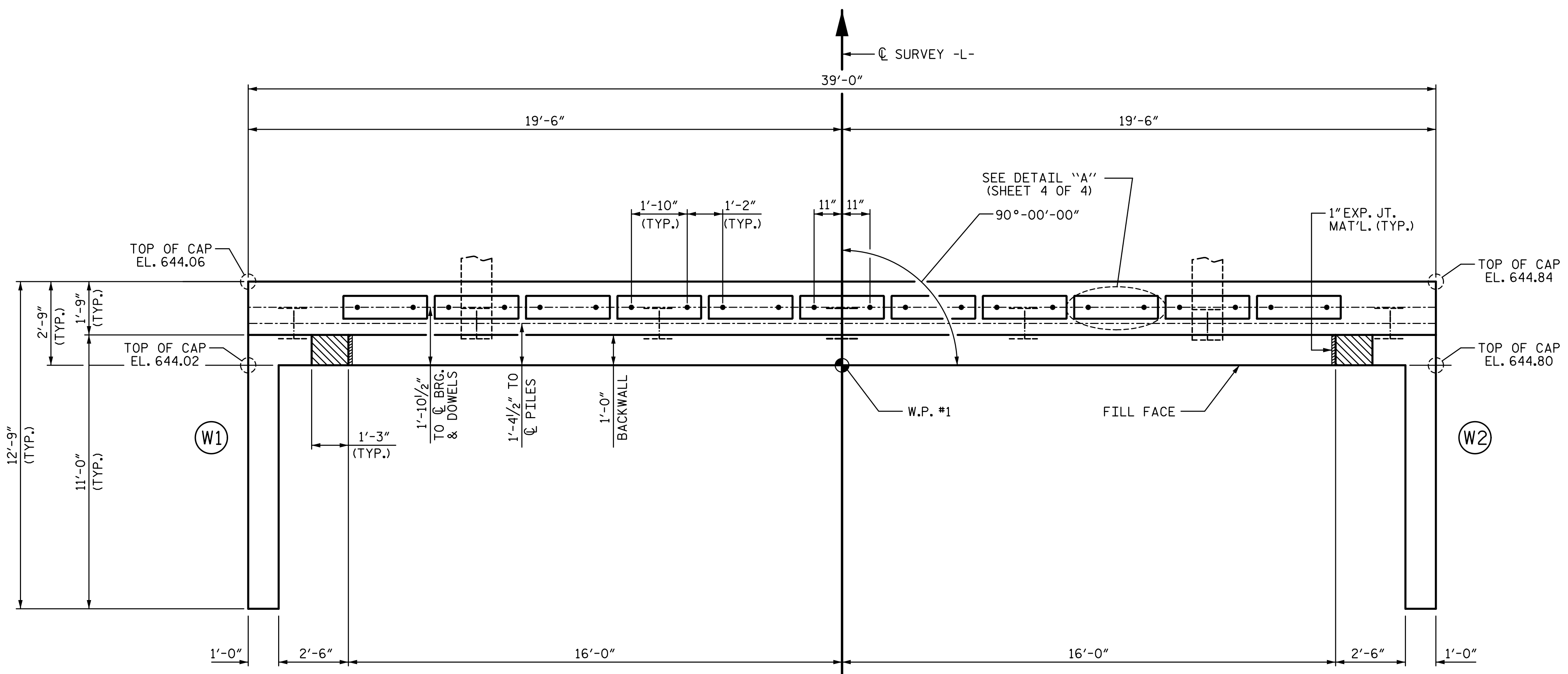


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
**GUARDRAIL ANCHORAGE
DETAILS
FOR METAL RAILS**

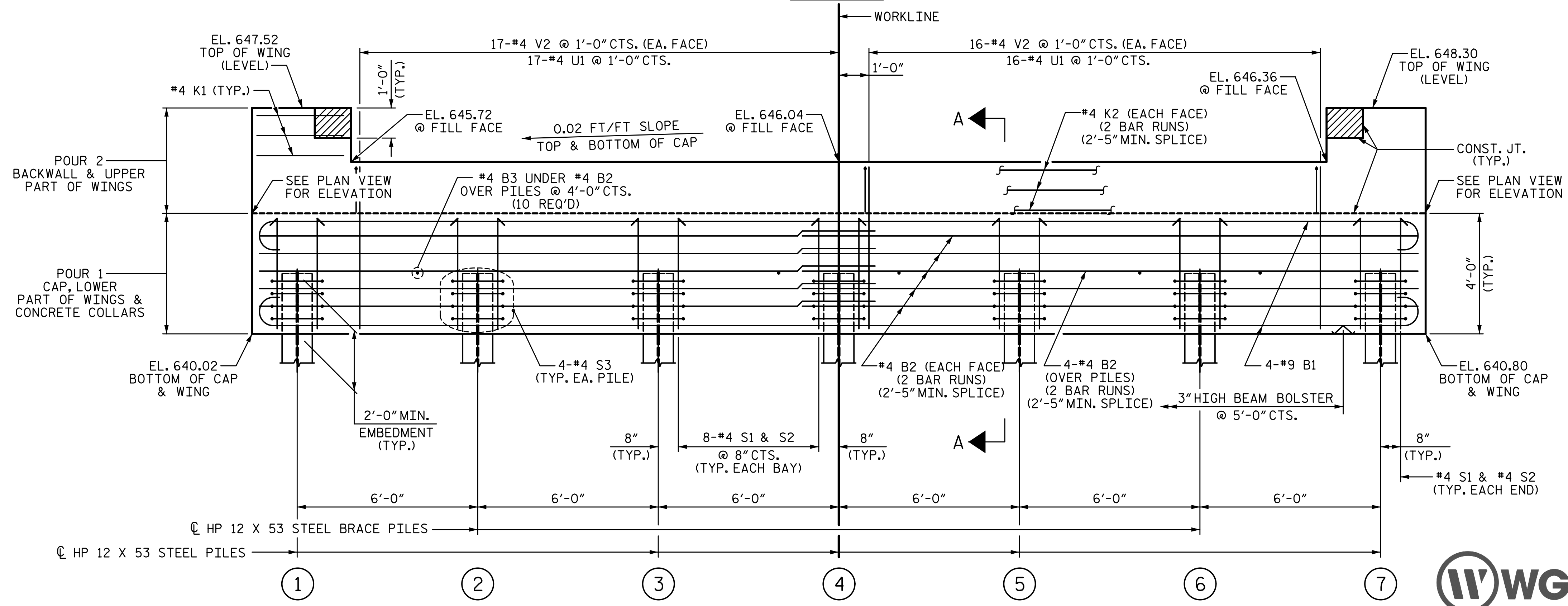
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PLAN



ELEVATION

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 CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.
 FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.
 FOR WING DETAILS, SEE SHEET 3 OF 4.

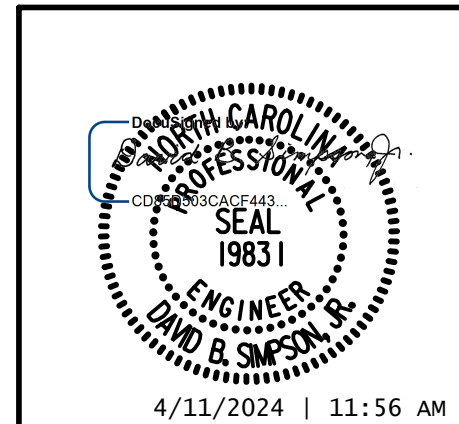
TOP OF PILE ELEVATIONS	
①	642.05
②	642.17
③	642.29
④	642.41
⑤	642.53
⑥	642.65
⑦	642.77

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE

END BENT 1



DRAWN BY: T. BANKOVICH DATE: 10-22
 CHECKED BY: B.S. COX DATE: 10-22
 DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 10-22

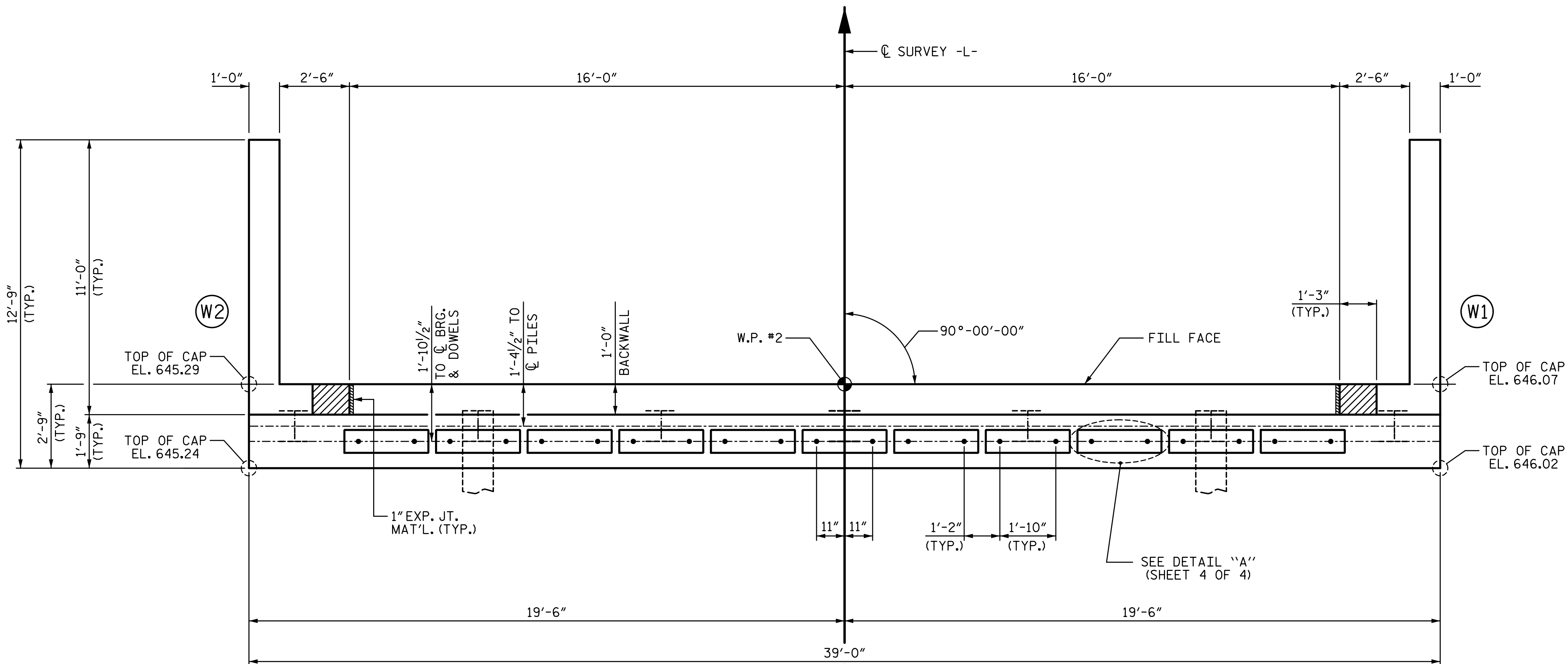
WINGS NOT SHOWN FOR CLARITY. FOR SECTION A-A, SEE SHEET 4 OF 4.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

