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(Blank entries indicate item is not applicable to structure)

[illegible]

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

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

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
END BENT 1 (Piles 1-7)	170			0.60		
END BENT 2 (Piles 1-7)	170			0.60		

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

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
END BENT 1 (Piles 1-7)				0
END BENT 2 (Piles 1-4)				0
END BENT 2 (Piles 5-7)				3
TOTAL QUANTITY:				3

PROJECT NO. BP7-R017

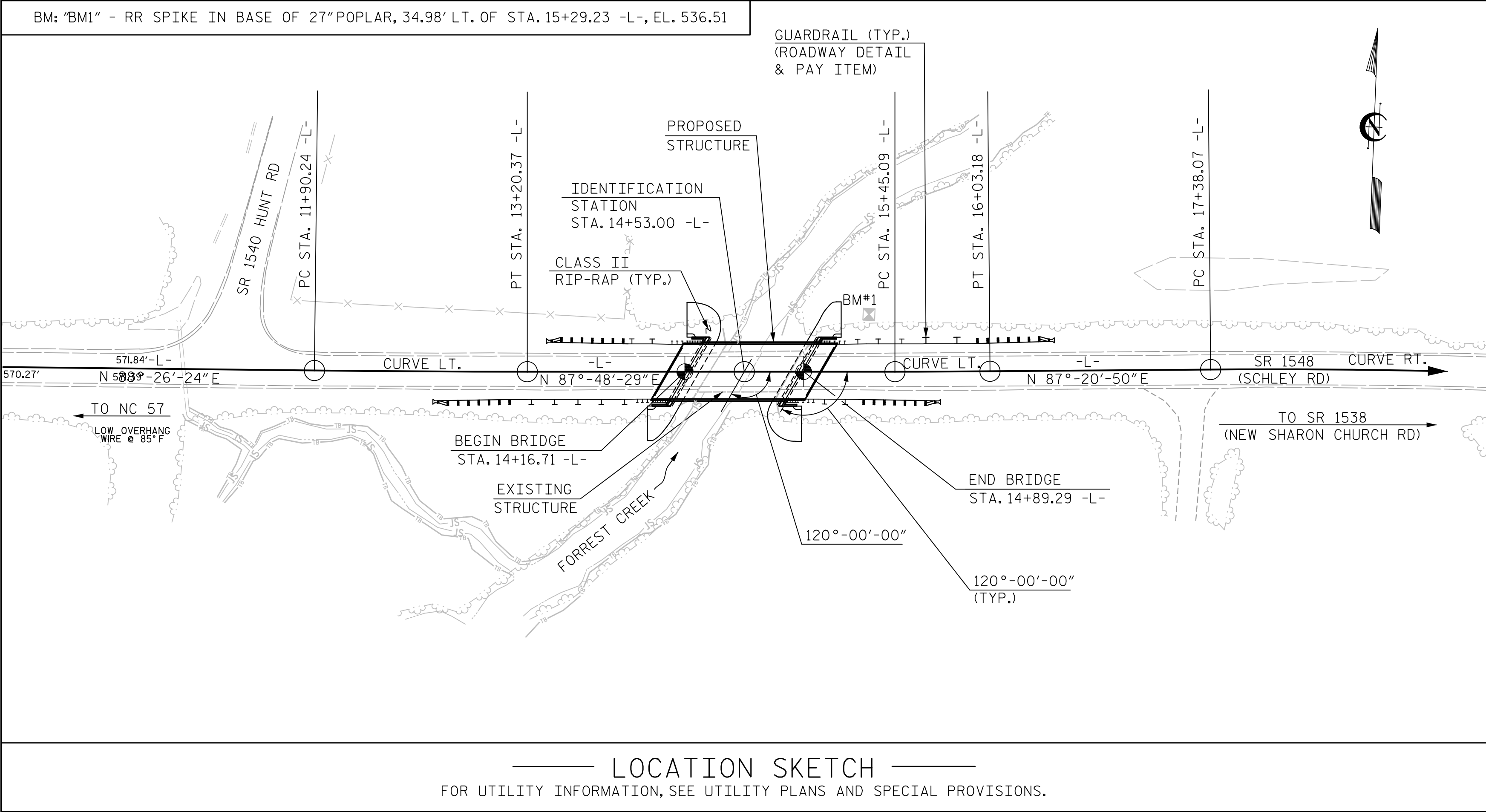
ORANGE COUNTY

STATION: 14+53.00 -L-

SHEET 2 OF 4

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Abner F. Riggs, Jr., PE, #014155) on 04-10-2026.
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 for DPT Testing and Pipe Pile Plates when necessary.



GENERAL DRAWING 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 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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 14+53.00 -L-."

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 21 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF TWO 25'-4" TIMBER DECK SPANS; 24.7' CLEAR ROADWAY WIDTH ON SALVAGED I-BEAMS AND TIMBER CAPS/TIMBER PILES CONCRETE ENCASED END BENTS AND BENT LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY 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.

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.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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

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

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

BEFORE FILLING HOLES FOR PILE EXCAVATION AT END BENT NO. 2, DRIVE PILES TO THE REQUIRED DRIVING RESISTANCE.

FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 1 AND END BENT NO. 2 WITH CONCRETE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 31,000 TO 45,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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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

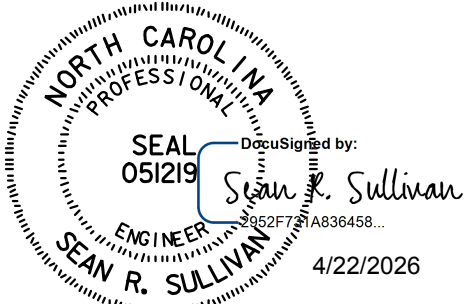
PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
70' CORED SLAB UNIT
60° SKEW & 120° SKEW
(NON-INTERSTATE TRAFFIC)

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

S-4
TOTAL SHEETS
17



HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1654
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DWG. NO. 4

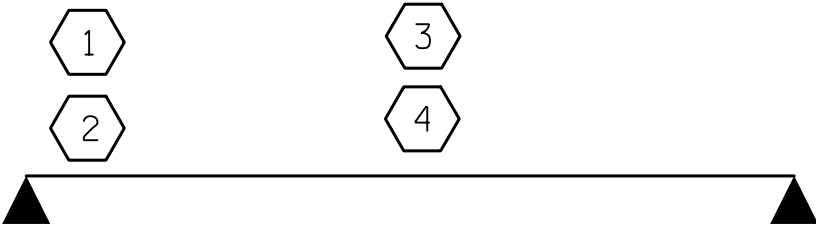
DRAWN BY: M. WRIGHT
CHECKED BY: S. SULLIVAN
DESIGN ENGINEER OF RECORD: S. SULLIVAN

DATE: 7/23
DATE: 7/23
DATE: 8/23

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING ⬢	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER	
							LIVE-LOAD FACTORS (γ LL)	MOMENT				SHEAR				LIVE-LOAD FACTORS (γ LL)	MOMENT							
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)
DESIGN LOAD		HL-93 (INVENTORY)	N/A	⬢1	1.060	--	1.75	0.248	1.14	70'	EL	34.423	0.655	1.06	70'	EL	6.885	0.80	0.248	1.11	70'	EL	34.423	
		HL-93 (OPERATING)	N/A		1.374	--	1.35	0.248	1.48	70'	EL	34.423	0.655	1.37	70'	EL	6.885	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⬢2	1.320	47.508	1.75	0.248	1.48	70'	EL	34.423	0.655	1.32	70'	EL	6.885	0.80	0.248	1.44	70'	EL	34.423	
		HS-20 (OPERATING)	36.000		1.711	61.585	1.35	0.248	1.91	70'	EL	34.423	0.655	1.71	70'	EL	6.885	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.204	43.258	1.4	0.248	4.12	70'	EL	34.423	0.655	3.90	70'	EL	6.885	0.80	0.248	3.20	70'	EL	34.423	
		SNGARBS2	20.000		2.403	48.063	1.4	0.248	3.09	70'	EL	34.423	0.655	2.78	70'	EL	6.885	0.80	0.248	2.40	70'	EL	34.423	
		SNAGRIS2	22.000		2.282	50.210	1.4	0.248	2.94	70'	EL	34.423	0.655	2.58	70'	EL	6.885	0.80	0.248	2.28	70'	EL	34.423	
		SNCOTTS3	27.250		1.595	43.463	1.4	0.248	2.05	70'	EL	34.423	0.655	1.95	70'	EL	6.885	0.80	0.248	1.59	70'	EL	34.423	
		SNAGGRS4	34.925		1.339	46.755	1.4	0.248	1.72	70'	EL	34.423	0.655	1.62	70'	EL	6.885	0.80	0.248	1.34	70'	EL	34.423	
		SNS5A	35.550		1.309	46.526	1.4	0.248	1.68	70'	EL	34.423	0.655	1.65	70'	EL	6.885	0.80	0.248	1.31	70'	EL	34.423	
		SNS6A	39.950		1.203	48.069	1.4	0.248	1.55	70'	EL	34.423	0.655	1.50	70'	EL	6.885	0.80	0.248	1.20	70'	EL	34.423	
		SNS7B	42.000		1.146	48.129	1.4	0.248	1.47	70'	EL	34.423	0.655	1.48	70'	EL	6.885	0.80	0.248	1.15	70'	EL	34.423	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.468	48.444	1.4	0.248	1.89	70'	EL	34.423	0.655	1.79	70'	EL	6.885	0.80	0.248	1.47	70'	EL	34.423	
		TNT4A	33.075		1.475	48.790	1.4	0.248	1.90	70'	EL	34.423	0.655	1.74	70'	EL	6.885	0.80	0.248	1.48	70'	EL	34.423	
		TNT6A	41.600		1.208	50.272	1.4	0.248	1.55	70'	EL	34.423	0.655	1.58	70'	EL	6.885	0.80	0.248	1.21	70'	EL	34.423	
		TNT7A	42.000		1.216	51.061	1.4	0.248	1.56	70'	EL	34.423	0.655	1.55	70'	EL	6.885	0.80	0.248	1.22	70'	EL	34.423	
		TNT7B	42.000		1.261	52.955	1.4	0.248	1.62	70'	EL	34.423	0.655	1.44	70'	EL	6.885	0.80	0.248	1.26	70'	EL	34.423	
		TNAGRIT4	43.000		1.197	51.476	1.4	0.248	1.54	70'	EL	34.423	0.655	1.40	70'	EL	6.885	0.80	0.248	1.20	70'	EL	34.423	
		TNAGT5A	45.000		1.128	50.745	1.4	0.248	1.45	70'	EL	34.423	0.655	1.39	70'	EL	6.885	0.80	0.248	1.13	70'	EL	34.423	
		TNAGT5B	45.000	⬢3	1.113	50.088	1.4	0.248	1.43	70'	EL	34.423	0.655	1.33	70'	EL	6.885	0.80	0.248	1.11	70'	EL	34.423	
EMERGENCY VEHICLE (EV)	EV2	28.750		1.198	57.432	1.3	0.248	2.32	70'	EL	34.423	0.655	2.08	70'	EL	6.885	0.80	0.248	1.20	70'	EL	34.423		
	EV3	43.000	⬢4	1.306	56.170	1.3	0.248	1.52	70'	EL	34.423	0.655	1.41	70'	EL	6.885	0.80	0.248	1.31	70'	EL	34.423		



LRFR SUMMARY

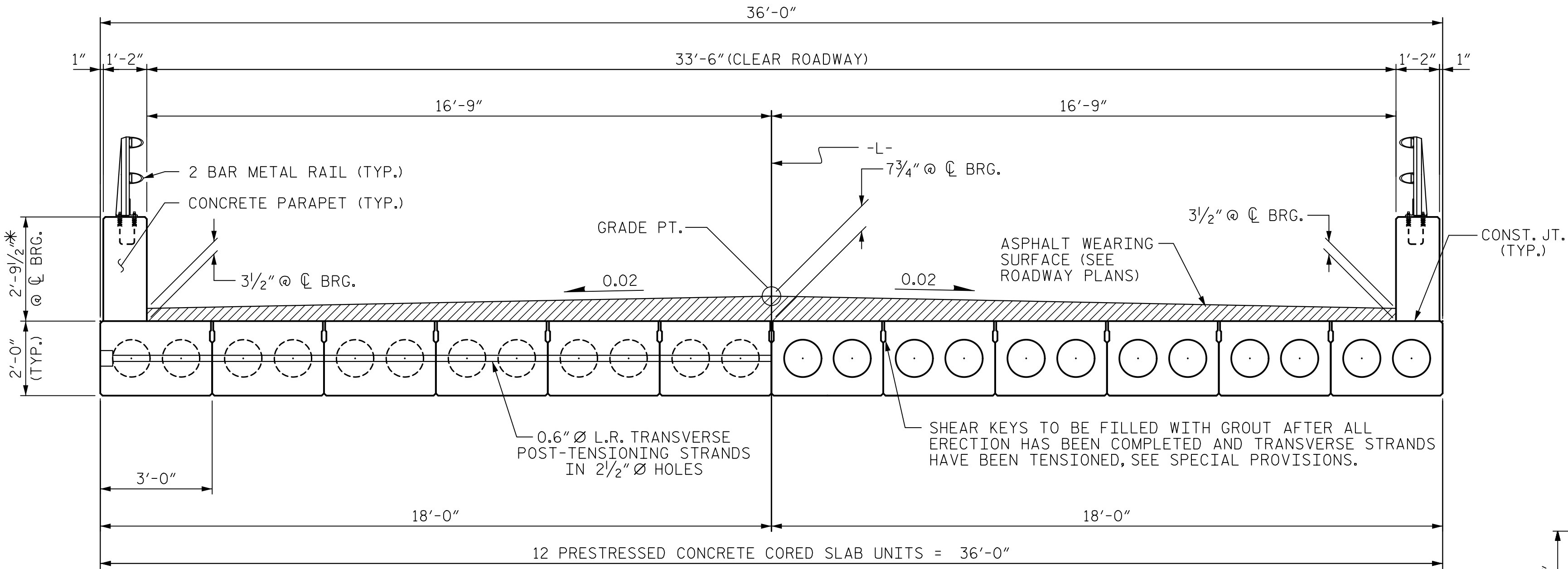
FOR SPAN " A "

STD. NO. 24LRFR1.60&120S_70L

ASSEMBLED BY: M. WRIGHT		DATE : 7/23	
CHECKED BY : S. SULLIVAN		DATE : 7/23	
DRAWN BY : CVC	6/10	REV. BY : BNB/AKP	06/23
CHECKED BY : DNS	6/10		

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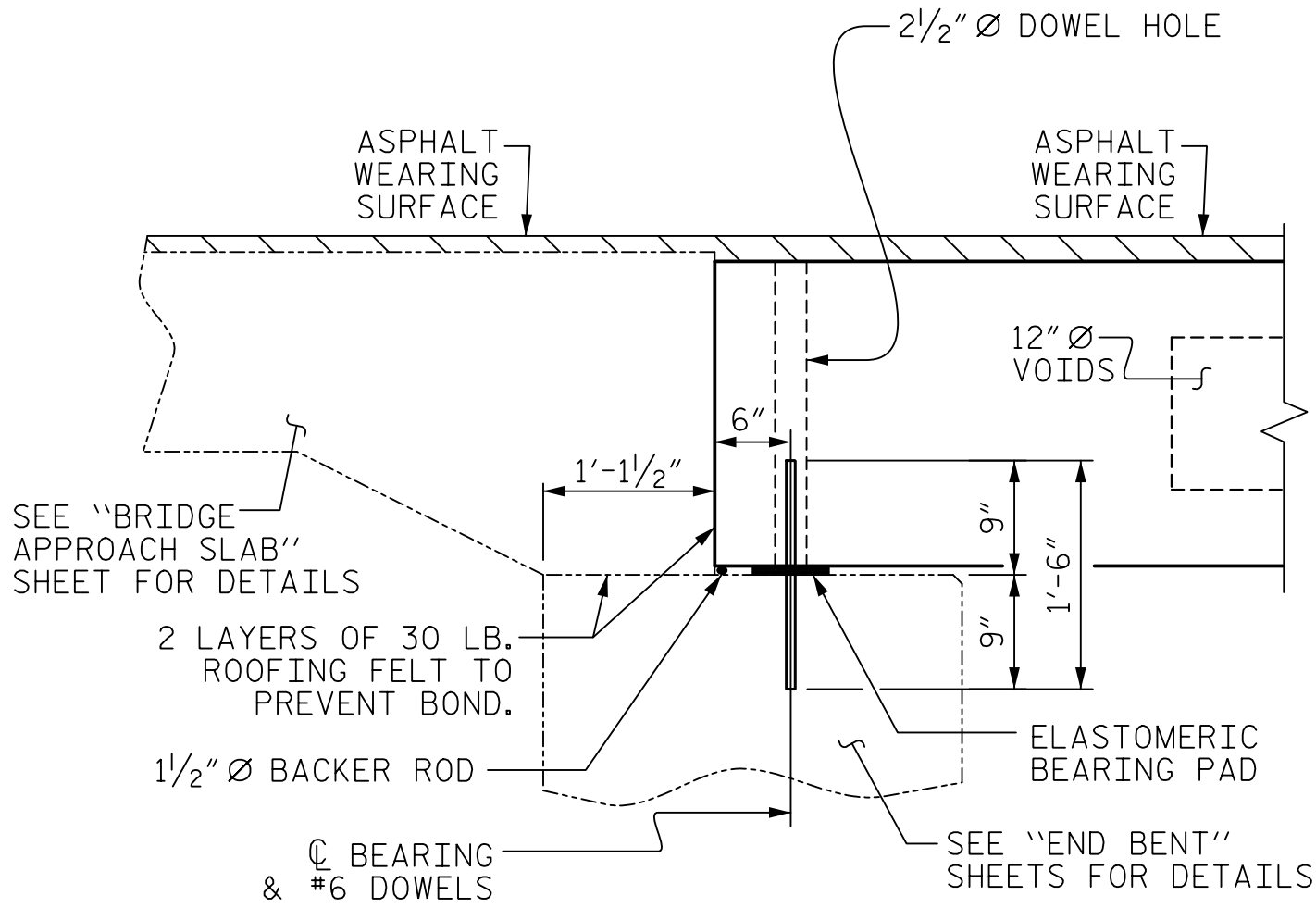


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

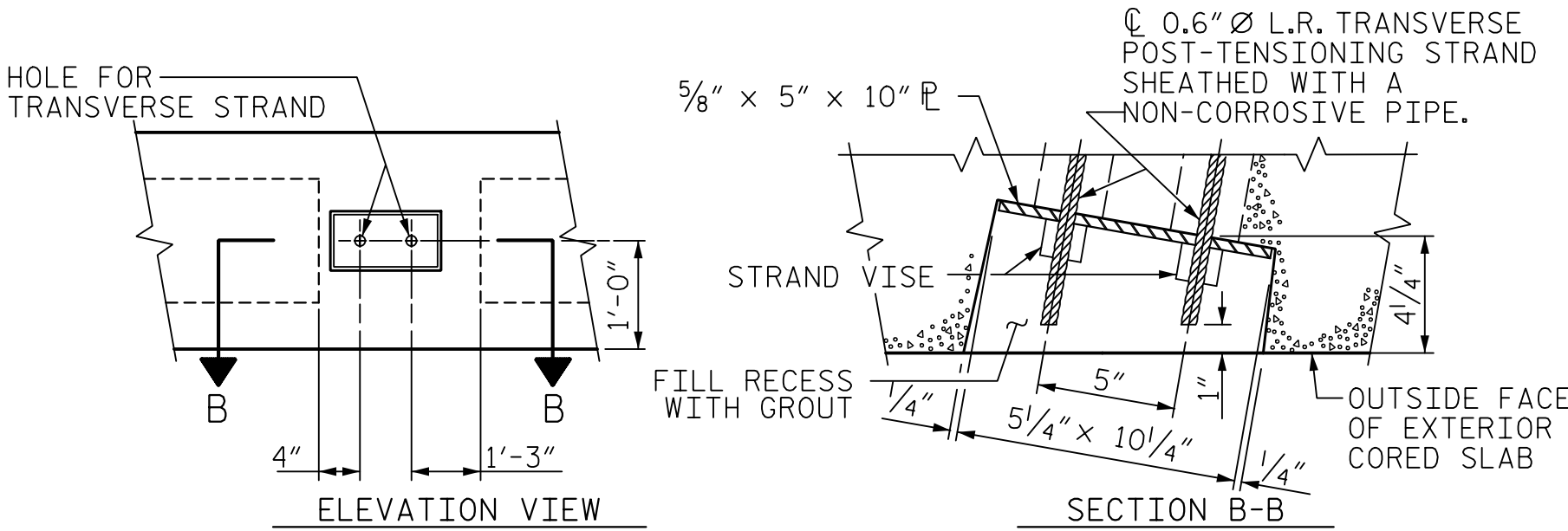
TYPICAL SECTION

HALF SECTION
THROUGH VOIDS

* - THE MAXIMUM PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR PARAPET HEIGHT DETAILS AND ASPHALT THICKNESS, SEE SHEET 3 OF 3.

