

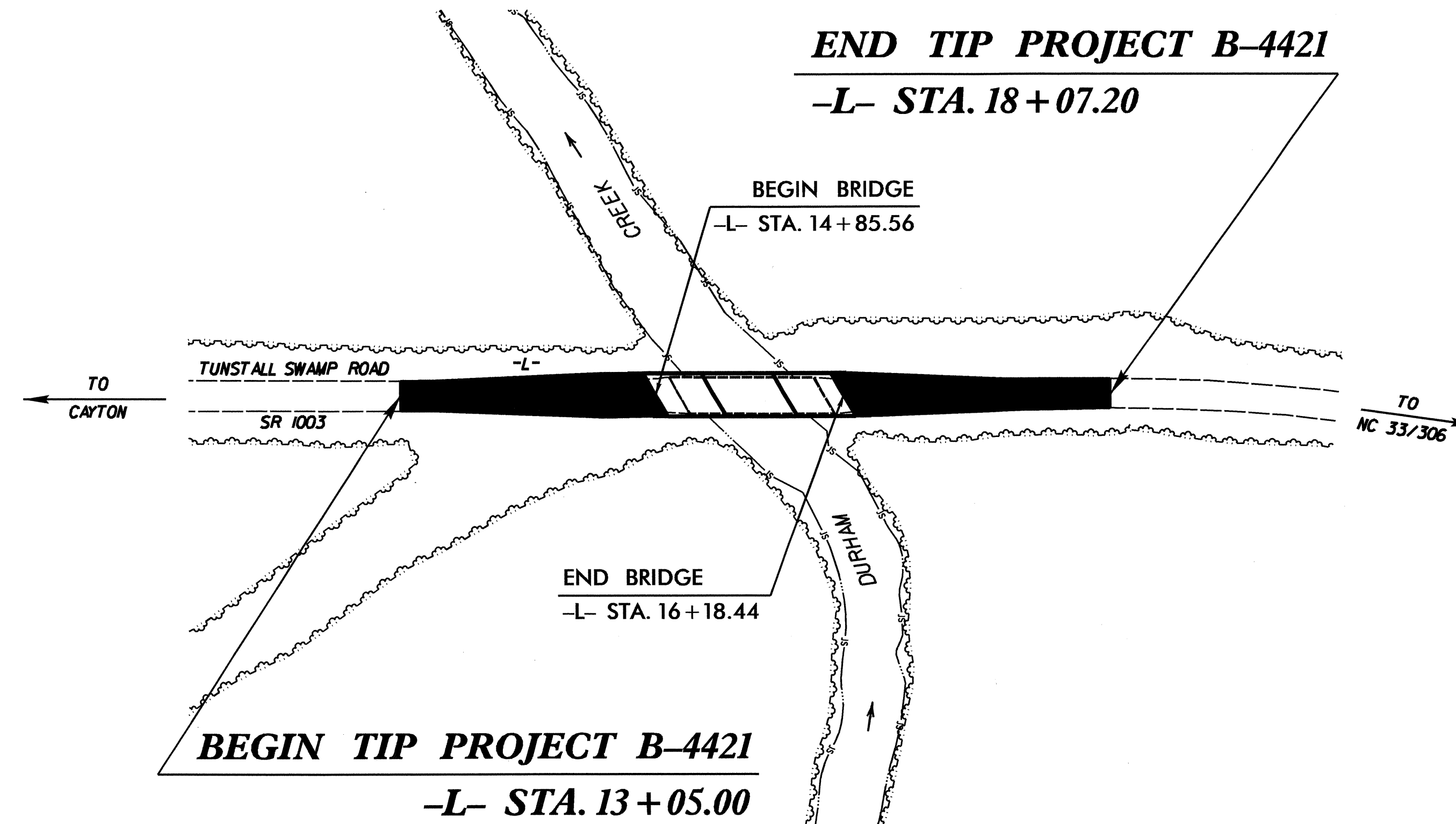
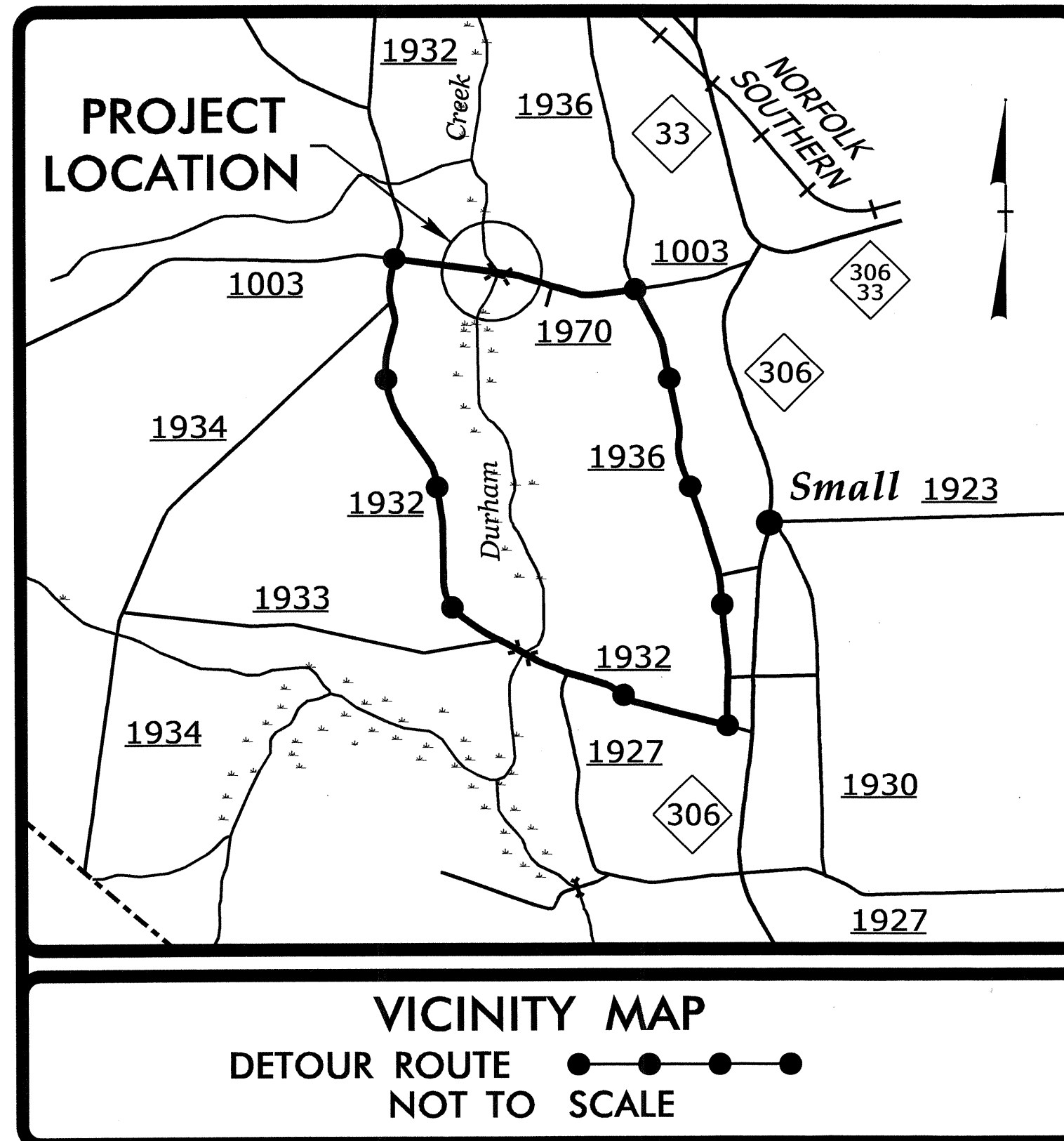
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4421		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33694.1.1	BRSTP-1003(31)	PE	
33694.2.1	BRSTP-1003(31)	RW & UTILITY	
33694.3.1	BRSTP-1003(31)	CONST.	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**BEAUFORT COUNTY**

LOCATION: BRIDGE NO. 42 OVER DURHAM CREEK ON SR 1003

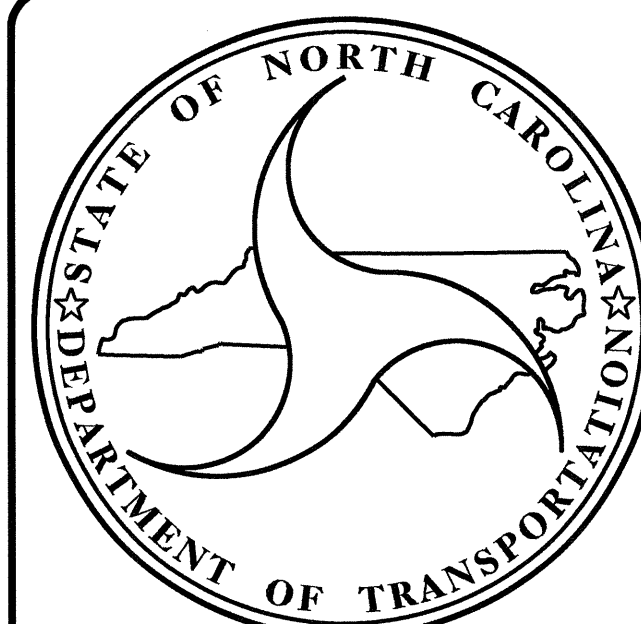
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE



TIP PROJECT: B-4421

CONTRACT: C202883

**STRUCTURE**



**DESIGN DATA**  
 ADT 2012 = 1,050  
 ADT 2032 = 1,530  
 DHV = 12%  
 D = 80%  
 T = 13%\*  
 V = 60 MPH  
 \*(TTST 7% + DUALS 6%)  
 FUNC CLASS =  
 RURAL MAJOR COLLECTOR  
 SUBREGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4421	= 0.070 MILES
LENGTH STRUCTURE TIP PROJECT B-4421	= 0.025 MILES
TOTAL LENGTH TIP PROJECT B-4421	= 0.095 MILES

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
 1000 Birch Ridge Dr., Raleigh NC, 27610

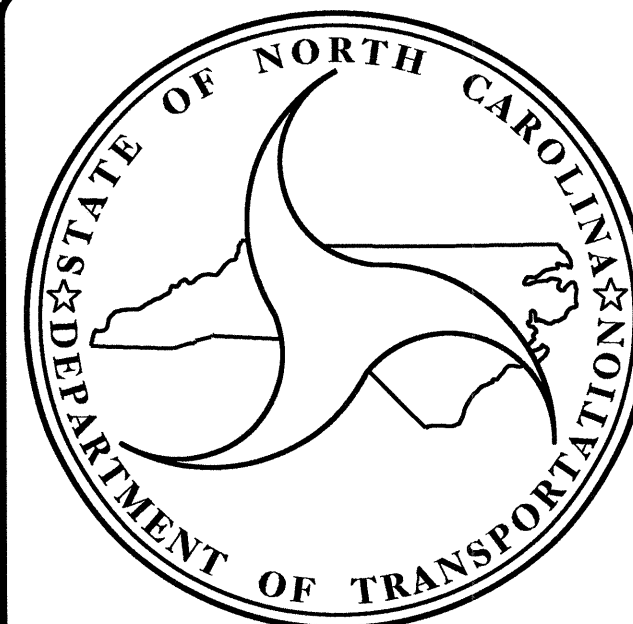
2012 STANDARD SPECIFICATIONS

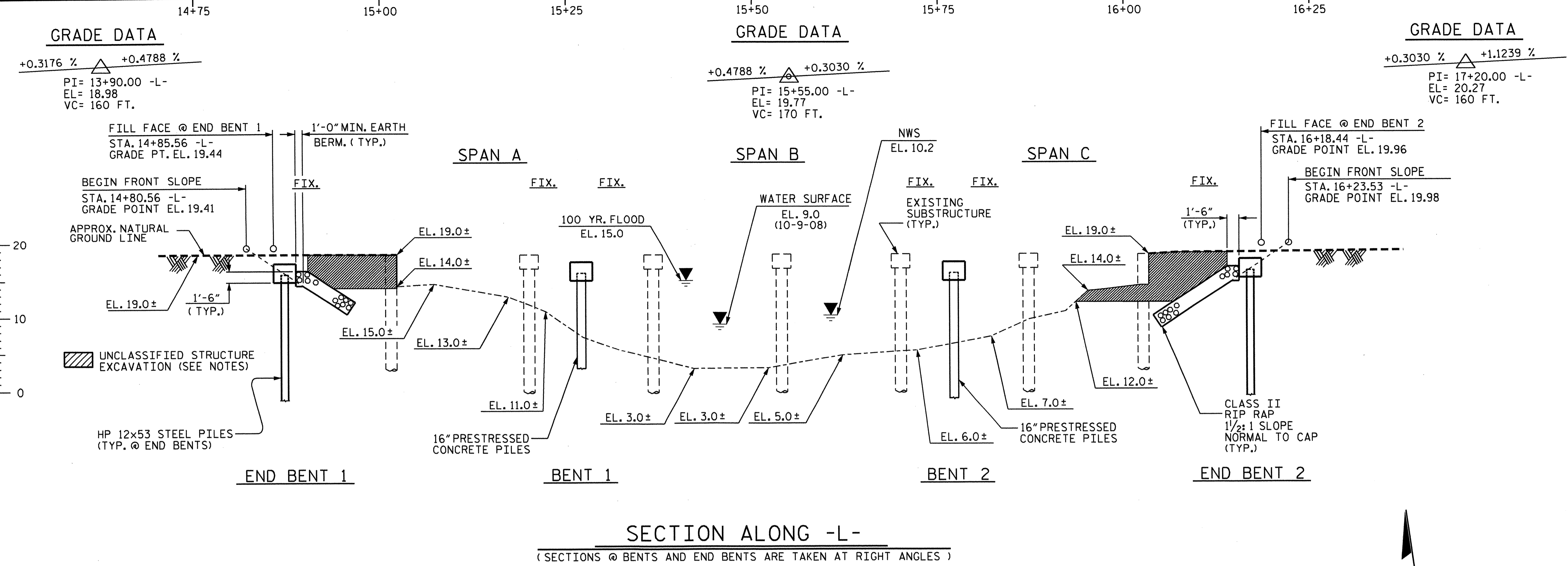
LETTING DATE:  
 AUGUST 21, 2012

OMAR R. AZIZI, P.E.  
 PROJECT ENGINEER

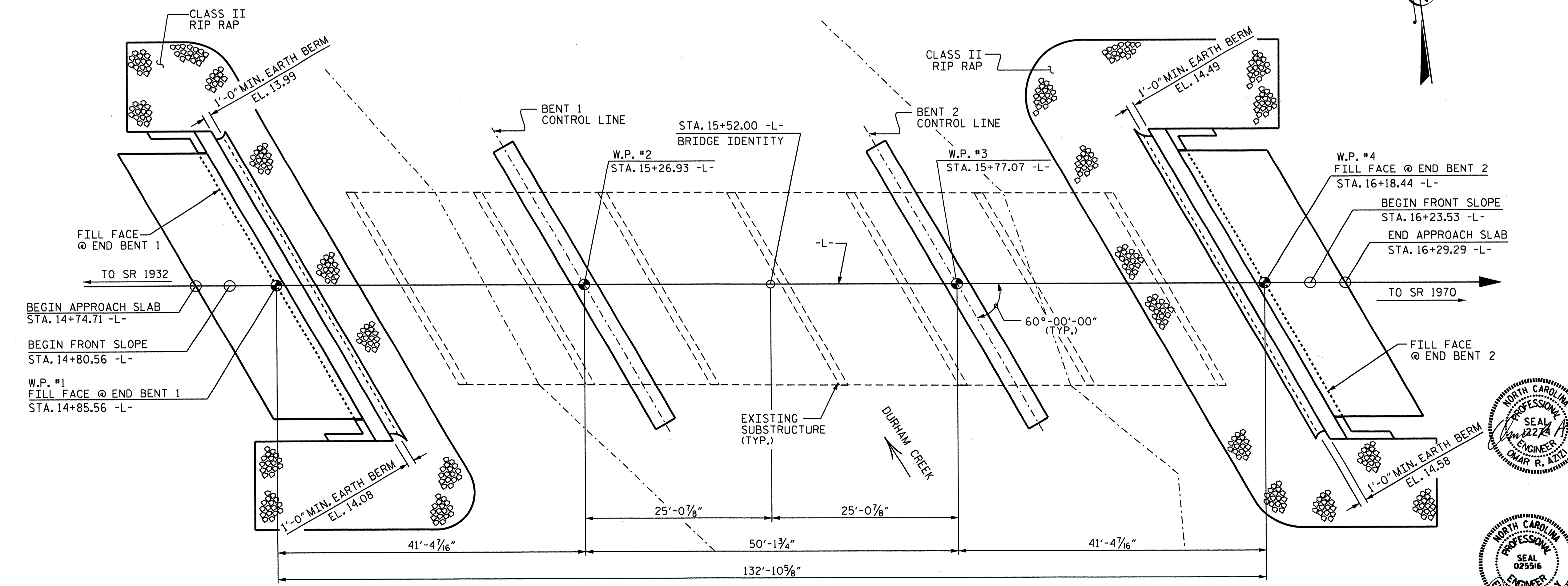
EMILY MURRAY, P.E.  
 PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT  
 1000 BIRCH RIDGE DR.  
 RALEIGH, N.C. 27610





SECTION ALONG -L-  
(SECTIONS @ BENTS AND END BENTS ARE TAKEN AT RIGHT ANGLES)



PLAN  
(PILES ARE NOT SHOWN IN PLAN VIEW FOR CLARITY)

I HEREBY CERTIFY THESE PLANS  
ARE THE AS-BUILT PLANS



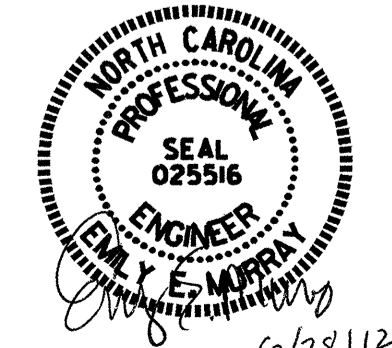
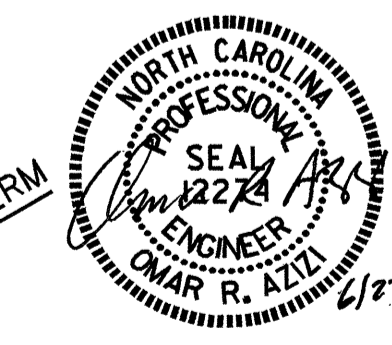
PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-  
 SHEET 1 OF 3 REPLACES BRIDGE NO. 42

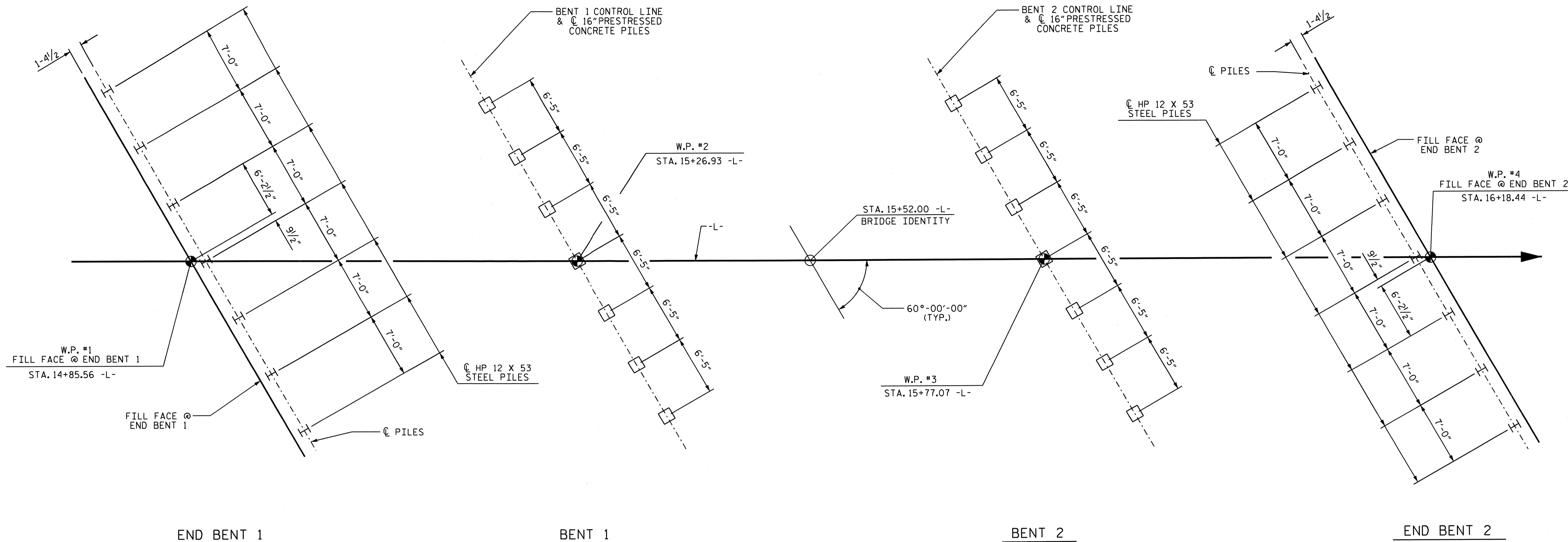
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 BRIDGE OVER DURHAM CREEK  
 ON SR 1003 BETWEEN  
 SR 1932 AND SR 1970

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

DRAWN BY: K. P. SEDAI DATE: 4/18/12  
 CHECKED BY: J. L. AVERETTE DATE: 5/16/12

27-JUN-2012 14:49  
 Z:\TIP\Projects-B\B4421\Structures\ksedai\B4421-SD.G0.dgn  
 emurray





### FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.

#### FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.

PILES AT BENT NO.1 AND BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAW OR SCOUR.

INSTALL PILES AT BENT NO.1 AND BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN -30.0 FT.

SCOUR CRITICAL ELEVATIONS FOR BENT NO.1 AND BENT NO.2 ARE ELEVATION -3.0 FT. AND -4.0 FT., RESPECTIVELY. 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.

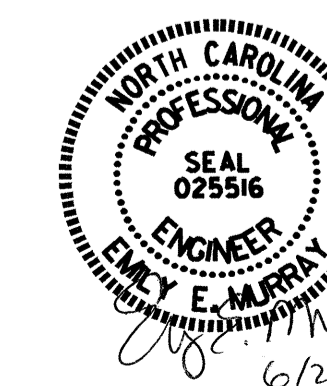
IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40-75 KIP-FT PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT NO.1 AND BENT NO.2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

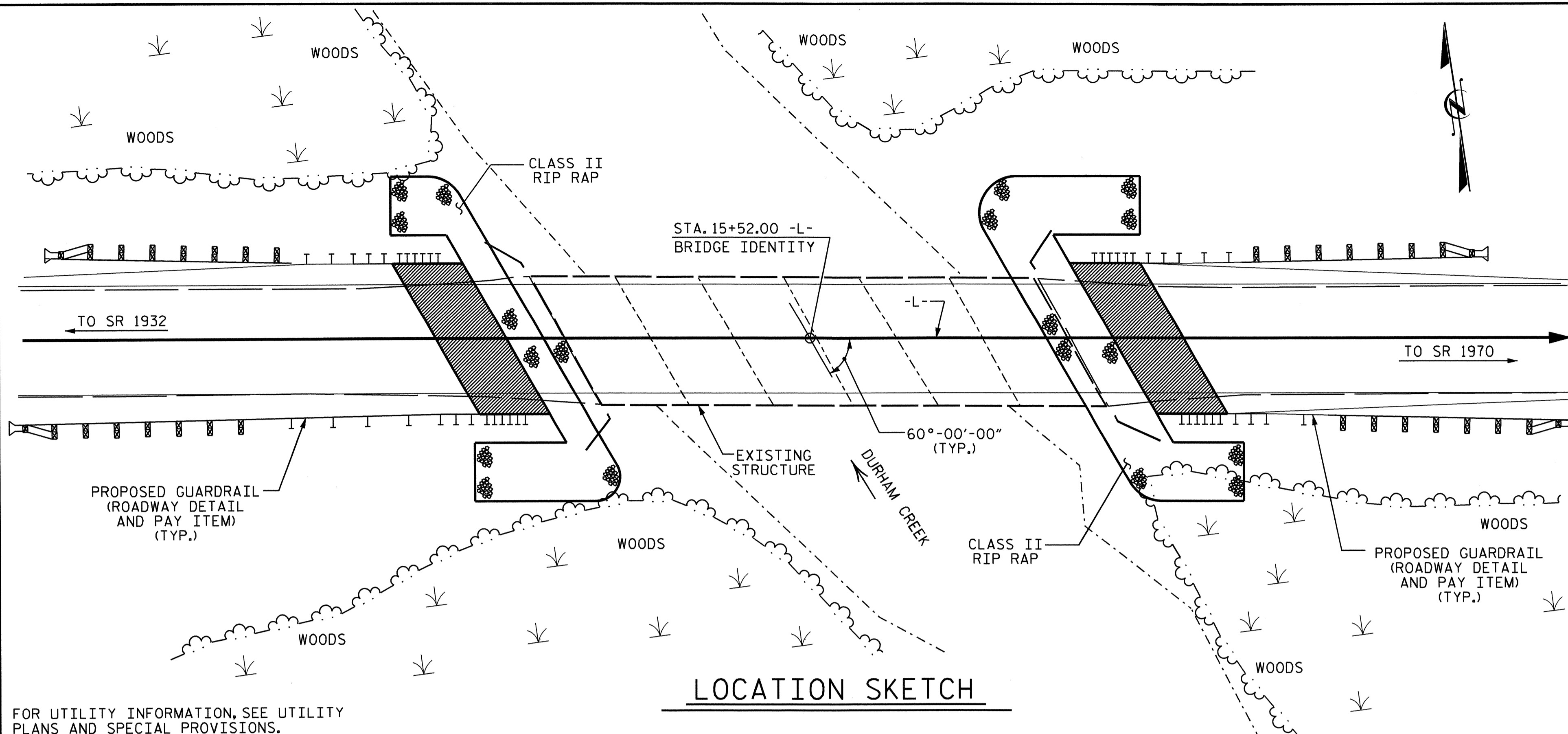
GENERAL DRAWING  
 BRIDGE OVER DURHAM CREEK  
 ON SR 1003 BETWEEN  
 SR 1932 AND SR 1970



DRAWN BY: K. P. SEDA DATE: 4/19/12  
 CHECKED BY: I. L. AVERETTE DATE: 5/16/12

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

B.M.: R. R. SPIKE IN BASE OF 15" HARDWOOD TREE; 70.00' LT. STA. 10+43.50 -L- EL. 13.79'



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

**NOTES:**

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS AND END BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL BAR SUPPORTS USED IN THE PARAPET, BENT CAPS, END BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE PILES OF BENT NO.1 AND NO.2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

THE EXISTING STRUCTURE CONSISTING OF 6 SPANS (1 SPAN @ 18'-3", 1 SPAN @ 16'-11", 1 SPAN @ 17'-5", 1 SPAN @ 15'-3", 1 SPAN @ 18'-2" AND 1 SPAN @ 17'-7") FOR A TOTAL LENGTH OF 104'-0"; CLEAR ROADWAY WIDTH OF 26'-2" ON REINFORCED CONCRETE FLOOR ON TIMBER JOISTS AND TIMBER CAPS ON TIMBER PILES AT VARIABLE CENTERS LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 20'-0" 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 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.

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

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.

**NOTES CONT'D.:**

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.  
 THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.  
 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.

**HYDRAULIC DATA**

DESIGN DISCHARGE = 1400 C.F.S.  
 FREQUENCY OF DESIGN FLOOD = 25 YRS.  
 DESIGN HIGH WATER ELEVATION = 13.9'  
 DRAINAGE AREA = 17.8 SQ. MI.  
 BASE DISCHARGE (Q100) = 2100 C.F.S.  
 BASE HIGH WATER ELEVATION = 15.0'

**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE = 5200 C.F.S.  
 FREQUENCY OF OVERTOPPING FLOOD = 500 YRS. (+)  
 OVERTOPPING FLOOD ELEVATION = 16.3'

**TOTAL BILL OF MATERIAL**

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	EPOXY COATED REINFORCING STEEL	16" PRESTRESSED CONCRETE PILES	HP 12 X 53 STEEL PILES	PILE REDRIVES	TWO BAR METAL RAIL	1'-2" X 2'-10" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLABS	
	LUMP SUM	EA.	LUMP SUM	CU.YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	NO.	LIN.FT.	EA.	LIN.FT.	SO.YDS.	LUMP SUM	NO.	LIN.FT.
SUPERSTRUCTURE					LUMP SUM					244.23	260.58			LUMP SUM	33	1430.00
END BENT NO.1			LUMP SUM	15.9		2331		7	525	4		68	76			
BENT NO.1				12.6		2493	7	525		4						
BENT NO.2				12.6		2493	7	525		4						
END BENT NO.2			LUMP SUM	15.9		2331		7	525	4		117	130			
TOTAL	LUMP SUM	1	LUMP SUM	57.0	LUMP SUM	9648	14	1050	14	1050	16	244.23	260.58	LUMP SUM	33	1430.00

PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 BRIDGE OVER DURHAM CREEK  
 ON SR 1003 BETWEEN  
 SR 1932 AND SR 1970



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

DRAWN BY: K. P. SEDAI DATE: 4/20/12  
 CHECKED BY: T. L. AVERETTE DATE: 5/16/12

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	1	1.352	--	1.75	0.252	1.95	40'	EL	19.423	0.653	1.35	40'	EL	7.769	0.80	0.252	1.72	40'	EL	19.423		
	HL-93(Opr)	N/A	--	1.753	--	1.35	0.252	2.52	40'	EL	19.423	0.653	1.75	40'	EL	7.769	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.544	55.583	1.75	0.252	2.45	40'	EL	19.423	0.653	1.54	40'	EL	7.769	0.80	0.252	2.14	40'	EL	19.423		
	HS-20(Opr)	36.000	--	2.001	72.053	1.35	0.252	3.17	40'	EL	19.423	0.653	2	40'	EL	7.769	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.929	53.037	1.4	0.252	5.64	40'	EL	19.423	0.653	3.93	40'	EL	7.769	0.80	0.252	3.99	40'	EL	19.423	
		SNGARBS2	20.000	--	2.985	59.708	1.4	0.252	4.63	40'	EL	15.538	0.653	2.99	40'	EL	7.769	0.80	0.252	3.28	40'	EL	19.423	
		SNAGRIS2	22.000	--	2.852	62.746	1.4	0.252	4.53	40'	EL	15.538	0.653	2.85	40'	EL	7.769	0.80	0.252	3.23	40'	EL	15.538	
		SNCOTTS3	27.250	--	1.98	53.947	1.4	0.252	2.82	40'	EL	19.423	0.653	1.98	40'	EL	7.769	0.80	0.252	1.99	40'	EL	19.423	
		SNAGGRS4	34.925	--	1.782	62.222	1.4	0.252	2.54	40'	EL	19.423	0.653	1.78	40'	EL	7.769	0.80	0.252	1.79	40'	EL	19.423	
		SNS5A	35.550	--	1.746	62.059	1.4	0.252	2.47	40'	EL	19.423	0.653	1.89	40'	EL	7.769	0.80	0.252	1.75	40'	EL	19.423	
		SNS6A	39.950	--	1.662	66.381	1.4	0.252	2.35	40'	EL	19.423	0.653	1.79	40'	EL	7.769	0.80	0.252	1.66	40'	EL	19.423	
	SNS7B	42.000	--	1.585	66.556	1.4	0.252	2.24	40'	EL	19.423	0.653	1.86	40'	EL	7.769	0.80	0.252	1.58	40'	EL	19.423		
	TTST	TNAGRIT3	33.000	--	2.045	67.476	1.4	0.252	2.89	40'	EL	19.423	0.653	2.07	40'	EL	7.769	0.80	0.252	2.04	40'	EL	19.423	
		TNT4A	33.075	--	1.951	64.52	1.4	0.252	2.93	40'	EL	19.423	0.653	1.95	40'	EL	7.769	0.80	0.252	2.07	40'	EL	19.423	
		TNT6A	41.600	--	1.757	73.106	1.4	0.252	2.49	40'	EL	19.423	0.653	1.91	40'	EL	7.769	0.80	0.252	1.76	40'	EL	19.423	
		TNT7A	42.000	--	1.795	75.386	1.4	0.252	2.55	40'	EL	19.423	0.653	1.79	40'	EL	7.769	0.80	0.252	1.80	40'	EL	19.423	
		TNT7B	42.000	--	1.729	72.638	1.4	0.252	2.61	40'	EL	19.423	0.653	1.73	40'	EL	7.769	0.80	0.252	1.84	40'	EL	19.423	
		TNAGRIT4	43.000	--	1.661	71.441	1.4	0.252	2.53	40'	EL	15.538	0.653	1.66	40'	EL	7.769	0.80	0.252	1.79	40'	EL	19.423	
TNAGT5A		45.000	--	1.659	74.644	1.4	0.252	2.35	40'	EL	19.423	0.653	1.77	40'	EL	7.769	0.80	0.252	1.66	40'	EL	19.423		
TNAGT5B	45.000	3	1.568	70.561	1.4	0.252	2.28	40'	EL	19.423	0.653	1.57	40'	EL	7.769	0.80	0.252	1.61	40'	EL	19.423			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	Y <sub>0c</sub>	Y <sub>0w</sub>
	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

---

GIRDER LOCATION

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



LRFR SUMMARY  
FOR SPANS 'A' & 'C'

PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-



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

ASSEMBLED BY : EM NOLTING DATE : 1/6/11  
 CHECKED BY : BN GRADY DATE : 2/4/11  
 DRAWN BY : CVC 6/10  
 CHECKED BY : DNS 6/10

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

STD. NO. 21LRFR1.60&120S\_40L

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	1	1.35	--	1.75	0.25	1.74	50'	EL	24.423	0.656	1.35	50'	EL	9.769	0.80	0.25	1.59	50'	EL	24.423		
	HL-93(0pr)	N/A	--	1.75	--	1.35	0.25	2.25	50'	EL	24.423	0.656	1.75	50'	EL	9.769	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.586	57.108	1.75	0.25	2.15	50'	EL	24.423	0.656	1.59	50'	EL	9.769	0.80	0.25	1.97	50'	EL	24.423		
	HS-20(0pr)	36.000	--	2.056	74.028	1.35	0.25	2.79	50'	EL	24.423	0.656	2.06	50'	EL	9.769	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.009	54.117	1.4	0.25	5.47	50'	EL	24.423	0.656	4.31	50'	EL	9.769	0.80	0.25	4.01	50'	EL	24.423	
		SNGARBS2	20.000	--	3.168	63.352	1.4	0.25	4.32	50'	EL	24.423	0.656	3.19	50'	EL	9.769	0.80	0.25	3.17	50'	EL	24.423	
		SNAGRIS2	22.000	--	3.009	66.192	1.4	0.25	4.18	50'	EL	19.538	0.656	3.01	50'	EL	9.769	0.80	0.25	3.07	50'	EL	24.423	
		SNCOTTS3	27.250	--	2	54.493	1.4	0.25	2.73	50'	EL	24.423	0.656	2.16	50'	EL	9.769	0.80	0.25	2.00	50'	EL	24.423	
		SNAGGRS4	34.925	--	1.739	60.742	1.4	0.25	2.37	50'	EL	24.423	0.656	1.88	50'	EL	9.769	0.80	0.25	1.74	50'	EL	24.423	
		SNS5A	35.550	--	1.696	60.292	1.4	0.25	2.31	50'	EL	24.423	0.656	1.96	50'	EL	9.769	0.80	0.25	1.70	50'	EL	24.423	
	TTST	SNS6A	39.950	--	1.586	63.364	1.4	0.25	2.16	50'	EL	24.423	0.656	1.82	50'	EL	9.769	0.80	0.25	1.59	50'	EL	24.423	
		SNS7B	42.000	--	1.512	63.487	1.4	0.25	2.06	50'	EL	24.423	0.656	1.85	50'	EL	9.769	0.80	0.25	1.51	50'	EL	24.423	
		TNAGRIT3	33.000	--	1.943	64.127	1.4	0.25	2.65	50'	EL	24.423	0.656	2.14	50'	EL	9.769	0.80	0.25	1.94	50'	EL	24.423	
		TNT4A	33.075	--	1.96	64.837	1.4	0.25	2.67	50'	EL	24.423	0.656	2.04	50'	EL	9.769	0.80	0.25	1.96	50'	EL	24.423	
		TNT6A	41.600	--	1.633	67.938	1.4	0.25	2.23	50'	EL	24.423	0.656	2	50'	EL	9.769	0.80	0.25	1.63	50'	EL	24.423	
		TNT7A	42.000	--	1.658	69.634	1.4	0.25	2.26	50'	EL	24.423	0.656	1.86	50'	EL	9.769	0.80	0.25	1.66	50'	EL	24.423	
TNT7B	42.000	--	1.728	72.595	1.4	0.25	2.36	50'	EL	24.423	0.656	1.76	50'	EL	9.769	0.80	0.25	1.73	50'	EL	24.423			
TNAGRIT4	43.000	--	1.64	70.537	1.4	0.25	2.24	50'	EL	24.423	0.656	1.69	50'	EL	9.769	0.80	0.25	1.64	50'	EL	24.423			
TNAGT5A	45.000	--	1.532	68.95	1.4	0.25	2.09	50'	EL	24.423	0.656	1.75	50'	EL	9.769	0.80	0.25	1.53	50'	EL	24.423			
TNAGT5B	45.000	3	1.501	67.548	1.4	0.25	2.05	50'	EL	24.423	0.656	1.6	50'	EL	9.769	0.80	0.25	1.50	50'	EL	24.423			

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)

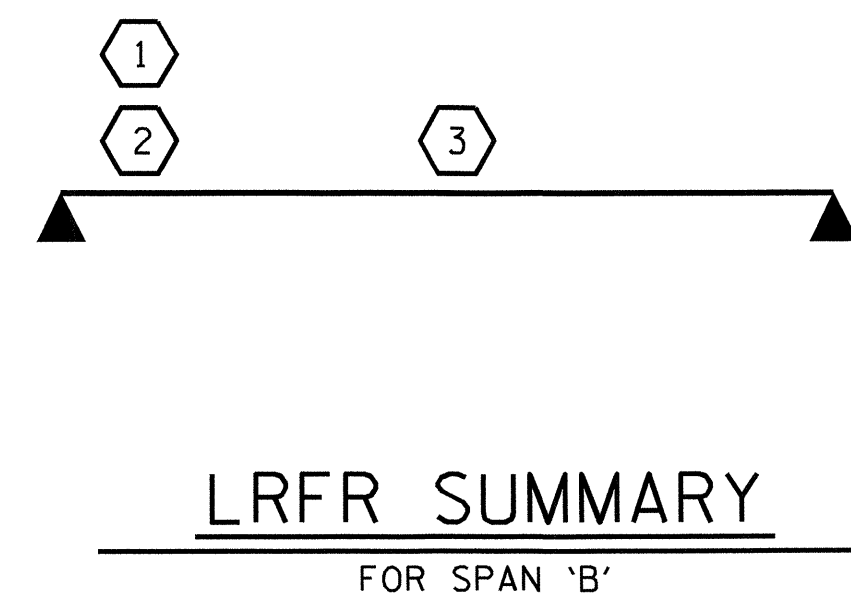
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

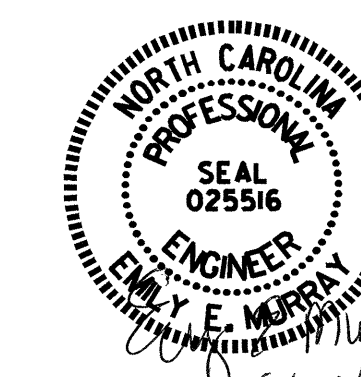
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GIRDER LOCATION

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



PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

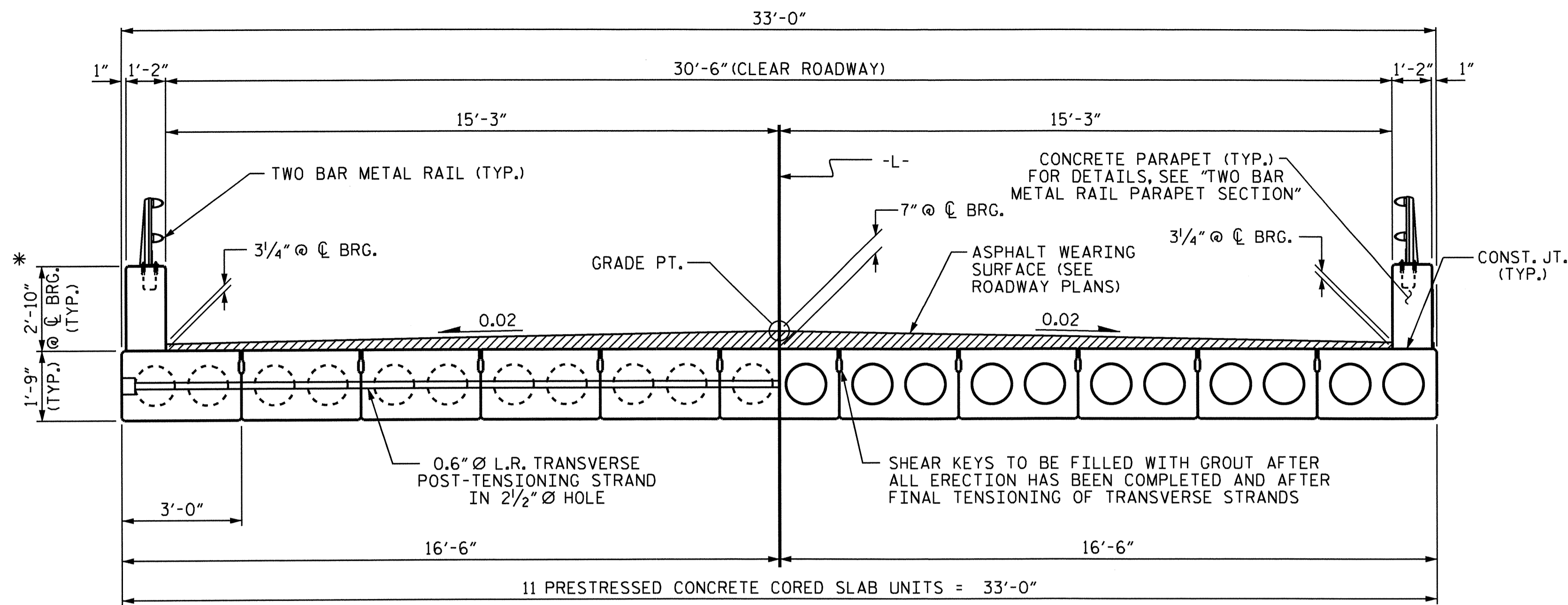


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 LRFR SUMMARY FOR  
 50' CORED SLAB UNIT  
 60° SKEW & 120° SKEW  
 (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO. S-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 25
2			4			

