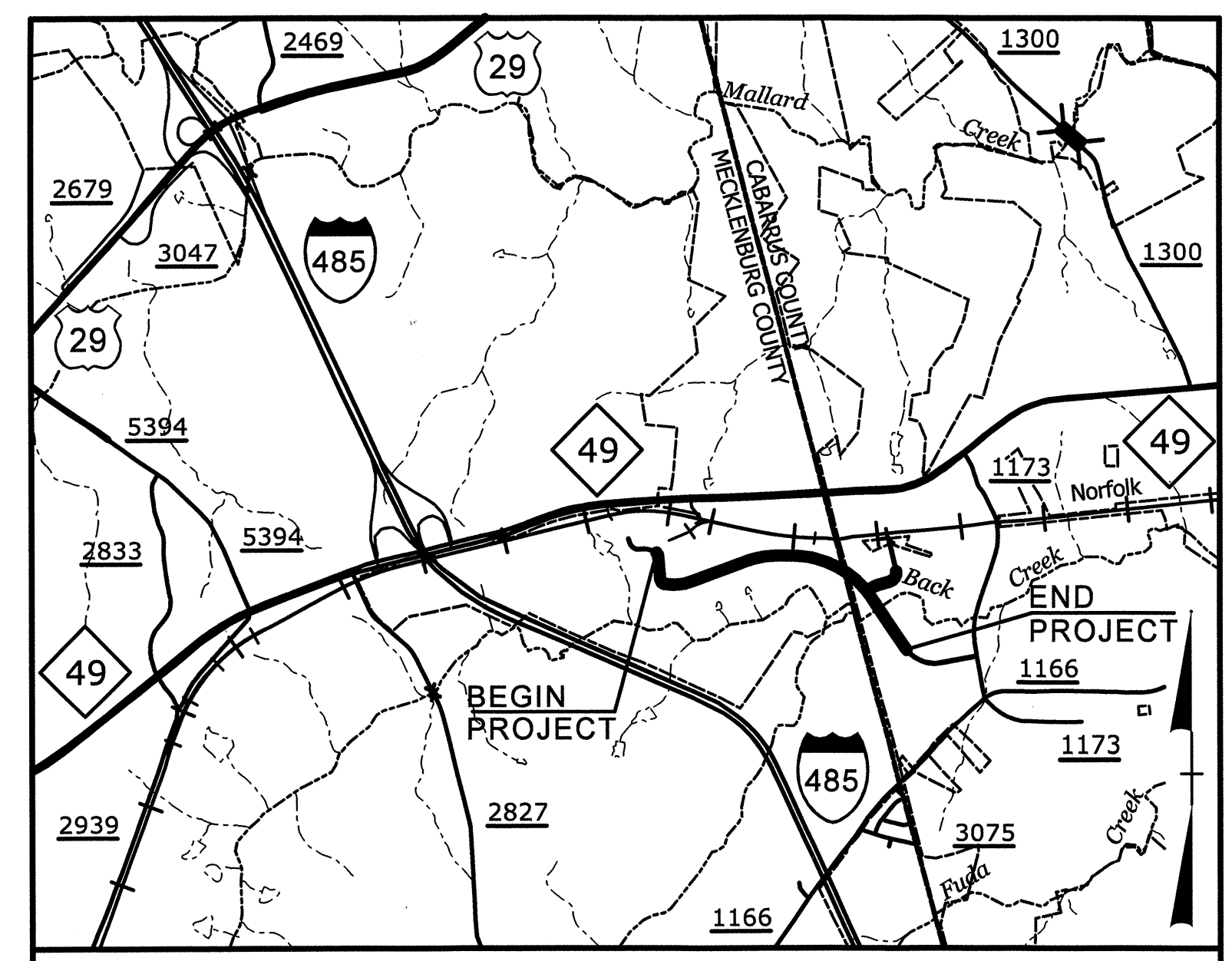


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**TIP PROJECT: P-5208E**  
**CONTRACT: C203209**

See Sheet S-2 For Index of Sheets

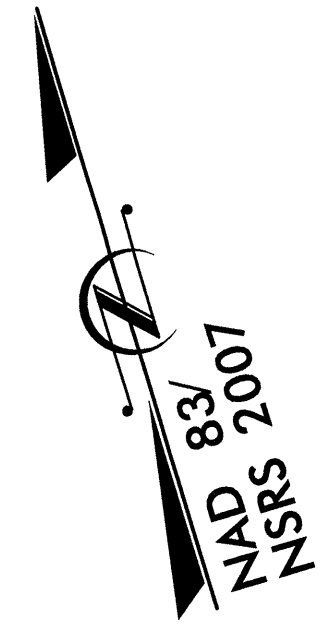


**SKETCH MAP SHOWING THE VICINITY OF STATE PROJECT P-5208E**

STATE OF NORTH CAROLINA  
 NCDOT RAIL DIVISION

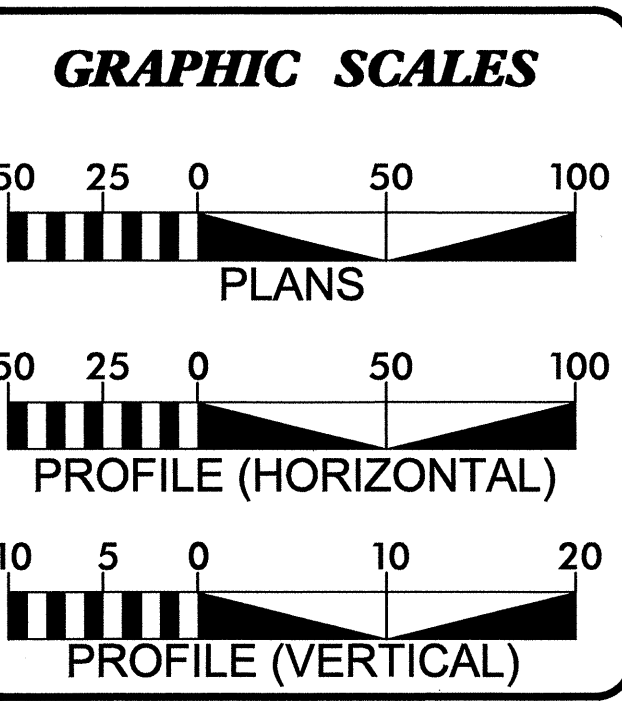
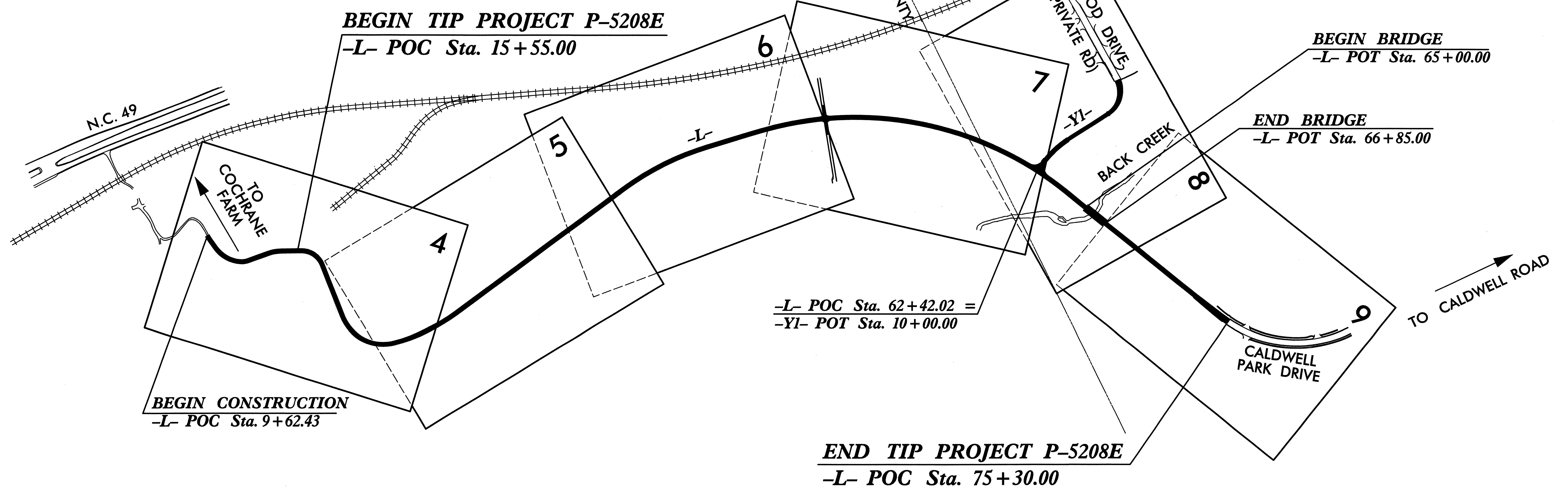
**MECKLENBURG & CABARRUS COUNTIES**

**LOCATION: CALDWELL PARK DRIVE EXTENSION ON NEW LOCATION FROM COCHRANE FARM PROPERTY TO EXISTING CALDWELL PARK DRIVE**



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5208E	S-1	36
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50000.1.STR20T1B		PE, UTIL PE	
50000.1.STR23T3		PE, UTIL PE	
43219.2.STR09P5208E		RW	
50000.3.STR05T4A		UTIL CONST	
50000.3.STR05T4A	FRA-FR-HSR-0006-10-01-00	CONST	

**BRIDGE ON CALDWELL PARK DRIVE EXTENSION (-L-) OVER BACK CREEK RFC BRIDGE PLANS**



**DESIGN DATA**

ADT 2012 =	N/A
ADT 2035 =	700
DHV =	12 %
D =	85 %
T =	3 % *
V =	40 MPH
* 1% TTST + 2% DUALS	
FUNC CLASS =	LOCAL
STATEWIDE TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT P-5208E	= 1.097 MILES
LENGTH STRUCTURES TIP PROJECT P-5208E	= 0.035 MILES
TOTAL LENGTH TIP PROJECT P-5208E	= 1.132 MILES

**SANDRA STEPNEY, PE**  
 NCDOT PROJECT ENGINEER

**2012 STANDARD SPECIFICATIONS**

**RIGHT OF WAY DATE:**  
 APRIL 30, 2012

**LETTING DATE:**  
 MAY 21, 2013

Prepared In the Office of:

**SIMPSON ENGINEERS & ASSOCIATES**

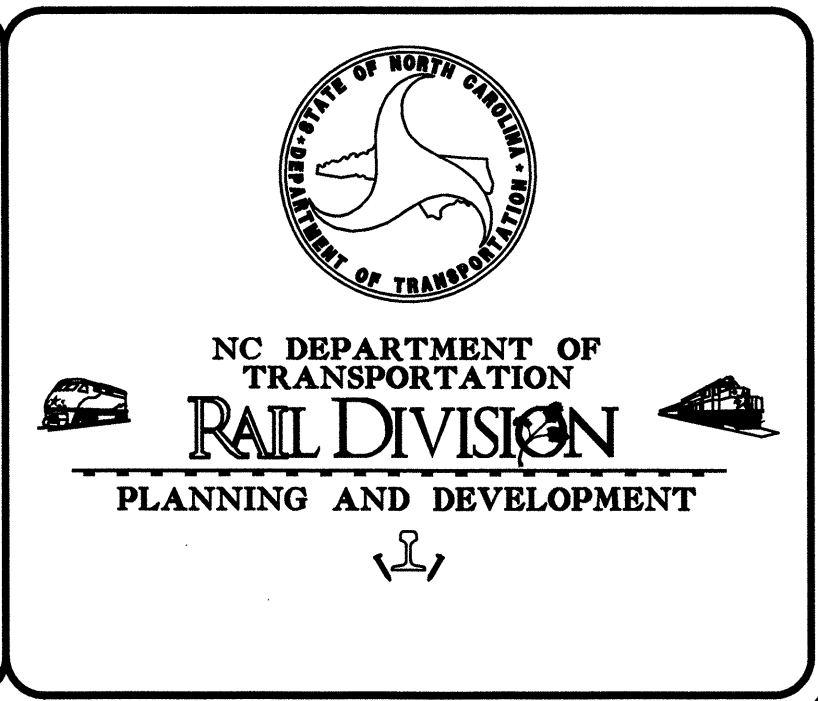
5640 Dillard Drive  
 Suite 200  
 Cary, NC 27518  
 (919) 852-0468  
 (919) 852-0598 (Fax)  
 www.simpsonengr.com

LICENSURE No. C2521

**ENGINEER**

**JOHN A. BATTIS**  
 PROFESSIONAL ENGINEER  
 SEAL 18056  
 1-31-13

SIGNATURE: *[Signature]* P.E.



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### INDEX OF SHEETS

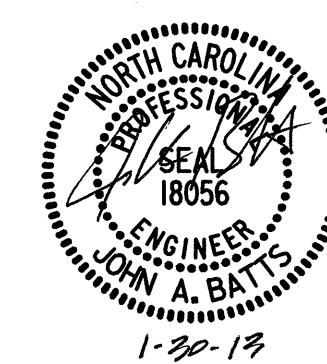
S-1	TITLE SHEET
S-2	INDEX OF STRUCTURE PLANS
S-3	GENERAL DRAWING - SHEET 1 OF 3
S-4	GENERAL DRAWING - SHEET 2 OF 3
S-5	GENERAL DRAWING - SHEET 3 OF 3
S-6	LRFR SUMMARY
S-7	SUPERSTRUCTURE - TYPICAL SECTION - SHEET 1 OF 2
S-8	SUPERSTRUCTURE - TYPICAL SECTION - SHEET 2 OF 2
S-9	SUPERSTRUCTURE - PLAN OF SPAN A
S-10	SUPERSTRUCTURE - PLAN OF SPAN B
S-11	SUPERSTRUCTURE - GIRDER LAYOUT
S-12	SUPERSTRUCTURE - AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER SPAN A
S-13	SUPERSTRUCTURE - AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER SPAN B
S-14	SUPERSTRUCTURE - PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS
S-15	SUPERSTRUCTURE - INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS
S-16	SUPERSTRUCTURE - ELASTOMERIC BEARING DETAILS
S-17	SUPERSTRUCTURE - SIDEWALK DETAILS
S-18	SUPERSTRUCTURE - RAIL POST SPACING AND END POST DETAILS
S-19	SUPERSTRUCTURE - 3 BAR METAL RAIL - SHEET 1 OF 3
S-20	SUPERSTRUCTURE - 3 BAR METAL RAIL - SHEET 2 OF 3
S-21	SUPERSTRUCTURE - 3 BAR METAL RAIL - SHEET 3 OF 3
S-22	SUPERSTRUCTURE - GUARDRAIL ANCHORAGE DETAILS
S-23	SUPERSTRUCTURE - BILL OF MATERIAL (POUR SEQUENCE) - SHEET 1 OF 2
S-24	SUPERSTRUCTURE - BILL OF MATERIAL - SHEET 2 OF 2
S-25	SUBSTRUCTURE - END BENT 1 - SHEET 1 OF 3
S-26	SUBSTRUCTURE - END BENT 1 - SHEET 2 OF 3
S-27	SUBSTRUCTURE - END BENT 1 - SHEET 3 OF 3
S-28	SUBSTRUCTURE - BENT 1 - SHEET 1 OF 2
S-29	SUBSTRUCTURE - BENT 1 - SHEET 2 OF 2
S-30	SUBSTRUCTURE - END BENT 2 - SHEET 1 OF 3
S-31	SUBSTRUCTURE - END BENT 2 - SHEET 2 OF 3
S-32	SUBSTRUCTURE - END BENT 2 - SHEET 3 OF 3
S-33	RIP RAP DETAILS
S-34	BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT
S-35	BRIDGE APPROACH SLAB DETAILS
S-36	STANDARD NOTES

PROJECT NO. P-5208E  
MECKLENBURG  
& CABARRUS COUNTY  
STATION: 65+92.50 -L-

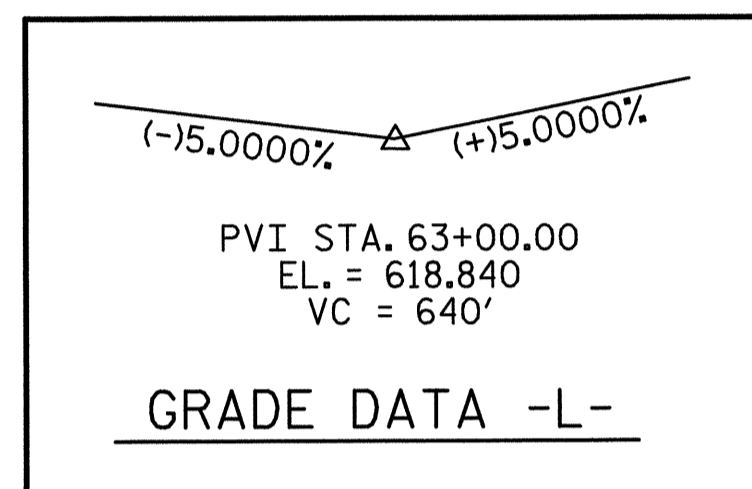
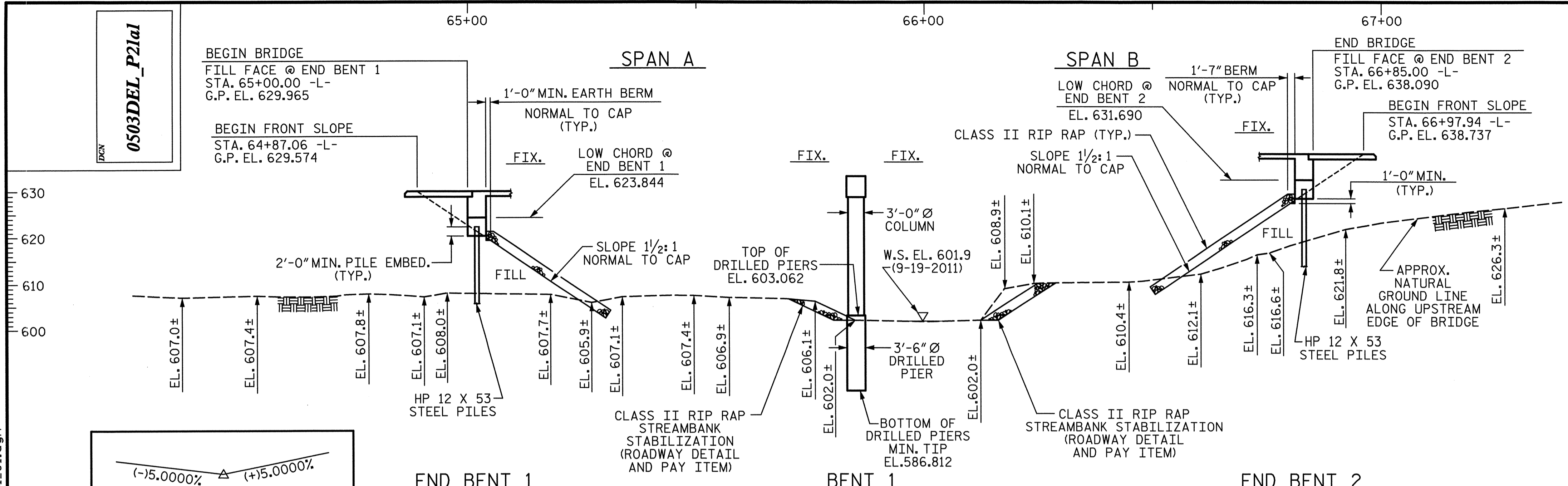
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DEPARTMENT OF TRANSPORTATION						
RALEIGH						
INDEX OF STRUCTURE PLANS						
REVISIONS					SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			36
2			4			

DRAWN BY: D. G. VESTER DATE: 12-12  
CHECKED BY: J. A. BATTS DATE: 12-12  
DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-22-13

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



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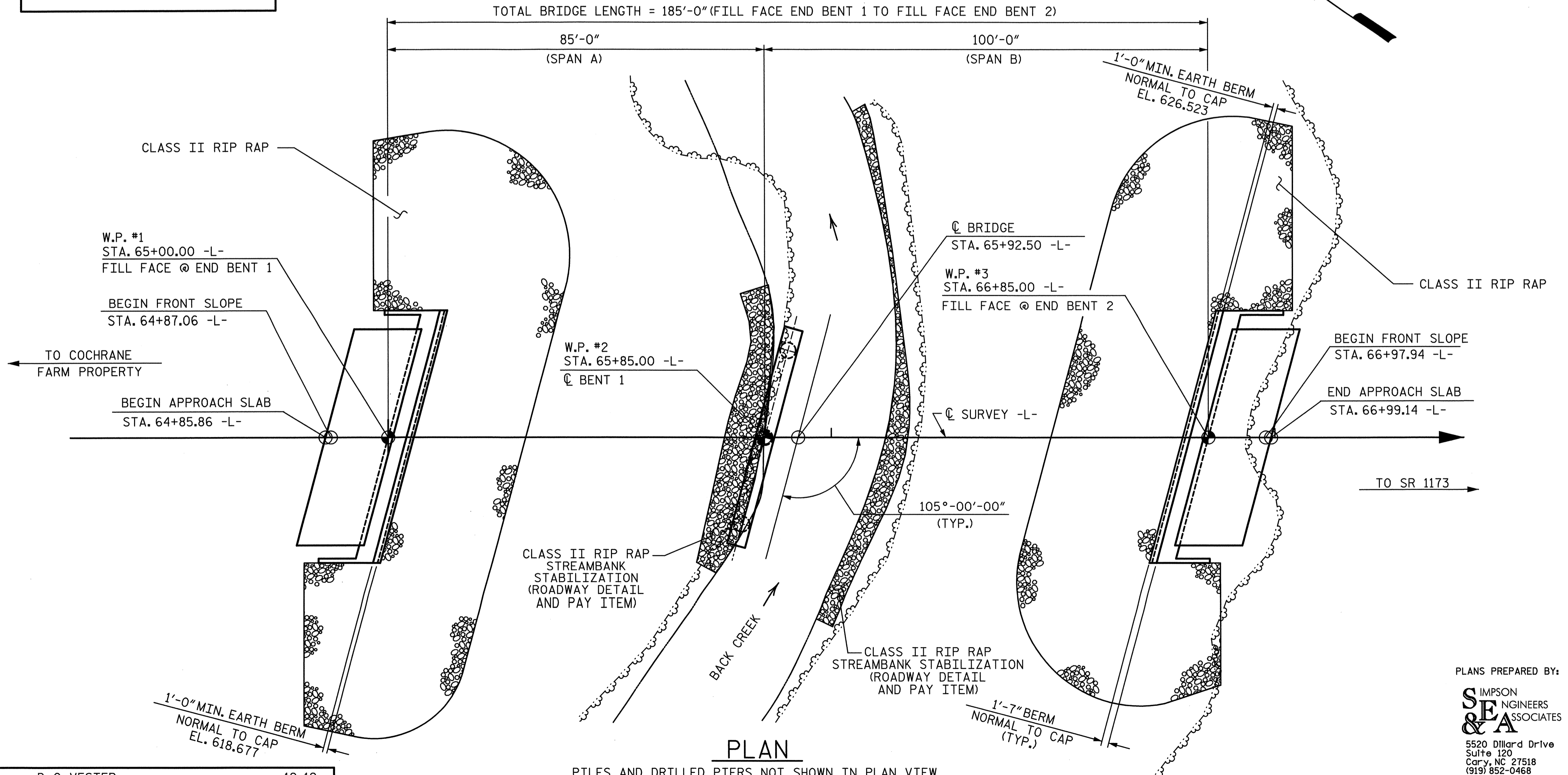
**HYDRAULIC DATA:**

DESIGN DISCHARGE	= 2550 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 611.7
DRAINAGE AREA	= 7.00 SQ. MI.
BASE DISCHARGE (Q 100)	= 3450 CFS
BASE HIGH WATER ELEVATION	= 612.9

**OVERTOPPING FLOOD DATA:**

OVERTOPPING DISCHARGE	= +4720 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEAR
OVERTOPPING FLOOD ELEVATION	= 626.84

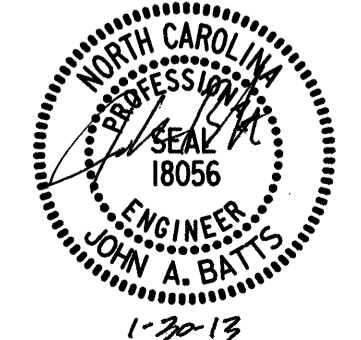
I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-  
 SHEET 1 OF 3    BRIDGE NO. 399

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 BRIDGE ON CALDWELL  
 PARK DRIVE EXTENSION  
 (-L-) OVER BACK CREEK

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 CHECKED BY: J. A. BATTIS    DATE: 12-12  
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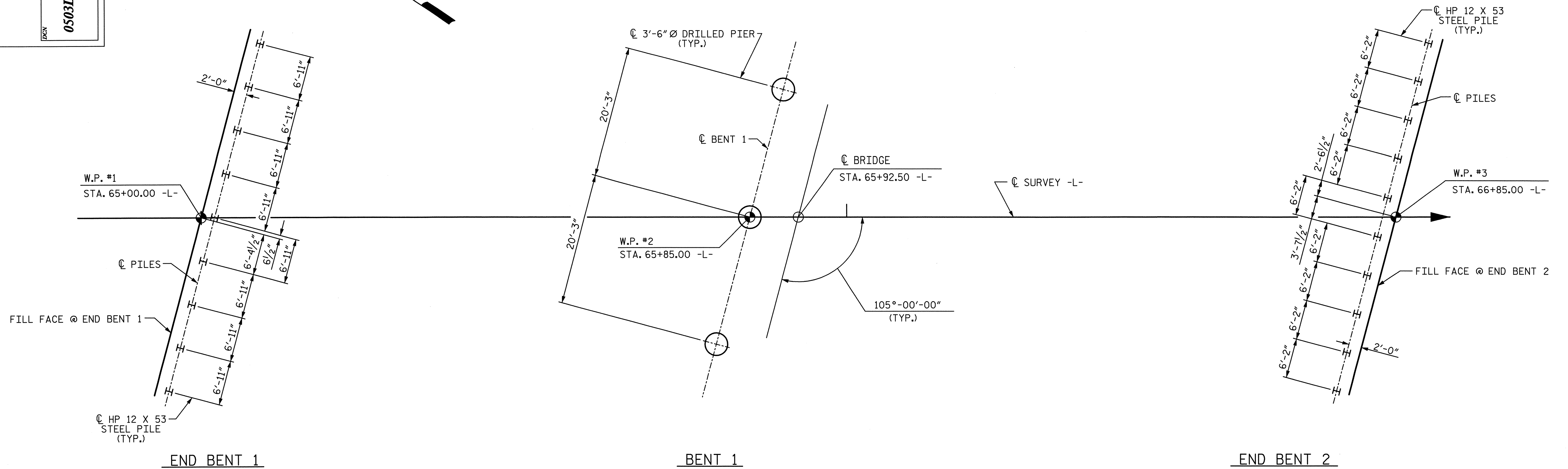
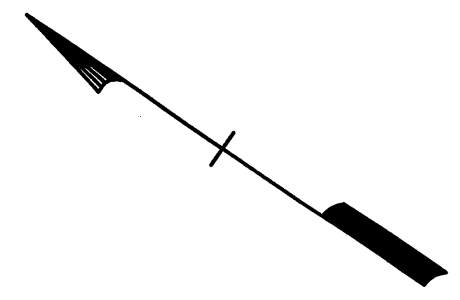
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-3  
 TOTAL SHEETS 36

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**FOUNDATION LAYOUT**

**FOUNDATION NOTES:**

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

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 60 TSF.

DO NOT USE SLURRY CONSTRUCTION FOR DRILLED PIERS AT BENT 1.

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

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 598 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASING.

INSTALL PERMANENT STEEL CASINGS AT BENT 1 BY VIBRATING, SCREWING, OR DRIVING PERMANENT CASING BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 598 FT.

PIT MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR PIT. FOR PIT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

INSTALL DRILLED PIERS AT BENT 1 THAT EXTEND TO AN ELEVATION NO HIGHER THAN ELEVATION 587 FT, SATISFY THE REQUIRED TIP RESISTANCE, AND HAVE A MINIMUM PENETRATION OF AT LEAST 8 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION 595 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAW OR SCOUR.

**FOUNDATION NOTES (CONTINUED):**

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAW OR SCOUR.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENTS 1 AND 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

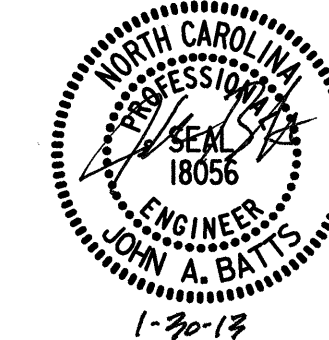
PROJECT NO. P-5208E  
**MECKLENBURG & CABARRUS COUNTY**  
 STATION: 65+92.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
**BRIDGE ON CALDWELL**  
**PARK DRIVE EXTENSION**  
**(-L-) OVER BACK CREEK**

PLANS PREPARED BY:  
**SE & A**  
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DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

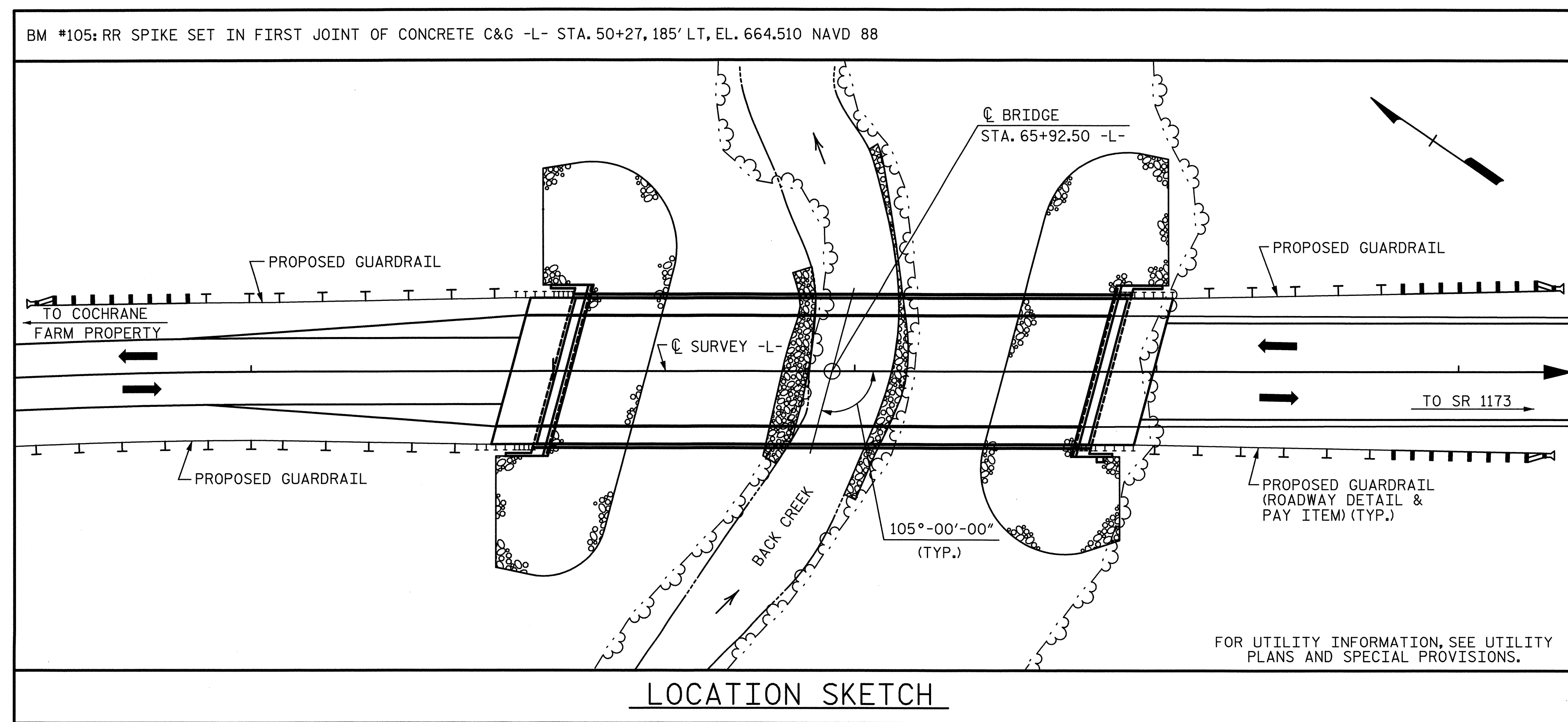
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			36

0503DEL\_P21a1

TOTAL BILL OF MATERIAL																		
	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	THREE BAR METAL RAIL	RTP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	
	LIN.FT.	LIN.FT.	LIN.FT.	EACH	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	LBS.	LIN.FT.	NO.	LIN.FT.	EACH	LIN.FT.	TONS	SQ.YDS.	LUMP SUM
SUPERSTRUCTURE					9358	7170		LUMP SUM			907.76							LUMP SUM
END BENT 1							50.9		7656			9	198	9		642	713	
BENT 1	18.75	30	15.1	1			55.3		10714	2287								
END BENT 2							52.7		8112			10	220	10		820	911	
TOTAL	18.75	30	15.1	1	9358	7170	158.9	LUMP SUM	26482	2287	907.76	19	418	19	350.95	1462	1624	LUMP SUM

**NOTES:**

- ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, EVALUATING SCOUR AT BRIDGES".
- 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 SAME 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.
- 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.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- 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.



LOCATION SKETCH

PROJECT NO. P-5208E  
**MECKLENBURG & CABARRUS COUNTY**  
 STATION: 65+92.50 -L-

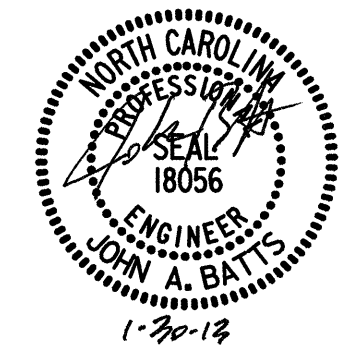
SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 BRIDGE ON CALDWELL  
 PARK DRIVE EXTENSION  
 (-L-) OVER BACK CREEK

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			36

PLANS PREPARED BY:  
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DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTIS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

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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			
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT					SHEAR					LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.05	--	1.75	0.873	1.50	B	EL	49.5	0.836	1.68	B	I	39.7	0.80	0.567	1.05	B	I	49.5		
	HL-93 (OPERATING)	N/A		1.95	--	1.35	0.873	1.95	B	EL	49.5	0.836	2.40	B	I	20	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.45	52.2	1.75	0.873	2.08	B	EL	49.5	0.836	2.39	B	I	20	0.80	0.567	1.45	B	I	49.5		
	HS-20 (OPERATING)	36.000		2.70	97.2	1.35	0.873	2.70	B	EL	49.5	0.836	3.17	B	I	20	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.43	46.3	1.40	0.873	6.15	B	EL	49.5	0.836	7.79	B	I	20	0.80	0.567	3.43	B	I	49.5	
		SNGARBS2	20.000		2.49	49.8	1.40	0.873	4.46	B	EL	49.5	0.836	5.40	B	I	20	0.80	0.567	2.49	B	I	49.5	
		SNAGRIS2	22.000		2.33	51.3	1.40	0.873	4.17	B	EL	49.5	0.836	4.98	B	I	20	0.80	0.567	2.33	B	I	49.5	
		SNCOTTS3	27.250		1.71	46.6	1.40	0.873	3.06	B	EL	49.5	0.836	3.74	B	I	20	0.80	0.567	1.71	B	I	49.5	
		SNAGGRS4	34.925		1.40	48.9	1.40	0.873	2.51	B	EL	49.5	0.836	3.02	B	I	20	0.80	0.567	1.40	B	I	49.5	
		SNS5A	35.550		1.37	48.7	1.40	0.873	2.45	B	EL	49.5	0.836	3.05	B	I	20	0.80	0.567	1.37	B	I	49.5	
		SNS6A	39.950		1.25	49.9	1.40	0.873	2.23	B	EL	49.5	0.836	2.75	B	I	20	0.80	0.567	1.25	B	I	49.5	
		SNS7B	42.000		1.19	50.0	1.40	0.873	2.13	B	EL	49.5	0.836	2.68	B	I	20	0.80	0.567	1.19	B	I	49.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.52	50.2	1.40	0.873	2.72	B	EL	49.5	0.836	3.32	B	I	20	0.80	0.567	1.52	B	I	49.5	
		TNT4A	33.075		1.52	50.3	1.40	0.873	2.72	B	EL	49.5	0.836	3.25	B	I	20	0.80	0.567	1.52	B	I	49.5	
		TNT6A	41.600		1.23	51.2	1.40	0.873	2.21	B	EL	49.5	0.836	2.84	B	I	20	0.80	0.567	1.23	B	I	49.5	
		TNT7A	42.000		1.23	51.7	1.40	0.873	2.21	B	EL	49.5	0.836	2.78	B	I	20	0.80	0.567	1.23	B	I	49.5	
		TNT7B	42.000		1.26	52.9	1.40	0.873	2.26	B	EL	49.5	0.836	2.62	B	I	20	0.80	0.567	1.26	B	I	49.5	
		TNAGRIT4	43.000		1.21	52.0	1.40	0.873	2.17	B	EL	49.5	0.836	2.54	B	I	20	0.80	0.567	1.21	B	I	49.5	
		TNAGT5A	45.000		1.15	51.8	1.40	0.873	2.05	B	EL	49.5	0.836	2.50	B	I	20	0.80	0.567	1.15	B	I	49.5	
		TNAGT5B	45.000		③	1.14	51.3	1.40	0.873	2.04	B	EL	49.5	0.836	2.41	B	I	20	0.80	0.567	1.14	B	I	49.5

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.

① CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

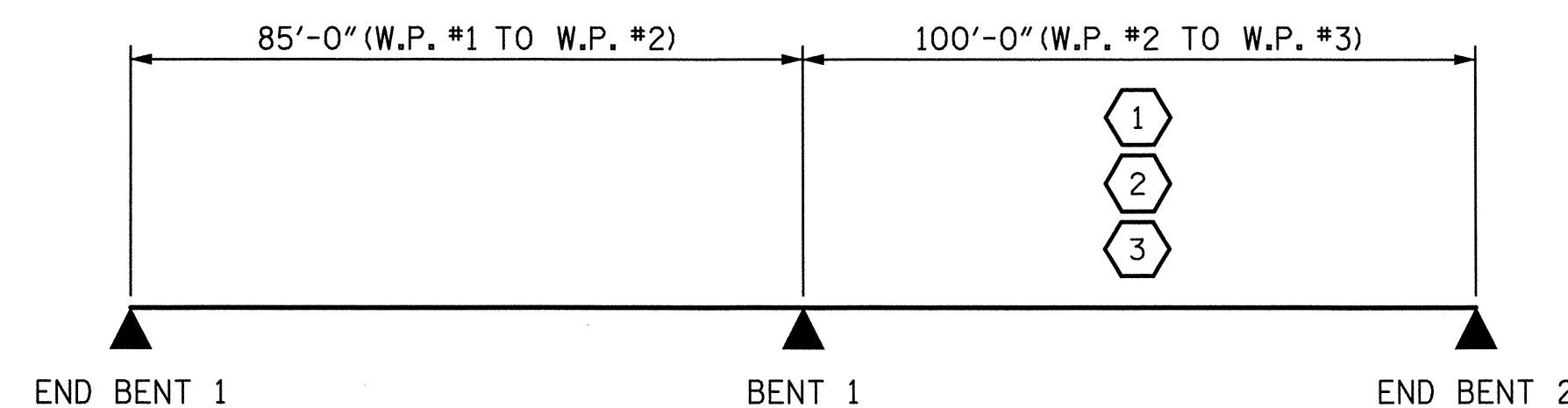
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



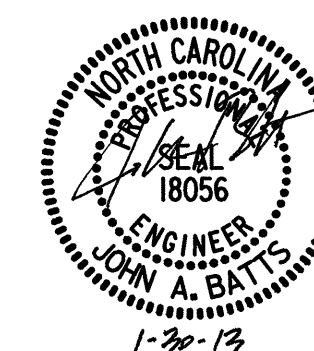
LRFR SUMMARY

PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
STATION: 65+92.50 -L-

PLANS PREPARED BY:



5520 Dillard Drive  
Suite 120  
Cary, NC 27518  
(919) 852-0468  
(919) 852-0598 (Fax)  
www.simpsonengr.com



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

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

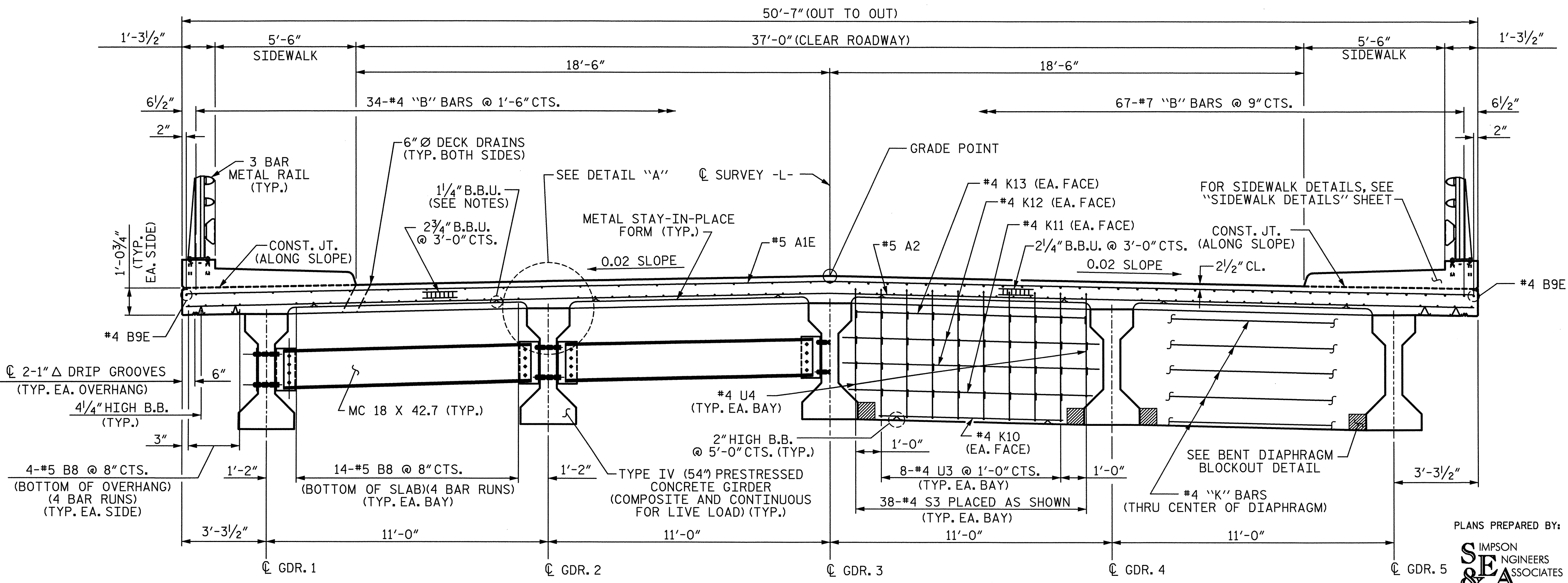
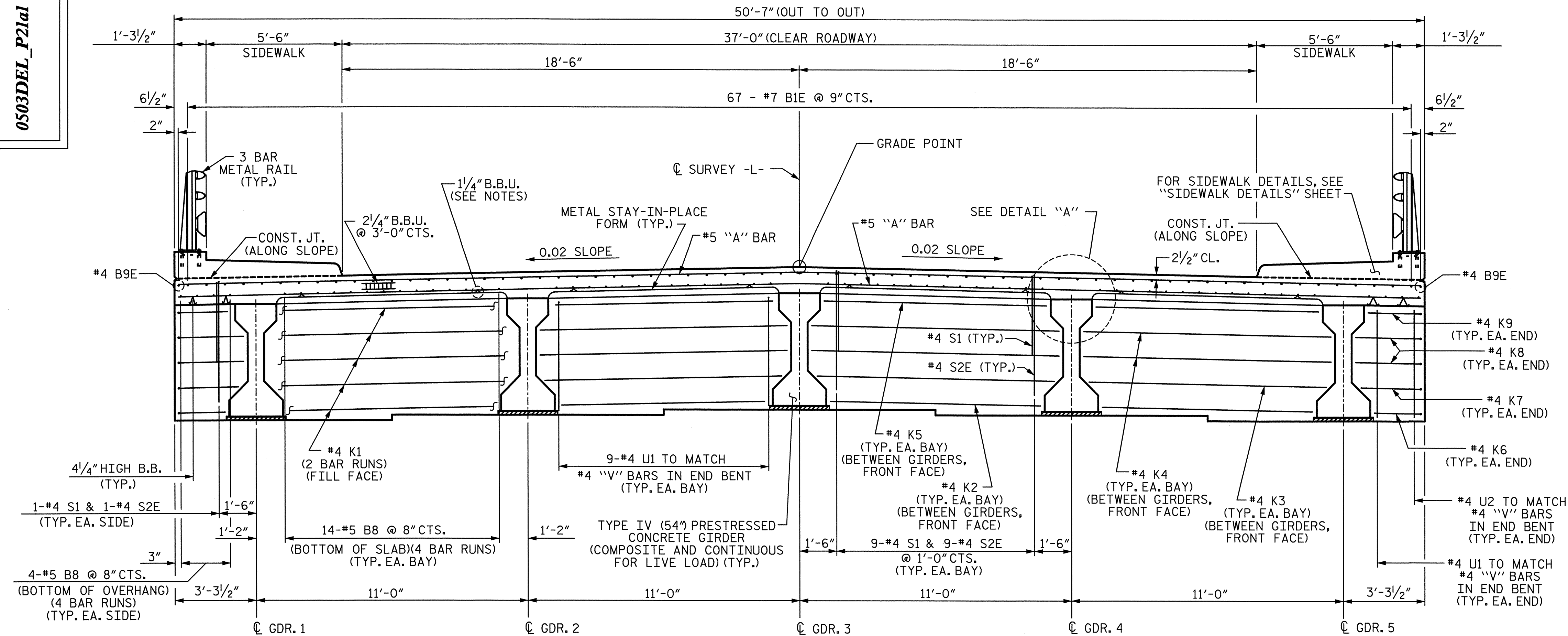
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			36

DRAWN BY: D. G. VESTER DATE: 12-12  
CHECKED BY: J. A. BATTS DATE: 12-12  
DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-22-13

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0503DEL\_P21a1



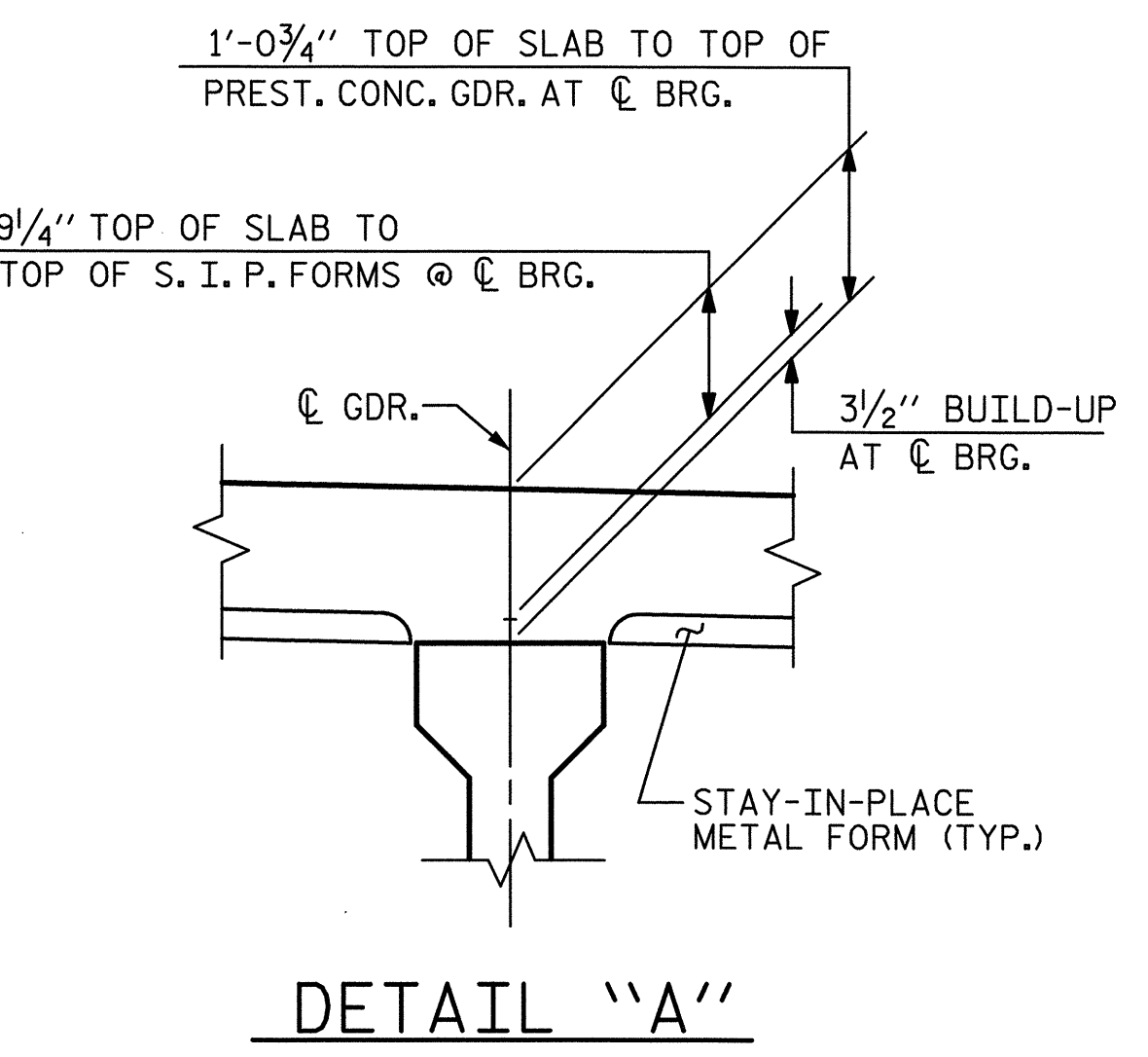
**NOTES:**

SEE "PLAN OF SPAN A" AND "PLAN OF SPAN B" SHEETS FOR LOCATIONS OF 6" Ø DECK DRAINS.

PROVIDE 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.

PREVIOUSLY CAST CONCRETE IN CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.



PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

SHEET 1 OF 2

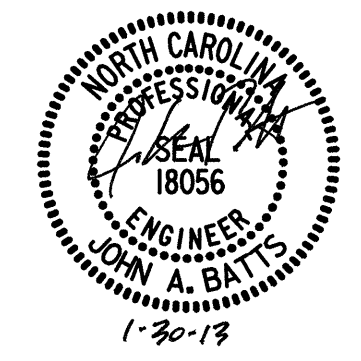
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE TYPICAL SECTION**

REVISIONS						SHEET NO. S-7
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

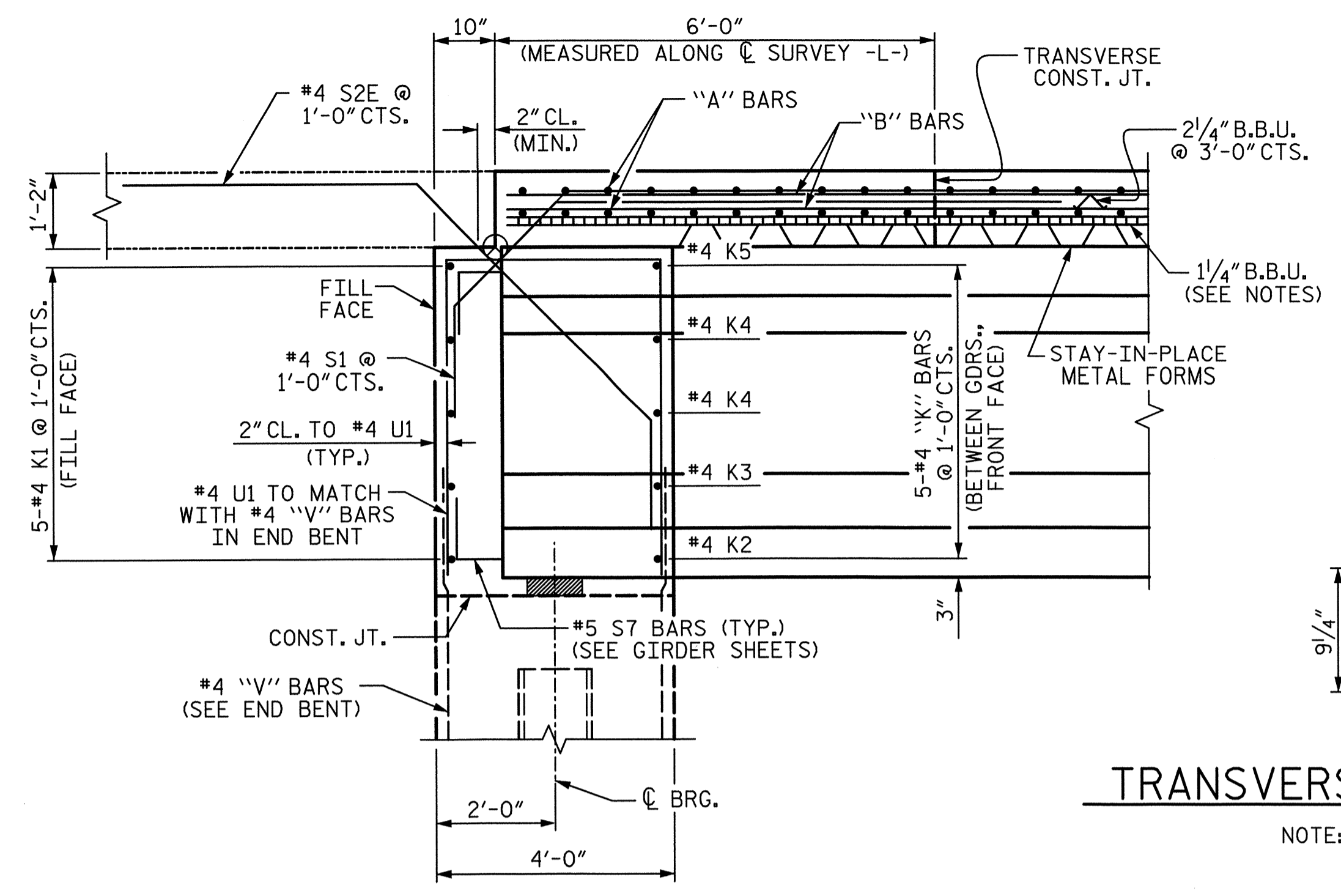
DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

PLANS PREPARED BY:  
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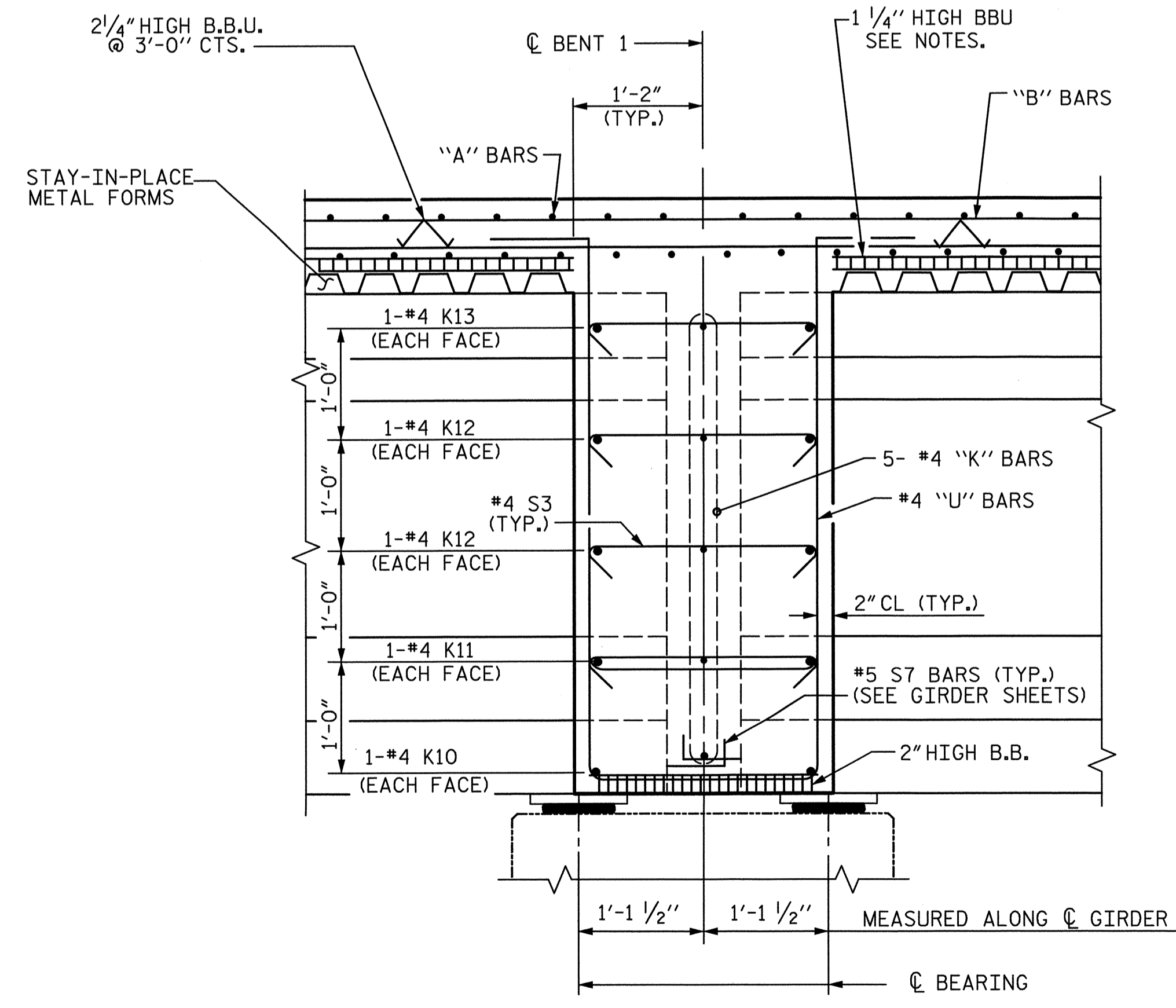


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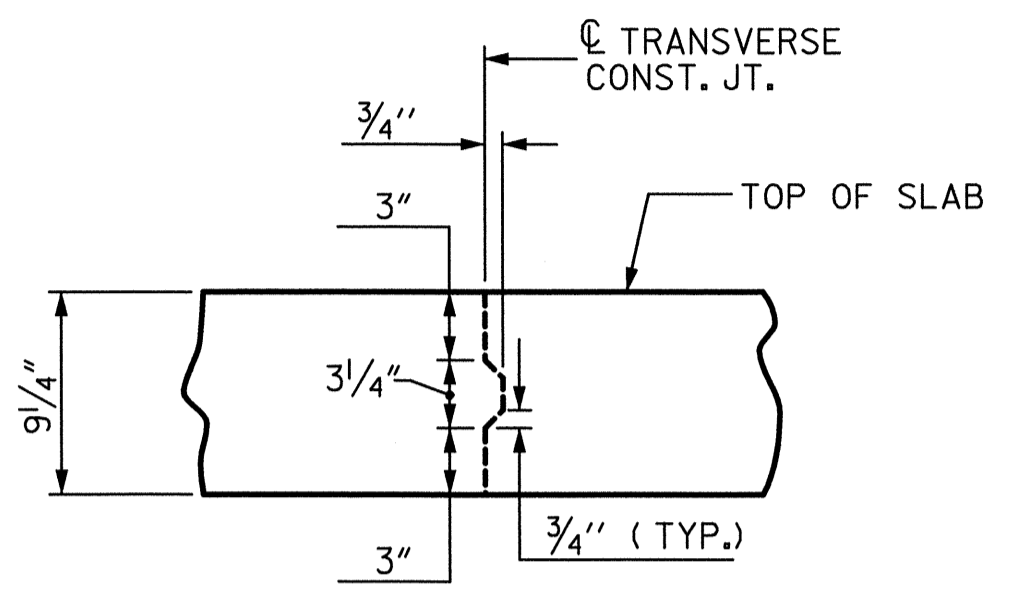
0503DEL\_P21a1



SECTION A-A  
(SECTION THRU INTEGRAL END BENT)

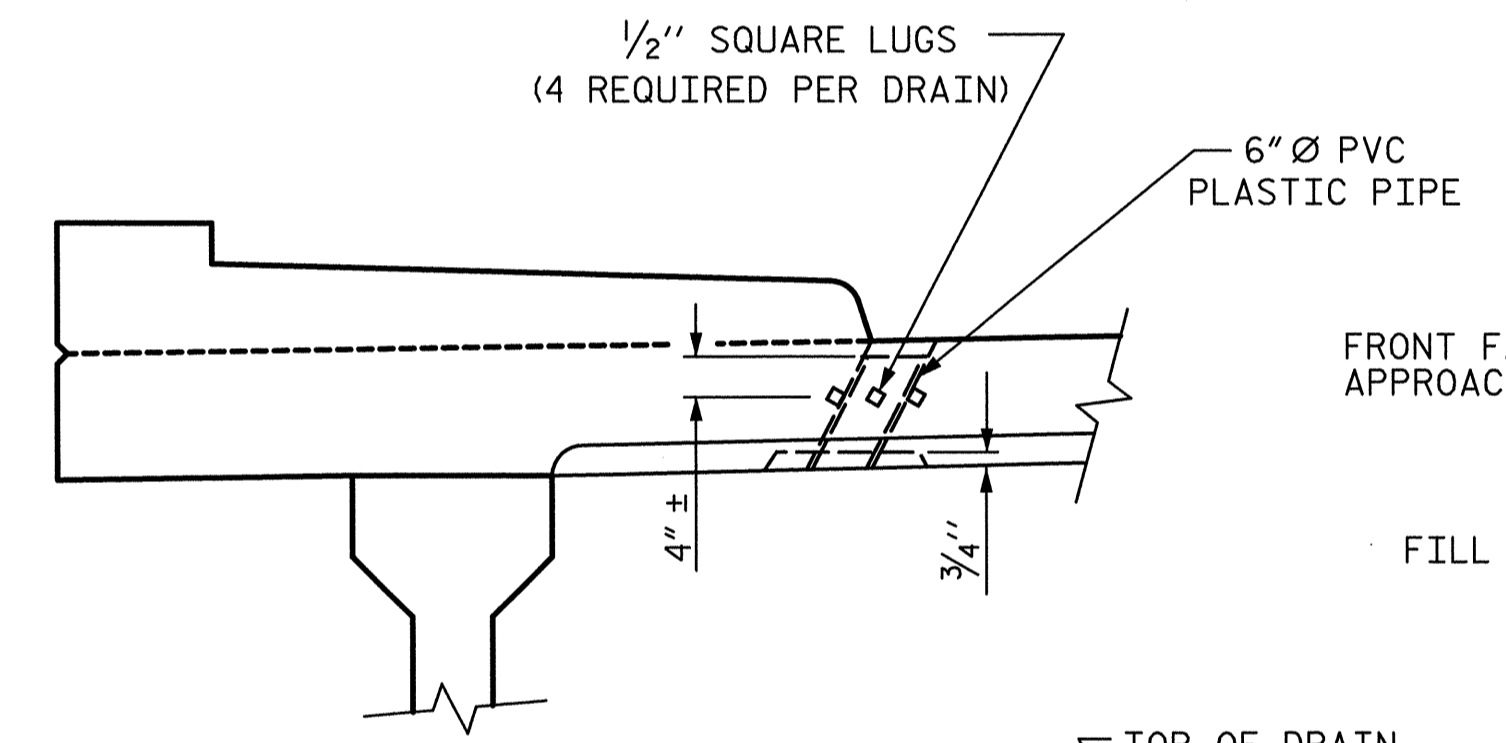


SECTION B-B  
(SECTION THRU BENT DIAPHRAGM)

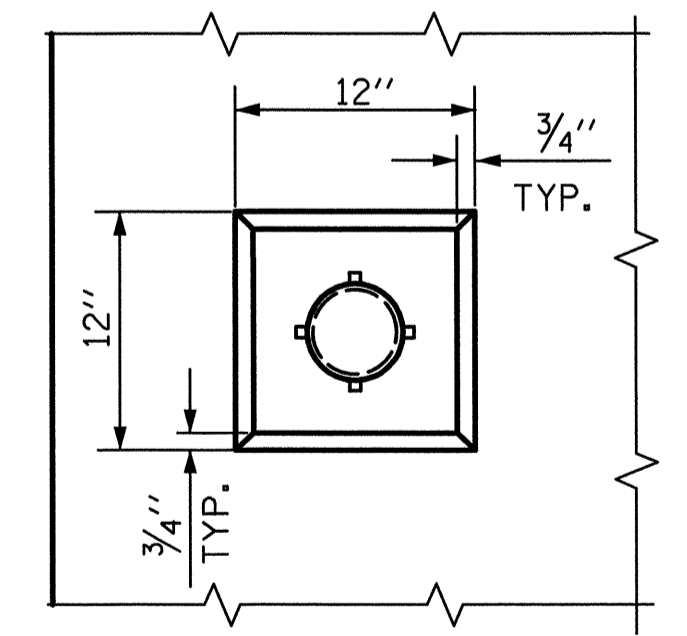


TRANSVERSE CONSTRUCTION JOINT DETAIL

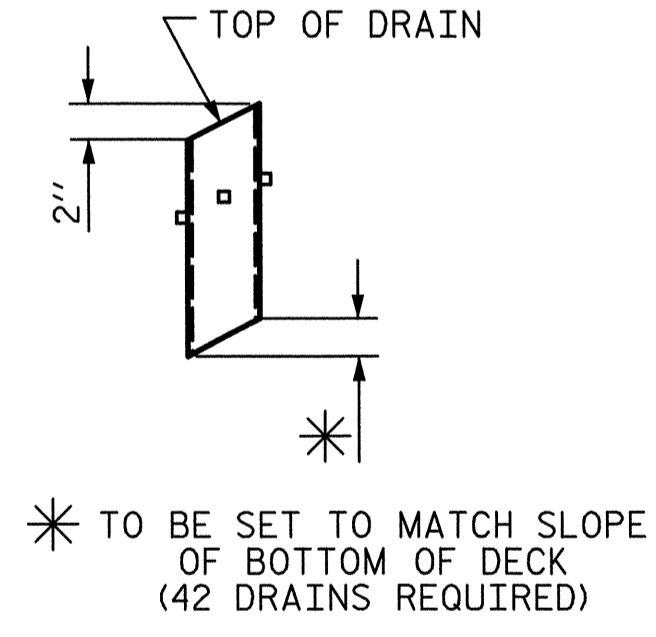
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.



