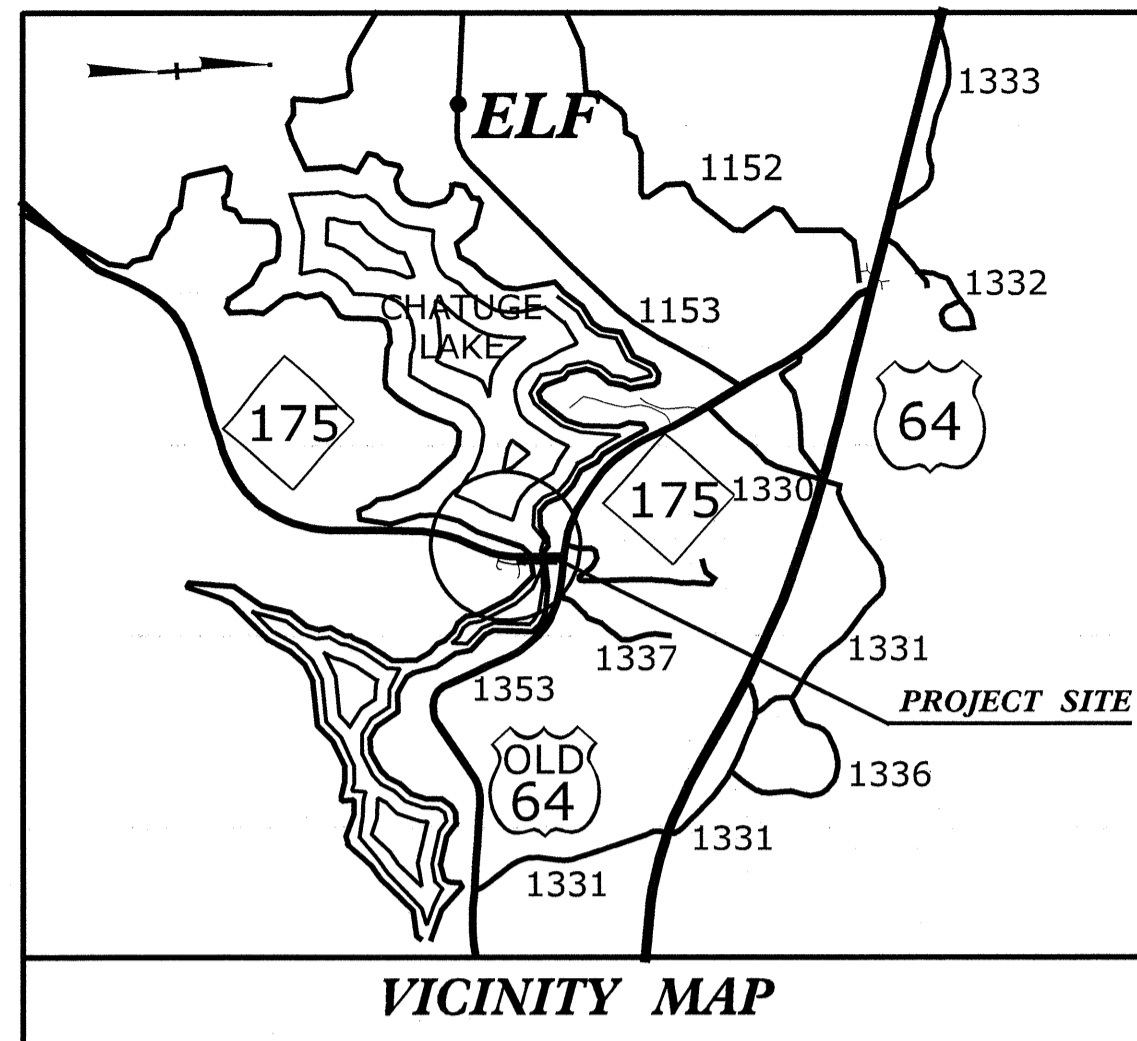


09/28/13

**TIP PROJECT: B-4733**

**CONTRACT: C203158**

**STRUCTURES**



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CLAY COUNTY**

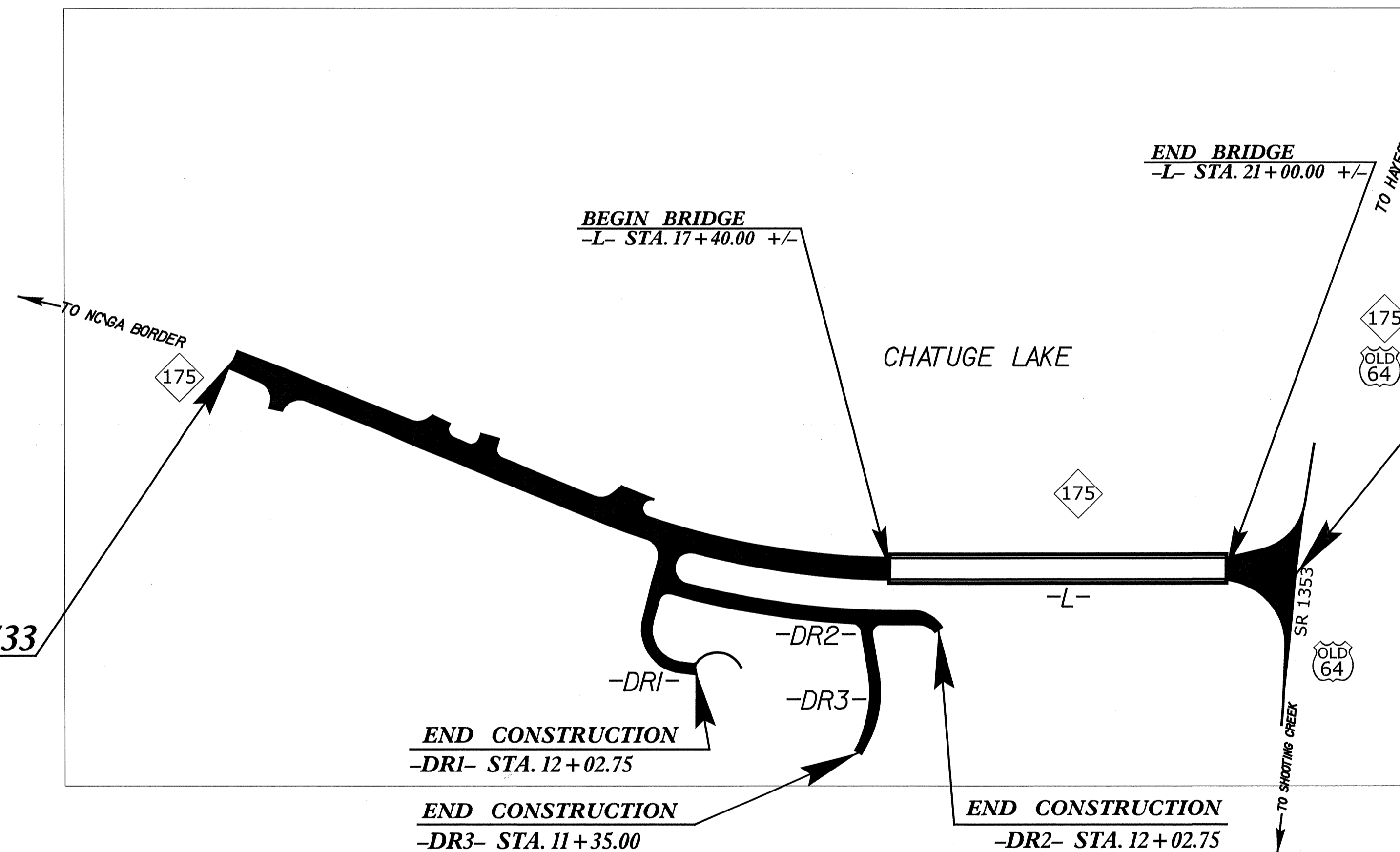
**LOCATION: BRIDGE NO. 11 OVER CHATUGE LAKE ON NC 175**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4733		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38506.1.1	BRSTP-175(7)	P.E.	
38506.2.1	BRSTP-175(7)	R/W, UTL.	



**BEGIN TIP PROJECT B-4733**  
-L- STA. 10+00.00



**END TIP PROJECT B-4733**  
-L- STA. 21+75.39

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

DESIGN DATA	
ADT 2013	= 5,140
ADT 2033	= 9,925
DHV	= 11 %
D	= 55 %
T	= 8 % *
V	= 60 MPH
FUNC. CLASS	= MAJOR COLLECTOR
REGIONAL TIER	
* (TTST 2% + DUAL 6%)	

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT B-4733	= 0.155 Miles
LENGTH STRUCTURE TIP PROJECT B-4733	= 0.068 Miles
TOTAL LENGTH OF TIP PROJECT B-4733	= 0.223 Miles

Prepared In the Office of:

**LETTING DATE:**  
JUNE 18, 2013

**E. R. PHIPPS, PE**  
PROJECT ENGINEER

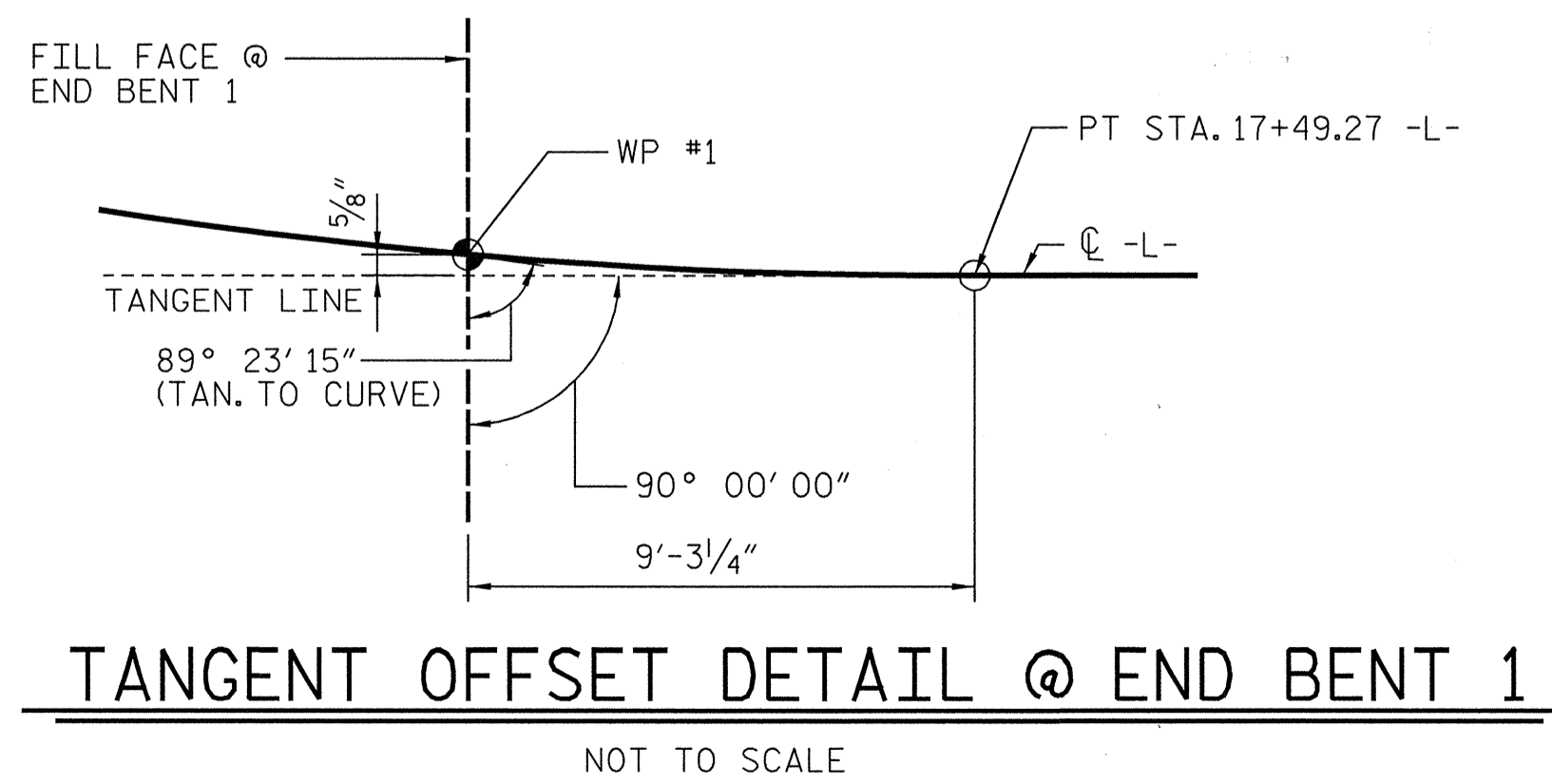
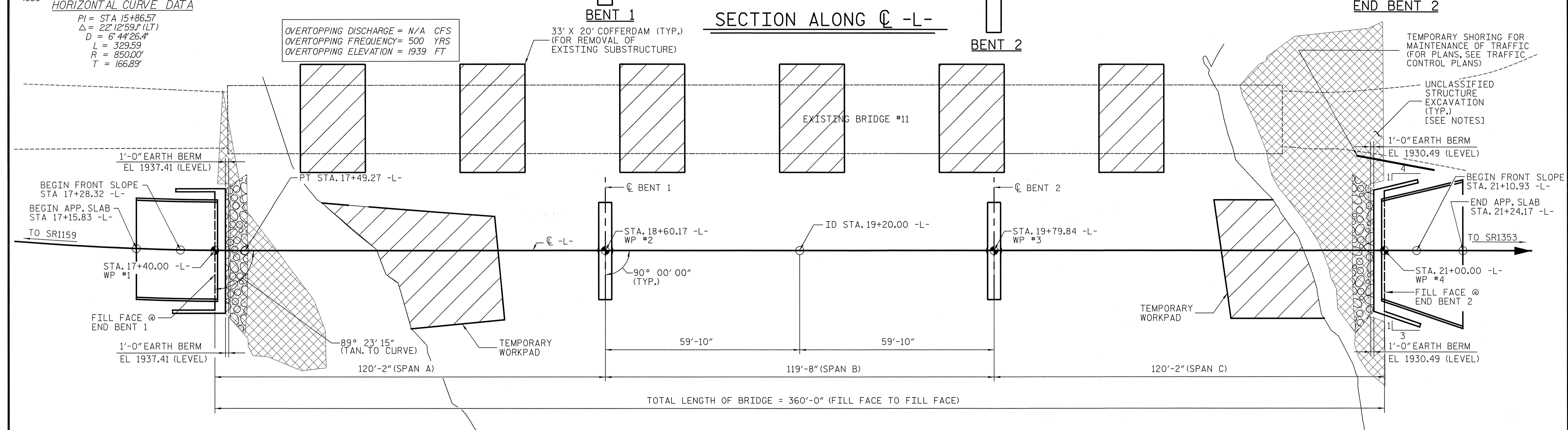
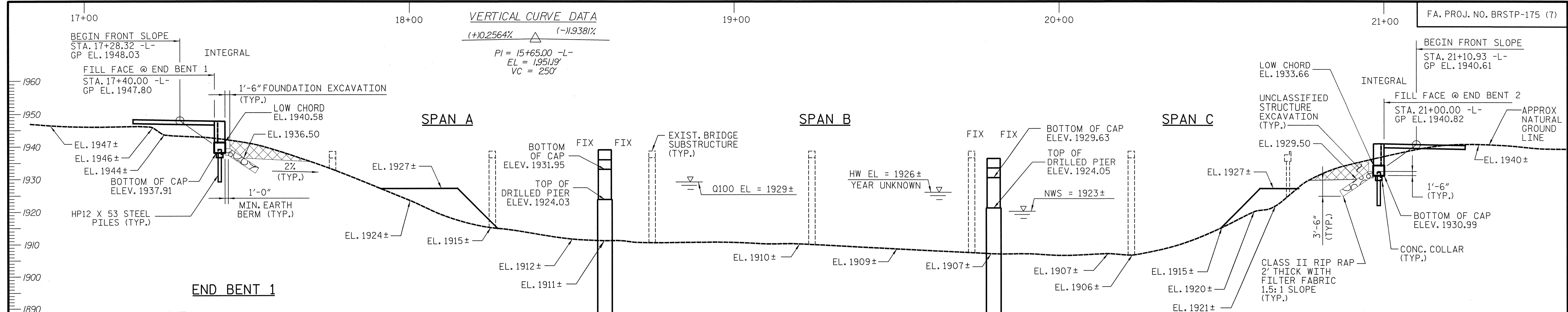
**R. C. LARSON, PE**  
PROJECT DESIGN ENGINEER

**STRUCTURES ENGINEER**

*Robert C. Larson*  
SIGNATURE

2/20/13  
P.E.

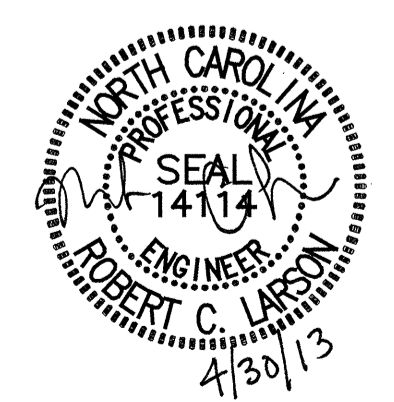
STATE OF NORTH CAROLINA



**PLAN**  
(PILES NOT SHOWN IN PLAN VIEW)  
(BENTS AND END BENTS ARE PARALLEL)

**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE	= 7000 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= N/A FT
DRAINAGE AREA	= 42 SQ.MI.
BASE DISCHARGE	= 8300 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 1929 FT
OVERTOPPING DISCHARGE	= N/A CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 1939 FT



PROJECT NO. B-4733  
 CLAY COUNTY  
 STATION: 19+20.00 -L-  
 SHEET 1 OF 4 REPLACES BR. NO. 11

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING  
 FOR BRIDGE ON NC 175  
 OVER LAKE CHATUGE  
 BETWEEN SR1159 AND SR1353**

DESIGN ENGINEER OF RECORD: [Signature] DATE: 4/30/13  
 DRAWN BY: R. A. PRUETT DATE: 4/09/12  
 CHECKED BY: R. C. LARSON DATE: 1/11/13

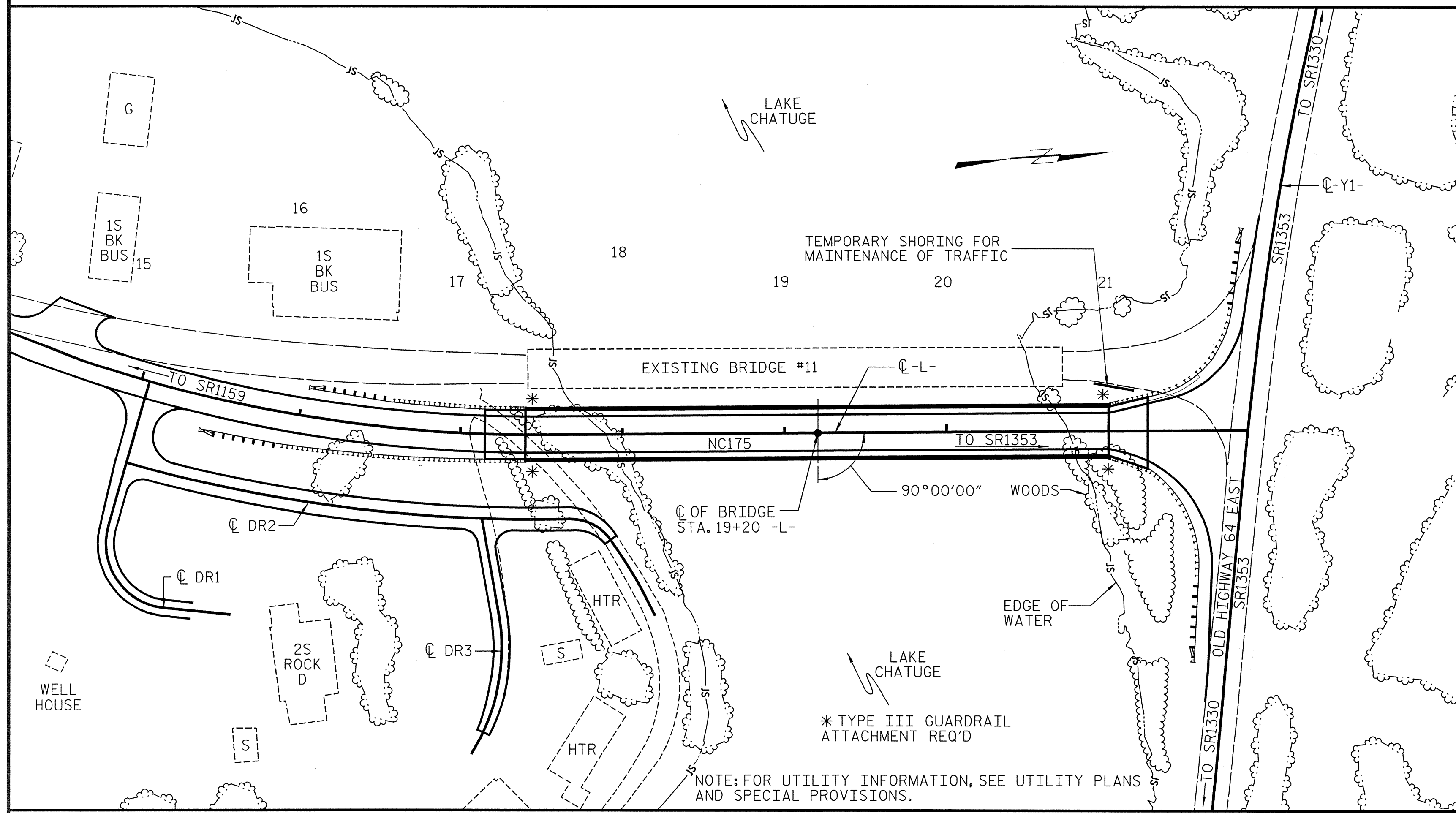
NOTE: BEGINNING OF SPAN A TO FOLLOW TANGENT AHEAD.

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

DWG. REF. NO. 1 OF 34







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.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF 7 @ 47' SPANS REINFORCED CONCRETE DECK GIRDERS WITH 18' CLEAR ROADWAY WIDTH AND CONCRETE FLOOR ON REINFORCED CONCRETE SUBSTRUCTURE AND LOCATED 40' DOWNSTREAM FROM 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 70 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
- THE 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.
- THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.
- 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.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS AT STA. 19+20.00-L-	REMOVAL OF EXISTING STRUCTURE AT STA. 19+20.00-L-	5'-0" DIA. DRILLED PIERS IN SOIL	5'-0" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT CASING FOR 5'-0" DIA. DRILLED PIERS	SID TESTING	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION STA. 19+20.00-L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS	HP12 X 53 STEEL PILES		PILE EXCAVATION			
																	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH
SUPERSTRUCTURE										11,730	10,971					12	1426.0					
END BENT 1												16.4		3614				7	70		30	35
BENT 1			24	12	23	1						33.5		14,643	1467							
BENT 2			32	13	32	1						32.1		17,410	1677							
END BENT 2												16.3		3498				7	70			35
TOTAL	LUMP SUM	LUMP SUM	56	25	55	2	1	1	LUMP SUM	11,730	10,971	98.3	LUMP SUM	39,165	3144	12	1426.0	14	140	30	70	

TOTAL BILL OF MATERIAL

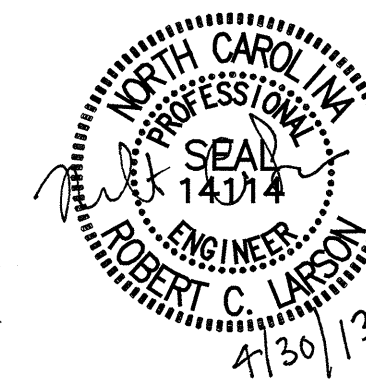
	4" FORCE MAIN SEWER BRIDGE ATTACHMENT	TWO BAR METAL RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	LUMP SUM	LIN. FT.	LIN. FT.	SQ. YDS.	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE		701.17	716.67			LUMP SUM
END BENT 1				52	58	
BENT 1						
BENT 2						
END BENT 2				48	53	
TOTAL	LUMP SUM	701.17	716.67	100	111	LUMP SUM

NOTES: (CONT'D)

- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING, SEE ROADWAY PLANS.
- FOR 4" FORCE MAIN SEWER BRIDGE ATTACHMENT, SEE UTILITY PLANS AND SPECIAL PROVISIONS.
- FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.
- FOR TEMPORARY ACCESS, SEE SPECIAL PROVISIONS.

PROJECT NO. B-4733  
 CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 3 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE ON NC 175  
 OVER LAKE CHATUGE  
 BETWEEN SR1159 AND SR1353

DESIGN ENGINEER OF RECORD: *R.A. Pruet* DATE: 4/30/13  
 DRAWN BY: R. A. PRUETT DATE: 4/09/12  
 CHECKED BY: R. C. LARSON DATE: 1/11/13

KCI Associates  
 41 North Carolina, P.A.  
 RALEIGH OFFICE  
 LICENSE NUMBER C-9184

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-3
2			4			TOTAL SHEETS 37



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

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

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			
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT					SHEAR					LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (Ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (Ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (Ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.02	--	1.75	0.763	1.21	120'-2"	E	58.7	0.763	1.17	120'-2"	E	34.9	0.80	0.763	1.02	120'-2"	E	58.7		
	HL-93 (OPERATING)	N/A		1.57	--	1.35	0.763	1.57	120'-2"	E	58.7	0.763	1.96	120'-2"	E	23.1	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.00	②	1.49	53.64	1.75	0.763	1.76	120'-2"	E	58.7	0.763	2.06	120'-2"	E	23.1	0.80	0.763	1.49	120'-2"	E	58.7		
	HS-20 (OPERATING)	36.00		2.29	82.44	1.35	0.763	2.29	120'-2"	E	58.7	0.763	2.73	120'-2"	E	23.1	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50		3.64	49.14	1.40	0.763	5.39	120'-2"	E	58.7	0.763	6.83	120'-2"	E	23.1	0.80	0.763	3.64	120'-2"	E	58.7	
		SNGARBS2	20.00		2.58	51.60	1.40	0.763	3.83	120'-2"	E	58.7	0.763	4.70	120'-2"	E	23.1	0.80	0.763	2.58	120'-2"	E	58.7	
		SNAGRIS2	22.00		2.39	52.58	1.40	0.763	3.54	120'-2"	E	58.7	0.763	4.32	120'-2"	E	23.1	0.80	0.763	2.39	120'-2"	E	58.7	
		SNCOTTS3	27.25		1.79	48.77	1.40	0.763	2.65	120'-2"	E	58.7	0.763	3.29	120'-2"	E	23.1	0.80	0.763	1.79	120'-2"	E	58.7	
		SNAGGRS4	34.925		1.45	50.64	1.40	0.763	2.15	120'-2"	E	58.7	0.763	2.63	120'-2"	E	23.1	0.80	0.763	1.45	120'-2"	E	58.7	
		SNS5A	35.55		1.43	50.83	1.40	0.763	2.11	120'-2"	E	58.7	0.763	2.64	120'-2"	E	23.1	0.80	0.763	1.43	120'-2"	E	58.7	
		SNS6A	39.95		1.29	51.53	1.40	0.763	1.92	120'-2"	E	58.7	0.763	2.36	120'-2"	E	23.1	0.80	0.763	1.29	120'-2"	E	58.7	
		SNS7B	42.00	③	1.23	51.66	1.40	0.763	1.82	120'-2"	E	58.7	0.763	2.29	120'-2"	E	23.1	0.80	0.763	1.23	120'-2"	E	58.7	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.00		1.58	52.14	1.40	0.763	2.33	120'-2"	E	58.7	0.763	2.87	120'-2"	E	23.1	0.80	0.763	1.58	120'-2"	E	58.7	
		TNT4A	33.075		1.58	52.25	1.40	0.763	2.34	120'-2"	E	58.7	0.763	2.82	120'-2"	E	23.1	0.80	0.763	1.58	120'-2"	E	58.7	
		TNT6A	41.60		1.27	52.83	1.40	0.763	1.88	120'-2"	E	58.7	0.763	2.40	120'-2"	E	23.1	0.80	0.763	1.27	120'-2"	E	58.7	
		TNT7A	42.00		1.27	53.34	1.40	0.763	1.88	120'-2"	E	58.7	0.763	2.36	120'-2"	E	23.1	0.80	0.763	1.27	120'-2"	E	58.7	
		TNT7B	42.00		1.29	54.18	1.40	0.763	1.91	120'-2"	E	58.7	0.763	2.25	120'-2"	E	23.1	0.80	0.763	1.29	120'-2"	E	58.7	
		TNAGRIT4	43.00		1.24	53.32	1.40	0.763	1.84	120'-2"	E	58.7	0.763	2.18	120'-2"	E	23.1	0.80	0.763	1.24	120'-2"	E	58.7	
		TNAGRIT5A	45.00		1.18	53.10	1.40	0.763	1.75	120'-2"	E	58.7	0.763	2.13	120'-2"	E	23.1	0.80	0.763	1.18	120'-2"	E	58.7	
TNAGRIT5B	45.00	③	1.17	52.65	1.40	0.763	1.73	120'-2"	E	58.7	0.763	2.07	120'-2"	E	23.1	0.80	0.763	1.17	120'-2"	E	58.7			

**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.

**# CONTROLLING LOAD RATING**

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

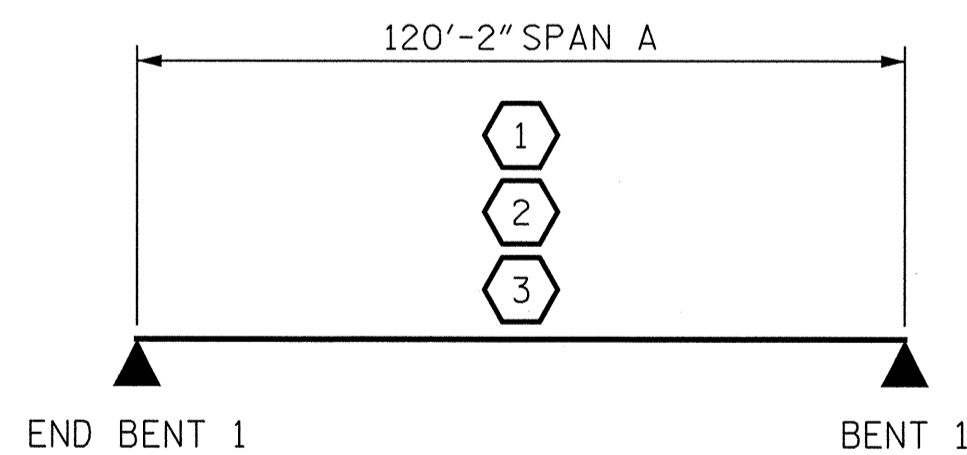
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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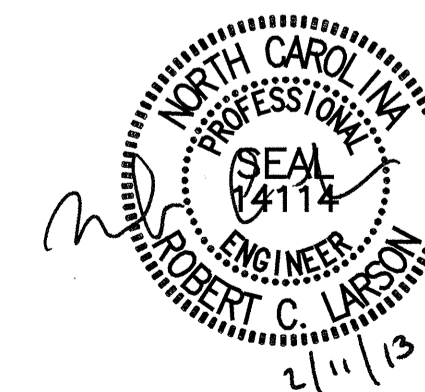
**GIRDER LOCATION**

I - INTERIOR GIRDER  
E - EXTERIOR GIRDER



**LRFR SUMMARY**  
(SPAN A SHOWN, SPANS B & C SIMILAR)

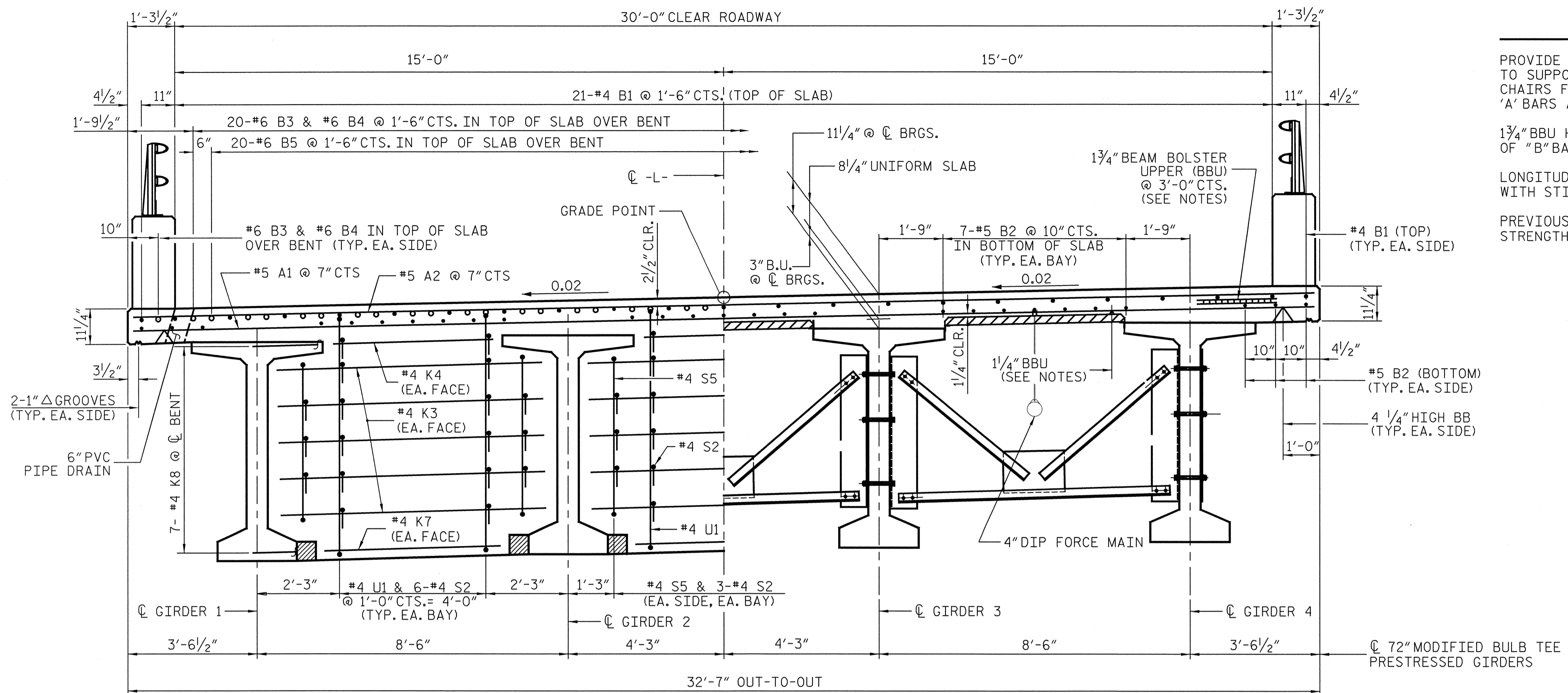
PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE GIRDERS**  
 (NON-INTERSTATE TRAFFIC)  
 STD. NO. LRFR1

DESIGN ENGINEER OF RECORD: <i>Robert C. Larson</i>	DATE: <u>2/11/13</u>
ASSEMBLED BY: K. SU	DATE: 1/4/13
CHECKED BY: R. C. LARSON	DATE: 1/5/13
DRAWN BY: MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY: GM/DI 2/08	REV. 10/1/11 MAA/GM

	REVISIONS						SHEET NO. <b>S-4</b> TOTAL SHEETS <b>39</b>
	NO.	BY:	DATE:	NO.	BY:	DATE:	
	1			3			
	2			4			



TYPICAL HALF SECTION AT BENT DIAPHRAGM

TYPICAL HALF SECTION AT INTERIOR DIAPHRAGM

TYPICAL SECTION

- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING OVER BENT

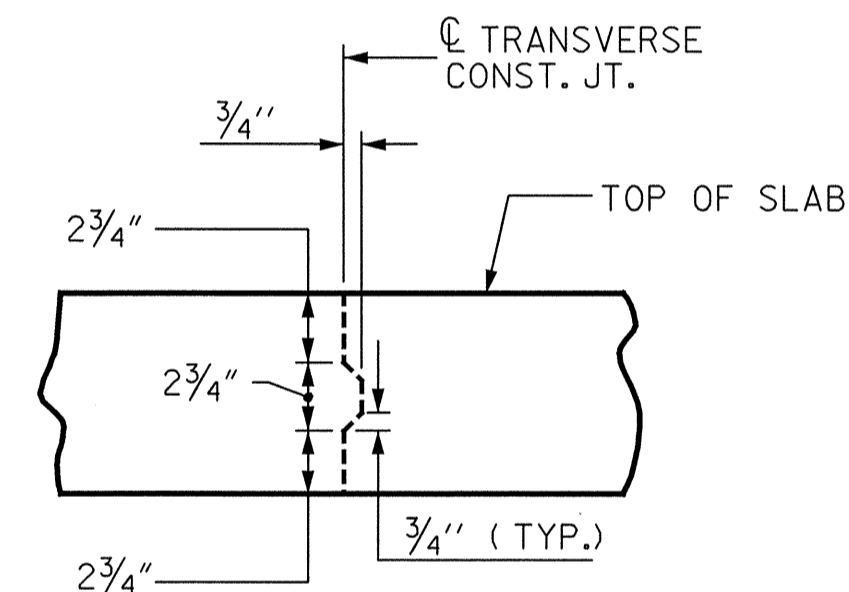
NOTES

PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

1 3/4" BBU HEIGHT IS SHOWN FOR MIDSPAN CONDITION. BBU HEIGHT WILL VARY WITH INCREASED SIZE OF "B" BARS OVER BENTS AND END BENTS.

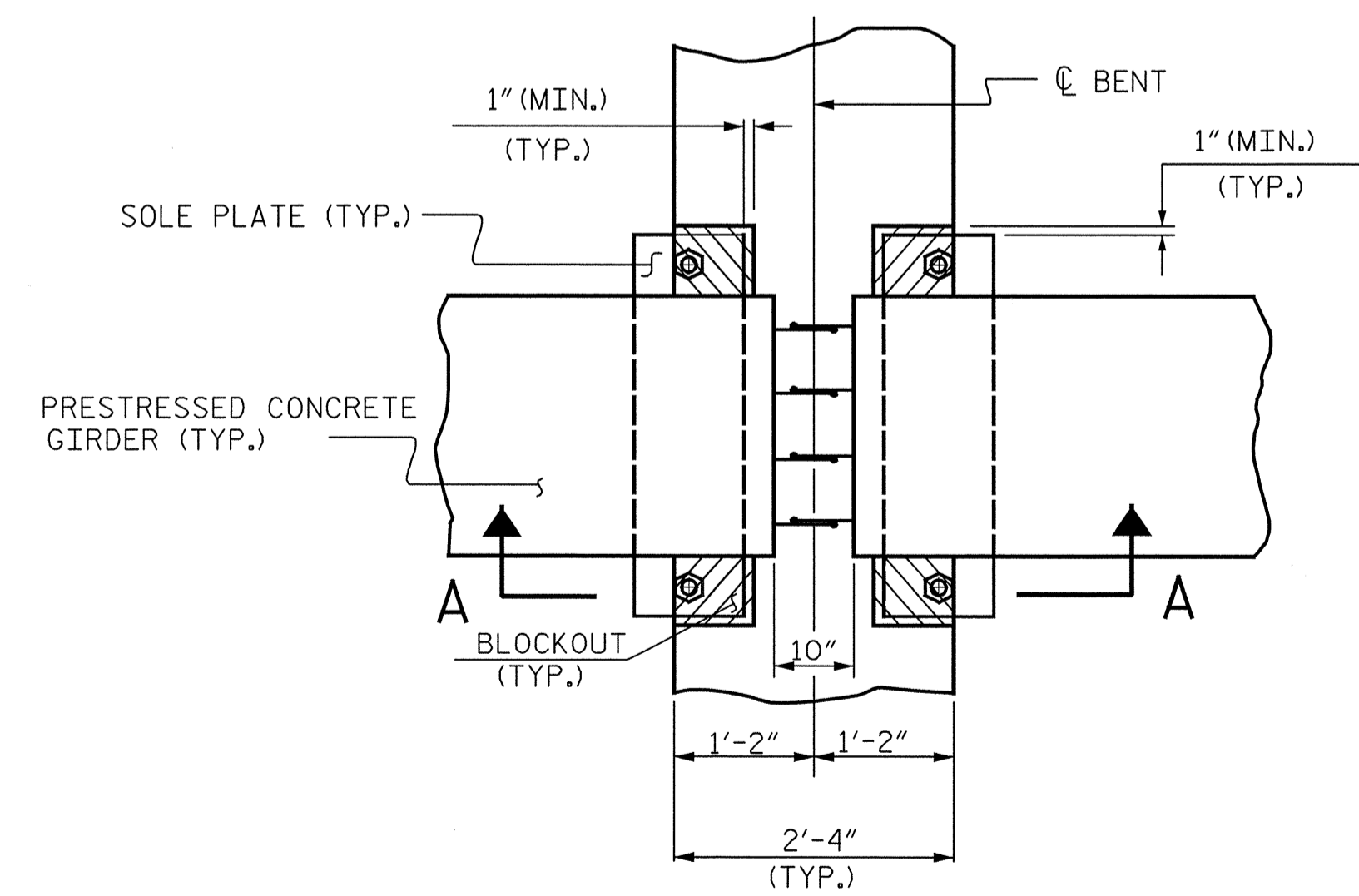
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

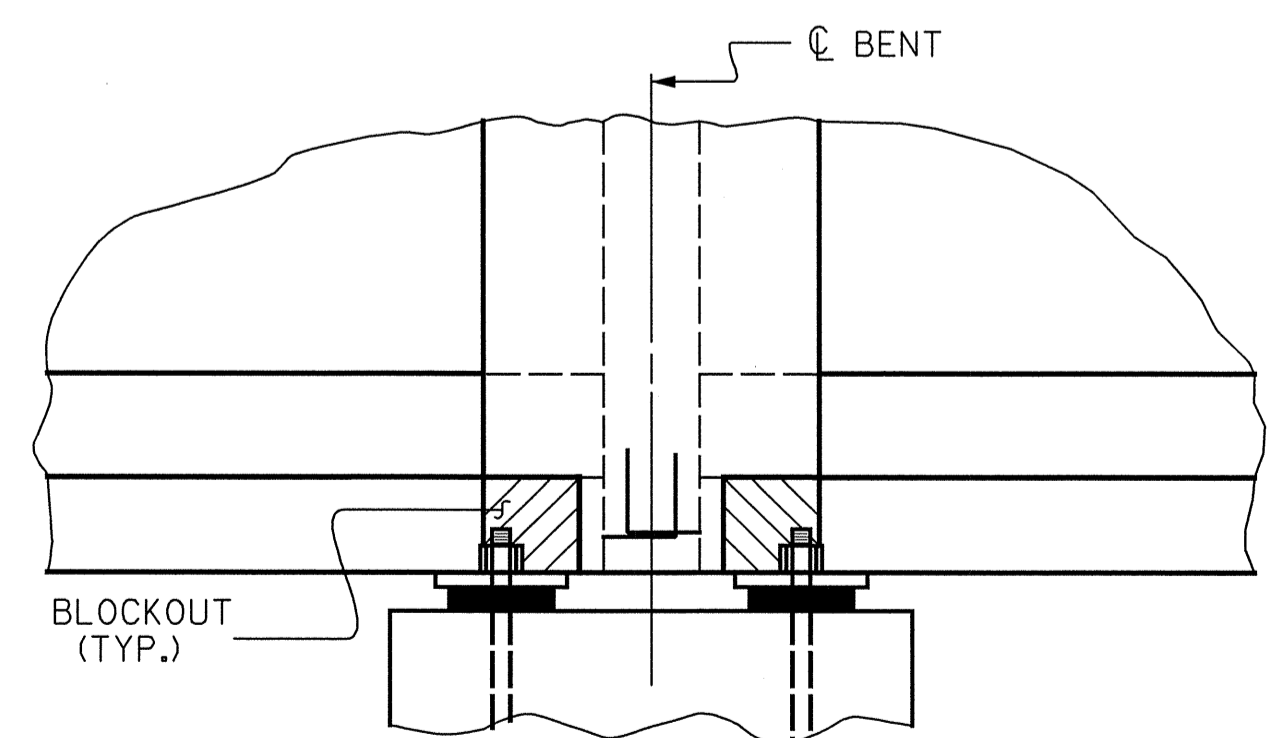


TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT



PLAN VIEW



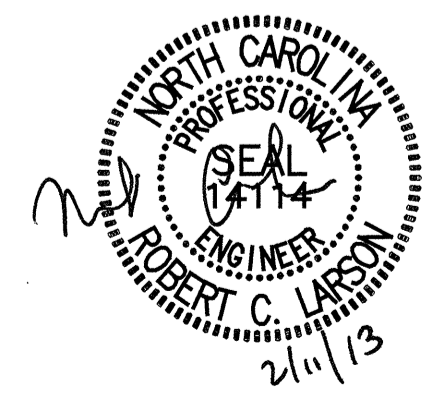
SECTION A-A

BENT DIAPHRAGM BLOCKOUT DETAIL

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-  
 SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 TYPICAL SECTION**

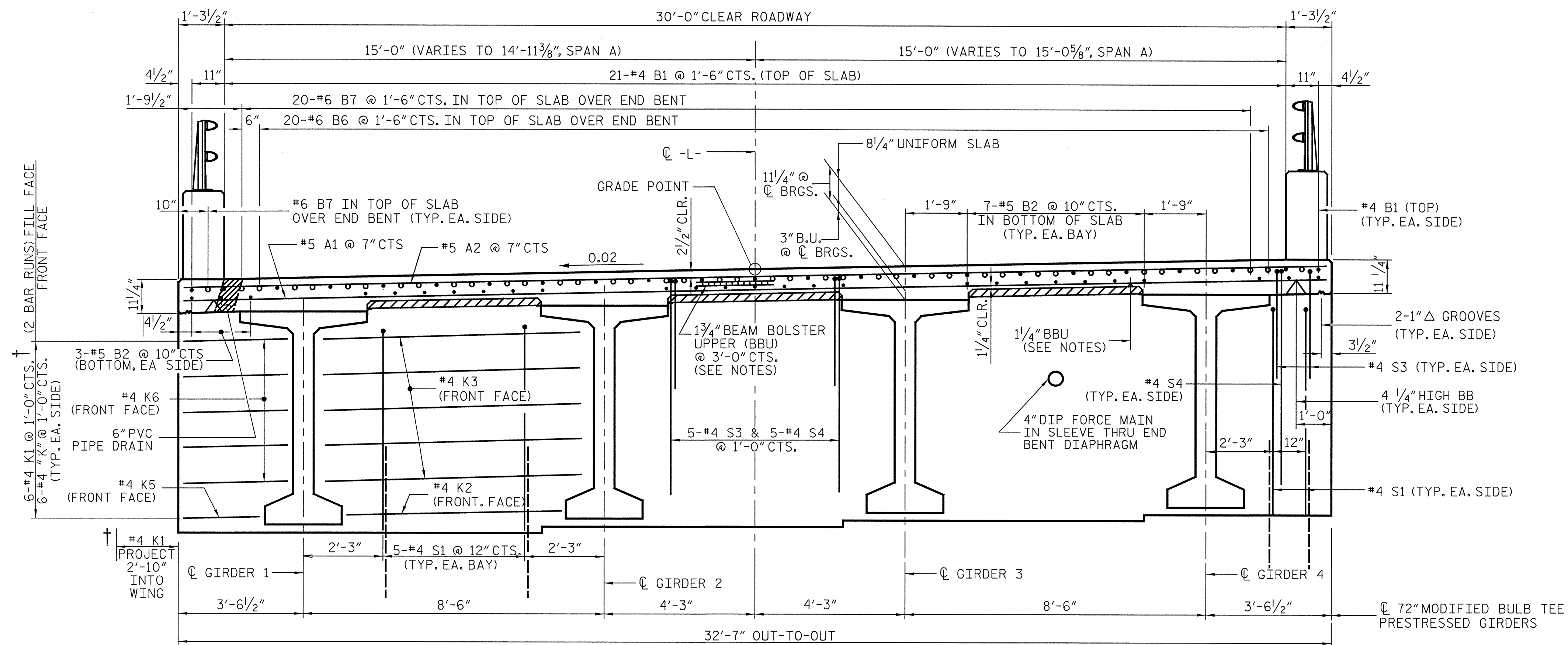


DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/11/13  
 DRAWN BY: R. C. LARSON DATE: 5/15/12  
 CHECKED BY: R. A. PRUETT DATE: 11/28/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			39
2			4			

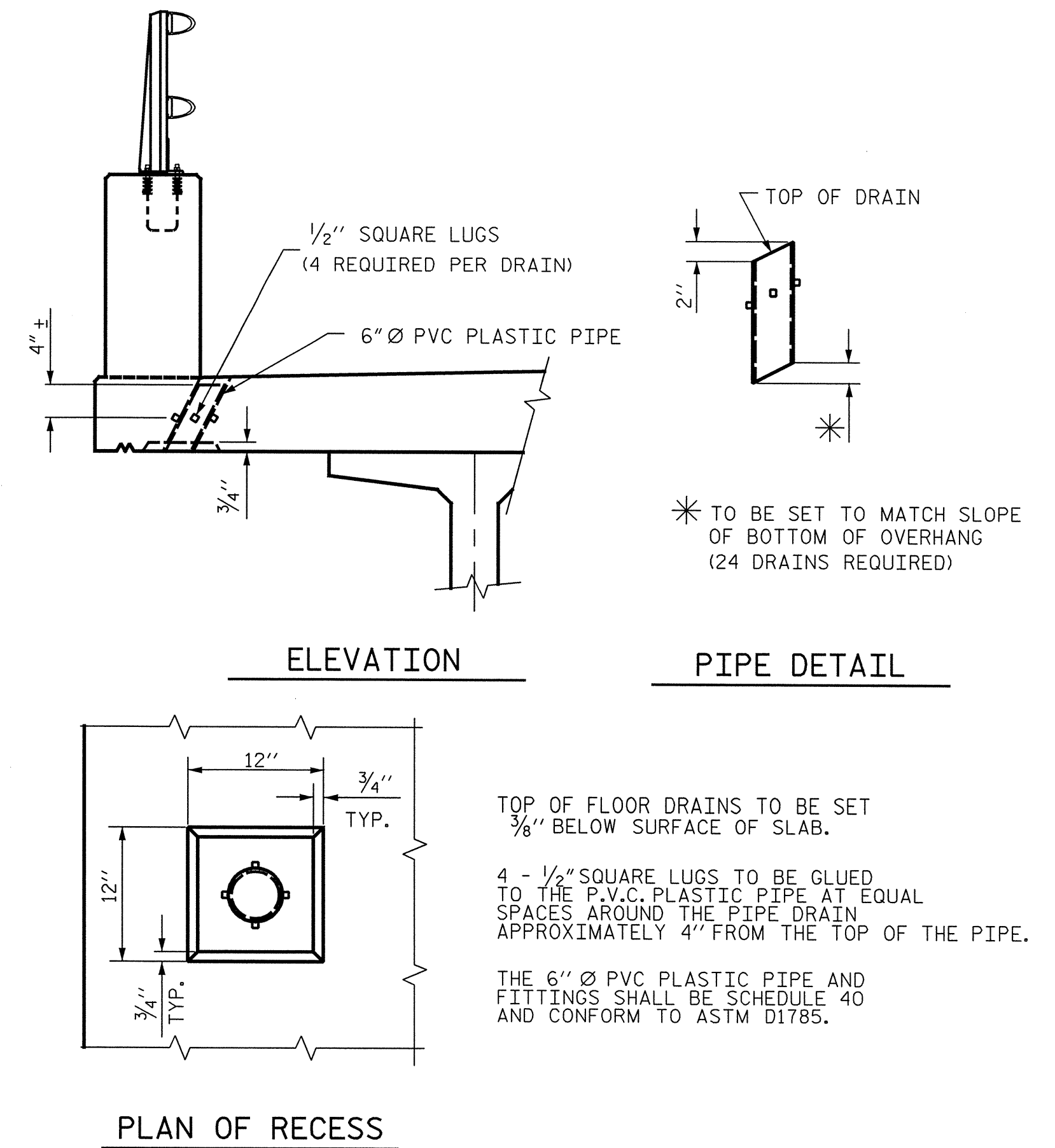
DWG. REF. NO. 5 OF 34





**TYPICAL SECTION AT END BENT**

- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING OVER END BENT



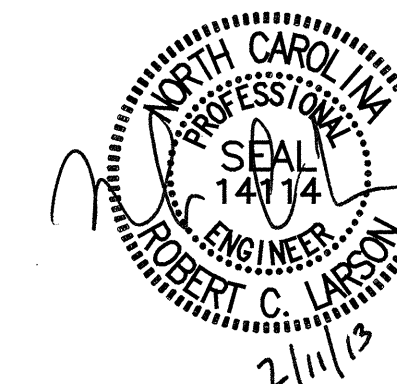
**DRAIN DETAILS**

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 TYPICAL SECTION**

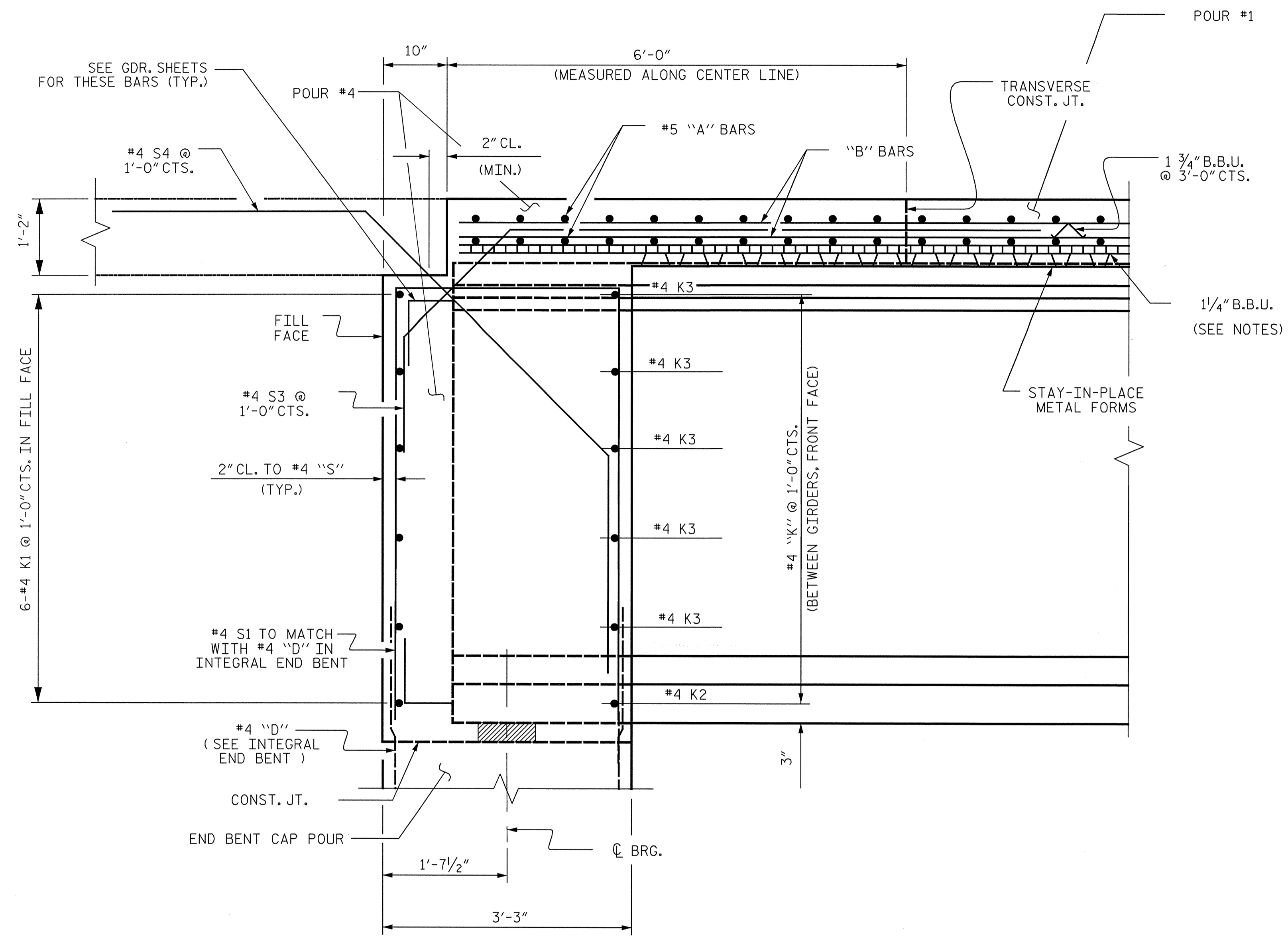


DESIGN ENGINEER OF RECORD: R. C. Larson DATE: 2/1/12  
 DRAWN BY: R. C. LARSON DATE: 5/15/12  
 CHECKED BY: R. A. PRUETT DATE: 11/28/12

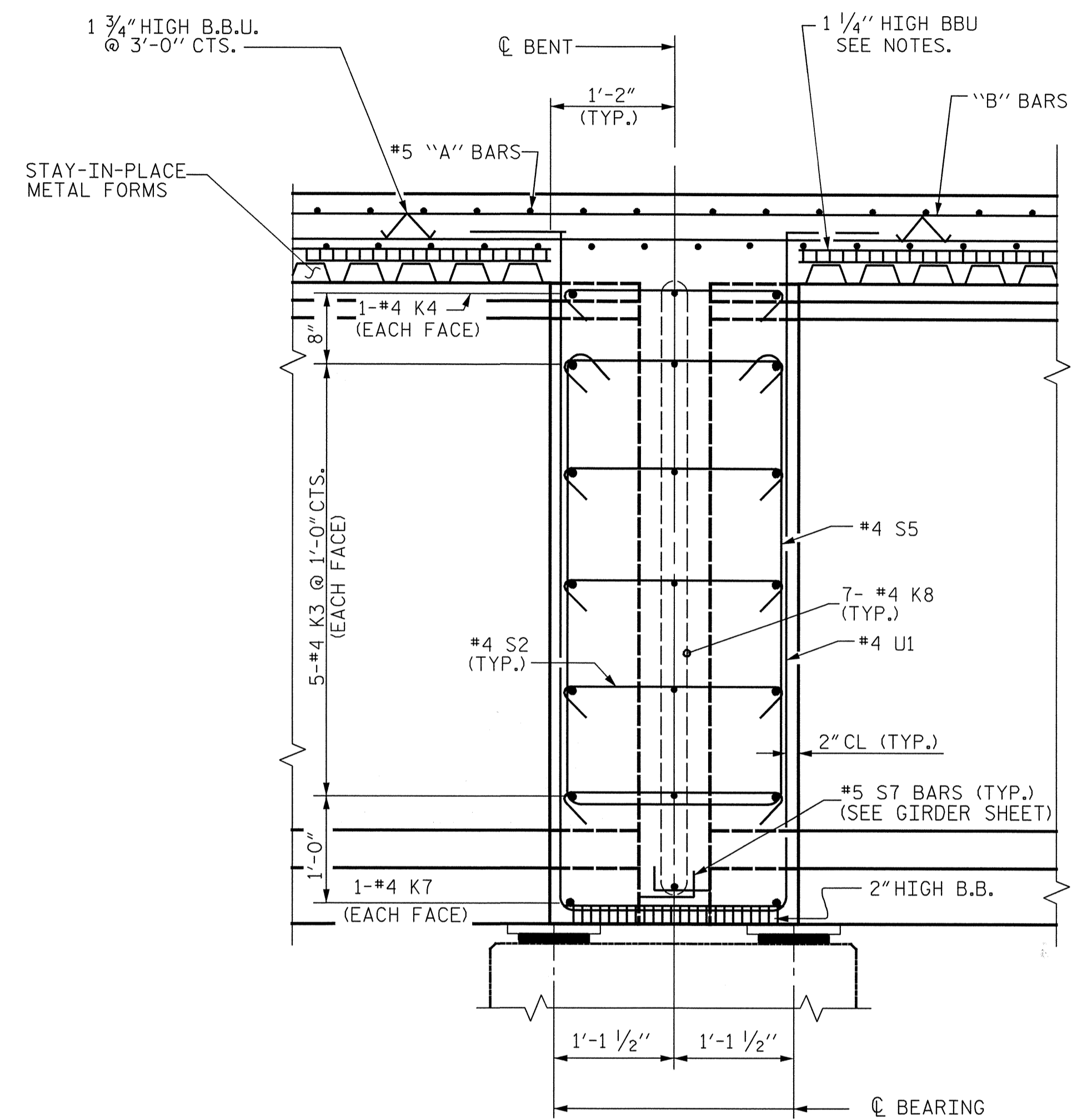
KCI Associates  
 of North Carolina, P.A.  
 LICENSE NO. 2700-0001

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

SHEET NO. 5-6  
 TOTAL SHEETS 39



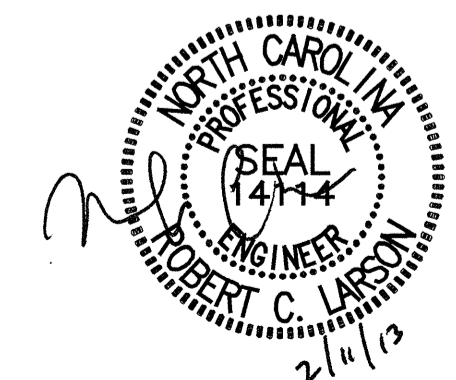
SECTION A-A



SECTION B-B

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 3 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION  
 DETAILS



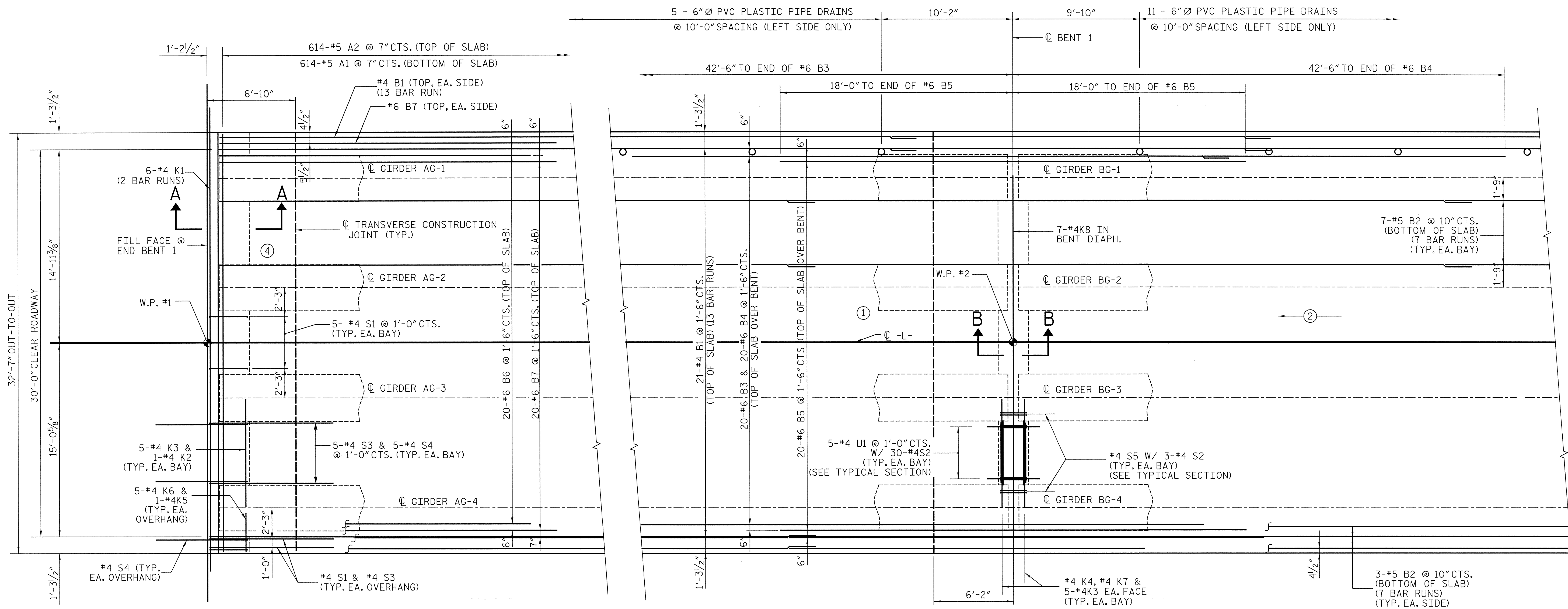
DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 2/11/12  
 DRAWN BY: R. C. LARSON DATE: 6/5/12  
 CHECKED BY: R. A. PRUETT DATE: 11/29/12

KCI Associates of North Carolina, P.A.		REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DWG. REF. NO. 7 OF 34

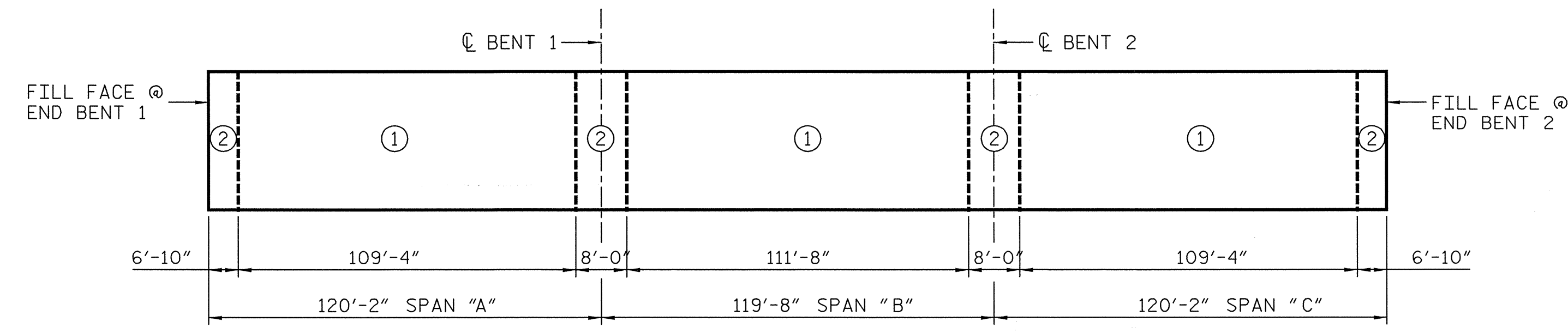
TOTAL SHEETS: 39





**PLAN - SPANS "A" & "B"**

← (N) → INDICATES POUR SEQUENCE AND DIRECTION  
 SEE SUPERSTRUCTURE BILL OF MATERIAL FOR REINFORCING SPLICE LENGTHS.