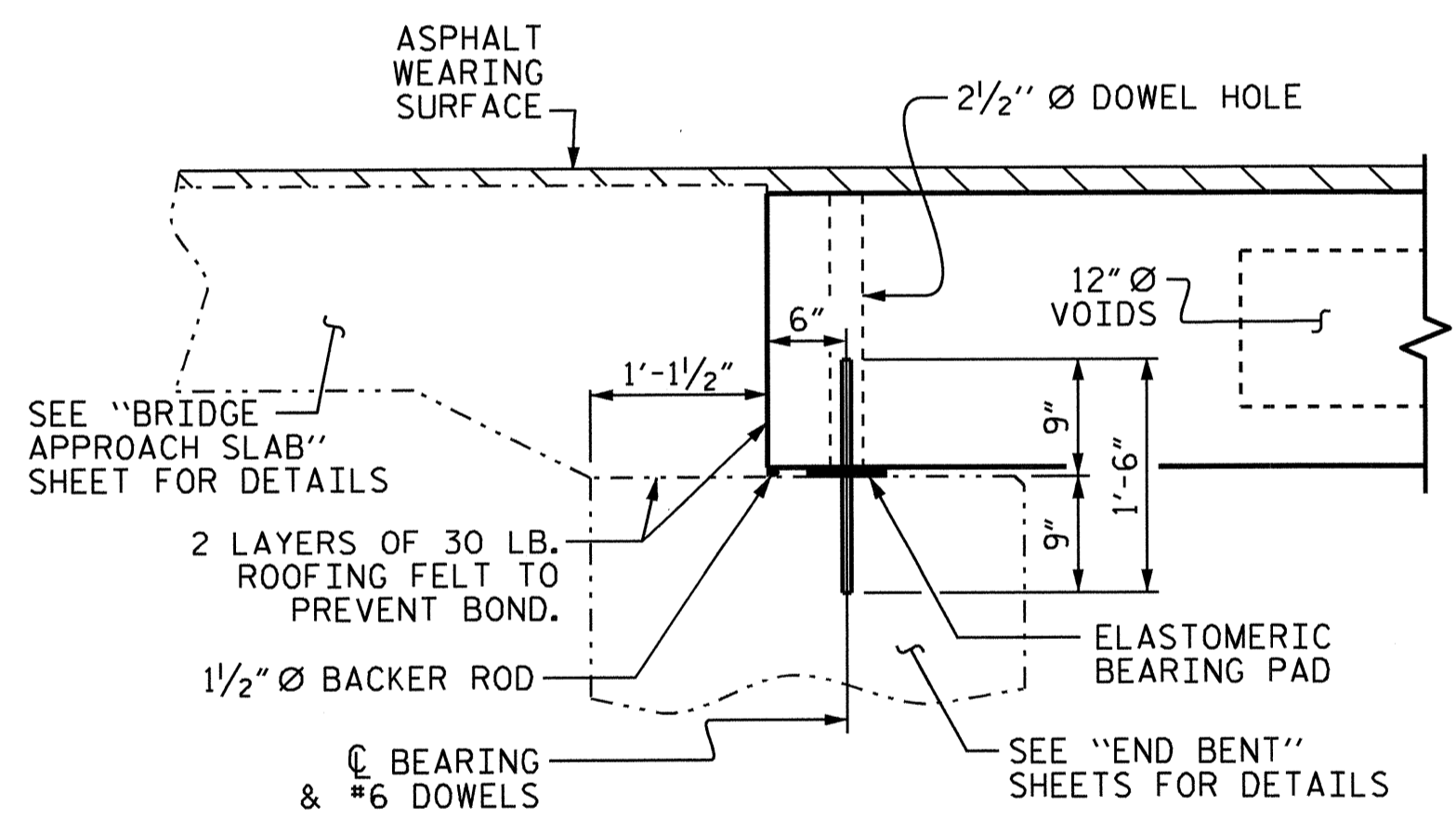
ASSEMBLED BY : EM NOLTING DATE : 1/6/11  
 CHECKED BY : BN GRADY DATE : 2/4/11  
 DRAWN BY : CVC 6/10  
 CHECKED BY : DNS 6/10



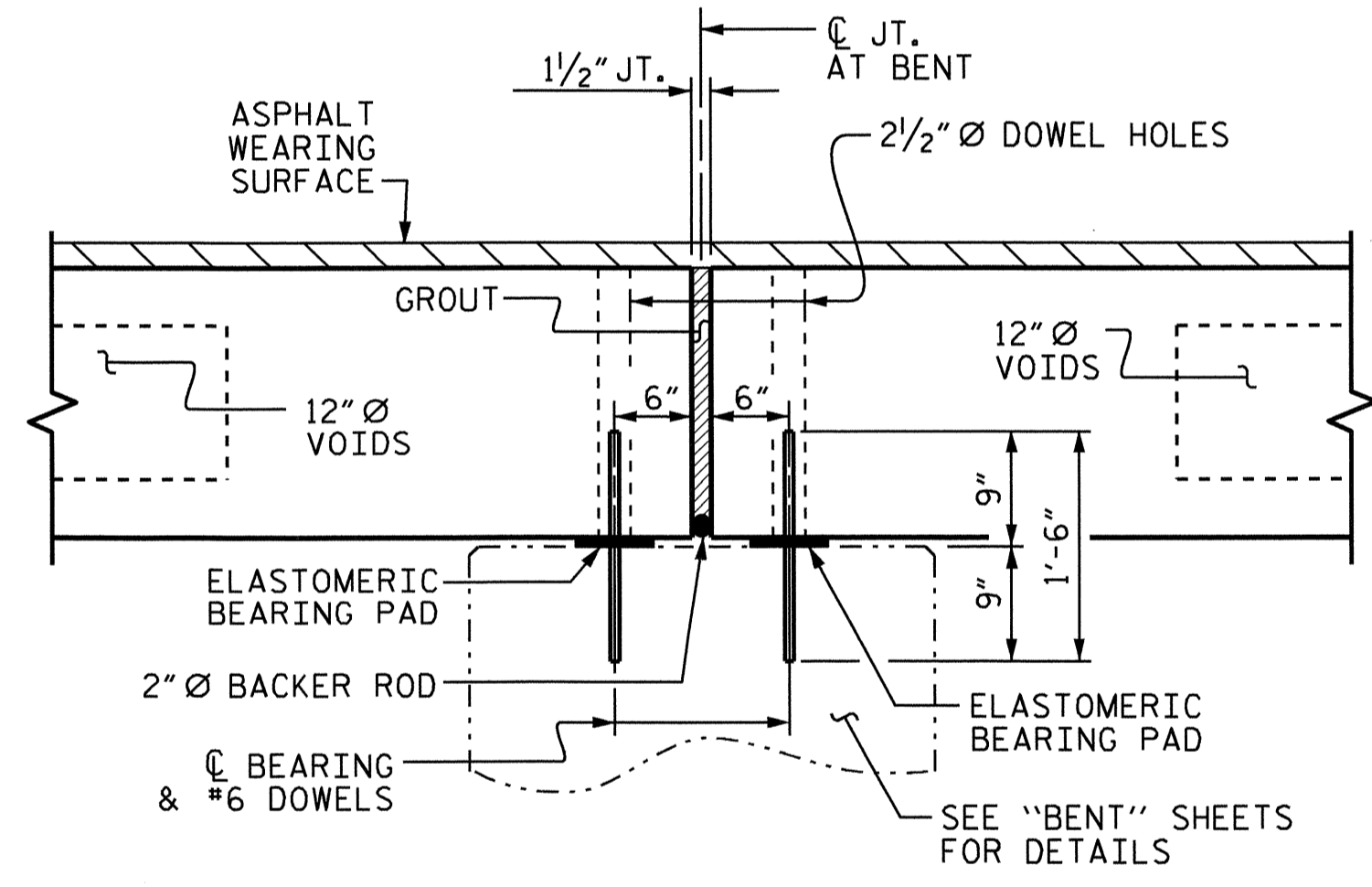
HALF SECTION AT INTERMEDIATE DIAPHRAGMS  
**TYPICAL SECTION**  
 HALF SECTION THROUGH VOIDS

\* - 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 THE "TWO BAR METAL RAIL PARAPET SECTION" DETAIL.

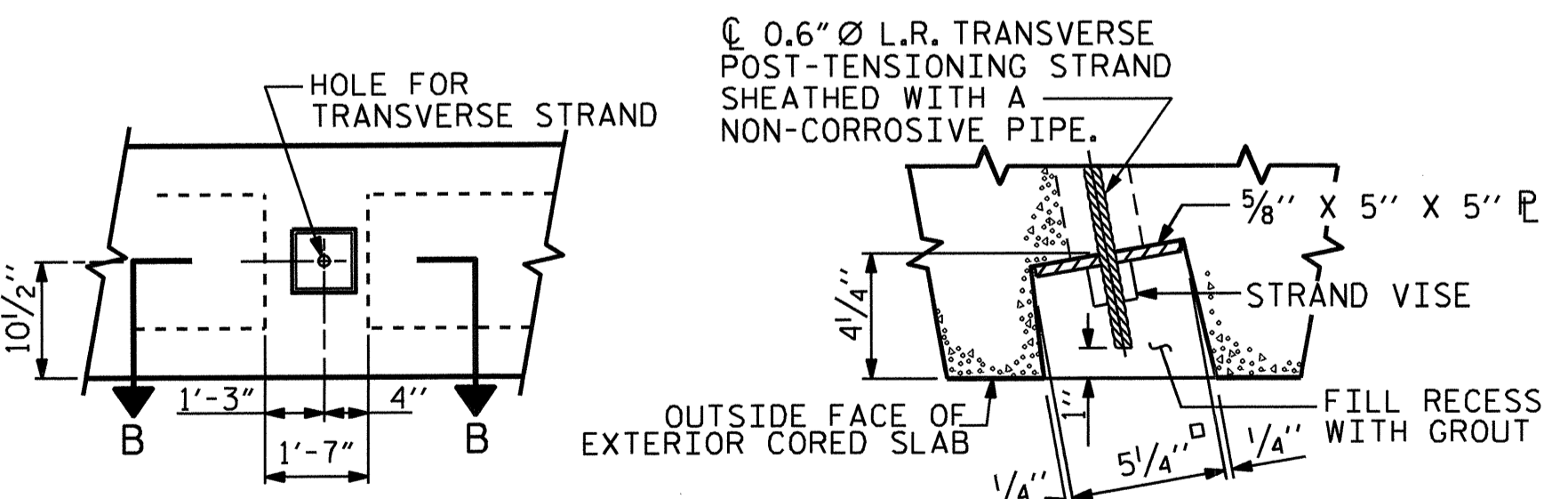
FIXED END  
 FIXED END  
 FIXED END



**SECTION AT END BENT**

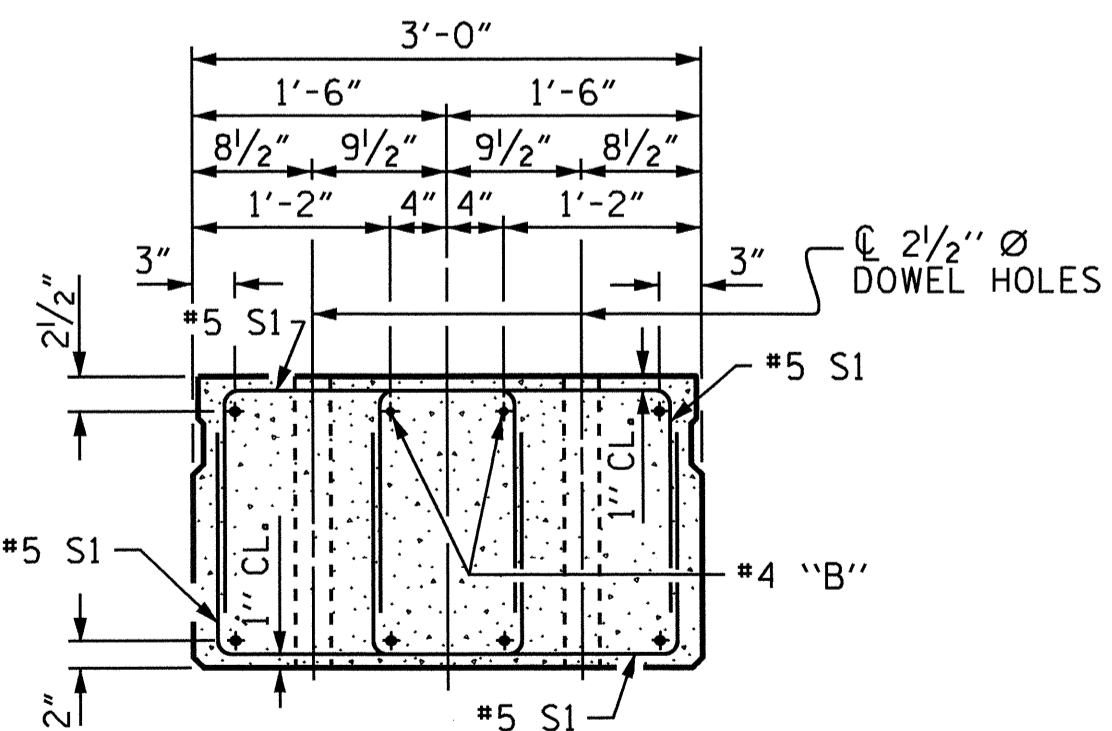


**SECTION AT BENT**



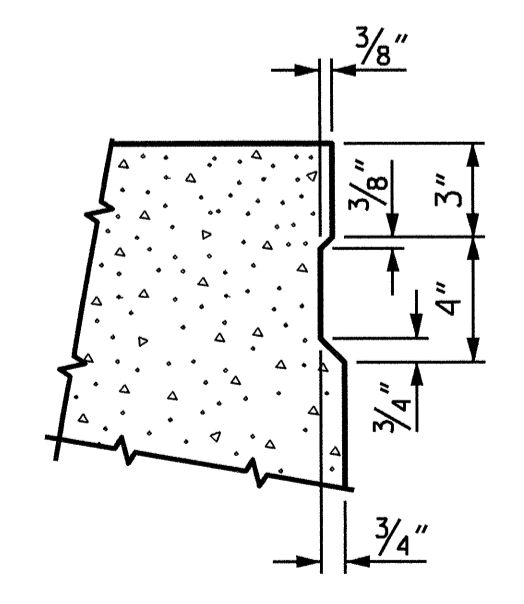
**ELEVATION VIEW**  
**SECTION B-B**

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



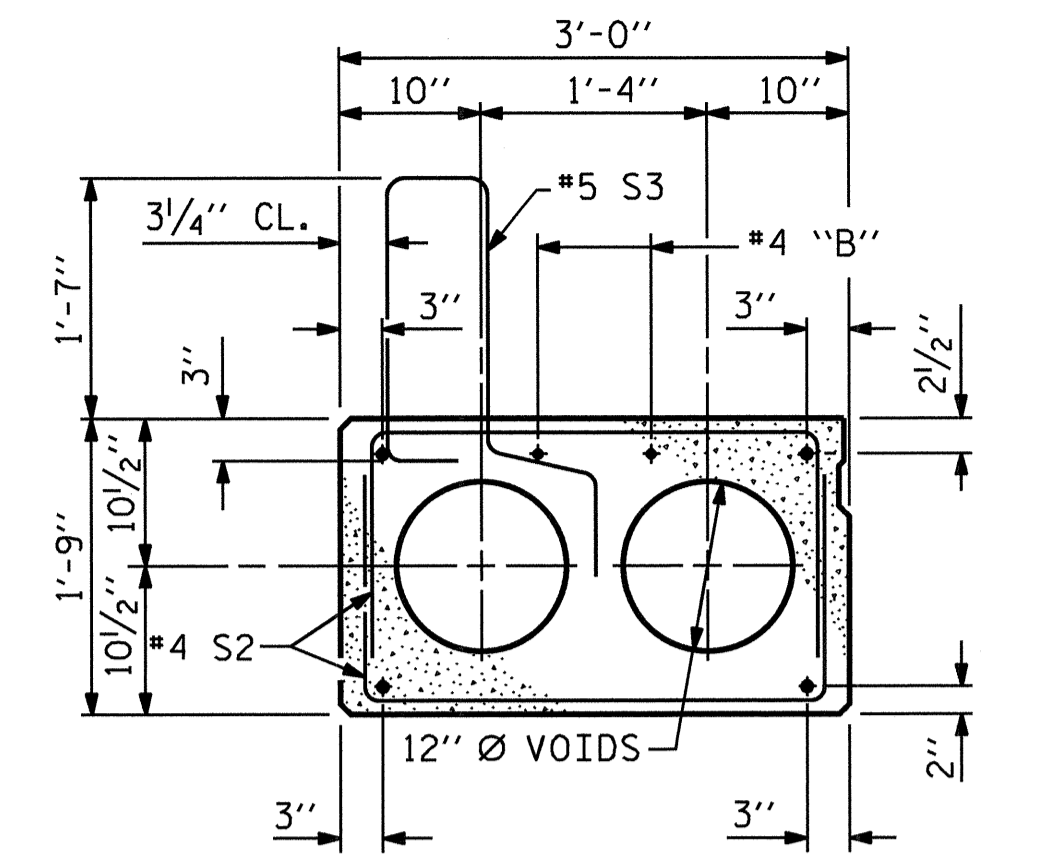
**END ELEVATION**

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



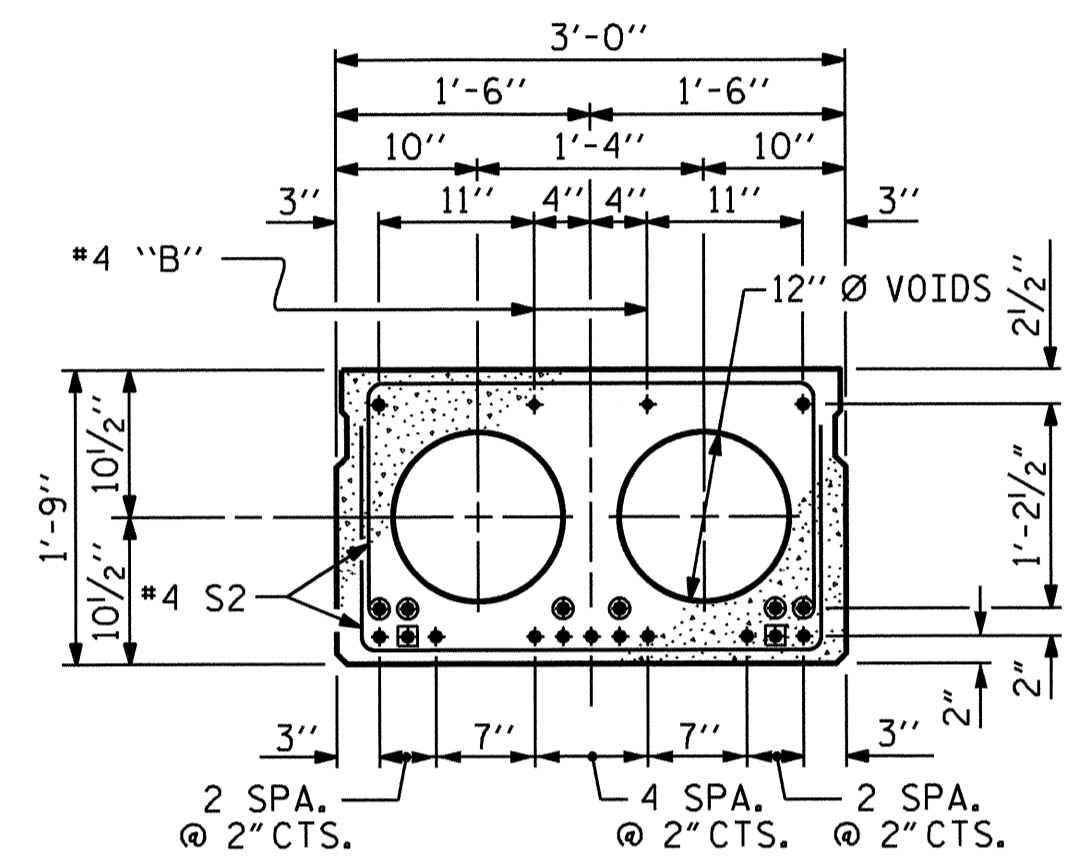
**SHEAR KEY DETAIL**

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

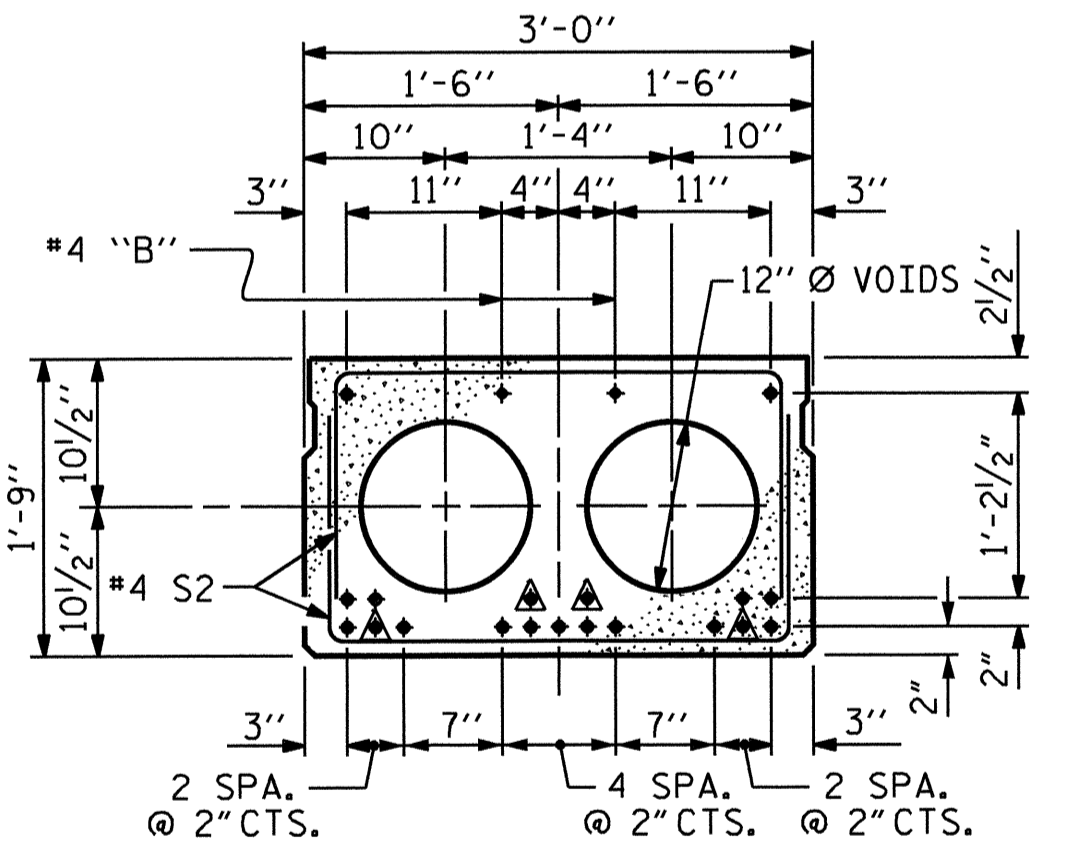


**EXT. SLAB SECTION**

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



**INTERIOR SLAB SECTION (40' UNIT)**  
 (13 STRANDS REQUIRED)



**INTERIOR SLAB SECTION (50' UNIT)**  
 (19 STRANDS REQUIRED)

**0.6" Ø LOW RELAXATION STRAND LAYOUT**

- DEBONDING LEGEND**
- ▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
  - 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.

PROJECT NO. B-4421  
 BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

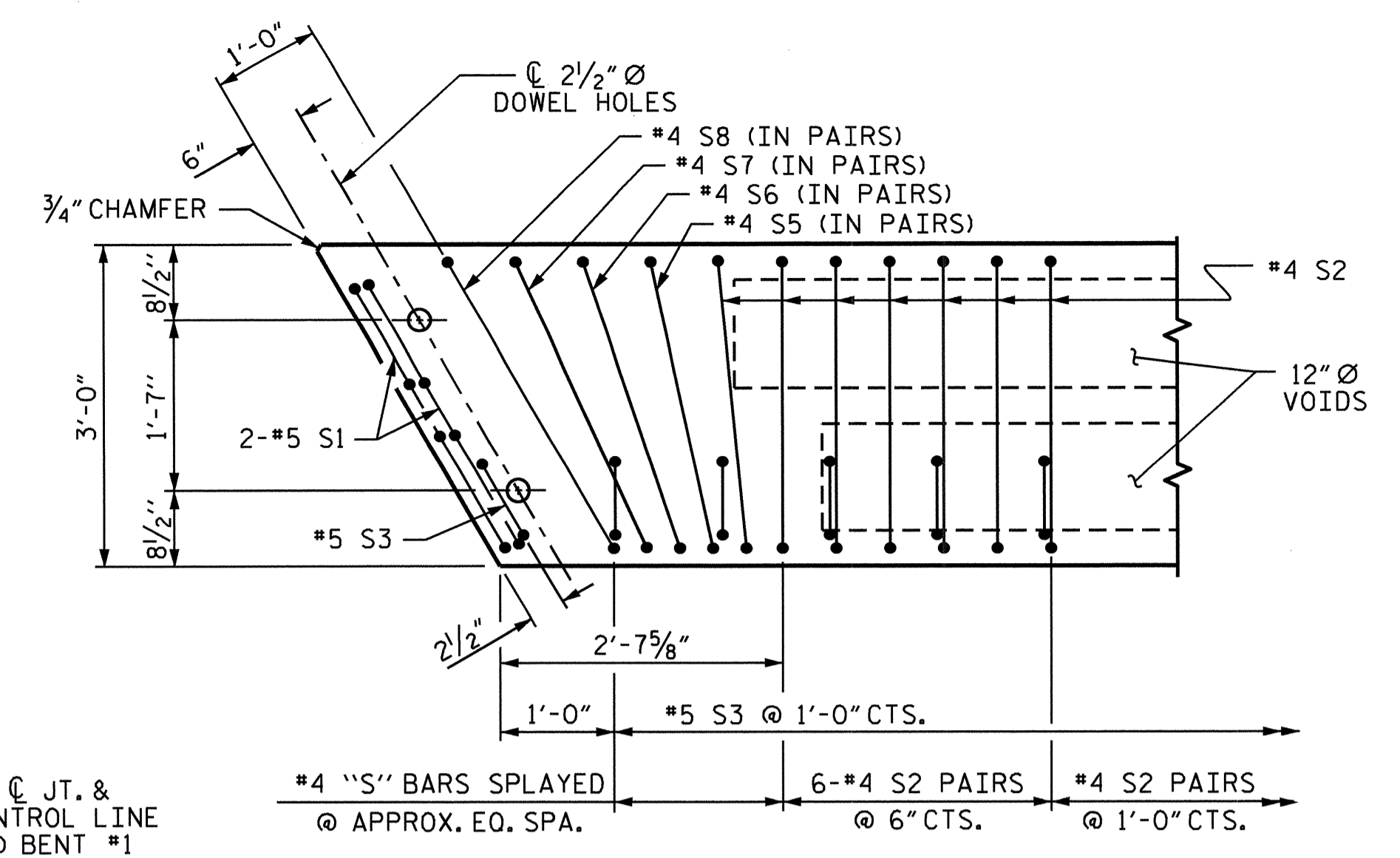
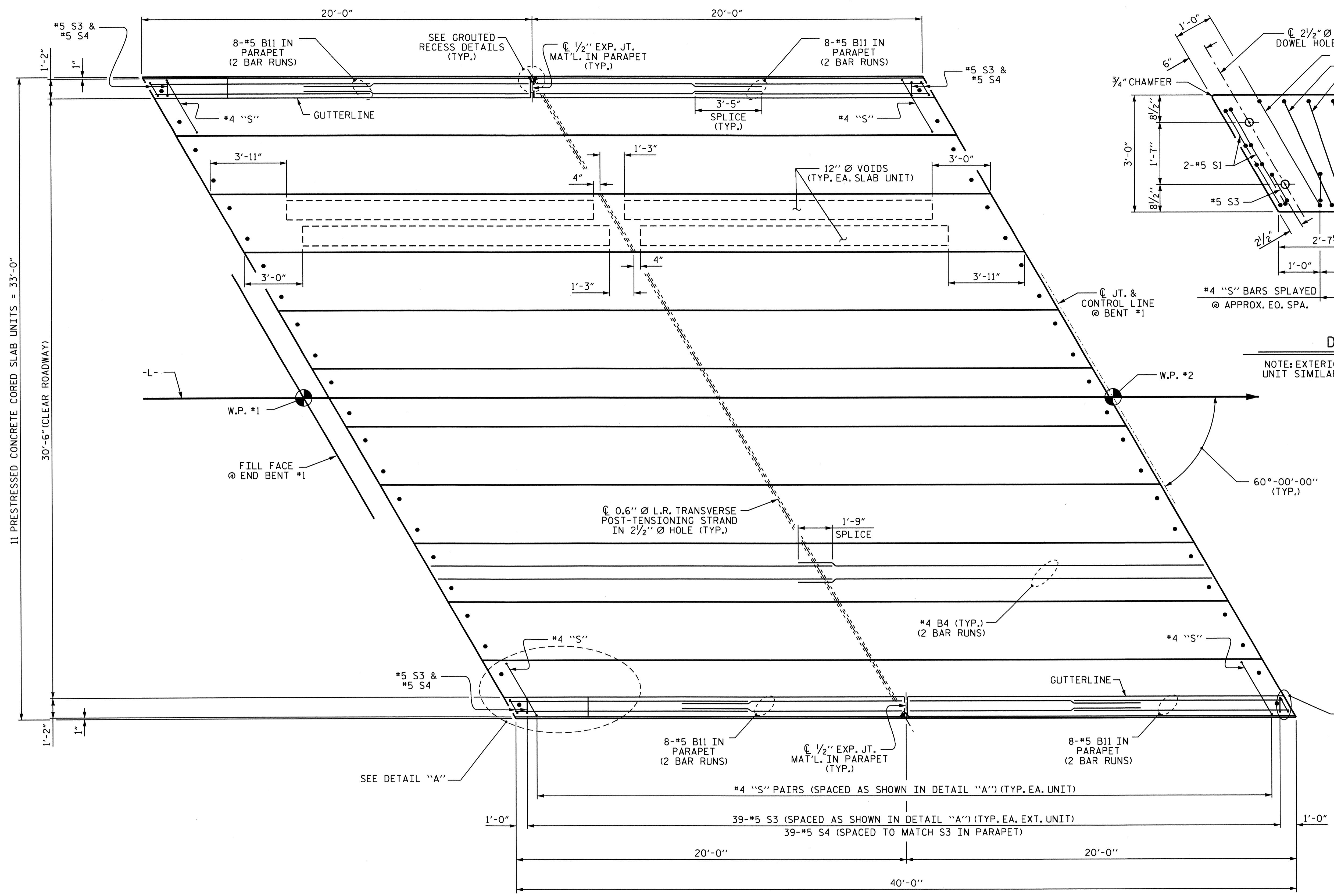
SHEET 1 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 1'-9"  
 PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 60° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			25



ASSEMBLED BY: EM NOLTING	DATE: 1/6/11
CHECKED BY: BN GRADY	DATE: 2/4/11
DRAWN BY: DGE 5/09	REV. 12/11
CHECKED BY: BCH 6/09	MAA/AAC

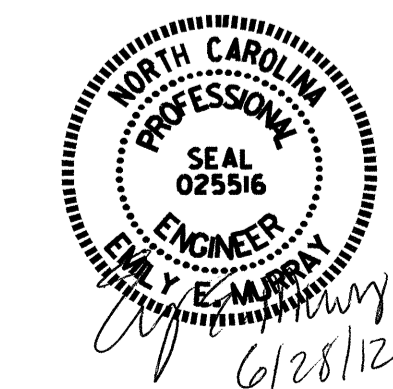


**DETAIL "A"**  
 NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

**PLAN OF UNIT**

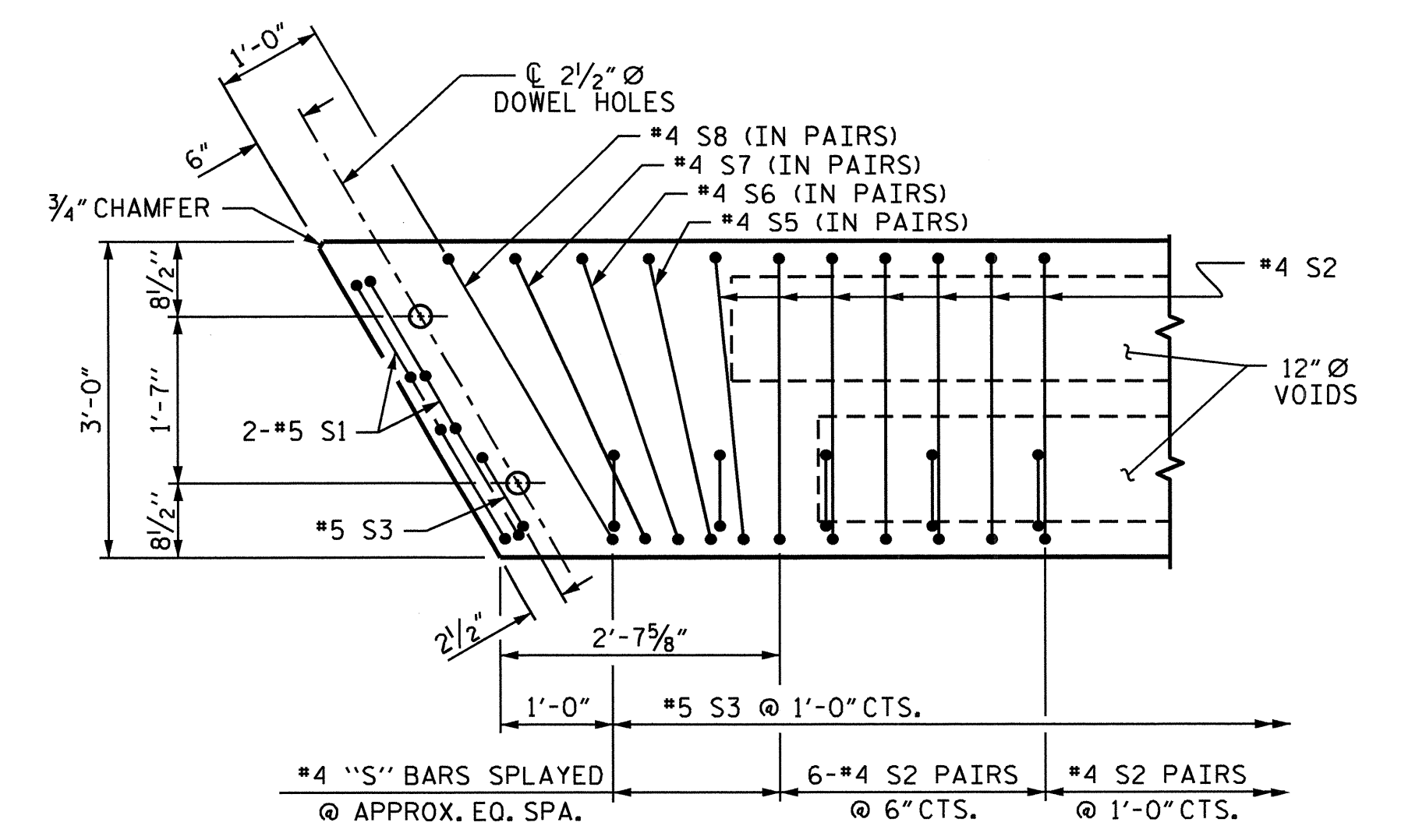
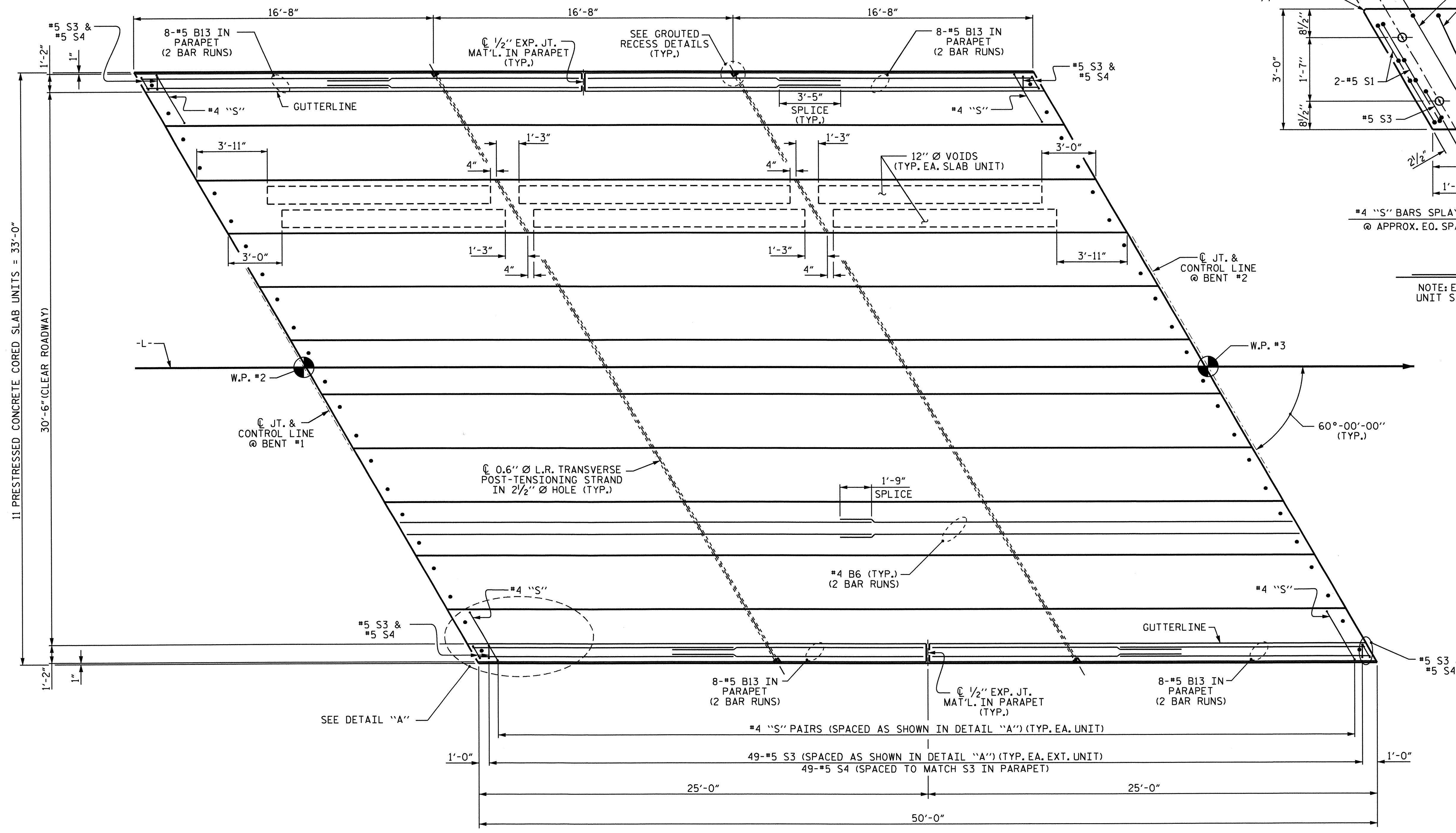
PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-  
 SHEET 2 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
PLAN OF SPAN A					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-7
					TOTAL SHEETS 25



ASSEMBLED BY: EM NOLTING DATE: 1/6/11  
 CHECKED BY: BN GRADY DATE: 2/4/11  
 DRAWN BY: DGE 3/09  
 CHECKED BY: BCH 3/09





**DETAIL "A"**  
 NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

**PLAN OF UNIT**

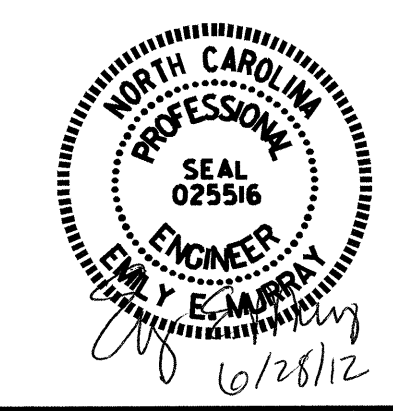
PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 3 OF 5