ELEVATION



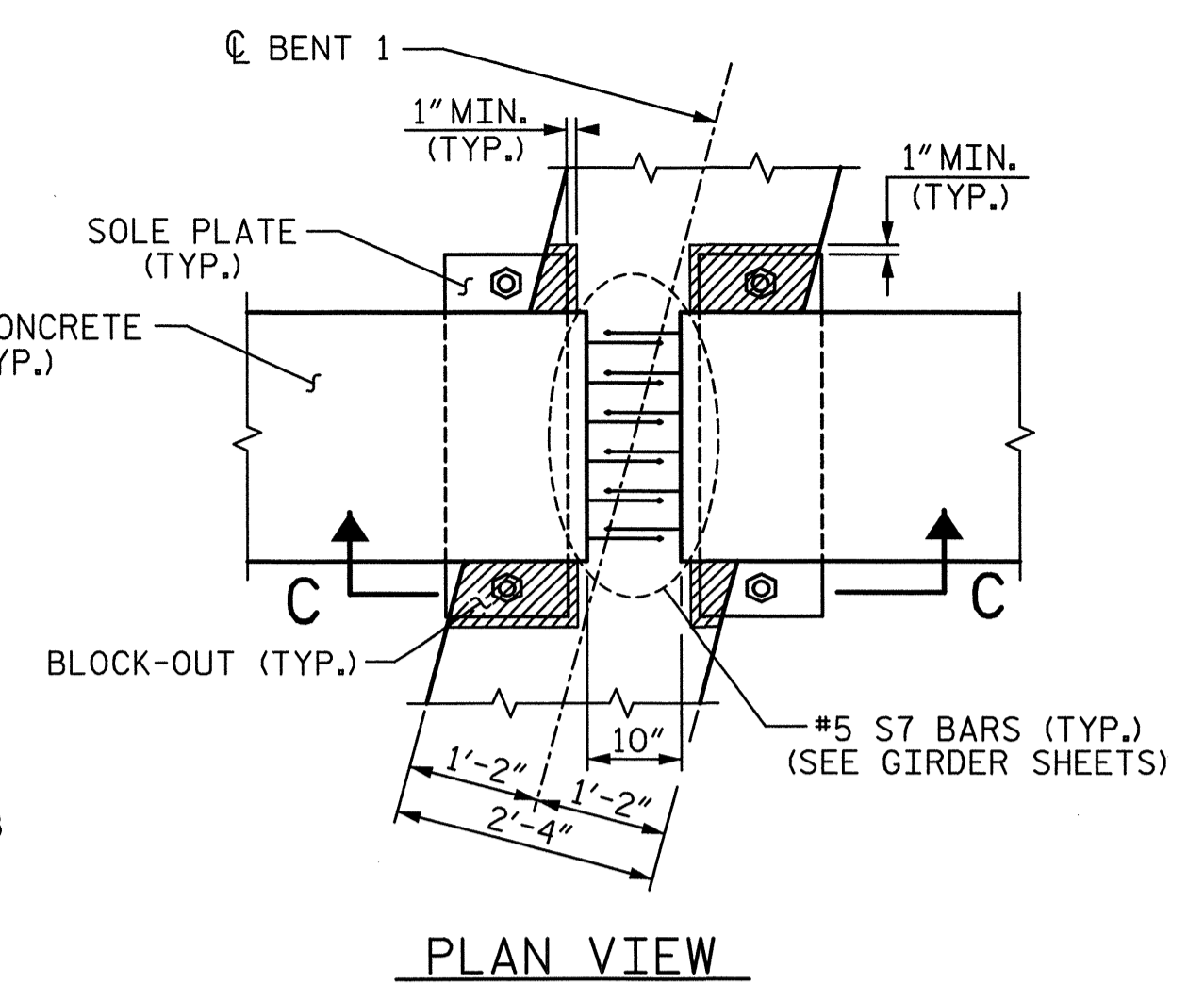
PLAN OF RECESS



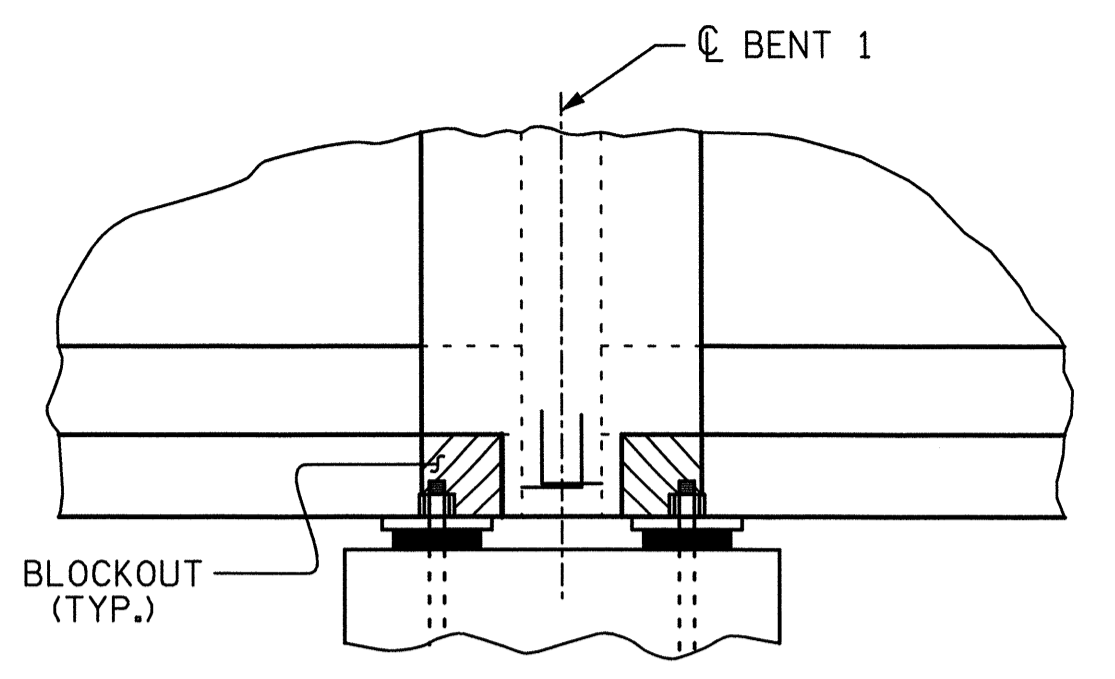
PIPE DETAIL

TOP OF FLOOR DRAINS TO BE SET 3/8" BELOW SURFACE OF SLAB.  
4 - 1/2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.  
THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

DRAIN DETAILS

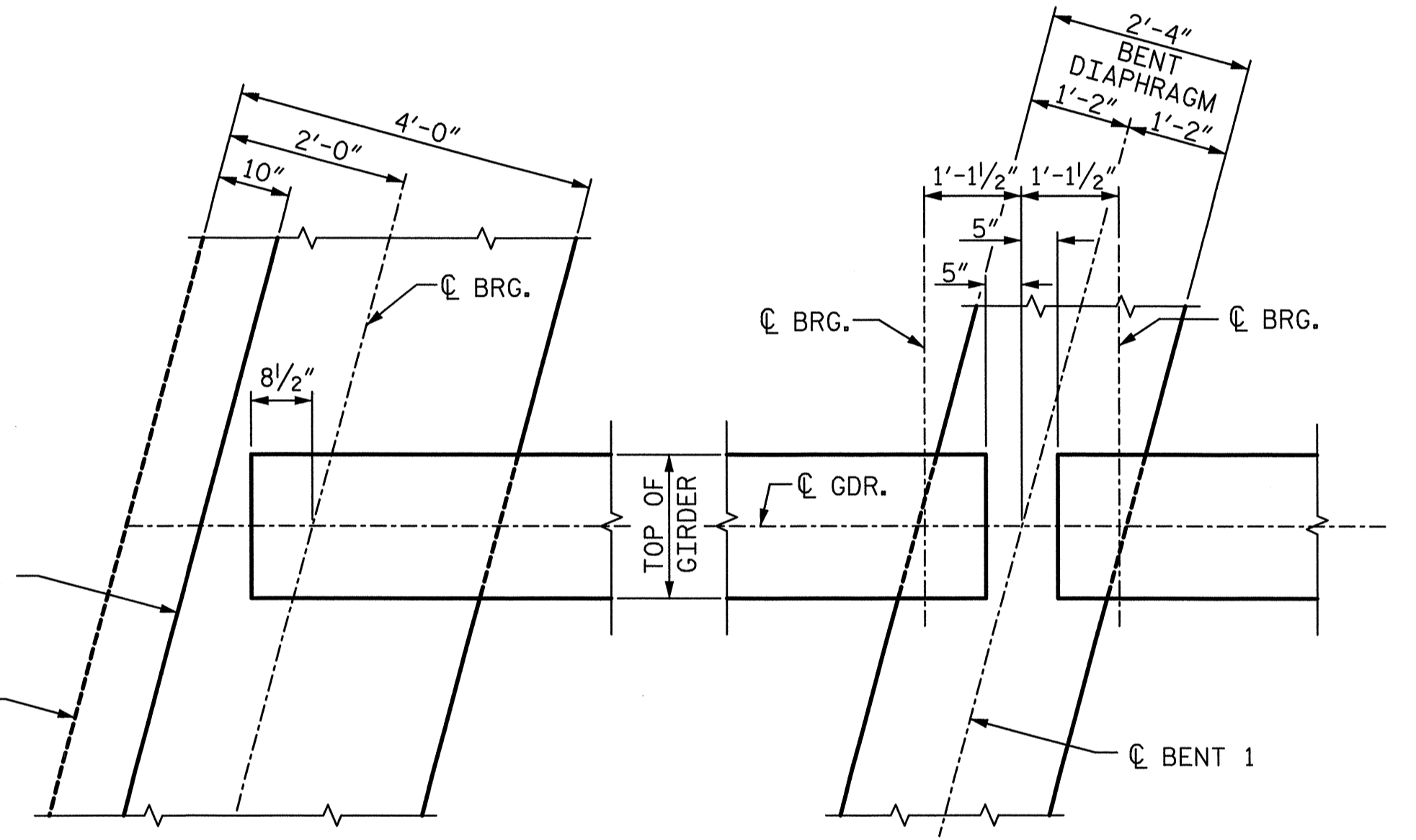


PLAN VIEW



SECTION C-C

BENT DIAPHRAGM BLOCKOUT DETAIL



END BENT  
BENT  
PLAN OF DIAPHRAGMS

PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
STATION: 65+92.50 -L-

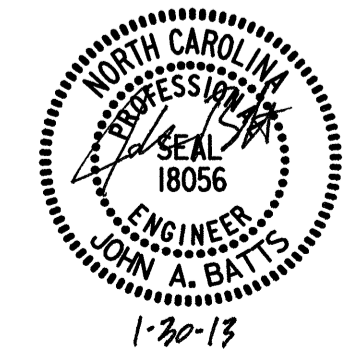
SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S-8  
TOTAL SHEETS 36

DRAWN BY: D. G. VESTER DATE: 12-12  
CHECKED BY: J. A. BATTS DATE: 12-12  
DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

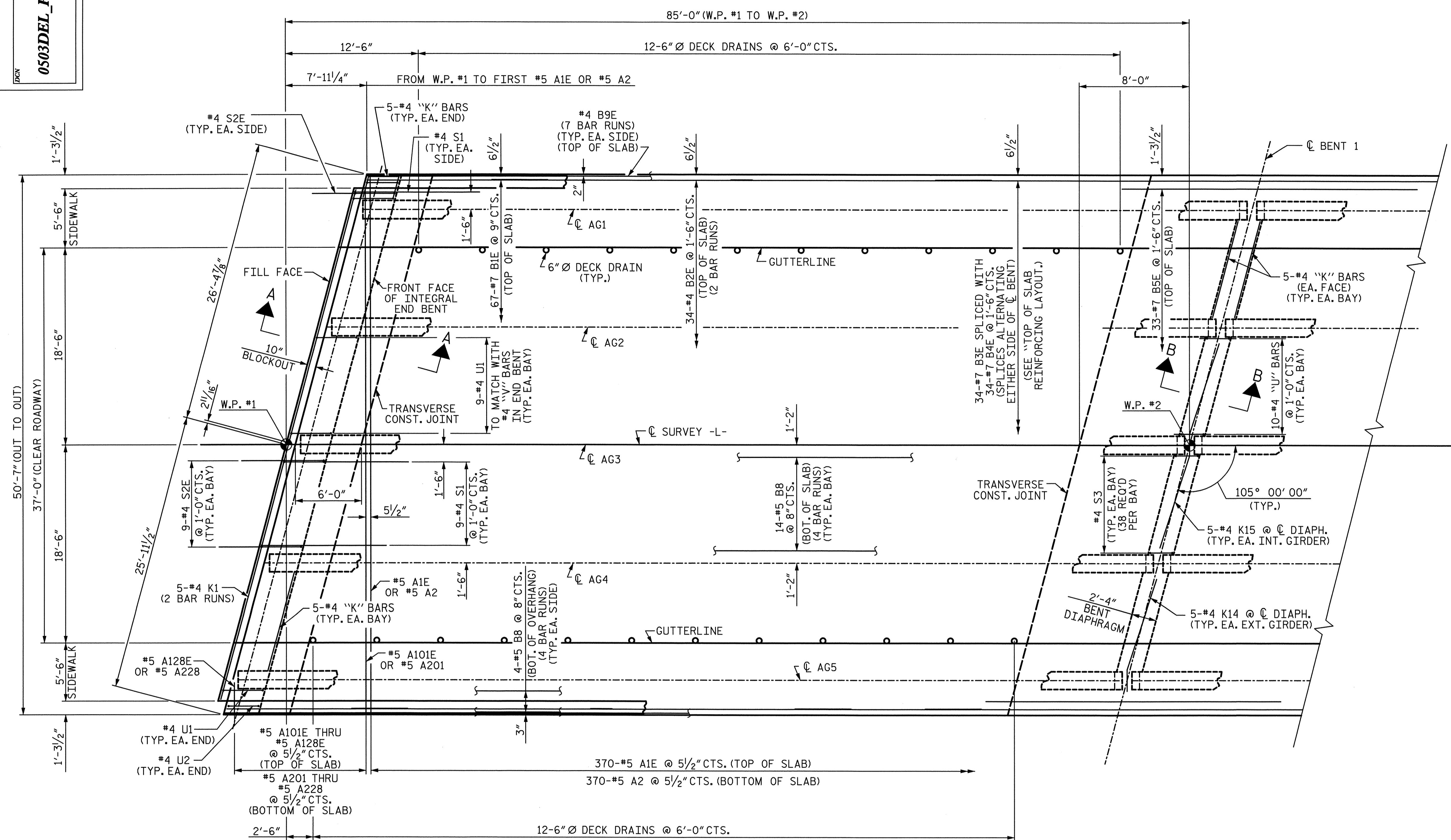
PLANS PREPARED BY:  
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5520 Dillard Drive  
Suite 120  
Cary, NC 27518  
(919) 852-0468  
(919) 852-0598 (Fax)  
www.simpsonengr.com  
LICENSURE NO. C2521



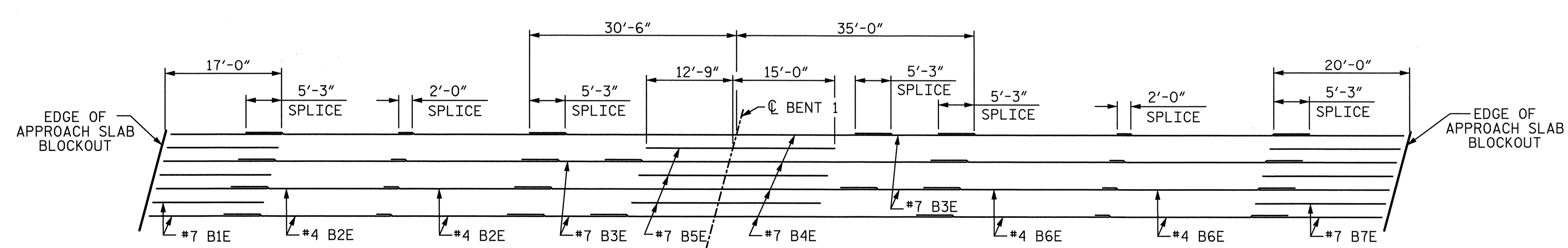


0503DEL\_P21a1

**NOTES:**  
 FOR SIDEWALK DETAILS, SEE "SIDEWALK DETAILS" SHEET.  
 FOR REINFORCING STEEL IN END BENT CAP AND WINGS, SEE "END BENT" SHEETS.  
 FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEETS.  
 FOR SECTIONS A-A AND B-B, SEE "TYPICAL SECTION" SHEET 2 OF 2.



**SPAN A**



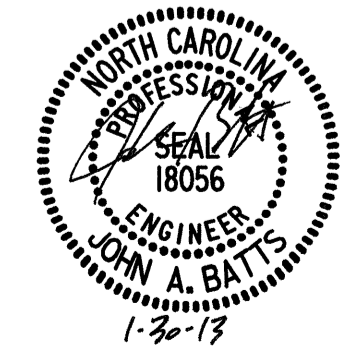
**TOP OF SLAB REINFORCEMENT LAYOUT**

SPLICE #7 B3E AND #7 B4E WITH SPLICE ALTERNATING EITHER SIDE OF C BENT

PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE PLAN OF SPAN A**

PLANS PREPARED BY:  
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 Suite 120  
 Cary, NC 27518  
 (919) 852-0468  
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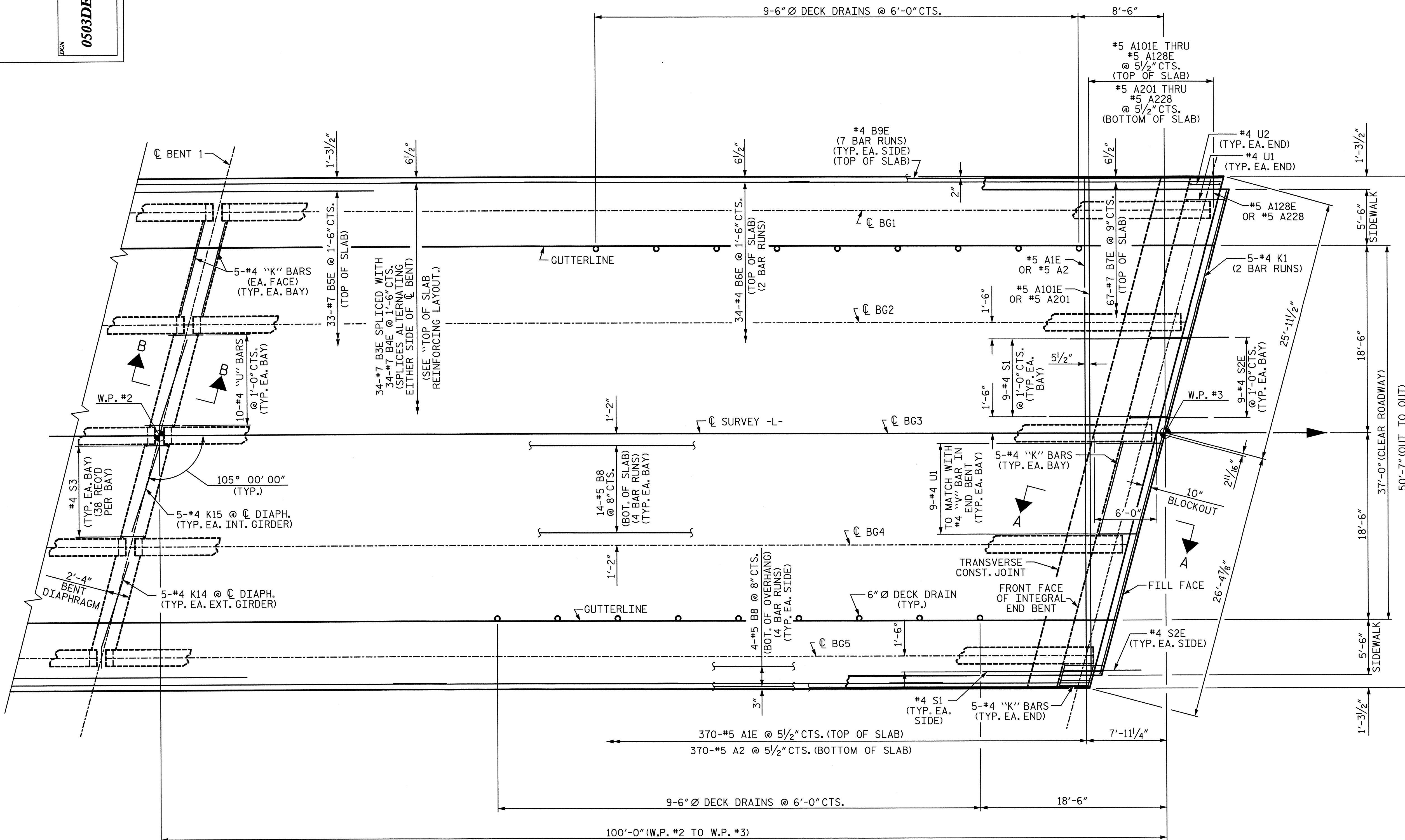
REVISIONS						SHEET NO. S-9
NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			

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 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

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### SPAN B

SEE "TOP OF SLAB REINFORCEMENT LAYOUT" DETAIL ON "PLAN OF SPAN A" SHEET.

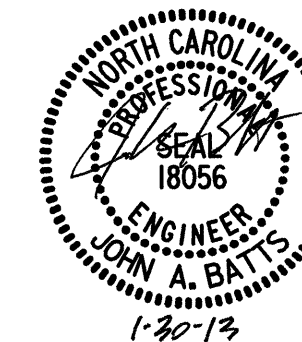
PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 PLAN OF SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			36

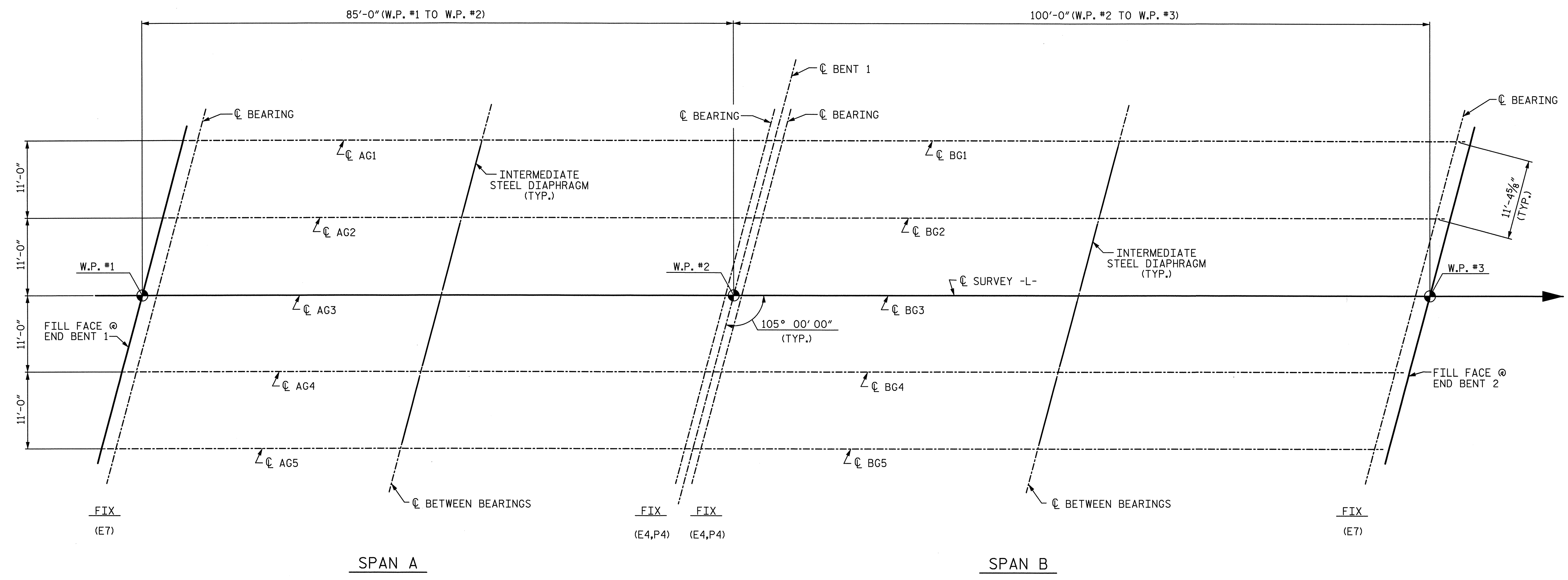
PLANS PREPARED BY:  
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 5520 Dillard Drive  
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 (919) 852-0598 (Fax)  
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DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: John A. Batts DATE: 1-30-13

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GIRDER LAYOUT

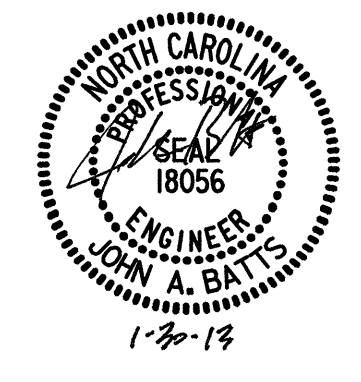
PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 GIRDER LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			36

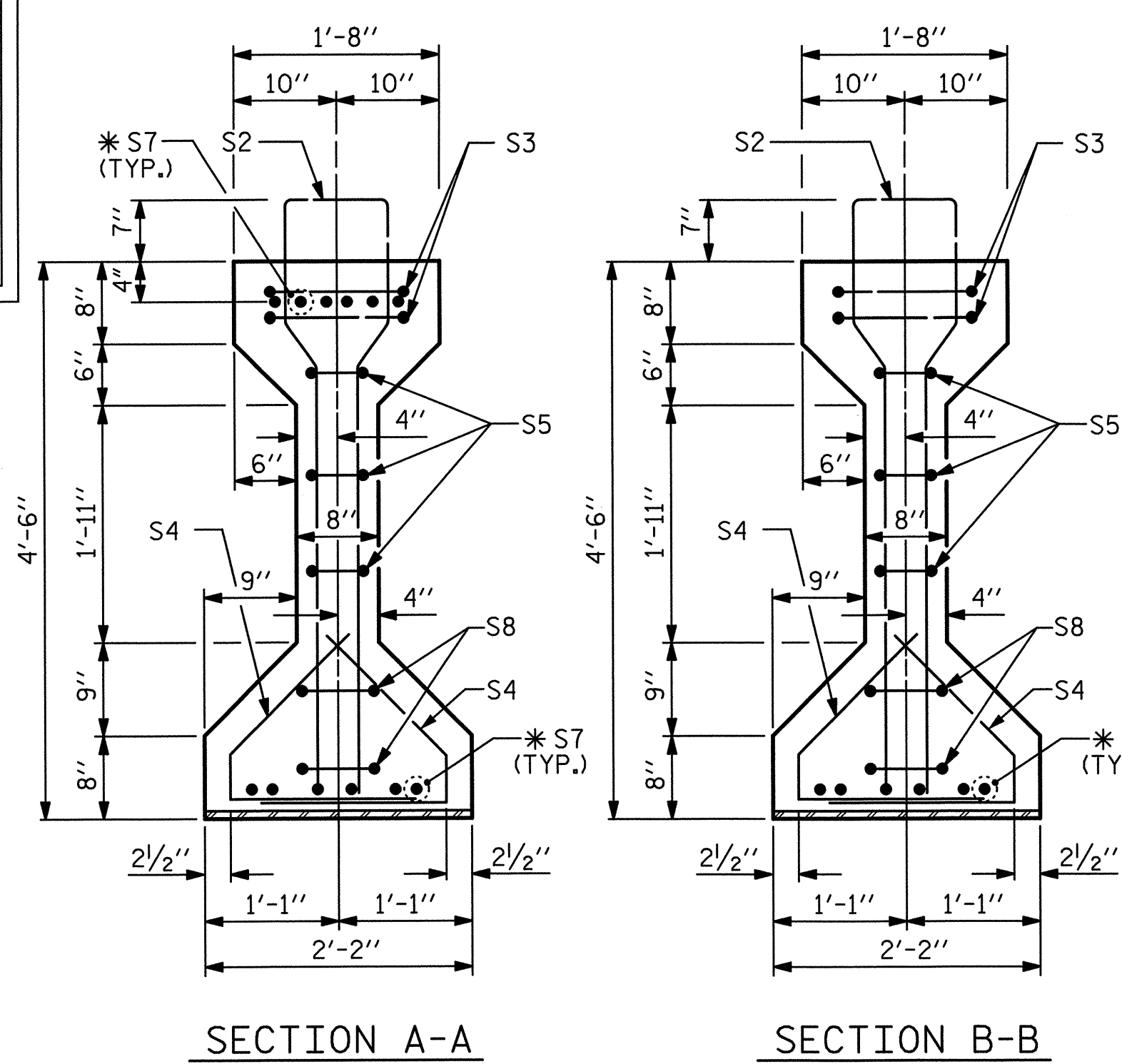
PLANS PREPARED BY:  
**SIMPSON ENGINEERS & ASSOCIATES**  
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 (919) 852-0468  
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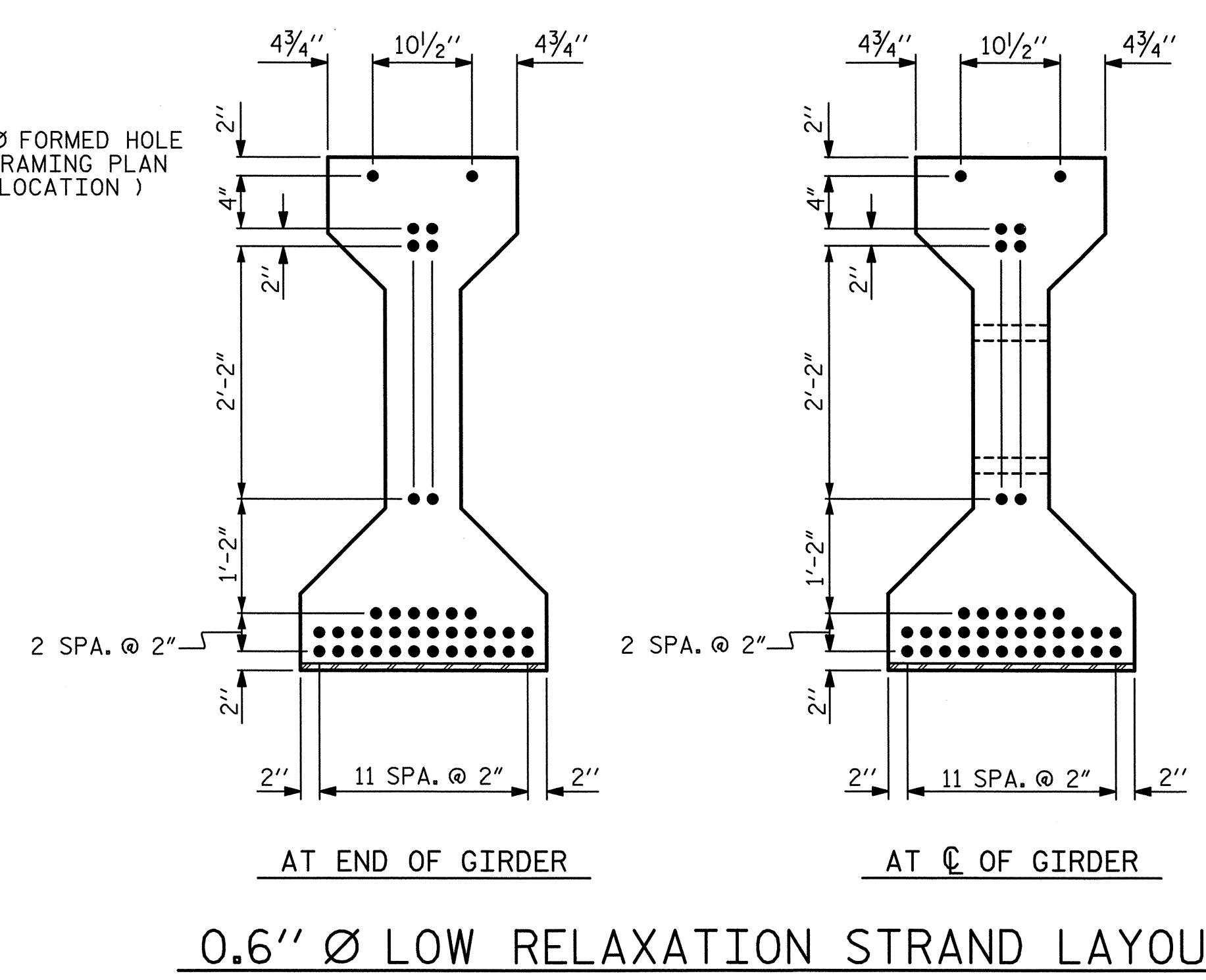
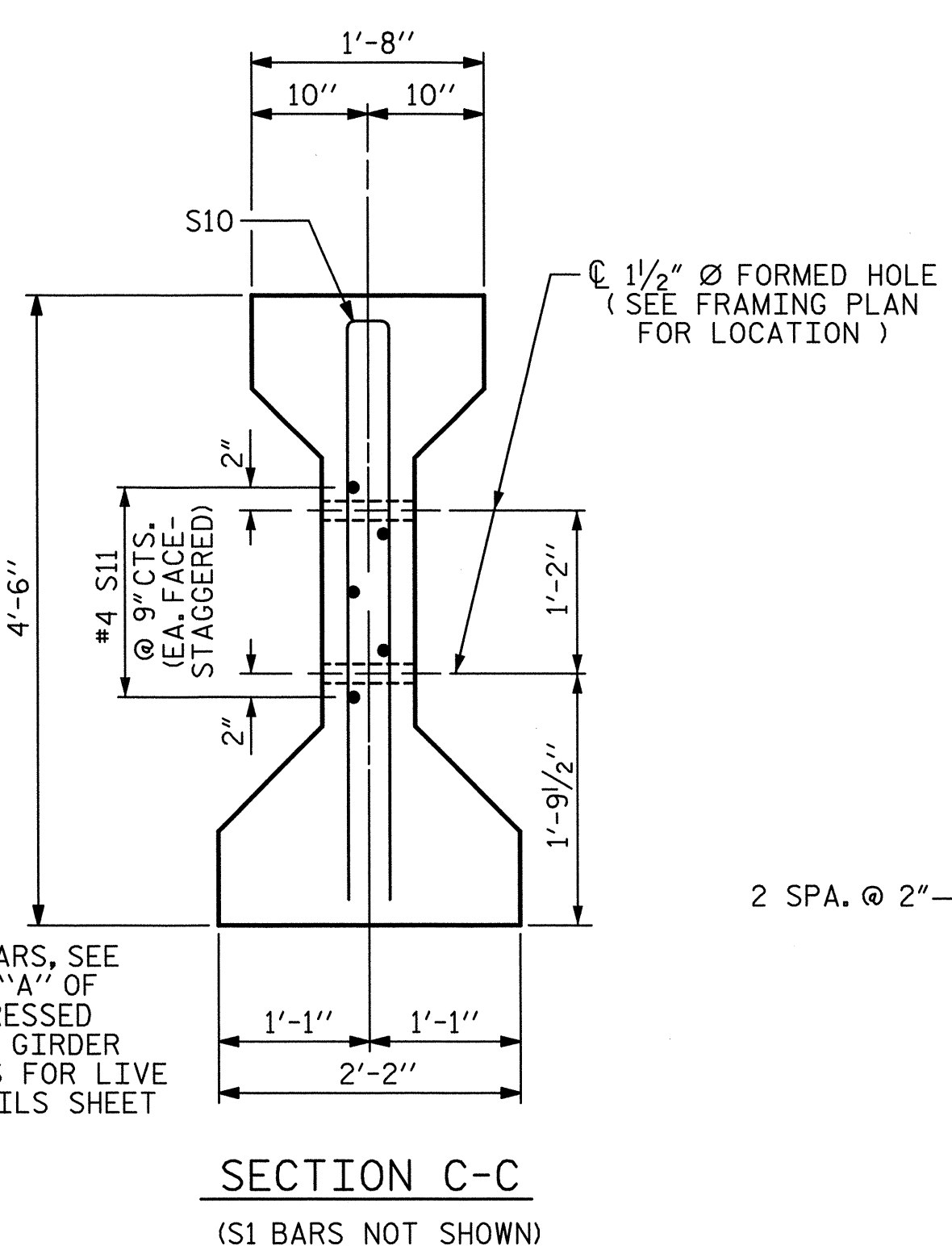
DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-22-13

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



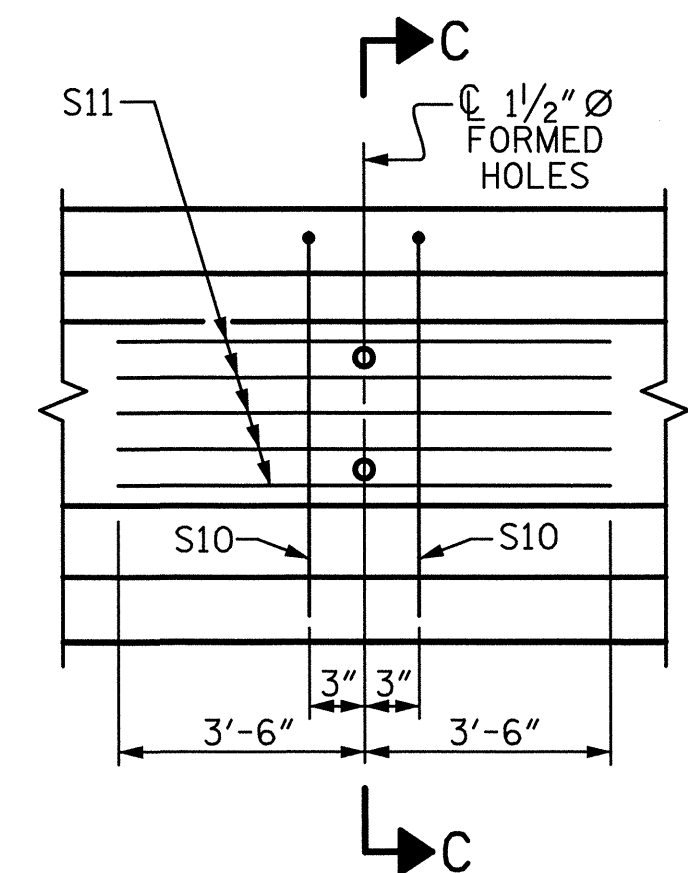
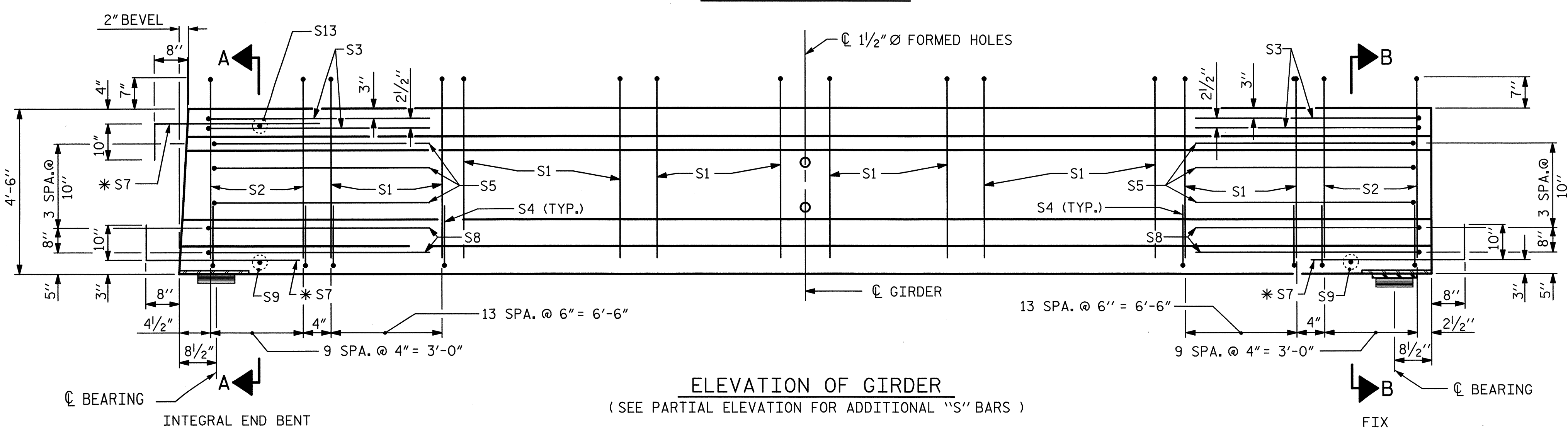
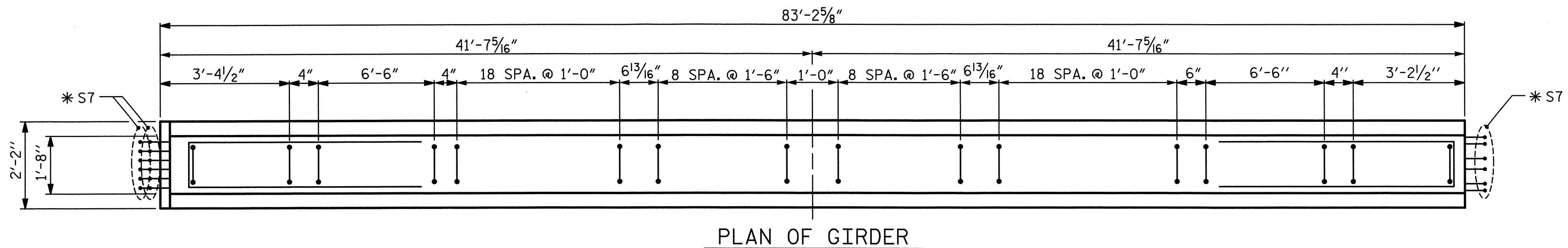
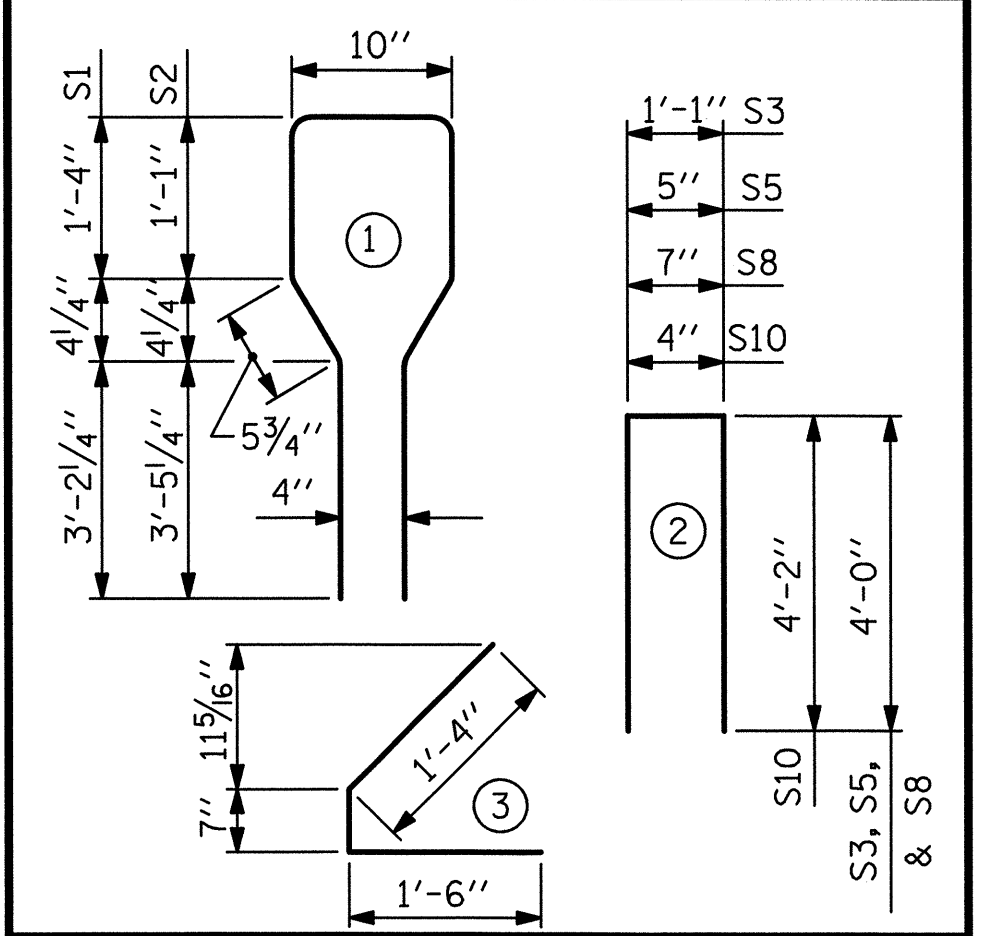
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	84	#4	1	10'-10"	608
S2	20	#6	1	10'-10"	325
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	219
S5	6	#4	2	8'-5"	34
*S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

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

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT-TO-OUT



PARTIAL ELEVATION SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDERS No. 1 THRU 5	1,345	16.9	38

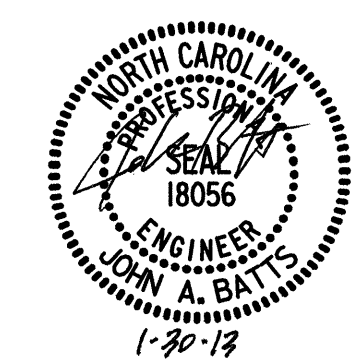
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	83'-2 5/8"	416.09'

PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 AASHTO TYPE IV  
 PRESTRESSED CONCRETE  
 GIRDER CONTINUOUS  
 FOR LIVE LOAD  
 SPAN A

DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: DATE: 1-20-13

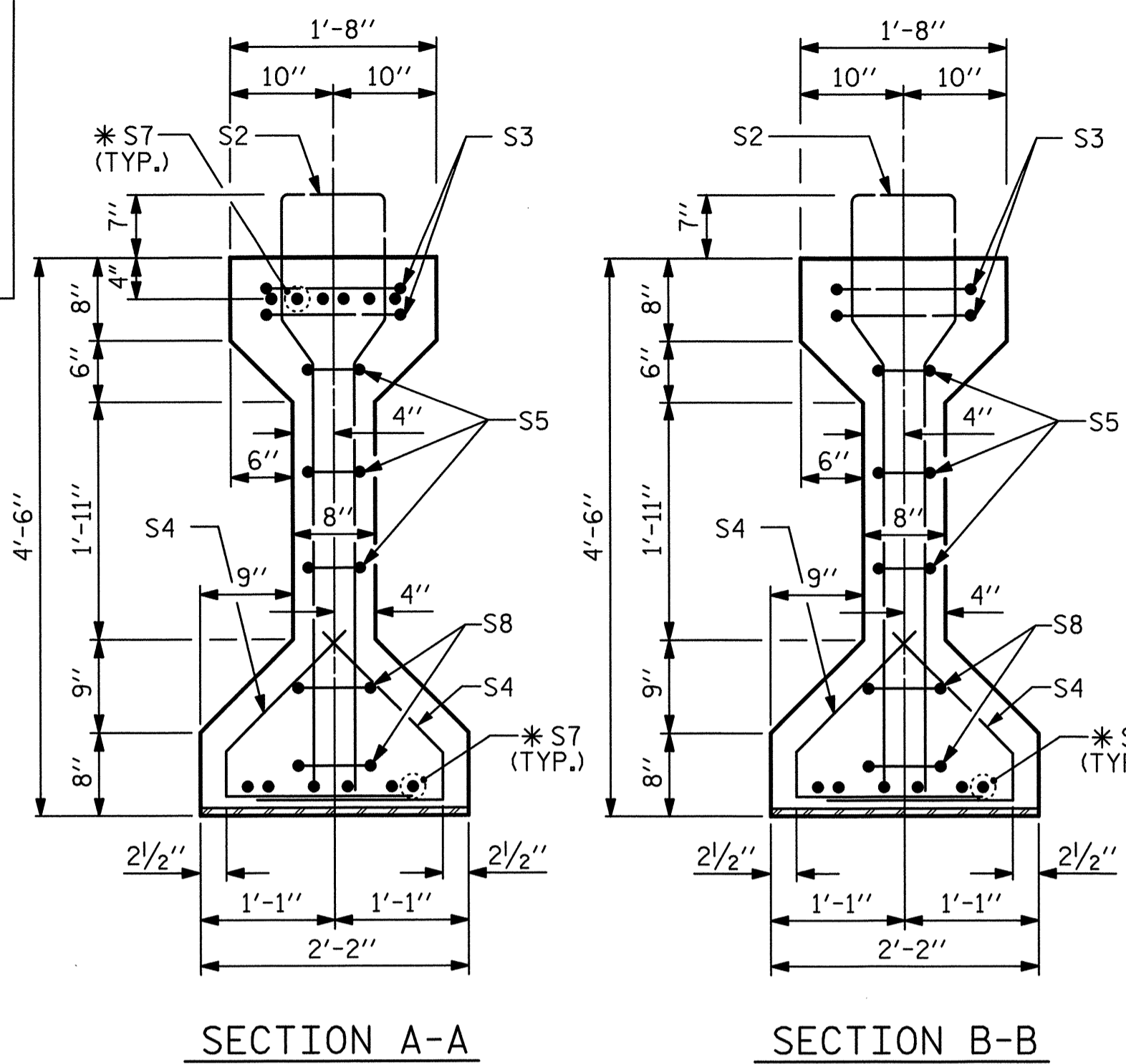
PLANS PREPARED BY:  
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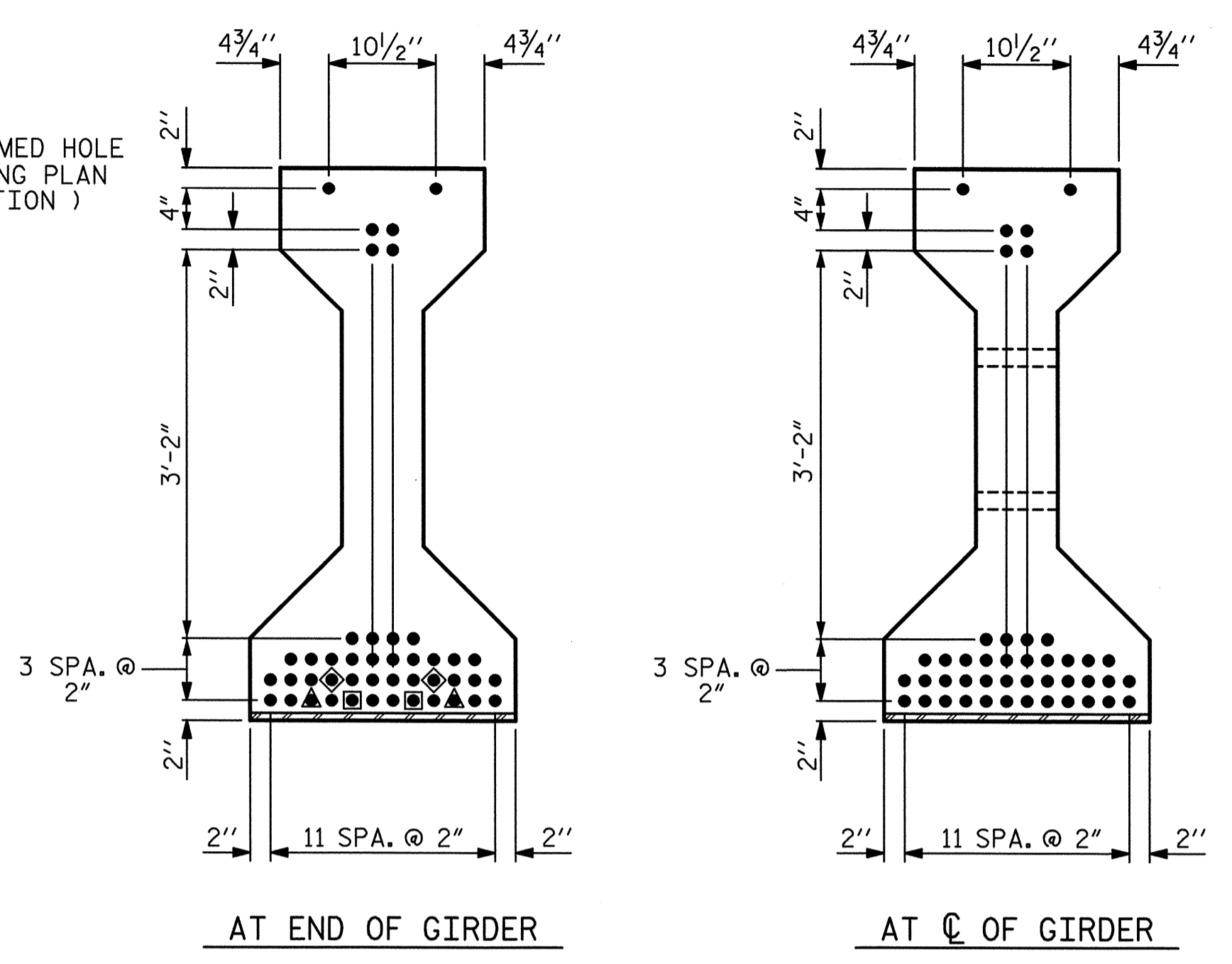
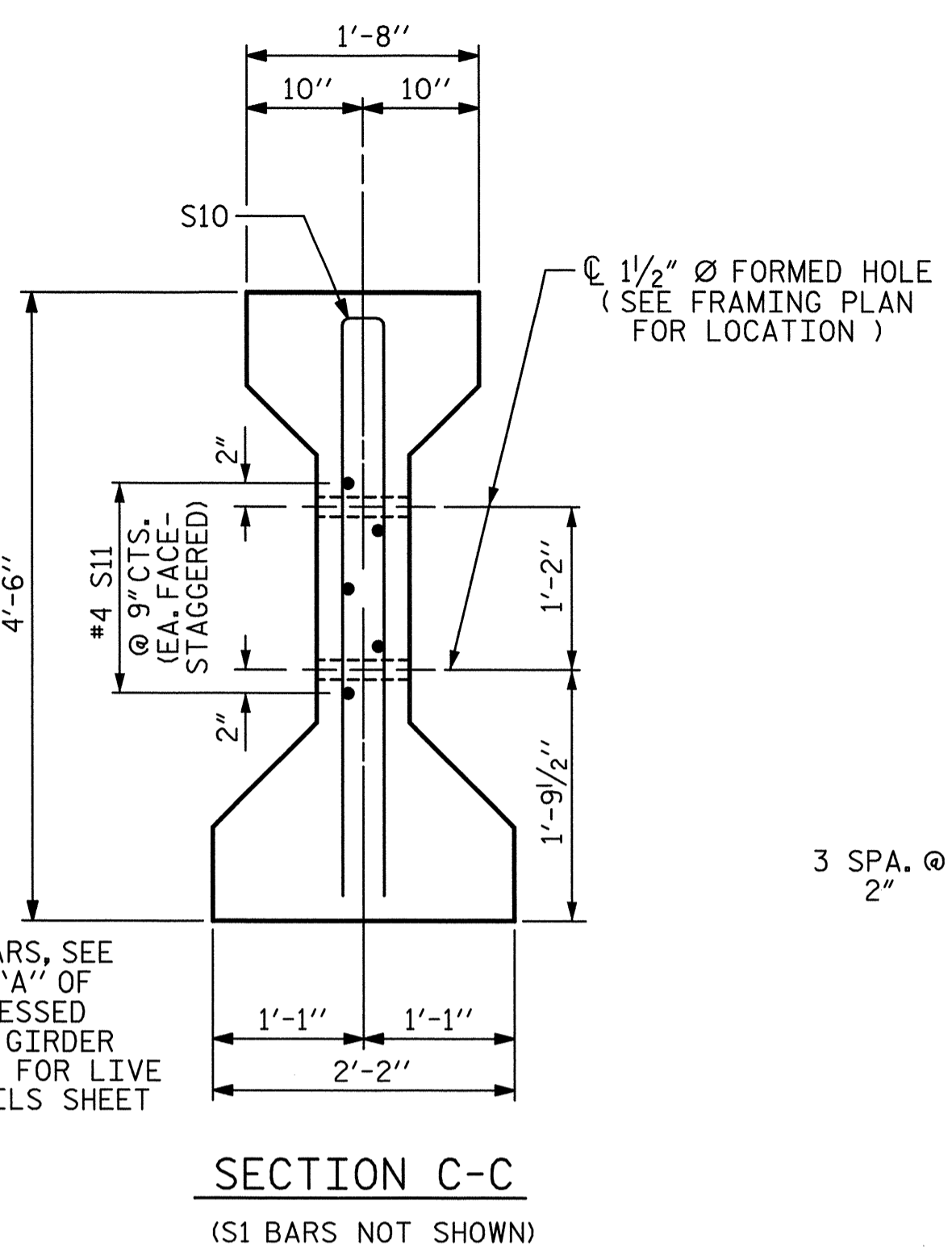
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NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 36
2			4			

