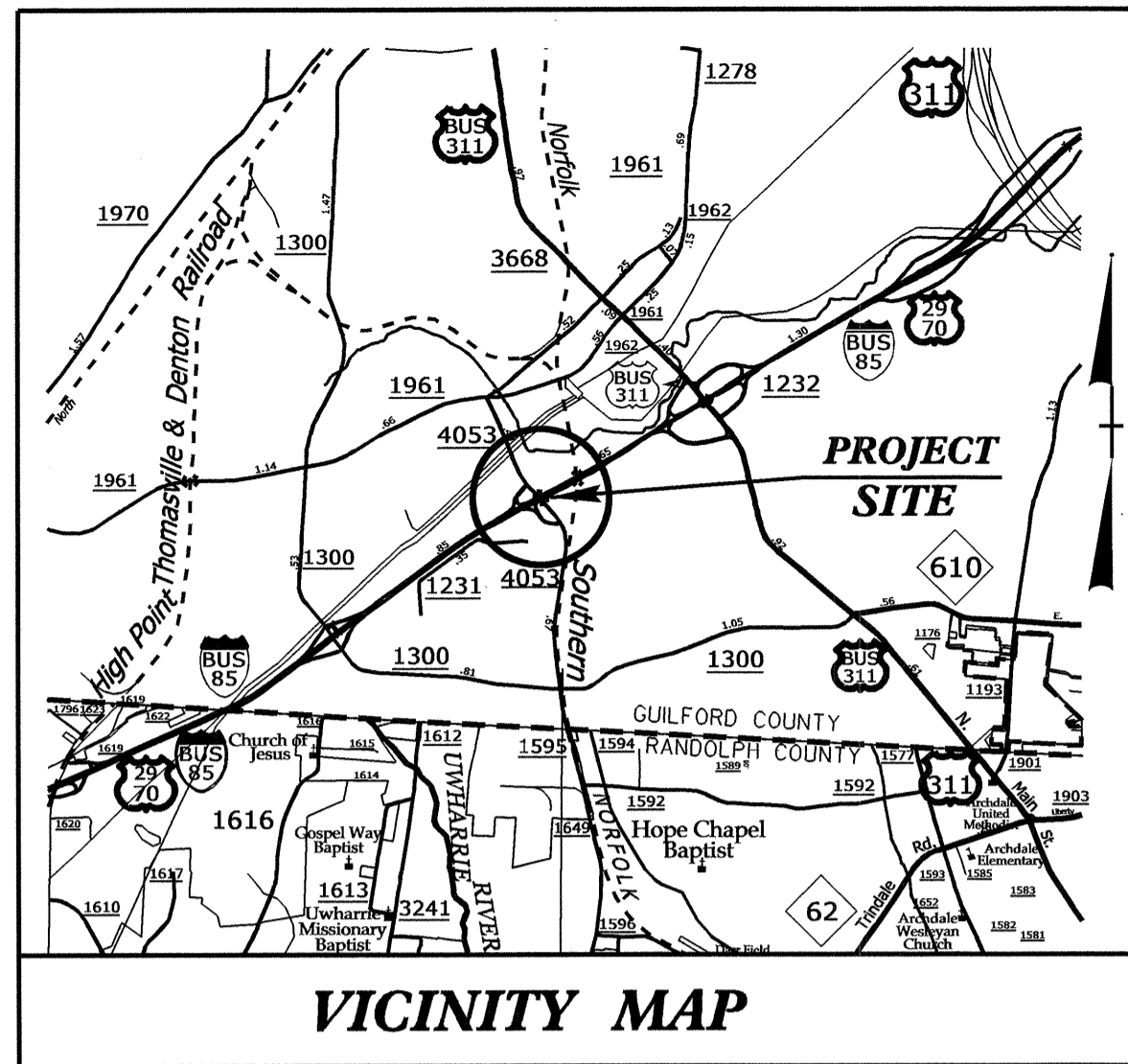


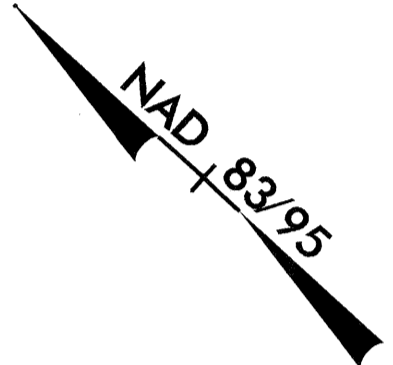
**CONTRACT C202846 TIP NO: B-4760**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4760		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38532.1.1	BRZ-4053(1)	PE	
38532.2.1	BRZ-4053(1)	RW & UTIL	
38532.3.1	BRZ-4053(1)	CONST.	

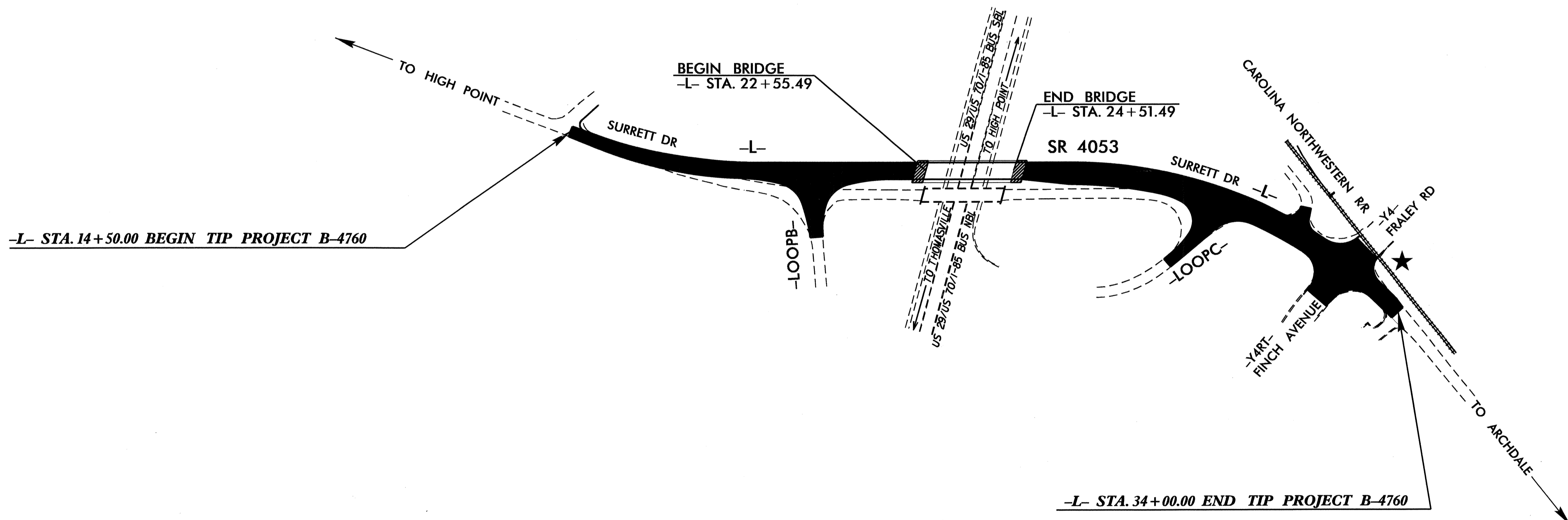


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**GUILFORD COUNTY**

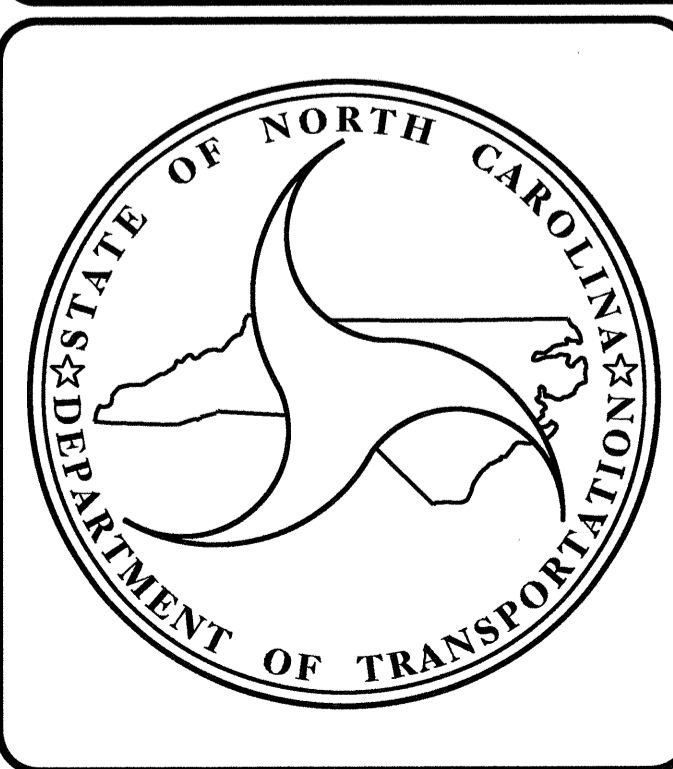
**REPLACEMENT OF BRIDGE 77 ON SR 4053  
OVER US 29 /US 70 /I-85 BUS  
GRADING, DRAINAGE, PAVING, STRUCTURE,  
CULVERT EXTENSION AND SIGNAL**



**STRUCTURE  
&  
CULVERT EXT.**



★ **TRAFFIC SIGNAL**



**DESIGN DATA**

ADT 2012 =	12,500
ADT 2035 =	17,600
DHV =	12 %
D =	55 %
T =	8 % *
V =	40 MPH
* TTST =	3% DUAL 5%
FUNC CLASS =	COLLECTOR
STATEWIDE	TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4760 =	0.332 MILES
LENGTH STRUCTURE TIP PROJECT B-4760 =	0.037 MILES
TOTAL LENGTH TIP PROJECT B-4760 =	0.369 MILES

Prepared for the office of:  
**DIVISION OF HIGHWAYS**

2012 STANDARD SPECIFICATIONS

**LETTING DATE :**  
JULY 17, 2012

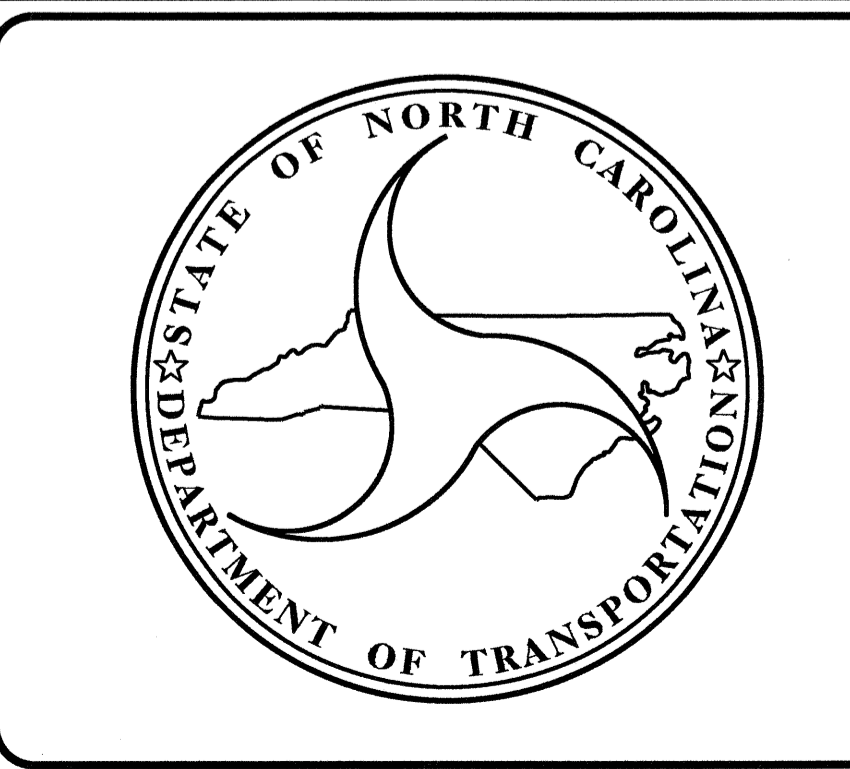
**SE & A**  
SIMPSON ENGINEERS ASSOCIATES  
5520 Dillard Drive  
Suite 120  
Cory, NC 27518  
(919) 852-0468  
(919) 852-0598 (Fax)  
www.simpsonengr.com  
LICENSURE NO. C2521

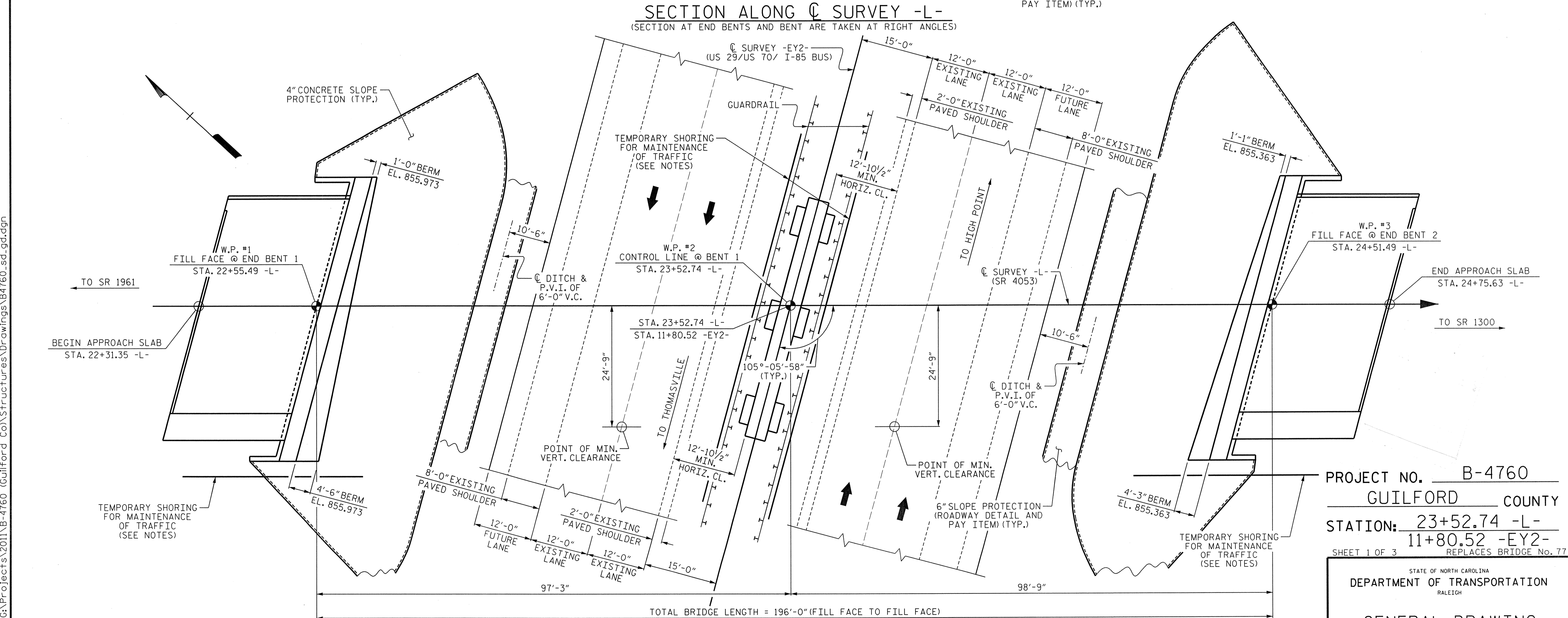
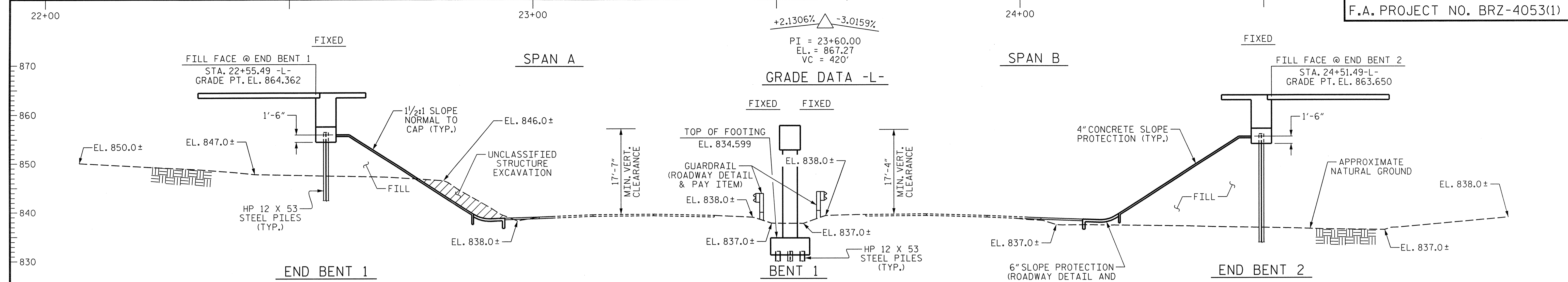
**STRUCTURES MANAGEMENT UNIT**  
1000 BIRCH RIDGE DR.  
RALEIGH, N.C. 27610

Culvert Prepared by:

**OMAR R. AZIZI, P.E.**  
PROJECT ENGINEER

**TIMOTHY L. COGGINS, P.E.**  
PROJECT DESIGN ENGINEER





PROJECT NO. B-4760  
 GUILFORD COUNTY  
 STATION: 23+52.74 -L-  
11+80.52 -EY2-  
 SHEET 1 OF 3 REPLACES BRIDGE No. 77

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE ON SR 4053  
 OVER US 29 / US 70 /  
 I-85 BUS BETWEEN  
 SR 1961 AND SR 1300

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

TOTAL SHEETS: 37

PLANS PREPARED BY:  
**SIMPSON ENGINEERS ASSOCIATES**  
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 Suite 120  
 Cary, NC 27518  
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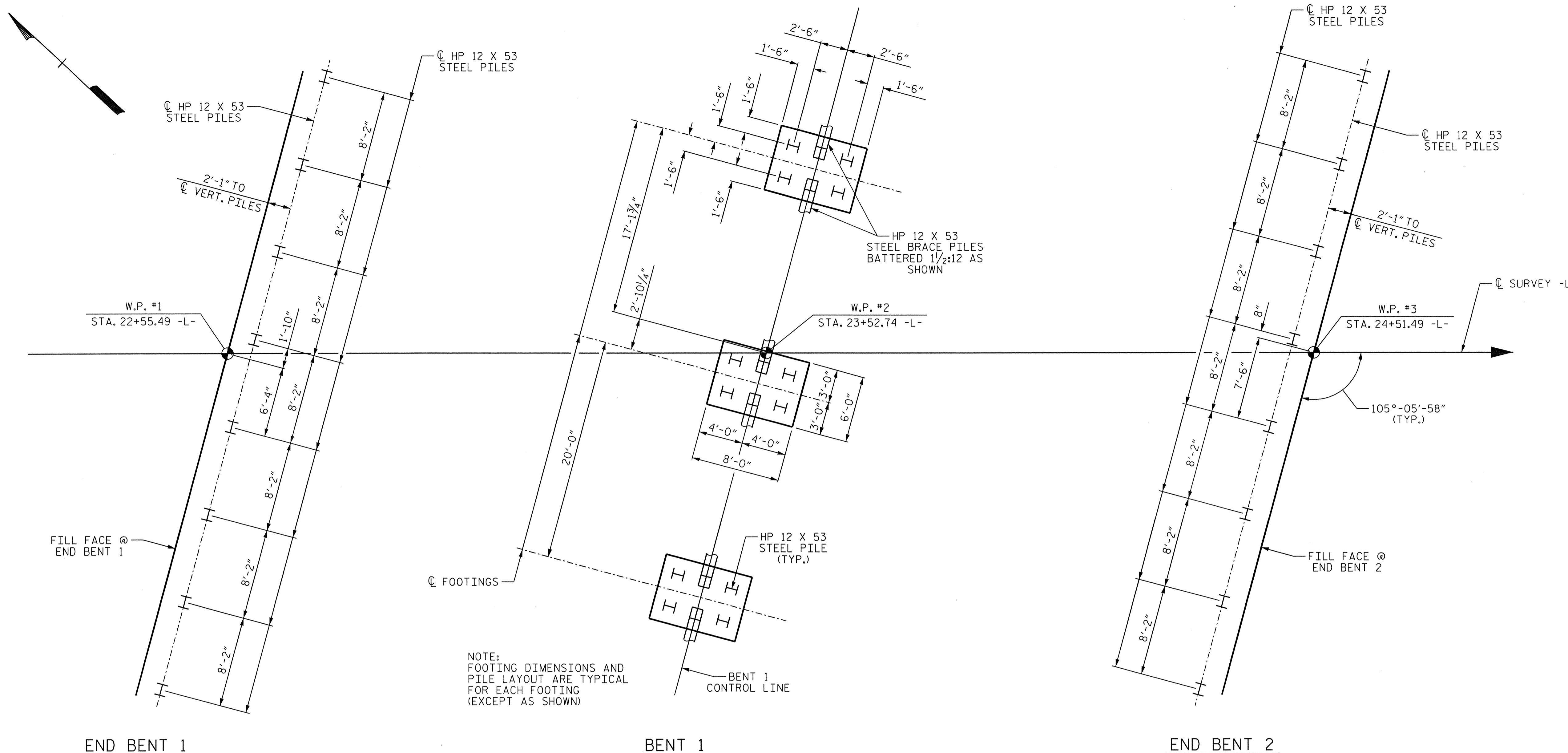
3/27/2012 2:34:13 PM G:\Projects\2011\B-4760 (Guilford Co)\Structures\Drawings\B4760.sd.gd.dgn  
 DRAWN BY: T. BANKOVICH DATE: 2-2012  
 CHECKED BY: M.A. AVERETTE DATE: 2-2012

**FOUNDATION NOTES:**

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1, BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 130 TONS PER PILE.

DRIVE PILES AT END BENT 1, BENT 1, AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 220 TONS PER PILE.



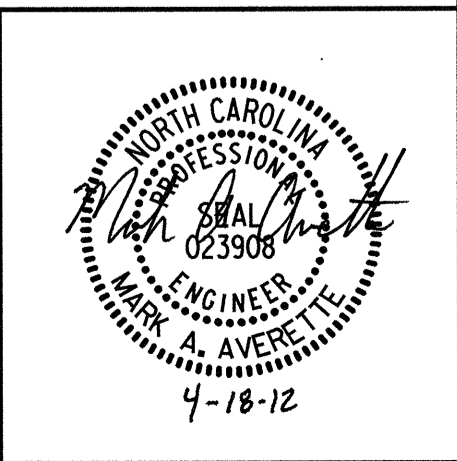
NOTE:  
FOOTING DIMENSIONS AND  
PILE LAYOUT ARE TYPICAL  
FOR EACH FOOTING  
(EXCEPT AS SHOWN)

**FOUNDATION LAYOUT**  
(DIMENSIONS LOCATING PILES ARE TO THE PILE CENTERLINE AT THE BOTTOM OF CAP OR FOOTING)

3/6/2012 11:27:42 AM G:\Projects\2011\B-4760 (Guilford Co)\Structures\Drawings\B4760\_sd.gd.dgn

DRAWN BY: T. BANKOVICH DATE: 2-2012  
CHECKED BY: M. AVERETTE DATE: 2-2012

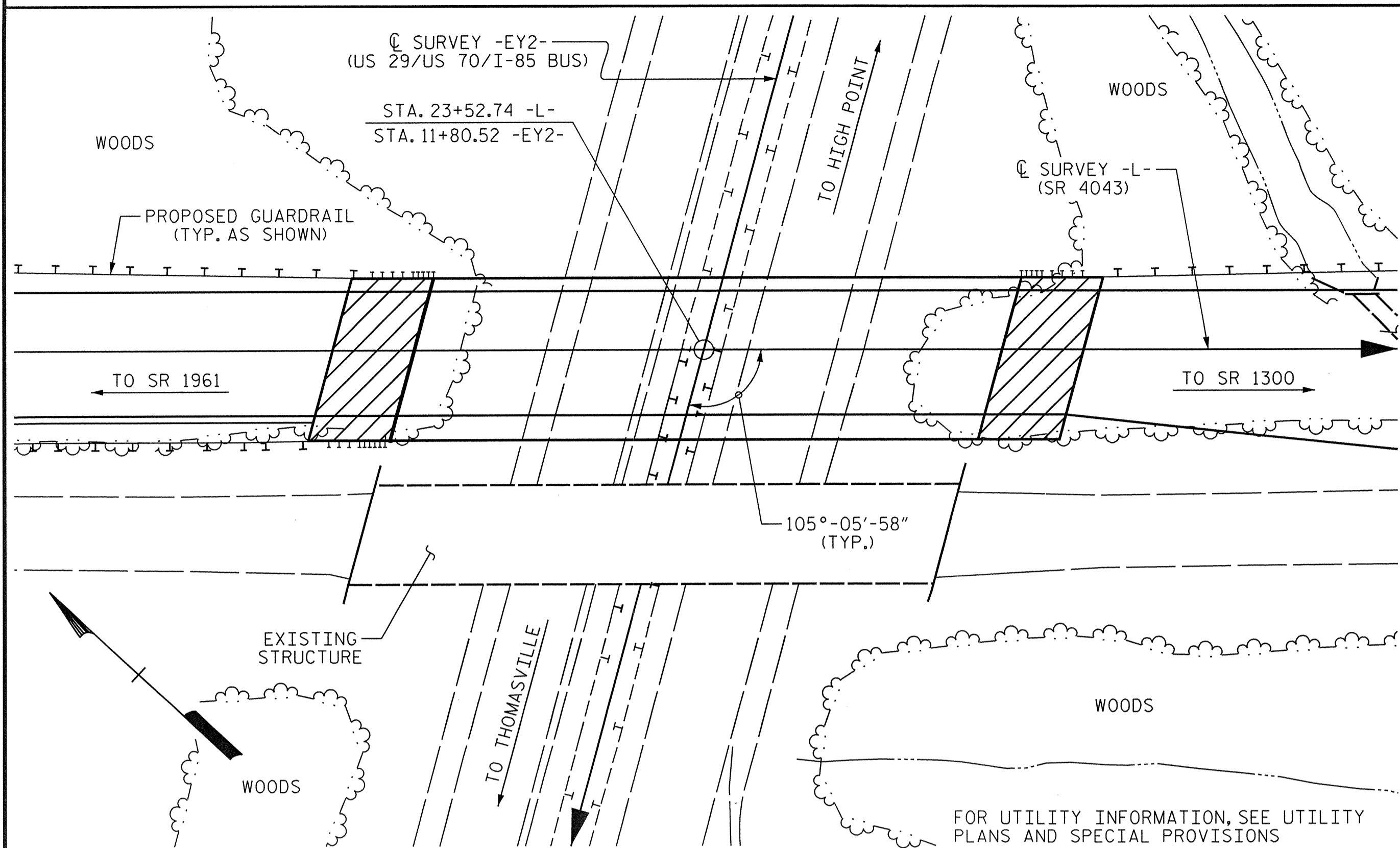
PLANS PREPARED BY:  
**SEA**  
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PROJECT NO. B-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-  
11+80.52 -EY2-  
SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR BRIDGE ON SR 4053 OVER US 29 / US 70 / I-85 BUS BETWEEN SR 1961 AND SR 1300					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					37

BM #2: CHISELED SQUARE IN CONCRETE, IN SOUTHERN MOST TIP OF PARKING LOT OF EAGLE SCREENPRINTING AND EMBROIDERY 404.43' RT. OF STA. 19+90.40 -L-, EL. 855.68'



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

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

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 1 SPAN OF 37'-6", 2 SPANS OF 52'-6" AND 1 SPAN OF 37'-6" WITH A CONCRETE DECK ON REINFORCED CONCRETE DECK GIRDERS WITH A CLEAR ROADWAY WIDTH OF 26.0 FT. WITH REINFORCED CONCRETE CAP ON TIMBER PILE END BENTS AND REINFORCED CONCRETE POST AND BEAM INTERIOR BENTS AND LOCATED AT THE SITE OF THE 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.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. TO THE LEFT AND 35 FT. TO THE RIGHT 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.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

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.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION FOR BENT 1	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS	HP 12 X 53 STEEL PILES	TWO BAR METAL RAIL	THREE BAR METAL RAIL	1'-2" X 2'-6" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS		
	LUMP SUM	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	
SUPERSTRUCTURE				10,208	9,930					10	961.36			186.46	186.46	194.28		
END BENT 1						37.6		7,319			8	240				325		
BENT 1						73.9		9,597	1,257		18	630						
END BENT 2						36.8		7,235			8	240				345		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	10,208	9,930	148.3	LUMP SUM	24,151	1,257	10	961.36	34	1,110	186.46	186.46	194.28	670	LUMP SUM

PROJECT NO. B-4760  
 GUILFORD COUNTY  
 STATION: 23+52.74 -L-  
11+80.52 -EY2-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

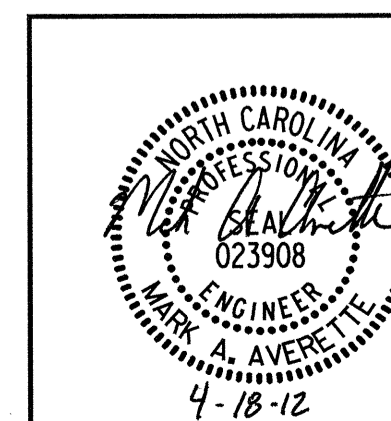
GENERAL DRAWING  
 FOR BRIDGE ON SR 4053  
 OVER US 29 / US 70 /  
 I-85 BUS BETWEEN  
 SR 1961 AND SR 1300

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

S-3  
TOTAL SHEETS  
37

PLANS PREPARED BY:

**SIMPSON & ASSOCIATES**  
 ENGINEERS  
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 (919) 852-0468  
 (919) 852-0598 (Fax)  
 www.simpsonengr.com  
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DRAWN BY: T. BANKOVICH DATE: 2-2012  
 CHECKED BY: M.A. AVERETTE DATE: 2-2012

LOAD FACTORS:

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

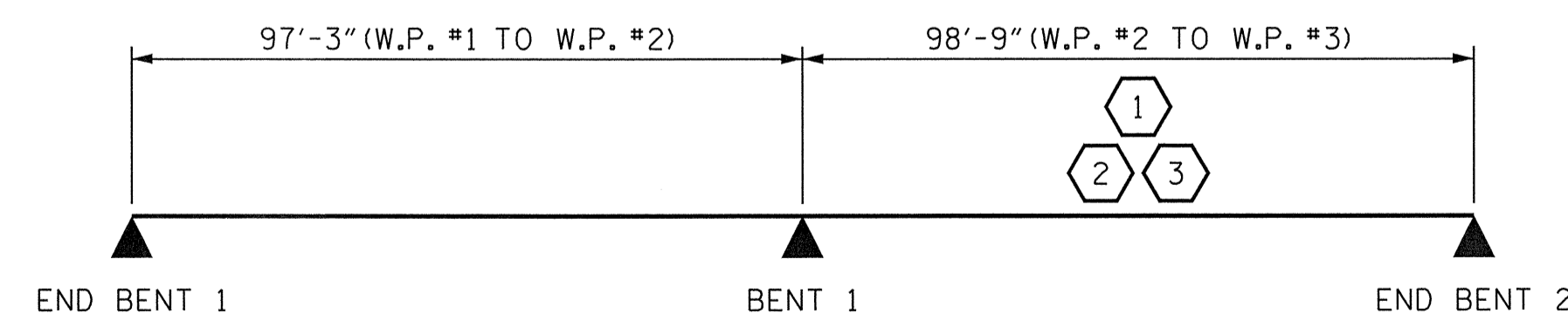
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																							
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER		
						MOMENT					SHEAR					MOMENT							
						LIVE-LOAD FACTORS (%LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (F+)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (F+)	LIVE-LOAD FACTORS (%LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (F+)
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.04	--	1.75	0.925	1.10	B	EL	48.408	1.073	1.36	B	I	9.708	0.80	0.865	1.04	B	I	48.408	
	HL-93 (OPERATING)	N/A		1.43	--	1.35	0.925	1.43	B	EL	48.408	1.073	1.79	B	I	9.708	N/A	--	--	--	--	--	
	HS-20 (INVENTORY)	36.000	②	1.44	51.8	1.75	0.925	1.52	B	EL	48.408	1.073	1.83	B	I	9.708	0.80	0.865	1.44	B	I	48.408	
	HS-20 (OPERATING)	36.000		1.97	70.9	1.35	0.925	1.97	B	EL	48.408	1.073	2.41	B	I	9.708	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.40	45.9	1.40	0.925	4.49	B	EL	48.408	1.073	5.83	B	I	9.708	0.80	0.865	3.40	B	I	48.408
		SNGARBS2	20.000		2.47	49.4	1.40	0.925	3.26	B	EL	48.408	1.073	4.06	B	I	9.708	0.80	0.865	2.47	B	I	48.408
		SNAGRIS2	22.000		2.31	50.8	1.40	0.925	3.05	B	EL	48.408	1.073	3.74	B	I	9.708	0.80	0.865	2.31	B	I	48.408
		SNCOTTS3	27.250		1.69	46.1	1.40	0.925	2.23	B	EL	48.408	1.073	2.85	B	I	9.708	0.80	0.865	1.69	B	I	48.408
		SNAGGRS4	34.925		1.39	48.5	1.40	0.925	1.83	B	EL	48.408	1.073	2.31	B	I	9.708	0.80	0.865	1.39	B	I	48.408
		SNS5A	35.550		1.36	48.3	1.40	0.925	1.79	B	EL	48.408	1.073	2.32	B	I	9.708	0.80	0.865	1.36	B	I	48.408
		SNS6A	39.950		1.23	49.1	1.40	0.925	1.63	B	EL	48.408	1.073	2.09	B	I	9.708	0.80	0.865	1.23	B	I	48.408
		SNS7B	42.000		1.18	49.6	1.40	0.925	1.55	B	EL	48.408	1.073	2.03	B	I	9.708	0.80	0.865	1.18	B	I	48.408
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.50	49.5	1.40	0.925	1.99	B	EL	48.408	1.073	2.52	B	I	9.708	0.80	0.865	1.50	B	I	48.408
		TNT4A	33.075		1.51	49.9	1.40	0.925	1.99	B	EL	48.408	1.073	2.47	B	I	9.708	0.80	0.865	1.51	B	I	48.408
		TNT6A	41.600		1.22	50.8	1.40	0.925	1.62	B	EL	48.408	1.073	2.14	B	I	9.708	0.80	0.865	1.22	B	I	48.408
		TNT7A	42.000		1.22	51.2	1.40	0.925	1.62	B	EL	48.408	1.073	2.10	B	I	9.708	0.80	0.865	1.22	B	I	48.408
		TNT7B	42.000		1.25	52.5	1.40	0.925	1.66	B	EL	48.408	1.073	2.00	B	I	9.708	0.80	0.865	1.25	B	I	48.408
		TNAGRIT4	43.000		1.20	51.6	1.40	0.925	1.59	B	EL	48.408	1.073	1.94	B	I	9.708	0.80	0.865	1.20	B	I	48.408
TNAGT5A	45.000		1.14	51.3	1.40	0.925	1.50	B	EL	48.408	1.073	1.90	B	I	9.708	0.80	0.865	1.14	B	I	48.408		
TNAGT5B	45.000		③	1.13	50.9	1.40	0.925	1.49	B	EL	48.408	1.073	1.84	B	I	9.708	0.80	0.865	1.13	B	I	48.408	

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



LRFR SUMMARY

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

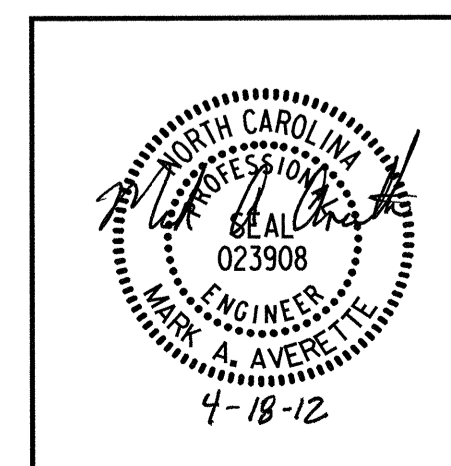
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE GIRDERS  
 (NON-INTERSTATE TRAFFIC)

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

PLANS PREPARED BY:

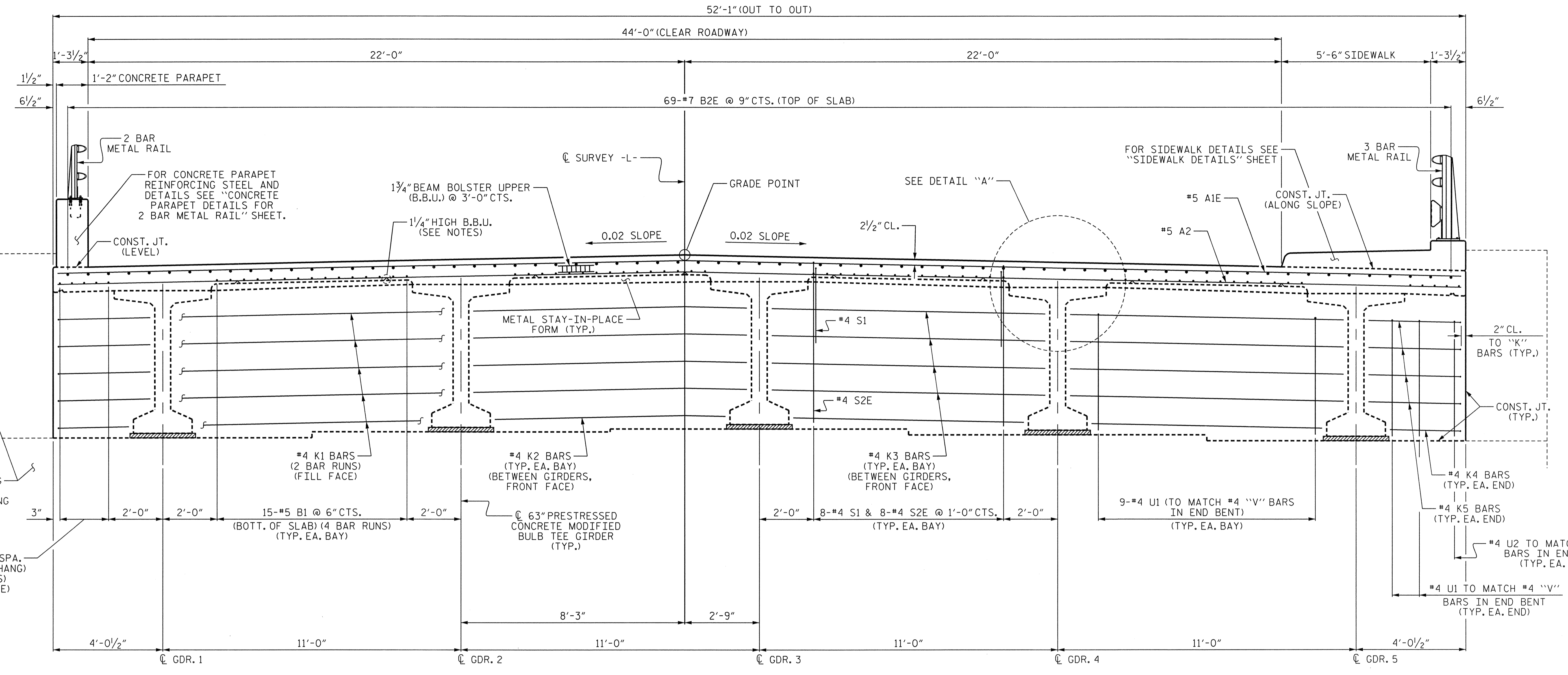
**SIMPSON ENGINEERS & ASSOCIATES**  
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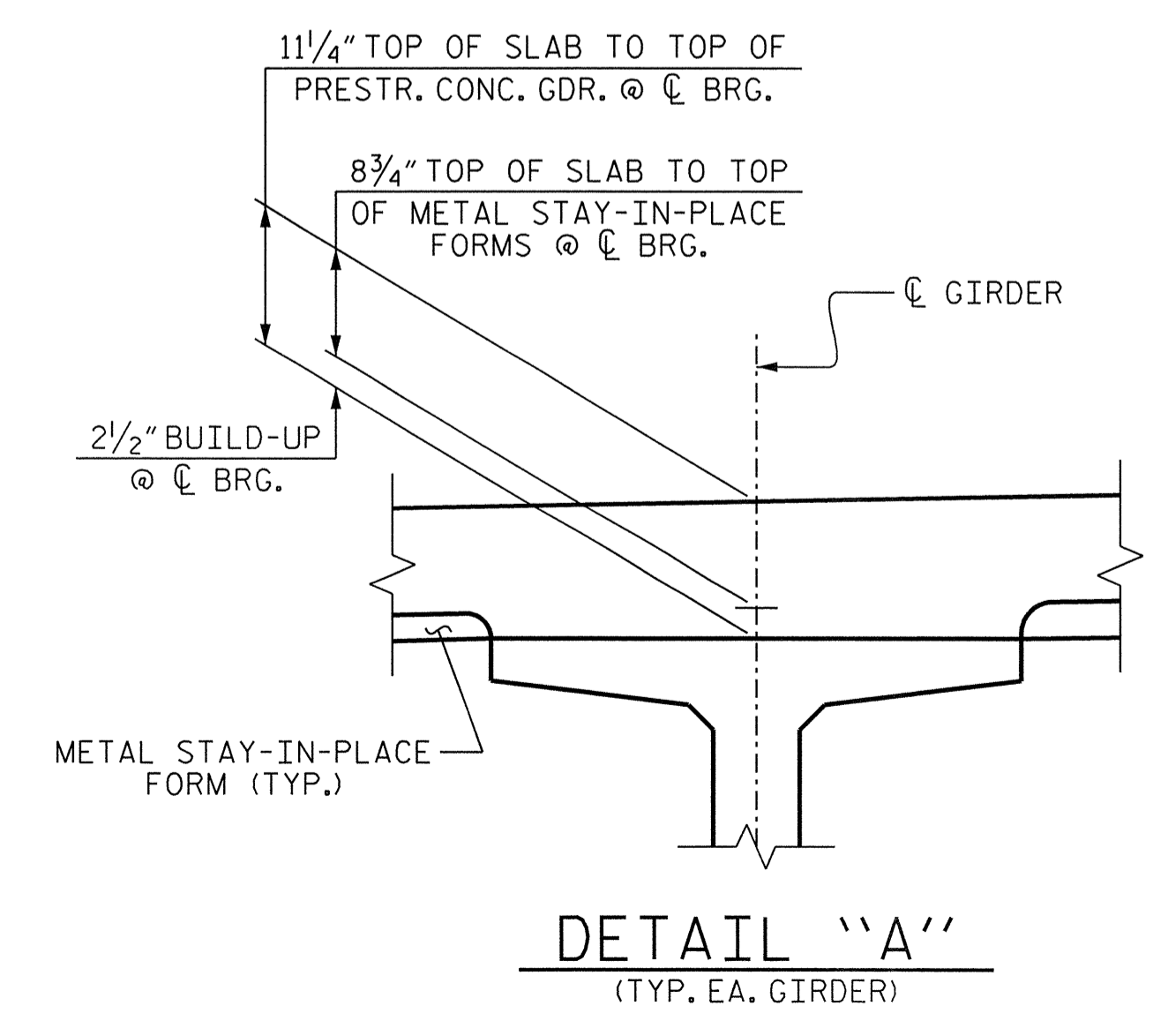
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DRAWN BY: T. BANKOVICH DATE: 1-2012  
 CHECKED BY: M. AVERETTE DATE: 2-2012

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**END ELEVATION**  
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



**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.

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

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

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.

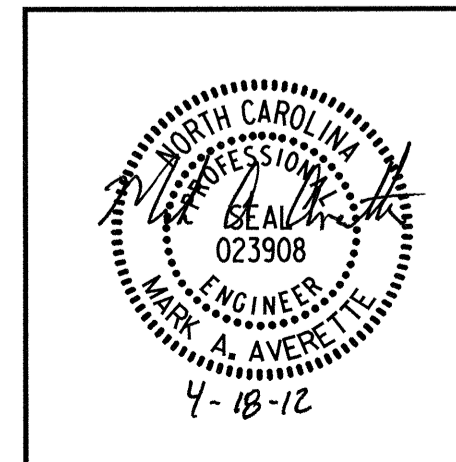
PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE

**TYPICAL SECTION**

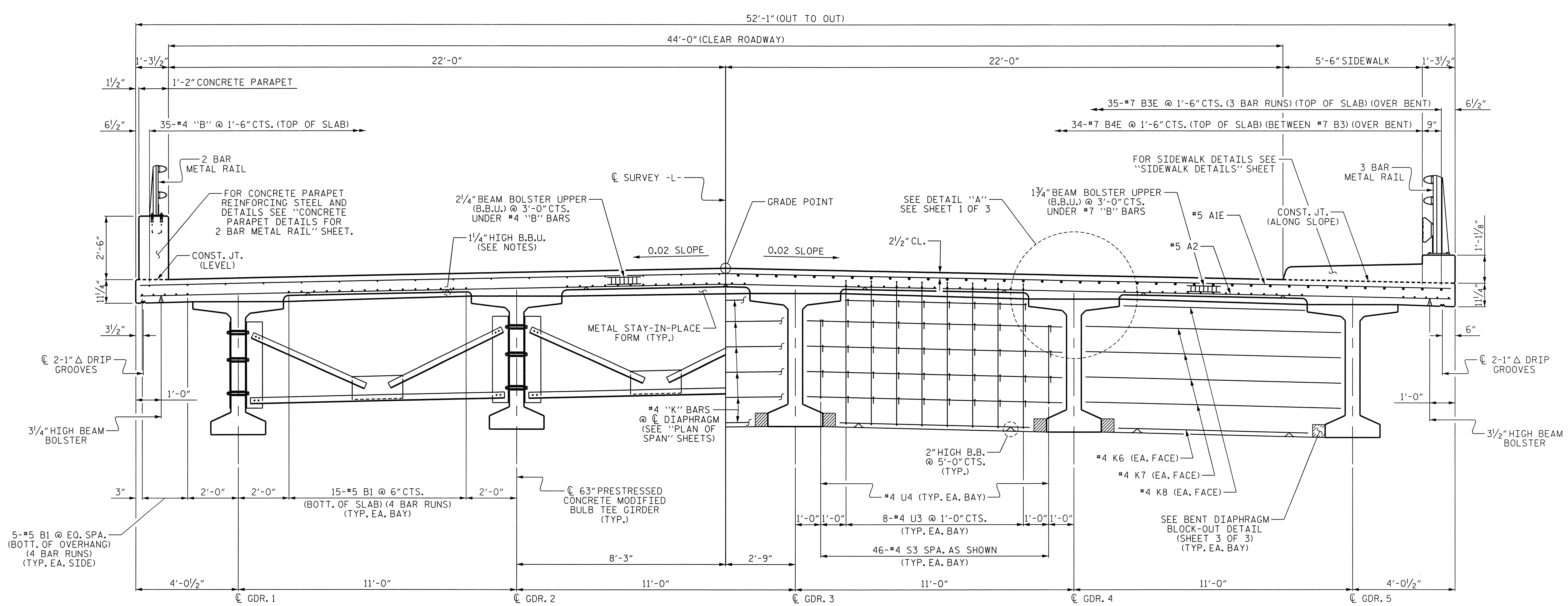
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			37

PLANS PREPARED BY:  
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DRAWN BY: T. BANKOVICH DATE: 10-2011  
 CHECKED BY: M. AVERETTE DATE: 1-2012

3/6/2012 11:27:44 AM G:\Projects\2011\B-4760 (Guilford Co.)\Structures\Drawings\B4760\_sd\_ts.dgn



**PARTIAL TYPICAL SECTION**  
(SHOWING INTERMEDIATE DIAPHRAGMS)

**PARTIAL TYPICAL SECTION**  
(SHOWING CONTINUOUS FOR LIVE LOAD BENT DIAPHRAGMS)

**TYPICAL SECTION**  
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS SEE  
"INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED  
BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET

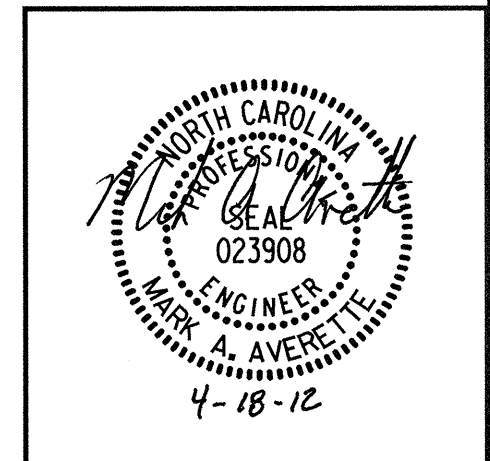
PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

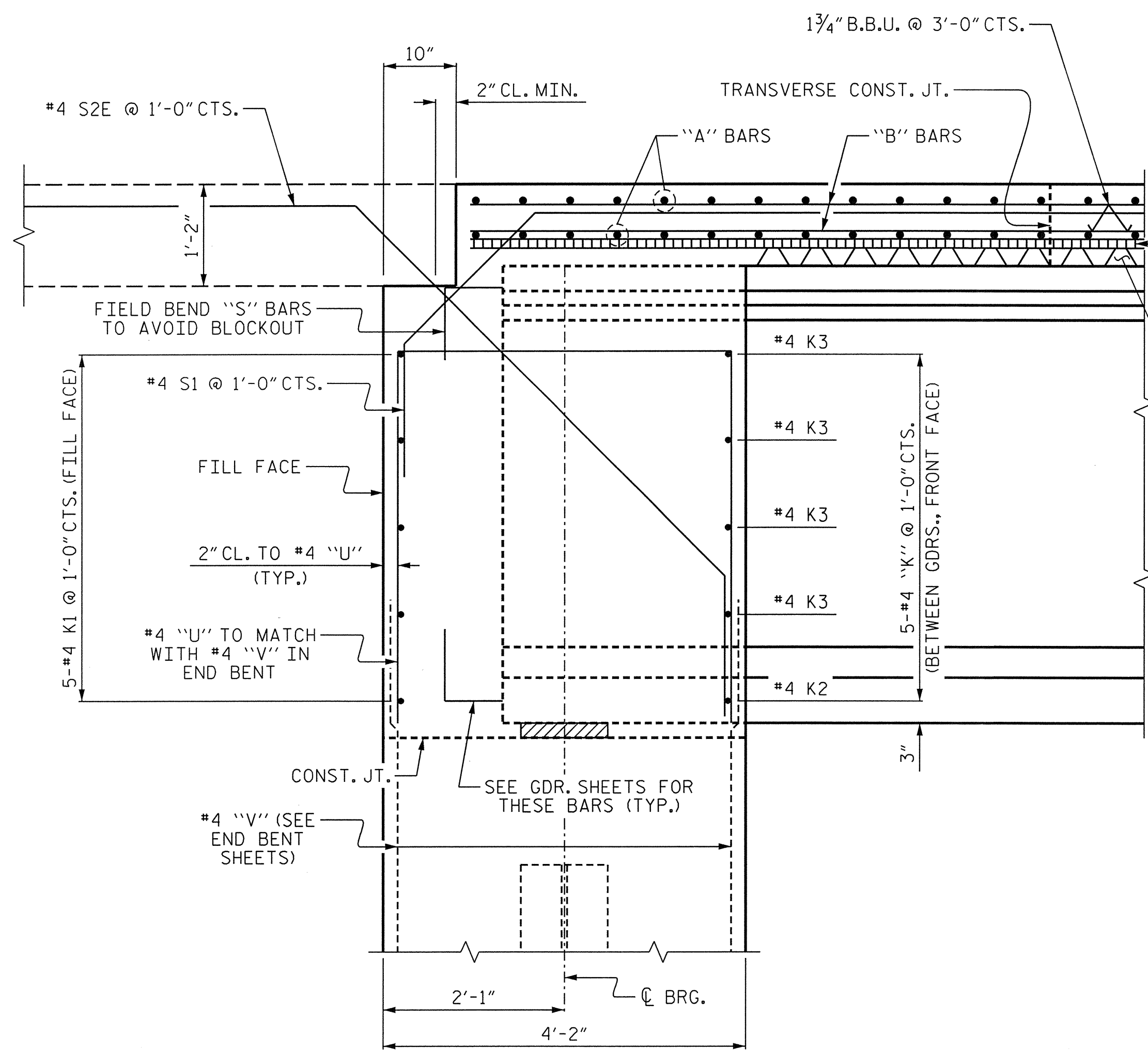
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			37

PLANS PREPARED BY:  
**SIMPSON ENGINEERS & ASSOCIATES**  
 5520 Dillard Drive  
 Suite 120  
 Cary, NC 27518  
 (919) 852-0468  
 (919) 852-0598 (Fax)  
 www.simpsonengr.com  
 LICENSURE NO. C2521

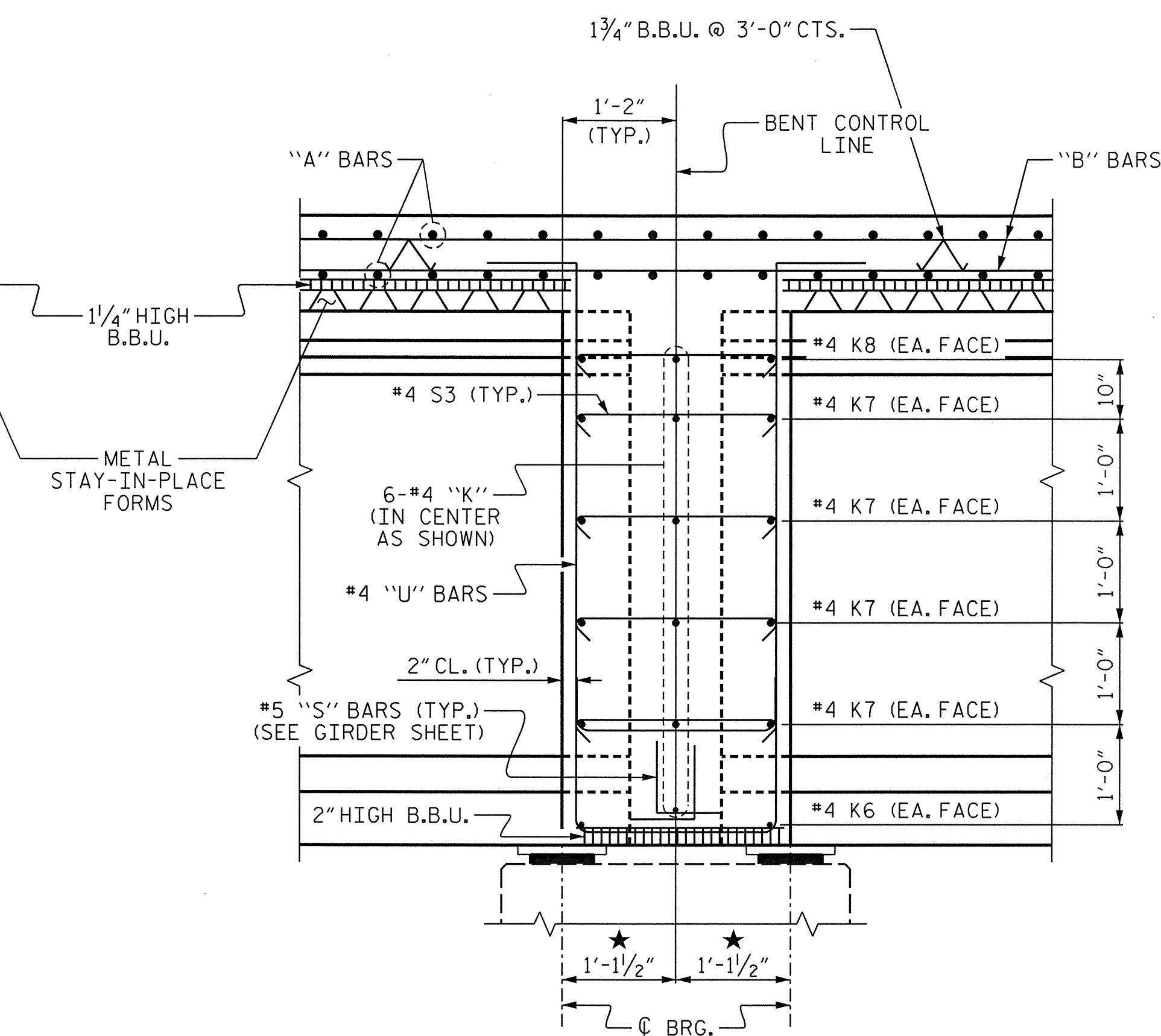


DRAWN BY: T. BANKOVICH DATE: 10-2011  
 CHECKED BY: M. AVERETTE DATE: 1-2012

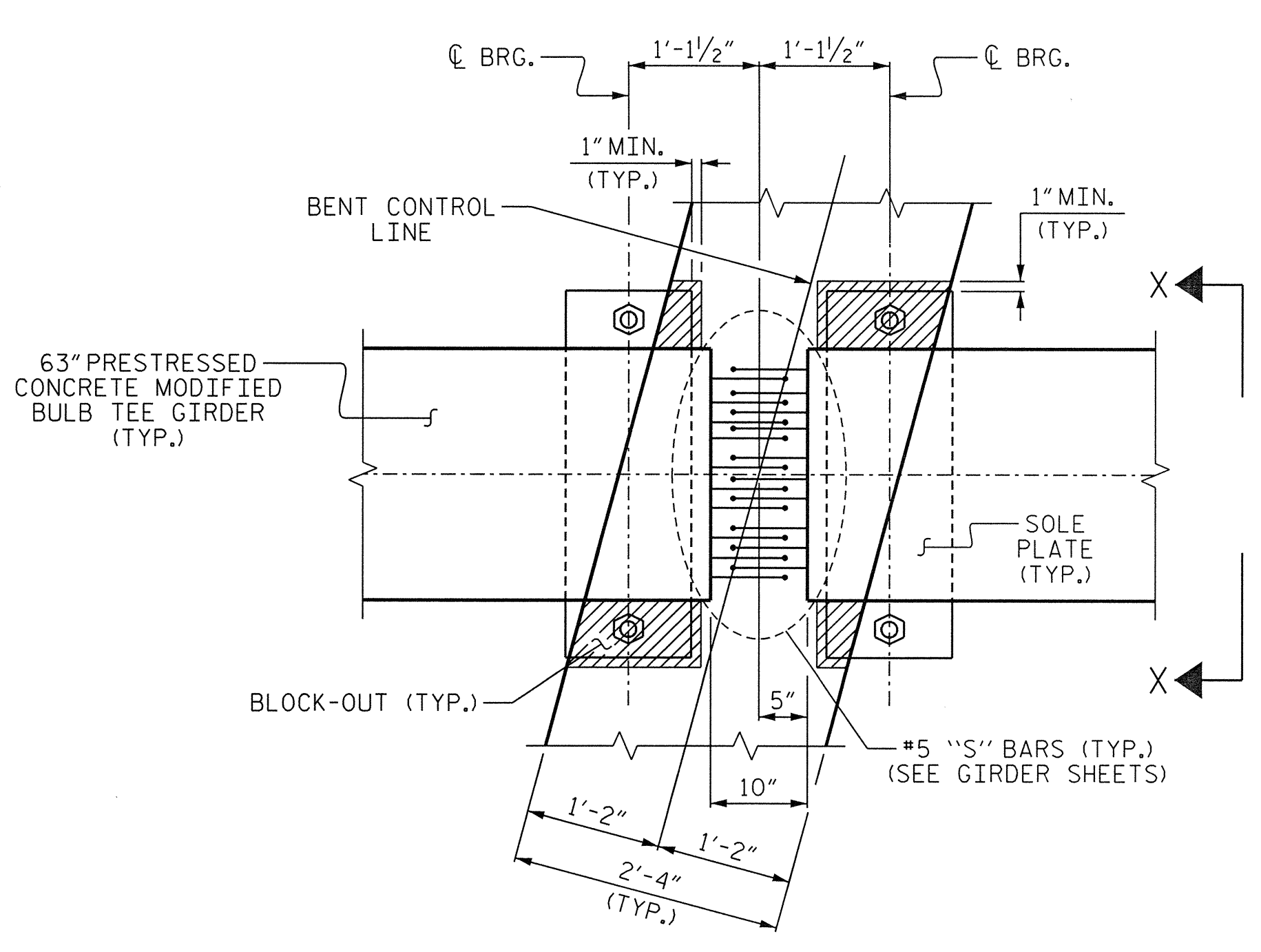
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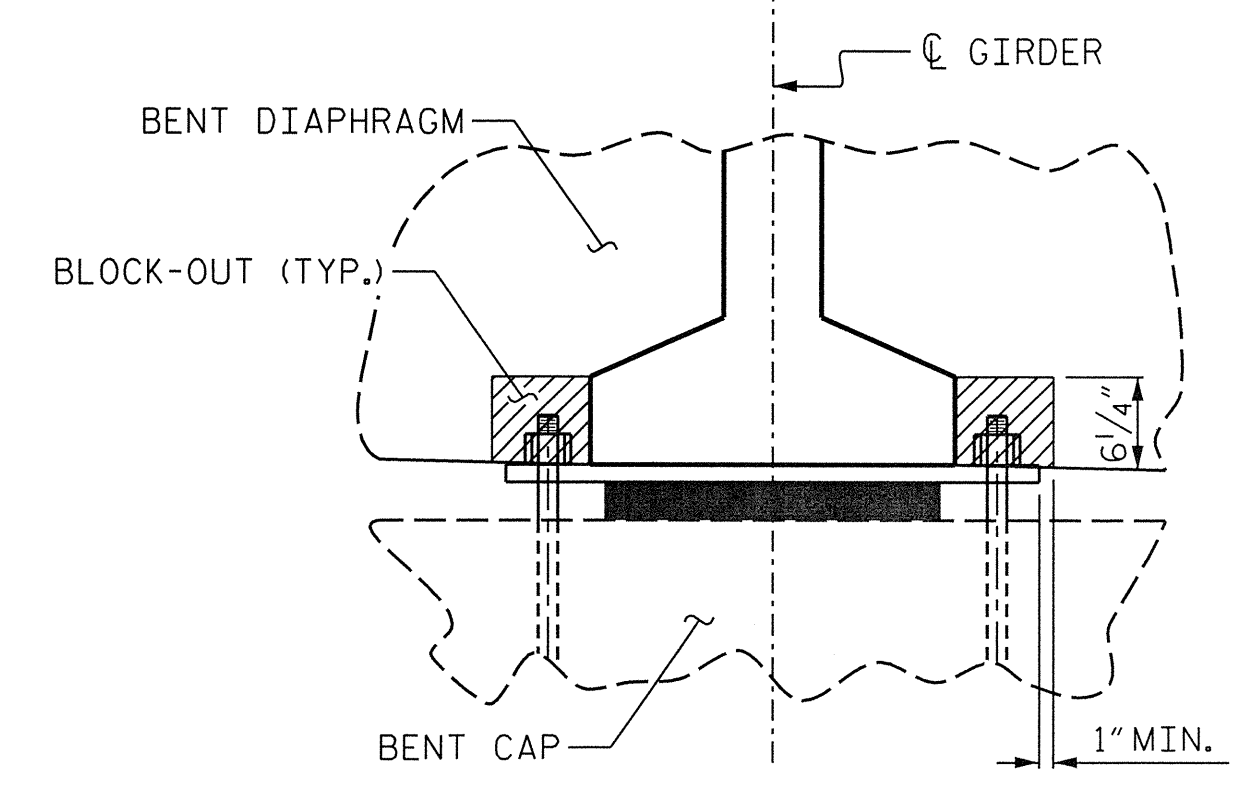
SECTION THRU END BENT



SECTION B-B  
★ MEASURED ALONG C GIRDER

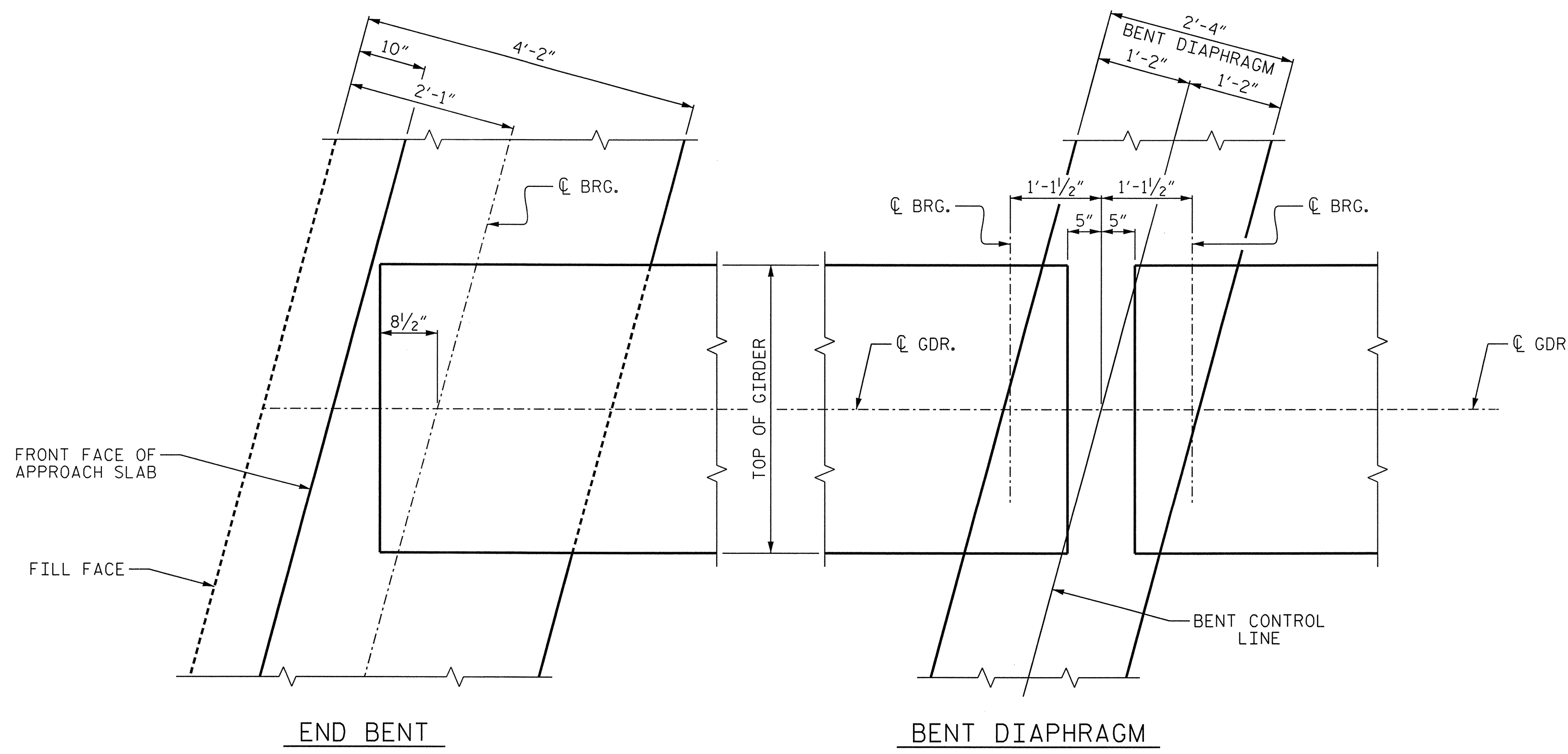


PLAN



SECTION X-X

BENT DIAPHRAGM  
BLOCK-OUT DETAIL



END BENT

BENT DIAPHRAGM

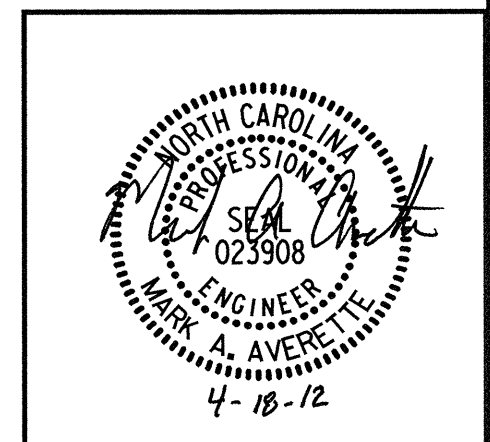
PLAN OF DIAPHRAGMS

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

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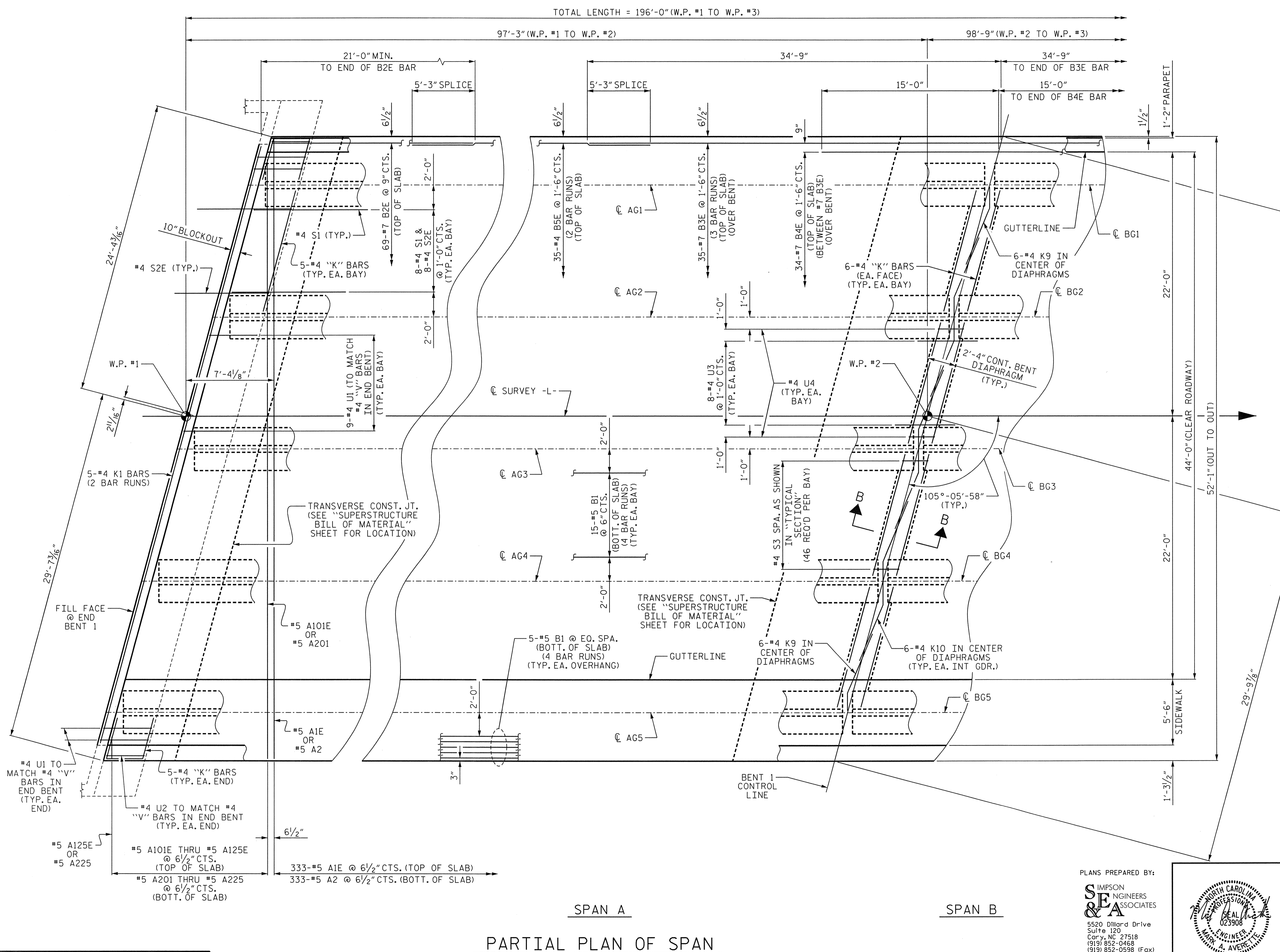
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NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS: 37

DRAWN BY: T. BANKOVICH DATE: 10-2011  
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**NOTES:**  
 FOR PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEET.  
 FOR SIDEWALK DETAILS, SEE "SIDEWALK DETAILS" SHEET.  
 FOR SECTION B-B, SEE "TYPICAL SECTION" SHEET 3 OF 3.  
 FOR REINFORCING STEEL IN END BENT CAP AND WINGS, SEE "END BENT" SHEETS.  
 FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEETS.

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

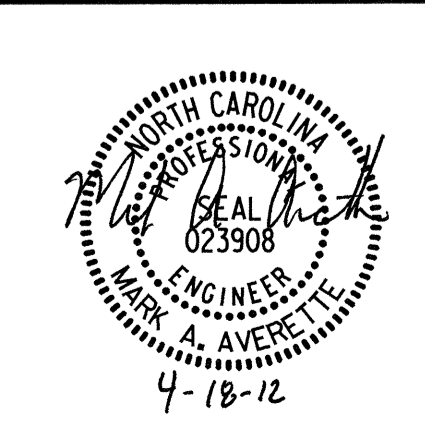
SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPANS

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

TOTAL SHEETS: 37

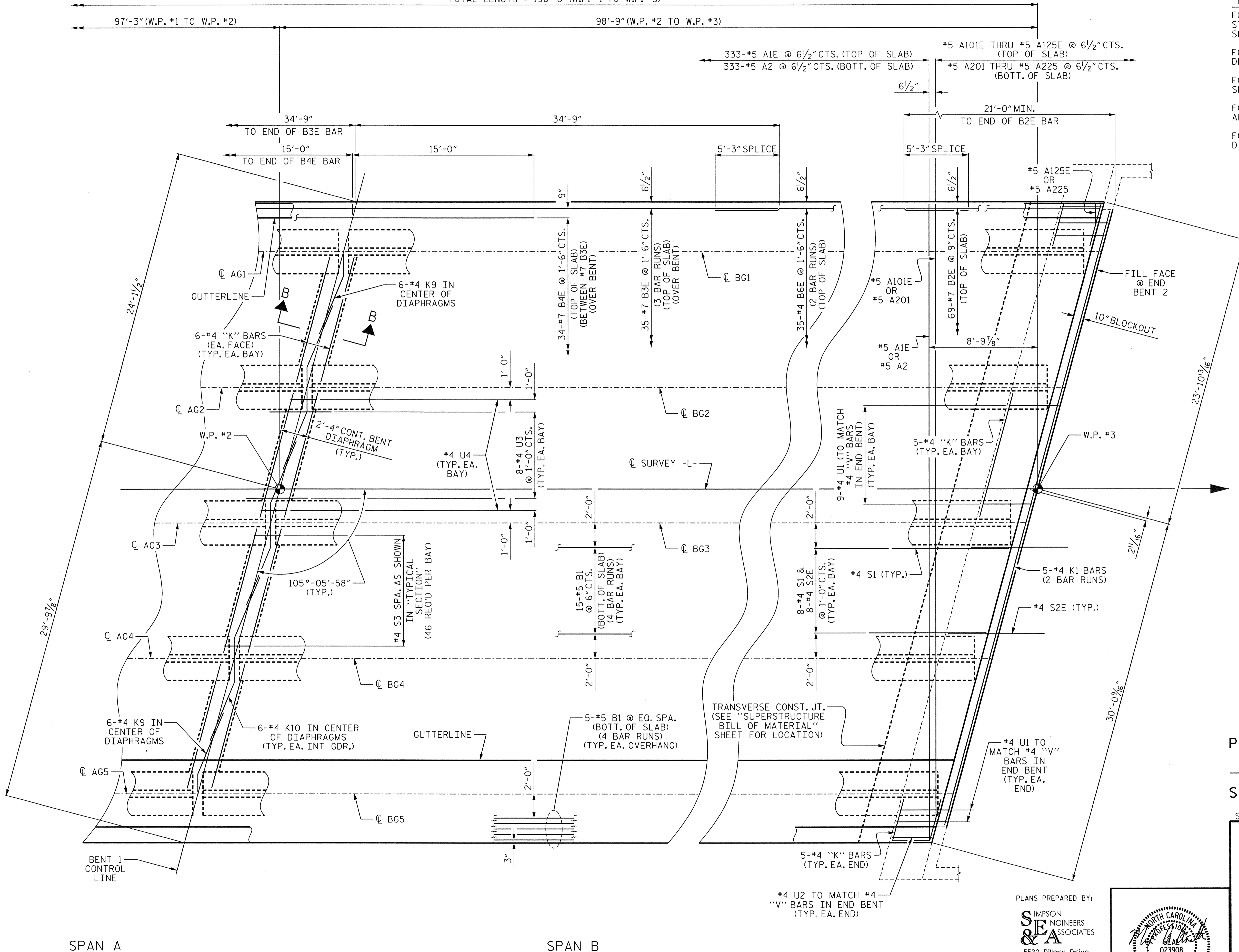
PLANS PREPARED BY:  
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SPAN A  
 SPAN B  
 PARTIAL PLAN OF SPAN

DRAWN BY: T. BANKOVICH DATE: 10-2011  
 CHECKED BY: M. AVERETTE DATE: 1-2012

TOTAL LENGTH = 196'-0" (W.P. #1 TO W.P. #3)



**NOTES:**  
 FOR PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEET.  
 FOR SIDEWALK DETAILS, SEE "SIDEWALK DETAILS" SHEET.  
 FOR SECTION B-B, SEE "TYPICAL SECTION" SHEET 3 OF 3.  
 FOR REINFORCING STEEL IN END BENT CAP AND WINGS, SEE "END BENT" SHEETS.  
 FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEETS.

