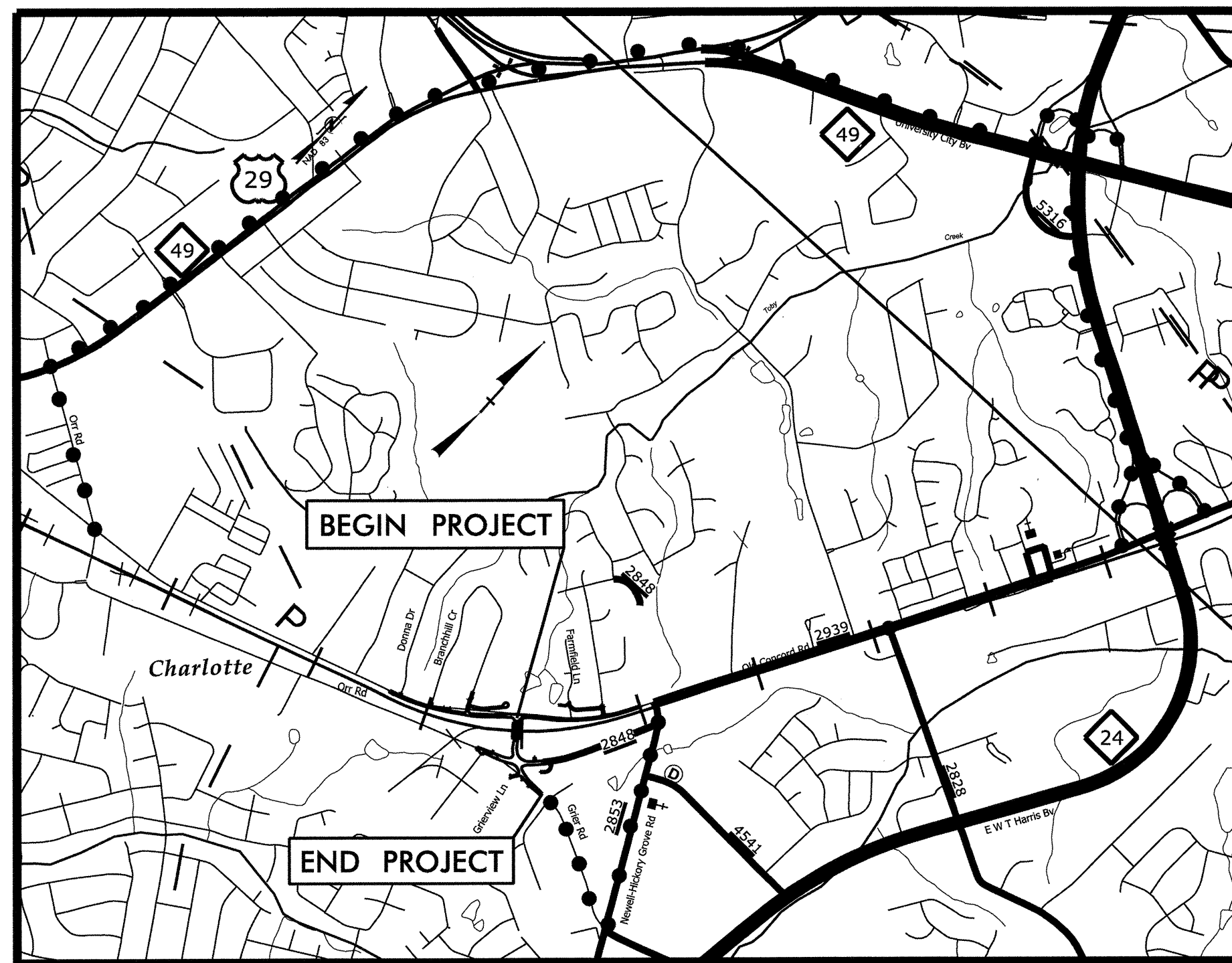


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TIP PROJECT: P-5208H

CONTRACT: C203148

STRUCTURES



VICINITY MAP

OFFSITE DETOUR

STATE OF NORTH CAROLINA  
NCDOT RAIL DIVISION

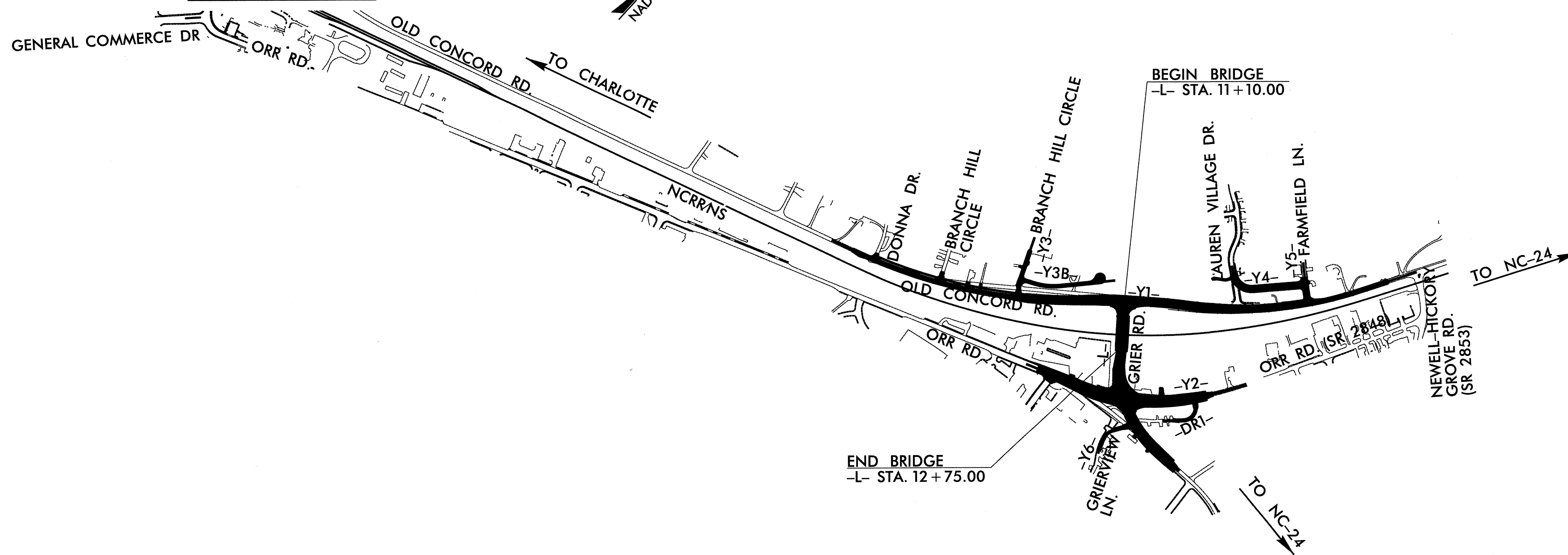


STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5208H	S-1	36
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50000.1.STR13T1B		PE, UTIL PE	
50000.1.STR14T3		PE, UTIL PE	
43219.2.STR09P5208		RW	
50000.3.STR08T4F	FRA-FR-HSR-0006-1	CONST	

# MECKLENBURG COUNTY

LOCATION: CHARLOTTE - GRIER RD. GRADE SEPARATION FROM SOUTH OF ORR RD. TO OLD CONCORD RD.

TYPE OF WORK: STRUCTURES



**DESIGN DATA**

ADT 2012 = 11,400  
 ADT 2035 = 26,900  
 DHV = 10 %  
 D = 70 %  
 T = 15 % \*  
 V = 40 MPH  
 \* TTST = 2% DUAL 13%  
 FUNC CLASS =  
 URBAN LOCAL  
 SUBREGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT P-5208H..... 0.177 mi  
 LENGTH STRUCTURE TIP PROJECT P-5208H..... 0.031 mi  
 TOTAL LENGTH TIP PROJECT P-5208H..... 0.208 mi



Prepared in the Office of:

RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE, SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 (919)878-9560 • NC LICENSE NO. F-0112

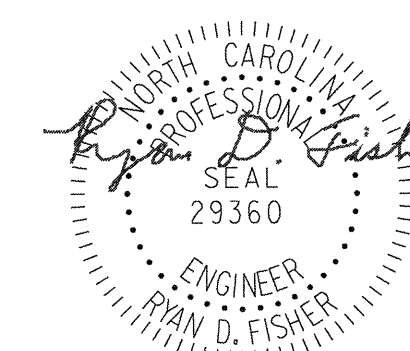
2012 STANDARD SPECIFICATIONS

LETTING DATE:  
MAY 21, 2013

J. T. Peacock, Jr., P.E.  
PROJECT ENGINEER

Brandon J. McInnis, P.E.  
PROJECT DESIGN ENGINEER

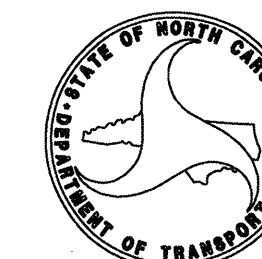
**STRUCTURAL ENGINEER**



2-13-2013

SIGNATURE:

P.E.



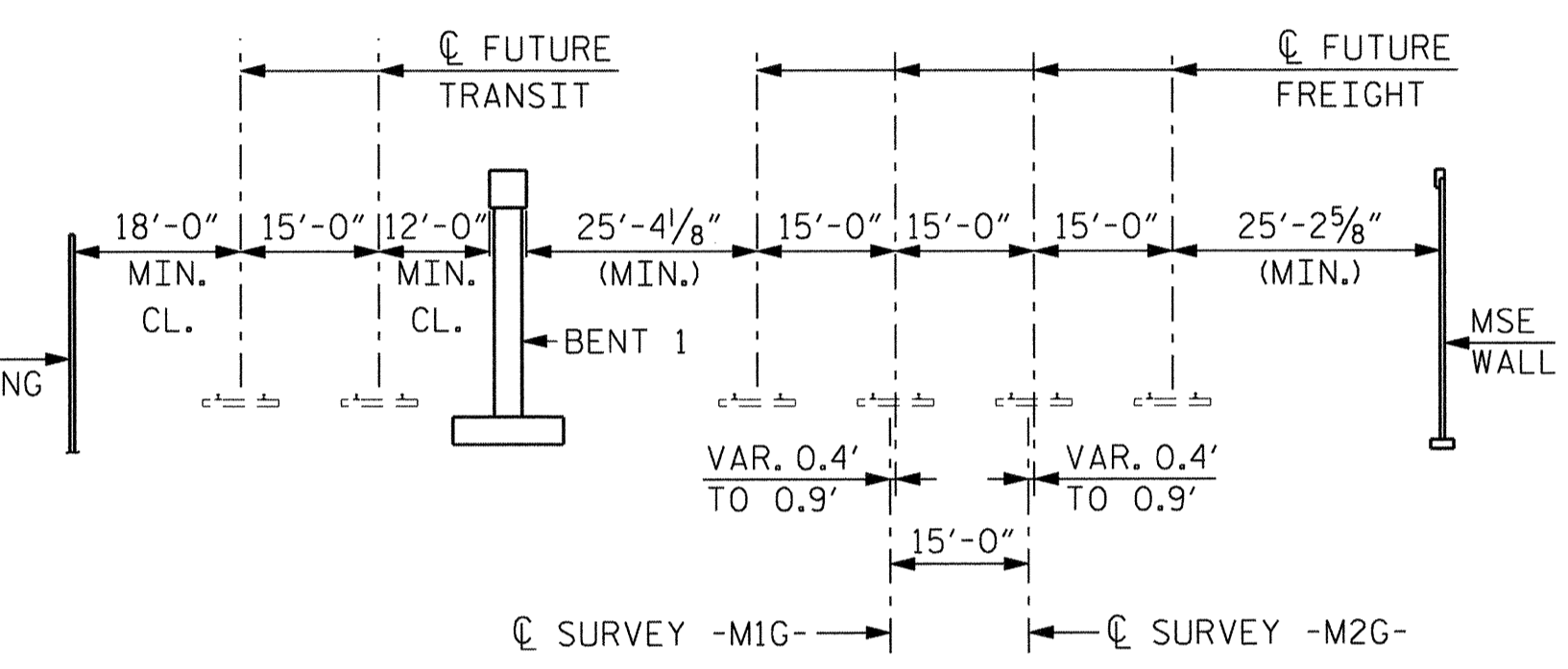
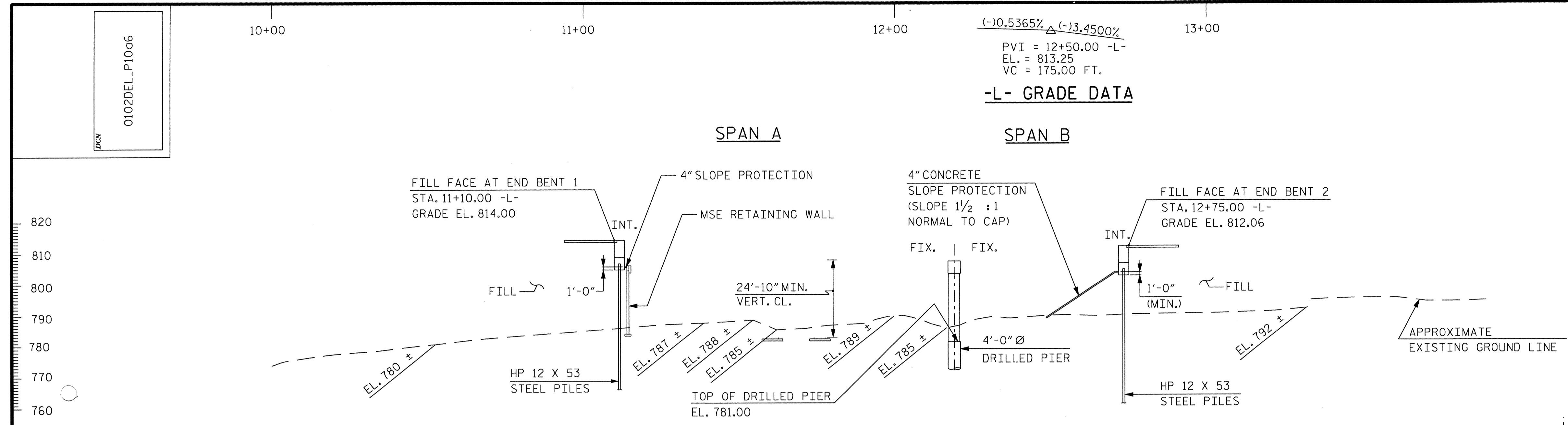
NC DEPARTMENT OF  
TRANSPORTATION  
**RAIL DIVISION**

PLANNING AND DEVELOPMENT

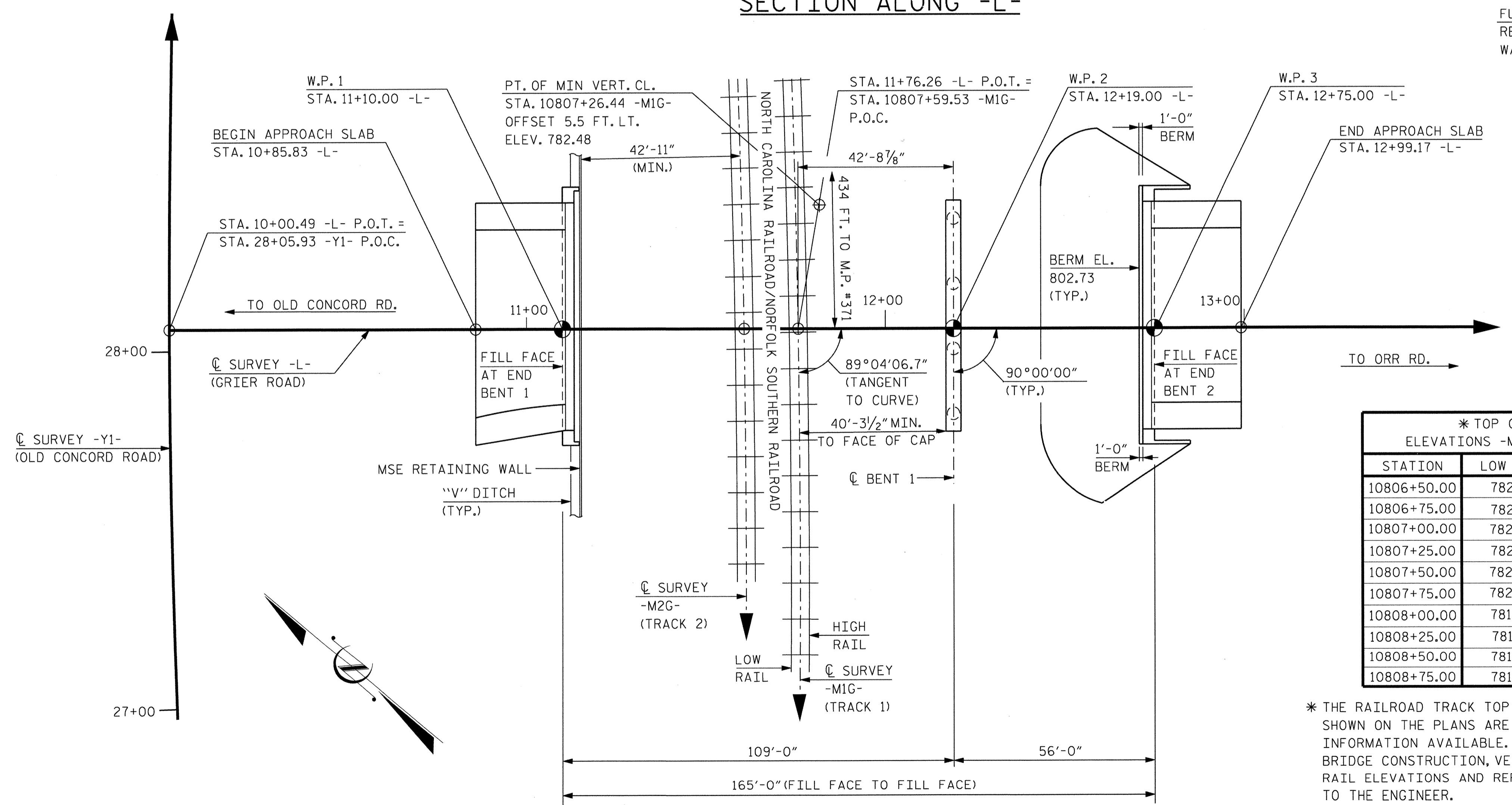
0102DEL\_P1006

(-10.5365% (-)3.4500%  
 PVI = 12+50.00 -L-  
 EL. = 813.25  
 VC = 175.00 FT.

-L- GRADE DATA



MINIMUM HORIZONTAL CLEARANCES TO RAILROAD  
 (LOOKING STATION AHEAD ALONG RAILROAD SPAN LENGTHS BASED ON THIS SECTION)



\* TOP OF RAIL ELEVATIONS -MIG- (TRACK 1)

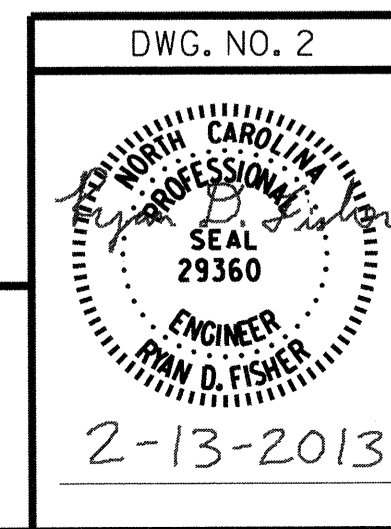
STATION	LOW RAIL	HIGH RAIL
10806+50.00	782.41	782.74
10806+75.00	782.31	782.65
10807+00.00	782.23	782.56
10807+25.00	782.15	782.48
10807+50.00	782.08	782.41
10807+75.00	782.02	782.35
10808+00.00	781.96	782.29
10808+25.00	781.91	782.25
10808+50.00	781.88	782.21
10808+75.00	781.85	782.18

\* THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER.

PLAN  
 (PILES NOT SHOWN IN PLAN VIEW)

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.  
 10807+59.53 -MIG- P.O.C.  
 SHEET 1 OF 3 BRIDGE NO. 1306 M.P. #371.08

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON GRIER ROAD  
 OVER NCR/NS RR  
 BETWEEN OLD CONCORD ROAD  
 AND ORR ROAD



**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

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

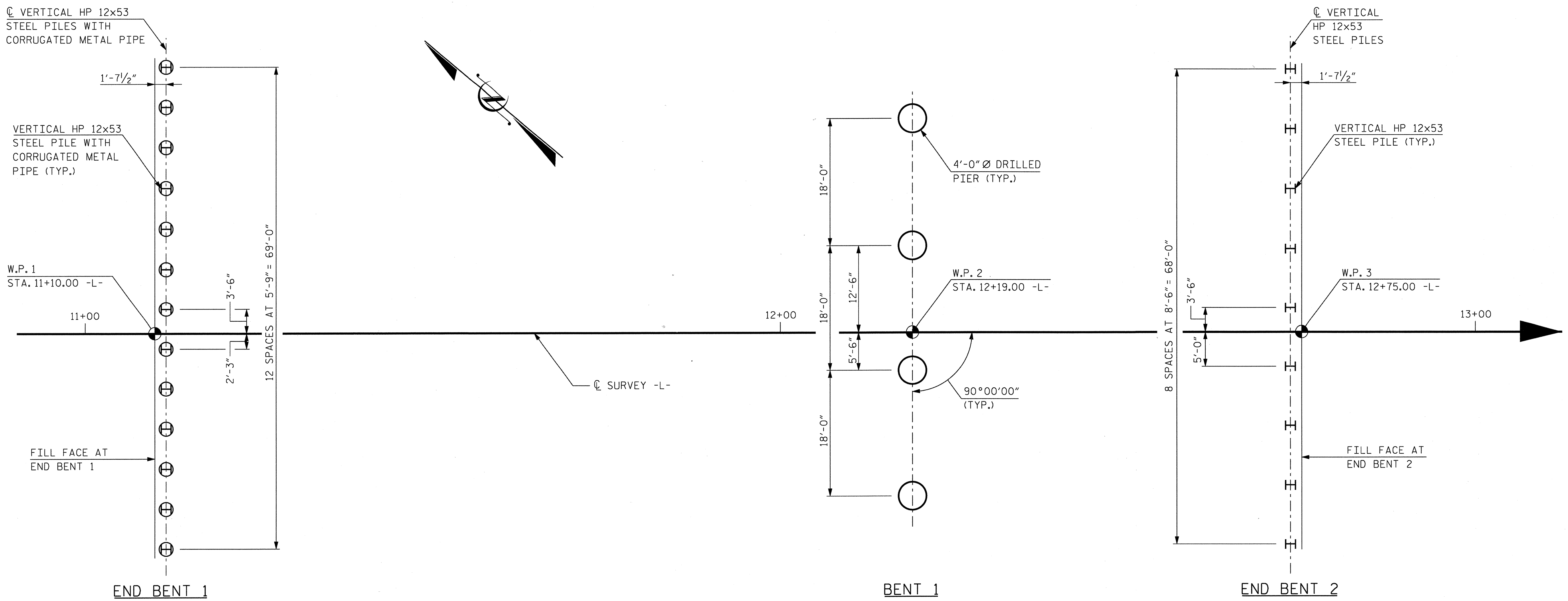
TOTAL SHEETS: 36

DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
 CHECKED BY : R.D. FISHER DATE : JAN. 2013

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3/28/2013 M:\projects\2011\11031\5208H\Design\Structures\Grier Road Bridge\DGN\Final\5208H\_sd\_.fltdgn

0102DEL\_P1006



**FOUNDATION LAYOUT**

(DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO THE PILE AND DRILLED PIER CENTERLINE)

**FOUNDATION NOTES:**

- PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.
- DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE.
- PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.
- DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE.
- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATION.
- LEFT MOST DRILLED PIER AT BENT NO.1 IS DESIGNED FOR A FACTORED RESISTANCE OF 400 TONS. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 15 TSF.
- INSTALL THE LEFT MOST DRILLED PIER AT BENT NO.1 TO AN ELEVATION NO HIGHER THAN 736.5 FT. AND WITH THE REQUIRED TIP RESISTANCE.
- LEFT DRILLED PIER AT BENT NO.1 IS DESIGNED FOR A FACTORED RESISTANCE OF 535 TONS. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25 TSF.
- INSTALL THE LEFT DRILLED PIER AT BENT NO.1 TO AN ELEVATION NO HIGHER THAN 748.0 FT. AND WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 10 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- RIGHT DRILLED PIER AT BENT NO.1 IS DESIGNED FOR A FACTORED RESISTANCE OF 595 TONS. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25 TSF.
- INSTALL THE RIGHT DRILLED PIER AT BENT NO.1 TO AN ELEVATION NO HIGHER THAN 751.0 FT. WITH THE WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 10 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- RIGHT MOST DRILLED PIER AT BENT NO.1 IS DESIGNED FOR A FACTORED RESISTANCE OF 383 TONS. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25 TSF.

- INSTALL THE RIGHT MOST DRILLED PIER AT BENT NO.1 TO AN ELEVATION NO HIGHER THAN 751.0 FT. AND WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 10 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- SPT MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTION, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CROSSHOLE SONIC LOGGING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- CONSTRUCT MSE WALL AT END BENT 1 BEFORE INSTALLING PILE FOUNDATIONS FOR END BENT 1.
- PLACE FILLS AT END BENT 2 BEFORE INSTALLING FOUNDATIONS FOR END BENT 2.
- SETTLEMENT MONITORING USING SETTLEMENT GAUGES IS REQUIRED AT END BENT 1 AND END BENT 2.
- A 24-INCH DIAMETER CORRUGATED METAL PIPE (CMP) SHALL BE INSTALLED VERTICALLY AT EACH PILE LOCATION AT END BENT 1 WHILE MSE WALL IS CONSTRUCTED.
- CORRUGATED METAL PIPES SHALL BE FILLED WITH #57 STONE OR MATERIALS APPROVED BY THE ENGINEER AFTER PILE DRIVING IS COMPLETED.
- SETTLEMENT MEASUREMENTS SHOULD BE TAKEN AT SETTLEMENT GAUGES ONCE EVERY 4 DAYS WITHIN THE FIRST 16 DAYS AND ONCE EVERY 7 DAYS AFTER THAT.
- END BENT PILES SHOULD BE DRIVEN AFTER THE MAJORITY OF THE SETTLEMENTS OF THE APPROACH FILLS HAVE BEEN COMPLETED.

OBSERVE A MONTH WAITING PERIOD AFTER CONSTRUCTING THE APPROACH FILLS AND MSE RETAINING WALL TO FINISHED GRADE BEFORE BEGINNING INSTALLING PILES AT BOTH END BENTS.

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOUNDATION LAYOUT

DWG. NO. 3

3-28-13

**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3
1			3			TOTAL SHEETS
2			4			36

DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
 CHECKED BY : R.D. FISHER DATE : JAN. 2013

0102DEL\_P1006

TOTAL BILL OF MATERIAL

LOCATION	4'-0" DIA. DRILLED PIERS IN SOIL	4'-0" DIA. DRILLED PIERS NOT IN SOIL	SID INSPECTIONS	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS "A" CONCRETE	BRIDGE APPROACH SLABS	REINF. STEEL	EPOXY COATED REINF. STEEL	SPIRAL COLUMN REINF. STEEL	54" PRESTRESSED CONCRETE GIRDERS		HP 12x53 STEEL PILES		TWO BAR METAL RAIL	CONCRETE PARAPET	72" CHAIN LINK FENCE	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	
	LIN. FEET	LIN. FEET	EACH	EACH	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	LBS.	NO.	L.F.	NO.	L.F.	L.F.	L.F.	L.F.	SQ. YDS.	LUMP SUM	
SUPERSTRUCTURE						10,821	9,605						14	1,136.33			311.67	326.67	323.00		LUMP SUM	
END BENT 1								37.2	LUMP SUM	7,546	754				13	715						
BENT 1	96.50	43.00	1	1	1			74.6		29,509		5,769										
END BENT 2								41.3	LUMP SUM	8,504	754			9	450						345	
TOTAL	96.50	43.00	1	1	1	10,821	9,605	153.1	LUMP SUM	45,559	1,508	5,769	14	1,136.33	22	1,165	311.67	326.67	323.00	345	LUMP SUM	

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLES 420-3 OF THE STANDARD SPECIFICATIONS.

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

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

ALL PAVEMENT MARKING WILL BE IN ACCORDANCE WITH THE PAVEMENT MARKING PLANS AND SHALL PROVIDE FOR BICYCLES.

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.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

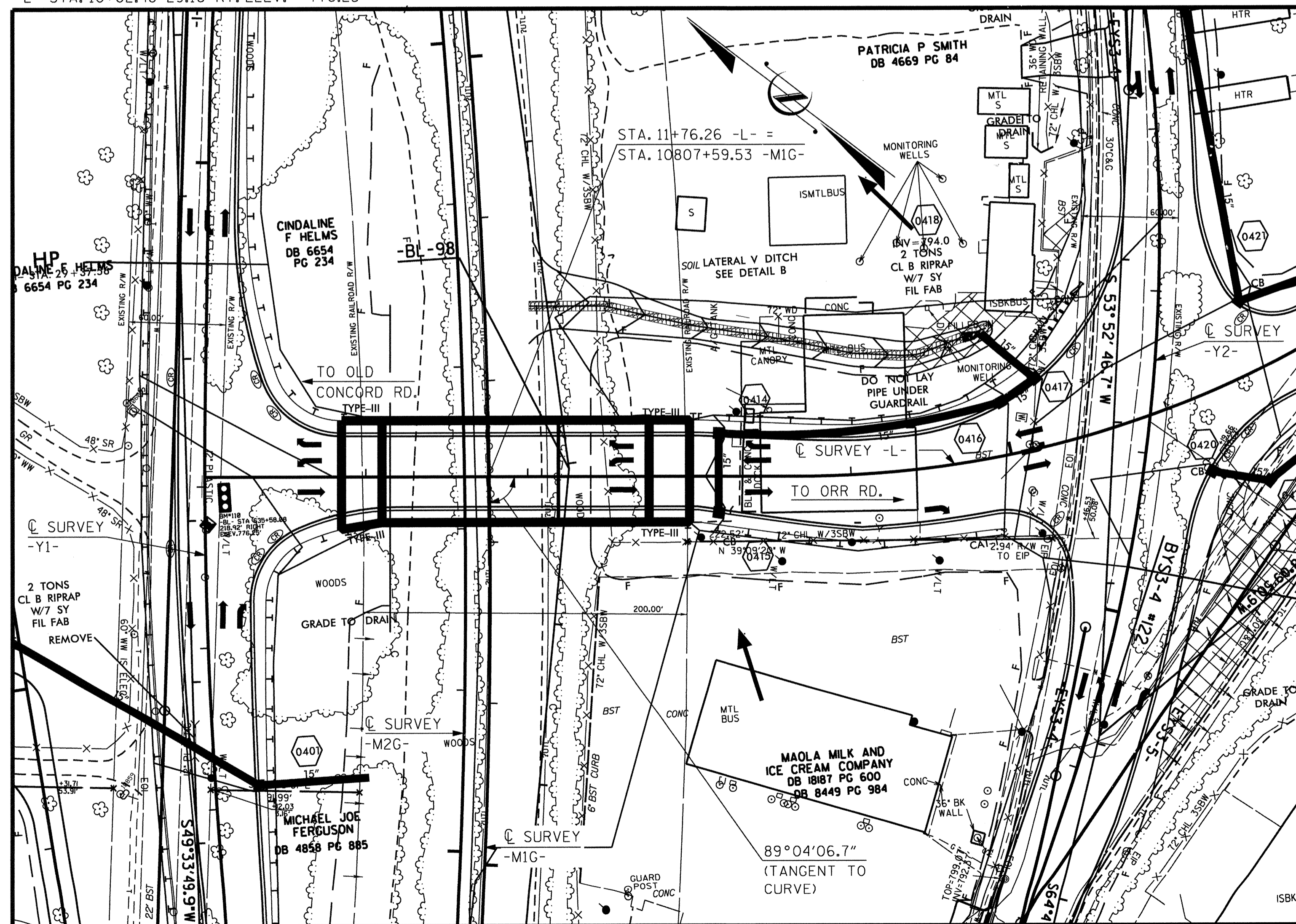
FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

BM #110 : R/R SPIKE SET IN DUKE POWER POLE ± 12' SOUTH OF EOP OF OLD CONCORD RD.  
 SR 9200 POLE IS ACROSS RD FROM BRANCH HILL FARMS 7217 OLD CONCORD RD.  
 -L- STA. 10+02.48 29.16' RT. ELEV. = 776.25'



LOCATION SKETCH

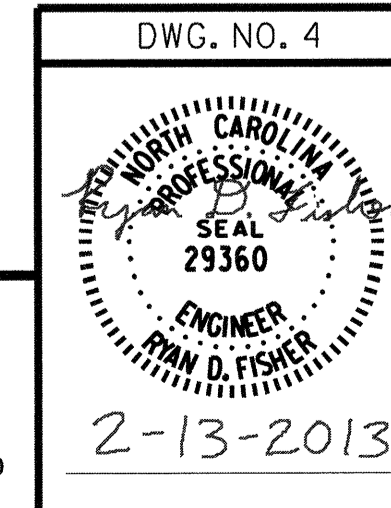
NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING FOR BRIDGE  
 ON GRIER ROAD  
 OVER NCRR/NS  
 BETWEEN OLD CONCORD ROAD  
 AND ORR ROAD



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4
1			3			TOTAL SHEETS
2			4			36

DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
 CHECKED BY : R.D. FISHER DATE : JAN. 2013

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0102DEL\_P1006

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	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)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.18	--	1.75	0.893	1.36	B	I	26.6	0.960	1.30	A	I	10.1	0.80	0.758	1.18	A	I	53.1		
	HL-93 (OPERATING)	N/A		1.73	--	1.35	0.893	1.76	B	I	26.6	0.960	1.73	A	I	10.1	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	2	1.66	59.76	1.75	0.893	1.70	B	I	26.6	0.960	1.81	A	I	10.1	0.80	0.758	1.66	A	I	53.1		
	HS-20 (OPERATING)	36.000		2.20	79.20	1.35	0.893	2.20	B	I	26.6	0.960	2.39	A	I	10.1	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.98	53.73	1.40	0.893	4.44	B	I	26.6	0.960	5.88	A	I	10.1	0.80	0.758	3.98	A	I	53.1	
		SNGARBS2	20.000		2.87	57.40	1.40	0.893	3.46	B	I	26.6	0.960	4.07	A	I	10.1	0.80	0.758	2.87	A	I	53.1	
		SNAGRIS2	22.000		2.68	58.96	1.40	0.893	3.34	B	I	26.6	0.960	3.74	A	I	10.1	0.80	0.758	2.68	A	I	53.1	
		SNCOTTS3	27.250		1.98	53.96	1.40	0.893	2.22	B	I	26.6	0.960	2.86	A	I	10.1	0.80	0.758	1.98	A	I	53.1	
		SNAGGRS4	34.925		1.62	56.58	1.40	0.893	1.91	B	I	26.6	0.960	2.30	A	I	10.1	0.80	0.758	1.62	A	I	53.1	
		SNS5A	35.550		1.58	56.17	1.40	0.893	1.86	B	I	26.6	0.960	2.31	A	I	10.1	0.80	0.758	1.58	A	I	53.1	
		SNS6A	39.950		1.44	57.53	1.40	0.893	1.73	B	I	26.6	0.960	2.07	A	I	10.1	0.80	0.758	1.44	A	I	53.1	
	SNS7B	42.000		1.37	57.54	1.40	0.893	1.65	B	I	26.6	0.960	2.01	A	I	10.1	0.80	0.758	1.37	A	I	53.1		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.75	57.75	1.40	0.893	2.12	B	I	26.6	0.960	2.51	A	I	10.1	0.80	0.758	1.75	A	I	53.1	
		TNT4A	33.075		1.75	57.88	1.40	0.893	2.13	B	I	26.6	0.960	2.46	A	I	10.1	0.80	0.758	1.75	A	I	53.1	
		TNT6A	41.600		1.42	59.07	1.40	0.893	1.77	B	I	26.6	0.960	2.10	A	I	10.1	0.80	0.758	1.42	A	I	53.1	
		TNT7A	42.000		1.42	59.64	1.40	0.893	1.79	B	I	26.6	0.960	2.07	A	I	10.1	0.80	0.758	1.42	A	I	53.1	
		TNT7B	42.000		1.45	60.90	1.40	0.893	1.87	B	I	26.6	0.960	1.98	A	I	10.1	0.80	0.758	1.45	A	I	53.1	
		TNAGRIT4	43.000		1.39	59.77	1.40	0.893	1.77	B	I	26.6	0.960	1.92	A	I	10.1	0.80	0.758	1.39	A	I	53.1	
TNAGT5A		45.000		1.32	59.40	1.40	0.893	1.66	B	I	26.6	0.960	1.88	A	I	10.1	0.80	0.758	1.32	A	I	53.1		
TNAGT5B	45.000	3	1.31	58.95	1.40	0.893	1.63	B	I	26.6	0.960	1.82	A	I	10.1	0.80	0.758	1.31	A	I	53.1			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.  
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

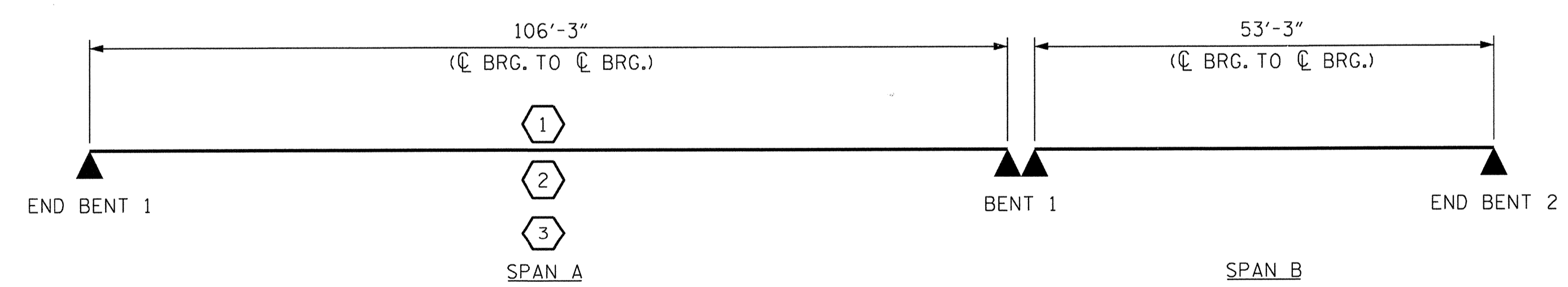
- END RESTRAINT FOR INTEGRAL ABUTMENTS IS NOT CONSIDERED FOR LOAD RATING ANALYSIS.
- LOAD RATING FOR SERVICE III LIMIT STATE IS BASED ON CONCRETE TENSION RATING OPTION.
- LOAD RATING ASSUMES SIMPLE SPAN CONDITIONS PER NCDOT BRIDGE DESIGN MANUAL, CHAPTER 6.

**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-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

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



DWG. NO. 5  
2-13-2013

REVISIONS						SHEET NO. S5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

2/8/2013 R:\Structures\Grier Road Bridge\GNN\Final\P5208H\_sd\_lr\_fr.dgn

DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
CHECKED BY: R.D. FISHER DATE: JAN. 2013

**NOTES:**

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.) AT 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.

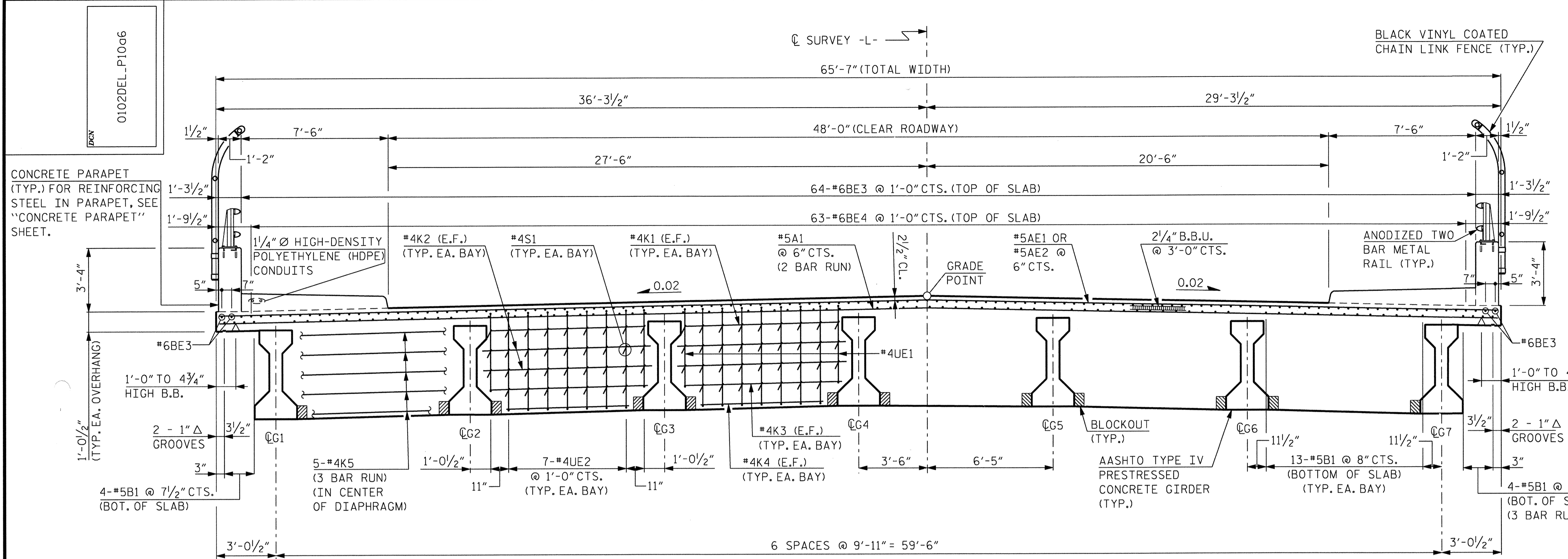
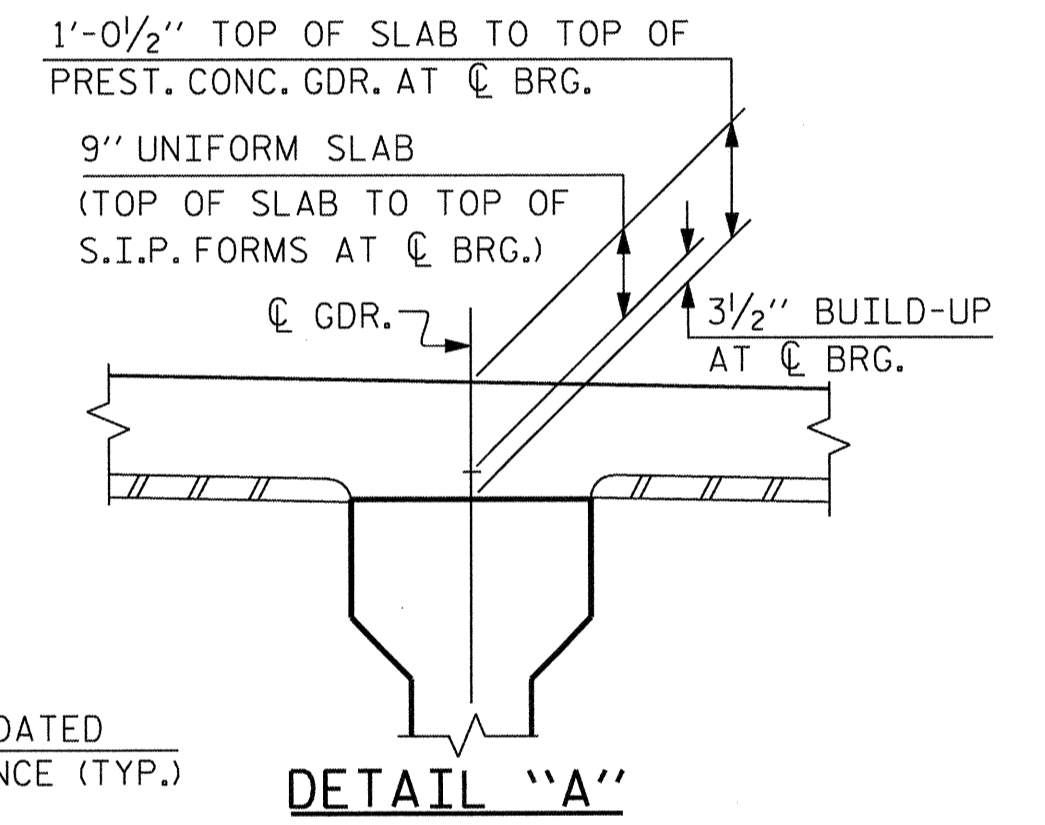
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

THE 3/8" SAW CUT JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

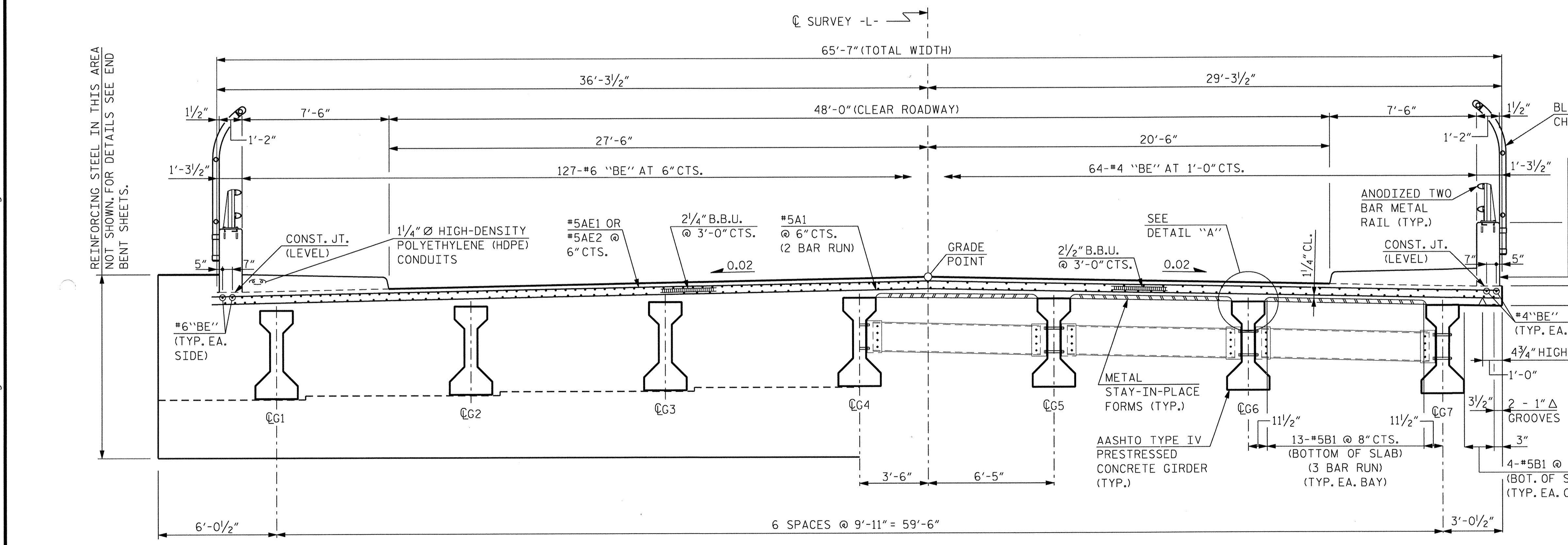
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

GROOVED CONTRACTION JOINTS 1/2" IN DEPTH SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT LOCATIONS SHALL MATCH THE CONTRACTION JOINT LOCATIONS OF THE CONCRETE PARAPETS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH. LOCATE A GROOVED CONTRACTION JOINT AT EACH 3/8" SAW CUT JOINT IN DECK AT END BENTS.

FOR DETAILS OF BLOCKOUTS, SEE SHEET 2 OF 2.



TYPICAL SECTION AT BENT DIAPHRAGM



TYPICAL HALF SECTION AT INTEGRAL END BENT

TYPICAL HALF SECTION AT INT. DIAPHRAGM

PROJECT NO. P-5208H  
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SHEET 1 OF 2  
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 RALEIGH

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

S6  
 TOTAL SHEETS  
 36

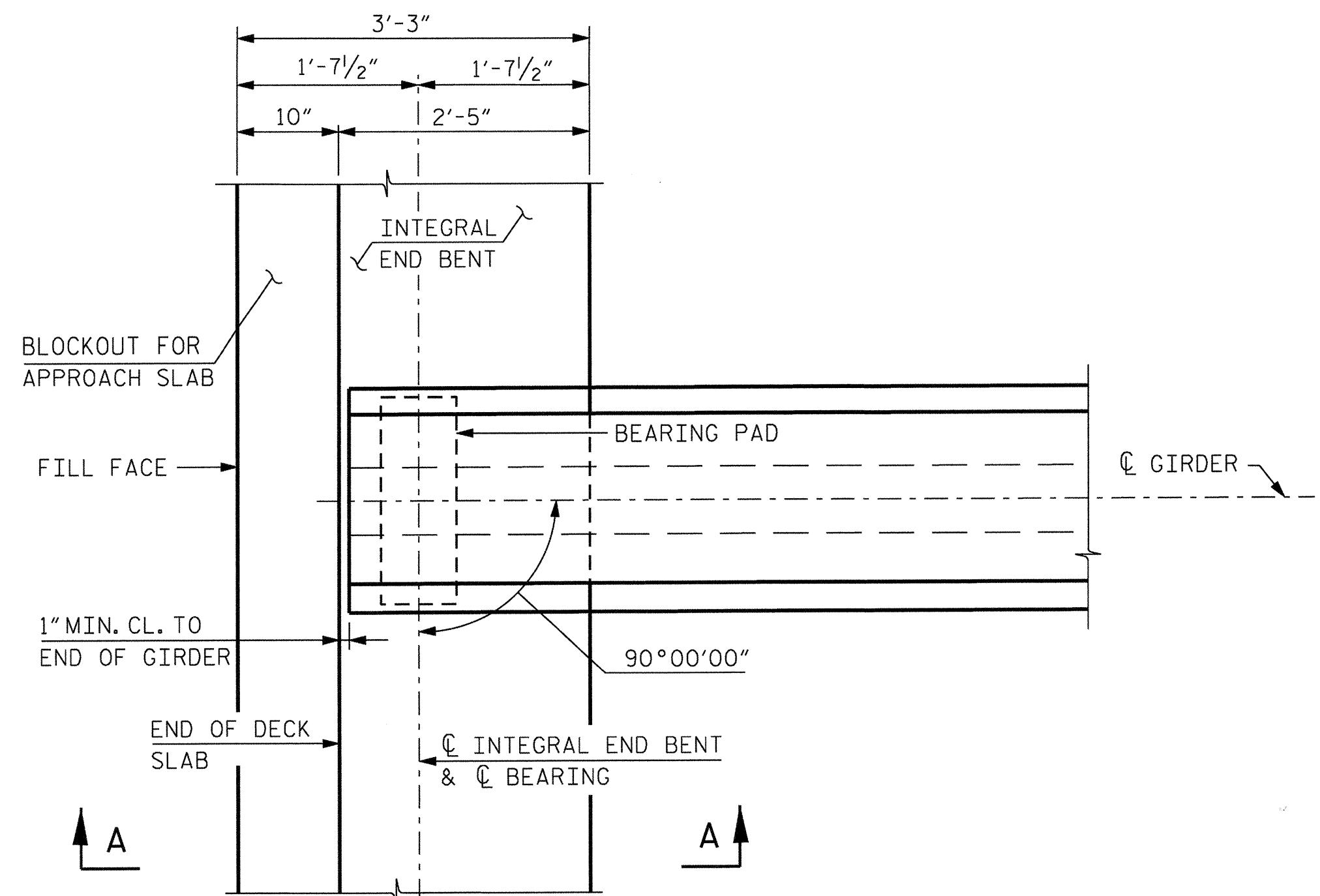
DWG. NO. 6  
 2-13-2013  
 PROFESSIONAL SEAL  
 29360  
 ENGINEER  
 PAUL D. FISHER

**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

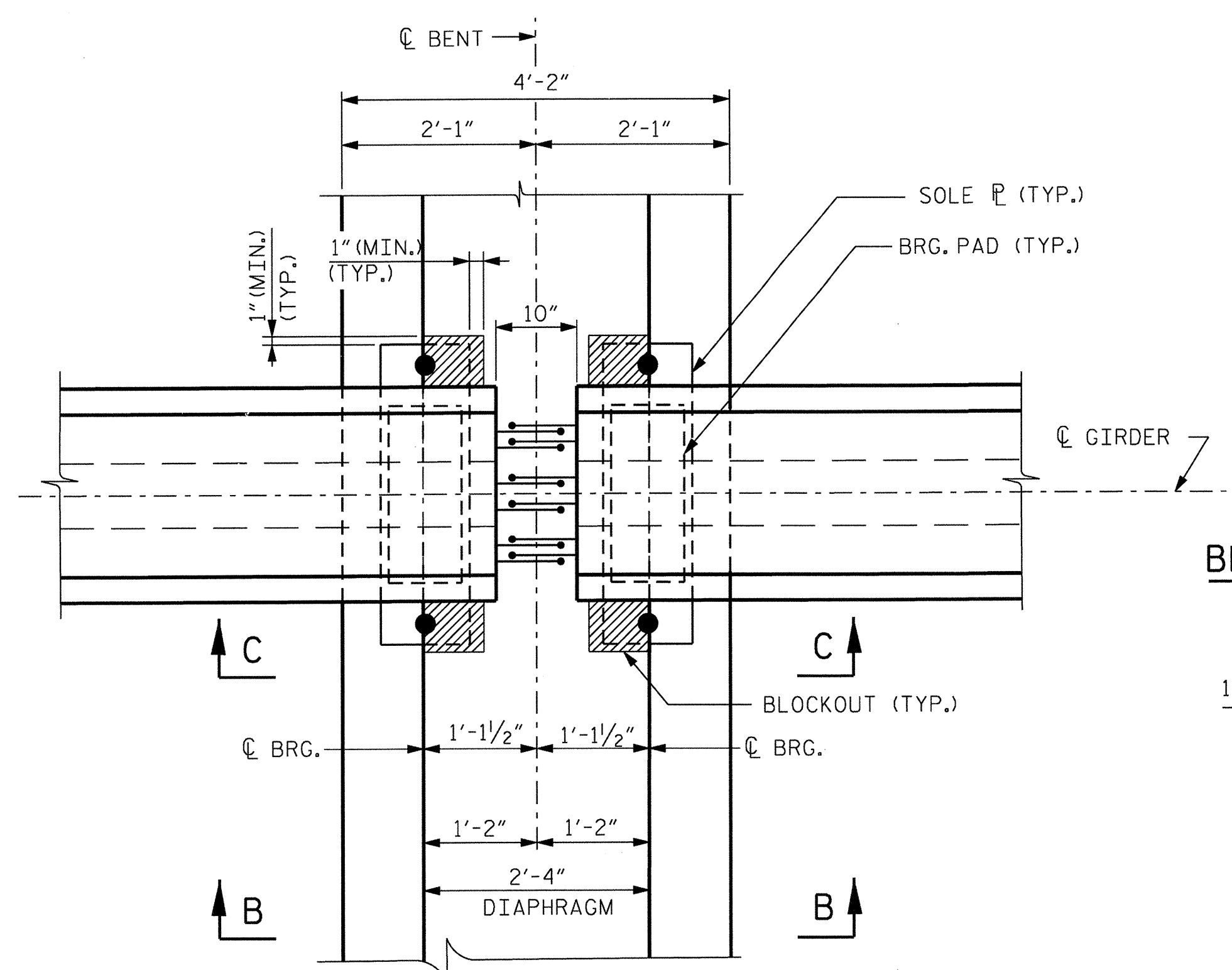
DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
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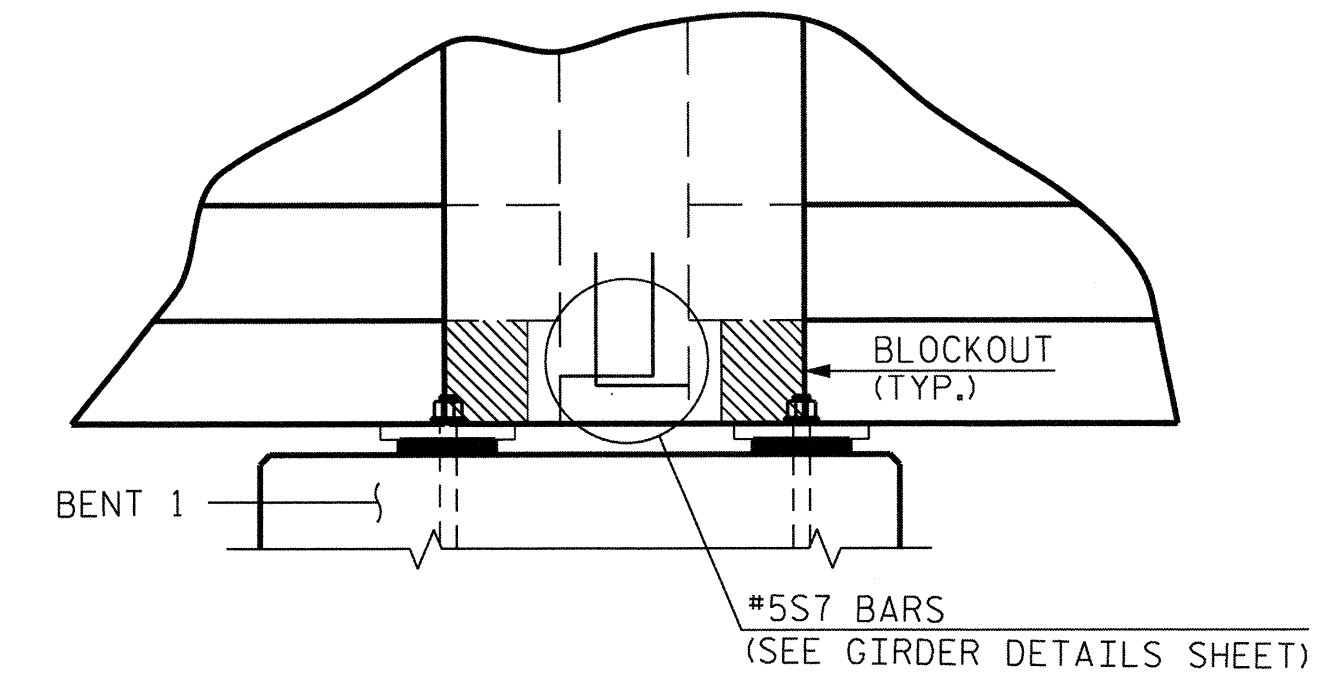
0102DEL\_P1006



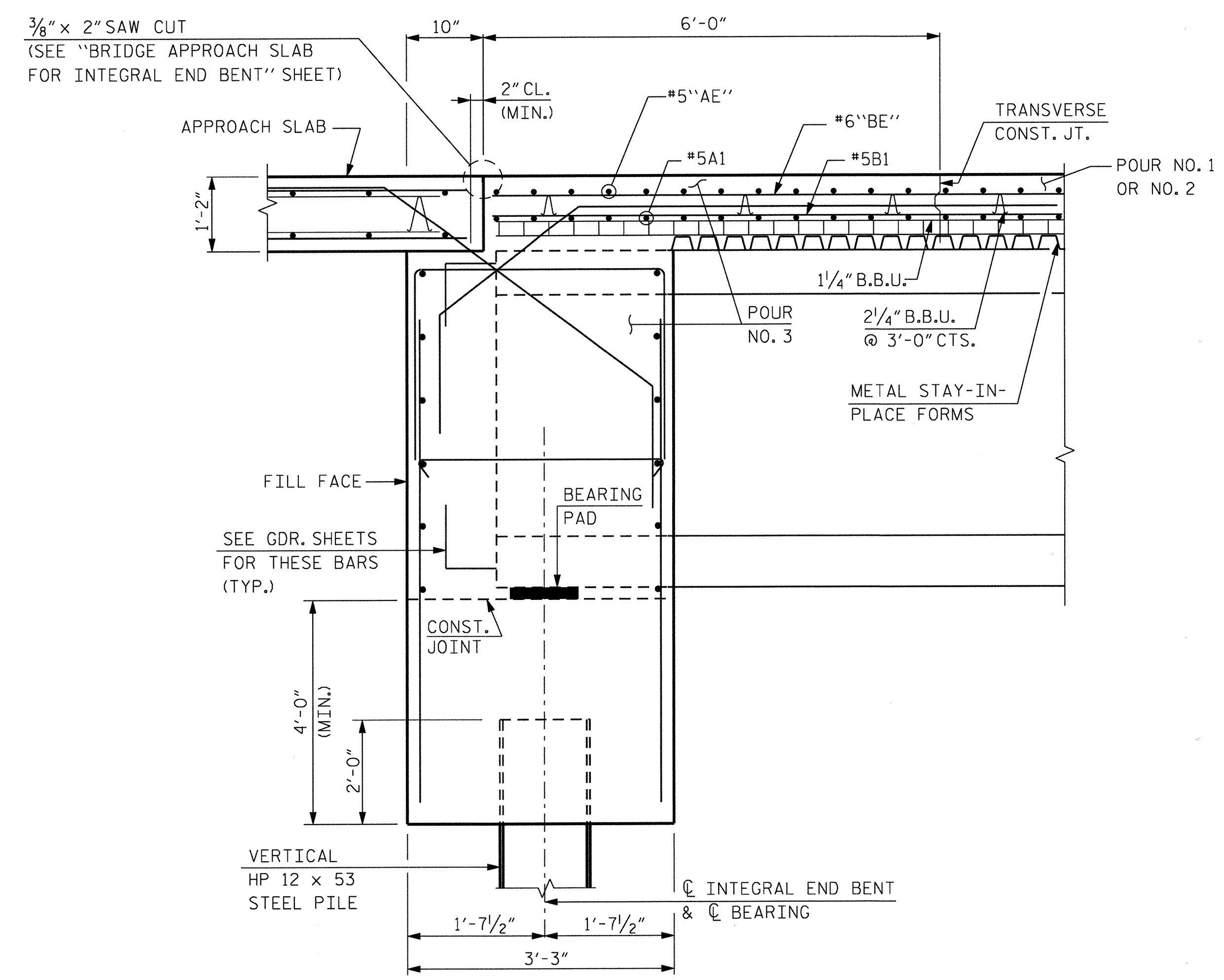
**PLAN DETAIL OF END BENT**  
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