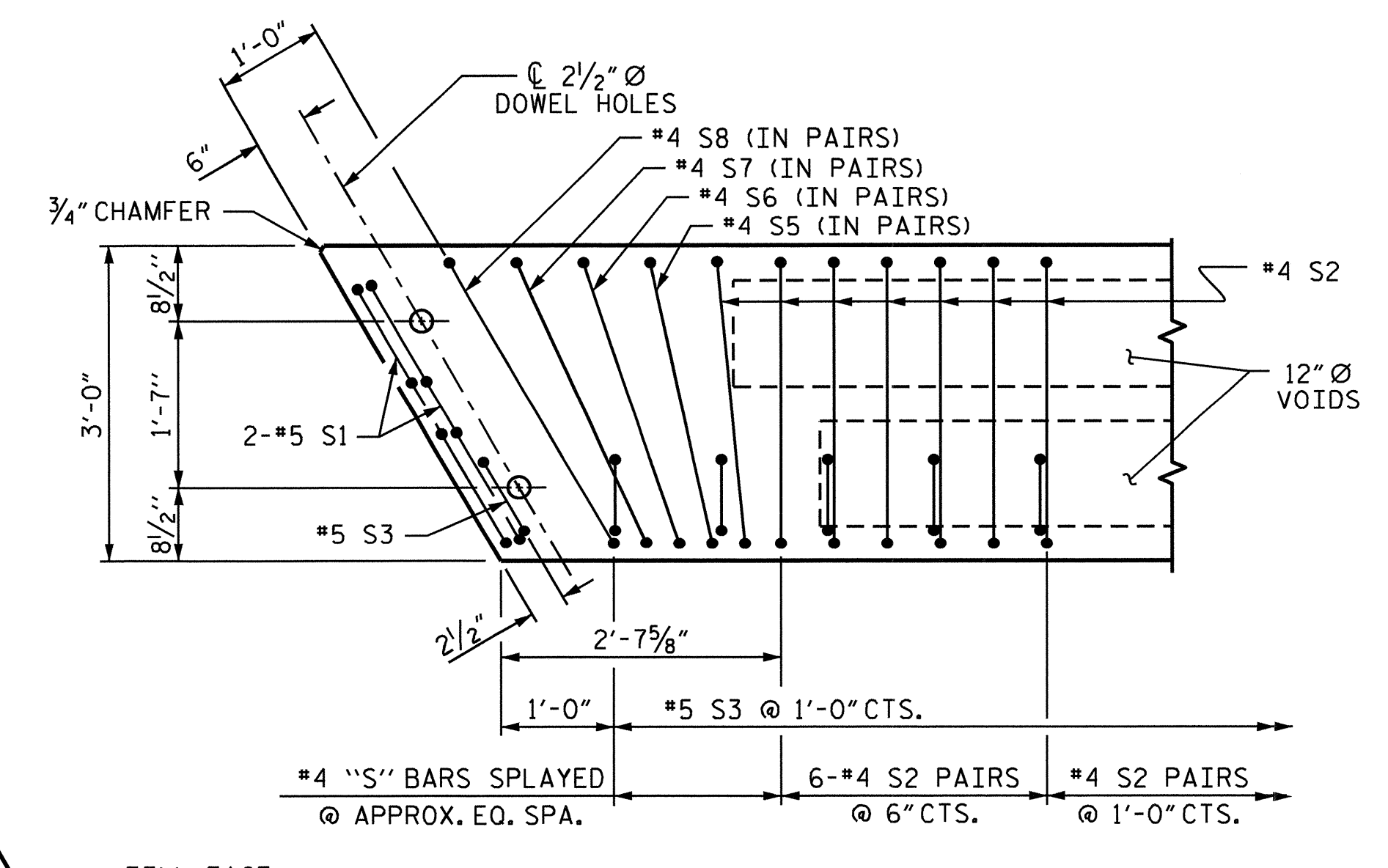
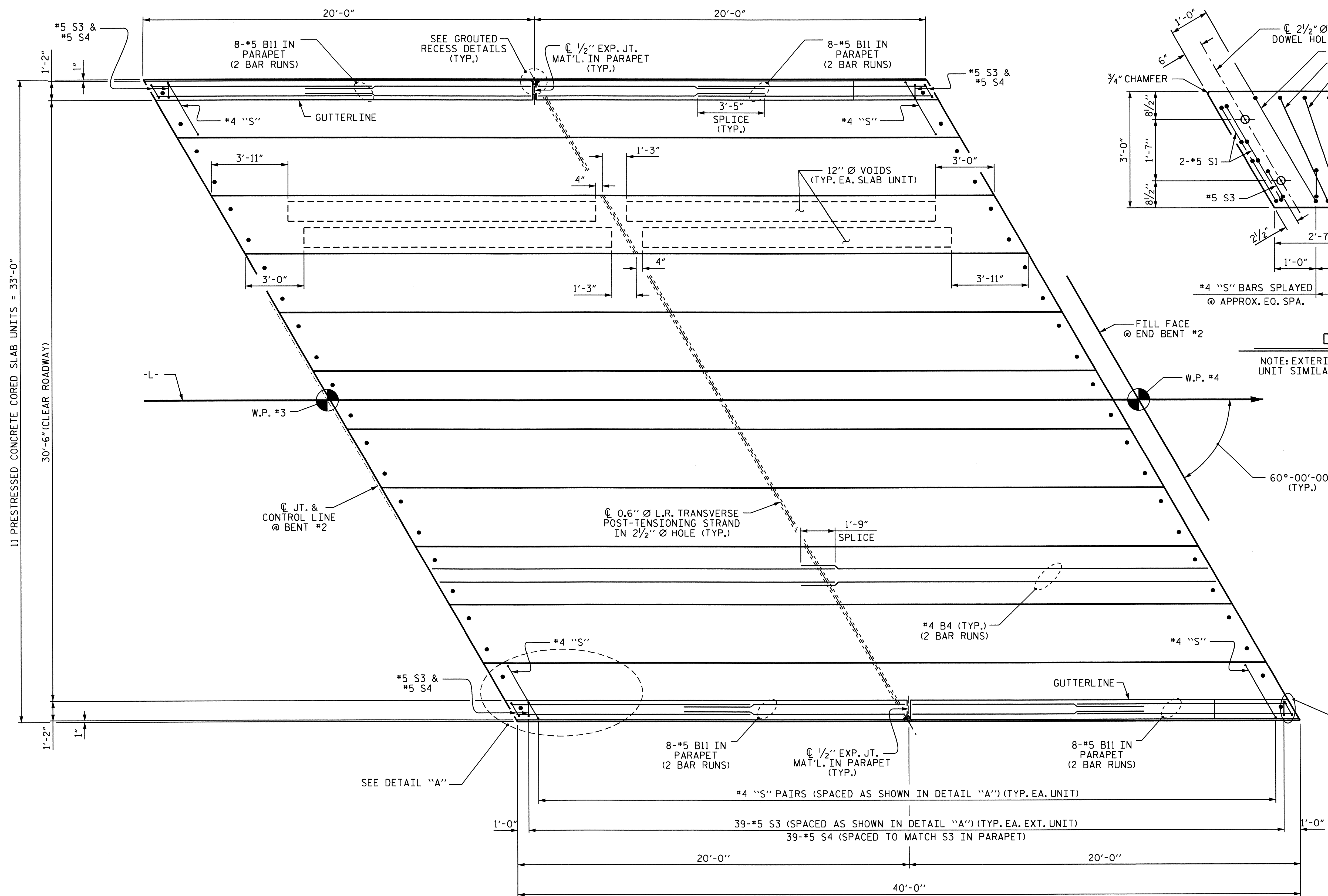
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**PLAN OF SPAN B**

ASSEMBLED BY : EM NOLTING DATE : 1/6/11  
 CHECKED BY : BN GRADY DATE : 2/4/11  
 DRAWN BY : DGE 3/09  
 CHECKED BY : BCH 3/09



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8	
1			3			TOTAL SHEETS	
2			4			25	



**DETAIL "A"**  
 NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

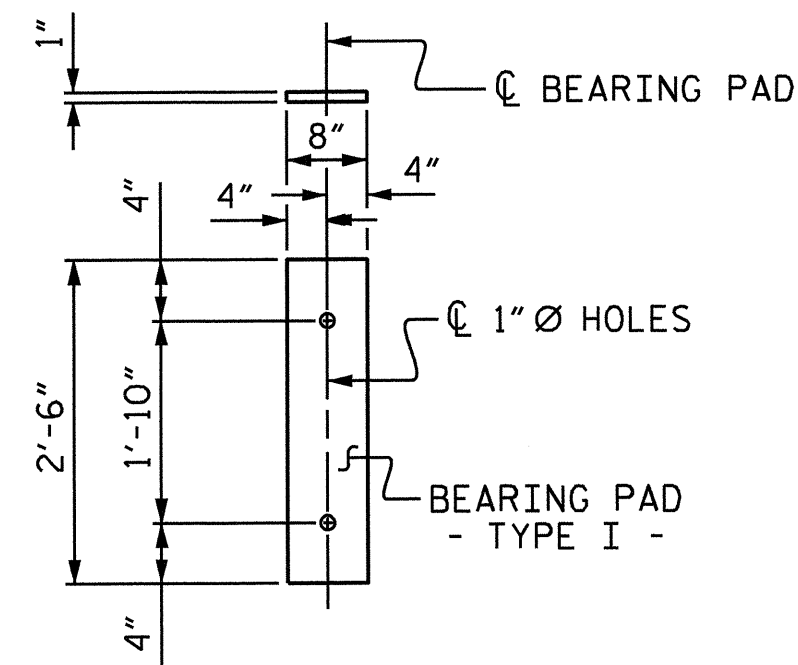
**PLAN OF UNIT**

PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-  
 SHEET 4 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
PLAN OF SPAN C					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-9 TOTAL SHEETS 25



ASSEMBLED BY: EM NOLTING DATE: 1/6/11  
 CHECKED BY: BN GRADY DATE: 2/4/11  
 DRAWN BY: DGE 3/09  
 CHECKED BY: BCH 3/09



FIXED END  
(TYPE I - 66 REQ'D)

**ELASTOMERIC BEARING DETAILS**

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

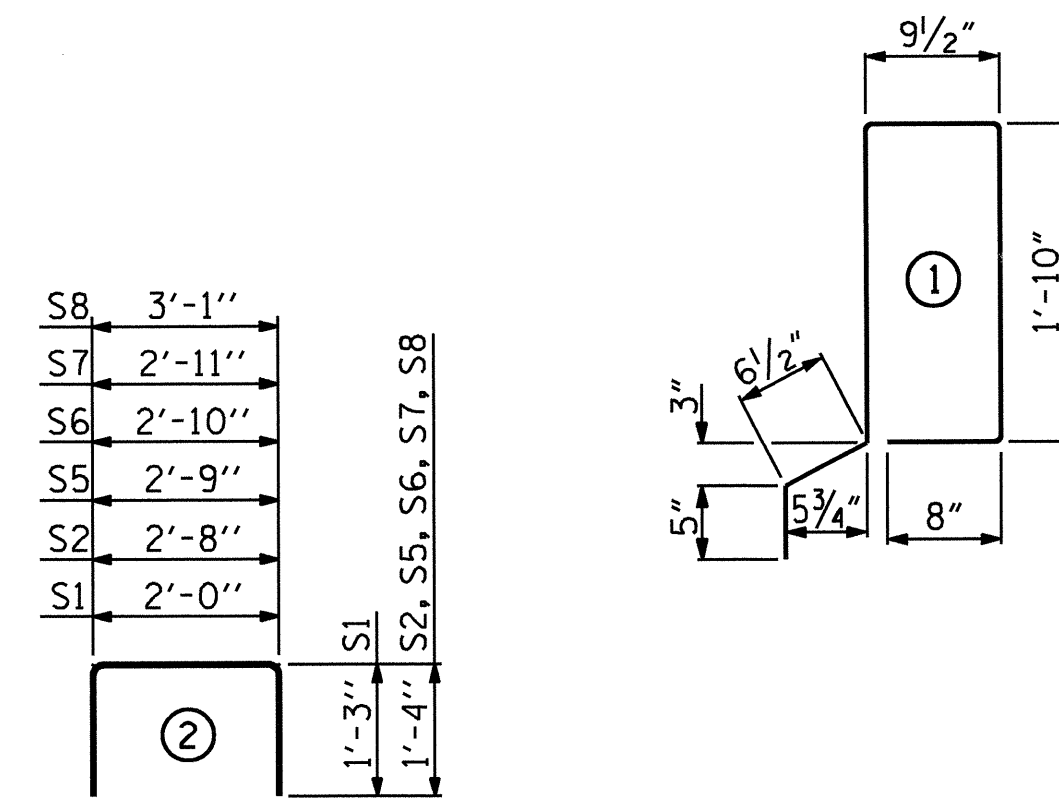
GRADE 270 STRANDS	
AREA ( SQUARE INCHES )	0.6" Ø L.R.
ULTIMATE STRENGTH ( LBS. PER STRAND )	58,600
APPLIED PRESTRESS ( LBS. PER STRAND )	43,950

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	50'-0"	100'-0"
INTERIOR C.S.	9	50'-0"	450'-0"
EXTERIOR C.S.	4	40'-0"	160'-0"
INTERIOR C.S.	18	40'-0"	720'-0"
TOTAL	33		1430'-0"

DEAD LOAD DEFLECTION AND CAMBER		
	SPANS A & C	SPAN B
CAMBER ( SLAB ALONE IN PLACE )	1/4" ↑	2 1/2" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/8" ↓	1/4" ↓
FINAL CAMBER	1/8" ↑	2 1/4" ↑

\*\* INCLUDES FUTURE WEARING SURFACE

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

**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.

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

TRANSVERSE POST TENSIONING OF THE CORED SLAB UNITS SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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.

PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

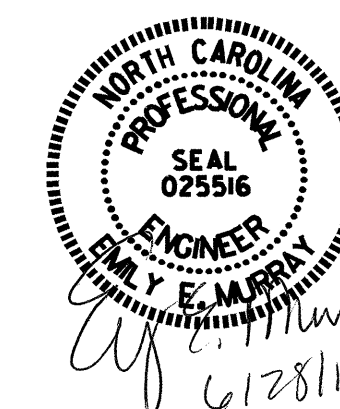
BILL OF MATERIAL FOR ONE 40' CORED SLAB UNIT								BILL OF MATERIAL FOR ONE 50' CORED SLAB UNIT							
				EXTERIOR UNIT		INTERIOR UNIT						EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B4	4	#4	STR	20'-9"	55	20'-9"	55	B6	4	#4	STR	25'-9"	69	25'-9"	69
S1	8	#5	2	4'-6"	38	4'-6"	38	S1	8	#5	2	4'-6"	38	4'-6"	38
S2	82	#4	2	5'-4"	292	5'-4"	292	S2	102	#4	2	5'-4"	363	5'-4"	363
*S3	41	#5	1	6'-1"	260			*S3	51	#5	1	6'-1"	324		
S5	4	#4	2	5'-5"	14	5'-5"	14	S5	4	#4	2	5'-5"	14	5'-5"	14
S6	4	#4	2	5'-6"	15	5'-6"	15	S6	4	#4	2	5'-6"	15	5'-6"	15
S7	4	#4	2	5'-7"	15	5'-7"	15	S7	4	#4	2	5'-7"	15	5'-7"	15
S8	4	#4	2	5'-9"	15	5'-9"	15	S8	4	#4	2	5'-9"	15	5'-9"	15
* EPOXY COATED REINFORCING STEEL				LBS.	260	* EPOXY COATED REINFORCING STEEL				LBS.	324				
REINFORCING STEEL				LBS.	444	REINFORCING STEEL				LBS.	529	529			
6500 P.S.I. CONCRETE				CU. YDS.	5.9	6500 P.S.I. CONCRETE				CU. YDS.	7.3	7.3			
0.6" Ø L.R. STRANDS				No.	13	0.6" Ø L.R. STRANDS				No.	19	19			

CONCRETE RELEASE STRENGTH	
UNIT	PSI
40' UNITS	4000
50' UNITS	4900

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
30'-6" CLEAR ROADWAY	ASPHALT OVERLAY THICKNESS:	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
	NORMAL CROWN SECTION	
40' UNITS	2 1/8"	2'-8 1/8"
50' UNITS	1"	2'-7 3/4"

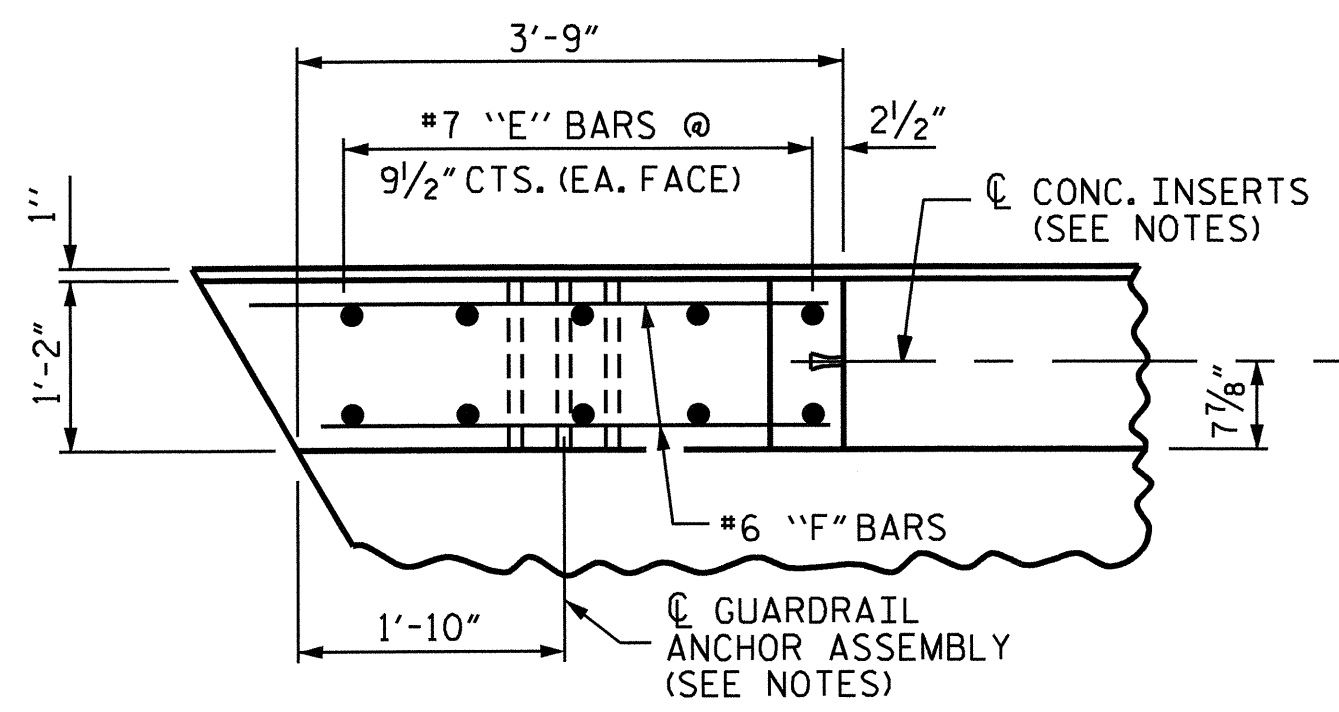
PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 5 OF 5

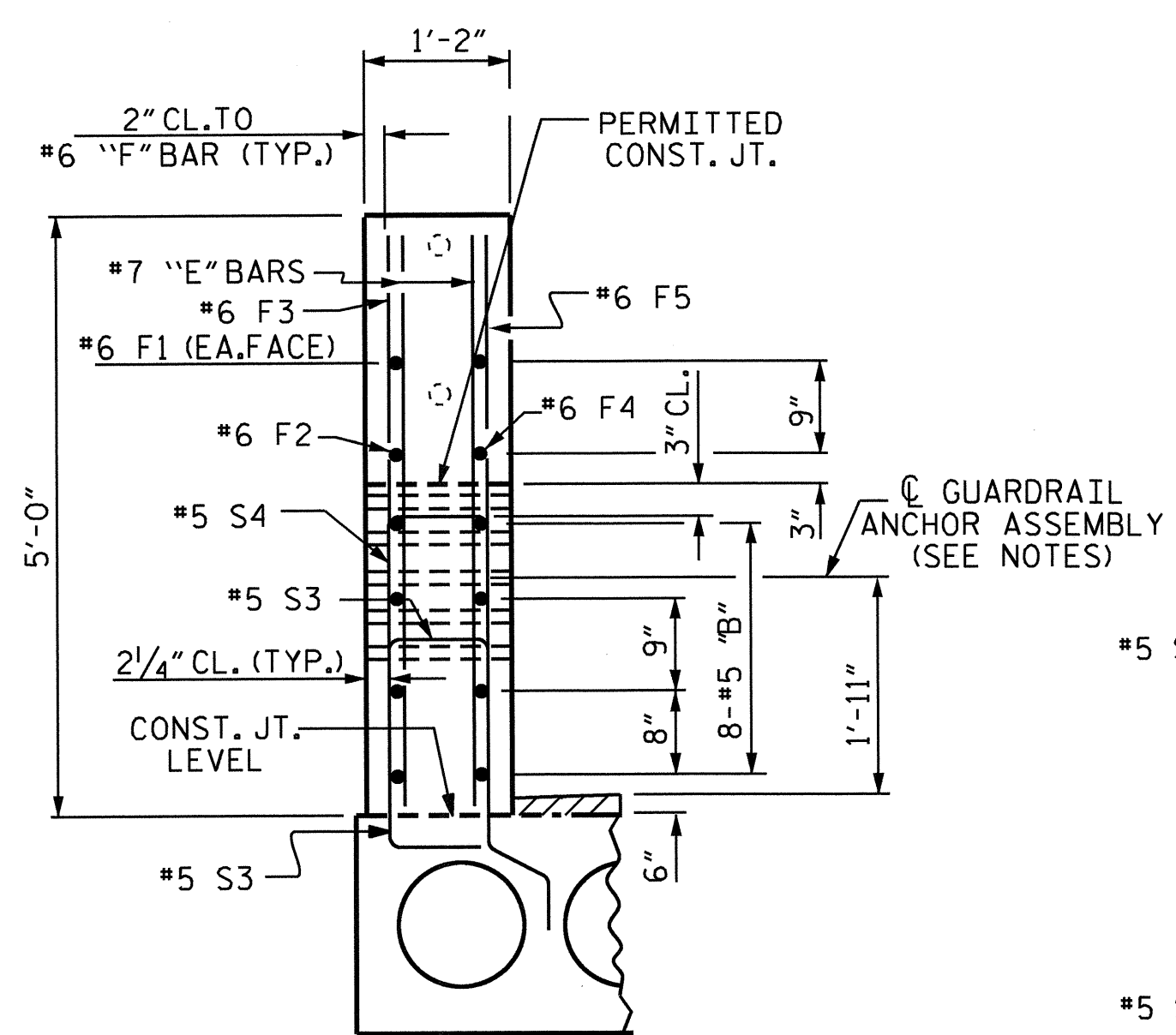


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						STANDARD 3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 60° SKEW	
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS	
1			3			S-10	
2			4			25	

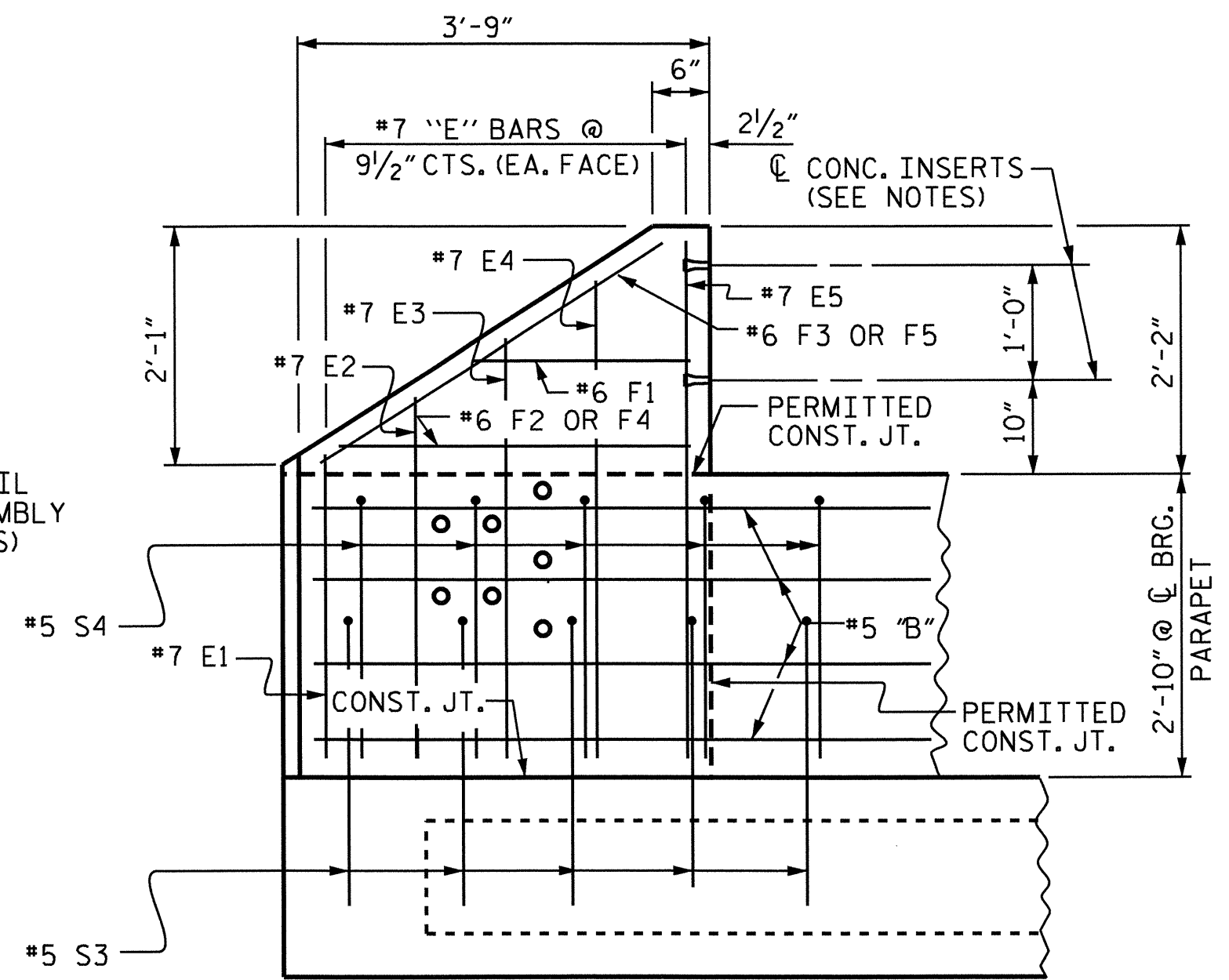
ASSEMBLED BY : EM NOLTING	DATE : 1/6/11
CHECKED BY : BN GRADY	DATE : 2/4/11
DRAWN BY : DGE 5/09	
CHECKED BY : BCH 6/09	



PLAN OF END POST

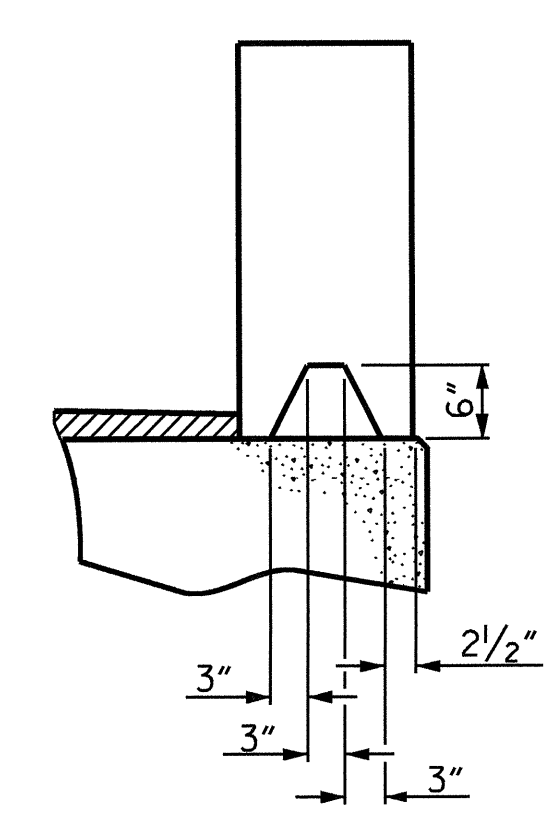


END VIEW

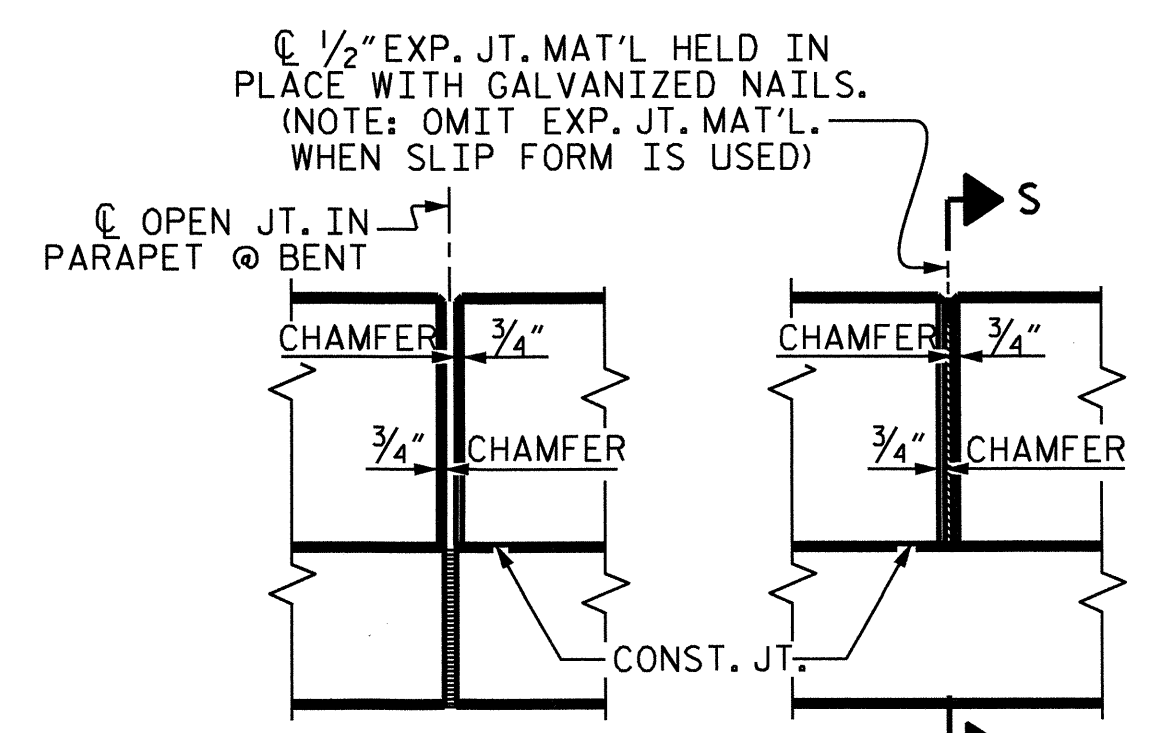


ELEVATION

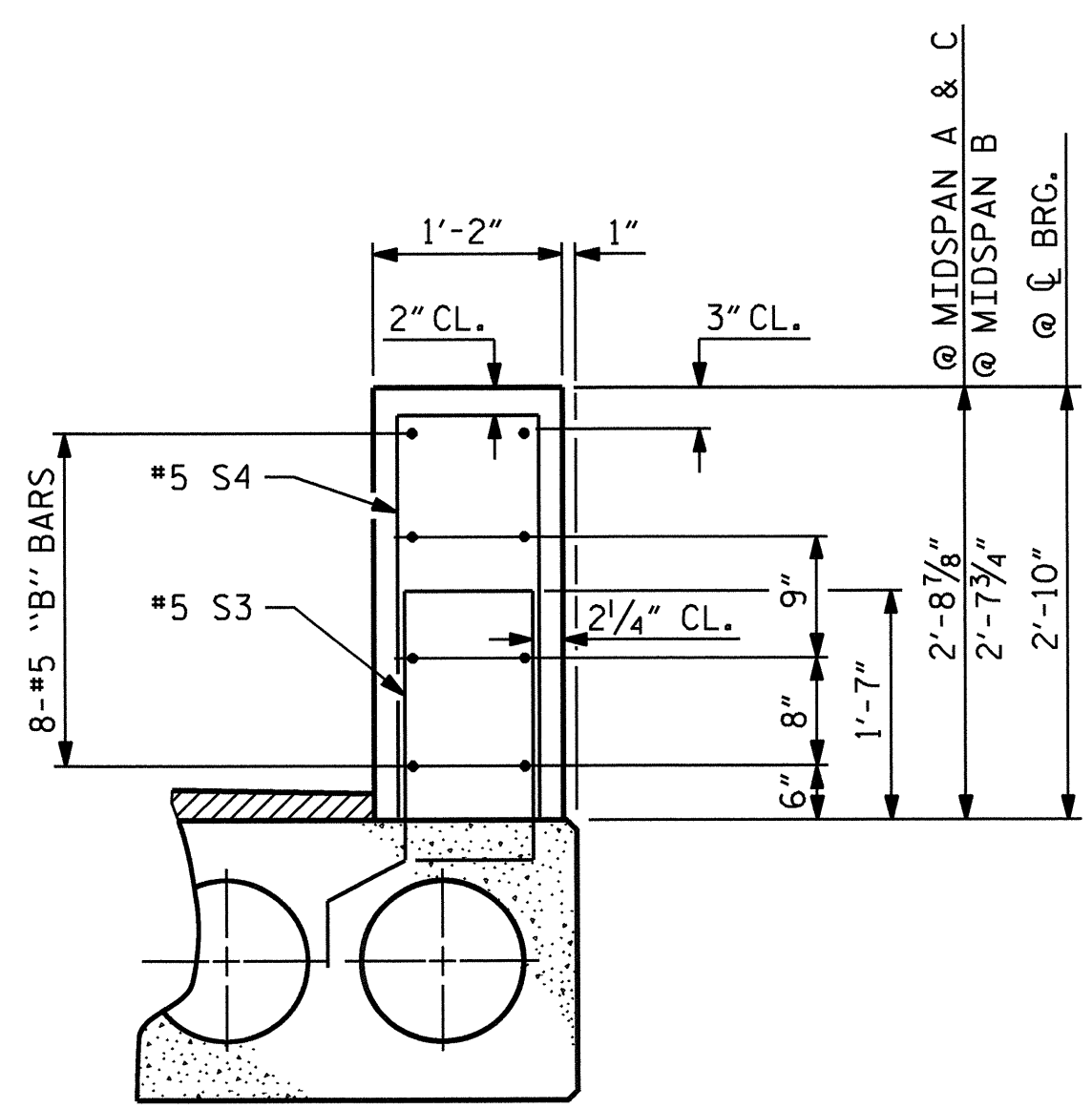
PARAPET AND END POST FOR TWO-BAR RAIL



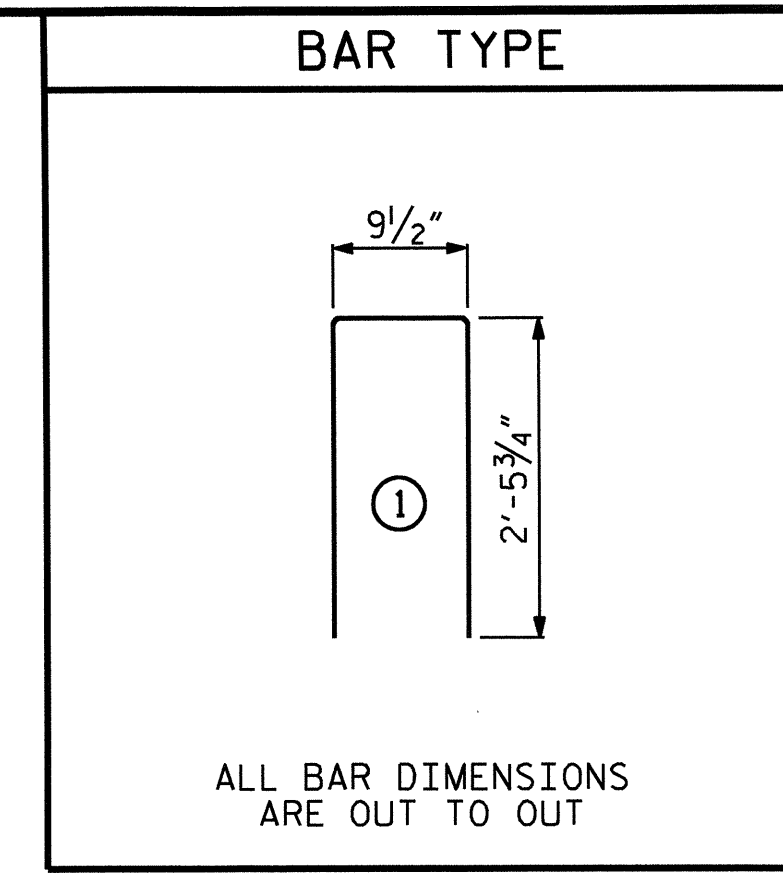
SECTION S-S  
AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY  
WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



TWO BAR METAL  
RAIL PARAPET SECTION



BILL OF MATERIAL PARAPETS AND END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B11	128	#5	STR	11'-9"	1569
* B13	64	#5	STR	14'-3"	951
* E1	8	#7	STR	3'-0"	49
* E2	8	#7	STR	3'-5"	56
* E3	8	#7	STR	3'-10"	63
* E4	8	#7	STR	4'-3"	69
* E5	8	#7	STR	4'-7"	75
* F1	8	#6	STR	2'-2"	26
* F2	4	#6	STR	3'-5"	21
* F3	4	#6	STR	4'-0"	24
* F4	4	#6	STR	3'-3"	20
* F5	4	#6	STR	3'-6"	21
* S4	266	#5	1	5'-9"	1595
* EPOXY COATED REINFORCING STEEL LBS.					4539
CLASS AA CONCRETE CU.YDS.					31.9
CONCRETE PARAPET LIN. FT.					260.58

NOTES

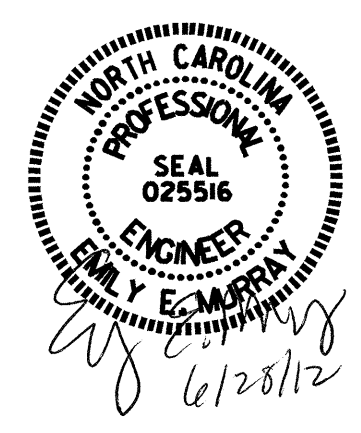
ALL REINFORCING STEEL IN THE PARAPETS AND END POSTS SHALL BE EPOXY COATED.  
 FOR DETAILS OF CONCRETE INSERT AND GUARDRAIL ANCHOR ASSEMBLY, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET 4 OF 5 AND "GUARDRAIL ANCHORAGE DETAILS" SHEET 5 OF 5.  
 #5 S3 BARS ARE INCLUDED IN THE BILL OF MATERIAL FOR CORED SLAB UNITS.  
 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.  
 ALL BAR SUPPORTS USED IN THE PARAPET AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

CONCRETE PARAPET  
 AND END POST  
 DETAILS



ASSEMBLED BY : EM NOLTING DATE : 1/6/11  
 CHECKED BY : BN GRADY DATE : 2/4/11  
 DRAWN BY : DGE 5/09  
 CHECKED BY : BCH 6/09

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11	
1			3			TOTAL SHEETS	
2			4			25	

**NOTES**

THE METAL RAIL SHALL BE ALUMINUM AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS.

**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.

**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.

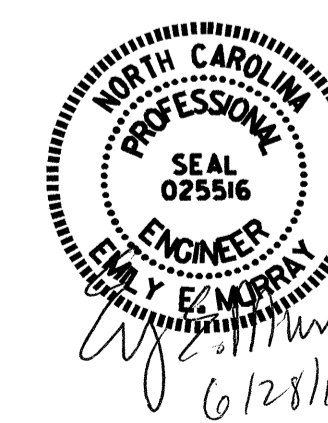
PAY LENGTH = 244.23 LIN. FT.