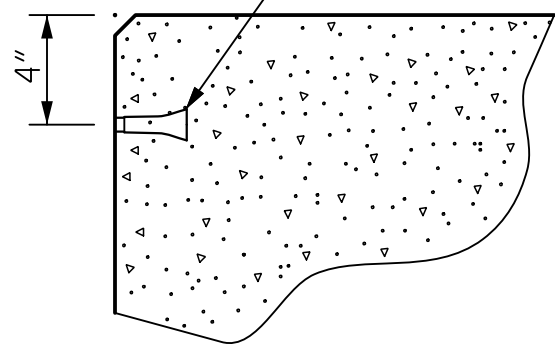


SECTION AT END BENT

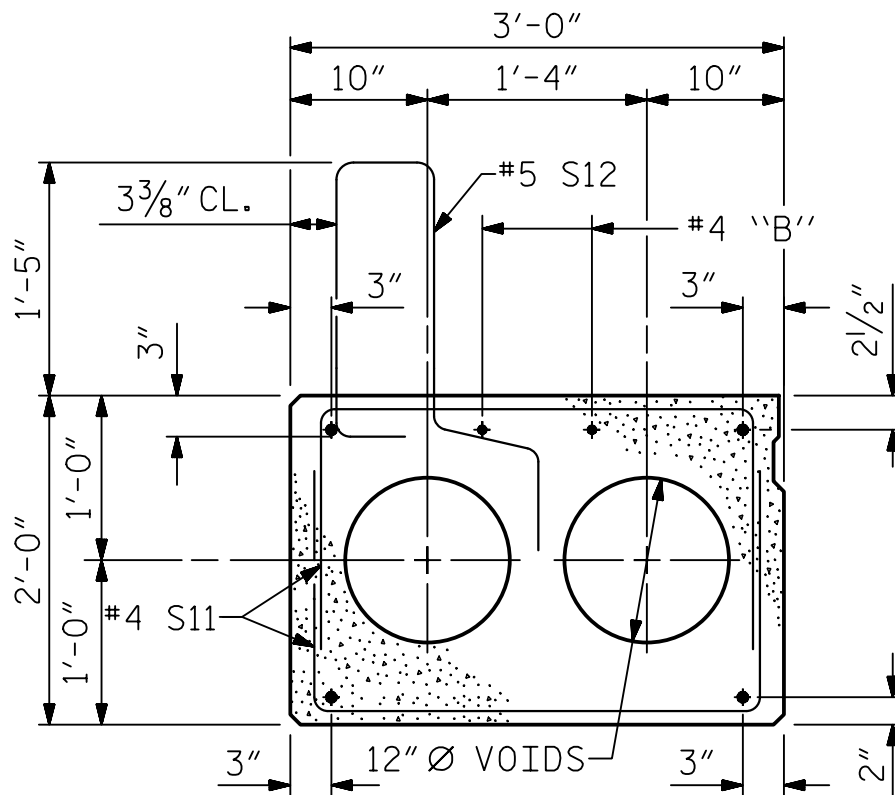


GROUTED RECESS AT END OF
POST-TENSIONED STRAND-CORED SLABS

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

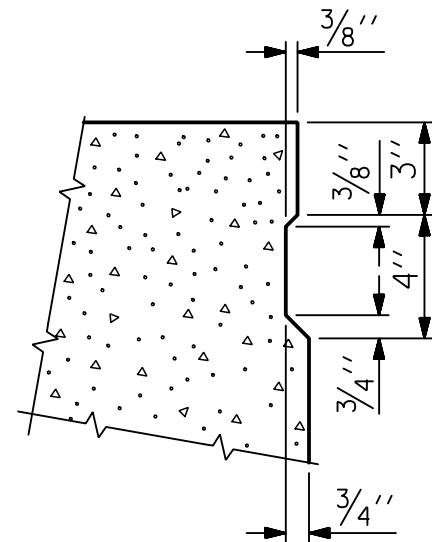


THREADED INSERT DETAIL



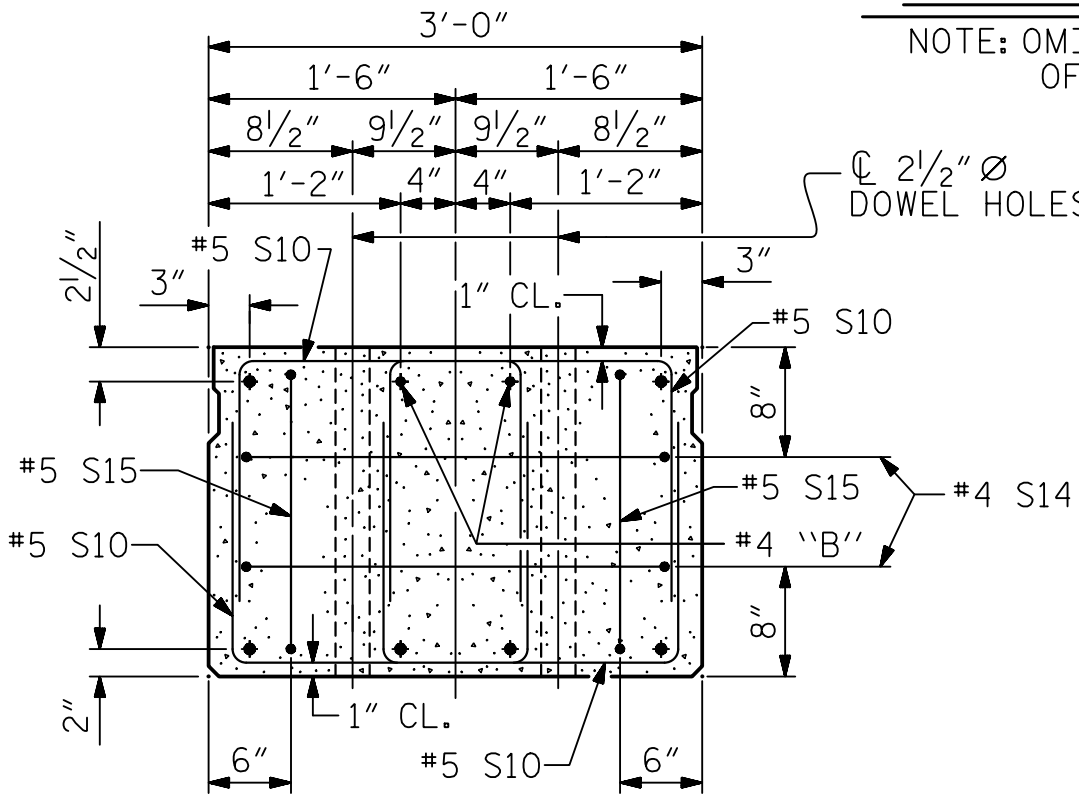
EXTERIOR SLAB SECTION

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



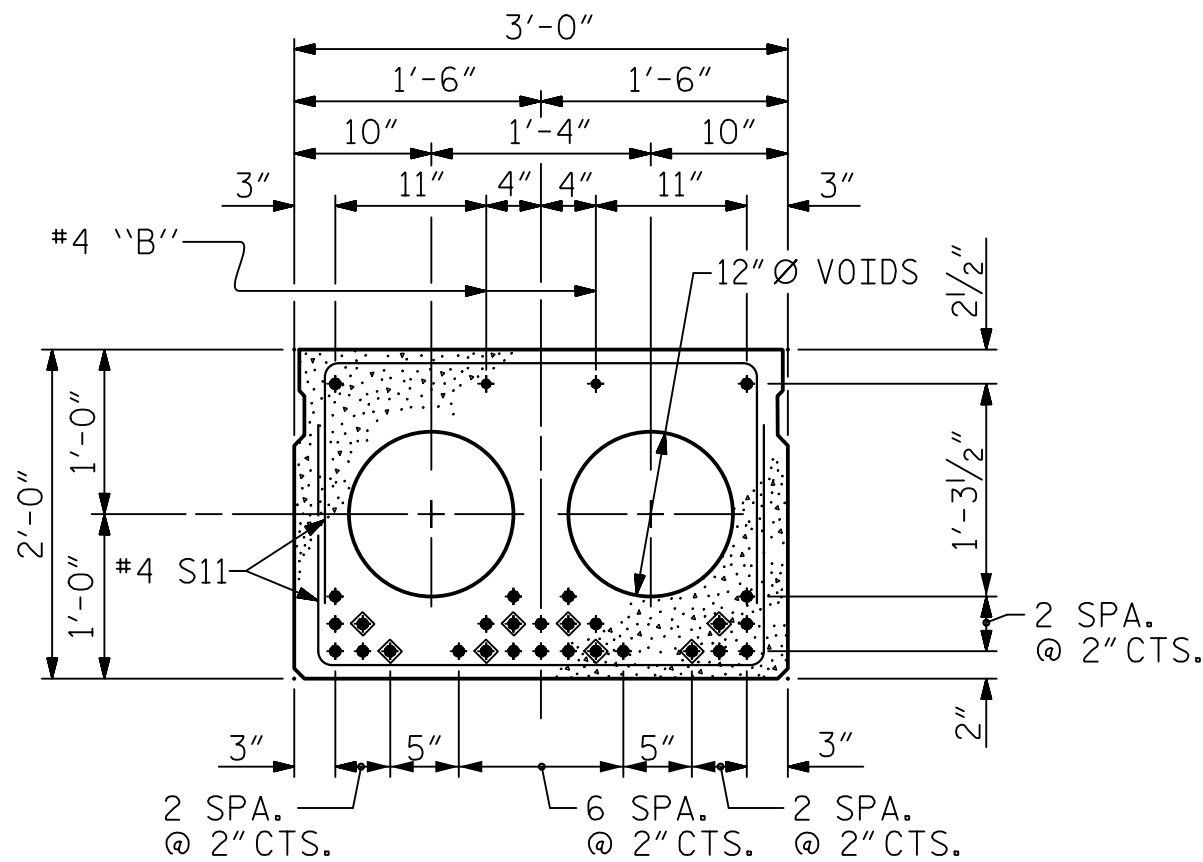
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE
OF EXTERIOR 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.



INTERIOR SLAB SECTION (70' UNIT)
(28 STRANDS REQUIRED)

0.6" Ø LOW
RELAXATION STRAND LAYOUT

- ◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					TOTAL SHEETS
					17

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1654 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY	M. WRIGHT	DATE	7/23
CHECKED BY	S. SULLIVAN	DATE	7/23
DESIGN ENGINEER OF RECORD	S. SULLIVAN	DATE	8/23

DWG. NO. 5

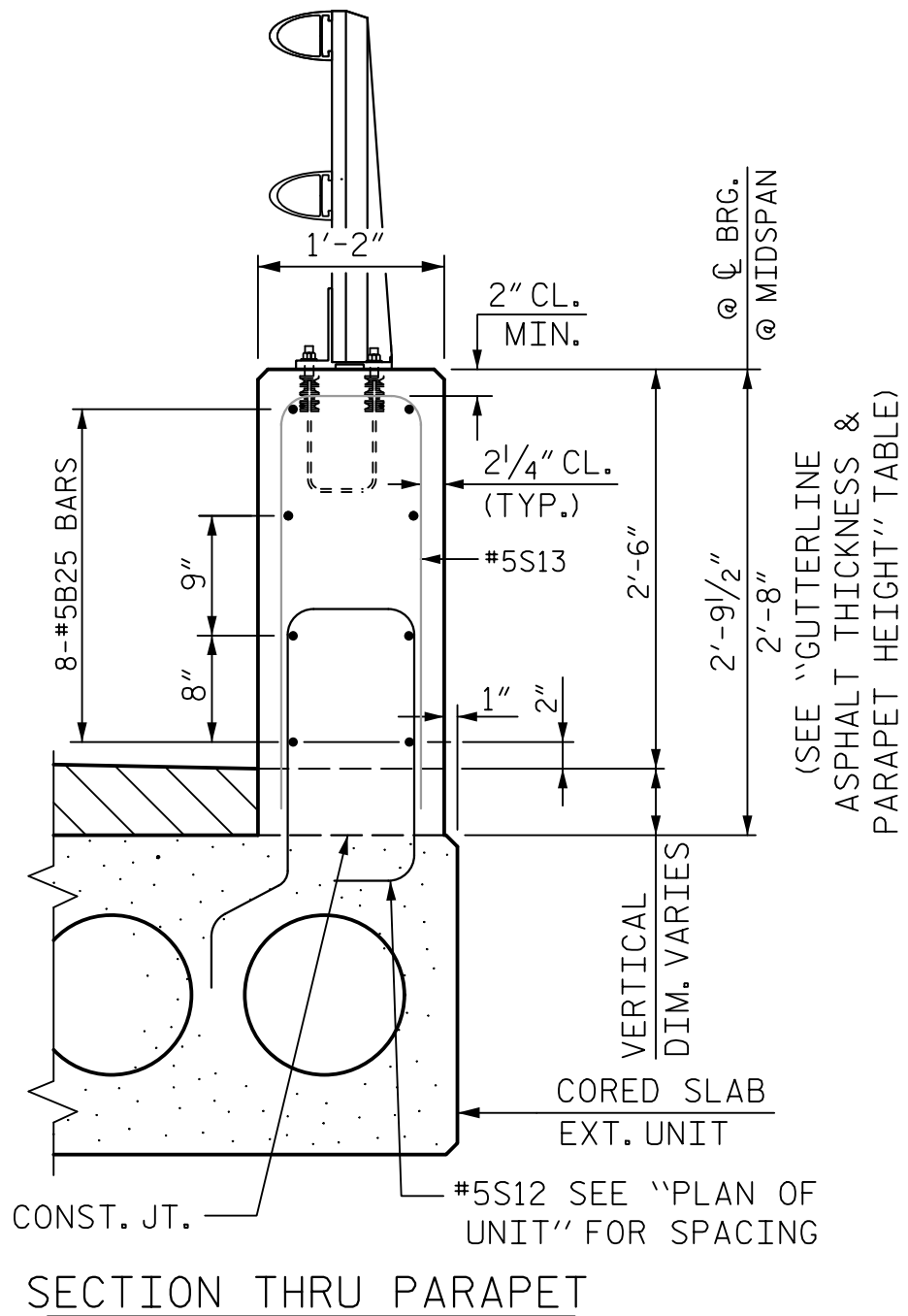
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

STD. NO. 24PCS4_36_120S	
ASSEMBLED BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23
DRAWN BY : MAA 6/10	REV. 9/14 MAA/TMG
CHECKED BY : MKT 7/10	

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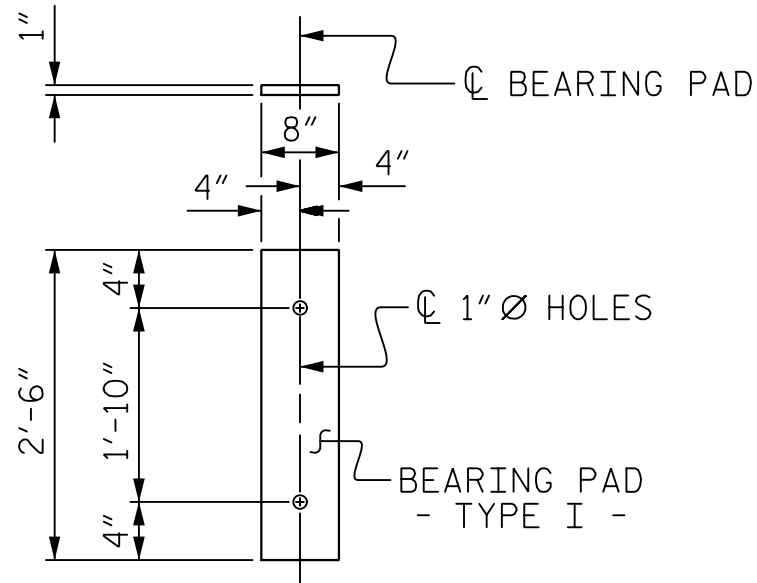
STD. NO. 24PCS3_36_60&120S

ASSEMBLED BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23
DRAWN BY : MAA	6/10
CHECKED BY : MKT	7/10
REV. 5/18	MAA/THC



BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
S10	8	#5	2	5'-0"	42	5'-0"	42
S11	170	#4	2	5'-10"	662	5'-10"	662
*S12	79	#5	1	5'-9"	474		
S14	4	#4	3	5'-11"	16	5'-11"	16
S15	4	#5	2	7'-1"	30	7'-1"	30
S16	4	#4	2	5'-11"	16	5'-11"	16
S17	4	#4	2	6'-1"	16	6'-1"	16
S18	4	#4	2	6'-3"	17	6'-3"	17
REINFORCING STEEL				LBS.	897	LBS.	897
*EPOXY COATED REINFORCING STEEL				LBS.	474		
7000 P.S.I. CONCRETE				CU. YDS.	12.0		12.0
0.6" Ø L.R. STRANDS				No.	28		28

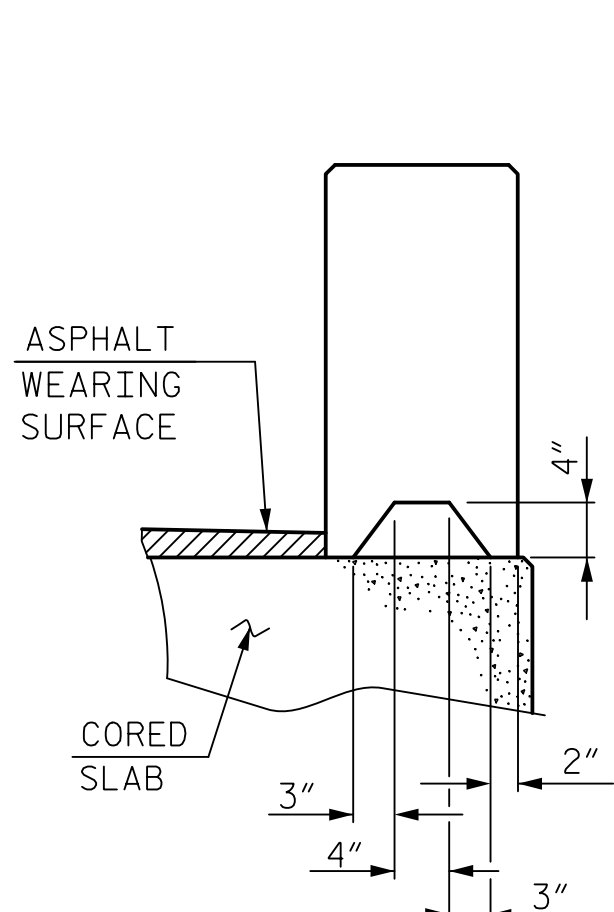
GUTTERLINE ASPHALT THICKNESS & PARAPET HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
70' UNITS	2"	2'-8"



FIXED END (TYPE I - 24 REQ'D)

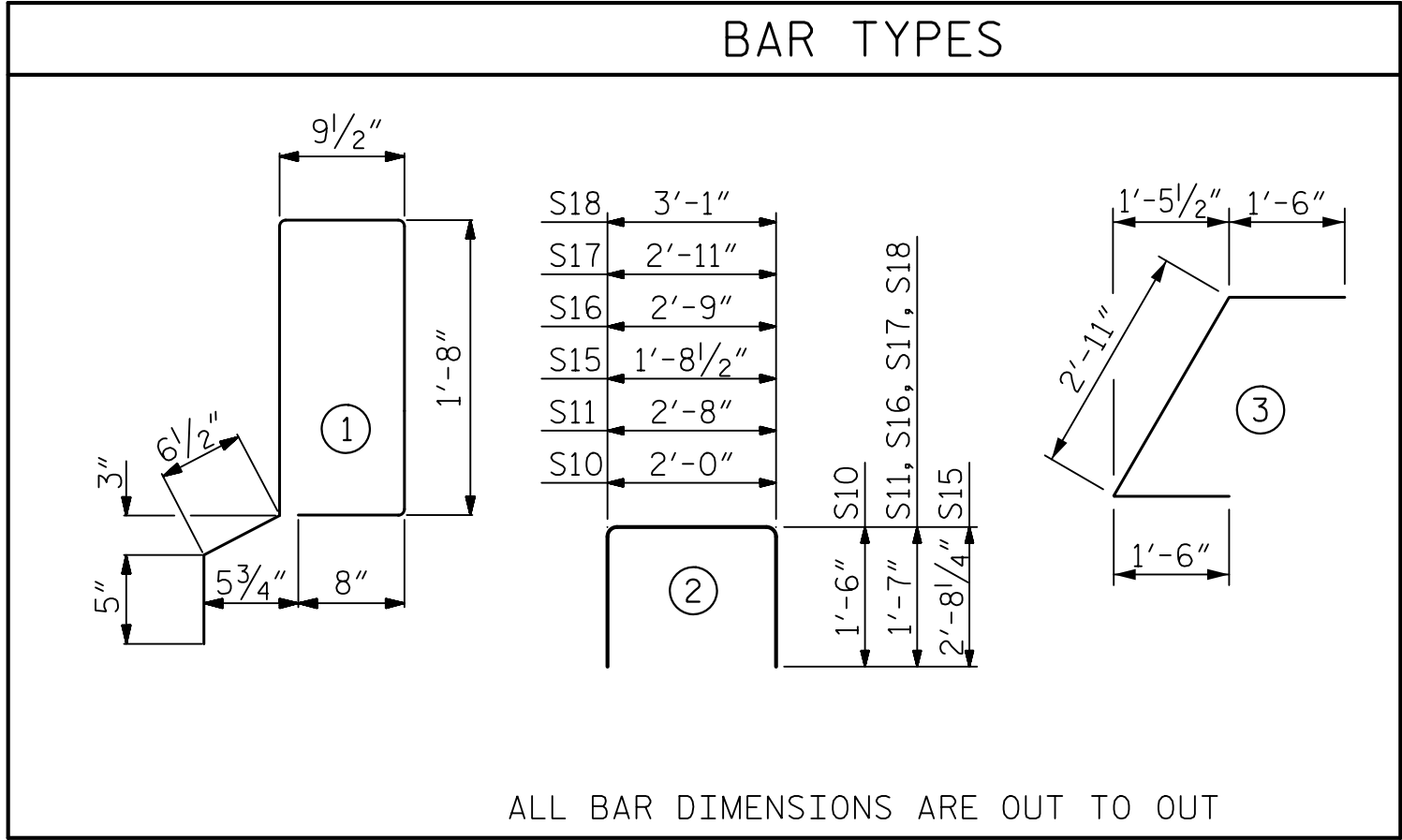
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



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

PARAPET DETAILS



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

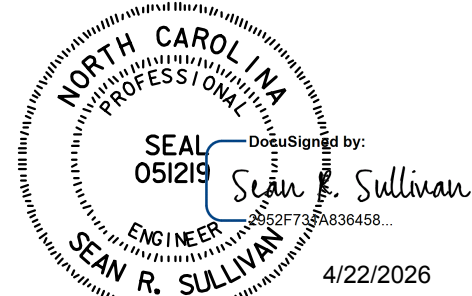
** INCLUDES FUTURE WEARING SURFACE

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
70' UNIT			
EXTERIOR C.S.	2	70'-0"	140'-0"
INTERIOR C.S.	10	70'-0"	700'-0"
TOTAL	12		840'-0"

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

CONCRETE RELEASE STRENGTH	
UNIT	PSI
70' UNITS	5500

NOTE:
FOR END POST REINFORCING DETAILS AND
PARAPET BILL OF MATERIAL, SEE SHEET
'END OF RAIL AND POST DETAILS'.



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DRAWN BY	M. WRIGHT	DATE	7/23
CHECKED BY	S. SULLIVAN	DATE	7/23
DESIGN ENGINEER OF RECORD	S. SULLIVAN	DATE	8/23
DWG. NO. 7			

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.

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.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS 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.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

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.