SPAN A

SPAN B

PARTIAL PLAN OF SPAN

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

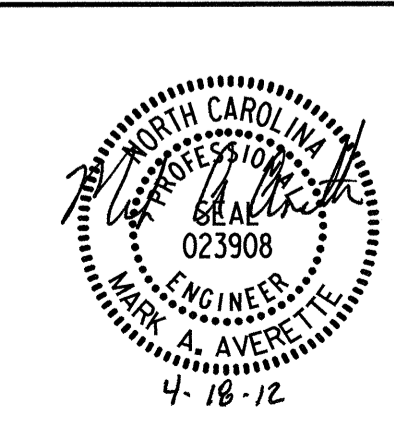
SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPANS

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

SHEET NO. 5-9  
TOTAL SHEETS 37

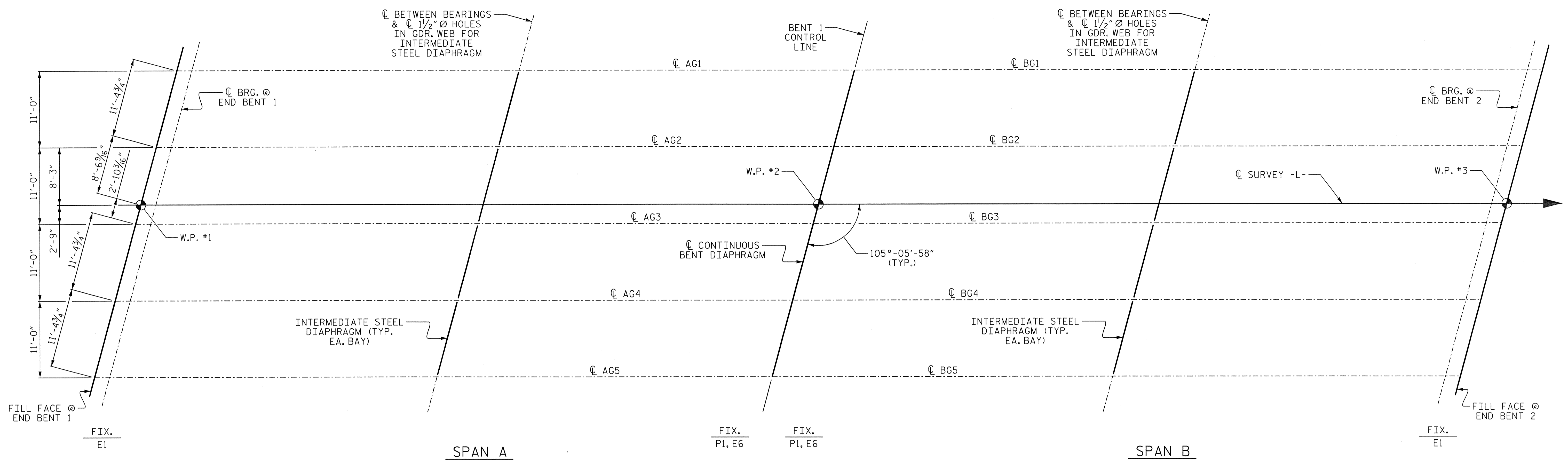
PLANS PREPARED BY:  
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 ENGINEERS  
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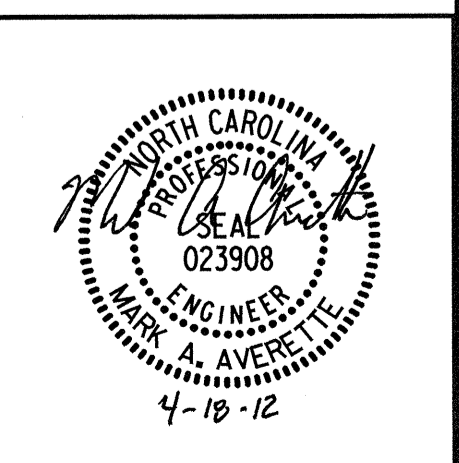
**GIRDER LAYOUT**

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

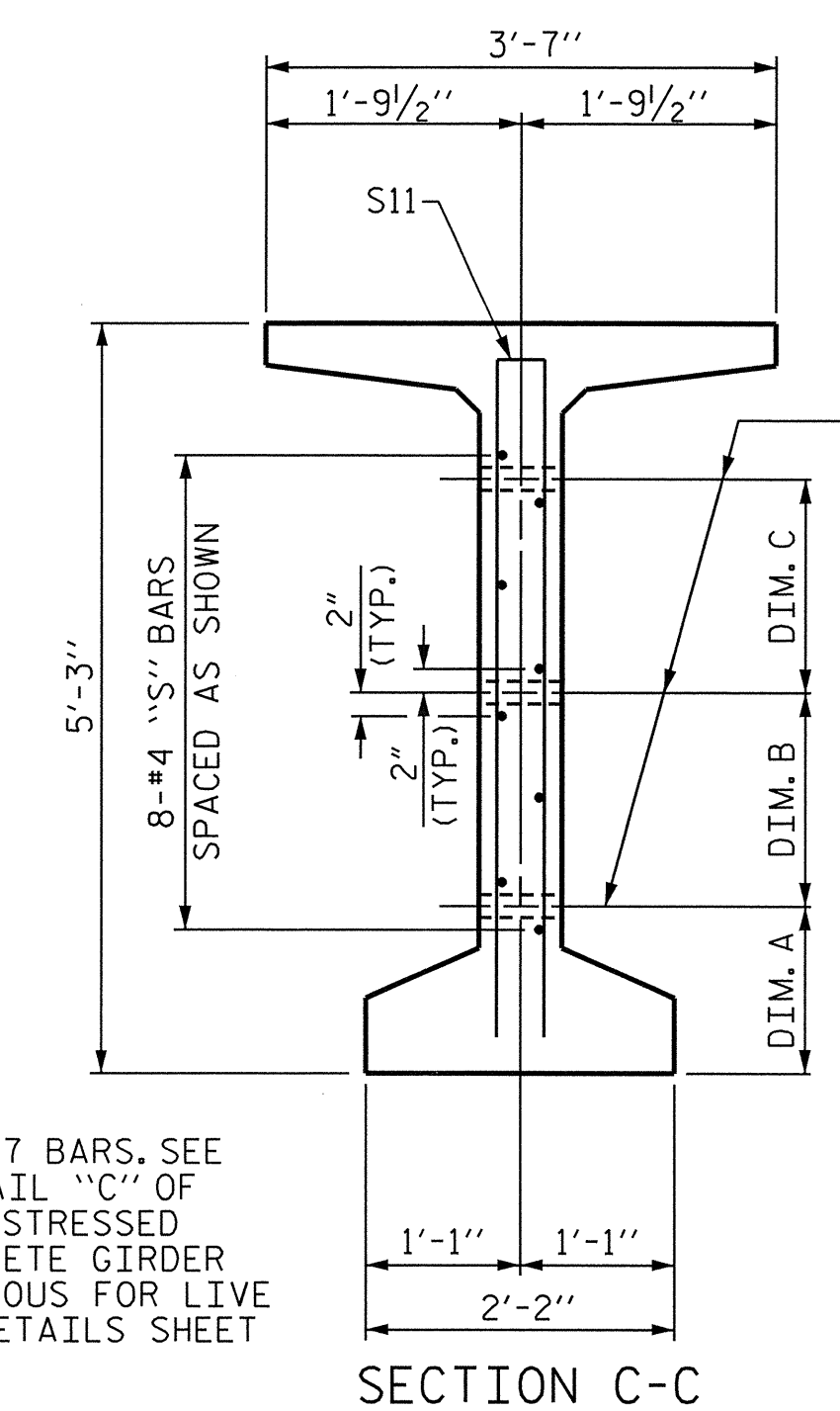
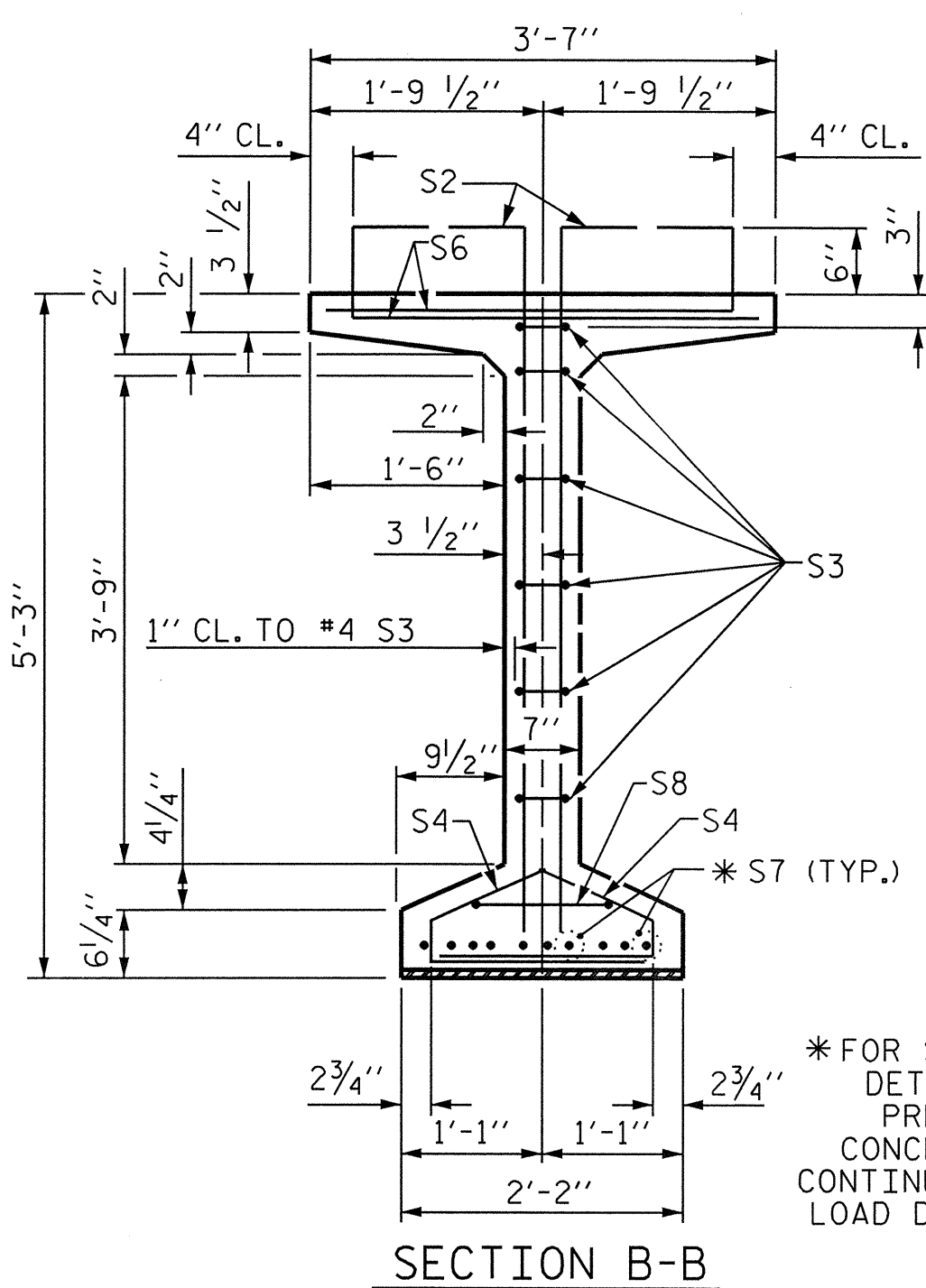
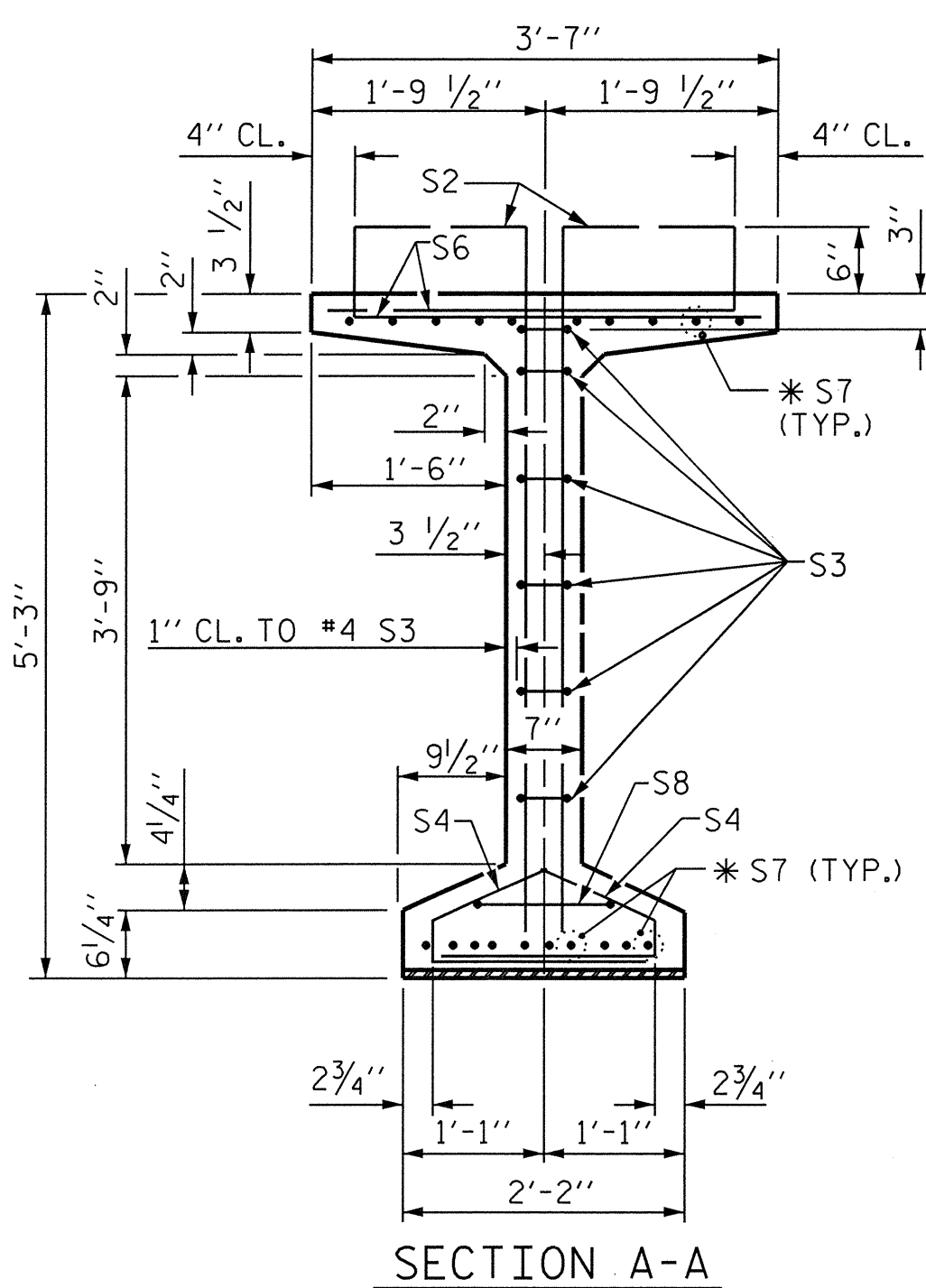
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 GIRDER LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			37

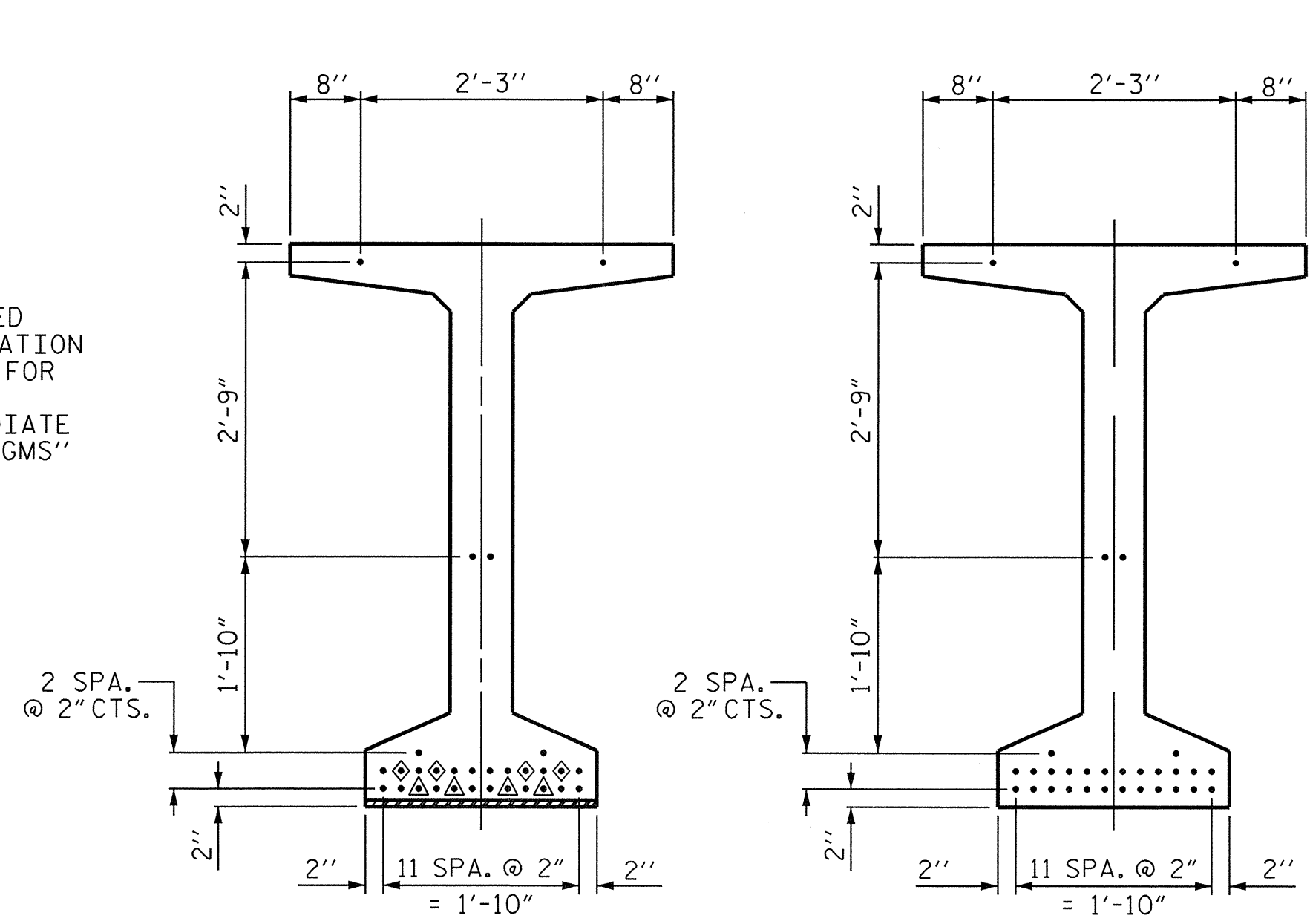
PLANS PREPARED BY:  
**SIMPSON**  
**ENGINEERS**  
**& ASSOCIATES**  
 5520 Dillard Drive  
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 CHECKED BY : M. AVERETTE DATE : 1-2012



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



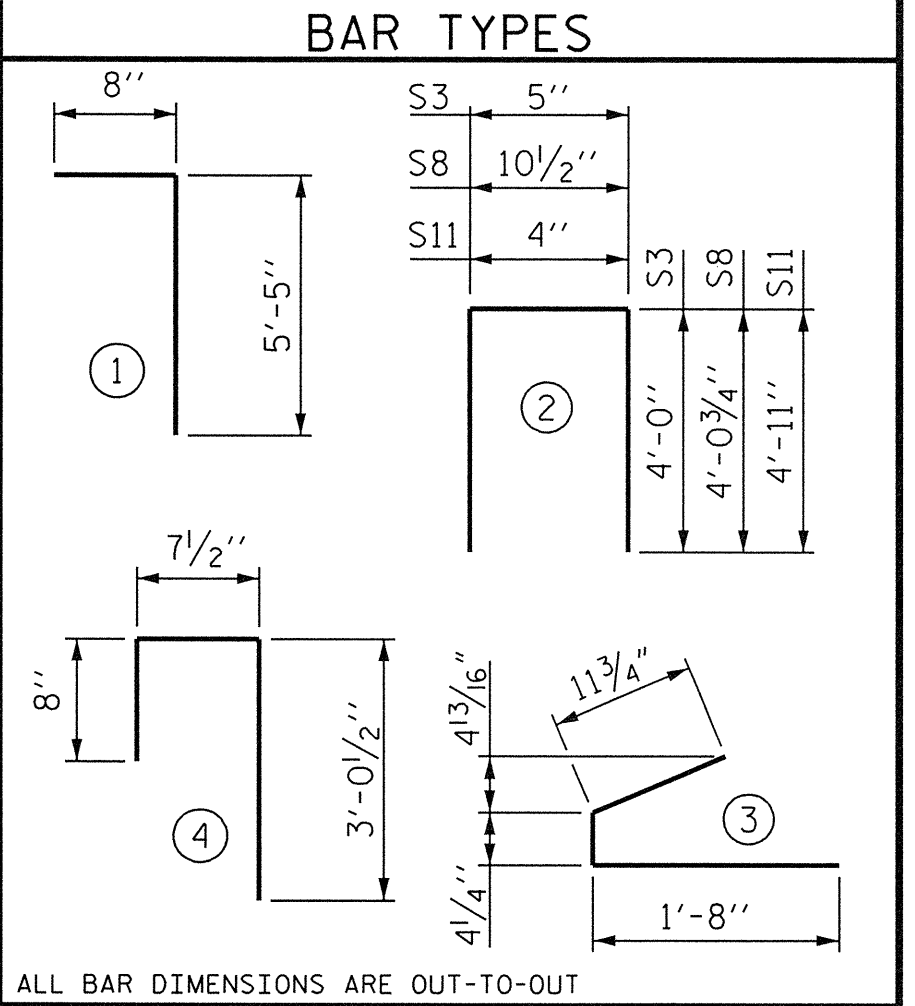
AT END OF GIRDER AT C OF GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

- FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- ◆ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER

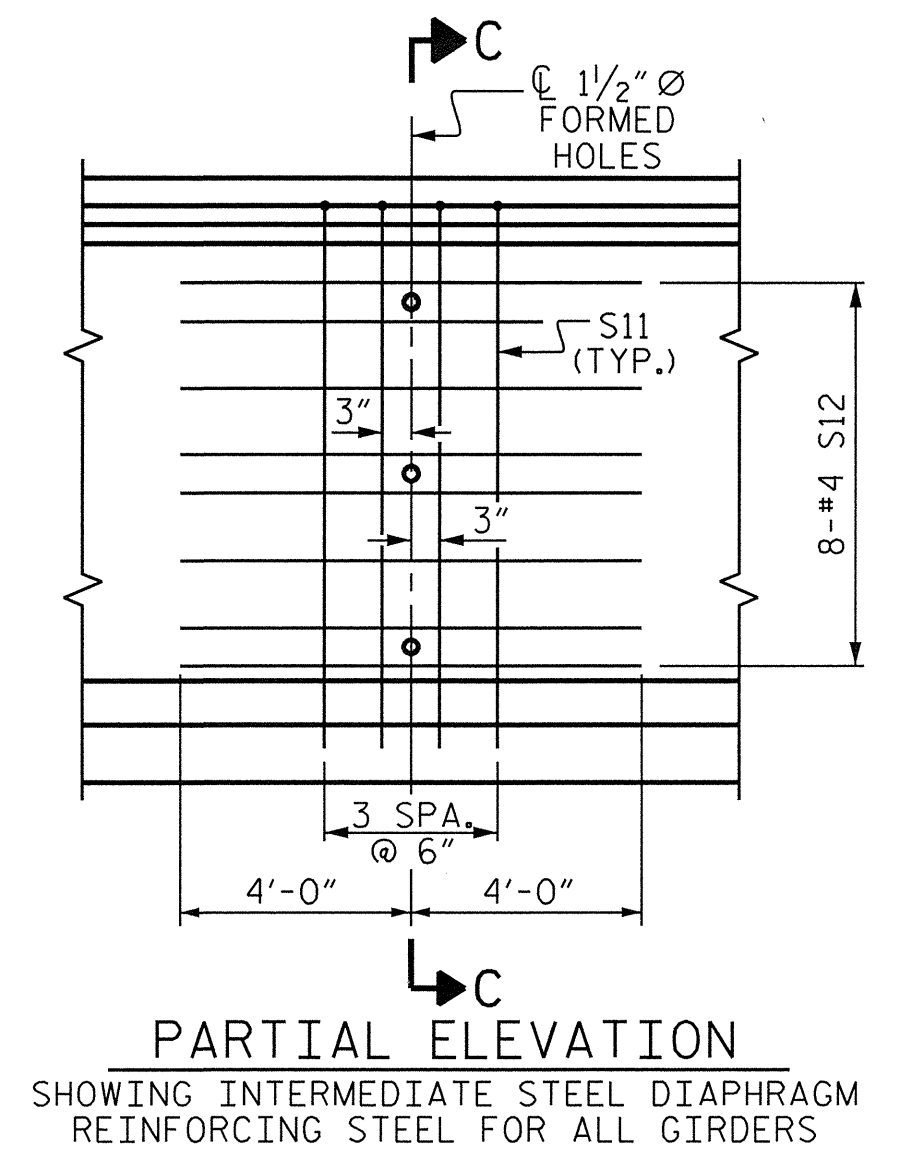
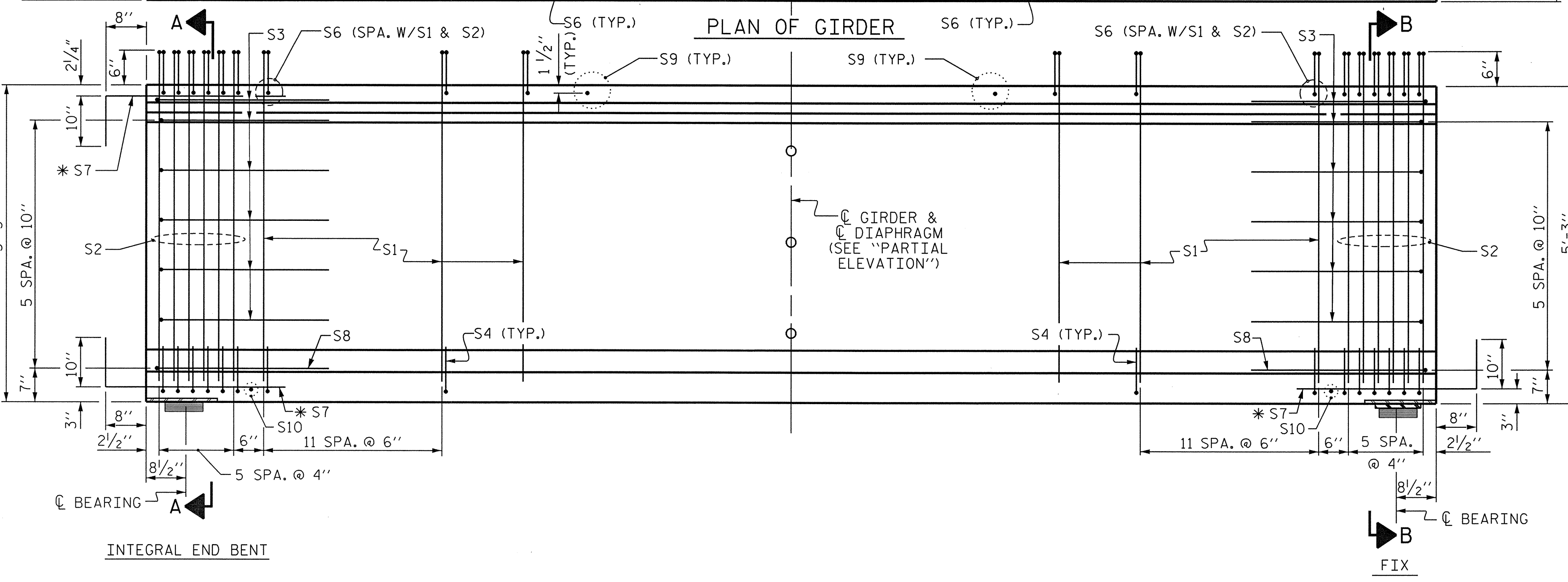
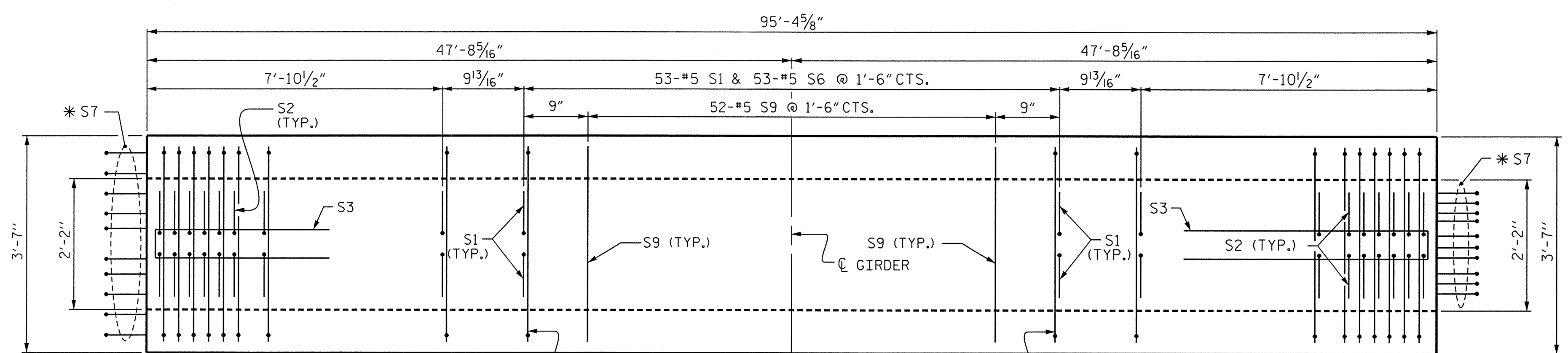
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	154	#5	1	6'-1"	977
S2	24	#5	1	6'-1"	152
S3	12	#4	2	8'-5"	67
S4	72	#4	3	3'-0"	144
S6	178	#5	4	4'-4"	805
*S7	30	#5	STR	3'-8"	115
S8	2	#5	2	9'-0"	19
S9	52	#5	STR	3'-3"	176
S10	2	#3	STR	1'-10"	1
S11	4	#5	2	10'-2"	42
S12	8	#4	STR	8'-0"	43

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



QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDERS No. 1 THRU 5	2,541	18.9	30
GIRDERS REQUIRED			
NUMBER	LENGTH	TOTAL LENGTH	
5	95'-4 5/8"	476.93'	

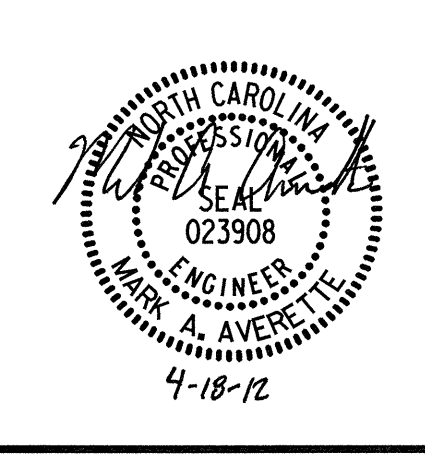


PARTIAL ELEVATION  
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

PROJECT NO. B-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-

SHEET 1 OF 2  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
63" PRESTRESSED CONCRETE  
MODIFIED BULB TEE  
CONTINUOUS FOR LIVE LOAD  
SPAN A

PLANS PREPARED BY:  
**SIMPSON ENGINEERS & ASSOCIATES**  
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Suite 120  
Cary, NC 27518  
(919) 852-0468  
(919) 852-0598 (Fax)  
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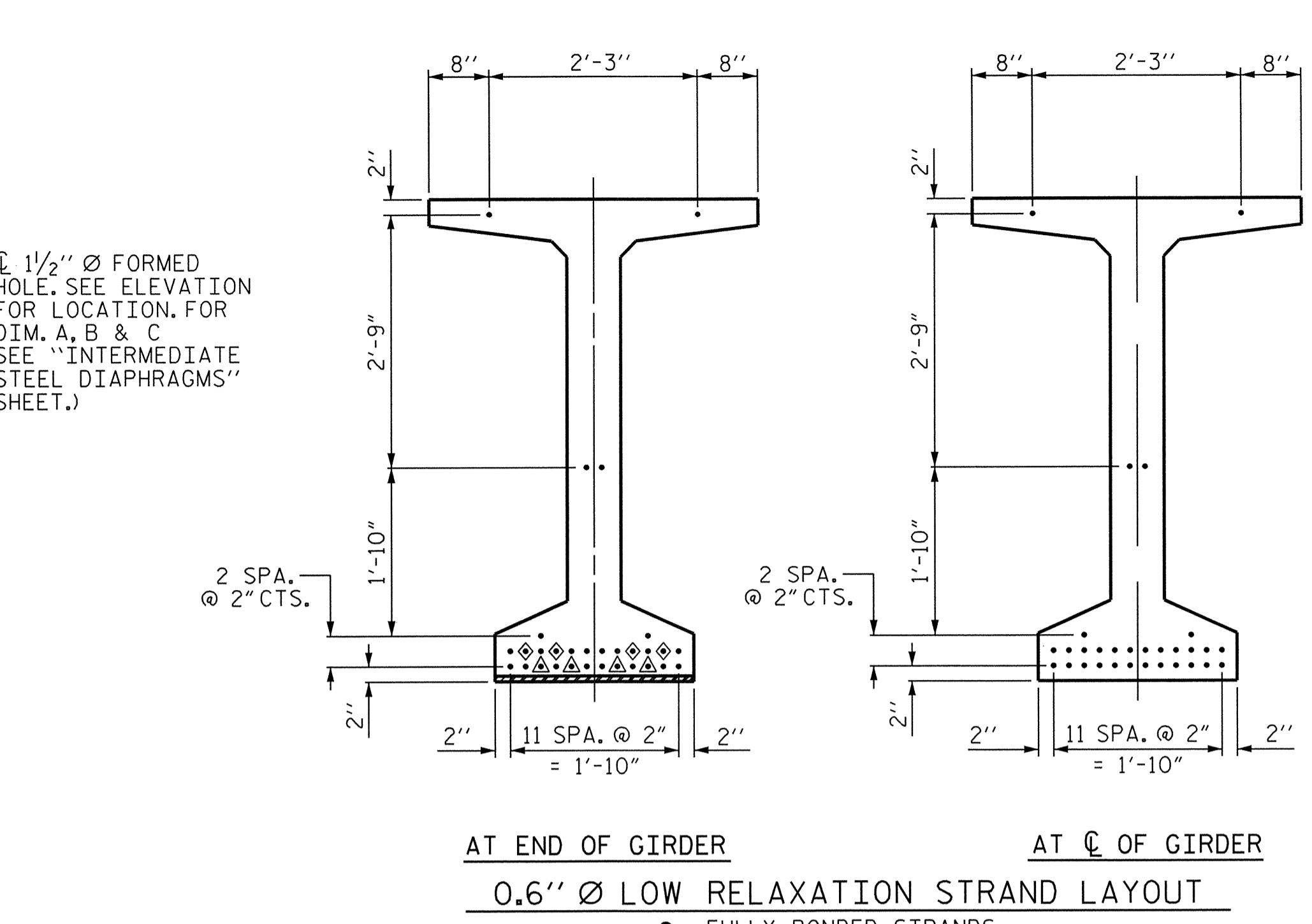
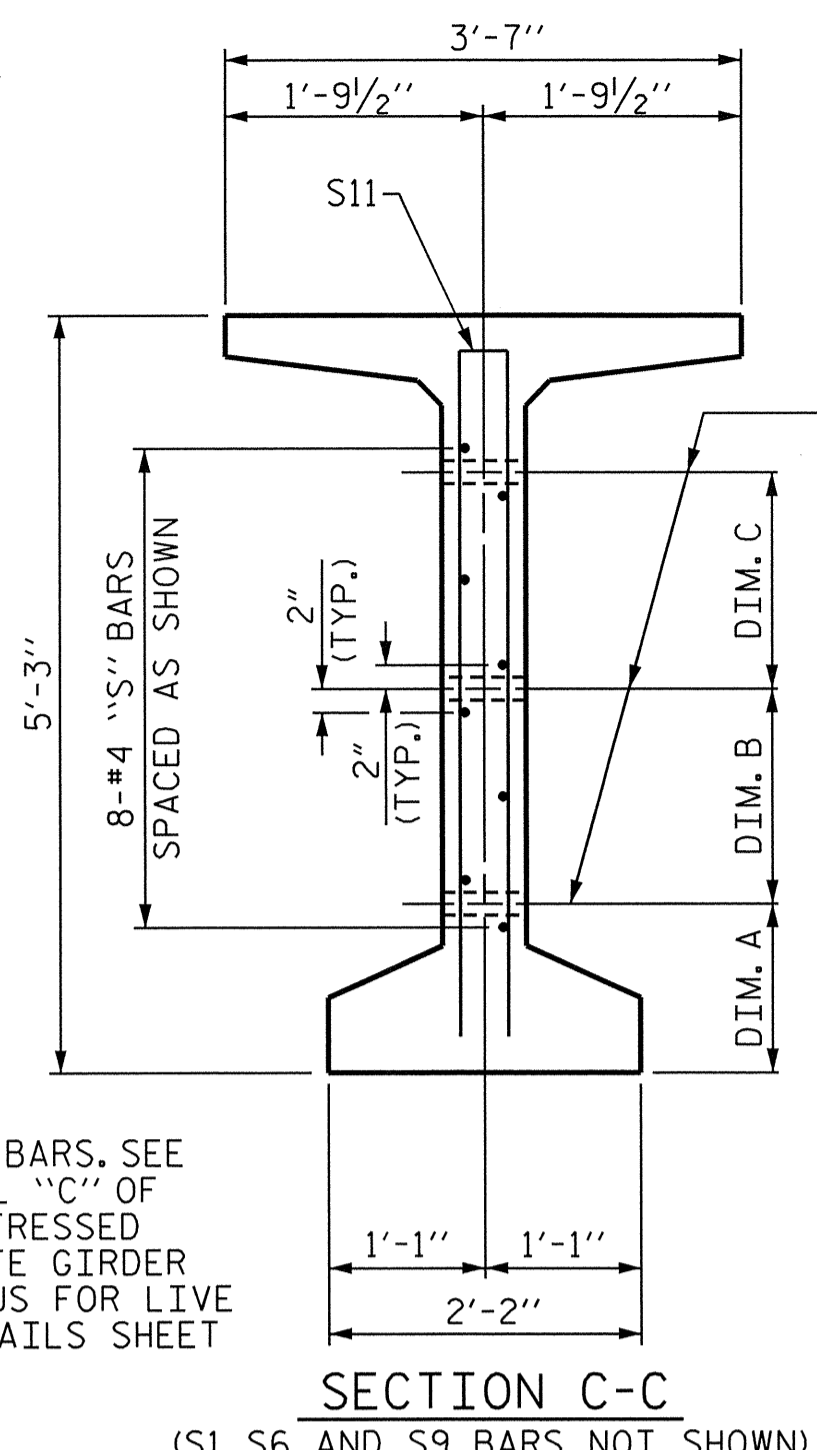
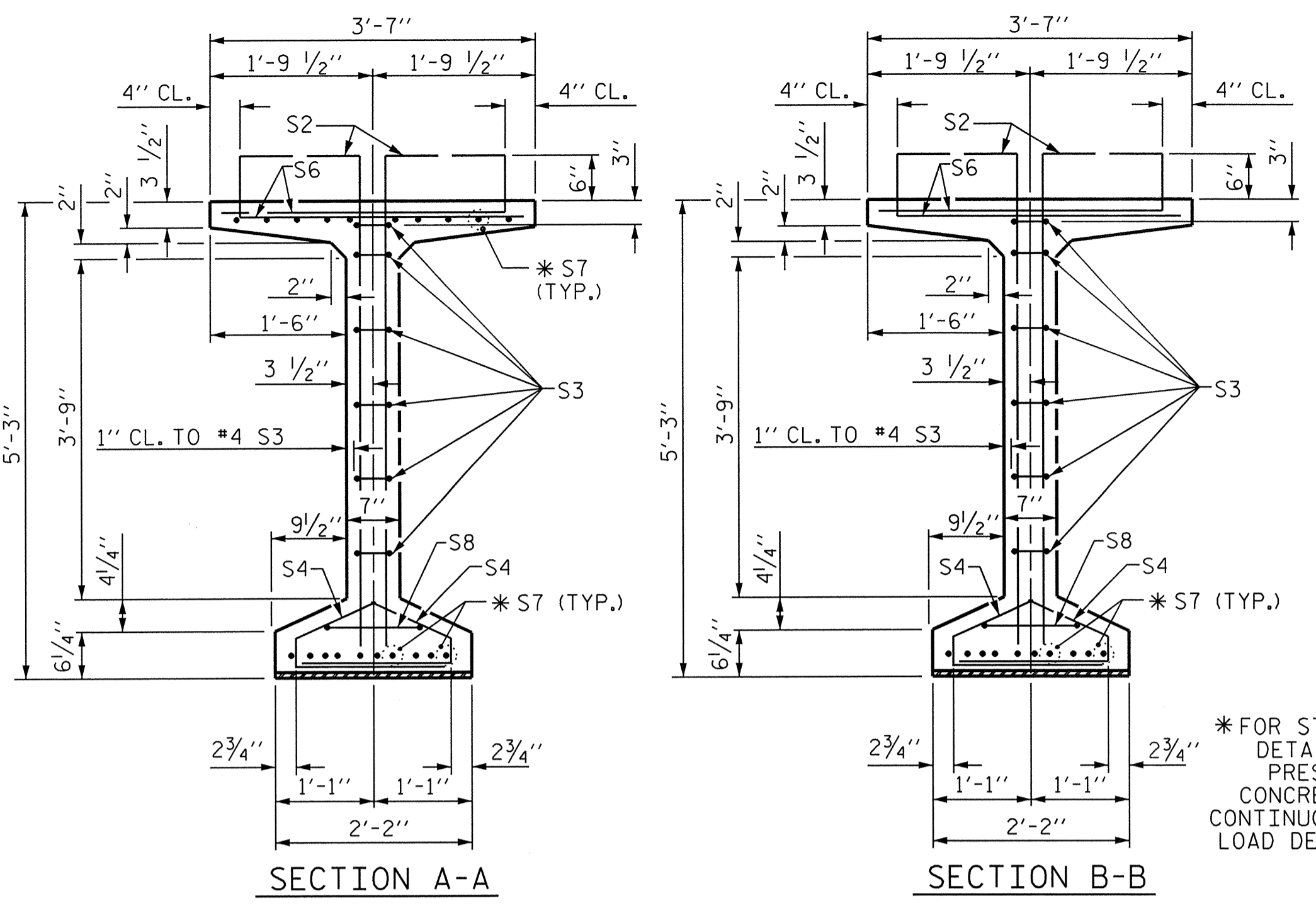


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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

S-11  
TOTAL SHEETS 37

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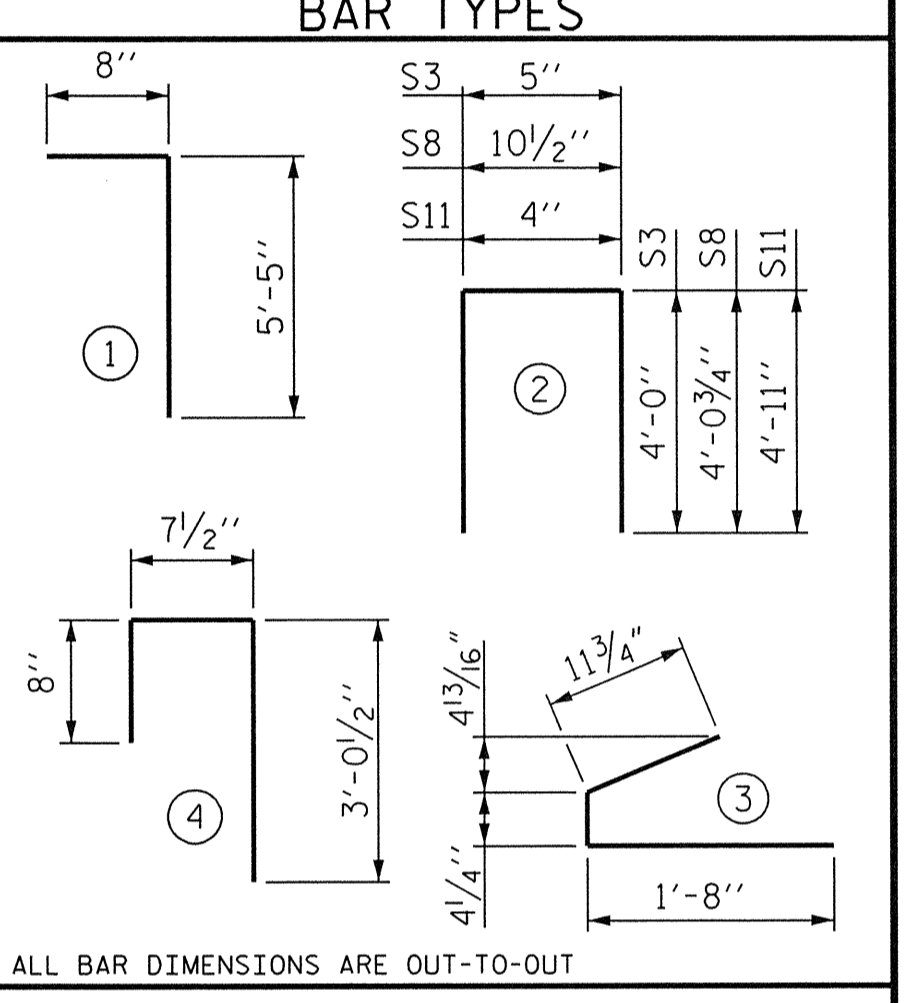


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	156	#5	1	6'-1"	990
S2	24	#5	1	6'-1"	152
S3	12	#4	2	8'-5"	67
S4	72	#4	3	3'-0"	144
S6	180	#5	4	4'-4"	814
*S7	30	#5	STR	3'-3"	115
S8	2	#5	2	9'-0"	19
S9	53	#5	STR	3'-3"	180
S10	2	#3	STR	1'-10"	1
S11	4	#5	2	10'-2"	42
S12	8	#4	STR	8'-0"	43

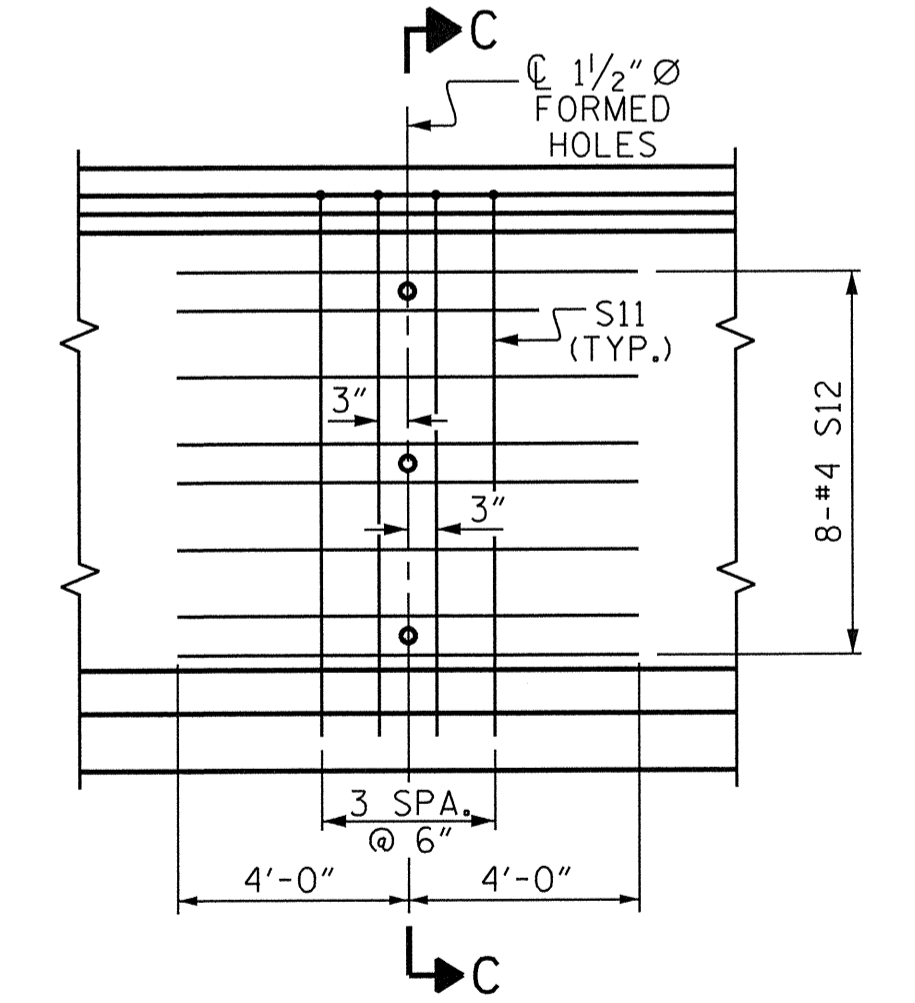
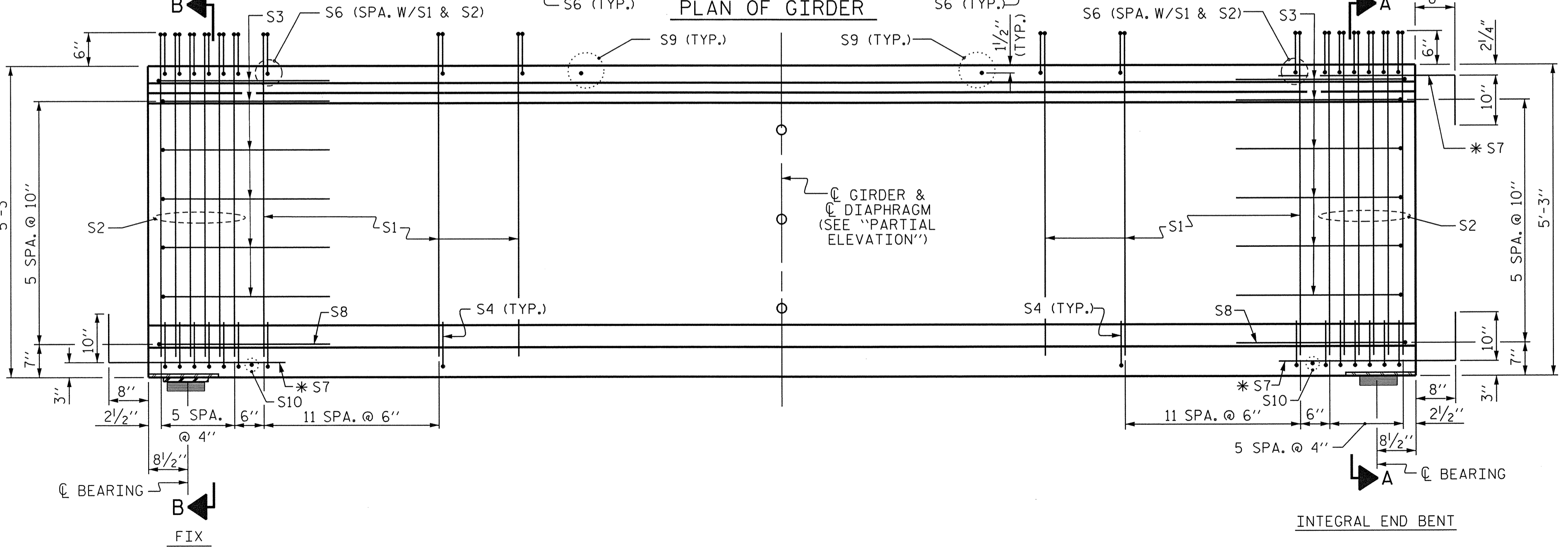
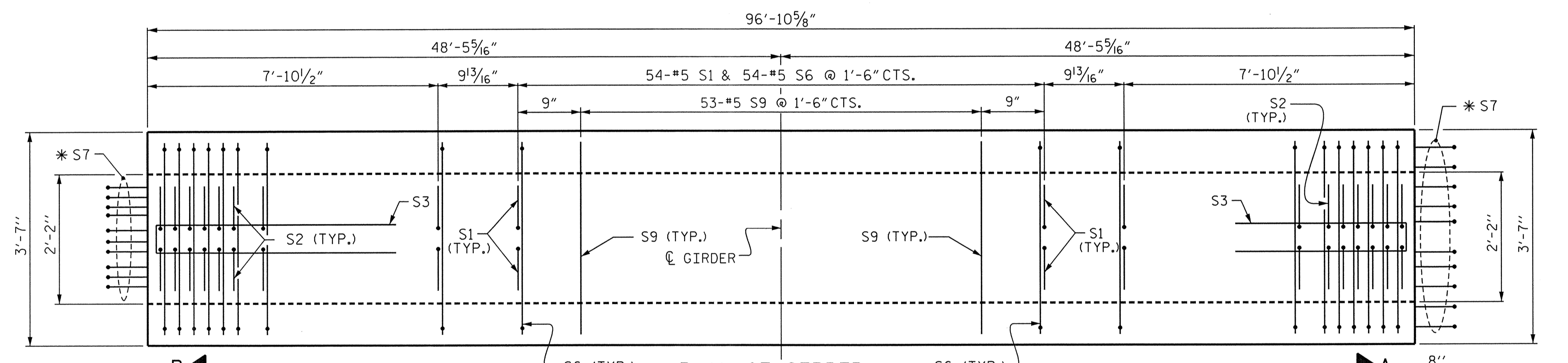
\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



- AT END OF GIRDER      AT C. OF GIRDER
- 0.6" Ø LOW RELAXATION STRAND LAYOUT
- FULLY BONDED STRANDS
  - ▲ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
  - ◆ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER

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

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



QUANTITIES FOR ONE GIRDER			
GIRDERS No. 1 THRU 5	REINFORCING STEEL	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	2,567	19.2	30

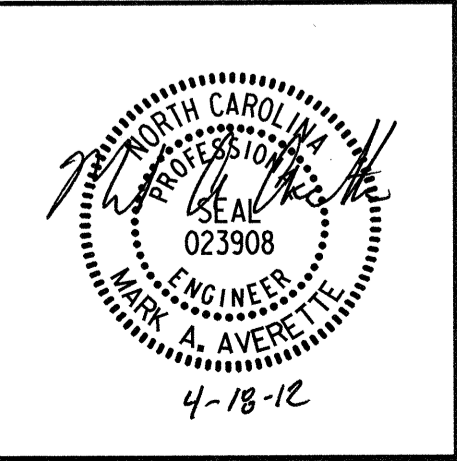
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	96'-10 5/8"	484.43'

PROJECT NO. B-4760  
 GUILFORD COUNTY  
 STATION: 23+52.74 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 63" PRESTRESSED CONCRETE  
 MODIFIED BULB TEE  
 CONTINUOUS FOR LIVE LOAD  
 SPAN B

PLANS PREPARED BY:  
**S & A**  
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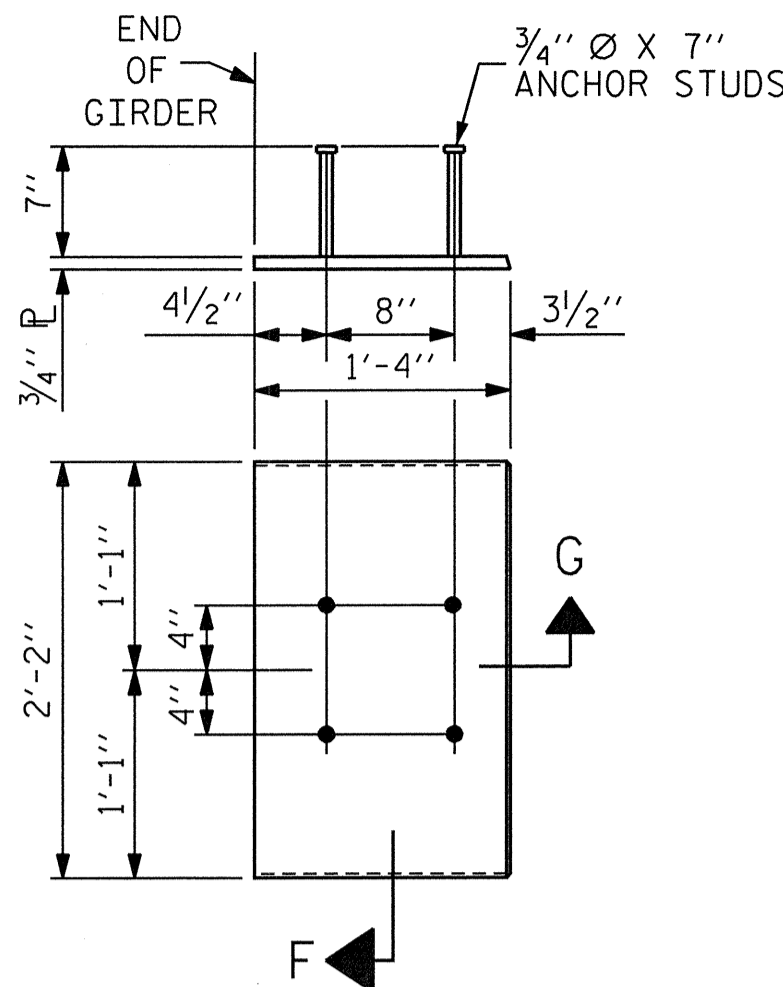


REVISIONS				SHEET NO. S-12
NO.	BY:	DATE:	DATE:	
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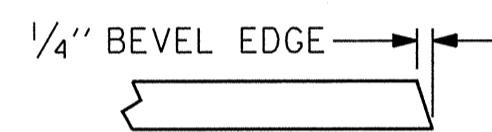
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DRAWN BY: T. BANKOVICH DATE: 11-2011  
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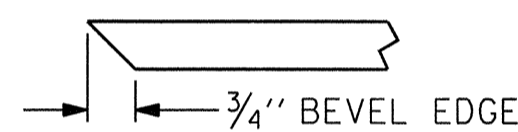
ELEVATION OF GIRDER



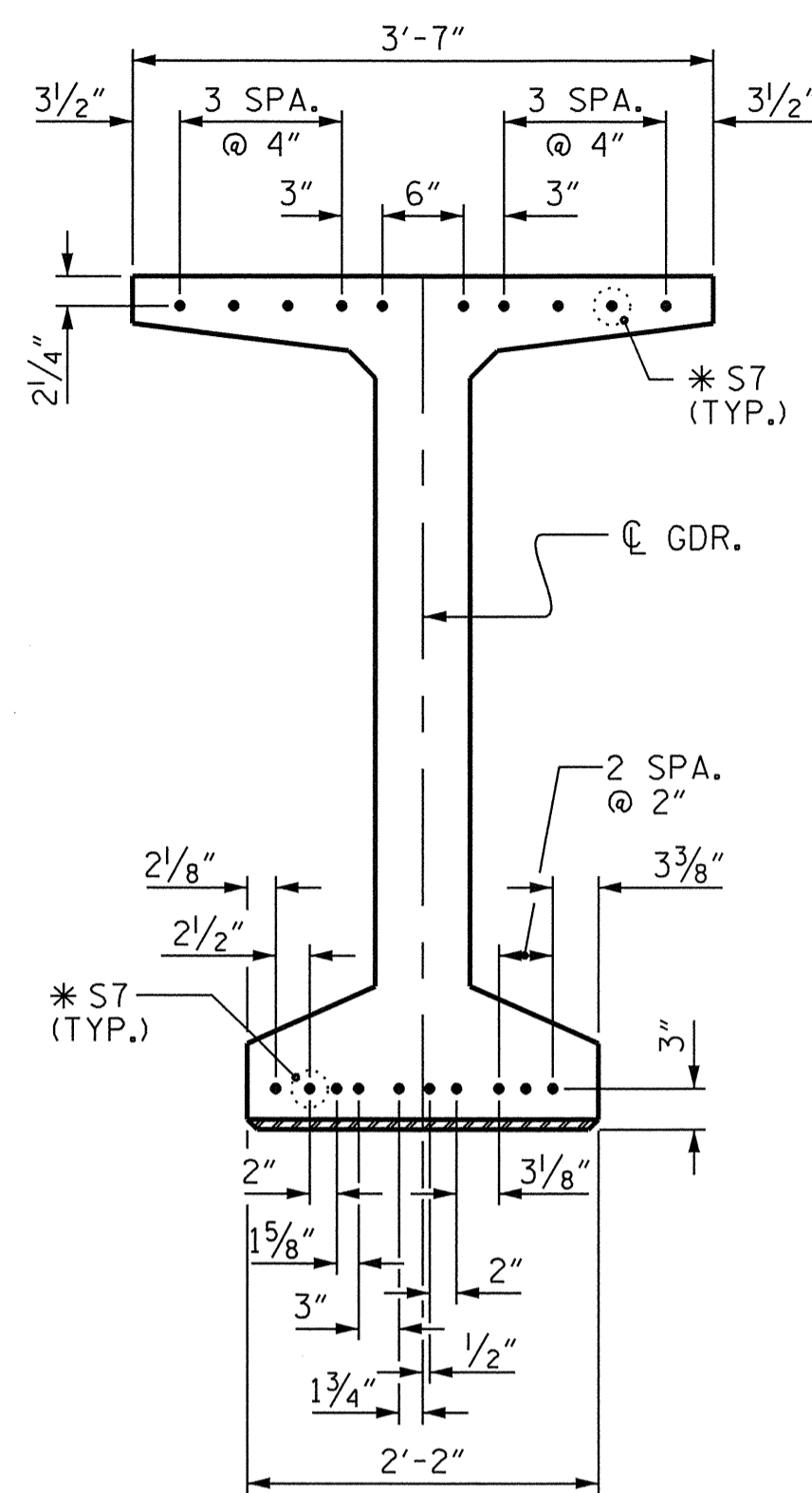
EMBEDDED PLATE "B-1" DETAILS FOR 63" MODIFIED BULB TEES (2 REQ'D PER GIRDER)



SECTION "G"



SECTION "F" (SEE NOTES)



DETAIL "C"

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 7000 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" MODIFIED BULB TEES.

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. (20 KN).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

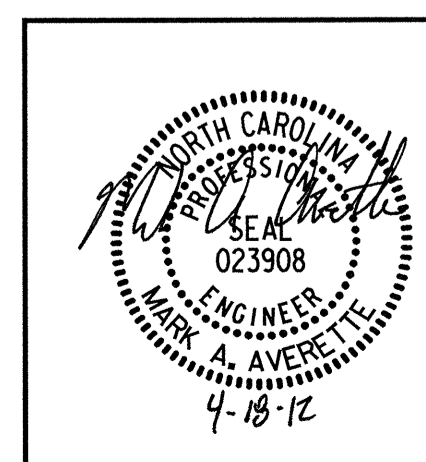
SPAN A																							
0.6" Ø LOW RELAXATION	GIRDER A1 & A5											GIRDER A2, A3, & A4											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.091	0.162	0.210	0.239	0.248	0.239	0.210	0.162	0.091	0	0	0.091	0.162	0.210	0.239	0.248	0.239	0.210	0.162	0.091	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.032	0.062	0.087	0.102	0.107	0.102	0.087	0.062	0.032	0	0	0.036	0.070	0.097	0.114	0.120	0.114	0.097	0.070	0.036	0
FINAL CAMBER	↑	0	1/16"	3/16"	1/2"	5/8"	1 1/16"	5/8"	1 1/2"	1 3/16"	1 1/16"	0	0	1/16"	1/8"	3/8"	1/2"	1/2"	1/2"	1 3/8"	1 1/8"	1 1/16"	0
SPAN B																							
0.6" Ø LOW RELAXATION	GIRDER B1 & B5											GIRDER B2, B3, & B4											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.093	0.165	0.215	0.243	0.253	0.243	0.215	0.165	0.093	0	0	0.093	0.165	0.215	0.243	0.253	0.243	0.215	0.165	0.093	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.034	0.067	0.092	0.109	0.114	0.109	0.092	0.067	0.034	0	0	0.038	0.075	0.103	0.122	0.128	0.122	0.103	0.075	0.038	0
FINAL CAMBER	↑	0	1/16"	3/16"	1/16"	5/8"	1 1/16"	5/8"	1 1/16"	1 3/16"	1 1/16"	0	0	1/16"	1/16"	1 3/16"	1 1/16"	1 1/2"	1 1/16"	1 5/16"	1 1/16"	1 1/16"	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-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-

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

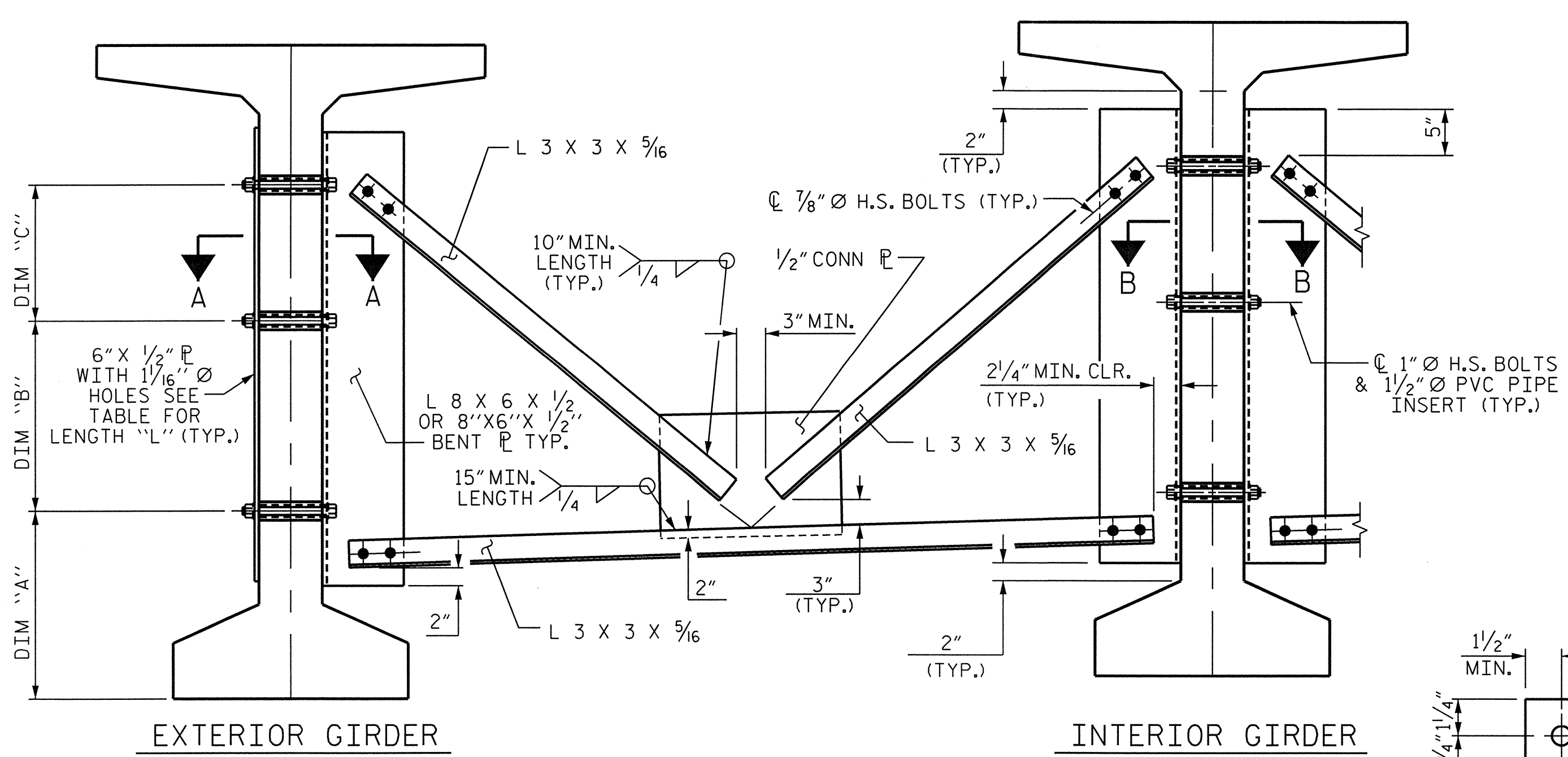
PLANS PREPARED BY:  
**SEA** SIMPSON ENGINEERS & ASSOCIATES  
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Suite 120  
Cary, NC 27518  
(919) 852-0468  
(919) 852-0598 (Fax)  
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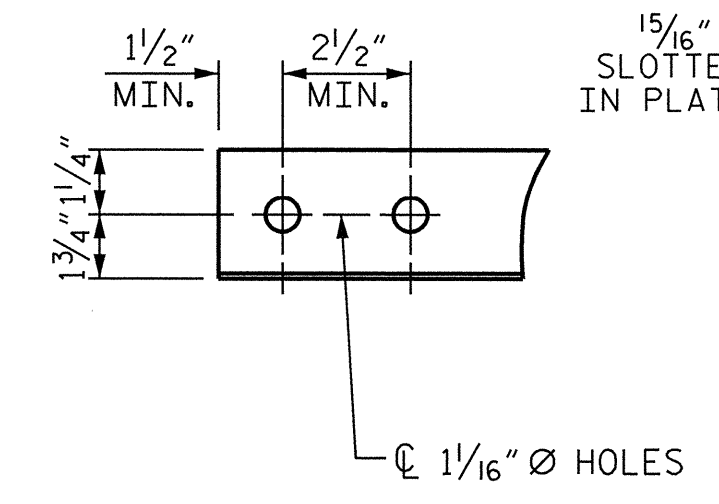
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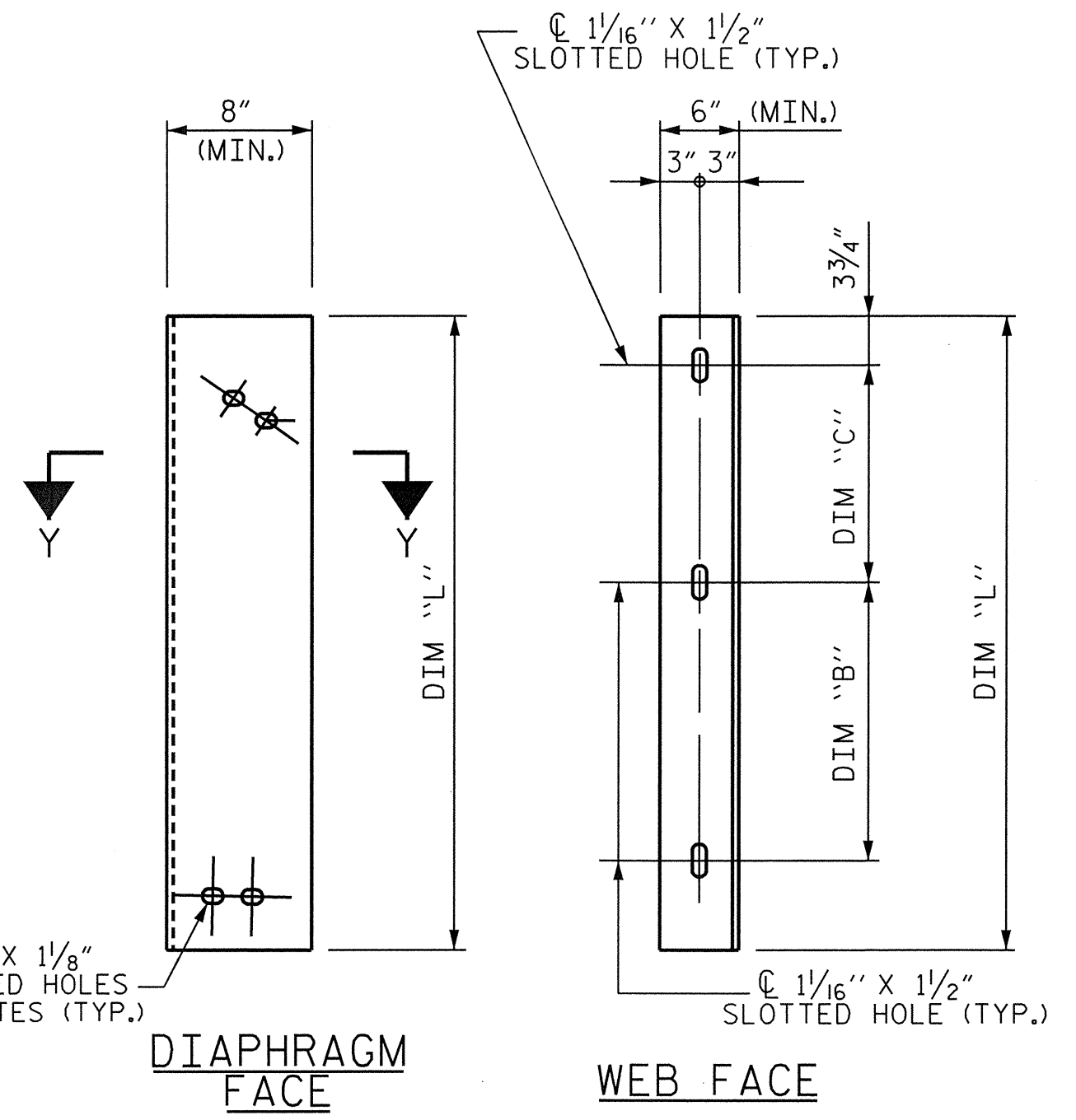
DRAWN BY: T. BANKOVICH DATE: 11-2011  
CHECKED BY: M. AVERETTE DATE: 1-2012



PART SECTION AT INTERMEDIATE DIAPHRAGM



ANGLE END  
(L 3 x 3 x 5/16)



CONNECTOR PLATE 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.

