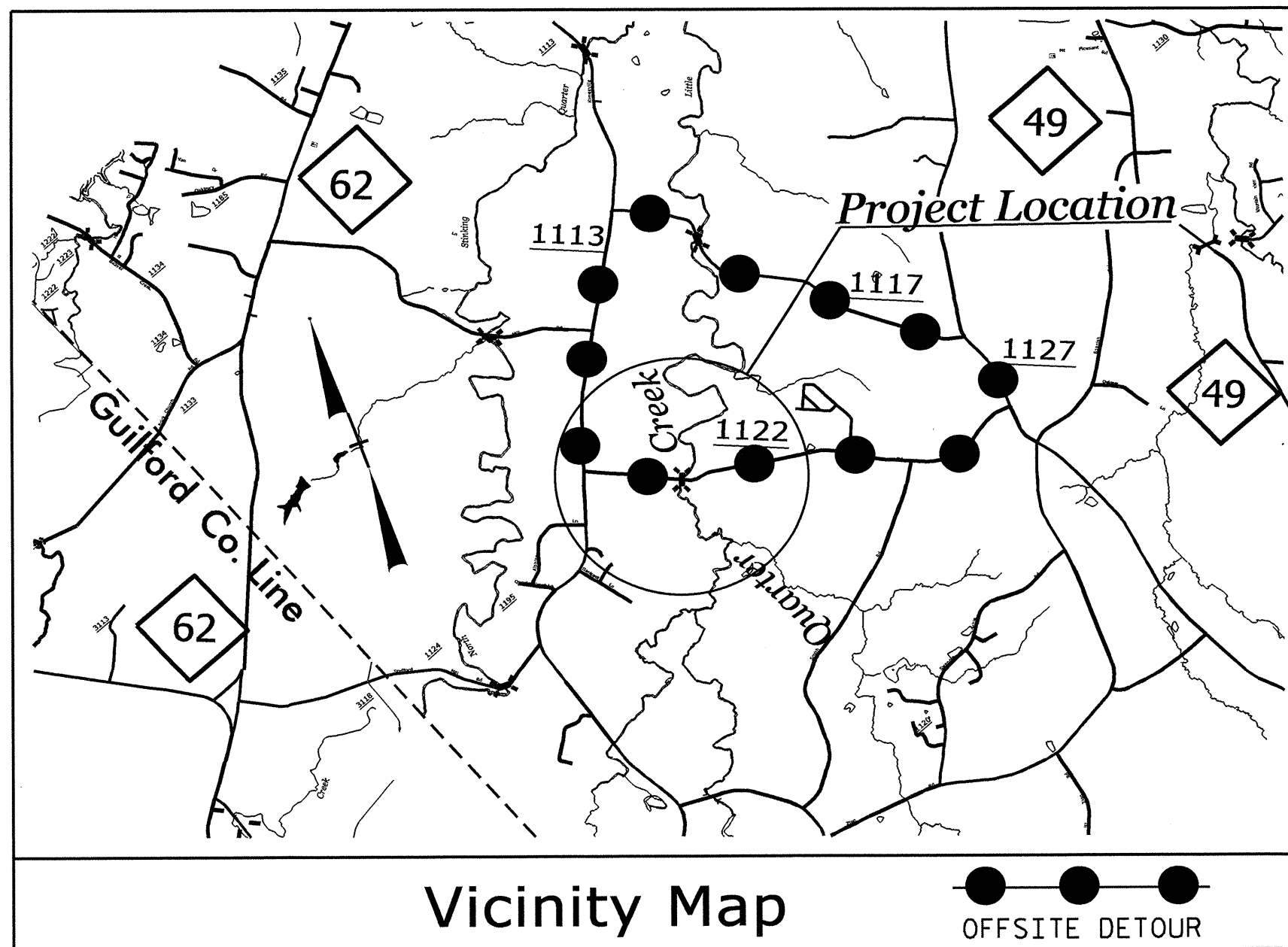


**CONTRACT: C203292 TIP PROJECT: B-4400**

**STRUCTURE**

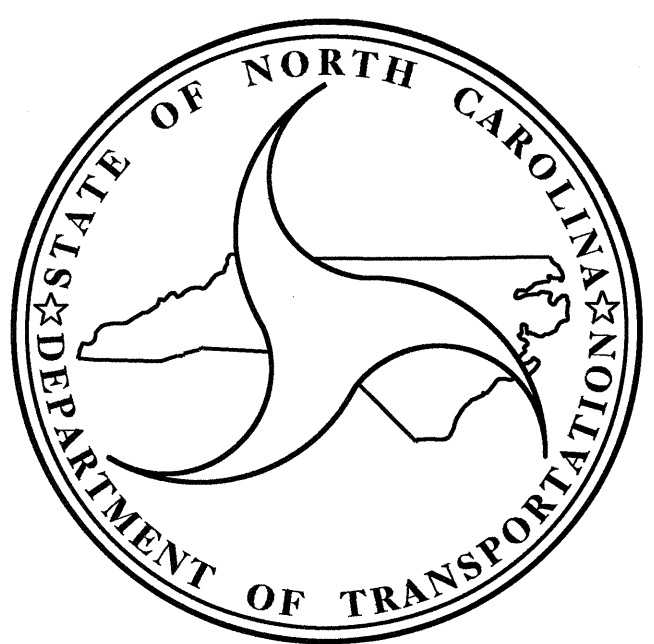
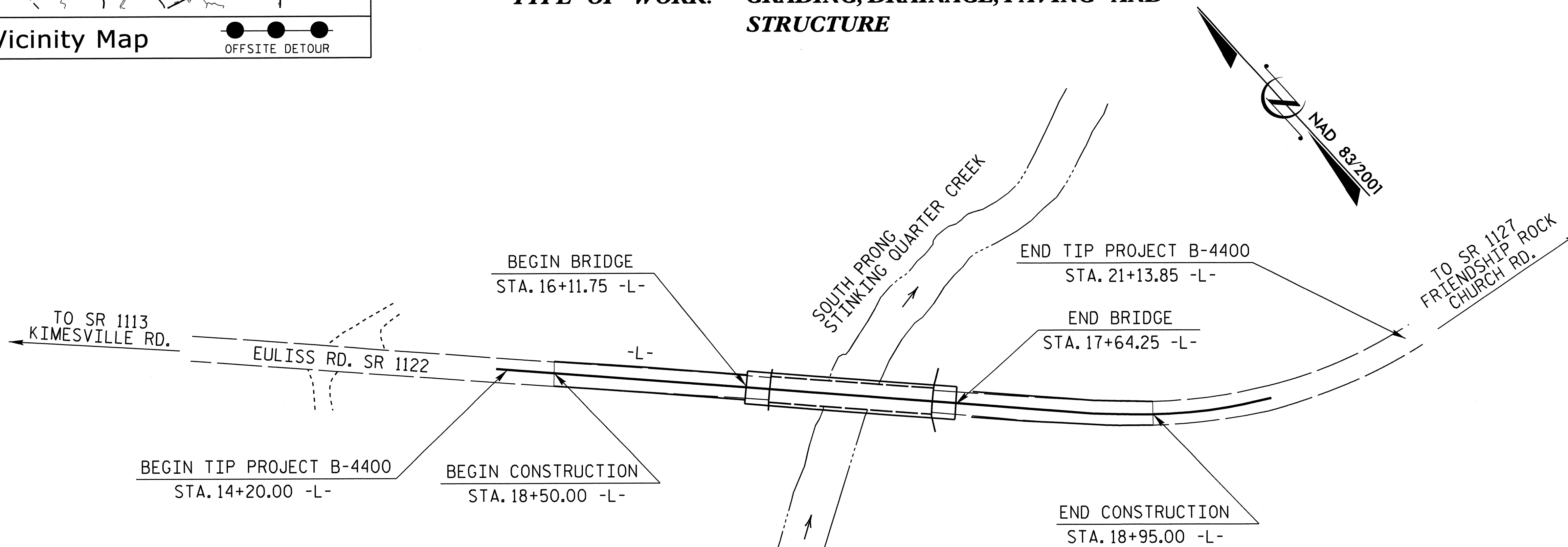


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**ALAMANCE COUNTY**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4400		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33680.1.1	BRZ-1122(4)	P. E.	
33680.2.1	BRZ-1122(4)	RW & UTIL	
33680.3.FD1	BRZ-1122(4)	CONSTRUCTION	

**LOCATION:** BRIDGE #160 OVER SOUTH PRONG OF STINKING QUATER CREEK ON SR 1122 (EULISS ROAD)

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



**DESIGN DATA**

ADT 2012 =	214
ADT 2035 =	400
DHV =	15 %
D =	55 %
T =	5 % *
V =	35 MPH**
* TTST 2	DUAL 3
SUB REGIONAL TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4400 =	0.102 MILE
LENGTH STRUCTURE TIP PROJECT B-4400 =	0.029 MILE
TOTAL LENGTH TIP PROJECT B-4400 =	0.131 MILE

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
1000 BIRCH RIDGE DR.  
RALEIGH, N.C. 27610

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2012 STANDARD SPECIFICATIONS

<b>LETTING DATE:</b> JANUARY 21, 2014	<b>J.M. BAILEY, P.E.</b> PROJECT ENGINEER
	<b>D.R. CALHOUN, P.E.</b> PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

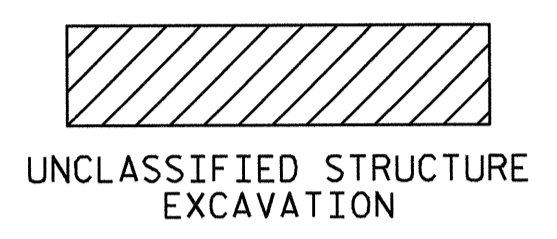
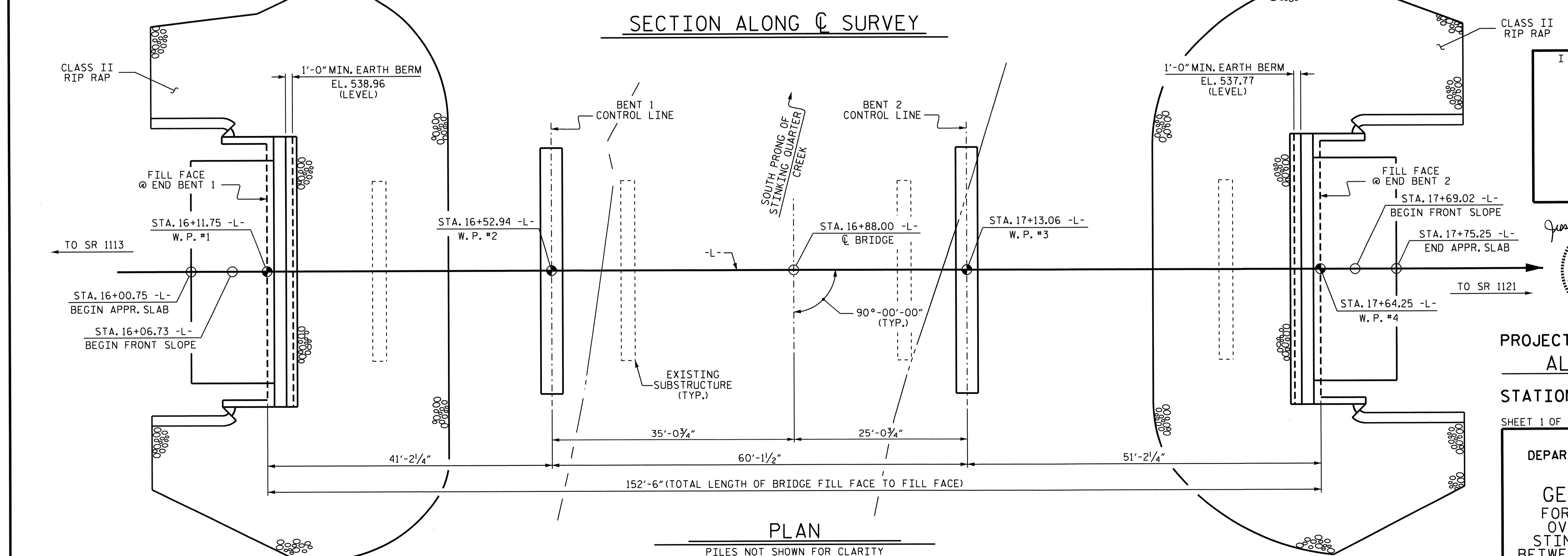
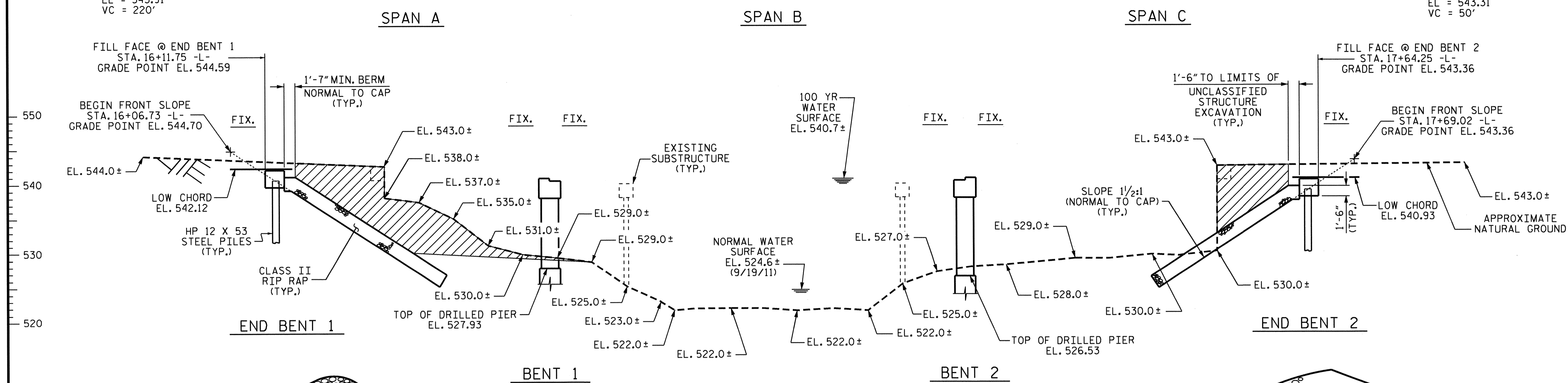
P.E.  
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

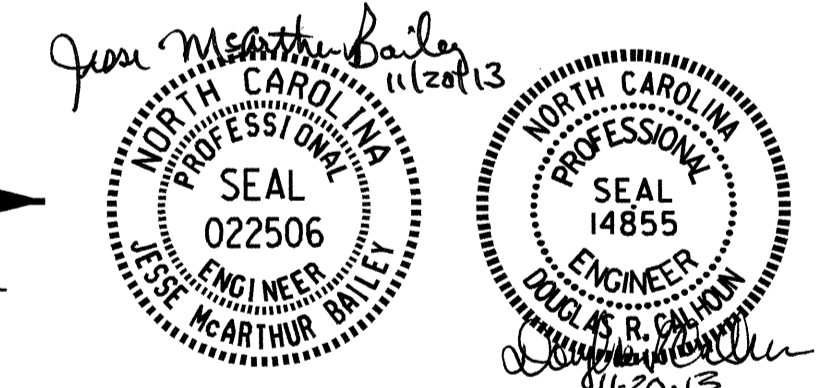
APPROVED \_\_\_\_\_  
DIVISION ADMINISTRATOR DATE \_\_\_\_\_

**GRADE DATA**  
 -4.7681% ▽ -0.3125%  
 P.I. STA. = 15+88.00 -L-  
 EL = 543.91  
 VC = 220'

**GRADE DATA**  
 -0.3125% ▽ +0.3364%  
 P.I. STA. = 17+80.00 -L-  
 EL = 543.31  
 VC = 50'



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



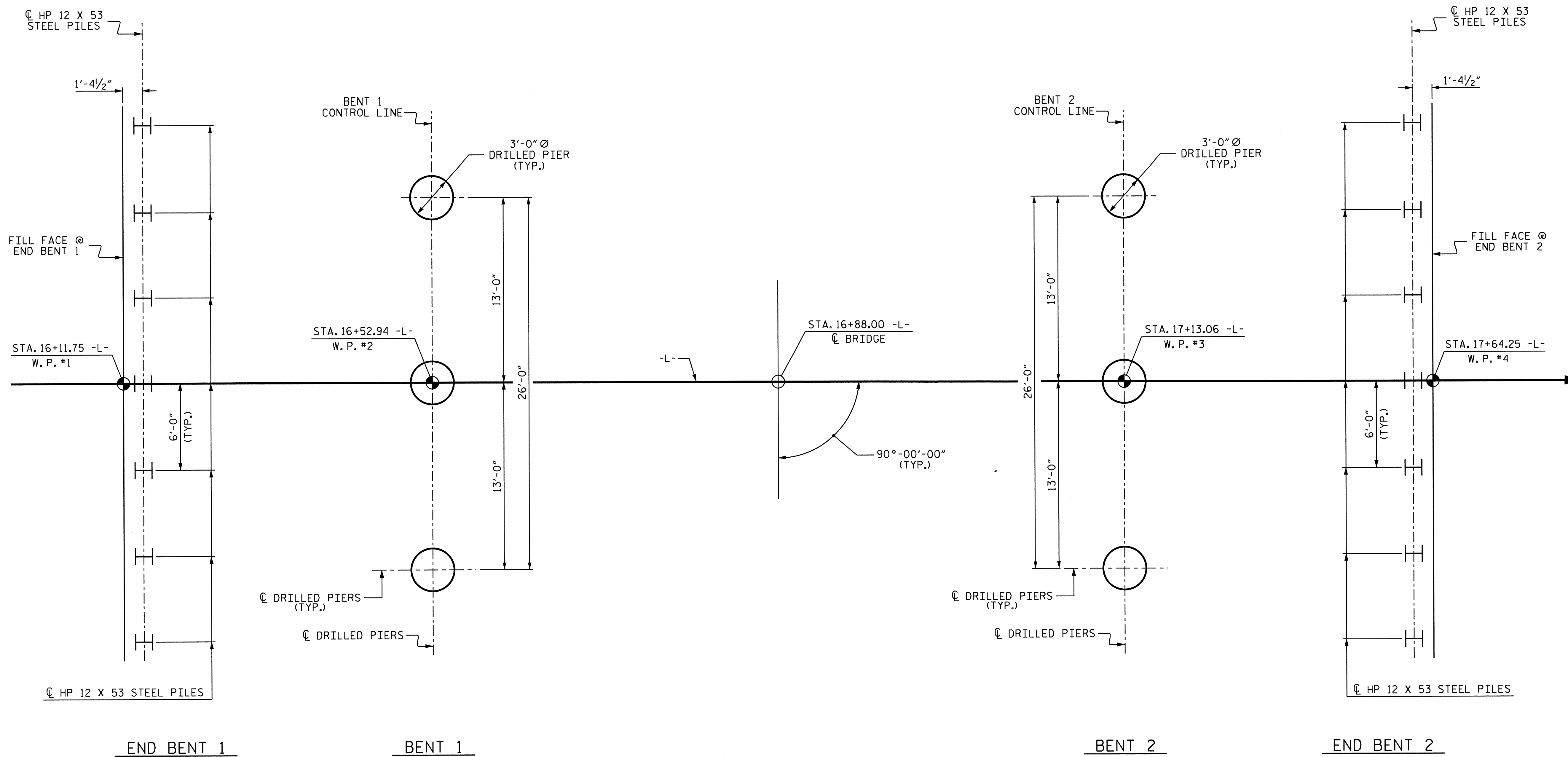
PROJECT NO. B-4400  
 ALAMANCE COUNTY  
 STATION: 16+88.00 -L-  
 SHEET 1 OF 3 REPLACES BRIDGE NO. 160

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON SR 1122  
 OVER SOUTH PRONG OF  
 STINKING QUARTER CREEK  
 BETWEEN SR 1113 AND SR 1121

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-1
2			4			TOTAL SHEETS 24

DRAWN BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012

19-NOV-2013 14:12  
 R:\Structures\Plans\asor\_senginh\Micrstation\B-4400\_SD.GD.dgn  
 asor\_senginh



**FOUNDATION LAYOUT**

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT BOTTOM OF CAP

**NOTES**

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 360 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 90 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 518 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

INSTALL DRILLED PIERS AT BENT 1 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 509 FT AND SATISFY THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS 518 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 360 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 90 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 2. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 516 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

INSTALL DRILLED PIERS AT BENT 2 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 508 FT AND SATISFY THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS ELEVATION 516 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SPT TEST IS REQUIRED FOR DRILLED PIERS AT BENT 1. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CROSSHOLE SONIC LOGGING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

PROJECT NO. B-4400  
ALAMANCE COUNTY  
 STATION: 16+88.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE ON SR 1122  
 OVER SOUTH PRONG OF  
 STINKING QUARTER CREEK  
 BETWEEN SR 1113 AND SR 1121

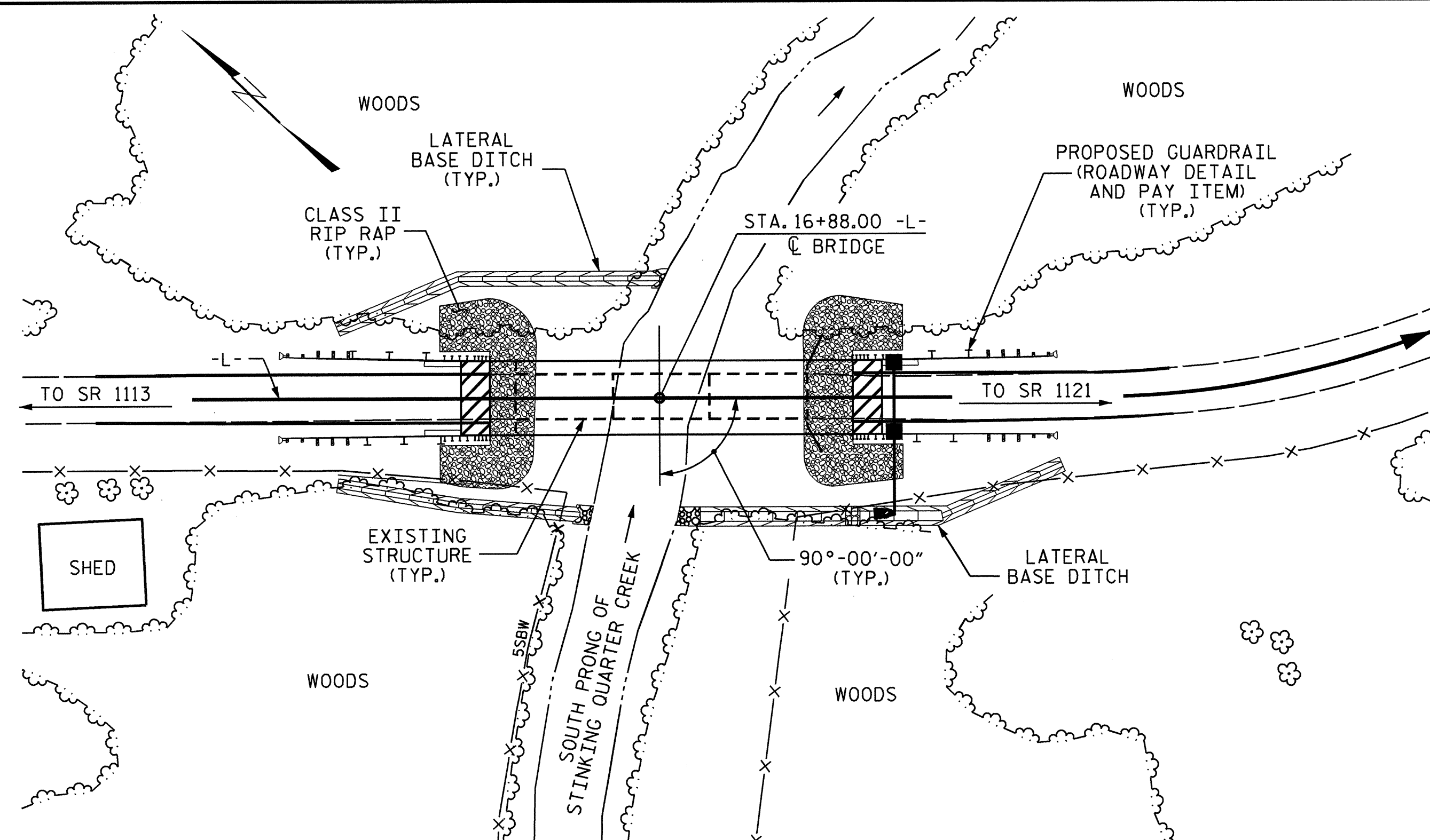
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			2
2			4			21



DRAWN BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012



BENCH MARK 2: RAIL ROAD SPIKE IN BASE OF 36 INCH OAK AT STA. 21+83.00 -L-, 318' LEFT, EL. 573.88



**HYDRAULIC DATA**

DESIGN DISCHARGE = 5,900 CFS.  
 FREQUENCY OF DESIGN FLOOD = 25 YRS.  
 DESIGN HIGH WATER ELEVATION = 538.7  
 DRAINAGE AREA = 31.80 SQ. MI.  
 BASE DISCHARGE (Q100) = 7,500 CFS.  
 BASE HIGH WATER ELEVATION = 540.3

**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE = 11,000 CFS.  
 FREQUENCY OF OVERTOPPING FLOOD = >100 YRS.  
 OVERTOPPING FLOOD ELEVATION = 543.4

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

**LOCATION SKETCH**

**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.

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS 1 @ 40'-4", 1 @ 40'-1", 1 @ 40'-4" WITH A 2" ASPHALT WEARING SURFACE OVER A TIMBER DECK ON A STEEL I-BEAMS SYSTEM SUPERSTRUCTURE AND A CLEAR ROADWAY WIDTH OF 19'-1" ON A SUBSTRUCTURE CONSISTING OF TIMBER VERTICAL ABUTMENTS, WITH INTERIOR BENTS CONSISTING OF TIMBER CAPS AND PILES WITH STEEL CAP AND PILE CRUTCH BENTS, LOCATED AT THE PROPOSED STRUCTURE LOCATION SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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 30 FEET, 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".

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+88.00 -L-".

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

THIS BRIDGE IS DESIGNED USING SUB-REGIONAL TIER GUIDELINES FOR BRIDGE PROJECTS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

**TOTAL BILL OF MATERIAL**

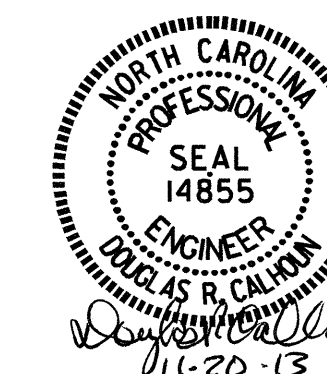
	REMOVAL OF EXISTING STRUCTURE	3'-0" Ø DRILLED PIERS IN SOIL	3'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12 X 53 STEEL PILES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLABS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS			
	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	EA.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	LIN. FT.	TONS	SQ. YDS	LUMP SUM	NO.	LIN. FT.	NO.	LIN. FT.
SUPERSTRUCTURE										LUMP SUM				300.75					22	990	11	660
END BENT 1								LUMP SUM	15.1		2190		7	175		355	390					
BENT 1		34.50	22.50	29.80					19.7		10025	1527										
BENT 2		33.00	21.00	31.60					20.2		10025	1529										
END BENT 2								LUMP SUM	15.1		2190		7	140		285	315					
TOTAL	LUMP SUM	67.50	43.50	61.40	1	3	1	LUMP SUM	70.1	LUMP SUM	24430	3056	14	315	300.75	640	705	LUMP SUM	22	990	11	660

PROJECT NO. B-4400  
ALAMANCE COUNTY  
 STATION: 16+88.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE ON SR 1122  
 OVER SOUTH PRONG OF  
 STINKING QUARTER CREEK  
 BETWEEN SR 1113 AND SR 1121



DRAWN BY: A. SORSENGINH DATE: 4/2012  
 CHECKED BY: D.G. ELY DATE: 7/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-3
1			3			TOTAL SHEETS
2			4			24



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(In)	N/A	1	1.319	--	1.75	0.278	1.76	40'	EL	19.5	0.549	<b>1.32</b>	40'	EL	<b>1.95</b>	0.80	0.278	1.55	40'	EL	19.5		
	HL-93(0pr)	N/A	--	1.709	--	1.35	0.278	2.28	40'	EL	19.5	0.549	1.71	40'	EL	1.95	N/A	--	--	--	--	--		
	HS-20(In)	36.000	2	1.540	55.449	1.75	0.278	2.21	40'	EL	19.5	0.549	<b>1.54</b>	40'	EL	<b>1.95</b>	0.80	0.278	1.94	40'	EL	19.5		
	HS-20(0pr)	36.000	--	1.997	71.878	1.35	0.278	2.86	40'	EL	19.5	0.549	2	40'	EL	1.95	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.606	48.687	1.4	0.278	5.1	40'	EL	19.5	0.549	4.13	40'	EL	1.95	0.80	0.278	3.61	40'	EL	19.5	
		SNGARBS2	20.000	--	2.964	59.289	1.4	0.278	4.19	40'	EL	15.6	0.549	3.07	40'	EL	1.95	0.80	0.278	2.96	40'	EL	19.5	
		SNAGRIS2	22.000	--	2.906	63.929	1.4	0.278	4.09	40'	EL	15.6	0.549	2.91	40'	EL	1.95	0.80	0.278	2.92	40'	EL	15.6	
		SNCOTTS3	27.250	--	1.803	49.125	1.4	0.278	2.55	40'	EL	19.5	0.549	2.07	40'	EL	1.95	0.80	0.278	1.80	40'	EL	19.5	
		SNAGGRS4	34.925	--	1.623	56.667	1.4	0.278	2.29	40'	EL	19.5	0.549	1.82	40'	EL	1.95	0.80	0.278	1.62	40'	EL	19.5	
		SNS5A	35.550	--	1.578	56.107	1.4	0.278	2.23	40'	EL	19.5	0.549	1.9	40'	EL	1.95	0.80	0.278	1.58	40'	EL	19.5	
		SNS6A	39.950	--	1.502	59.992	1.4	0.278	2.12	40'	EL	19.5	0.549	1.77	40'	EL	1.95	0.80	0.278	1.50	40'	EL	19.5	
	SNS7B	42.000	3	1.432	60.149	1.4	0.278	2.02	40'	EL	19.5	0.549	1.81	40'	EL	1.95	0.80	0.278	<b>1.43</b>	40'	EL	<b>19.5</b>		
	TTST	TNAGRIT3	33.000	--	1.848	60.976	1.4	0.278	2.61	40'	EL	19.5	0.549	2.08	40'	EL	1.95	0.80	0.278	1.85	40'	EL	19.5	
		TNT4A	33.075	--	1.872	61.901	1.4	0.278	2.65	40'	EL	19.5	0.549	1.98	40'	EL	1.95	0.80	0.278	1.87	40'	EL	19.5	
		TNT6A	41.600	--	1.587	66.032	1.4	0.278	2.24	40'	EL	19.5	0.549	1.94	40'	EL	1.95	0.80	0.278	1.59	40'	EL	19.5	
		TNT7A	42.000	--	1.627	68.354	1.4	0.278	2.3	40'	EL	19.5	0.549	1.79	40'	EL	1.95	0.80	0.278	1.63	40'	EL	19.5	
		TNT7B	42.000	--	1.664	69.888	1.4	0.278	2.35	40'	EL	19.5	0.549	1.72	40'	EL	1.95	0.80	0.278	1.66	40'	EL	19.5	
		TNAGRIT4	43.000	--	1.619	69.61	1.4	0.278	2.28	40'	EL	15.6	0.549	1.65	40'	EL	1.95	0.80	0.278	1.62	40'	EL	19.5	
TNAGT5A		45.000	--	1.498	67.412	1.4	0.278	2.12	40'	EL	19.5	0.549	1.71	40'	EL	1.95	0.80	0.278	1.50	40'	EL	19.5		
TNAGT5B	45.000	--	1.455	65.486	1.4	0.278	2.06	40'	EL	19.5	0.549	1.56	40'	EL	1.95	0.80	0.278	1.46	40'	EL	19.5			

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)

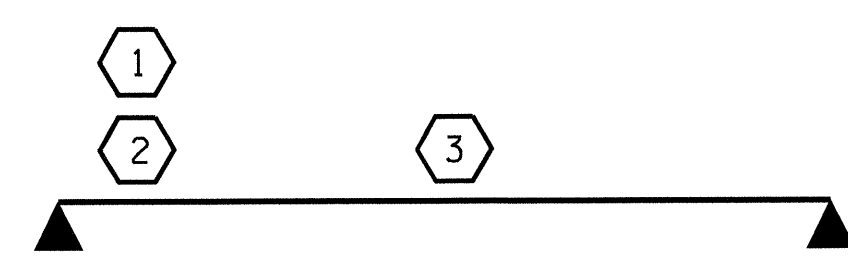
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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GIRDER LOCATION

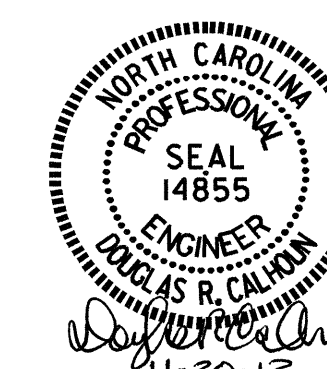
I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY  
FOR SPAN A

PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 1 OF 3



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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-4
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
CHECKED BY : D.G. ELY DATE : 7/2012  
DRAWN BY : CVC 6/10  
CHECKED BY : DNS 6/10

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	1.33	--	1.75	0.275	1.33	60'	EL	29.5	0.52	<b>1.33</b>	60'	EL	<b>5.9</b>	0.80	0.275	1.37	60'	EL	29.5		
	HL-93(0pr)	N/A	--	1.725	--	1.35	0.275	1.73	60'	EL	29.5	0.52	1.72	60'	EL	5.9	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.601	57.643	1.75	0.275	1.69	60'	EL	29.5	0.52	<b>1.6</b>	60'	EL	<b>5.9</b>	0.80	0.275	1.74	60'	EL	29.5		
	HS-20(0pr)	36.000	--	2.076	74.723	1.35	0.275	2.19	60'	EL	29.5	0.52	2.08	60'	EL	5.9	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.745	50.557	1.4	0.275	4.55	60'	EL	29.5	0.52	4.63	60'	EL	5.9	0.80	0.275	3.74	60'	EL	29.5	
		SNGARBS2	20.000	--	2.867	57.338	1.4	0.275	3.48	60'	EL	29.5	0.52	3.33	60'	EL	5.9	0.80	0.275	2.87	60'	EL	29.5	
		SNAGRIS2	22.000	--	2.748	60.46	1.4	0.275	3.34	60'	EL	29.5	0.52	3.11	60'	EL	5.9	0.80	0.275	2.75	60'	EL	29.5	
		SNCOTTS3	27.250	--	1.866	50.841	1.4	0.275	2.27	60'	EL	29.5	0.52	2.31	60'	EL	5.9	0.80	0.275	1.87	60'	EL	29.5	
		SNAGGRS4	34.925	--	1.588	55.465	1.4	0.275	1.93	60'	EL	29.5	0.52	1.95	60'	EL	5.9	0.80	0.275	1.59	60'	EL	29.5	
		SNS5A	35.550	--	1.551	55.139	1.4	0.275	1.89	60'	EL	29.5	0.52	1.99	60'	EL	5.9	0.80	0.275	1.55	60'	EL	29.5	
		SNS6A	39.950	--	1.435	57.347	1.4	0.275	1.74	60'	EL	29.5	0.52	1.83	60'	EL	5.9	0.80	0.275	1.44	60'	EL	29.5	
	SNS7B	42.000	--	1.367	57.434	1.4	0.275	1.66	60'	EL	29.5	0.52	1.81	60'	EL	5.9	0.80	0.275	1.37	60'	EL	29.5		
	TTST	TNAGRIT3	33.000	--	1.754	57.887	1.4	0.275	2.13	60'	EL	29.5	0.52	2.17	60'	EL	5.9	0.80	0.275	1.75	60'	EL	29.5	
		TNT4A	33.075	--	1.765	58.389	1.4	0.275	2.15	60'	EL	29.5	0.52	2.1	60'	EL	5.9	0.80	0.275	1.77	60'	EL	29.5	
		TNT6A	41.600	--	1.456	60.551	1.4	0.275	1.77	60'	EL	29.5	0.52	1.96	60'	EL	5.9	0.80	0.275	1.46	60'	EL	29.5	
		TNT7A	42.000	--	1.469	61.714	1.4	0.275	1.79	60'	EL	29.5	0.52	1.88	60'	EL	5.9	0.80	0.275	1.47	60'	EL	29.5	
		TNT7B	42.000	--	1.535	64.463	1.4	0.275	1.87	60'	EL	29.5	0.52	1.76	60'	EL	5.9	0.80	0.275	1.53	60'	EL	29.5	
		TNAGRIT4	43.000	--	1.45	62.329	1.4	0.275	1.76	60'	EL	29.5	0.52	1.7	60'	EL	5.9	0.80	0.275	1.45	60'	EL	29.5	
TNAGT5A		45.000	--	1.361	61.247	1.4	0.275	1.65	60'	EL	29.5	0.52	1.71	60'	EL	5.9	0.80	0.275	1.36	60'	EL	29.5		
TNAGT5B	45.000	3	1.34	60.282	1.4	0.275	1.63	60'	EL	29.5	0.52	1.61	60'	EL	5.9	0.80	0.275	<b>1.34</b>	60'	EL	<b>29.5</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)

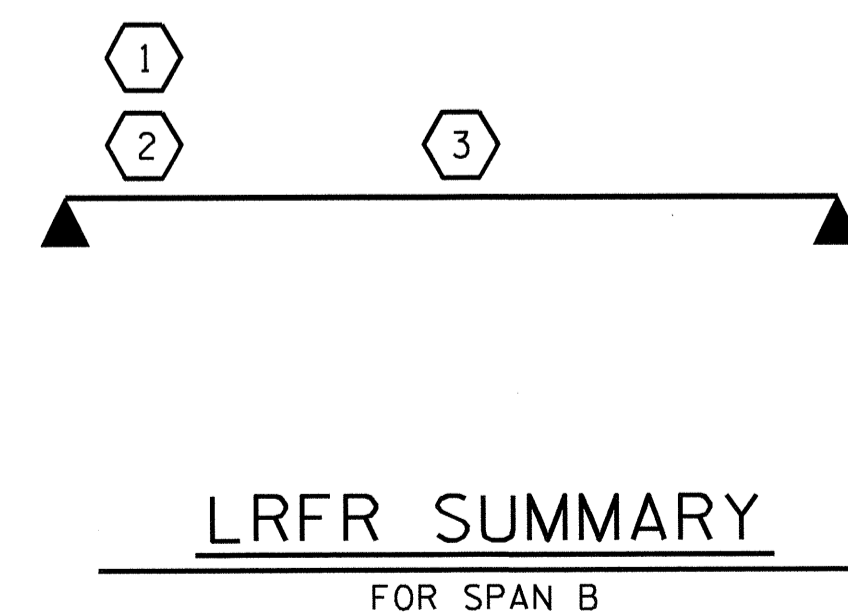
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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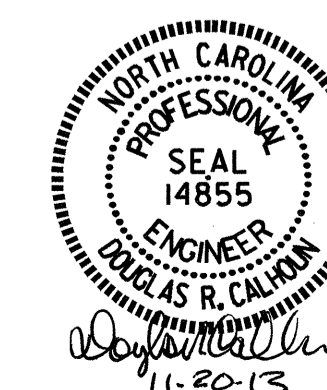
GIRDER LOCATION

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



PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
LRFR SUMMARY FOR  
60' CORED SLAB UNIT  
90° SKEW  
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-5
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
CHECKED BY : D.G. ELY DATE : 7/2012  
DRAWN BY : CVC 6/10  
CHECKED BY : DNS 6/10