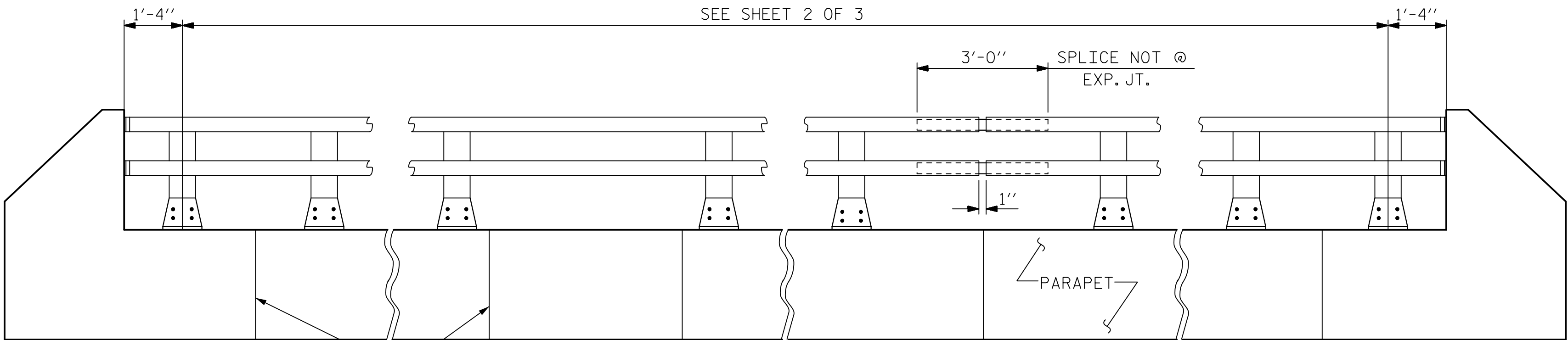
THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-

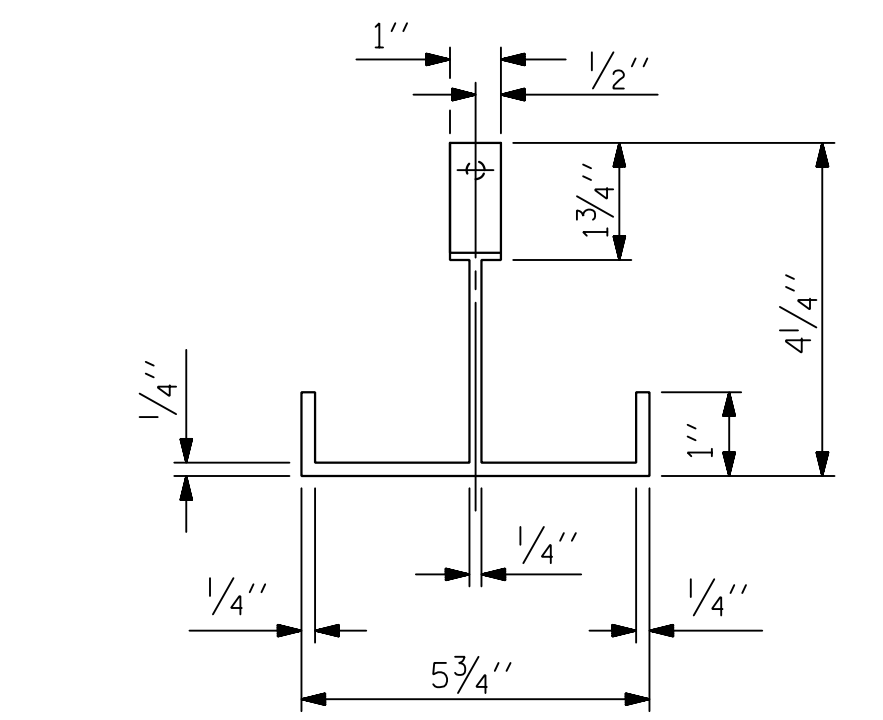
SHEET 3 OF 3

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

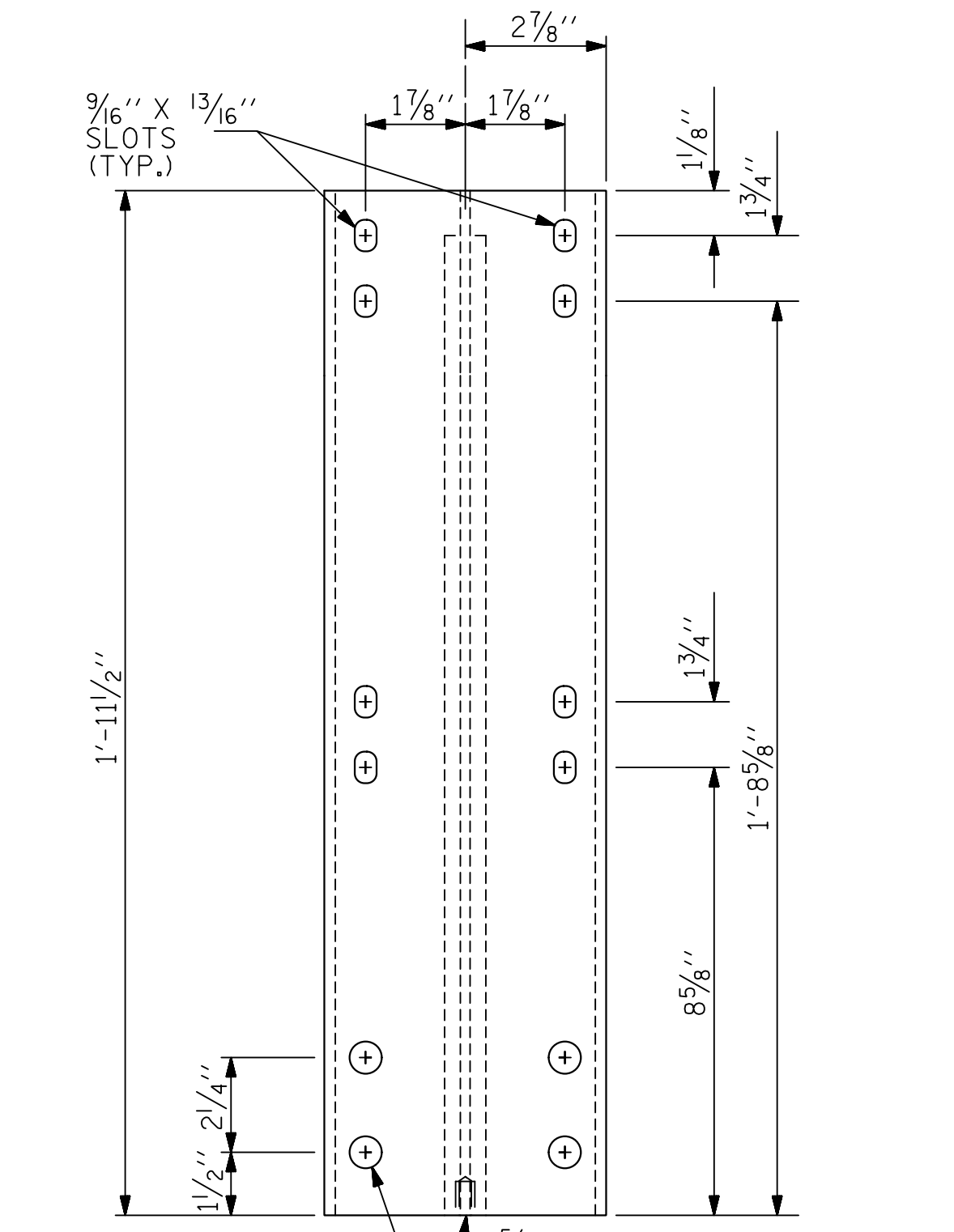
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NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS
2			4			17



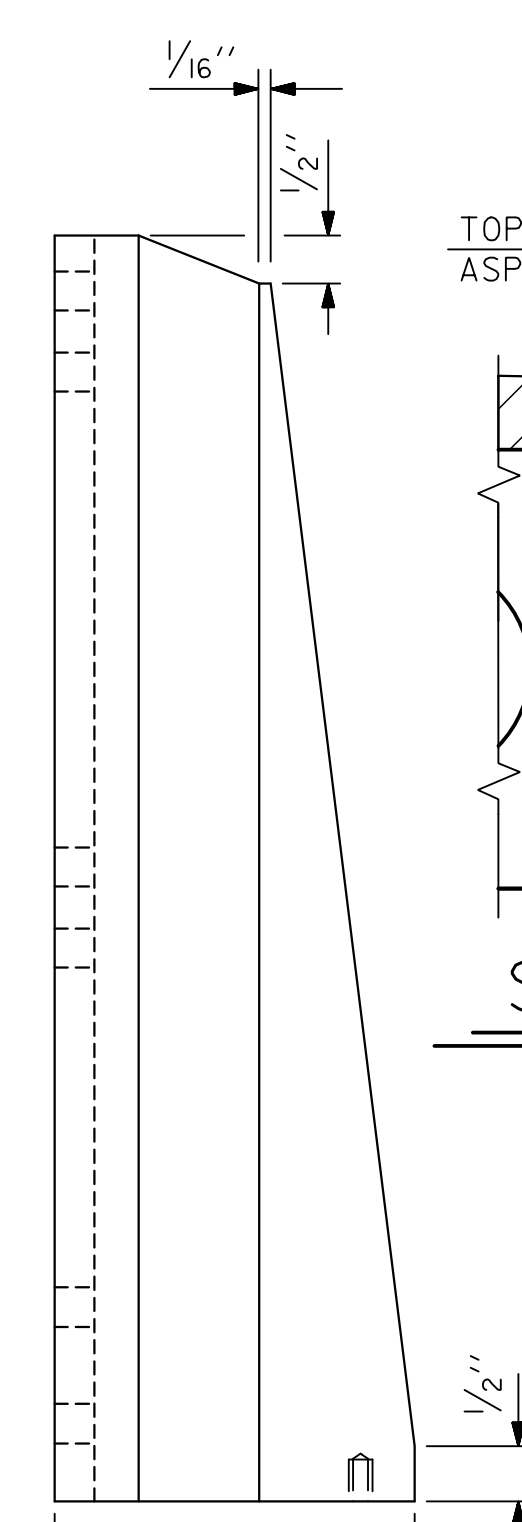
ELEVATION
NOTE :FOR ATTACHMENT OF METAL RAIL TO END POST,SEE SHEET 3 OF 3.



PLAN



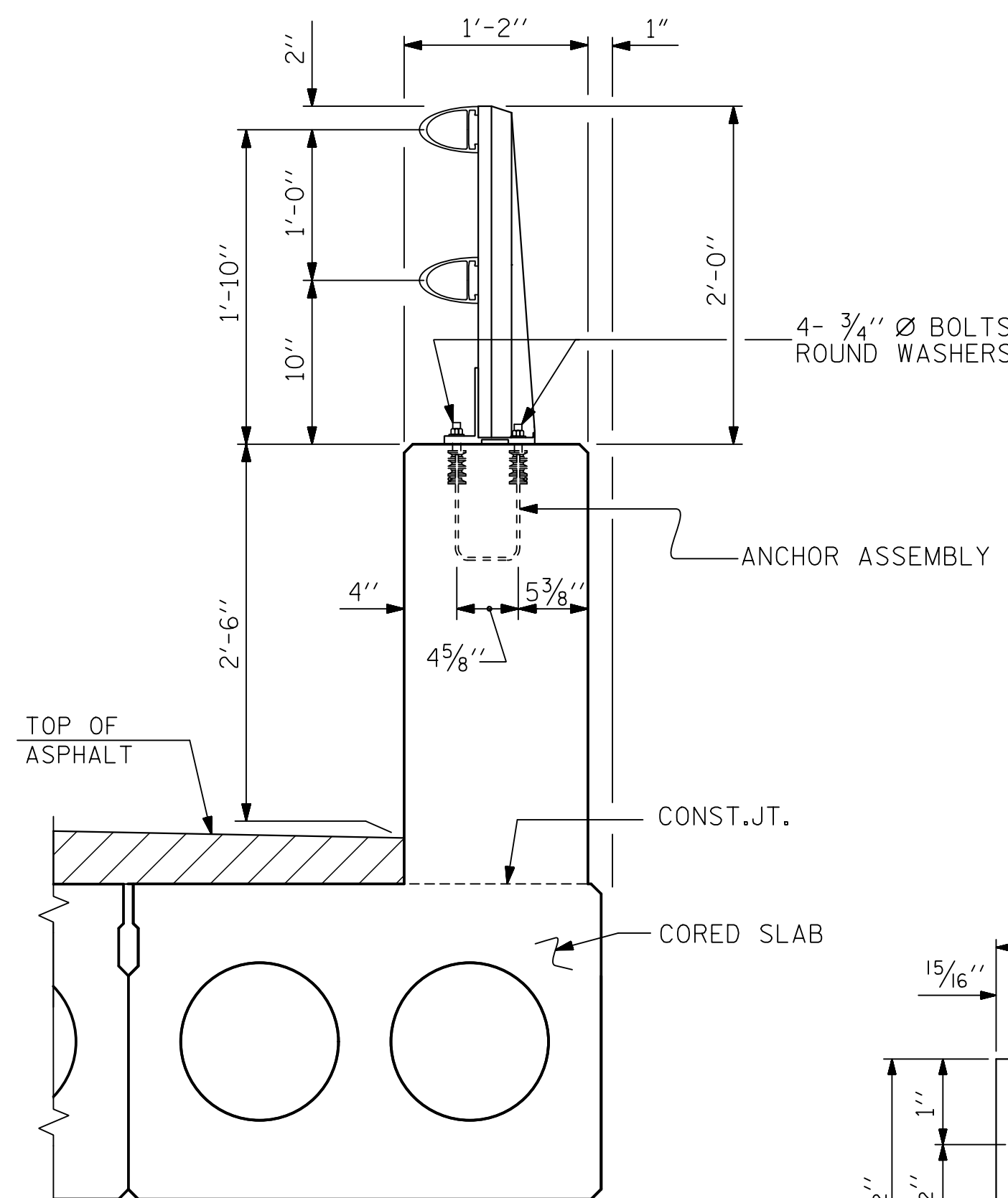
FRONT ELEVATION



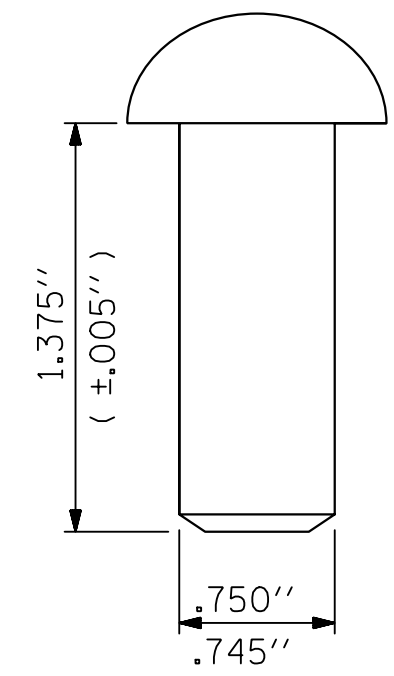
SIDE ELEVATION

DETAILS OF POST

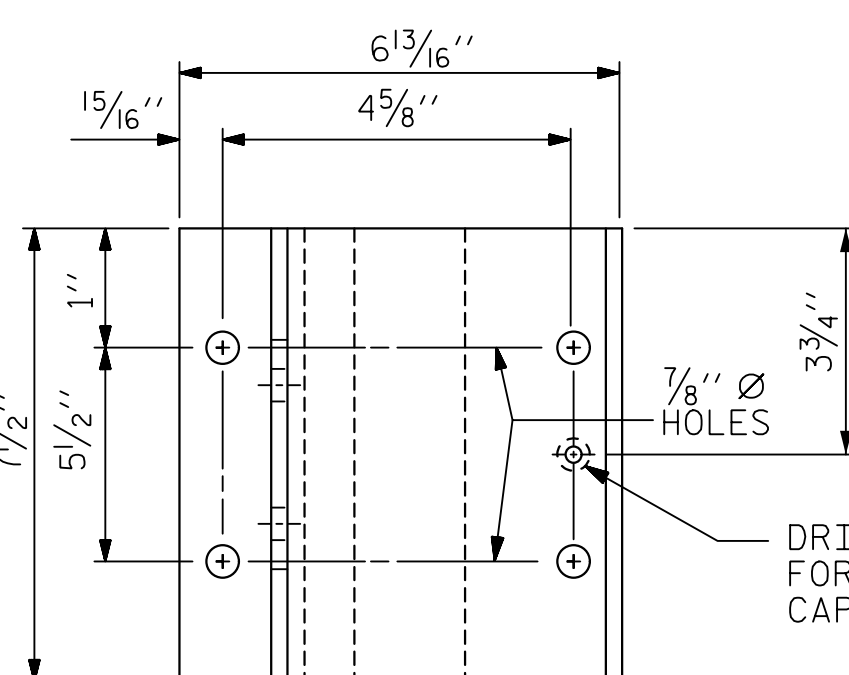
STD. NO. BMR3 (SHT 1)			
ASSEMBLED BY : M. WRIGHT		DATE : 7/23	
CHECKED BY : S. SULLIVAN		DATE : 7/23	
DRAWN BY : EEM		REV. 10/1/11	MAA/GM
CHECKED BY : RGW		REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC



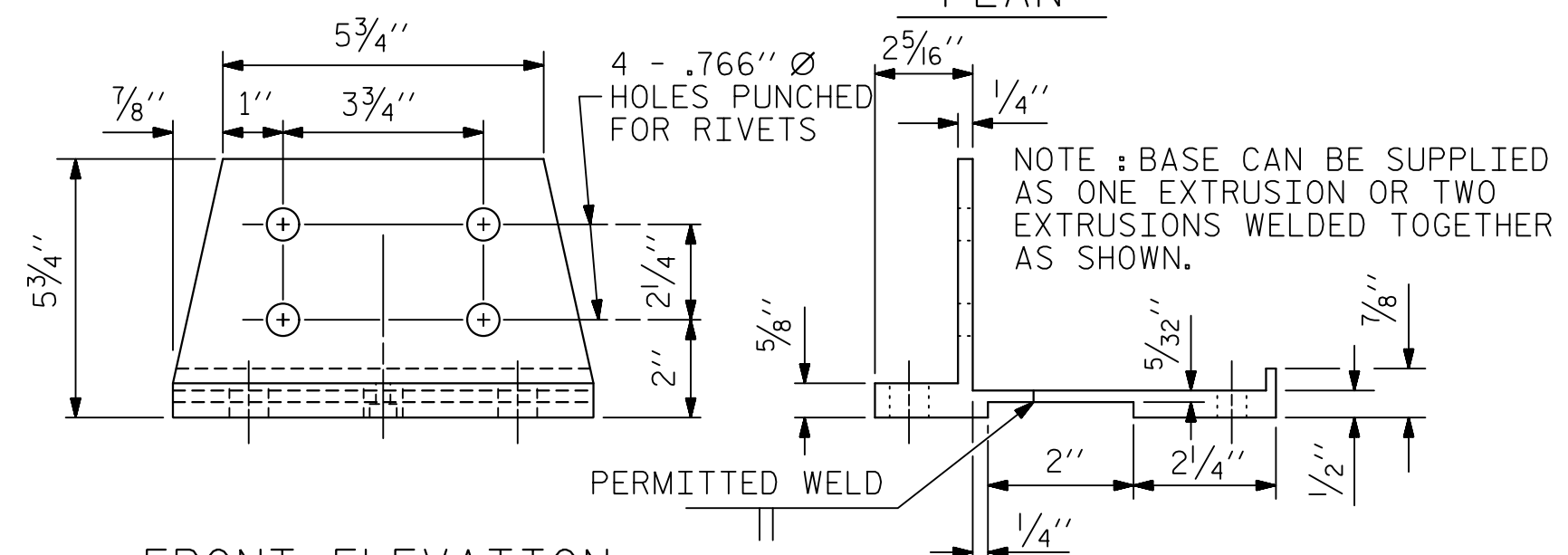
SECTION THRU PARAPET
AND RAIL



RIVET DETAIL



PLAN



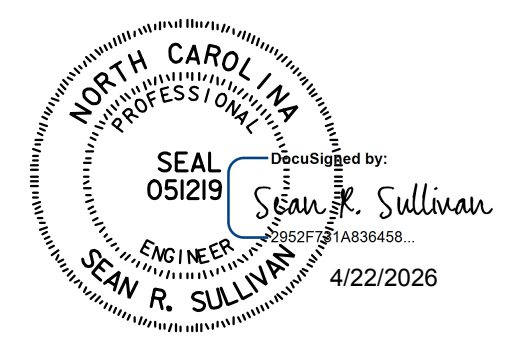
FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS

NOTE : BASE CAN BE SUPPLIED AS ONE EXTRUSION OR TWO EXTRUSIONS WELDED TOGETHER AS SHOWN.

PAY LENGTH = 123.55 LIN. FT.



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 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.

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 STANDARD NO. BMR2.

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.