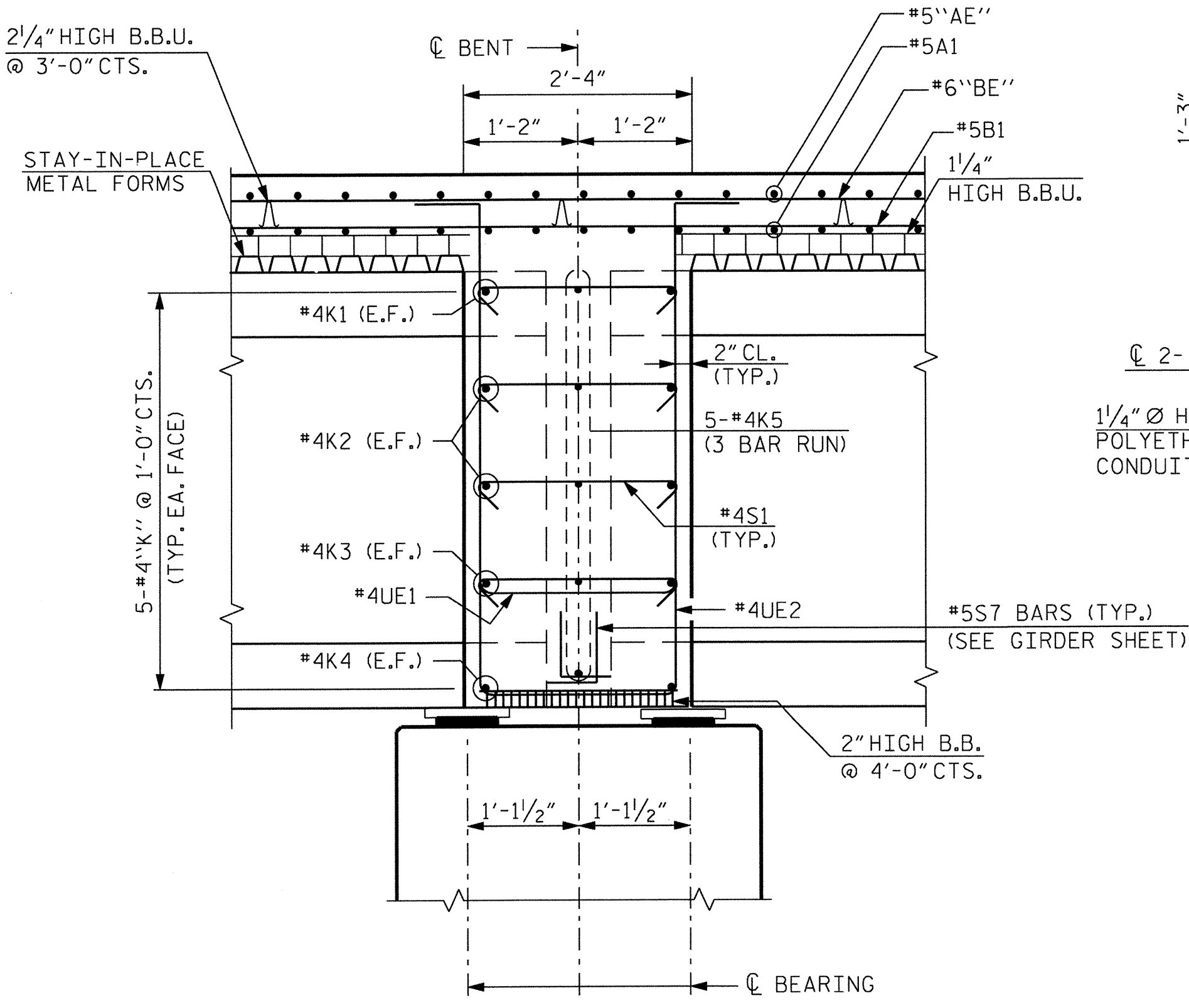
**PLAN DETAIL OF INTERIOR BENT I**  
(CONTINUOUS DECK SLAB NOT SHOWN FOR CLARITY)



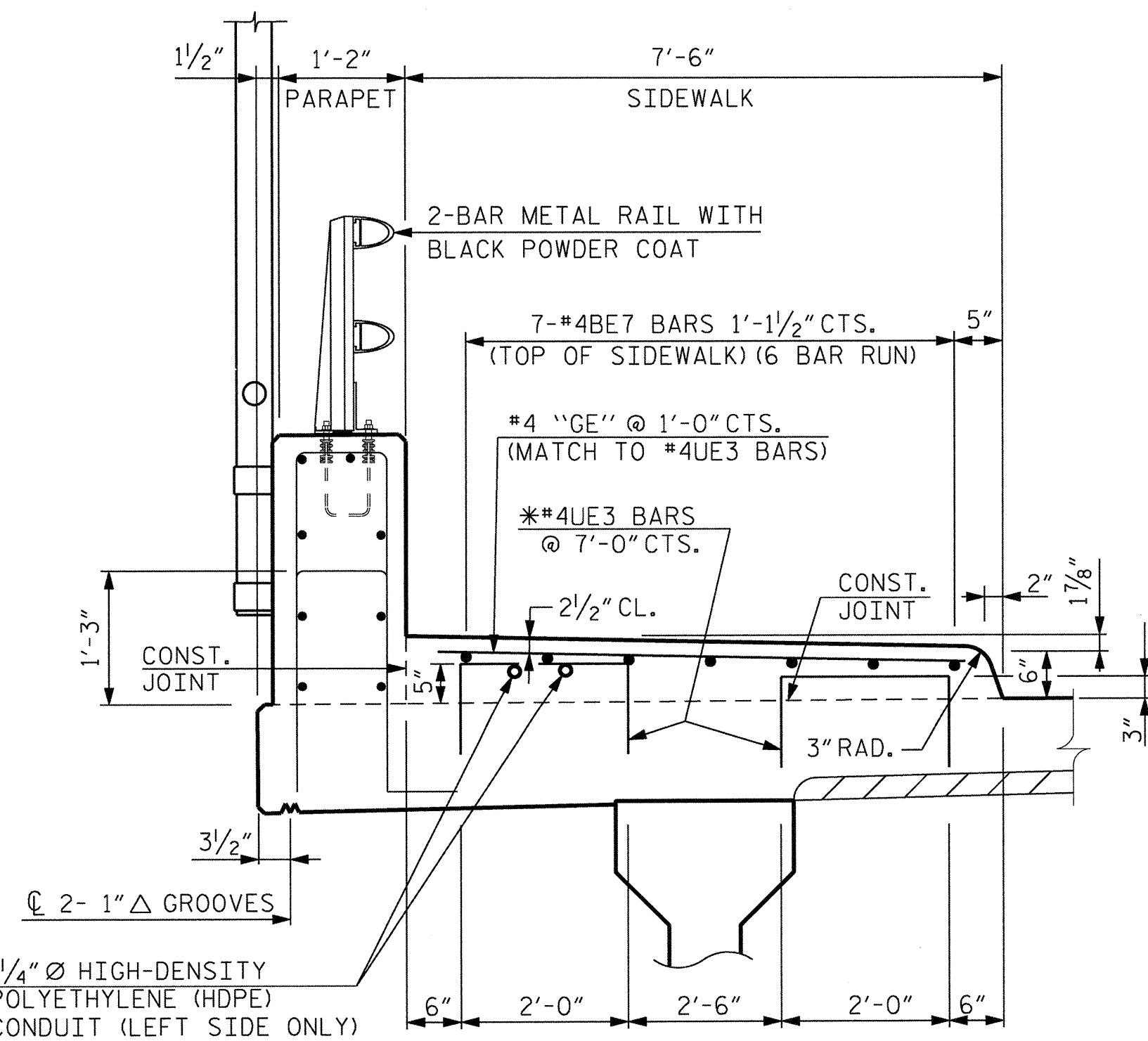
**SECTION C-C**  
**BLOCKOUT DETAIL AT BENT 1 DIAPHRAGMS**



**SECTION A-A**  
(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)  
(END BENT 1 SHOWN, END BENT 2 SIMILAR)  
(SEE END BENT SHEETS FOR INTEGRAL END BENT REINFORCEMENT DETAILS)



**SECTION B-B**  
**SECTION THROUGH INTERIOR BENT DIAPHRAGM**  
(DIMENSIONS SHOWN ARE NORMAL TO THE BENT)

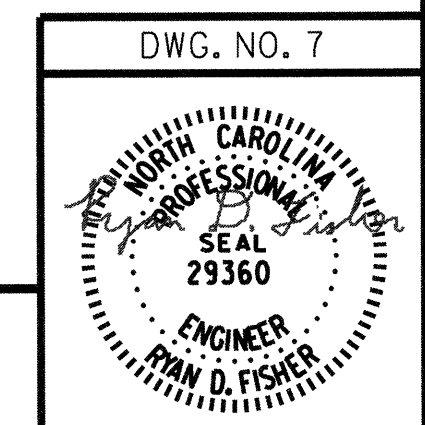


**SIDEWALK DETAIL**  
NOTE: SEE PARAPET DETAILS SHEET FOR PARAPET REBAR REINFORCING DETAILS AND DESCRIPTION.  
\* "U" BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

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SHEET 2 OF 2  
STATE OF NORTH CAROLINA  
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RALEIGH

**SUPERSTRUCTURE**  
**TYPICAL SECTION**  
**DETAILS**



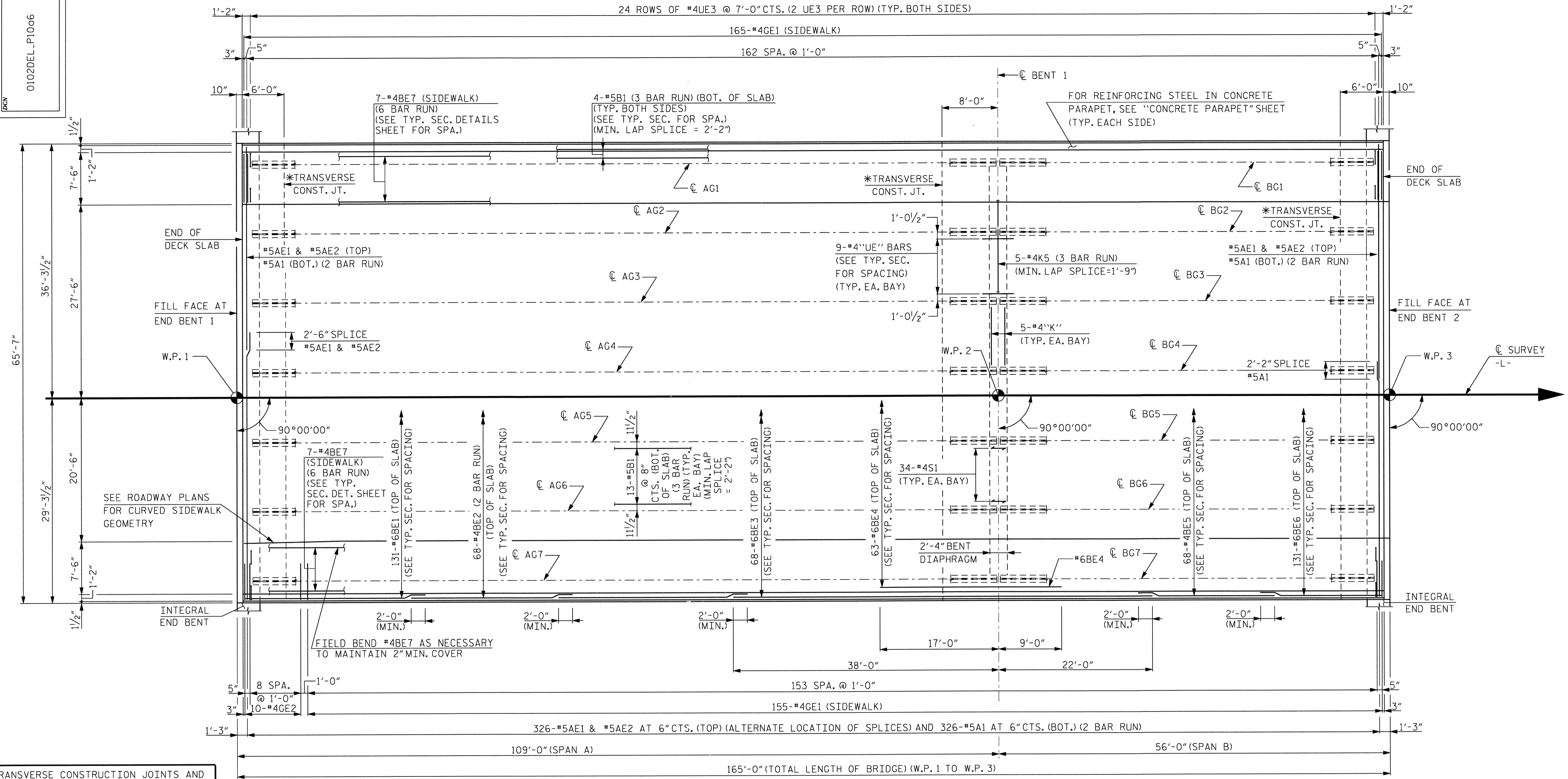
**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO. S7
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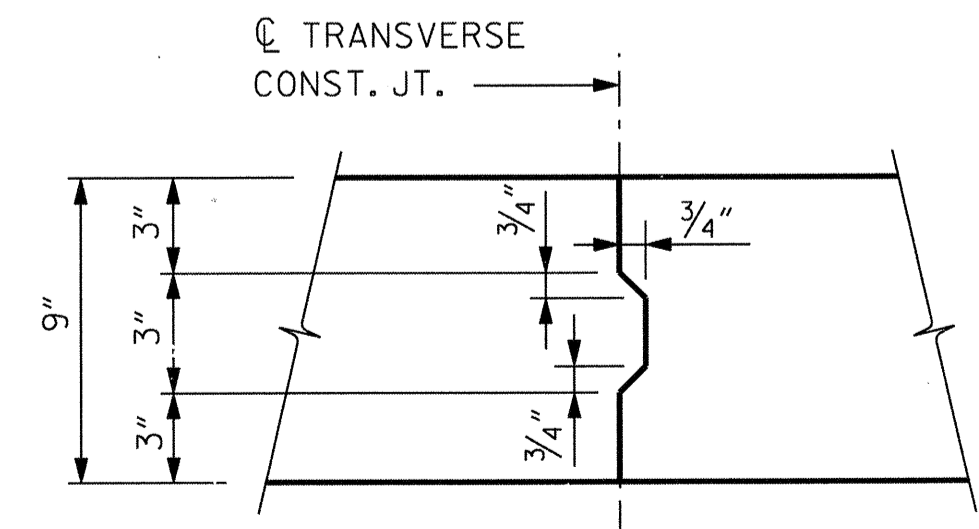
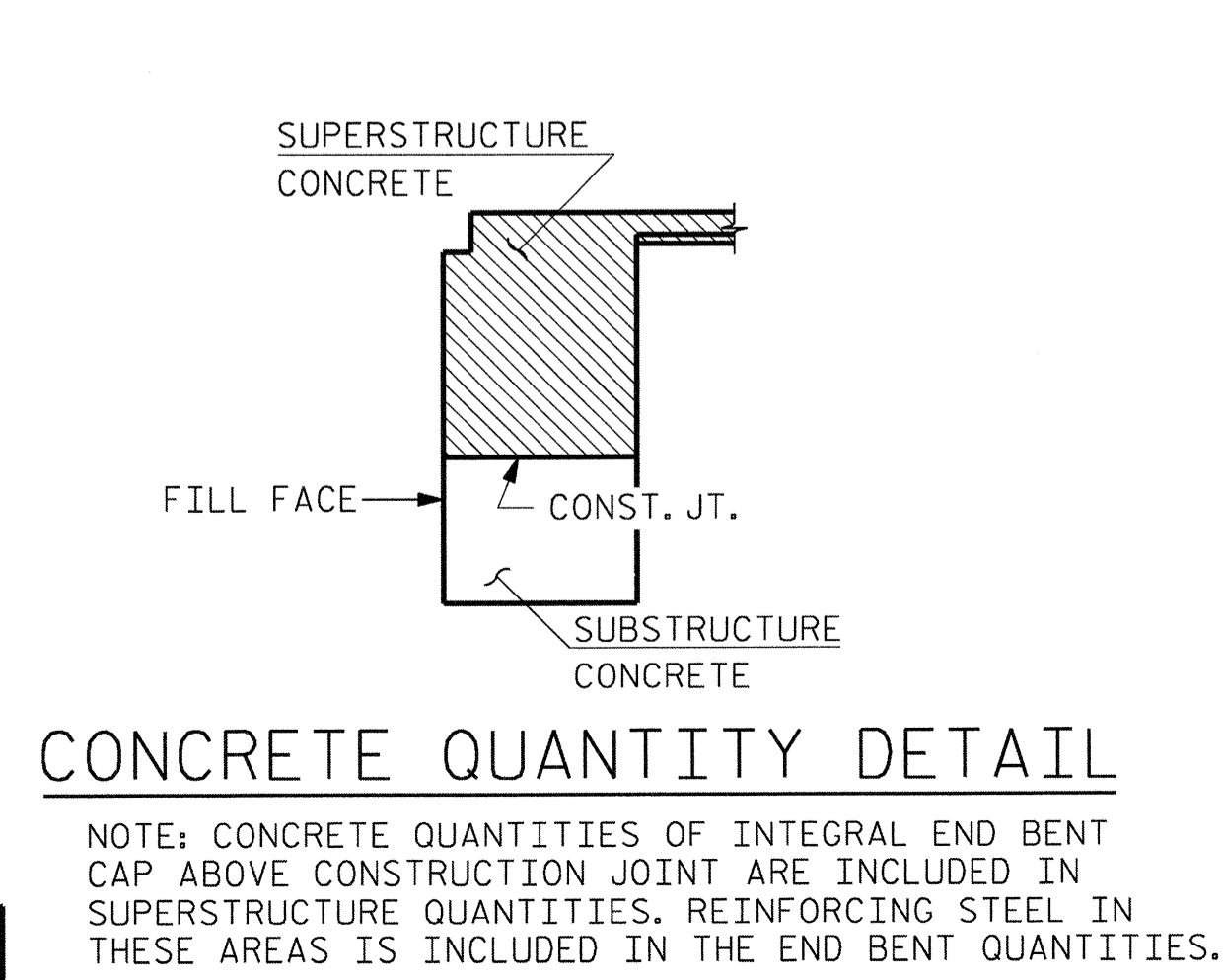
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\*FOR TRANSVERSE CONSTRUCTION JOINTS AND SLAB POURING SEQUENCE DETAILS, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

CONCRETE QUANTITY DETAIL



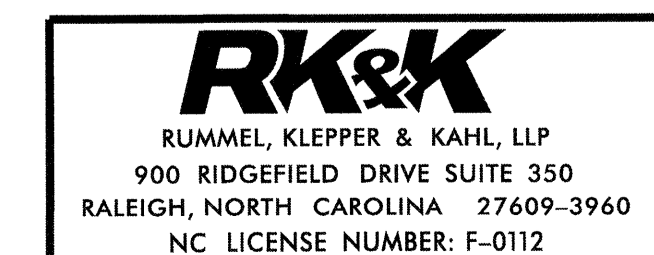
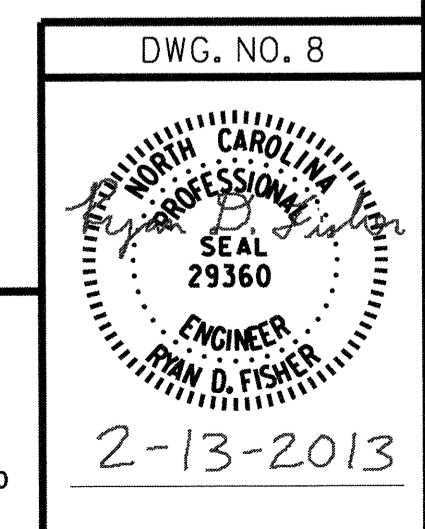
TRANSVERSE CONST. JOINT IN DECK SLAB

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 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

STATE OF NORTH CAROLINA  
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SUPERSTRUCTURE  
 PLAN OF SPANS A AND B

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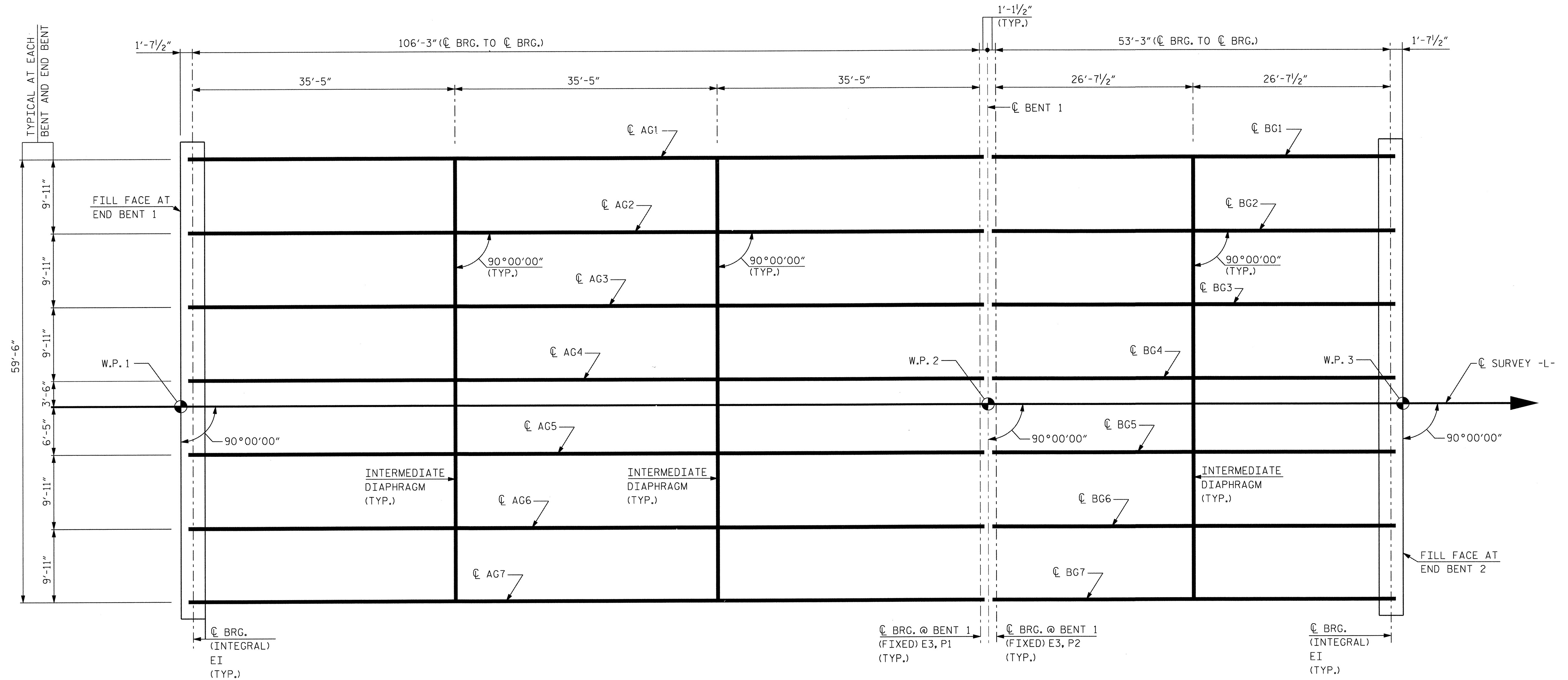


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SPAN A

SPAN B

**GIRDER FRAMING PLAN**

NOTE: GIRDERS ARE STRAIGHT AND PARALLEL TO ONE ANOTHER.

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 MECKLENBURG COUNTY  
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STATE OF NORTH CAROLINA  
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**SUPERSTRUCTURE  
 FRAMING PLAN**

DWG. NO. 9

Professional Engineer Seal for Ryan D. Fisher, License No. 29360, dated 2-13-2013.

**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

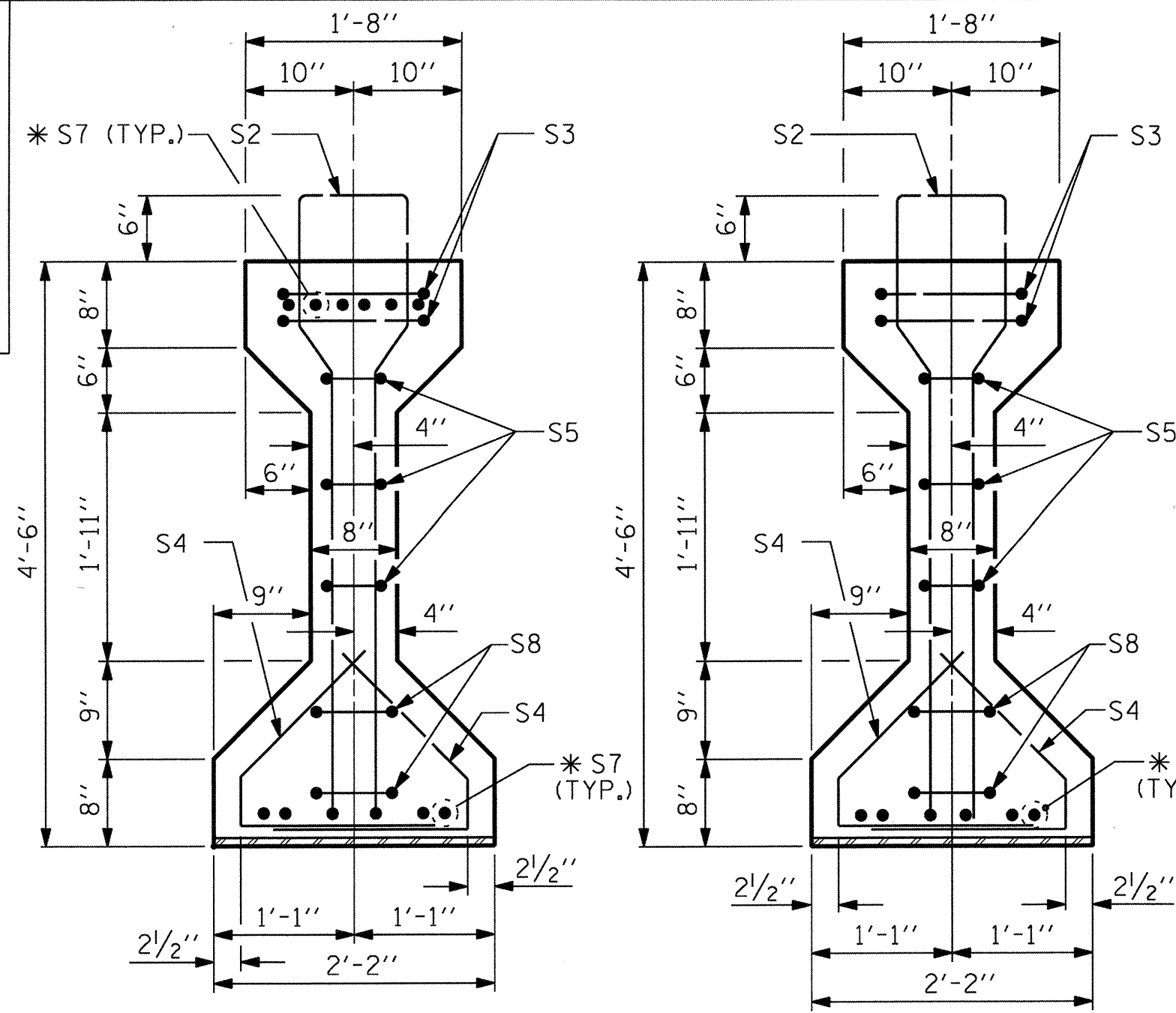
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NO.	BY:	DATE:	NO.	BY:	DATE:	S9	
1			3			TOTAL SHEETS	36
2			4				

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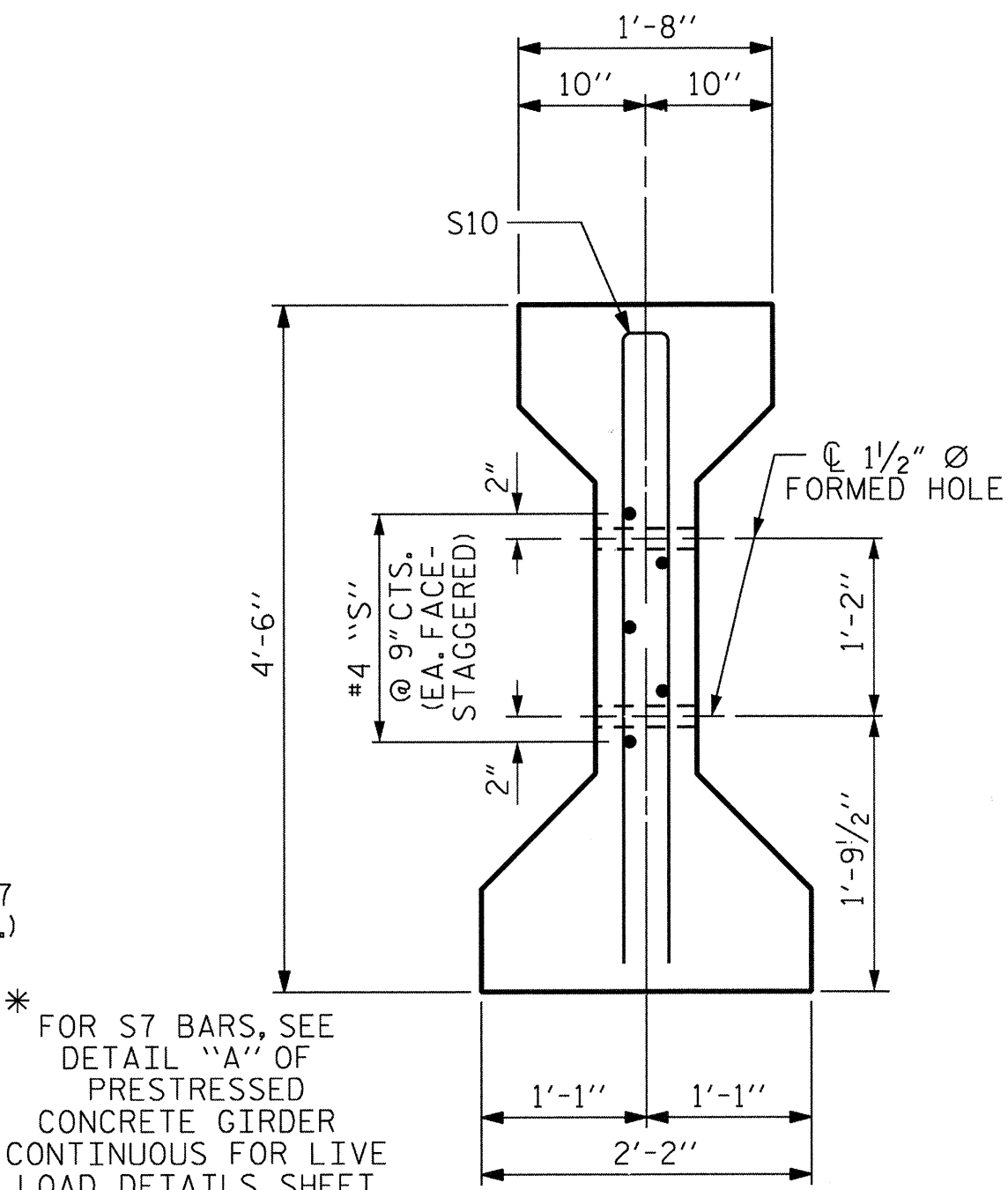
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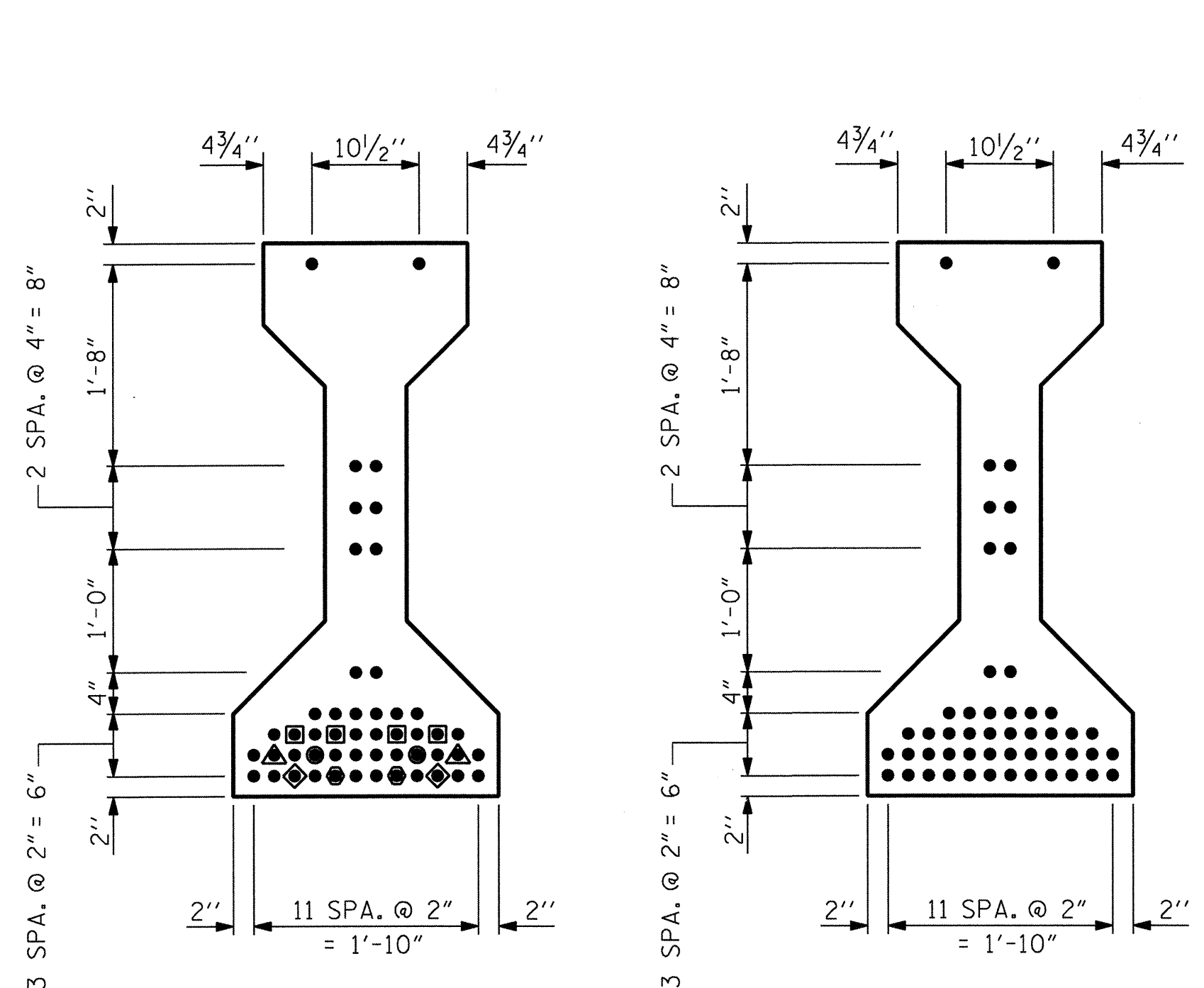
SECTION A-A

SECTION B-B



SECTION C-C  
(S1 BARS NOT SHOWN)

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



AT END OF GIRDER

AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- ⊙ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- ◆ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- ⊖ STRANDS DEBONDED FOR 22'-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

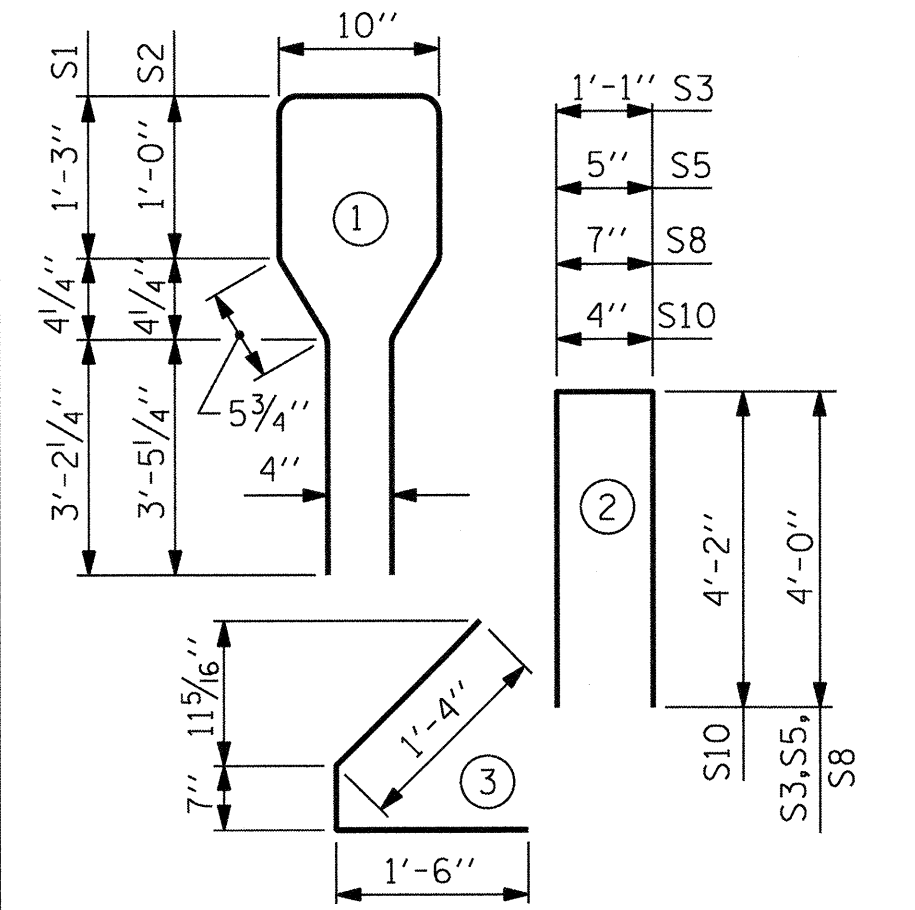
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	113	#4	1	10'-8"	805
S2	14	#6	1	10'-8"	224
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
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	4	#5	2	8'-8"	36
S11	10	#4	STR.	7'-0"	47
S12	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

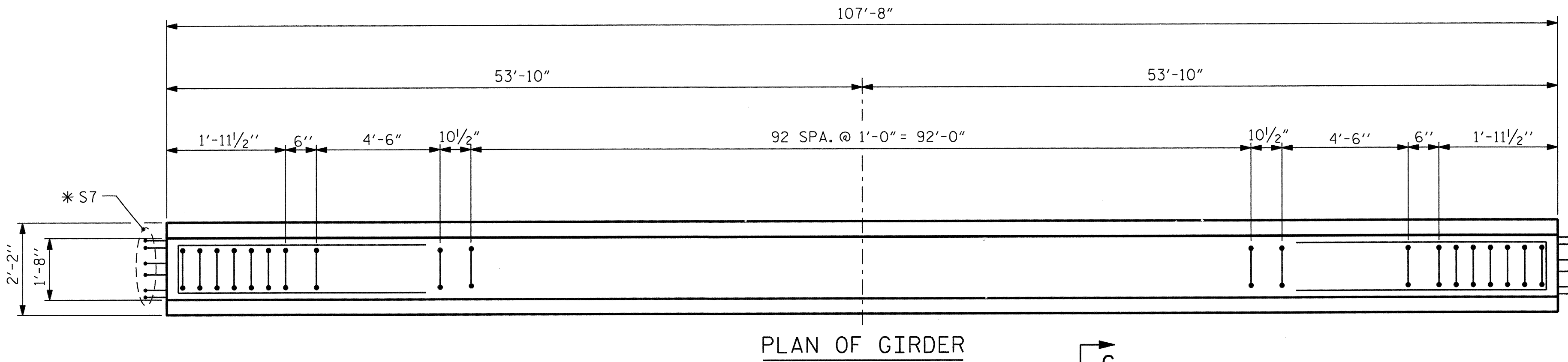


QUANTITIES FOR ONE GIRDER

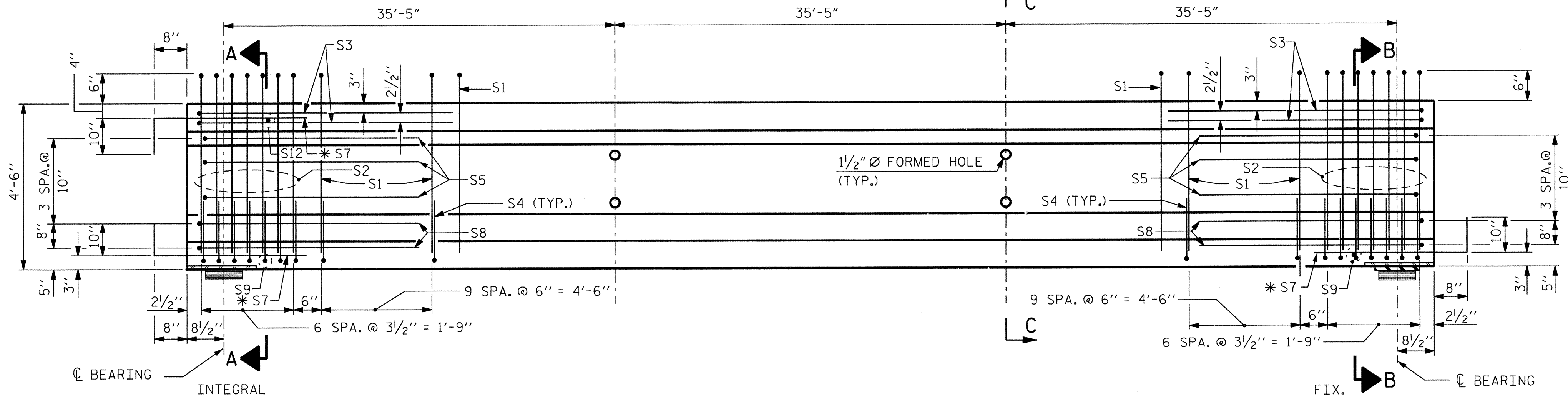
	REINFORCING STEEL	9,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
SPAN A GIRDER	1,419	21.8	50

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	107'-8"	753'-8"

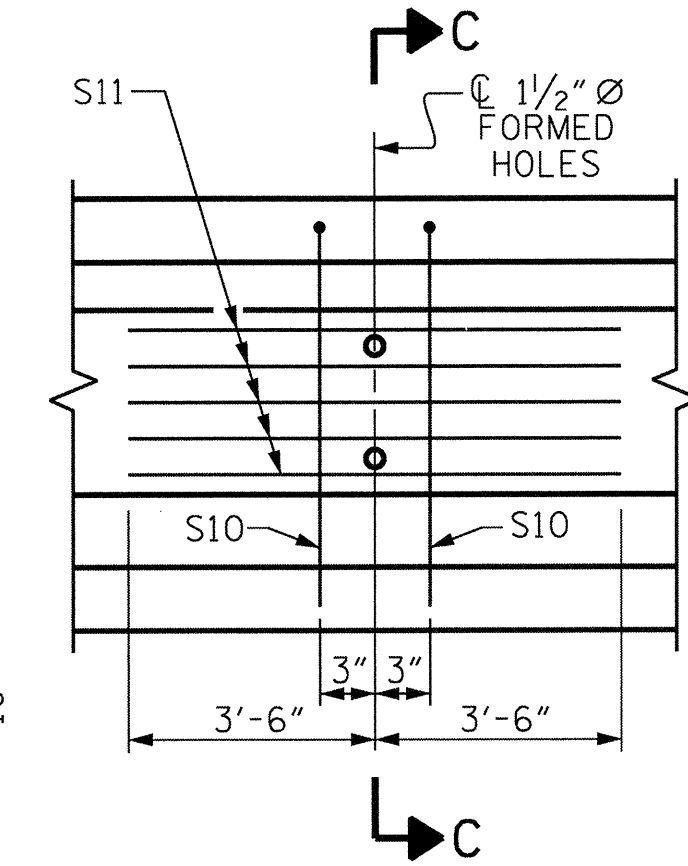


PLAN OF GIRDER



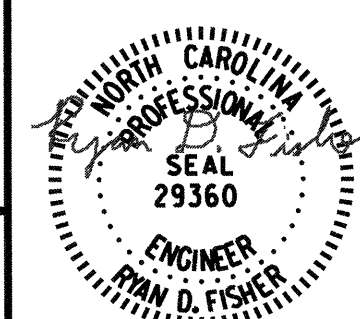
ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL

DWG. NO. 10



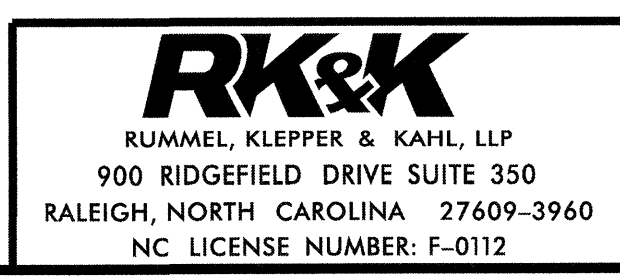
PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

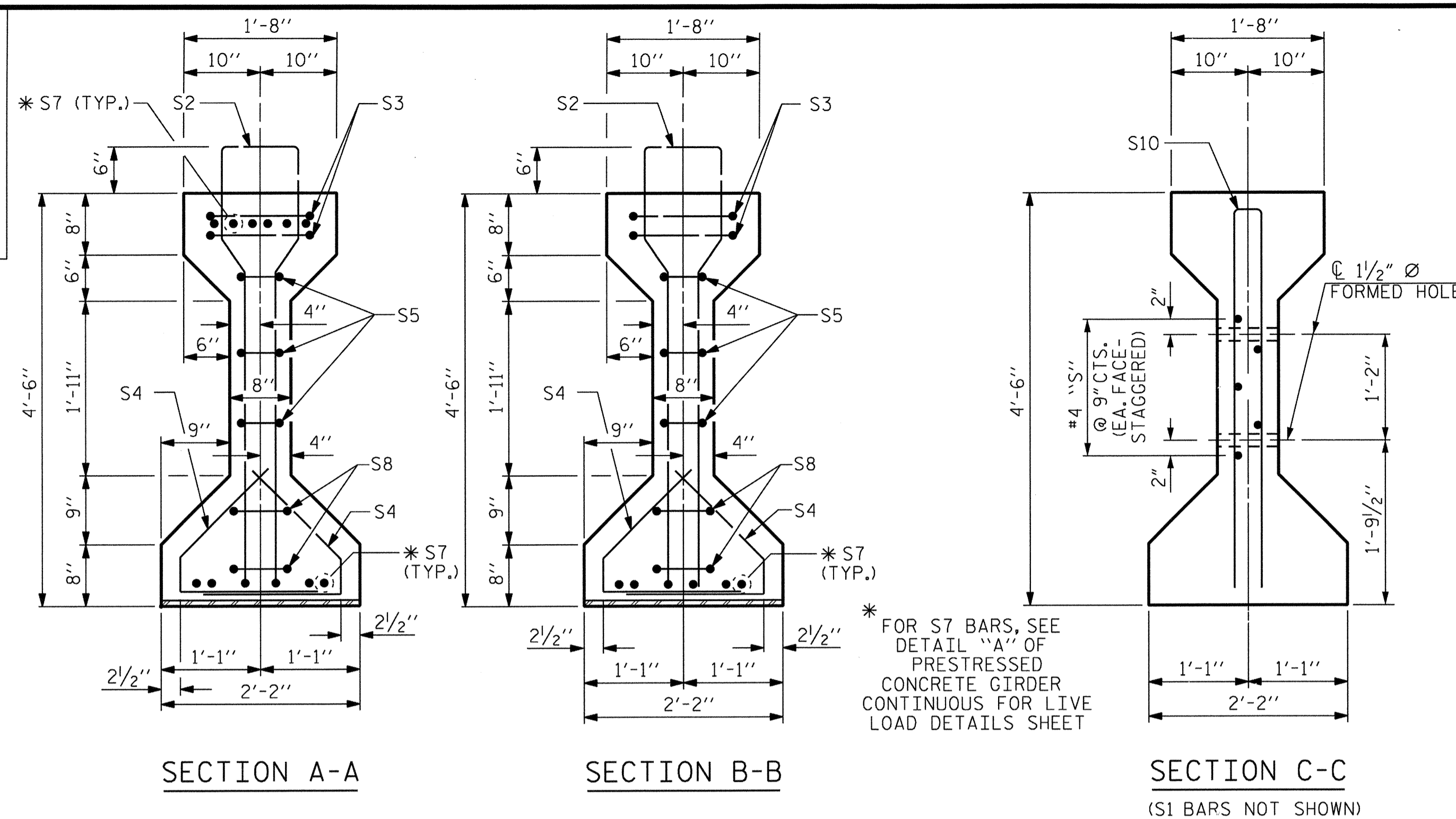
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN A

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

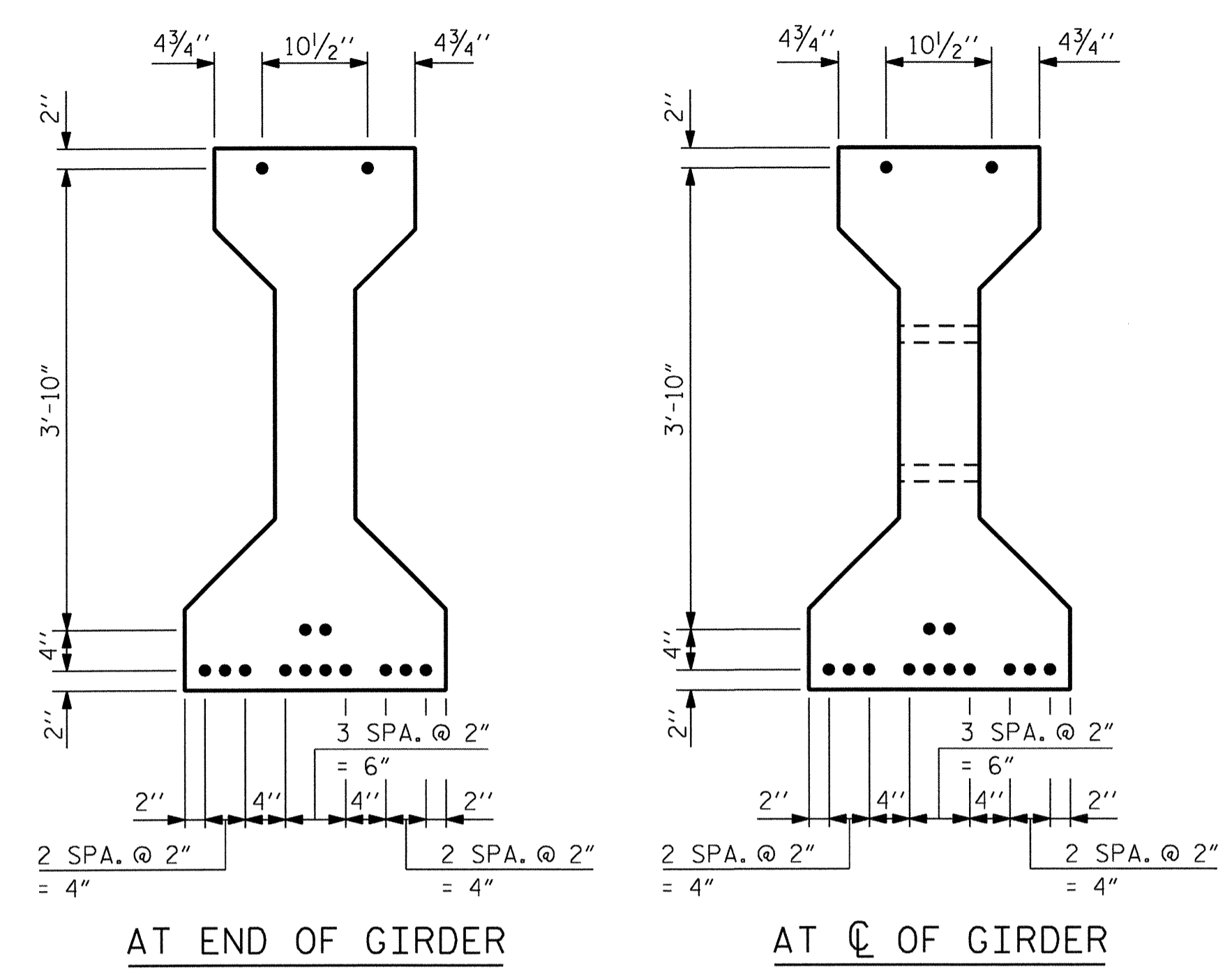


DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
CHECKED BY: R.D. FISHER DATE: JAN. 2013

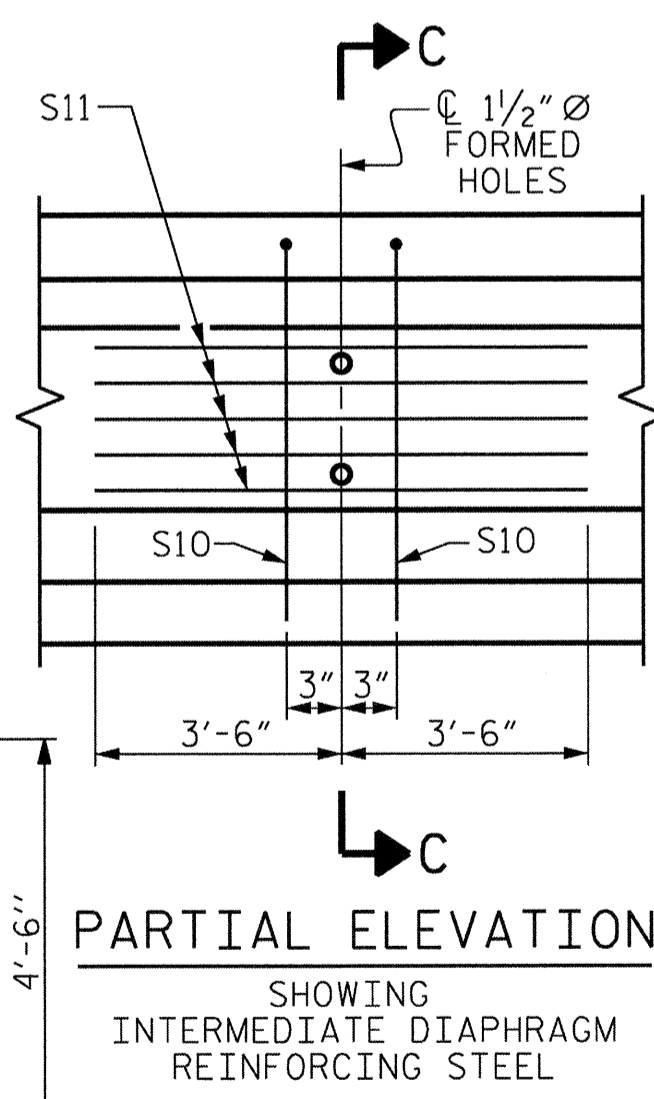
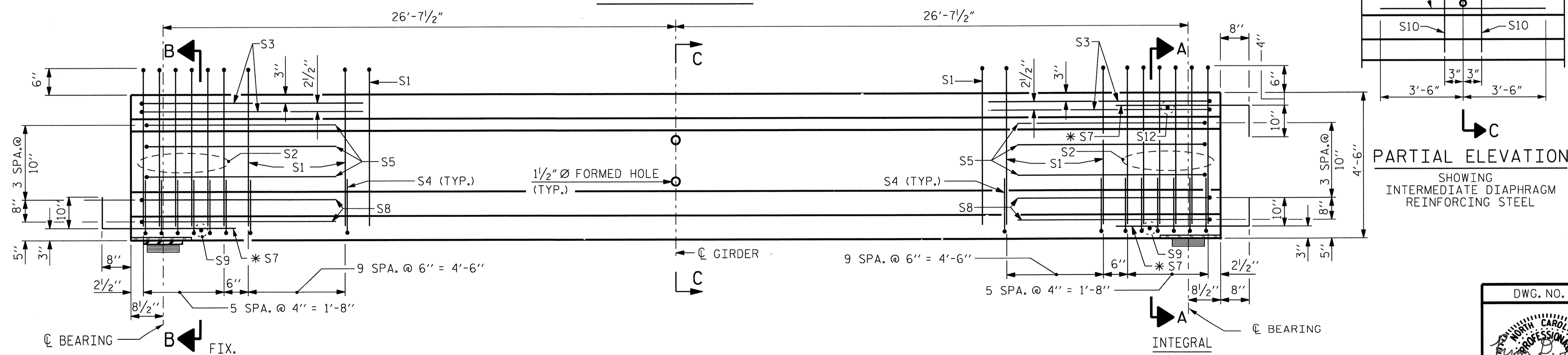
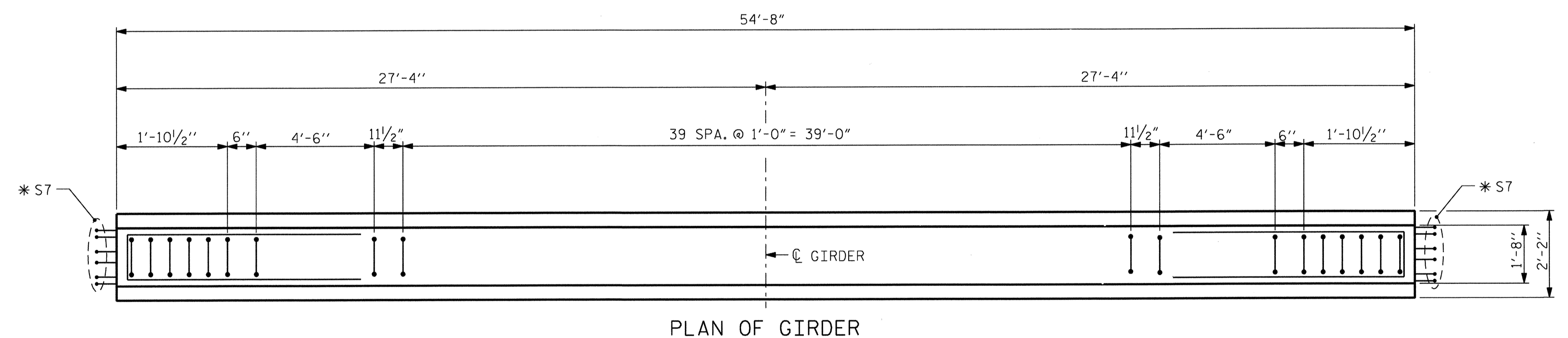
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\* FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET



0.6" Ø LOW RELAXATION STRAND LAYOUT

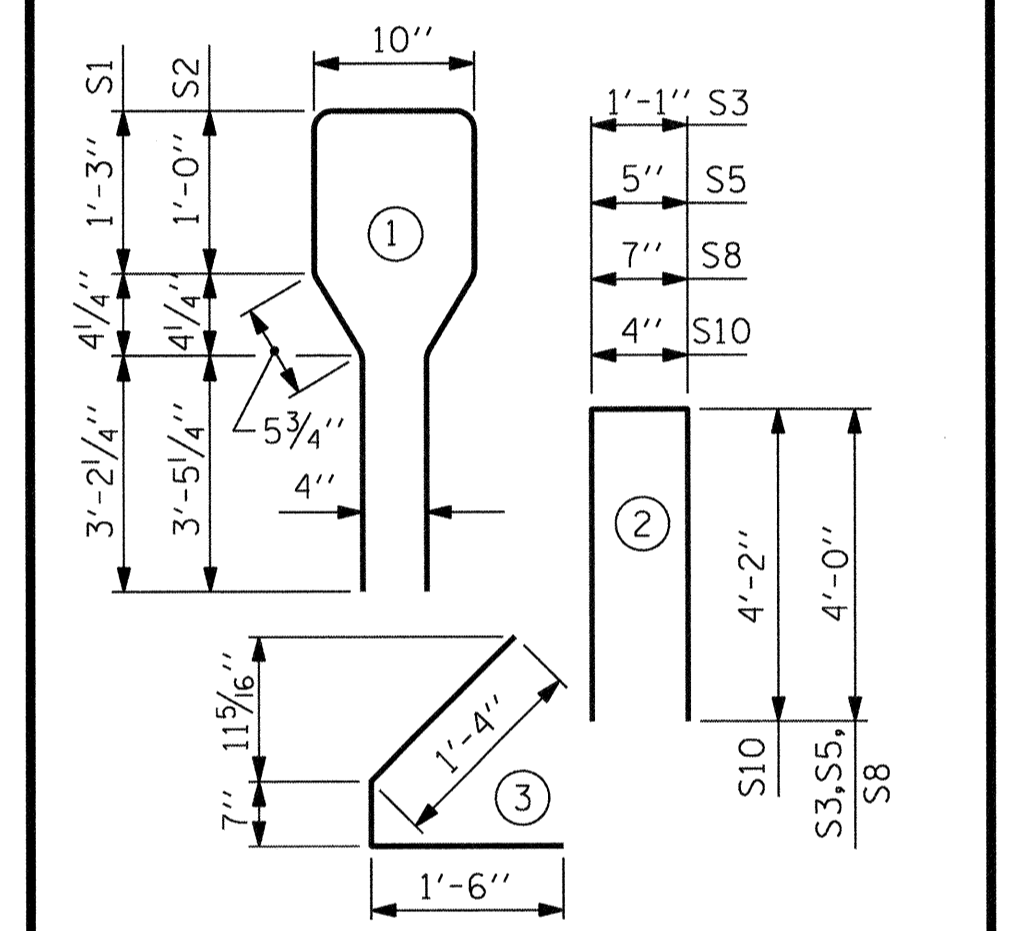


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	60	#4	1	10'-8"	428	
S2	12	#6	1	10'-8"	192	
S3	4	#4	2	9'-1"	24	
S4	64	#4	3	3'-5"	146	
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	
S12	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

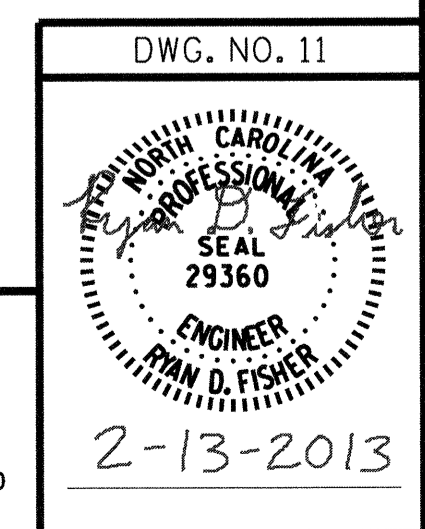


QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	5,600 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
SPAN B GIRDER	959	11.1	14

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
7	54'-8"	382'-8"

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN B



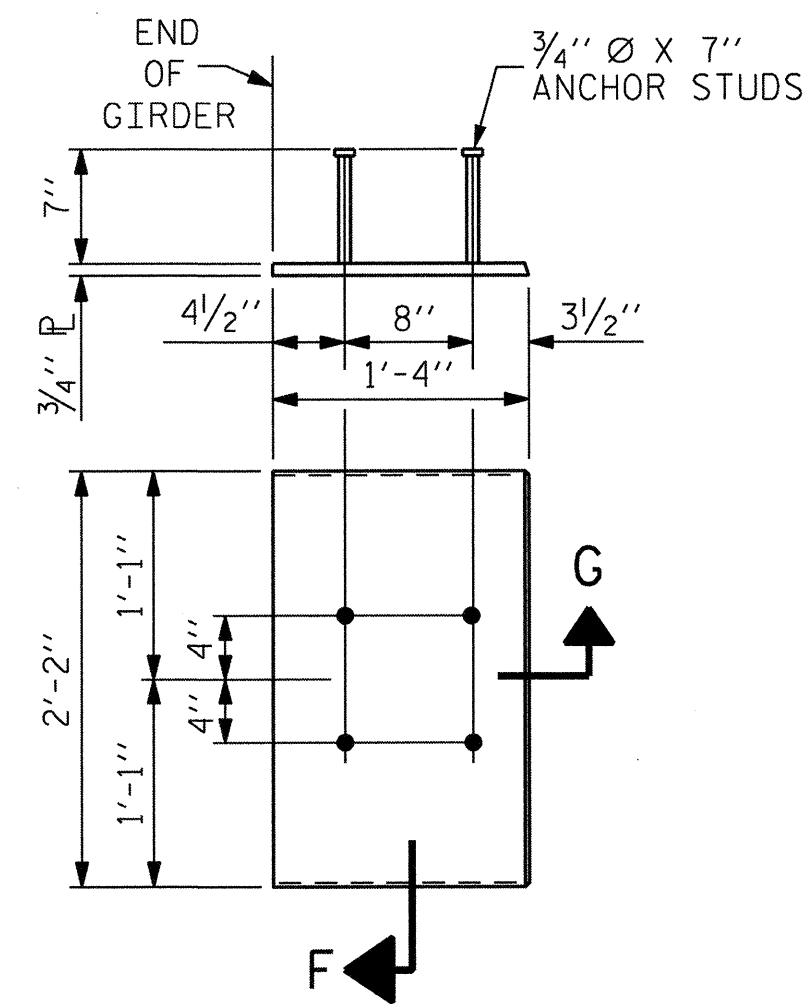
**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

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1			3			TOTAL SHEETS 36
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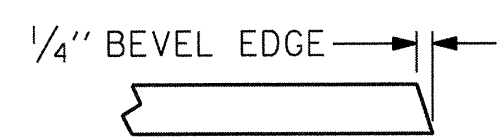
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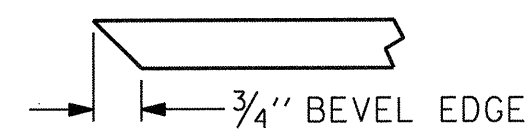


**EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER**

(2 REQ'D PER GIRDER)

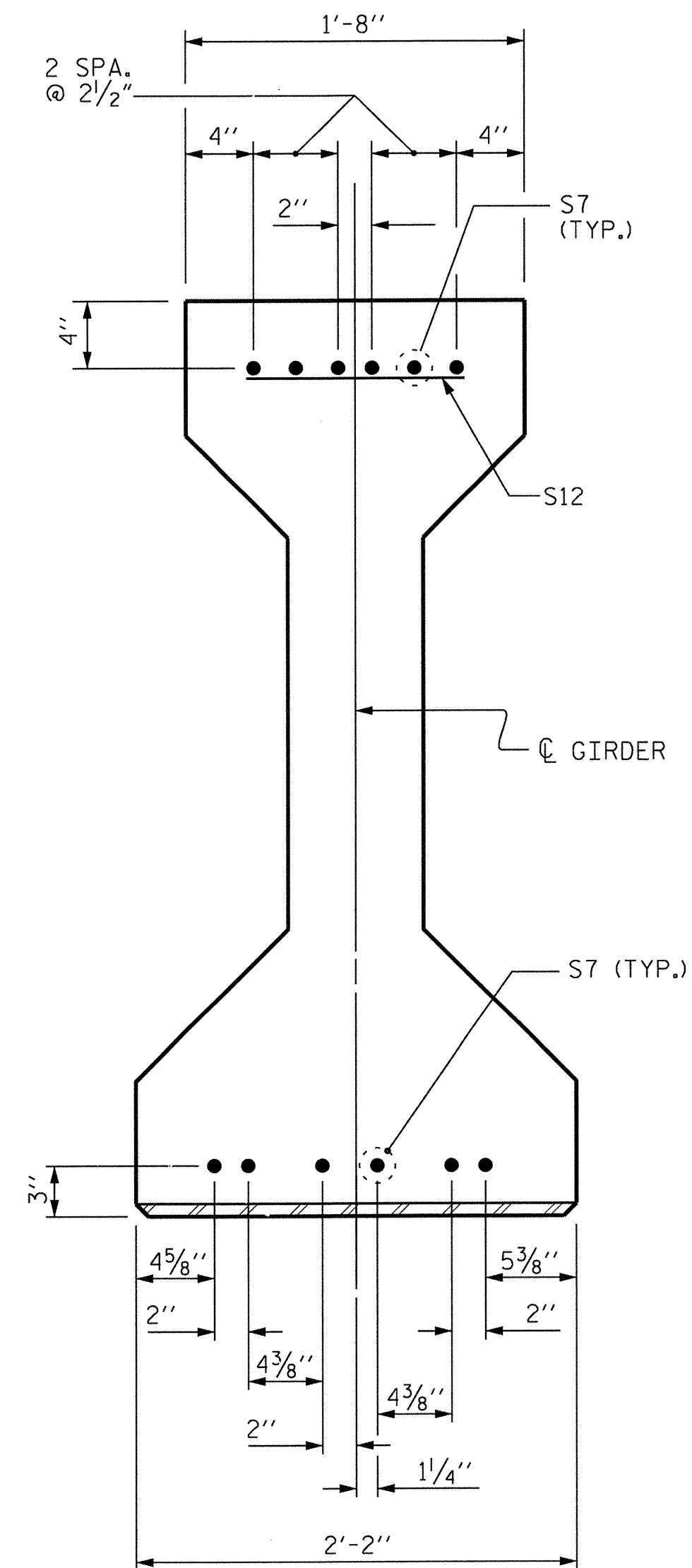


**SECTION "G"**



**SECTION "F"**

(SEE NOTES)



**DETAIL "A"**

(FOR AASHTO TYPE IV GIRDERS)

**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 7,000 PSI FOR SPAN A AND 4,500 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".