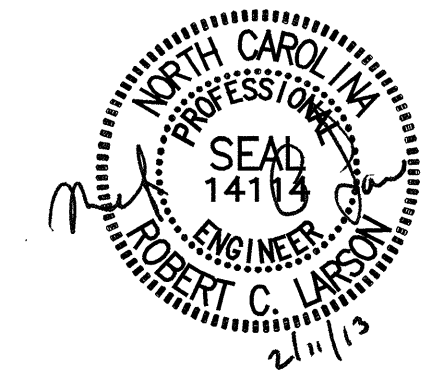
**OPTIONAL POUR SEQUENCE**

AT THE CONTRACTOR'S OPTION, THIS SEQUENCE MAY BE USED IN LIEU OF THE SEQUENCE SHOWN ON THE PLAN OF SPANS. DO NOT BEGIN ANY POUR ② UNTIL BOTH ADJACENT POURS ① HAVE REACHED A STRENGTH OF 3000 PSI.

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 1 OF 2

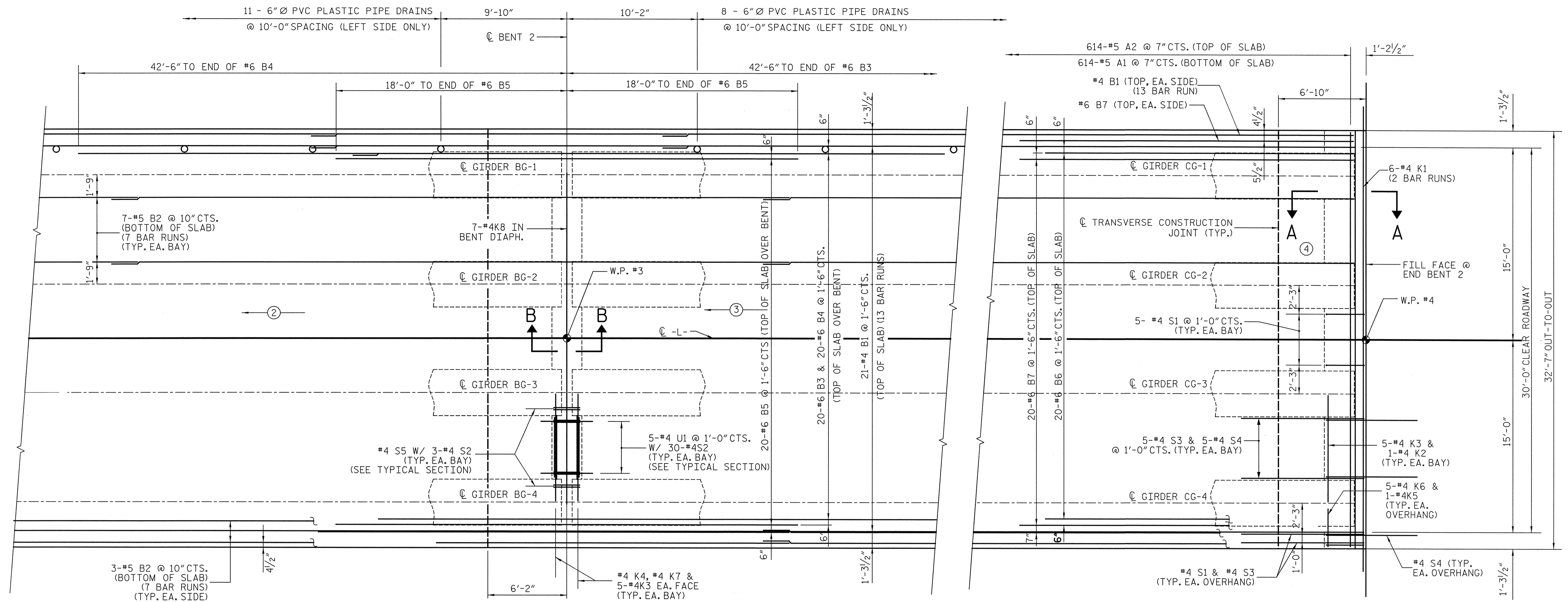
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE  
 PLAN OF SPANS  
 "A" & "B"**



DESIGN ENGINEER OF RECORD: R. C. Larson DATE: 2/1/13  
 DRAWN BY: R. A. PRUETT DATE: 5/15/12  
 CHECKED BY: R. A. PRUETT DATE: 11/28/12

REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.
1			5-B
2			TOTAL SHEETS
			39

DWG. REF. NO. 8 OF 34



**PLAN - SPANS "B" & "C"**

Ⓝ INDICATES POUR SEQUENCE AND DIRECTION

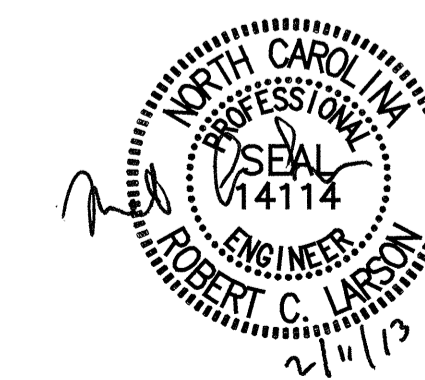
SEE SUPERSTRUCTURE BILL OF MATERIAL FOR REINFORCING SPLICE LENGTHS.

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 PLAN OF SPANS  
 "B" & "C"**



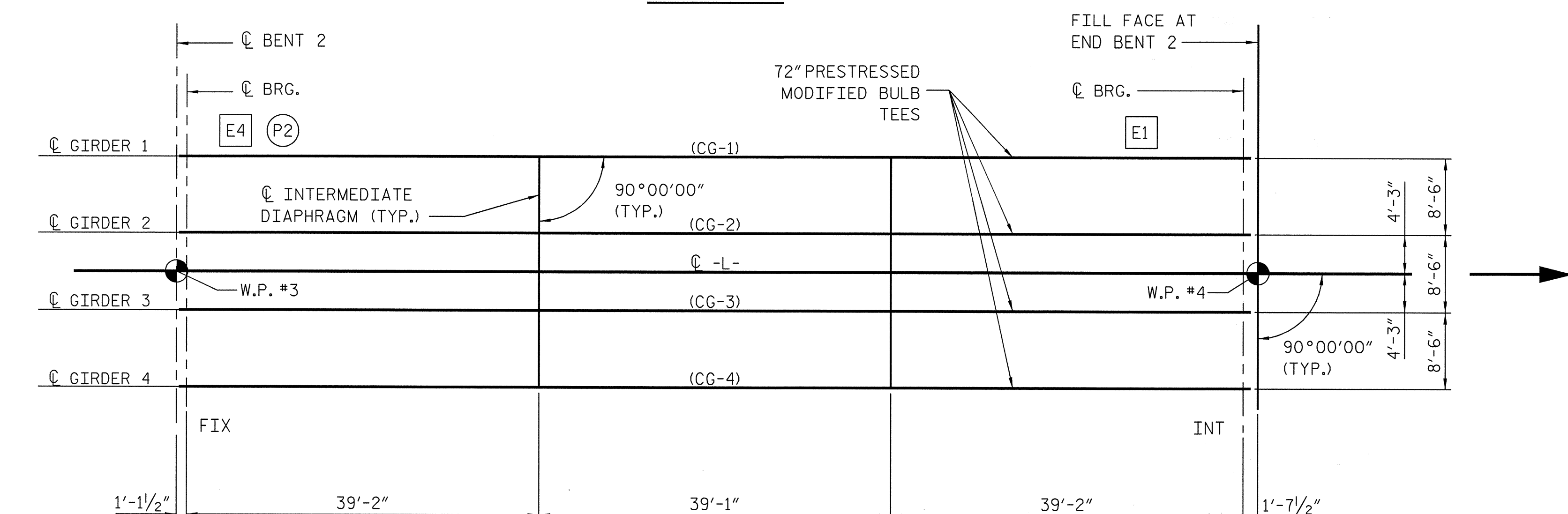
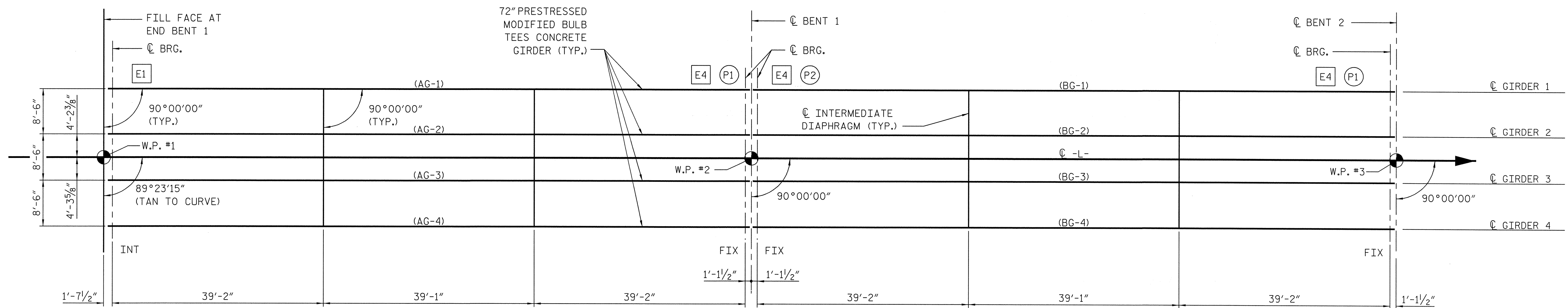
DESIGN ENGINEER OF RECORD: R. C. Larson DATE: 2/11/13  
 DRAWN BY: R. C. LARSON DATE: 5/15/12  
 CHECKED BY: R. A. PRUETT DATE: 11/28/12

KCI Associates of North Carolina, P.A. STATE LICENSE CENTER # 000285 ENGINEER NO. 14114  
 RALEIGH OFFICE LICENSE # 14114 REGISTERED PROFESSIONAL ENGINEER LICENSE NUMBER 0-0141

REVISIONS						SHEET NO. 5-9 TOTAL SHEETS 39
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DWG. REF. NO. 9 OF 34





**FRAMING PLAN AND INTERMEDIATE DIAPHRAGM LOCATIONS**

- NOTES:**
- ELASTOMERIC BEARINGS INDICATED THUS:  
[EN] (N = NUMBER)
  - SOLE PLATES INDICATED THUS:  
[PN] (N = NUMBER)
  - FOR INTERMEDIATE DIAPHRAGMS SEE STD PCG11
  - GIRDERS IN SPAN A ARE PARALLEL TO -L- TANGENT AHEAD. ALL BENTS/END BENTS ARE PARALLEL.

**DEAD LOAD DEFLECTION TABLE FOR GIRDERS**

0.6" Ø LOW RELAXATION STRANDS	SPANS A-C																					
	GIRDERS 1-4																					
	LOCATION	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.00	0.07	0.13	0.18	0.22	0.25	0.28	0.30	0.32	0.33	0.33	0.33	0.32	0.30	0.28	0.25	0.22	0.18	0.13	0.07	0.00
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.00	0.03	0.05	0.08	0.10	0.12	0.14	0.15	0.16	0.17	0.17	0.17	0.16	0.15	0.14	0.12	0.10	0.08	0.05	0.03	0.00
FINAL CAMBER	↑	0	1/2	3/8	13/16	17/16	19/16	11/16	13/16	17/16	17/16	17/16	17/16	17/16	13/16	11/16	19/16	17/16	13/16	7/8	1/2	0

\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-



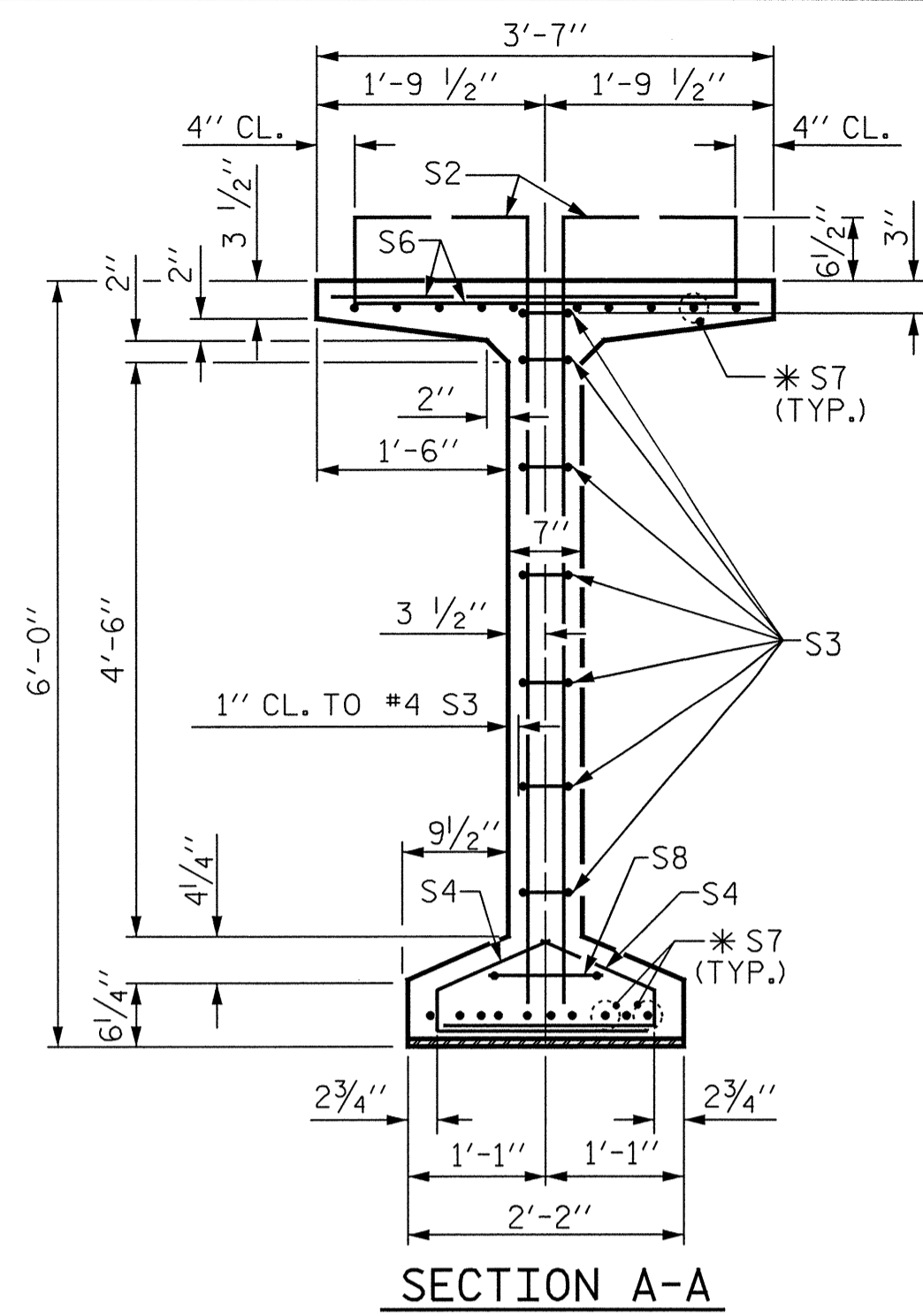
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 FRAMING PLAN  
 GIRDER AND CAMBER**

DESIGN ENGINEER OF RECORD: R.C. Larson DATE: 2/14/13  
 DRAWN BY: K. SU DATE: 5/14/12  
 CHECKED BY: R.C. LARSON DATE: 5/14/12

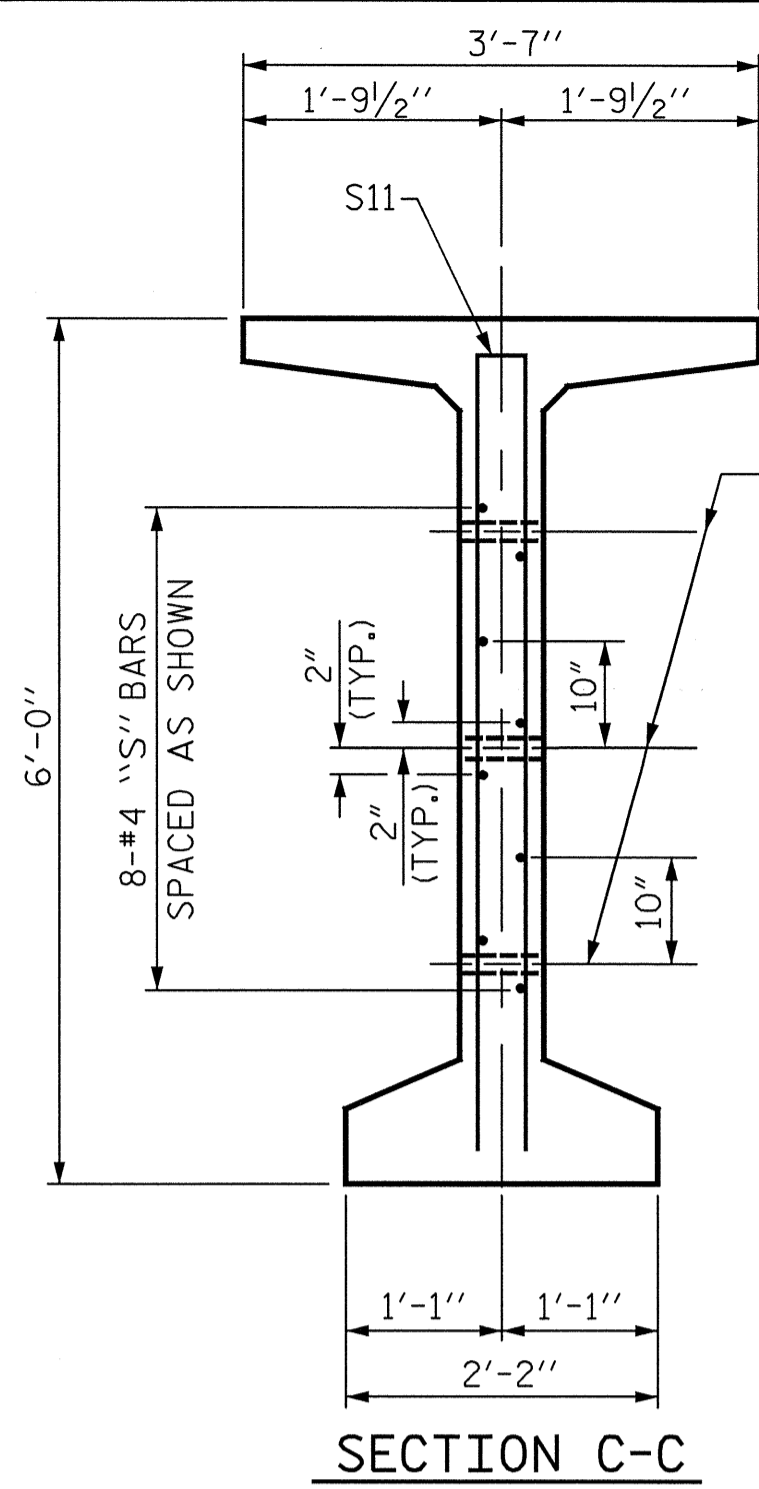
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS	SHEET NO.
1			3			39	5-10
2			4				

DWG. REF. NO. 10 OF 34



SECTION A-A

\*FOR S7 BARS, SEE  
DETAIL "C" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET



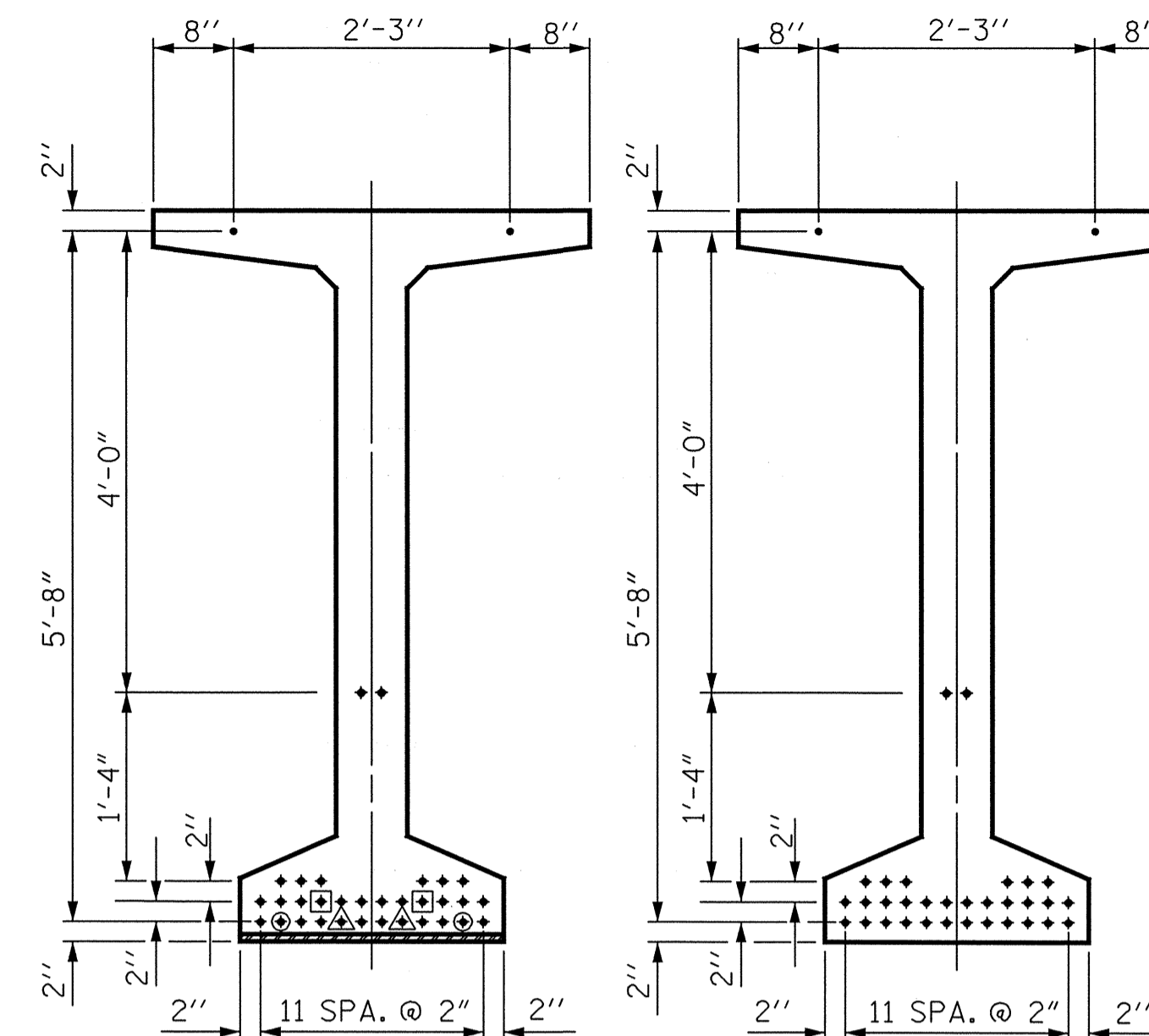
SECTION C-C

(S1, S6 AND S9 BARS NOT SHOWN)

Ø 1 1/2" Ø FORMED  
HOLE, SEE ELEVATION  
FOR LOCATION, FOR  
DIM. "A", "B" & "C"  
SEE "INTERMEDIATE  
STEEL DIAPHRAGMS"  
SHEET.)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- ◻ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ◻ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- ◻ STRANDS DEBONDED FOR 24'-0" FROM END OF GIRDER



AT END OF GIRDER

AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

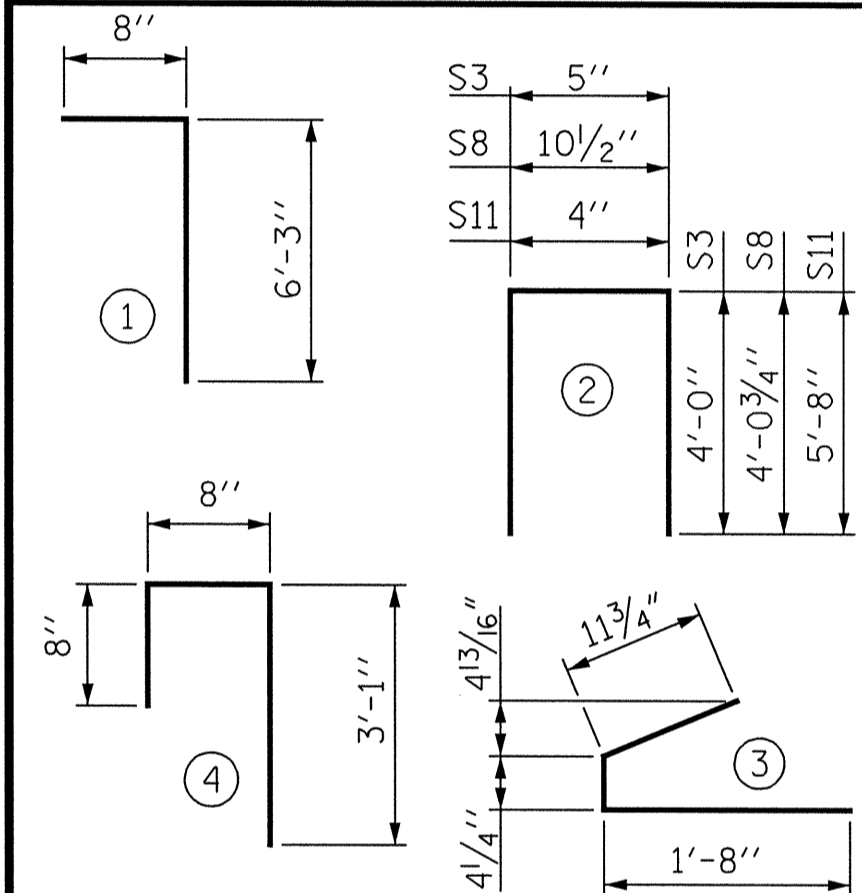
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

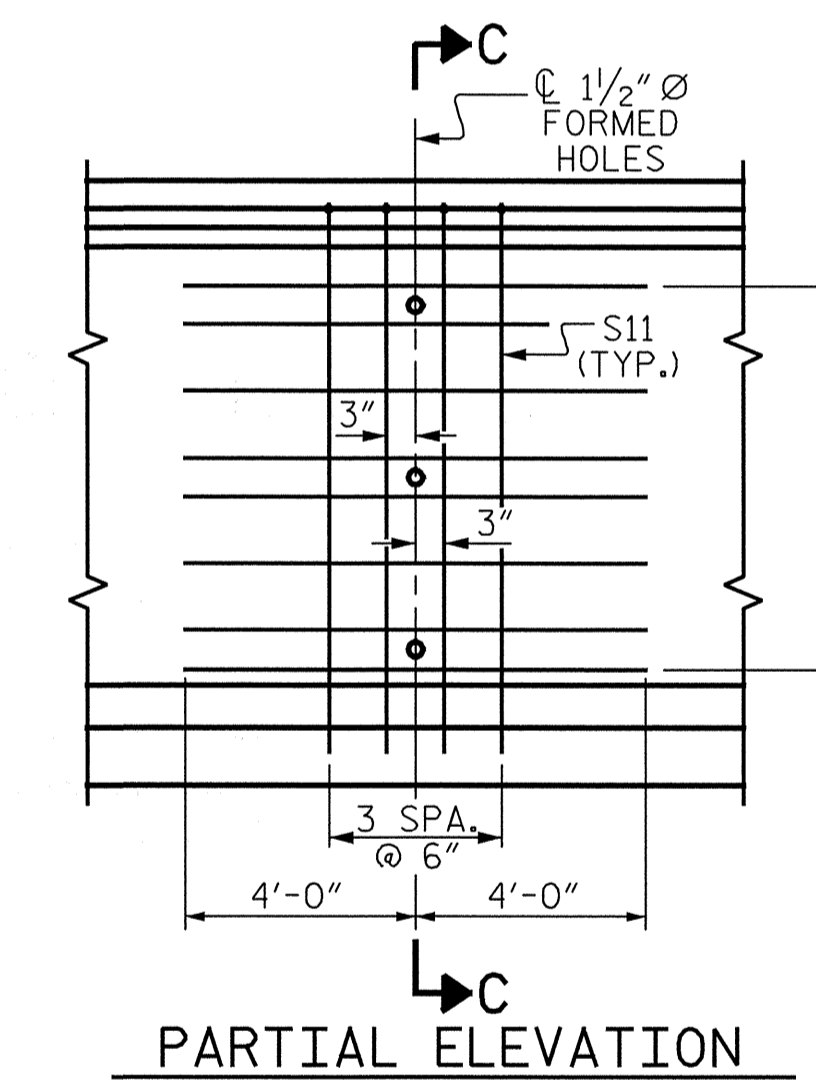
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	166	#4	1	6'-11"	767
S2	24	#5	1	6'-11"	173
S3	14	#4	2	8'-5"	79
S4	104	#4	3	3'-0"	208
S6	190	#5	4	4'-5"	875
*S7	30	#5	STR	3'-8"	115
S8	2	#5	2	9'-0"	19
S9	46	#5	STR	3'-3"	156
S10	2	#3	STR	1'-10"	1
S11	8	#5	2	11'-8"	97
S12	16	#4	STR	8'-0"	86

\*NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

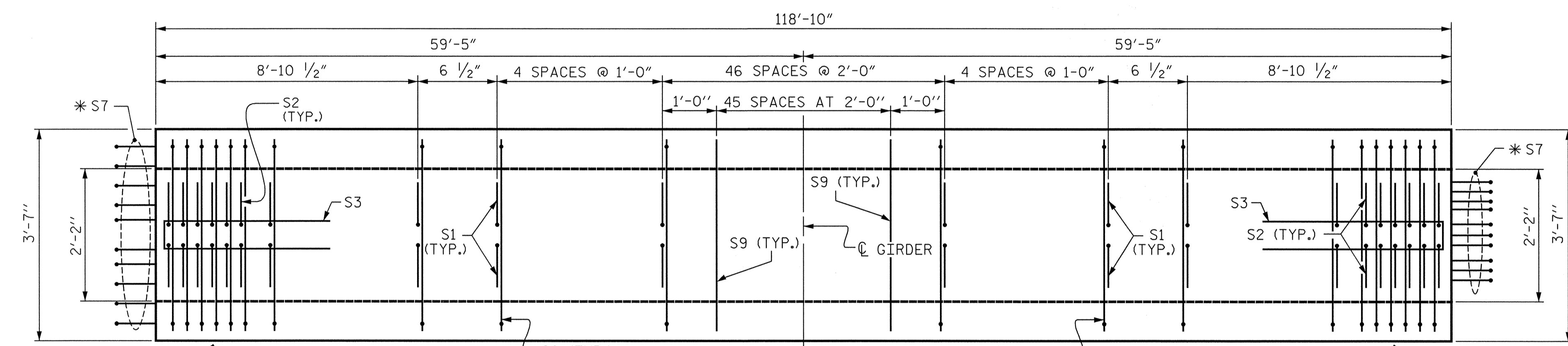
BAR TYPES



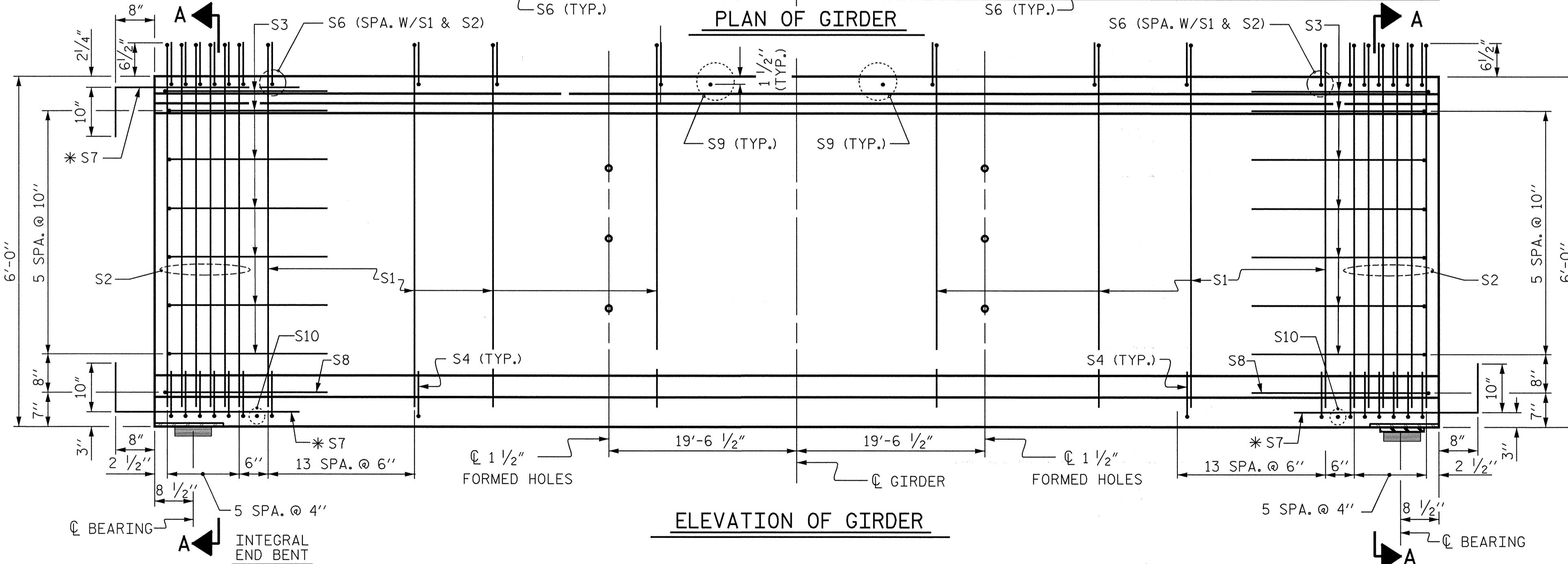
ALL BAR DIMENSIONS ARE OUT-TO-OUT



PARTIAL ELEVATION  
SHOWING INTERMEDIATE STEEL DIAPHRAGM  
REINFORCING STEEL FOR ALL GIRDERS



PLAN OF GIRDER



ELEVATION OF GIRDER

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	7000 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
2576	25.5	34

GIRDERS REQUIRED

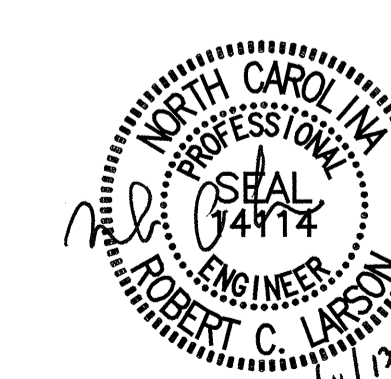
NUMBER	LENGTH	TOTAL LENGTH
4 (SPAN "A")	118'-10"	475'-4"
4 (SPAN "C")	118'-10"	475'-4"

PROJECT NO. B-4733  
CLAY COUNTY  
STATION: 19+20.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
72" PRESTRESSED CONCRETE  
MODIFIED BULB TEE  
CONTINUOUS FOR LIVE LOAD  
SPANS "A" & "C"

STD. NO. PCG8



ASSEMBLED BY : E. C. DECOLA	DATE : 12/20/12	RWW/LES	DESIGN ENGINEER OF RECORD:	DATE : 2/11/13
CHECKED BY : E. R. PHIPPS	DATE : 12/28/12	TLA/GM		
DRAWN BY : EEM 2/6/97	REV. 10/17/00	MAA/GM		
CHECKED BY : VAP 2/6/97	REV. 5/1/06R			
	REV. 10/1/11			

KCI Associates of North Carolina, P.A. REGISTERED PROFESSIONAL ENGINEERS & ARCHITECTS 1000 W. HARRIS STREET Raleigh, NC 27601	REVISIONS				SHEET NO. 3-11 TOTAL SHEETS 39	
	NO.	BY:	DATE:	NO.		BY:
	1			3		
	2			4		

DWG. REF. NO. 11 OF 34





**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 SHALL BE GRADE 60.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. BEVEL EDGES OF PLATE "B-1" TO GIVE CLOSE FIT BUT NOT TIGHT FIT TO STEEL CASTING FORM.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

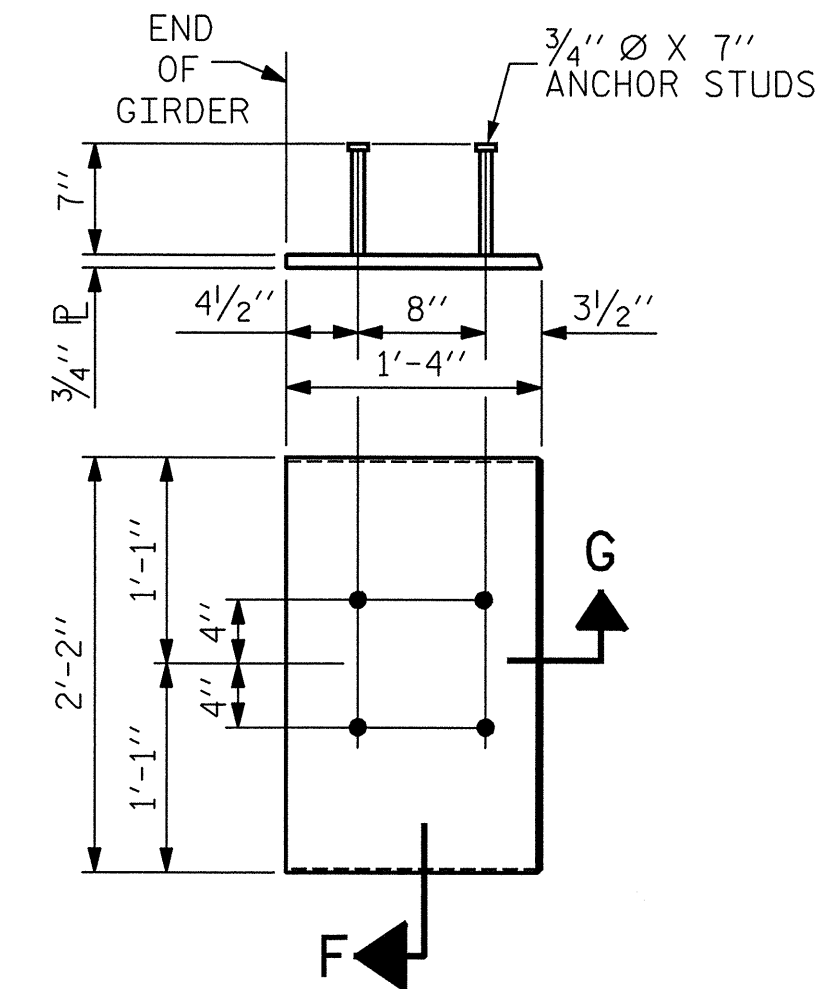
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5500 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

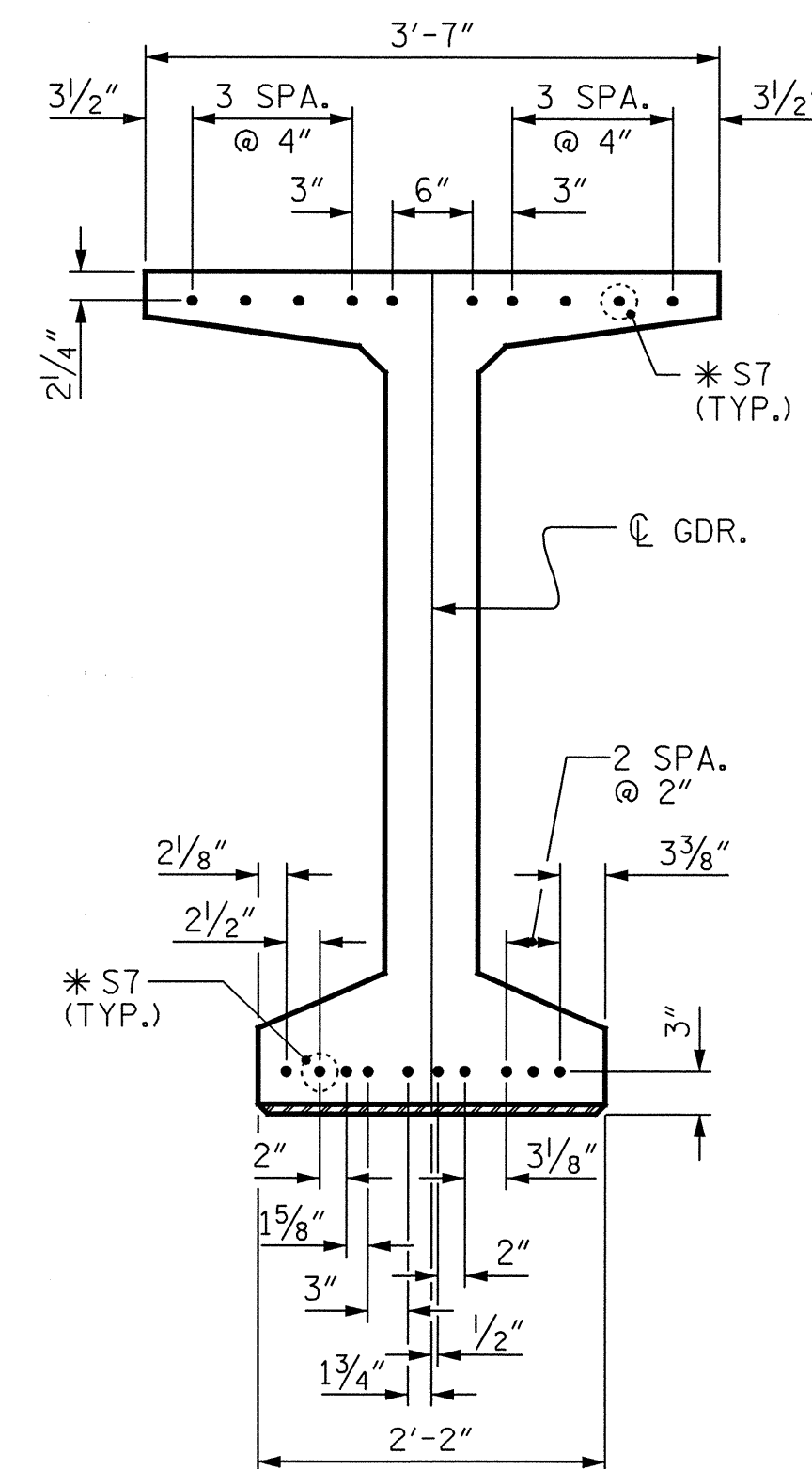
A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



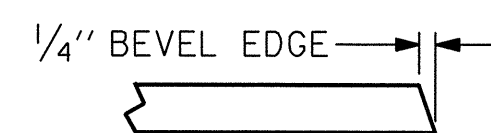
**EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER AND 63" & 72" MODIFIED BULB TEES**

(2 REQ'D PER GIRDER)

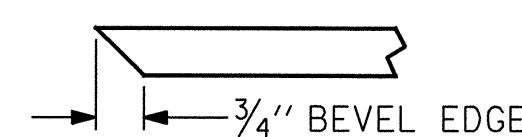


**DETAIL "C"**

(FOR 63" & 72" MODIFIED BULB TEES)



**SECTION "G"**



**SECTION "F"**

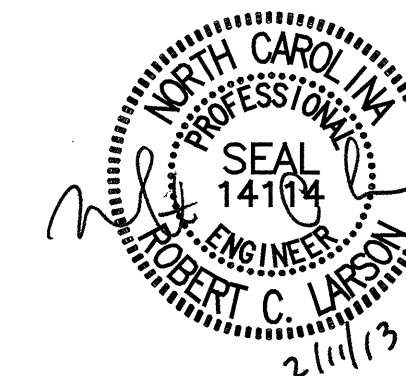
(SEE NOTES)

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 PRESTRESSED CONCRETE GIRDER  
 CONTINUOUS FOR LIVE LOAD  
 DETAILS

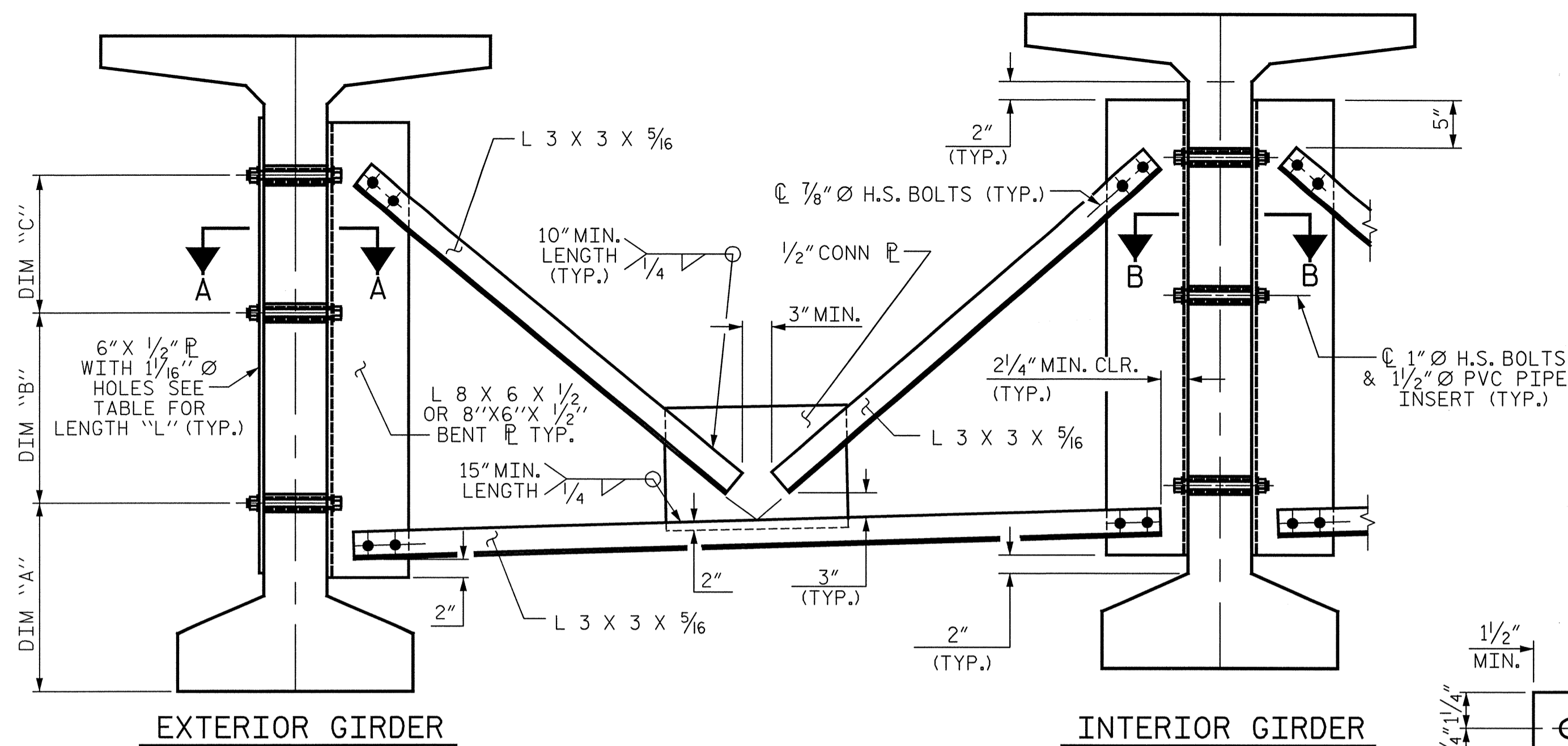
STD. NO. PCG9



DESIGN ENGINEER OF RECORD:	DATE:
<i>mp ch</i>	2/11/13
ASSEMBLED BY: R. C. LARSON	DATE: 5/15/12
CHECKED BY: E. R. PHIPPS	DATE: 5/15/12
DRAWN BY: ELR 11/91	REV. 7/10/01RR LES/RDR
CHECKED BY: GRP 11/91	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

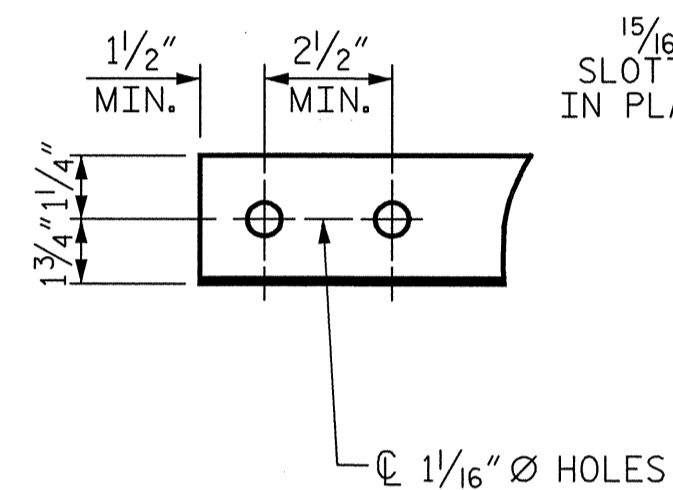
KCI Associates of North Carolina, P.A. REGISTERED PROFESSIONAL ENGINEERS & ARCHITECTS LICENSE NUMBER: 0184		DATE: 02/11/2013 14104 14104 14104	
DWG. REF. NO. 13 OF 34			

REVISIONS				SHEET NO.		
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			39
2			4			



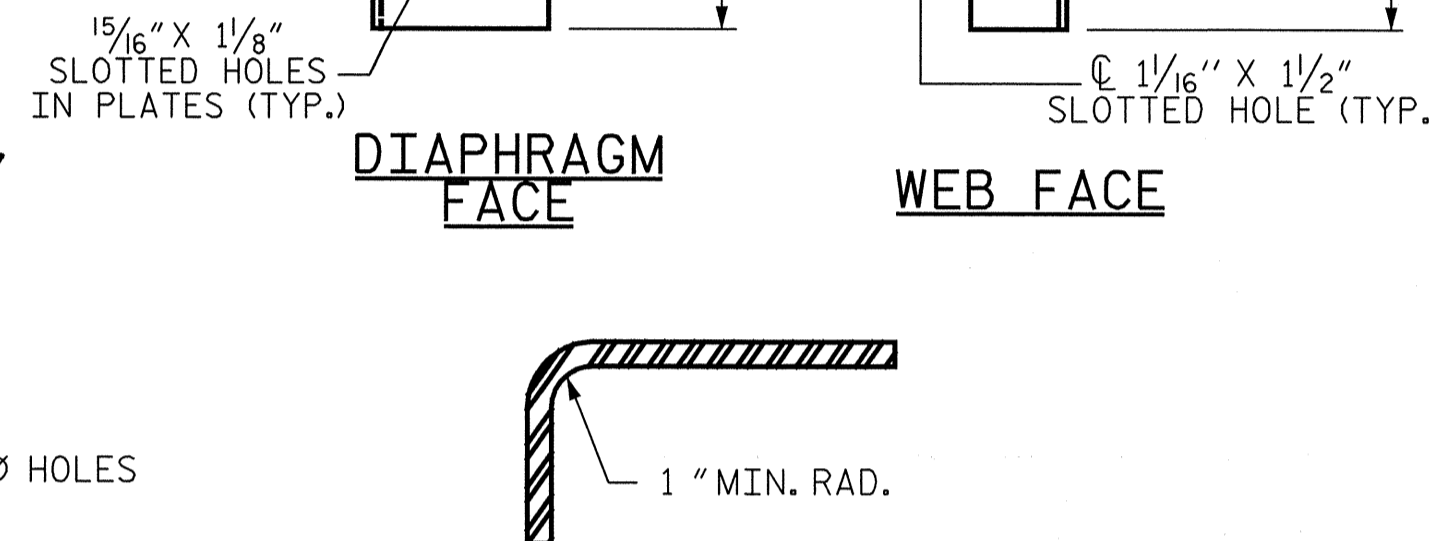
**PART SECTION AT INTERMEDIATE DIAPHRAGM**

(63" BULB TEE OR 72" BULB TEE GIRDER SHOWN)