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-

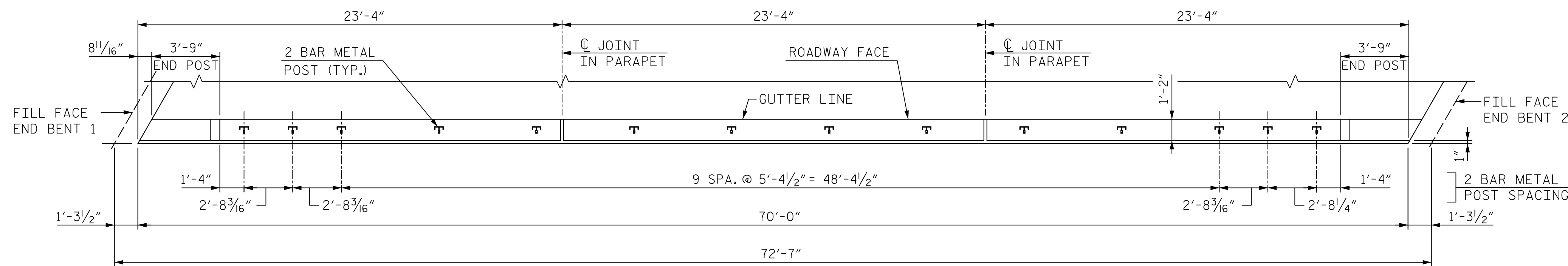
SHEET 1 OF 3

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

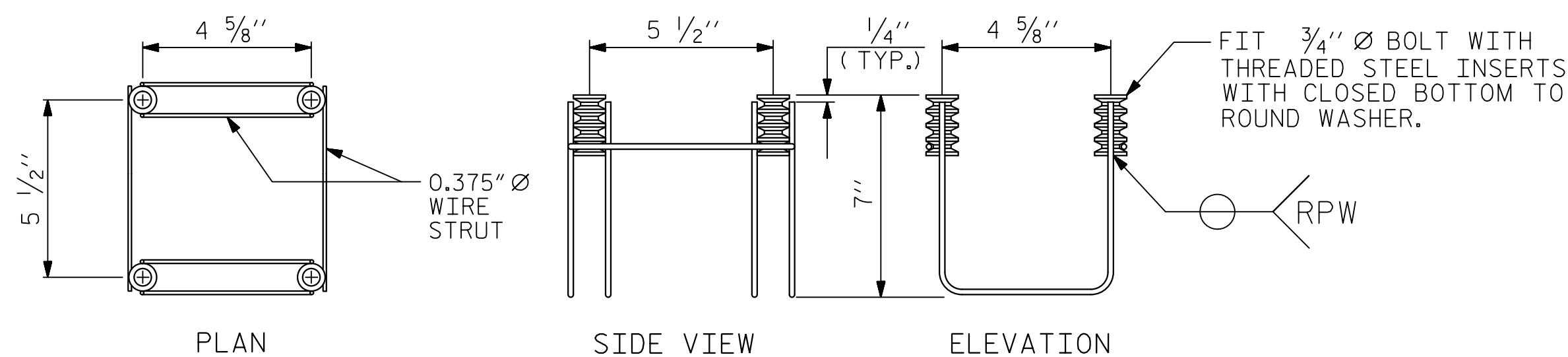
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	
1			3		S-8
2			4		

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1654 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : M. WRIGHT	DATE : 7/23	DWG. NO. 8	
CHECKED BY : S. SULLIVAN	DATE : 7/23		
DESIGN ENGINEER OF RECORD : S. SULLIVAN	DATE : 8/23		

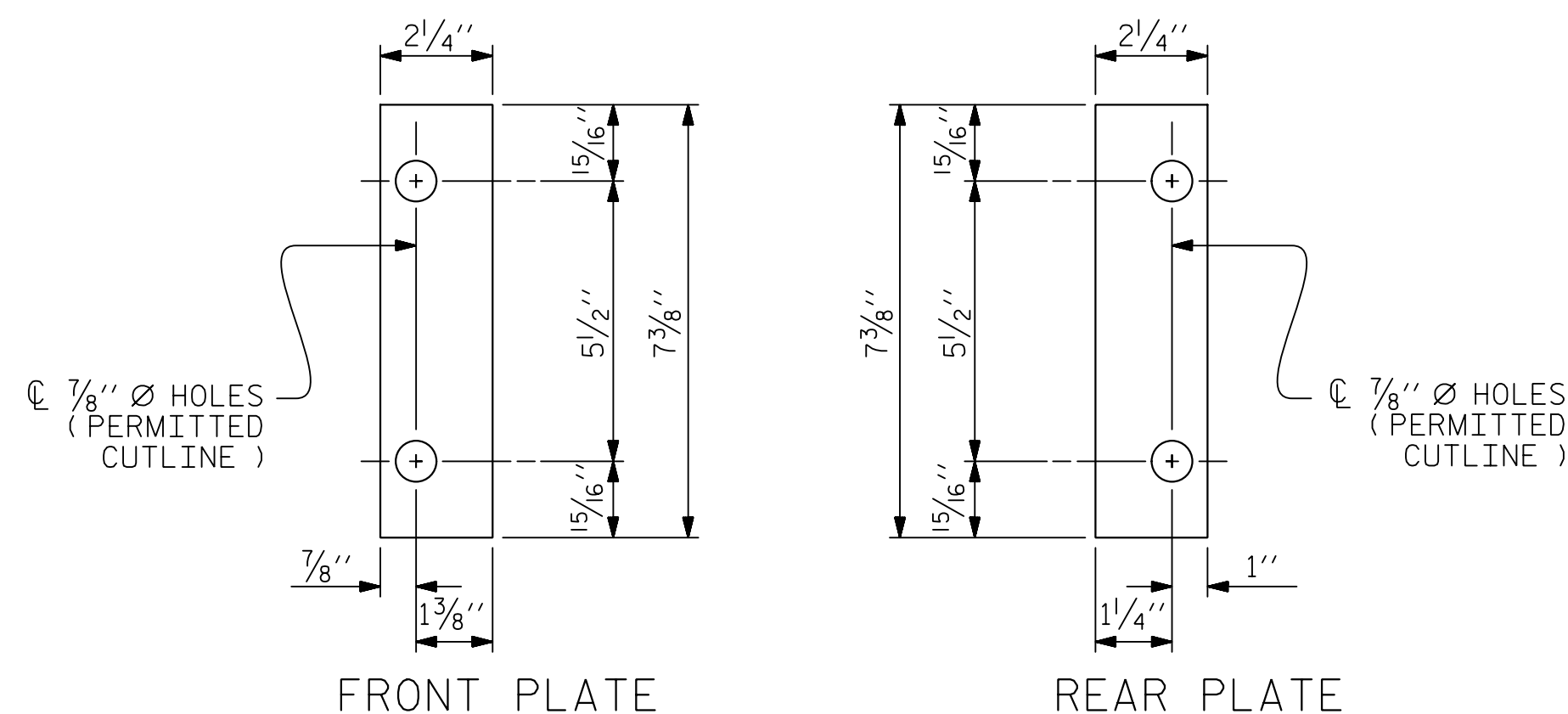
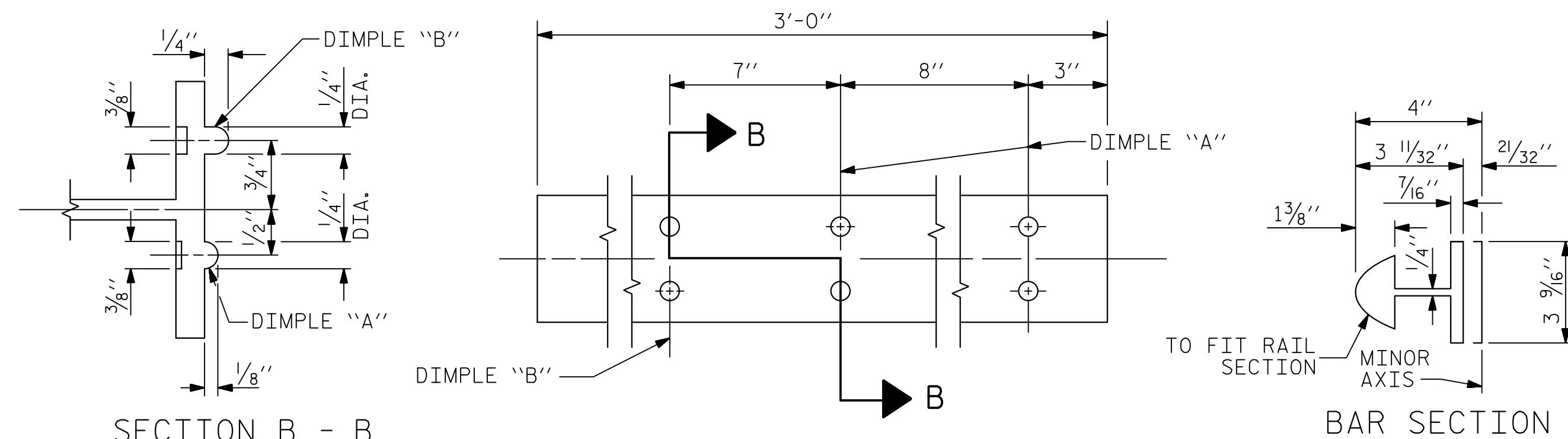
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



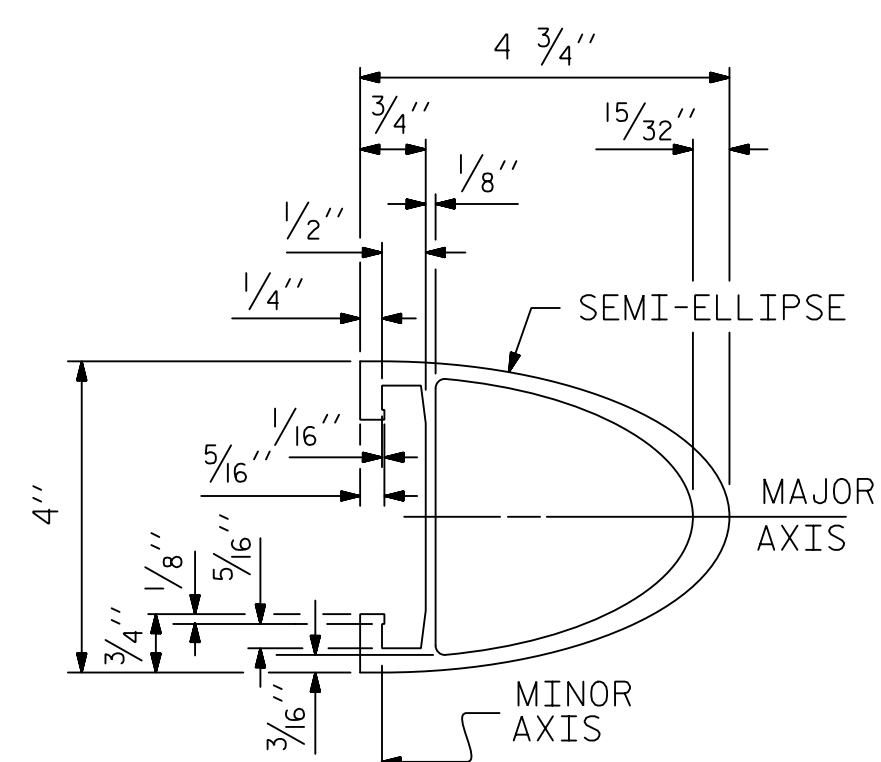
RIGHT SIDE PLAN SHOWN. LEFT SIDE OPPOSITE HAND.



(28 ASSEMBLIES REQUIRED)



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



PROJECT NO. BP7-R017
ORANGE COUNTY
 STATION: 14+53.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO. 5-9
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 17
2			4			

STD. NO. BMR4 (SHT 1)

ASSEMBLED BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23

DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

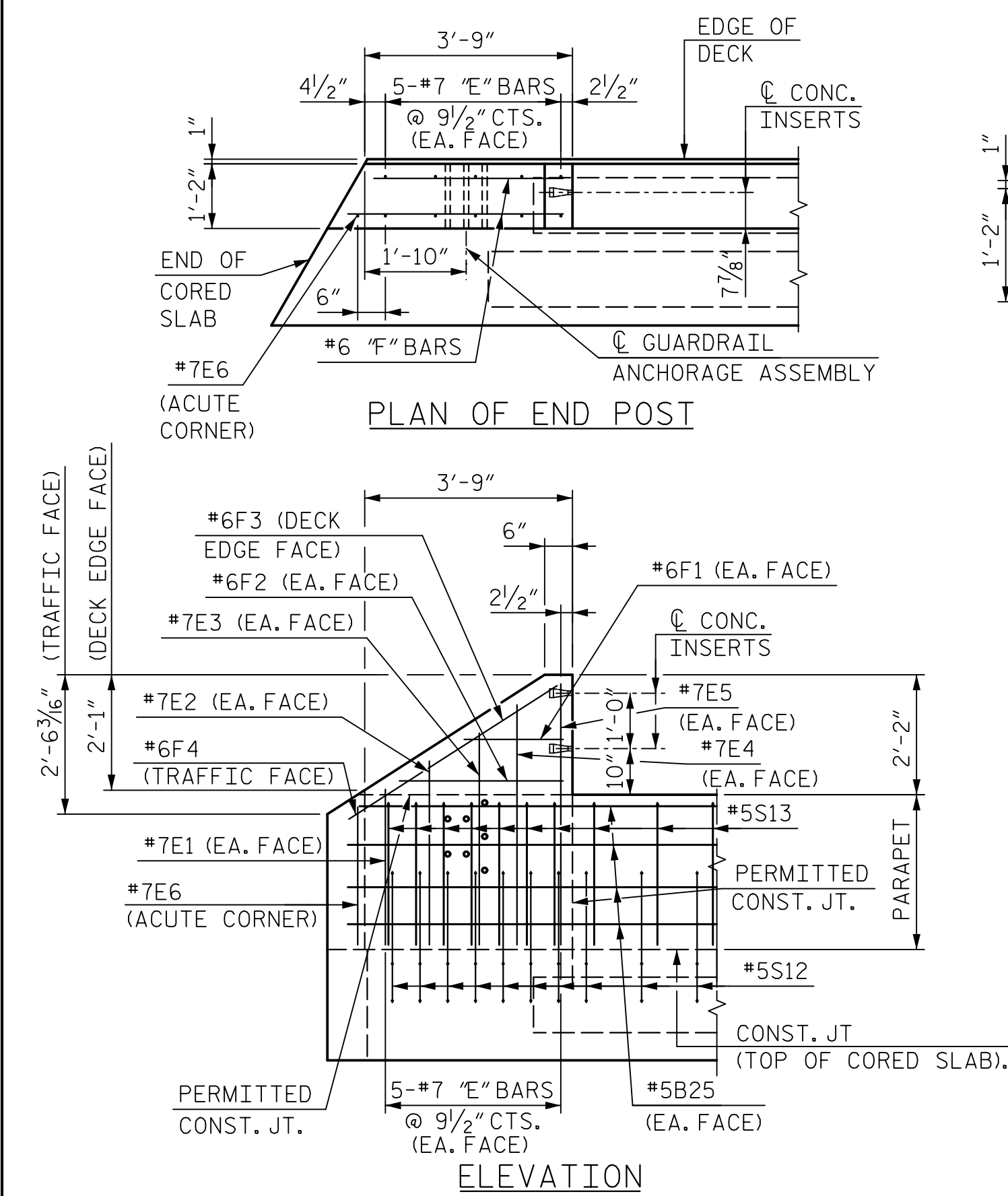
HNTB HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY _____	M. WRIGHT	DATE	7/23
CHECKED BY _____	S. SULLIVAN	DATE	7/23
DESIGN ENGINEER OF RECORD _____	S. SULLIVAN	DATE	8/23

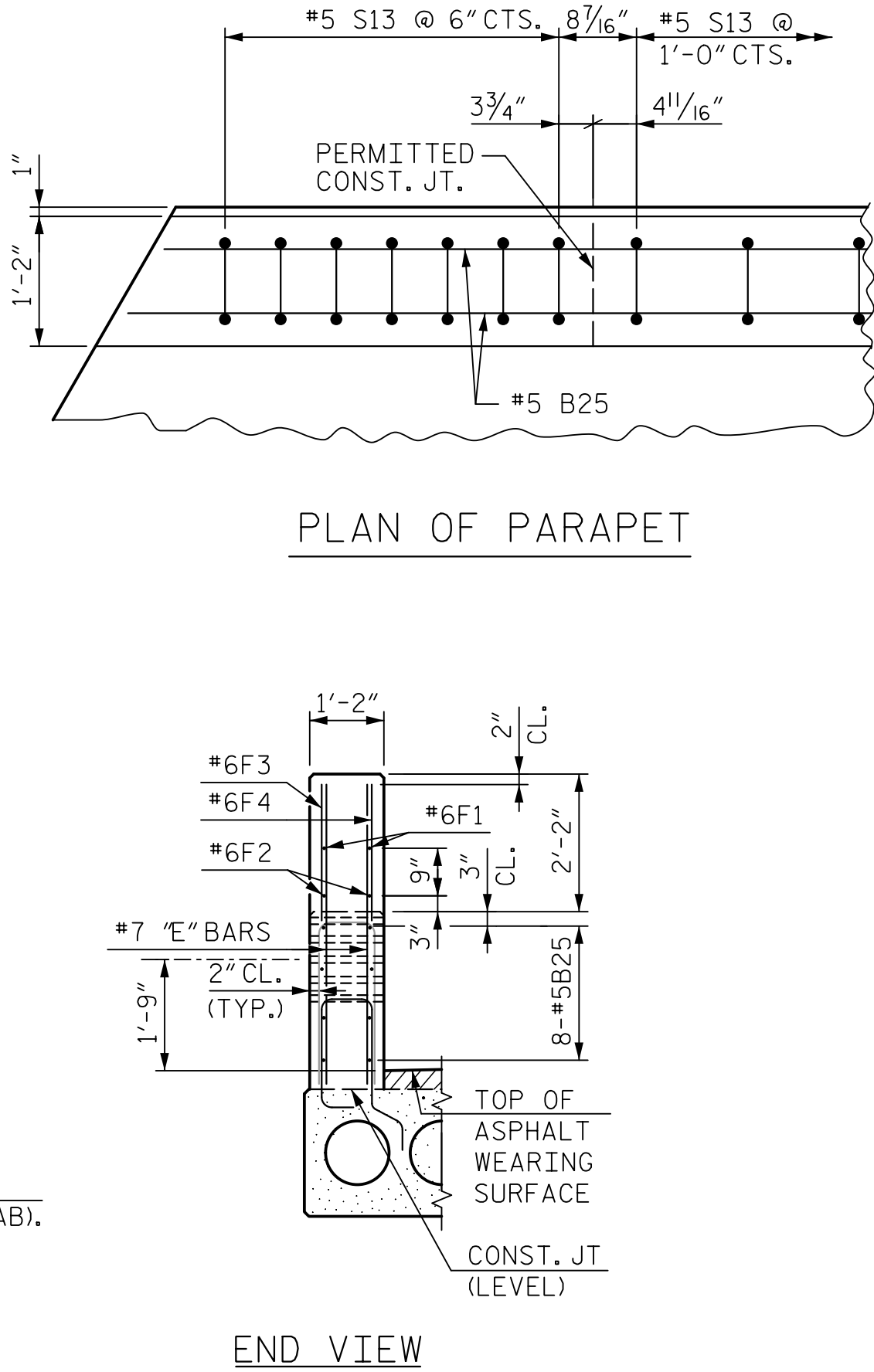
BY	M. WRIGHT	DATE	7/23	DWG. NO. 9
	S. SULLIVAN	DATE	7/23	

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3/17/2026 10:44:49 AM \\RAVING\00\proj\hwy57\6767_2019_East Region_LSC - Division 7\BPT\RO T1.LBR\14_Orange County\Structures\OGN\MO1_019_LBPT\RO T1.LSWL2M\RO3_010_670114.dgn