PROJECT NO. B-4421

BEAUFORT COUNTY

STATION: 15+52.00 -L-

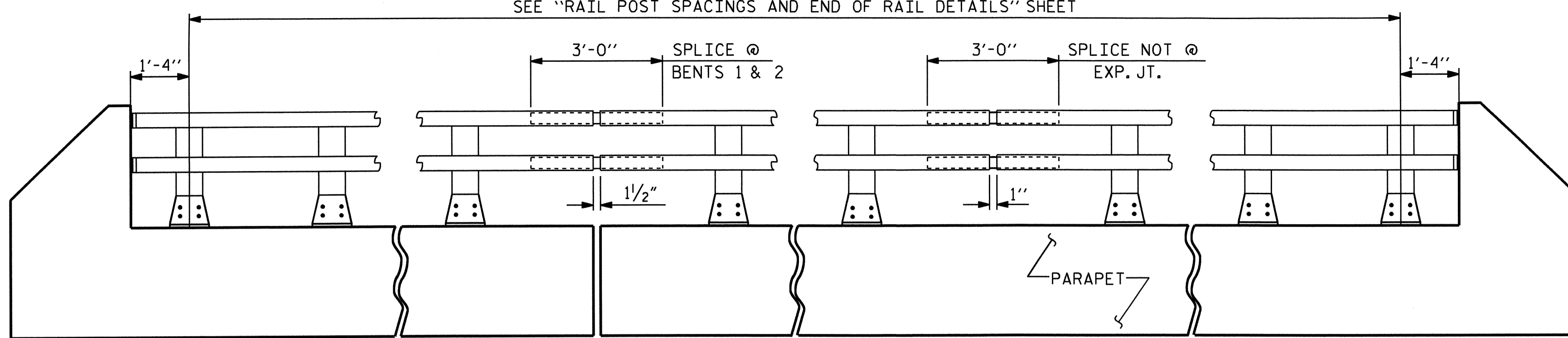
SHEET 2 OF 5



STATE OF NORTH CAROLINA						SHEET NO.
DEPARTMENT OF TRANSPORTATION						S-12
RALEIGH						TOTAL SHEETS
STANDARD						25
2 BAR METAL RAIL						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

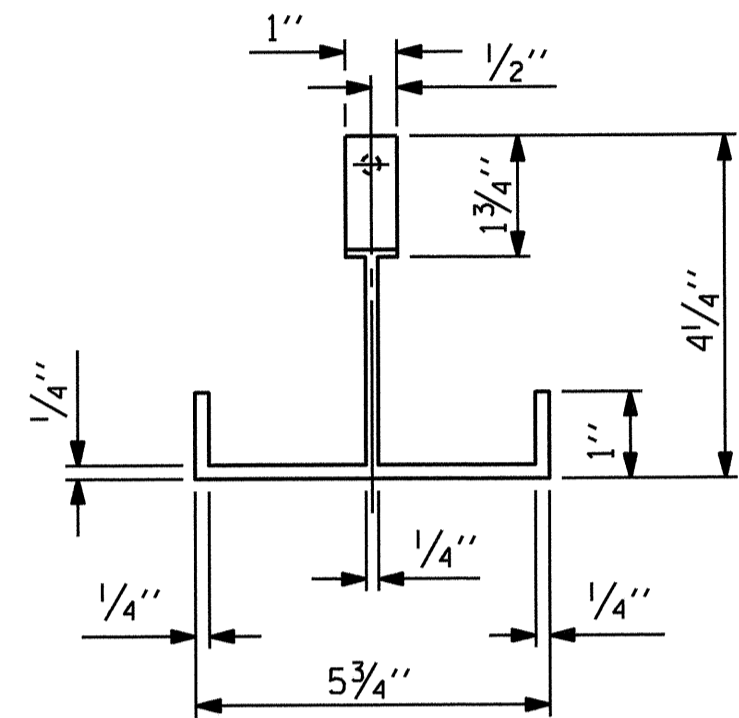
STD. NO. BMR3

SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET

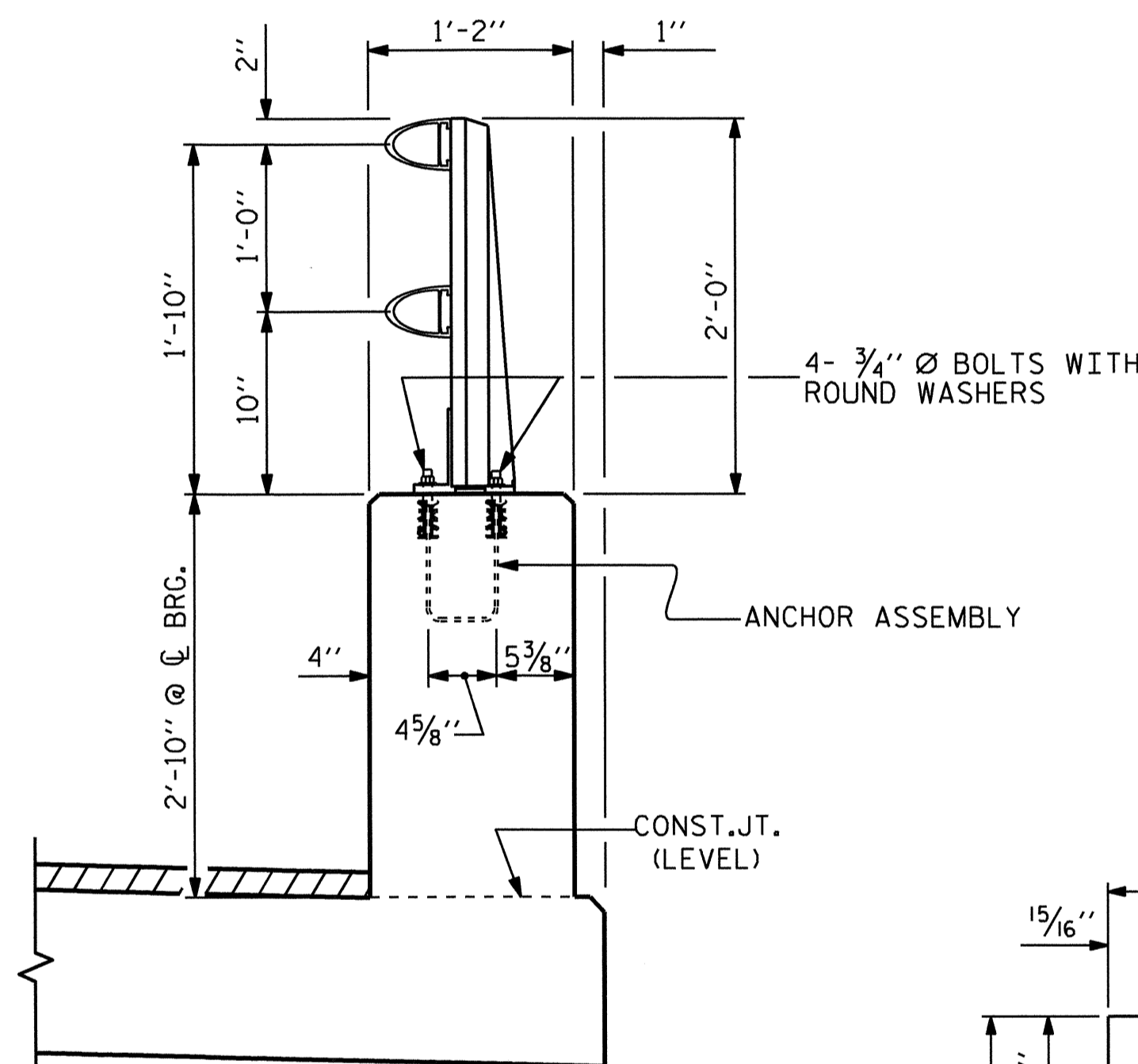


**ELEVATION**

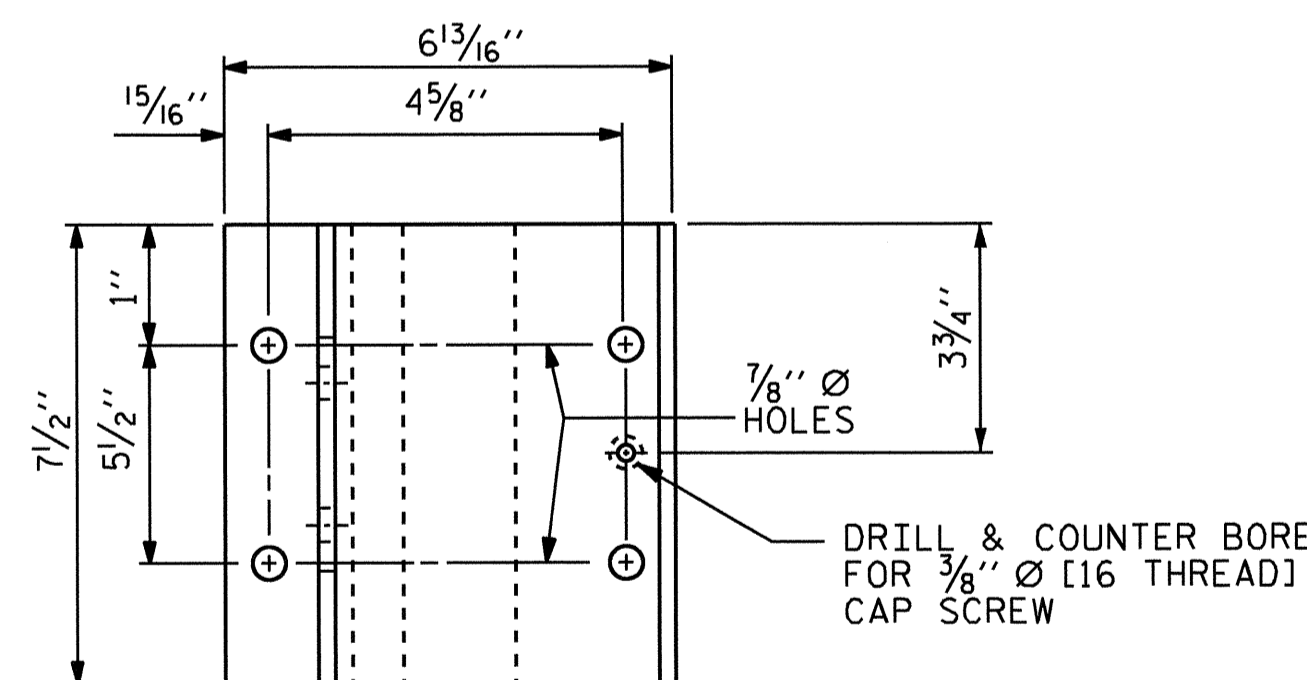
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



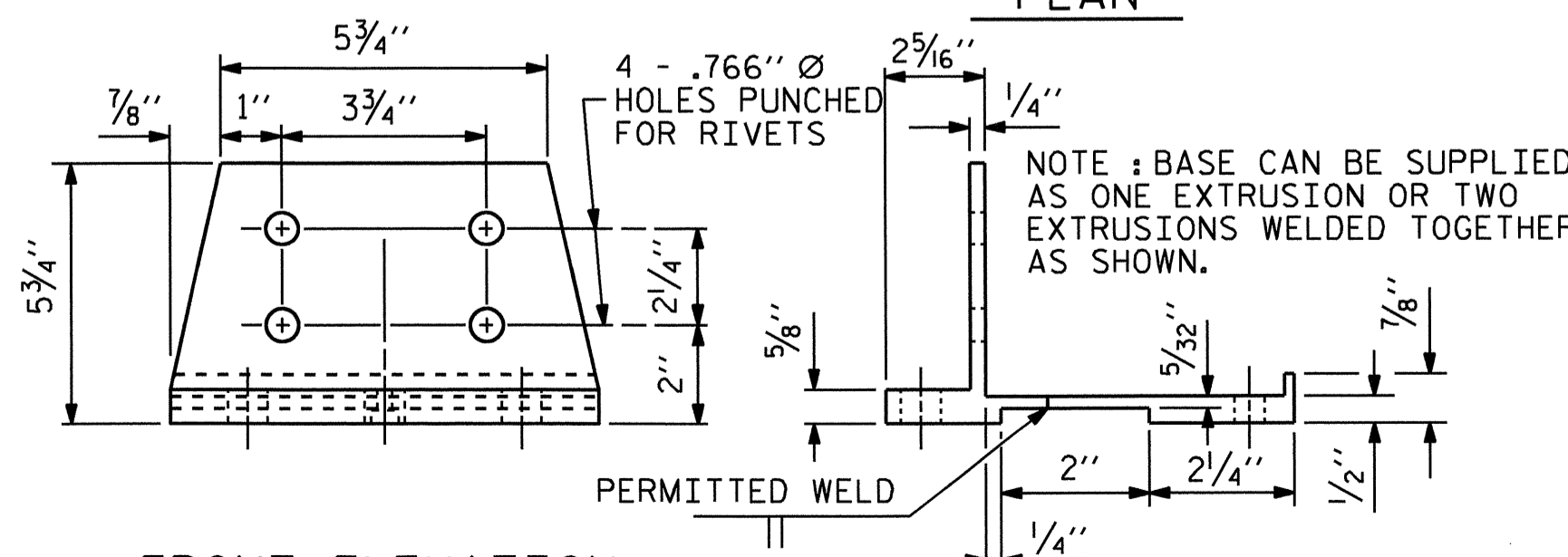
**PLAN**



**SECTION THRU PARAPET AND RAIL**



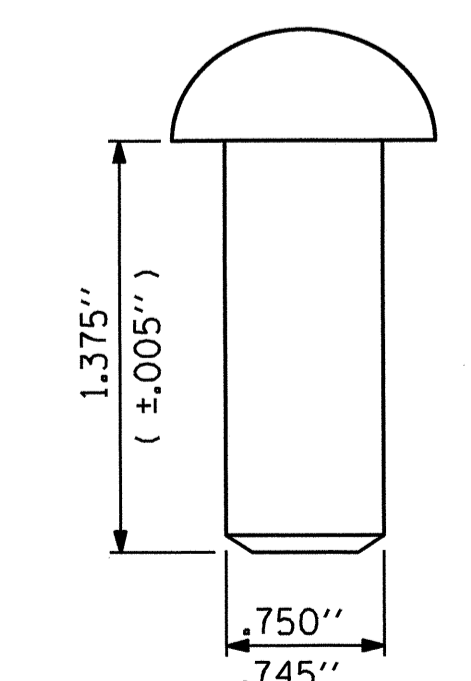
**PLAN**



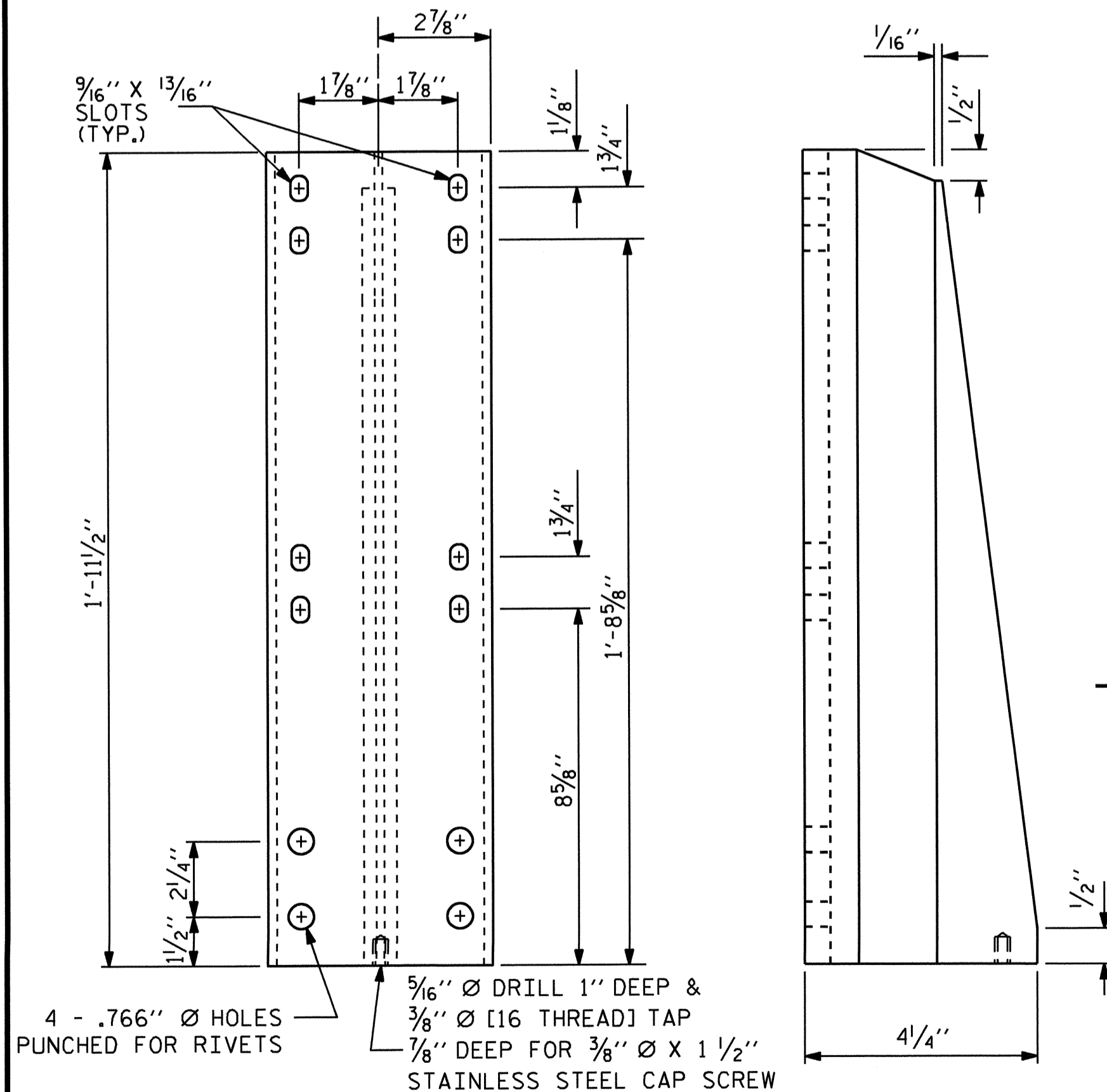
**FRONT ELEVATION**

**SIDE ELEVATION**

**POST BASE DETAILS**



**RIVET DETAIL**



**FRONT ELEVATION**

**SIDE ELEVATION**

**DETAILS OF POST**

ASSEMBLED BY : E. E. MURRAY	DATE : 5/18/12
CHECKED BY : T. L. AVERETTE	DATE : 5/18/12
DRAWN BY : EEM 6/94	REV. 5/7/03R RWW/JTE
CHECKED BY : RGW 6/94	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

NOTES

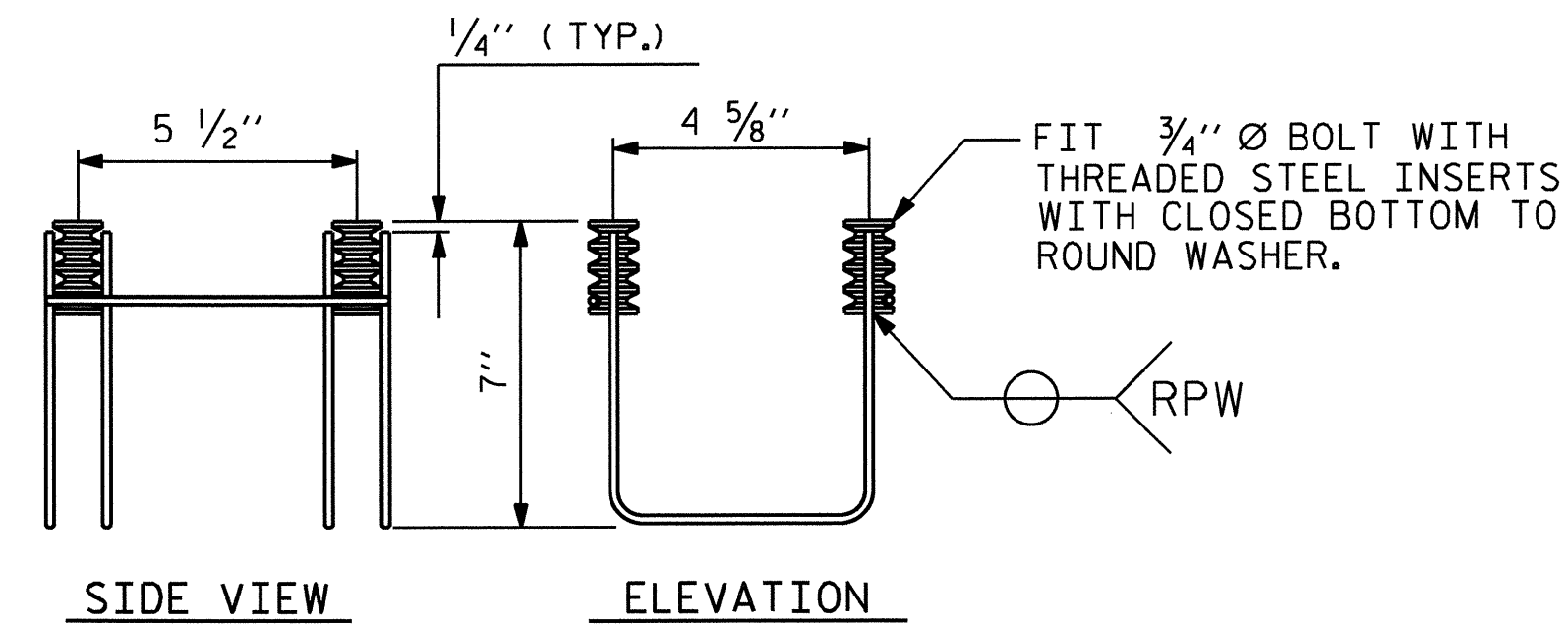
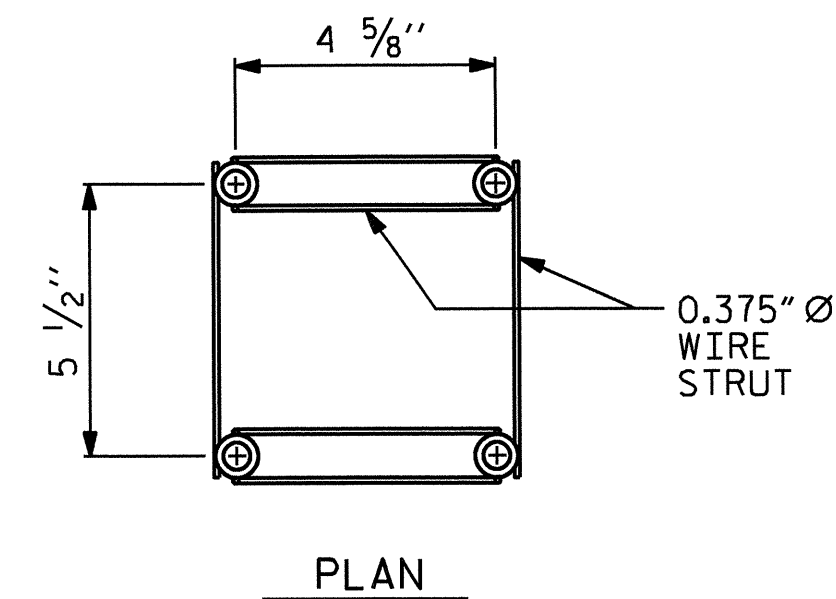
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/6" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

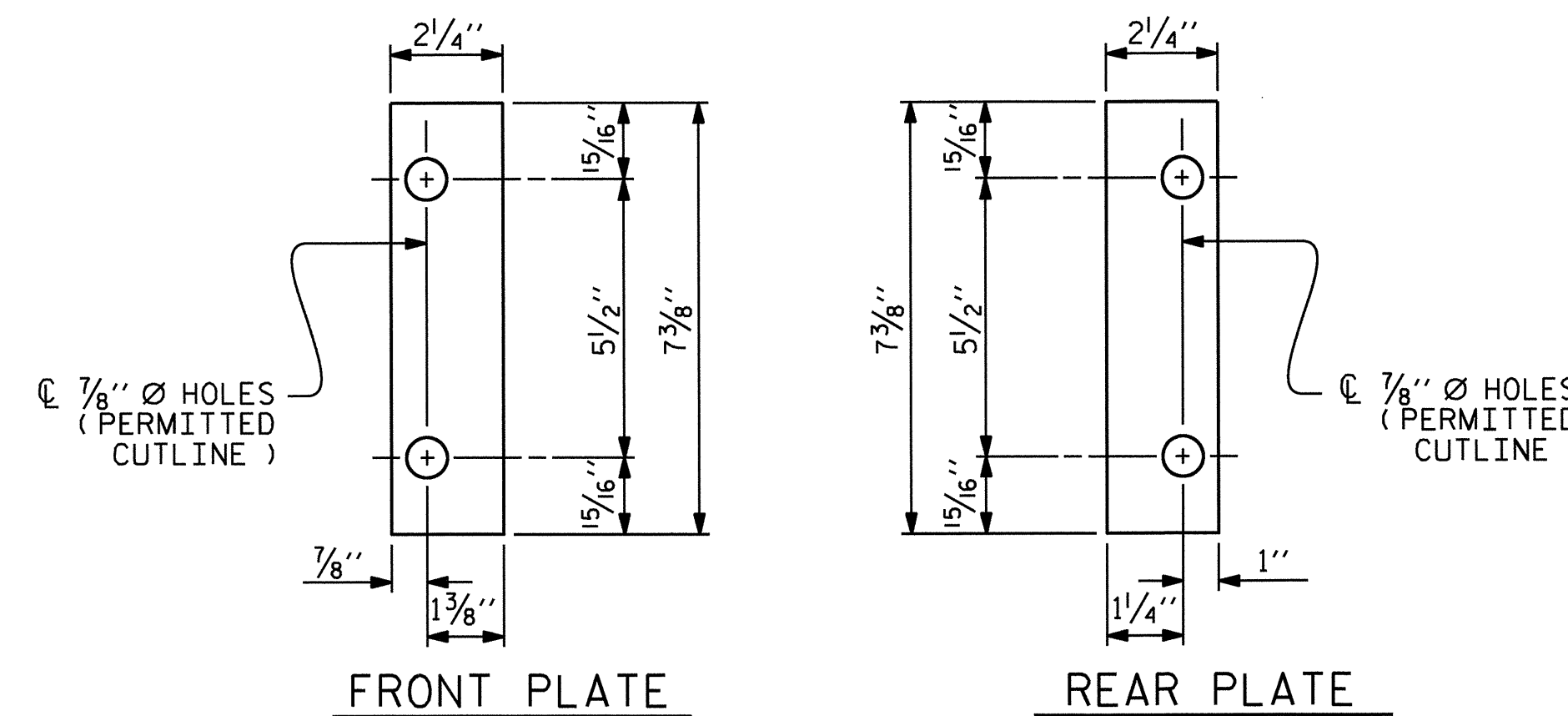
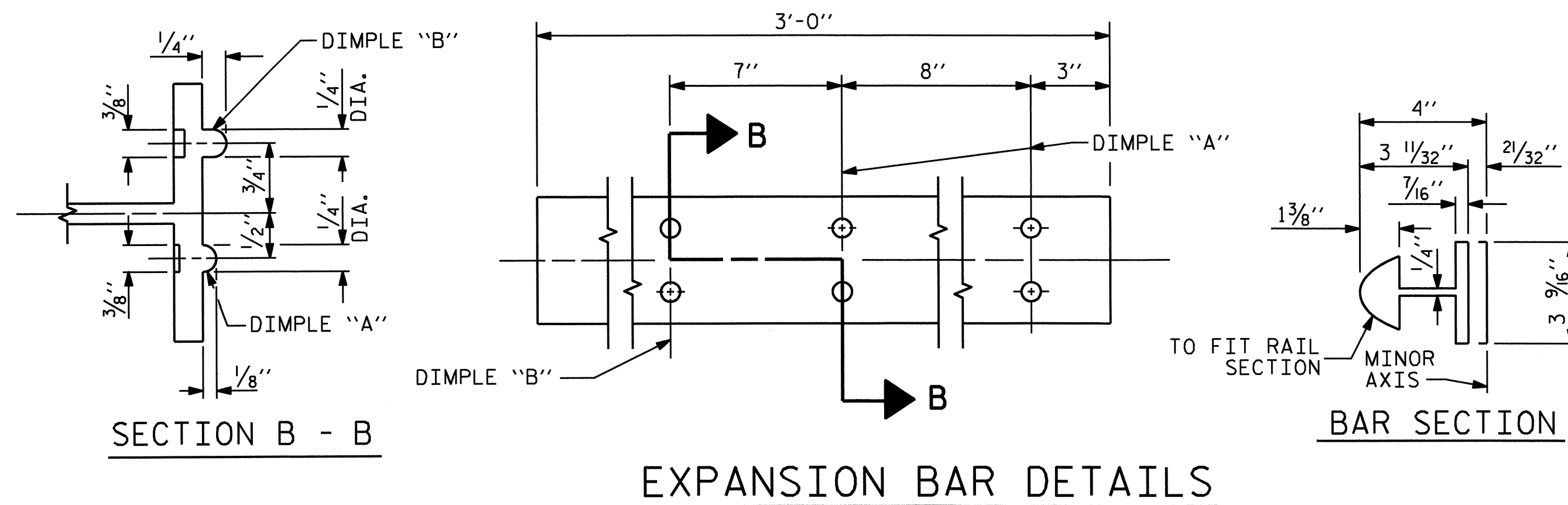
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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



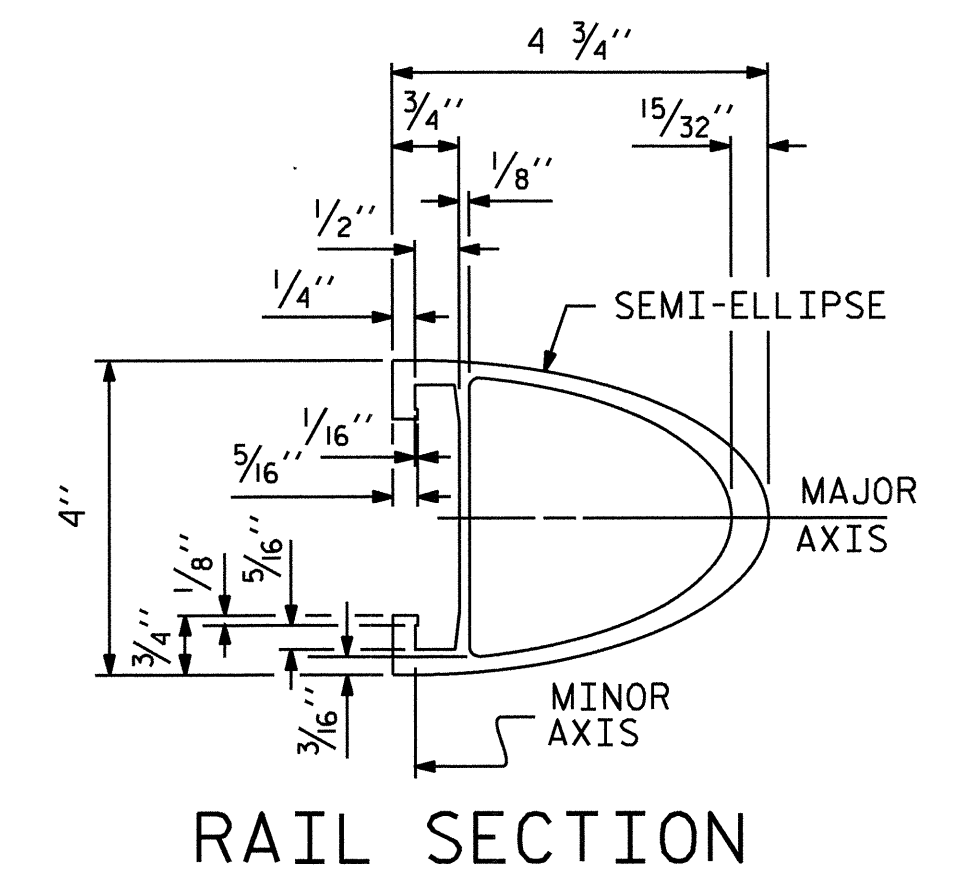
4-BOLT METAL RAIL ANCHOR ASSEMBLY

( 44 ASSEMBLIES REQUIRED )

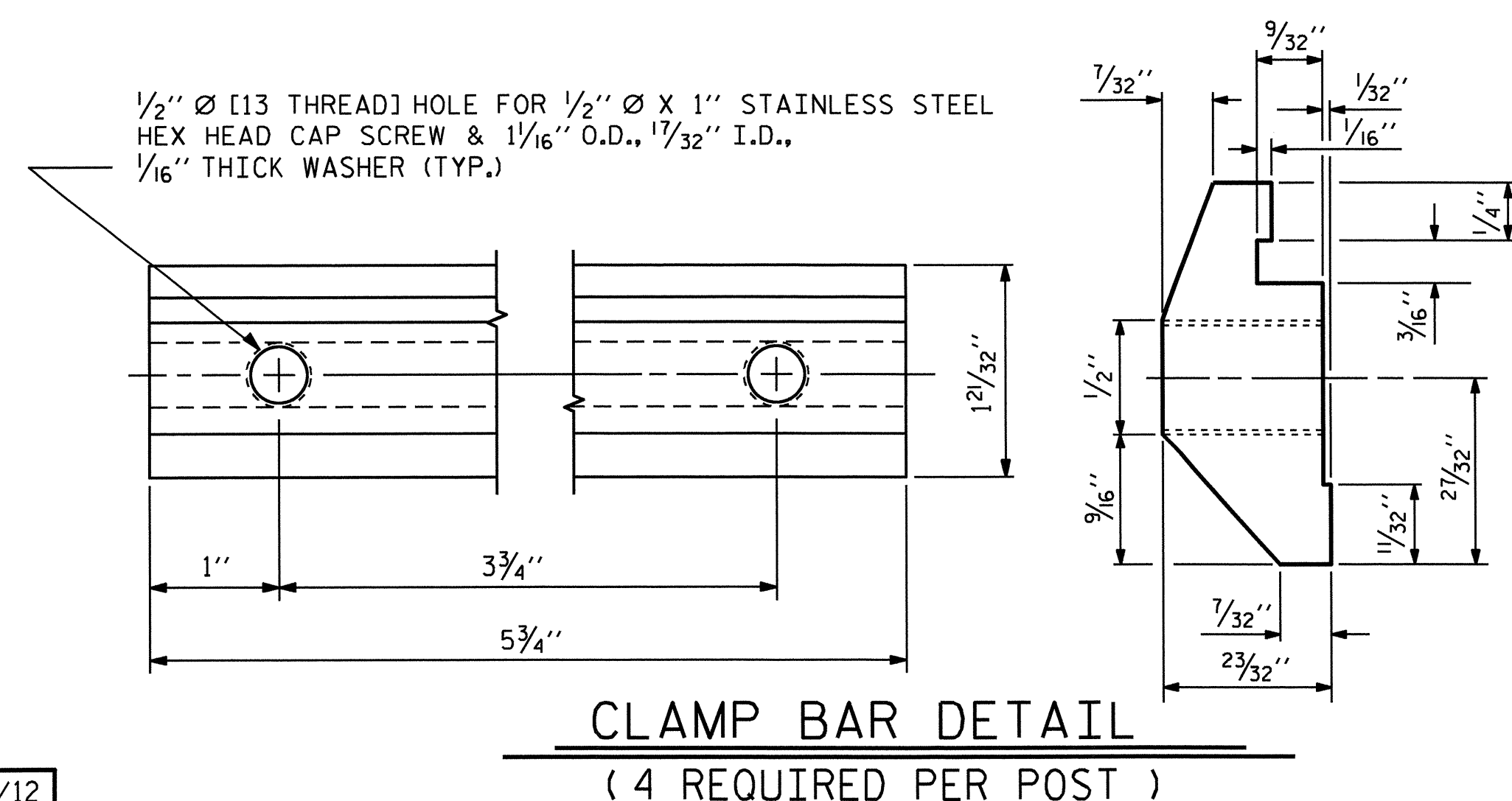


SHIM DETAILS

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

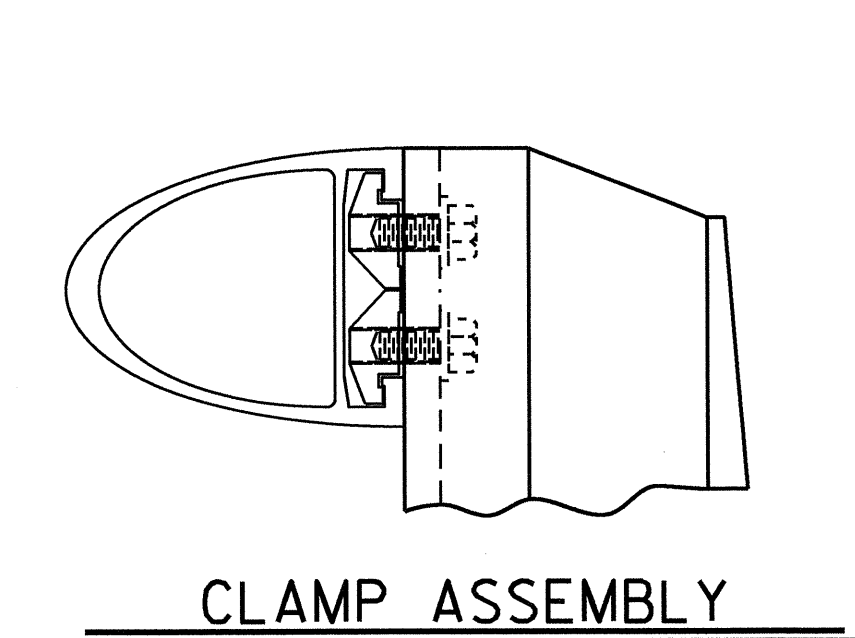


RAIL SECTION

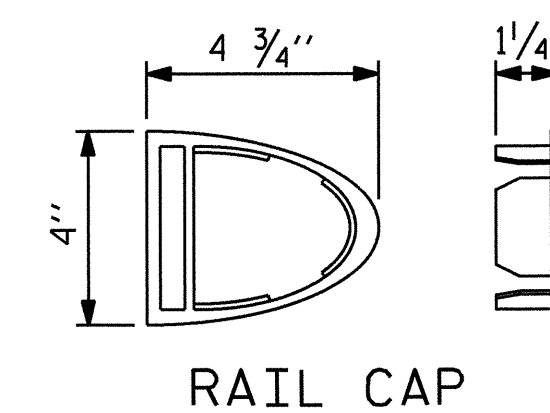


CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY



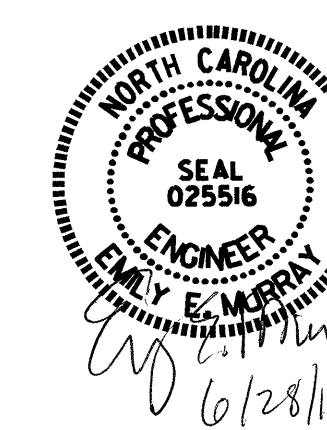
RAIL CAP

PROJECT NO. B-4421  
 BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 3 OF 5

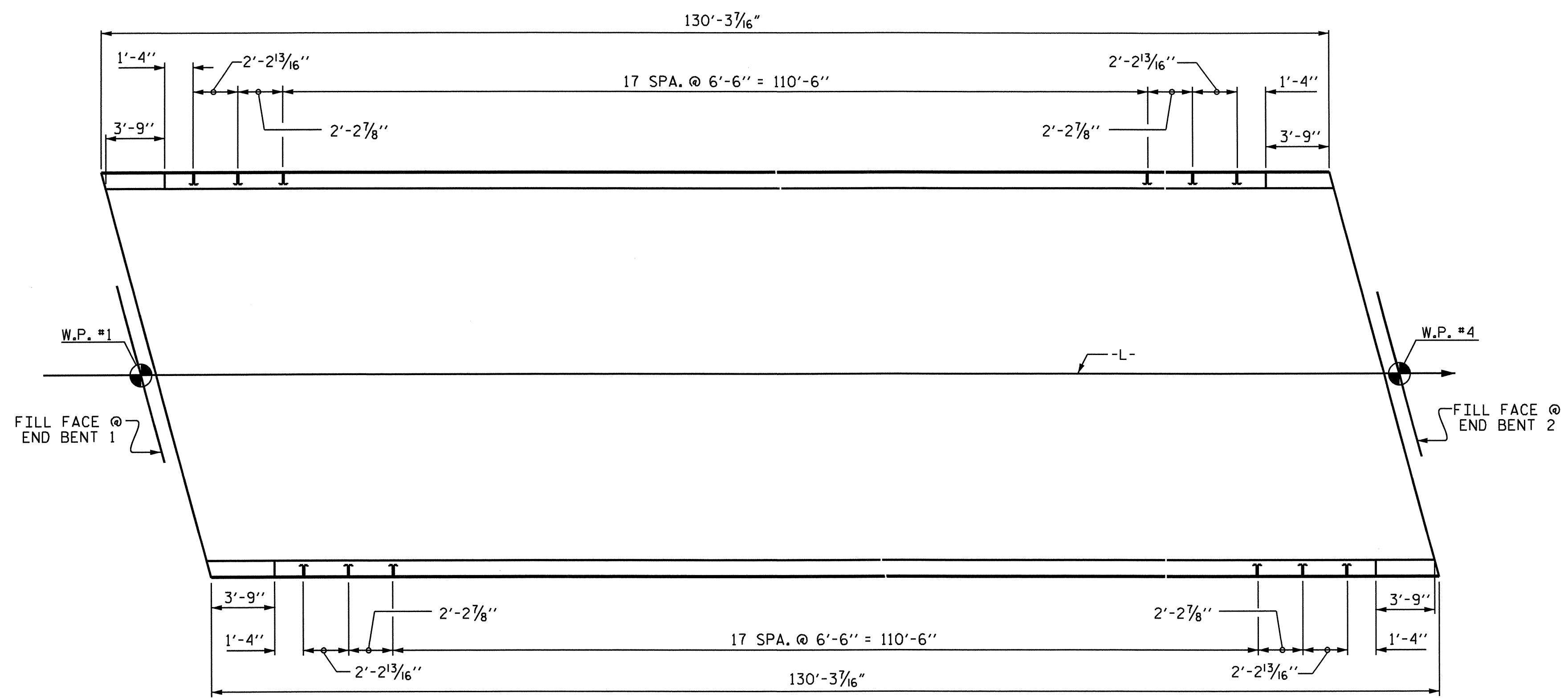
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 2 BAR METAL RAIL