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	1.394	--	1.75	0.276	1.57	50'	EL	24.5	0.531	<b>1.39</b>	50'	EL	<b>2.45</b>	0.80	0.276	1.44	50'	EL	24.5		
	HL-93(0pr)	N/A	--	1.807	--	1.35	0.276	2.03	50'	EL	24.5	0.531	1.81	50'	EL	2.45	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.667	60.007	1.75	0.276	1.95	50'	EL	24.5	0.531	<b>1.67</b>	50'	EL	<b>2.45</b>	0.80	0.276	1.79	50'	EL	24.5		
	HS-20(0pr)	36.000	--	2.161	77.787	1.35	0.276	2.52	50'	EL	24.5	0.531	2.16	50'	EL	2.45	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13,500	--	3.635	49.079	1.4	0.276	4.95	50'	EL	24.5	0.531	4.7	50'	EL	2.45	0.80	0.276	3.64	50'	EL	24.5	
		SNGARBS2	20,000	--	2.871	57.42	1.4	0.276	3.91	50'	EL	24.5	0.531	3.42	50'	EL	2.45	0.80	0.276	2.87	50'	EL	24.5	
		SNAGRIS2	22,000	--	2.778	61.109	1.4	0.276	3.78	50'	EL	19.6	0.531	3.21	50'	EL	2.45	0.80	0.276	2.78	50'	EL	24.5	
		SNCOTTS3	27,250	--	1.814	49.418	1.4	0.276	2.47	50'	EL	24.5	0.531	2.36	50'	EL	2.45	0.80	0.276	1.81	50'	EL	24.5	
		SNAGCRS4	34,925	--	1.577	55.063	1.4	0.276	2.15	50'	EL	24.5	0.531	2.01	50'	EL	2.45	0.80	0.276	1.58	50'	EL	24.5	
		SNS5A	35,550	--	1.537	54.657	1.4	0.276	2.09	50'	EL	24.5	0.531	2.07	50'	EL	2.45	0.80	0.276	1.54	50'	EL	24.5	
		SNS6A	39,950	--	1.438	57.43	1.4	0.276	1.96	50'	EL	24.5	0.531	1.91	50'	EL	2.45	0.80	0.276	1.44	50'	EL	24.5	
	SNS7B	42,000	--	1.370	57.54	1.4	0.276	1.87	50'	EL	24.5	0.531	1.91	50'	EL	2.45	0.80	0.276	1.37	50'	EL	24.5		
	TTST	TNAGRIT3	33,000	--	1.761	58.118	1.4	0.276	2.4	50'	EL	24.5	0.531	2.25	50'	EL	2.45	0.80	0.276	1.76	50'	EL	24.5	
		TNT4A	33,075	--	1.777	58.759	1.4	0.276	2.42	50'	EL	24.5	0.531	2.17	50'	EL	2.45	0.80	0.276	1.78	50'	EL	24.5	
		TNT6A	41,600	--	1.480	61.558	1.4	0.276	2.01	50'	EL	24.5	0.531	2.08	50'	EL	2.45	0.80	0.276	1.48	50'	EL	24.5	
		TNT7A	42,000	--	1.502	63.087	1.4	0.276	2.05	50'	EL	24.5	0.531	1.94	50'	EL	2.45	0.80	0.276	1.50	50'	EL	24.5	
		TNT7B	42,000	--	1.566	65.773	1.4	0.276	2.13	50'	EL	24.5	0.531	1.84	50'	EL	2.45	0.80	0.276	1.57	50'	EL	24.5	
		TNAGRIT4	43,000	--	1.486	63.902	1.4	0.276	2.02	50'	EL	24.5	0.531	1.77	50'	EL	2.45	0.80	0.276	1.49	50'	EL	24.5	
TNACT5A		45,000	--	1.388	62.47	1.4	0.276	1.89	50'	EL	24.5	0.531	1.8	50'	EL	2.45	0.80	0.276	1.39	50'	EL	24.5		
TNACT5B	45,000	3	1.360	61.206	1.4	0.276	1.85	50'	EL	24.5	0.531	1.68	50'	EL	2.45	0.80	0.276	<b>1.36</b>	50'	EL	<b>24.5</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:

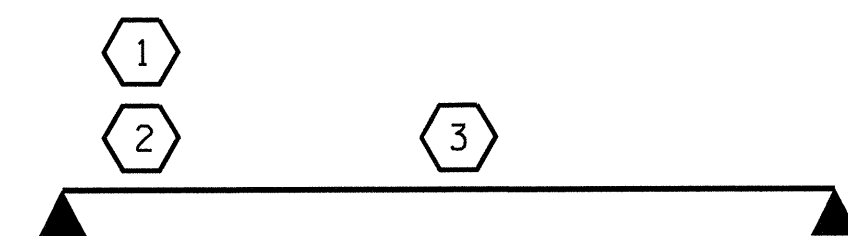
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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



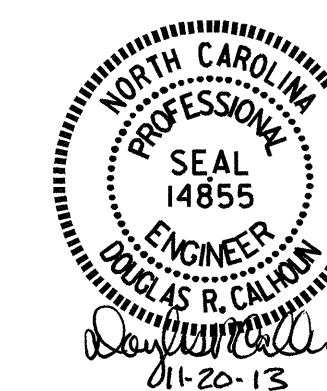
LRFR SUMMARY  
FOR SPAN C

ASSEMBLED BY : A. SORSENGINH	DATE : 4/2012
CHECKED BY : D.G. ELY	DATE : 7/2012
DRAWN BY : CVC	6/10
CHECKED BY : DNS	6/10

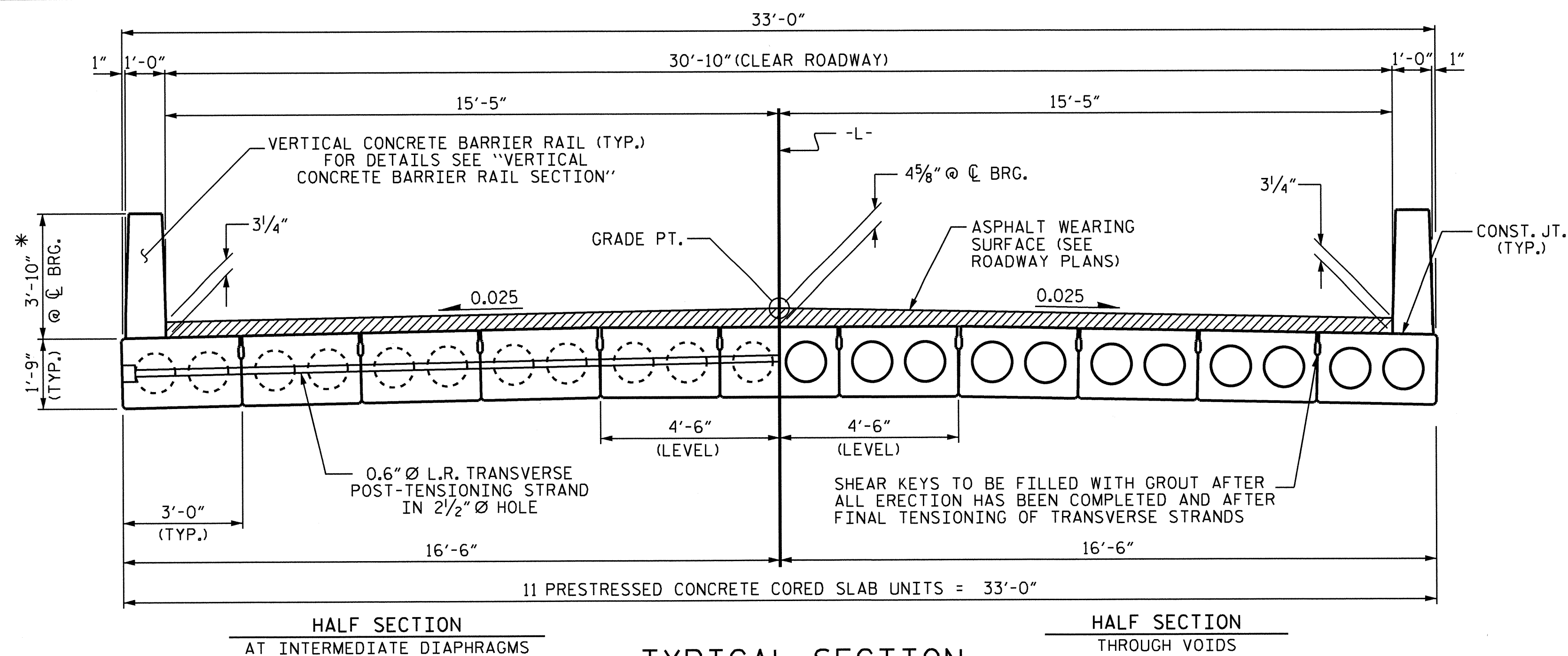
PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 3 OF 3

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



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-6
2			4			TOTAL SHEETS 24



HALF SECTION  
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION  
THROUGH VOIDS

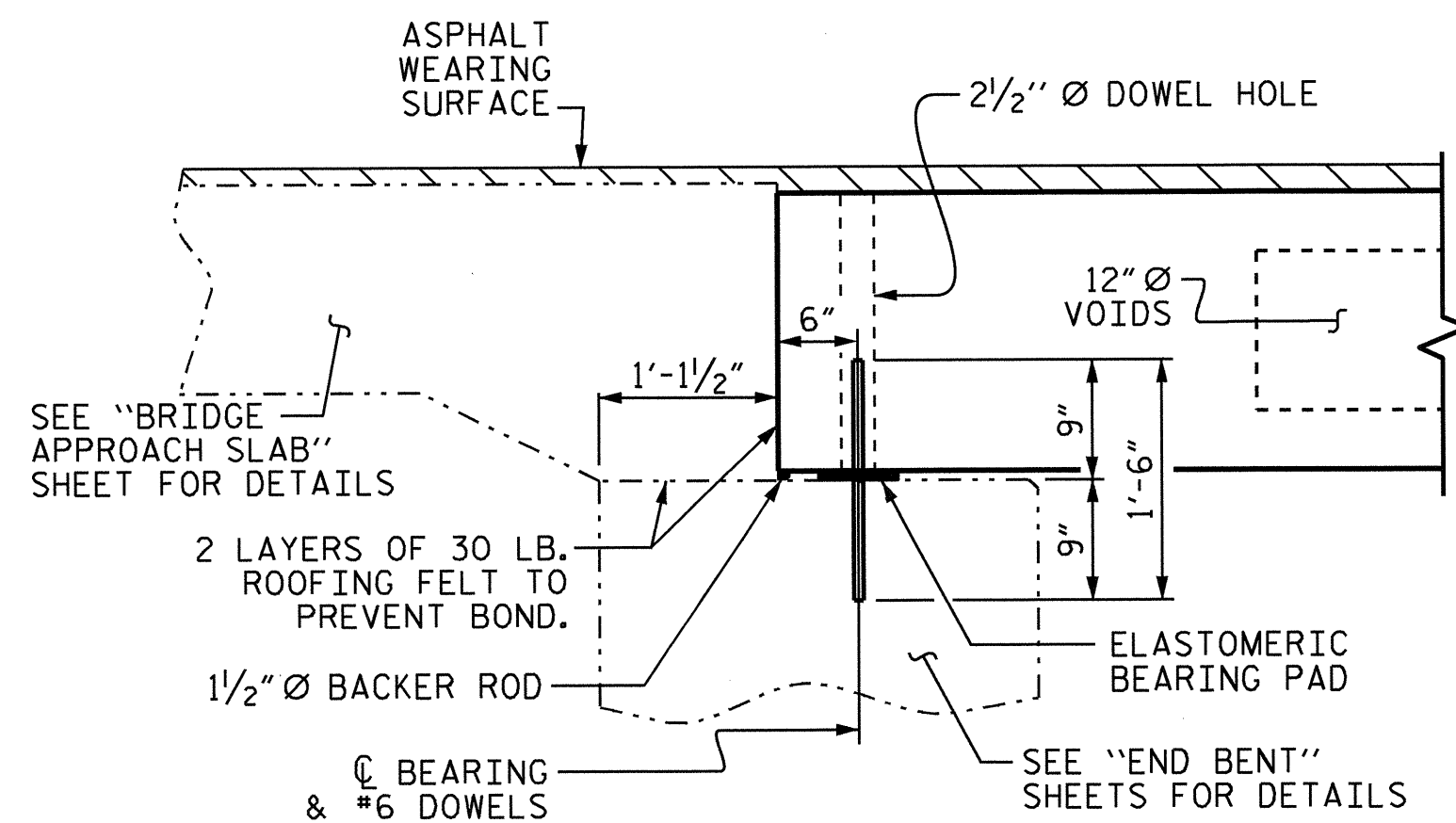
TYPICAL SECTION

\* - 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.

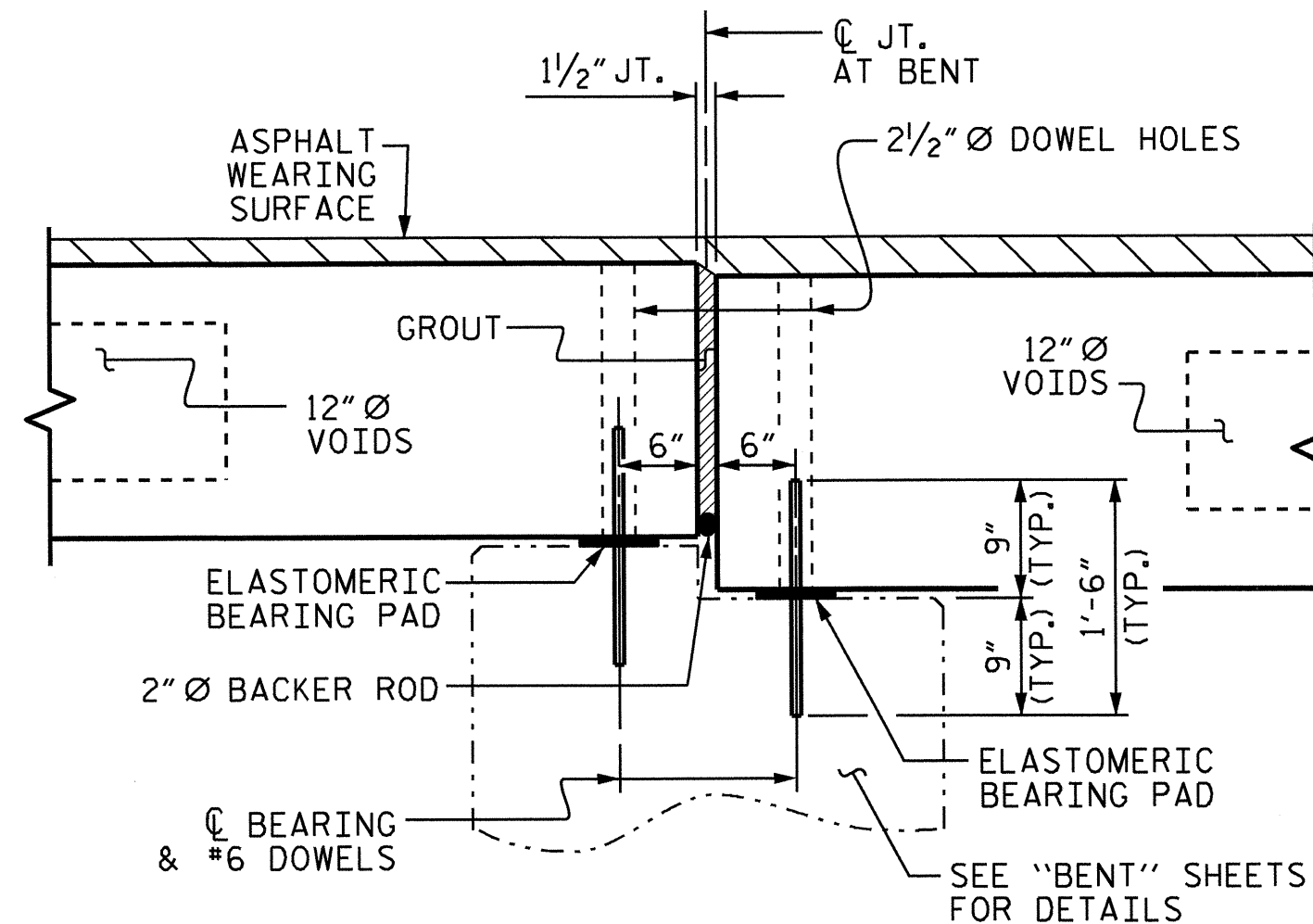
FIXED END

FIXED END

FIXED END

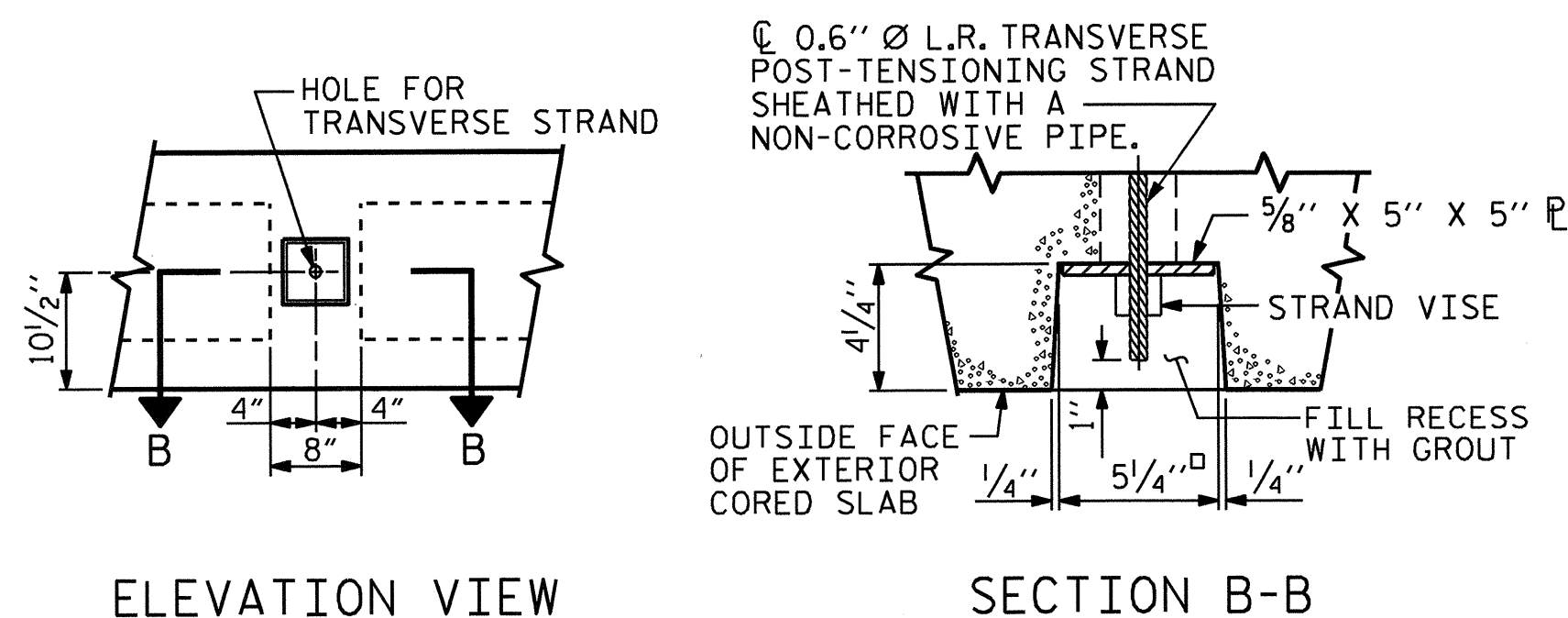


SECTION AT END BENT



SECTION AT BENTS

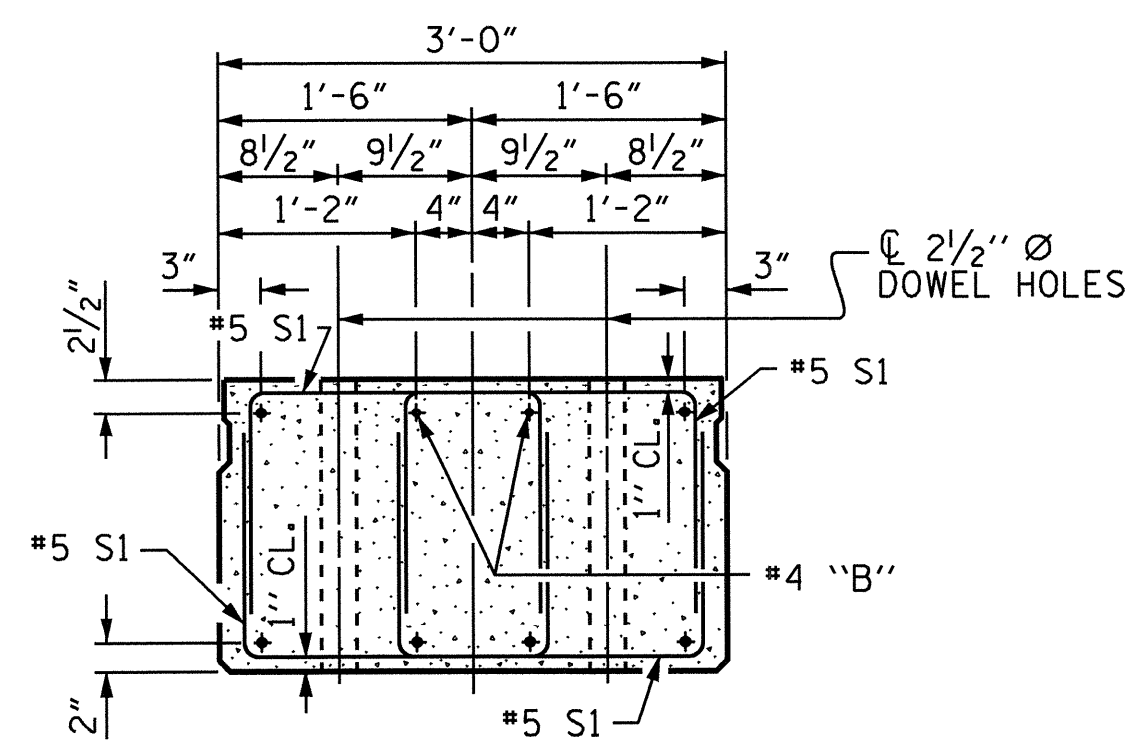
(BENT 1 SHOWN, BENT 2 SIMILAR BY ROTATION)



ELEVATION VIEW

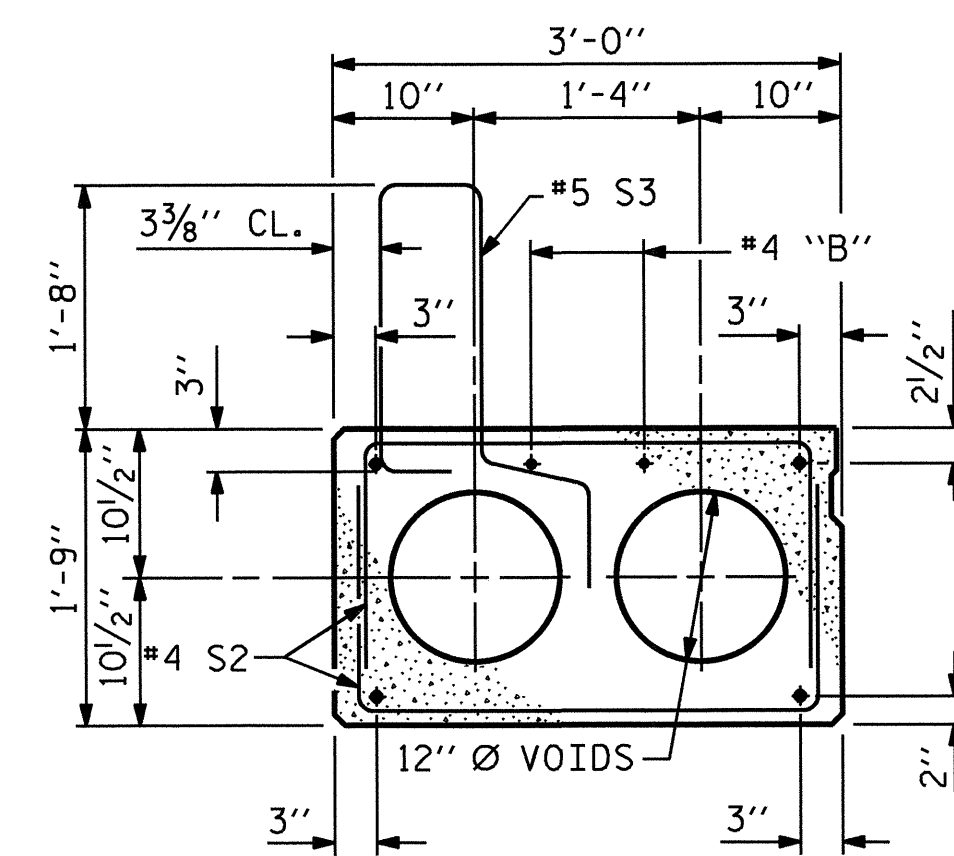
SECTION B-B

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

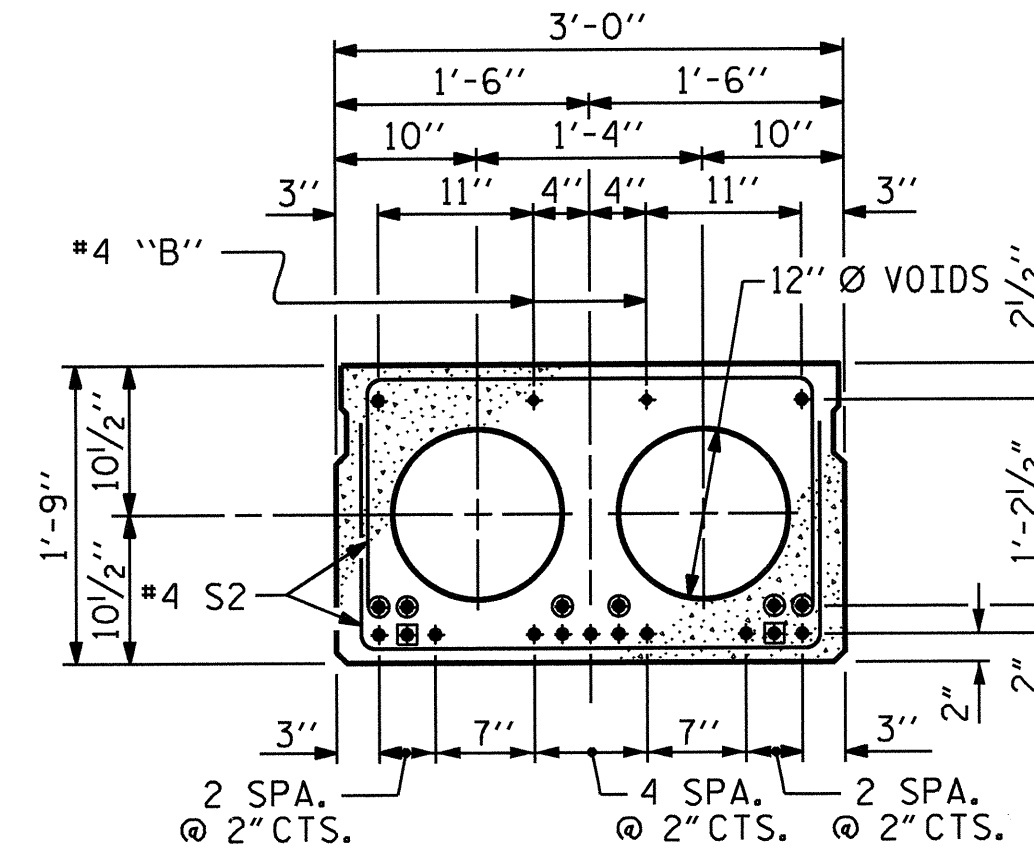


END ELEVATION

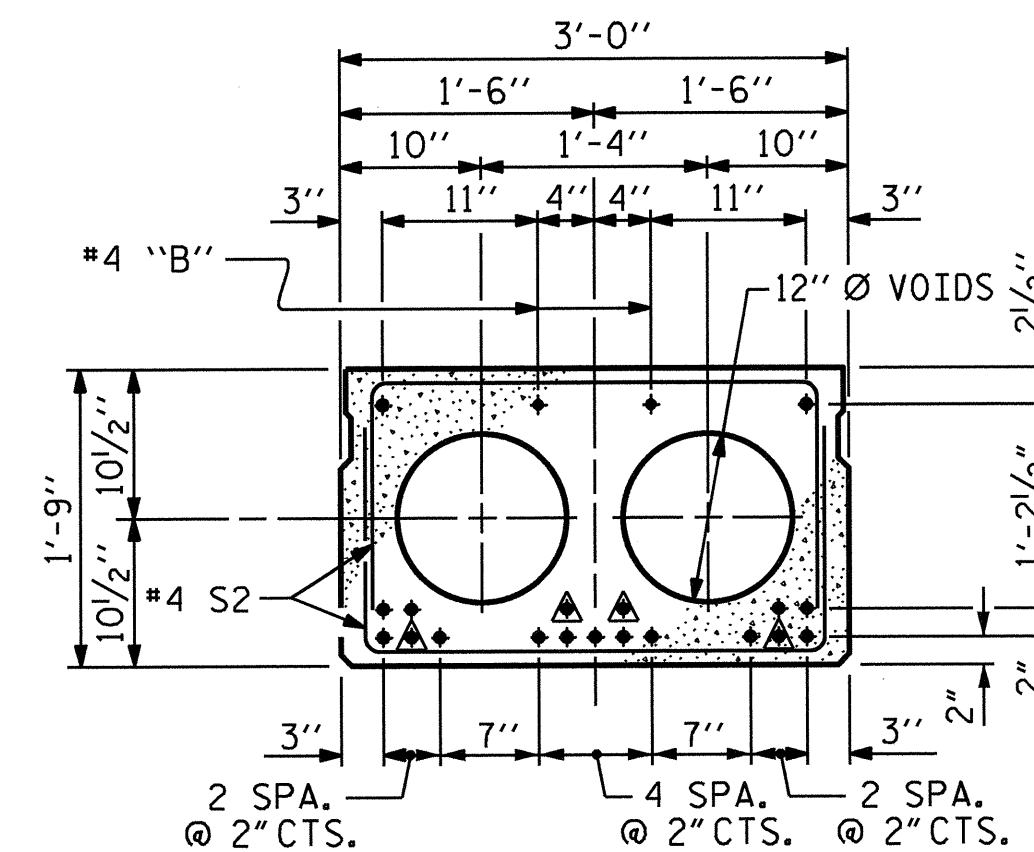
SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



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



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

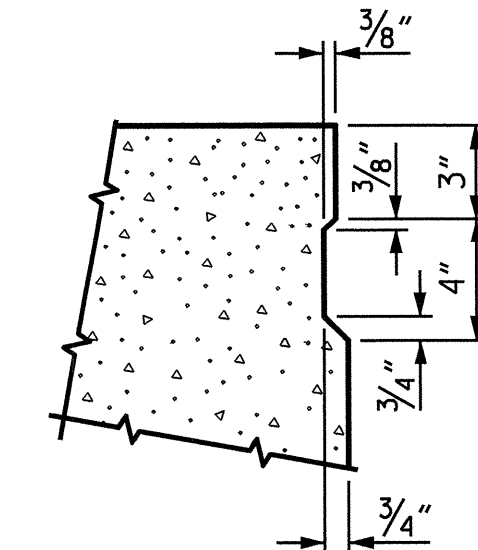


INTERIOR SLAB SECTION  
(50' UNIT)  
(19 STRANDS REQUIRED)

- ▲ 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.

DEBONDING LEGEND

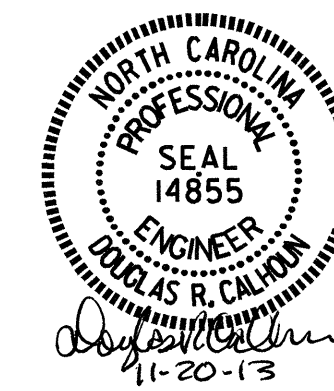
0.6" Ø LOW RELAXATION  
STRAND LAYOUT



SHEAR KEY DETAIL

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

ASSEMBLED BY :	A. SORSENGINH	DATE :	4/2012
CHECKED BY :	D.G. ELY	DATE :	7/2012
DRAWN BY :	DGE	5/09	REV. 12/11
CHECKED BY :	BCH	6/09	MAA/AAC



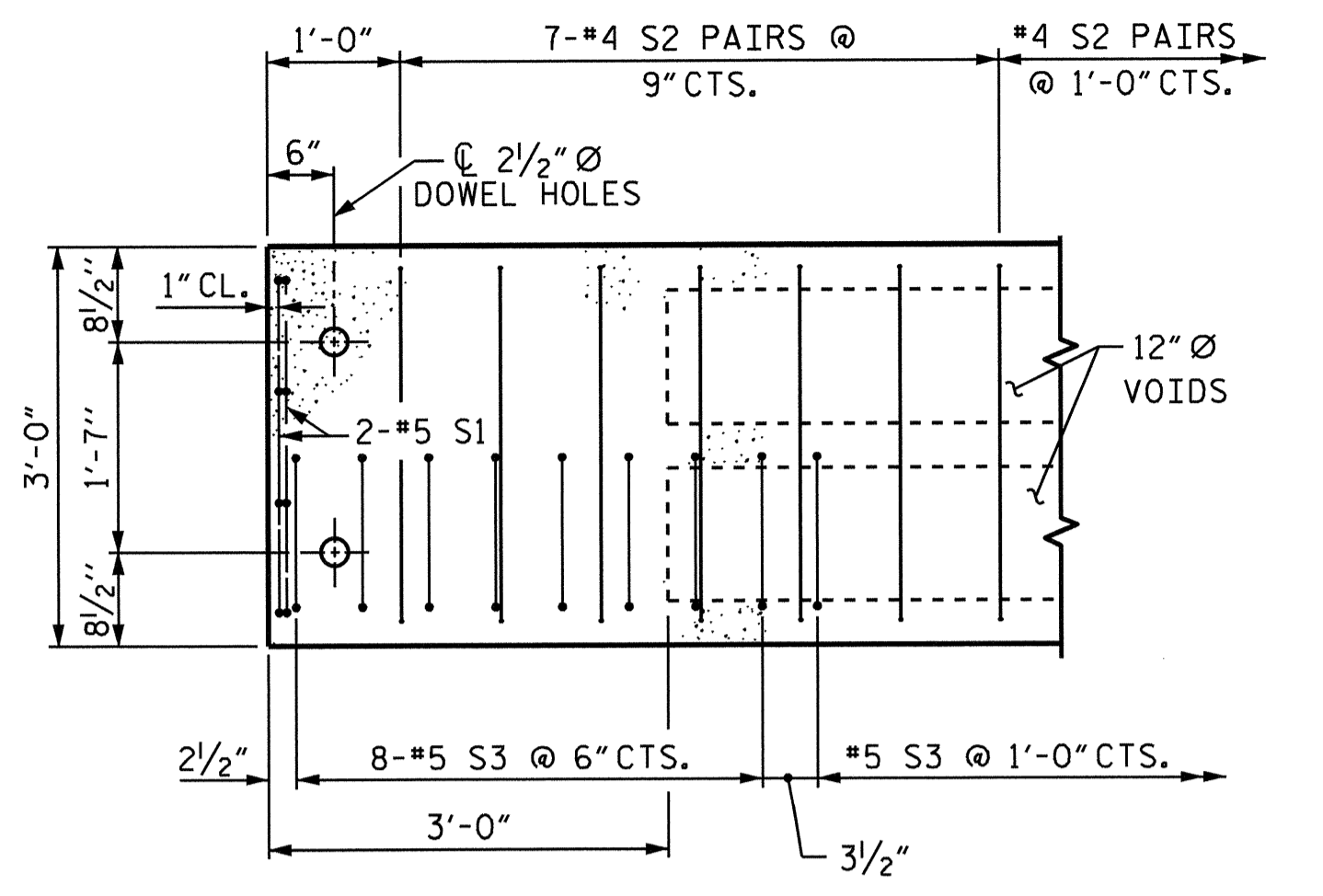
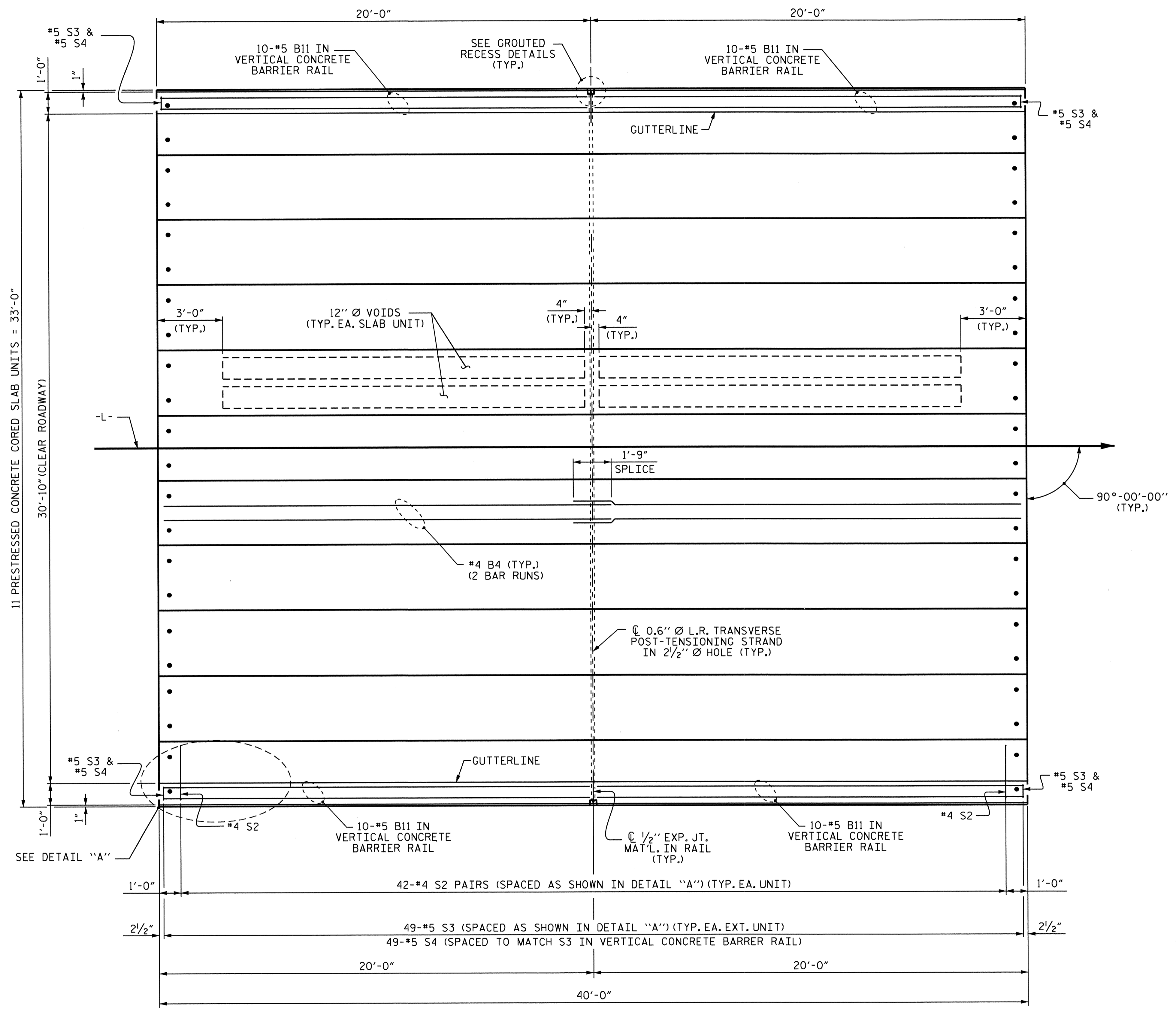
PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 1 OF 4

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-7
1			3			TOTAL SHEETS 24
2			4			





DETAIL "A"

NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PLAN OF SPAN A

PROJECT NO. B-4400  
 ALAMANCE COUNTY  
 STATION: 16+88.00 -L-

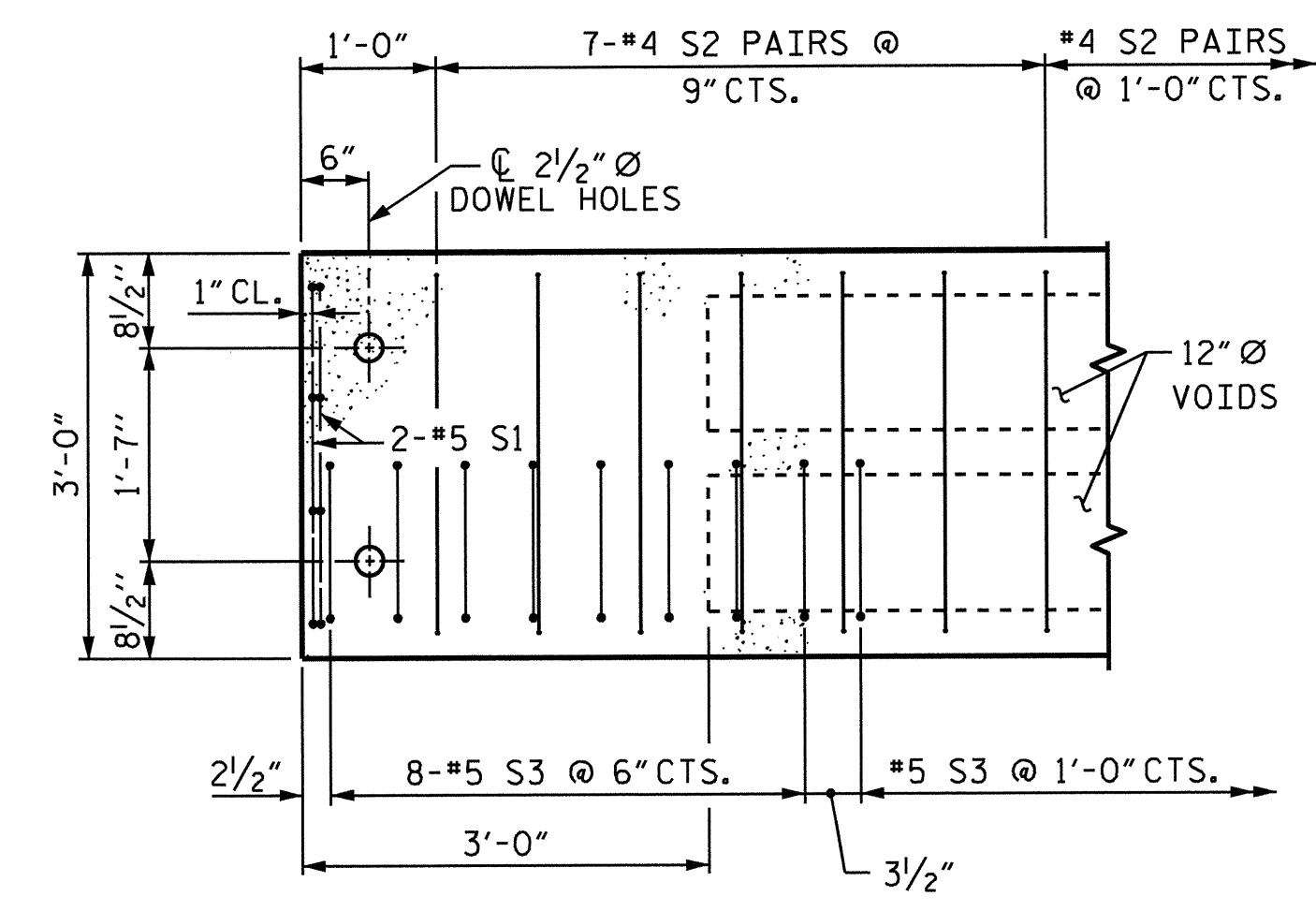
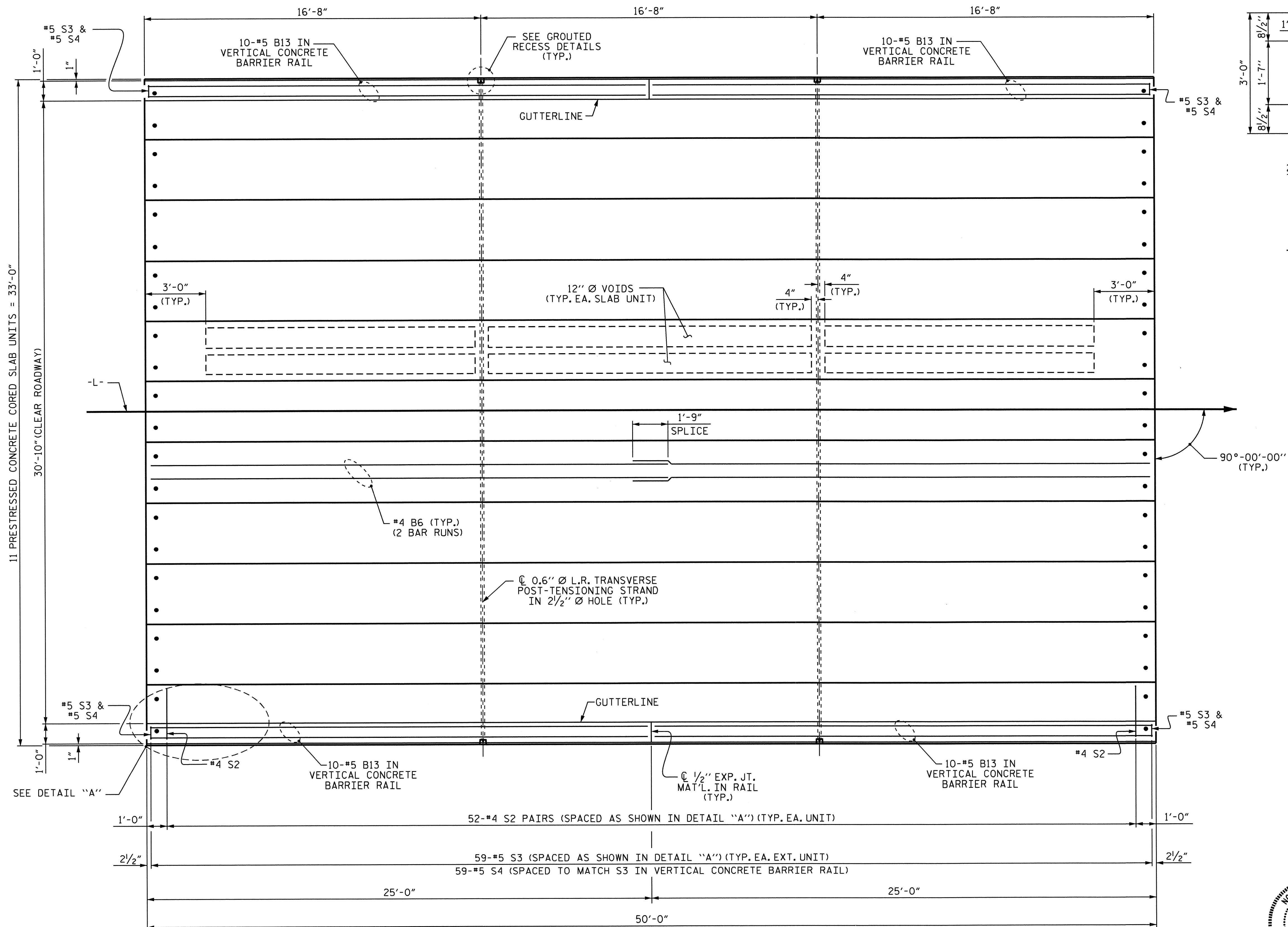
SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 PLAN OF 40' UNIT  
 30'-10" CLEAR ROADWAY  
 90° SKEW  
 SPAN A



ASSEMBLED BY : A. SORSENGINH	DATE : 4/2012
CHECKED BY : D.G. ELY	DATE : 7/2012
DRAWN BY : DGE 3/09	REV. 12/5/11 MAA/AAC
CHECKED BY : BCH 3/09	

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5
2			4			24



DETAIL "A"

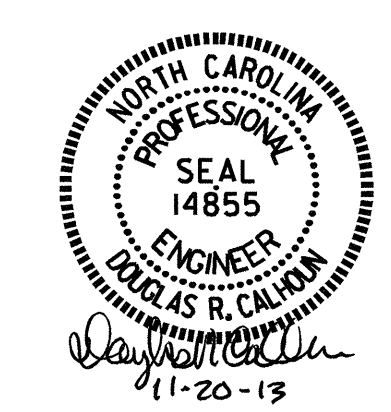
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PLAN OF UNIT

PROJECT NO. B-4400  
 ALAMANCE COUNTY  
 STATION: 16+88.00 -L-

SHEET 3 OF 4

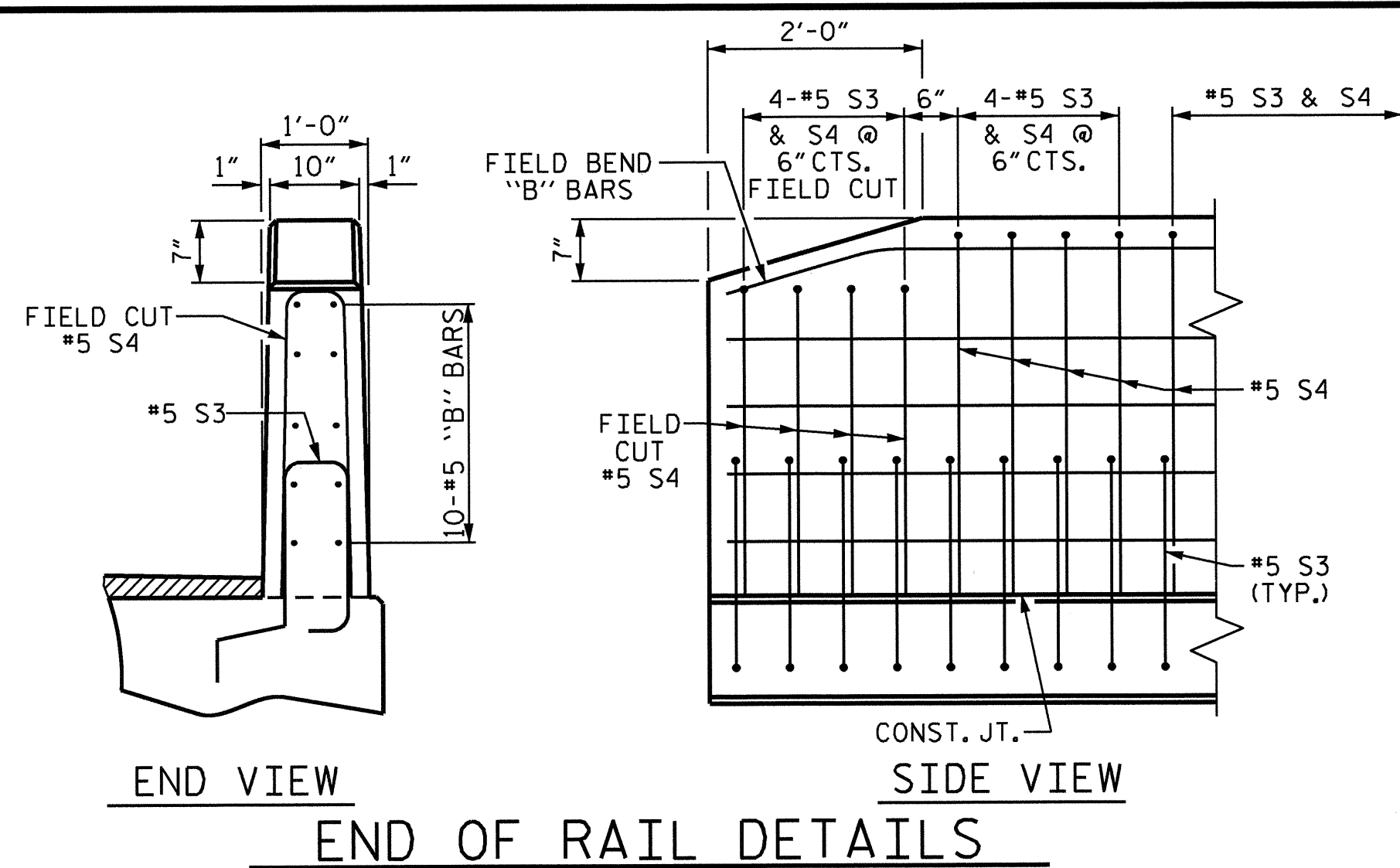
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 PLAN OF 50' UNIT  
 30'-10" CLEAR ROADWAY  
 90° SKEW  
 SPAN C



ASSEMBLED BY : A. SORSENGINH	DATE : 4/2012
CHECKED BY : D.G. ELY	DATE : 7/2012
DRAWN BY : DCE 3/09	REV. 12/5/11 MAA/AAC
CHECKED BY : BCH 3/09	

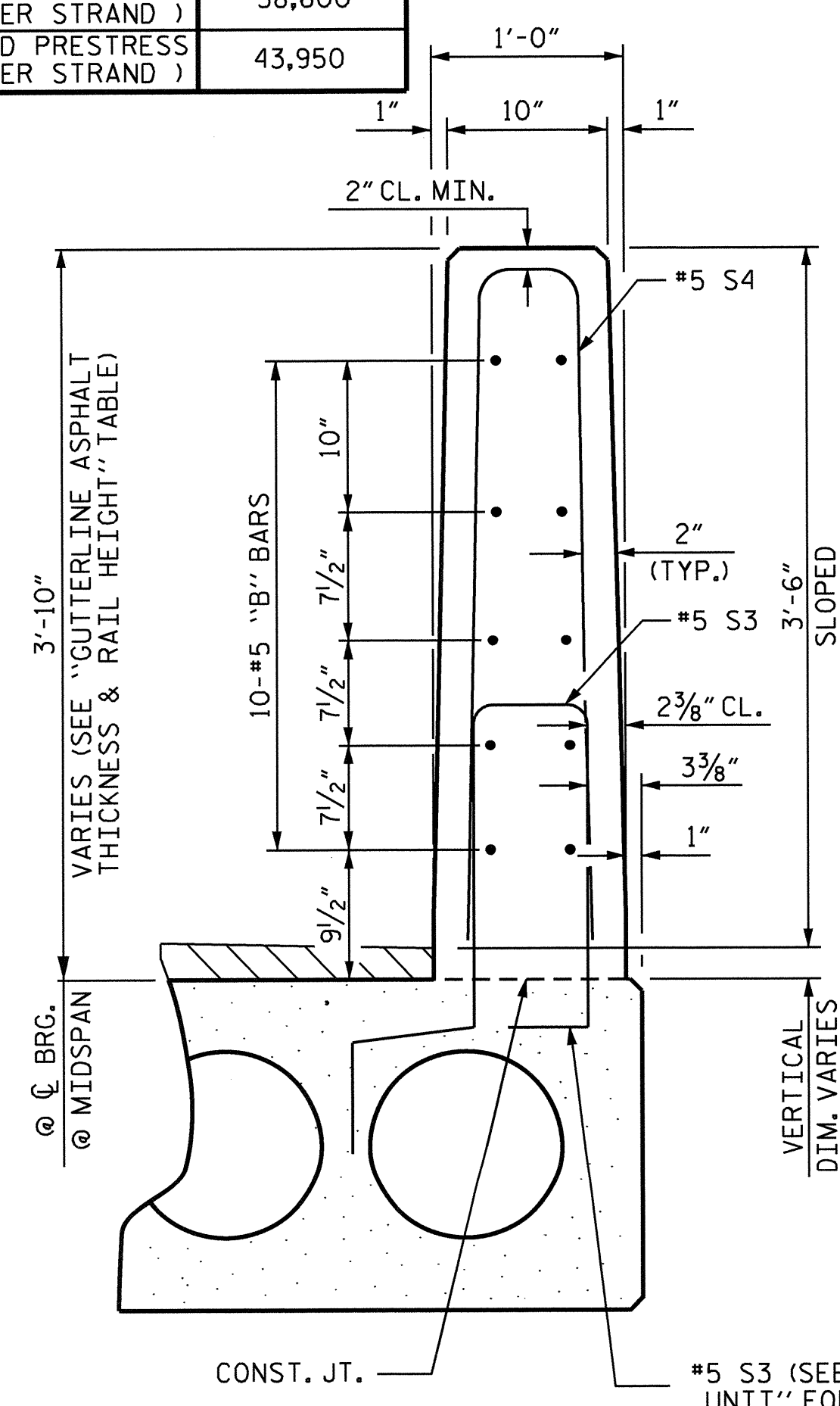
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-9
1			3			TOTAL SHEETS 29
2			4			



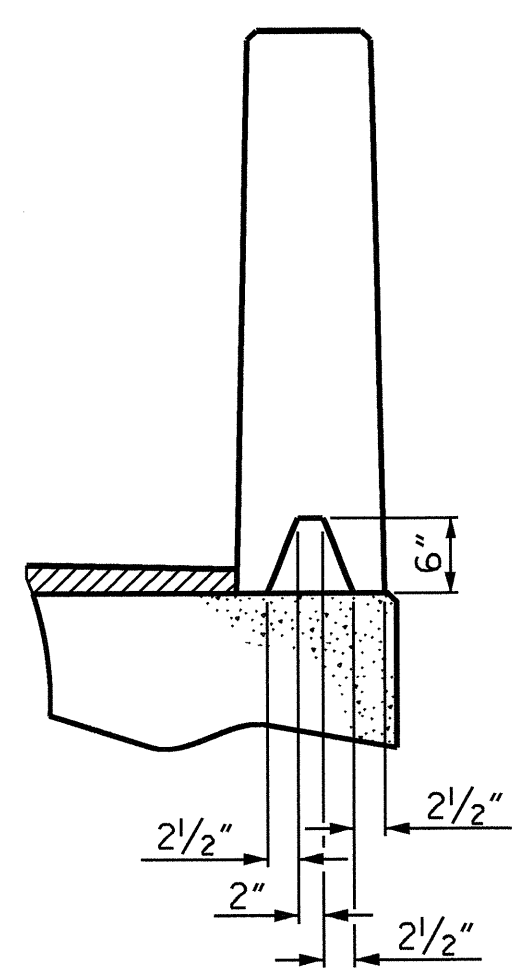


GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
30'-10" CLEAR ROADWAY	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
	NORMAL CROWN SECTION	
40' UNIT	1 5/8"	3'-8 3/8"
50' UNIT	1 1/8"	3'-7 7/8"

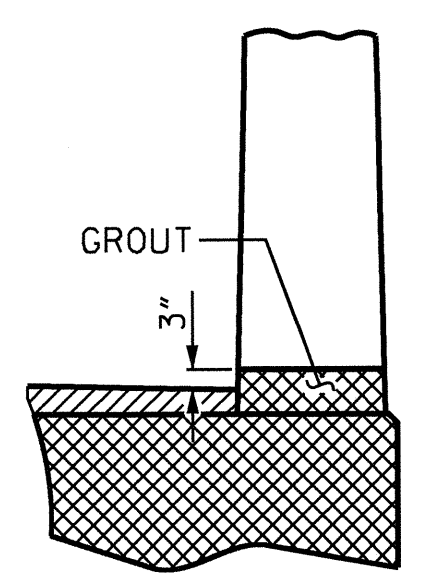
GRADE 270 STRANDS	
AREA ( SQUARE INCHES )	0.6" Ø L.R. 0.217
ULTIMATE STRENGTH ( LBS. PER STRAND )	58,600
APPLIED PRESTRESS ( LBS. PER STRAND )	43,950



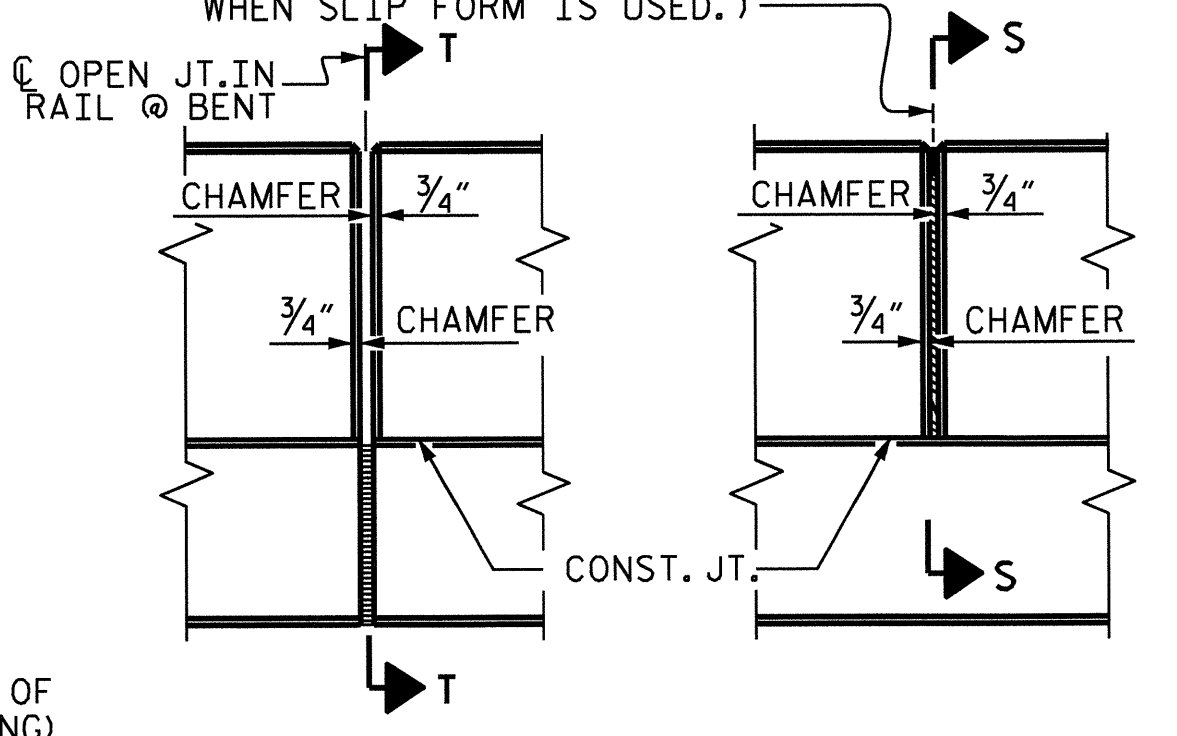
VERTICAL CONCRETE BARRIER RAIL SECTION



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



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



ELEVATION AT EXPANSION JOINTS

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

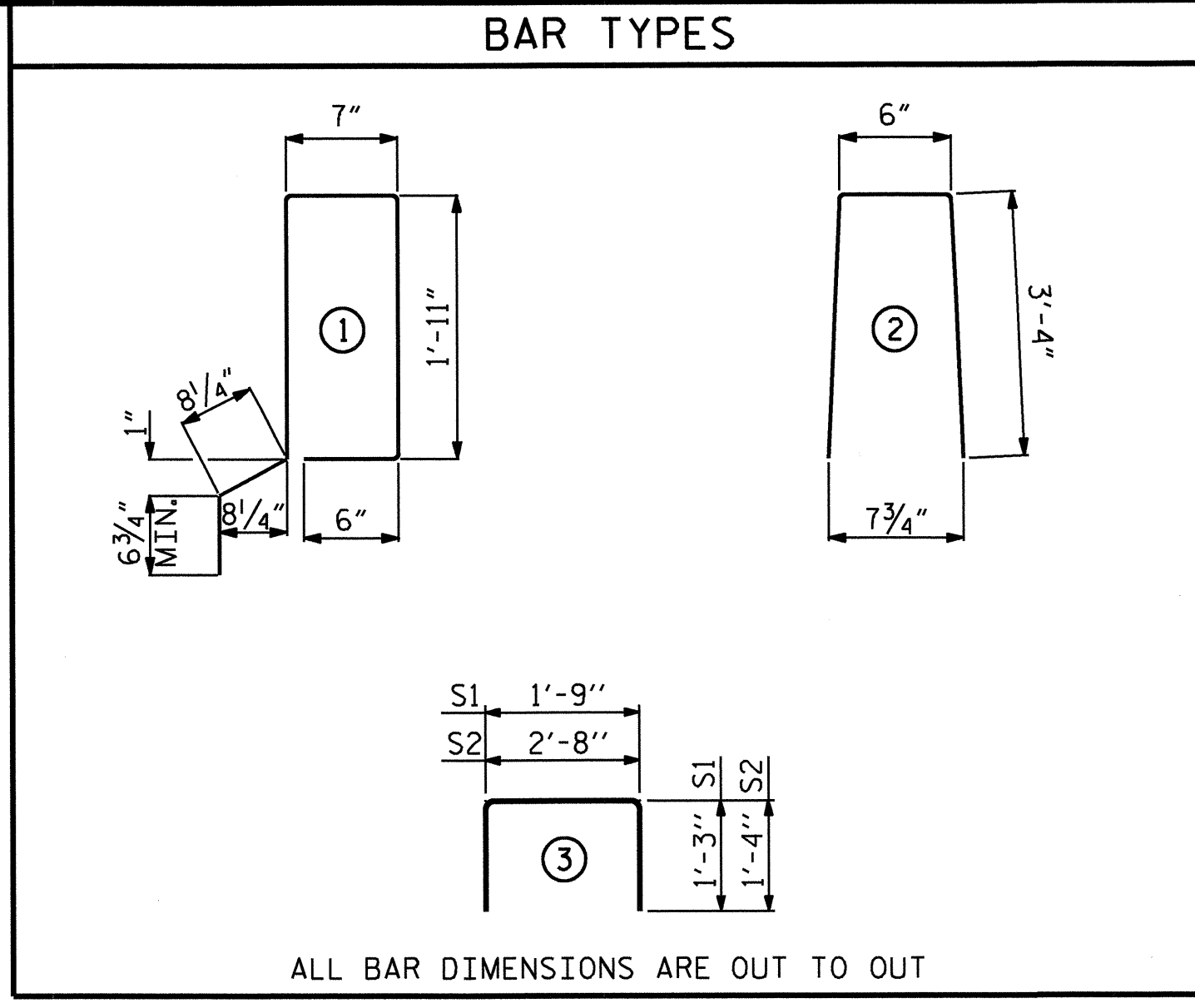
DEAD LOAD DEFLECTION AND CAMBER	
50' CORED SLAB UNIT	3'-0" x 1'-9"
CAMBER (SLAB ALONE IN PLACE)	0.6" Ø L.R. STRAND 2 3/8" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/4" ↓
FINAL CAMBER	2 1/8" ↑

\*\* INCLUDES FUTURE WEARING SURFACE

CORED SLABS REQUIRED			
40' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	40'-0"	80'-0"
INTERIOR C.S.	9	40'-0"	360'-0"
TOTAL	11		440'-0"

CORED SLABS REQUIRED			
50' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	50'-0"	100'-0"
INTERIOR C.S.	9	50'-0"	450'-0"
TOTAL	11		550'-0"

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



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE 40' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B4	4	#4	STR	20'-9"	55	20'-9"	55
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	84	#4	3	5'-4"	299	5'-4"	299
* S3	49	#5	1	6'-2"	315		
REINFORCING STEEL	LBS.				389		389
* EPOXY COATED REINFORCING STEEL	LBS.				315		
6500 P.S.I. CONCRETE	CU. YDS.				5.8		5.8
0.6" Ø L.R. STRANDS	No.				13		13

BILL OF MATERIAL FOR ONE 50' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B6	4	#4	STR	25'-9"	69	25'-9"	69
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	104	#4	3	5'-4"	371	5'-4"	371
* S3	59	#5	1	6'-2"	379		
REINFORCING STEEL	LBS.				475		475
* EPOXY COATED REINFORCING STEEL	LBS.				379		
6500 P.S.I. CONCRETE	CU. YDS.				7.1		7.1
0.6" Ø L.R. STRANDS	No.				19		19

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	40' UNIT					
* B11	40	40	#5	STR	19'-7"	817
* S4	98	98	#5	2	7'-2"	733
* EPOXY COATED REINFORCING STEEL	LBS.					1550
CLASS AA CONCRETE	CU. YDS.					10.5
TOTAL VERTICAL CONCRETE BARRIER RAIL	LN. FT.					80.25

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	50' UNIT					
* B13	40	40	#5	STR	24'-7"	1026
* S4	118	118	#5	2	7'-2"	882
* EPOXY COATED REINFORCING STEEL	LBS.					1908
CLASS AA CONCRETE	CU. YDS.					13.1
TOTAL VERTICAL CONCRETE BARRIER RAIL	LN. FT.					100.25

NOTES

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

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

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

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

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

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

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

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

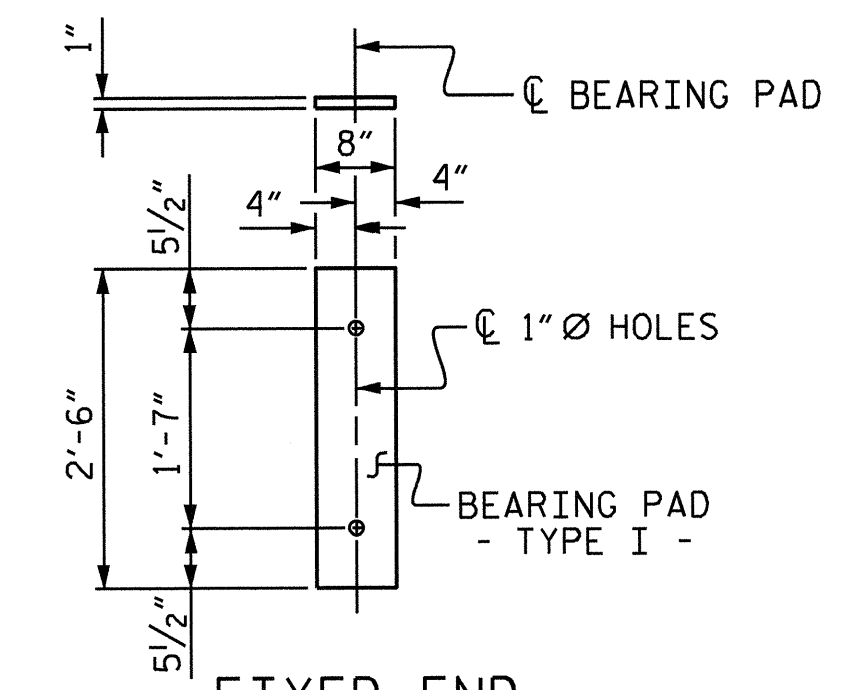
APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

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.

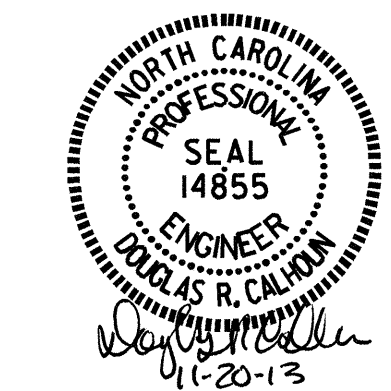


ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 4 OF 4

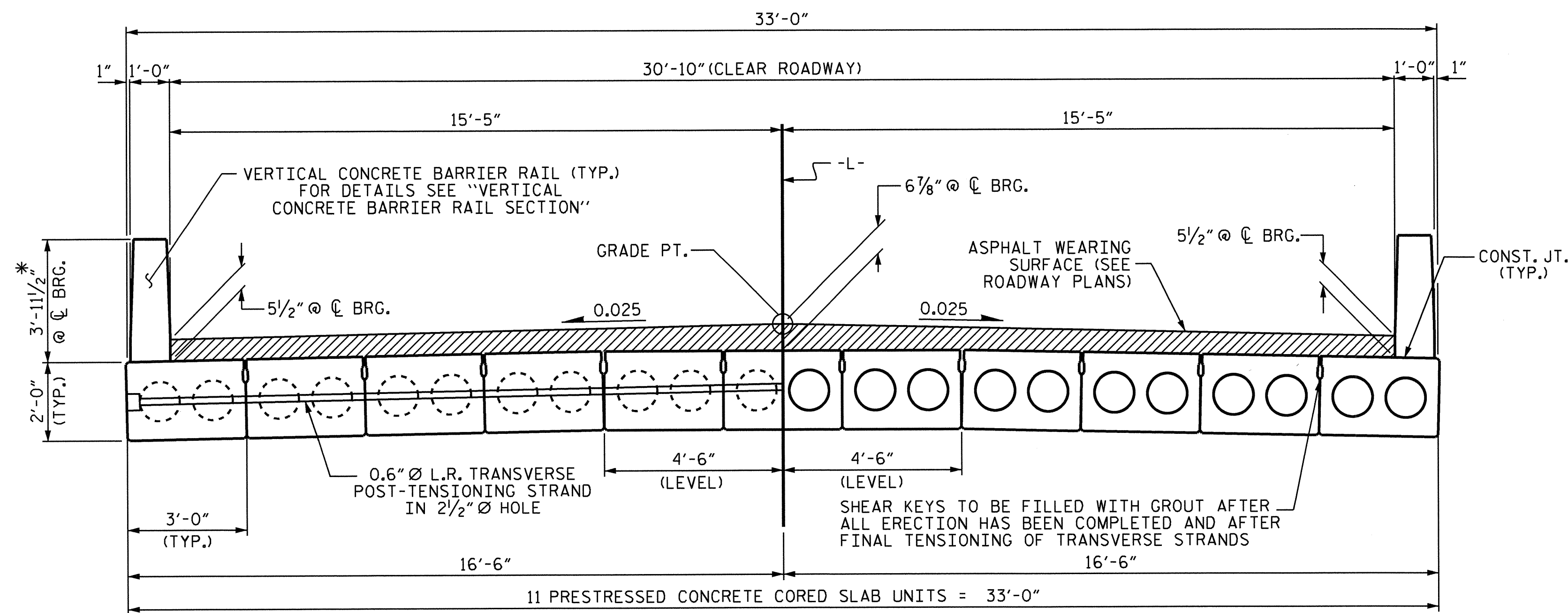


STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 1'-9"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT  
SPANS A & C

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

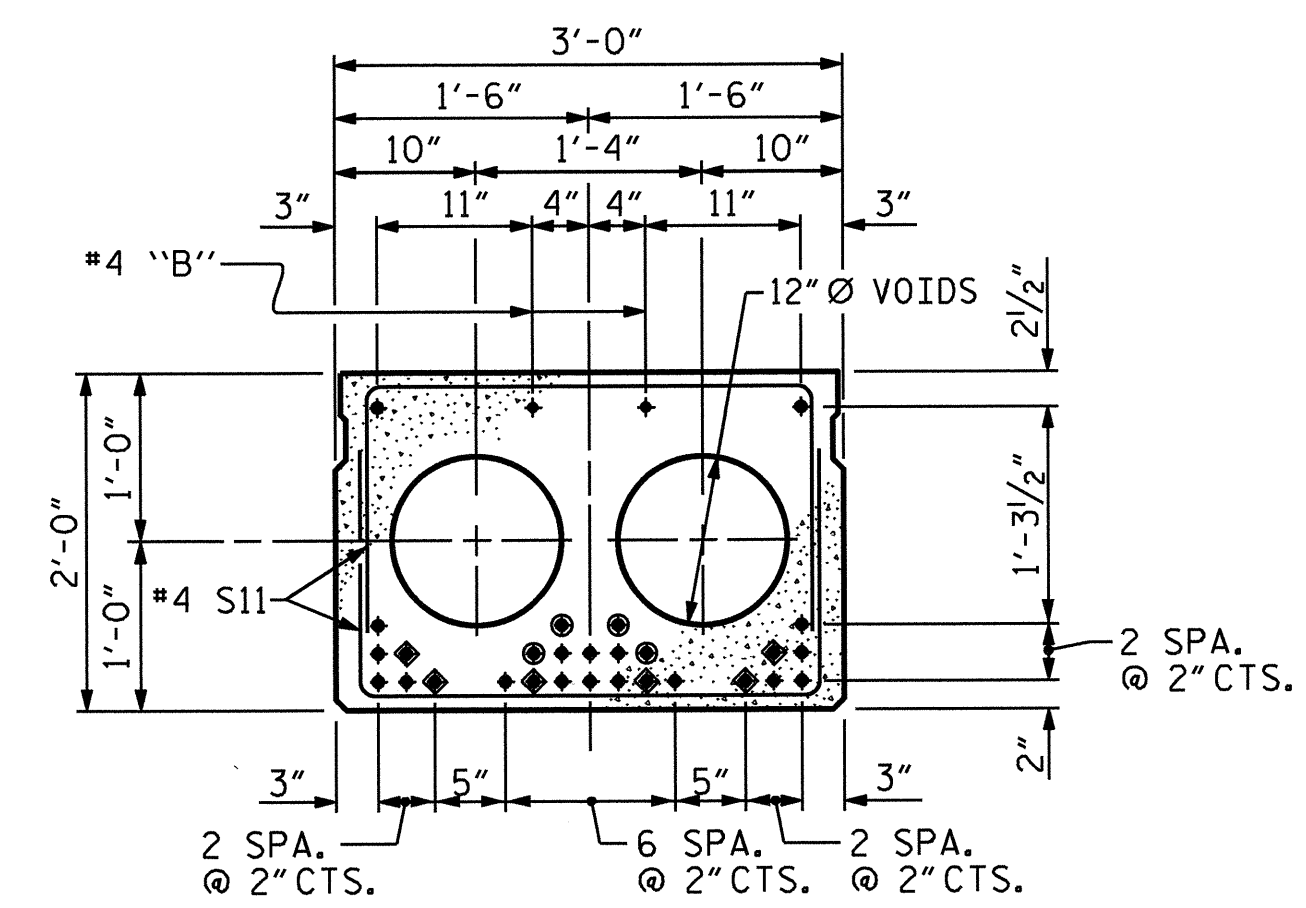
ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
CHECKED BY : D.G. ELY DATE : 7/2012  
DRAWN BY : DGE 5/09 REV. 12/11 MAA/AAC  
CHECKED BY : BCH 6/09





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.