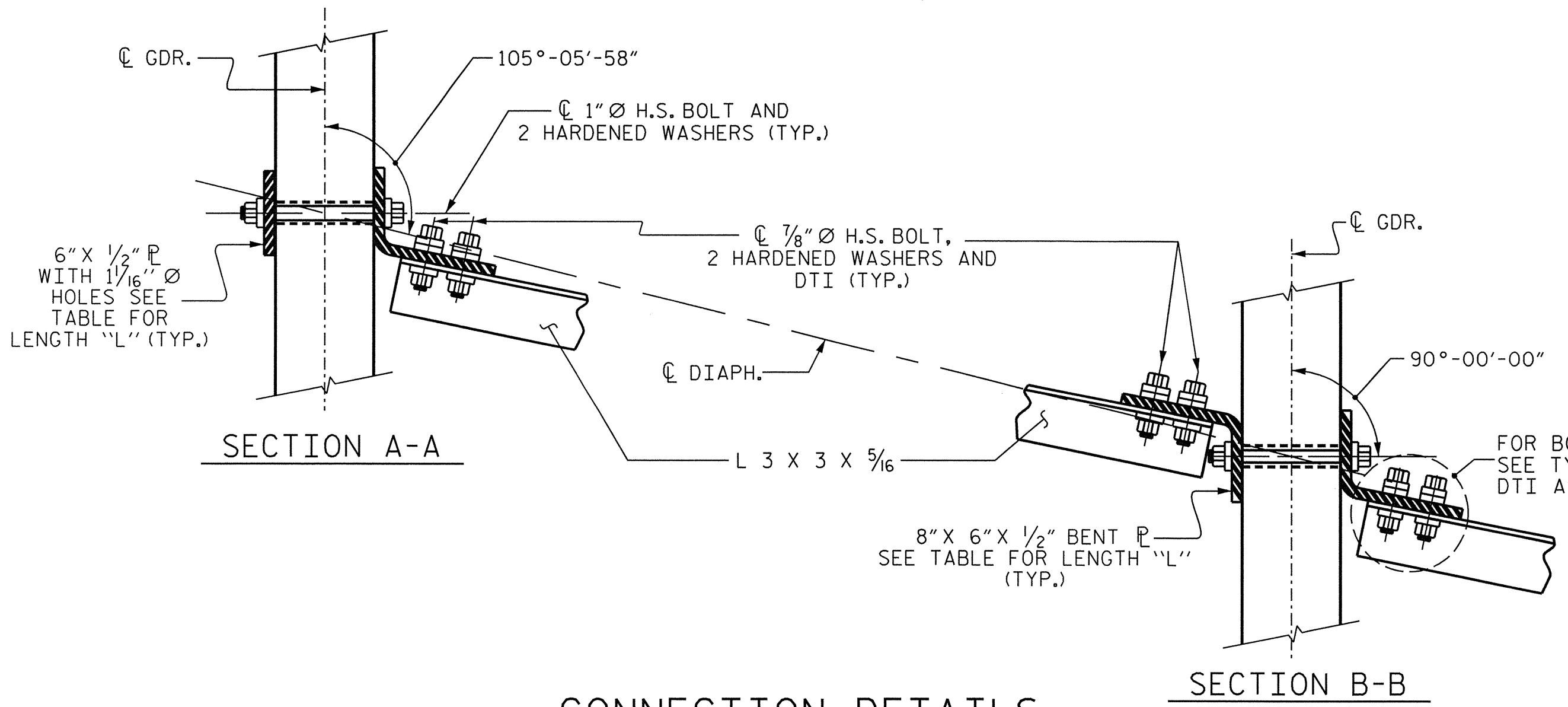
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

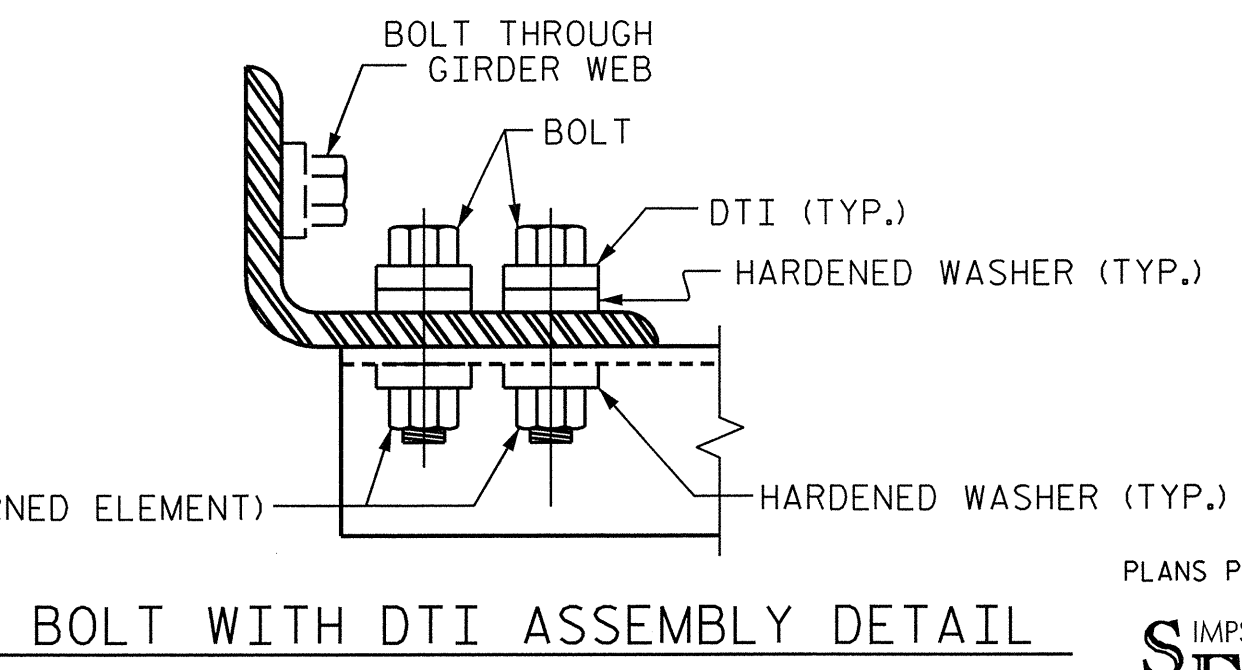
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63" BULB TEE	1'-4 1/2"	1'-5 1/2"	1'-3 1/2"	3'-5"



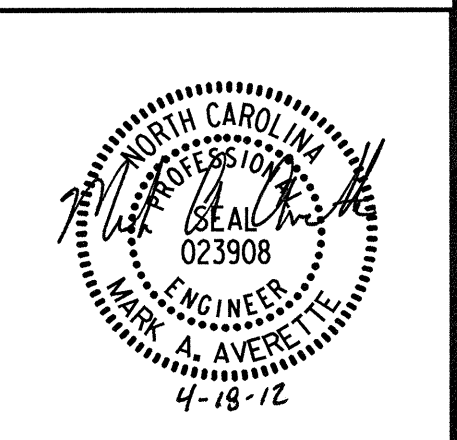
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

PLANS PREPARED BY:  
**SE & A**  
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 (919) 852-0598 (Fax)  
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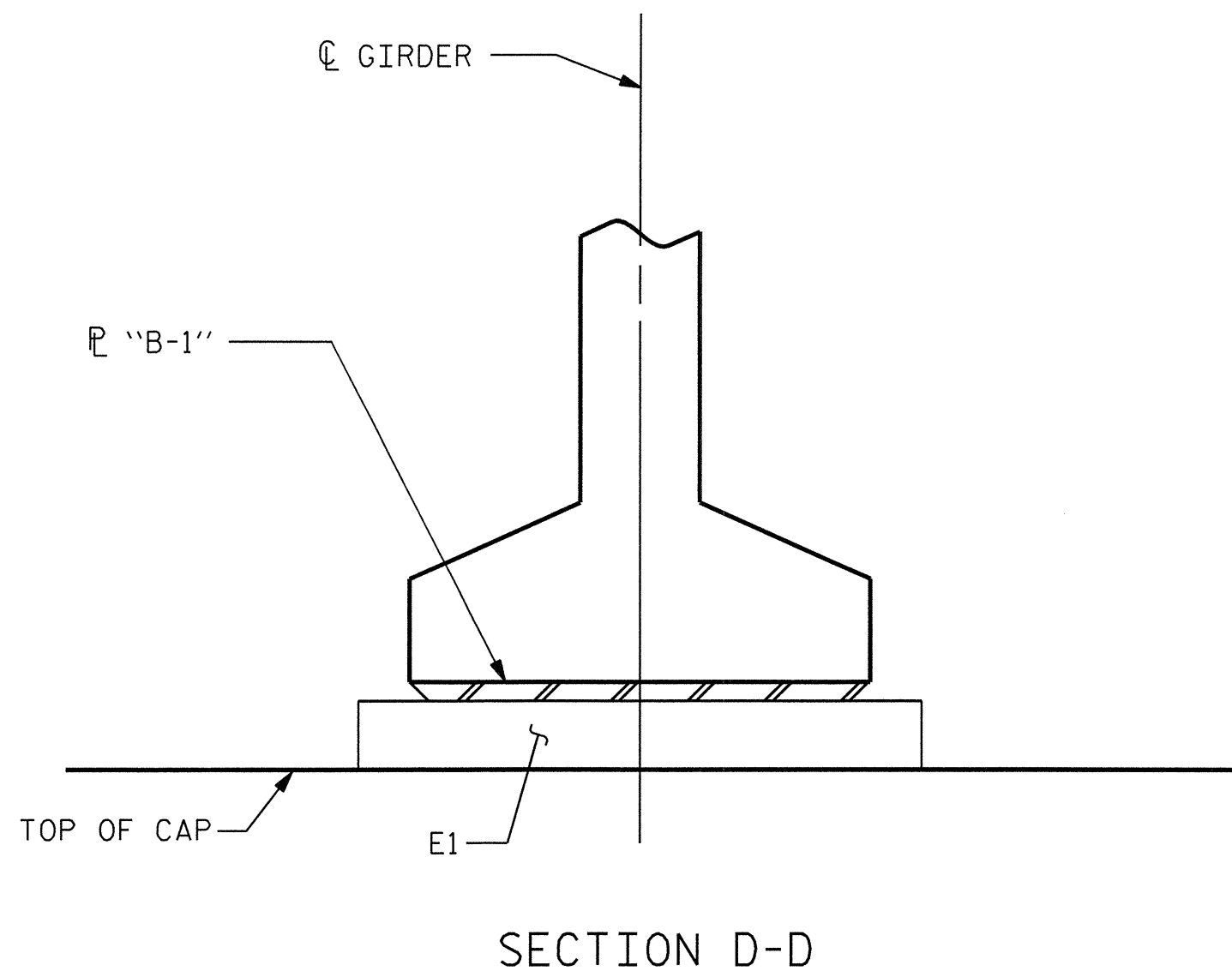


STATE OF NORTH CAROLINA  
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 RALEIGH  
 SUPERSTRUCTURE  
 INTERMEDIATE  
 STEEL DIAPHRAGMS  
 FOR 63" MODIFIED  
 BULB TEE PRESTRESSED  
 CONCRETE GIRDERS

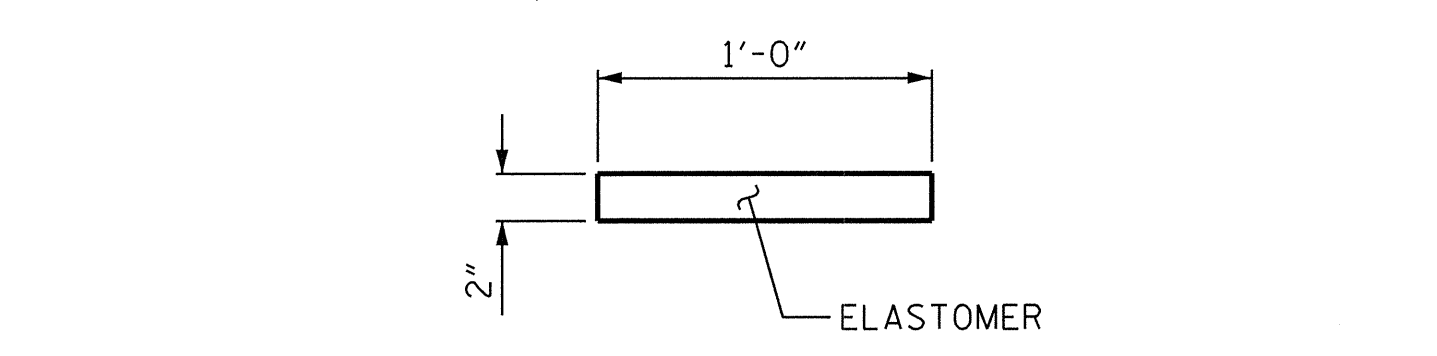
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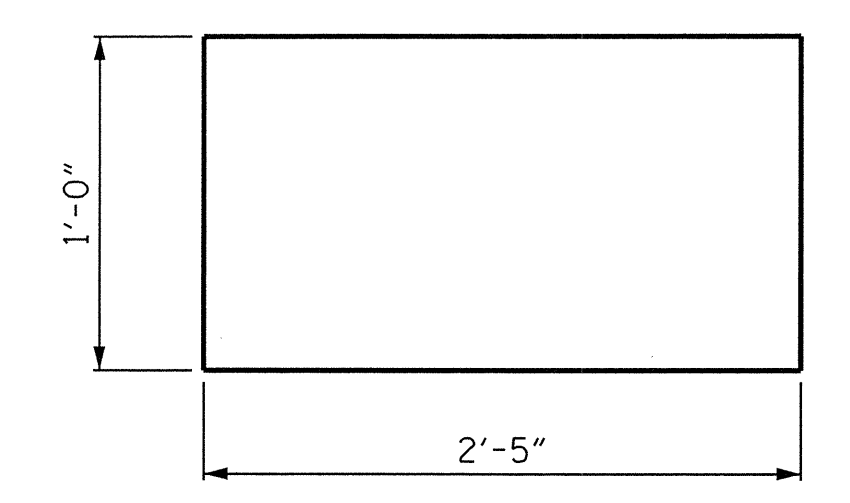
DRAWN BY: T. BANKOVICH DATE: 11-2011  
 CHECKED BY: M. AVERETTE DATE: 1-2012



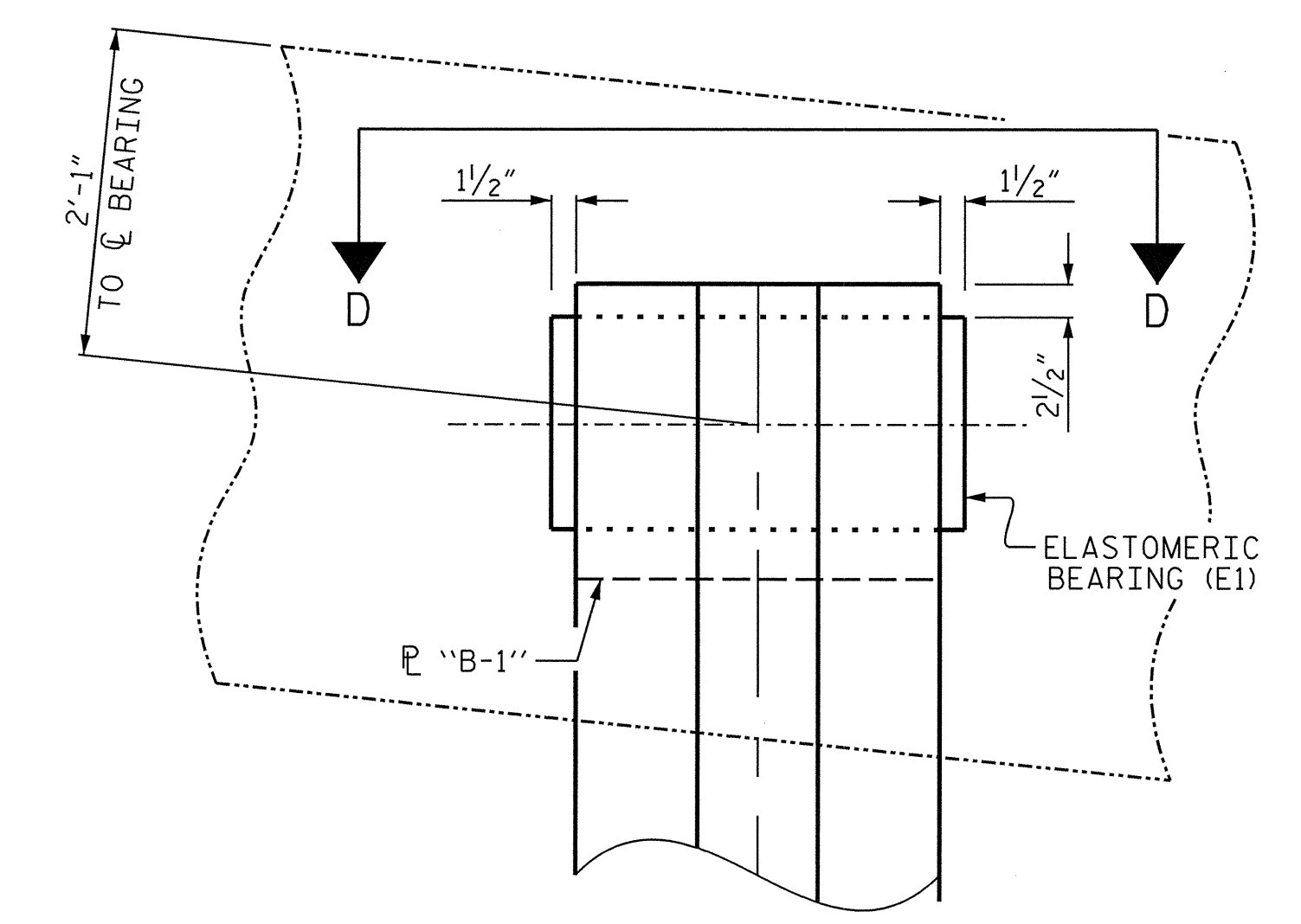
SECTION D-D



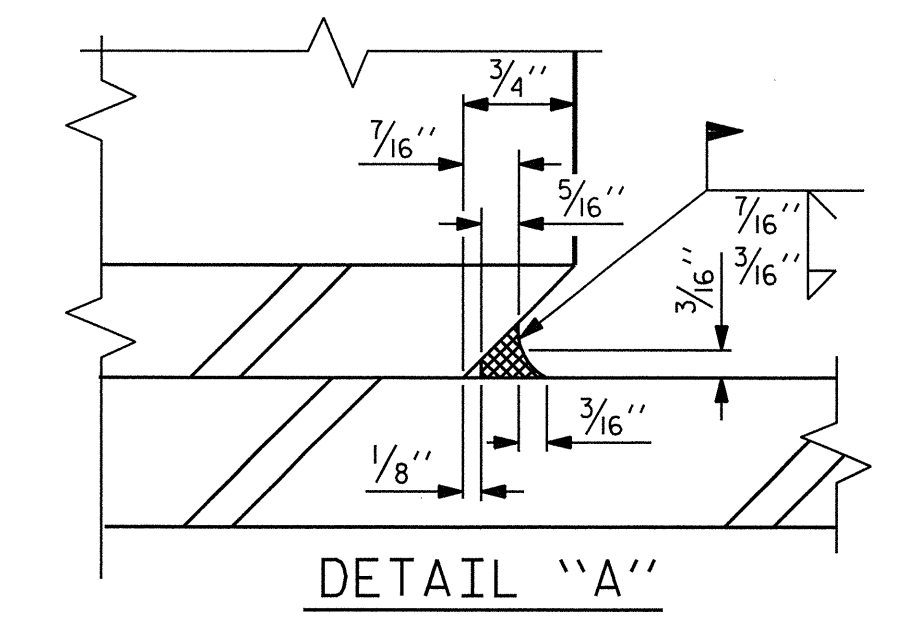
TYPICAL SECTION OF ELASTOMERIC BEARING



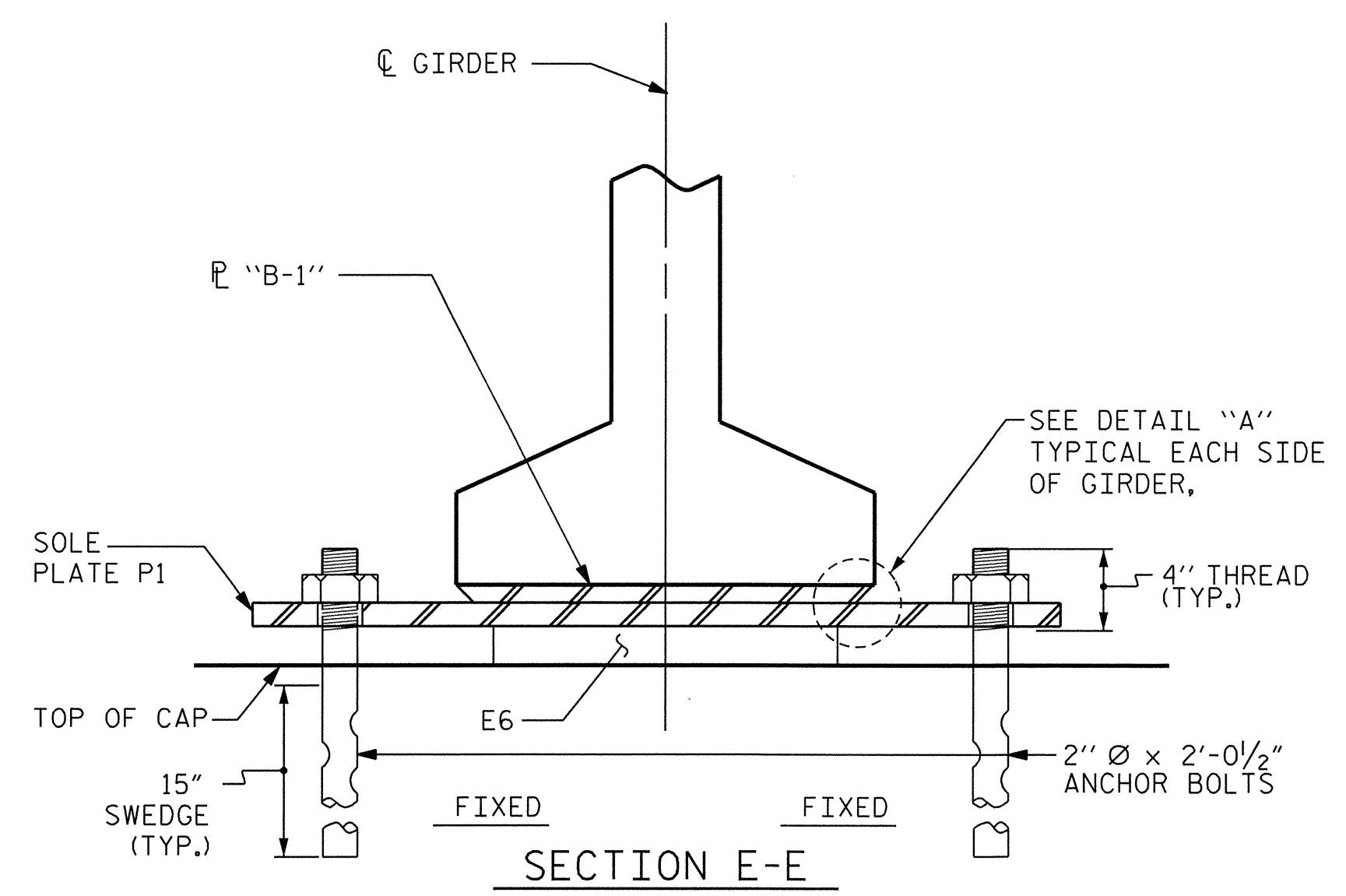
PLAN VIEW OF ELASTOMERIC BEARING



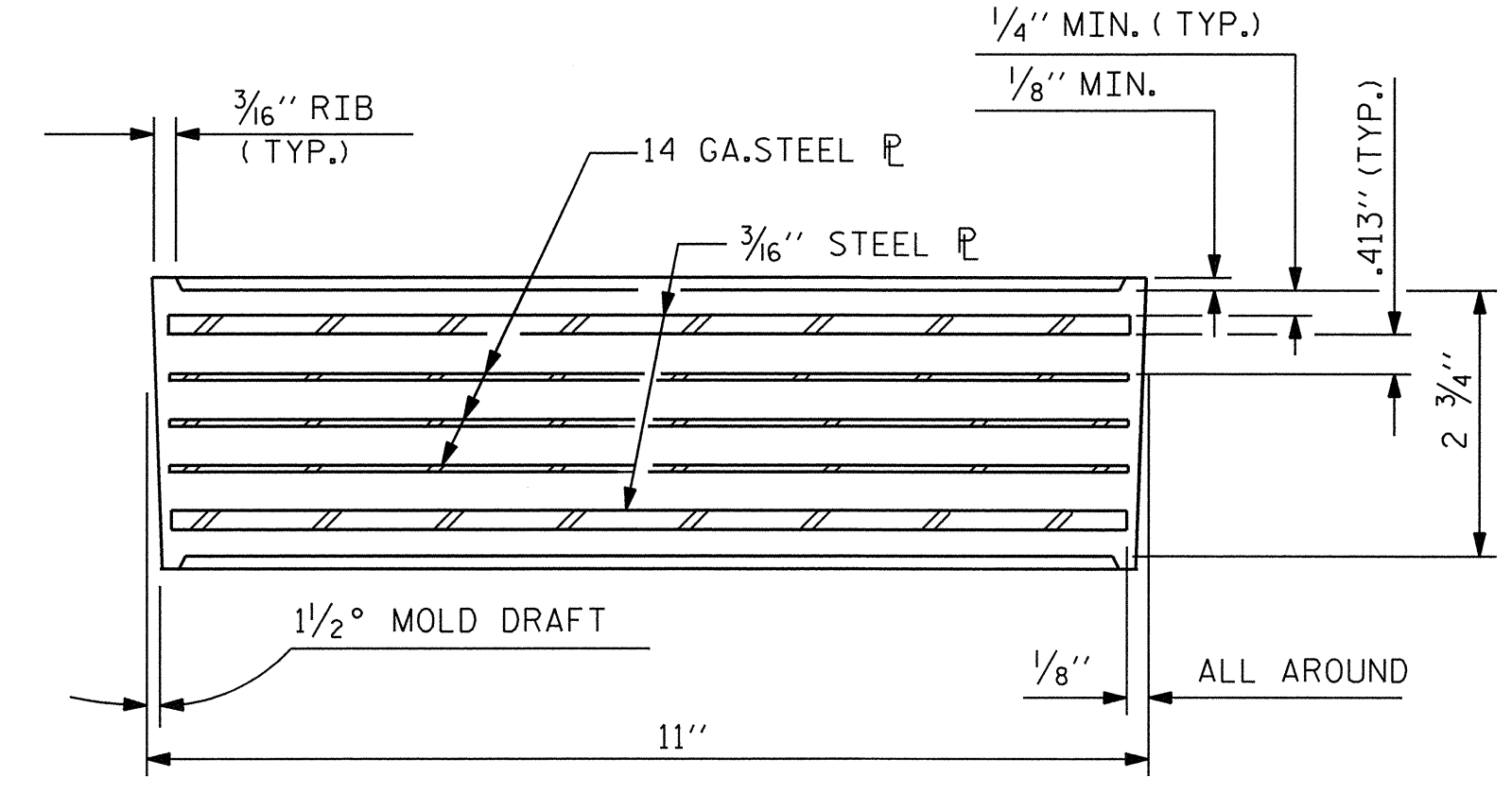
PLAN VIEW AT END BENTS



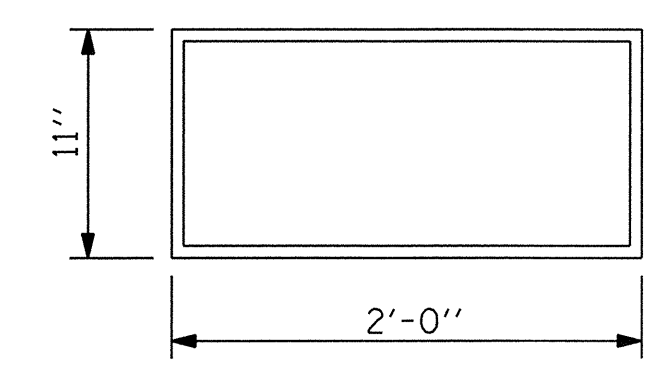
DETAIL "A"



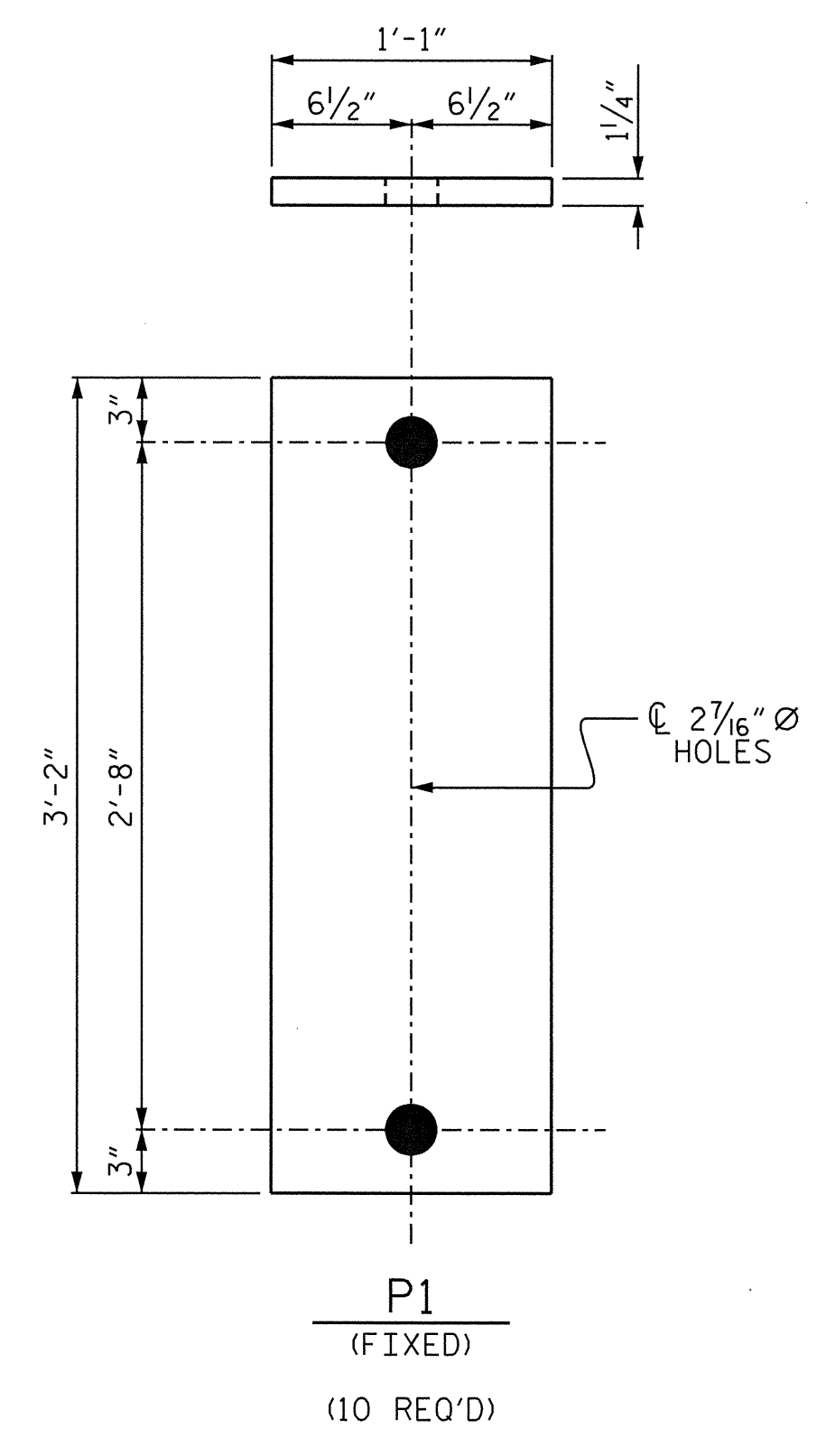
SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS

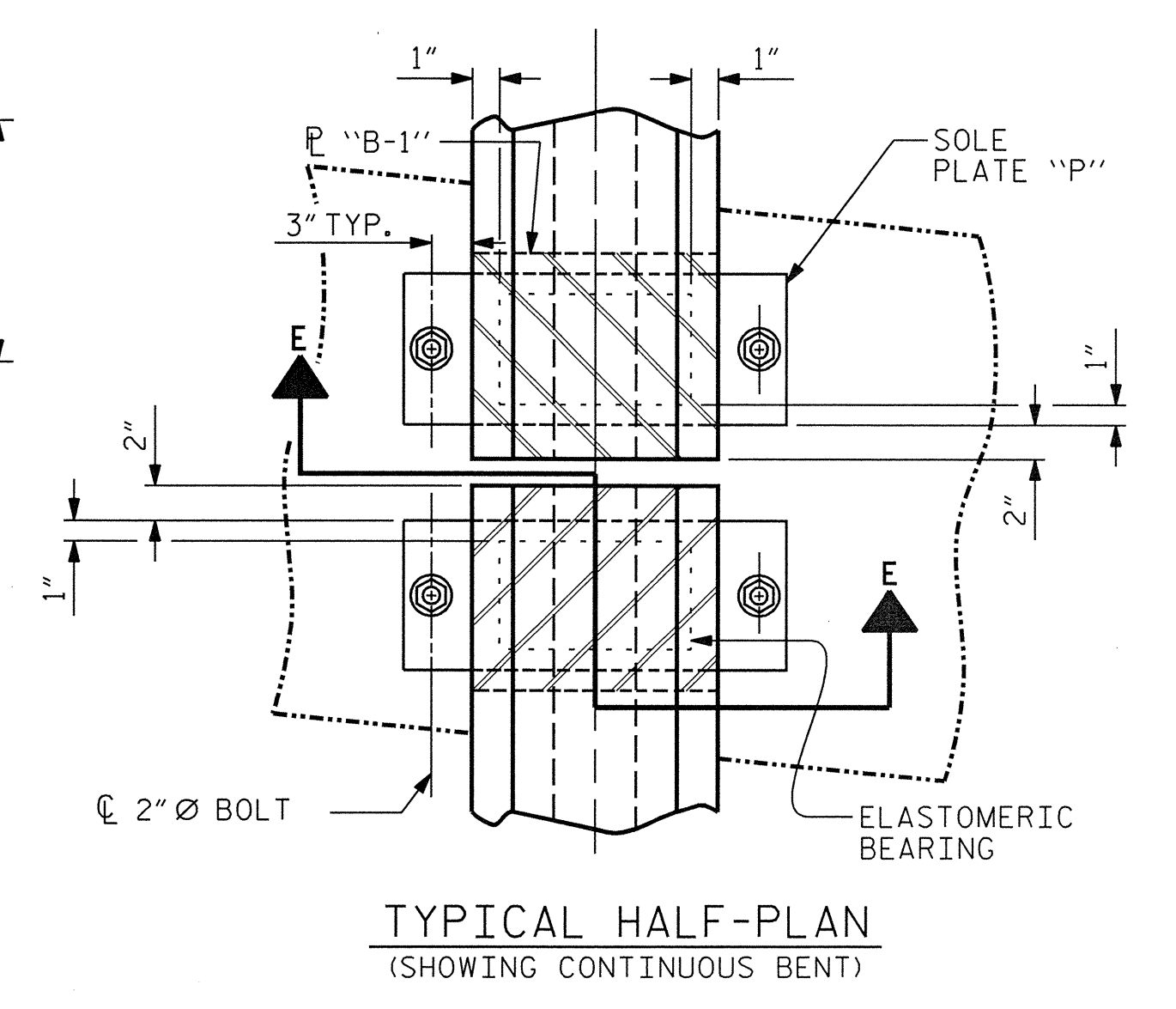


E6 (10 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE VII



SOLE PLATE DETAILS (P1)

**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 P1, BOLTS, NUTS, AND WASHERS, 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.

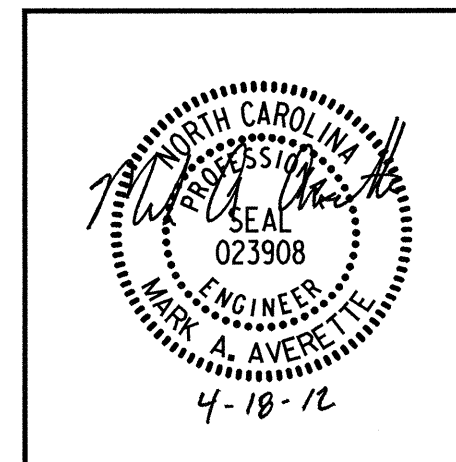


TYPICAL HALF-PLAN  
(SHOWING CONTINUOUS BENT)

— LOAD RATINGS —	
TYPE VII	MAX.D.L.+ L.L. 264 K

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

PLANS PREPARED BY:  
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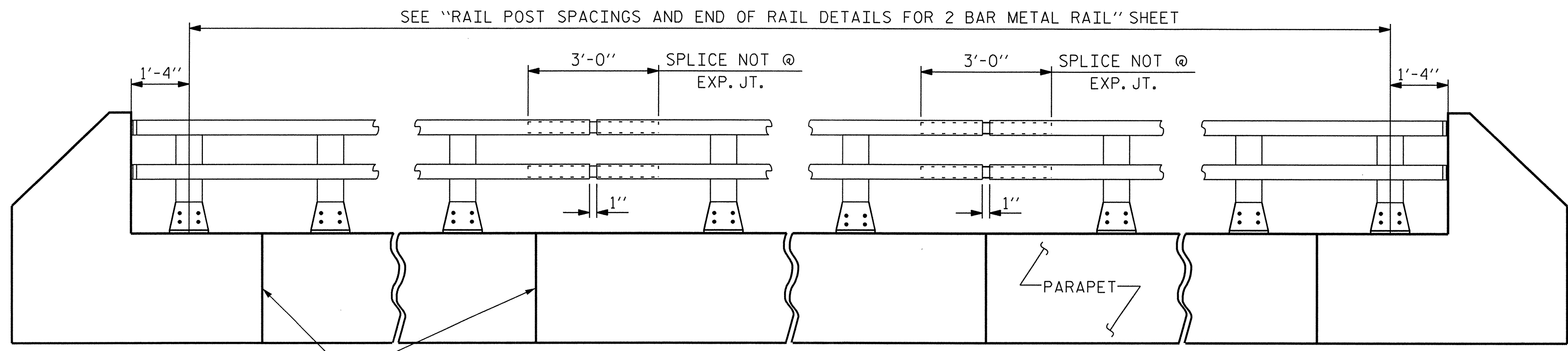
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**ELASTOMERIC BEARING**  
 DETAILS  
 PRESTRESSED CONCRETE GIRDER  
 SUPERSTRUCTURE

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
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DRAWN BY: T. BANKOVICH DATE: 11-2011  
 CHECKED BY: M. AVERETTE DATE: 1-2012





TOOLED CONTRACTION JTS. (SEE NOTES)

**ELEVATION**

NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST SEE "RAIL POST SPACING AND END OF RAIL DETAILS FOR 2 BAR METAL RAIL" SHEET.

**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 "RAIL POST SPACING AND END OF RAIL DETAILS FOR 2 BAR METAL RAIL" SHEET.

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.

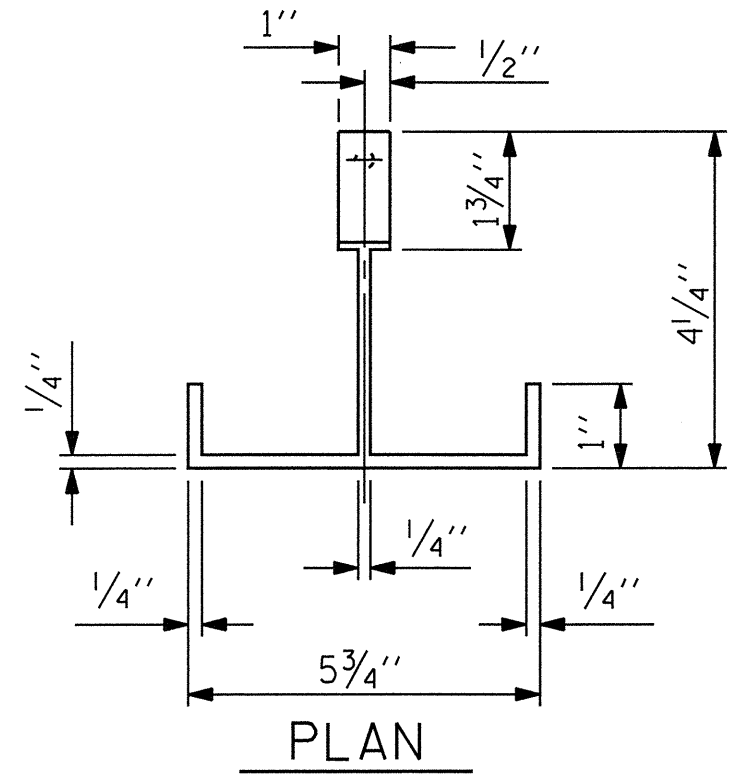
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

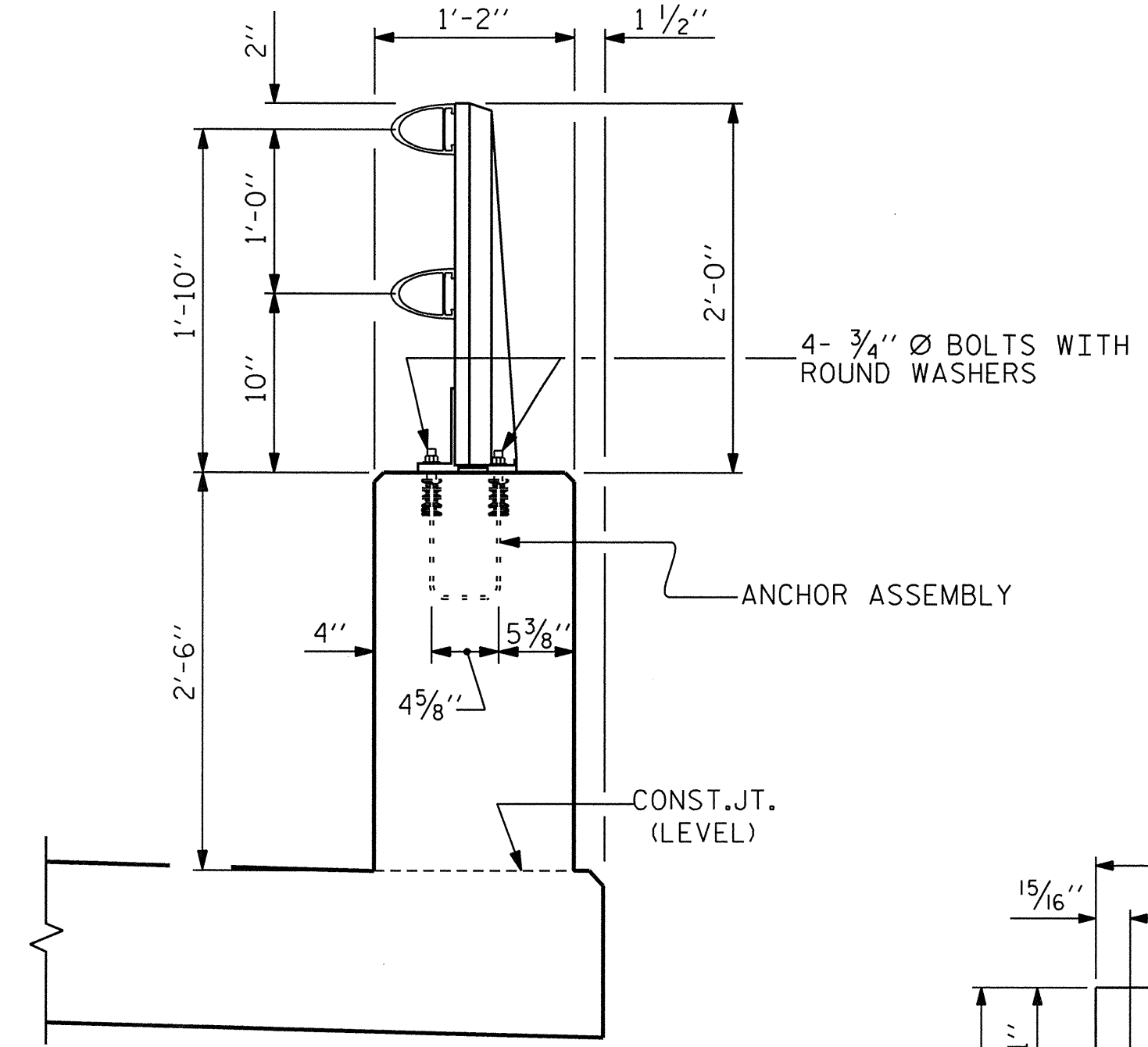
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

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.

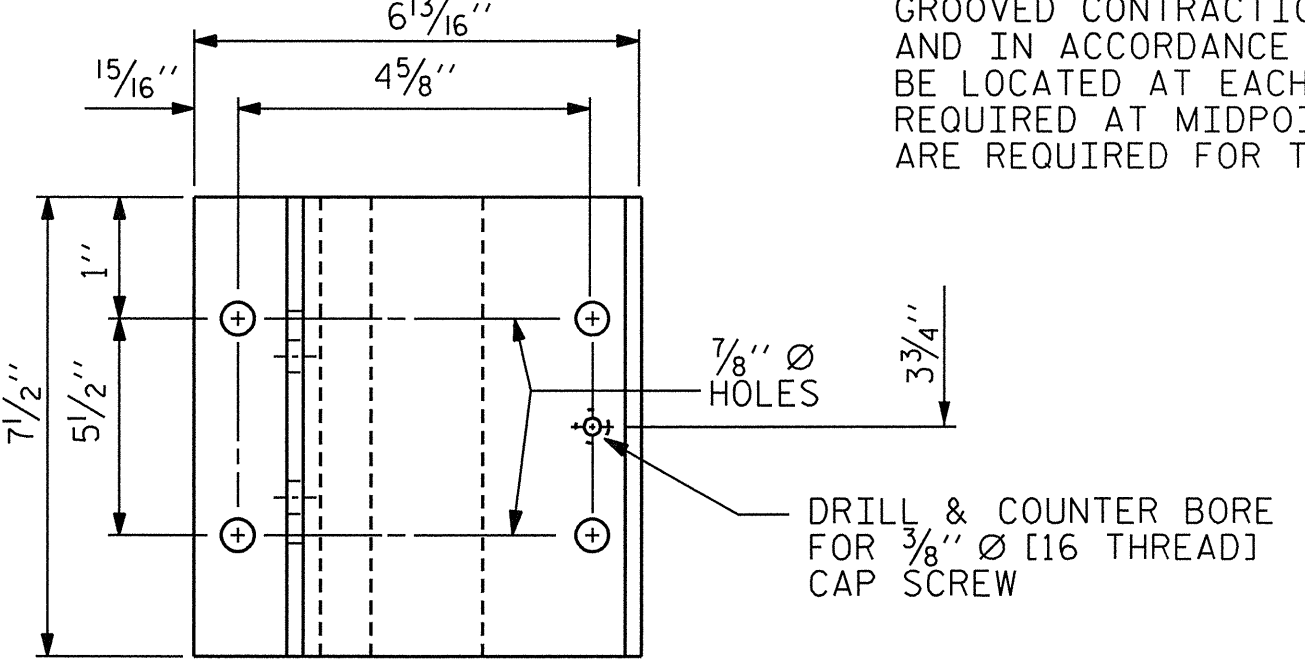
PAY LENGTH = 186.46 LIN. FT.



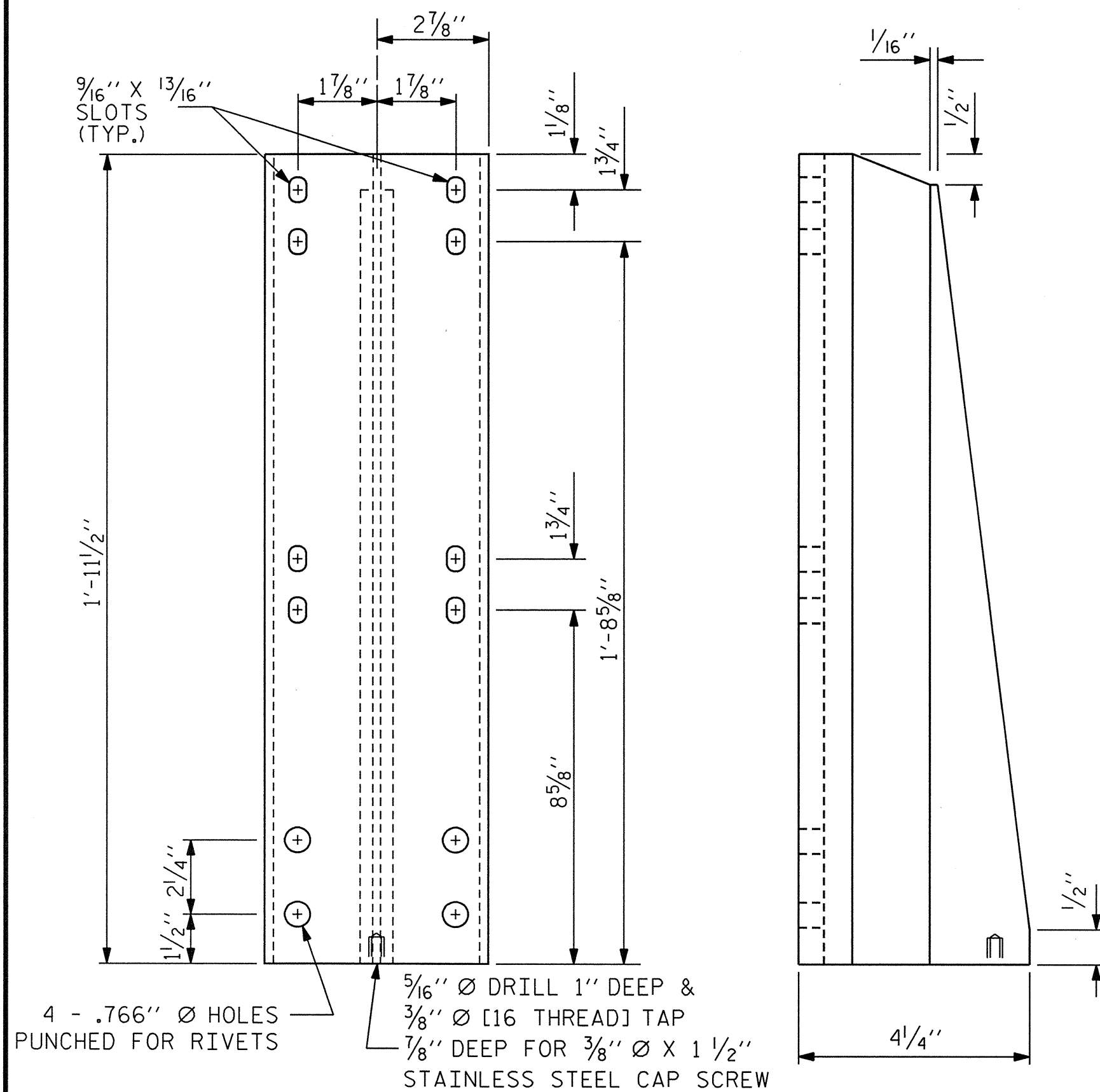
**PLAN**



**SECTION THRU PARAPET AND RAIL**



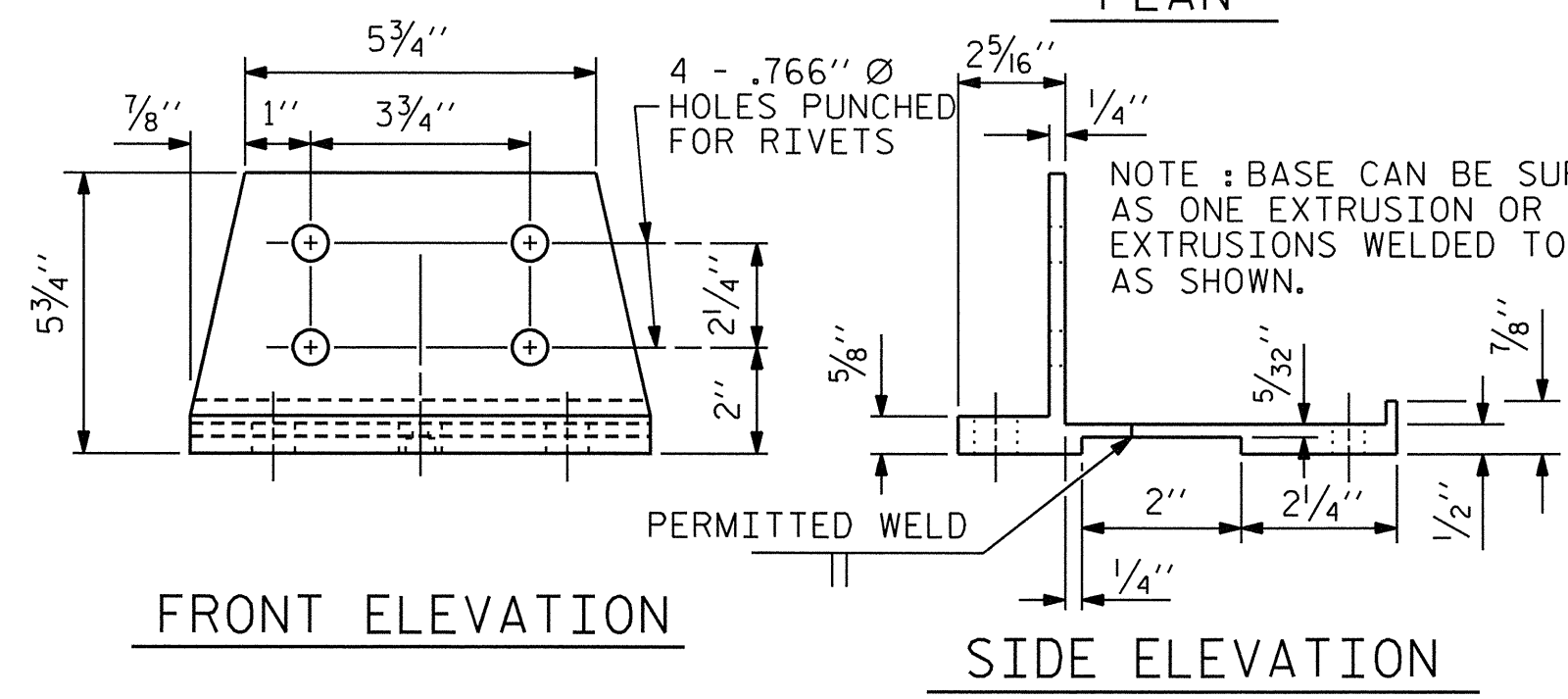
**PLAN**



**FRONT ELEVATION**

**SIDE ELEVATION**

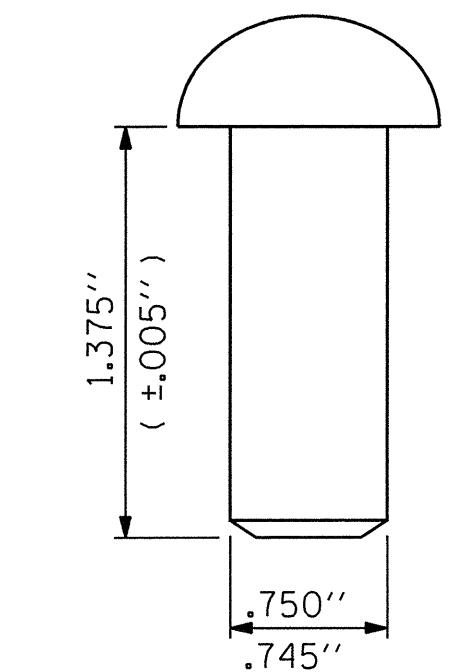
**DETAILS OF POST**



**FRONT ELEVATION**

**SIDE ELEVATION**

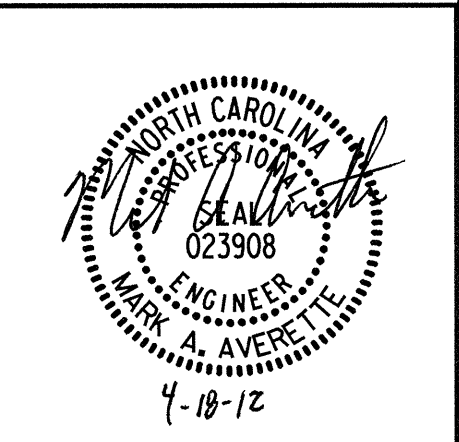
**POST BASE DETAILS**



**RIVET DETAIL**

PLANS PREPARED BY:

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(919) 852-0598 (Fax)  
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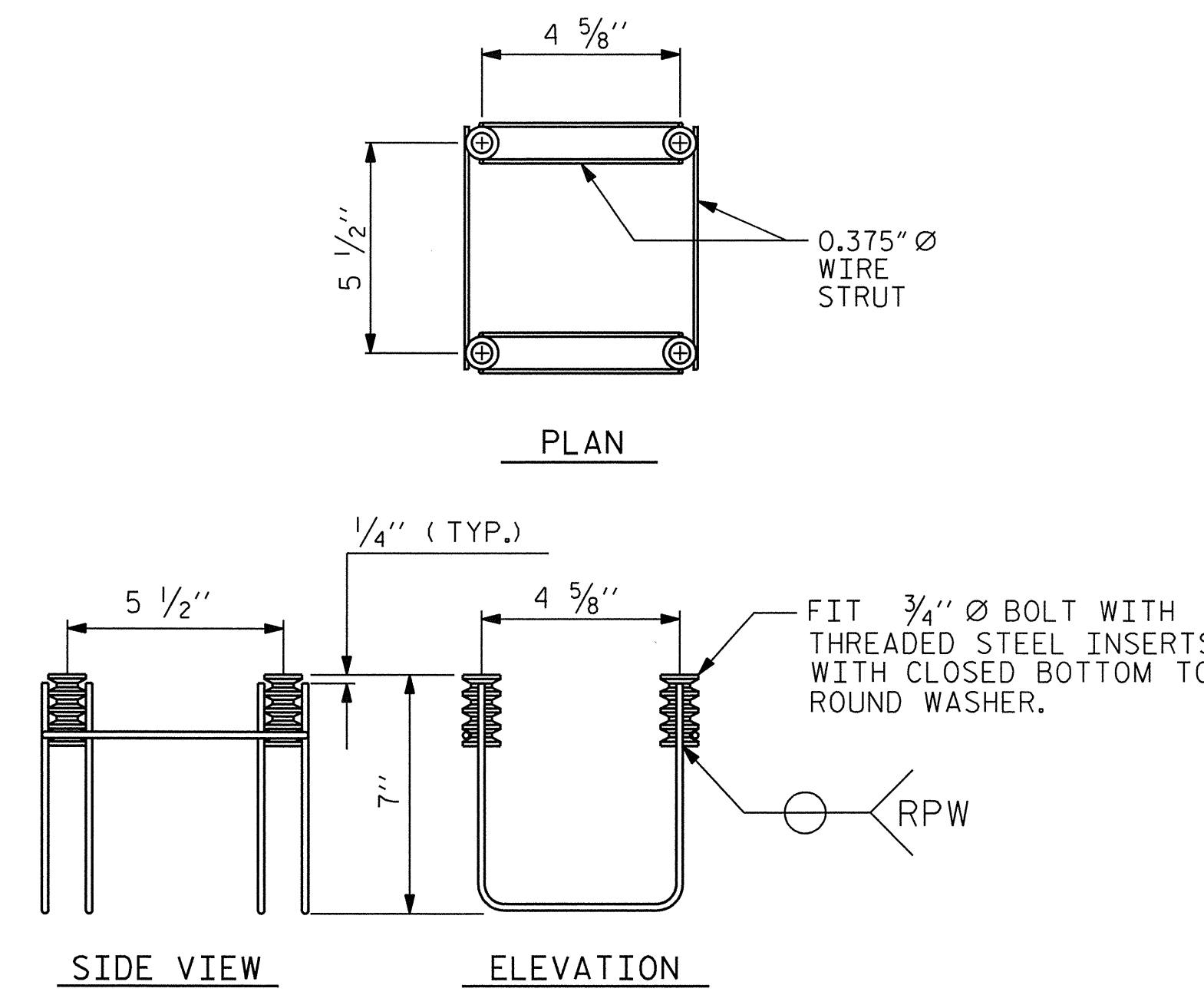
SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				SHEET NO. S-16
SUPERSTRUCTURE 2 BAR METAL RAIL				TOTAL SHEETS 37
REVISIONS				
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1			3	
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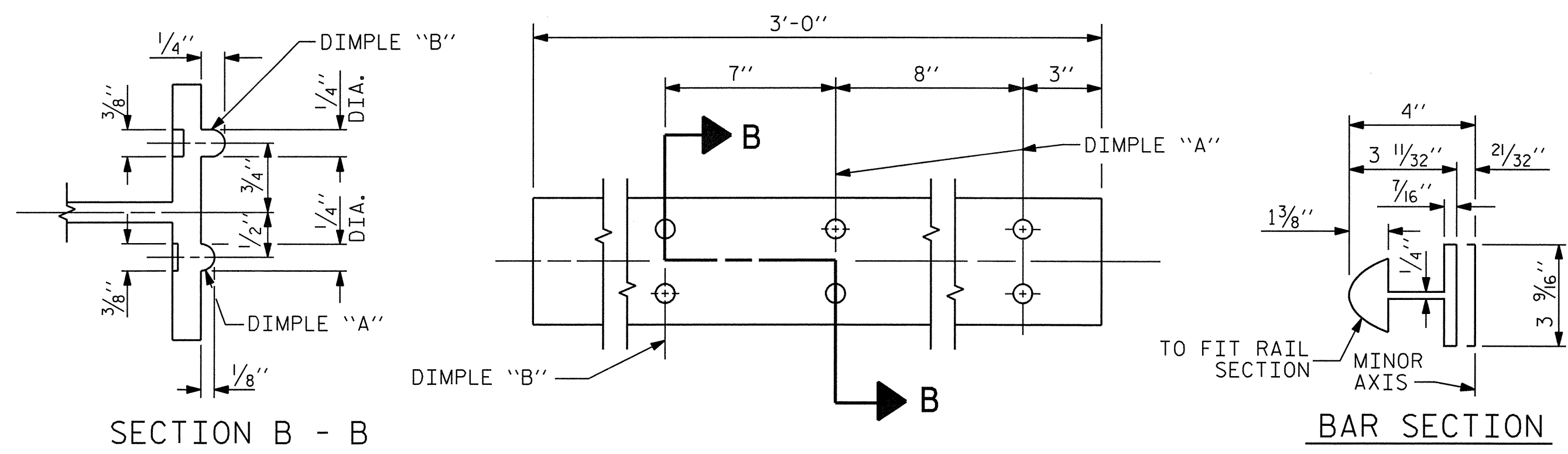


**4-BOLT METAL RAIL ANCHOR ASSEMBLY**  
(33 ASSEMBLIES REQUIRED)

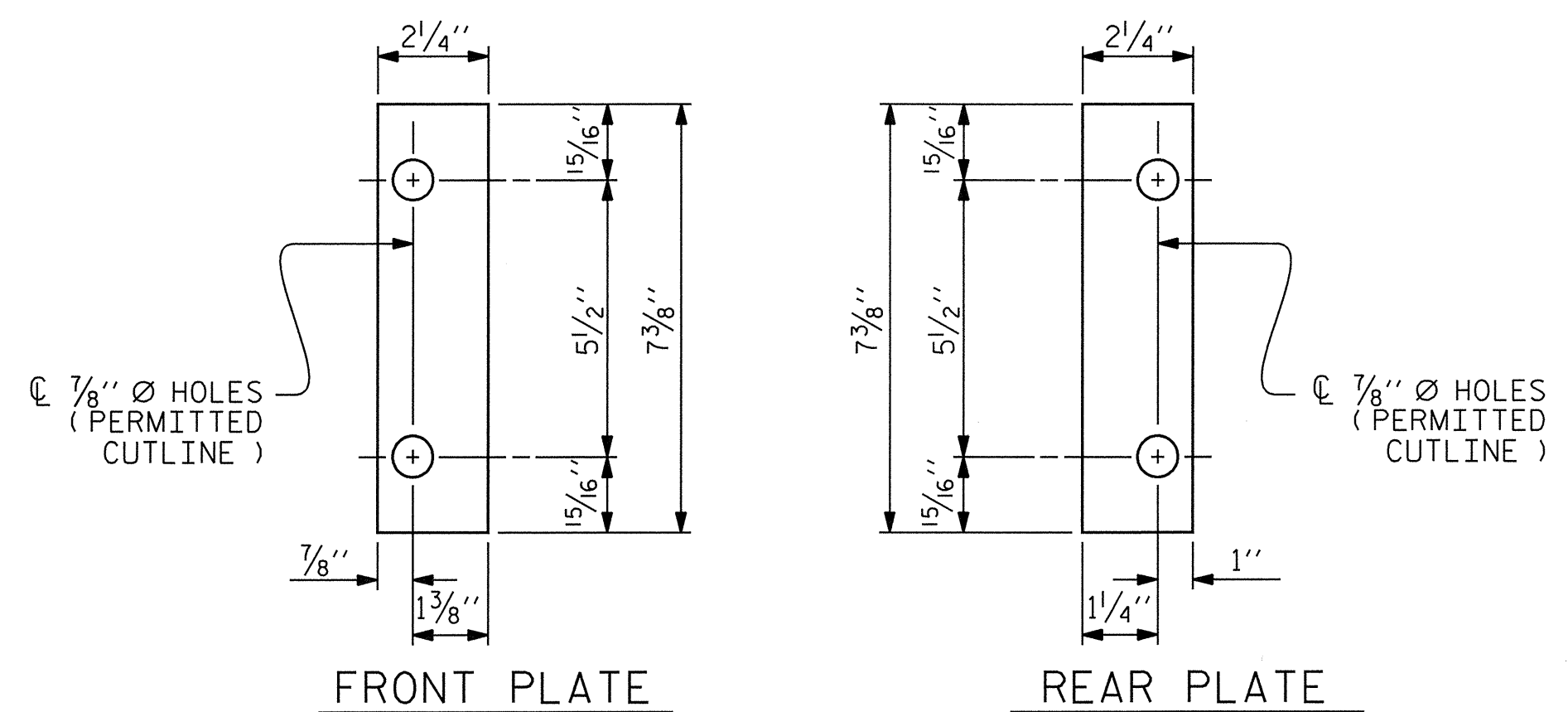
- NOTES:**  
STRUCTURAL CONCRETE ANCHOR ASSEMBLY
- THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
  - 4 - 3/4" 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.
  - 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.
  - THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
  - 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.
  - 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.

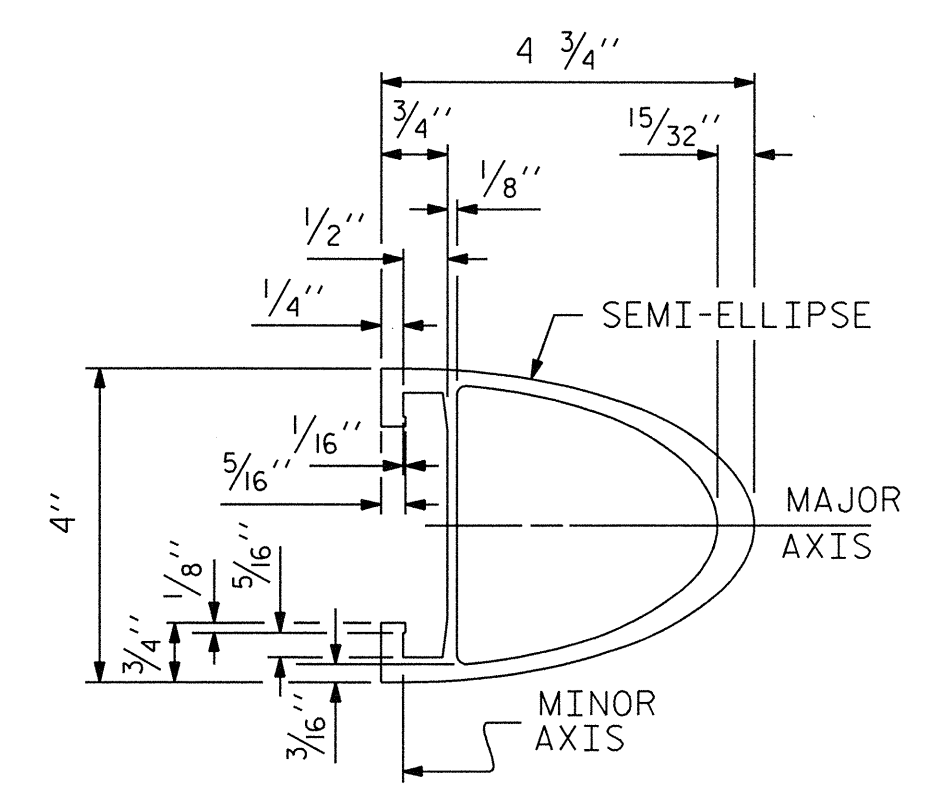


**EXPANSION BAR DETAILS**

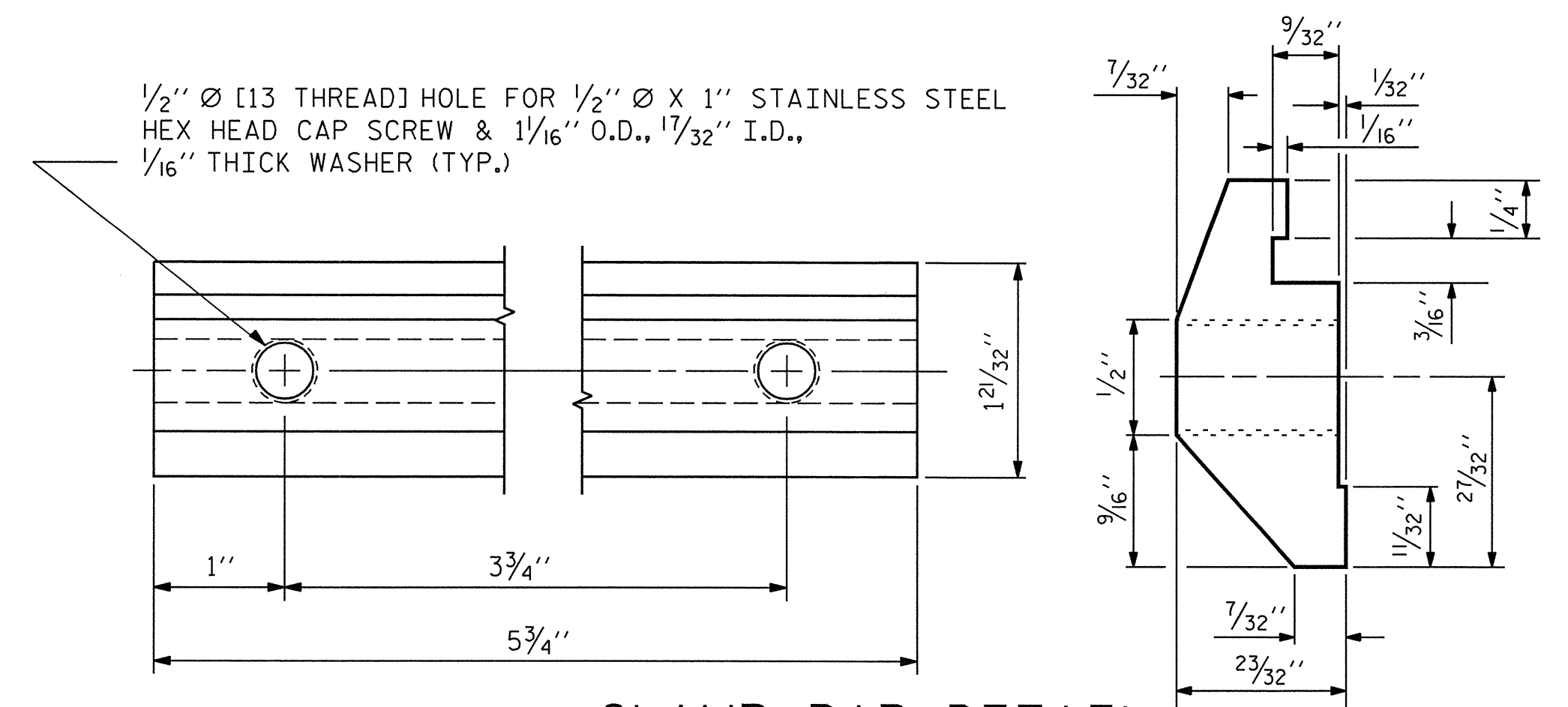


**SHIM DETAILS**

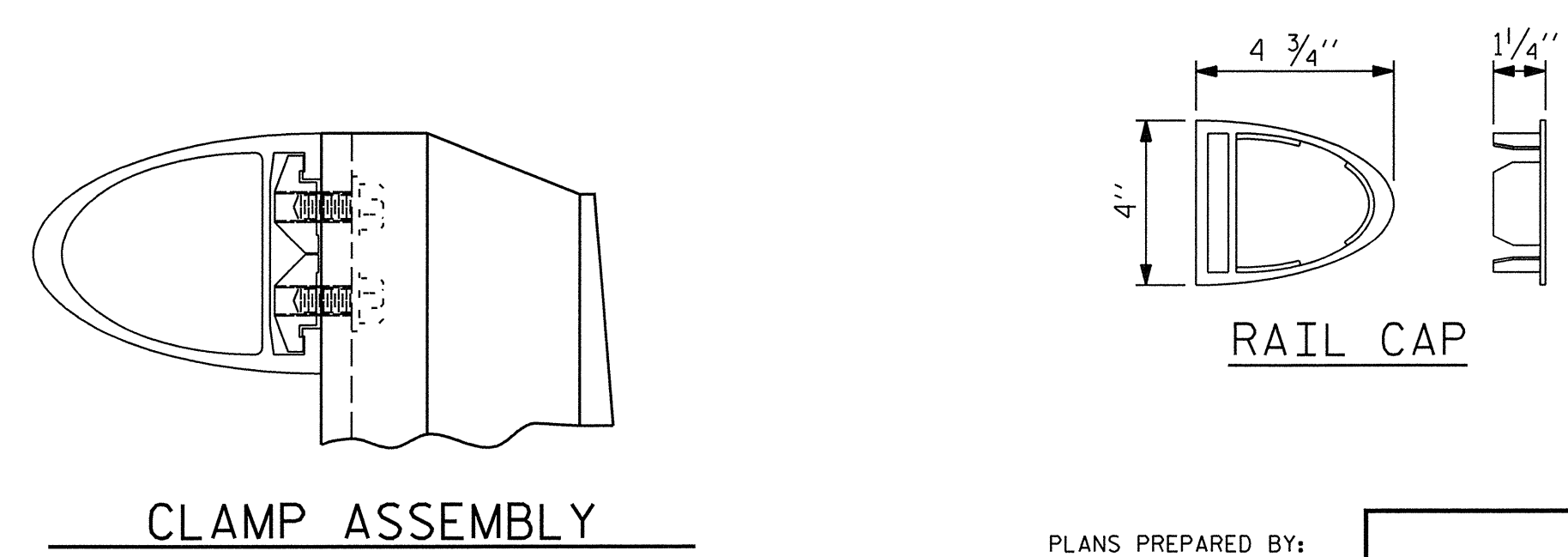
NOTE :  
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



**RAIL SECTION**



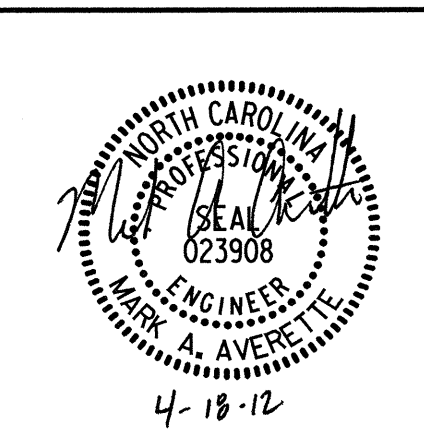
**CLAMP BAR DETAIL**  
(4 REQUIRED PER POST)



**CLAMP ASSEMBLY**

**RAIL CAP**

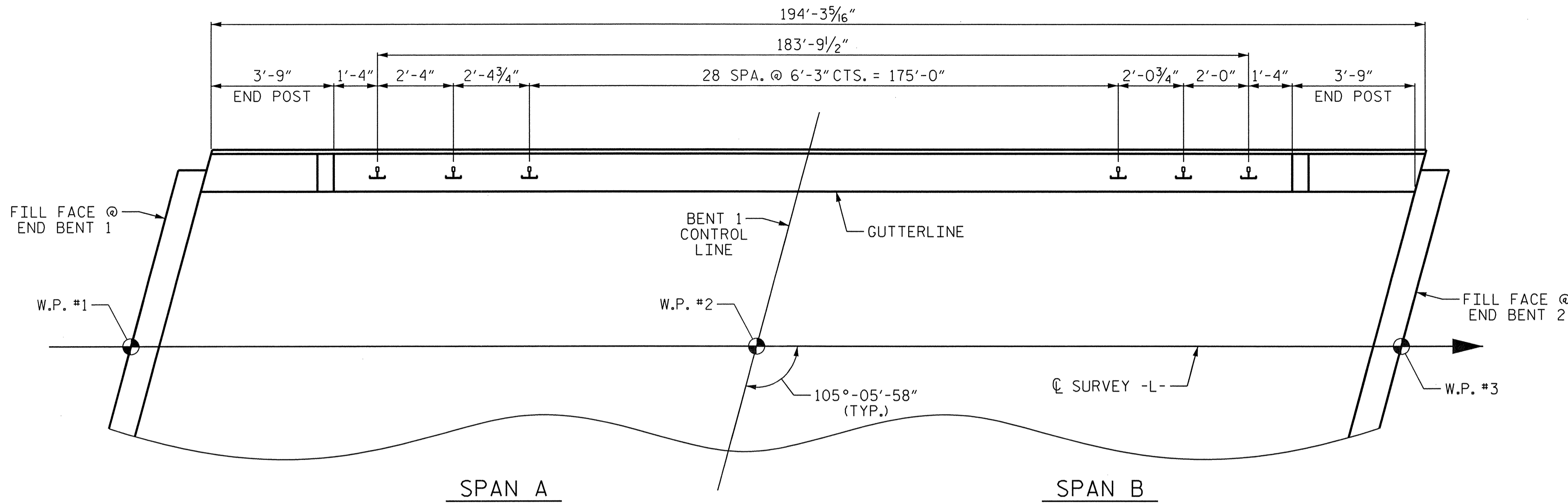
PLANS PREPARED BY:  
**SE & A**  
SIMPSON ENGINEERS ASSOCIATES  
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PROJECT NO. B-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-  
SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
2 BAR METAL RAIL					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					37

DRAWN BY : T. BANKOVICH DATE : 11-2011  
CHECKED BY : M. AVERETTE DATE : 1-2012



PLAN OF RAIL POST SPACINGS

NOTES:

STRUCTURAL CONCRETE INSERT

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

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

NOTES:

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

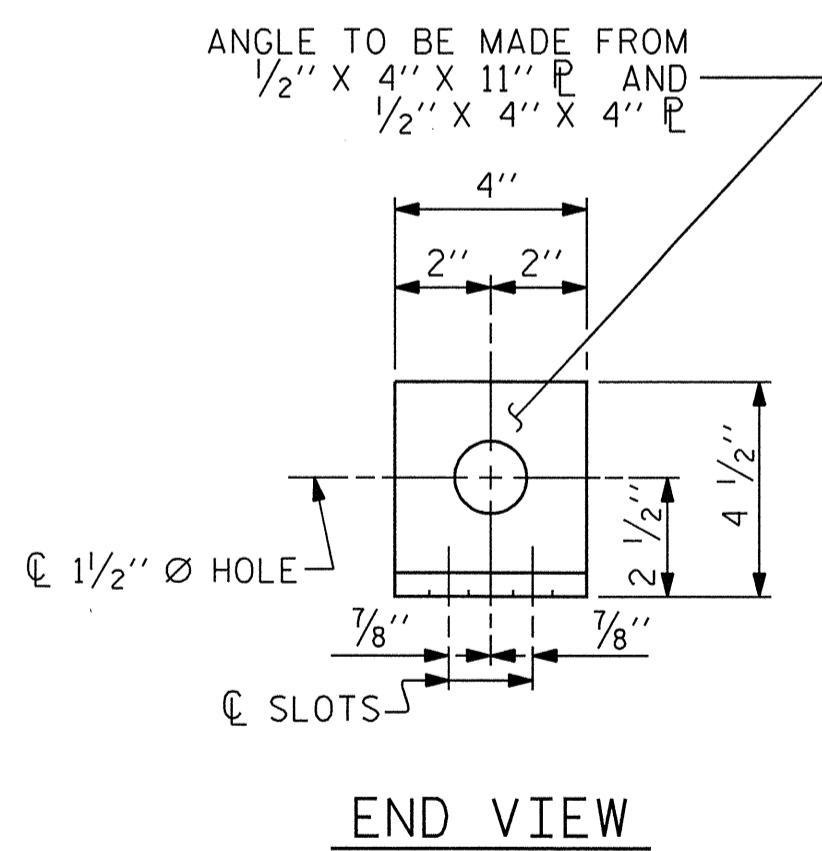
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE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

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

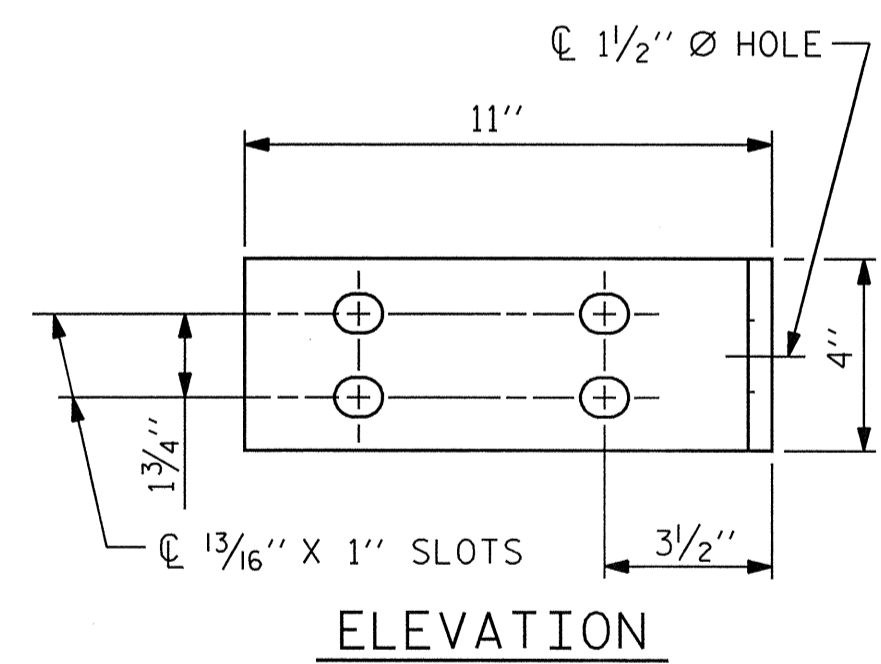
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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.