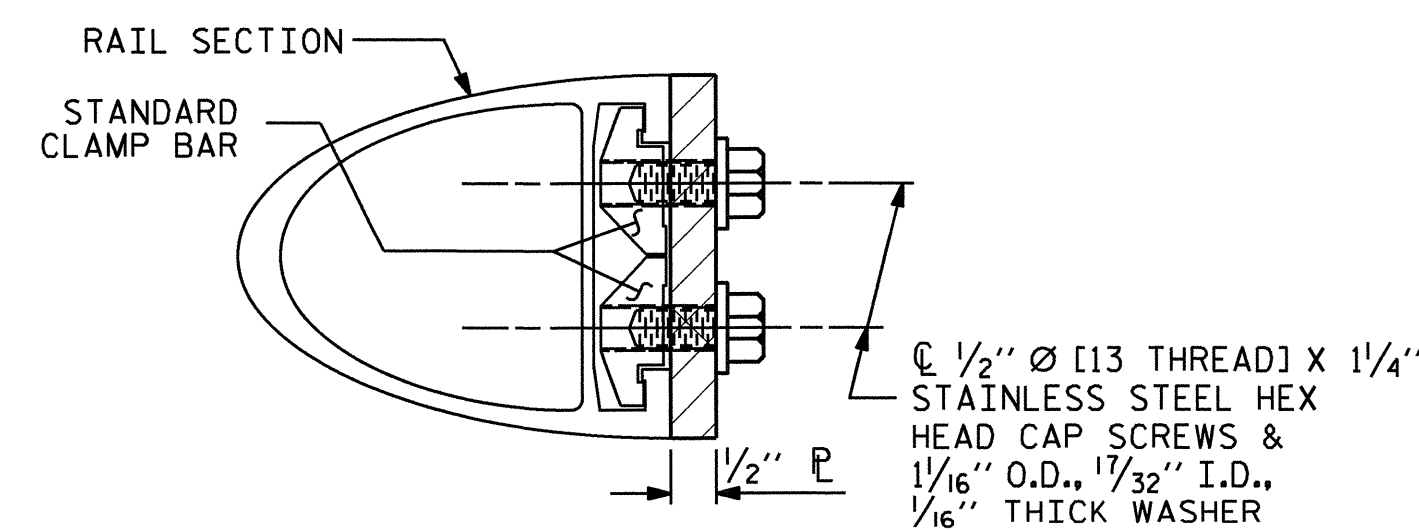
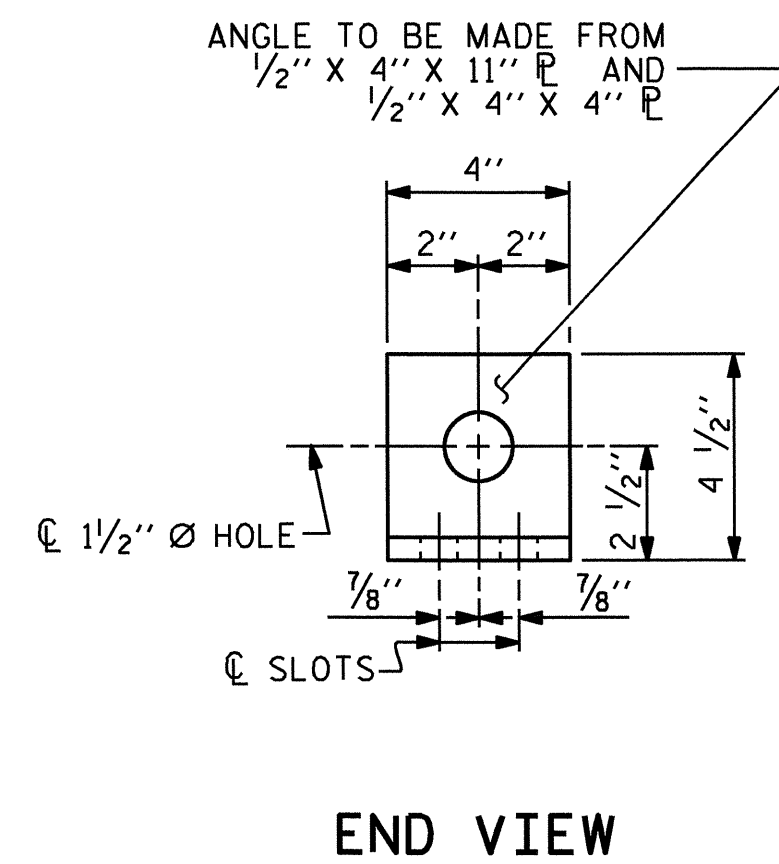
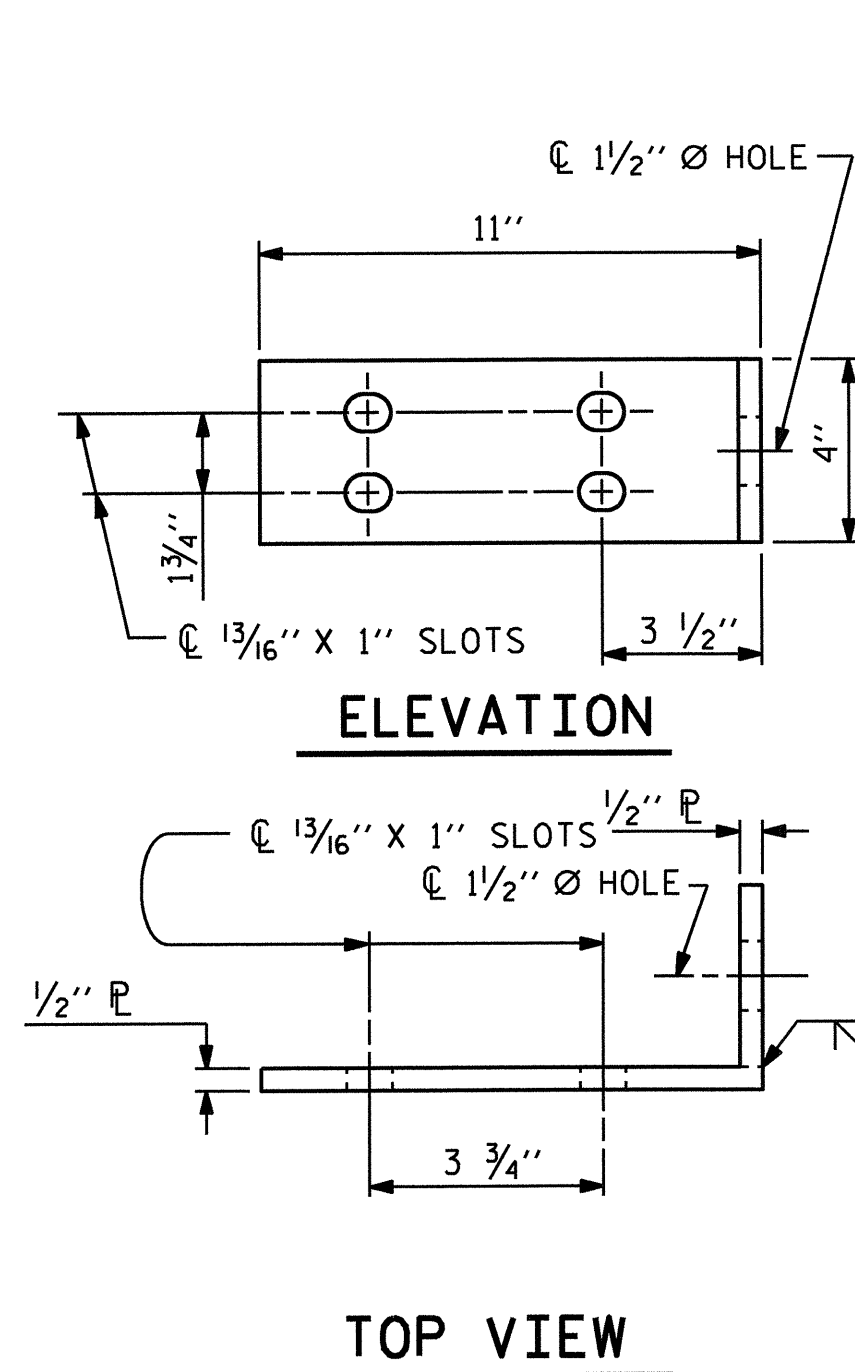


ASSEMBLED BY : E. E. MURRAY	DATE : 5/18/12
CHECKED BY : T. L. AVERETTE	DATE : 5/18/12
DRAWN BY : EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			25



**PLAN OF RAIL POST SPACINGS**



**FIXED**

**DETAILS FOR ATTACHING METAL RAIL TO END POST**

**NOTES**  
STRUCTURAL CONCRETE INSERT

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

**NOTES**  
METAL RAIL TO END POST CONNECTION

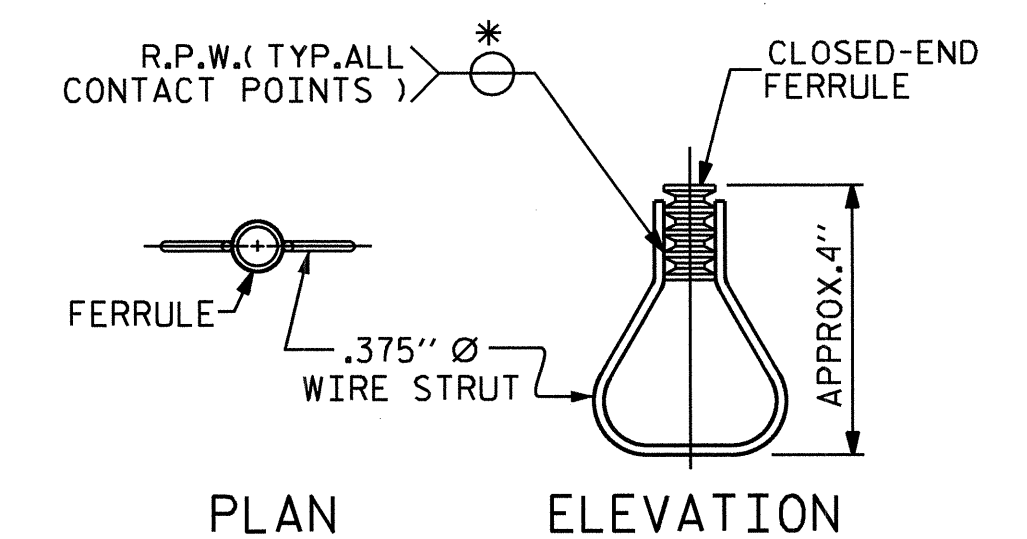
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
  - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
  - E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

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

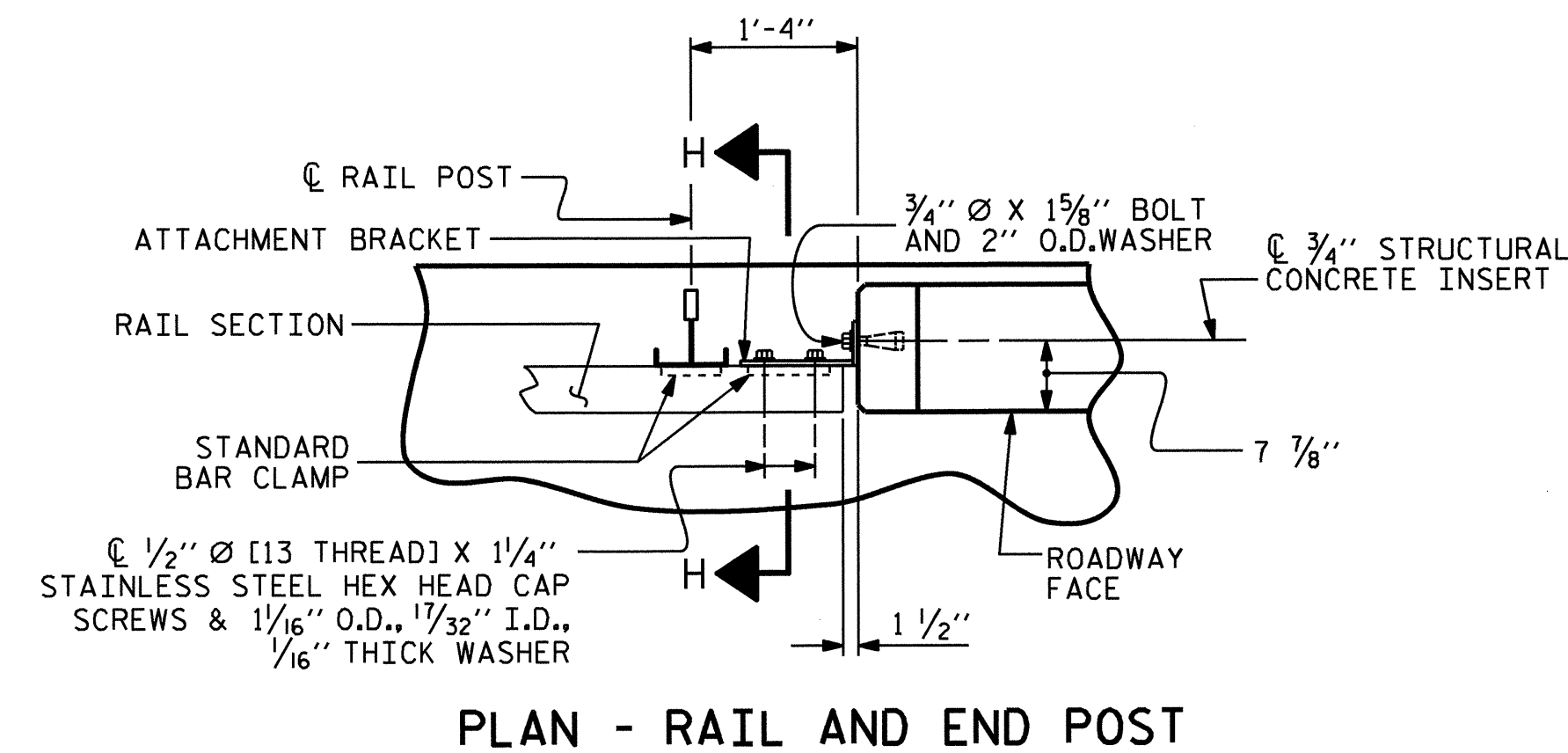
THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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



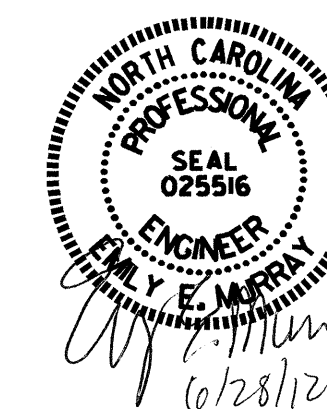
**STRUCTURAL CONCRETE INSERT**

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



PROJECT NO. B-4421  
BEAUFORT COUNTY  
STATION: 15+52.00 -L-

SHEET 4 OF 5



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD

RAIL POST SPACINGS  
AND  
END OF RAIL DETAILS  
FOR ONE OR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			25

STD. NO. BMR2

ASSEMBLED BY : E. E. MURRAY	DATE : 5/18/12
CHECKED BY : T. L. AVERETTE	DATE : 5/18/12
DRAWN BY : FCJ 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : CRK 3/89	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

NOTES

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

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

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

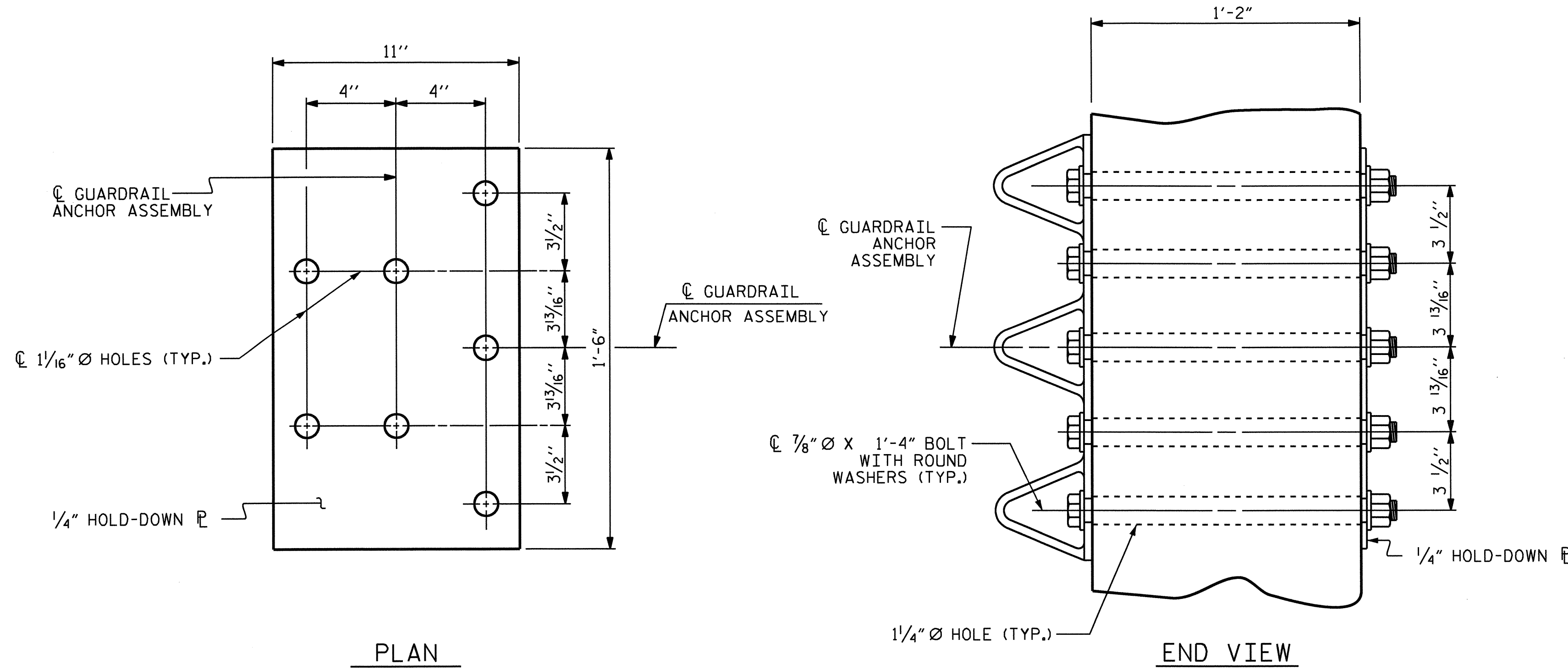
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

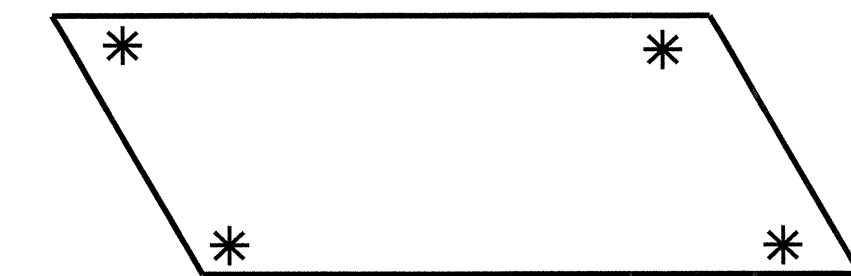
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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

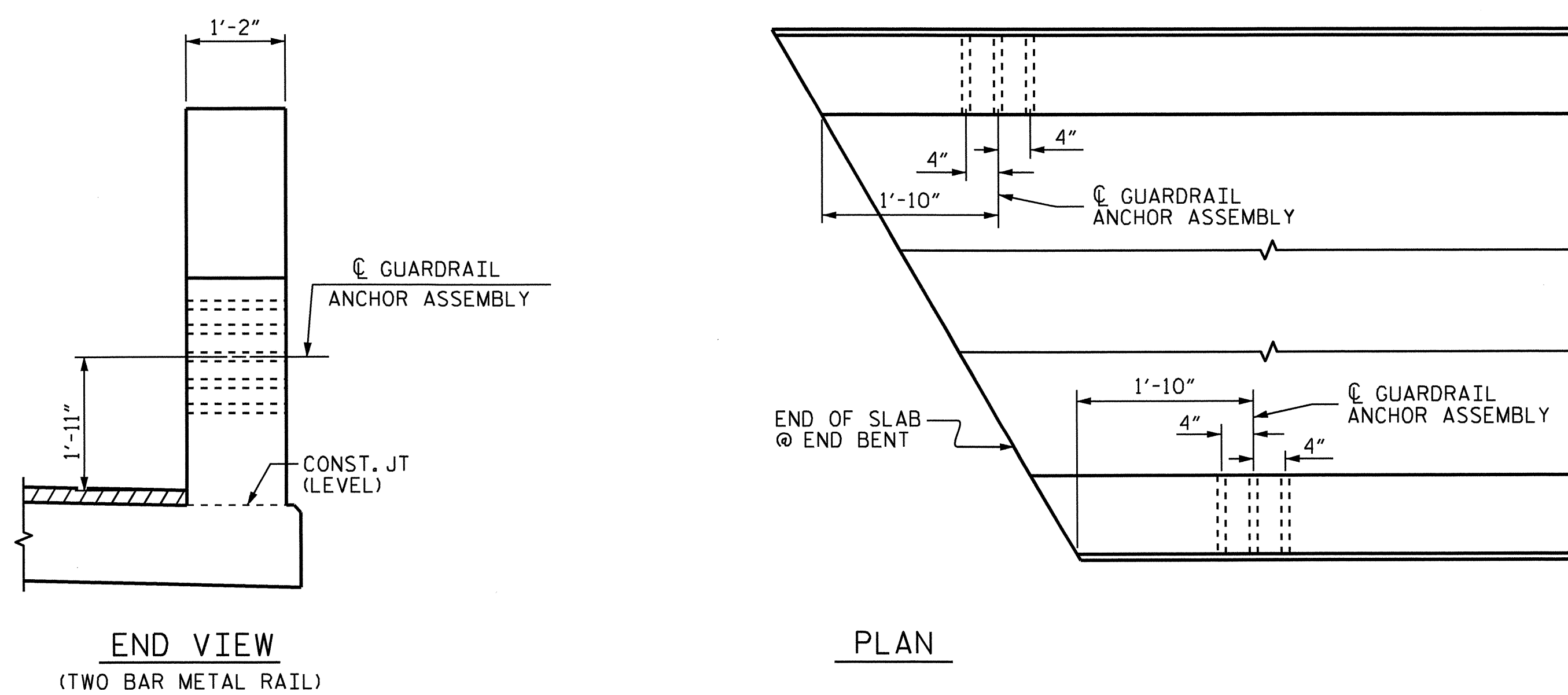


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

ASSEMBLED BY : E. E. MURRAY	DATE : 5/18/12
CHECKED BY : T.L. AVERETTE	DATE : 5/18/12
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	REV. 10/1/11
	REV. 12/5/11
MAA/GM	MAA/GM

12-JUN-2012 08:08  
Z:\TIP\Projects-B\B4421\Structures\ekpope\B-4421\_SD\_CS.dgn  
podkins



PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 5 OF 5

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			25

(SHT 6) STD. NO. GRA3



**NOTES**

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

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

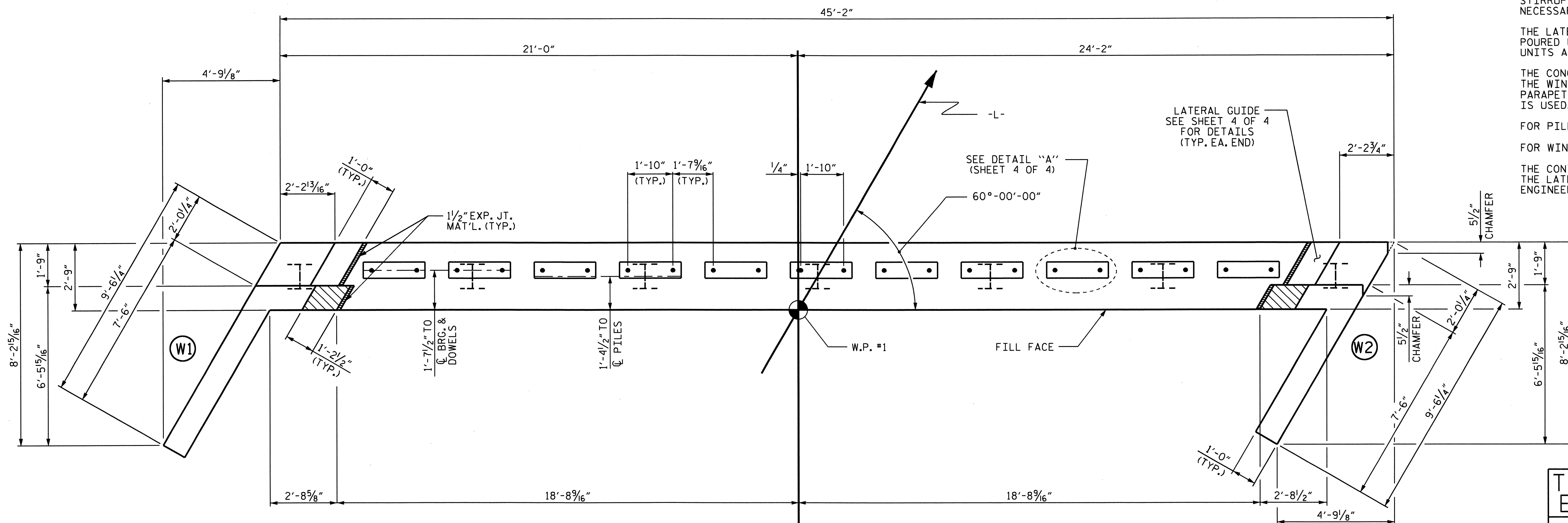
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.

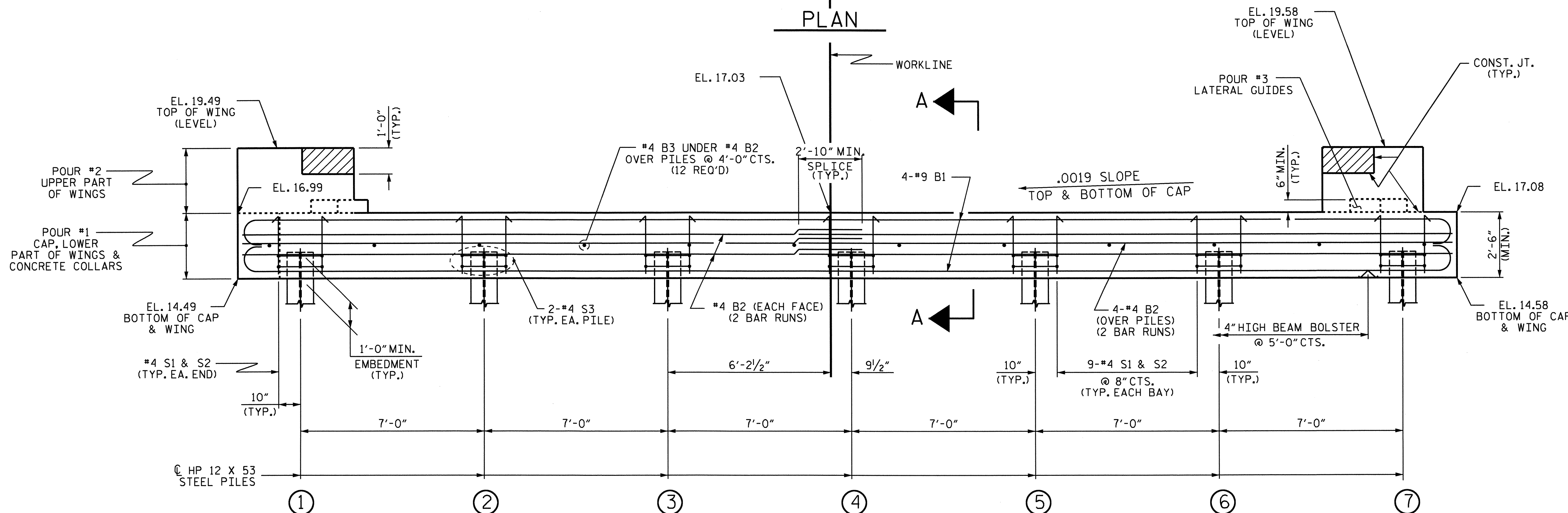
INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



**PLAN**

**TOP OF PILE ELEVATIONS**

①	15.49
②	15.50
③	15.52
④	15.53
⑤	15.54
⑥	15.56
⑦	15.57



**ELEVATION**

PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1



ASSEMBLED BY : EM NOLTING DATE : 1/10/11  
 CHECKED BY : BN GRADY DATE : 2/4/11  
 DRAWN BY : DGE 02/10  
 CHECKED BY : MKT 02/10

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

REVISIONS						SHEET NO. S-16
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 25
2			4			

NOTES

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

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

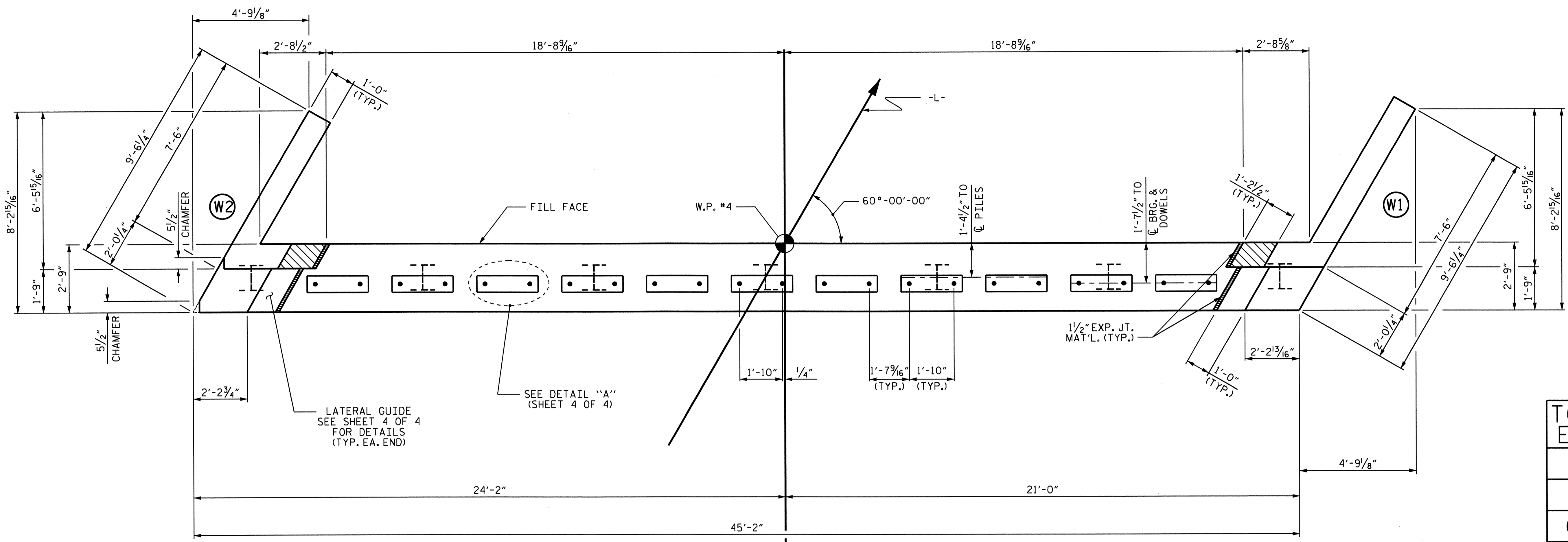
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

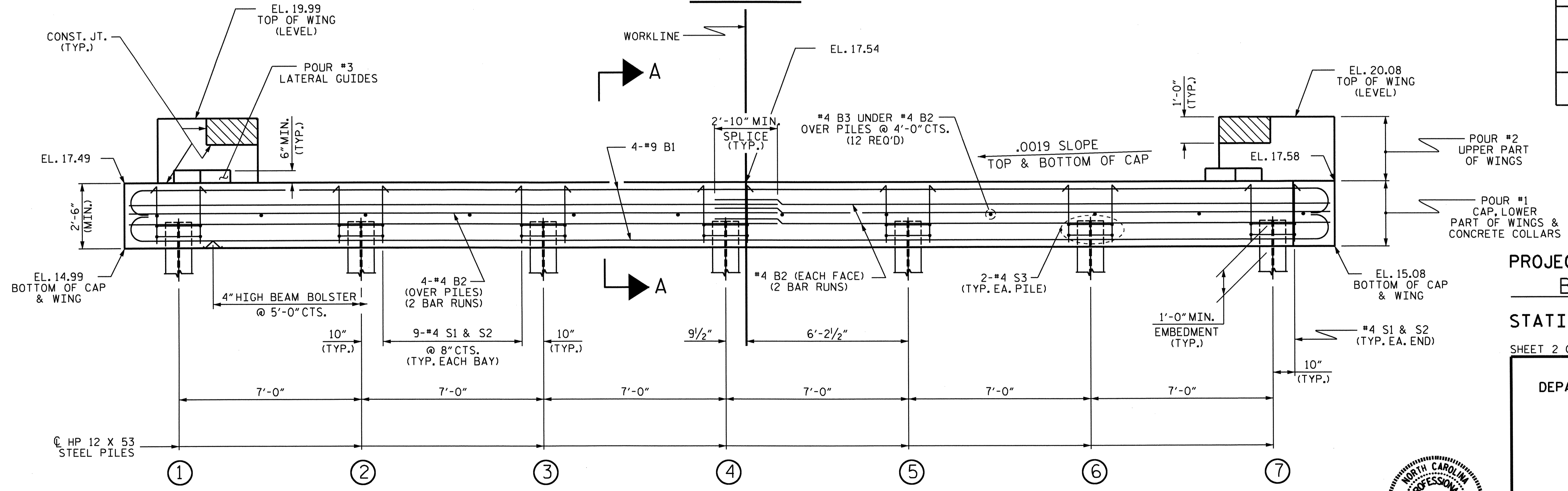
THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



TOP OF PILE ELEVATIONS	
①	16.00
②	16.02
③	16.03
④	16.04
⑤	16.05
⑥	16.06
⑦	16.07

PLAN



ELEVATION

PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

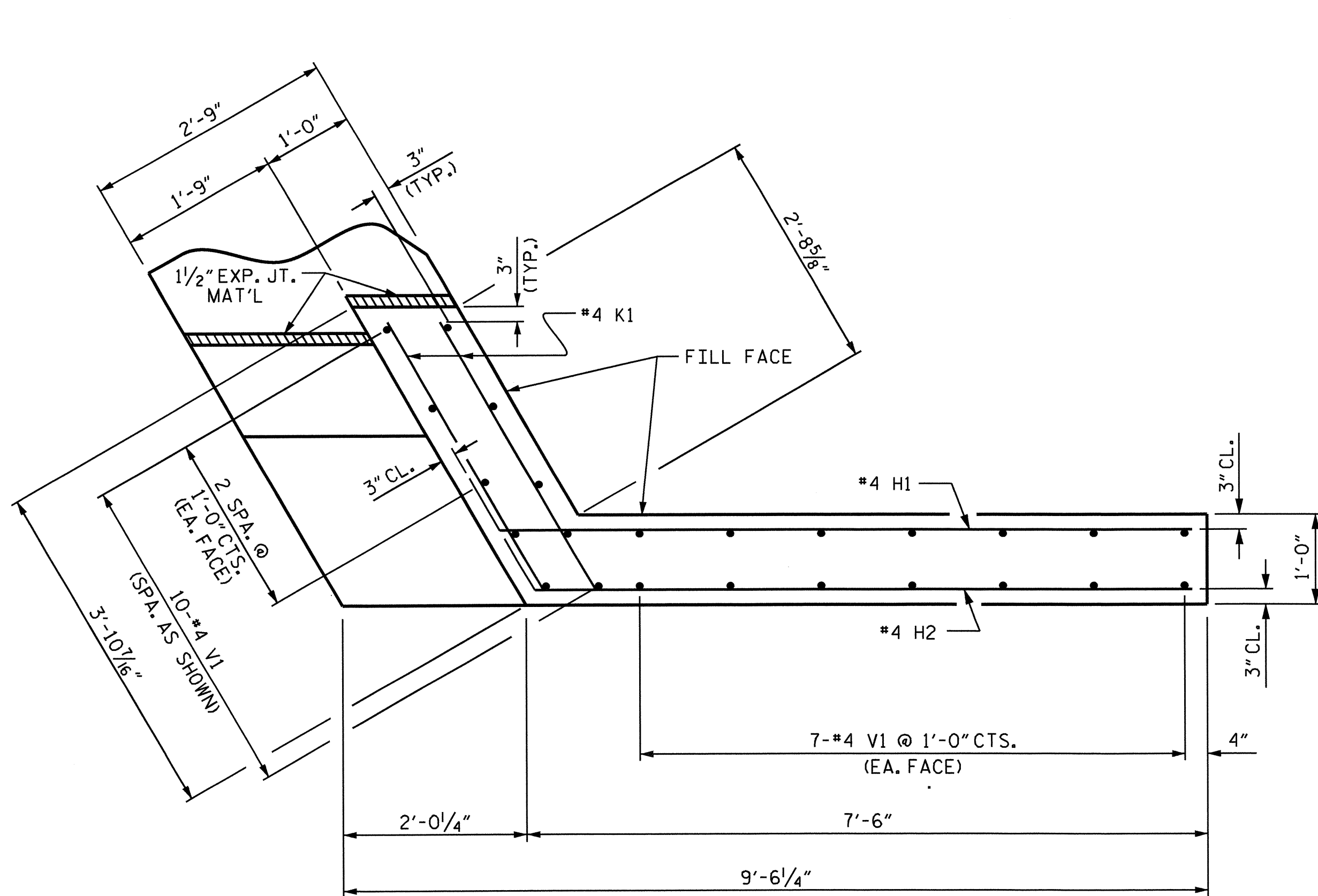
SUBSTRUCTURE  
 END BENT No. 2



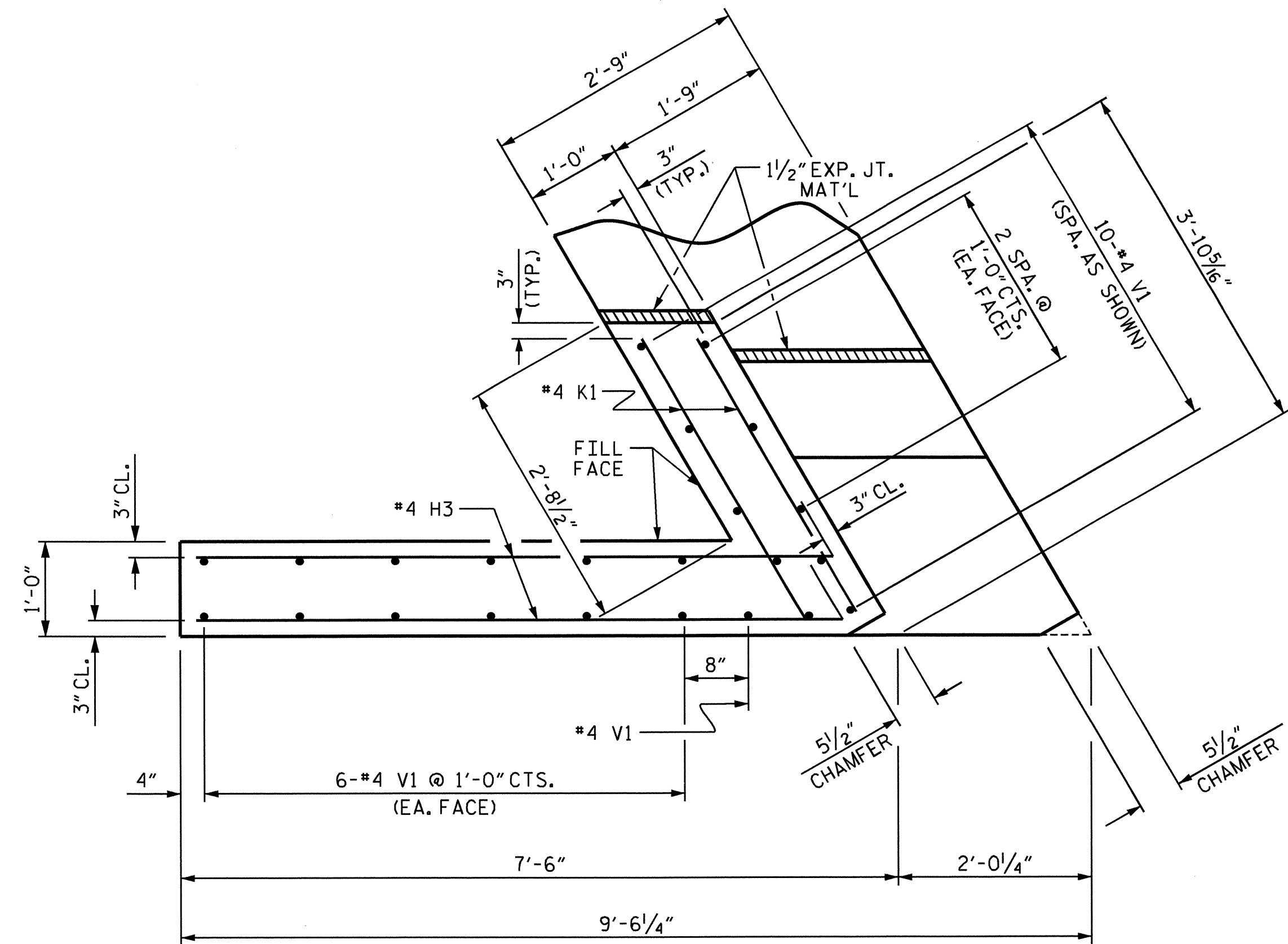
REVISIONS						SHEET NO. S-17
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 25
2			4			

ASSEMBLED BY : EM NOLTING DATE : 1/10/11  
 CHECKED BY : BN GRADY DATE : 2/4/11  
 DRAWN BY : DGE 02/10  
 CHECKED BY : MKT 02/10

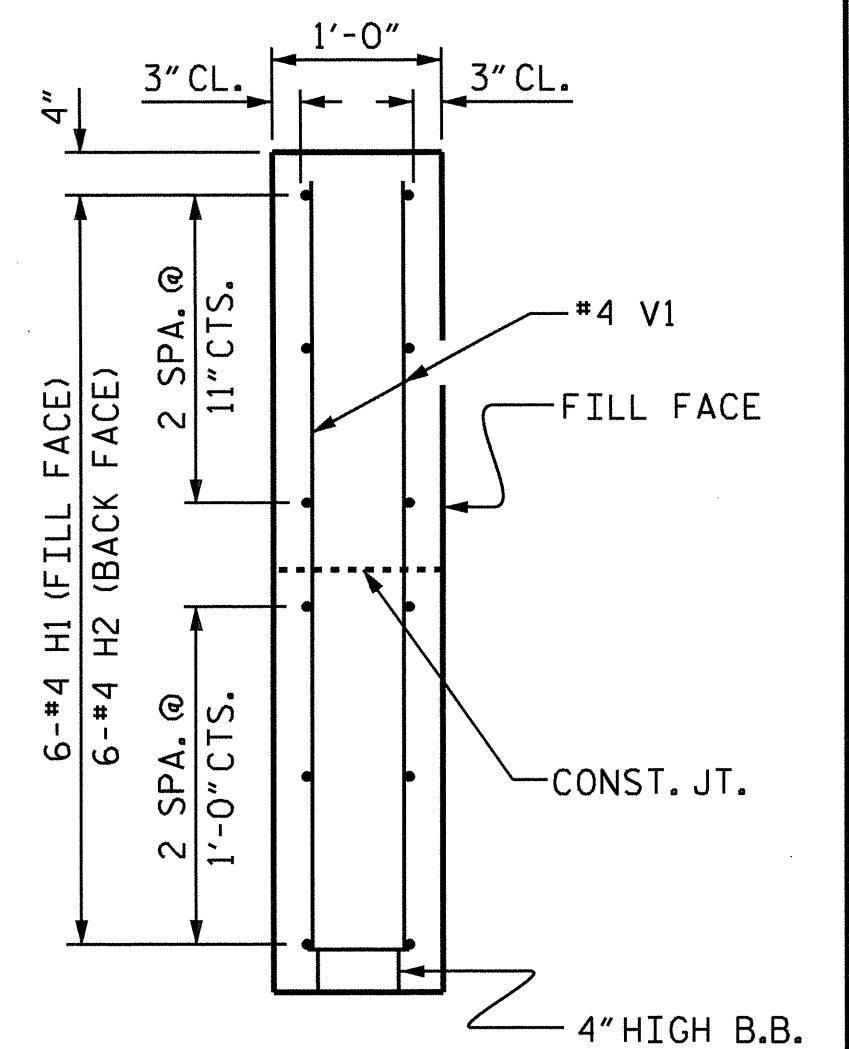
WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.



