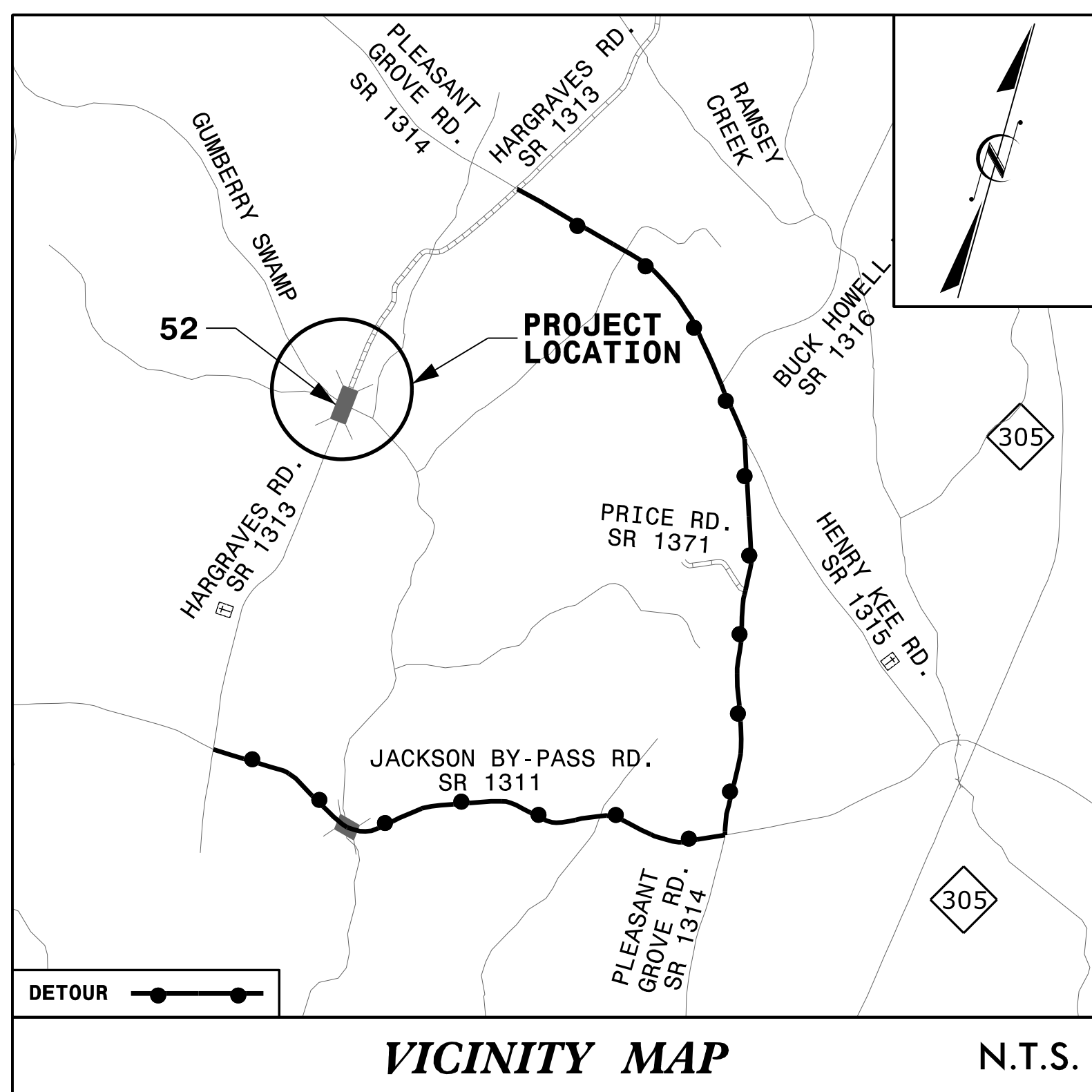


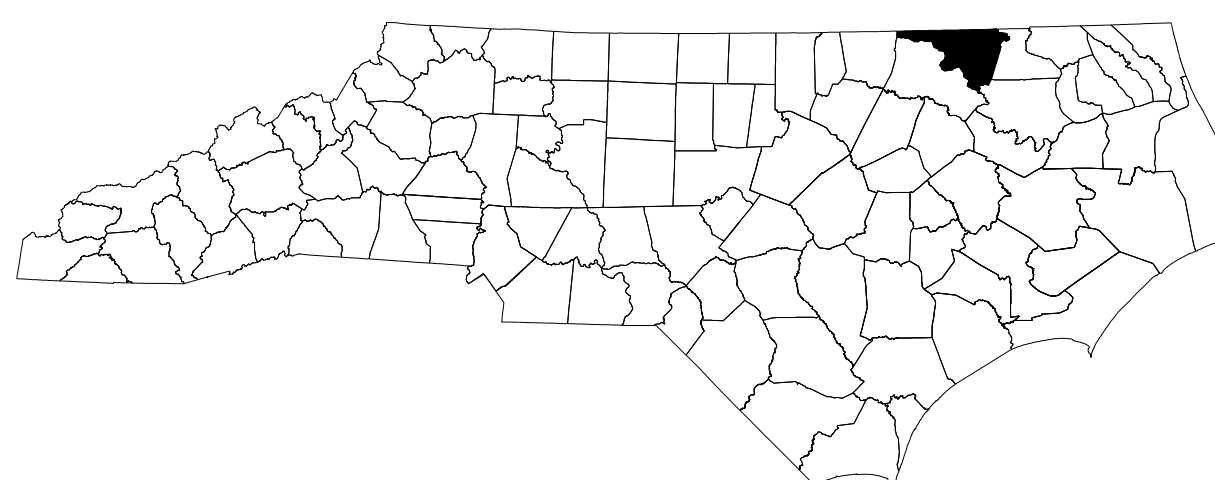
**TIP PROJECT: BR-0117**



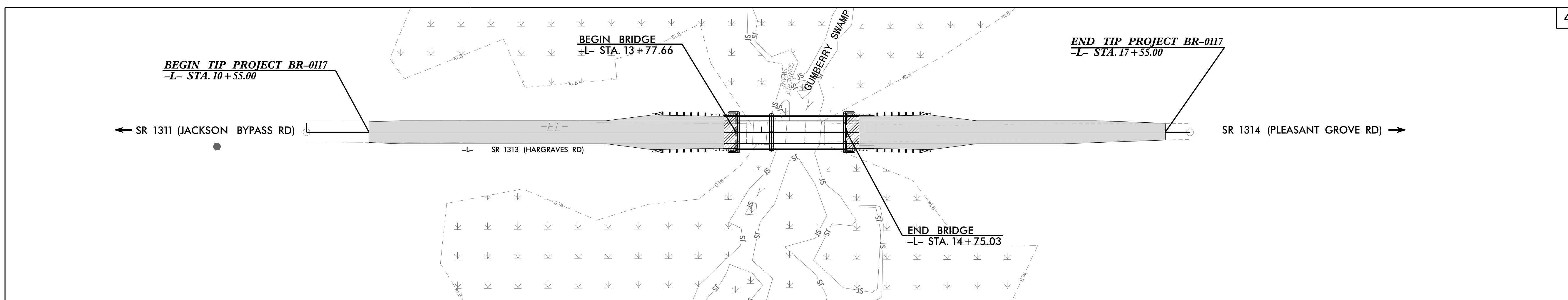
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**NORTHAMPTON COUNTY**

**LOCATION: BRIDGE 650052 ON SR 1313 (HARGRAVES RD)  
OVER GUMBERRY SWAMP**

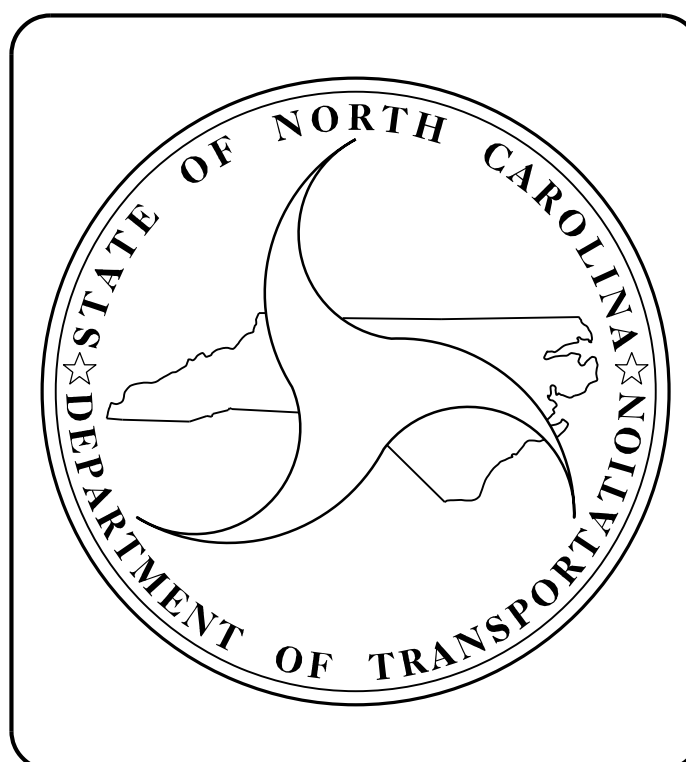
**TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE**



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	<b>BR-0117</b>	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
48826.1.1	-	P.E.	
48826.2.1	-	R/W, UTILITIES	
48826.3.1	2020001	CONST.	



**STRUCTURES**



**DESIGN DATA**

ADT (2020) = 70  
 T = 6 % \*  
 V = 55 MPH  
 \* (TTST 3 %, DUAL 3 %)

FUNC CLASS = LOCAL RURAL  
 SUB-REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT BR-0117 = 0.115 MILES  
 LENGTH STRUCTURE TIP PROJECT BR-0117 = 0.118 MILES

---

TOTAL LENGTH TIP PROJECT BR-0117 = 0.133 MILES

Prepared In the Office of:

**KCA** 301 FAYETTEVILLE ST., SUITE 1500  
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601 (919) 882-7839  
 NC FIRM LICENSE: C-1506

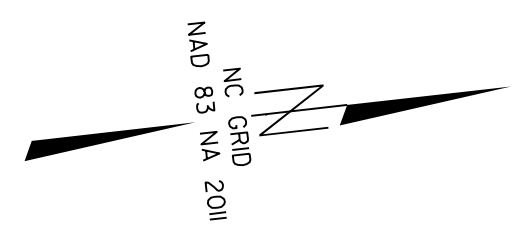
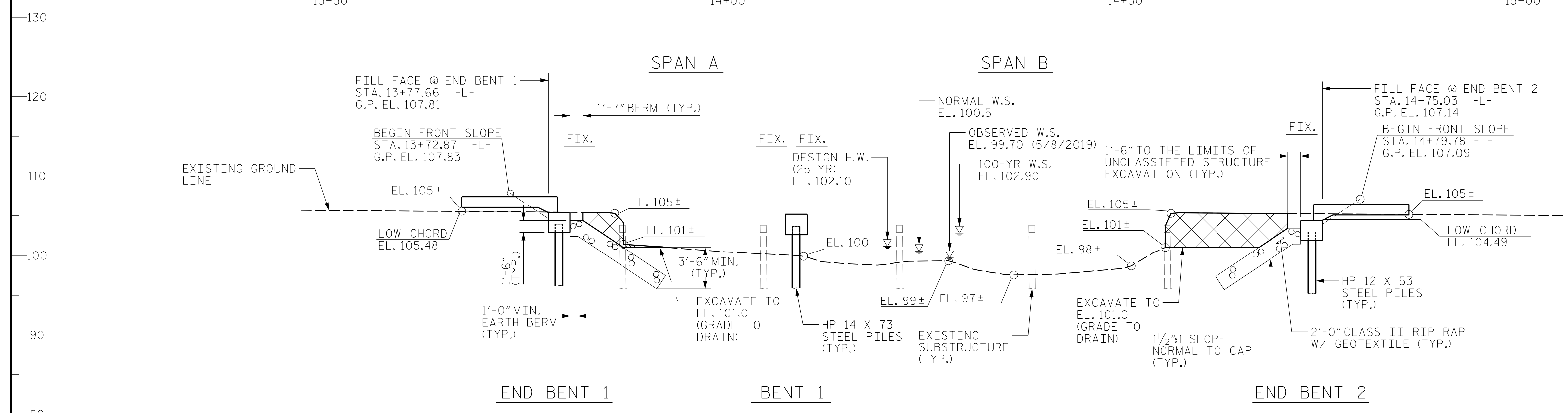
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2018 STANDARD SPECIFICATIONS

**LETTING DATE :**  
NOVEMBER 17, 2020

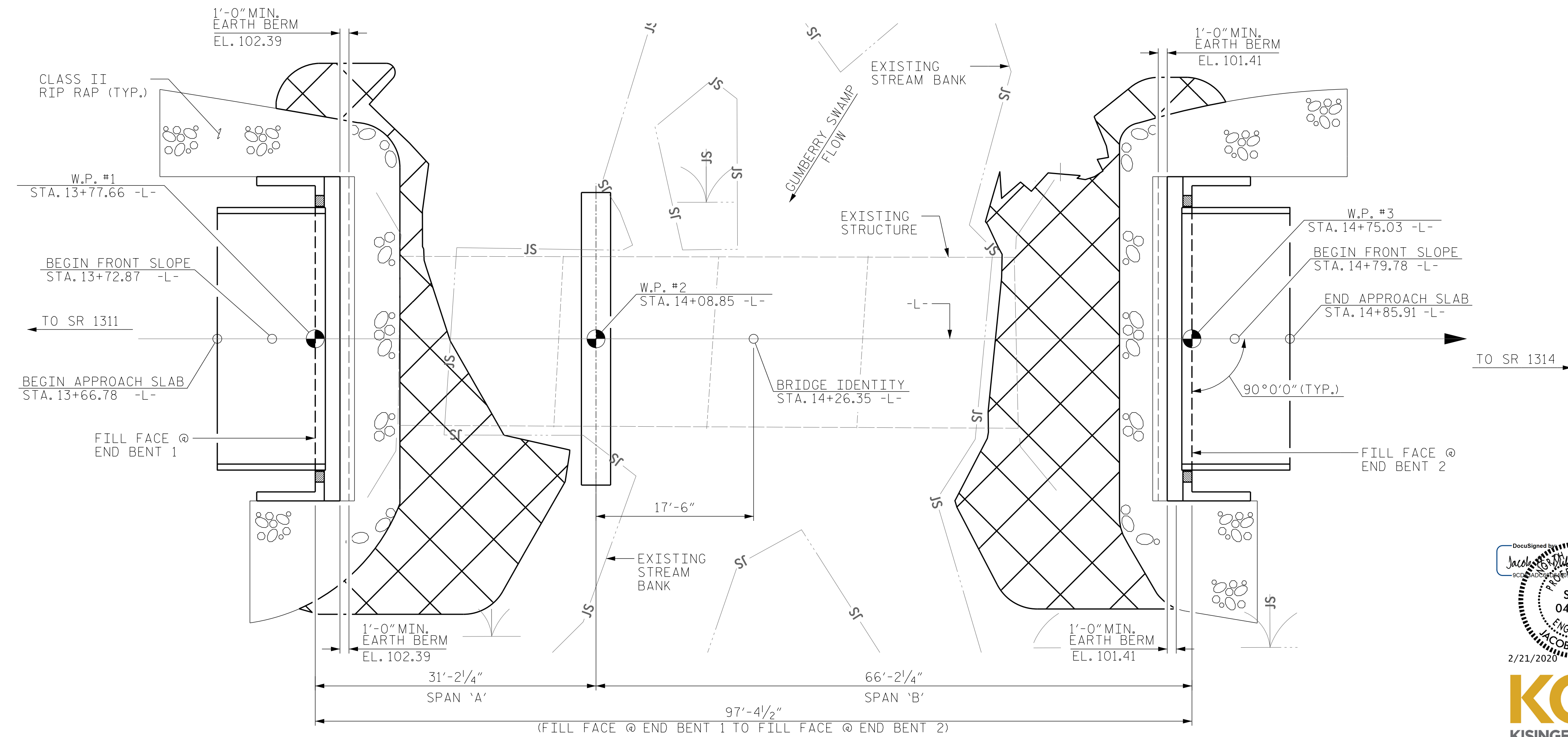
\_\_\_\_\_  
JACOB H. DUKE, PE  
PROJECT ENGINEER

\_\_\_\_\_  
DIEGO A. AGUIRRE, PE  
PROJECT DESIGN ENGINEER



**GRADE DATA -L-**

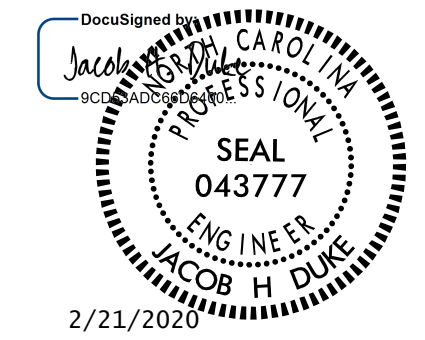
PI	=	14+42.0
EL.	=	107.62'
VC	=	120'



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. BR-0117  
 NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 650052



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE ON SR 1313 OVER  
 GUMBERRY SWAMP BETWEEN  
 BLACKWELL-STEPHENSON RD &  
 NC HWY 186

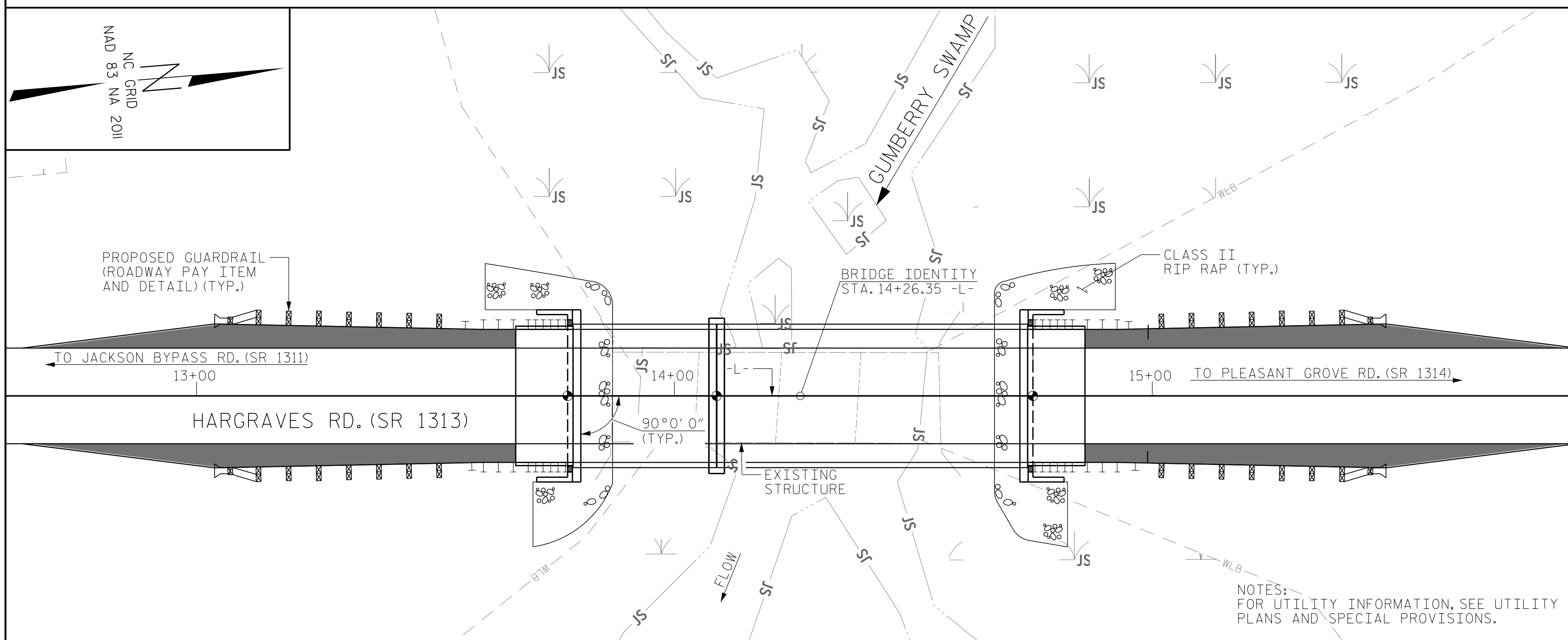
DRAWN BY : DIEGO A. AGUIRRE DATE : 01/2020  
 CHECKED BY : FIDEL L. FLORES DATE : 01/2020  
 DESIGN ENGINEER OF RECORD: JACOB H. DUKE 01/2020

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

301 FAYETTEVILLE ST., SUITE 1500  
 RALEIGH, NC 27601 (919) 882-7839  
 NC FIRM LICENSE: C-1506

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			19

BM#10: "RR" SPIKE IN 18" OAK, -L- STA. 11+53.19, 55.11' RT; EL. 106.01'



LOCATION SKETCH

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 GALVANIZED STEEL PILES	HP 12 X 53 STEEL PILES	HP 14 X 73 GALVANIZED STEEL PILES	PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL
	LUMP SUM	LUMP SUM	EA.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EA.	EA.	No.	LIN. FT.	EA.	LIN. FT.
SUPERSTRUCTURE													190.5
END BENT No. 1					13.0		1965	5		5	400	5	
BENT No. 1					10.8		2090		7		665	7	
END BENT No. 2					13.2		1965	5		5	425	5	
TOTAL	LUMP SUM	LUMP SUM	2	LUMP SUM	37.0	LUMP SUM	6020	10	7	10	825	17	190.5

	RIP RAP CLASS II (2'-0") THICK	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB	FIBER OPTIC CONDUIT SYSTEM		
	TONS.	SQ. YDS.	LUMP SUM	No.	LIN. FT.	No.	LIN. FT.	LIN. FT.
SUPERSTRUCTURE			LUMP SUM	10	300	10	650	186
END BENT No. 1	65	72						
BENT No. 1								
END BENT No. 2	62	69						
TOTAL	127	141	LUMP SUM	10	300	10	650	186

FOUNDATION NOTES:

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 65 TONS PER PILE.
- PILES AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.
- PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.
- DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 110 TONS PER PILE.
- DRIVE PILES BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 205 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.
- DRIVE PILES AT END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.
- INSTALL PILES AT END BENT NO.1 AND END BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 68.0 FT.
- THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 IS ELEVATION 90.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
- 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.
- PILES AT ALL BENTS MAY REQUIRE PILE REDRIVES. IF ENGINEER DETERMINES TO USE PILE REDRIVES THE TIME TO WAIT SHOULD BE A MINIMUM OF 18 HOURS.

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE "STANDARD NOTES" SHEET.

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 30 FEET EACH SIDE OF THE CENTERLINE OF 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 FOUR SPANS (1 @ 17'-6", 1 @ 16'-0", 1 @ 17'-8", 1 @ 16'-8"), WITH A CLEAR ROADWAY WIDTH OF NINETEEN FEET, HAVING A TIMBER DECK ON TIMBER CAPS AND TIMBER PILES SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING THE 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. EXISTING AND REMNANT PILES SHALL BE REMOVED BY PULLING THE PILES OUT OF THE GROUND COMPLETELY, IF POSSIBLE. ALTERNATIVELY, EXISTING AND REMNANT PILES SHALL BE REMOVED/CUT TO THE MUDLINE.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

FOR INTERIOR BENT 1, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEET(S) FOR REQUIRED GALVANIZING LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR FIBER OPTIC CONDUIT SYSTEM, SEE SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	600 CFS
FREQUENCY OF DESIGN FLOOD	25 YRS.
DESIGN HIGH WATER ELEVATION	102.1'
DRAINAGE AREA	4.5 SQ.MI.
BASE DISCHARGE (Q100)	950 CFS
BASE HIGH WATER ELEVATION	102.9'

OVERTOPPING FLOOD DATA

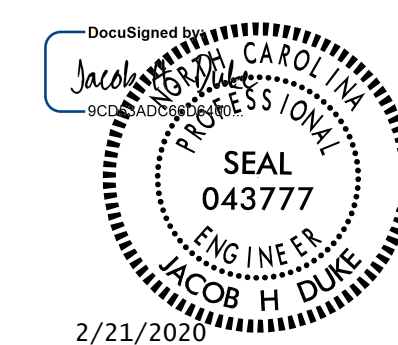
OVERTOPPING DISCHARGE	2525 CFS
FREQUENCY OF OVERTOPPING FLOOD	500+ YRS.
OVERTOPPING FLOOD ELEVATION	105.4'
SAG STA.	16+90 -L-

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND  $f_y = 60\text{ksi}$ .

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR BRIDGE ON SR 1313 OVER GUMBERRY SWAMP BETWEEN BLACKWELL-STEPHENSON RD & NC HWY 186					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-2
					TOTAL SHEETS 19

DRAWN BY : DIEGO A. AGUIRRE DATE : 01/2020  
 CHECKED BY : FIDEL L. FLORES DATE : 01/2020  
 DESIGN ENGINEER OF RECORD: JACOB H. DUKE 01/2020

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

LEVEL	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								
						LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	<b>1</b>	1.037	--	1.75	0.283	1.83	30'	EL	14.5	0.574	<b>1.04</b>	30'	EL	<b>1.45</b>	0.80	0.283	1.58	30'	EL	14.5		
	HL-93(0pr)	N/A	--	1.344	--	1.35	0.283	2.38	30'	EL	14.5	0.574	1.34	30'	EL	1.45	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	<b>2</b>	1.183	42.587	1.75	0.283	2.53	30'	EL	11.6	0.574	<b>1.18</b>	30'	EL	<b>1.45</b>	0.80	0.283	2.20	30'	EL	11.6		
	HS-20(0pr)	36.000	--	1.533	55.205	1.35	0.283	3.28	30'	EL	11.6	0.574	1.53	30'	EL	1.45	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.895	39.081	1.4	0.283	5.18	30'	EL	14.5	0.574	2.89	30'	EL	1.45	0.80	0.283	3.56	30'	EL	14.5	
		SNGARBS2	20.000	--	2.240	44.792	1.4	0.283	4.53	30'	EL	11.6	0.574	2.24	30'	EL	1.45	0.80	0.283	3.15	30'	EL	11.6	
		SNAGRIS2	22.000	--	2.157	47.463	1.4	0.283	4.6	30'	EL	11.6	0.574	2.16	30'	EL	1.45	0.80	0.283	3.20	30'	EL	11.6	
		SNCOTTS3	27.250	--	1.462	39.849	1.4	0.283	2.6	30'	EL	14.5	0.574	1.46	30'	EL	1.45	0.80	0.283	1.79	30'	EL	14.5	
		SNAGGRS4	34.925	--	1.346	46.999	1.4	0.283	2.5	30'	EL	14.5	0.574	1.35	30'	EL	1.45	0.80	0.283	1.72	30'	EL	14.5	
		SNS5A	35.550	--	1.427	50.733	1.4	0.283	2.42	30'	EL	14.5	0.574	1.43	30'	EL	1.45	0.80	0.283	1.67	30'	EL	14.5	
		SNS6A	39.950	--	1.341	53.59	1.4	0.283	2.29	30'	EL	14.5	0.574	1.34	30'	EL	1.45	0.80	0.283	1.58	30'	EL	14.5	
	TTST	SNS7B	42.000	--	1.369	57.505	1.4	0.283	2.23	30'	EL	14.5	0.574	1.37	30'	EL	1.45	0.80	0.283	1.53	30'	EL	14.5	
		TNAGRIT3	33.000	--	1.593	52.58	1.4	0.283	2.97	30'	EL	14.5	0.574	1.59	30'	EL	1.45	0.80	0.283	2.04	30'	EL	14.5	
		TNT4A	33.075	--	1.483	49.043	1.4	0.283	2.82	30'	EL	14.5	0.574	1.48	30'	EL	1.45	0.80	0.283	1.94	30'	EL	14.5	
		TNT6A	41.600	--	1.433	59.622	1.4	0.283	2.56	30'	EL	14.5	0.574	1.43	30'	EL	1.45	0.80	0.283	1.76	30'	EL	14.5	
		TNT7A	42.000	--	1.363	57.264	1.4	0.283	2.64	30'	EL	14.5	0.574	1.36	30'	EL	1.45	0.80	0.283	1.82	30'	EL	14.5	
		TNT7B	42.000	--	1.331	55.915	1.4	0.283	2.49	30'	EL	14.5	0.574	1.33	30'	EL	1.45	0.80	0.283	1.72	30'	EL	14.5	
		TNAGRIT4	43.000	--	1.287	55.356	1.4	0.283	2.58	30'	EL	14.5	0.574	1.29	30'	EL	1.45	0.80	0.283	1.78	30'	EL	14.5	
TNAGT5A	45.000	--	1.381	62.151	1.4	0.283	2.5	30'	EL	14.5	0.574	1.38	30'	EL	1.45	0.80	0.283	1.72	30'	EL	14.5			
TNAGT5B	45.000	<b>3</b>	1.212	54.54	1.4	0.283	2.41	30'	EL	11.6	0.574	<b>1.21</b>	30'	EL	<b>1.45</b>	0.80	0.283	1.66	30'	EL	11.6			

**LOAD FACTORS:**

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	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 \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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**GIRDER LOCATION**

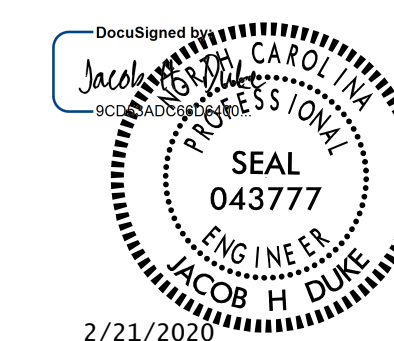
I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



**LRFR SUMMARY**  
FOR SPAN 'A'

PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
**DEPARTMENT OF TRANSPORTATION**  
 RALEIGH  
 STANDARD  
**LRFR SUMMARY FOR**  
**30' CORED SLAB UNIT**  
**90° SKEW**  
 (NON-INTERSTATE TRAFFIC)  
 SPAN 'A'

DESIGN ENGINEER OF RECORD: <u>JACOB H. DUKE</u> DATE: <u>01/2020</u>	
ASSEMBLED BY: <u>DIEGO A. AGUIRRE</u> DATE: <u>01/2020</u>	CHECKED BY: <u>FIDEL L. FLORES</u> DATE: <u>01/2020</u>
DRAWN BY: <u>CVC</u> 6/10	CHECKED BY: <u>DNS</u> 6/10

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

301 FAYETTEVILLE ST., SUITE 1500  
 RALEIGH, NC 27601 (919) 882-7839  
 NC FIRM LICENSE: C-1506

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			19

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

LEVEL	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								
						LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	<b>1</b>	1.018	--	1.75	0.274	1.05	65'	EL	32	0.513	1.2	65'	EL	6.4	0.80	0.274	<b>1.02</b>	65'	EL	<b>32</b>		
	HL-93(Opr)	N/A	--	1.358	--	1.35	0.274	1.36	65'	EL	32	0.513	1.56	65'	EL	6.4	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	<b>2</b>	1.306	47.014	1.75	0.274	1.34	65'	EL	32	0.513	1.48	65'	EL	6.4	0.80	0.274	<b>1.31</b>	65'	EL	<b>32</b>		
	HS-20(Opr)	36.000	--	1.742	62.706	1.35	0.274	1.74	65'	EL	32	0.513	1.92	65'	EL	6.4	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.868	38.725	1.4	0.274	3.69	65'	EL	32	0.513	4.33	65'	EL	6.4	0.80	0.274	2.87	65'	EL	32	
		SNGARBS2	20.000	--	2.171	43.424	1.4	0.274	2.79	65'	EL	32	0.513	3.11	65'	EL	6.4	0.80	0.274	2.17	65'	EL	32	
		SNAGRIS2	22.000	--	2.071	45.552	1.4	0.274	2.66	65'	EL	32	0.513	2.89	65'	EL	6.4	0.80	0.274	2.07	65'	EL	32	
		SNCOTTS3	27.250	--	1.428	38.924	1.4	0.274	1.84	65'	EL	32	0.513	2.17	65'	EL	6.4	0.80	0.274	1.43	65'	EL	32	
		SNAGGRS4	34.925	--	1.206	42.136	1.4	0.274	1.55	65'	EL	32	0.513	1.81	65'	EL	6.4	0.80	0.274	1.21	65'	EL	32	
		SNS5A	35.550	--	1.179	41.911	1.4	0.274	1.52	65'	EL	32	0.513	1.85	65'	EL	6.4	0.80	0.274	1.18	65'	EL	32	
		SNS6A	39.950	--	1.087	43.43	1.4	0.274	1.4	65'	EL	32	0.513	1.69	65'	EL	6.4	0.80	0.274	1.09	65'	EL	32	
	TTST	TNAGRIT3	33.000	--	1.327	43.8	1.4	0.274	1.71	65'	EL	32	0.513	2.01	65'	EL	6.4	0.80	0.274	1.33	65'	EL	32	
		TNT4A	33.075	--	1.335	44.142	1.4	0.274	1.72	65'	EL	32	0.513	1.95	65'	EL	6.4	0.80	0.274	1.33	65'	EL	32	
		TNT6A	41.600	--	1.096	45.613	1.4	0.274	1.41	65'	EL	32	0.513	1.8	65'	EL	6.4	0.80	0.274	1.10	65'	EL	32	
		TNT7A	42.000	--	1.105	46.4	1.4	0.274	1.42	65'	EL	32	0.513	1.74	65'	EL	6.4	0.80	0.274	1.10	65'	EL	32	
		TNT7B	42.000	--	1.15	48.298	1.4	0.274	1.48	65'	EL	32	0.513	1.62	65'	EL	6.4	0.80	0.274	1.15	65'	EL	32	
		TNAGRIT4	43.000	--	1.089	46.815	1.4	0.274	1.4	65'	EL	32	0.513	1.57	65'	EL	6.4	0.80	0.274	1.09	65'	EL	32	
		TNAGT5A	45.000	--	1.024	46.084	1.4	0.274	1.32	65'	EL	32	0.513	1.57	65'	EL	6.4	0.80	0.274	1.02	65'	EL	32	
TNAGT5B	45.000	<b>3</b>	1.01	45.431	1.4	0.274	1.3	65'	EL	32	0.513	1.49	65'	EL	6.4	0.80	0.274	<b>1.01</b>	65'	EL	<b>32</b>			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	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)

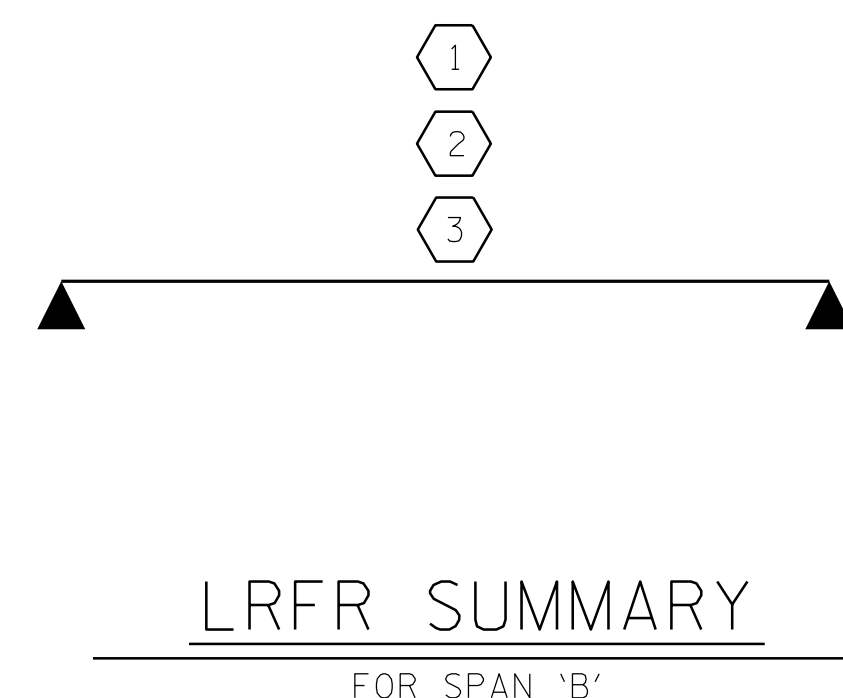
**3** LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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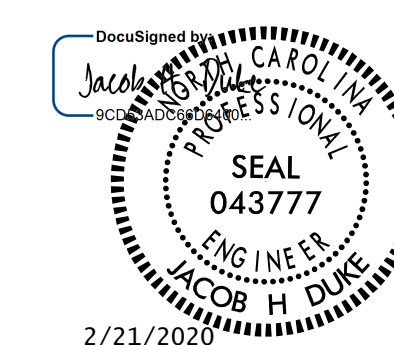
**GIRDER LOCATION**