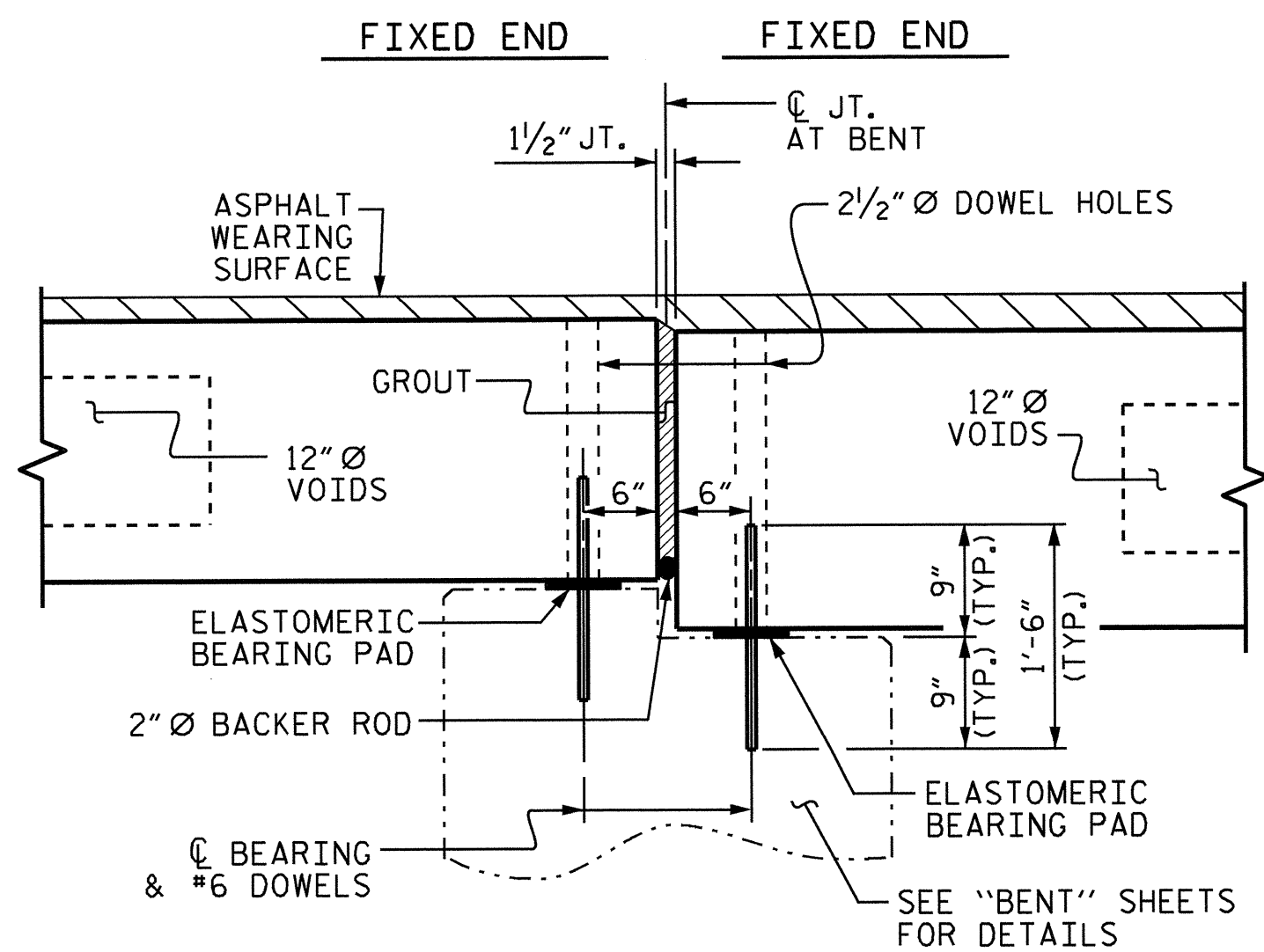


**INTERIOR SLAB SECTION (60' UNIT)**  
(24 STRANDS REQUIRED)

**0.6" Ø LOW RELAXATION STRAND LAYOUT**

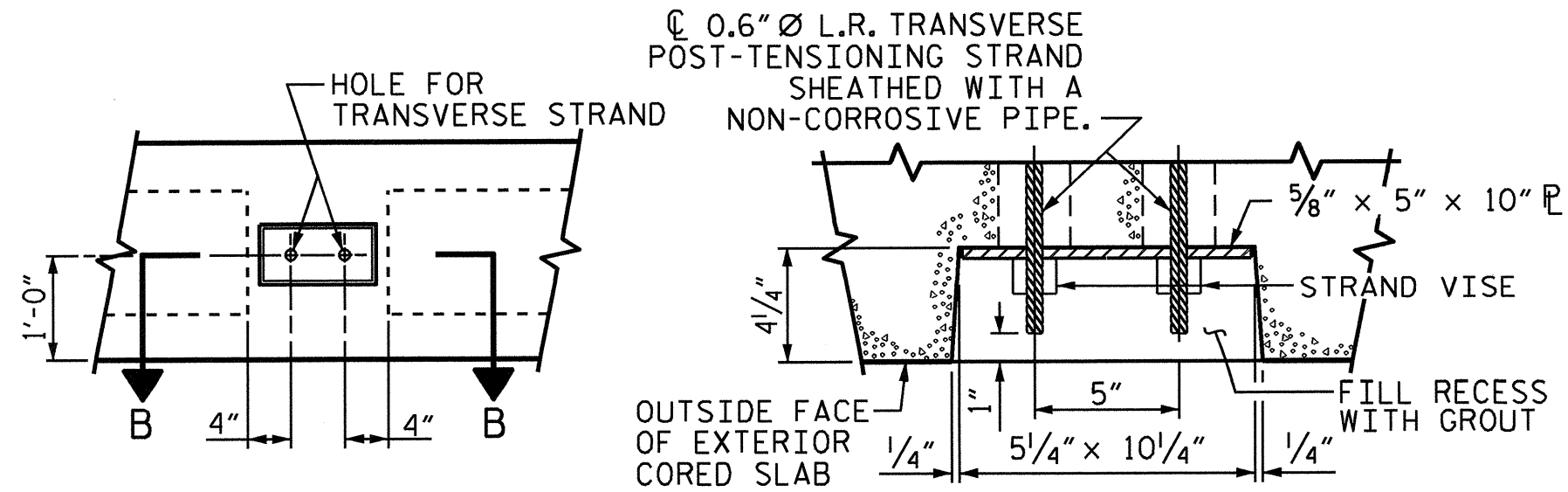
- ◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED, IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS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

**DEBONDING LEGEND**



**SECTION AT BENTS**

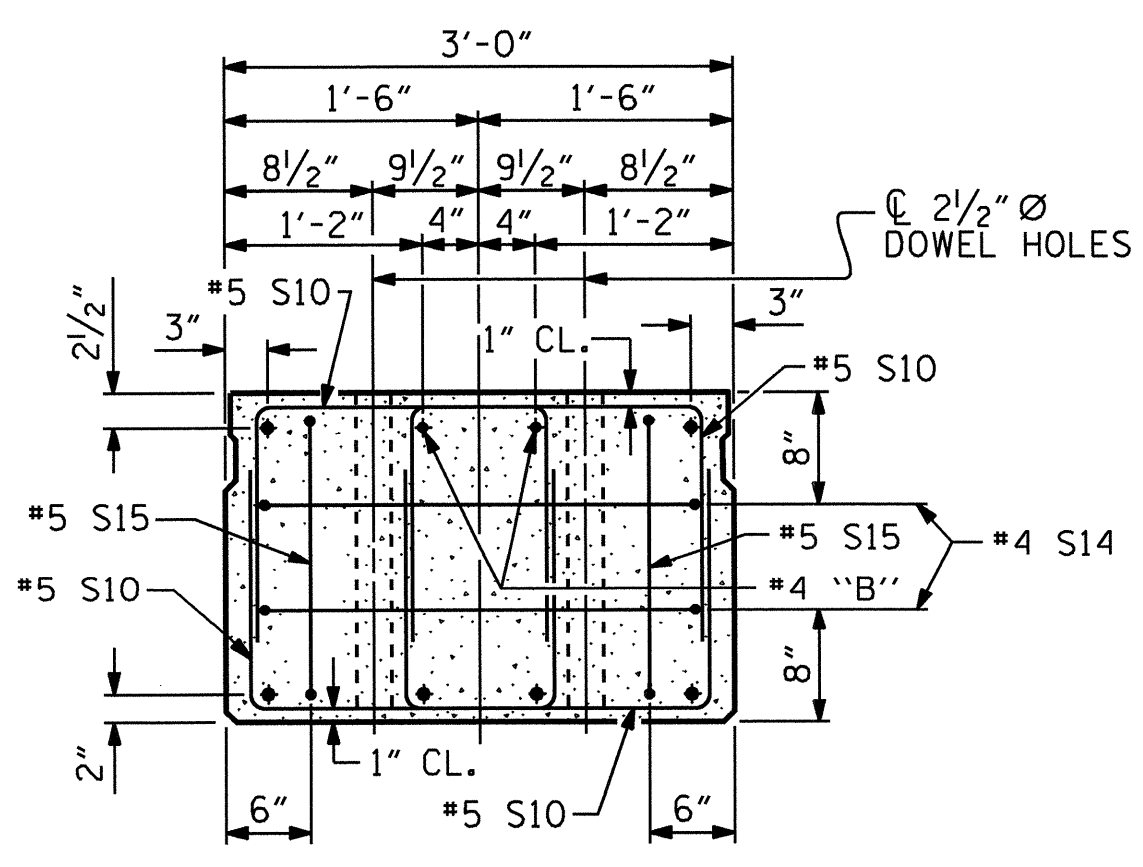
(BENT 1 SHOWN, BENT 2 SIMILAR BY ROTATION)



**ELEVATION VIEW**

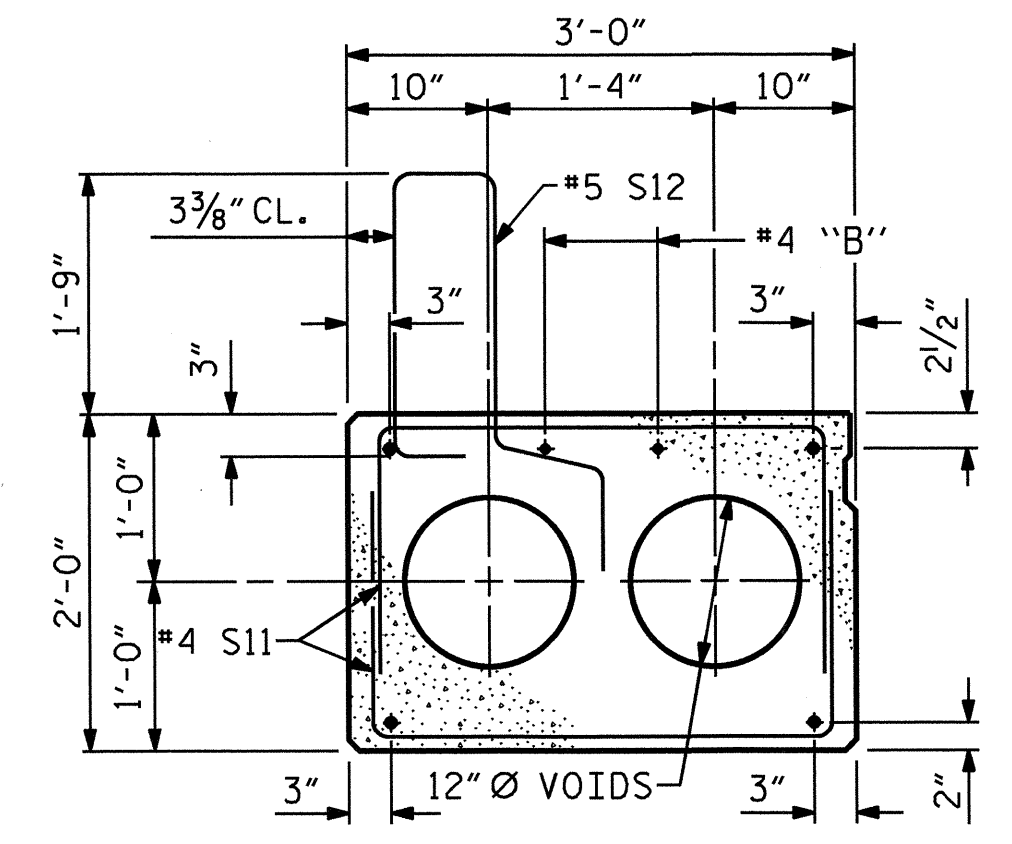
**SECTION B-B**

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



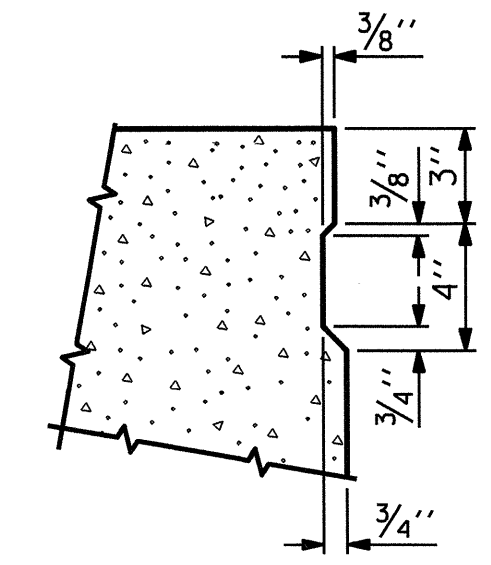
**END ELEVATION**

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



**EXTERIOR SLAB SECTION**

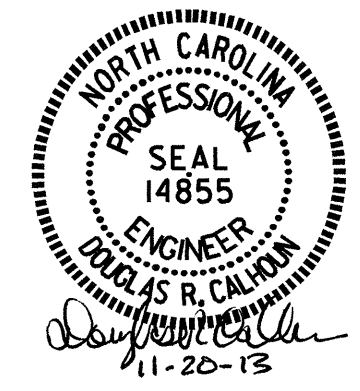
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



**SHEAR KEY DETAIL**

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

ASSEMBLED BY :	A. SORSENGINH	DATE :	4/2012
CHECKED BY :	D.G. ELY	DATE :	7/2012
DRAWN BY :	MAA 6/10	REV. :	12/11
CHECKED BY :	MKT 7/10		MAA/AAC

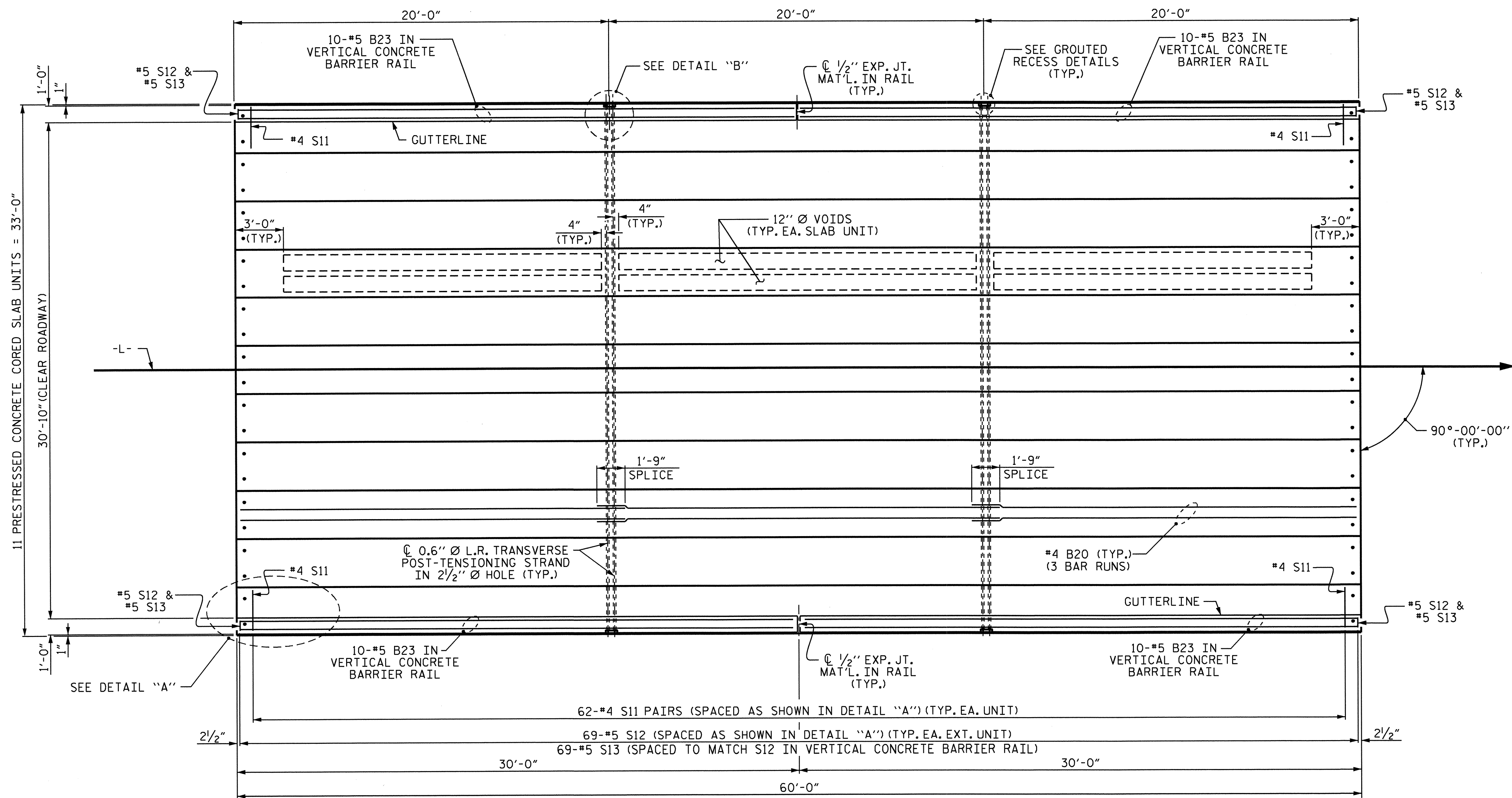


PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

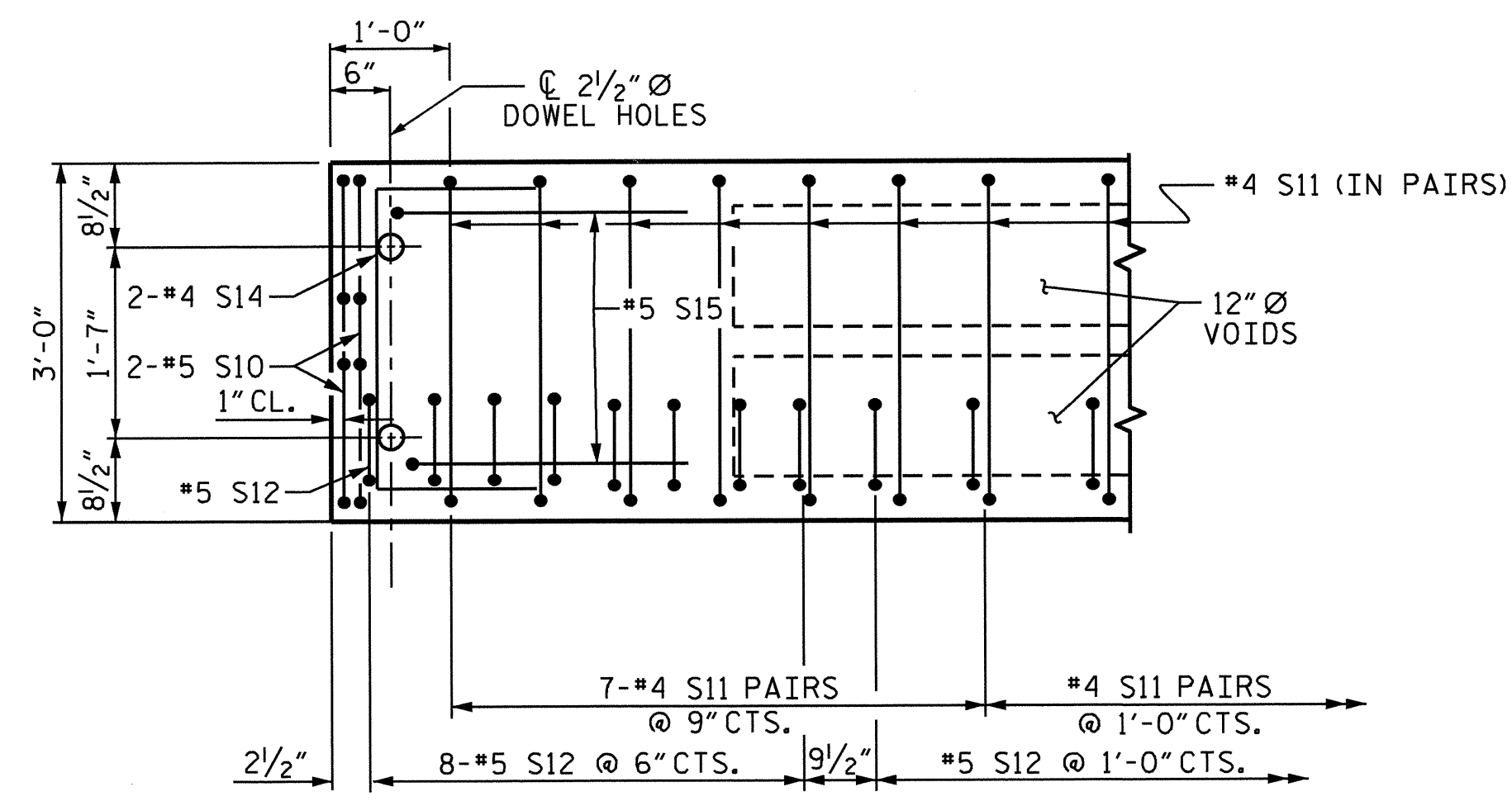
SHEET 1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. 5-11
STANDARD 3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT 90° SKEW SPAN B						
REVISIONS						TOTAL SHEETS 24
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

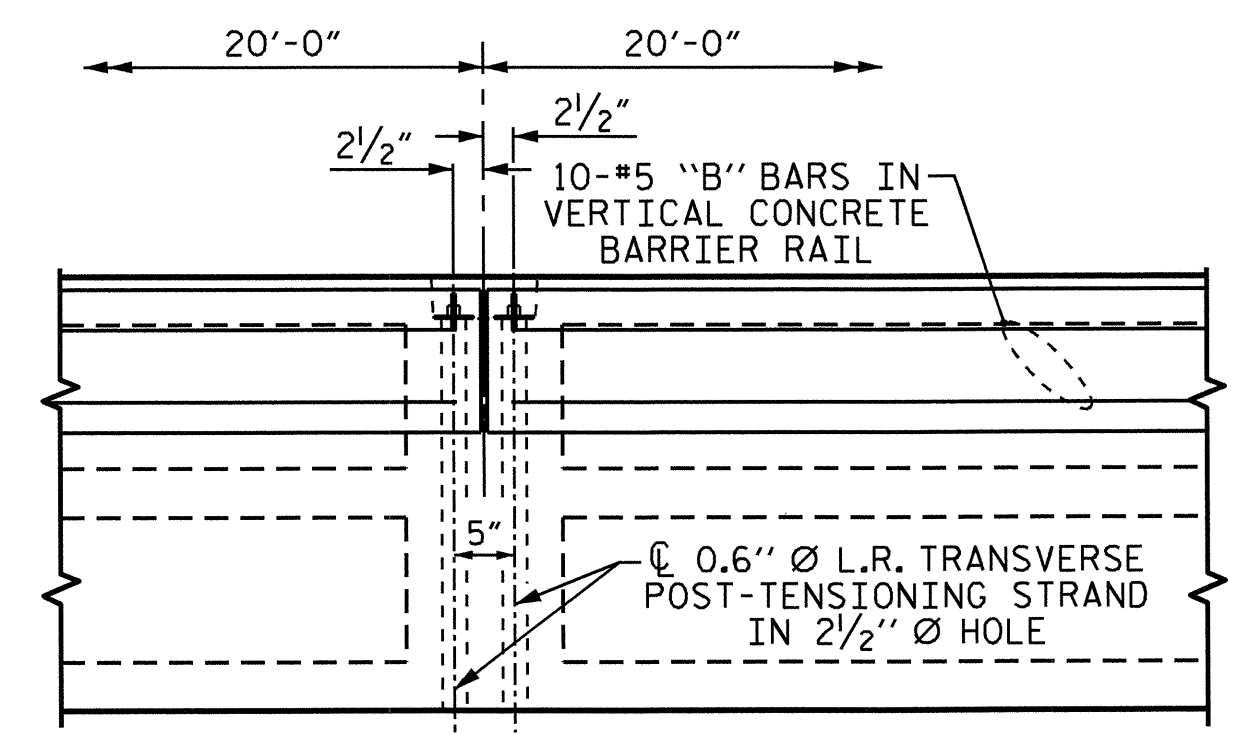




PLAN OF UNIT



DETAIL "A"



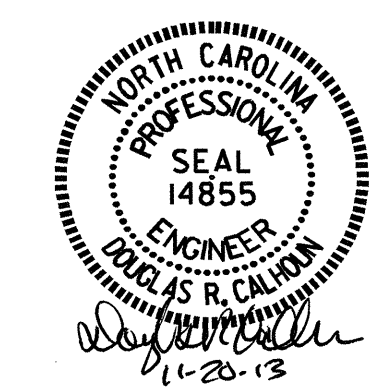
DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUDED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012  
 DRAWN BY : MAA 6/10 REV. 12/5/11 MAA/AAC  
 CHECKED BY : MKT 7/10

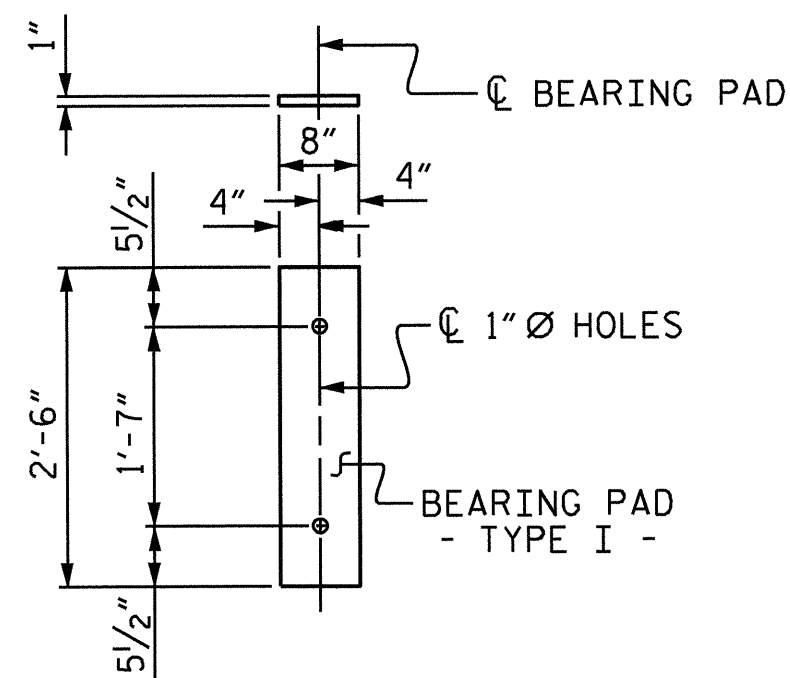
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PROJECT NO. B-4400  
 ALAMANCE COUNTY  
 STATION: 16+88.00 -L-  
 SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
PLAN OF 60' UNIT 30'-10" CLEAR ROADWAY 90° SKEW SPAN B					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-12
					TOTAL SHEETS 24

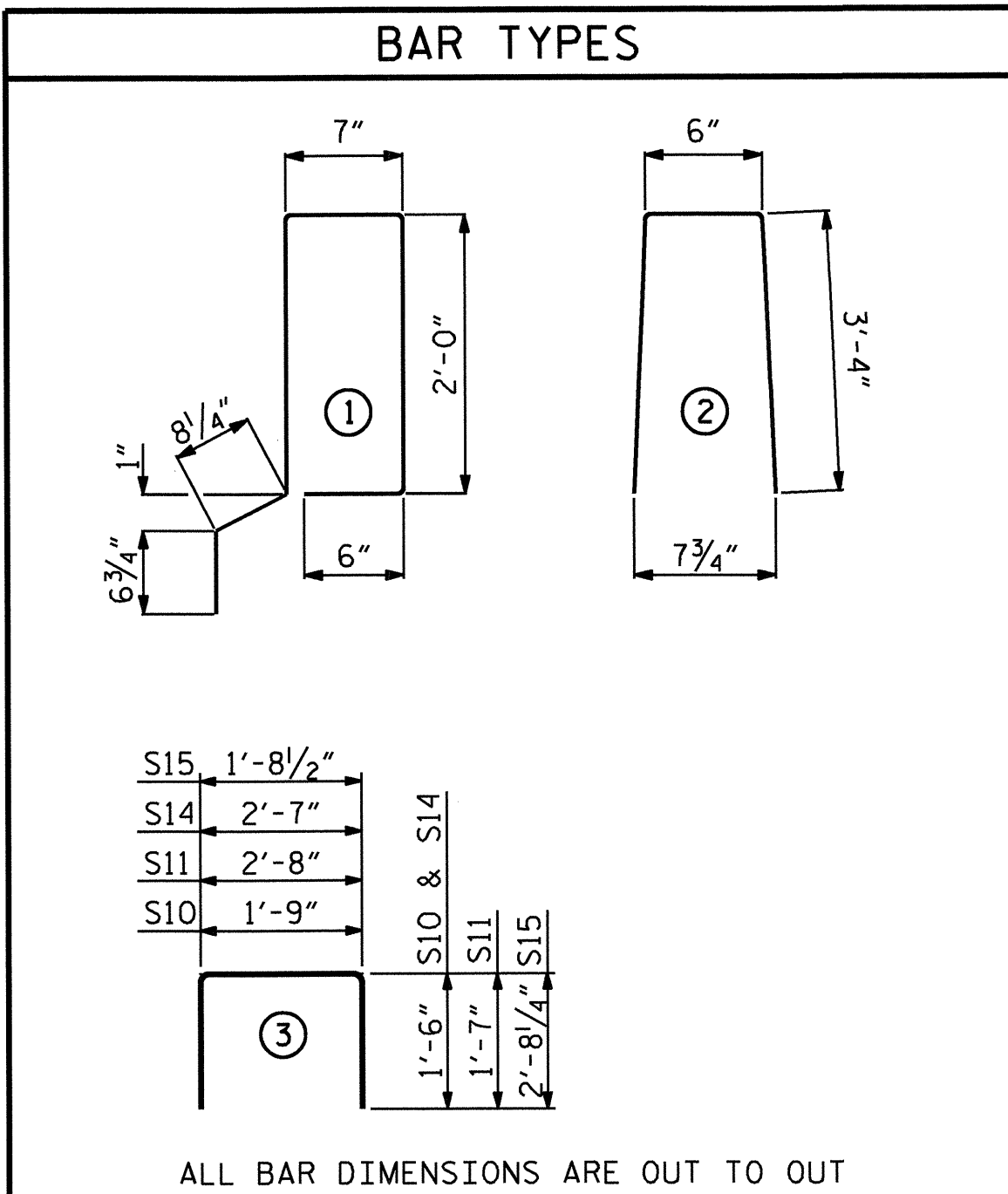
STD. NO. 24PCS\_33\_90S\_60L



FIXED END  
(TYPE I - 22 REQ'D)

**ELASTOMERIC BEARING DETAILS**

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



**BILL OF MATERIAL FOR ONE 60' CORED SLAB UNIT**

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
B20	6	#4	STR	21'-2"	85	21'-2"	85
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	124	#4	3	5'-10"	483	5'-10"	483
*S12	69	#5	1	6'-4"	456		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL				LBS.	653		653
* EPOXY COATED REINFORCING STEEL				LBS.	456		
6000 P.S.I. CONCRETE				CU. YDS.	10.2		10.2
0.6" ∅ L.R. STRANDS				No.	24		24

**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" ∅ 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.

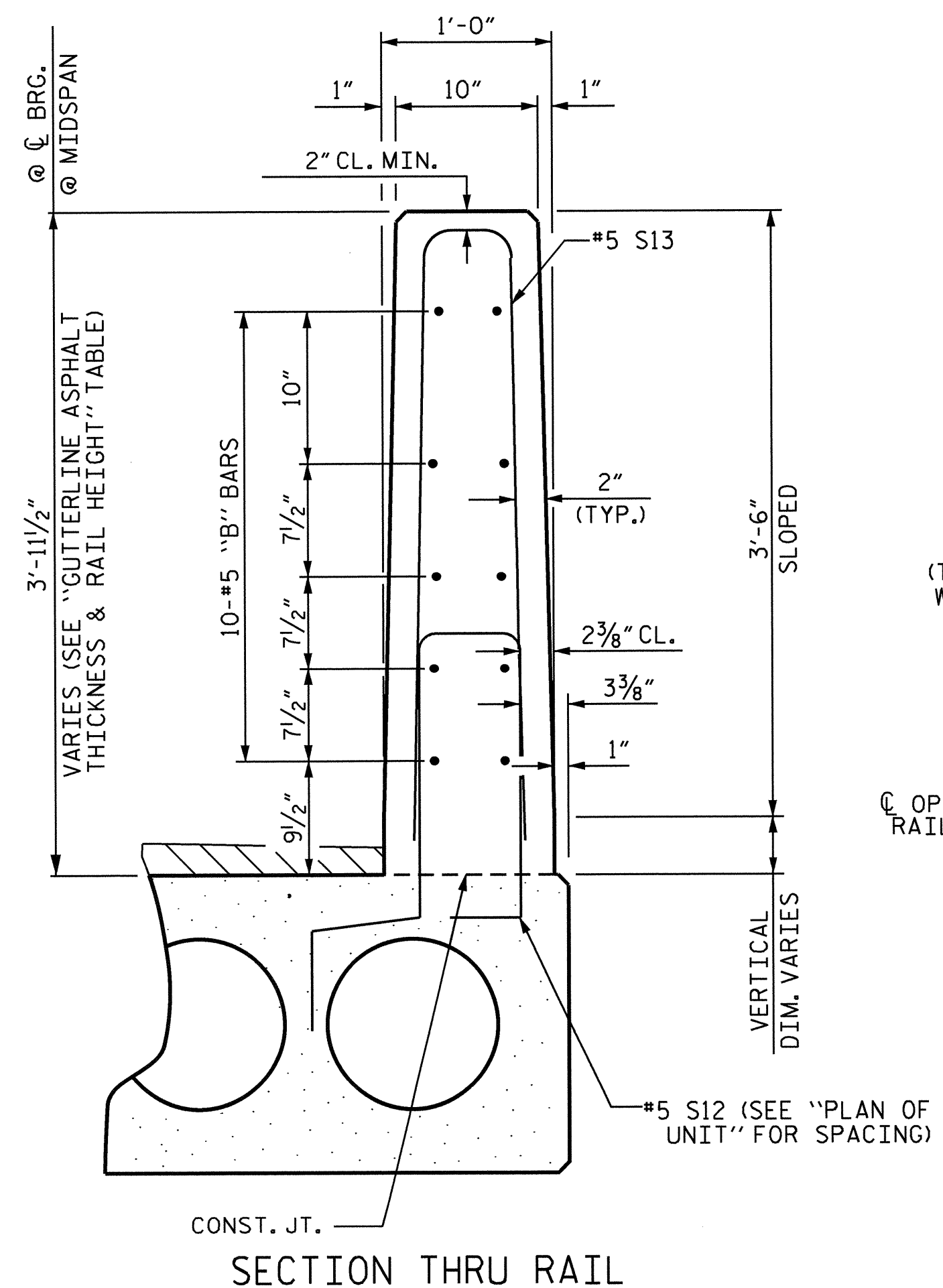
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED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

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

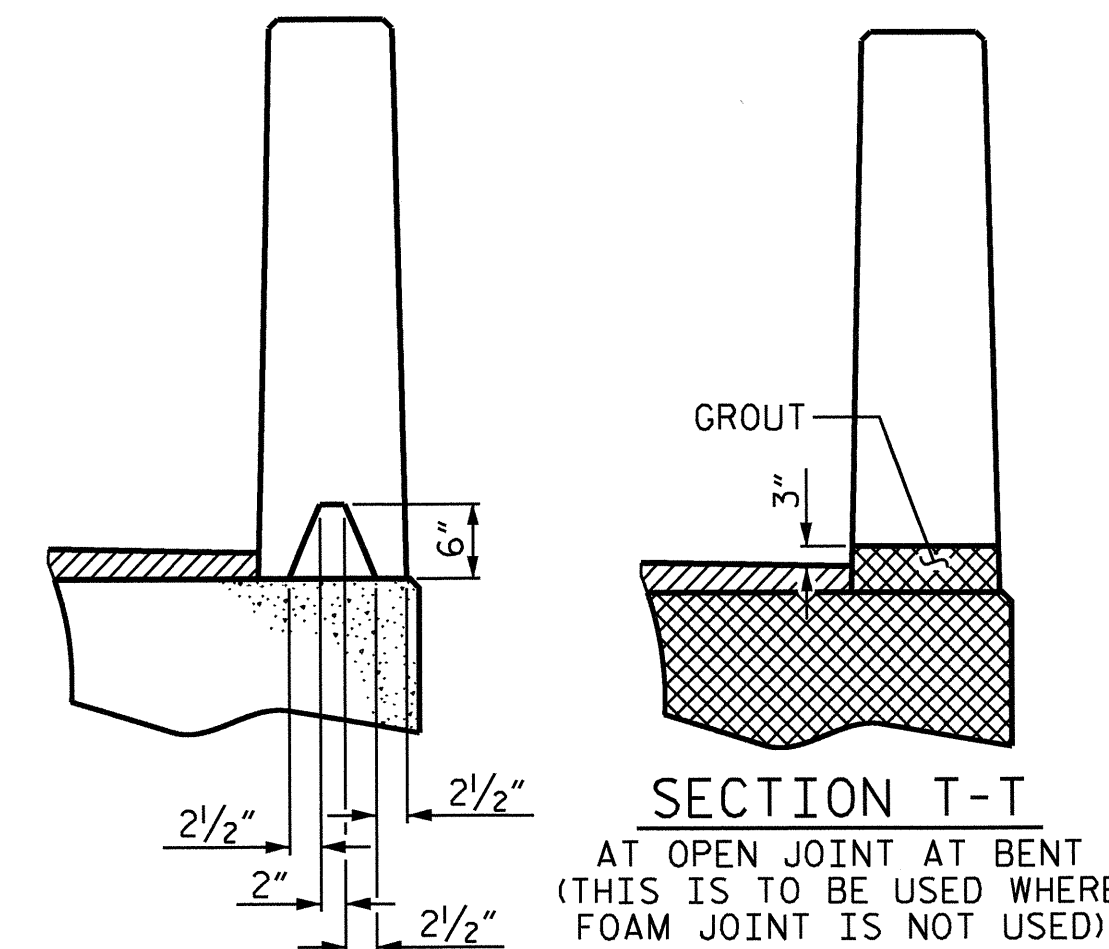
MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

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

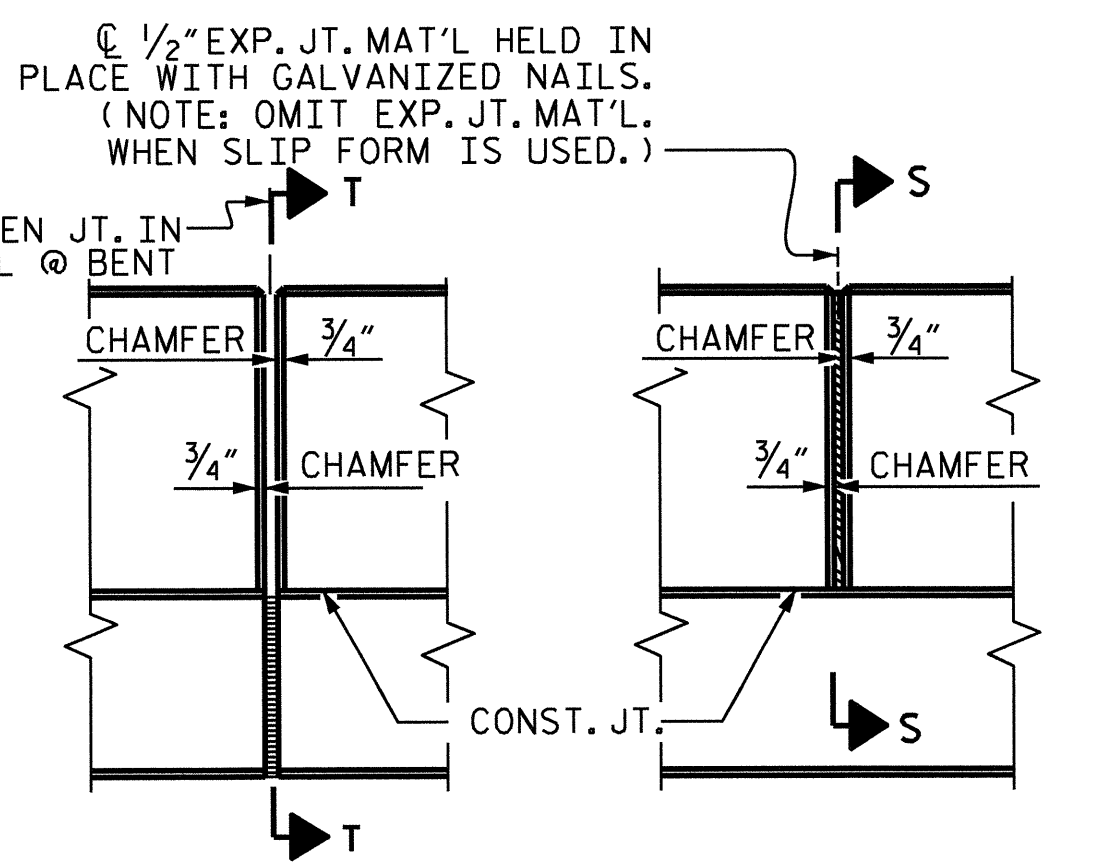
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



SECTION THRU RAIL



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



**VERTICAL CONCRETE BARRIER RAIL DETAILS**

**BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL**

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
60' UNIT						
*B23	40	40	#5	STR	29'-7"	1234
*S13	138	138	#5	2	7'-2"	1032
* EPOXY COATED REINFORCING STEEL				LBS.		2266
CLASS AA CONCRETE				CU. YDS.		16.2
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		120.25

**DEAD LOAD DEFLECTION AND CAMBER**

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

\*\* INCLUDES FUTURE WEARING SURFACE

**GRADE 270 STRANDS**

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

**GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT**

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
60' UNITS	1 5/8"	3'-7 5/8"

**CORED SLABS REQUIRED**

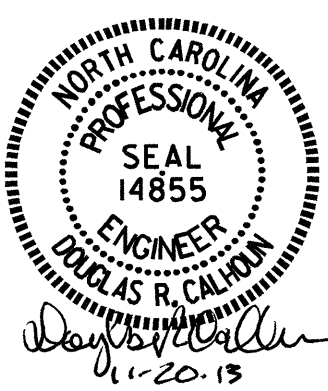
60' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	60'-0"	120'-0"
INTERIOR C.S.	9	60'-0"	540'-0"
TOTAL	11		660'-0"

**CONCRETE RELEASE STRENGTH**

UNIT	PSI
60' UNIT	4800

PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 3 OF 3



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

REVISIONS

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

SHEET NO. 5-13  
TOTAL SHEETS 24

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
CHECKED BY : D.G. ELY DATE : 7/2012  
DRAWN BY : MAA 6/10 REV. 12/11 MAA/AAC  
CHECKED BY : MKT 7/10



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.)