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



0.6" Ø LOW RELAXATION STRAND LAYOUT

- STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- ◆ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

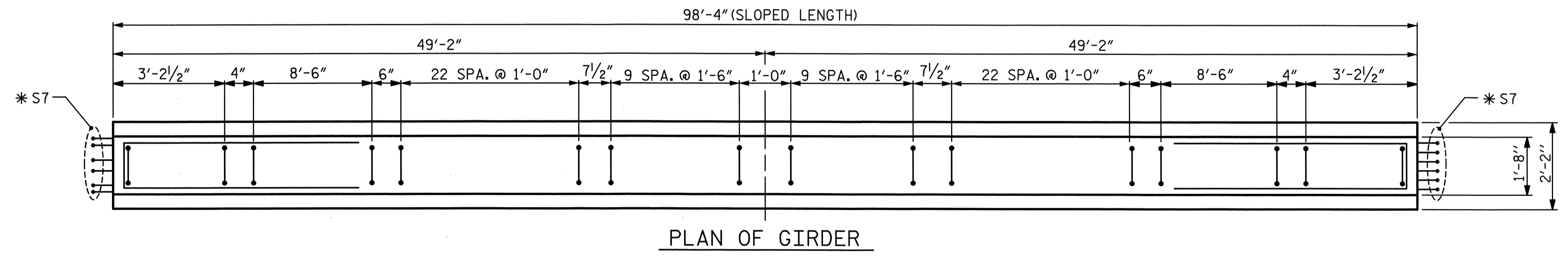
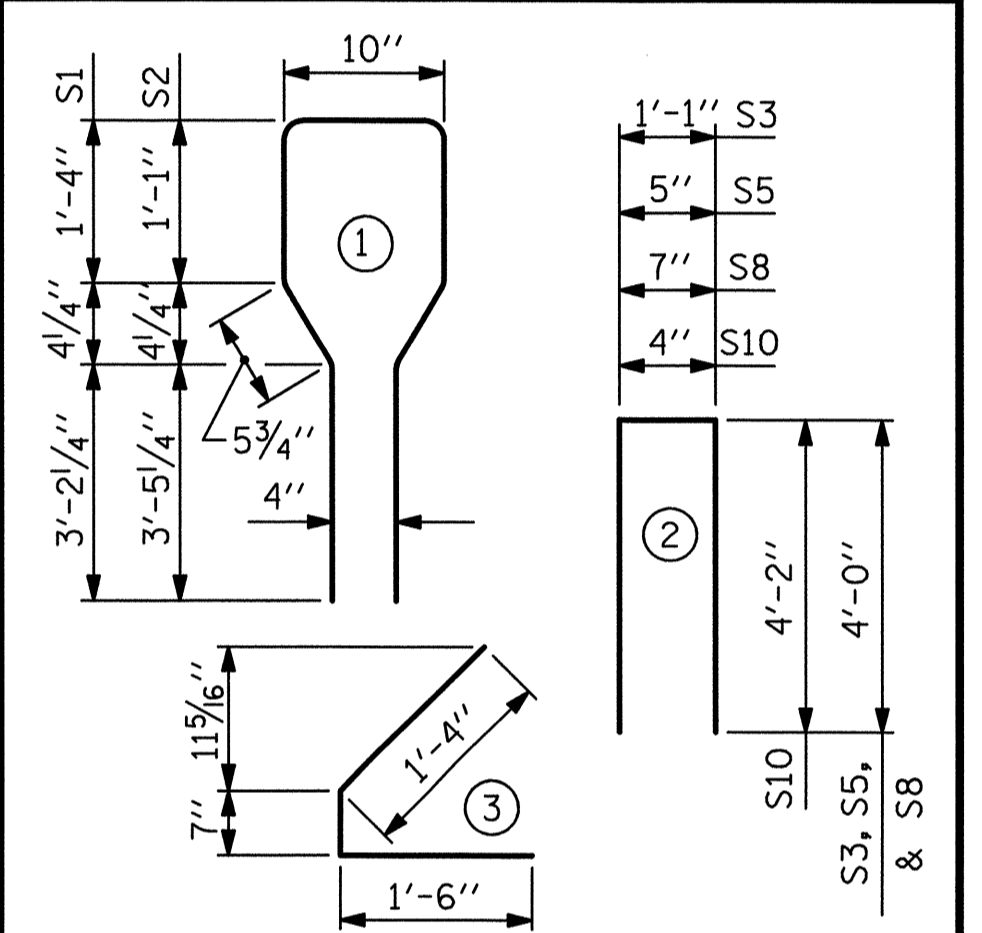
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	102	#4	1	10'-10"	738	
S2	20	#6	1	10'-10"	325	
S3	4	#4	2	9'-1"	24	
S4	112	#4	3	3'-5"	256	
S5	6	#4	2	8'-5"	34	
*S7	18	#5	STR	3'-8"	69	
S8	4	#4	2	8'-7"	23	
S9	2	#3	STR	1'-10"	1	
S10	2	#5	2	8'-8"	18	
S11	5	#4	STR	7'-0"	23	
S13	1	#3	STR	1'-4"	1	

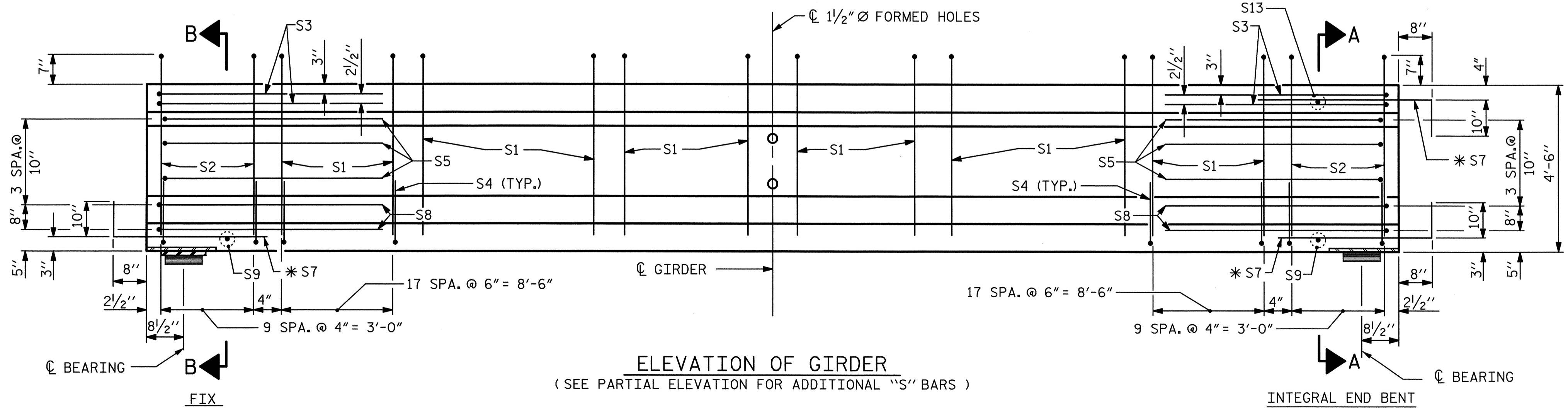
\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

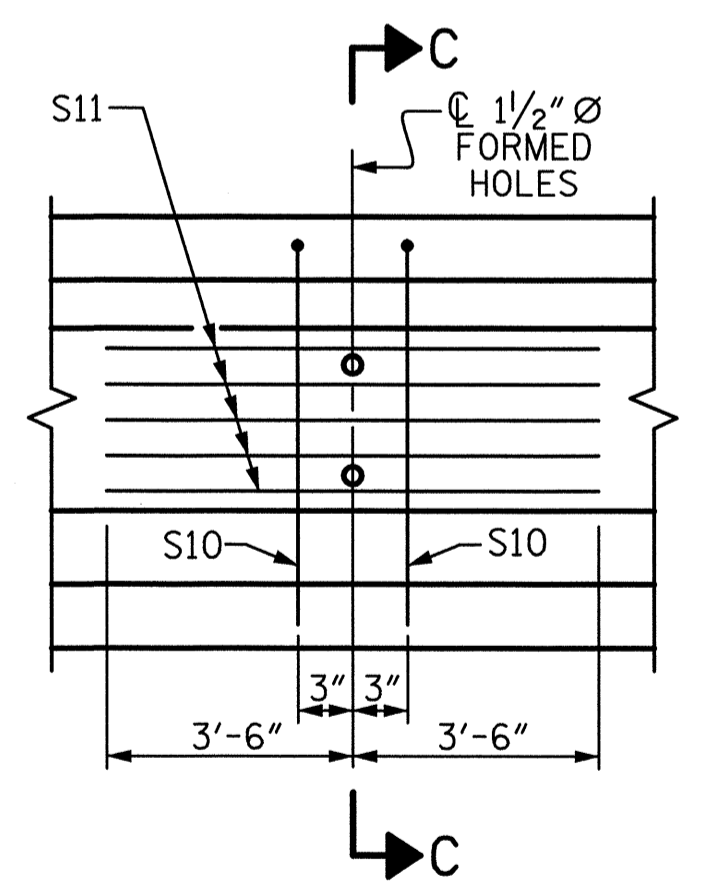
ALL BAR DIMENSIONS ARE OUT-TO-OUT



PLAN OF GIRDER



ELEVATION OF GIRDER (SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

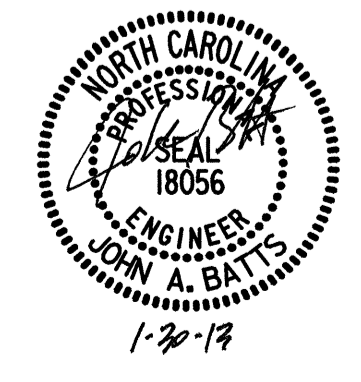
QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDERS No. 1 THRU 5	1,512	19.9	44
GIRDERS REQUIRED			
NUMBER	LENGTH	TOTAL LENGTH	
5	98'-4"	491.67'	

PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
STATION: 65+92.50 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
AASHTO TYPE IV  
PRESTRESSED CONCRETE  
GIRDER CONTINUOUS  
FOR LIVE LOAD  
SPAN B

DRAWN BY: D. G. VESTER DATE: 12-12  
CHECKED BY: J. A. BATTS DATE: 12-12  
DESIGN ENGINEER OF RECORD: DATE: 1-30-13

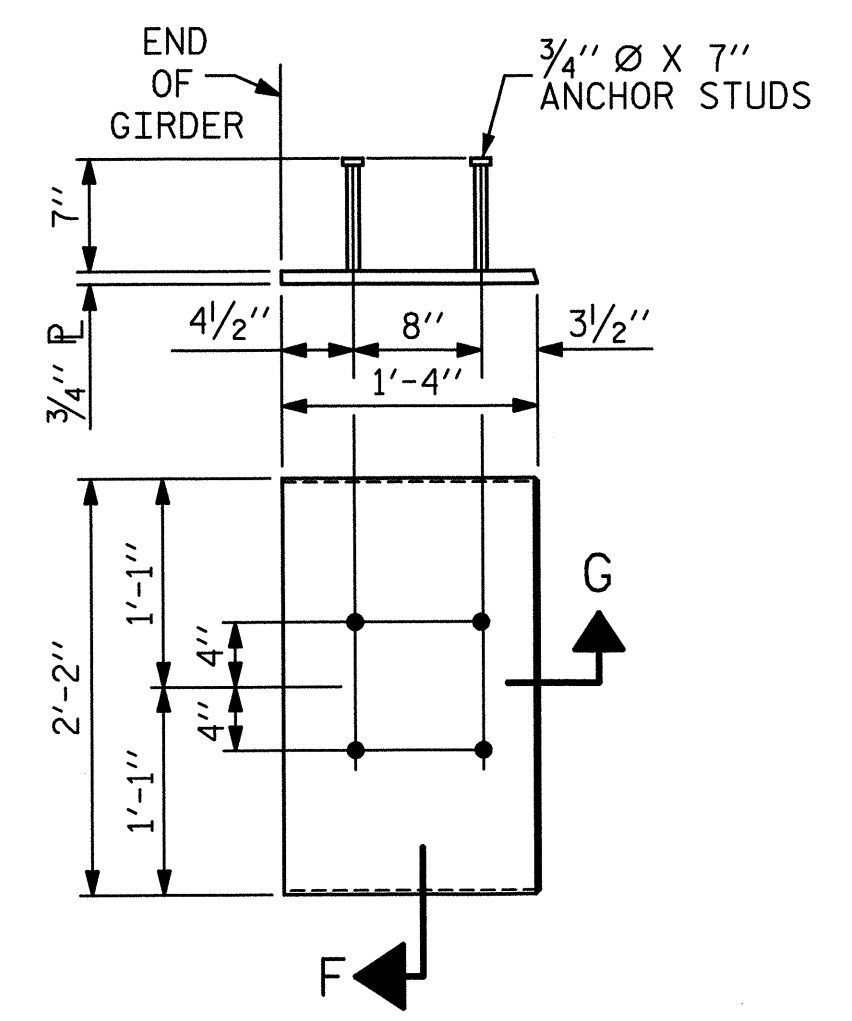
PLANS PREPARED BY:  
SIMPSON ENGINEERS & ASSOCIATES  
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(919) 852-0468  
(919) 852-0598 (Fax)  
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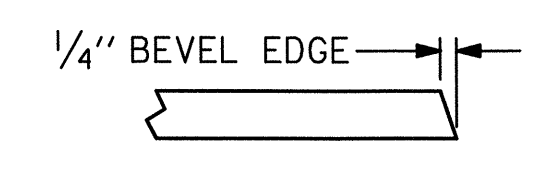
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

S-13  
TOTAL SHEETS 36

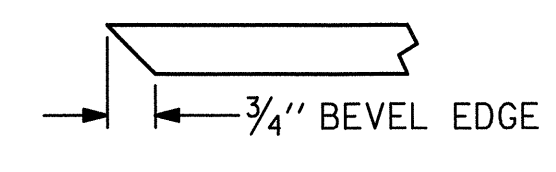
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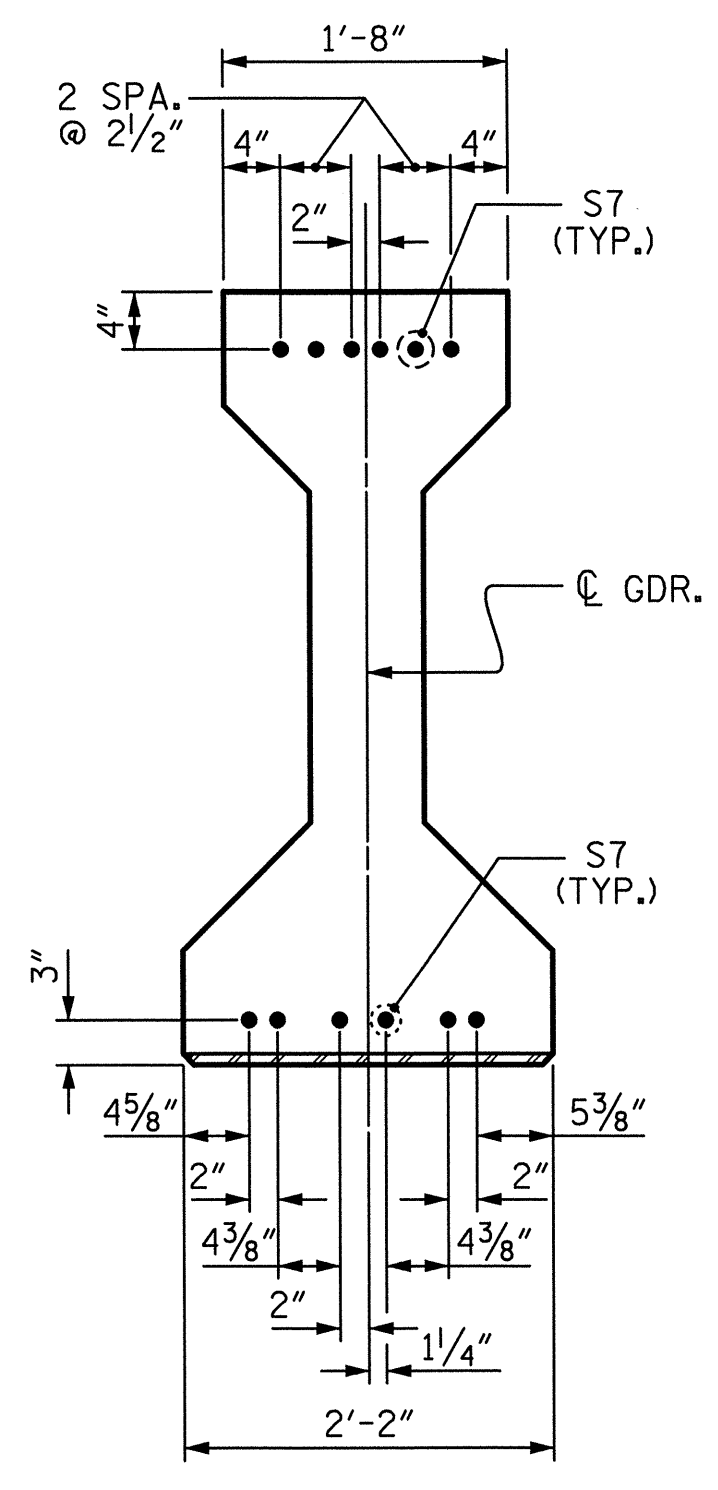
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDERS  
(2 REQ'D PER GIRDER)



SECTION "G"



SECTION "F"  
(SEE NOTES)



DETAIL "A"

NOTES:

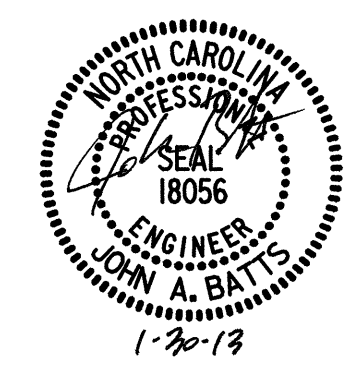
- ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- ALL REINFORCING STEEL SHALL BE GRADE 60.
- EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE 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 6500 PSI FOR SPAN A OR 7000 PSI FOR SPAN B.
- 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".
- 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.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																							
SPAN A																							
0.6" Ø LOW RELAXATION	GIRDERS A1 & A5											GIRDERS 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)	↑	0.000	0.081	0.140	0.180	0.203	0.211	0.203	0.180	0.140	0.081	0.000	0.000	0.081	0.140	0.180	0.203	0.211	0.203	0.180	0.140	0.081	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.027	0.053	0.073	0.086	0.091	0.086	0.073	0.053	0.027	0.000	0.000	0.031	0.061	0.084	0.099	0.105	0.099	0.084	0.061	0.031	0.000
FINAL CAMBER	↑	0	5/8"	1 1/16"	1 5/16"	1 3/8"	1 7/16"	1 3/8"	1 5/16"	1 1/16"	5/8"	0	0	5/8"	1 5/16"	1 1/8"	1 1/4"	1 1/4"	1 1/4"	1 1/8"	1 5/16"	5/8"	0
SPAN B																							
0.6" Ø LOW RELAXATION	GIRDERS B1 & B5											GIRDERS 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)	↑	0.000	0.122	0.213	0.276	0.312	0.324	0.312	0.276	0.213	0.122	0.000	0.000	0.122	0.213	0.276	0.312	0.324	0.312	0.276	0.213	0.122	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.051	0.101	0.140	0.164	0.173	0.164	0.140	0.101	0.051	0.000	0.000	0.059	0.116	0.161	0.190	0.199	0.190	0.161	0.116	0.059	0.000
FINAL CAMBER	↑	0	7/8"	1 3/8"	1 5/8"	1 3/4"	1 13/16"	1 3/4"	1 5/8"	1 3/8"	7/8"	0	0	3/4"	1 3/16"	1 3/8"	1 1/2"	1 1/2"	1 1/2"	1 3/8"	1 3/16"	3/4"	0

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

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PRESTRESSED CONCRETE  
GIRDER CONTINUOUS  
FOR LIVE LOAD  
DETAILS



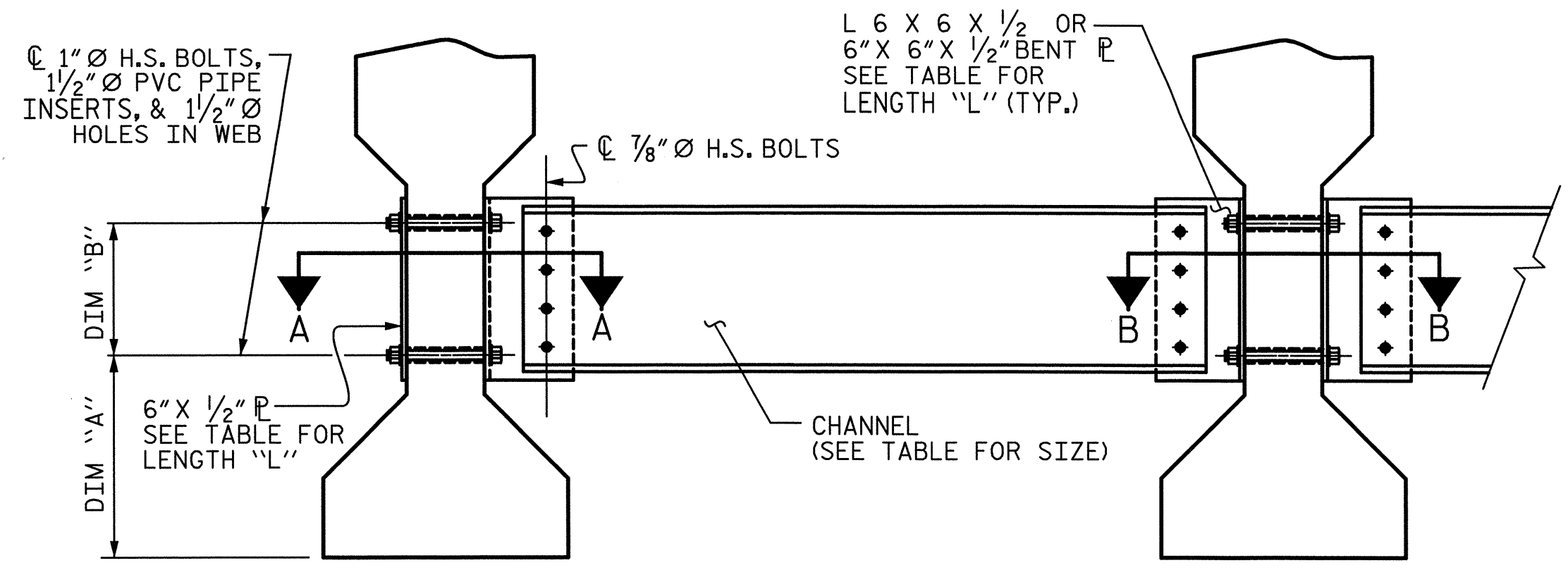
PLANS PREPARED BY:  
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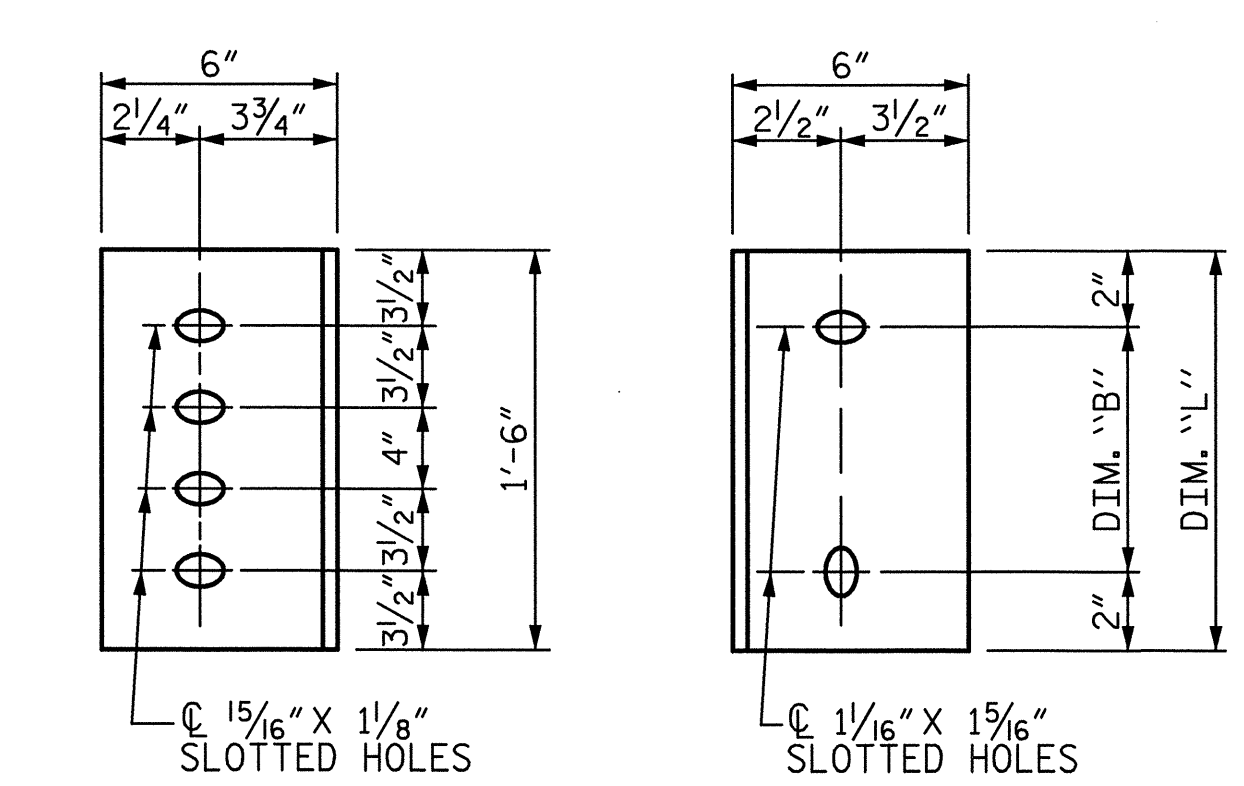
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EXTERIOR GIRDER  
INTERIOR GIRDER  
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE  
WEB FACE  
CONNECTOR PLATE DETAILS

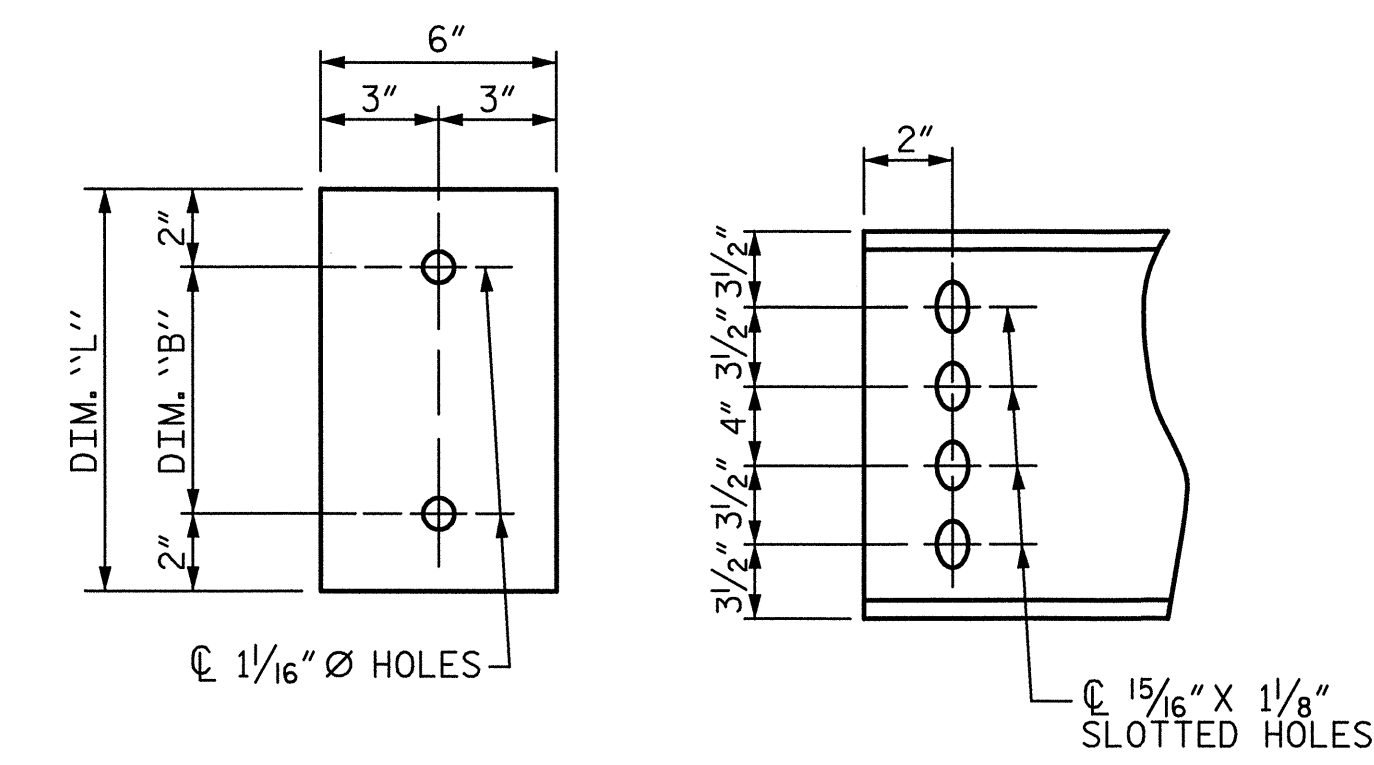
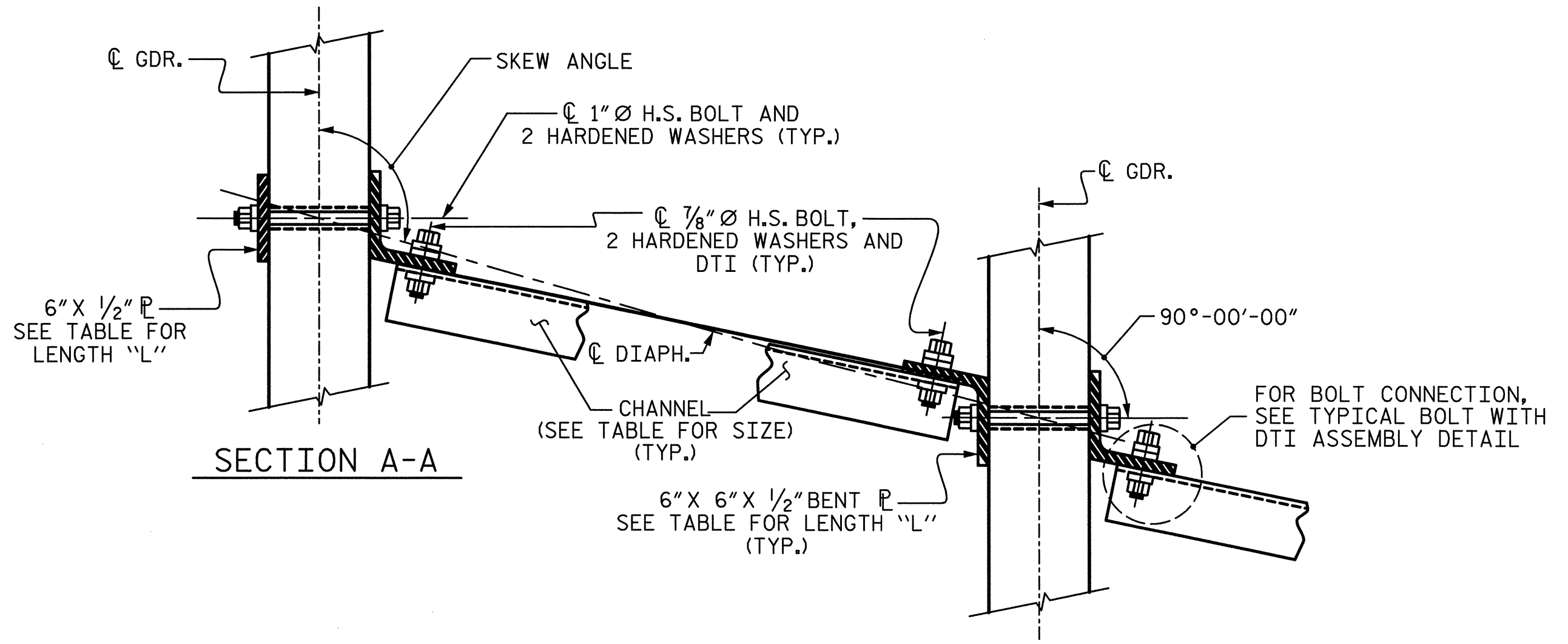
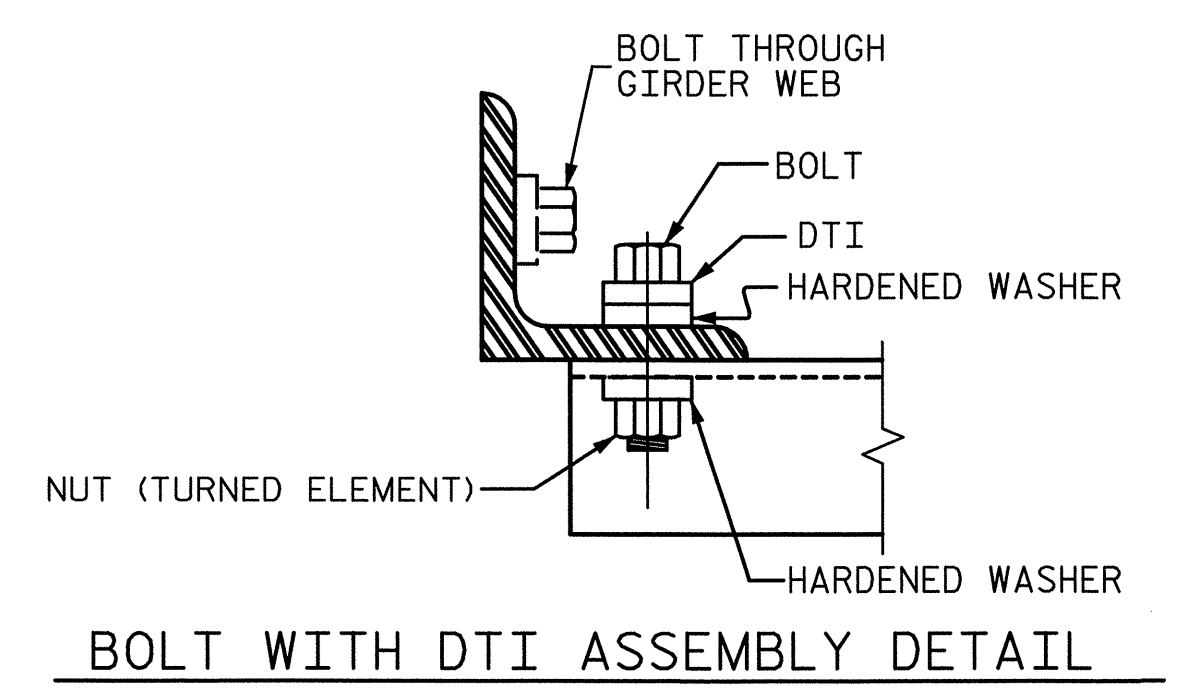


PLATE DETAILS  
CHANNEL END



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

**STRUCTURAL STEEL NOTES:**

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL 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, CHANNELS, 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

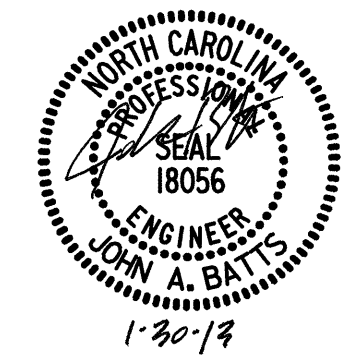
GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"

PROJECT NO. P-5208E  
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STATE OF NORTH CAROLINA  
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 RALEIGH  
 SUPERSTRUCTURE  
 INTERMEDIATE  
 STEEL DIAPHRAGMS  
 FOR TYPE IV  
 PRESTRESSED CONCRETE  
 GIRDERS

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			36

PLANS PREPARED BY:  
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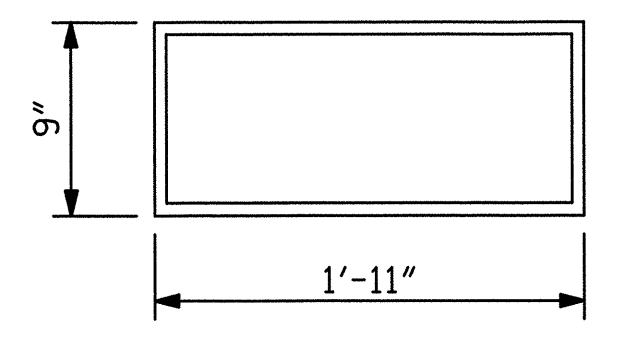
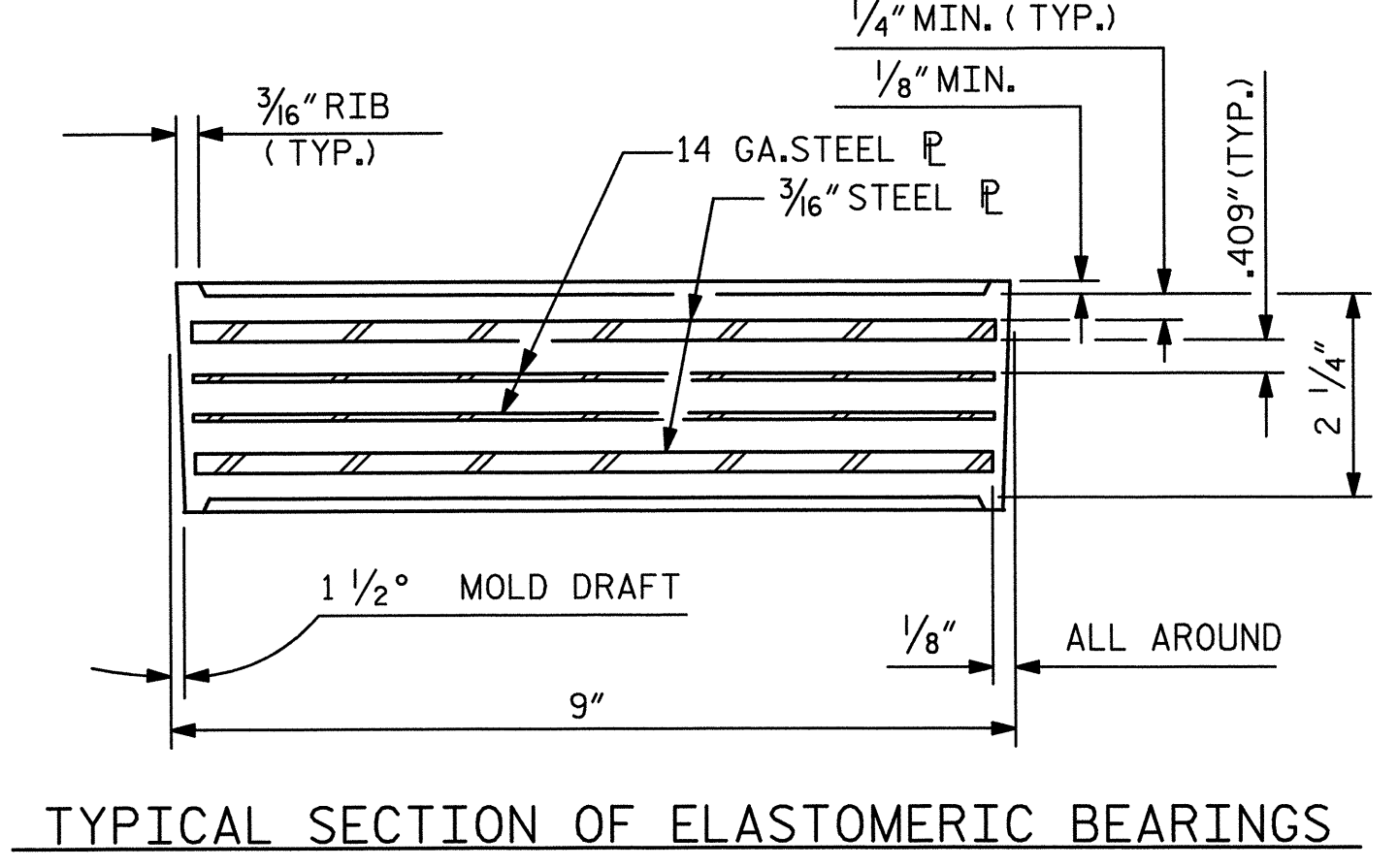
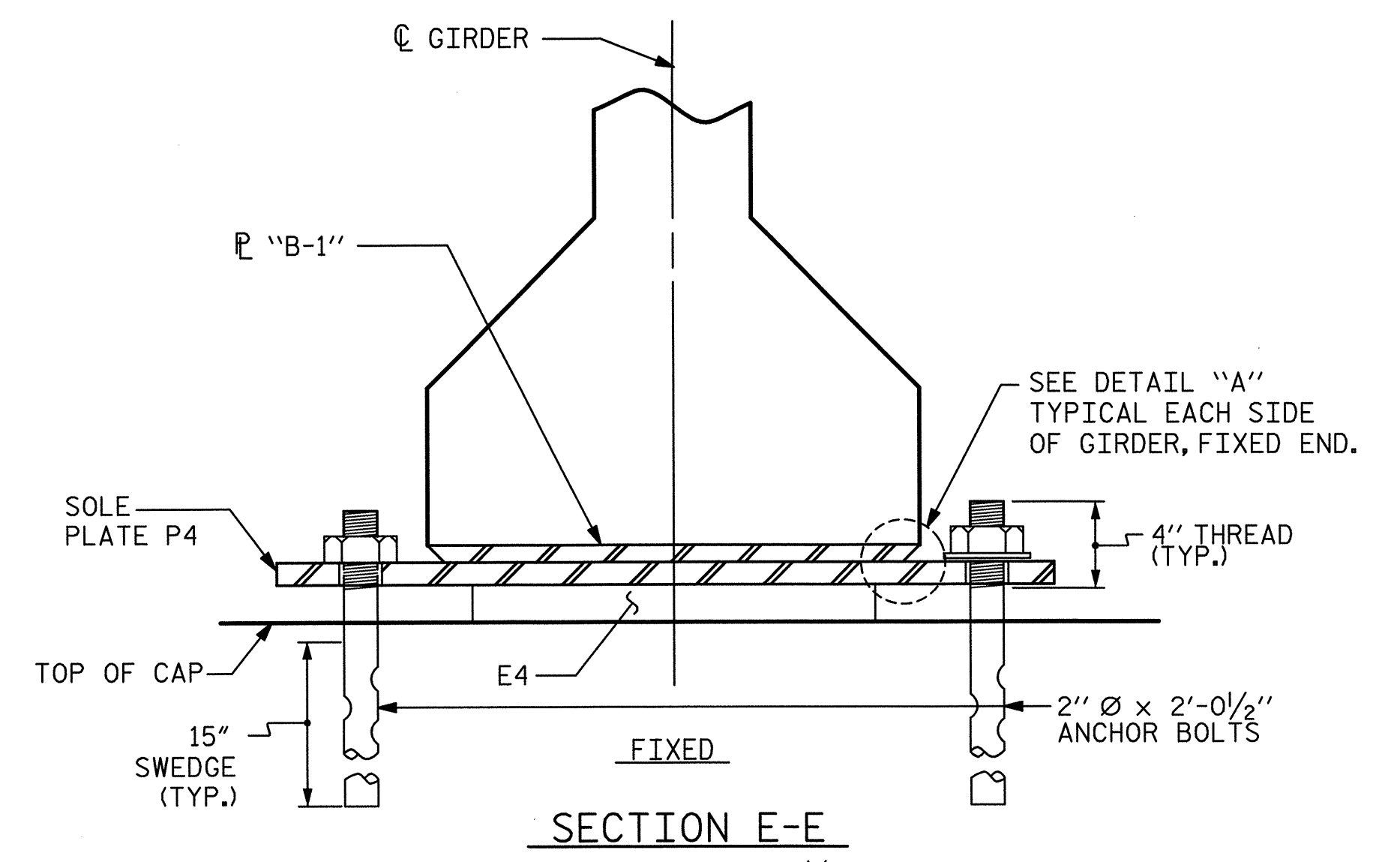


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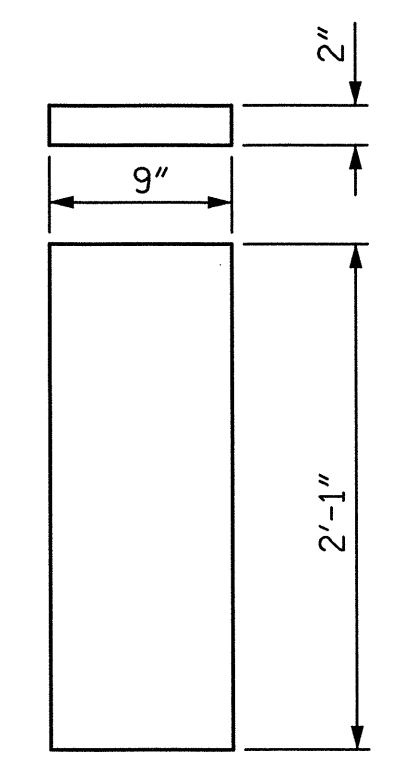
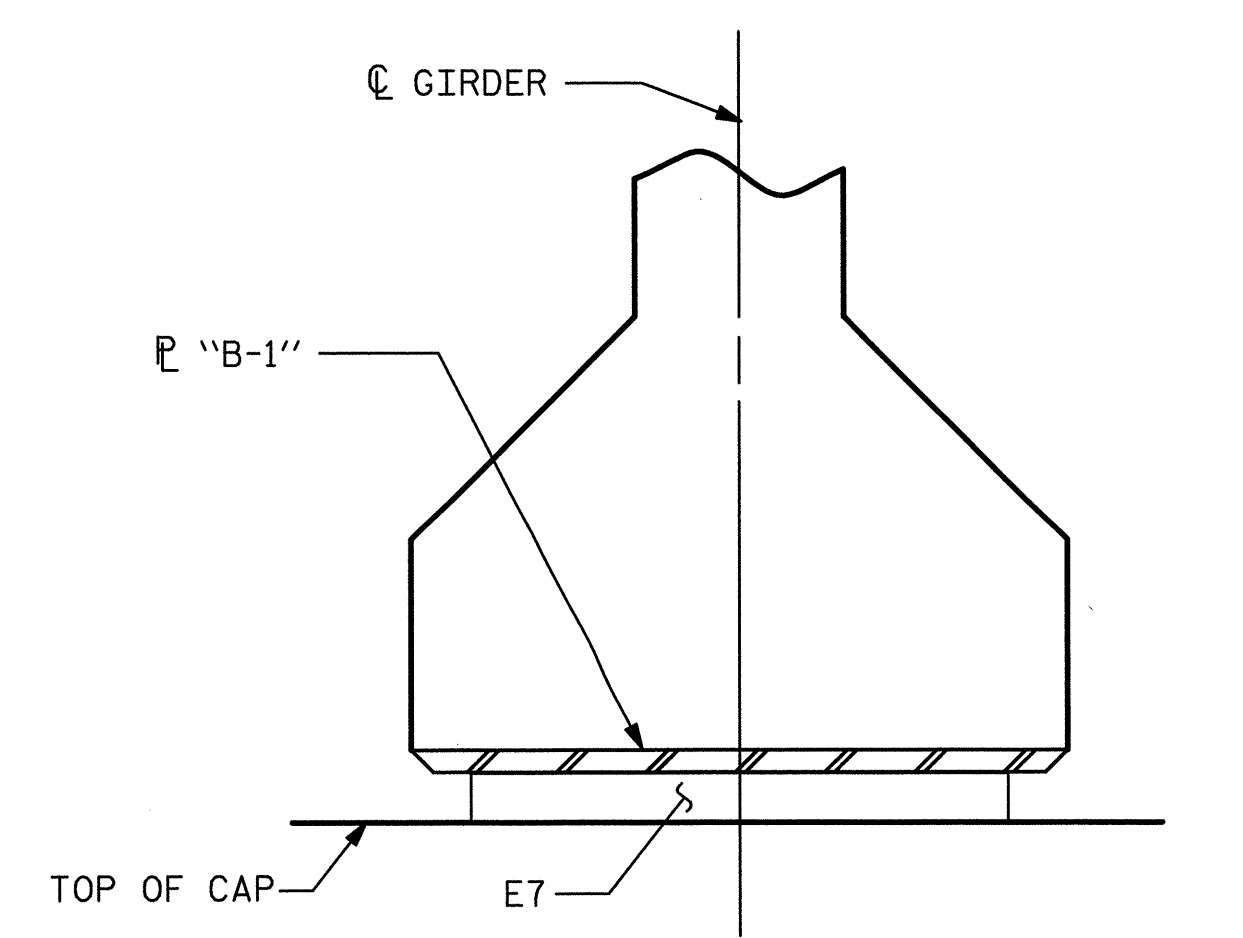
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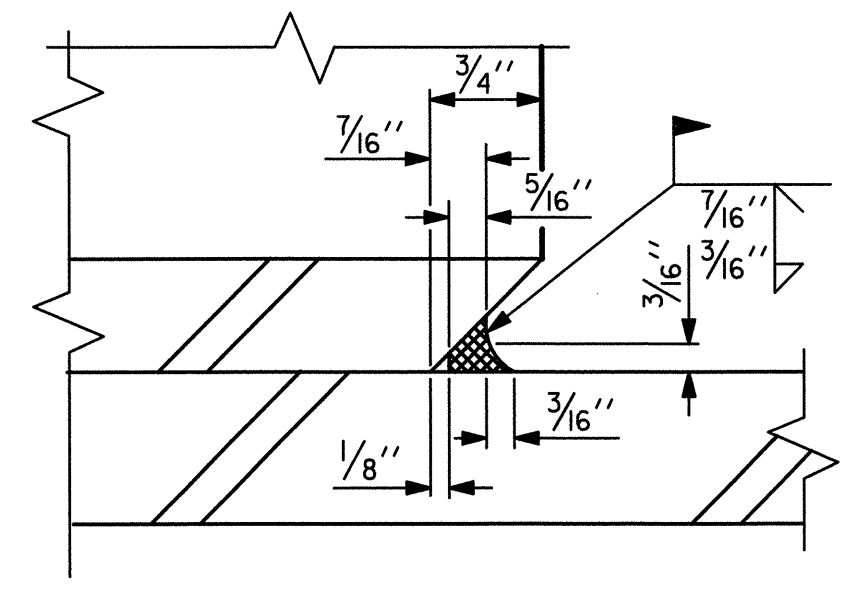
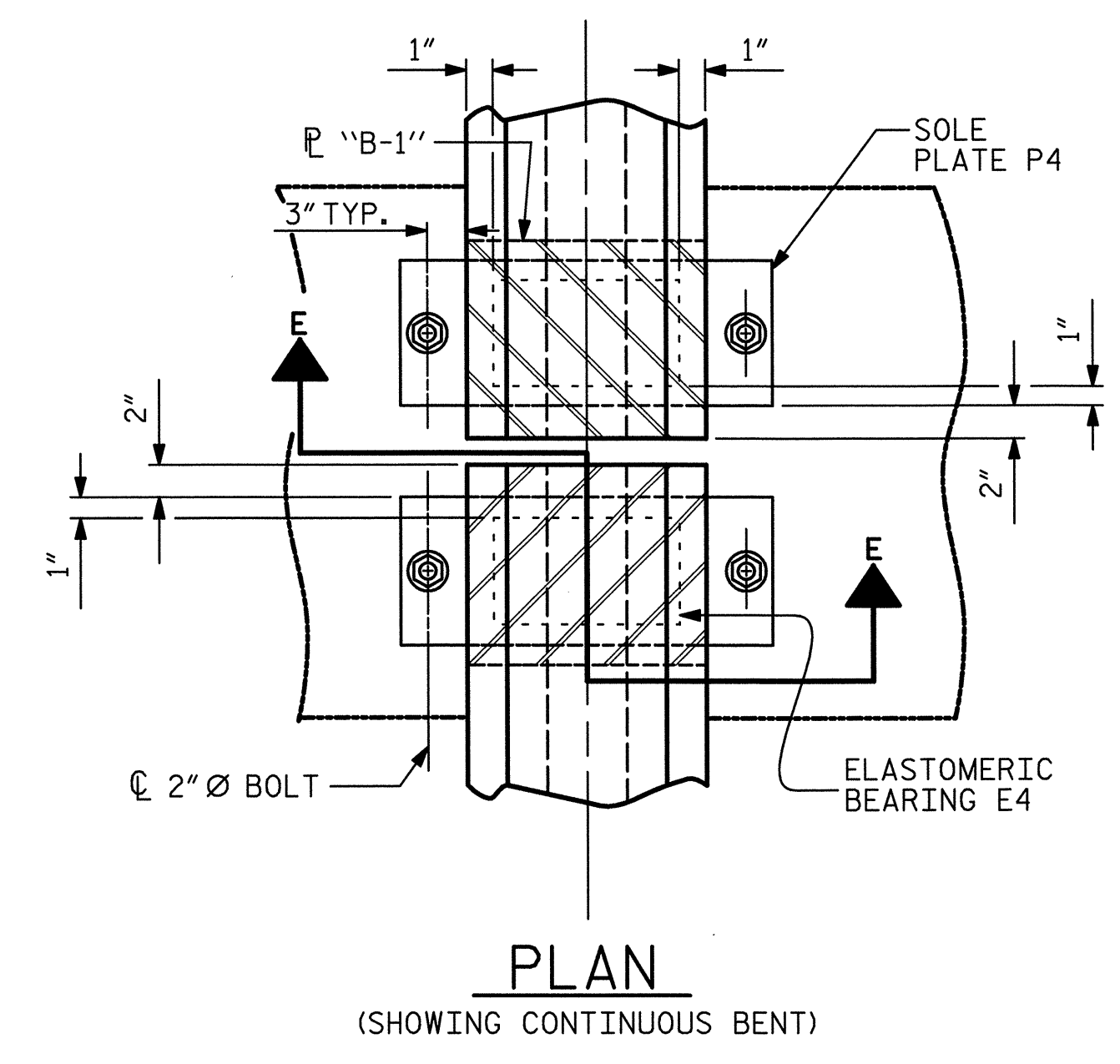


PLAN VIEW OF ELASTOMERIC BEARING  
TYPE V

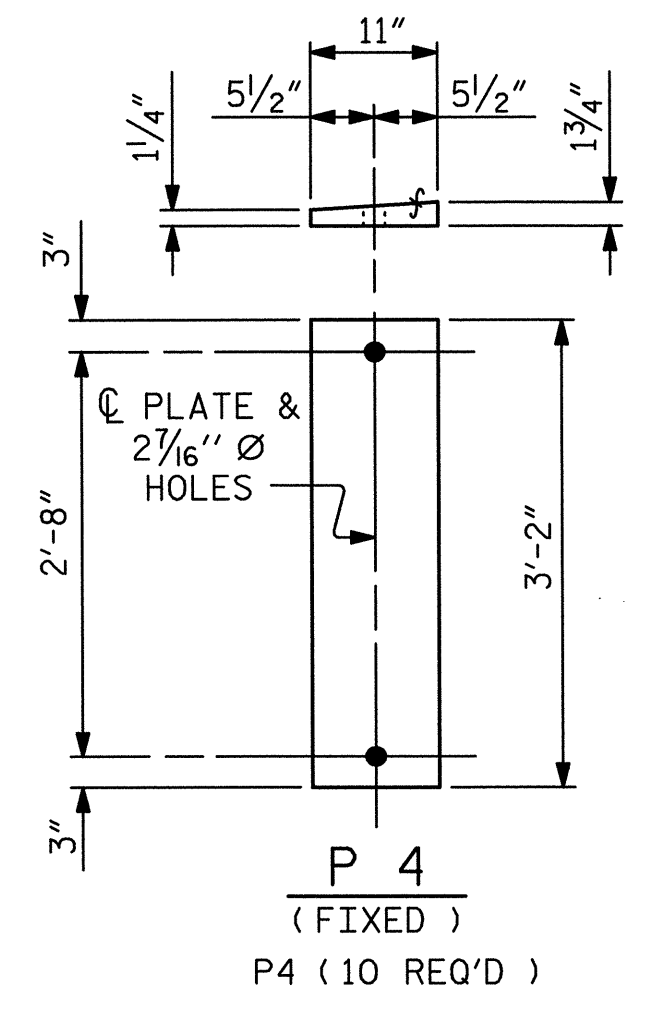


ELEVATION VIEW AT END BENTS  
PLAIN ELASTOMERIC BEARING

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DETAIL "A"



SOLE PLATE DETAILS ("P")

**NOTES:**

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

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

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

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

SOLE PLATE "P", BOLTS, NUTS, 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.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 36.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	334 k

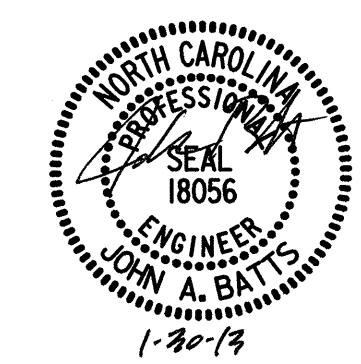
PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 ELASTOMERIC BEARING  
 DETAILS**

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1			3			TOTAL SHEETS
2			4			36

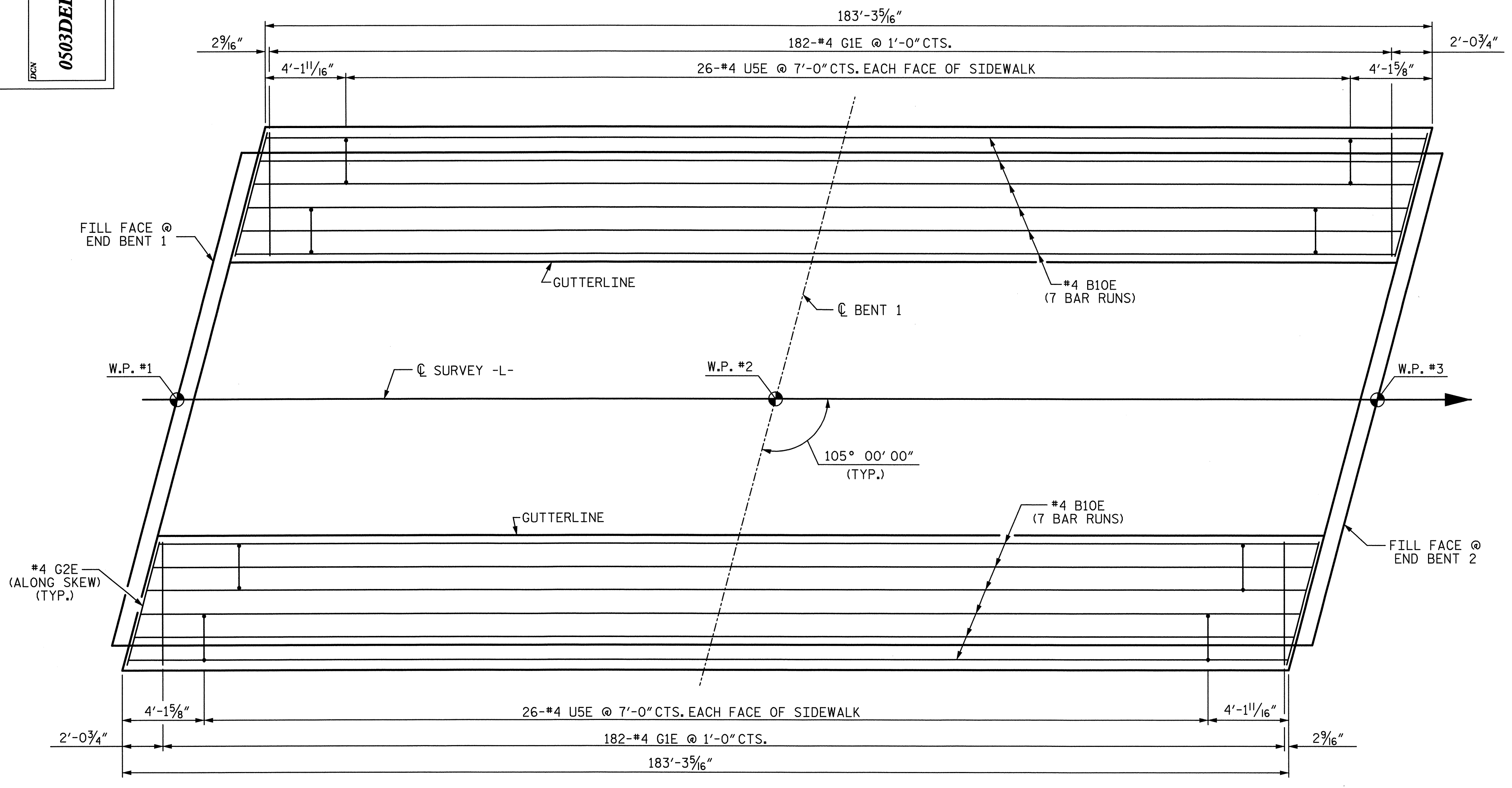
PLANS PREPARED BY:  
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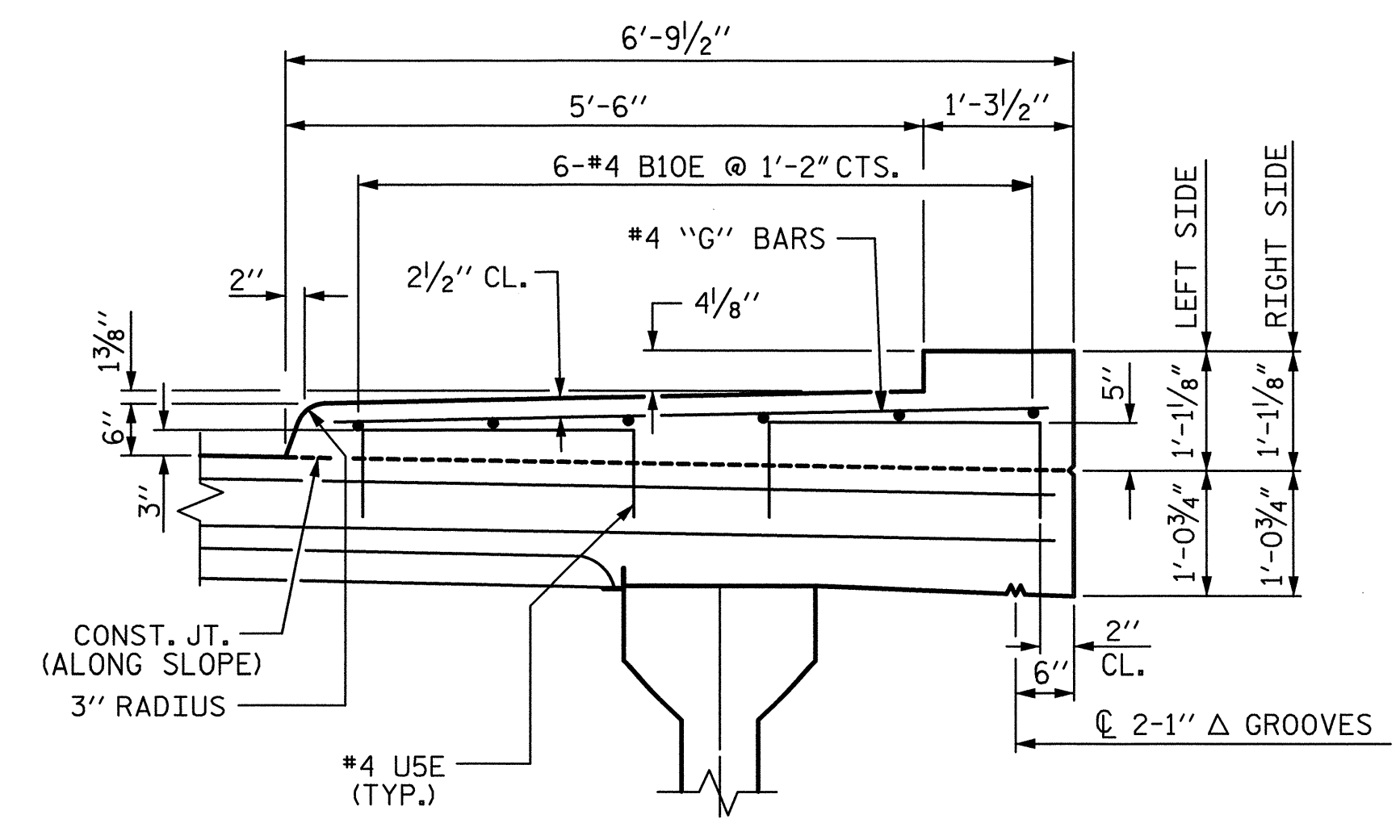


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PLAN OF SIDEWALK



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.