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

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, TWO 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.

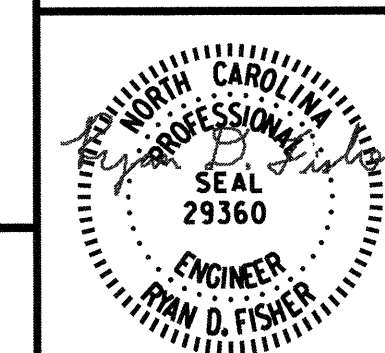
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MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
DETAILS

DWG. NO. 12



2-13-2013

**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

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1			3			TOTAL SHEETS
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DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
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**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.

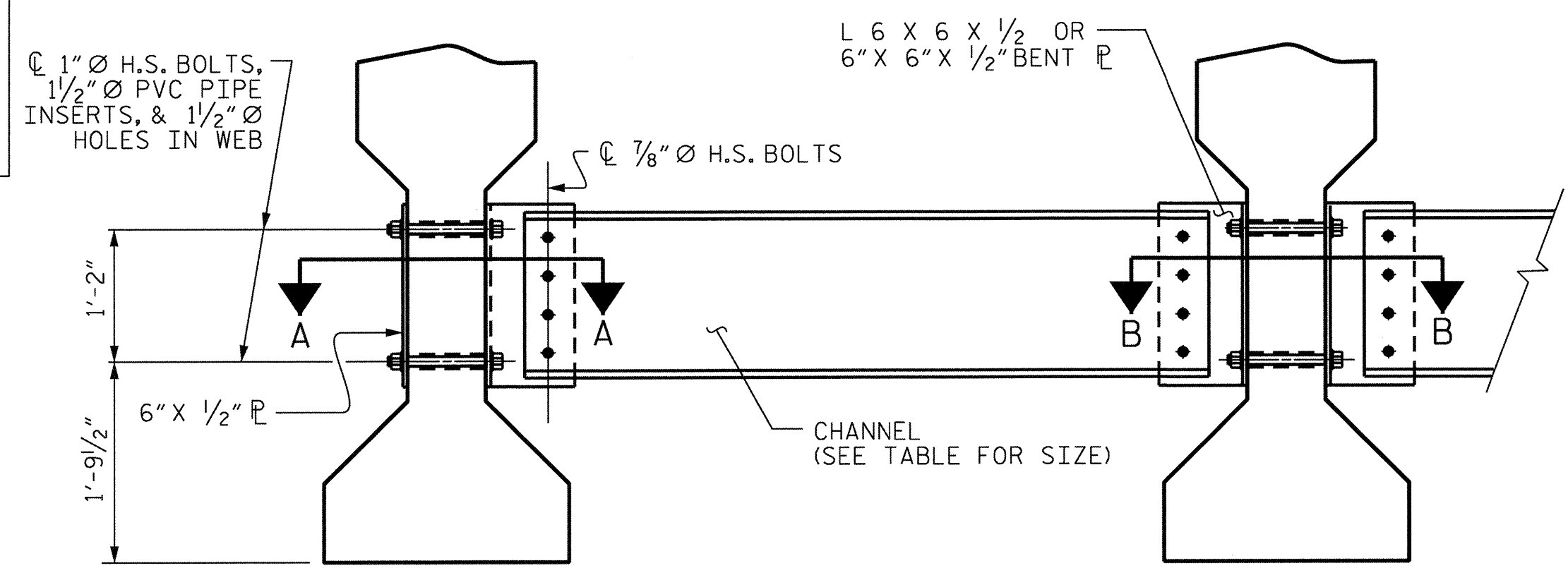
INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

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.

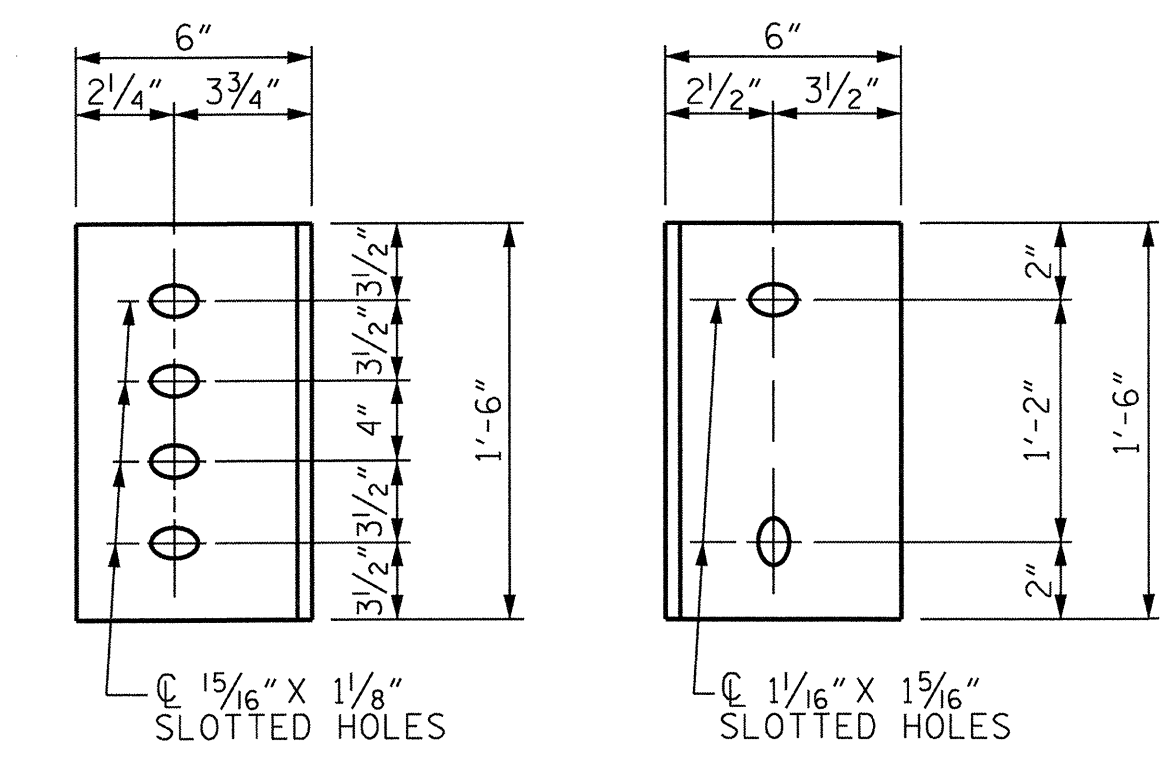
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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

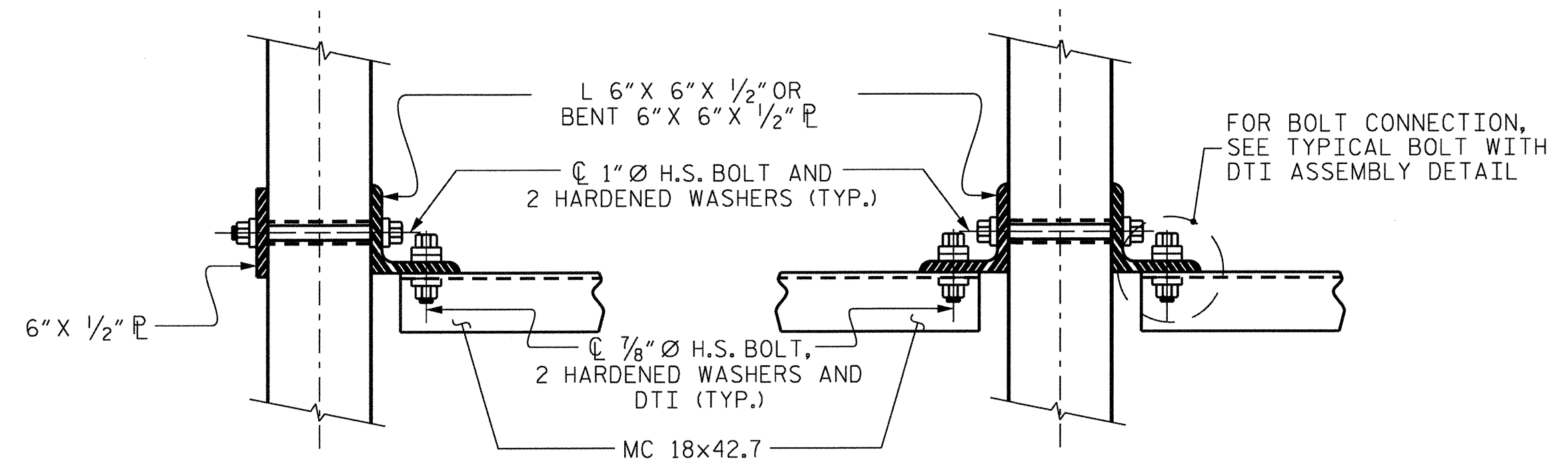
0102DEL\_P10c6



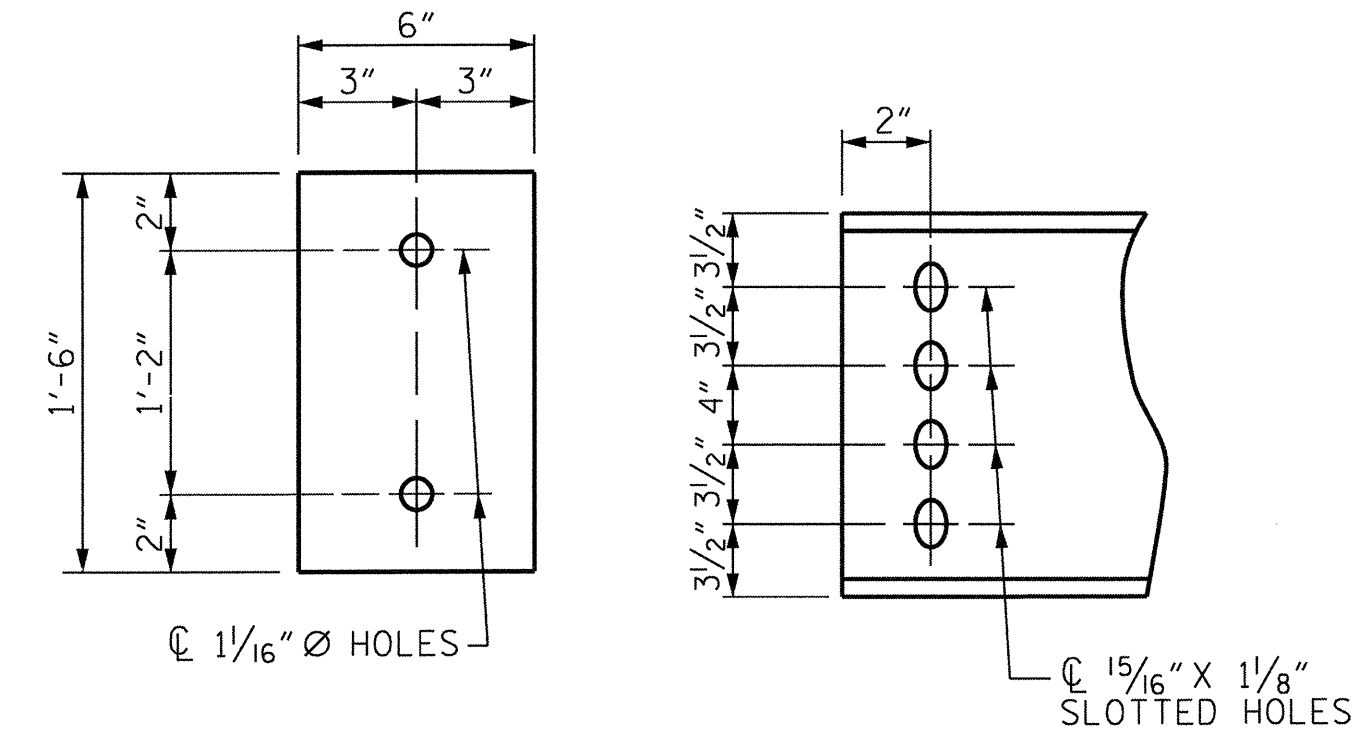
**EXTERIOR GIRDER**      **INTERIOR GIRDER**  
**PART SECTION AT INTERMEDIATE DIAPHRAGM**



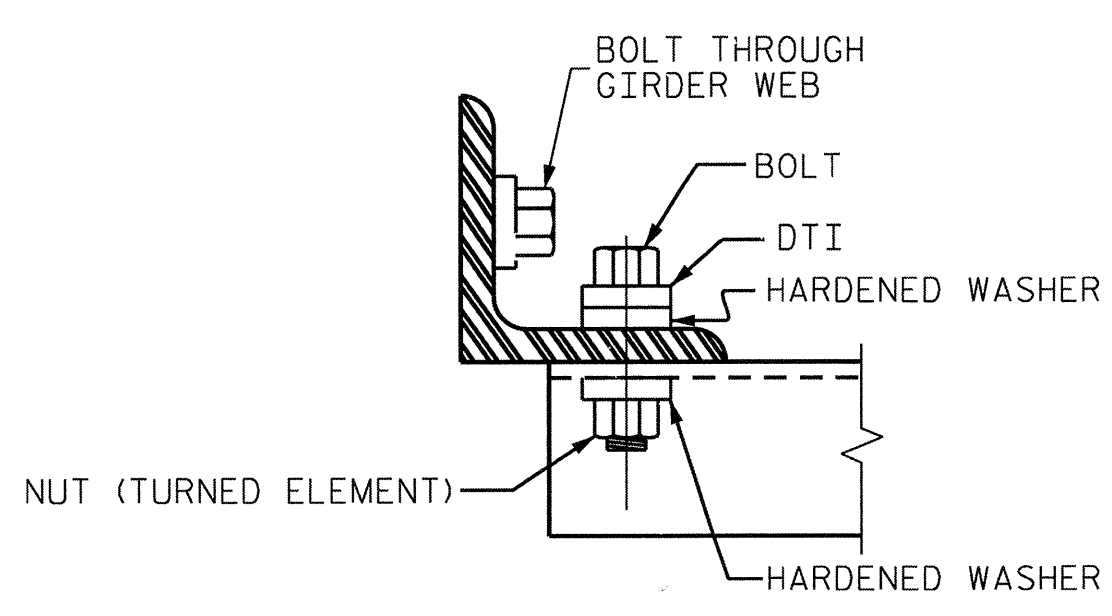
**DIAPHRAGM FACE**      **WEB FACE**  
**CONNECTOR PLATE DETAILS**



**SECTION A-A**      **SECTION B-B**  
**CONNECTION DETAILS**



**PLATE DETAILS**      **CHANNEL END**



**BOLT WITH DTI ASSEMBLY DETAIL**

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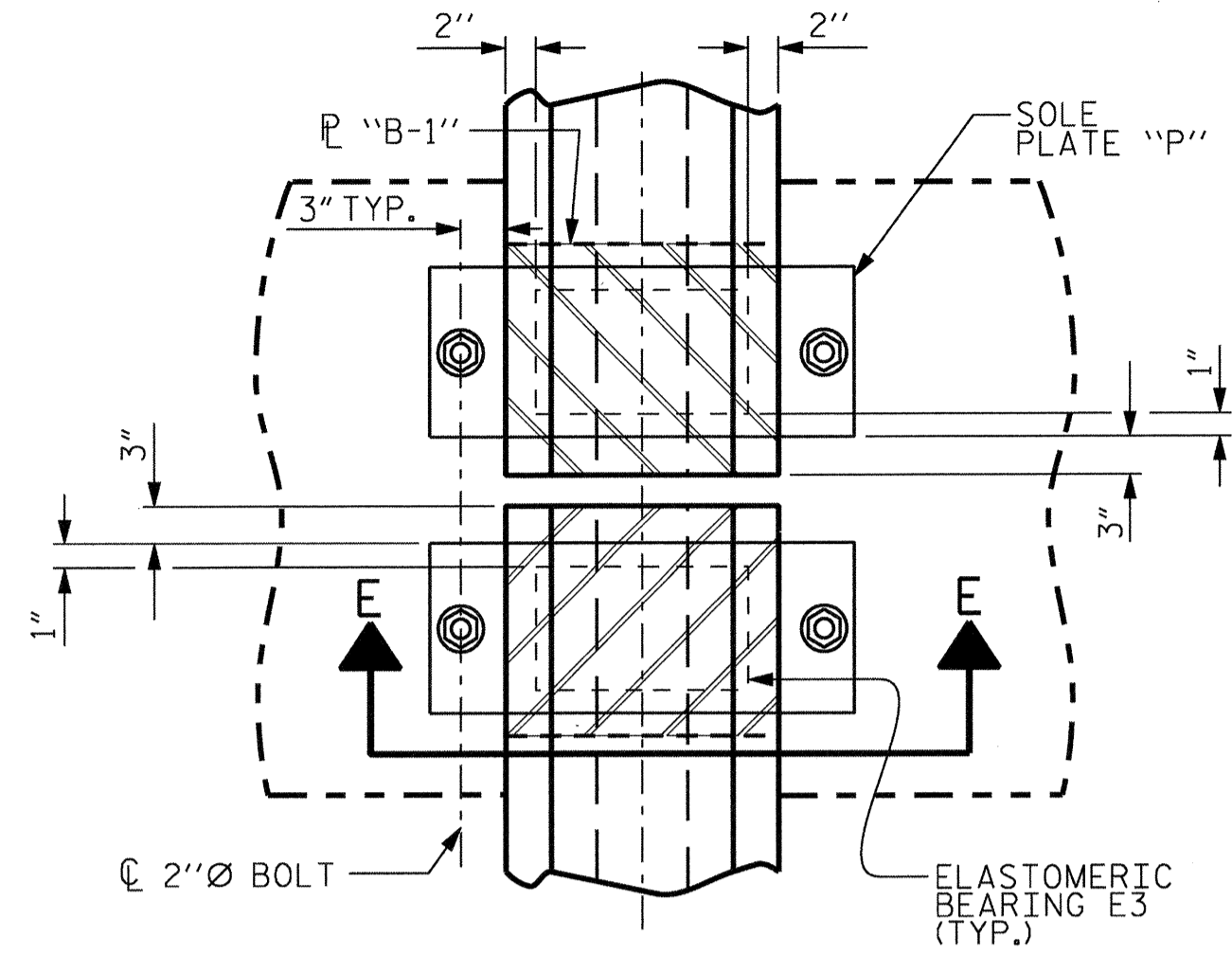
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS					
DWG. NO. 13					
2-13-2013					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S13
					TOTAL SHEETS 36

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 RALEIGH, NORTH CAROLINA 27609-3960  
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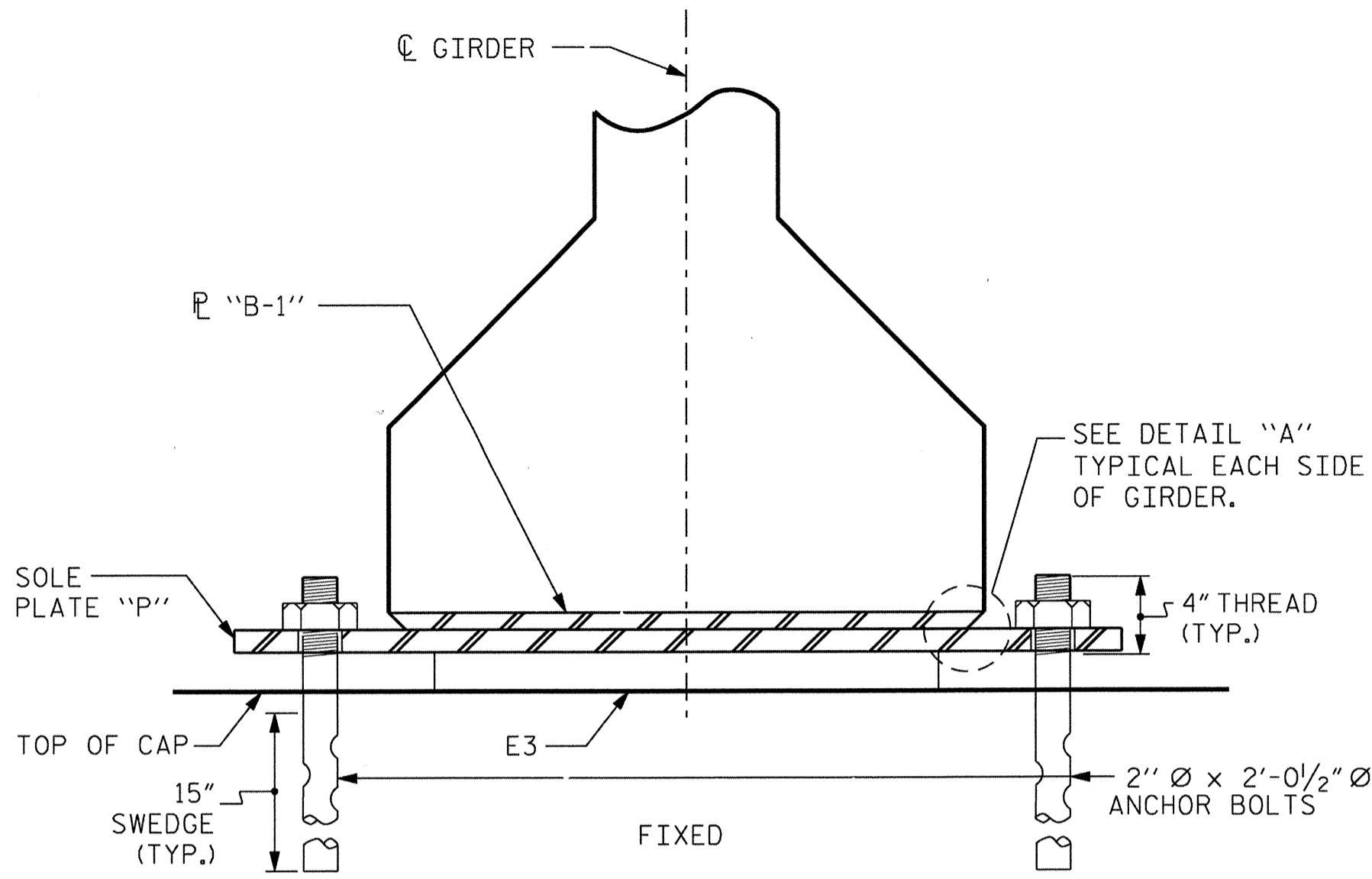
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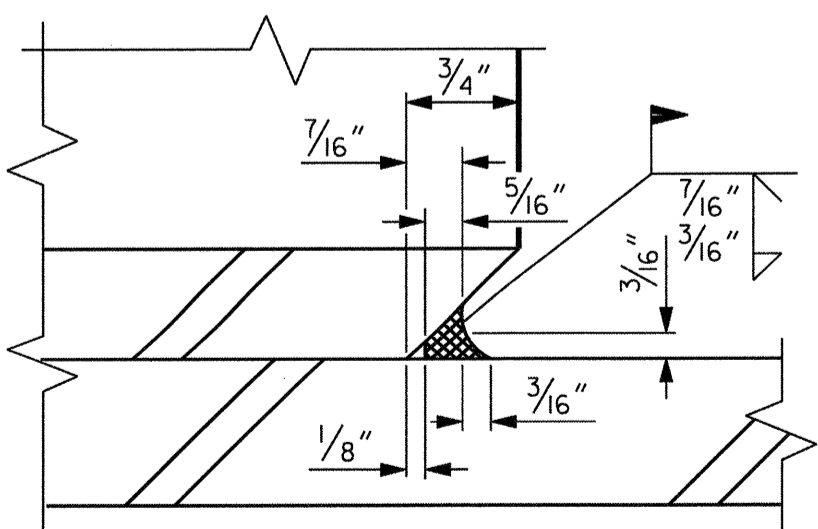
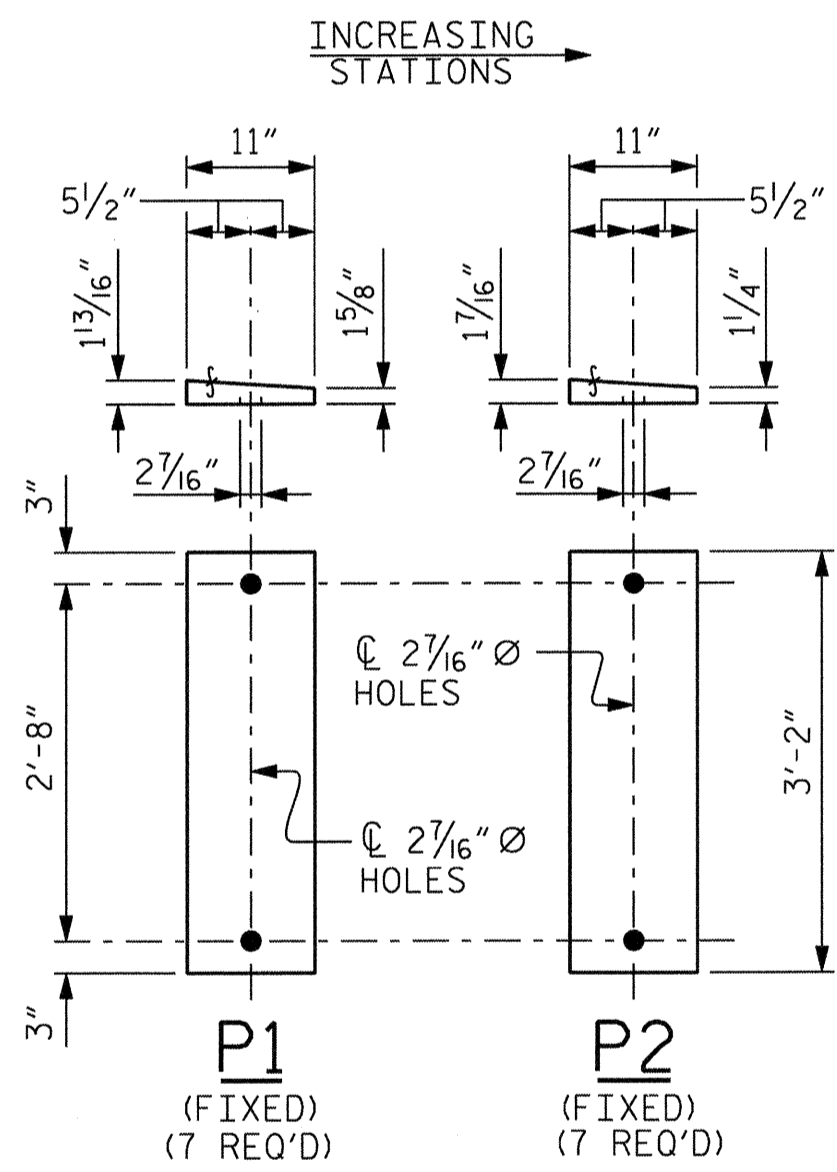
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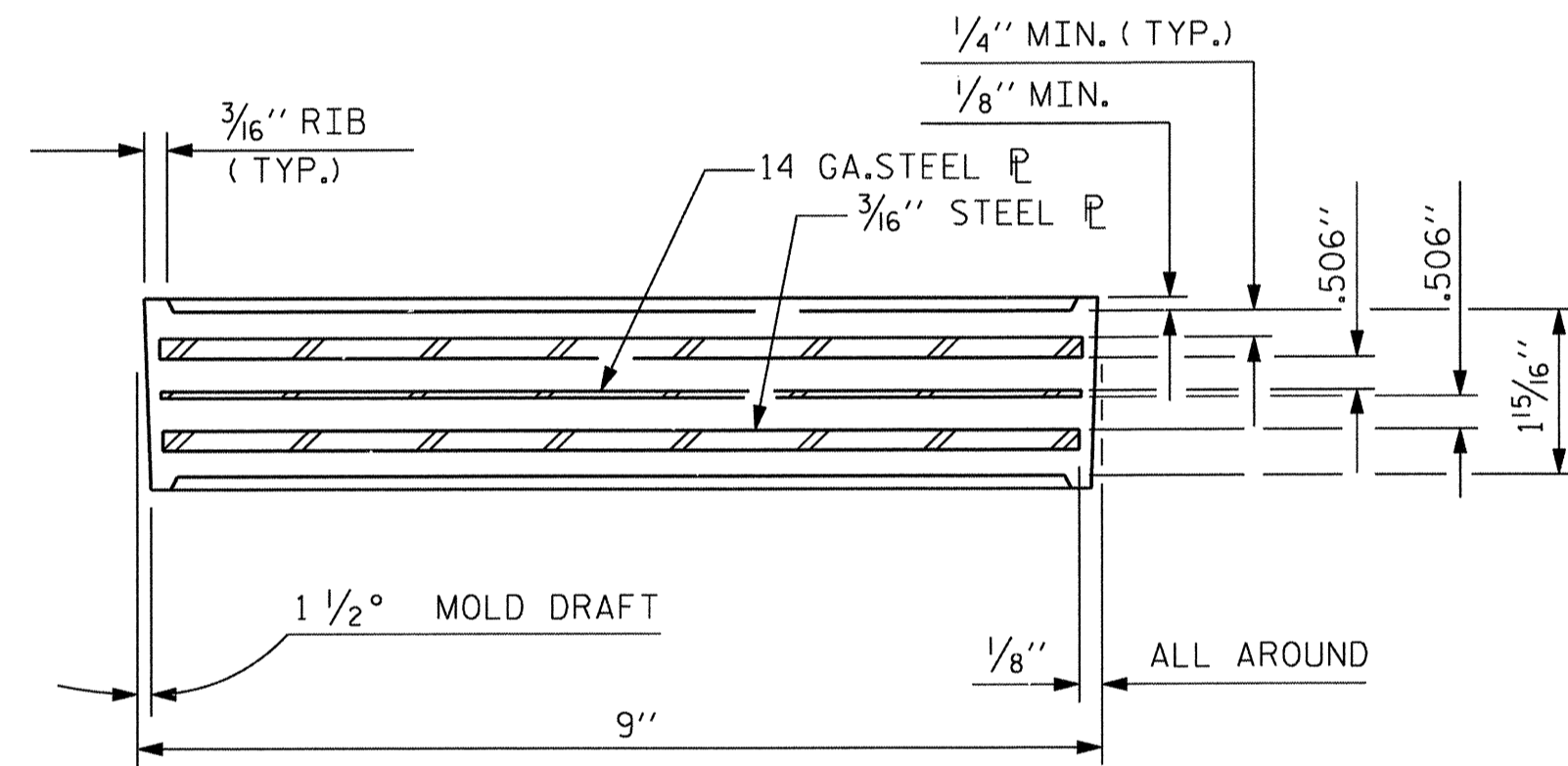
**TYPICAL PLAN AT BENT 1**  
(TOP FLANGE NOT SHOWN)



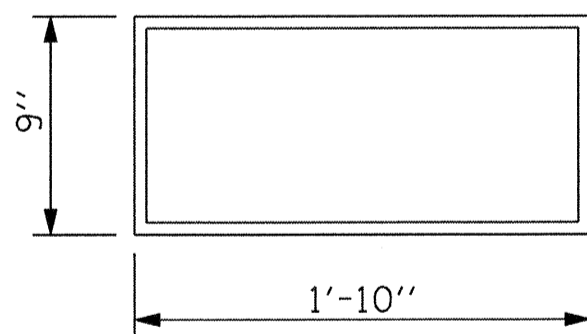
**SECTION E-E**



**DETAIL "A"**



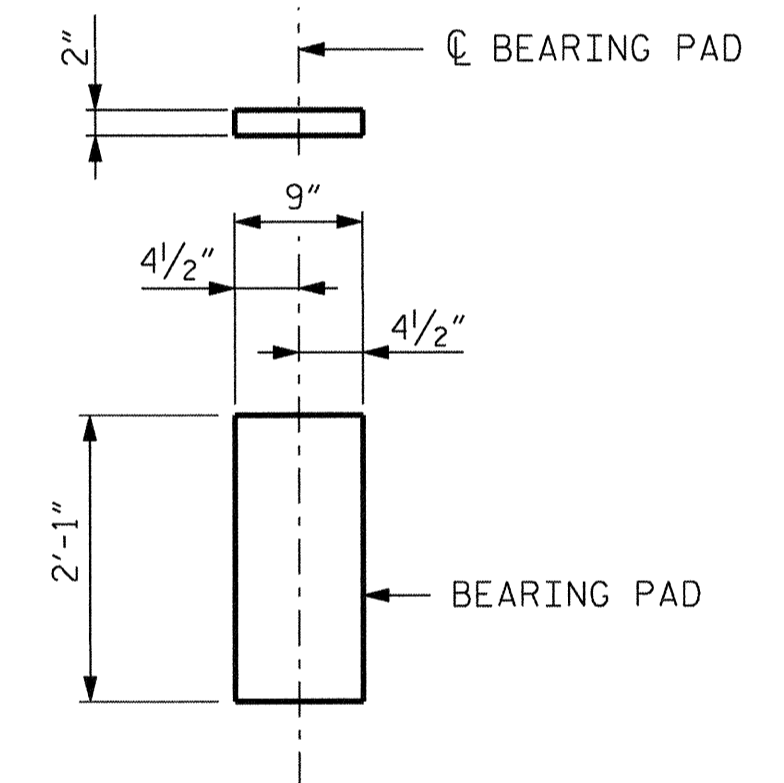
**TYPICAL SECTION OF ELASTOMERIC BEARINGS**



**PLAN VIEW OF ELASTOMERIC BEARING**  
E3 (14 REQ'D)

**TYPE IV**

LOAD RATINGS	
TYPE IV	MAX.D.L.+L.L. 257 K



**E1 (14 REQ'D)**  
**PLAIN ELASTOMERIC BEARING DETAILS**  
(TYPICAL BEARING AT INTEGRAL END BENT)

**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.

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. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

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SUPERSTRUCTURE  
ELASTOMERIC BEARING  
DETAILS

DWG. NO. 14

2-13-2013

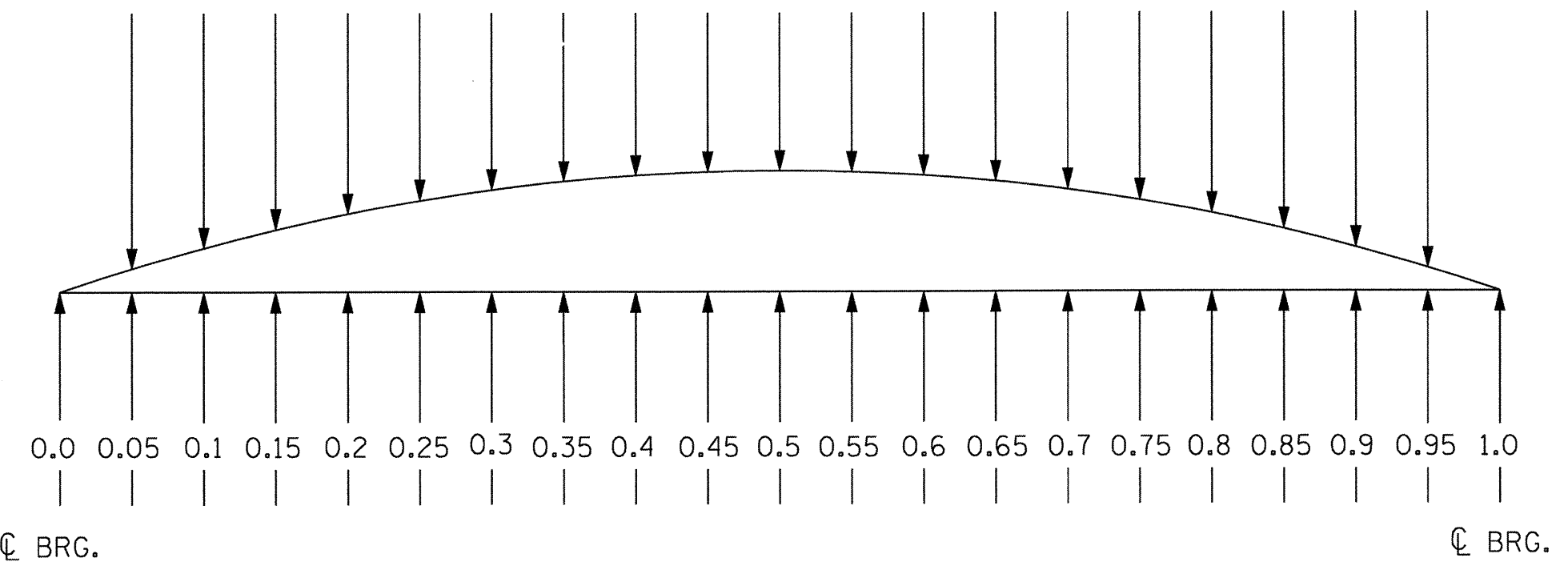
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NC LICENSE NUMBER: F-0112

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1			3			TOTAL SHEETS 36
2			4			

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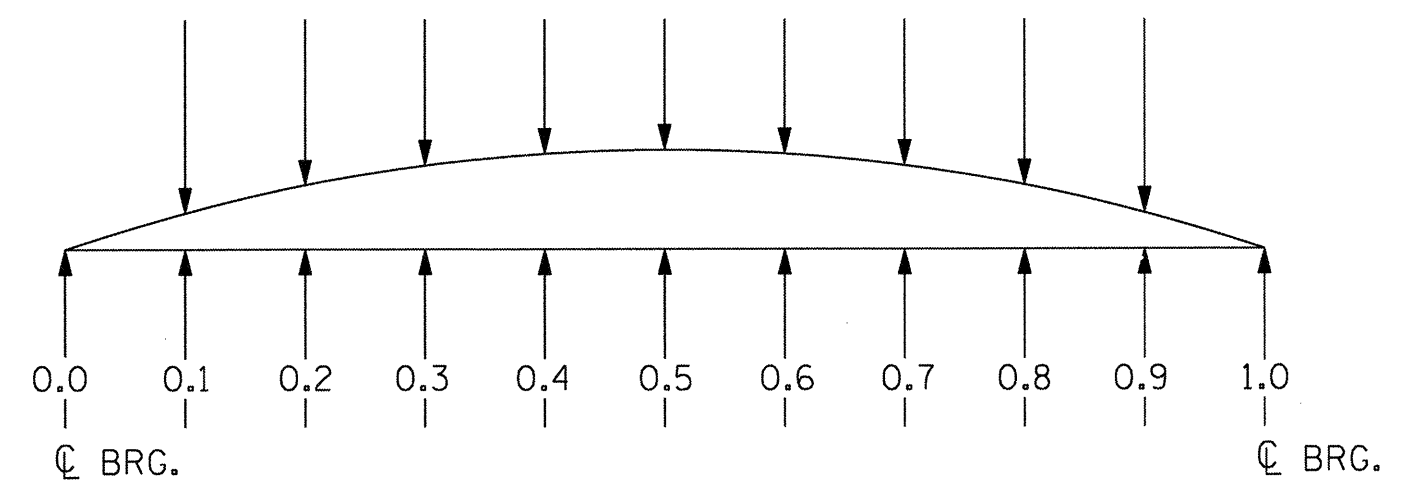


**SCHEMATIC CAMBER ORDINATES @ GIRDER TWENTIETH POINTS**

DEFLECTIONS ARE IN FEET (DECIMAL FORM) AT TWENTIETH POINTS BETWEEN BEARINGS. REQUIRED CAMBER VALUES ARE IN INCHES (FRACTIONAL FORM).

\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD

GIRDER		DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS - SPAN "A"																					
		TWENTIETH POINTS																					
		0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0	
AG1 & AG7	CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.103	0.191	0.265	0.328	0.381	0.424	0.456	0.478	0.491	0.496	0.491	0.478	0.456	0.424	0.381	0.328	0.265	0.191	0.103	0.000
	DEFLECTION DUE TO SUPERIMPOSED D.L. *	↓	0.000	0.033	0.067	0.101	0.132	0.159	0.182	0.201	0.215	0.223	0.226	0.223	0.215	0.201	0.182	0.159	0.132	0.101	0.067	0.033	0.000
	FINAL CAMBER	↑	0"	7/8"	1 1/2"	2"	2 3/8"	2 11/16"	2 7/8"	3 1/16"	3 3/16"	3 3/16"	3 1/4"	3 3/16"	3 3/16"	3 1/16"	2 7/8"	2 11/16"	2 3/8"	2"	1 1/2"	7/8"	0"
AG2, AG3, AG5, & AG6	CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.103	0.191	0.265	0.328	0.381	0.424	0.456	0.478	0.491	0.496	0.491	0.478	0.456	0.424	0.381	0.328	0.265	0.191	0.103	0.000
	DEFLECTION DUE TO SUPERIMPOSED D.L. *	↓	0.000	0.037	0.076	0.113	0.148	0.179	0.205	0.226	0.242	0.251	0.254	0.251	0.242	0.226	0.205	0.179	0.148	0.113	0.076	0.037	0.000
	FINAL CAMBER	↑	0"	1 3/16"	1 3/8"	1 13/16"	2 3/16"	2 7/16"	2 5/8"	2 3/4"	2 13/16"	2 7/8"	2 7/8"	2 7/8"	2 13/16"	2 3/4"	2 5/8"	2 7/16"	2 3/16"	1 13/16"	1 3/8"	1 3/16"	0"
AG4	CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.103	0.191	0.265	0.328	0.381	0.424	0.456	0.478	0.491	0.496	0.491	0.478	0.456	0.424	0.381	0.328	0.265	0.191	0.103	0.000
	DEFLECTION DUE TO SUPERIMPOSED D.L. *	↓	0.000	0.033	0.068	0.101	0.133	0.160	0.183	0.202	0.216	0.224	0.227	0.224	0.216	0.202	0.183	0.160	0.133	0.101	0.068	0.033	0.000
	FINAL CAMBER	↑	0"	1 3/16"	1 1/2"	1 5/16"	2 3/8"	2 5/8"	2 7/8"	3 1/16"	3 1/8"	3 3/16"	3 1/4"	3 3/16"	3 1/8"	3 1/16"	2 7/8"	2 5/8"	2 3/8"	1 5/16"	1 1/2"	1 3/16"	0"



**SCHEMATIC CAMBER ORDINATES @ GIRDER TENTH POINTS**

DEFLECTIONS ARE IN FEET (DECIMAL FORM) AT TENTH POINTS BETWEEN BEARINGS. REQUIRED CAMBER VALUES ARE IN INCHES (FRACTIONAL FORM).

\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD

0.6 Ø LOW RELAXATION		GIRDER BG1 THROUGH BG7										
TENTH POINTS		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.022	0.038	0.048	0.055	0.057	0.055	0.048	0.038	0.022	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. *	↓	0.000	0.005	0.011	0.015	0.018	0.018	0.018	0.015	0.011	0.005	0.000
FINAL CAMBER	↑	0"	3/16"	5/16"	3/8"	7/16"	7/16"	7/16"	3/8"	5/16"	3/16"	0"

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MECKLENBURG COUNTY  
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**SUPERSTRUCTURE  
 GIRDER CAMBER DETAILS**

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

SHEET NO. S15  
 TOTAL SHEETS 30

DWG. NO. 15

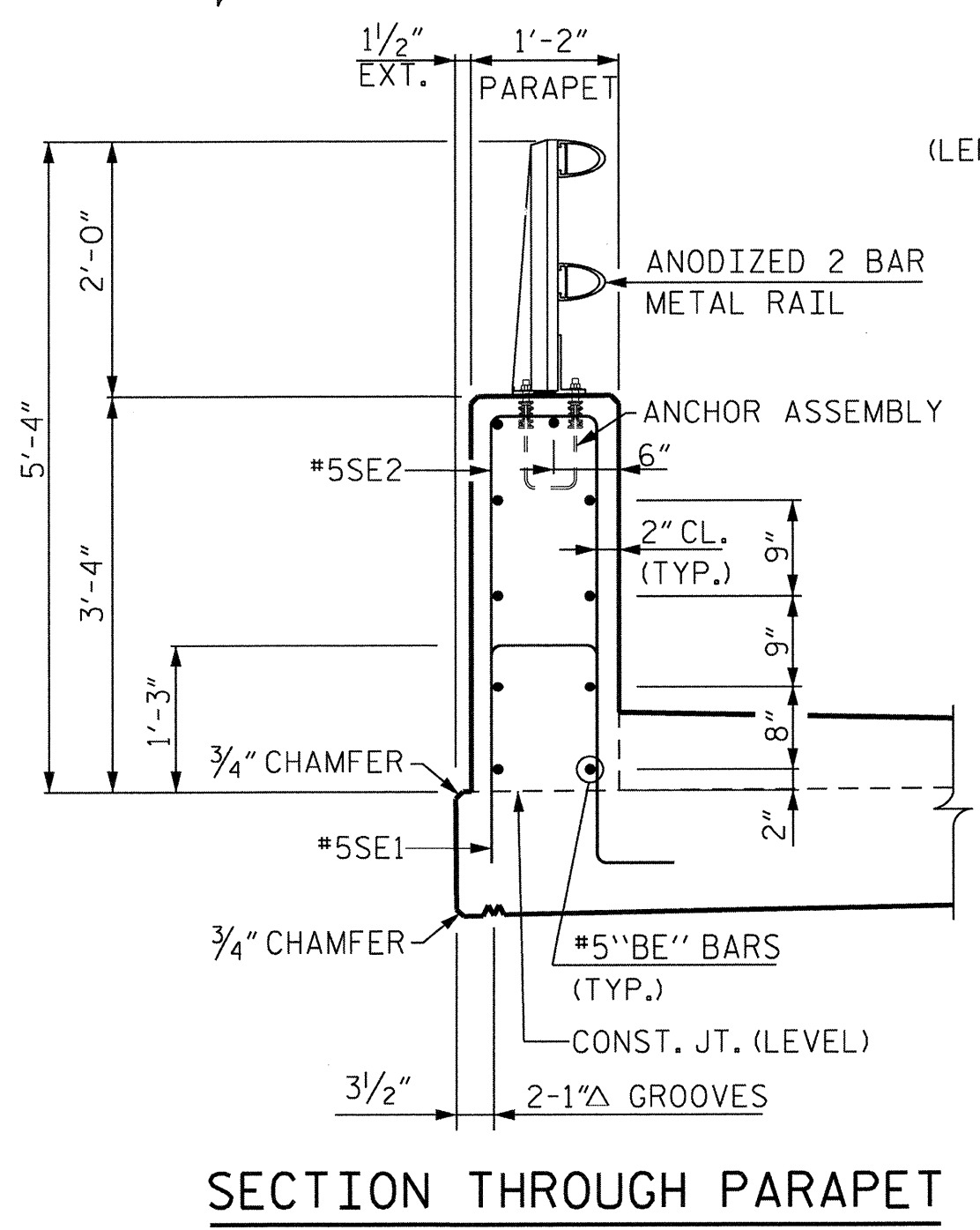
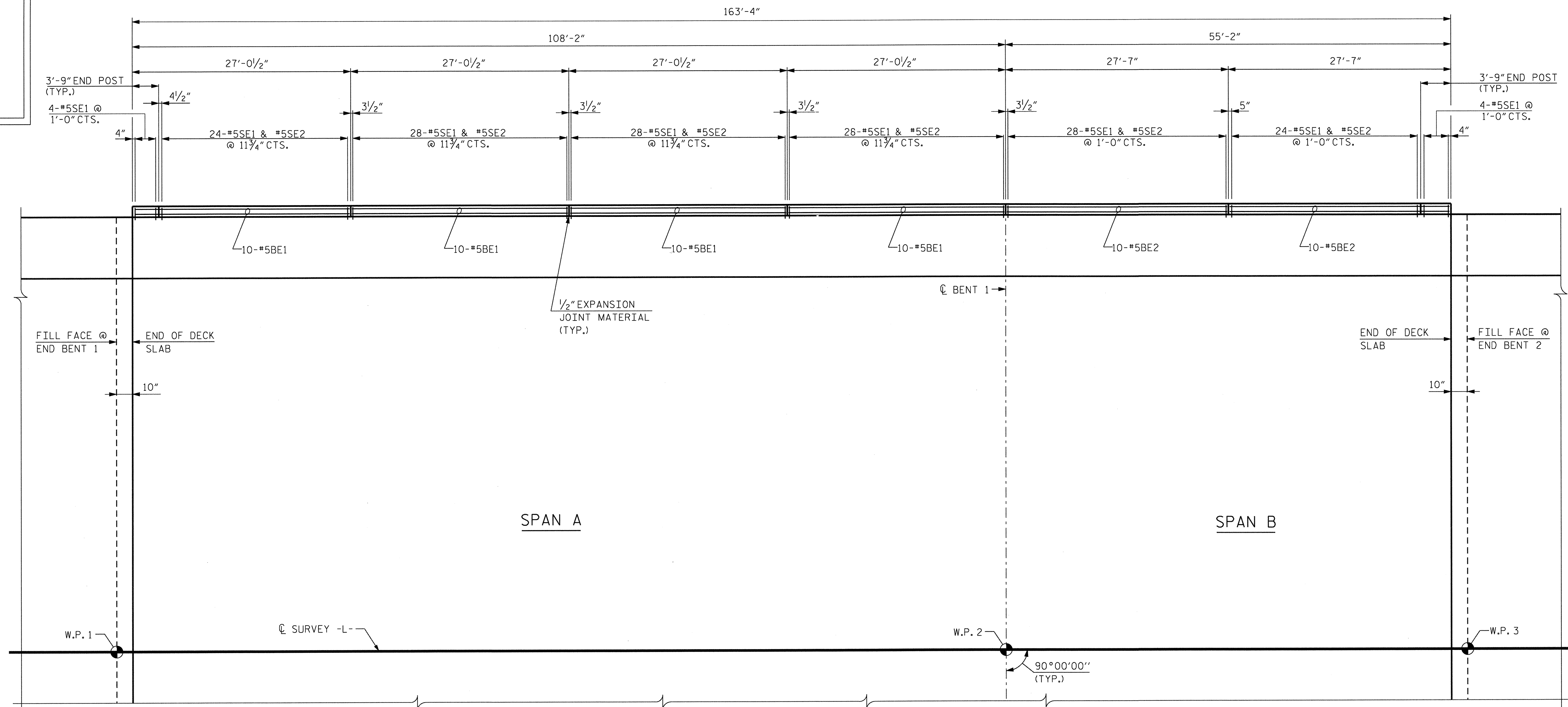
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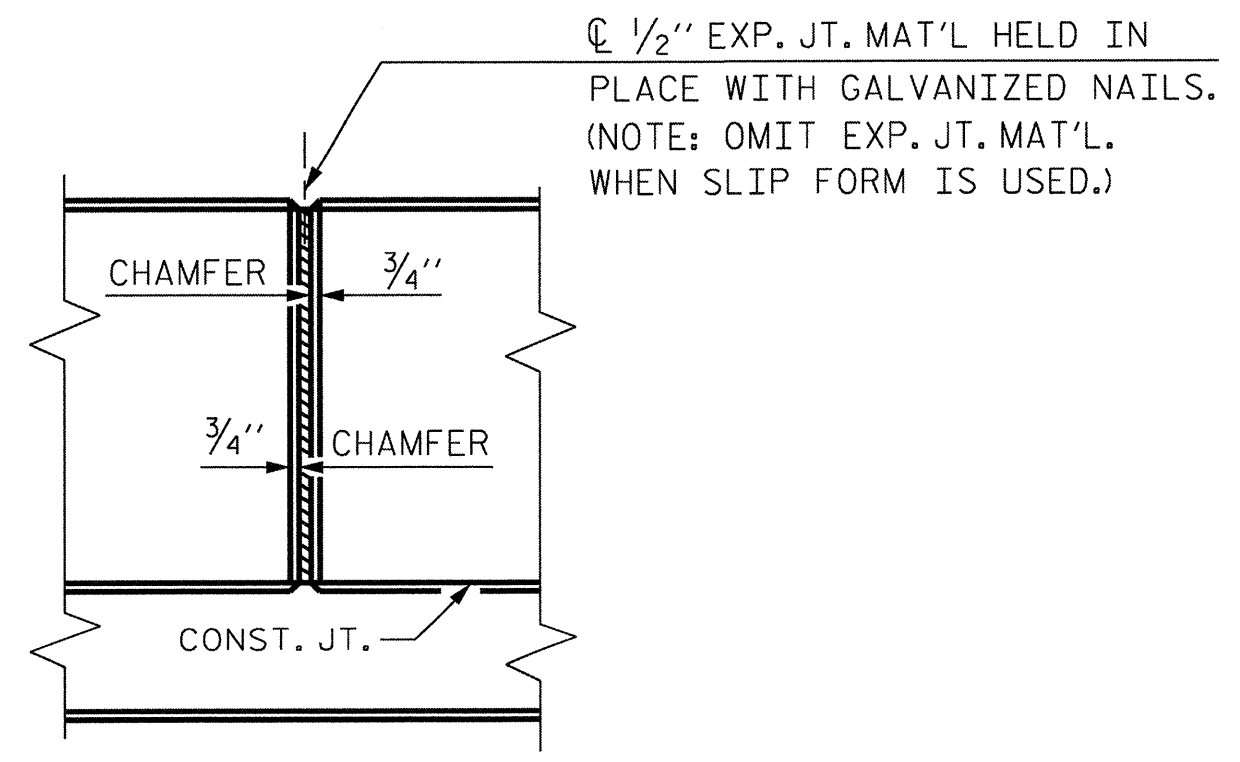
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SECTION THROUGH PARAPET

PLAN OF PARAPET

(LEFT SIDE RAIL SHOWN, RIGHT SIDE SIMILAR)



ELEVATION AT EXPANSION JOINTS

PARAPET DETAILS

1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)

PROJECT NO. P-5208H  
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SHEET 1 OF 2  
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SUPERSTRUCTURE  
CONCRETE PARAPET

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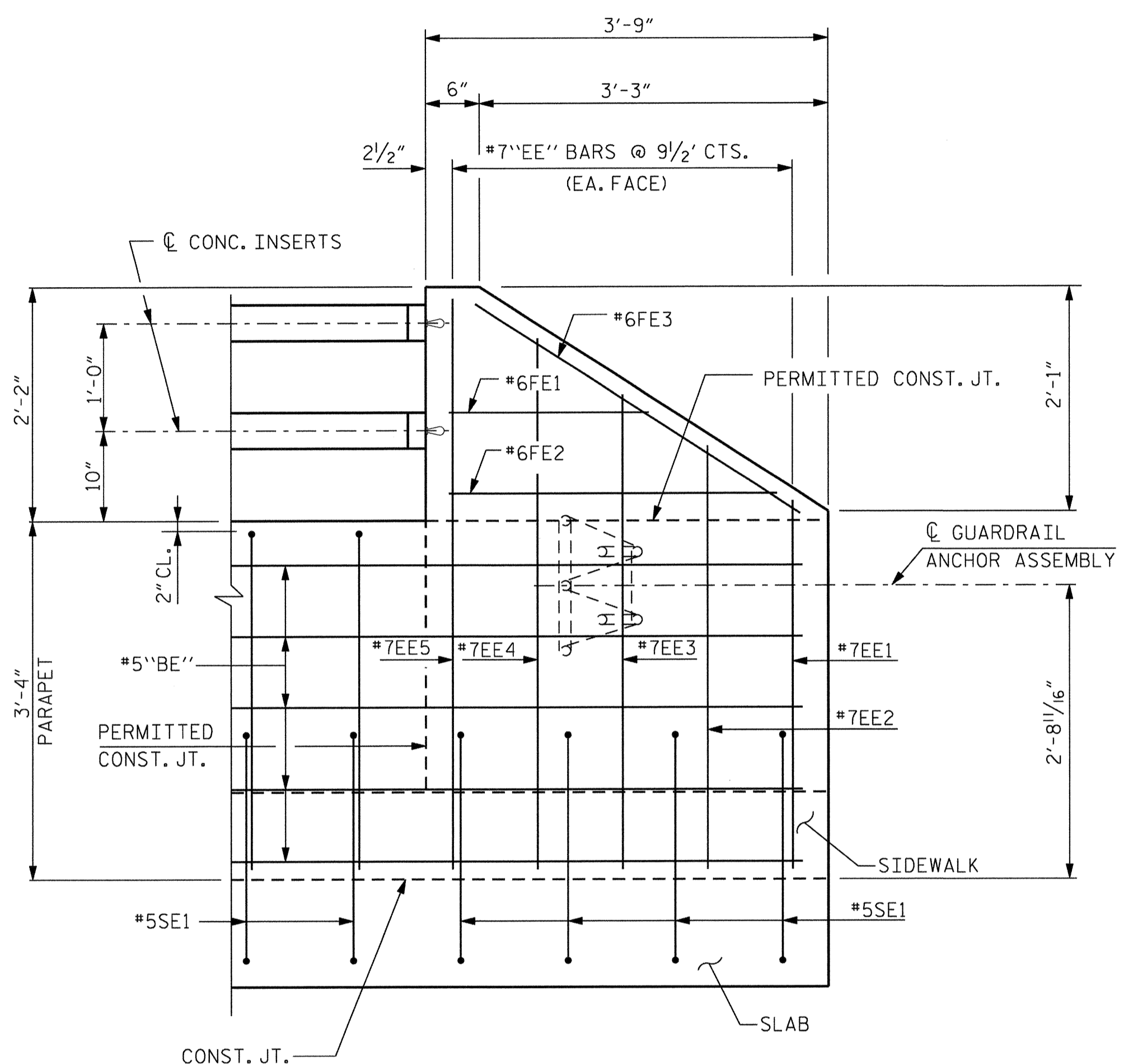
DWG. NO. 16  
2-13-2013  
Professional Engineer Seal for Ryan D. Fisher, No. 29360

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S16	
1			3			TOTAL SHEETS	36
2			4				