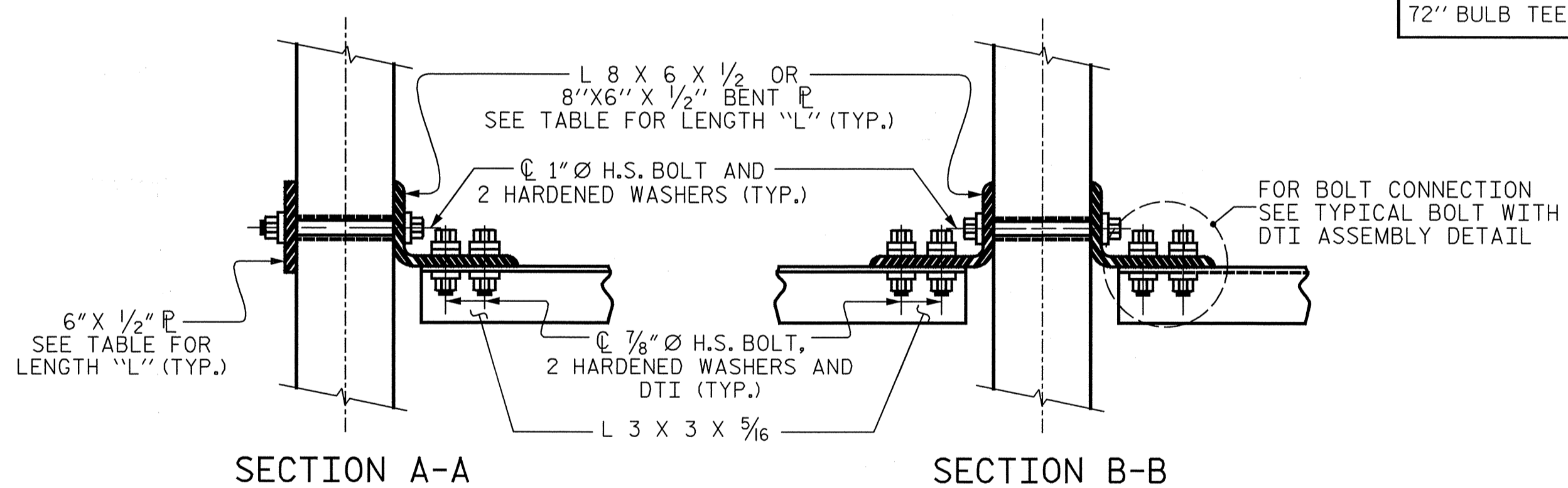


**ANGLE END**

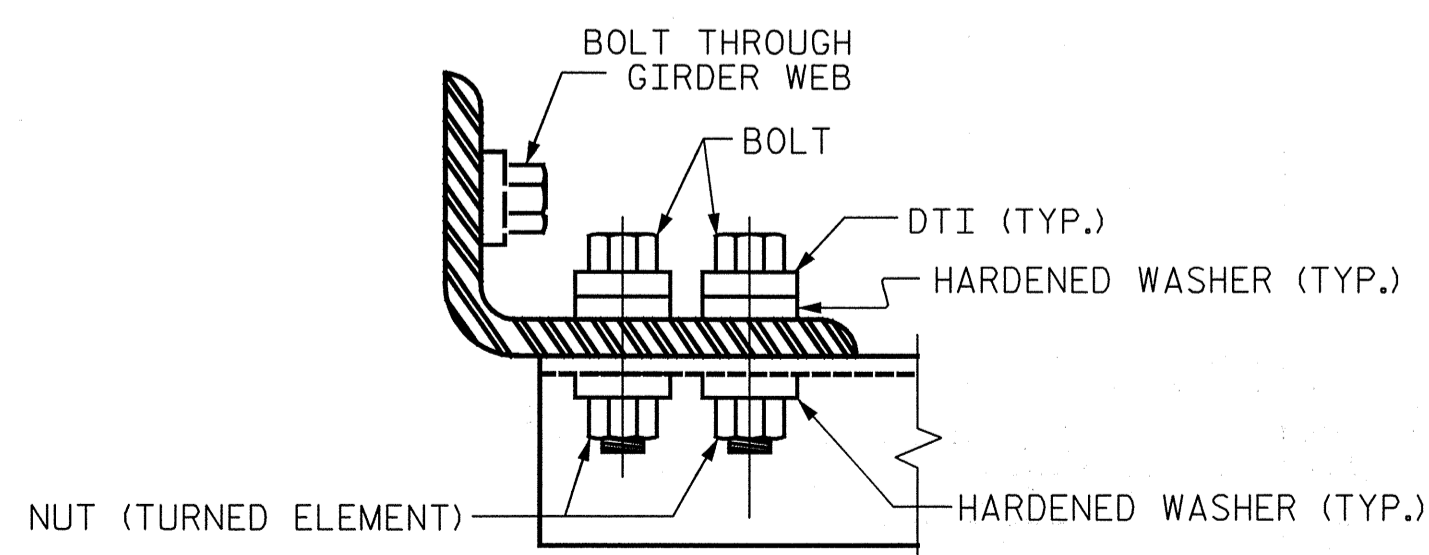
(L 3 X 3 X 5/16)



**CONNECTOR PLATE DETAIL**



**CONNECTION DETAILS**



**BOLT WITH DTI ASSEMBLY DETAIL**

**STRUCTURAL STEEL NOTES**

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE DECK IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

**TABLE**

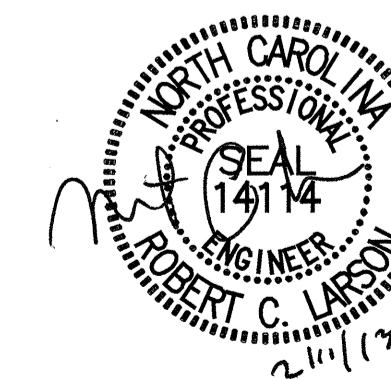
GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-8"	1'-7"	1'-7 3/4"	4'-2"

PROJECT NO. B-4733

CLAY COUNTY

STATION: 19+20.00 -L-

SHEET 4 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
INTERMEDIATE  
STEEL DIAPHRAGMS  
FOR 63" & 72"  
MODIFIED BULB TEE  
PRESTRESSED CONCRETE  
GIRDERS STD. NO. PCG11

DESIGN ENGINEER OF RECORD: <i>Robert C. Larson</i>	DATE: 2/11/13
ASSEMBLED BY: R. C. LARSON	DATE: 5/15/12
CHECKED BY: E. R. PHIPPS	DATE: 5/15/12
DRAWN BY: RWW 11/09	ADDED 11/23/09R
CHECKED BY: GM 11/09	REV. 10/1/11 MAA/GM

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

SHEET NO.	5-14
TOTAL SHEETS	37

DWG. REF. NO. 14 OF 34



**NOTES**

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

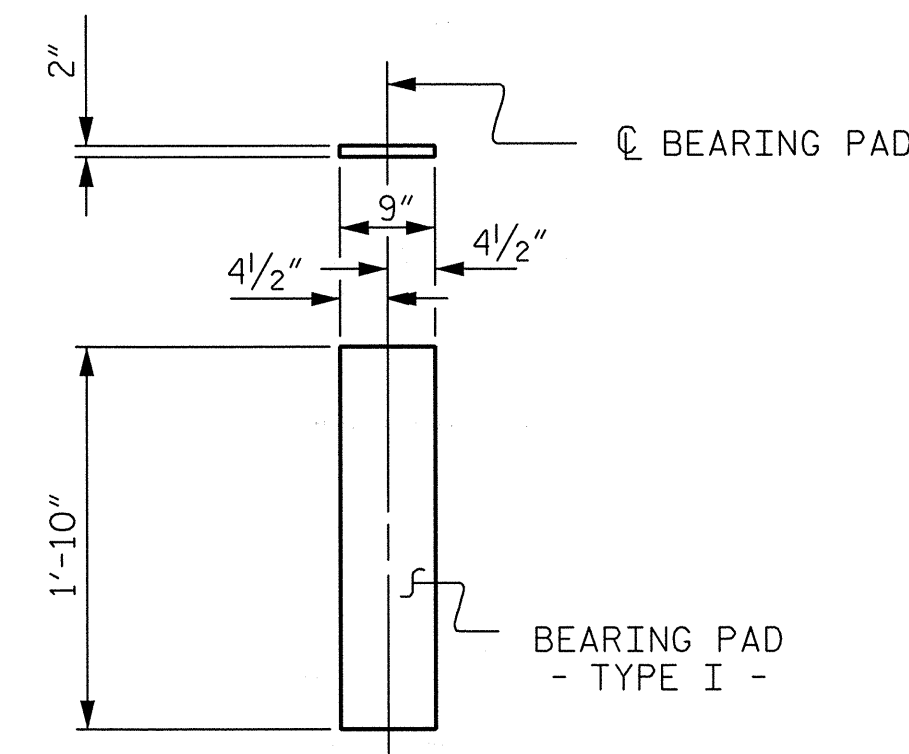
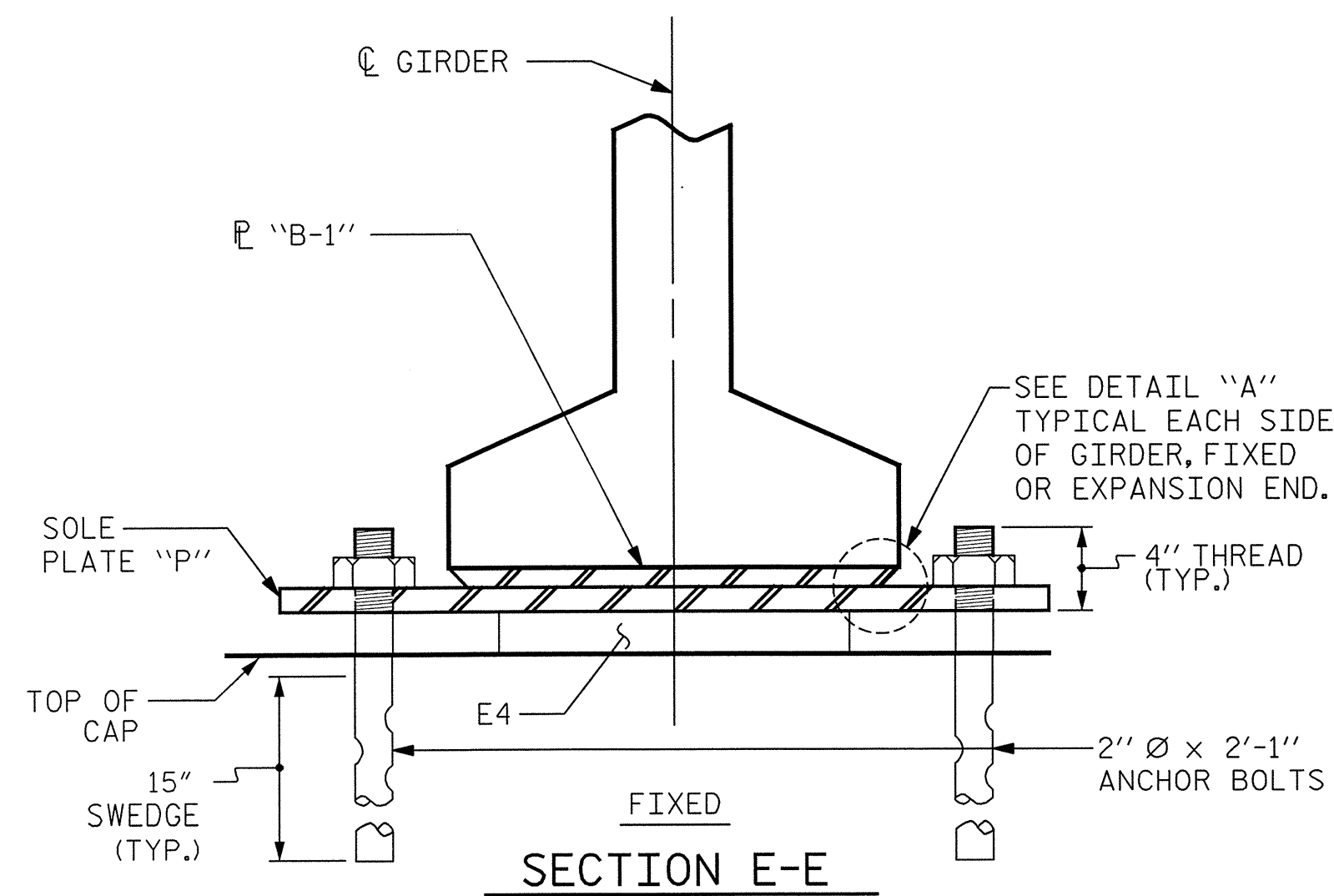
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

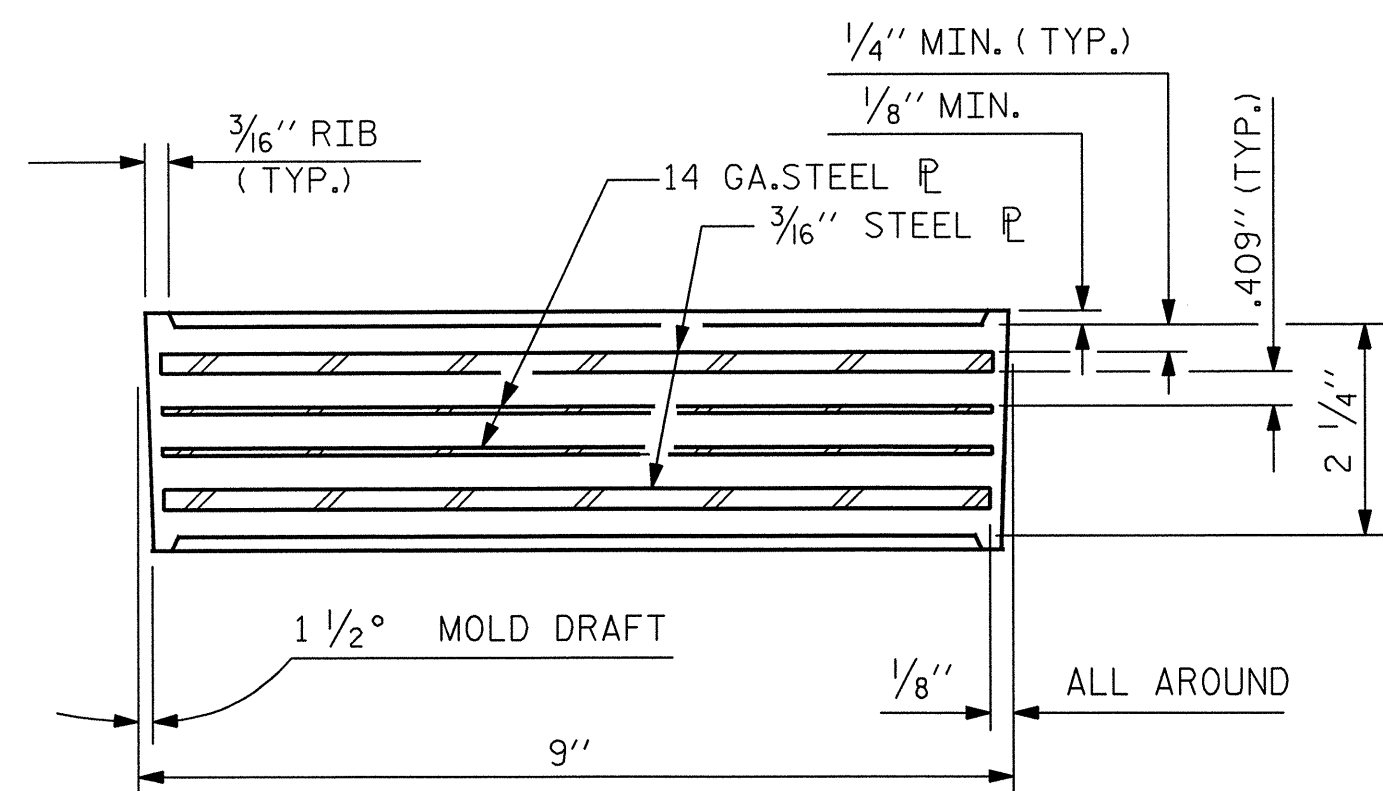
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

THE ELASTOMER IN THE PLAIN BEARINGS SHALL BE 50 DUROMETER.

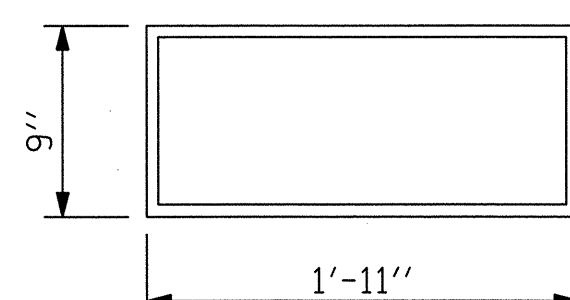
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



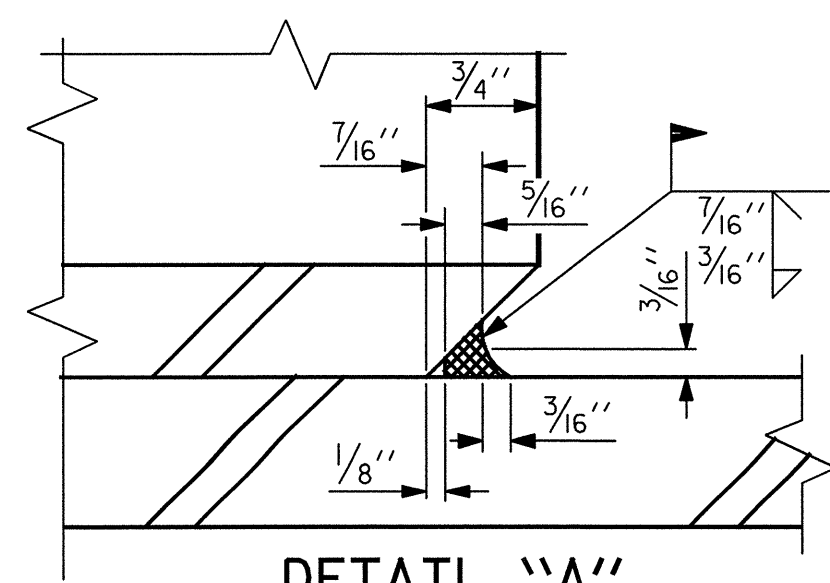
**E1 ( 8 REQ'D )  
PLAIN ELASTOMERIC BEARING DETAIL  
TYPE I**



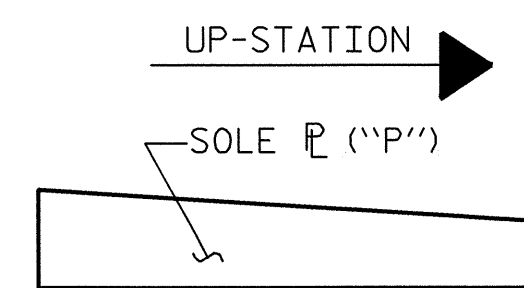
**TYPICAL SECTION OF ELASTOMERIC BEARING**



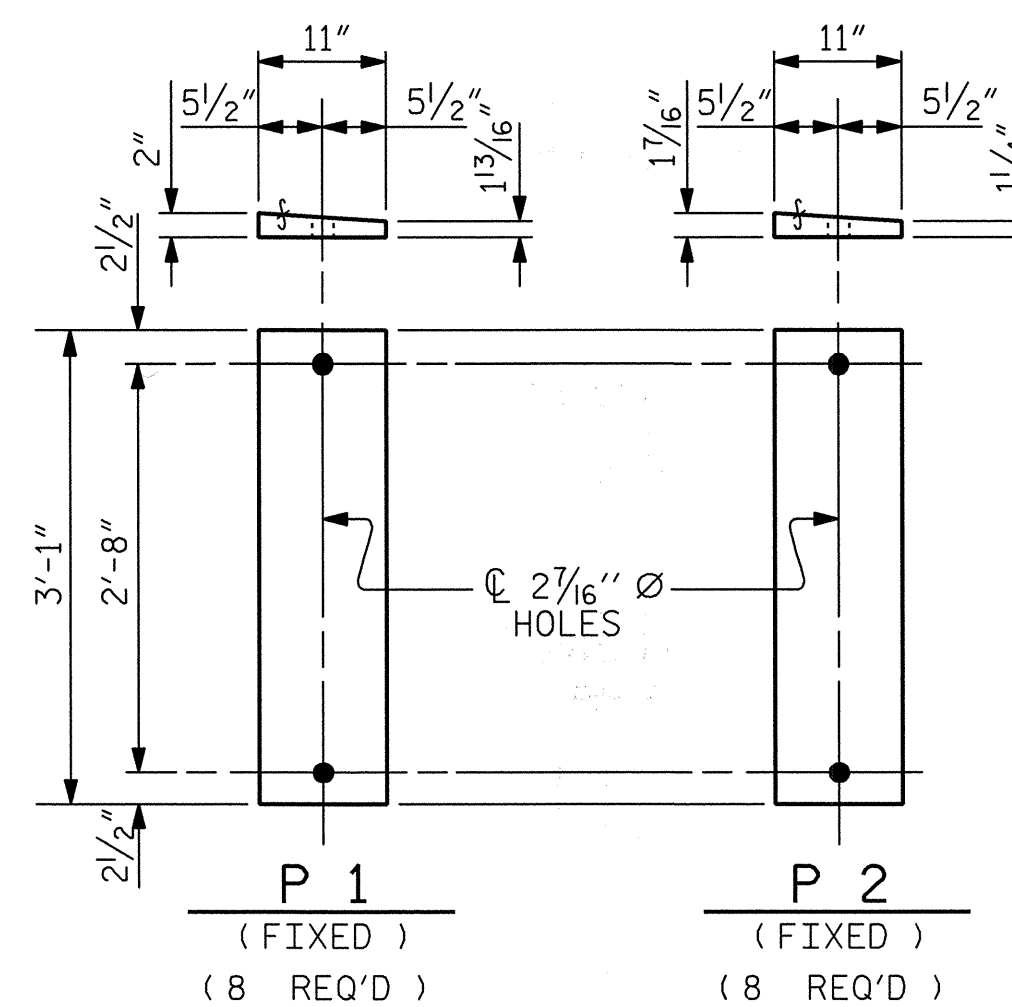
**E4 ( 16 REQ'D )  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE V**



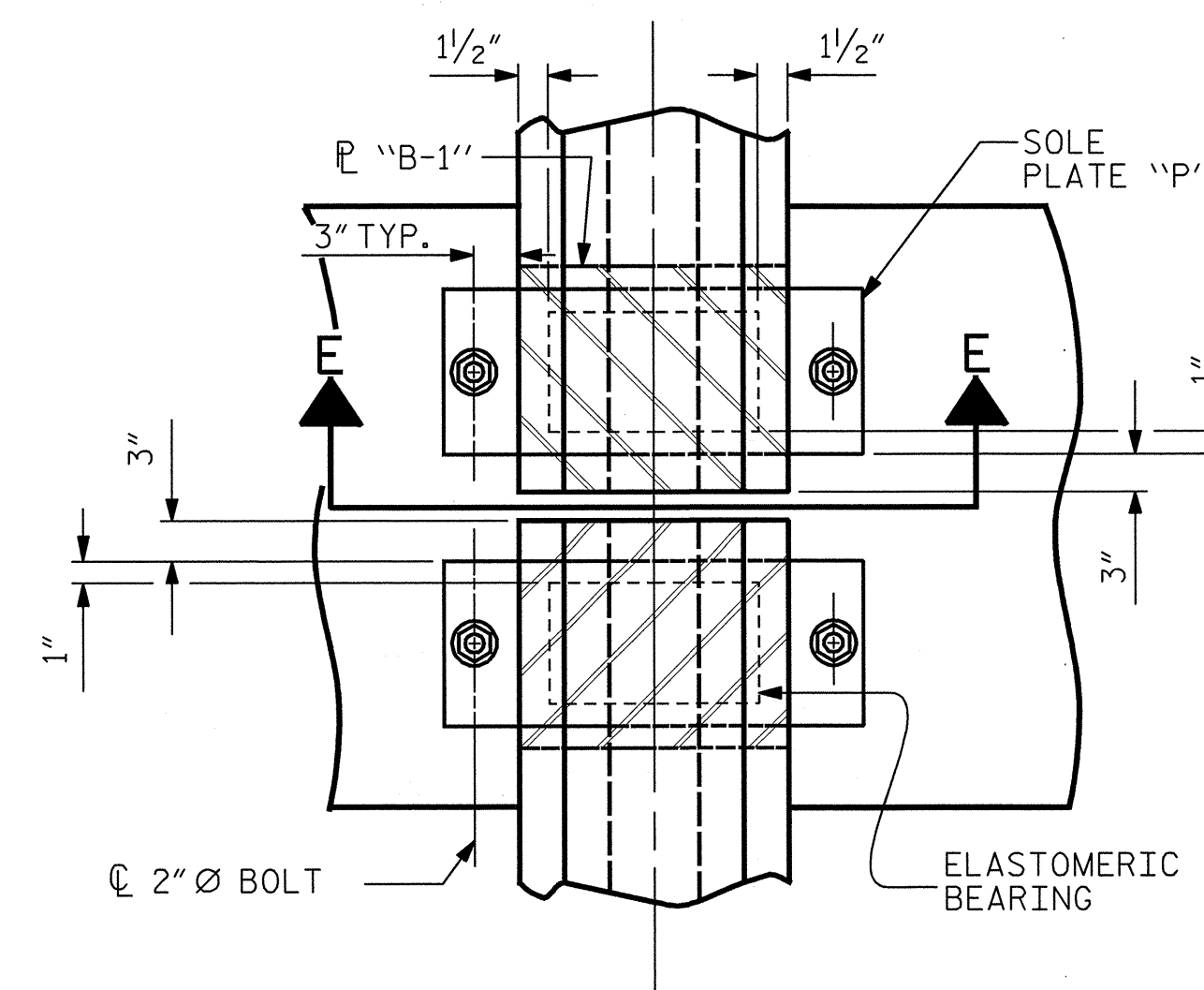
**DETAIL "A"**



**SOLE 'P' PLACEMENT DETAIL**



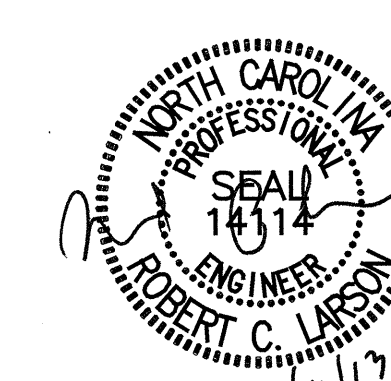
**SOLE PLATE DETAILS ("P")**



**TYPICAL PLAN  
(SHOWING CONTINUOUS BENT)**

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k
TYPE VI	420 k
TYPE VII	470 k

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

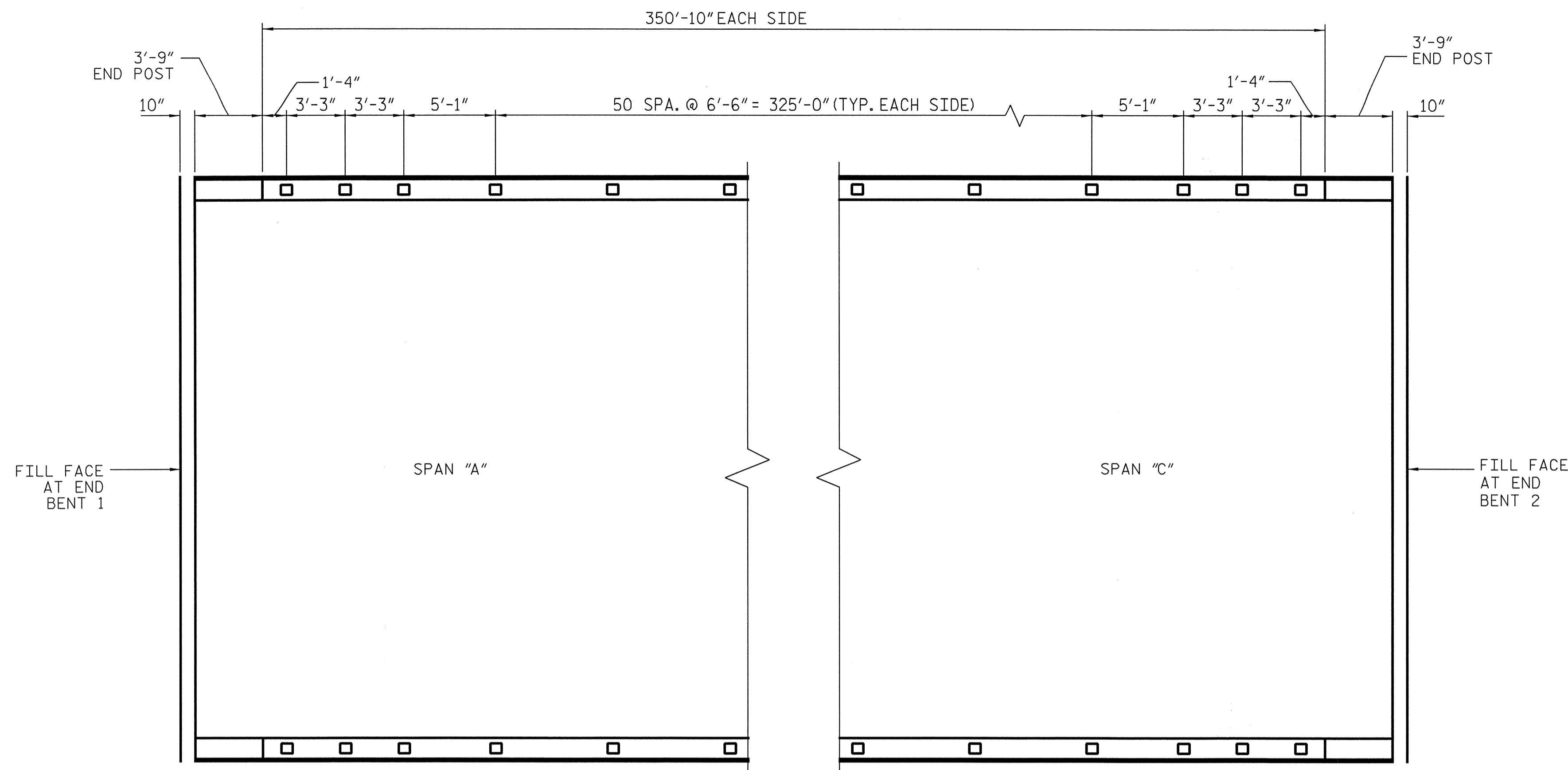


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**ELASTOMERIC BEARING  
 DETAILS**  
 PRESTRESSED CONCRETE GIRDER  
 SUPERSTRUCTURE  
 STD. NO. EB4

DESIGN ENGINEER OF RECORD: <i>M. C. H.</i>	DATE: <u>2/11/13</u>
ASSEMBLED BY: R. C. LARSON	DATE: 5/15/12
CHECKED BY: K. SU	DATE: 1/3/13
DRAWN BY: EEM 2/97	REV. 10/17/00 RWW/LES
CHECKED BY: VAP 2/97	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

KCI Associates of North Carolina, P.A. REGISTERED PROFESSIONAL ENGINEERS & ARCHITECTS LICENSE NUMBER 6784	REVISIONS			SHEET NO. S-15 TOTAL SHEETS 39
	NO.	BY:	DATE:	
	1			
	2			
	3			
	4			

DWG. REF. NO. 15 OF 34

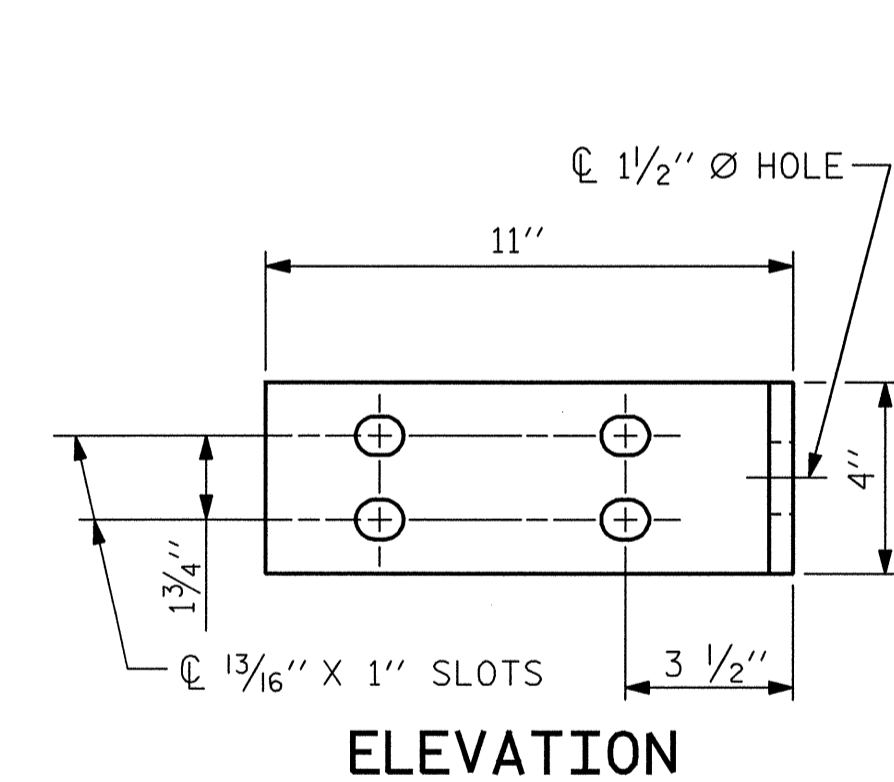


**PLAN OF RAIL POST SPACINGS**

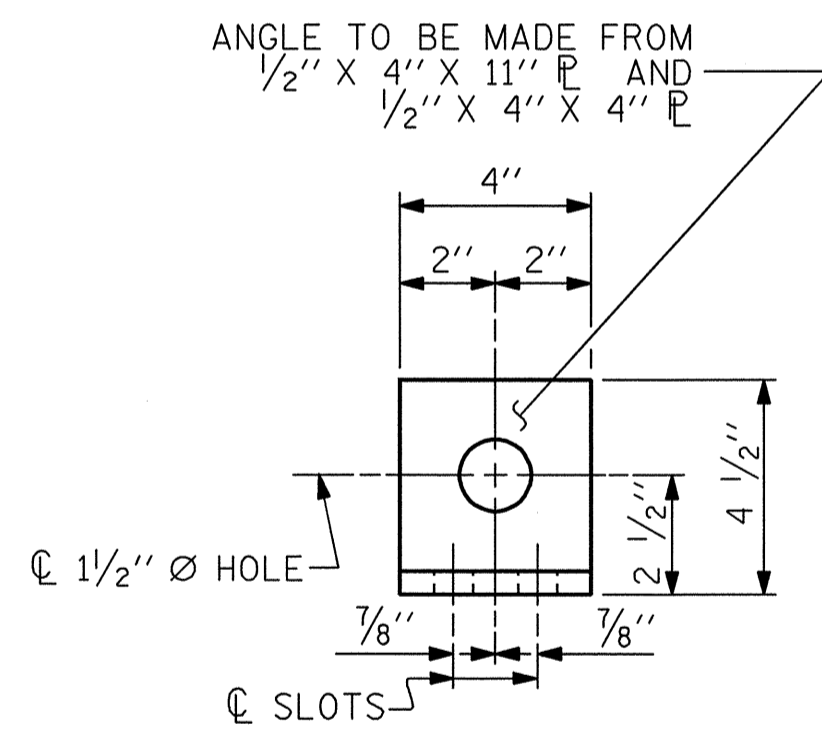
- NOTES**  
STRUCTURAL CONCRETE INSERT
- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
  - 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
  - WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 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:
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
  - CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
  - STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
  - 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.

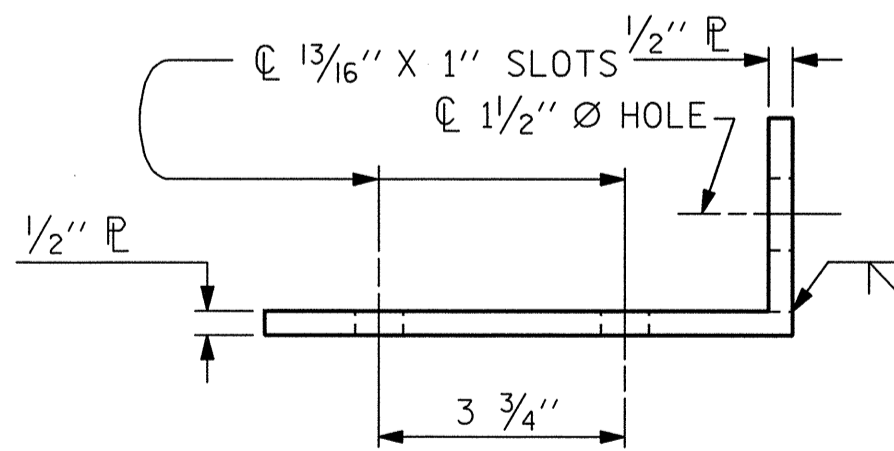
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT 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.



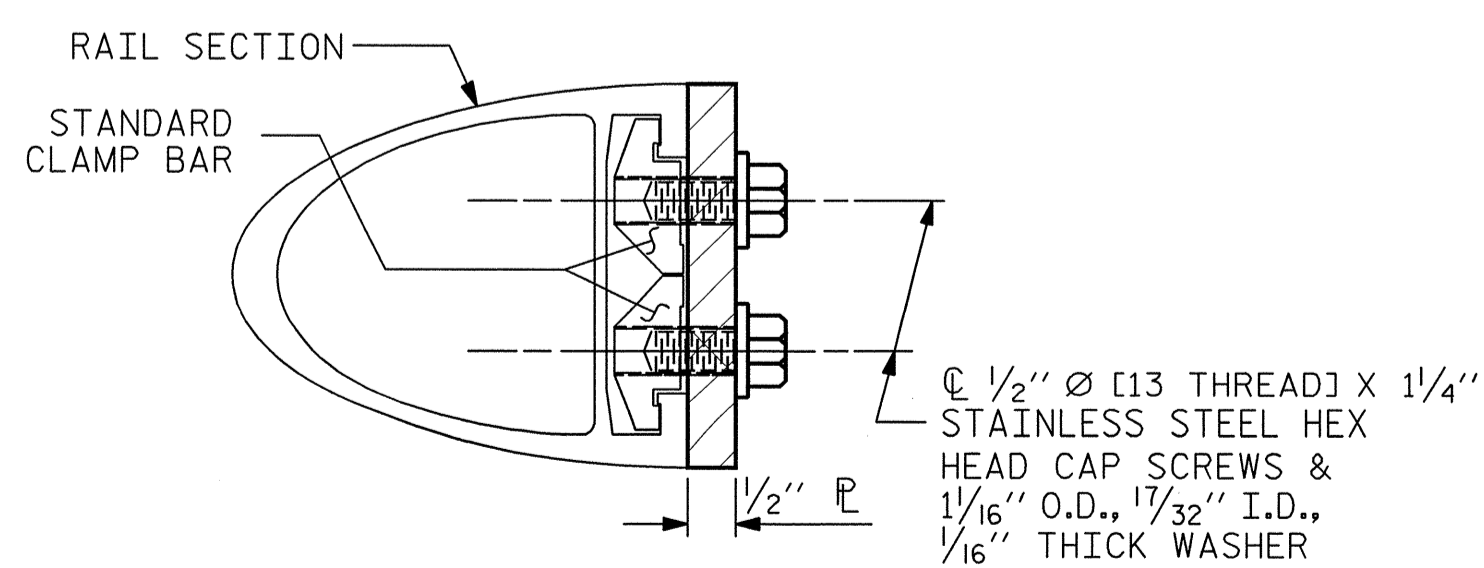
**ELEVATION**



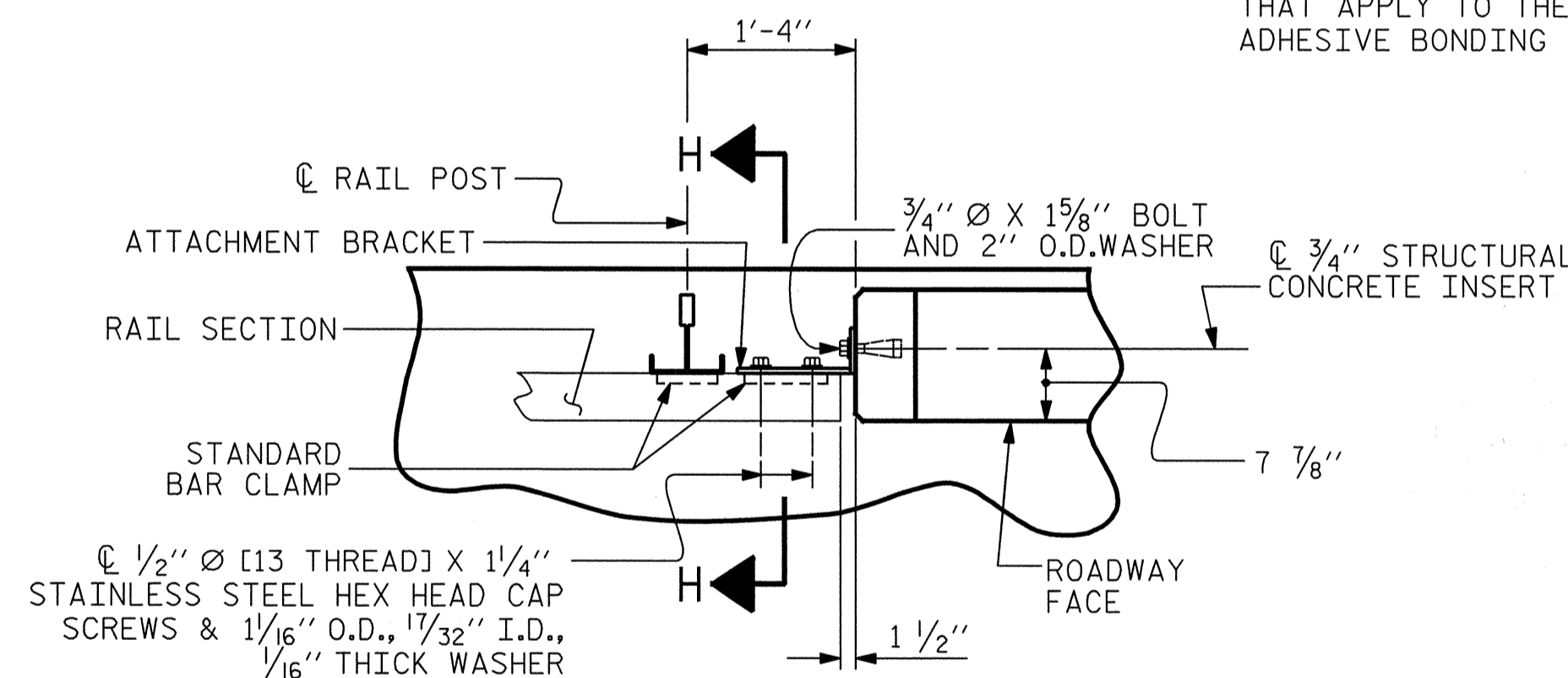
**END VIEW**



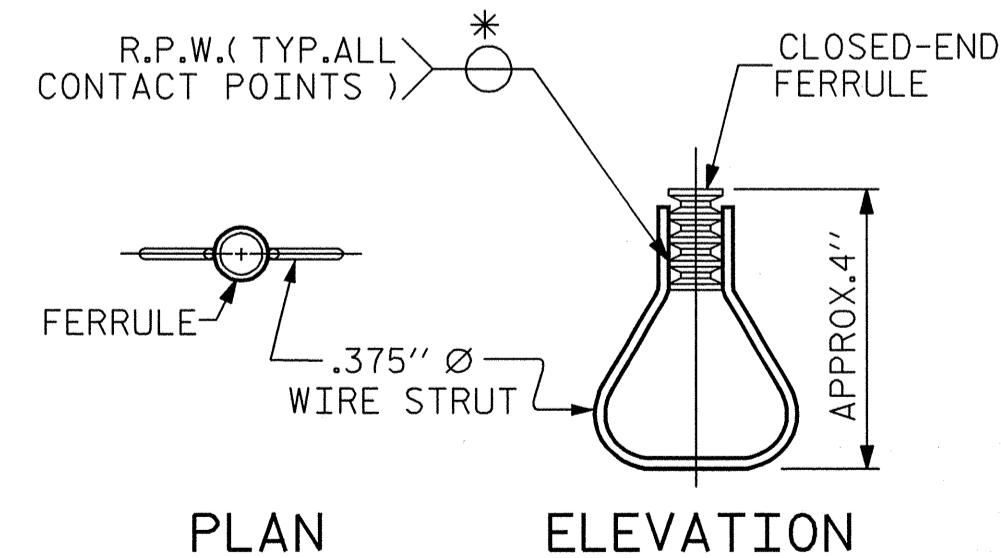
**TOP VIEW**



**SECTION H-H**

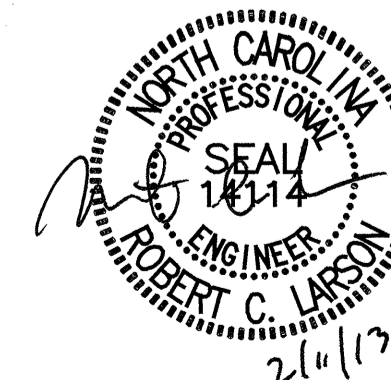


**PLAN - RAIL AND END POST**



**STRUCTURAL CONCRETE INSERT**

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



PROJECT NO. B-4733  
CLAY COUNTY  
STATION: 19+20.00 -L-

SHEET 1 OF 1

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
RAIL POST SPACINGS  
AND  
END OF RAIL DETAILS  
FOR ONE OR TWO BAR METAL RAILS  
STD. NO. BMR2

DESIGN ENGINEER OF RECORD:	DATE:	2/11/13
ASSEMBLED BY: R. C. LARSON	DATE:	5/15/12
CHECKED BY: E. R. PHIPPS	DATE:	5/15/12
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

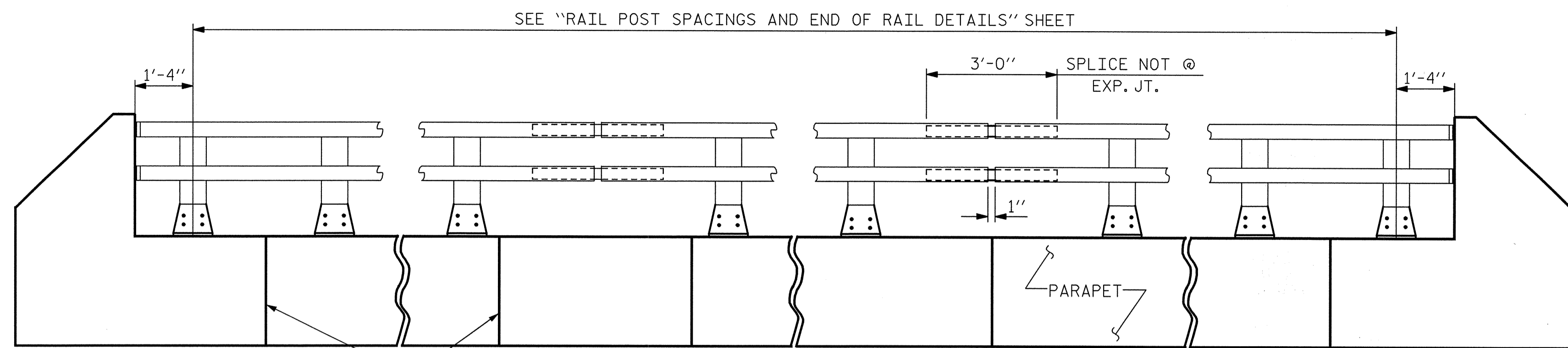
**FIXED**

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

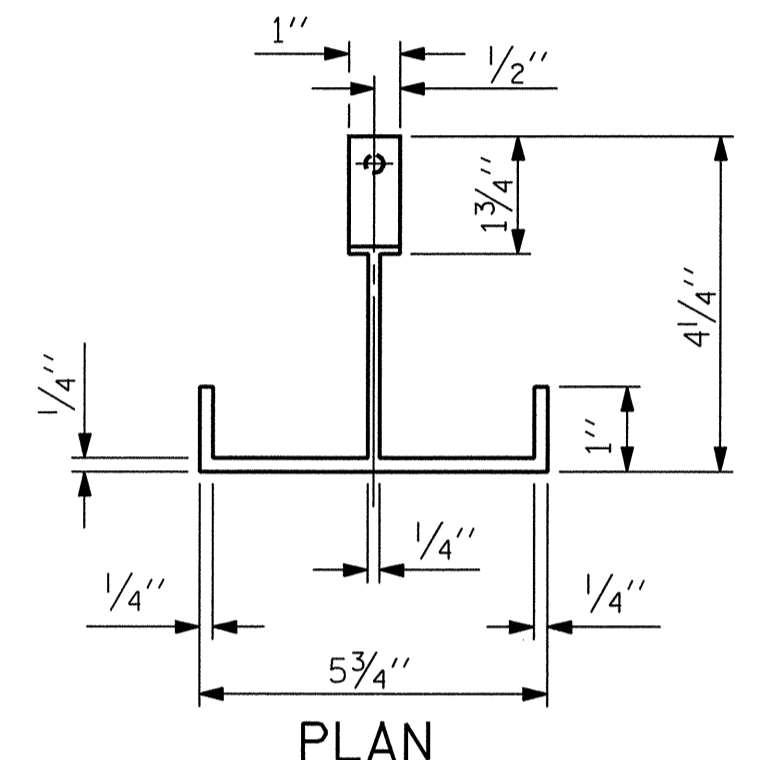
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DWG. REF. NO. 16 OF 34	TOTAL SHEETS	39
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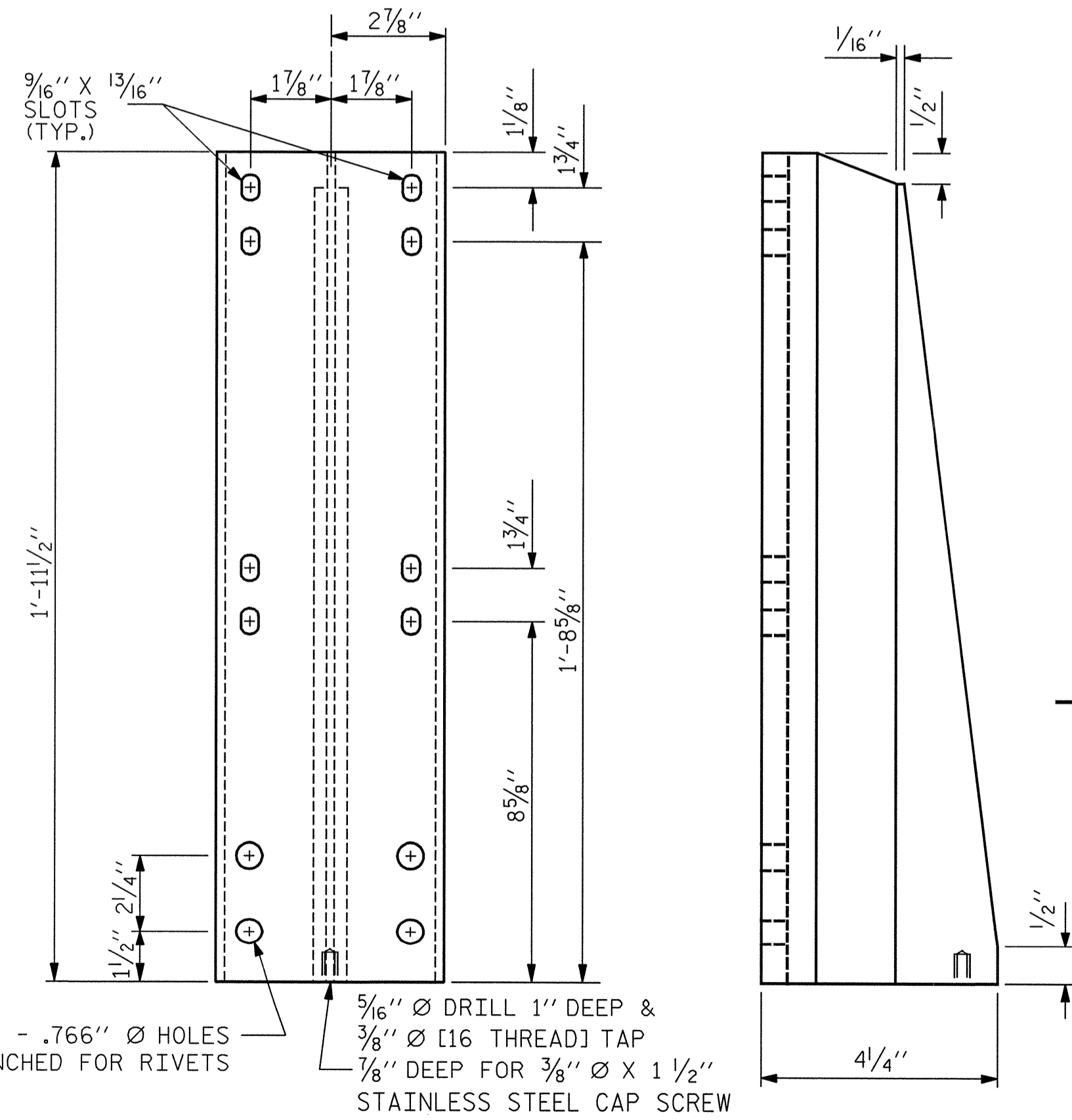




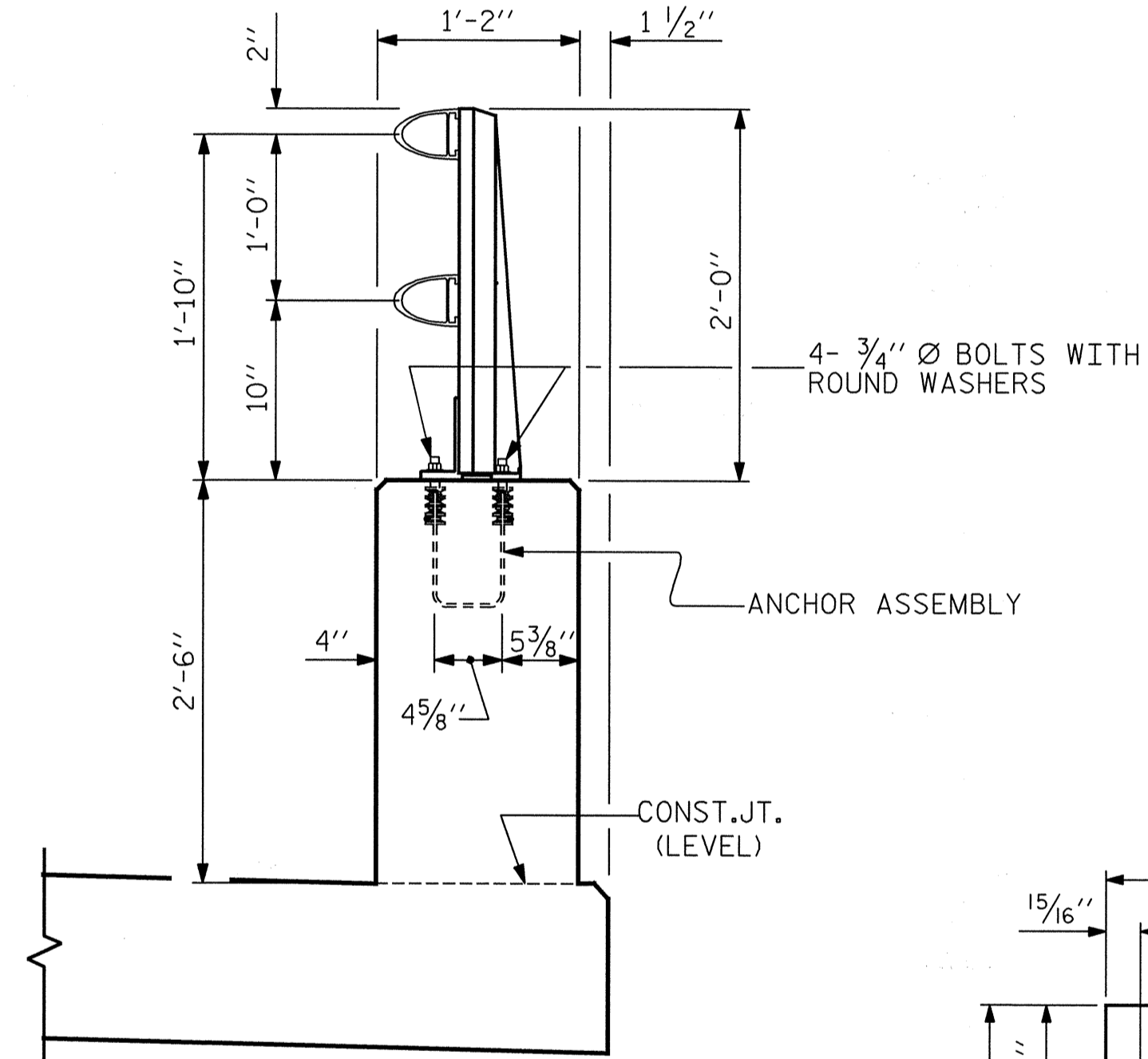
ELEVATION  
NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



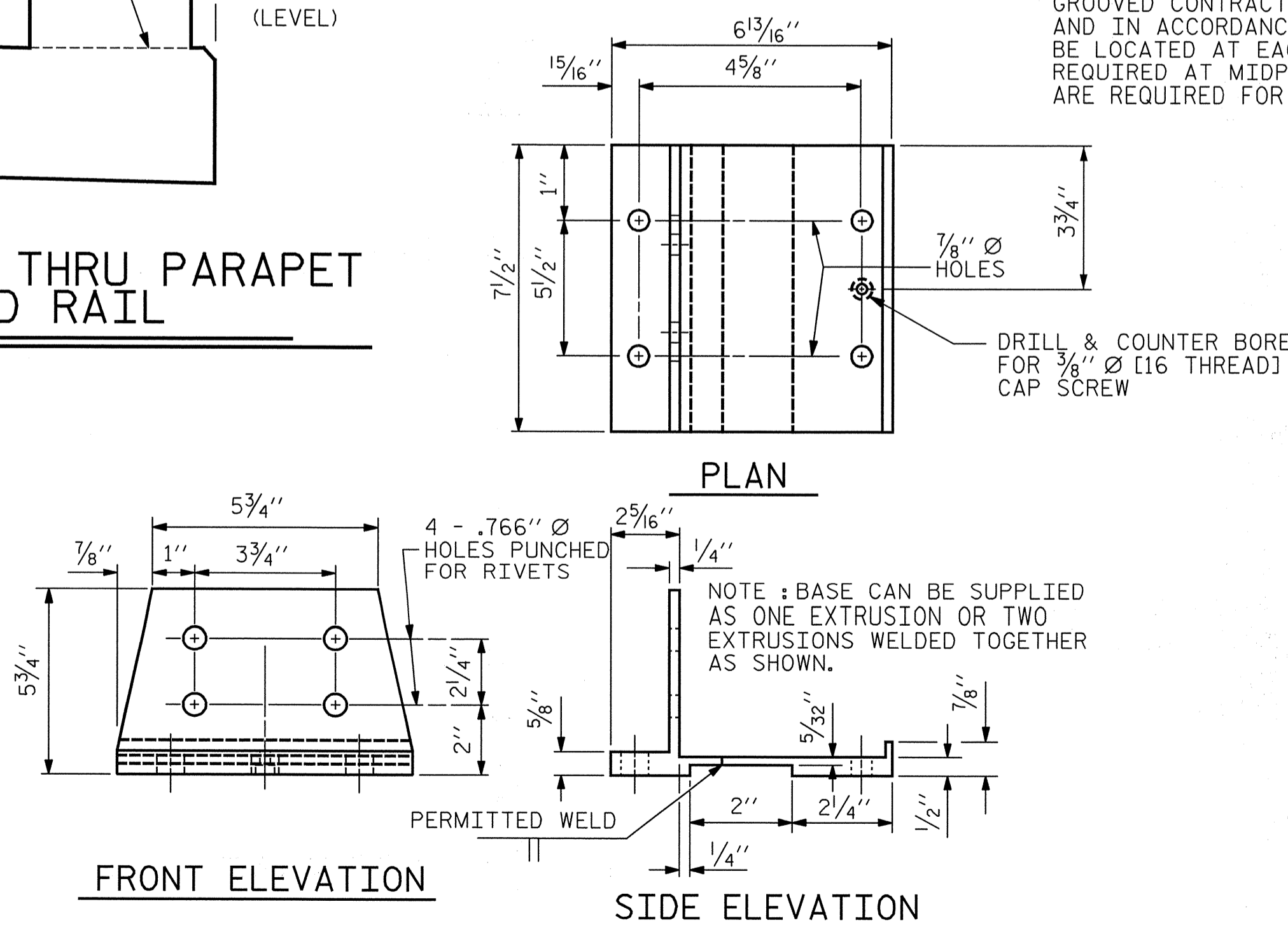
PLAN



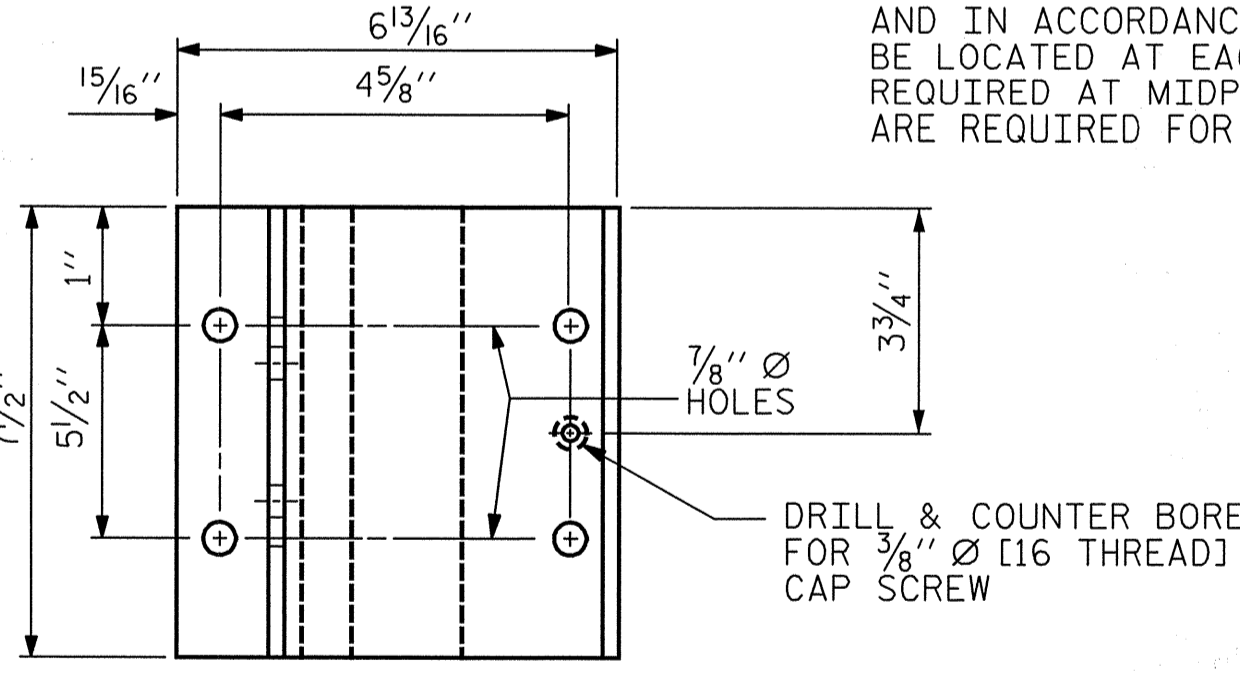
FRONT ELEVATION SIDE ELEVATION  
DETAILS OF POST



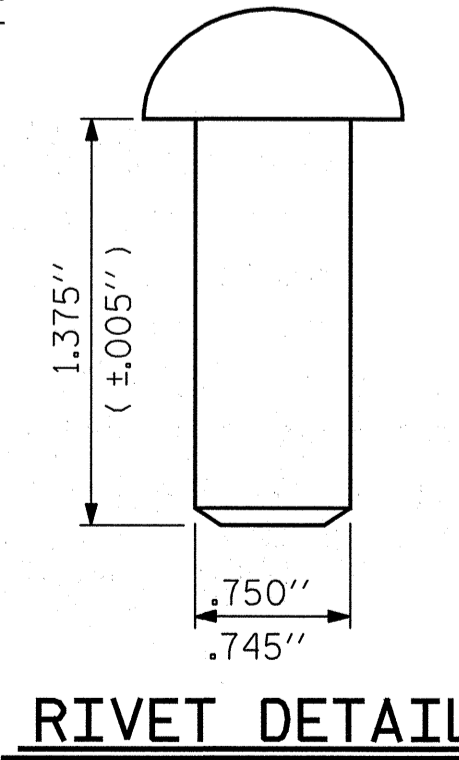
SECTION THRU PARAPET AND RAIL



FRONT ELEVATION SIDE ELEVATION  
POST BASE DETAILS

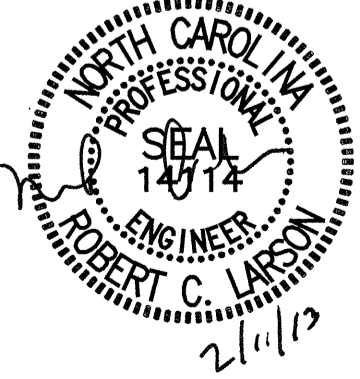


PLAN



RIVET DETAIL

PAY LENGTH = 701.17 LIN. FT.



NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING. THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY. MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS: POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111. RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS. THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641. SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111. RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2. CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED. METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE. METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS. CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER. TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT. SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT. ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE. MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL. GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. B-4733  
CLAY COUNTY  
STATION: 19+20.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
2 BAR METAL RAIL  
STD. NO. BMR3

ASSEMBLED BY: R. C. LARSON	DATE: 5/15/12	DESIGN ENGINEER OF RECORD: <i>[Signature]</i>	DATE: 2/11/13
CHECKED BY: E. R. PHIPPS	DATE: 5/15/12		
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	

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-17
1			3			TOTAL SHEETS
2			4			39

DWG. REF. NO. 17 OF 34



**NOTES**

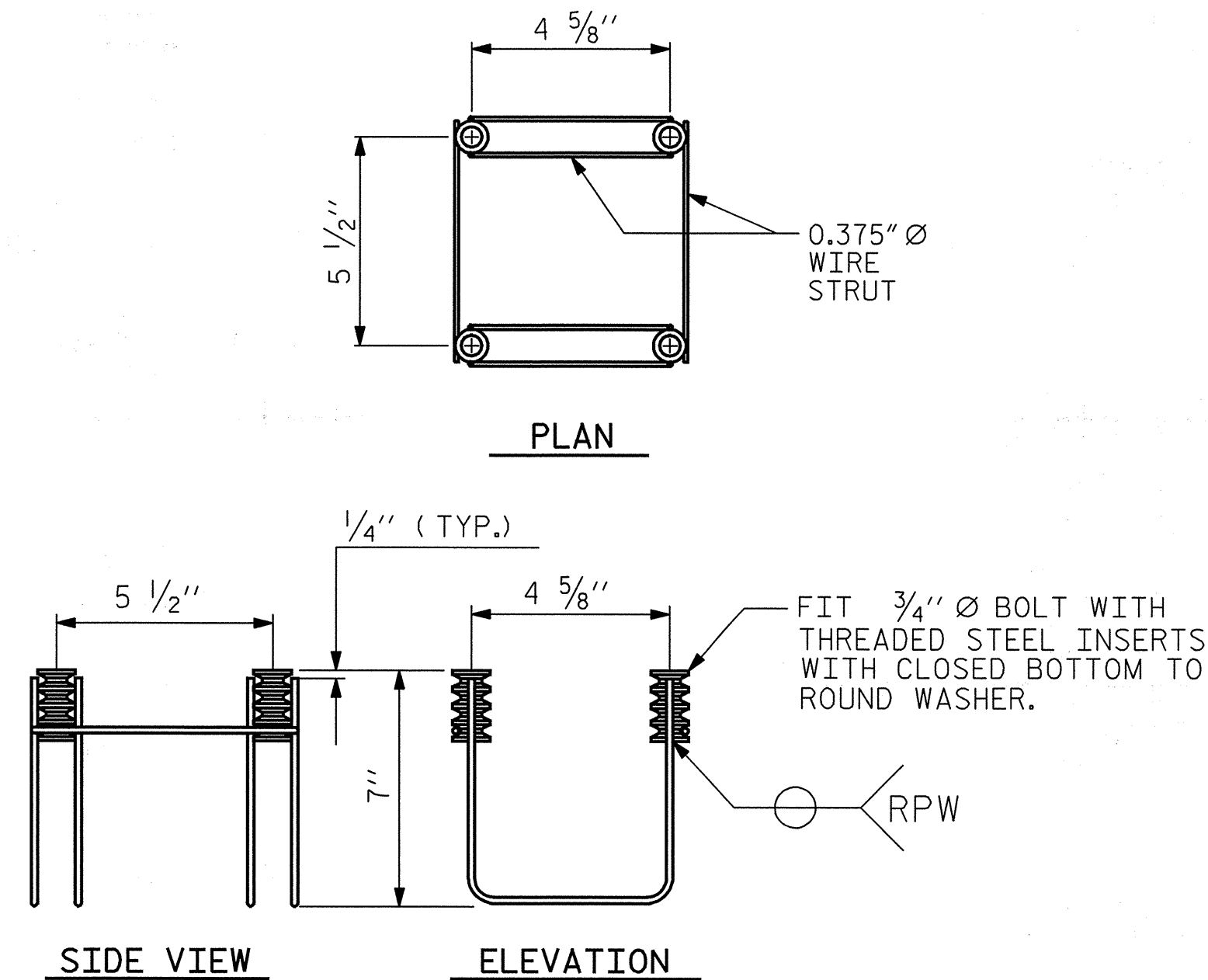
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

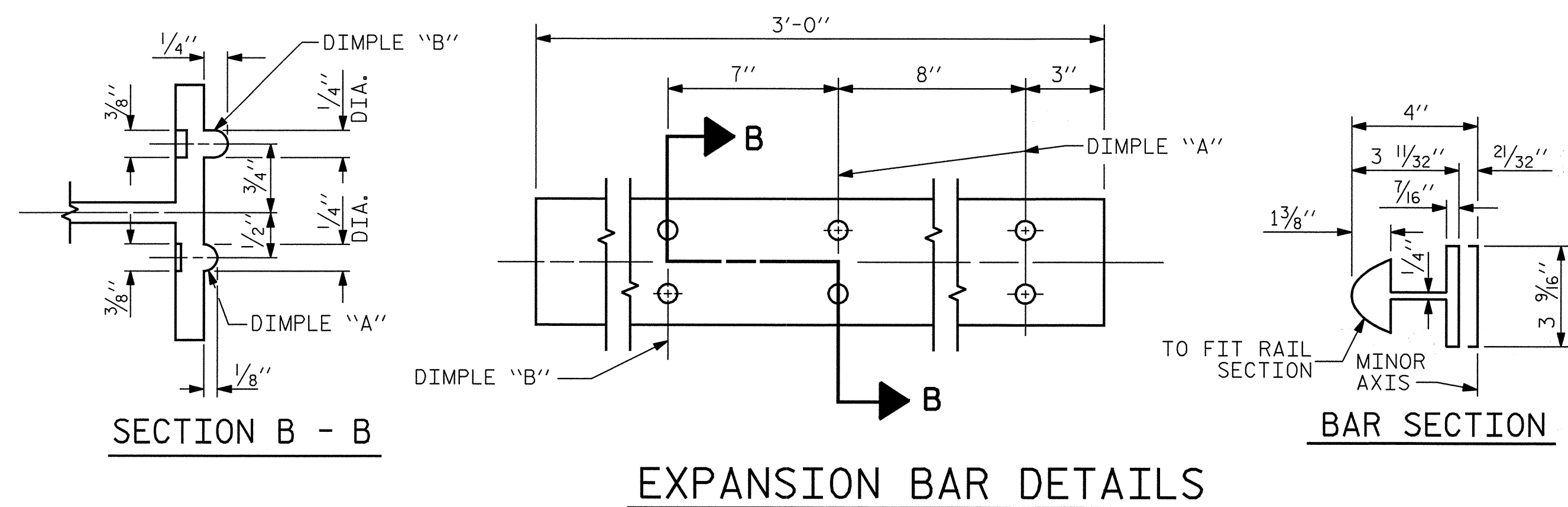
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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

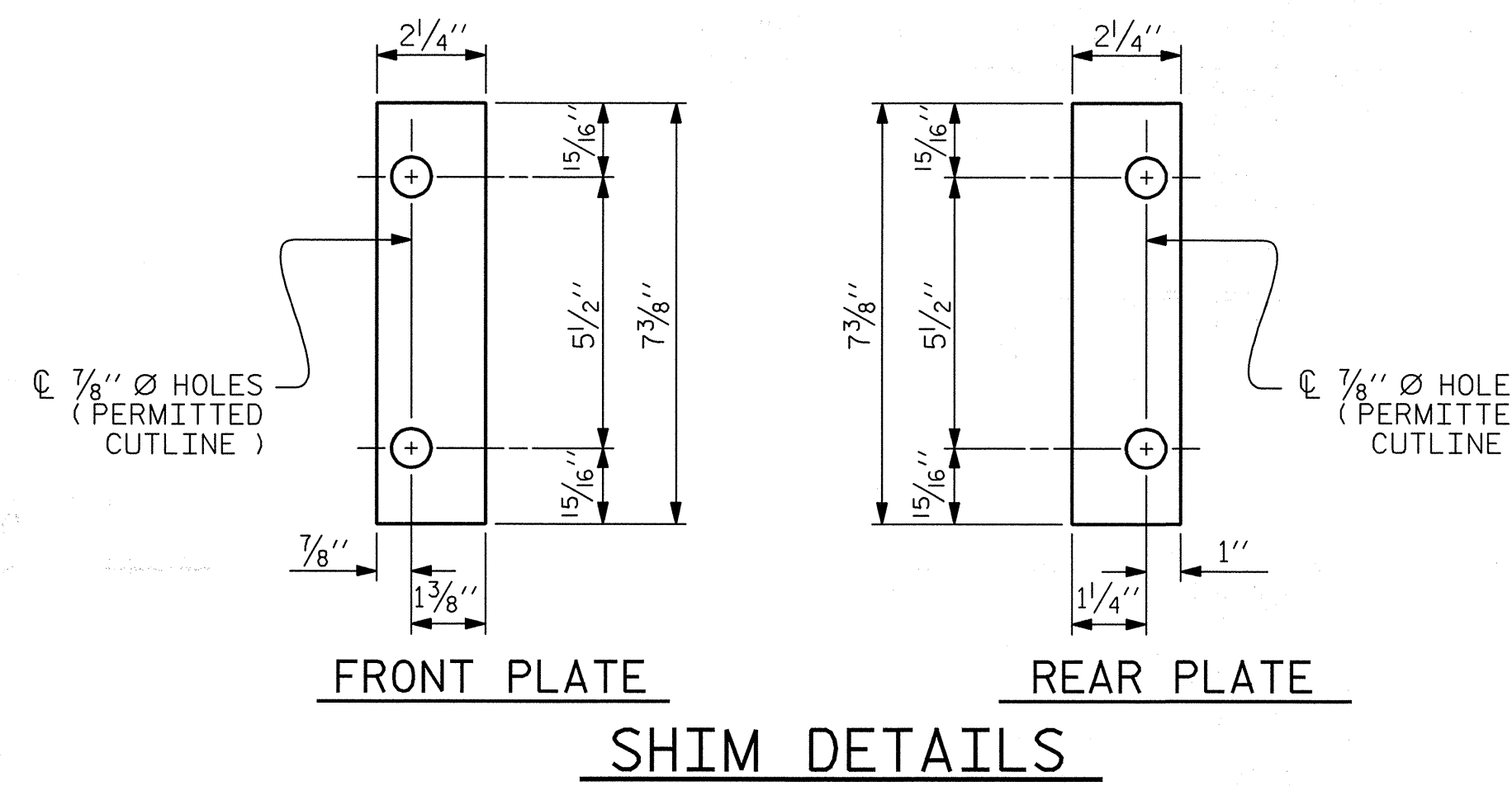


**4-BOLT METAL RAIL ANCHOR ASSEMBLY**

( 114 ASSEMBLIES REQUIRED )

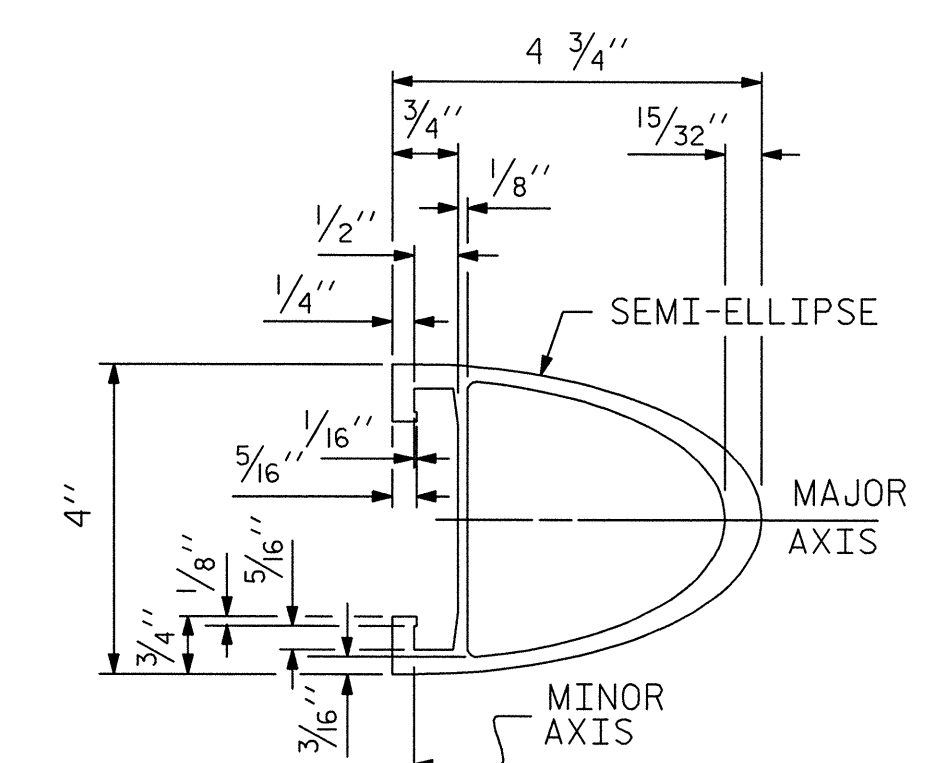


**EXPANSION BAR DETAILS**

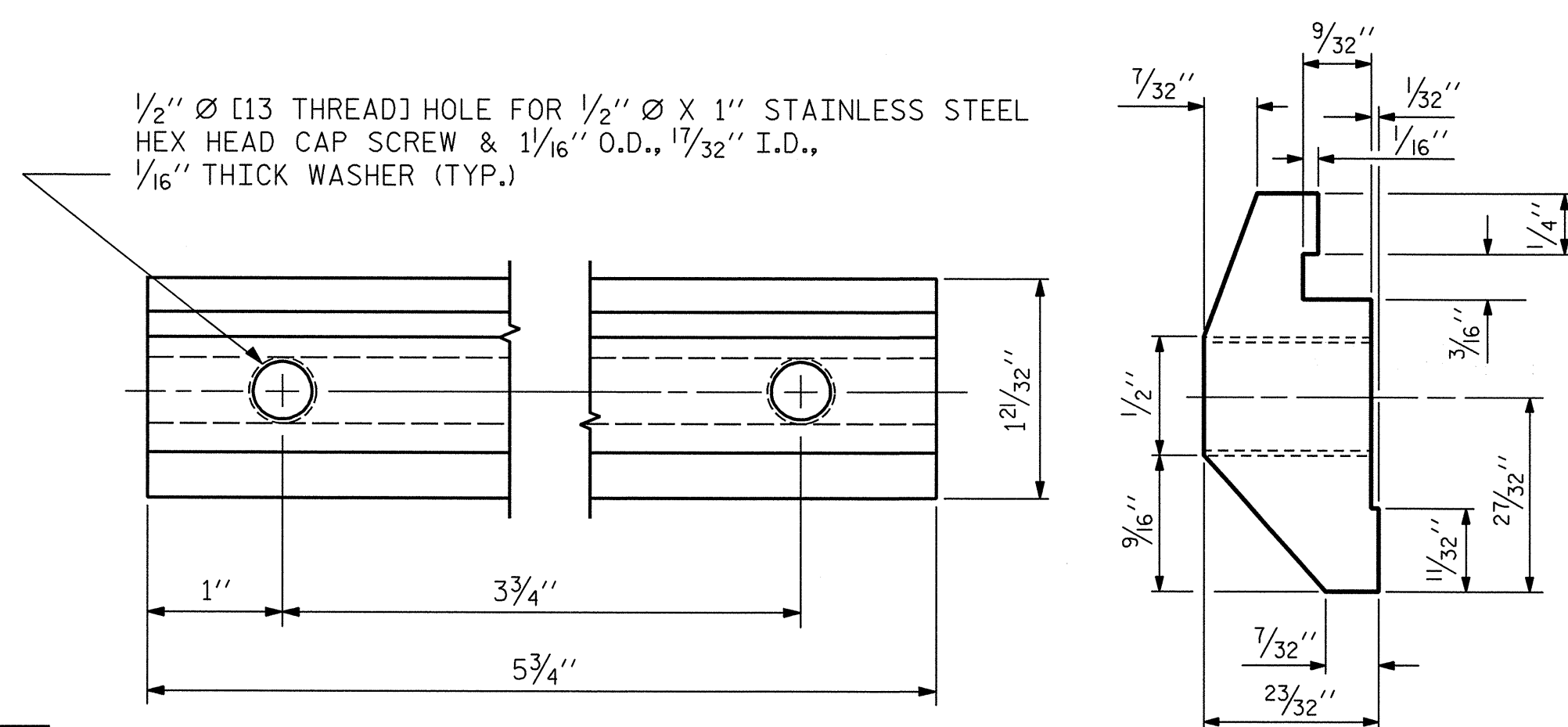


**SHIM DETAILS**

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

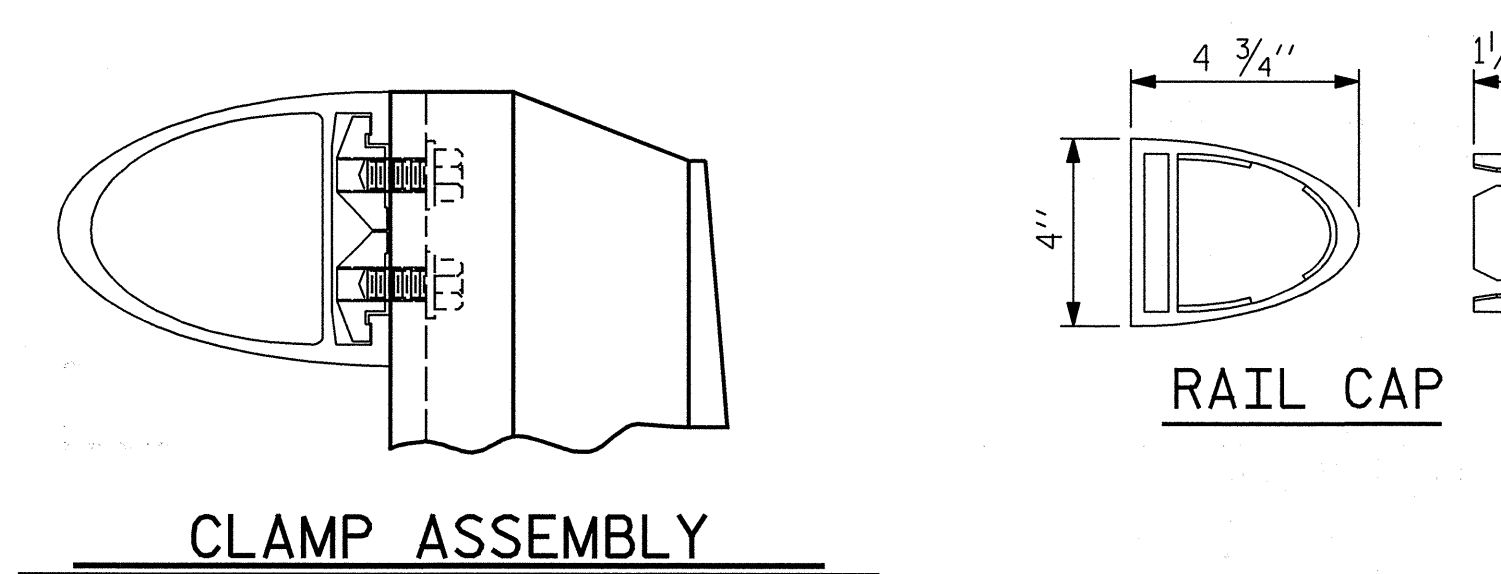


**RAIL SECTION**

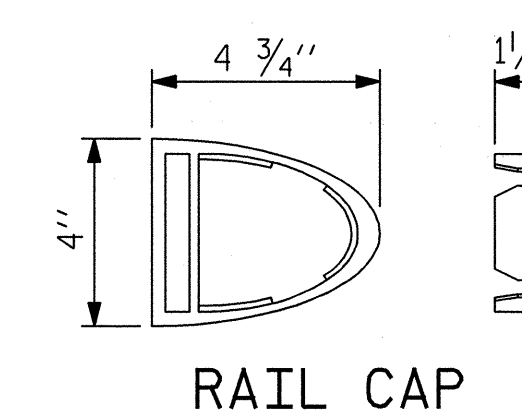


**CLAMP BAR DETAIL**

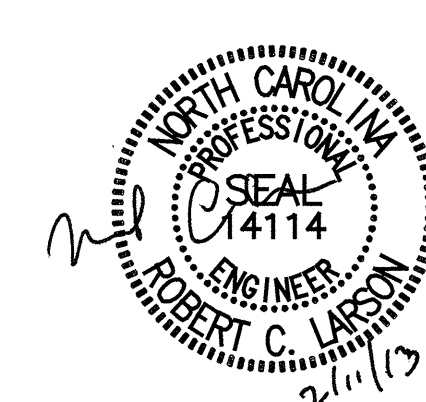
( 4 REQUIRED PER POST )



**CLAMP ASSEMBLY**



**RAIL CAP**



PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 2

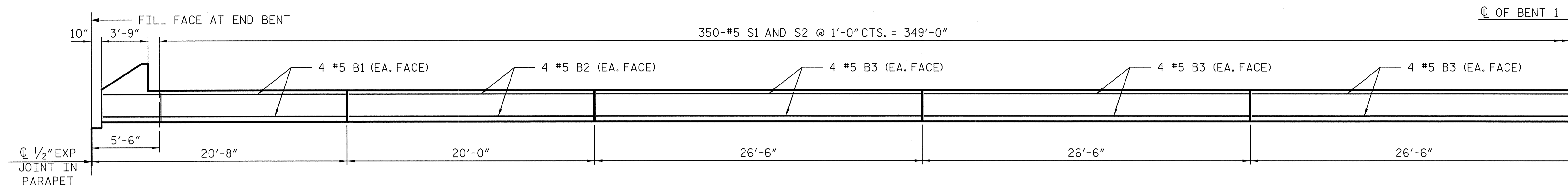
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**2 BAR METAL RAIL**

STD. NO. BMR4

DESIGN ENGINEER OF RECORD: <i>Robert C. Larson</i>	DATE: <u>2/11/13</u>
ASSEMBLED BY: R. C. LARSON	DATE: 5/15/12
CHECKED BY: E. R. PHIPPS	DATE: 5/15/12
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

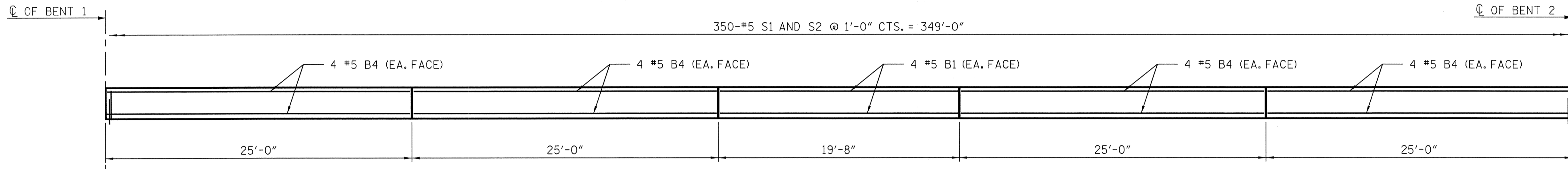
KCI Associates of North Carolina, P.A. REGISTERED PROFESSIONAL ENGINEERS LICENSE NUMBER 0014		STATE COLLEGE CENTER REGISTERED PROFESSIONAL ENGINEERS LICENSE NUMBER 0014	
DWG. REF. NO. 18 OF 34			

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS	
1			3			S-18	
2			4			39	



**SPAN "A" PARAPET ELEVATION**

(SPAN "C" SIMILAR)



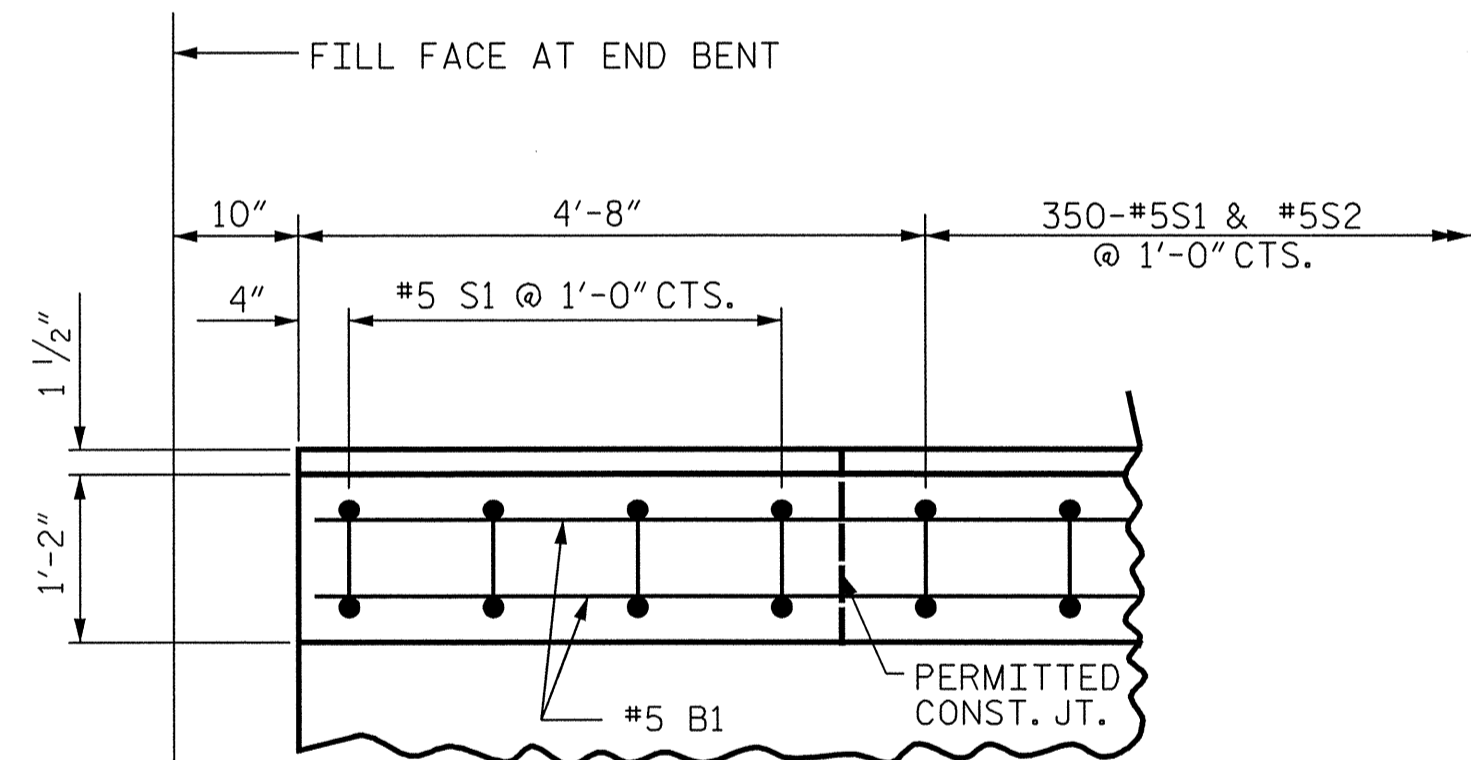
**SPAN "B" PARAPET ELEVATION**

**NOTES**

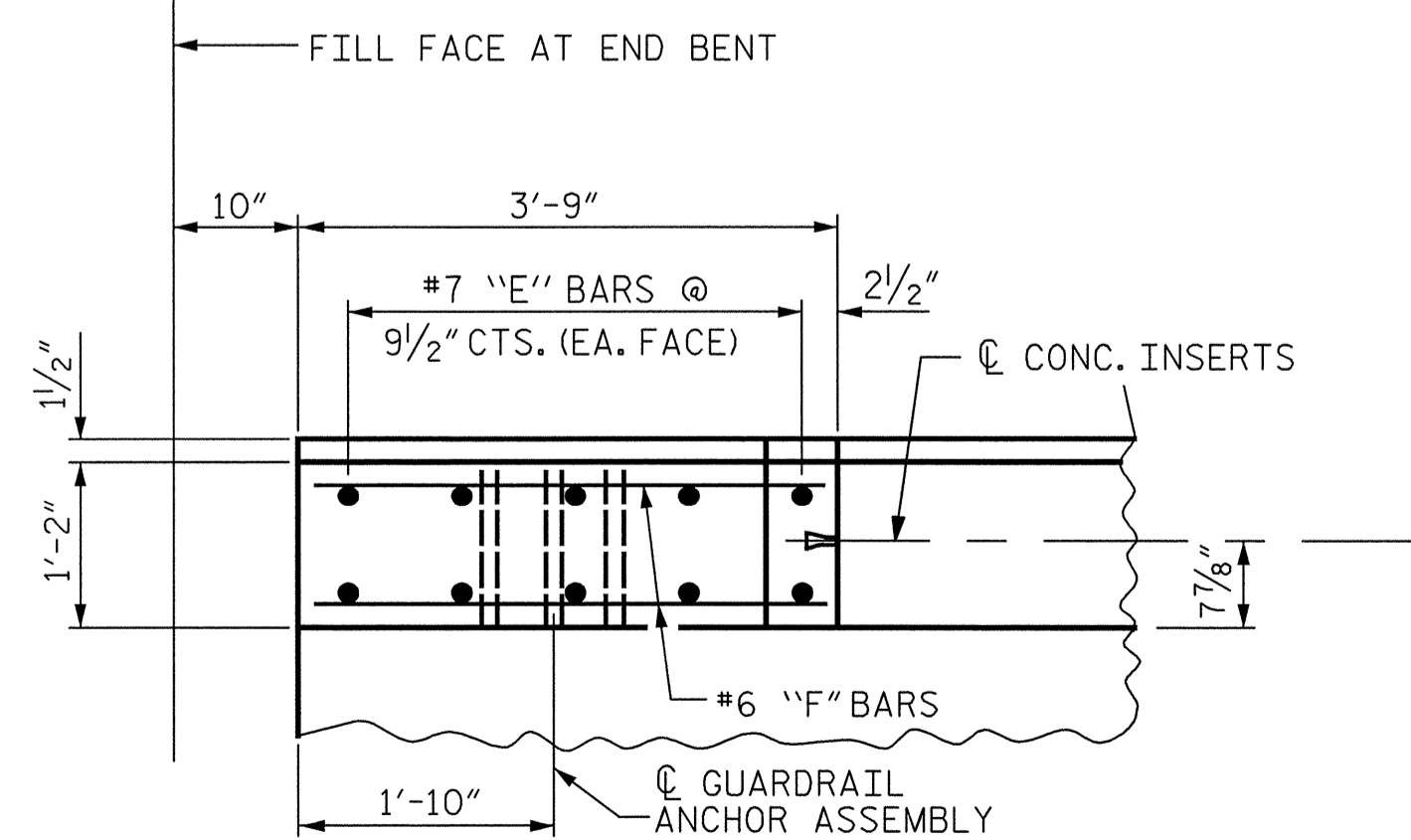
THE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN PARAPETS SHALL BE EPOXY COATED.

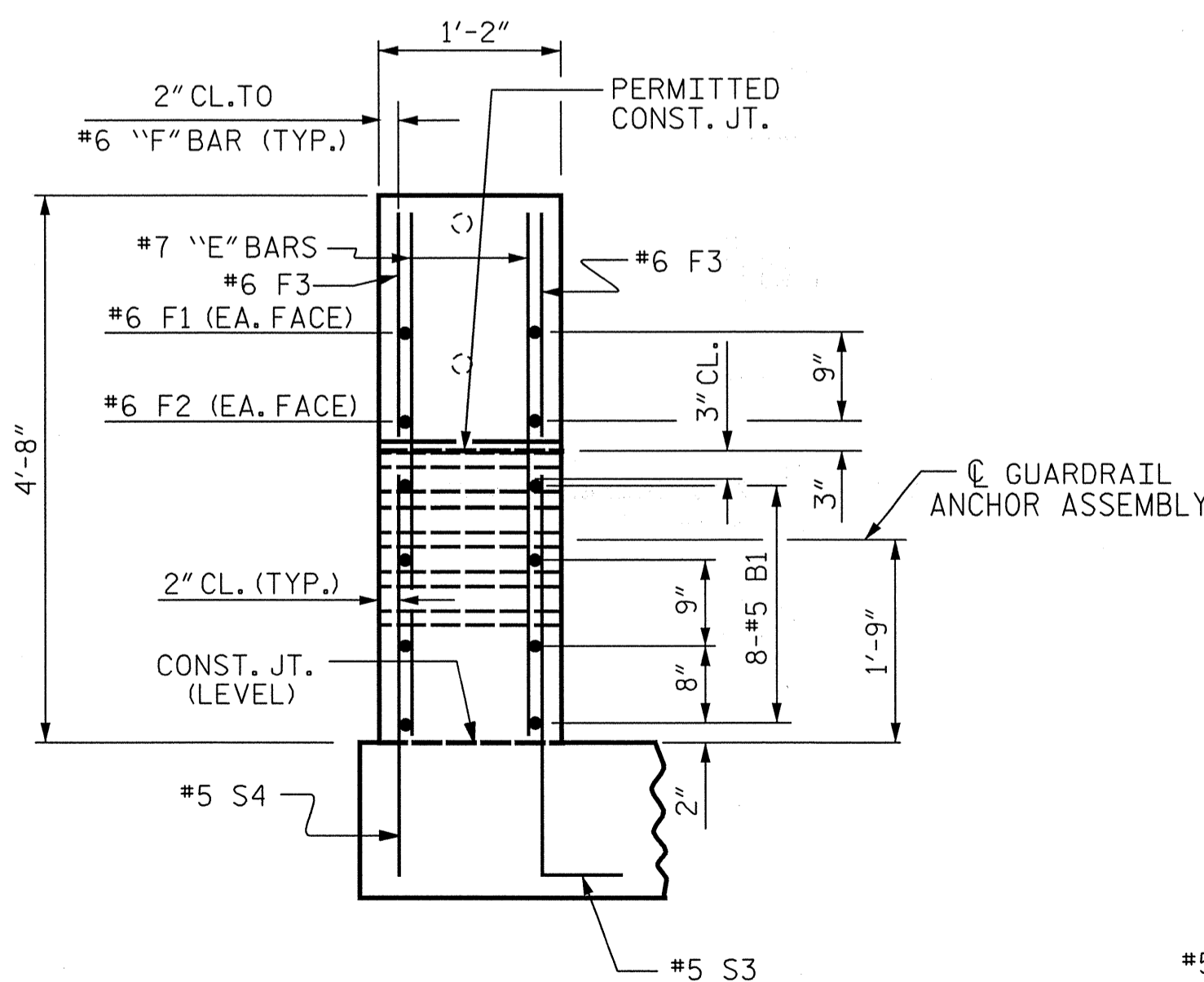
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT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



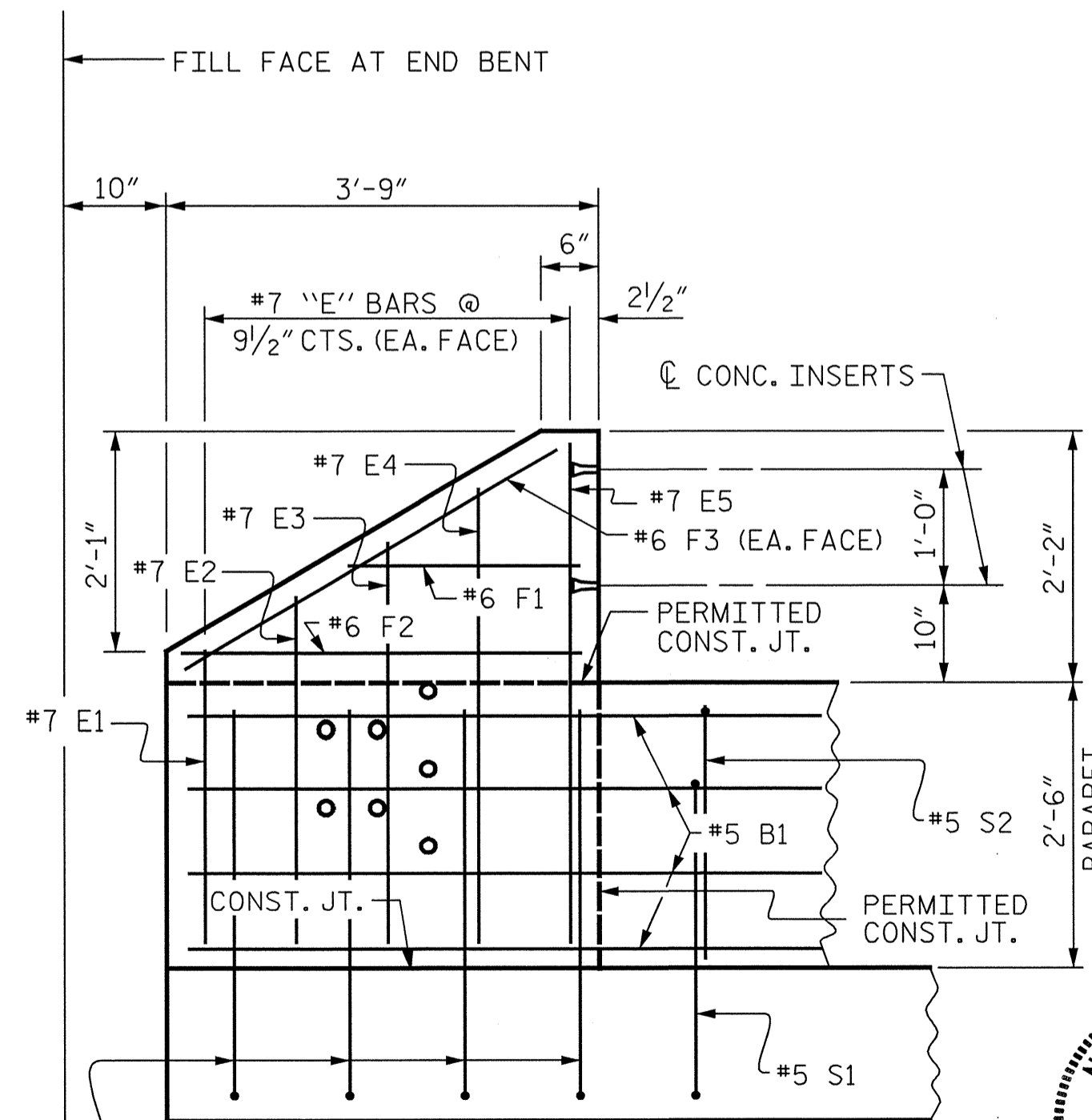
**PLAN OF PARAPET**



**PLAN OF END POST**

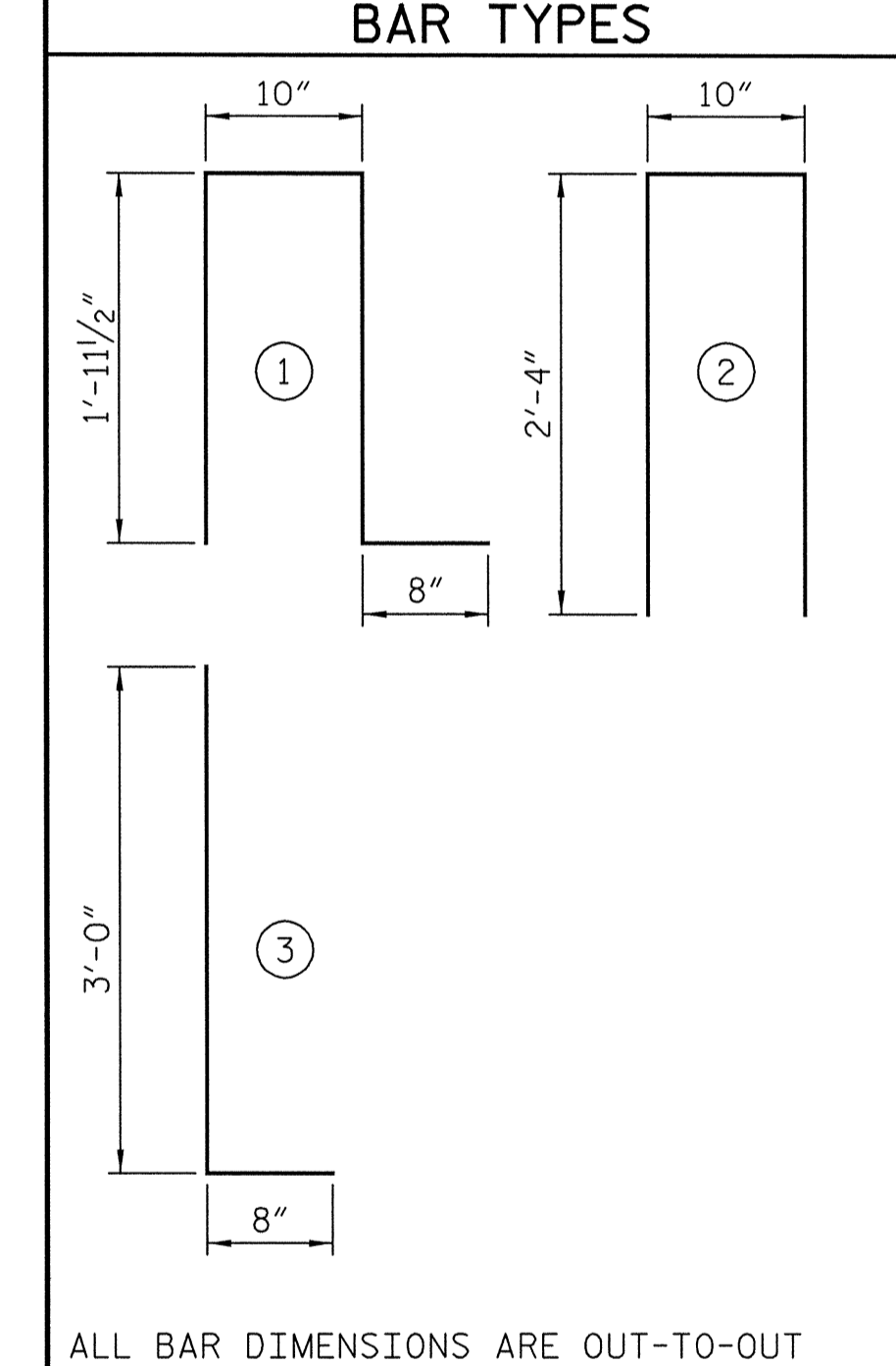


**END VIEW**

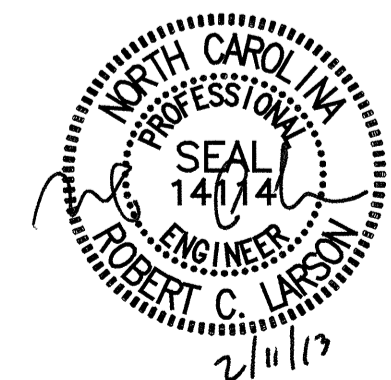


**ELEVATION**

BILL OF MATERIAL					
FOR CONCRETE PARAPET AND END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	48	#5	STR	19'-4"	968
* B2	32	#5	STR	19'-8"	656
* B3	96	#5	STR	26'-2"	2620
* B4	64	#5	STR	24'-8"	1647
* E1	8	#7	STR	2'-6"	41
* E2	8	#7	STR	3'-0"	49
* E3	8	#7	STR	3'-6"	57
* E4	8	#7	STR	4'-0"	65
* E5	8	#7	STR	4'-4"	71
* F1	8	#6	STR	1'-10"	22
* F2	8	#6	STR	3'-0"	36
* F3	8	#6	STR	3'-10"	46
* S1	700	#5	1	5'-5"	3955
* S2	700	#5	2	5'-6"	4016
* S3	16	#5	3	3'-8"	61
* S4	16	#5	STR	3'-0"	50
* EPOXY COATED REINFORCING STEEL				14,360 LBS.	
CLASS AA CONCRETE				78.1 CU. YDS.	
CONCRETE PARAPET				716.67 LIN. FT.	



PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE  
 PARAPET AND  
 END POST**

DESIGN ENGINEER OF RECORD: RC DATE: 2/10/12  
 DRAWN BY: K. SU DATE: 5/15/12  
 CHECKED BY: R. C. LARSON DATE: 12/13/12

**PARAPET AND END POST FOR TWO BAR RAIL**

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

DWG. REF. NO. 19 OF 34

**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.

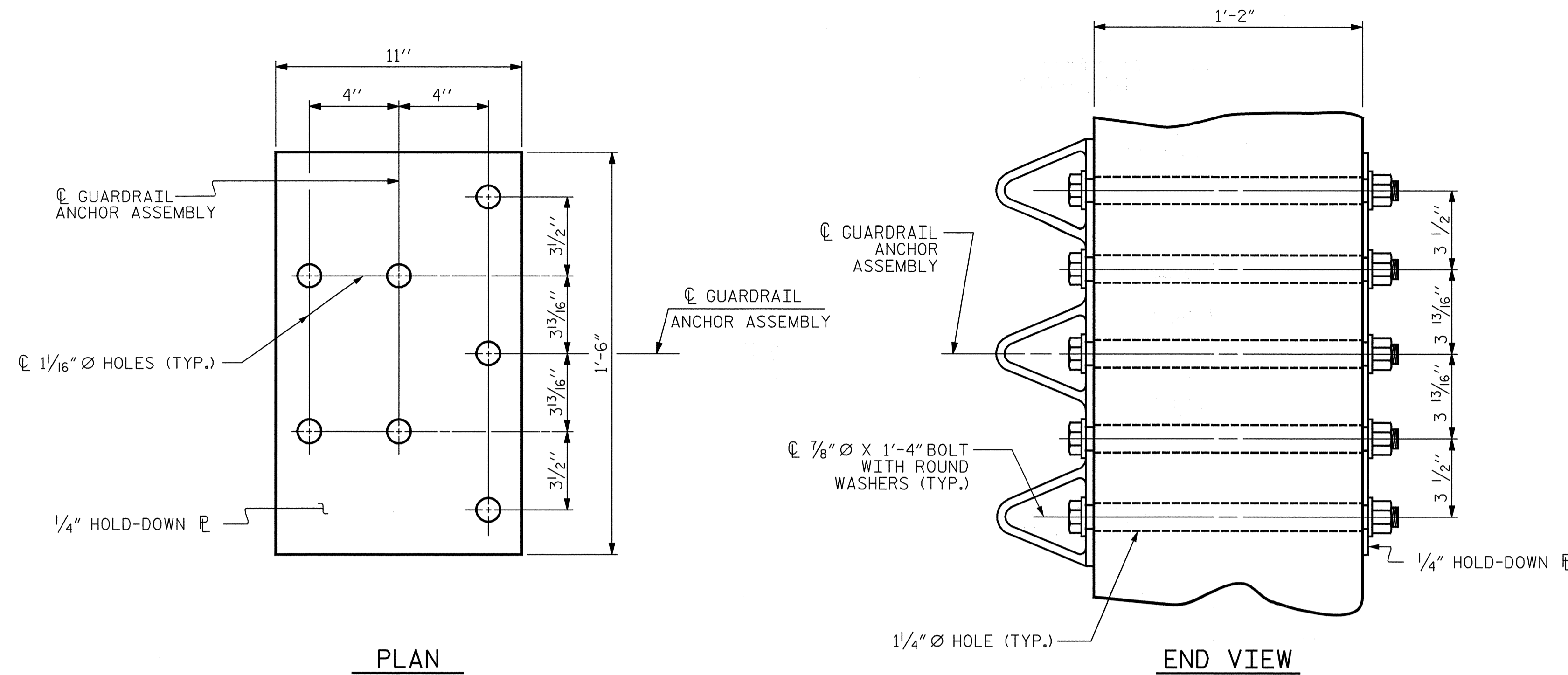
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

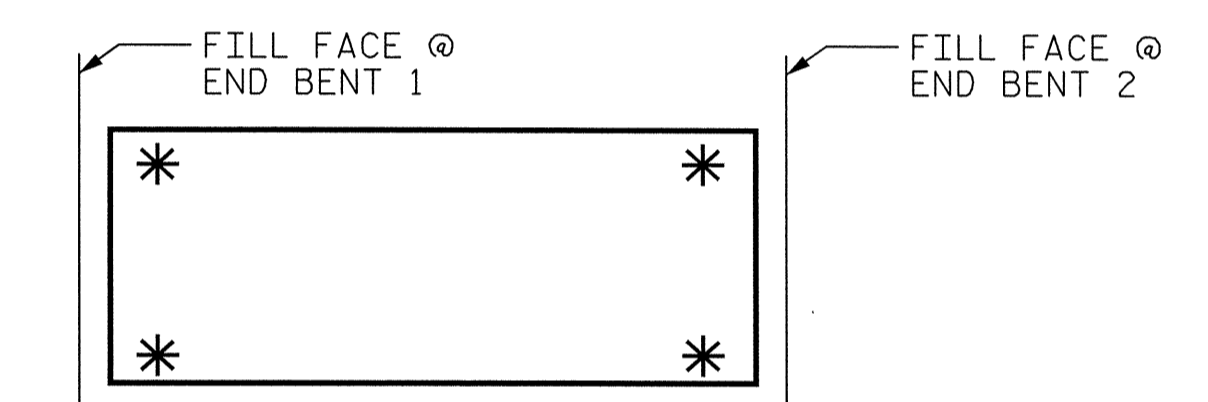
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



PLAN

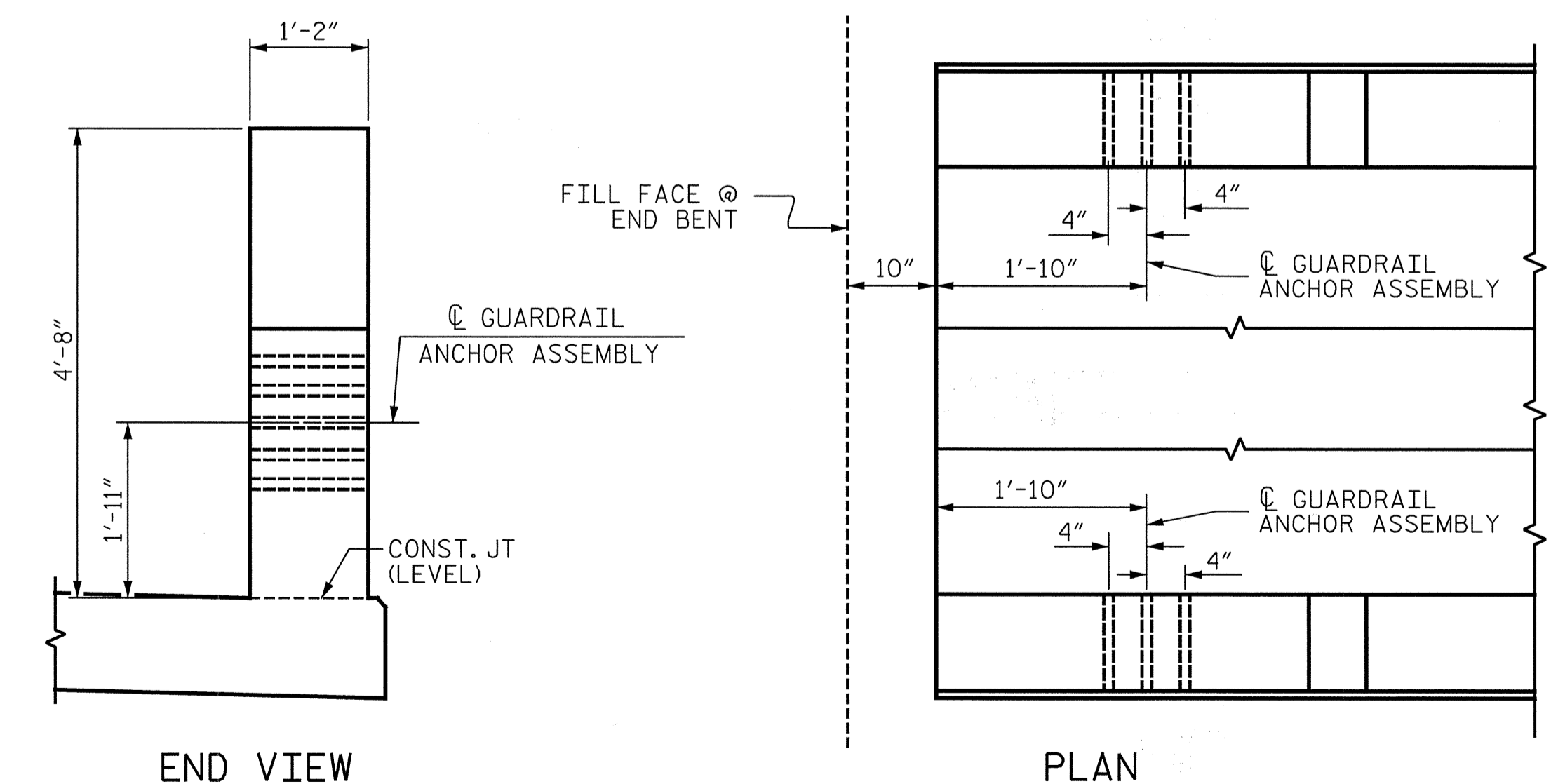
END VIEW

**GUARDRAIL ANCHOR ASSEMBLY DETAILS**



**SKETCH SHOWING POINTS OF ATTACHMENT**

\* LOCATION OF GUARDRAIL ATTACHMENT

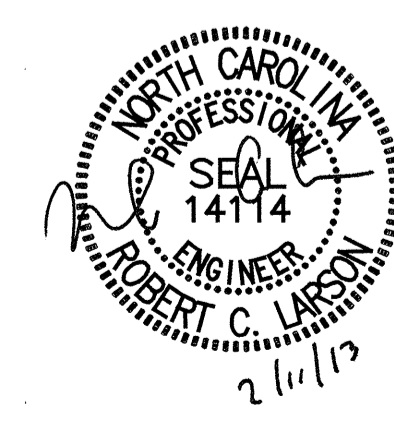


END VIEW

PLAN

**LOCATION OF GUARDRAIL ANCHOR AT END POST**

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS**  
 STD. NO. GRA3

DESIGN ENGINEER OF RECORD:	DATE:
<i>MAA</i>	2/11/13
ASSEMBLED BY: R. C. LARSON	DATE: 5/15/12
CHECKED BY: E. R. PHIPPS	DATE: 5/15/12
DRAWN BY: MAA 5/10	ADDED 5/6/10
CHECKED BY: GM 5/10	REV. 10/1/11 MAA/GM
	REV. 12/5/11 MAA/GM

KCI Associates a North Carolina, P.A. 10010 STONEY HOLLOW, CL 27603-0000 LICENSE NUMBER P-20184	REVISIONS				SHEET NO. 5-20 TOTAL SHEETS 39	
	NO.	BY:	DATE:	NO.		BY:
	1			3		
	2			4		