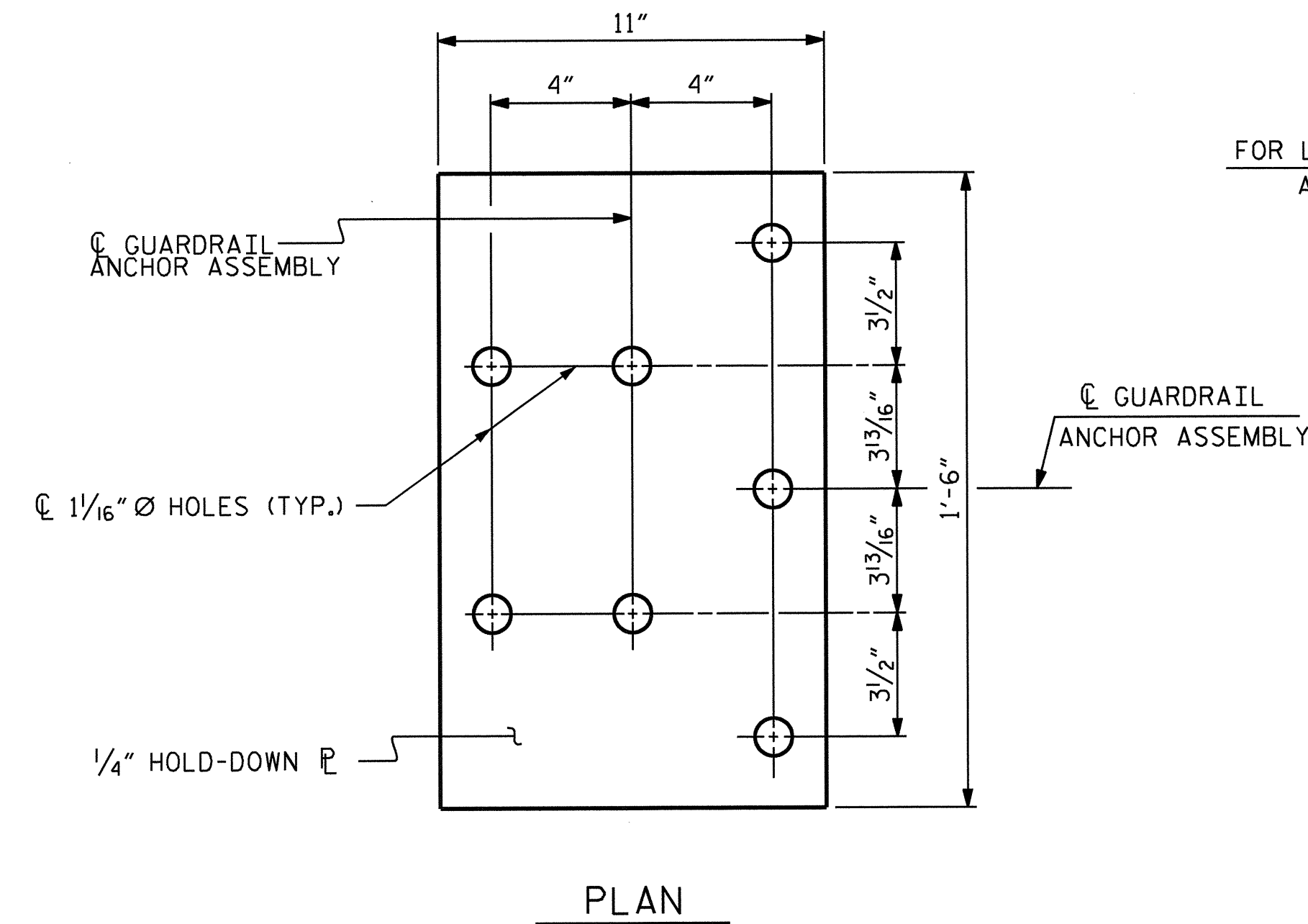
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

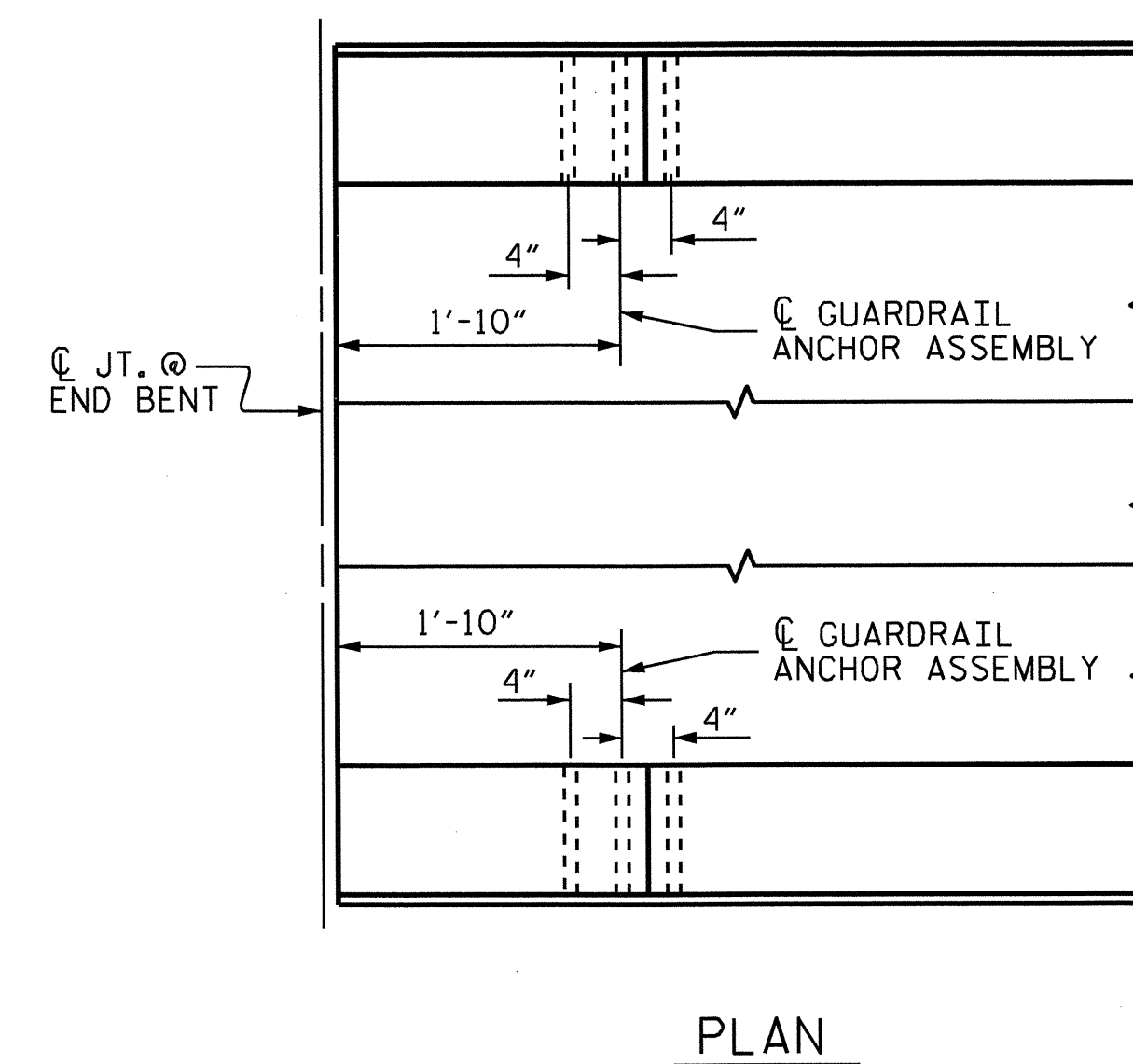
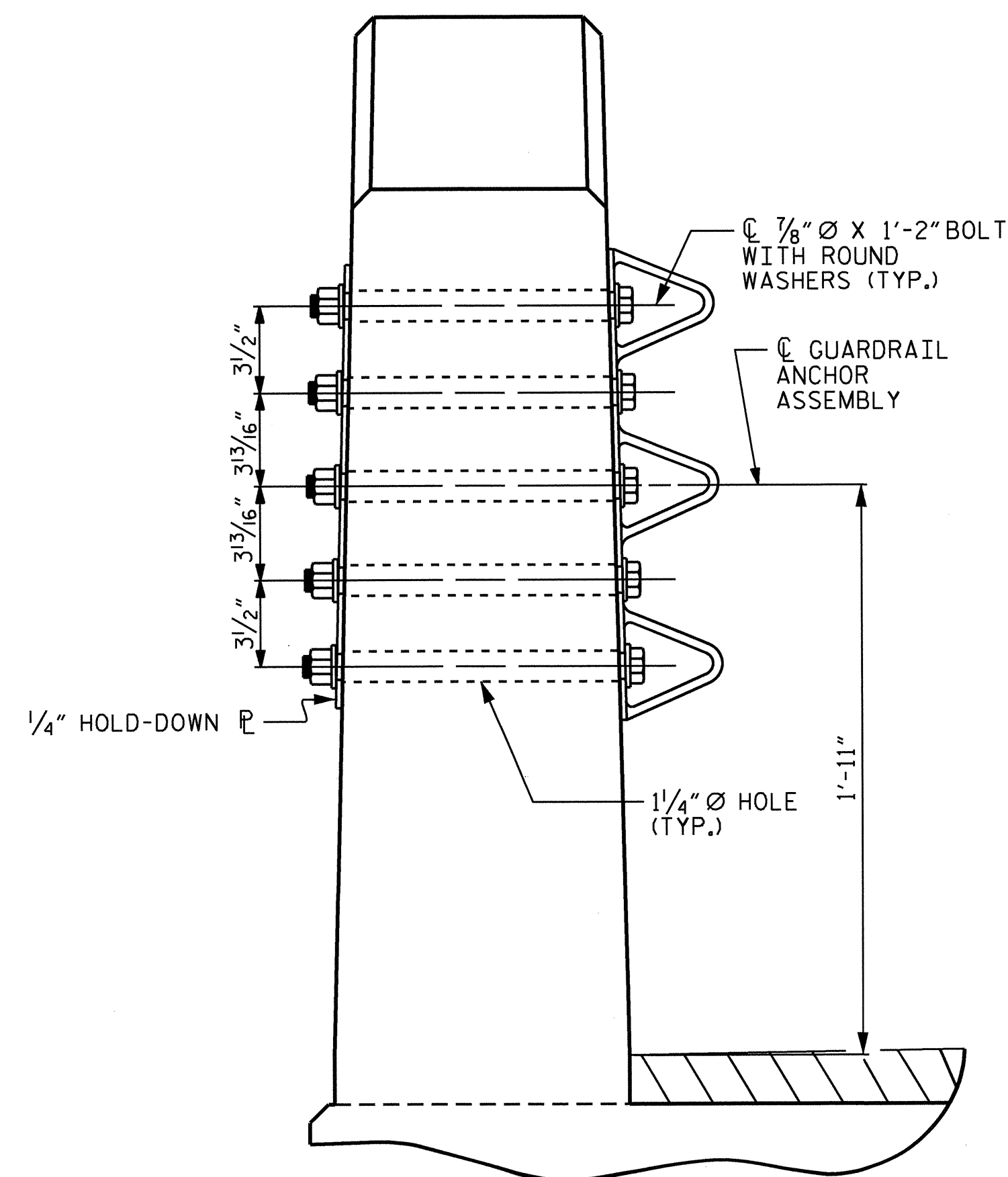
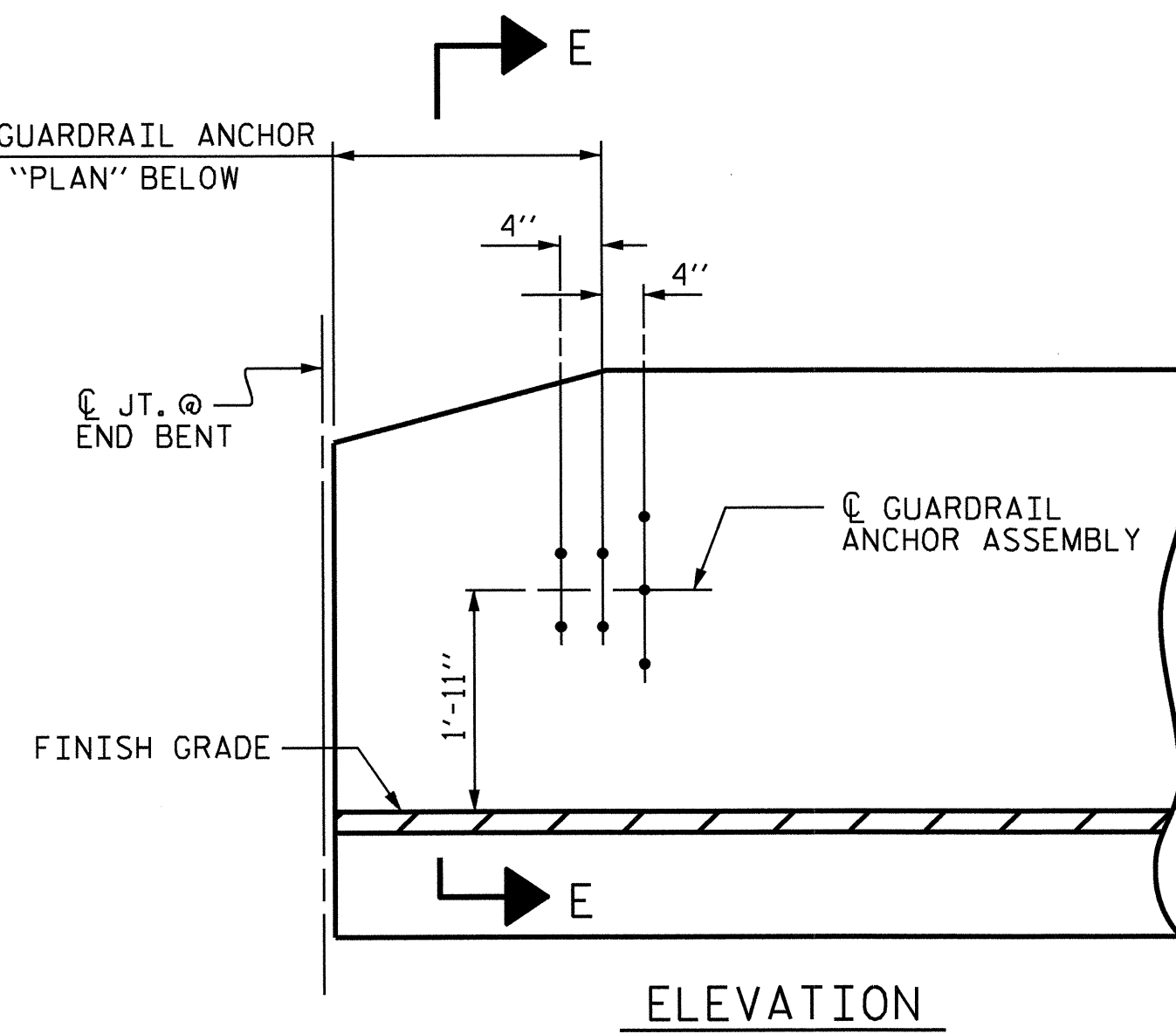
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

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.

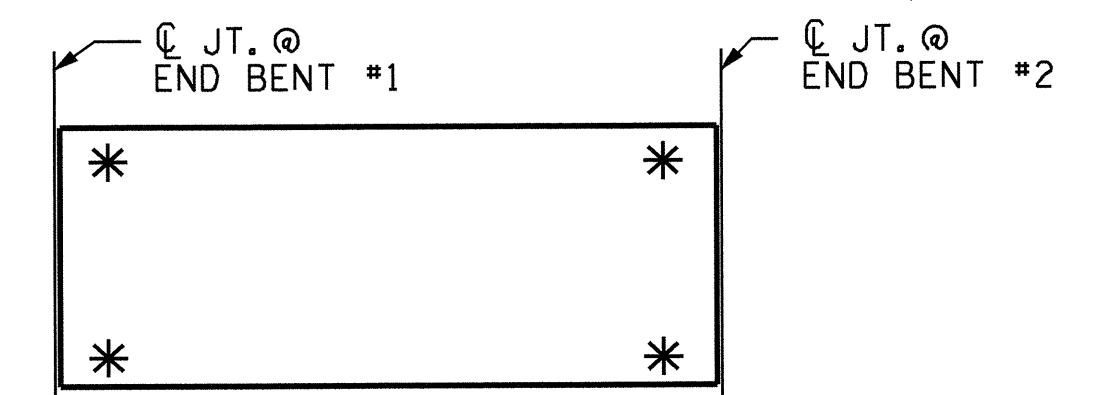


FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



LOCATION OF ANCHORS FOR GUARDRAIL

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



\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4400  
ALAMANCE COUNTY  
 STATION: 16+88.00 -L-



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

ASSEMBLED BY : A. SORSENGIN	DATE : 4/2012
CHECKED BY : D.G. ELY	DATE : 7/2012
DRAWN BY : MAA 5/10	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/10	REV. 12/5/11 MAA/GM
	REV. 6/13 MAA/GM

20-NOV-2013 13:22  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-14
2			4			24

(SHT 1) STD. NO. GRA3

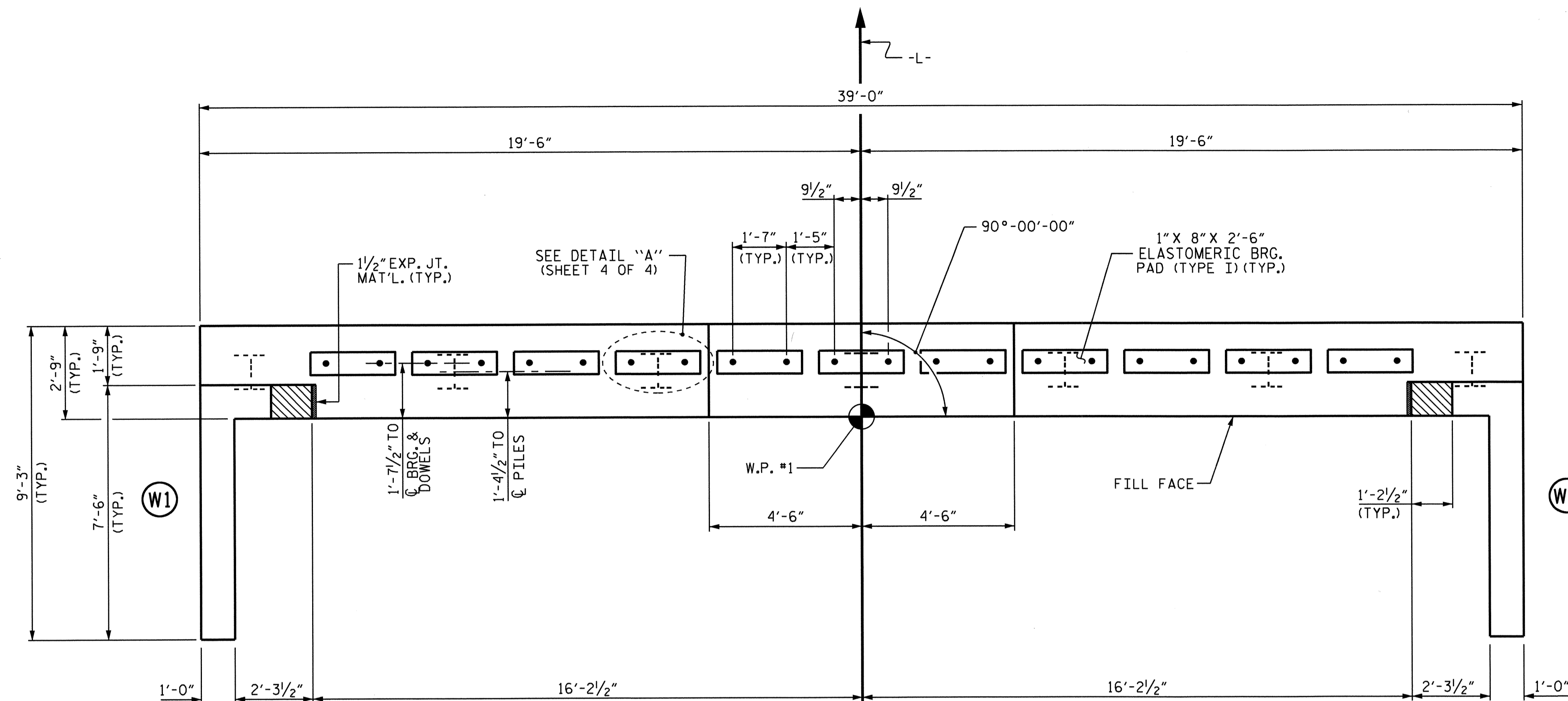
**NOTES**

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

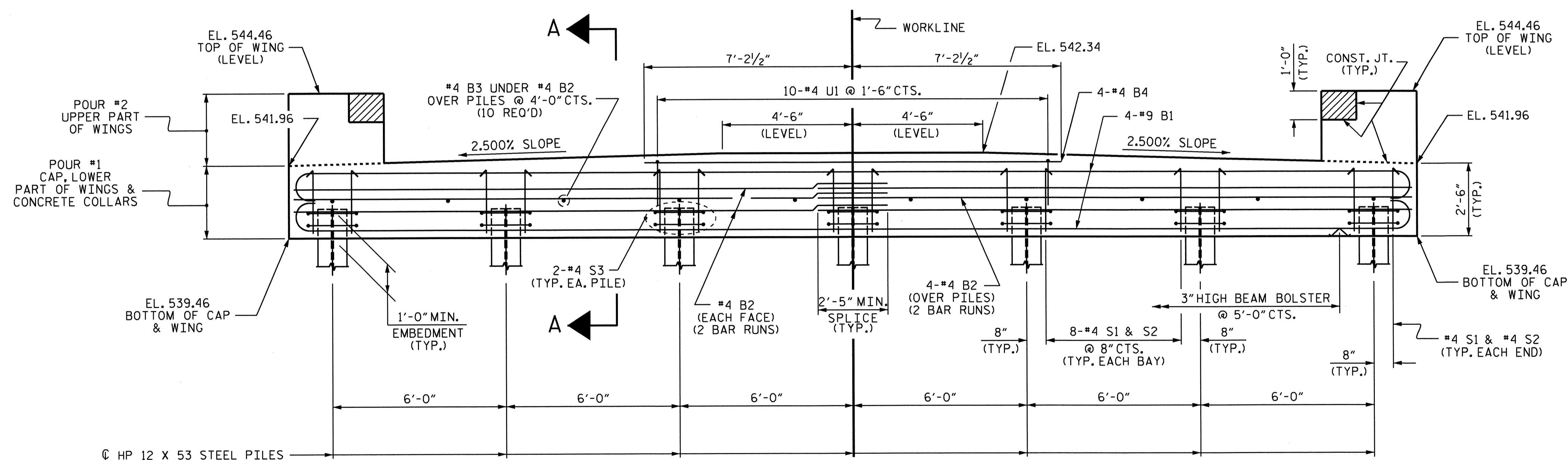
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



**PLAN**



**ELEVATION**

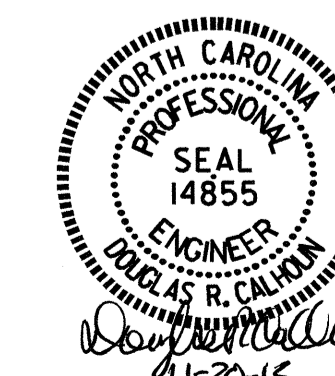
WINGS NOT SHOWN FOR CLARITY.  
FOR SECTION A-A, SEE SHEET 4 OF 4.  
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 1



ASSEMBLED BY : A. SORSENGINH	DATE : 4/2012
CHECKED BY : D.G. ELY	DATE : 7/2012
DRAWN BY : DGE 02/10	
CHECKED BY : MKT 02/10	

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



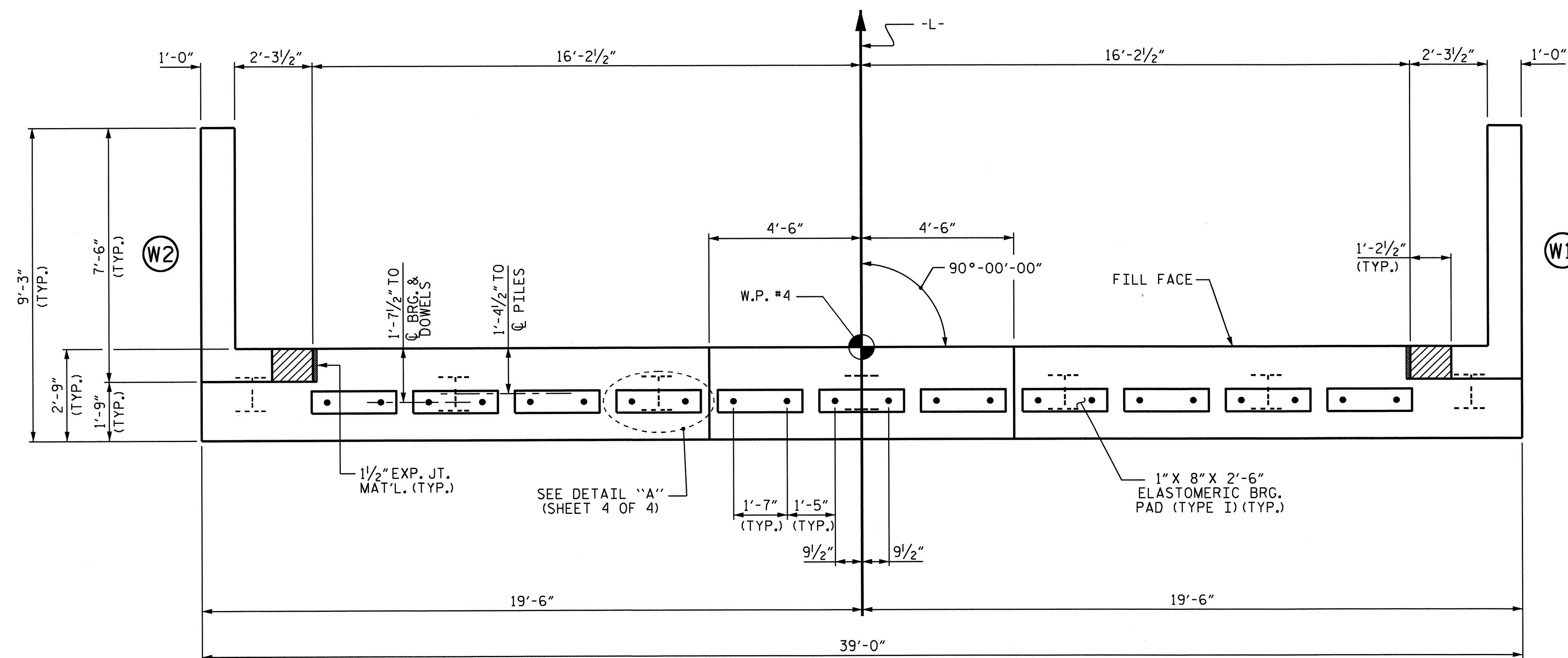
**NOTES**

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

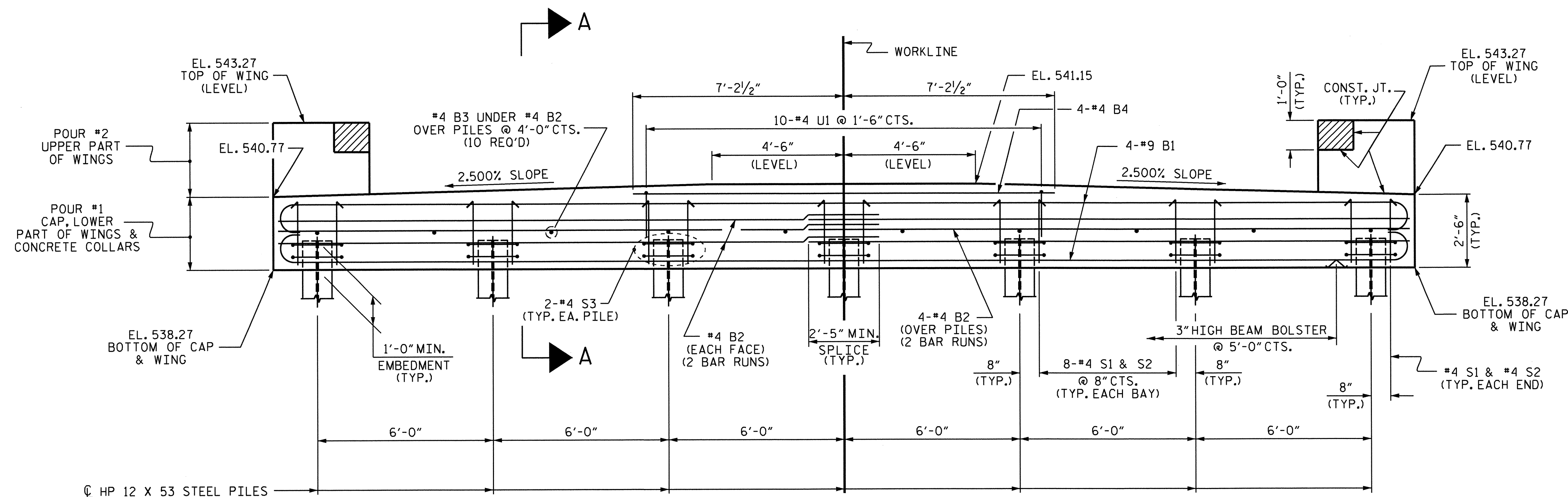
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



**PLAN**



**ELEVATION**

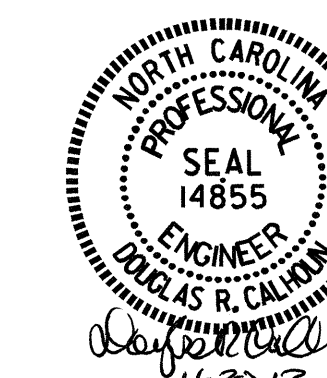
WINGS NOT SHOWN FOR CLARITY.  
FOR SECTION A-A, SEE SHEET 4 OF 4.  
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 2

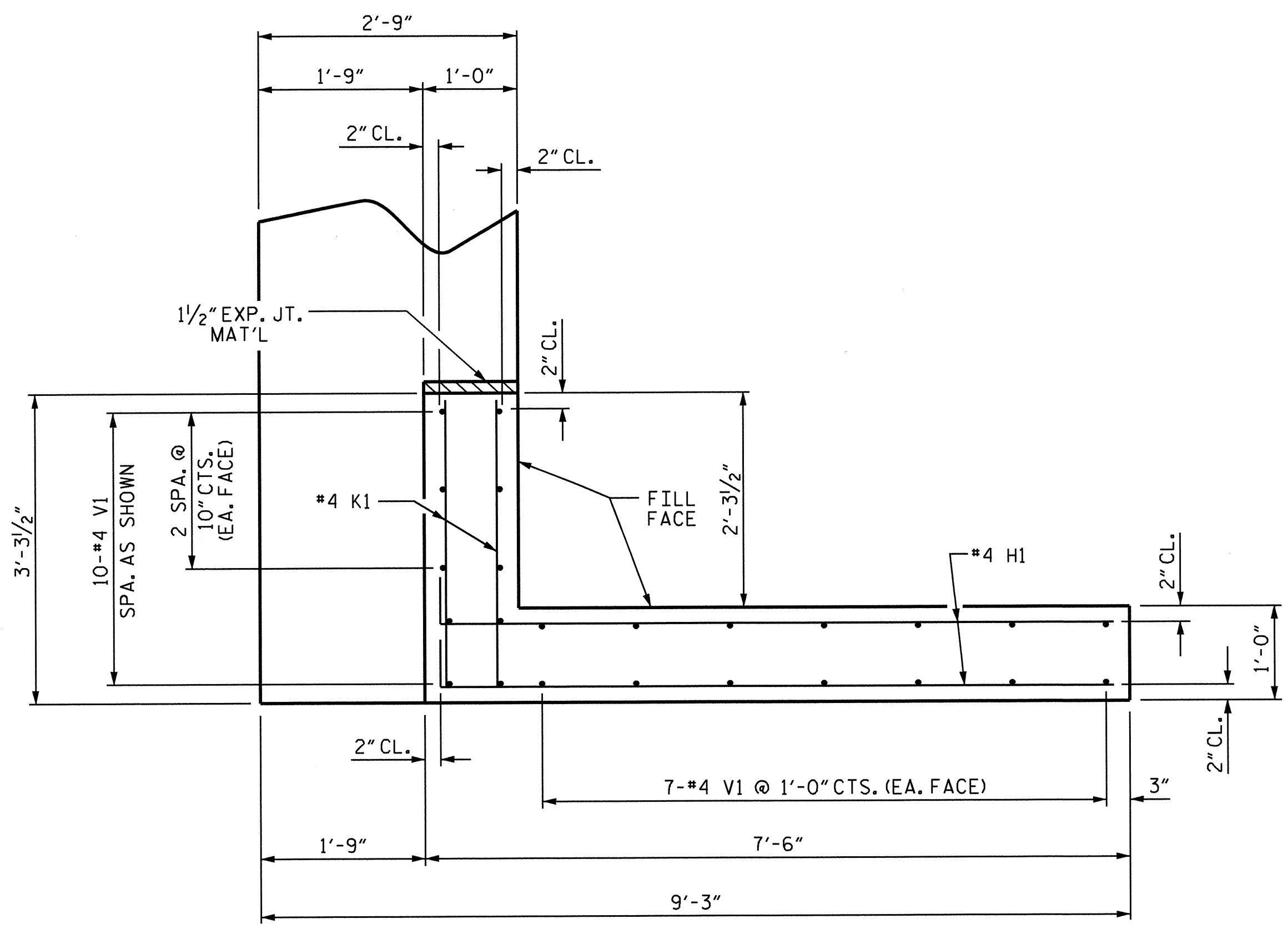


ASSEMBLED BY :	A. SORSENGINH	DATE :	4/2012
CHECKED BY :	D.G. ELY	DATE :	7/2012
DRAWN BY :	DGE 02/10		
CHECKED BY :	MKT 02/10		

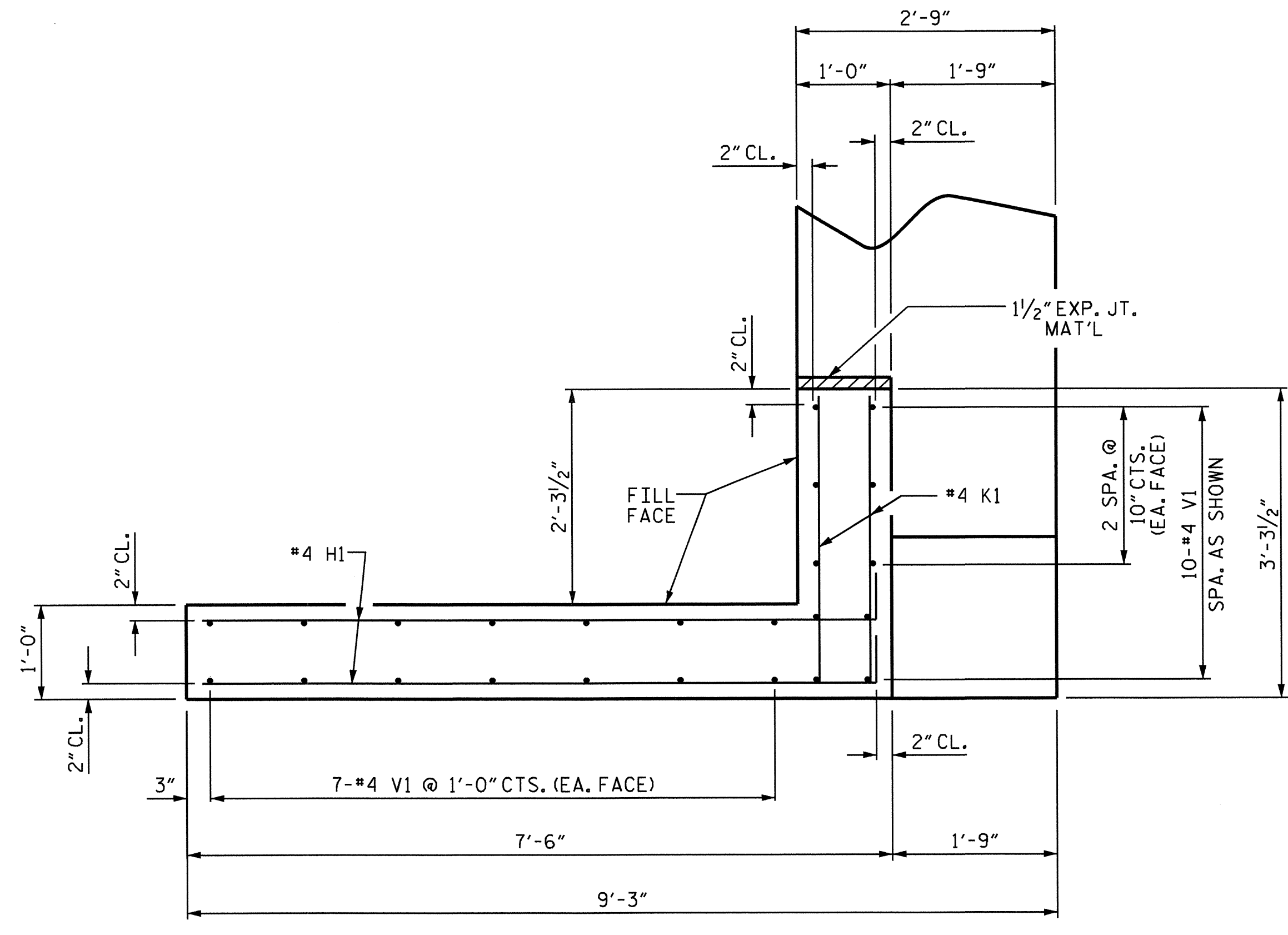
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-16
2			4			TOTAL SHEETS 24

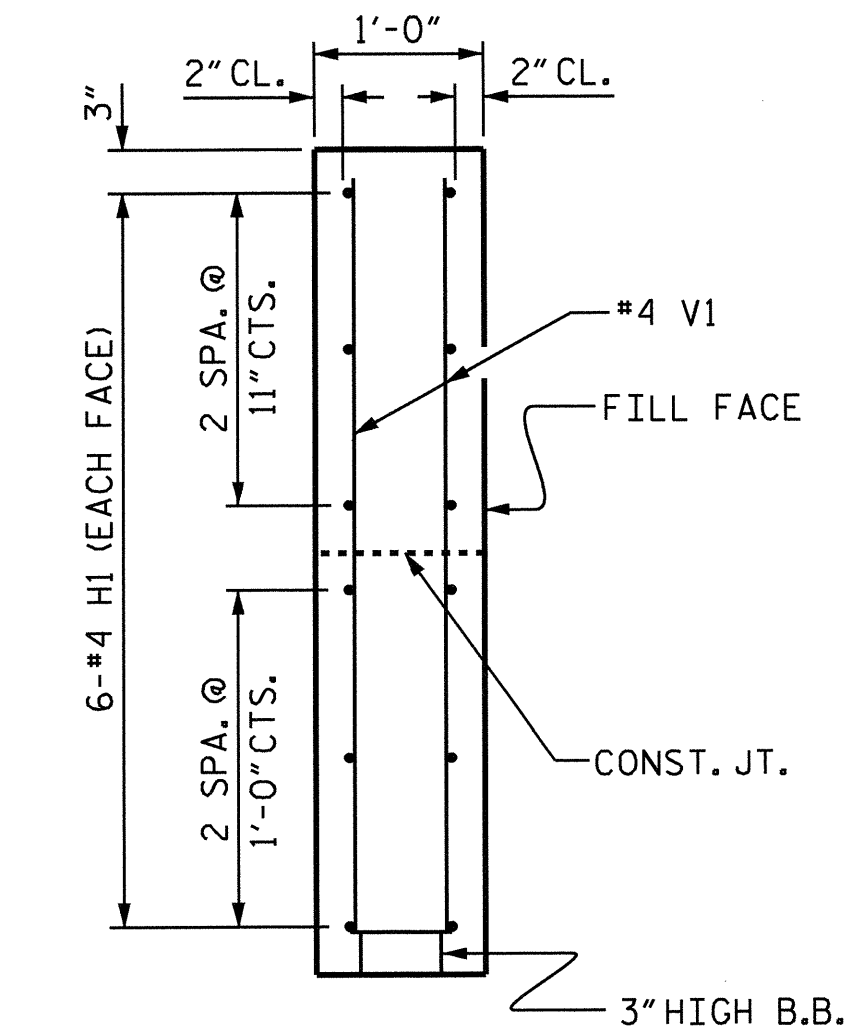
STD. NO. EB\_33\_90S



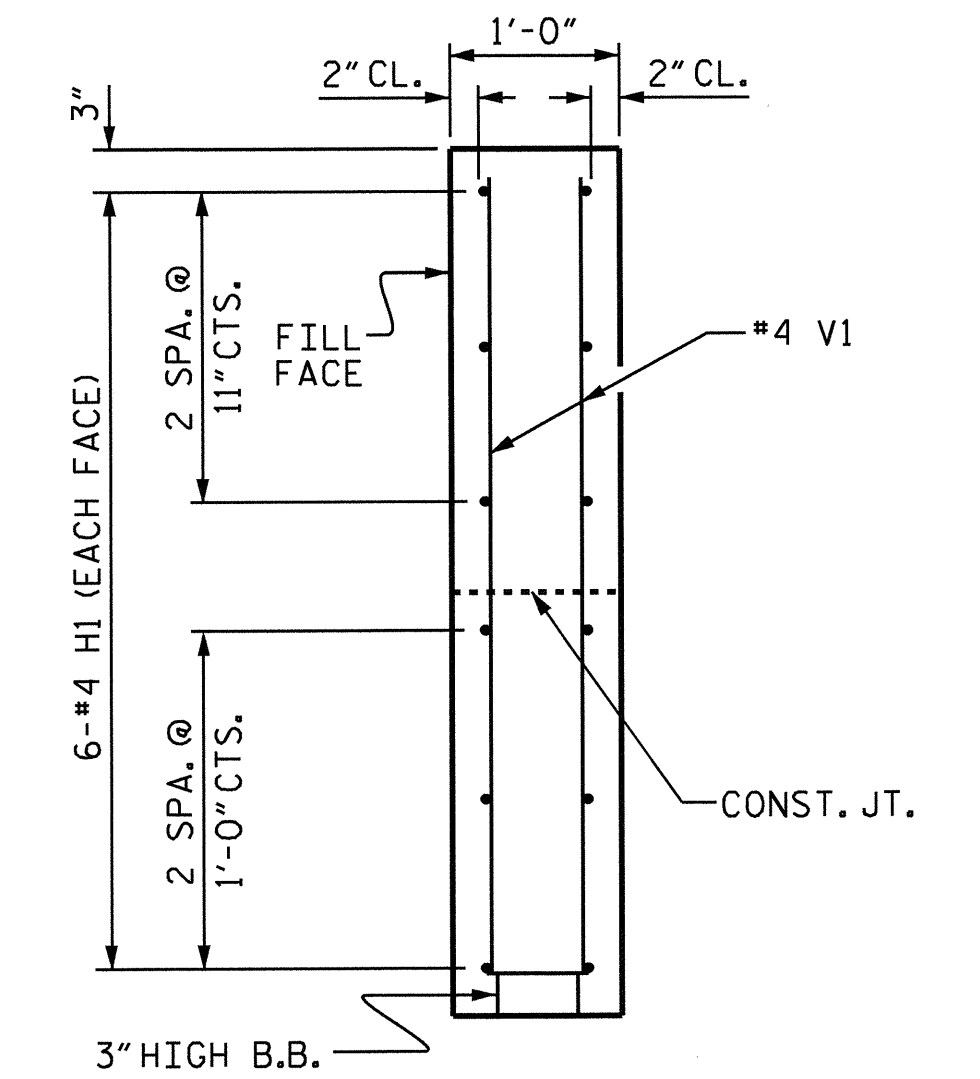
PLAN OF WING (W1)



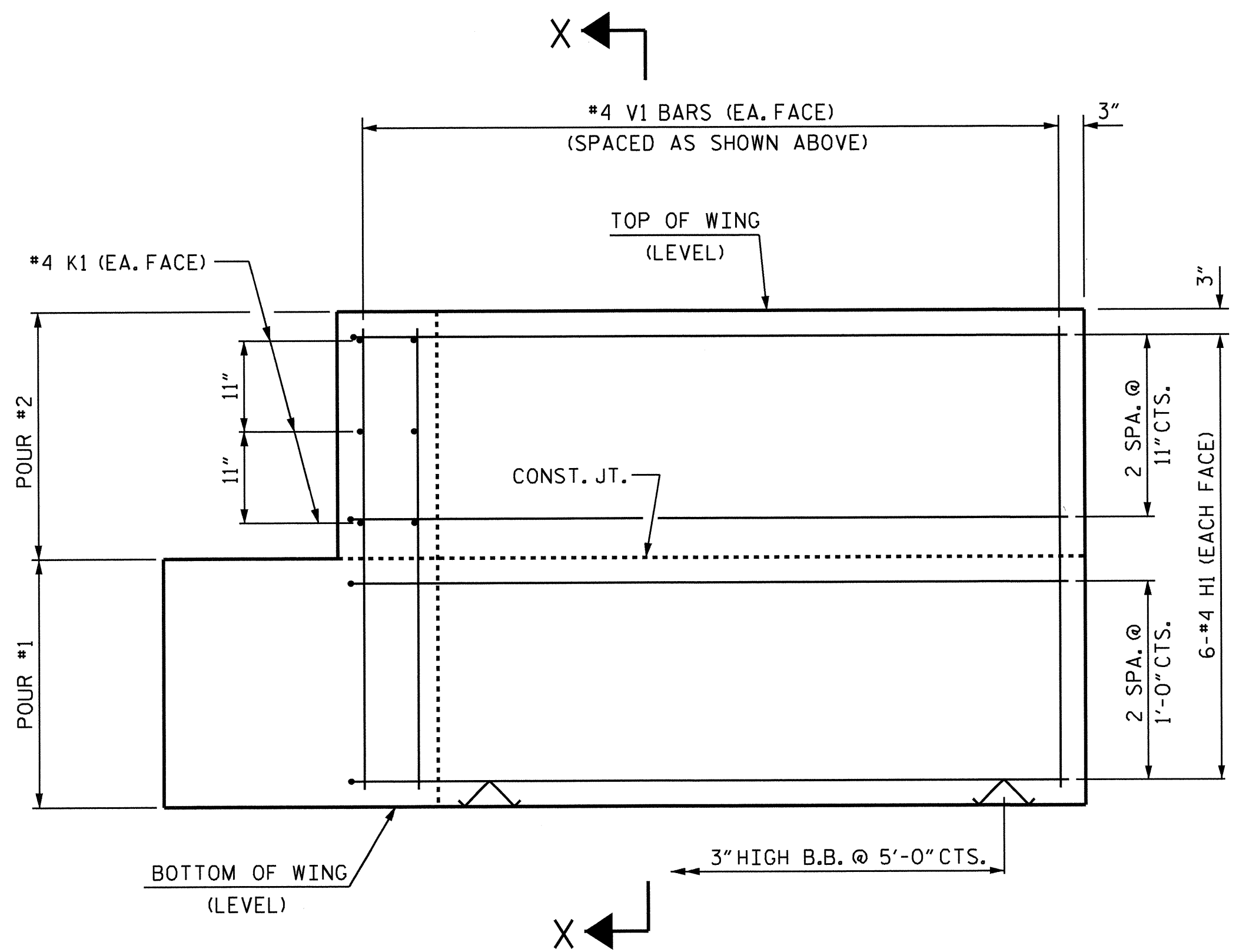
PLAN OF WING (W2)



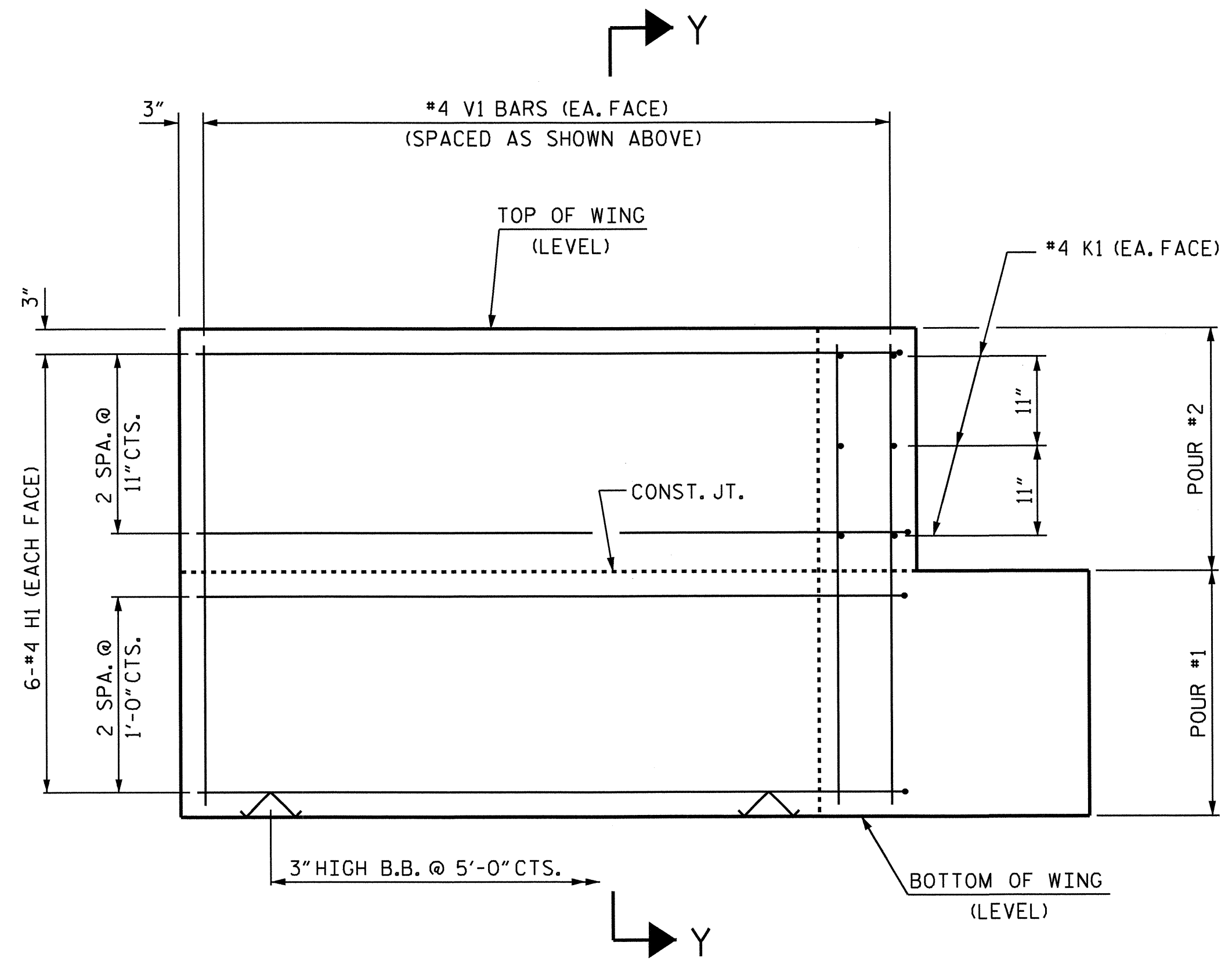
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)

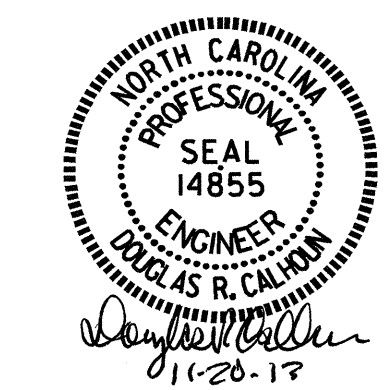


ELEVATION OF WING (W2)

WING DETAILS

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012  
 DRAWN BY : DGE 02/10  
 CHECKED BY : MKT 02/10

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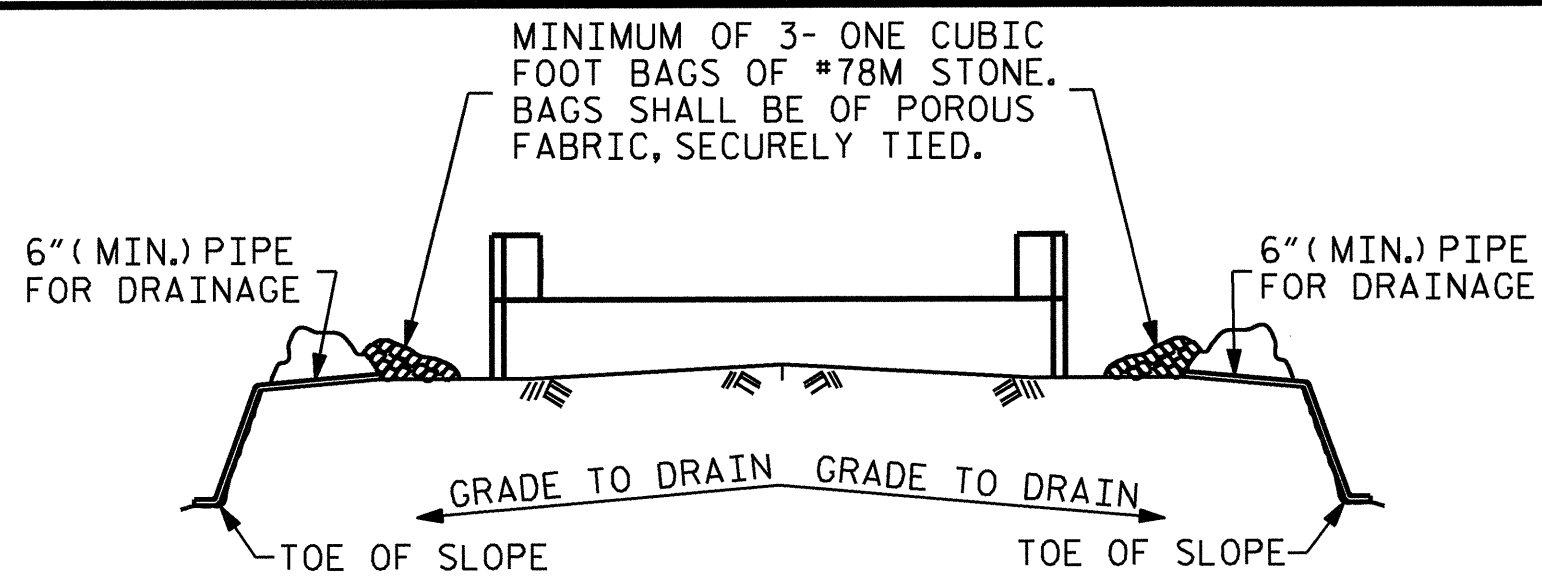


PROJECT NO. B-4400  
 ALAMANCE COUNTY  
 STATION: 16+88.00 -L-  
 SHEET 3 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-17 TOTAL SHEETS 24
SUBSTRUCTURE END BENT WING DETAILS						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

STD. NO. EB\_33\_90S



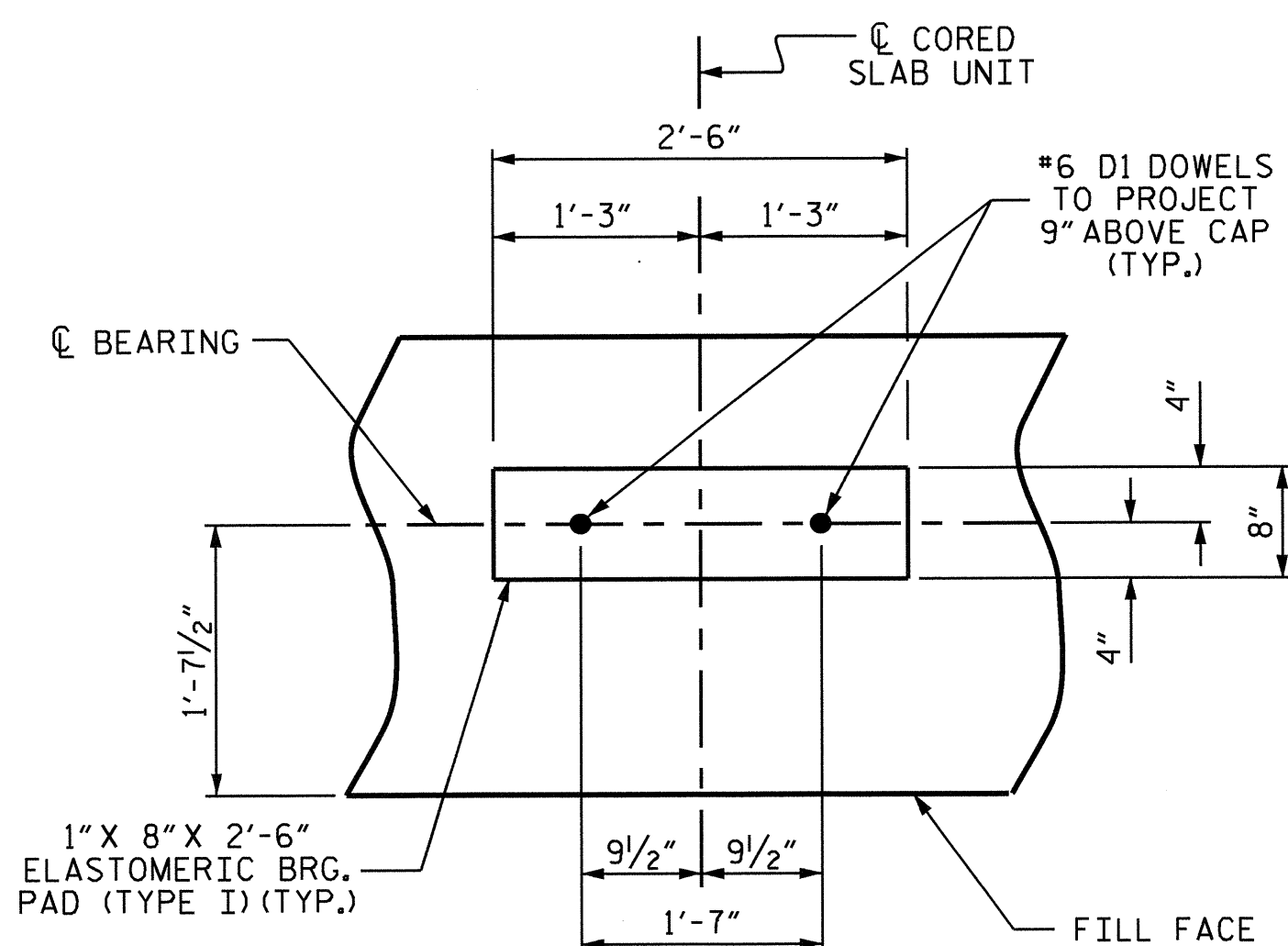


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

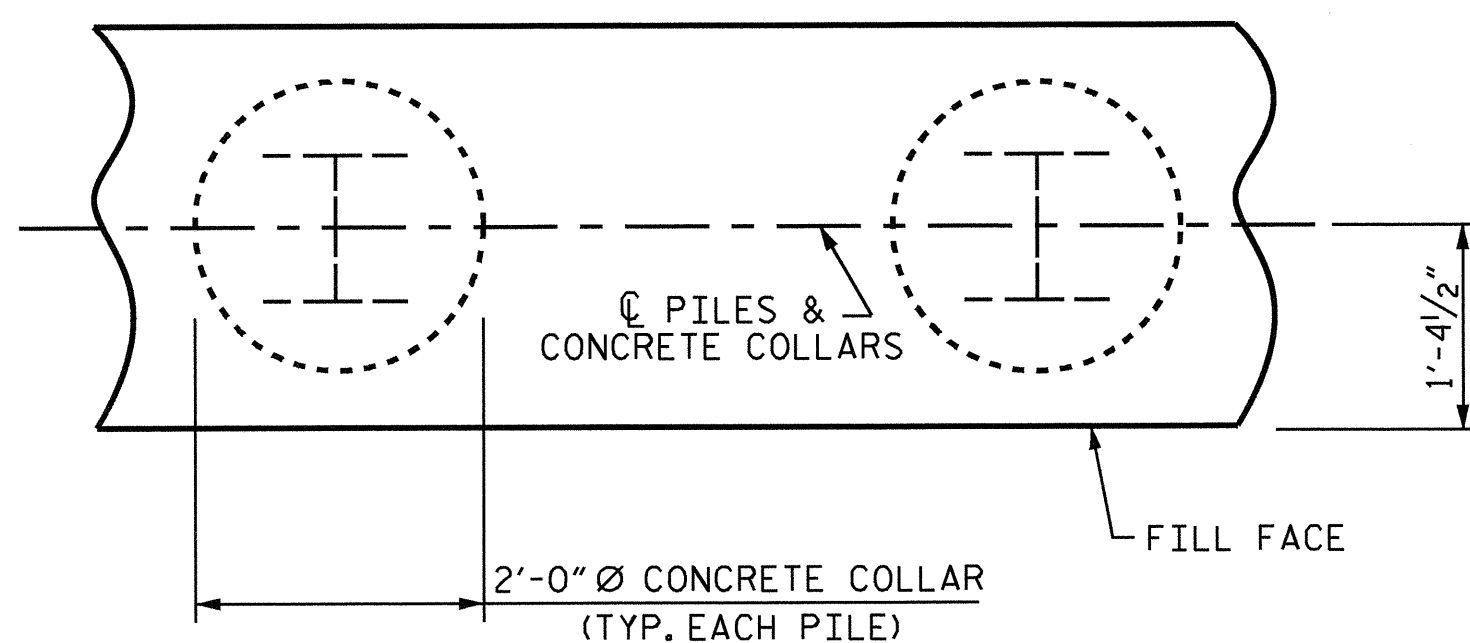
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



### DETAIL "A"

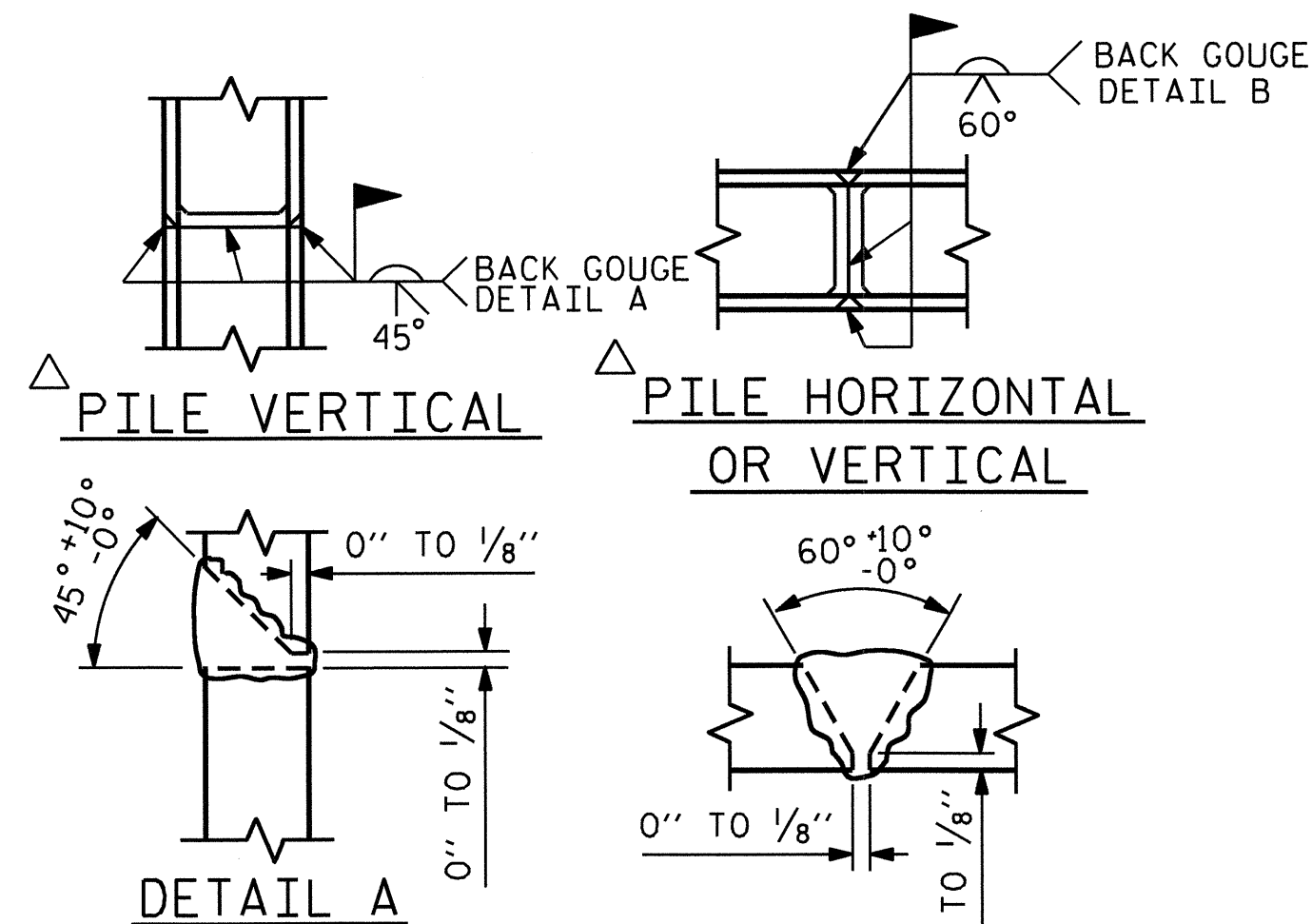
(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



### PLAN

### CORROSION PROTECTION FOR STEEL PILES DETAIL

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



POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS

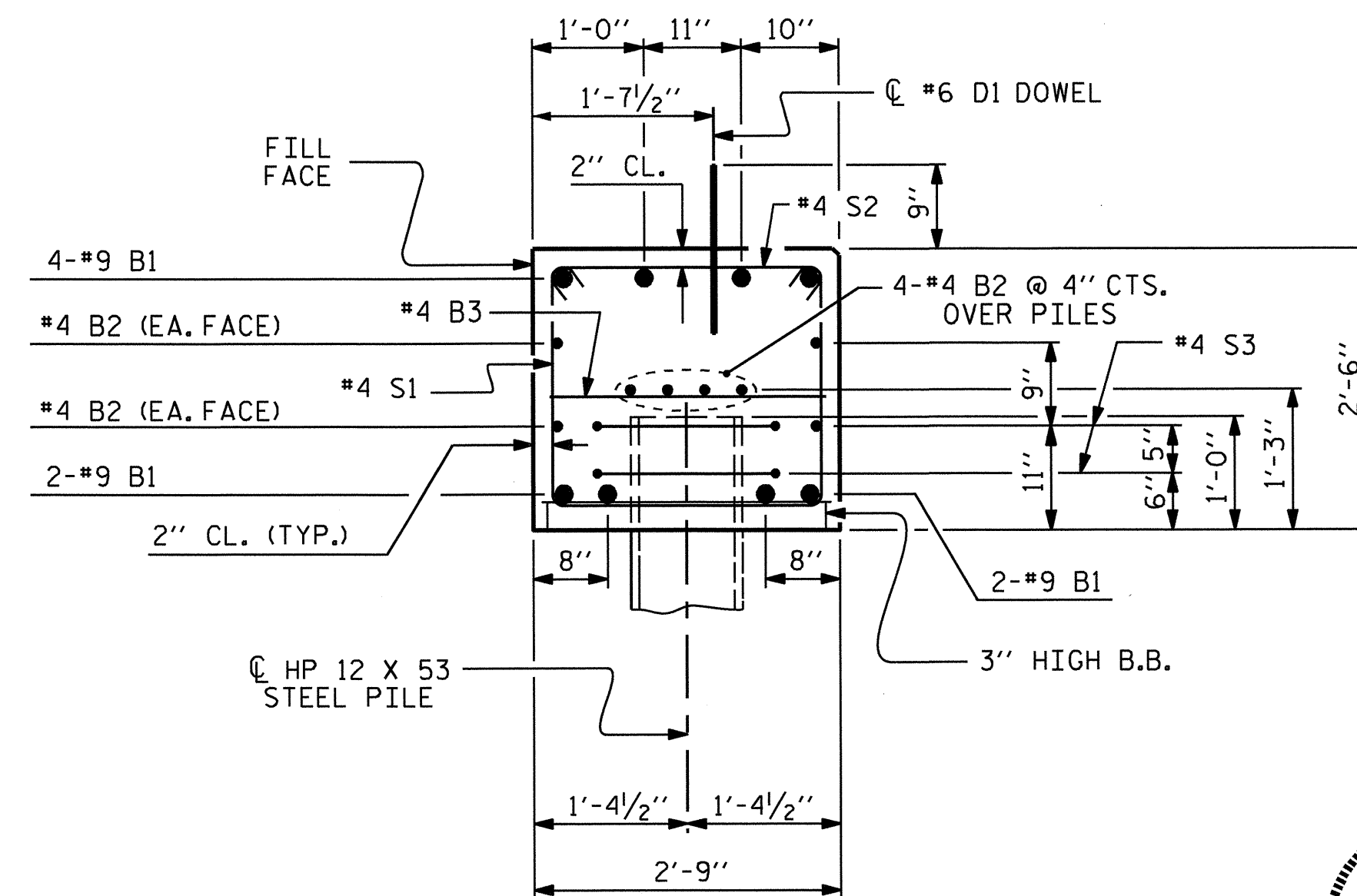
BILL OF MATERIAL FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	16	#4	STR	20'-7"	220
B3	10	#4	STR	2'-5"	16
B4	4	#4	STR	14'-5"	39
D1	22	#6	STR	1'-6"	50
H1	24	#4	2	7'-10"	126
K1	12	#4	STR	2'-11"	23
S1	50	#4	3	7'-5"	248
S2	50	#4	4	3'-2"	106
S3	14	#4	5	6'-6"	61
V1	48	#4	STR	4'-8"	150
U1	10	#4	6	5'-5"	36
REINFORCING STEEL (FOR ONE END BENT)					2190 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					13.3 C.Y.
POUR #2 UPPER PART OF WINGS					1.8 C.Y.
TOTAL CLASS A CONCRETE					15.1 C.Y.

BAR TYPES	

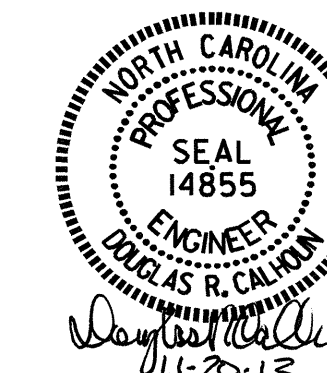
ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT 1	END BENT 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO: 7	NO: 7
LIN. FT. = 175	LIN. FT. = 140



### SECTION A-A

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



PROJECT NO. B-4400  
ALAMANCE COUNTY  
STATION: 16+88.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENTS 1 & 2  
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-18
2			4			24

ASSEMBLED BY : A. SORSENGINH	DATE : 4/2012
CHECKED BY : D.G. ELY	DATE : 7/2012
DRAWN BY : DGE 02/10	
CHECKED BY : MKT 02/10	

**NOTES**

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

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

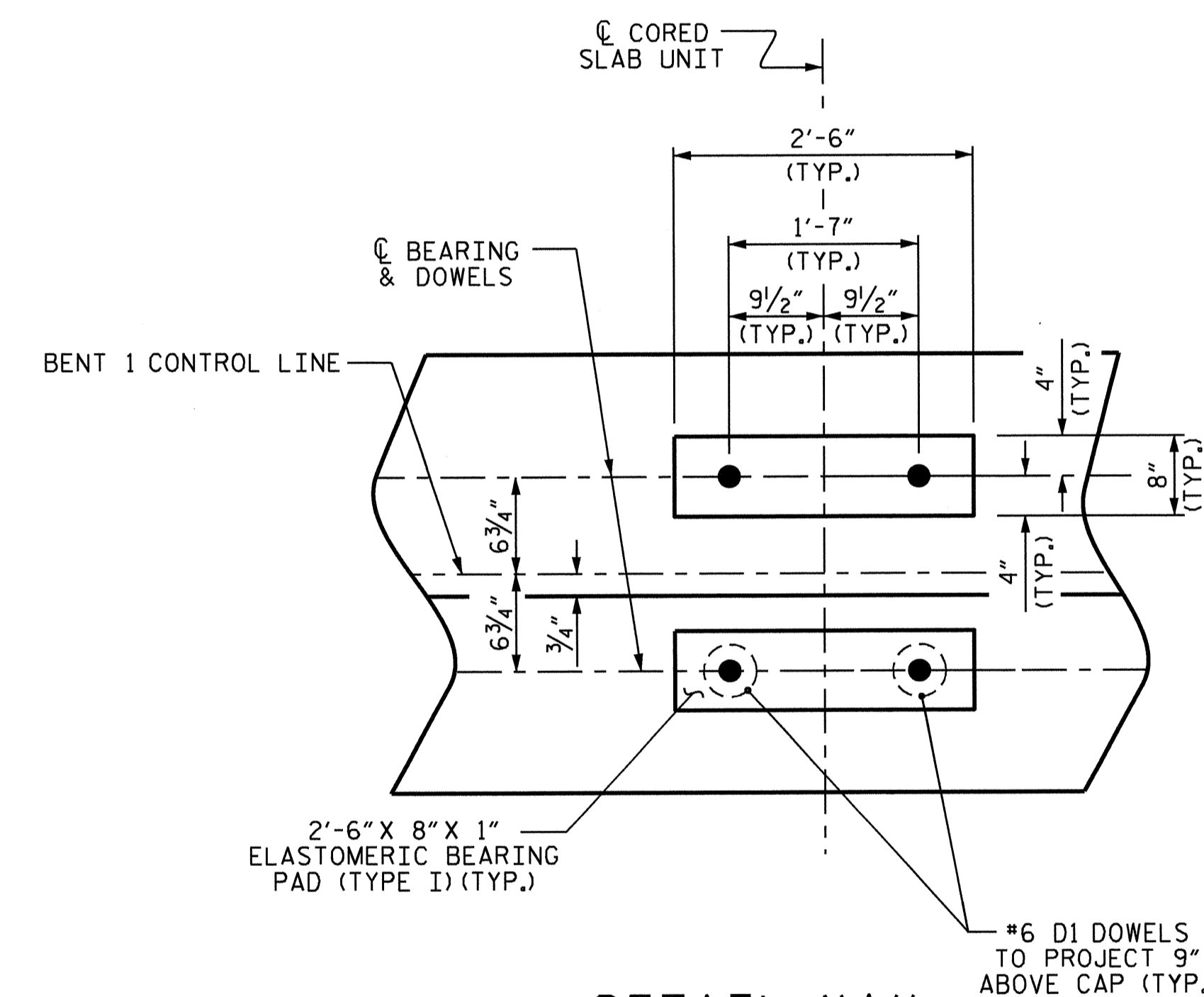
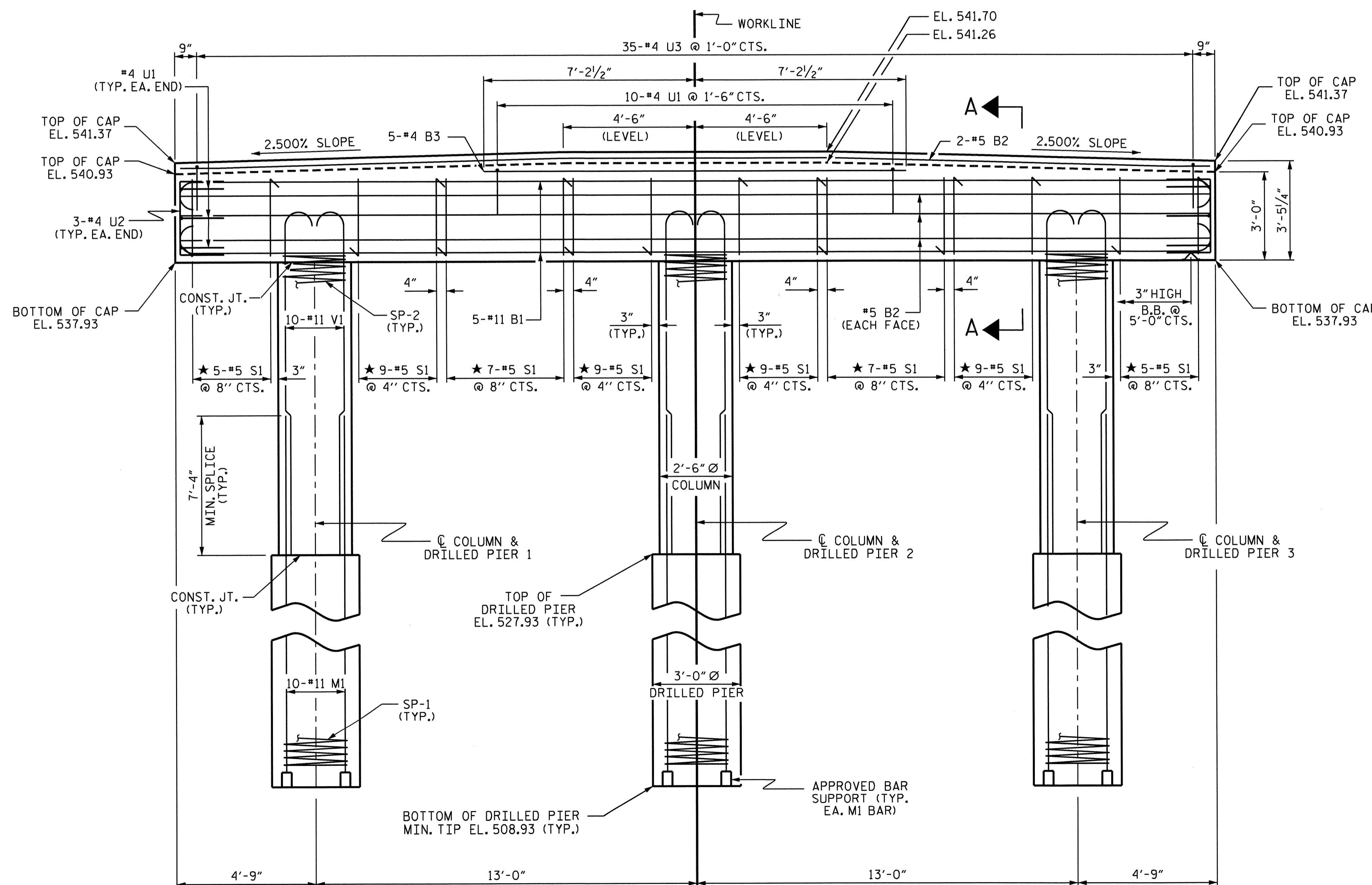
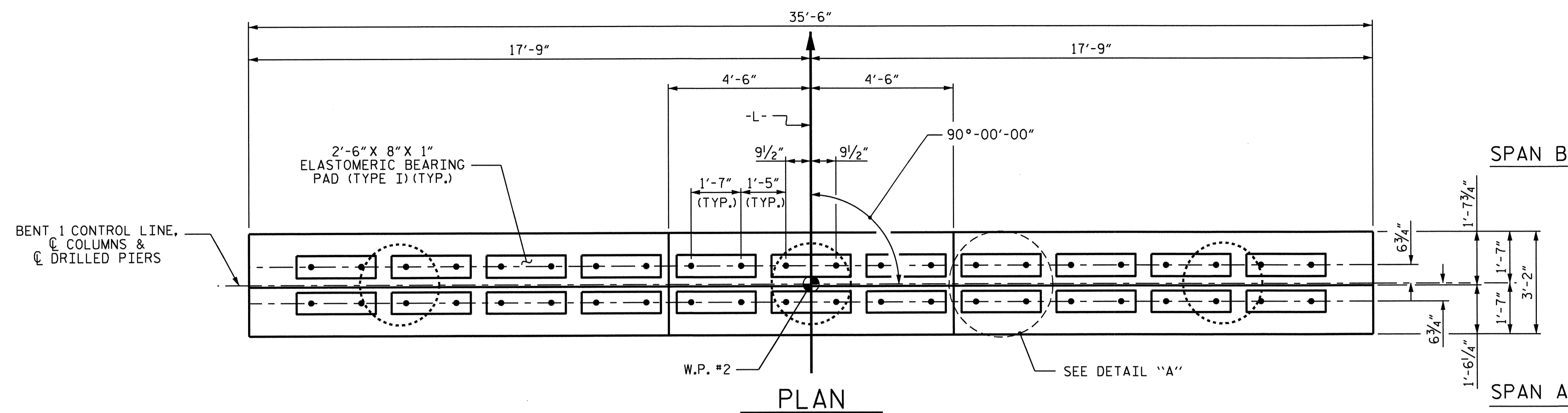
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



**DETAIL "A"**

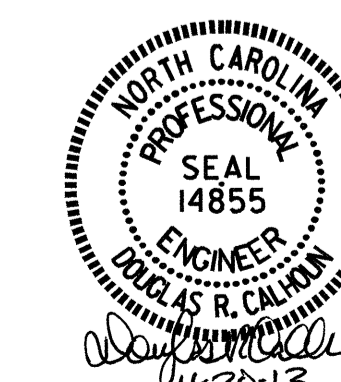
(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. B-4400  
 ALAMANCE COUNTY  
 STATION: 16+88.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 BENT 1**



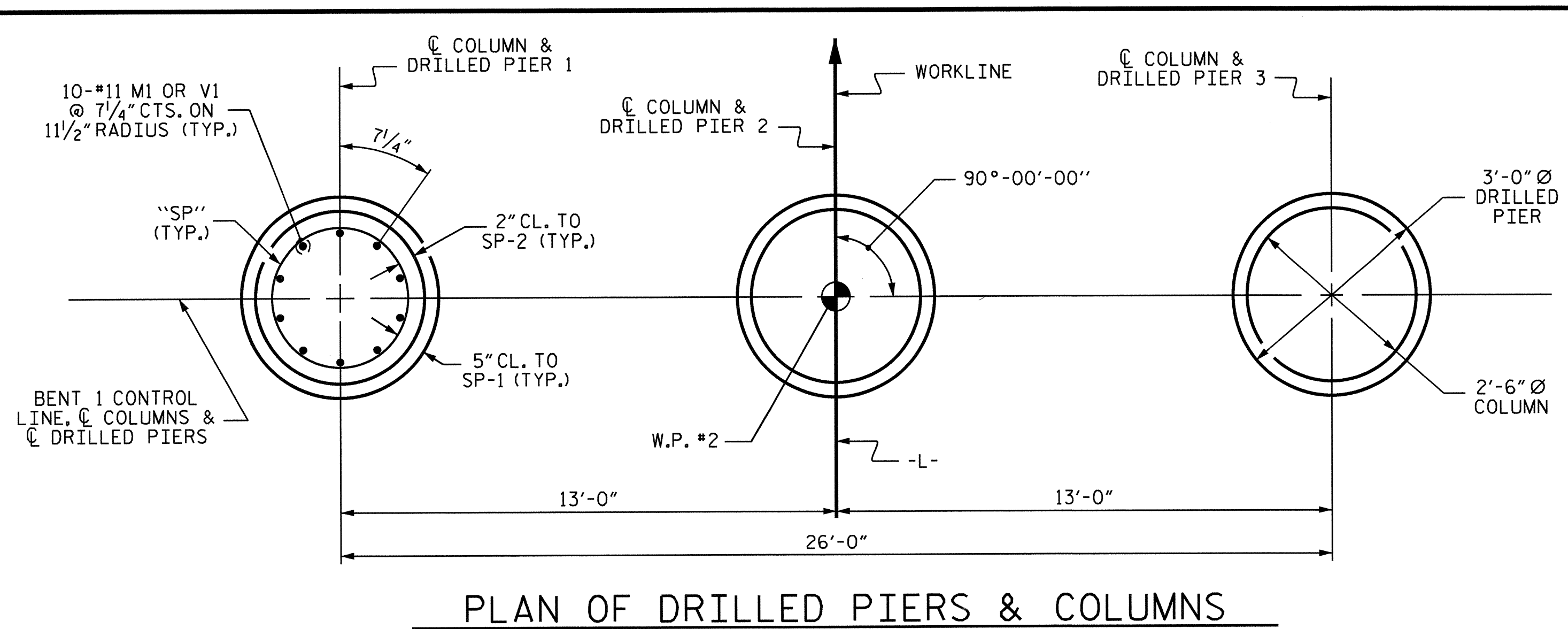
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NO.	BY:	DATE:	NO.	BY:	DATE:	5-19
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : A. SORSENGIN DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012  
 DRAWN BY : DGE 03/10  
 CHECKED BY : MKT 03/10

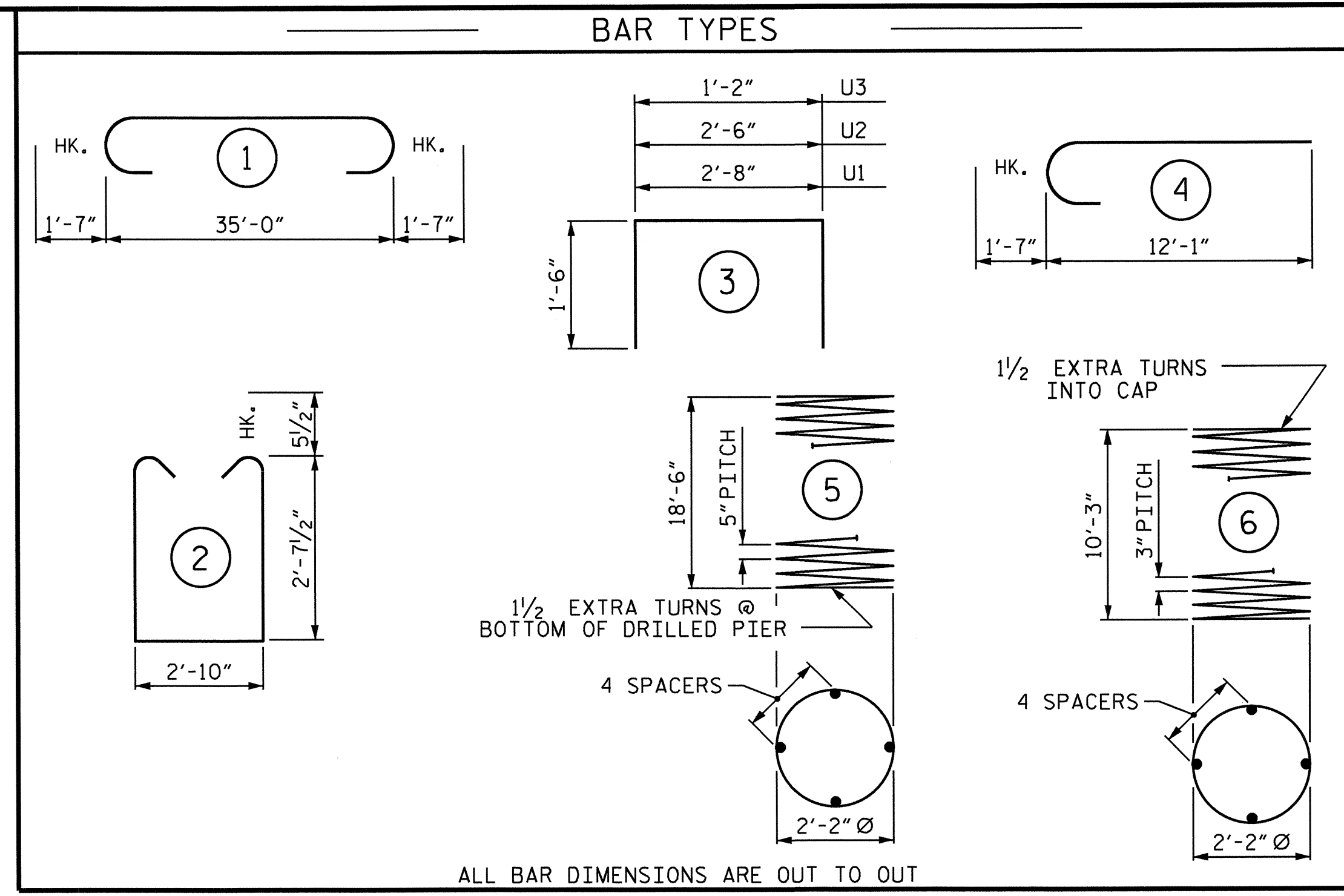
**ELEVATION**

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.