REVISIONS				SHEET NO.	
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1			3		
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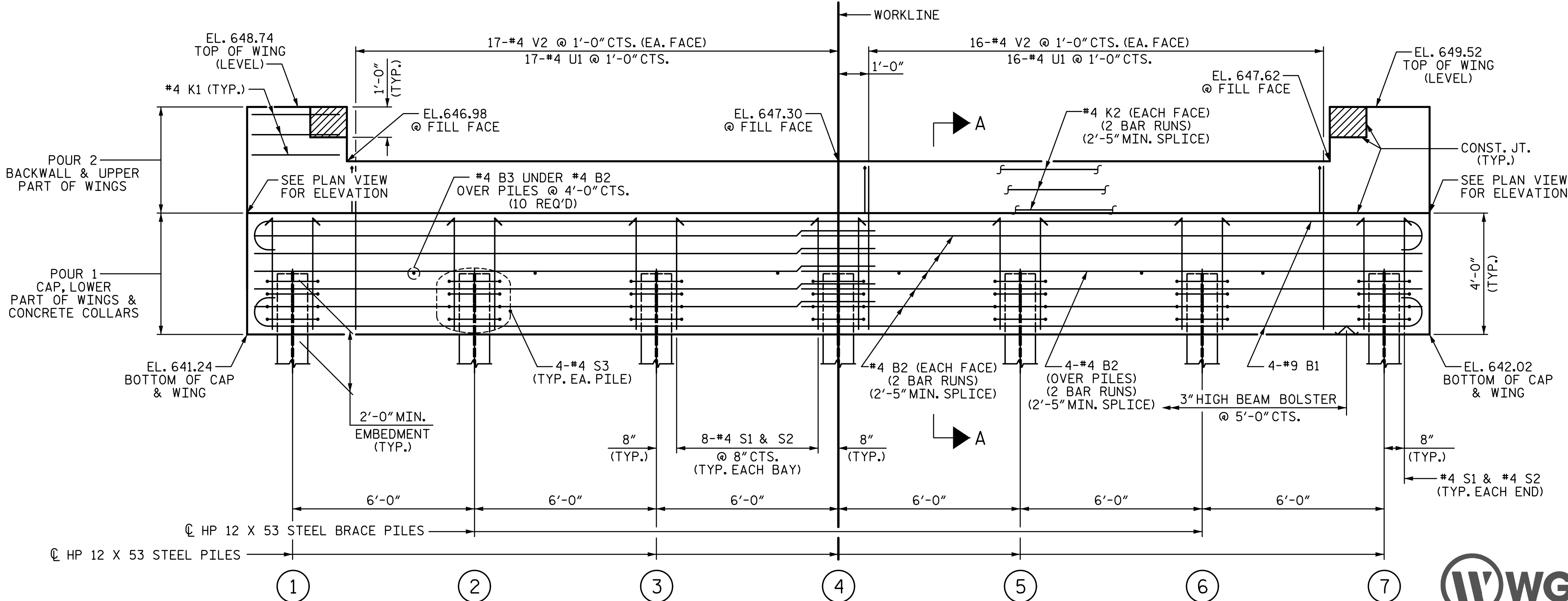
TOTAL SHEETS: 20

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PLAN



ELEVATION

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 CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

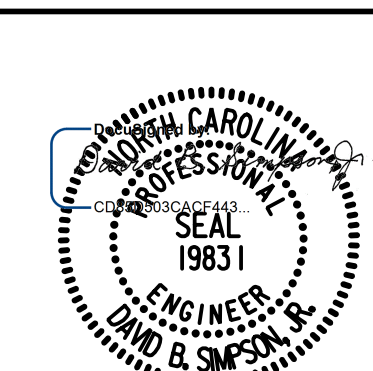
TOP OF PILE ELEVATIONS	
①	643.27
②	643.39
③	643.51
④	643.63
⑤	643.75
⑥	643.87
⑦	643.99

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE

END BENT 2



DRAWN BY: T. BANKOVICH DATE: 10-22
 CHECKED BY: B.S. COX DATE: 10-22
 DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 10-22

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

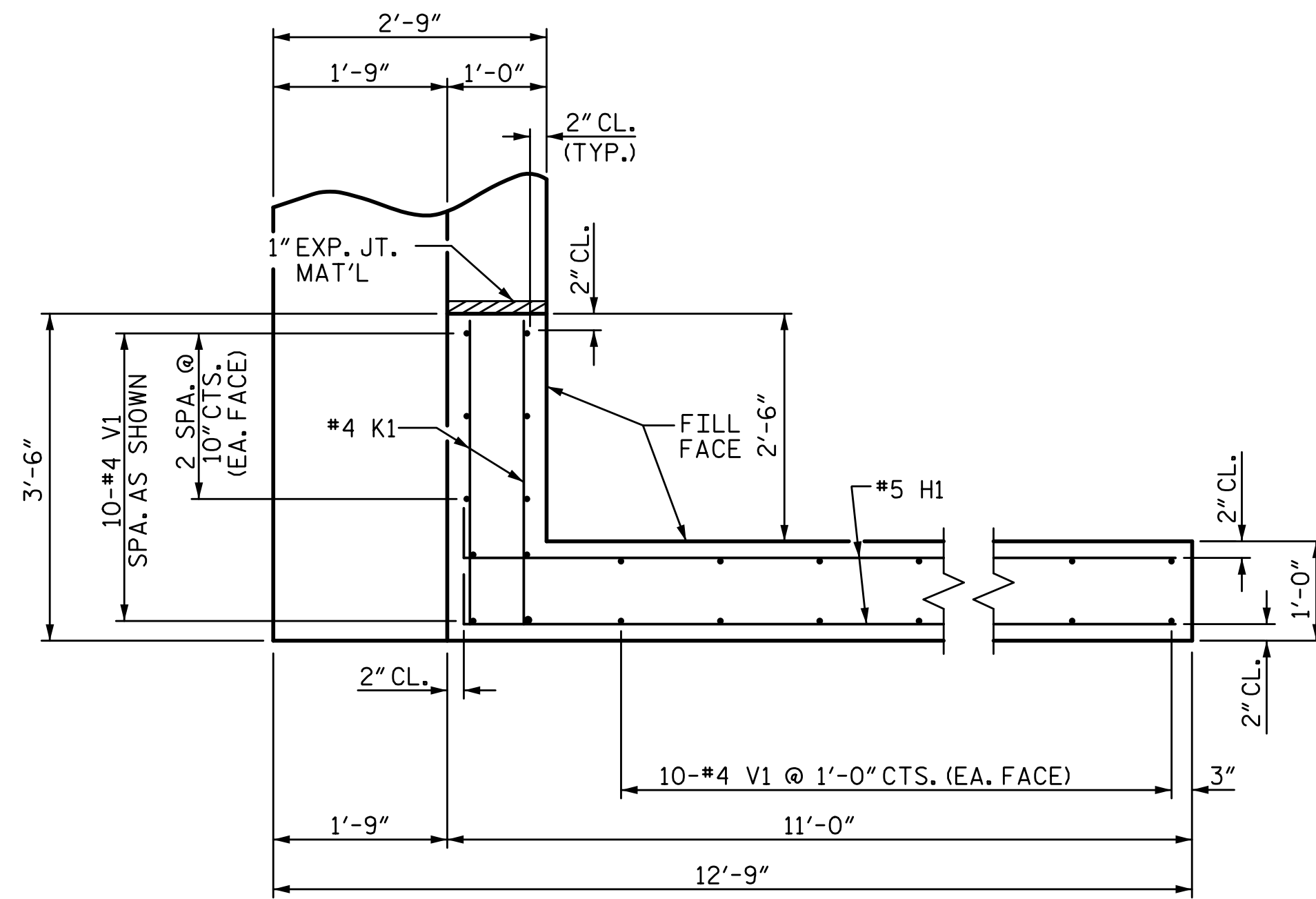
LICENSURE NO. C-4434

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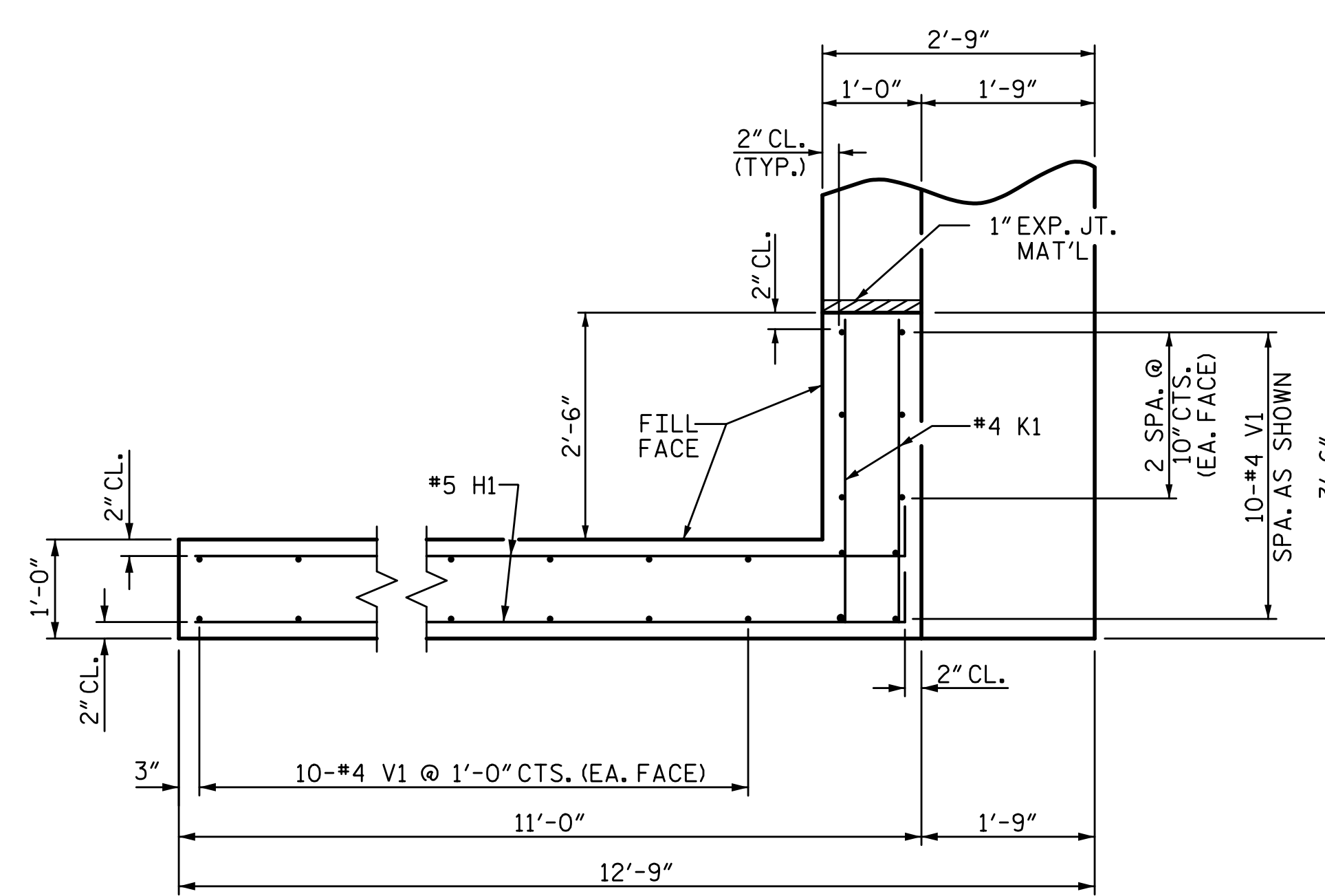
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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TOTAL SHEETS: 20