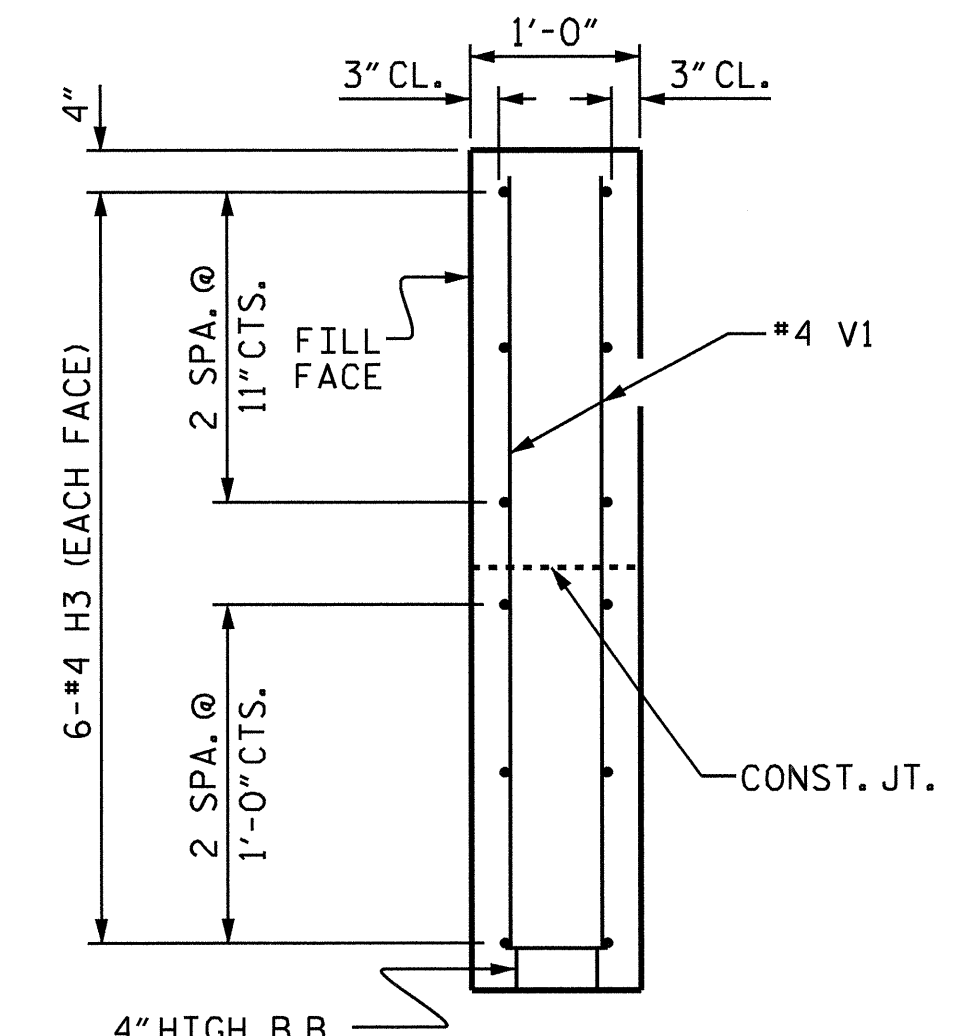
PLAN OF WING (W1)



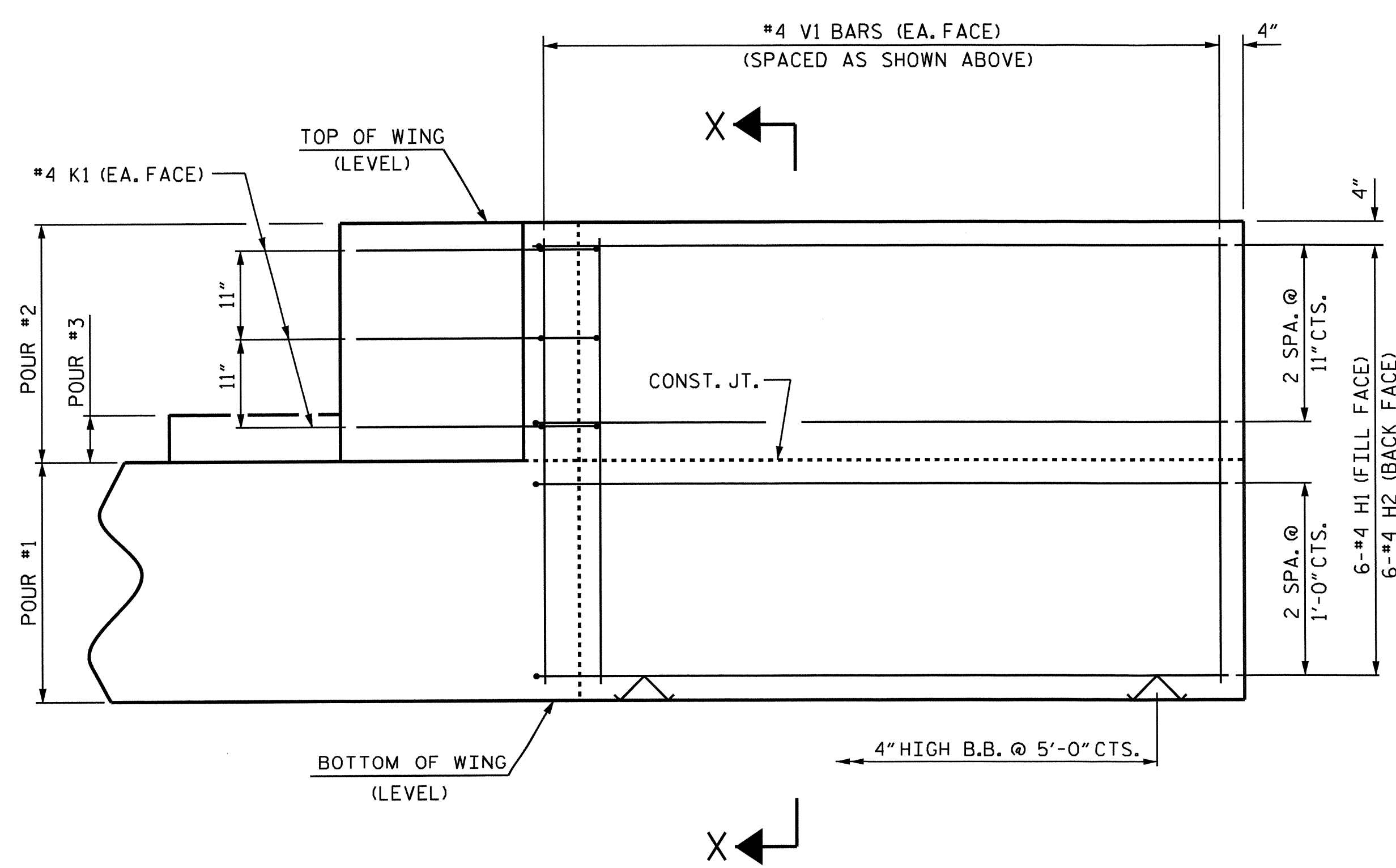
PLAN OF WING (W2)



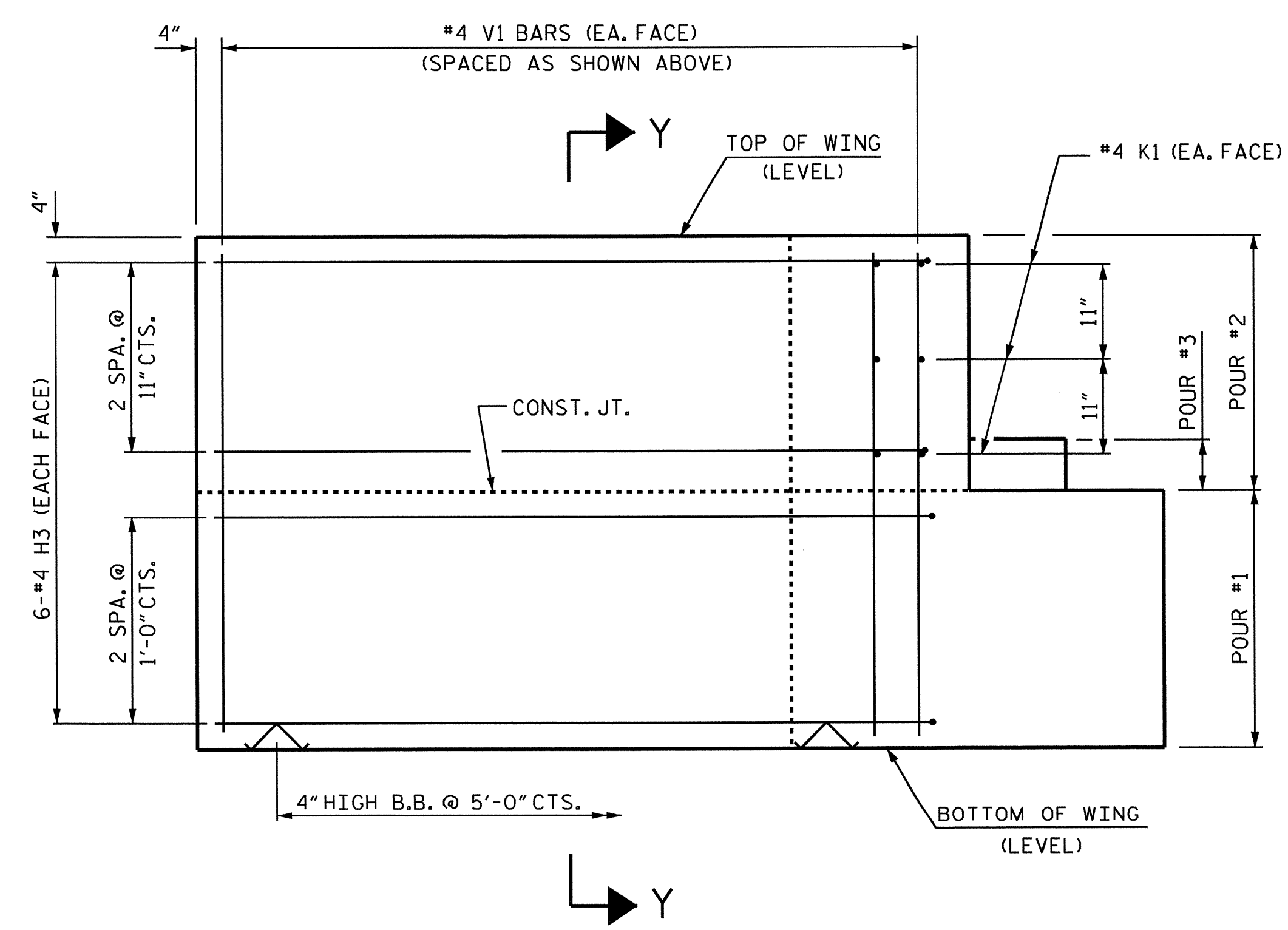
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)

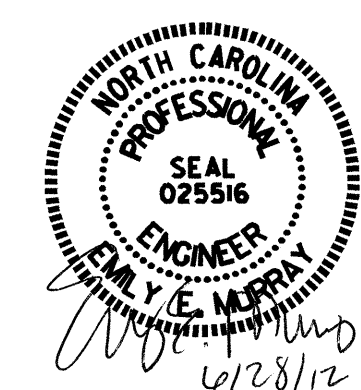


ELEVATION OF WING (W2)

WING DETAILS

ASSEMBLED BY : EM NOLTING DATE : 1/10/11  
 CHECKED BY : BN GRADY DATE : 2/4/11  
 DRAWN BY : DGE 02/10  
 CHECKED BY : MKT 02/10

12-JUN-2012 08:07  
 Z:\TIP\Projects\B-4421\Structures\ekpope\B-4421.SD.CS.dgn  
 podkins

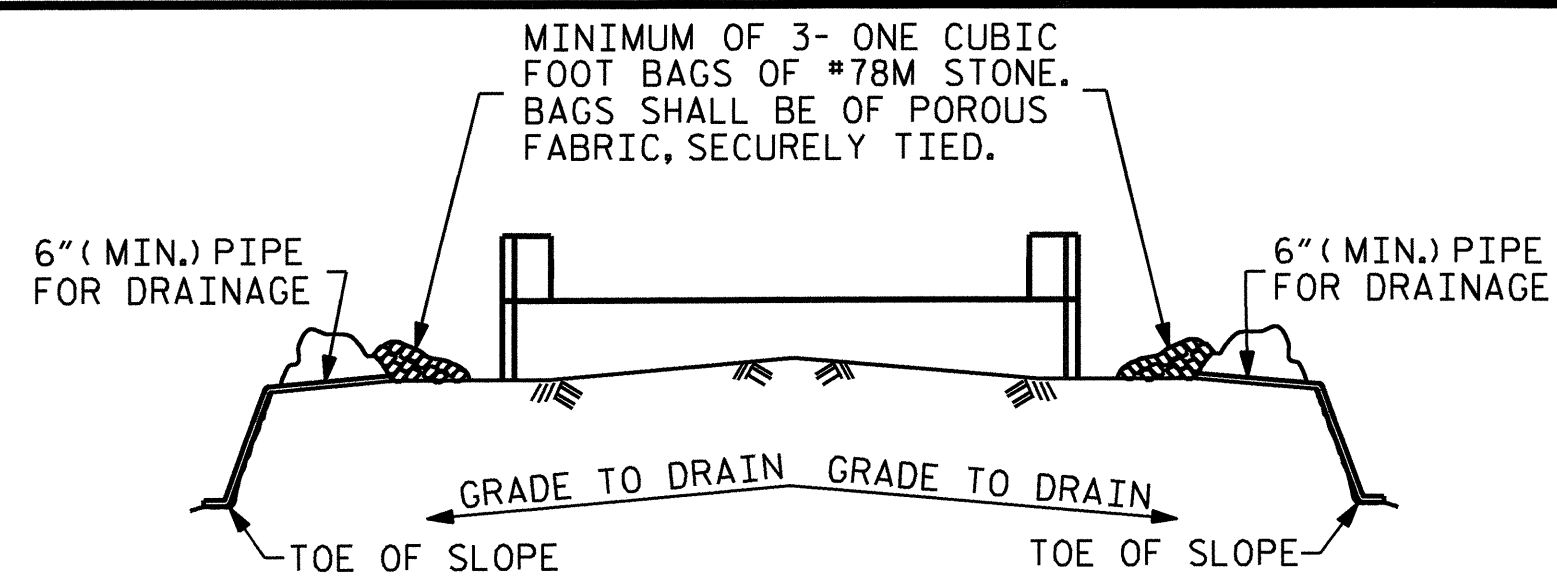


PROJECT NO. B-4421  
 BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT WING DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-18
TOTAL SHEETS					25

STD. NO. EB-33-60S

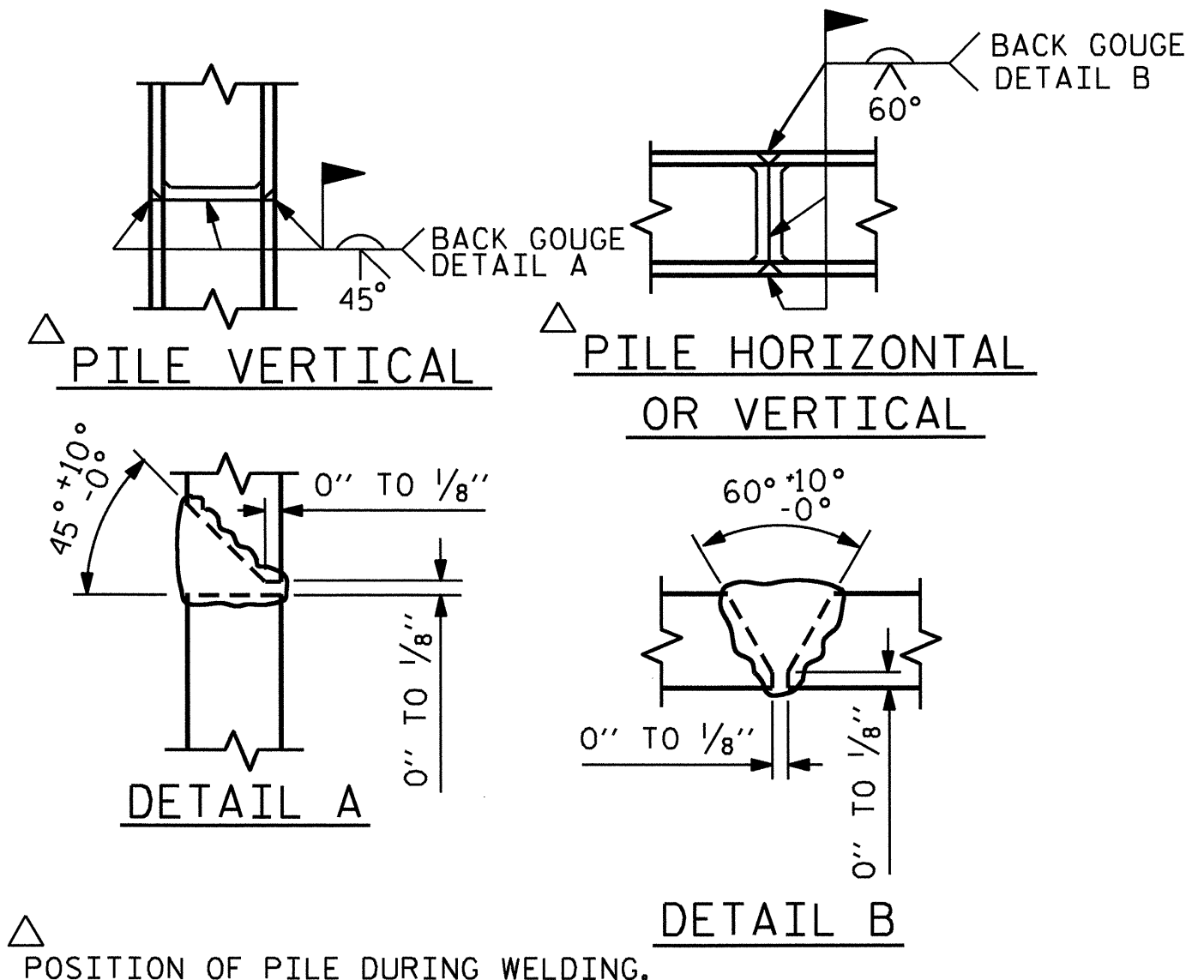


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

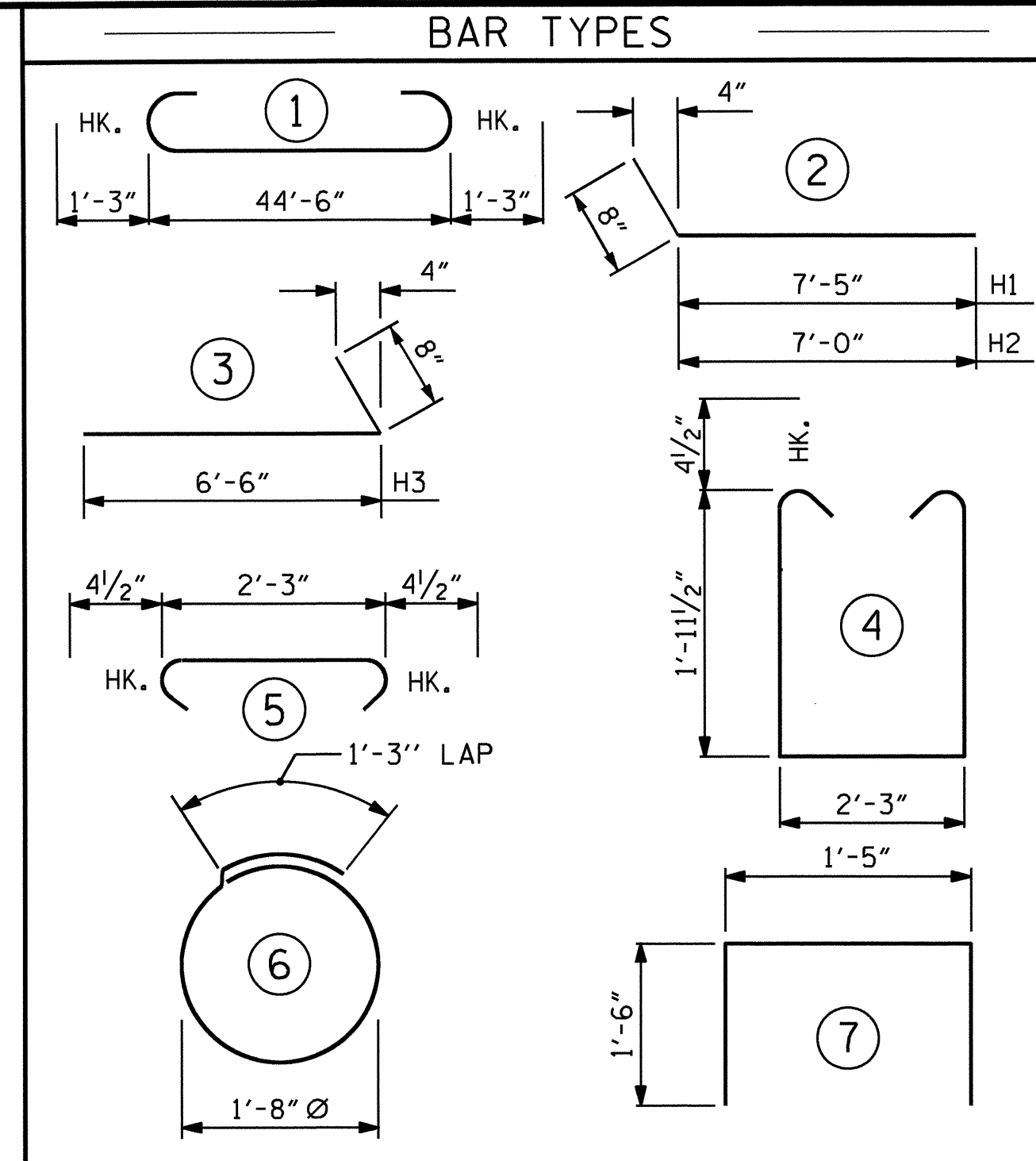
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



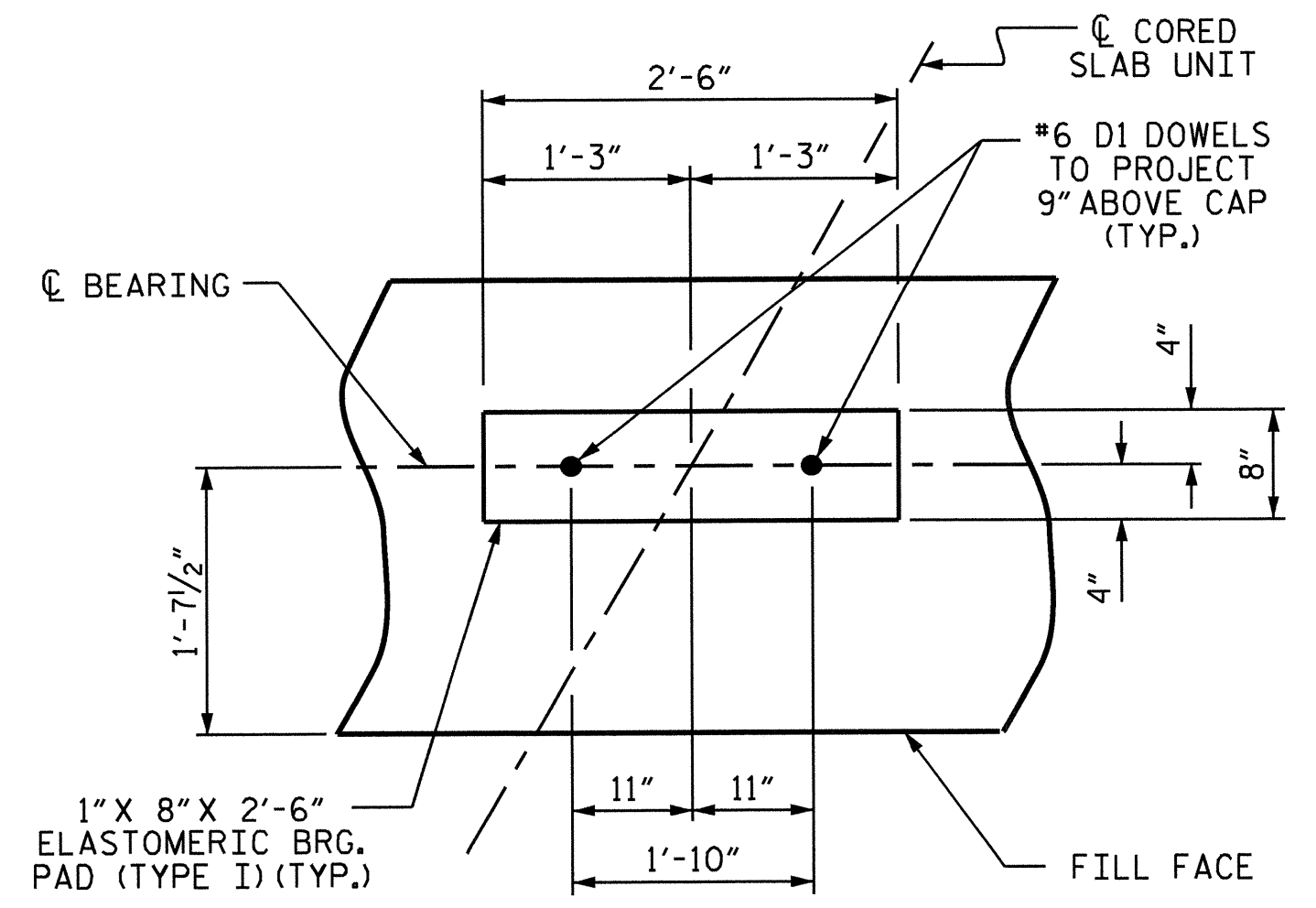
### PILE SPLICE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT.

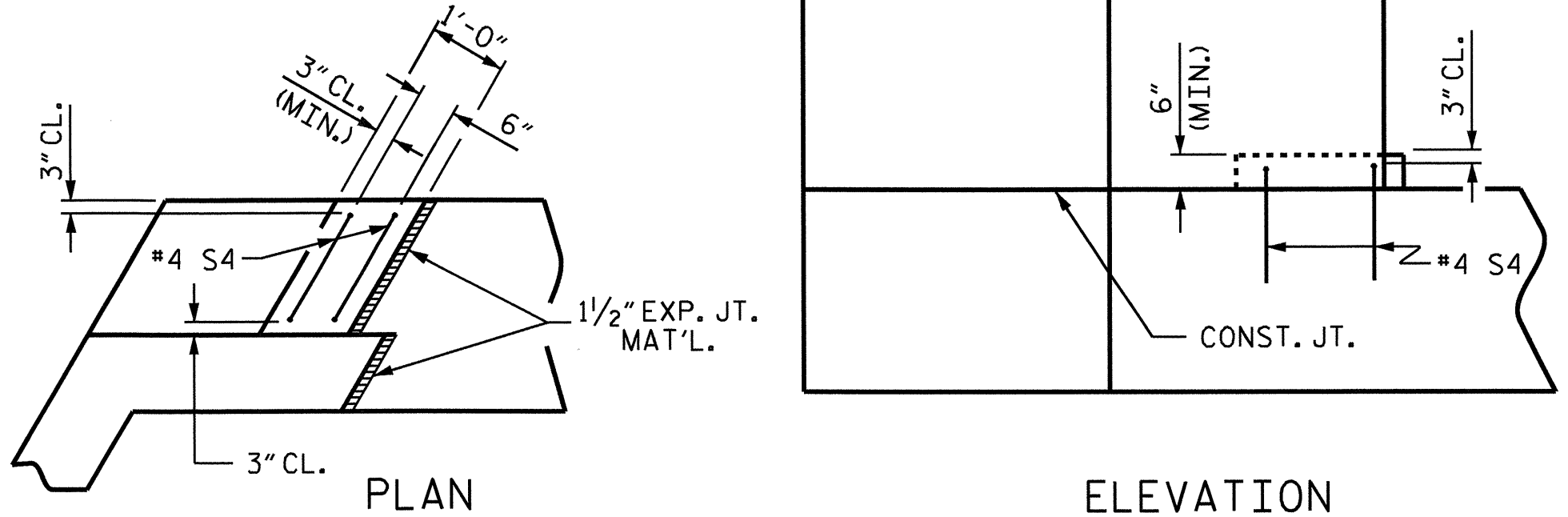
END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO: 7	NO: 7
LIN. FT.= 525	LIN. FT.= 525
PILE REDRIVES EA. 4	PILE REDRIVES EA. 4

BILL OF MATERIAL FOR ONE END BENT					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
* B1	#8		47'-0"	1278	
* B2	#4	STR	23'-10"	255	
* B3	#4	STR	2'-3"	18	
* D1	#6	STR	1'-6"	50	
* H1	#4		8'-1"	32	
* H2	#4		7'-8"	31	
* H3	#4		7'-2"	57	
* K1	#4	STR	3'-1"	25	
* S1	#4		6'-11"	259	
* S2	#4		3'-0"	112	
* S3	#4		6'-6"	61	
* S4	#4		4'-5"	12	
* V1	#4	STR	4'-6"	141	
* EPOXY COATED REINFORCING STEEL (FOR ONE END BENT)					2331 LBS.
CLASS AA CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					13.9 C.Y.
POUR #2 UPPER PART OF WINGS					1.9 C.Y.
POUR #3 LATERAL GUIDES					0.1 C.Y.
TOTAL CLASS AA CONCRETE					15.9 C.Y.



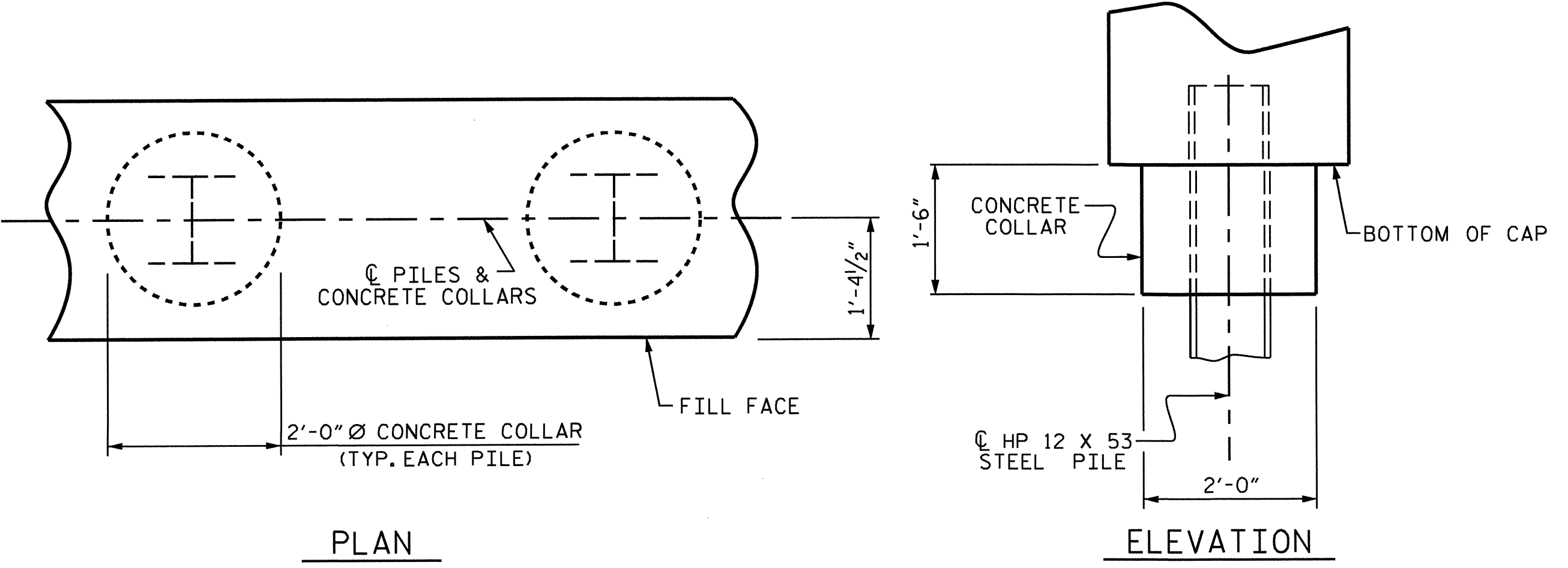
### DETAIL "A"

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



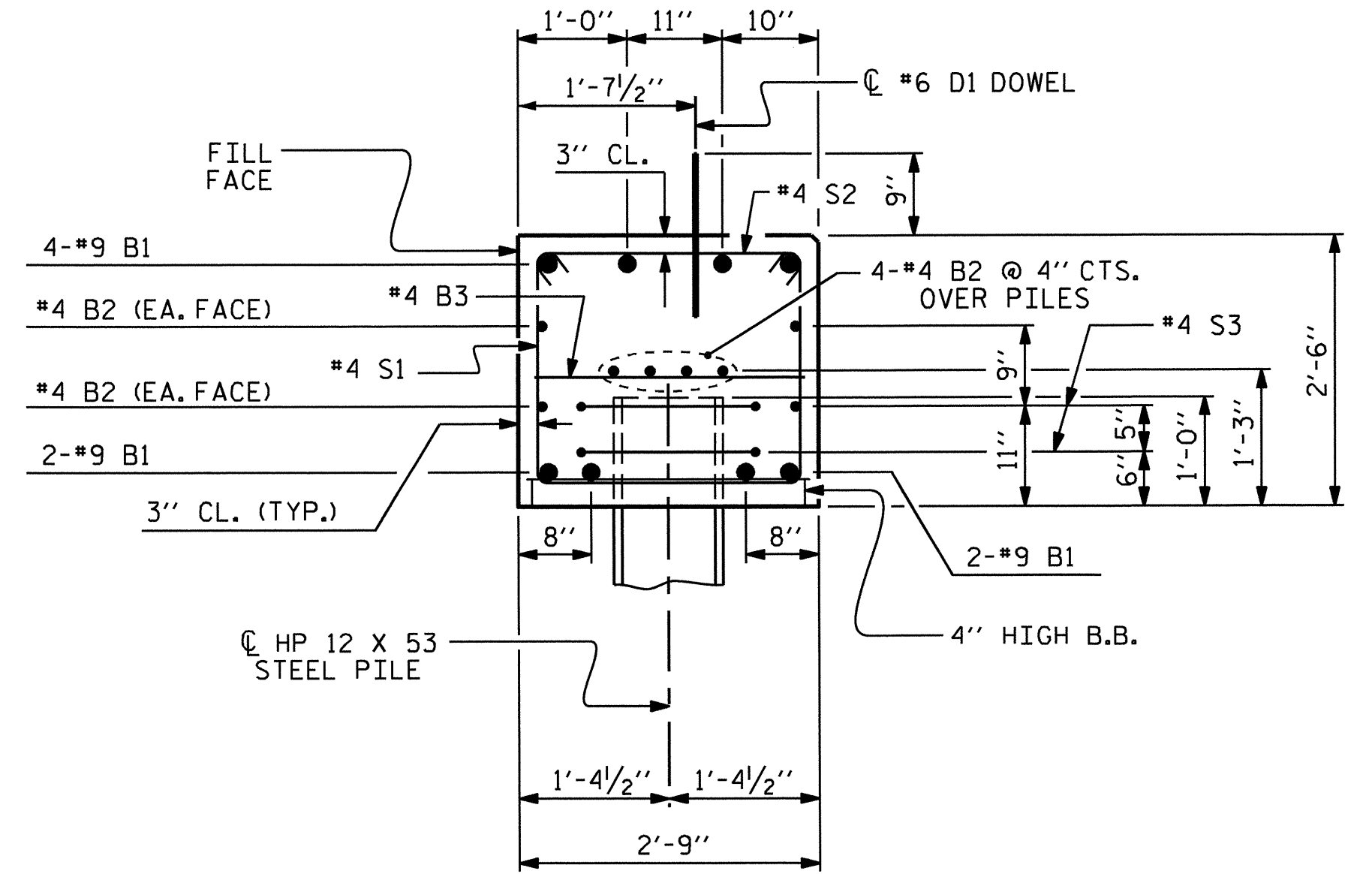
### LATERAL GUIDE DETAILS

(END BENT No. 1, LEFT LATERAL GUIDE SHOWN, RIGHT END SIMILAR) (END BENT No. 2 SIMILAR BY ROTATION)



### CORROSION PROTECTION FOR STEEL PILES DETAIL

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



### SECTION A-A

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

PROJECT NO. B-4421  
 BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

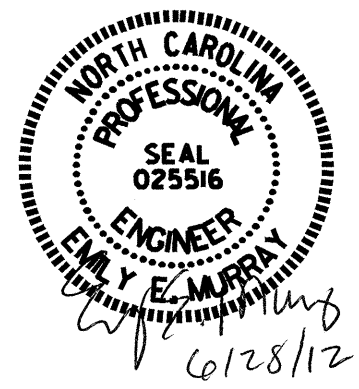
SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1 & 2  
 DETAILS