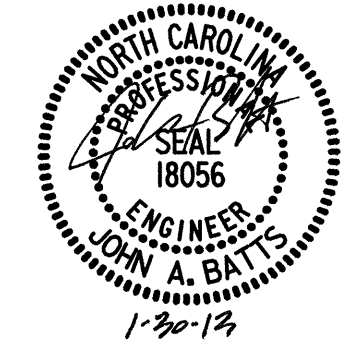
USE BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

PROJECT NO. P-5208E  
**MECKLENBURG & CABARRUS COUNTY**  
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STATE OF NORTH CAROLINA  
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**SUPERSTRUCTURE  
 SIDEWALK DETAILS**

PLANS PREPARED BY:  
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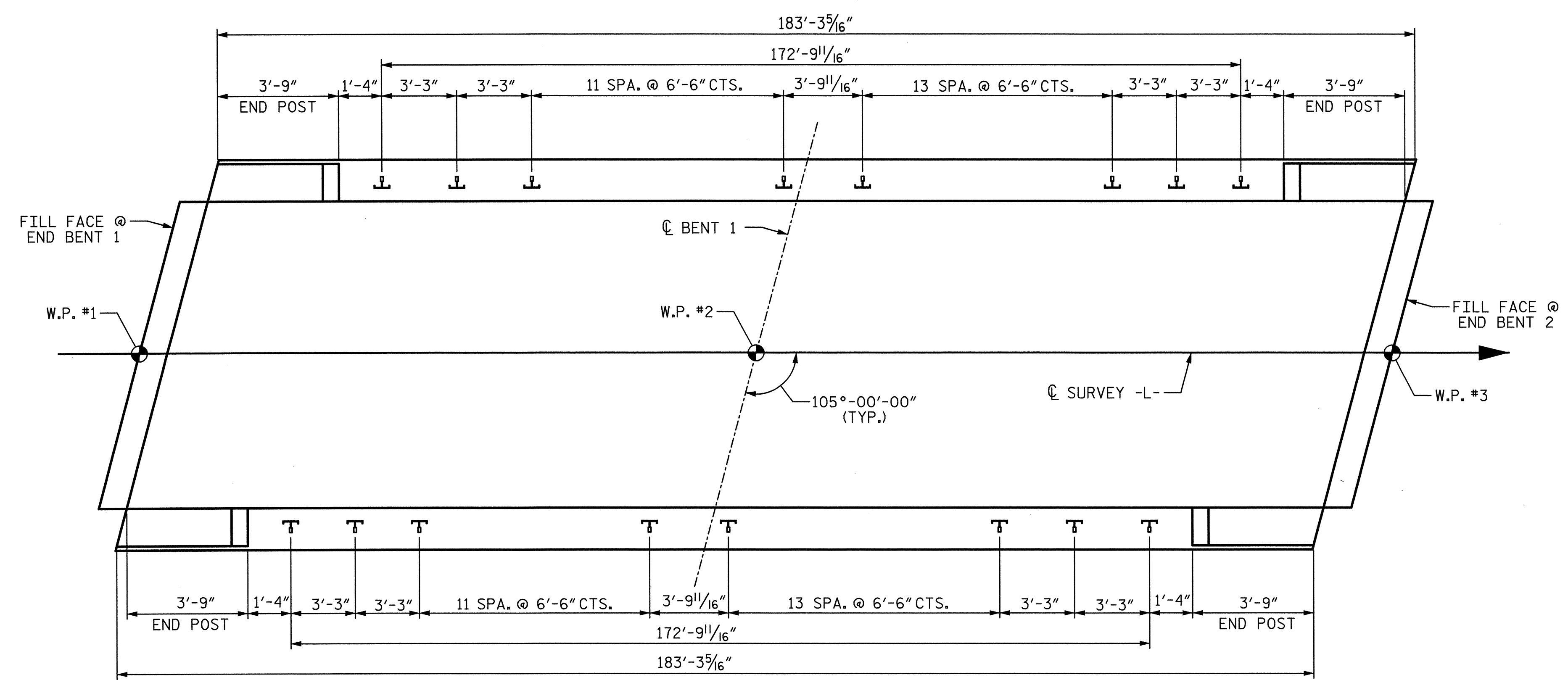
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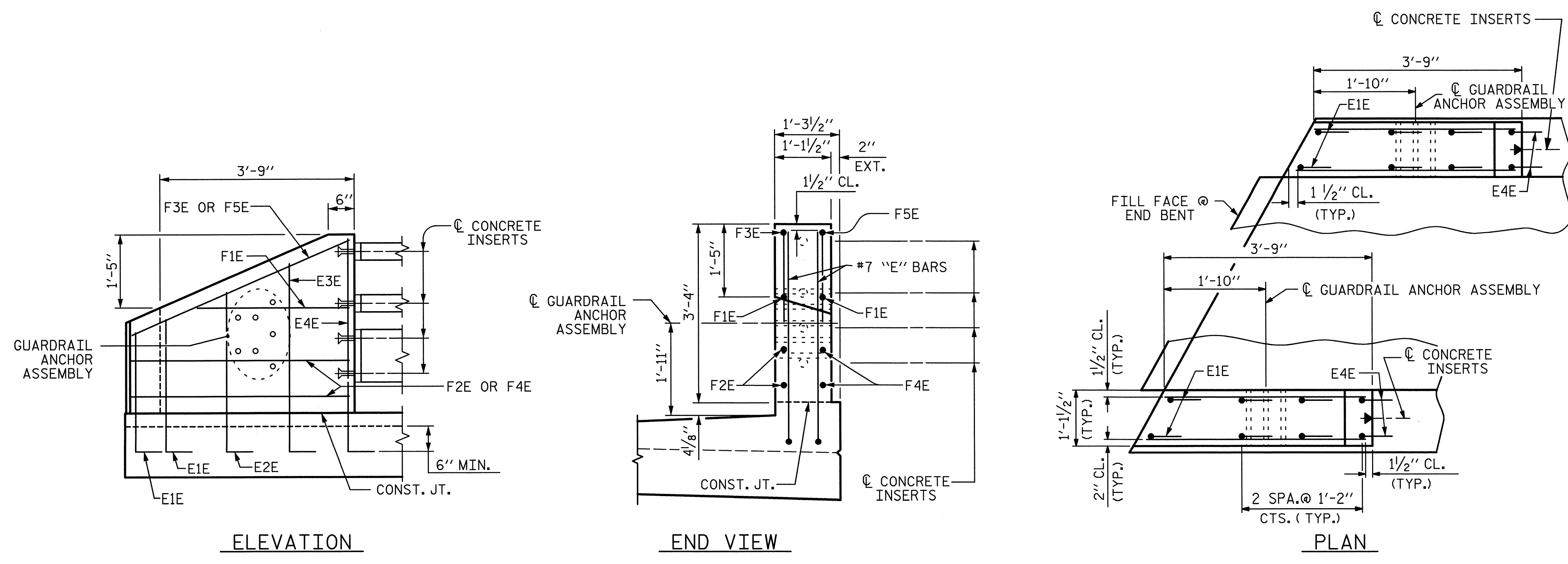
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**NOTE:**  
FOR END POSTS REINFORCING STEEL AND CONCRETE QUANTITIES, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.



PLAN OF RAIL POST SPACINGS



ELEVATION

END VIEW

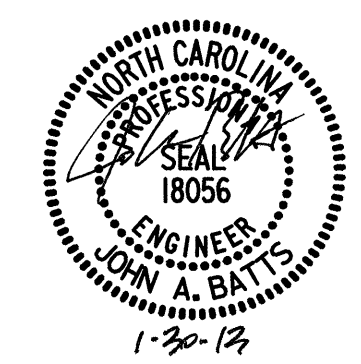
PLAN

END POST DETAILS

END BENT 1 SHOWN, END BENT 2 SIMILAR

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SUPERSTRUCTURE RAIL POST SPACING AND END POST DETAILS						S-18
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	36
1			3			
2			4			

**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.

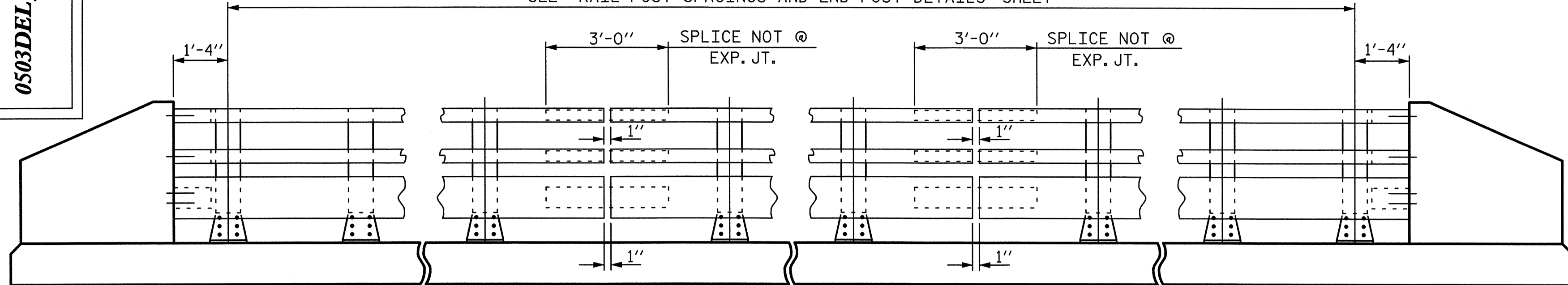
ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

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

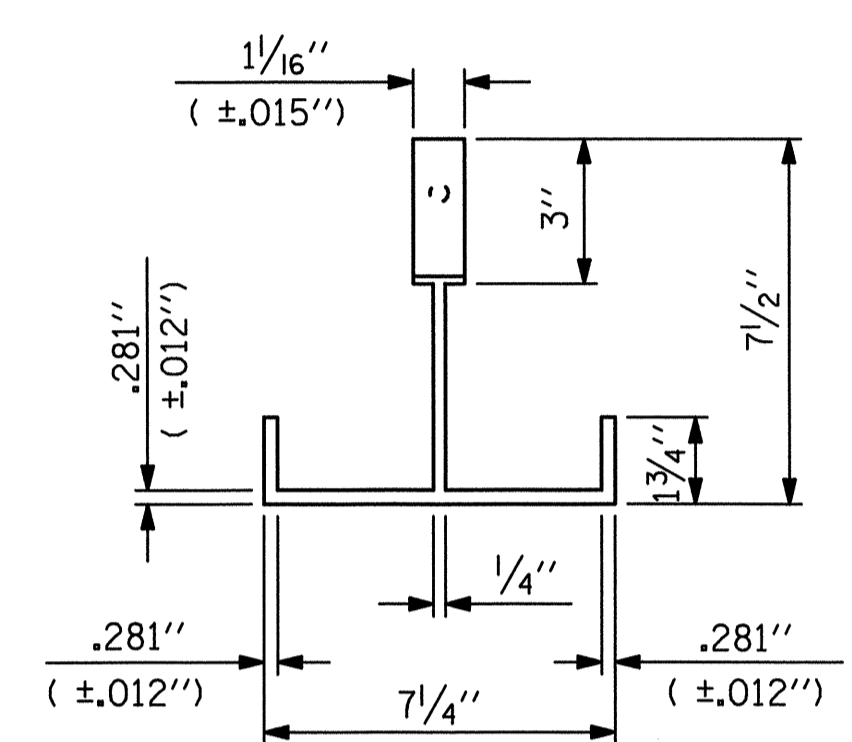
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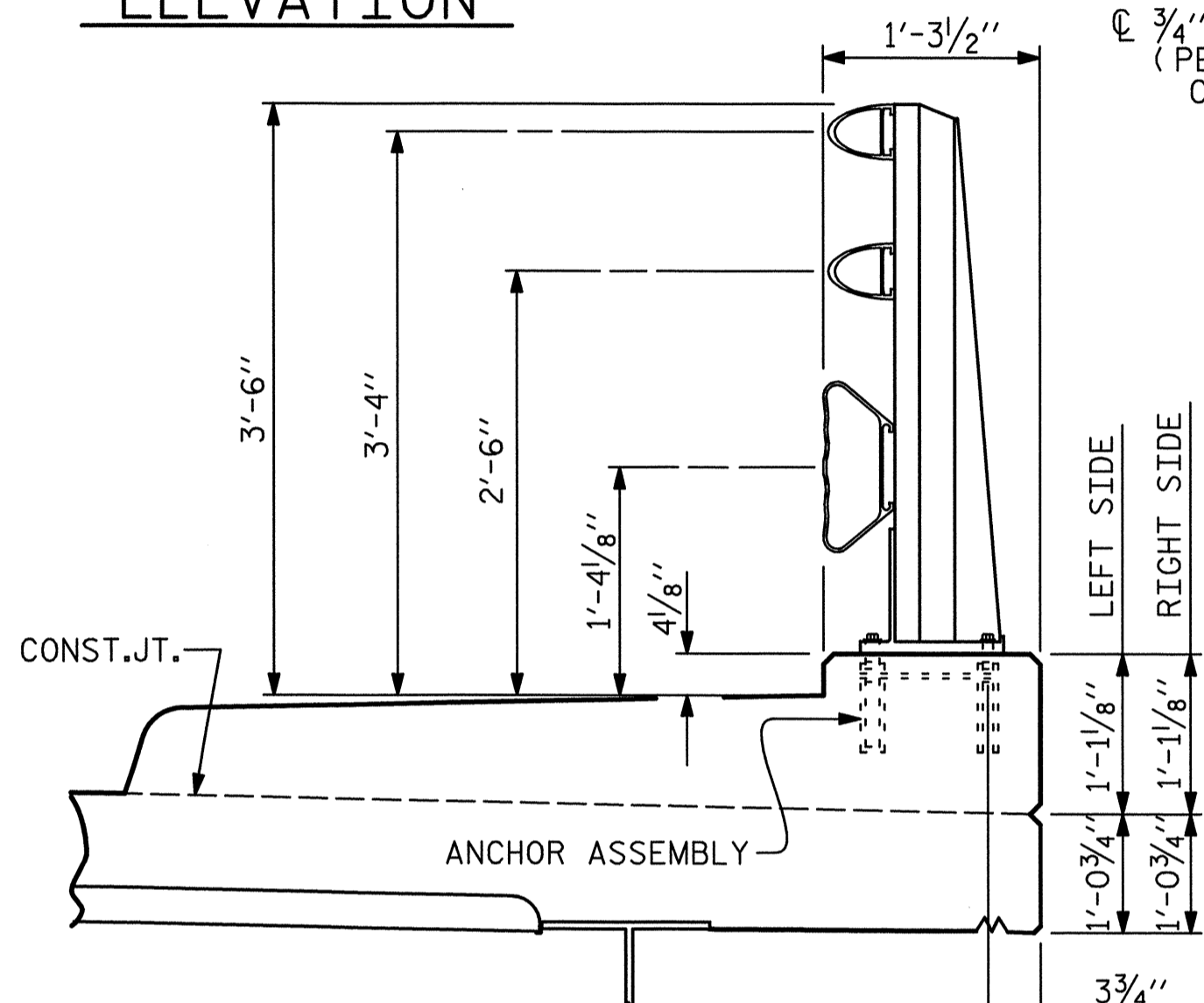
SEE "RAIL POST SPACINGS AND END POST DETAILS" SHEET



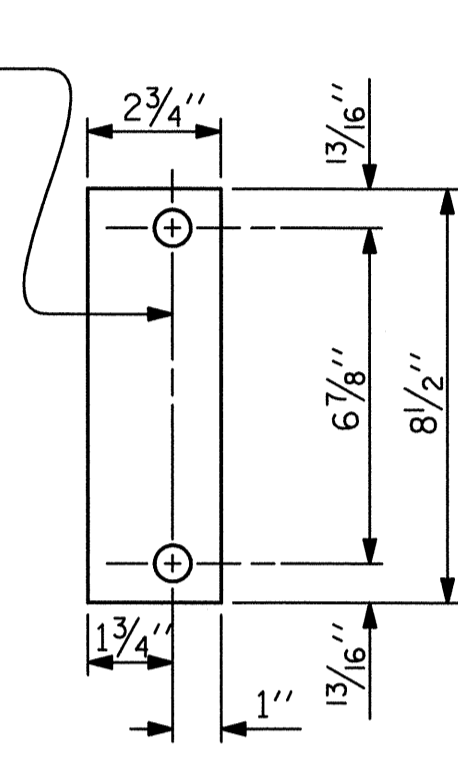
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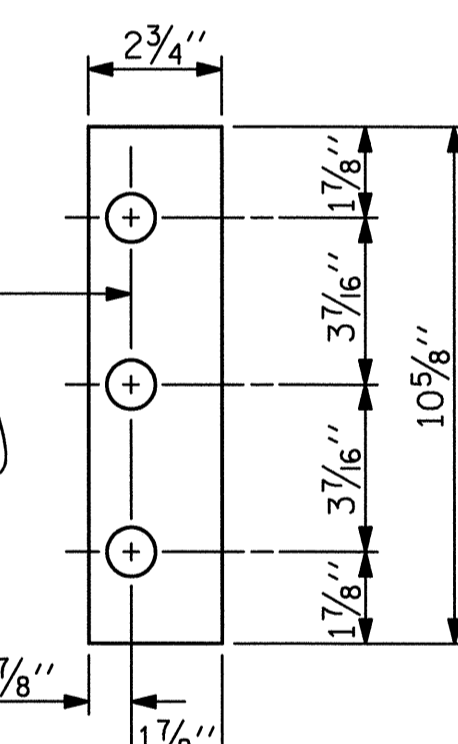
PLAN



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

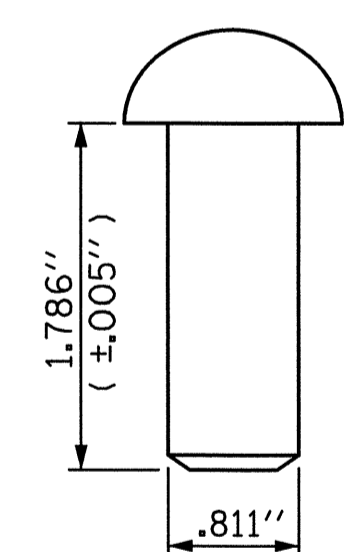


REAR PLATE

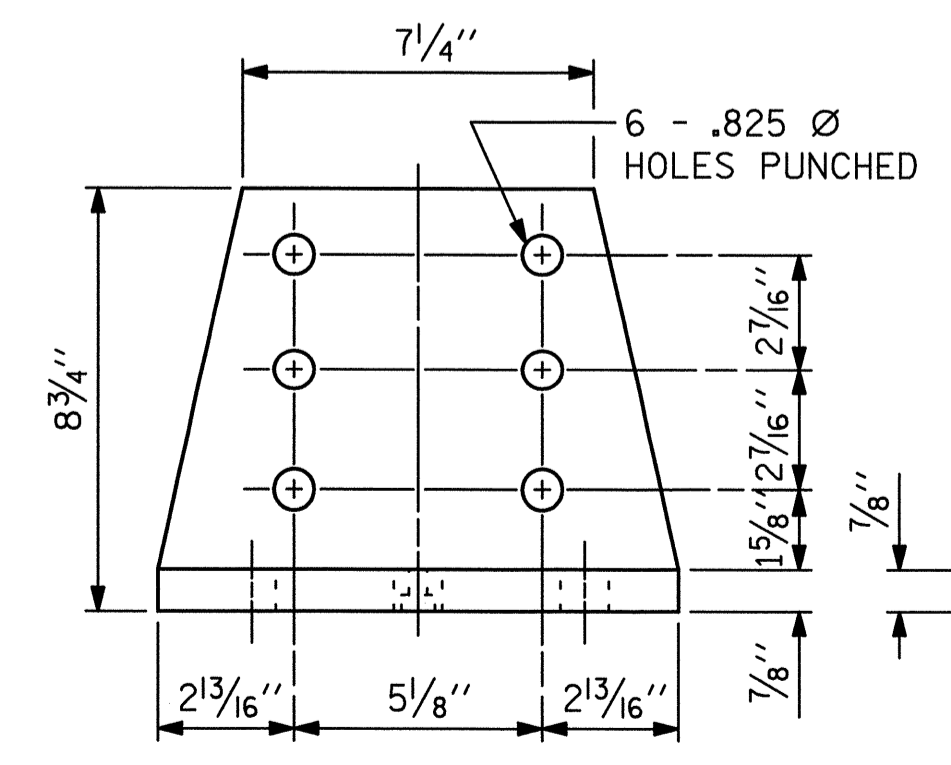


FRONT PLATE  
SHIM DETAILS

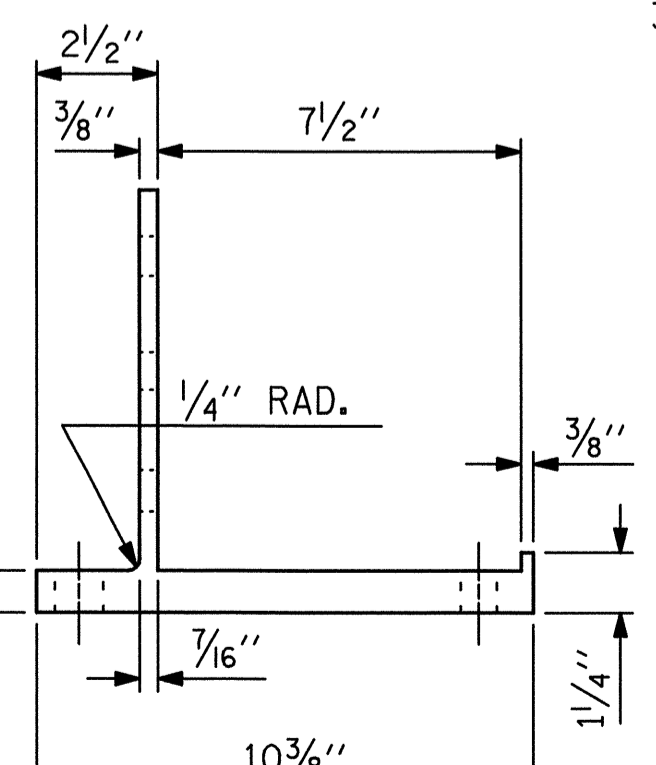
NOTE: SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



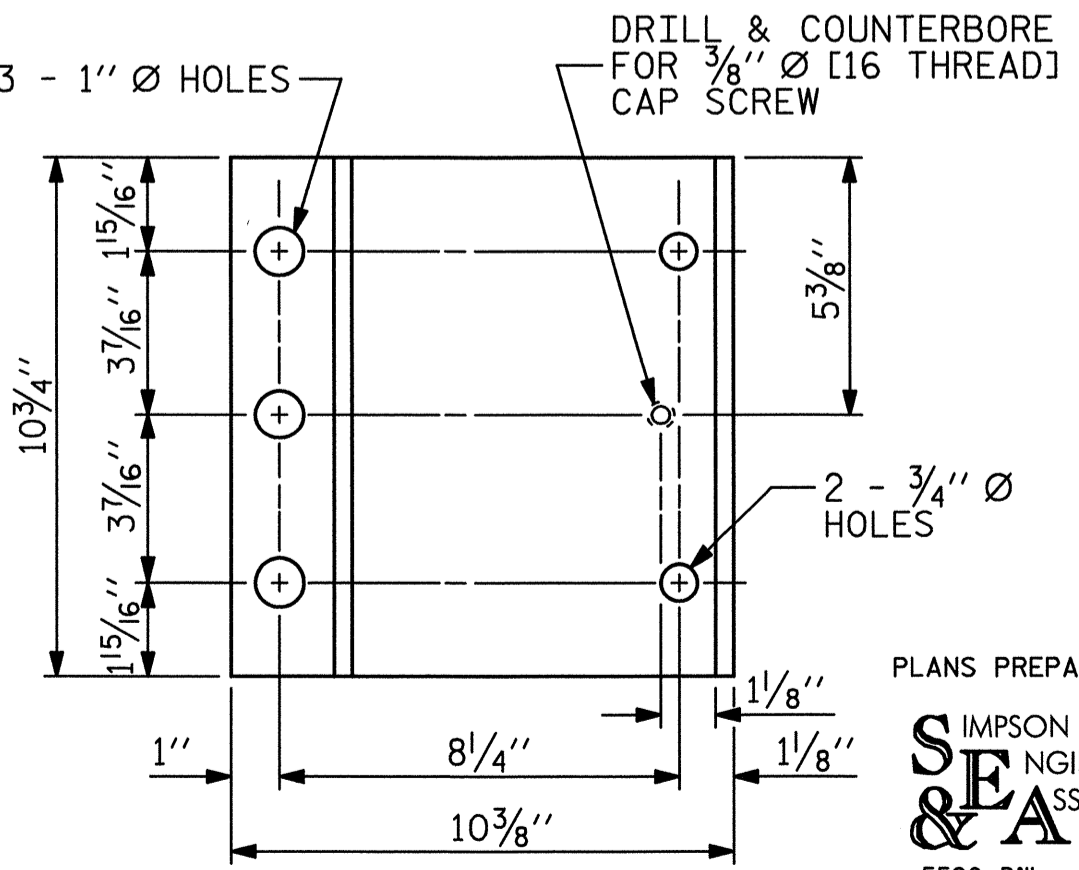
RIVET DETAIL



FRONT ELEVATION



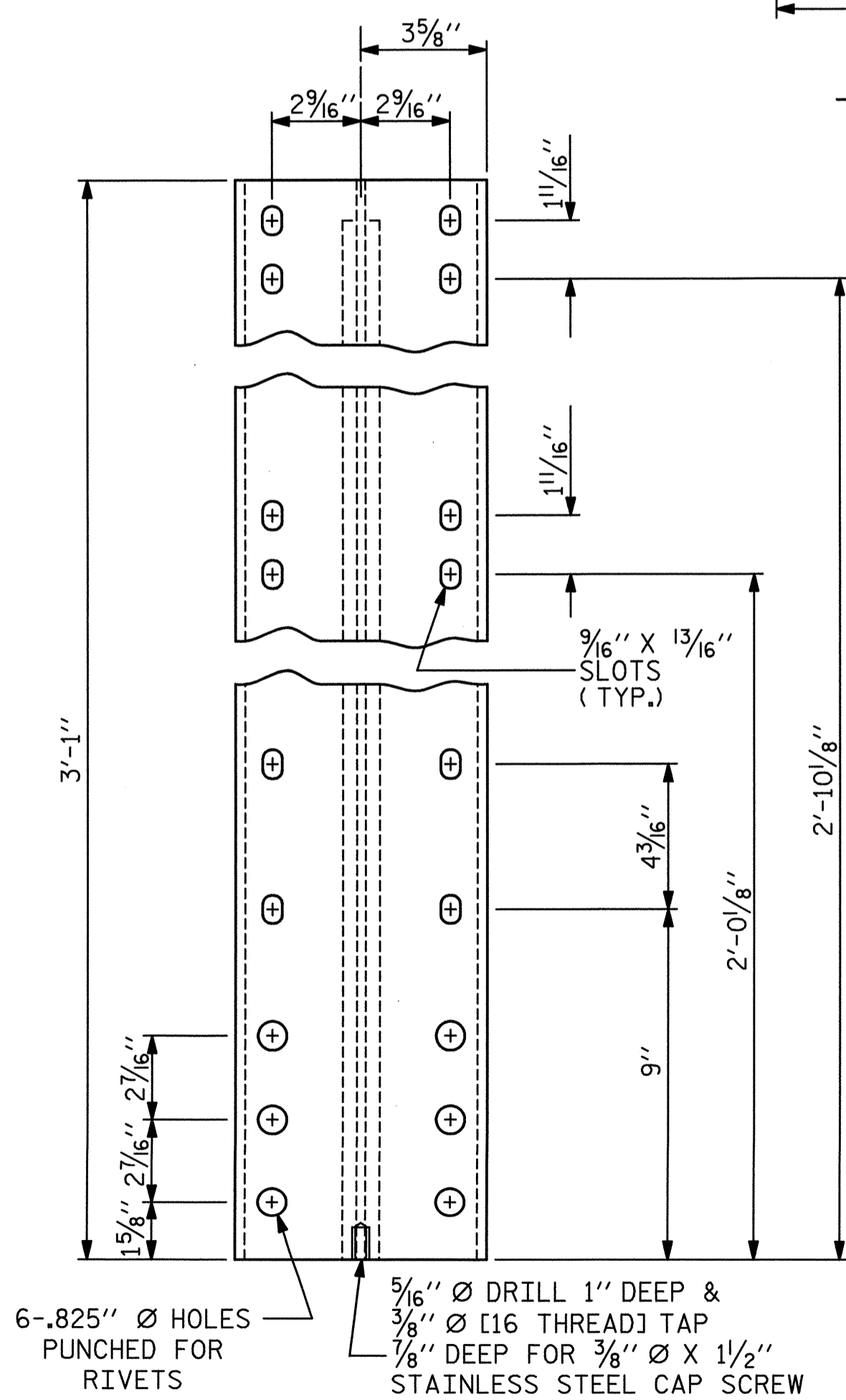
SIDE ELEVATION



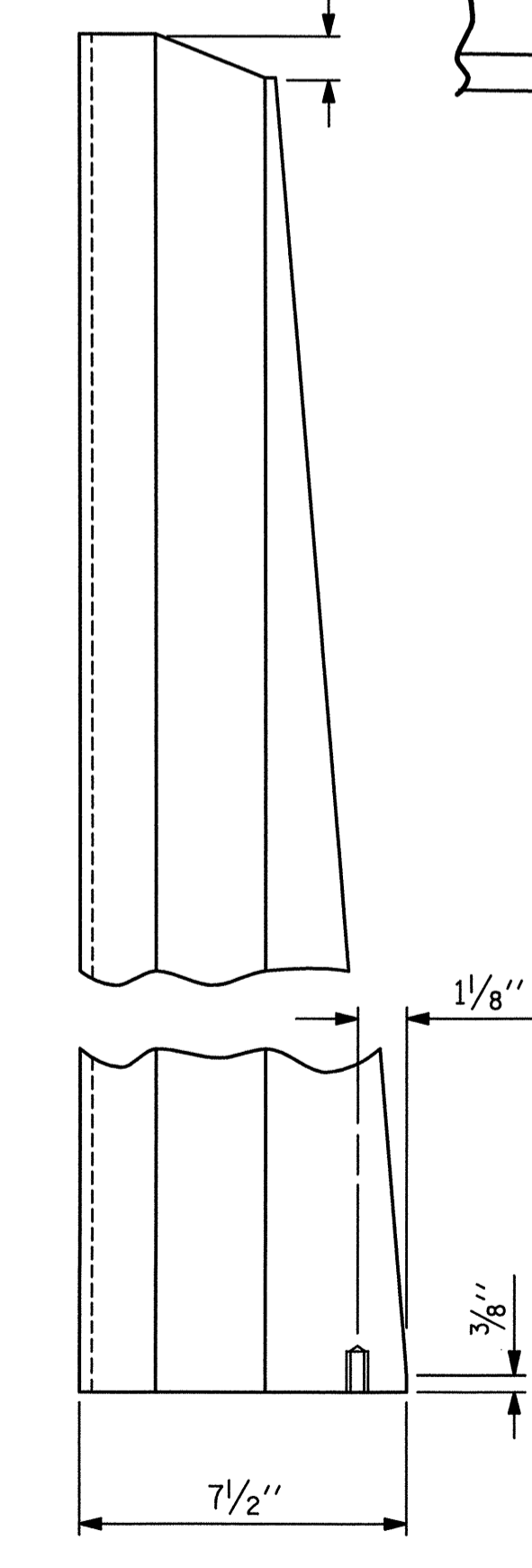
PLAN

POST BASE DETAILS

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



FRONT ELEVATION



SIDE ELEVATION

DETAILS OF POST

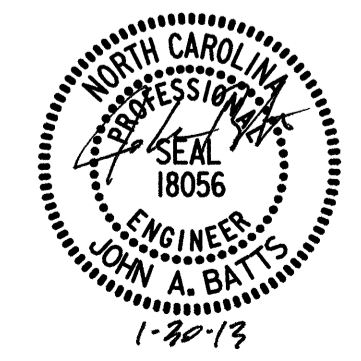
DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: DATE: 1-22-13

PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

SHEET 1 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-19
					TOTAL SHEETS 36

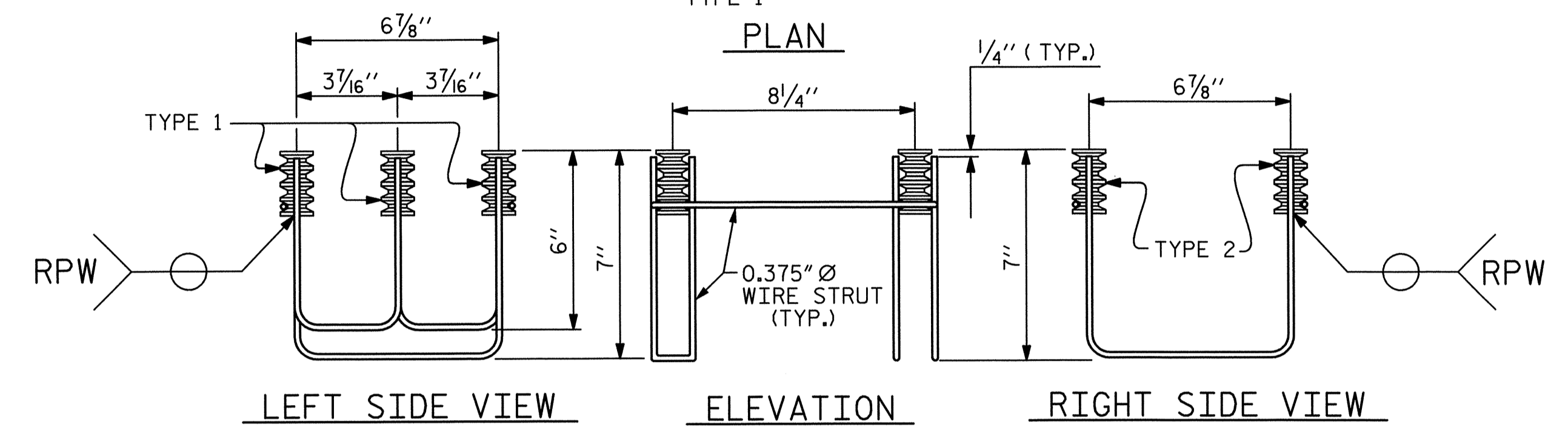
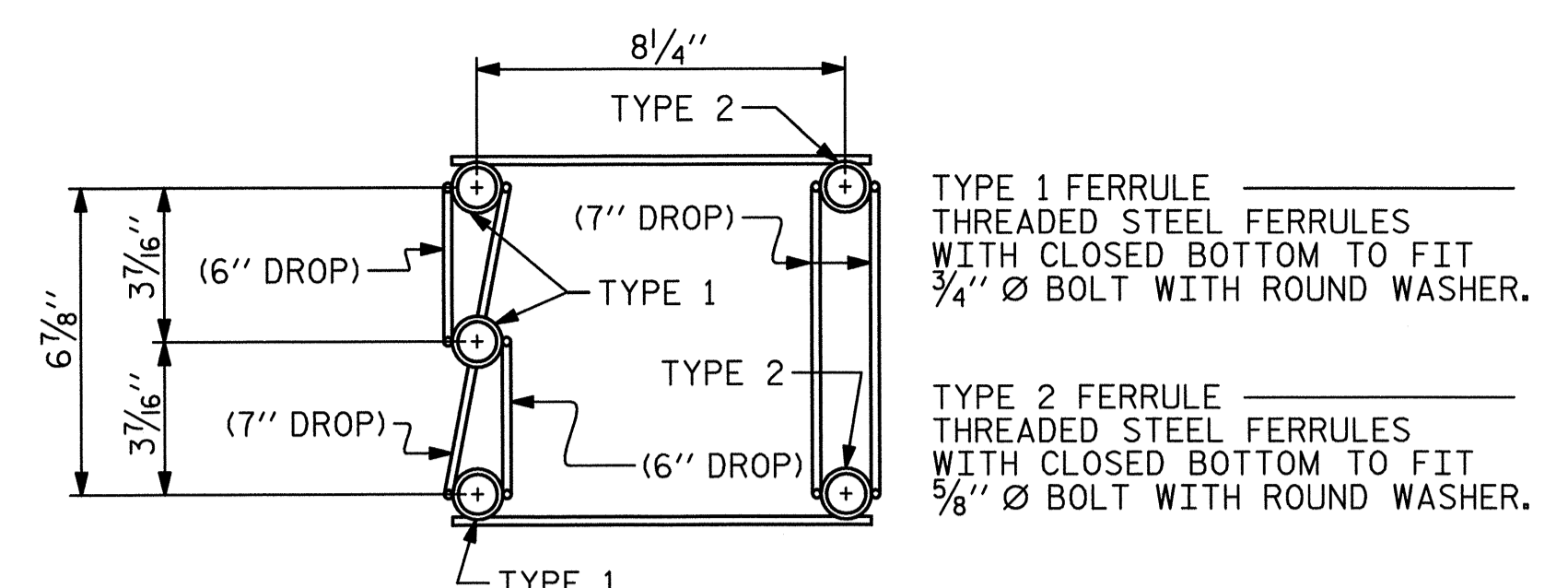
PLANS PREPARED BY:  
**S&EA**  
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 Suite 120  
 Cary, NC 27518  
 (919) 852-0468  
 (919) 852-0598 (Fax)  
 www.slmpsonengr.com  
 LICENSURE NO. C2521



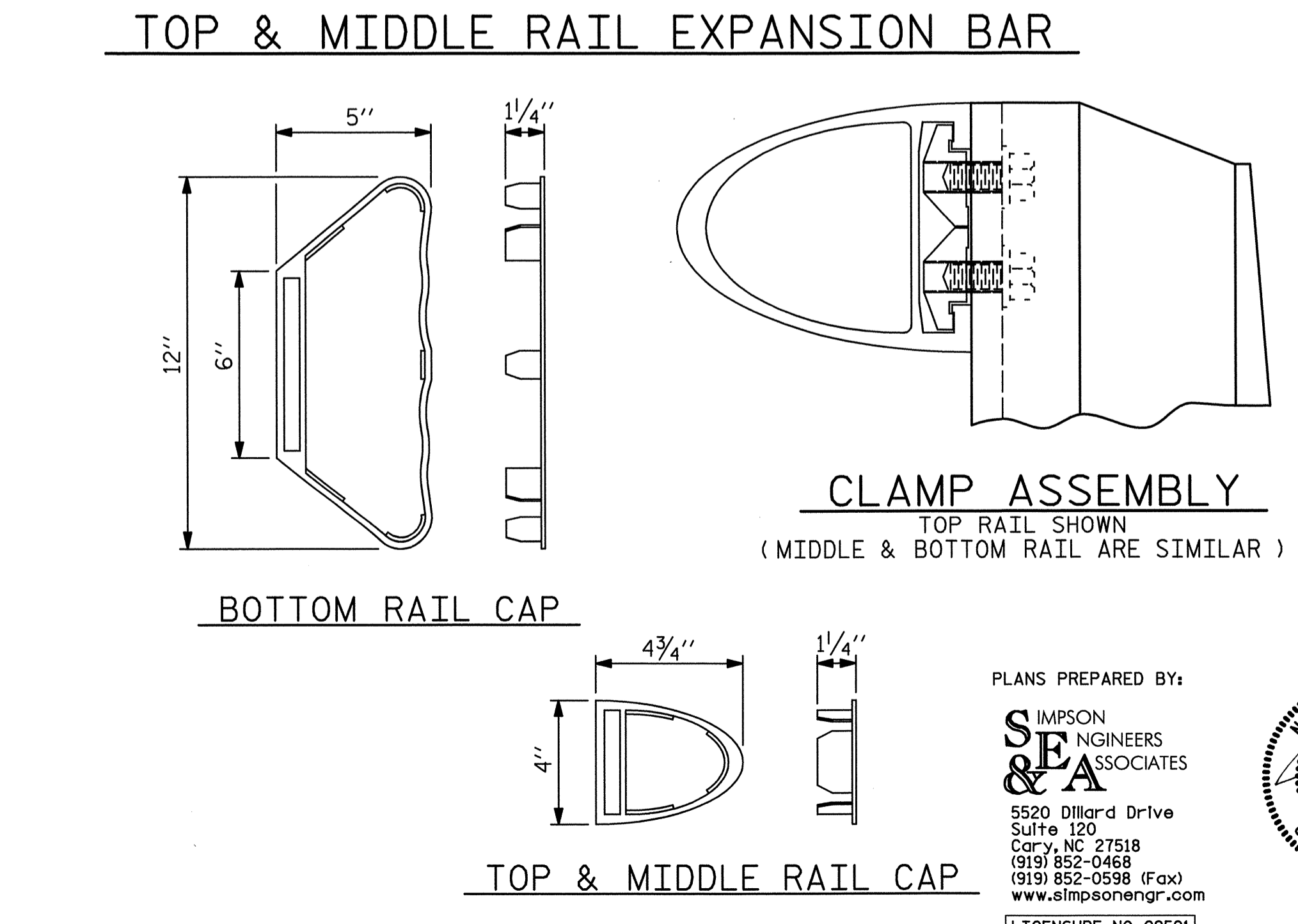
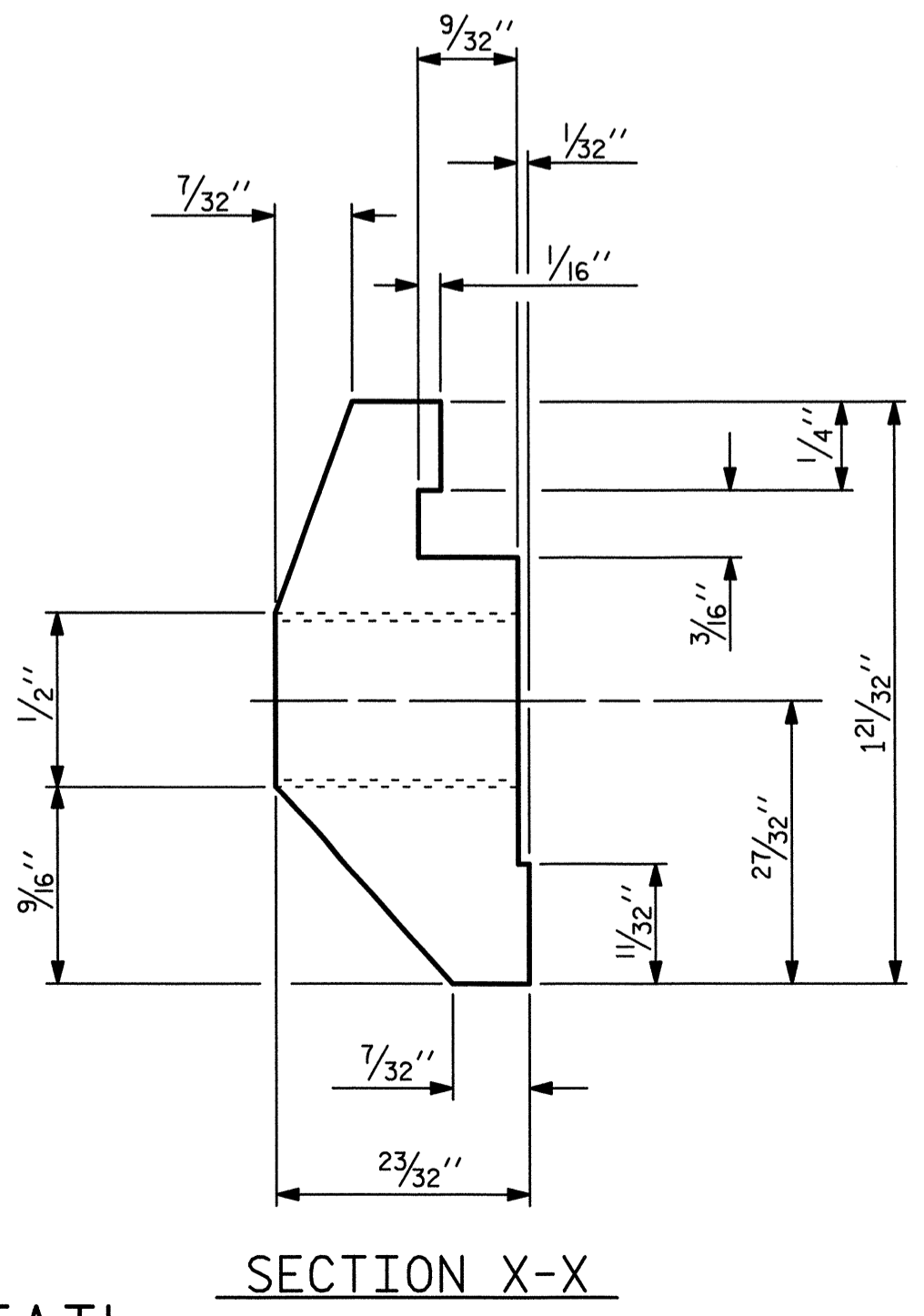
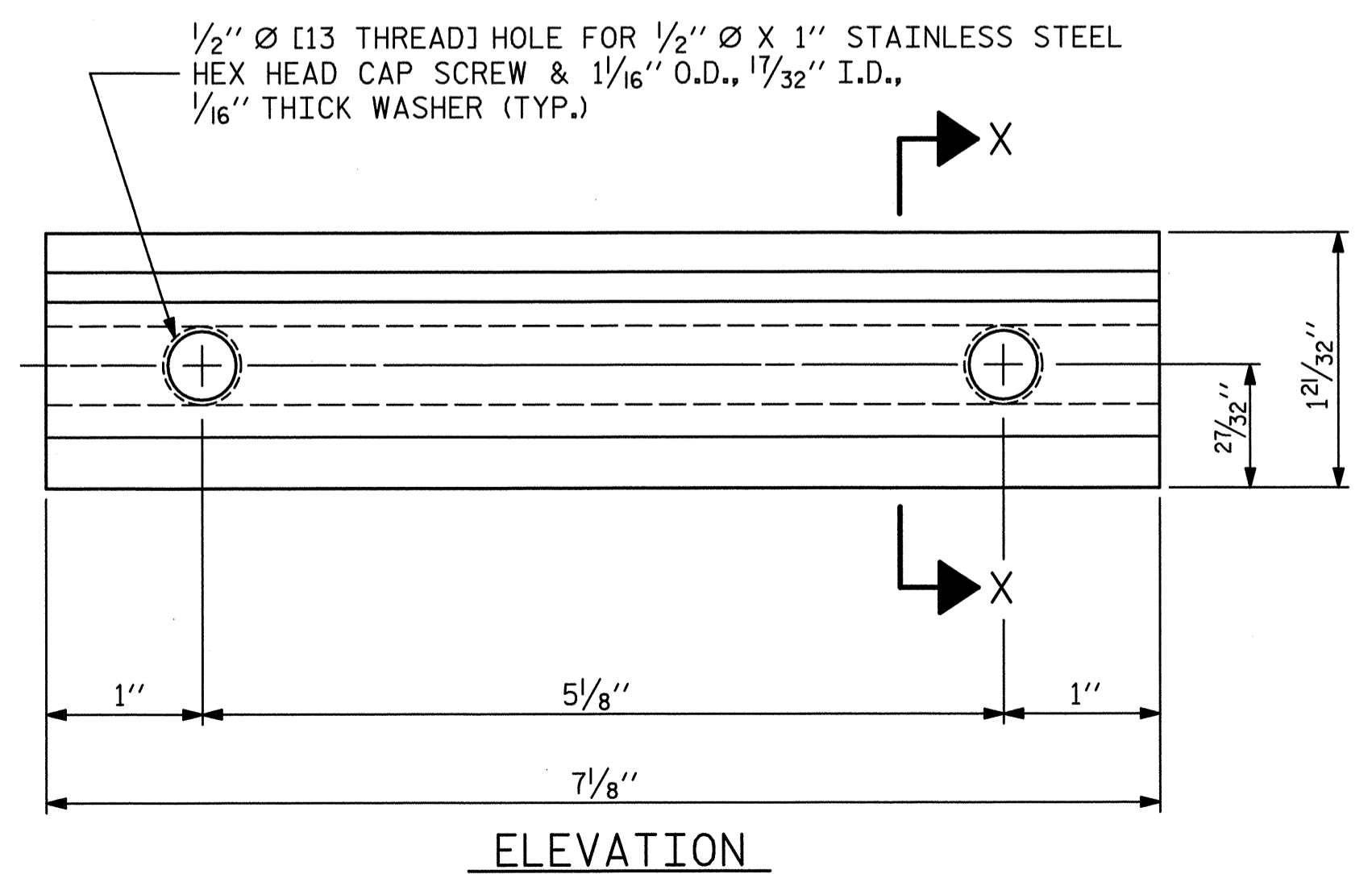
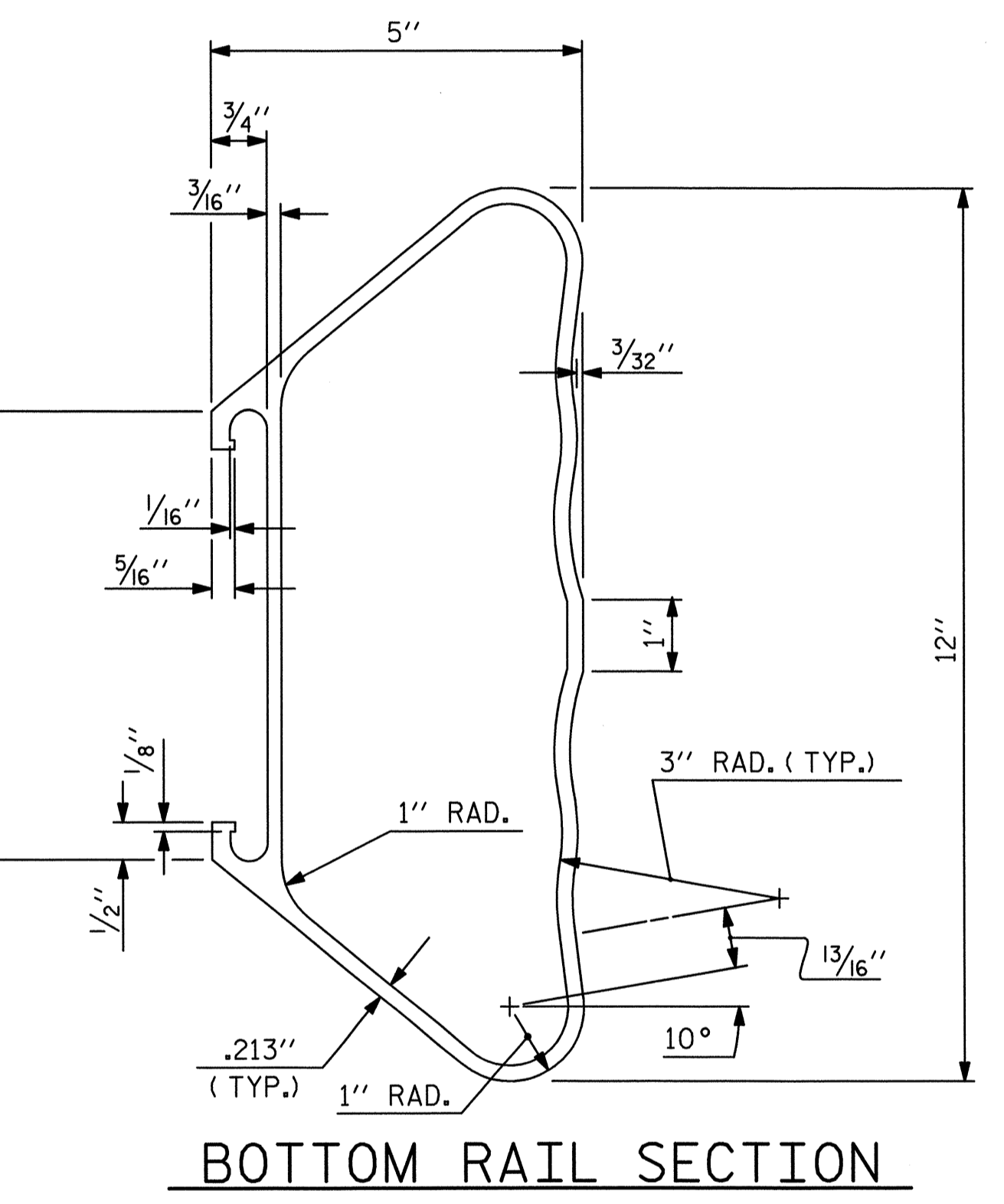
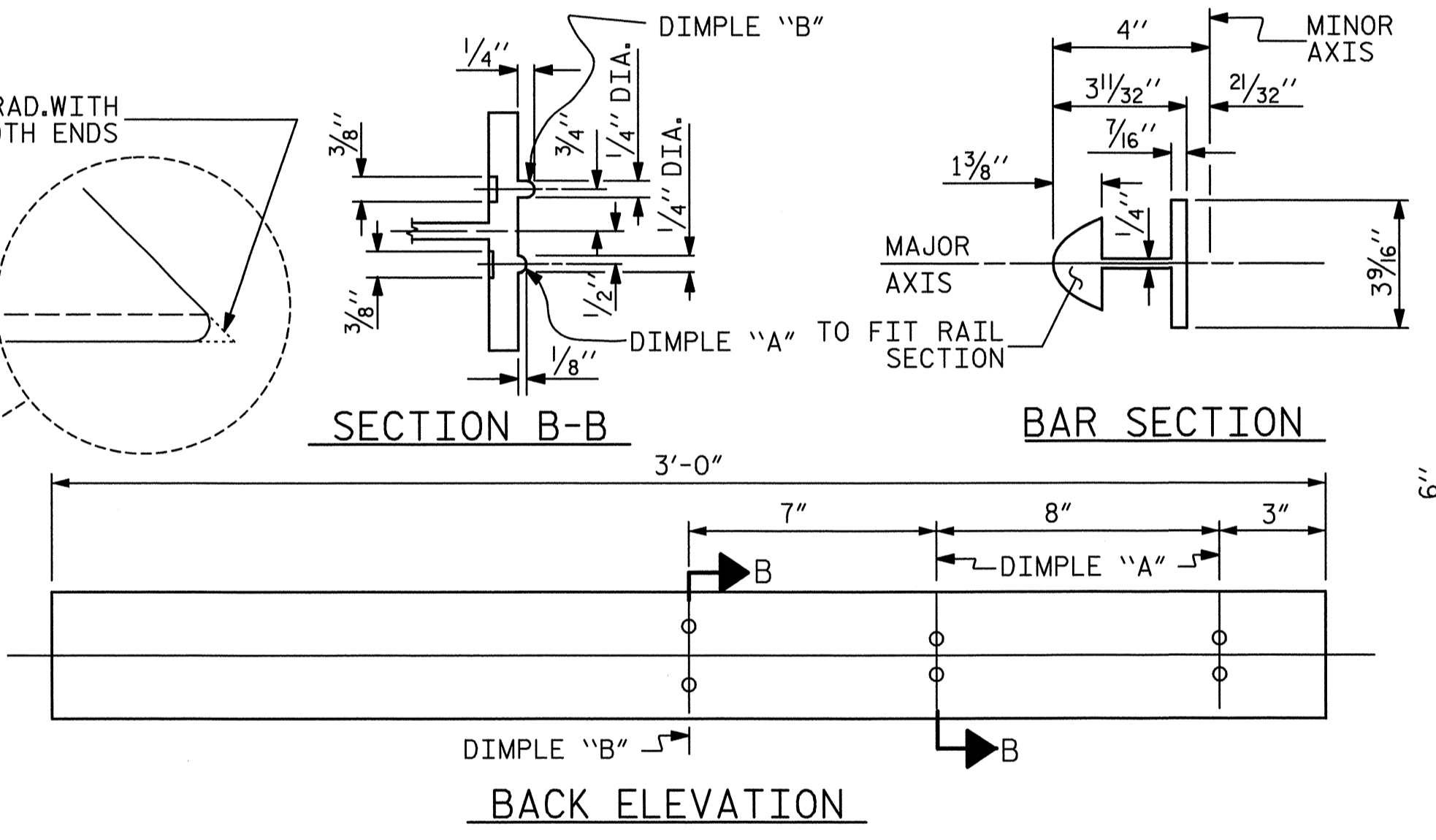
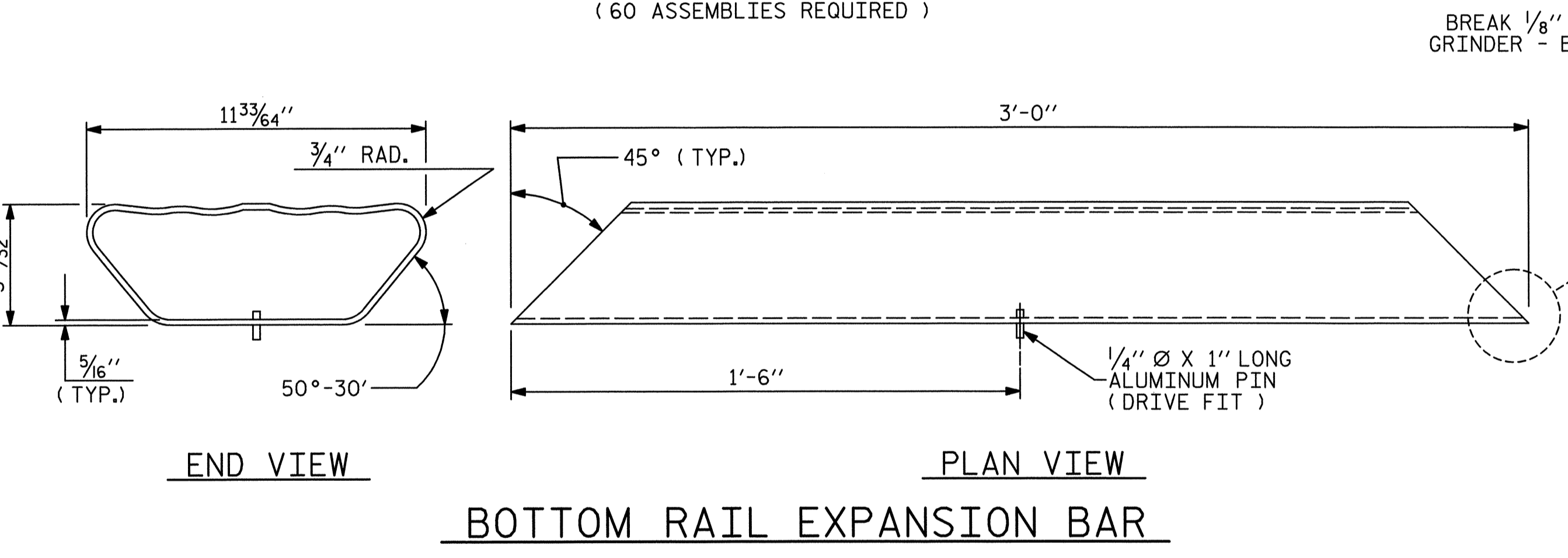
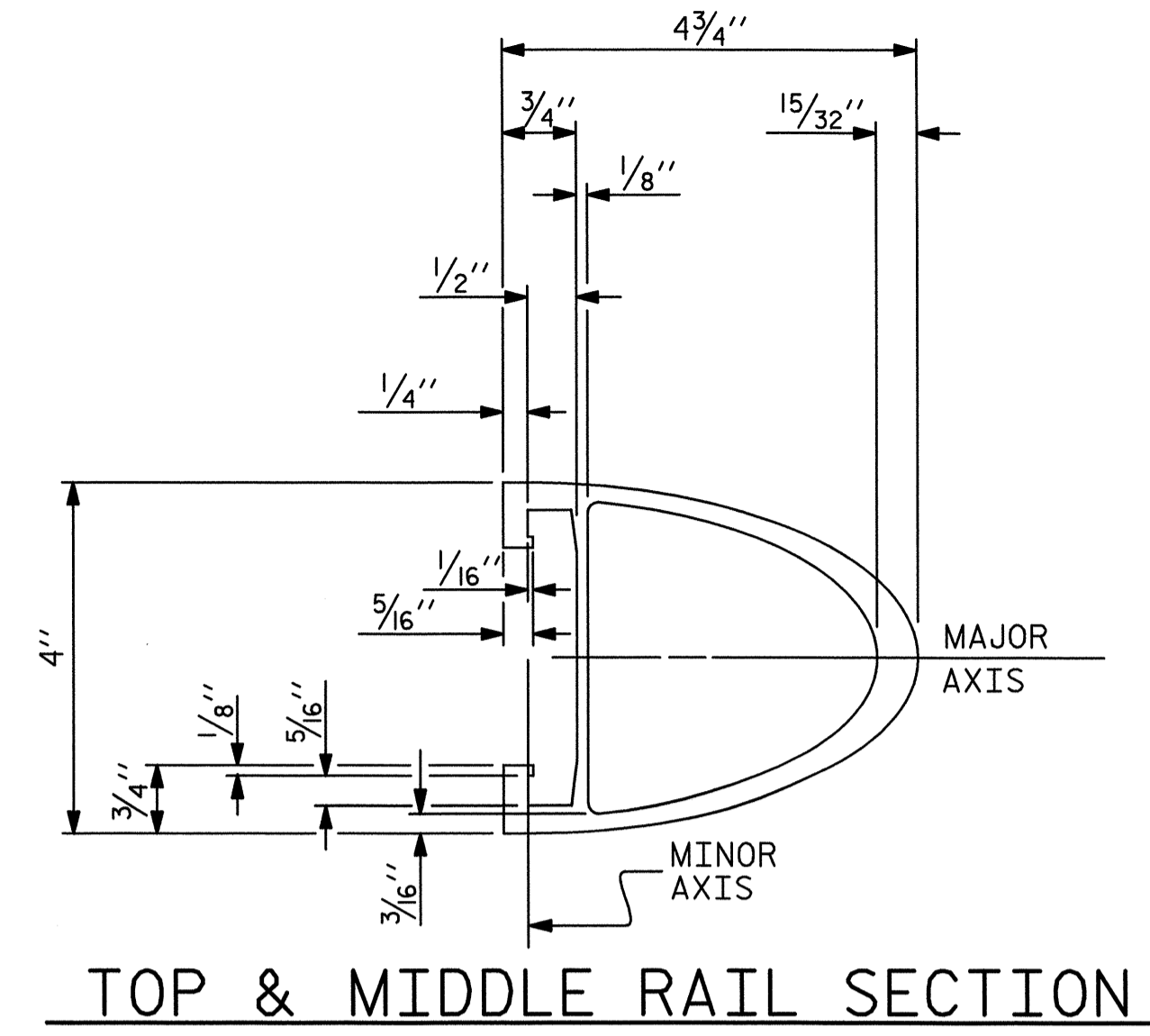
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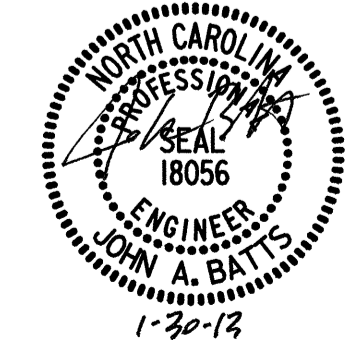