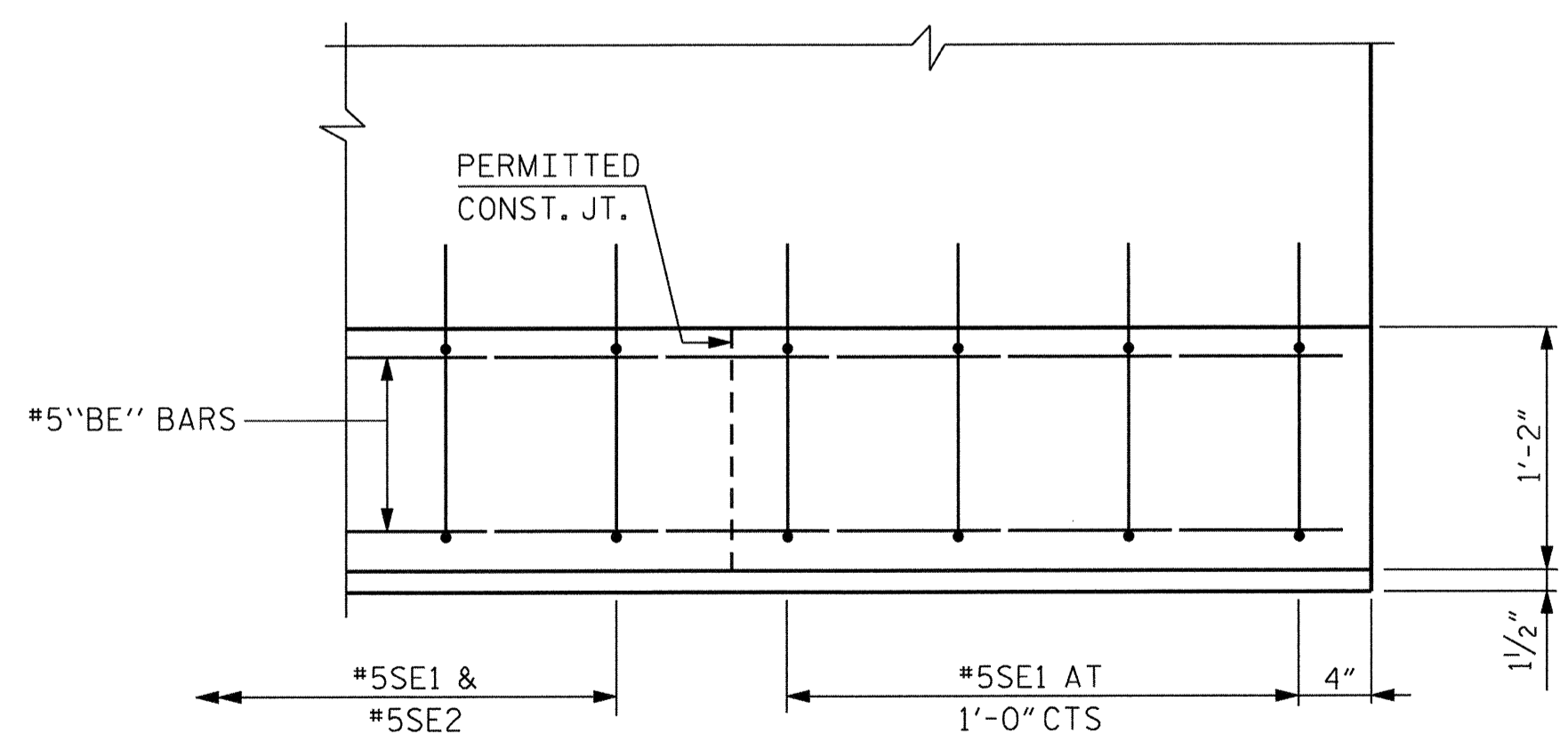
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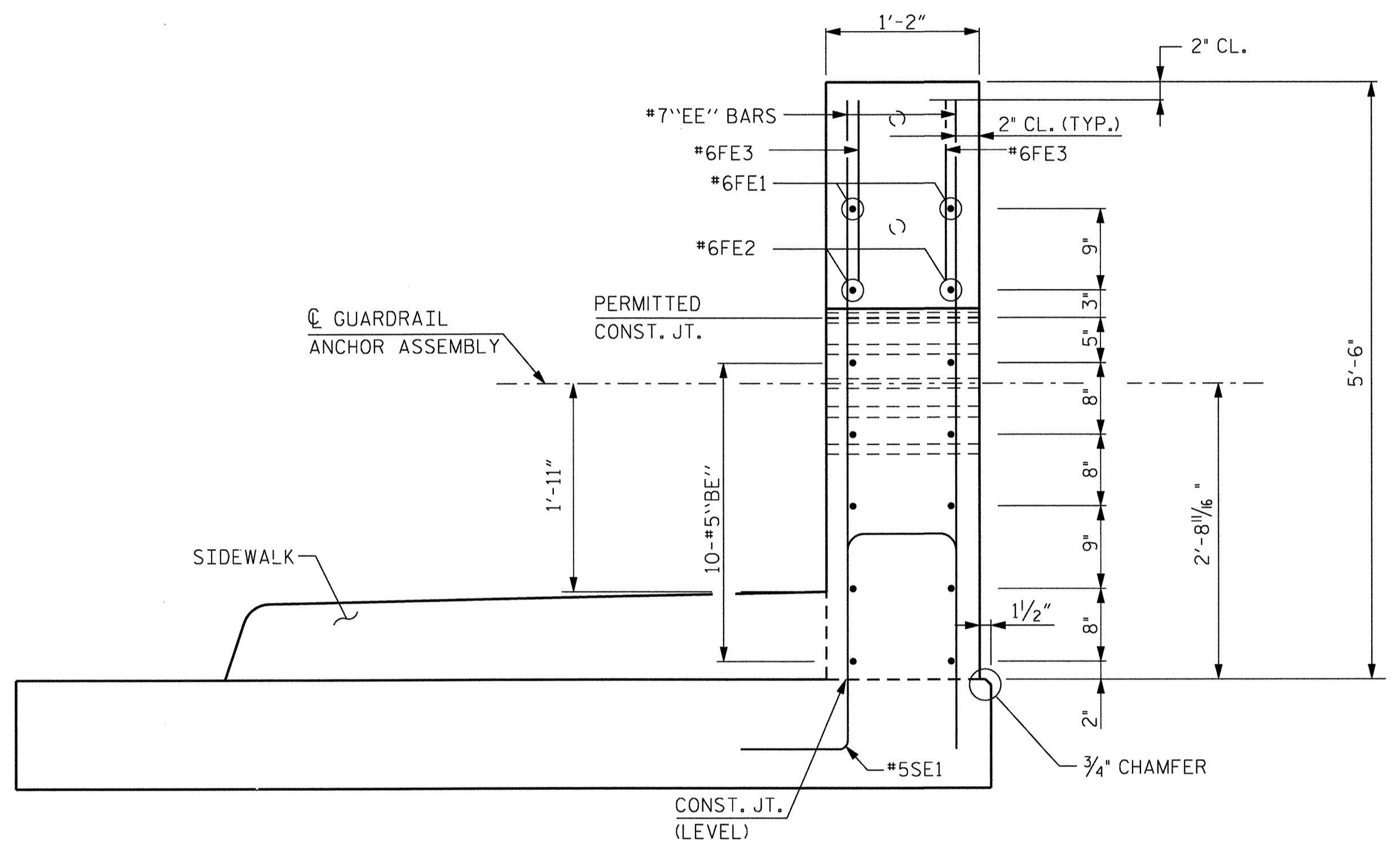
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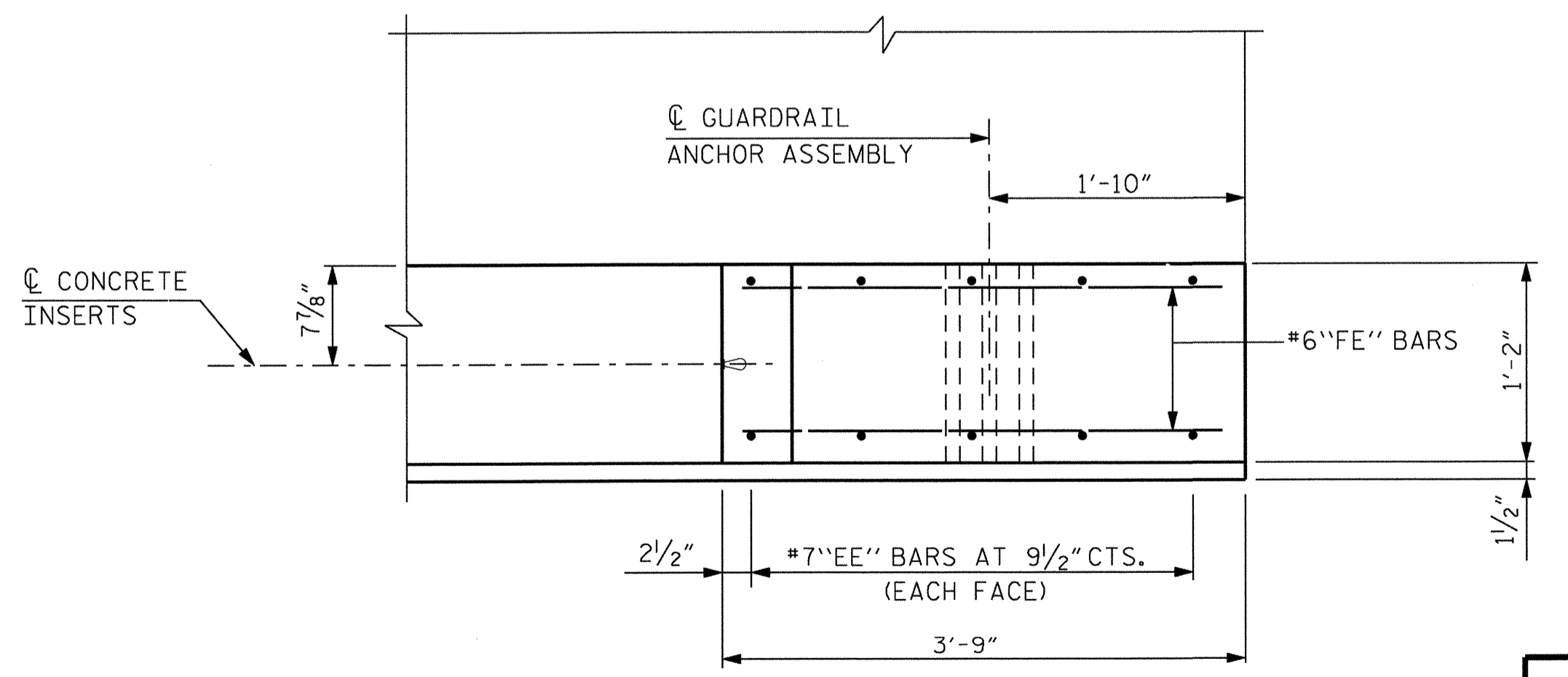
ELEVATION



PLAN OF PARAPET



END VIEW



PLAN OF END POST

NOTES:

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

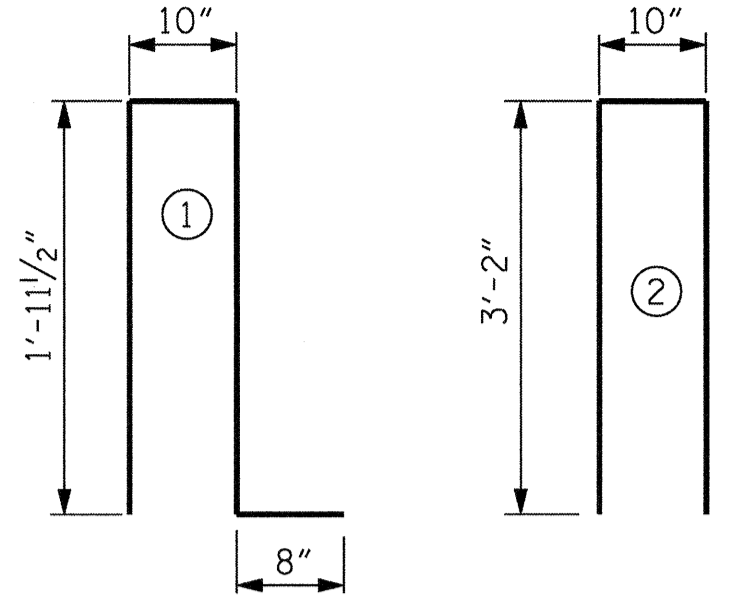
ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.

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

FOR DETAILS OF CONCRETE INSERTS AND ANCHOR ASSEMBLIES, SEE "2 BAR METAL RAIL" SHEETS.

FOR GUARDRAIL ANCHOR ASSEMBLY DETAILS, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE PARAPET

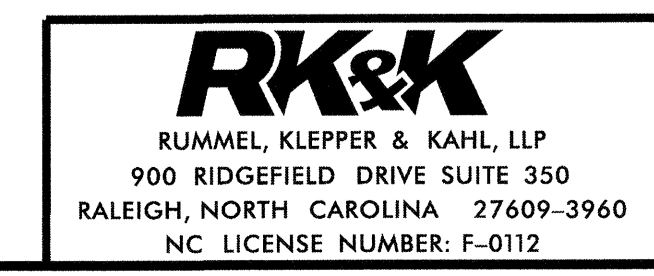
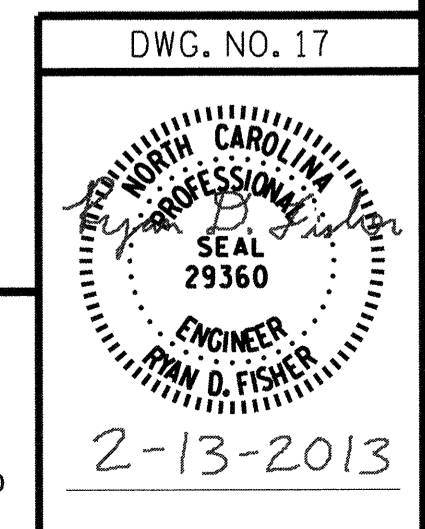
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
BE1	80	#5	STR.	26'-8"	2,225
BE2	40	#5	STR.	27'-3"	1,137
EE1	8	#7	STR.	3'-4"	55
EE2	8	#7	STR.	3'-10"	63
EE3	8	#7	STR.	4'-4"	71
EE4	8	#7	STR.	4'-10"	79
EE5	8	#7	STR.	5'-2"	84
FE1	8	#6	STR.	1'-9"	21
FE2	8	#6	STR.	2'-11"	35
FE3	8	#6	STR.	3'-3"	39
SE1	336	#5	1	5'-5"	1,898
SE2	320	#5	2	7'-2"	2,392

EPOXY COATED REINFORCING STEEL	8,099 LBS.
CLASS AA CONCRETE (PARAPET)	47.8 CY
CONCRETE PARAPET	326.67 LIN. FT.

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 2  
STATE OF NORTH CAROLINA  
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RALEIGH

SUPERSTRUCTURE  
CONCRETE PARAPET  
DETAILS



REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			36

PARAPET AND END POST FOR TWO BAR METAL RAIL

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**NOTES**  
STRUCTURAL CONCRETE INSERT

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

**NOTES**

METAL RAIL TO END POST CONNECTION

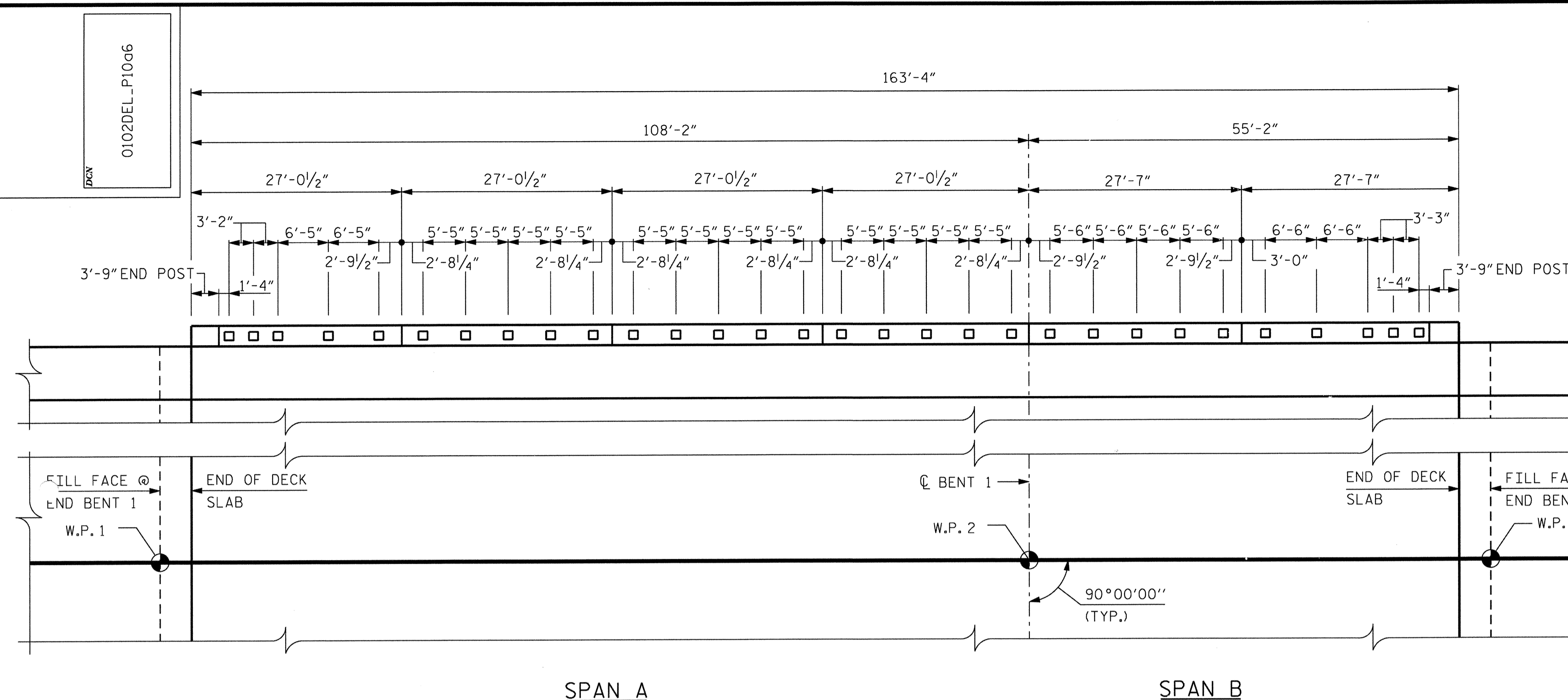
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A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

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

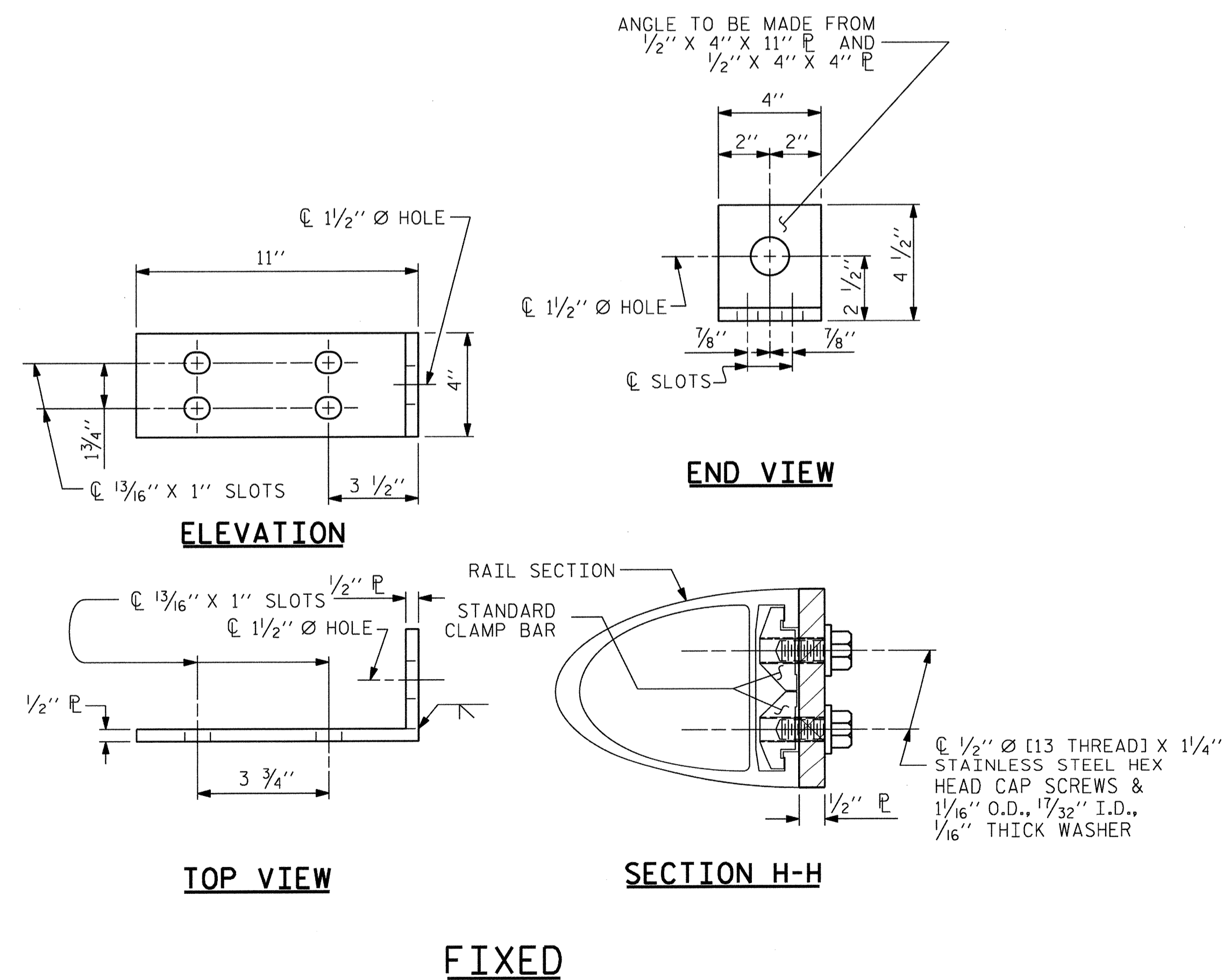
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

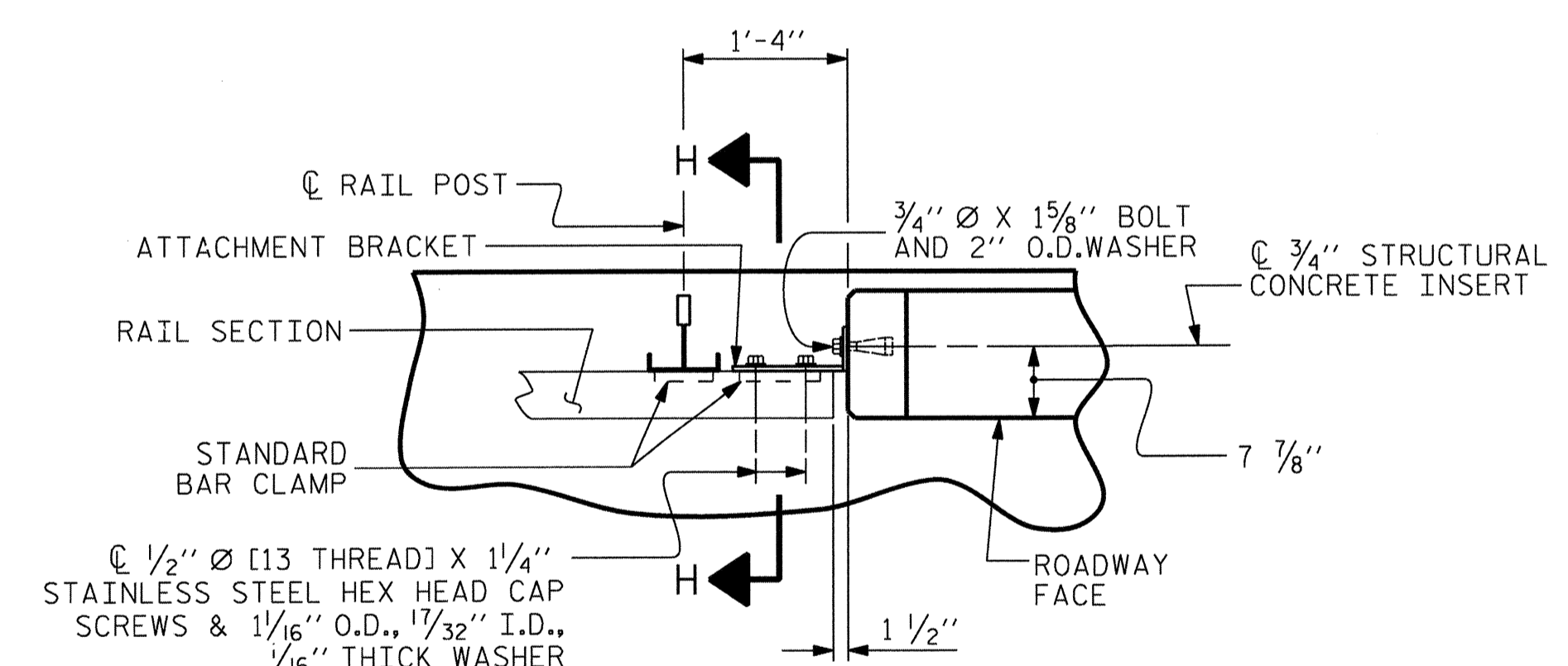
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 1/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT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



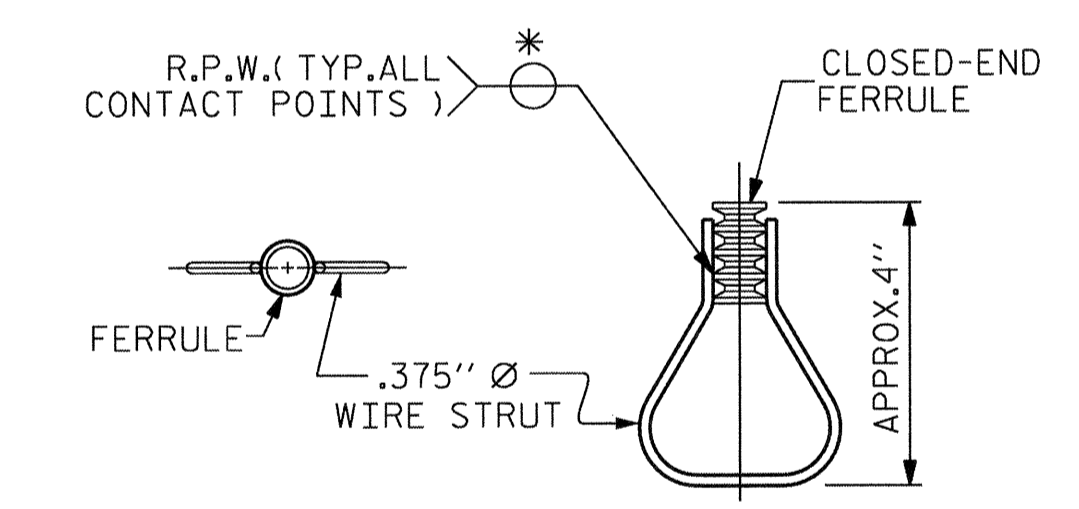
**PLAN OF RAIL POST SPACINGS**



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



**PLAN - RAIL AND END POST**



**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**RAIL POST SPACINGS AND END OF RAIL DETAILS**

DWG. NO. 18

2-13-2013

**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO. S18
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

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DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
CHECKED BY : R.D. FISHER DATE : JAN. 2013

**NOTES**

METAL RAIL SHALL BE ANODIZED ALUMINUM (COLOR = BLACK) IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE MATERIAL.

**ALUMINUM RAILS**

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

**GENERAL NOTES**

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

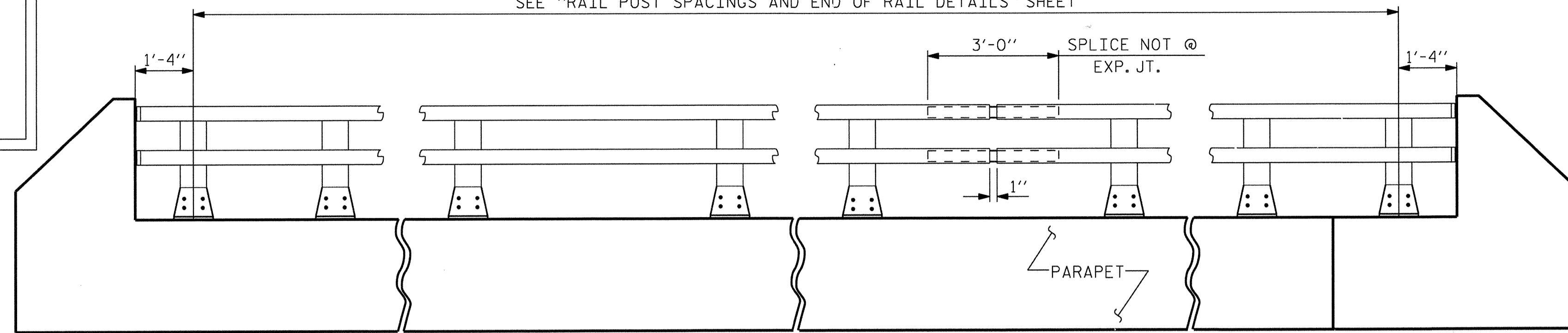
ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

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

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

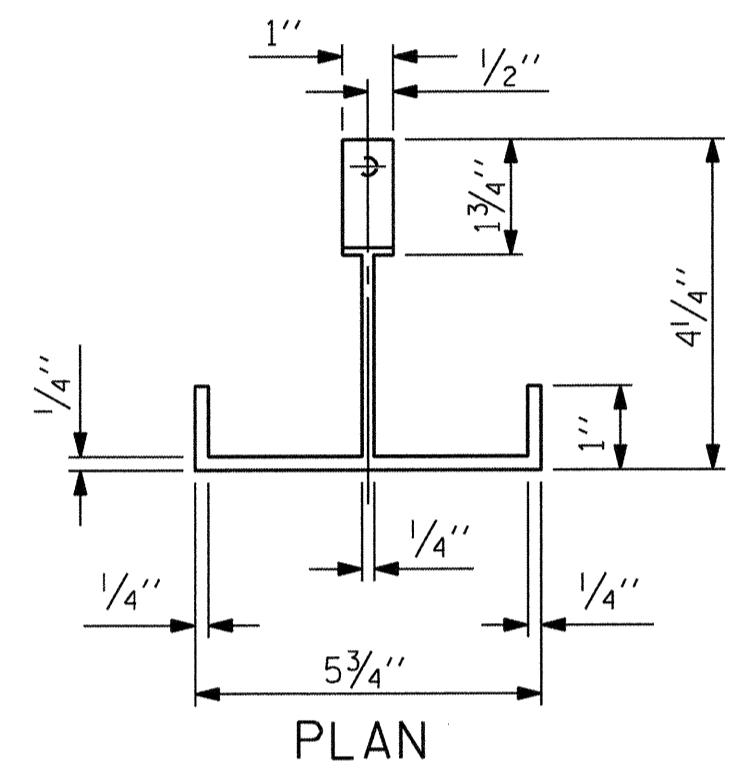
PAY LENGTH = 311.67 LIN. FT.

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

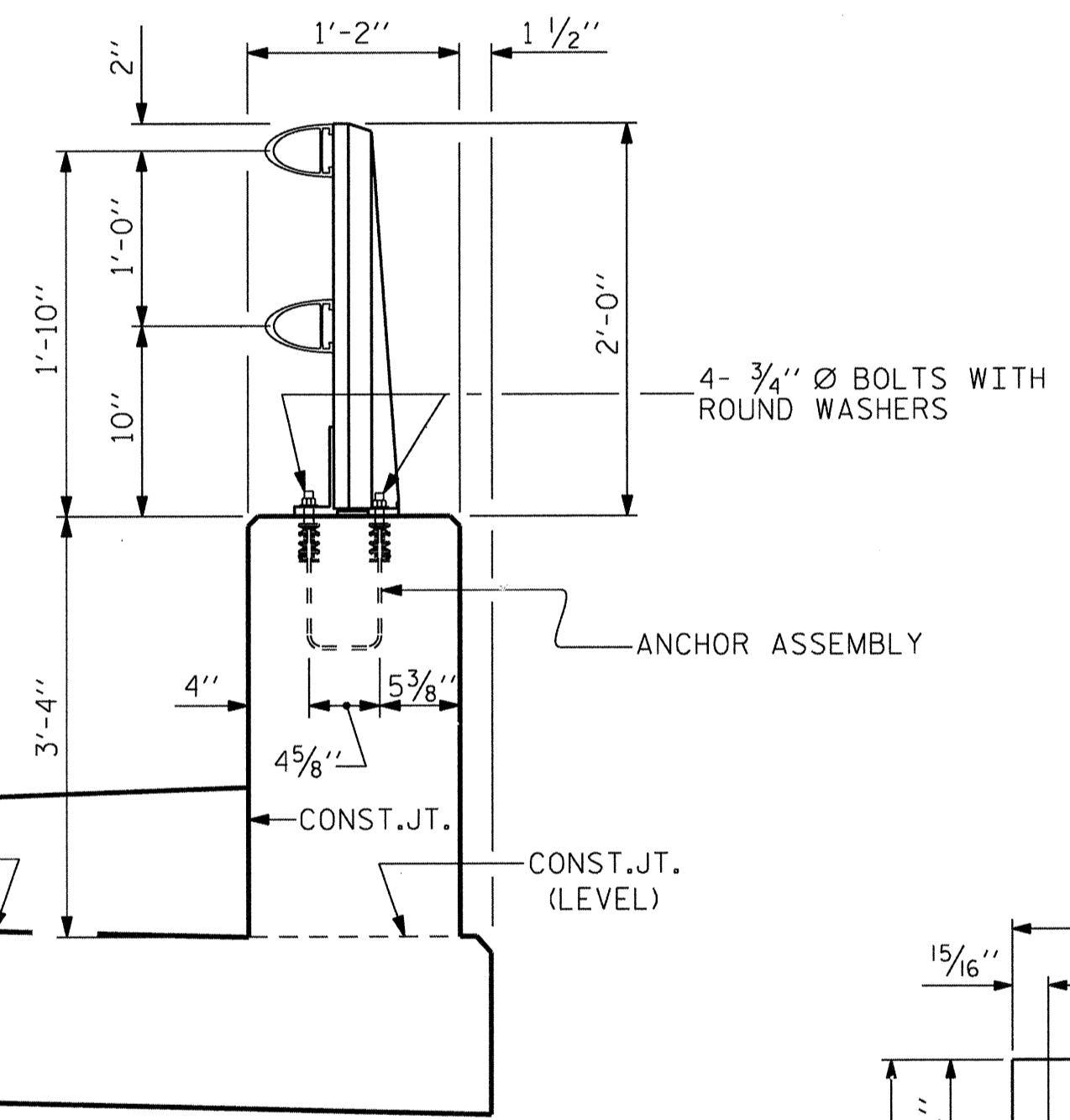


**ELEVATION**

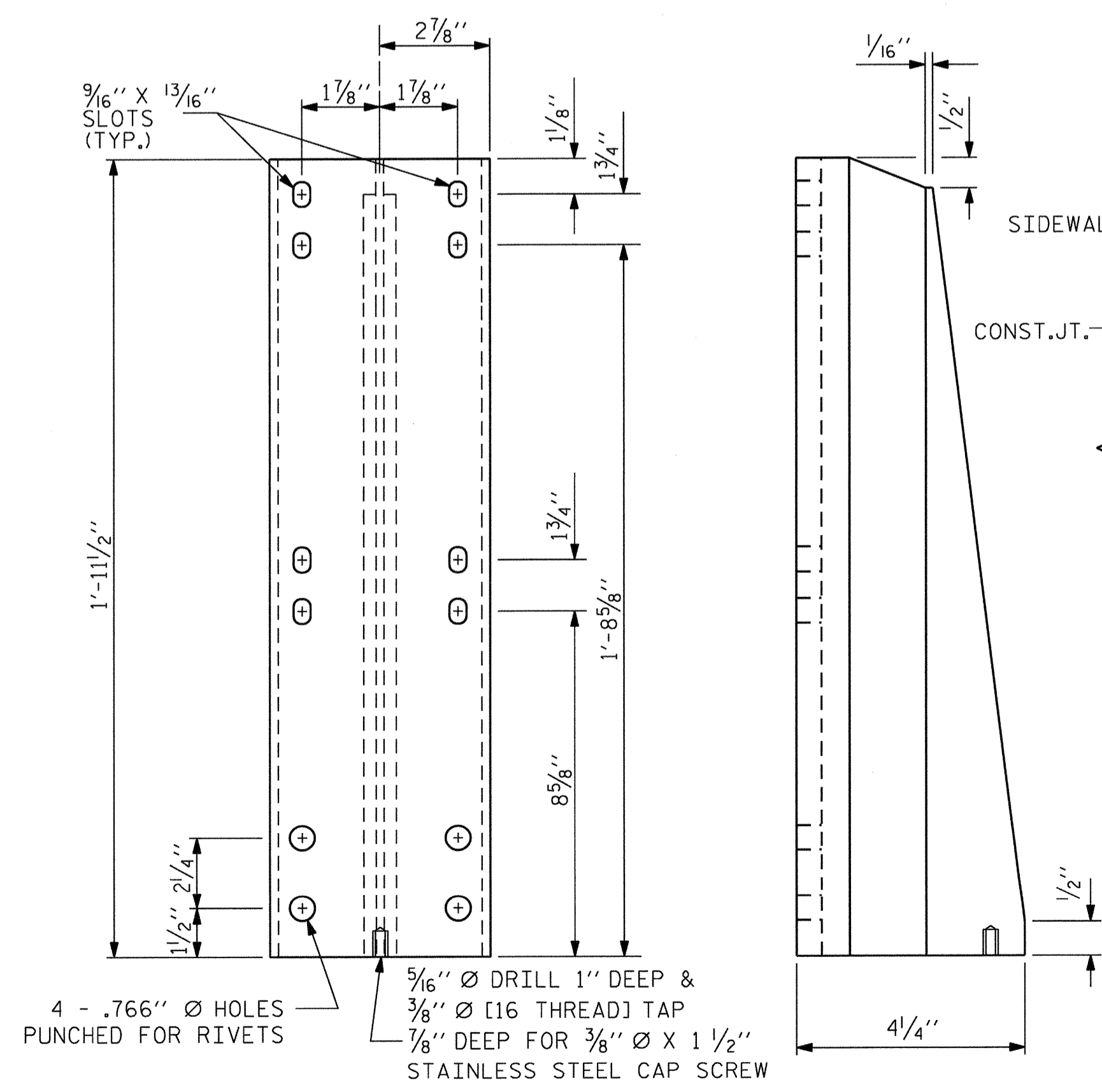
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



**PLAN**



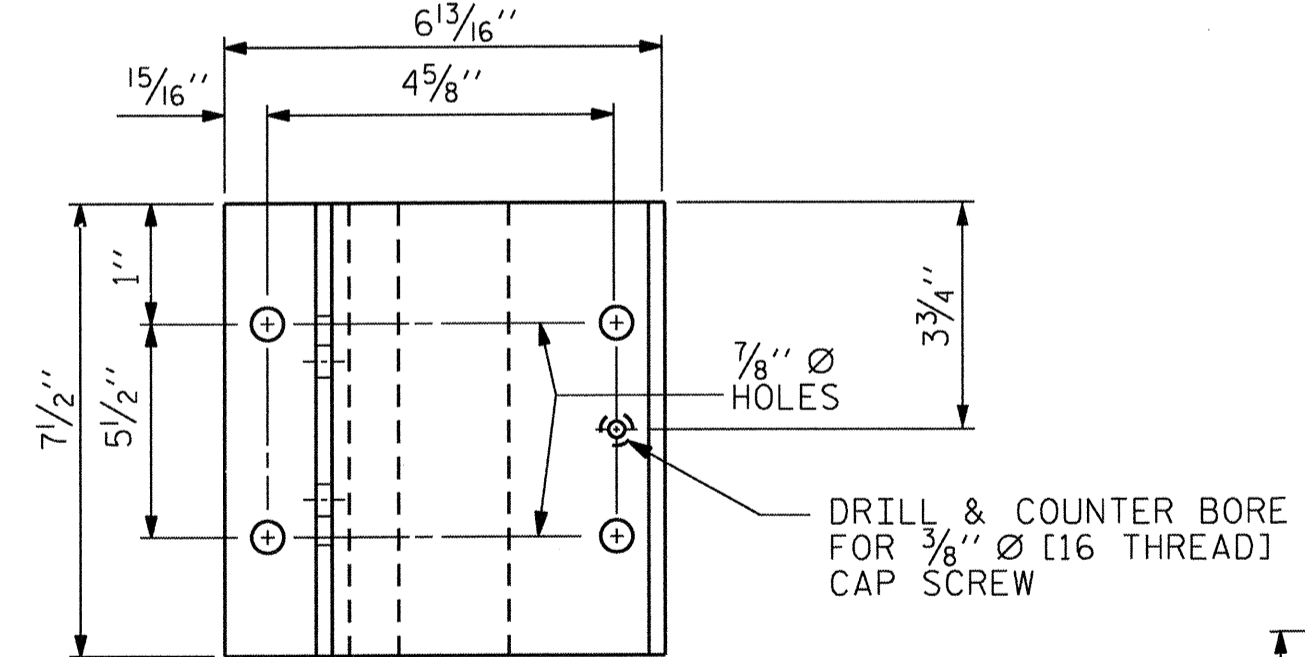
**SECTION THRU PARAPET AND RAIL**



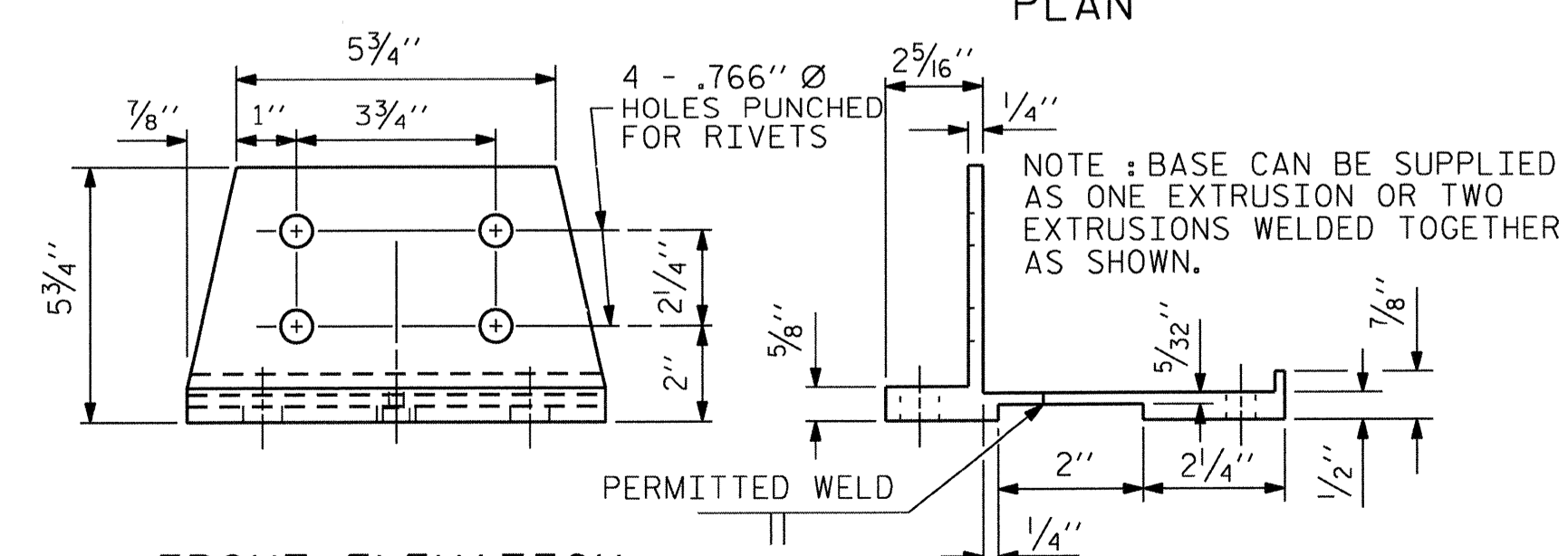
**FRONT ELEVATION**

**SIDE ELEVATION**

**DETAILS OF POST**



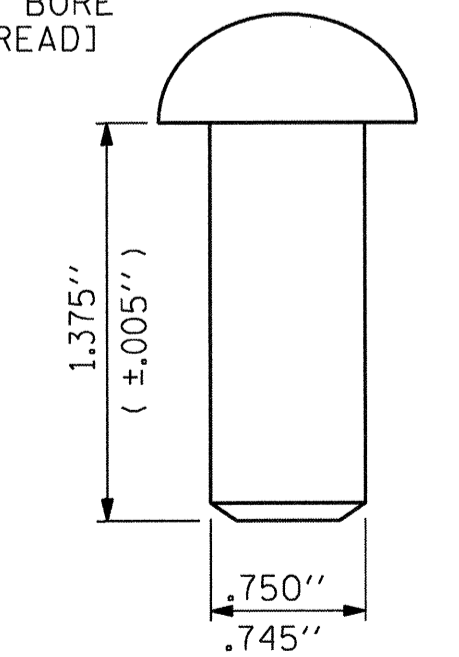
**PLAN**



**FRONT ELEVATION**

**SIDE ELEVATION**

**POST BASE DETAILS**



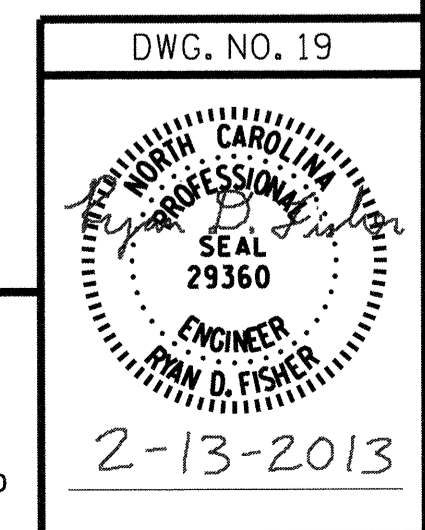
**RIVET DETAIL**

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

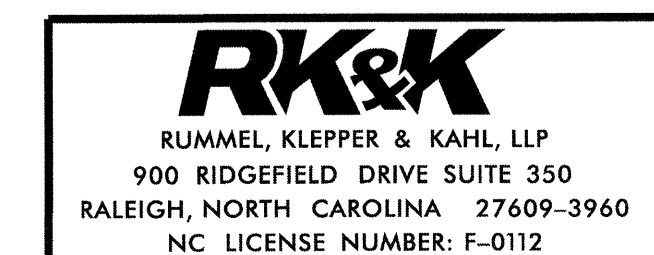
SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**TWO BAR METAL RAIL**



REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			36



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NOTES

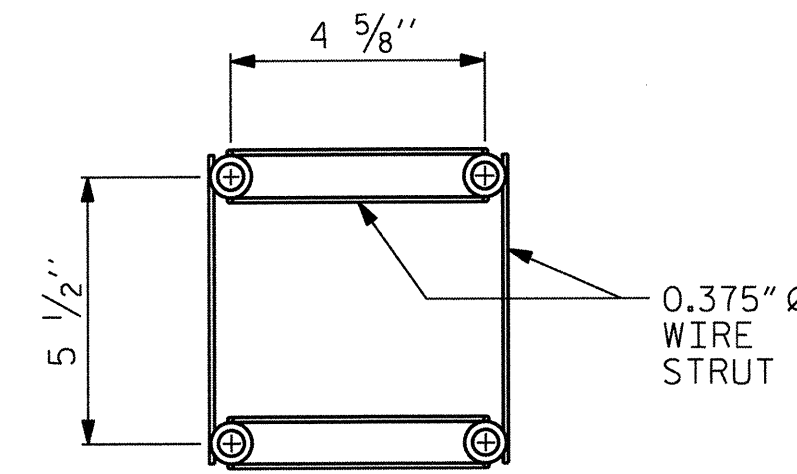
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

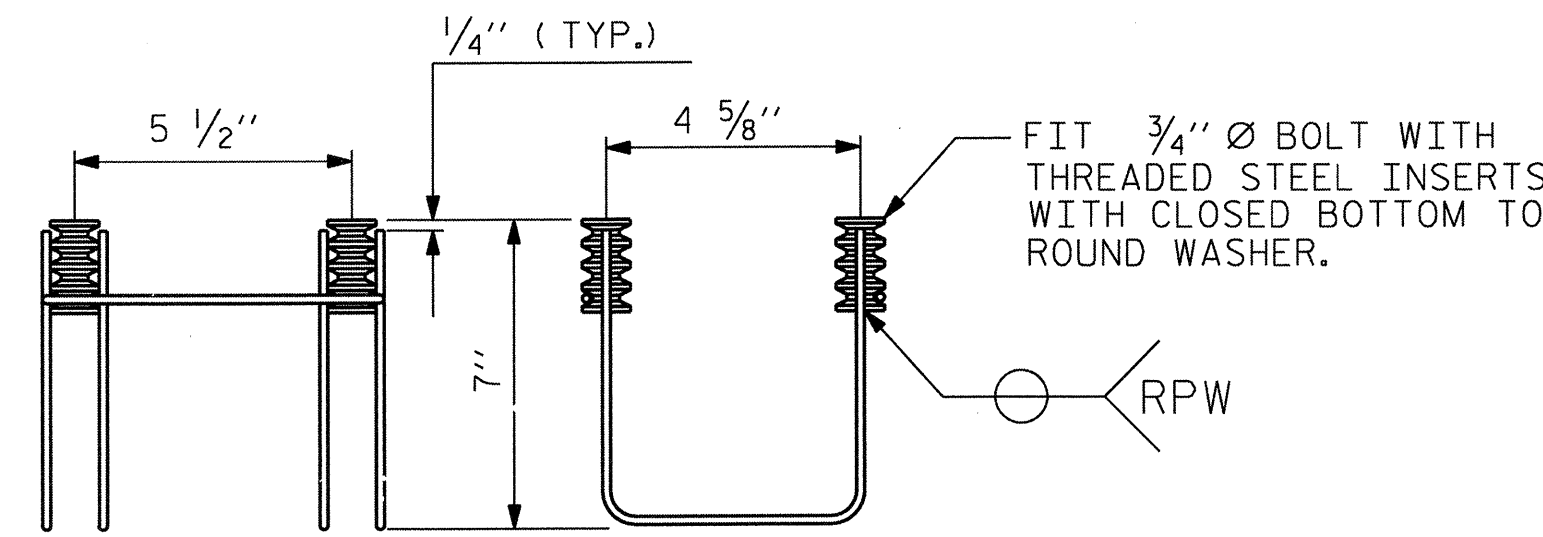
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

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



PLAN

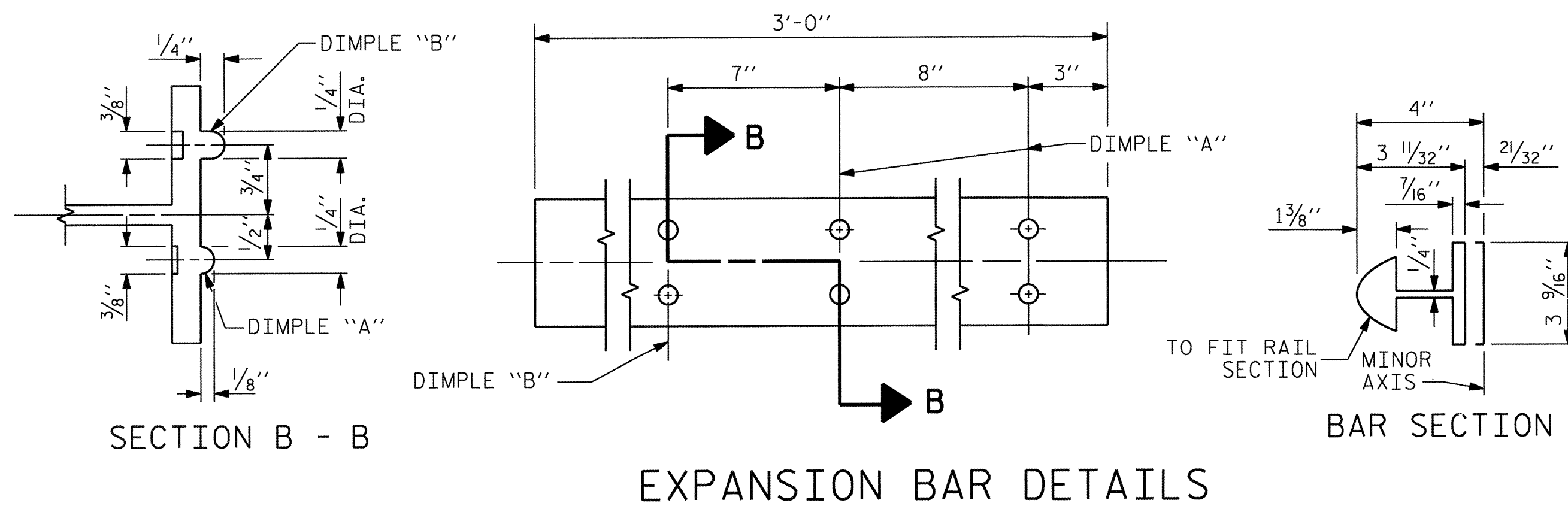


SIDE VIEW

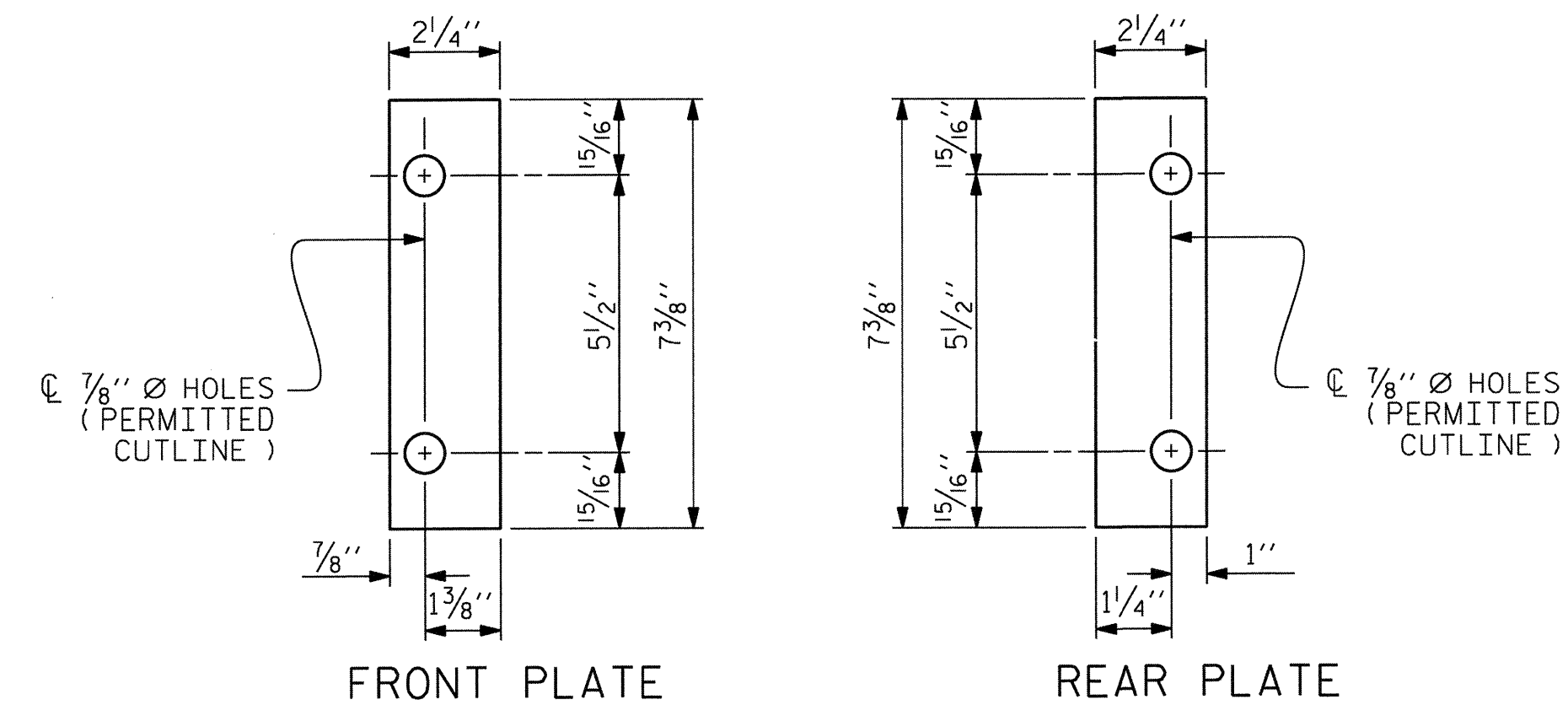
ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

( 60 ASSEMBLIES REQUIRED )



EXPANSION BAR DETAILS

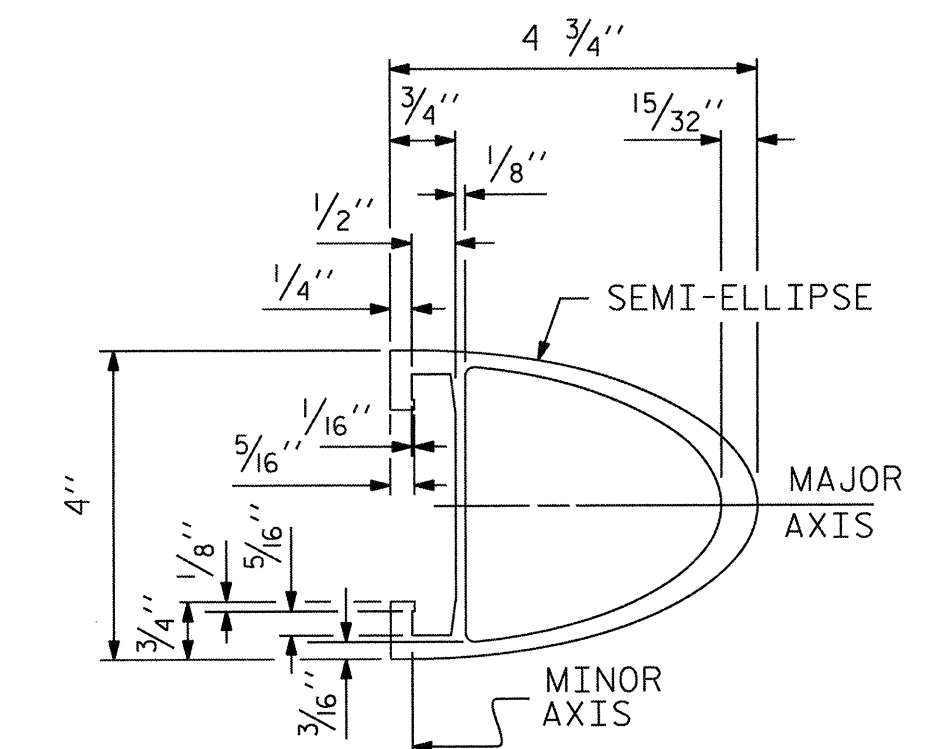


FRONT PLATE

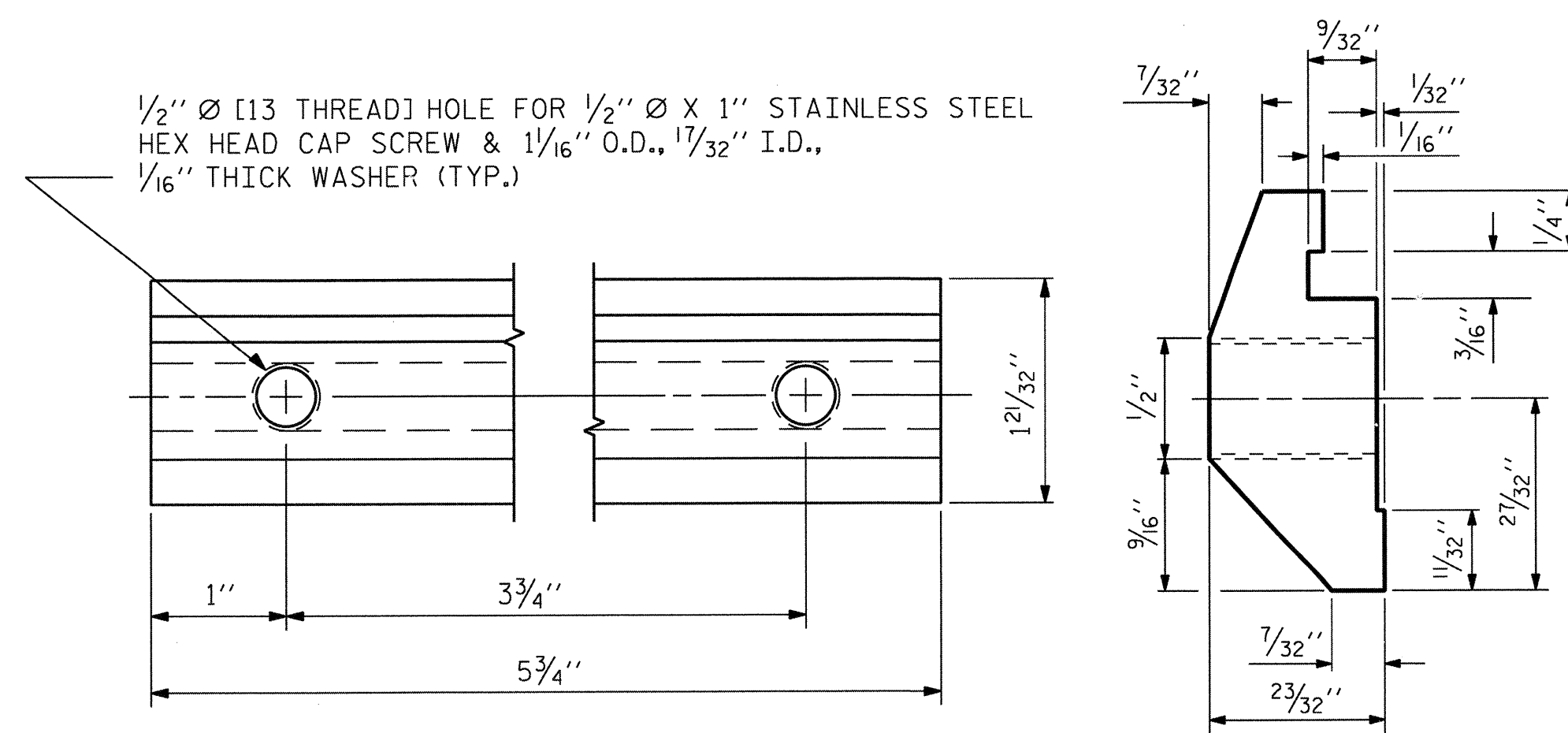
REAR PLATE

SHIM DETAILS

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

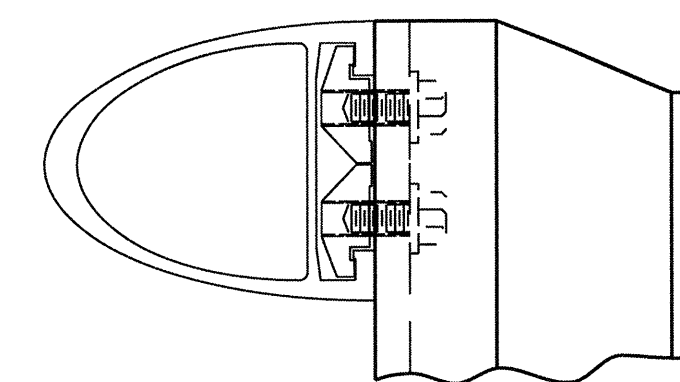


RAIL SECTION

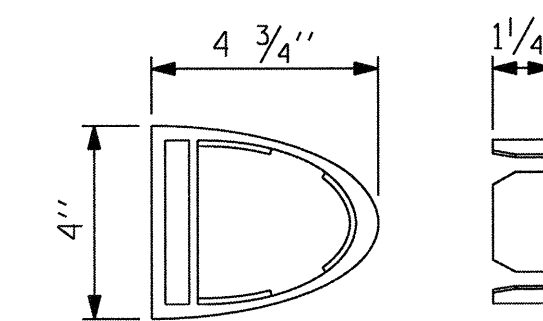


CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY



RAIL CAP

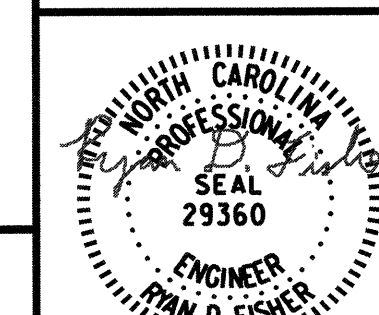
PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