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



PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 2 OF 2

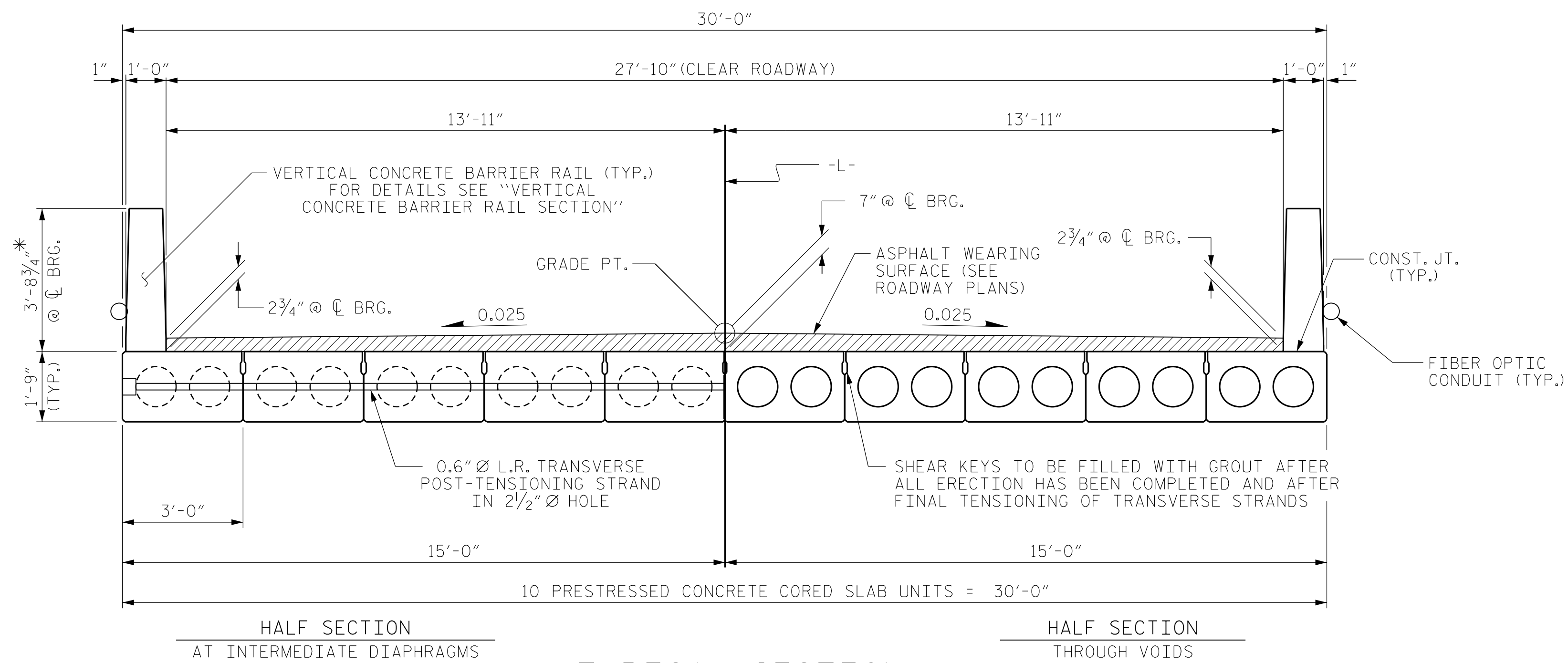


STATE OF NORTH CAROLINA  
**DEPARTMENT OF TRANSPORTATION**  
 RALEIGH  
 STANDARD  
**LRFR SUMMARY FOR**  
**65' CORED SLAB UNIT**  
**90° SKEW**  
 (NON-INTERSTATE TRAFFIC)  
 SPAN 'B'

DESIGN ENGINEER OF RECORD:	
JACOB H. DUKE DATE: 01/2020	
ASSEMBLED BY: DIEGO A. AGUIRRE	DATE: 01/2020
CHECKED BY: FIDEL L. FLORES	DATE: 01/2020
DRAWN BY: CVC	6/10
CHECKED BY: DNS	6/10

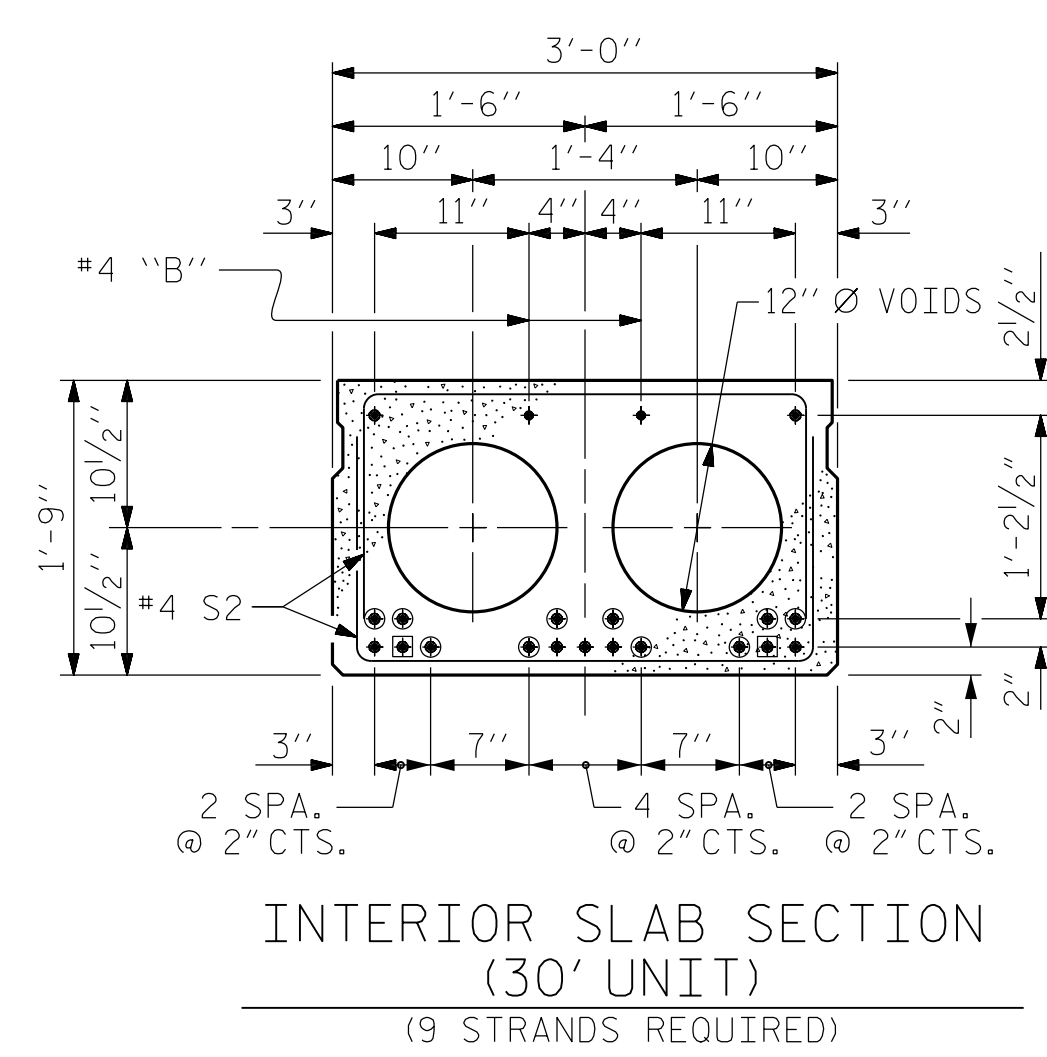
DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			19

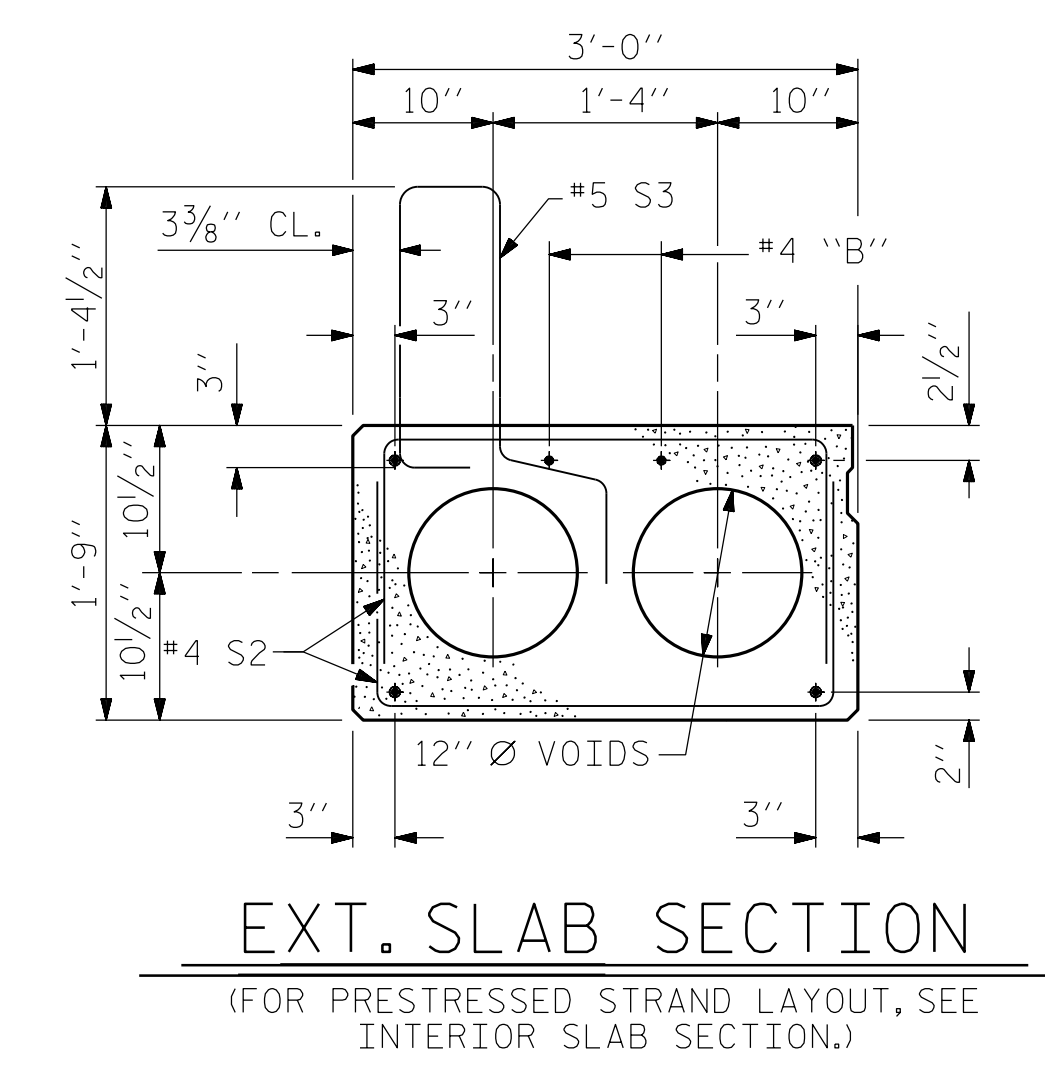


TYPICAL SECTION

\* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.



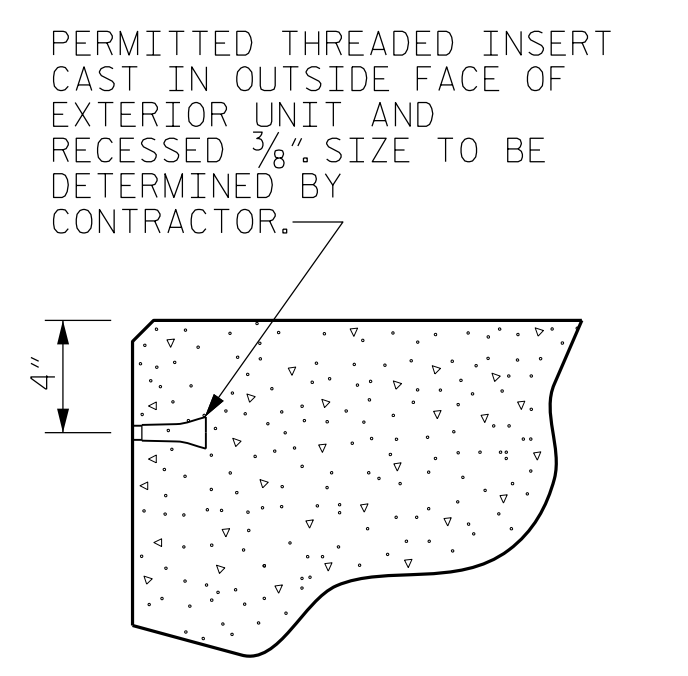
0.6" Ø LOW RELAXATION STRAND LAYOUT



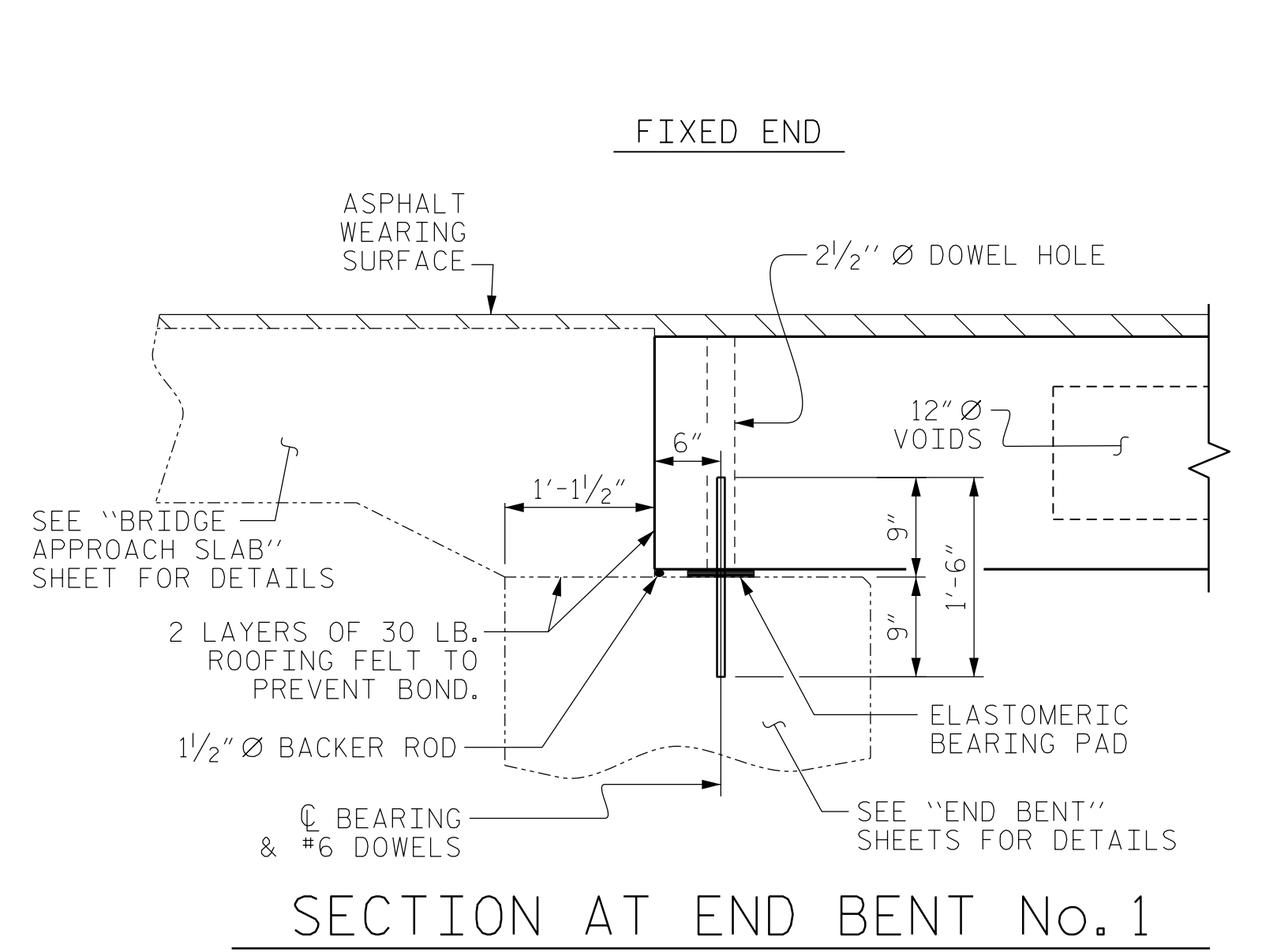
EXT. SLAB SECTION  
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

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

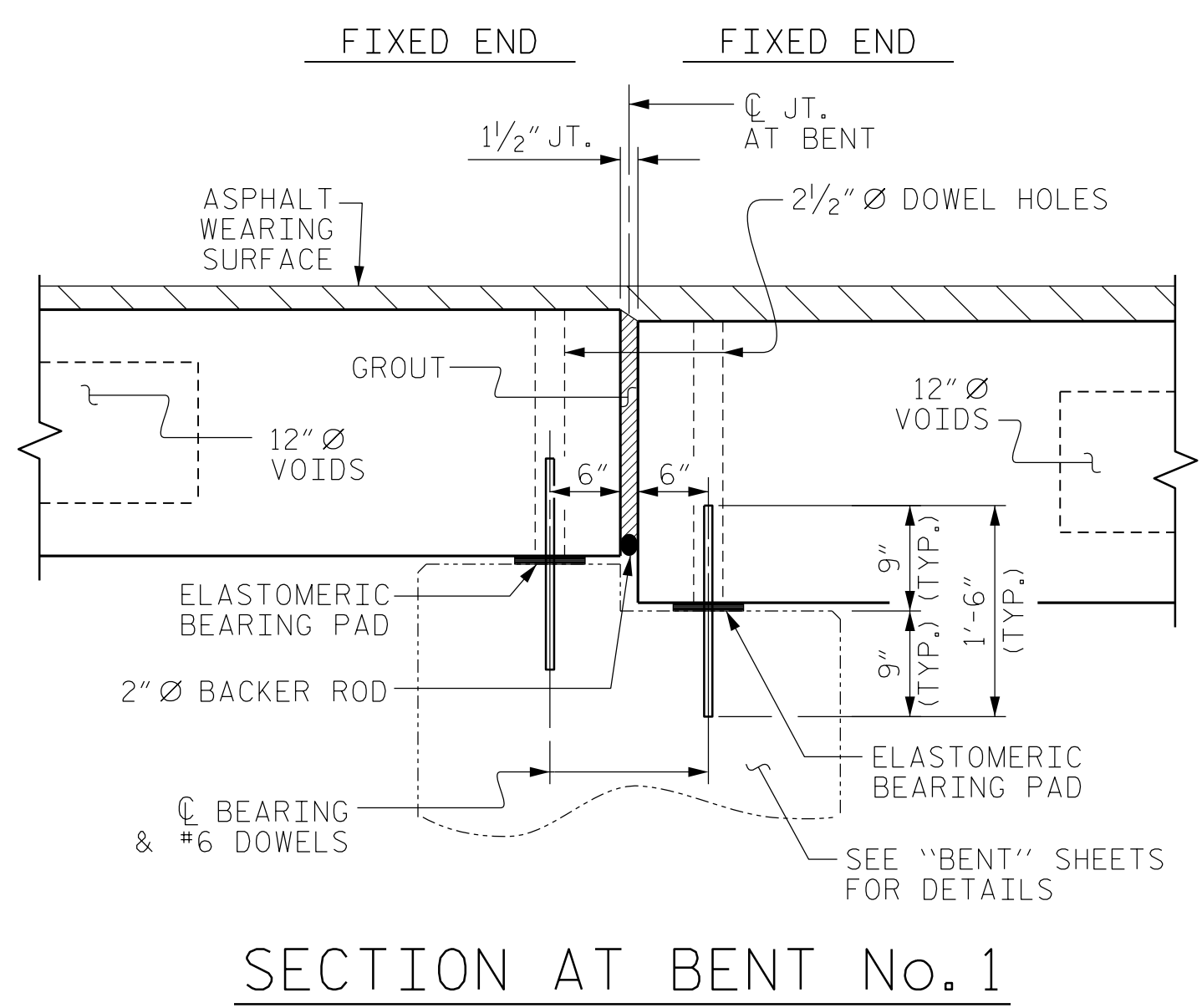
DEBONDING LEGEND



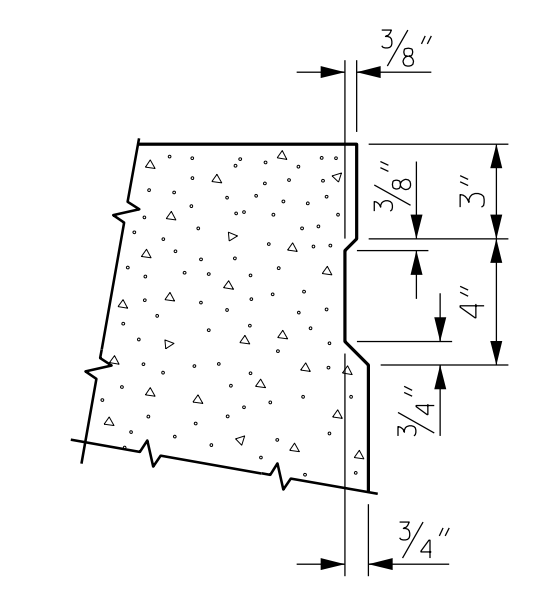
THREADED INSERT DETAIL



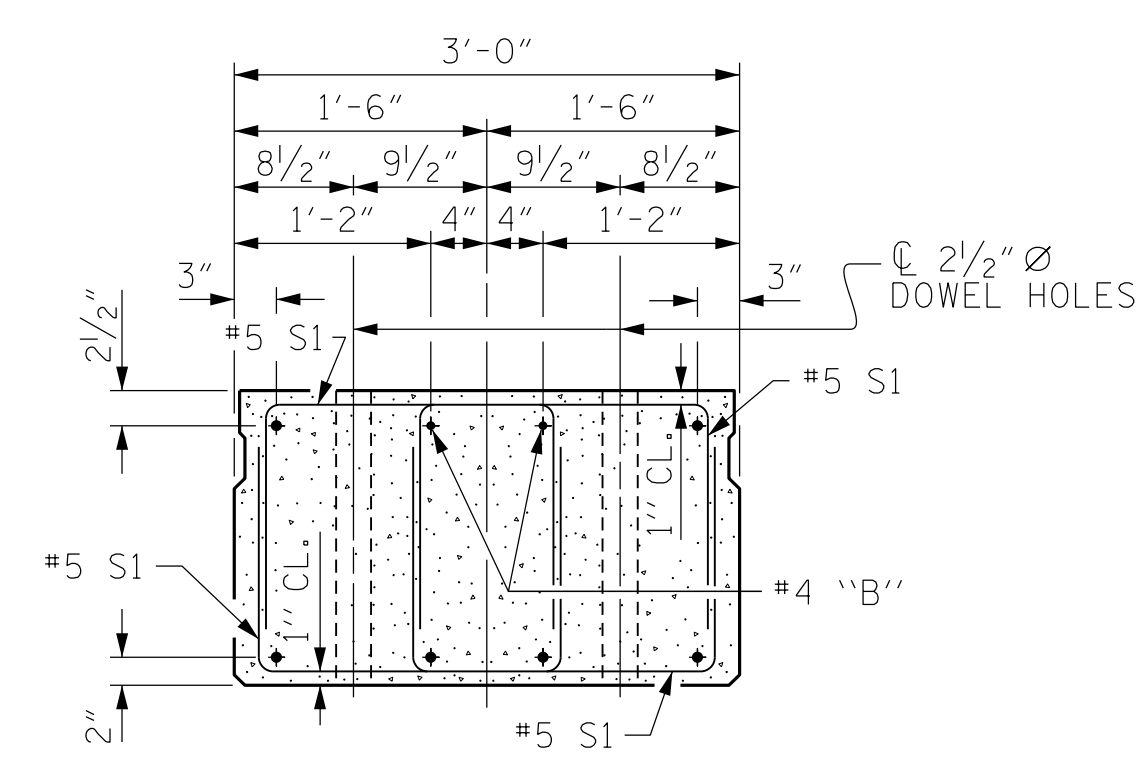
SECTION AT END BENT No. 1



SECTION AT BENT No. 1

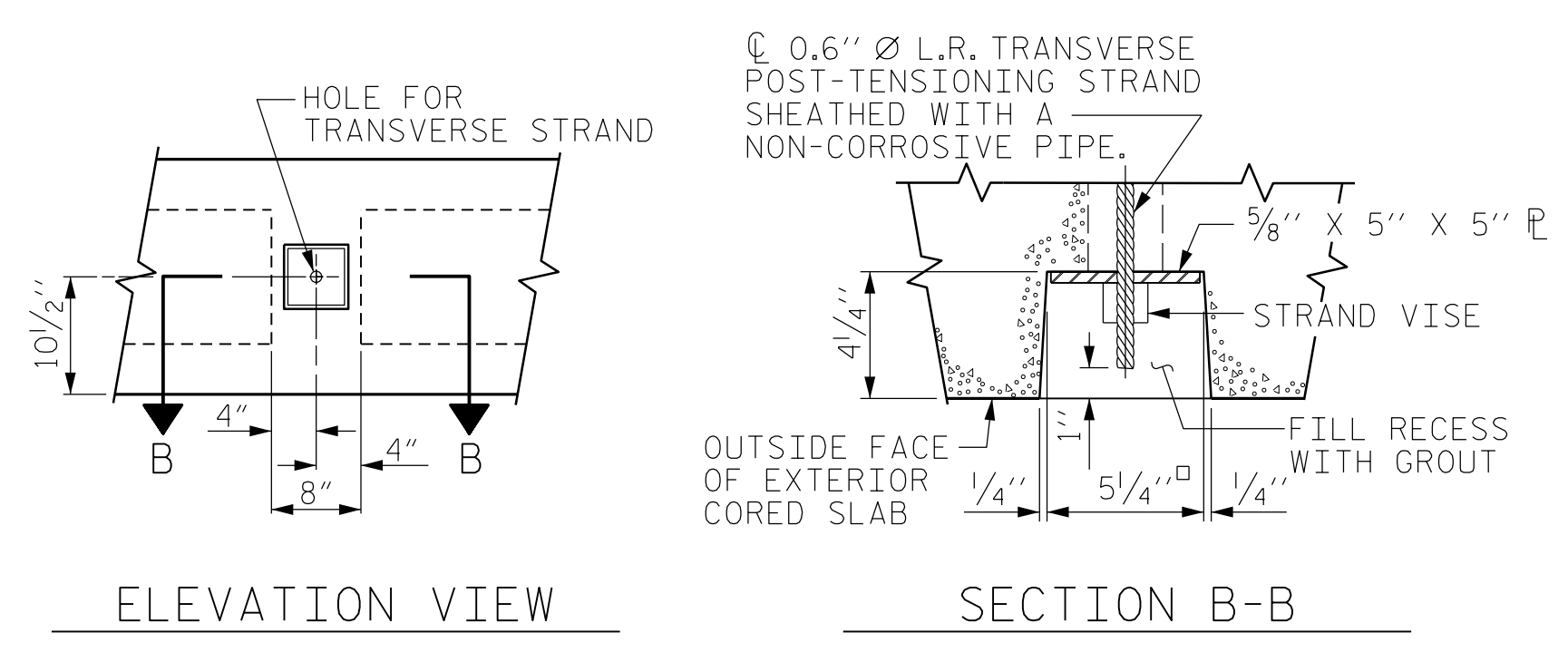


SHEAR KEY DETAIL  
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



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.



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

FOR FIBER OPTIC CONDUIT SYSTEM, SEE SPECIAL PROVISIONS.

DESIGN ENGINEER OF RECORD:		
JACOB H. DUKE DATE: 01/2020		
ASSEMBLED BY: DIEGO A. AGUIRRE	DATE: 01/2020	
CHECKED BY: FIDEL L. FLORES	DATE: 01/2020	
DRAWN BY: DGE 5/09	REV. 8/14	MAA/TMG
CHECKED BY: BCH 6/09		

2/21/2020 BR-0117.SMU.CS01.650052.dgn jduke

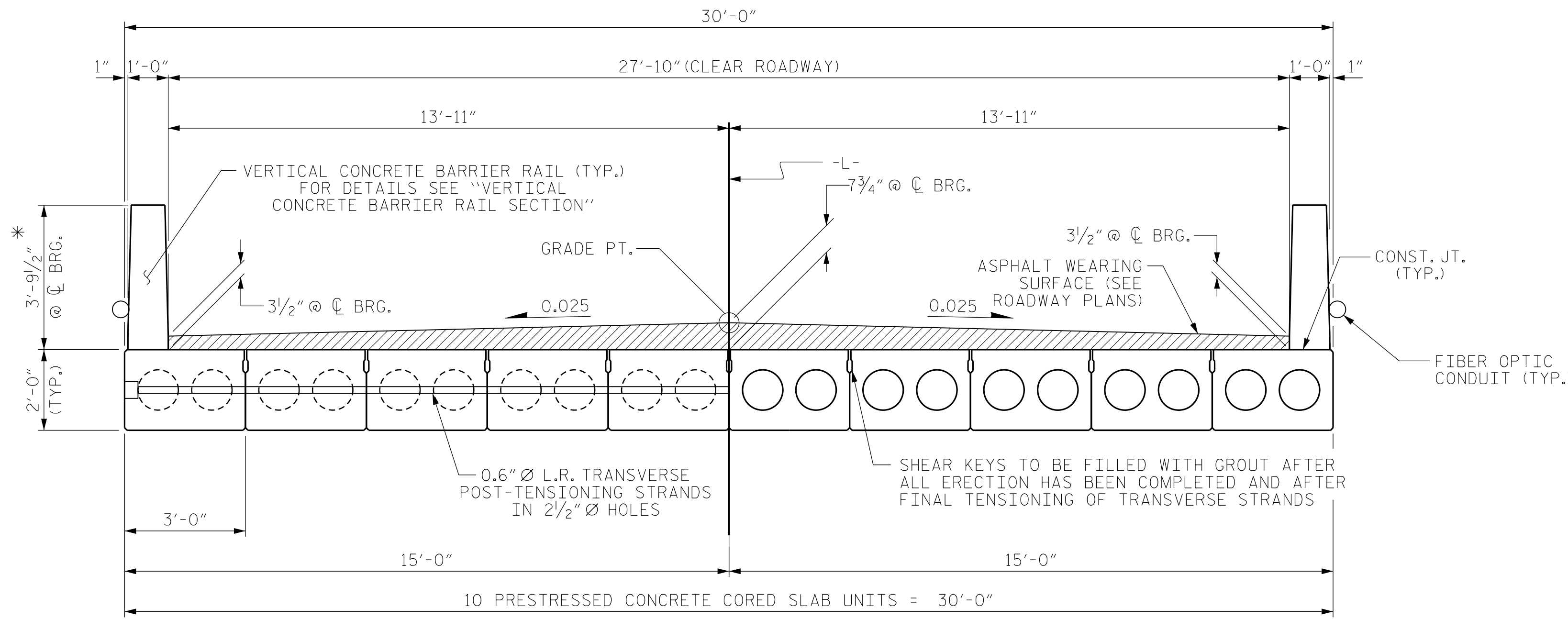
DocuSigned by:  
  
 2/21/2020  
**KCA**  
 KISINGER CAMPO & ASSOCIATES  
 301 FAYETTEVILLE ST., SUITE 1500  
 RALEIGH, NC 27601 (919) 882-7839  
 NC FIRM LICENSE: C-1506

PROJECT NO. BR-0117  
 NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD 3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 90° SKEW SPAN 'A'					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-5
TOTAL SHEETS					19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