- NOTES**  
STRUCTURAL CONCRETE ANCHOR ASSEMBLY
- THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 1/4" FOR 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 1/6" 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.



DRAWN BY: D. G. VESTER      DATE: 12-12  
 CHECKED BY: J. A. BATTS      DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature]      DATE: 1-30-13

PLANS PREPARED BY:  
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 LICENSURE NO. C2521



PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -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-20
					TOTAL SHEETS 36

NOTES

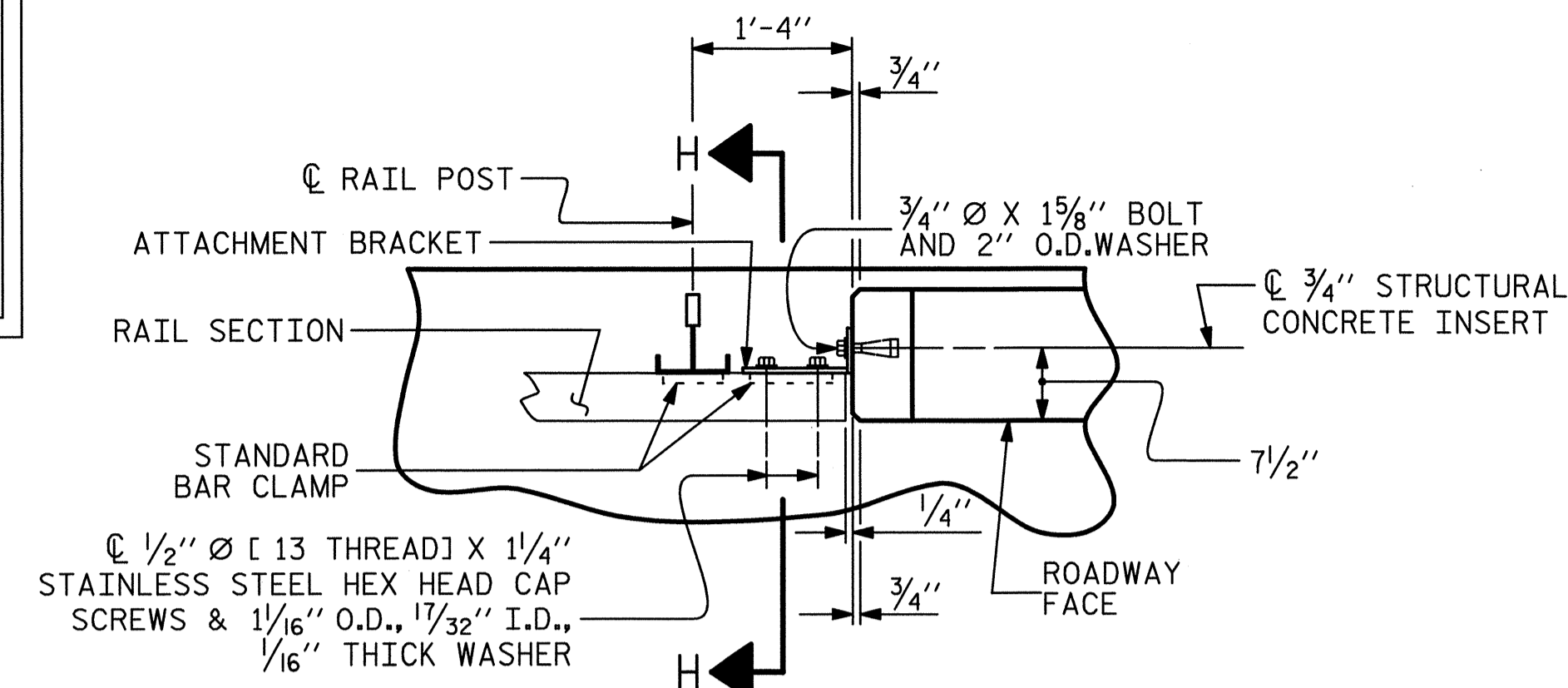
METAL RAIL TO END POST CONNECTION

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

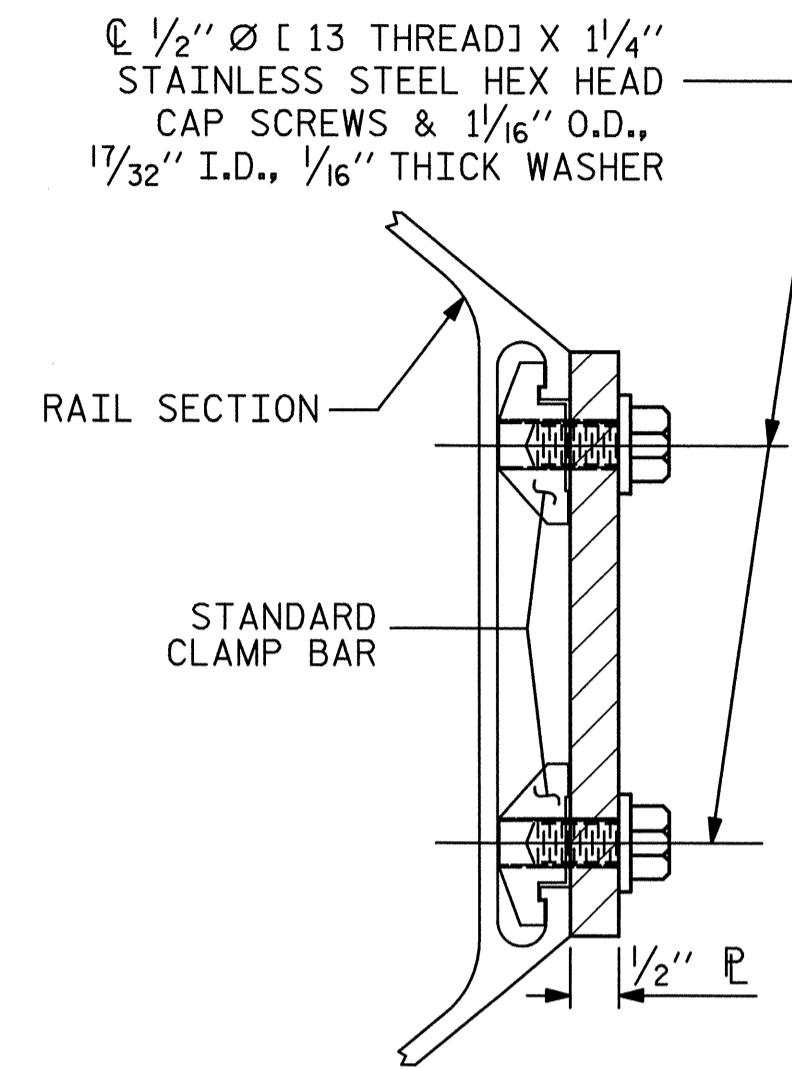
NOTES

STRUCTURAL CONCRETE INSERT

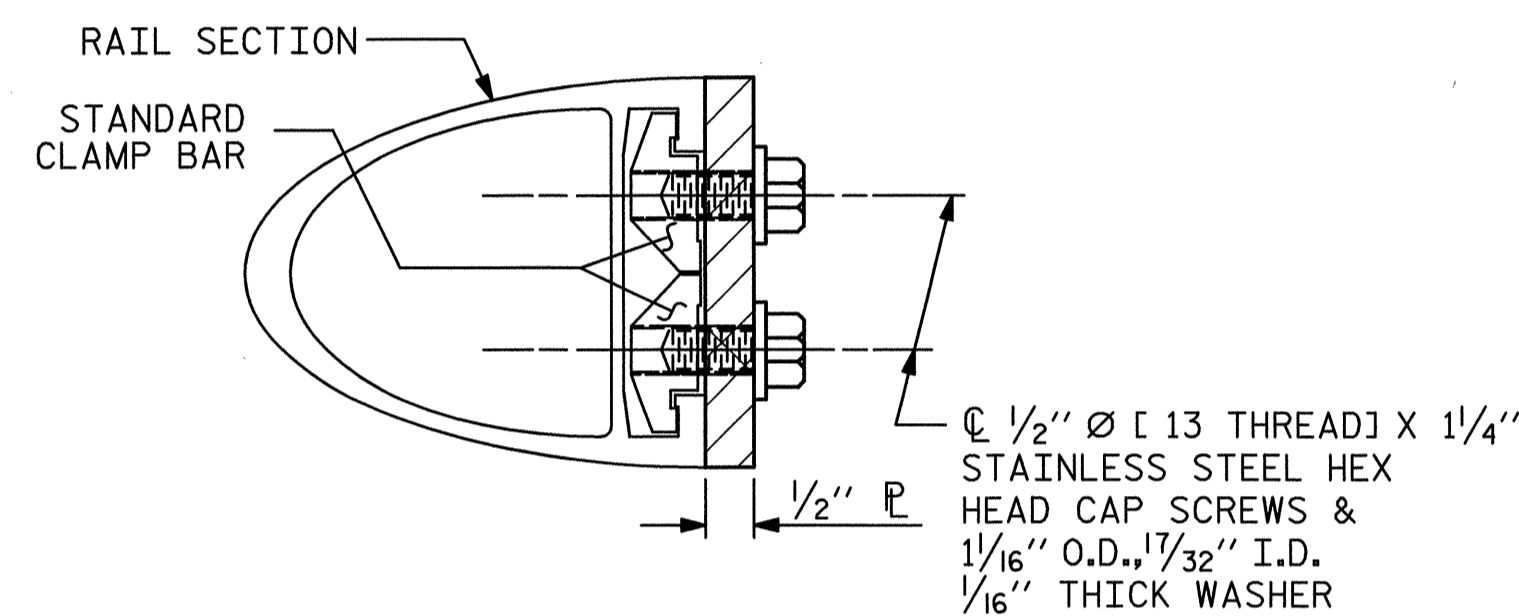
- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
  - 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS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



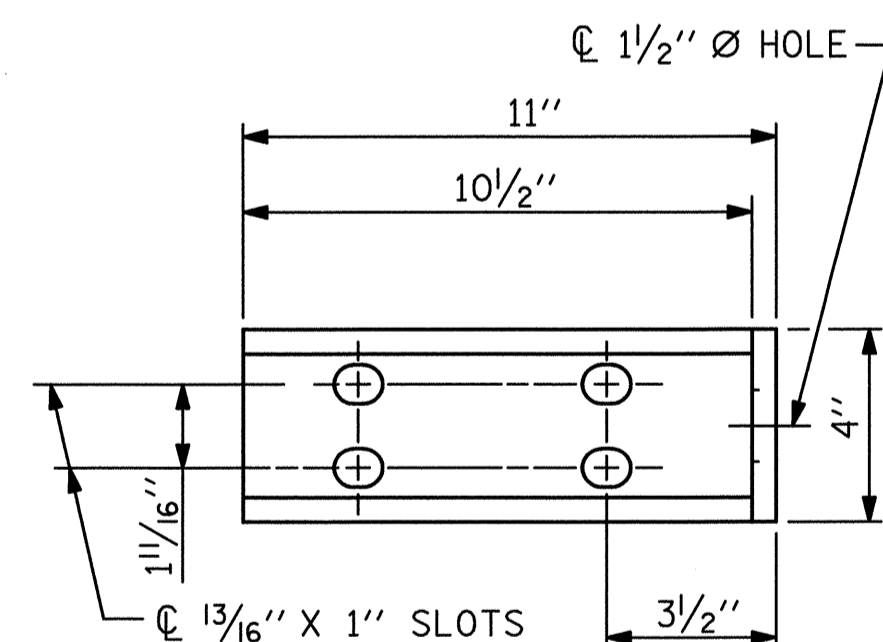
PLAN OF RAIL AND END POST  
(STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)



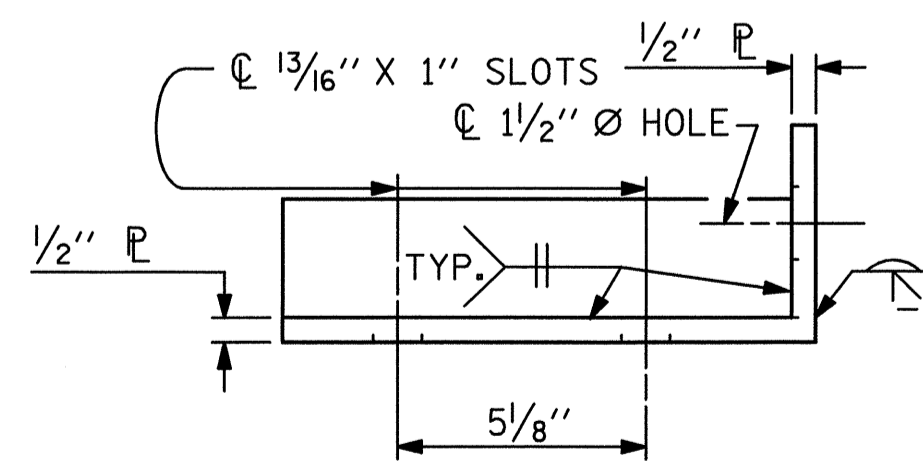
SECTION H-H  
(FOR BOTTOM RAIL)



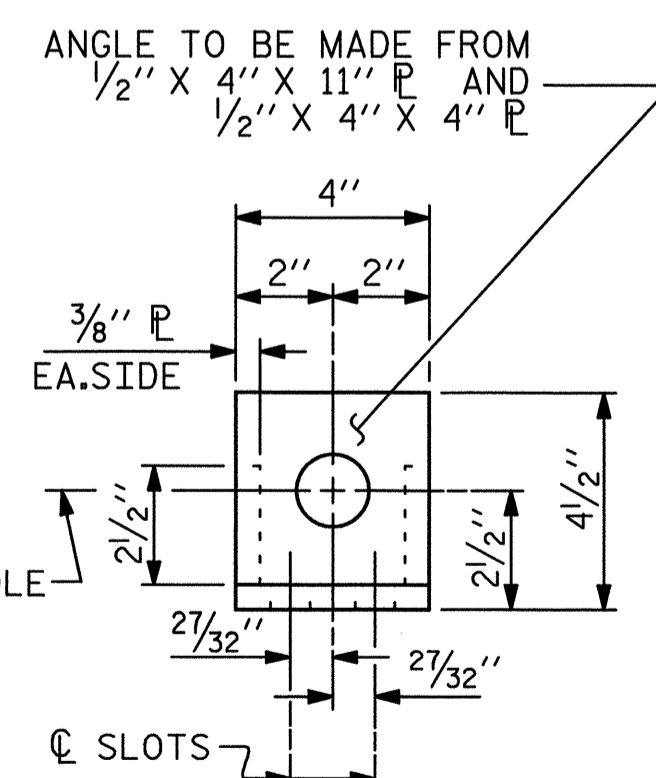
SECTION H-H  
(FOR TOP & MIDDLE RAIL)



ELEVATION

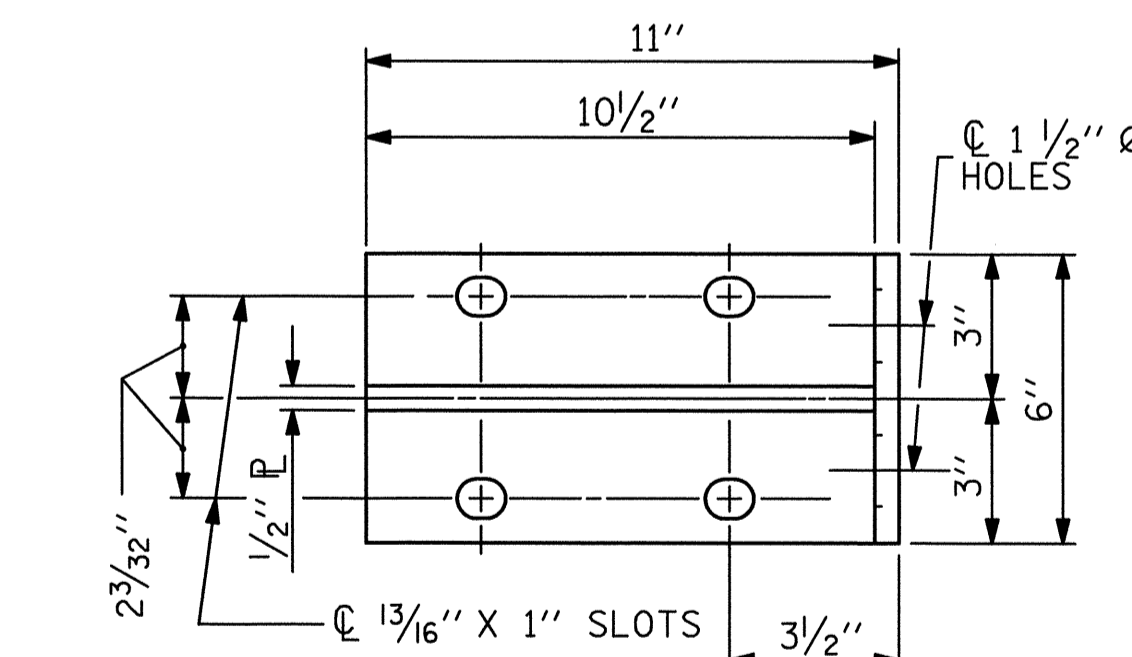


PLAN

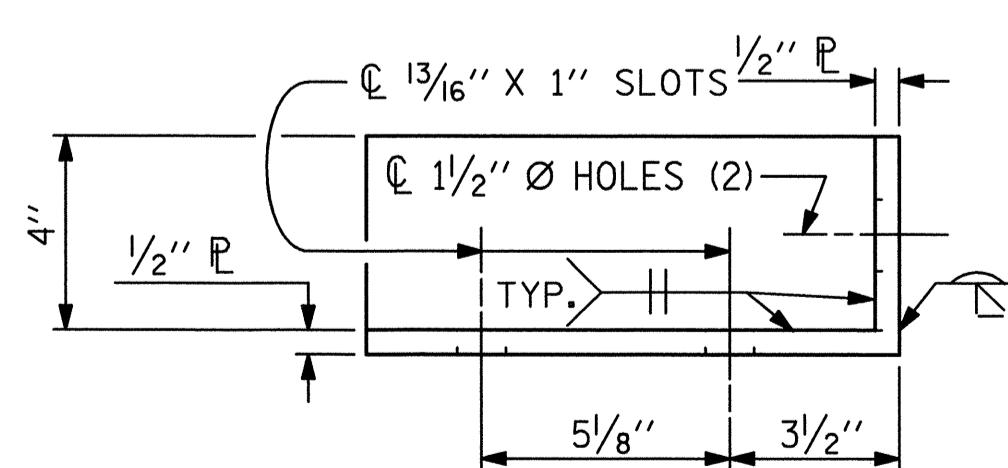


END VIEW  
(FIX. AND EXP.)

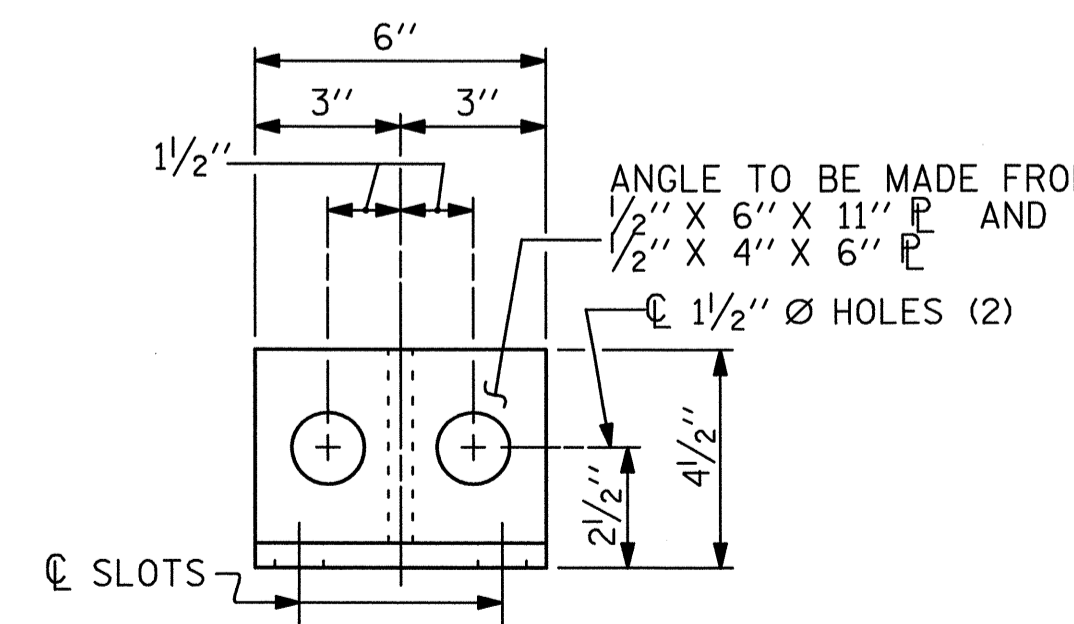
DETAILS FOR ATTACHMENT BRACKET  
(TOP & MIDDLE RAIL ONLY)



ELEVATION

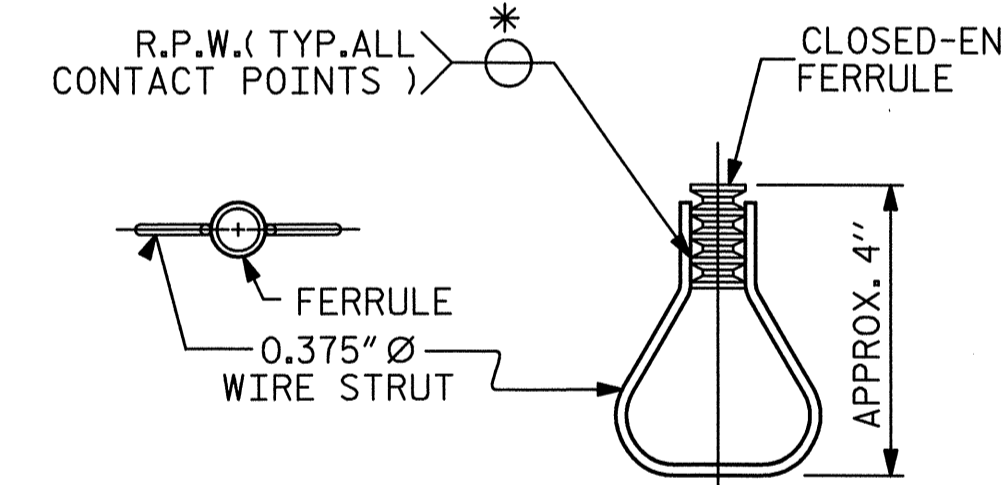


PLAN



END VIEW

DETAILS FOR ATTACHMENT BRACKET  
(BOTTOM RAIL ONLY)



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
STATION: 65+92.50 -L-

SHEET 3 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		

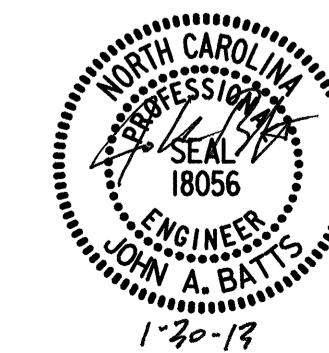
SHEET NO.  
S-21  
TOTAL SHEETS  
36

PLANS PREPARED BY:

SLIMPSON ENGINEERS & ASSOCIATES

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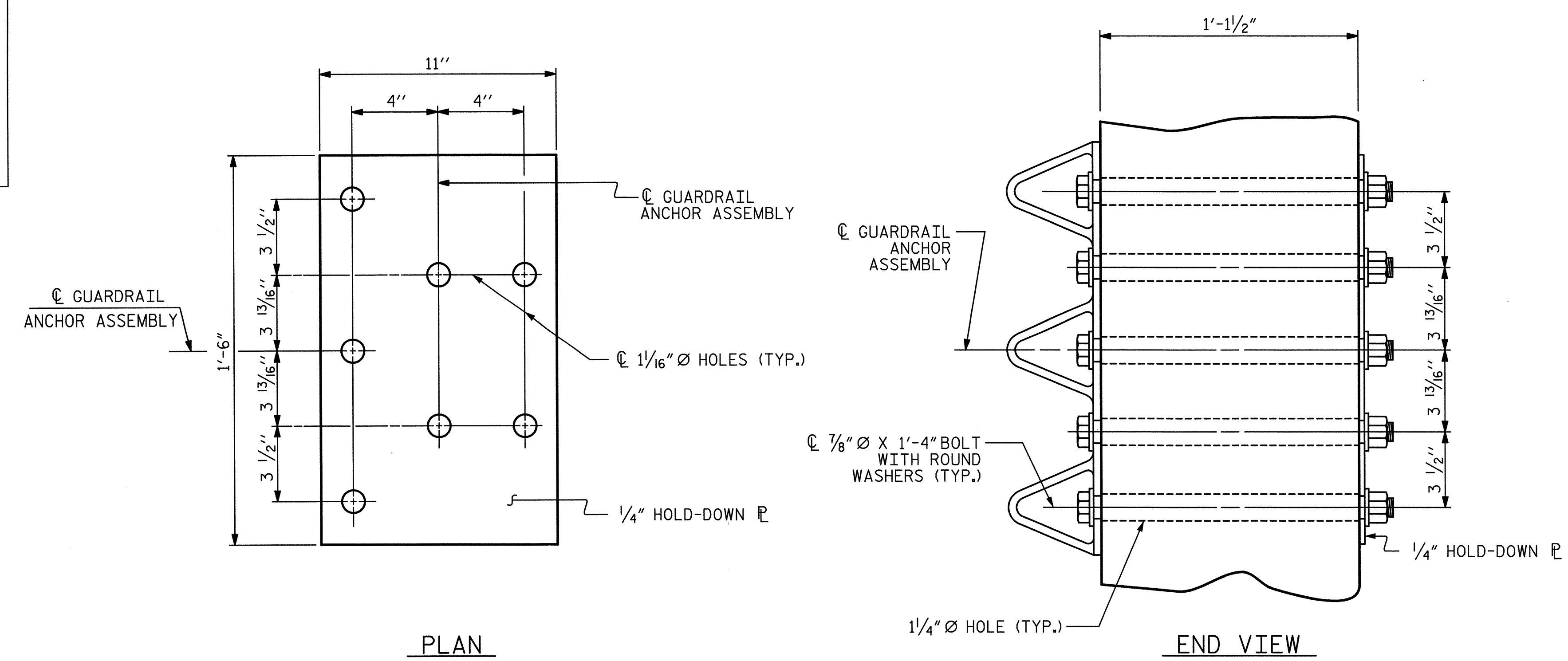
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DRAWN BY: D. G. VESTER DATE: 12-12  
CHECKED BY: J. A. BATTS DATE: 12-12  
DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

1/30/2013 8:56:39 AM G:\Projects\2011\5208E\_CaldwellPark Drive Extension (Rail Division)\Structures\Drawings\P5208E\_sd\_para\_01.dgn

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**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.

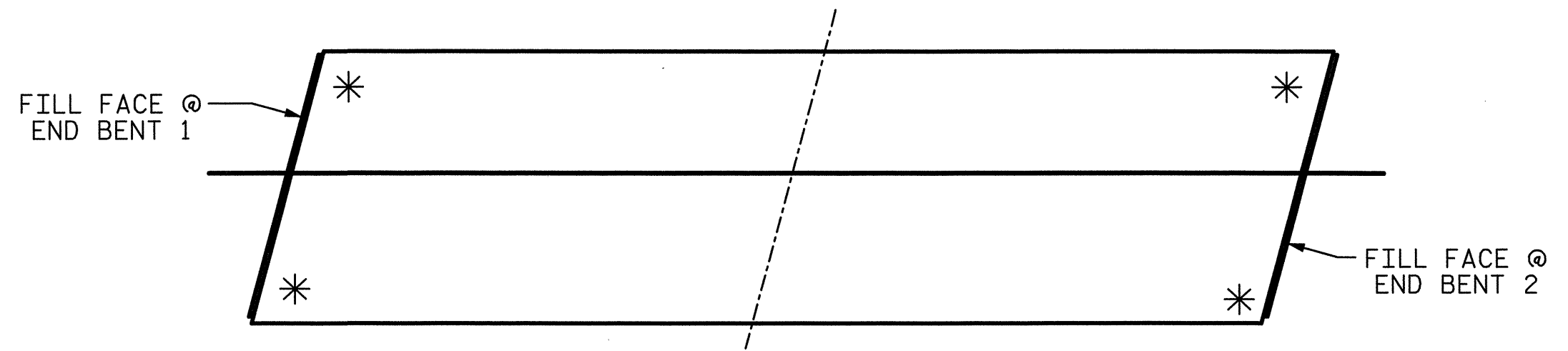
AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

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

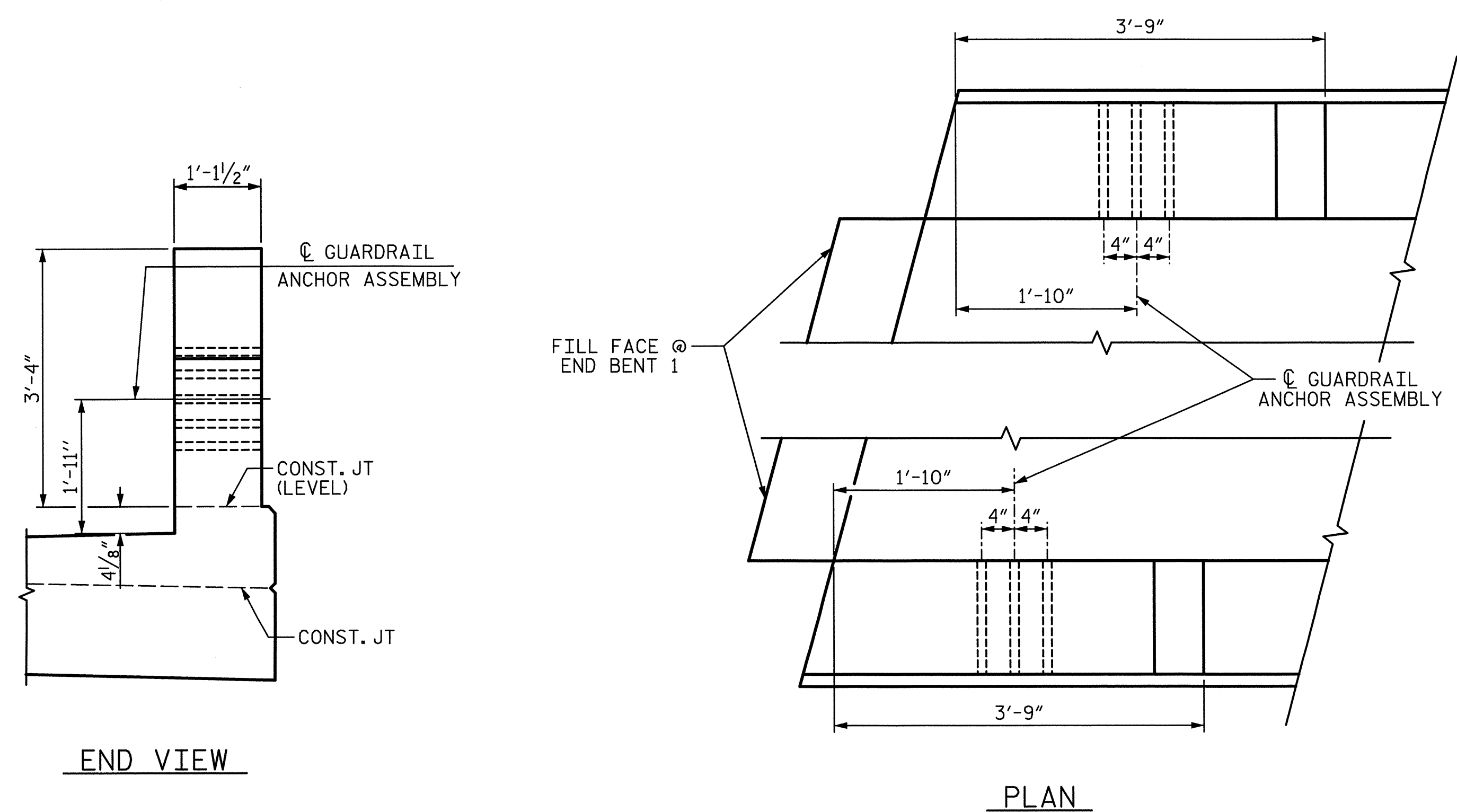
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.

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



**SKETCH SHOWING POINTS OF ATTACHMENT**



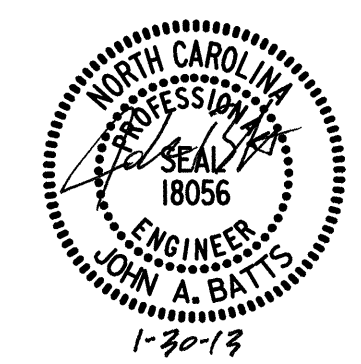
**LOCATION OF GUARDRAIL ANCHOR AT END POST**

END BENT 1 SHOWN, END BENT 2 SIMILAR

PROJECT NO. P-5208E  
**MECKLENBURG & CABARRUS COUNTY**  
 STATION: 65+92.50 -L-

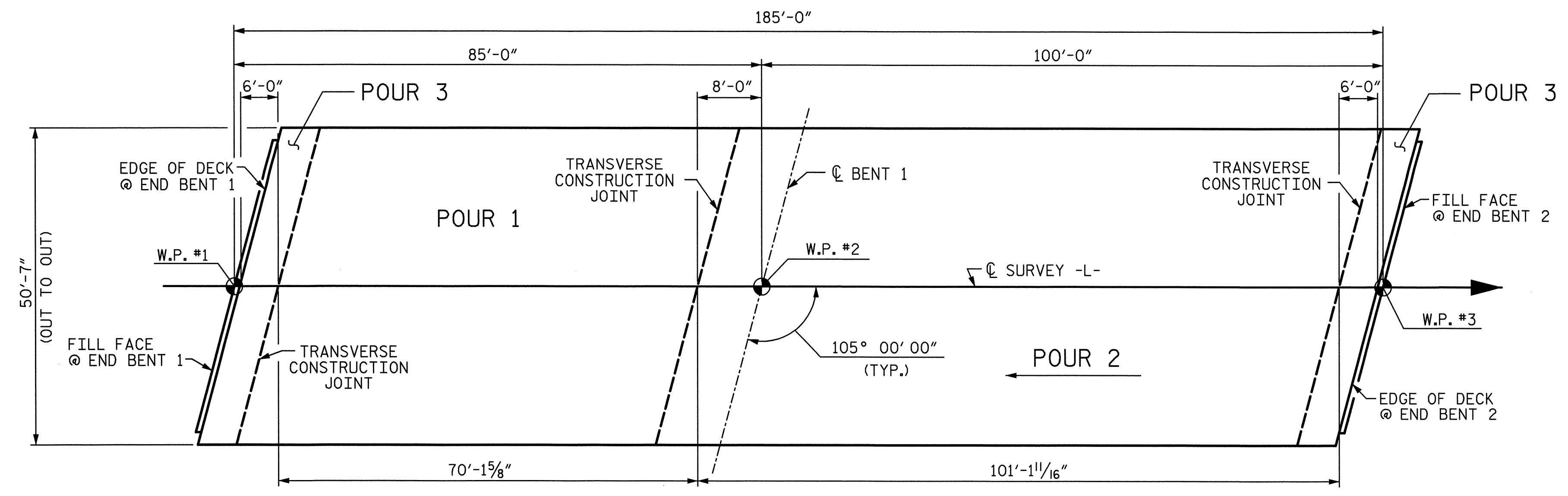
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>SUPERSTRUCTURE GUARDRAIL ANCHORAGE DETAILS</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-22
					TOTAL SHEETS 36

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

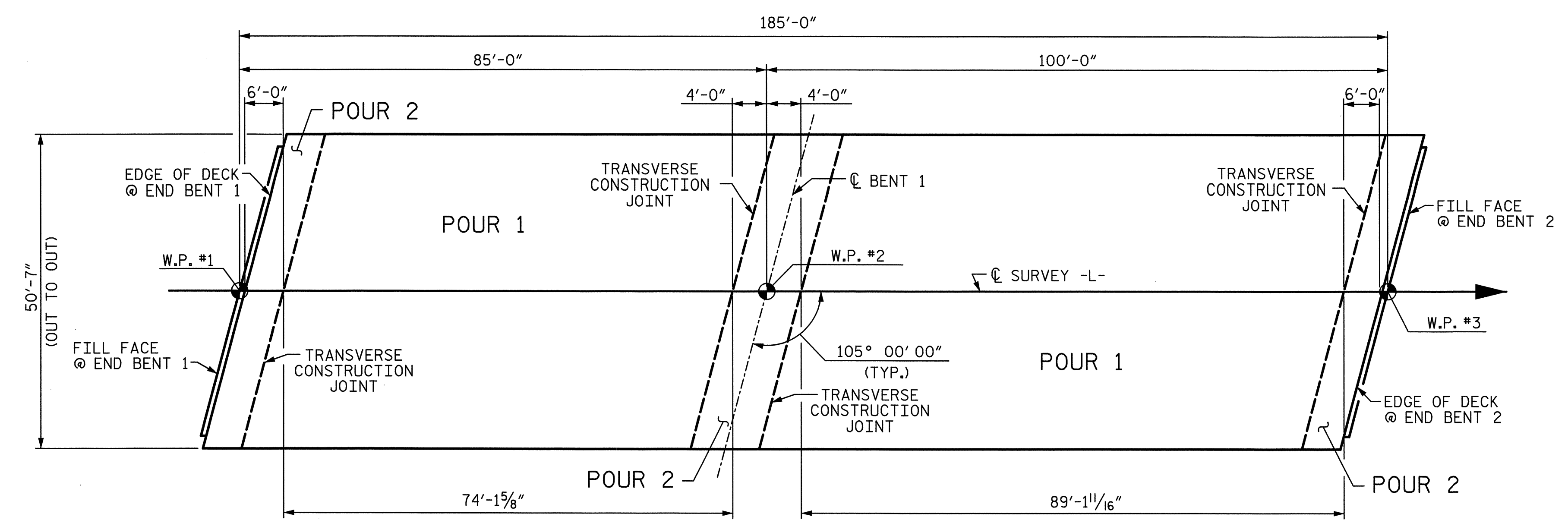


DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

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**POUR SEQUENCE AND LAYOUT**  
**FOR COMPUTING REINFORCED CONCRETE DECK SLAB AREA**  
 (SQ. FT. = 9,358)



**OPTIONAL POUR SEQUENCE**  
 POUR 2 CANNOT BE STARTED UNTIL THE CONCRETE IN BOTH ADJACENT  
 POUR 1'S REACHES A MINIMUM STRENGTH OF 3000 PSI.

PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

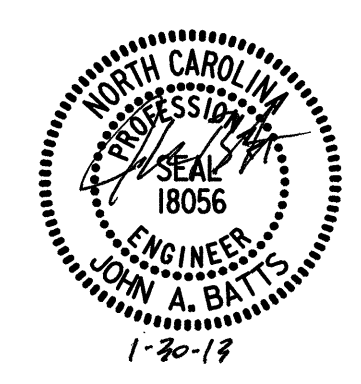
SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 BILL OF MATERIAL  
 (POUR SEQUENCE)**

REVISIONS						SHEET NO. S-23
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

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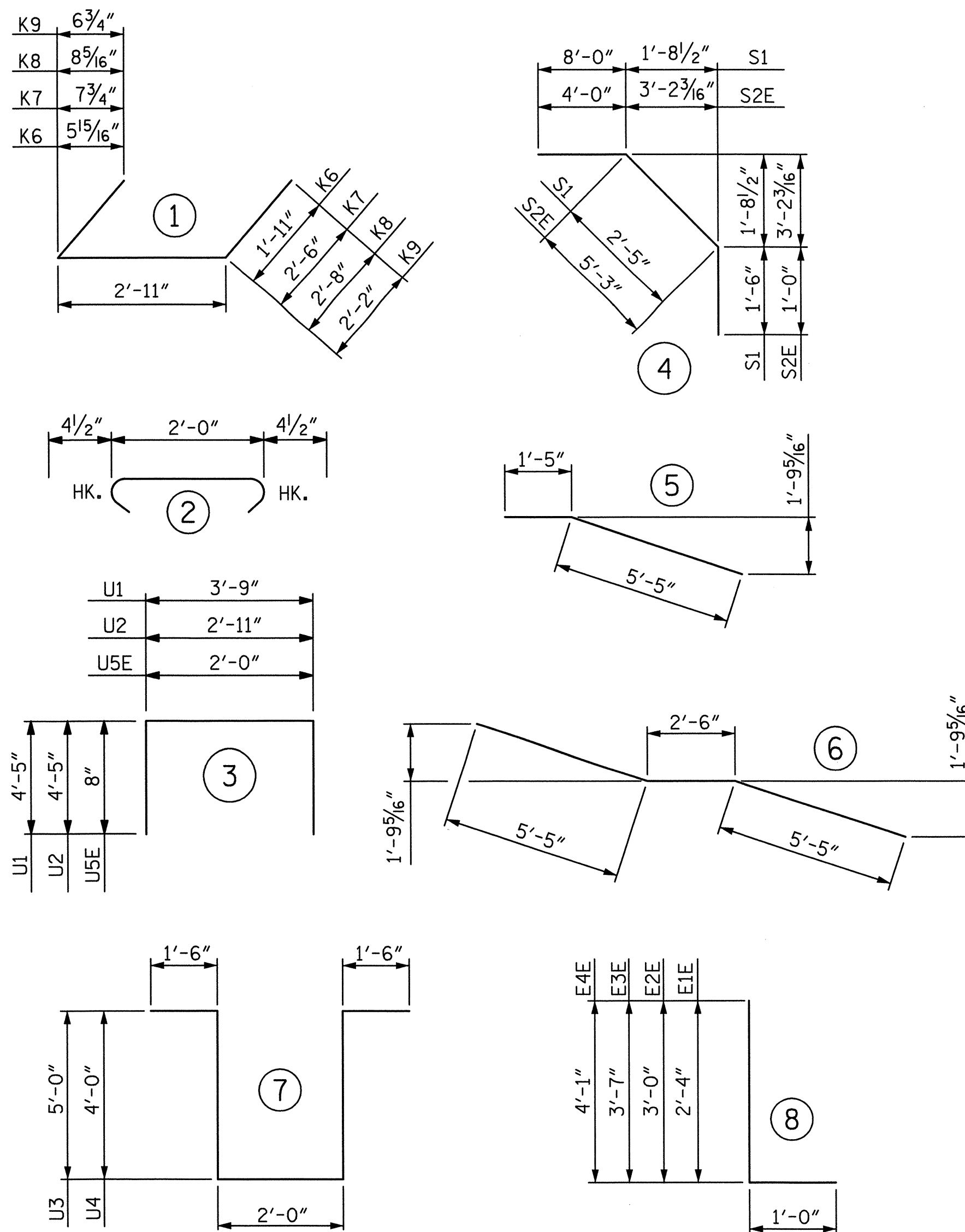
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BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

Table with columns for BAR NO. SIZE TYPE LENGTH WEIGHT. Includes sub-headers for SPANS A & B and a summary row for REINFORCING STEEL (36676 LBS.) and EPOXY COATED REINFORCING STEEL (39678 LBS.).

"E" INDICATES EPOXY COATED REINFORCING STEEL

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

Table with columns: BAR SIZE, SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND SIDEWALK, APPROACH SLABS, PARAPET AND SIDEWALK.

SUPERSTRUCTURE BILL OF MATERIAL

Table with columns: CLASS AA CONCRETE, REINFORCING STEEL, EPOXY COATED REINFORCING STEEL.

\* END POST QUANTITY FOR 3 BAR METAL RAIL END POSTS

GROOVING BRIDGE FLOORS

Table with columns: APPROACH SLABS, BRIDGE DECK, TOTAL.

PROJECT NO. P-5208E MECKLENBURG & CABARRUS COUNTY STATION: 65+92.50 -L-

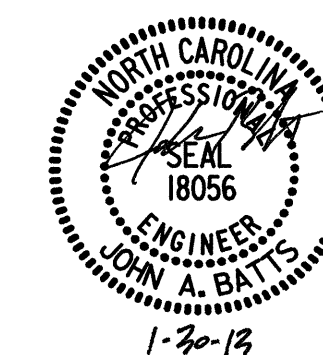
SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

Table with columns: NO., BY, DATE, NO., BY, DATE, SHEET NO., TOTAL SHEETS.

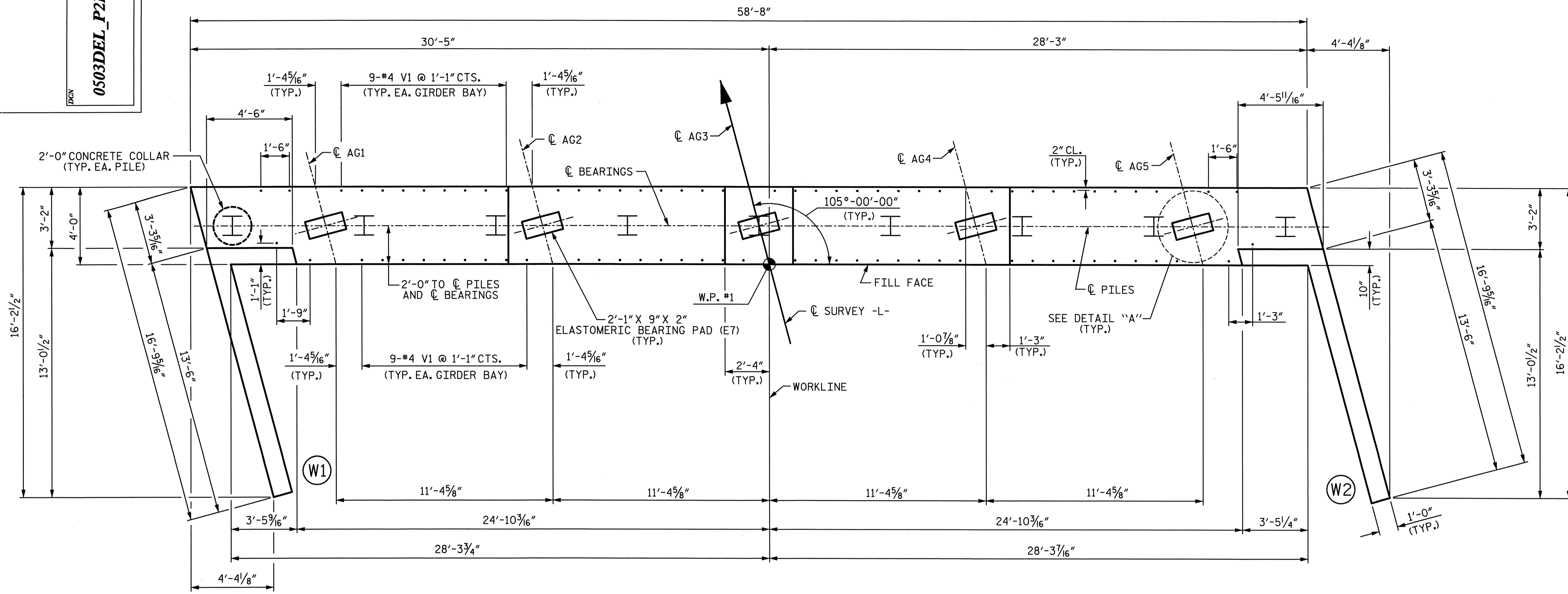
PLANS PREPARED BY: SIMPSON ENGINEERS & ASSOCIATES 5520 Dilgard Drive Suite 120 Cary, NC 27518



DRAWN BY: D. G. VESTER DATE: 12-12 CHECKED BY: J. A. BATTS DATE: 12-12 DESIGN ENGINEER OF RECORD: J.A.B. DATE: 1-20-13

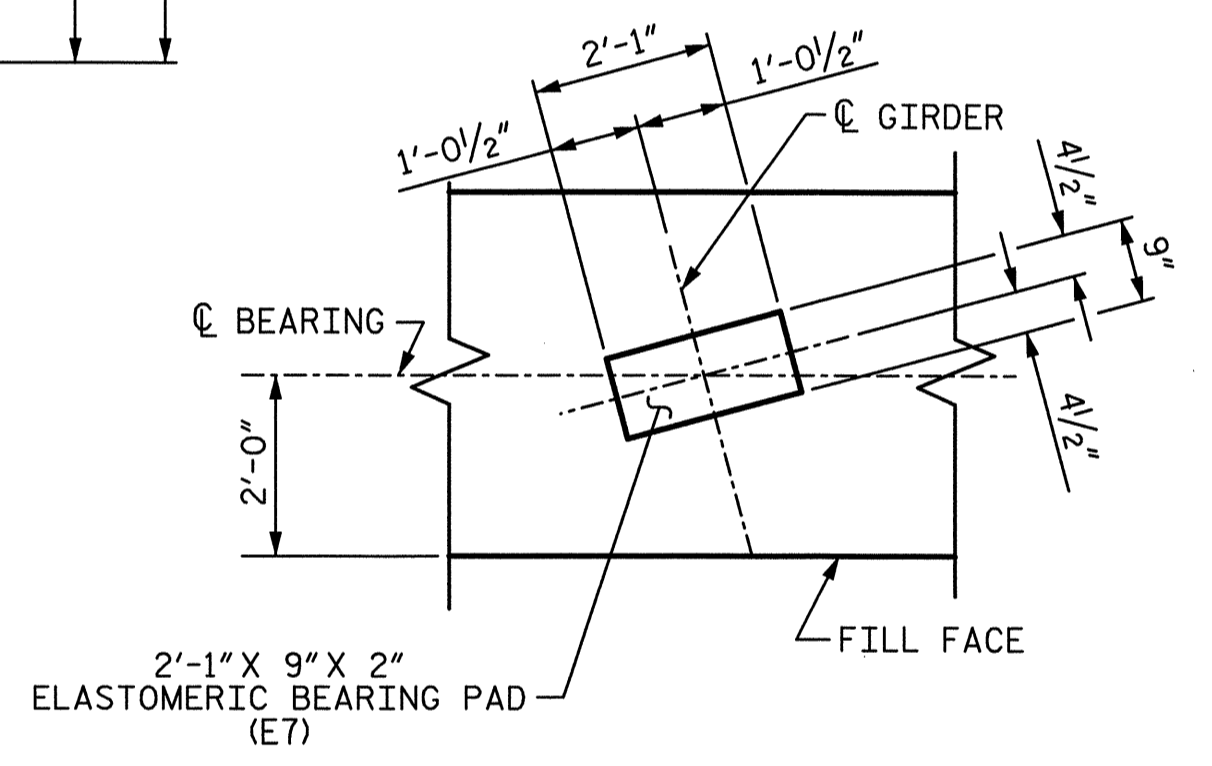


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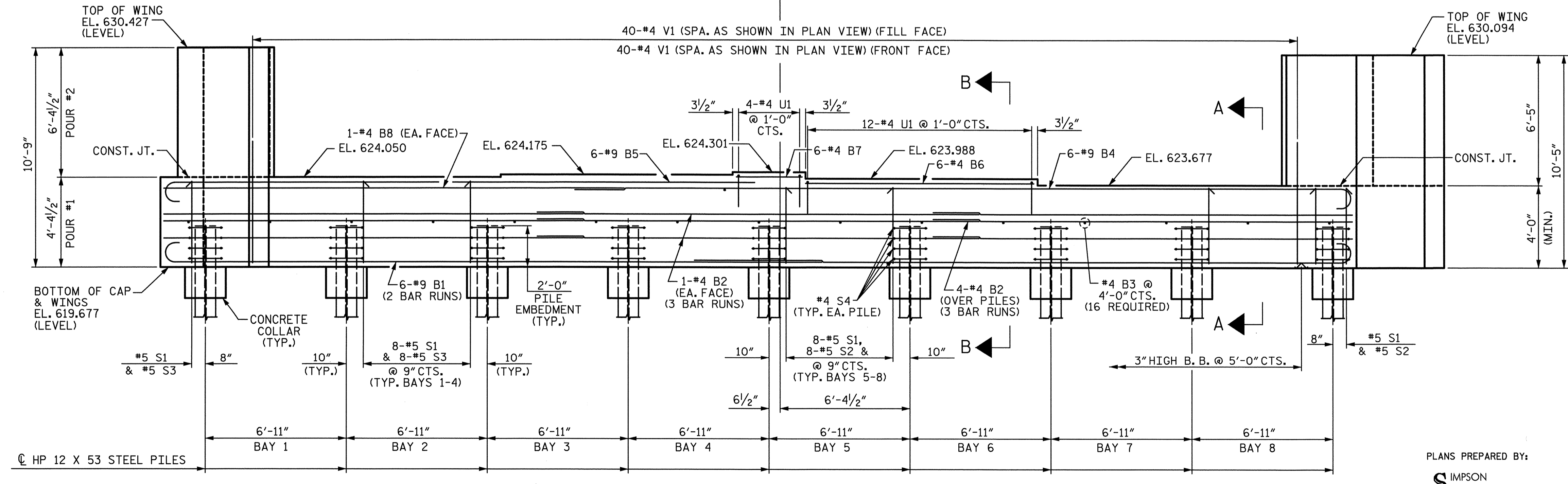


PLAN

**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.  
 #4 V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN CAP.  
 FOR SECTION A-A & SECTION B-B, SEE SHEET 3 OF 3.  
 THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1), EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".