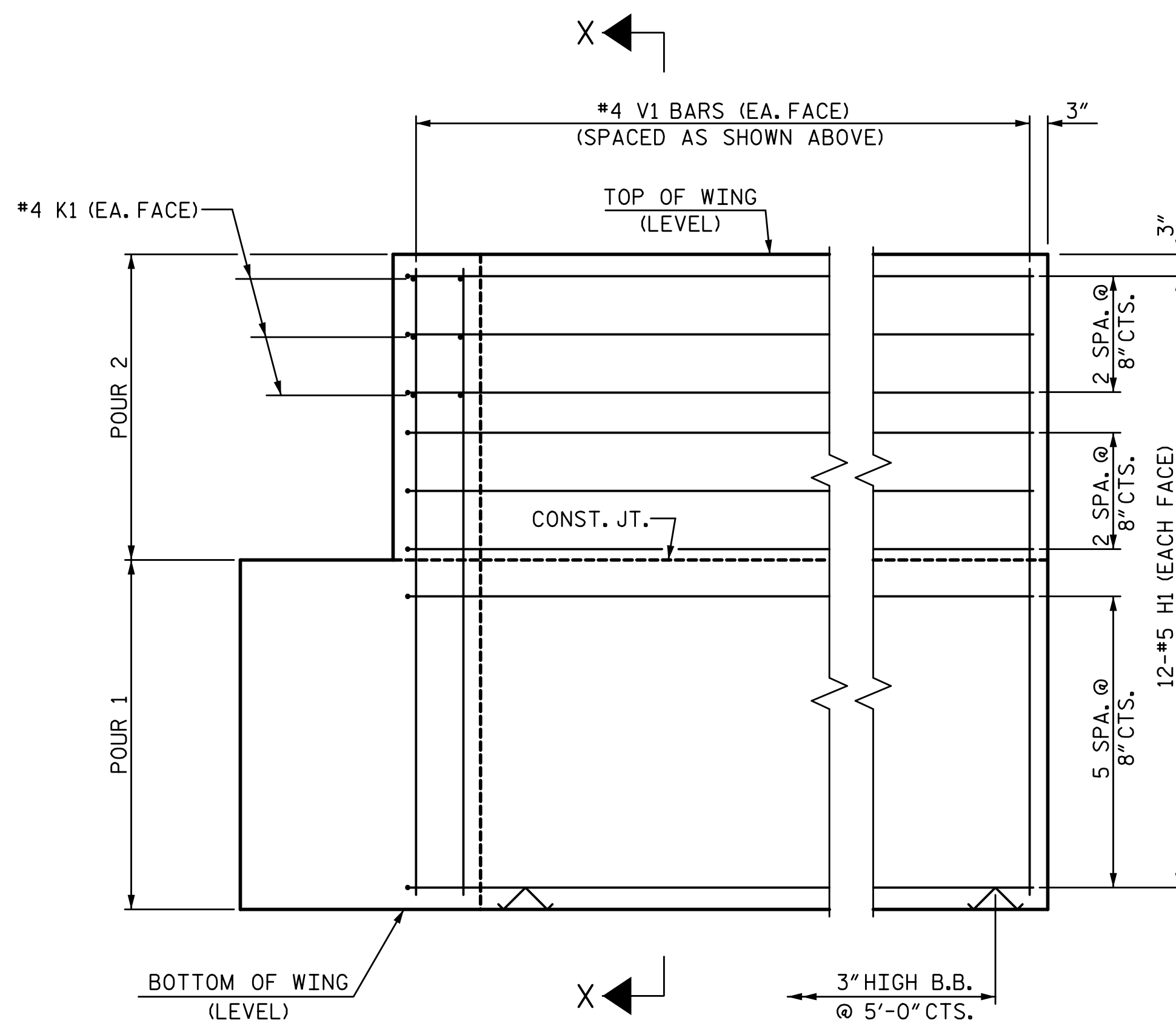
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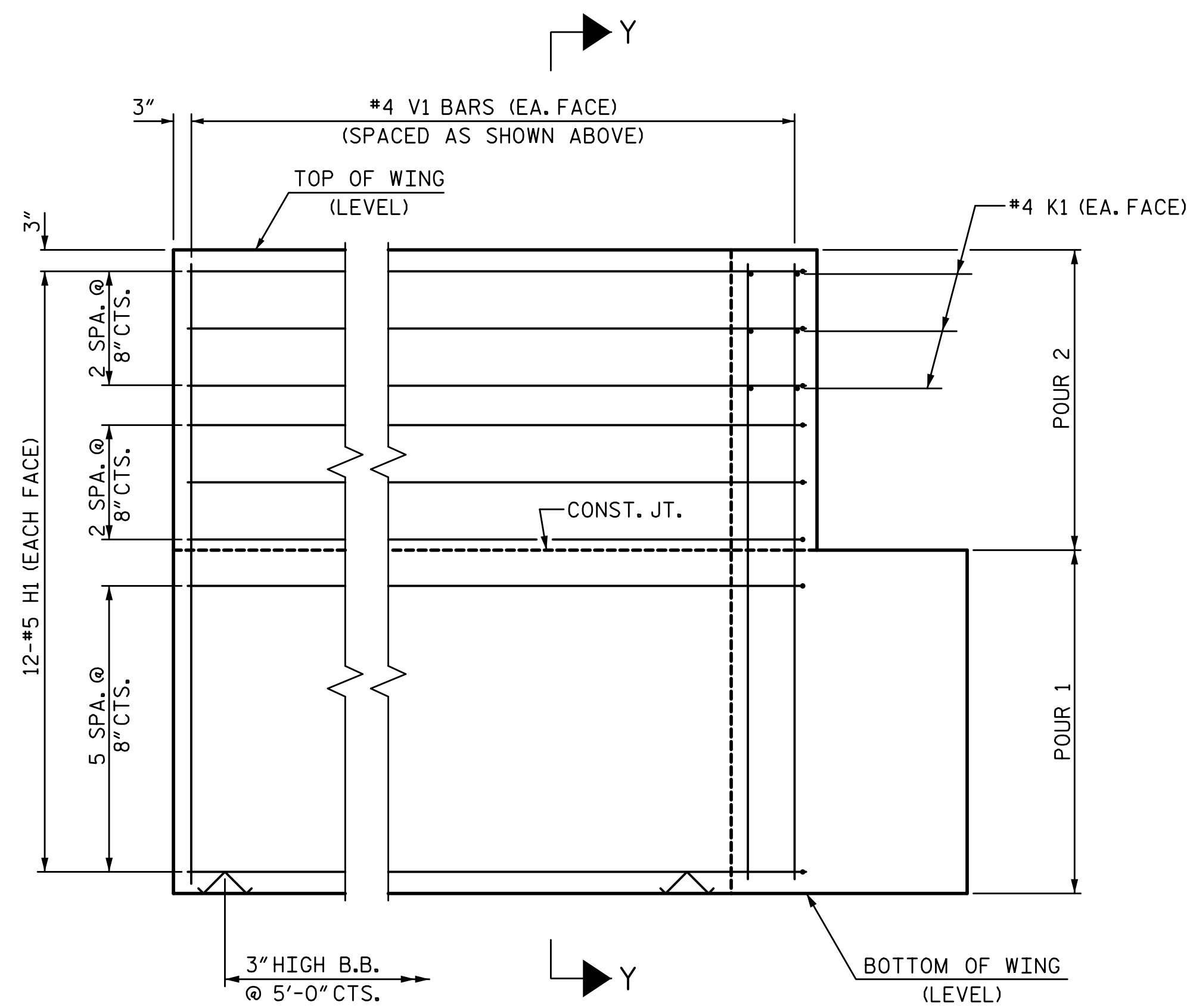
PLAN OF WING (W1)



PLAN OF WING (W2)

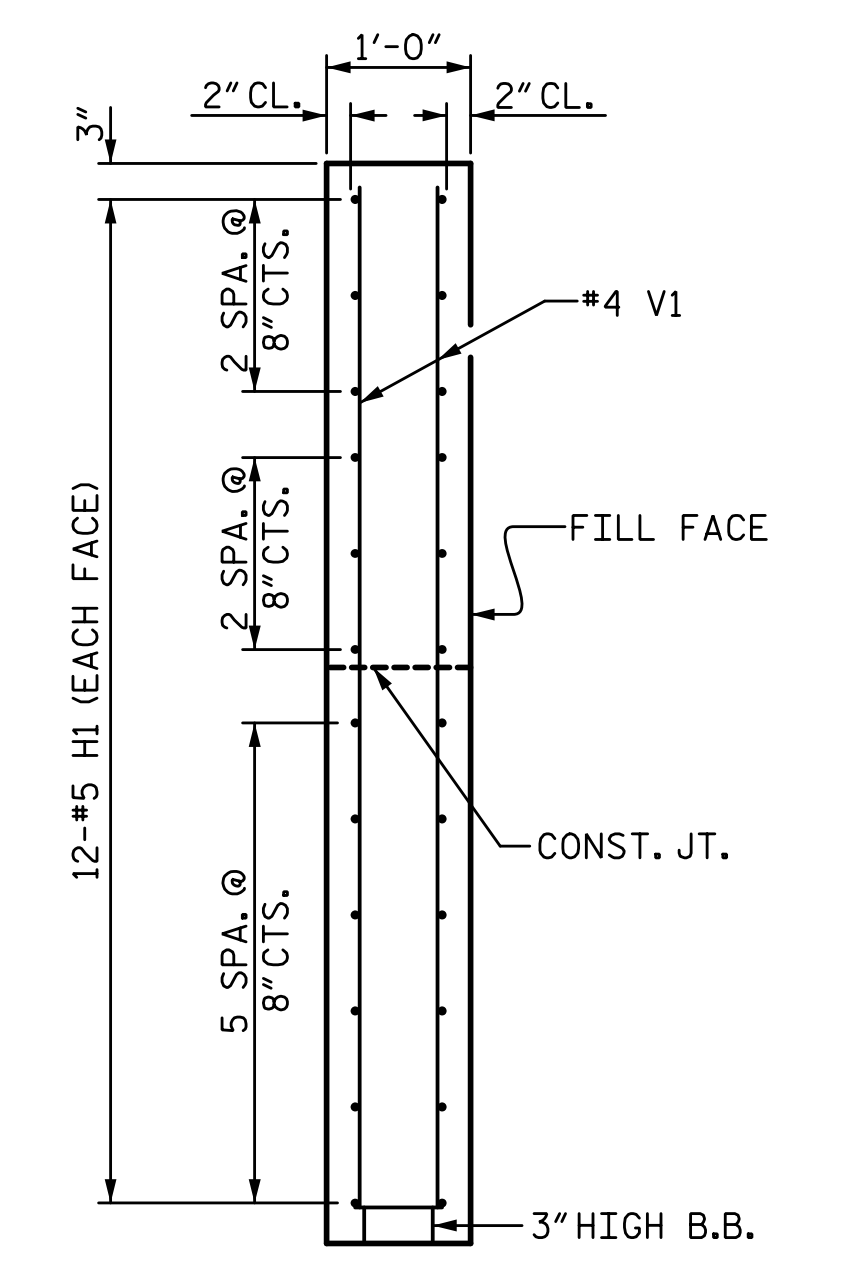


ELEVATION OF WING (W1)

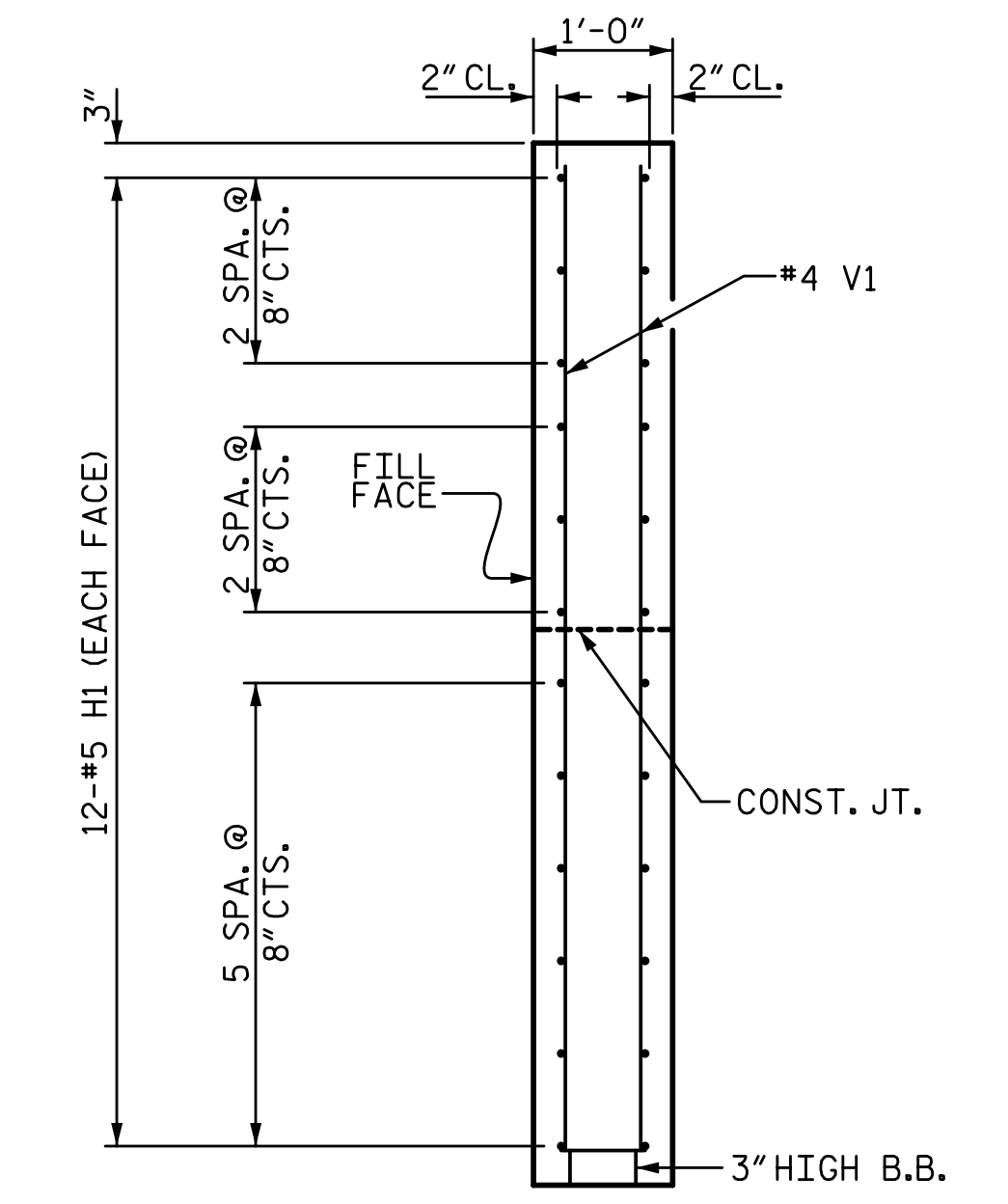


ELEVATION OF WING (W3)