TWO BAR  
METAL RAIL

DWG. NO. 20



2-13-2013

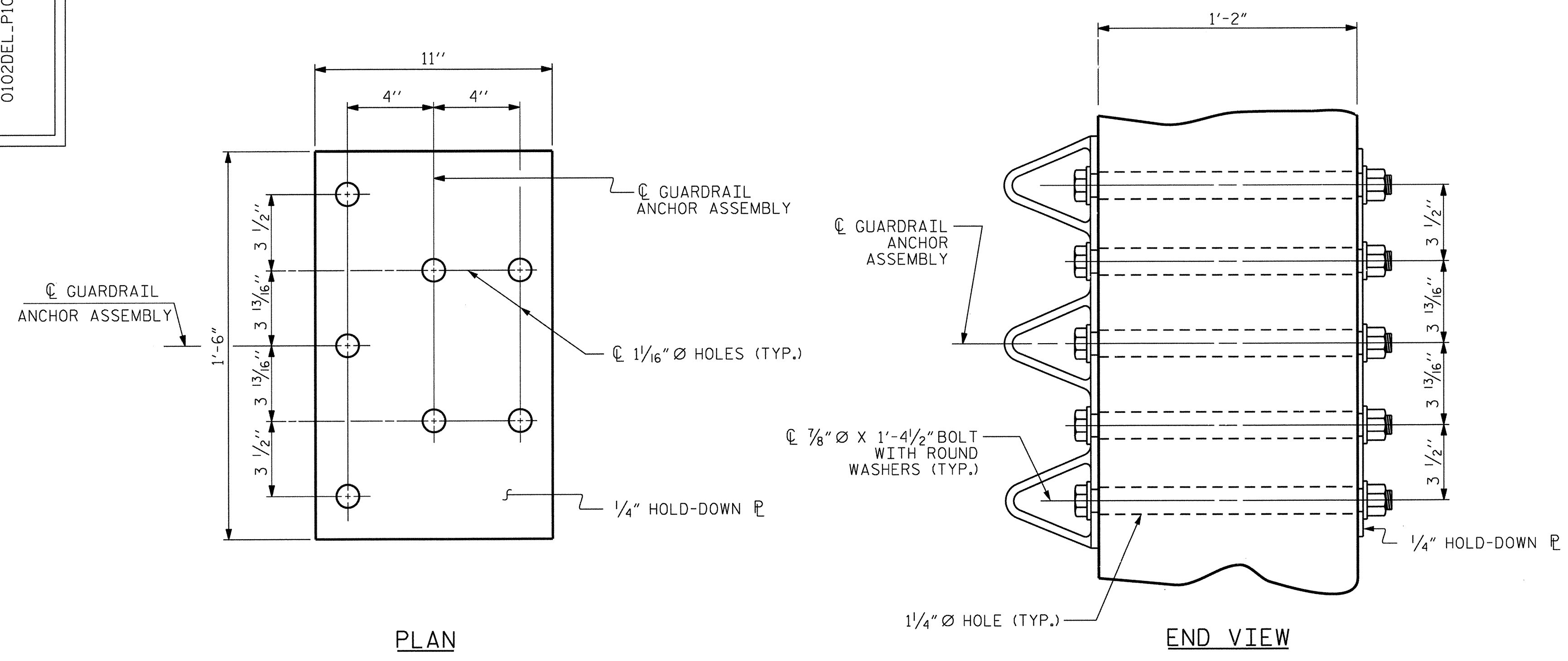
**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			30

DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
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0102DEL\_P1006



**GUARDRAIL ANCHOR ASSEMBLY DETAILS**

**NOTES**

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

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

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

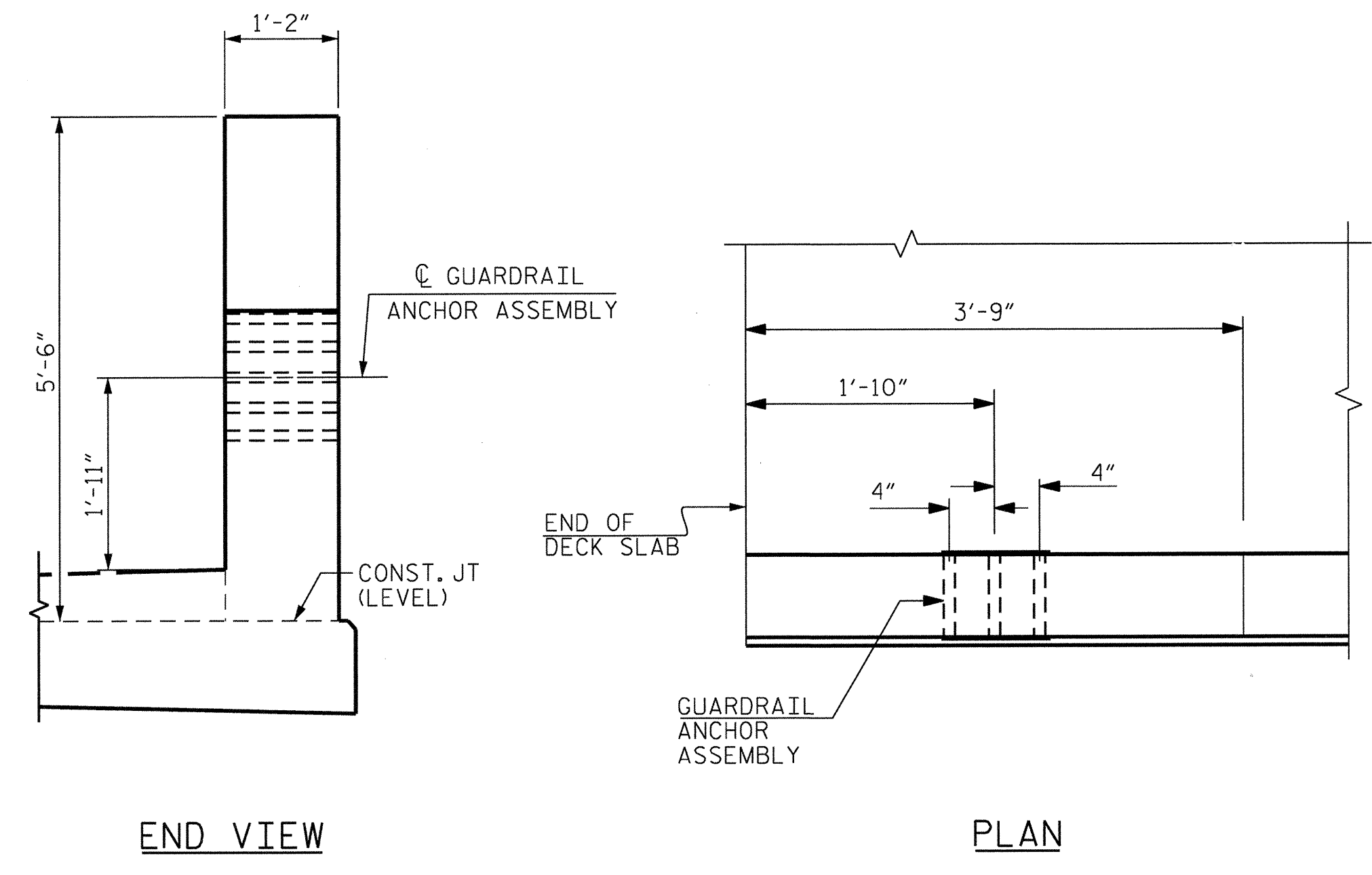
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

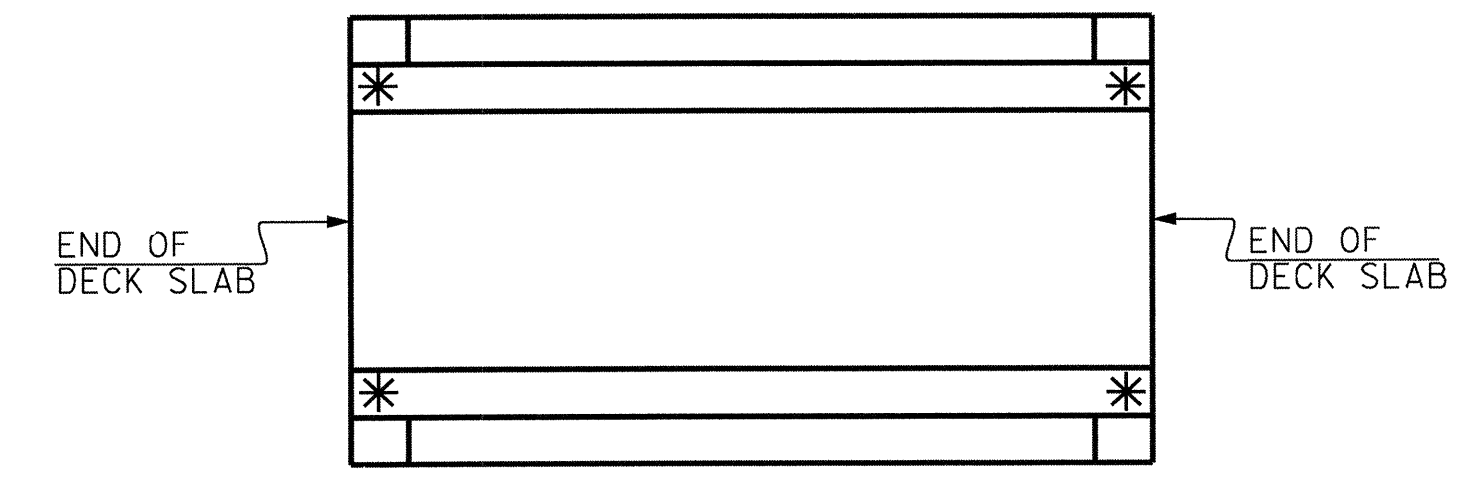
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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



**LOCATION OF GUARDRAIL ANCHOR AT END POST**



**SKETCH SHOWING POINTS OF ATTACHMENT**

\* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

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

DWG. NO. 21  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 29360  
 ENGINEER  
 RAY D. FISHER  
 2-13-2013

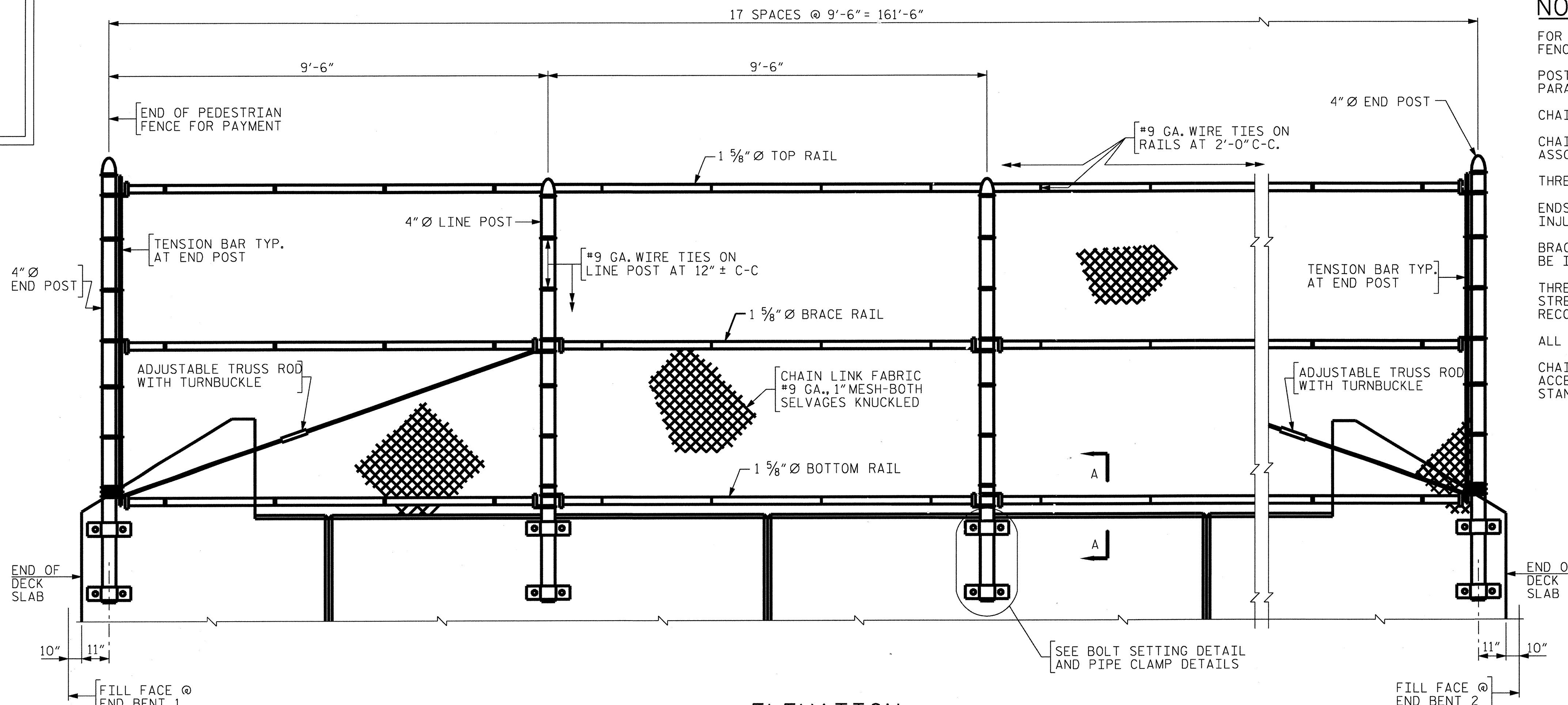
**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S21	
1			3			TOTAL SHEETS	
2			4			36	

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 CHECKED BY : R.D. FISHER DATE : JAN. 2013

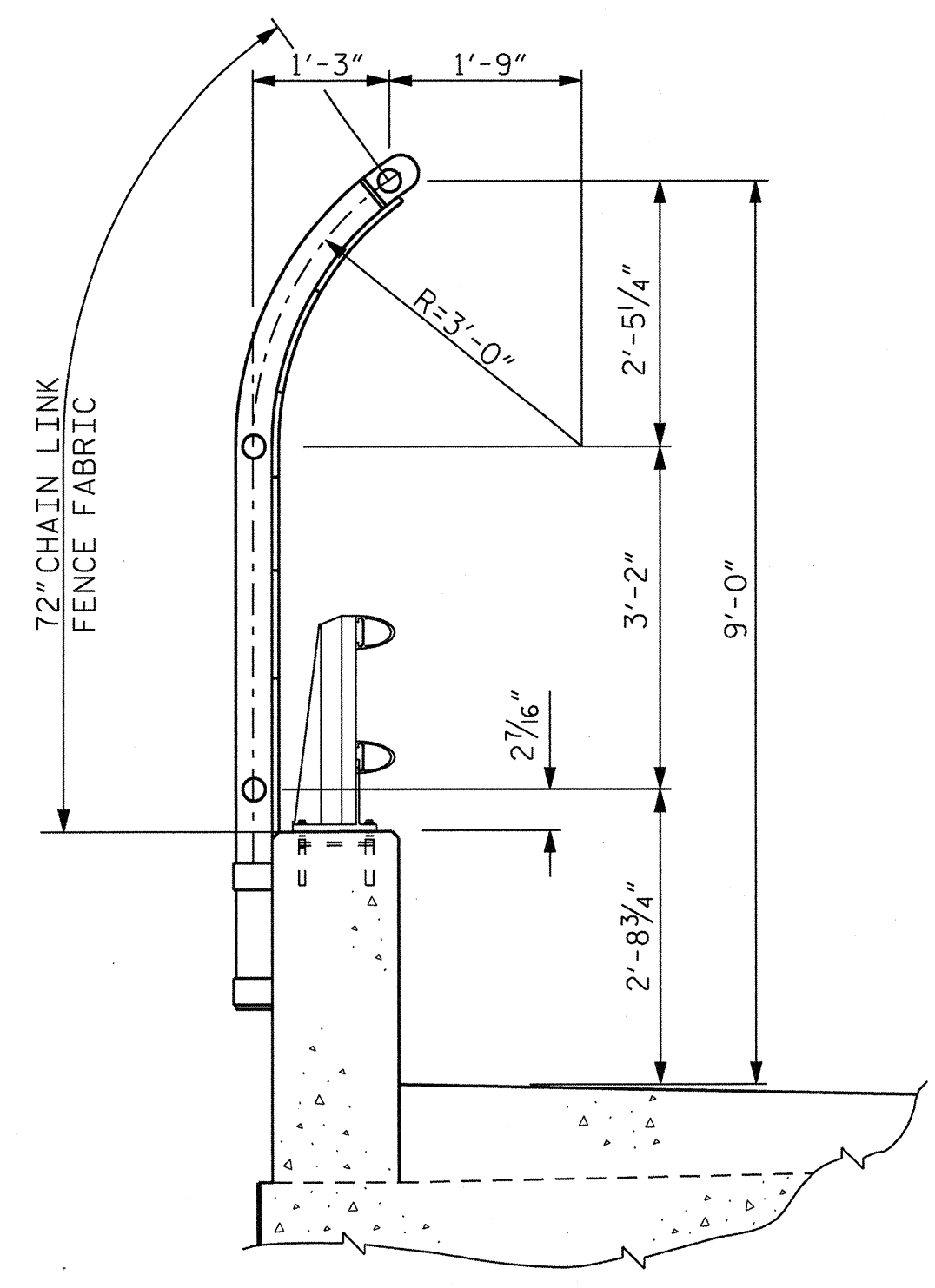
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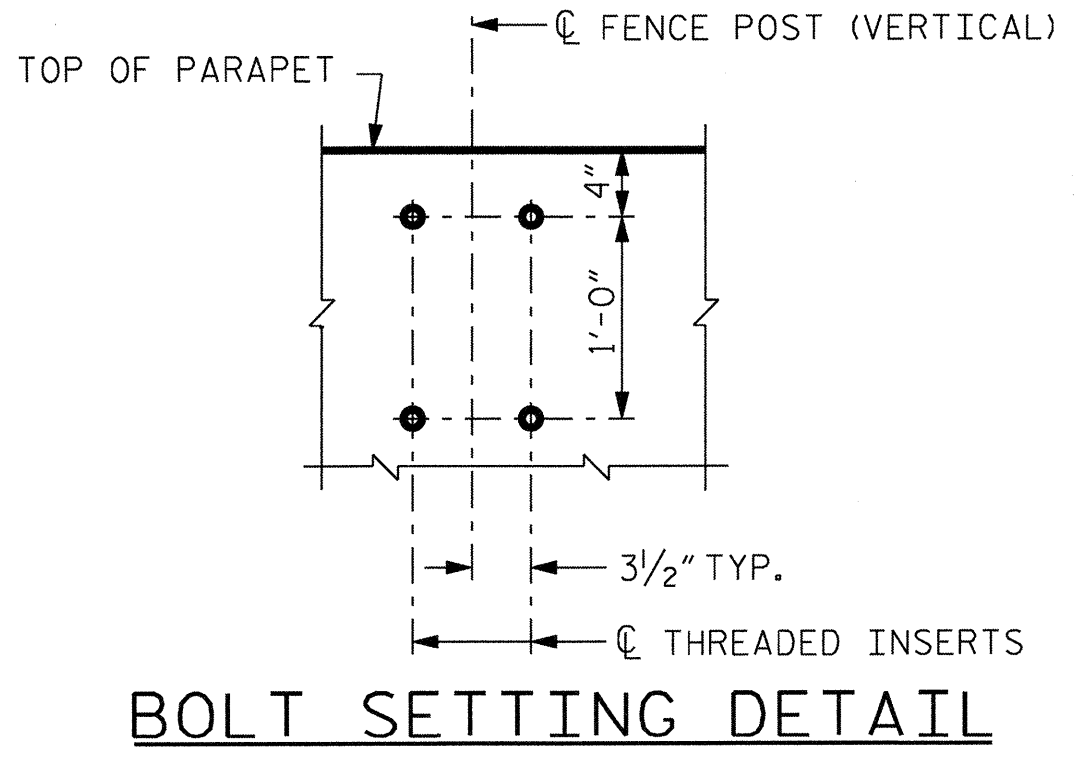
**ELEVATION**  
(2 BAR METAL RAIL NOT SHOWN)  
72" CHAIN LINK FENCE PAY LENGTH = 323.00 LIN. FEET

**NOTES:**

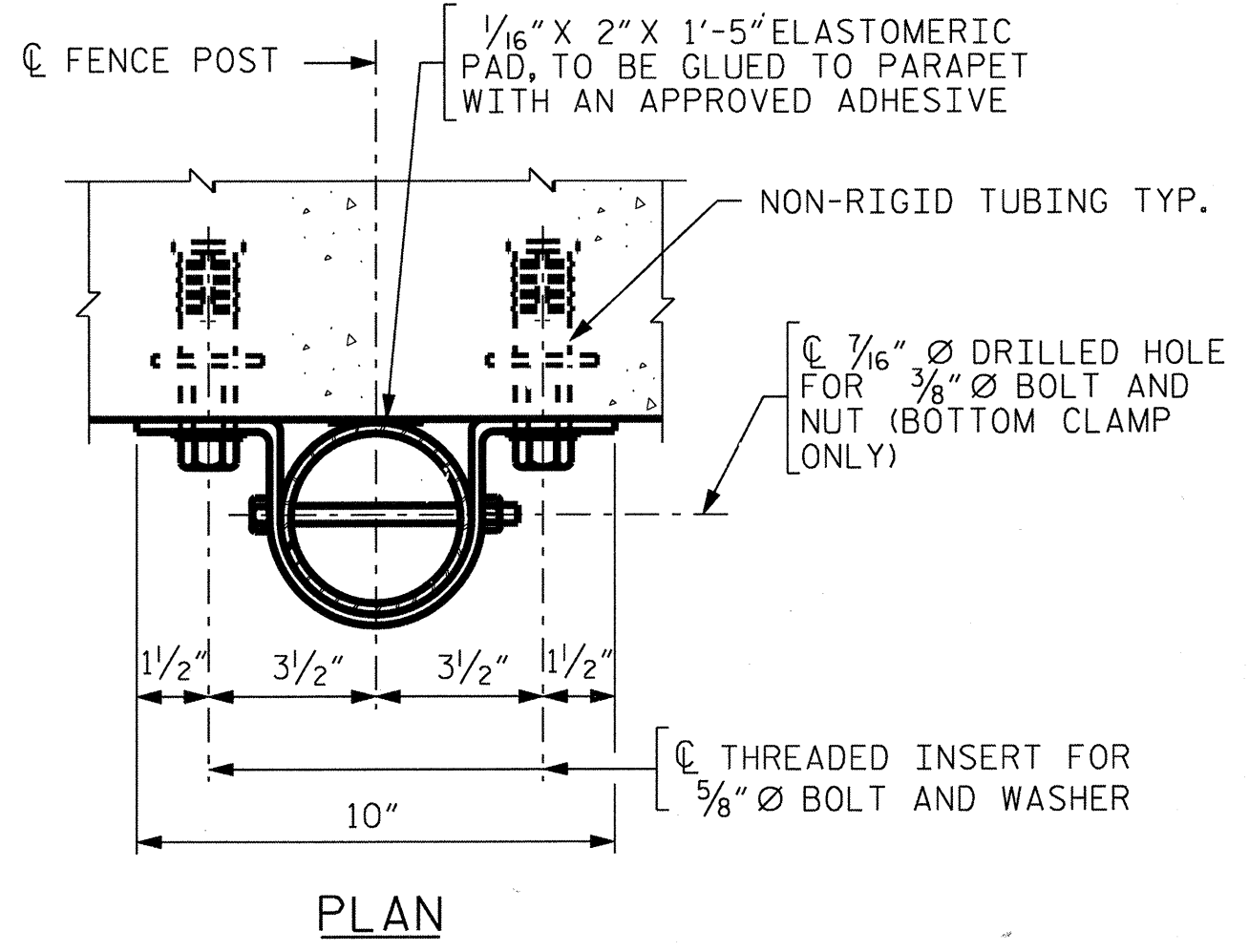
- FOR 72" CHAIN LINK FENCE, SEE "72 INCH BLACK VINYL COATED CHAIN LINK FENCE (BRIDGE MOUNTED)" SPECIAL PROVISION.
- POSTS SHALL BE SET VERTICAL. RAILS SHALL BE SET PARALLEL TO THE TOP OF PARAPET.
- CHAIN LINK FABRIC SHALL BE PLACED ON INSIDE OF POSTS AND RAILS.
- CHAIN LINK FABRIC, POSTS, RAILS, BOLTS EXCLUDING THREADS, AND OTHER ASSOCIATED HARDWARE SHALL BE VINYL COATED WITH BLACK COLOR.
- THREADED INSERTS AND BOLT THREADS SHALL NOT BE GALVANIZED OR COATED.
- ENDS OF WIRE TIES SHALL BE TURNED TO OUTSIDE TO FENCE TO PREVENT INJURY TO PEDESTRIANS.
- BRACE RAIL SHALL BE USED. ADJUSTABLE TRUSS ROD WITH TURNBUCKLE SHALL BE INSTALLED BETWEEN LINE POST AND BASE OF END POST.
- THREADED INSERTS, WHEN EMBEDDED AS SHOWN, SHALL DEVELOP FULL STRENGTH OF THREADED BOLTS. EMBEDMENT OF INSERT PER MANUFACTURERS RECOMMENDATIONS OR 5" WHICHEVER IS GREATER.
- ALL BOLTS SHALL BE HIGH STRENGTH (ASTM A325)
- CHAIN LINK FABRIC, METAL POSTS AND RAILS, FENCE FITTINGS, HARDWARE, AND ACCESSORIES SHALL COMPLY WITH SECTION 866 AND SECTION 1050 OF THE STANDARD SPECIFICATIONS.



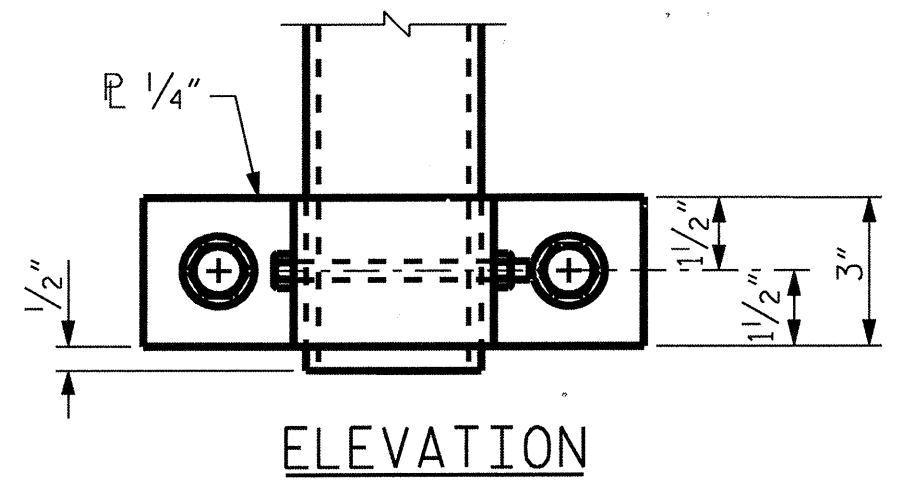
**TYPICAL SECTION**



**BOLT SETTING DETAIL**

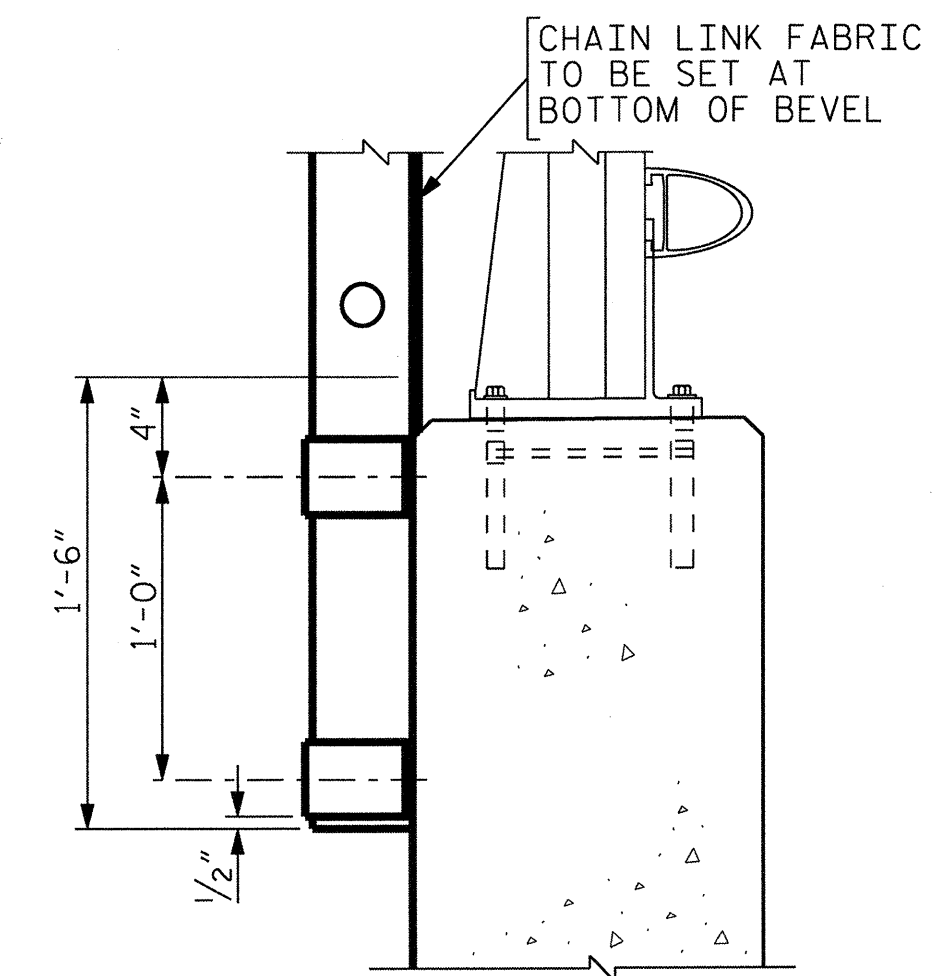


**PLAN**



**ELEVATION**

**PIPE CLAMP DETAILS**



**SECTION A-A**

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

CHAIN LINK FENCE

DWG. NO. 22

3-28-13

**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

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1			3			TOTAL SHEETS 36
2			4			

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DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
CHECKED BY: R.D. FISHER DATE: JAN. 2013

0102DEL\_P1006

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

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

GROOVING BRIDGE FLOORS

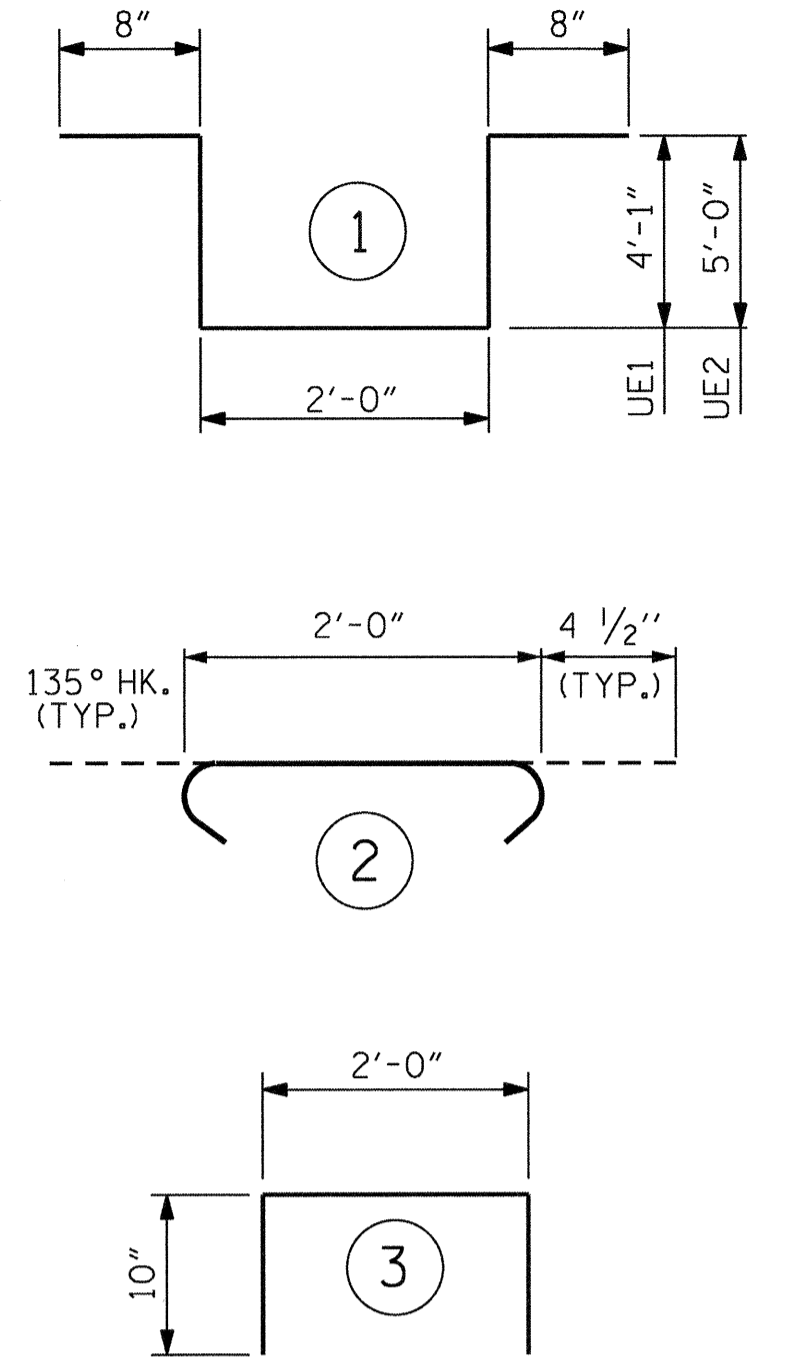
APPROACH SLABS	2,254	SQ.FT.
BRIDGE DECK	7,351	SQ.FT.
TOTAL	9,605	SQ.FT.

REINFORCING BAR SCHEDULE

SPANS A AND B

EPOXY COATED						NON-EPOXY COATED					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
AE1	326	#5	STR.	38'-8"	13,147	A1	652	#5	STR.	33'-9"	22,951
AE2	326	#5	STR.	29'-2"	9,917	B1	258	#5	STR.	55'-10"	15,024
BE1	131	#6	STR.	22'-0"	4,329	K1	12	#4	STR.	8'-0"	64
BE2	136	#4	STR.	27'-0"	2,453	K2	24	#4	STR.	9'-0"	144
BE3	68	#6	STR.	60'-0"	6,128	K3	12	#4	STR.	8'-6"	68
BE4	63	#6	STR.	26'-0"	2,460	K4	12	#4	STR.	6'-3"	50
BE5	68	#4	STR.	25'-0"	1,136	K5	15	#4	STR.	21'-2"	212
BE6	131	#6	STR.	12'-0"	2,361	S1	204	#4	2	2'-9"	375
BE7	84	#4	STR.	28'-10"	1,618						
GE1	320	#4	STR.	7'-0"	1,496						
GE2	10	#4	STR.	6'-9"	45						
UE1	12	#4	1	11'-6"	92						
UE2	42	#4	1	13'-4"	374						
UE3	96	#4	3	3'-8"	235						

BAR TYPES

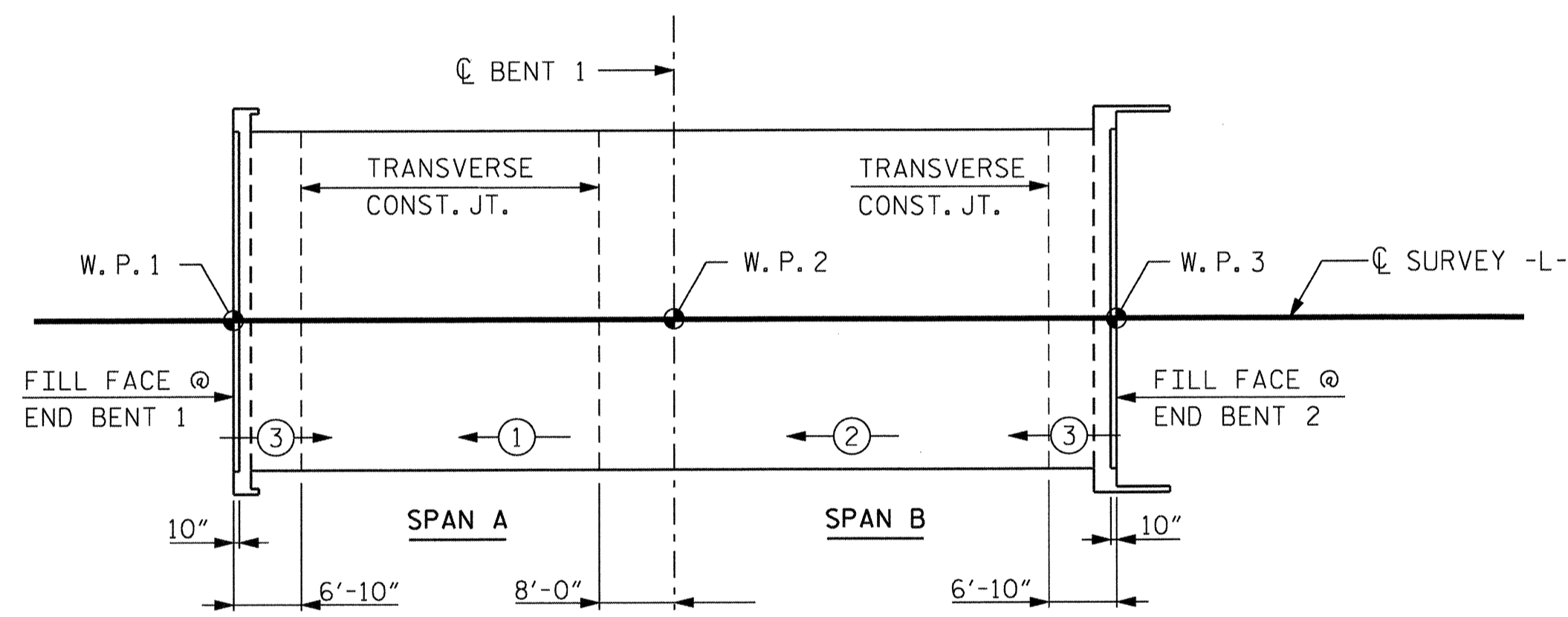


ALL BAR DIMENSIONS ARE OUT TO OUT.

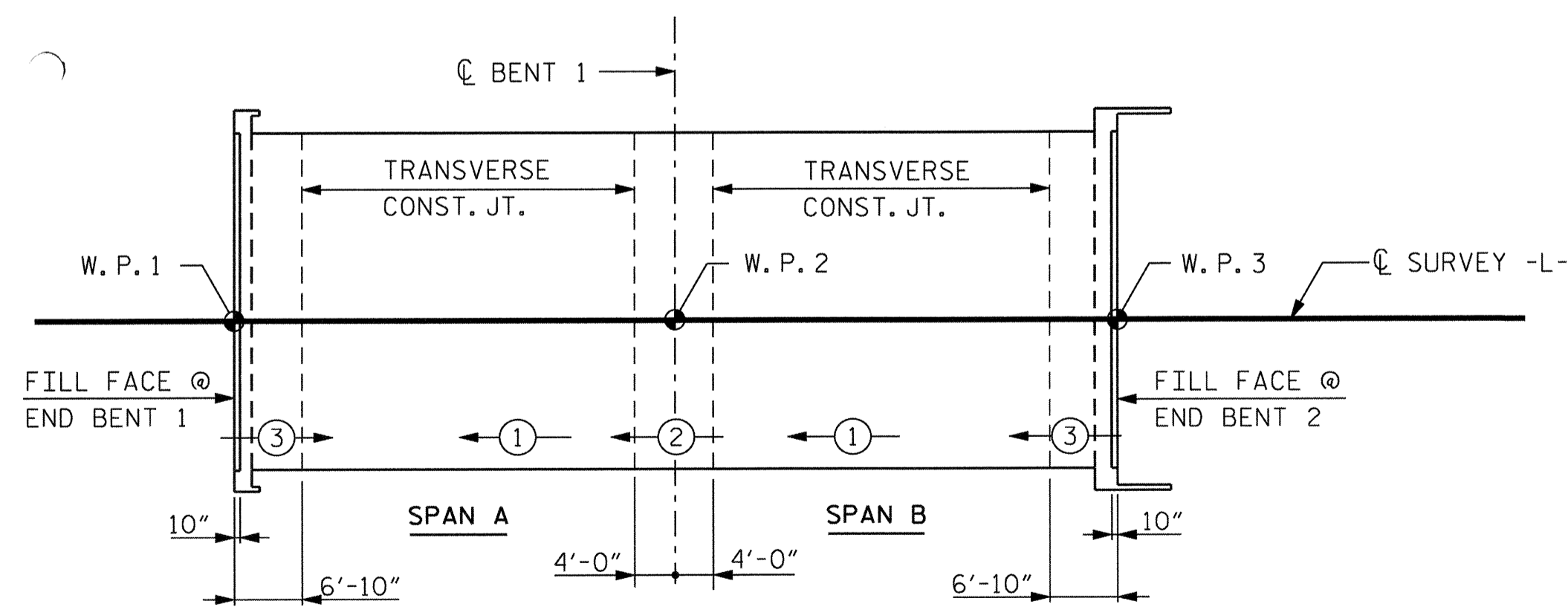
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
SPANS A AND B		38,888	45,791
POUR 1	204.5		
POUR 2	146.2		
POUR 3	109.7		
SIDEWALK	58.5		
TOTALS**	518.9	38,888	45,791

\*\* QUANTITIES FOR PARAPET ARE NOT INCLUDED.

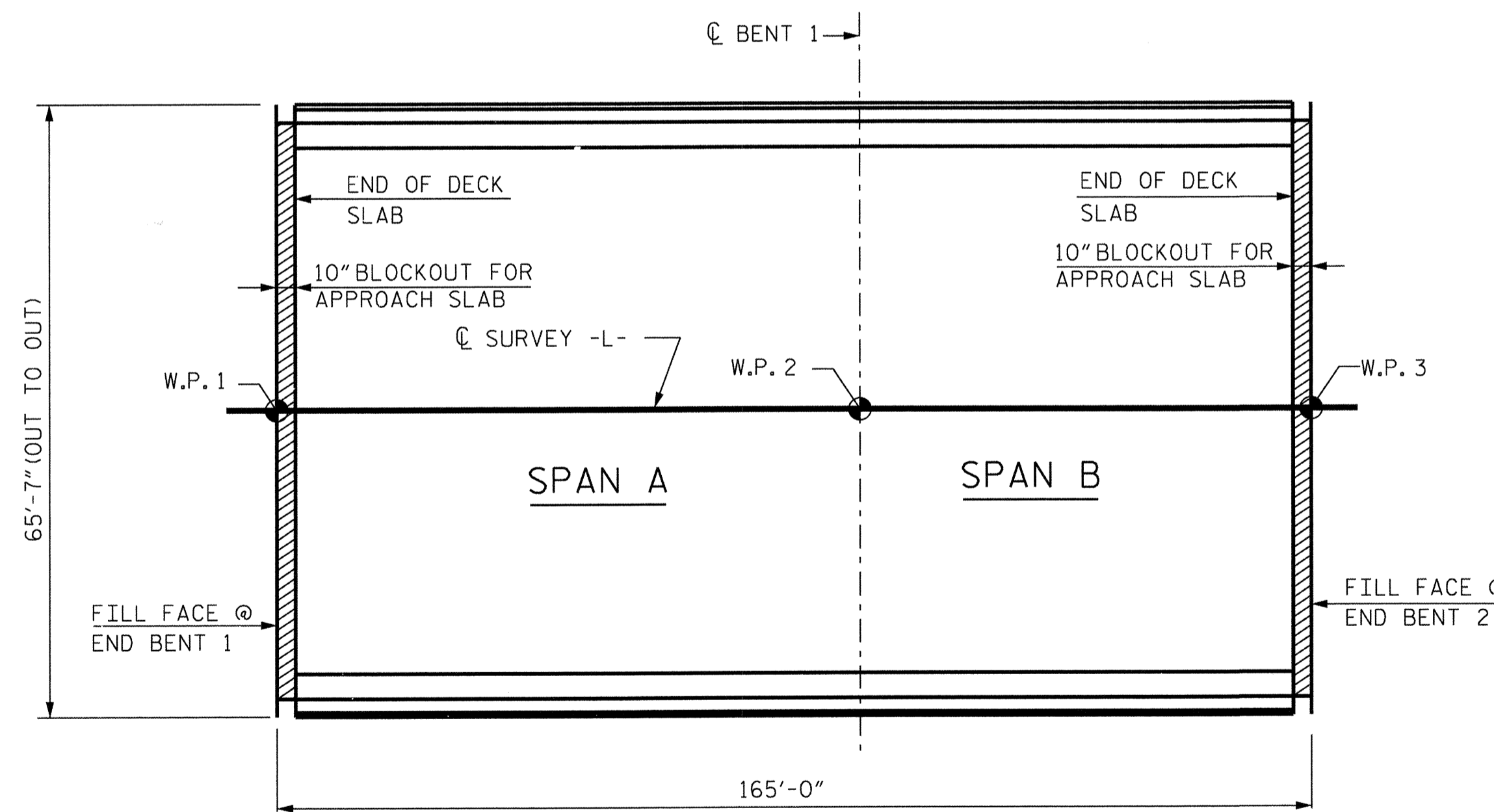


SLAB POURING SEQUENCE



OPTIONAL SLAB POURING SEQUENCE

POUR 2 CANNOT BE STARTED UNTIL BOTH ADJACENT POUR 1'S REACH A MINIMUM OF 3000 PSI.

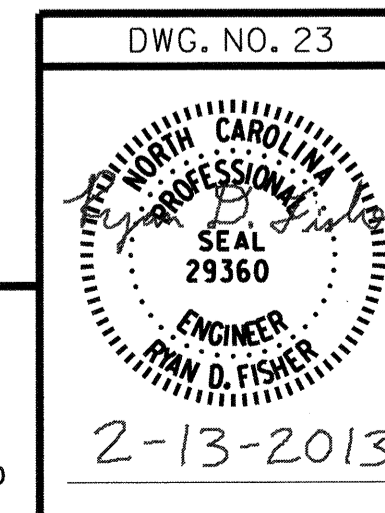


LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10,821)

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

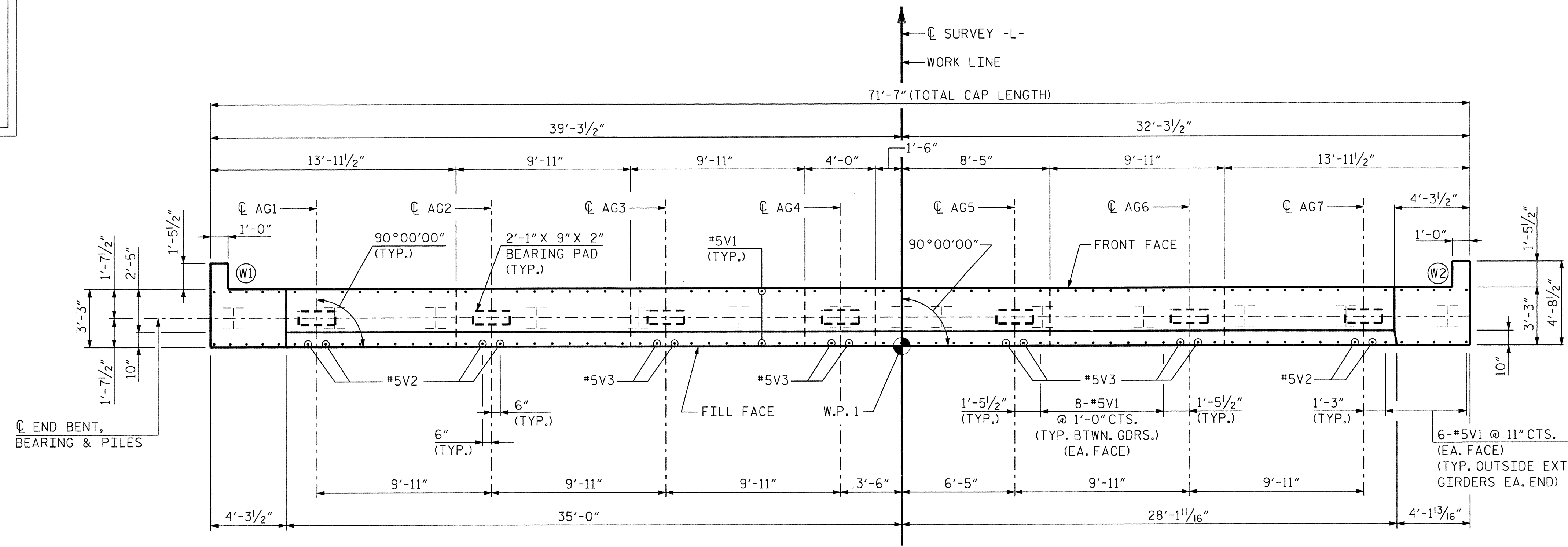


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S23
1			3			TOTAL SHEETS
2			4			36

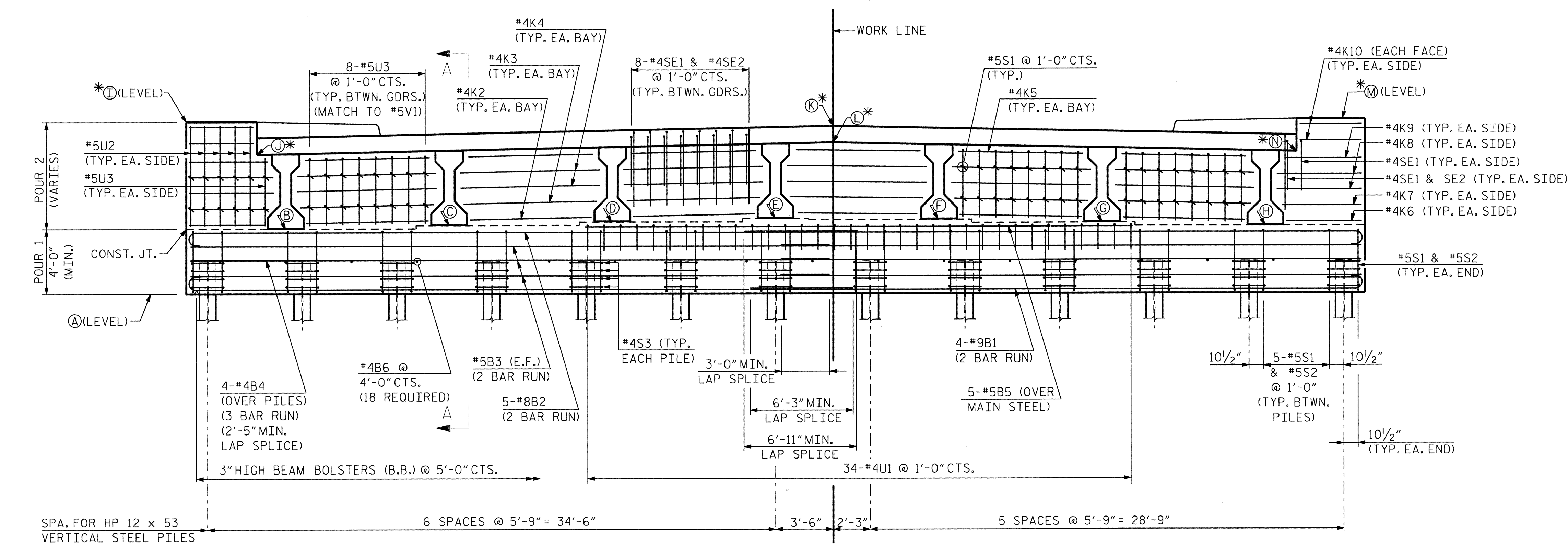
DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
CHECKED BY: R.D. FISHER DATE: JAN. 2013

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0102DEL\_P1006



PLAN



ELEVATION

FOR DESCRIPTION AND LOCATION OF REINFORCING STEEL IN SUPERSTRUCTURE SLAB, SEE "TYPICAL SECTION" SHEET.

#5V1 NOT SHOWN IN ELEVATION FOR CLARITY. SEE PLAN VIEW FOR PLACEMENT AND DIMENSIONING.

NOTES:

FOR SECTION A-A AND PILE SPLICE DETAILS, SEE "END BENT 1 DETAILS" SHEET, SHEET 2 OF 3.

THE MSE RETAINING WALLS ARE NOT SHOWN. FOR DETAILS, SEE "MSE RETAINING WALL FOR BRIDGE ON GRIER RD. OVER NCR/NS" SHEETS.

FOR MSE RETAINING WALLS, SEE SPECIAL PROVISIONS.

FOR TEMPORARY DRAINAGE, SEE "END BENT 2 DETAILS" SHEET, SHEET 2 OF 3.

ELEVATION TABLE

A	803.62
B	807.62
C	807.82
D	808.02
E	808.21
F	808.16
G	807.96
H	807.76
I*	814.11
J*	812.13
K*	814.00
L*	812.83
M*	814.24
N*	812.27

\* AT FILL FACE

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1

DWG. NO. 24

2-13-2013

**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S24	
1			3			TOTAL SHEETS	36
2			4				

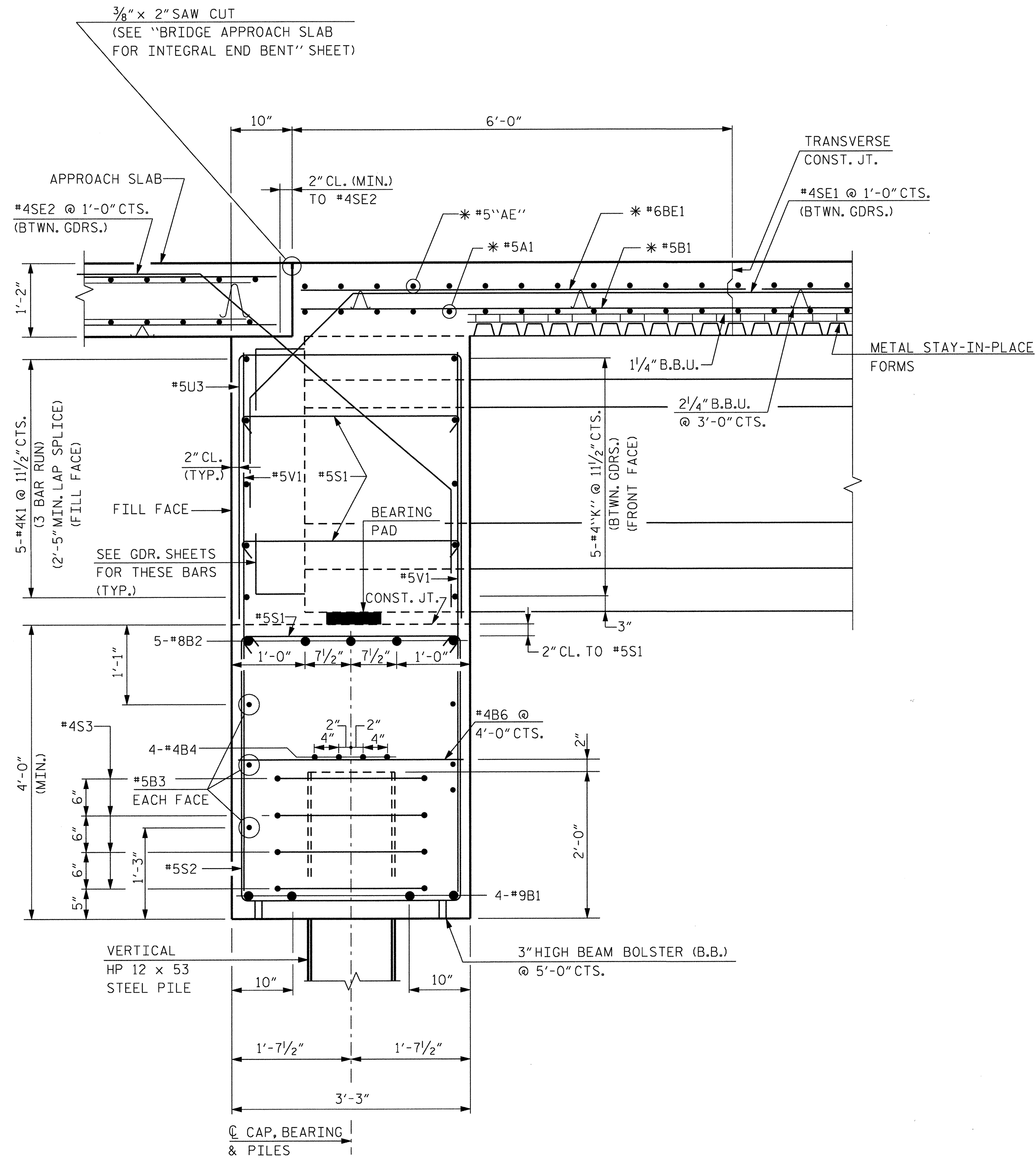
default 2/8/2013 R:\Structures\Grier Road Bridge\GDN\Final\P5208H\_sd.e1.dgn

DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
 CHECKED BY: R.D. FISHER DATE: JAN. 2013

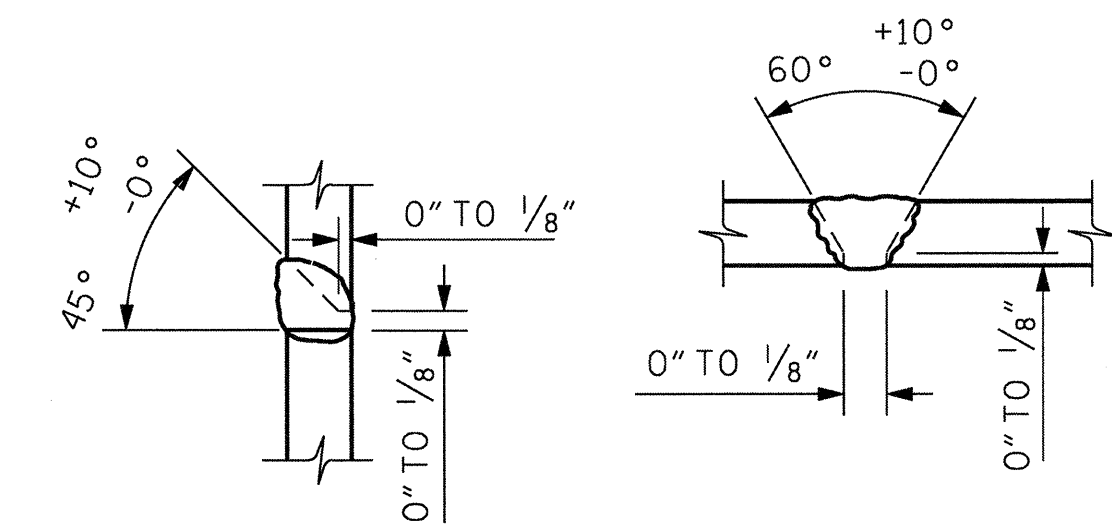


0102DEL\_P1006

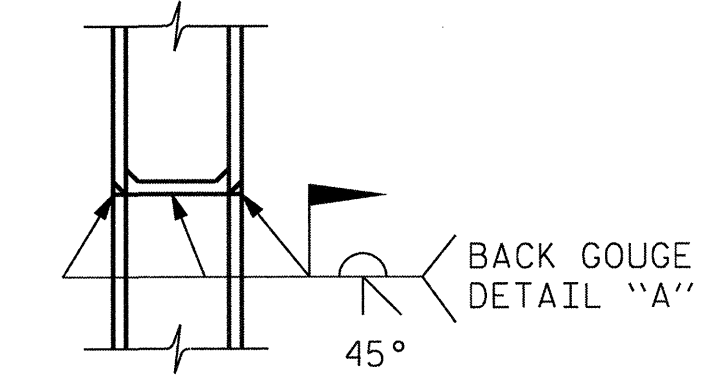
\* BARS ARE PLACED ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.



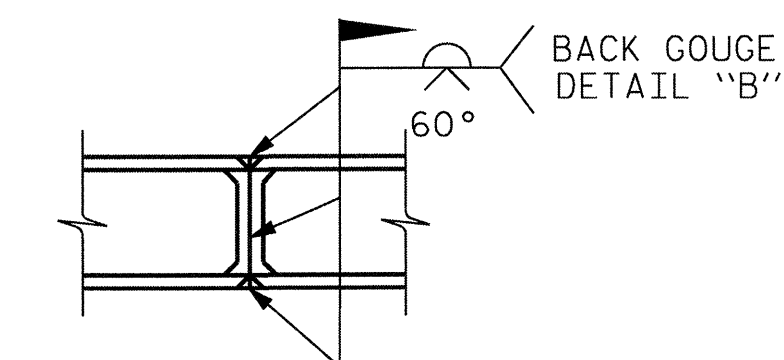
SECTION A-A  
(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)



DETAIL "A" DETAIL "B"



\*PILE VERTICAL



\*PILE HORIZONTAL OR VERTICAL

PILE SPLICE DETAILS

\* POSITION OF PILE DURING WELDING.

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 1  
DETAILS

DWG. NO. 25  
2-13-2013  
Professional Engineer Seal for Ryan D. Fisher, No. 29360, State of North Carolina.