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

SHEET NO. S-19  
 TOTAL SHEETS 25



ASSEMBLED BY : EM NOLTING	DATE : 1/10/11
CHECKED BY : BN GRADY	DATE : 2/4/11
DRAWN BY : DGE	02/10
CHECKED BY : MKT	02/10

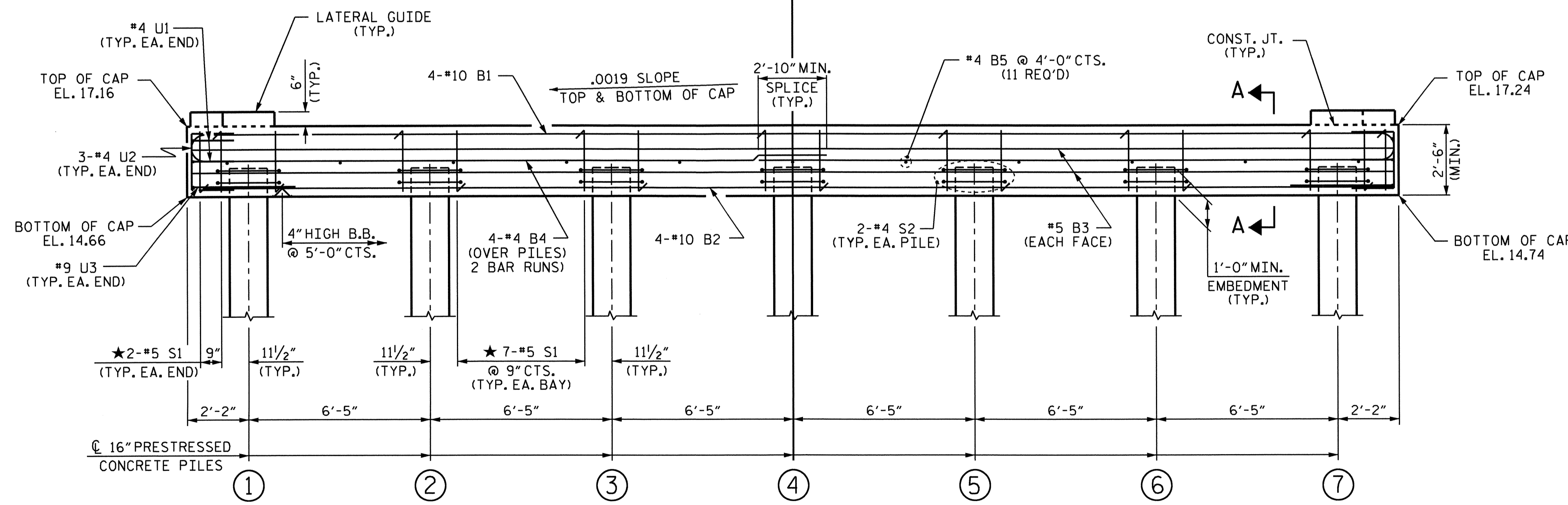
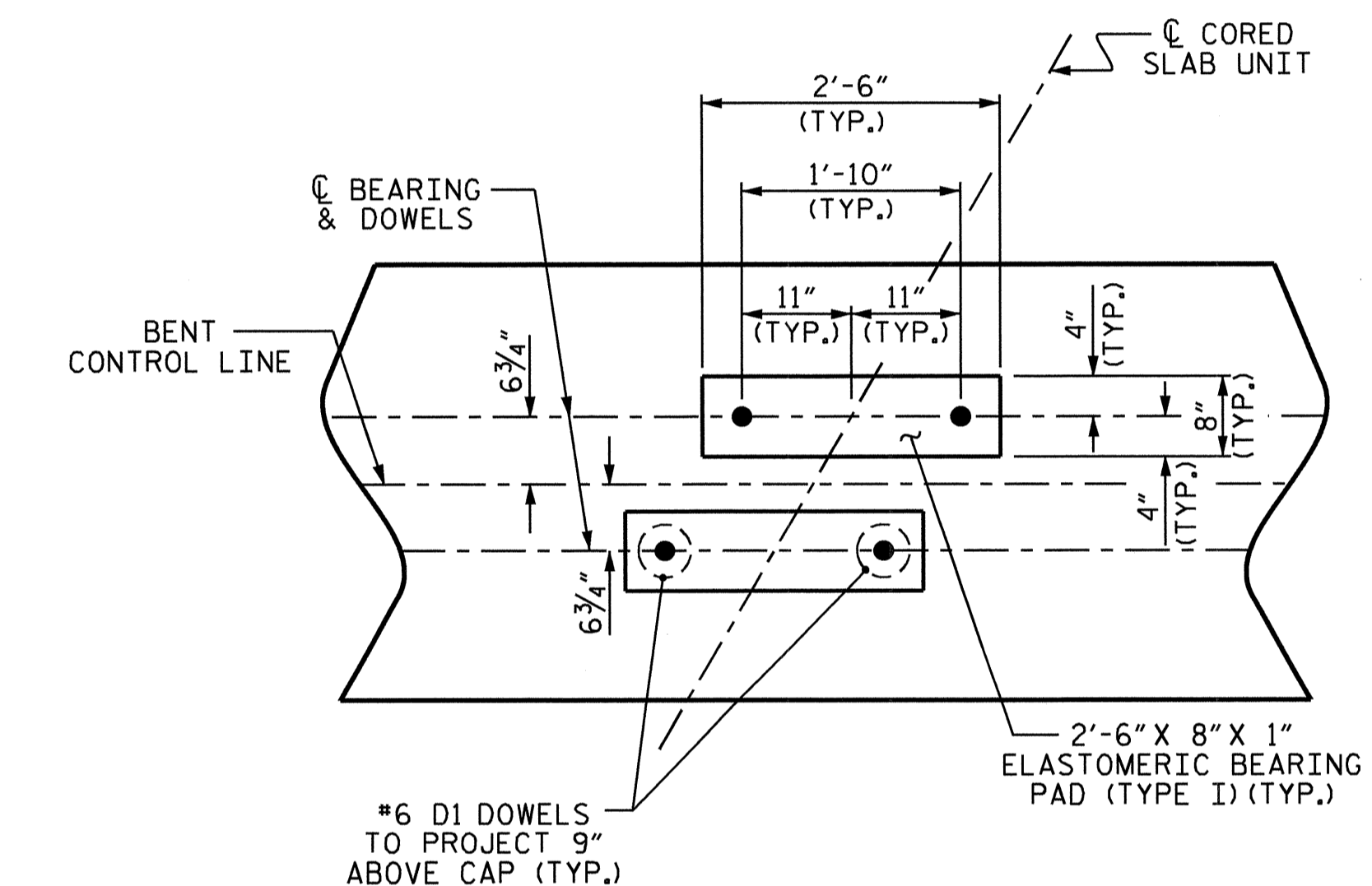
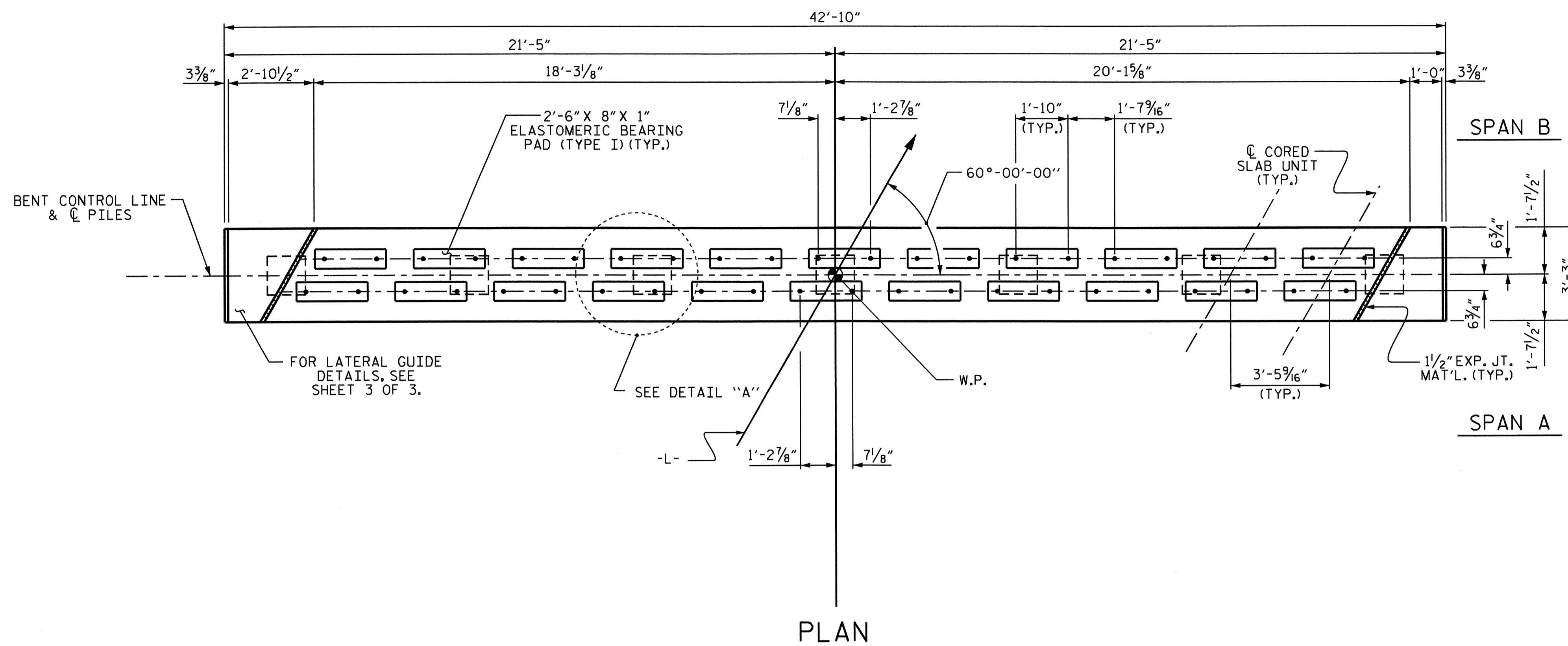
NOTES

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

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

★ INVERT ALTERNATE STIRRUPS.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.



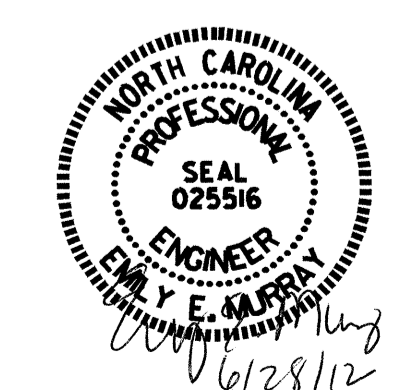
TOP OF PILE ELEVATIONS	
①	15.66
②	15.68
③	15.69
④	15.70
⑤	15.72
⑥	15.73
⑦	15.74

PROJECT NO. B-4421  
 BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT No. 1



ASSEMBLED BY : E. K. POPE DATE : 1-5-12  
 CHECKED BY : PEGGY PARISI DATE : 4-20-12

DRAWN BY : DGE 06/10  
 CHECKED BY : MKT 06/10

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20	
1			3			TOTAL SHEETS 25	
2			4				

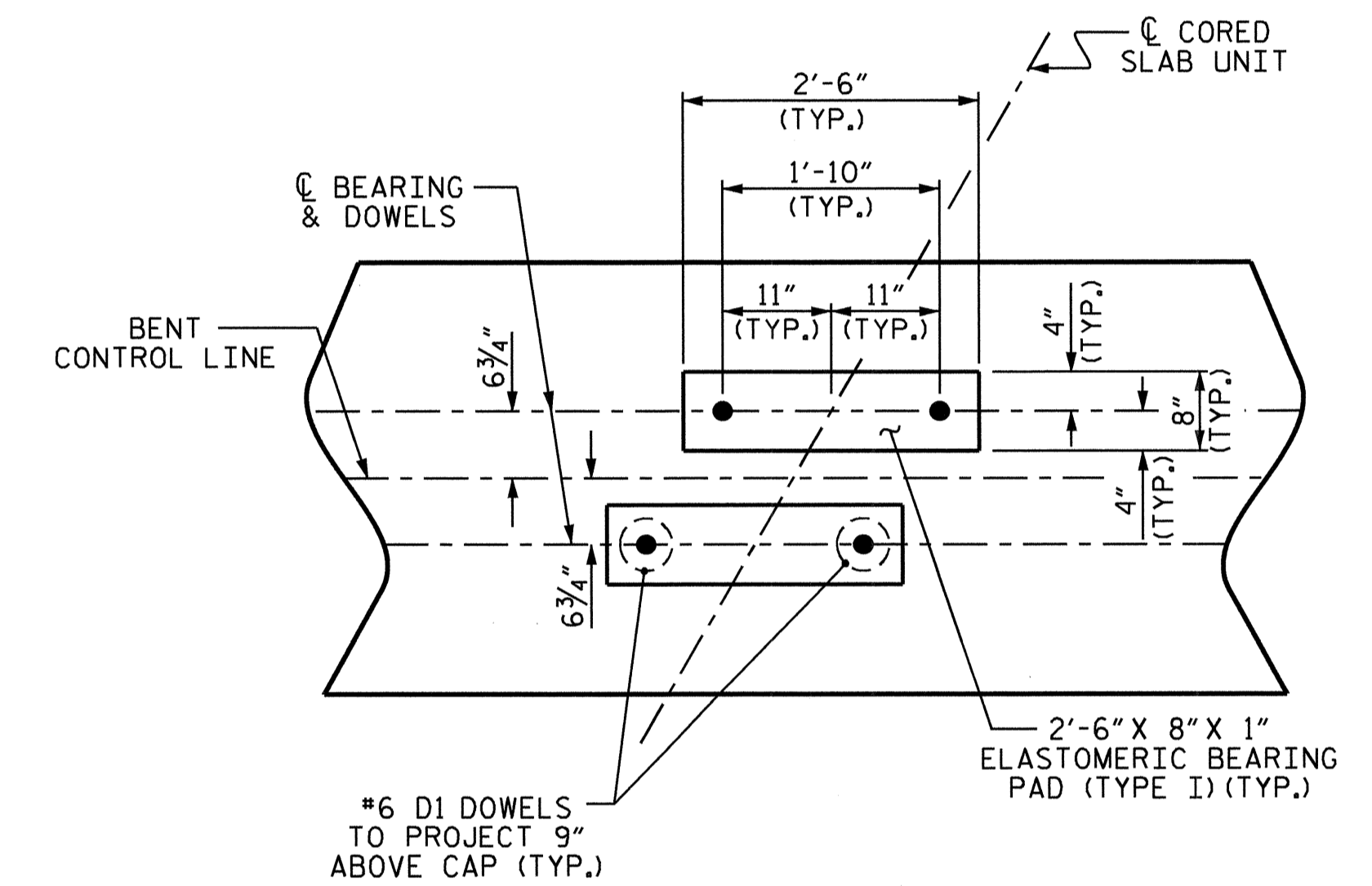
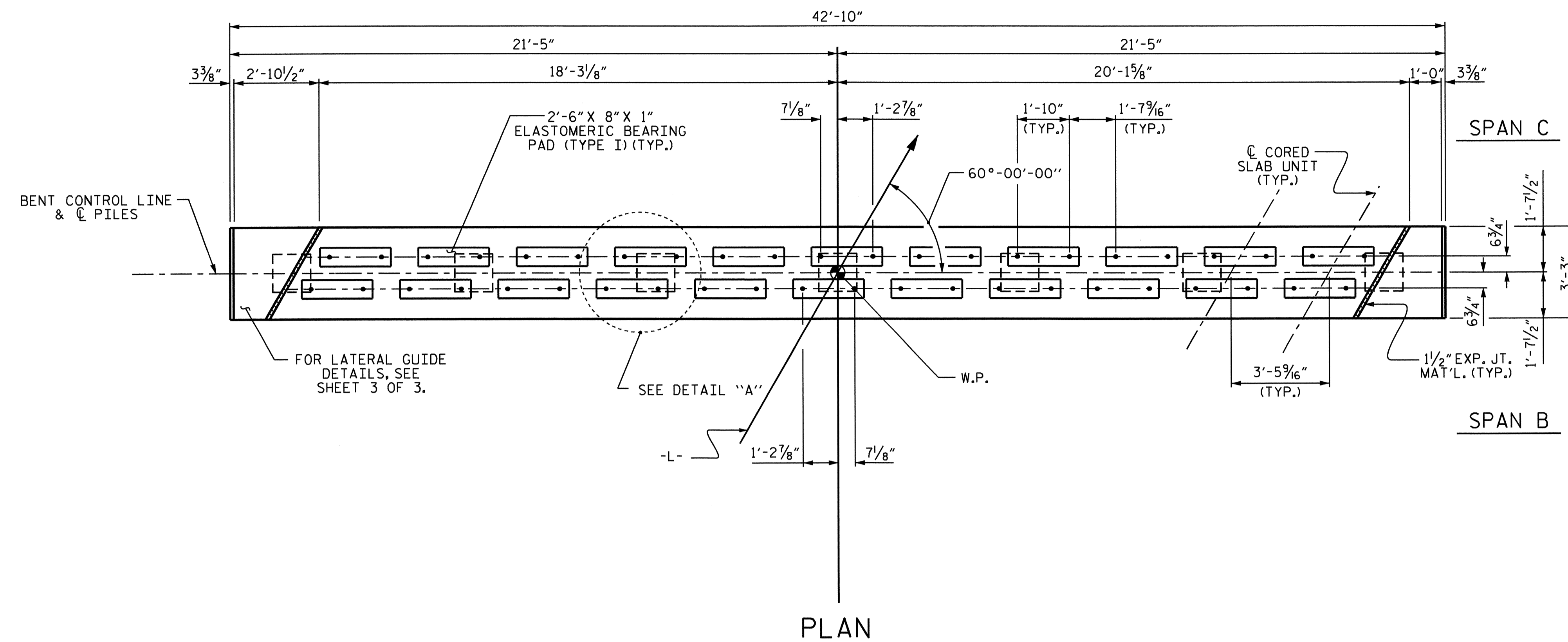
NOTES

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

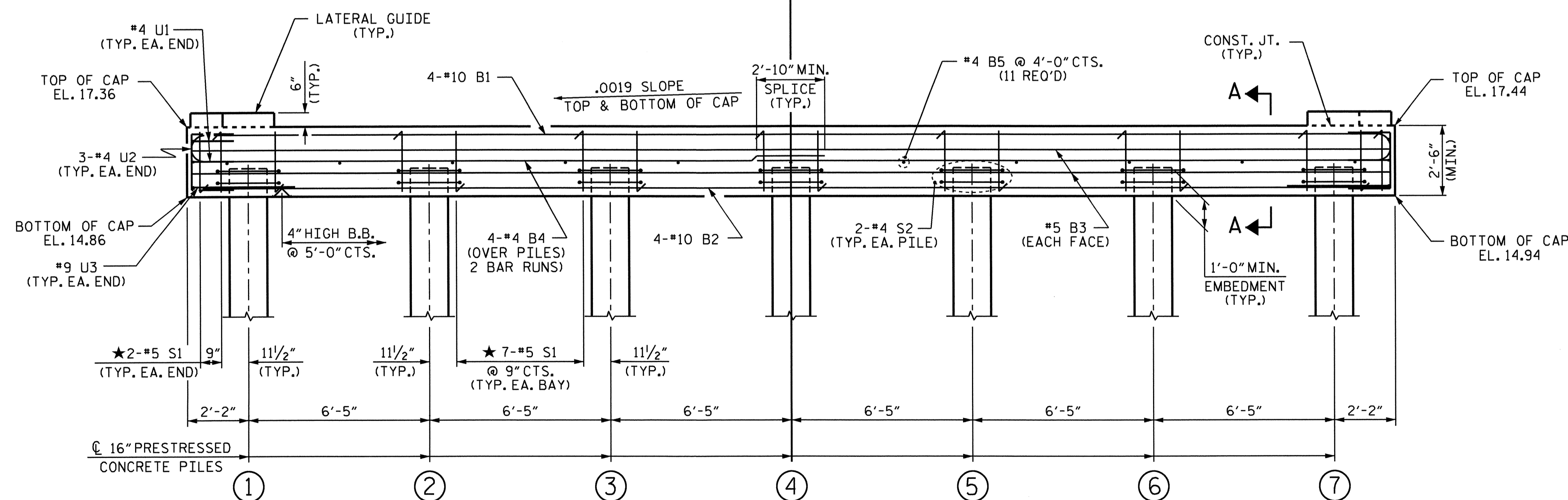
THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

★ INVERT ALTERNATE STIRRUPS.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.



DETAIL "A"  
(DIMENSIONS ARE TYPICAL EACH BEARING)



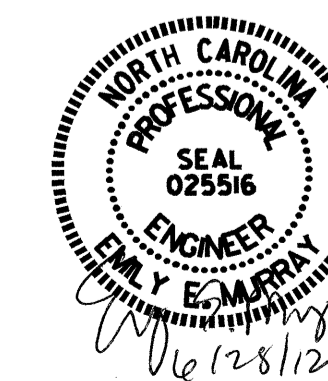
TOP OF PILE ELEVATIONS	
①	15.86
②	15.88
③	15.89
④	15.90
⑤	15.91
⑥	15.92
⑦	15.94

PROJECT NO. B-4421  
BEAUFORT COUNTY  
STATION: 15+52.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT No. 2

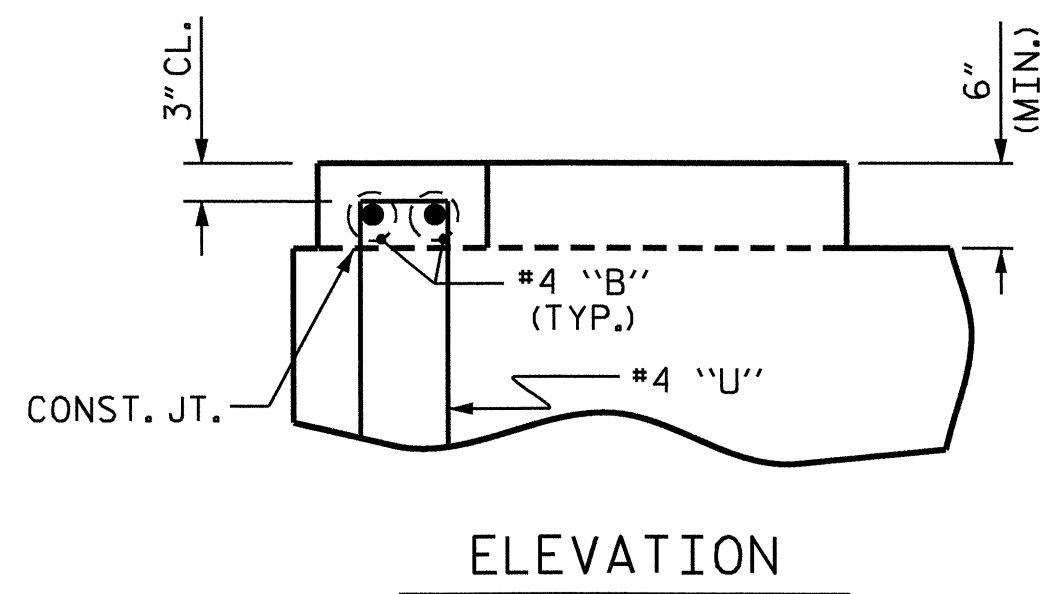
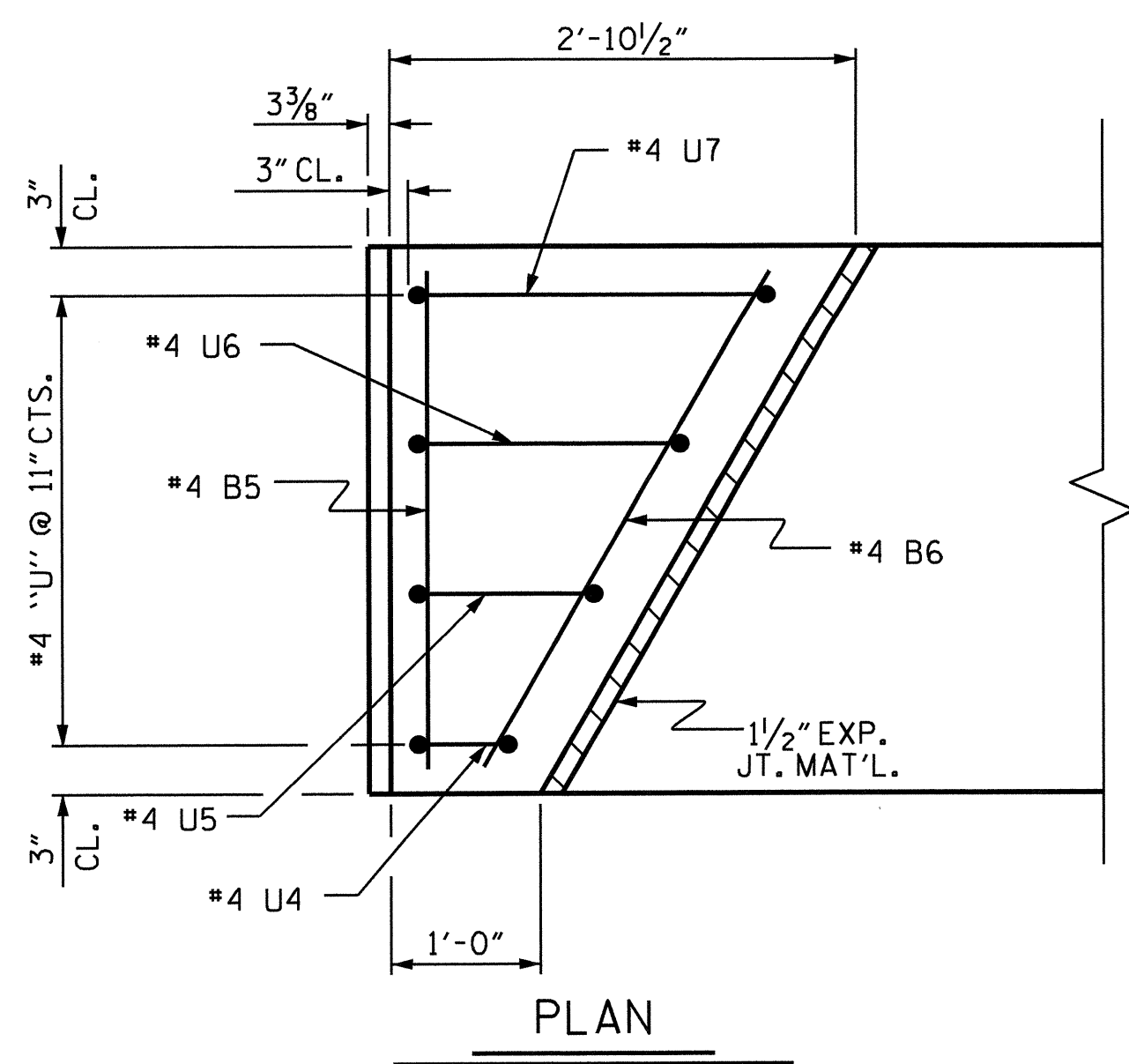


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS	
2			4			25	

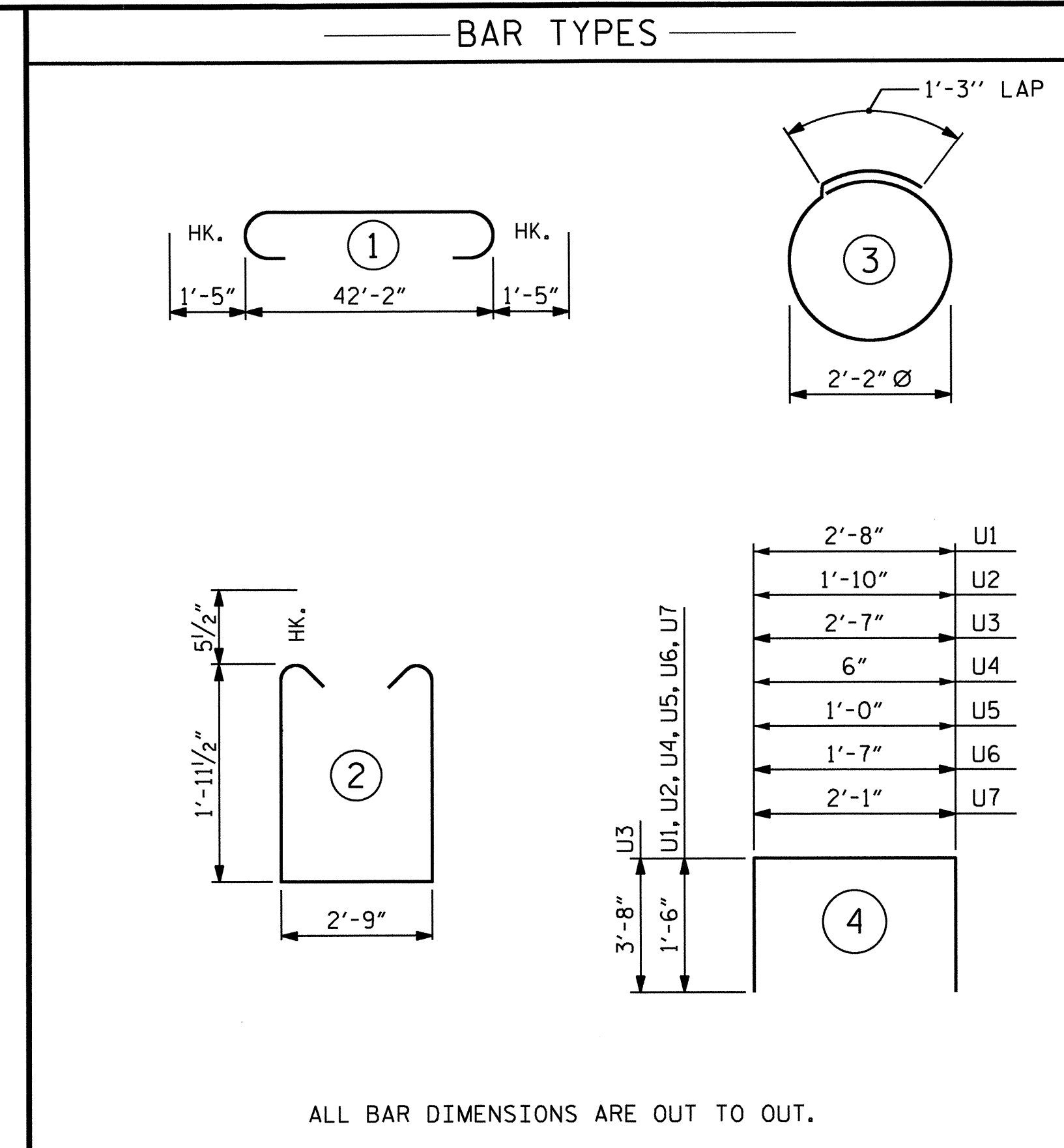
ASSEMBLED BY: E. K. POPE DATE: 1-5-12  
CHECKED BY: PEGGY PARISI DATE: 4-20-12  
DRAWN BY: DGE 06/10  
CHECKED BY: MKT 06/10

12-JUN-2012 08:06  
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podkins

STD. NO. 16"PS\_BT\_33\_60S\_<60'



**LATERAL GUIDE DETAILS**  
(LEFT LATERAL GUIDE SHOWN, RIGHT SIDE SIMILAR)



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR ONE BENT					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	4	#10	1	45'-0"	775
* B2	4	#10	STR	42'-4"	729
* B3	4	#5	STR	42'-4"	177
* B4	8	#4	STR	22'-8"	121
* B5	13	#4	STR	2'-9"	24
* B6	2	#4	STR	3'-2"	4
* D1	44	#6	STR	1'-6"	99
* S1	46	#5	2	7'-7"	364
* S2	14	#4	3	8'-1"	76
* U1	4	#4	4	5'-8"	15
* U2	6	#4	4	4'-10"	19
* U3	2	#9	4	9'-11"	67
* U4	2	#4	4	3'-6"	5
* U5	2	#4	4	4'-0"	5
* U6	2	#4	4	4'-7"	6
* U7	2	#4	4	5'-1"	7

\* EPOXY COATED REINFORCING STEEL 2493 LBS (FOR ONE BENT)

CLASS AA CONCRETE BREAKDOWN (FOR ONE BENT)

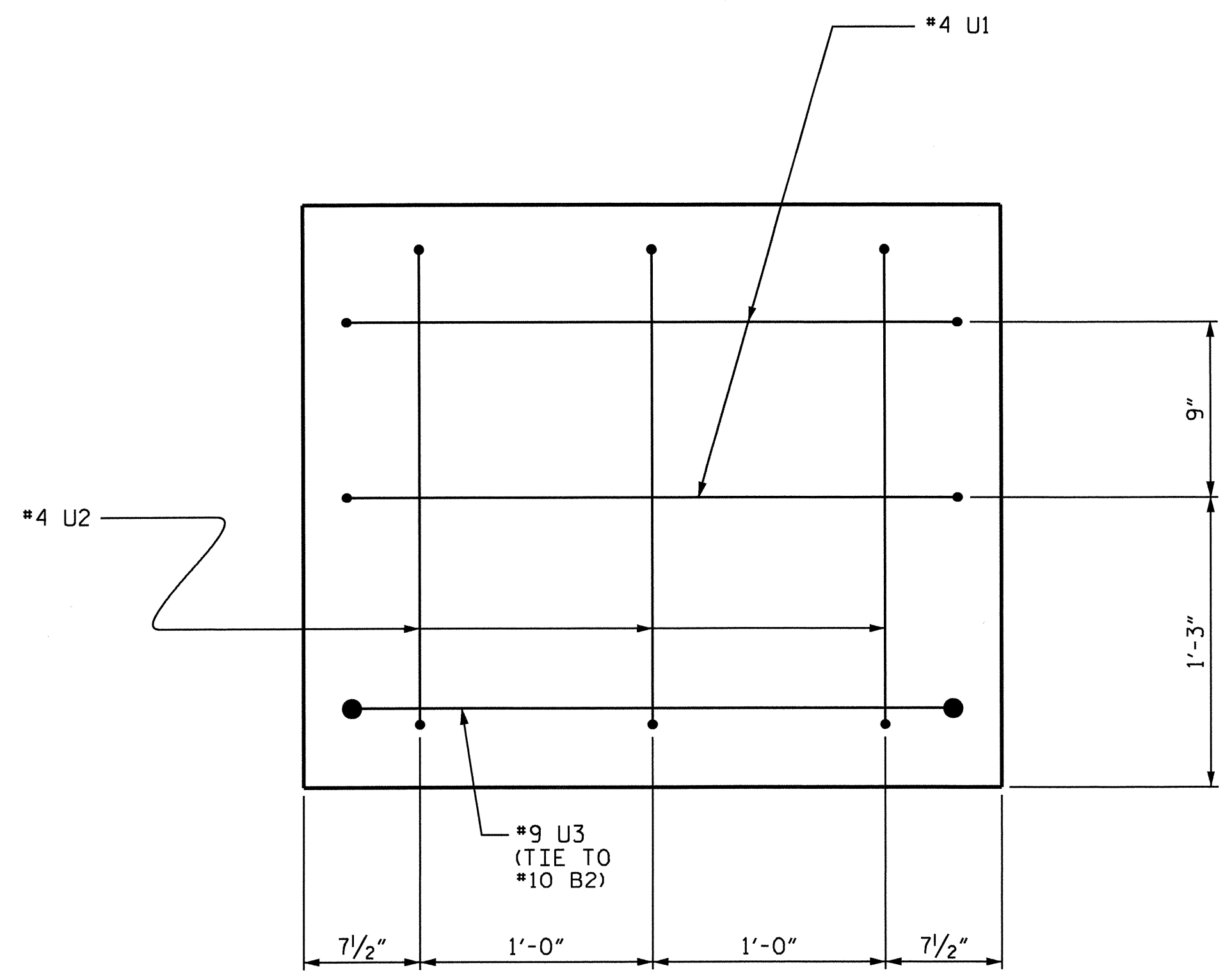
POUR #1 (CAP) ▲ 12.4 C.Y.  
POUR #2 (LATERAL GUIDES) 0.2 C.Y.

TOTAL CLASS AA CONCRETE 12.6 C.Y.

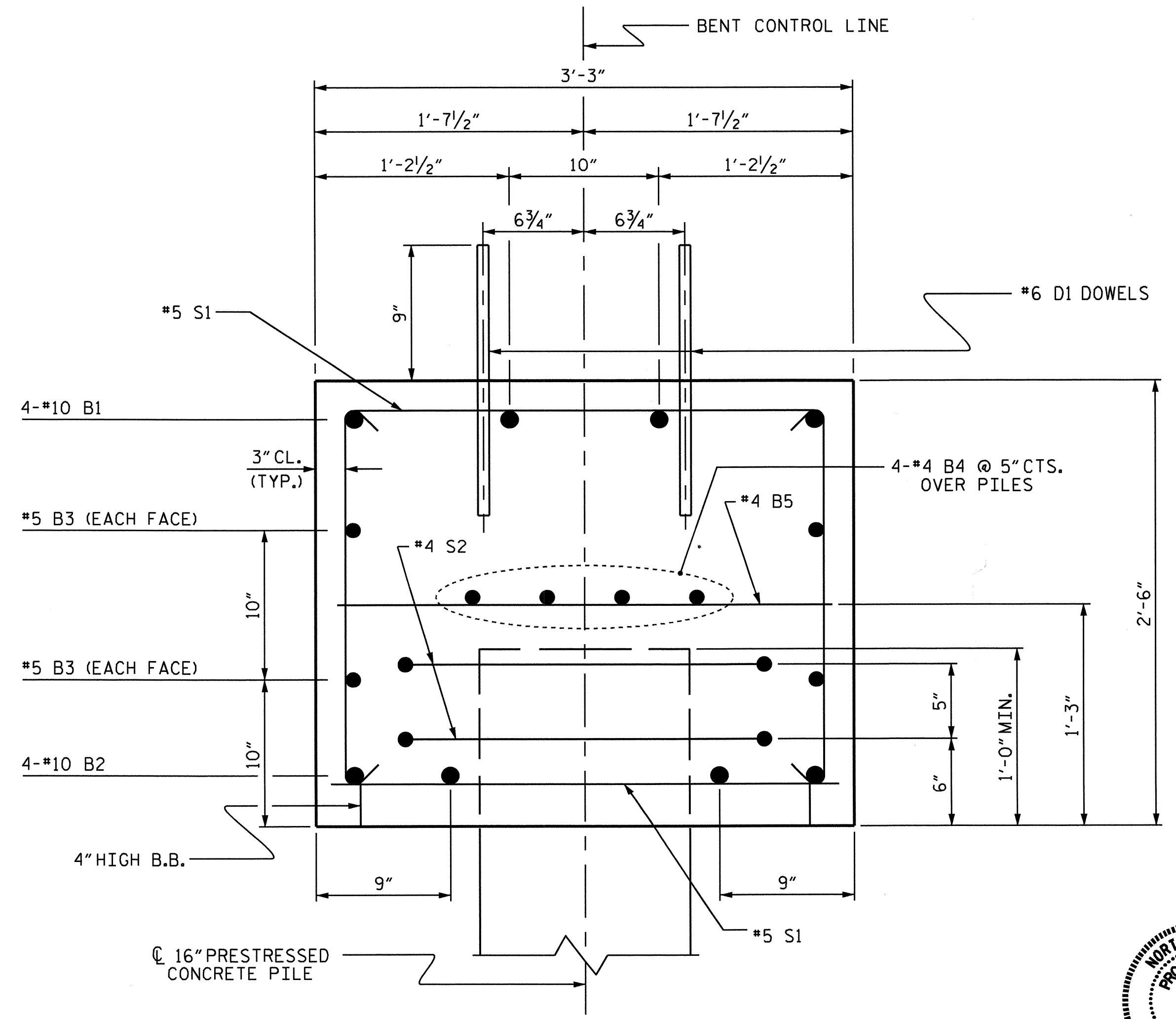
16" PRESTRESSED CONCRETE PILES (FOR ONE BENT)

No. 7 PILE REDRIVES LIN. FT. 525 EA. 4

▲ CONCRETE DISPLACED BY THE 16" PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.



**END OF CAP VIEW**  
(TYPICAL BOTH ENDS)

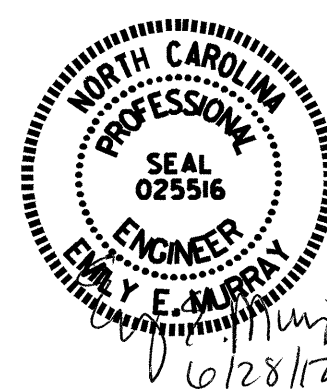


**SECTION A-A**

PROJECT NO. B-4421  
BEAUFORT COUNTY  
STATION: 15+52.00 -L-  
SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENTS No. 1 & 2



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS 25
2			4			

DRAWN BY : E. K. POPE DATE : 1-5-12  
CHECKED BY : PEGGY PARISI DATE : 4-20-12  
DRAWN BY : DCE 06/10  
CHECKED BY : MKT 06/10

**NOTES**

PRESTRESSED CONCRETE STRENGTH :  $f'_c = 7,500$  PSI

BUILD-UP CONCRETE STRENGTH :  $f'_c = 7,500$  PSI

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
1/2"	270 L.R.	0.153	41,300* PER STRAND	30,980* PER STRAND
0.6"	270 L.R.	0.217	58,600* PER STRAND	43,940* PER STRAND

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, 1/2" OR 0.6" STRANDS MAY BE USED IN EITHER STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, BURN IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 3-3 AND 4-4, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2" WIDE BLACK MARK.