WING DETAILS



SECTION X-X

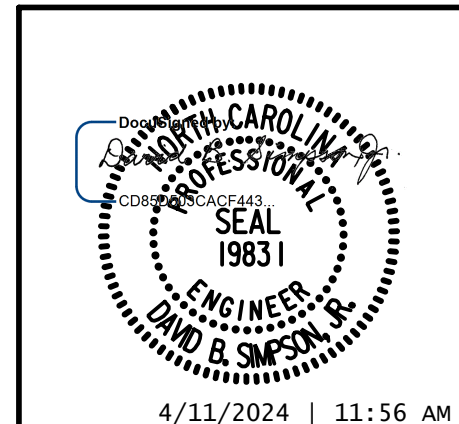


SECTION Y-Y

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-

SHEET 3 OF 4

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

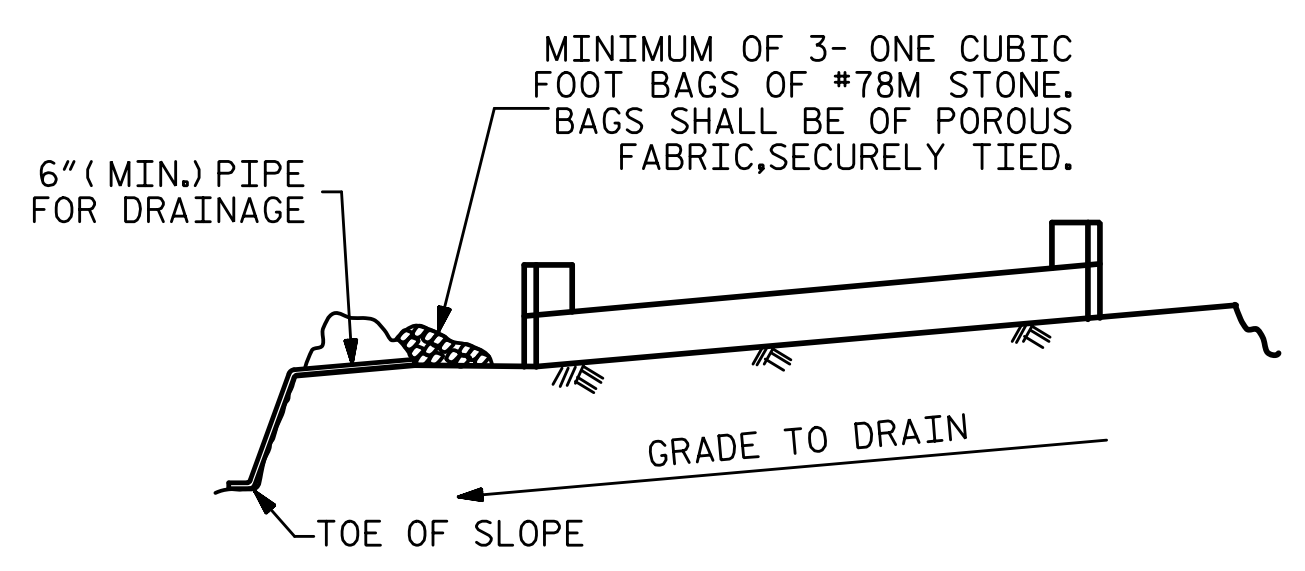


DRAWN BY: T. BANKOVICH	DATE: 10-22
CHECKED BY: B.S. COX	DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22

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2			4		
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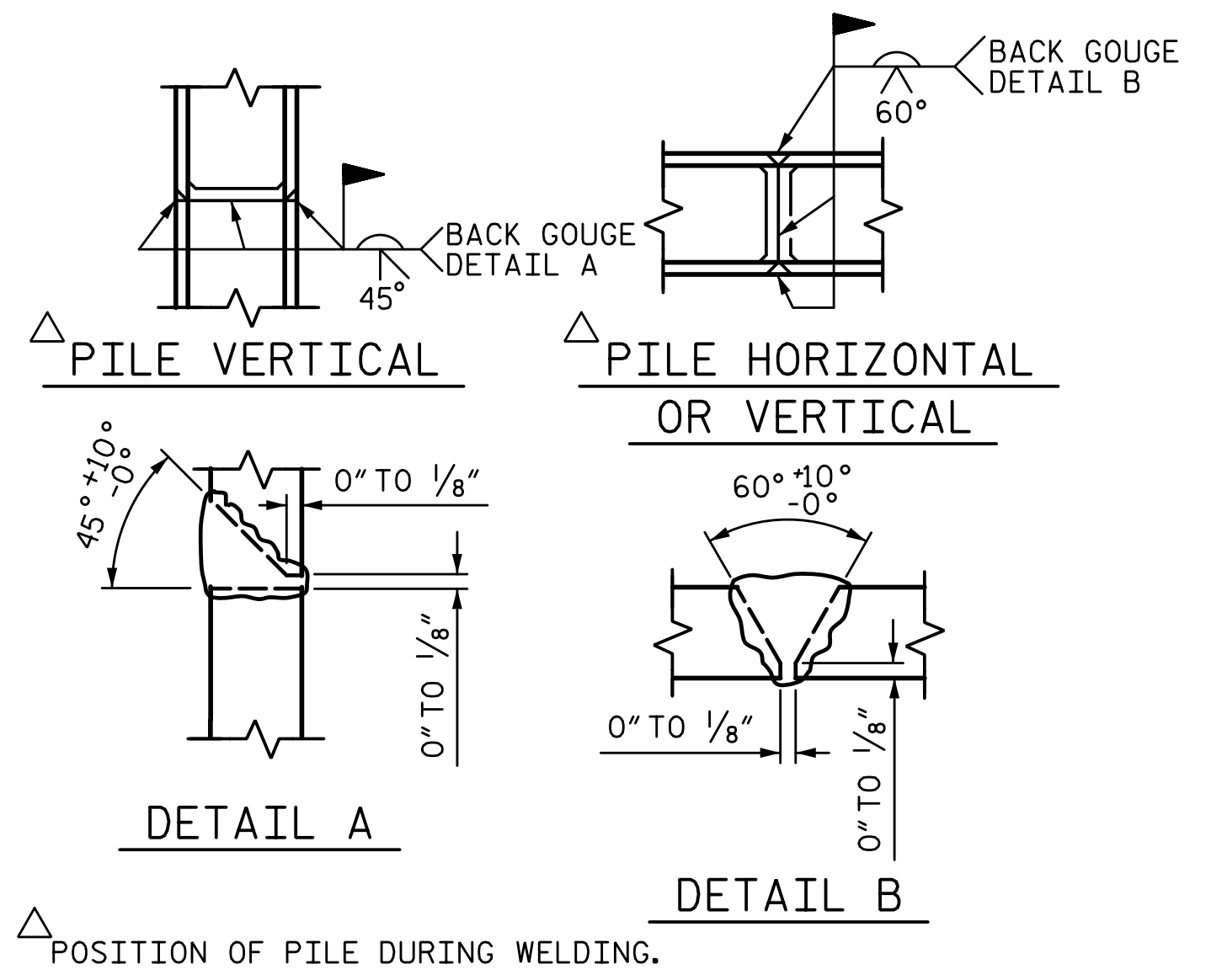


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

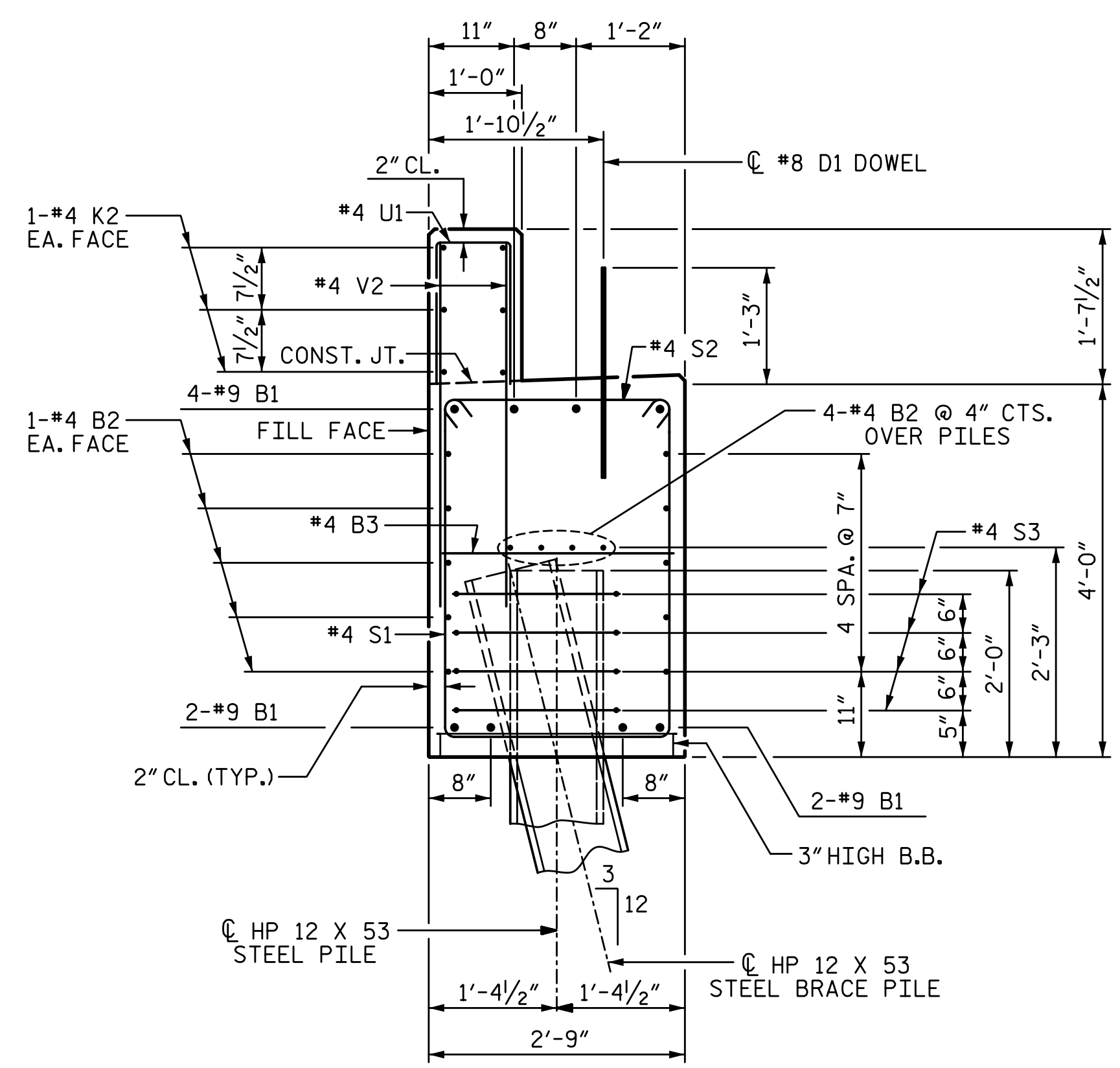
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT



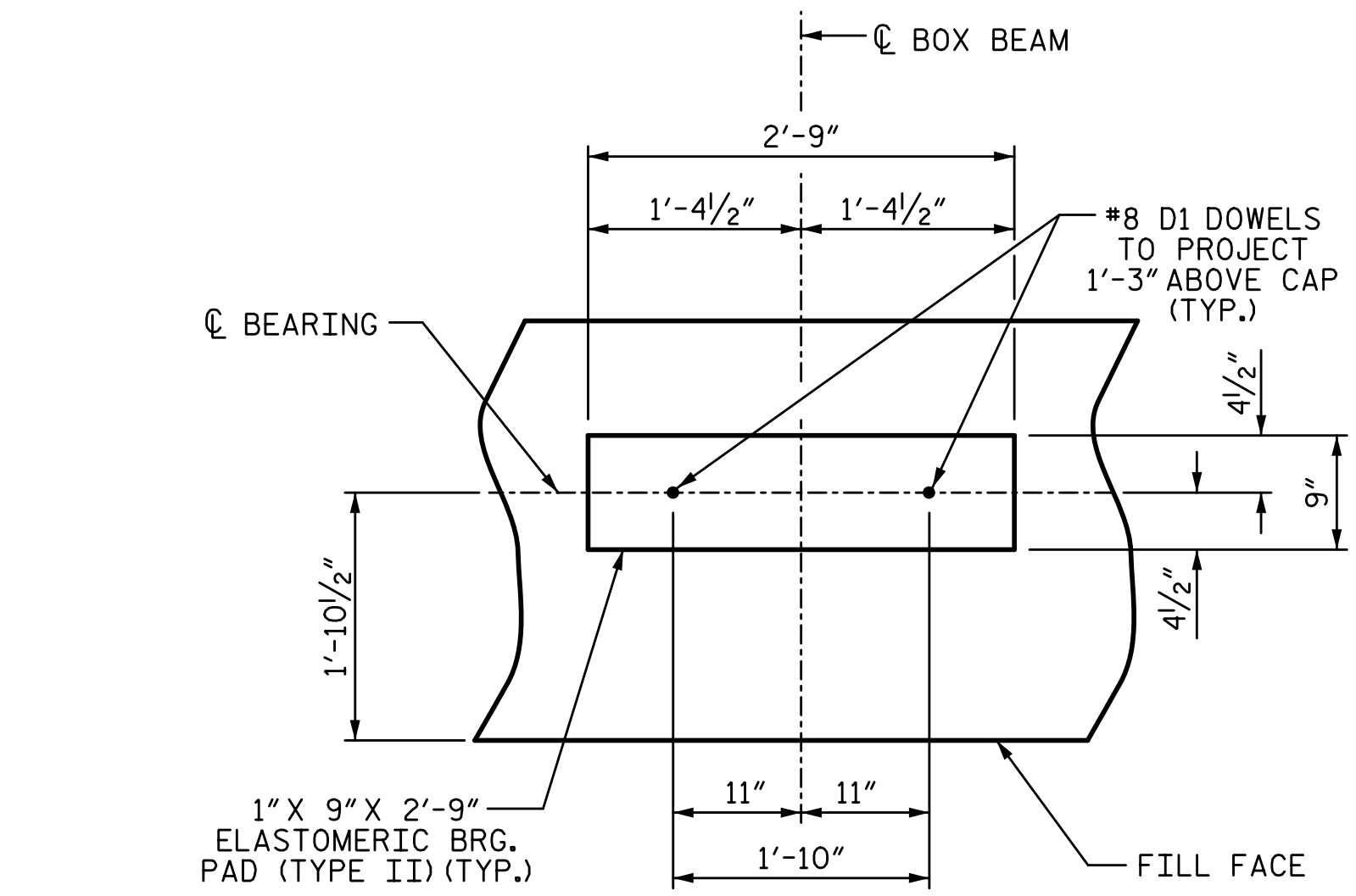
PILE SPLICE DETAILS



SECTION A-A

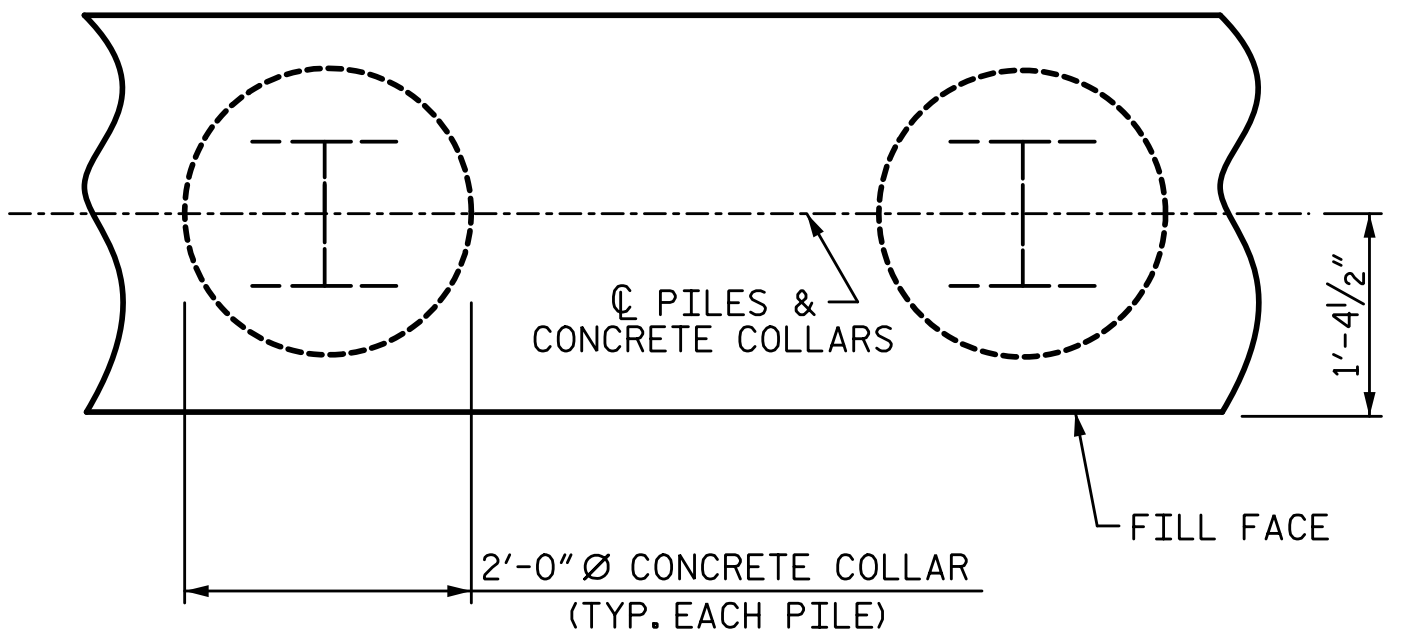
(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

END BENT 1 SHOWN, END BENT 2 SIMILAR



DETAIL "A"

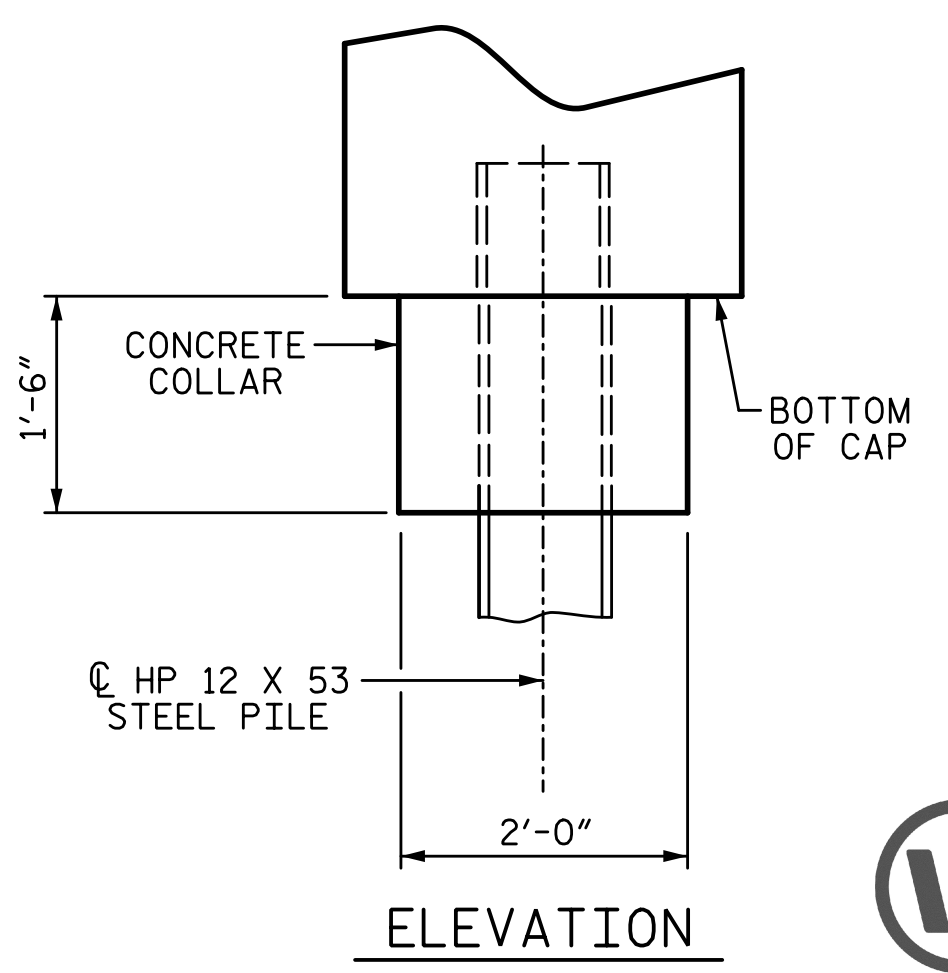
(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



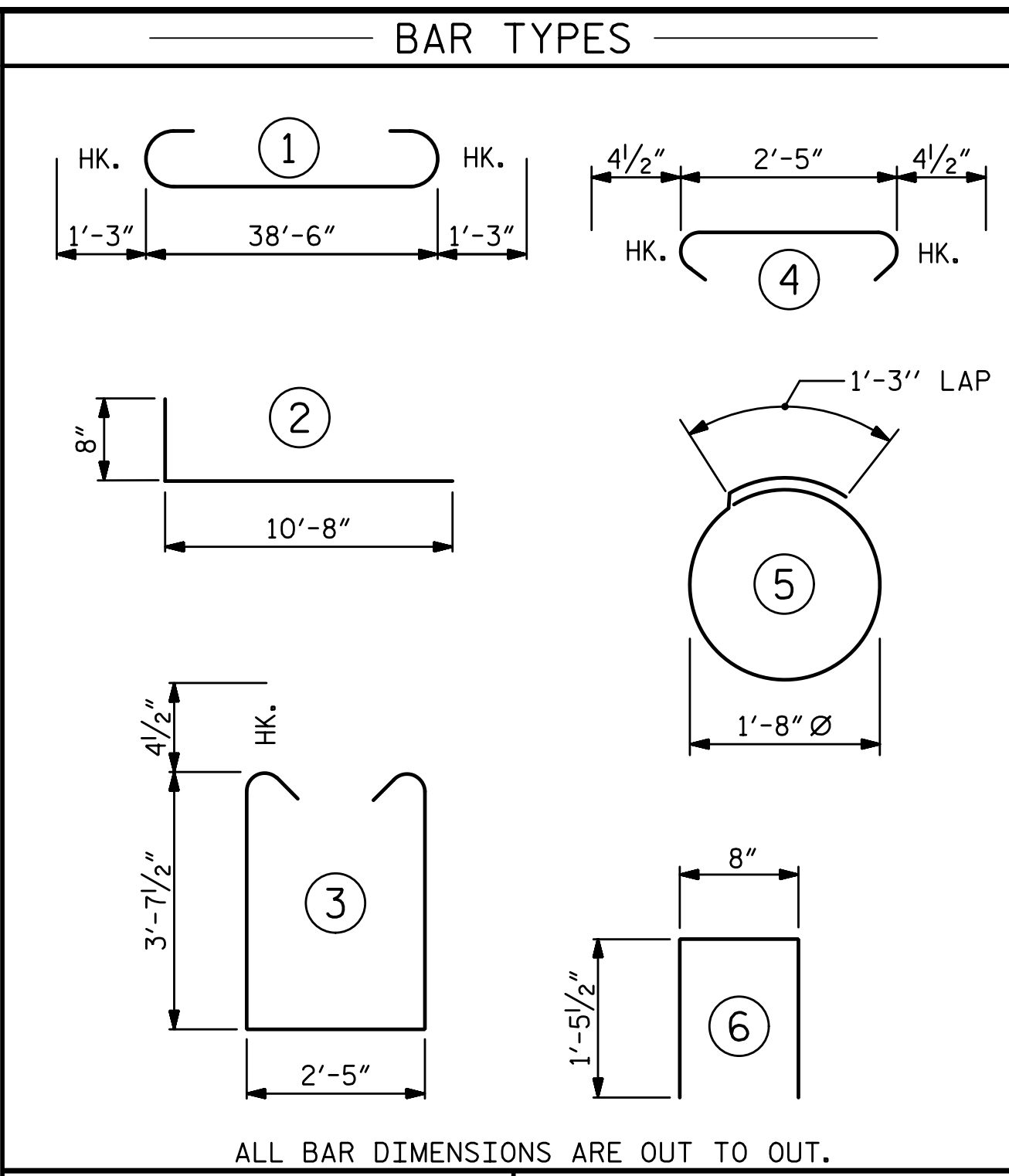
PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