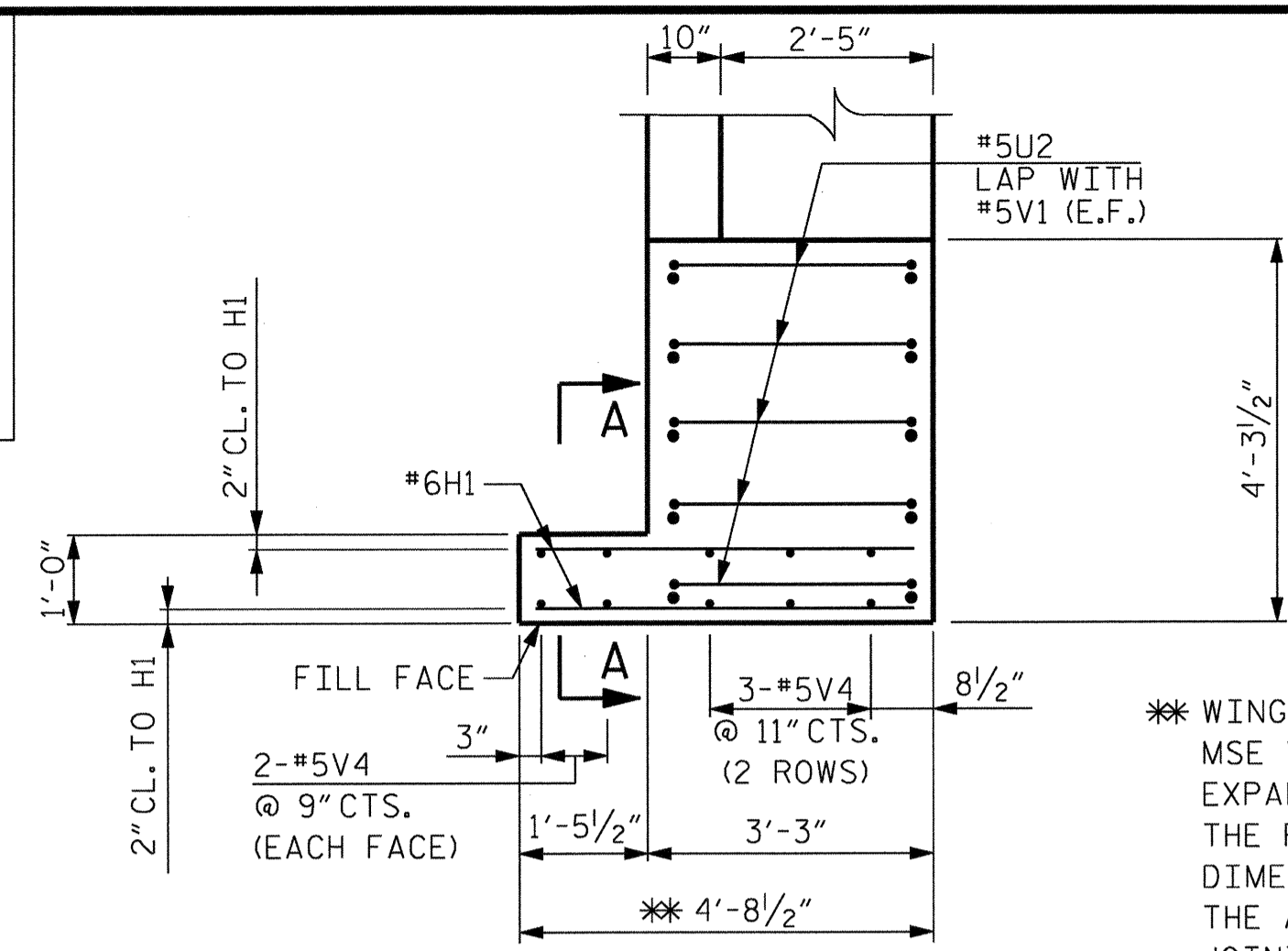
**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S25	
1			3			TOTAL SHEETS	
2			4			36	

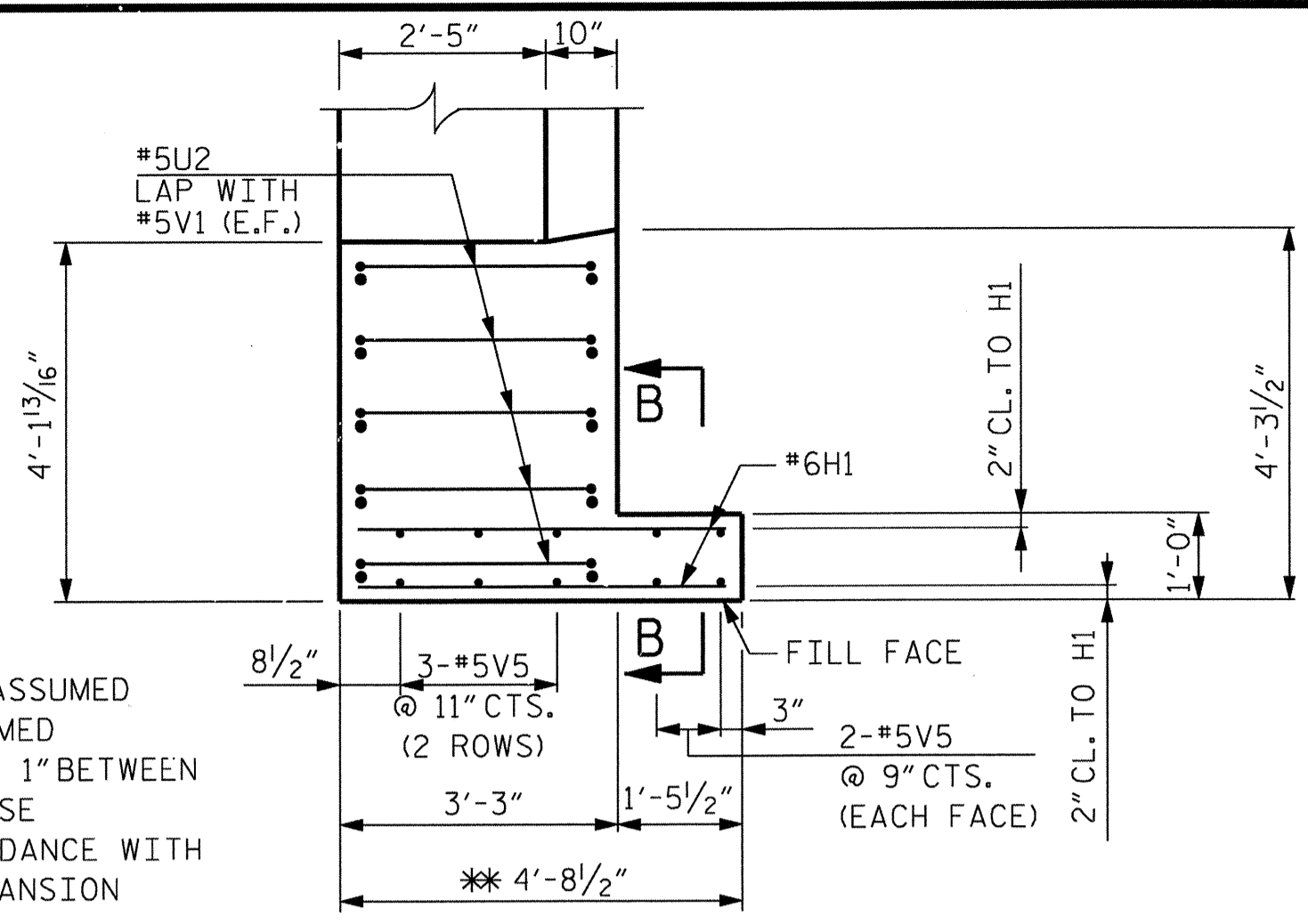
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DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
CHECKED BY : R.D. FISHER DATE : JAN. 2013

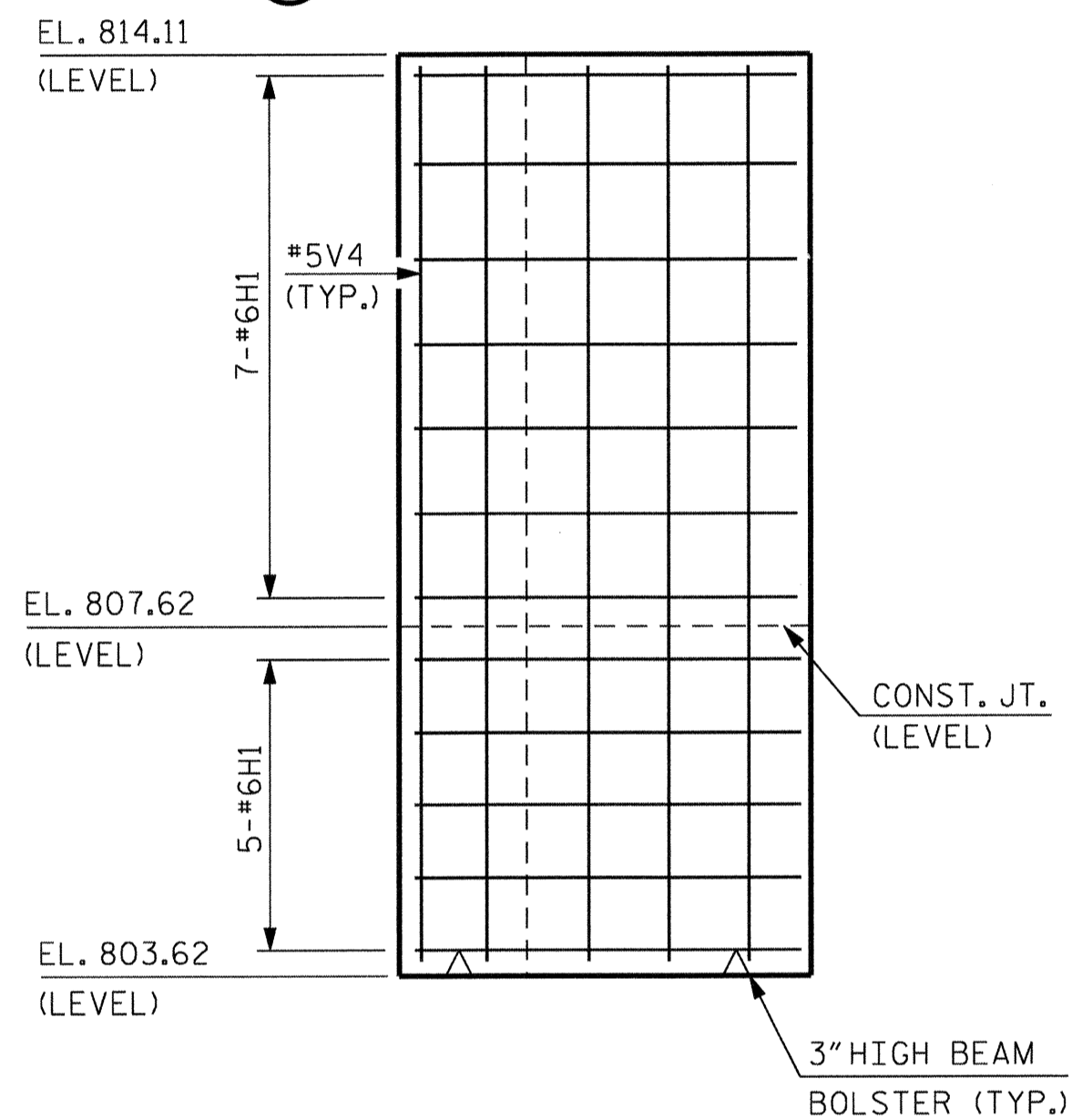
0102DEL\_P1006



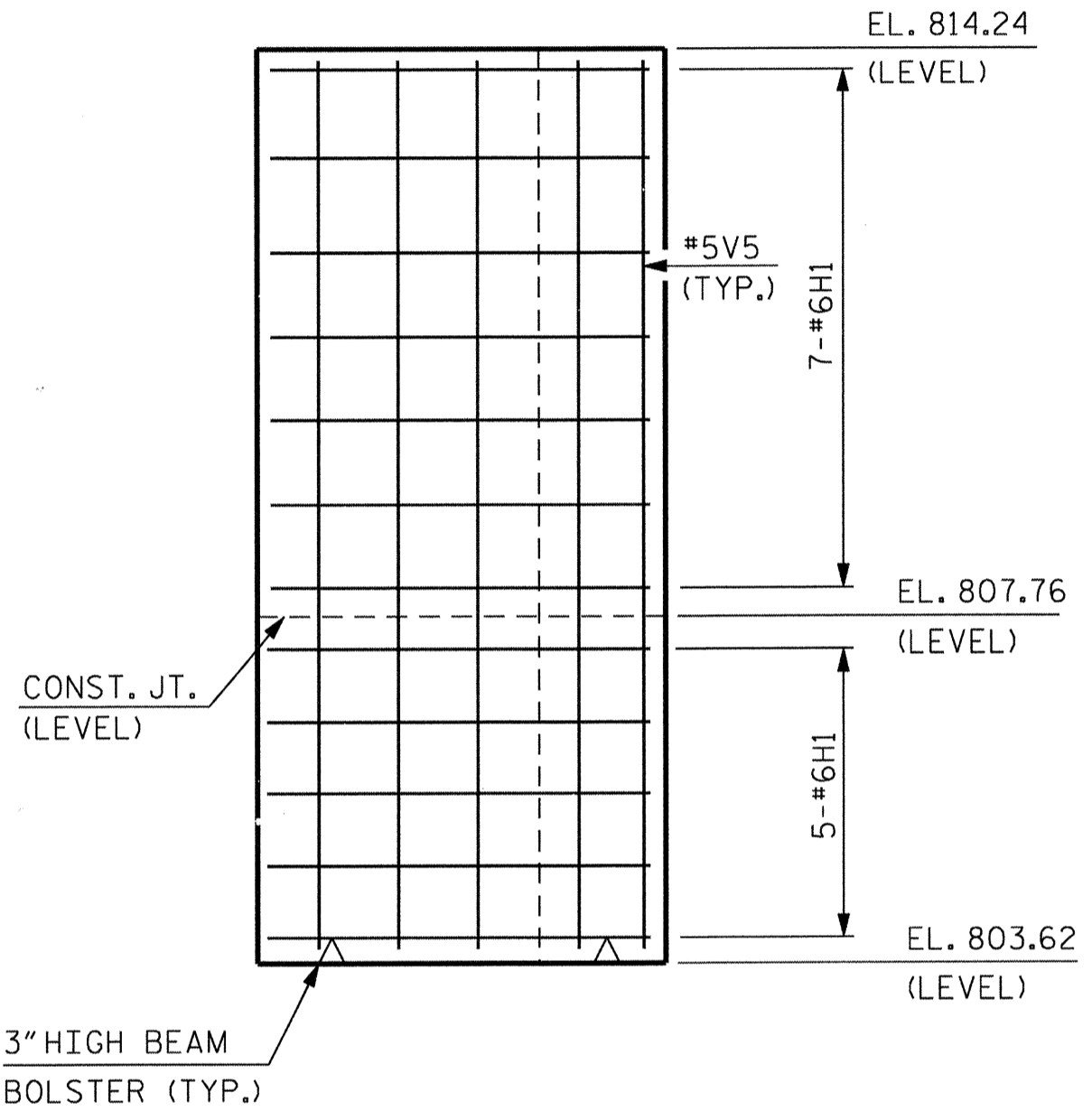
(W1) PLAN OF LEFT REVERSE WING



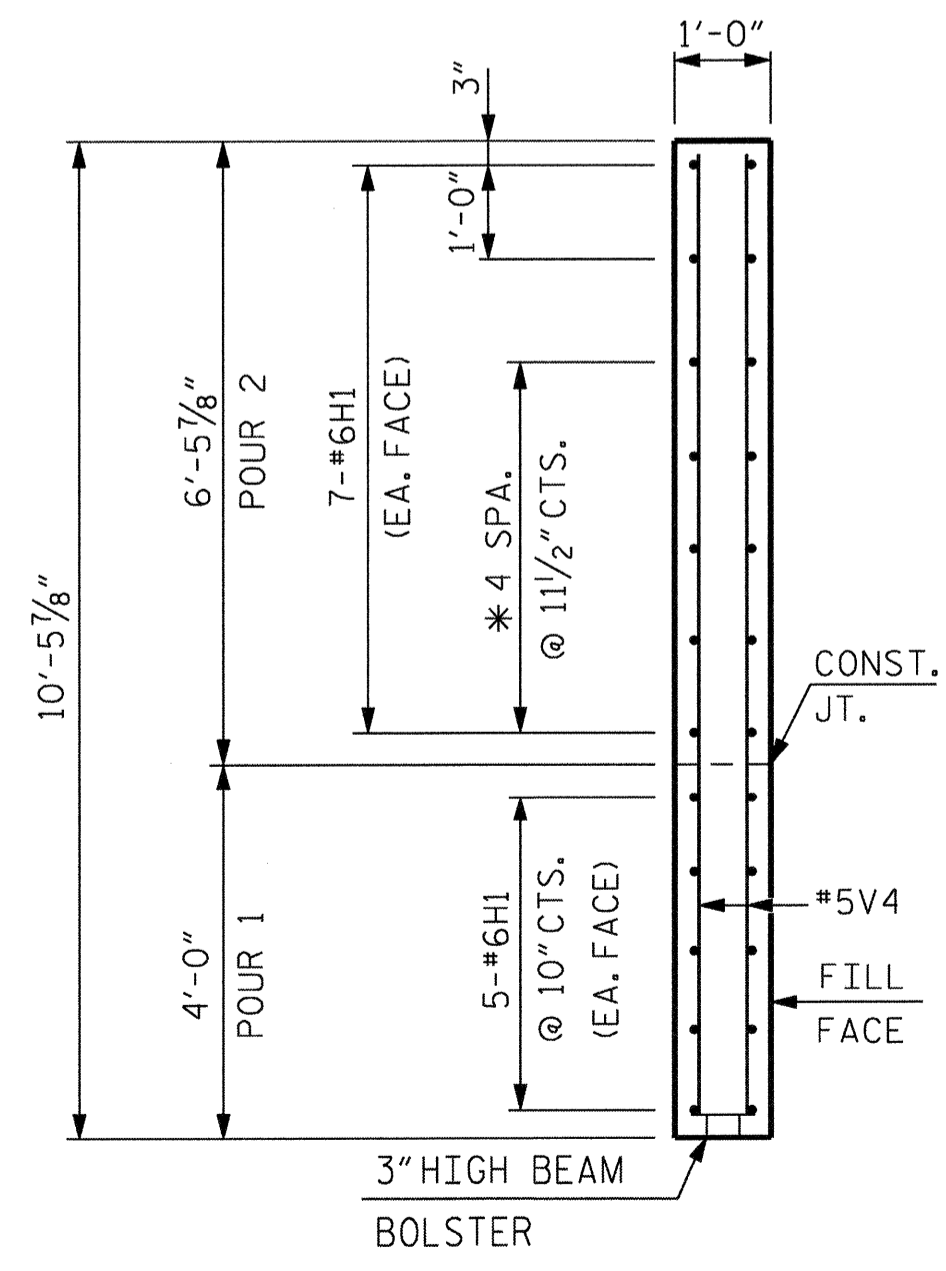
(W2) PLAN OF RIGHT REVERSE WING



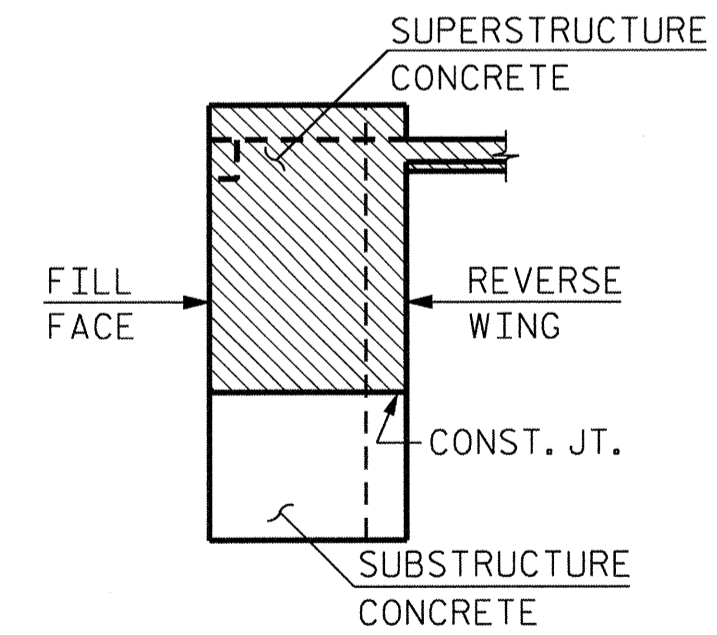
ELEVATION OF LEFT REVERSE WING



ELEVATION OF RIGHT REVERSE WING

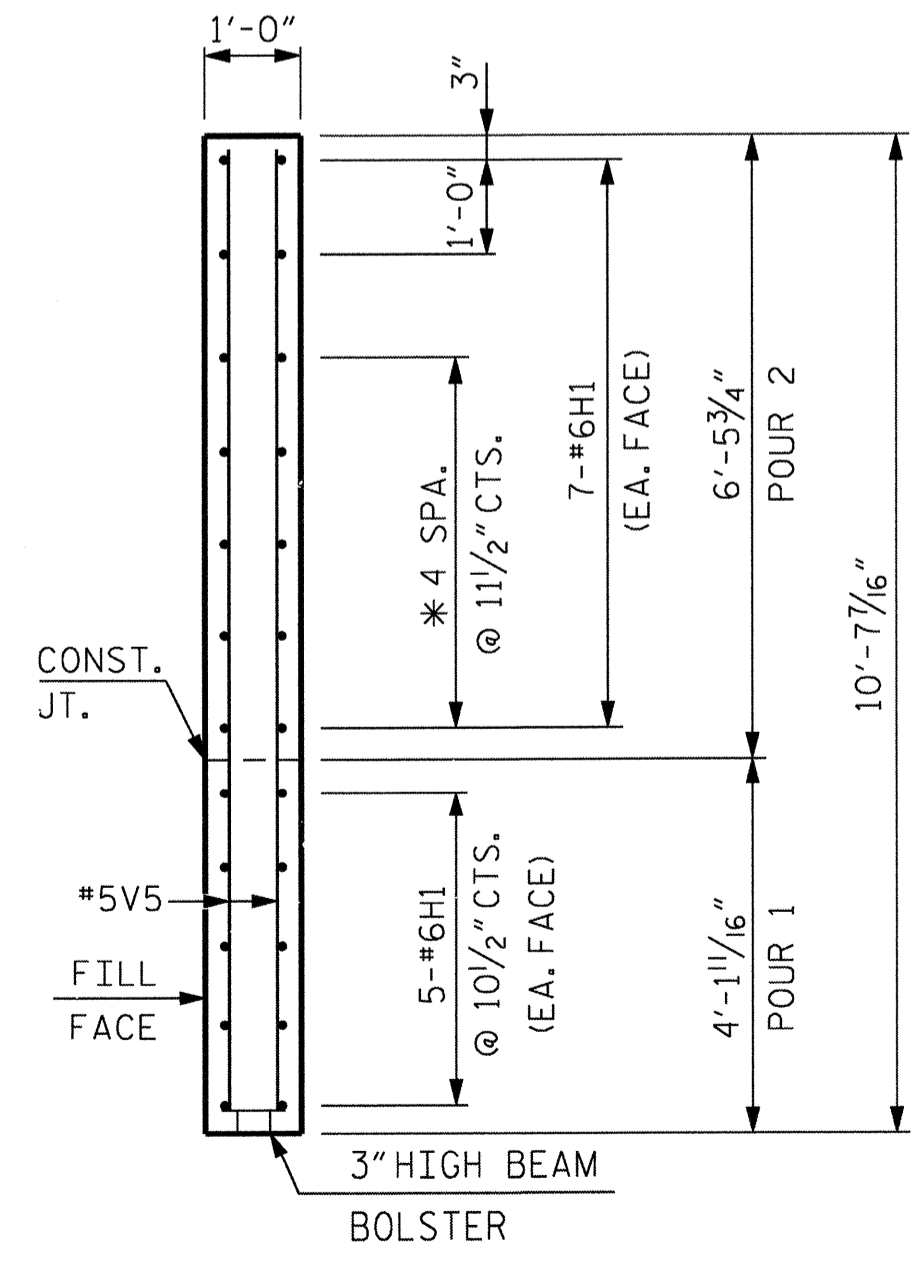


SECTION A-A  
\* MATCH TO #4K1 BARS IN BACKWALL



CONCRETE QUANTITY DETAIL

NOTE: CONCRETE QUANTITIES OF INTEGRAL END BENT CAP AND WINGWALLS ABOVE CONSTRUCTION JOINT ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES. REINFORCING STEEL IN THESE AREAS IS INCLUDED IN END BENT QUANTITIES.



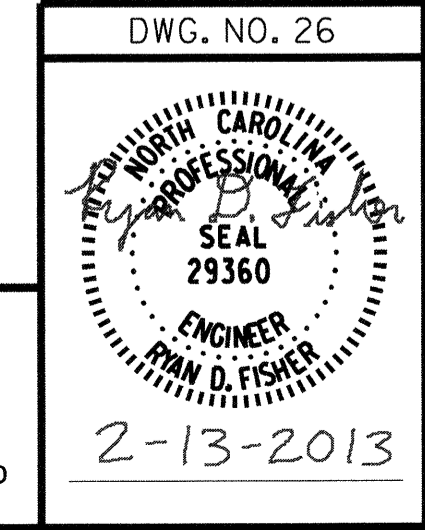
SECTION B-B  
\* MATCH TO #4K1 BARS IN BACKWALL

BAR TYPES		BILL OF MATERIAL															
		<b>END BENT 1</b>															
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT													
B1	#8		40'-0"	1,088													
B2	#8		40'-0"	1,068													
B3	#5	STR.	37'-2"	465													
B4	#4	STR.	25'-5"	204													
B5	#5	STR.	33'-5"	174													
B6	#4	STR.	2'-11"	35													
H1	#6	STR.	4'-4"	312													
K1	#4	STR.	25'-5"	255													
K2	#4	STR.	7'-6"	30													
K3	#4	STR.	8'-6"	34													
K4	#4	STR.	9'-0"	72													
K5	#4	STR.	8'-0"	32													
K6	#4	STR.	4'-8"	6													
K7	#4	STR.	5'-2"	7													
K8	#4	STR.	5'-5"	14													
K9	#4	STR.	4'-11"	7													
K10	#4	STR.	3'-9"	20													
S1	#5		3'-10"	728													
S2	#5		11'-1"	717													
S3	#4		6'-5"	223													
SE1	#4		11'-11"	414													
SE2	#4		10'-2"	340													
U1	#4		6'-3"	142													
U2	#5		15'-1"	157													
U3	#5		11'-4"	591													
V1	#5	STR.	6'-9"	845													
V2	#5	STR.	8'-1"	51													
V3	#5	STR.	8'-5"	70													
V4	#5	STR.	10'-0"	104													
V5	#5	STR.	10'-2"	106													
		<table border="1"> <tr> <td>EPOXY COATED REINFORCING STEEL</td> <td>754 LB.</td> </tr> <tr> <td>REINFORCING STEEL</td> <td>7,557 LB.</td> </tr> <tr> <td>CLASS "A" CONCRETE POUR 1 (CAP &amp; LOWER WINGS)</td> <td>37.2 C.Y.</td> </tr> <tr> <td>HP 12 x 53 STEEL PILES</td> <td></td> </tr> <tr> <td>NO.</td> <td>13</td> </tr> <tr> <td>LIN. FEET</td> <td>715</td> </tr> <tr> <td>E = EPOXY COATED STEEL</td> <td></td> </tr> </table>		EPOXY COATED REINFORCING STEEL	754 LB.	REINFORCING STEEL	7,557 LB.	CLASS "A" CONCRETE POUR 1 (CAP & LOWER WINGS)	37.2 C.Y.	HP 12 x 53 STEEL PILES		NO.	13	LIN. FEET	715	E = EPOXY COATED STEEL	
EPOXY COATED REINFORCING STEEL	754 LB.																
REINFORCING STEEL	7,557 LB.																
CLASS "A" CONCRETE POUR 1 (CAP & LOWER WINGS)	37.2 C.Y.																
HP 12 x 53 STEEL PILES																	
NO.	13																
LIN. FEET	715																
E = EPOXY COATED STEEL																	
NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT.																	

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 3 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 1  
WING WALL AND  
BILL OF MATERIALS



**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

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

TOTAL SHEETS: 36

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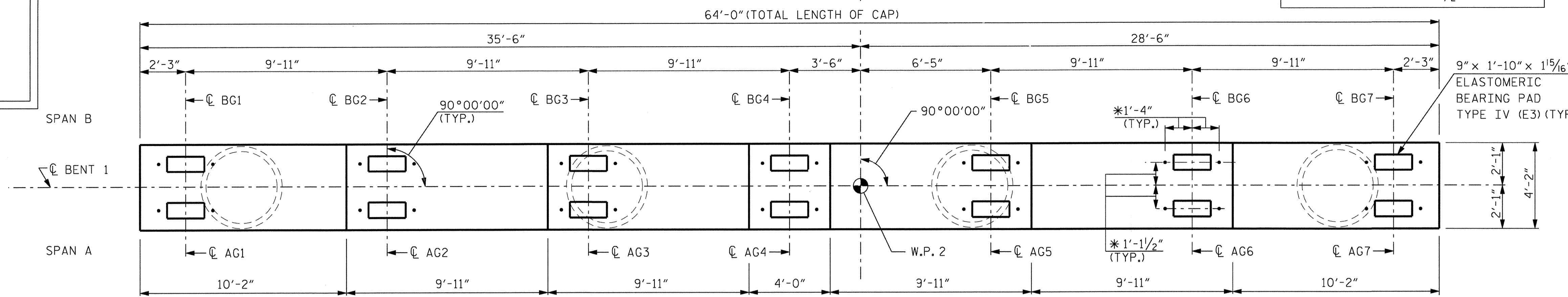
DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
CHECKED BY: R.D. FISHER DATE: JAN. 2013

0102DEL\_P10G6

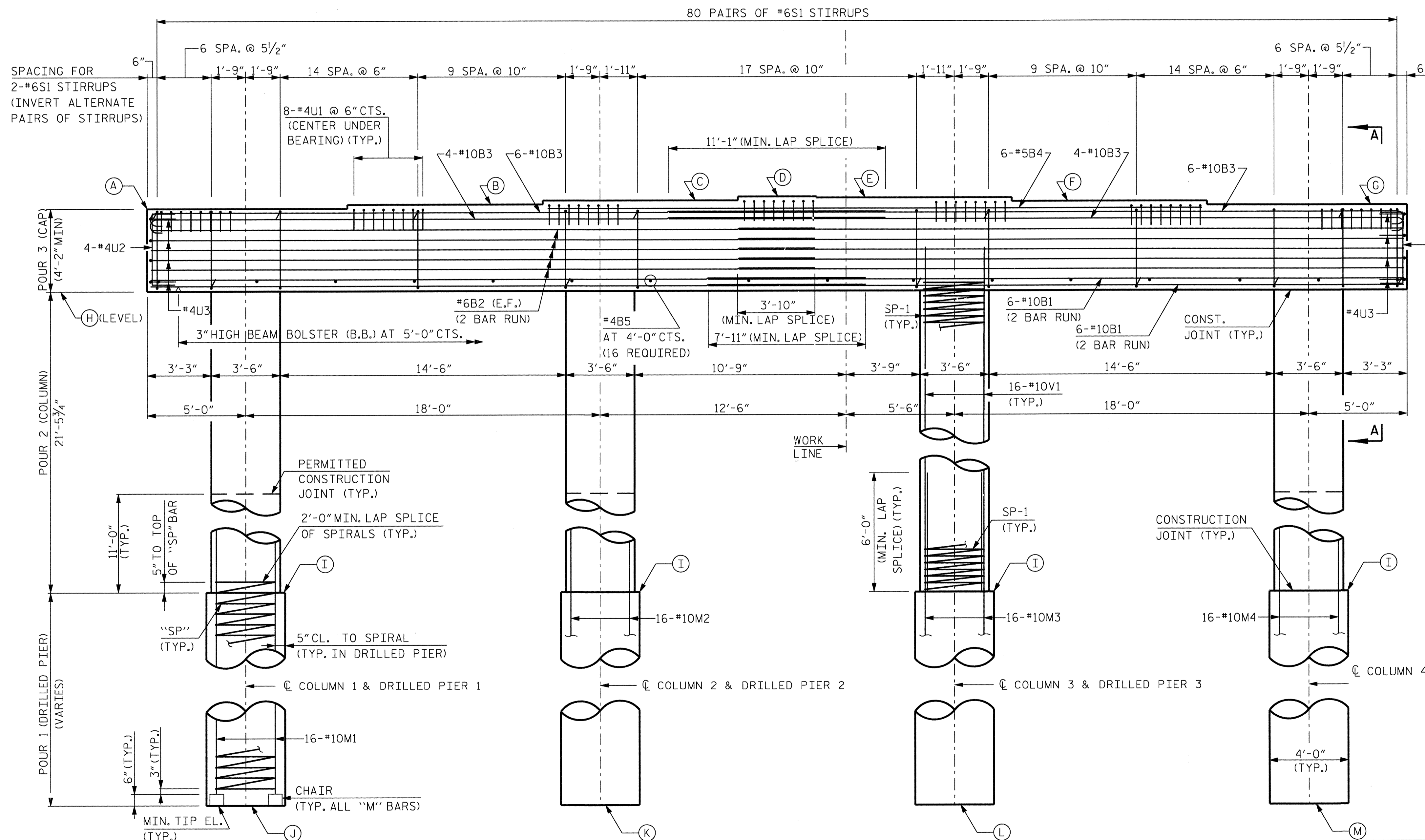
CL SURVEY -L- WORK LINE

\*SPACING FOR 2" Ø x 2'-0 1/2" ANCHOR BOLT WITH 6 1/2" PROJECTION

FOR NOTES, SEE SHEET 2 OF 2.

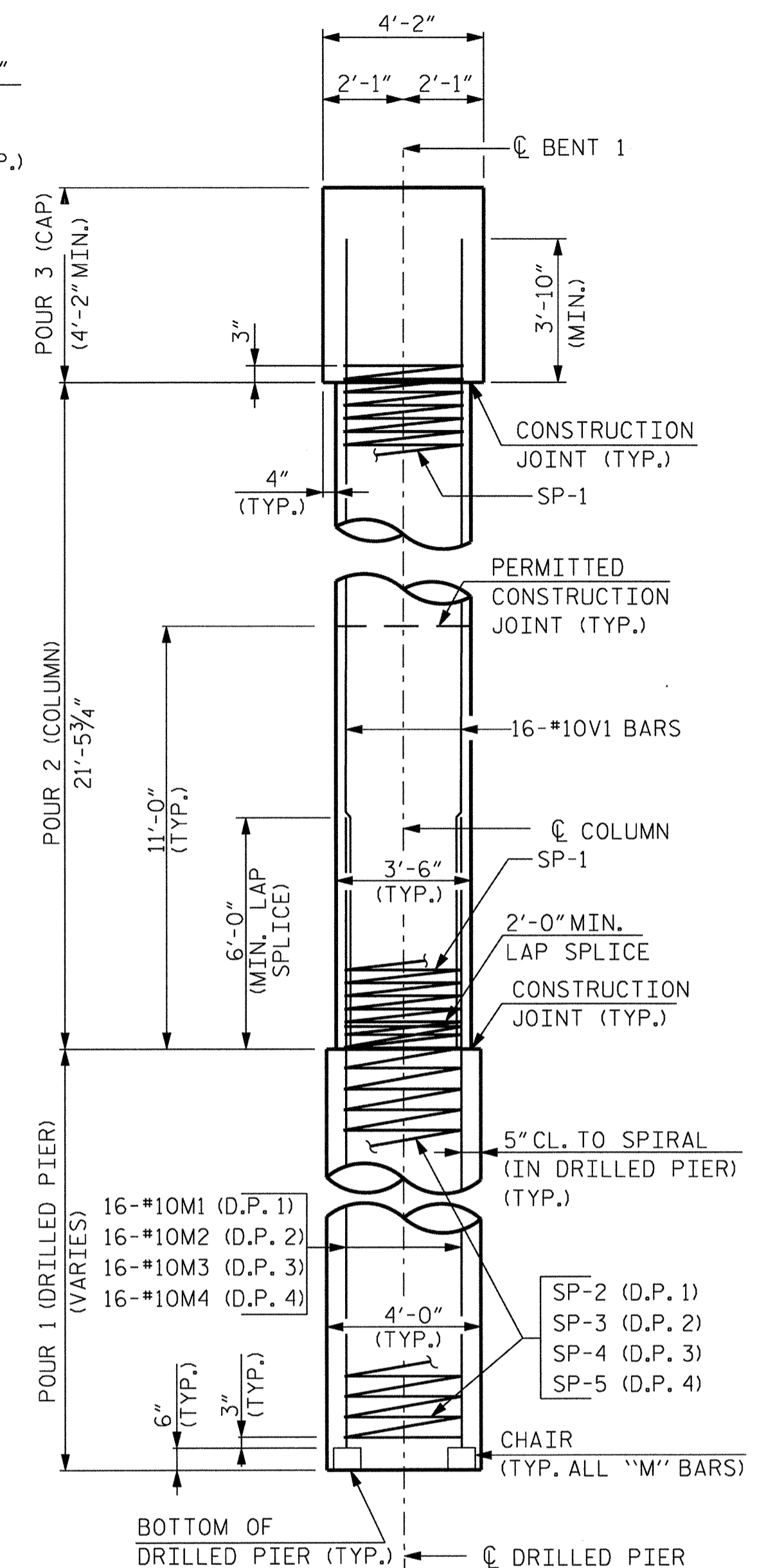


PLAN



ELEVATION

ELEVATION TABLE	
A	806.65
B	806.85
C	807.05
D	807.25
E	807.19
F	806.99
G	806.79
H	802.48
I	781.00
J	736.50
K	747.00
L	750.00
M	751.00



END ELEVATION

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT 1

DWG. NO. 27

2-13-2013

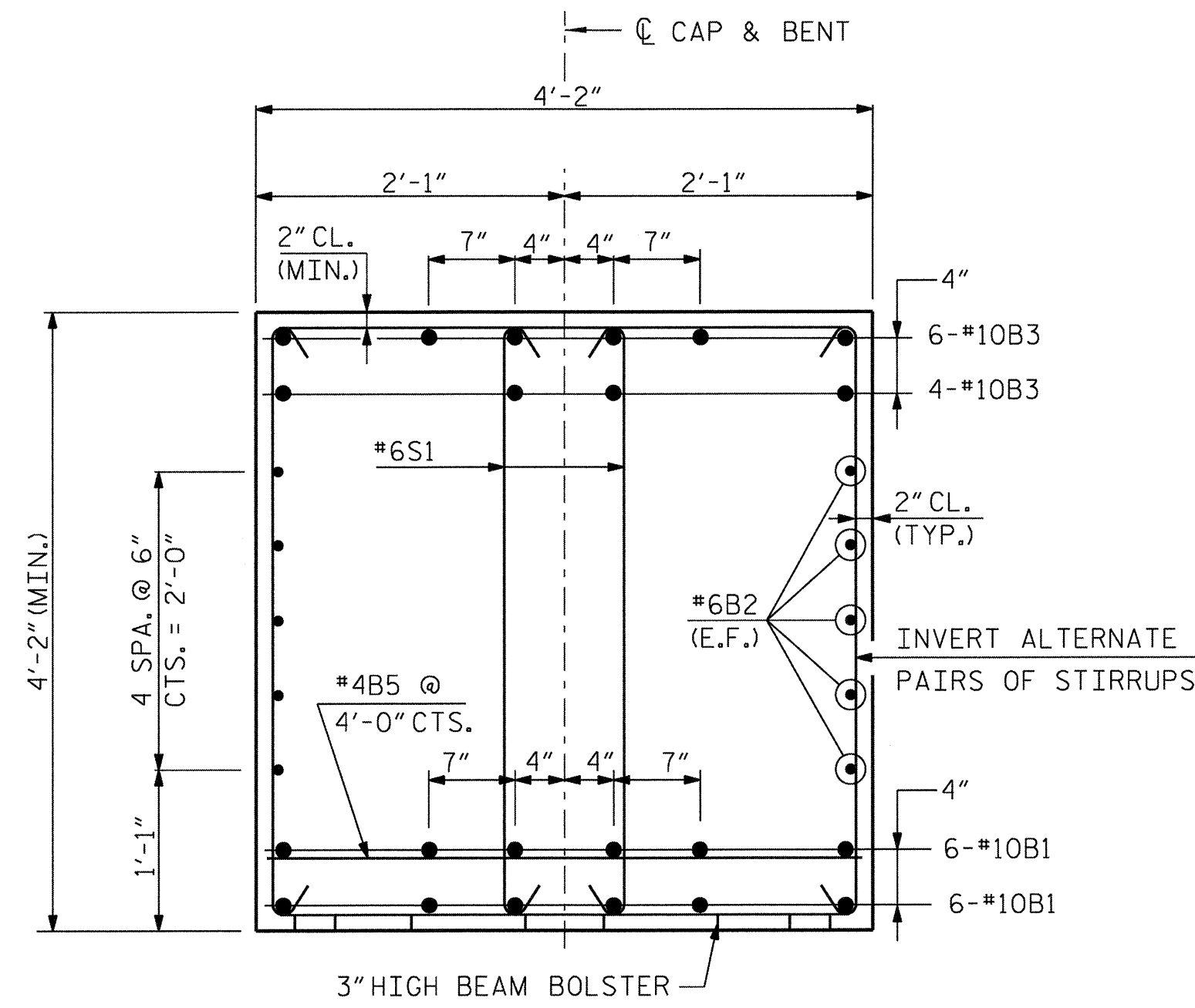
PROFESSIONAL ENGINEER  
FRANK D. FISHER  
SEAL 29360

**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

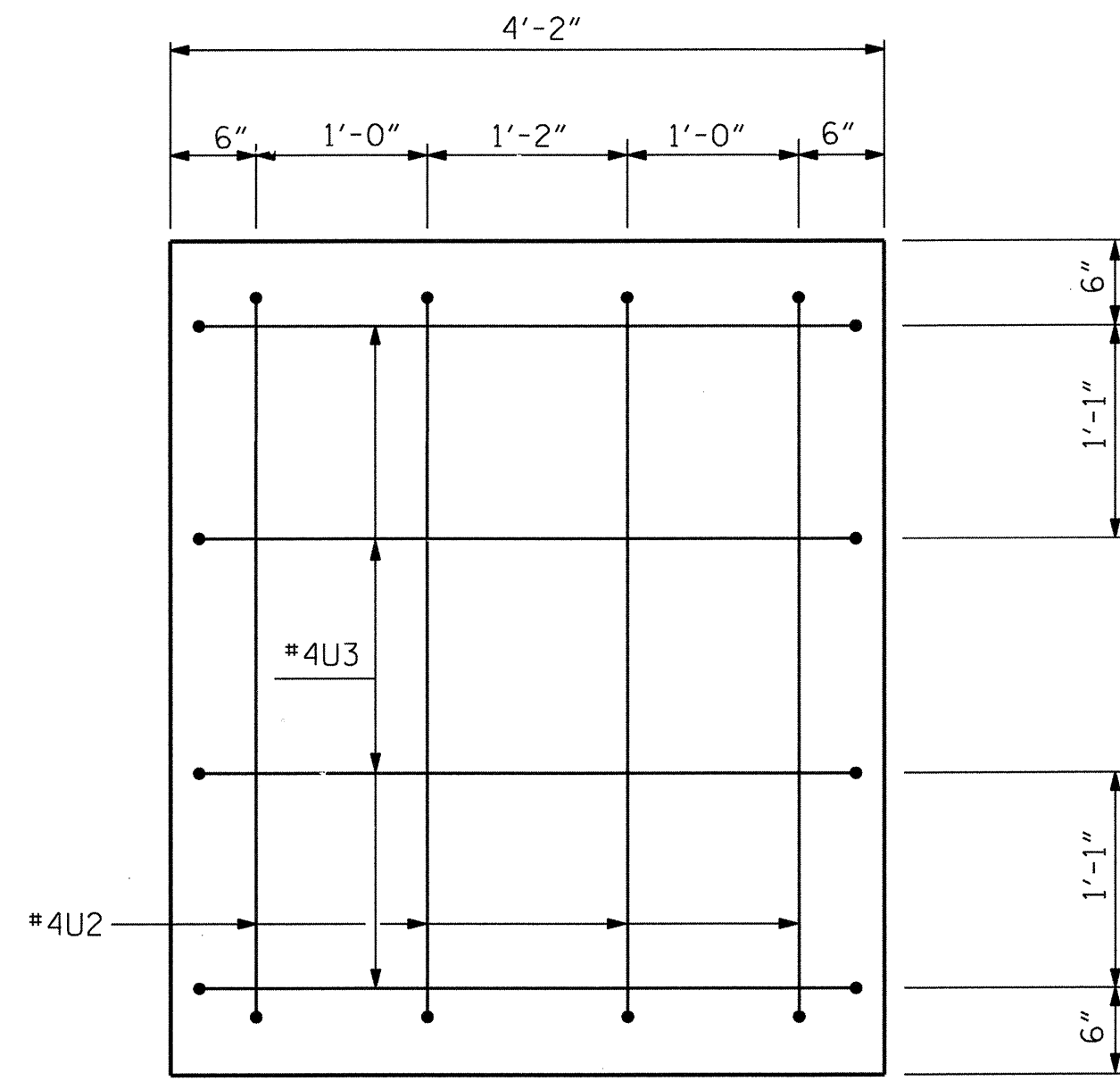
REVISIONS						SHEET NO. S27
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
CHECKED BY: R.D. FISHER DATE: JAN. 2013

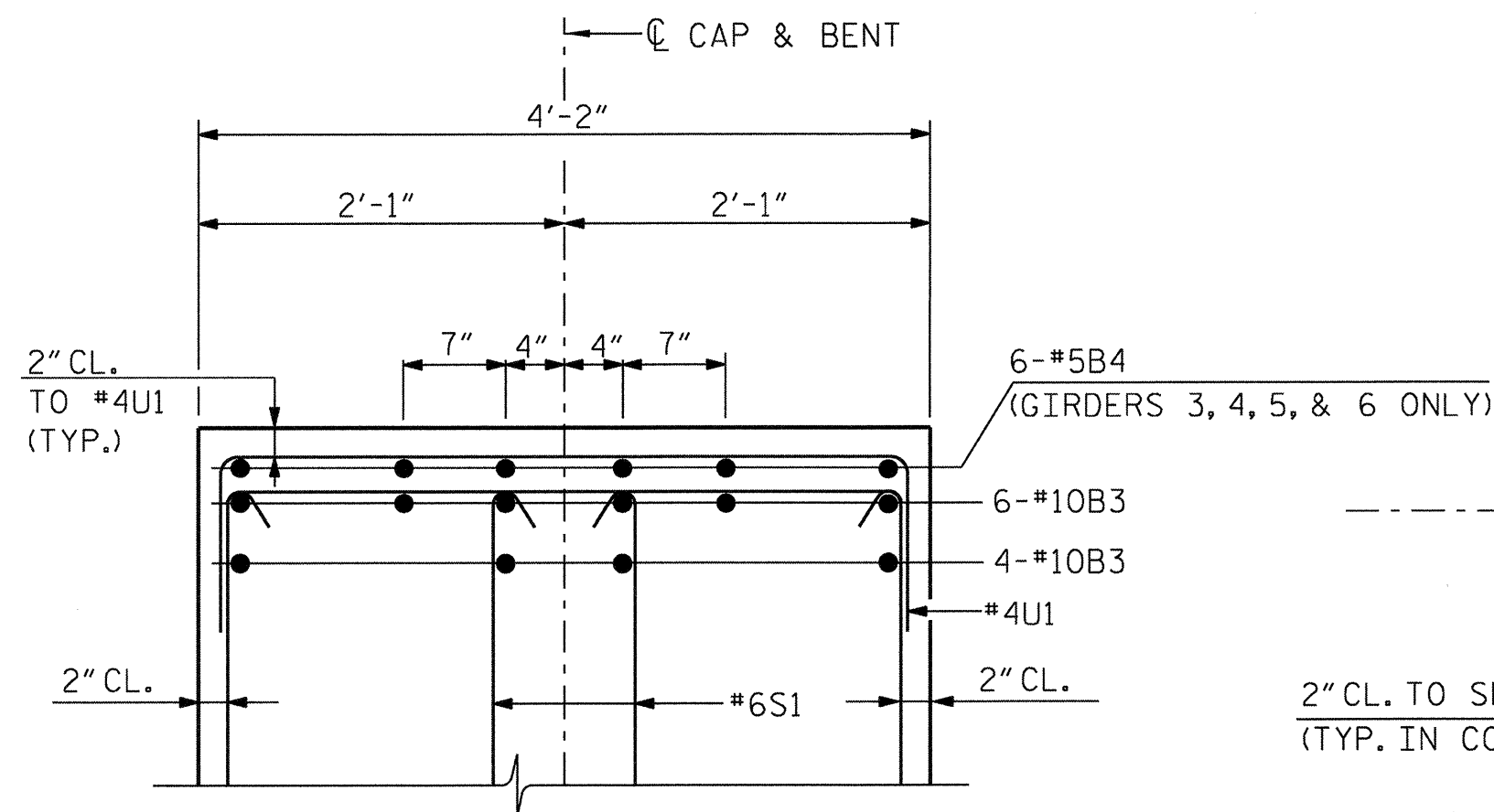
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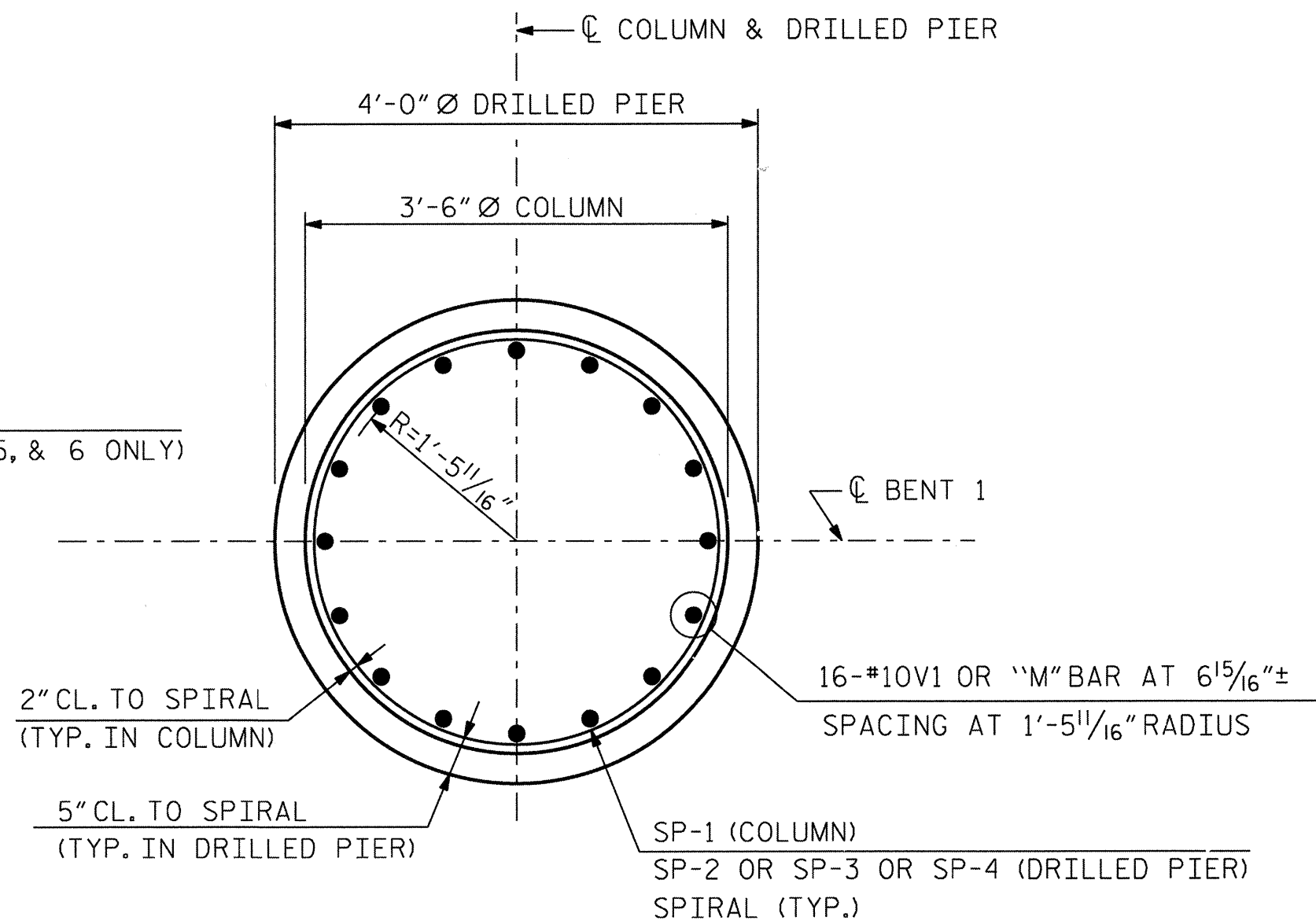
SECTION A-A



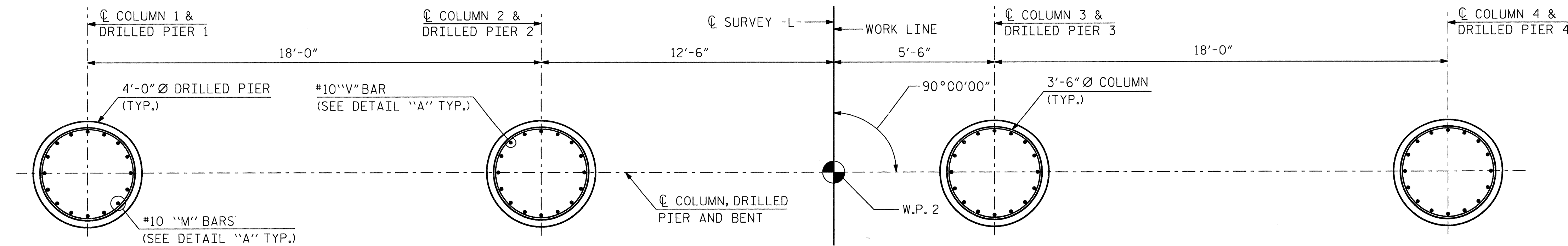
END OF CAP DETAIL



SECTION THRU BEARING

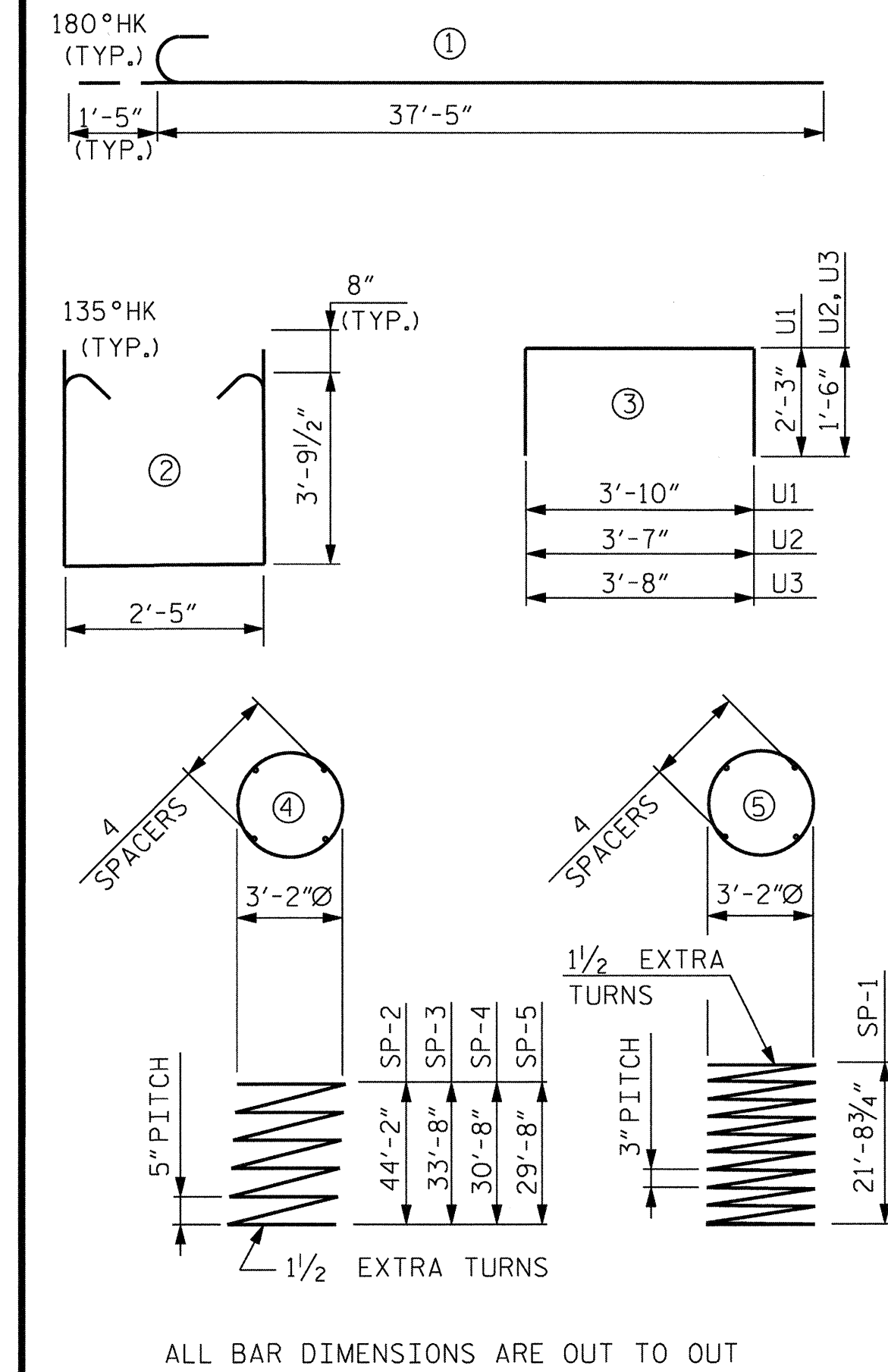


DETAIL "A"



PLAN OF COLUMNS AND DRILLED PIERS

BILL OF MATERIAL



BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	24	#10	STR.	35'-10"	3,701
B2	20	#6	STR.	33'-9"	1,014
B3	20	#10	1	38'-10"	3,342
B4	6	#5	STR.	33'-5"	209
B5	16	#4	STR.	3'-10"	41
M1	16	#10	STR.	50'-0"	3,442
M2	16	#10	STR.	39'-6"	2,719
M3	16	#10	STR.	36'-6"	2,513
M4	16	#10	STR.	35'-6"	2,444
S1	160	#6	2	11'-4"	2,724
U1	56	#4	3	8'-4"	312
U2	8	#4	3	6'-7"	35
U3	8	#4	3	6'-8"	36
V1	64	#10	STR.	25'-4"	6,977
SP-1	4	*	5	868'-5"	2,320
SP-2	1	**	4	1052'-10"	1,098
SP-3	1	**	4	806'-1"	841
SP-4	1	**	4	735'-7"	767
SP-5	1	**	4	712'-0"	743
SPIRAL COLUMN REINFORCING STEEL					5,769 LBS.
REINFORCING STEEL					29,509 LBS.
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)					64.9 C.Y.
CLASS A CONCRETE POUR 2 (COLUMNS)					30.6 C.Y.
POUR 3 (CAP)					44.0 C.Y.
TOTAL					74.6 C.Y.
4'-0" D.P. IN SOIL					96.5 L.F.
4'-0" D.P. NOT IN SOIL					43 L.F.

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.

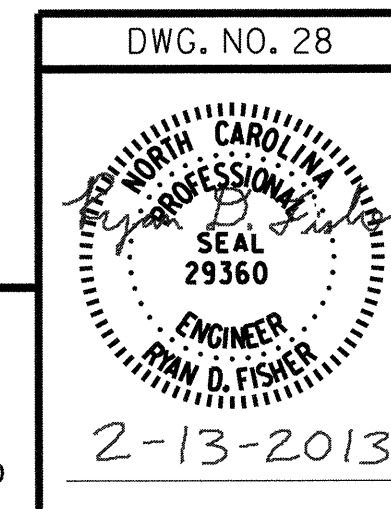
\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.  
 \*\* THE SP-2, SP-3, SP-4, & SP-5 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 1  
 DETAILS



**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

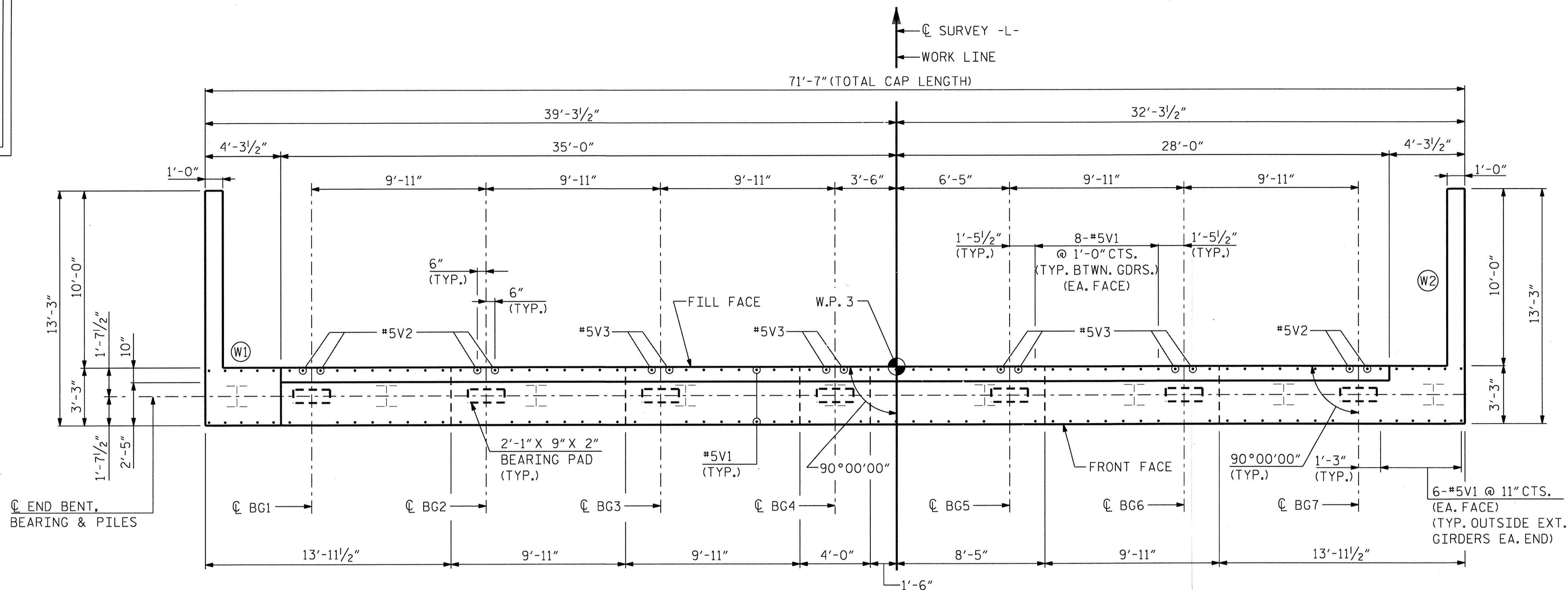
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
 S28  
 TOTAL SHEETS  
 36

DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
 CHECKED BY: R.D. FISHER DATE: JAN. 2013

DWG. NO. 28  
 2-13-2013

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PLAN

**NOTES:**

FOR SECTION A-A, SEE "END BENT 2 DETAILS" SHEET, SHEET 2 OF 3.