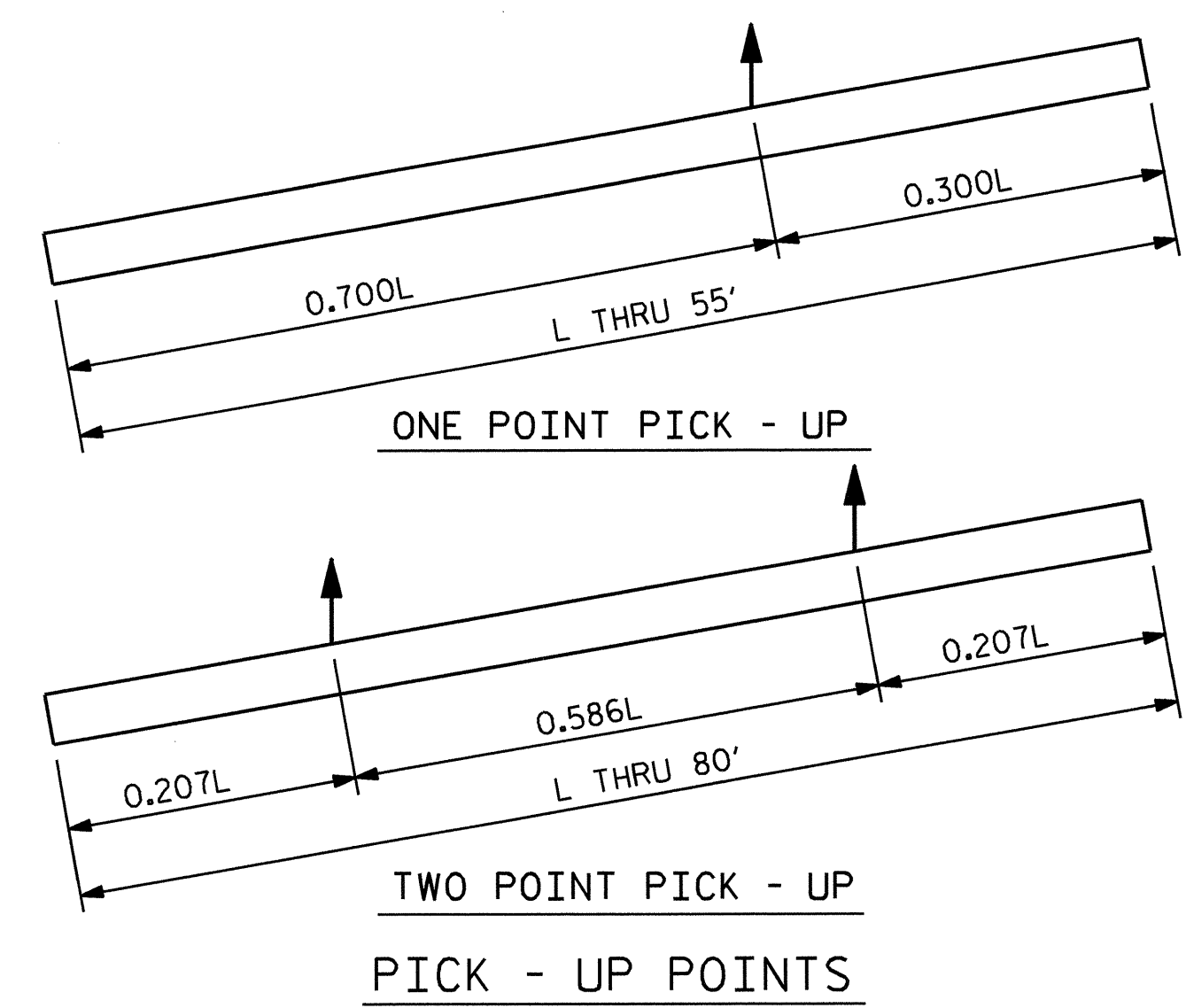
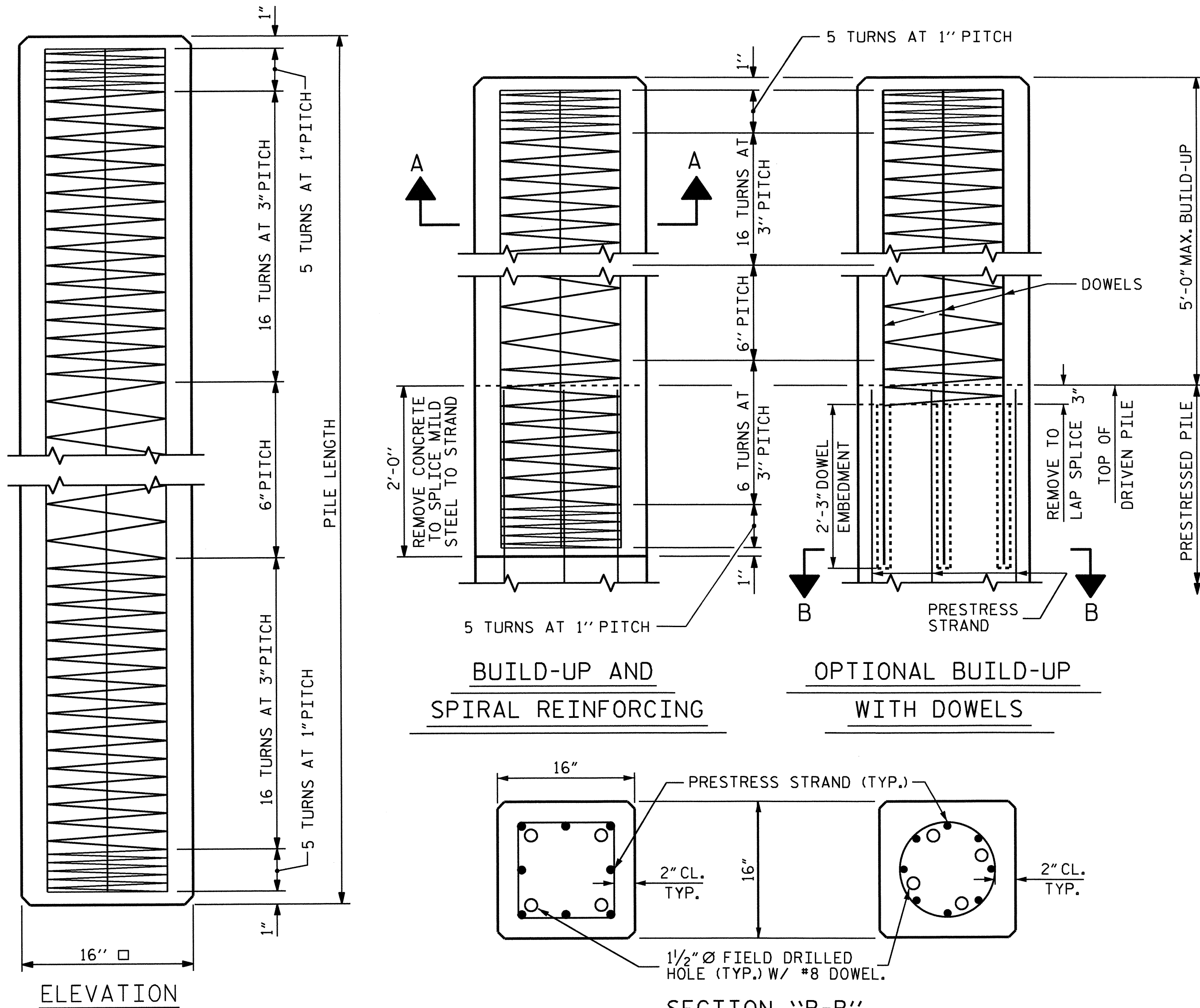
DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

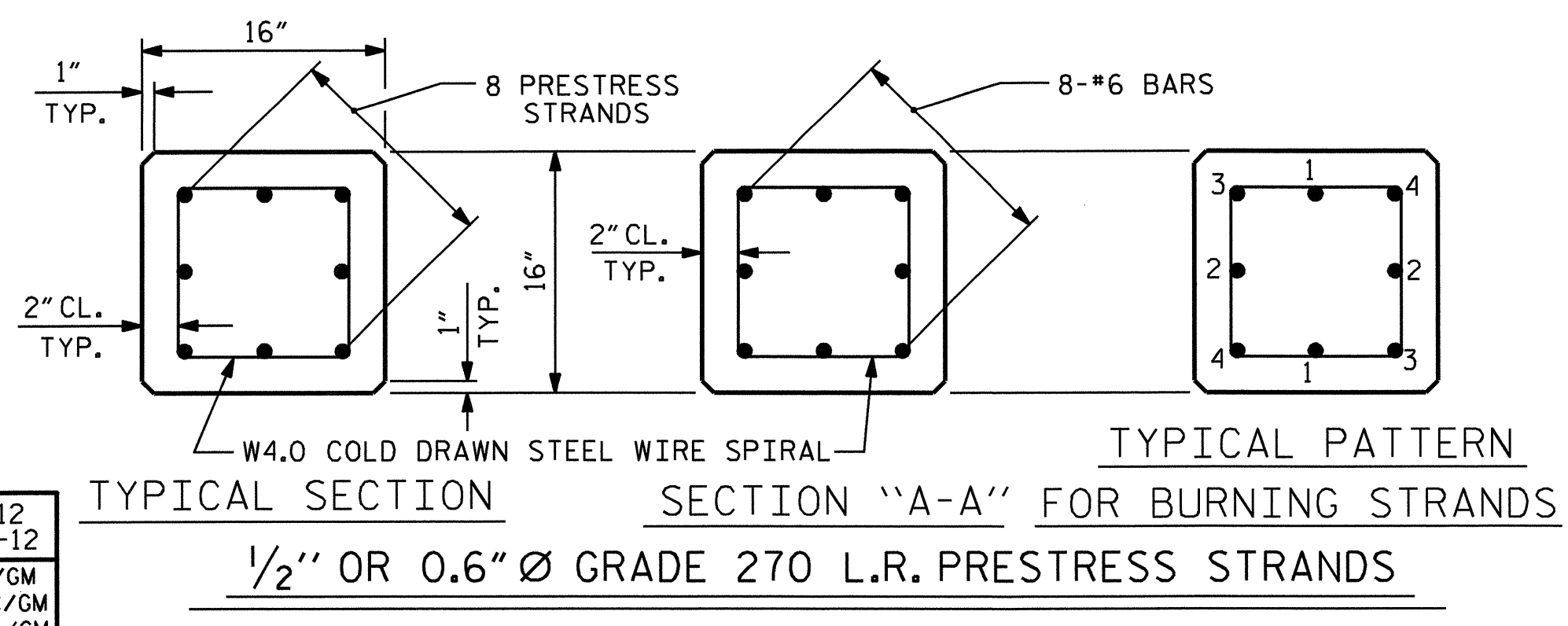
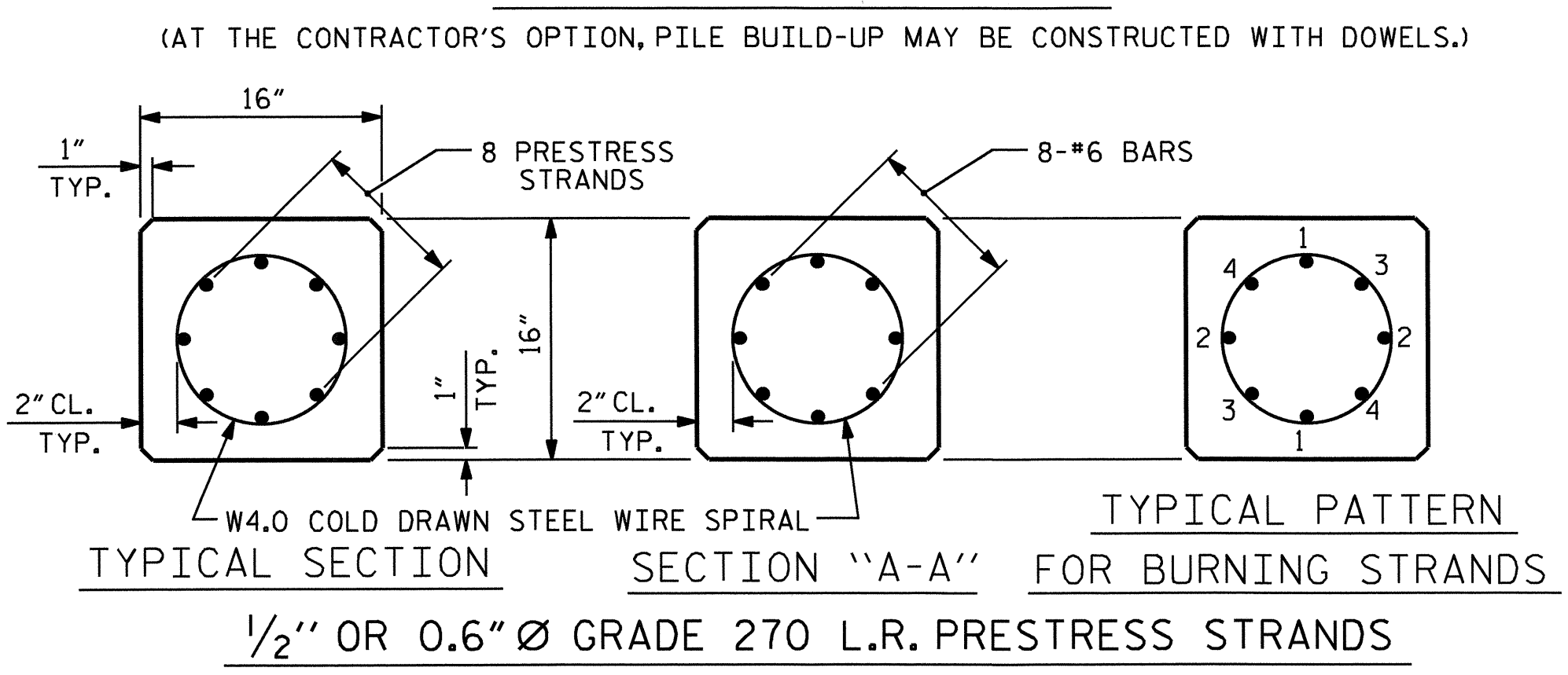
PRESTRESSED PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATION.

THE CONCRETE IN PILES OF BENT NO. 1 AND 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.



**QUANTITIES FOR ONE 16" PRESTRESSED PILE**

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP		TWO POINT PICK-UP	
			0.300L	0.700L	0.207L	0.586L
25'-0"	1.63	3.31	7'-6"	17'-6"	5'-2"	14'-8"
30'-0"	1.96	3.97	9'-0"	21'-0"	6'-2 1/2"	17'-7"
35'-0"	2.29	4.63	10'-6"	24'-6"	7'-3"	20'-6"
40'-0"	2.61	5.29	12'-0"	28'-0"	8'-3 1/2"	23'-5"
45'-0"	2.94	5.95	13'-6"	31'-6"	9'-4"	26'-4"
50'-0"	3.27	6.61	15'-0"	35'-0"	10'-4"	29'-4"
55'-0"	3.59	7.28	16'-6"	38'-6"	11'-4 1/2"	32'-3"
60'-0"	3.92	7.94			12'-5"	35'-2"
65'-0"	4.25	8.60			13'-5 1/2"	38'-1"
70'-0"	4.57	9.26			14'-6"	41'-0"
75'-0"	4.90	9.92			15'-6 1/2"	43'-11"
80'-0"	5.23	10.58			16'-7"	46'-10"



**DOWEL INSTALLATION FOR OPTIONAL BUILD-UP**

GROUT COMPRESSIVE STRENGTH:  $f'_c = 5,000$  PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3" OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

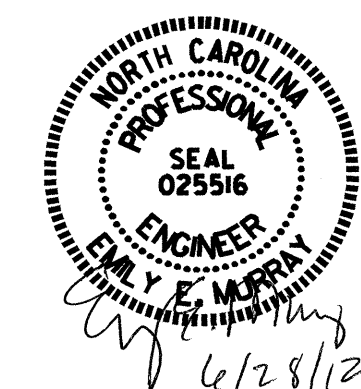
DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN 1/2" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN STEEL WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

PROJECT NO. B-4421  
BEAUFORT COUNTY  
 STATION: 15+52.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

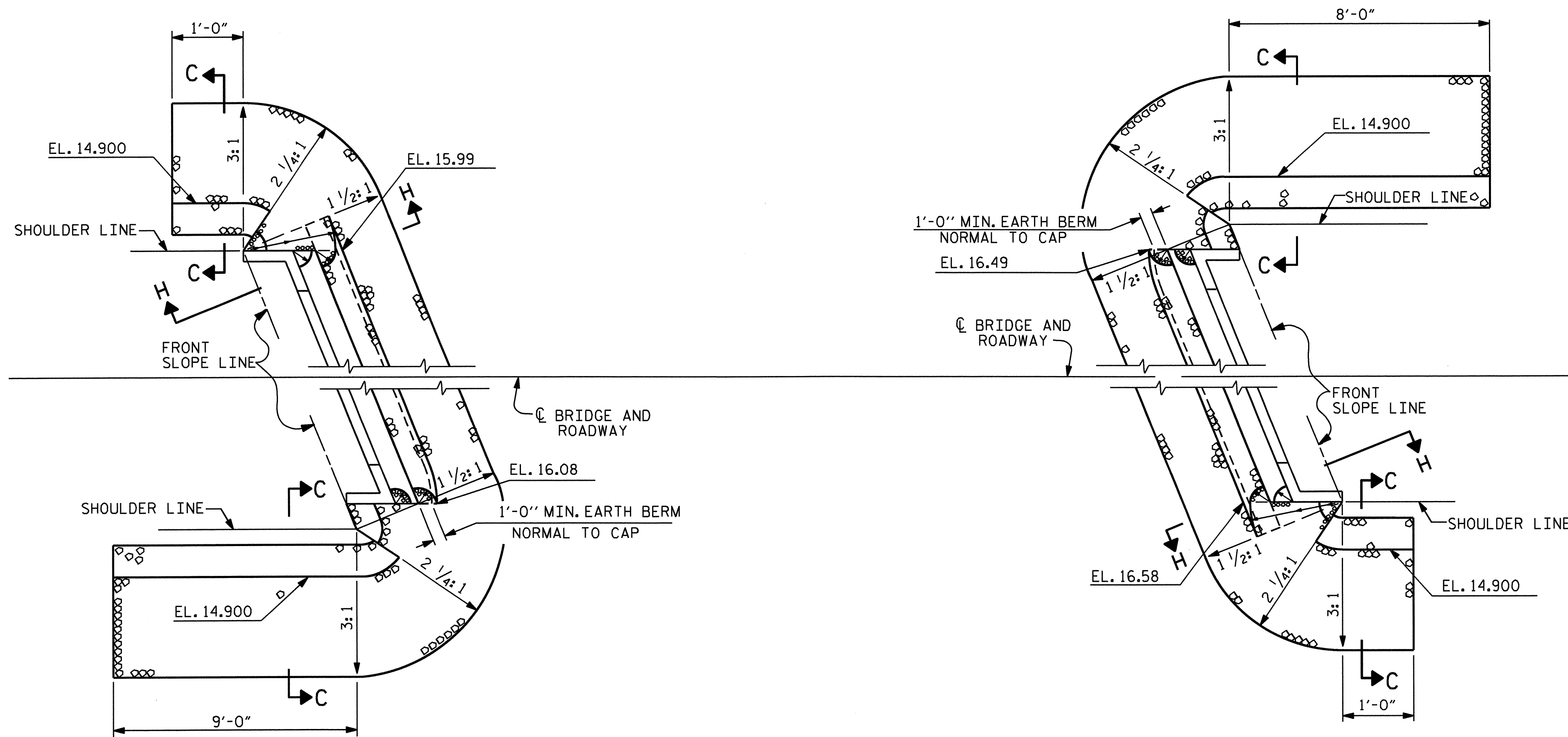
STANDARD  
 16" PRESTRESSED  
 CONCRETE PILE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			25

ASSEMBLED BY : E. K. POPE DATE : 1-5-12  
 CHECKED BY : PEGGY PARISI DATE : 4-20-12  
 DRAWN BY : RH 9/98 REV. 5/1/06R TLA/GM  
 CHECKED BY : LES 10/98 REV. 11/30/10 WMC/GM  
 REV. 10/1/11 MAA/GM

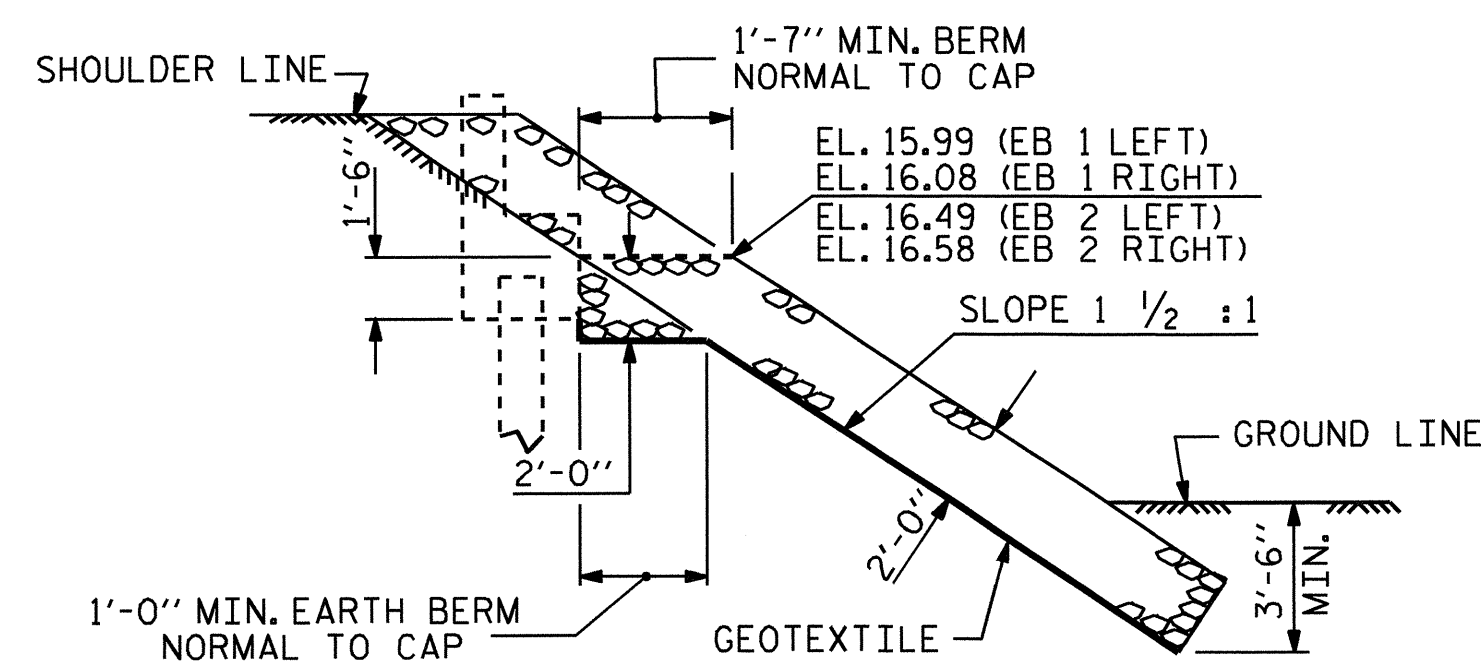


NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

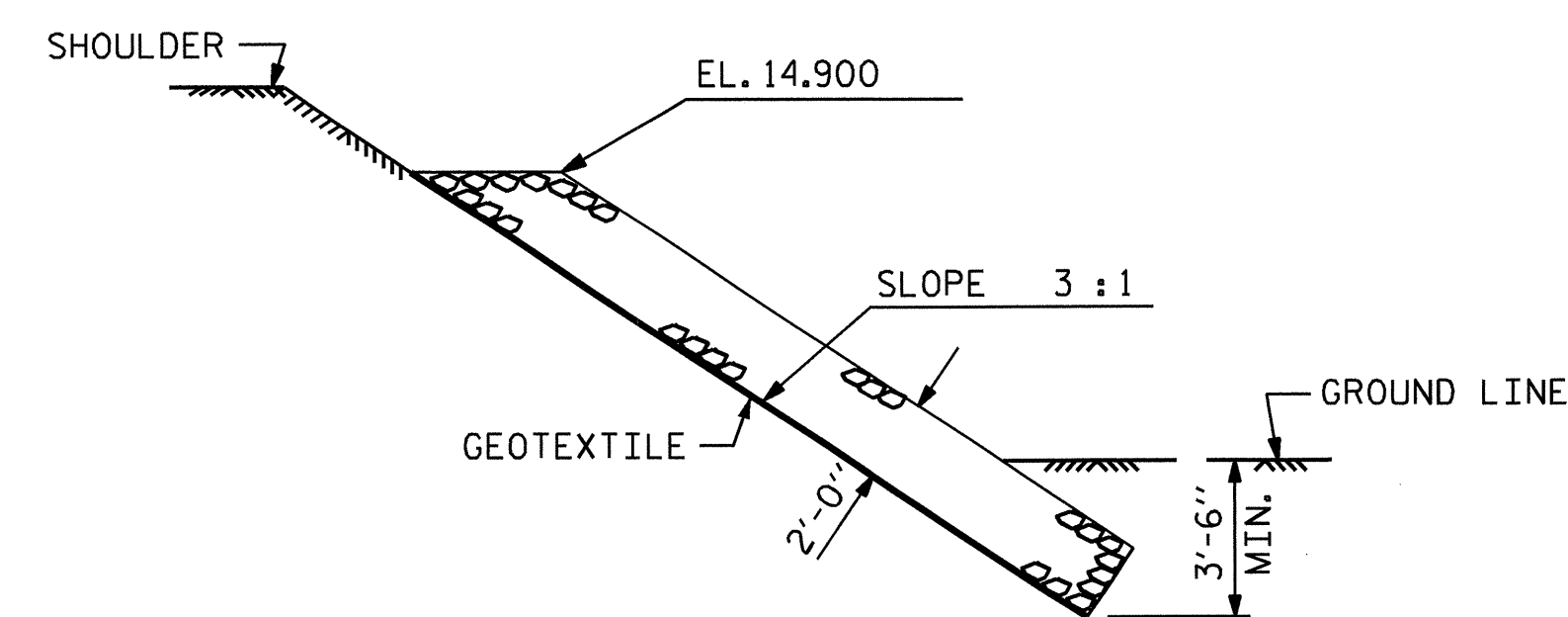


PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 15+52.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	68	76
END BENT 2	117	130



SECTION H-H

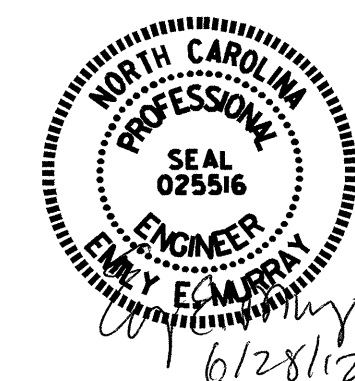


SECTION C-C

PROJECT NO. B-4421  
BEAUFORT COUNTY  
STATION: 15+52.00 -L-

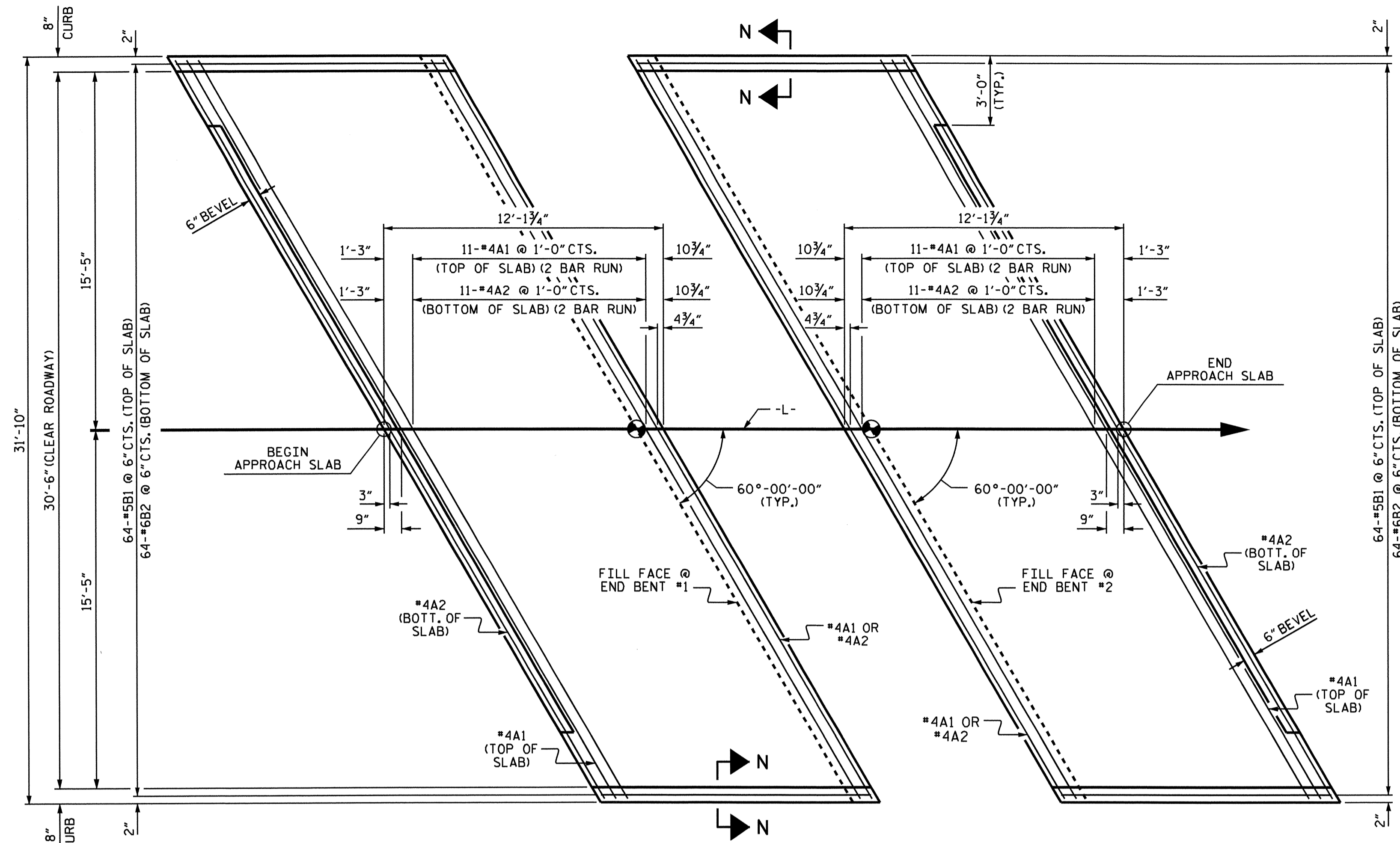
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			25

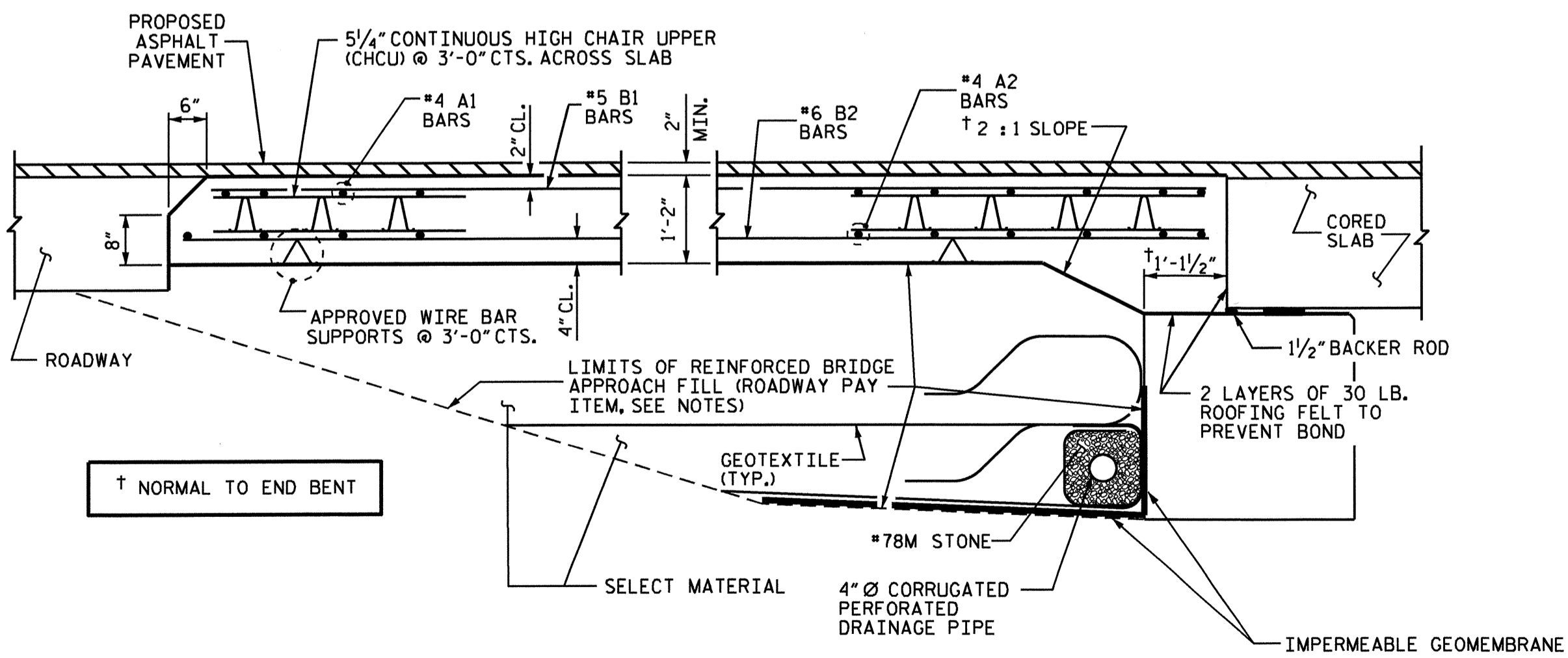


ASSEMBLED BY : E. K. POPE DATE : 1-5-12  
CHECKED BY : T. L. AVERETTE DATE : 5-8-12  
DRAWN BY : REK 1/84 REV. 5/1/06R TLA/GM  
CHECKED BY : ROU 1/84 REV. 10/1/11 MAA/GM  
REV. 12/21/11 MAA/GM

12-JUN-2012 08:05  
Z:\TIP\Projects-B\B4421\Structures\ekpoppe\B-4421.SD.CS.dgn  
podkins



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



SECTION THRU SLAB

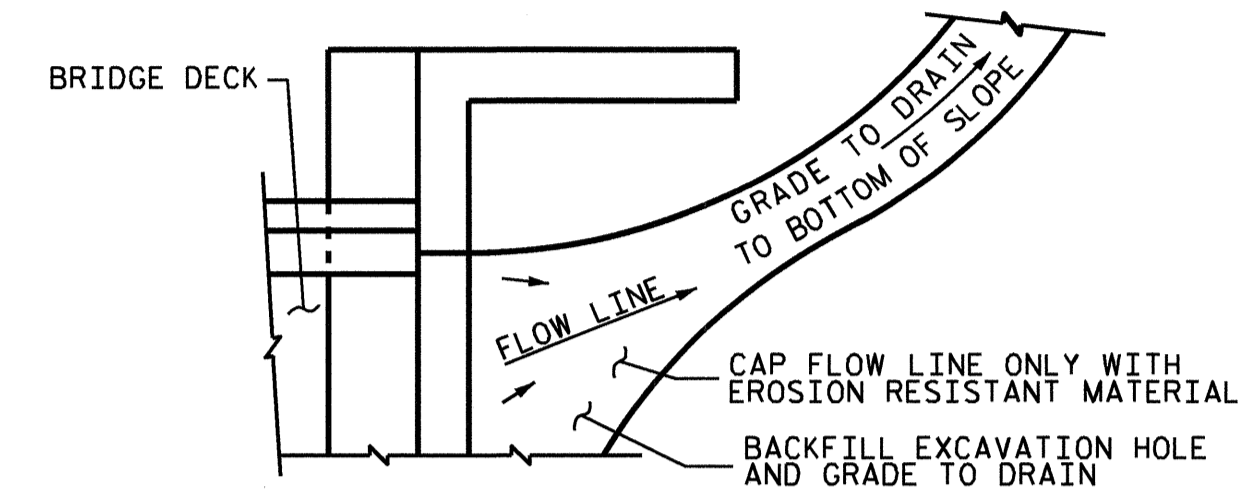
ASSEMBLED BY : E.E.MURRAY DATE : 5/29/12  
 CHECKED BY : T.L.AVERETTE DATE : 5/30/12  
 DRAWN BY : SHS/MAA 5-09 REV. 12-11 MAA/AAC  
 CHECKED BY : BCH 5-09

12-JUN-2012 08:05  
 Z:\TIP\Projects-B\B4421\Structures\ekpope\B-4421.SD.CS.dgn  
 padkins

NOTES

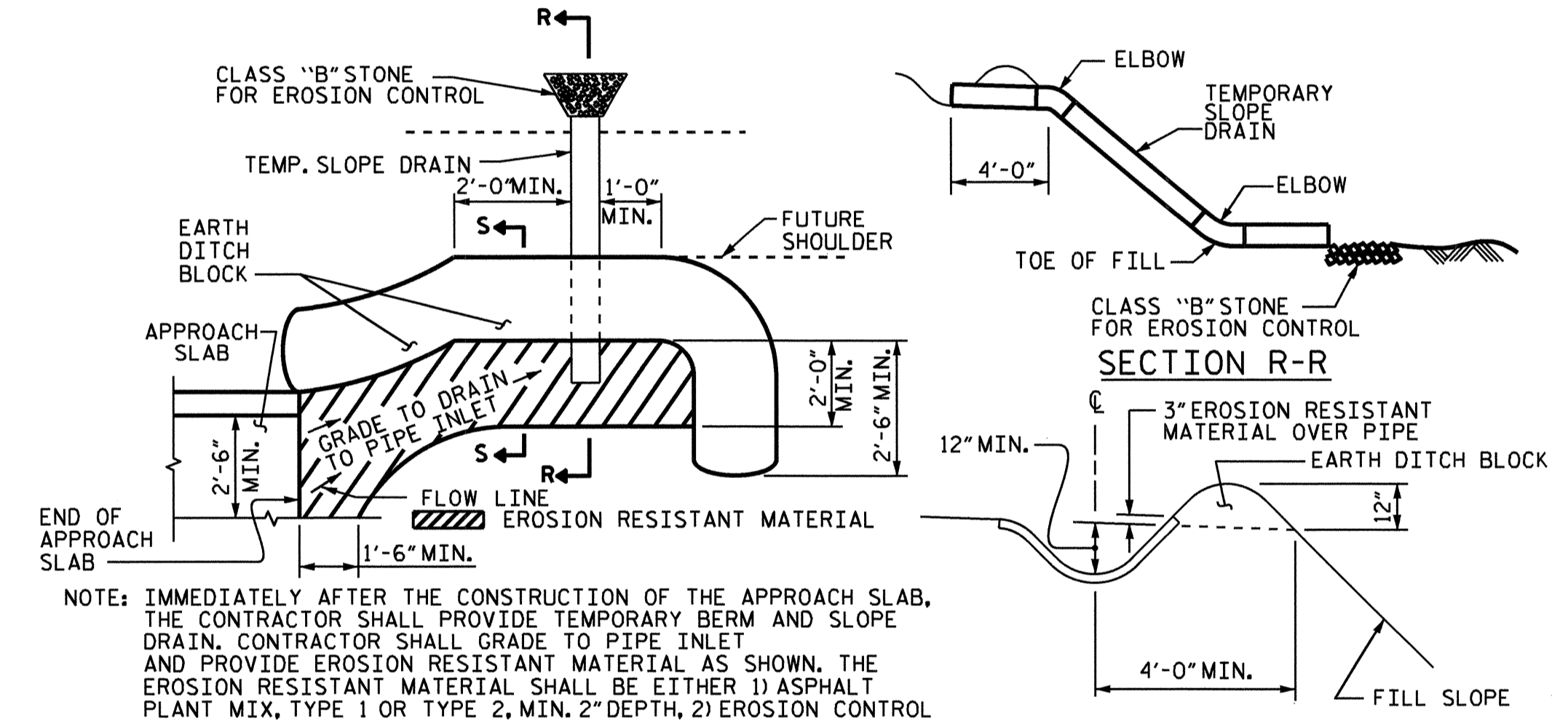
FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.  
 AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.  
 APPROACH SLAB GROOVING IS NOT REQUIRED.

BILL OF MATERIAL						
APPROACH SLAB AT EB #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	26	#4	STR	19'-3"	334	
*A2	26	#4	STR	19'-3"	334	
*B1	64	#5	STR	11'-1"	740	
*B2	64	#6	STR	11'-7"	1113	
* EPOXY COATED REINFORCING STEEL					LBS.	2521
CLASS AA CONCRETE					C. Y.	18.8
APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	26	#4	STR	19'-3"	334	
*A2	26	#4	STR	19'-3"	334	
*B1	64	#5	STR	11'-1"	740	
*B2	64	#6	STR	11'-7"	1113	
* EPOXY COATED REINFORCING STEEL					LBS.	2521
CLASS AA CONCRETE					C. Y.	18.8



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.

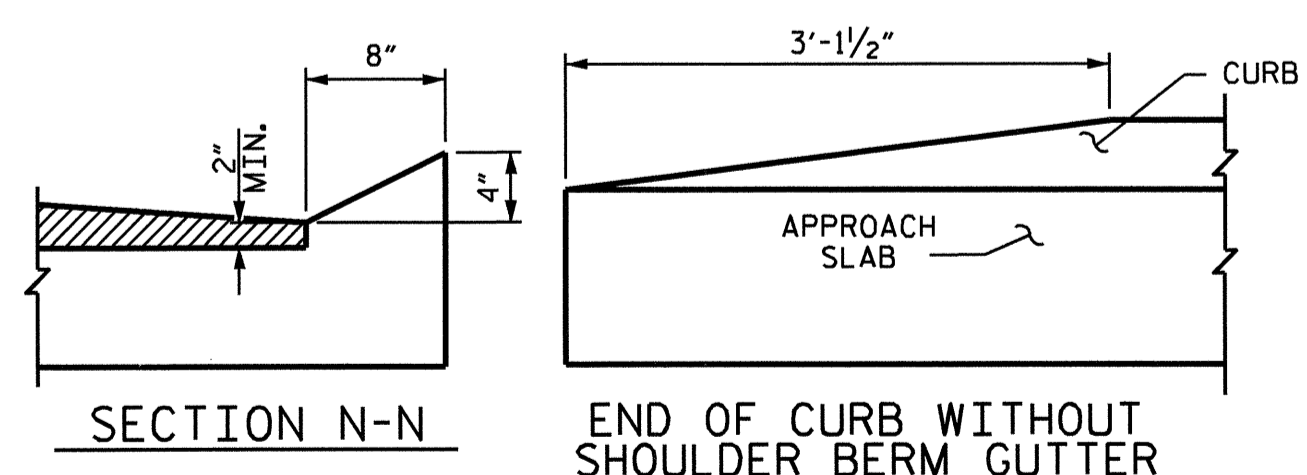
TEMPORARY DRAINAGE DETAIL



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.

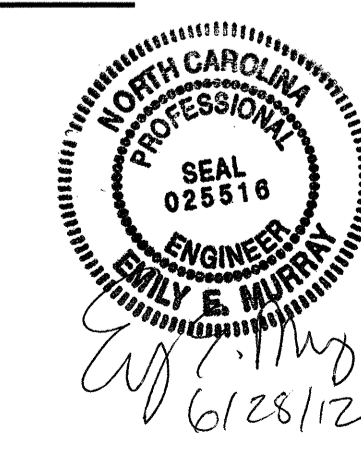
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



CURB DETAILS

SPlice LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



PROJECT NO. B-4421  
 BEAUFORT COUNTY  
 STATION: 15+52.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT					
60° SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-25  
 TOTAL SHEETS 25

## 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	-----	375 LBS. PER SQ. IN.
OF TIMBER		
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 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDNATE AND ACTUAL BEAM C/CMBER, 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 ORDNATE, AND ACTUAL BEAM C/CMBER. 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 PROFILES AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER. DETAILS 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 LESS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0". EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED. WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 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**

JANUARY, 1990

STD. NO. SN