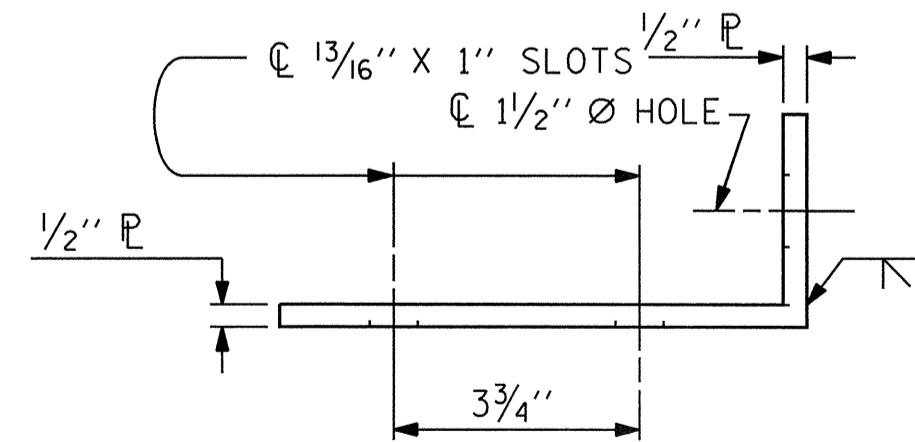
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT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



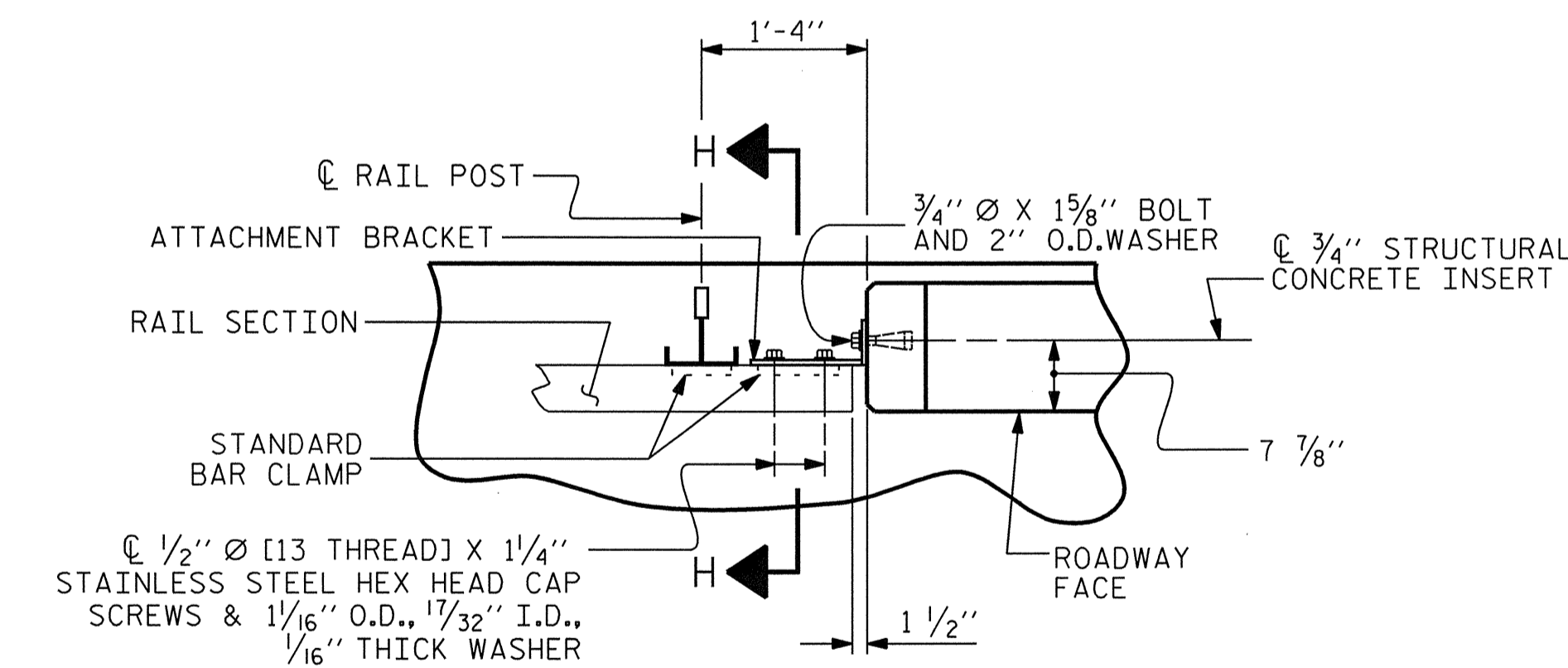
END VIEW



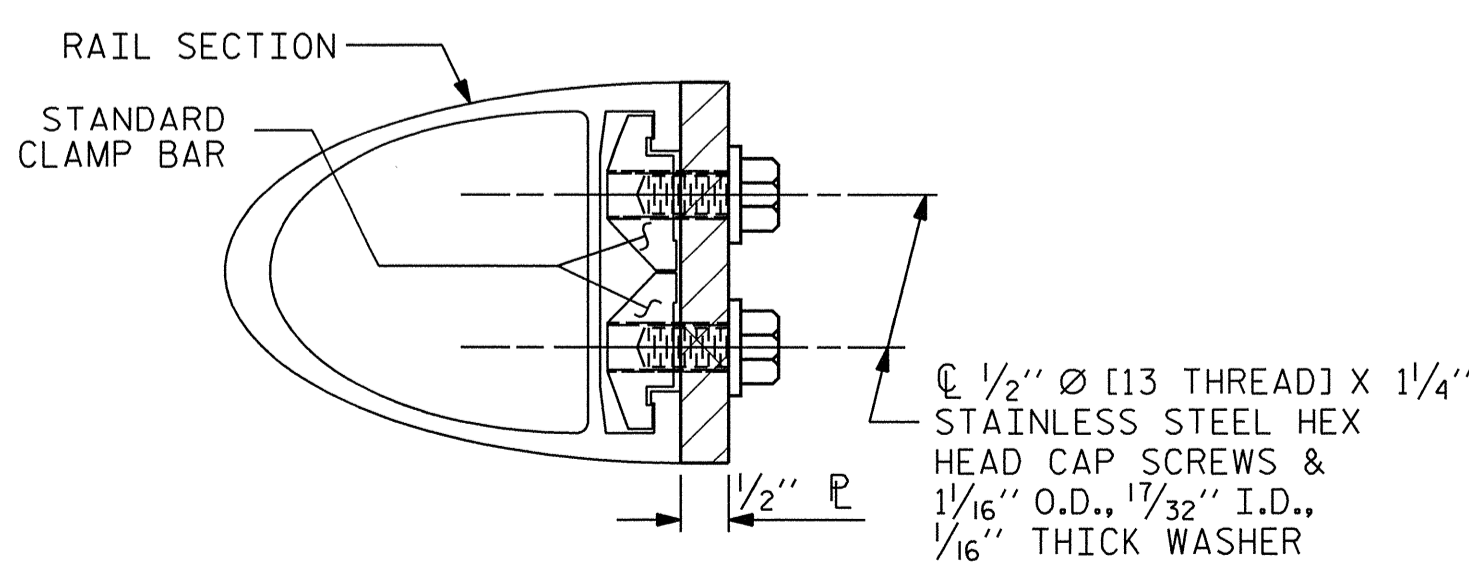
ELEVATION



TOP VIEW

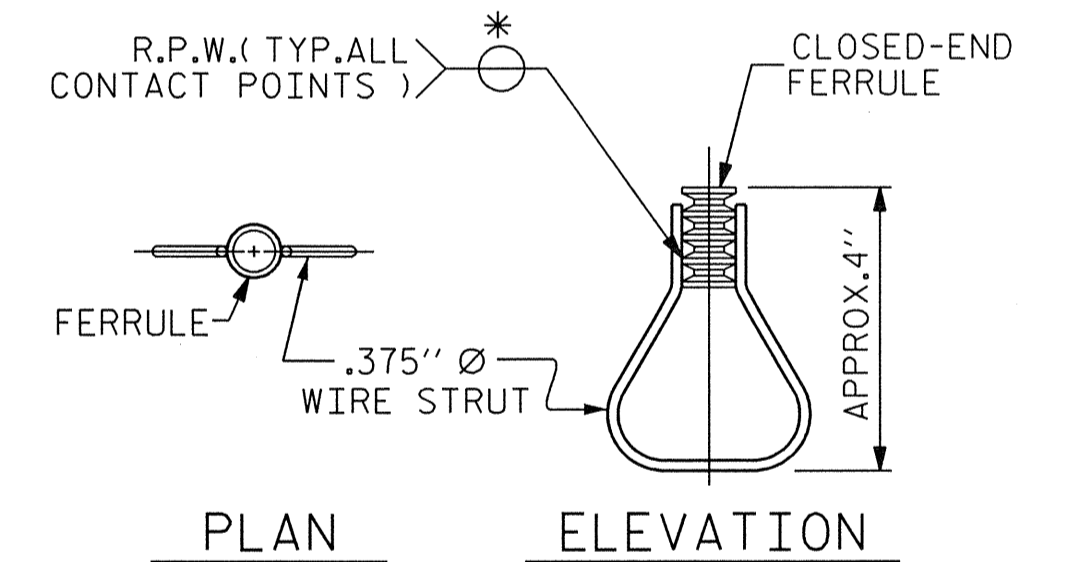


PLAN - RAIL AND END POST



SECTION H-H

DETAILS FOR ATTACHING METAL RAIL TO END POST



PLAN ELEVATION STRUCTURAL CONCRETE INSERT

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

PROJECT NO. B-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

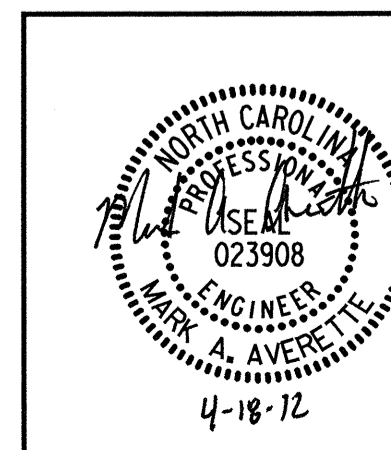
RAIL POST SPACINGS  
AND  
END OF RAIL DETAILS  
FOR 2 BAR METAL RAIL

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

TOTAL SHEETS 37

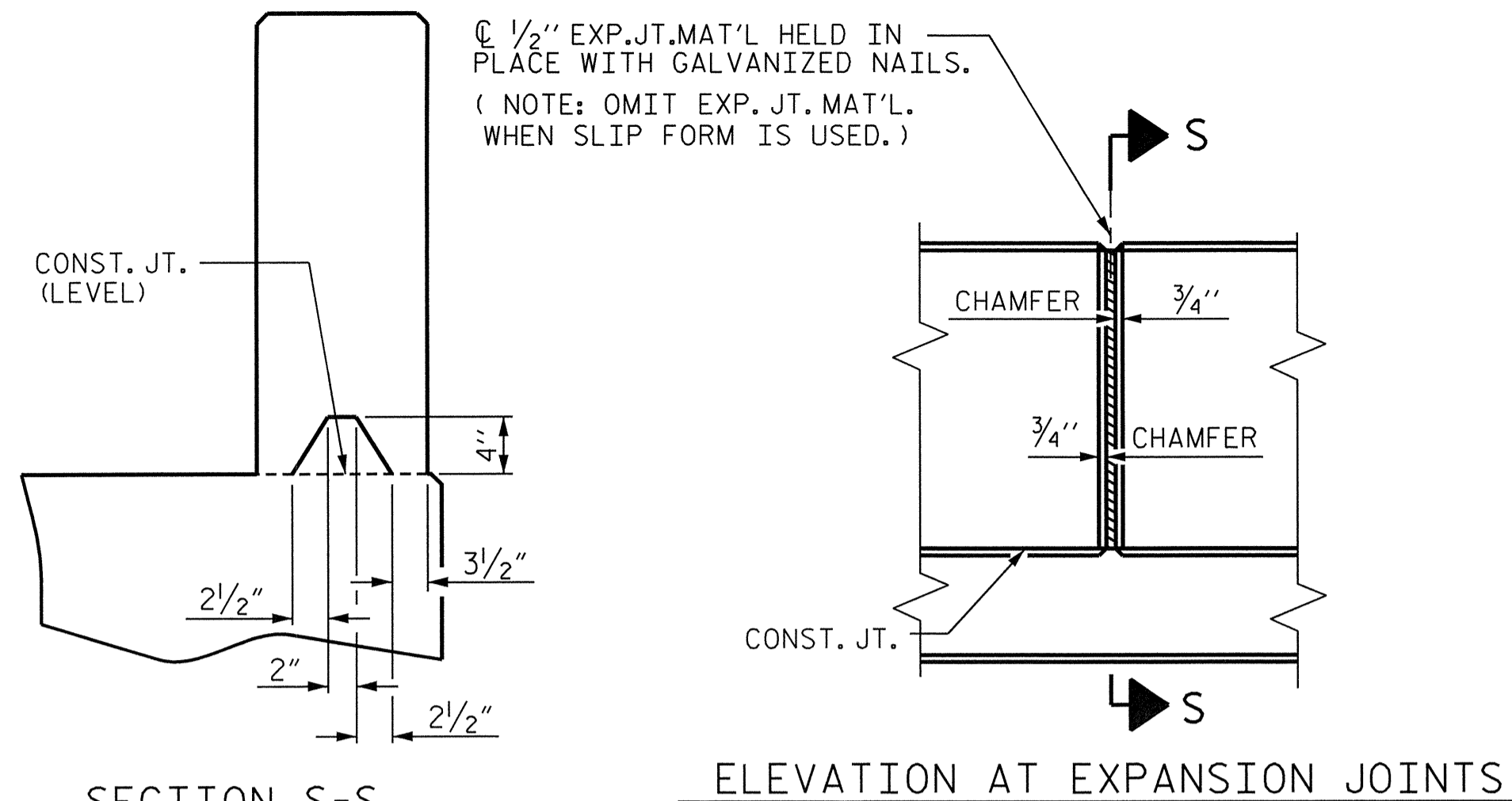
PLANS PREPARED BY:

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LICENSURE NO. C2521



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DRAWN BY: T. BANKOVICH DATE: 11-2011  
CHECKED BY: M. AVERETTE DATE: 1-2012



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

ELEVATION AT EXPANSION JOINTS

PARAPET DETAILS

NOTES:

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

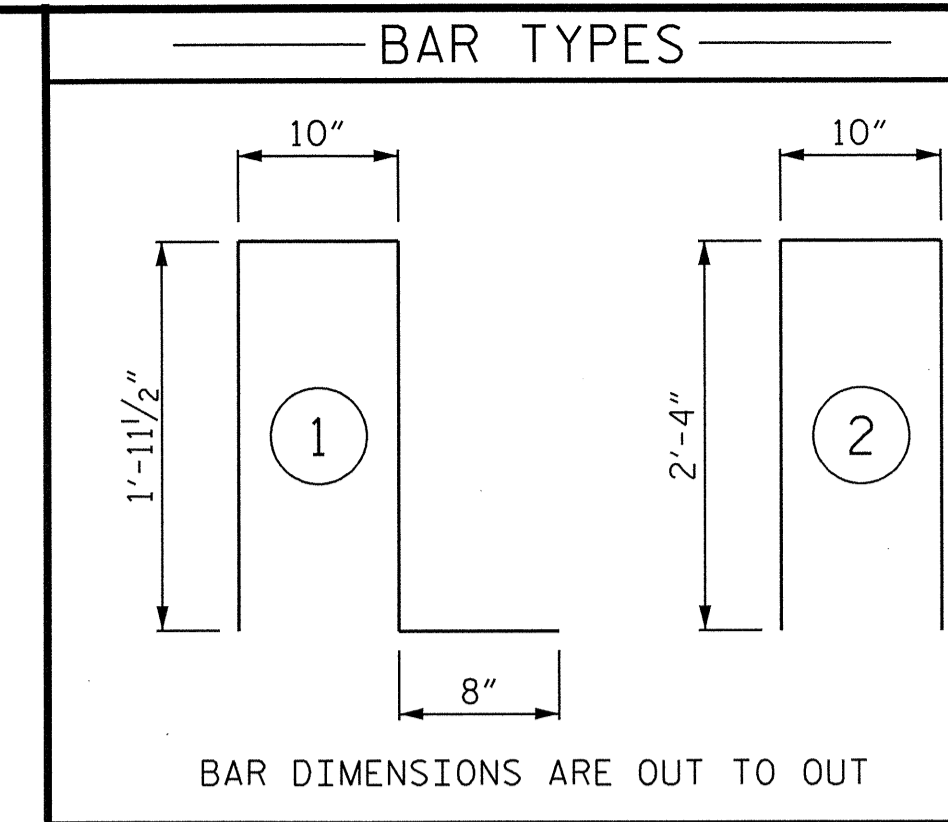
ALL REINFORCING STEEL IN PARAPET AND END POSTS SHALL BE EPOXY COATED.

THE #5 S1E & #5 S2E BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN PARAPET.

FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS" SHEET.

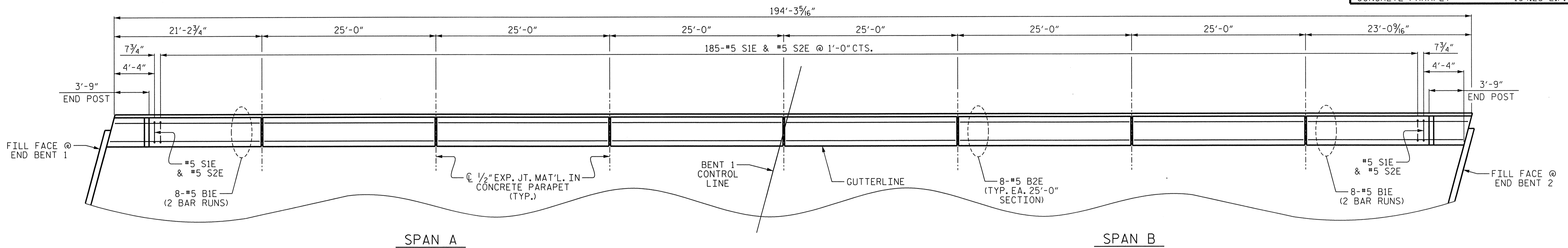
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT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



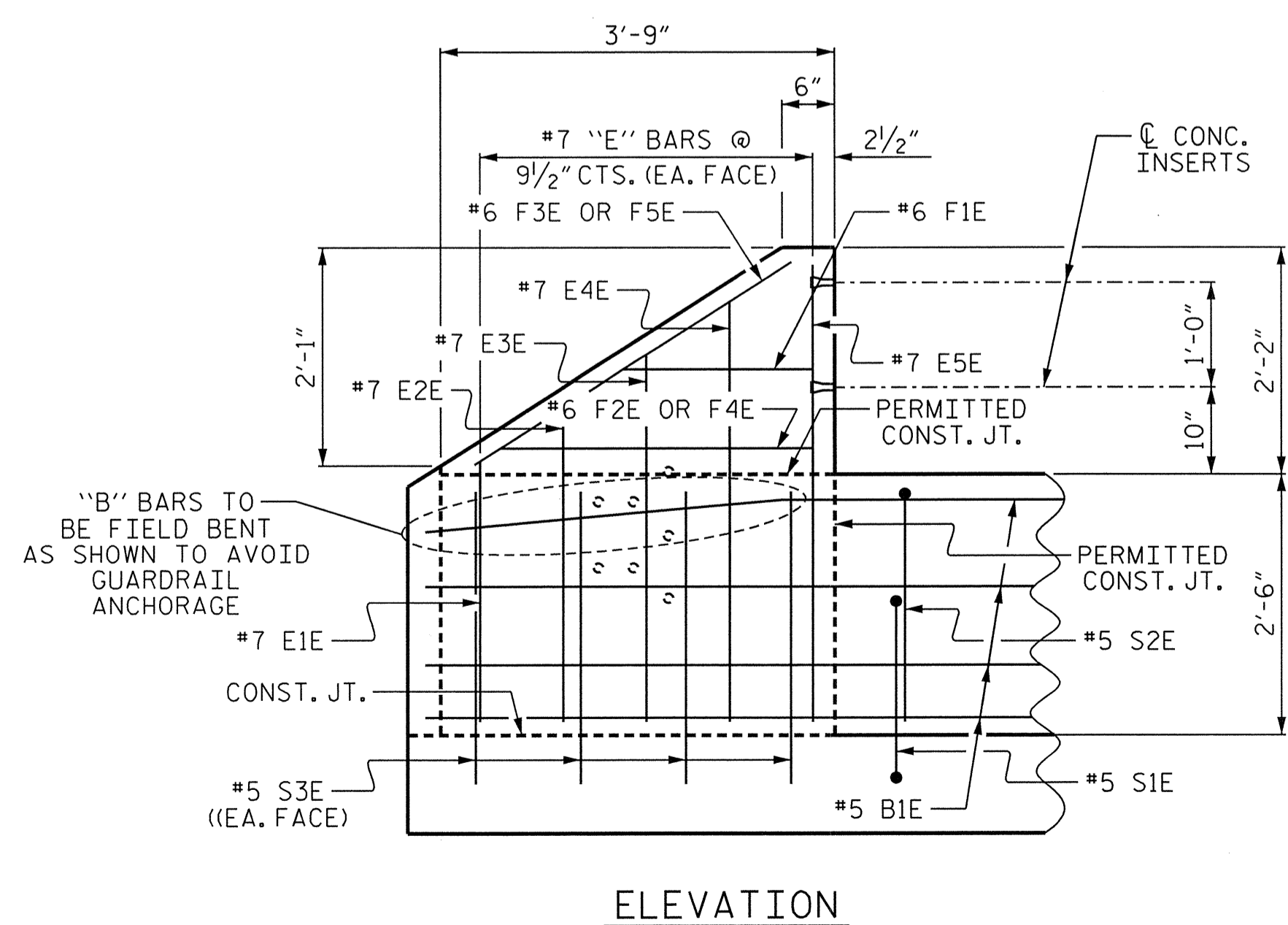
BAR DIMENSIONS ARE OUT TO OUT

"E" INDICATES EPOXY COATED REINFORCING STEEL

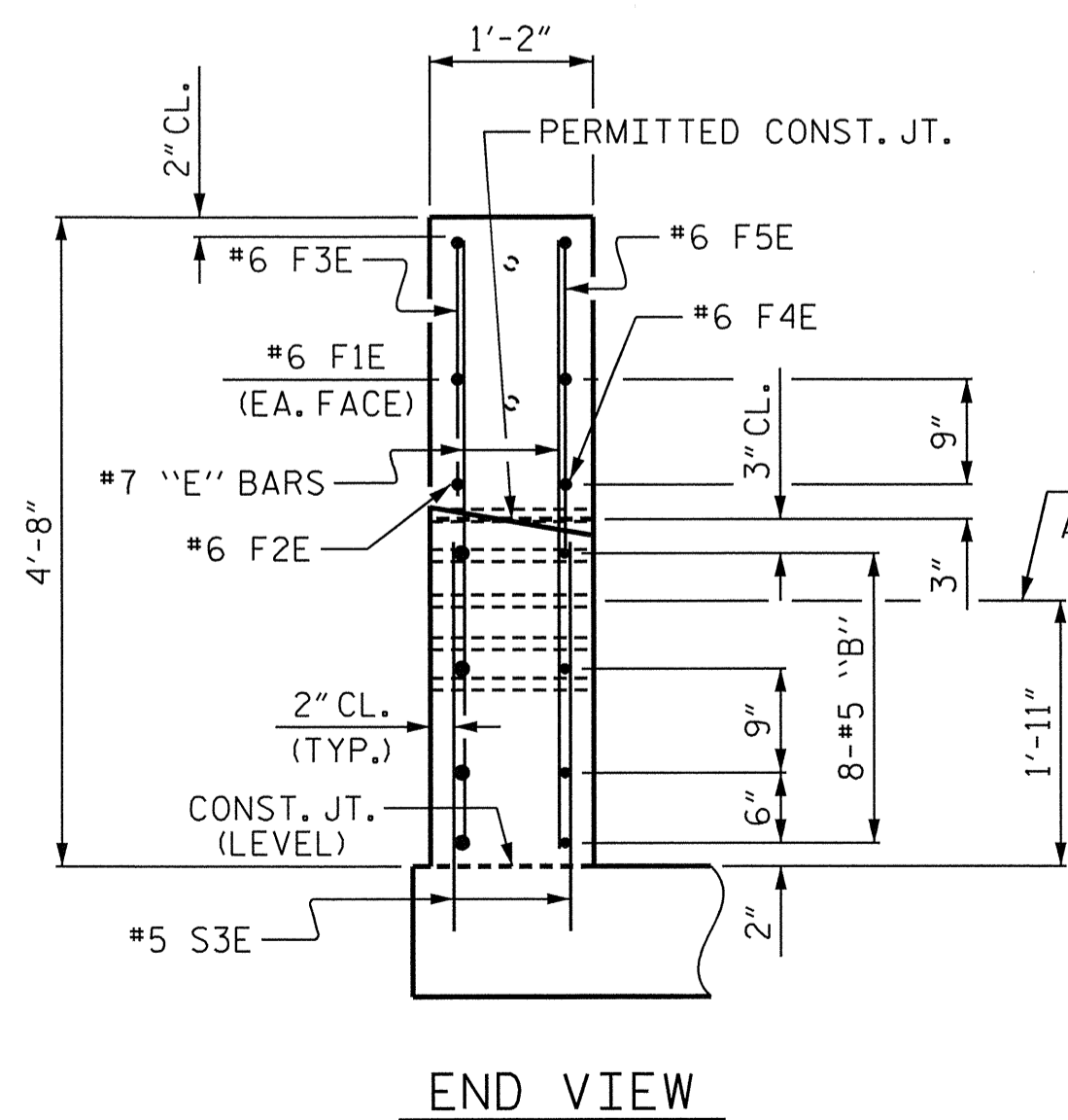
BILL OF MATERIAL					
PARAPET AND END POSTS					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1E	32	5	STR	13'-1"	437
B2E	48	5	STR	24'-8"	1235
E1E	4	7	STR	2'-6"	20
E2E	4	7	STR	3'-0"	25
E3E	4	7	STR	3'-6"	29
E4E	4	7	STR	4'-0"	33
E5E	4	7	STR	4'-4"	35
F1E	4	6	STR	1'-9"	11
F2E	2	6	STR	3'-1"	9
F3E	2	6	STR	3'-5"	10
F4E	2	6	STR	3'-5"	10
F5E	2	6	STR	4'-1"	12
S1E	187	5	1	5'-5"	1056
S2E	187	5	2	5'-6"	1073
S3E	16	5	STR	3'-0"	50
EPOXY COATED REINFORCING STEEL					4045 LBS.
CLASS AA CONCRETE					21.4 C.Y.
1'-2" X 2'-6" CONCRETE PARAPET					194.28 L.F.



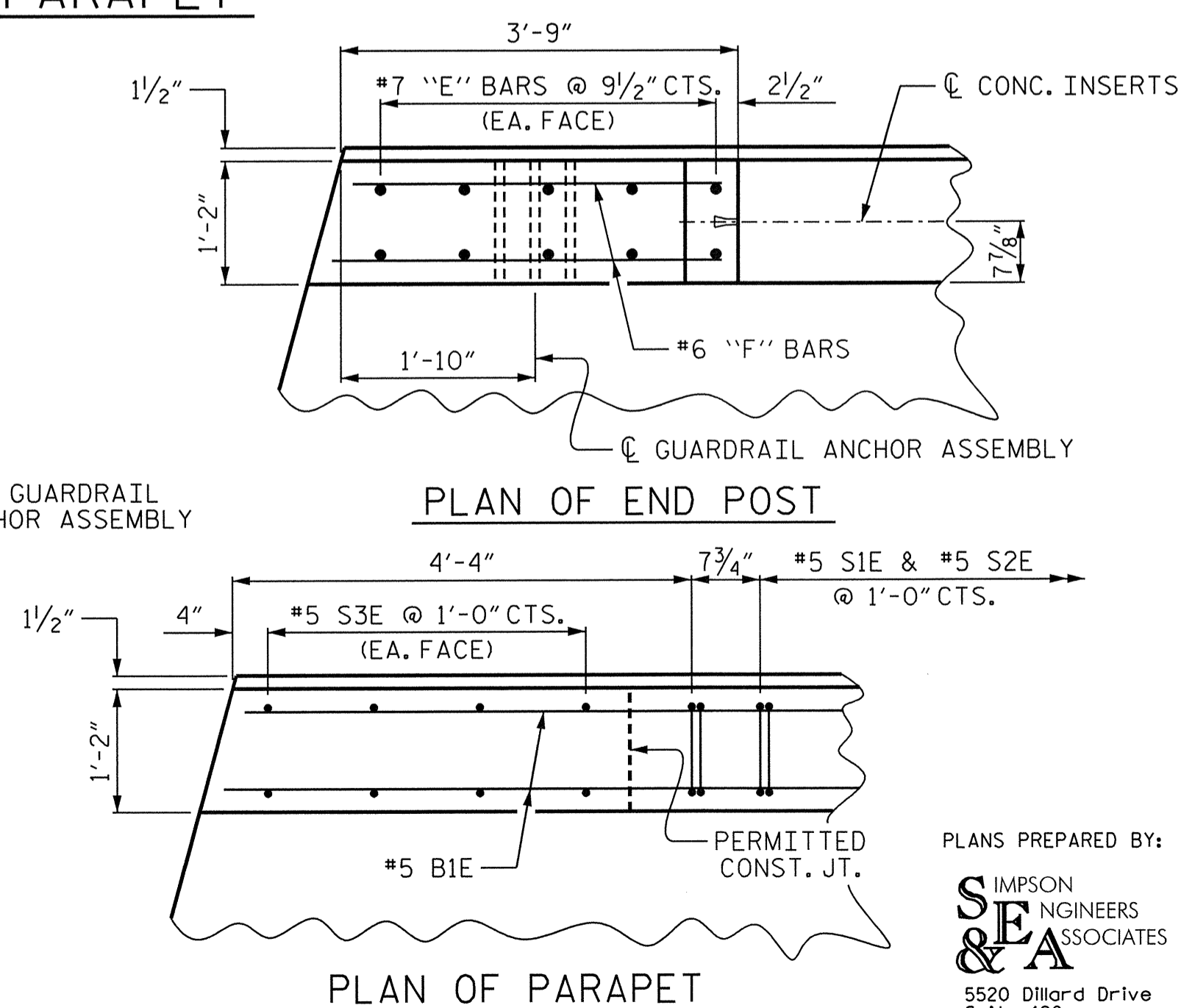
PLAN OF PARAPET



ELEVATION



END VIEW



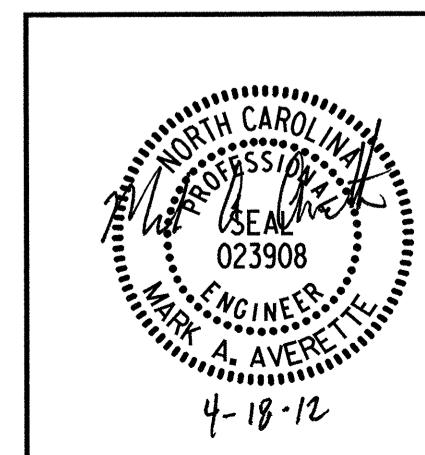
PLAN OF PARAPET

PROJECT NO. B-4760  
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
CONCRETE PARAPET  
DETAILS  
FOR 2 BAR METAL RAIL

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

PLANS PREPARED BY:  
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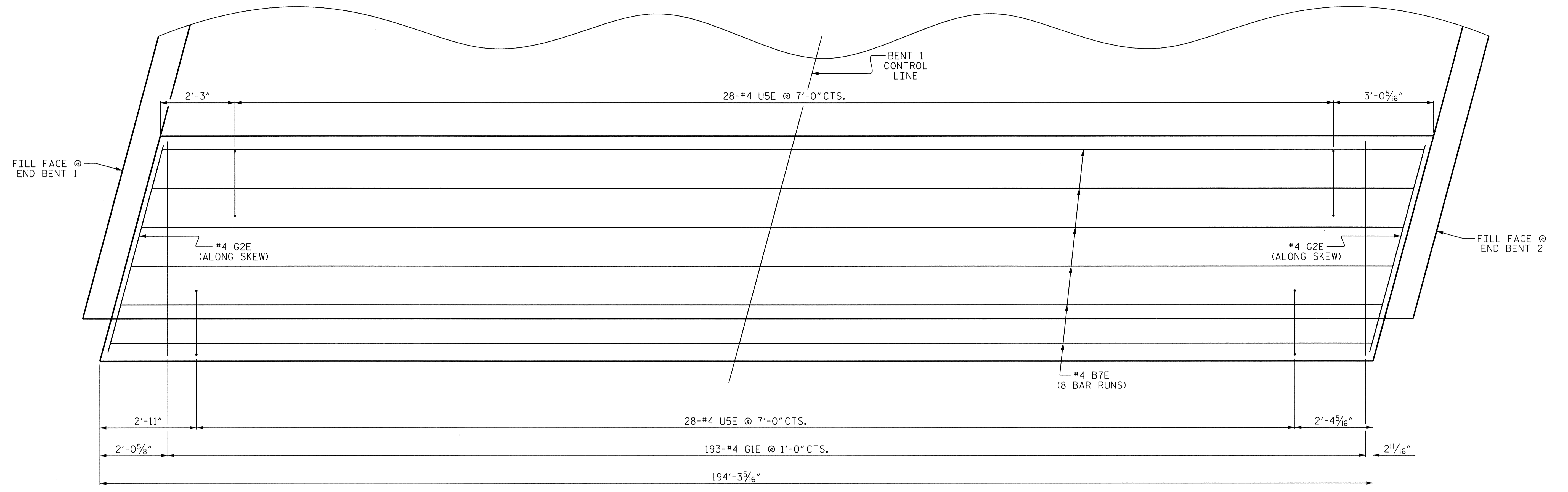


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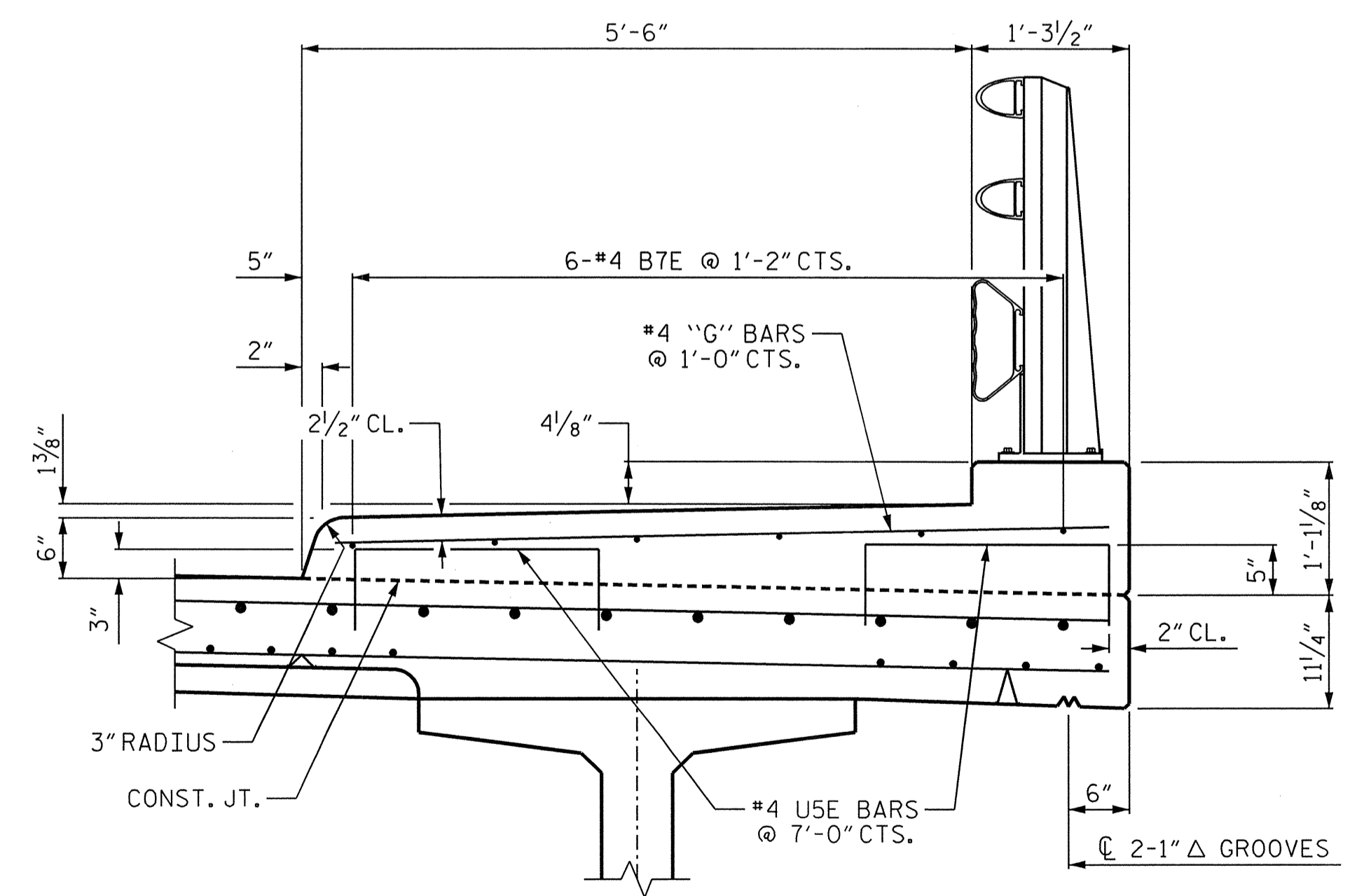
DRAWN BY: T. BANKOVICH DATE: 11-2011  
CHECKED BY: M. AVERETTE DATE: 1-2012

PARAPET AND END POST FOR TWO BAR METAL RAIL

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PLAN OF SIDEWALK



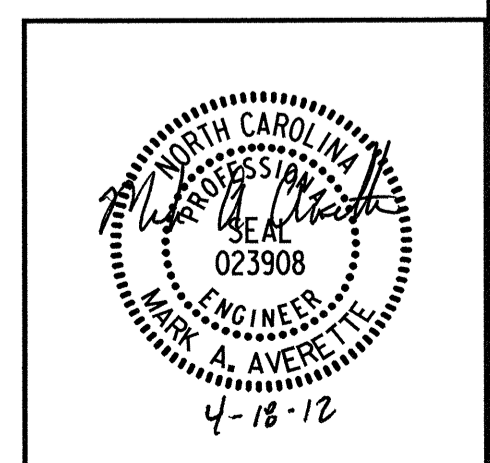
SECTION THRU SIDEWALK

**NOTES:**  
 SIDEWALK IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.  
 ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.  
 GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FT. IN LENGTH.  
 FOR SIDEWALK REINFORCING STEEL AND CONCRETE QUANTITIES SEE SUPERSTRUCTURE "BILL OF MATERIAL" SHEET.  
 USE BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 SIDEWALK DETAILS  
 (RIGHT SIDE)

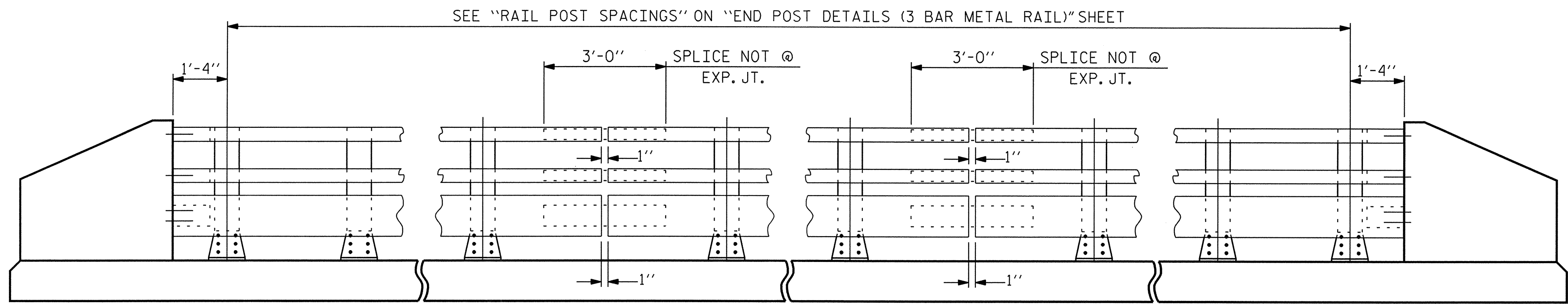
PLANS PREPARED BY:  
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			37

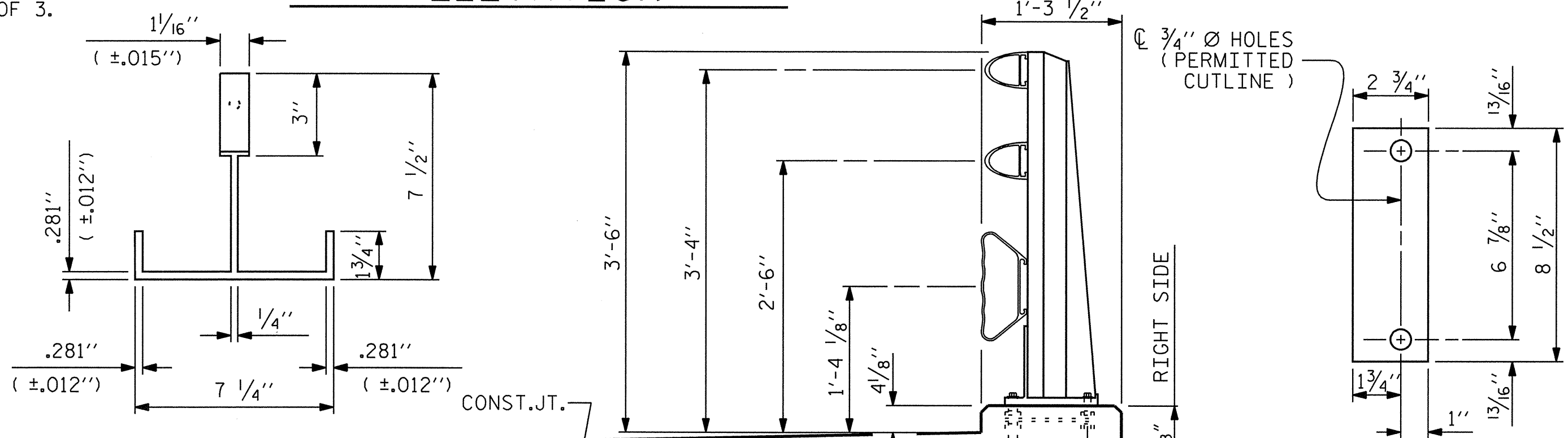
DRAWN BY: T. BANKOVICH DATE: 11-2011  
 CHECKED BY: M. AVERETTE DATE: 1-2012

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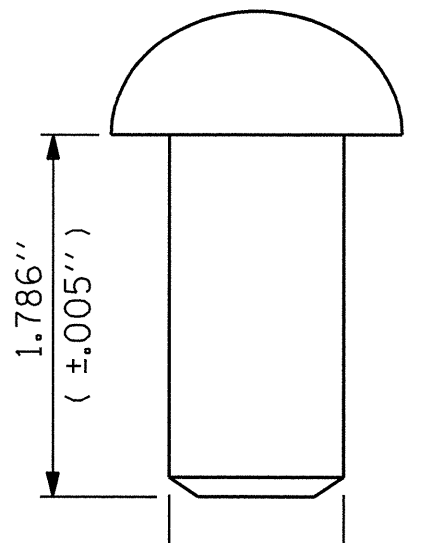
NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE "3 BAR METAL RAIL" SHEET 3 OF 3.

**ELEVATION**

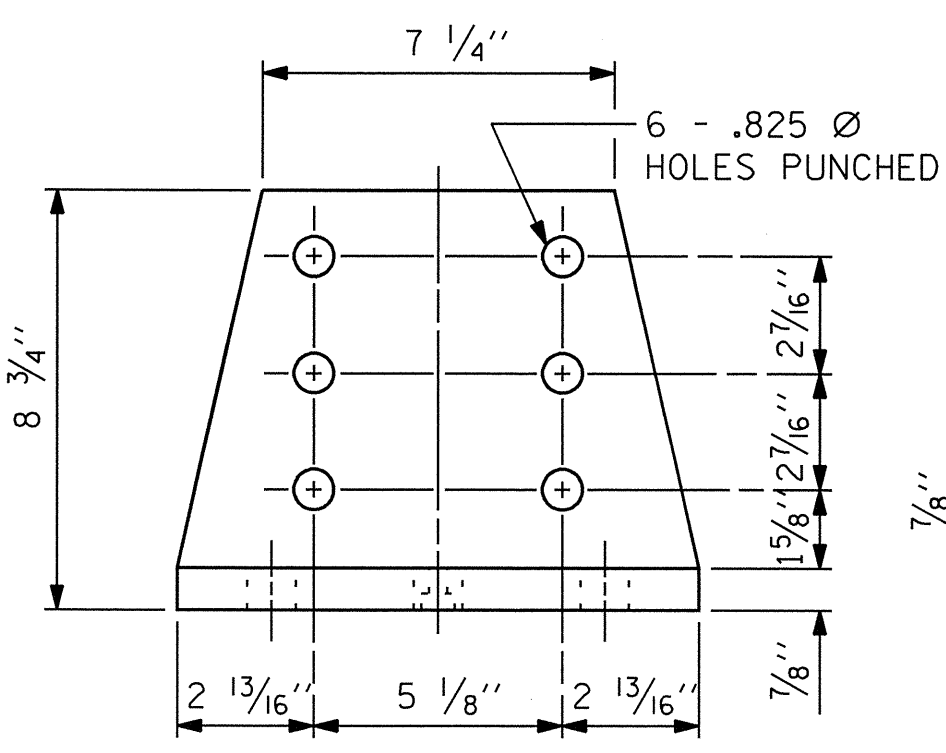


**SECTION THRU RAIL**

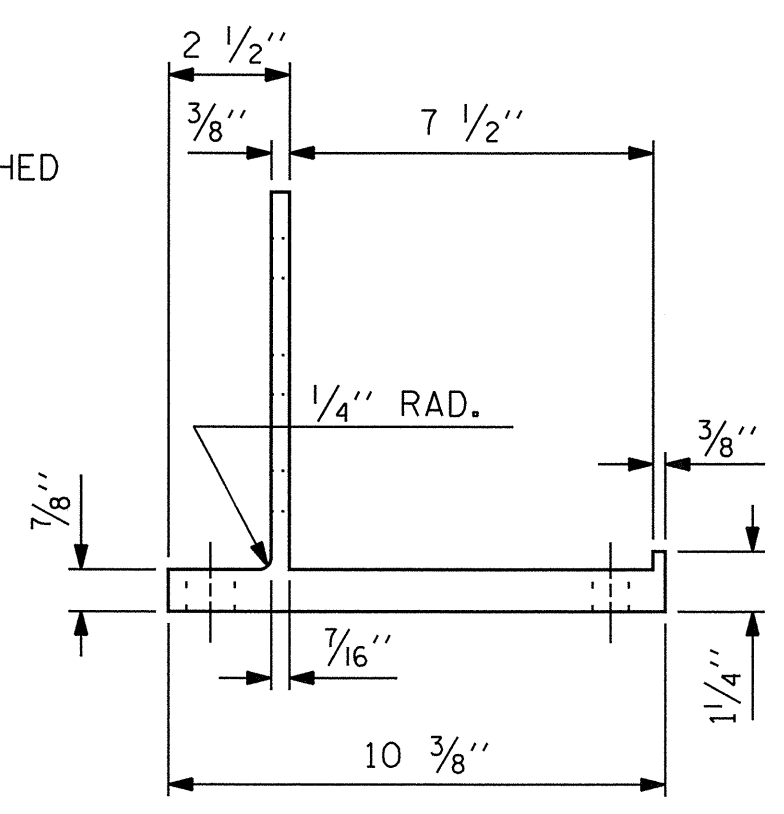
FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" SHEET 2 OF 3.



**RIVET DETAIL**

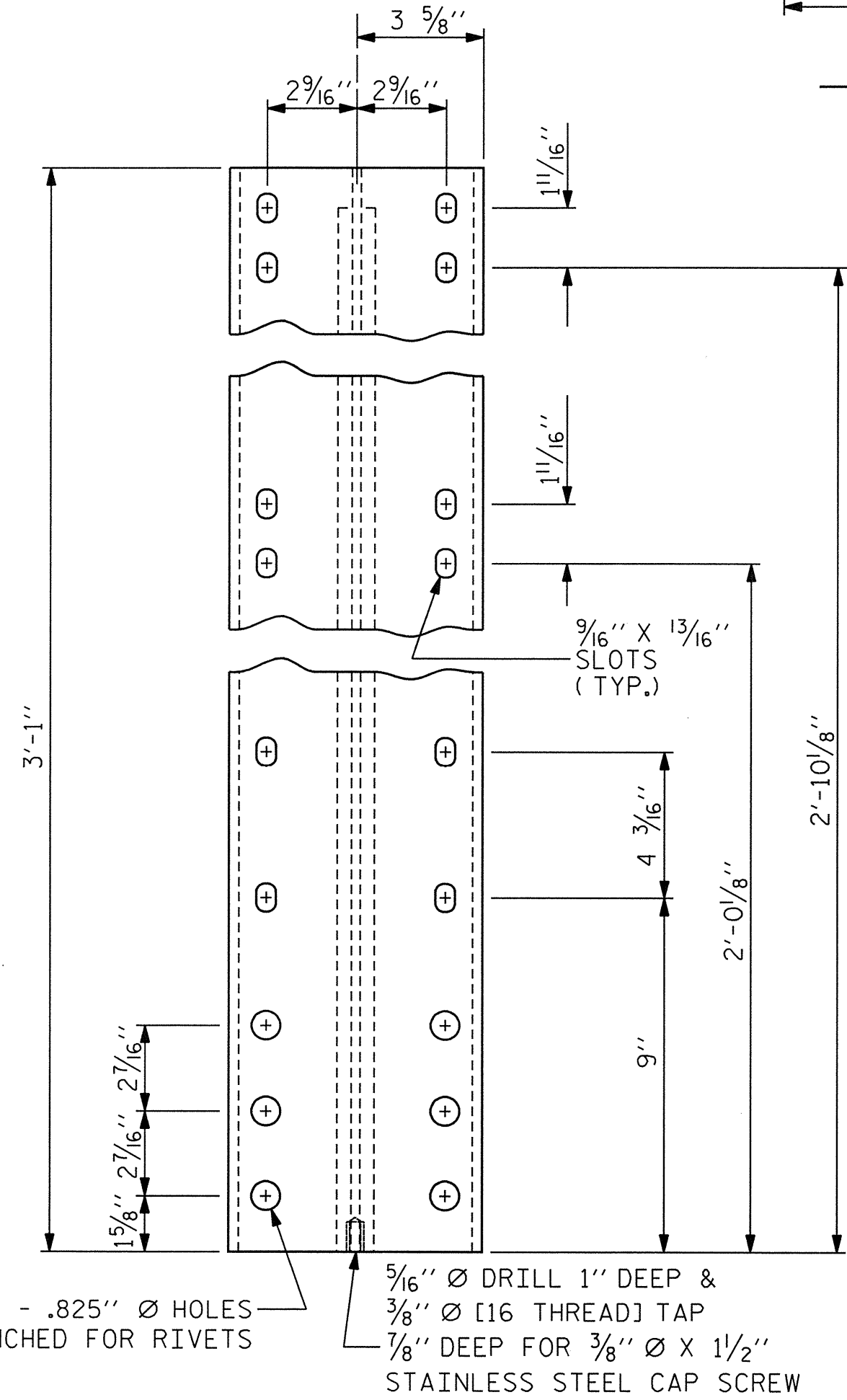


**FRONT ELEVATION**

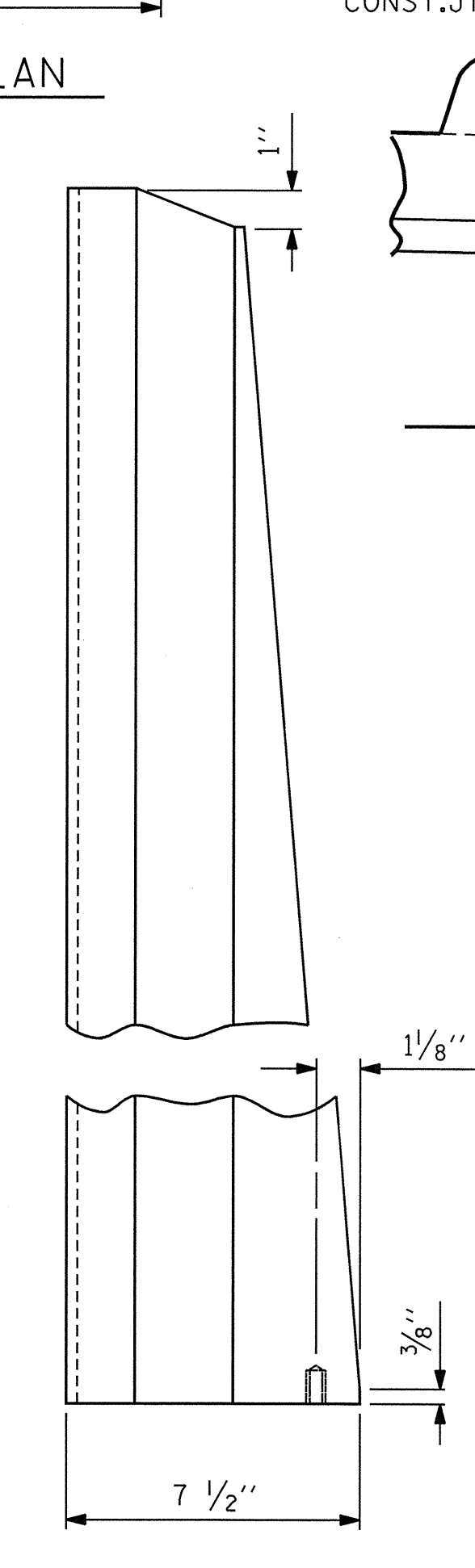


**SIDE ELEVATION**

**POST BASE DETAILS**



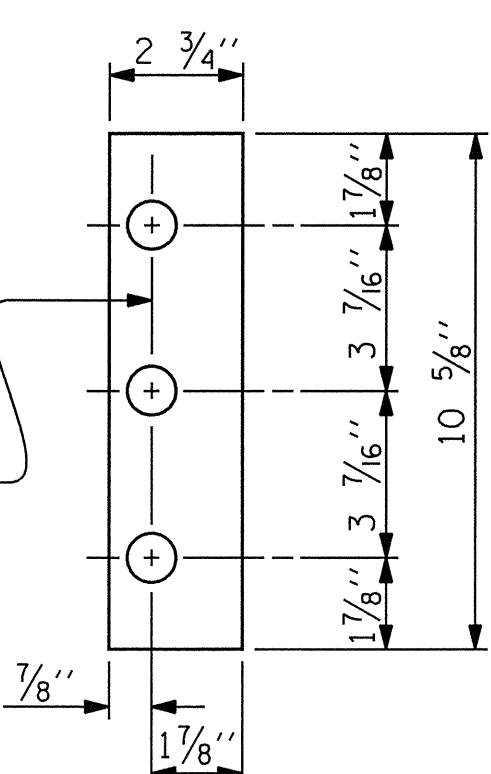
**FRONT ELEVATION**



**SIDE ELEVATION**

**DETAILS OF POST**

**REAR PLATE**



**FRONT PLATE**

**SHIM DETAILS**

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

PAY LENGTH = 186.46 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 B221 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. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE "3 BAR METAL RAIL" SHEET 3 OF 3.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT 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 REMAIN 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.

PROJECT NO. B-4760  
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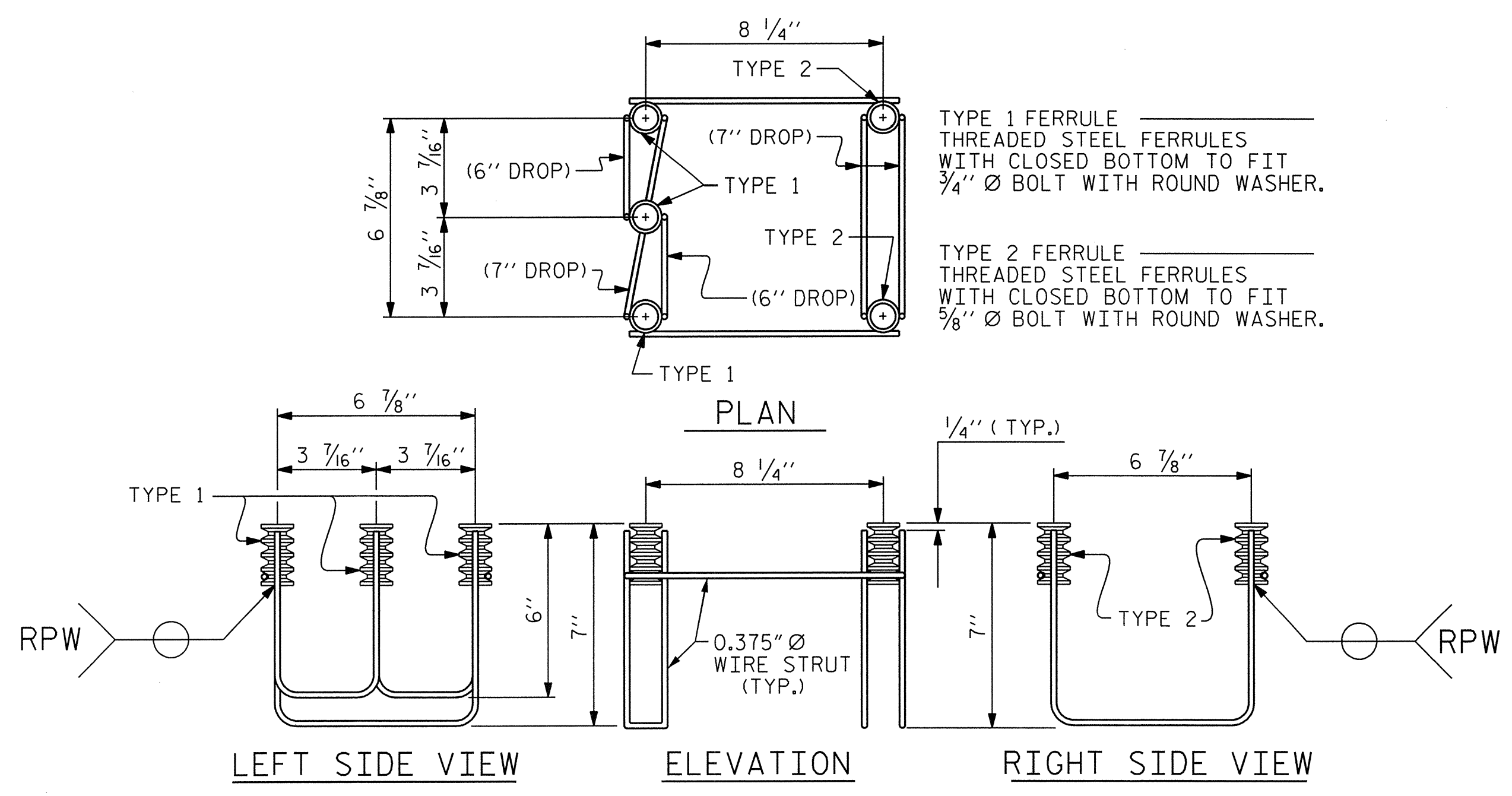
PLANS PREPARED BY:  
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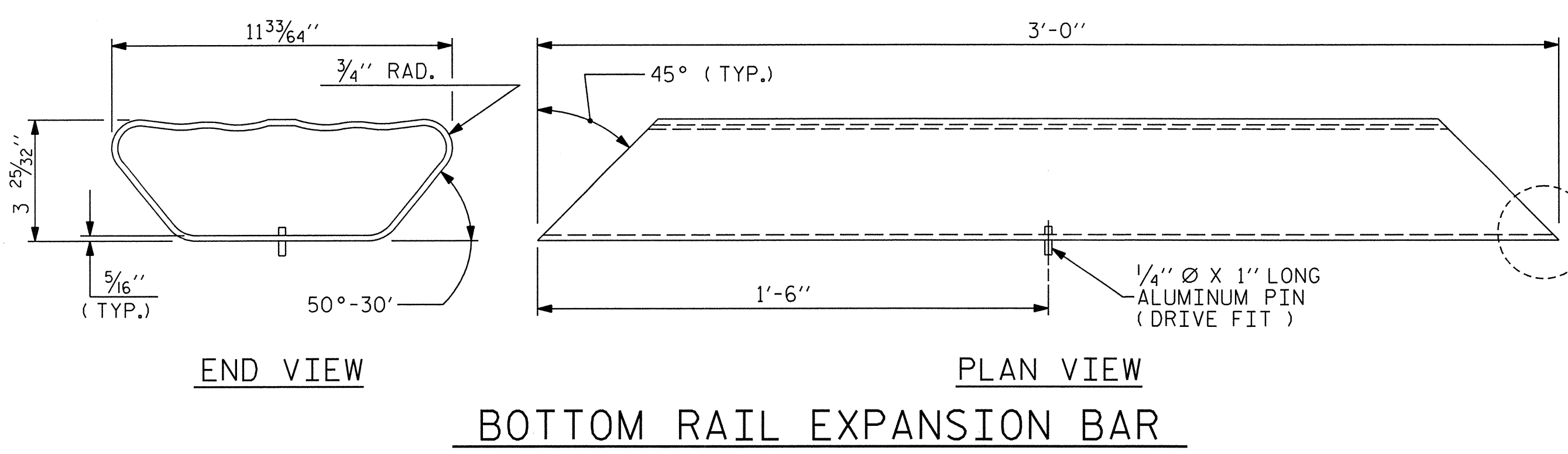
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
**3 BAR METAL RAIL**

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS	37
2			4				

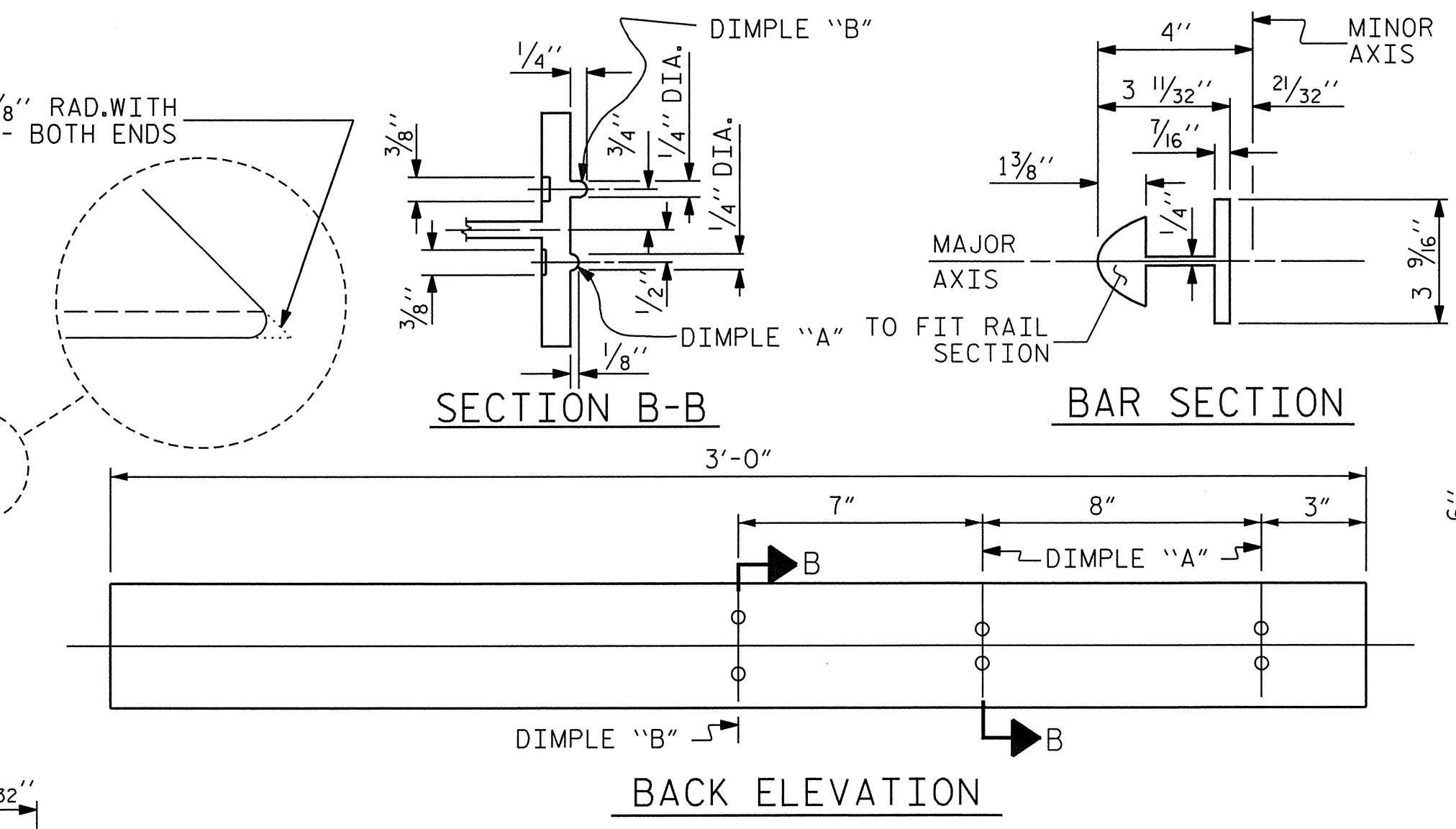
DRAWN BY: T. BANKOVICH DATE: 11-2011  
CHECKED BY: M. AVERETTE DATE: 1-2012



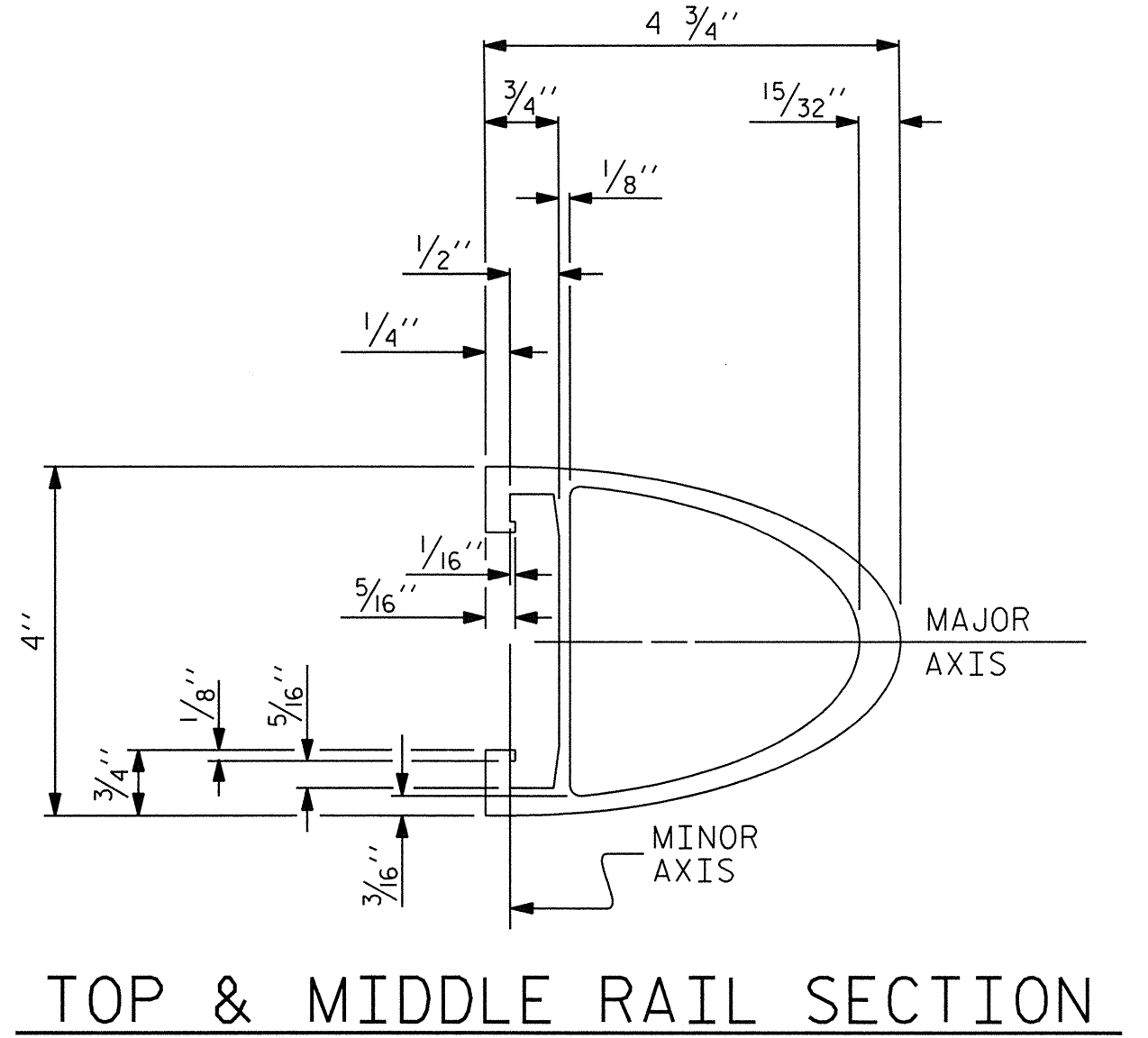
**5-BOLT METAL RAIL ANCHOR ASSEMBLY**  
(33 ASSEMBLIES REQUIRED)