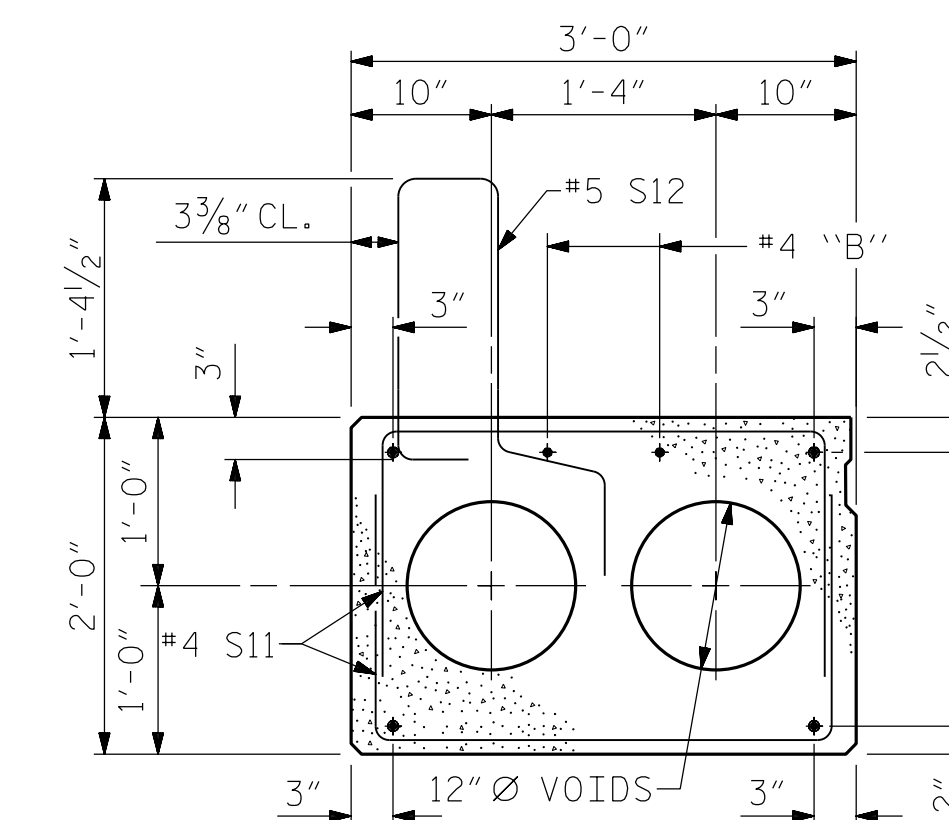


HALF SECTION  
AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

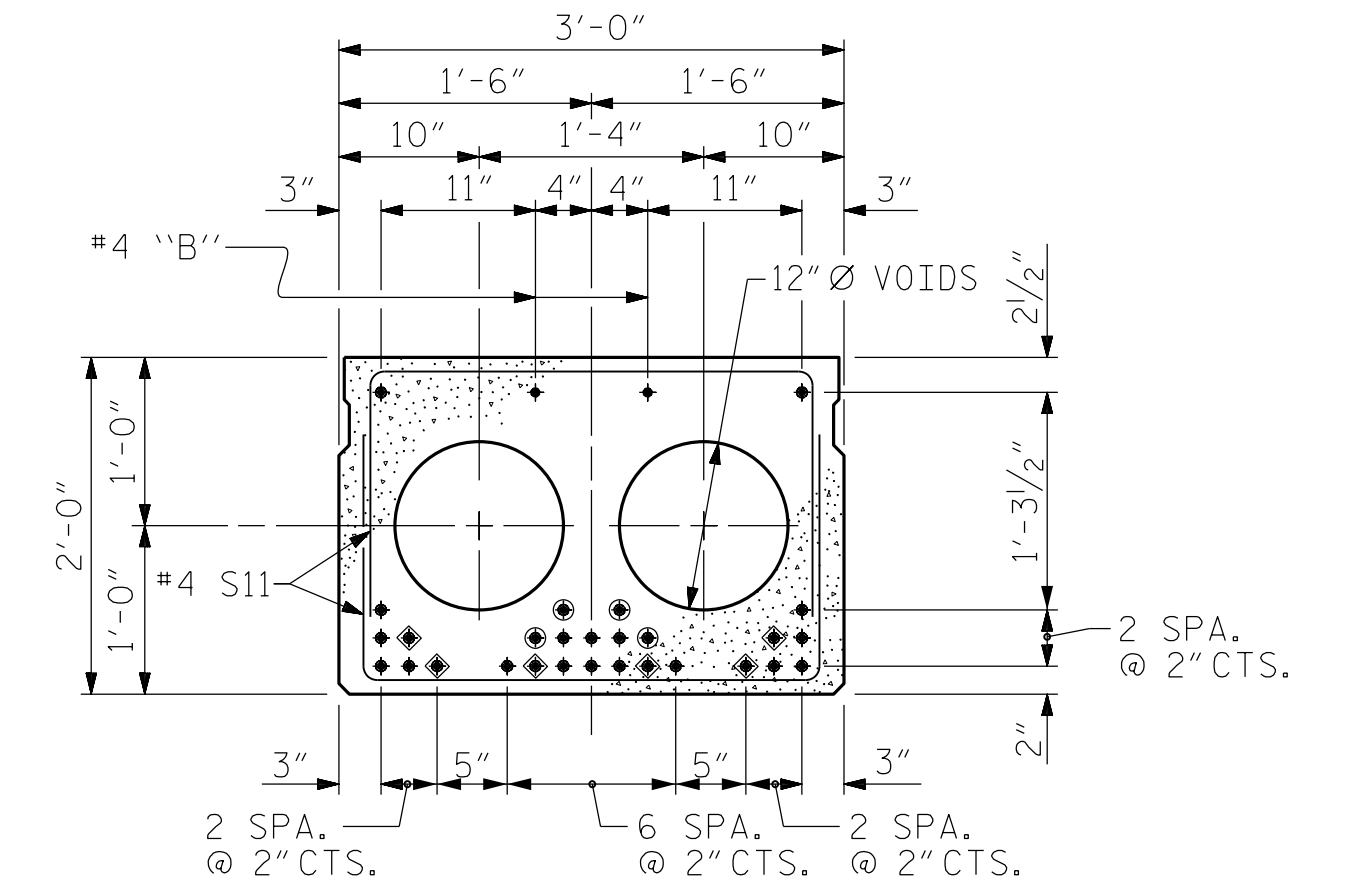
HALF SECTION  
THROUGH VOIDS

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



EXTERIOR SLAB SECTION

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

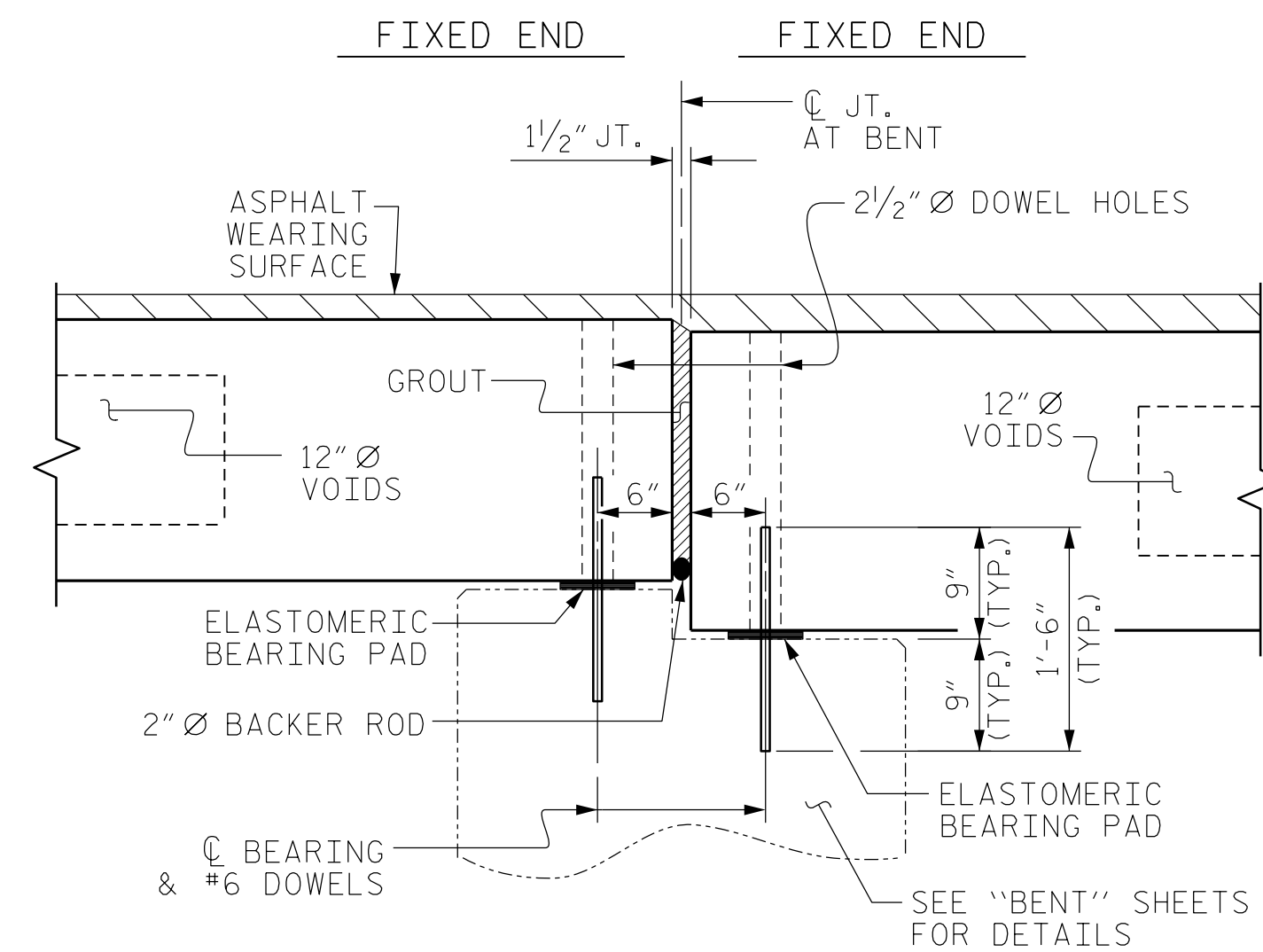


INTERIOR SLAB SECTION (65' UNIT)  
(24 STRANDS REQUIRED)

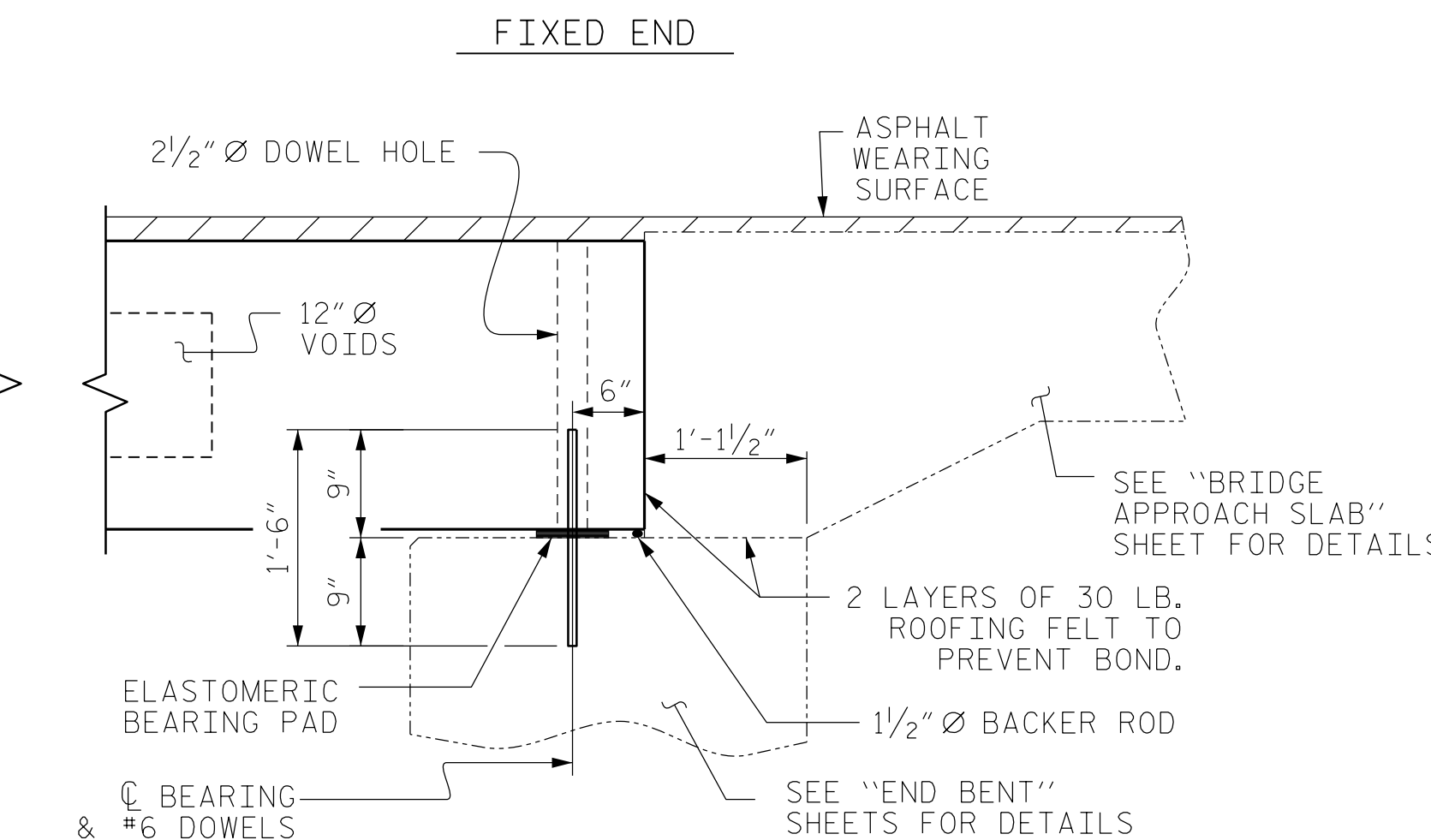
0.6" Ø LOW RELAXATION STRAND LAYOUT

- ◆ 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

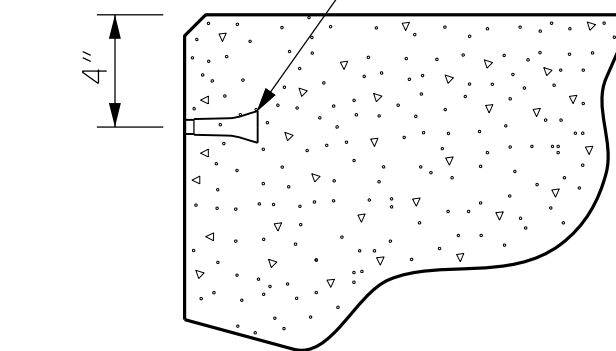


SECTION AT BENT No. 1

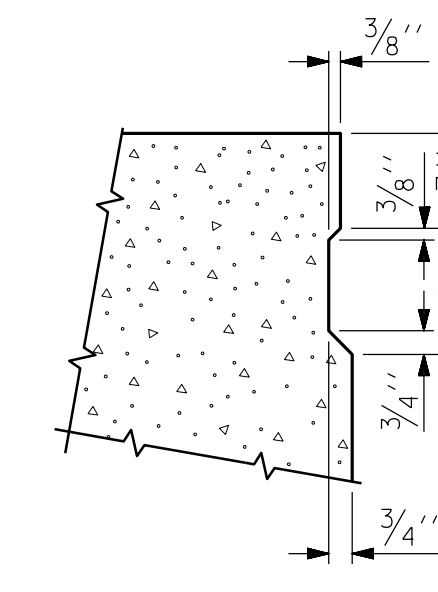


SECTION AT END BENT No. 2

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

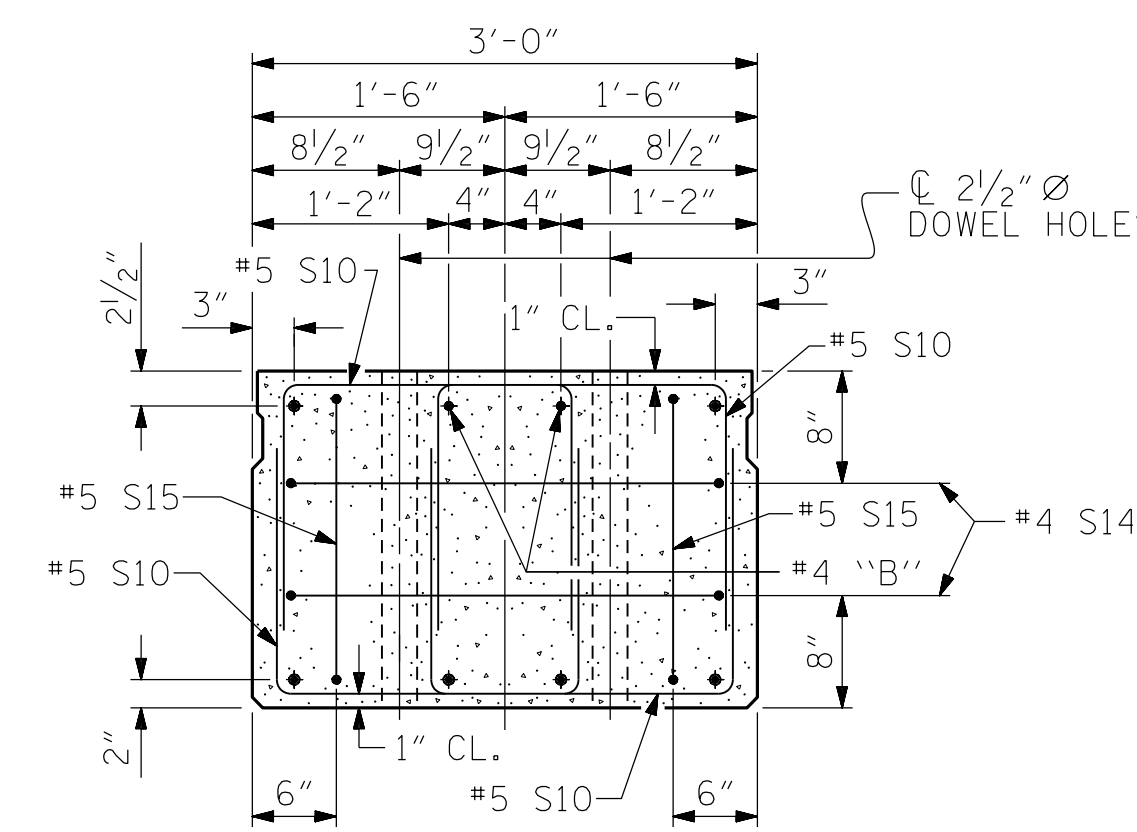


THREADED INSERT DETAIL



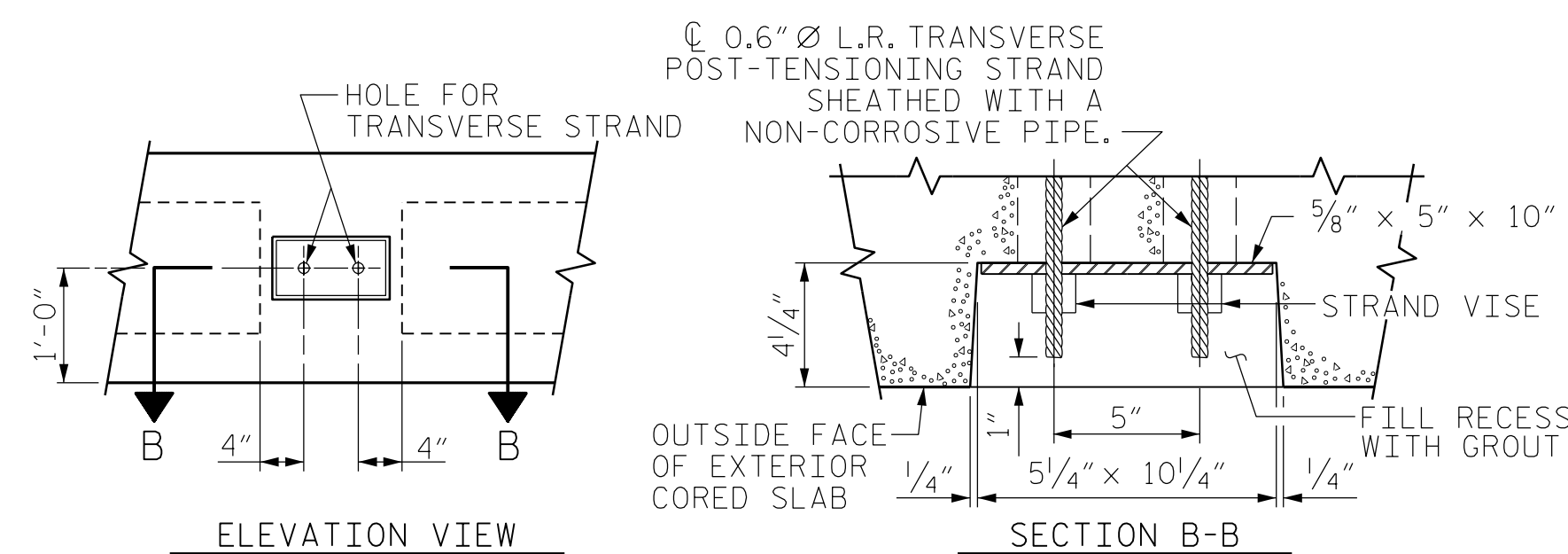
SHEAR KEY DETAIL

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.

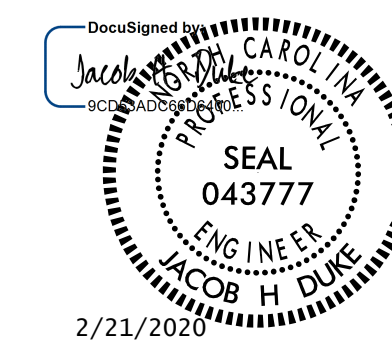


GROUTED RECESS AT END OF POST-TENSIONED STRAND-CORED SLABS

FOR FIBER OPTIC CONDUIT SYSTEM, SEE SPECIAL PROVISIONS.

DESIGN ENGINEER OF RECORD:	
JACOB H. DUKE	DATE: 01/2020
ASSEMBLED BY: DIEGO A. AGUIRRE	DATE: 01/2020
CHECKED BY: FIDEL L. FLORES	DATE: 01/2020
DRAWN BY: MAA 6/10	REV. 8/14 MAA/TMG
CHECKED BY: MKT 7/10	

2/21/2020  
BR-0117.SMU.CS02.650052.dgn  
jduke



PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
STATION: 14+26.35 -L-

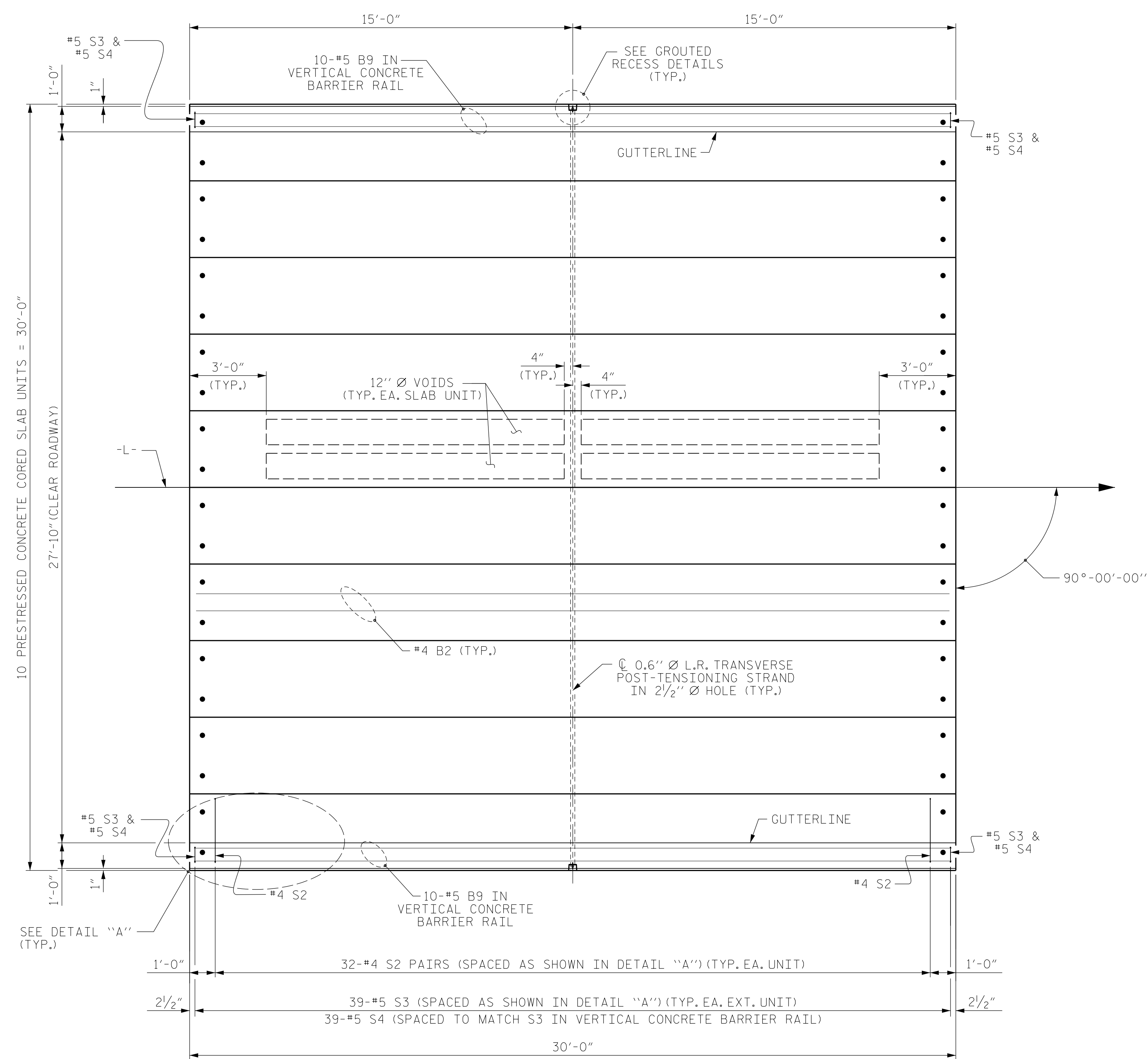
SHEET 2 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 2'-0"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT  
90° SKEW  
SPAN 'B'

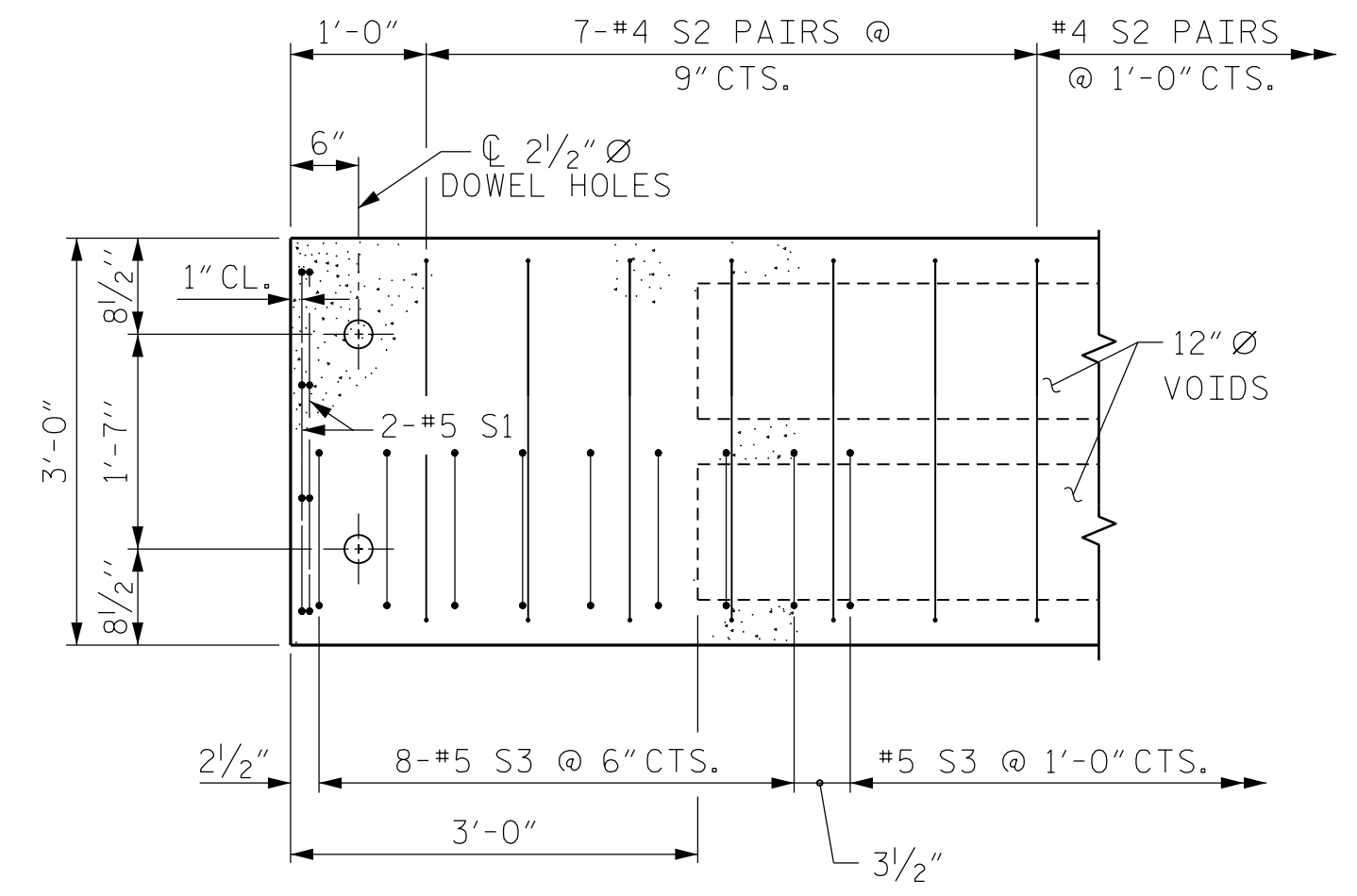
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS 19
2			4			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. 24PCS4\_30\_90S



PLAN OF UNIT

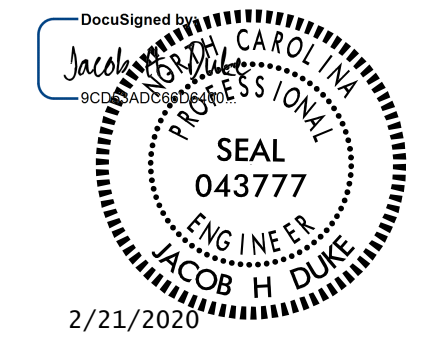


DETAIL "A"

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

PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 3 OF 6



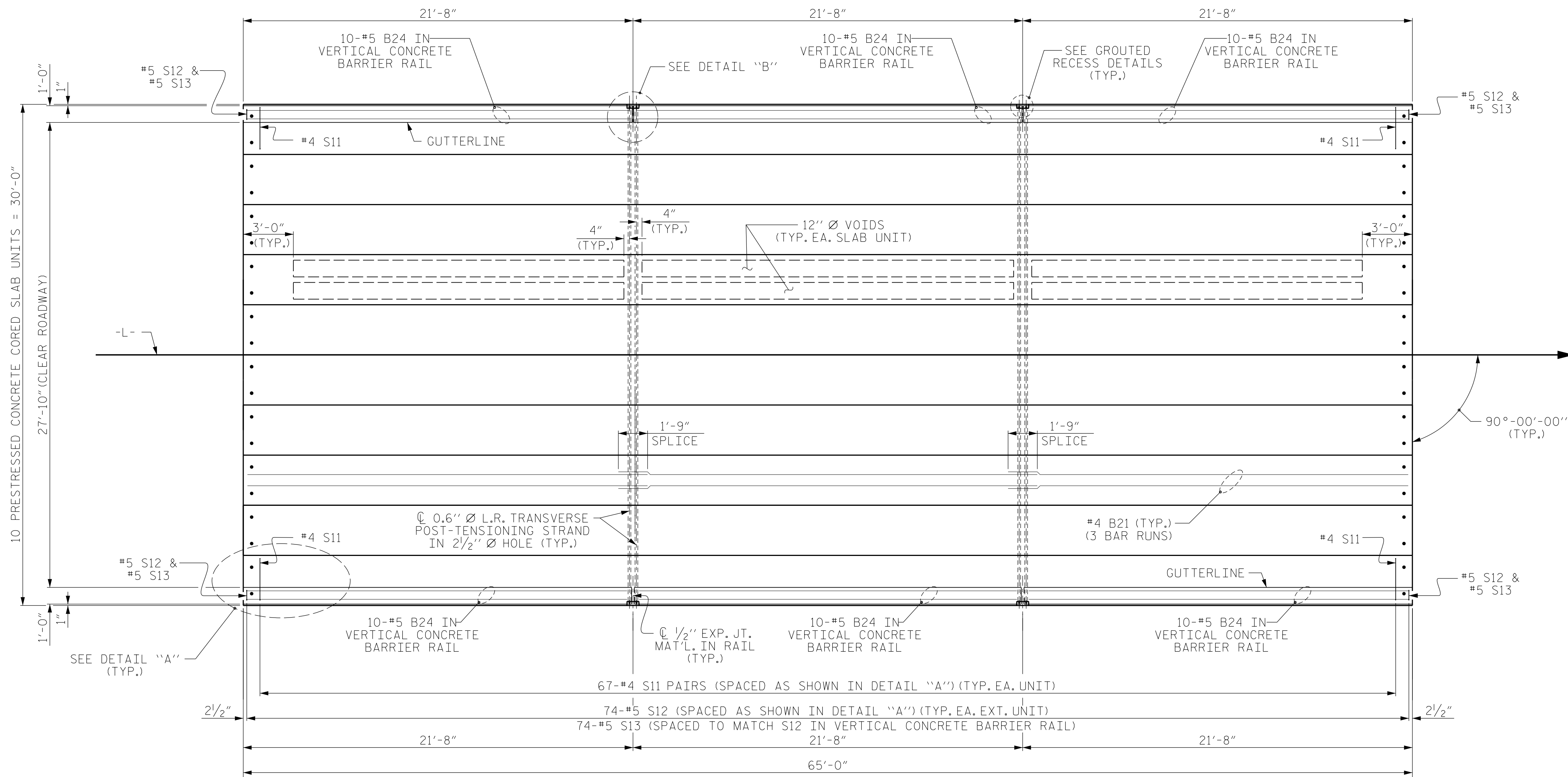
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 PLAN OF 30' UNIT  
 27'-10" CLEAR ROADWAY  
 90° SKEW  
 SPAN "A"

DESIGN ENGINEER OF RECORD:			
JACOB H. DUKE		DATE : 01/2020	
ASSEMBLED BY : DIEGO A. AGUIRRE		DATE : 01/2020	
CHECKED BY : FIDEL L. FLORES		DATE : 01/2020	
DRAWN BY : DGE	3/09	REV. 12/5/11	MAA/AAC
CHECKED BY : BCH	3/09	REV. 8/14	MAA/TMG

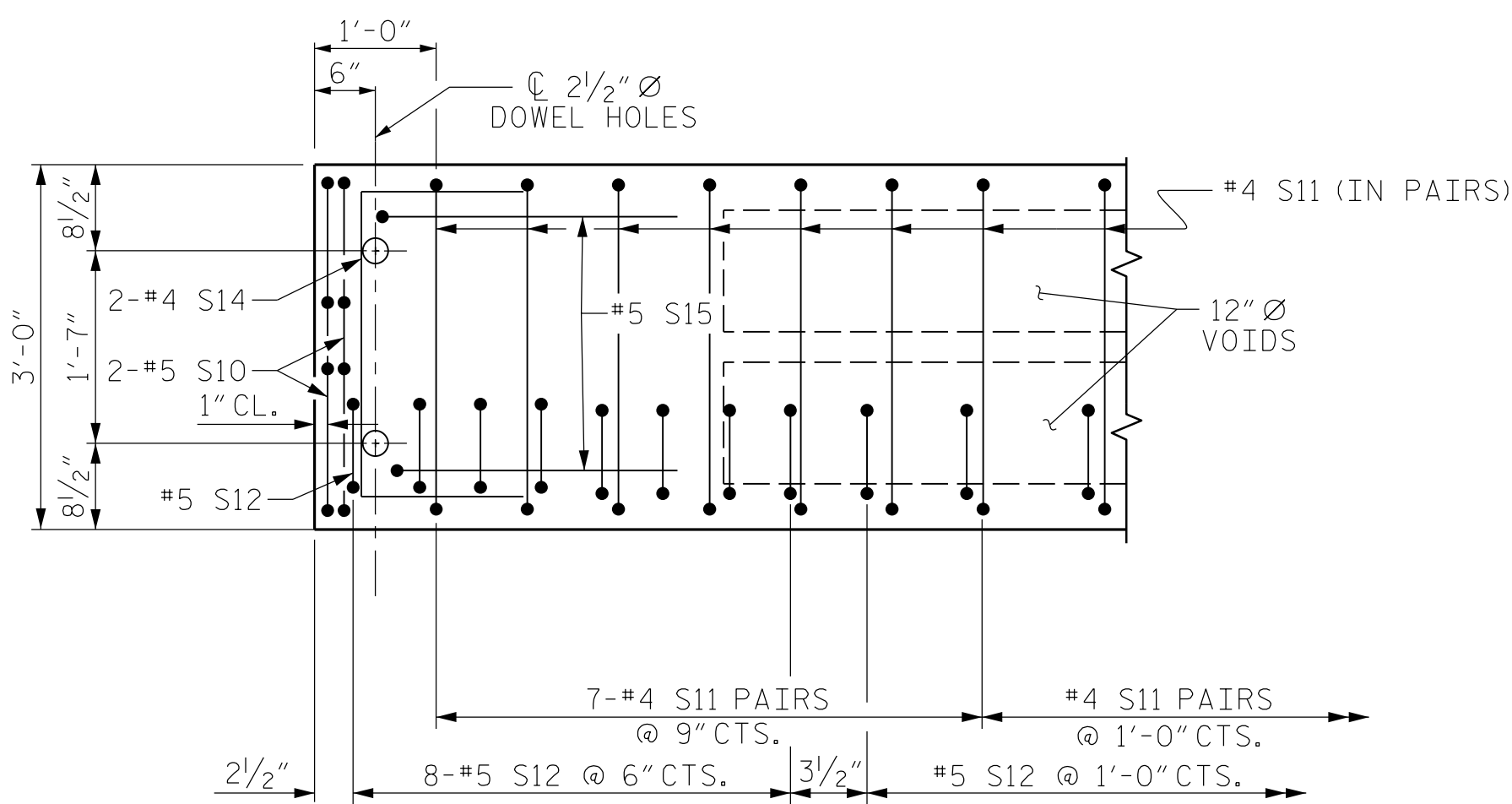
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 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7	
1			3			TOTAL SHEETS	19
2			4				



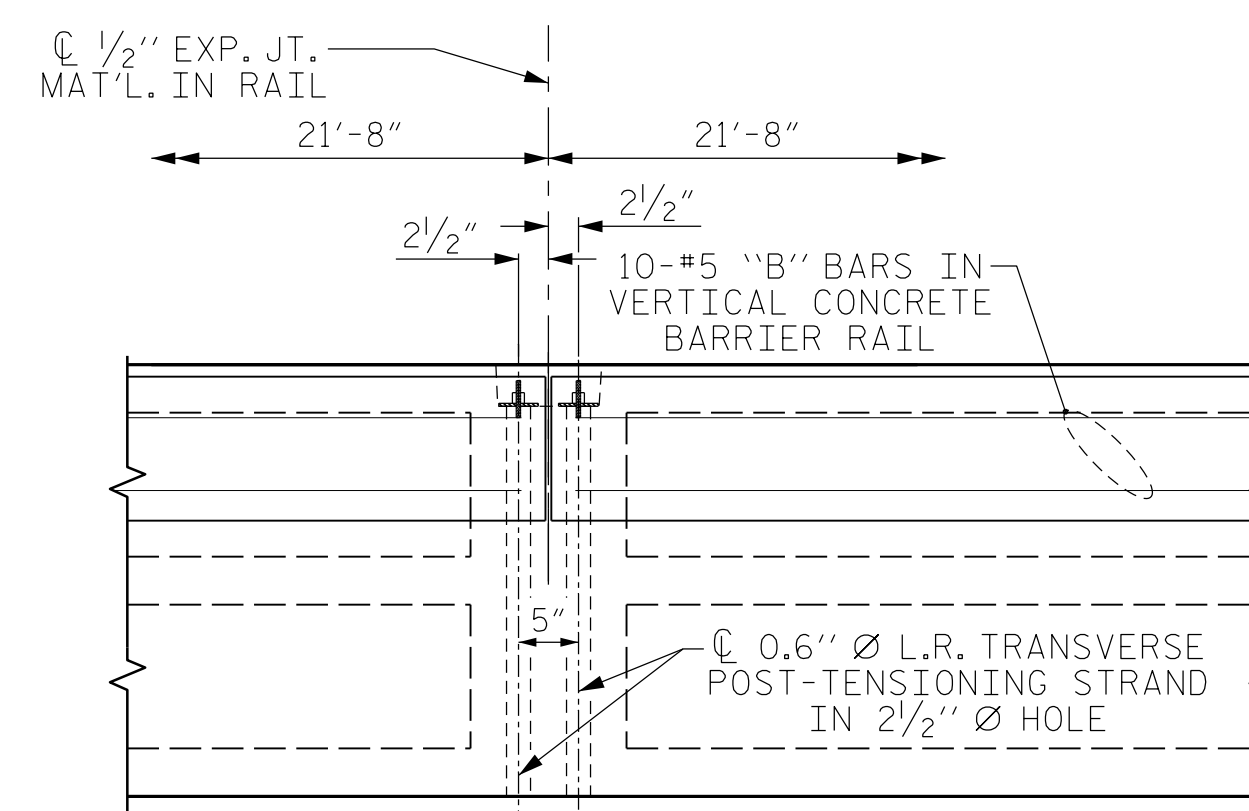


PLAN OF UNIT



DETAIL "A"