DETAIL "A"  
(TYP. EA. GIRDER)



ELEVATION

**SPLICE CHART**

- #9 B1 SPLICE LENGTH = 6'-3"
- #4 B2 SPLICE LENGTH = 2'-5"
- #4 B8 SPLICE LENGTH = 2'-5"

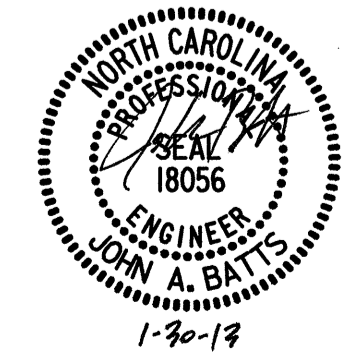
PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

SHEET 1 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUBSTRUCTURE  
 END BENT 1**

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

TOTAL SHEETS: 36

PLANS PREPARED BY:  
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 (919) 852-0468  
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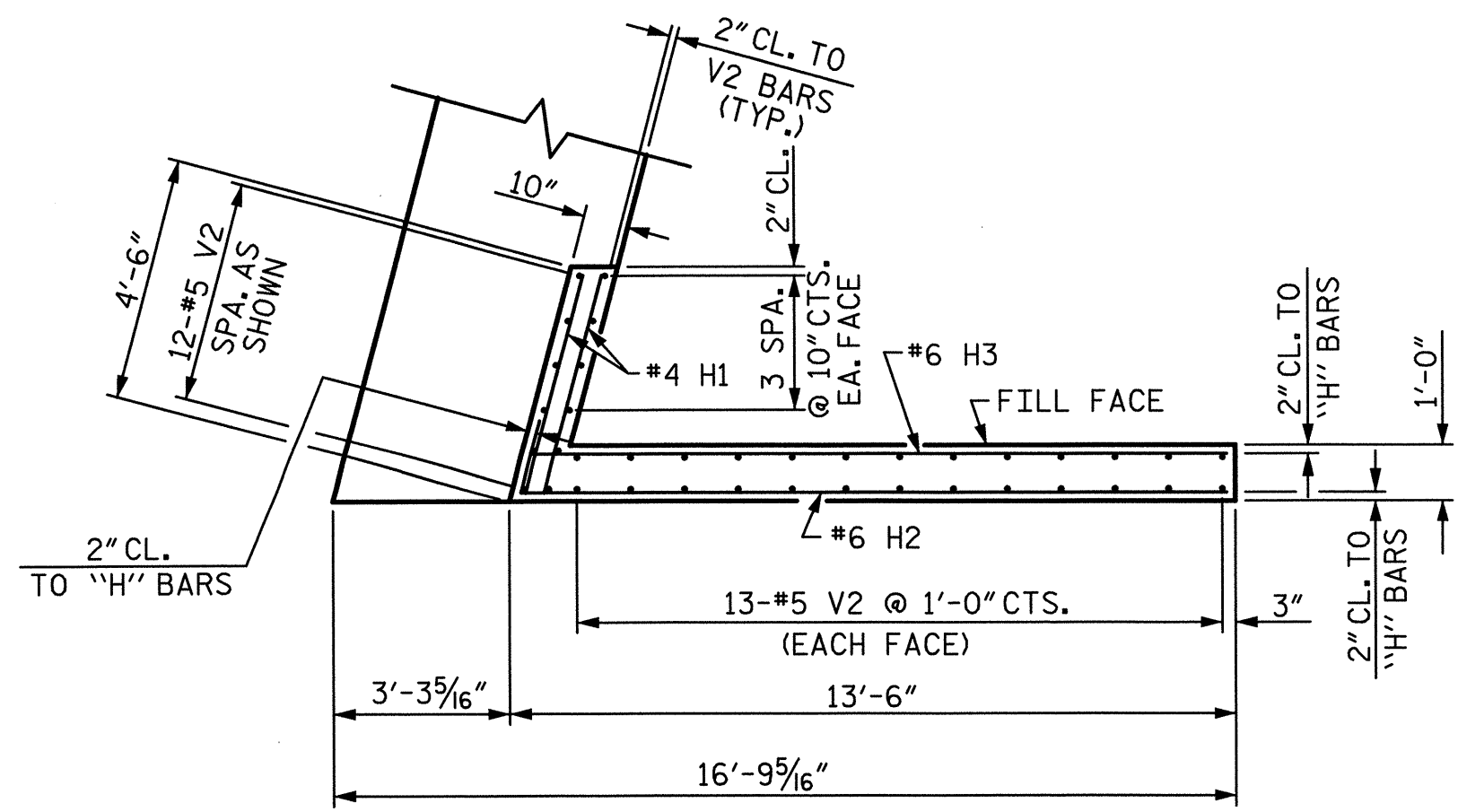


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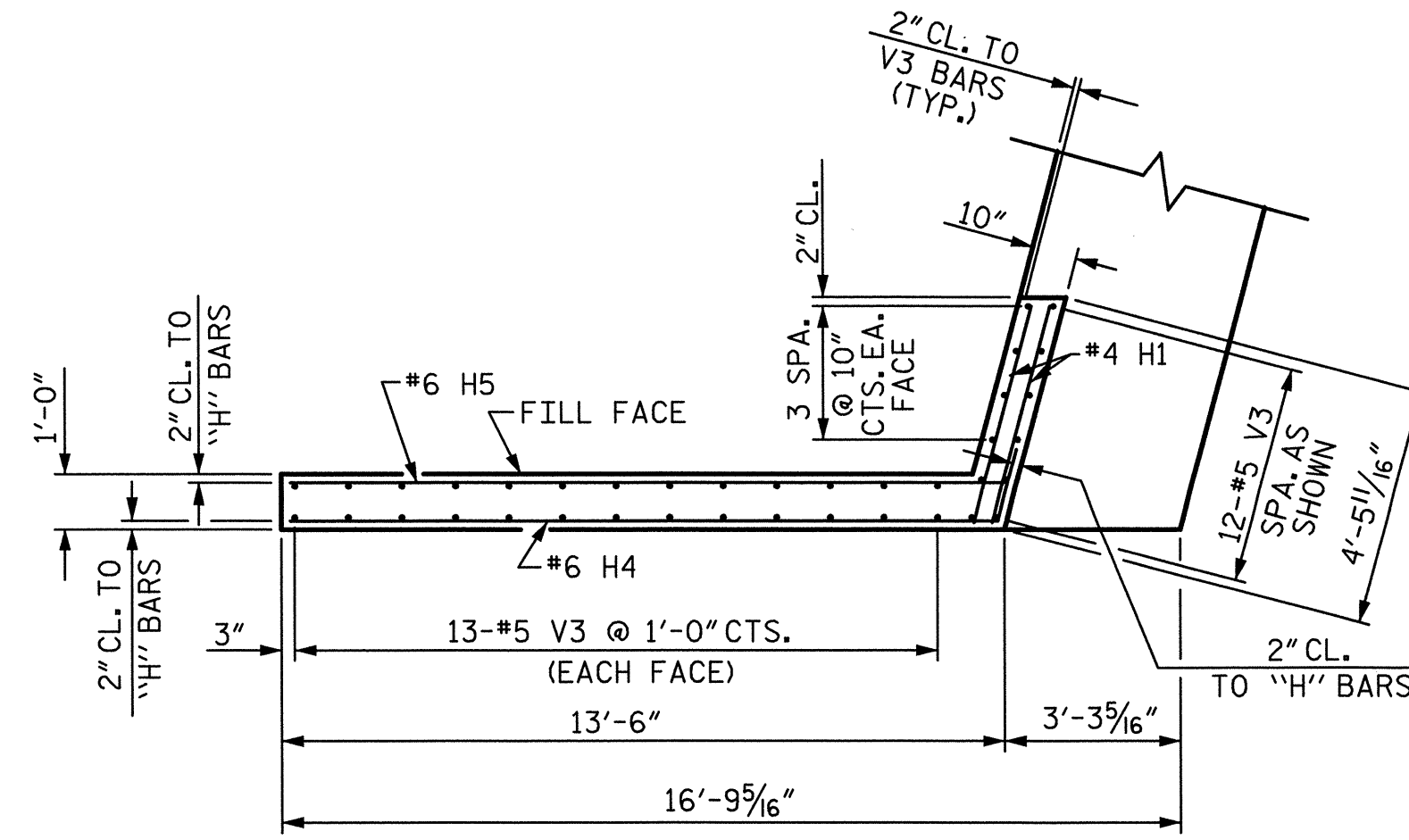
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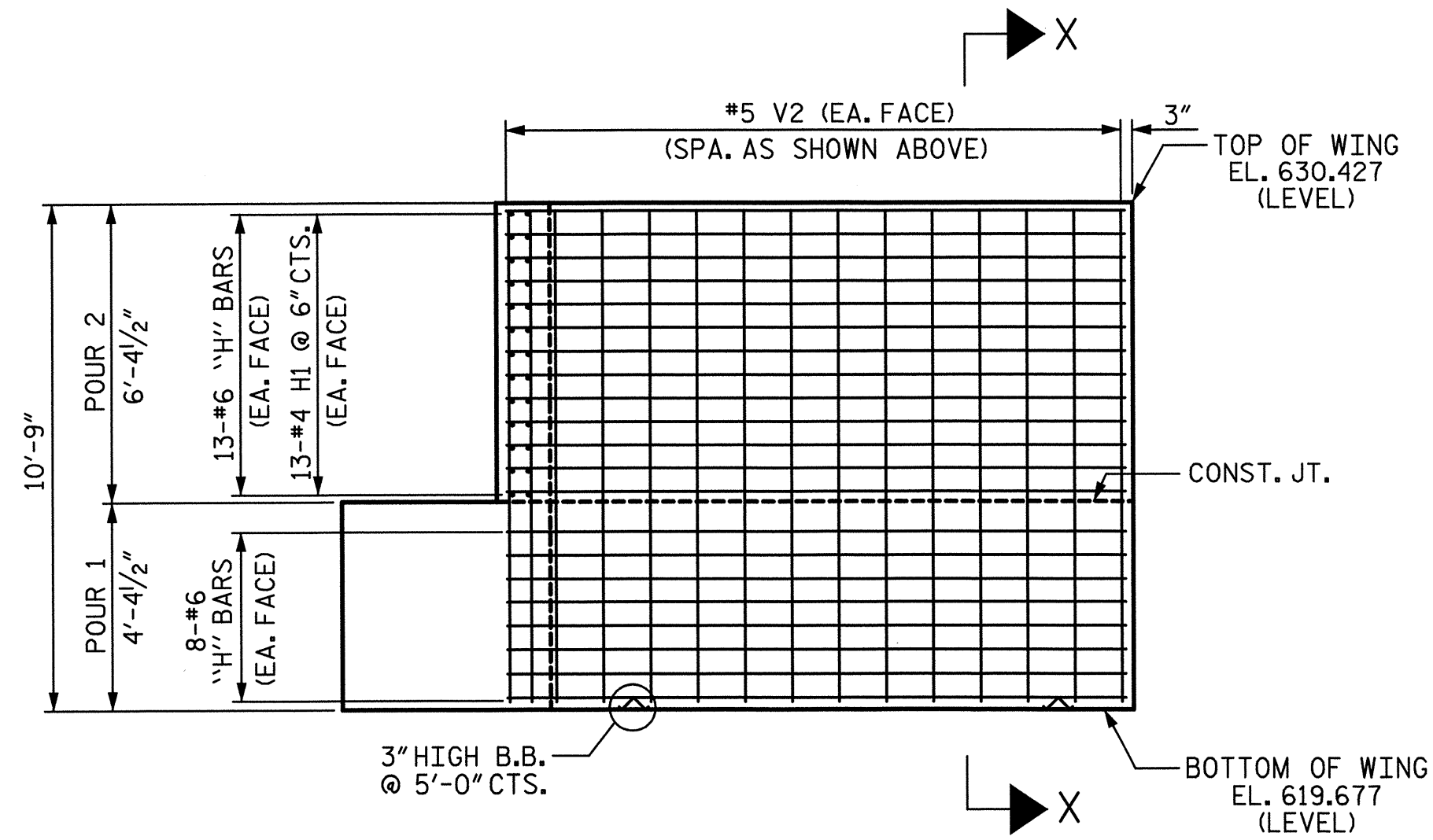
0503DEL\_P21a1



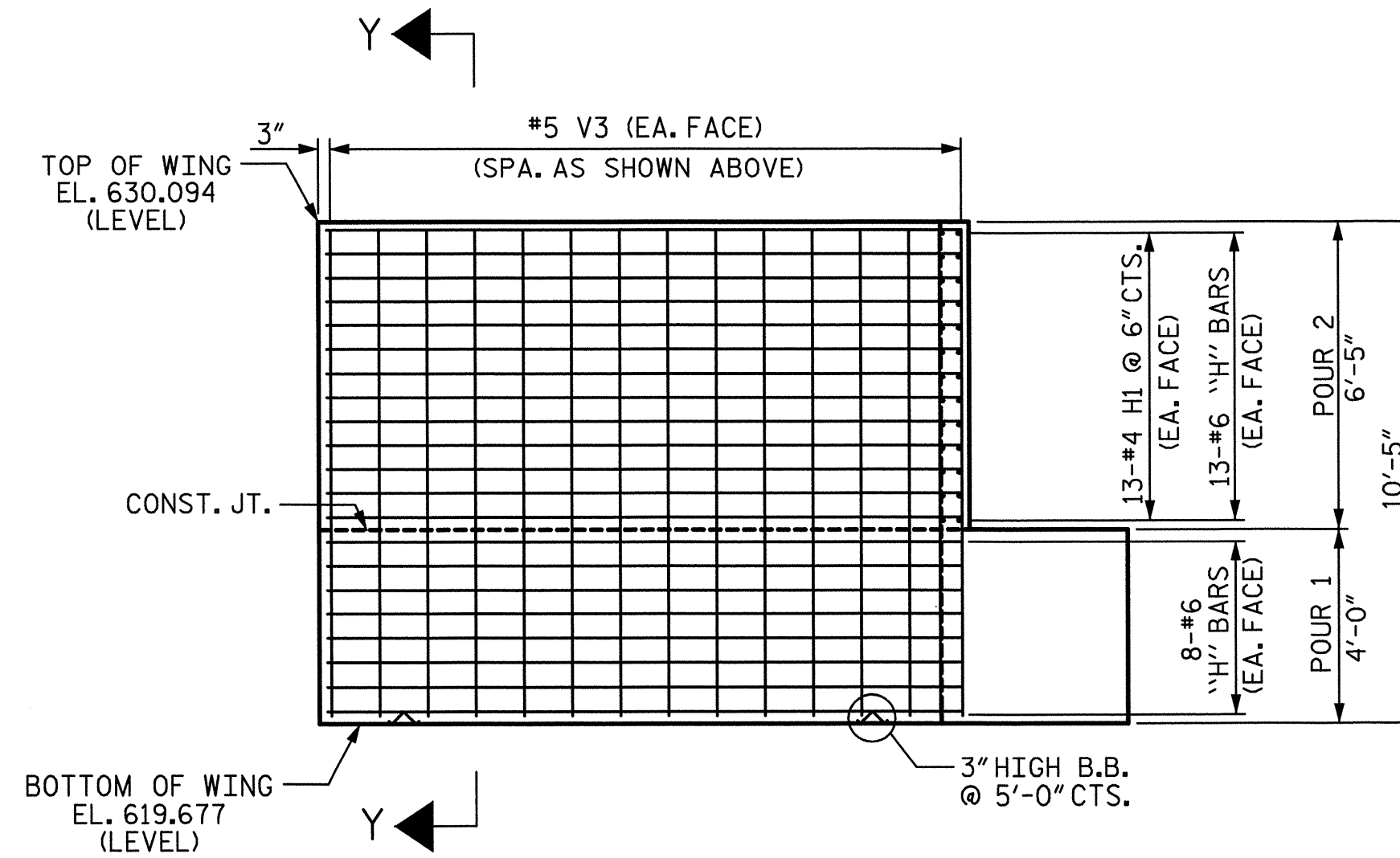
PLAN OF WING (W1)



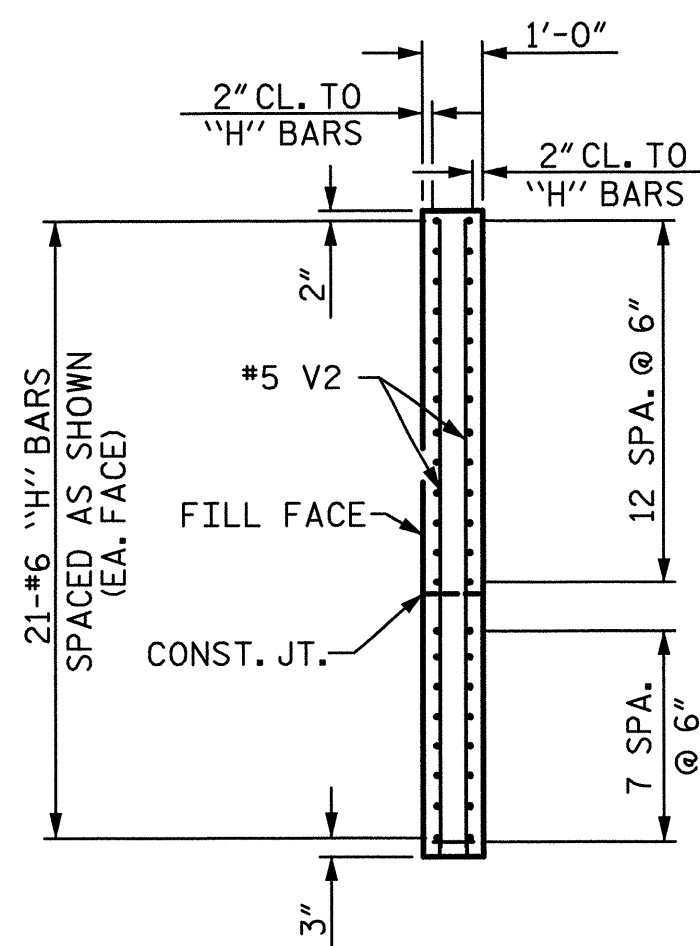
PLAN OF WING (W2)



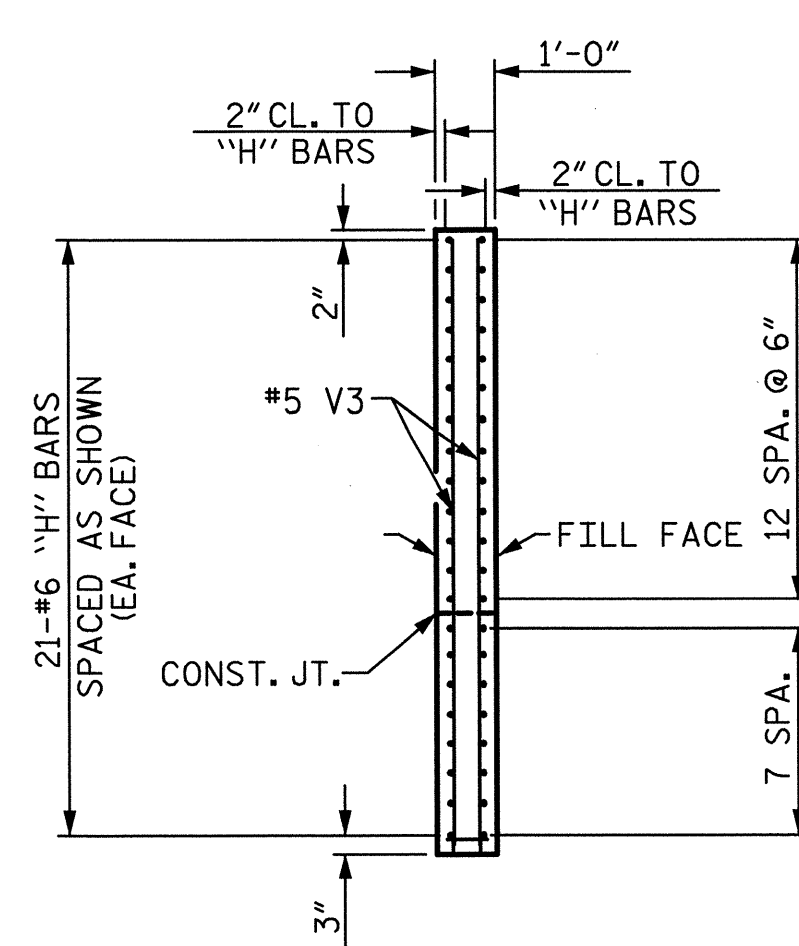
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

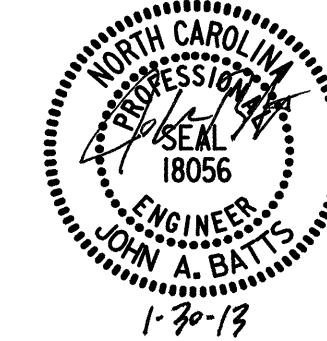


SECTION X-X



SECTION Y-Y

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PROJECT NO. P-5208E  
 MECKLENBURG  
 & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

SHEET 2 OF 3

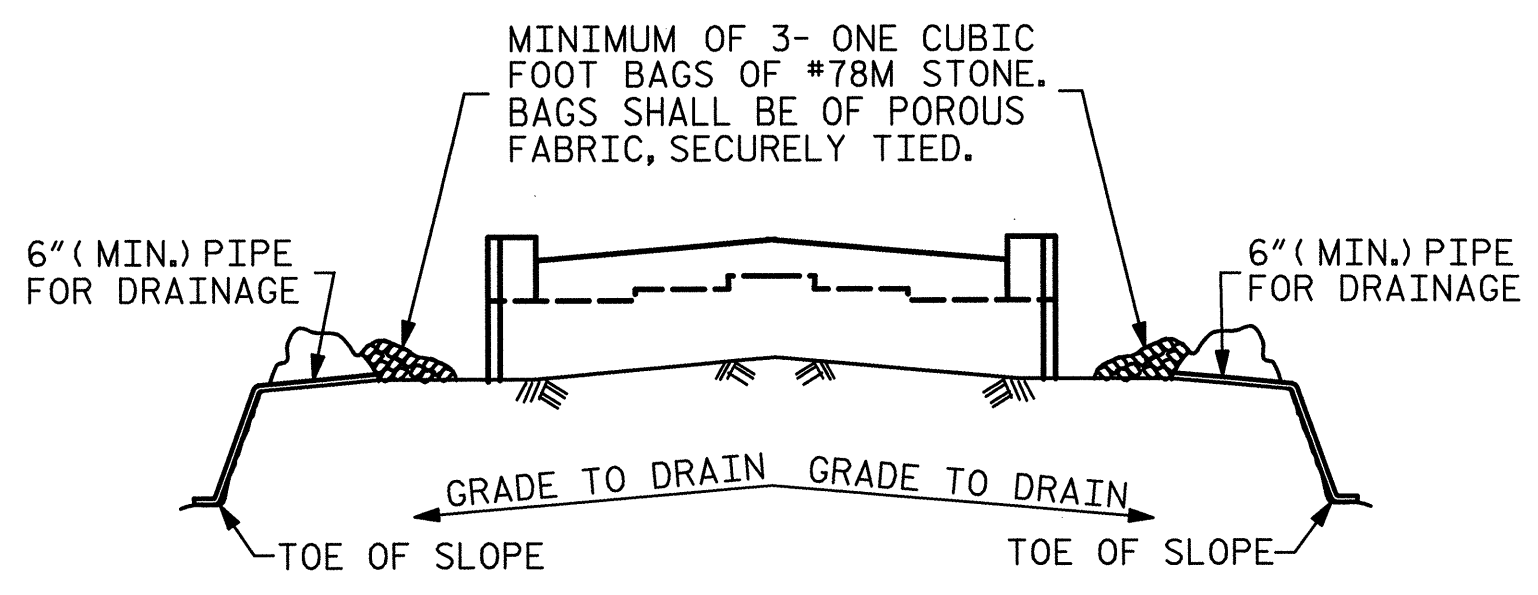
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1

REVISIONS						SHEET NO. S-26 TOTAL SHEETS 36
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

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 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

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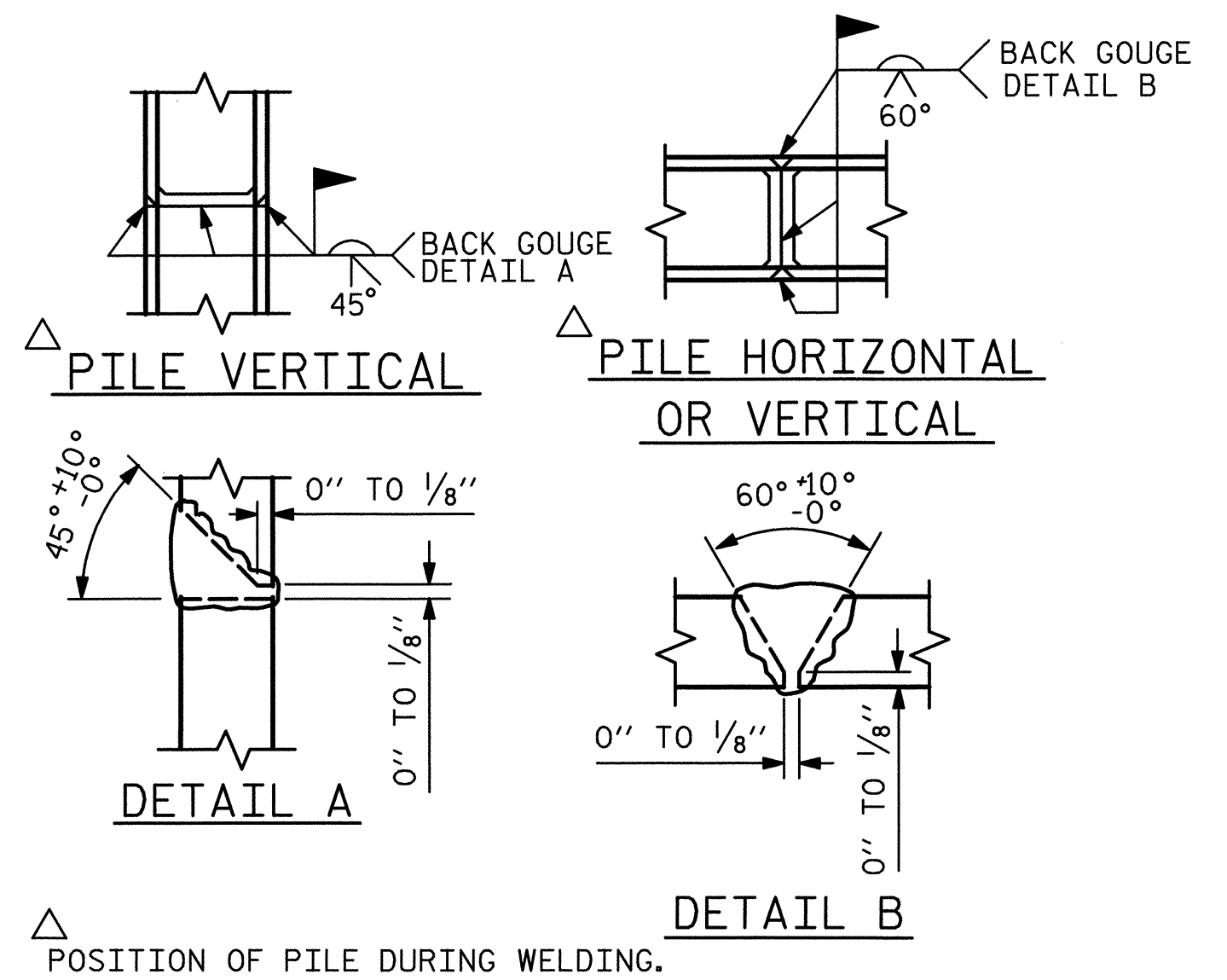


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

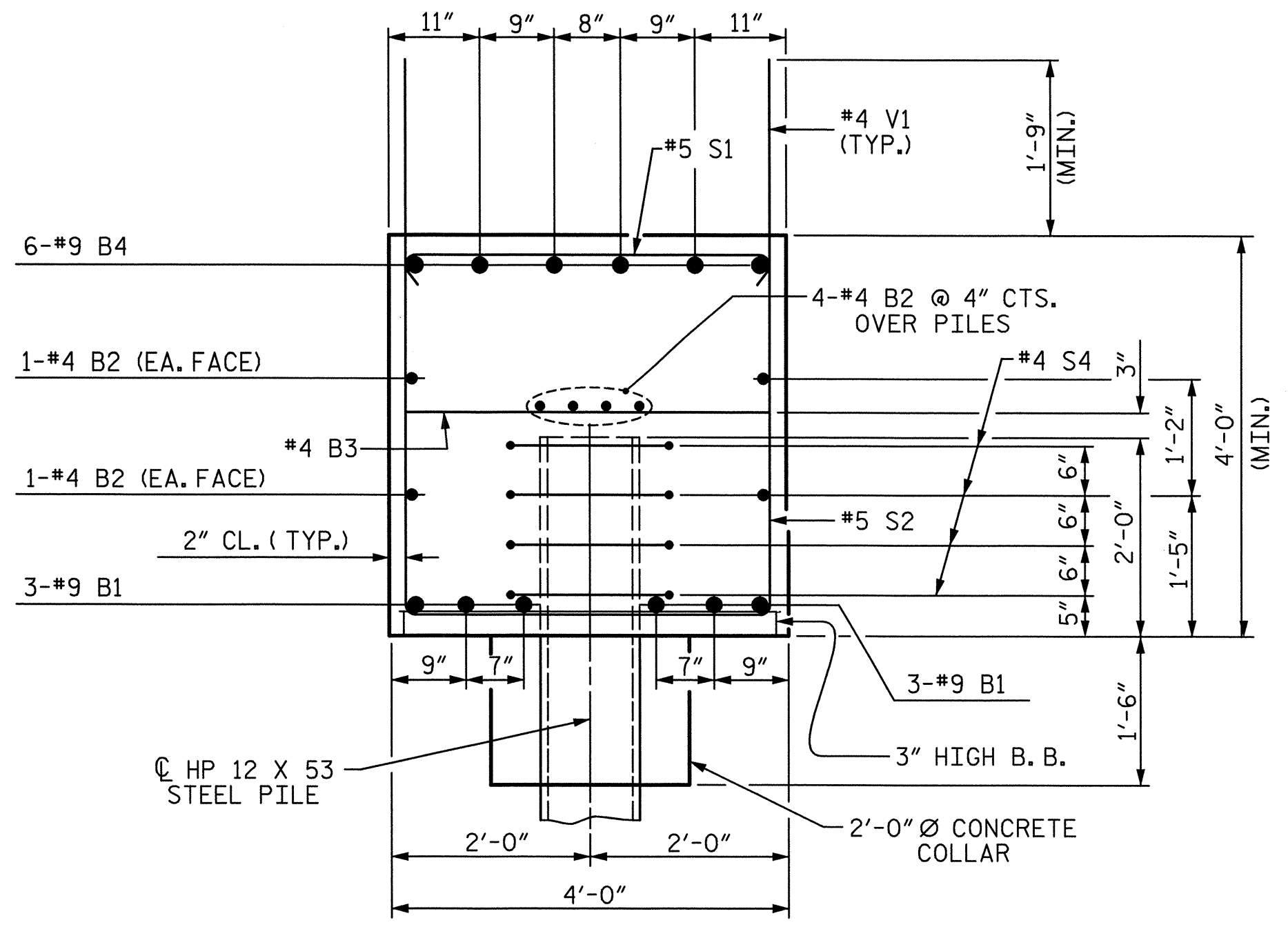
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

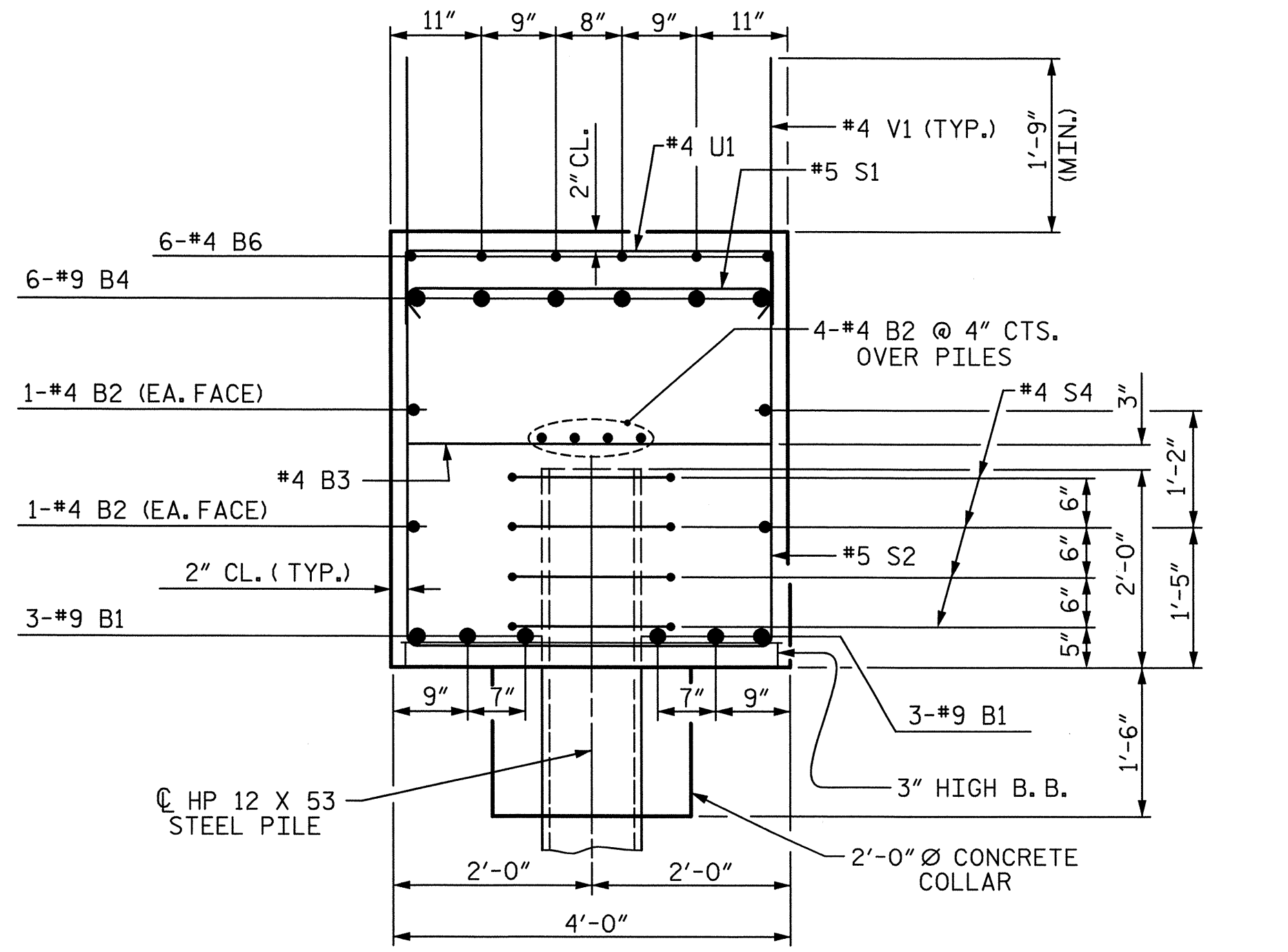
**TEMPORARY DRAINAGE AT END BENT**



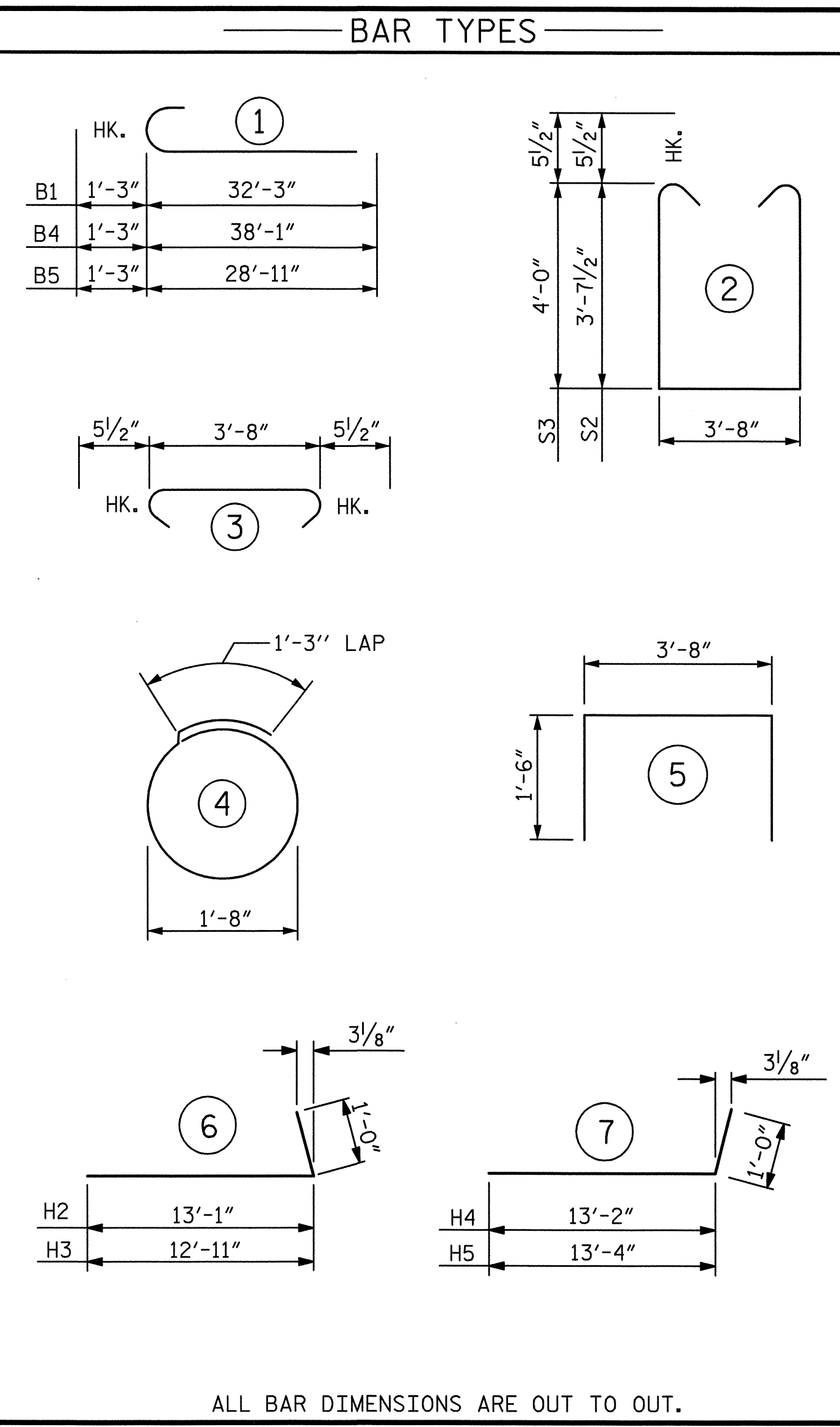
**PILE SPLICE DETAILS**



**SECTION A-A**



**SECTION B-B**



BILL OF MATERIAL						
END BENT 1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	12	9	1	33'-6"	1367	
B2	24	4	STR	21'-1"	338	
B3	16	4	STR	3'-8"	39	
B4	6	9	1	39'-4"	802	
B5	6	9	1	30'-2"	615	
B6	6	4	STR	11'-4"	45	
B7	6	4	STR	3'-3"	13	
B8	2	4	STR	22'-7"	30	
H1	52	4	STR	4'-1"	142	
H2	21	6	6	14'-1"	444	
H3	21	6	6	13'-11"	439	
H4	21	6	7	14'-2"	447	
H5	21	6	7	14'-4"	452	
S1	66	5	3	4'-7"	316	
S2	33	5	2	11'-10"	407	
S3	33	5	2	12'-7"	433	
S4	36	4	4	6'-6"	156	
U1	16	4	5	6'-8"	71	
V1	80	4	STR	5'-6"	294	
V2	38	5	STR	10'-4"	410	
V3	38	5	STR	10'-0"	396	
REINFORCING STEEL				LBS	7656	
CLASS A CONCRETE BREAKDOWN						
POUR 1				CY	43.1	
(CAP, COLLARS, & LOWER WINGS)						
POUR 2				CY	7.8	
(UPPER WINGS)						
TOTAL CLASS A CONCRETE				CY	50.9	
HP 12 X 53 STEEL PILES				NO. = 9	LF	198
STEEL PILE POINTS				EA	9	

PROJECT NO. P-5208E

MECKLENBURG & CABARRUS COUNTY

STATION: 65+92.50 -L-

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-27

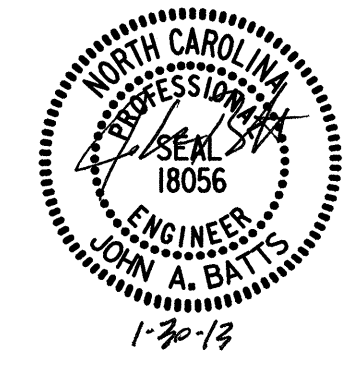
TOTAL SHEETS 36

PLANS PREPARED BY:

**SIMPSON ENGINEERS & ASSOCIATES**

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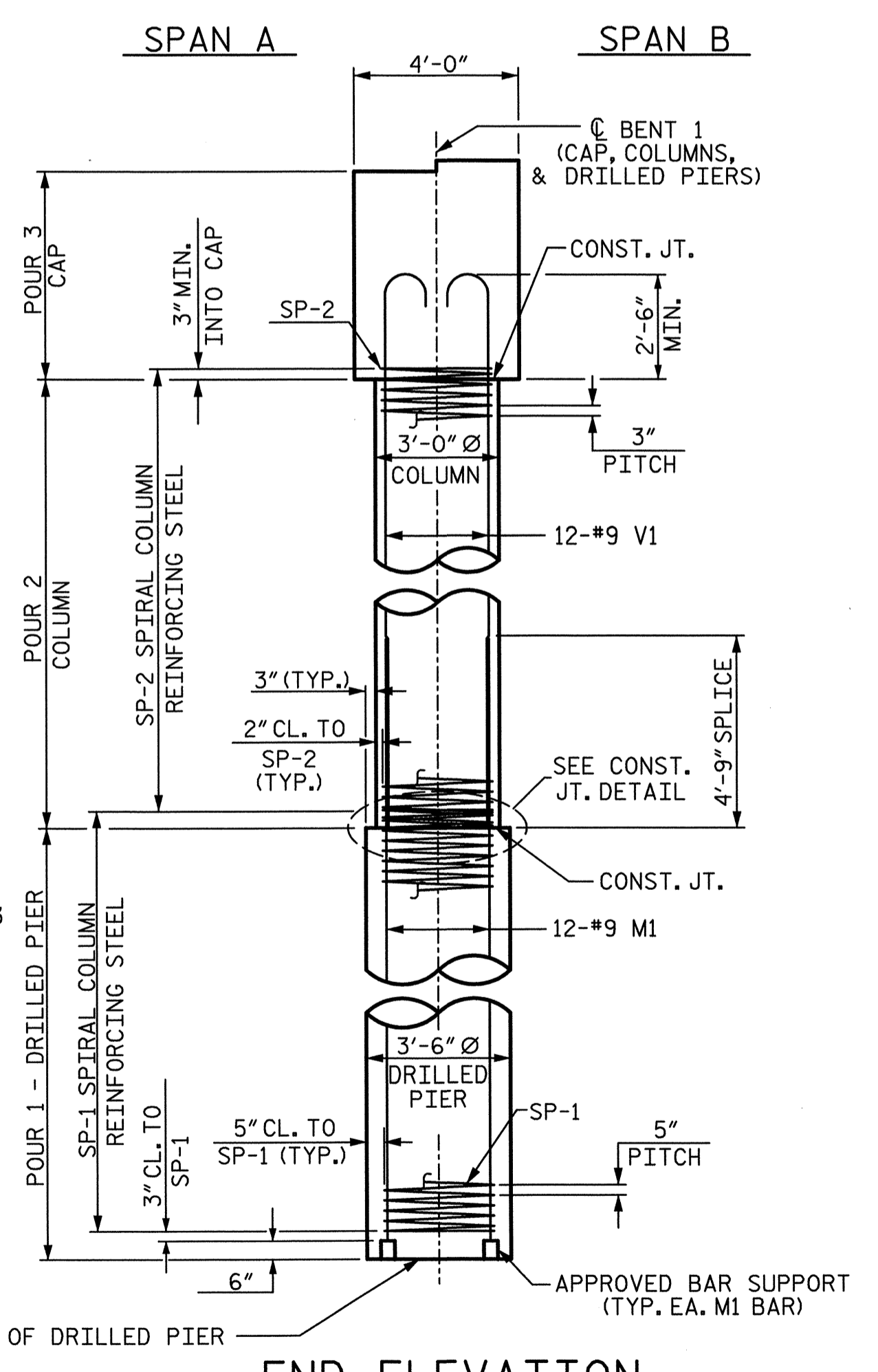
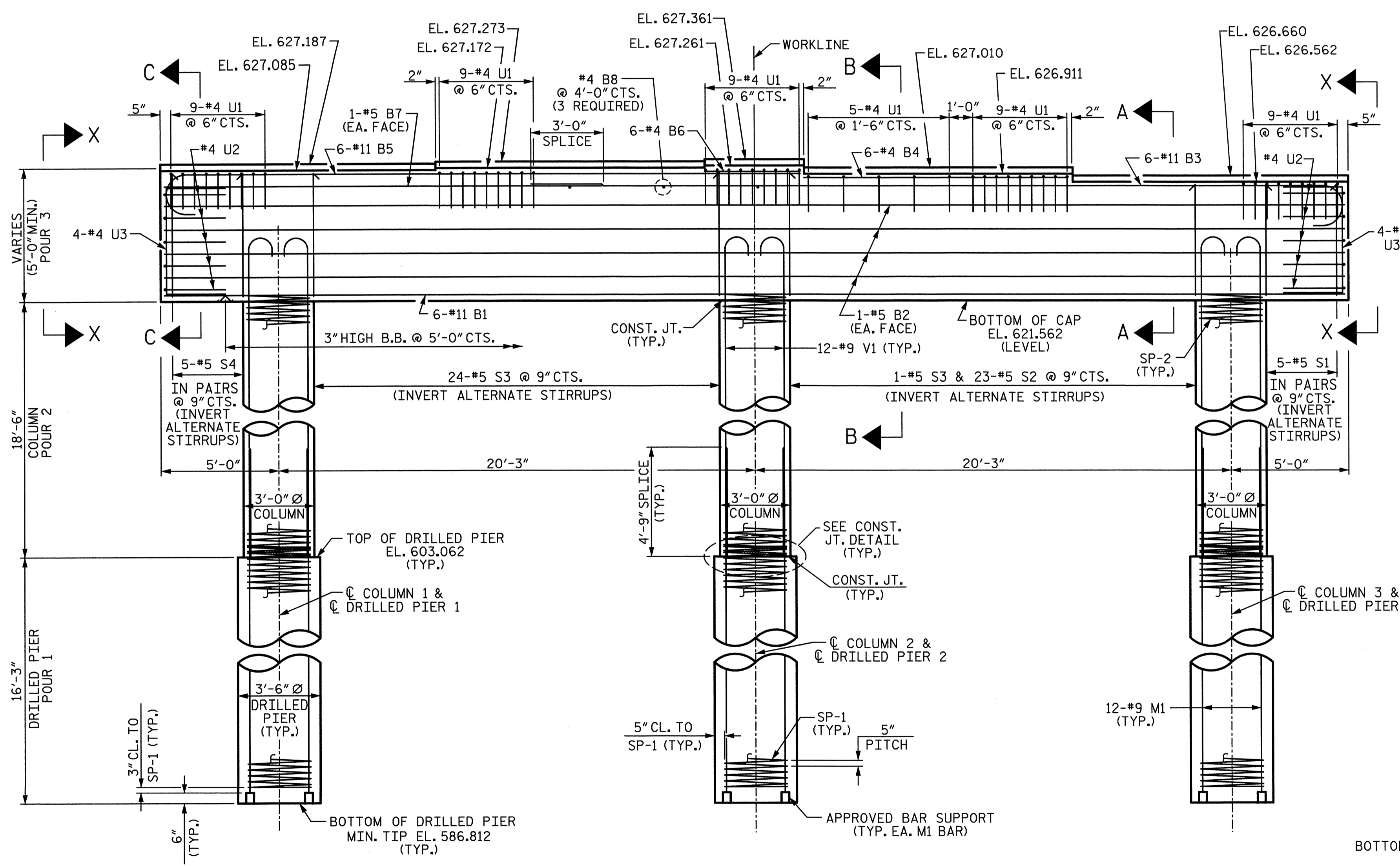
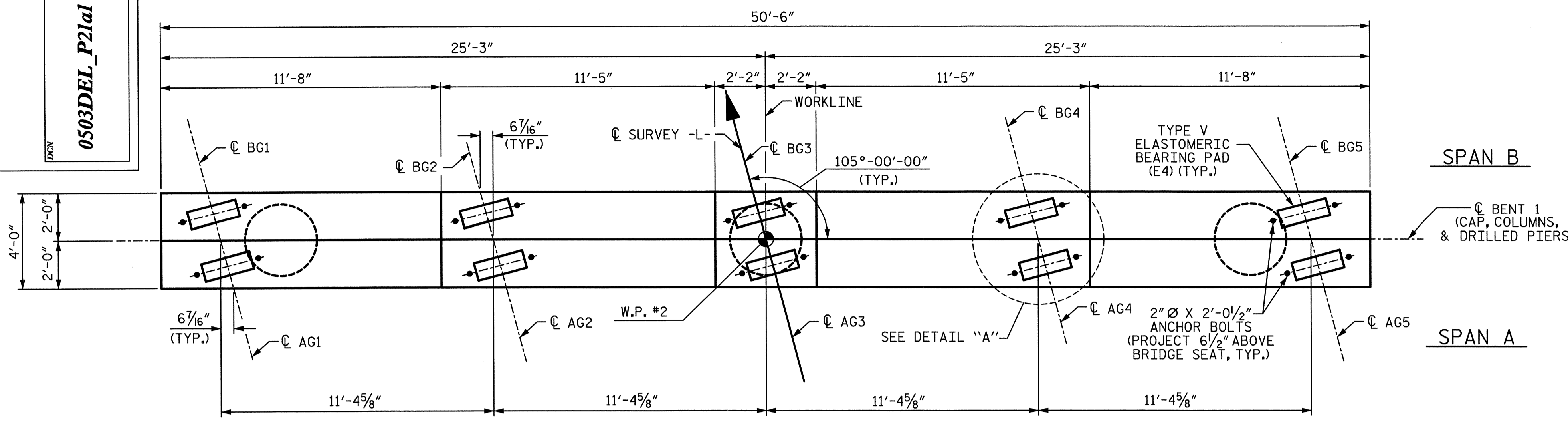
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CHECKED BY: J. A. BATTS DATE: 12-12

DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-20-12

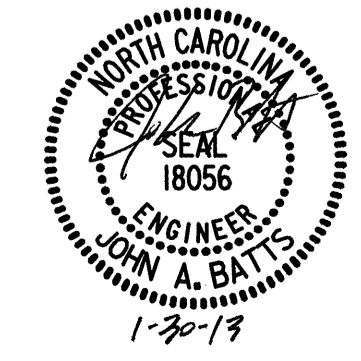
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PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

SHEET 1 OF 2

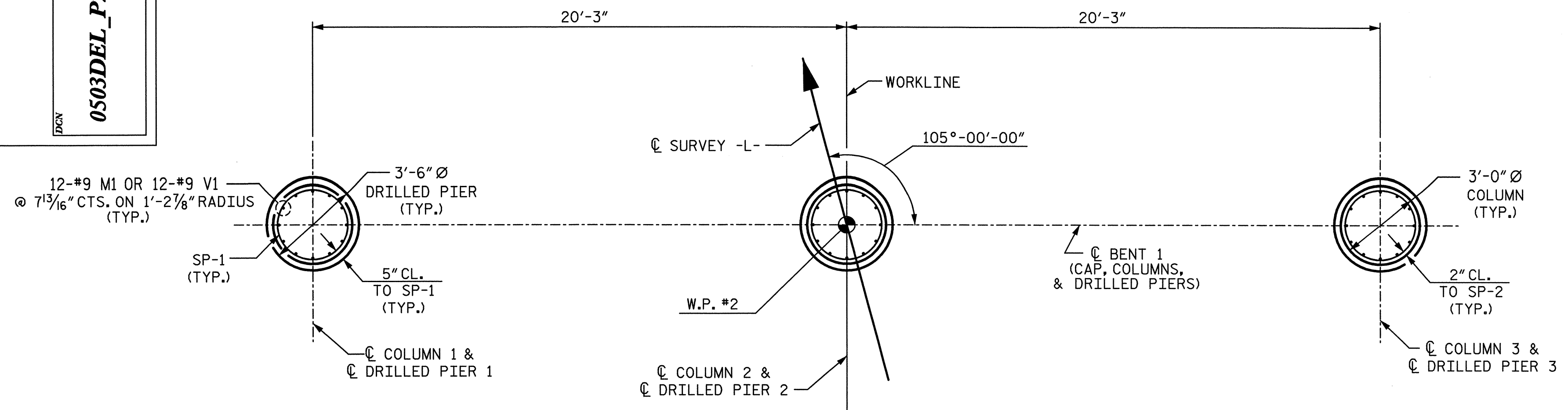
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2			4			