**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

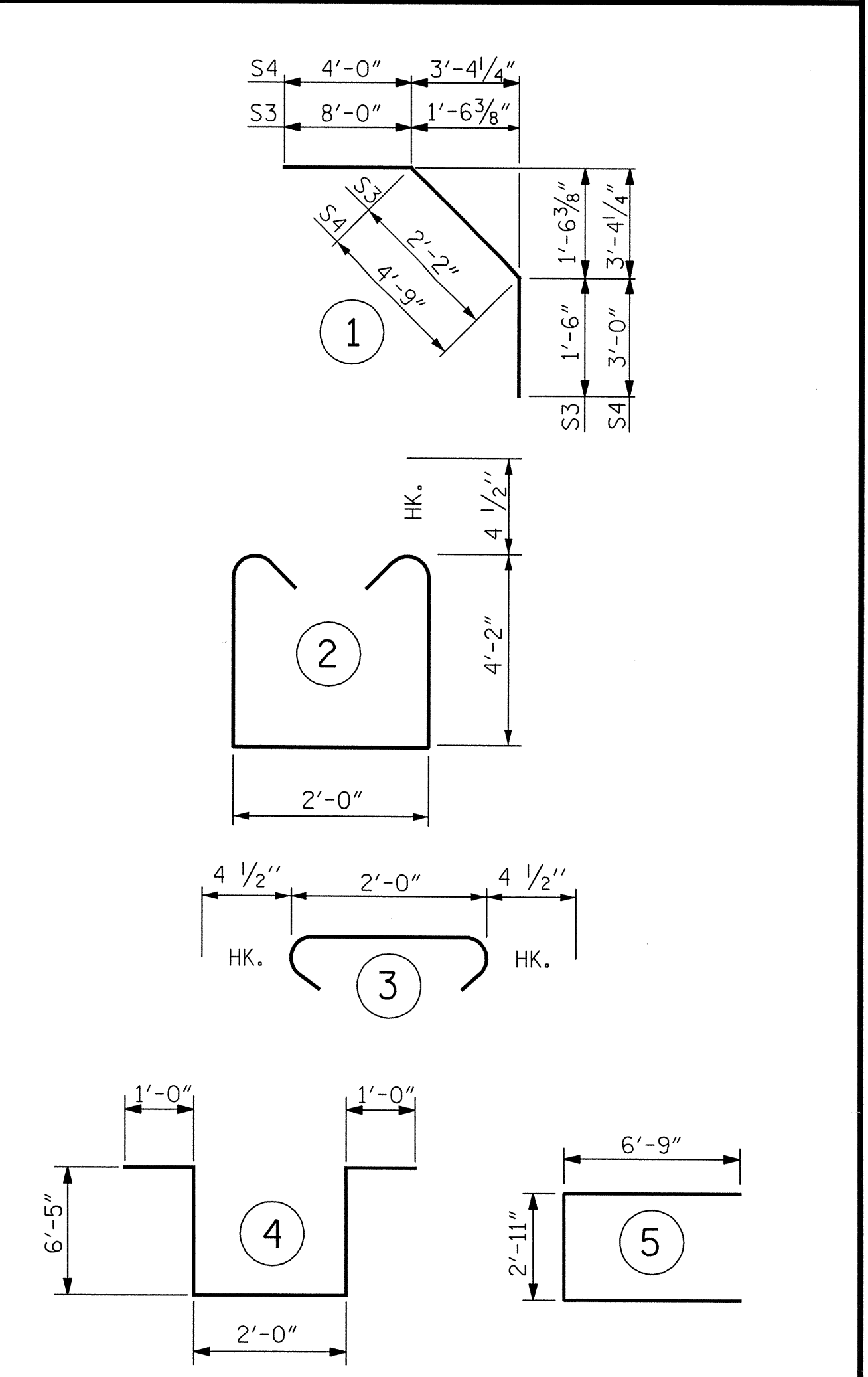
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

**REINFORCING STEEL SCHEDULE**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	614	#5	STR.	32'-3"	20653
*A2	614	#5	STR.	32'-3"	20653
*B1	299	#4	STR.	29'-5"	5875
B2	189	#5	STR.	53'-0"	10448
*B3	44	#6	STR.	60'-0"	3965
*B4	44	#6	STR.	25'-0"	1652
*B5	40	#6	STR.	36'-0"	2163
*B6	40	#6	STR.	24'-0"	1442
*B7	44	#6	STR.	26'-0"	1718
K1	24	#4	STR.	20'-6"	329
K2	6	#4	STR.	6'-0"	24
K3	90	#4	STR.	7'-7"	456
K4	12	#4	STR.	4'-7"	37
K5	4	#4	STR.	2'-1"	6
K6	20	#4	STR.	2'-11"	39
K7	12	#4	STR.	4'-11"	39
K8	14	#4	STR.	25'-9"	241
S1	38	#4	5	16'-5"	417
S2	216	#4	3	2'-9"	397
*S3	38	#4	1	11'-8"	296
*S4	34	#4	1	11'-9"	267
S5	12	#4	2	11'-1"	89
*U1	30	#4	4	16'-10"	337

\* EPOXY COATED REINFORCING STEEL

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

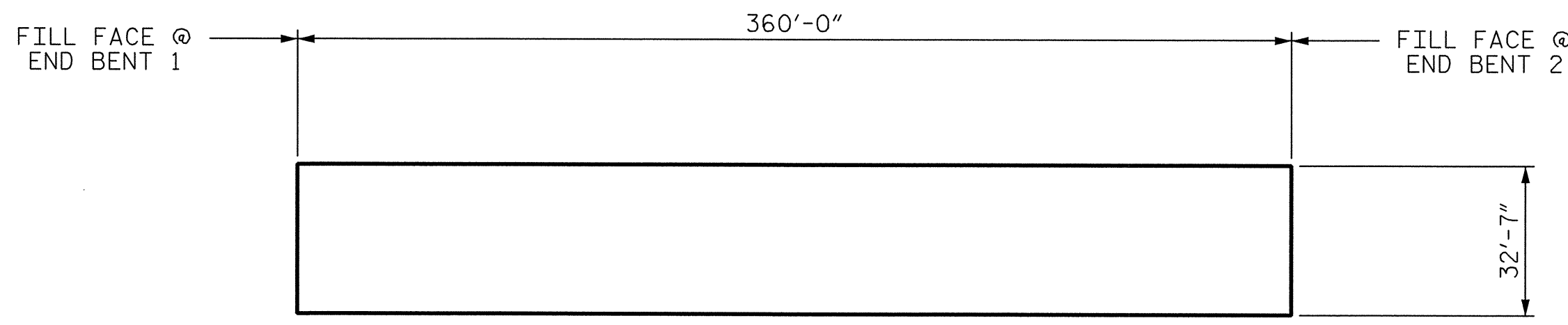
**SUPERSTRUCTURE BILL OF MATERIAL**

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
SPANS A-C			
POUR 1	111.5		
POUR 2	137.1		
POUR 3	137.1		
POUR 4 †	73.9		
TOTALS**	459.6	33175	38368

† POUR 4 INCLUDES 8.7 CY AND 8.5 CY FOR UPPER PORTION OF WINGWALLS AT END BENT 1 & 2 RESPECTIVELY.  
\*\*QUANTITIES FOR PARAPET ARE NOT INCLUDED

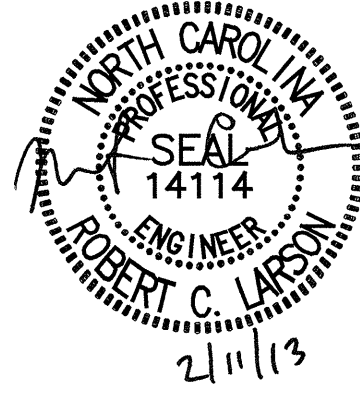
**GROOVING BRIDGE FLOORS**

APPROACH SLABS	1305	SQ.FT.
BRIDGE DECK	9666	SQ.FT.
TOTAL	10971	SQ.FT.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 11,730)

PROJECT NO. B-4733  
CLAY COUNTY  
STATION: 19+20.00 -L-



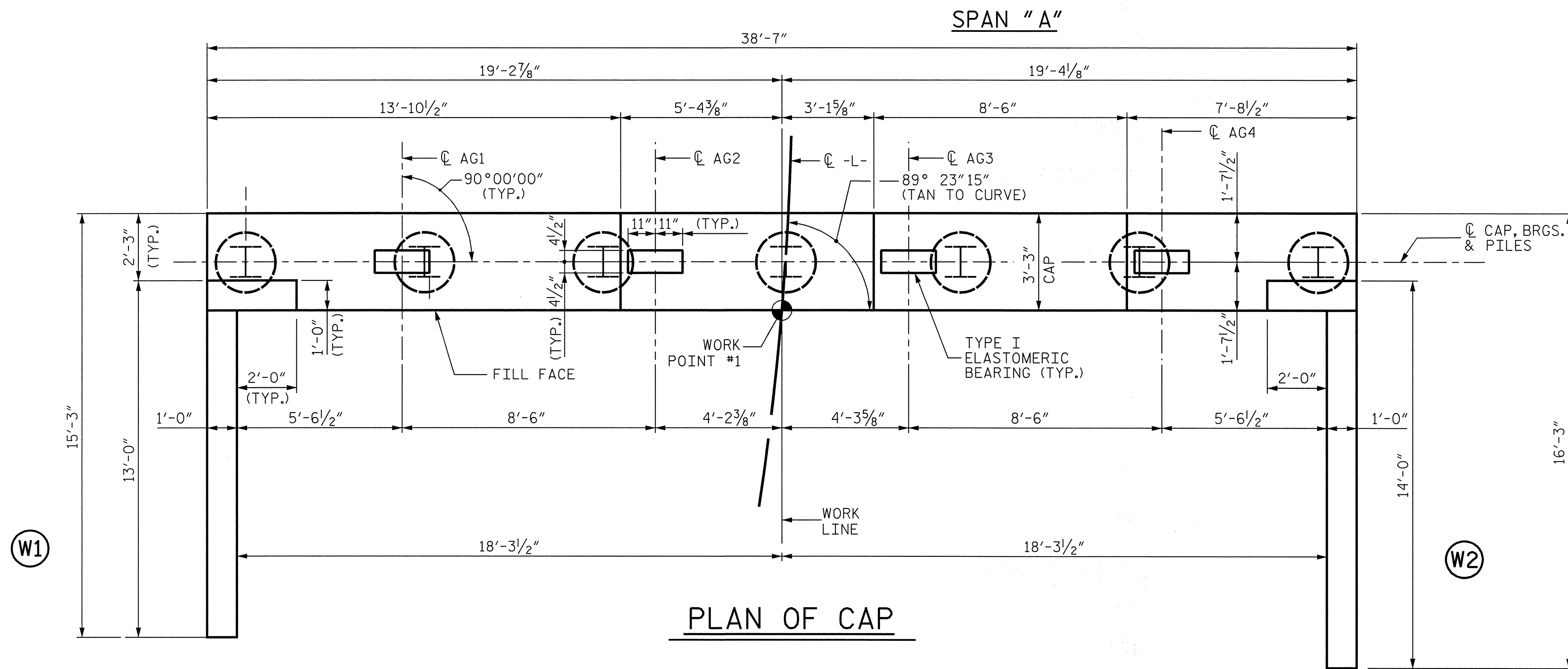
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
SUPERSTRUCTURE  
BILL OF MATERIAL

STD. NO. BOM2

DESIGN ENGINEER OF RECORD:	DATE:	2/11/13
ASSEMBLED BY: R. C. LARSON	DATE:	5/18/12
CHECKED BY: R. A. PRUETT	DATE:	11/12/12
DRAWN BY: JMB 5/87	REV. 8/16/99	RWW/LES
CHECKED BY: SJD 9/87	REV. 5/1/06	TLA/GM
	REV. 10/1/11	MAA/GM

NO.	REVISIONS			SHEET NO.
	BY:	DATE:	NO.	
1			3	6-21
2			4	TOTAL SHEETS 39

KCI Associates of North Carolina, P.A. STATE 225 LAMAR CENTER BLDG. RALEIGH, NC 27601-2000  
DWG. REF. NO. 21 OF 33



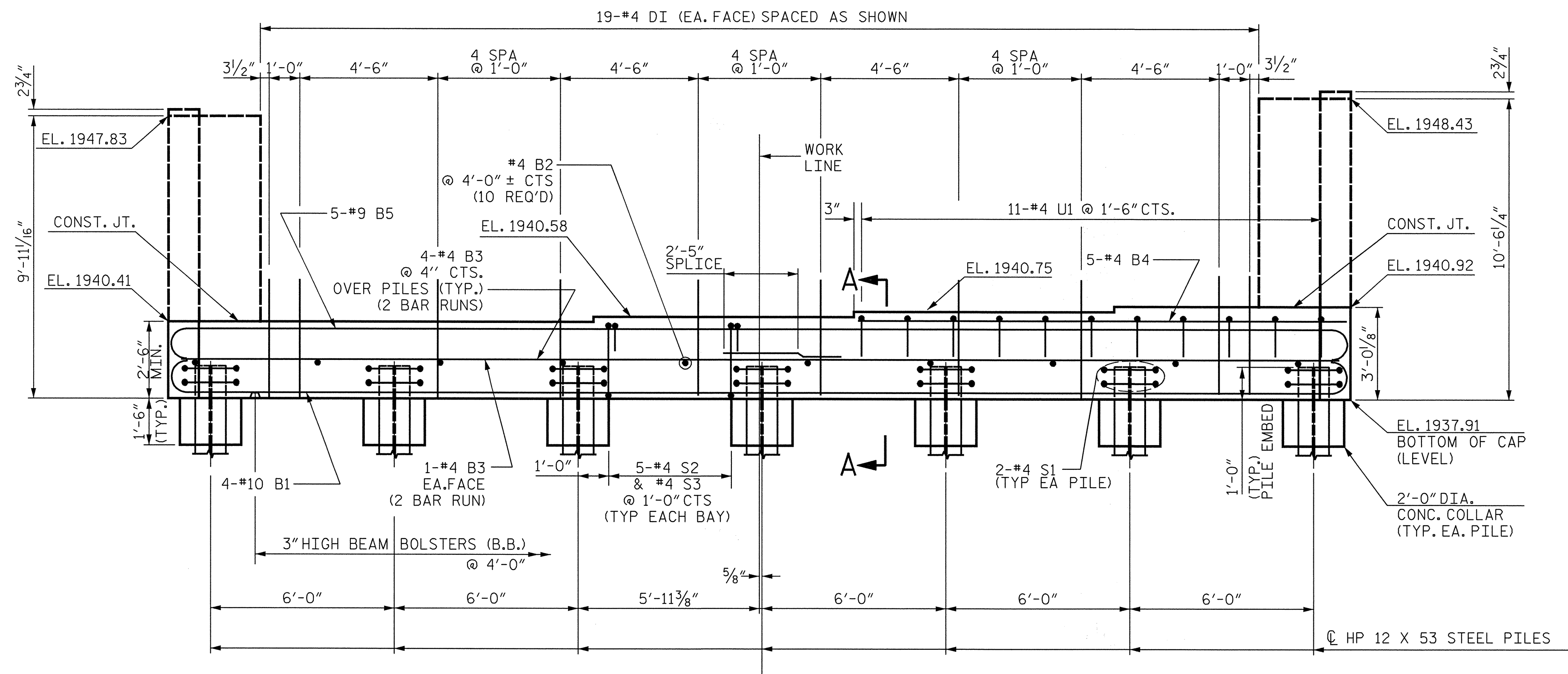
**PLAN OF CAP**

**NOTES**

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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.

THE PORTIONS OF THE WINGS ABOVE THE CONSTRUCTION JOINT ARE TO BE POURED WITH THE SUPERSTRUCTURE. AT THE CONTRACTORS OPTION, THESE PORTIONS MAY BE POURED SEPARATELY FROM THE SUPERSTRUCTURE, IN WHICH CASE CLASS 'A' CONCRETE MAY BE USED.

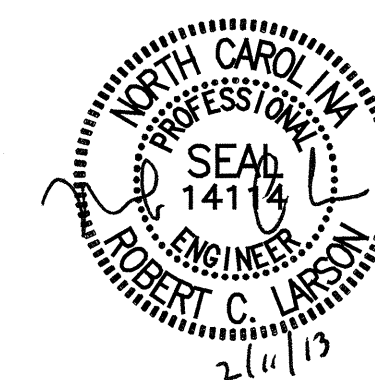
FOR 'BLOCKOUT IN WINGWALL', SEE END BENT 2.



**ELEVATION**

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

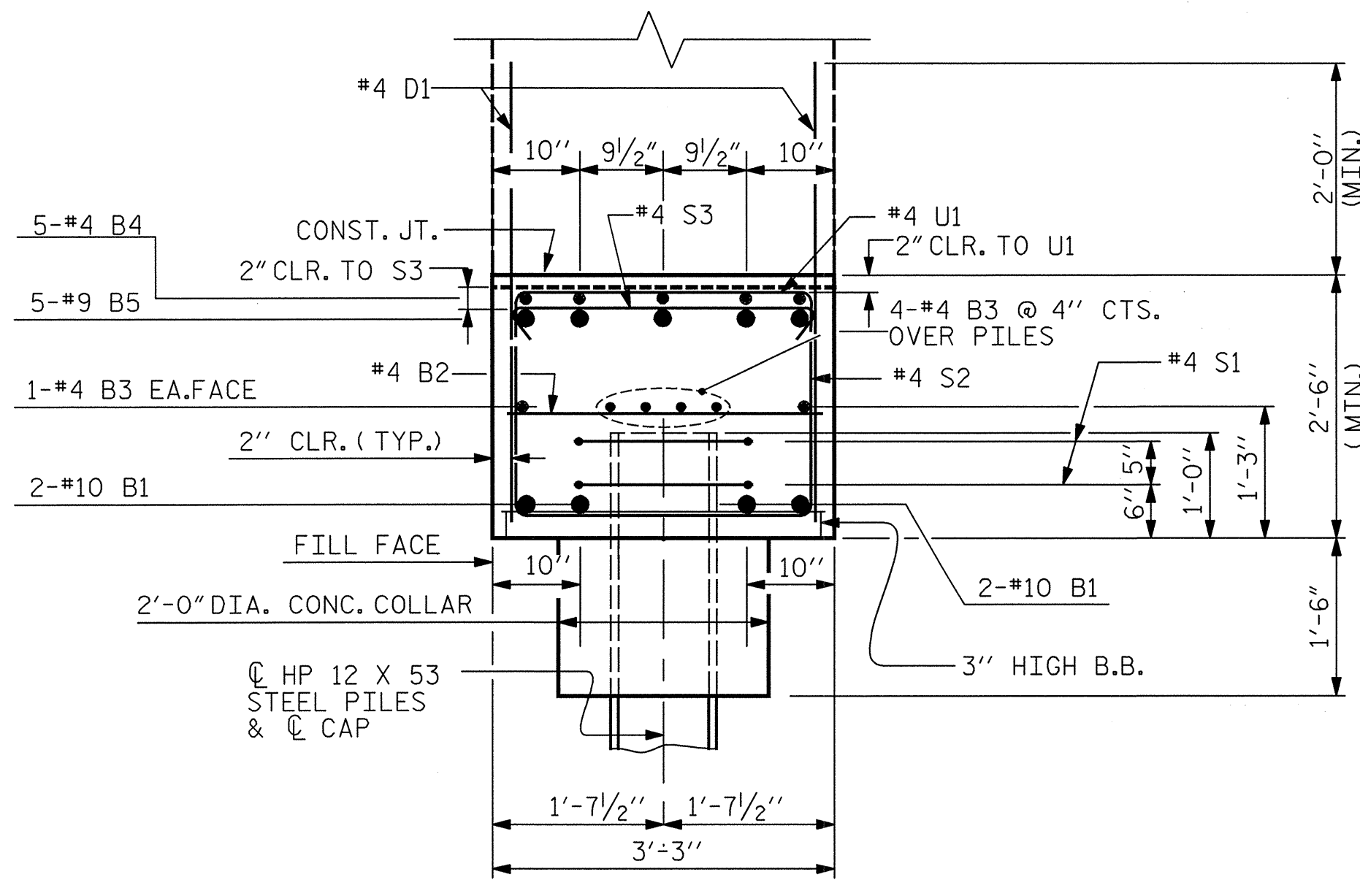
**SUBSTRUCTURE  
 END BENT 1**

DESIGN ENGINEER OF RECORD: R. J. FLORY DATE: 2/11/13  
 DRAWN BY: R. J. FLORY DATE: 11/20/12  
 CHECKED BY: R. C. LARSON DATE: 12/13/12

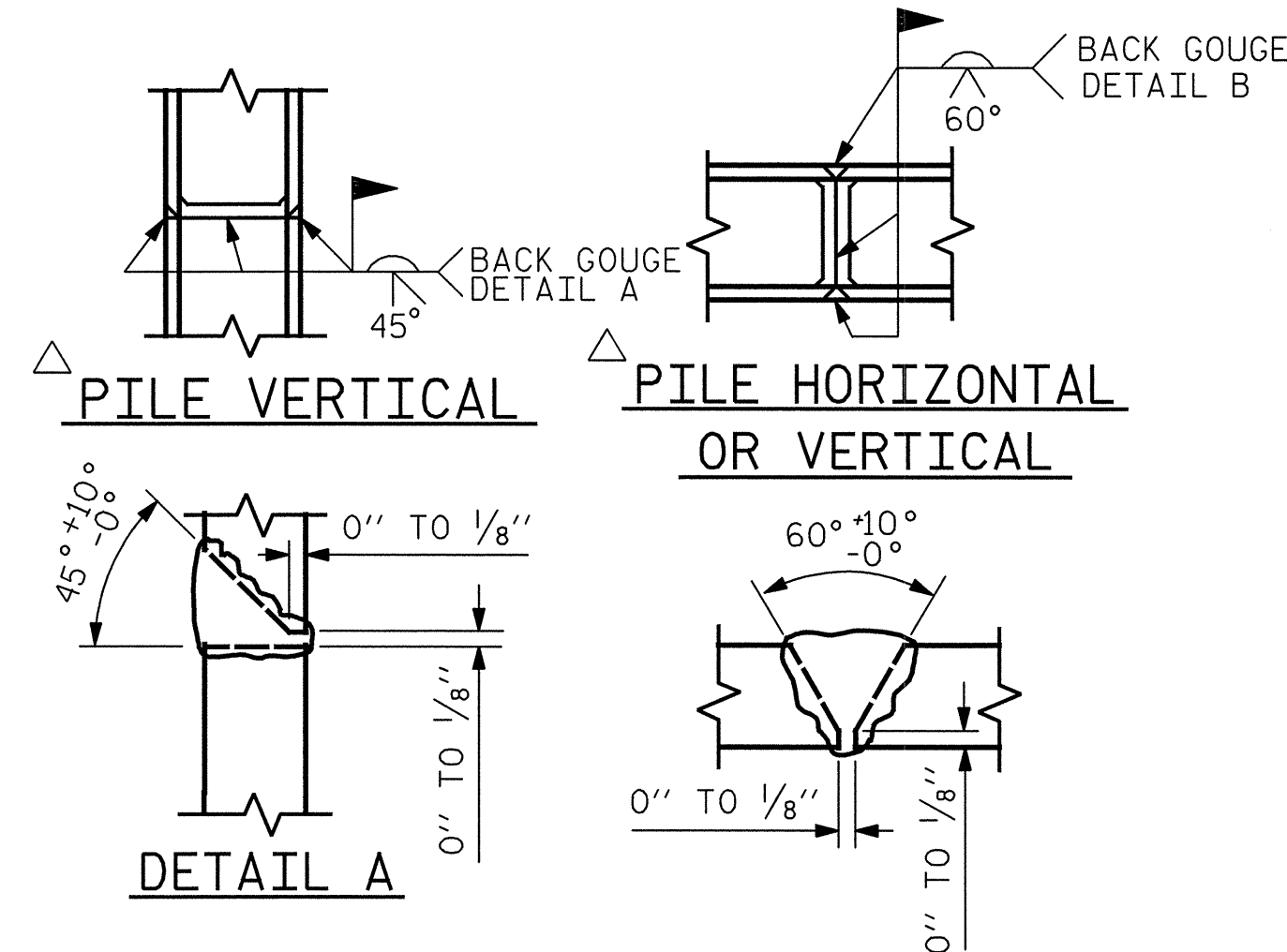
KCI Associates  
 of North Carolina, P.A.  
 1000 W. HARRIS STREET  
 RALEIGH, NC 27601  
 LICENSE NUMBER 0-0794

REVISIONS						SHEET NO. S-22
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 39
2			4			

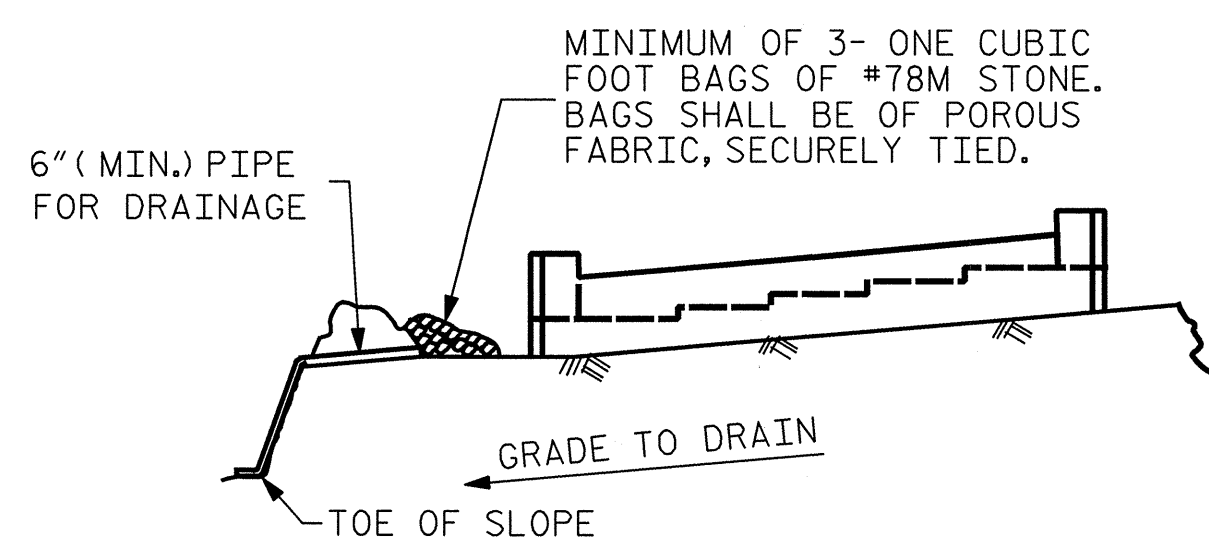
DWG. REF. NO. 22 OF 34



SECTION A-A



PILE SPLICE DETAILS



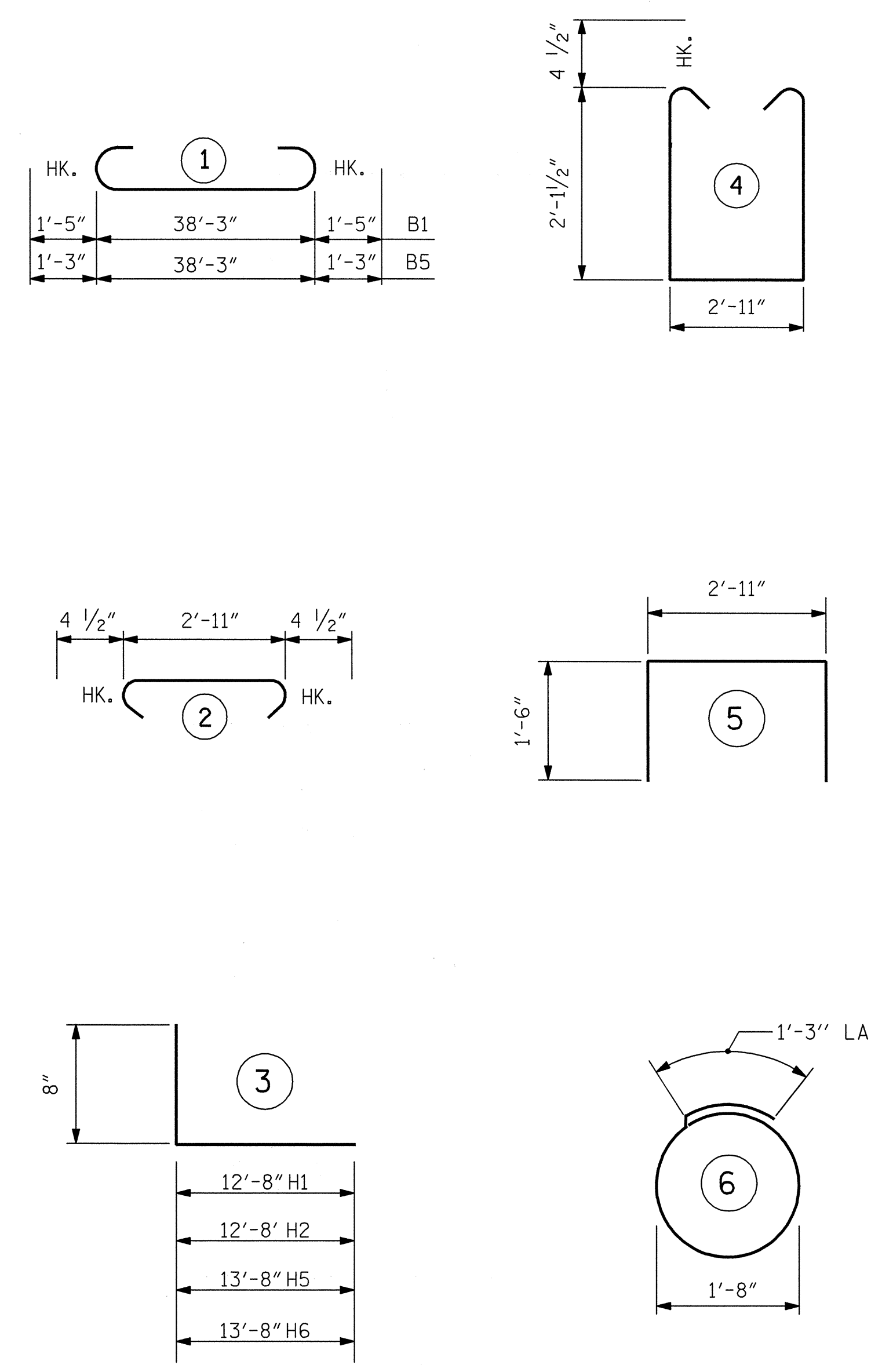
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	10	1	41'-1"	707
B2	10	4	STR.	2'-11"	19
B3	12	4	STR.	20'-4"	163
B4	5	4	STR.	15'-10"	53
B5	5	9	1	40'-9"	693
D1	38	4	STR.	4'-10"	123
H1	11	4	3	13'-4"	98
H2	20	5	3	13'-4"	278
H3	8	4	STR.	2'-10"	15
H4	10	4	STR.	4'-4"	29
H5	11	4	3	14'-4"	105
H6	20	6	3	14'-4"	431
S1	14	4	6	6'-4"	59
S2	30	4	4	7'-11"	159
S3	30	4	2	3'-8"	73
U1	11	4	5	5'-11"	43
V1	32	4	STR.	9'-7"	205
V2	34	5	STR.	10'-2"	361

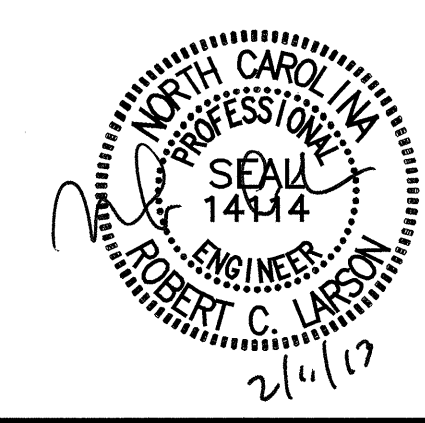
REINFORCING STEEL, LB	3614
CLASS A CONCRETE, CY POUR 1	16.4
(POUR 2 INCLUDED IN SUPERSTRUCTURE)	
HP 12X53 STEEL PILES	NO. 7
	LF 70
PILE EXCAVATION IN SOIL,	LF 30
PILE EXCAVATION NOT IN SOIL,	LF 35

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1



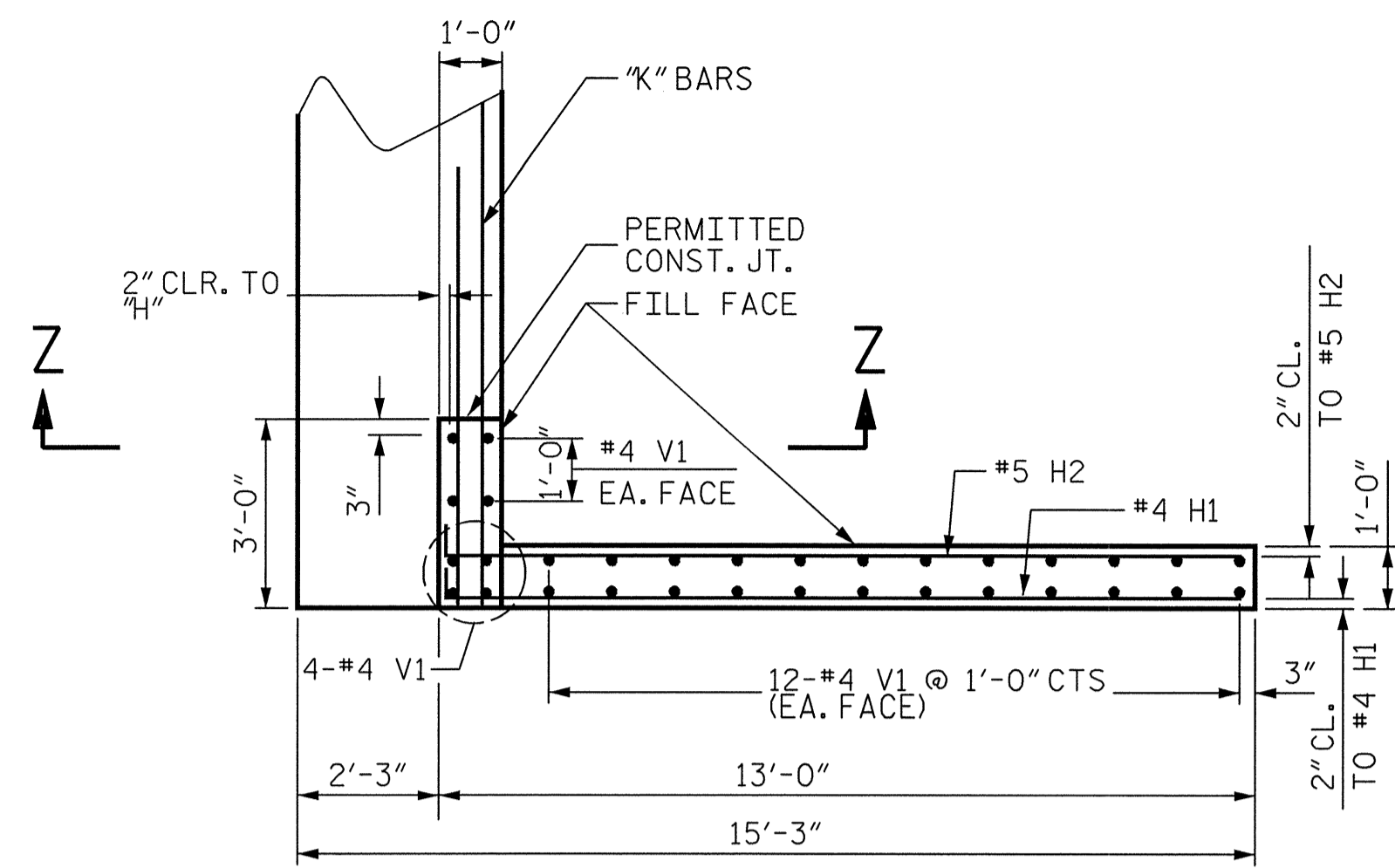
DESIGN ENGINEER OF RECORD: mt ck DATE: 2/1/12  
 DRAWN BY: R. J. FLORY DATE: 11/20/12  
 CHECKED BY: R. C. LARSON DATE: 12/14/12

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

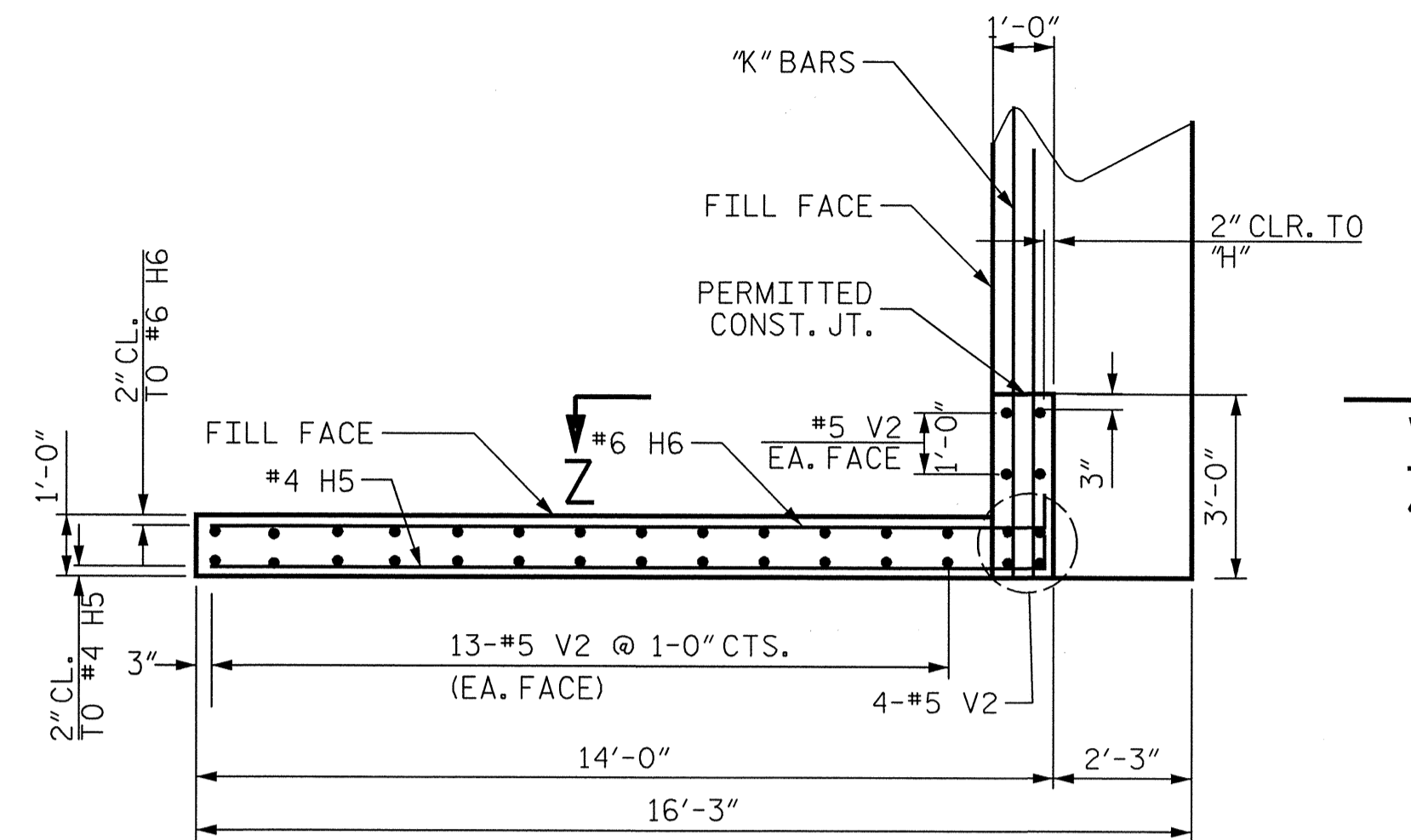
DWG. REF. NO. 23 OF 34

SHEET NO. S-23  
 TOTAL SHEETS 39

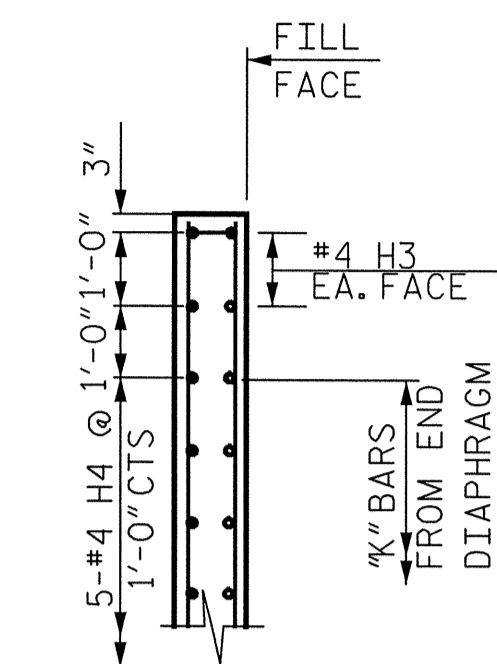




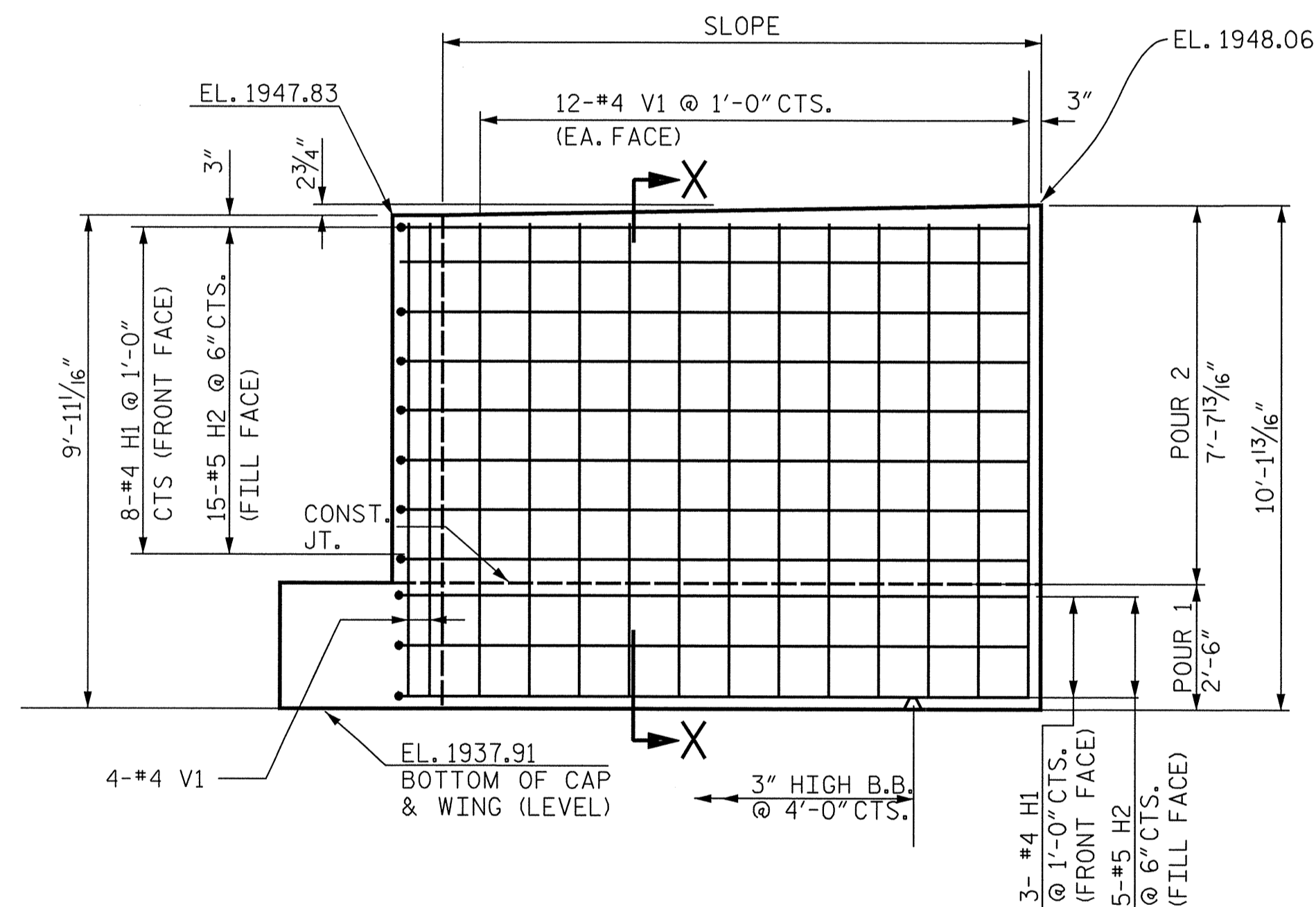
PLAN W1



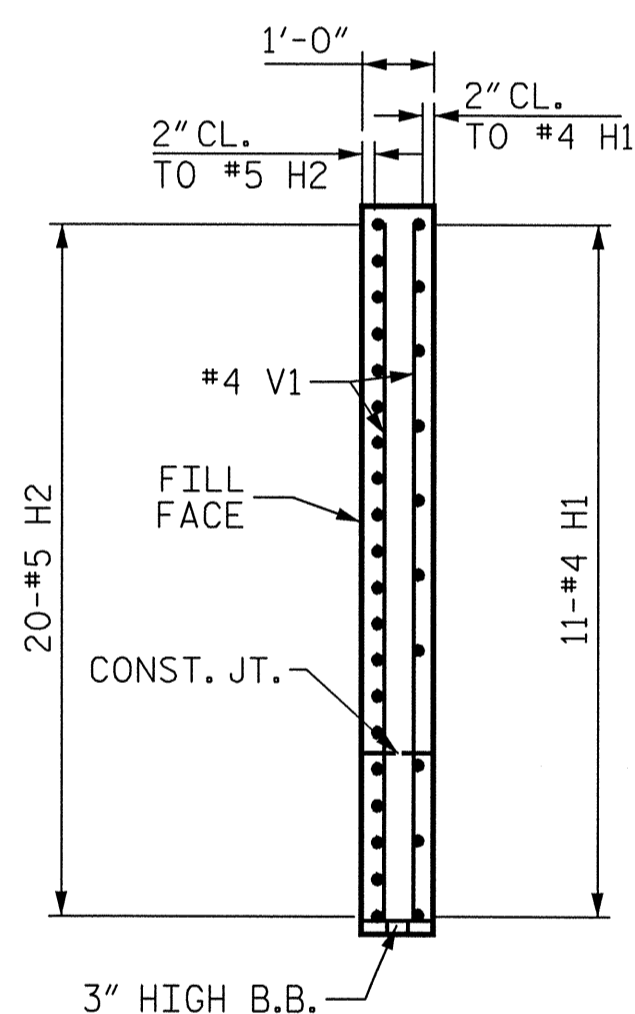
PLAN W2



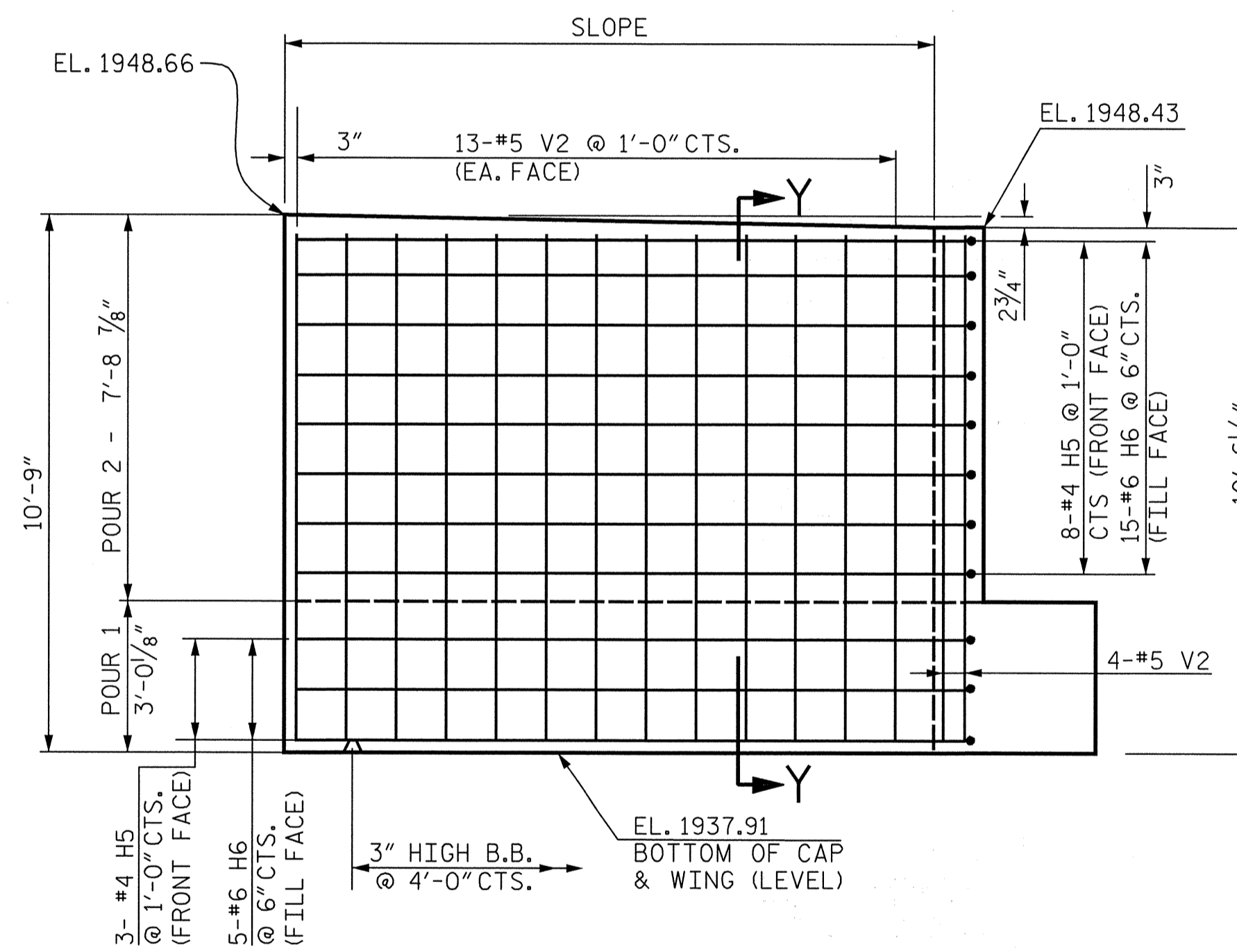
SECTION Z-Z



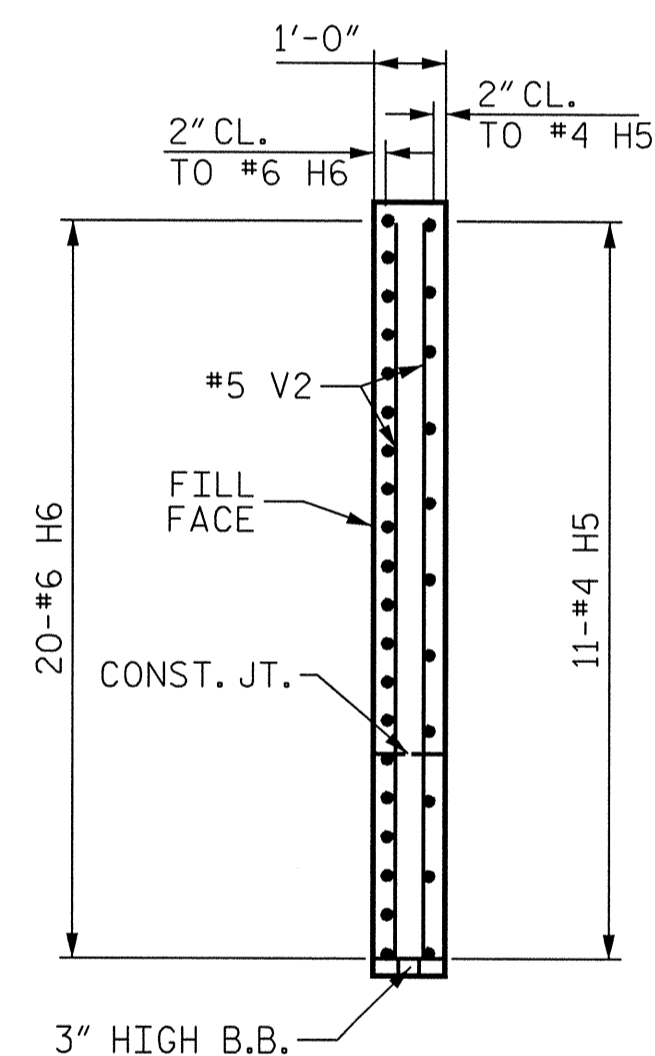
ELEVATION W1



SECTION X-X



ELEVATION W2



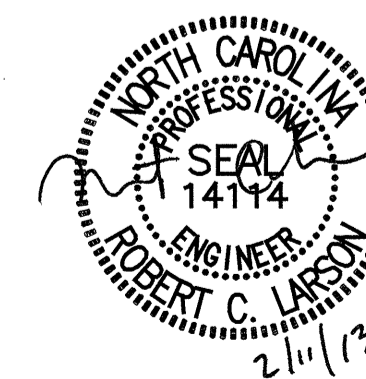
SECTION Y-Y

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1



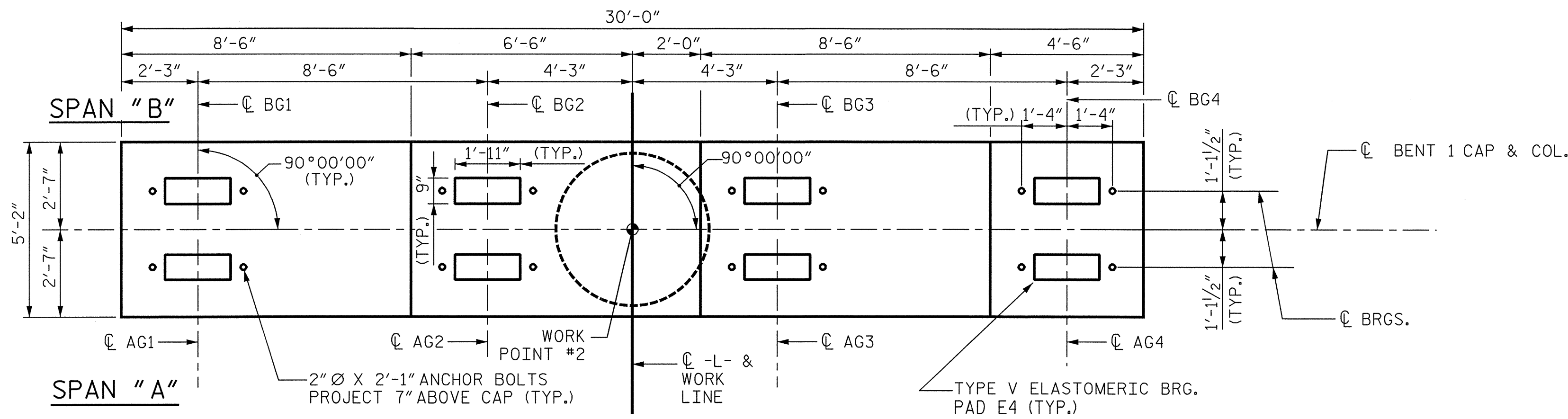
DESIGN ENGINEER OF RECORD: MC DATE: 2/11/13  
 DRAWN BY: R. J. FLORY DATE: 11/20/12  
 CHECKED BY: R. C. LARSON DATE: 11/14/12

KCI Associates  
 of North Carolina, P.A.  
 2000 LANTANA CENTER #  
 SUITE 200 RALEIGH, N.C. 27603  
 LICENSE NUMBER: 0-0784

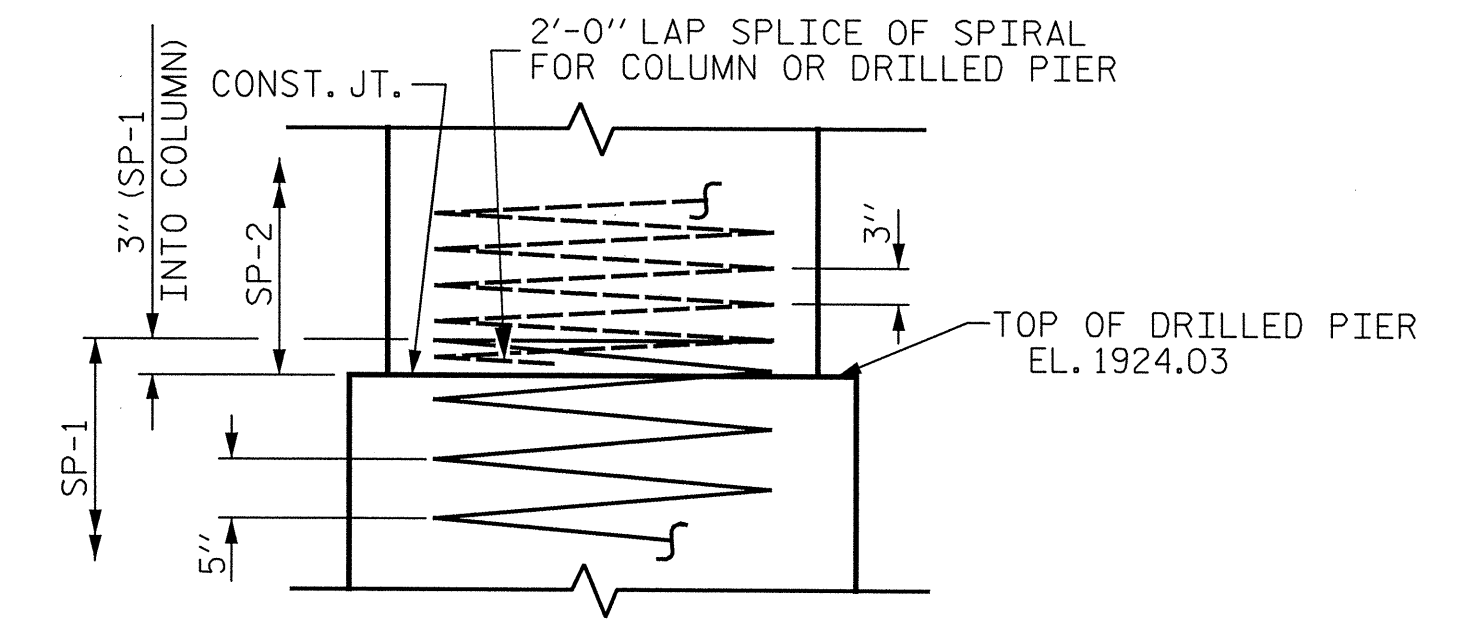
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 39