ELEVATION



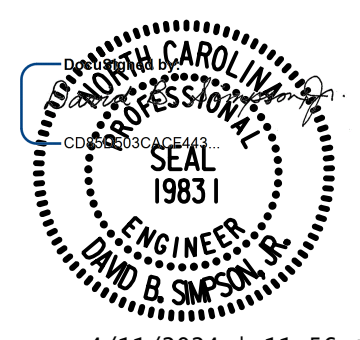
ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1		END BENT No. 2	
HP 12 X 53 STEEL PILES	NO: 7	HP 12 X 53 STEEL PILES	NO: 7
LIN. FT.= 105		LIN. FT.= 105	
STEEL PILE POINTS	NO: 7	STEEL PILE POINTS	NO: 7
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	NO: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	NO: 7
PILE EXCAVATION IN SOIL	56.0 LF	PILE EXCAVATION IN SOIL	56.0 LF
PILE EXCAVATION NOT IN SOIL	14.0 LF	PILE EXCAVATION NOT IN SOIL	14.0 LF

BILL OF MATERIAL FOR ONE END BENT					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	28	#4	STR	20'-7"	385
B3	10	#4	STR	2'-5"	16
D1	22	#8	STR	2'-3"	132
H1	48	#5	2	11'-4"	567
K1	12	#4	STR	3'-1"	25
K2	12	#4	STR	20'-7"	165
S1	50	#4	3	10'-5"	348
S2	50	#4	4	3'-2"	106
S3	28	#4	5	6'-6"	122
U1	33	#4	6	3'-7"	79
V1	60	#4	STR	7'-2"	287
V2	66	#4	STR	5'-3"	231
REINFORCING STEEL (FOR ONE END BENT)					3578 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1	CAP, LOWER PART OF WINGS & COLLARS				20.1 C.Y.
POUR #2	BACKWALL & UPPER PART OF WINGS				5.4 C.Y.
TOTAL CLASS A CONCRETE					25.6 C.Y.

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 GUILFORD COUNTY
 STATION: 17+05.00 -L-
 SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1 & 2
 DETAILS



W WGI
 5640 Dillard Drive, Suite 200
 Cary, NC 27518
 LICENSURE NO. C-4434

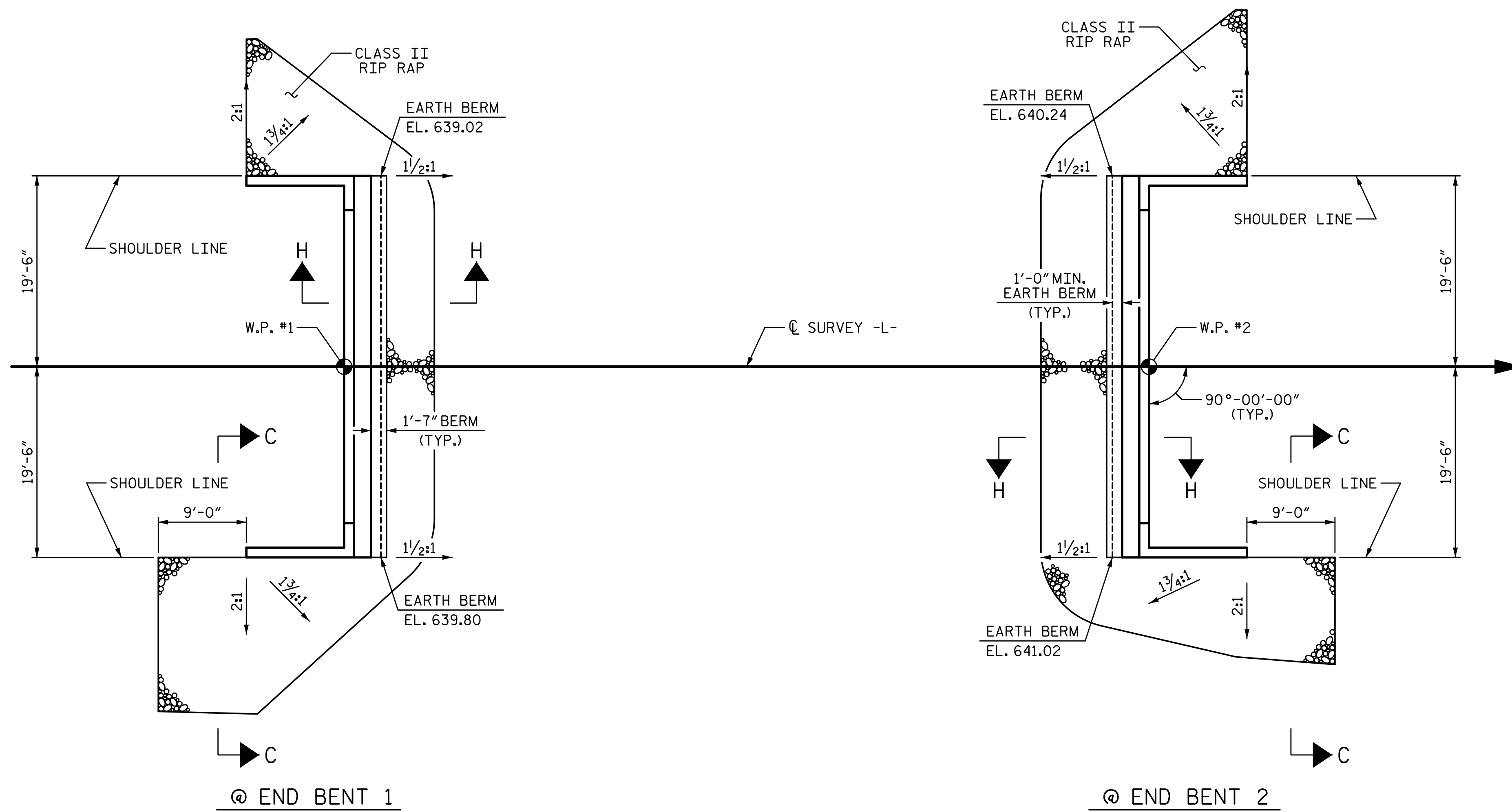
DRAWN BY: T. BANKOVICH	DATE: 10-22
CHECKED BY: B.S. COX	DATE: 10-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22

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2			4		

TOTAL SHEETS: 20

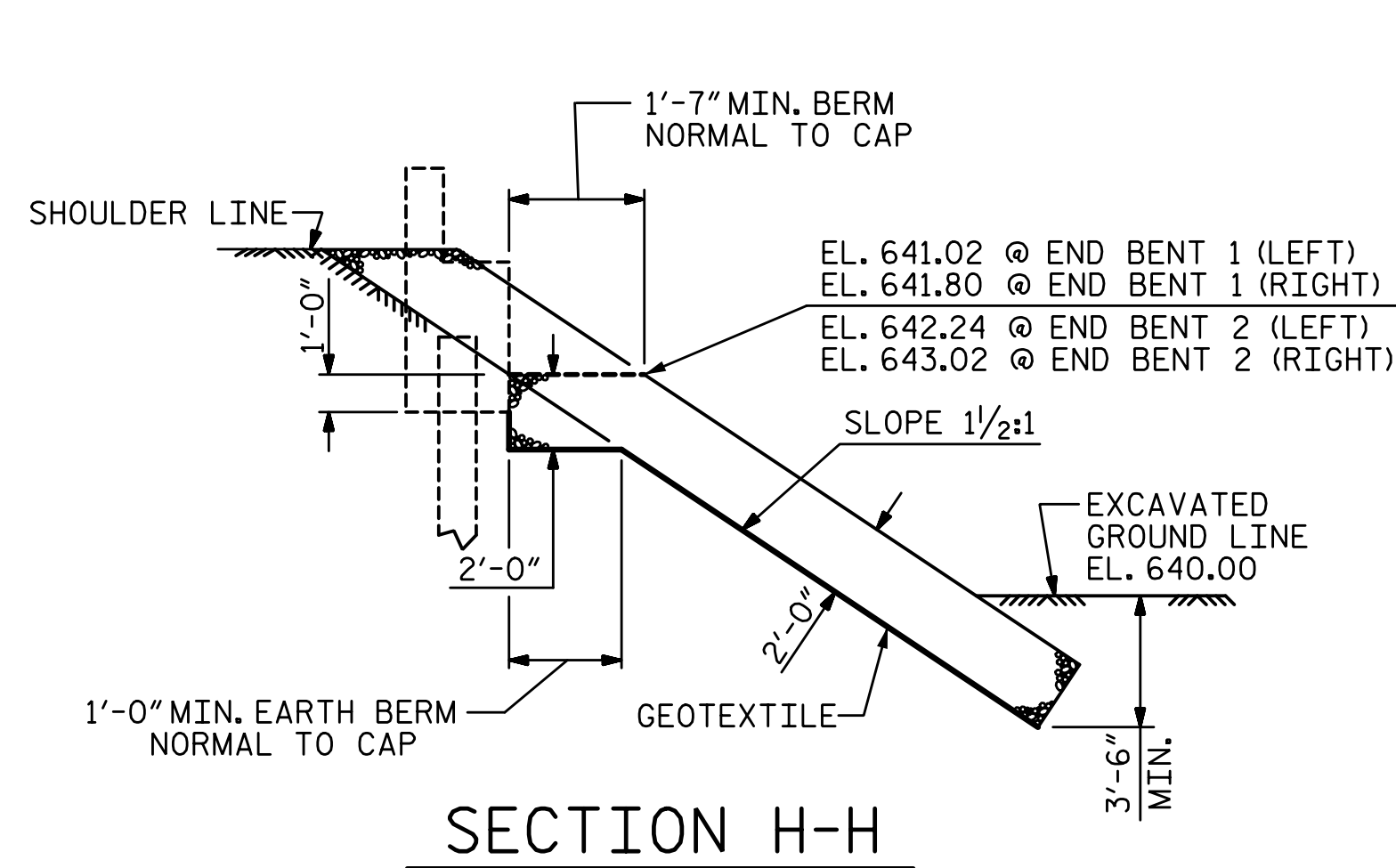
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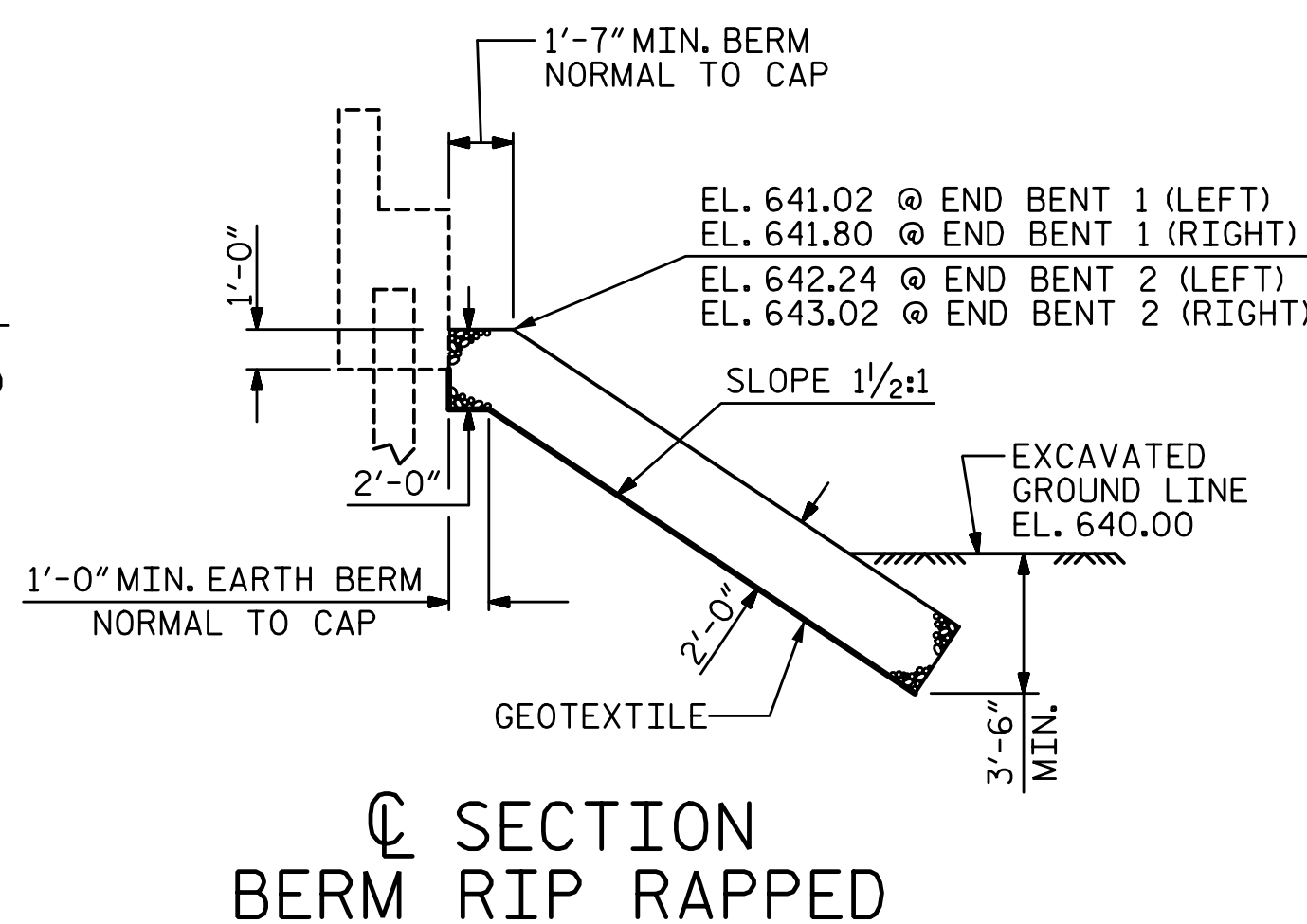