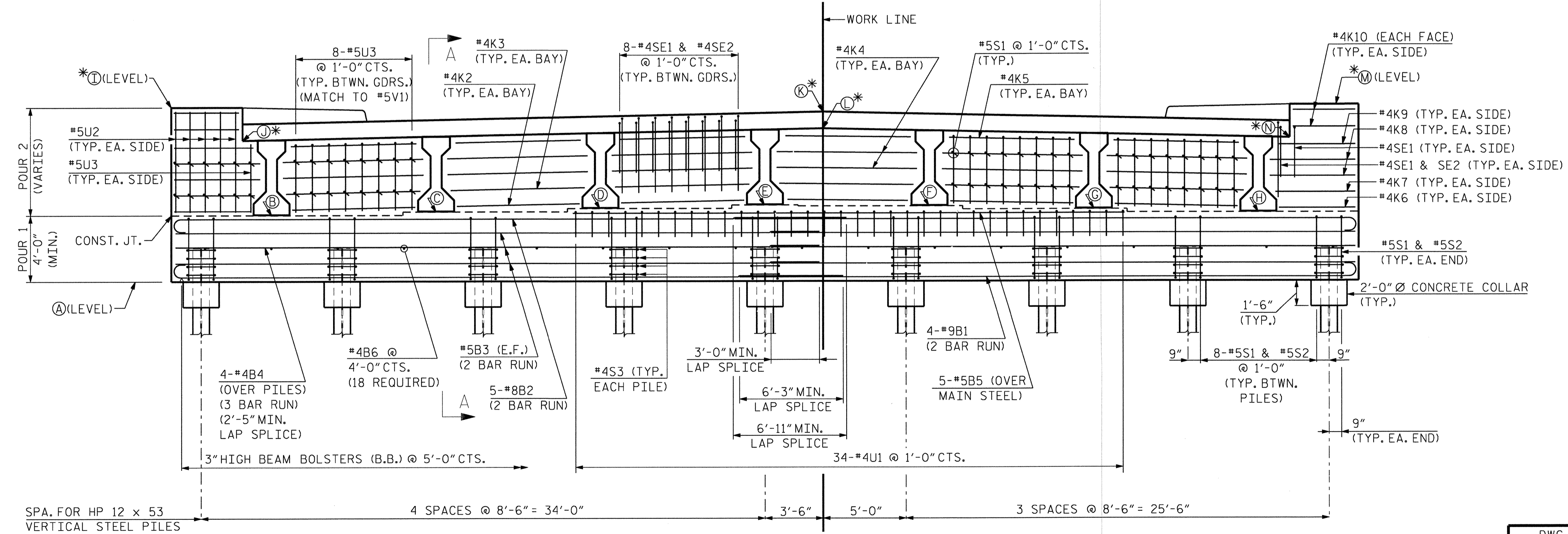
FOR PILE SPLICE DETAILS, SEE "END BENT 1 DETAILS" SHEET, SHEET 2 OF 3.

FOR TEMPORARY DRAINAGE, SEE "END BENT 2 DETAILS" SHEET, SHEET 2 OF 3.

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

ELEVATION TABLE	
A	801.73
B	805.73
C	805.93
D	806.12
E	806.32
F	806.26
G	806.07
H	805.87
I*	812.17
J*	810.20
K*	812.06
L*	810.90
M*	812.31
N*	810.33

\* AT FILL FACE



ELEVATION

FOR DESCRIPTION AND LOCATION OF REINFORCING STEEL IN SUPERSTRUCTURE SLAB, SEE "TYPICAL SECTION" SHEET.

#5V1 NOT SHOWN IN ELEVATION FOR CLARITY. SEE PLAN VIEW FOR PLACEMENT AND DIMENSIONING.

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2

DWG. NO. 29

2-13-2013

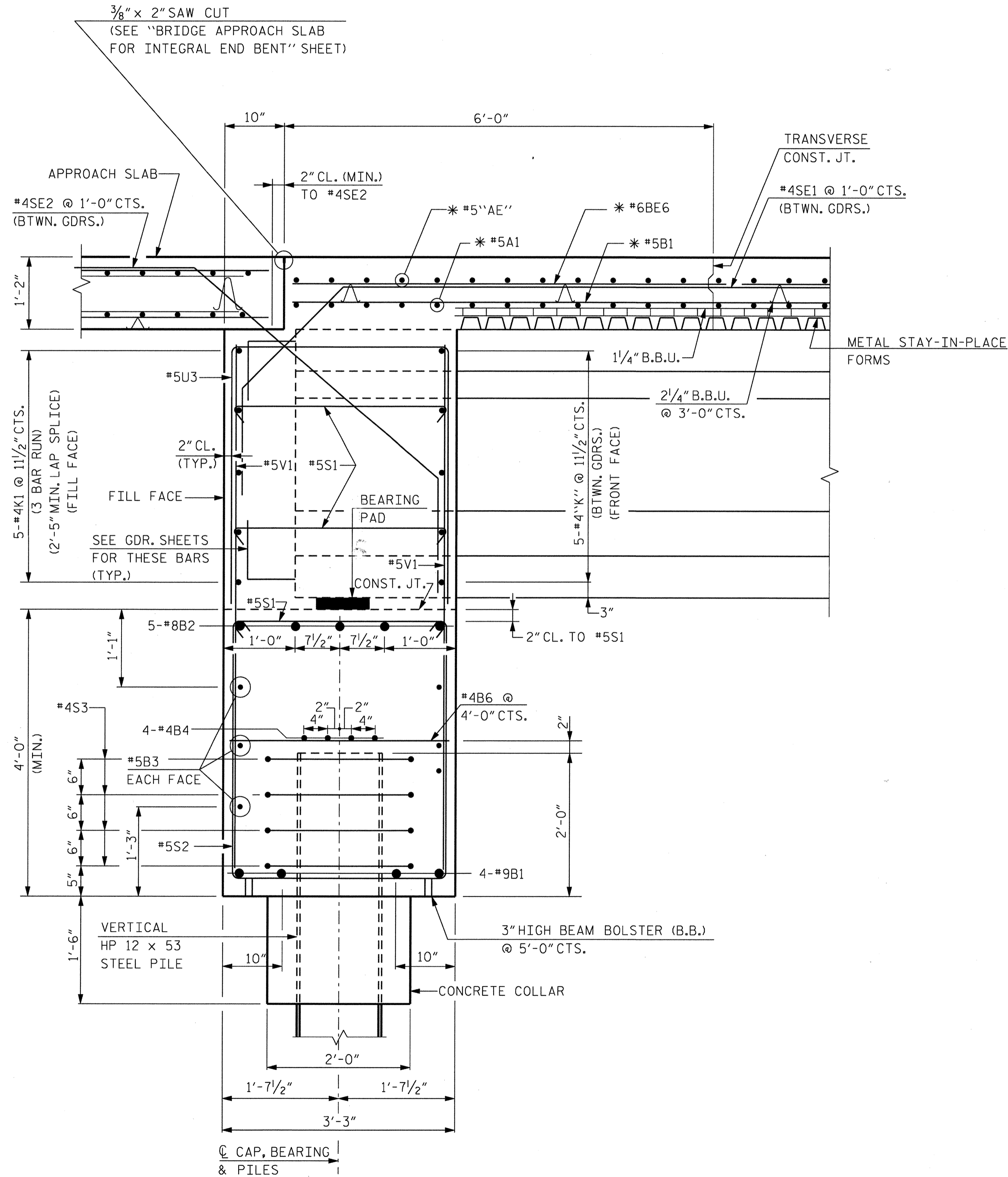
**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO. S29
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
 CHECKED BY: R.D. FISHER DATE: JAN. 2013

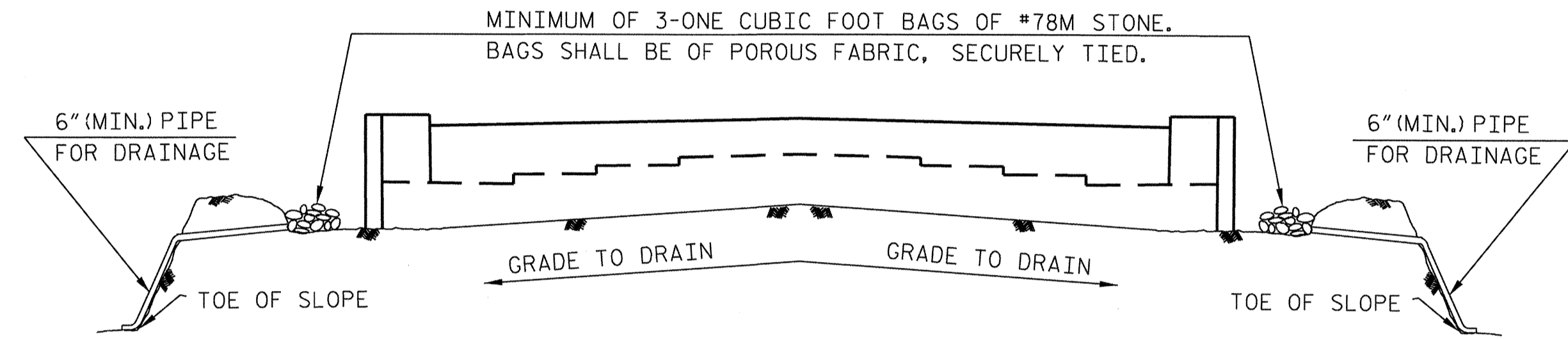
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\* BARS ARE PLACED ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.



**SECTION A-A**

(DIMENSIONS SHOWN ARE NORMAL TO THE END BENT)



**TEMPORARY DRAINAGE AT END BENT**

**NOTES:**

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 FOR THE SEVERAL PAY ITEMS.

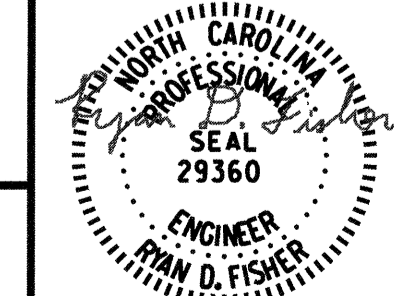
PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2  
 DETAILS

DWG. NO. 30



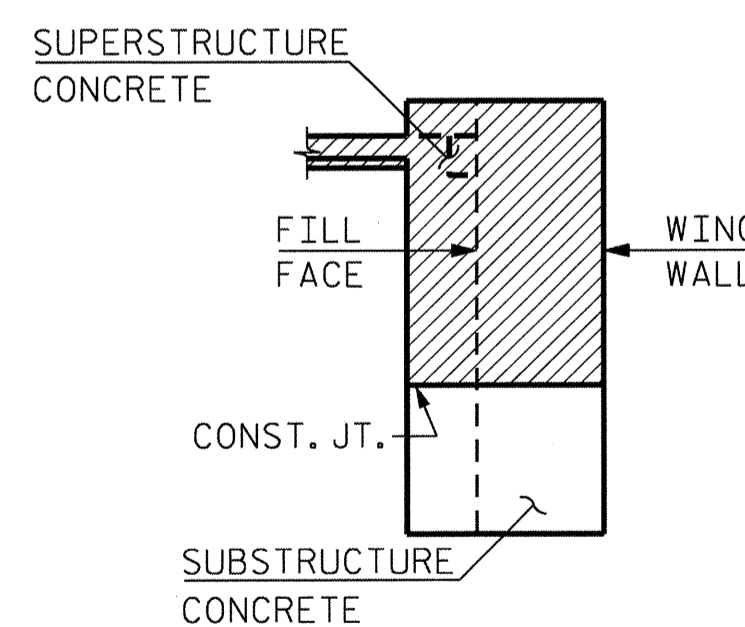
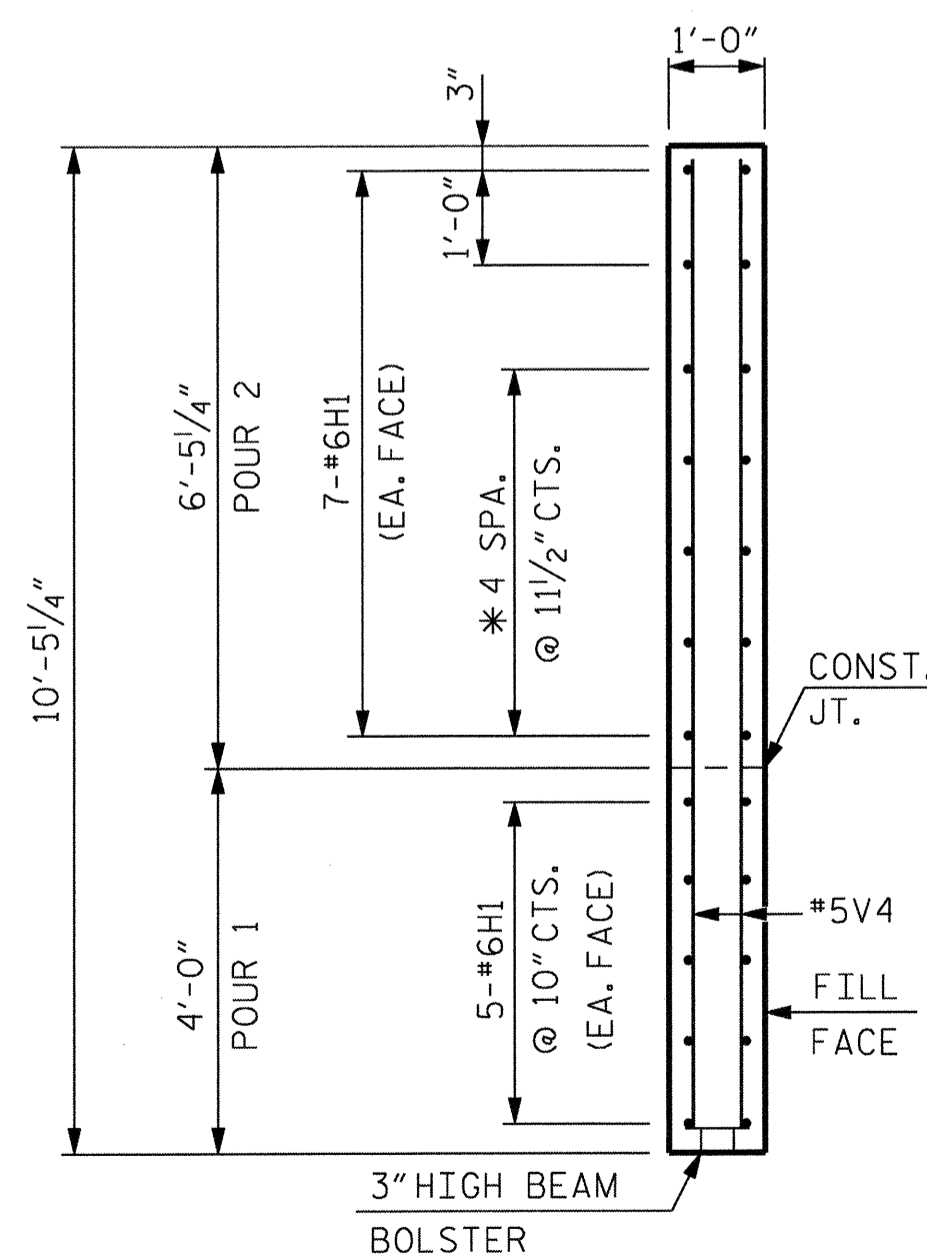
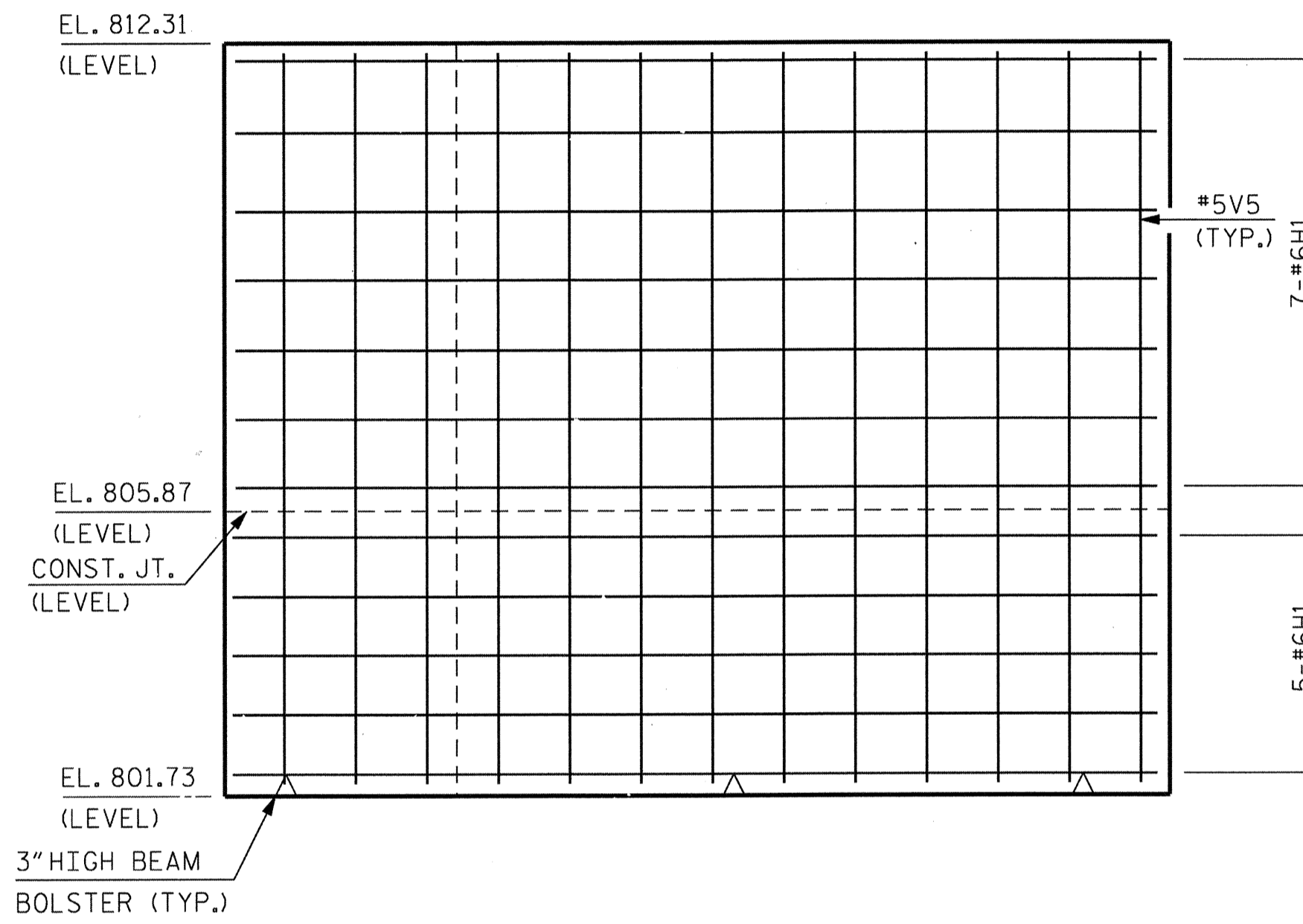
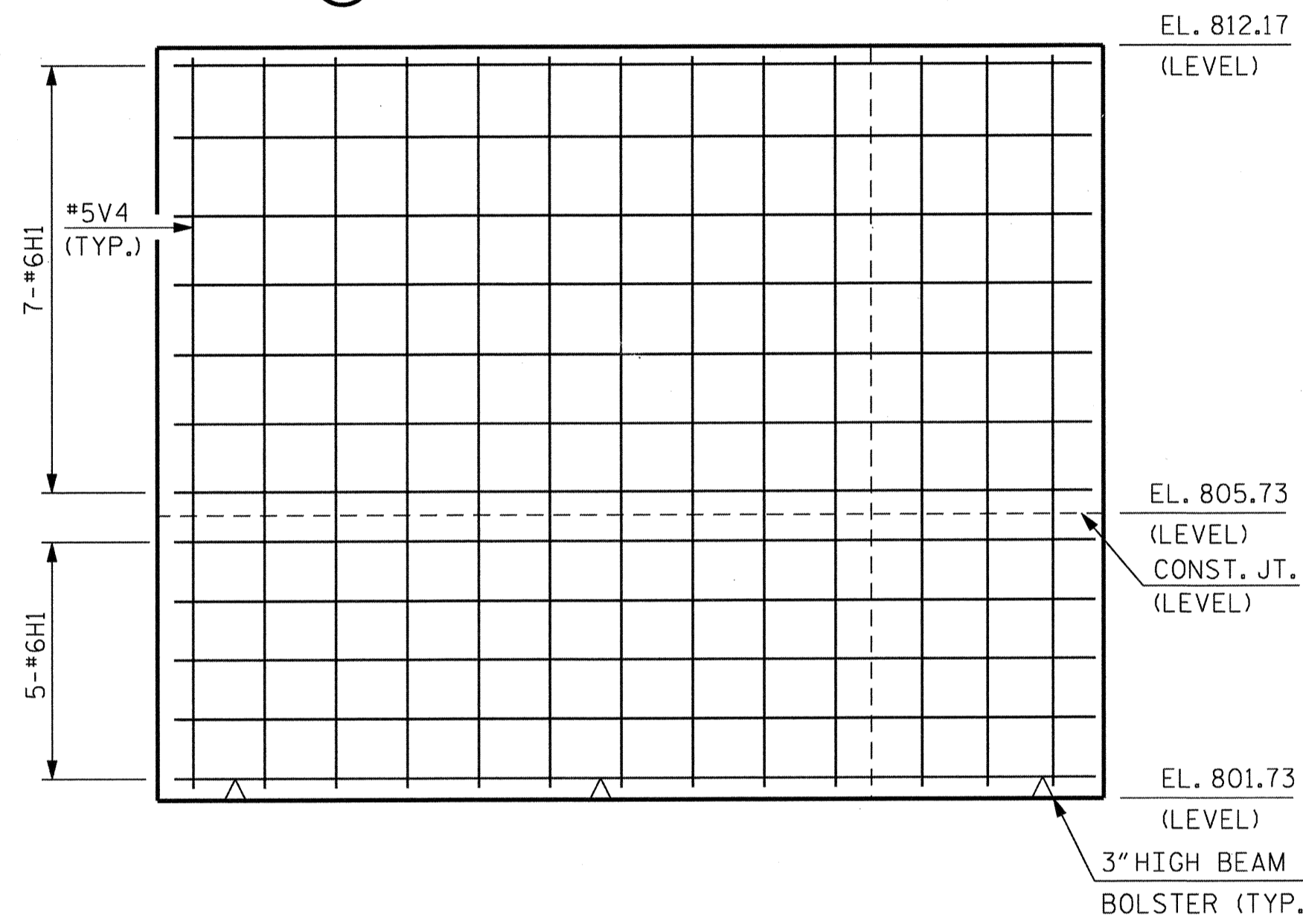
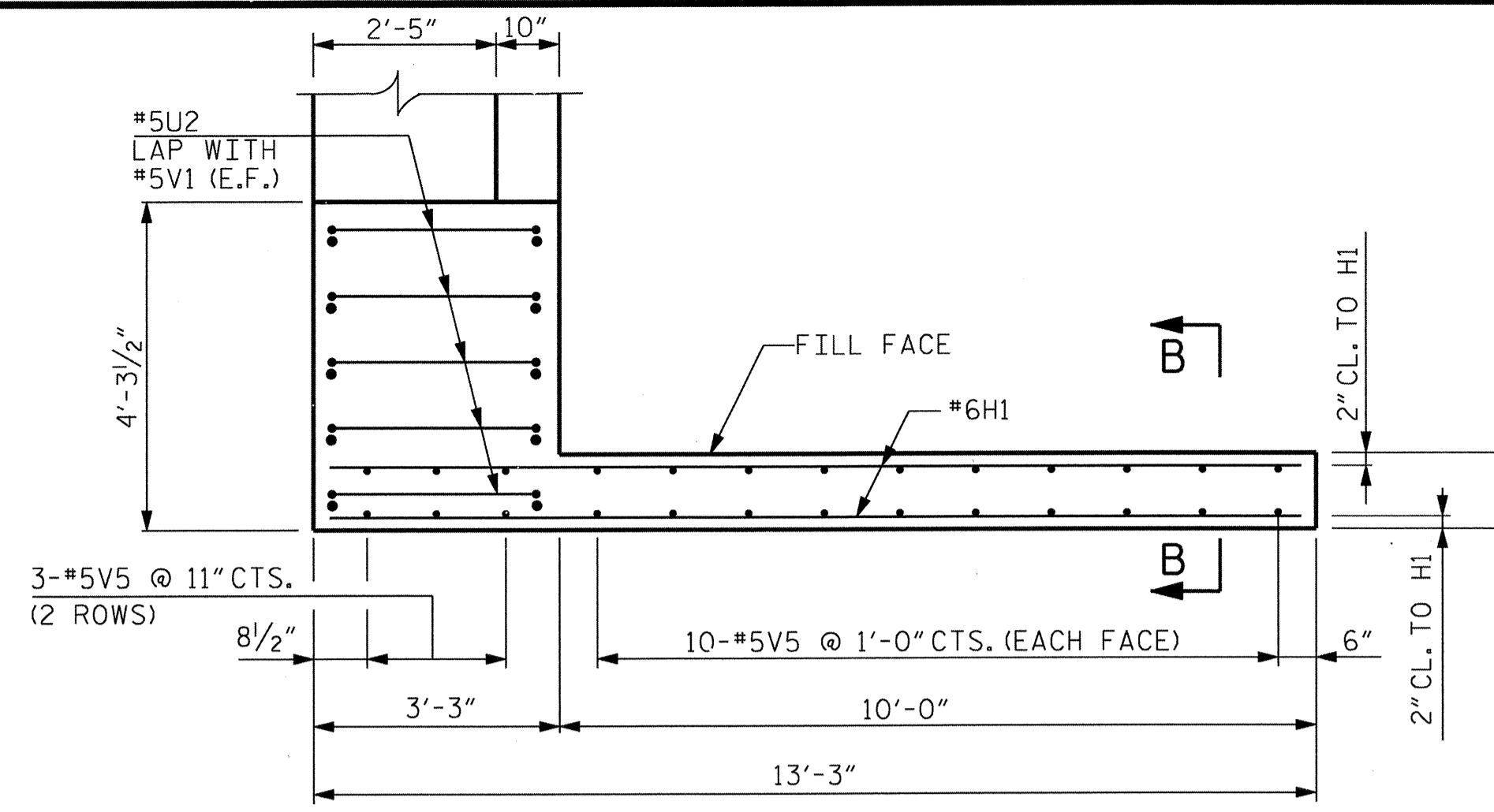
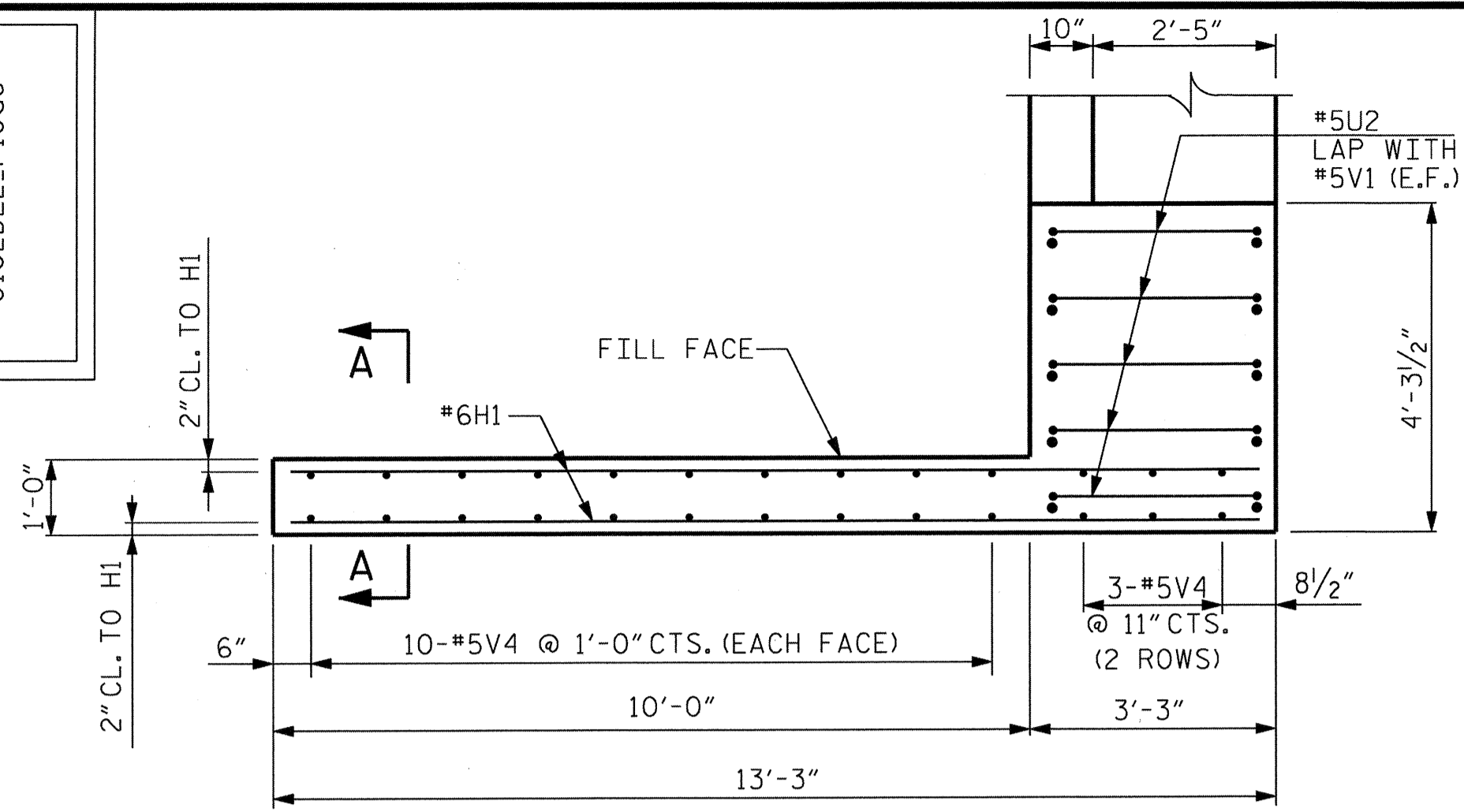
**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

2-13-2013

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S30	
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2			4			36	

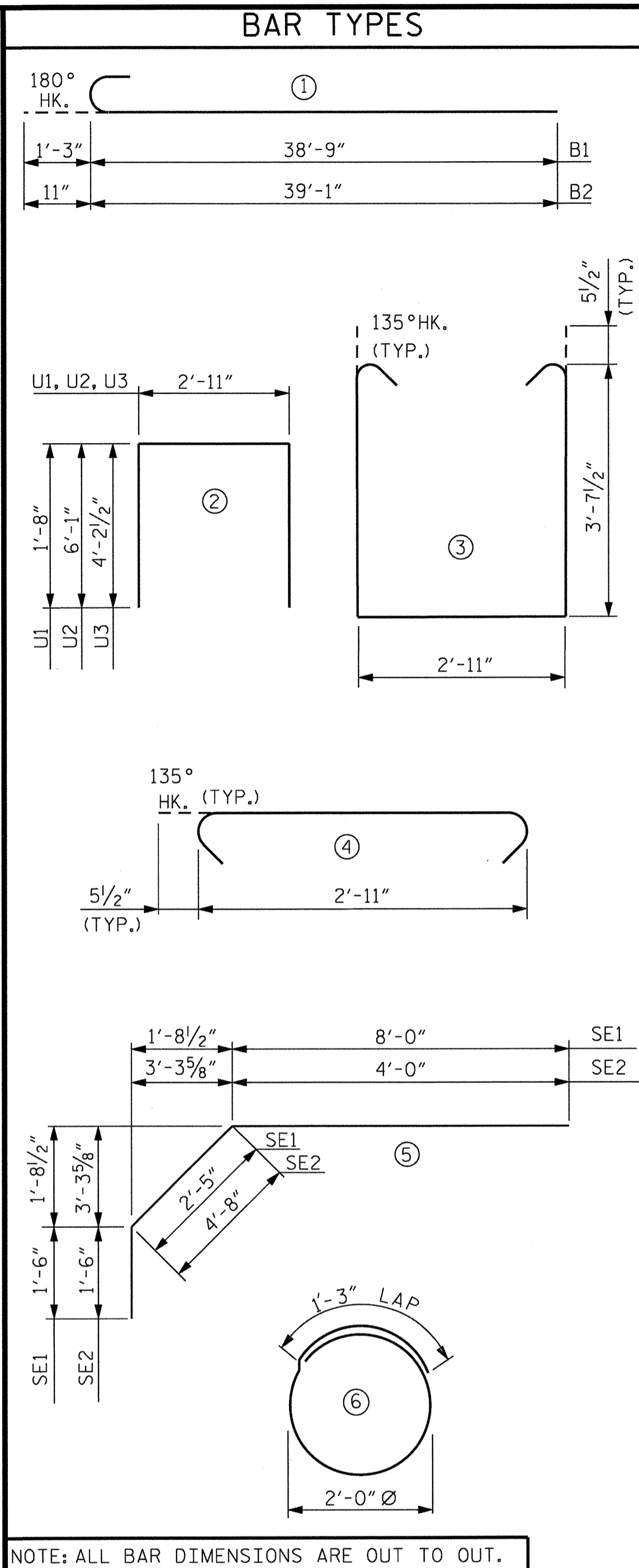
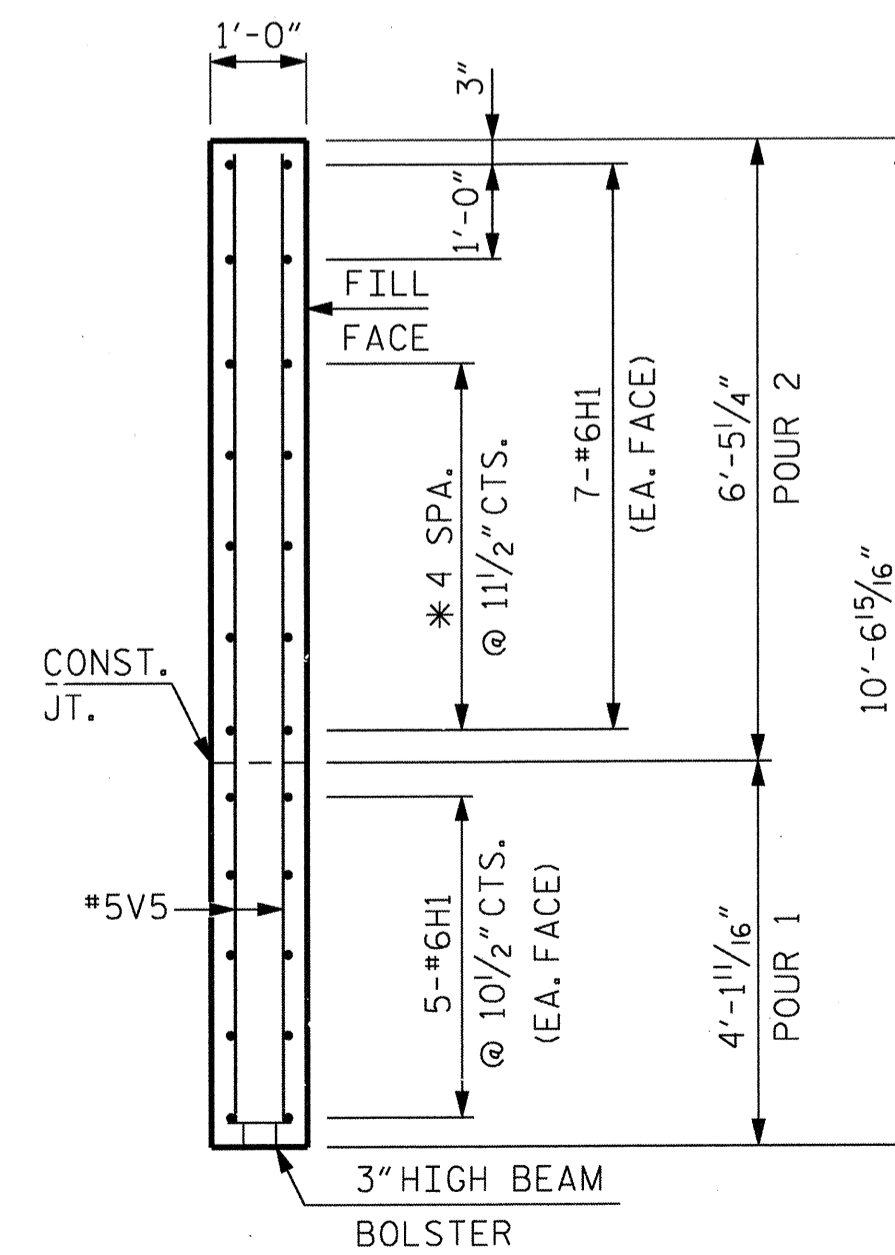
DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
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CONCRETE QUANTITY DETAIL

NOTE: CONCRETE QUANTITIES OF INTEGRAL END BENT CAP AND WINGWALLS ABOVE CONSTRUCTION JOINT ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES. REINFORCING STEEL IN THESE AREAS IS INCLUDED IN END BENT QUANTITIES.



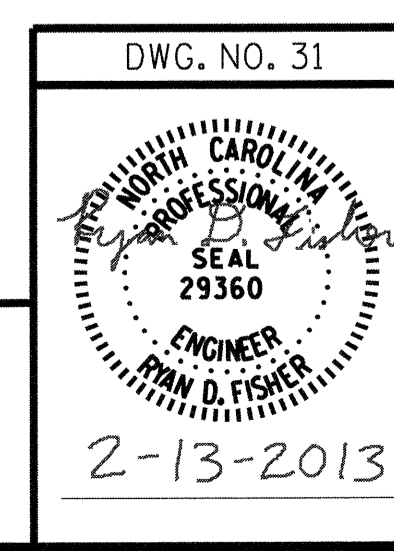
BILL OF MATERIAL					
END BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	8	#9	1	40'-0"	1,088
B2	10	#8	1	40'-0"	1,068
B3	12	#5	STR.	37'-2"	465
B4	12	#4	STR.	25'-5"	204
B5	5	#5	STR.	33'-5"	174
B6	18	#4	STR.	2'-11"	35
H1	48	#6	STR.	12'-11"	931
K1	15	#4	STR.	25'-5"	255
K2	6	#4	STR.	7'-6"	30
K3	6	#4	STR.	8'-6"	34
K4	12	#4	STR.	9'-0"	72
K5	6	#4	STR.	8'-0"	32
K6	2	#4	STR.	4'-8"	6
K7	2	#4	STR.	5'-2"	7
K8	4	#4	STR.	5'-5"	14
K9	2	#4	STR.	4'-11"	7
K10	8	#4	STR.	3'-11"	21
S1	186	#5	4	3'-10"	744
S2	66	#5	3	11'-1"	763
S3	36	#4	6	6'-5"	154
SE1	52	#4	5	11'-11"	414
SE2	50	#4	5	10'-2"	340
U1	34	#4	2	6'-3"	142
U2	10	#5	2	15'-1"	157
U3	50	#5	2	11'-4"	591
V1	120	#5	STR.	6'-9"	845
V2	6	#5	STR.	8'-1"	51
V3	8	#5	STR.	8'-5"	70
V4	26	#5	STR.	10'-0"	271
V5	26	#5	STR.	10'-1"	273
EPOXY COATED REINFORCING STEEL				754 LB.	
REINFORCING STEEL				8,504 LB.	
CLASS "A" CONCRETE POUR 1 (CAP, LOWER WINGS, & COLLARS)				41.3 C.Y.	
HP 12 x 53 STEEL PILES					
NO.				9	
LIN. FEET				450	
E = EPOXY COATED STEEL					

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 3 OF 3  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2  
 WING WALL AND  
 BILL OF MATERIALS

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



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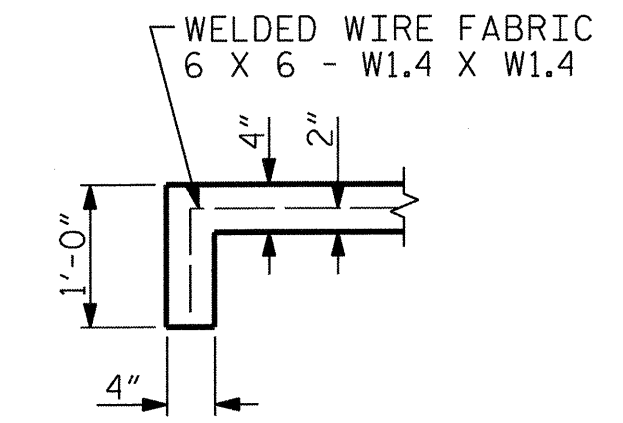
SHEET NO. S31  
 TOTAL SHEETS 36

0102DEL\_P10a6

**GENERAL NOTES**

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

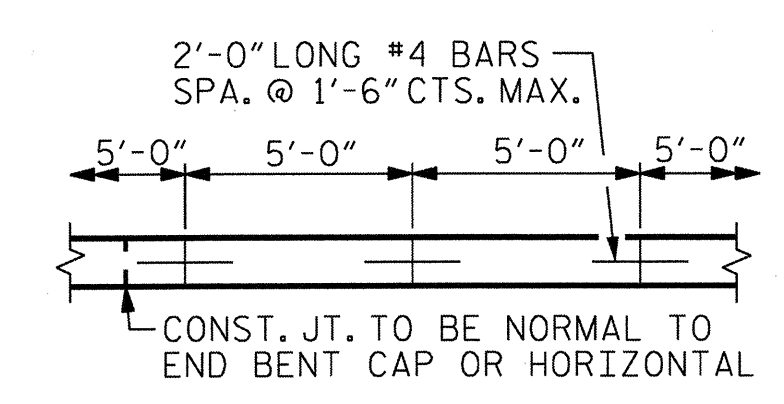
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL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



**SECTION A-A**

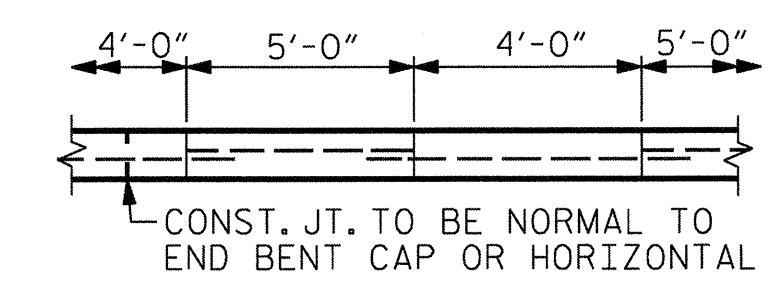
BRIDGE @ STA. 11+76.26 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 2	345	625

\* QUANTITY SHOWN IS BASED ON 5' POURS.



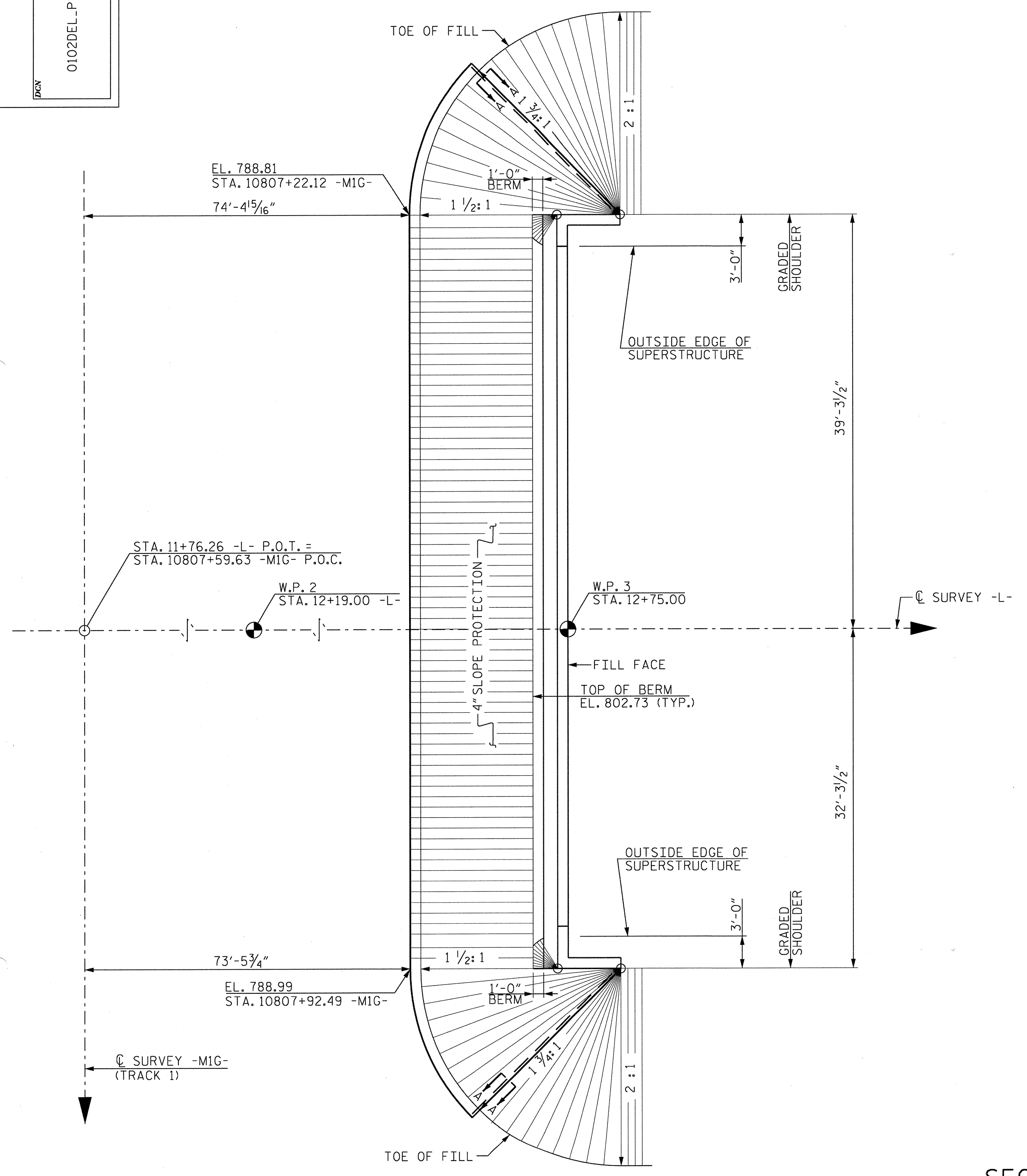
STRIP WIDTHS MAY VARY IN CURVED PORTION.

**POURING DETAIL**

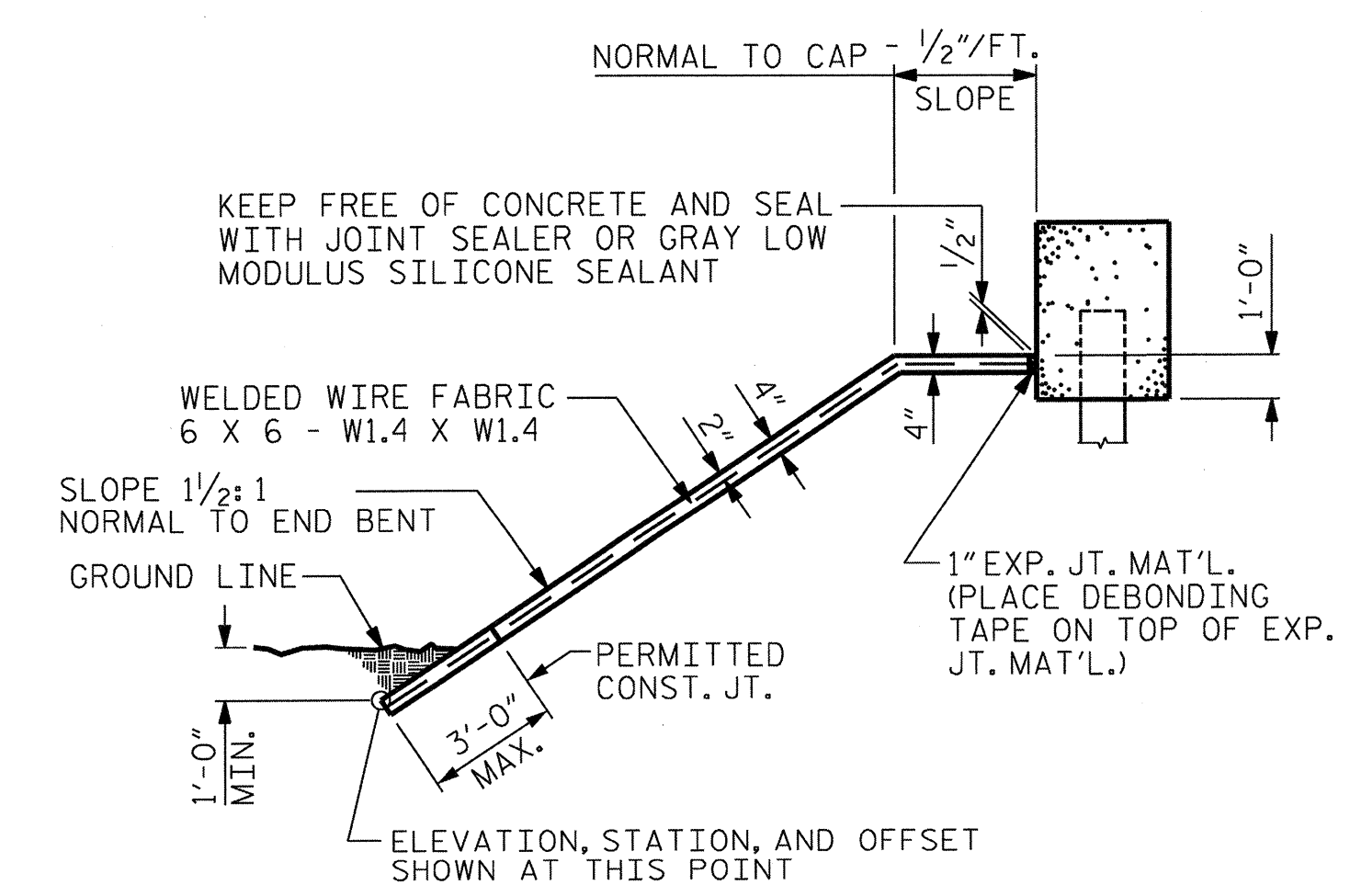


POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

**OPTIONAL POURING DETAIL**



**PLAN - END BENT 2**



**SECTION ALONG ROADWAY WHEN DITCH IS NOT PROVIDED**

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SLOPE PROTECTION  
 DETAILS**

REVISIONS						SHEET NO. S32
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

DWG. NO. 32

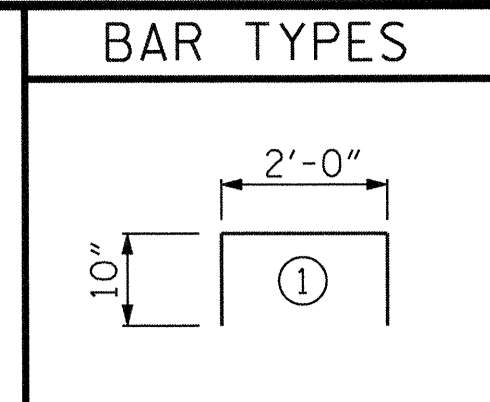
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 900 RIDGEFIELD DRIVE SUITE 350  
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 NC LICENSE NUMBER: F-0112

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DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
 CHECKED BY: R.D. FISHER DATE: JAN. 2013





ALL BAR DIMENSIONS ARE OUT-TO-OUT.

BILL OF MATERIAL					
END BENT 1 APPROACH SLAB					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
AE1	78	#4	STR.	23'-7"	1,229
A1	78	#4	STR.	23'-6"	1,224
BE1	126	#5	STR.	24'-3"	3,187
BE2	1	#5	STR.	22'-1"	23
BE3	1	#5	STR.	19'-1"	20
BE4	1	#5	STR.	16'-1"	17
BE5	1	#5	STR.	13'-1"	14
BE6	1	#5	STR.	10'-1"	11
BE7	1	#5	STR.	7'-1"	7
BE8	2	#5	STR.	4'-1"	9
BE9	7	#4	STR.	24'-7"	115
BE10	7	#4	STR.	25'-0"	117
B1	126	#6	STR.	24'-7"	4,652
B2	1	#6	STR.	22'-1"	33
B3	1	#6	STR.	19'-1"	29
B4	1	#6	STR.	16'-1"	24
B5	1	#6	STR.	13'-1"	20
B6	1	#6	STR.	10'-1"	15
B7	1	#6	STR.	7'-1"	11
B8	2	#6	STR.	4'-1"	12
GE1	25	#4	STR.	7'-0"	117
GE2	19	#4	STR.	7'-3"	92
GE3	6	#4	STR.	6'-9"	27
UE1	16	#4	1	3'-8"	39
REINFORCING STEEL				LBS.	6,020
EPOXY COATED REINFORCING STEEL				LBS.	5,024
CLASS AA CONCRETE					
POUR #1 - APPROACH SLAB				C.Y.	70.1
POUR #2 - SIDEWALK				C.Y.	9.0
TOTAL				C.Y.	79.1

END BENT 2 APPROACH SLAB					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
AE1	78	#4	STR.	22'-3"	1,159
A1	78	#4	STR.	22'-1"	1,151
BE1	126	#5	STR.	24'-3"	3,187
BE2	14	#4	STR.	24'-7"	230
B1	126	#6	STR.	24'-7"	4,652
GE1	50	#4	STR.	7'-0"	234
UE1	16	#4	1	3'-8"	39
REINFORCING STEEL				LBS.	5,803
EPOXY COATED REINFORCING STEEL				LBS.	4,849
CLASS AA CONCRETE					
POUR #1 - APPROACH SLAB				C.Y.	67.8
POUR #2 - SIDEWALK				C.Y.	9.0
TOTAL				C.Y.	76.8

E = EPOXY COATED STEEL

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 1 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

DWG. NO. 33

BRIDGE APPROACH SLAB FOR INTEGRAL END BENT

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

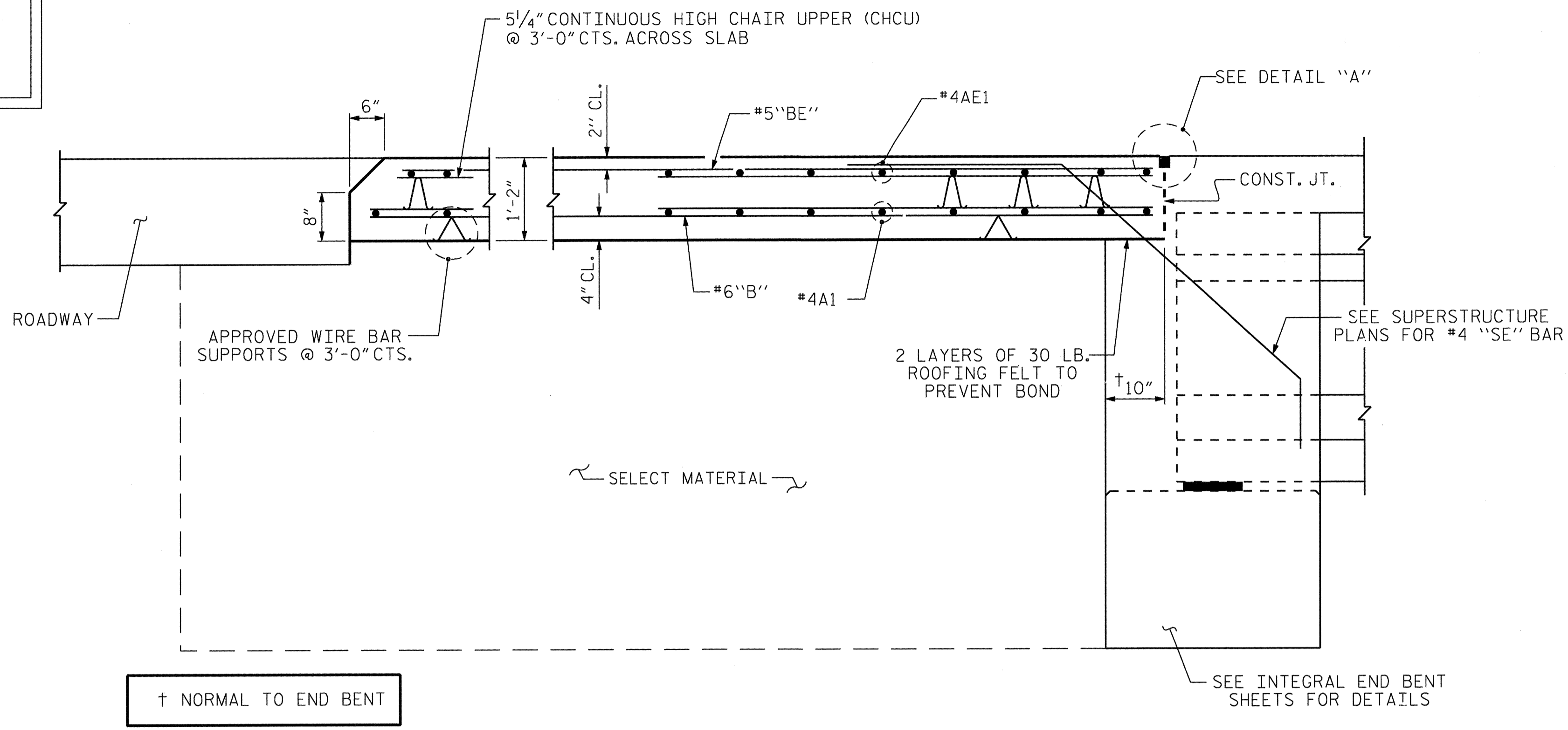
SHEET NO. S33  
 TOTAL SHEETS 36

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 900 RIDGEFIELD DRIVE SUITE 350  
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 NC LICENSE NUMBER: F-0112

2-13-2013

PROFESSIONAL SEAL  
 29360  
 ENGINEER  
 ERIC D. FISHER

0102DEL\_P10a6



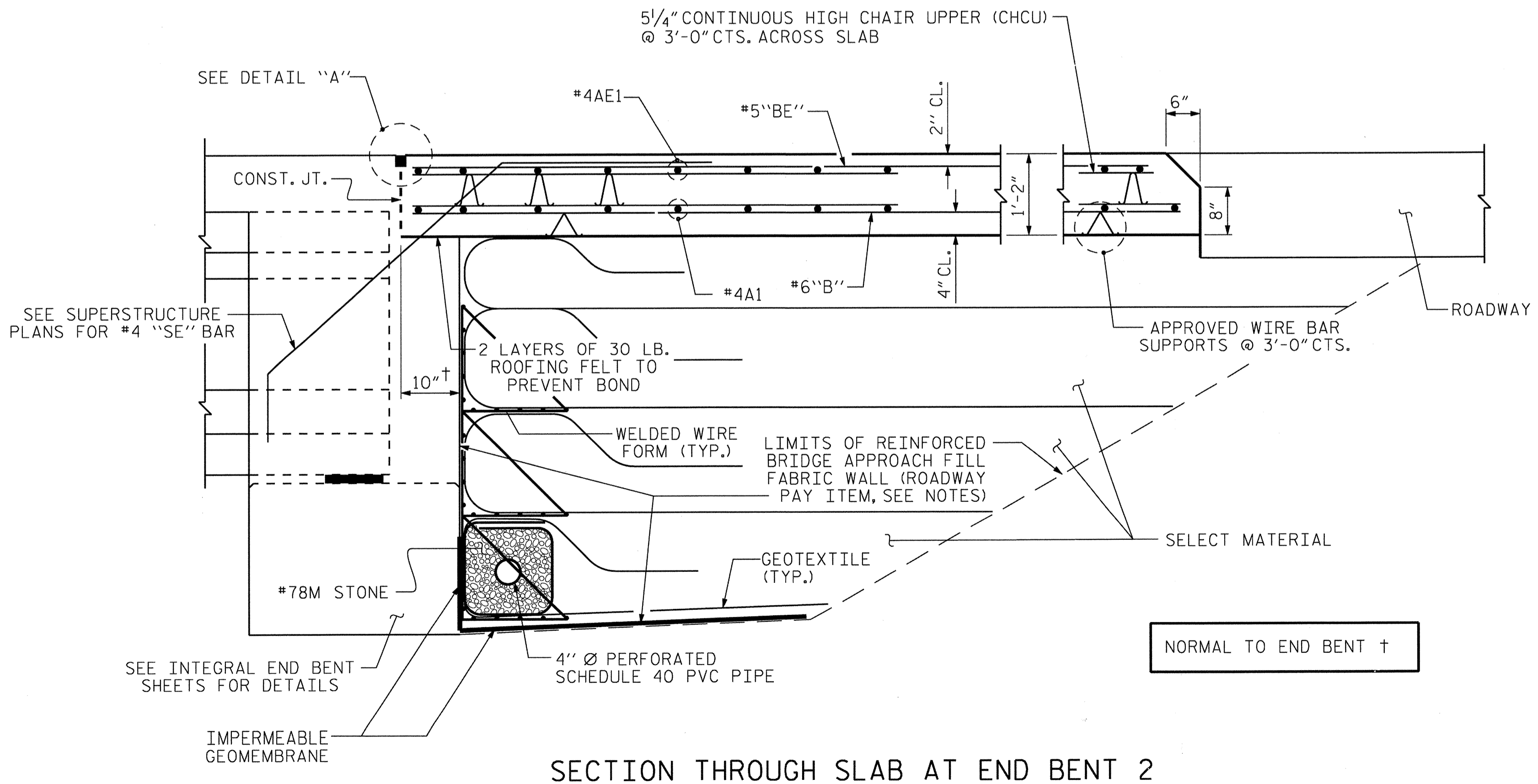
SECTION THROUGH SLAB AT END BENT 1

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

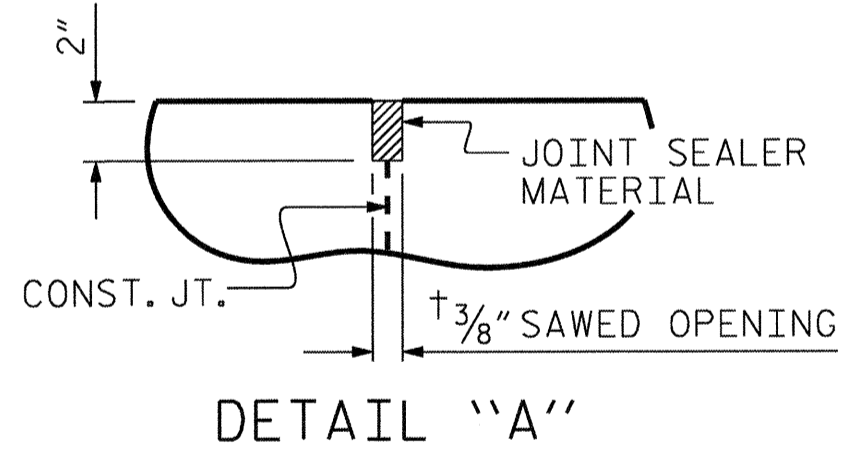
FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL AT END BENT 2 INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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