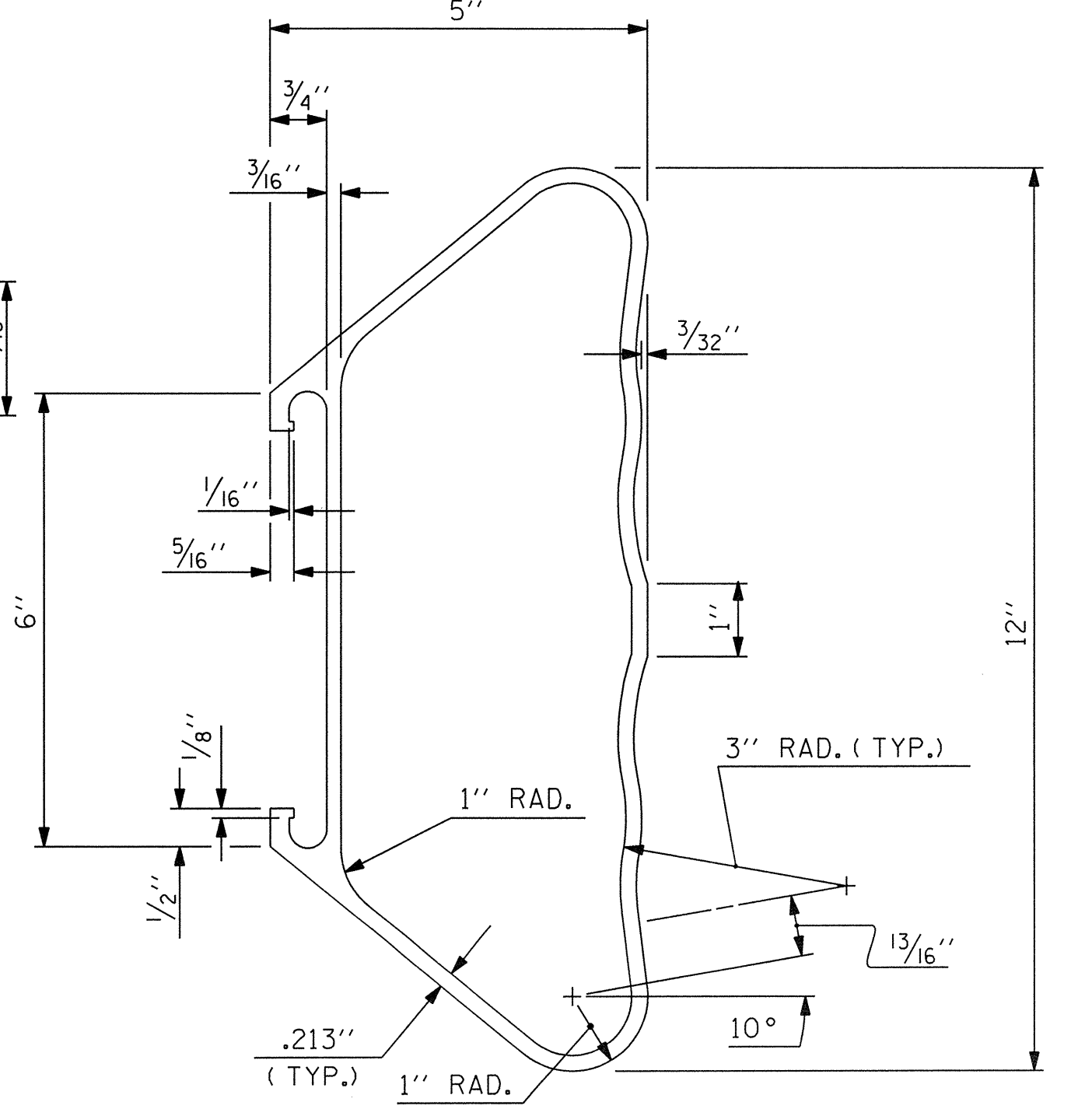
**BOTTOM RAIL EXPANSION BAR**



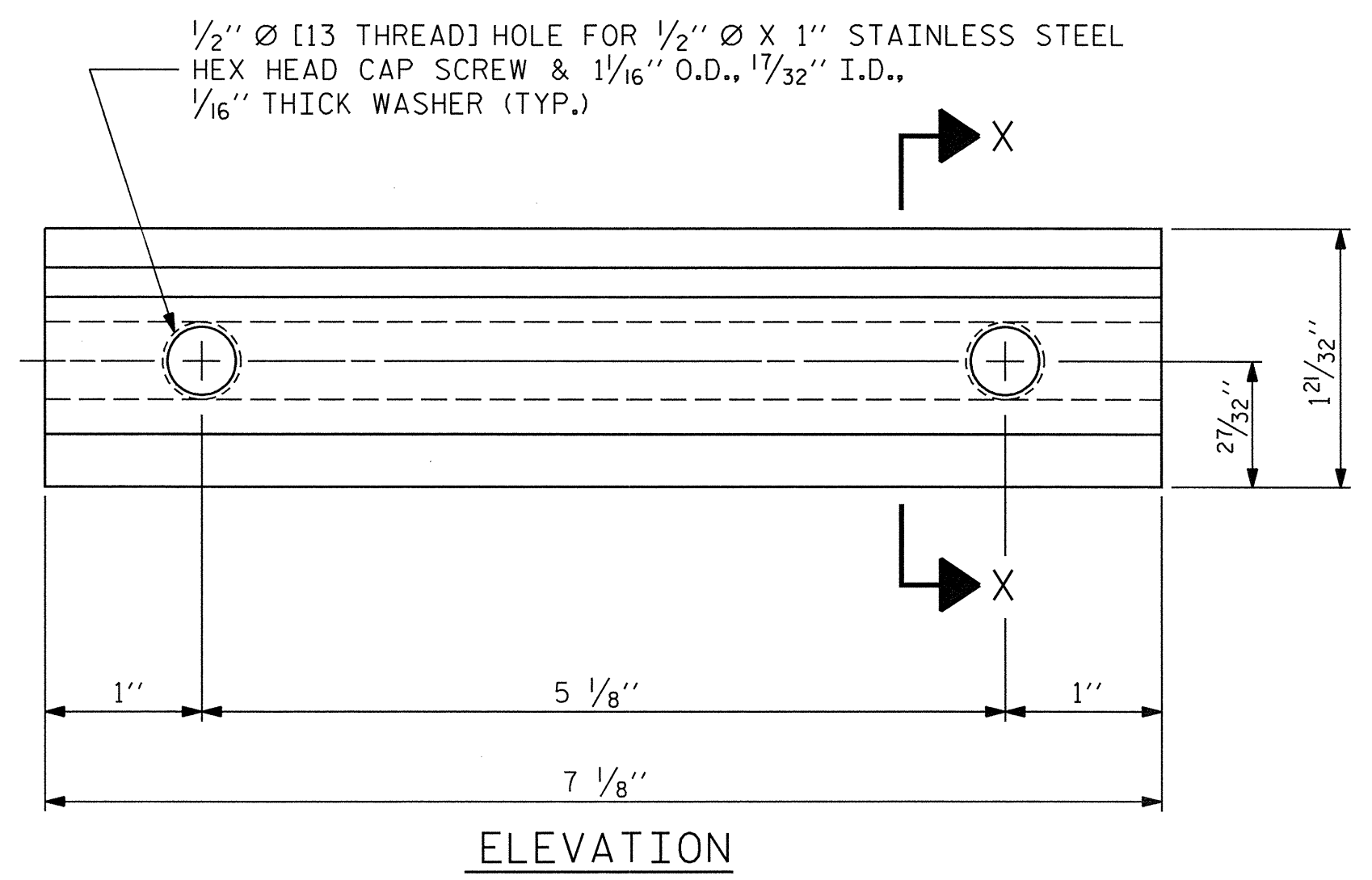
**TOP & MIDDLE RAIL EXPANSION BAR**



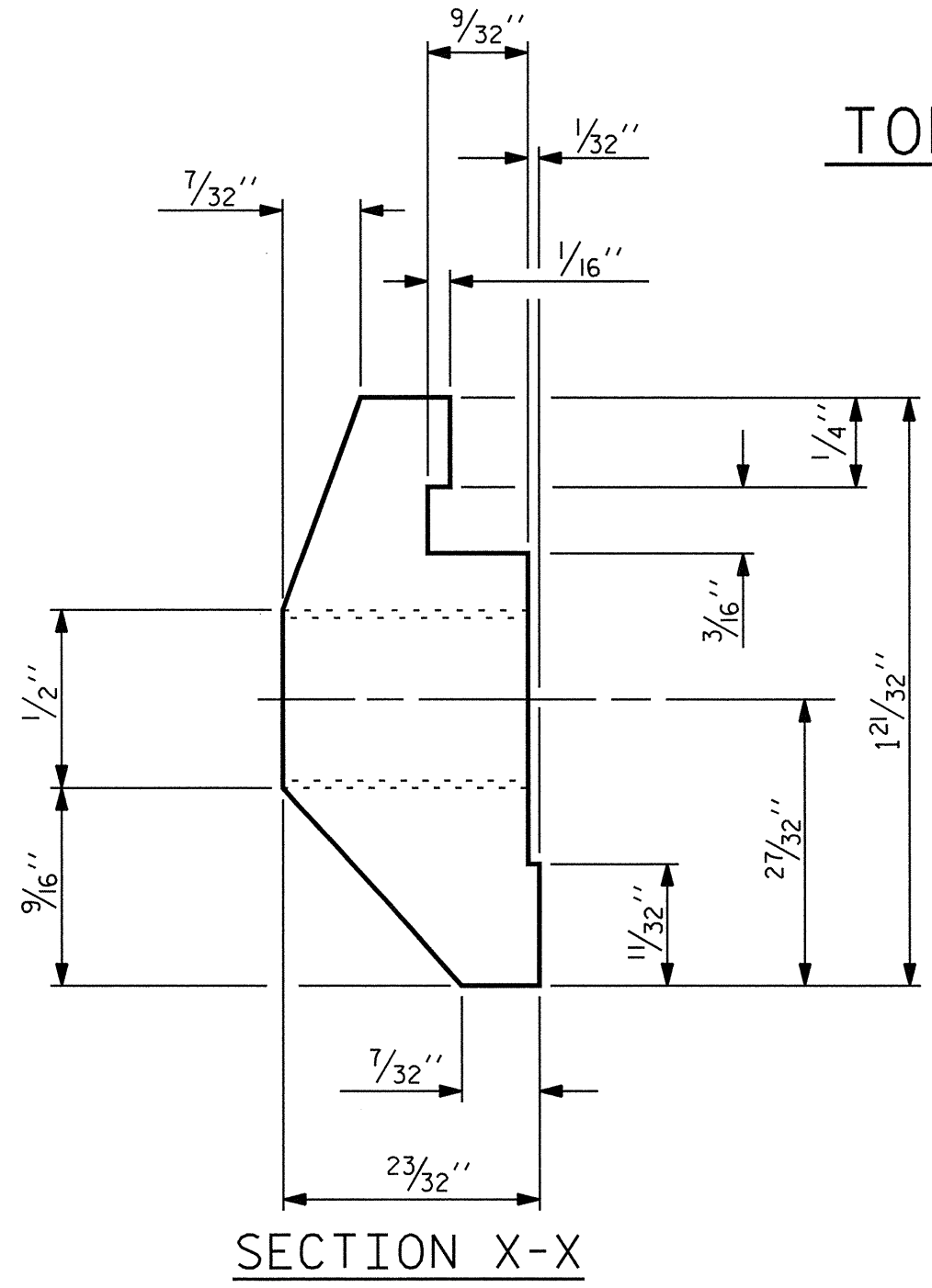
**TOP & MIDDLE RAIL SECTION**



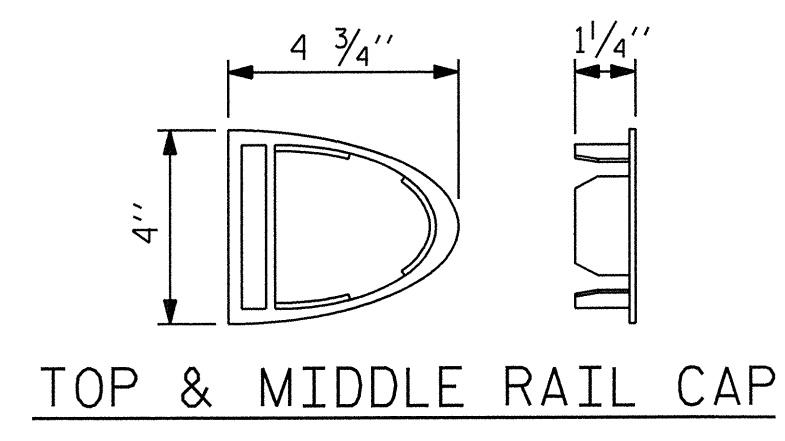
**BOTTOM RAIL SECTION**



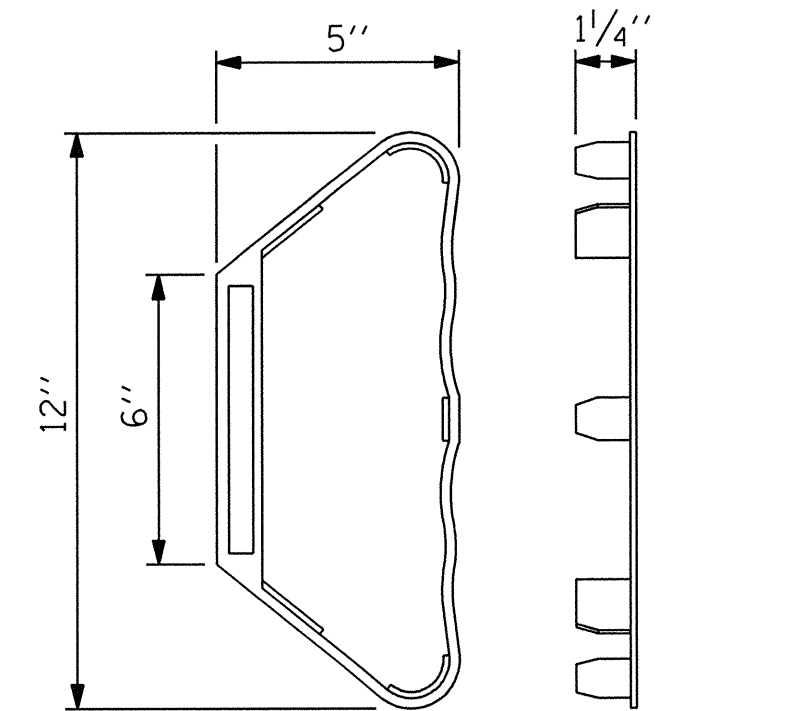
**CLAMP BAR DETAIL**  
(6 REQUIRED PER POST)



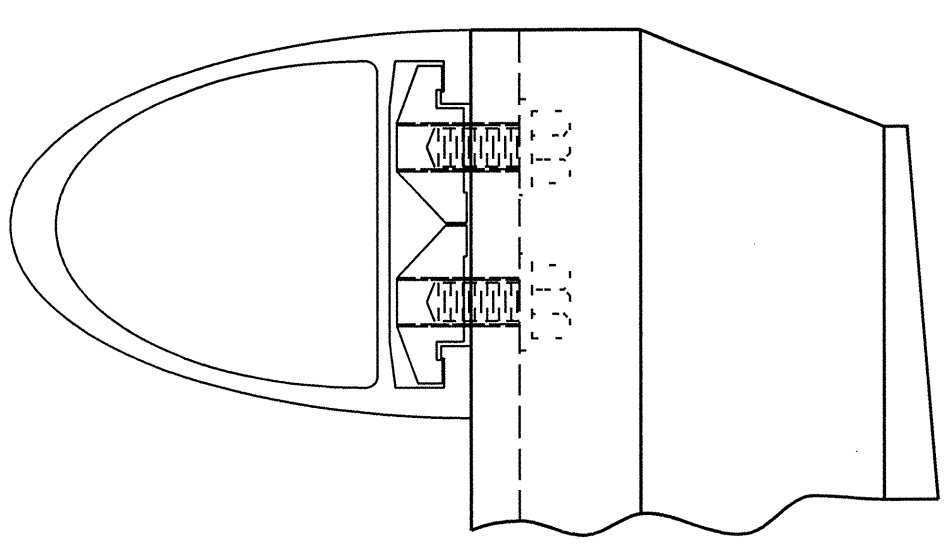
**SECTION X-X**



**TOP & MIDDLE RAIL CAP**



**BOTTOM RAIL CAP**



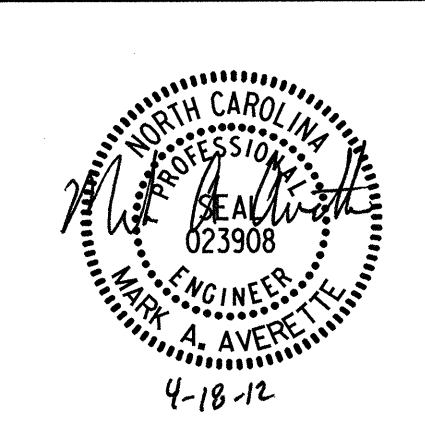
**CLAMP ASSEMBLY**  
TOP RAIL SHOWN  
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

- NOTES:**  
STRUCTURAL CONCRETE ANCHOR ASSEMBLY
- THE STRUCTURAL CONCRETE ANCHOR 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 2" FOR 3/4" FERRULES AND 1 3/4" FOR 5/8" FERRULES.
  - 3 - 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.
  - 2 - 5/8" Ø X 2 1/4" 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 5/8" Ø X 2 1/4" 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.
  - 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.
  - THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
  - 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.
  - BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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DRAWN BY : T. BANKOVICH DATE : 11-2011  
CHECKED BY : M. AVERETTE DATE : 1-2012

PLANS PREPARED BY:  
**SIMPSON ENGINEERS ASSOCIATES**  
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www.simpsonengr.com  
LICENSURE NO. C2521

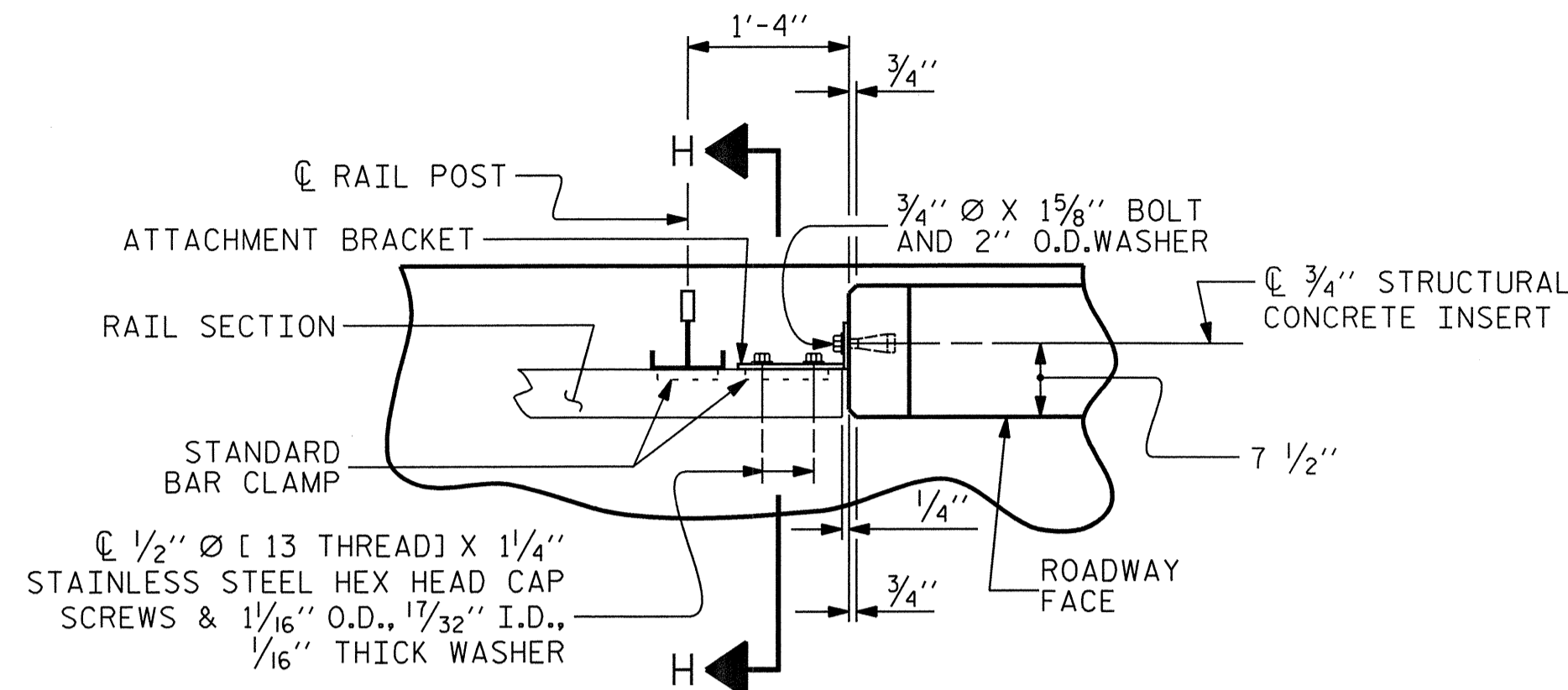


PROJECT NO. B-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-  
SHEET 2 OF 3

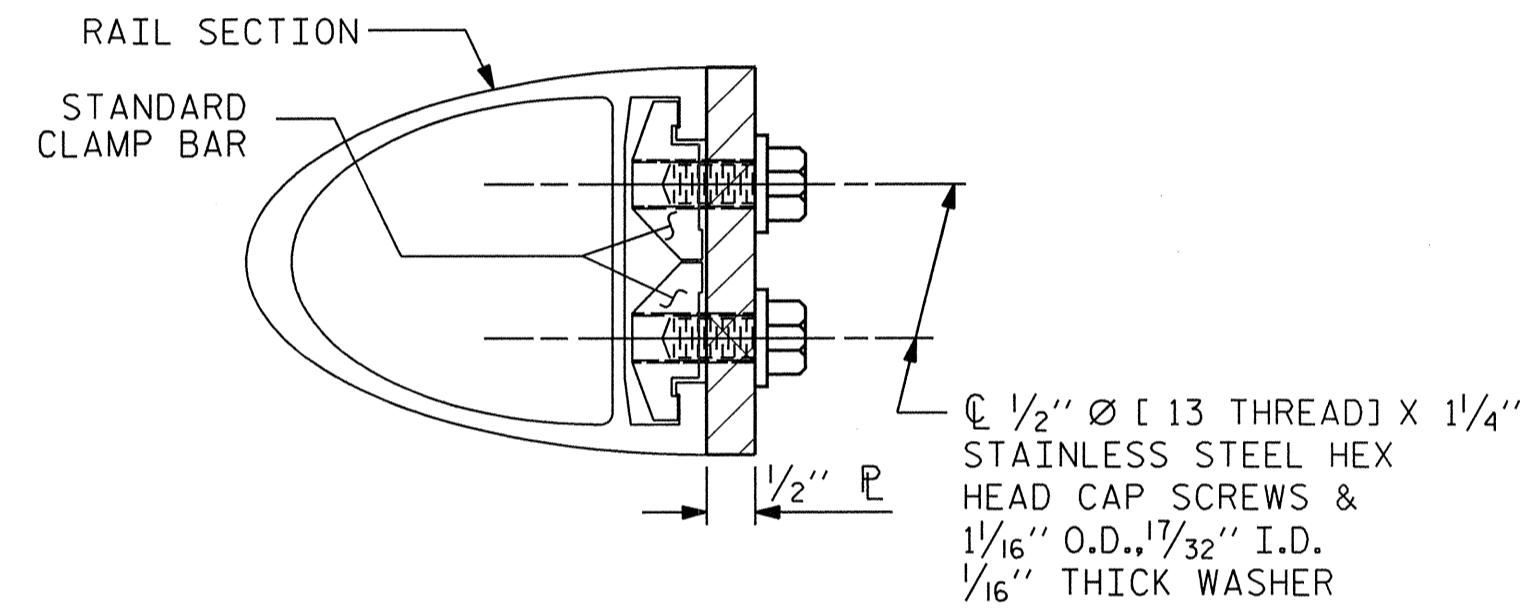
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
3 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-22  
TOTAL SHEETS 37

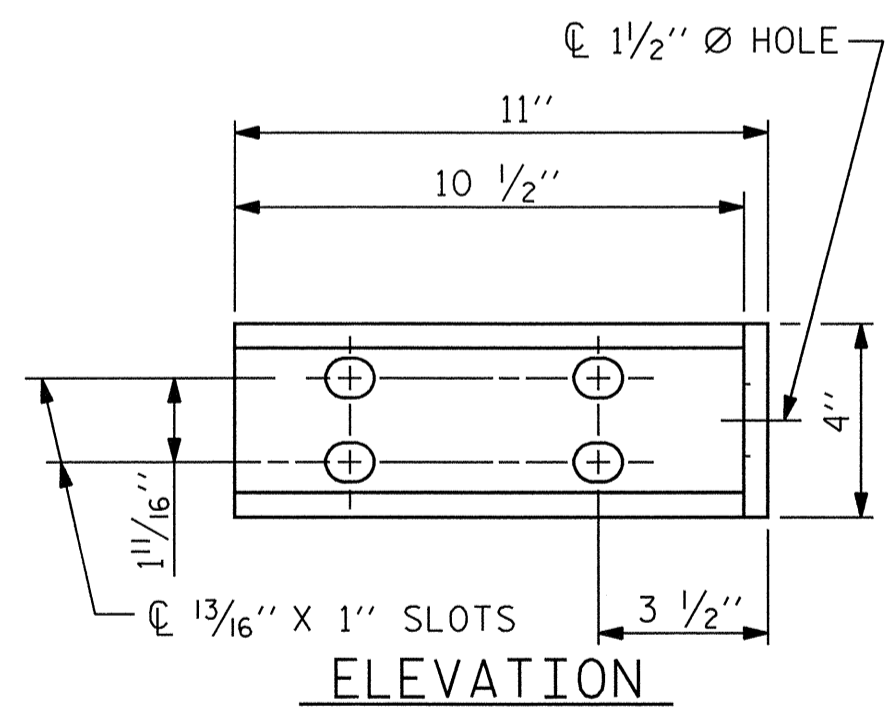
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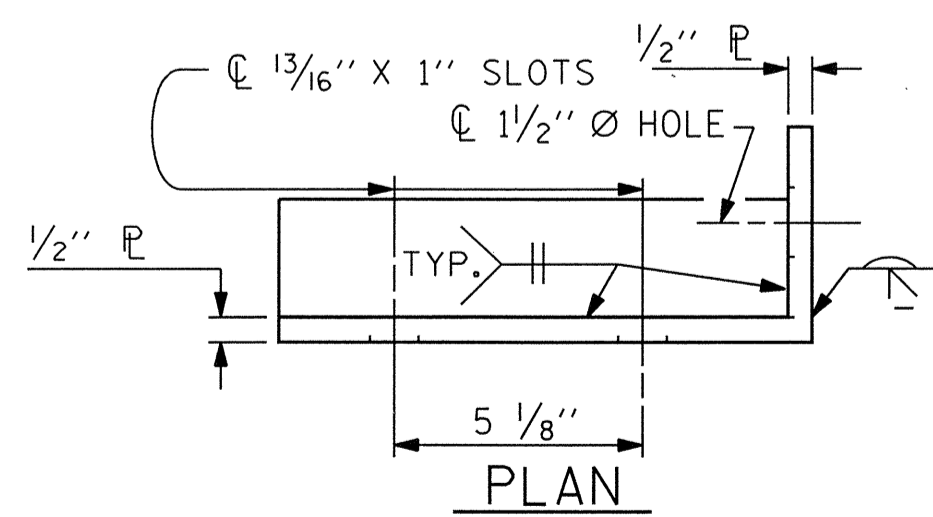
**PLAN OF RAIL AND END POST**  
(STIFFENER ON 1/2" R NOT SHOWN FOR CLARITY)



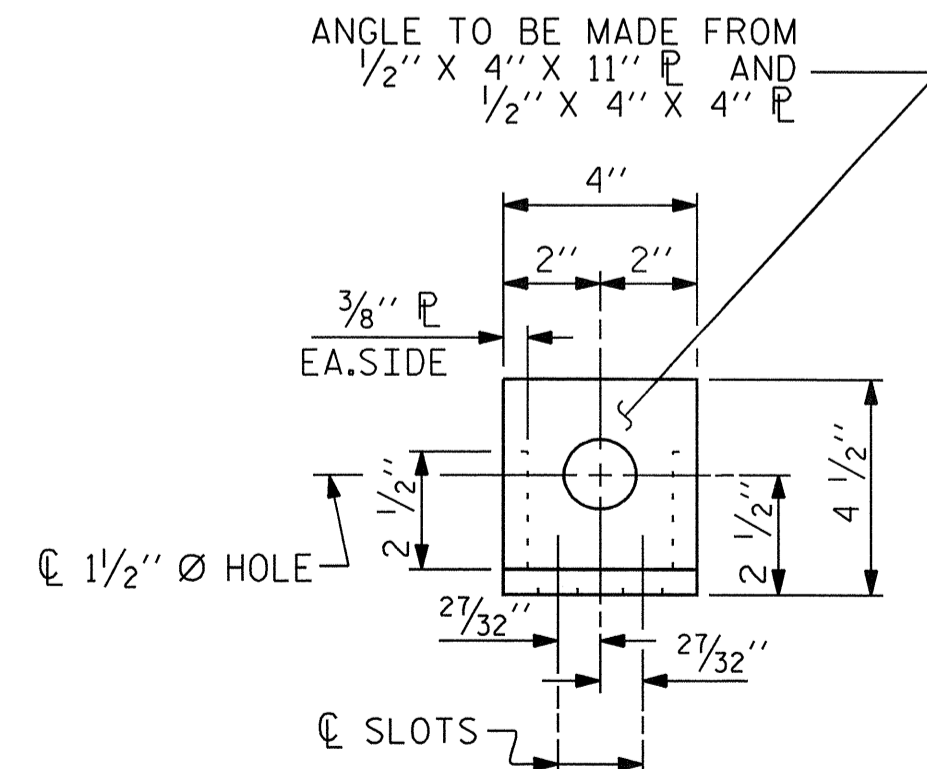
**SECTION H-H**  
(FOR TOP & MIDDLE RAIL)



**ELEVATION**

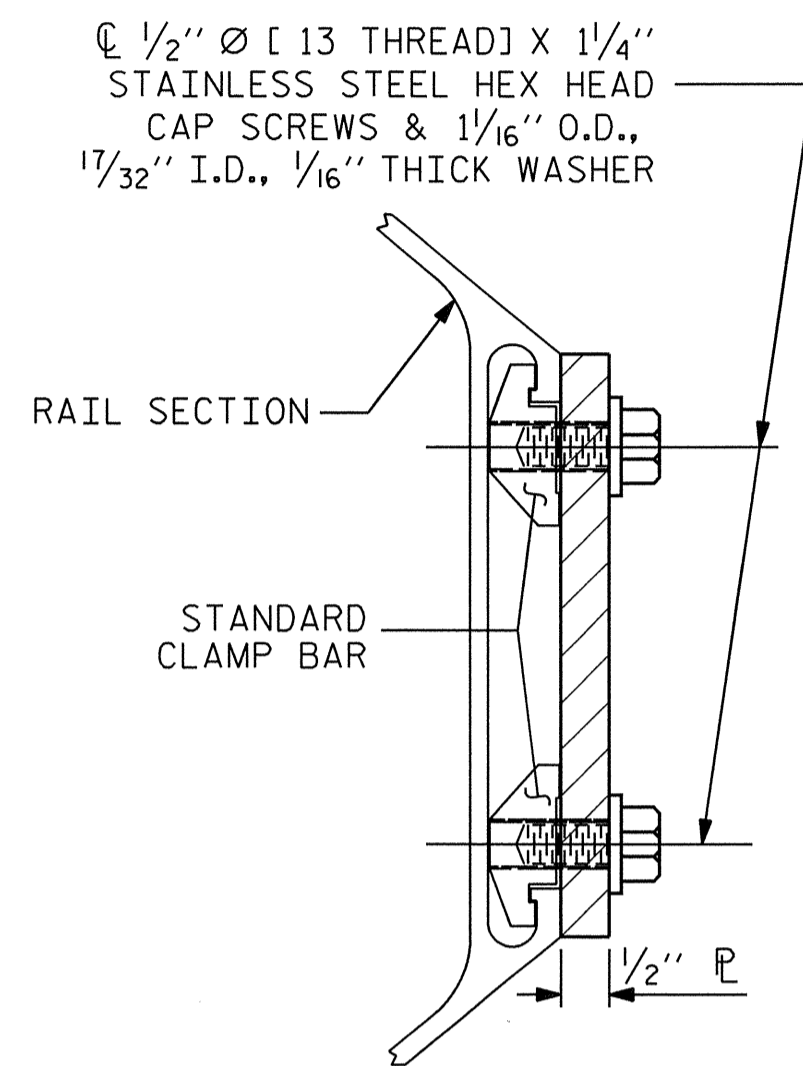


**PLAN**

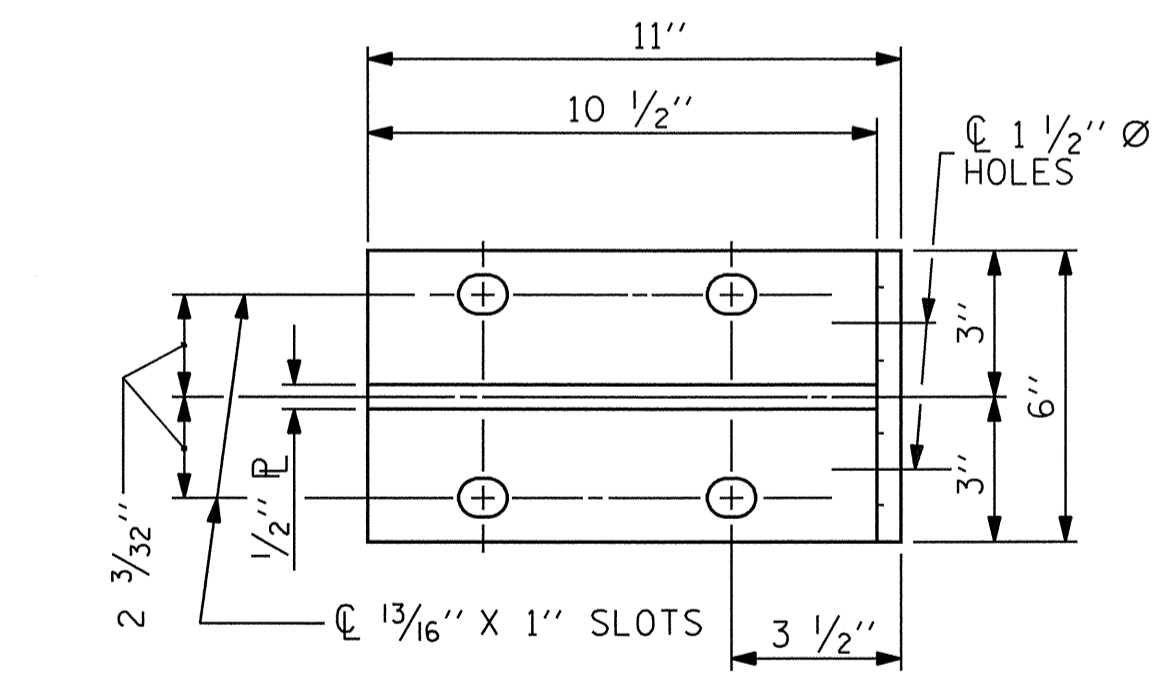


**END VIEW**  
(FIX. AND EXP.)

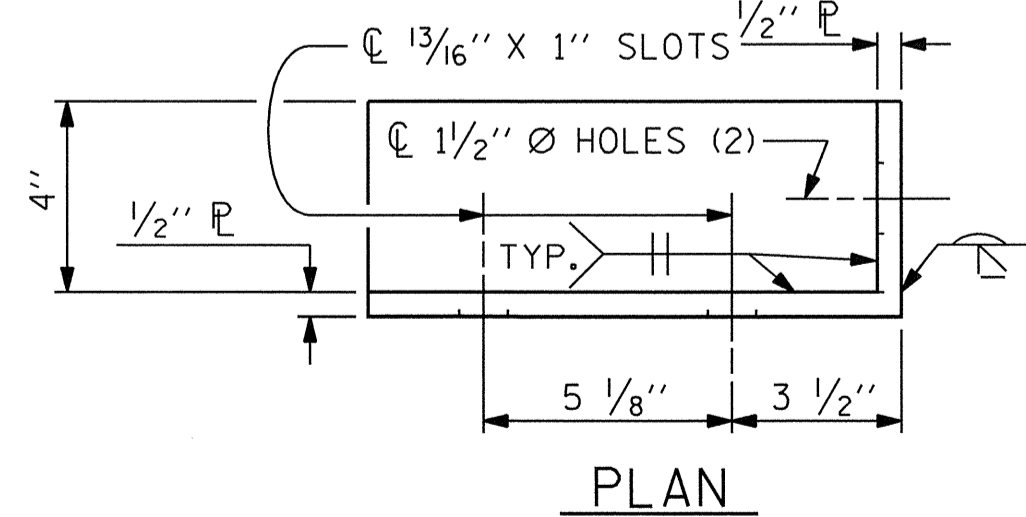
**DETAILS FOR ATTACHMENT BRACKET**  
(TOP & MIDDLE RAIL ONLY)



**SECTION H-H**  
(FOR BOTTOM RAIL)



**ELEVATION**



**PLAN**

**DETAILS FOR ATTACHMENT BRACKET**  
(BOTTOM RAIL ONLY)

**NOTES:**

**METAL RAIL TO END POST CONNECTION**

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
  - D. STANDARD CLAMP BARS ("3 BAR METAL RAIL" SHEET 2 OF 3)

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 3 BAR METAL RAIL.

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.

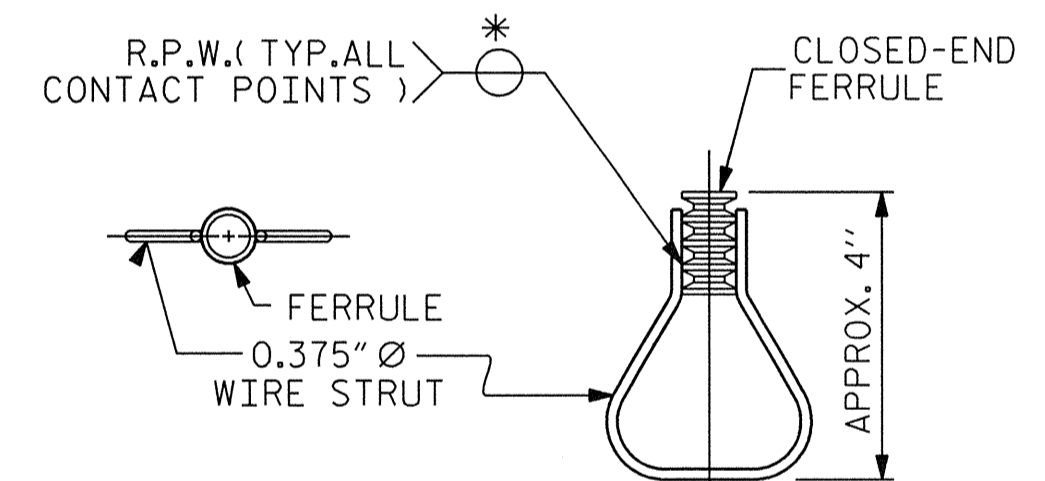
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. ALL SPECIFICATIONS THAT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

**NOTES:**

**STRUCTURAL CONCRETE INSERT**

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

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



**PLAN ELEVATION**  
**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. B-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-

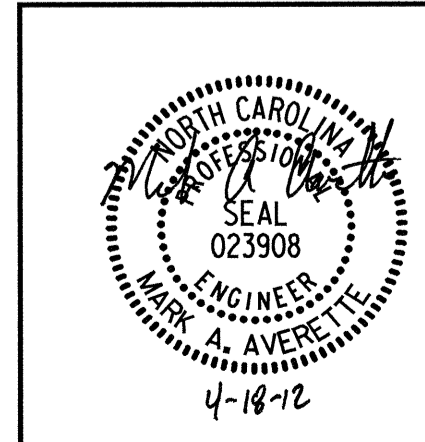
SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE

**3 BAR METAL RAIL**

PLANS PREPARED BY:

**SIMPSON**  
**ENGINEERS**  
**& ASSOCIATES**  
5520 Dilard Drive  
Suite 120  
Cary, NC 27518  
(919) 852-0468  
(919) 852-0598 (Fax)  
www.simpsonengr.com  
LICENSURE NO. C2521

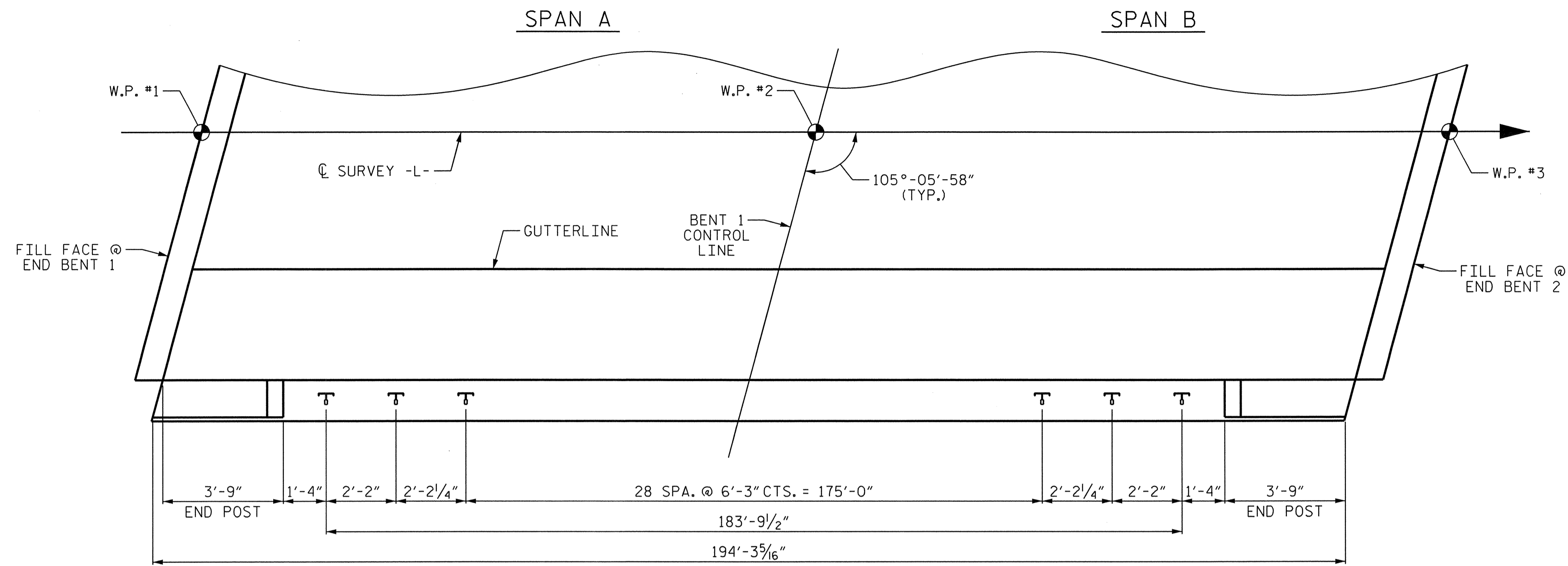


REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS: 37

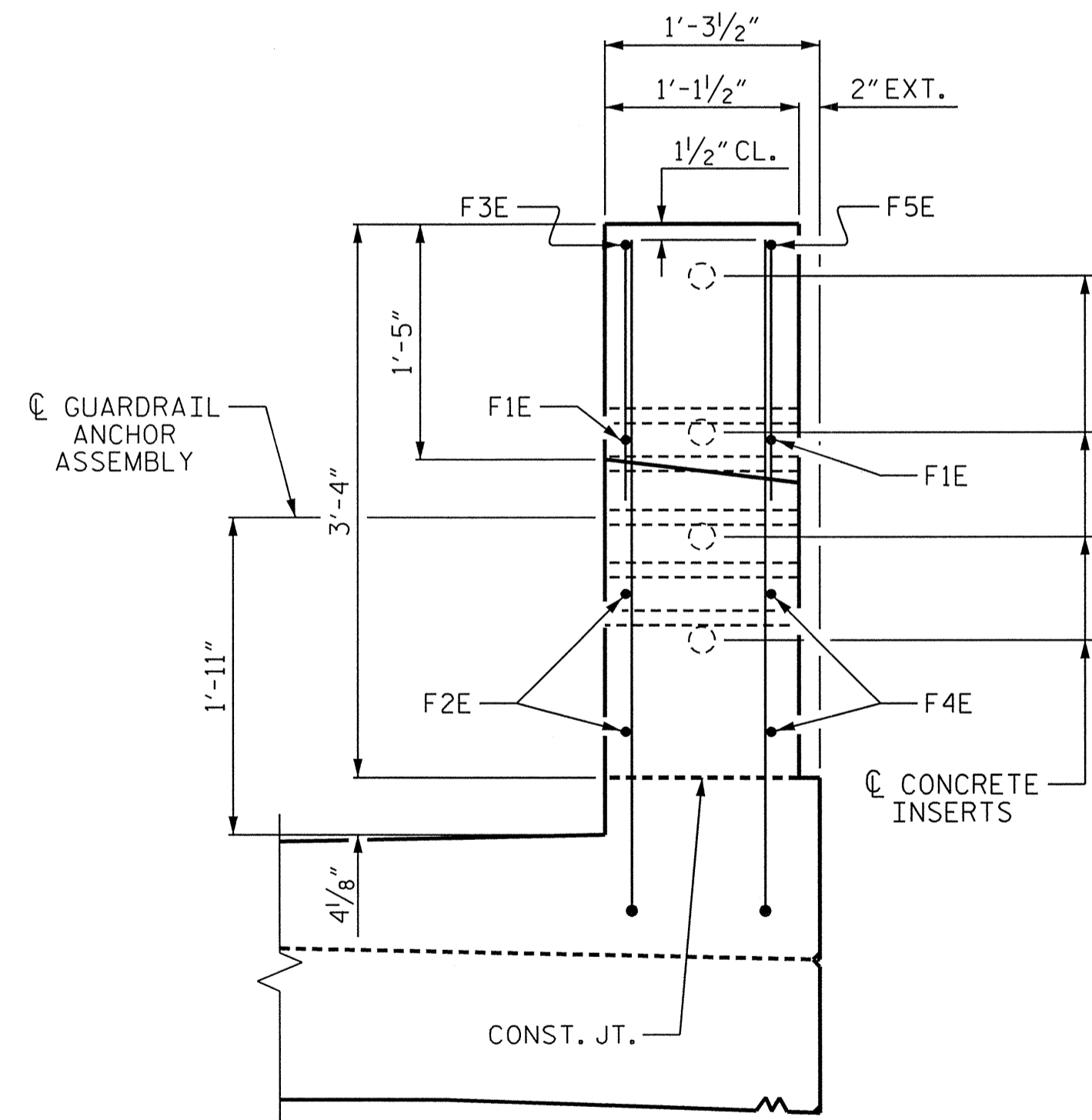
DRAWN BY: T. BANKOVICH DATE: 11-2011  
CHECKED BY: M. AVERETTE DATE: 1-2012



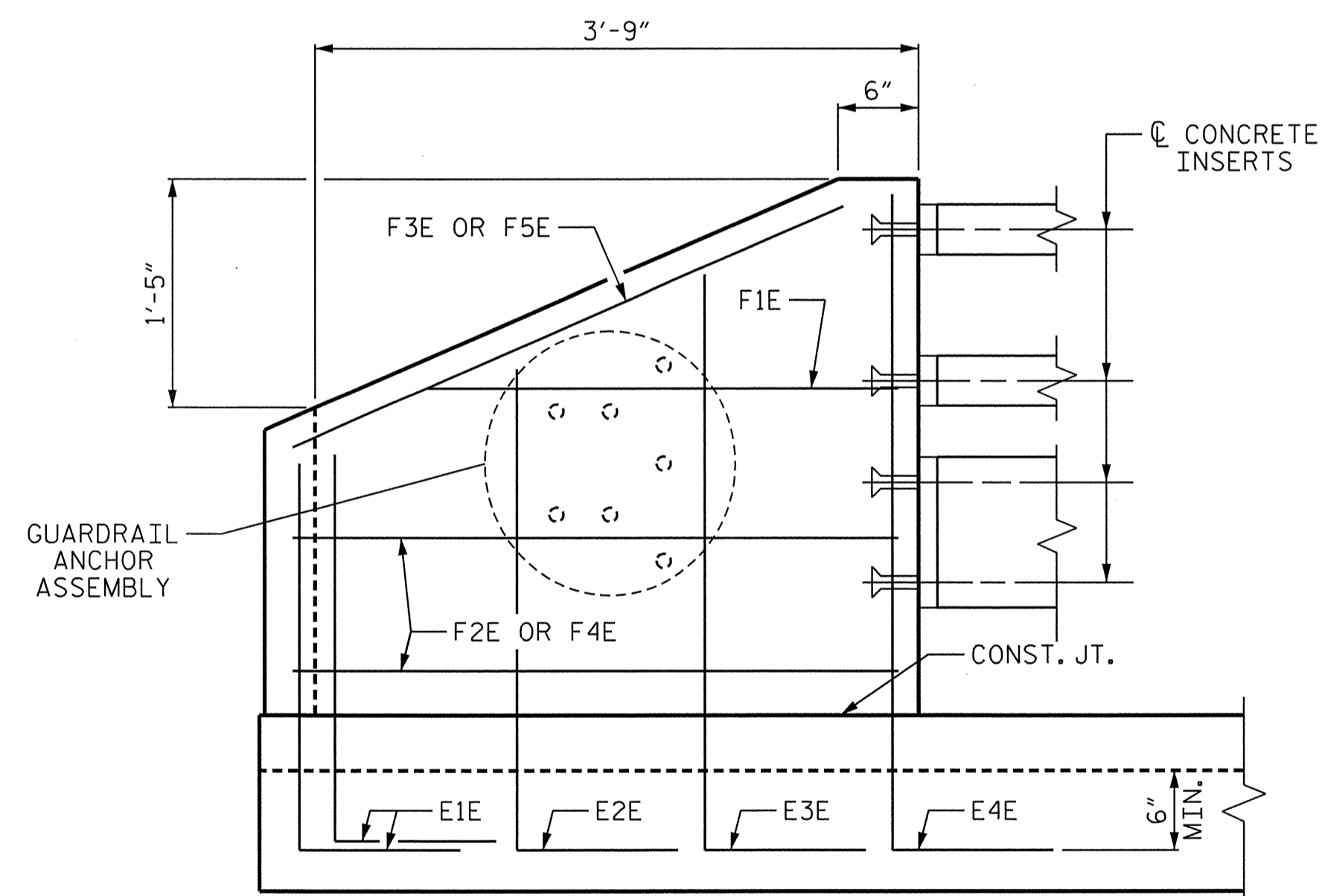


PLAN OF RAIL POST SPACINGS

NOTES:  
 FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS" SHEET.  
 FOR REINFORCING STEEL AND CONCRETE IN END POSTS, SEE SUPERSTRUCTURE "BILL OF MATERIAL" SHEET.

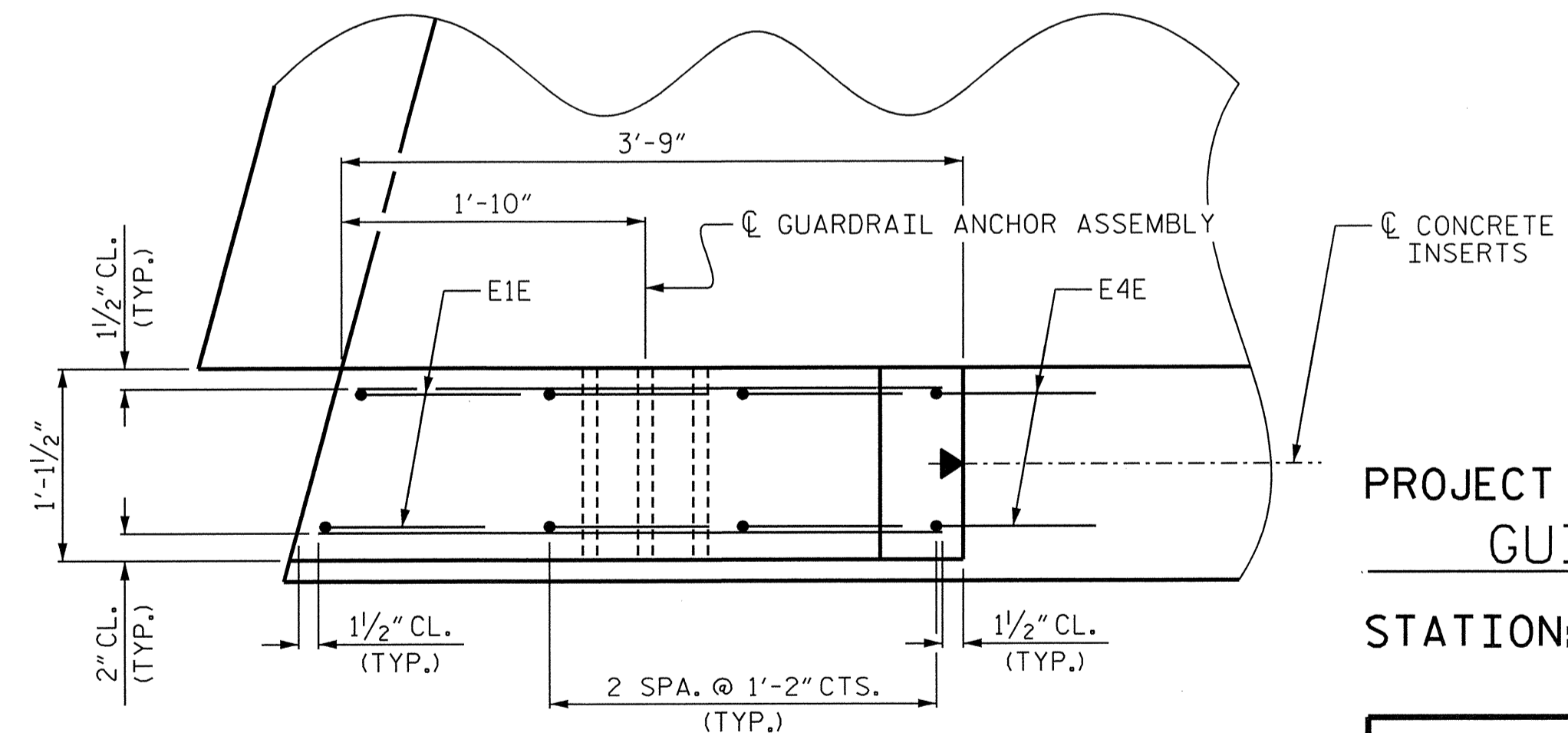


END VIEW



ELEVATION

END POST FOR THREE BAR METAL RAIL  
 END BENT 1 SHOWN, END BENT 2 SIMILAR



PLAN

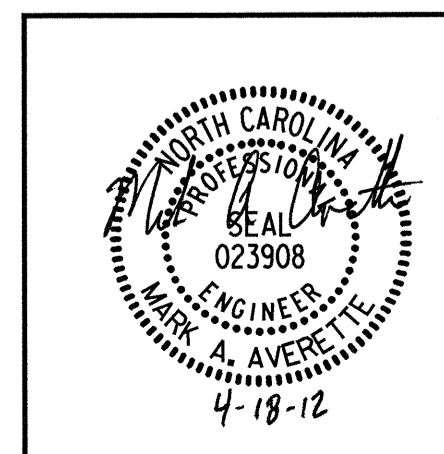
PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE

END POST DETAILS  
 (3 BAR METAL RAIL)

PLANS PREPARED BY:

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 Cary, NC 27518  
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 (919) 852-0598 (Fax)  
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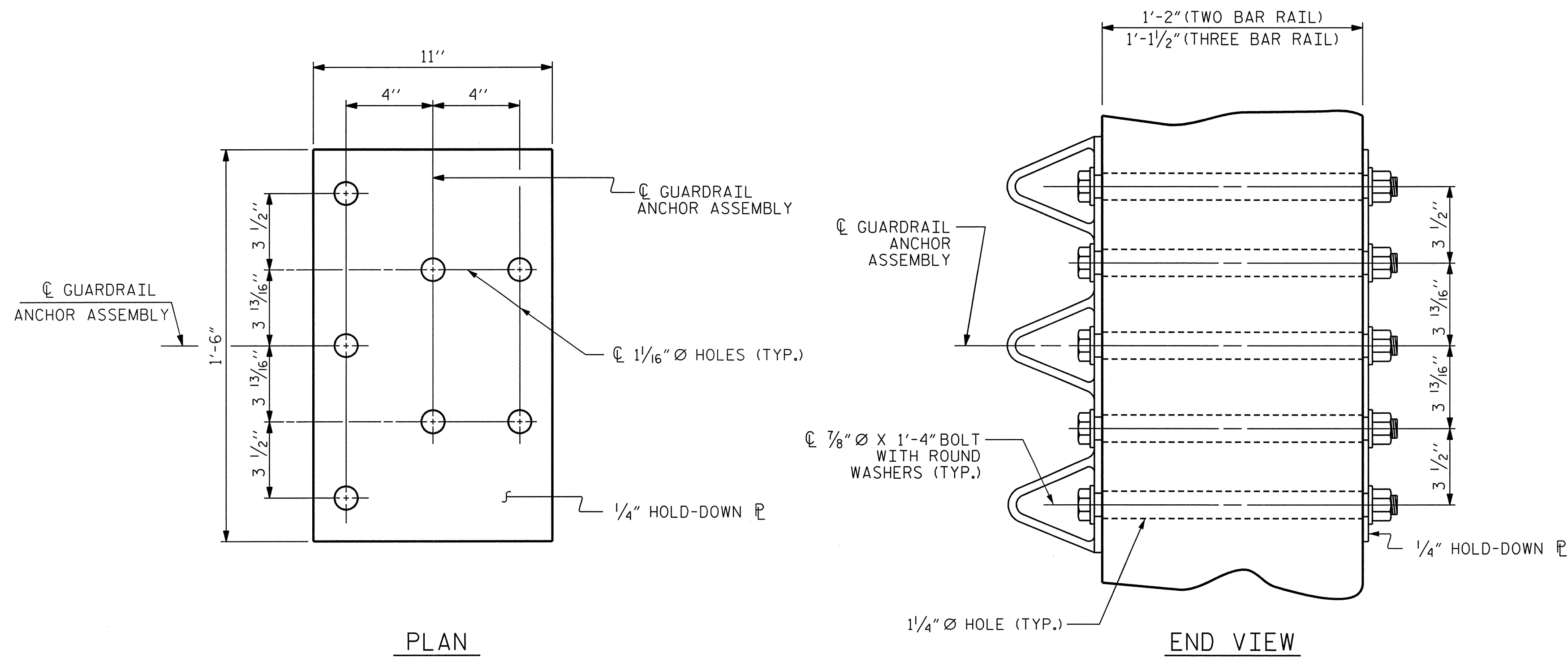


REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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TOTAL SHEETS  
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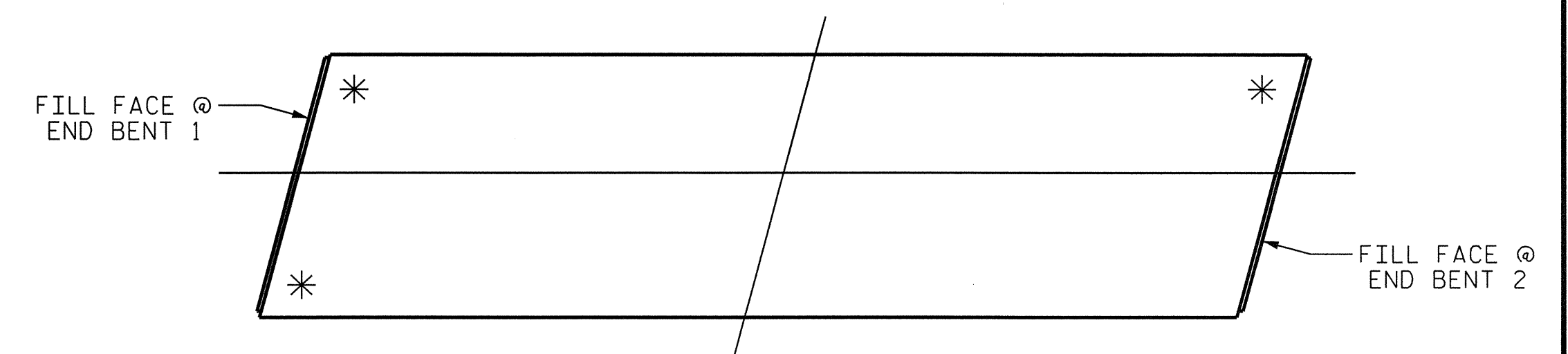
DRAWN BY: T.BANKOVICH DATE: 11-2011  
 CHECKED BY: M.AVERETTE DATE: 1-2012



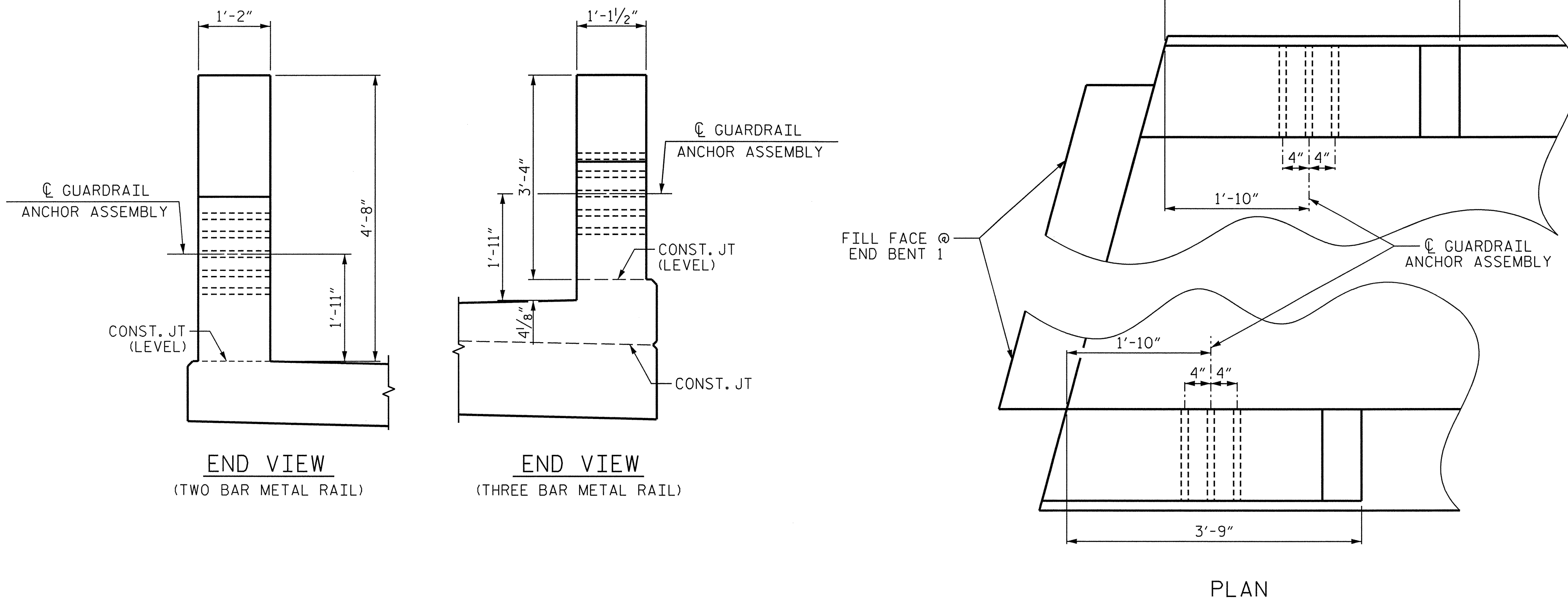
**GUARDRAIL ANCHOR ASSEMBLY DETAILS**

**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.



**SKETCH SHOWING POINTS OF ATTACHMENT**  
\* LOCATION OF GUARDRAIL ATTACHMENT

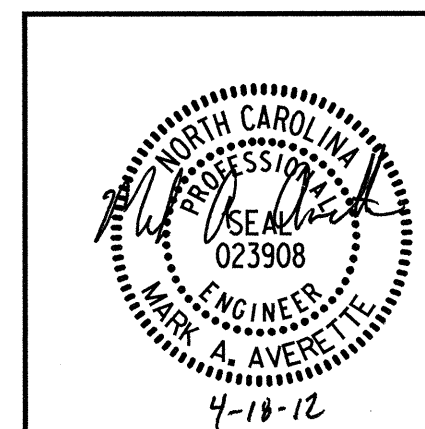


**LOCATION OF GUARDRAIL ANCHOR AT END POST**  
END BENT 1 SHOWN, END BENT 2 SIMILAR

PROJECT NO. B-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUPERSTRUCTURE					
<b>GUARDRAIL ANCHORAGE DETAILS</b>					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 37

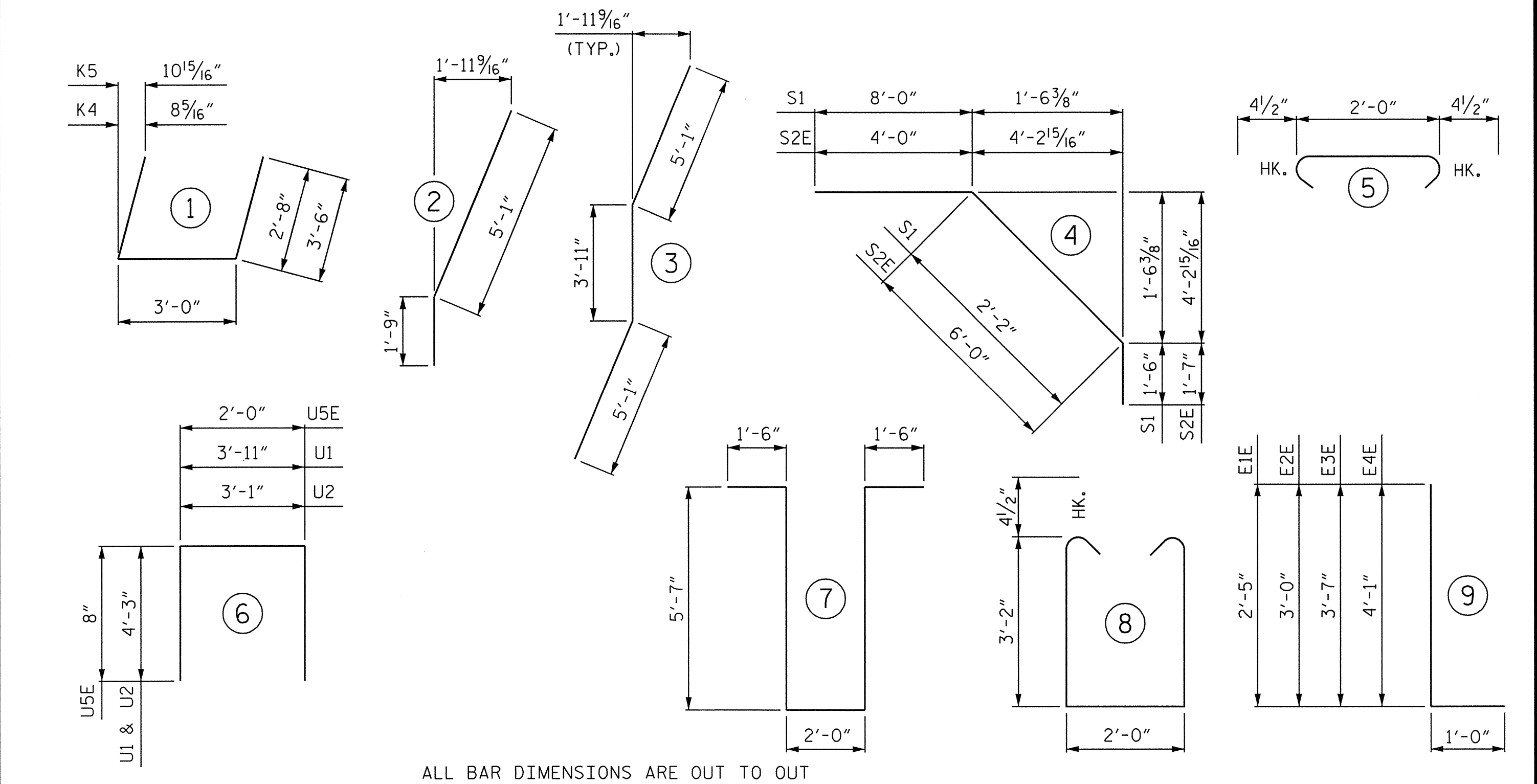
PLANS PREPARED BY:  
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DRAWN BY: T. BANKOVICH DATE: 11-2011  
CHECKED BY: M. AVERETTE DATE: 1-2012

BAR TYPES



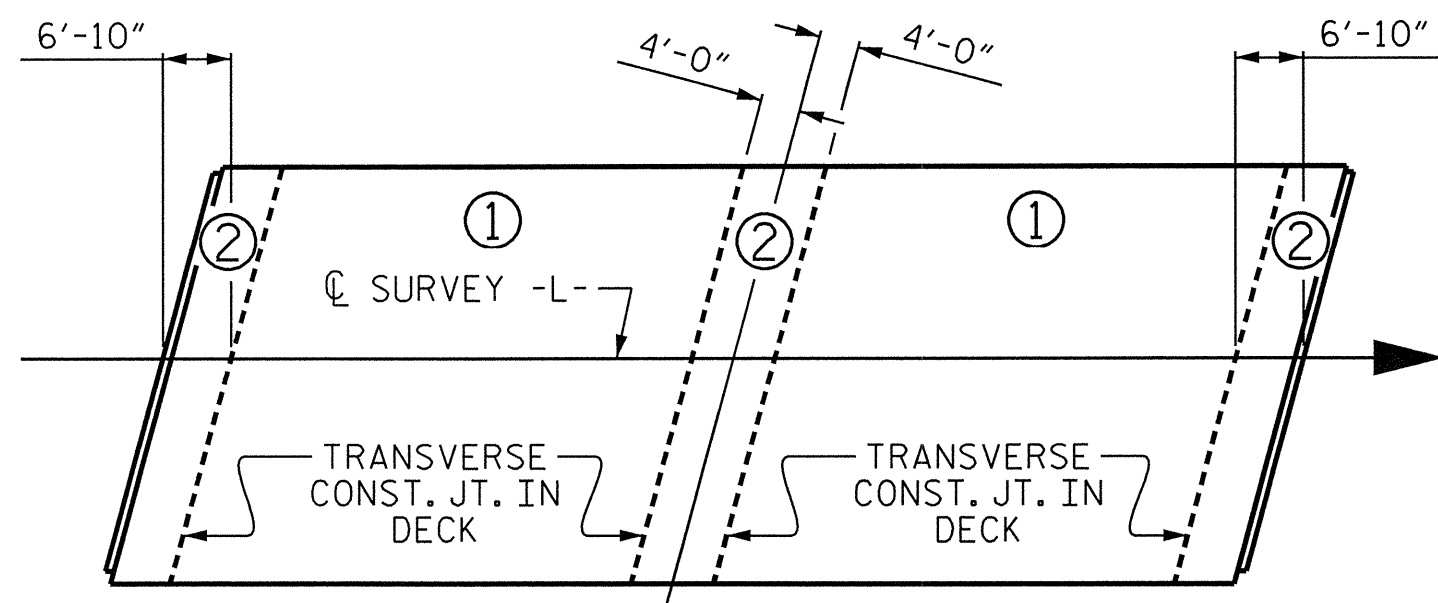
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT			
A1E	333	5	STR	51'-9"	17974	A201	2	5	STR	49'-11"	104	B3E	105	7	STR	26'-8"	5723
A2	333	5	STR	51'-9"	17974	A202	2	5	STR	47'-11"	100	B4E	34	7	STR	30'-0"	2085
						A203	2	5	STR	45'-11"	96	B5E	70	4	STR	27'-0"	1263
A101E	2	5	STR	49'-11"	104	A204	2	5	STR	43'-11"	92	B6E	70	4	STR	27'-9"	1298
A102E	2	5	STR	47'-11"	100	A205	2	5	STR	41'-11"	87	B7E	48	4	STR	26'-8"	855
A103E	2	5	STR	45'-11"	96	A206	2	5	STR	39'-11"	83						
A104E	2	5	STR	43'-11"	92	A207	2	5	STR	37'-11"	79	E1E	4	7	9	3'-5"	28
A105E	2	5	STR	41'-11"	87	A208	2	5	STR	35'-11"	75	E2E	4	7	9	4'-0"	33
A106E	2	5	STR	39'-11"	83	A209	2	5	STR	33'-11"	71	E3E	4	7	9	4'-7"	37
A107E	2	5	STR	37'-11"	79	A210	2	5	STR	31'-11"	67	E4E	4	7	9	5'-1"	42
A108E	2	5	STR	35'-11"	75	A211	2	5	STR	29'-10"	62						
A109E	2	5	STR	33'-11"	71	A212	2	5	STR	27'-10"	58	F1E	4	6	STR	2'-11"	18
A110E	2	5	STR	31'-11"	67	A213	2	5	STR	25'-10"	54	F2E	4	6	STR	3'-6"	21
A111E	2	5	STR	29'-10"	62	A214	2	5	STR	23'-10"	50	F3E	2	6	STR	3'-4"	10
A112E	2	5	STR	27'-10"	58	A215	2	5	STR	21'-10"	46	F4E	4	6	STR	3'-9"	23
A113E	2	5	STR	25'-10"	54	A216	2	5	STR	19'-10"	41	F5E	2	6	STR	3'-8"	11
A114E	2	5	STR	23'-10"	50	A217	2	5	STR	17'-10"	37						
A115E	2	5	STR	21'-10"	46	A218	2	5	STR	15'-10"	33	G1E	193	4	STR	6'-4"	817
A116E	2	5	STR	19'-10"	41	A219	2	5	STR	13'-10"	29	G2E	2	4	STR	6'-6"	9
A117E	2	5	STR	17'-10"	37	A220	2	5	STR	11'-10"	25						
A118E	2	5	STR	15'-10"	33	A221	2	5	STR	9'-10"	21	K1	20	4	STR	26'-9"	357
A119E	2	5	STR	13'-10"	29	A222	2	5	STR	7'-9"	16	K2	8	4	STR	8'-9"	47
A120E	2	5	STR	11'-10"	25	A223	2	5	STR	5'-9"	12	K3	32	4	STR	10'-5"	223
A121E	2	5	STR	9'-10"	21	A224	2	5	STR	3'-9"	8	K4	4	4	1	8'-4"	22
A122E	2	5	STR	7'-9"	16	A225	2	5	STR	1'-9"	4	K5	16	4	1	10'-0"	107
A123E	2	5	STR	5'-9"	12							K6	8	4	STR	7'-7"	41
A124E	2	5	STR	3'-9"	8	B1	280	5	STR	50'-2"	14651	K7	32	4	STR	10'-5"	223
A125E	2	5	STR	1'-9"	4	B2E	138	7	STR	19'-2"	5406	K8	8	4	STR	7'-4"	39

"E" INDICATES EPOXY COATED REINFORCING STEEL

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
S1	64	4	4	11'-8"	499
S2E	64	4	4	11'-7"	495
S3	184	4	5	2'-9"	338
U1	80	4	6	12'-5"	664
U2	4	4	6	11'-7"	31
U3	32	4	7	16'-2"	346
U4	8	4	8	9'-1"	49
USE	56	4	6	3'-4"	125
REINFORCING STEEL				37185	LBS.
EPOXY COATED REINFORCING STEEL				37623	LBS.



OPTIONAL DECK POUR DETAIL

POUR 2 SHALL NOT BE STARTED UNTIL BOTH ADJACENT 1 POURS REACH A MINIMUM OF 3000 PSI

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND SIDEWALK		APPROACH SLABS		PARAPET AND SIDEWALK
	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"			

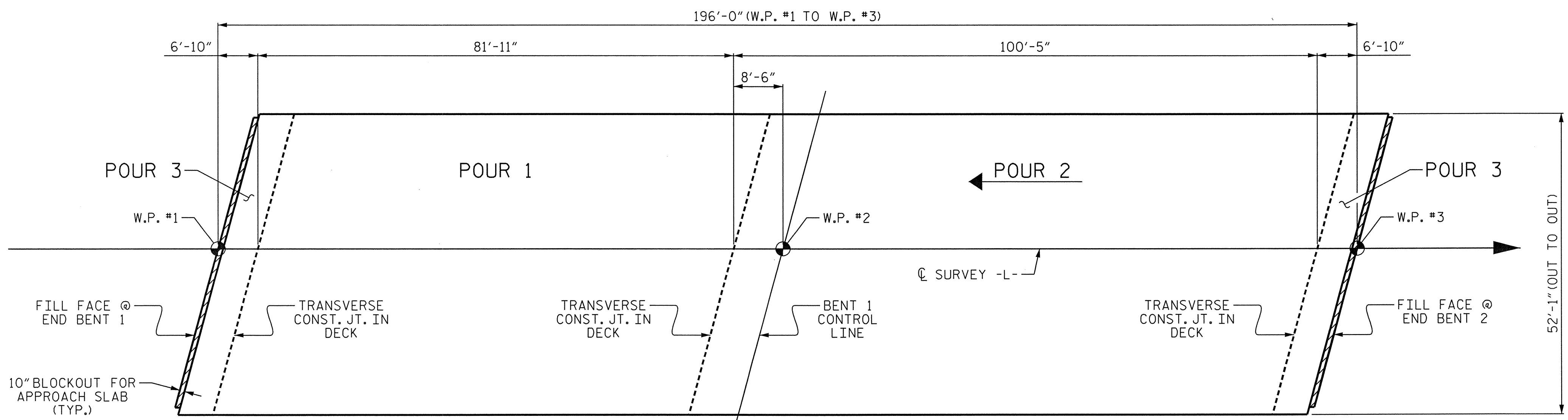
GROOVING BRIDGE FLOOR

APPROACH SLABS	1,979	SQ. FT.
BRIDGE DECK	7,951	SQ. FT.
TOTAL	9,930	SQ. FT.

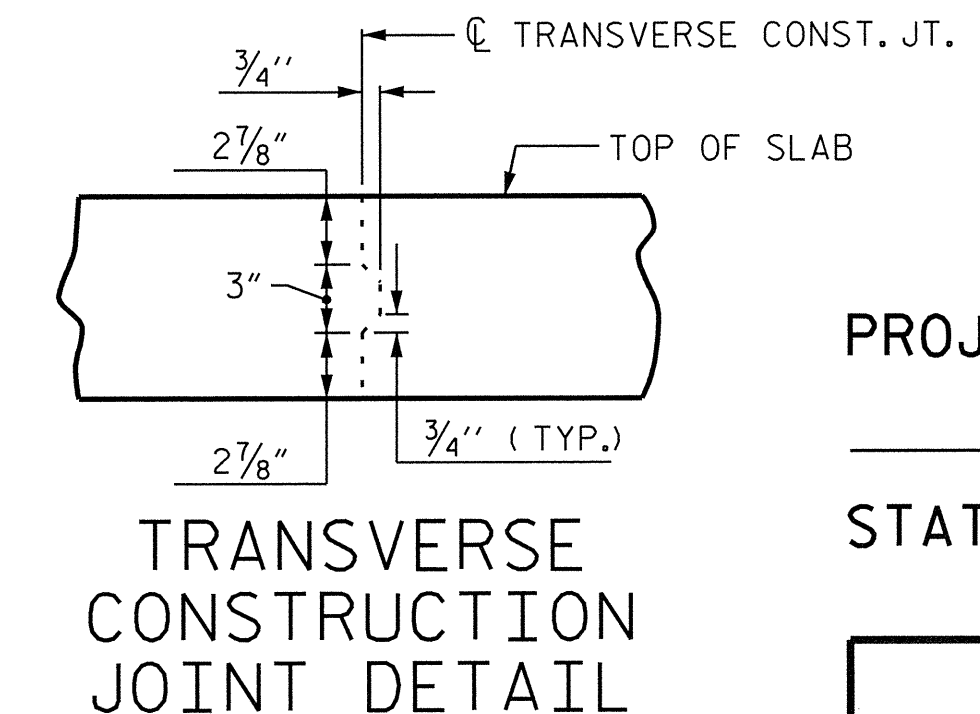
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR #1	136.9	---	---
POUR #2	188.0	---	---
POUR #3	102.0	---	---
SIDEWALK	33.9	---	---
END POSTS *	0.9	---	---
TOTAL **	461.7	37,185	37,623

\* END POST QUANTITY FOR 3 BAR METAL RAIL END POSTS  
\*\* QUANTITIES FOR CONCRETE PARAPET ARE NOT INCLUDED

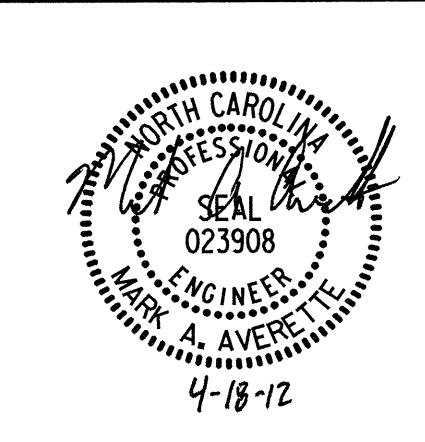


LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB & POUR SEQUENCE (SQ. FT. = 10,208)



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

PLANS PREPARED BY:  
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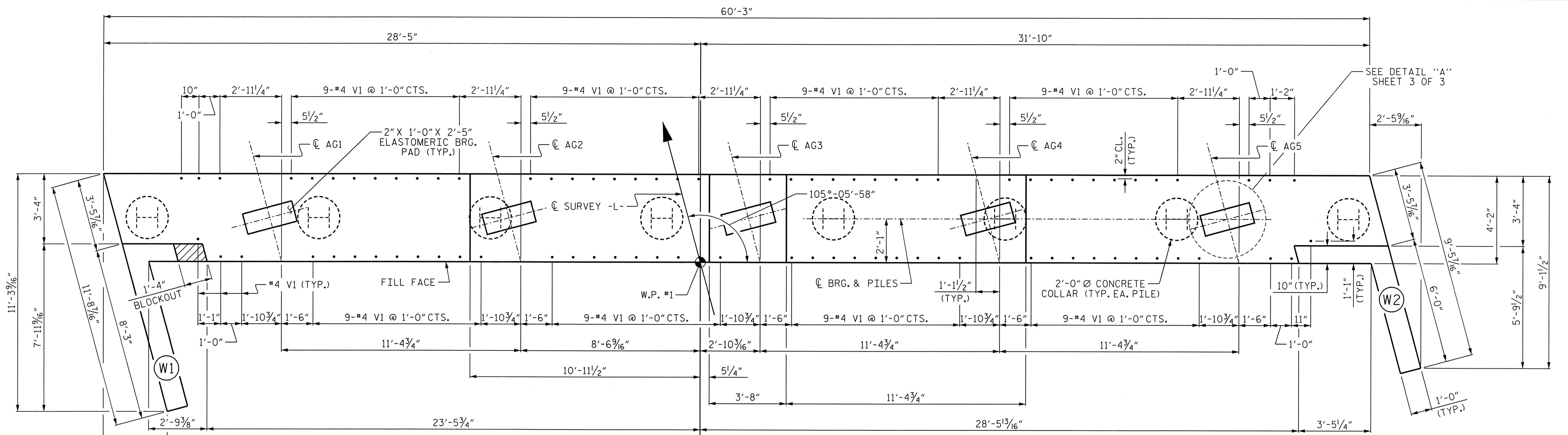
PROJECT NO. B-4760  
GUILFORD COUNTY  
STATION: 23+52.74 -L-

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

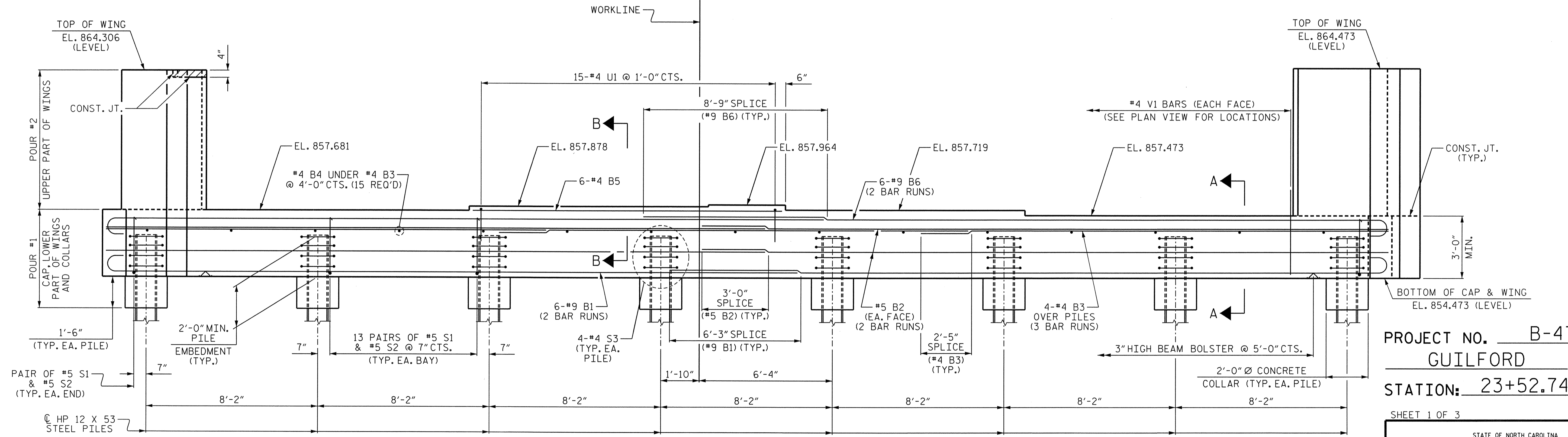
REVISIONS				SHEET NO. S-26
NO.	BY:	DATE:	NO.	
1			3	TOTAL SHEETS 37
2			4	

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DRAWN BY: T. BANKOVICH DATE: 11-2011  
CHECKED BY: M. AVERETTE DATE: 1-2012



PLAN



ELEVATION

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

#4 V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN CAP.  
FOR SECTION A-A & B-B, SEE SHEET 3 OF 3.