PLAN OF RIP RAP

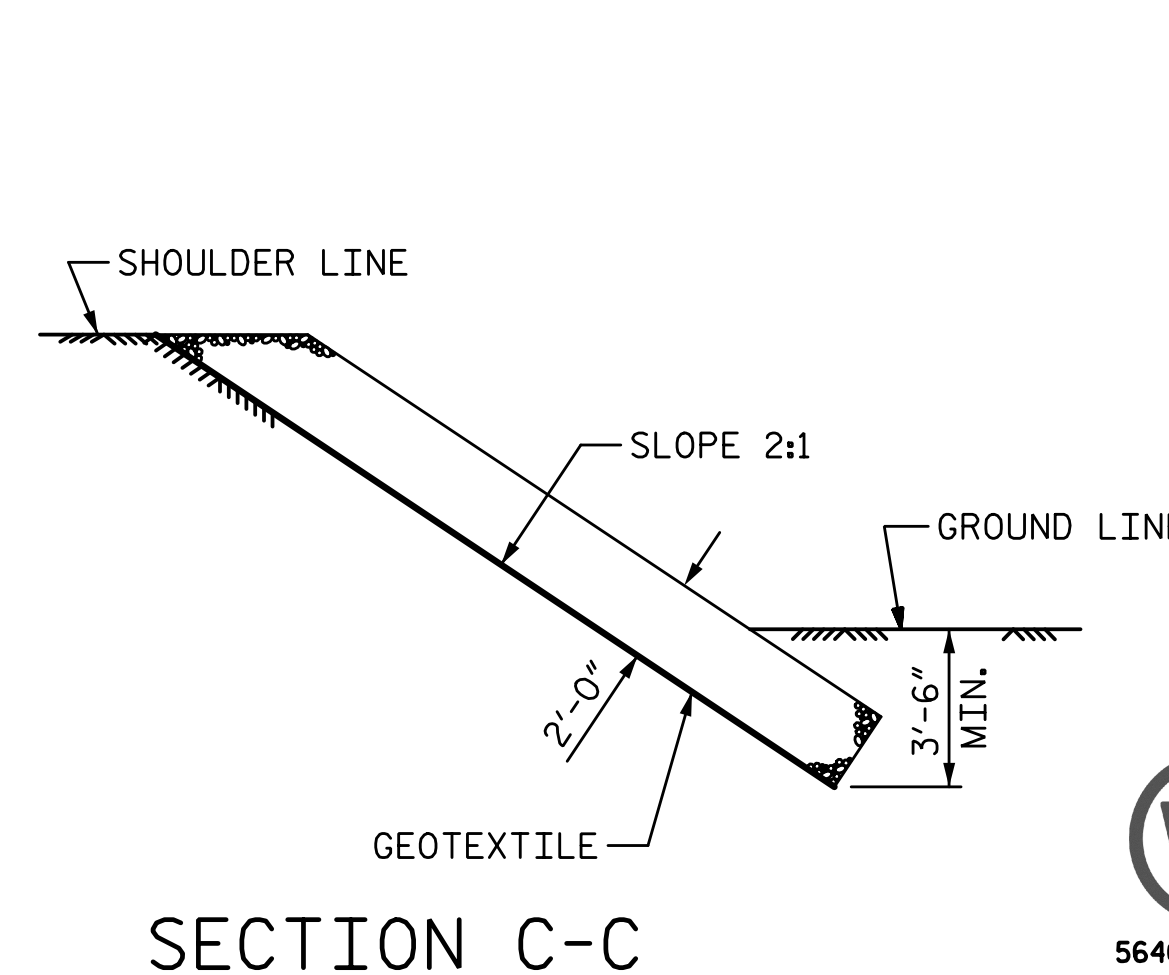
ESTIMATED QUANTITIES		
BRIDGE @ STA. 17+05.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	100	115
END BENT 2	125	140



SECTION H-H



SECTION BERM RIP RAPPED

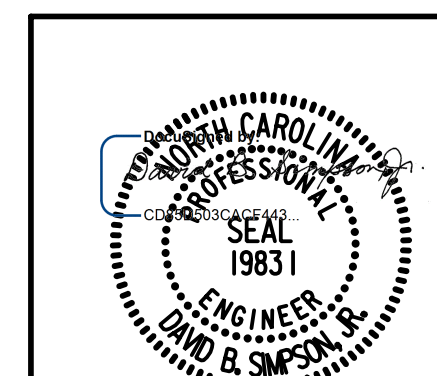


SECTION C-C

PROJECT NO. 17BP.7.R.136
GUILFORD COUNTY
 STATION: 17+05.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

RIP RAP DETAILS

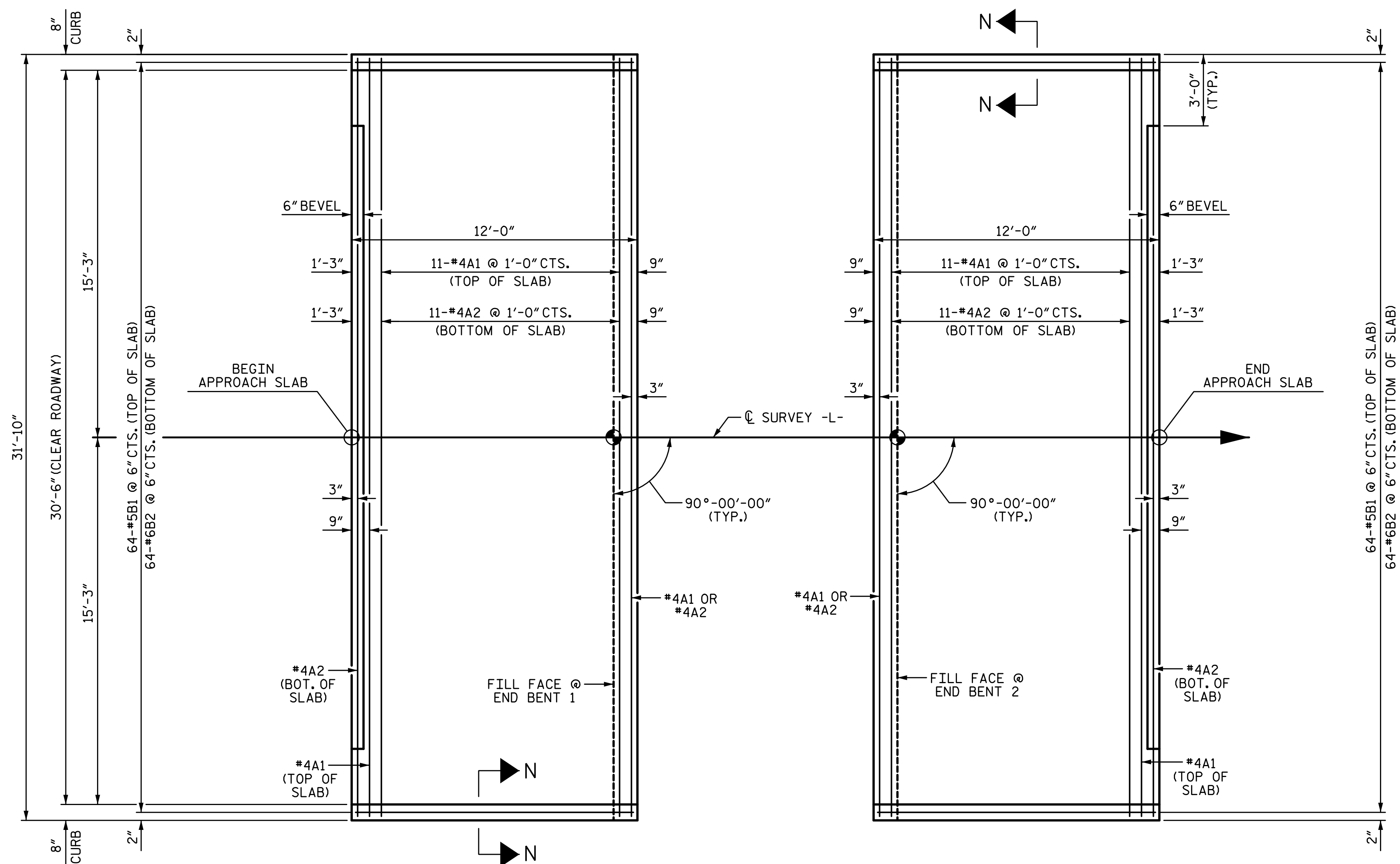


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 DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 10-22

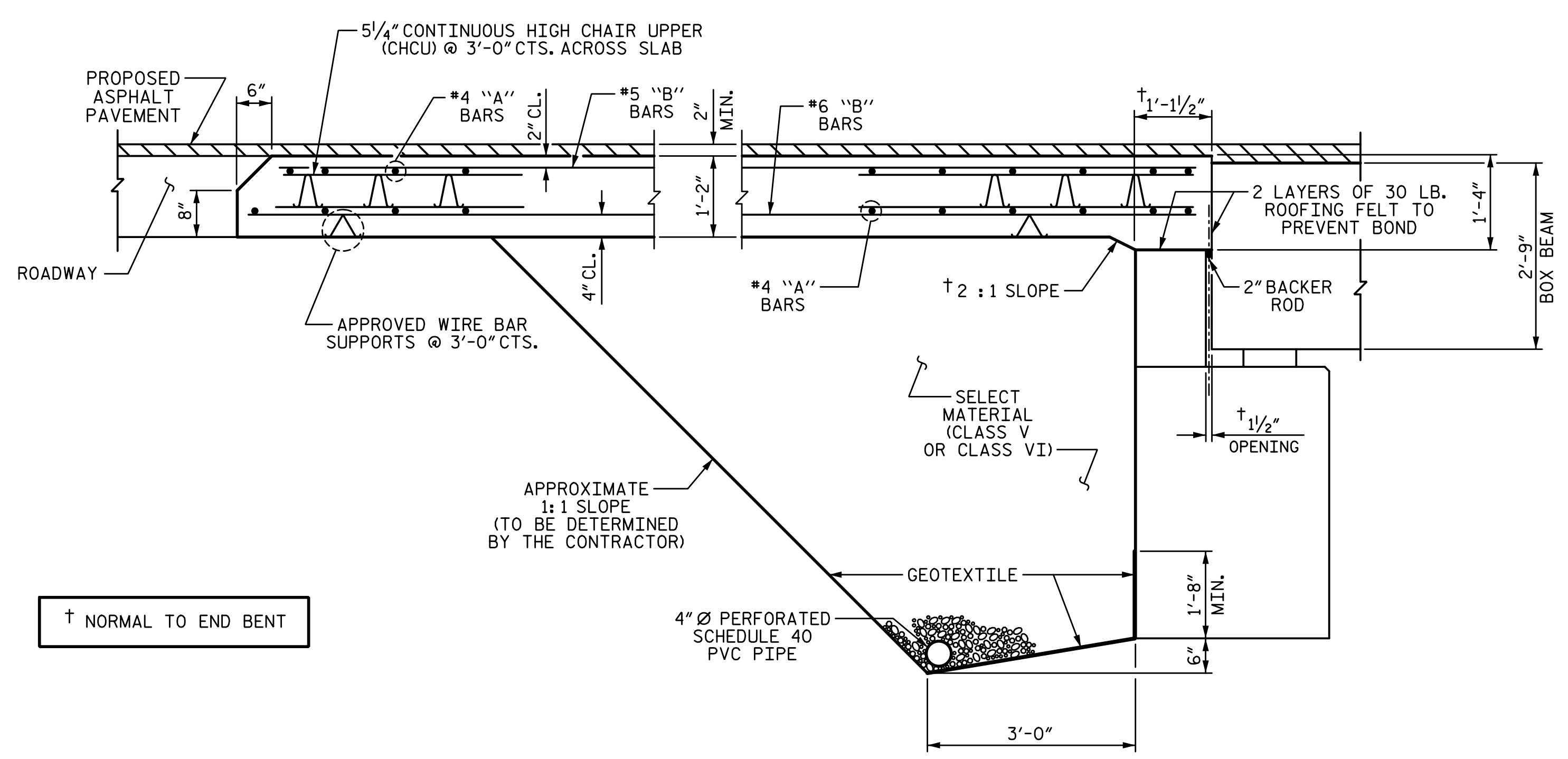
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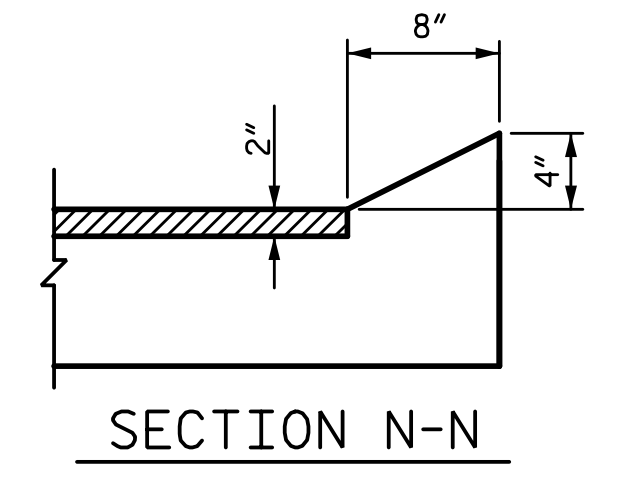


PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB
(TYPE II - MODIFIED APPROACH FILL)



SECTION N-N
CURB DETAILS

NOTES:

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

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

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

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

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 THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

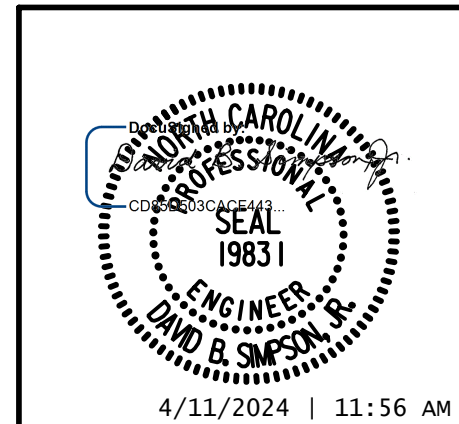
SPLICE CHART		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

BILL OF MATERIAL					
APPROACH SLAB AT EB 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	31'-6"	274
A2	13	#4	STR	31'-6"	274
* B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL					LB 1395
* EPOXY COATED REINFORCING STEEL					LB 1019
CLASS AA CONCRETE					CY 16.8
APPROACH SLAB AT EB 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	31'-6"	274
A2	13	#4	STR	31'-6"	274
* B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL					LB 1395
* EPOXY COATED REINFORCING STEEL					LB 1019
CLASS AA CONCRETE					CY 16.8

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GUILFORD COUNTY
 STATION: 17+05.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**BRIDGE APPROACH
 SLAB FOR PRESTRESSED
 CONCRETE BOX
 BEAM UNIT**
 (SUB-REGIONAL TIER)-90° SKEW



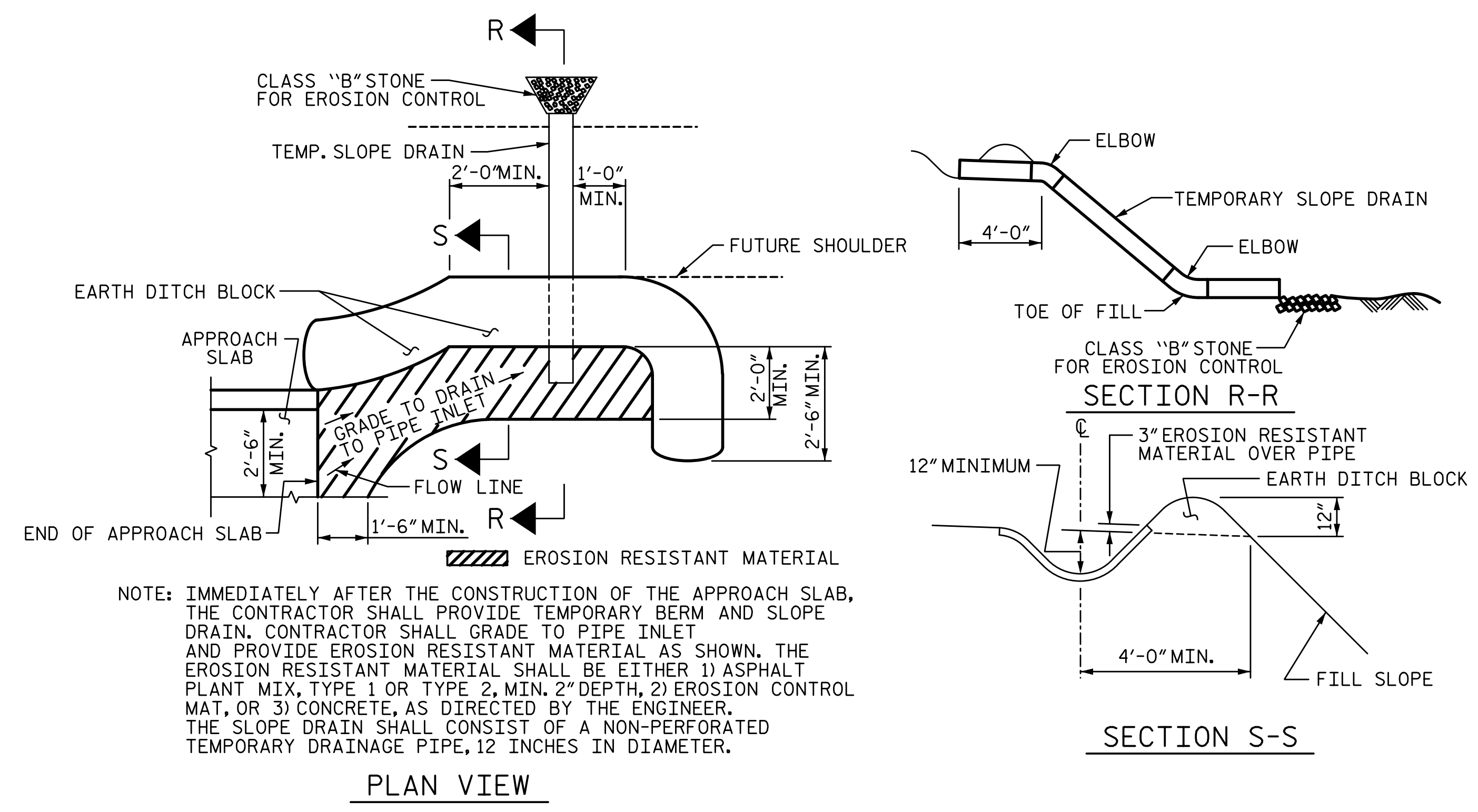
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DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 10-22

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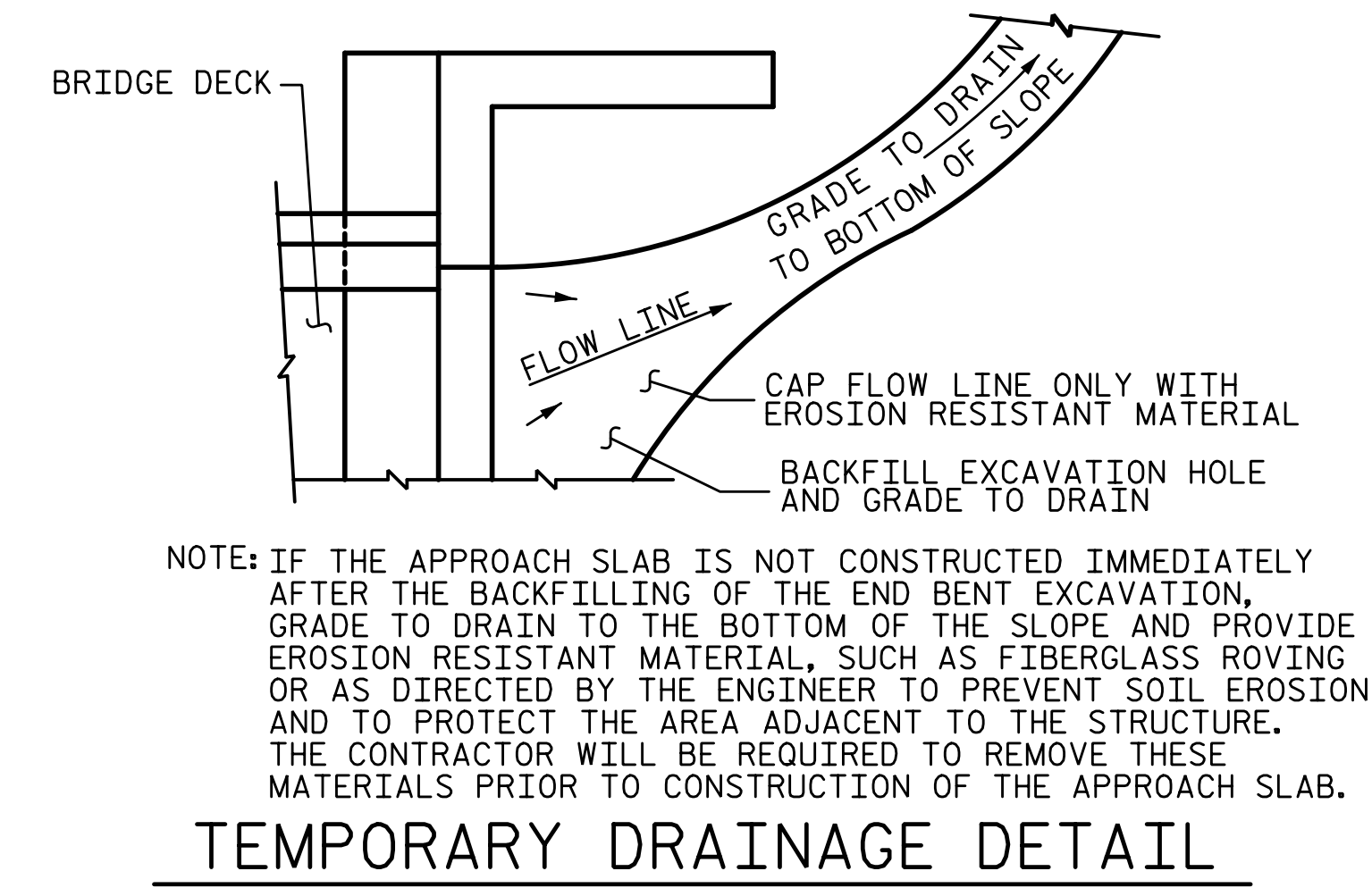
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TEMPORARY BERM AND SLOPE DRAIN DETAILS
 (TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

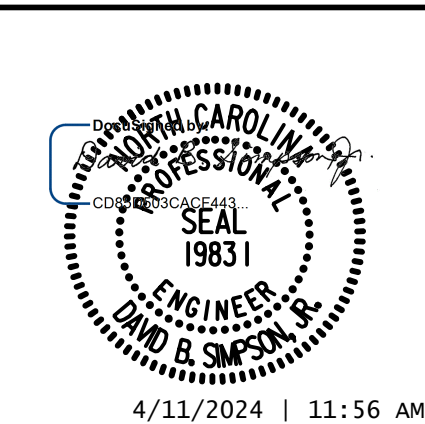


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SHEET 2 OF 2

STATE OF NORTH CAROLINA
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**BRIDGE APPROACH
 SLAB DETAILS**



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