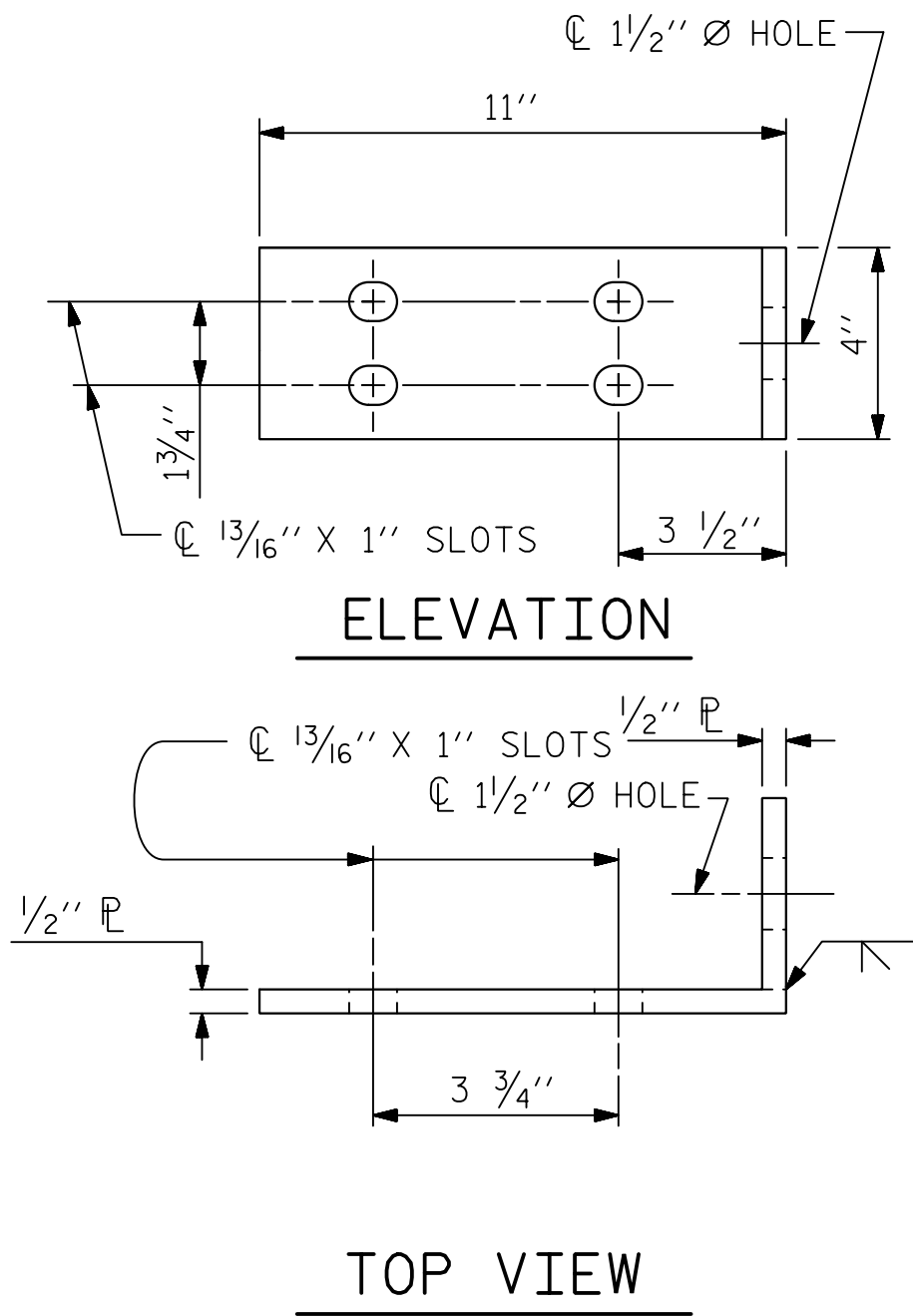


PARAPET AND END POST FOR TWO BAR METAL RAIL

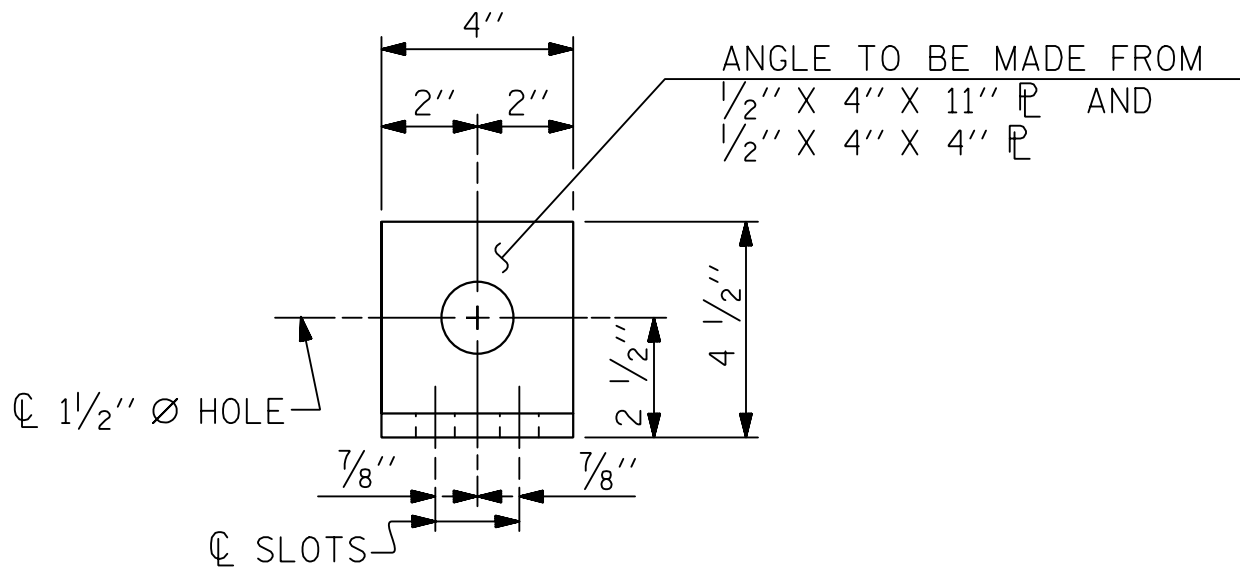


END VIEW

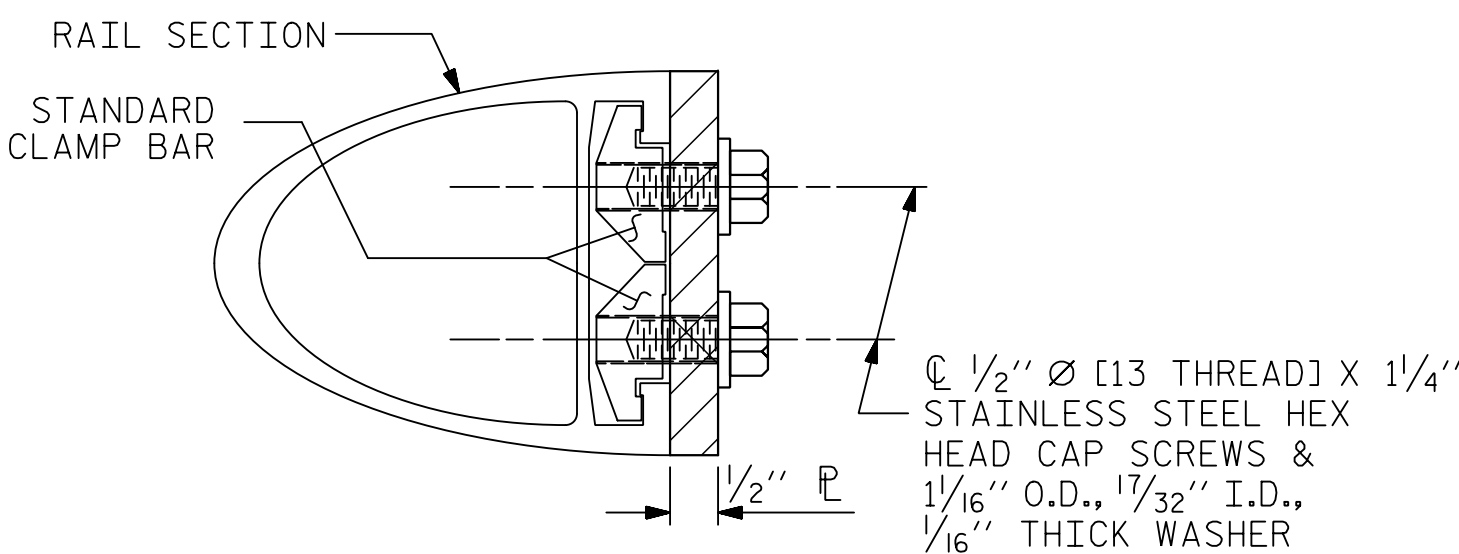
BAR TYPES					
ALL BAR DIMENSIONS ARE OUT TO OUT					
BILL OF MATERIAL FOR PARAPETS & END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B25	96	# 5	STR	13'-8"	1,368
*E1	8	# 7	STR	2'-8"	44
*E2	8	# 7	STR	3'-2"	52
*E3	8	# 7	STR	3'-8"	60
*E4	8	# 7	STR	4'-2"	68
*E5	8	# 7	STR	4'-6"	74
*E6	4	# 7	STR	2'-3"	18
*F1	8	# 6	STR	1'-9"	21
*F2	8	# 6	STR	2'-11"	35
*F3	4	# 6	STR	3'-10"	23
*F4	4	# 6	STR	4'-2"	25
*S13	154	#5	1	5'-8"	910
*EPOXY COATED REINFORCING STEEL					LBS. 2,698
CLASS AA CONCRETE					CU. YDS. 18.0
TOTAL LIN. FT. OF 1'-2" x 2'-9 1/2" CONCRETE PARAPET					140.00'



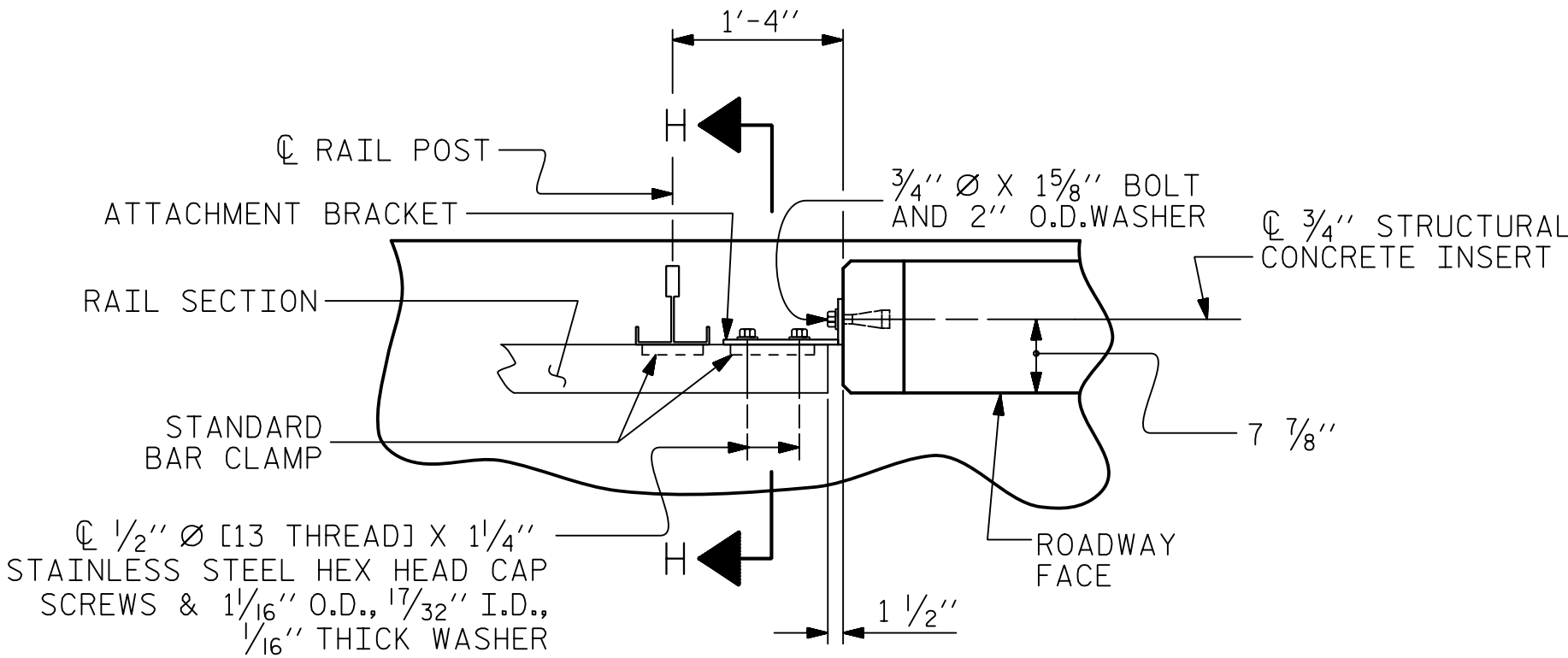
TOP VIEW



END VIEW (FIX AND EXP.)



SECTION H-H (FIX)



PLAN - RAIL AND 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 1/2".
- 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 3/16" 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:

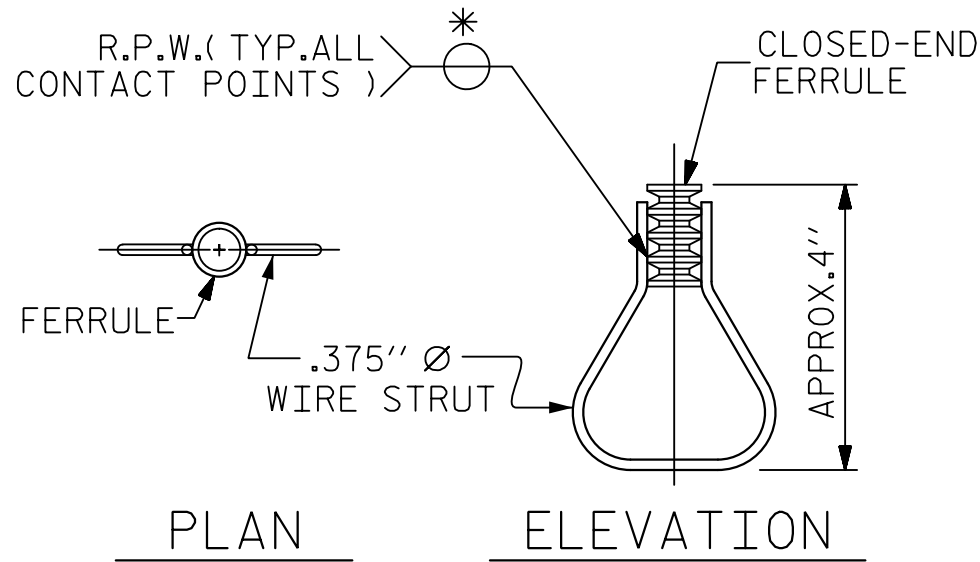
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. 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 SHEET 2 OF 3).
- 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.



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-

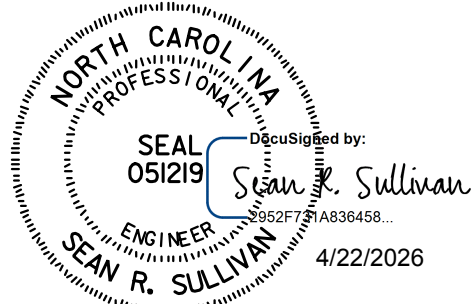
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
END OF RAIL AND
POST DETAILS
FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO. S-10
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS
2			4			17

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1654 343 E. Six Forks Rd., Suite 200, Raleigh, NC 27609	
DRAWN BY	M. WRIGHT	DATE	7/23
CHECKED BY	S. SULLIVAN	DATE	7/23
DESIGN ENGINEER OF RECORD	S. SULLIVAN	DATE	8/23

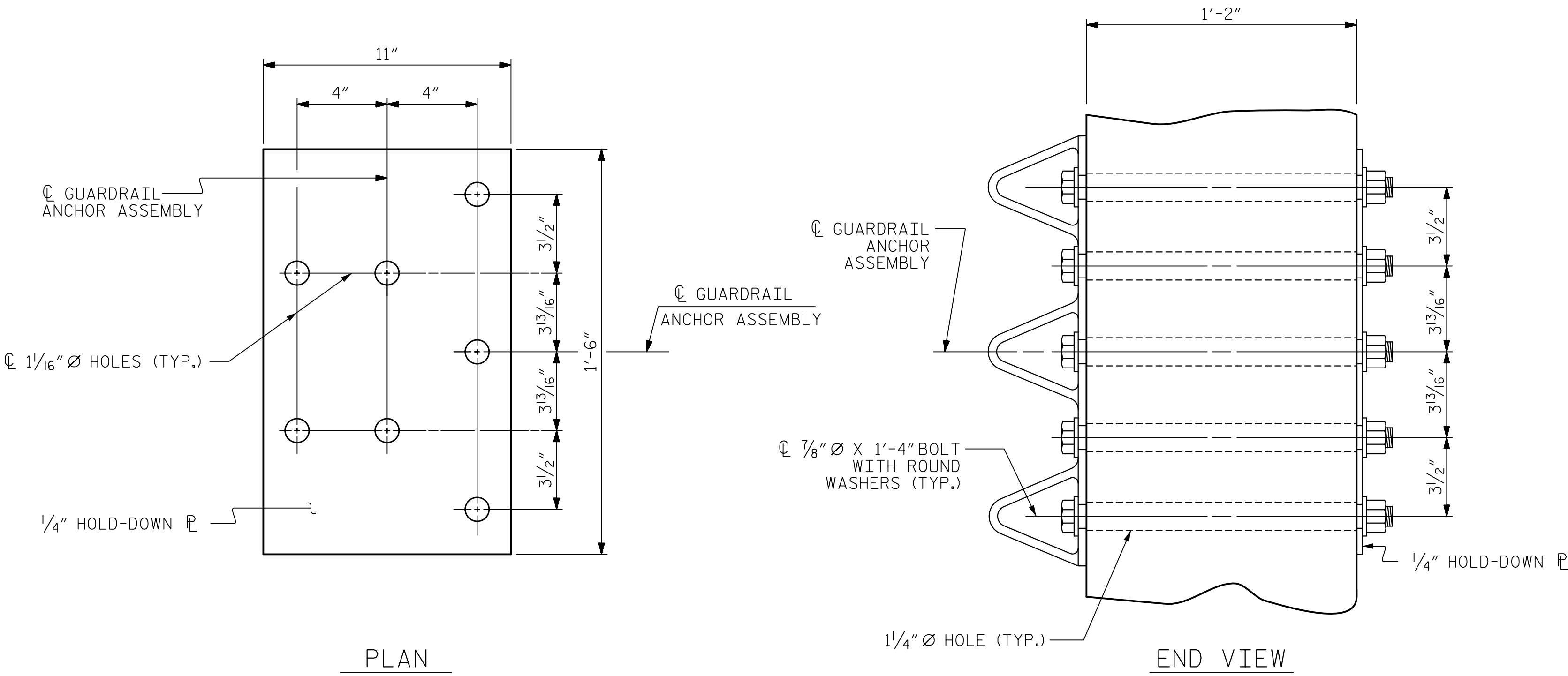


STD. NO. BMR2	
ASSEMBLED BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23
DRAWN BY : FCJ 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

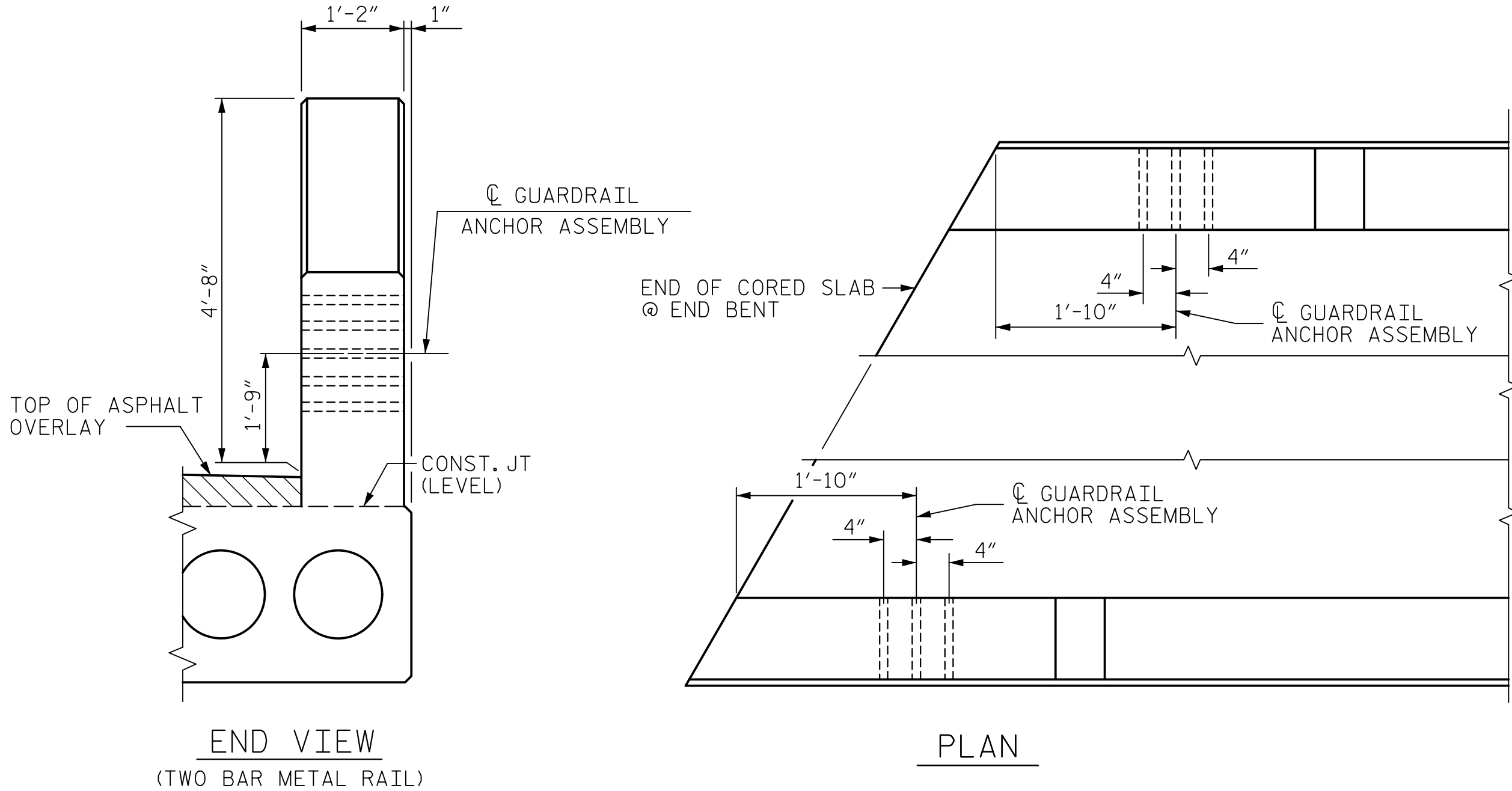
FIXED

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UNLESS ALL SIGNATURES COMPLETED

DWG. NO. 10



GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF GUARDRAIL ANCHOR AT END POST

NOTES (FOR METAL RAILS)

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.

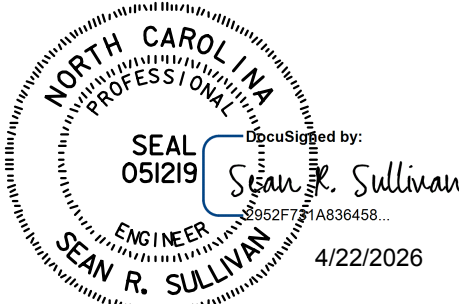
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-



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

STD. NO. GRA3			
ASSEMBLED BY : M. WRIGHT		DATE : 7/23	
CHECKED BY : S. SULLIVAN		DATE : 7/23	
DRAWN BY : MAA	5/10	REV. 1/15	MAA/TMG
CHECKED BY : CM	5/10	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC

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HNTB HNTB NORTH CAROLINA, P.C. NC License No. C-1654 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609			
DRAWN BY : M. WRIGHT	DATE : 7/23	DWG. NO. II	
CHECKED BY : S. SULLIVAN	DATE : 7/23		
DESIGN ENGINEER OF RECORD : S. SULLIVAN	DATE : 8/23		

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

SHEET NO. S-11
TOTAL SHEETS 17

NOTES

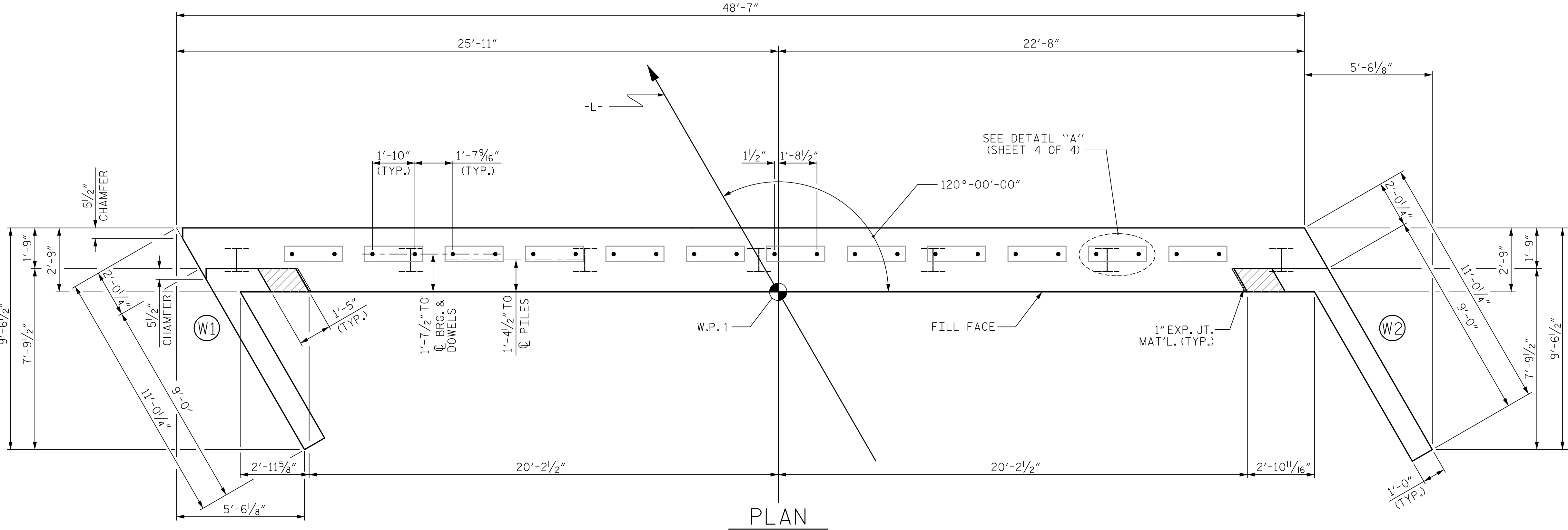
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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.