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

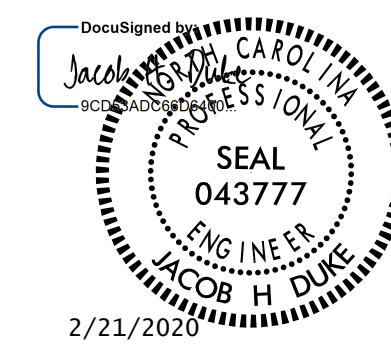


DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2.5" TRANSVERSE POST-TENSIONING STRAND HOLES

DESIGN ENGINEER OF RECORD:			
JACOB H. DUKE DATE: 01/2020			
ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020		CHECKED BY: FIDEL L. FLORES DATE: 01/2020	
DRAWN BY: MAA 6/10	REV. 12/5/11	MAA/AAC	
CHECKED BY: MKT 7/10	REV. 8/14	MAA/TMG	

2/21/2020  
 BR-0117.SMU.CS04.650052.dgn  
 jduke



PROJECT NO. BR-0117  
 NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 PLAN OF 65' UNIT  
 27'-10" CLEAR ROADWAY  
 90° SKEW  
 SPAN "B"

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

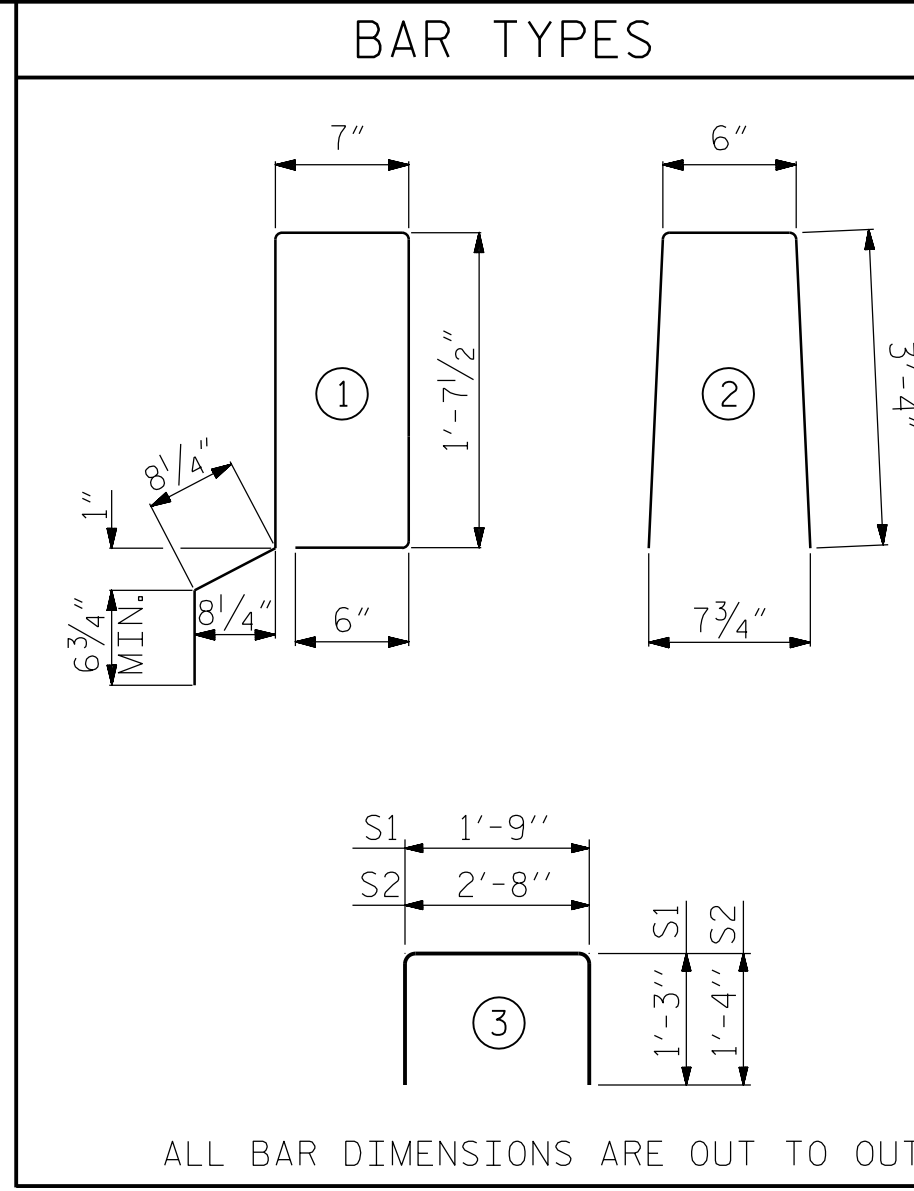
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			19

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
30' UNIT						
* B9	20	20	#5	STR	29'-7"	617
* S4	78	78	#5	2	7'-2"	583
* EPOXY COATED REINFORCING STEEL						LBS. 1200
CLASS AA CONCRETE						CU.YDS. 7.7
TOTAL VERTICAL CONCRETE BARRIER RAIL						LN. FT. 60.25

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
30' UNITS	2 5/8"	3'-8 5/8"

DEAD LOAD DEFLECTION AND CAMBER	
30' CORED SLAB UNIT	3'-0" x 1'-9"
CAMBER (SLAB ALONE IN PLACE)	0.6" Ø L.R. STRAND
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/4" ↑
FINAL CAMBER	1/8" ↓

\*\* INCLUDES FUTURE WEARING SURFACE



### 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 SIDWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

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

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

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

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

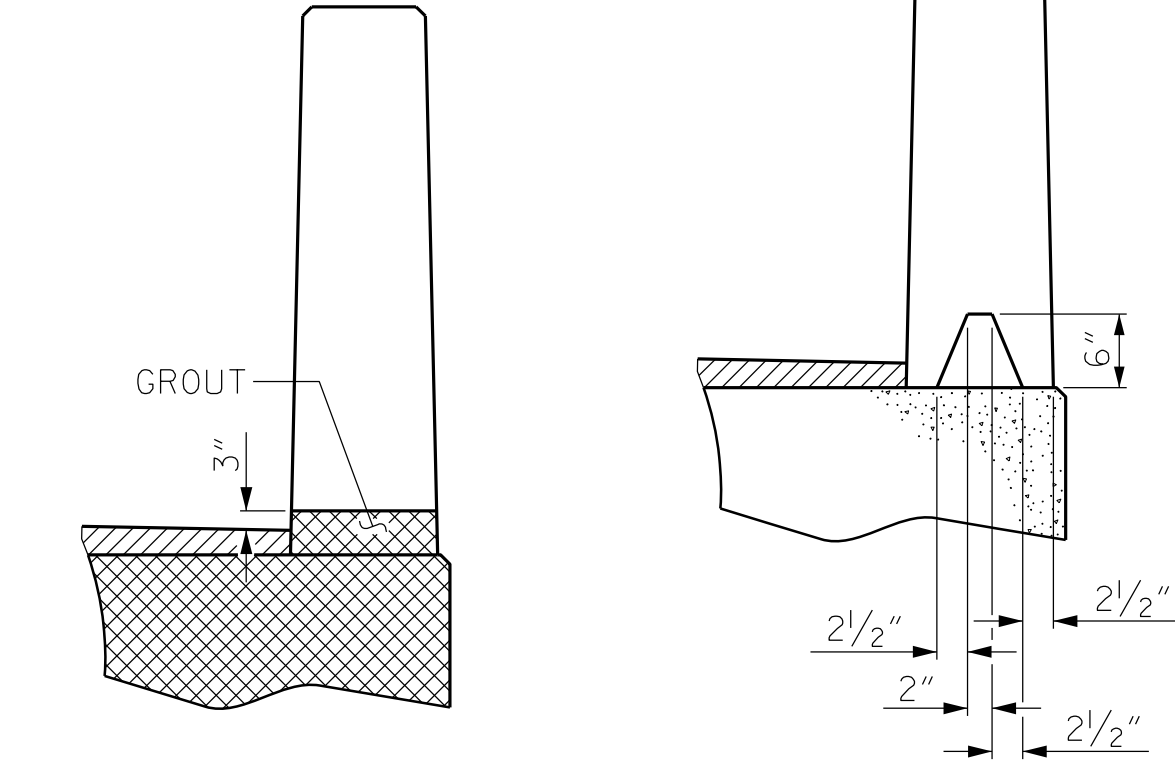
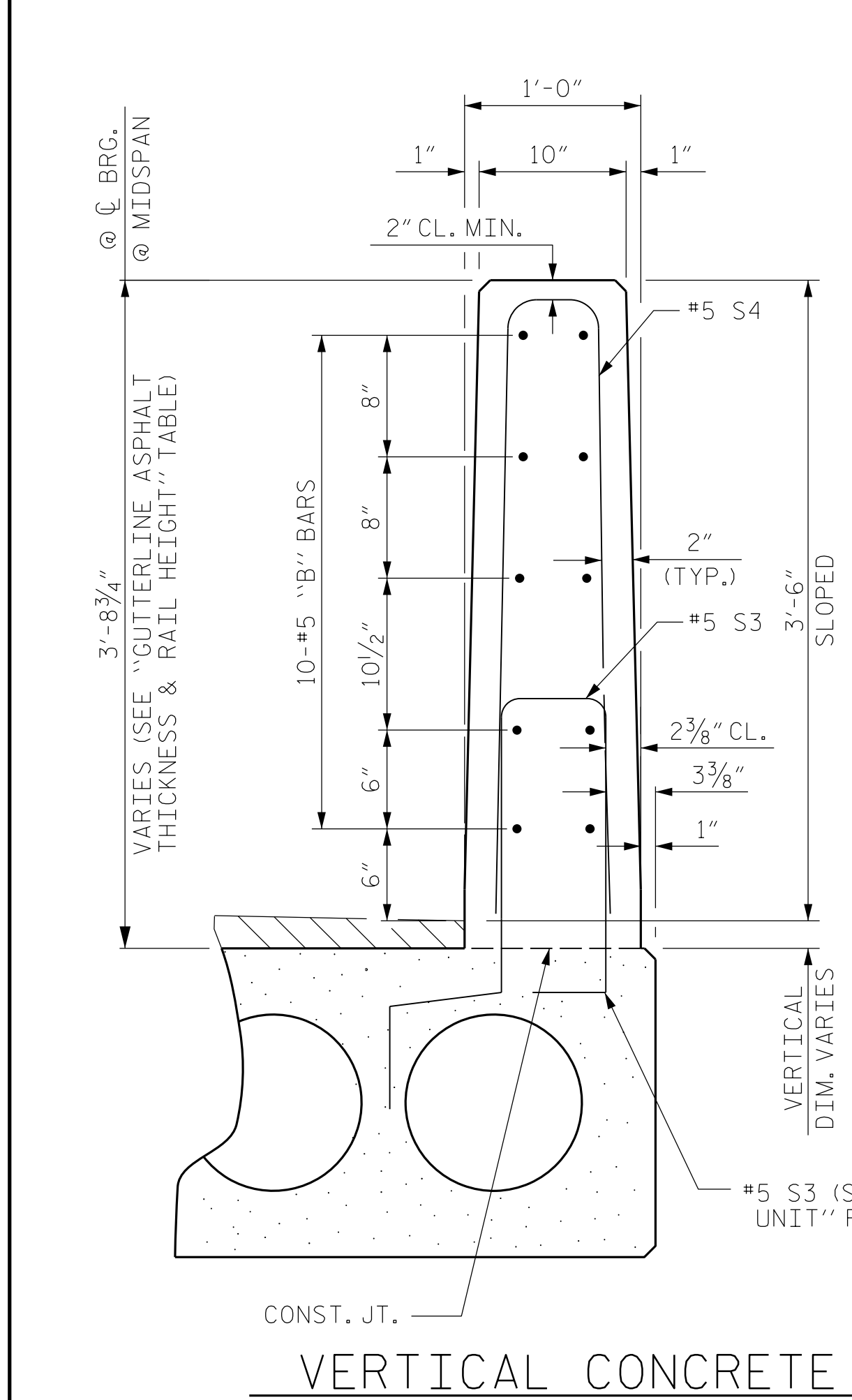
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

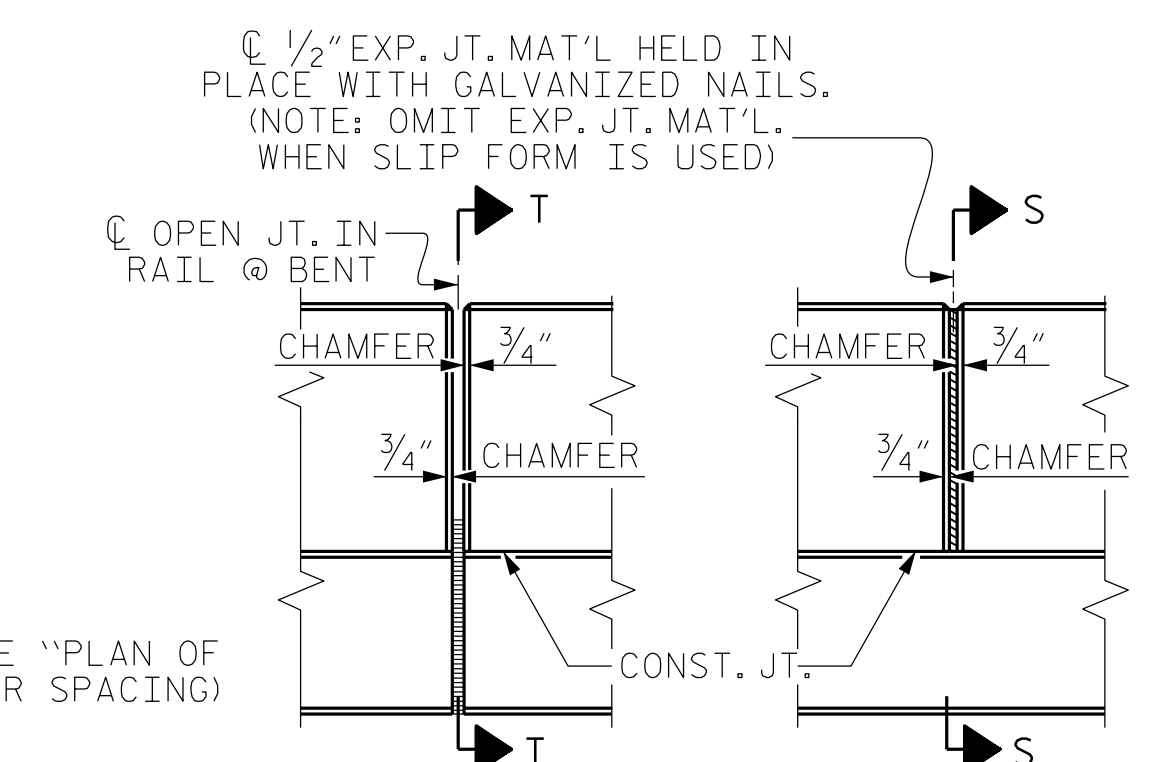
THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

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



**SECTION T-T**  
AT OPEN JOINT AT BENT  
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)

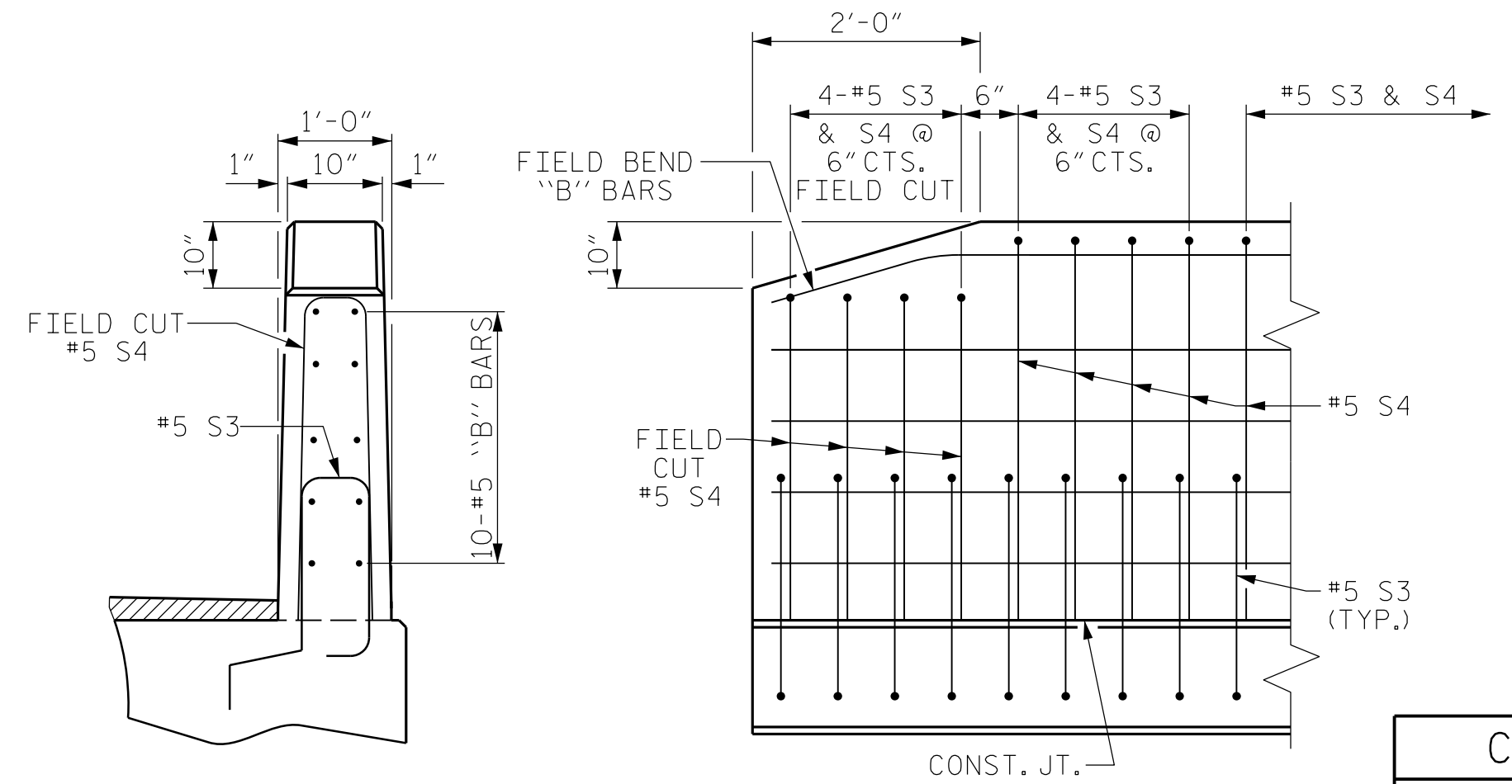
**SECTION S-S**  
AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

### ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



END VIEW SIDE VIEW

### END OF RAIL DETAILS

BILL OF MATERIAL FOR ONE 30' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B2	2	#4	STR	29'-8"	40	29'-8"	40
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	64	#4	3	5'-4"	228	5'-4"	228
* S3	39	#5	1	5'-7"	227		
REINFORCING STEEL				LBS.	303		303
* EPOXY COATED REINFORCING STEEL				LBS.	227		
5000 P.S.I. CONCRETE				CU. YDS.	4.4		4.4
0.6" Ø L.R. STRANDS				No.	9		9

CORED SLABS REQUIRED			
30' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	30'-0"	60'-0"
INTERIOR C.S.	8	30'-0"	240'-0"
TOTAL	10		300'-0"

CONCRETE RELEASE STRENGTH	
UNIT	PSI
30' UNITS	4000

PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
STATION: 14+26.35 -L-

SHEET 5 OF 6



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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 1'-9"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT  
90° SKEW  
SPAN "A"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS 19
2			4			

DESIGN ENGINEER OF RECORD:  
JACOB H. DUKE DATE: 01/2020

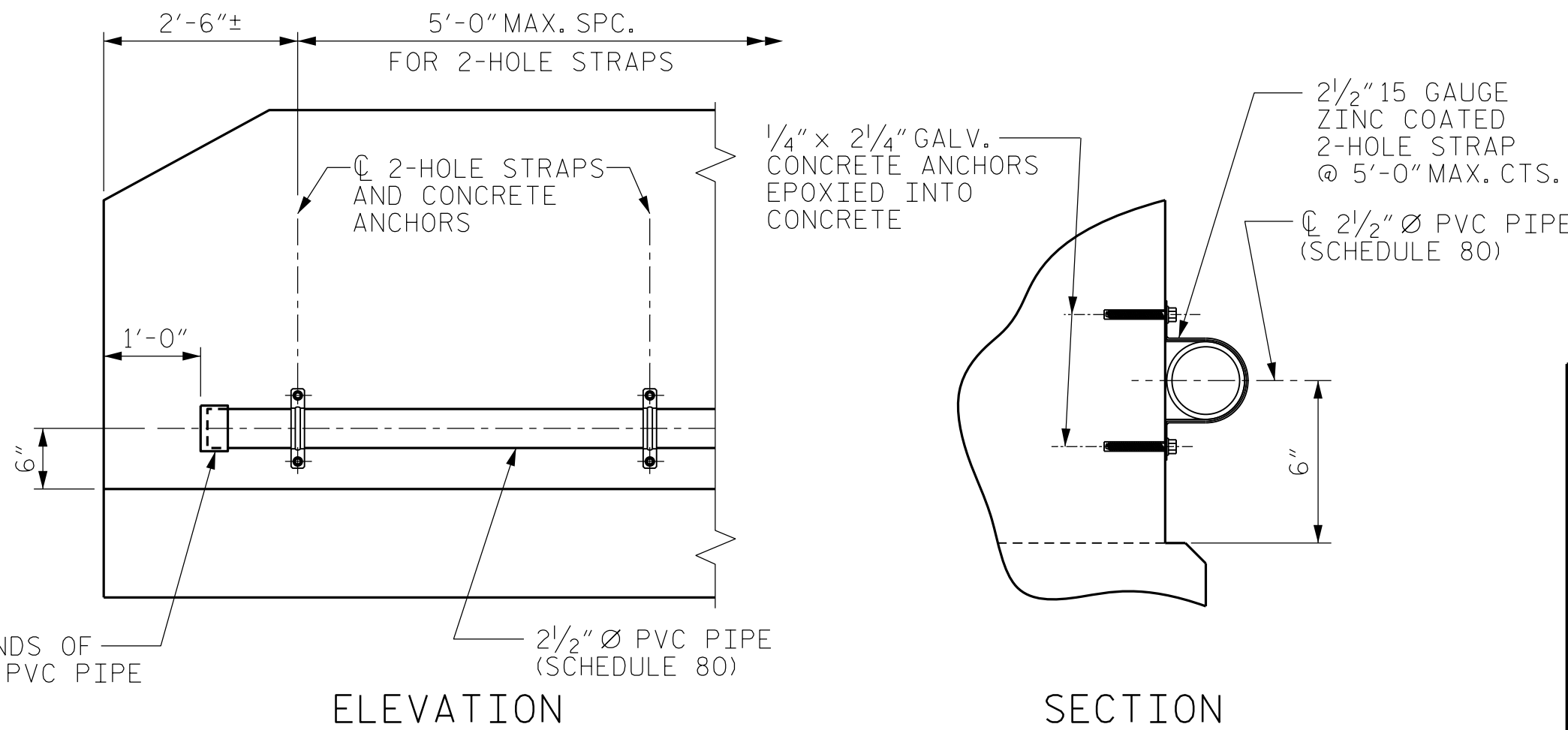
ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020  
CHECKED BY: FIDEL L. FLORES DATE: 01/2020

DRAWN BY: DGE 5/09  
CHECKED BY: BCH 6/09

REV. 5/18 MAA/THC

### FIBER OPTIC CONDUIT SYSTEM DETAILS

2 1/2" Ø SCHEDULE 80 PVC PIPE ATTACHED TO THE BACK OF BOTH RAILS FOR FUTURE FIBER OPTIC CABLE.



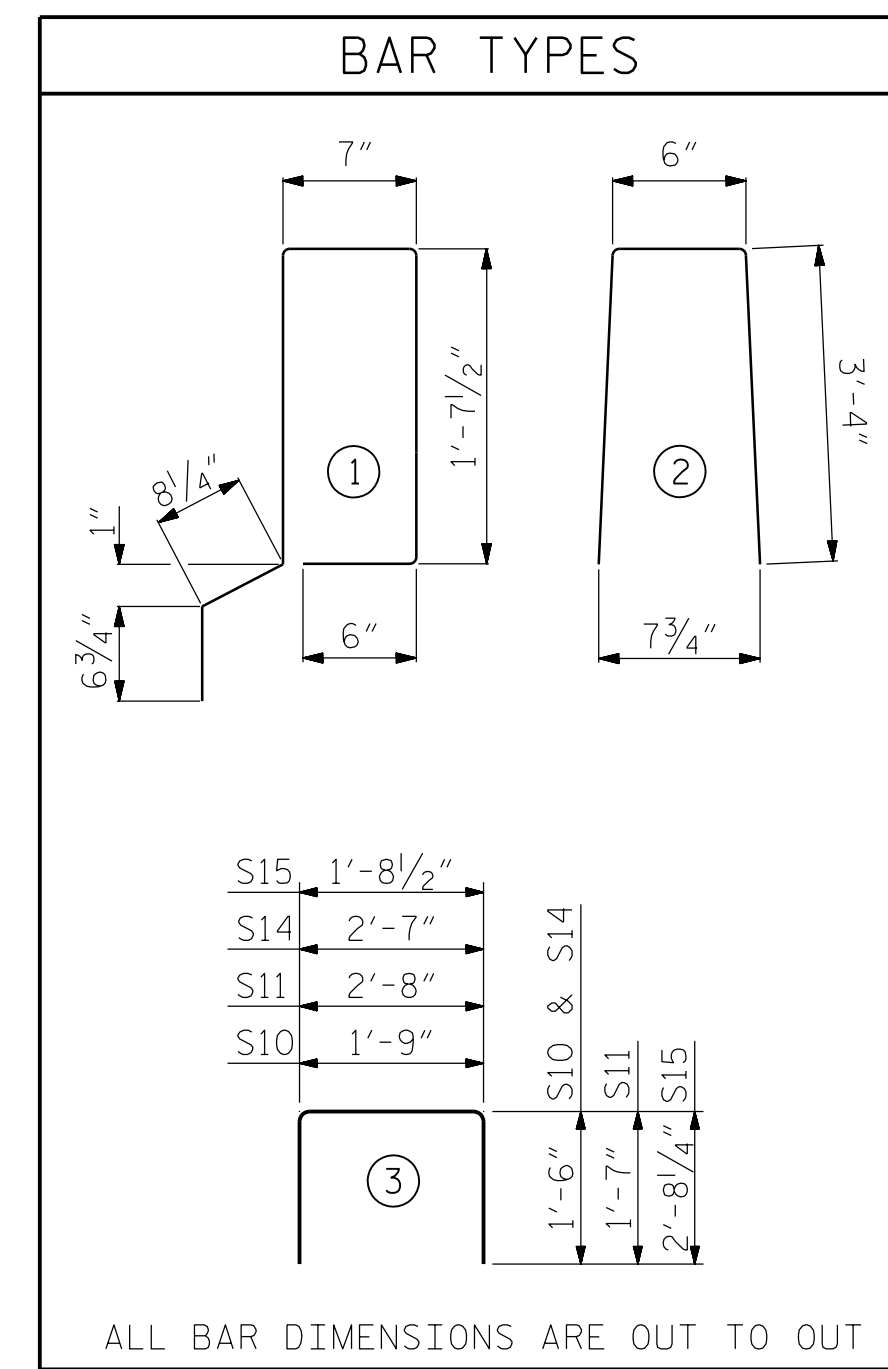
ELEVATION SECTION

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS 65' UNIT	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
*B24	60	60	#5	STR	21'-3"	1330
*S13	148	148	#5	2	7'-2"	1106
*EPOXY COATED REINFORCING STEEL					LBS.	2436
CLASS AA CONCRETE					CU.YDS.	16.9
TOTAL VERTICAL CONCRETE BARRIER RAIL					LN. FT.	130.25

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
65' UNITS	2 1/8"	3'-8 1/8"

DEAD LOAD DEFLECTION AND CAMBER	
65' CORED SLAB UNIT	3'-0" x 2'-0" 0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 7/8" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/2" ↓
FINAL CAMBER	1 3/8" ↑

\*\* INCLUDES FUTURE WEARING SURFACE



### 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.

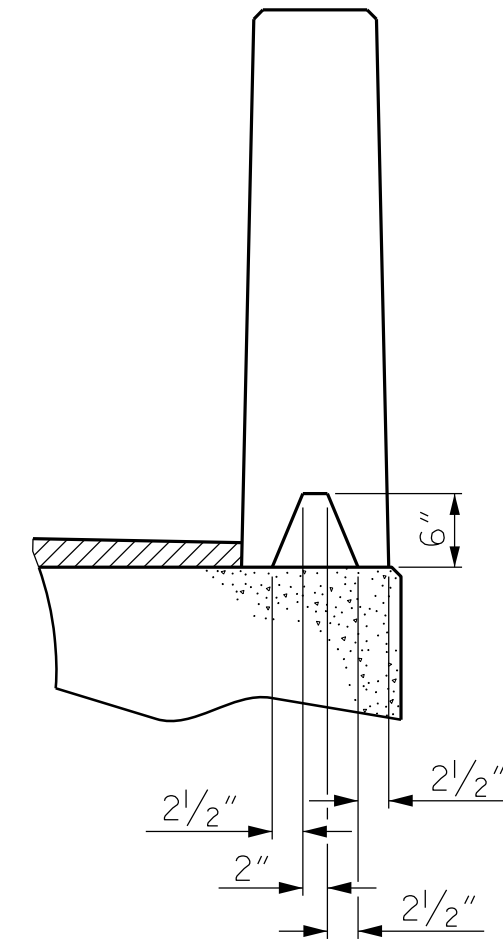
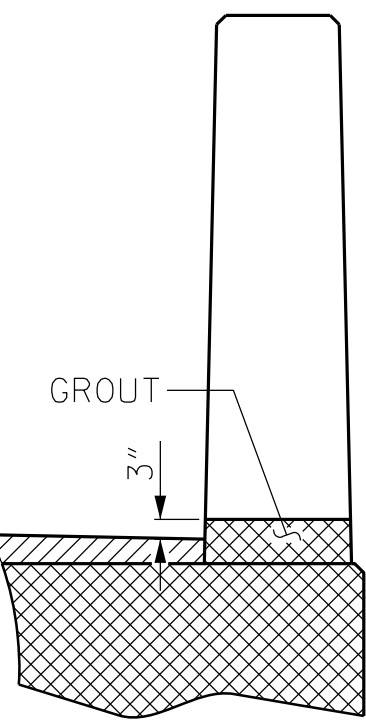
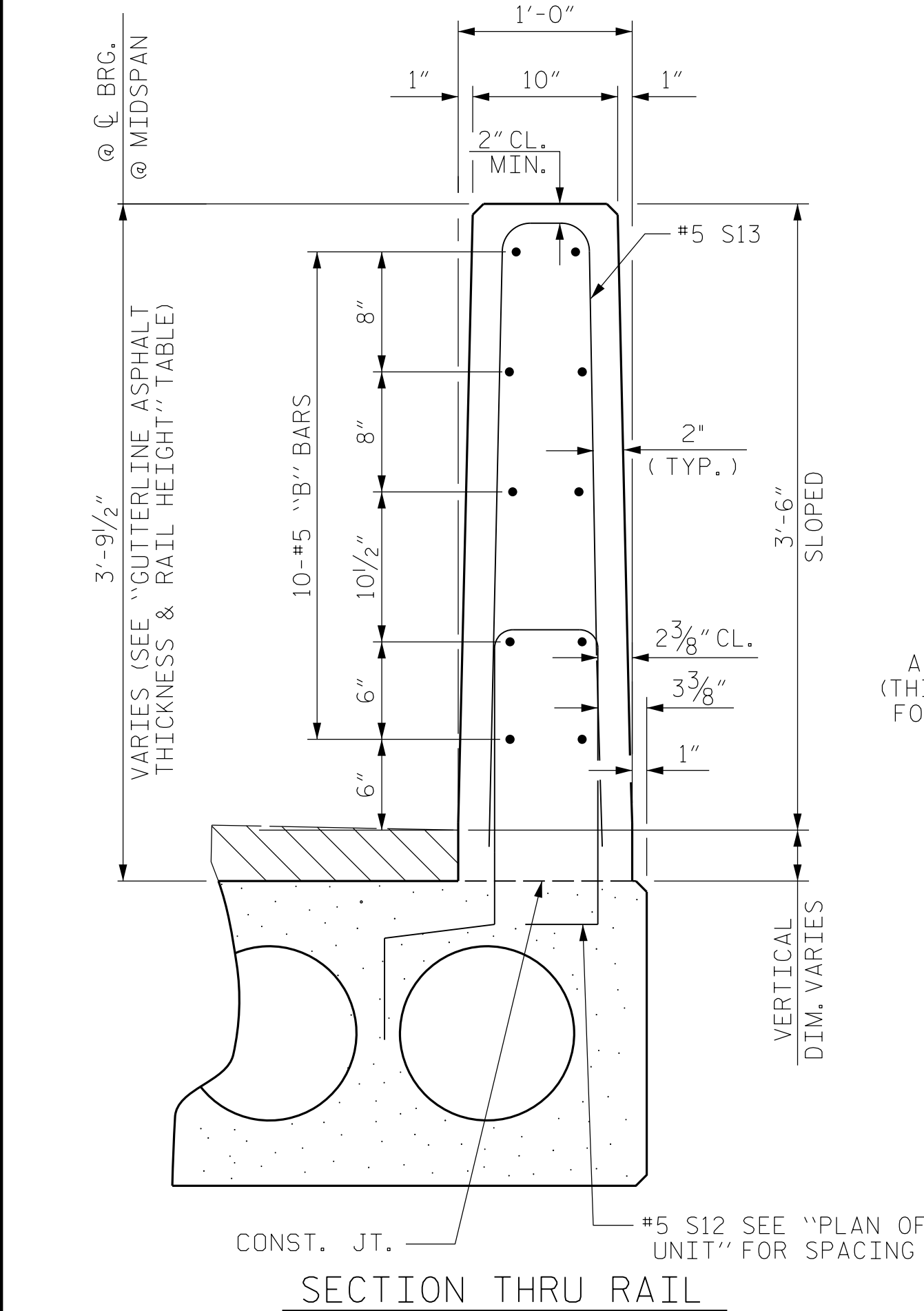
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.