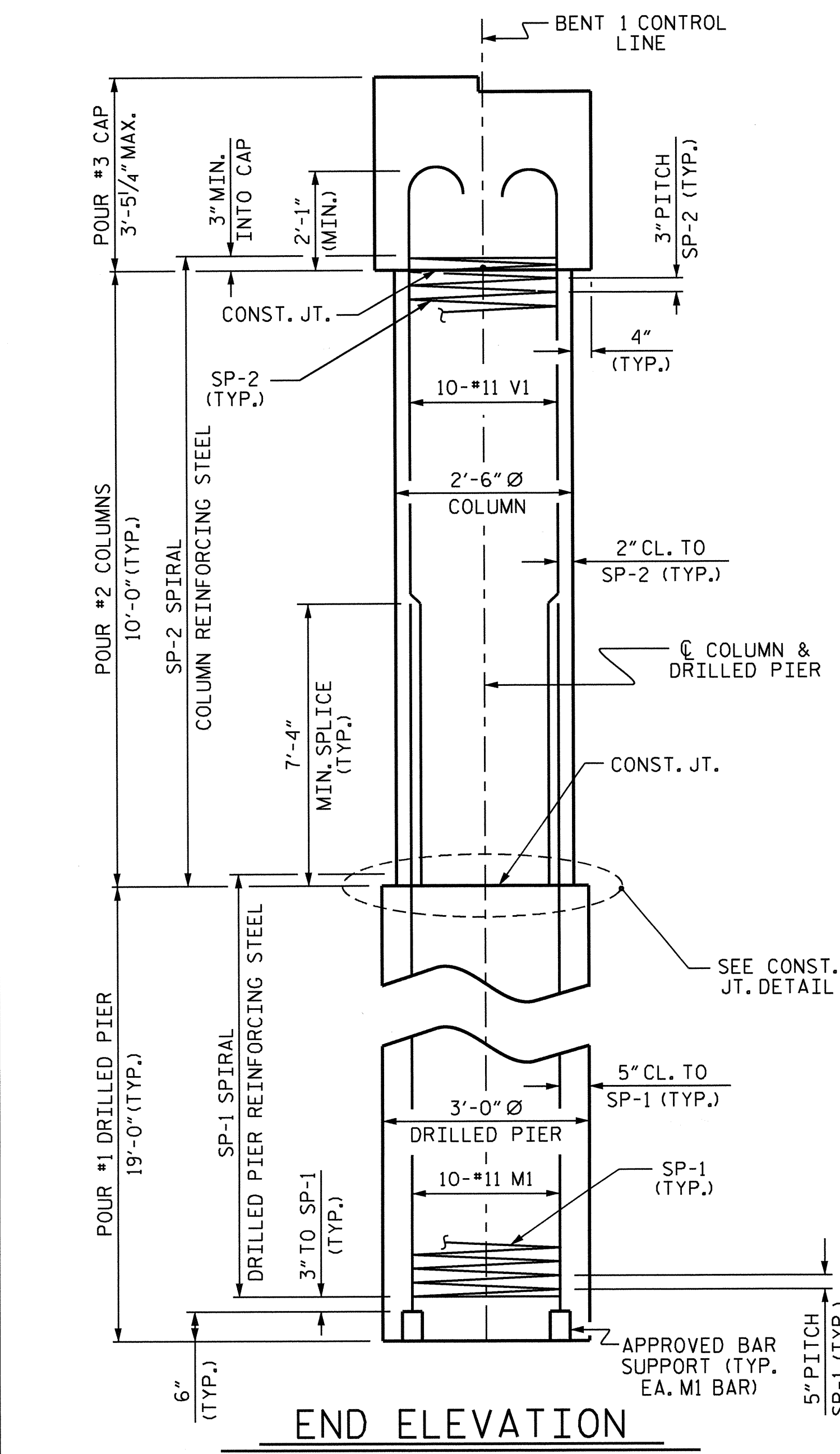


PLAN OF DRILLED PIERS & COLUMNS

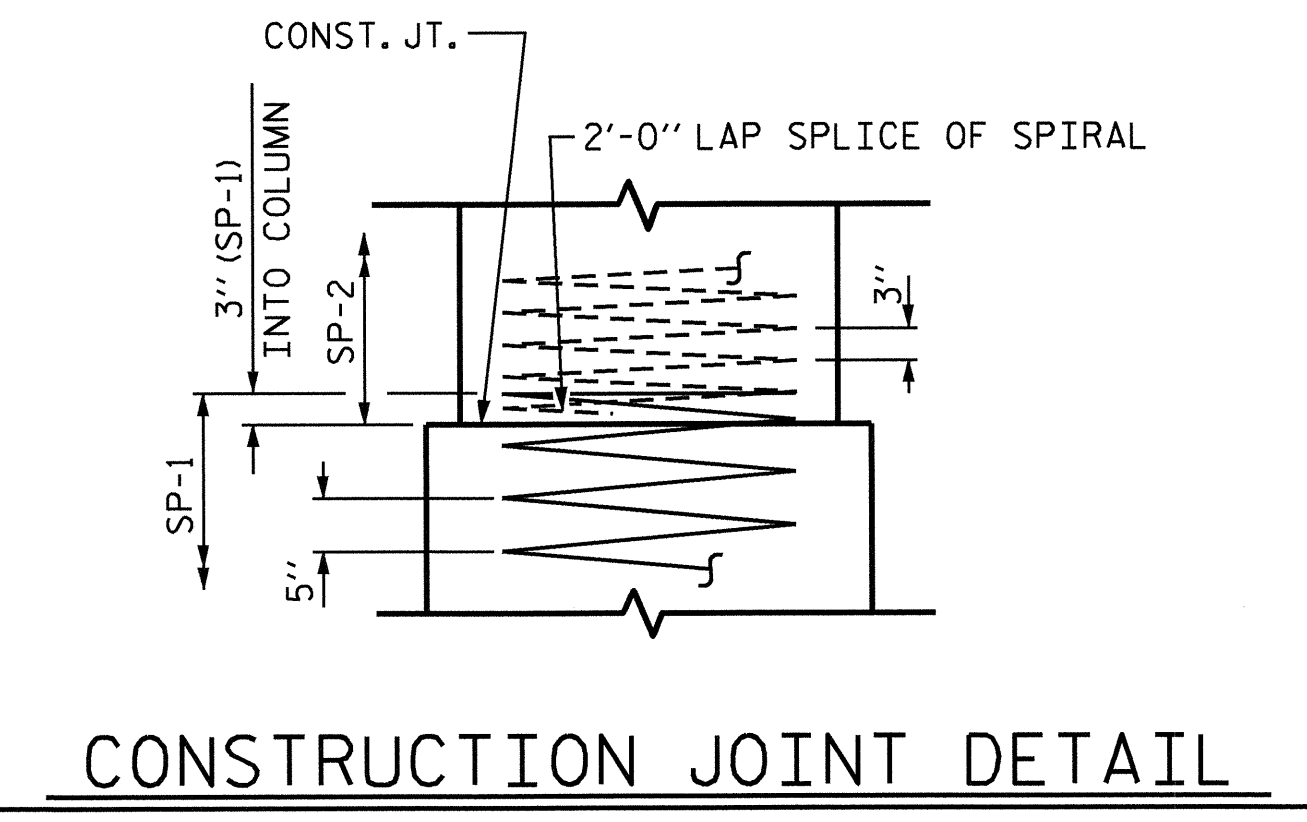


ALL BAR DIMENSIONS ARE OUT TO OUT

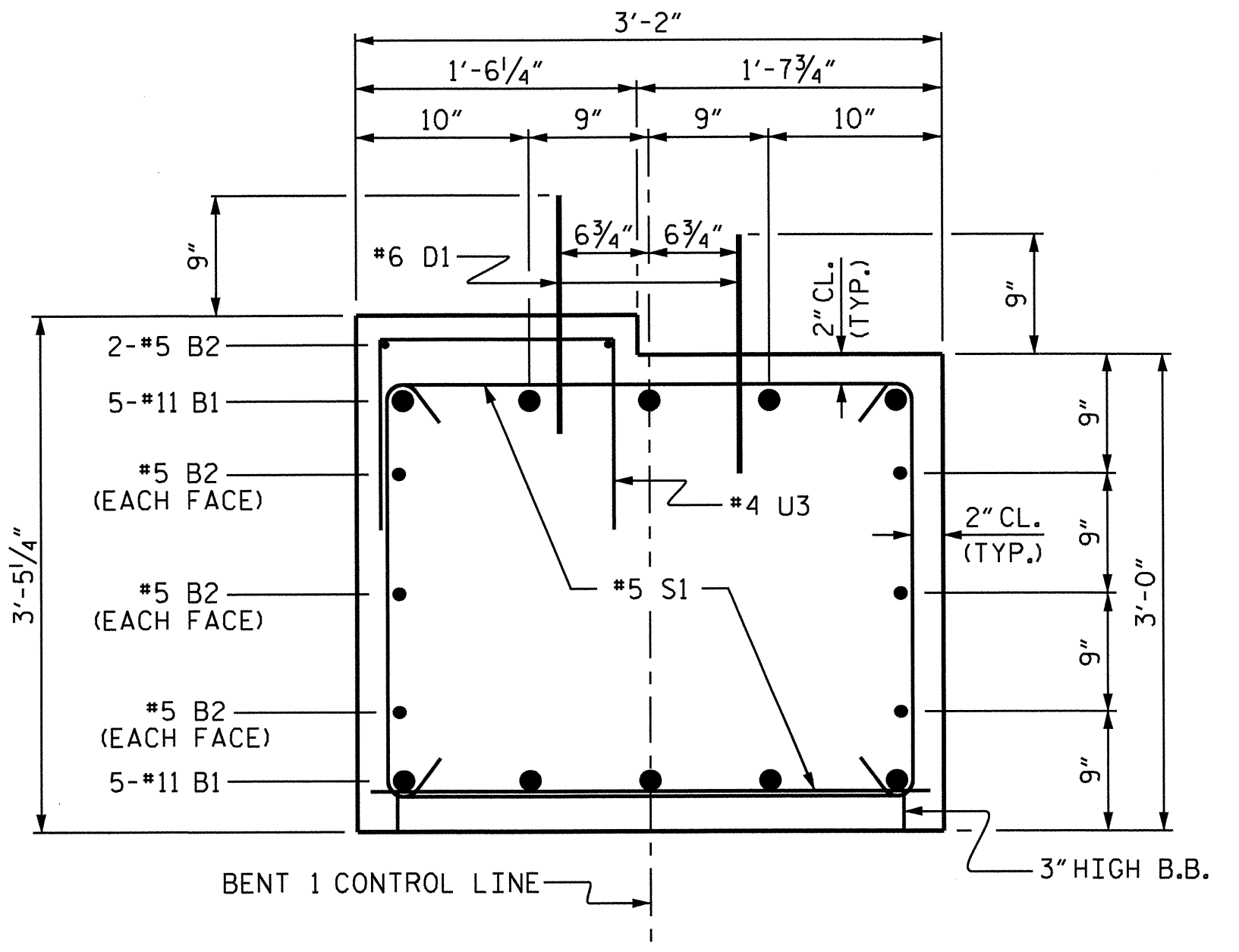
BILL OF MATERIAL FOR ONE BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	38'-2"	2028
B2	8	#5	STR	35'-2"	293
B3	5	#4	STR	14'-5"	48
D1	44	#6	STR	1'-6"	99
M1	30	#11	STR	29'-1"	4636
S1	60	#5	2	9'-0"	563
U1	16	#4	3	5'-8"	61
U2	6	#4	3	5'-6"	22
U3	35	#4	3	4'-2"	97
V1	30	#11	4	13'-8"	2178
REINFORCING STEEL (FOR ONE BENT)					10,025 LBS.
SP-1	3	*	5	306'-3"	958
SP-2	3	**	6	284'-0"	569
SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT)					1,527 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
POUR #2 (COLUMNS)					5.5 C.Y.
POUR #3 (CAP)					14.2 C.Y.
TOTAL CLASS A CONCRETE					19.7 C.Y.
DRILLED PIERS: (FOR ONE BENT)					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)					14.9 C.Y.
3'-0" Ø DRILLED PIER NOT IN SOIL					22.5 LIN. FT.
3'-0" Ø DRILLED PIER IN SOIL					34.5 LIN. FT.
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER					29.8 LIN. FT.
CSL TUBES					246.00 LIN. FT.



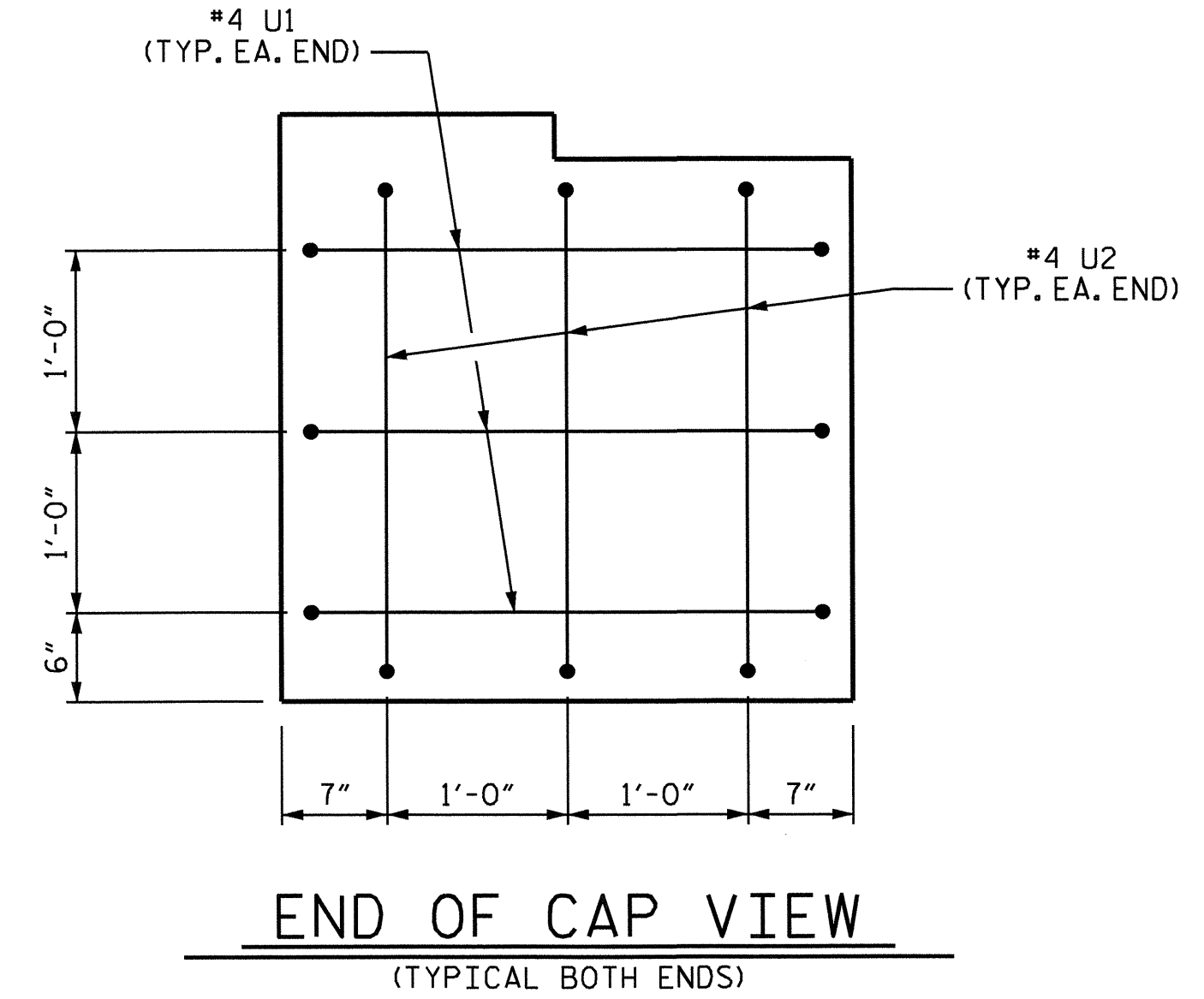
END ELEVATION



CONSTRUCTION JOINT DETAIL



SECTION A-A



END OF CAP VIEW (TYPICAL BOTH ENDS)

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012  
 DRAWN BY : DGE 03/10  
 CHECKED BY : MKT 03/10

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PROJECT NO. B-4400  
 ALAMANCE COUNTY  
 STATION: 16+88.00 -L-  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 29

STD. NO. DP\_BT\_33\_90S\_<50'

**NOTES**

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

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

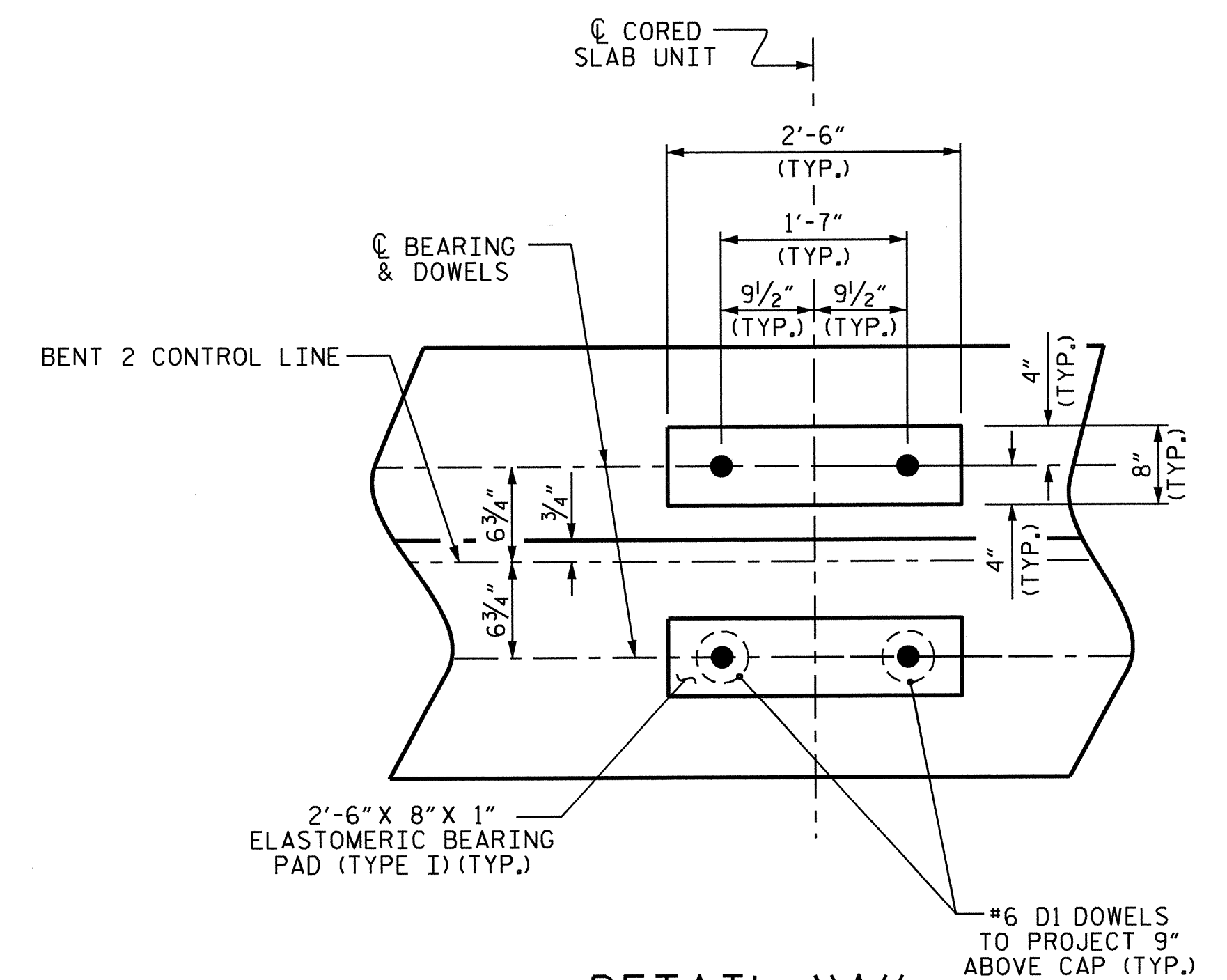
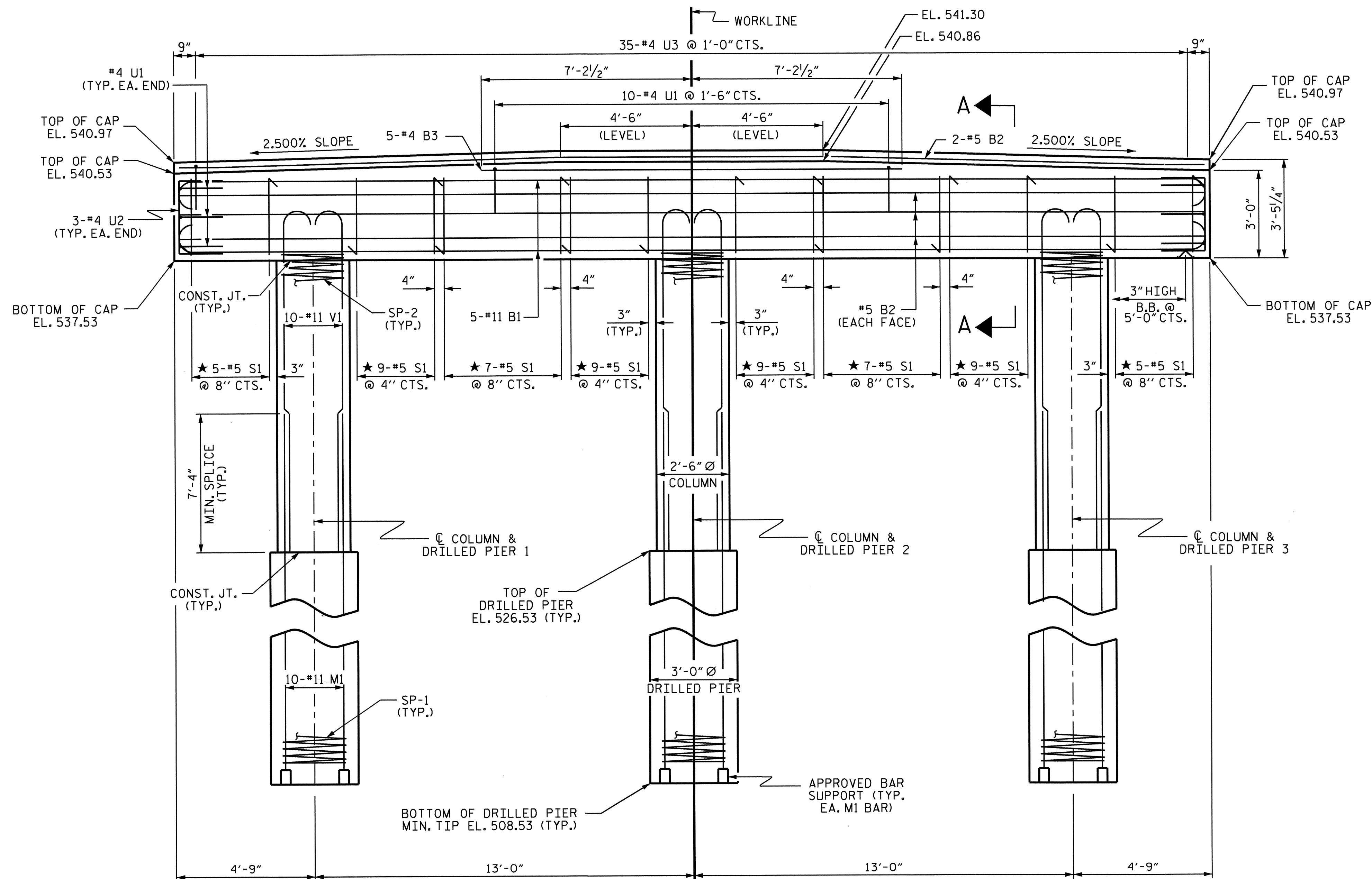
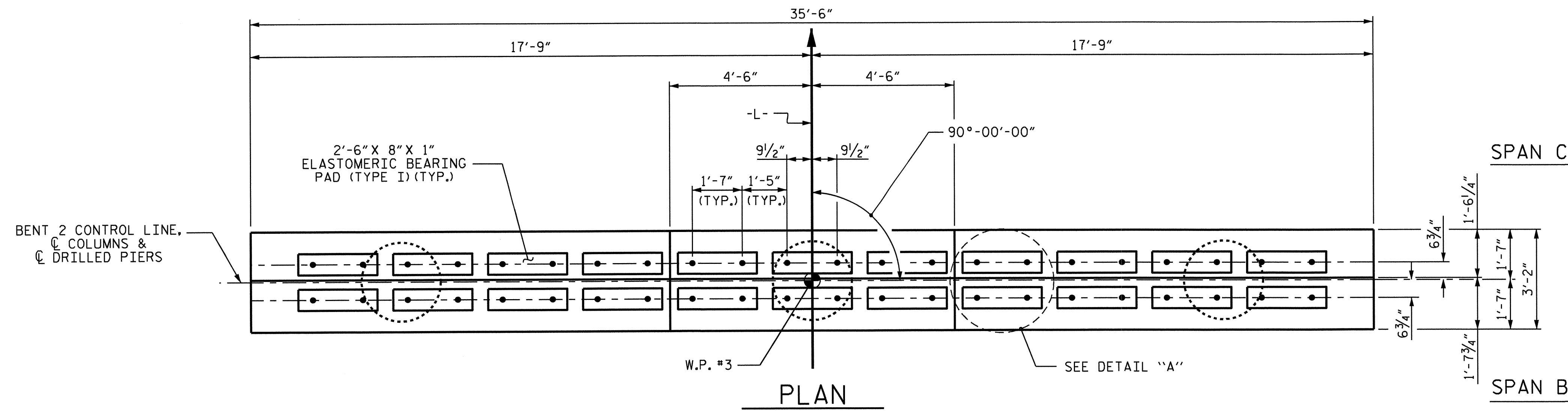
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



**DETAIL "A"**

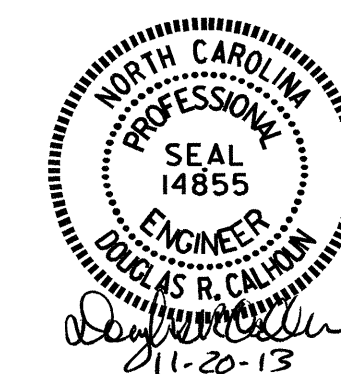
(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. B-4400  
ALAMANCE COUNTY  
 STATION: 16+88.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 BENT 2**



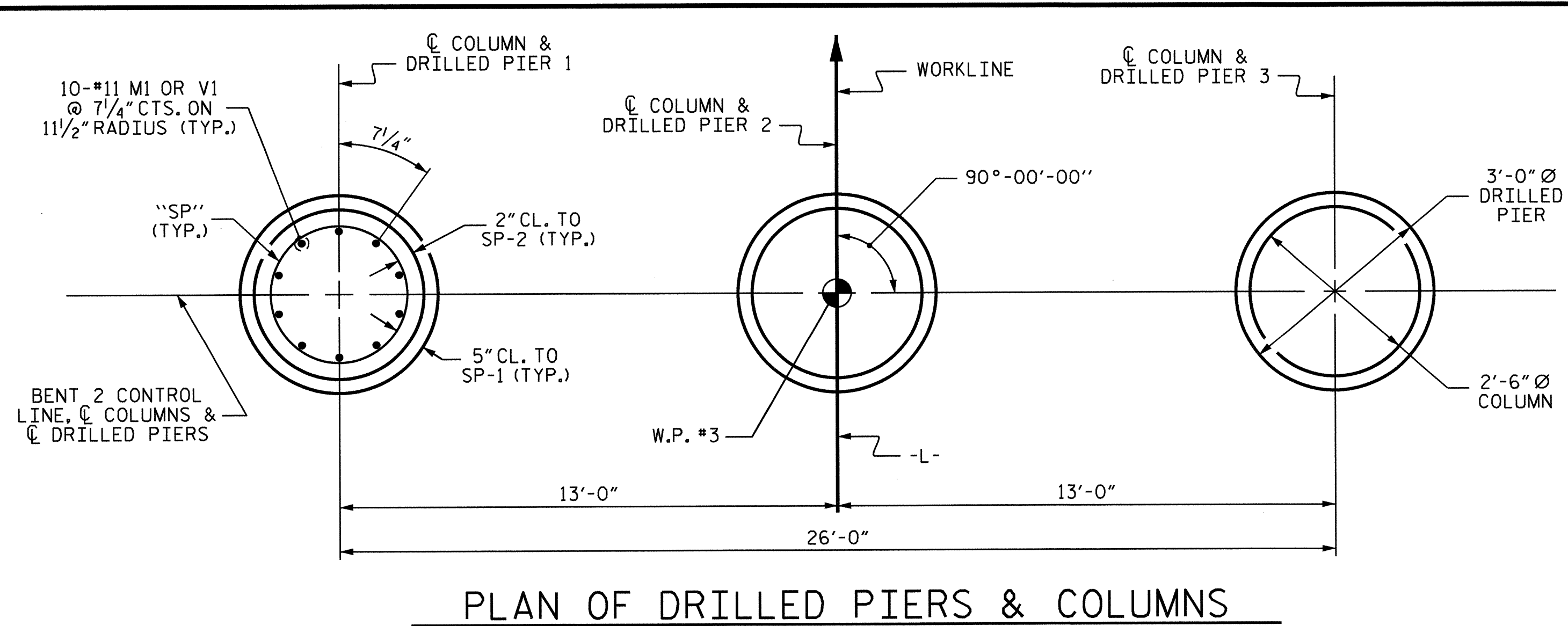
REVISIONS						SHEET NO. S-21 TOTAL SHEETS 24
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2			4			

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012  
 DRAWN BY : DGE 03/10  
 CHECKED BY : MKT 03/10

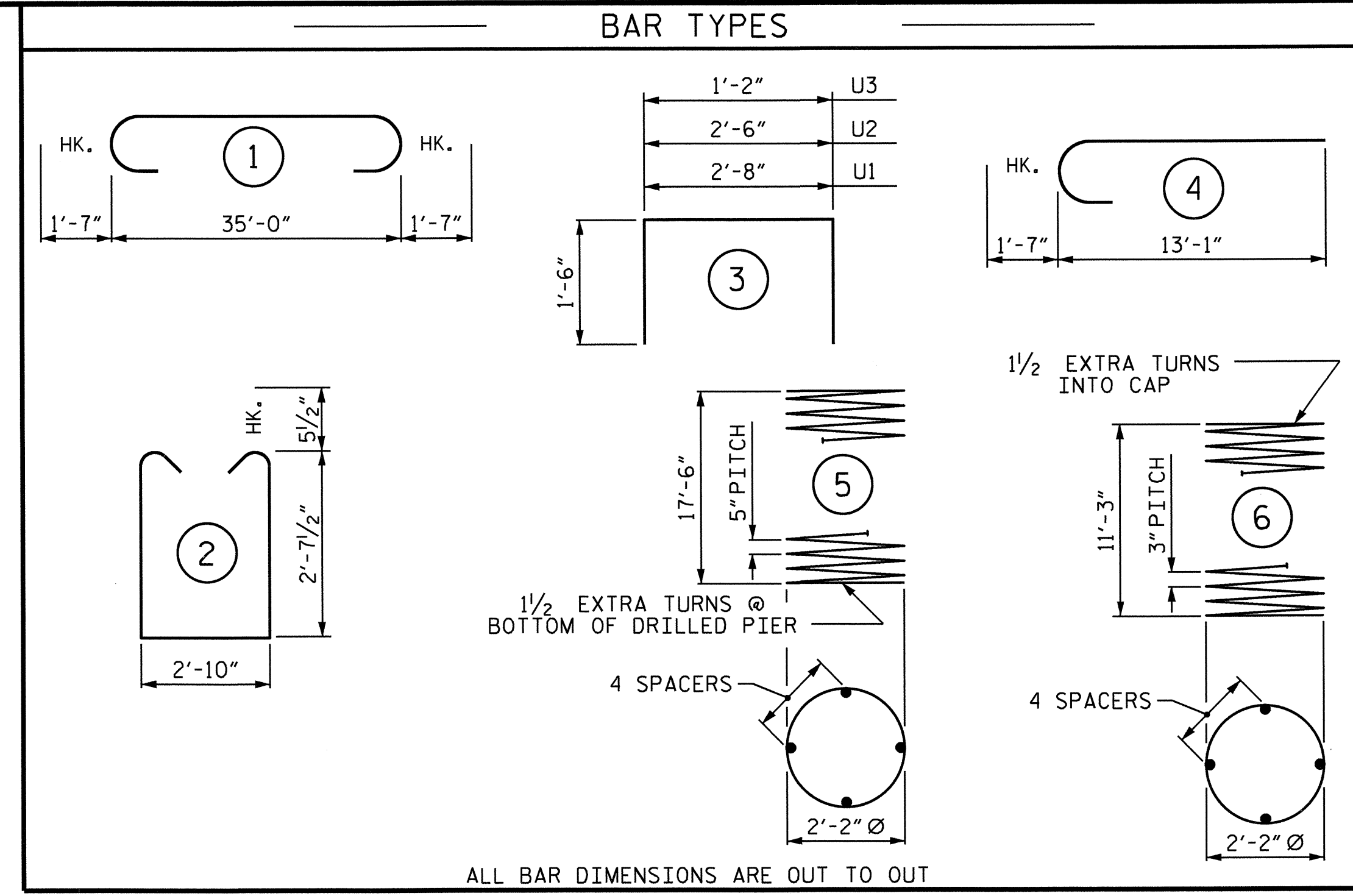
**ELEVATION**

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.