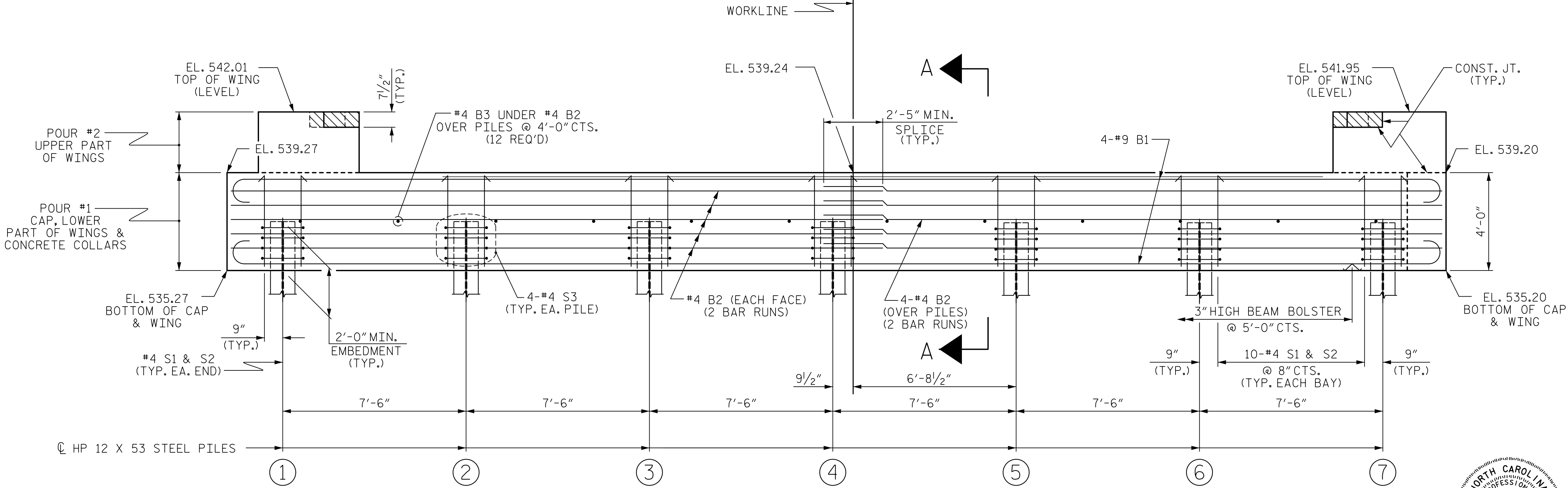
FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

FOR TOP OF PILE ELEVATIONS, SEE "PILE FOUNDATION TABLES" SHEET.



PLAN



ELEVATION

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.

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 1

STD. NO. EB-36-120S4

ASSEMBLED BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23
DRAWN BY : WJH 12/II	REV. 4/15
CHECKED BY : AAC 12/II	MAA/TMG

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UNLESS ALL SIGNATURES COMPLETED

HNTB

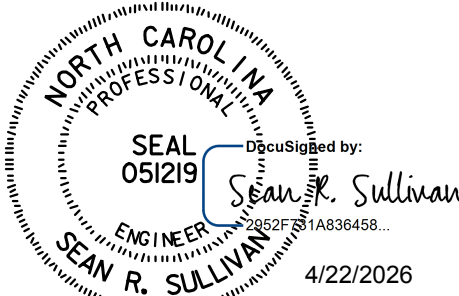
HNTB NORTH CAROLINA, P.C.
NC License No. C-1654
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23
DESIGN ENGINEER OF RECORD : S. SULLIVAN	DATE : 8/23

DWG. NO. 12

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

SHEET NO.	S-12
TOTAL SHEETS	17





Technical drawing showing the cross-section and plan view of a wing structure, likely a bridge or pier, supported by steel piles.

Plan View (Bottom):

- Structure is supported by **HP 12 X 53 STEEL PILES**.
- Section line **A-A** is indicated.
- Dimensions between pile locations (1 to 7): **7'-6"** (each bay).
- Dimensions from pile 1 to wing face: **9" (TYP.)** and **10'-#4 S1 & S2 @ 8" CTS. (TYP. EACH BAY)**.
- Dimensions from pile 7 to wing face: **9" (TYP.)** and **#4 S1 & S2 (TYP. EA. END)**.
- Wing width: **4'-0" (MIN.)**.

Cross-Section Details (Top):

- Left Section (Elevations):**
 - EL. 539.48 (Top of Wing Level)
 - EL. 535.47 (Bottom of Cap & Wing)
- Right Section (Elevations):**
 - EL. 542.17 (Top of Wing Level)
 - EL. 539.41 (Bottom of Cap & Wing)

Reinforcement and Structural Details:

- Wing:** 4'-#9 B1 (Top), 4'-#4 B2 (OVER PILES) (2 BAR RUNS) (Bottom).
- Cap:** 4'-#4 B2 (OVER PILES) (2 BAR RUNS) (Top), 4'-#4 S3 (TYP. EA. PILE) (Bottom).
- Embedment:** 2'-0" MIN. EMBEDMENT (TYP.)
- Splice:** 2'-5" MIN. SPLICE (TYP.)
- Reinforcement:** #4 B3 UNDER #4 B2 OVER PILES @ 4'-0" CTS. (12 REQ'D).
- Concrete:** POUR #2 UPPER PART OF WINGS, POUR #1 CAP, LOWER PART OF WINGS & CONCRETE COLLARS.
- Other Details:** 3" HIGH BEAM BOLSTER @ 5'-0" CTS., 7/2" (TYP.) (Vertical dimension), 9" (TYP.) (Horizontal dimension).

ELEVATION

NORTH CAROLINA
 PROFESSIONAL
 SEAL
 051219
 ENGINEER
 SEAN R. SULLIVAN
 1A836458
 4/22/2026

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 4 OF 4.						
FOR WING DETAILS, SEE SHEET 3 OF 4.						
FOR TOP OF PILE ELEVATIONS, SEE "PILE FOUNDATION TABLES" SHEET.						
PROJECT NO. <u>BP7-R017</u>						
<u>ORANGE</u> COUNTY						
STATION: <u>14+53.00 -L-</u>						
SHEET 2 OF 4						
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE END BENT No. 2						
<i>REVISIONS</i>						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-13
1			3			TOTAL SHEETS
2			4			17



SHEET 3 OF 4

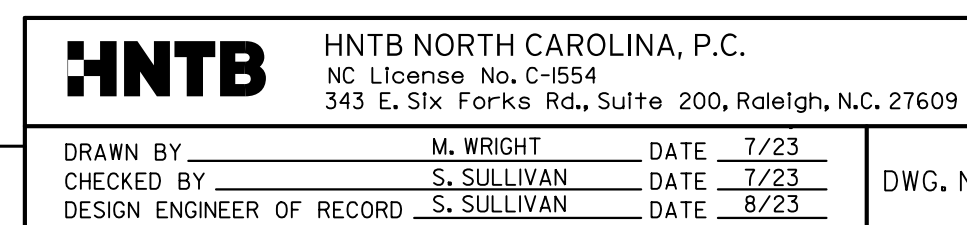
SUBSTRUCTURE
END BENT
WING DETAILS

REVISONS						SHEET NO. S-14
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 17
2			4			

ASSEMBLED BY : M. WRIGHT		DATE : 7/23	
CHECKED BY : S. SULLIVAN		DATE : 7/23	
DRAWN BY : WJH 12/11		REV. 4/15	MAA/TMG
CHECKED BY : AAC 12/11			

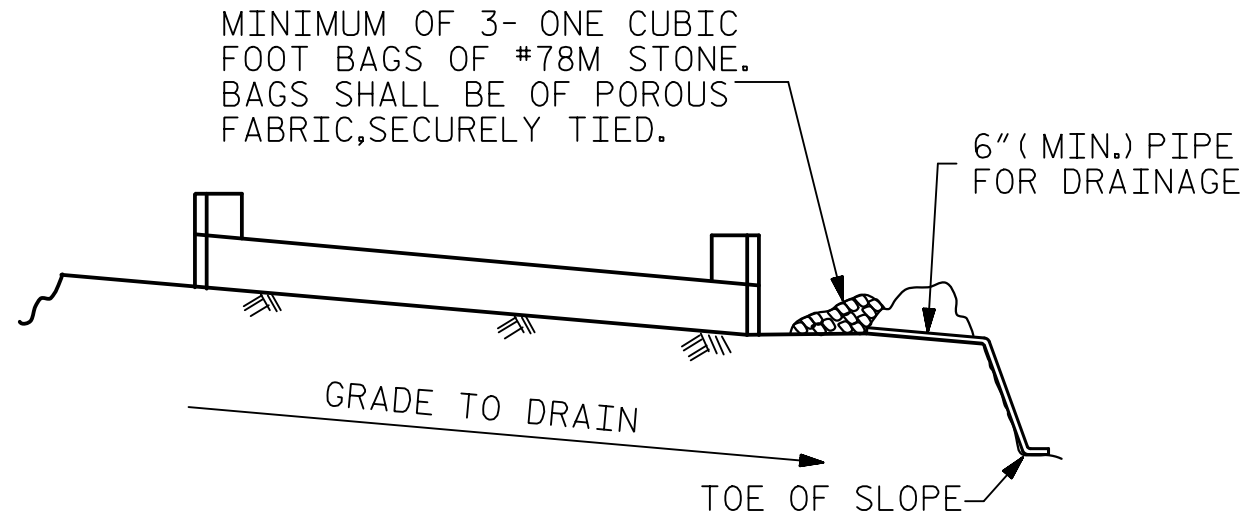
WING DETAILS

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UNLESS ALL SIGNATURES COMPLETED**



DWG. NO. 14

3/17/2026 10:46:28 AM \\RAVINO\coro\hds\76767 2019 East Region LSC - Division 7\BP7\RO T1 - LBR 114_Orange County\Structures\CON\MO1_029_BP7\RO T1 - SWI_E04_015.G0114.dgn

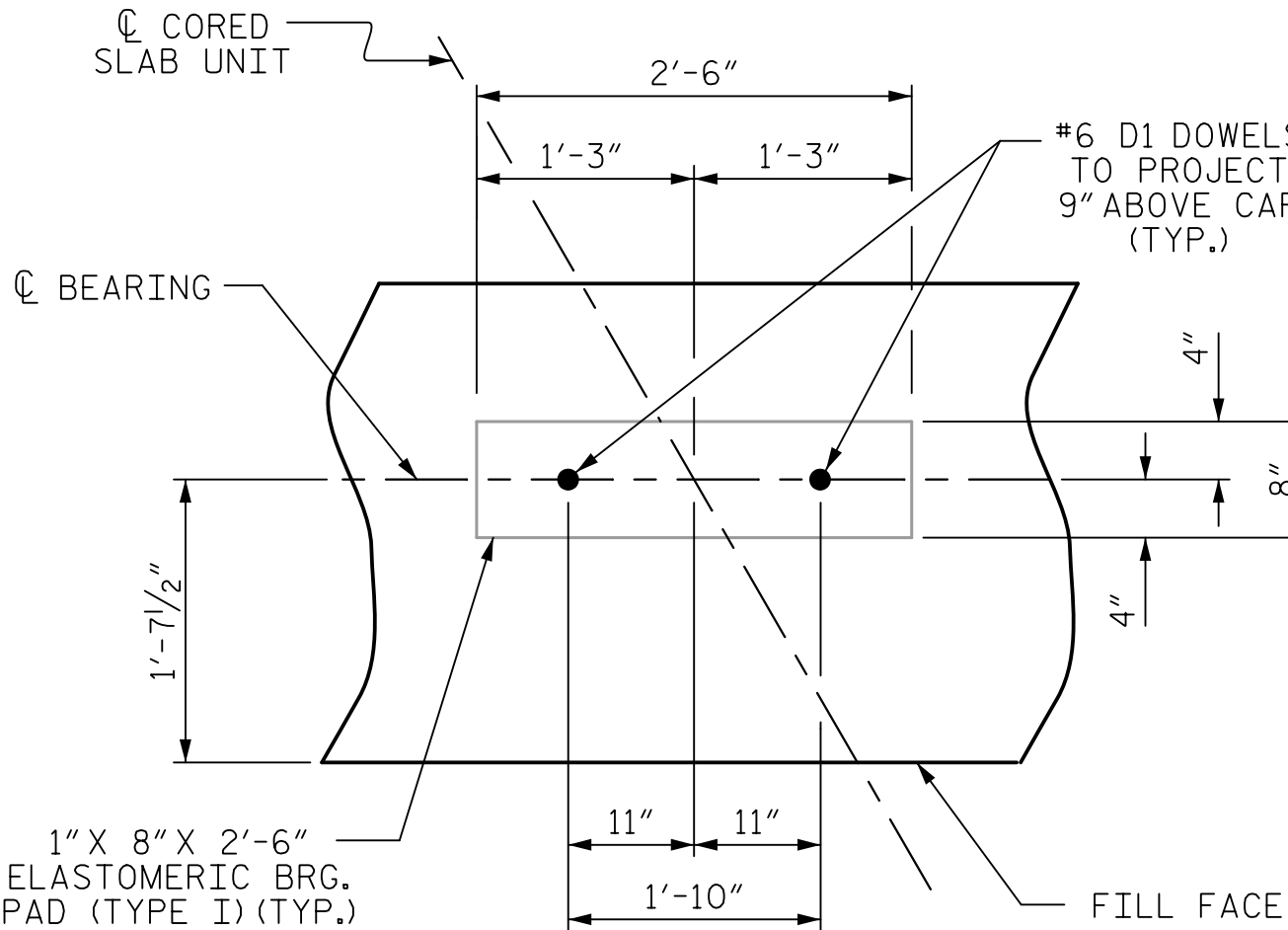


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

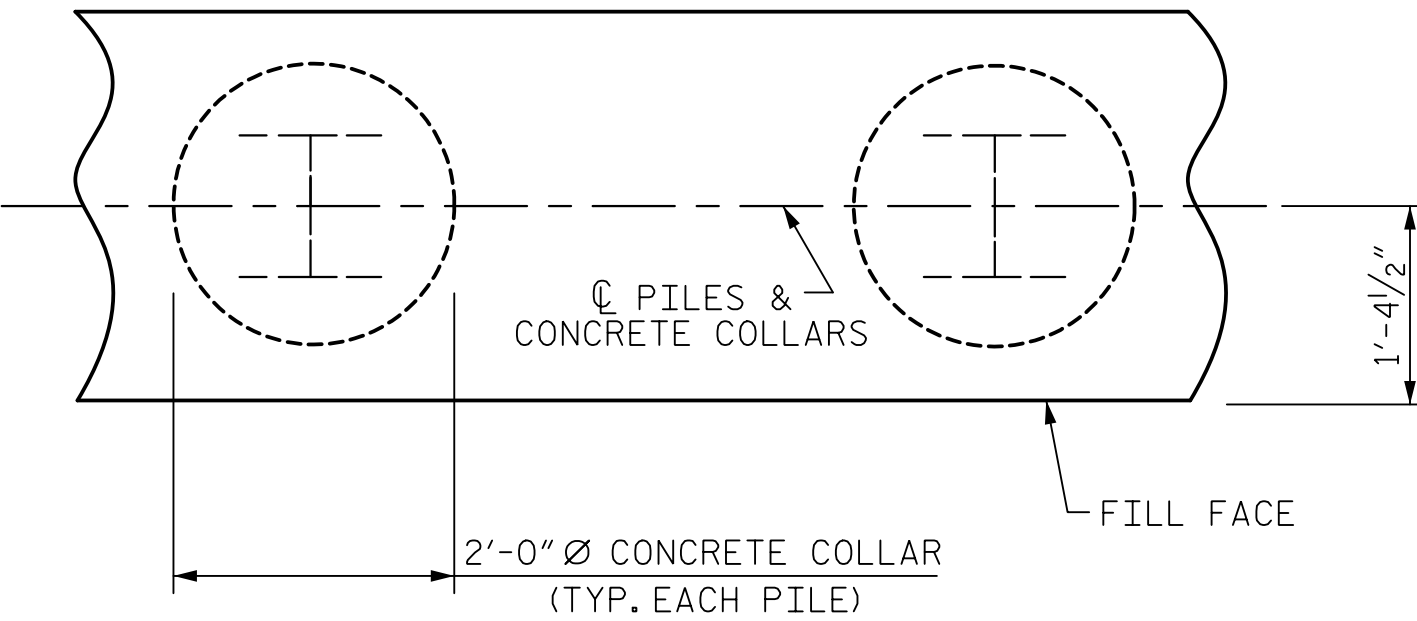
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

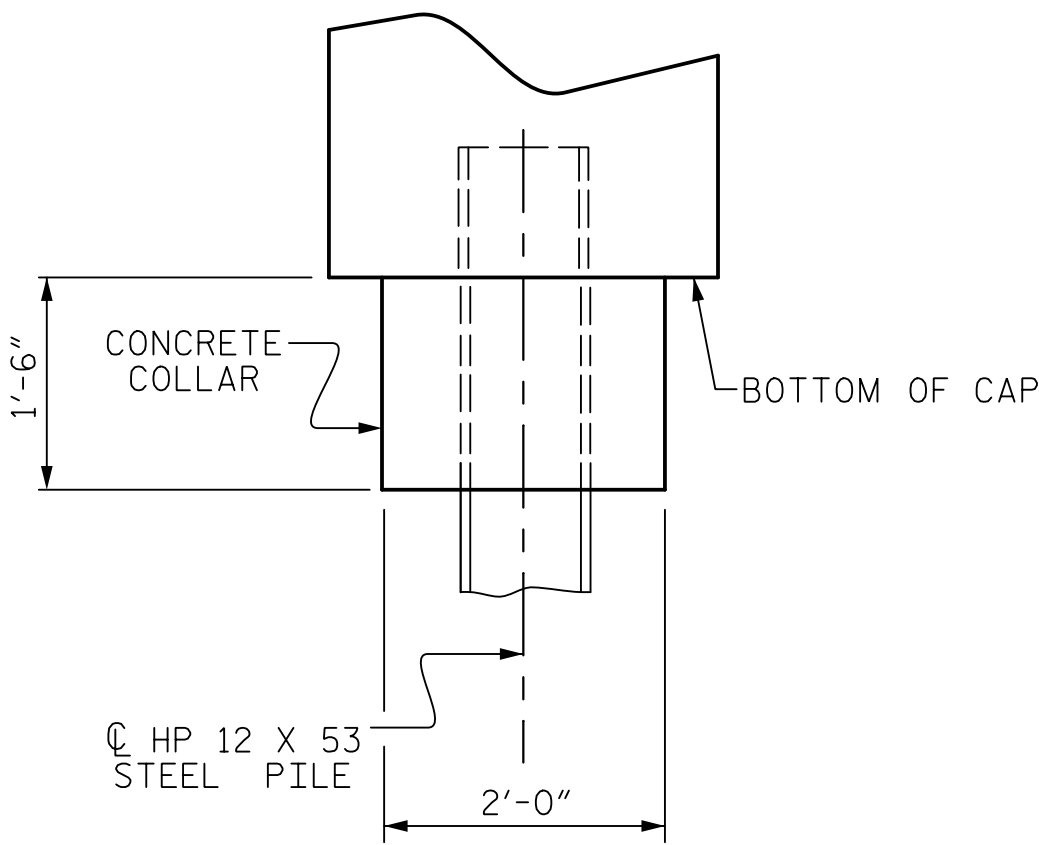


DETAIL "A"

(END BENT No.1 SHOWN, END BENT No.2 SIMILAR BY ROTATION)