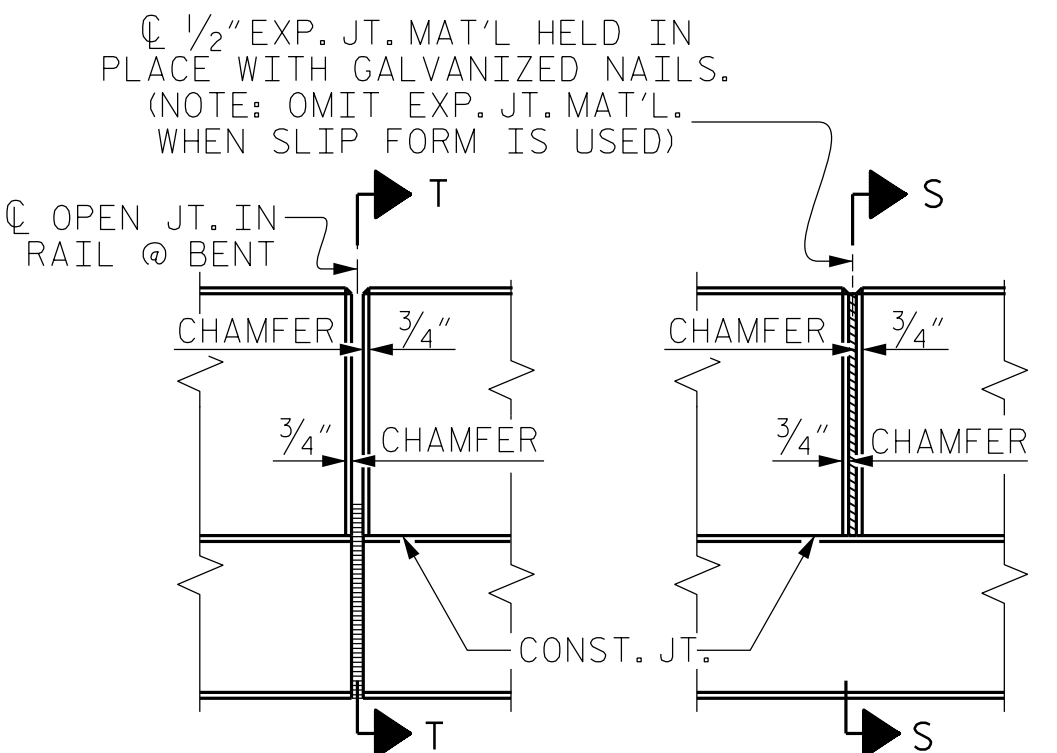
THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

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



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

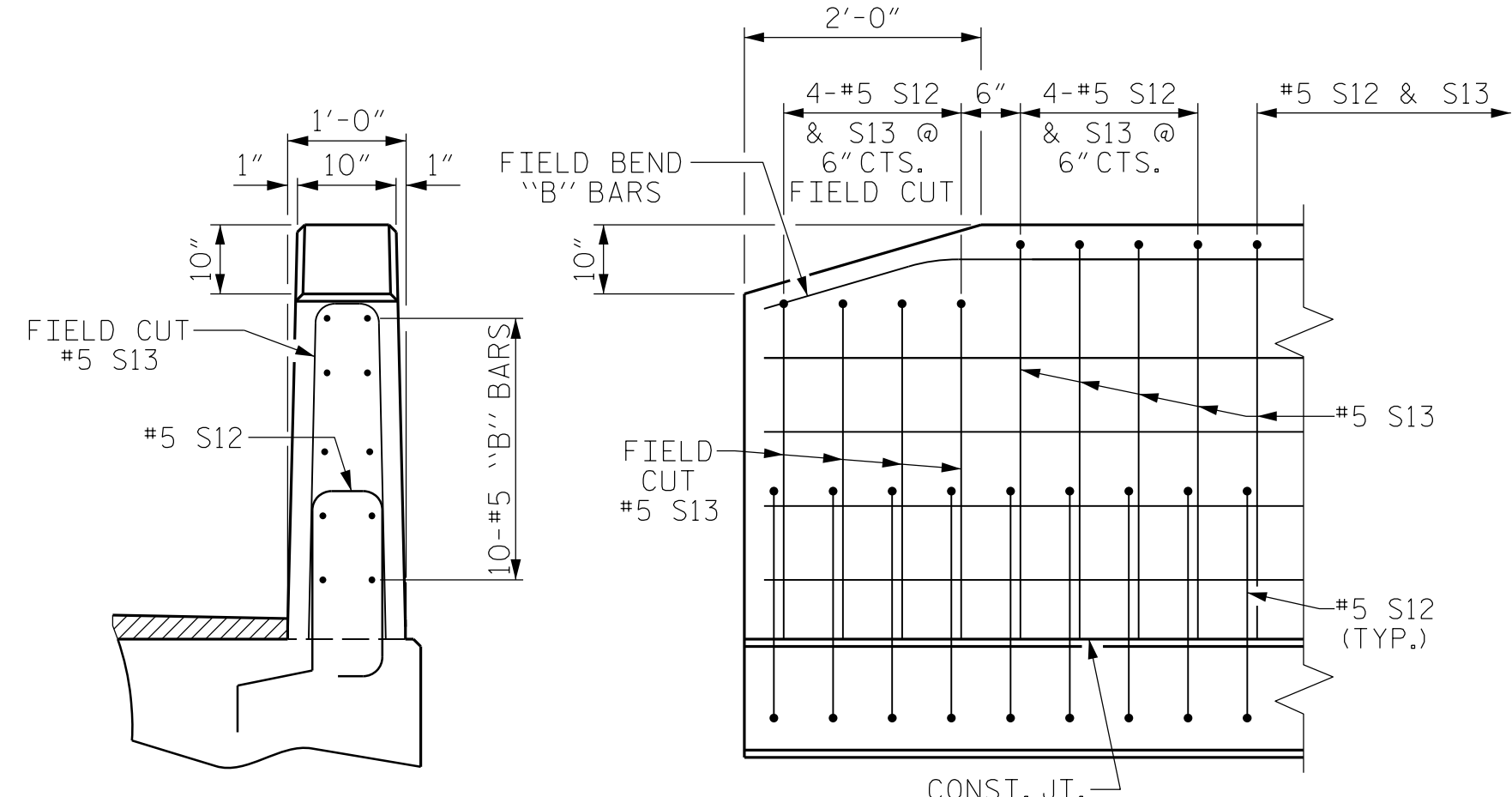
SECTION S-S  
AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY  
WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

### ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



END VIEW  
SIDE VIEW  
END OF RAIL DETAILS

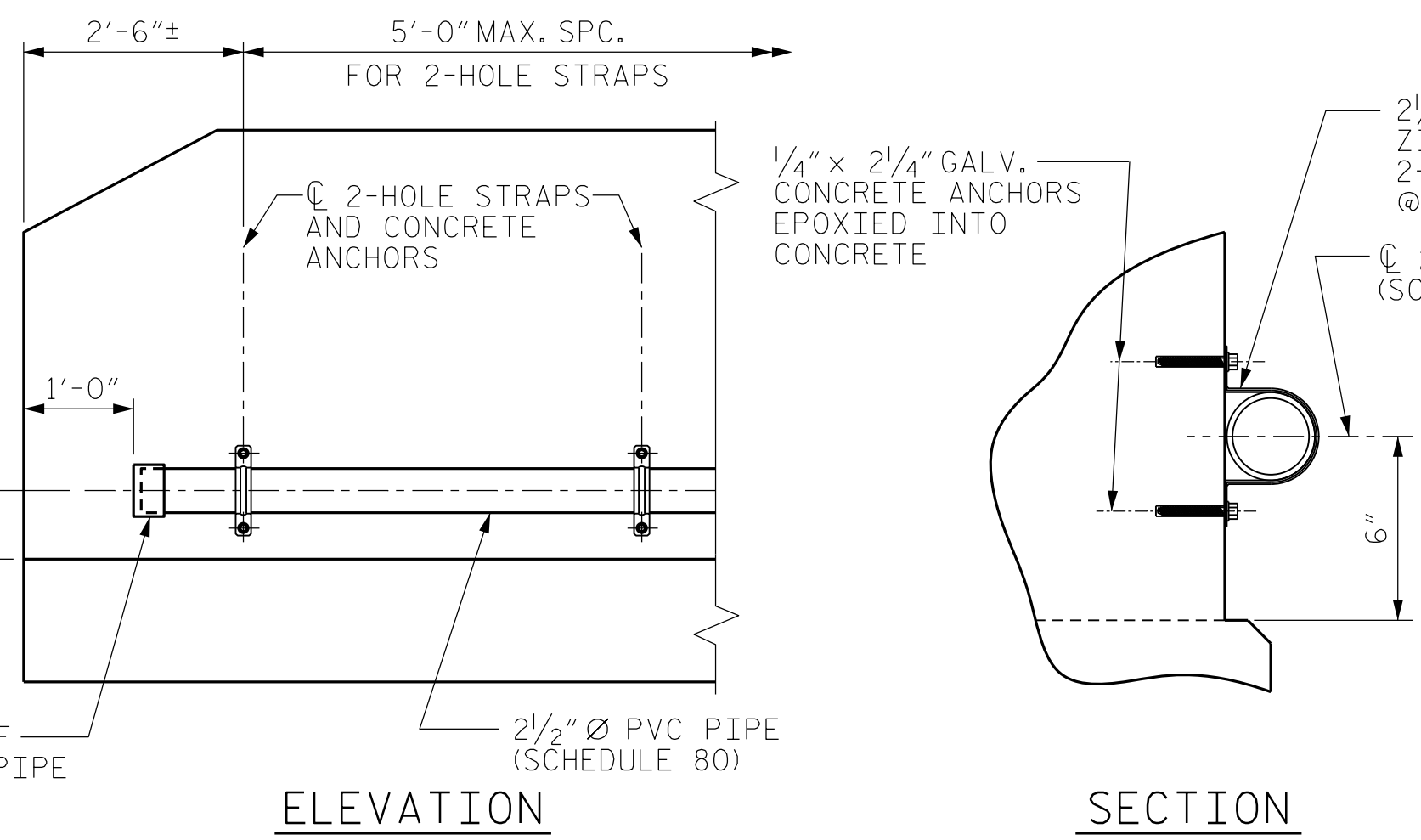
BILL OF MATERIAL FOR ONE 65' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B21	6	#4	STR	22'-10"	92	22'-10"	92
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	134	#4	3	5'-10"	522	5'-10"	522
*S12	74	#5	1	5'-7"	431		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL				LBS.	699	699	
*EPOXY COATED REINFORCING STEEL				LBS.	431		
6000 P.S.I. CONCRETE				CU. YDS.	11.0	11.0	
0.6" Ø L.R. STRANDS				No.	24	24	

CORED SLABS REQUIRED			
65' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	65'-0"	130'-0"
INTERIOR C.S.	8	65'-0"	520'-0"
TOTAL	10		650'-0"

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

### VERTICAL CONCRETE BARRIER RAIL DETAILS



ELEVATION  
SECTION  
FIBER OPTIC CONDUIT SYSTEM DETAILS

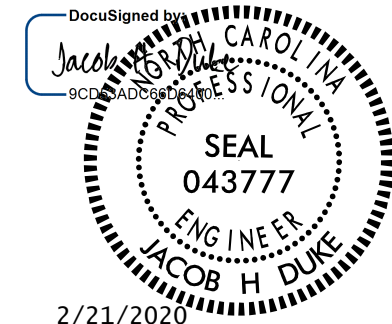
2 1/2" Ø SCHEDULE 80 PVC PIPE ATTACHED TO THE BACK OF BOTH RAILS FOR FUTURE FIBER OPTIC CABLE.

DESIGN ENGINEER OF RECORD:			
JACOB H. DUKE DATE: 01/2020			
ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020			
CHECKED BY: FIDEL L. FLORES DATE: 01/2020			
DRAWN BY: MAA	6/10	REV. 5/18	MAA/THC
CHECKED BY: MKT	7/10		

CONCRETE RELEASE STRENGTH	
UNIT	PSI
65' UNITS	4800

PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
STATION: 14+26.35 -L-

SHEET 6 OF 6



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS 19
2			4			

NOTES

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

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

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

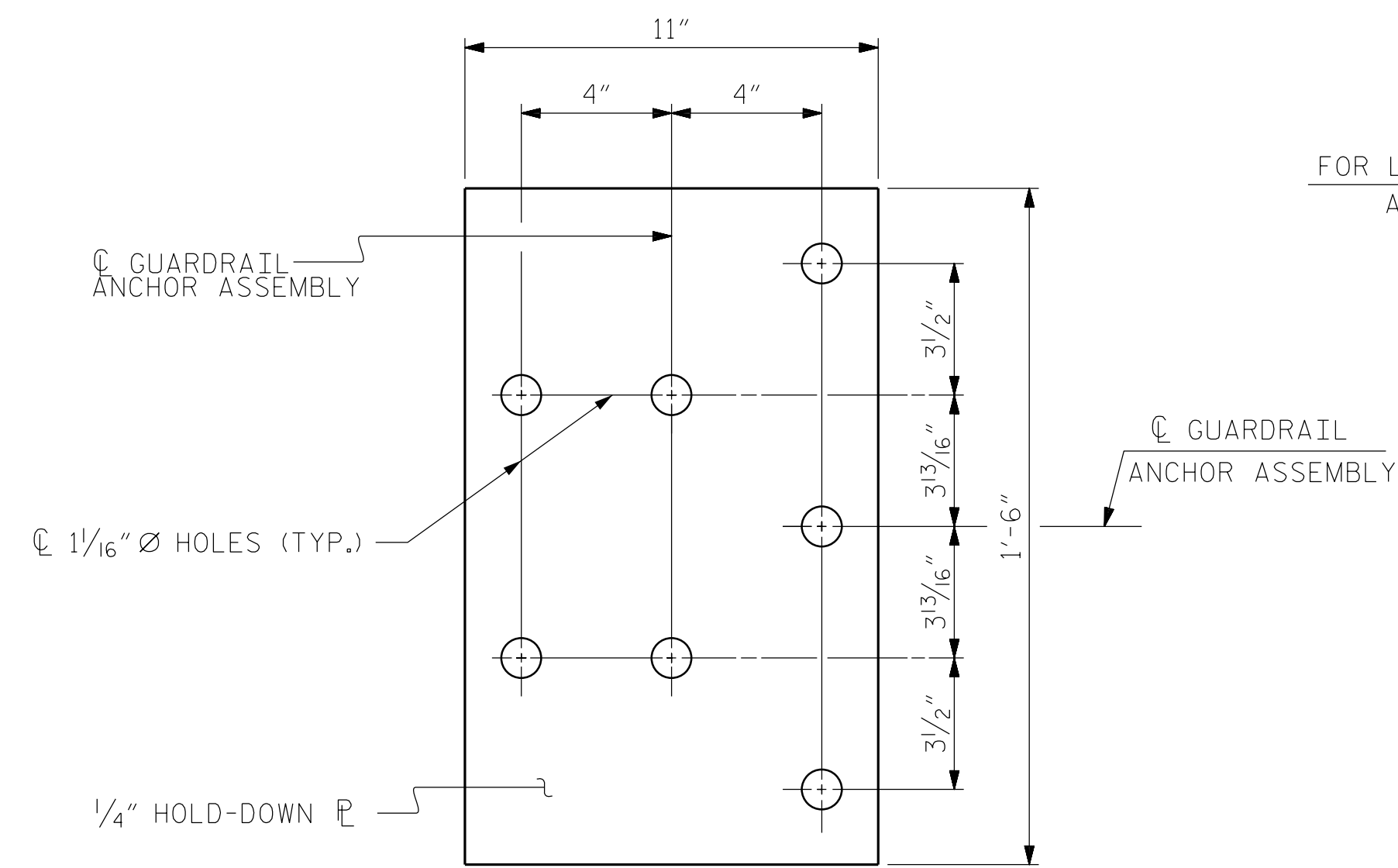
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

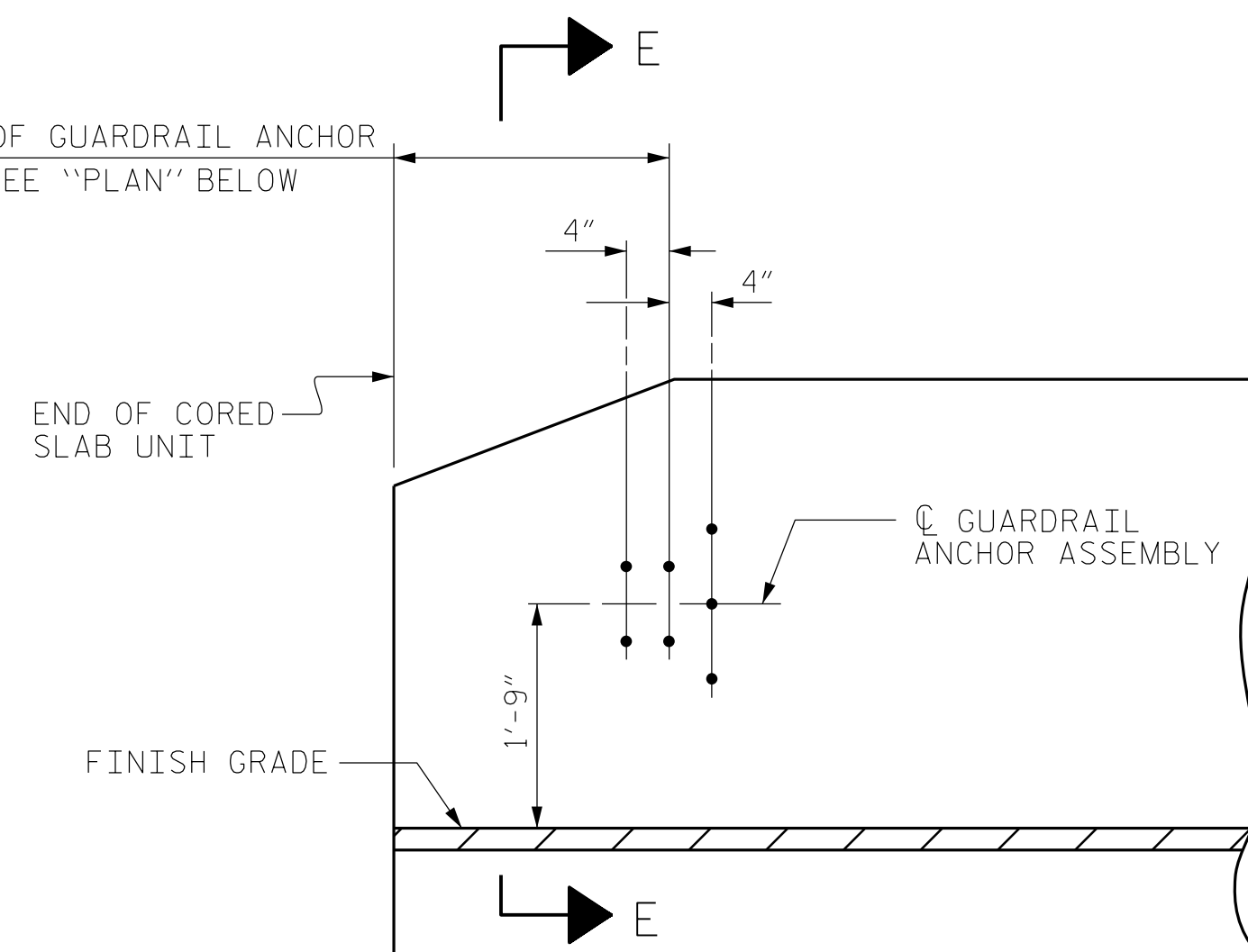
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 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.

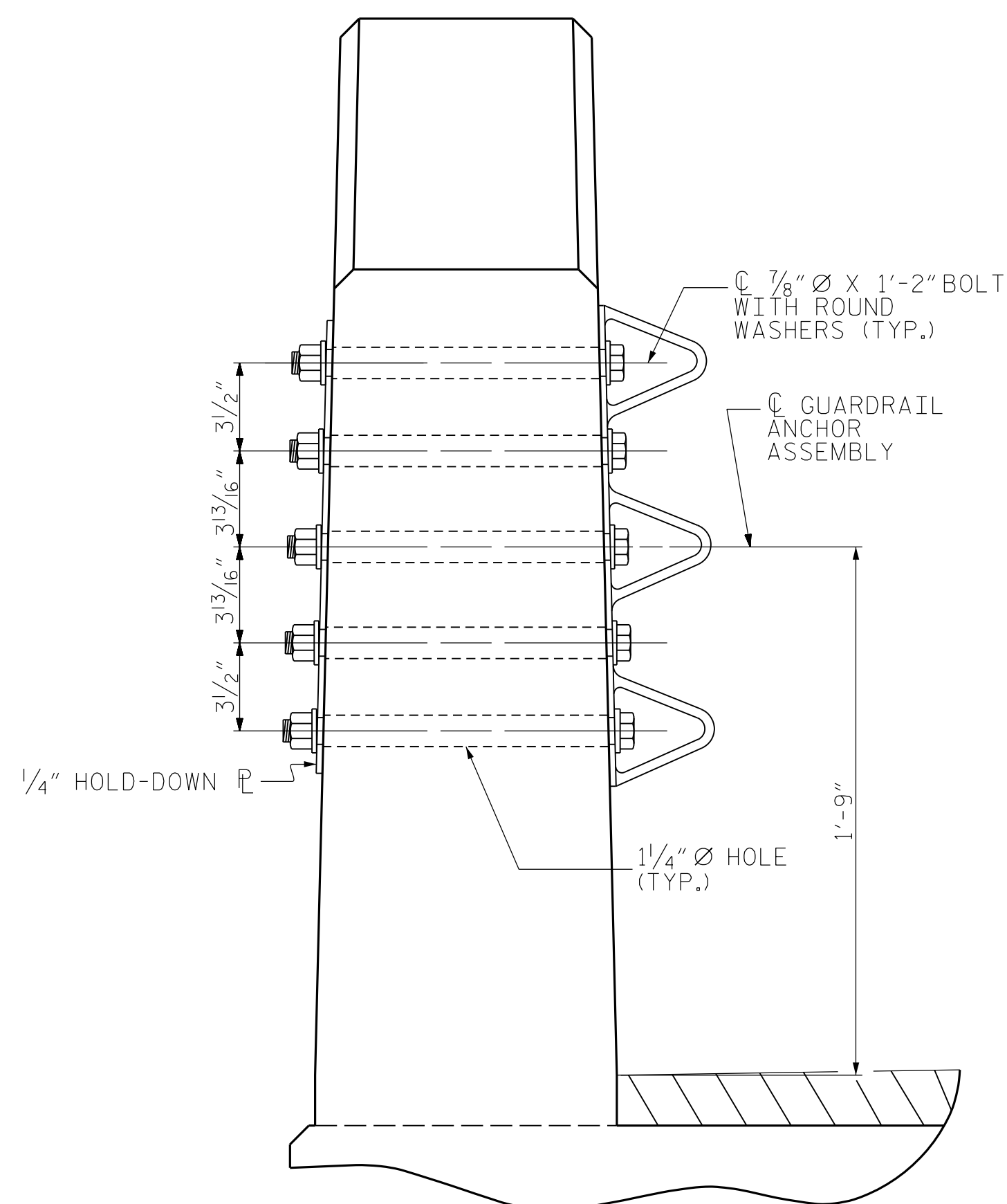


PLAN

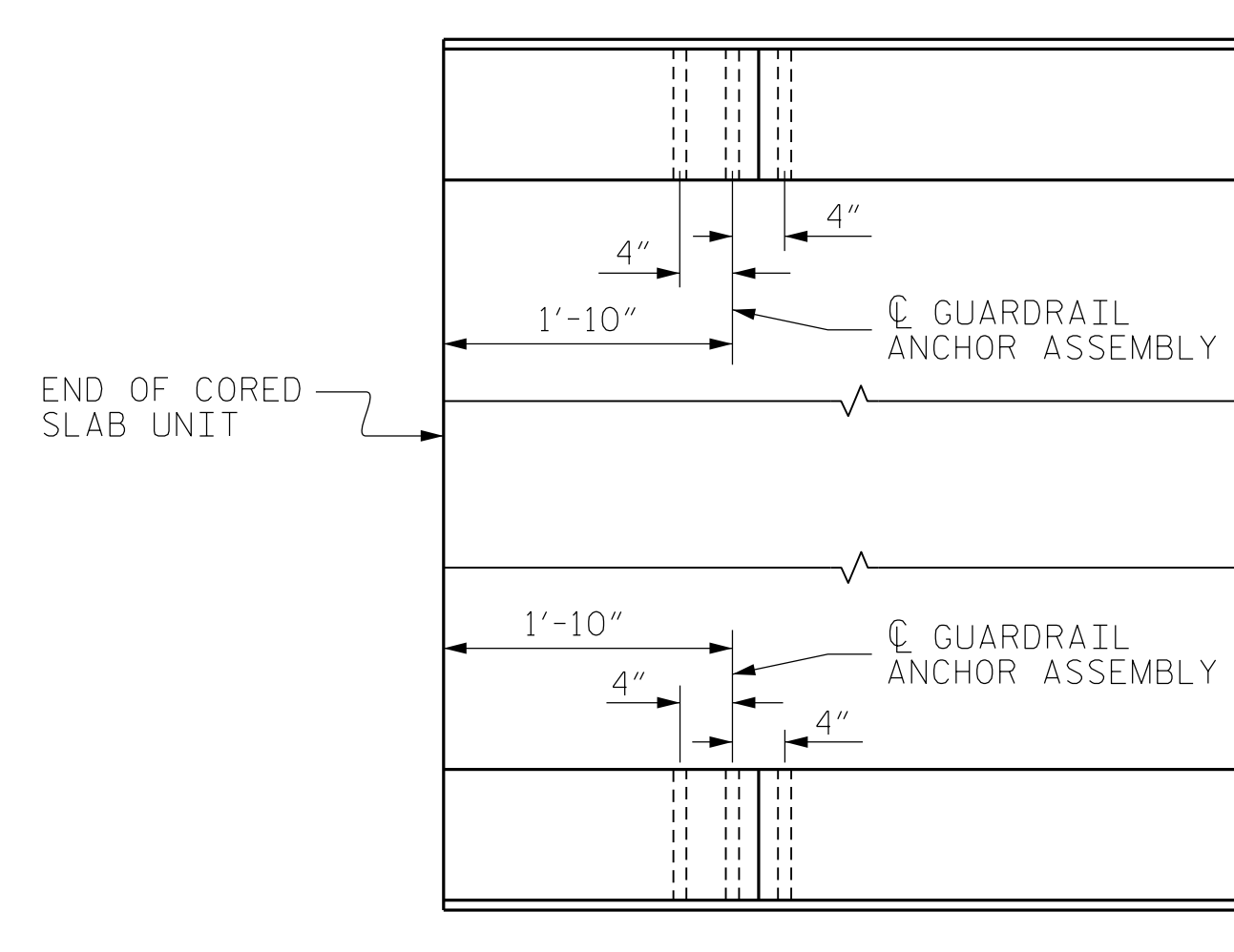
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



ELEVATION



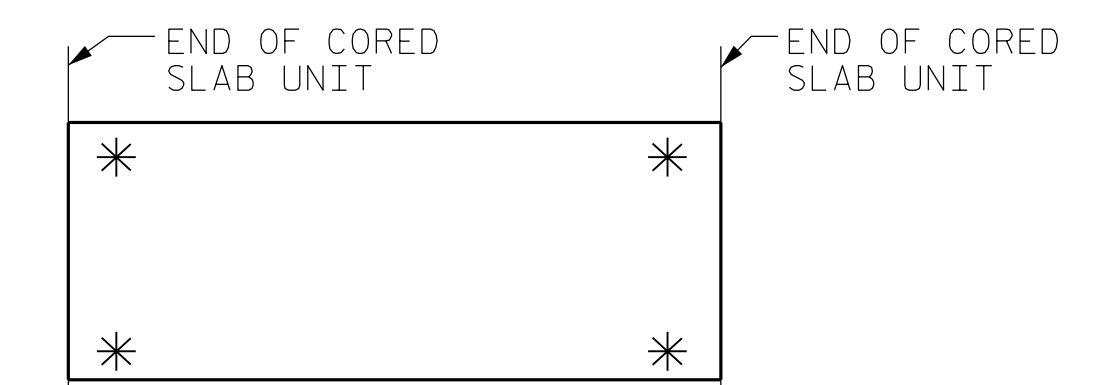
SECTION E-E  
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



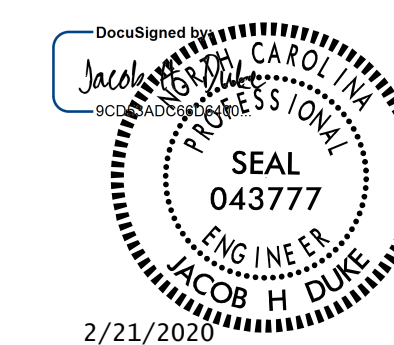
SKETCH SHOWING POINTS OF ATTACHMENT

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

DESIGN ENGINEER OF RECORD:		
JACOB H. DUKE DATE : 01/2020		
ASSEMBLED BY : DIEGO A. AGUIRRE	DATE : 01/2020	
CHECKED BY : FIDEL L. FLORES	DATE : 01/2020	
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC
	REV. 5/18	MAA/THC

2/21/2020  
 BR-0117.SMU.GR.650052.dgn  
 jduke



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR VERTICAL CONCRETE  
 BARRIER RAIL

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			19

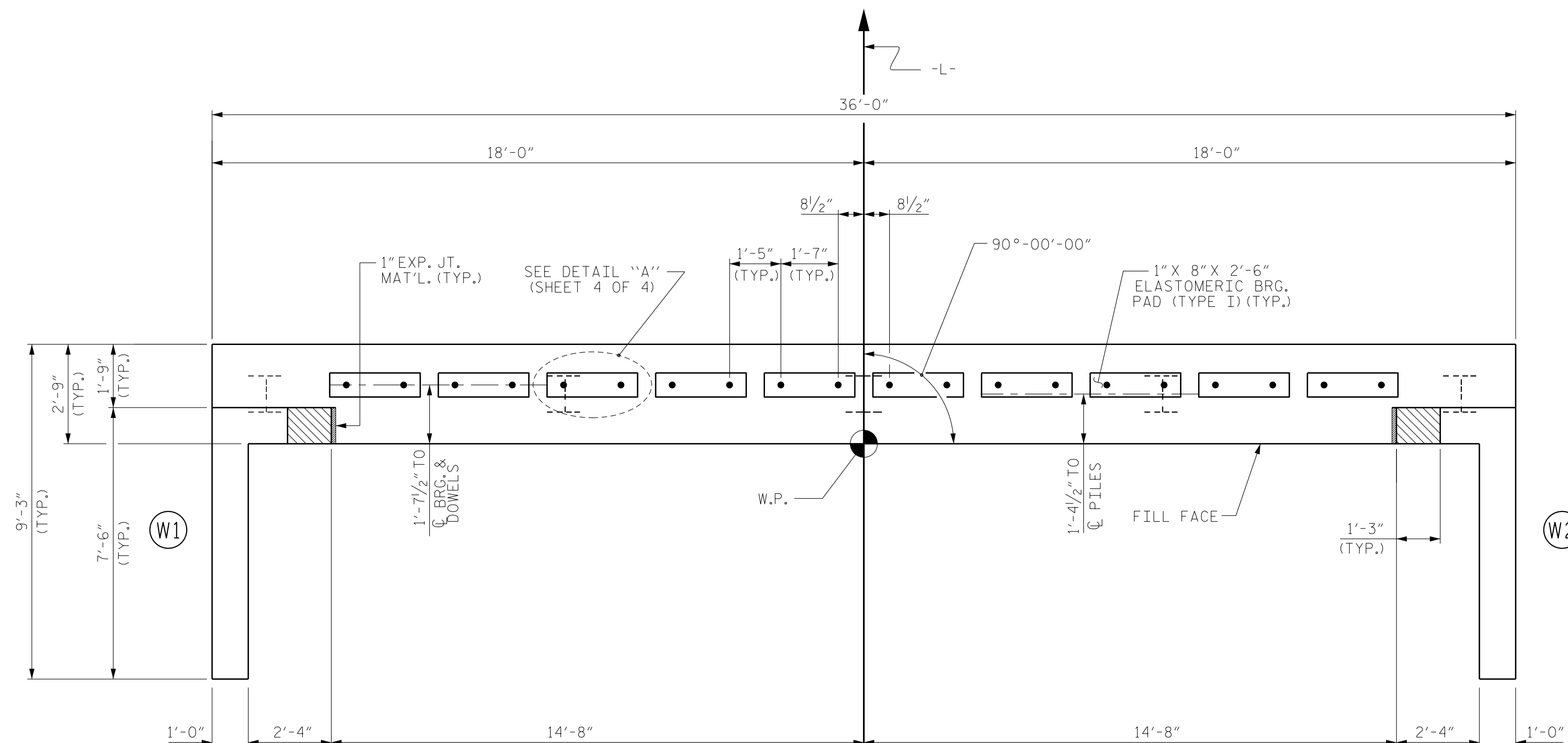
NOTES

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

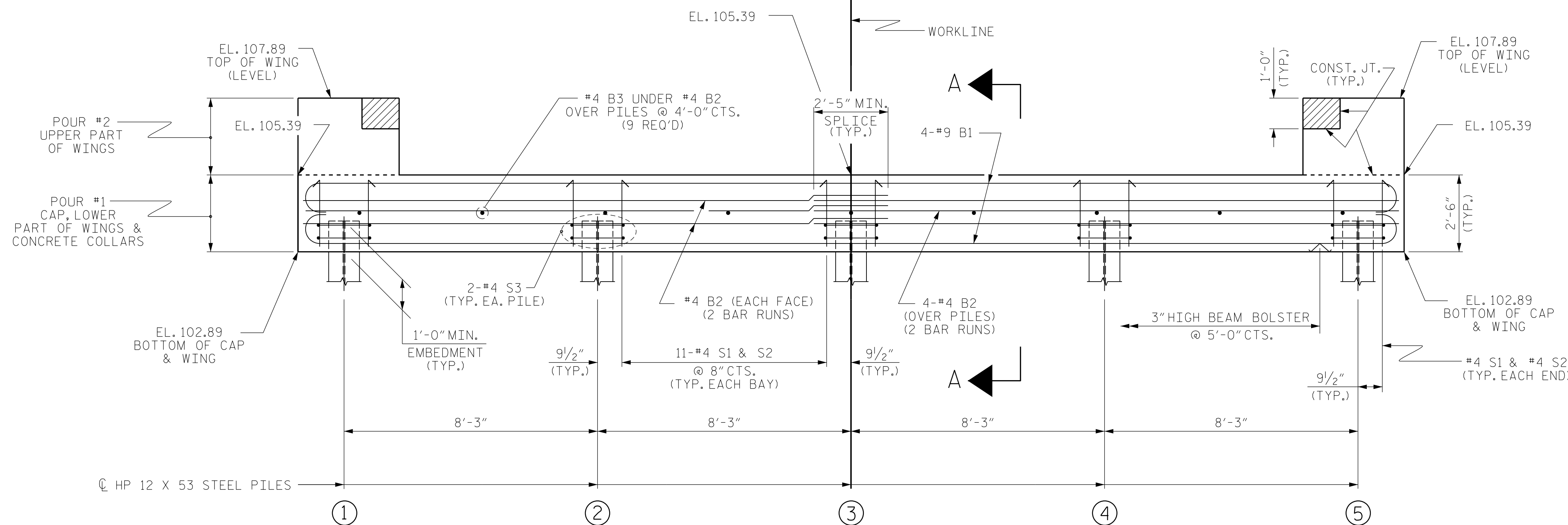
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN

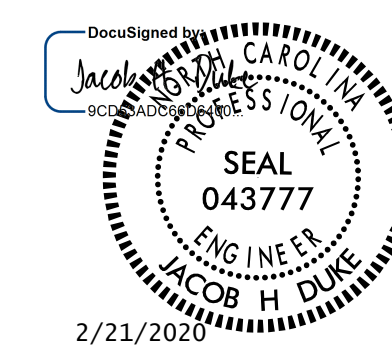


ELEVATION

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. BR-0117  
NORTHAMPTON COUNTY  
STATION: 14+26.35 -L-

SHEET 1 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT No. 1

DESIGN ENGINEER OF RECORD:		
JACOB H. DUKE DATE: 01/2020		
ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020		
CHECKED BY: FIDEL L. FLORES DATE: 01/2020		
DRAWN BY: DGE 01/10	REV. 4/15	MAA/TMG
CHECKED BY: MKT 01/10		