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

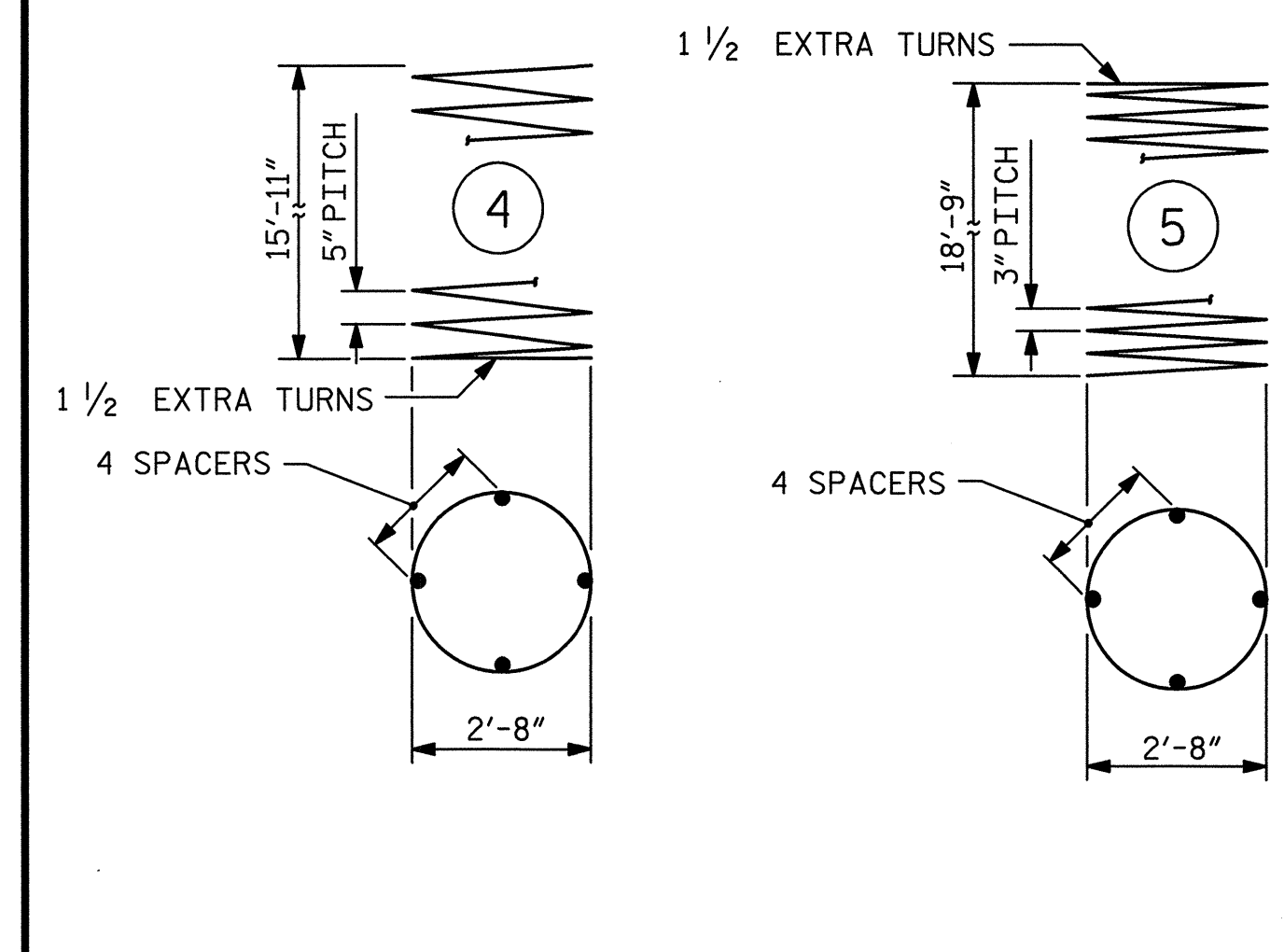
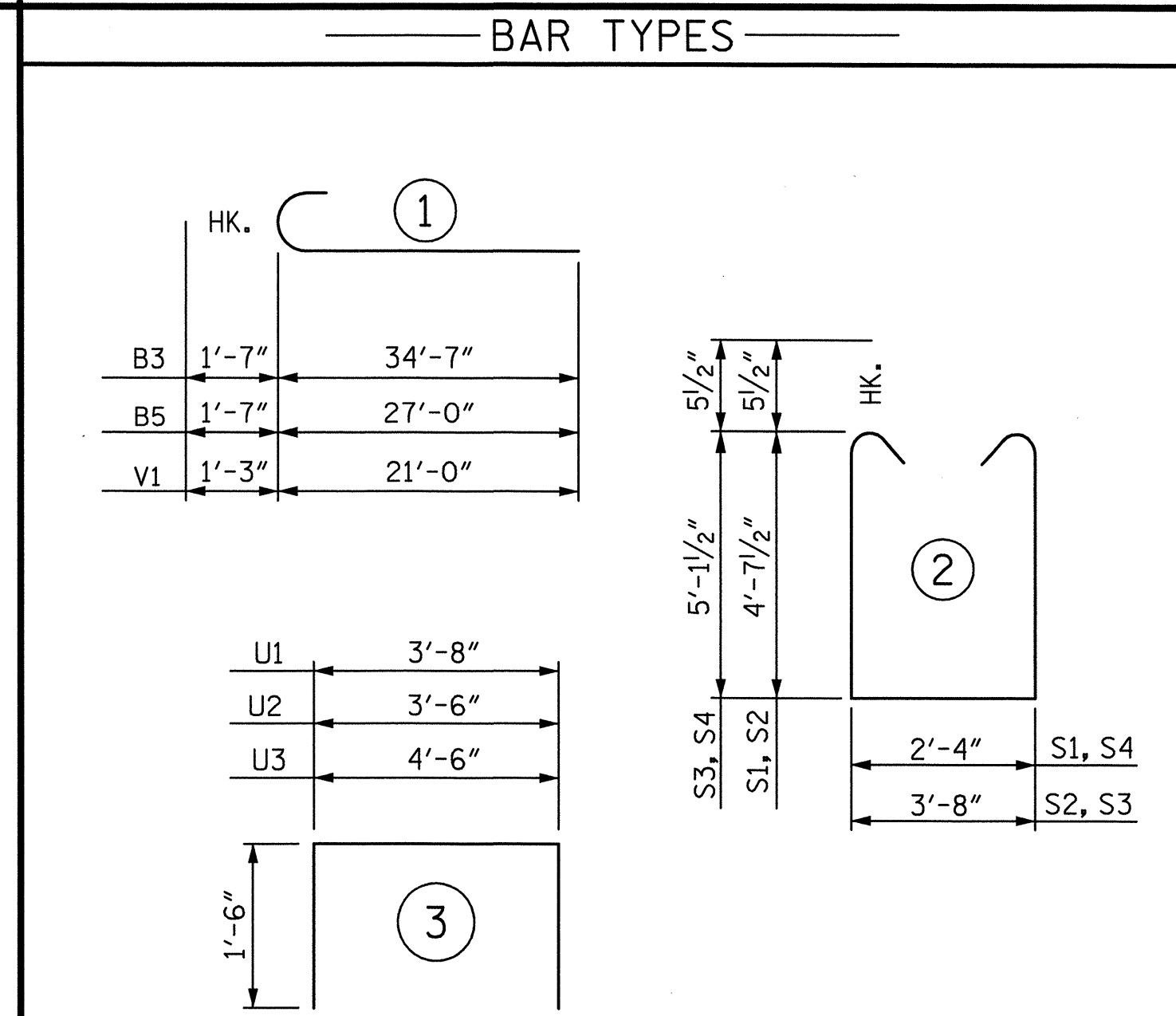
**SUBSTRUCTURE BENT 1**

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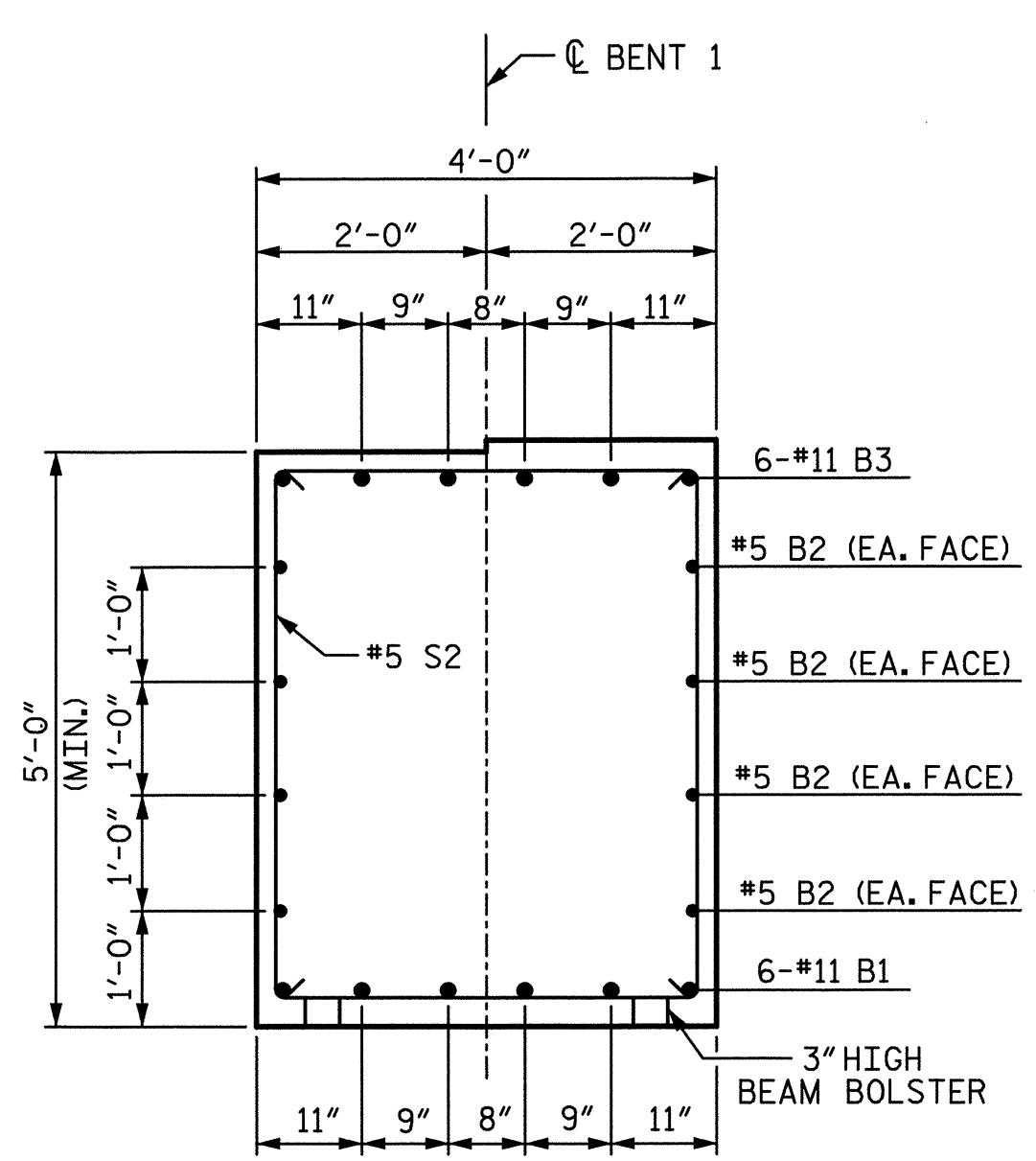
PLAN OF DRILLED PIERS & COLUMNS



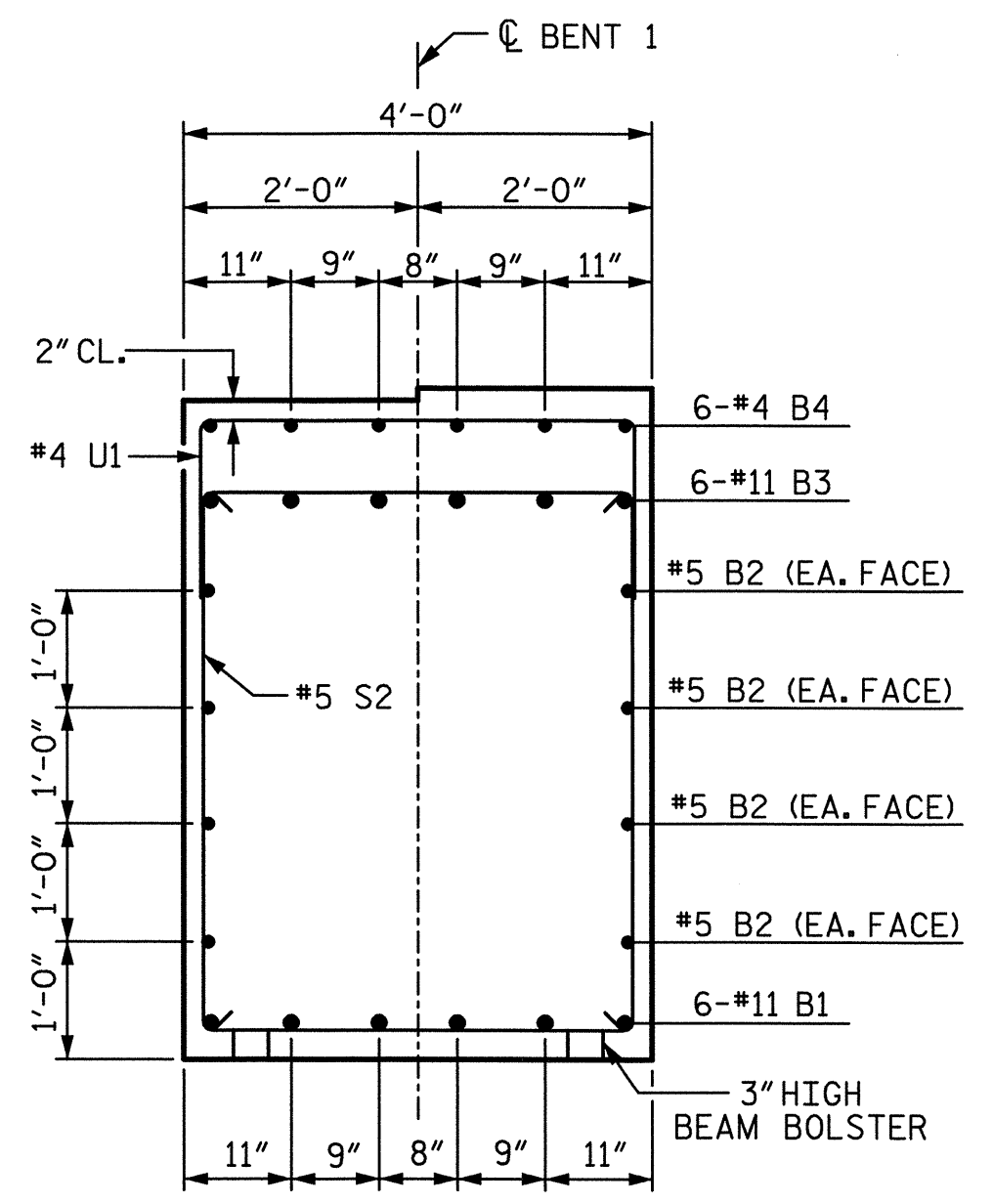
ALL BAR DIMENSIONS ARE OUT TO OUT.

\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.  
 \*\* THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

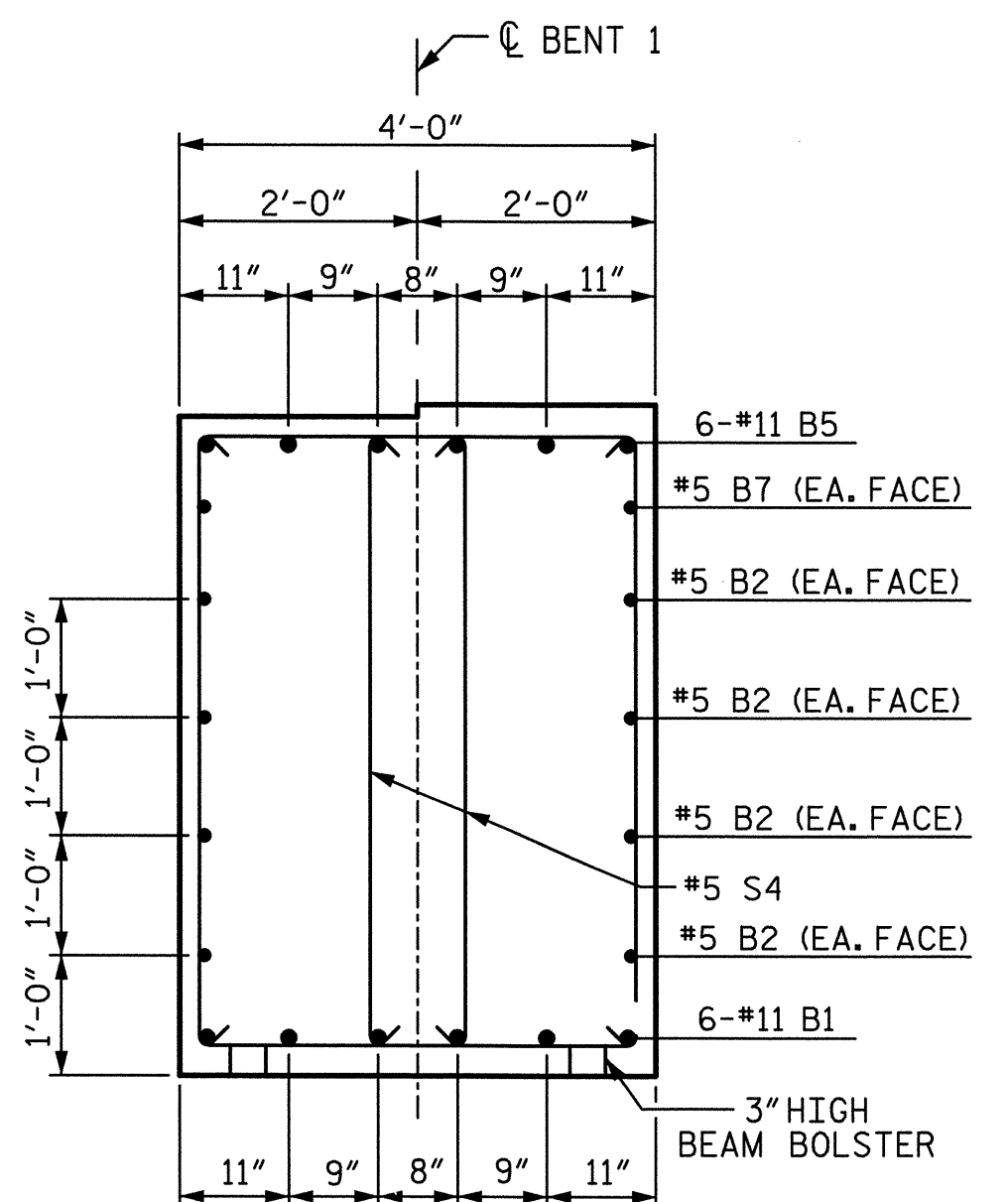
BILL OF MATERIAL					
BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	11	STR	50'-1"	1597
B2	8	5	STR	50'-1"	418
B3	6	11	1	36'-2"	1153
B4	6	4	STR	11'-4"	45
B5	6	11	1	28'-7"	911
B6	6	4	STR	4'-0"	16
B7	2	5	STR	18'-6"	39
B8	3	4	STR	3'-8"	7
M1	36	9	STR	20'-6"	2509
S1	10	5	2	12'-6"	130
S2	23	5	2	13'-10"	332
S3	25	5	2	14'-10"	387
S4	10	5	2	13'-6"	141
U1	50	4	3	6'-8"	223
U2	10	4	3	6'-6"	43
U3	8	4	3	7'-6"	40
V1	36	9	1	22'-3"	2723
REINFORCING STEEL					LBS 10714
SP-1	3	*	4	326'-7"	1022
SP-2	3	**	5	631'-2"	1265
SPIRAL COLUMN					LBS 2287
REINFORCING STEEL					LBS 2287
CLASS A CONCRETE BREAKDOWN					
POUR 2 (COLUMNS)				CY	14.5
POUR 3 (CAP)				CY	40.8
CLASS A CONCRETE				CY	55.3
DRILLED PIERS					
DRILLED PIER CONCRETE					
POUR 1 (DRILLED PIERS)				CY	17.4
3'-6" DIA. DRILLED PIER					
NOT IN SOIL				LF	30.0
3'-6" DIA. DRILLED PIER					
IN SOIL				LF	18.75
PERMANENT STEEL CASING FOR					
3'-6" DIA. DRILLED PIER				LF	15.1
CSL TUBES				LF	213



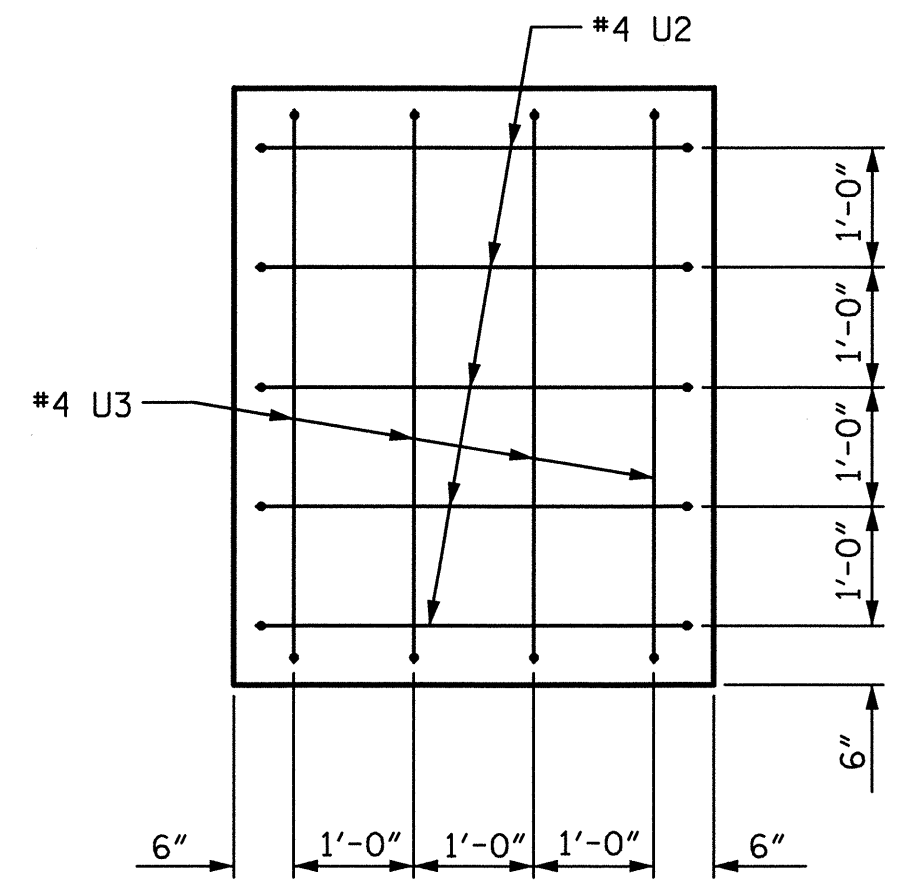
SECTION A-A



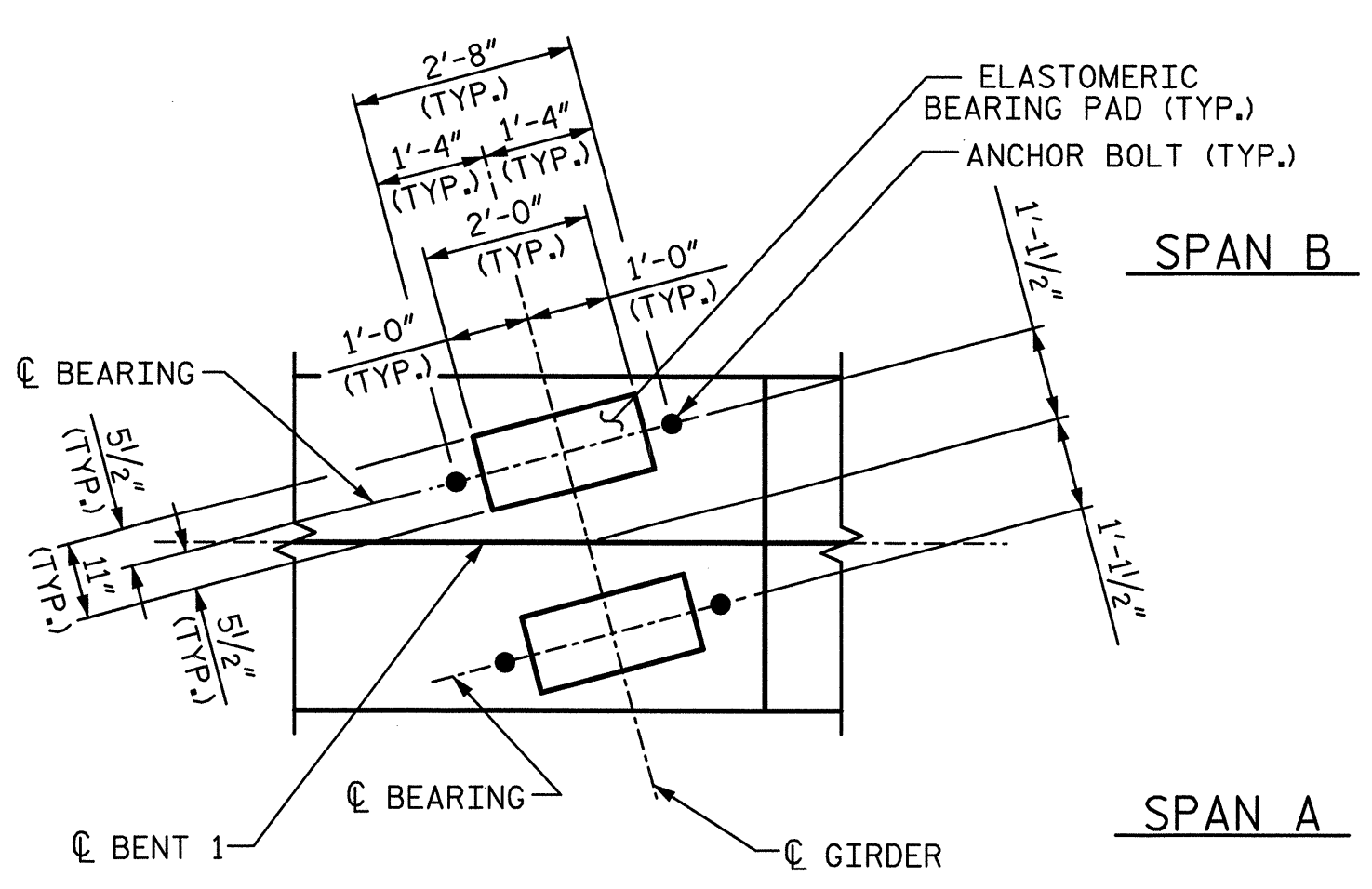
SECTION B-B



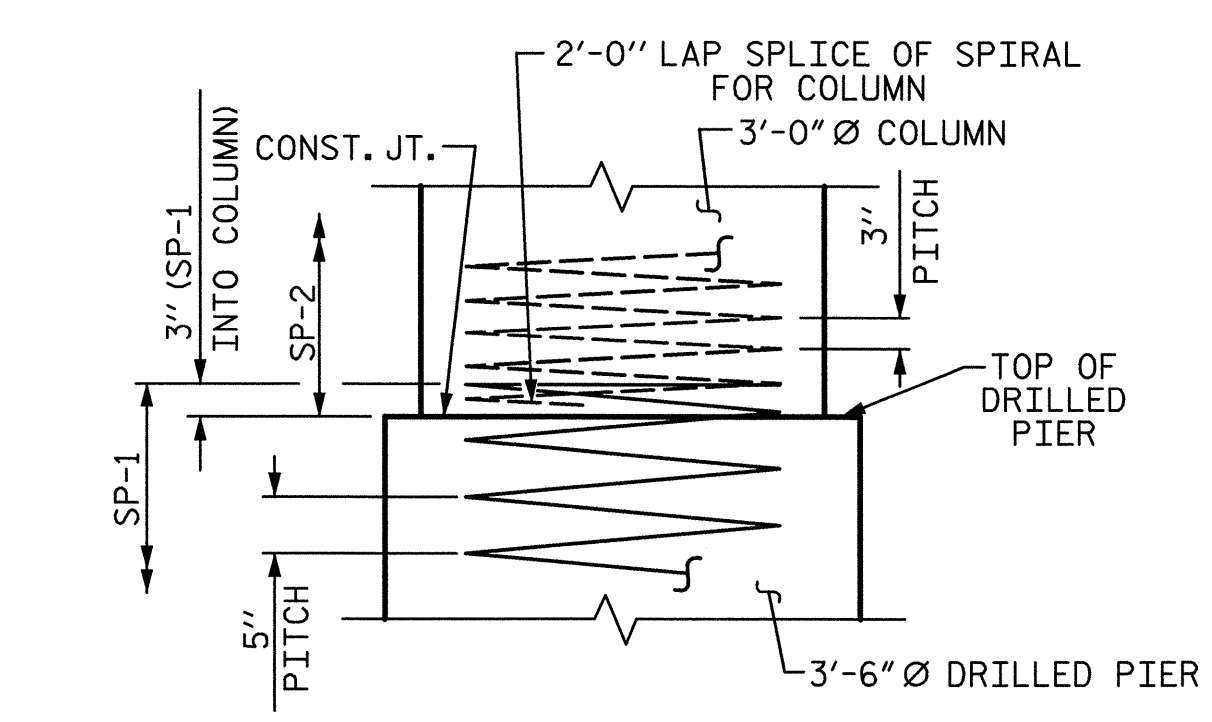
SECTION C-C



VIEW X-X

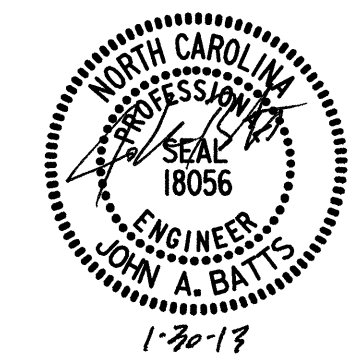


DETAIL "A"  
TYP. EACH GIRDER



CONSTRUCTION JOINT DETAIL

PLANS PREPARED BY:  
**S&EA**  
 IMPSON ENGINEERS ASSOCIATES  
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PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-  
 SHEET 2 OF 2

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

SHEET NO. S-29  
TOTAL SHEETS 36

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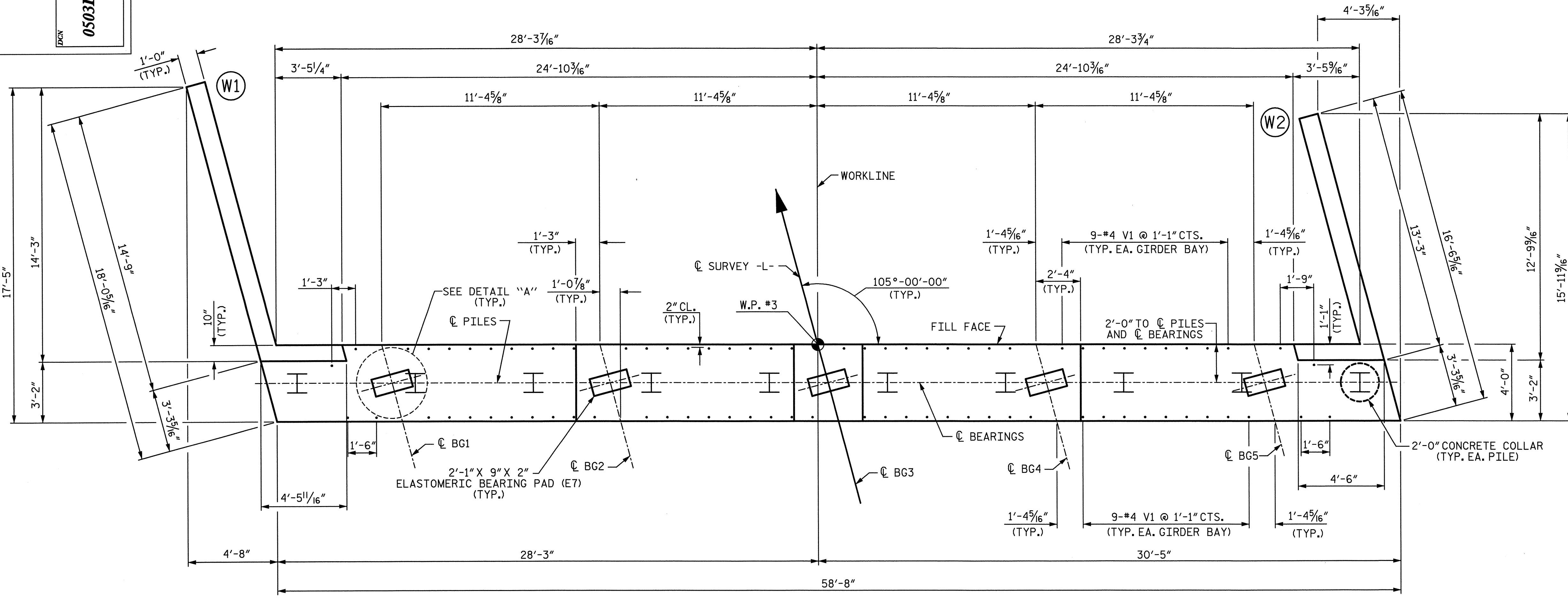
NOTES:

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.

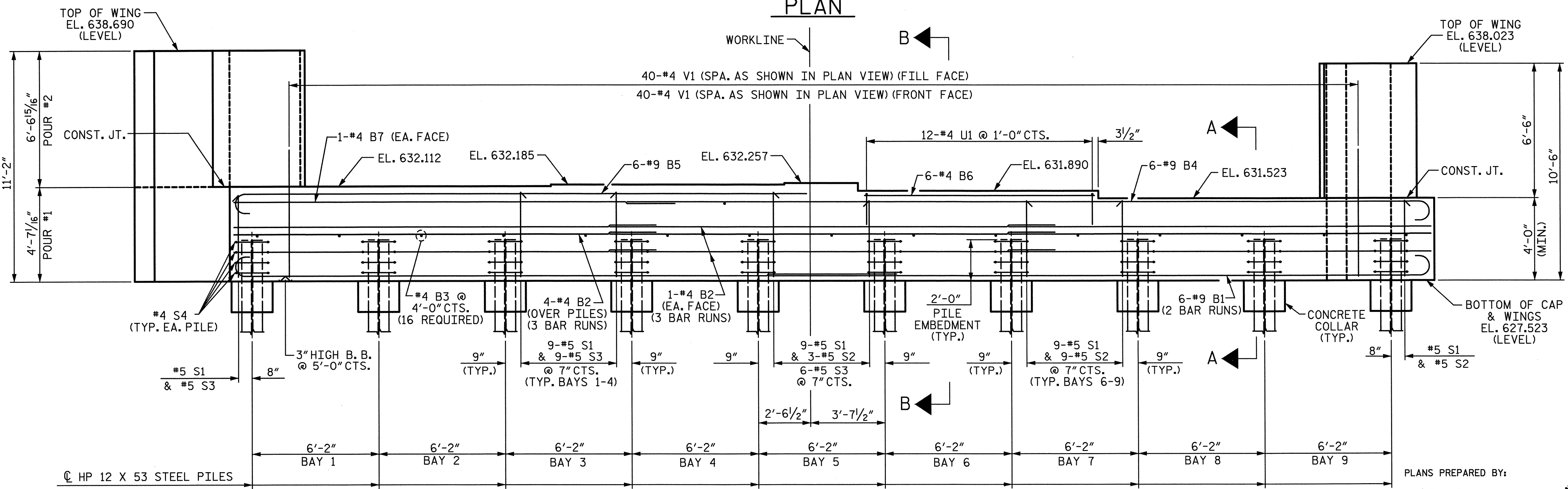
#4 V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN CAP.

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

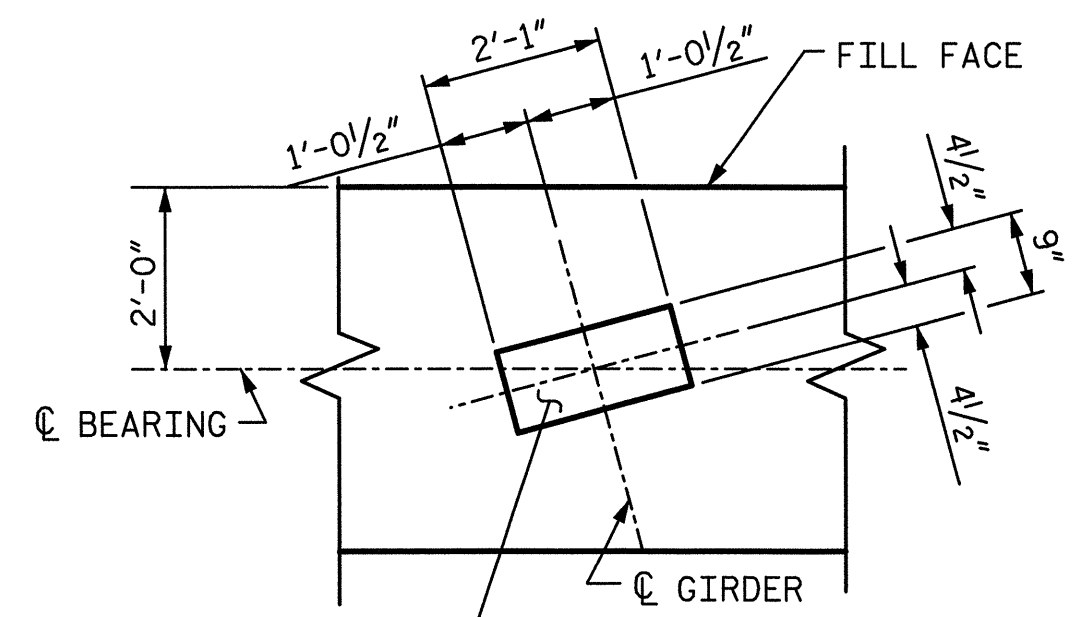
THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1), EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".



PLAN



ELEVATION



DETAIL "A"

**SPLICE CHART**

#9 B1 SPLICE LENGTH = 6'-3"
#4 B2 SPLICE LENGTH = 2'-5"
#4 B7 SPLICE LENGTH = 2'-5"

PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
STATION: 65+92.50 -L-

SHEET 1 OF 3

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

SHEET NO. S-30  
TOTAL SHEETS 36

PLANS PREPARED BY:

**SEA & ASSOCIATES**  
IMPSON ENGINEERS

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(919) 852-0598 (Fax)  
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LICENSURE NO. C2521

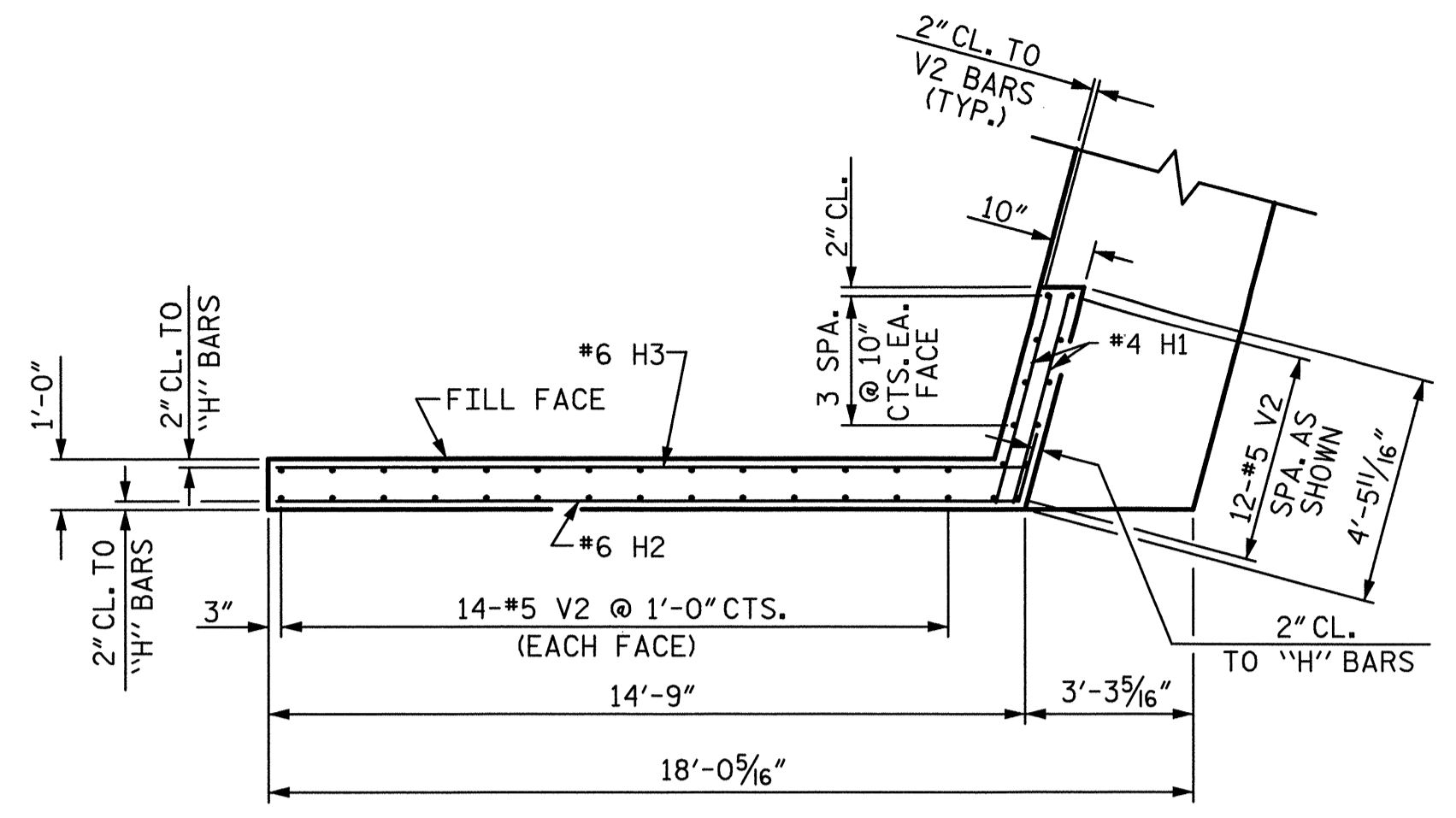
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**ENGINEER**  
JOHN A. BATTIS  
1-30-13

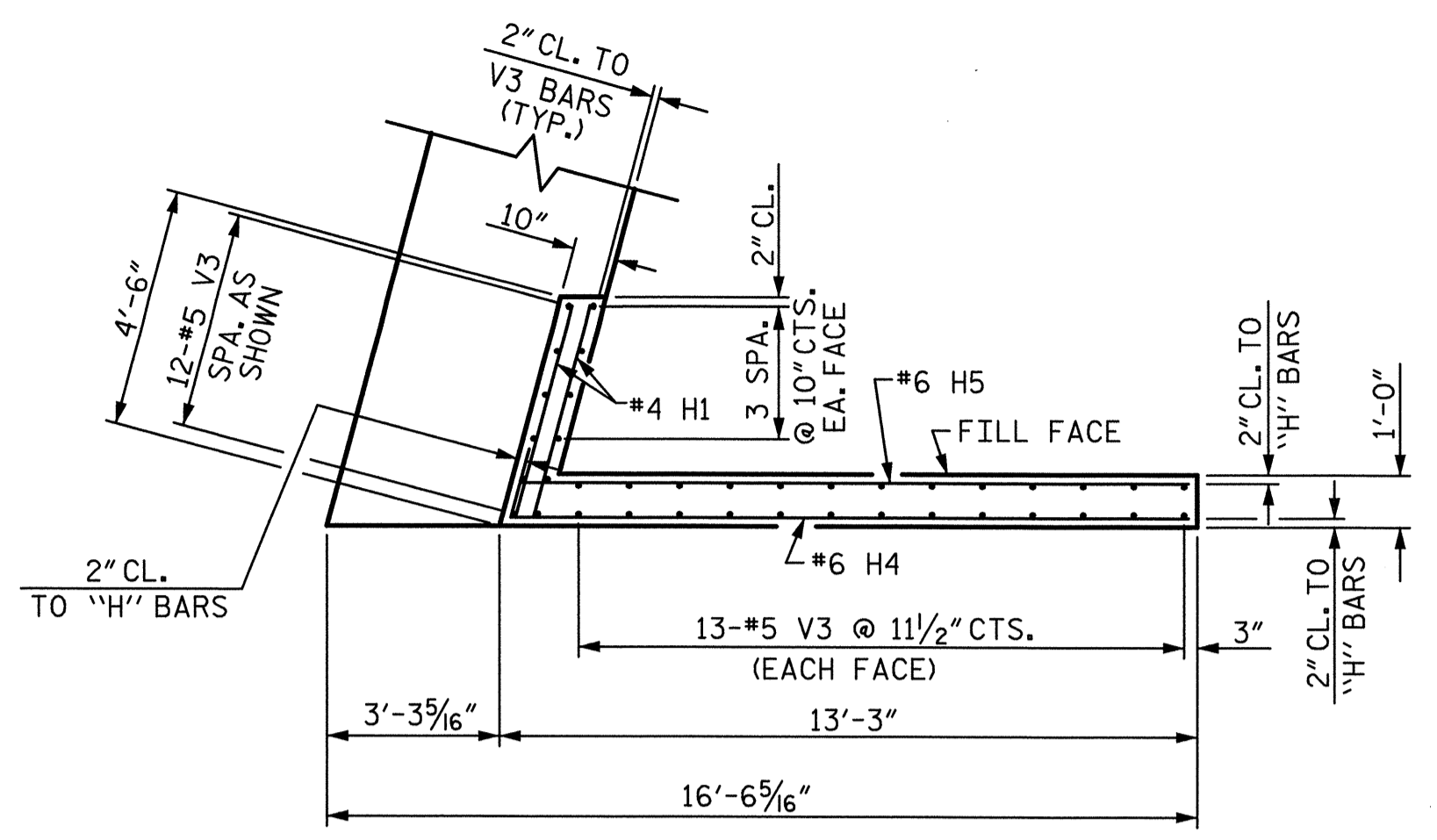
DRAWN BY: D. G. VESTER DATE: 12-12  
CHECKED BY: J. A. BATTS DATE: 12-12  
DESIGN ENGINEER OF RECORD: DATE: 1-30-13

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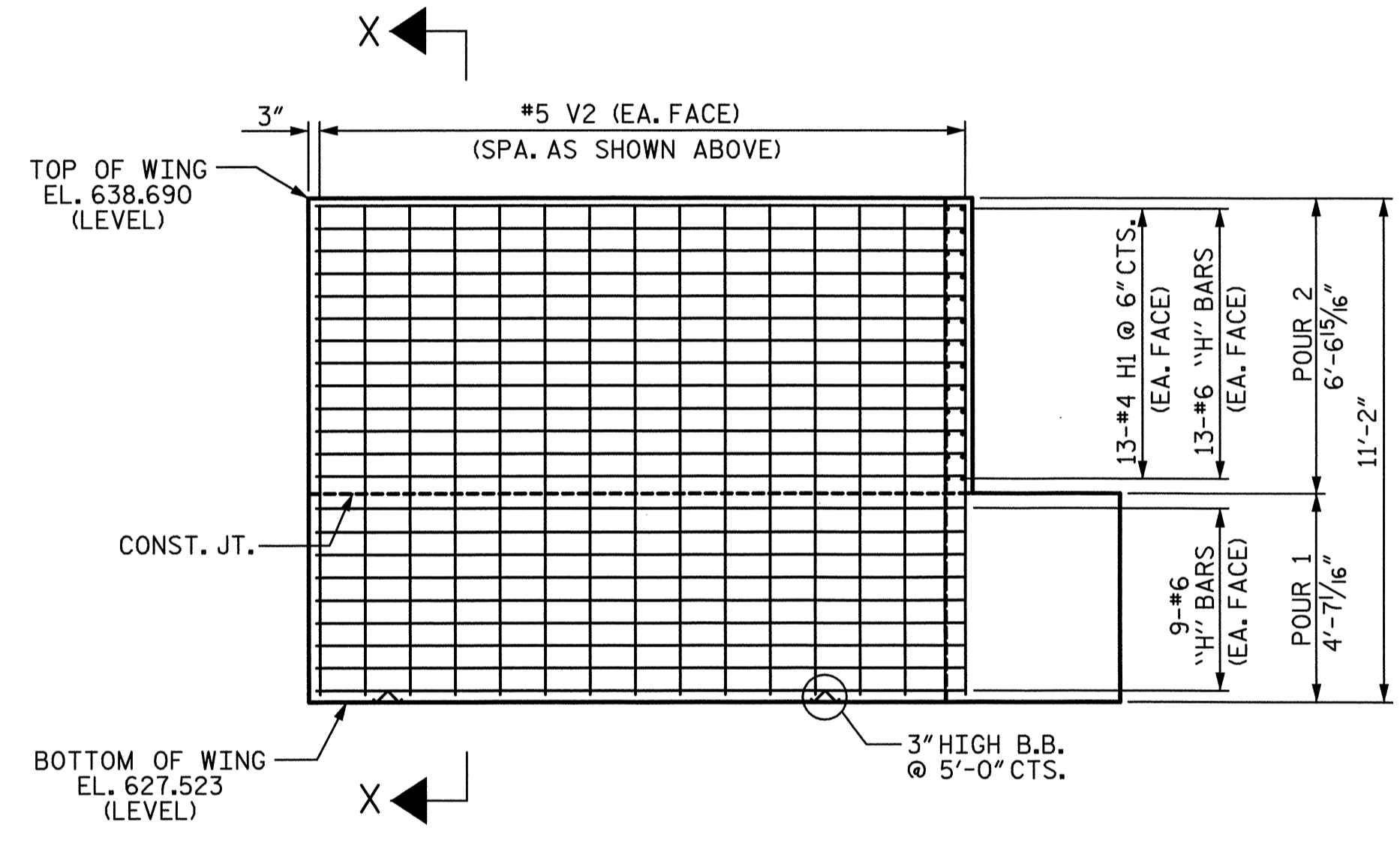
PKCN  
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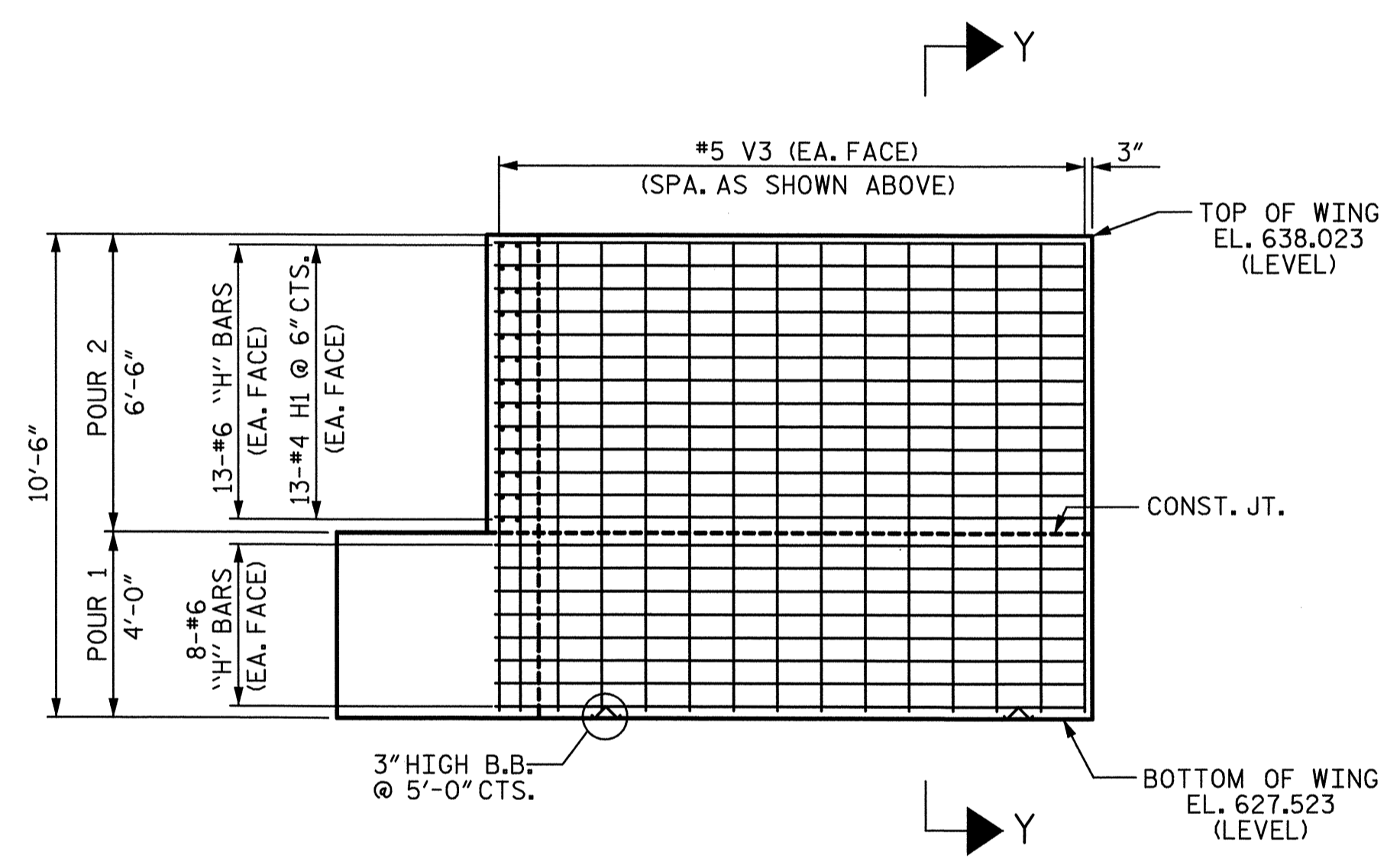
PLAN OF WING (W1)



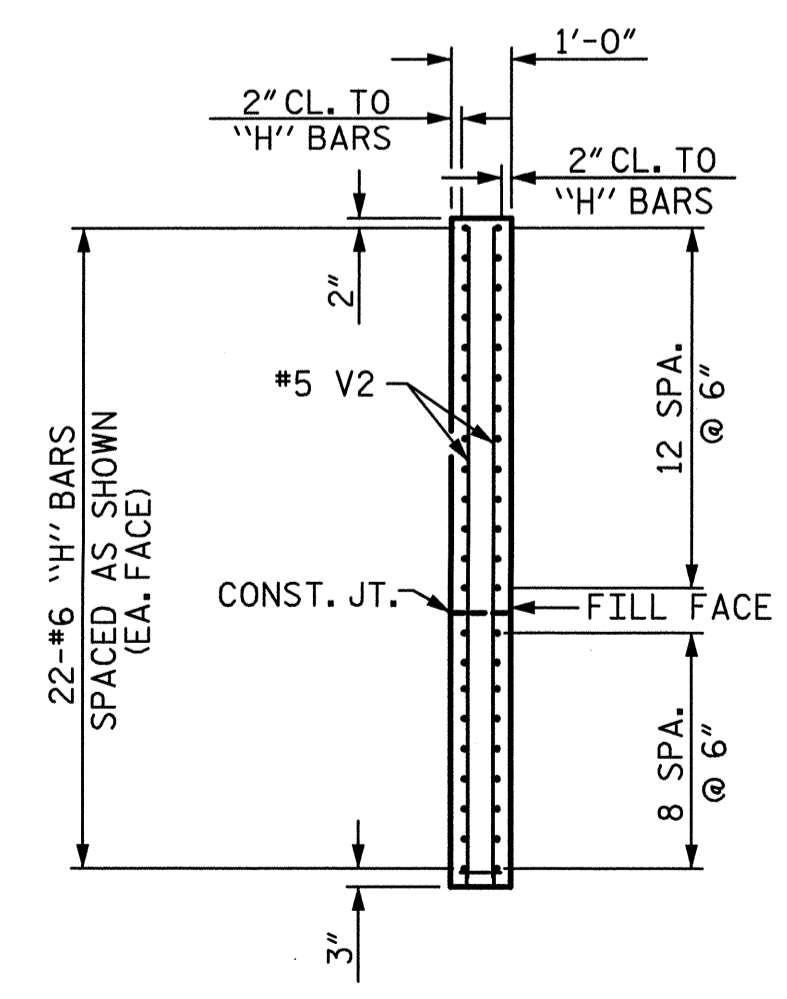
PLAN OF WING (W2)



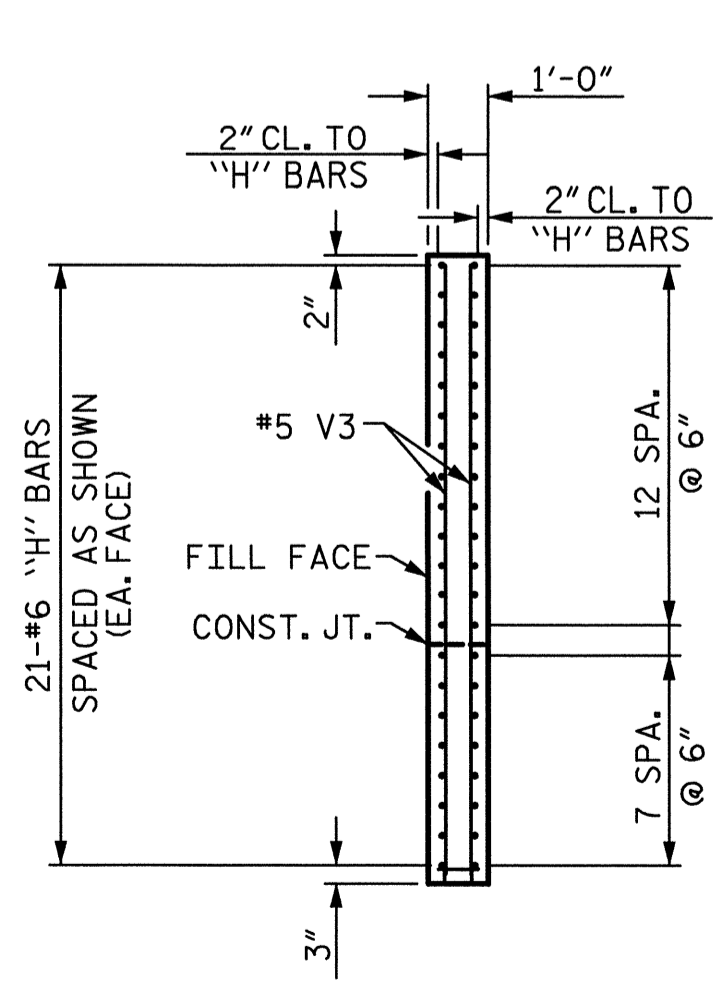
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X



SECTION Y-Y

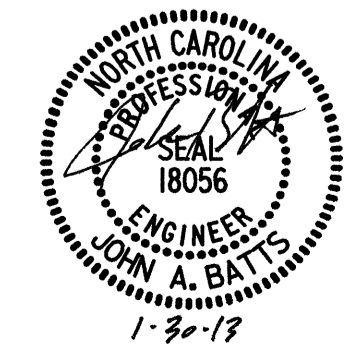
PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-31
					TOTAL SHEETS 36

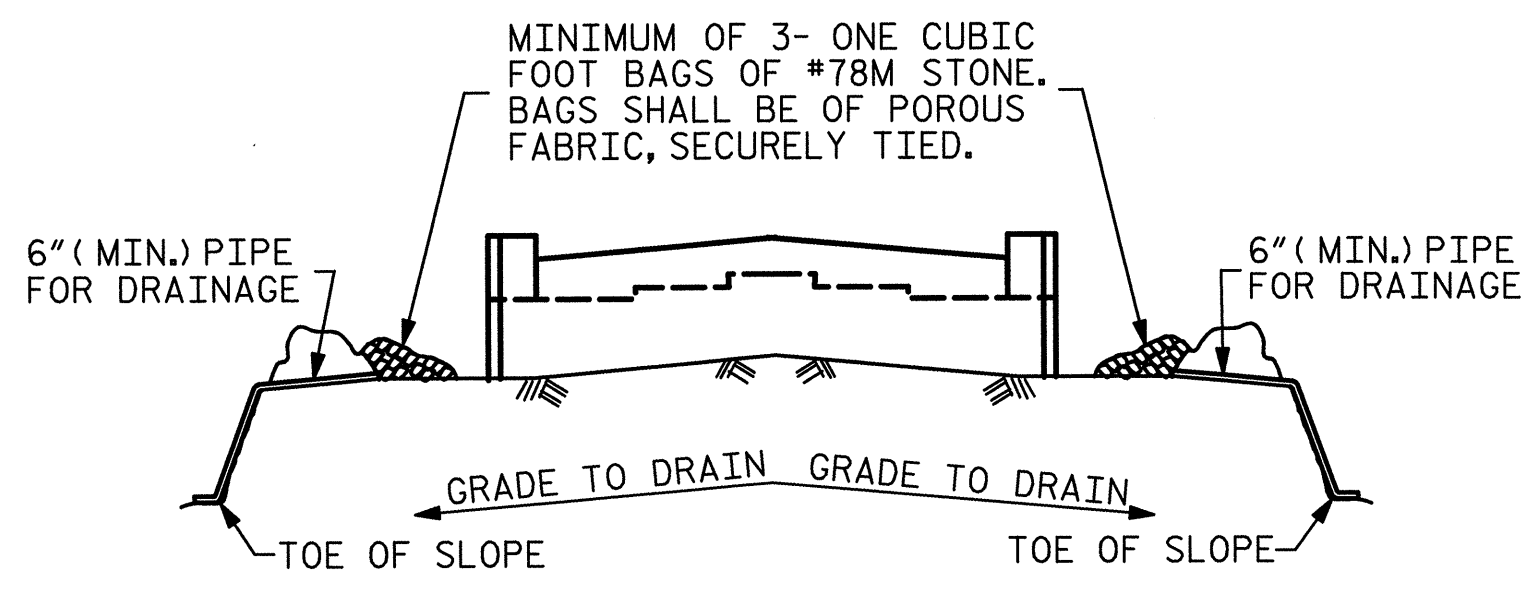
DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