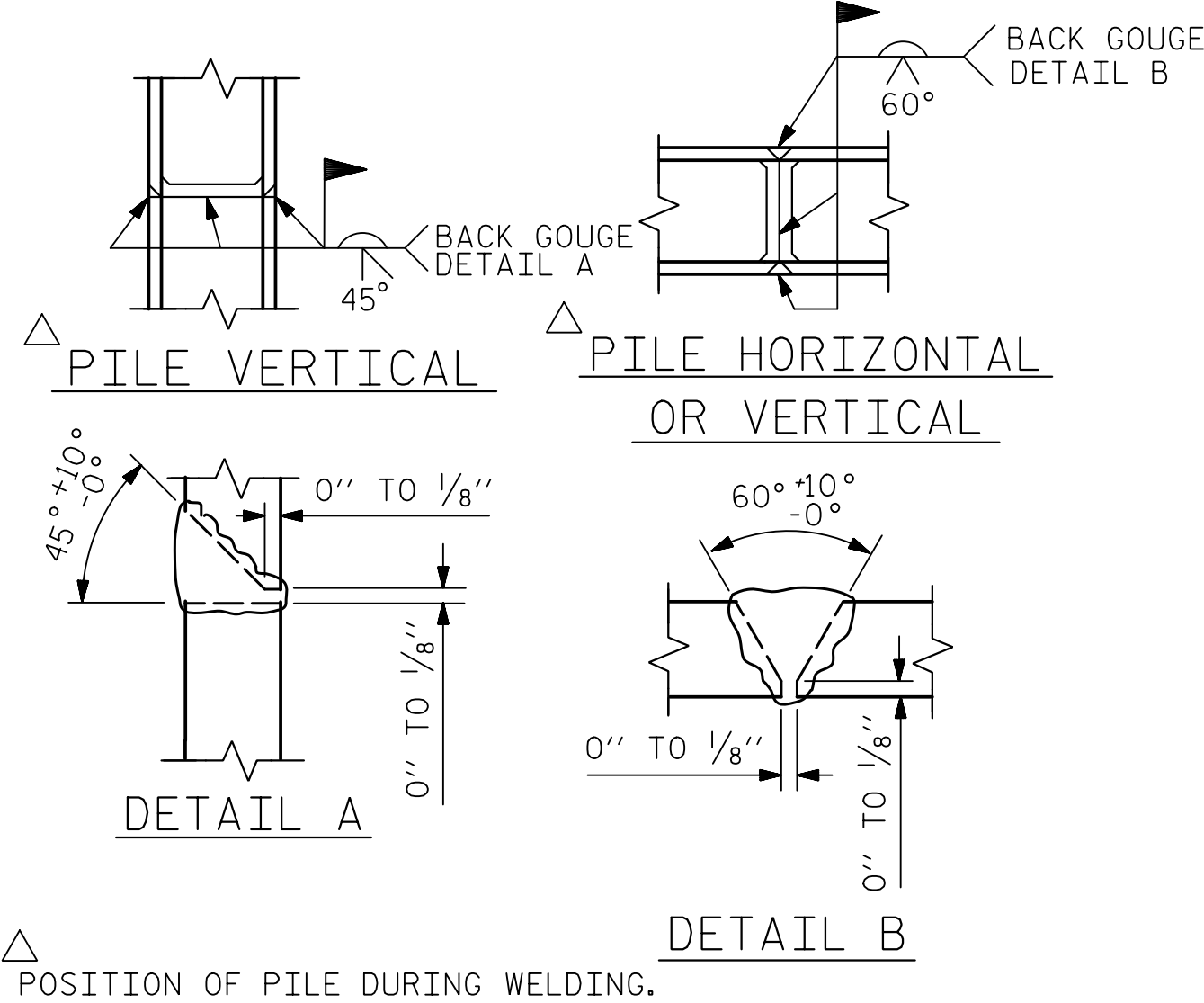
PLAN



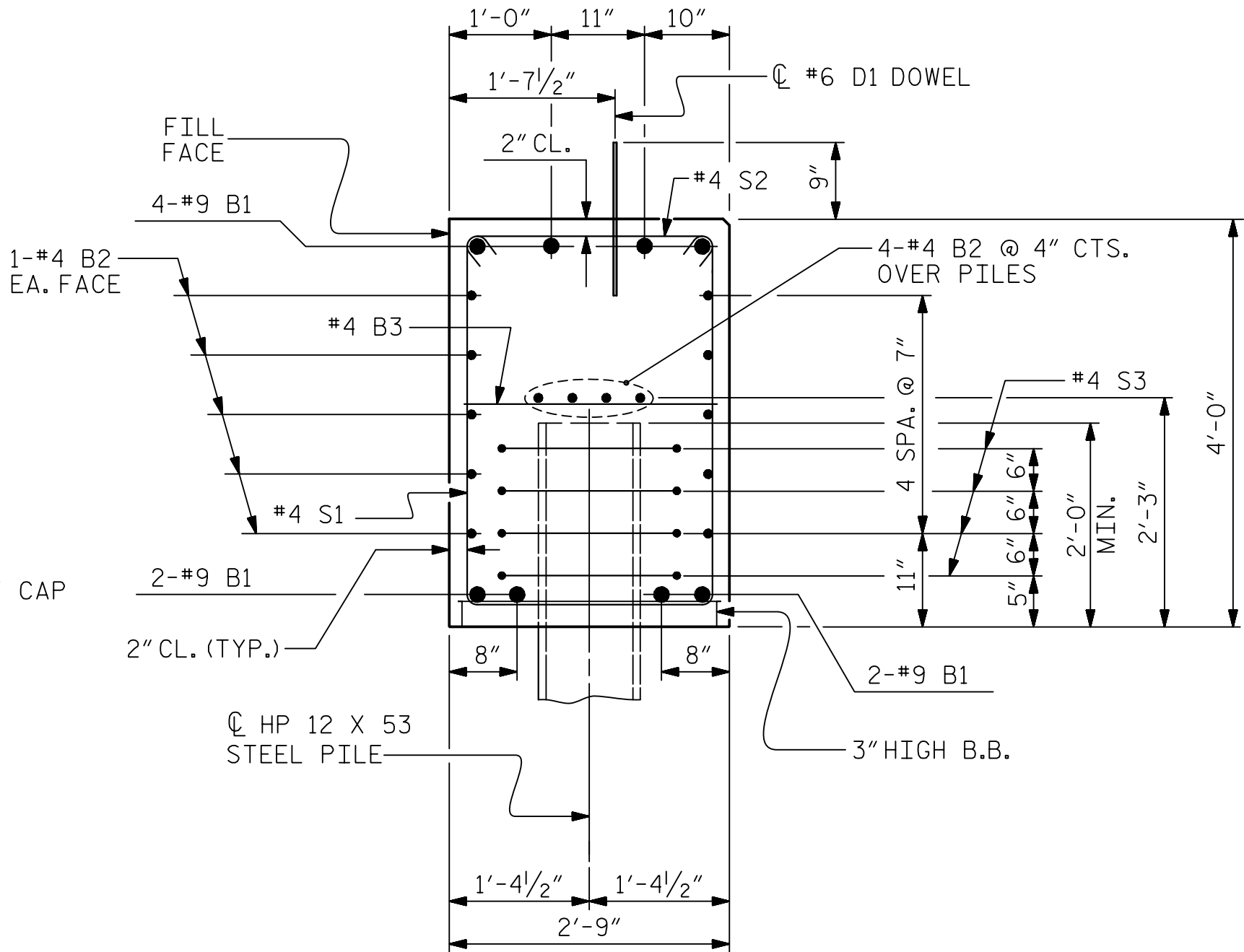
ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No.1 SHOWN, END BENT No.2 SIMILAR BY ROTATION)

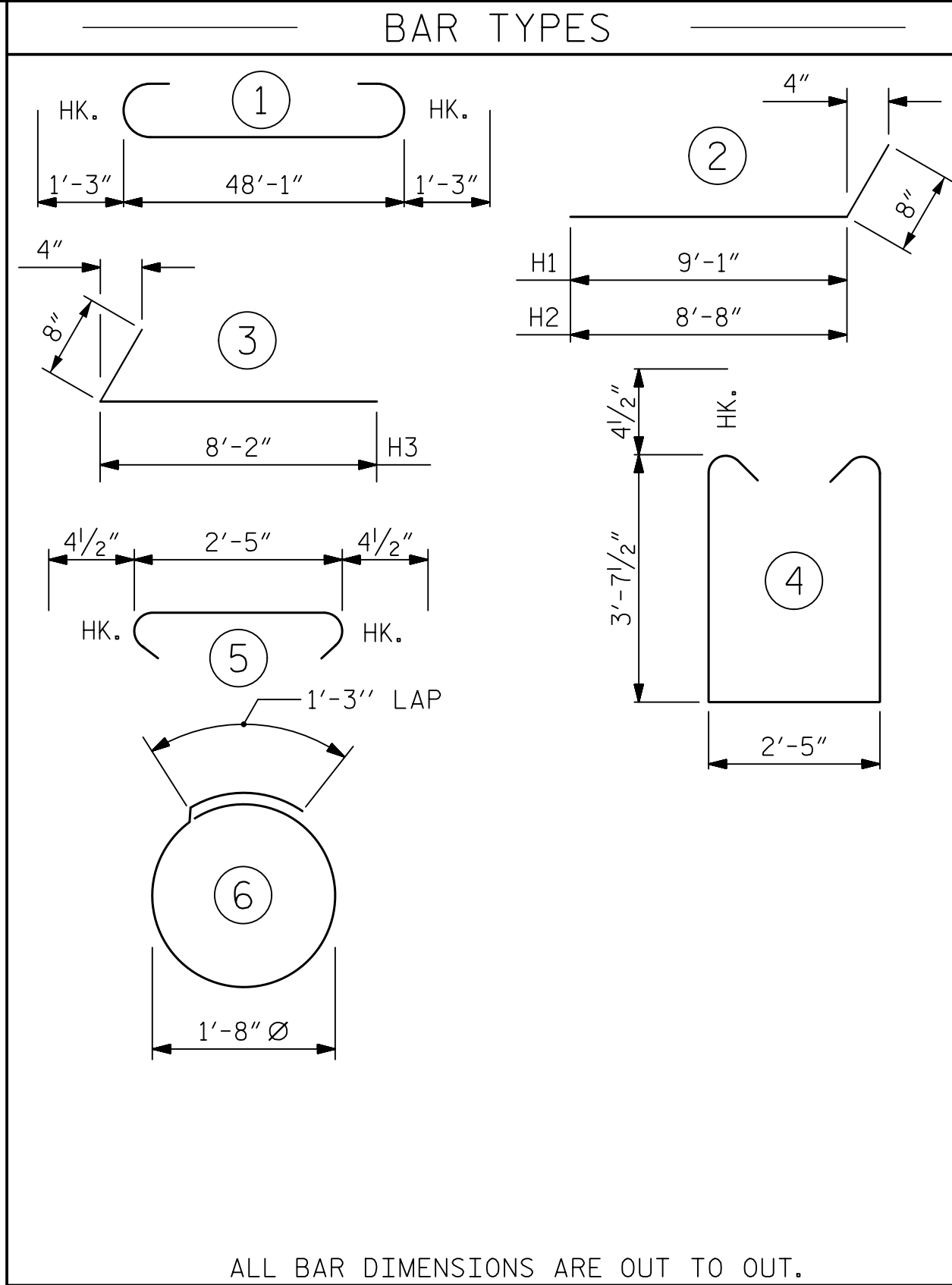


PILE SPLICE DETAILS



SECTION A-A

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



BILL OF MATERIAL FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	50'-7"	1376
B2	28	#4	STR	25'-4"	474
B3	12	#4	STR	2'-5"	19
D1	24	#6	STR	1'-6"	54
H1	10	#4	2	9'-9"	65
H2	10	#4	2	9'-4"	62
H3	20	#4	3	8'-10"	118
K1	16	#4	STR	3'-5"	37
S1	62	#4	4	10'-5"	431
S2	62	#4	5	3'-2"	131
S3	28	#4	6	6'-6"	122
V1	53	#4	STR	6'-2"	218
REINFORCING STEEL (FOR ONE END BENT)					3,107 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					23.3 C.Y.
POUR #2 UPPER PART OF WINGS					2.4 C.Y.
TOTAL CLASS A CONCRETE					25.7 C.Y.

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No.1 & 2
DETAILS

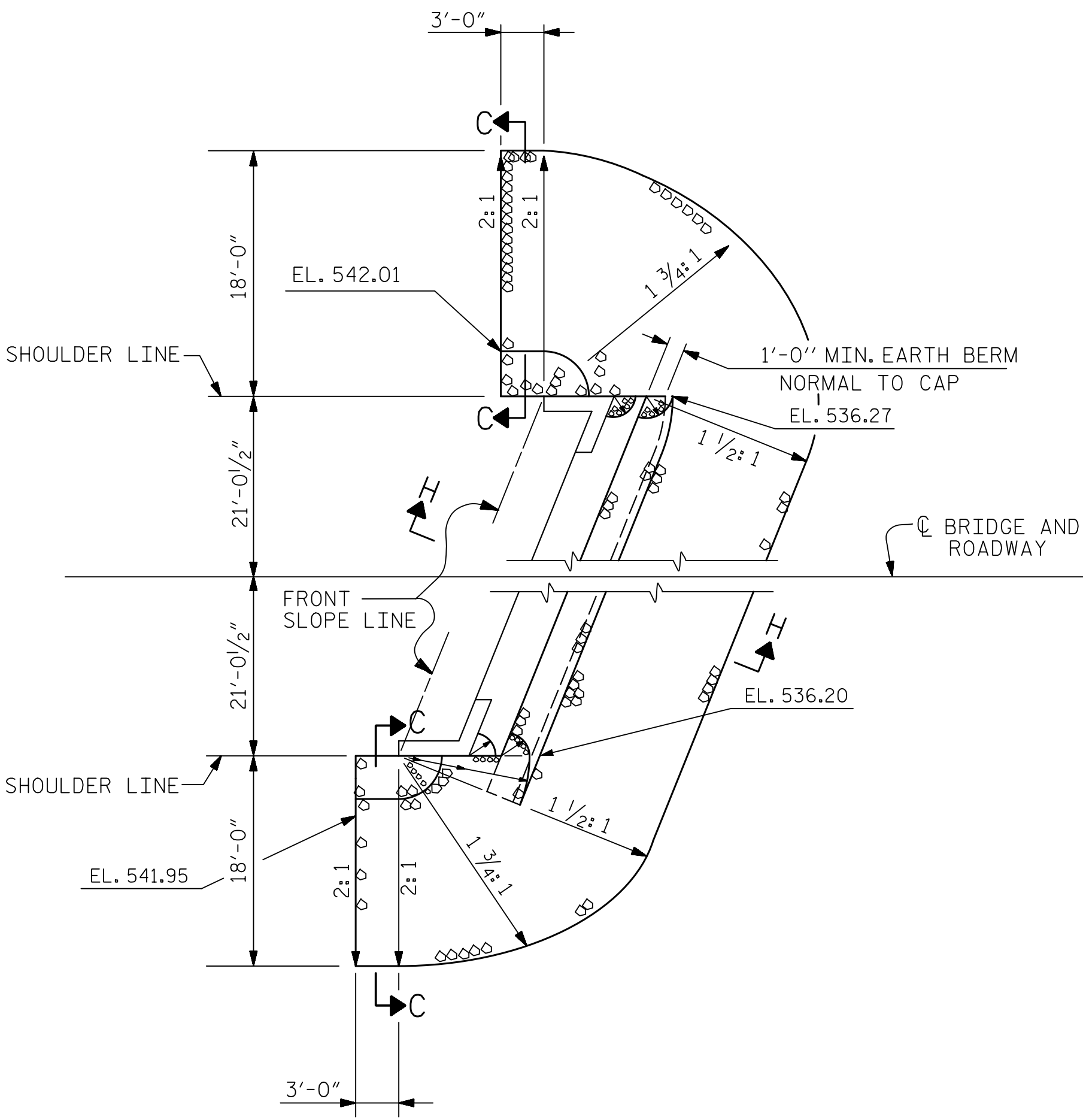
REVISIONS					SHEET NO. S-15
NO.	BY	DATE	NO.	BY	
1			3		TOTAL SHEETS
2			4		17

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1654 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY _____	M. WRIGHT	DATE 7/23	DWG. NO. 15
CHECKED BY _____	S. SULLIVAN	DATE 7/23	
DESIGN ENGINEER OF RECORD _____	S. SULLIVAN	DATE 8/23	

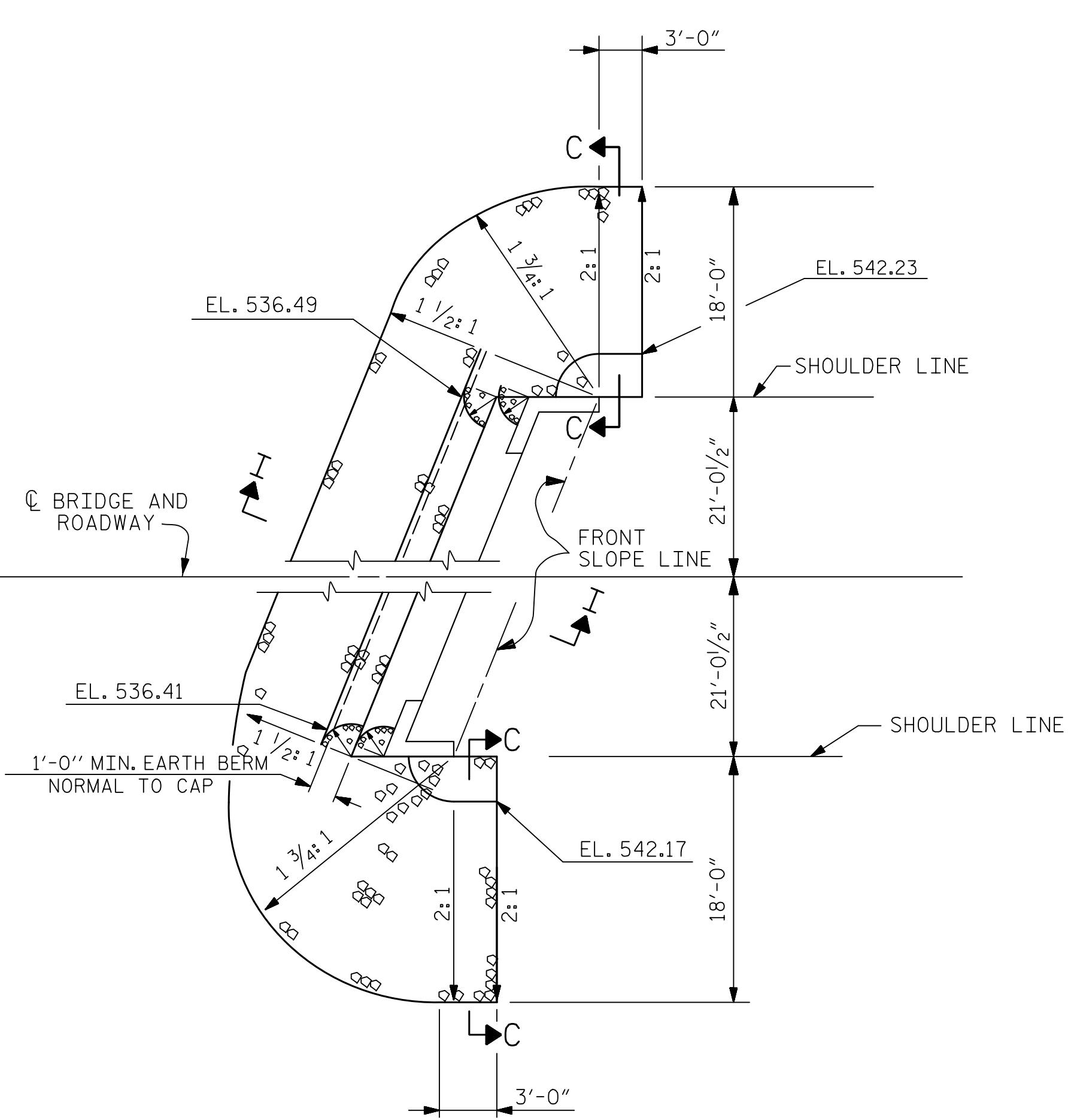
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

STD. NO. EB_36_120S4	
ASSEMBLED BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23
DRAWN BY : WJH 12/11	REV. 4/17 MAA/THC
CHECKED BY : AAC 12/11	

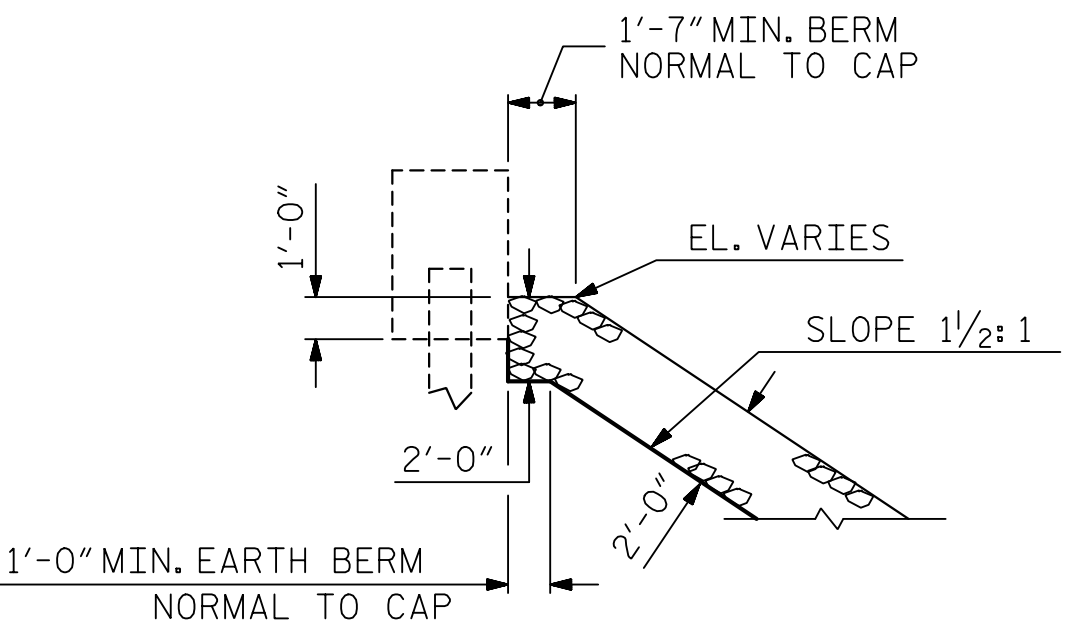
NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