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS 19
2			4			

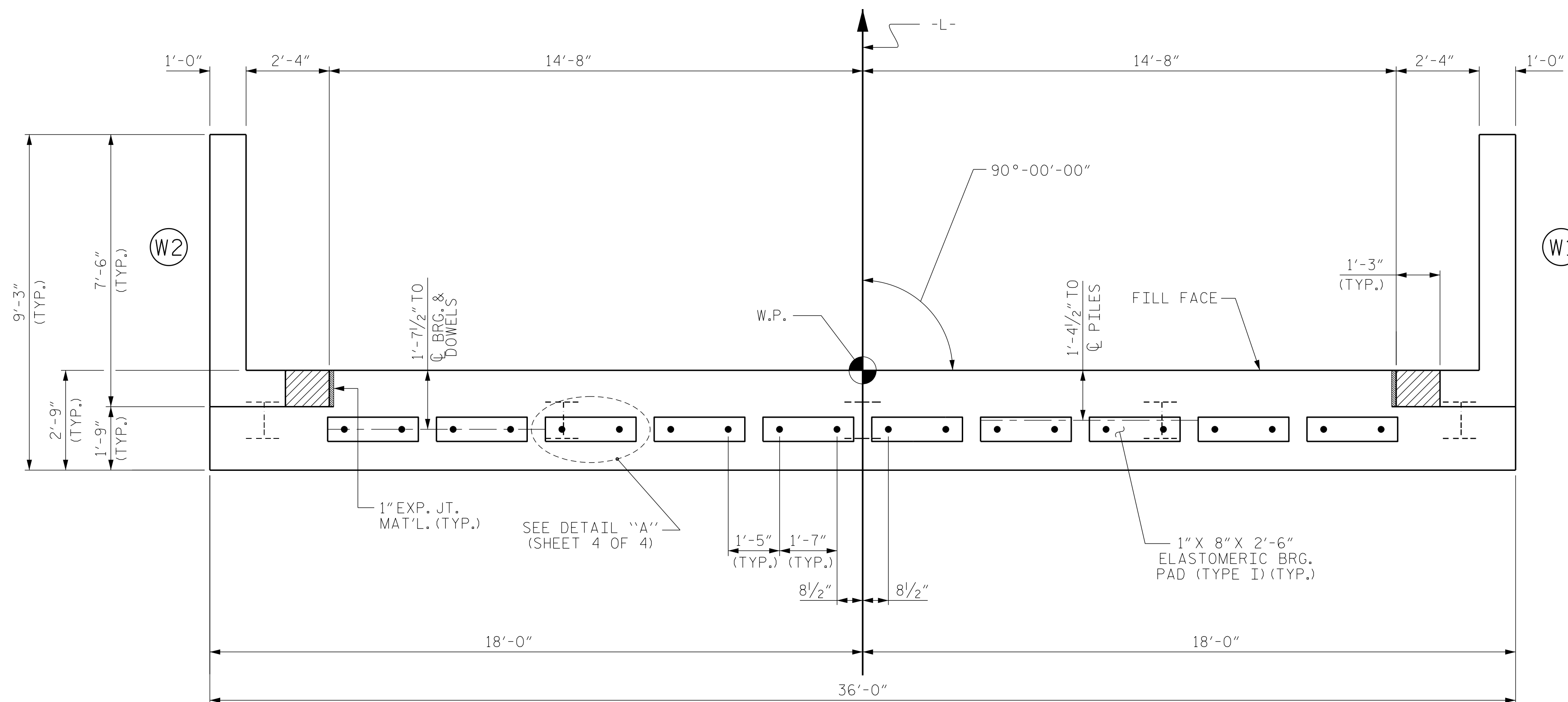
NOTES

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

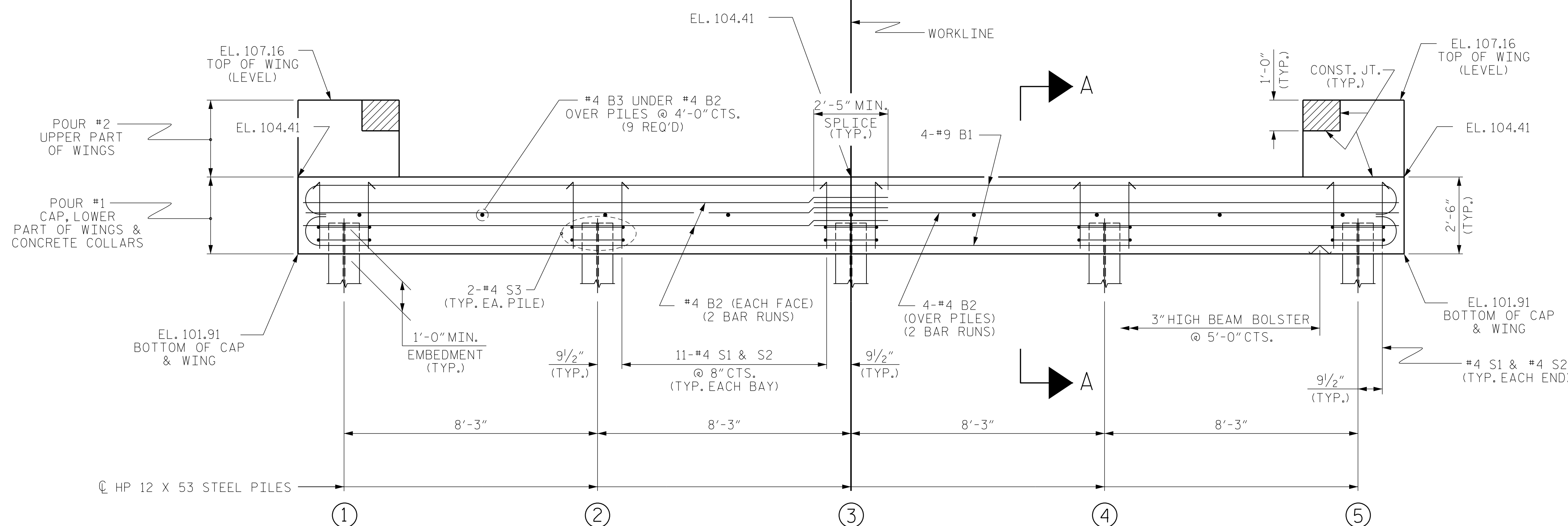
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

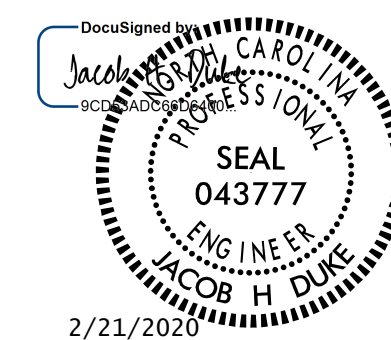
WINGS NOT SHOWN FOR CLARITY. FOR SECTION A-A, SEE SHEET 4 OF 4. CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. BR-0117  
 NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

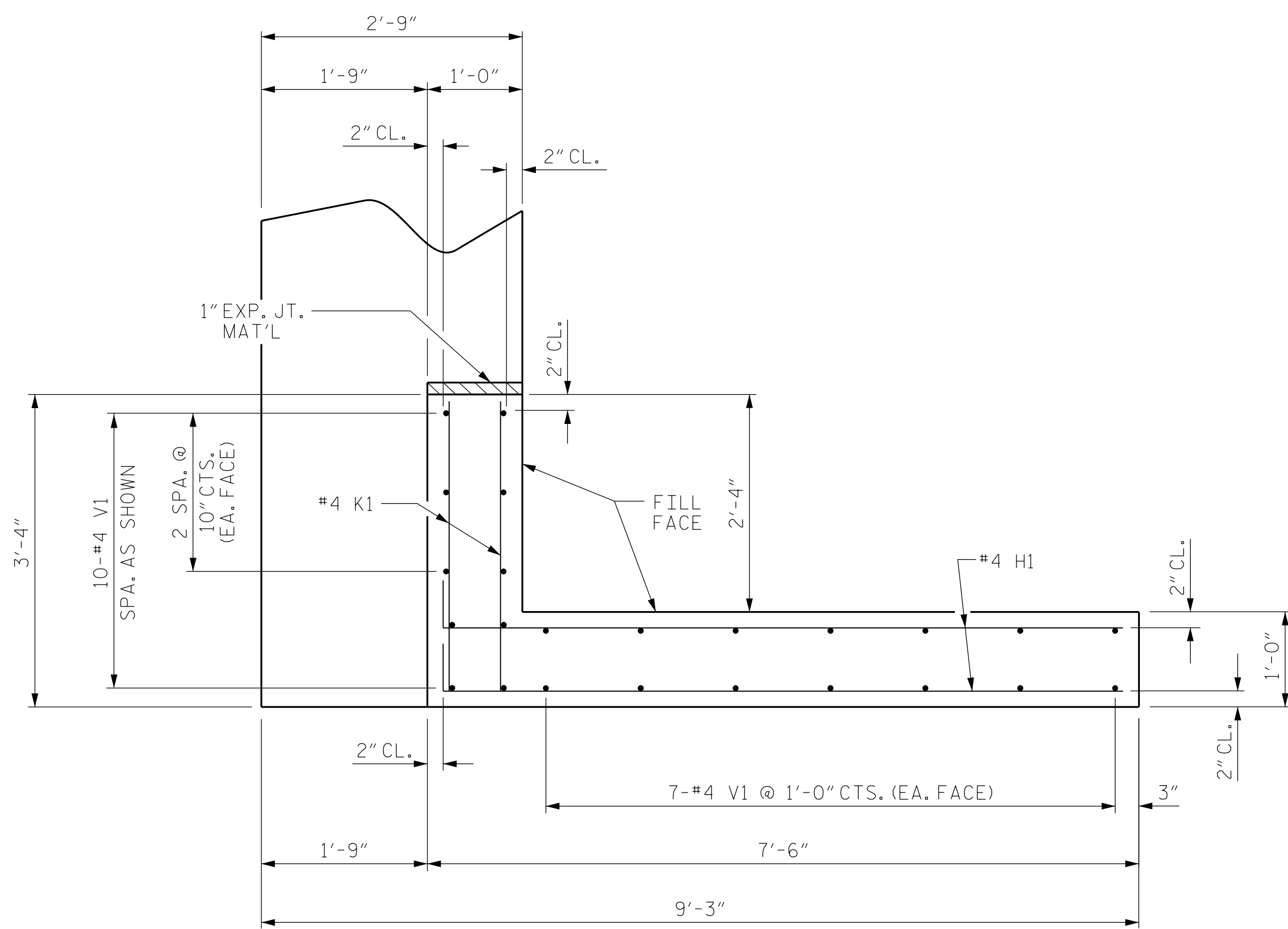
SUBSTRUCTURE  
 END BENT No. 2



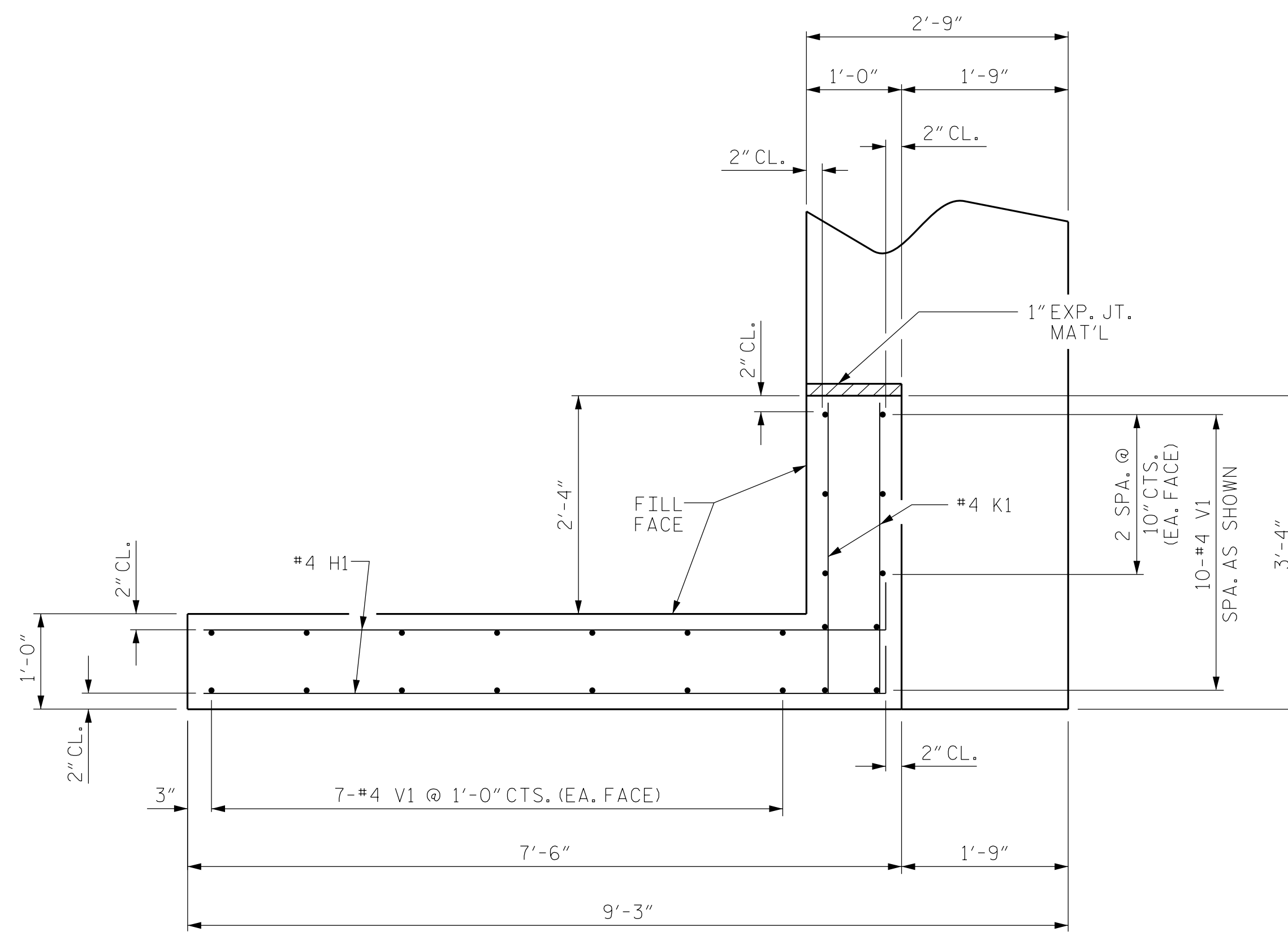
DESIGN ENGINEER OF RECORD:		
JACOB H. DUKE DATE: 01/2020		
ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020		
CHECKED BY: FIDEL L. FLORES DATE: 01/2020		
DRAWN BY: DGE 01/10	REV. 4/15	MAA/TMG
CHECKED BY: MKT 01/10		

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

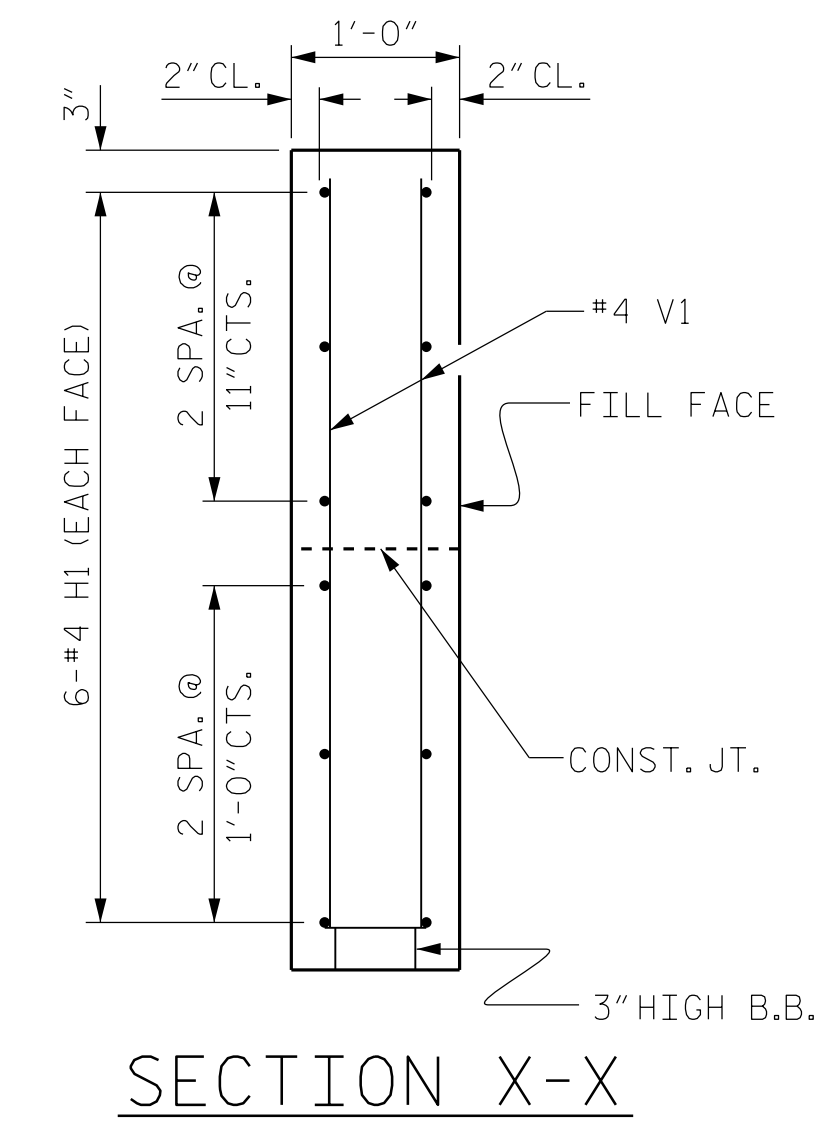
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS 19
2			4			



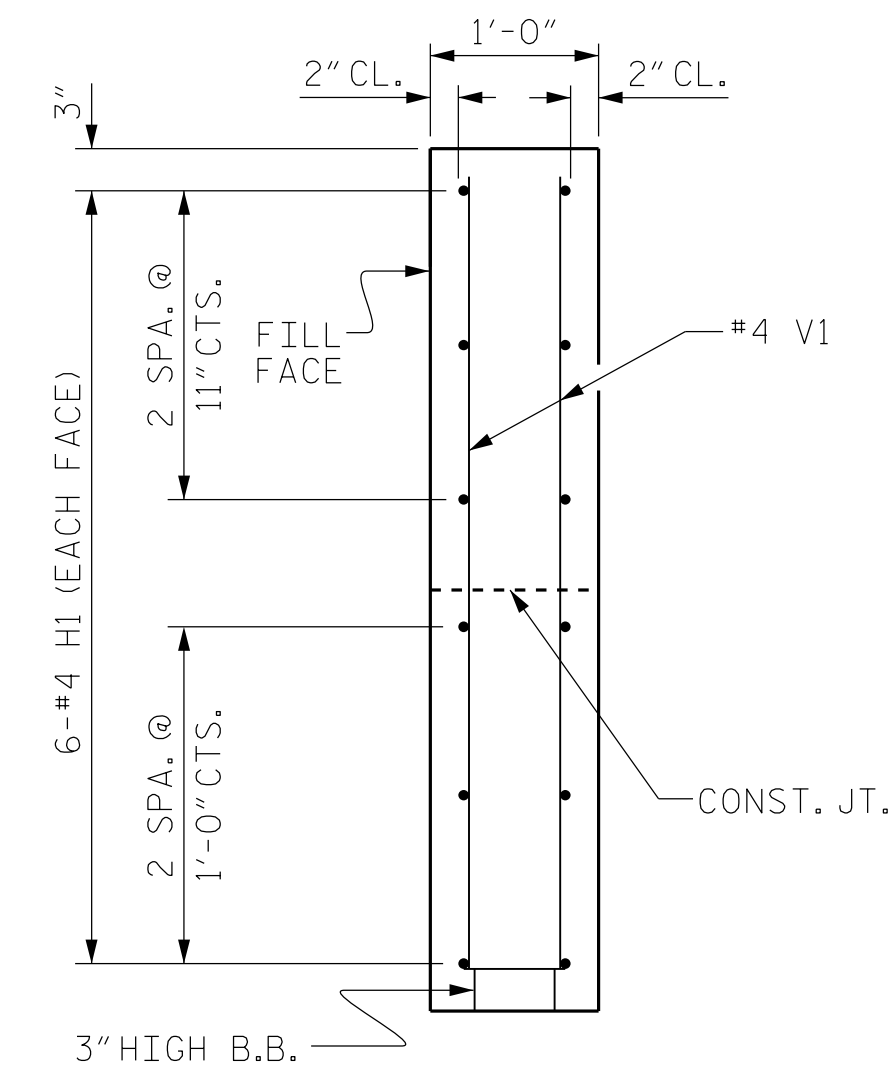
PLAN OF WING (W1)



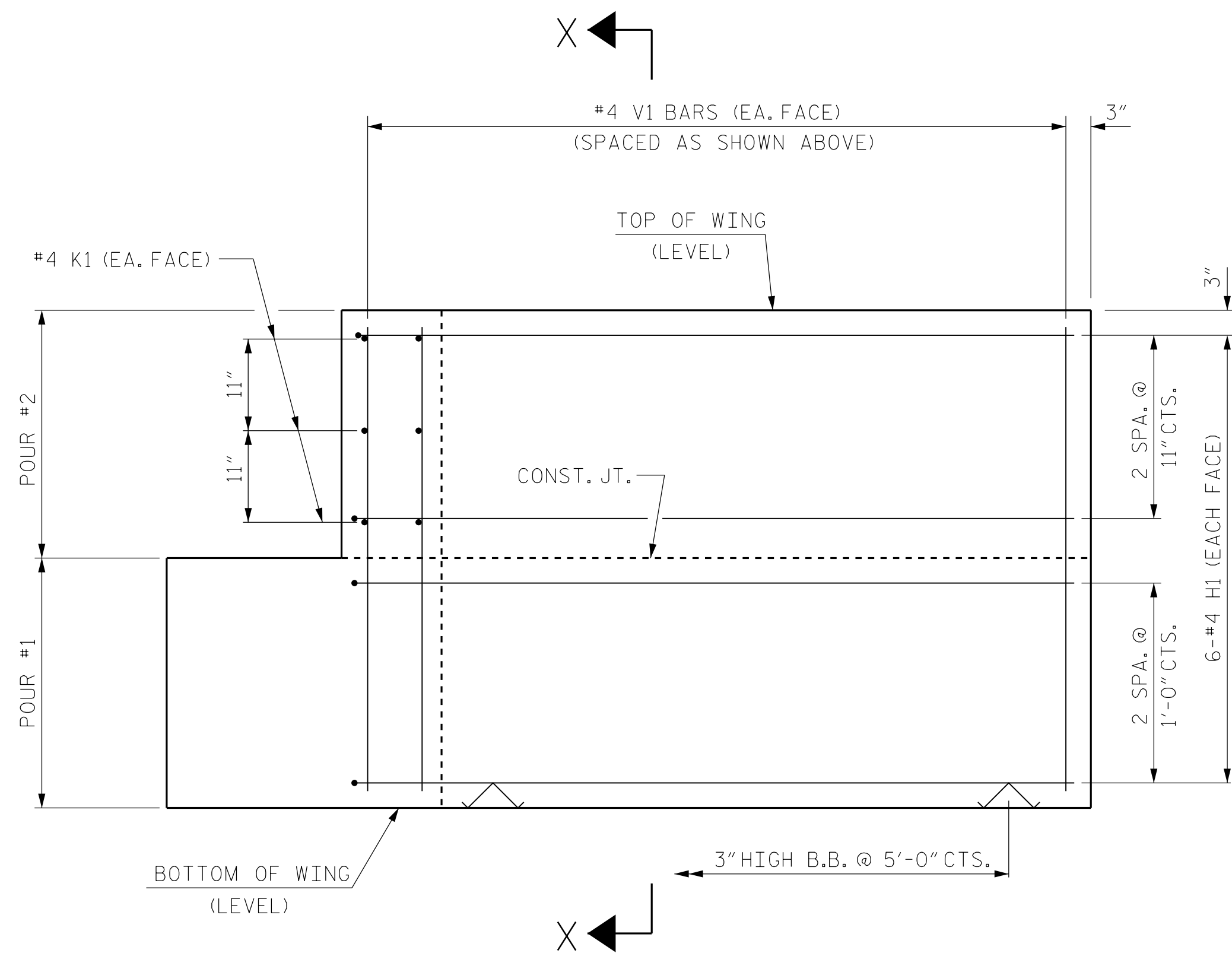
PLAN OF WING (W2)



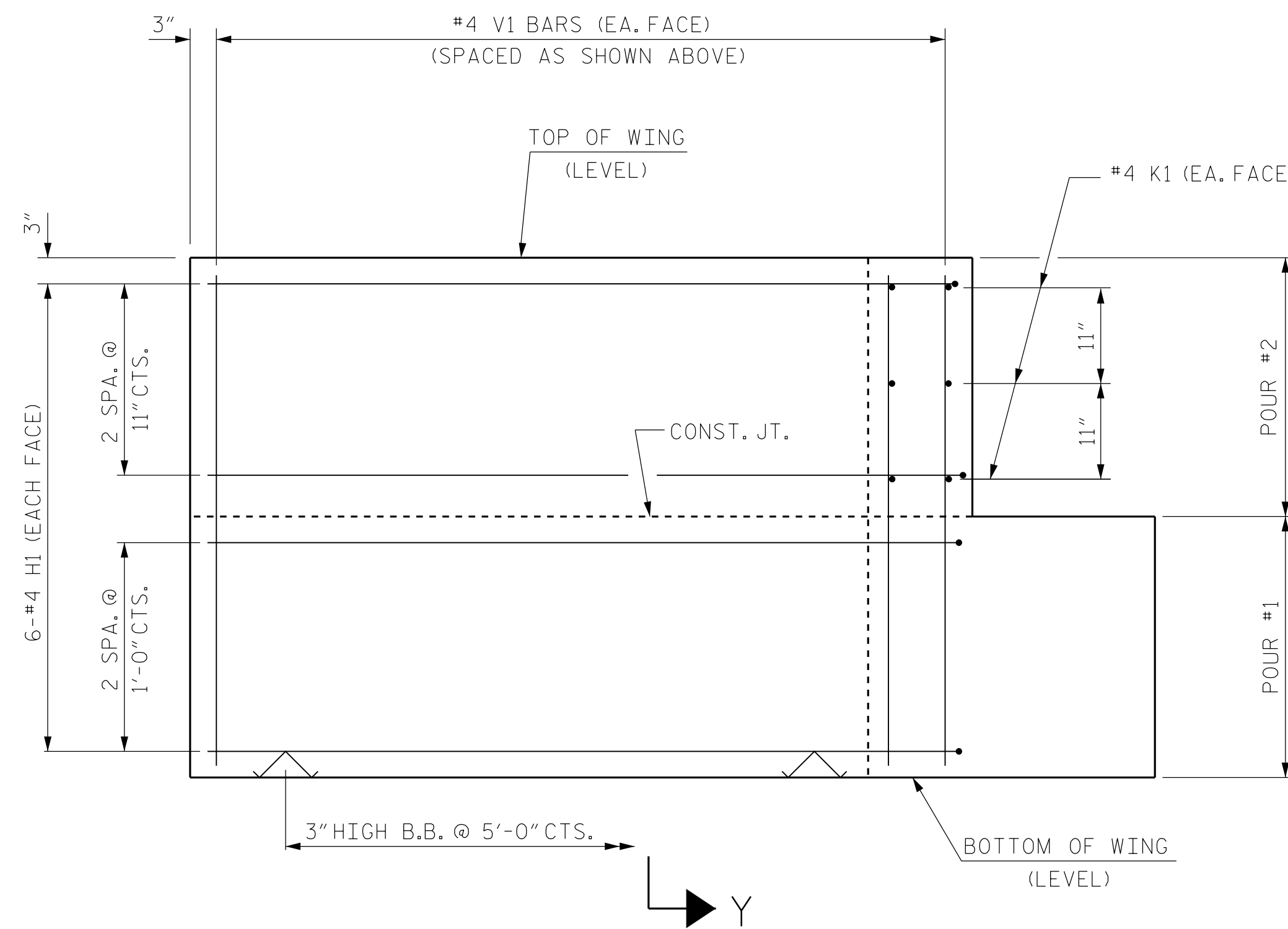
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

DESIGN ENGINEER OF RECORD:  
 JACOB H. DUKE DATE: 01/2020  
 ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020  
 CHECKED BY: FIDEL L. FLORES DATE: 01/2020  
 DRAWN BY: DGE 02/10  
 CHECKED BY: MKT 02/10  
 REV. 4/15 MAA/TMG

2/21/2020  
 BR-0117.SMU.E03.650052.dgn  
 jduke

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

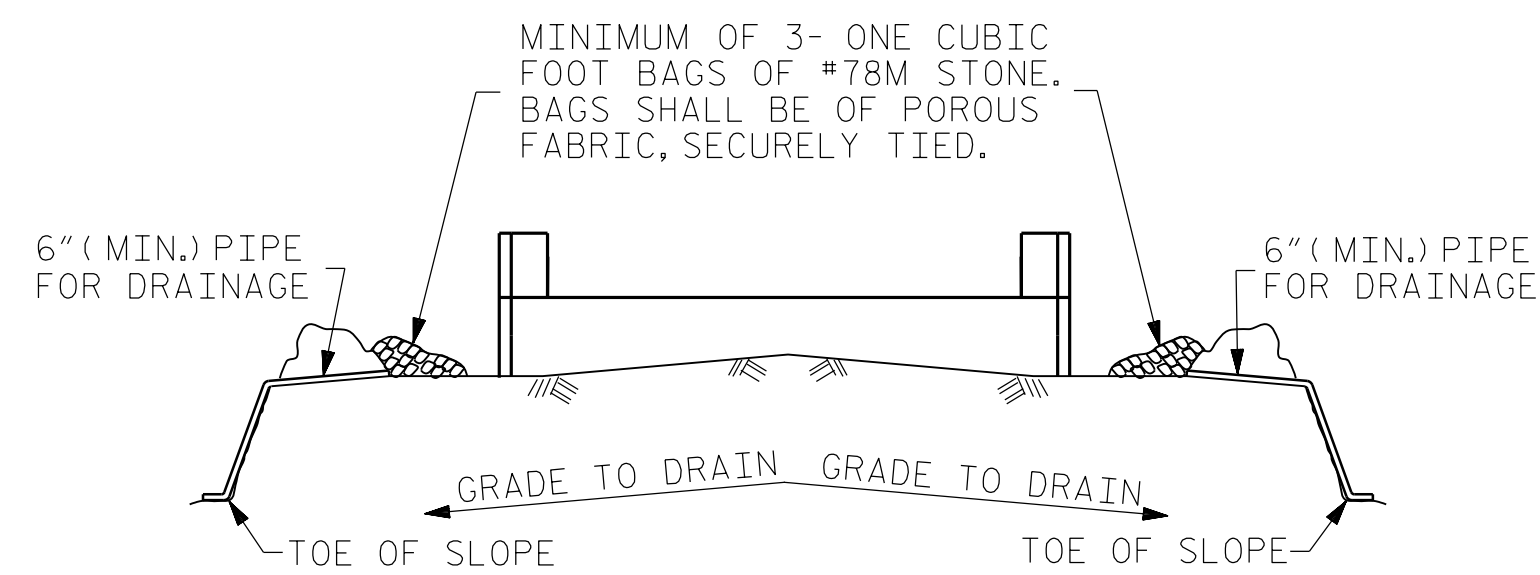


PROJECT NO. BR-0117  
 NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

SHEET 3 OF 4

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-14
2			4			TOTAL SHEETS 19

STD. NO. EB\_30\_90S

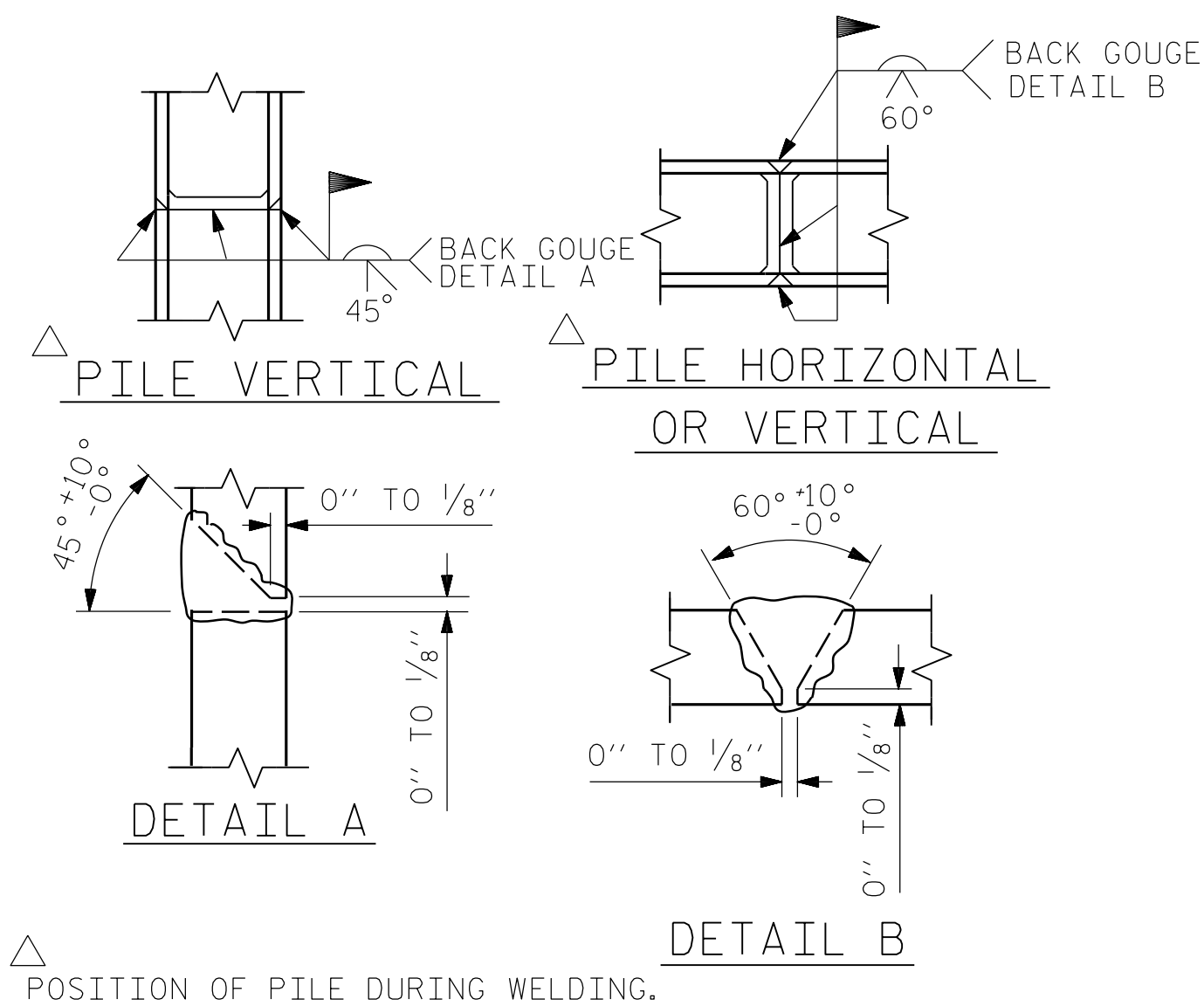


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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**

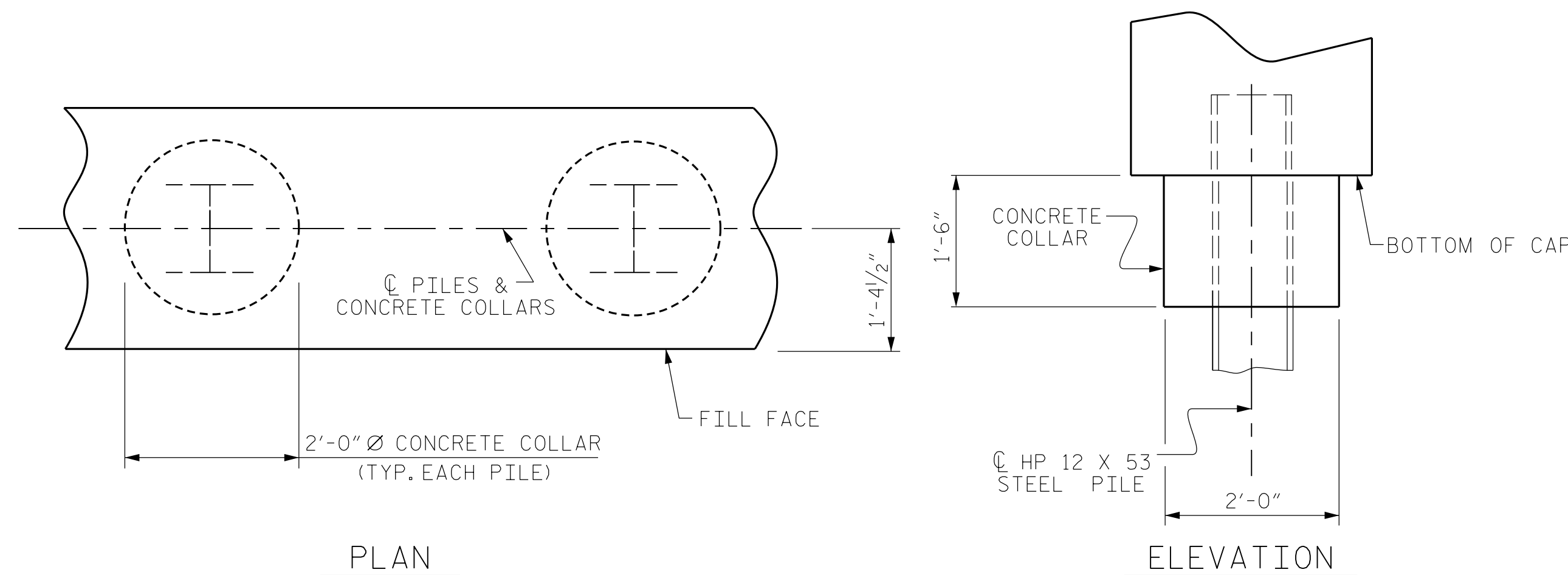
BILL OF MATERIAL FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		38'-0"	1034
B2	16	#4	STR	19'-1"	204
B3	9	#4	STR	2'-5"	15
D1	20	#6	STR	1'-6"	45
H1	24	#4		7'-10"	126
K1	12	#4	STR	2'-11"	23
S1	46	#4		7'-5"	228
S2	46	#4		3'-2"	97
S3	10	#4		6'-6"	43
V1	48	#4	STR	4'-8"	150
REINFORCING STEEL (FOR ONE END BENT)					1965 LBS.
CLASS A CONCRETE BREAKDOWN (FOR END BENT 1)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					11.2 C.Y.
POUR #2 UPPER PART OF WINGS					1.8 C.Y.
TOTAL CLASS A CONCRETE					13.0 C.Y.
CLASS A CONCRETE BREAKDOWN (END BENT 2)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					11.2 C.Y.
POUR #2 UPPER PART OF WINGS					2.0 C.Y.
TOTAL CLASS A CONCRETE					13.2 C.Y.