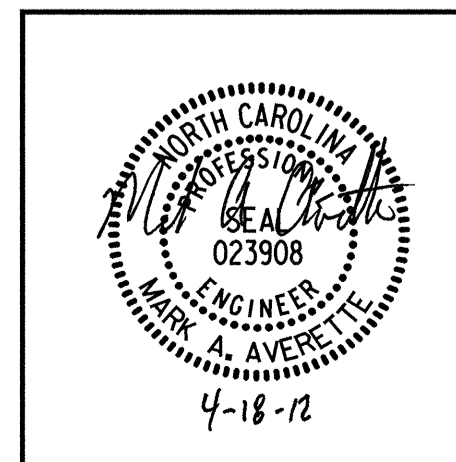
THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
END BENT 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-27
TOTAL SHEETS					37

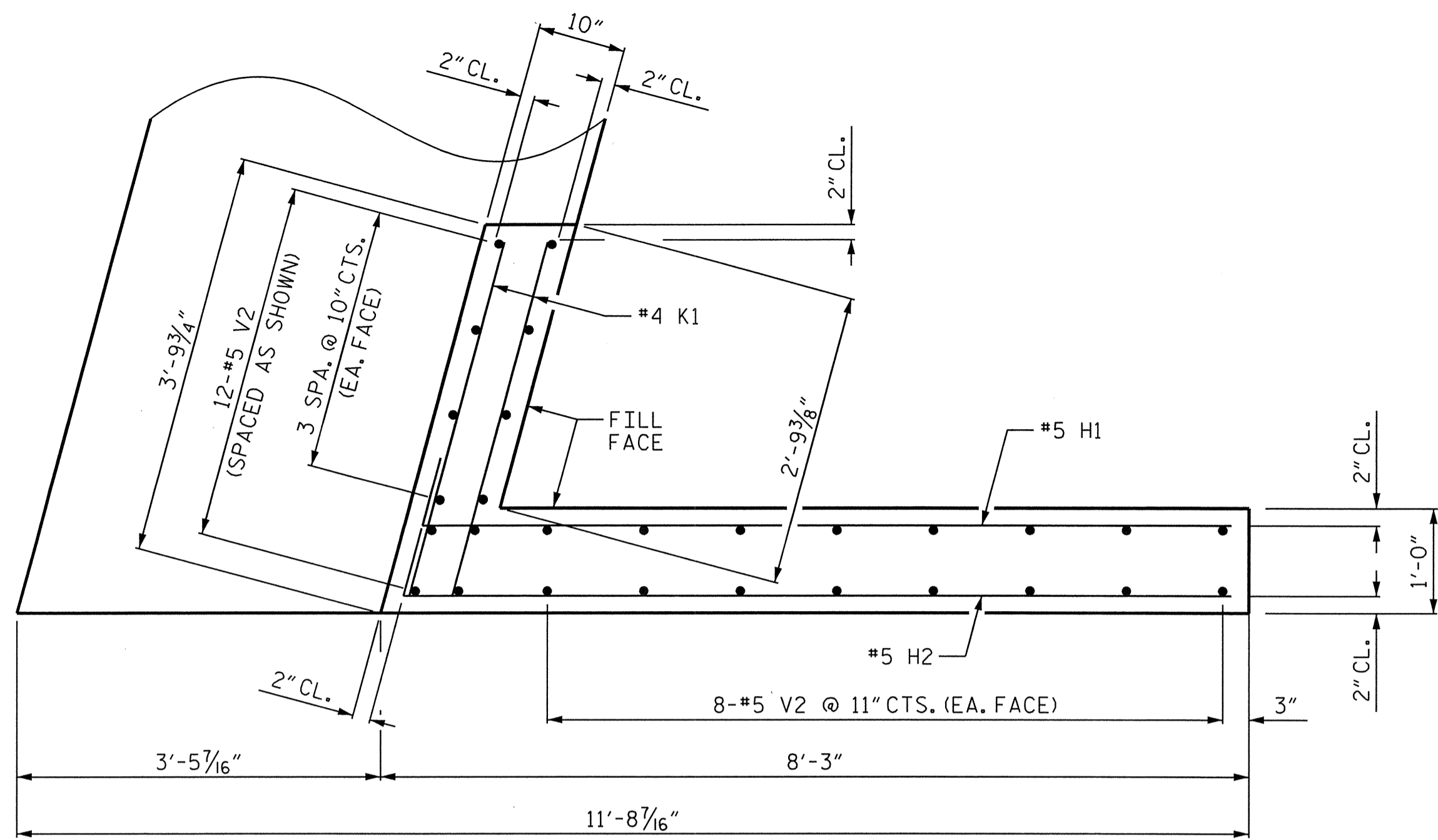
PLANS PREPARED BY:  
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 ENGINEERS  
 5520 Dillard Drive  
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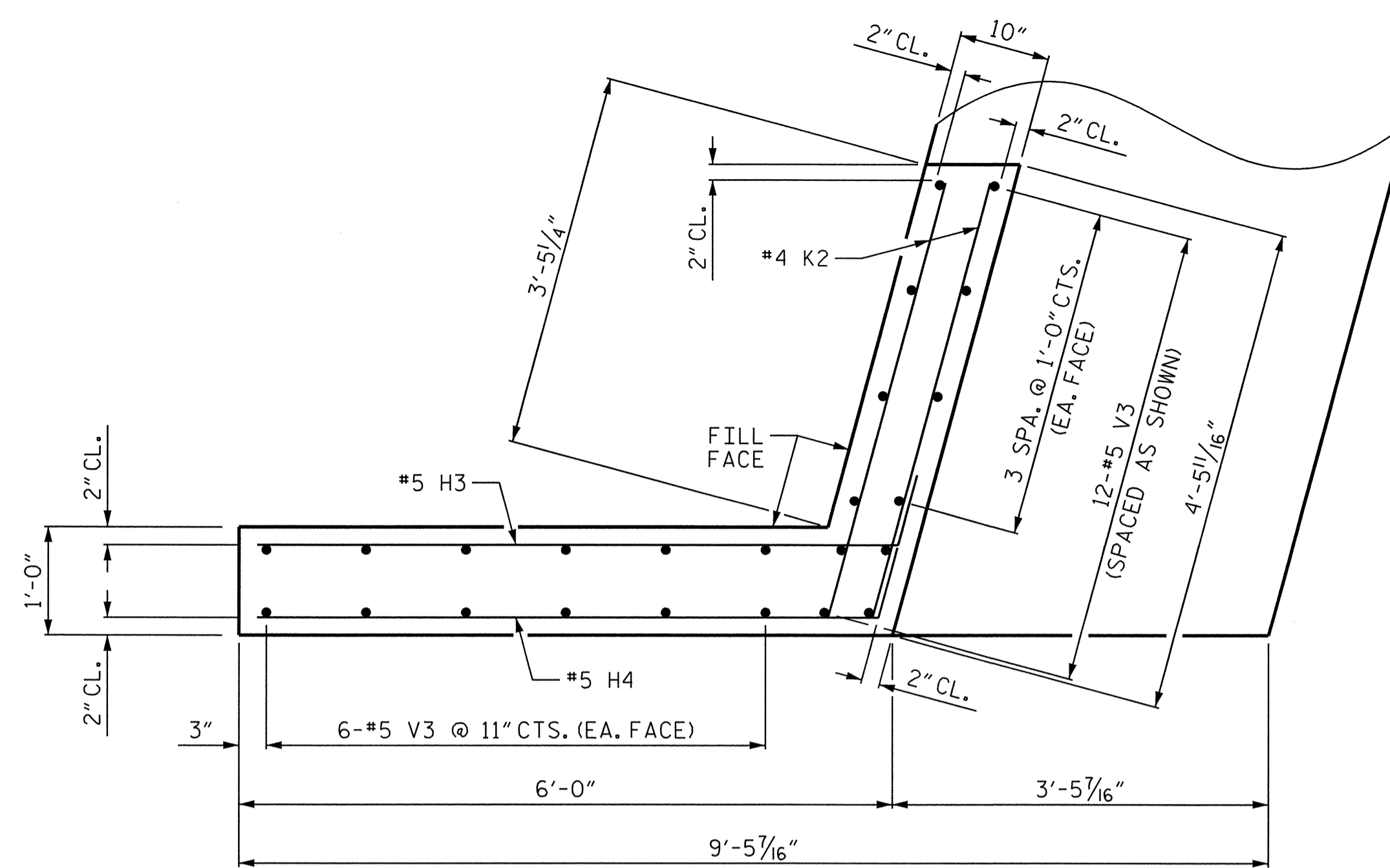
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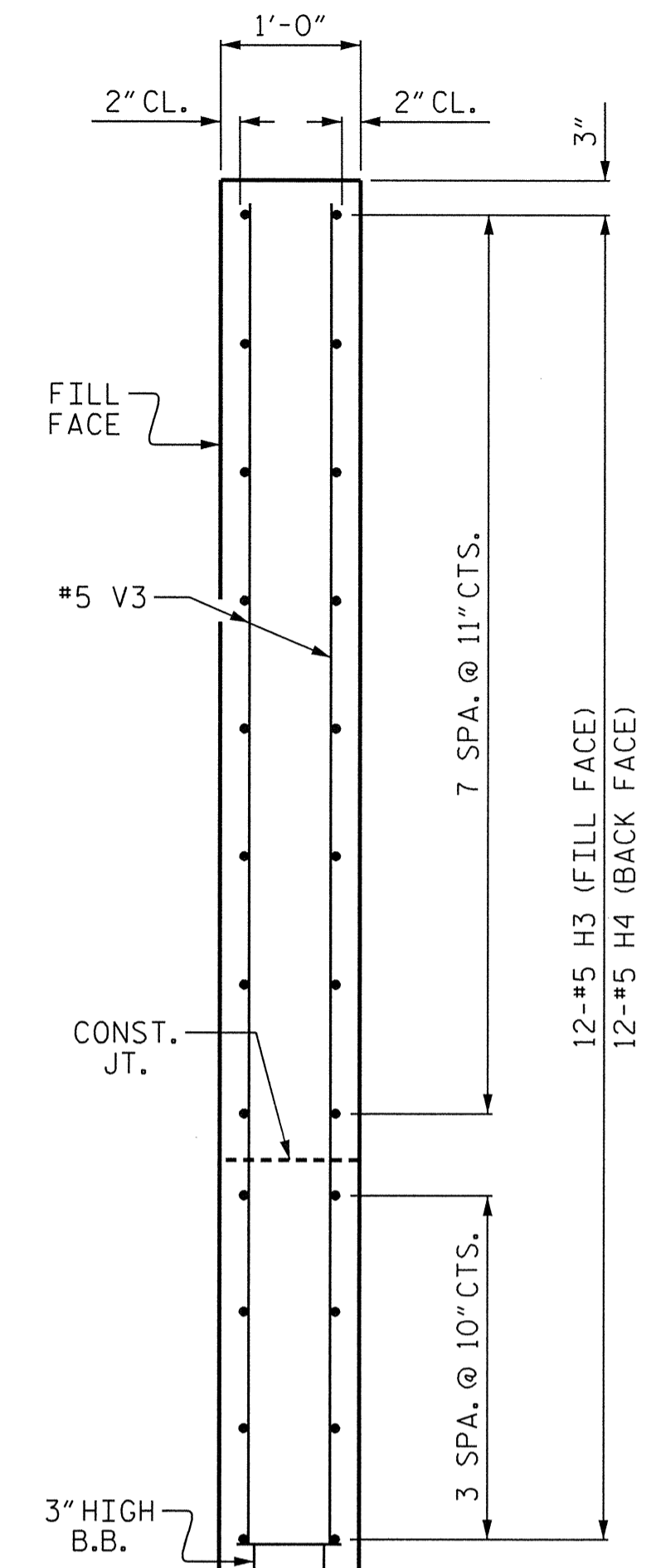
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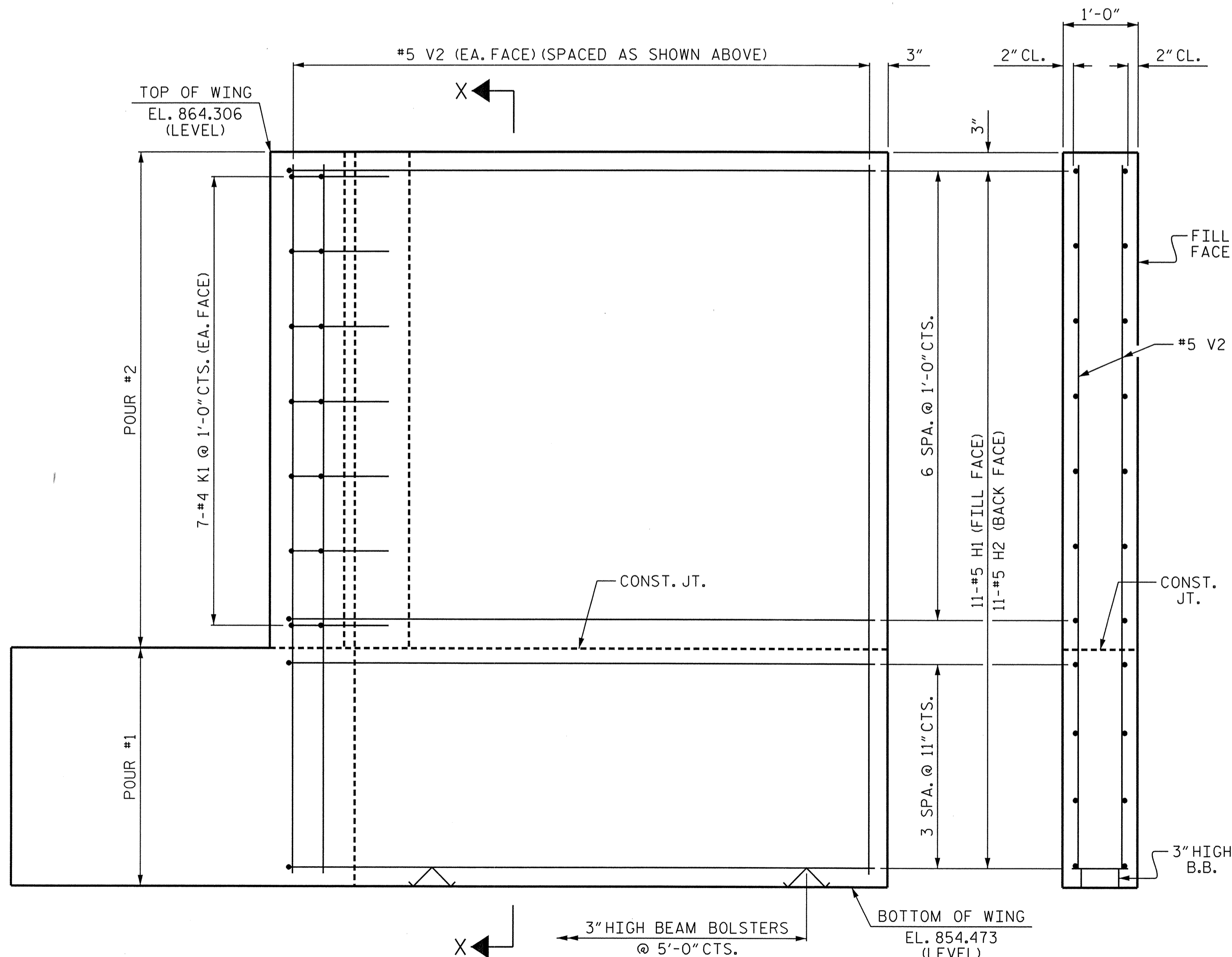
PLAN OF WING (W1)



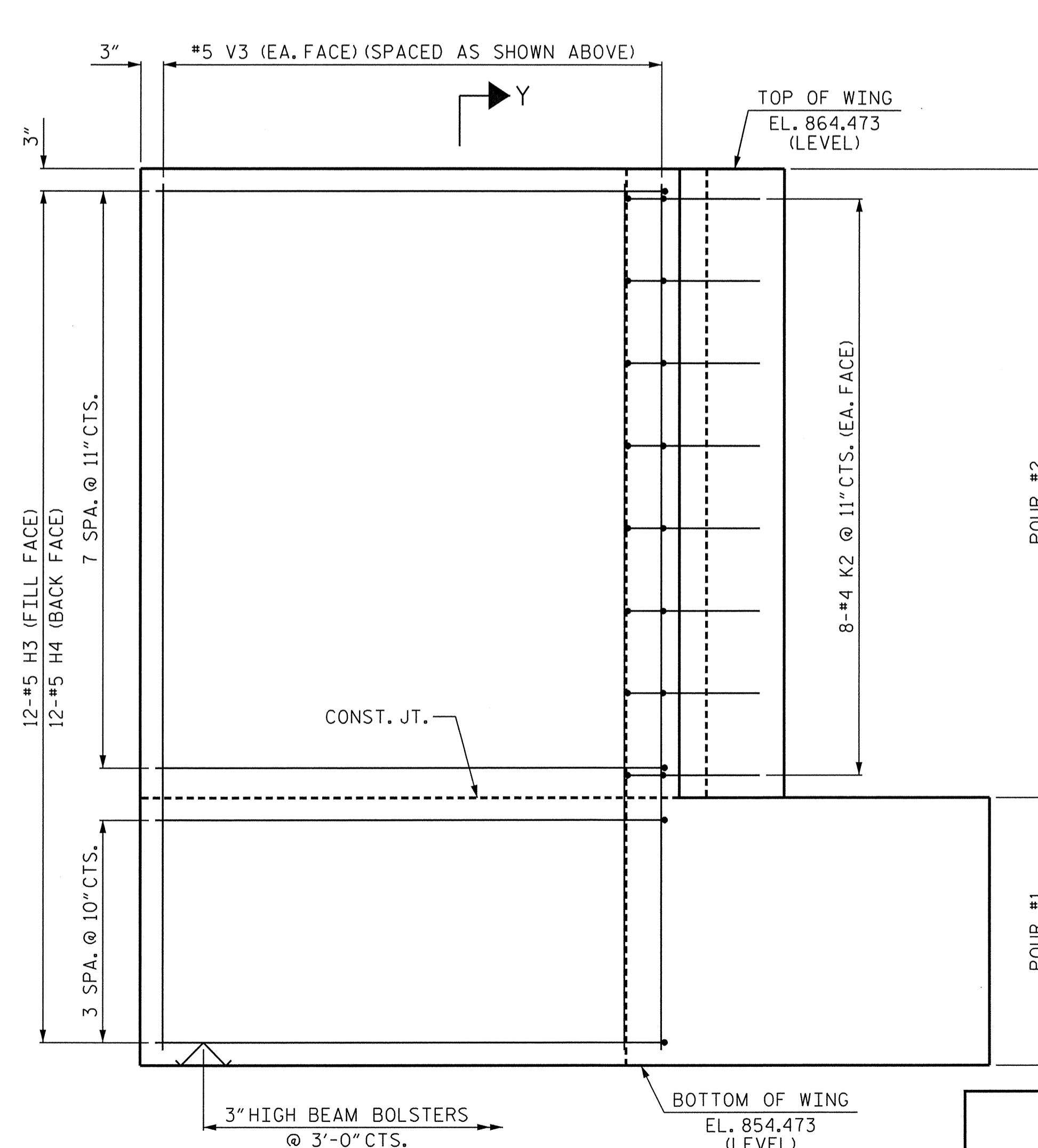
PLAN OF WING (W2)



SECTION Y-Y



ELEVATION OF WING (W1)



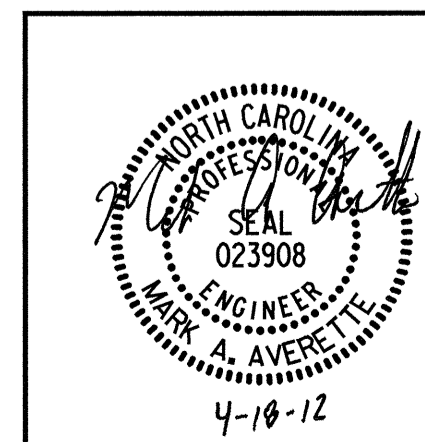
ELEVATION OF WING (W2)

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SHEET 2 OF 3

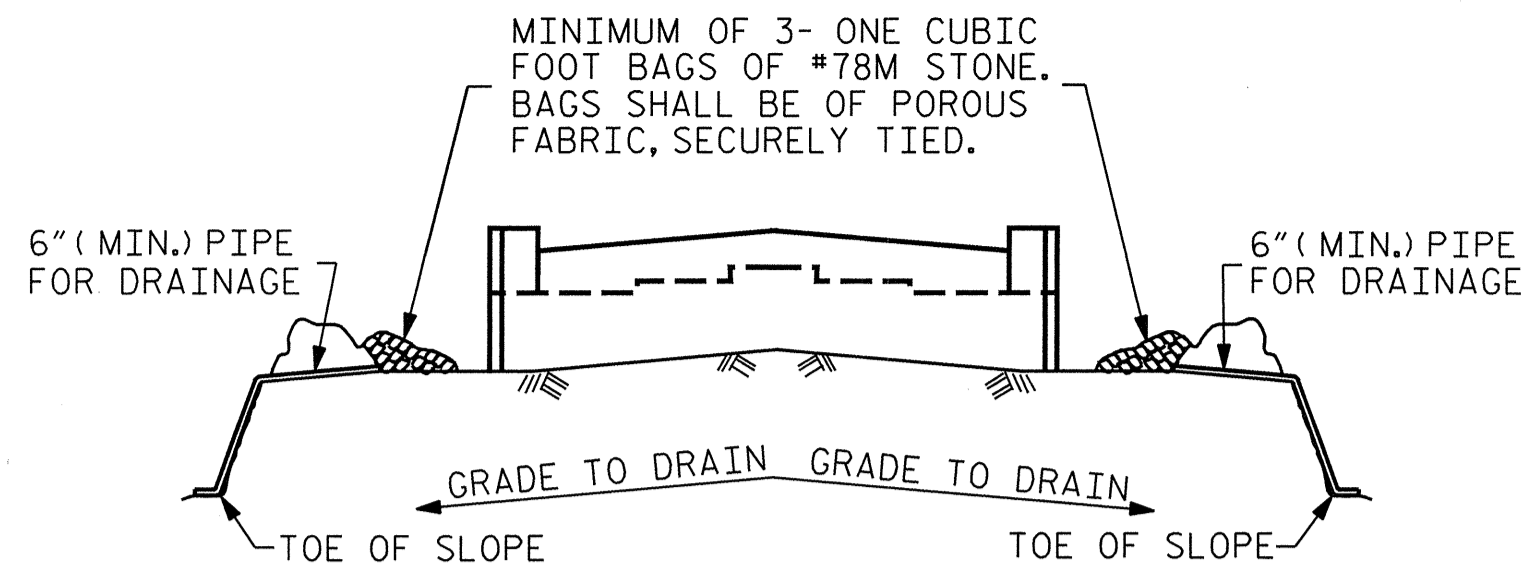
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
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 SUBSTRUCTURE  
 END BENT 1



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

TOTAL SHEETS: 37

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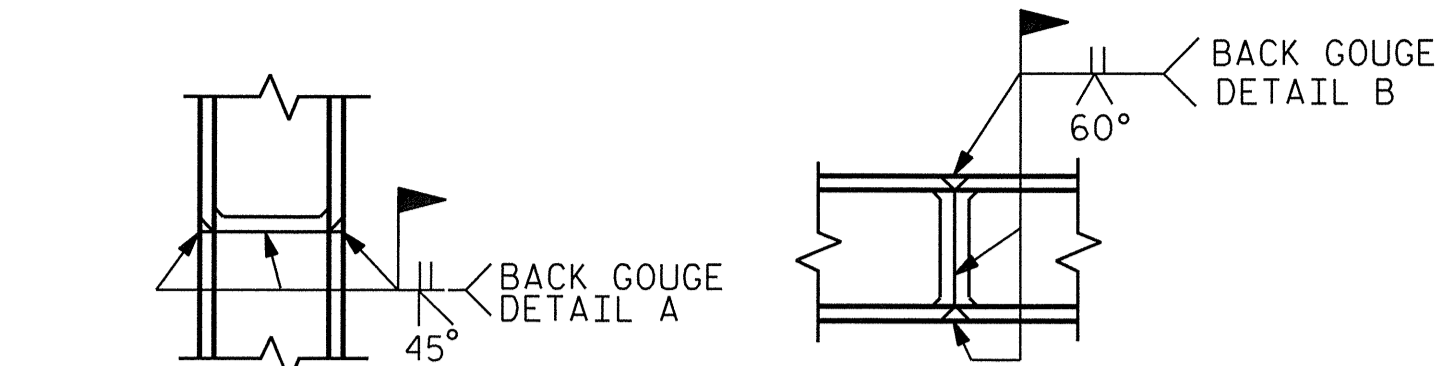


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

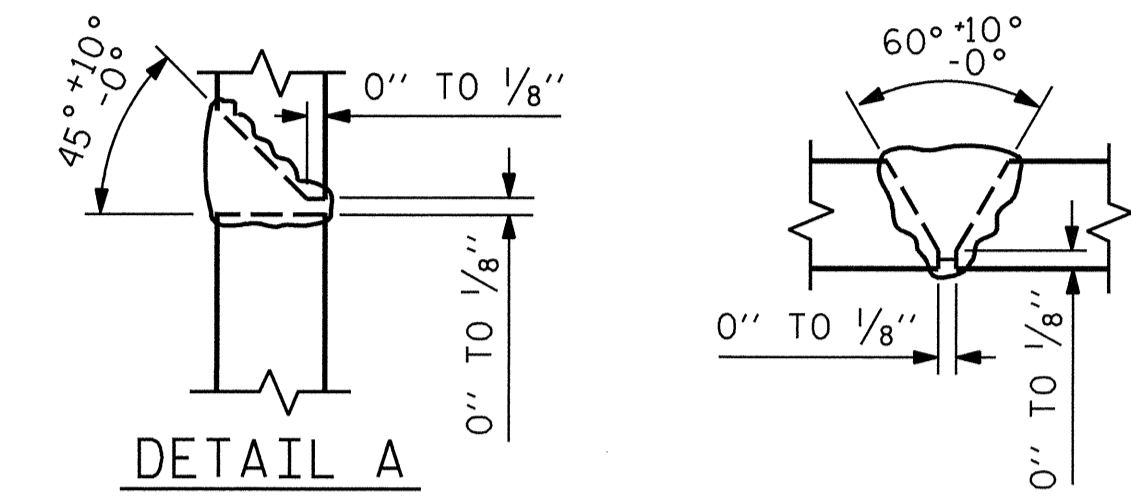
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

**TEMPORARY DRAINAGE AT END BENT**

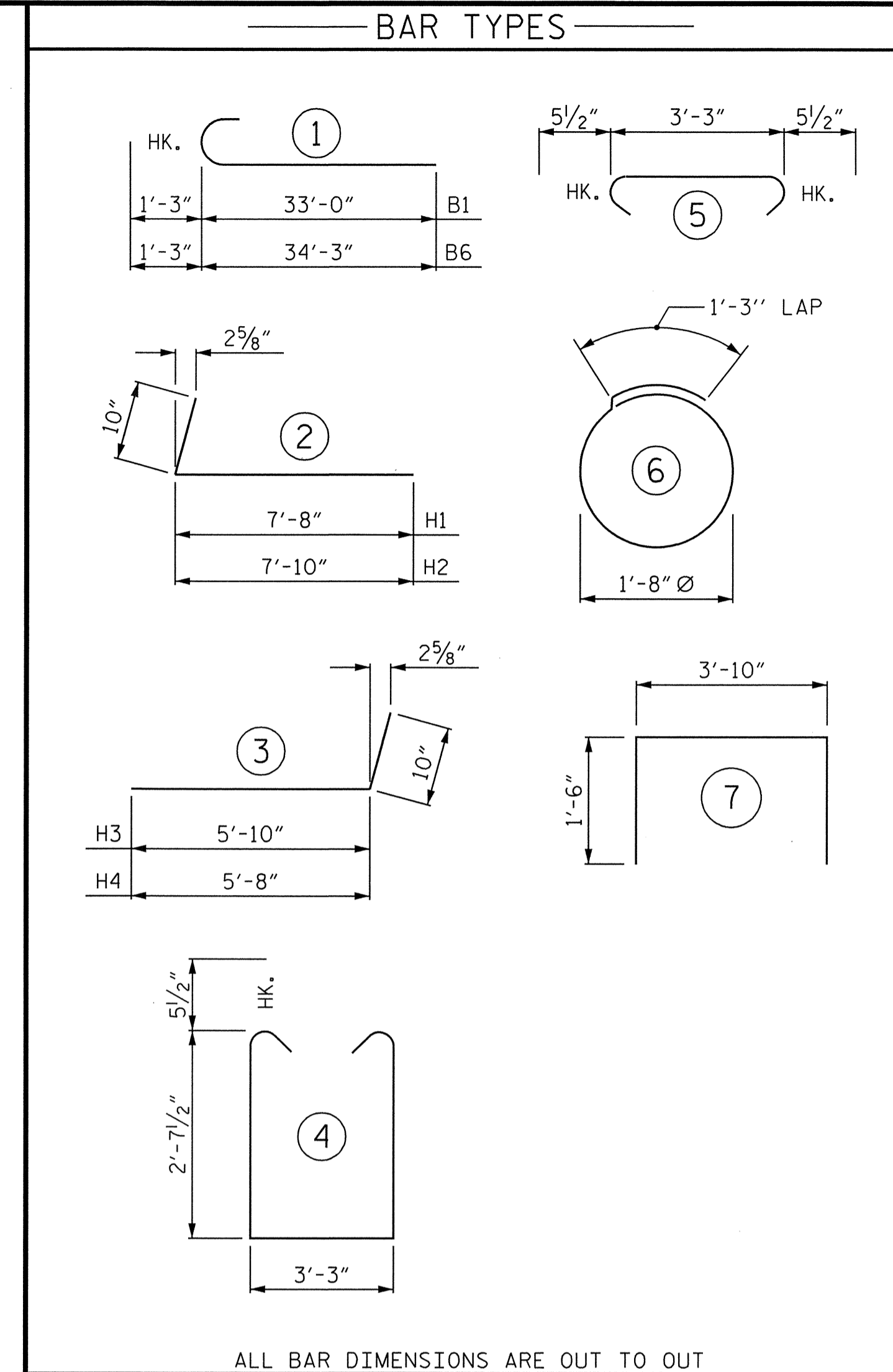


\*PILE VERTICAL \*PILE HORIZONTAL OR VERTICAL

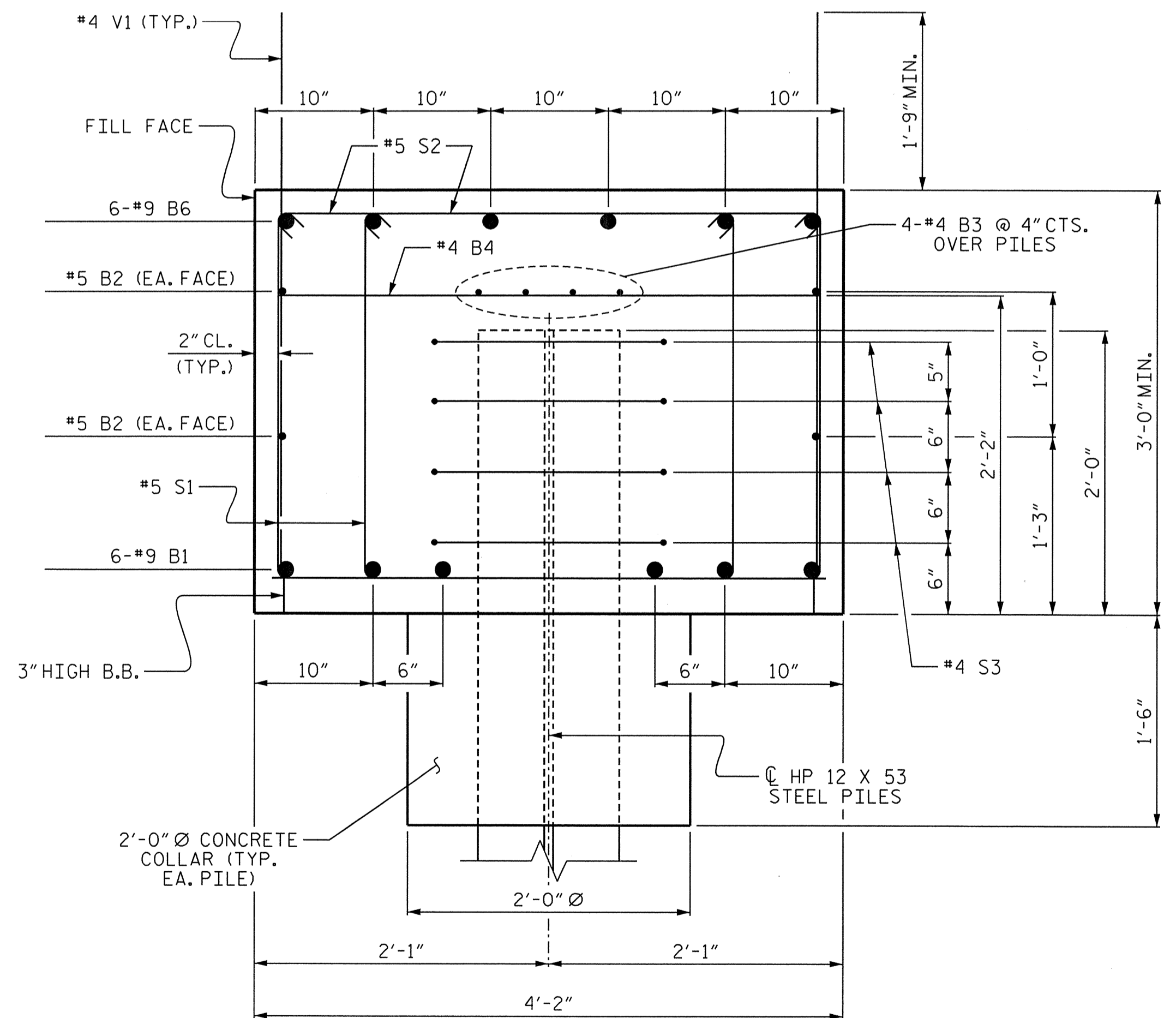


\* POSITION OF PILE DURING WELDING.

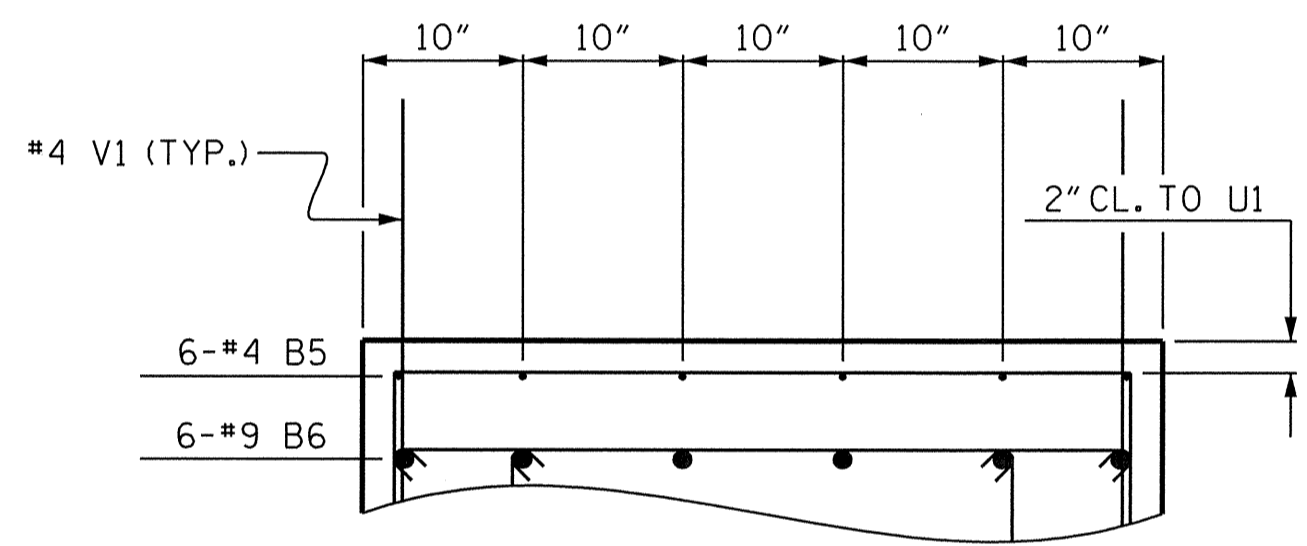
**PILE SPLICE DETAILS**



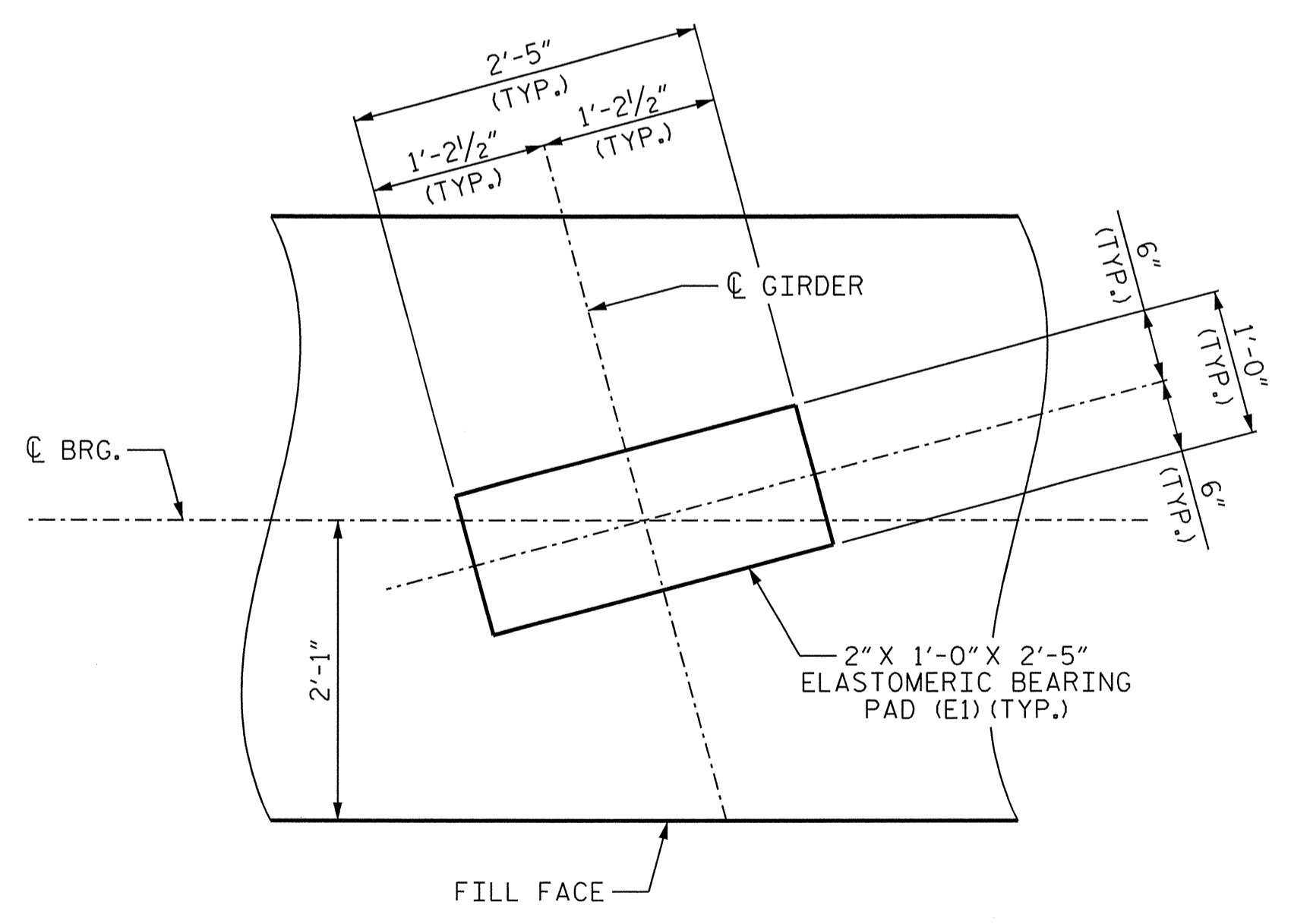
BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	34'-3"	1397
B2	4	5	STR	31'-6"	131
B3	12	4	STR	21'-7"	173
B4	15	4	STR	3'-10"	38
B5	6	4	STR	14'-8"	59
B6	12	9	1	35'-6"	1448
H1	11	5	2	8'-6"	98
H2	11	5	2	8'-8"	99
H3	12	5	3	6'-8"	83
H4	12	5	3	6'-6"	81
K1	14	4	STR	3'-5"	32
K2	16	4	STR	4'-1"	44
S1	186	5	4	9'-5"	1827
S2	186	5	5	4'-2"	808
S3	32	4	6	6'-6"	139
U1	15	4	7	6'-10"	68
V1	84	4	STR	5'-0"	281
V2	28	5	STR	9'-4"	273
V3	24	5	STR	9'-7"	240
REINFORCING STEEL					7319 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (CAP, LOWER PART OF WINGS & COLLARS)					32.7 C.Y.
POUR #2 (UPPER PART OF WINGS)					4.9 C.Y.
TOTAL CLASS A CONCRETE					37.6 C.Y.
HP 12 X 53 STEEL PILES					
No. = 8					240 LIN. FT.



**SECTION A-A**



**PARTIAL SECTION B-B**



**DETAIL "A"**  
(TYP. EA. GDR.)

PLANS PREPARED BY:

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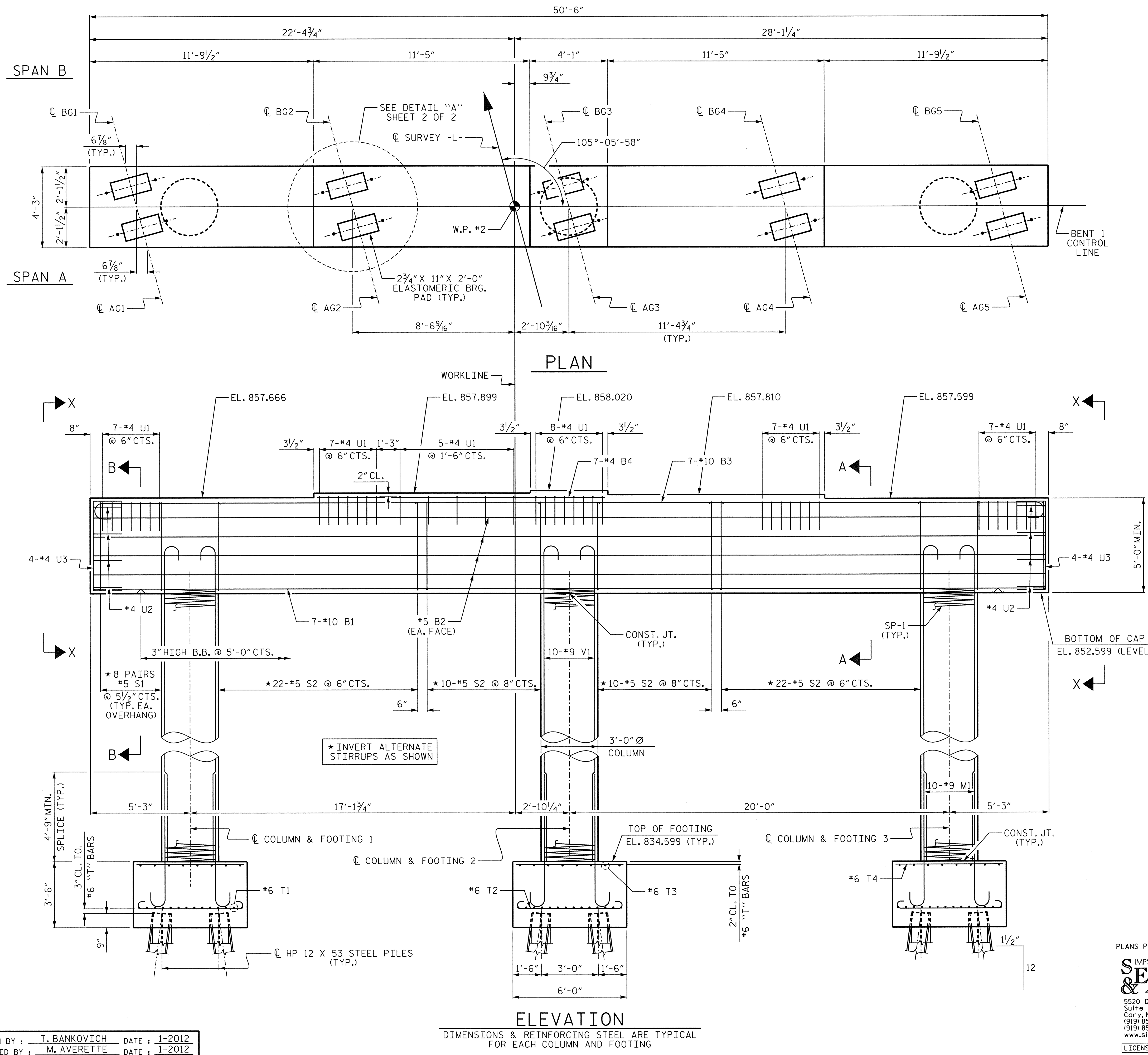
SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				SUBSTRUCTURE	
END BENT 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-29					TOTAL SHEETS 37

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**NOTES:**  
 STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
 HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

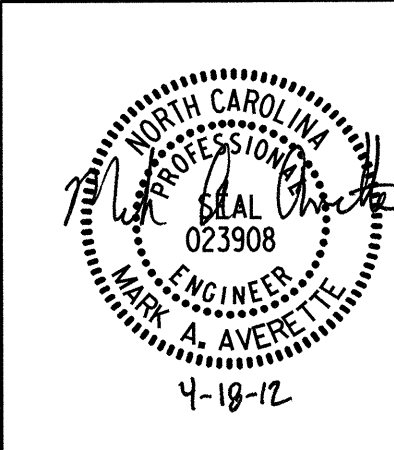
DETAILS, DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING

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 STATION: 23+52.74 -L-

SHEET 1 OF 2

REVISIONS						SHEET NO. S-30
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1			3			TOTAL SHEETS 37
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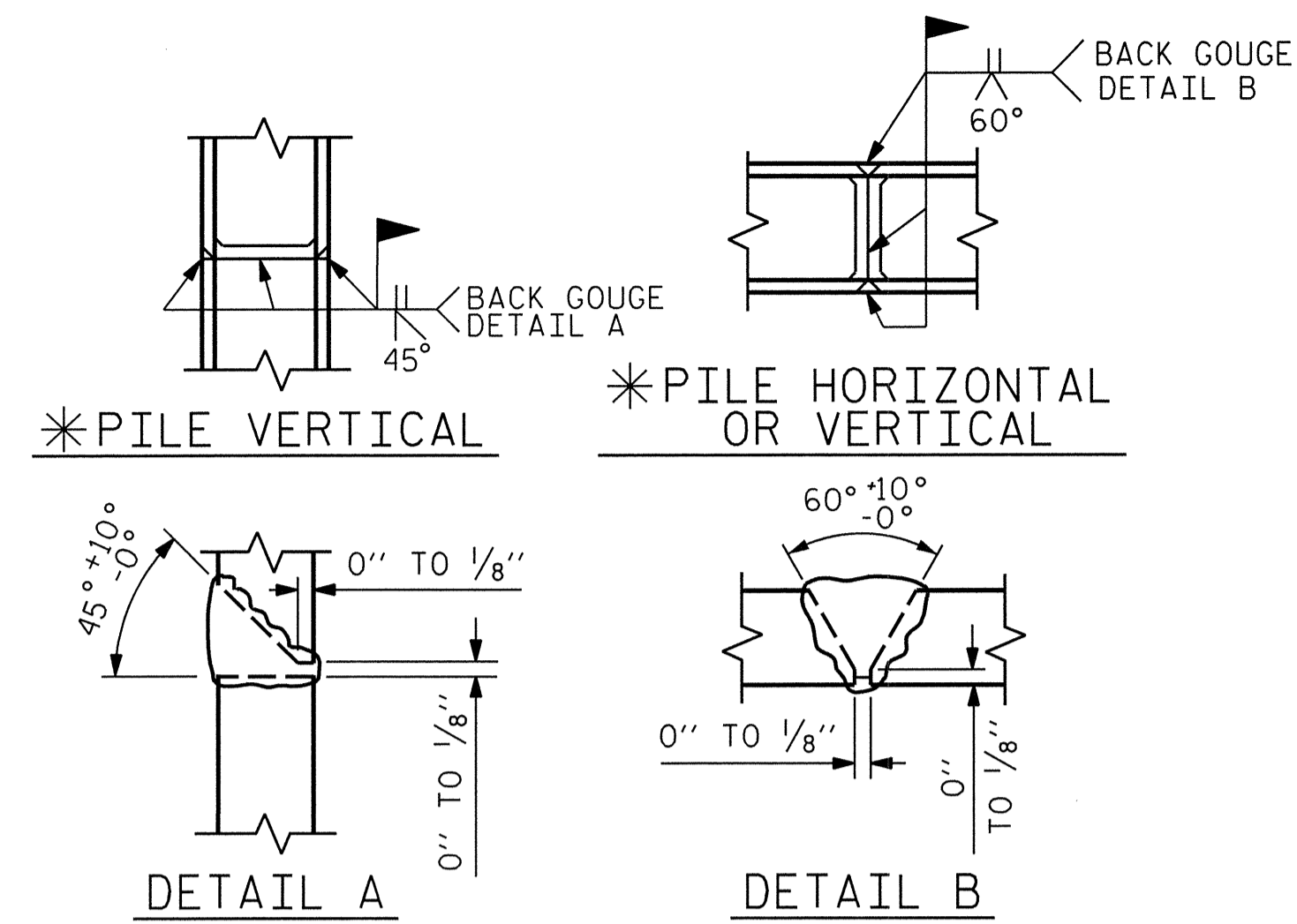


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
**BENT 1**

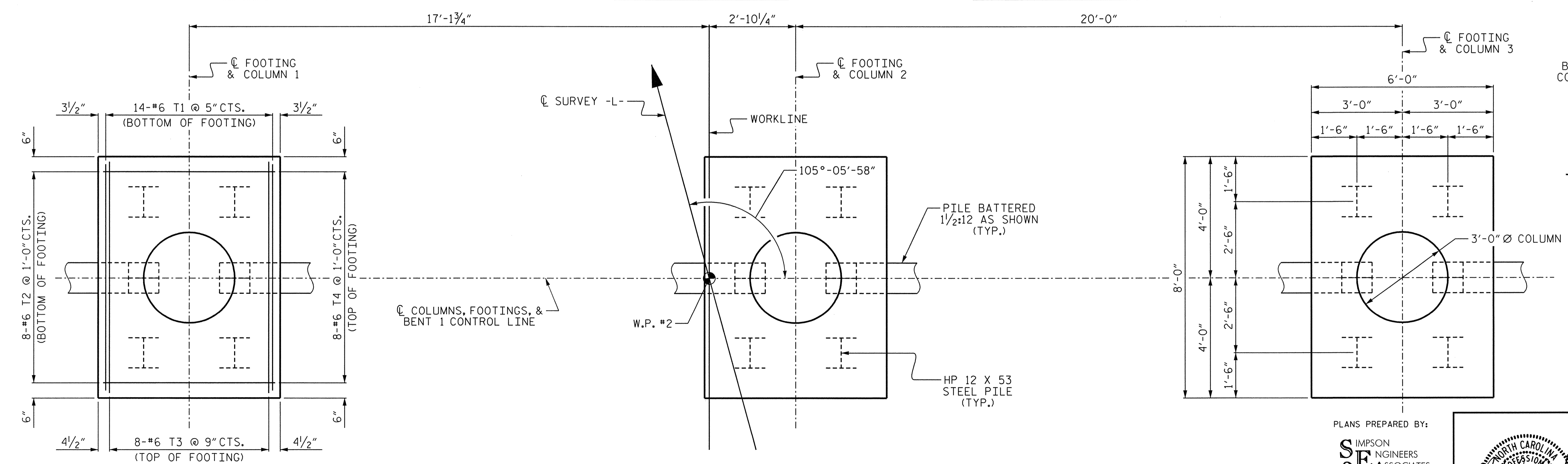
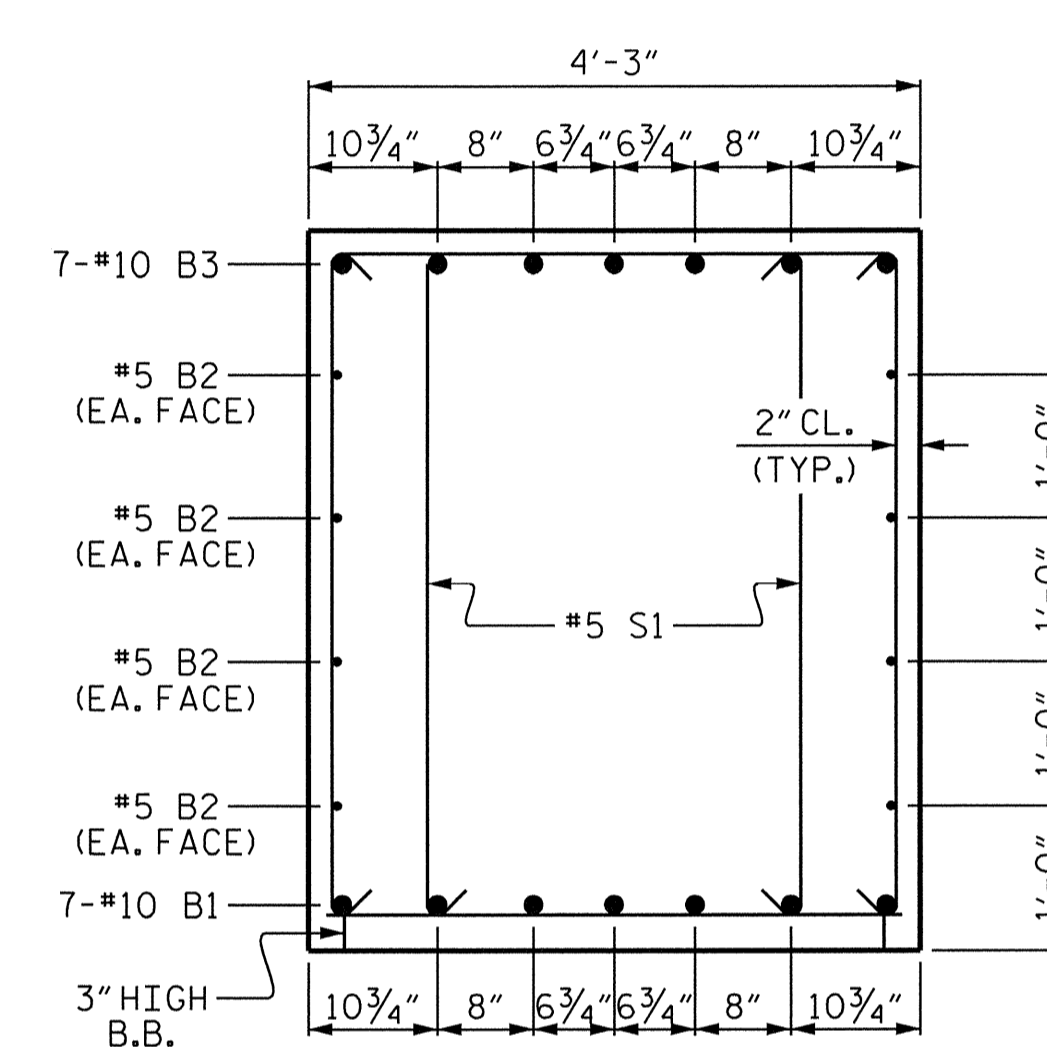
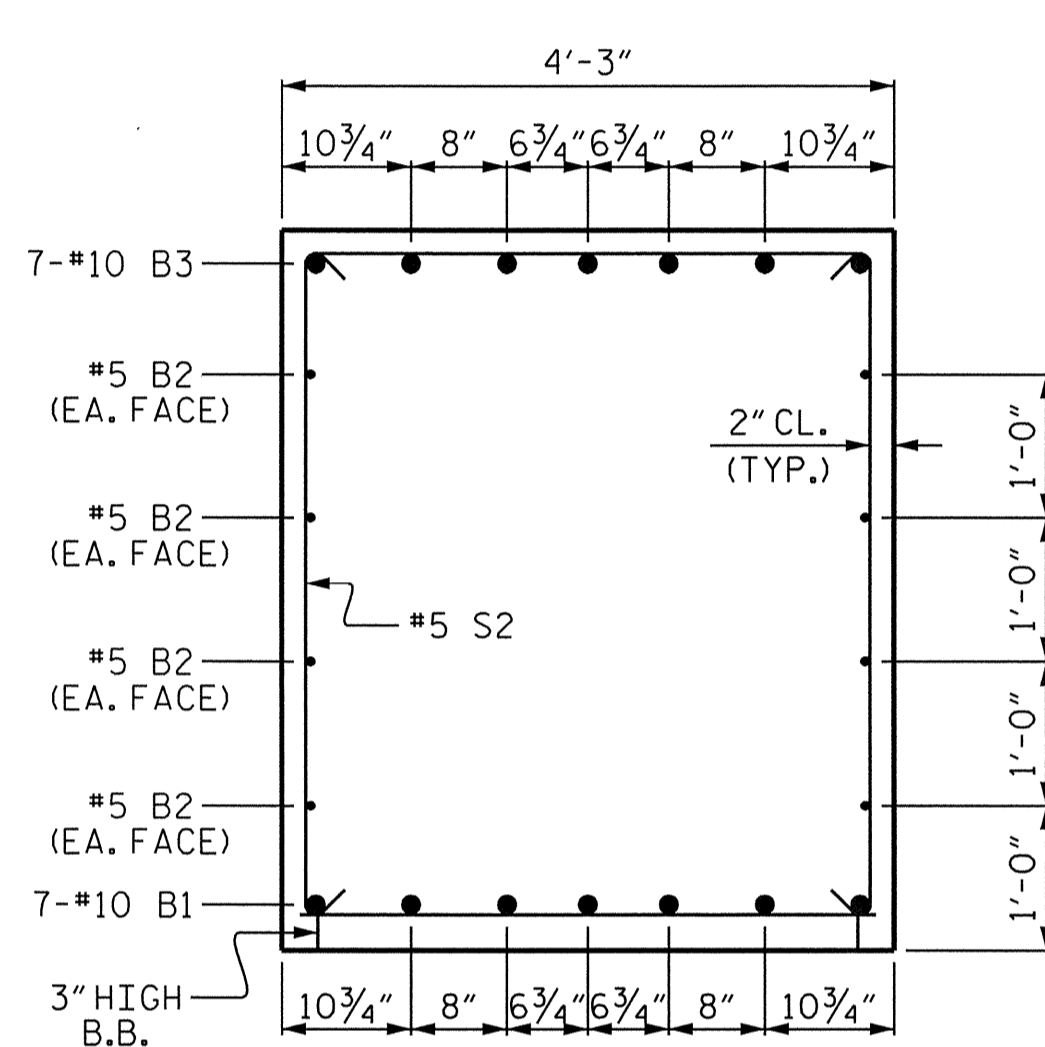
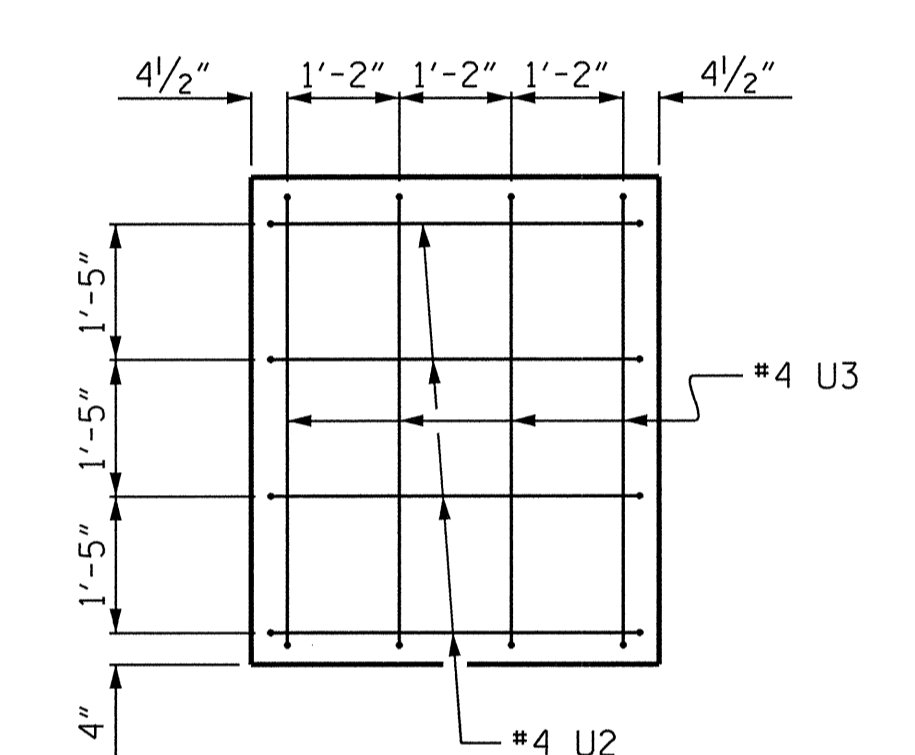
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DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING

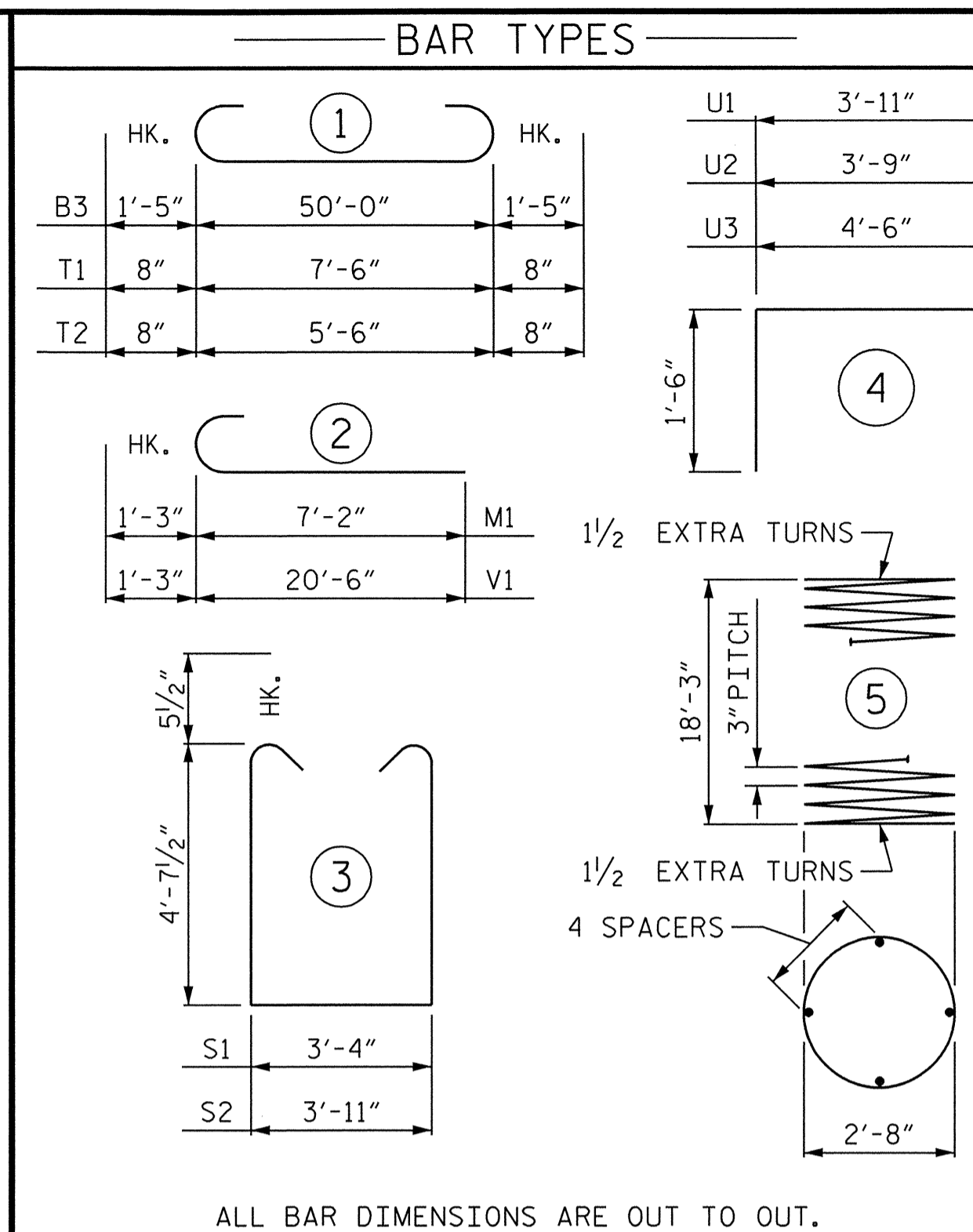
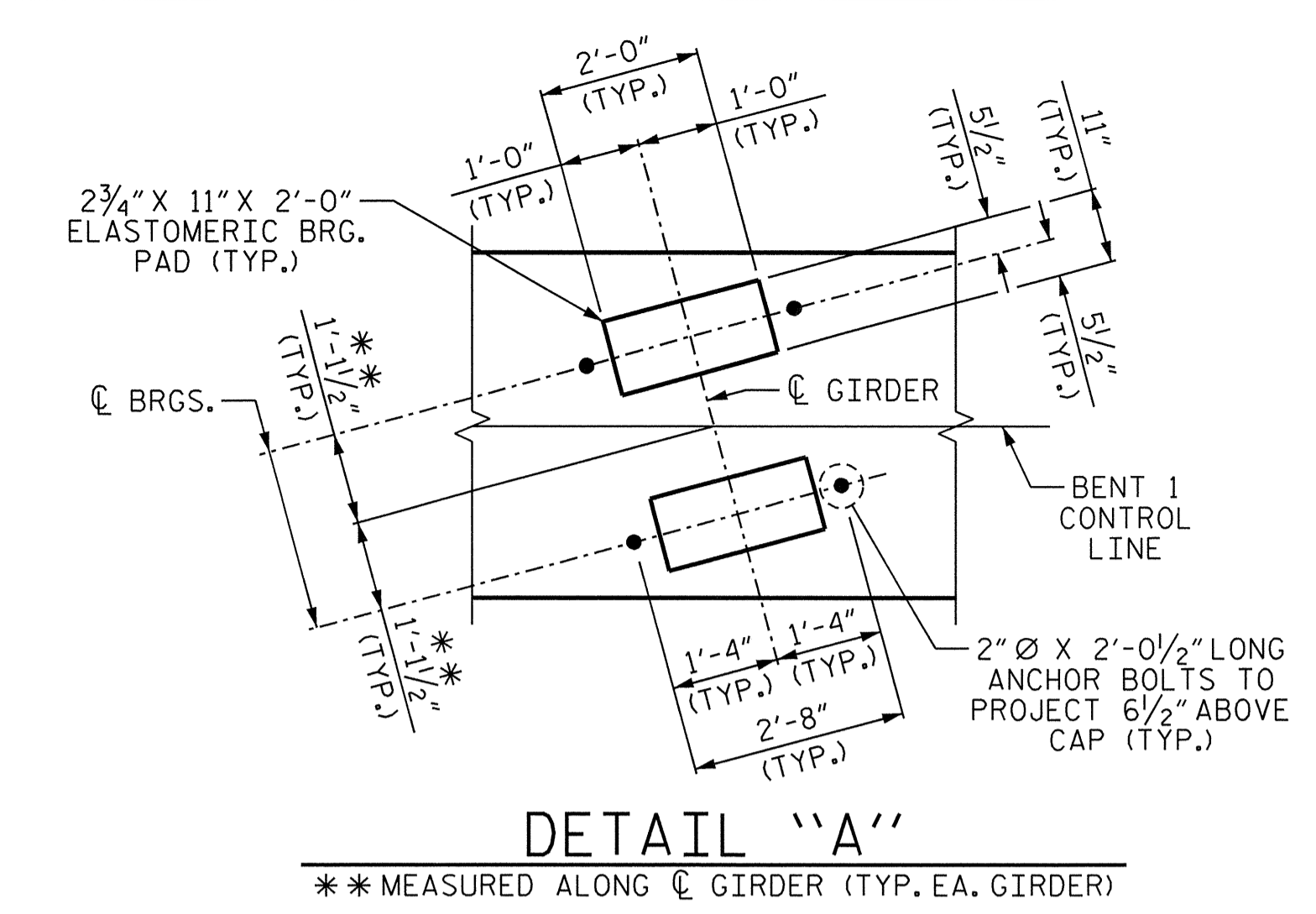
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**PILE SPlice DETAILS**  
 \* POSITION OF PILE DURING WELDING.

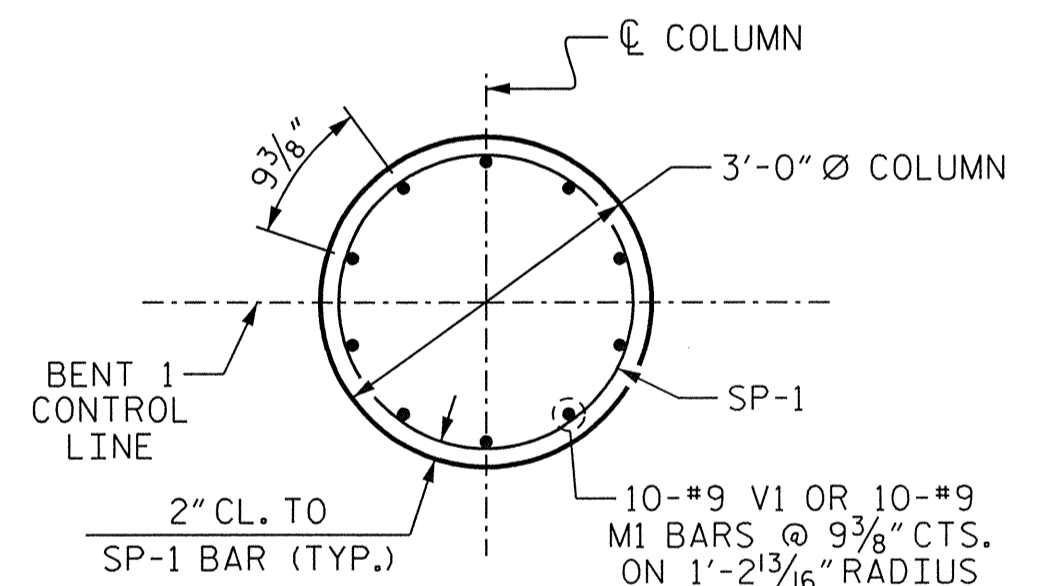


**PLAN OF FOOTING**  
 PILE PLACEMENT, DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING



ALL BAR DIMENSIONS ARE OUT TO OUT.  
 \* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL					
BENT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	7	10	STR	50'-2"	1511
B2	8	5	STR	50'-2"	419
B3	7	10	1	52'-10"	1591
B4	7	4	STR	15'-2"	71
M1	30	9	2	8'-5"	859
S1	32	5	3	13'-6"	451
S2	64	5	3	14'-1"	940
T1	42	6	1	8'-10"	557
T2	24	6	1	6'-10"	246
T3	24	6	STR	7'-6"	270
T4	24	6	STR	5'-6"	198
U1	41	4	4	6'-11"	189
U2	8	4	4	6'-9"	36
U3	8	4	4	7'-6"	40
V1	30	9	2	21'-9"	2219
SP-1	3	*	5	627'-1"	1257
REINFORCING STEEL					9597 LBS.
SPIRAL REINFORCING STEEL					1257 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (FOOTINGS)					18.7 CU. YDS.
POUR #2 (COLUMNS)					14.1 CU. YDS.
POUR #3 (CAP)					41.1 CU. YDS.
TOTAL CLASS A CONCRETE					73.9 CU. YDS.
HP 12 X 53 STEEL PILES					
No. = 18					630 LIN. FT.



**PLAN OF COLUMN**  
 REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH COLUMN

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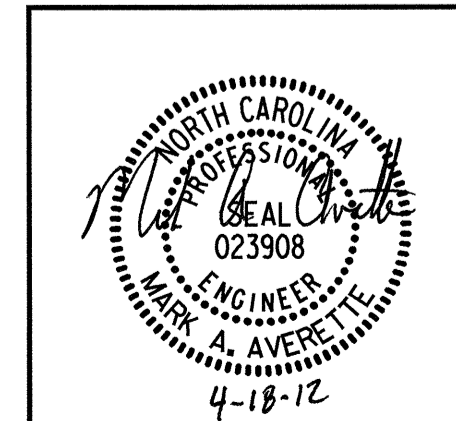
SHEET 2 OF 2

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**BENT 1**

REVISIONS				SHEET NO.
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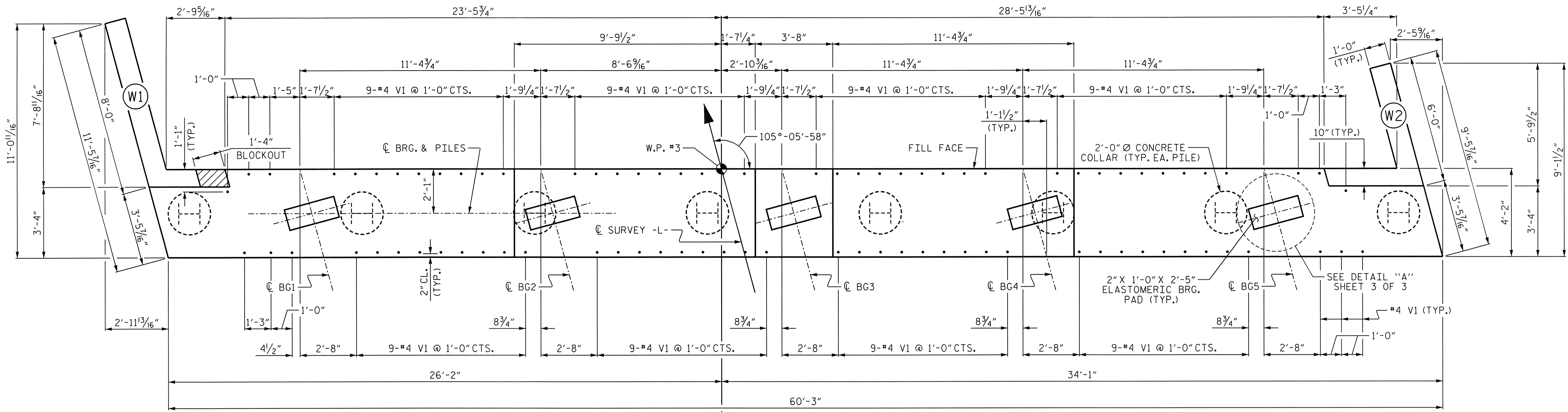
TOTAL SHEETS: 37

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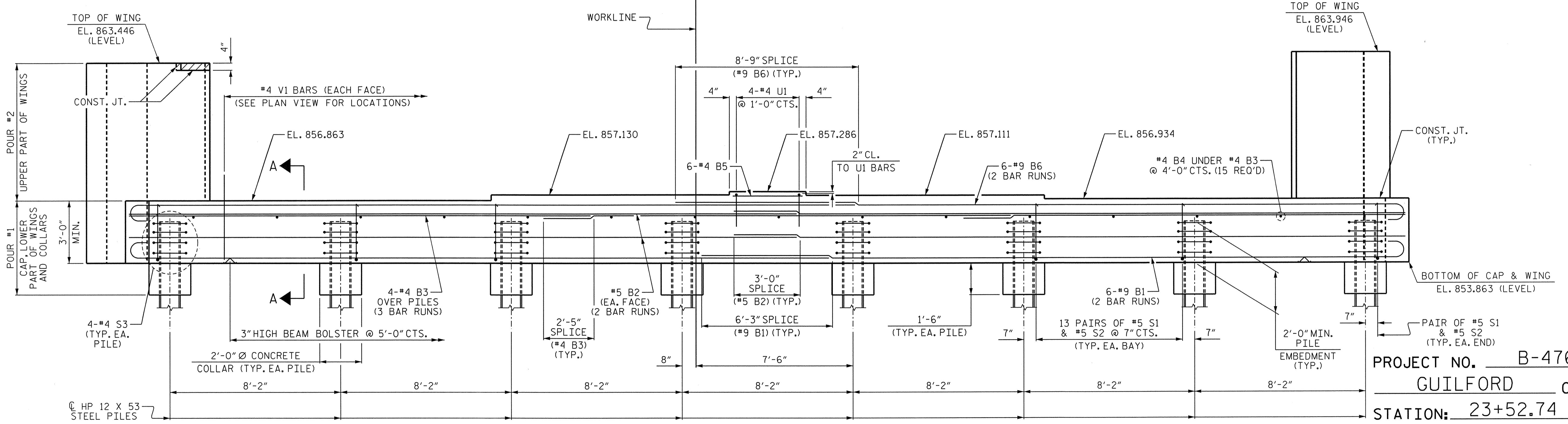


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PLAN



ELEVATION

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

#4 V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN CAP.