AT END BENT 1

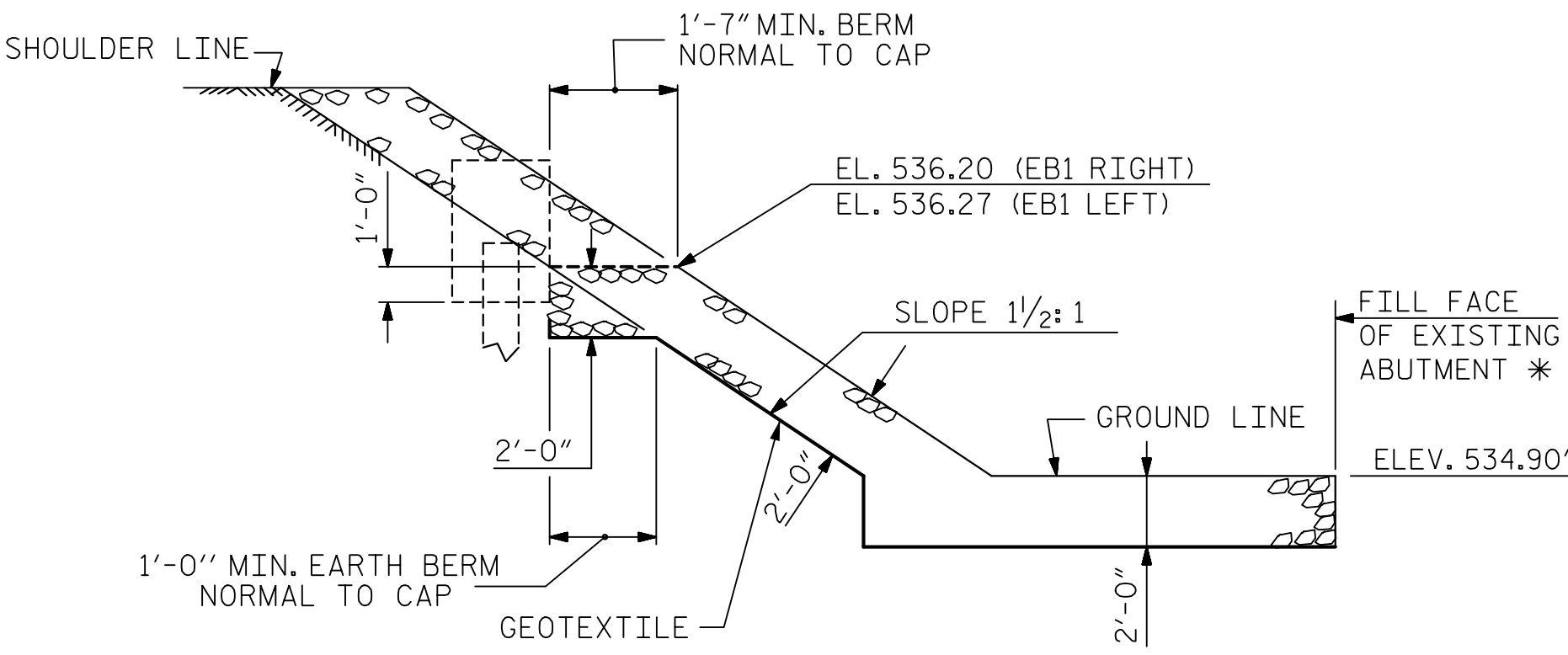


AT END BENT 2

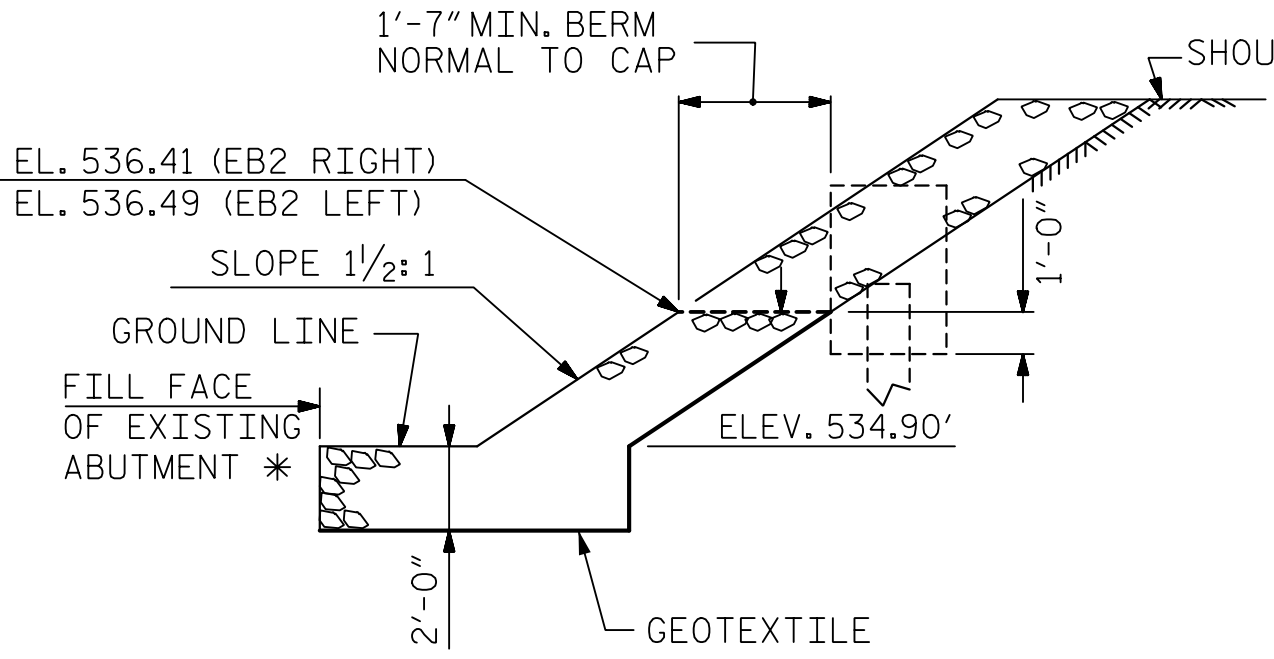


SECTION
BERM RIP RAPPED

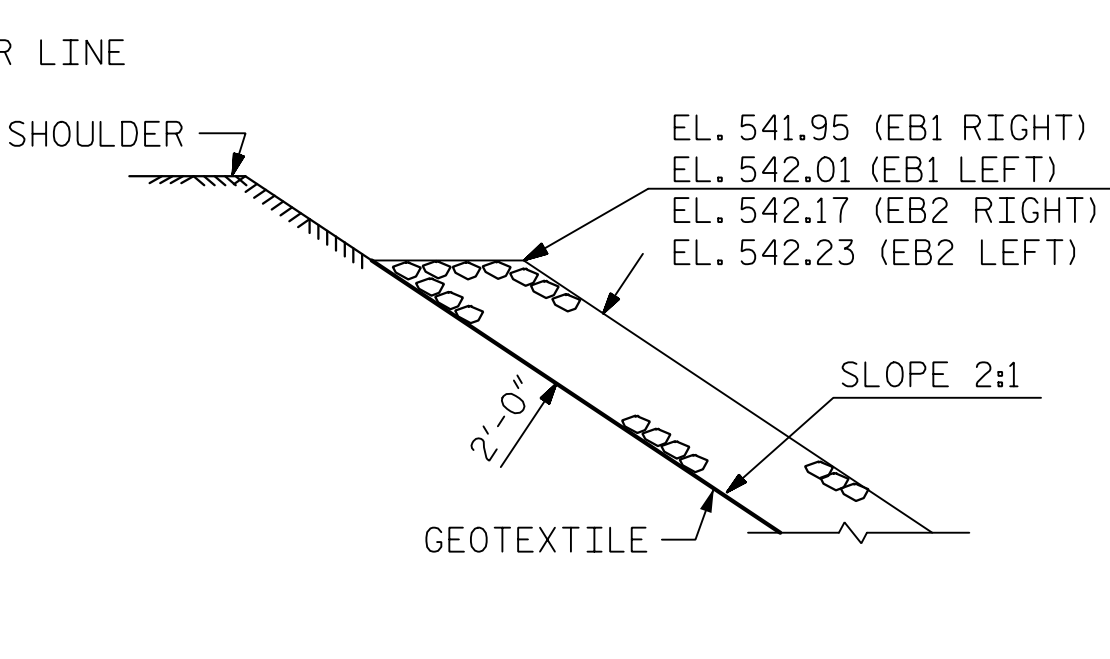
ESTIMATED QUANTITIES		
BRIDGE @ STA. 14+53.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	160	180
END BENT 2	125	140



SECTION H-H

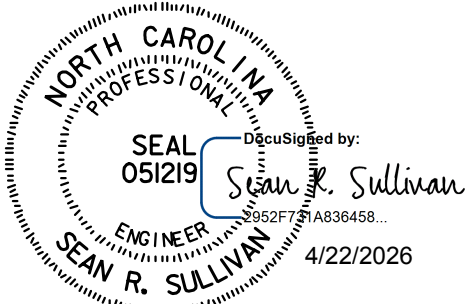


SECTION I-I



SECTION C-C

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
RIP RAP DETAILS

STD. NO. RR1 (Sheet 3)

ASSEMBLED BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23
DRAWN BY : REK 1/84	REV. 10/1/II MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/II MAA/GM
	REV. 12/17 MAA/THC

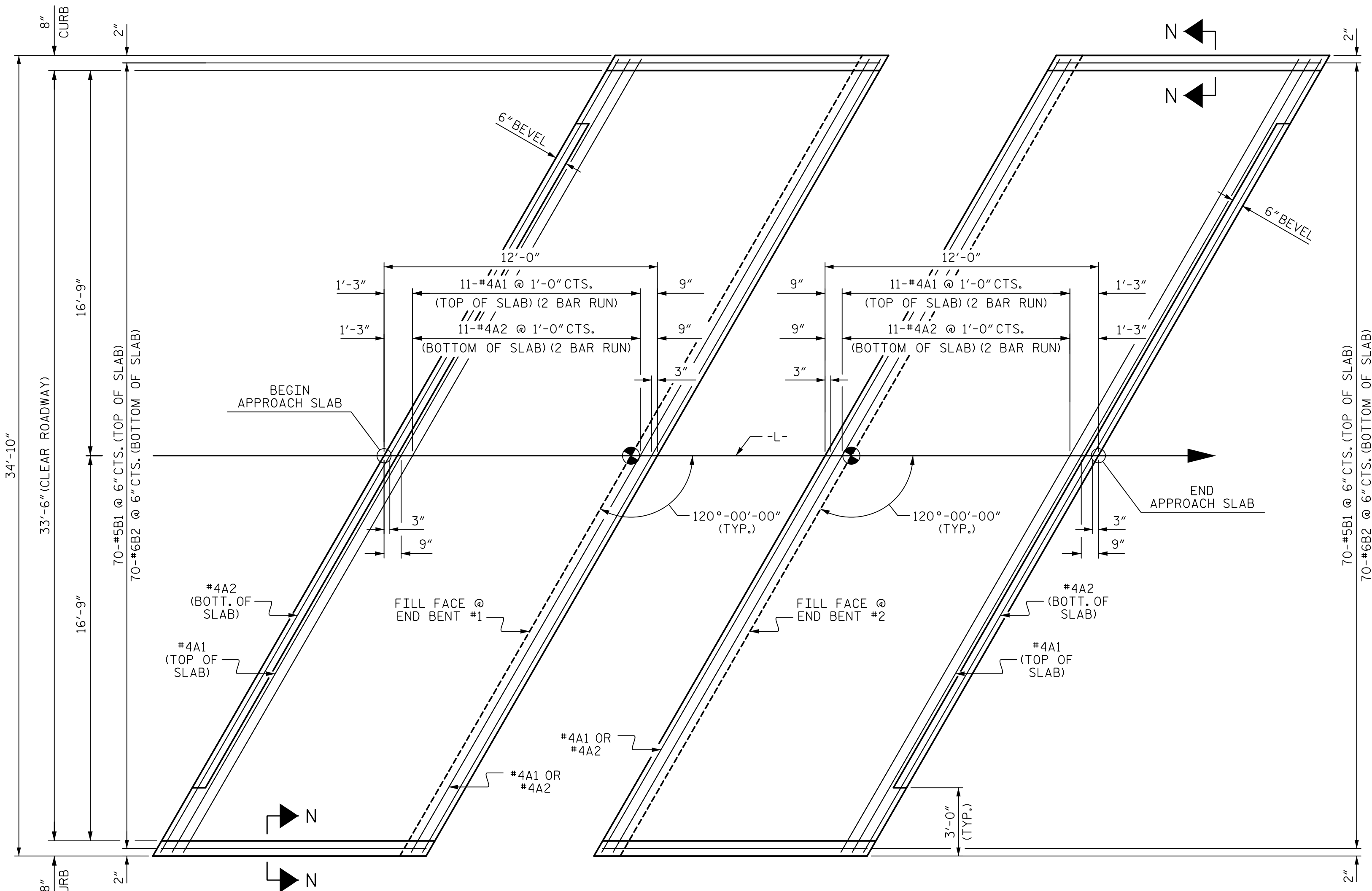
REMOVE TIMBER ABUTMENT TO TOP
* OF RETAINED MUD SILL ELEV.
534.90'.

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1654 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : M. WRIGHT	DATE : 7/23	DWG. NO. 16	
CHECKED BY : S. SULLIVAN	DATE : 7/23		
DESIGN ENGINEER OF RECORD : S. SULLIVAN	DATE : 8/23		

REVISIONS					SHEET NO. S-16
NO.	BY	DATE	NO.	BY	
1			3		TOTAL SHEETS
2			4		17

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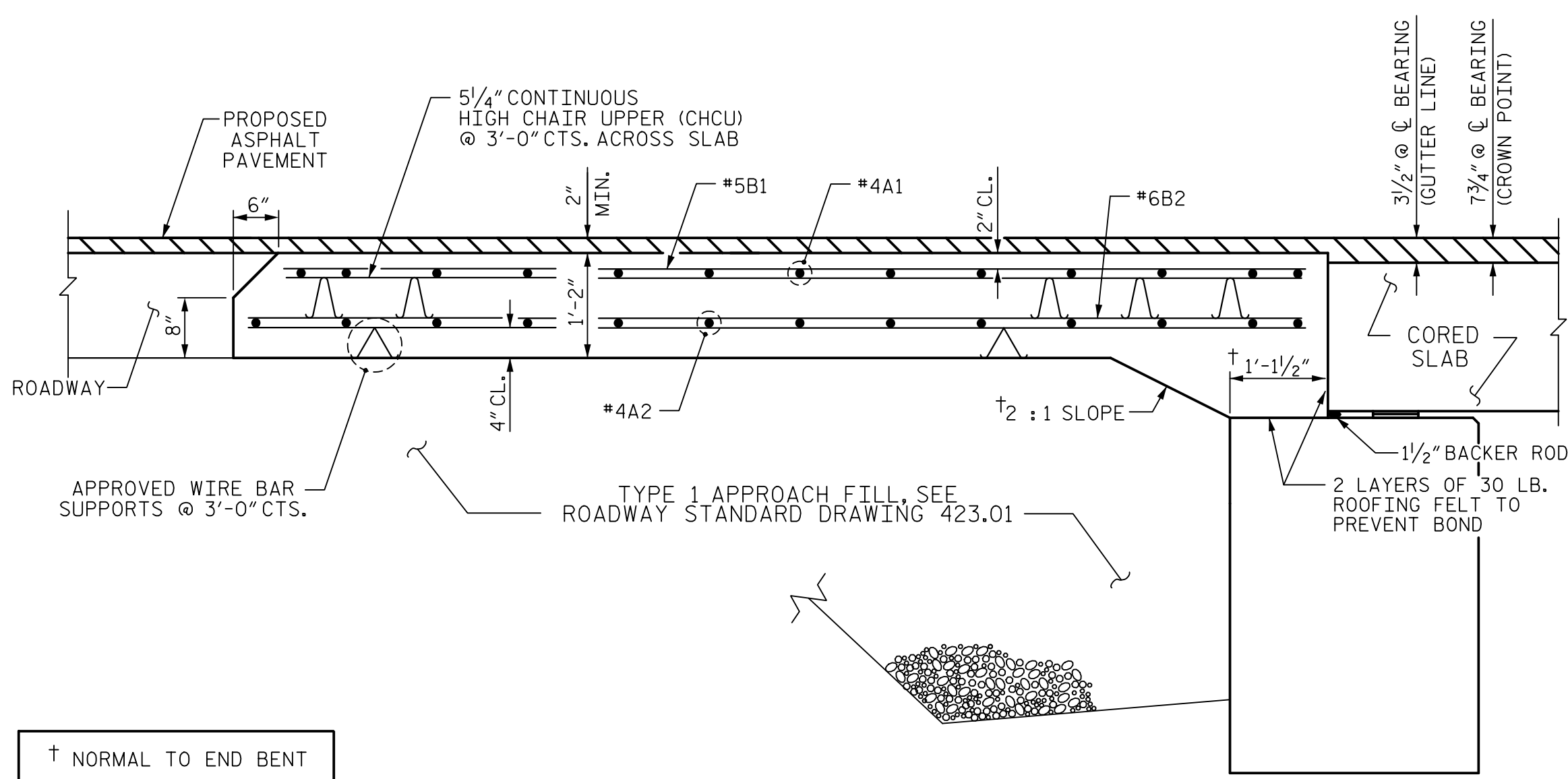
3/17/2026 10:41:32 AM \\RAVING\ora\hede\76767 2019 East Region LSC - Division 7\BPT\70.T1.LBR\14.Orange County\Structures\Design\033_BPT\70.T1.SML\AS01.DIT\LETO114.dgn



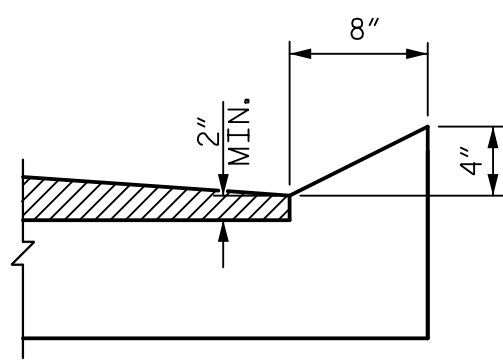
PLAN @ END BENT #1

PLAN @ END BENT #2

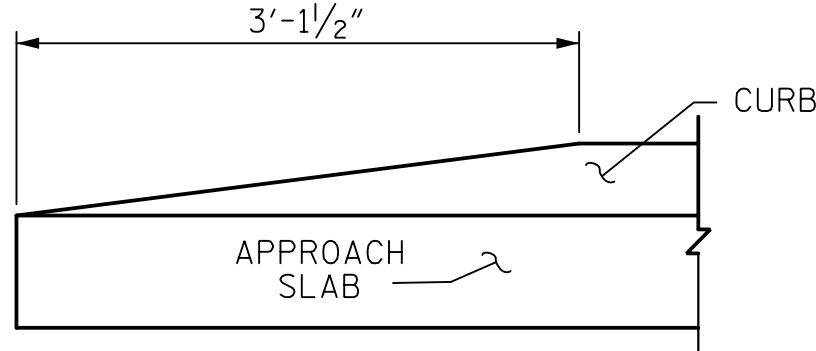
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

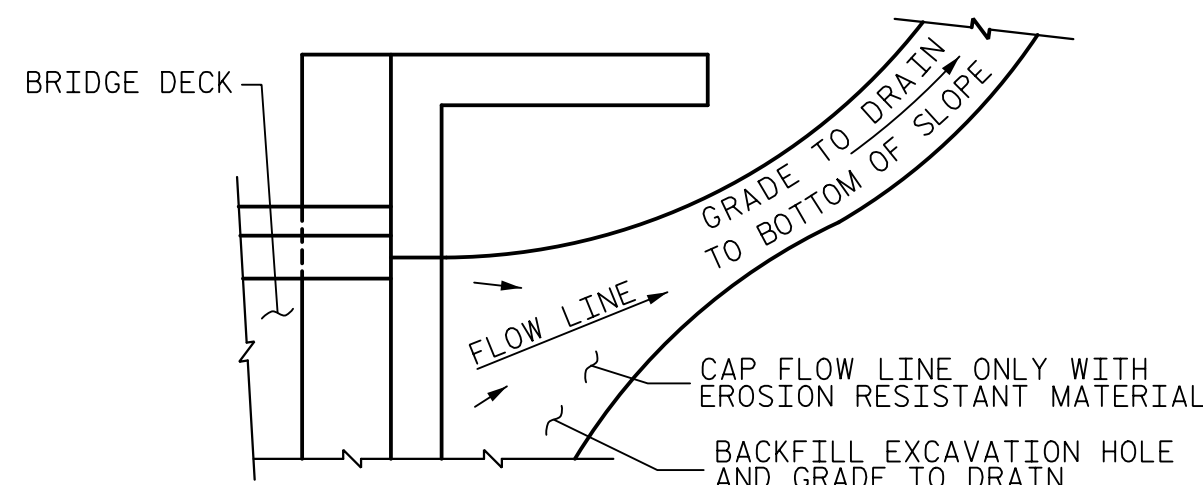
CURB DETAILS

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

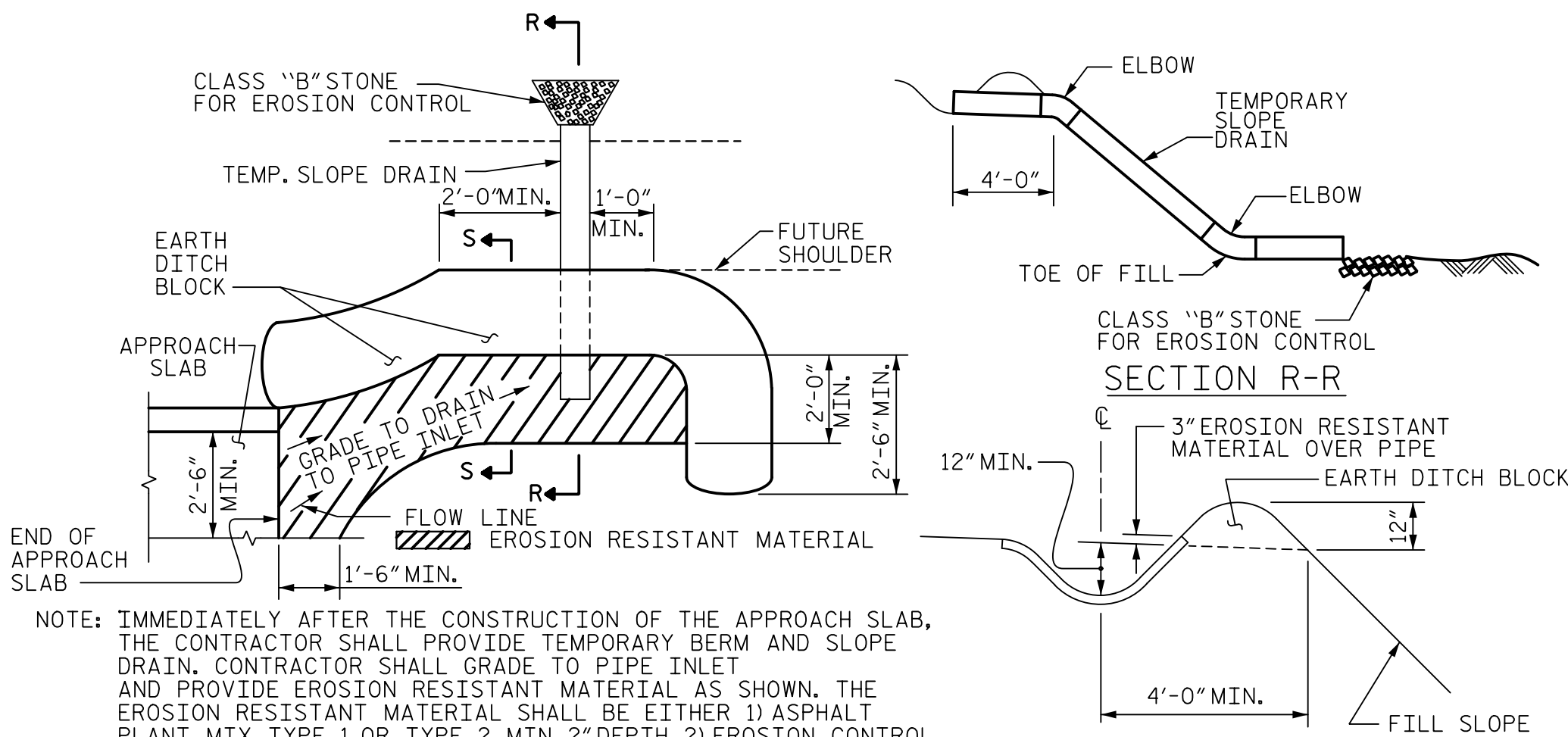
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



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

TEMPORARY DRAINAGE DETAIL



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

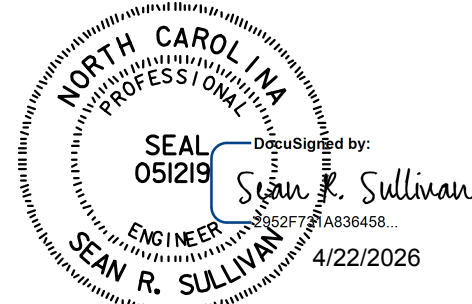
PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

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

PROJECT NO. BP7-R017
ORANGE COUNTY
STATION: 14+53.00 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
(SUB-REGIONAL TIER)
120° SKEW

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

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY	M. WRIGHT	DATE	7/23
CHECKED BY	S. SULLIVAN	DATE	7/23
DESIGN ENGINEER OF RECORD	S. SULLIVAN	DATE	8/23

DWG. NO. 17

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STD.BAS6 SHT. 01B

ASSEMBLED BY : M. WRIGHT	DATE : 7/23
CHECKED BY : S. SULLIVAN	DATE : 7/23
DRAWN BY : KMM	3-08
REV. 06/19	MAA/THC
REV. 08/19	BNB/THC
CHECKED BY : GM	3-08
REV. 07/23	BNB/SNM

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE $\frac{7}{8}"$ Ø SHEAR STUDS FOR THE $\frac{3}{4}"$ Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}"$ Ø STUDS FOR 4 - $\frac{3}{4}"$ Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}"$ Ø STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}"$ Ø STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}"$ Ø STUDS FOR 4 - $\frac{3}{4}"$ 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 $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

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

Certificate Of Completion

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jsour@ncdot.gov

Division Contract Engineer

North Carolina Department of Transportation

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Timestamps