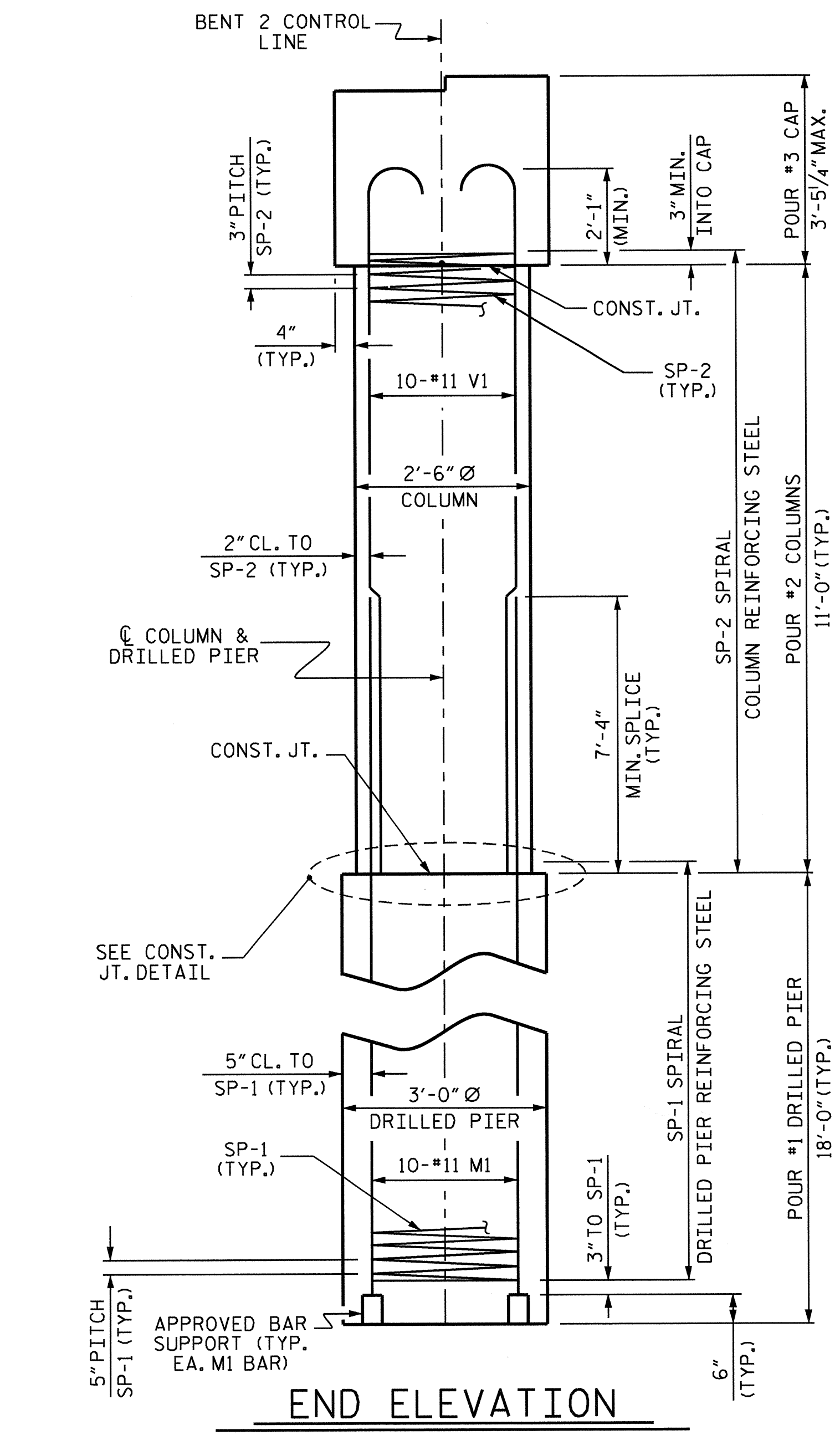


PLAN OF DRILLED PIERS & COLUMNS

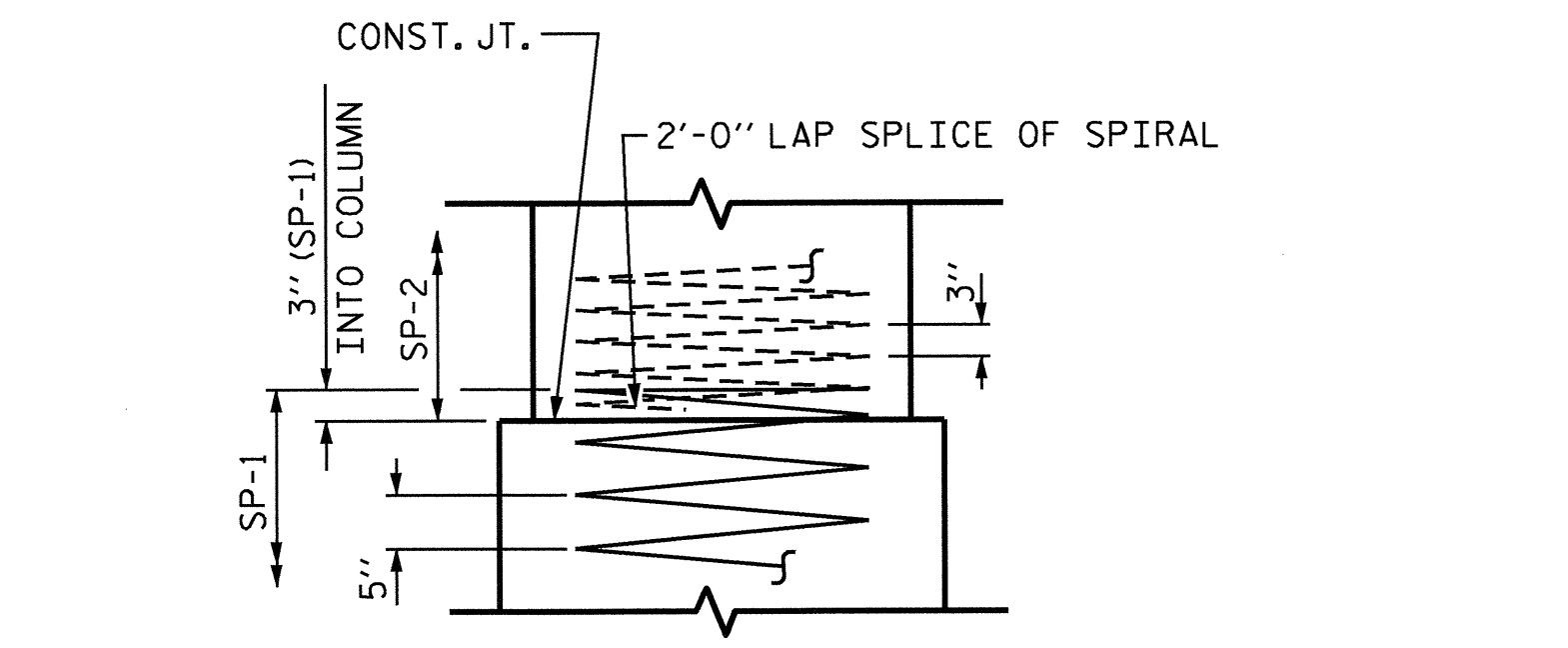


ALL BAR DIMENSIONS ARE OUT TO OUT

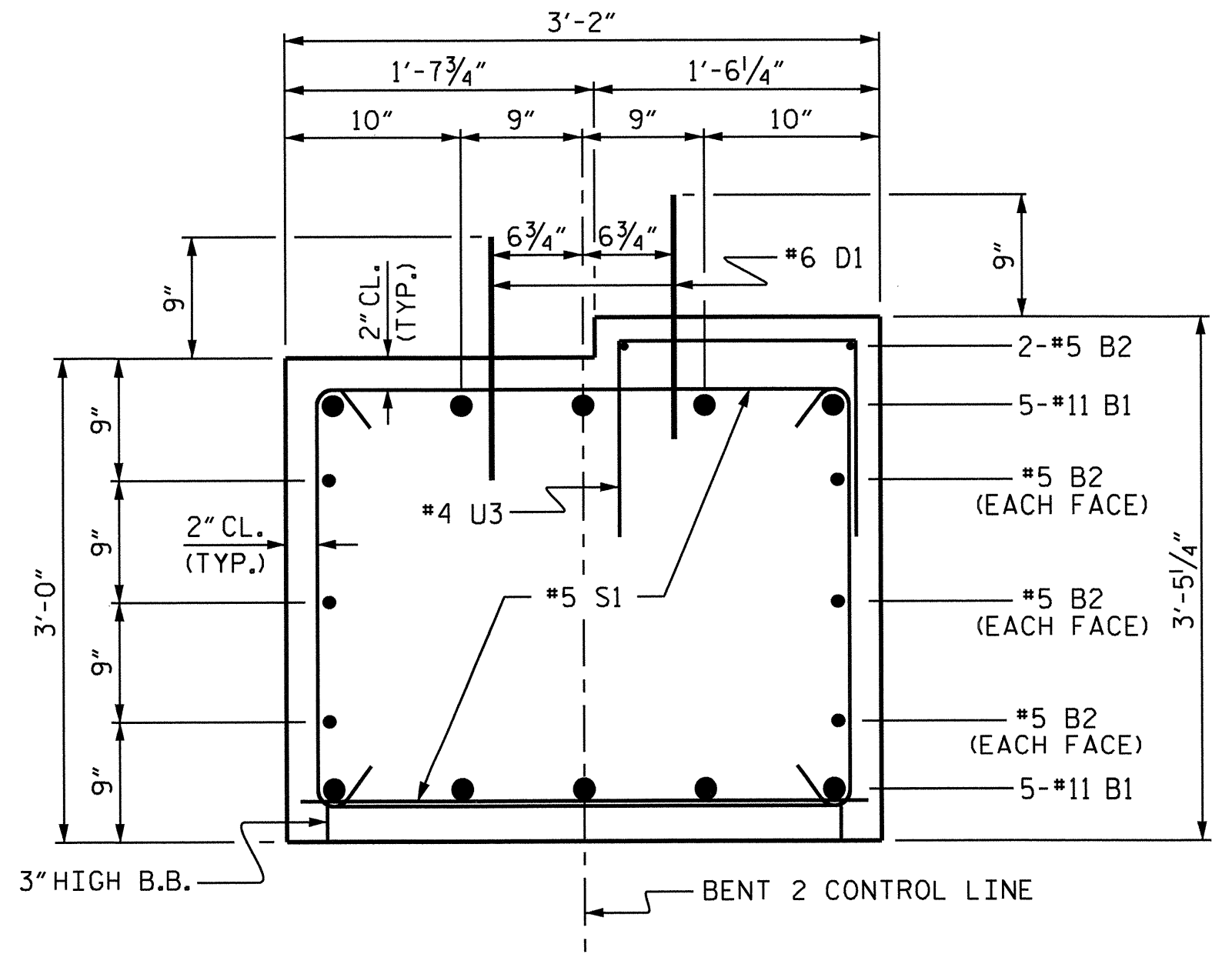
BILL OF MATERIAL FOR ONE BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	38'-2"	2028
B2	8	#5	STR	35'-2"	293
B3	5	#4	STR	14'-5"	48
D1	44	#6	STR	1'-6"	99
M1	30	#11	STR	28'-1"	4476
S1	60	#5	2	9'-0"	563
U1	16	#4	3	5'-8"	61
U2	6	#4	3	5'-6"	22
U3	35	#4	3	4'-2"	97
V1	30	#11	4	14'-8"	2338
REINFORCING STEEL (FOR ONE BENT)					10,025 LBS.
SP-1	3	*	5	289'-7"	906
SP-2	3	**	6	310'-8"	623
SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT)					1,529 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
POUR #2 (COLUMNS)					6.0 C.Y.
POUR #3 (CAP)					14.2 C.Y.
TOTAL CLASS A CONCRETE					20.2 C.Y.
DRILLED PIERS: (FOR ONE BENT)					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)					14.1 C.Y.
3'-0" Ø DRILLED PIER NOT IN SOIL					21.0 LIN. FT.
3'-0" Ø DRILLED PIER IN SOIL					33.0 LIN. FT.
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER					31.6 LIN. FT.
CSL TUBES					234.00 LIN. FT.



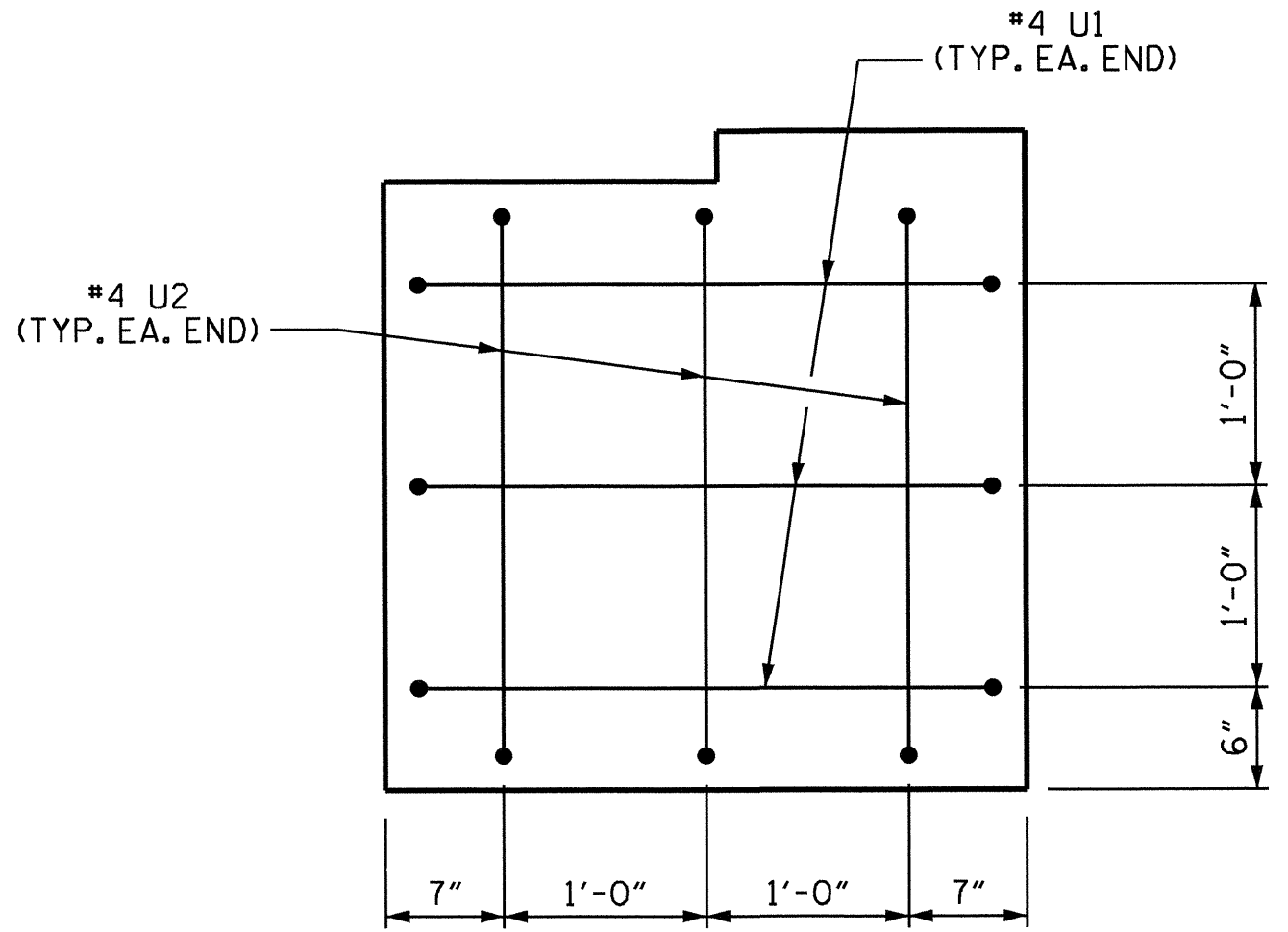
END ELEVATION



CONSTRUCTION JOINT DETAIL



SECTION A-A



END OF CAP VIEW

(TYPICAL BOTH ENDS)

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012  
 DRAWN BY : DGE 03/10  
 CHECKED BY : MKT 03/10

14-OCT-2013 13:37  
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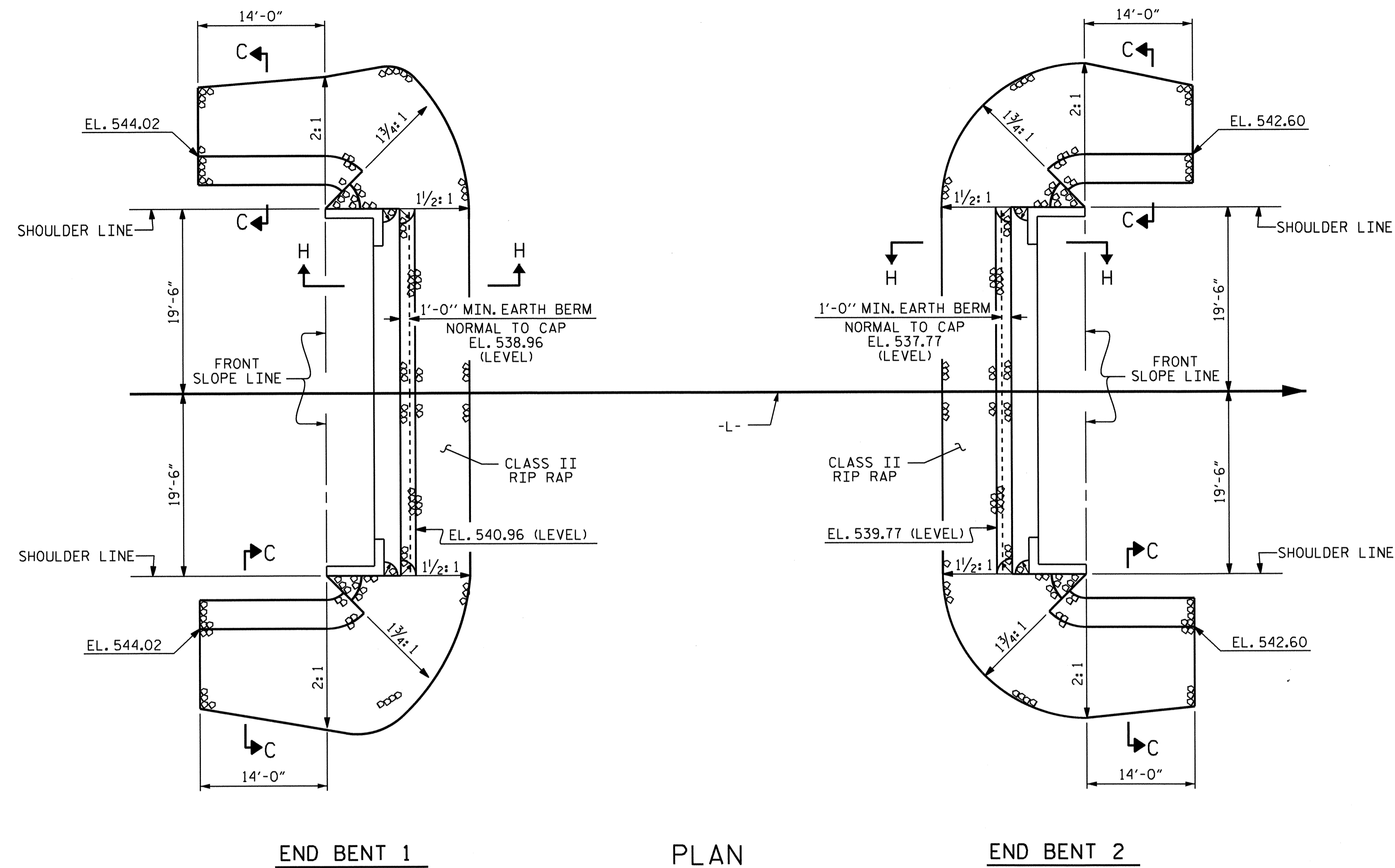


PROJECT NO. B-4400  
 ALAMANCE COUNTY  
 STATION: 16+88.00 -L-  
 SHEET 2 OF 2

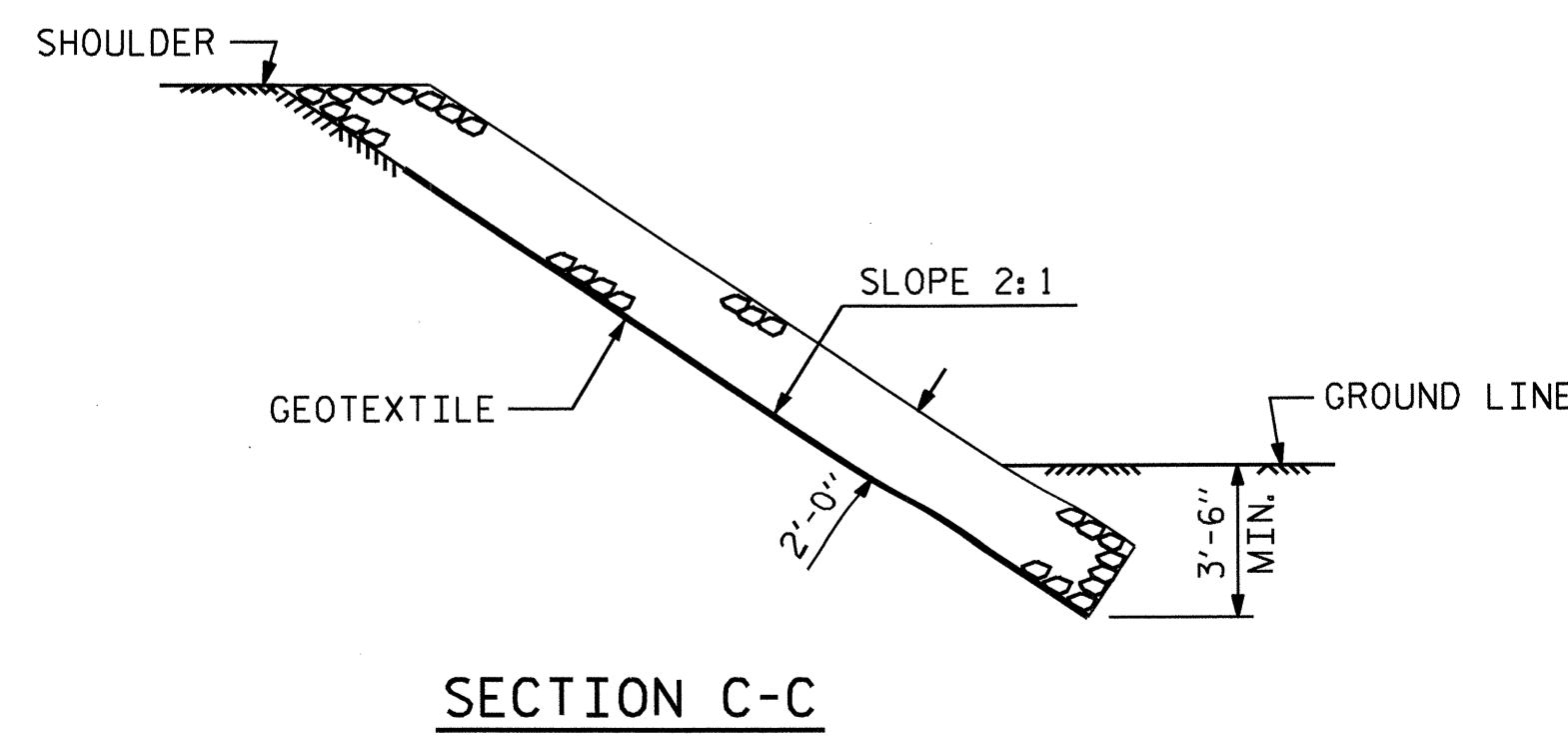
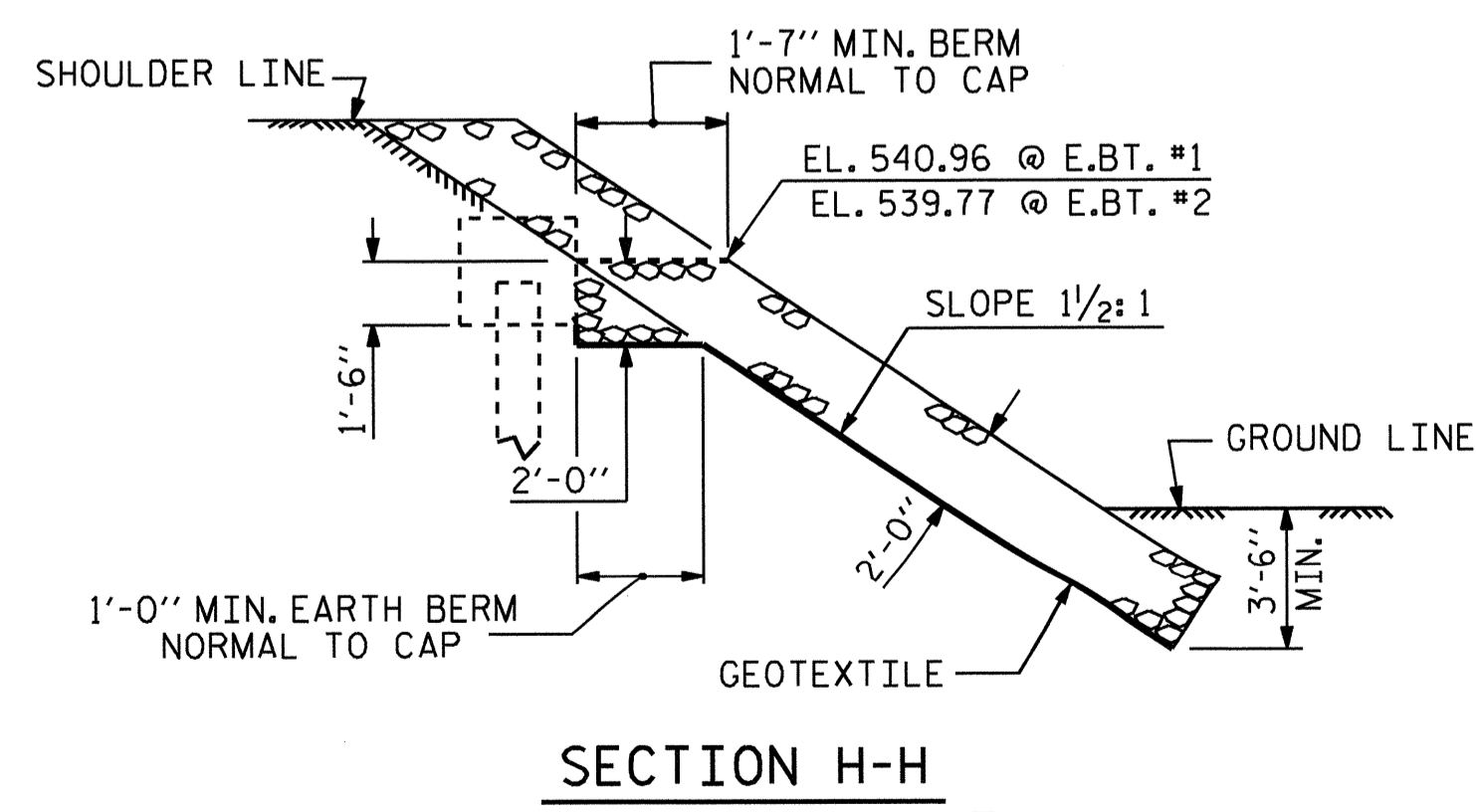
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 2					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS 24

STD. NO. DP\_BT\_33-90S\_<50'

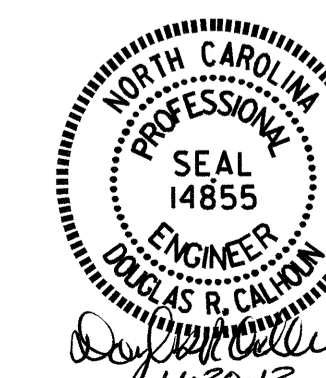


ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+88.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	355	390
END BENT 2	285	315



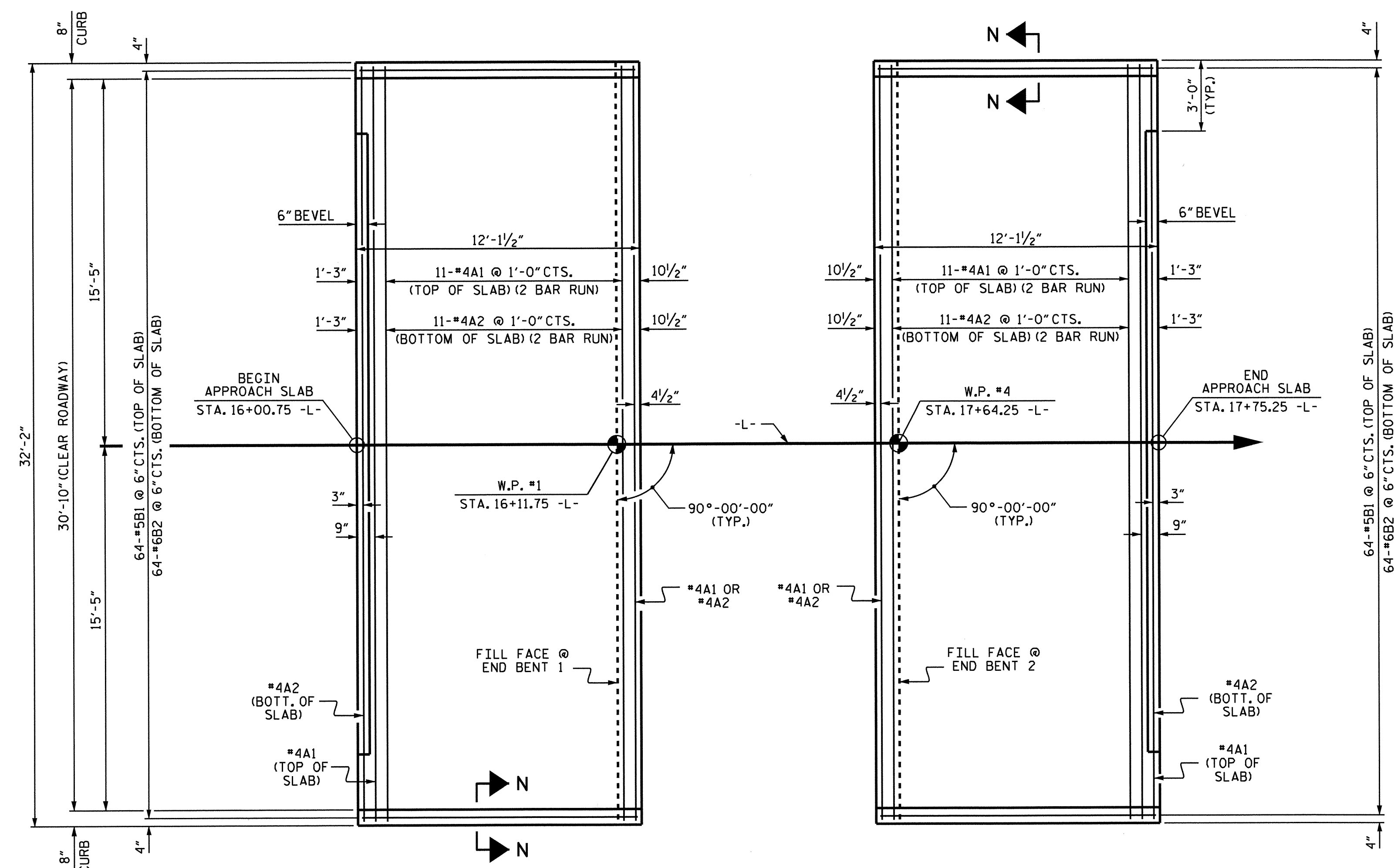
PROJECT NO. B-4400  
ALAMANCE COUNTY  
 STATION: 16+88.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. 5-23
STANDARD = RIP RAP DETAILS =						
REVISIONS						TOTAL SHEETS 24
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

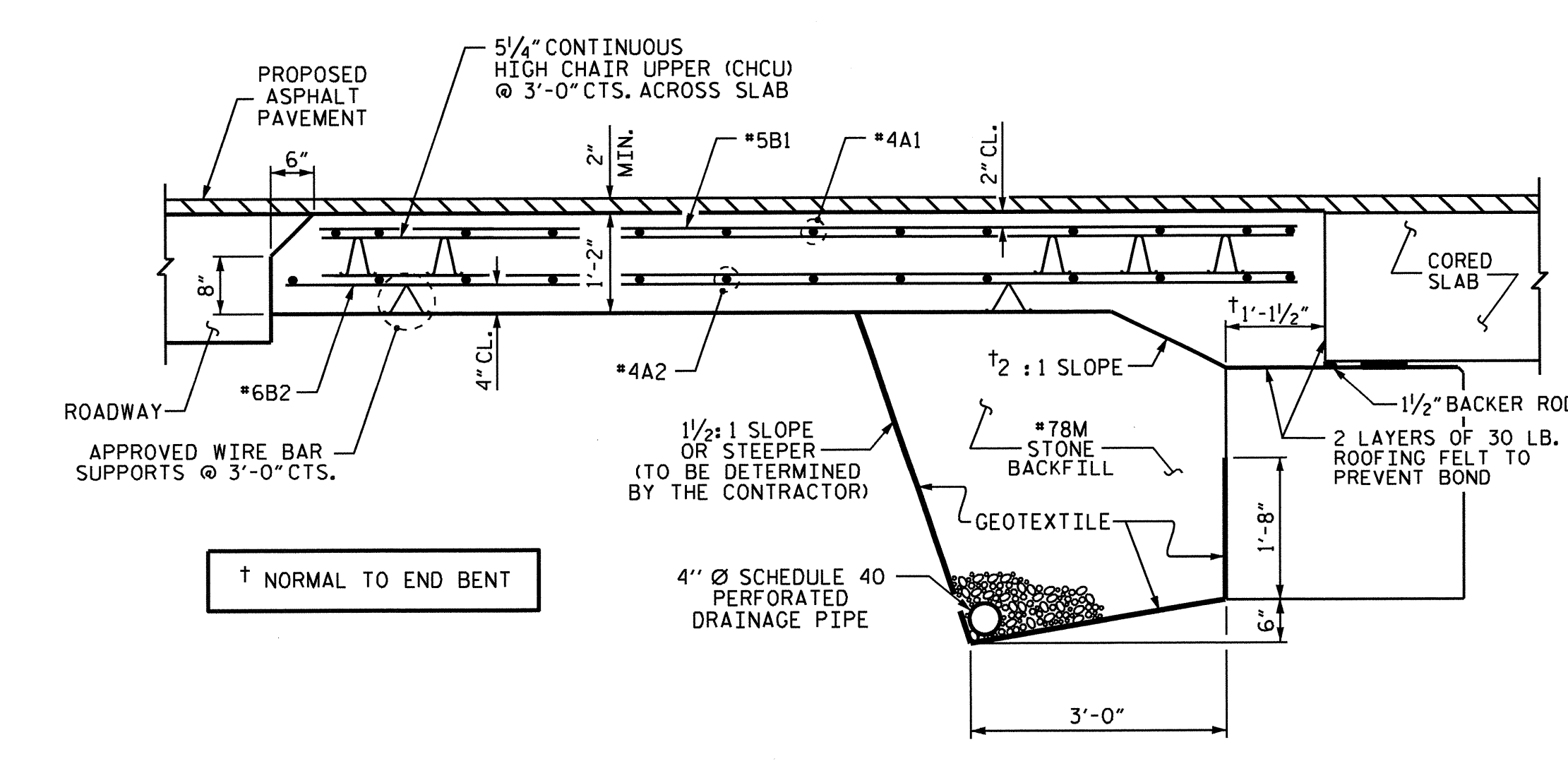


ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012  
 DRAWN BY : REK 1/84 REV. 5/1/06R TLA/GM  
 CHECKED BY : RDU 1/84 REV. 10/1/11 MAA/GM  
 REV. 12/21/11 MAA/GM

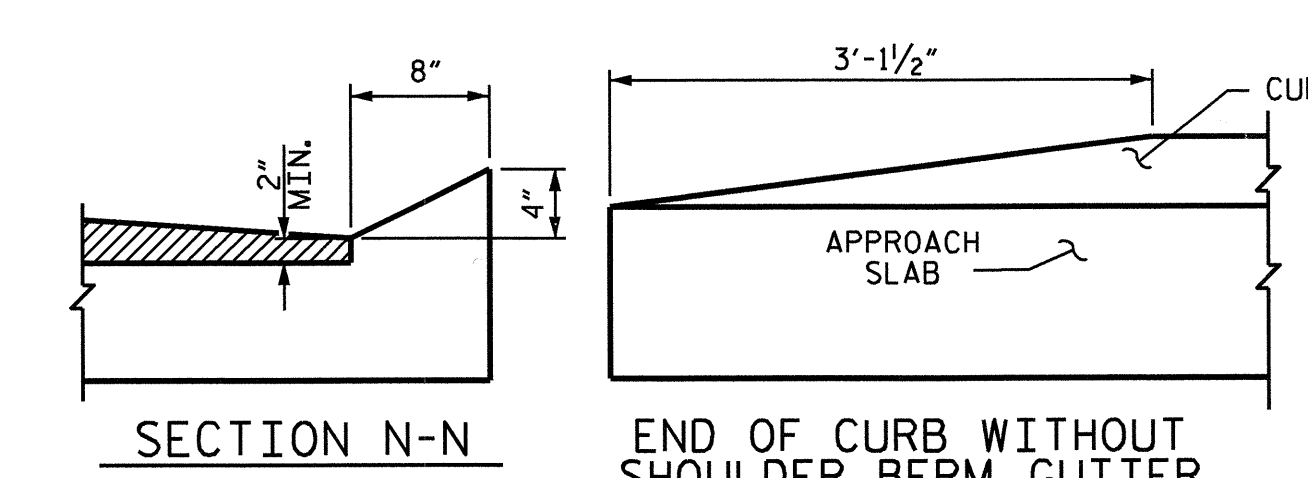




**PLAN @ END BENT 1**      **PLAN @ END BENT 2**  
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



**SECTION THRU SLAB**

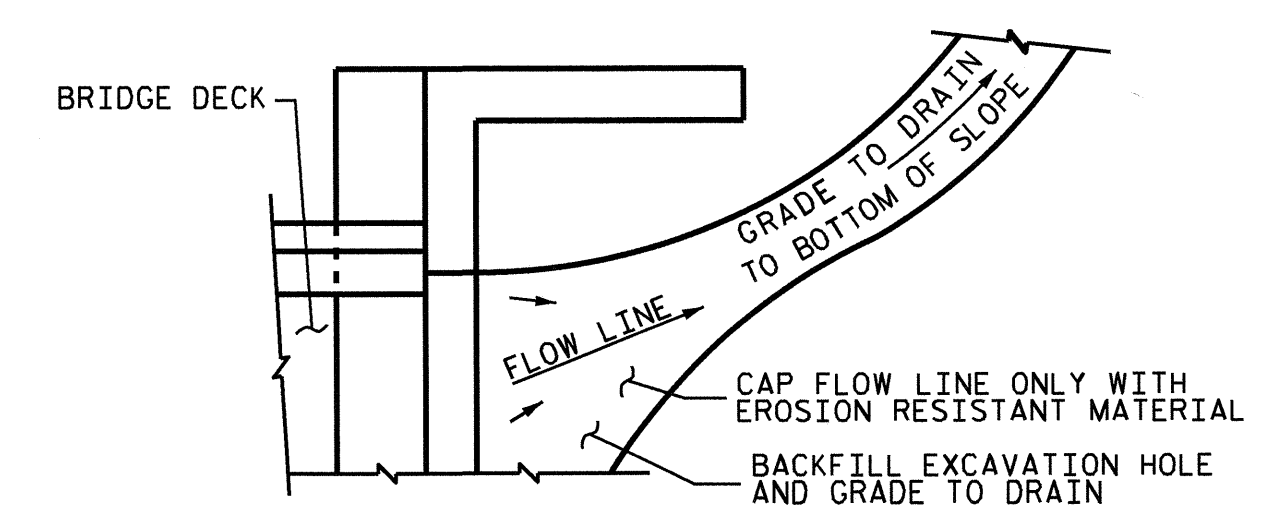


**CURB DETAILS**  
 (OMIT TAPER IF SHOULDER BERM GUTTER IS REQUIRED)

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

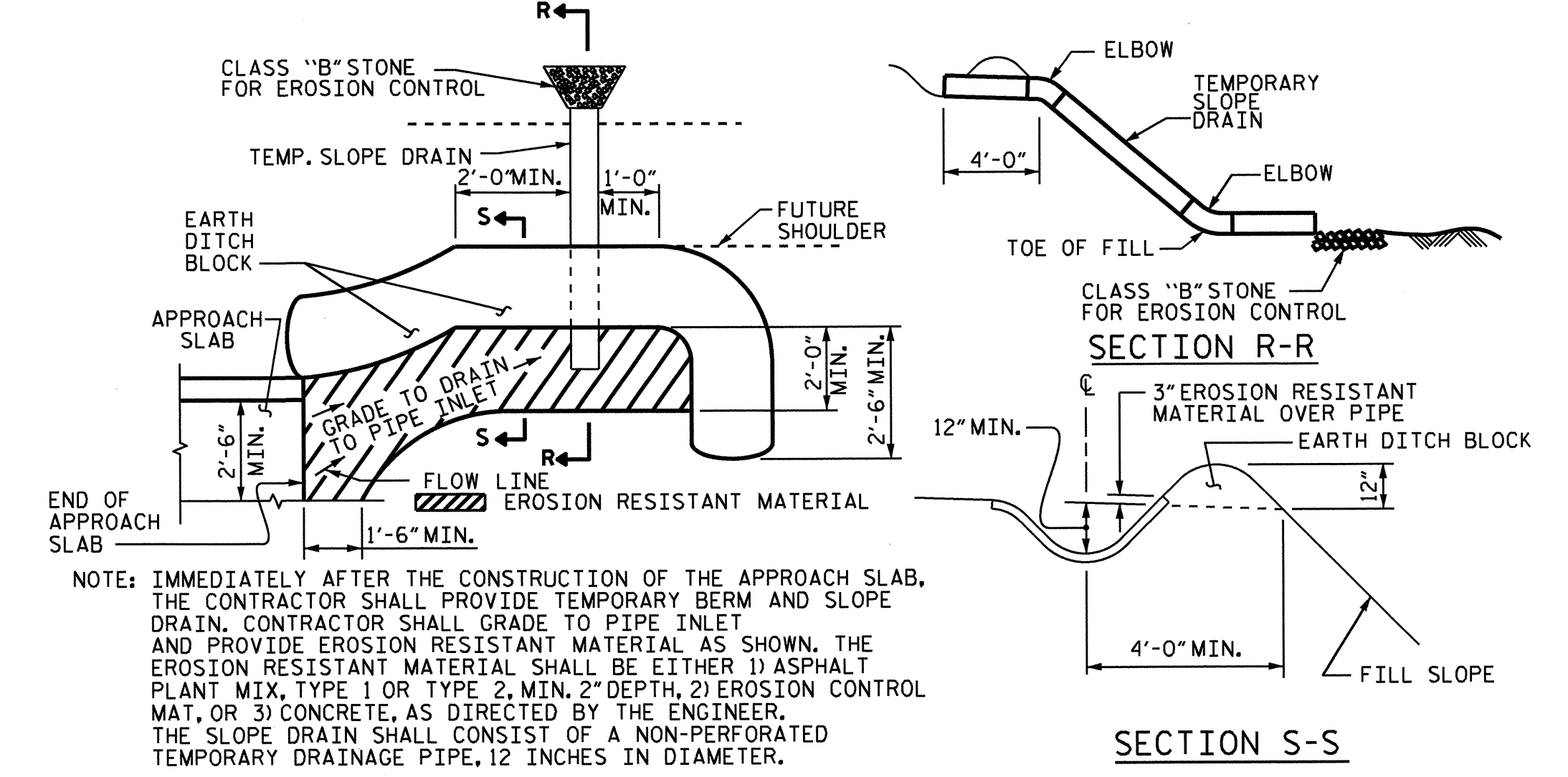
**NOTES**

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.  
 GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.  
 #78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.  
 #78M STONE 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**

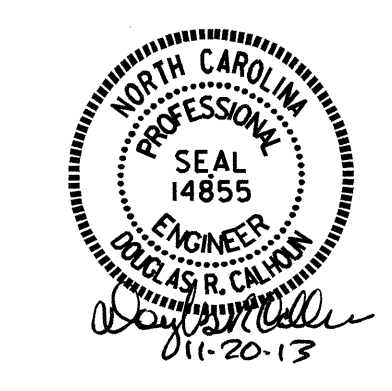


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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	26	#4	STR	16'-11"	294	
A2	26	#4	STR	16'-9"	291	
*B1	64	#5	STR	11'-2"	745	
B2	64	#6	STR	11'-8"	1121	
REINFORCING STEEL					LBS.	1412
*EPOXY COATED REINFORCING STEEL					LBS.	1039
CLASS AA CONCRETE					C. Y.	18.6
APPROACH SLAB AT EB 2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	26	#4	STR	16'-11"	294	
A2	26	#4	STR	16'-9"	291	
*B1	64	#5	STR	11'-2"	745	
B2	64	#6	STR	11'-8"	1121	
REINFORCING STEEL					LBS.	1412
*EPOXY COATED REINFORCING STEEL					LBS.	1039
CLASS AA CONCRETE					C. Y.	18.6

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012  
 CHECKED BY : D.G. ELY DATE : 7/2012  
 DRAWN BY : SHS/MAA 5-09 REV. 12-11 MAA/AAC  
 CHECKED BY : BCH 5-09



PROJECT NO. B-4400  
ALAMANCE COUNTY  
 STATION: 16+88.00 -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					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 24

## 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 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.  
ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.  
IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.  
DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.  
WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".  
EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 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. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

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

ENGLISH  
JANUARY, 1990