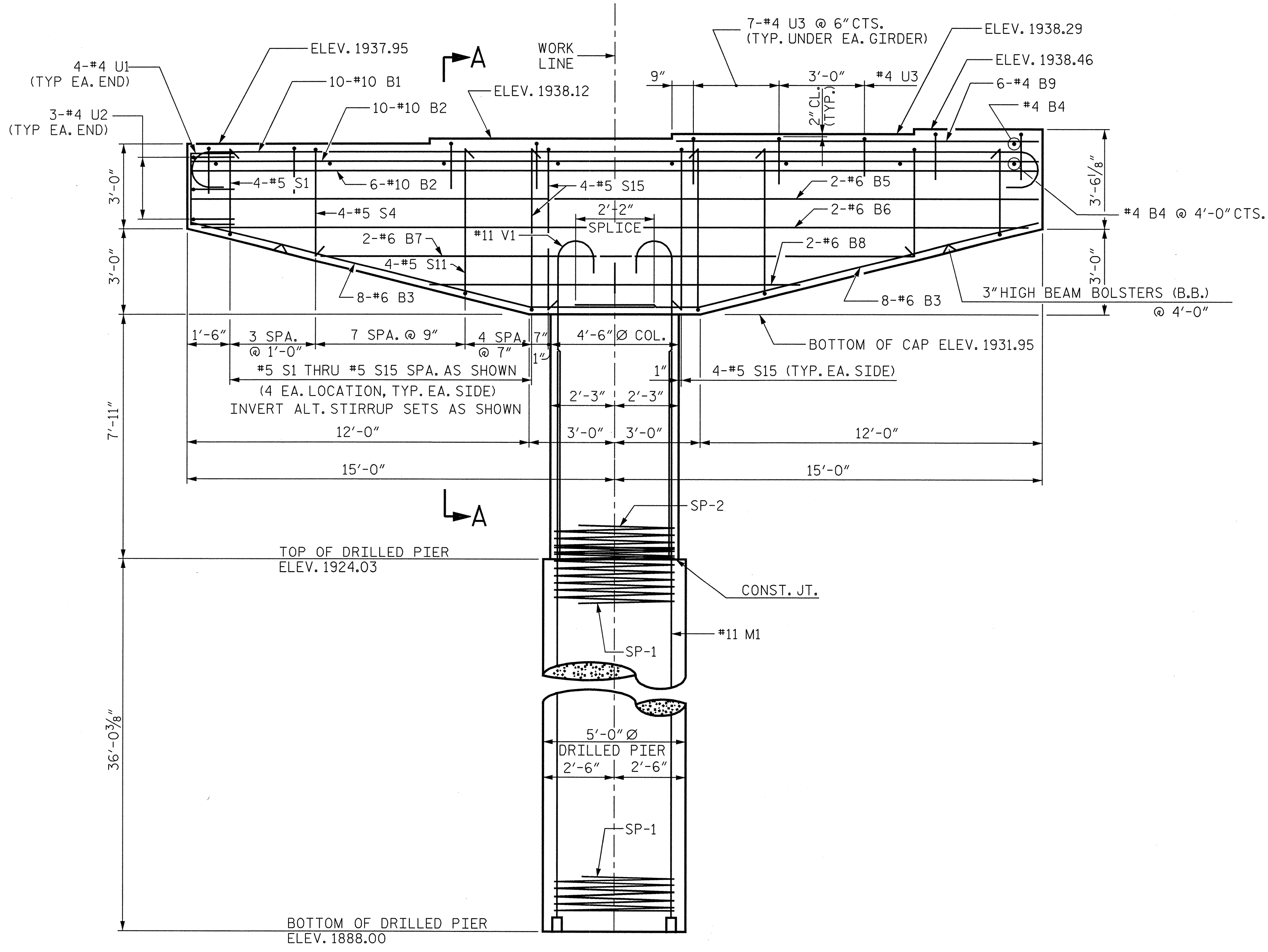
DWG. REF. NO. 24 OF 34



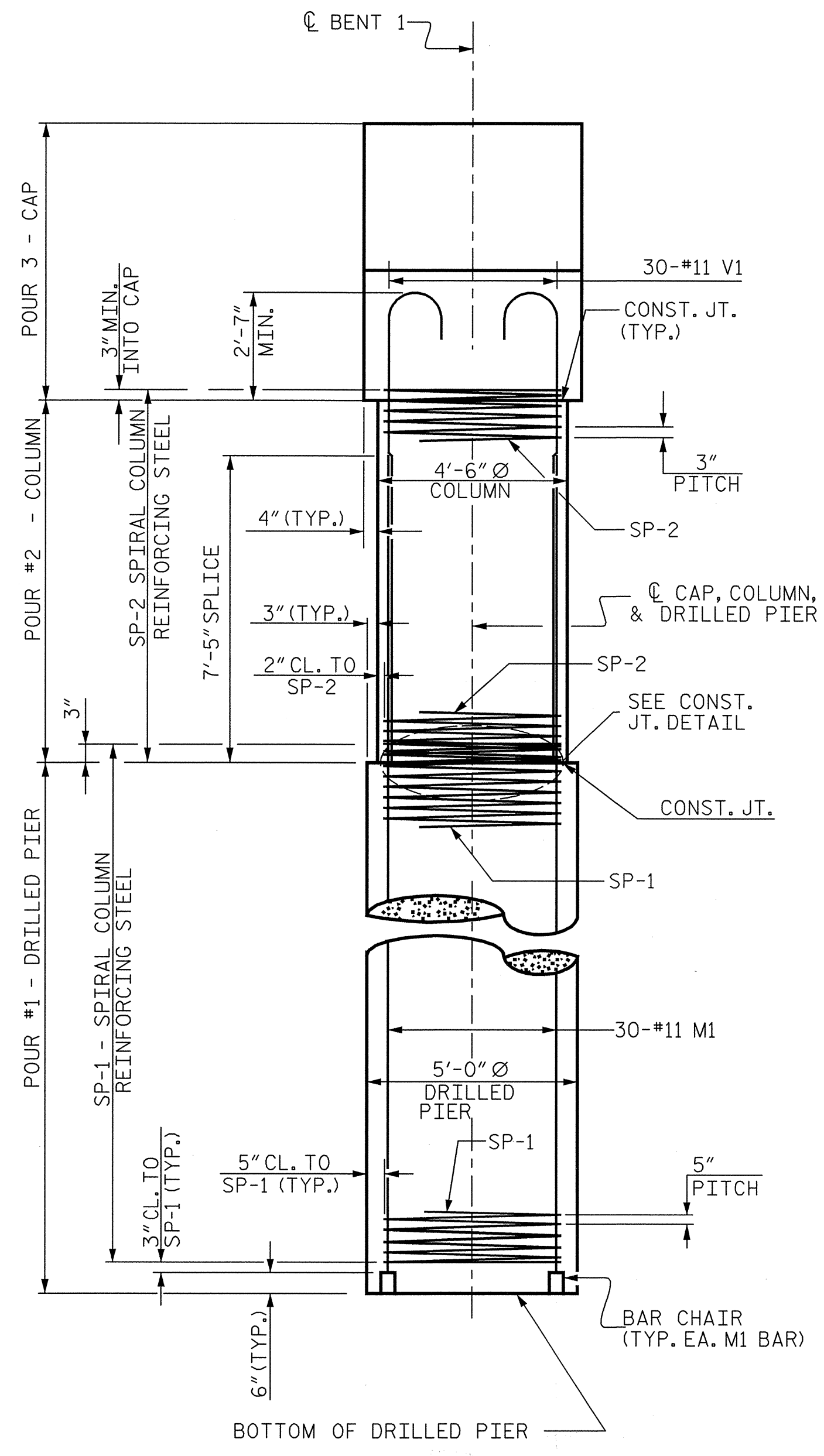
PLAN OF CAP



CONSTRUCTION JOINT DETAIL



ELEVATION

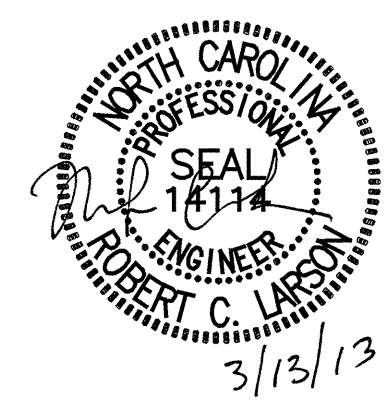


END ELEVATION

NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- DETAILED DRAWINGS FOR FALSEWORK AND FORMS FOR THIS BENT SHALL BE SUBMITTED. SEE SHEET SN.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-  
 SHEET 1 OF 2



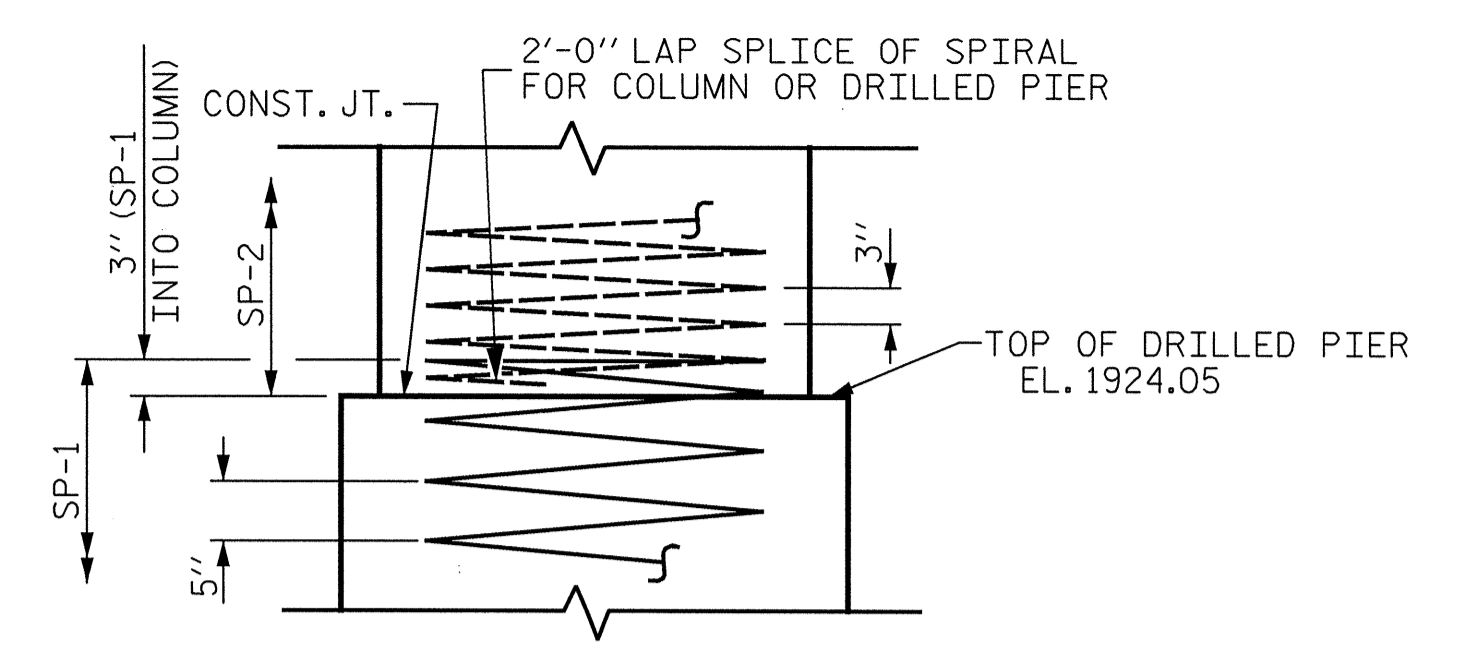
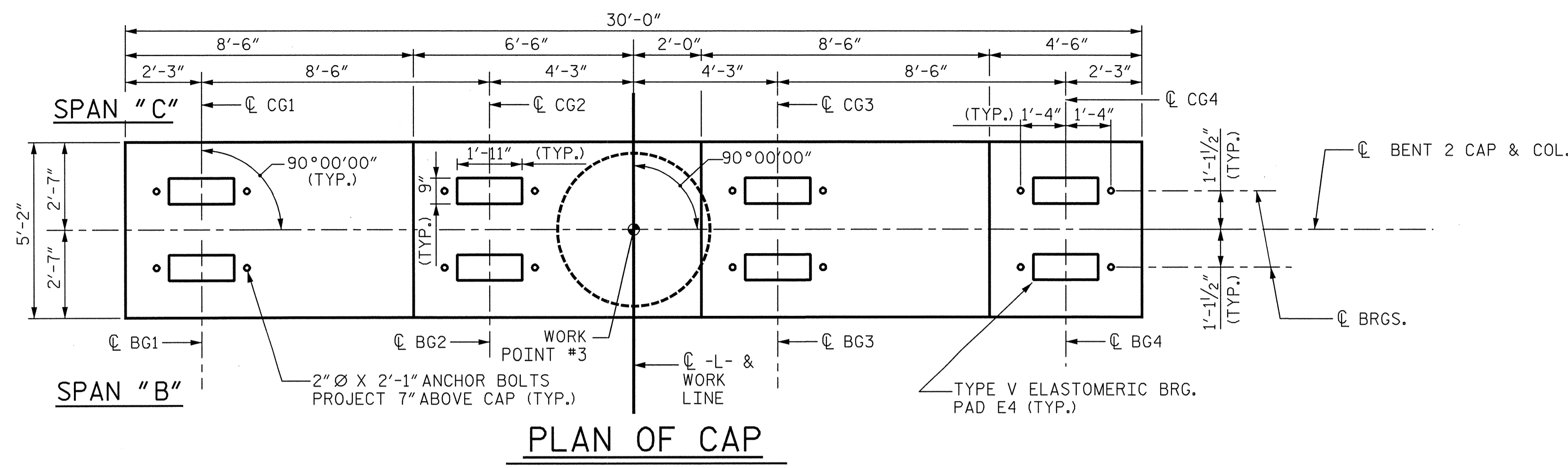
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE BENT 1	
REVISIONS			
NO.	BY:	DATE:	TOTAL SHEETS
1			37
2			
3			
4			

DESIGN ENGINEER OF RECORD: [Signature] DATE: 3/13/13  
 DRAWN BY: R. A. PRUETT DATE: 5/15/12  
 CHECKED BY: R. C. LARSON DATE: 11/29/12

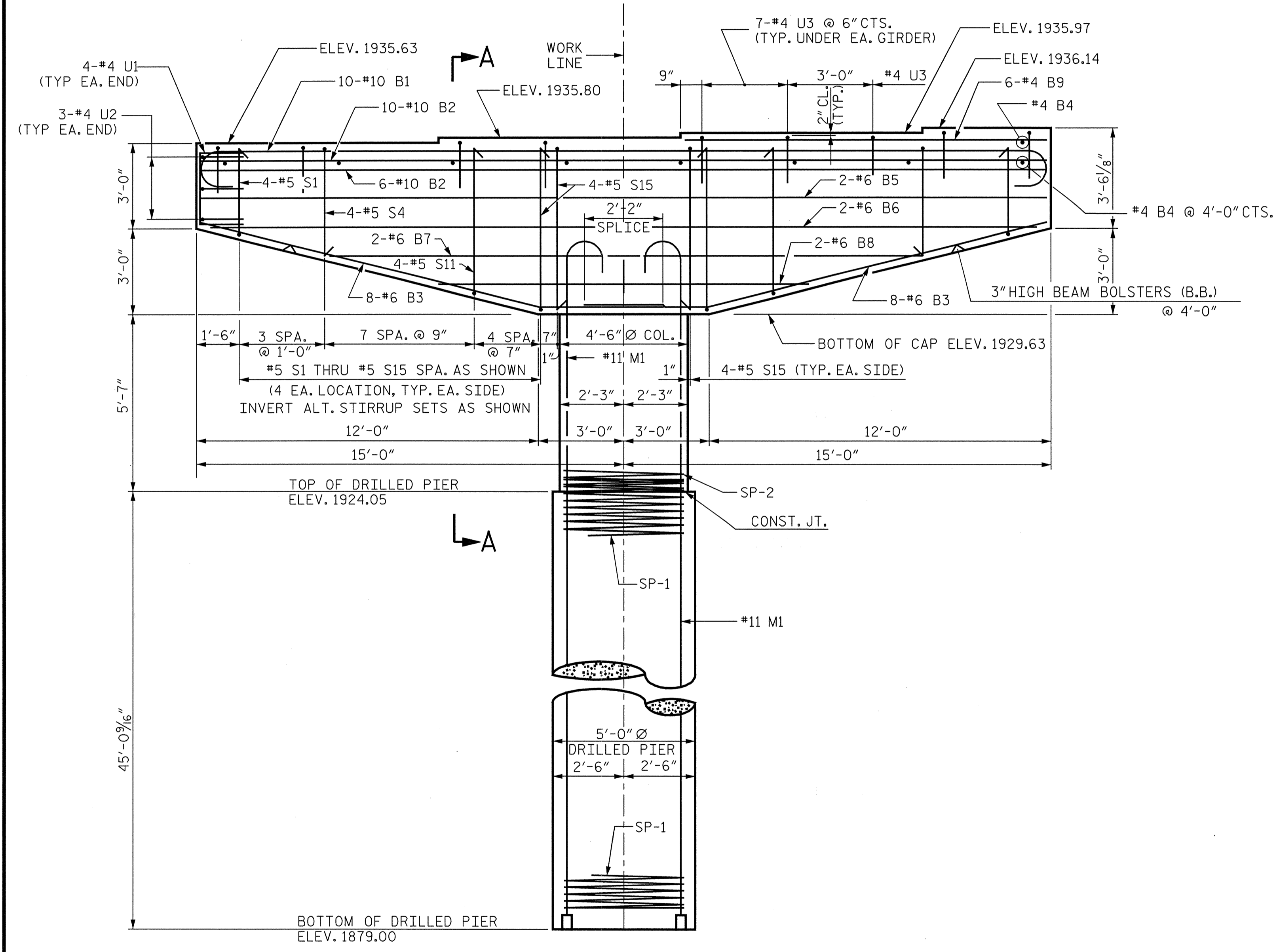
KCI Associates  
 of North Carolina, P.A.  
 200 LAMAR CENTER II  
 RALEIGH, NC 27601  
 DWG. REF. NO. 25 OF 34



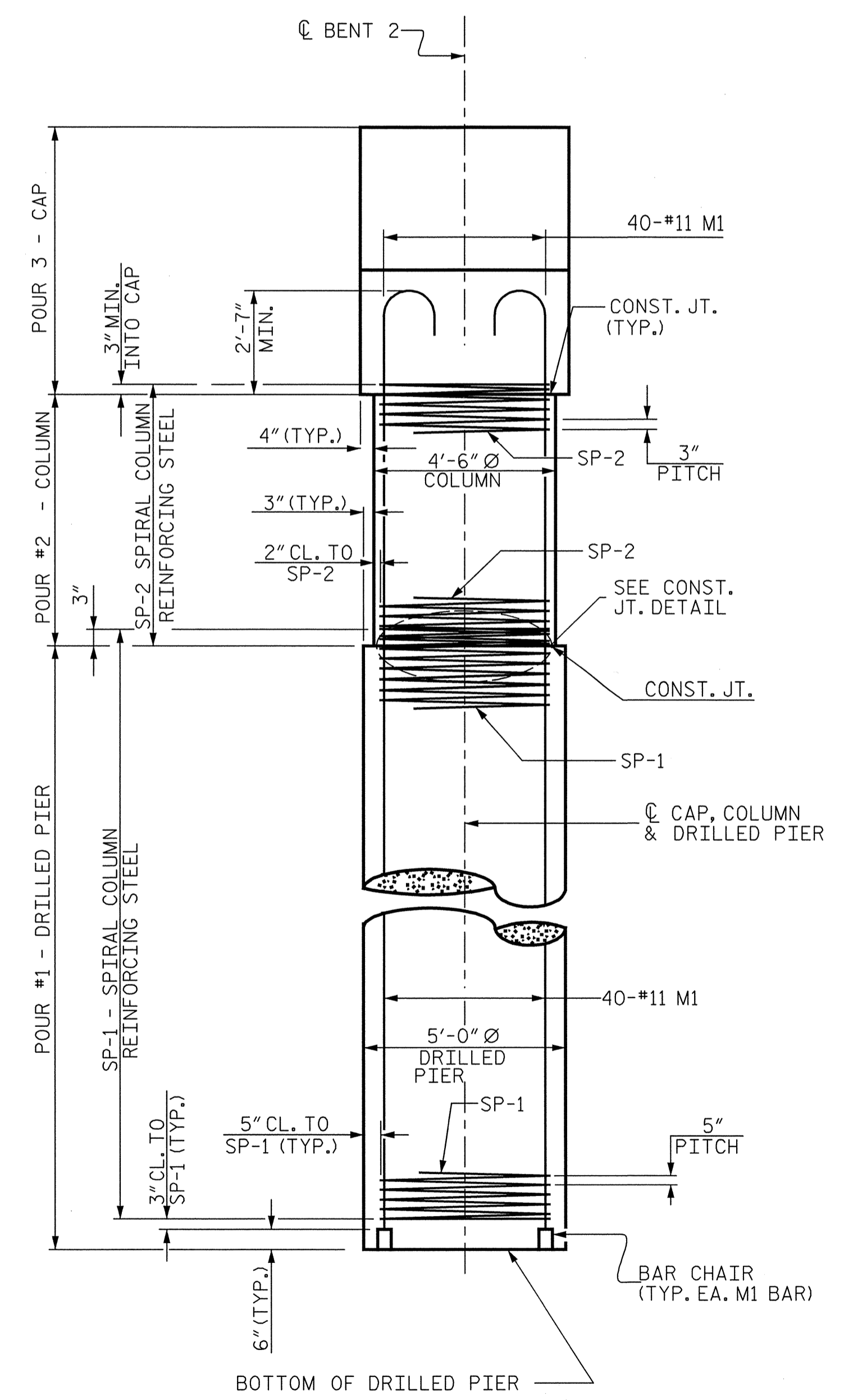




**CONSTRUCTION JOINT DETAIL**



**ELEVATION**



**END ELEVATION**

**NOTES**

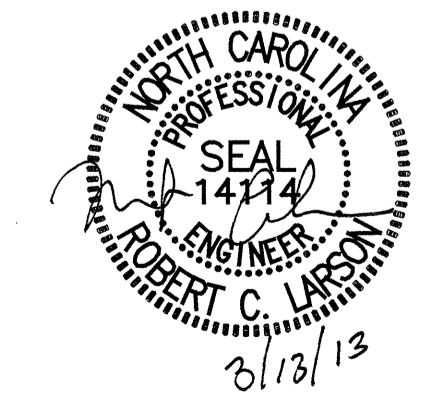
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- DETAILED DRAWINGS FOR FALSEWORK AND FORMS FOR THIS BENT SHALL BE SUBMITTED. SEE SHEET SN.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".
- SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIER WILL NOT BE PERMITTED.

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 BENT 2**

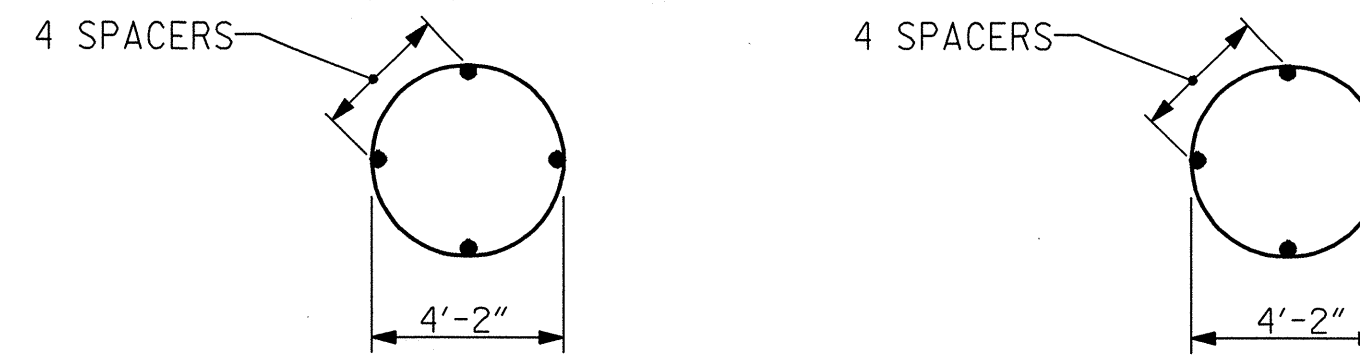
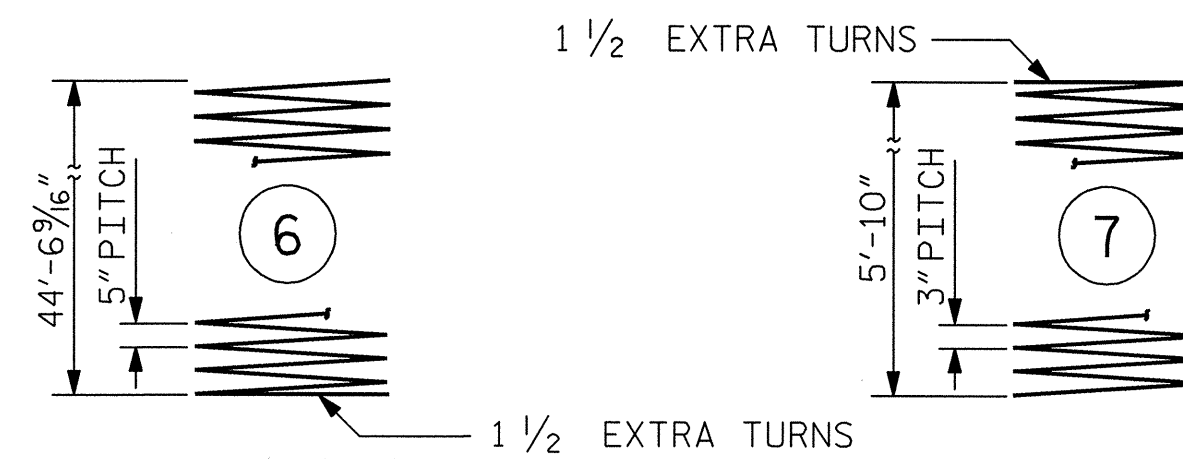
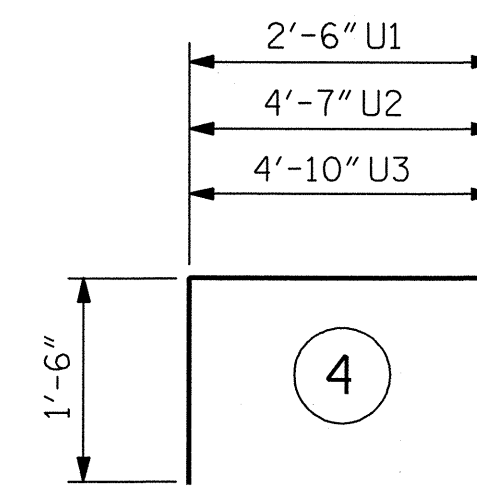
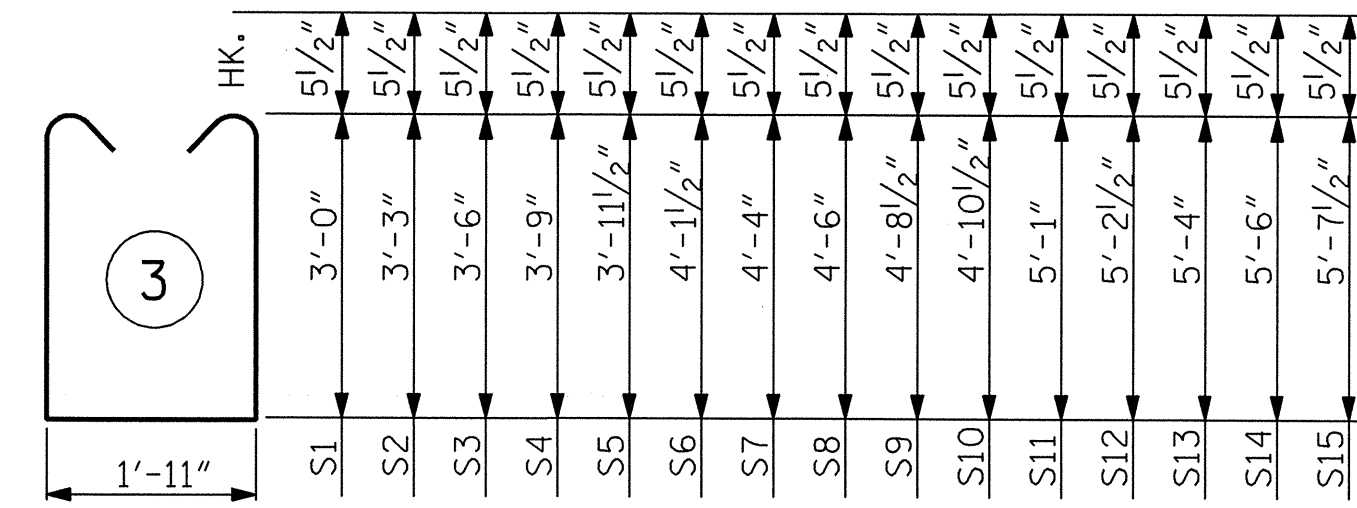
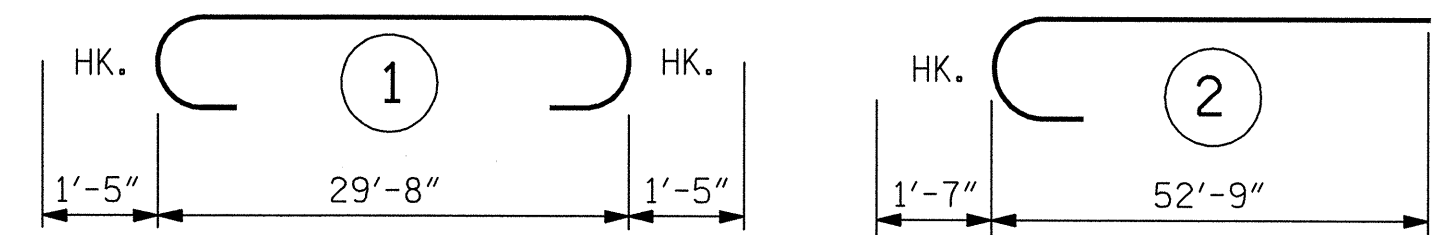


DESIGN ENGINEER OF RECORD: R. C. LARSON DATE: 3/13/12  
 DRAWN BY: R. C. LARSON DATE: 5/15/12  
 CHECKED BY: R. A. PRUETT DATE: 11/29/12

KCI Associates of North Carolina, P.A. REGISTERED PROFESSIONAL ENGINEERS LICENSED IN NORTH CAROLINA LICENSE NO. 14174	REVISIONS				SHEET NO. <b>6-27</b> TOTAL SHEETS <b>37</b>
	NO.	BY:	DATE:	NO.	
	1			3	
	2			4	

DWG. REF. NO. 27 OF 34

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

- \* 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.

BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	32'-6"	1398
B2	16	#10	STR.	29'-8"	2042
B3	16	#5	5	16'-3"	271
B4	9	#4	STR.	4'-10"	29
B5	2	#6	STR.	29'-8"	89
B6	2	#6	STR.	28'-7"	86
B7	2	#6	STR.	20'-7"	62
B8	2	#6	STR.	12'-7"	38
B9	6	#4	STR.	12'-8"	51
M1	40	#11	2	54'-4"	11,547
S1	8	#5	3	8'-10"	74
S2	8	#5	3	9'-4"	78
S3	8	#5	3	9'-10"	82
S4	8	#5	3	10'-4"	86
S5	8	#5	3	10'-9"	90
S6	8	#5	3	11'-1"	92
S7	8	#5	3	11'-6"	96
S8	8	#5	3	11'-10"	99
S9	8	#5	3	12'-3"	102
S10	8	#5	3	12'-7"	105
S11	8	#5	3	13'-0"	108
S12	8	#5	3	13'-3"	111
S13	8	#5	3	13'-6"	113
S14	8	#5	3	13'-10"	115
S15	16	#5	3	14'-1"	235
U1	8	#4	4	5'-6"	29
U2	6	#4	4	7'-7"	30
U3	29	#4	4	7'-10"	152

SP-1	1	*	6	1402'-1"	1462
SP-2	1	**	7	321'-11"	215

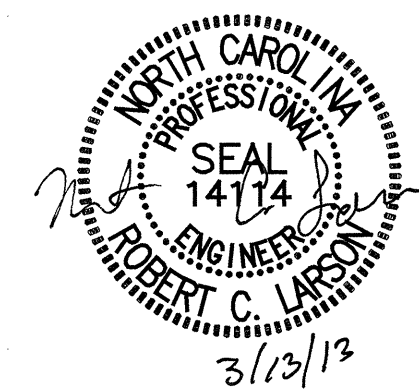
REINFORCING STEEL, LBS.	17,410
SPIRAL COLUMN REINFORCING STEEL, LBS.	1677
CLASS "A" CONCRETE, C.Y.	
POUR 2	3.3
POUR 3	28.8
TOTAL	32.1
5'-0" Ø DRILLED PIER IN SOIL, LF	32
5'-0" Ø DRILLED PIER NOT IN SOIL, LF	13
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIER, LF	23
SID INSPECTION, EA.	1
SPT TESTING, EA.	
CSL TESTING, EA.	
CSL TUBES, LF	233
DRILLED PIER CONCRETE, CY	32.8

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 2

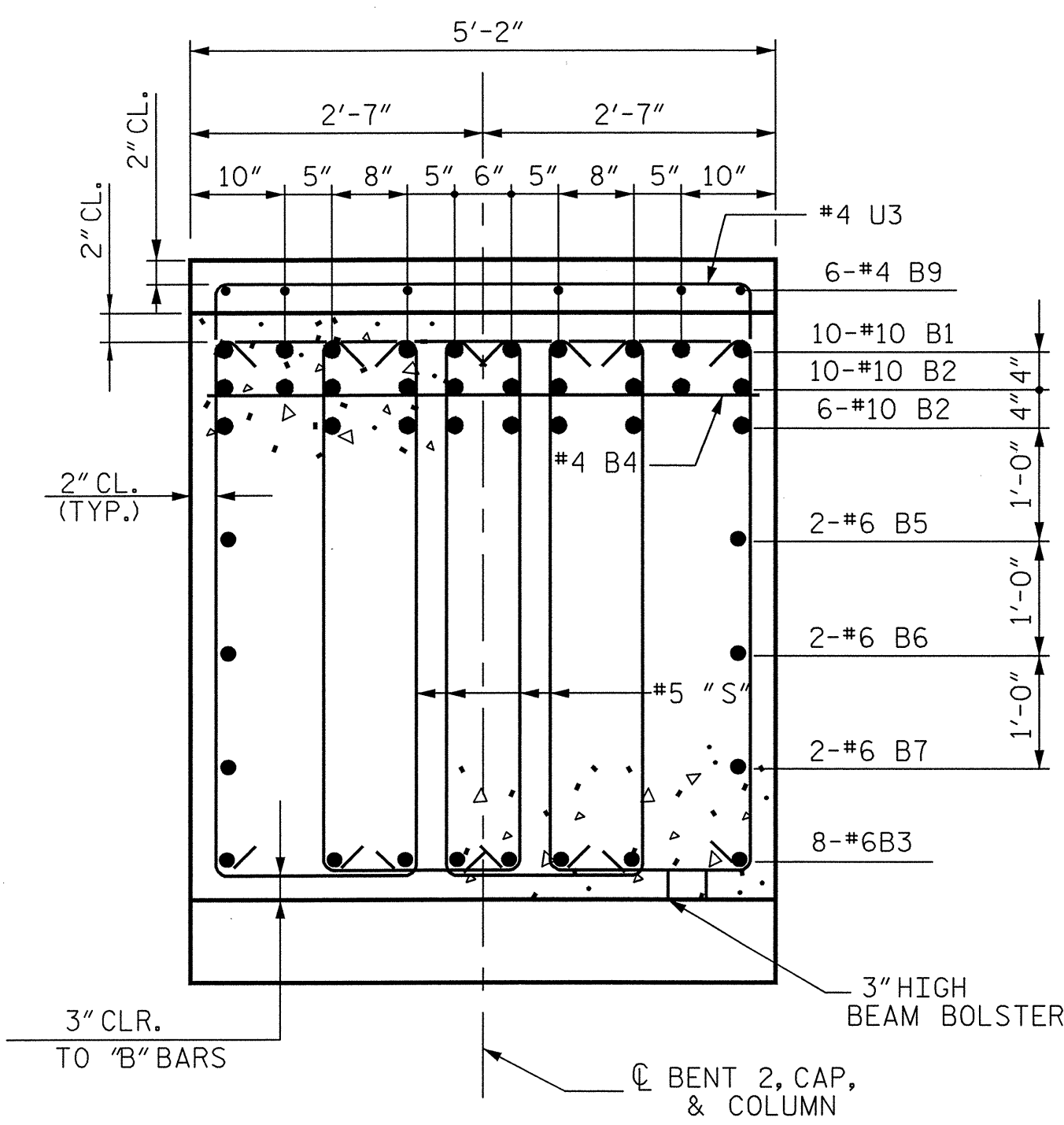
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 2

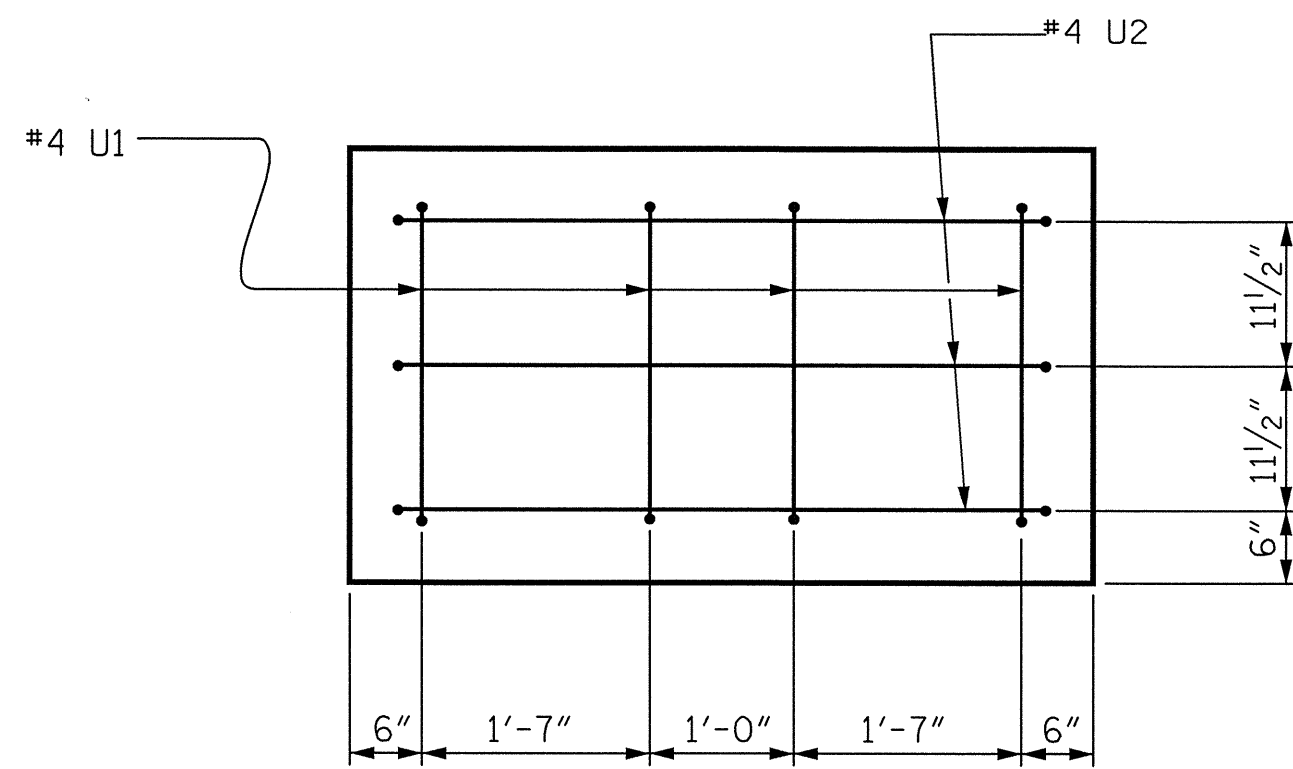


KCI Associates  
 of North Carolina, P.A.  
 ENGINEERS AND ARCHITECTS  
 200 S. LANTANA CENTER  
 RALEIGH, NC 27601-3000  
 DWG. REF. NO. 28 OF 34

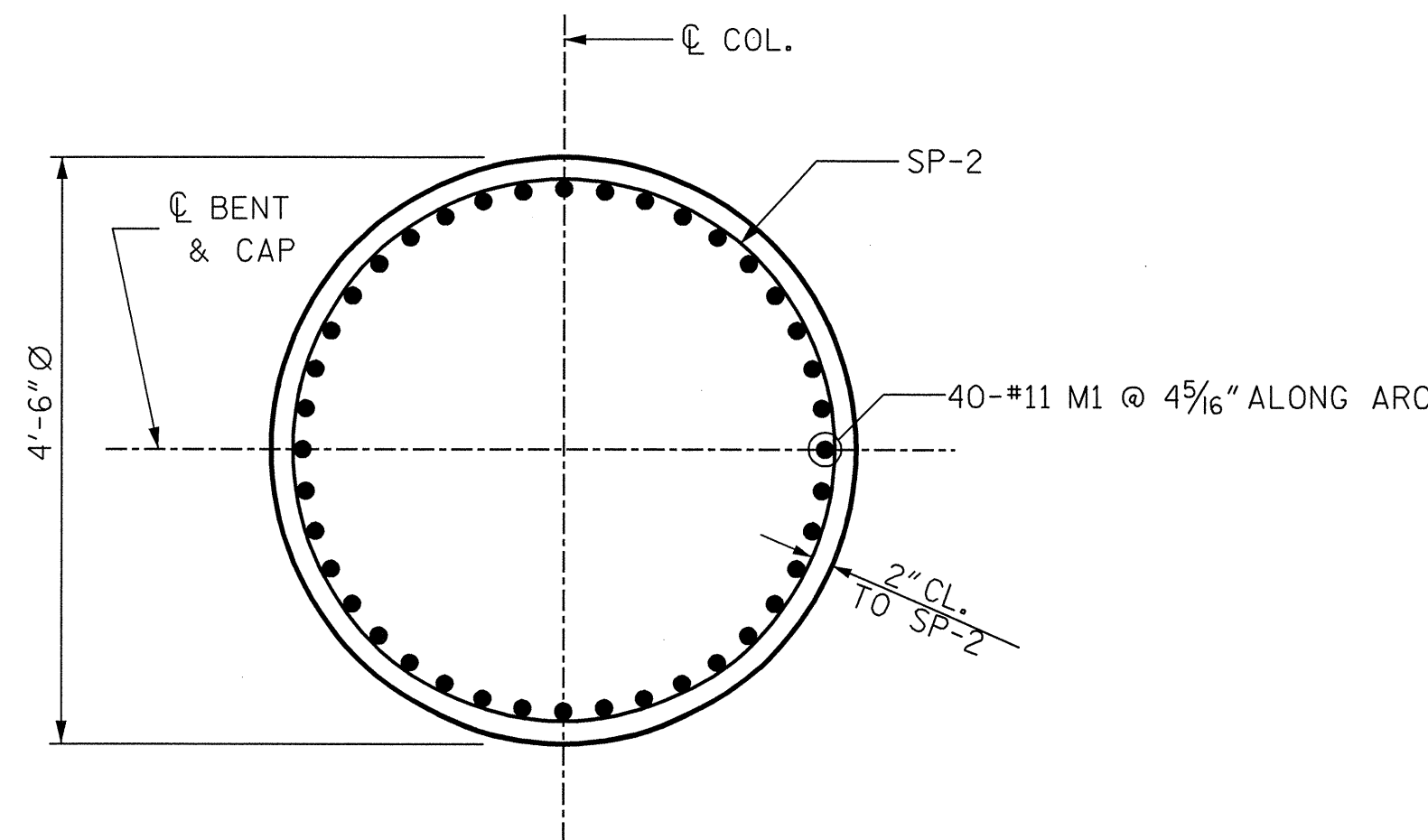
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-28
2			4			39



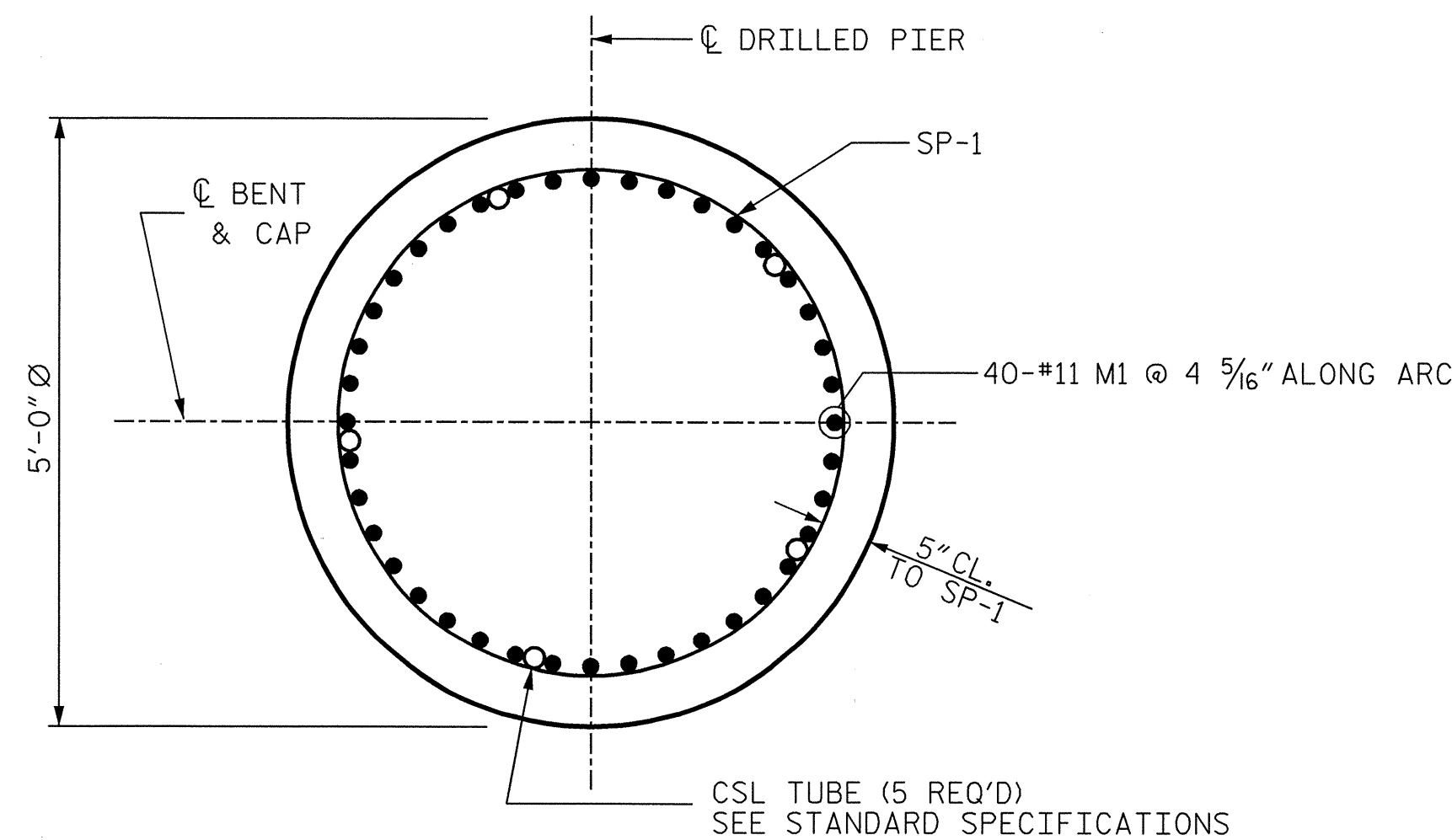
SECTION A-A



END OF CAP VIEW  
 (TYP. EA. END)

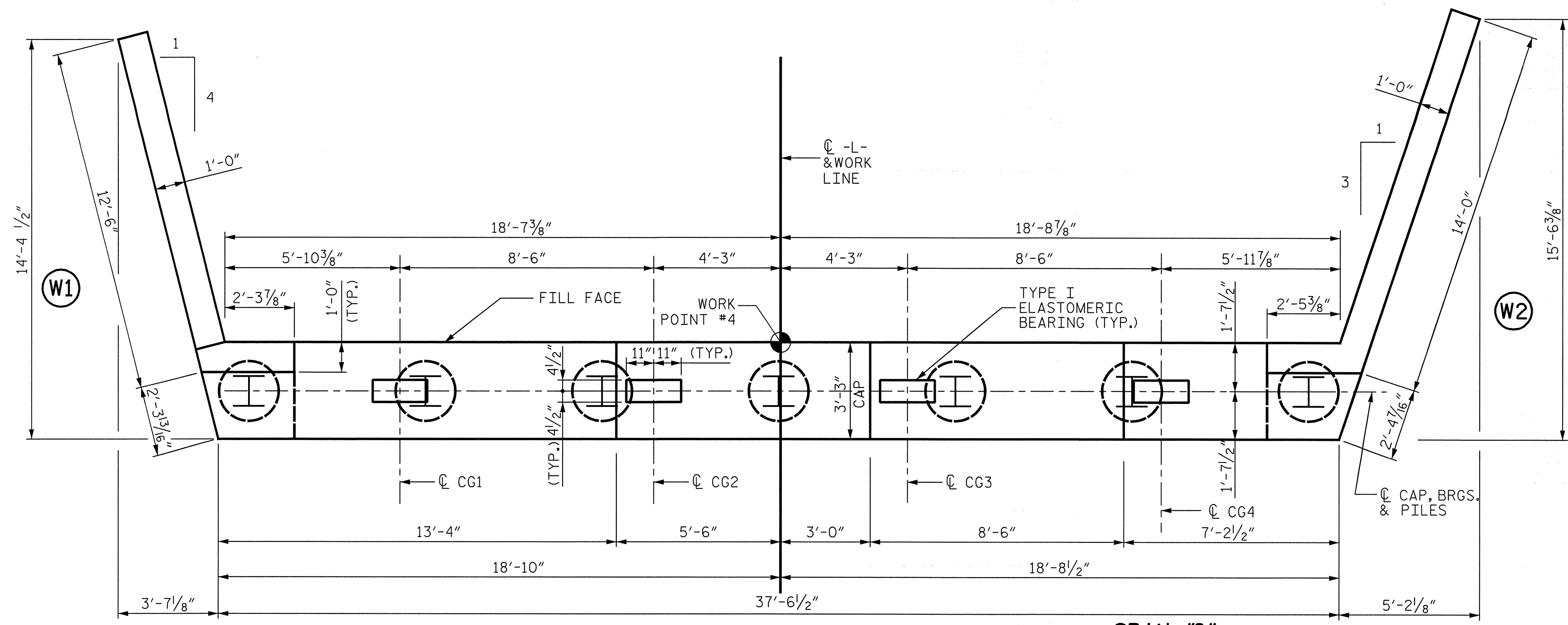


SECTION THRU COLUMN



SECTION THRU DRILLED PIER

DESIGN ENGINEER OF RECORD: R. C. Larson DATE: 3/13/13  
 DRAWN BY: R. C. Larson DATE: 5/15/12  
 CHECKED BY: R. A. PRUETT DATE: 11/29/12



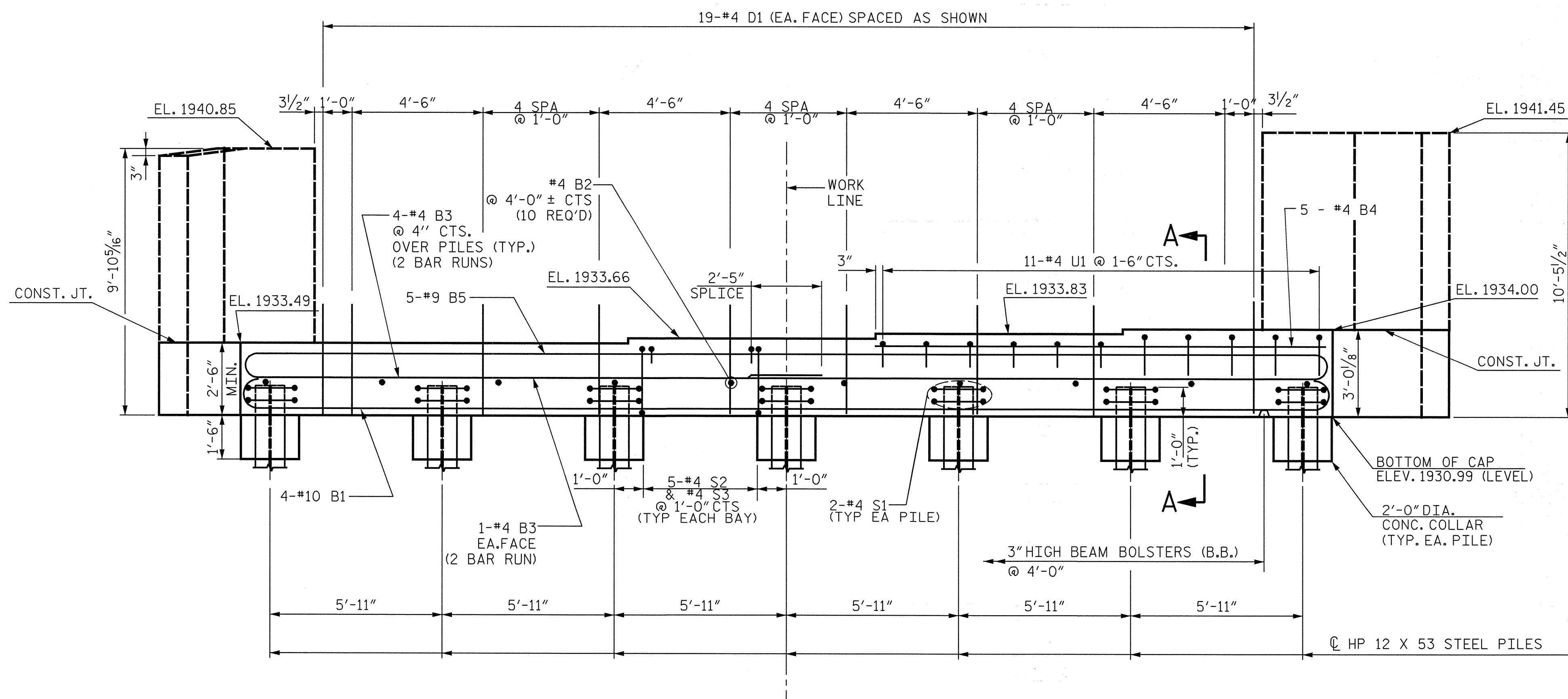
NOTES

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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.

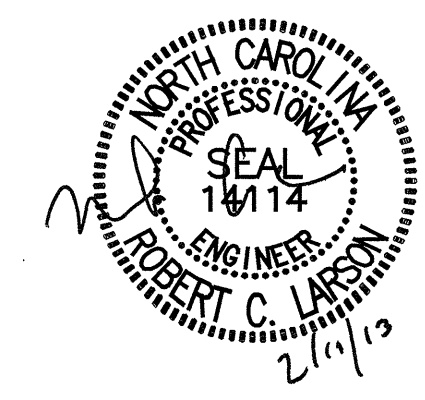
THE PORTIONS OF THE WINGS ABOVE THE CONSTRUCTION JOINT ARE TO BE POURED WITH THE SUPERSTRUCTURE. AT THE CONTRACTORS OPTION, THESE PORTIONS MAY BE POURED SEPARATELY FROM THE SUPERSTRUCTURE, IN WHICH CASE CLASS 'A' CONCRETE MAY BE USED.

FOR "TEMPORARY DRAINAGE AT END BENT" SEE END BENT 1.

FOR "PILE SPLICE DETAILS" SEE END BENT 1.



PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-  
 SHEET 1 OF 3

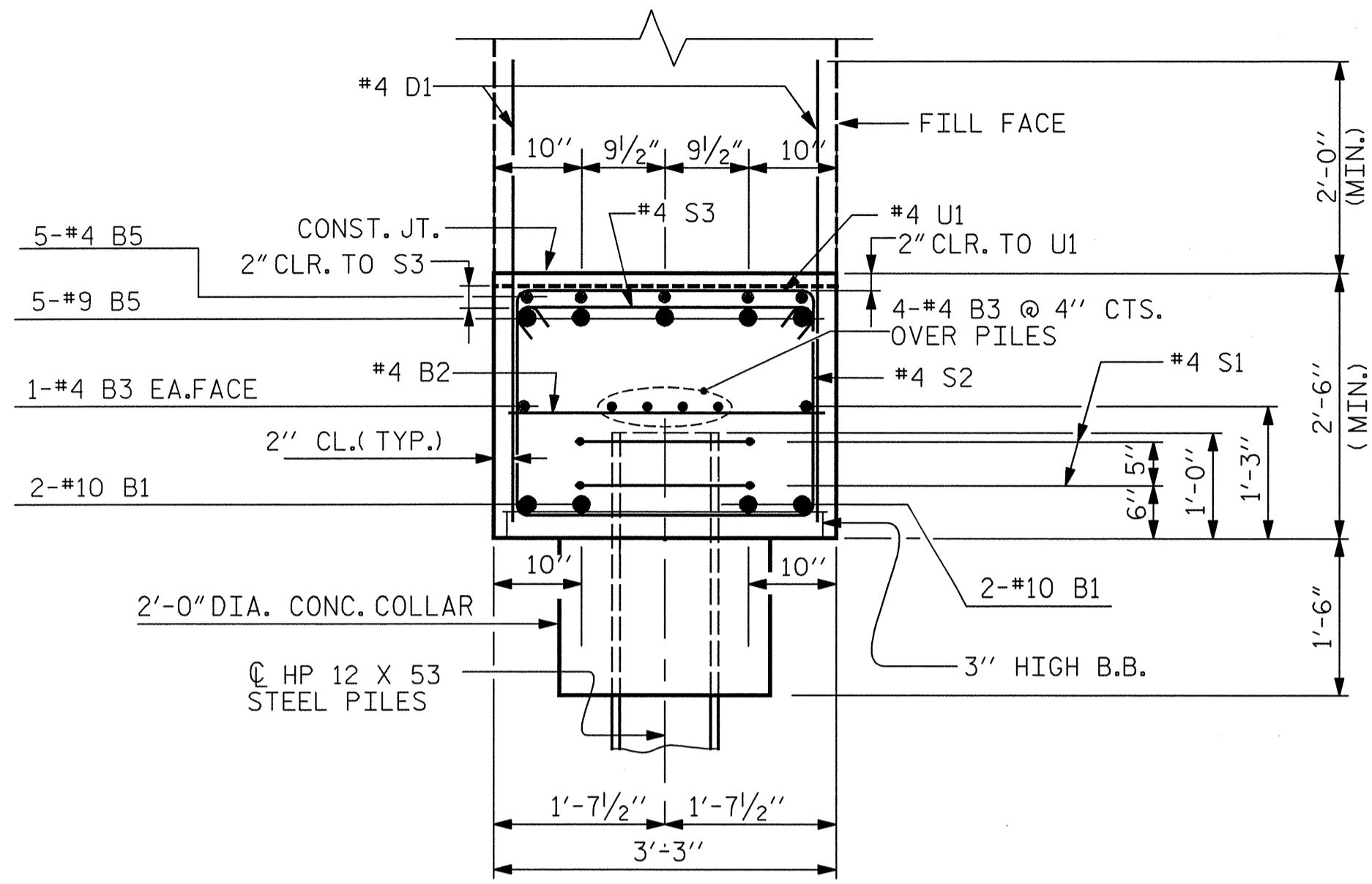


STATE OF NORTH CAROLINA		DEPARTMENT OF TRANSPORTATION		RALEIGH	
<b>SUBSTRUCTURE END BENT 2</b>					
SHEET NO. <u>5-29</u>					
TOTAL SHEETS <u>39</u>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

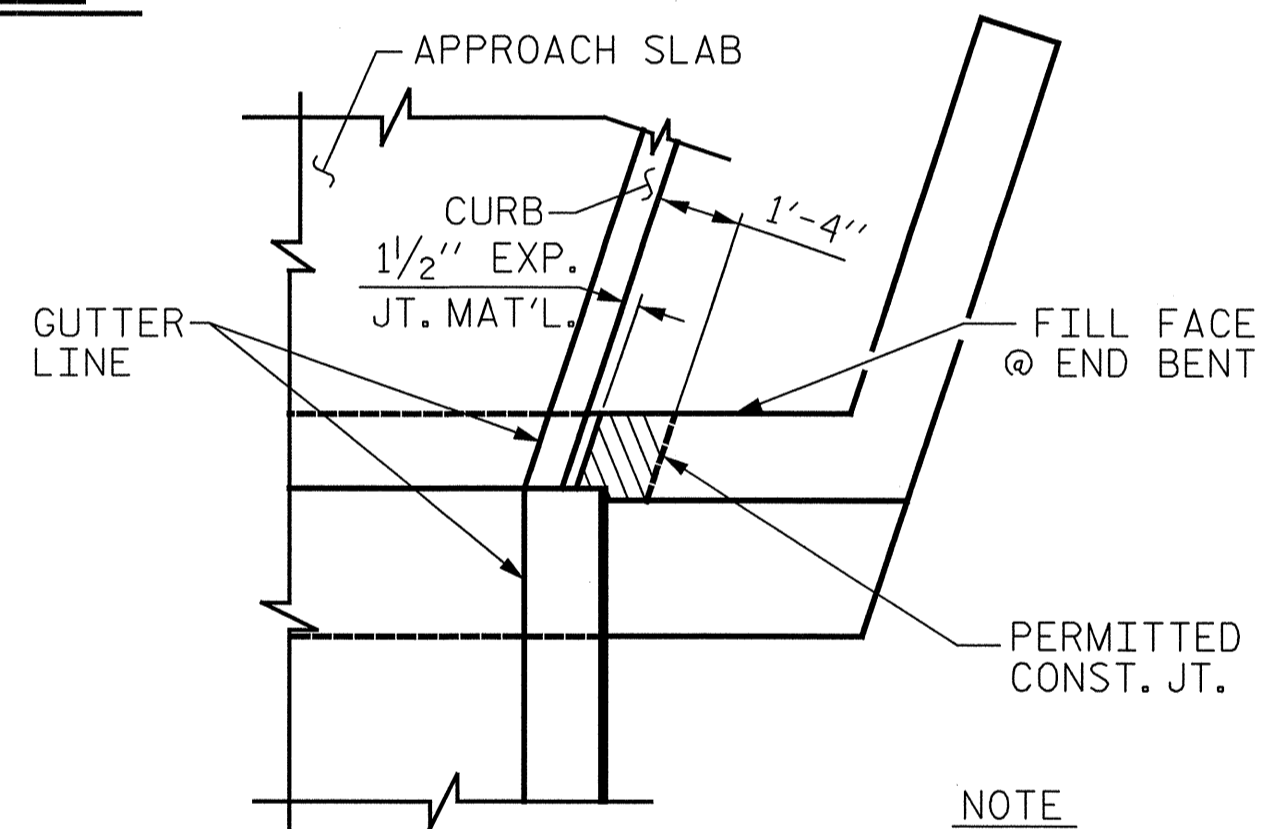
DESIGN ENGINEER OF RECORD: Robert C. Larson DATE: 2/6/13  
 DRAWN BY: R. J. FLORY DATE: 12/03/12  
 CHECKED BY: R. C. LARSON DATE: 12/12/12

KCI Associates of North Carolina, P.A. STATE 2012 LICENSE CENTER # 40025 FUNDING NO. 14714  
 RALEIGH, N.C. 27601-2000  
 LICENSE NUMBER 0-0714  
 DWG. REF. NO. 29 OF 34





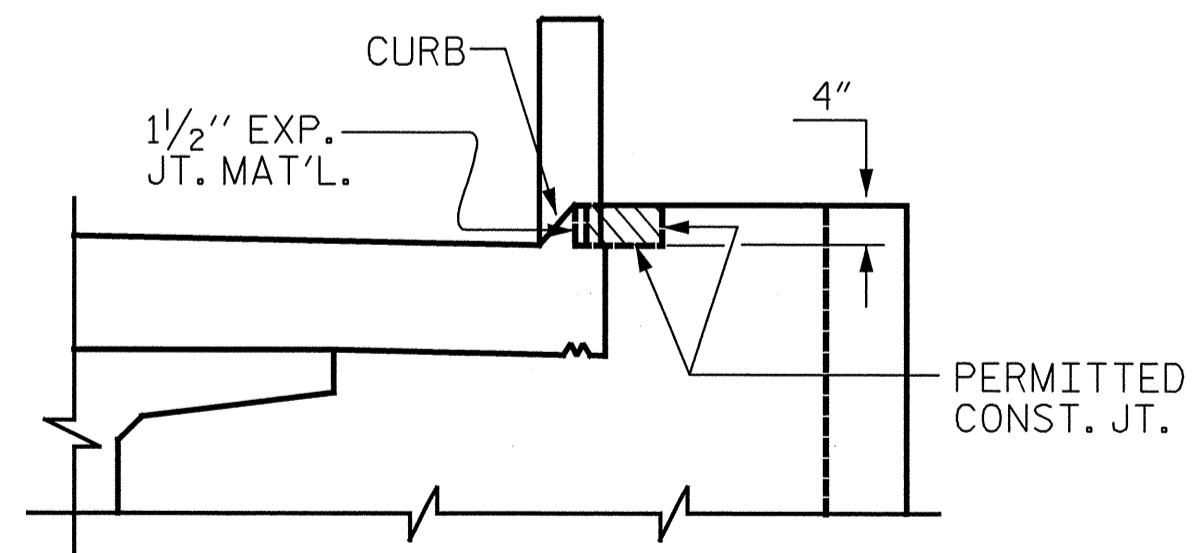
SECTION A-A



PLAN

NOTE

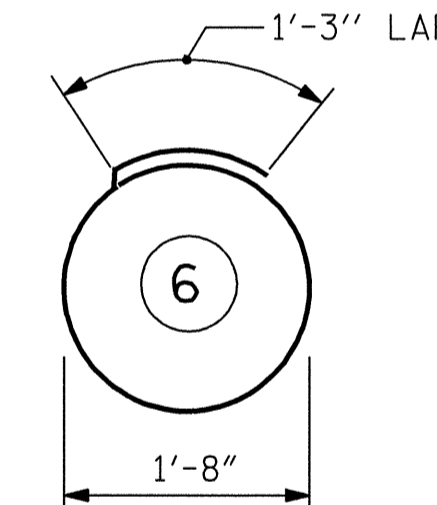
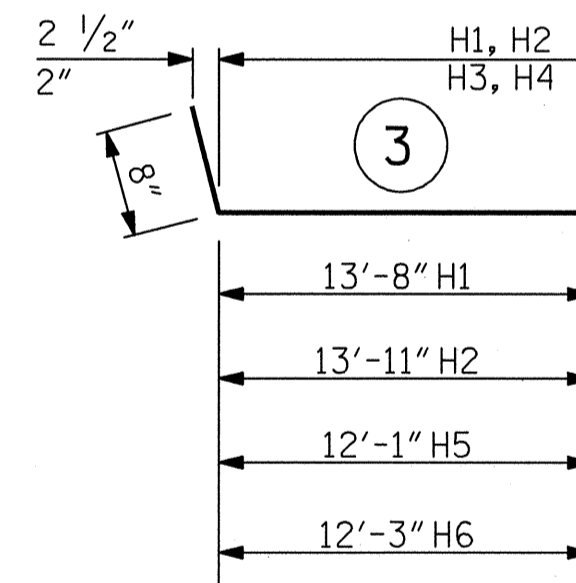
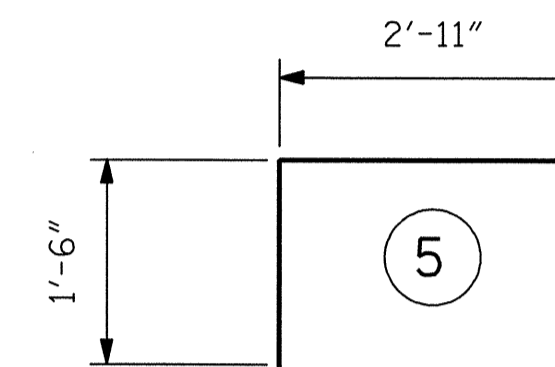
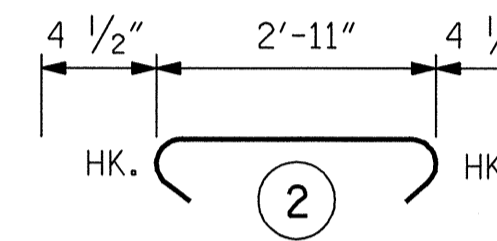
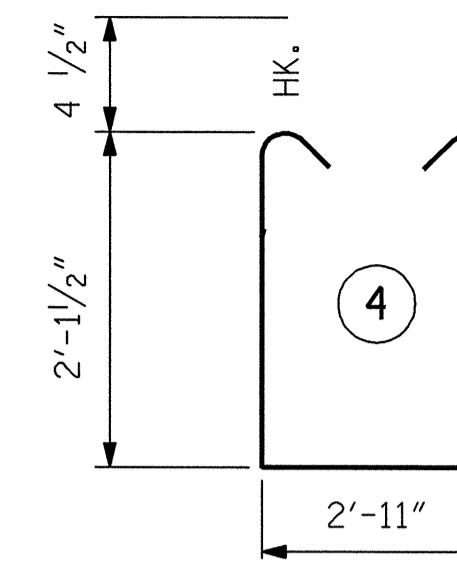
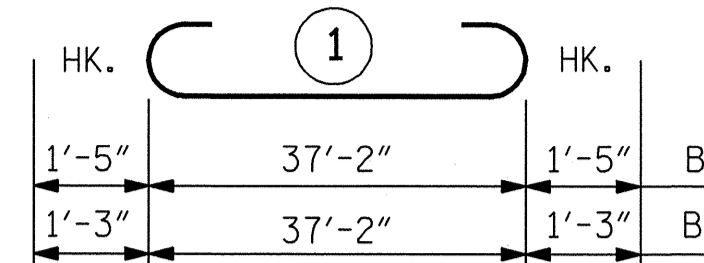
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.



ELEVATION

BLOCKOUT IN WING WALL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	10	1	40'-0"	688
B2	10	4	STR.	2'-11"	19
B3	12	4	STR.	16'-3"	130
B4	5	4	STR.	15'-4"	51
B5	5	9	1	39'-8"	674
D1	38	4	STR.	4'-10"	123
H1	11	4	3	14'-4"	105
H2	20	6	3	14'-7"	438
H3	8	4	STR.	2'-10"	15
H4	10	4	STR.	5'-7"	37
H5	10	4	3	12'-9"	85
H6	19	5	3	12'-11"	256
S1	14	4	6	6'-4"	59
S2	30	4	4	7'-11"	159
S3	30	4	2	3'-8"	73
U1	11	4	5	5'-11"	43
V1	34	5	STR.	10'-1"	358
V2	30	4	STR.	9'-3"	185

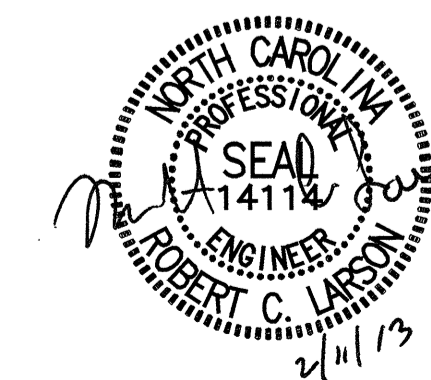
REINFORCING STEEL, LB	3498
CLASS A CONCRETE, CY (POUR 1)	16.3
(POUR 2 INCLUDED IN SUPERSTRUCTURE)	
HP 12X53 STEEL PILES	NO. 7
	LF 70
PILE EXCAVATION NOT IN SOIL L.F.	35

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2

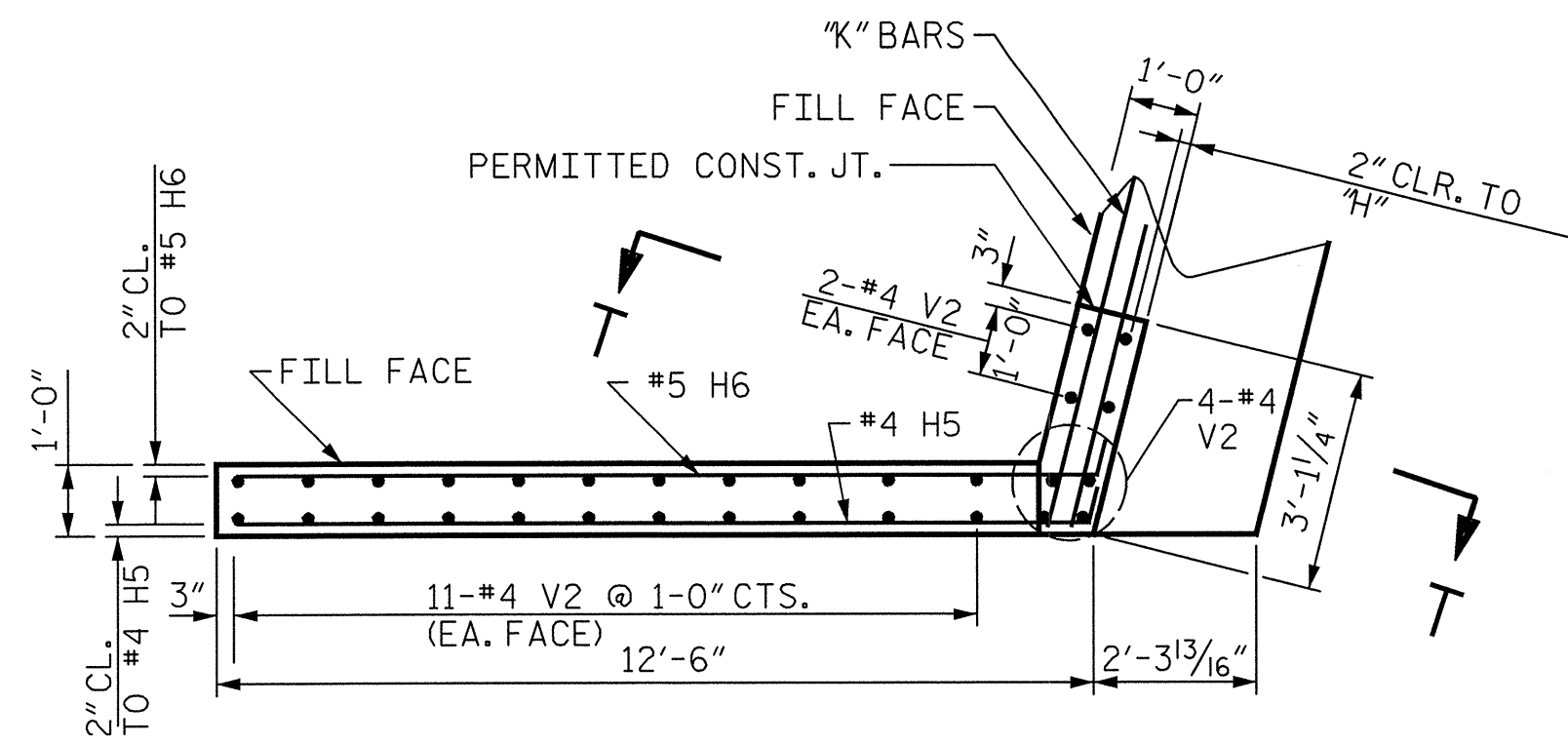


DESIGN ENGINEER OF RECORD: mlt DATE: 2/1/12  
 DRAWN BY: R. J. FLORY DATE: 12/03/12  
 CHECKED BY: R. C. LARSON DATE: 12/12/12

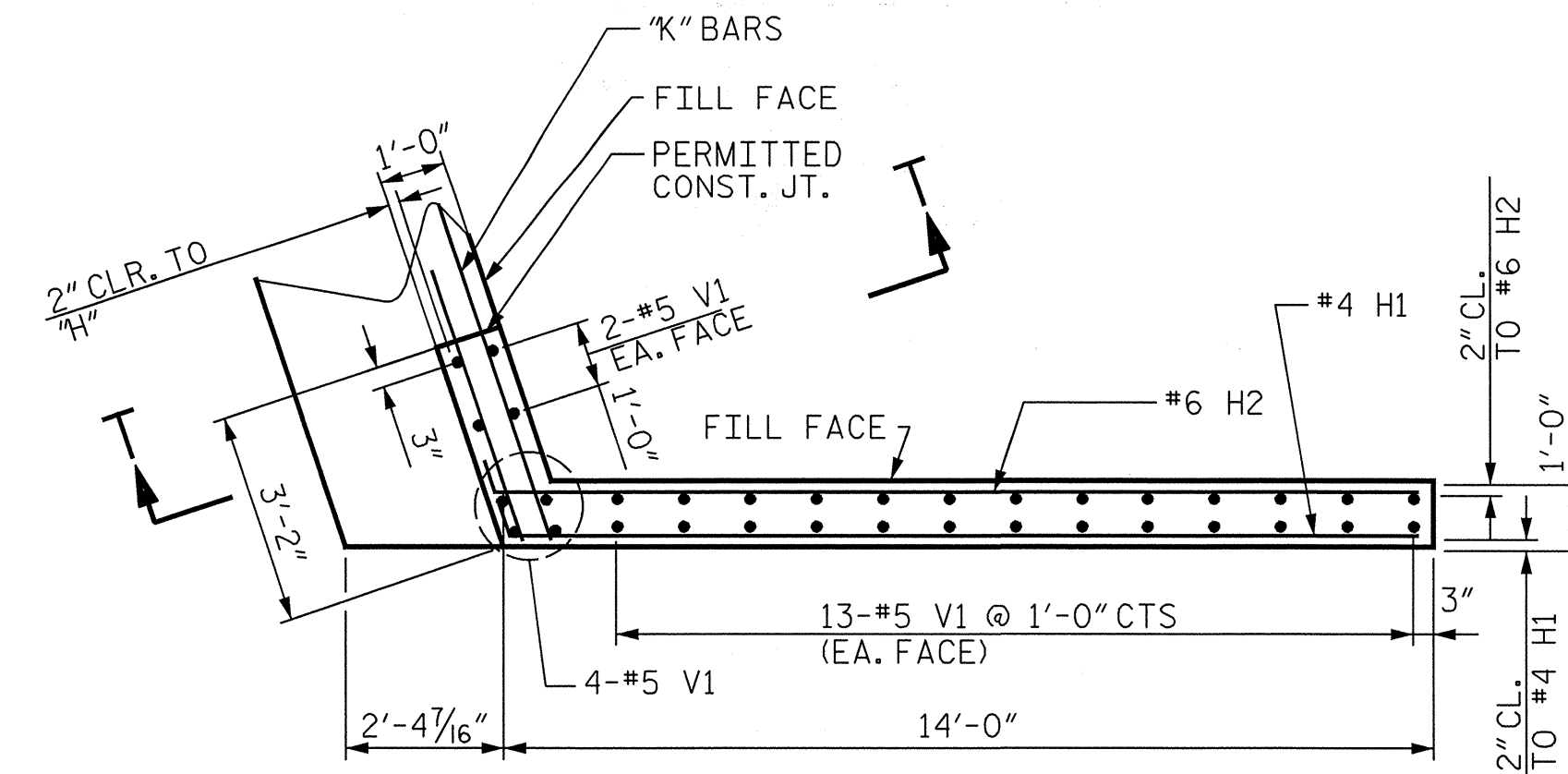
KCI Associates  
 a North Carolina, P.A. DATE 200 LANDMARK CENTER #  
 RALEIGH OFFICE 14114 RALEIGH, N.C. 27603  
 LICENSE NUMBER 0-0154

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			39
2			4			

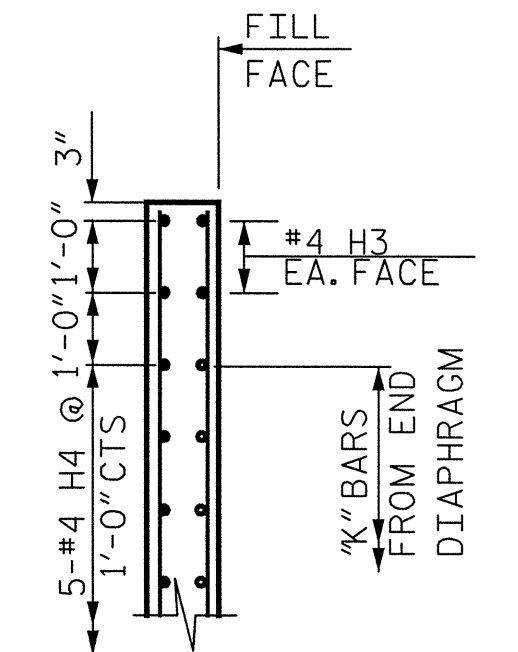
DWG. REF. NO. 30 OF 34



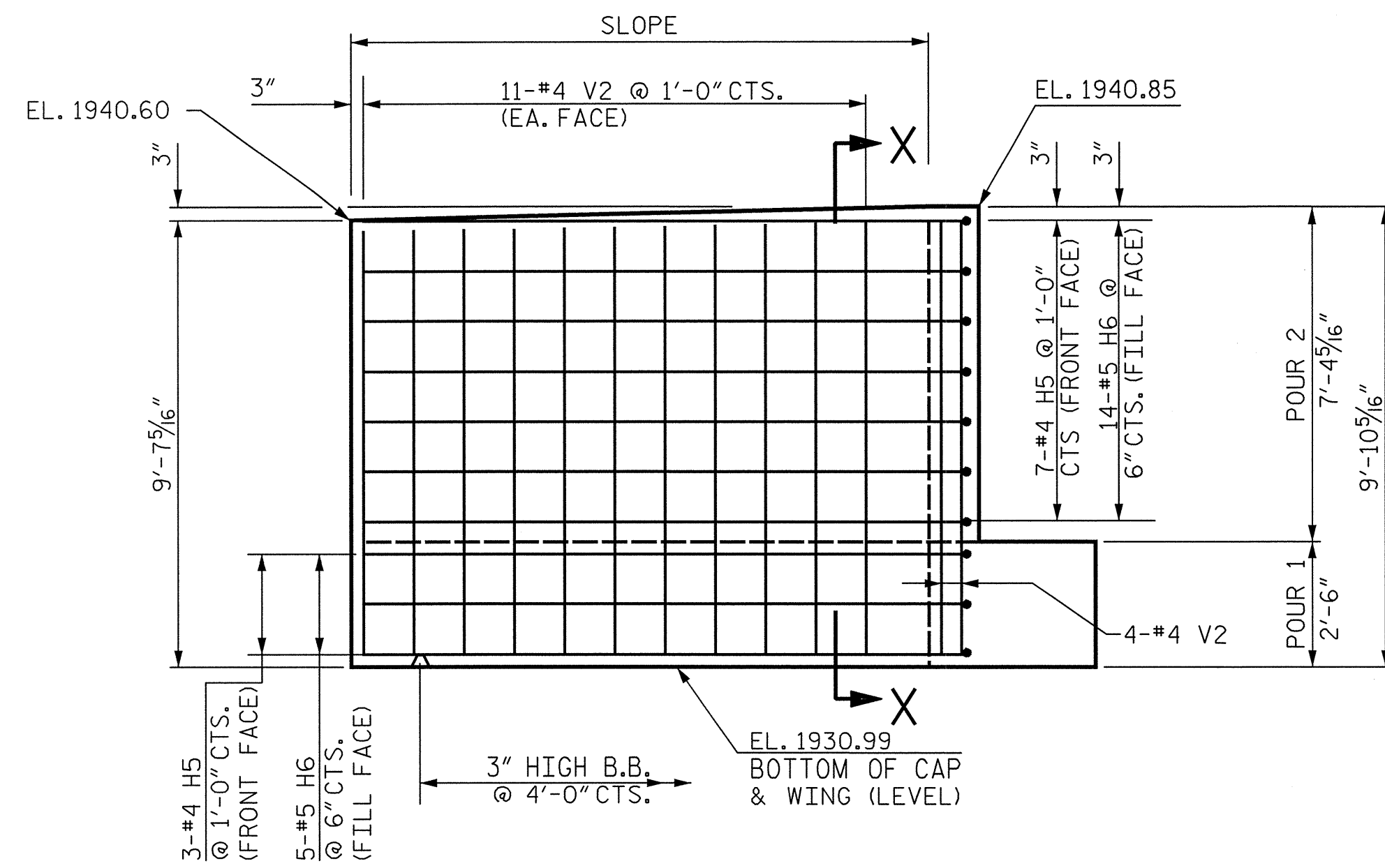
PLAN W1



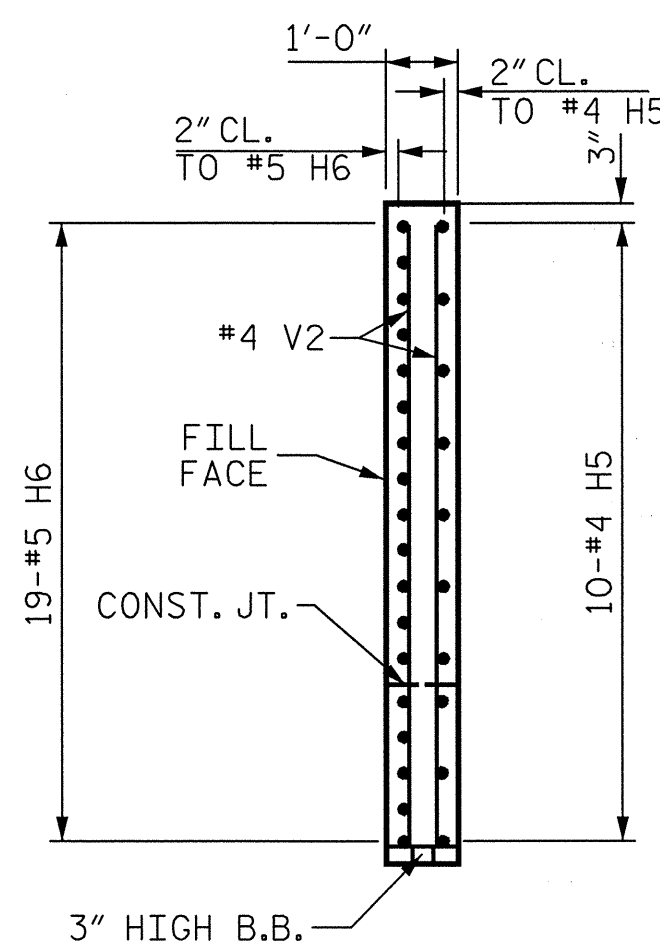
PLAN W2



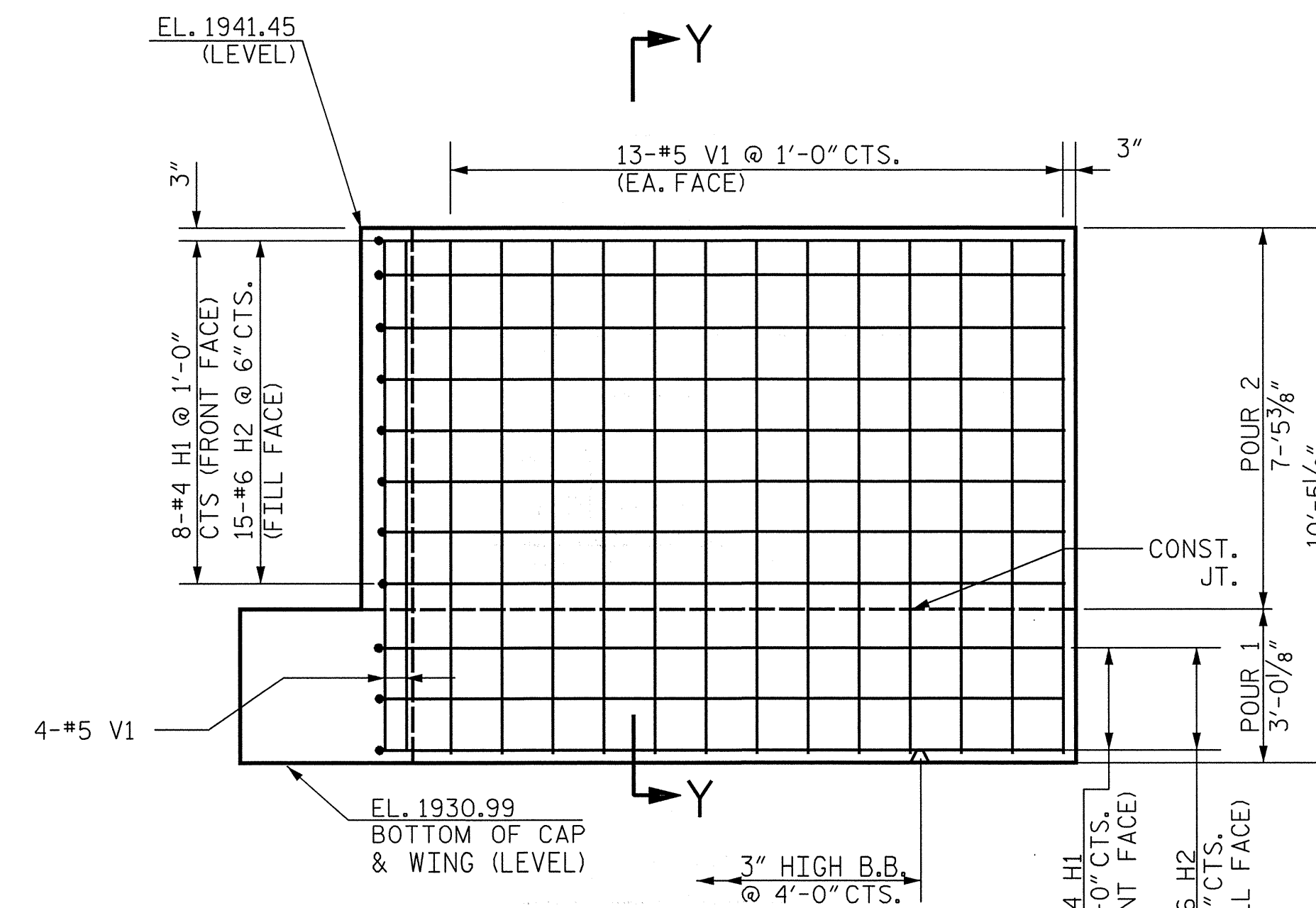
SECTION T-T



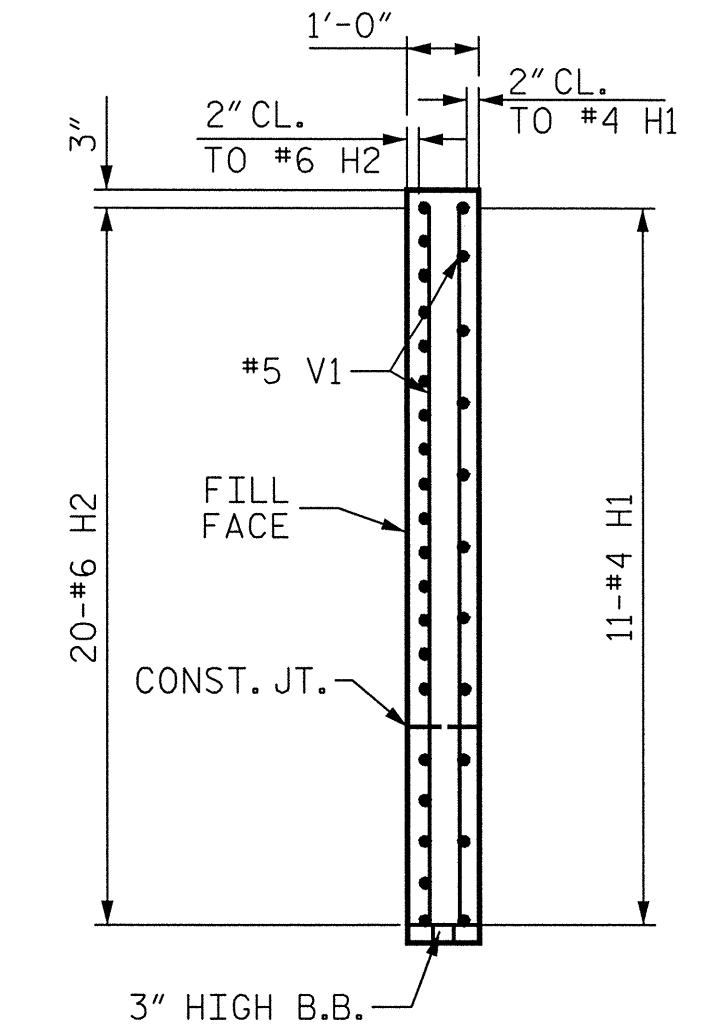
ELEVATION W1



SECTION X-X



ELEVATION W2



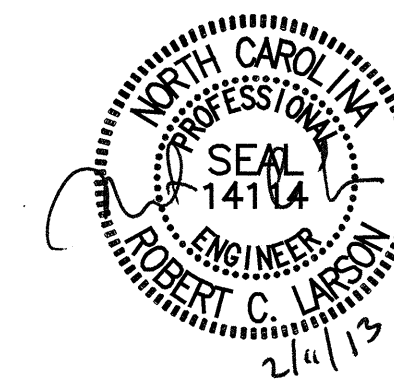
SECTION Y-Y

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2



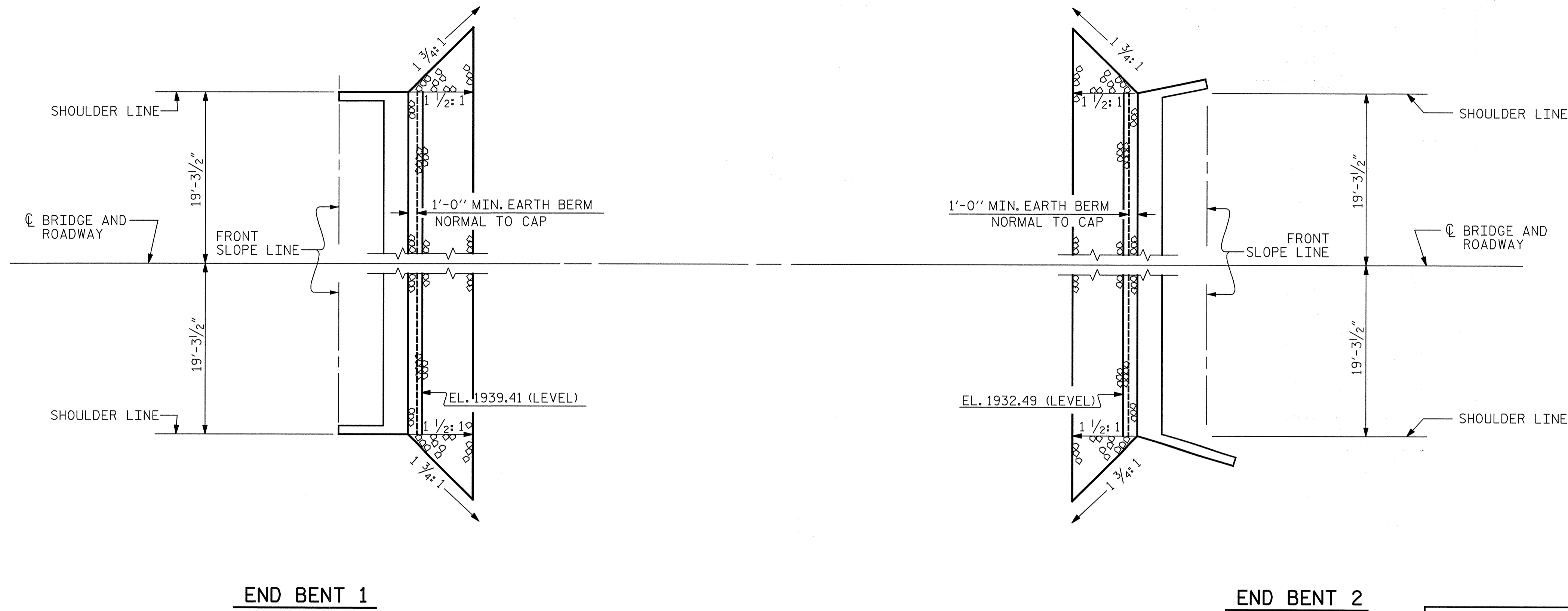
DESIGN ENGINEER OF RECORD: [Signature] DATE: 2/4/13  
 DRAWN BY: R. J. FLORY DATE: 12/03/12  
 CHECKED BY: R. C. LARSON DATE: 12/12/12

KCI Associates  
 of North Carolina, P.A.  
 ENGINEERS & ARCHITECTS  
 LICENSE NUMBER: 0104

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	3-31
1			3			TOTAL SHEETS
2			4			33

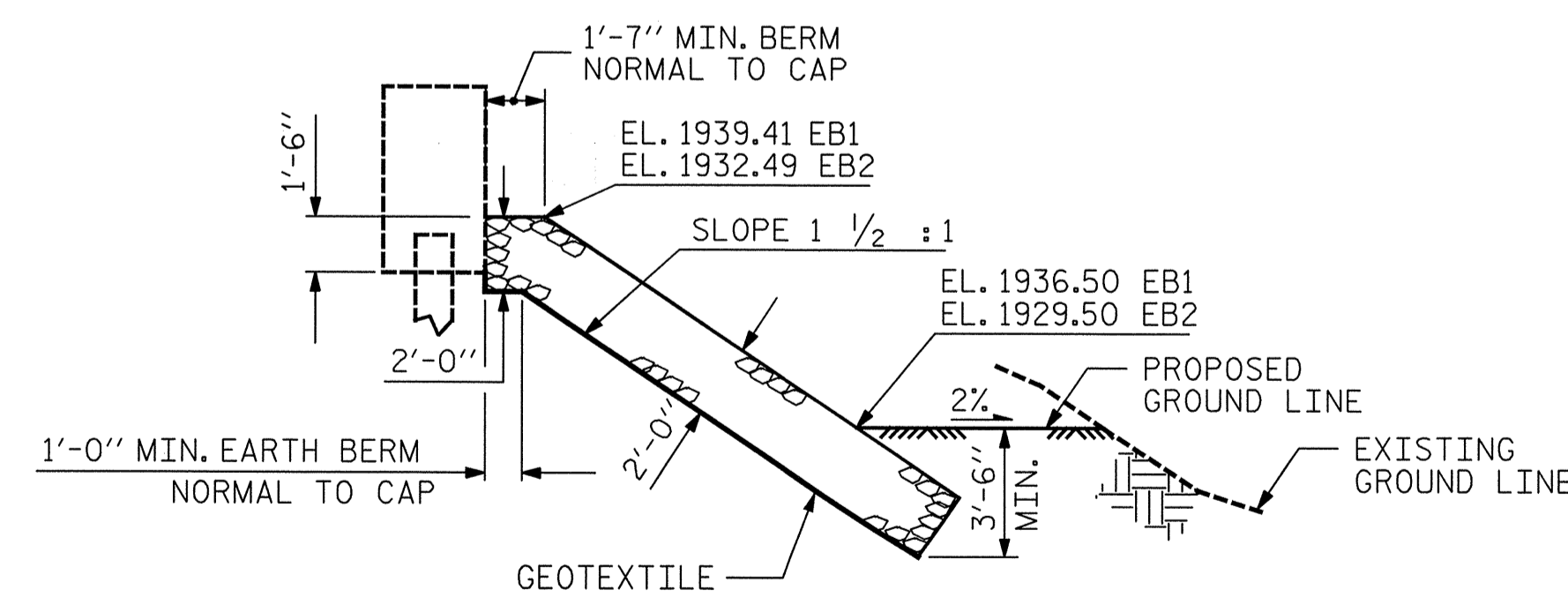
DWG. REF. NO. 31 OF 34

NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



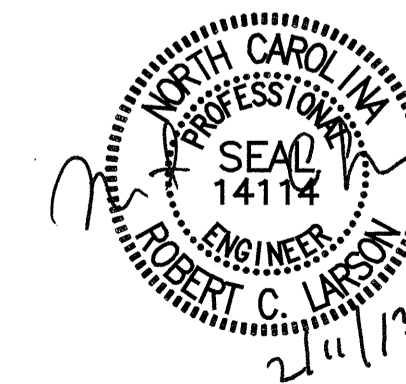
PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 19+20 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	52	58
END BENT 2	48	53



C SECTION

PROJECT NO. B-4733  
CLAY COUNTY  
STATION: 19+20.00 -L-



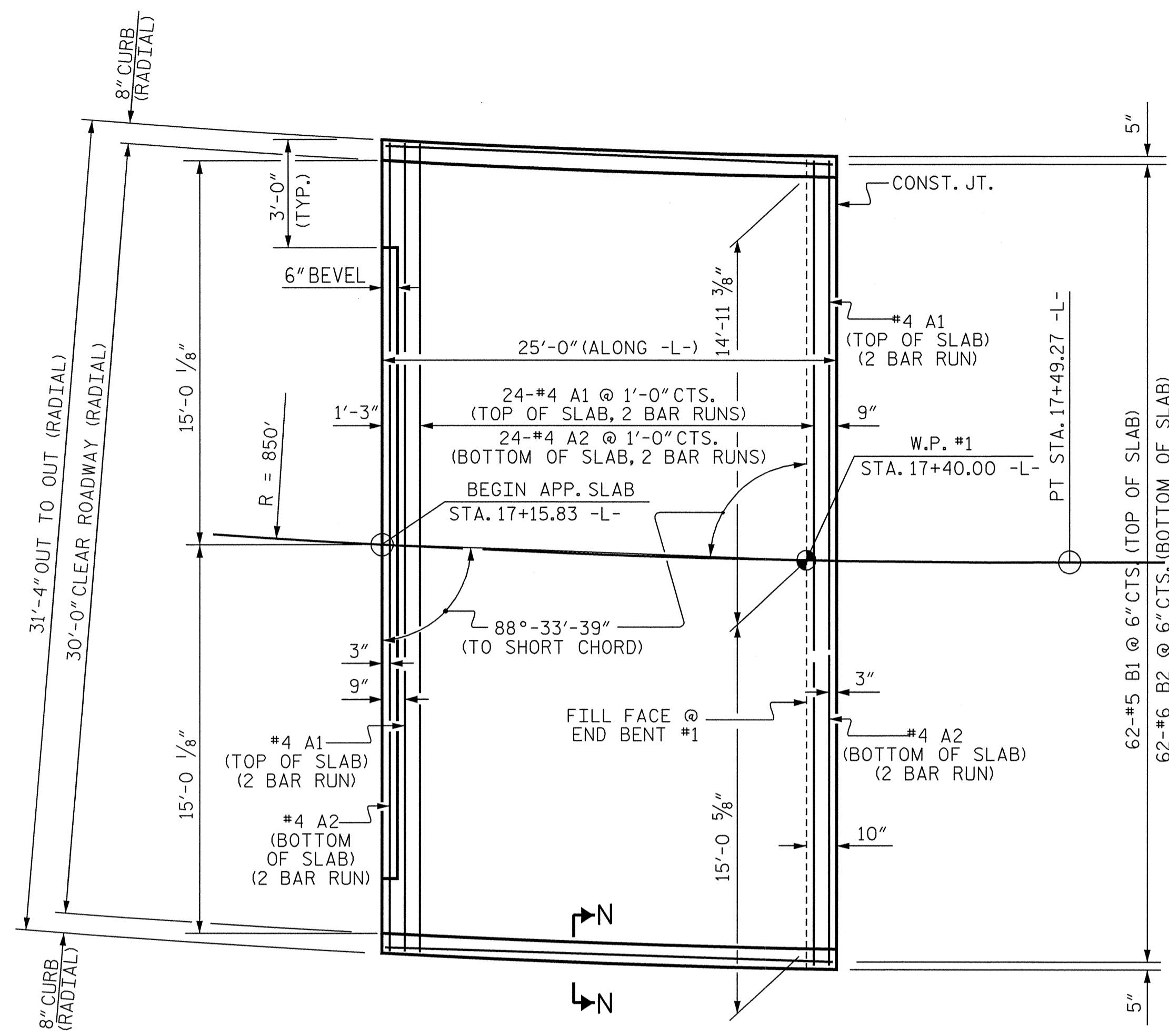
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**RIP RAP  
DETAILS**

DESIGN ENGINEER OF RECORD: [Signature] DATE: 2/11/13  
DRAWN BY: R. J. FLORY DATE: 11/14/12  
CHECKED BY: R.C. LARSON DATE: 11/15/12

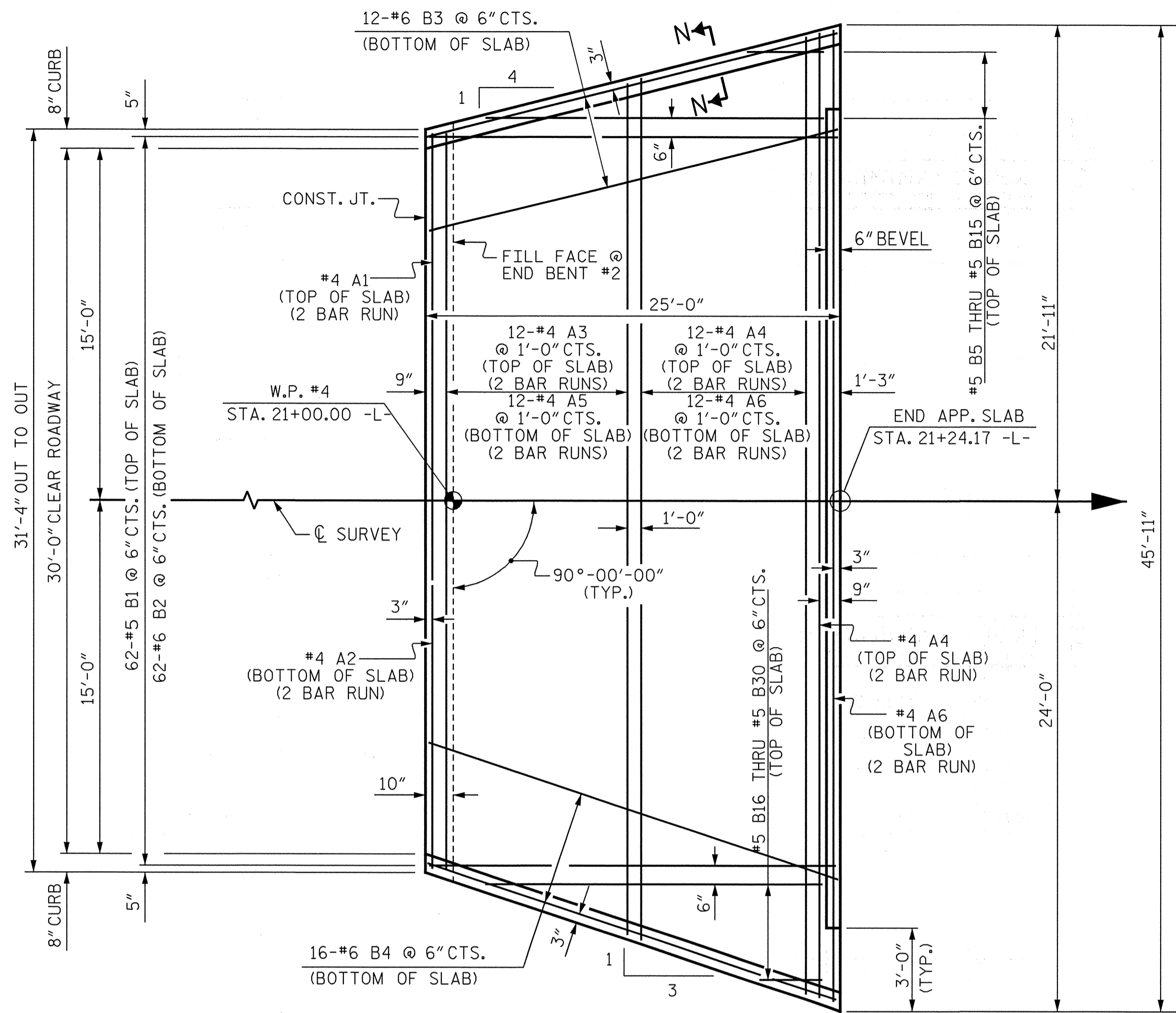
KCI Associates  
of North Carolina, P.A.  
SITE 200 LAWRENCE CENTER II  
RALEIGH, NC 27609-2000  
PHONE 919-871-1000  
FAX 919-871-1001  
LICENSE NUMBER 0-0784

REVISIONS						SHEET NO. 3-32
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 37
2			4			

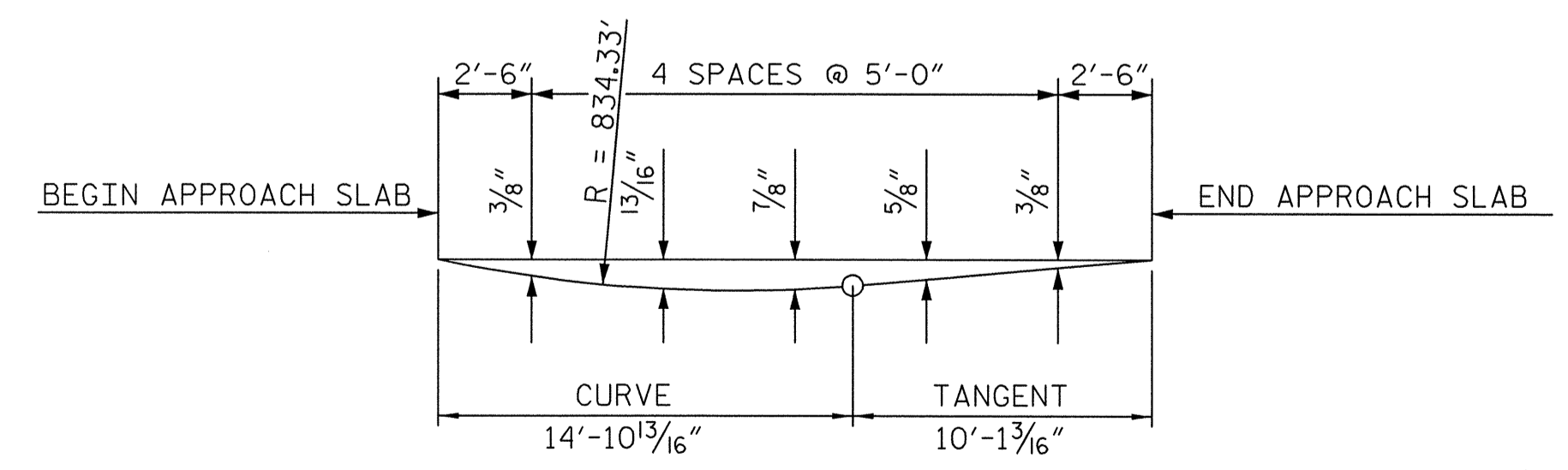




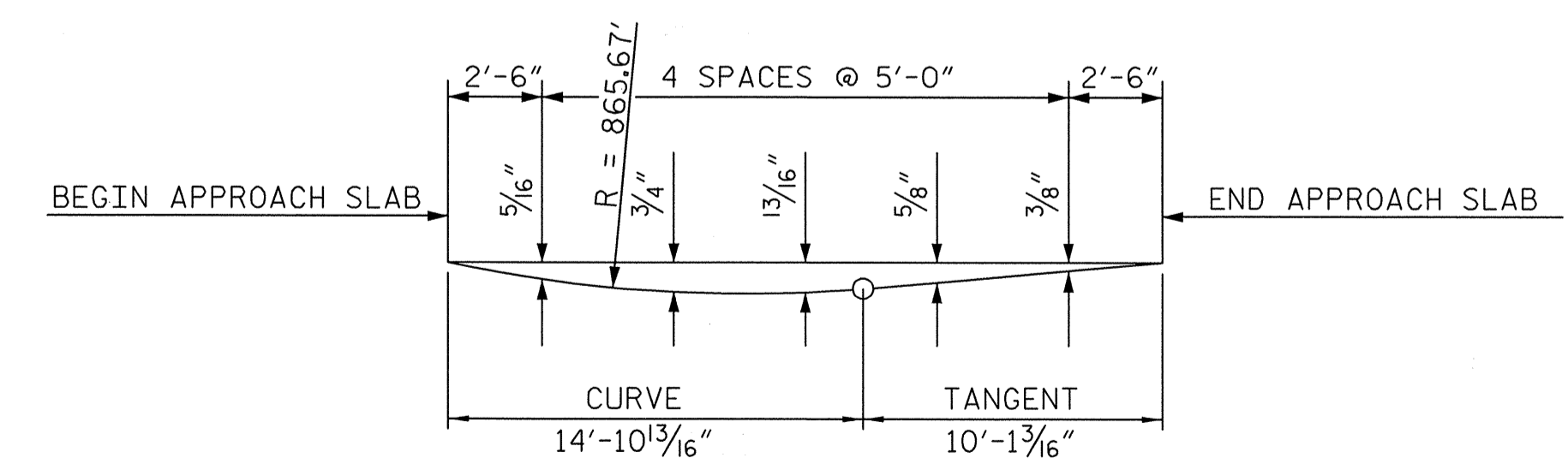
PLAN @ END BENT #1



PLAN @ END BENT #2



LEFT EDGE



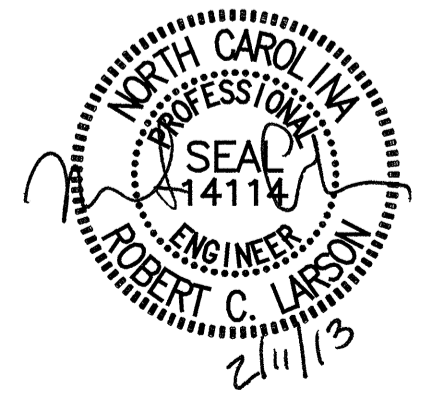
RIGHT EDGE

EDGE OFFSETS - END BENT 1

BILL OF MATERIAL					
APPROACH SLAB @ END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR.	16'-6"	573
A2	52	#4	STR.	16'-5"	570
*B1	62	#5	STR.	24'-4"	1574
B2	62	#6	STR.	24'-8"	2297
REINFORCING STEEL					2867 LBS
*EPOXY COATED REINFORCING STEEL					2147 LBS
CLASS AA CONCRETE					33.9 CU YD
APPROACH SLAB @ END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	2	#4	STR.	16'-6"	22
A2	2	#4	STR.	16'-5"	22
*A3	24	#4	STR.	19'-11"	319
*A4	26	#4	STR.	23'-8"	411
A5	24	#4	STR.	19'-9"	317
A6	26	#4	STR.	23'-7"	410
*B1	62	#5	STR.	24'-4"	1574
B2	62	#6	STR.	24'-8"	2297
B3	12	#6	STR.	25'-5"	458
B4	16	#6	STR.	26'-0"	625
*B5	1	#5	STR.	23'-6"	25
*B6	1	#5	STR.	21'-6"	22
*B7	1	#5	STR.	19'-6"	20
*B8	1	#5	STR.	17'-6"	18
*B9	1	#5	STR.	15'-6"	16
*B10	1	#5	STR.	13'-6"	14
*B11	1	#5	STR.	11'-6"	12
*B12	1	#5	STR.	9'-6"	10
*B13	1	#5	STR.	7'-6"	8
*B14	1	#5	STR.	5'-6"	6
*B15	1	#5	STR.	3'-6"	4
*B16	1	#5	STR.	23'-8"	25
*B17	1	#5	STR.	22'-2"	23
*B18	1	#5	STR.	20'-8"	22
*B19	1	#5	STR.	19'-2"	20
*B20	1	#5	STR.	17'-8"	18
*B21	1	#5	STR.	16'-2"	17
*B22	1	#5	STR.	14'-8"	15
*B23	1	#5	STR.	13'-2"	14
*B24	1	#5	STR.	11'-8"	12
*B25	1	#5	STR.	10'-2"	11
*B26	1	#5	STR.	8'-8"	9
*B27	1	#5	STR.	7'-2"	7
*B28	1	#5	STR.	5'-8"	6
*B29	1	#5	STR.	4'-2"	4
*B30	1	#5	STR.	2'-8"	3
REINFORCING STEEL					4129 LBS
*EPOXY COATED REINFORCING STEEL					2687 LBS
CLASS AA CONCRETE					42.2 CU YD

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 1 OF 2  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT



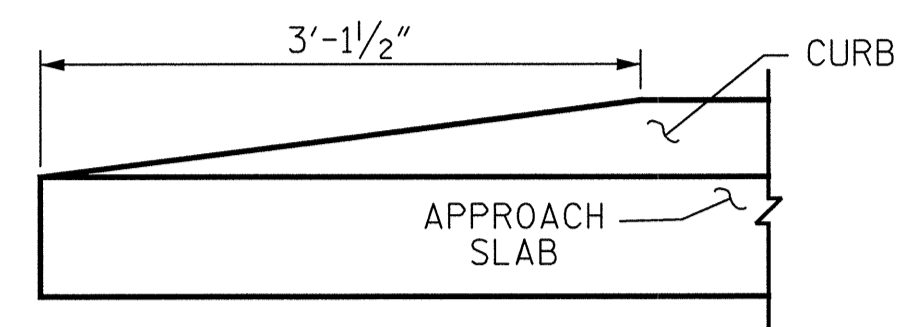
DESIGN ENGINEER OF RECORD: [Signature] DATE: 2/11/13  
 ASSEMBLED BY: R. C. LARSON DATE: 5/15/12  
 CHECKED BY: E. R. PHIPPS DATE: 1/8/13  
 DRAWN BY: TLA 10/05  
 CHECKED BY: GM 5/06  
 ADDED 5/1/06RR KMM/GM  
 REV. 10/1/11 MAA/GM  
 REV. 12/21/11 MAA/GM

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

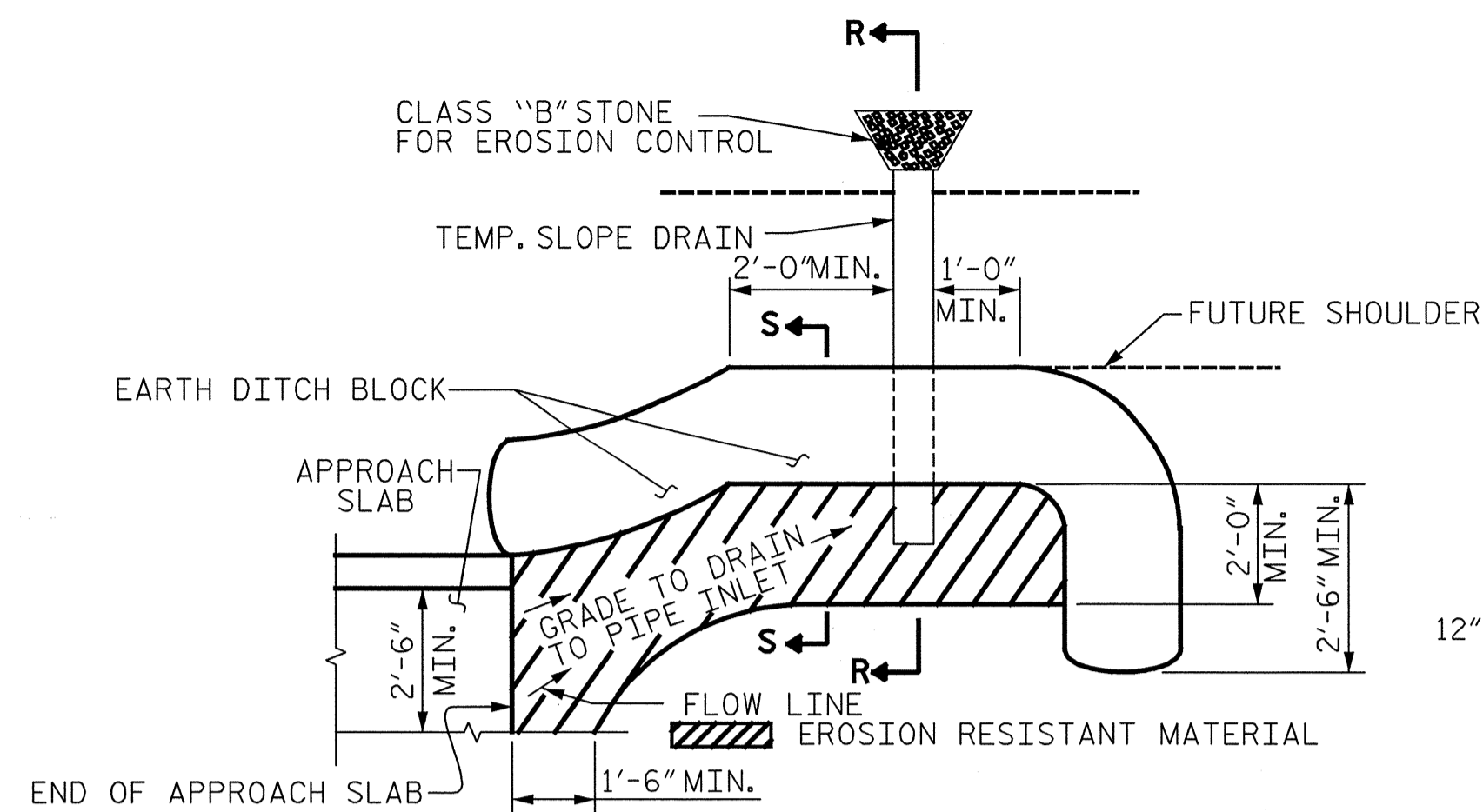
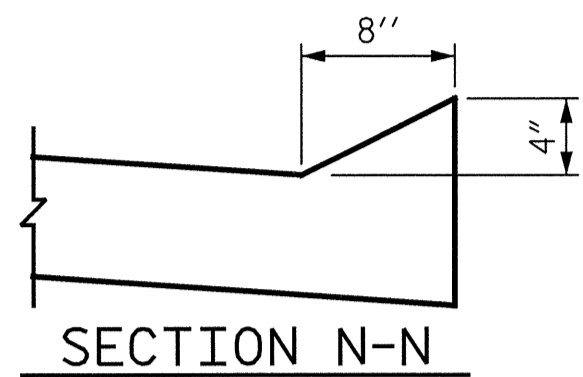
DWG. REF. NO. 33 OF 34

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

STD. NO. BAS5  
 SHEET NO. S-33  
 TOTAL SHEETS 39

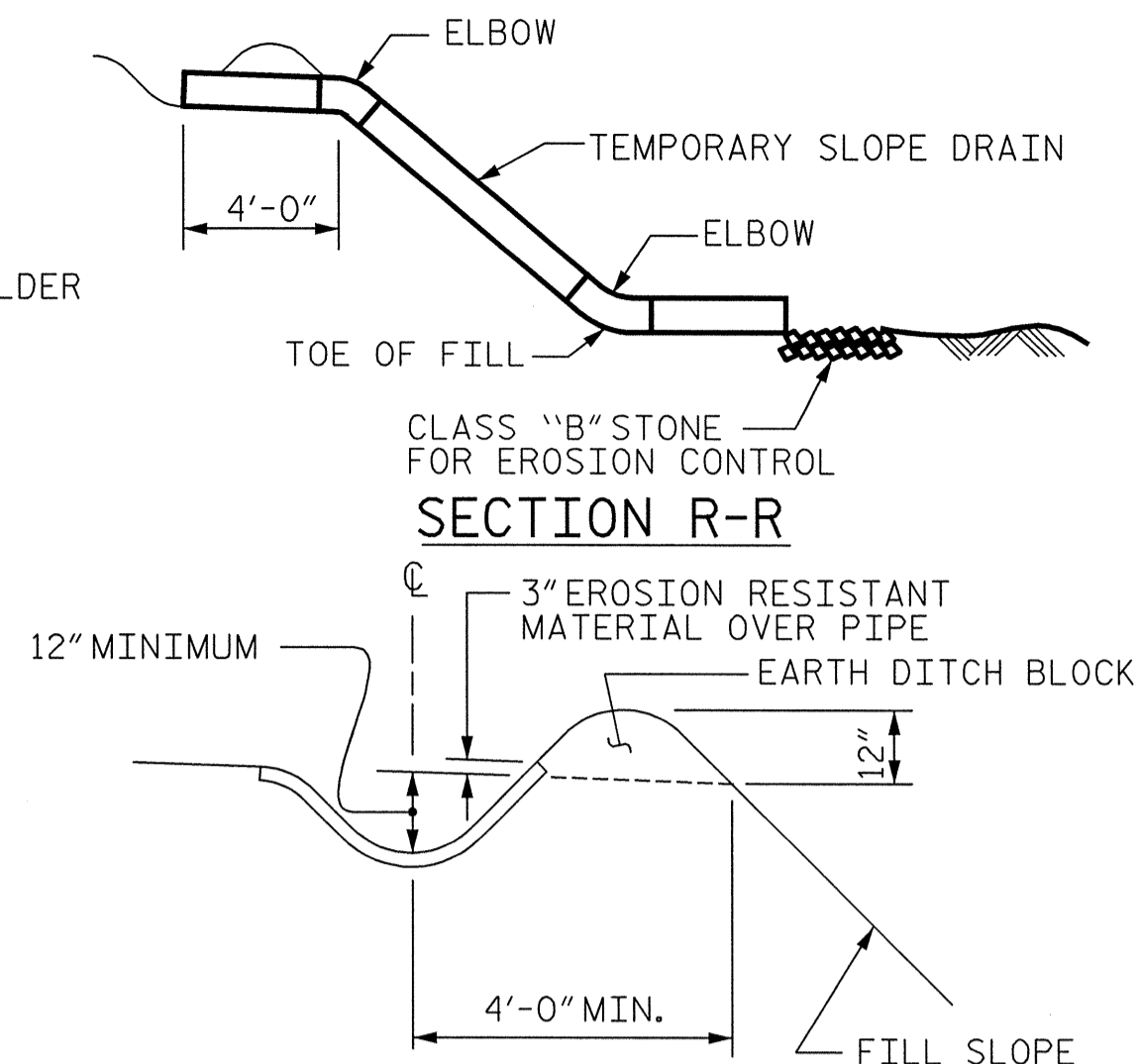


END OF CURB WITHOUT SHOULDER BERM GUTTER



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\"/>

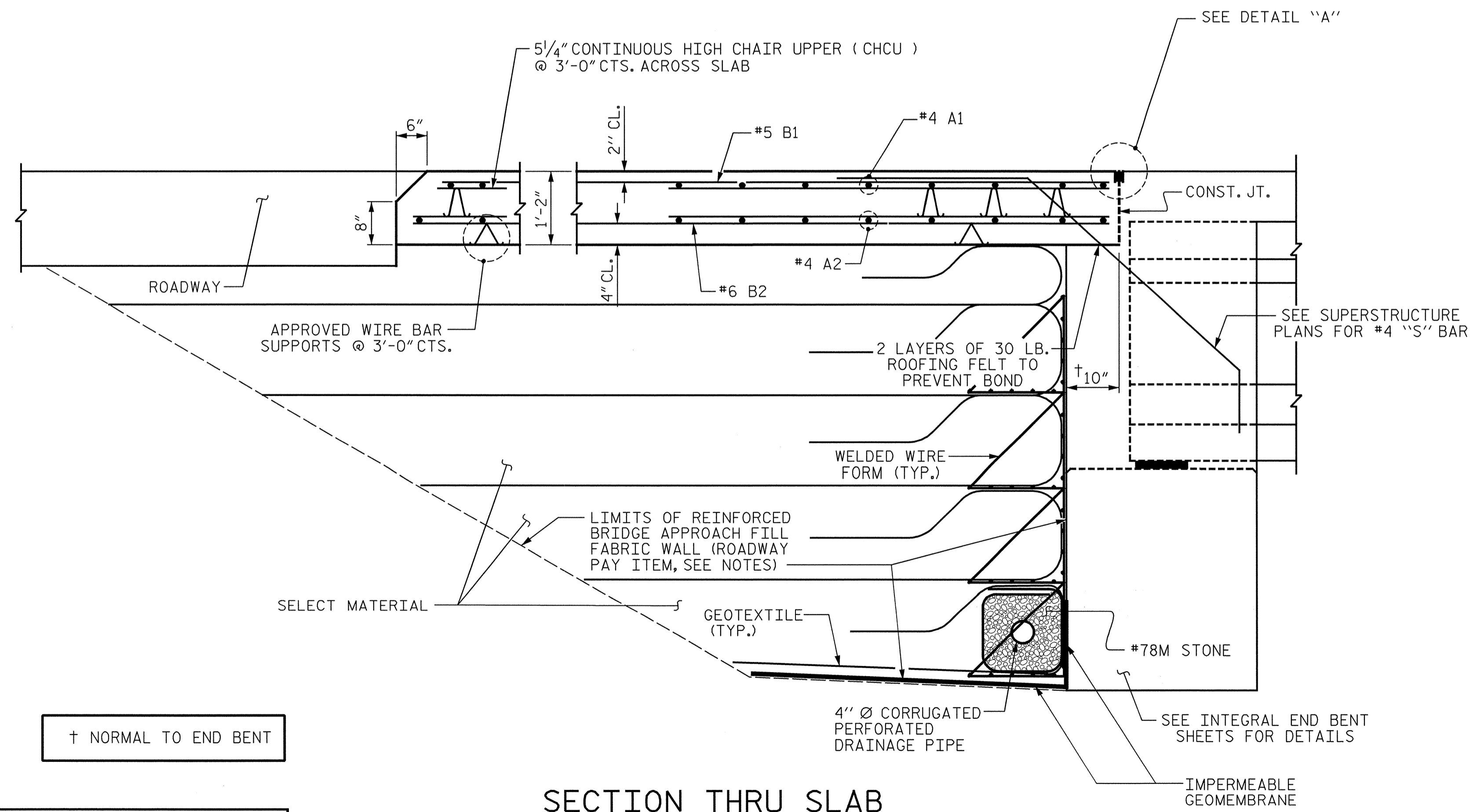
PLAN VIEW



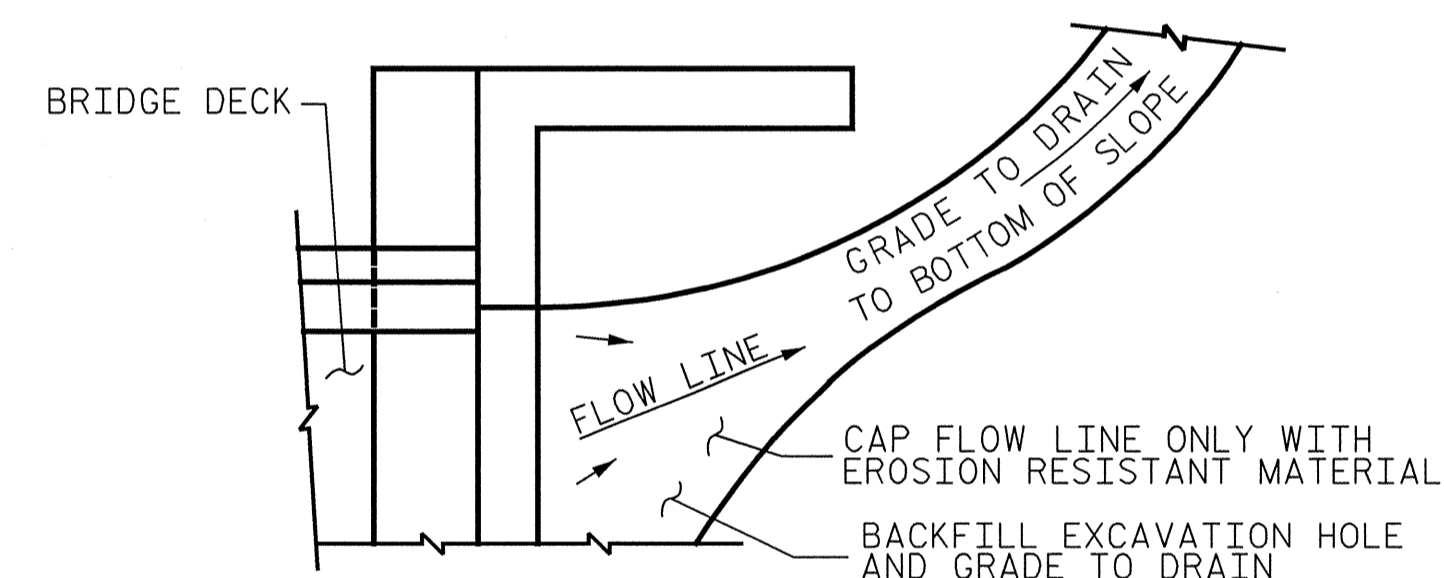
SECTION S-S

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

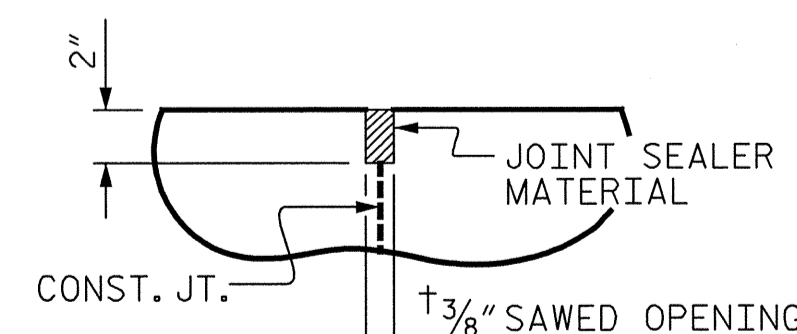


SECTION THRU SLAB



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



DETAIL "A"

PROJECT NO. B-4733  
CLAY COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 BRIDGE APPROACH  
 SLAB DETAILS

STD. NO. BAS4

DESIGN ENGINEER OF RECORD: <i>R. C. Larson</i>	DATE: <u>2/11/13</u>
ASSEMBLED BY: R. C. LARSON	DATE: 5/15/12
CHECKED BY: E. R. PHIPPS	DATE: 1/8/13
DRAWN BY: FCJ 11/88	REV. 5/7/03 RWW/JTE
CHECKED BY: ARB 11/88	REV. 5/1/06RRR MAA/KMM
	REV. 10/1/11 MAA/OM

 KCI Associates 41 North Carolina, P.A. 400 S. LANTANA CENTER FALCON, N.C. 27834-3000 LEASE NUMBER C-0164	REVISIONS			
	NO.	BY:	DATE:	NO.
	1			3
	2			4

SHEET NO.	5-34
TOTAL SHEETS	39

DWG. REF. NO. 34 OF 34



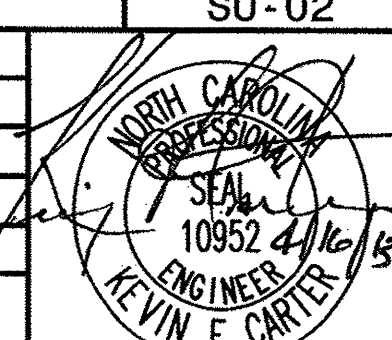




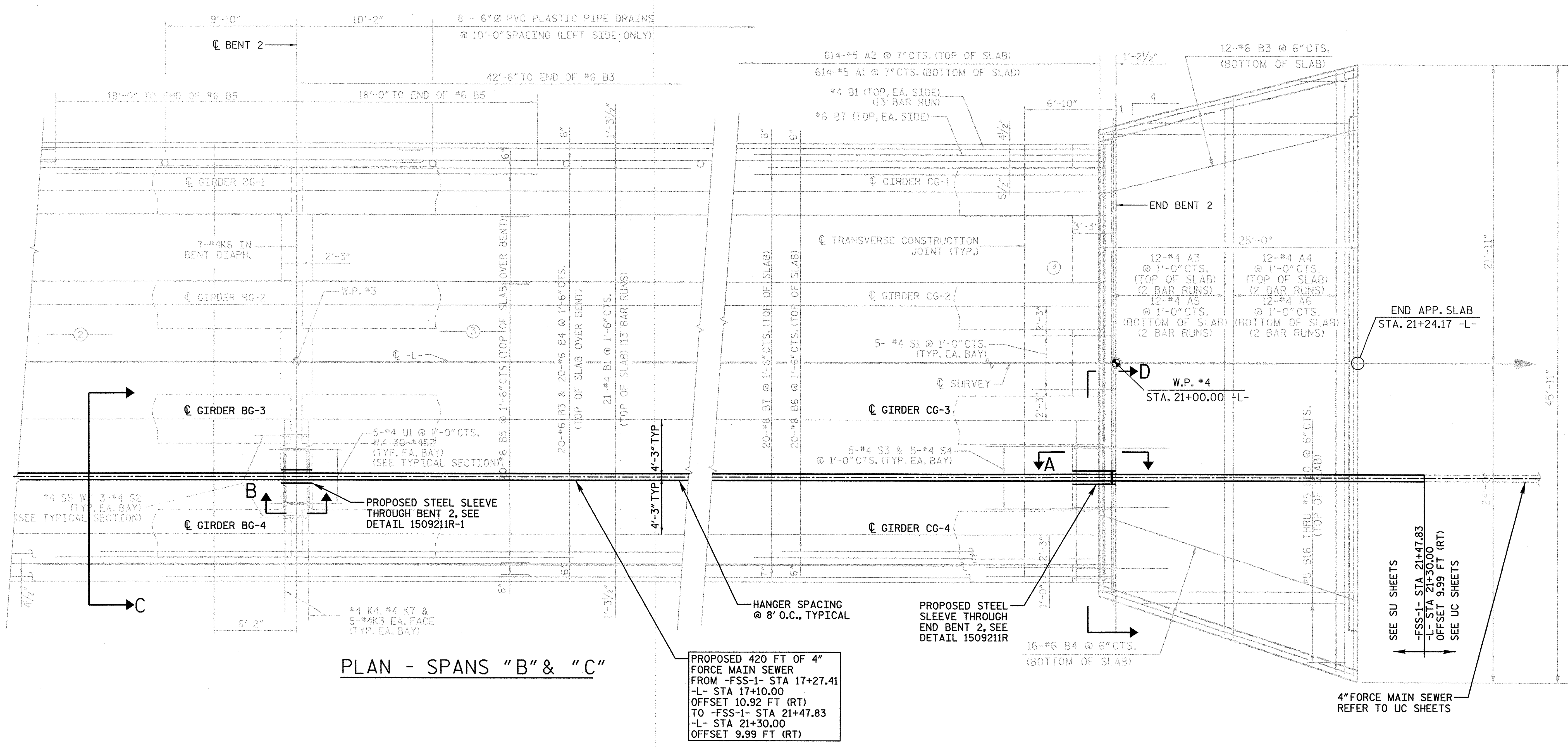
5/14/99

NOTE:  
 1. ALL FORCE MAIN SEWER PIPE SHALL BE DI RJ PC 350, CERAMIC EPOXY LINING (CALCIUM ALUMINATE IS NOT ALLOWED). EXPOSED PIPE SHALL BE INSULATED.  
 2. ALL RESTRAINED JOINT PIPE SHALL BE "FULLY EXTENDED" AFTER ASSEMBLY TO MINIMIZE JOINT TAKE-UP.

PREPARED IN THE OFFICE OF:  
  
**Kimley-Horn and Associates, Inc.**  
 P.O. BOX 33068  
 RALEIGH, NORTH CAROLINA 27636-3068  
 PHONE: (919) 671-2000  
 FAX: (919) 671-2050  
 PE NO. F-102

PROJECT REFERENCE NO. B-4733	SHEET NO. SU-02
DESIGNED BY: JJW	
DRAWN BY: JGB	
CHECKED BY: KFC	
APPROVED BY: KFC	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

### STRUCTURE UTILITIES



PLAN - SPANS "B" & "C"

SEE SU SHEETS  
 -FSS-1- STA 21+47.83  
 -L- STA 21+30.00  
 OFFSET 9.99 FT (RT)  
 SEE UC SHEETS

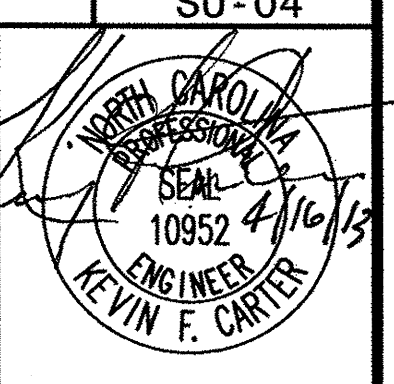
DATE: 5/14/99  
 DRAWN BY: JGB  
 CHECKED BY: KFC  
 APPROVED BY: KFC



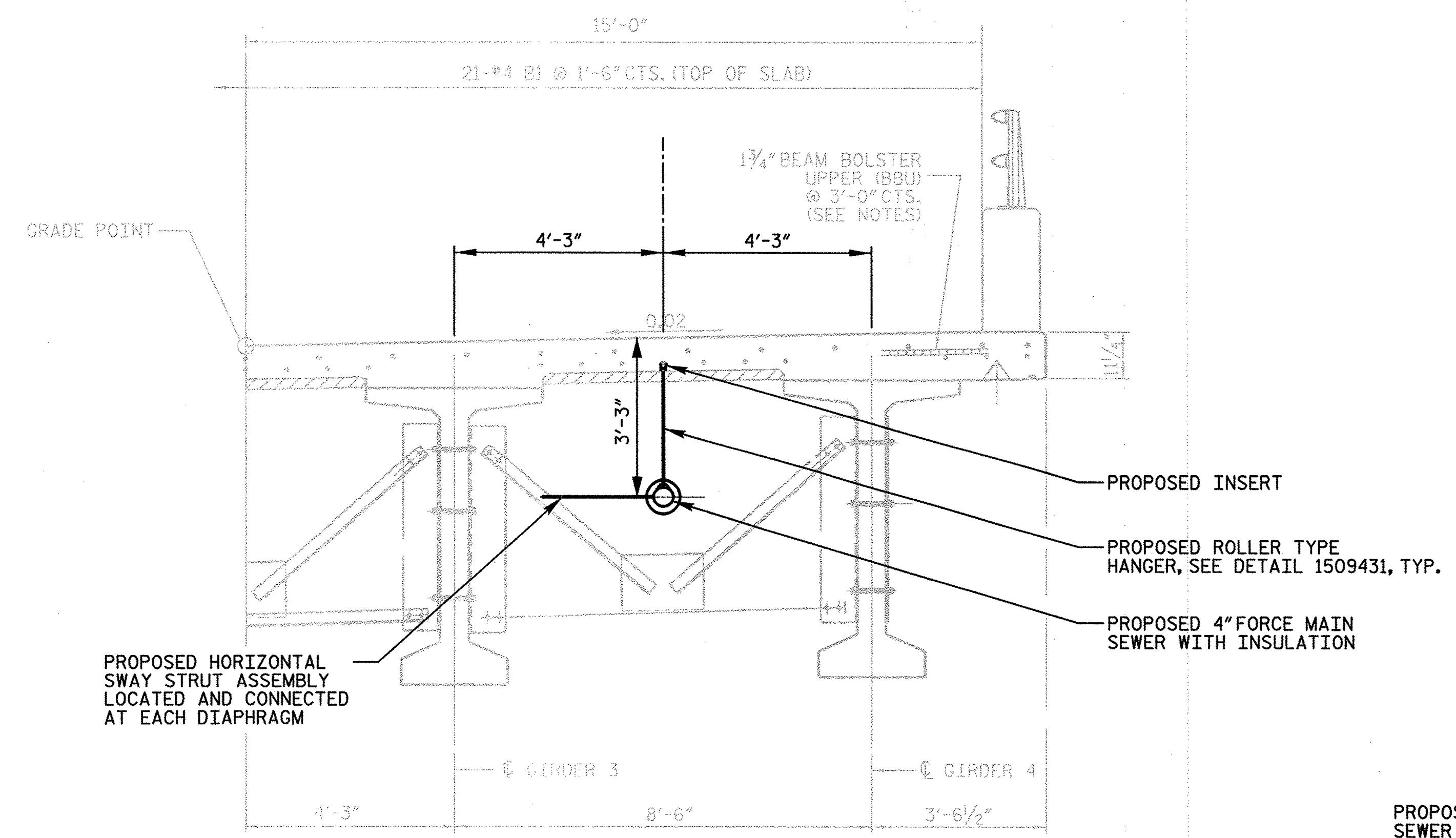
5/14/99

NOTE:  
 1. ALL FORCE MAIN SEWER PIPE SHALL BE DI RJ PC 350, CERAMIC EPOXY LINING (CALCIUM ALUMINATE IS NOT ALLOWED). EXPOSED PIPE SHALL BE INSULATED.  
 2. ALL RESTRAINED JOINT PIPE SHALL BE "FULLY EXTENDED" AFTER ASSEMBLY TO MINIMIZE JOINT TAKE-UP.

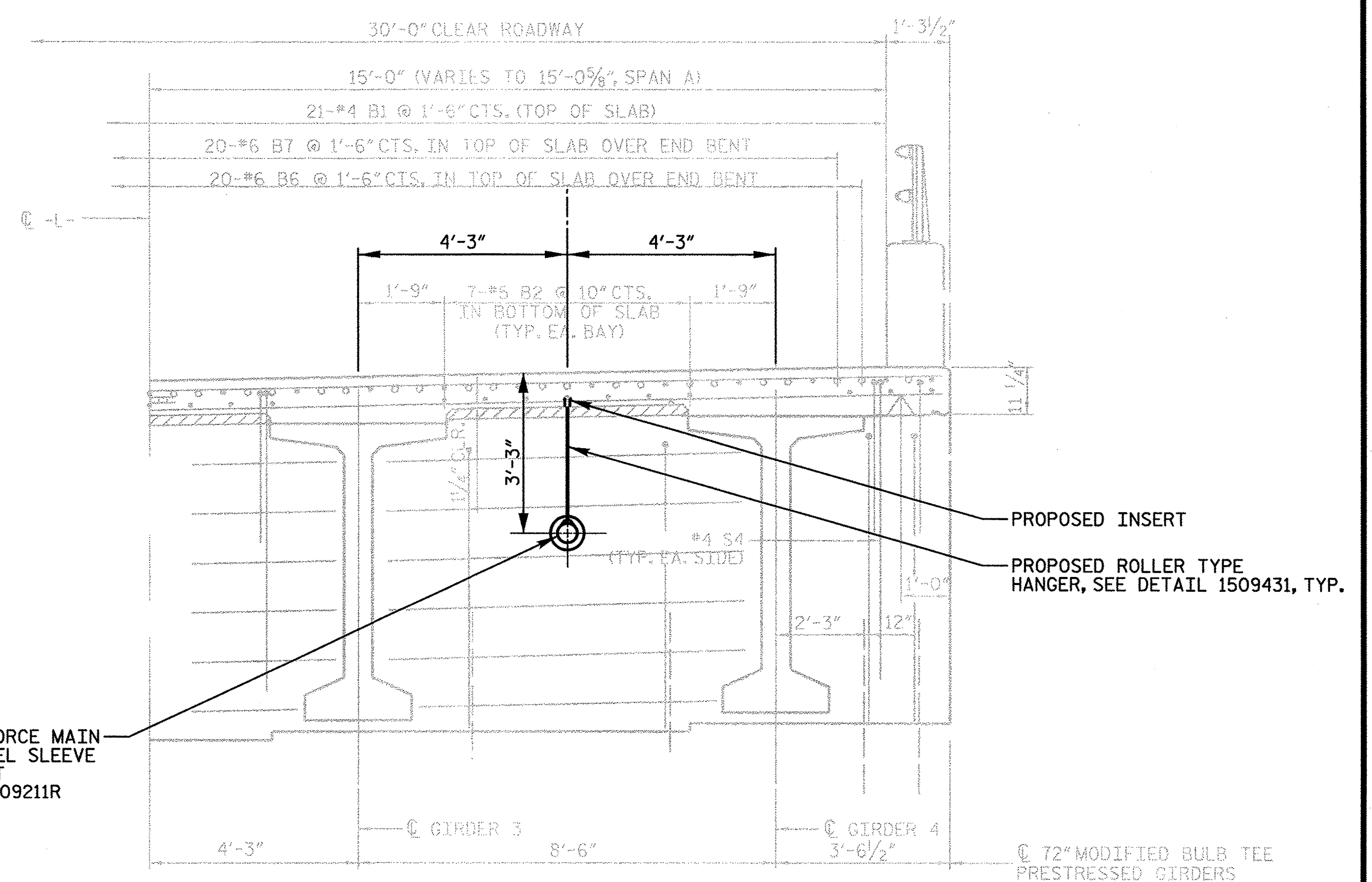
PREPARED IN THE OFFICE OF:  
  
**Kimley-Horn and Associates, Inc.**  
 P.O. BOX 33068  
 RALEIGH, NORTH CAROLINA 27636-3068  
 PHONE: (919) 677-2000  
 FAX: (919) 677-2050  
 PE NO. F-0102

PROJECT REFERENCE NO. B-4733	SHEET NO. SU-04
DESIGNED BY: JJW	
DRAWN BY: JGB	
CHECKED BY: KFC	
APPROVED BY: KFC	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

### STRUCTURE UTILITIES



TYPICAL HALF SECTION AT INTERIOR DIAPHRAGM  
**SECTION C**



TYPICAL HALF SECTION AT END BENTS  
**SECTION D**

5/14/99

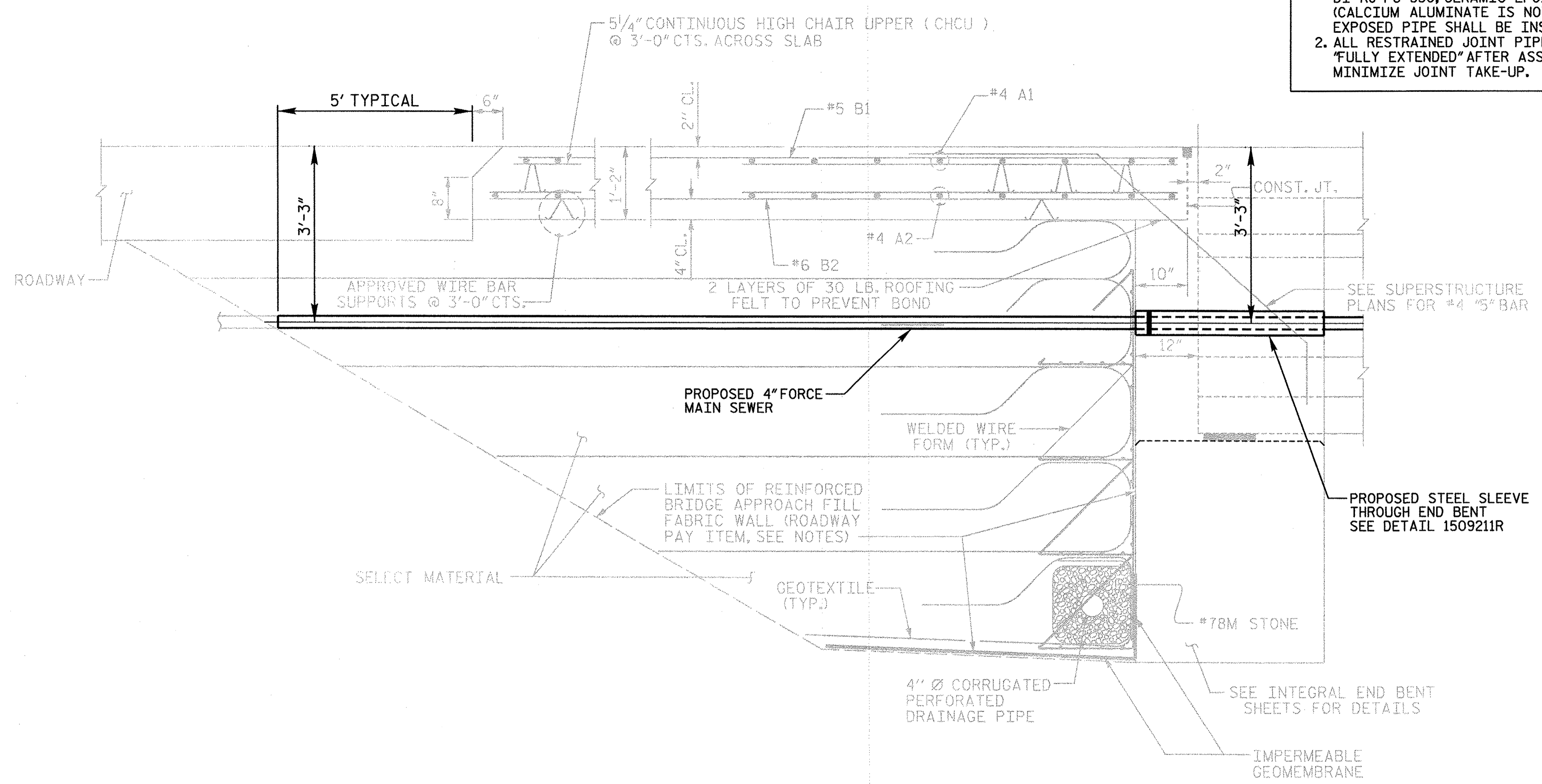


5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4733	SU-05
DESIGNED BY: JJW	
DRAWN BY: JGB	
CHECKED BY: KFC	
APPROVED BY: KFC	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	

PREPARED IN THE OFFICE OF:  
  
**Kimley-Horn and Associates, Inc.**  
 P.O. BOX 33068  
 RALEIGH, NORTH CAROLINA 27636-3068  
 PHONE: (919) 677-2000  
 FAX: (919) 577-2050  
 PE NO. F-0102

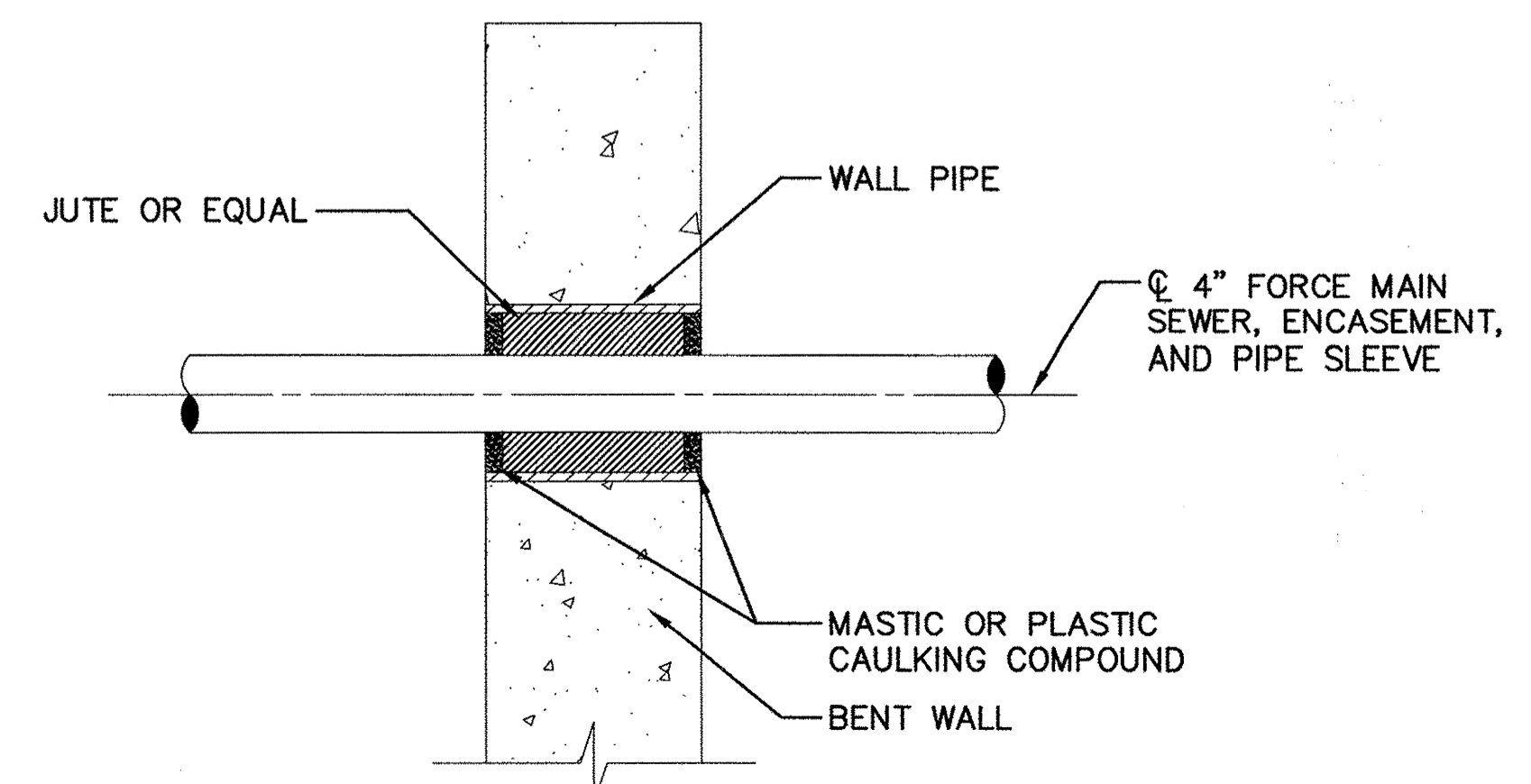
NOTE:  
 1. ALL FORCE MAIN SEWER PIPE SHALL BE DI RJ PC 350, CERAMIC EPOXY LINING (CALCIUM ALUMINATE IS NOT ALLOWED). EXPOSED PIPE SHALL BE INSULATED.  
 2. ALL RESTRAINED JOINT PIPE SHALL BE "FULLY EXTENDED" AFTER ASSEMBLY TO MINIMIZE JOINT TAKE-UP.



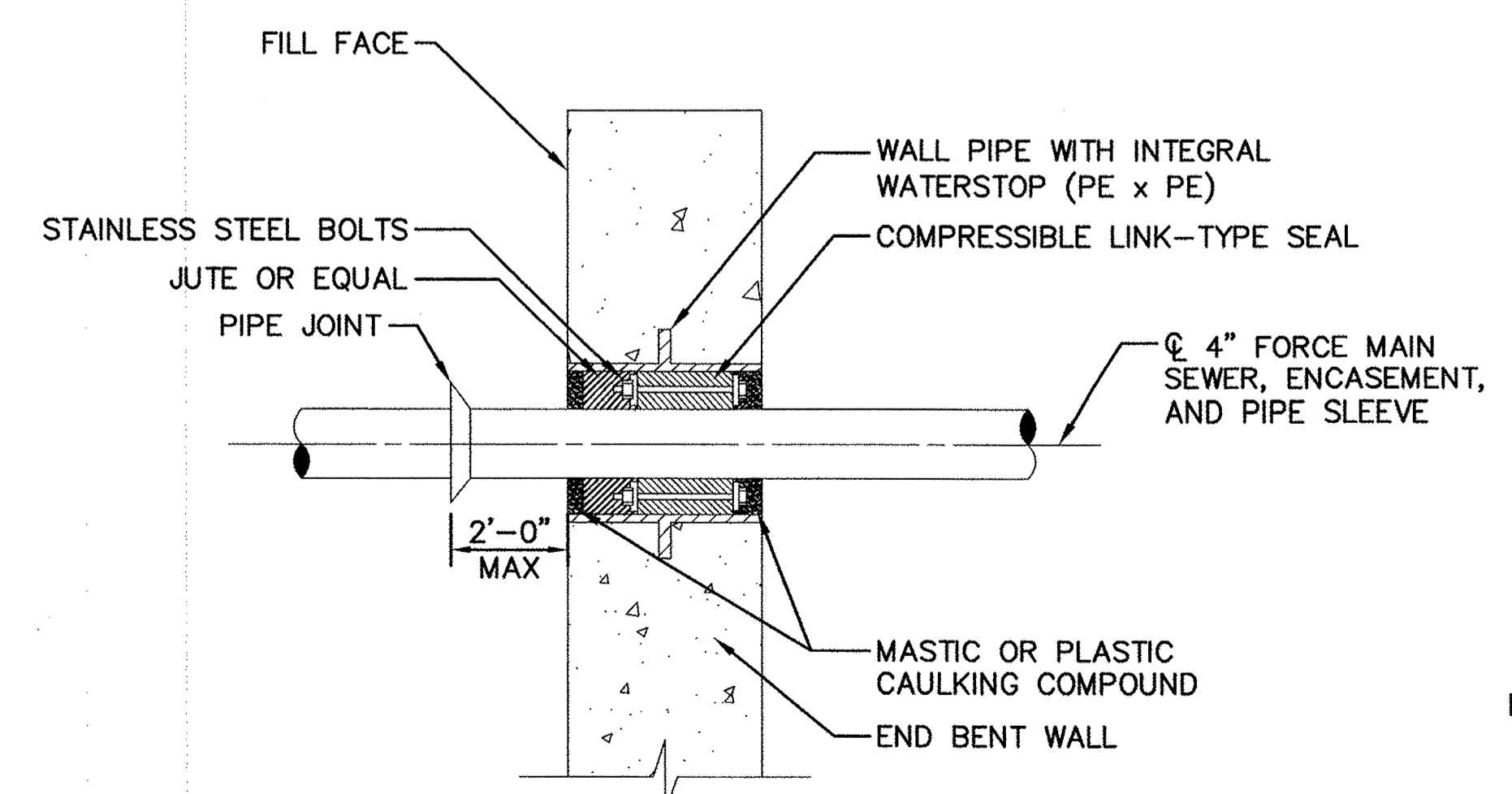
**STRUCTURE UTILITIES**

**TYPICAL SECTION THRU APRON SLAB**

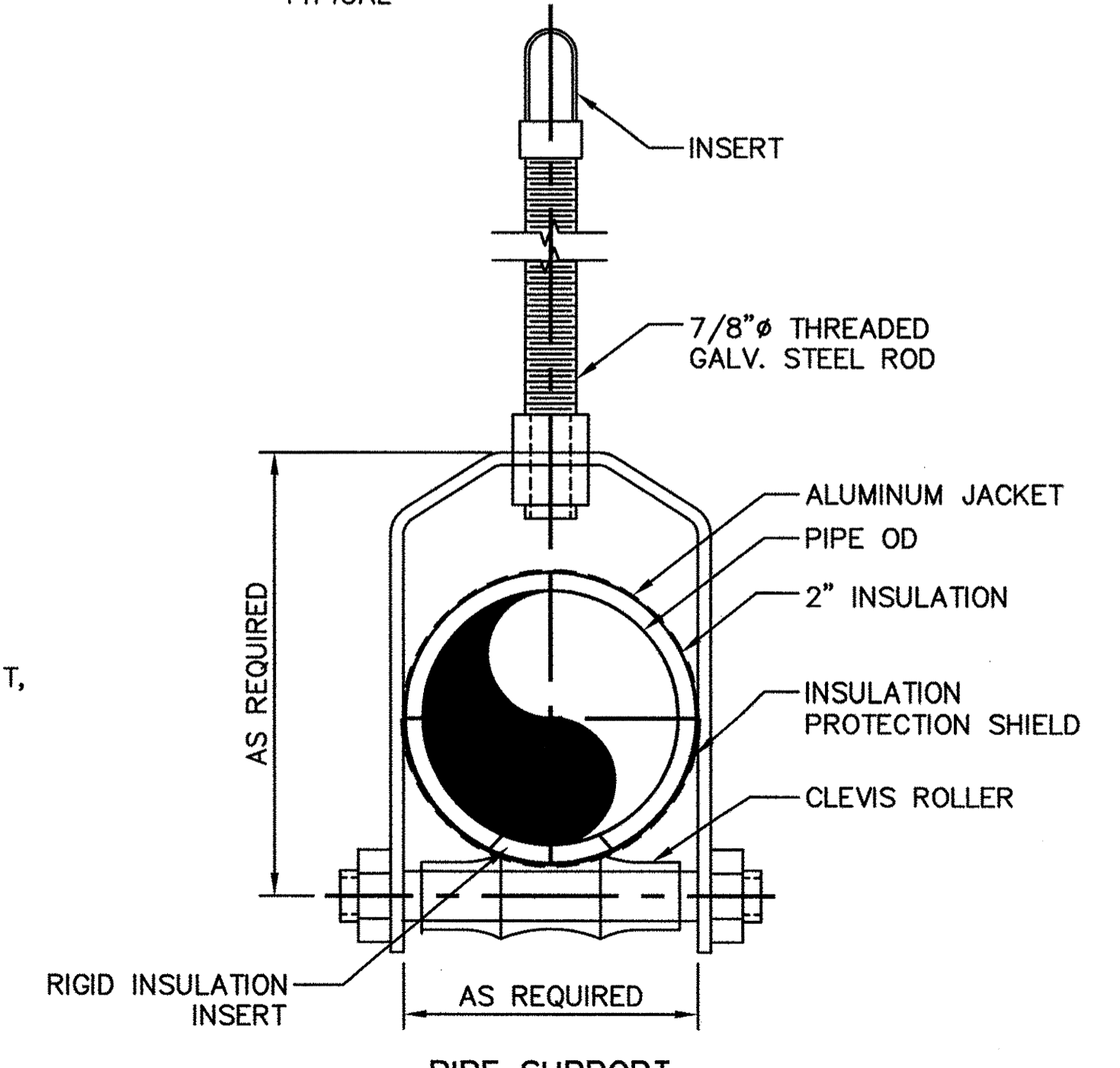
DETAIL NOTE:  
 PIPE SUPPORTS SHALL BE EQUALLY SPACED BETWEEN ALL BENTS (END BENTS AND BENTS) AT 8-FT O.C., MAX, TYPICAL



1509211R-1

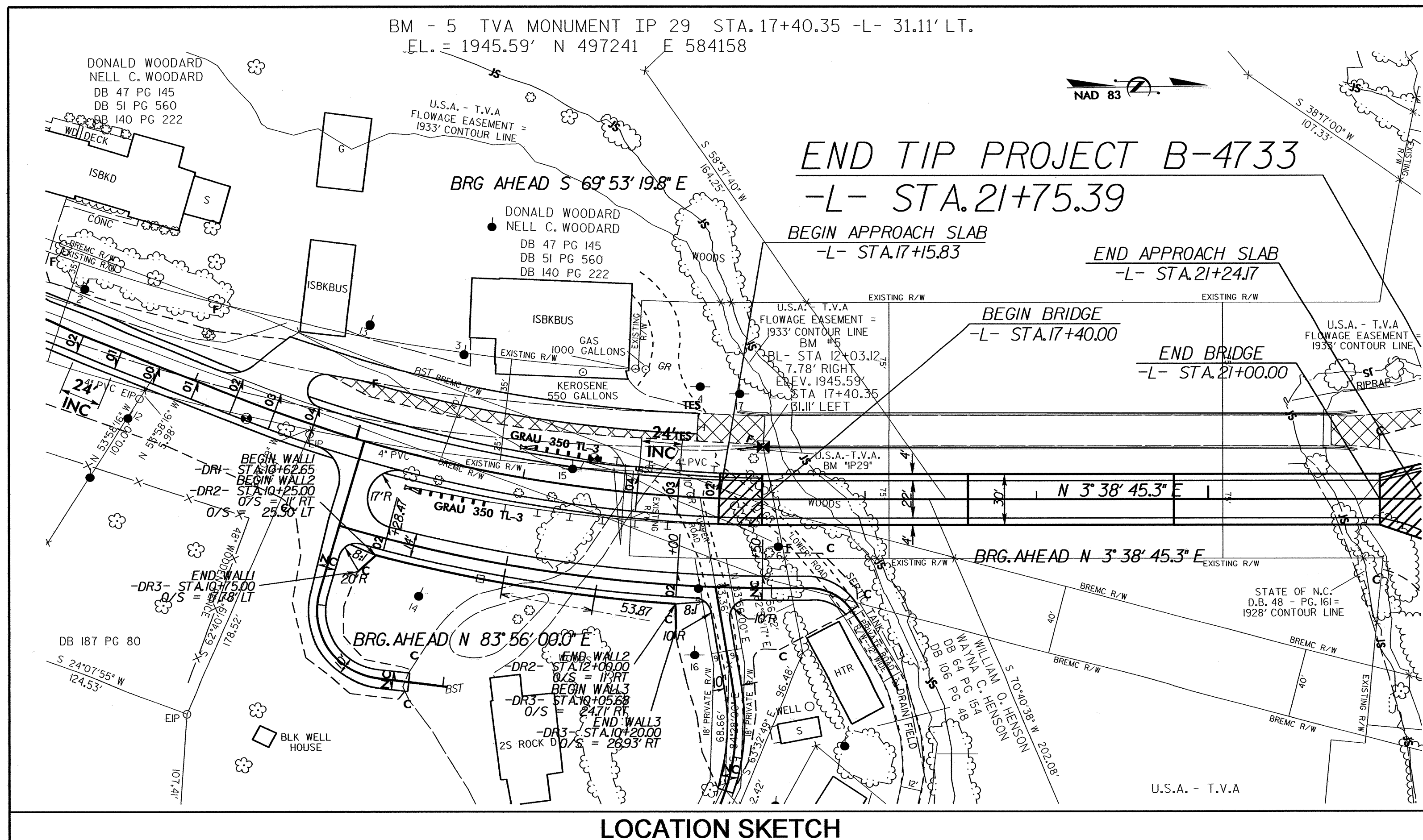


1509211R



PIPE SUPPORT (CLEVIS ROLLER TYPE)  
 1509431

1509211R-1  
 1509211R  
 1509431



ESTIMATED WALL QUANTITIES	
RETAINING WALL NO.	STONE VENEERED CMU RETAINING WALLS (SQUARE FEET)
1	35
2	749
3	43
TOTAL QUANTITY = 827 SF	

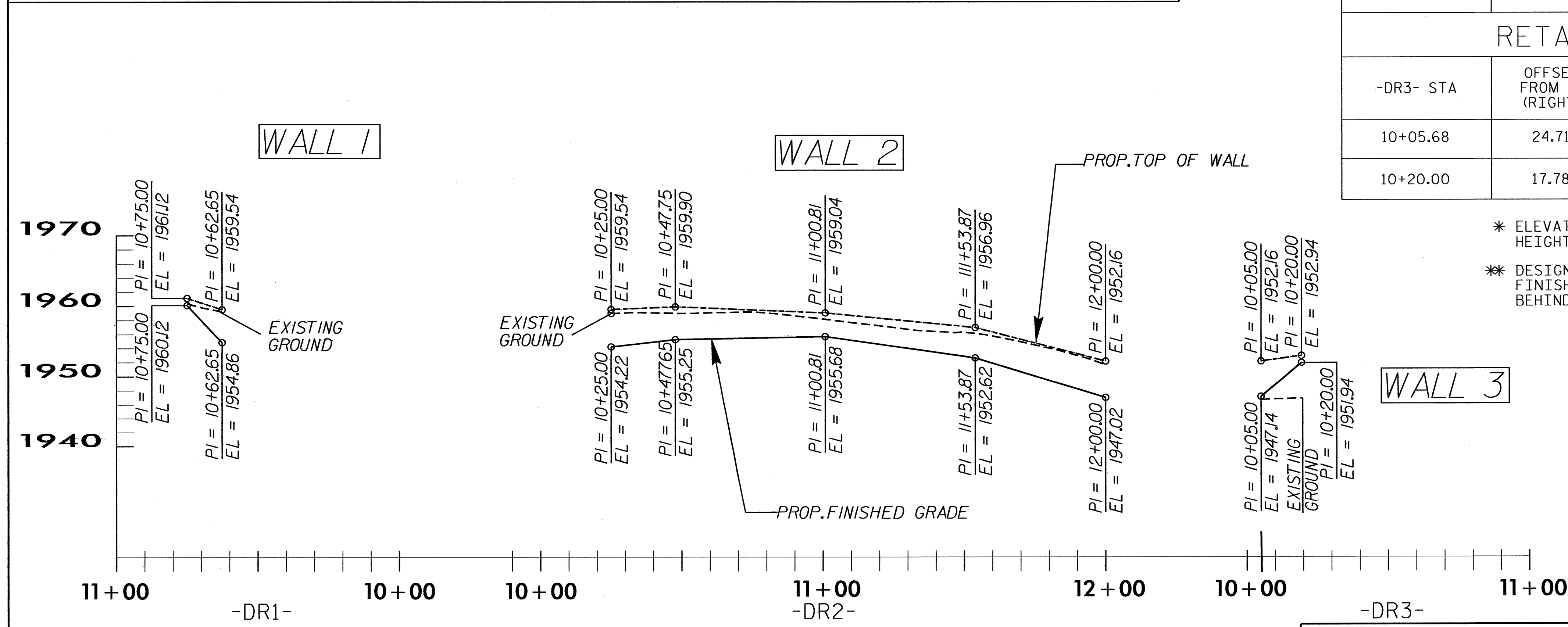
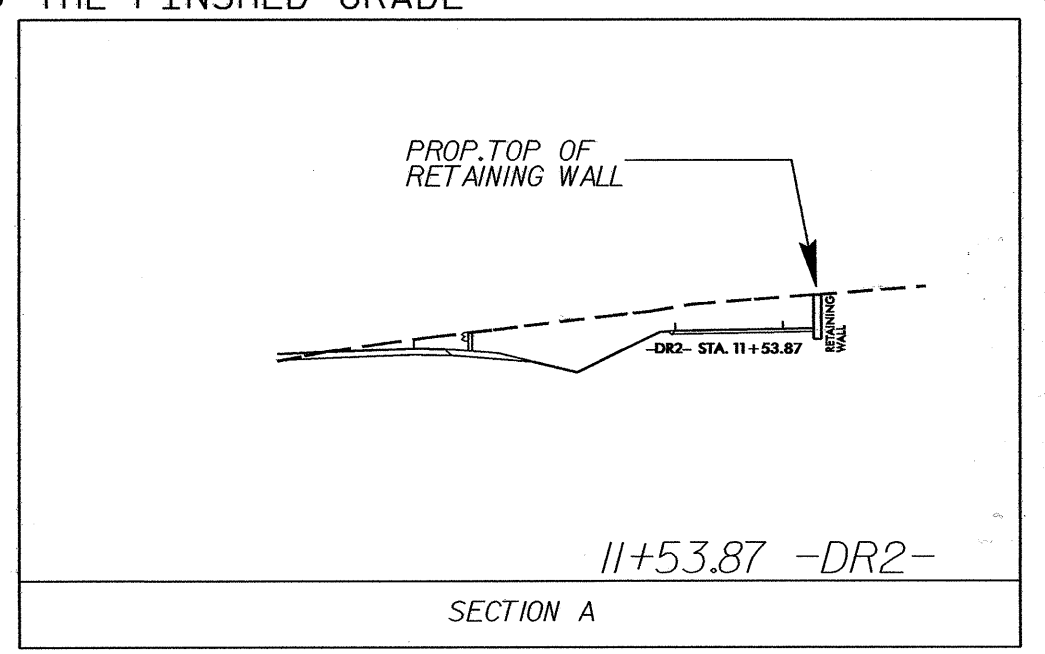
GEOTECHNICAL ENGINEER  
 ENGINEER  
 NORTH CAROLINA PROFESSIONAL SEAL 029869  
 ENGINEER SHANE C. CLARK  
 3/14/23  
 SIGNATURE DATE SIGNATURE DATE

RETAINING WALL ELEVATIONS					
-DR1- STA	OFFSET FROM C (LEFT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	** DESIGN WALL HEIGHT "H"	EXPOSED WALL HEIGHT
10+62.65	25.30	1959.54	1954.86	4.68	5.18
10+75.00	17.78	1961.12	1960.12	1.00	1.50

RETAINING WALL ELEVATIONS					
-DR2- STA	OFFSET FROM C (RIGHT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	** DESIGN WALL HEIGHT "H"	EXPOSED WALL HEIGHT
10+25.00	11.00	1959.54	1954.22	5.32	5.92
10+47.75	11.00	1959.90	1955.50	4.40	5.00
11+00.81	11.00	1959.04	1955.68	3.68	4.18
11+53.87	11.00	1956.96	1152.62	4.34	4.94
12+00.00	11.00	1952.16	1947.02	5.14	5.74

RETAINING WALL ELEVATIONS					
-DR3- STA	OFFSET FROM C (RIGHT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	** DESIGN WALL HEIGHT "H"	EXPOSED WALL HEIGHT
10+05.68	24.71	1952.16	1947.14	7.02	7.52
10+20.00	17.78	1952.94	1951.94	1.00	1.50

\* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH  
 \*\* DESIGN WALL HEIGHT "H" IS MEASURED FROM THE FINISHED GRADE IN FRONT TO THE FINISHED GRADE BEHIND THE WALL.



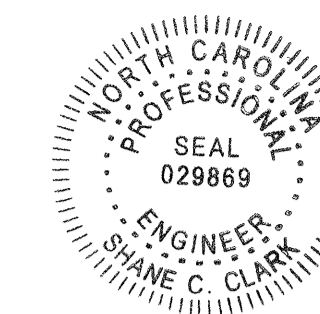
PROJECT NO.: B-4733  
 CLAY COUNTY  
 STATION: VARIES-SEE WALL ENVELOPES  
 SHEET 1 OF 2

PREPARED BY: J.T.W. DATE: 2.13  
 REVIEWED BY: S.C.C. DATE: 3.13

**GEOTECHNICAL ENGINEERING UNIT**  
 EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 CONTRACT OFFICE  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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





Signature: *Shane C. Clark* Date: 3/14/13

**NOTES:**

FOR STONE VENEERED CONCRETE MASONRY UNIT (CMU) RETAINING WALLS, SEE STONE VENEERED CONCRETE MASONRY UNIT (CMU) RETAINING WALLS SPECIAL PROVISION.

STONE TREATMENT FOR WALL IS TO BE IRREGULARLY SIZED NATURAL STONE, MORTARED (TO REPLICATE EXISTING STONE MASONRY IN THE VICINITY) AND TIED INTO CMU WALL.

ALL CMU ARE TO BE POUR-THROUGH BOND BEAM TYPE UNITS.

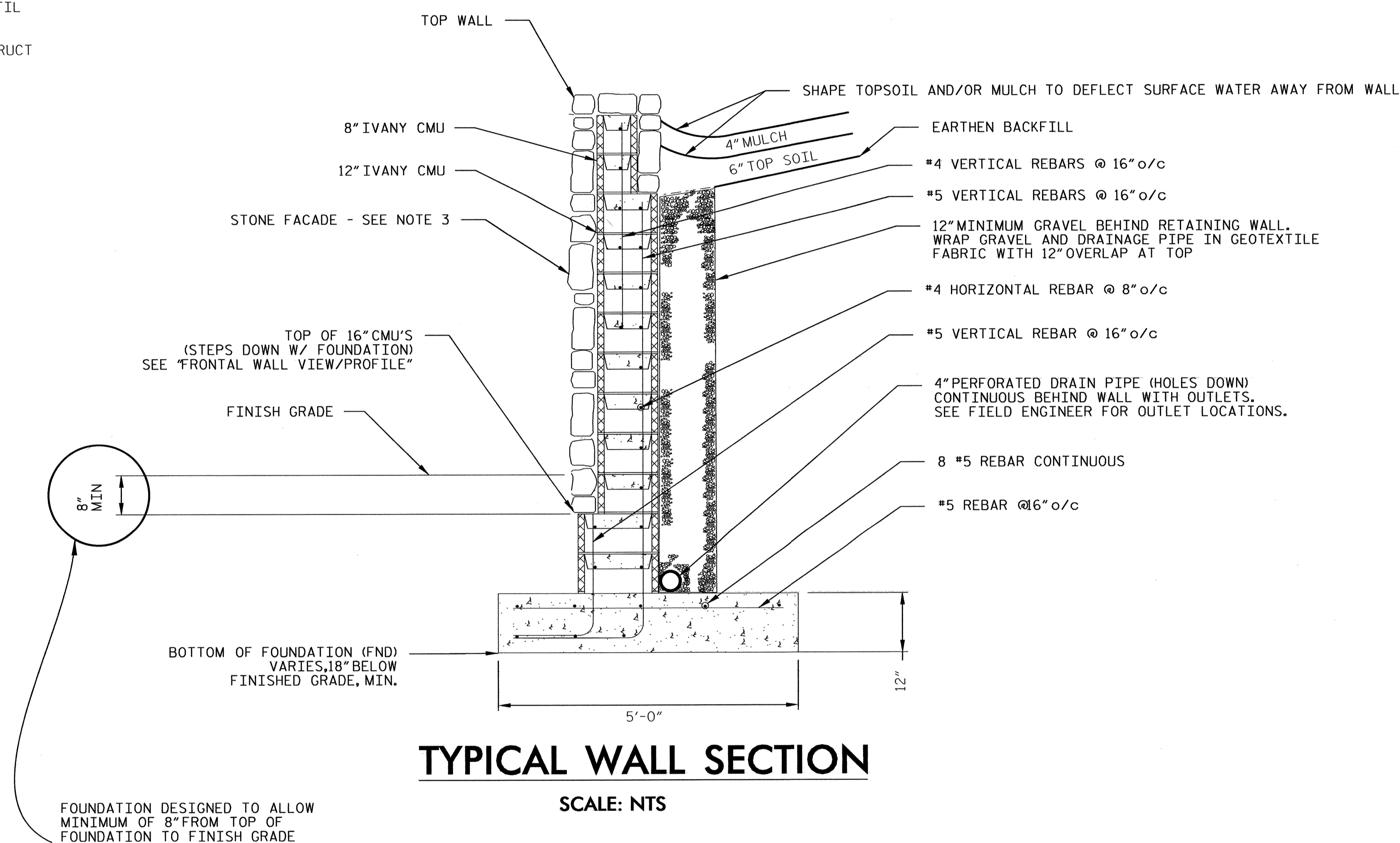
A FENCE OR HANDRAIL IS REQUIRED BEHIND THE RETAINING WALL. SEE ROADWAY PLANS FOR FENCE FOR ADDITIONAL INFORMATION AND PLACEMENT DETAILS.

A NATURAL STONE VENEER FINISH IS REQUIRED FOR THIS RETAINING WALL.

A DRAIN IS REQUIRED FOR THIS RETAINING WALL.

BEFORE BEGINNING CMU WALL CONSTRUCTION FOR THIS RETAINING WALL, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

AT THE CONTRACTOR'S OPTION, "TEMPORARY SHORING FOR WALL CONSTRUCTION" MAY BE USED TO CONSTRUCT RETAINING WALL. SEE STONE VENEERED CONCRETE MASONRY UNIT (CMU) RETAINING WALLS SPECIAL PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.



**TYPICAL WALL SECTION**

SCALE: NTS

FOUNDATION DESIGNED TO ALLOW MINIMUM OF 8" FROM TOP OF FOUNDATION TO FINISH GRADE

**PROJECT NO.:** B-4733  
**CLAY COUNTY**  
**STATION:** VARIES-SEE WALL ENVELOPES  
 SHEET 2 OF 2

**GEOTECHNICAL ENGINEERING UNIT**

EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 CONTRACT OFFICE

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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

PREPARED BY: SCC	DATE: 2.13
REVIEWED BY: EJS	DATE: 3.13



## 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.

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