BAR TYPES	
<p>1</p>	<p>2</p>
<p>3</p>	<p>4</p>
<p>5</p>	

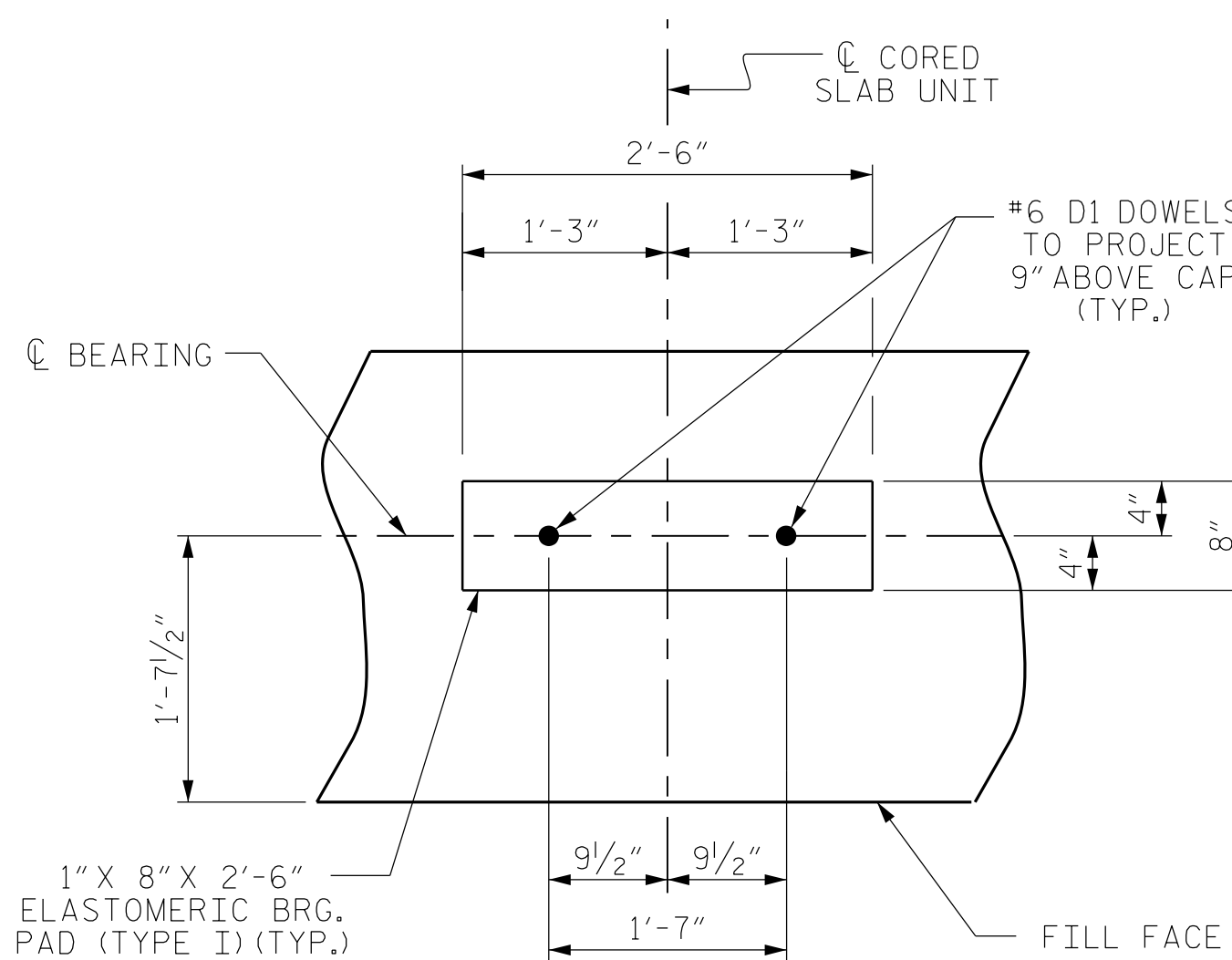
ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES NO: 5 LIN. FT.= 400	HP 12 X 53 STEEL PILES NO: 5 LIN. FT.= 425
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 5	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 5
PILE REDRIVES NO: 5	PILE REDRIVES NO: 5



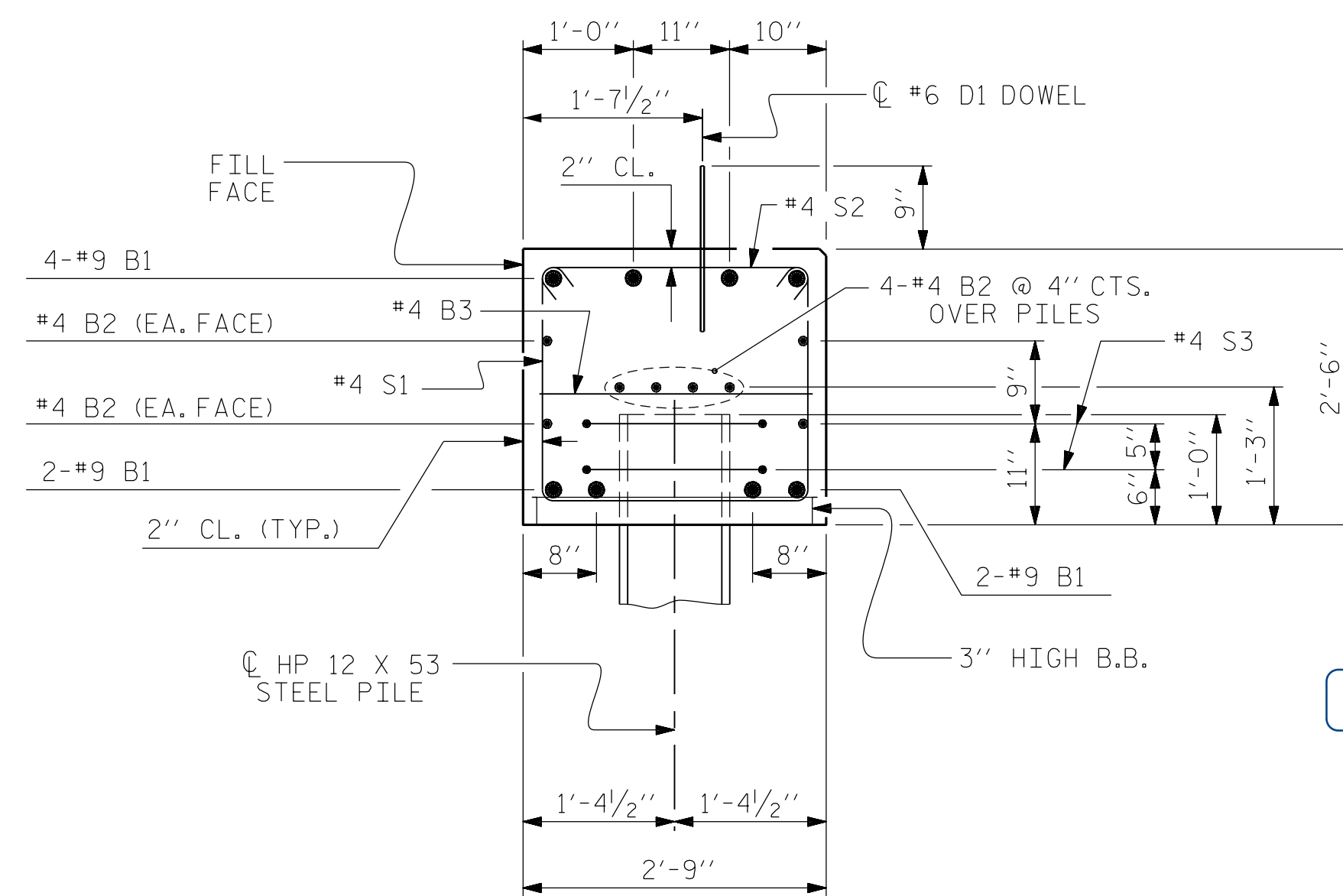
**CORROSION PROTECTION FOR STEEL PILES DETAIL**

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



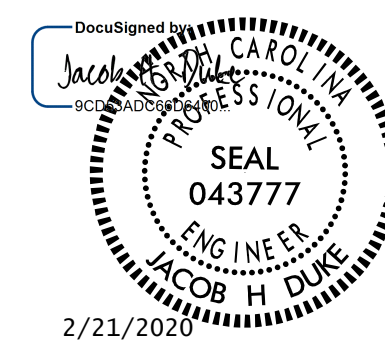
**DETAIL "A"**

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



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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
STATION: 14+26.35 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2  
DETAILS

REVISIONS

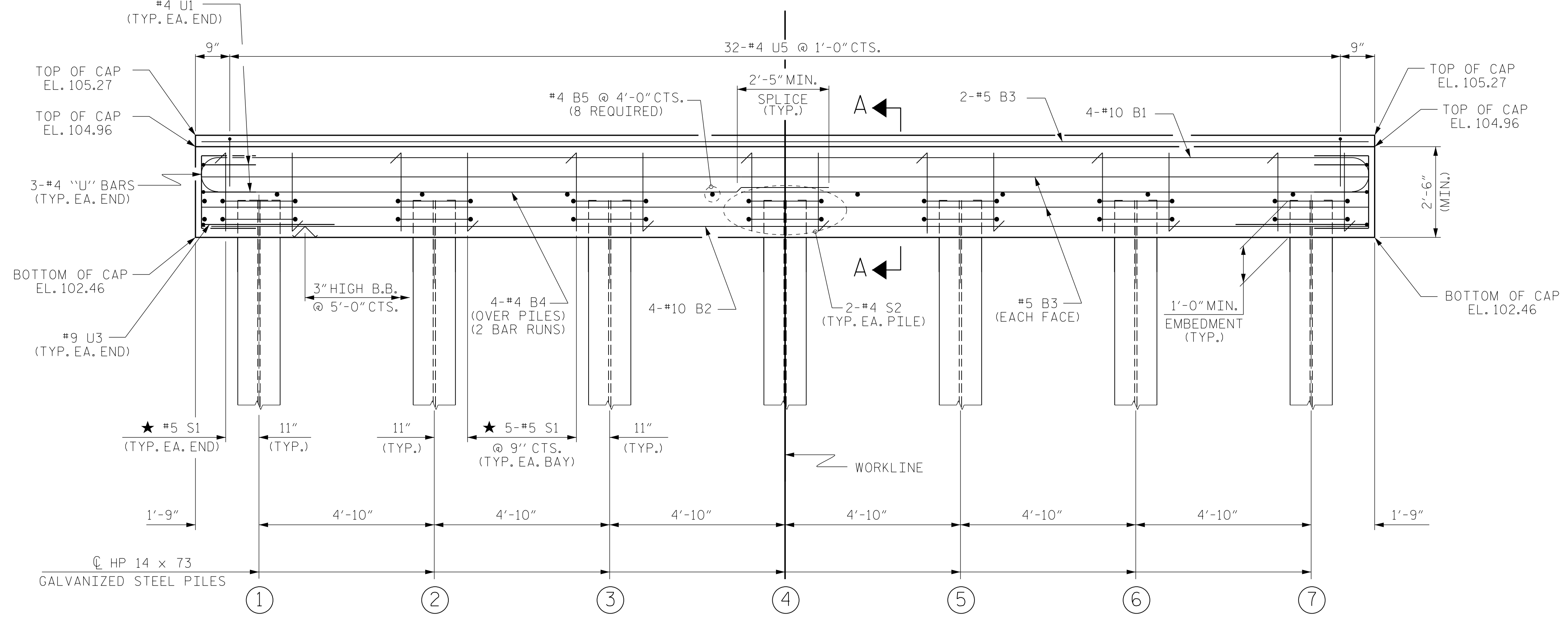
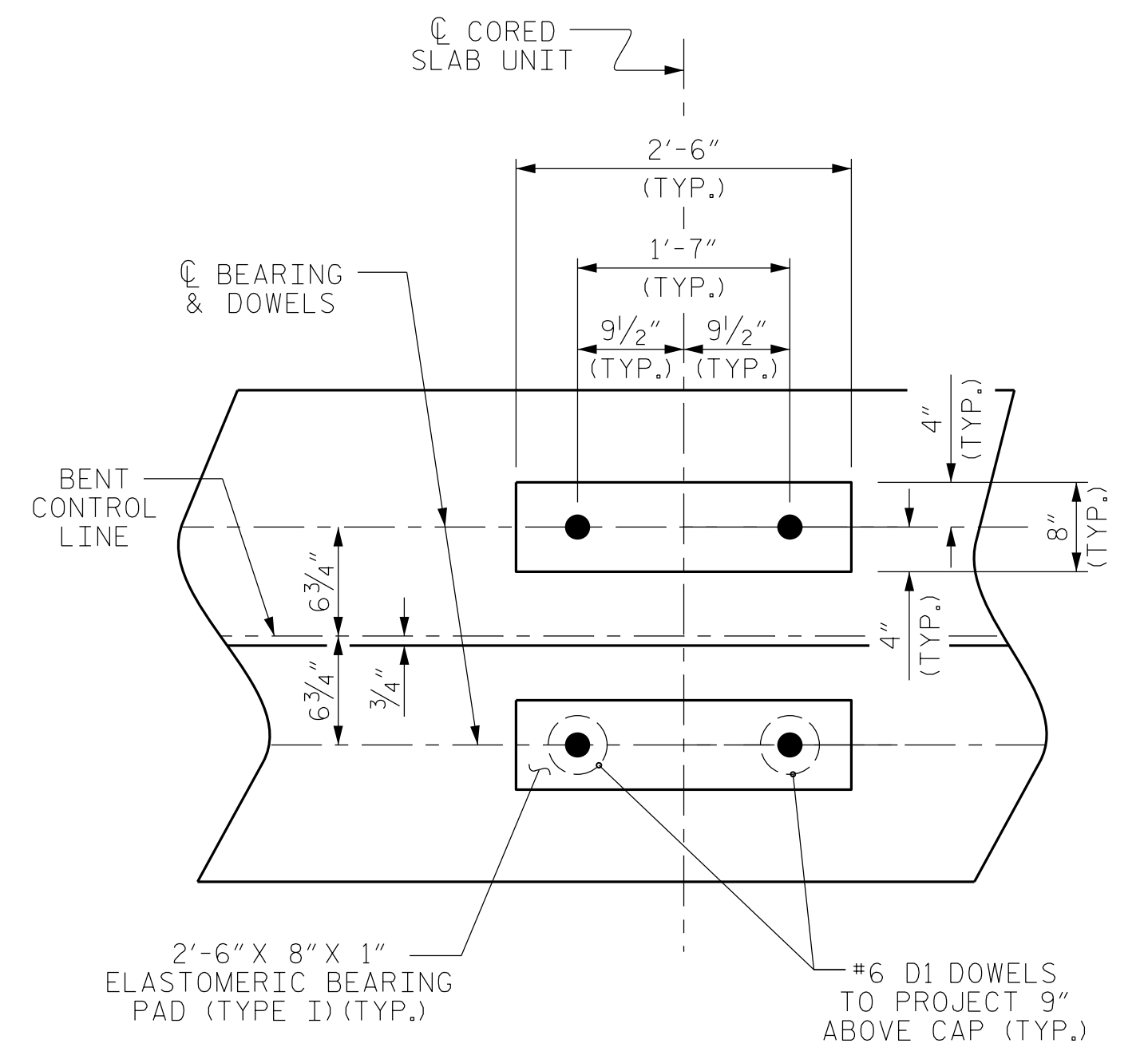
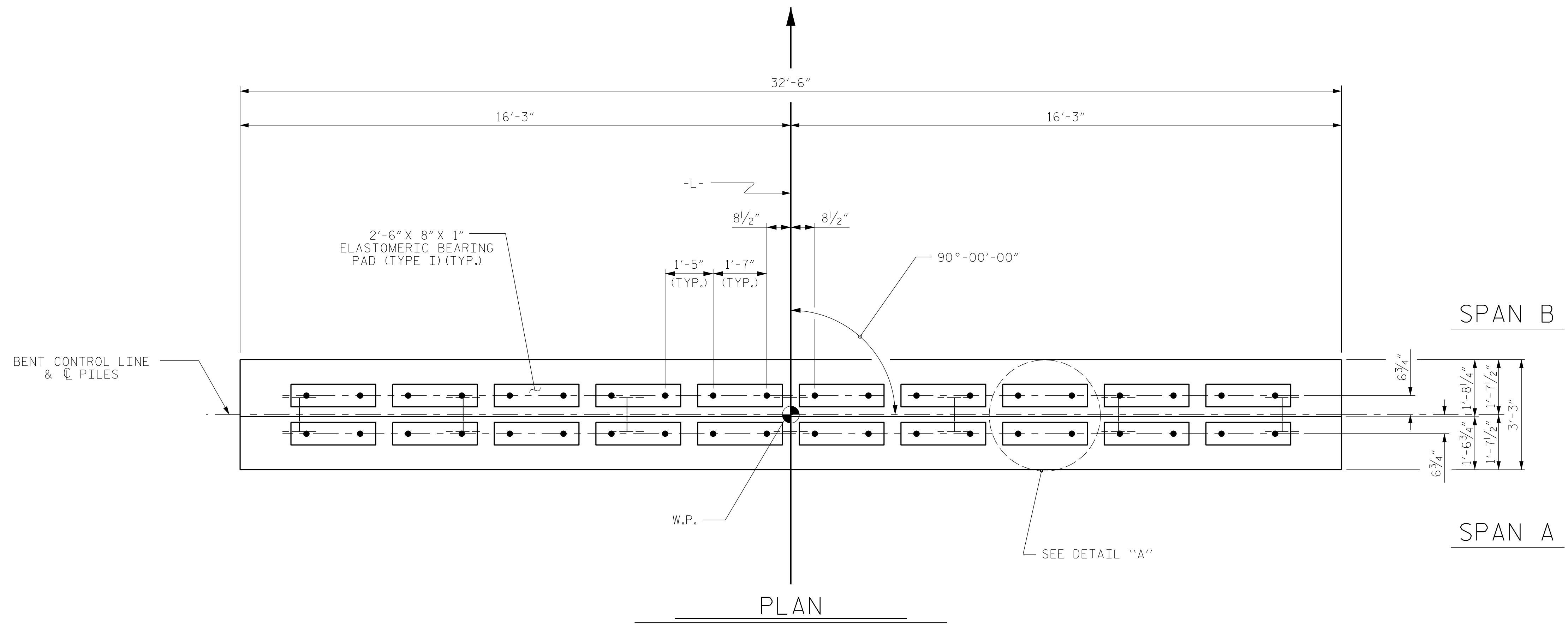
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-15
2			4			TOTAL SHEETS 19

DESIGN ENGINEER OF RECORD: JACOB H. DUKE DATE: 01/2020
ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020 CHECKED BY: FIDEL L. FLORES DATE: 01/2020
DRAWN BY: DGE 12/09 CHECKED BY: MKT 01/10
REV. 4/17 MAA/THC



NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
- ★ INVERT ALTERNATE STIRRUPS.
- GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 25 FEET, GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



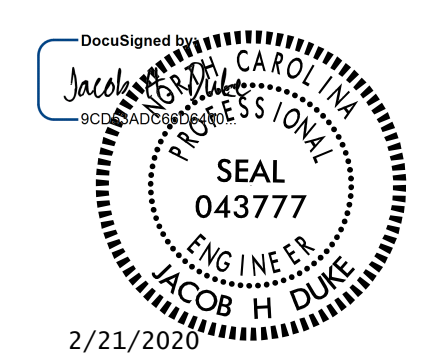
DETAIL "A"  
(DIMENSIONS ARE TYPICAL EACH BEARING)

ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2

PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
STATION: 14+26.35 -L-

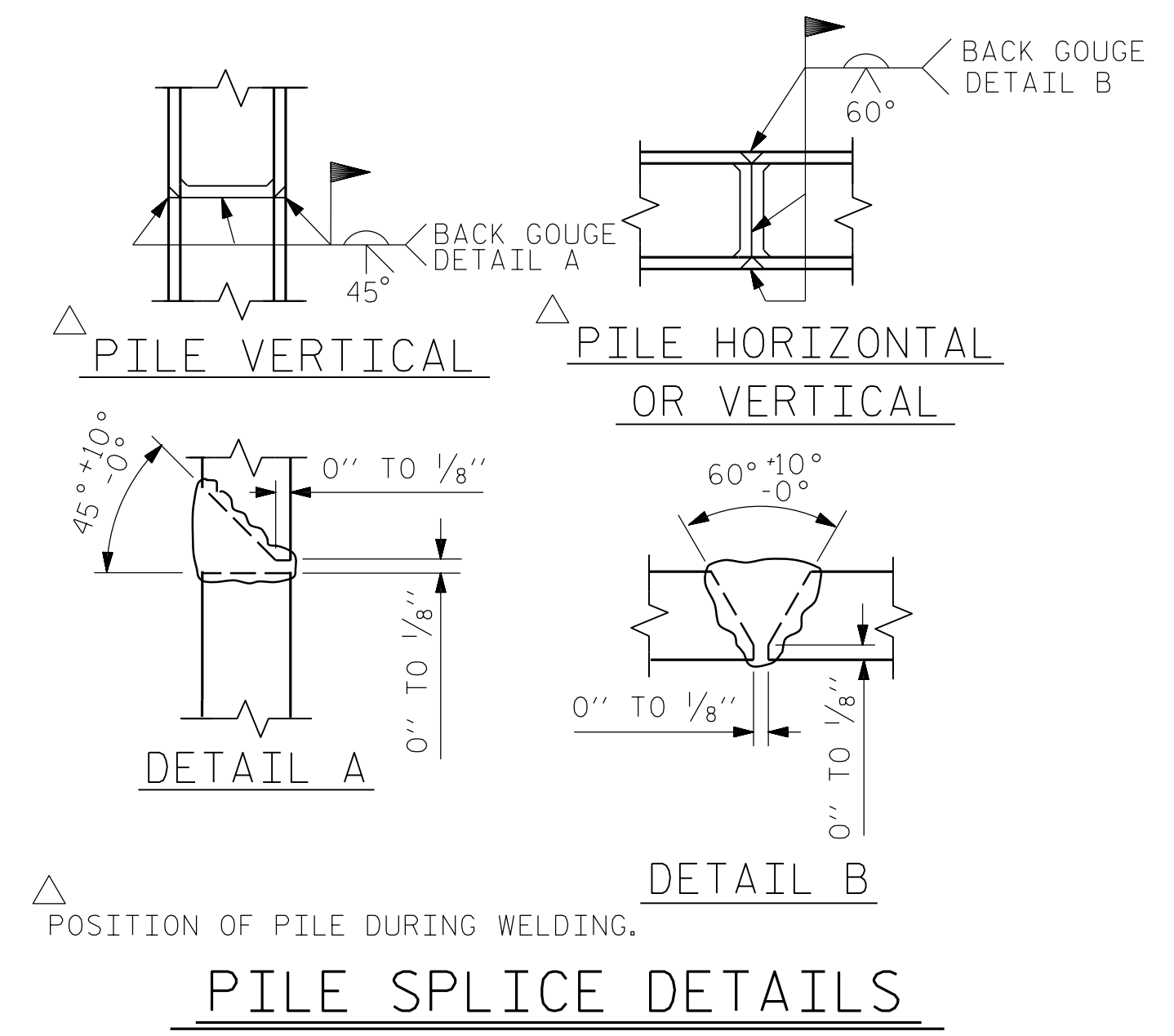
SHEET 1 OF 2



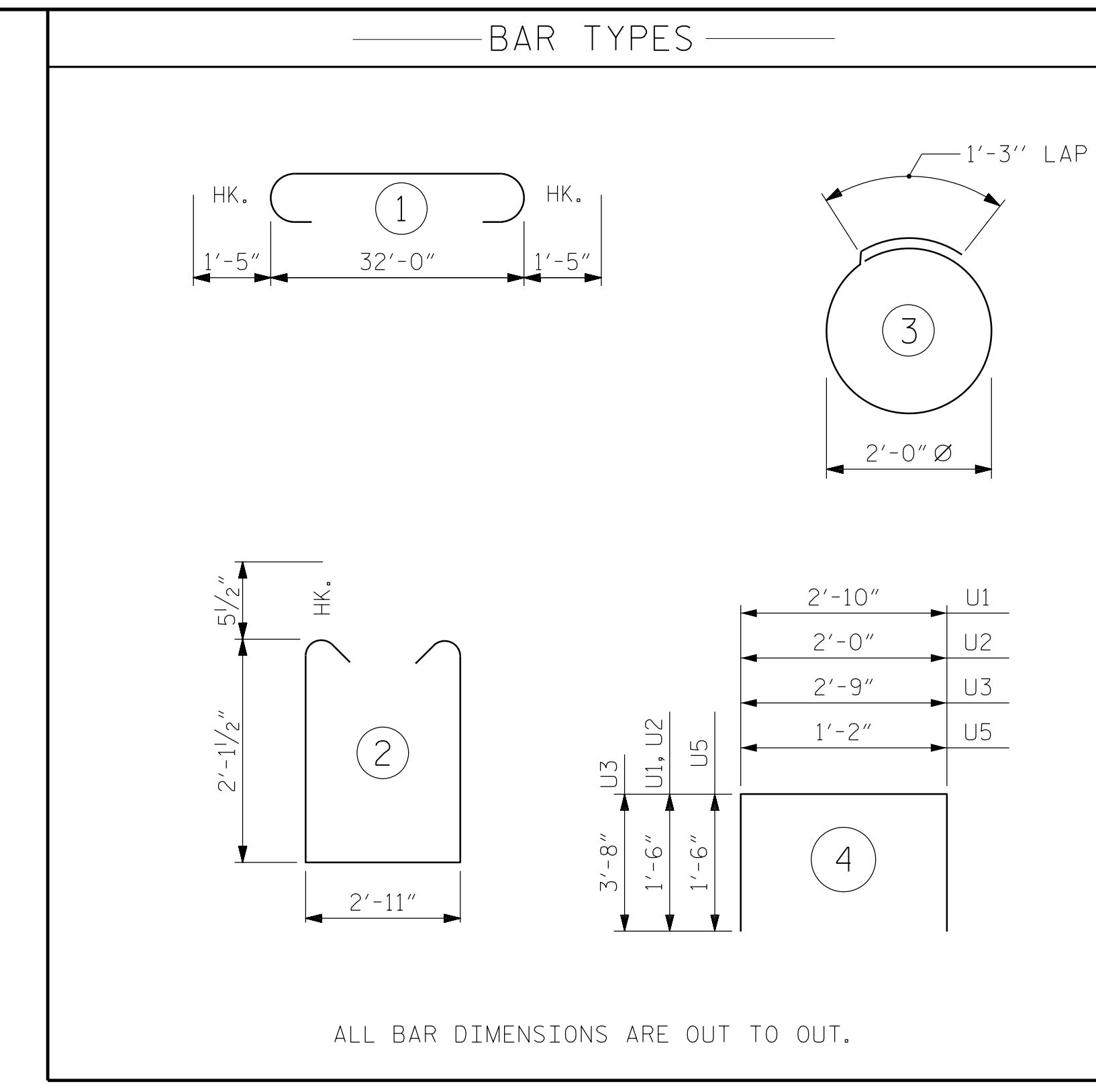
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-16					TOTAL SHEETS 19

DESIGN ENGINEER OF RECORD: JACOB H. DUKE DATE: 01/2020					
ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020					
CHECKED BY: FIDEL L. FLORES DATE: 01/2020					
DRAWN BY: DGE 05/10		REV. 6/17		MAA/THC	
CHECKED BY: MKT 05/10					

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

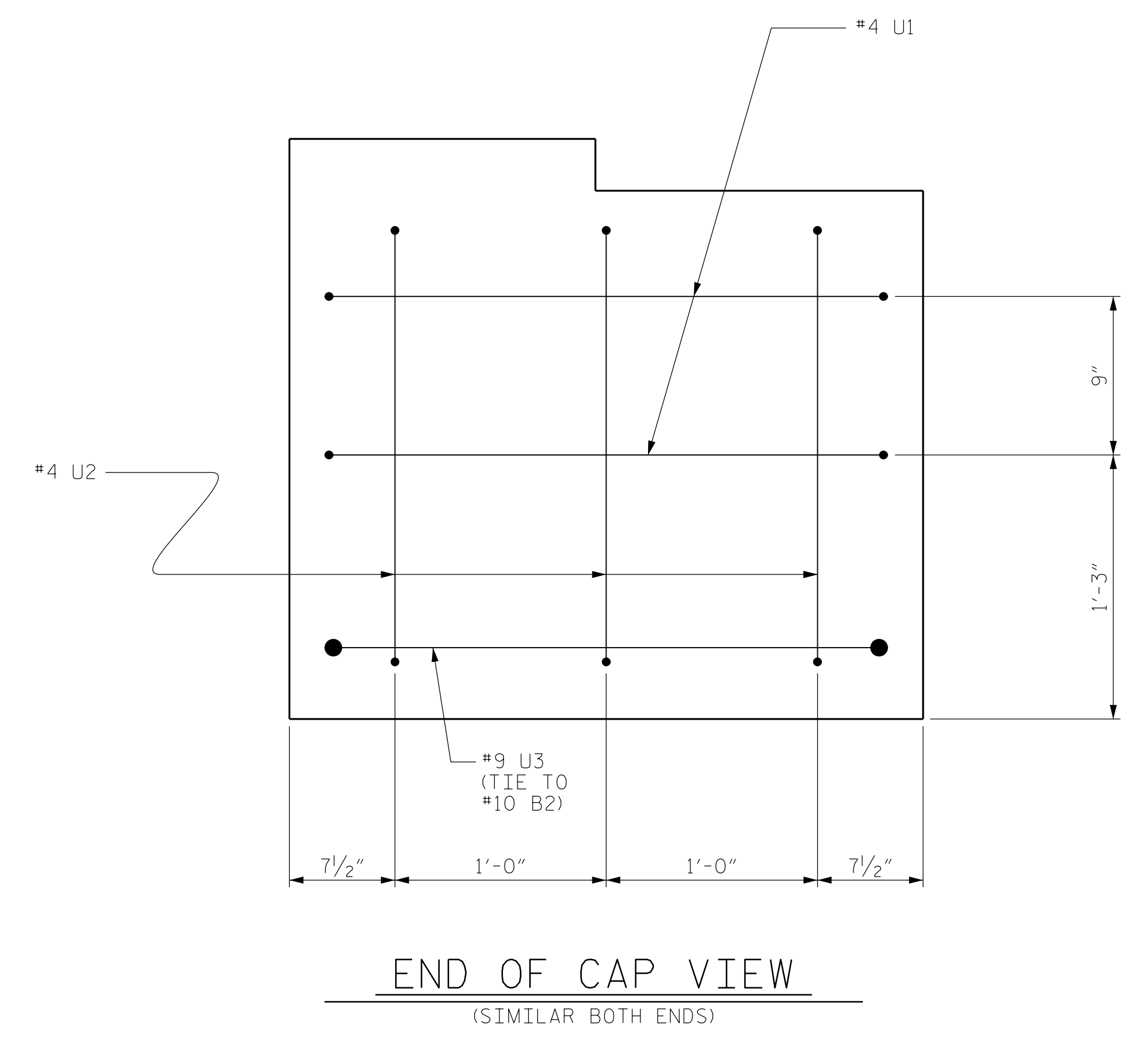


PILE SPLICE DETAILS

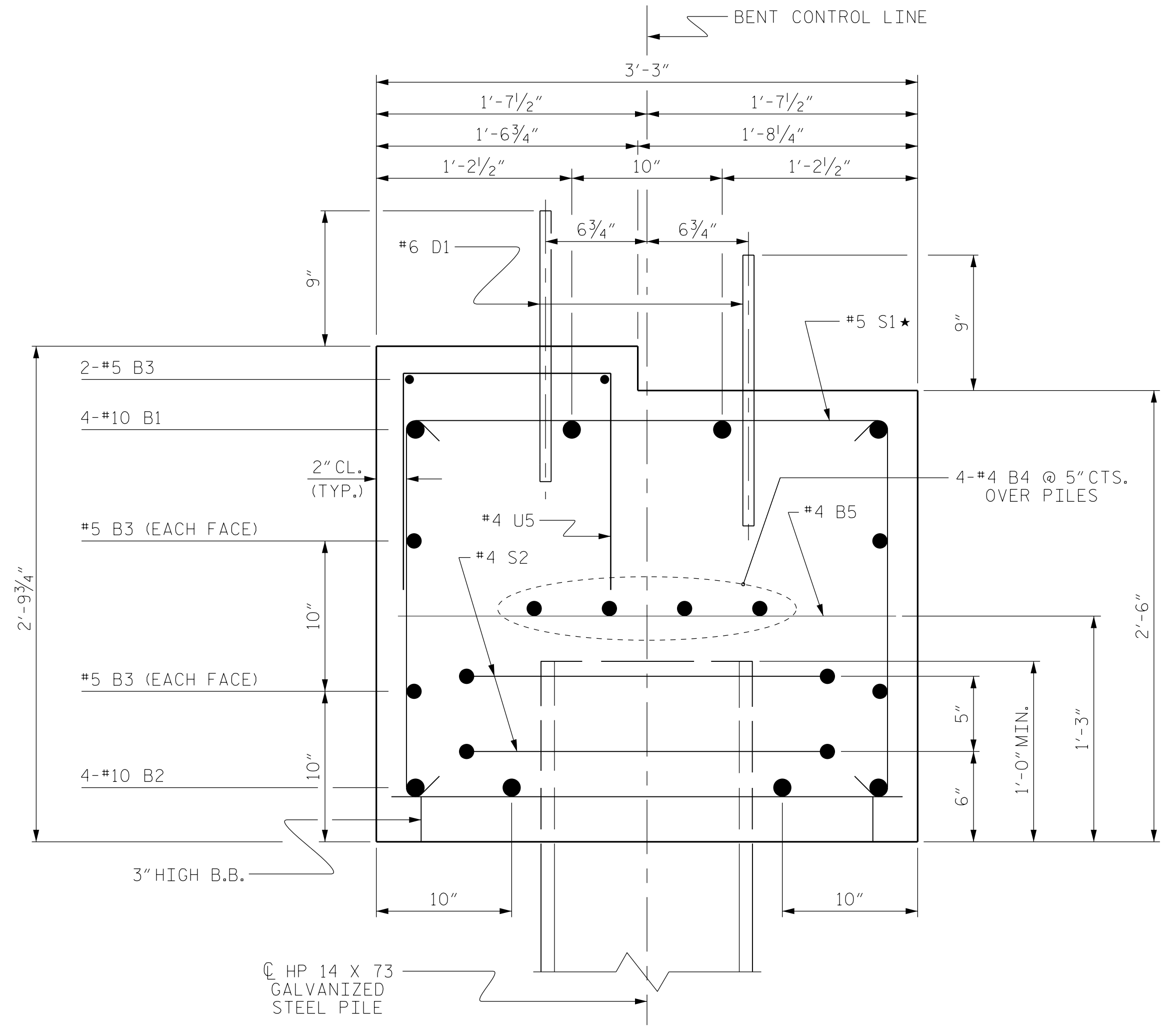


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR ONE BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	34'-10"	600
B2	4	#10	STR	32'-2"	554
B3	6	#5	STR	32'-2"	201
B4	8	#4	STR	17'-4"	93
B5	8	#4	STR	2'-11"	16
D1	40	#6	STR	1'-6"	90
S1	32	#5	2	8'-1"	270
S2	14	#4	3	7'-7"	71
U1	4	#4	4	5'-10"	16
U2	6	#4	4	5'-0"	21
U3	2	#9	4	10'-1"	69
U5	32	#4	4	4'-2"	89
REINFORCING STEEL (FOR ONE BENT)					2090 LBS
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
TOTAL CLASS A CONCRETE					10.8 C.Y.
HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT)					
No. 7					LN.FT. 665
PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT)					NO: 7
PILE REDRIVES					NO: 7