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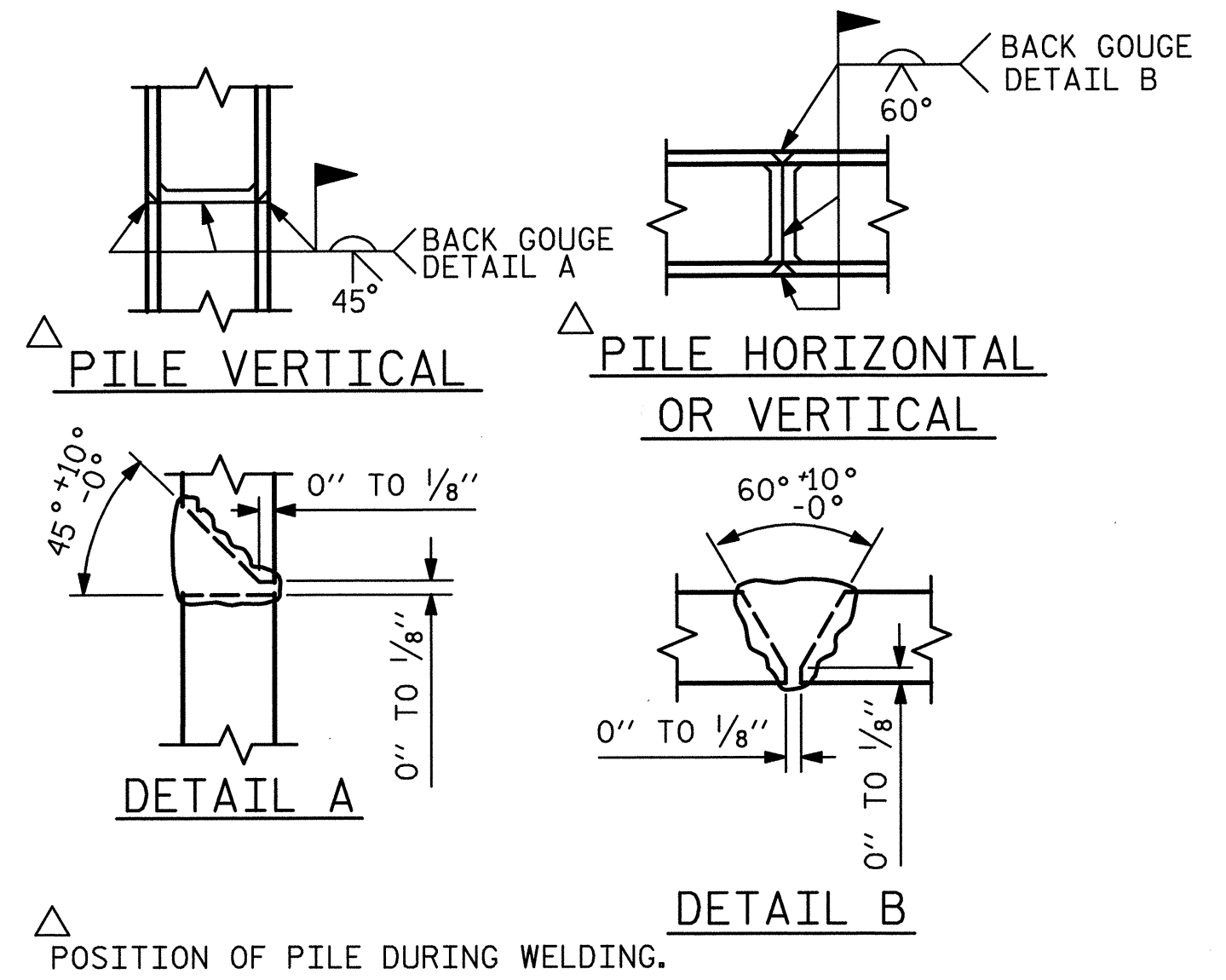


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

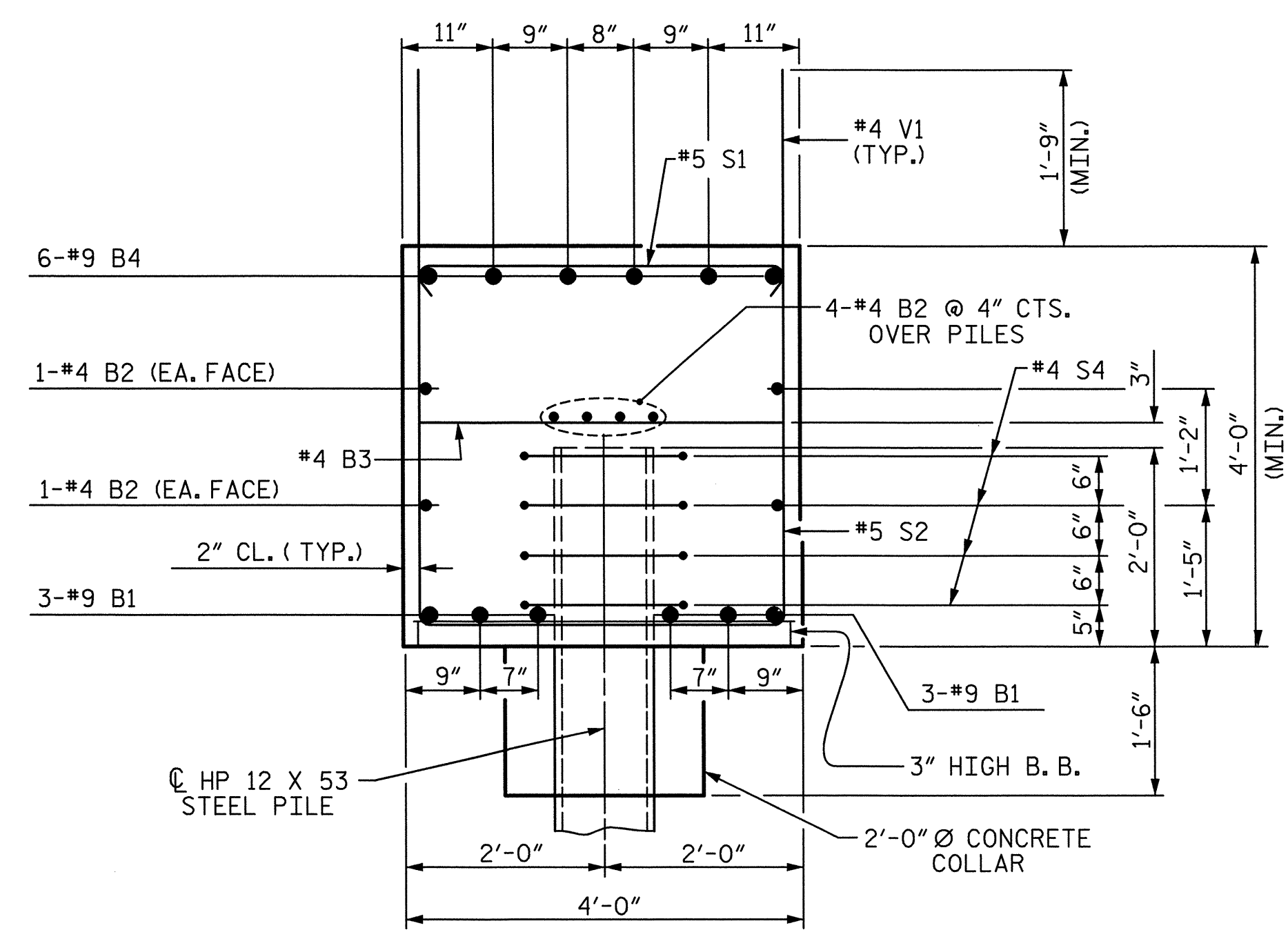
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

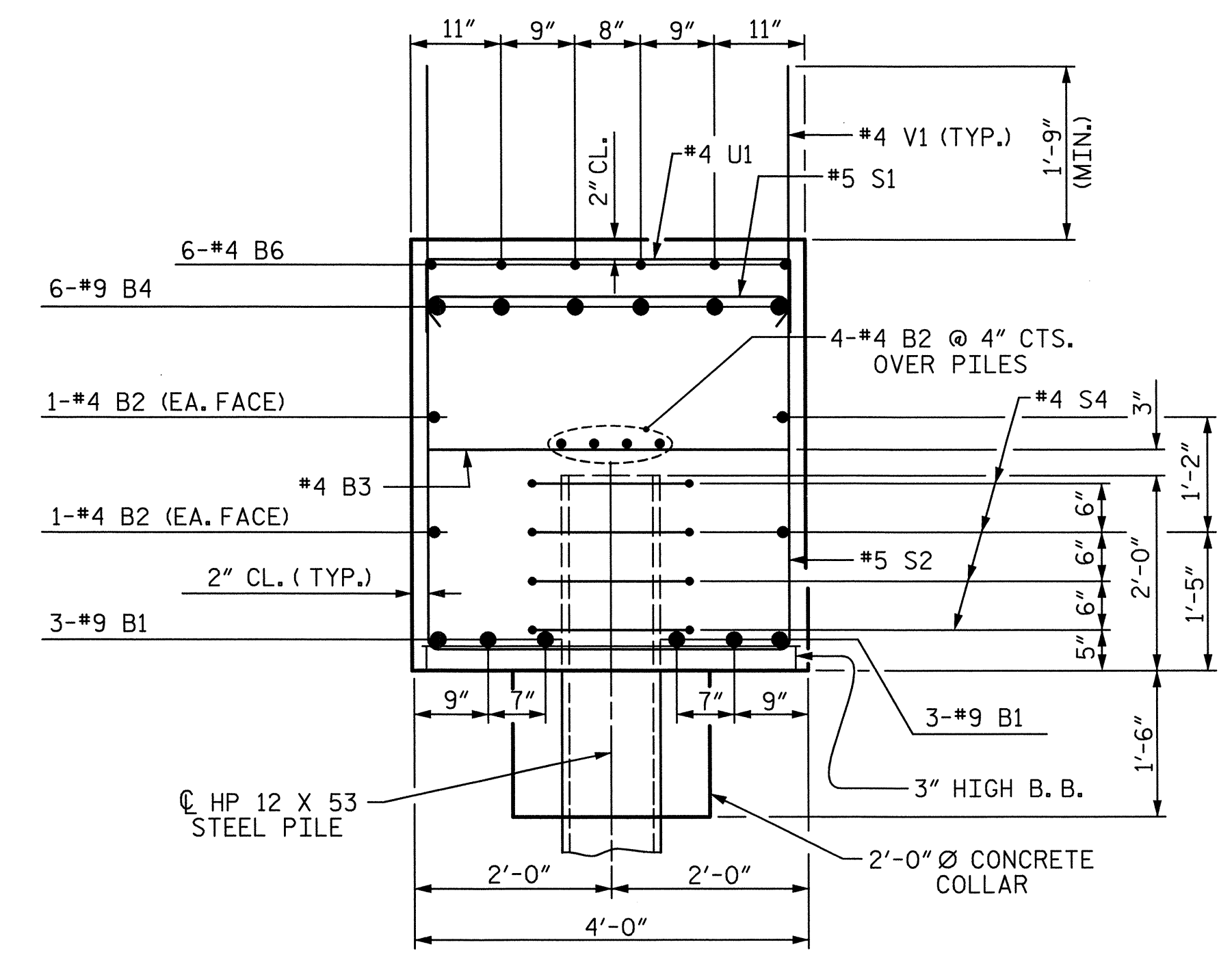
**TEMPORARY DRAINAGE AT END BENT**



**PILE SPLICE DETAILS**

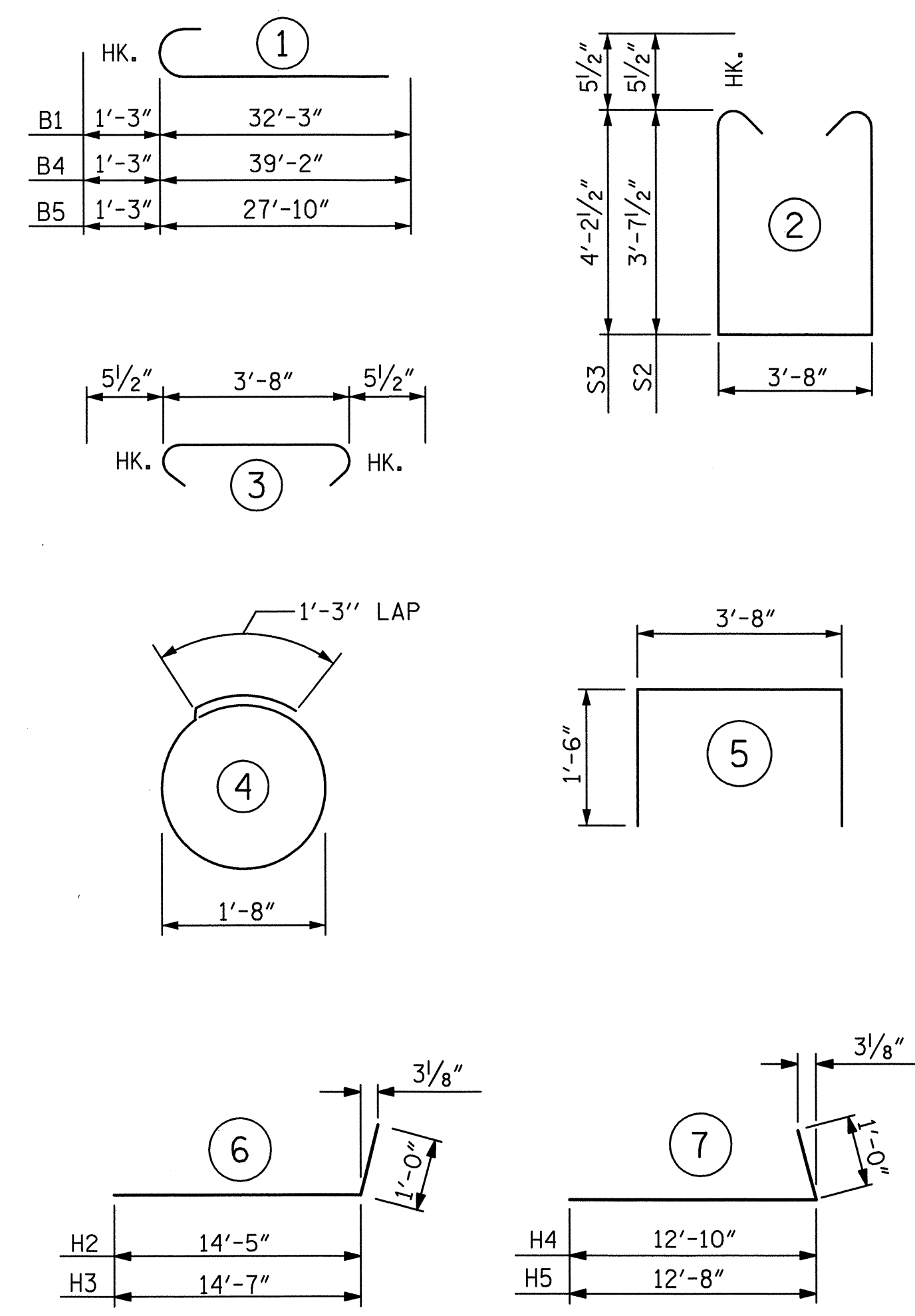


**SECTION A-A**



**SECTION B-B**

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT.

**BILL OF MATERIAL**

**END BENT 2**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	33'-6"	1367
B2	24	4	STR	21'-1"	338
B3	16	4	STR	3'-8"	39
B4	6	9	1	40'-5"	825
B5	6	9	1	29'-1"	593
B6	6	4	STR	11'-4"	45
B7	2	4	STR	21'-6"	29
H1	52	4	STR	4'-1"	142
H2	22	6	6	15'-5"	509
H3	22	6	6	15'-7"	515
H4	21	6	7	13'-10"	436
H5	21	6	7	13'-8"	431
S1	83	5	3	4'-7"	397
S2	40	5	2	11'-10"	494
S3	43	5	2	13'-0"	583
S4	40	4	4	6'-6"	174
U1	12	4	5	6'-8"	53
V1	80	4	STR	5'-6"	294
V2	40	5	STR	10'-9"	448
V3	38	5	STR	10'-1"	400

REINFORCING STEEL		LBS	8112
CLASS A CONCRETE BREAKDOWN			
POUR 1	CY	44.5	
(CAP, COLLARS, & LOWER WINGS)			
POUR 2	CY	8.2	
(UPPER WINGS)			
TOTAL CLASS A CONCRETE	CY	52.7	
HP 12 X 53 STEEL PILES			
NO. = 10	LF	220	
STEEL PILE POINTS			
	EA	10	

PROJECT NO. P-5208E

MECKLENBURG & CABARRUS COUNTY

STATION: 65+92.50 -L-

SHEET 3 OF 3

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RALEIGH

**SUBSTRUCTURE  
END BENT 2**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			36

DRAWN BY: D. G. VESTER DATE: 12-12

CHECKED BY: J. A. BATTS DATE: 12-12

DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-20-13

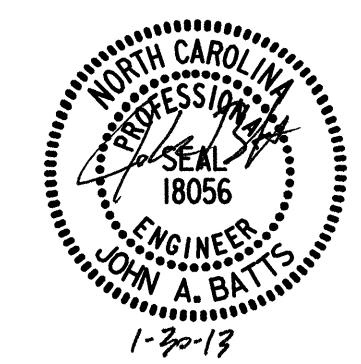
PLANS PREPARED BY:

**SE & A**

IMPSON ENGINEERS & ASSOCIATES

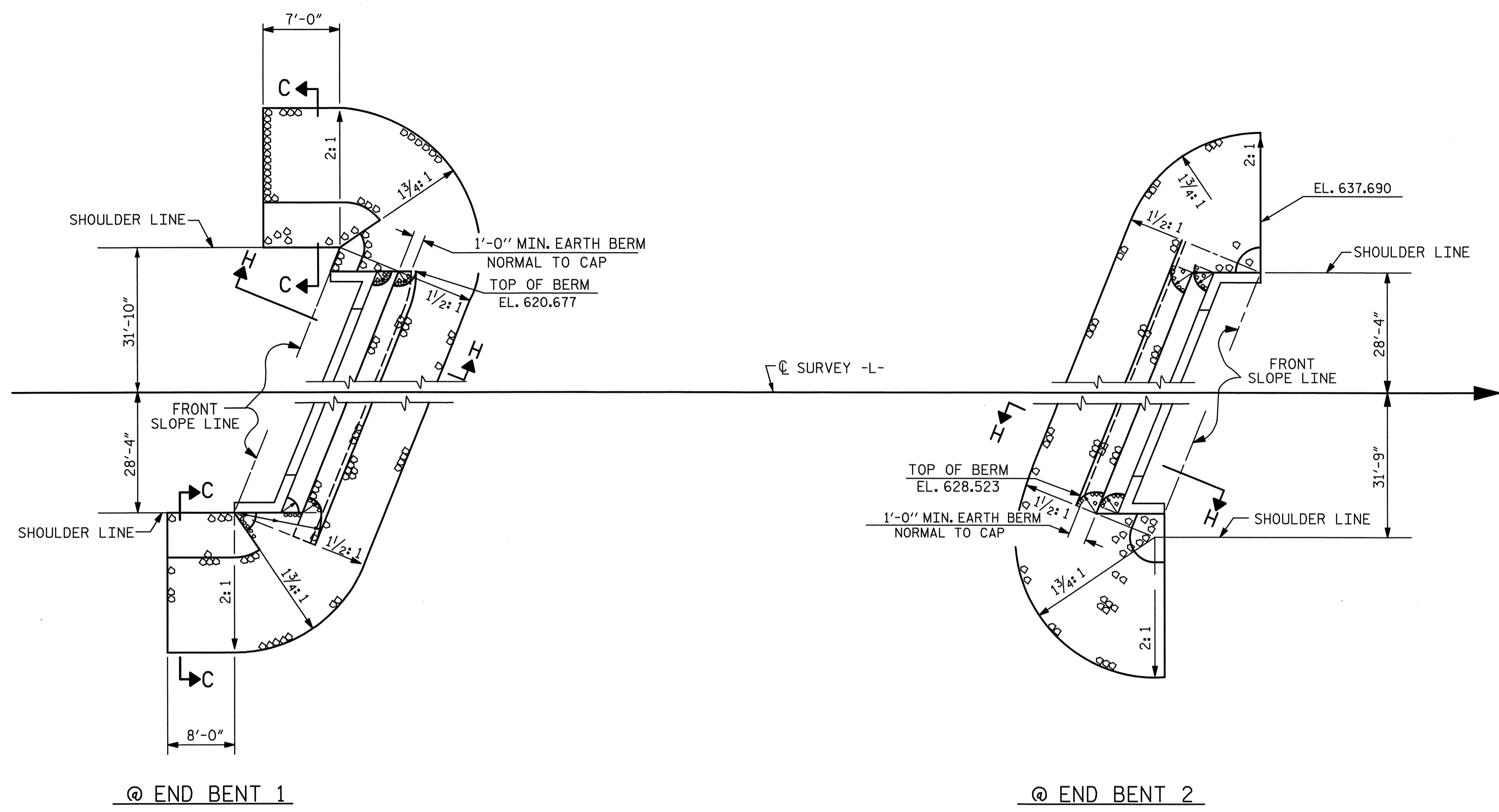
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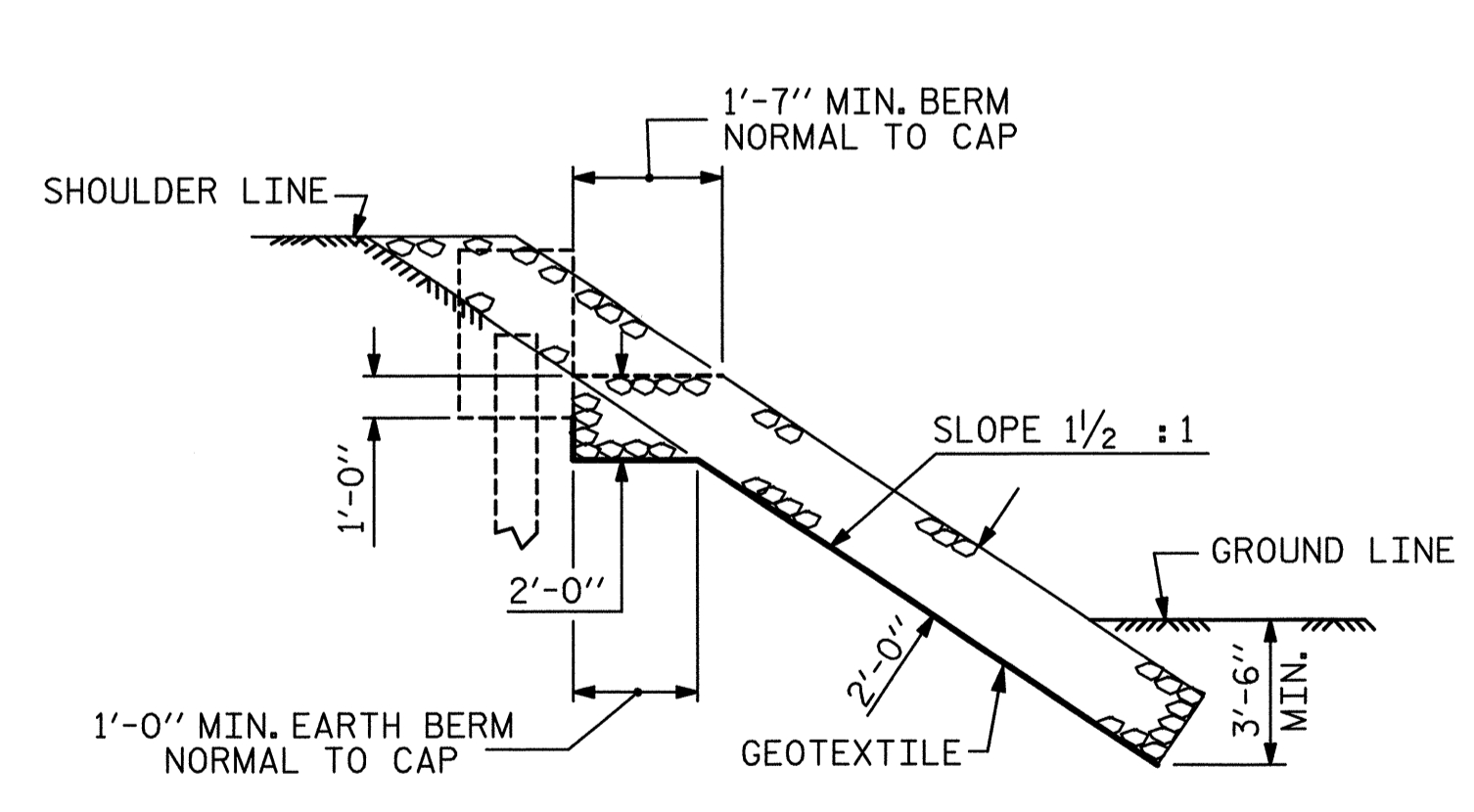


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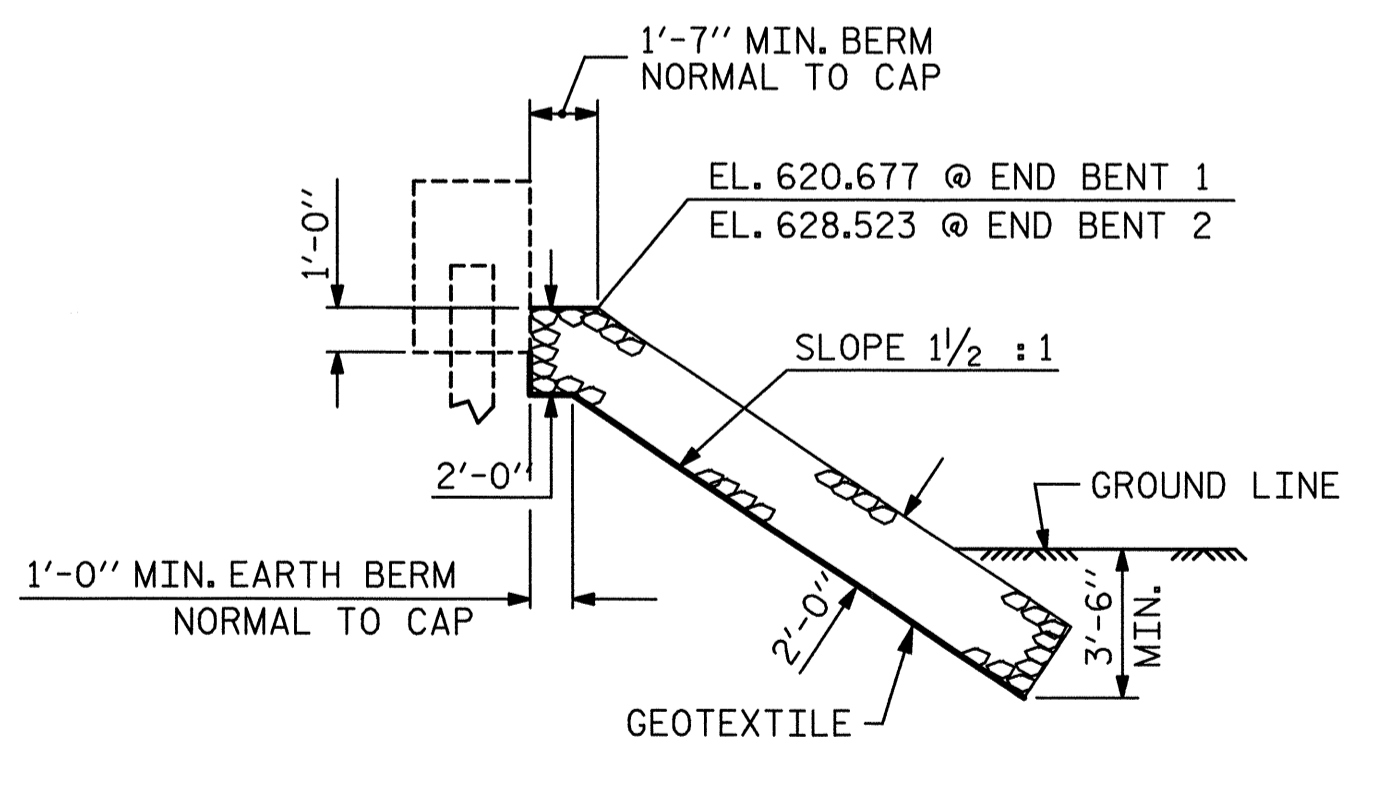


PLAN OF RIP RAP

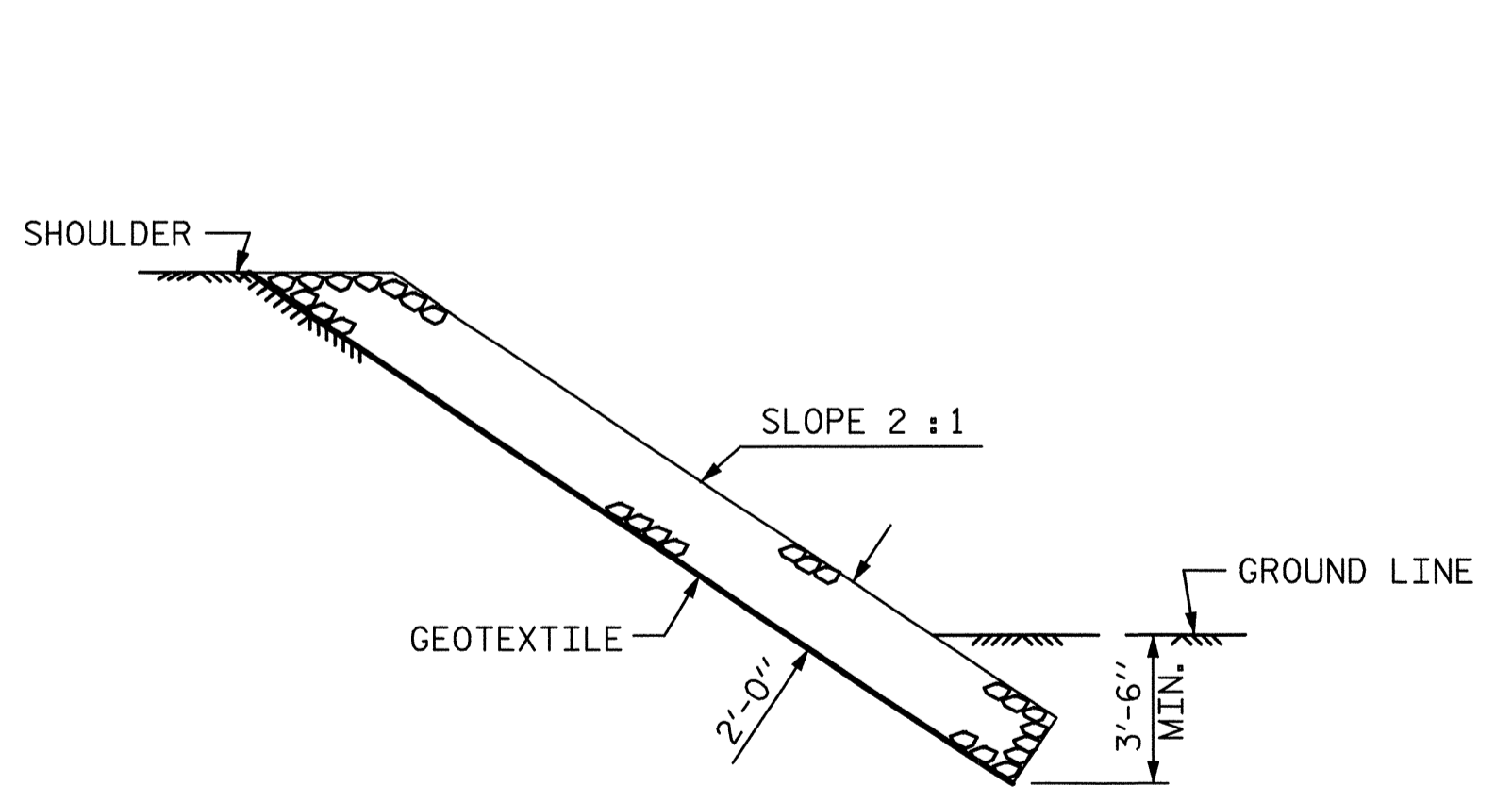
ESTIMATED QUANTITIES		
BRIDGE @ STA. 65+92.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	642	713
END BENT 2	820	911



SECTION H-H



SECTION BERM RIP RAPPED



SECTION C-C

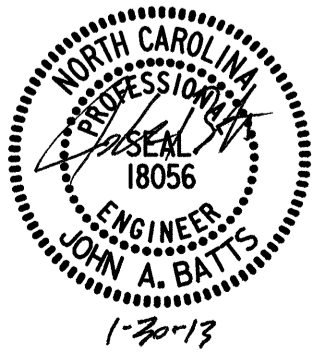
PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

RIP RAP DETAILS

REVISIONS						SHEET NO. S-33
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

PLANS PREPARED BY:  
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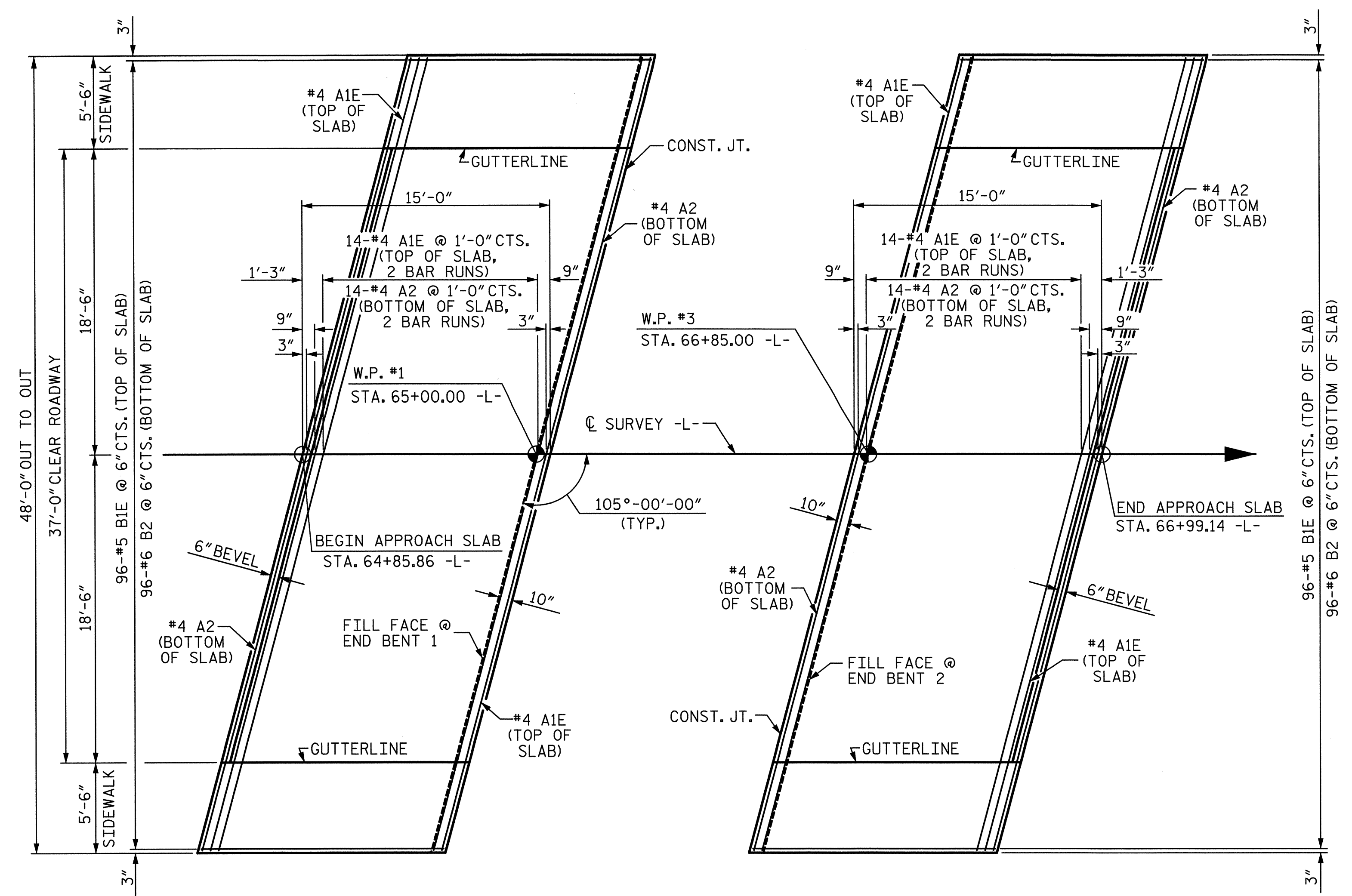


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 CHECKED BY: J. A. BATTIS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

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PLAN @ END BENT 1

PLAN @ END BENT 2

**NOTES:**

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

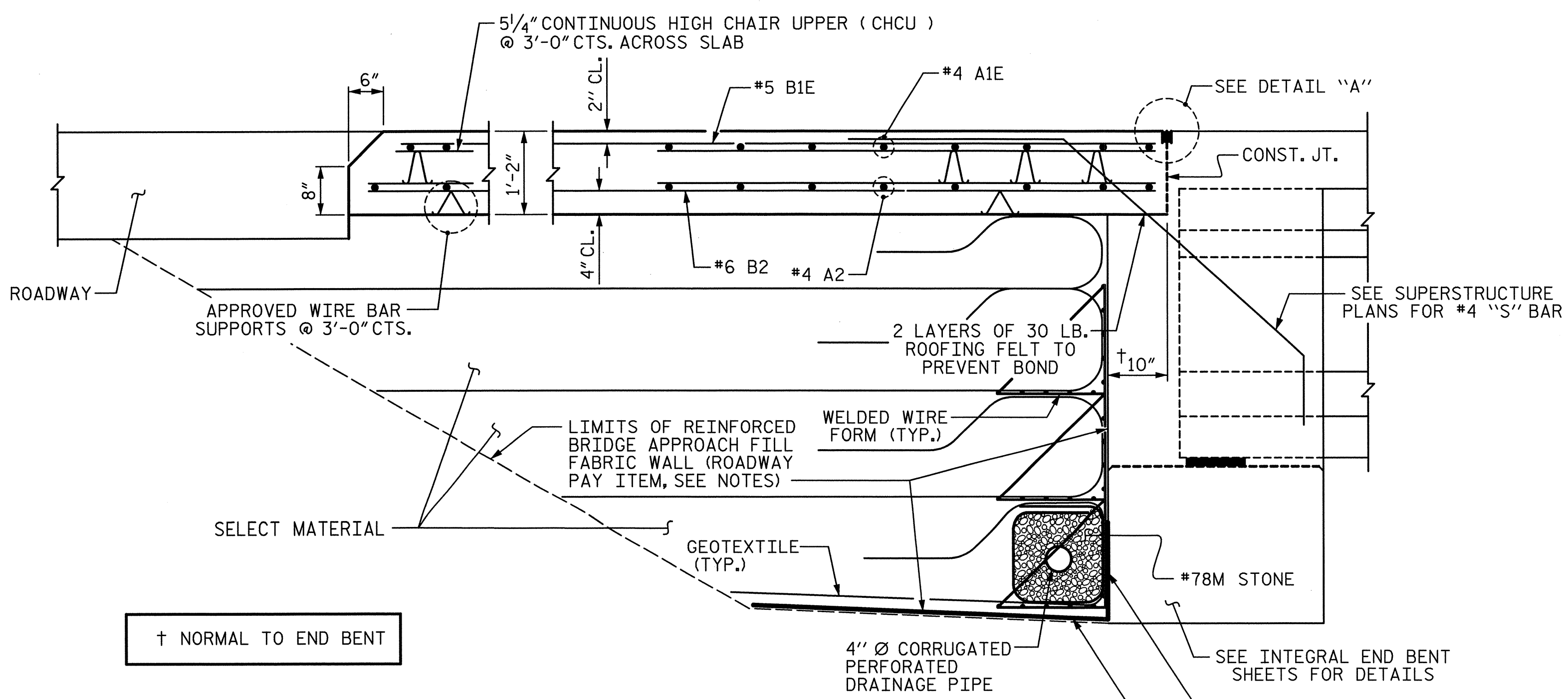
FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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.

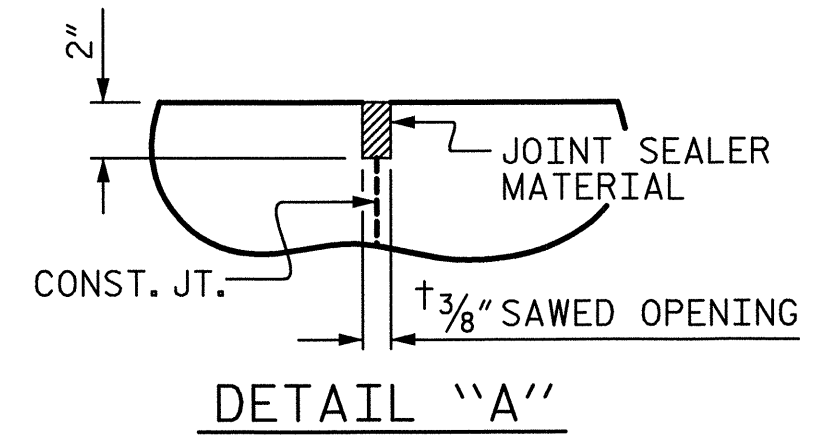
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

FOR SIDEWALK DETAILS, SEE SHEET 2 OF 2.

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1E	32	#4	STR	25'-9"	550
A2	32	#4	STR	25'-7"	547
B1E	96	#5	STR	14'-2"	1418
B2	96	#6	STR	14'-7"	2103
B3E	8	#4	STR	14'-7"	78
G1E	30	#4	STR	5'-2"	104
U1E	12	#4	1	3'-1"	25
REINFORCING STEEL				2650 LBS.	
EPOXY COATED REINFORCING STEEL				2175 LBS.	
CLASS AA CONCRETE					
POUR 1 (SLAB)				30.9 C. Y.	
POUR 2 (SIDEWALK)				3.7 C. Y.	
TOTAL				34.6 C. Y.	
"E" INDICATES EPOXY COATED REINFORCING SEEL.					
BAR TYPES					
ALL BAR DIMENSIONS ARE OUT TO OUT					



SECTION THRU SLAB



DETAIL "A"

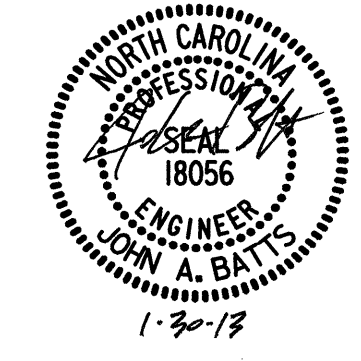
PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-34
					TOTAL SHEETS 36

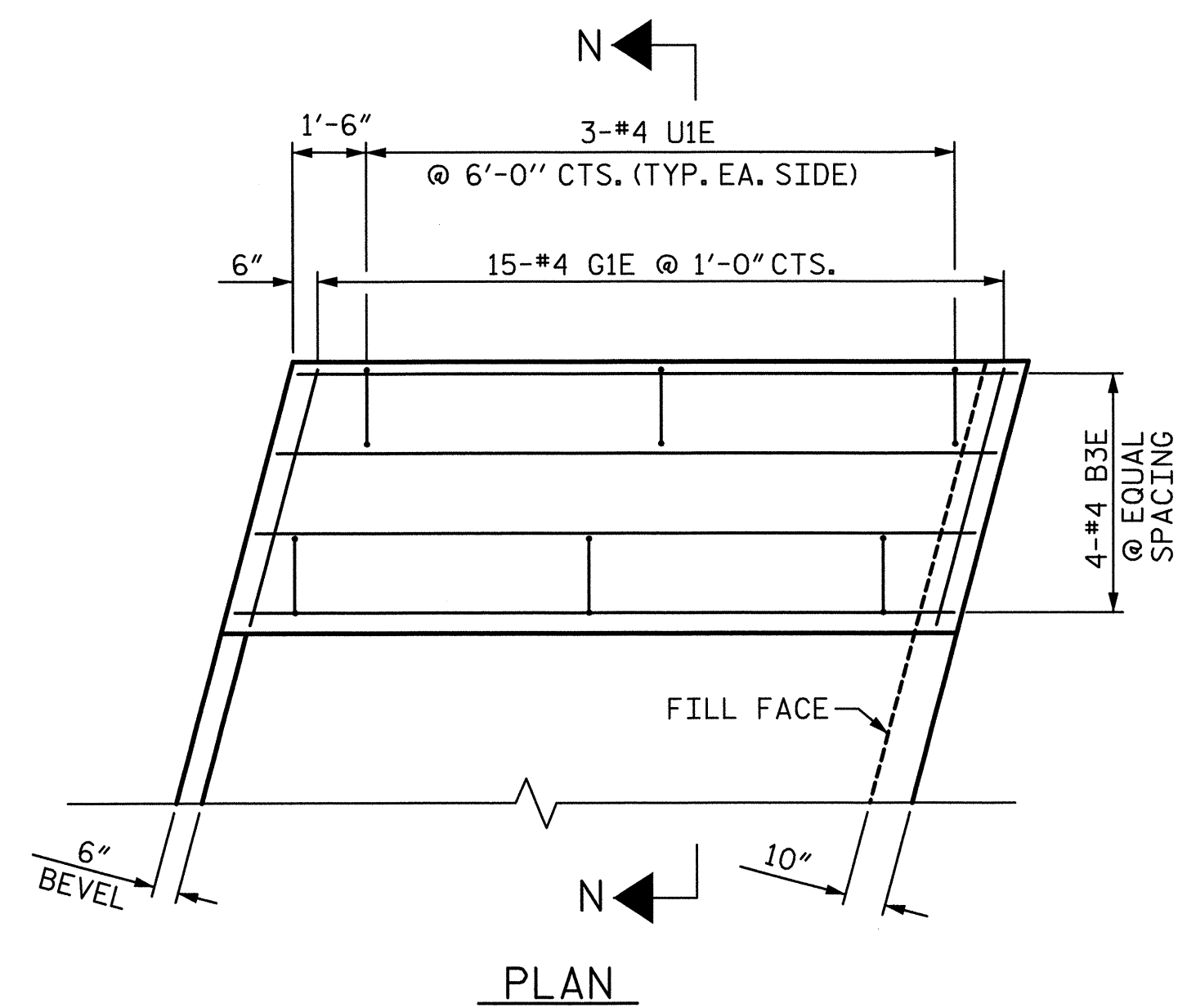
DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-13

PLANS PREPARED BY:  
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 IMPSON ENGINEERS & ASSOCIATES  
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 Cary, NC 27518  
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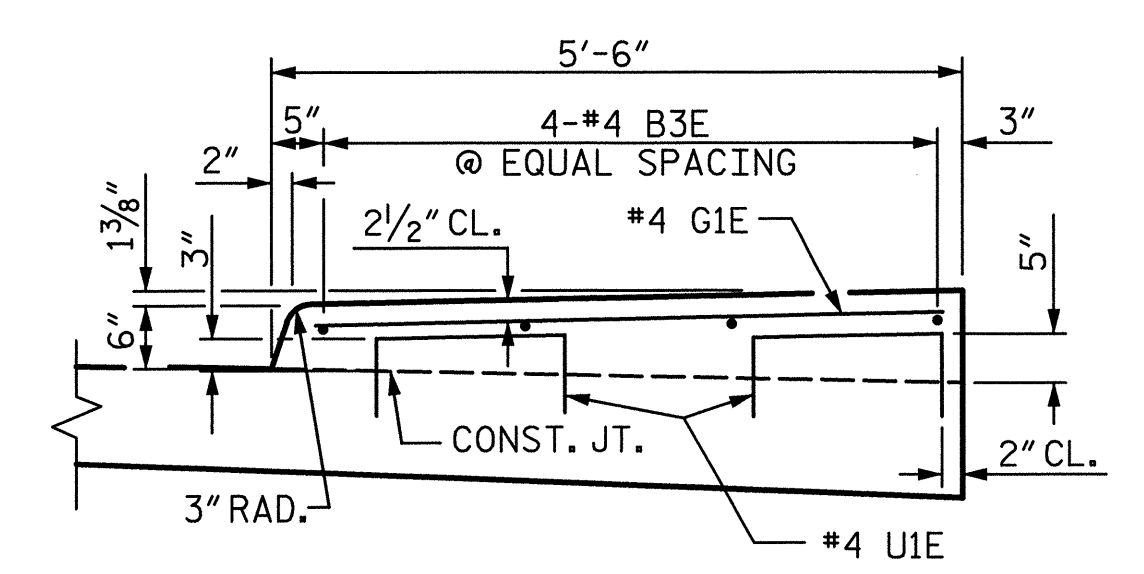


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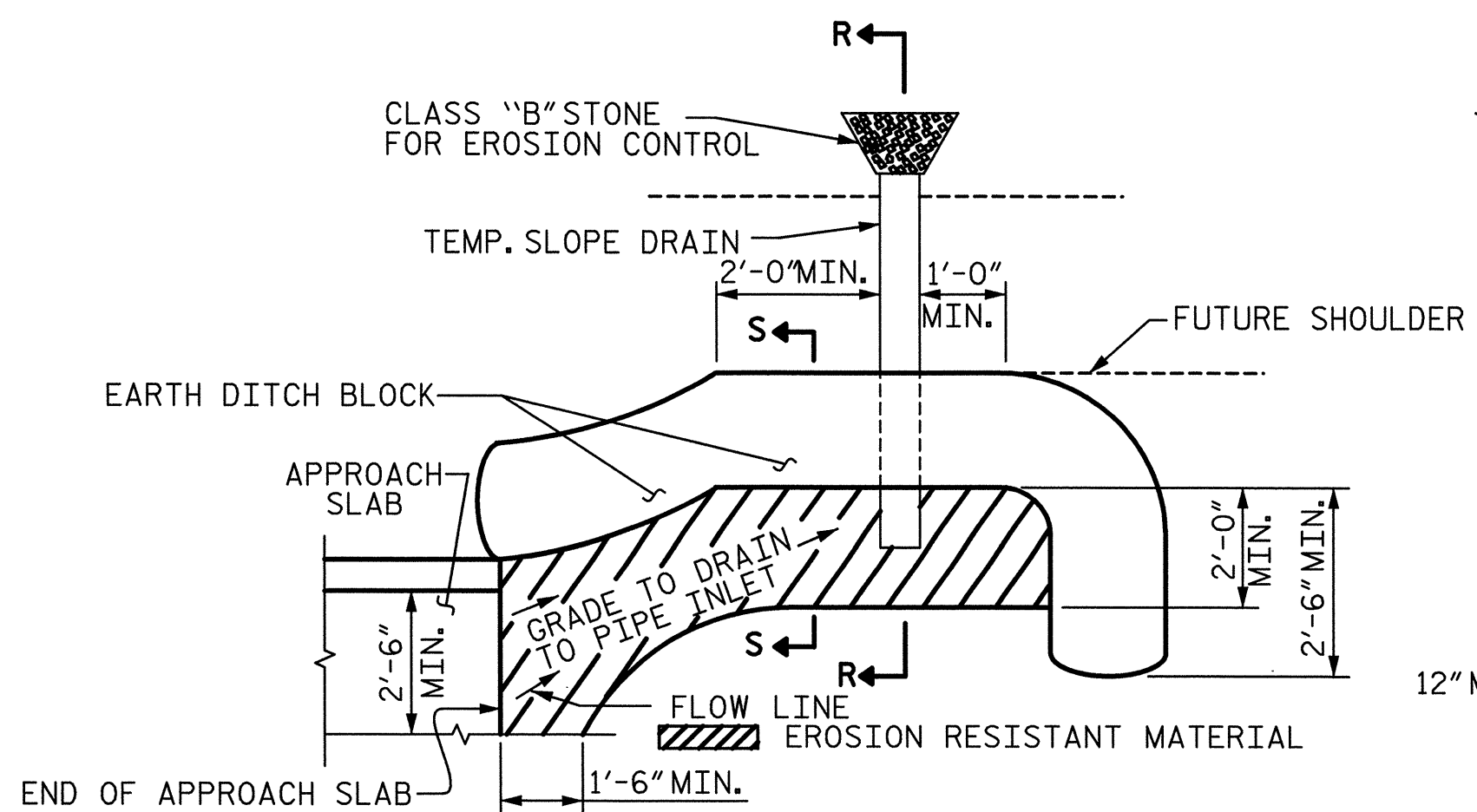
PLAN



SECTION N-N  
SIDEWALK DETAILS

#4 U1E BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER THE APPROACH SLAB HAS BEEN SCREEDED OFF.

DRAWN BY: D. G. VESTER DATE: 12-12  
 CHECKED BY: J. A. BATTS DATE: 12-12  
 DESIGN ENGINEER OF RECORD: [Signature] DATE: 1-30-12

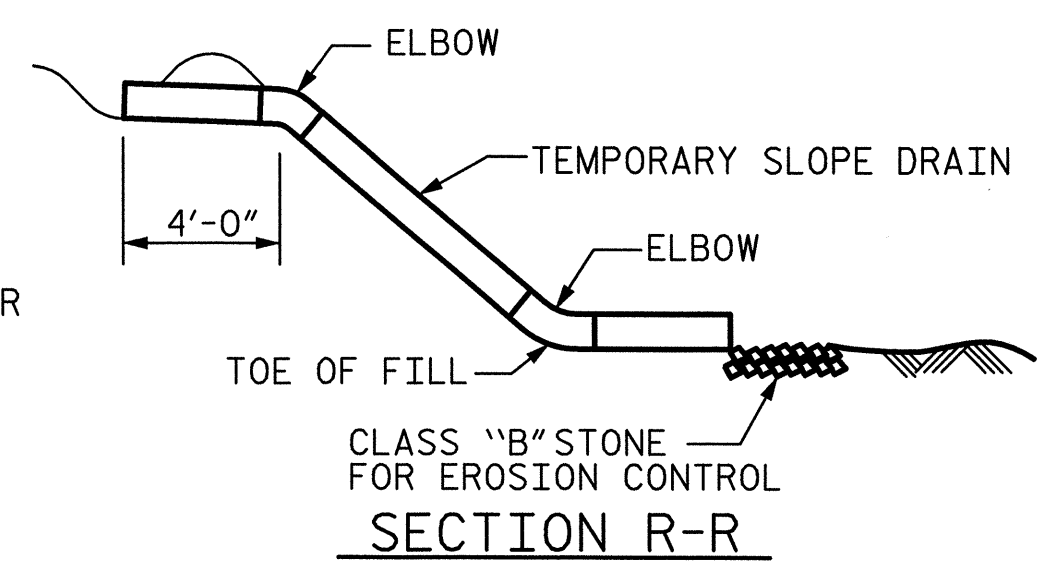


PLAN VIEW

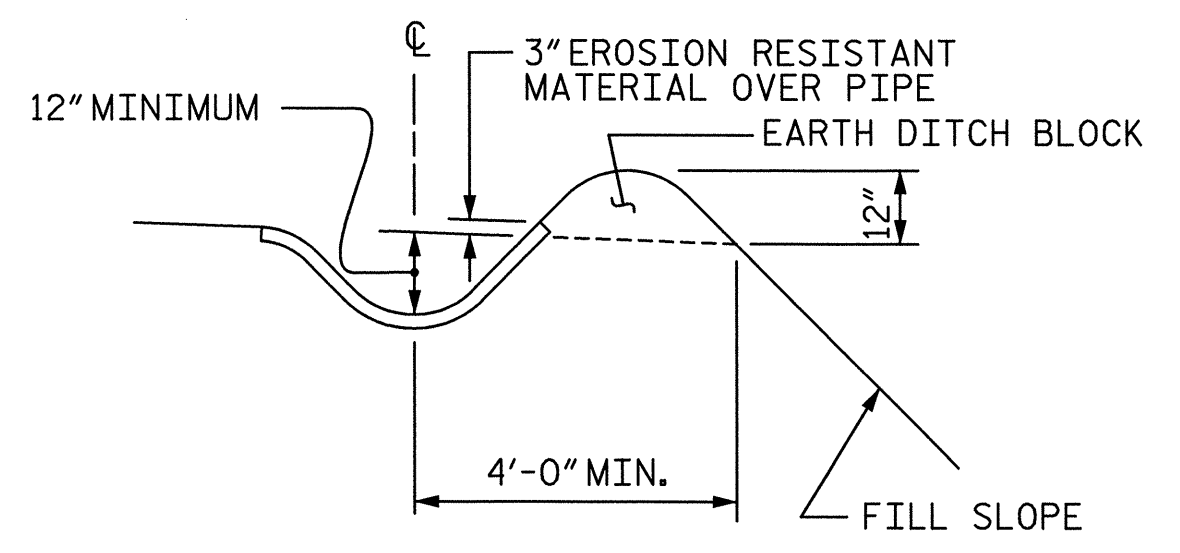
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

TEMPORARY BERM AND SLOPE DRAIN DETAILS

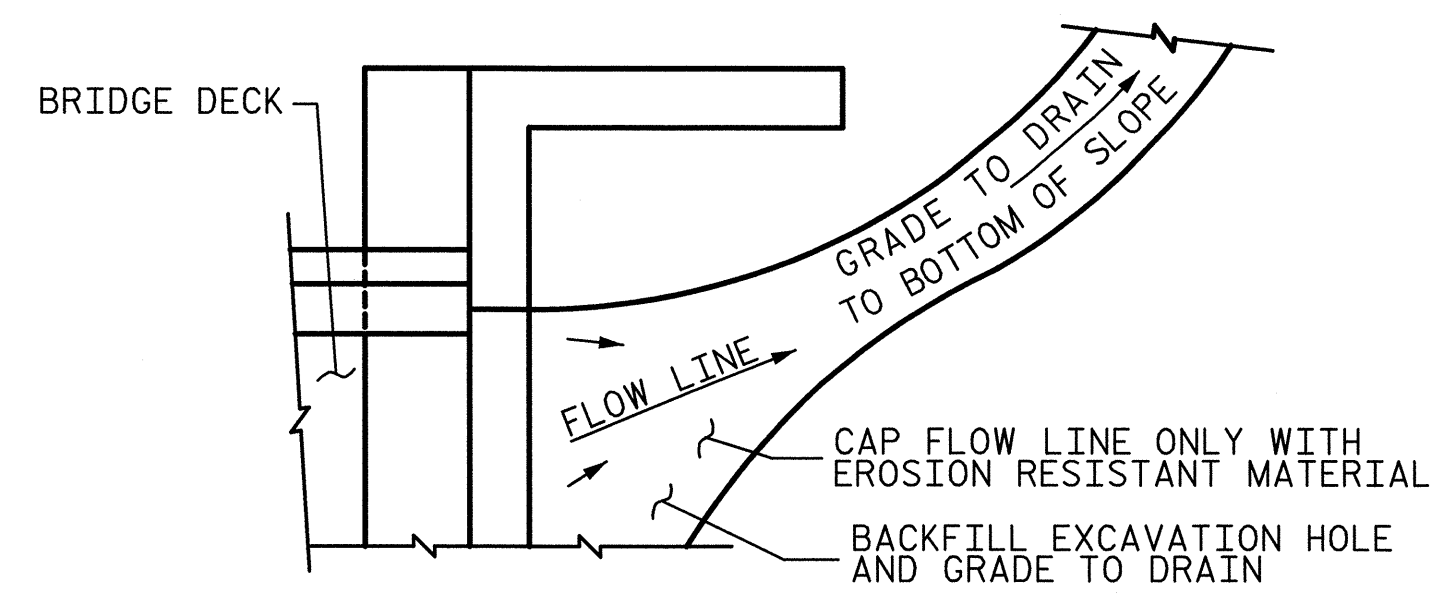
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION R-R



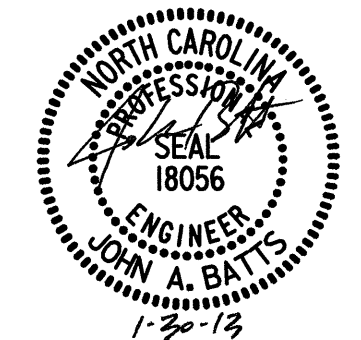
SECTION S-S



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

PLANS PREPARED BY:  
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PROJECT NO. P-5208E  
 MECKLENBURG & CABARRUS COUNTY  
 STATION: 65+92.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-35
BRIDGE APPROACH SLAB DETAILS						
REVISIONS						TOTAL SHEETS 36
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

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### STANDARD NOTES

#### DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	HL93
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:

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#### 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. FINISHES AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

#### SPECIAL NOTES:

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

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PROJECT NO. P-5208E  
MECKLENBURG & CABARRUS COUNTY  
STATION: 65+92.50 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD NOTES

REVISIONS						SHEET NO. S-36
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

PLANS PREPARED BY:



5520 Dillard Drive  
Suite 120  
Cary, NC 27518  
(919) 852-0468  
(919) 852-0598 (Fax)  
www.simpsonengr.com

LICENSE NO. C2521

DRAWN BY: <u>D. G. VESTER</u>	DATE: <u>12-12</u>
CHECKED BY: <u>J. A. BATTS</u>	DATE: <u>12-12</u>
DESIGN ENGINEER OF RECORD: <u>[Signature]</u>	DATE: <u>1-30-13</u>

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

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ENGLISH

JANUARY, 1990

STD. NO. SN