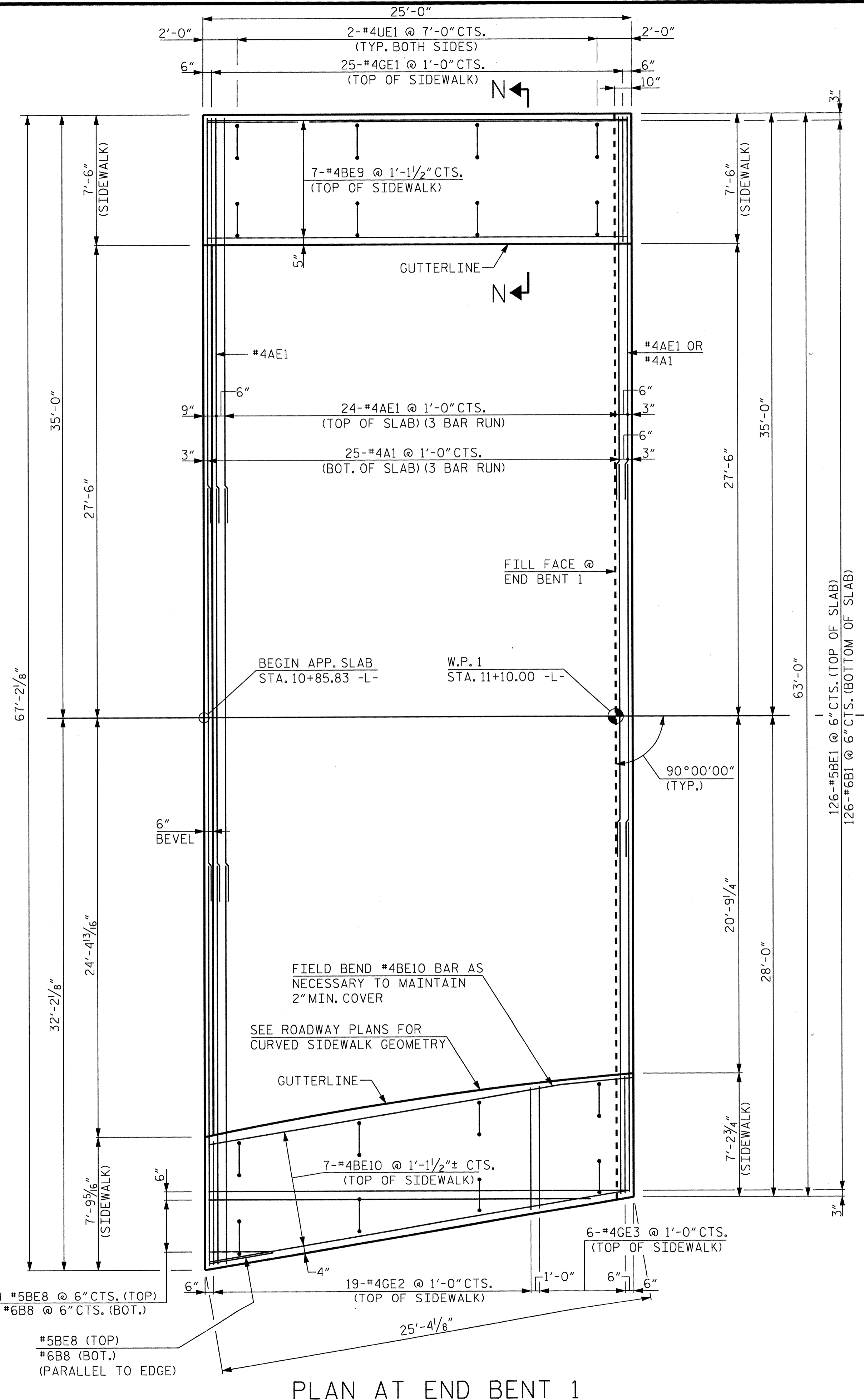
SECTION THROUGH SLAB AT END BENT 2



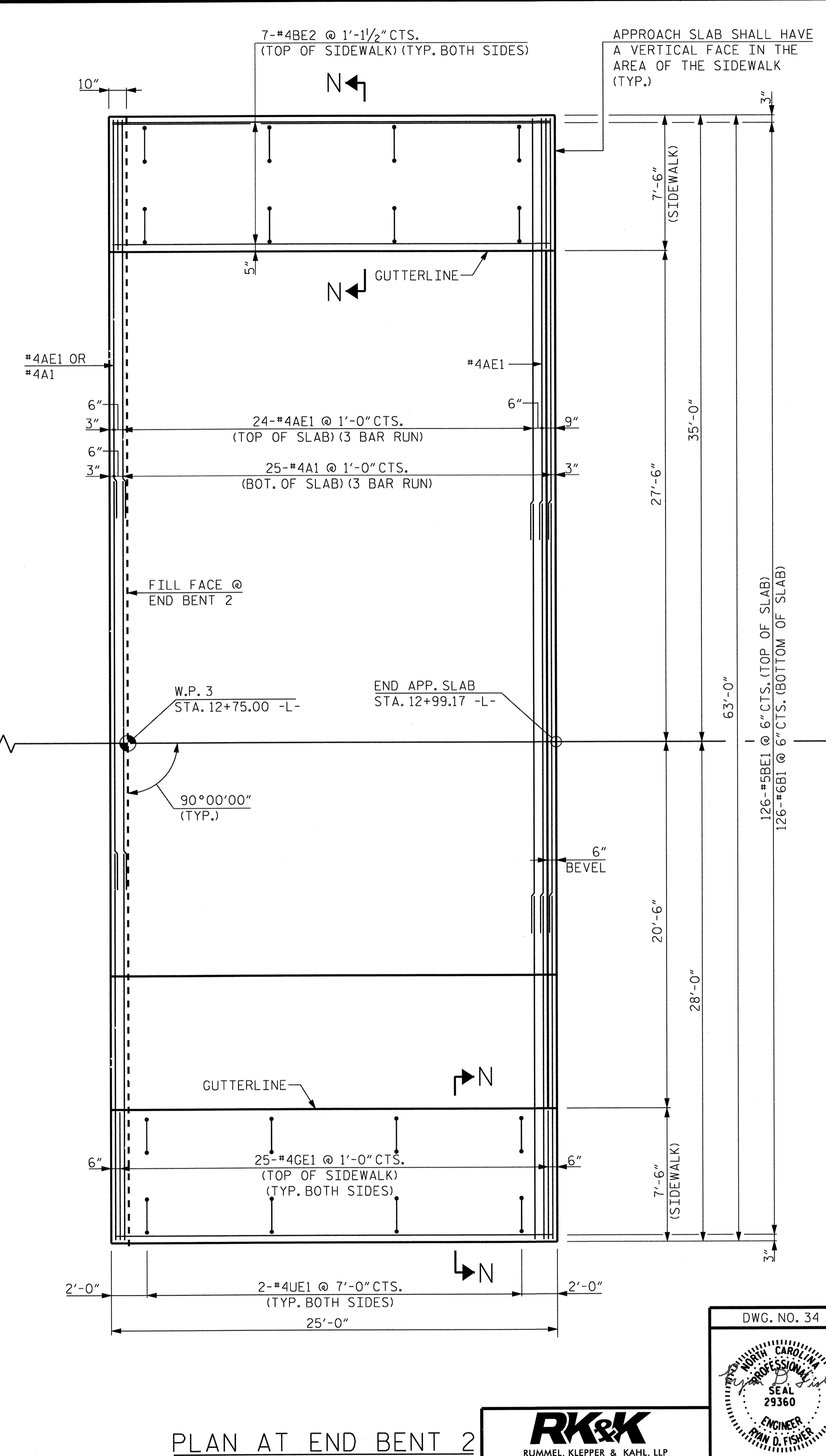
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 DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
 CHECKED BY: R.D. FISHER DATE: JAN. 2013

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PLAN AT END BENT 1



PLAN AT END BENT 2

MINIMUM SPLICE LENGTH	
#4AE1	2'-0"
#4A1	1'-9"

PROJECT NO. P-5208H  
 MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB  
 FOR INTEGRAL END BENT

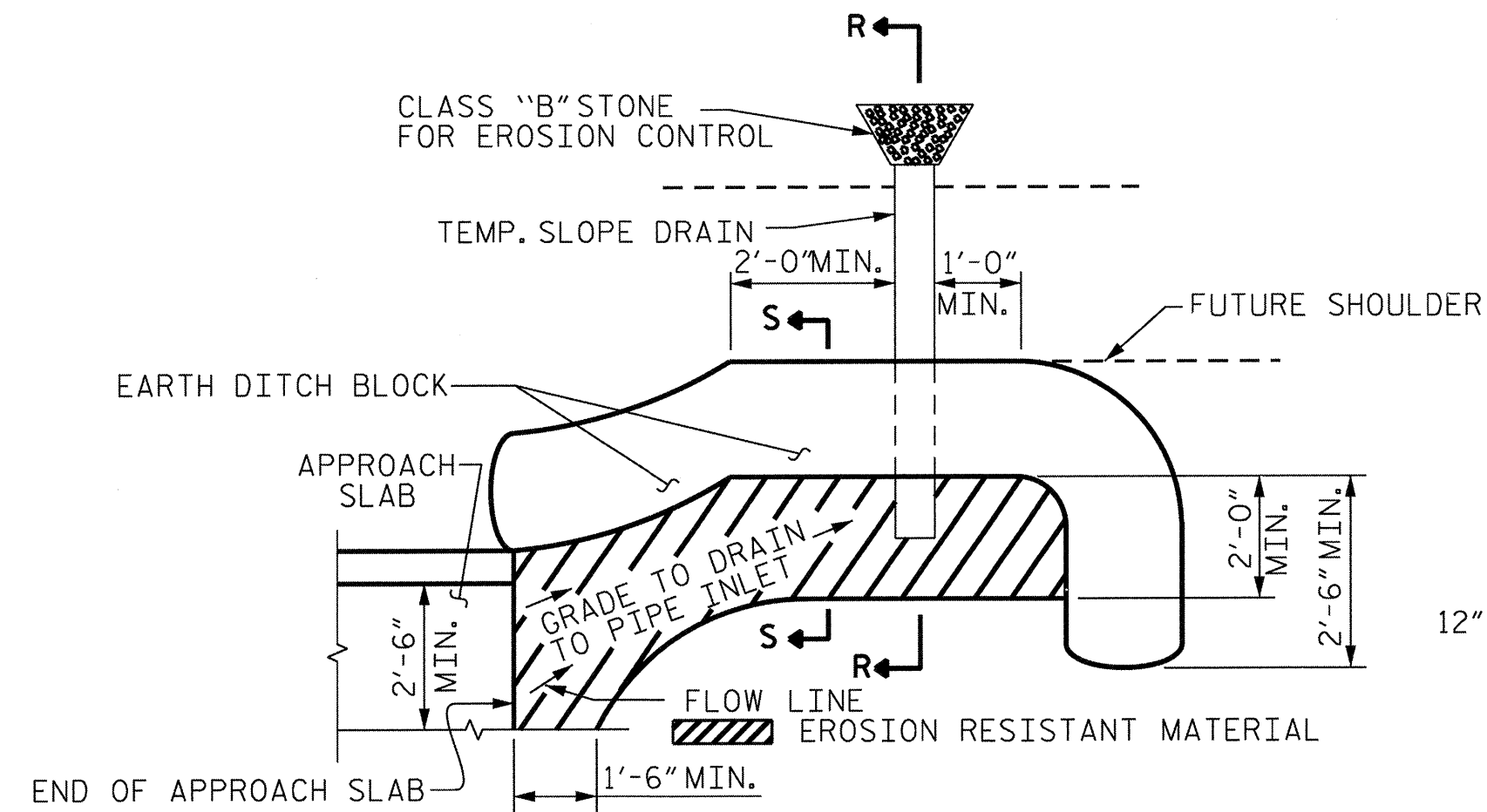
DWG. NO. 34  
 2-13-2013  
 PROFESSIONAL SEAL  
 29360  
 ENGINEER  
 RYAN D. FISHER

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 900 RIDGEFIELD DRIVE SUITE 350  
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 NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S34	
1			3			TOTAL SHEETS	
2			4			36	

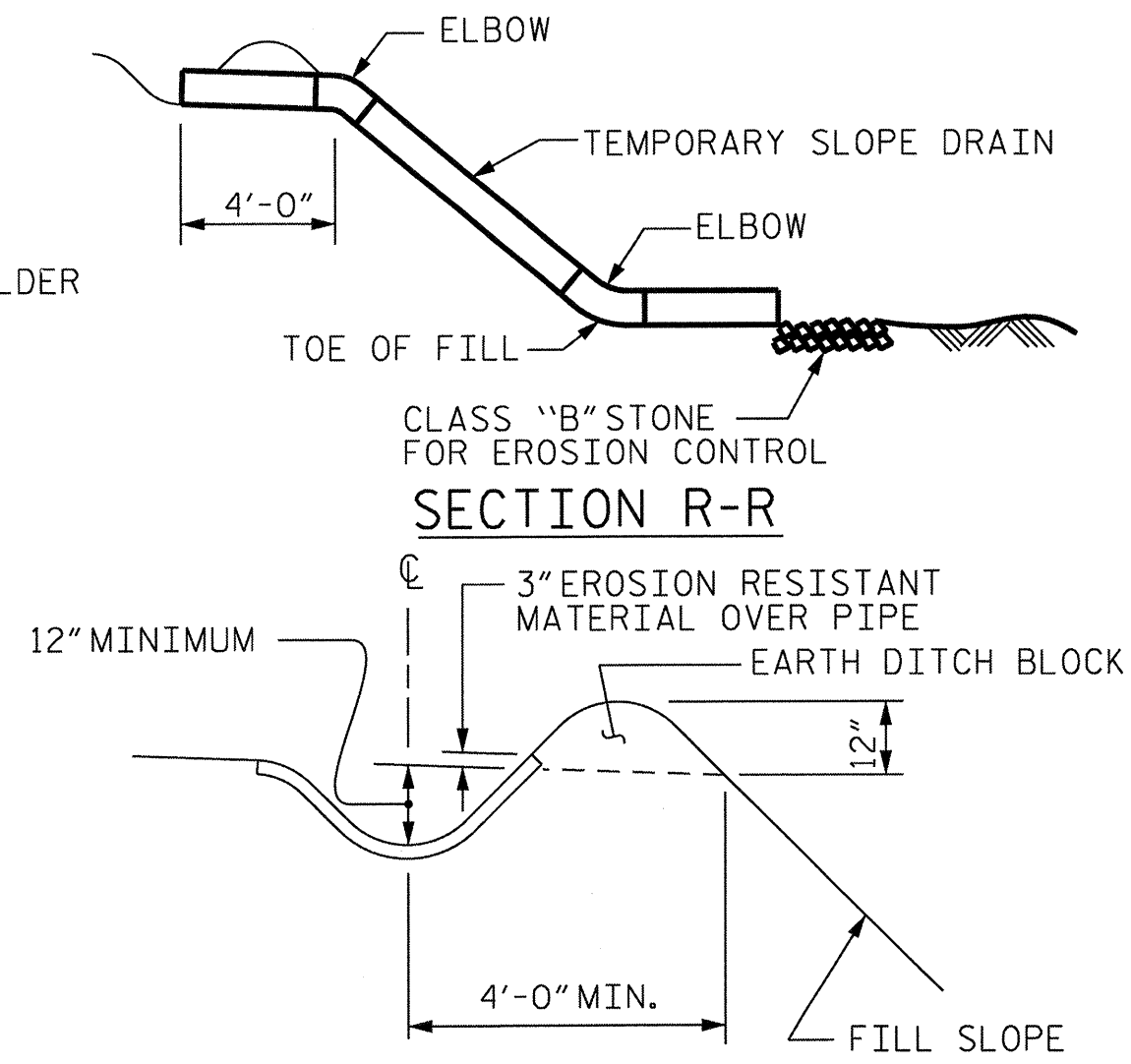
default 2/8/2013 R:\Structures\Grier\_Road Bridge\Drawings\Final\PS208H\_sd\_ap2.dgn

DRAWN BY: W.R. PARRISH DATE: JAN. 2013  
 CHECKED BY: R.D. FISHER DATE: JAN. 2013



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 DRAINAGE PIPE SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

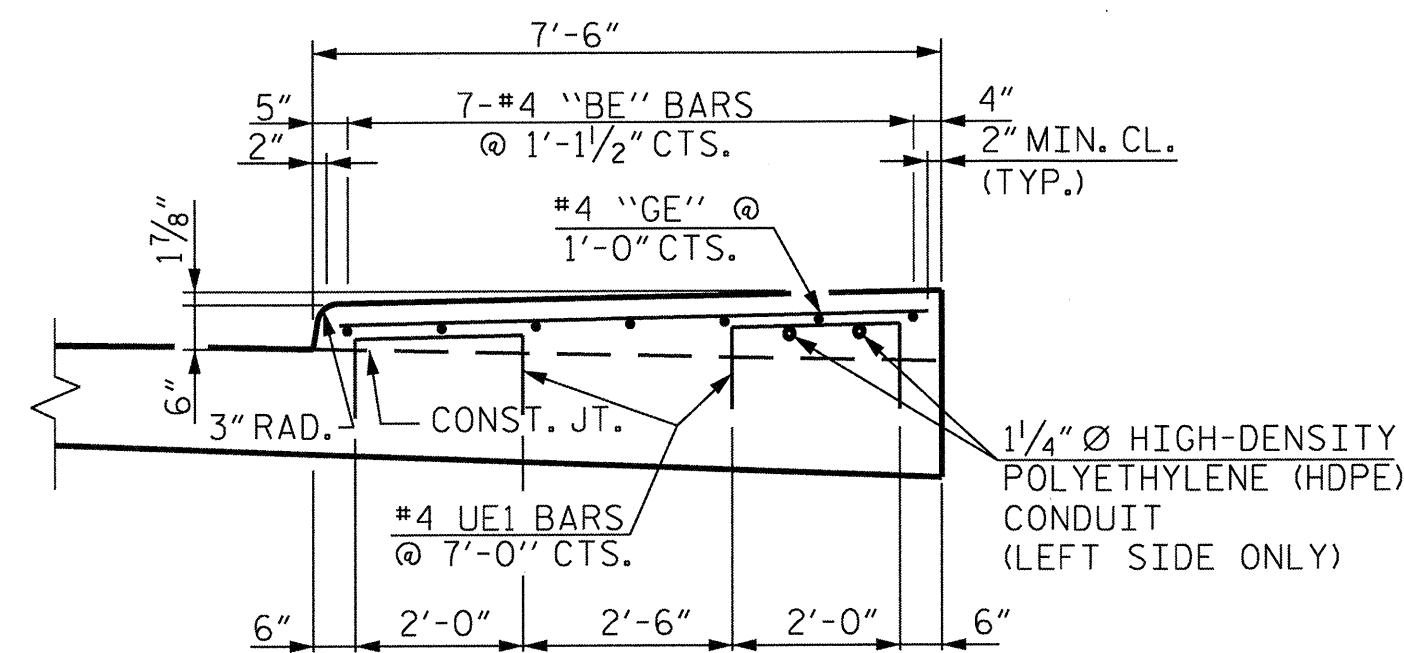
PLAN VIEW



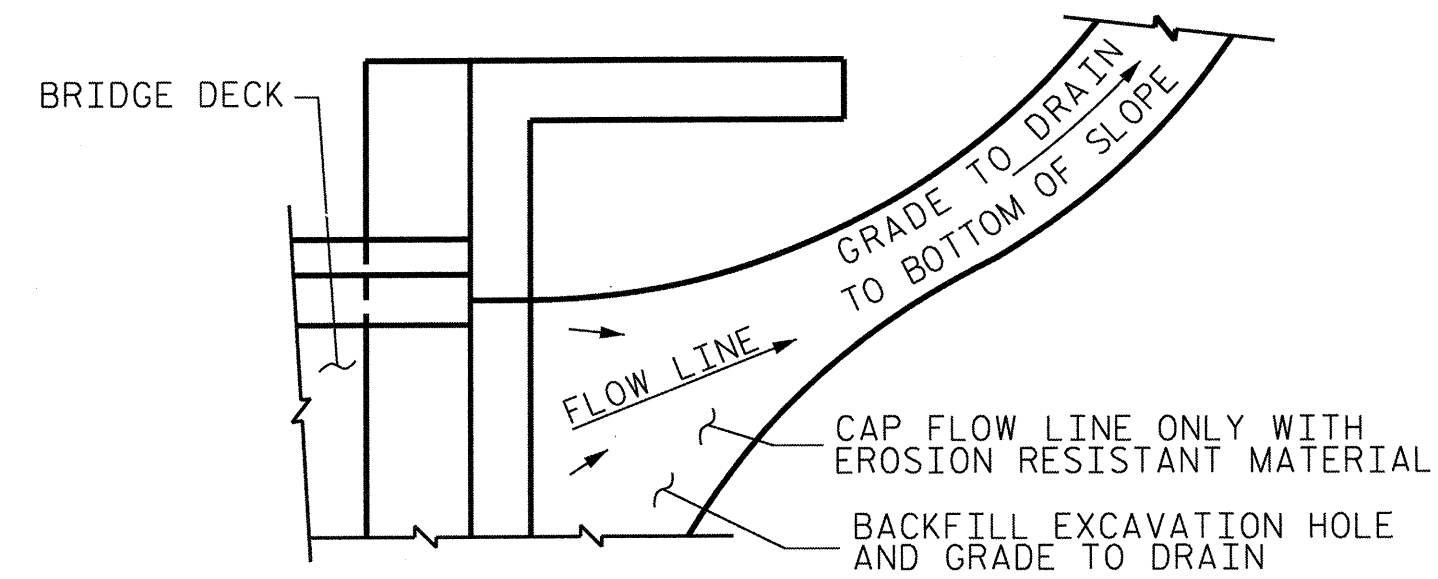
SECTION S-S

### TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N  
SIDEWALK DETAILS



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

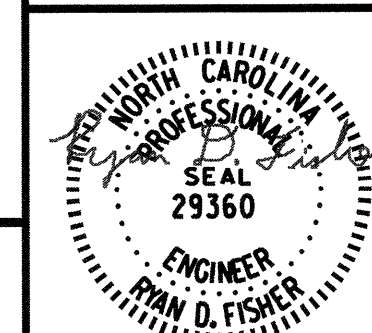
PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH  
 SLAB DETAILS

DWG. NO. 35



2-13-2013

**RK&K**  
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 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S35
1			3			TOTAL SHEETS
2			4			30

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

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

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

### REINFORCING STEEL:

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

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".  
 EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.  
 WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

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

### SPECIAL NOTES:

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

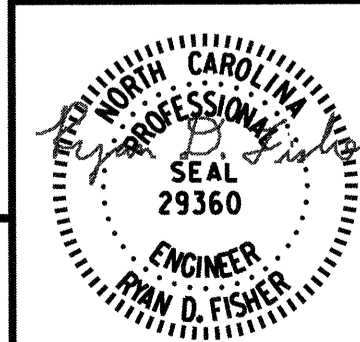
PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD NOTES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S36
1			3			TOTAL SHEETS
2			4			36

DWG. NO. 36



2-13-2013

RK&K

RUMMEL, KLEPPER & KAHL, LLP  
 900 RIDGEFIELD DRIVE SUITE 350  
 RALEIGH, NORTH CAROLINA 27609-3960  
 NC LICENSE NUMBER: F-0112

DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
 CHECKED BY : R.D. FISHER DATE : JAN. 2013

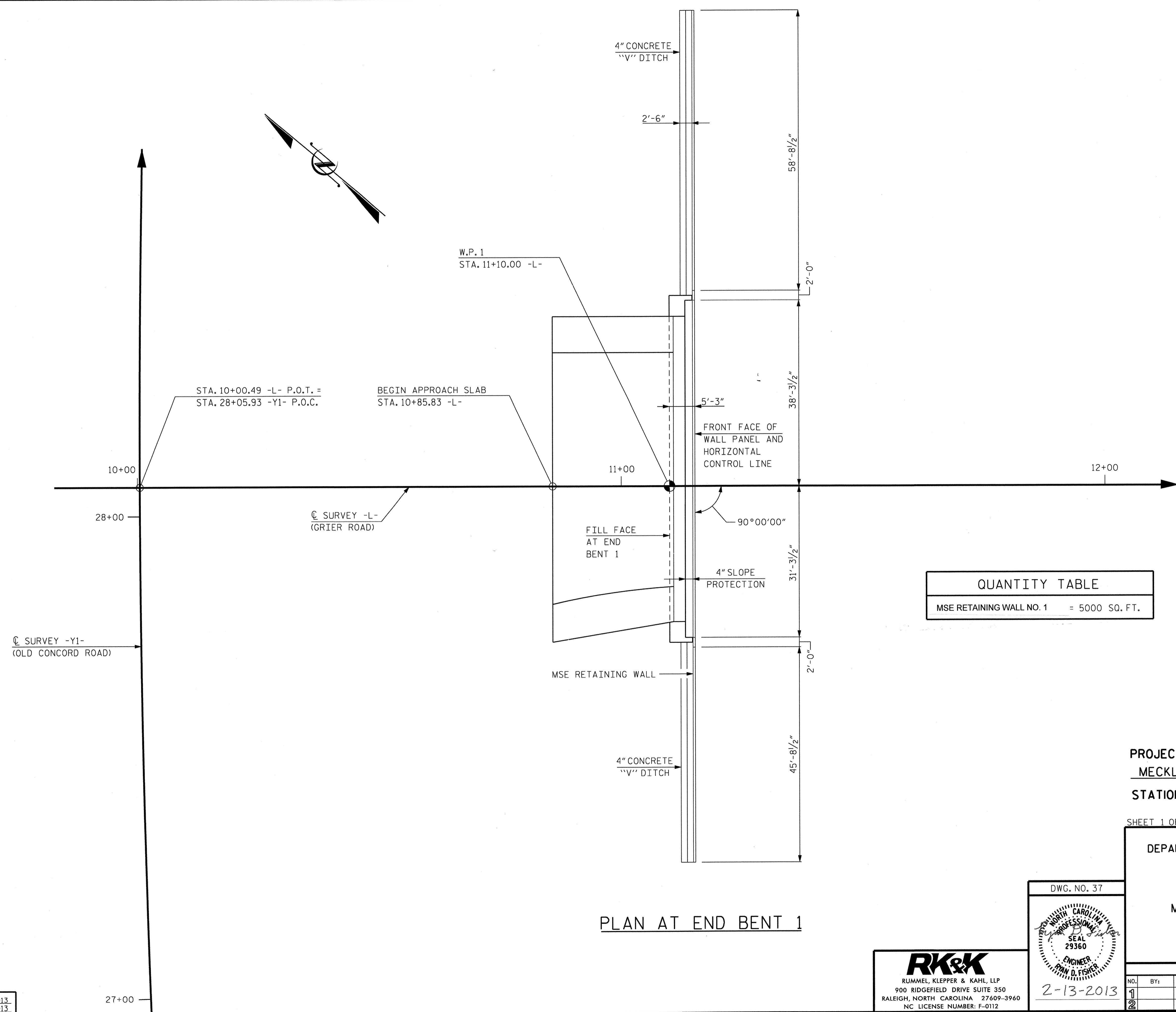
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DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
CHECKED BY : R.D. FISHER DATE : JAN. 2013



QUANTITY TABLE	
MSE RETAINING WALL NO. 1	= 5000 SQ. FT.

PLAN AT END BENT 1

PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 1 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

MSE WALL DRAWING FOR  
BRIDGE ON GRIER RD.

**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

DWG. NO. 37  
Professional Engineer Seal for R.D. FISHER, No. 29360, dated 2-13-2013.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W1
1			3			TOTAL SHEETS
2			4			5

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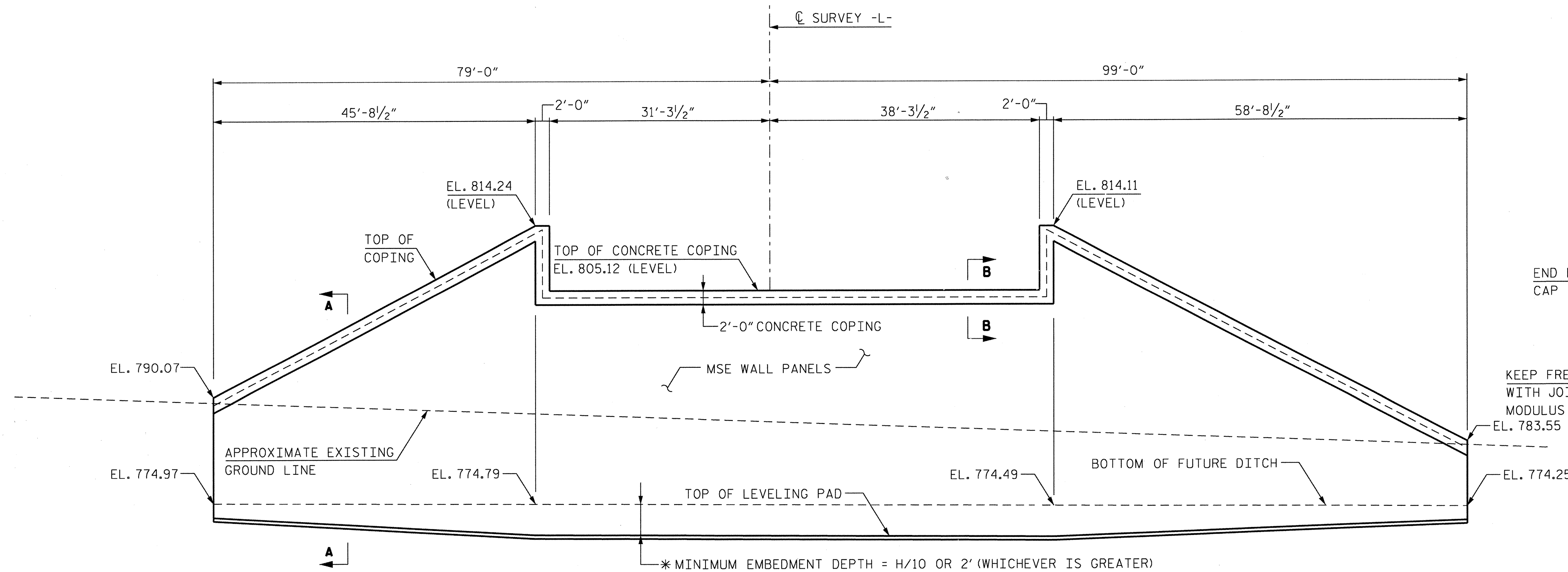
**NOTES:**

THE AREA SHOWN FOR EACH MSE WALL WAS MEASURED FROM THE TOP OF LEVELING PAD TO THE TOP OF COPING.

V-DITCH AND SLOPE PROTECTION ARE INCLUDED IN COST OF WALL.

TOP OF LEVELING PAD ELEVATIONS SHALL BE SET A MINIMUM EMBEDMENT DEPTH BELOW THE BOTTOM OF THE FUTURE DITCH. THE BOTTOM OF FUTURE DITCH ELEVATIONS SHOWN MATCH THE BOTTOM OF THE PROPOSED DITCH ELEVATIONS.

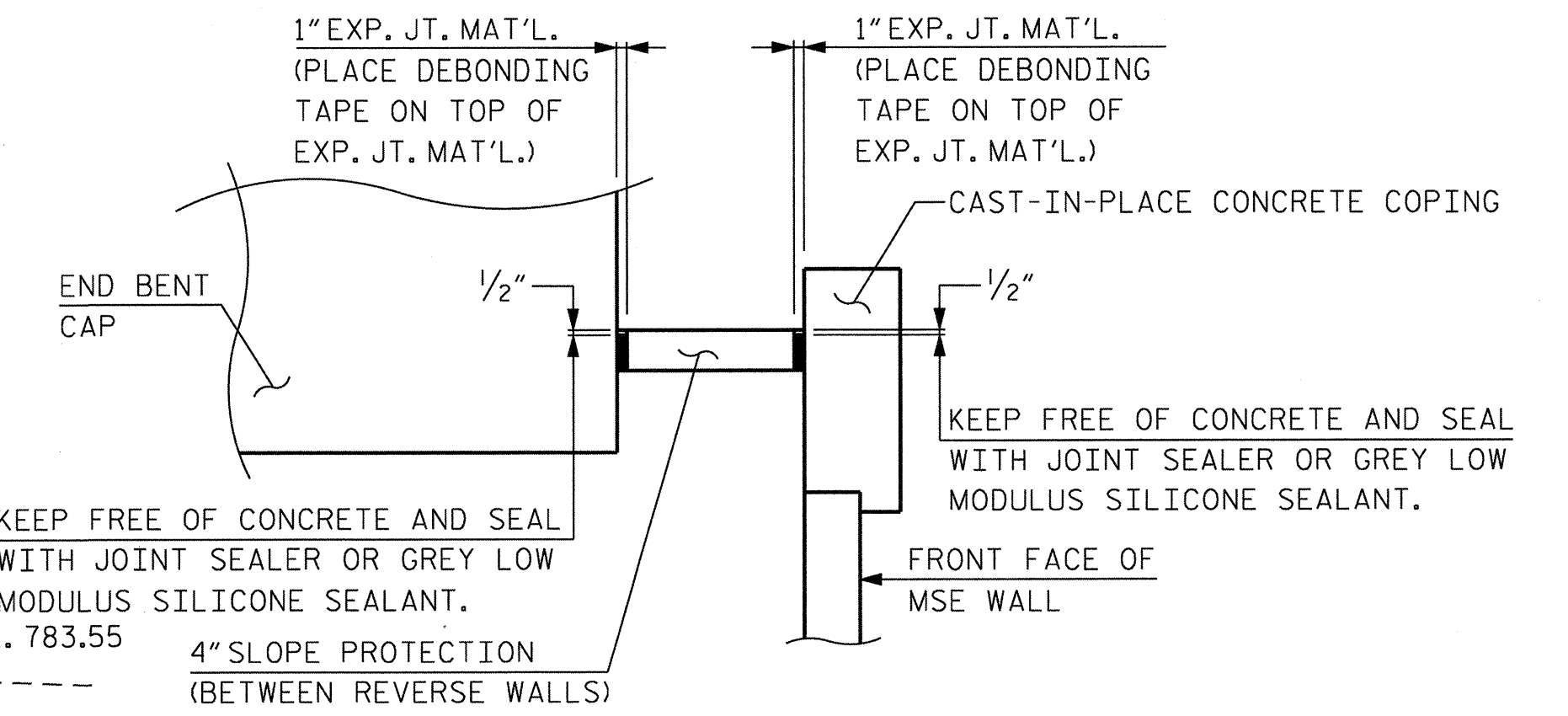
SLOPE PROTECTION SHALL CONSIST OF 4"POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 x 6 - W1.4 x W1.4.



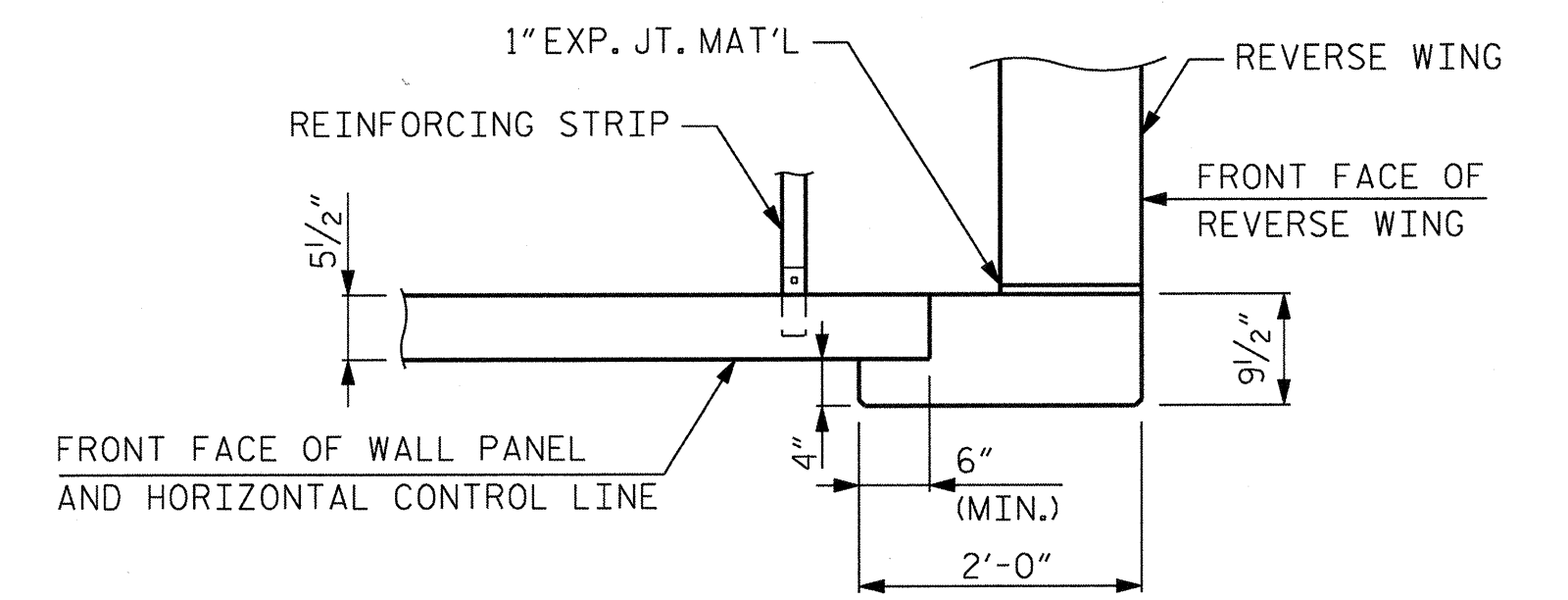
**WALL ELEVATION - END BENT 1**

(LOOKING STATIONS BACK)  
AREA = 5,000± SQ. FT.

\* DEFINE "H" AS THE MAXIMUM DESIGN HEIGHT PLUS EMBEDMENT PER WALL WITH THE DESIGN HEIGHT AND EMBEDMENT AS SHOWN IN THE PLANS.

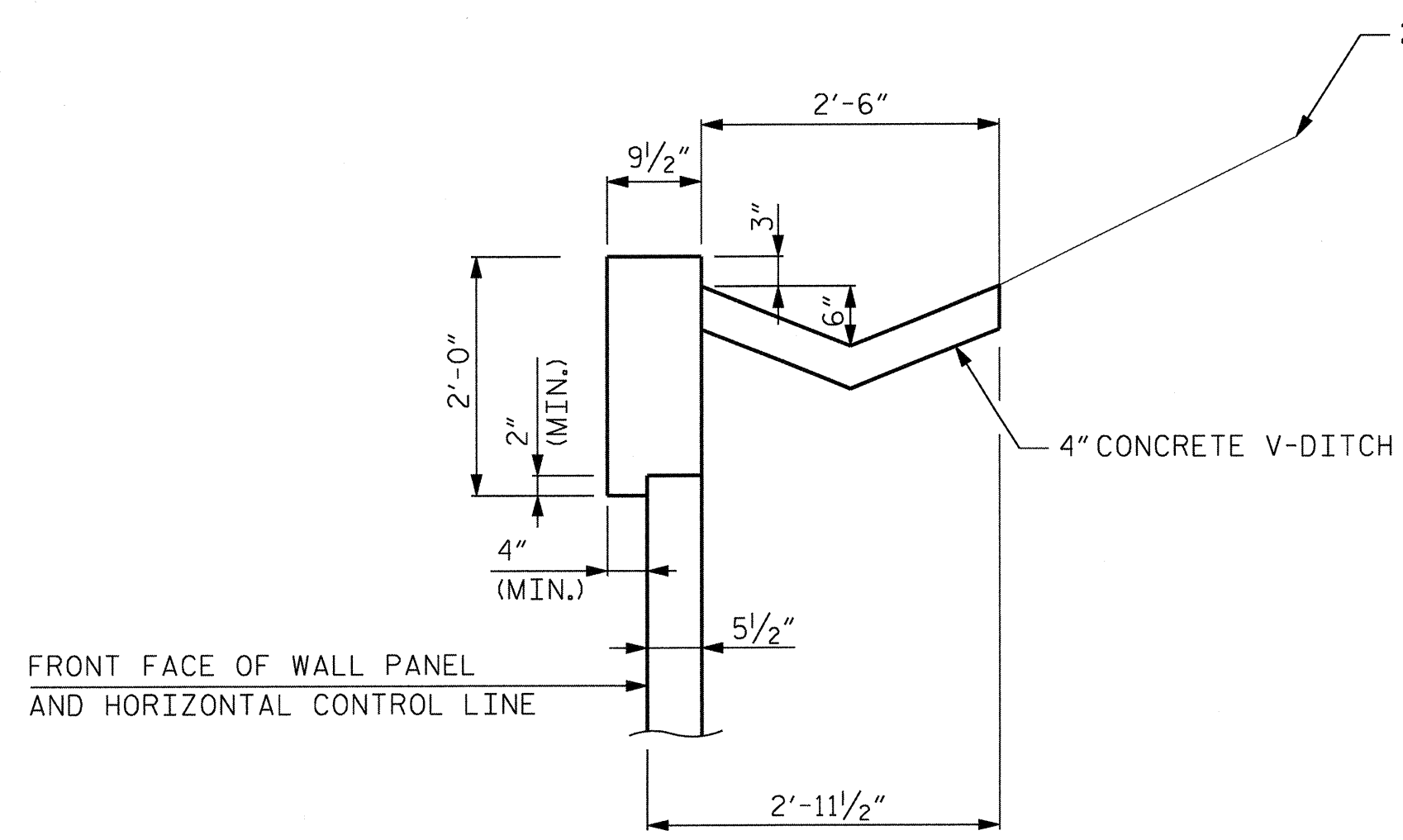


**DETAIL "A"**

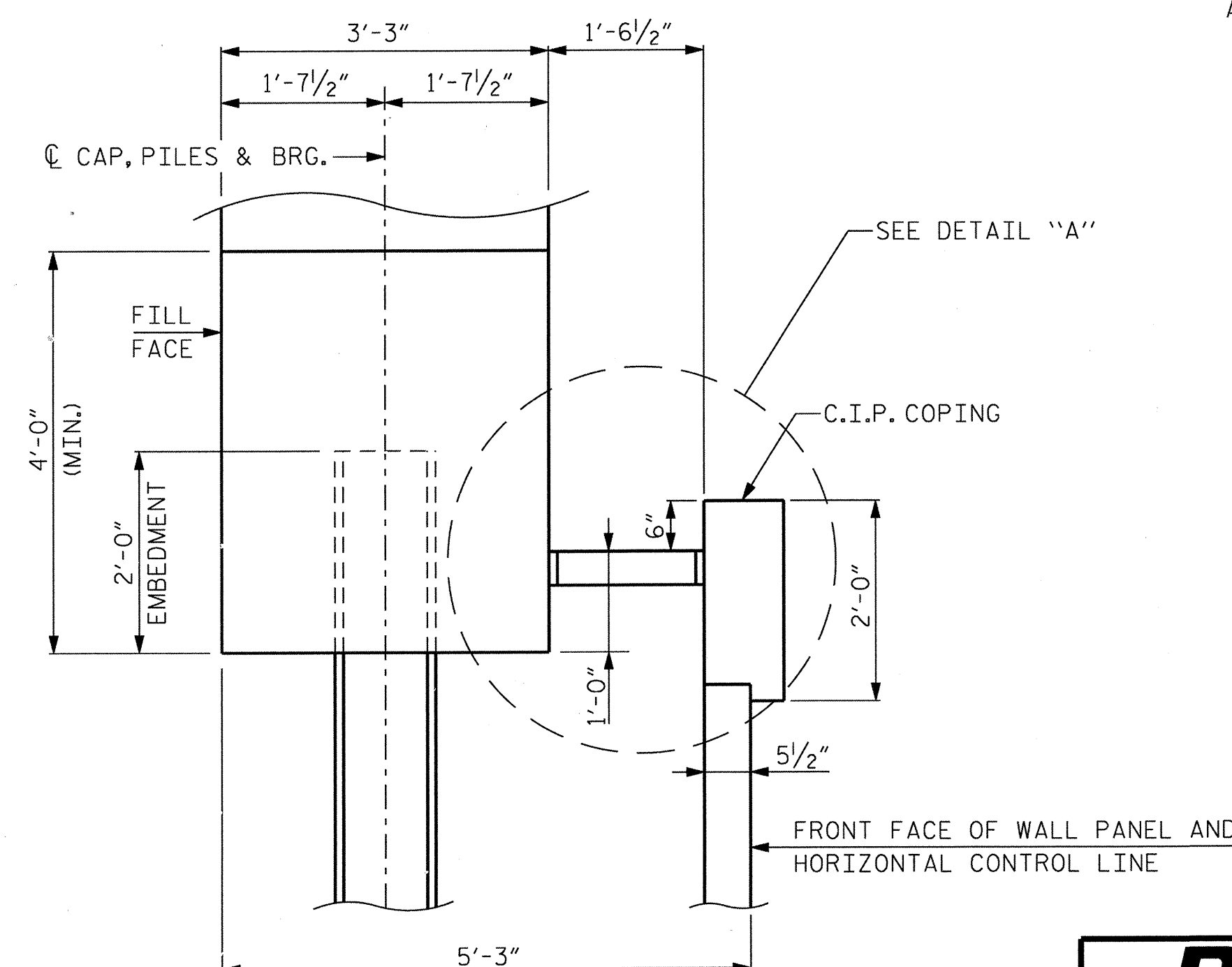


**CAST IN PLACE CONCRETE VERTICAL COPING DETAIL**

NOTE: THICKNESS OF VERTICAL C.I.P. COPING SHALL MATCH THICKNESS OF HORIZONTAL C.I.P. COPING



**SECTION A-A**



**SECTION B-B**

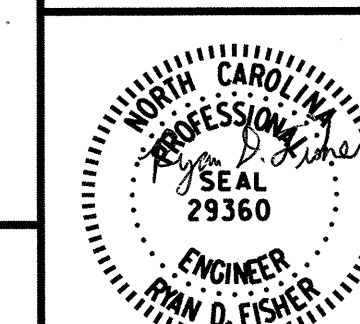
PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
STATION: 11+76.26 -L- P.O.T.

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**MSE RETAINING WALL ELEVATION**

DWG. NO. 38



**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NUMBER: F-0112

3-28-13

REVISIONS						SHEET NO. W2
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 5
2			4			

DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
CHECKED BY : R.D. FISHER DATE : JAN. 2013

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**MSE WALL NOTES:**

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO.1.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.1.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.1, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO.1 FOR THE FOLLOWING:

- A) H = DESIGN HEIGHT + EMBEDMENT
- B) DESIGN LIFE = 100 YEARS
- C) MAXIMUM FACTORED VERTICAL STRESS ON FOUNDATION MATERIAL = 3,000 PSF.
- D) MINIMUM REINFORCEMENT LENGTH (L) = 30 FT
- E) MINIMUM EMBEDMENT ELEVATION = VARIES (SEE PLANS)
- F) AGGREGATE PARAMETERS:

AGGREGATE TYPE *	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110	38	0

\* SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.

G) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	32	0

DESIGN RETAINING WALL NO.1 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS, OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1.

FOUNDATIONS FOR END BENT NO.1 LOCATED AT STATION 11+10 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE, OR REINFORCEMENT FOR RETAINING WALL NO.1 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

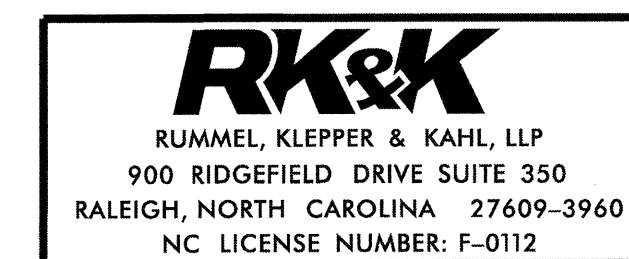
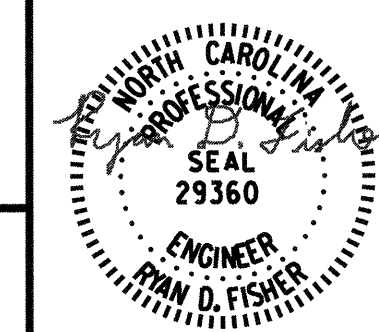
PROJECT NO. P-5208H  
MECKLENBURG COUNTY  
 STATION: 11+76.26 -L- P.O.T.

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

MSE RETAINING WALL NOTES

DWG. NO. 39

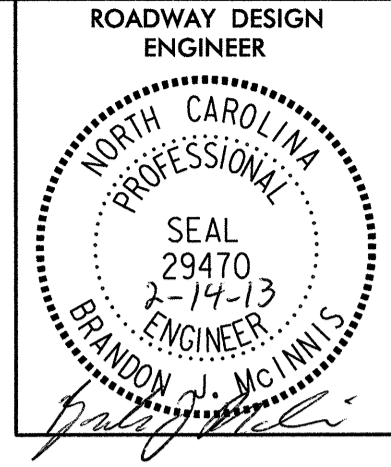


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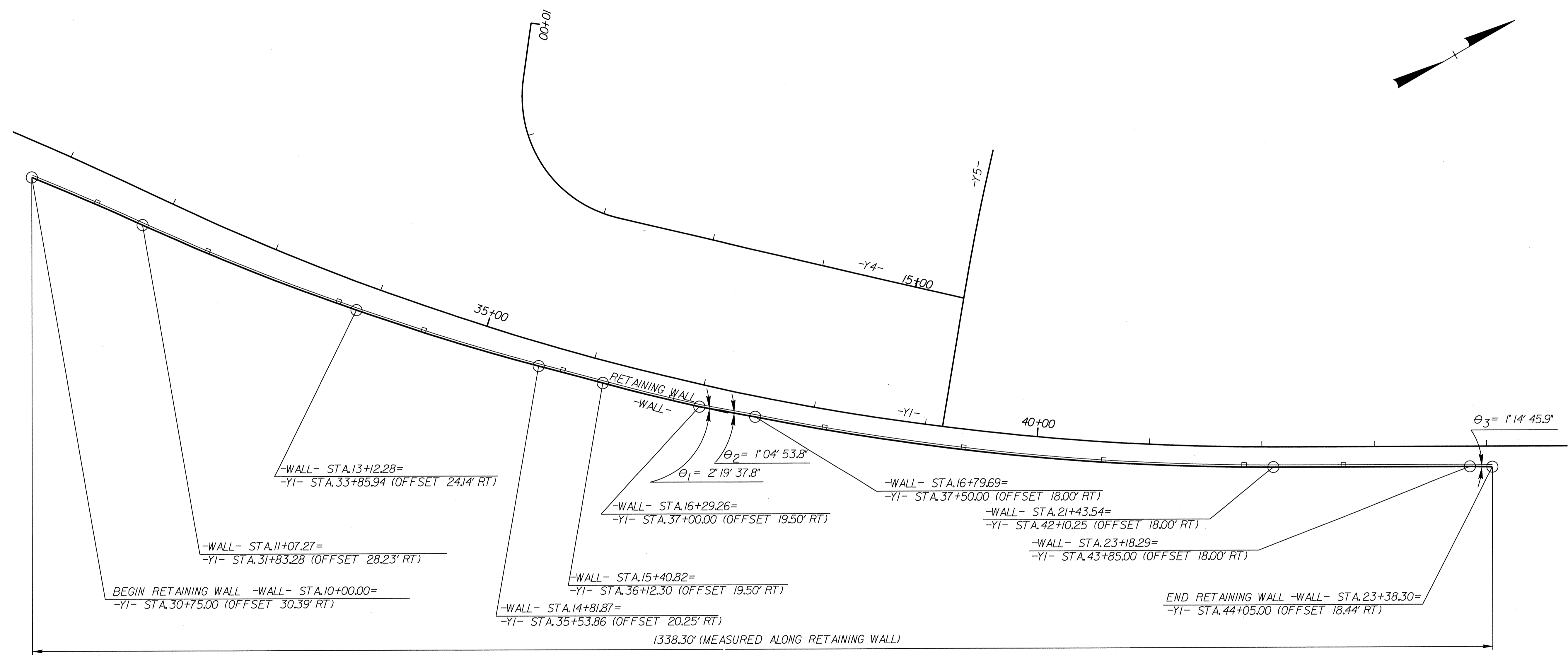
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W3
1			3			TOTAL SHEETS
2			4			5

DRAWN BY : W.R. PARRISH DATE : JAN. 2013  
 CHECKED BY : R.D. FISHER DATE : JAN. 2013

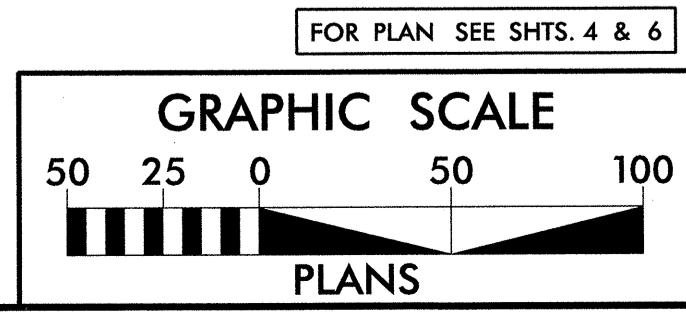
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# RETAINING WALL DETAIL – LOCATION DETAIL



-WALL-				
PI Sta 10+53.64	PI Sta 12+09.85	PI Sta 13+97.12	PI Sta 15+85.05	PI Sta 19+12.39
$\Delta = 2'02'55.7" (RT)$	$\Delta = 5'06'25.3" (LT)$	$\Delta = 4'28'02.2" (LT)$	$\Delta = 2'11'04.6" (LT)$	$\Delta = 1'27'54.9" (LT)$
$D = 1'54'35.5"$	$D = 2'29'28.0"$	$D = 2'38'03.4"$	$D = 2'28'12.6"$	$D = 2'28'18.4"$
$L = 107.27'$	$L = 205.01'$	$L = 169.58'$	$L = 88.44'$	$L = 463.85'$
$T = 53.64'$	$T = 102.57'$	$T = 84.83'$	$T = 44.22'$	$T = 232.70'$
$R = 3,000.00'$	$R = 2,300.00'$	$R = 2,175.00'$	$R = 2,319.50'$	$R = 2,318.00'$



**PLANS PREPARED BY :**

**RK&K**

RUMMEL, KLEPPER & KAHL, LLP  
900 RIDGEFIELD DRIVE SUITE 350  
RALEIGH, NORTH CAROLINA 27609-3960  
NC LICENSE NO. F-0112 • (919) 878-9560

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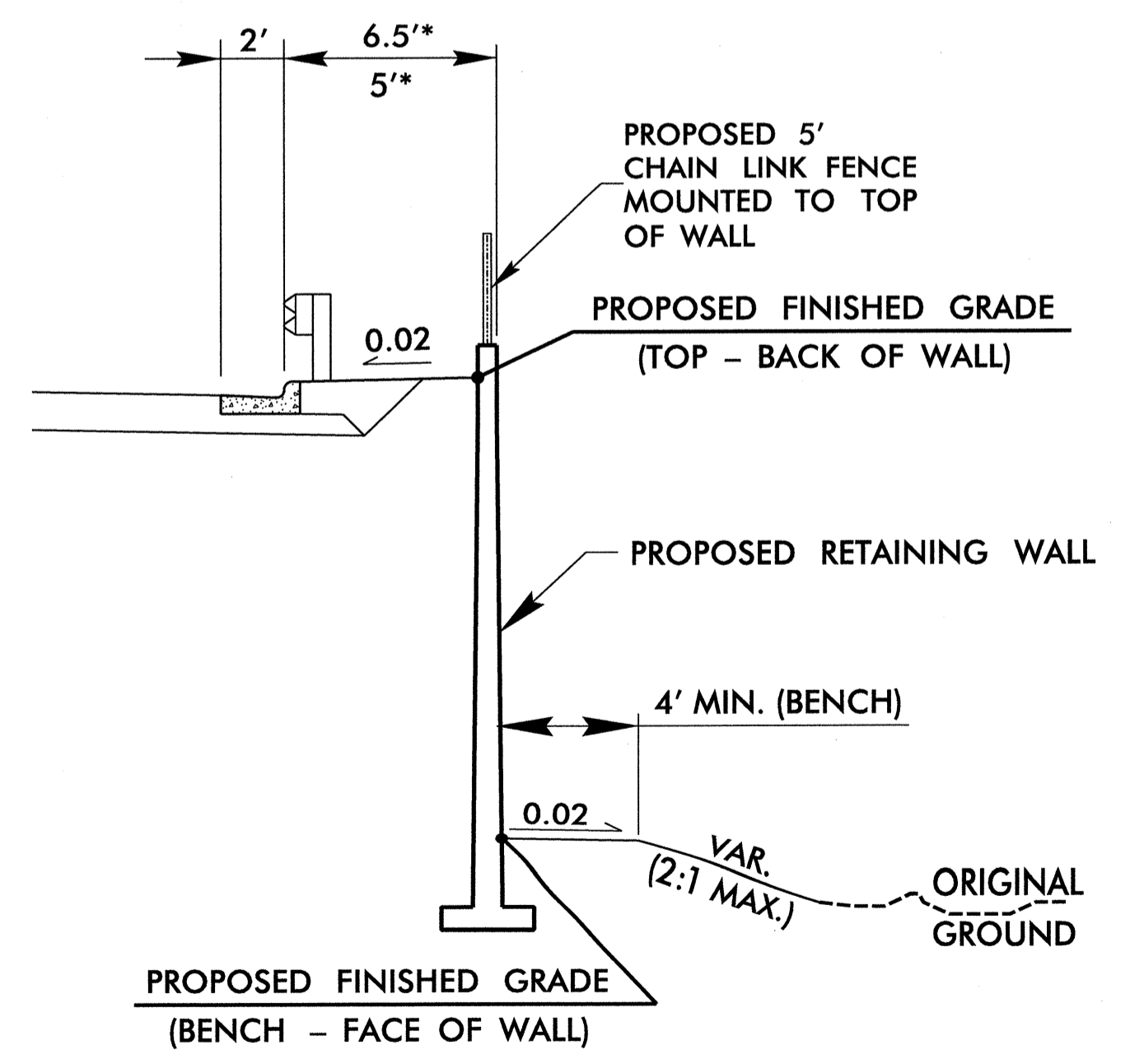
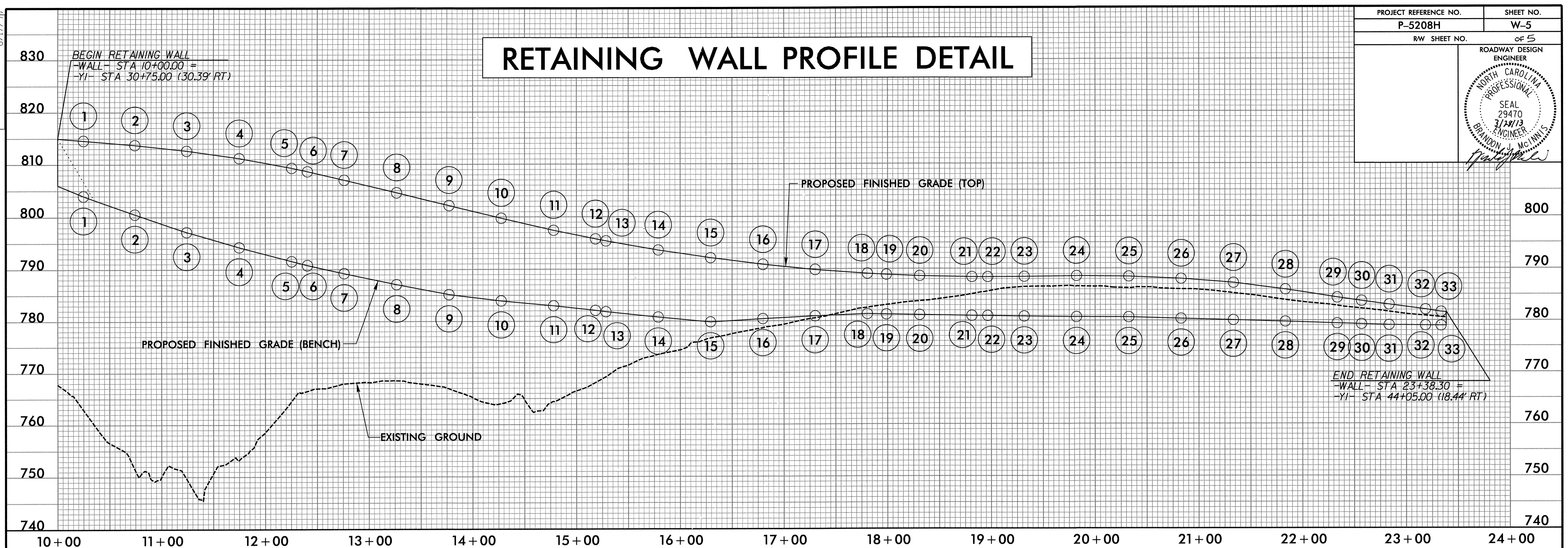
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PROJECT REFERENCE NO. P-5208H	SHEET NO. W-5
RW SHEET NO. OF 5	
ROADWAY DESIGN ENGINEER	
NORTH CAROLINA PROFESSIONAL SEAL 29470 3/28/13	
BRANDON J. McMINN'S	

# RETAINING WALL PROFILE DETAIL



ELEVATION LOCATIONS  
N.T.S.

\* DISTANCE FROM FACE OF GUARDRAIL TO BACK OF WALL TRANSITIONS  
FROM 6.5' TO 5' FROM -WALL- STA. 16+29.26 TO STA. 16+79.69.  
USE 5' FROM -WALL- STA. 16+79.69 TO STA. 23+38.30 WITH 8' GUARDRAIL POSTS.

POINT NO.	-WALL-STATION	PROPOSED FINISHED GRADE (TOP)	PROPOSED FINISHED GRADE (BENCH)	POINT NO.	-WALL-STATION	PROPOSED FINISHED GRADE (TOP)	PROPOSED FINISHED GRADE (BENCH)
1	10+24.75	814.60	804.00	17	17+30.08	789.84	780.94
2	10+74.27	813.77	800.54	18	17+80.47	789.10	781.33
3	11+24.20	812.65	797.15	19	17+98.81	788.90	781.26
4	11+74.80	811.23	794.25	20	18+30.86	788.63	781.14
5	12+25.39	809.34	791.53	21	18+81.26	788.41	780.96
6	12+40.56	808.68	790.78	22	18+96.55	788.40	780.92
7	12+75.95	807.02	789.25	23	19+31.65	788.45	780.82
8	13+26.49	804.60	787.10	24	19+82.04	788.59	780.69
9	13+77.01	802.18	785.16	25	20+32.43	788.47	780.64
10	14+27.50	799.76	783.94	26	20+82.82	788.04	780.35
11	14+77.97	797.44	782.99	27	21+33.21	787.25	780.06
12	15+18.33	795.78	782.09	28	21+83.29	785.95	779.75
12	15+28.41	795.39	781.81	29	22+33.29	784.38	779.40
13	15+78.84	793.62	780.76	30	22+56.76	783.73	779.24
14	16+29.26	792.12	779.81	31	22+83.29	783.02	779.06
16	16+79.69	790.83	780.42	32	23+18.29	782.08	778.98
				33	23+33.30	781.61	778.93

PLANS PREPARED BY :  
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900 RIDGEFIELD DRIVE SUITE 350  
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NC LICENSE NO. F-0112 • (919) 878-9560

## 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)

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### CONCRETE CHAMFERS:

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### DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

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

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

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

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

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