FOR SECTION A-A, SEE SHEET 3 OF 3.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

PROJECT NO. B-4760  
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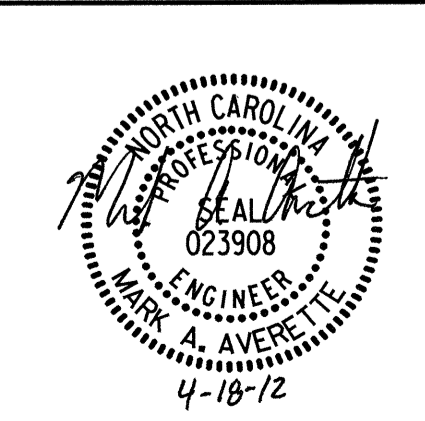
SHEET 1 OF 3

STATE OF NORTH CAROLINA  
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END BENT 2

REVISIONS				SHEET NO.
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2			4	

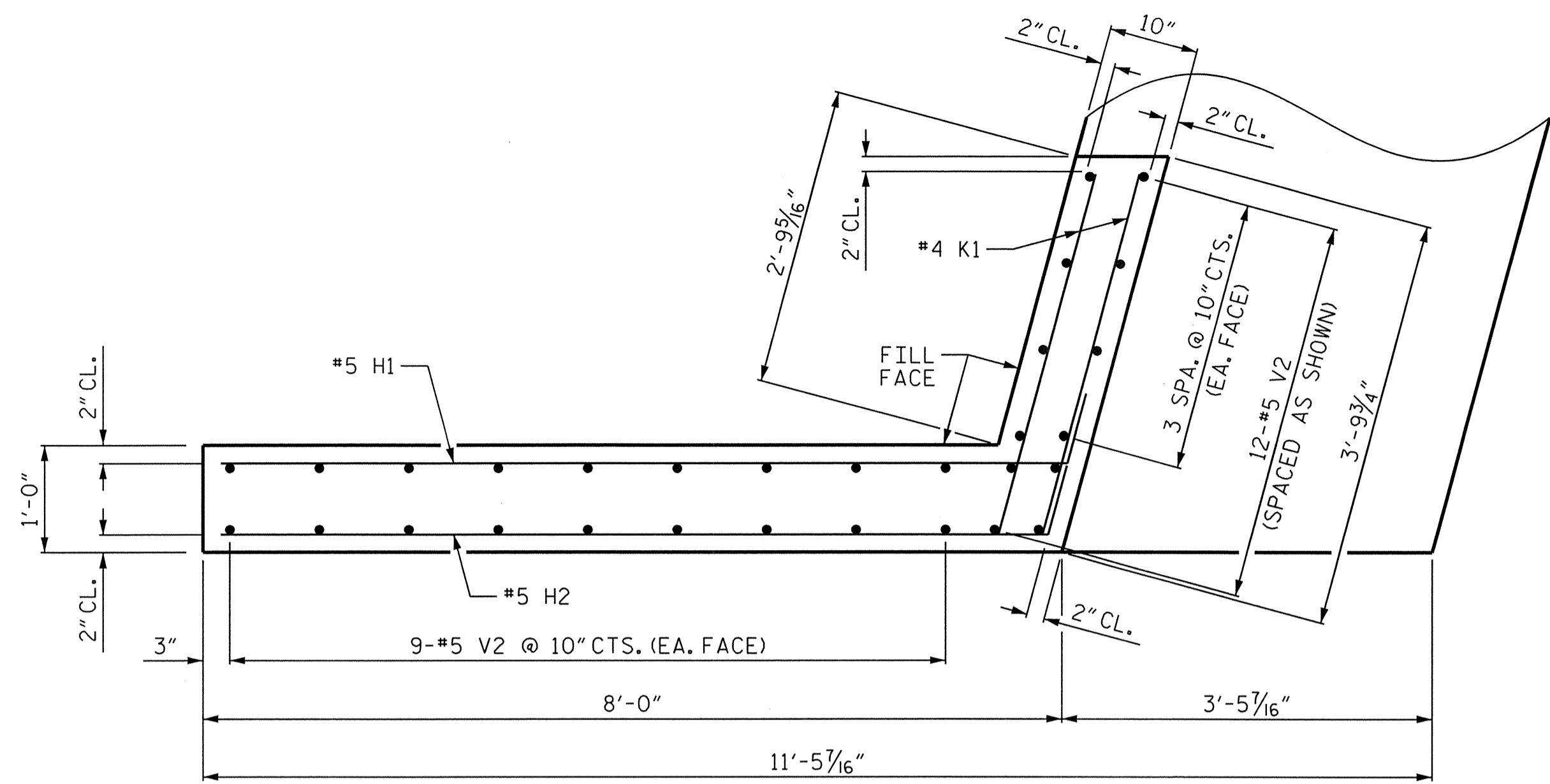
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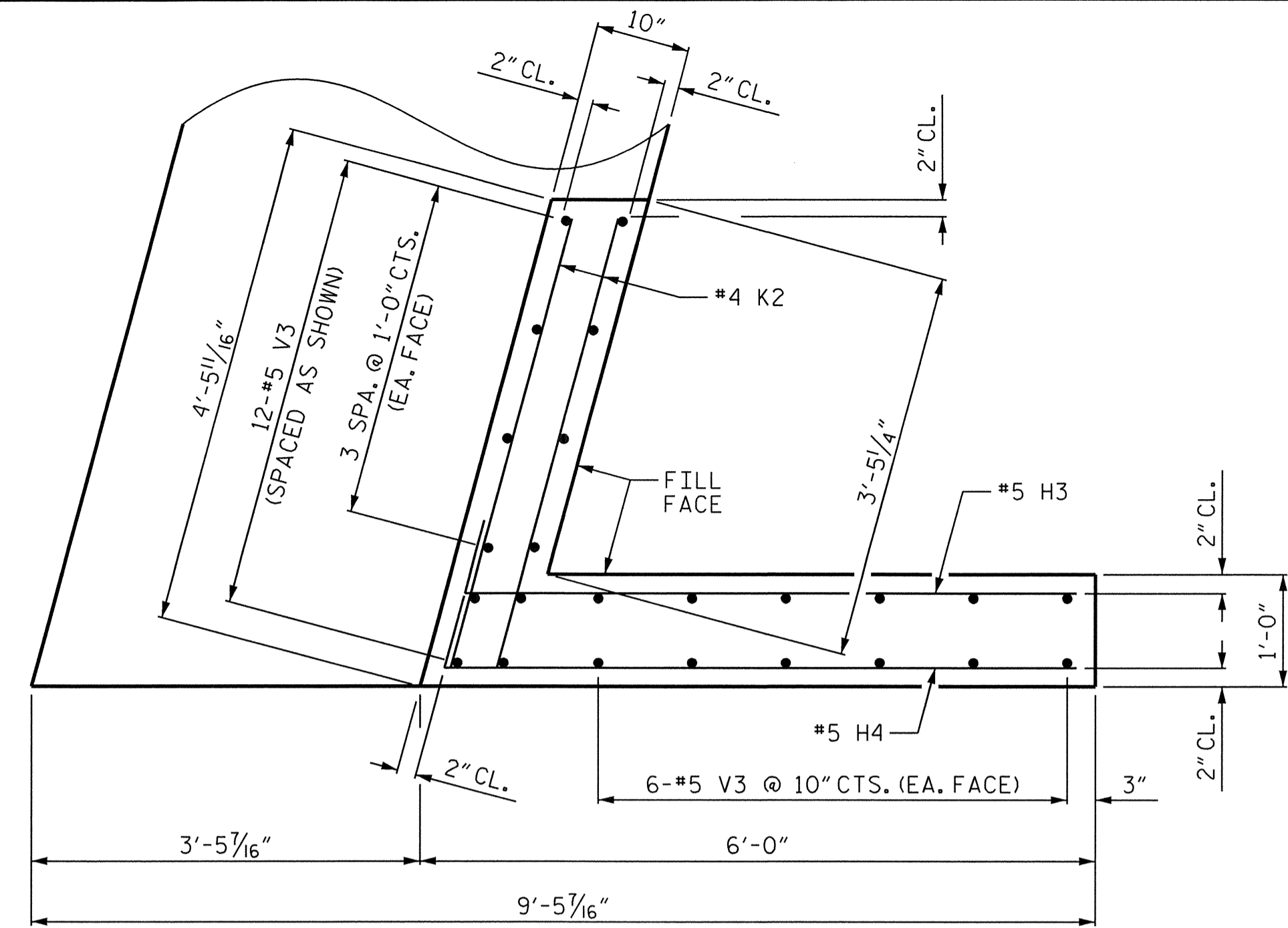
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DRAWN BY: T. BANKOVICH DATE: 12-2011  
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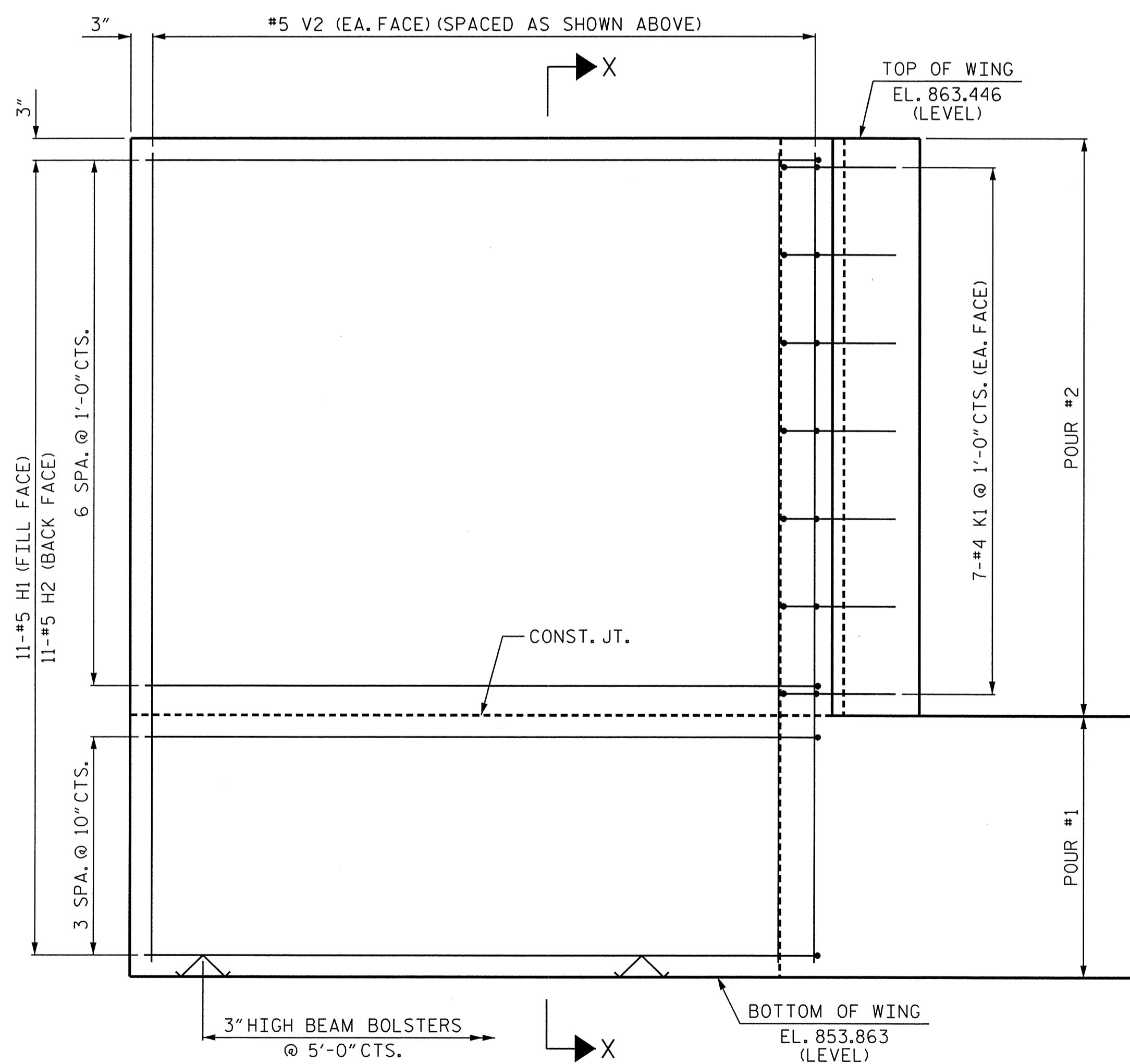
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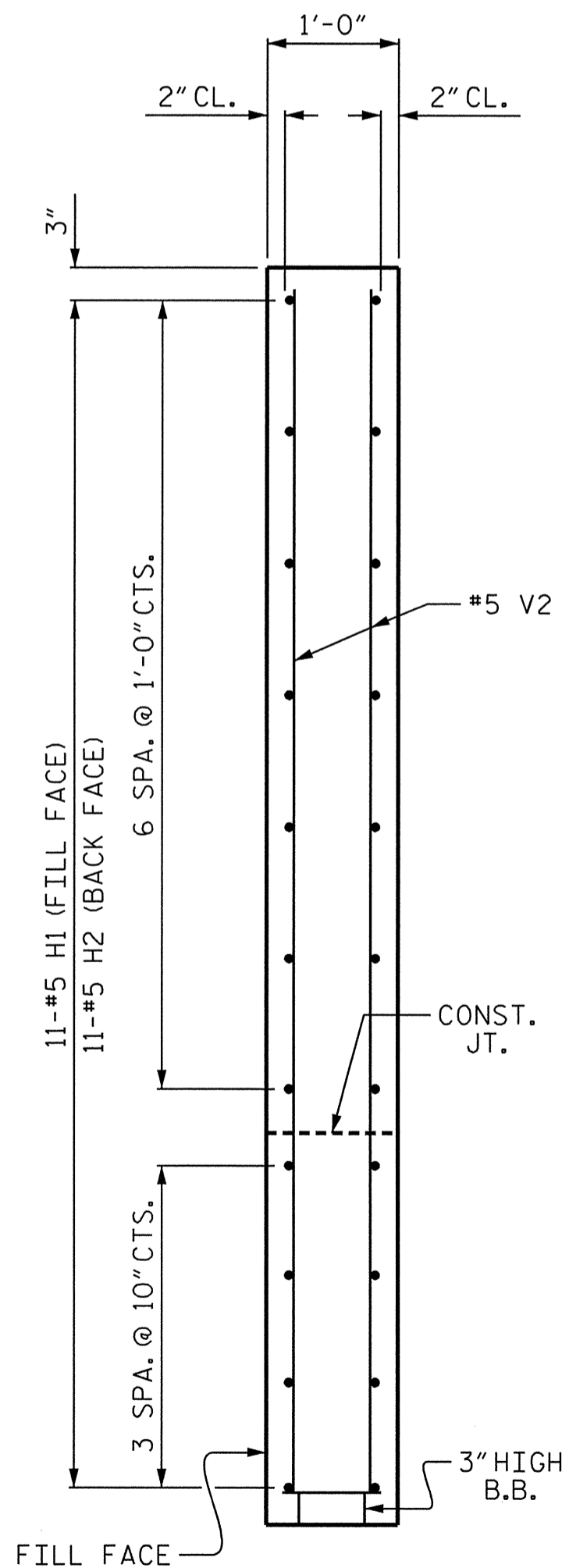
PLAN OF WING (W1)



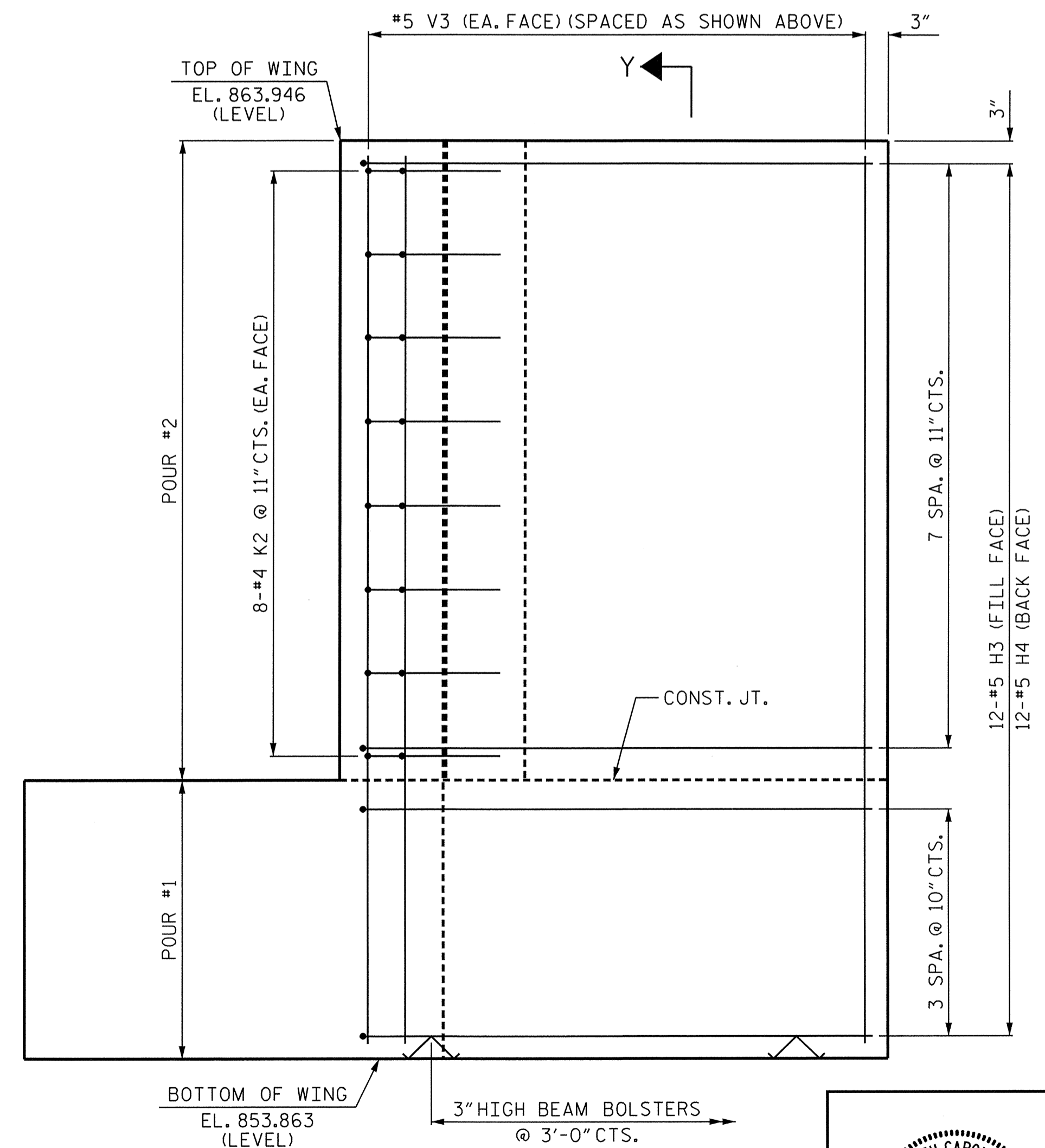
PLAN OF WING (W2)



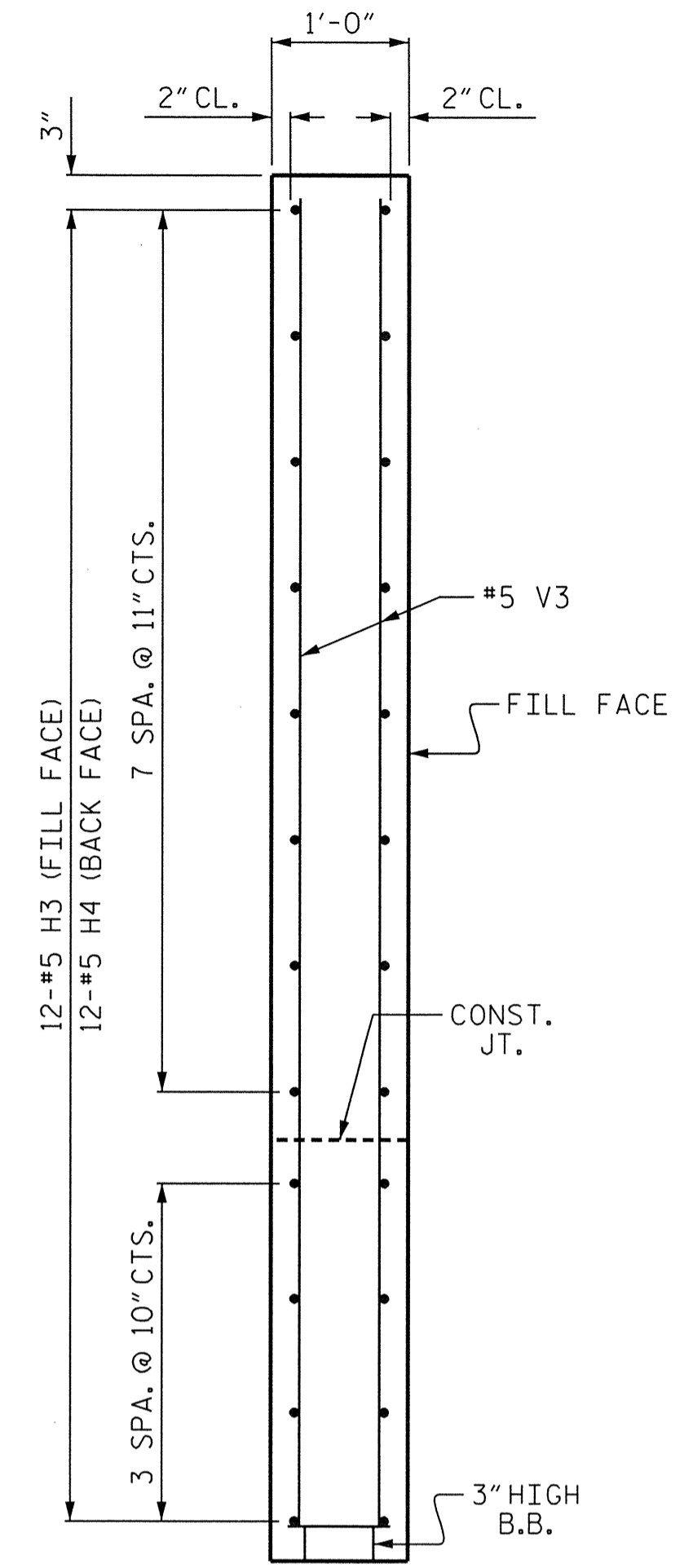
ELEVATION OF WING (W1)



SECTION X-X



ELEVATION OF WING (W2)

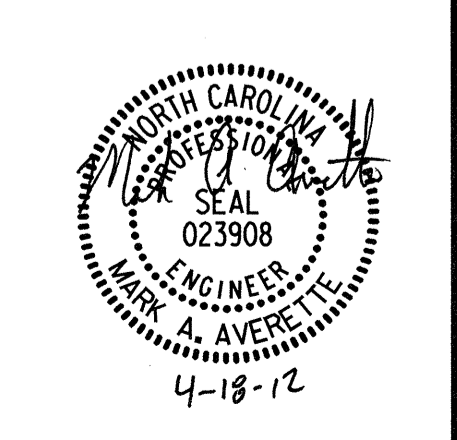


SECTION Y-Y

PLANS PREPARED BY:  
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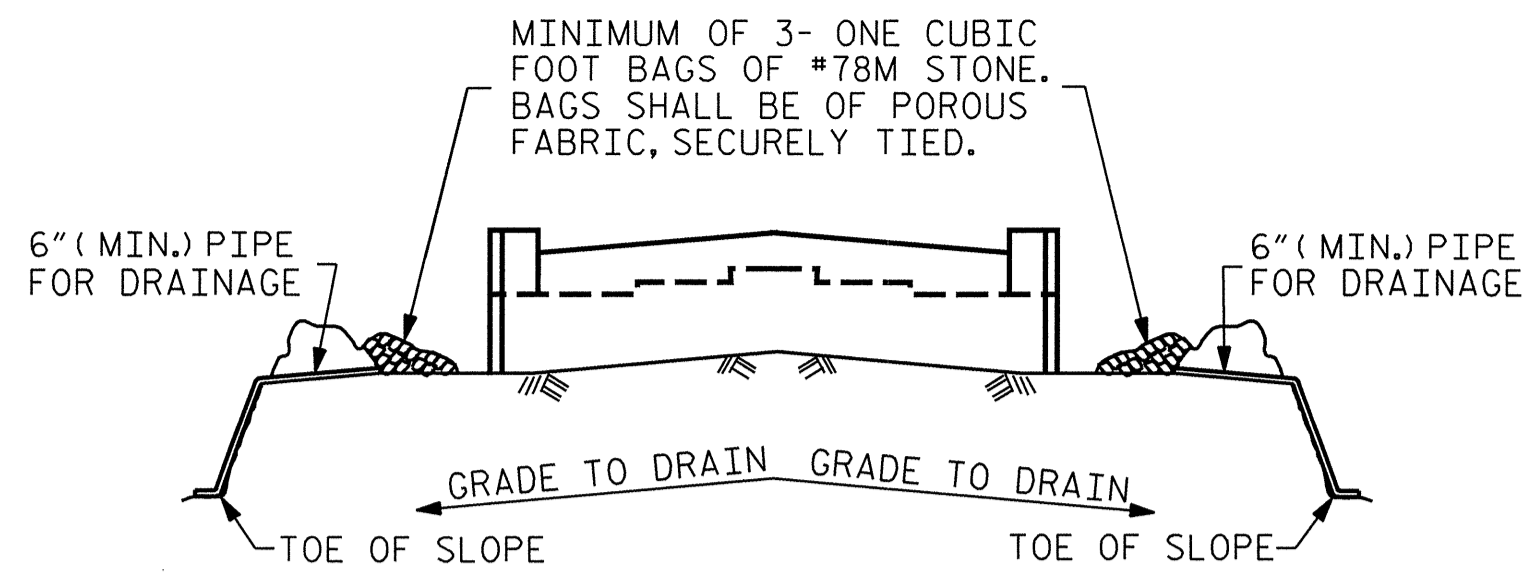
PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-

SHEET 2 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2



REVISIONS						SHEET NO.	
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1			3			TOTAL SHEETS	
2			4			37	

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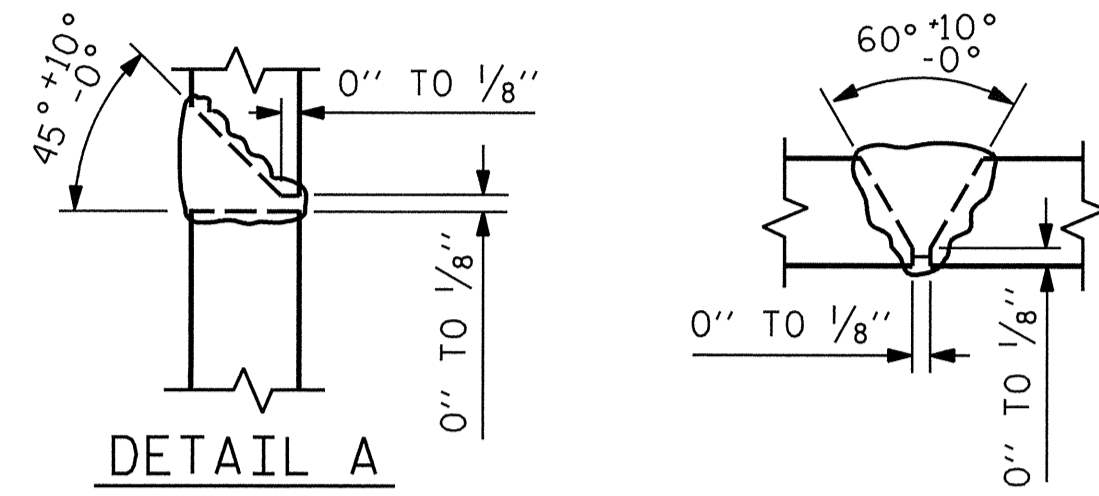
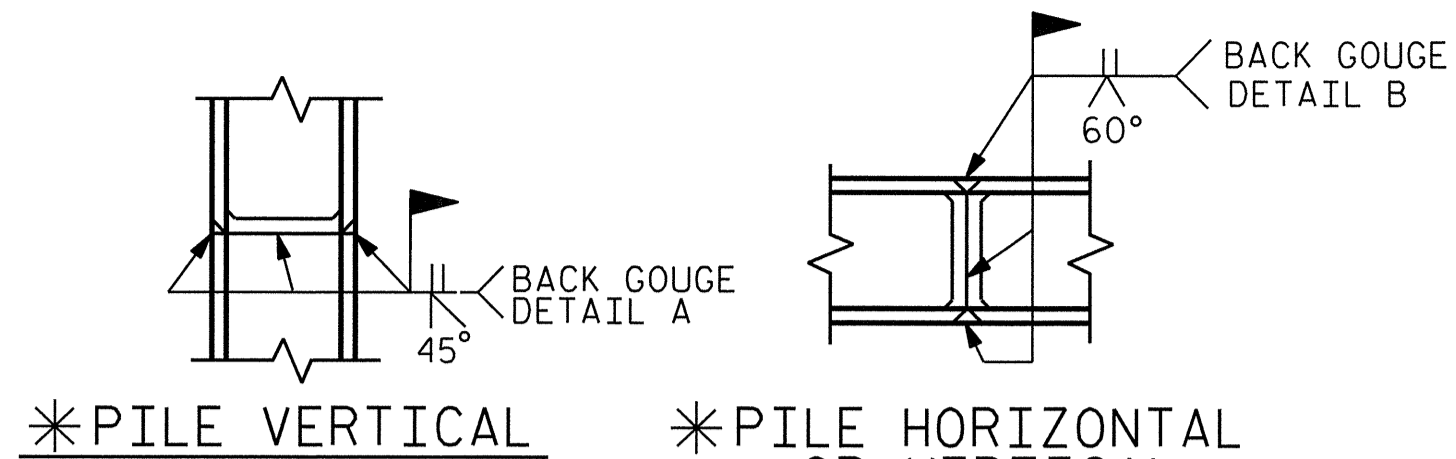


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

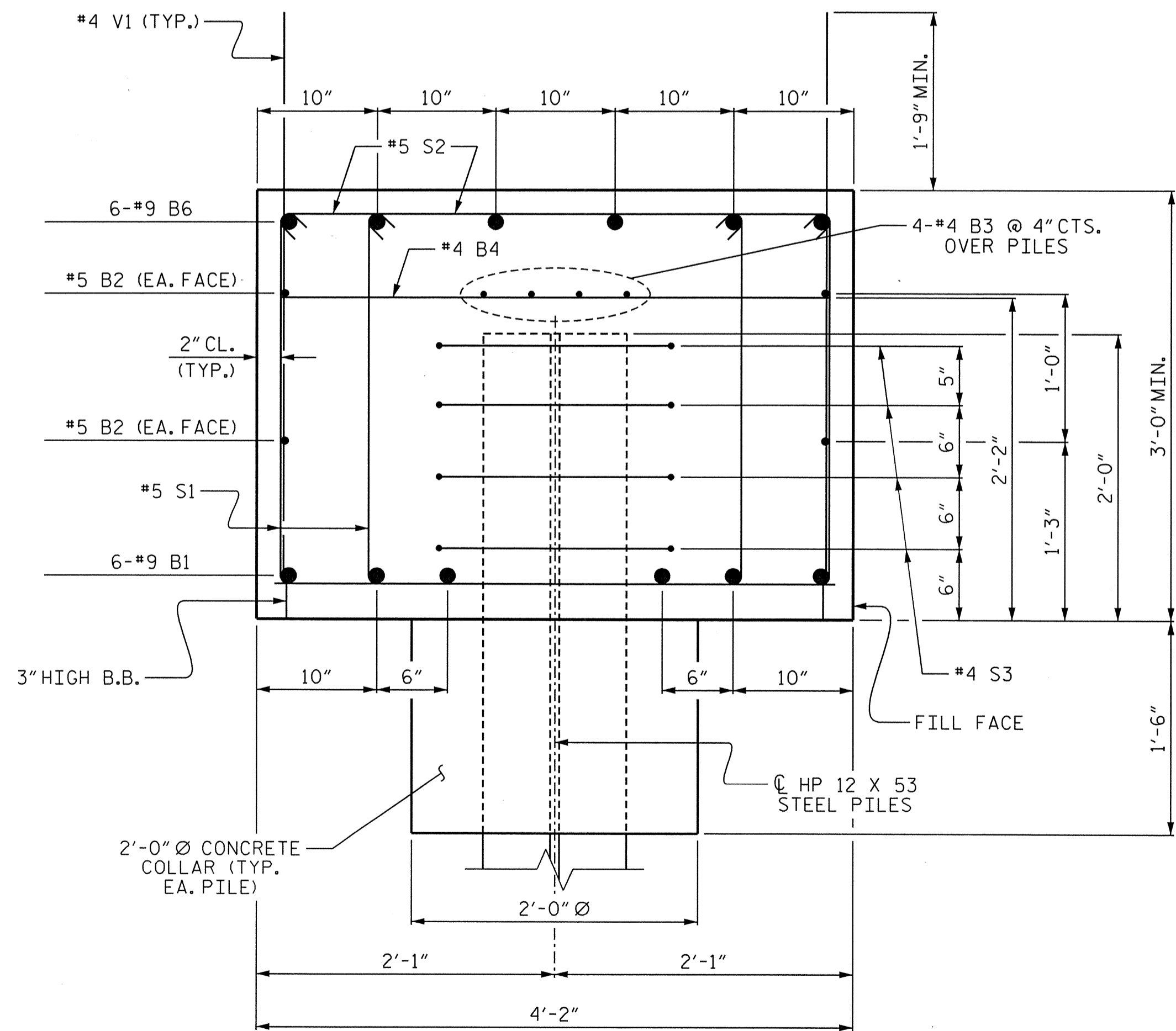
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT

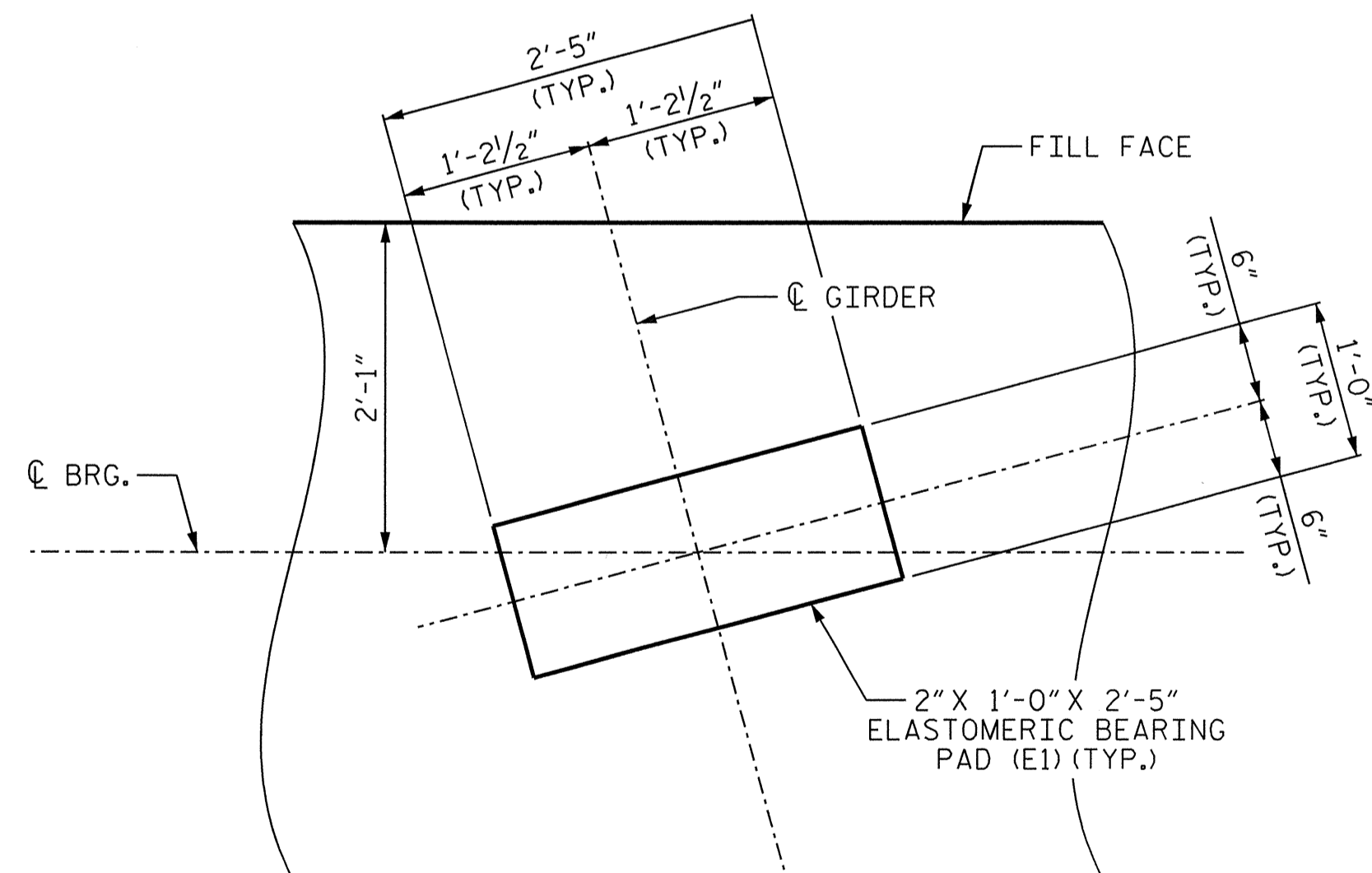


\* POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS

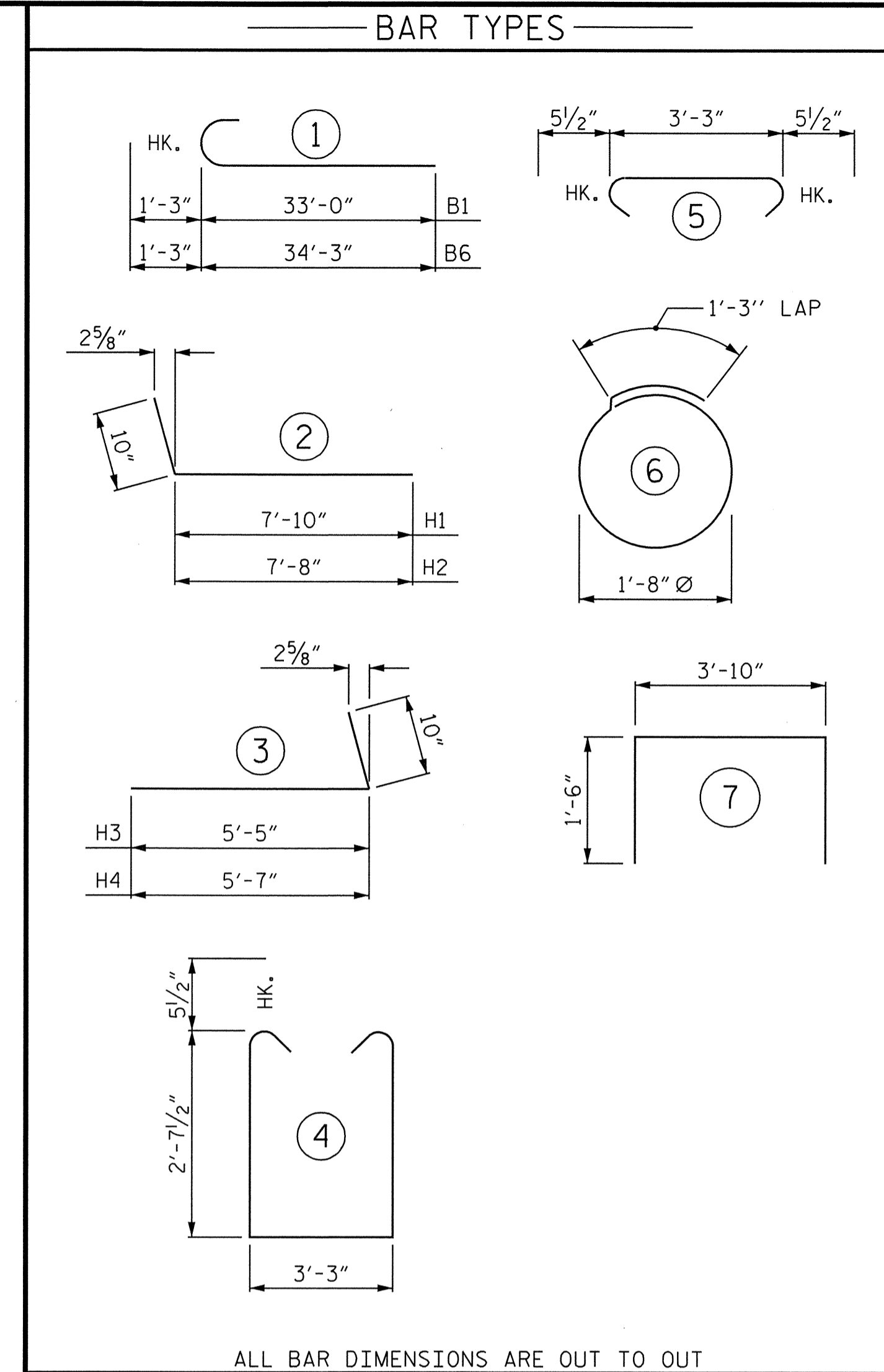


### SECTION A-A



### DETAIL "A"

(TYP. EA. GDR.)



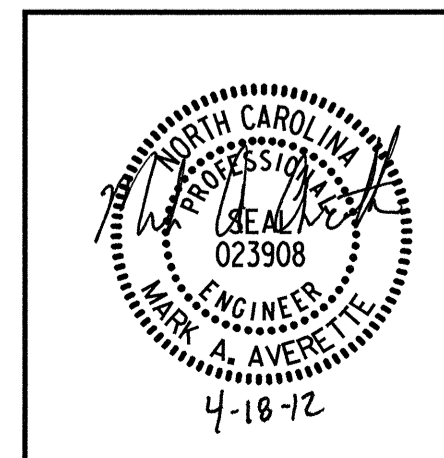
BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	34'-3"	1397
B2	4	5	STR	31'-6"	131
B3	12	4	STR	21'-7"	173
B4	15	4	STR	3'-10"	38
B5	6	4	STR	3'-4"	13
B6	12	9	1	35'-6"	1448
H1	11	5	2	8'-8"	99
H2	11	5	2	8'-6"	98
H3	12	5	3	6'-3"	78
H4	12	5	3	6'-5"	80
K1	14	4	STR	3'-5"	32
K2	16	4	STR	4'-1"	44
S1	186	5	4	9'-5"	1827
S2	186	5	5	4'-2"	808
S3	32	4	6	6'-6"	139
U1	4	4	7	6'-10"	18
V1	84	4	STR	5'-0"	281
V2	30	5	STR	9'-2"	287
V3	24	5	STR	9'-9"	244
REINFORCING STEEL				7235	LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (CAP, LOWER PART OF WINGS & COLLARS)				32.0	C.Y.
POUR #2 (UPPER PART OF WINGS)				4.8	C.Y.
TOTAL CLASS A CONCRETE				36.8	C.Y.
HP 12 X 53 STEEL PILES				No. = 8	240 LIN. FT.

PROJECT NO. B-4760  
 GUILFORD COUNTY  
 STATION: 23+52.74 -L-

SHEET 3 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2

PLANS PREPARED BY:

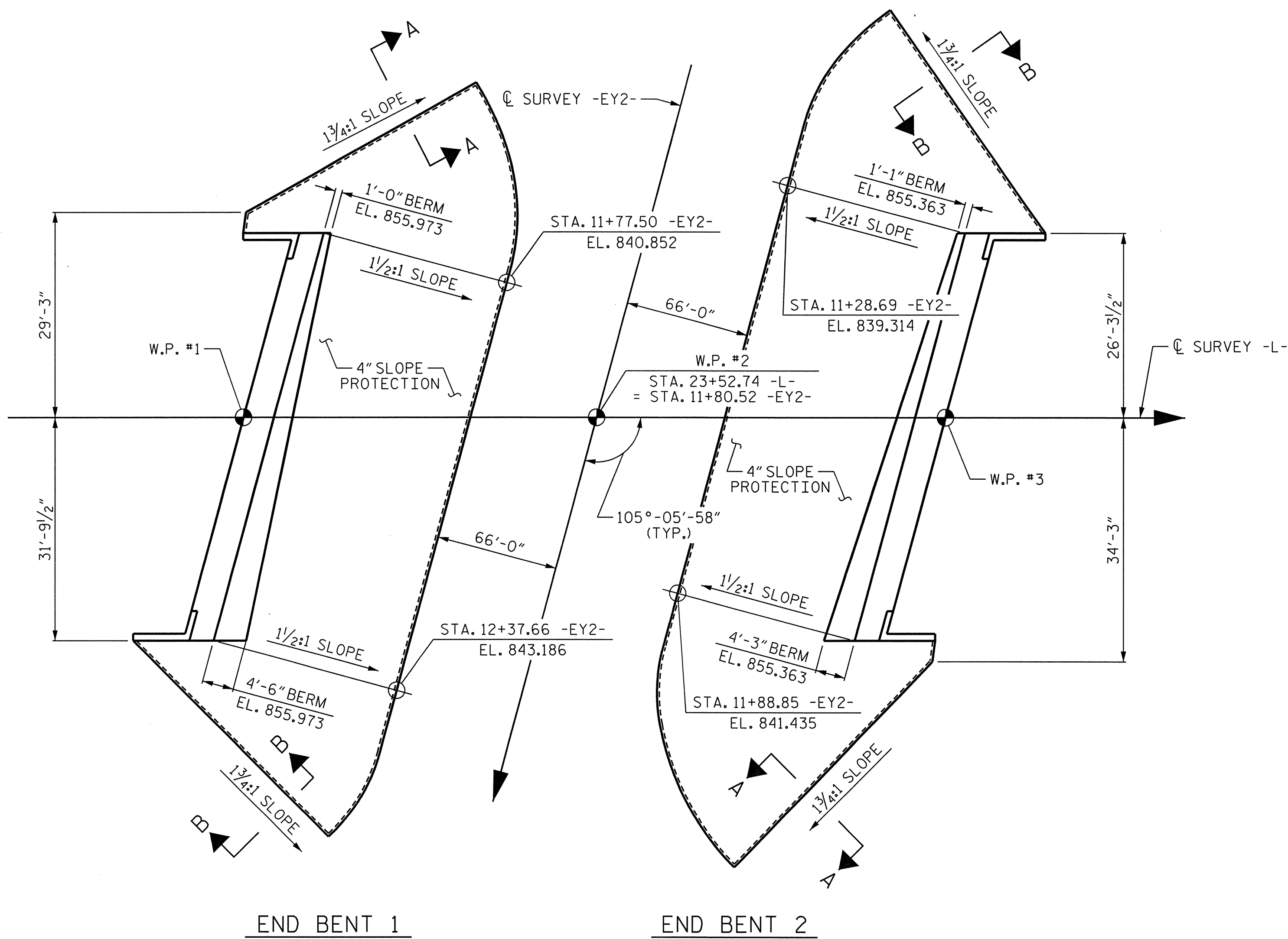
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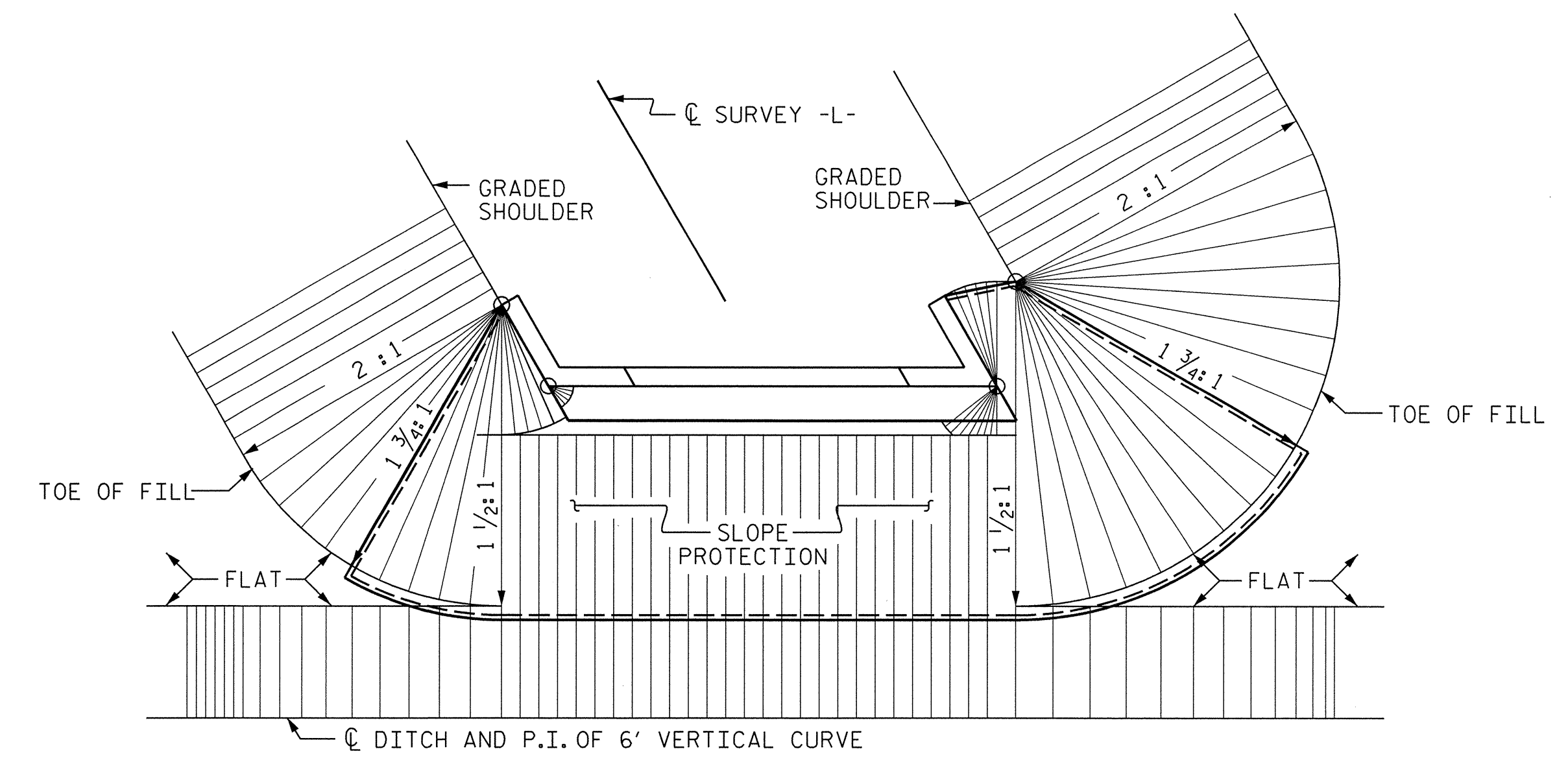
PLAN OF SLOPE PROTECTION

**GENERAL NOTES:**

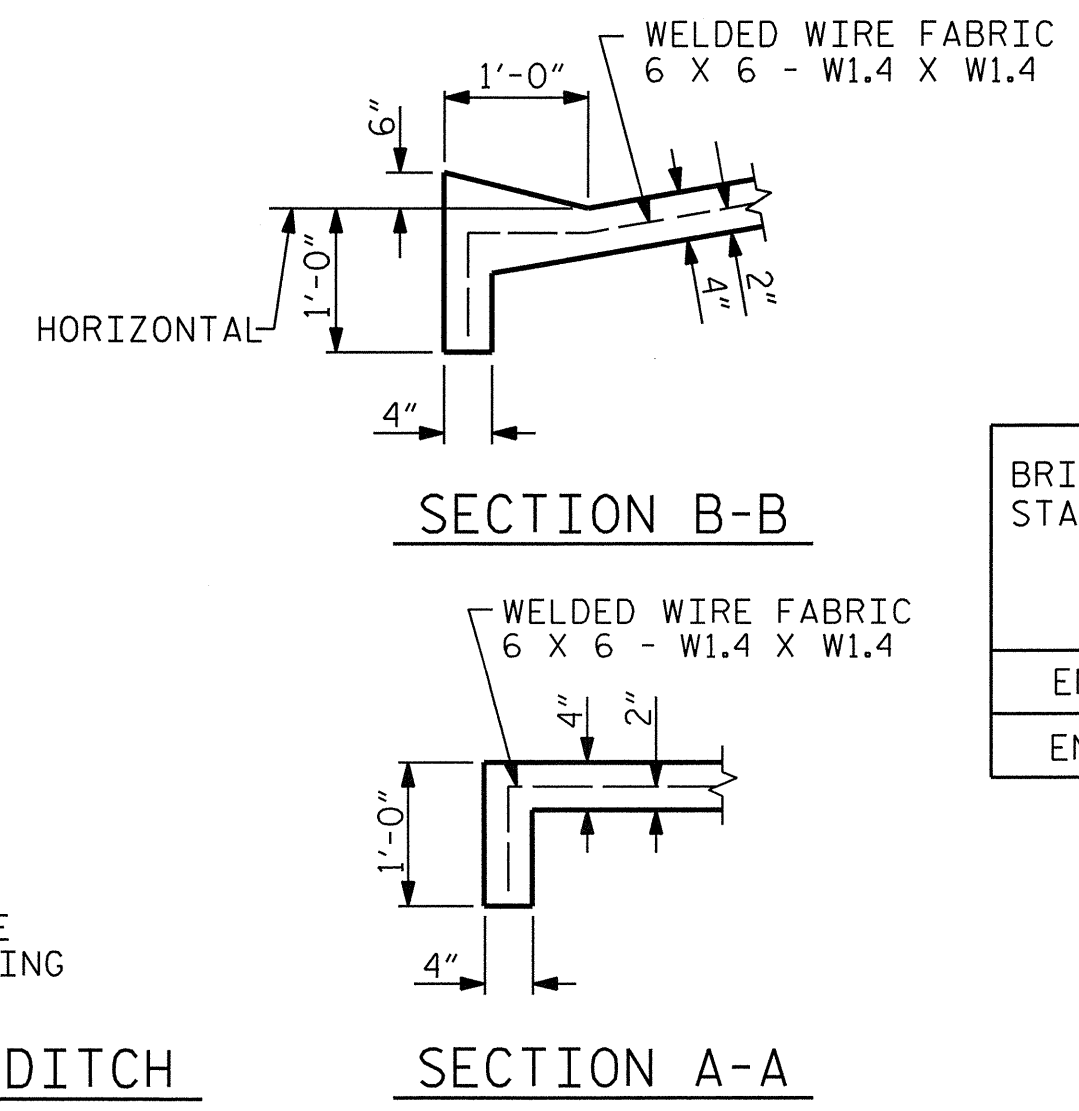
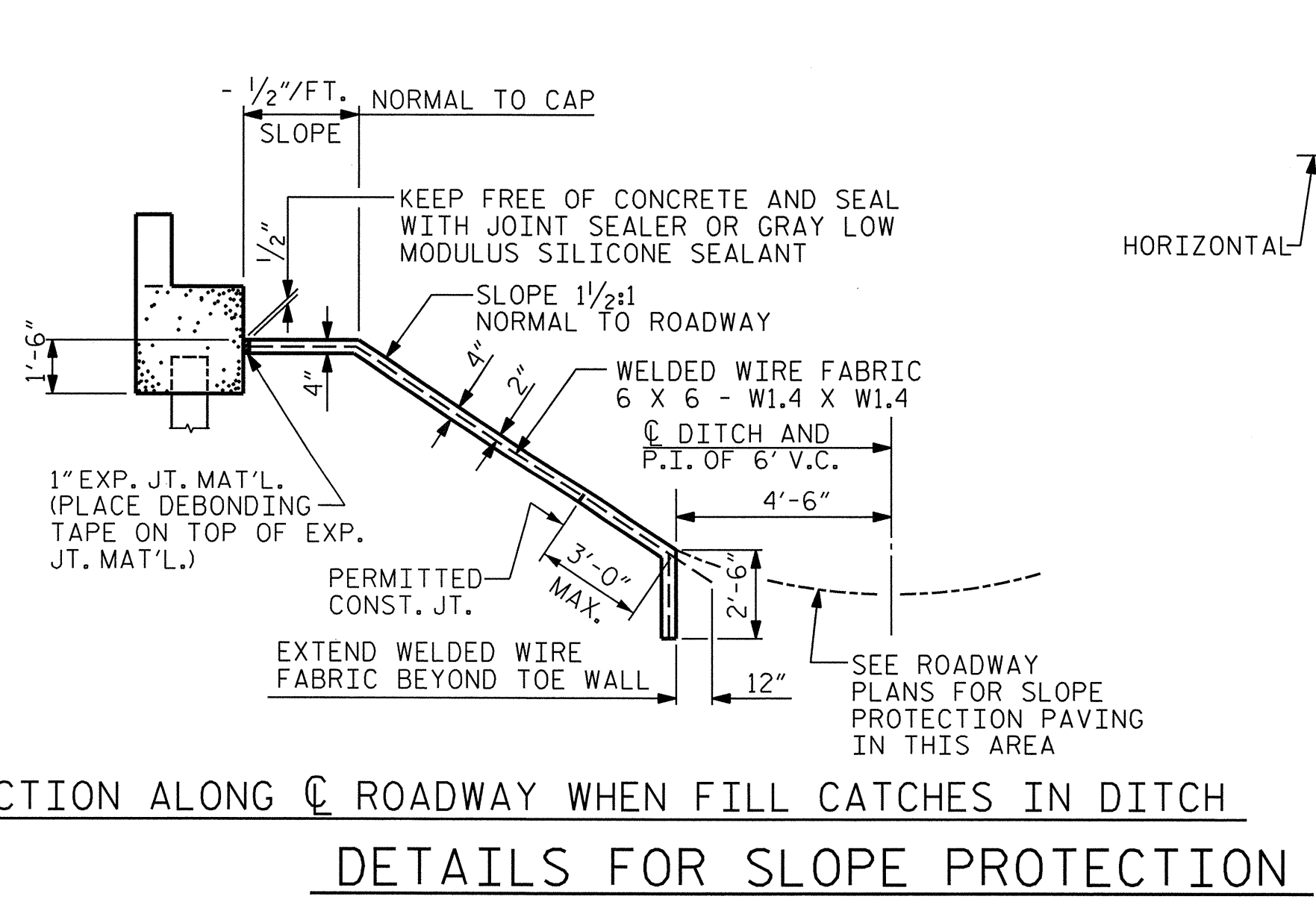
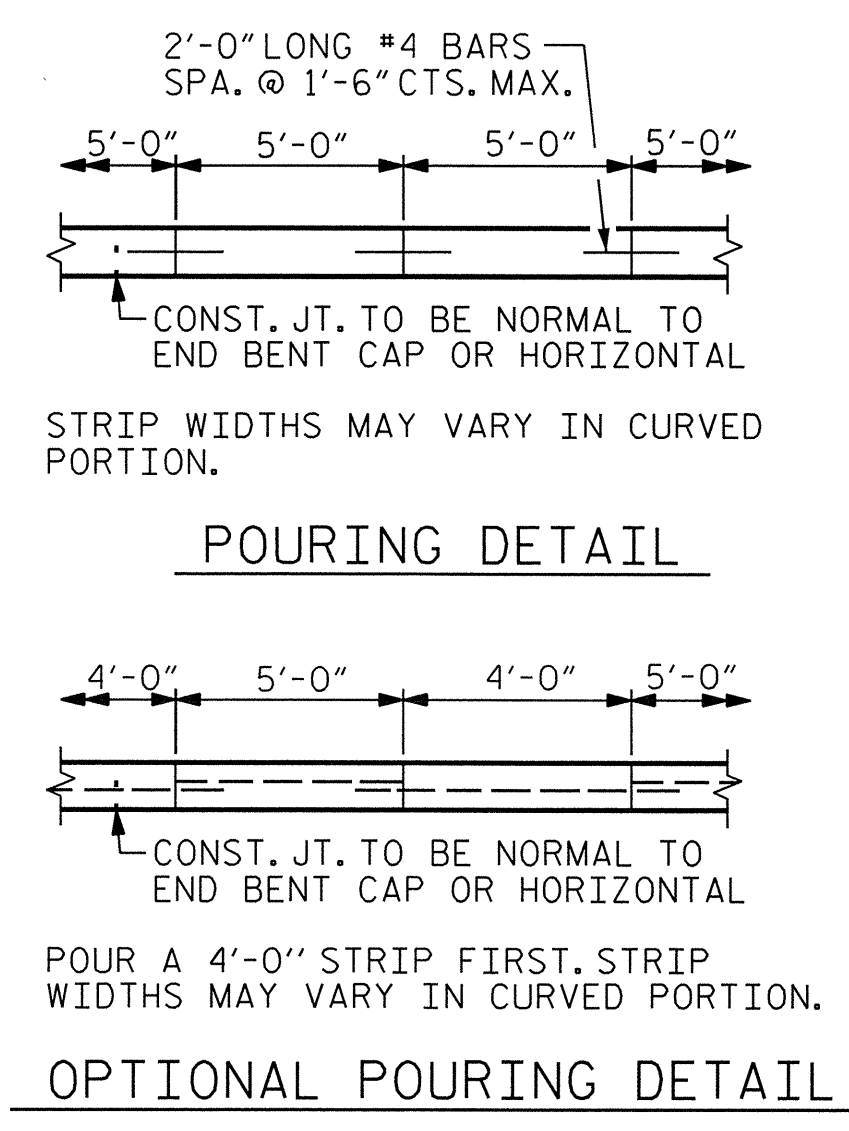
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

**SLOPE PROTECTION**

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



PLAN - END BENT WITH SWEEP BACK WINGS - SKEWED (1 1/2:1 SLOPE)



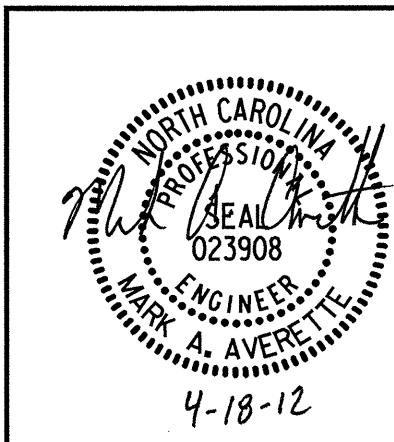
BRIDGE @ STA. 23+52.74 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	325	585
END BENT 2	345	620

\* QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. B-4760  
GUILFORD COUNTY  
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STATE OF NORTH CAROLINA  
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**SLOPE PROTECTION  
 DETAILS**

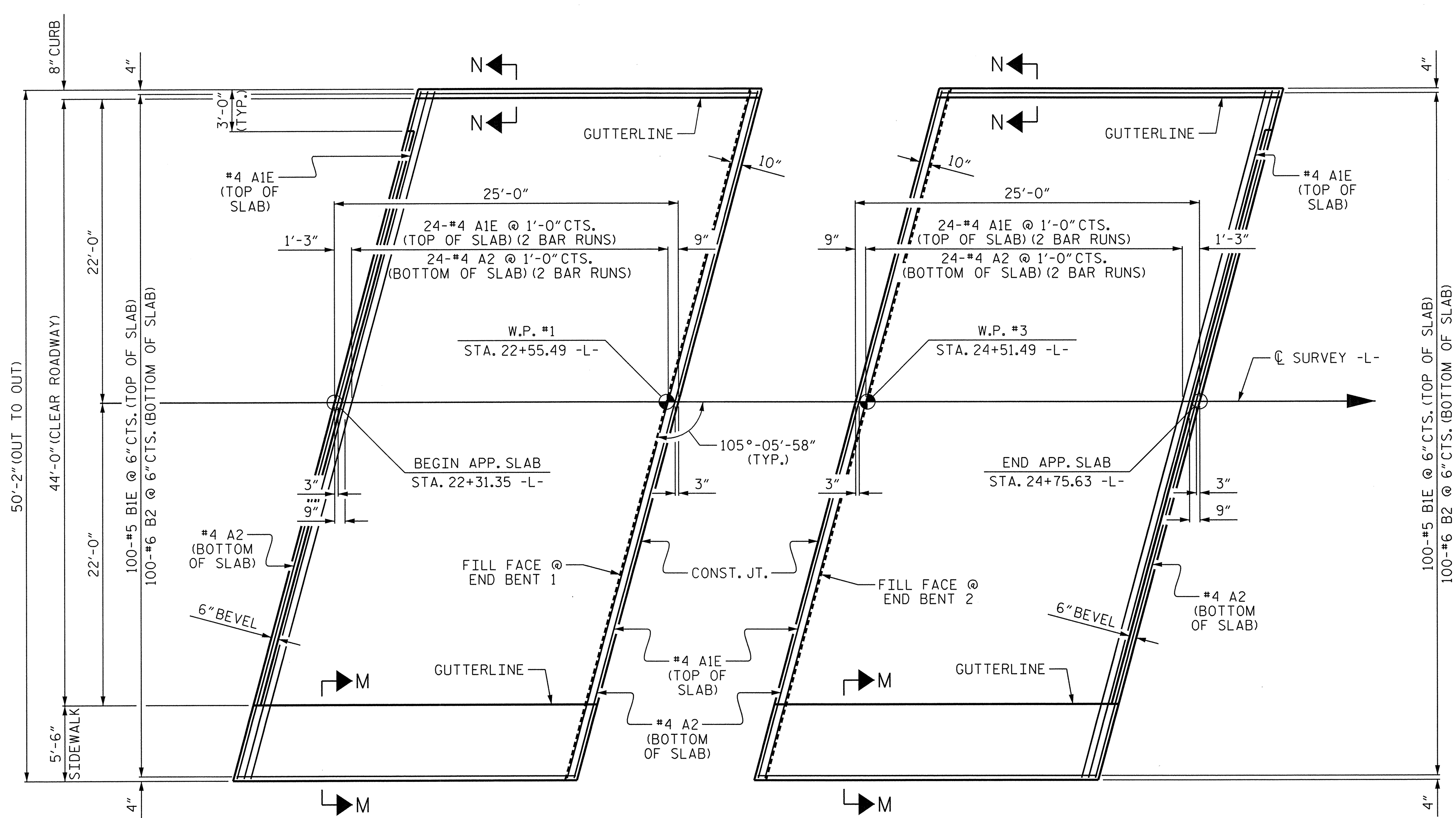
PLANS PREPARED BY:  
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1			3		5-35
2			4		37

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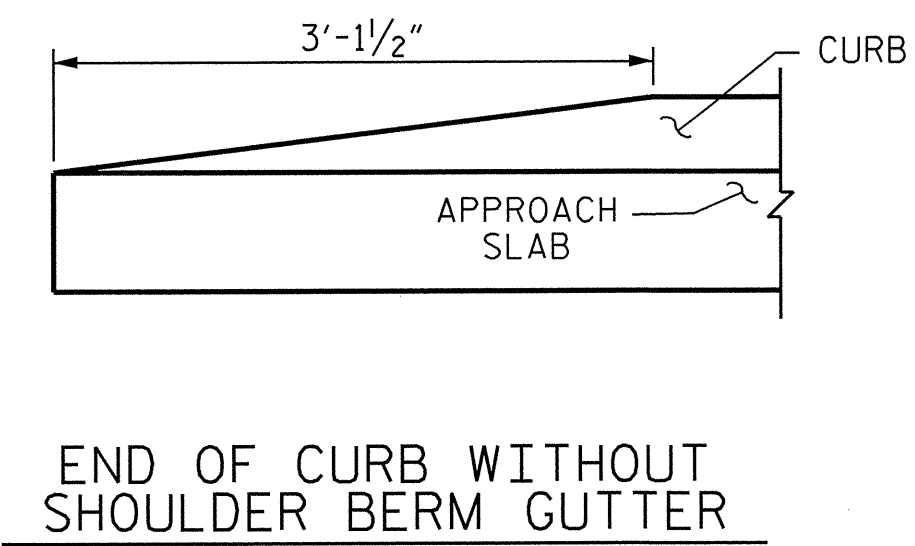
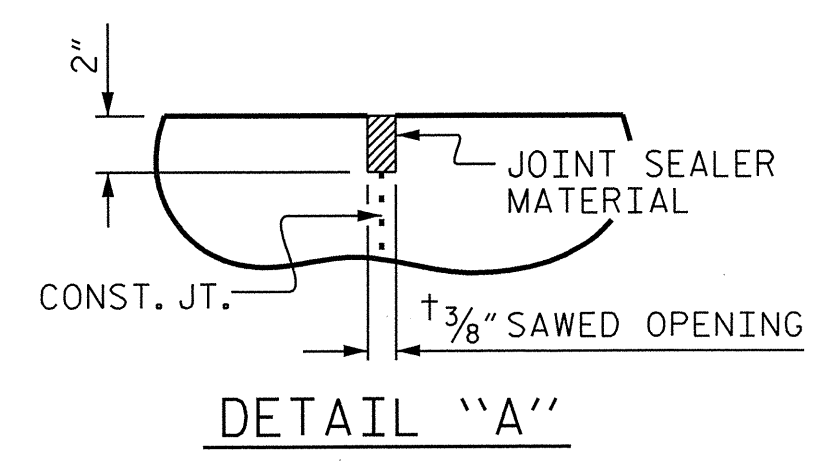
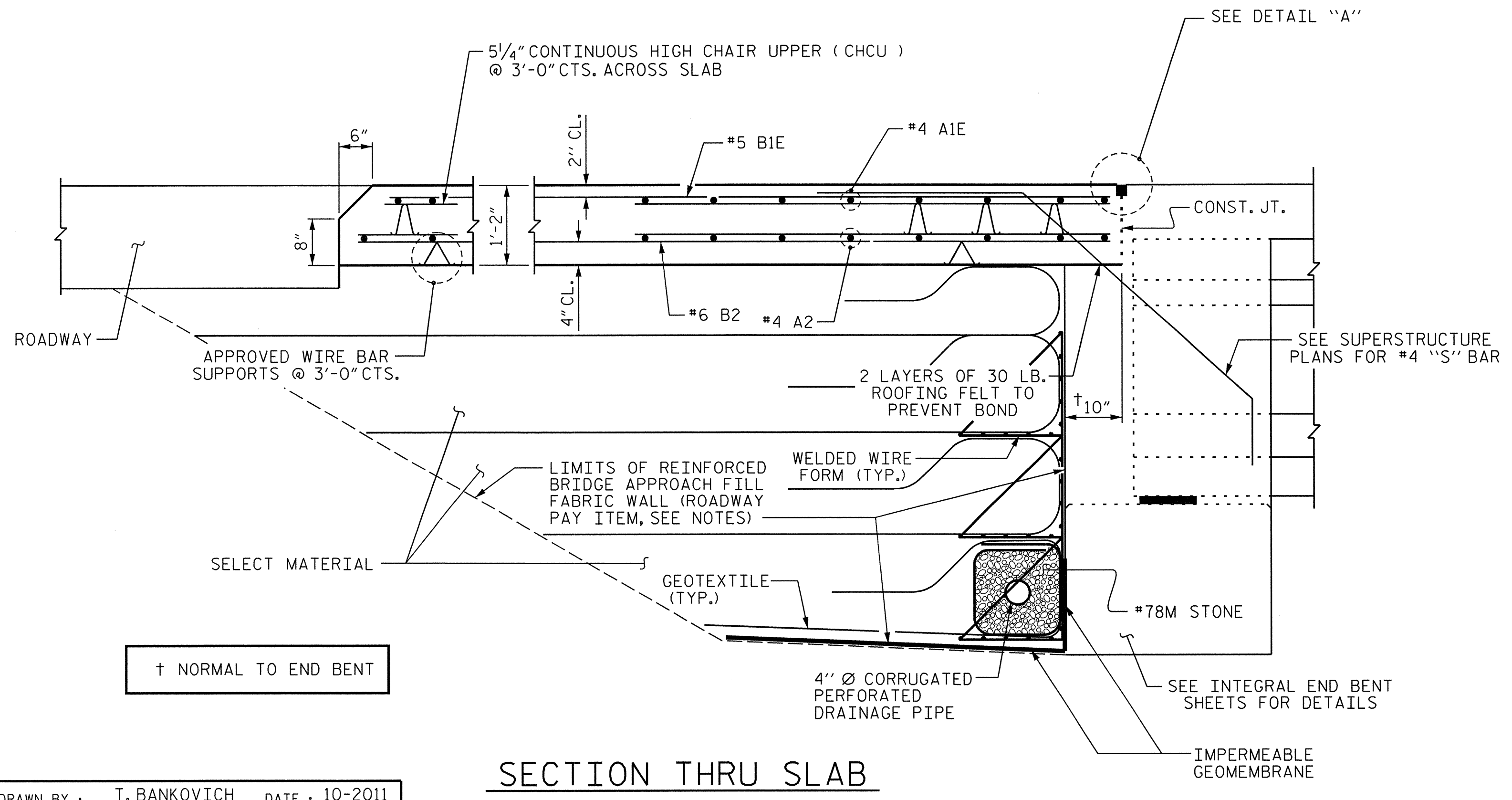
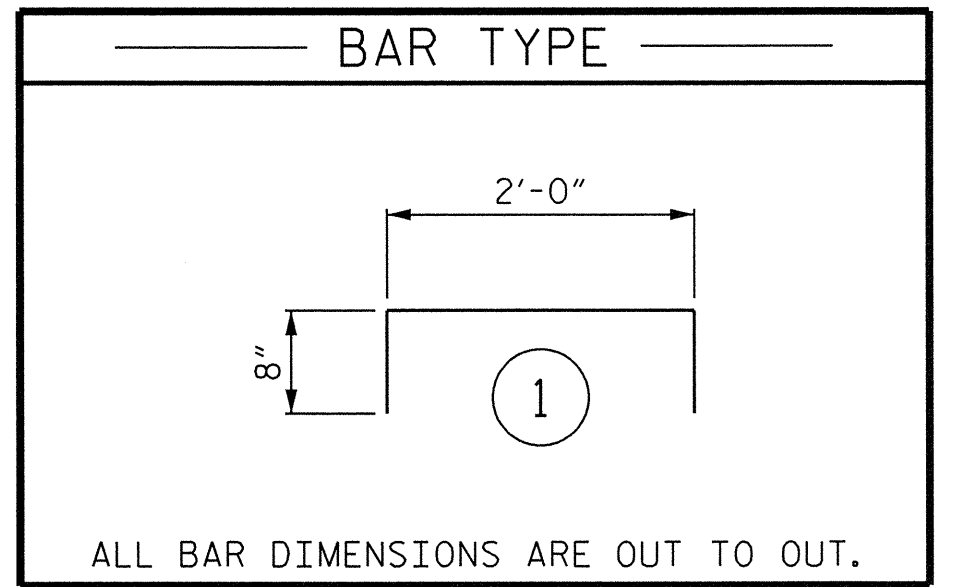


**PLAN @ END BENT 1      PLAN @ END BENT 2**  
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS  
 FOR SECTION M-M, SEE SHEET 2 OF 2

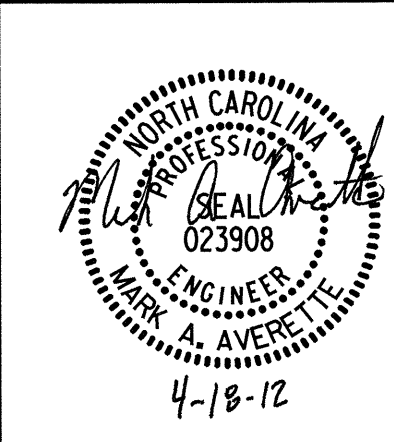
**NOTES:**  
 APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.  
 FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.  
 AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.  
 THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

BILL OF MATERIAL					
FOR APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1E	52	4	STR	26'-10"	932
A2	52	4	STR	26'-9"	929
B1E	100	5	STR	24'-2"	2521
B2	100	6	STR	24'-7"	3692
B3E	4	4	STR	24'-7"	66
G1E	25	4	STR	5'-2"	86
U1E	8	4	1	3'-4"	18
TOTAL REINFORCING STEEL					4621 LBS.
EPOXY COATED REINFORCING STEEL					3623 LBS.
CLASS A CONCRETE					
POUR 1 (SLAB)					54.1 CU. YDS.
POUR 2 (SIDEWALK)					3.0 CU. YDS.
TOTAL					57.1 CU. YDS.