END OF CAP VIEW (SIMILAR BOTH ENDS)



SECTION A-A  
(\* INVERT ALTERNATE STIRRUPS)

DESIGN ENGINEER OF RECORD:		
JACOB H. DUKE DATE: 01/2020		
ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020		
CHECKED BY: FIDEL L. FLORES DATE: 01/2020		
DRAWN BY: DGE 05/10	REV. 6/17	MAA/THC
CHECKED BY: MKT 05/10		

2/21/2020 BR-0117.SMU.B02.650052.dgn jduke

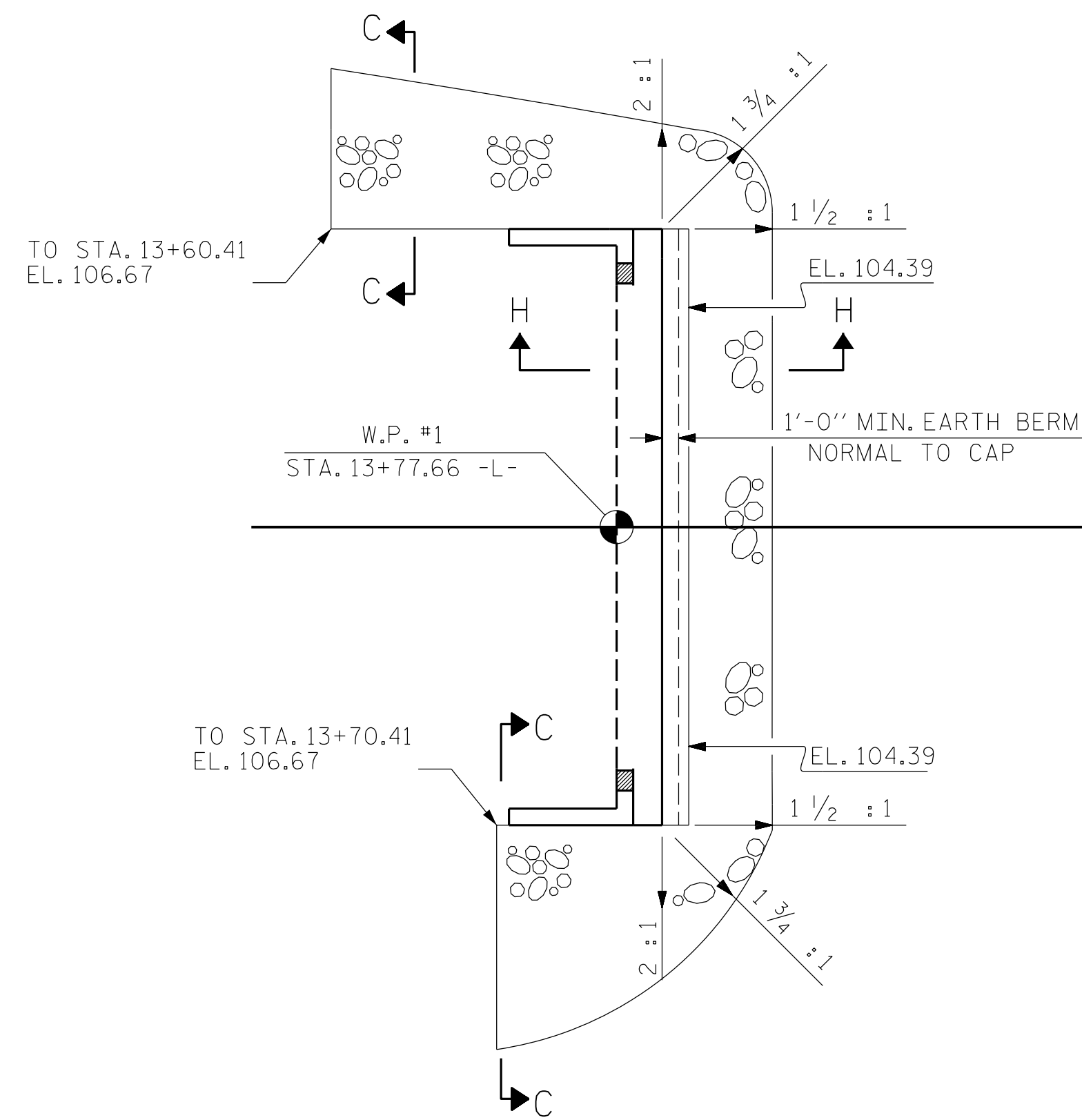
DocuSigned by: JACOB H. DUKE  
 STATE OF NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 043777  
 ENGINEER  
 JACOB H. DUKE  
 2/21/2020  
**KCA**  
 KISINGER CAMPO & ASSOCIATES  
 301 FAYETTEVILLE ST., SUITE 1500  
 RALEIGH, NC 27601 (919) 882-7839  
 NC FIRM LICENSE: C-1506

PROJECT NO. BR-0117  
 NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-  
 SHEET 2 OF 2

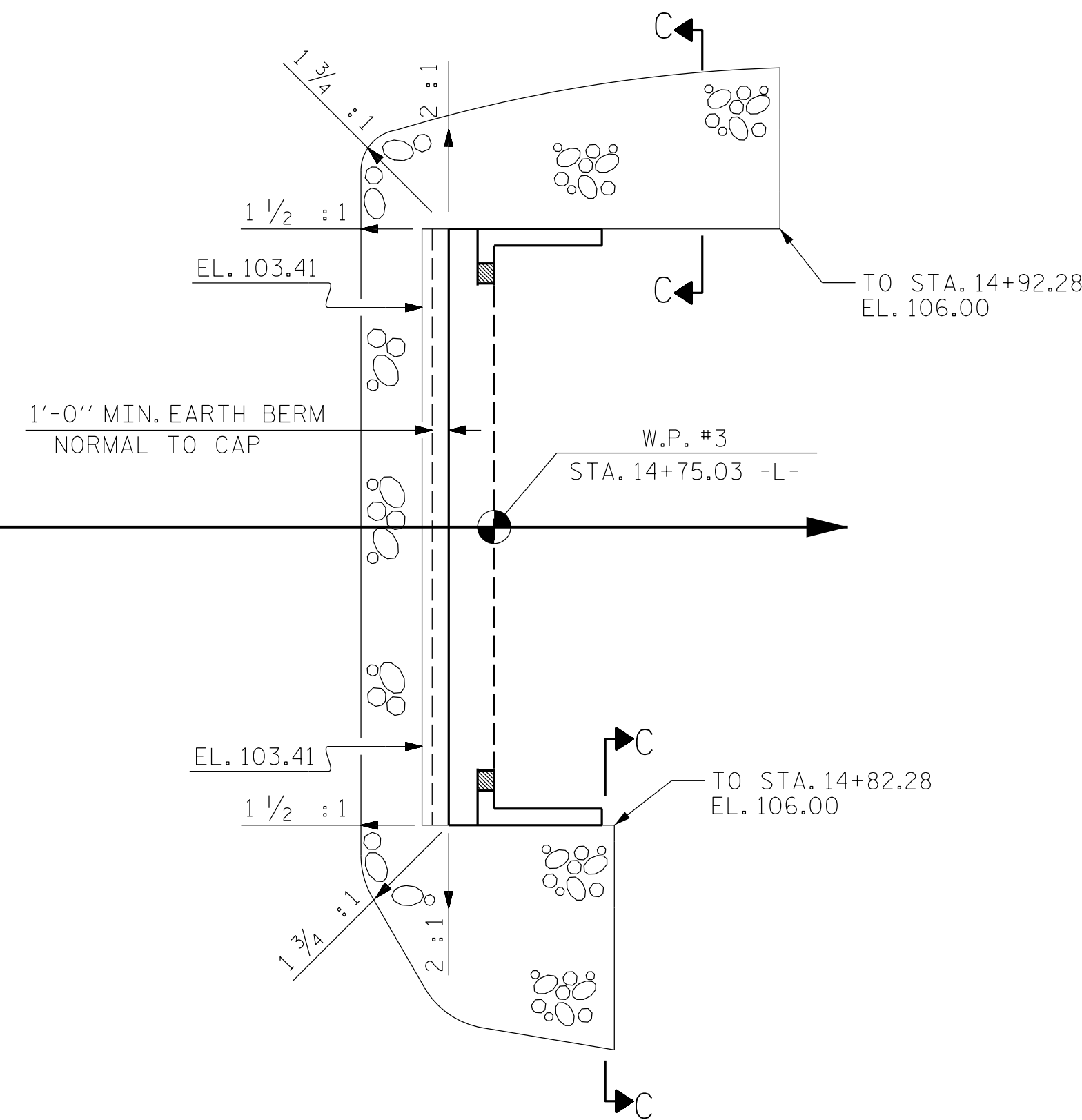
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-17					TOTAL SHEETS 19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

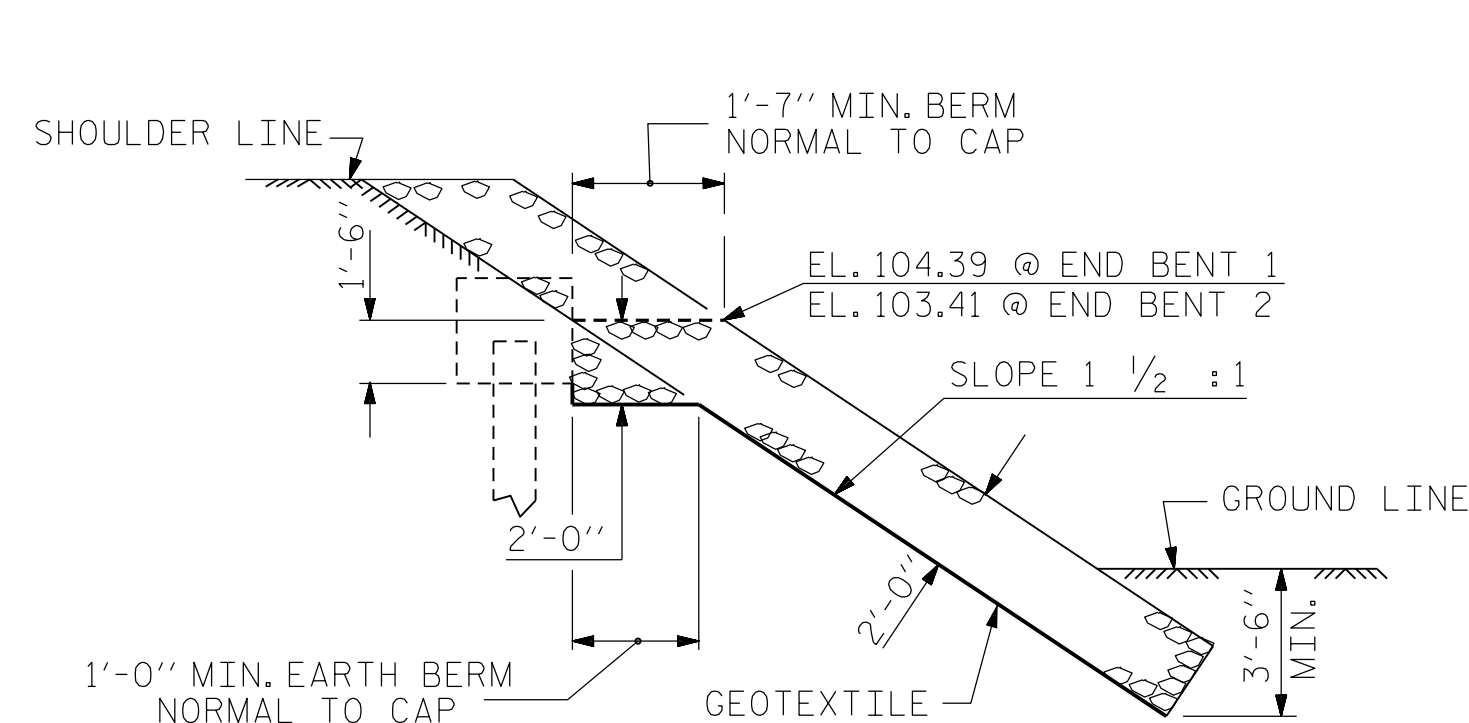


RIP RAP AT END BENT 1

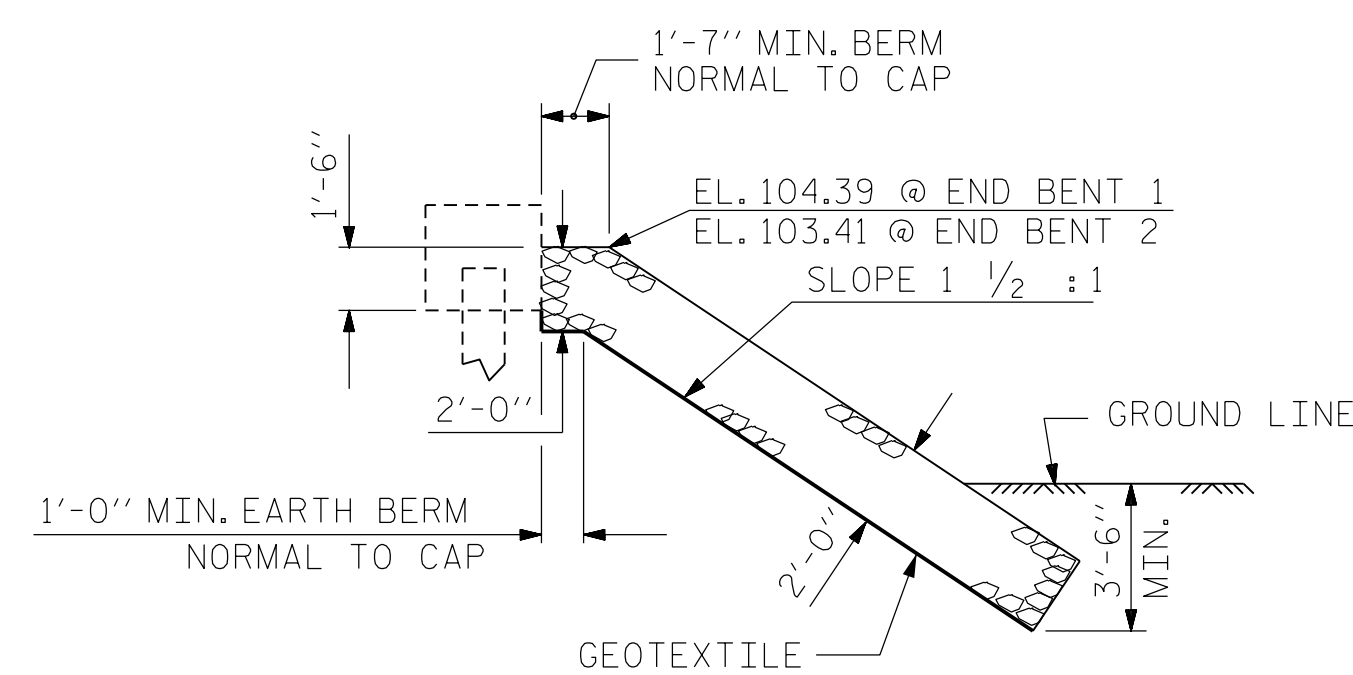


RIP RAP AT END BENT 2

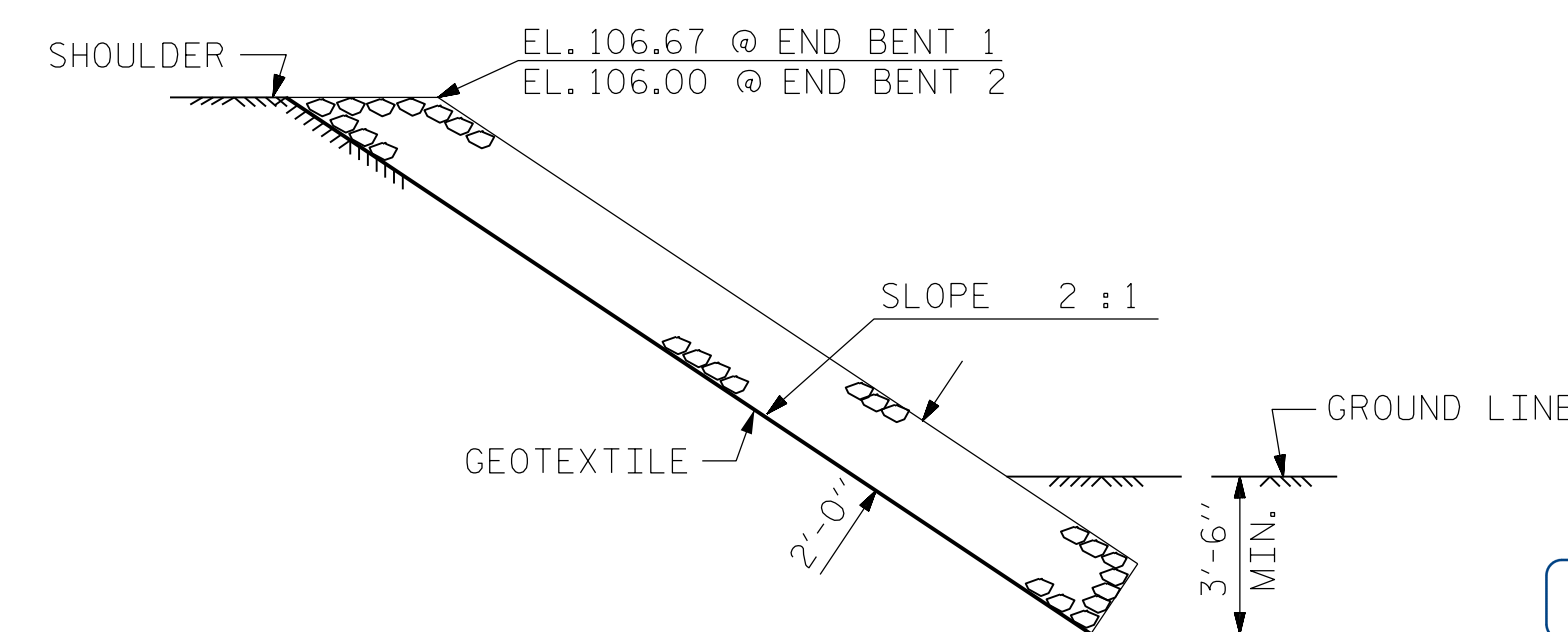
ESTIMATED QUANTITIES		
BRIDGE @ STA. 14+26.35	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	65	72
END BENT 2	62	69



SECTION H-H

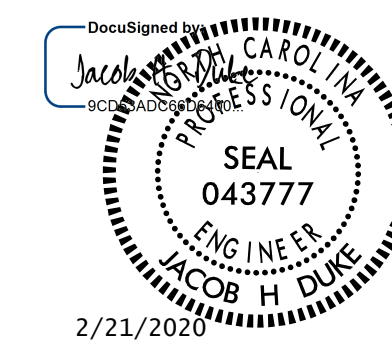


SECTION C-C  
BERM RIP RAPPED



SECTION C-C

PROJECT NO. BR-0117  
NORTHAMPTON COUNTY  
STATION: 14+26.35 -L-

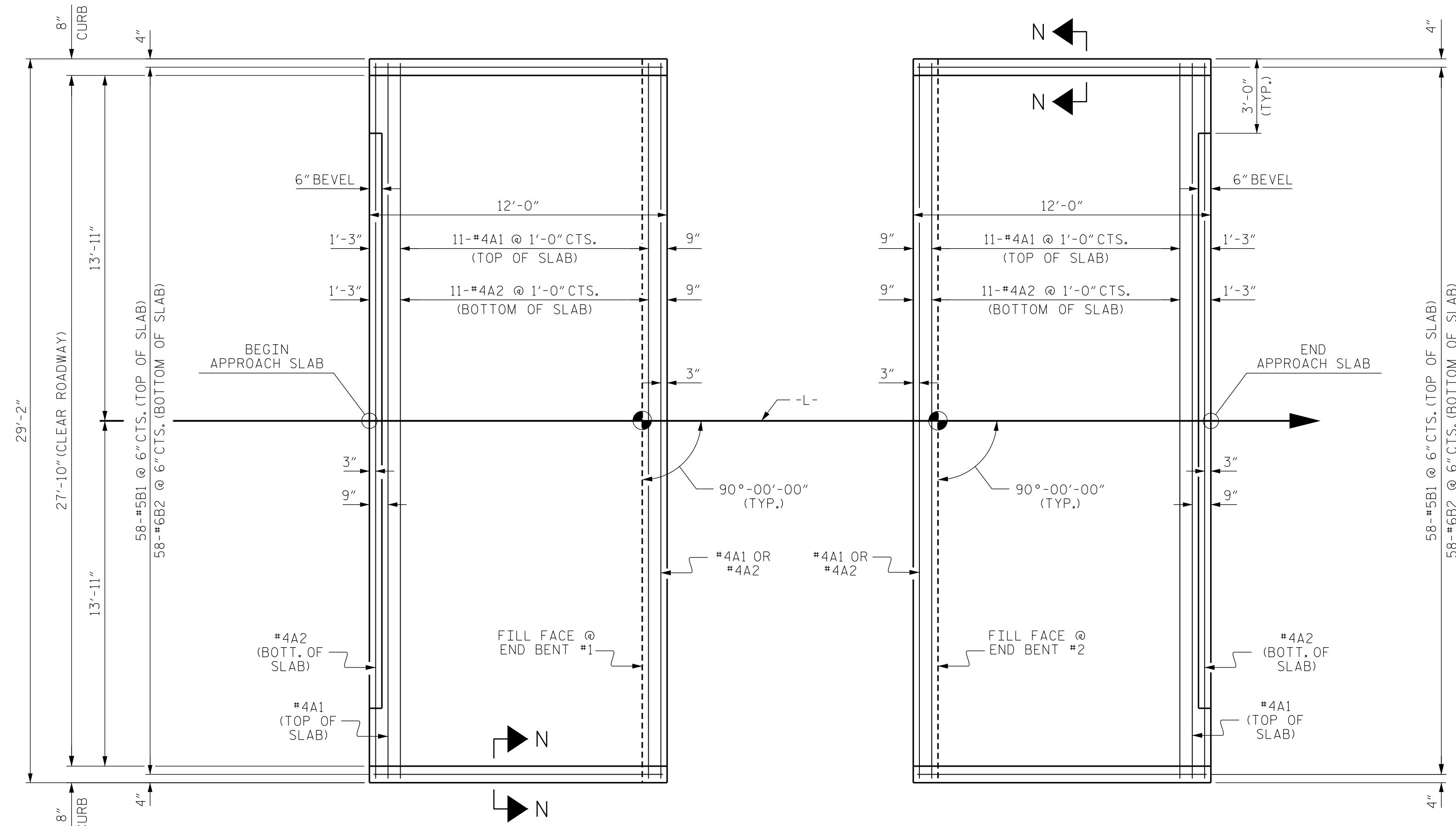


**KCA**  
KISINGER CAMPO  
& ASSOCIATES  
301 FAYETTEVILLE ST., SUITE 1500  
RALEIGH, NC 27601 (919) 882-7839  
NC FIRM LICENSE: C-1506

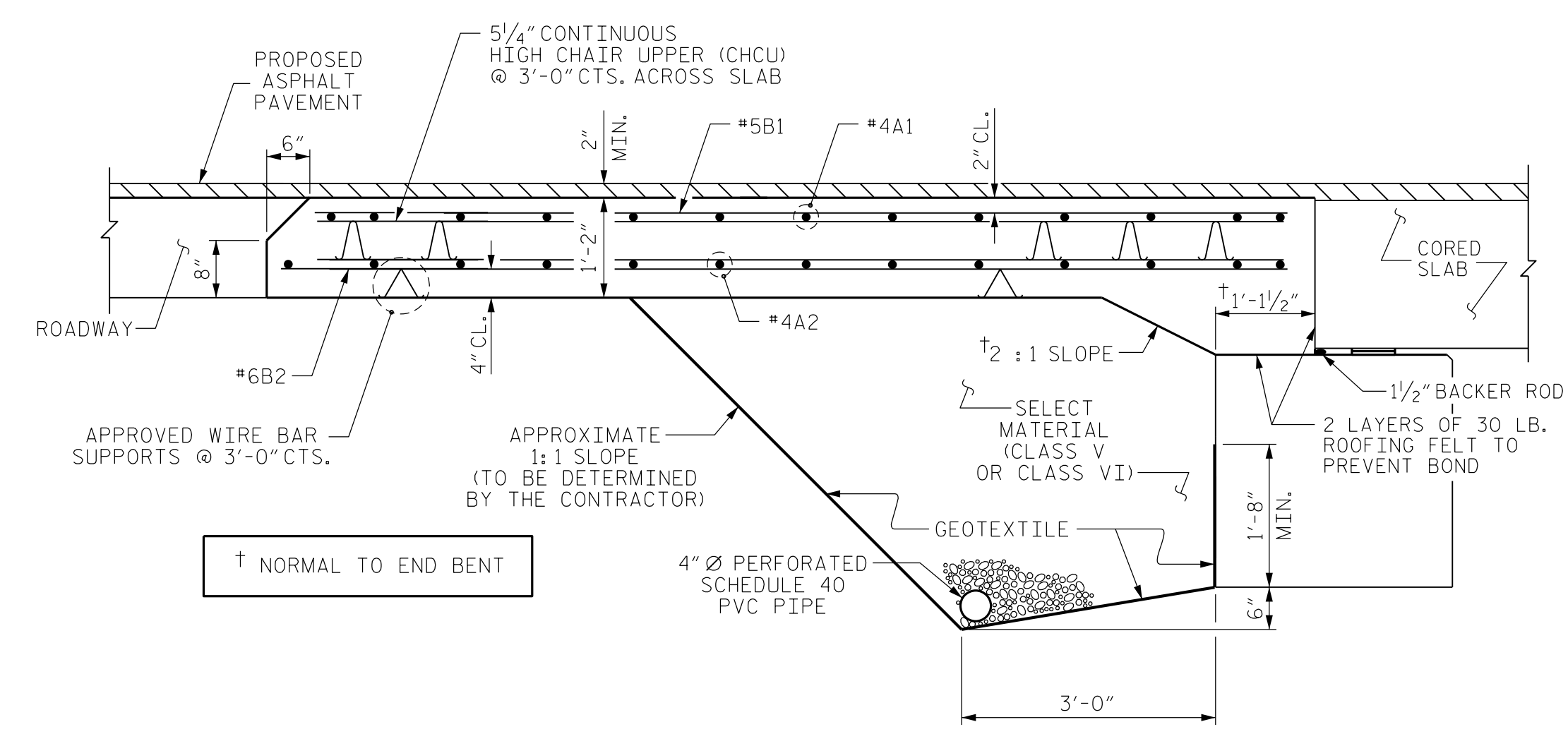
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						STANDARD RIP RAP DETAILS			
REVISIONS								SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:			S-18	
1			3					TOTAL SHEETS	
2			4					19	

DESIGN ENGINEER OF RECORD:			
JACOB H. DUKE DATE : 01/2020			
ASSEMBLED BY : DIEGO A. AGUIRRE DATE : 01/2020			
CHECKED BY : FIDEL L. FLORES DATE : 01/2020			
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/GM	
CHECKED BY : RDU 1/84	REV. 12/21/11	MAA/GM	
	REV. 12/17	MAA/THC	

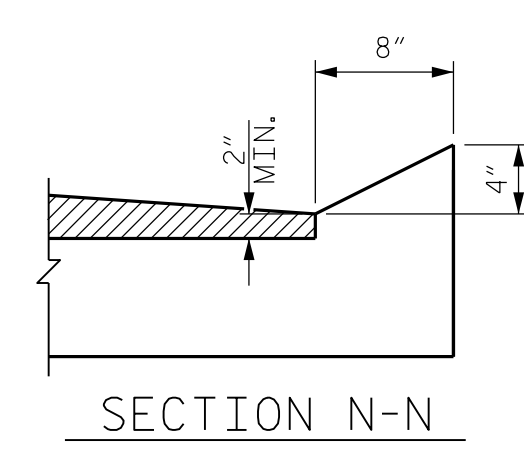
DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED



PLAN @ END BENT #1 PLAN @ END BENT #2  
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB  
(TYPE II - MODIFIED APPROACH FILL)

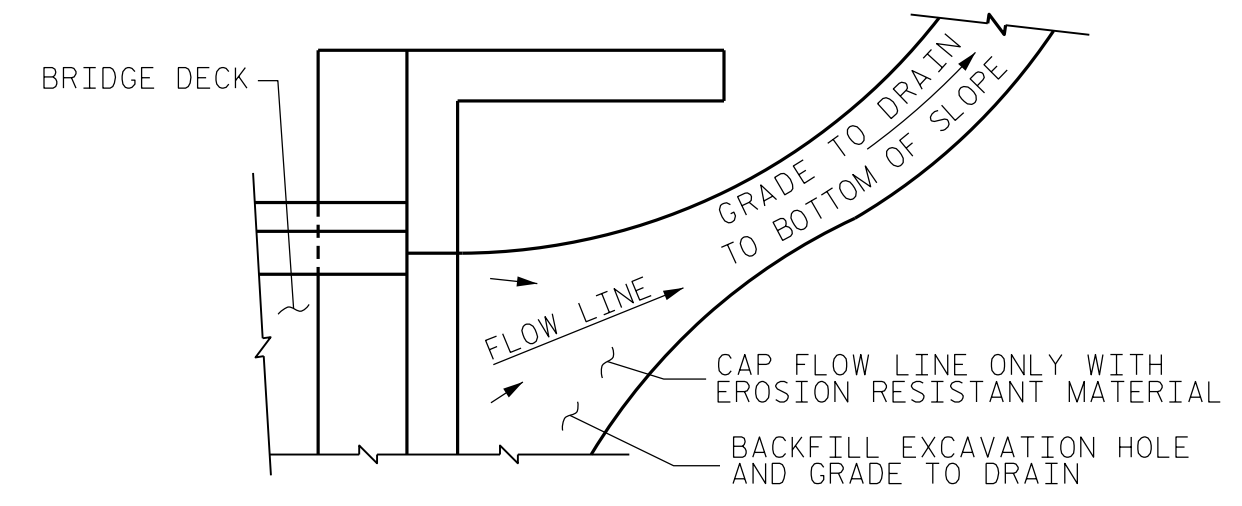


CURB DETAILS

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

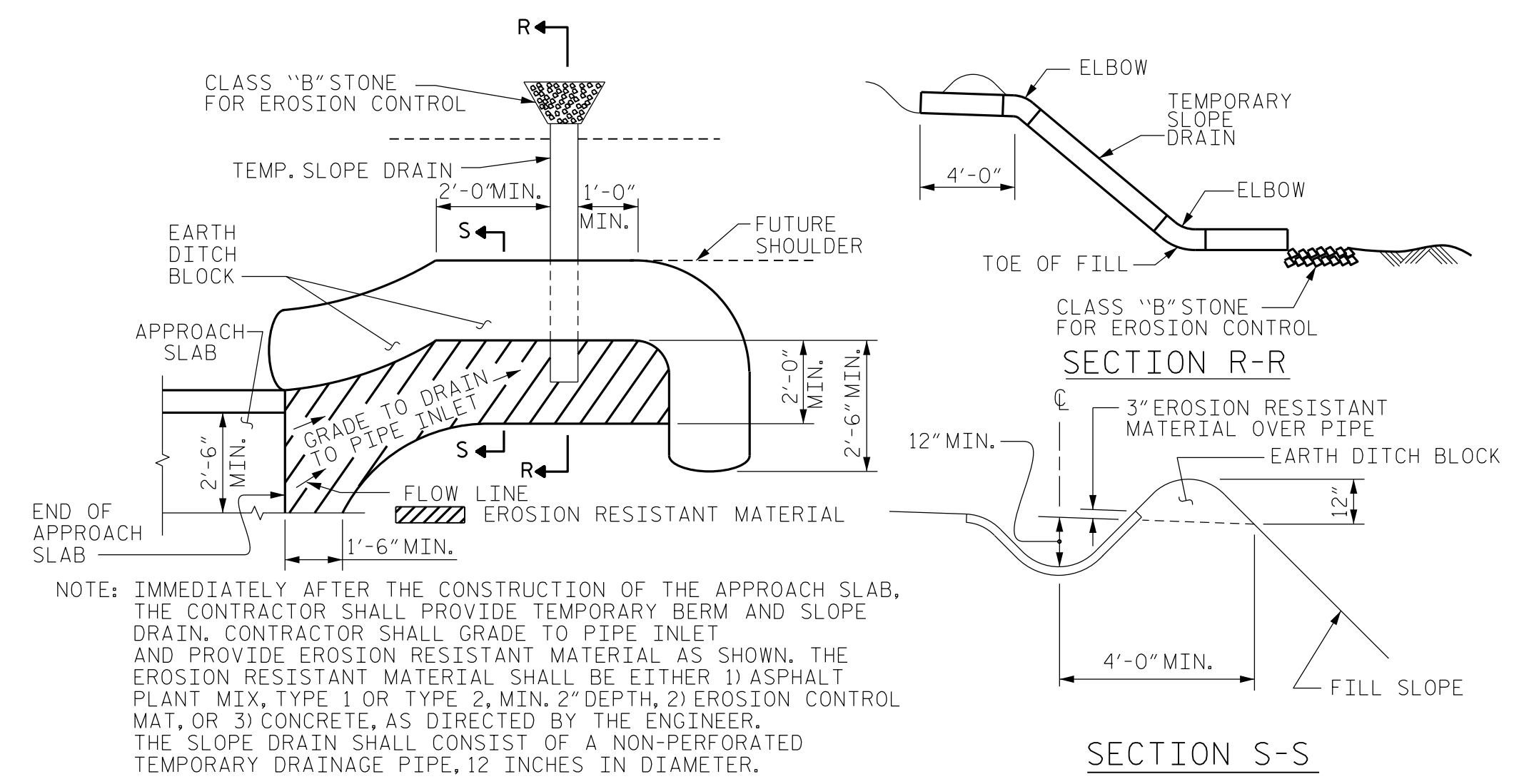
NOTES

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

BILL OF MATERIAL						
APPROACH SLAB AT EB #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	13	#4	STR	28'-10"	250	
A2	13	#4	STR	28'-10"	250	
*B1	58	#5	STR	11'-2"	676	
B2	58	#6	STR	11'-8"	1016	
REINFORCING STEEL					LBS.	1266
*EPOXY COATED REINFORCING STEEL					LBS.	926
CLASS AA CONCRETE					C. Y.	16.7

APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	13	#4	STR	28'-10"	250	
A2	13	#4	STR	28'-10"	250	
*B1	58	#5	STR	11'-2"	676	
B2	58	#6	STR	11'-8"	1016	
REINFORCING STEEL					LBS.	1266
*EPOXY COATED REINFORCING STEEL					LBS.	926
CLASS AA CONCRETE					C. Y.	17.7

DESIGN ENGINEER OF RECORD:  
 JACOB H. DUKE DATE: 01/2020  
 ASSEMBLED BY: DIEGO A. AGUIRRE DATE: 01/2020  
 CHECKED BY: FIDEL L. FLORES DATE: 01/2020  
 DRAWN BY: SHS/MAA 5-09 REV. 12-17 MAA/THC  
 CHECKED BY: BCH 5-09 REV. 08-19 BNB/THC



PROJECT NO. BR-0117  
 NORTHAMPTON COUNTY  
 STATION: 14+26.35 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	
S-19	TOTAL SHEETS 19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST  $\frac{3}{16}$ " 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  $\frac{1}{16}$  INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

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

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS 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.

# ENGLISH

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