"E" INDICATES EPOXY COATED REINFORCING STEEL



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PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 23+52.74 -L-  
 SHEET 1 OF 2

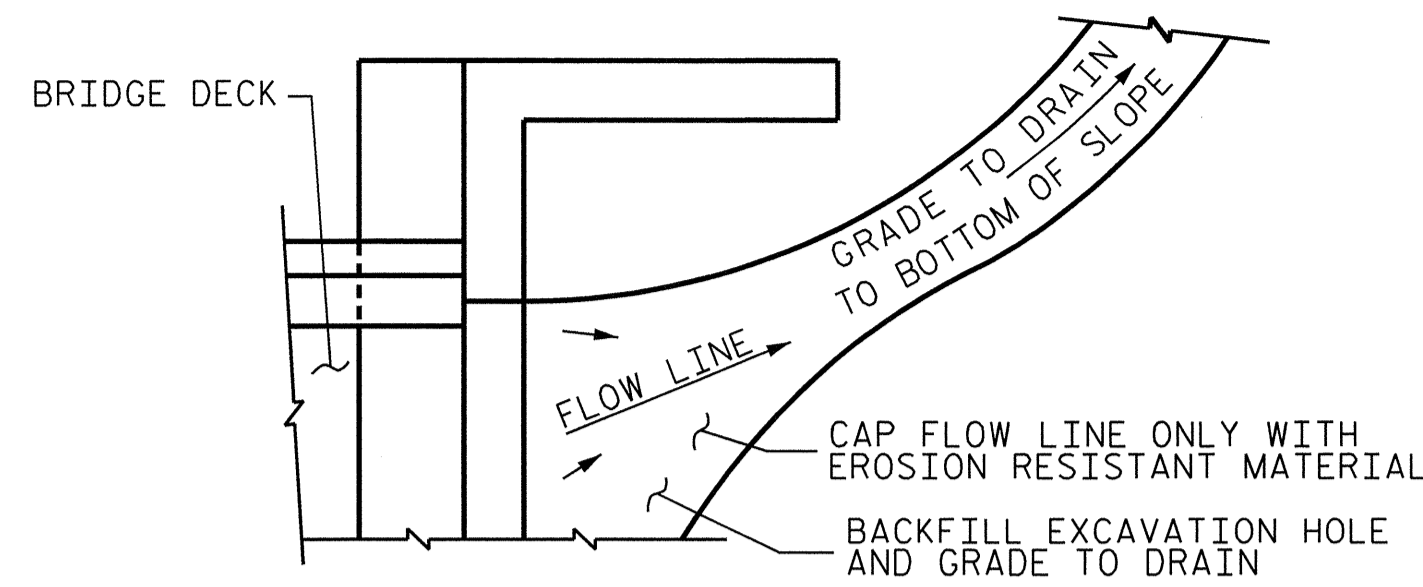
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT**

REVISIONS				SHEET NO.	
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1			3		
2			4		

TOTAL SHEETS: 37

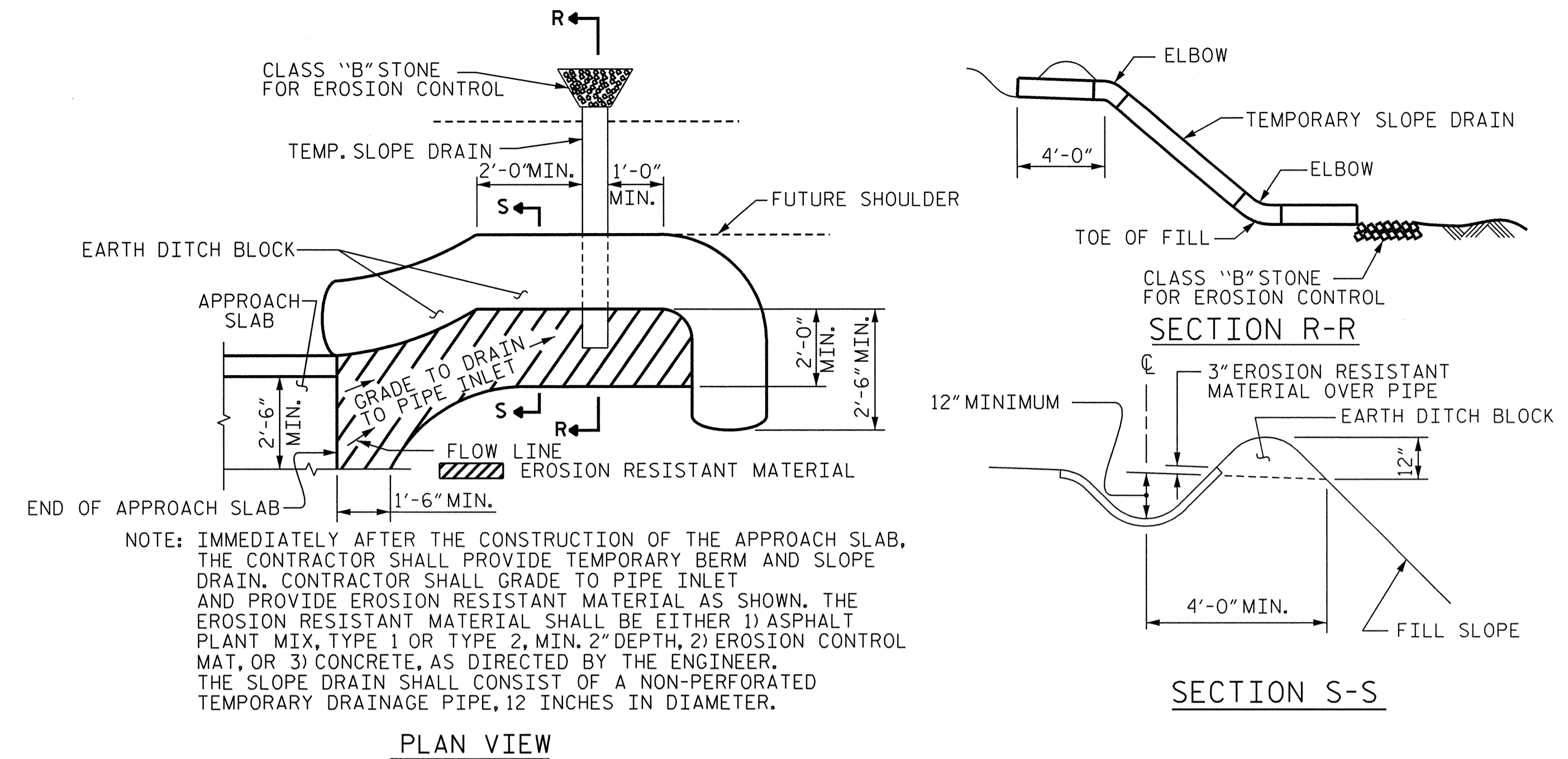
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**SECTION THRU SLAB**



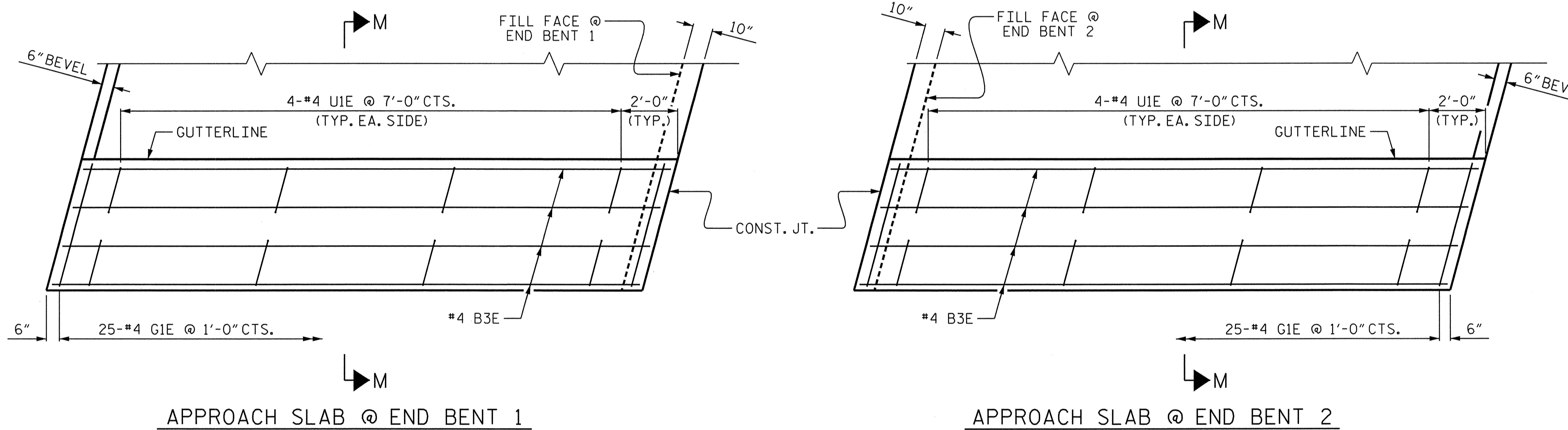
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

**TEMPORARY DRAINAGE DETAIL**

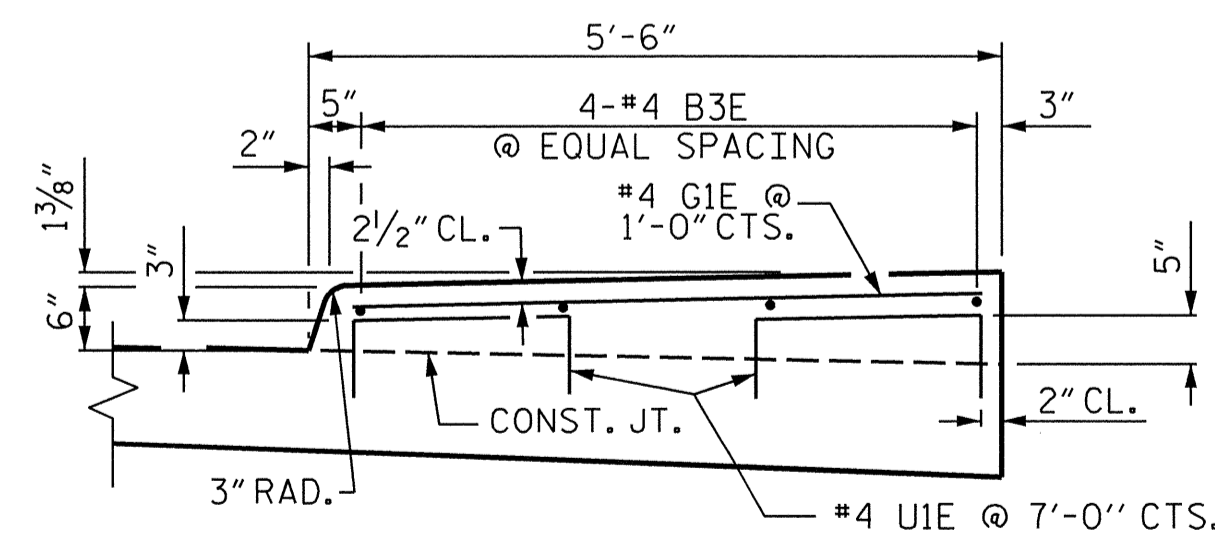


**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



**PLAN OF SIDEWALK**



**SECTION THRU SIDEWALK**

**NOTES**

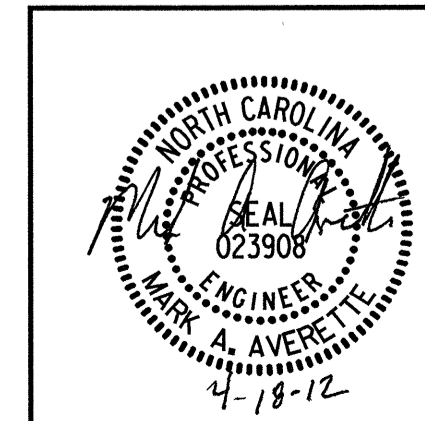
ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FT. IN LENGTH.

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SHEET 2 OF 2

STATE OF NORTH CAROLINA  
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 RALEIGH

**BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT**

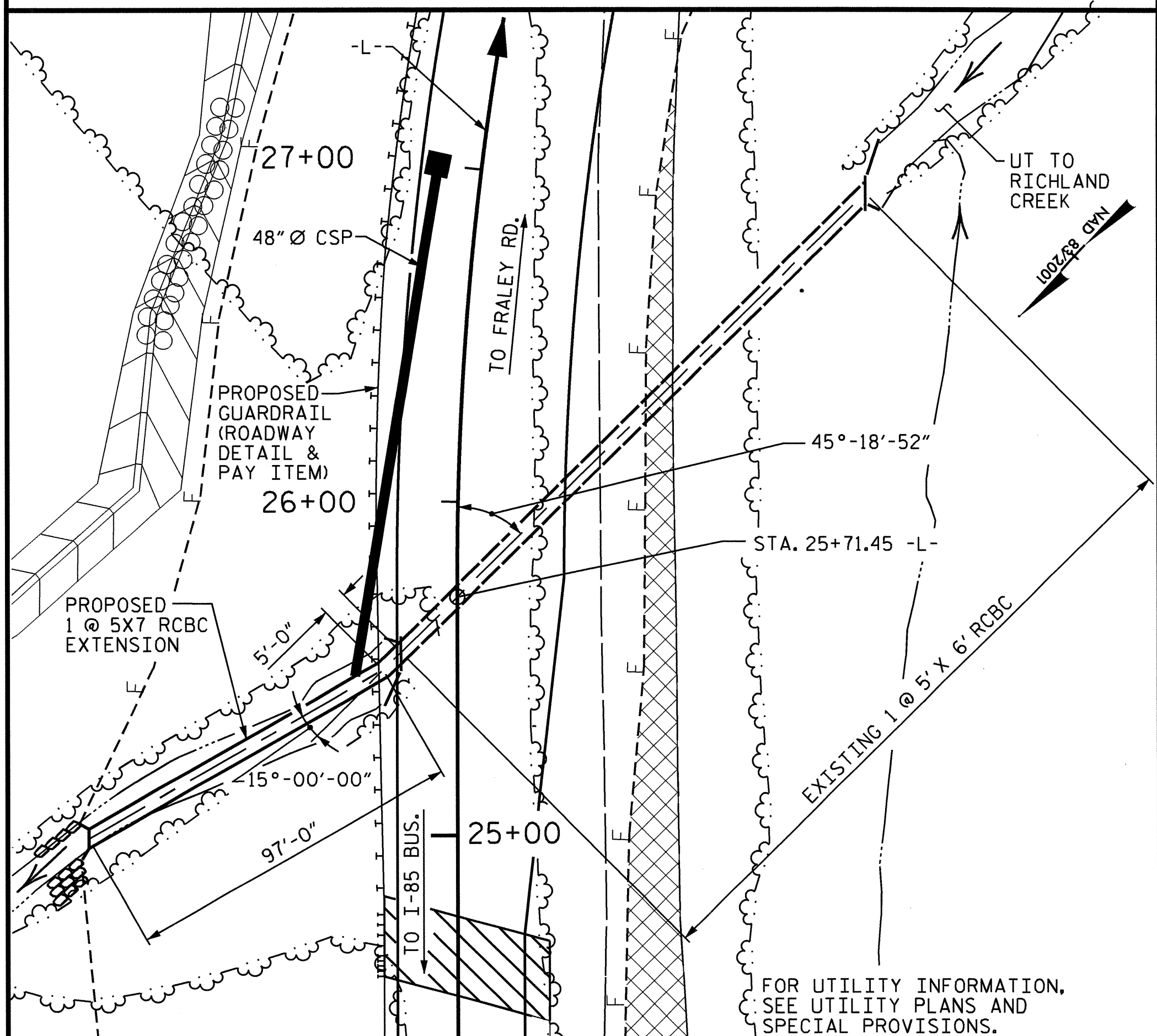
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2			4			37

BM #2: CHISELED SQUARE IN CONCRETE, IN SOUTHERNMOST TIP OF PARKING LOT OF EAGLE SCREENPRINTING AND EMBROIDERY, -L- STA. 19+90.40 (404.43' RT), ELEV. 855.68'.

NOTES

ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.  
 DESIGN FILL-----37.20'  
 FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.  
 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.  
 CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:  
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.  
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.  
 THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.  
 DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.  
 TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.  
 AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.  
 DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.  
 FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.  
 A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.  
 NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.  
 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.  
 IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.  
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.  
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.  
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.  
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.  
 THE 48"Ø CSP THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT OR CUT AS NECESSARY TO CLEAR THE PIPE.

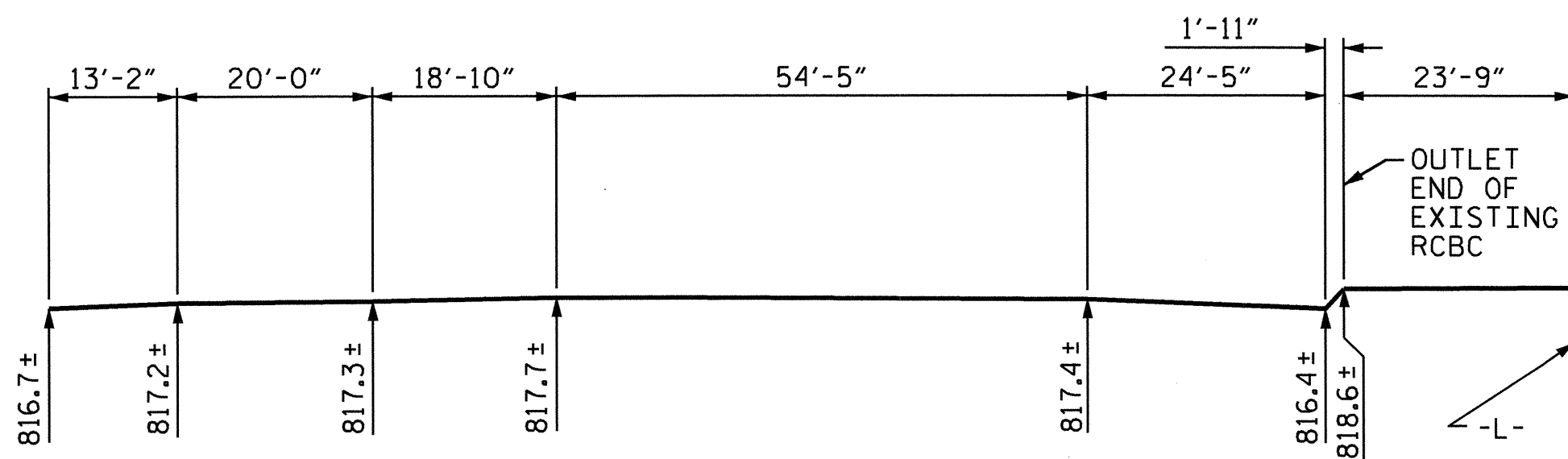
TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE		
BARREL	84.5	C.Y.
WINGS ETC.	11.2	C.Y.
TOTAL	95.7	C.Y.
REINFORCING STEEL		
BARREL	9,446	LBS.
WINGS ETC.	660	LBS.
TOTAL	10,106	LBS.
CULVERT EXCAVATION		LUMP SUM
FOUNDATION CONDITIONING MATERIAL		76 TONS



LOCATION SKETCH

GRADE DATA	
GRADE POINT ELEVATION @ STA. 25+71.45 -L-	= 860.89'
ROADWAY SLOPES	= 2 : 1
HYDRAULIC DATA	
DESIGN DISCHARGE	= 360 c.f.s.
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 830.9'
DRAINAGE AREA	= 0.239 SQ. MI.
BASE DISCHARGE (Q100)	= 420 c.f.s.
BASE HIGH WATER ELEVATION	= 832.7'
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 650 c.f.s.
FREQUENCY OF OVERTOPPING FLOOD	= 500 YR. +/-
OVERTOPPING FLOOD ELEVATION	= 842.5'

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.



PROFILE ALONG CULVERT

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 25+71.45 -L-

SHEET 1 OF 6

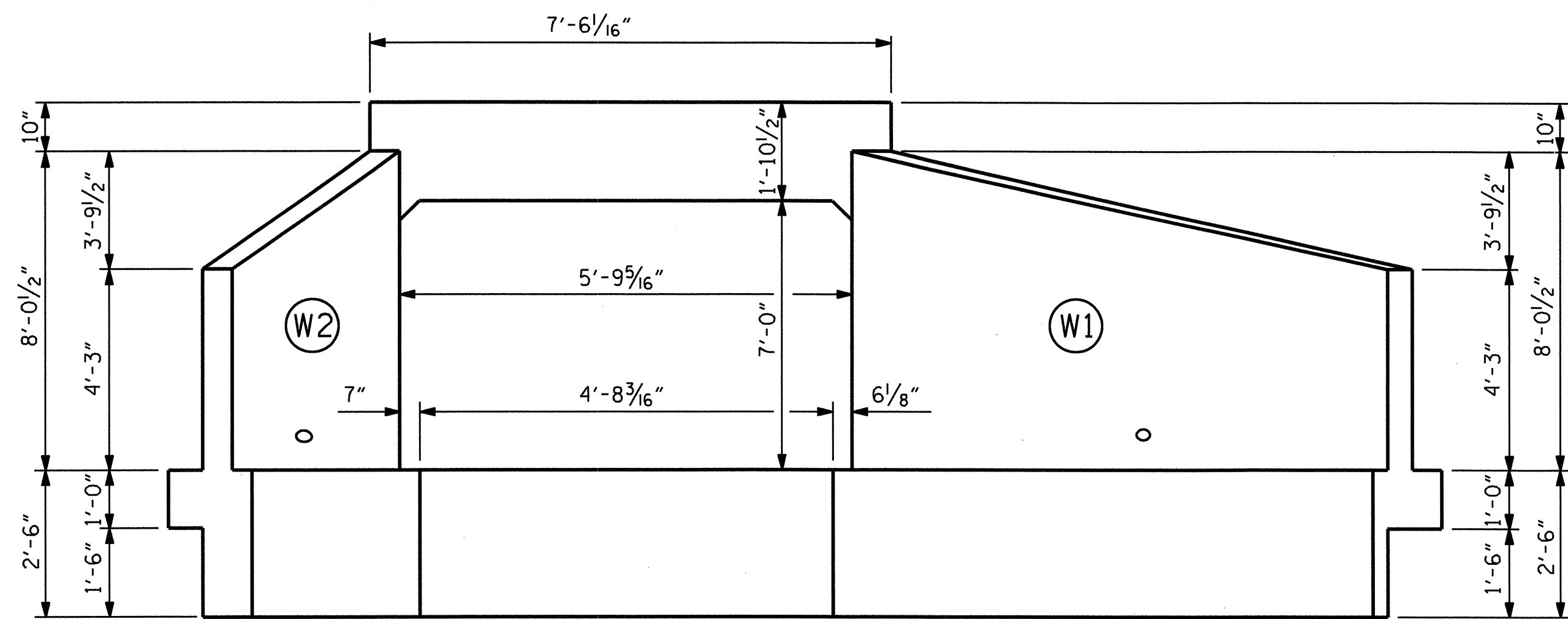
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SINGLE 5 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 EXTENSION



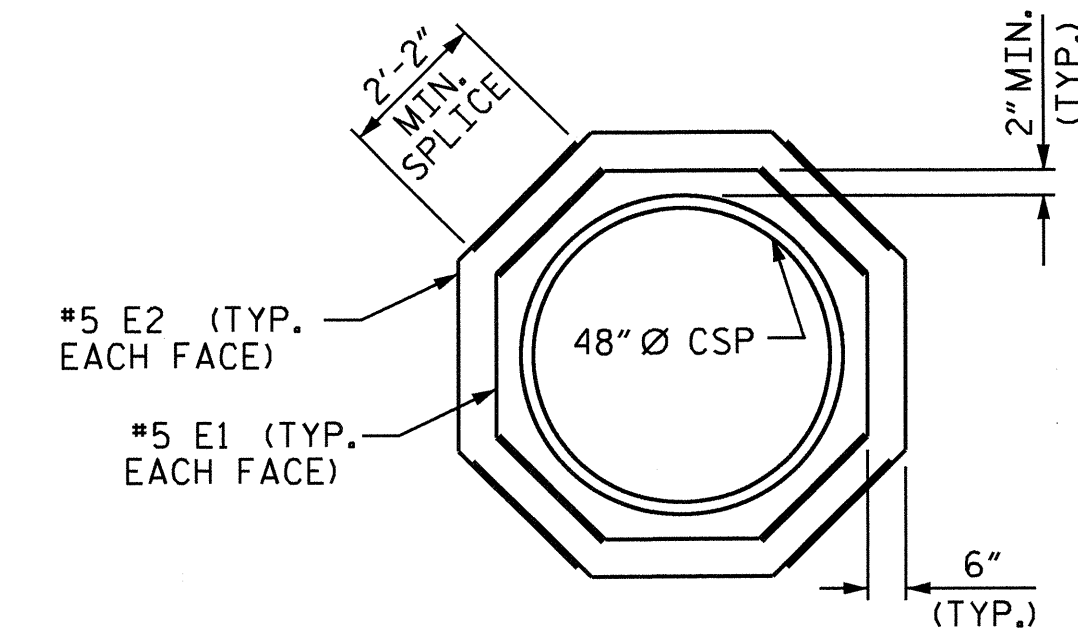
ASSEMBLED BY : PEGGY PARISI	DATE : 2-1-12	SPECIAL
CHECKED BY : L. AVERETTE	DATE : 4-02-12	
DRAWN BY : B.M. MEYERS	DATE : AUG. 1989	STANDARD
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989	

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

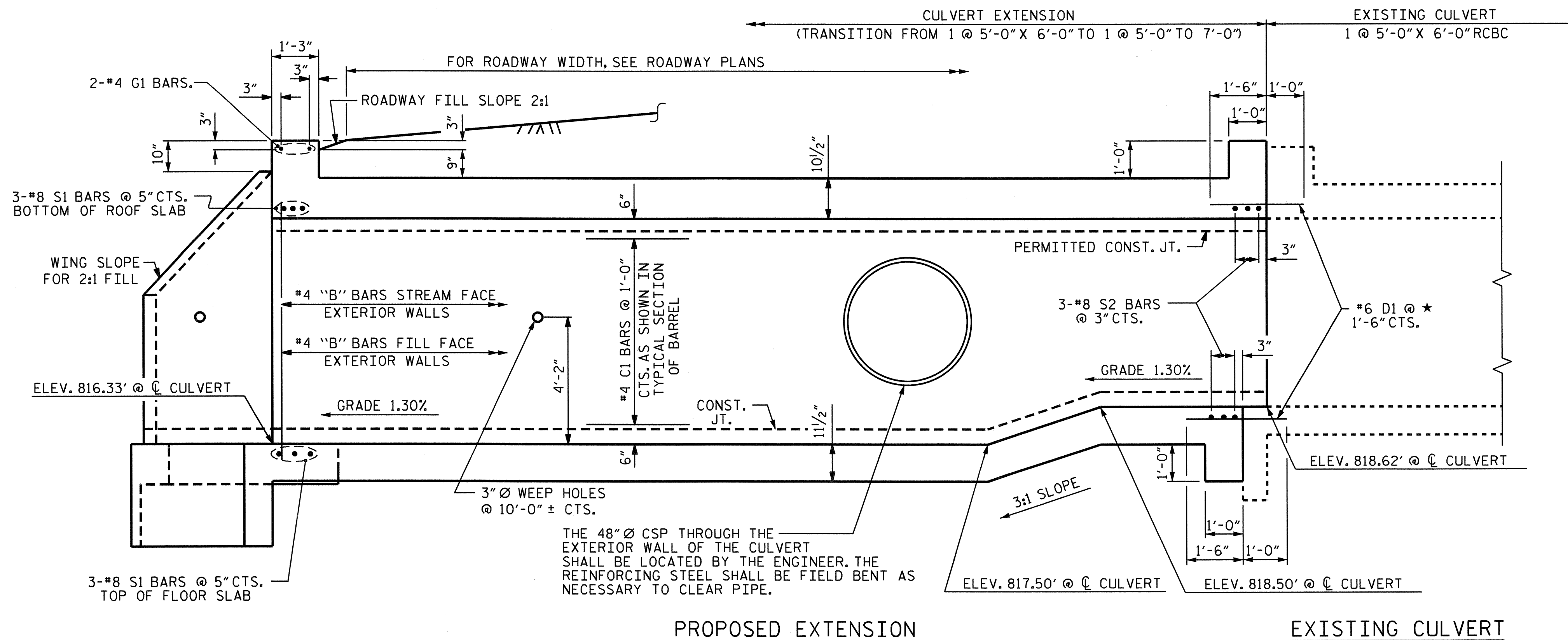
REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P. ADDED 8-22-89



OUTLET END ELEVATION NORMAL TO SKEW



DETAIL OF REINFORCING AROUND 48" Ø CSP



CULVERT SECTION NORMAL TO ROADWAY

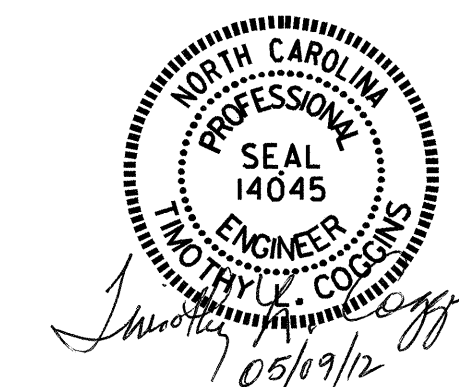
\* #6 D1 DOWELS SHALL BE PLACED @ 1'-6" CTS. IN THE ROOF SLAB, FLOOR SLAB, AND EXTERIOR WALLS TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT.

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 25+71.45 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SINGLE 5 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 EXTENSION



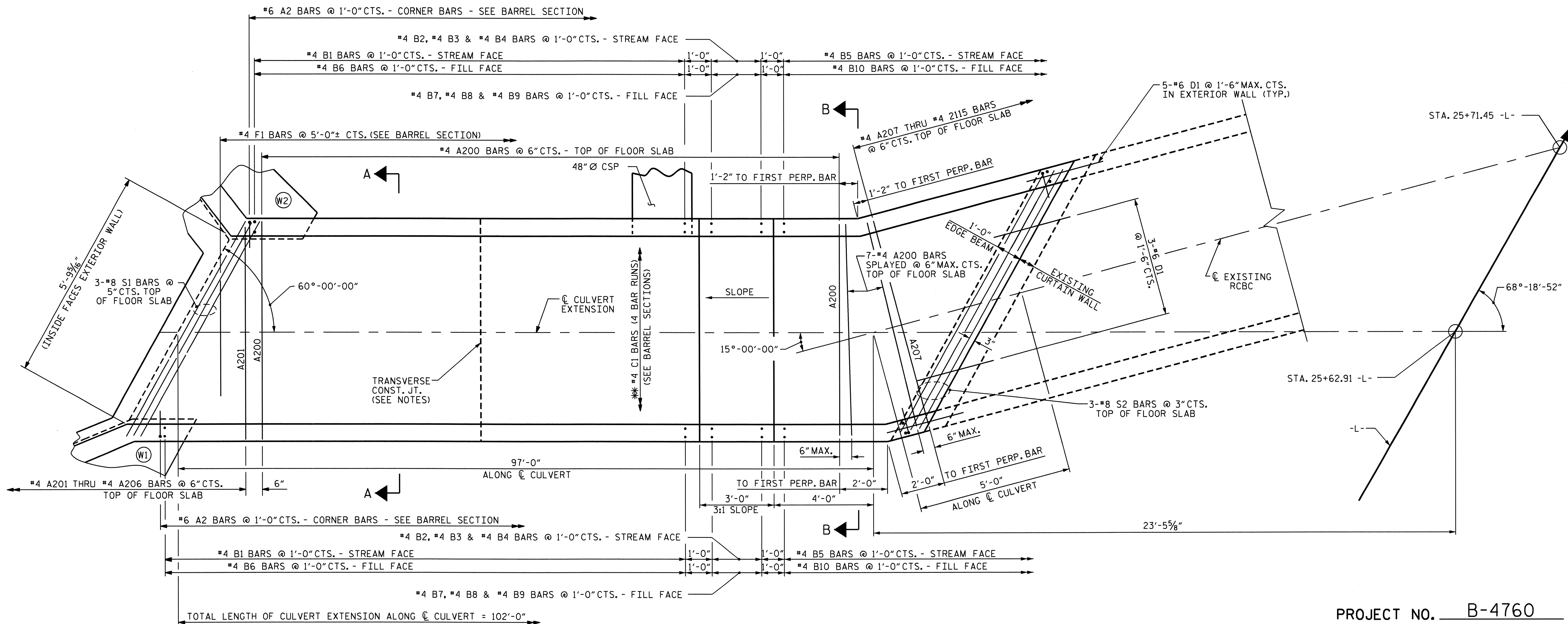
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			6

STR. #2

REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.  
 REVISED 8-22-89 BY A.R.B. CHECKED BY C.R.K.  
 REDRAWN 8-22-89  
 REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.

ASSEMBLED BY: PEGGY PARISI DATE: 2-2-12  
 CHECKED BY: T. AVERETTE DATE: 4-02-12





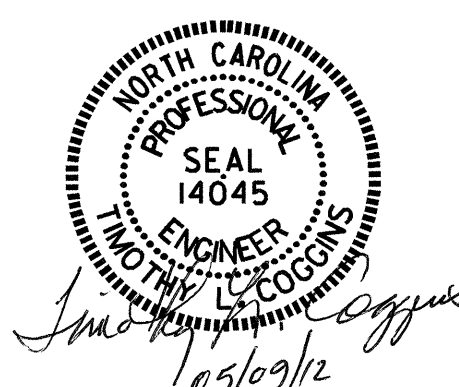
**PLAN - FLOOR SLAB**

\* FIELD BEND C1 BARS AS NECESSARY DUE TO BENDS AND SLOPING AREA OF CULVERT.  
 FOR BARREL SECTIONS A-A AND B-B, SEE SHEET 5 OF 6.

PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 25+71.45 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SINGLE 5 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 EXTENSION

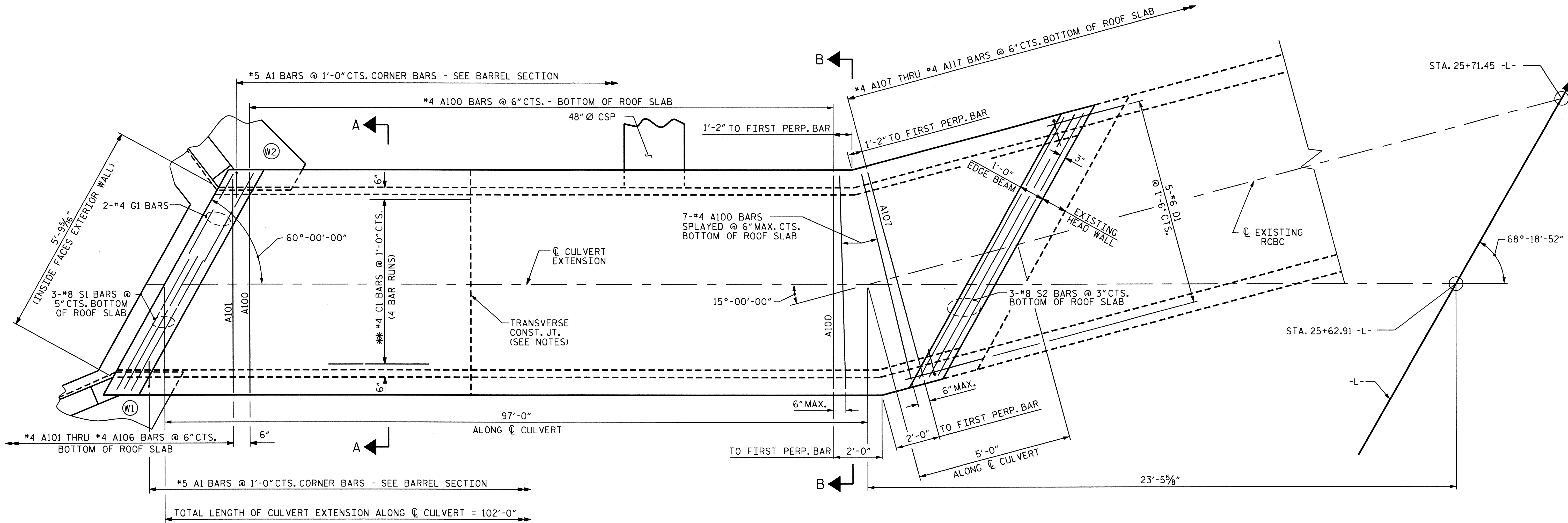


ASSEMBLED BY: PEGGY PARISI DATE: 2-2-12  
 CHECKED BY: T. AVERETTE DATE: 4-02-12

10-APR-2012 08:20  
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 rcoggin

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

STR. #2



**PLAN - ROOF SLAB**

\*\* FIELD BEND C1 BARS AS NECESSARY DUE TO BENDS AND SLOPING AREA OF CULVERT.  
 FOR BARREL SECTIONS A-A AND B-B, SEE SHEET 5 OF 6.

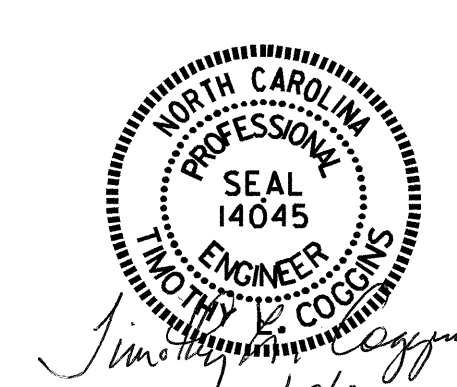
PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 25+71.45 -L-

SHEET 4 OF 6

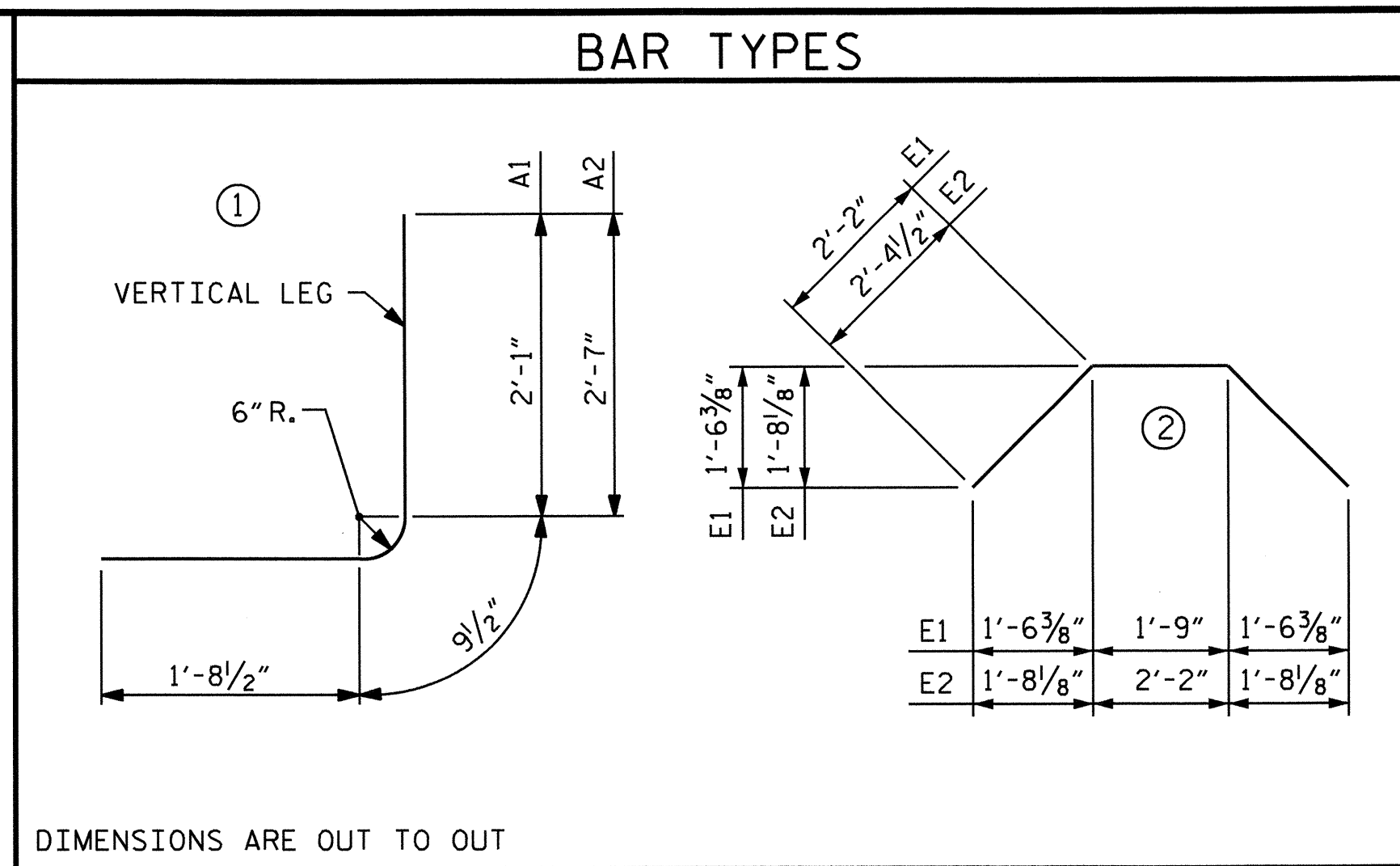
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SINGLE 5 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 EXTENSION**

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



ASSEMBLED BY: PEGGY PARISI DATE: 2-2-12  
 CHECKED BY: T. AVERETTE DATE: 4-02-12

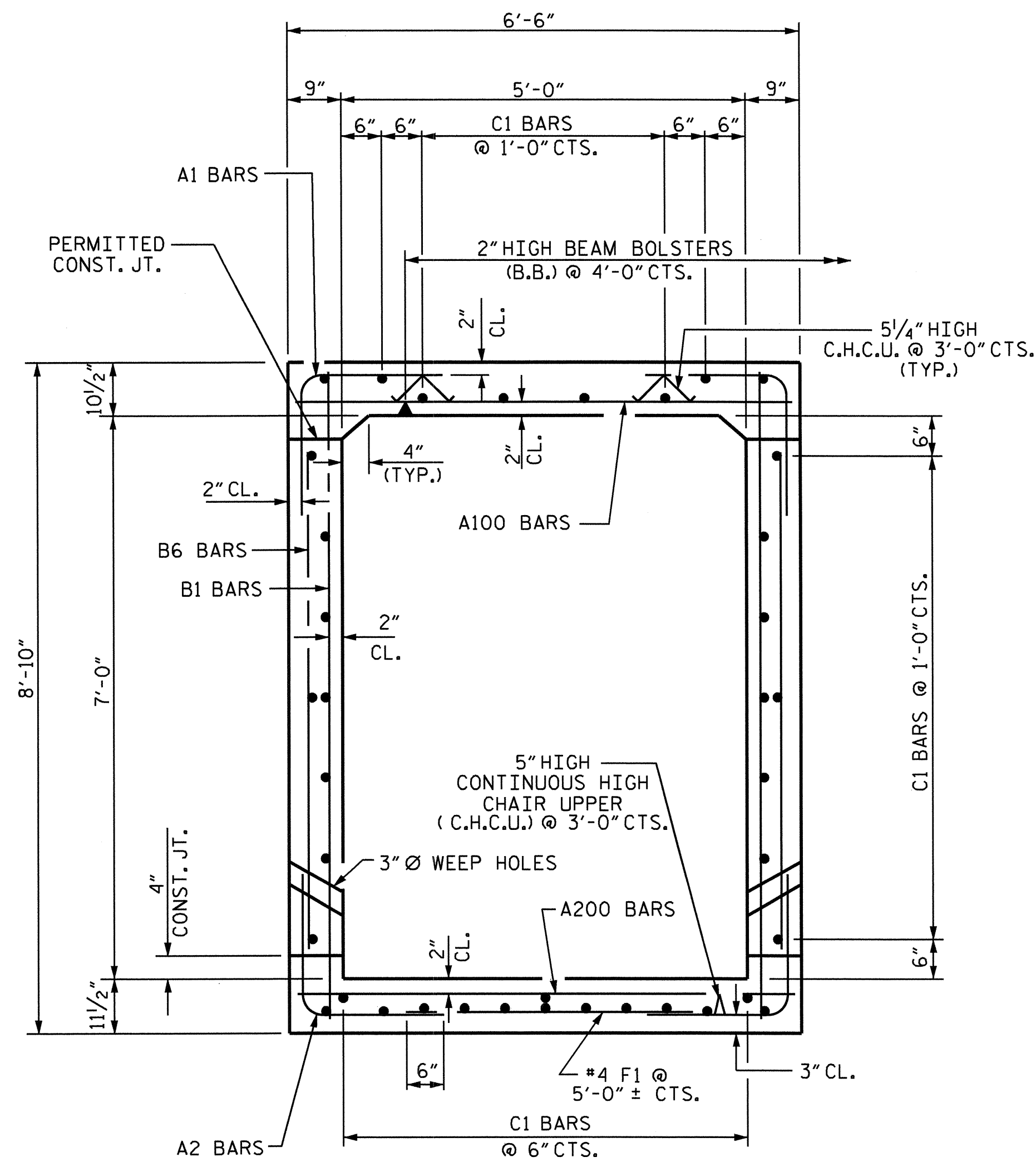


### SPLICE CHART

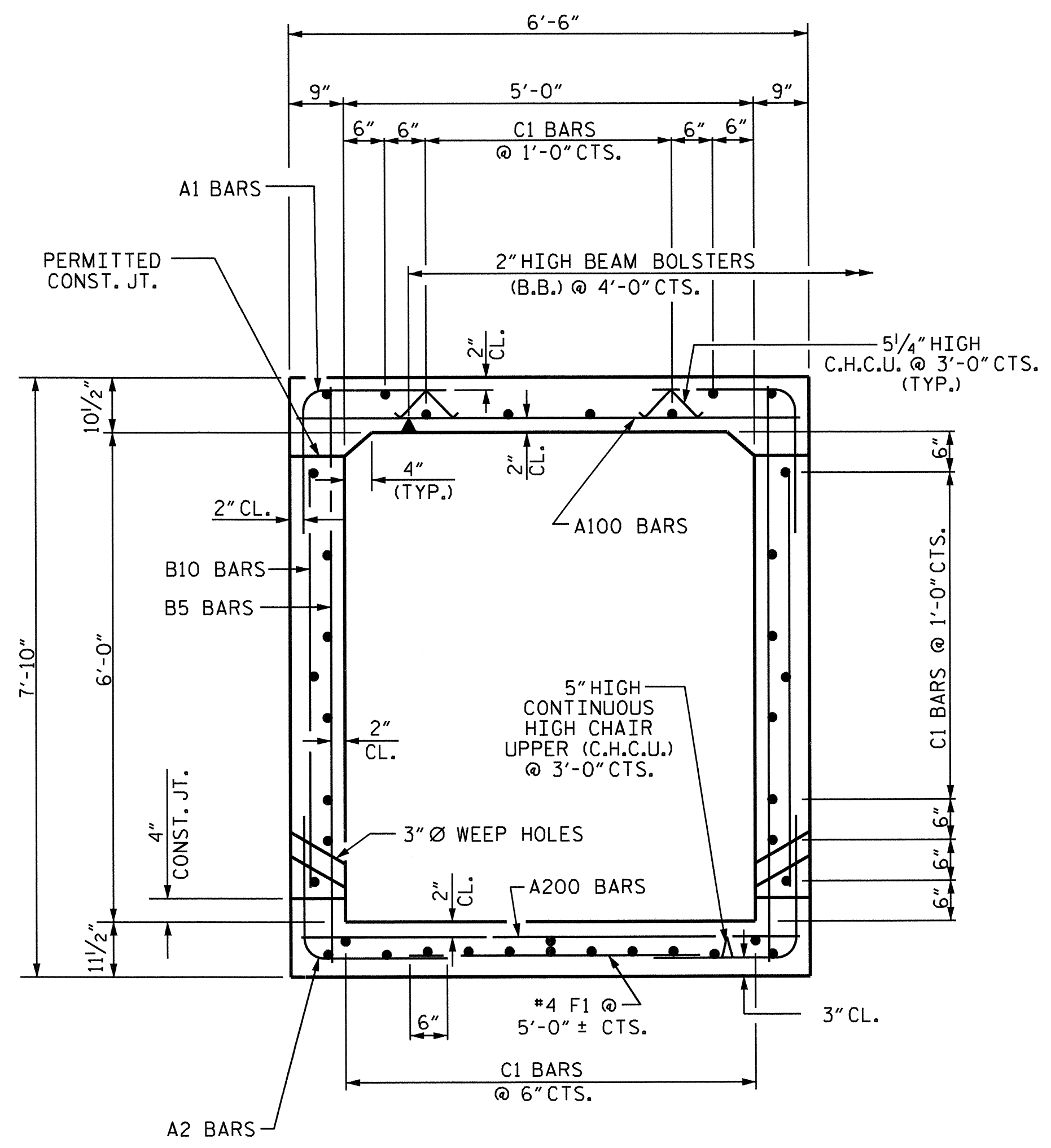
BAR	SIZE	SPLICE LENGTH
B1	4	1'-9"
B5	4	1'-9"
C1	4	1'-11"

BILL OF MATERIAL						BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	206	#5	1	4'-7"	985	B1	181	#4	STR	8'-4"	1008
A2	206	#6	1	5'-1"	1573	B2	2	#4	STR	8'-2"	11
A100	195	#4	STR	6'-2"	803	B3	2	#4	STR	7'-10"	10
A101	1	#4	STR	5'-6"	4	B4	2	#4	STR	7'-6"	10
A102	1	#4	STR	4'-8"	3	B5	19	#4	STR	7'-4"	93
A103	1	#4	STR	3'-10"	3	B6	181	#4	STR	6'-4"	766
A104	1	#4	STR	2'-11"	2	B7	2	#4	STR	6'-2"	8
A105	1	#4	STR	2'-1"	1	B8	2	#4	STR	5'-10"	8
A106	1	#4	STR	1'-2"	1	B9	2	#4	STR	5'-6"	7
A107	1	#4	STR	6'-2"	4	B10	19	#4	STR	5'-4"	68
A108	1	#4	STR	5'-10"	4						
A109	1	#4	STR	5'-4"	4	C1	152	#4	STR	27'-0"	2741
A110	1	#4	STR	4'-10"	3	D1	18	#6	STR	2'-6"	68
A111	1	#4	STR	4'-3"	3						
A112	1	#4	STR	3'-9"	3	E1	8	#5	2	6'-1"	51
A113	1	#4	STR	3'-3"	2	E2	8	#5	2	6'-11"	58
A114	1	#4	STR	2'-9"	2						
A115	1	#4	STR	2'-3"	2	F1	20	#4	STR	2'-9"	37
A116	1	#4	STR	1'-8"	1						
A117	1	#4	STR	1'-2"	1	G1	2	#4	STR	7'-1"	9
A200	195	#4	STR	6'-2"	803	S1	6	#8	STR	7'-1"	113
A201	1	#4	STR	5'-6"	4	S2	6	#8	STR	8'-7"	138
A202	1	#4	STR	4'-8"	3						
A203	1	#4	STR	3'-10"	3						
A204	1	#4	STR	2'-11"	2						
A205	1	#4	STR	2'-1"	1						
A206	1	#4	STR	1'-2"	1						
A207	1	#4	STR	5'-5"	4						
A208	1	#4	STR	4'-11"	3						
A209	1	#4	STR	4'-4"	3						
A210	1	#4	STR	3'-10"	3						
A211	1	#4	STR	3'-4"	2						
A212	1	#4	STR	2'-10"	2						
A213	1	#4	STR	2'-3"	2						
A214	1	#4	STR	1'-9"	1						
A215	1	#4	STR	1'-3"	1						

REINFORCING STEEL 9446 LBS



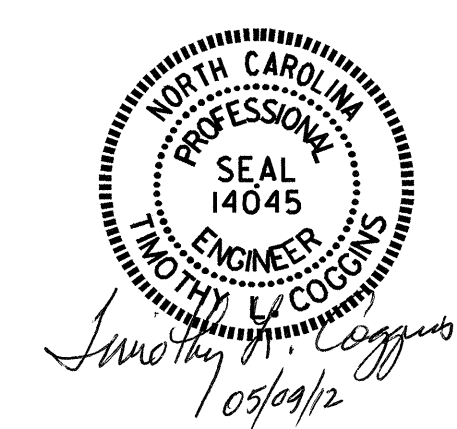
**SECTION A-A**  
THERE ARE 38 "C" BARS IN SECTION OF BARREL.



**SECTION B-B**  
THERE ARE 38 "C" BARS IN SECTION OF BARREL.

ASSEMBLED BY: PEGGY PARISI DATE: 2-2-12  
 CHECKED BY: T. AVERETTE DATE: 4-02-12

10-APR-2012 08:20  
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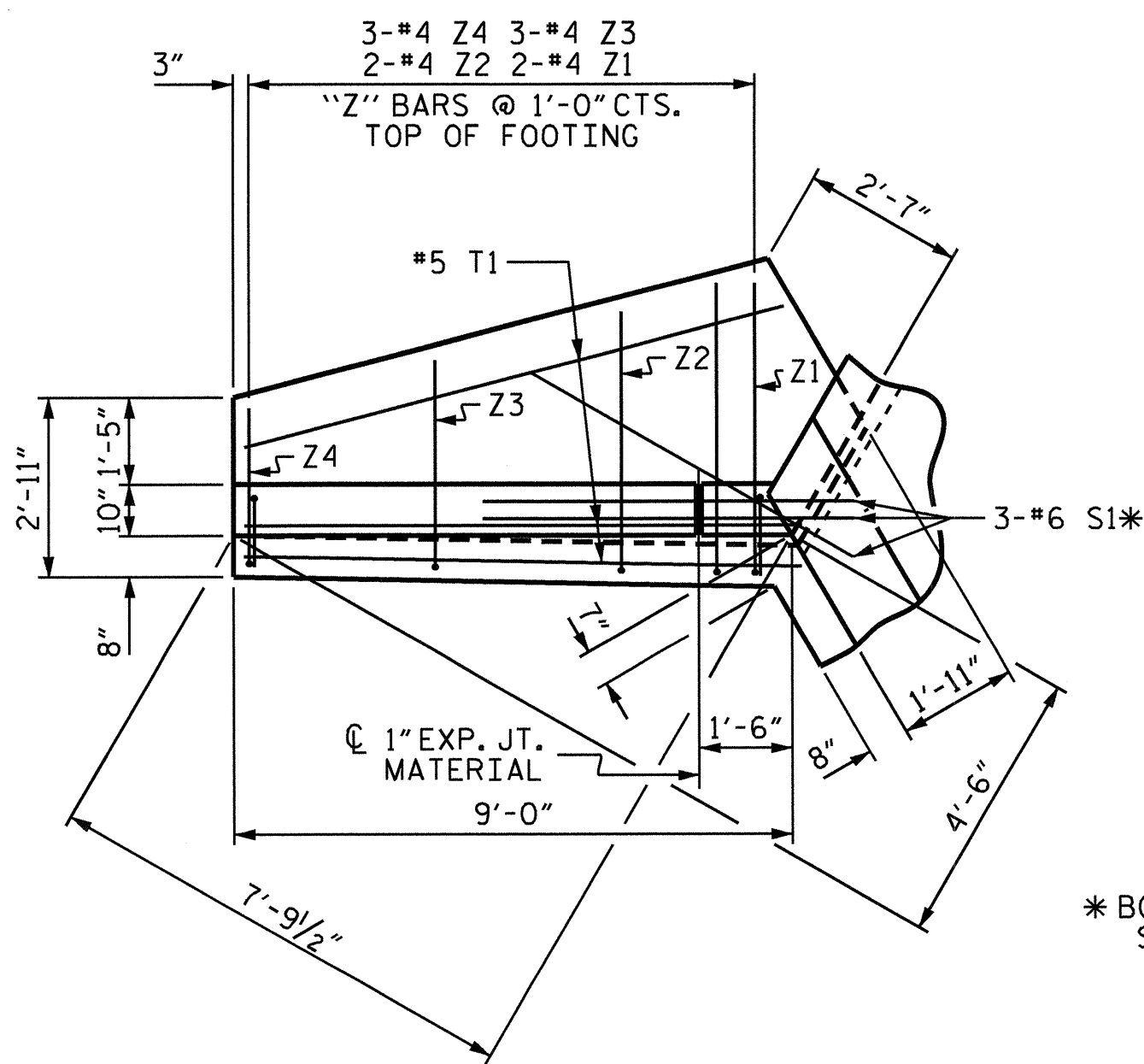


PROJECT NO. B-4760  
GUILFORD COUNTY  
 STATION: 25+71.45 -L-

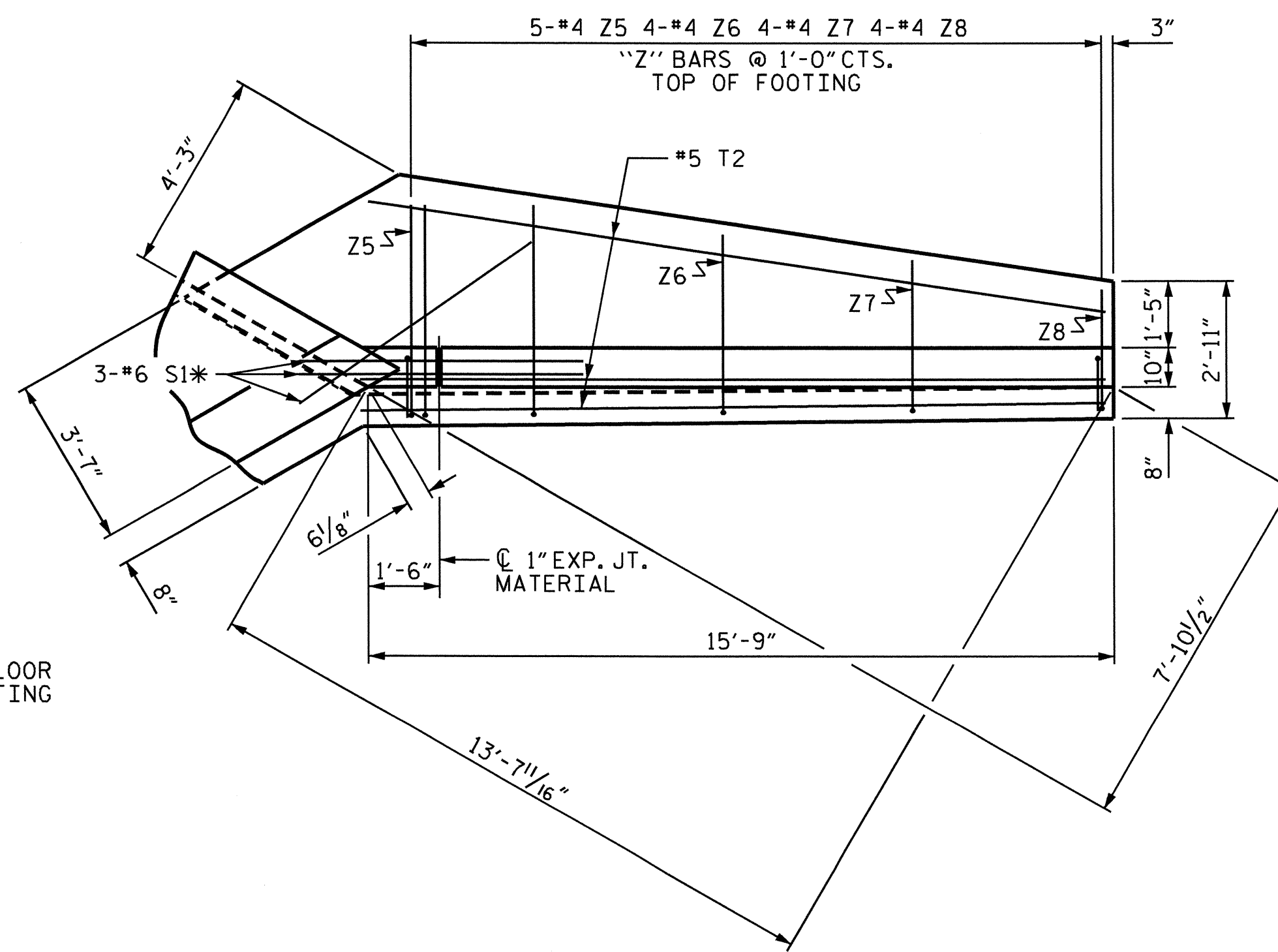
SHEET 5 OF 6

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

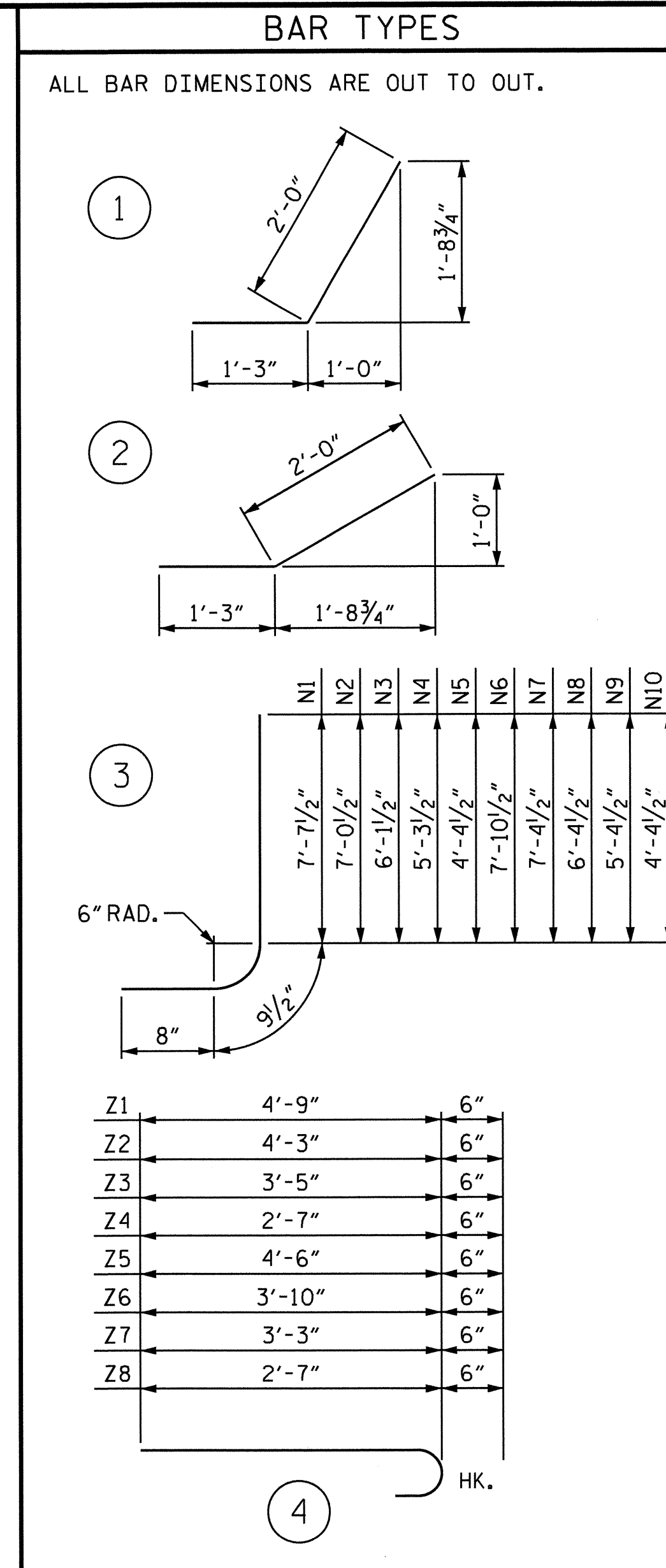
STR. #2



PLAN W2

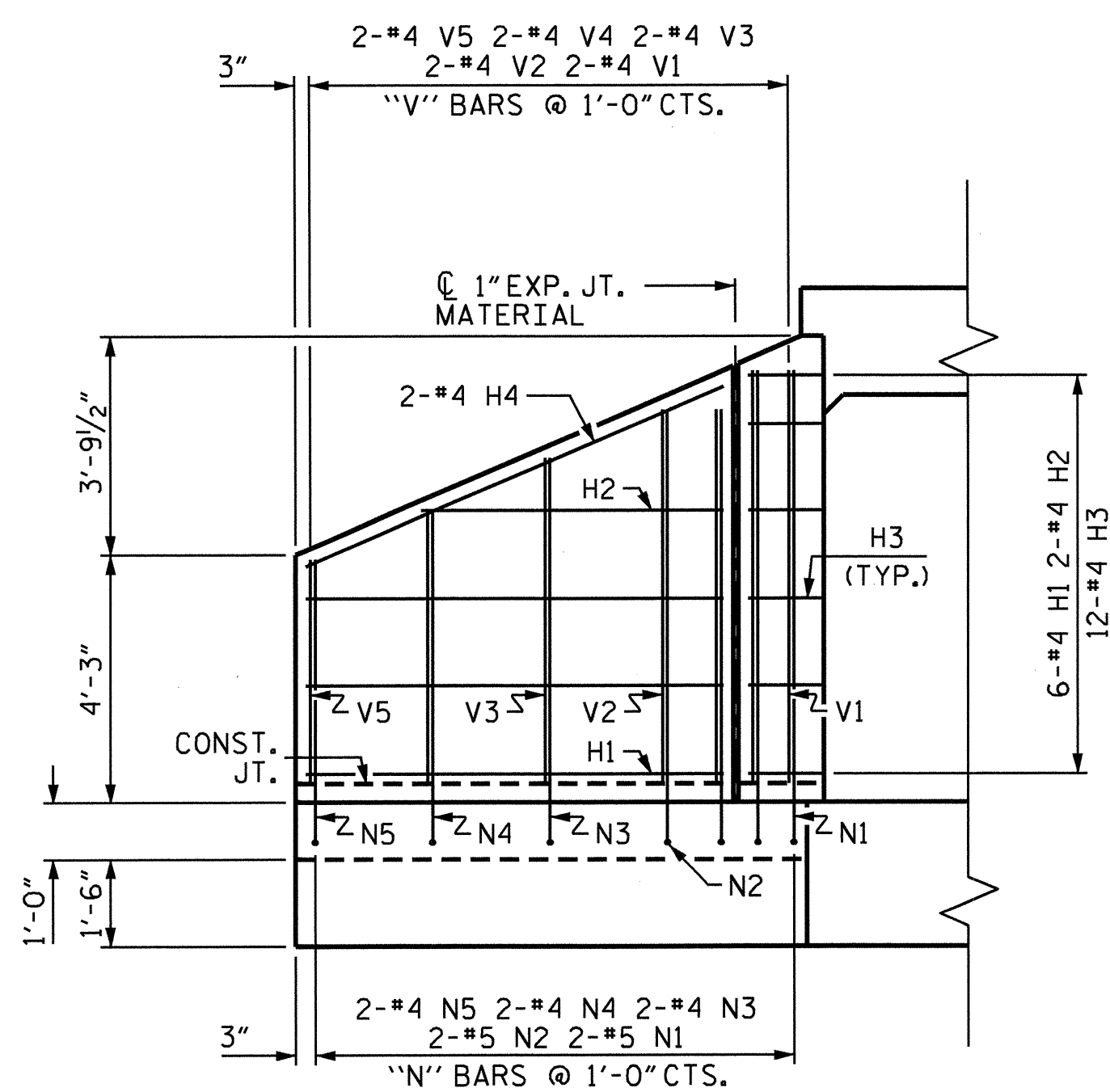


PLAN W1

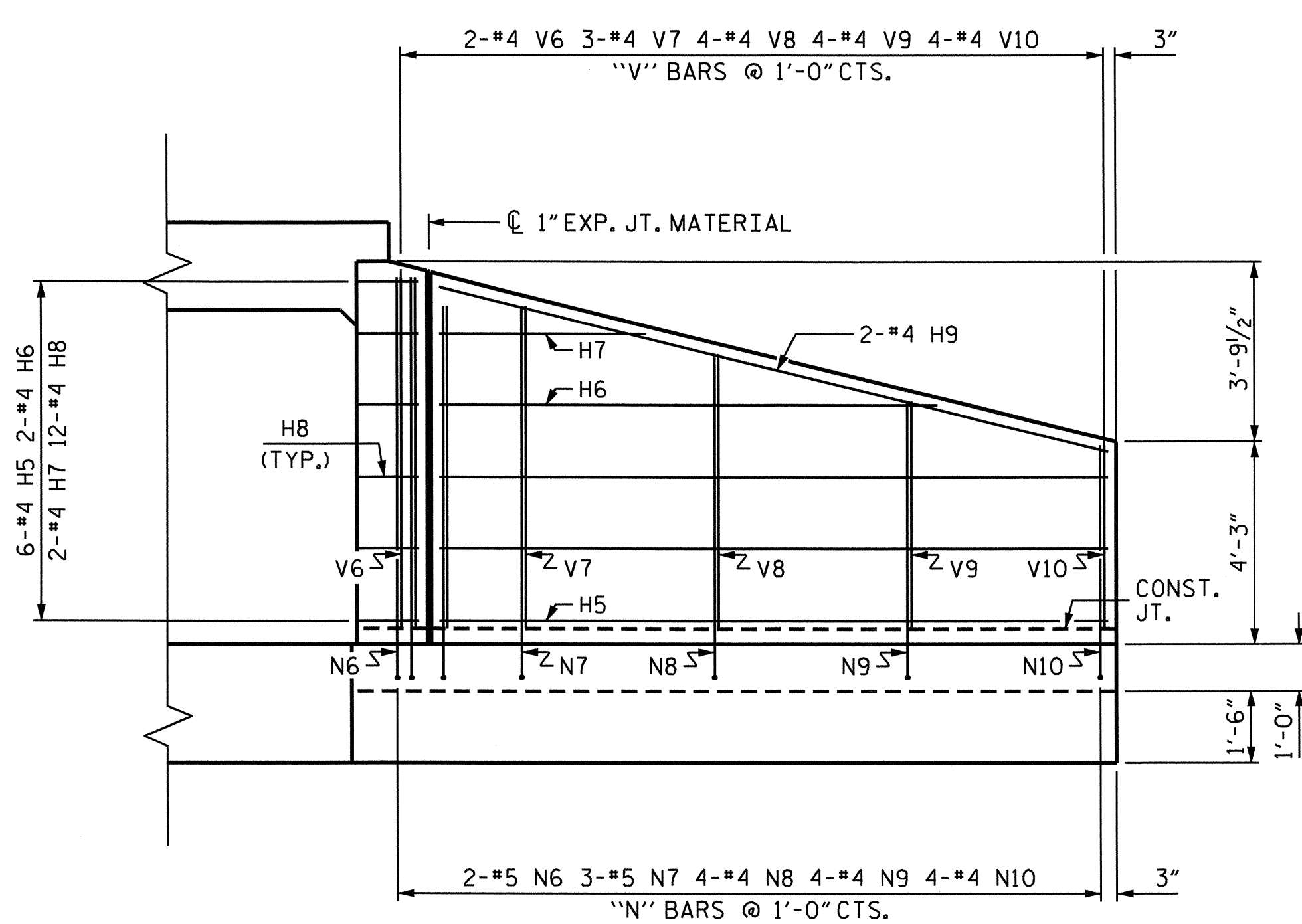


Z1	4'-9"	6"
Z2	4'-3"	6"
Z3	3'-5"	6"
Z4	2'-7"	6"
Z5	4'-6"	6"
Z6	3'-10"	6"
Z7	3'-3"	6"
Z8	2'-7"	6"

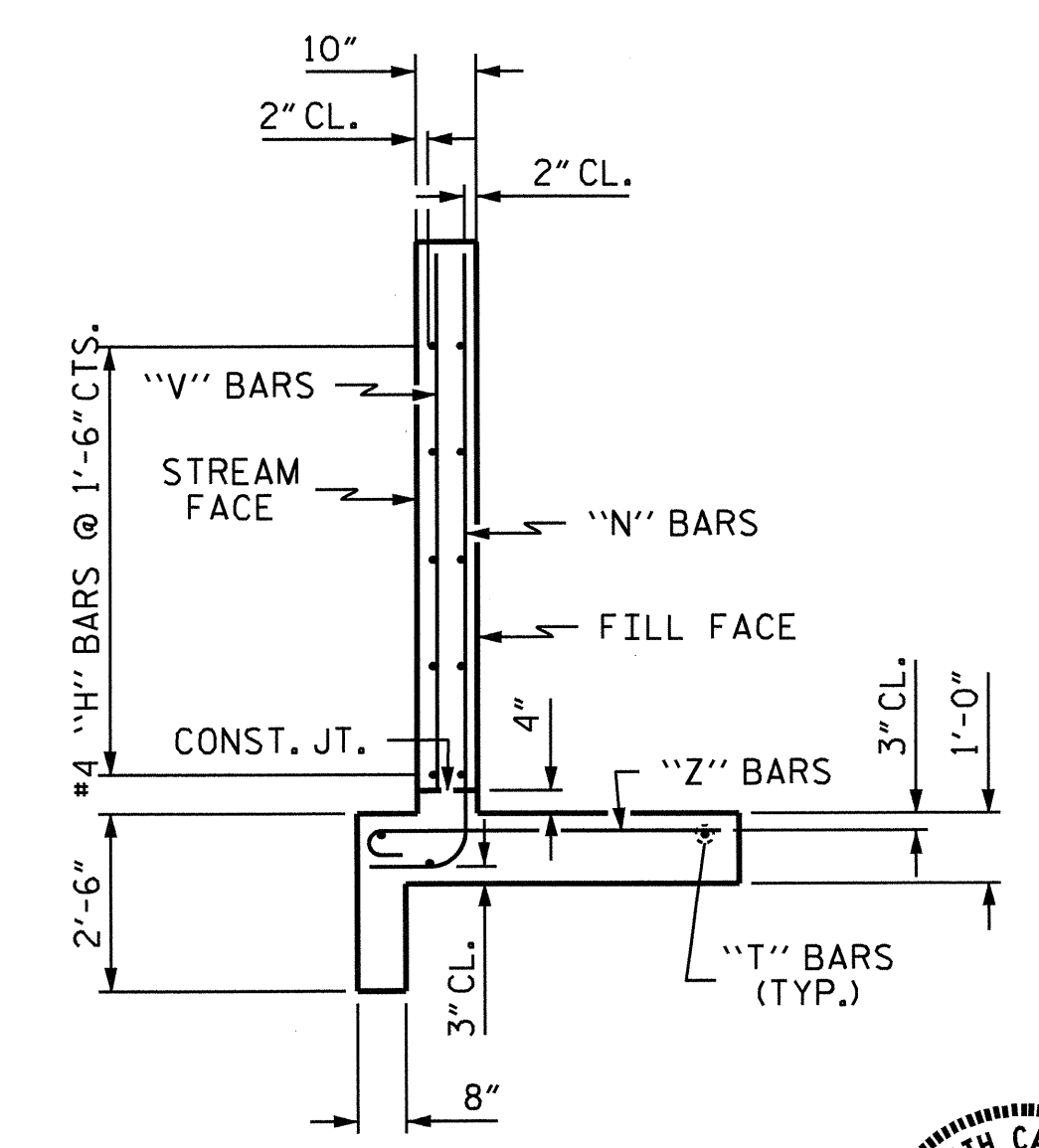
BILL OF MATERIAL					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	#4	STR	7'-1"	28	
H2	#4	STR	5'-2"	7	
H3	#4	STR	3'-3"	26	
H4	#4	STR	7'-9"	10	
H5	#4	STR	13'-10"	55	
H6	#4	STR	10'-4"	14	
H7	#4	STR	4'-3"	6	
H8	#4	STR	3'-3"	26	
H9	#4	STR	14'-3"	19	
N1	#5	STR	9'-1"	19	
N2	#5	STR	8'-6"	18	
N3	#4	STR	7'-7"	10	
N4	#4	STR	6'-9"	9	
N5	#4	STR	5'-10"	8	
N6	#5	STR	9'-4"	19	
N7	#5	STR	8'-10"	28	
N8	#4	STR	7'-10"	21	
N9	#4	STR	6'-10"	18	
N10	#4	STR	5'-10"	16	
S1	#6	STR	6'-0"	54	
T1	#5	STR	9'-0"	28	
T2	#5	STR	15'-9"	49	
V1	#4	STR	7'-1"	9	
V2	#4	STR	6'-5"	9	
V3	#4	STR	5'-7"	7	
V4	#4	STR	4'-8"	6	
V5	#4	STR	3'-10"	5	
V6	#4	STR	7'-4"	10	
V7	#4	STR	6'-9"	14	
V8	#4	STR	5'-9"	15	
V9	#4	STR	4'-9"	13	
V10	#4	STR	3'-10"	10	
Z1	#4	STR	5'-3"	7	
Z2	#4	STR	4'-9"	6	
Z3	#4	STR	3'-11"	8	
Z4	#4	STR	3'-1"	6	
Z5	#4	STR	5'-0"	17	
Z6	#4	STR	4'-4"	12	
Z7	#4	STR	3'-9"	10	
Z8	#4	STR	3'-1"	8	
REINFORCING STEEL FOR 2 WINGS				660	LBS
CLASS A CONCRETE					
2 WINGS				9.9	CY
1 HEADWALL				0.3	CY
1 END CURTAIN WALL				0.3	CY
2 EDGE BEAMS				0.7	CY
TOTAL				11.2	CY



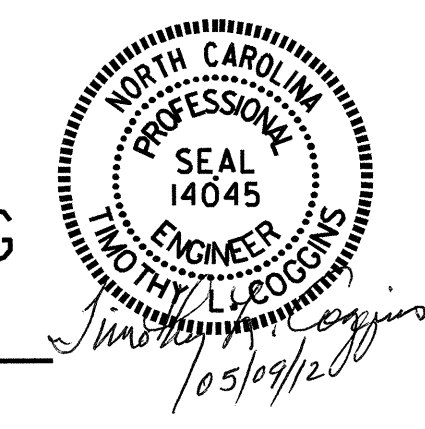
ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION



PROJECT NO. B-4760  
 GUILFORD COUNTY  
 STATION: 25+71.45 -L-

SHEET 6 OF 6  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD WINGS  
 FOR  
 CONCRETE BOX CULVERT  
 H = 7'-0" SLOPE = 2:1  
 60° SKEW

ASSEMBLED BY : PEGGY PARISI DATE : 2-7-12  
 CHECKED BY : T. AVERETTE DATE : 4-02-12  
 DRAWN BY : CCJ 11/99  
 CHECKED BY : RWW 03/00

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

TOTAL SHEETS 6

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## 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 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB. METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN