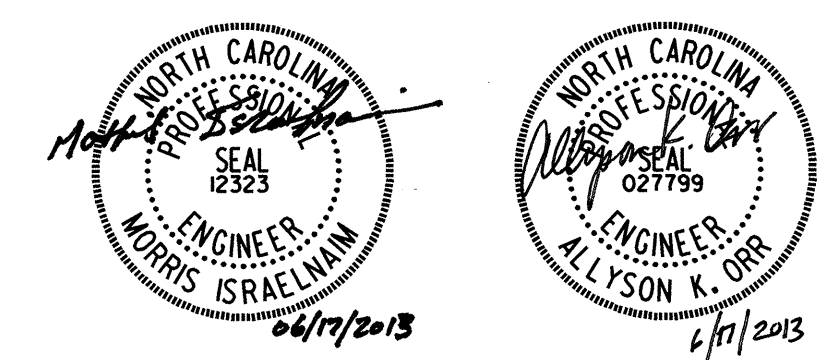


PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L- P.O.T. = 13+09.68 -Y-
 SHEET 1 OF 3 REPLACE BRIDGE NO. 150

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

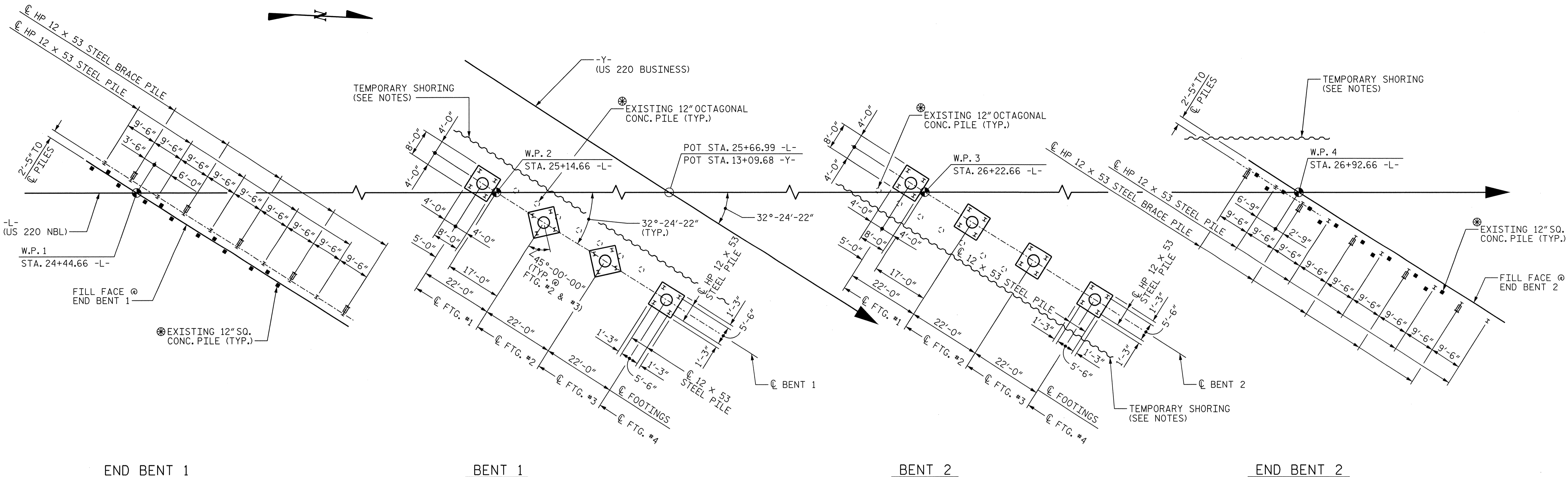
GENERAL DRAWING
 FOR BRIDGE ON US 220 NBL
 OVER US 220 BUSINESS BETWEEN
 US 311 & NC 770



DRAWN BY : B.E. LANNING DATE : 02/13
 CHECKED BY : A.K. ORR DATE : 02/13
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 06/13

MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-8606 FIRM PE NUMBER : P-0671		REVISIONS		SHEET NO. S-1 TOTAL SHEETS 42	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

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FOUNDATION LAYOUT

DIMENSIONS LOCATING END BENT PILES ARE SHOWN TO THE PILE CENTERLINE.
 BRACE PILES ARE TO BE BATTERED AT 3:12.
 FOOTING DIMENSIONS ARE TYPICAL FOR EACH FOOTING AT BENT 1 AND BENT 2.
 FOOTING #2 AND #3 AT BENT 1 ARE ROTATED 45° TO AVOID CONFLICT WITH EXISTING CONCRETE PILES.
 * CONTRACTOR TO VERIFY THE LOCATION OF EXISTING PILES. EXISTING PILES TO REMAIN IN PLACE. CUT EXISTING PILES TO 1'-6" BELOW BOTTOM OF CAP ELEVATION AT END BENTS AND TO THE BOTTOM OF FOOTING ELEVATION AT INTERIOR BENTS.

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
 PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.
 DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.
 PILES AT BENT 1 AND BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.
 DRIVE PILES AT BENT 1 AND BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE ON US 220 NBL
 OVER US 220 BUSINESS BETWEEN
 US 311 & NC 770



MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

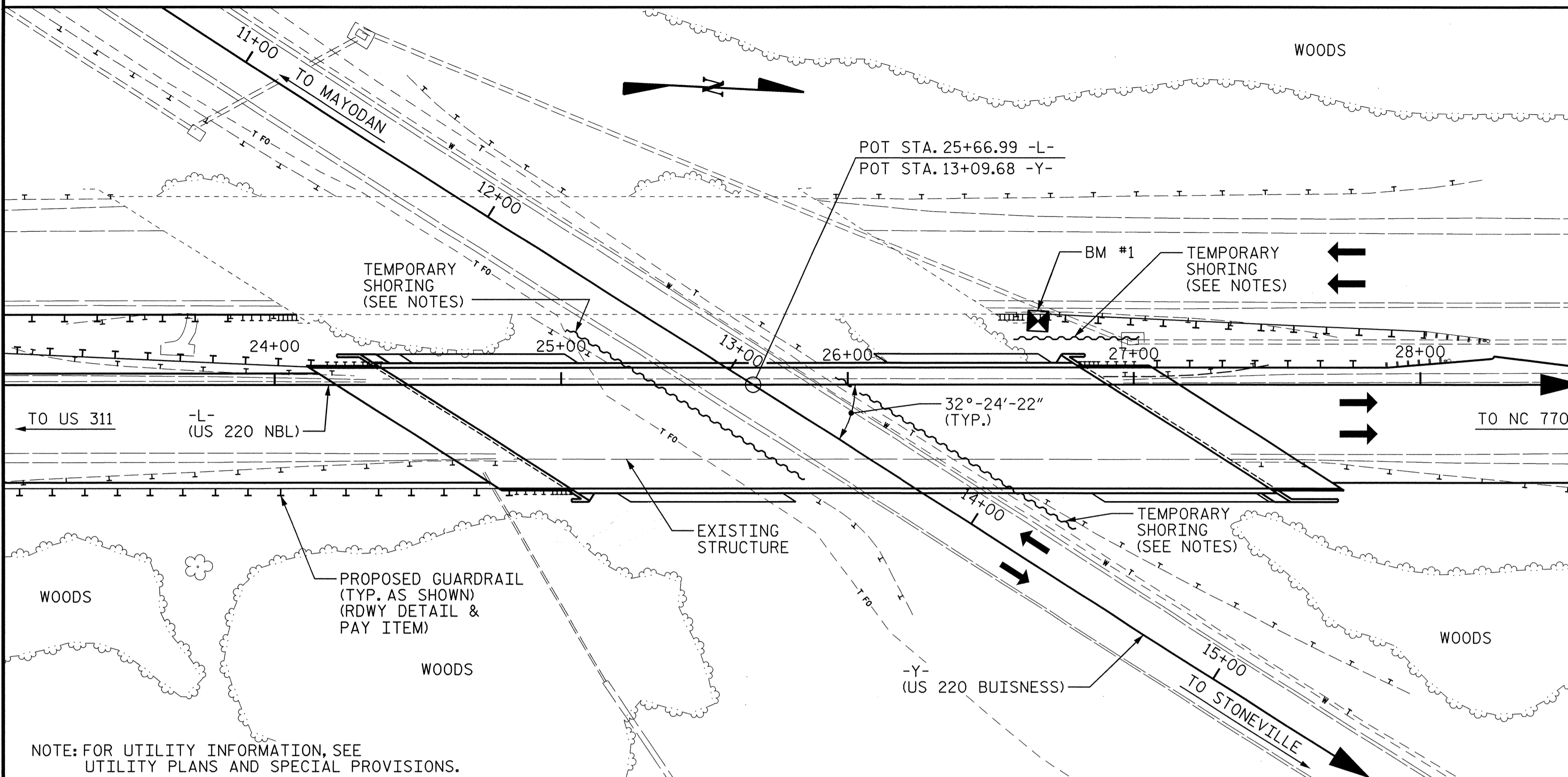
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
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DRAWN BY : B.E. LANNING	DATE : 02/13
CHECKED BY : A.K. ORR	DATE : 02/13
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 06/13

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B.M. #1: CHISELED SQUARE ON NORTHEAST WINGWALL OF SOUTHBOUND BRIDGE; 22.21' LEFT OF STA. 26+66.57 -L-, EL. 750.54.

NOTES



LOCATION SKETCH

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 2 SPANS @ 40'-6", 1 SPAN @ 88'-0", AND 2 SPANS @ 40'-6" WITH A REINFORCED CONCRETE DECK ON I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 28 FT., WITH END BENTS AND INTERIOR BENTS ON REINFORCED CONCRETE CAP ON PRECAST PRESTRESSED CONCRETE PILES, LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS NOT PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE" AT STATION 25+66.99 -L-.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W (345W) AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

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.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR FOUNDATION NOTES, SEE "FOUNDATION LAYOUT" SHEET.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

THE ELEVATION(S) AND CLEARANCE(S) SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

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

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

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL (APPROX.)	HP 12 X 53 STEEL PILES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS	LBS.	NO. LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			11,045	11,220		LUMP SUM			286,800		532.10		LUMP SUM	LUMP SUM
END BENT 1					59.5		9,433			10	360.0	416		
BENT 1		LUMP SUM			92.3		15,558	1,703		16	572.0			
BENT 2		LUMP SUM			92.3		15,558	1,703		16	492.0			
END BENT 2					62.7		10,235			10	310.0	424		
TOTAL	LUMP SUM	LUMP SUM	11,045	11,220	306.8	LUMP SUM	50,784	3,406	286,800	52	1,734.0	840	LUMP SUM	LUMP SUM

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

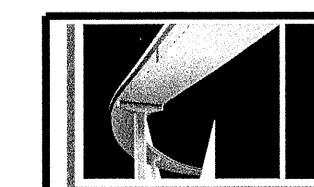
SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON US 220 NBL
 OVER US 220 BUSINESS BETWEEN
 US 311 & NC 770



6/17/2013



MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

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

TOTAL SHEETS: 42

DRAWN BY : B.E. LANNING DATE : 02/13
 CHECKED BY : A.K. ORR DATE : 02/13
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 06/13

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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL	VEHICLE	WEIGHT (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ _{LL})	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 _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.24	--	1.75	0.6049	1.25	B	E	0	0.7968	1.24	B	I	108.0	1.30	0.6049	1.79	B	E	108.0		
	HL-93 (OPERATING)	N/A		1.61	--	1.35	0.6049	1.61	B	E	0	0.7968	1.61	B	I	108.0	1.00	0.6049	2.33	B	E	108.0		
	HS-20 (INVENTORY)	36.00	2	1.73	62.28	1.75	0.6244	1.91	B	E	54.0	0.7968	1.73	B	I	108.0	1.30	0.6244	2.72	B	E	54.0		
	HS-20 (OPERATING)	36.00		2.33	83.88	1.35	0.6244	2.58	B	E	54.0	0.7968	2.33	B	I	108.0	1.00	0.6244	3.54	B	E	54.0		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.60	75.60	1.40	0.6244	5.66	B	E	54.0	0.7968	5.60	B	I	108.0	1.30	0.6244	6.18	B	E	54.0	
		SNGARBS2	20.000		3.86	77.20	1.40	0.6244	4.21	B	E	54.0	0.7968	3.86	B	I	108.0	1.30	0.6244	4.59	B	E	54.0	
		SNAGRIS2	22.000		3.54	77.88	1.40	0.6244	3.98	B	E	54.0	0.7968	3.54	B	I	108.0	1.30	0.6244	4.34	B	E	54.0	
		SNCOTTS3	27.250		2.81	76.57	1.40	0.6244	2.83	B	E	54.0	0.7968	2.81	B	I	108.0	1.30	0.6244	3.09	B	E	54.0	
		SNAGGRS4	34.925		2.25	78.58	1.40	0.6244	2.36	B	E	54.0	0.7968	2.25	B	I	108.0	1.30	0.6244	2.57	B	E	54.0	
		SNS5A	35.550		2.24	79.63	1.40	0.6244	2.35	B	E	54.0	0.7968	2.24	B	I	108.0	1.30	0.6244	2.56	B	E	54.0	
		SNS6A	39.950		2.02	80.70	1.40	0.6244	2.14	B	E	54.0	0.7968	2.02	B	I	108.0	1.30	0.6244	2.33	B	E	54.0	
		SNS7B	42.000		1.95	81.90	1.40	0.6244	2.03	B	E	54.0	0.7968	1.95	B	I	108.0	1.30	0.6244	2.21	B	E	54.0	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.43	80.19	1.40	0.6244	2.59	B	E	54.0	0.7968	2.43	B	I	108.0	1.30	0.6244	2.82	B	E	54.0	
		TNT4A	33.075		2.39	79.05	1.40	0.6244	2.58	B	E	54.0	0.7968	2.39	B	I	108.0	1.30	0.6244	2.82	B	E	54.0	
		TNT6A	41.600		2.01	83.62	1.40	0.6244	2.11	B	E	54.0	0.7968	2.01	B	I	108.0	1.30	0.6244	2.30	B	E	54.0	
		TNT7A	42.000		1.99	83.58	1.40	0.6244	2.15	B	E	54.0	0.7968	1.99	B	I	108.0	1.30	0.6244	2.35	B	E	54.0	
		TNT7B	42.000		1.93	81.06	1.40	0.6244	2.16	B	E	54.0	0.7968	1.93	B	I	108.0	1.30	0.6244	2.36	B	E	54.0	
		TNAGRIT4	43.000		1.90	81.70	1.40	0.6244	2.09	B	E	54.0	0.7968	1.90	B	I	108.0	1.30	0.6244	2.29	B	E	54.0	
TNAGT5A	45.000		1.83	82.35	1.40	0.6244	1.98	B	E	54.0	0.7968	1.83	B	I	108.0	1.30	0.6244	2.16	B	E	54.0			
TNAGT5B	45.000		3	1.81	81.45	1.40	0.6244	1.96	B	E	54.0	0.7968	1.81	B	I	108.0	1.30	0.6244	2.14	B	E	54.0		
FATIGUE	HL-93 (INVENTORY)	γ _{LL} =0.75																						

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ _{DC}	γ _{DW}
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

NOTES:

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

COMMENTS:

-
-
-
-

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93) **

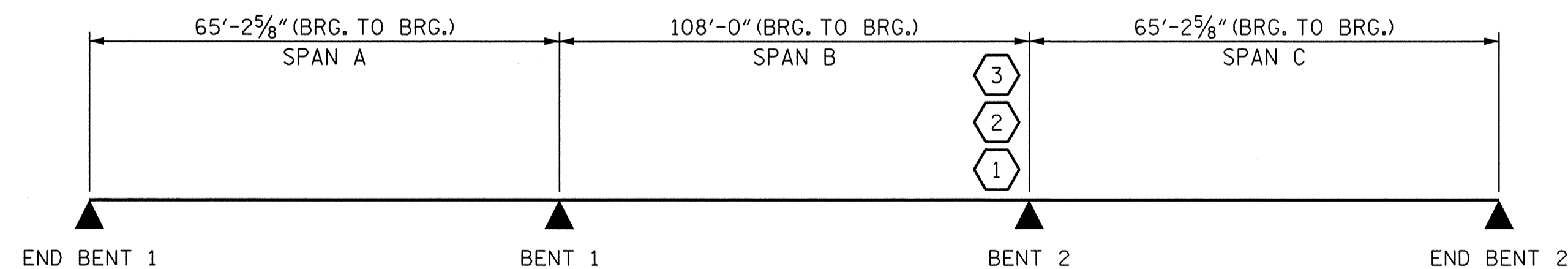
2 DESIGN LOAD RATING (HS-20) **

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

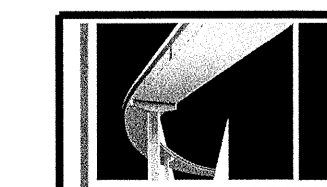
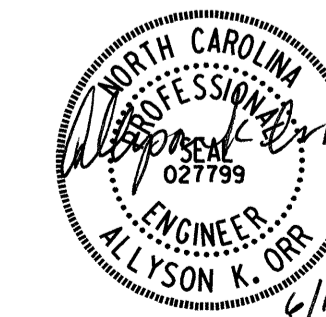
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. B-4621
ROCKINGHAM COUNTY
STATION: 25+66.99 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)



MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
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				TOTAL SHEETS	
				42	

STD. NO. LRFR3

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ASSEMBLED BY : B.E. LANNING	DATE : 02/13
CHECKED BY : A.K. ORR	DATE : 02/13
DESIGN ENGINEER	
OF RECORD: A.K. ORR	DATE : 06/13
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM

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.) @ 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.

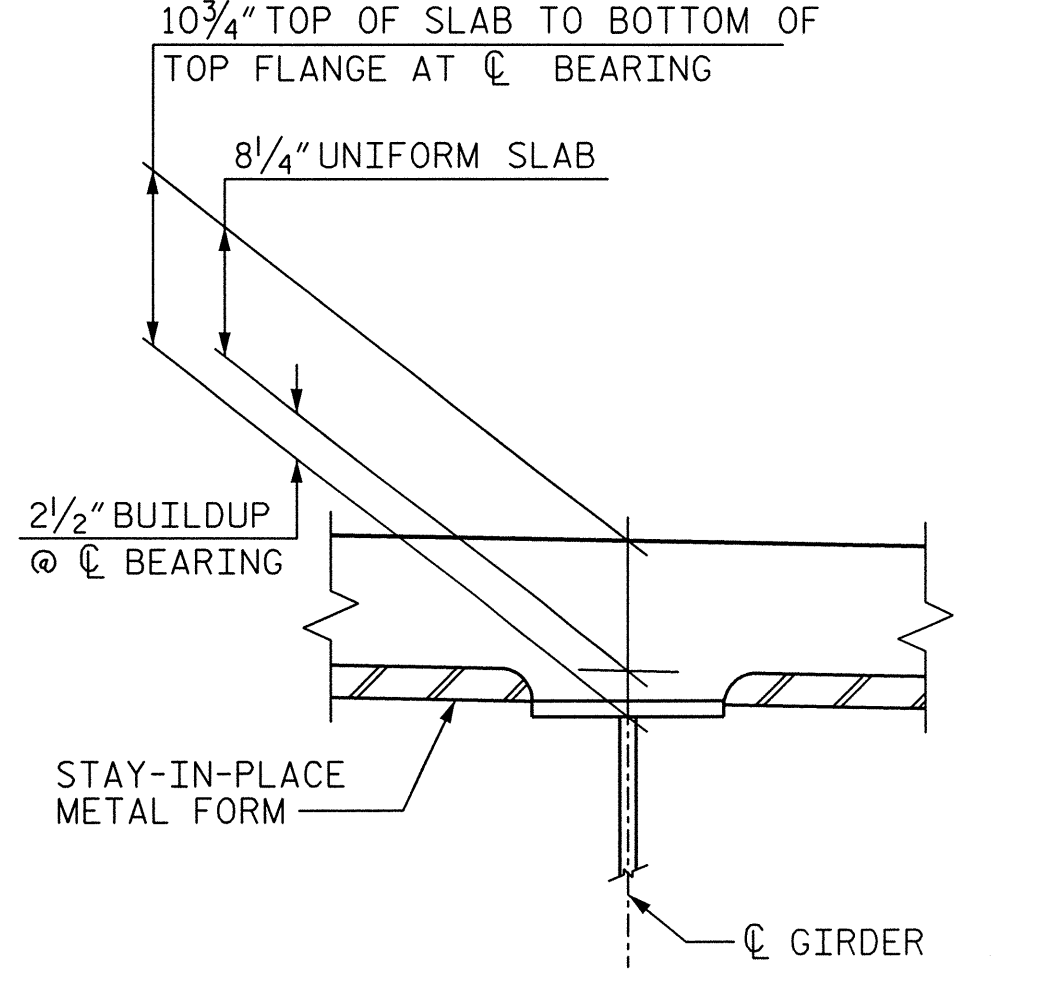
METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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.

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

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM/GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

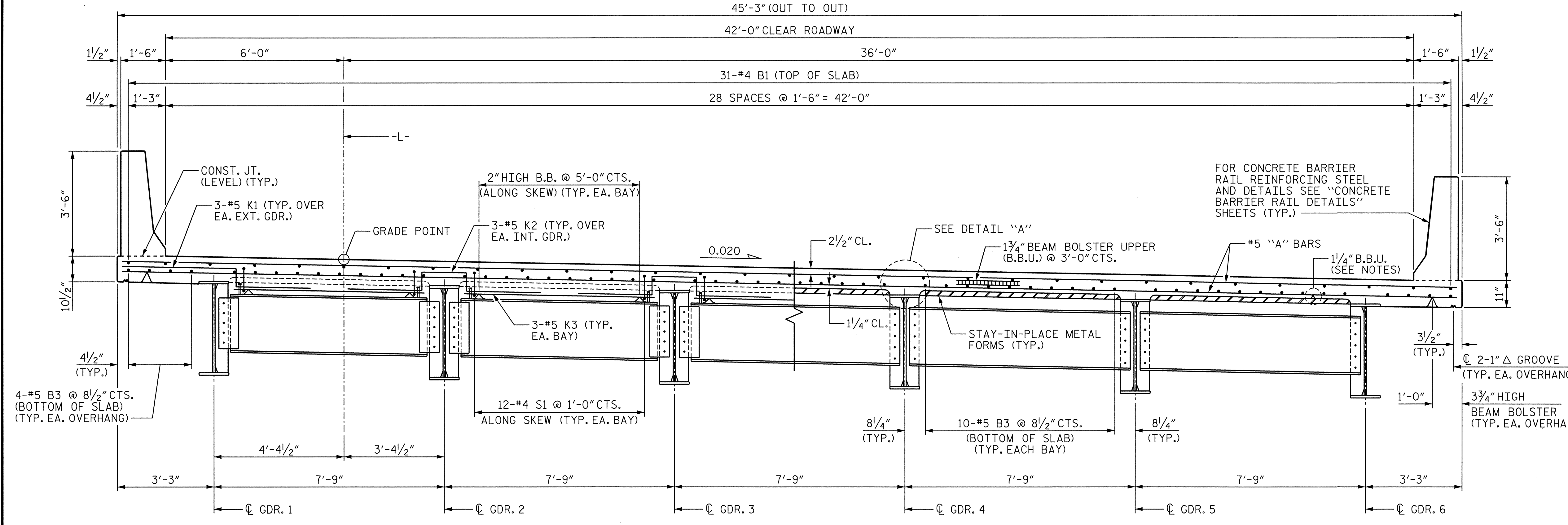
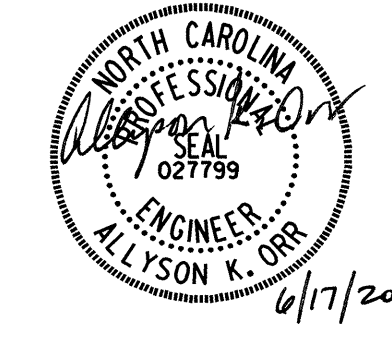


DETAIL "A"

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 1 OF 2

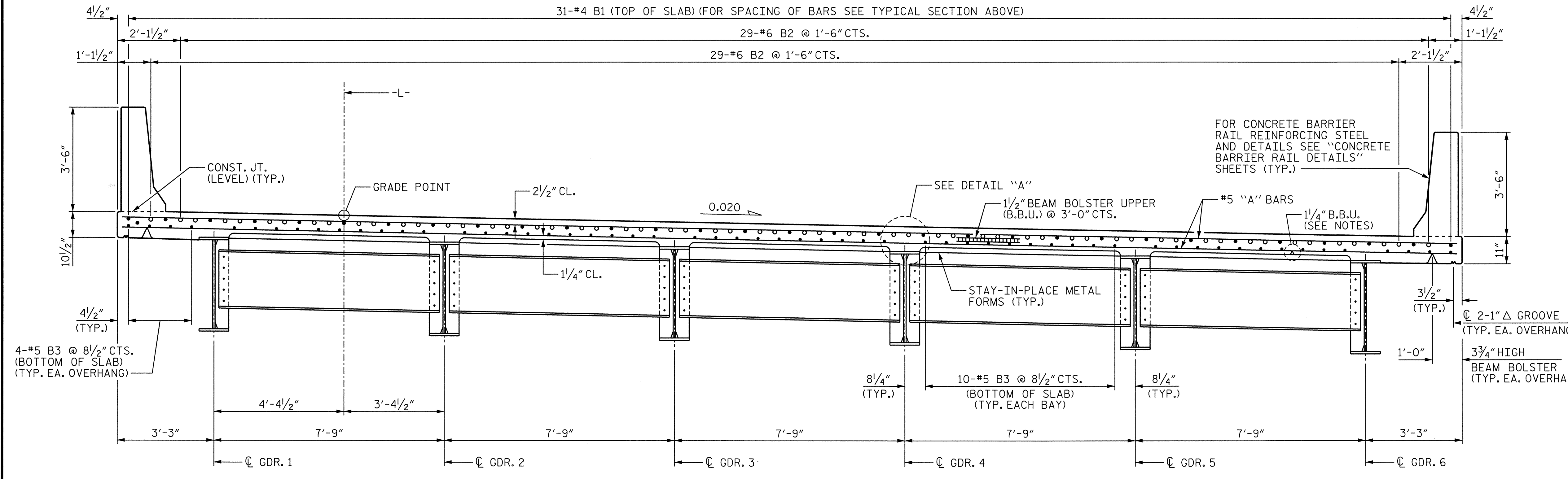
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION



AT END BENT DIAPHRAGM

AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION



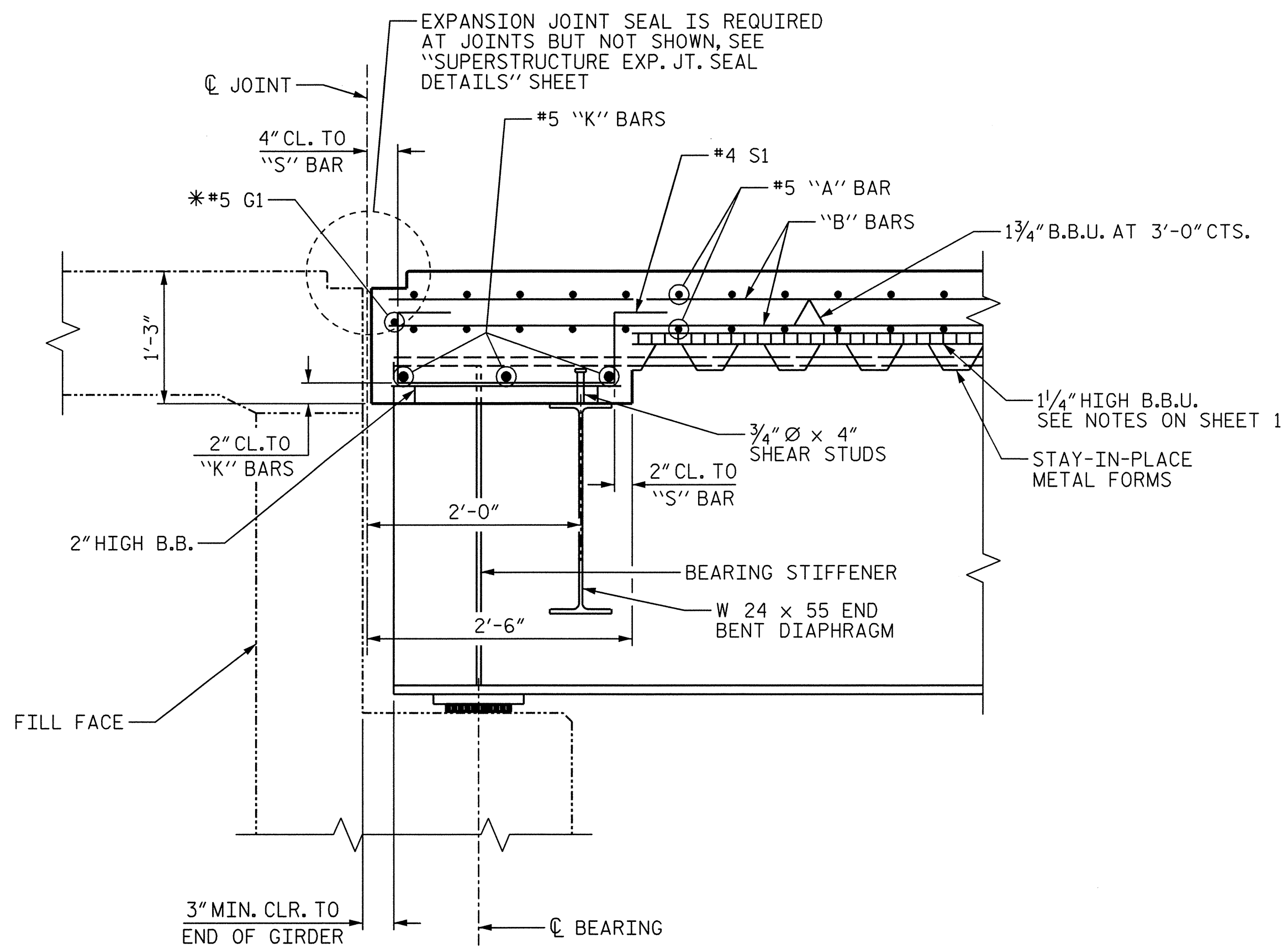
TYPICAL SECTION AT BENT DIAPHRAGM
 (FOR ADDITIONAL DIMENSIONS, SEE SECTION ABOVE)

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DRAWN BY : B.E. LANNING	DATE : 02/13
CHECKED BY : A.K. ORR	DATE : 02/13
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 06/13

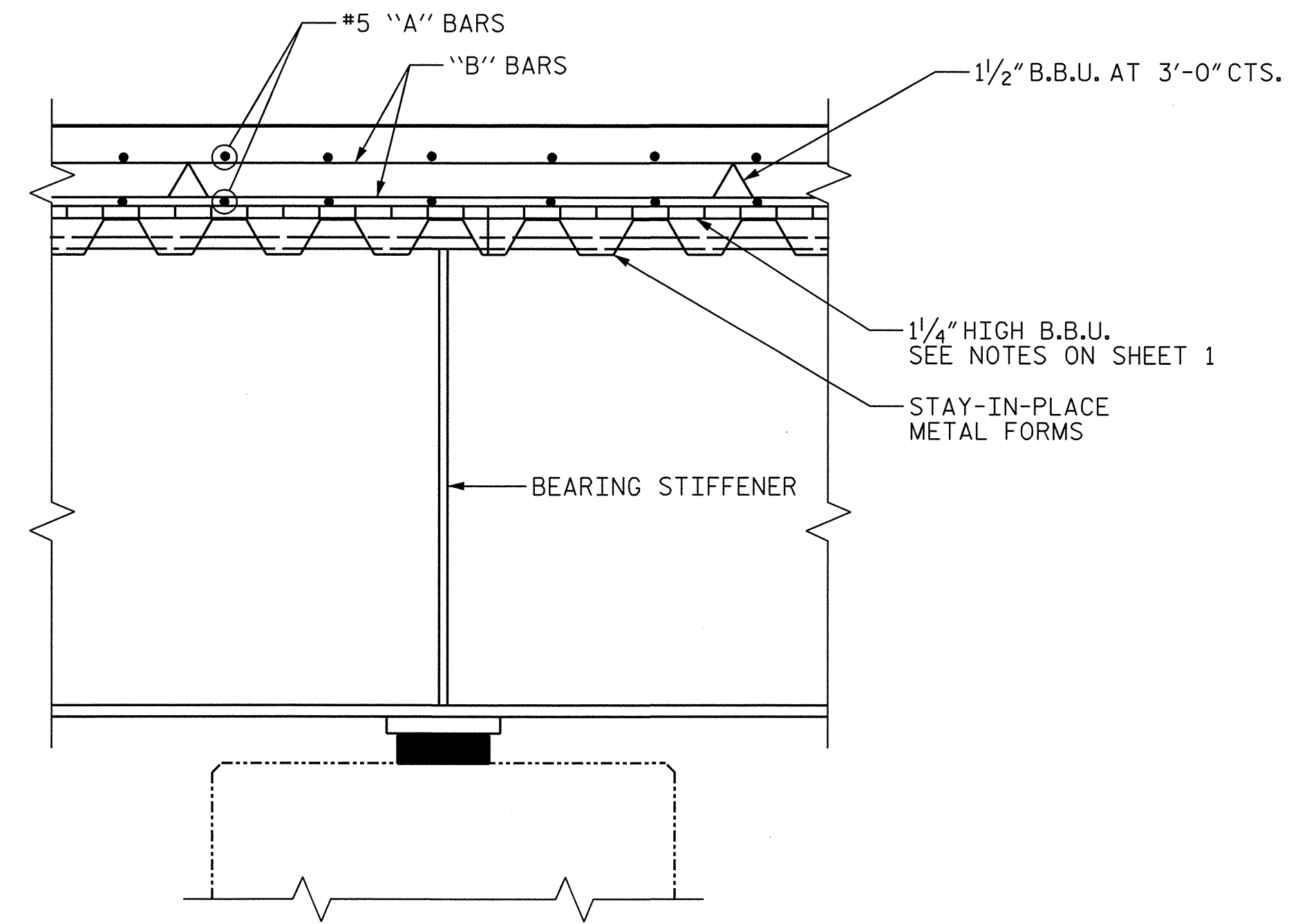
MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5	
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2			4			42	

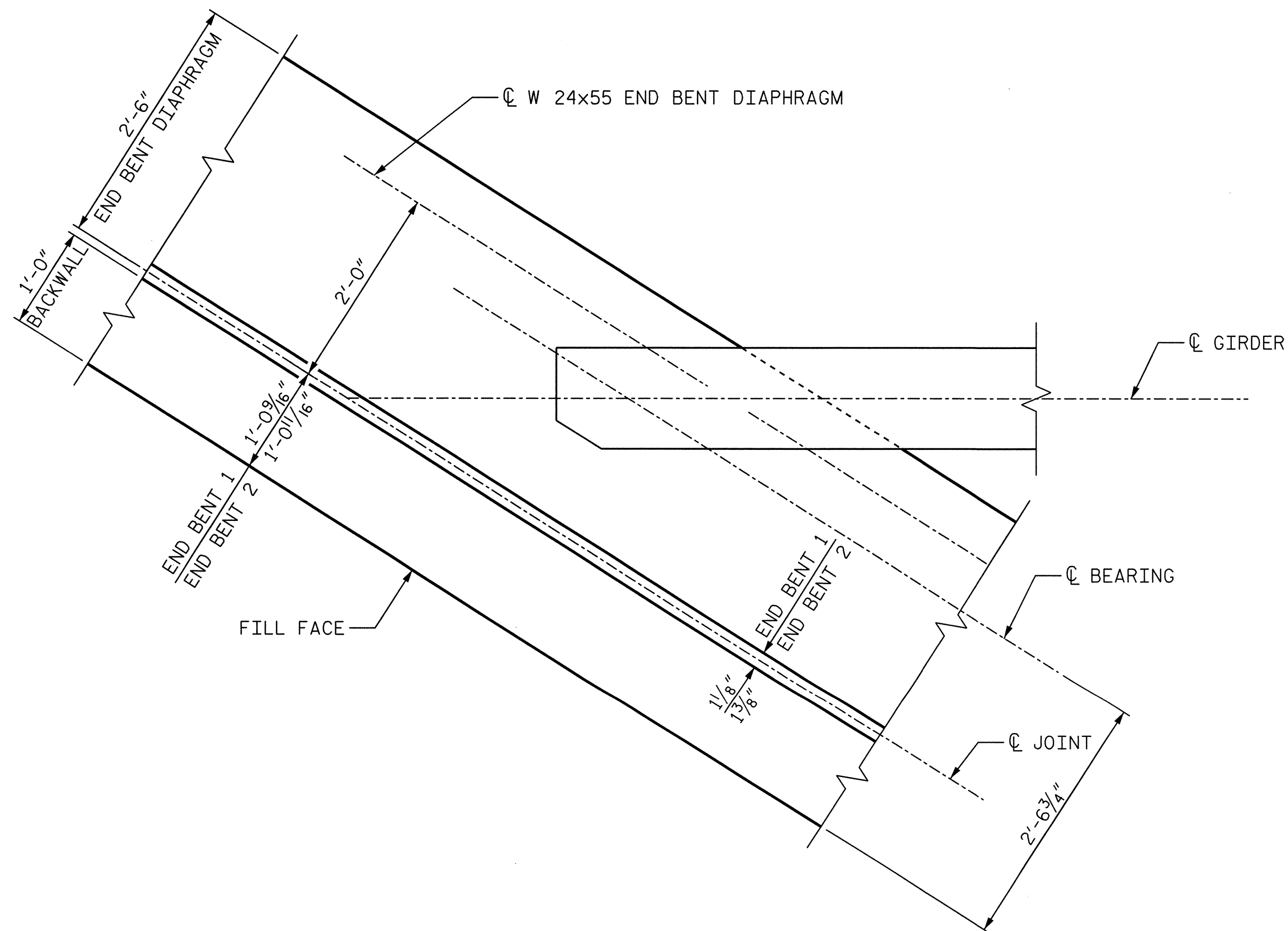


SECTION A-A

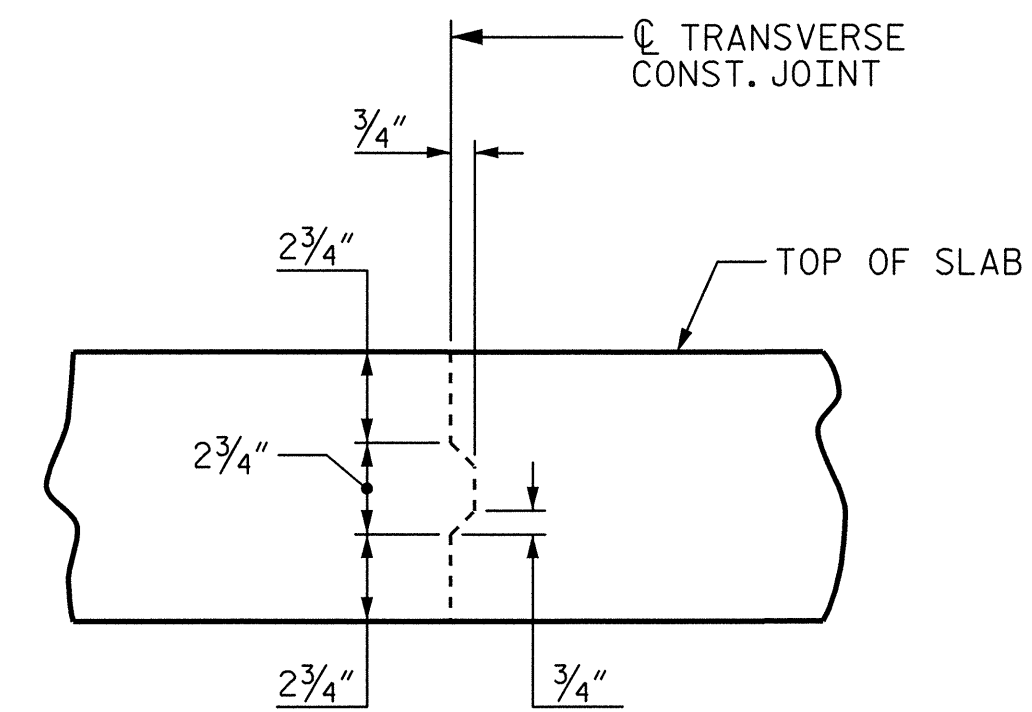
*#5 G1 BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



SECTION OF INTERIOR BENT DIAPHRAGM



PLAN OF END BENT DIAPHRAGM



TRANSVERSE CONSTRUCTION JOINT DETAIL

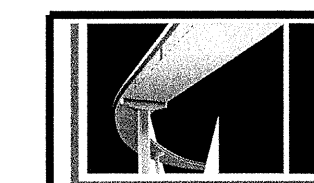
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION
 DETAILS

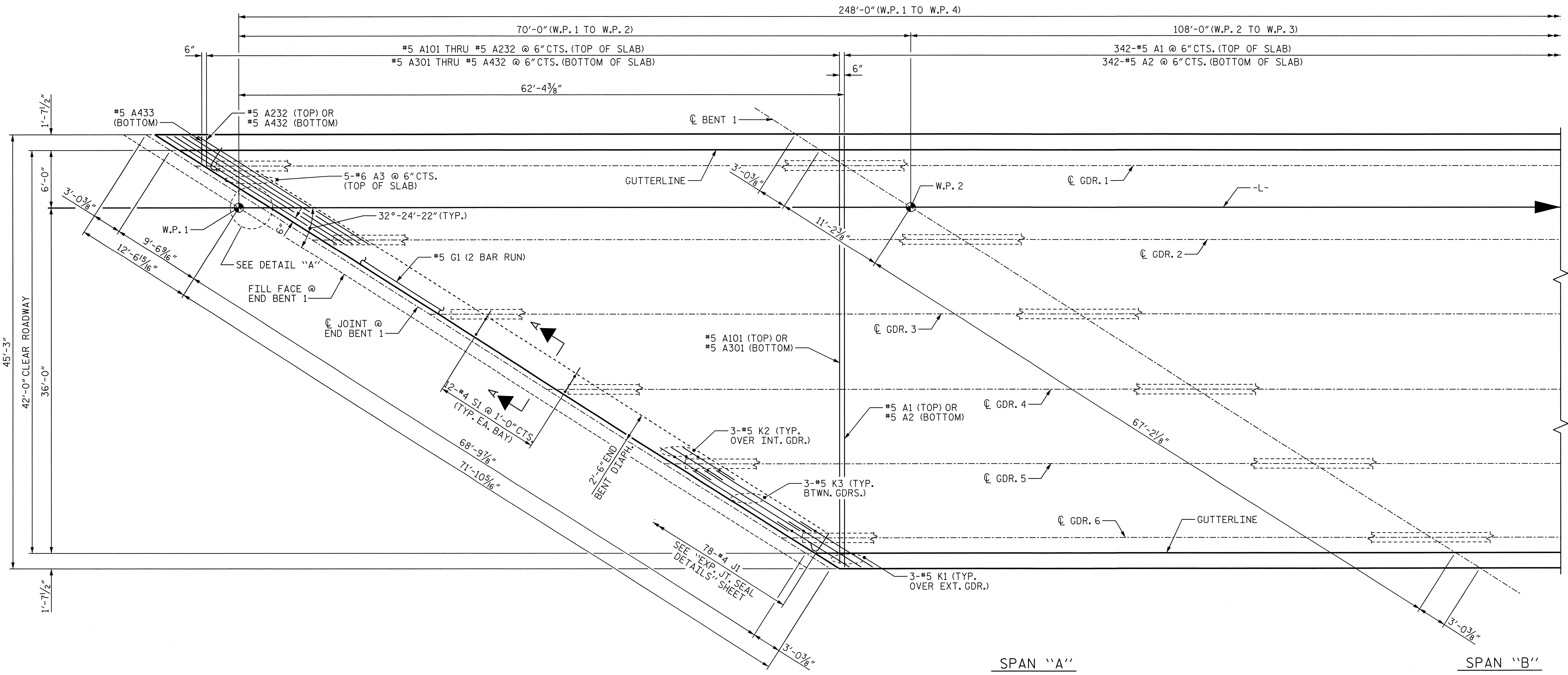


MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
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1			3			42
2			4			

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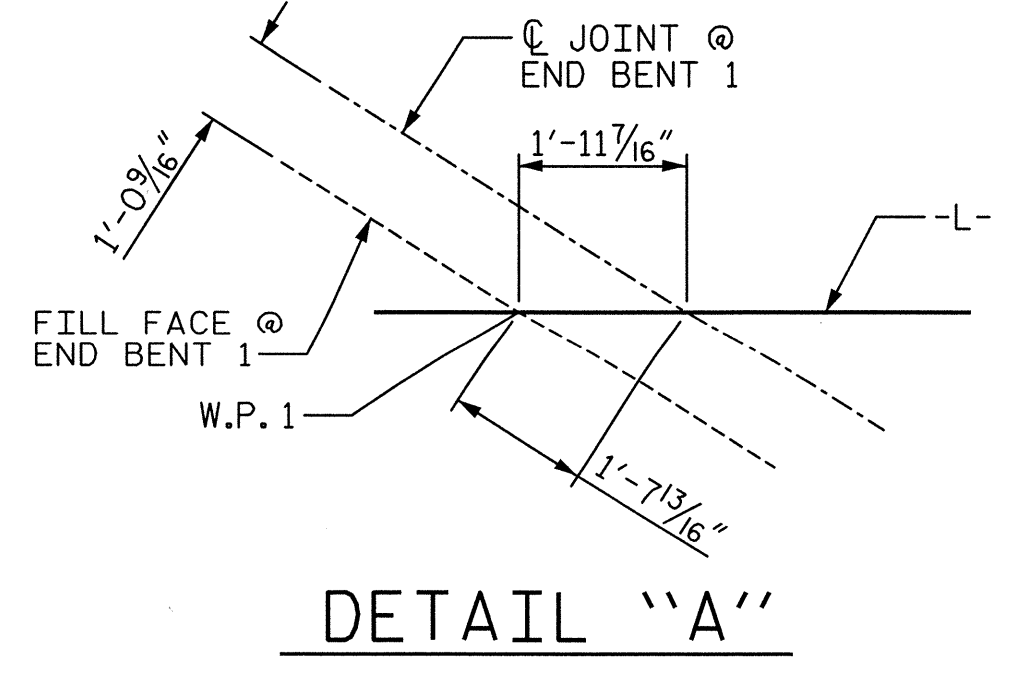


SPAN "A"

SPAN "B"

PLAN OF SPAN "A" AND PART OF SPAN "B"

NOTES
 FOR REINFORCING STEEL IN BARRIER RAIL, SEE "CONCRETE BARRIER RAIL DETAILS" SHEET.
 FOR TOP AND BOTTOM SLAB "B" BARS NOT SHOWN, SEE "B" BAR LAYOUT ON SHEET 3 OF 3.
 FOR SECTION VIEWS, SEE "TYPICAL SECTION DETAILS" SHEET.
 FOR TRANSVERSE CONSTRUCTION JOINT LOCATIONS, SEE SUPERSTRUCTURE BILL OF MATERIAL SHEET 1 OF 2.



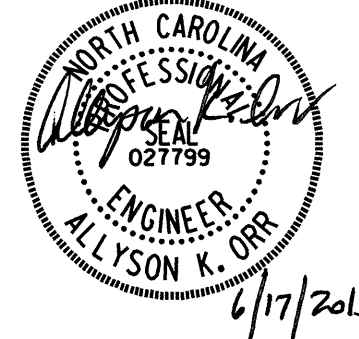
DETAIL "A"

PROJECT NO. B-4621
 ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

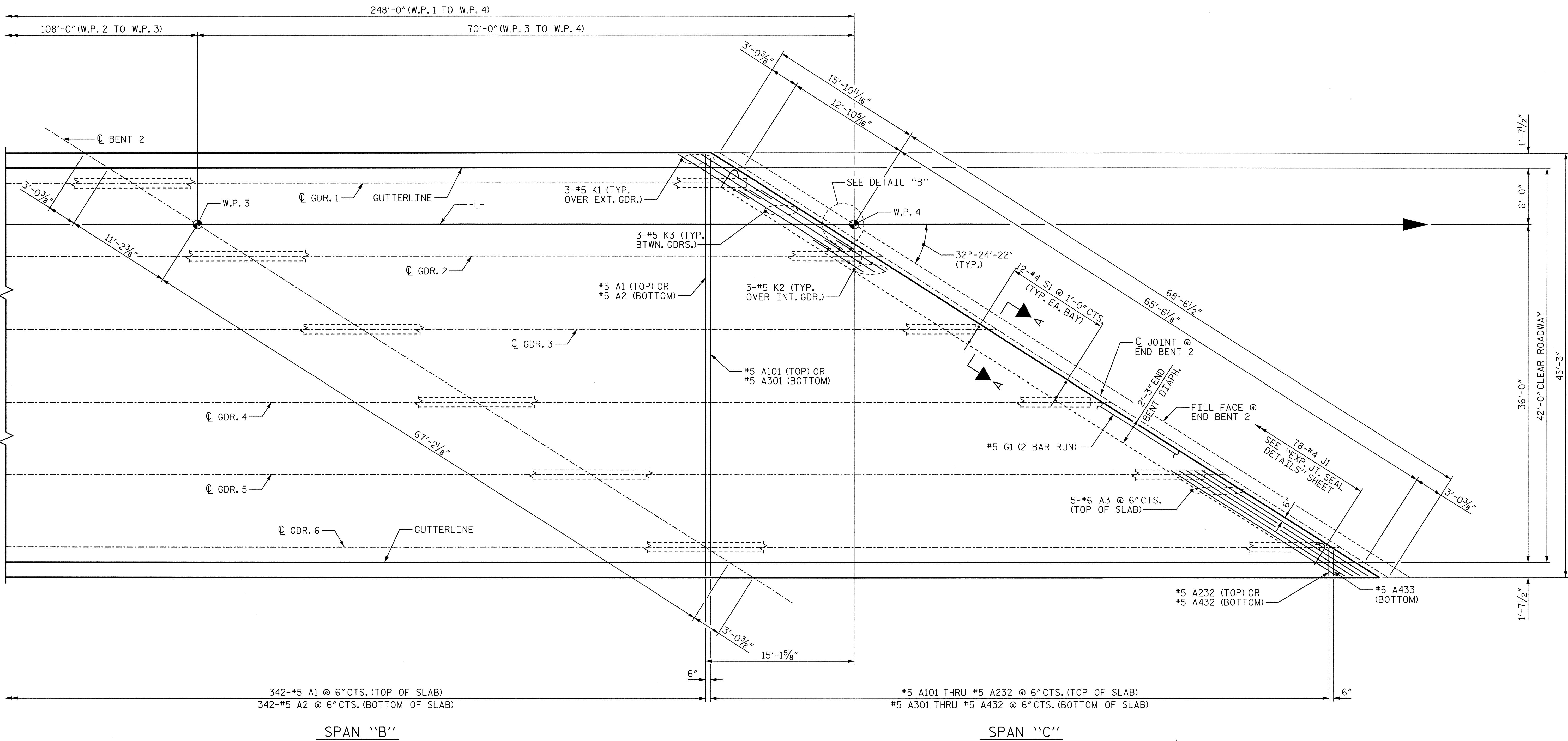
SUPERSTRUCTURE
 PLAN OF SPANS
 SPAN "A" AND
 PART OF SPAN "B"



MI ENGINEERING 1011 SCHAUH DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
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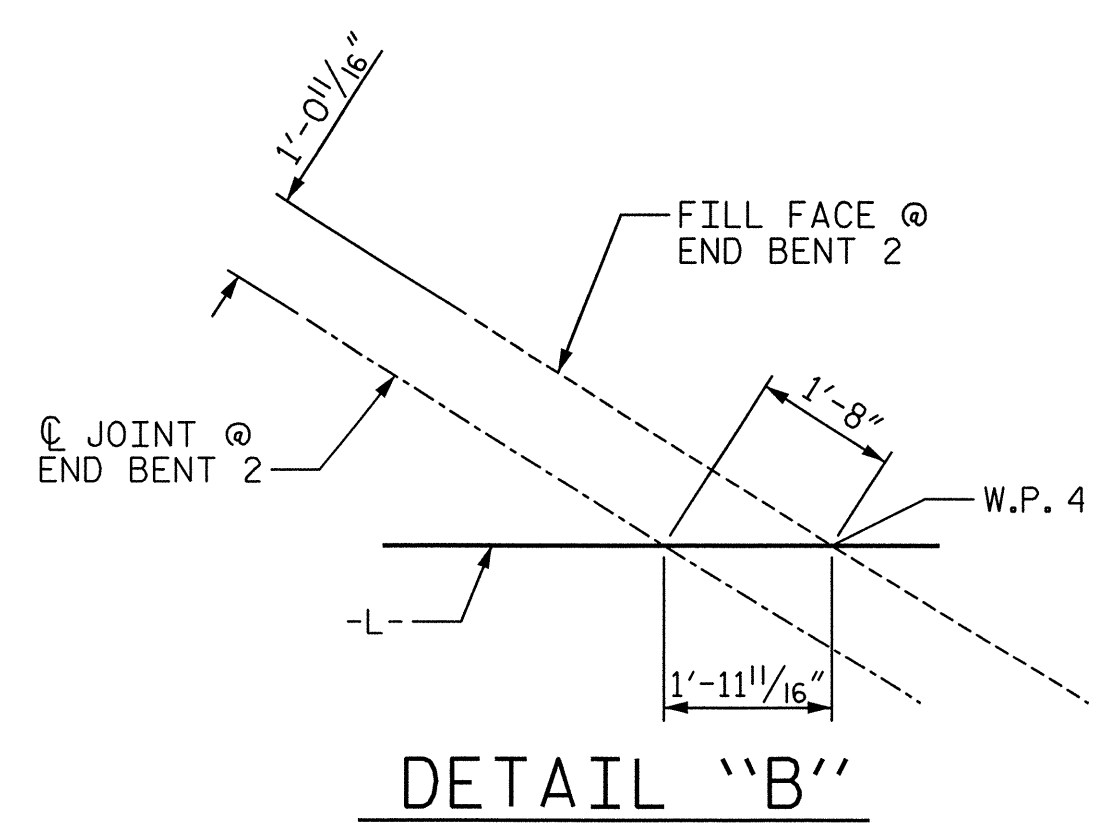
SPAN "B"

SPAN "C"

PLAN OF PART OF SPAN "B" AND SPAN "C"

NOTES

- FOR REINFORCING STEEL IN BARRIER RAIL, SEE "CONCRETE BARRIER RAIL DETAILS" SHEET.
- FOR TOP AND BOTTOM SLAB "B" BARS NOT SHOWN, SEE "B" BAR LAYOUT ON SHEET 3 OF 3.
- FOR SECTION VIEWS, SEE "TYPICAL SECTION DETAILS" SHEET.
- FOR TRANSVERSE CONSTRUCTION JOINT LOCATIONS, SEE SUPERSTRUCTURE BILL OF MATERIAL SHEET 1 OF 2.

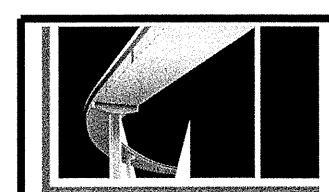
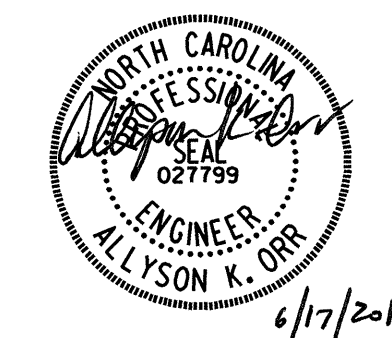


DETAIL "B"

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPANS
 PART OF SPAN "B"
 AND SPAN "C"



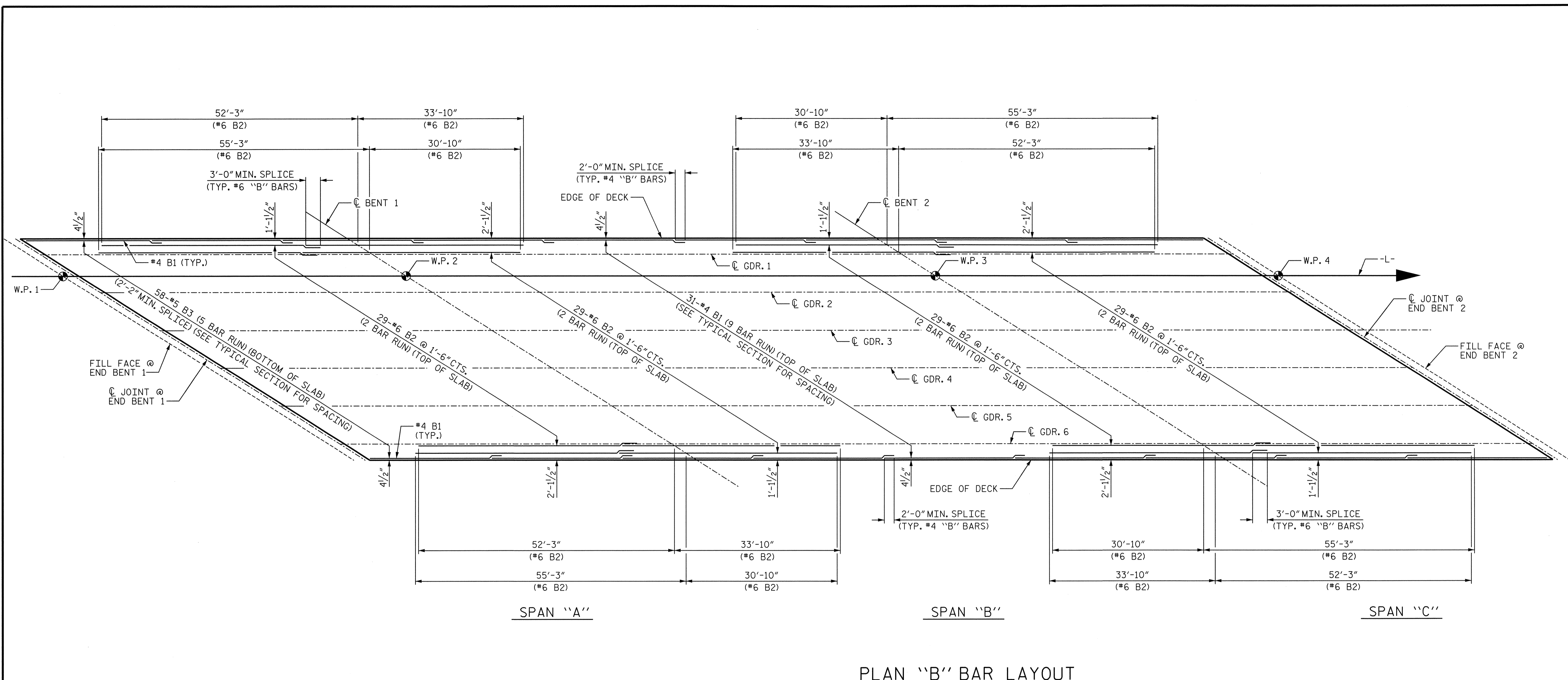
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TOTAL SHEETS: 42

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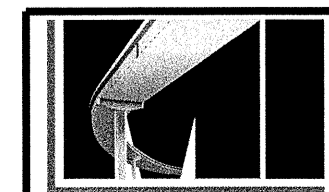
PLAN "B" BAR LAYOUT

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPANS
 "B" BAR LAYOUT

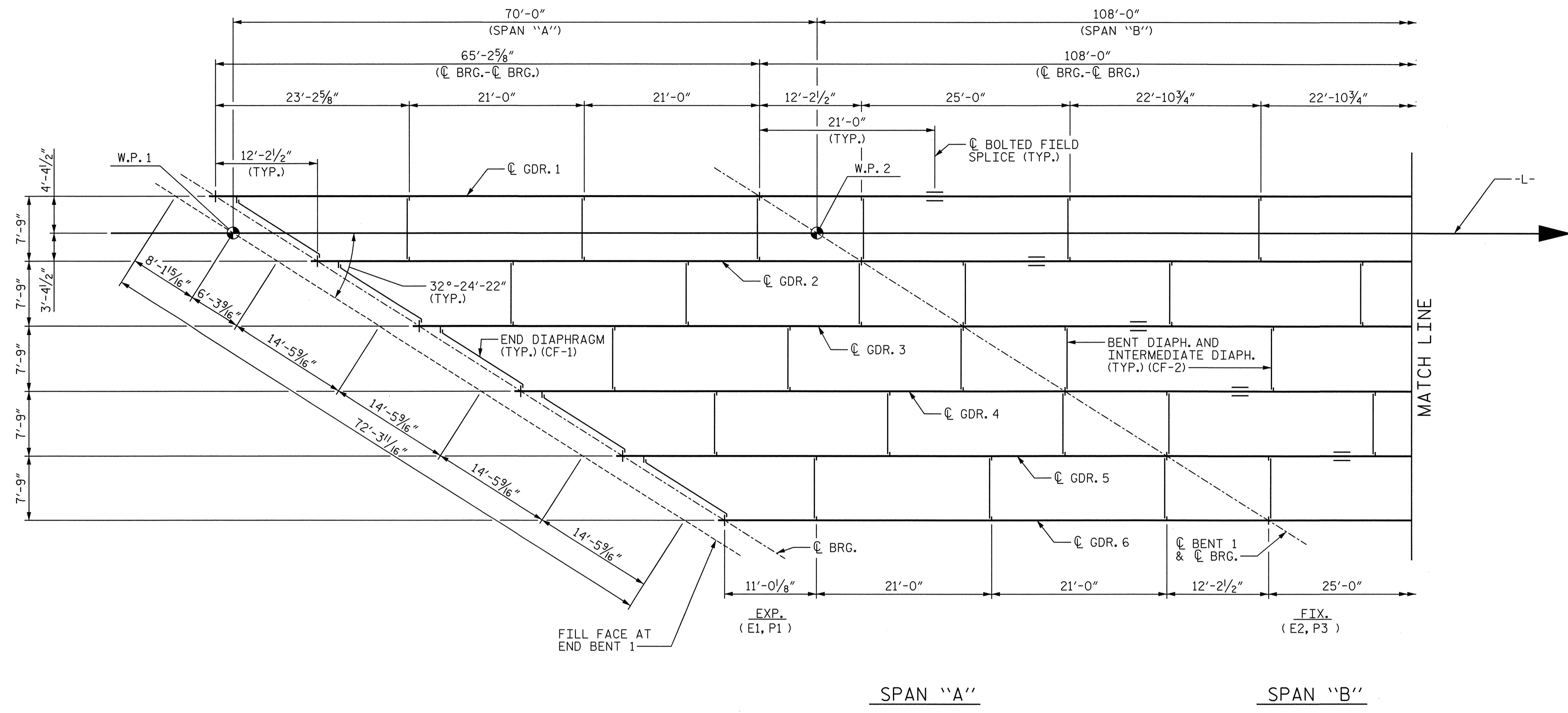


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FRAMING PLAN

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 1 OF 2

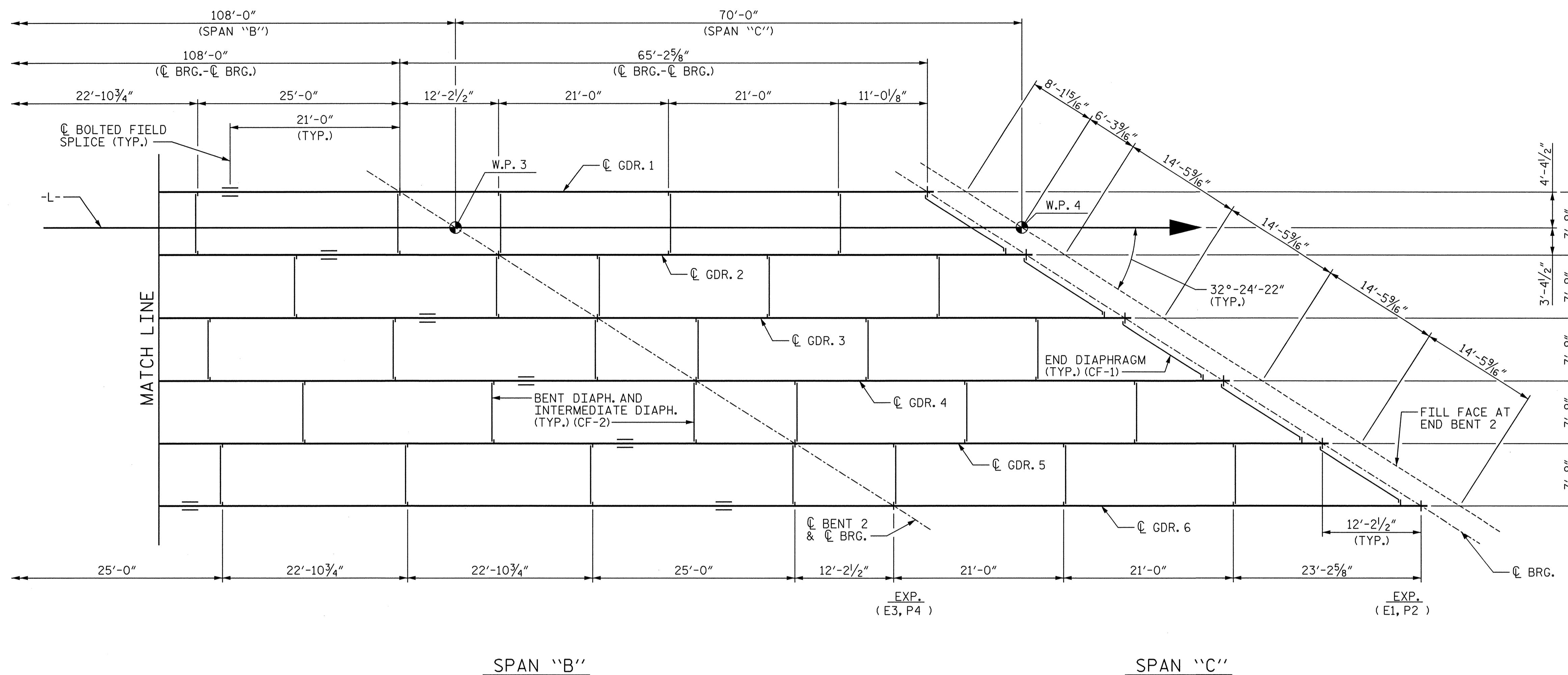
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 FRAMING PLAN



	MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671				REVISIONS				SHEET NO. S-10
	NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS		
1				3			42		
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DRAWN BY : J.S. ISRAELNAIM	DATE : 02/13
CHECKED BY : A.K. ORR	DATE : 02/13
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 06/13

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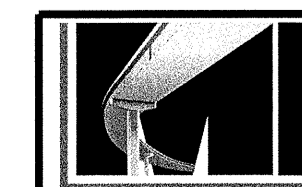
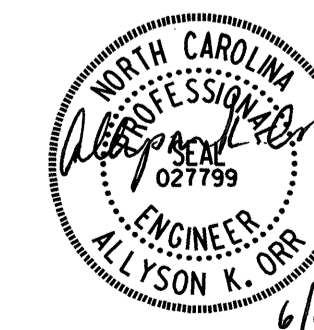


FRAMING PLAN

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 FRAMING PLAN



MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
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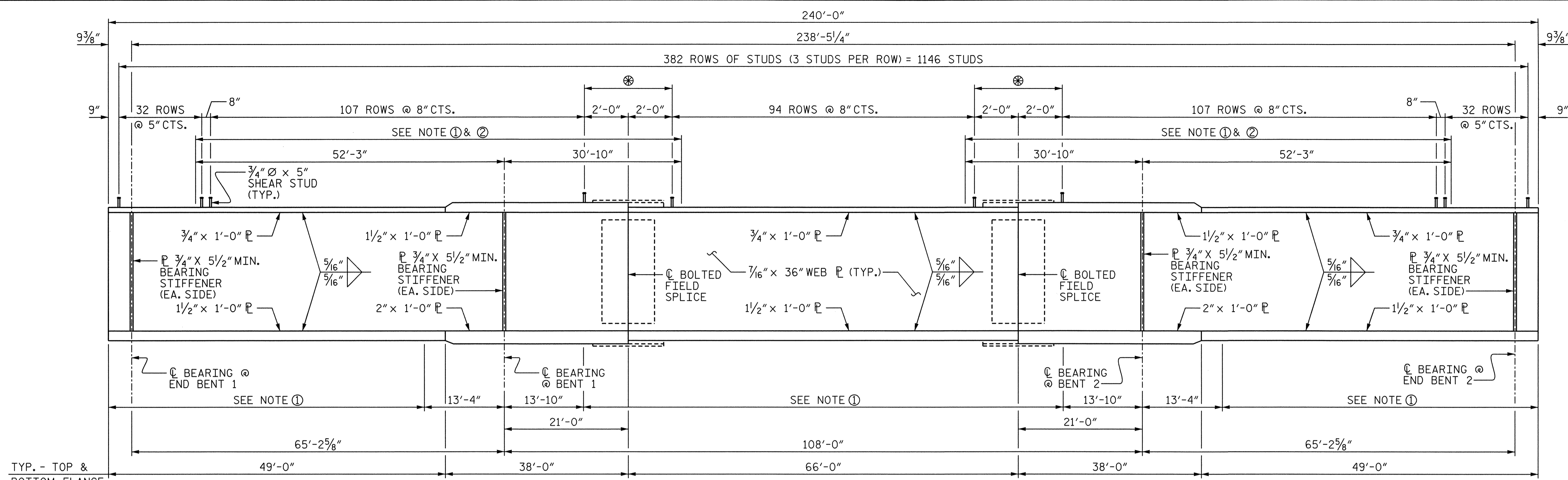
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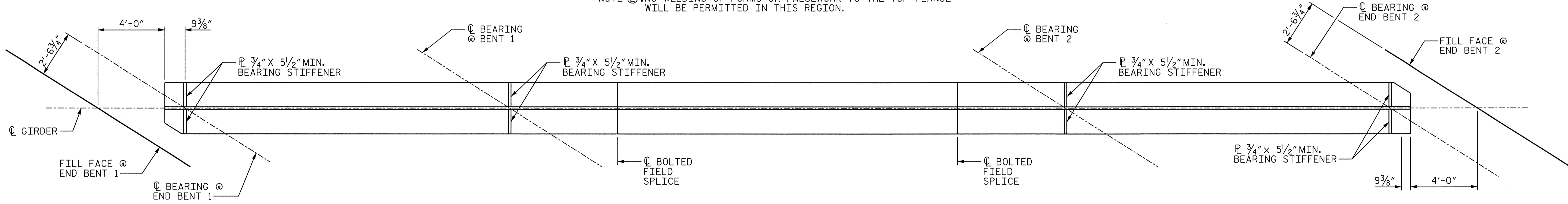
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NOTES
 FOR SHEAR STUD DETAILS, SEE SHEET 2 OF 3.
 FOR BOLTED FIELD SPLICE DETAILS, SEE SHEET 3 OF 3.
 SEE SHEET 3 OF 3 FOR STUD LOCATIONS ON SPLICE PLATES.

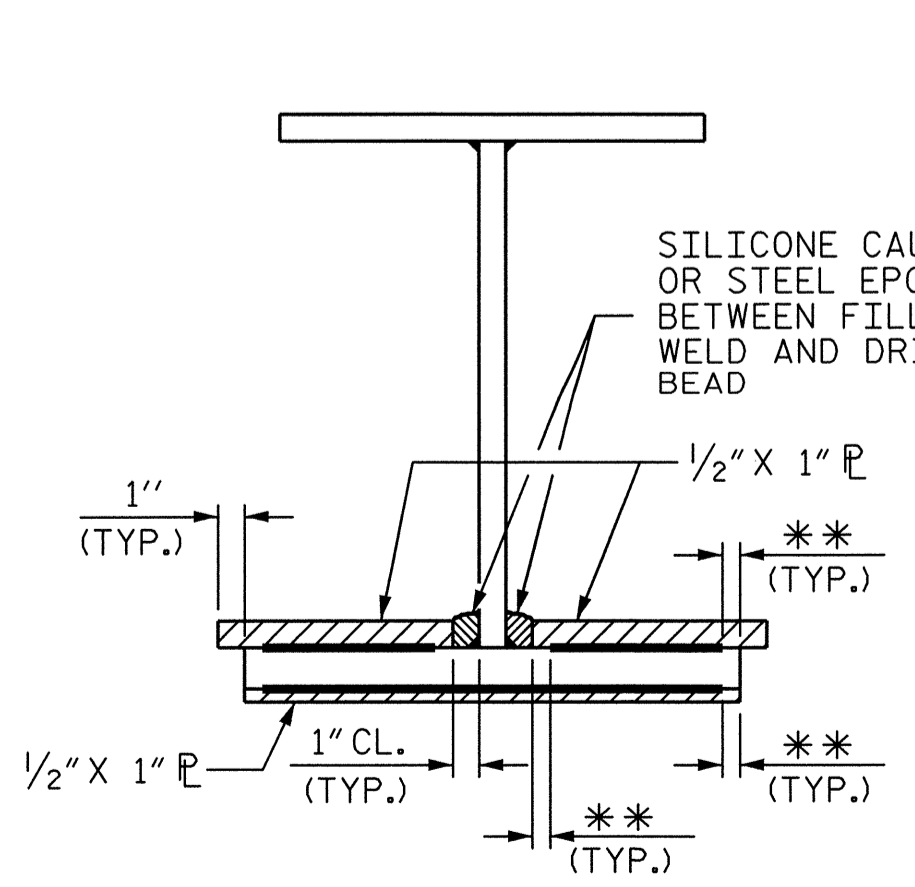
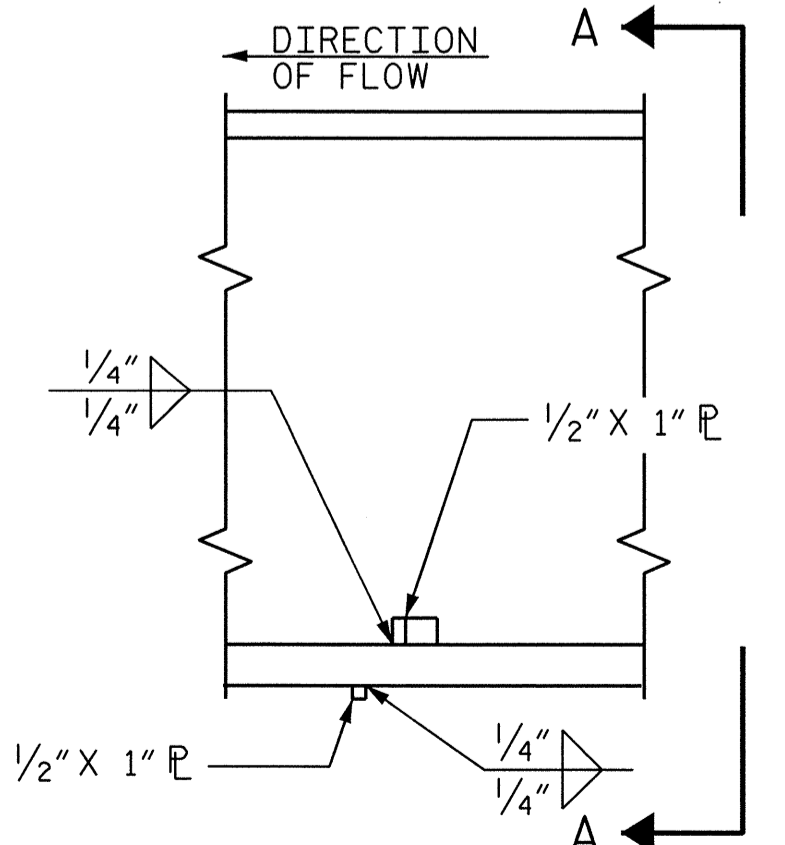
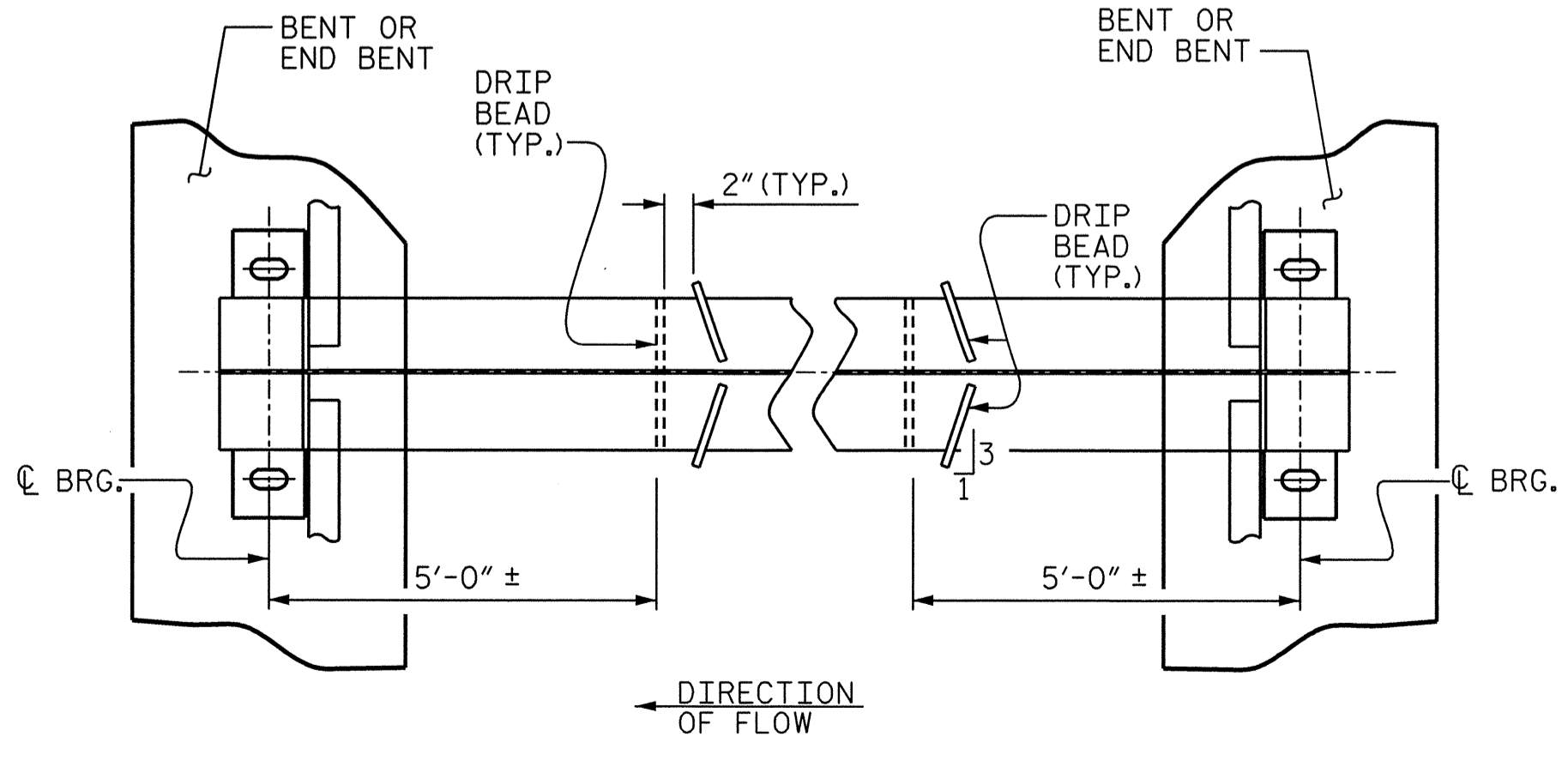


GIRDER ELEVATION

NOTE ①: CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS, ALL WEB PLATES AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.
 NOTE ②: NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.



PLAN OF BOTTOM FLANGE



PART PLAN - BOTTOM FLANGE

SECTION

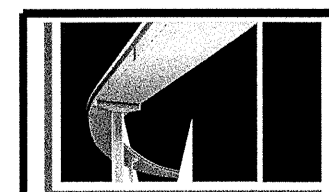
VIEW A-A

DRIP BEAD DETAILS

** SEE "WELD TERMINATION DETAILS" SHEET 2 OF 3.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 1 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 STRUCTURAL
 STEEL DETAILS



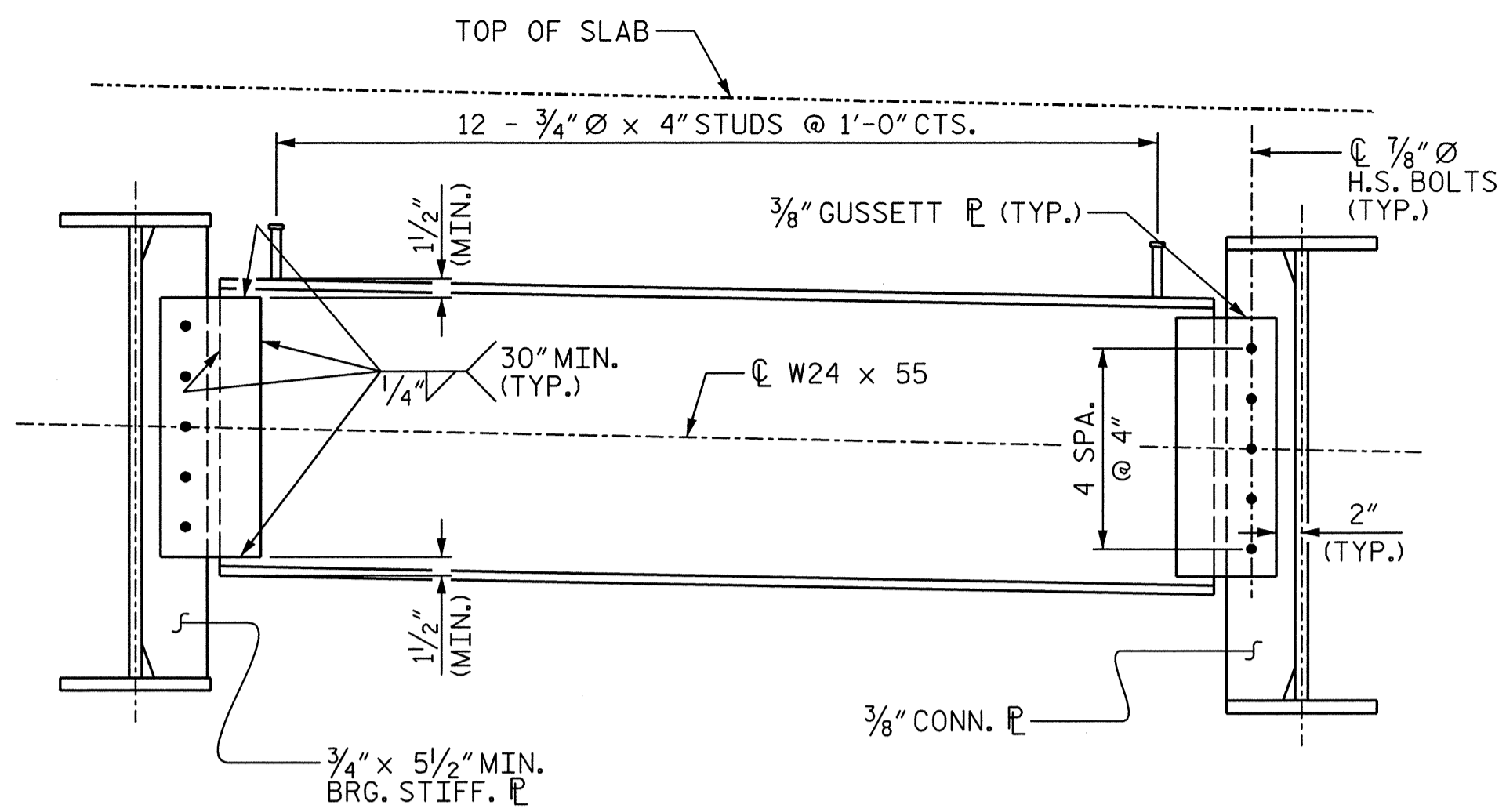
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REVISIONS				SHEET NO.	
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2			4		

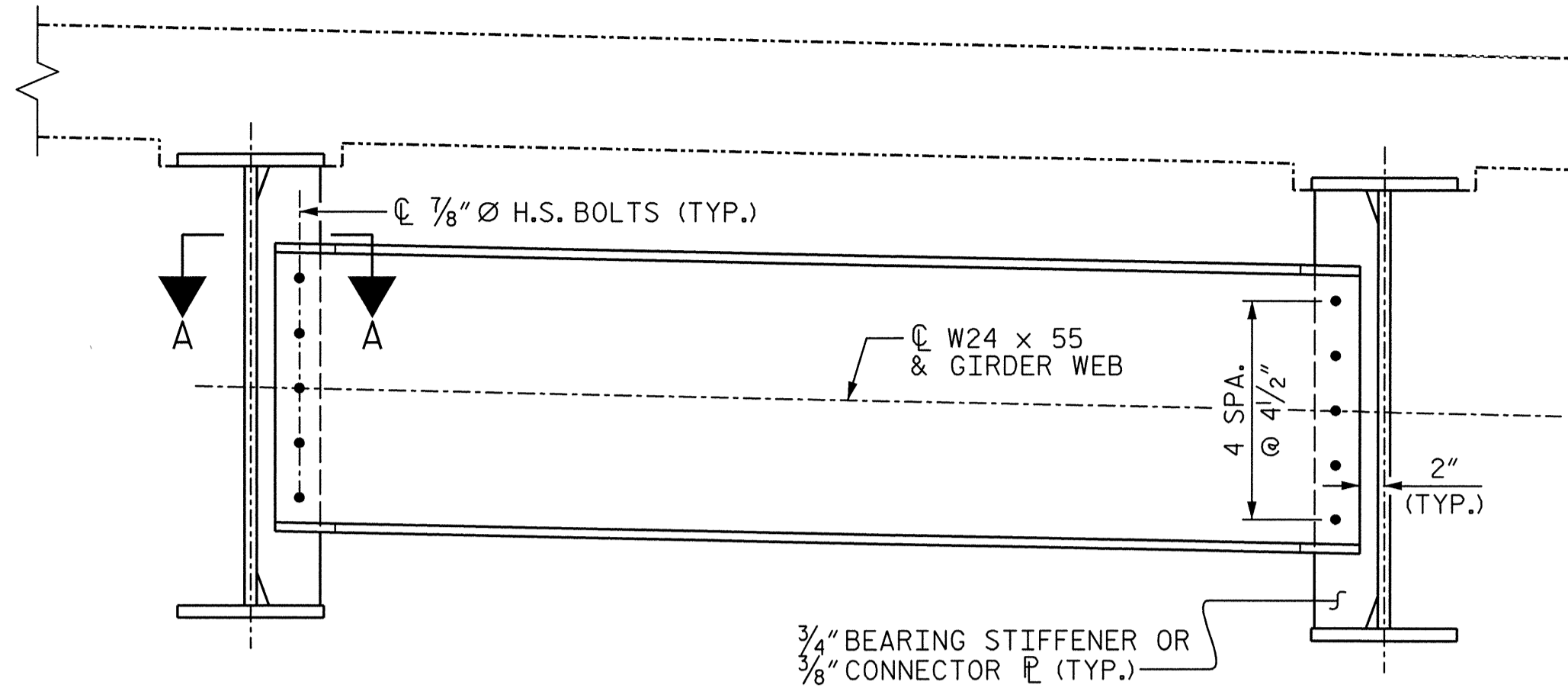
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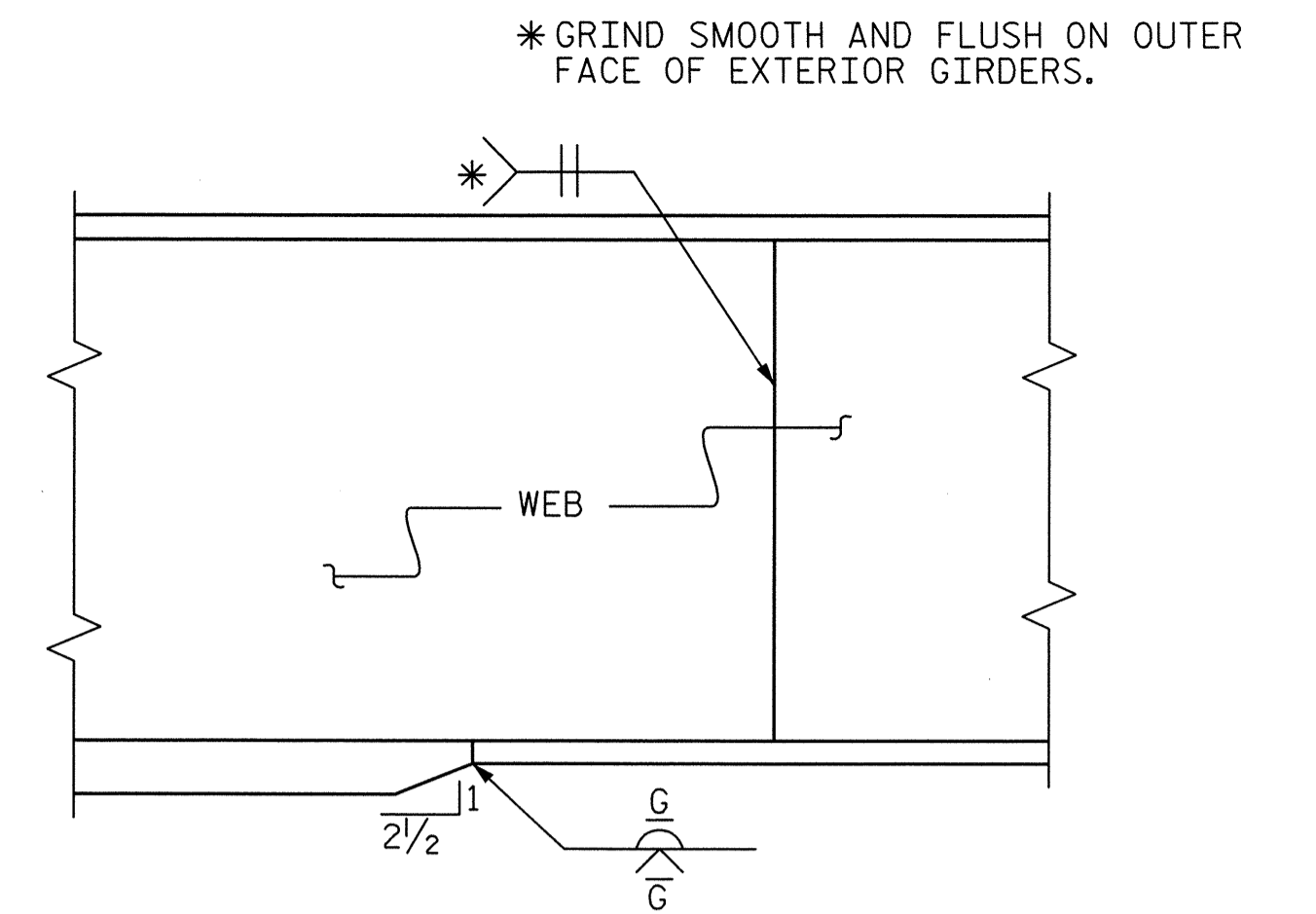
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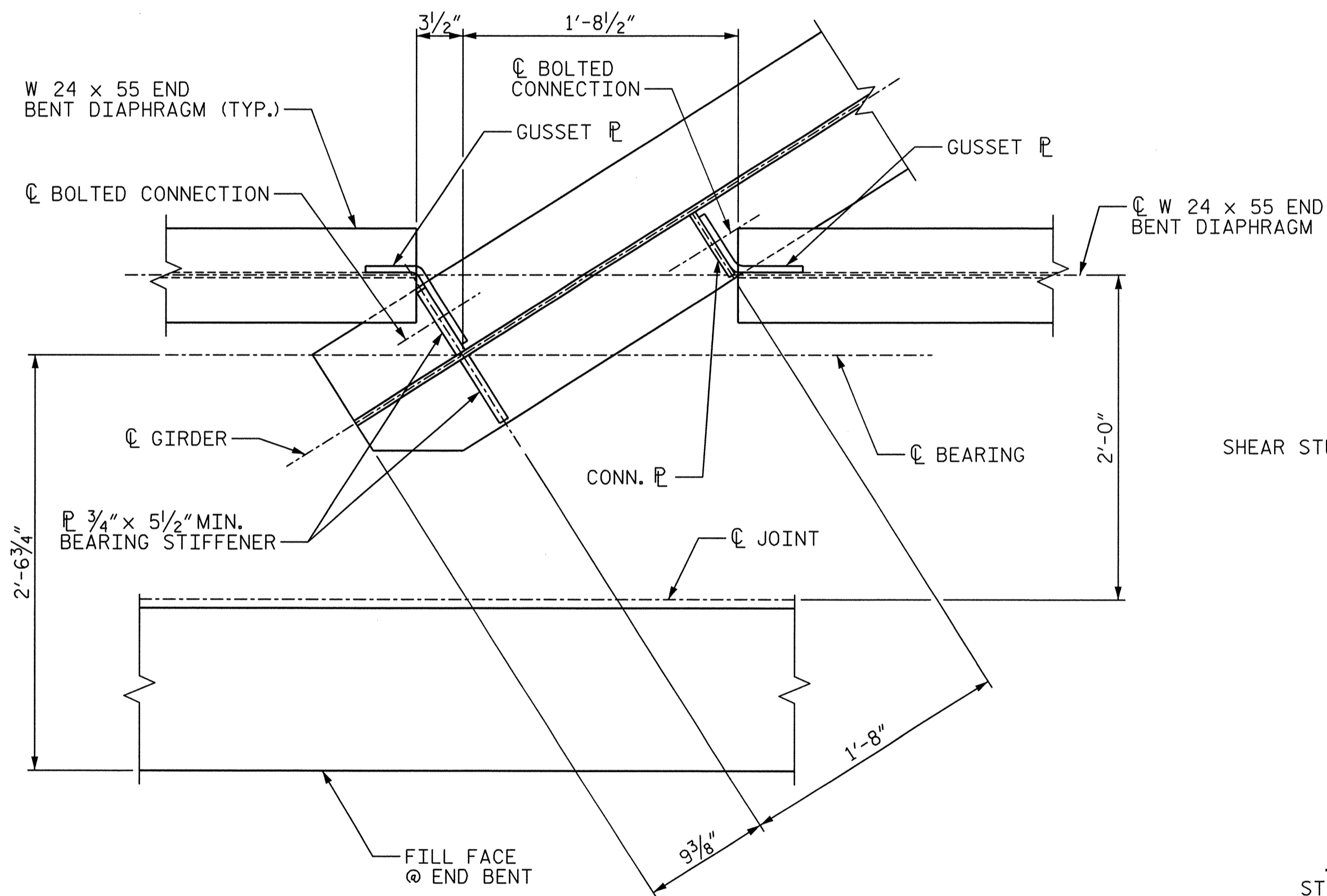
END BENT DIAPHRAGM (CF-1)



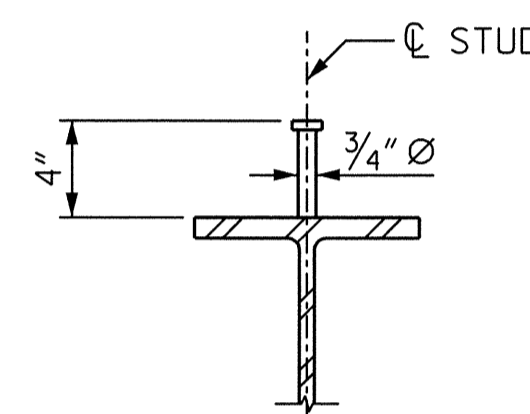
BENT DIAPHRAGM & INTERMEDIATE DIAPHRAGM (CF-2)



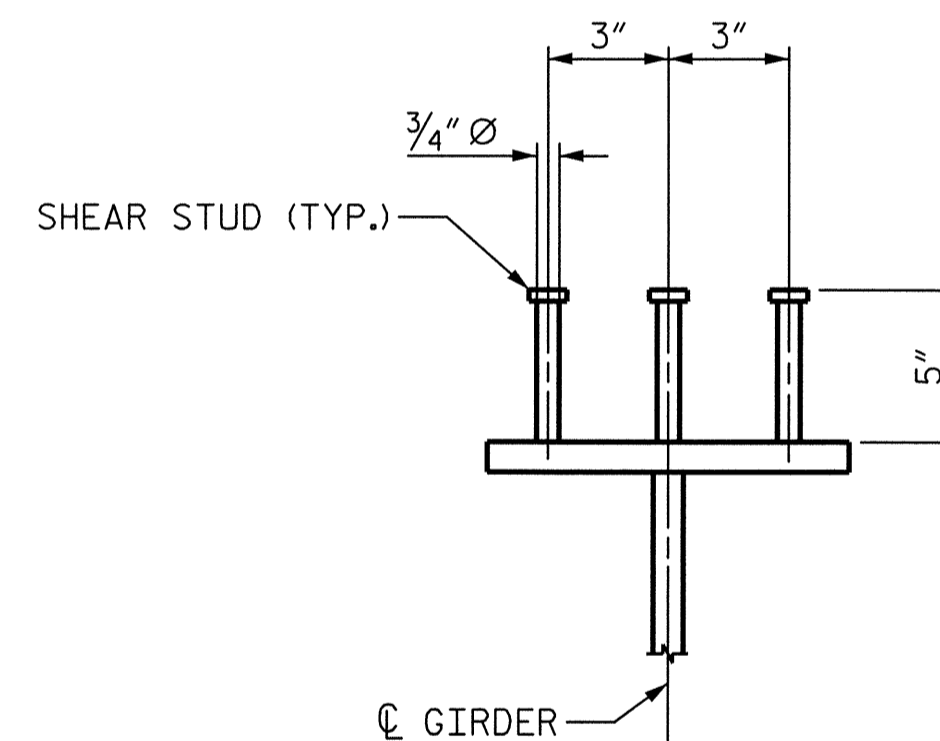
ELEVATION
TYPICAL FLANGE AND WEB BUTT JOINT



PLAN AT END BENT DIAPHRAGM (CF-1)

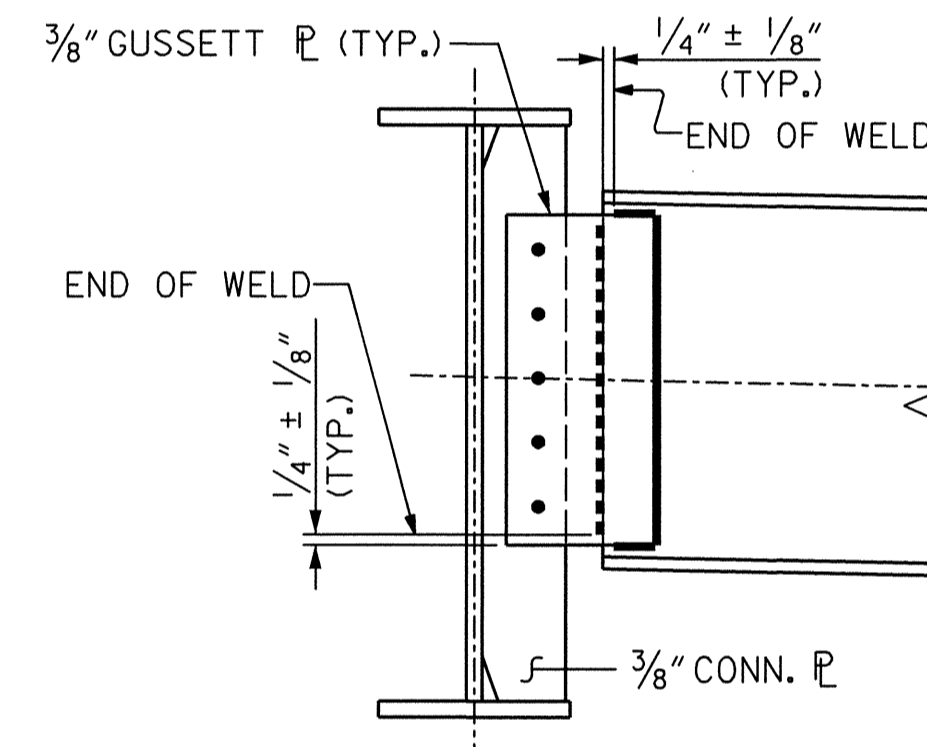


ON DIAPHRAGMS

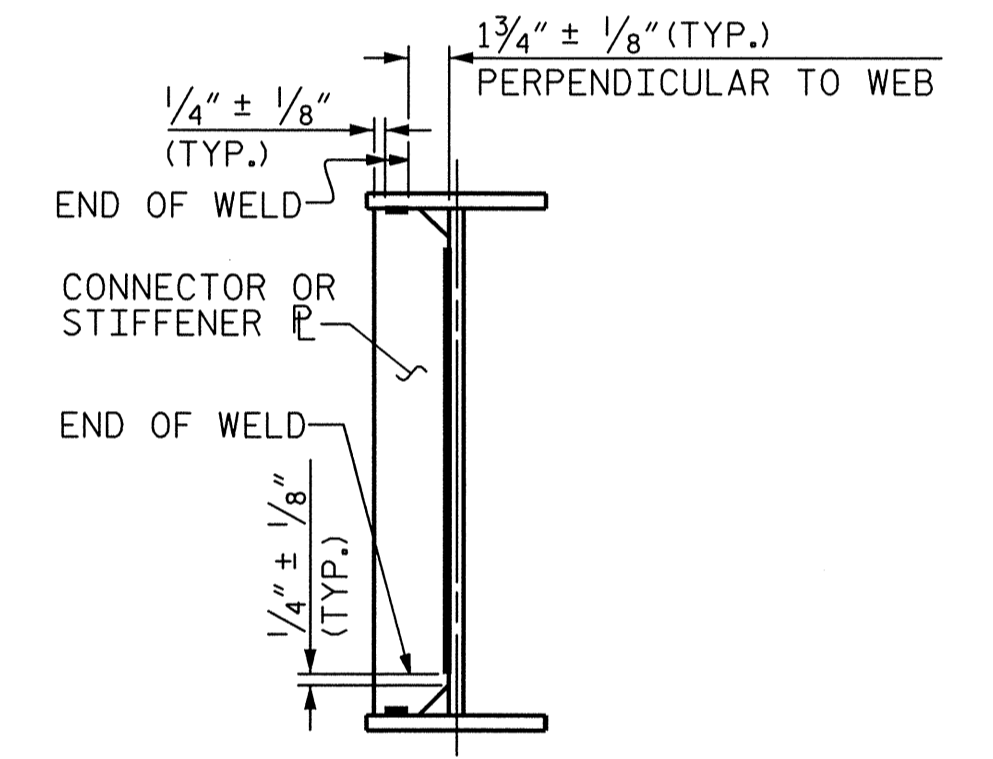


ON GIRDERS

SHEAR STUD DETAILS
STUDS ON GIRDERS MAY BE SHIFTED SLIGHTLY, IF NECESSARY, TO CLEAR FLANGE SPLICE WELD.

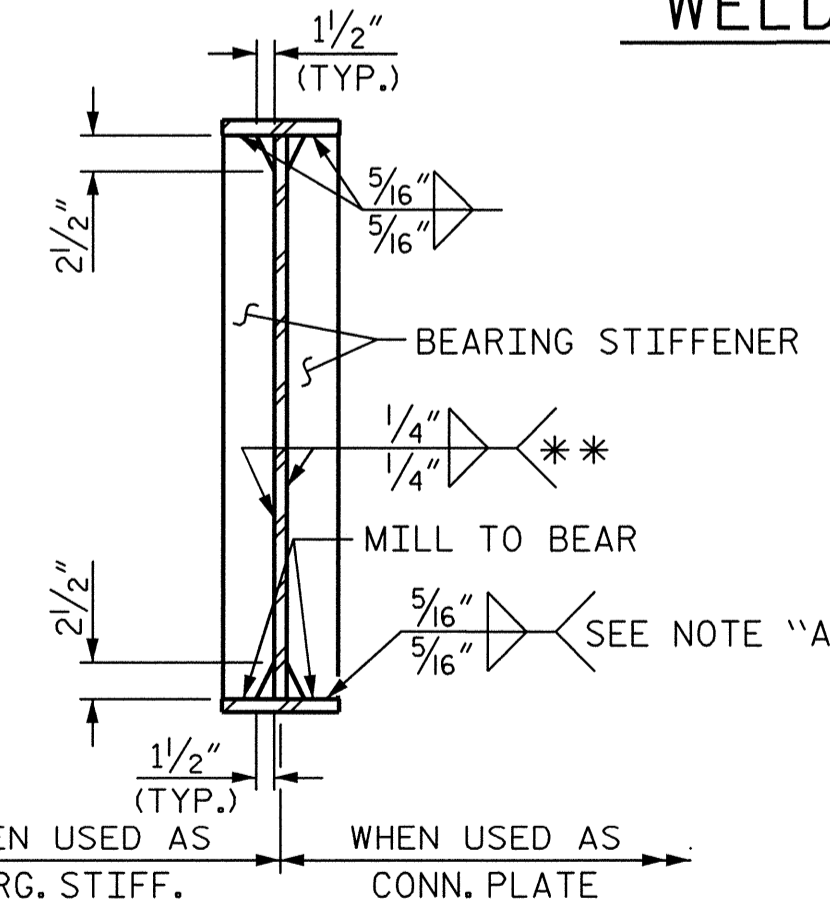


TYPICAL END BENT CONNECTOR PLATE CONNECTIONS



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS

WELD TERMINATION DETAILS



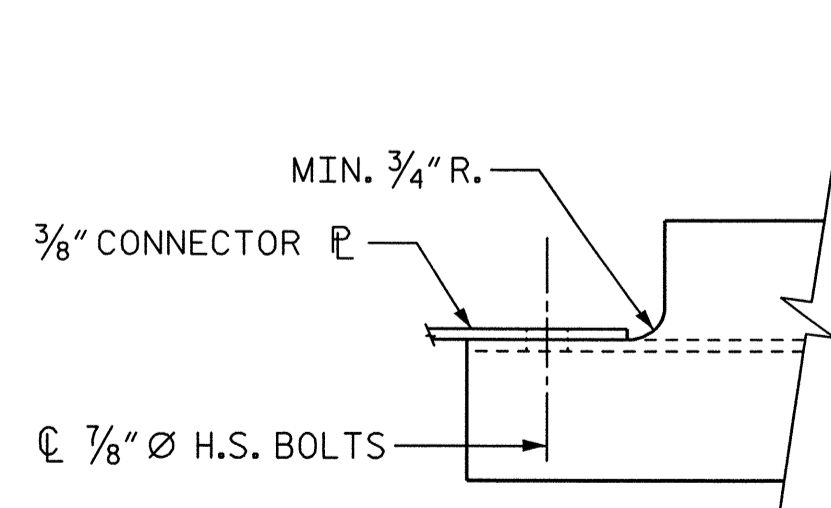
BEARING STIFFENER

NOTE A:
ONLY WELD BEARING STIFFENER TO BOTTOM FLANGE IF DIAPHRAGM IS ATTACHED TO BEARING STIFFENER.

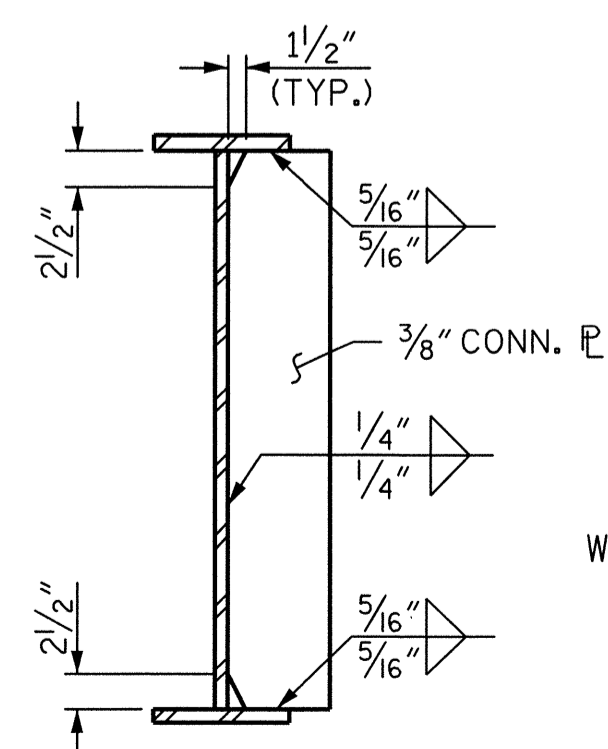
BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

** PER BRIDGE WELDING CODE FIG. 2.3(c) BEVEL IF NECESSARY.

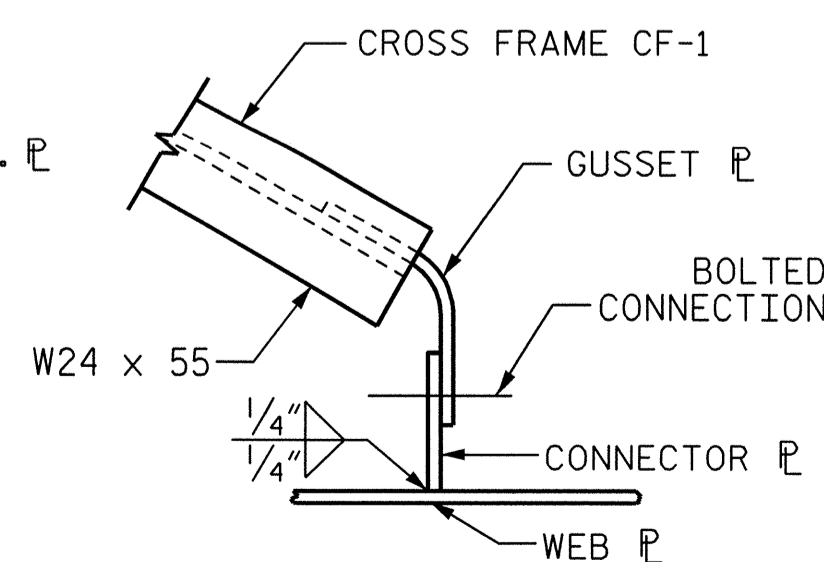
NOTE: FOR OTHER STRUCTURAL STEEL DETAILS AND NOTES, SEE SHEET 3 OF 3.



SECTION A-A



CONNECTOR PLATE WELD DETAIL



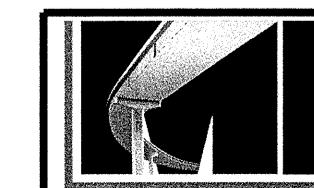
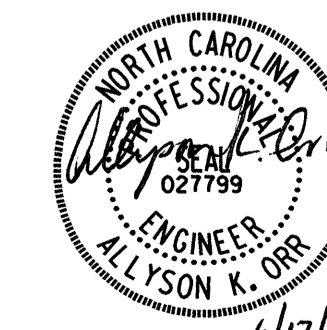
AT CF-1

PROJECT NO. B-4621
ROCKINGHAM COUNTY
STATION: 25+66.99 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
STRUCTURAL
STEEL DETAILS



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 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 06/13

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS, UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS, UNLESS OTHERWISE NOTED.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

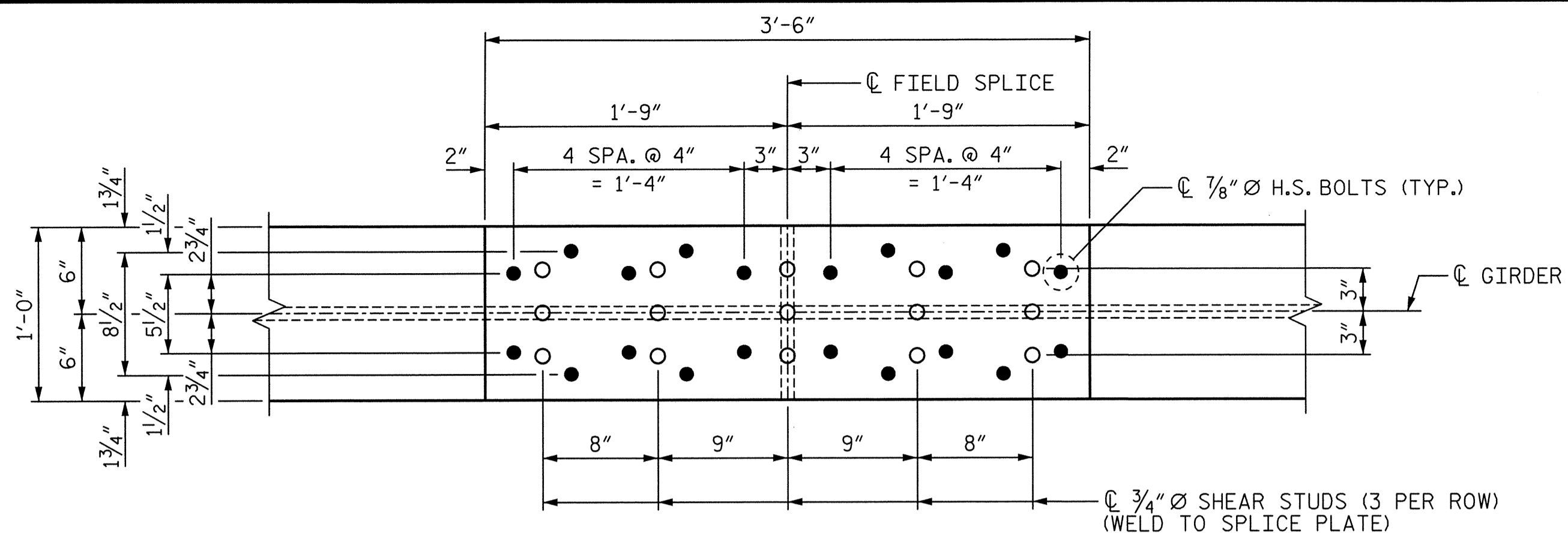
STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

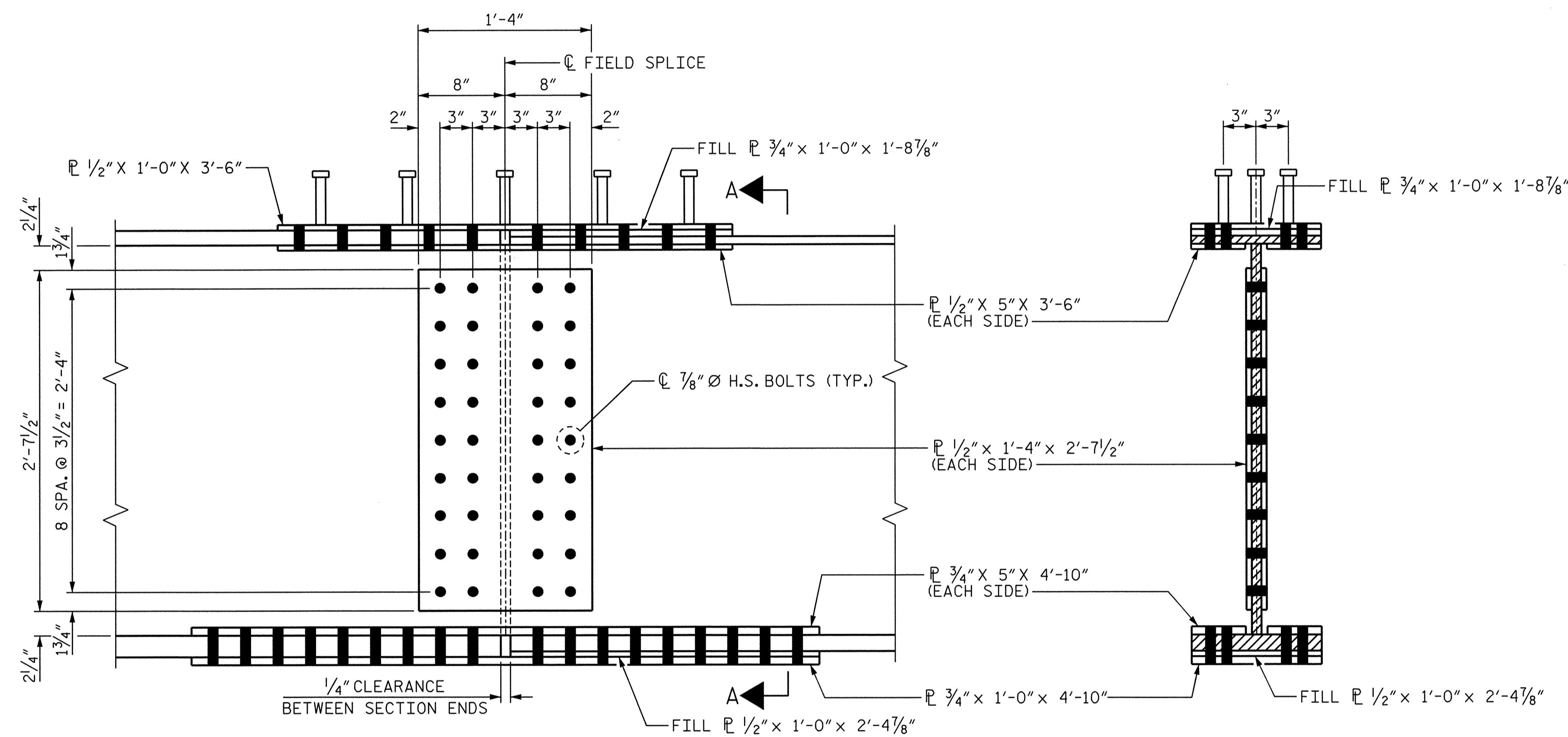
ENDS OF GIRDERS SHALL BE PLUMB.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

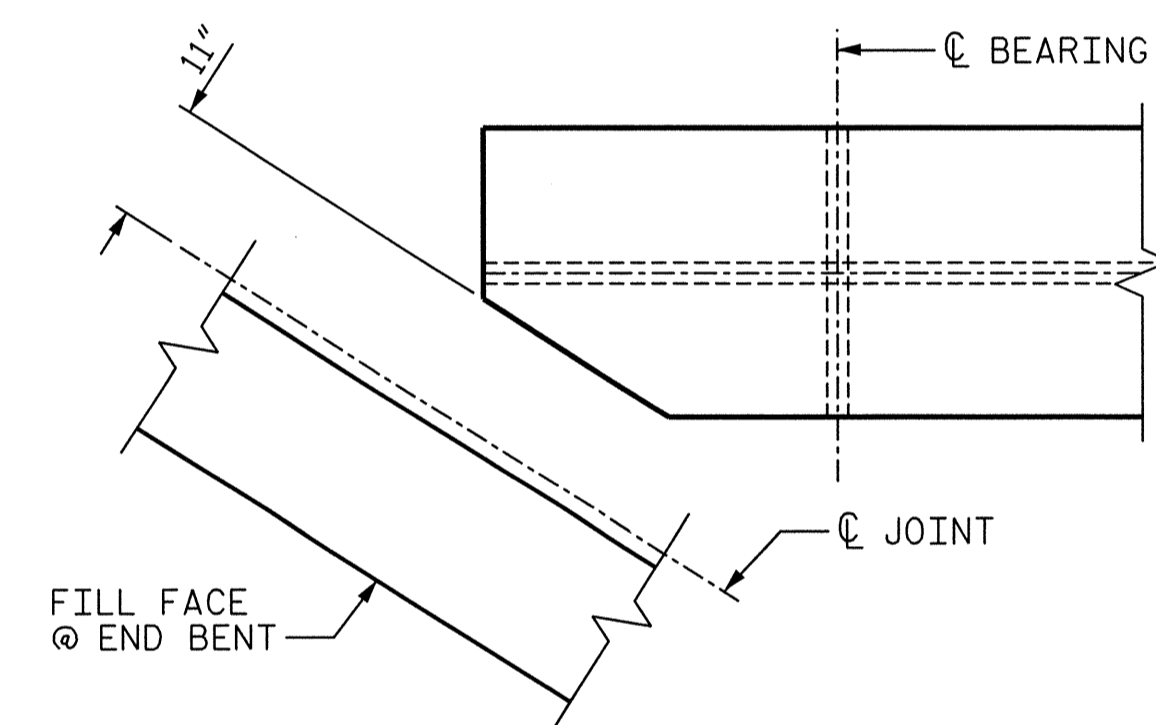


TOP FLANGE PLAN

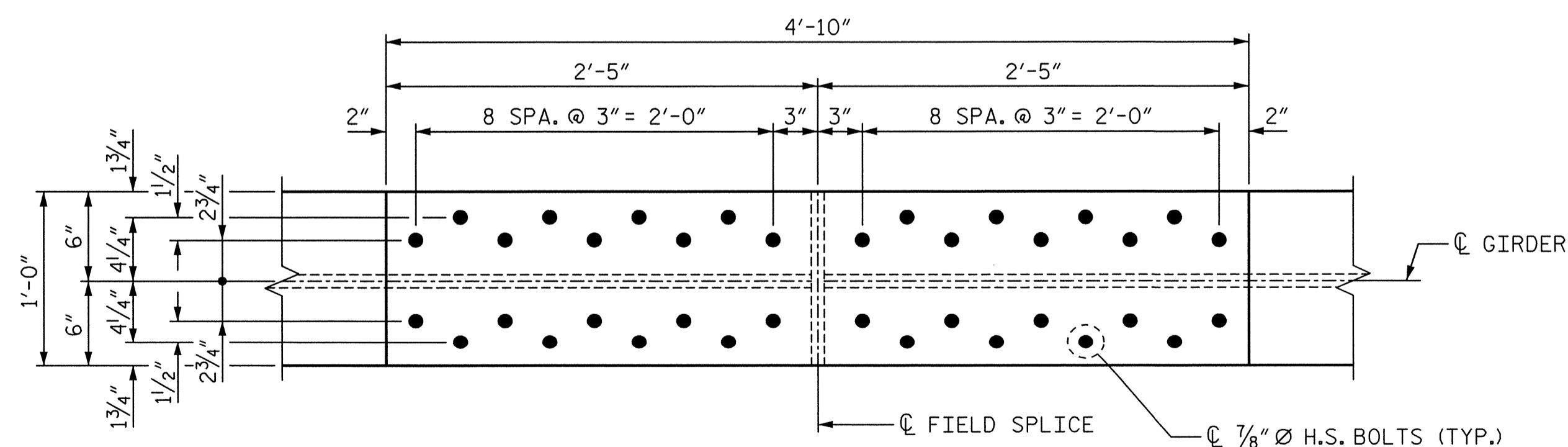


ELEVATION

SECTION A-A



TOP FLANGE CLIP DETAIL
(TYP. AT BOTH ENDS OF GIRDER)



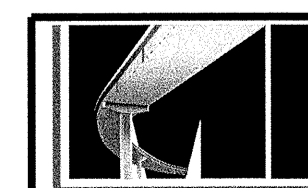
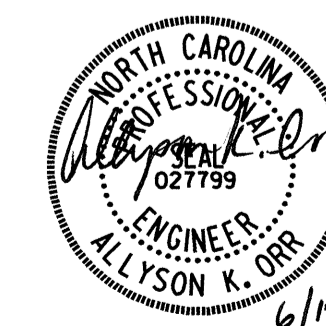
BOTTOM FLANGE PLAN

BOLTED FIELD SPLICE DETAILS

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 STRUCTURAL
 STEEL DETAILS



MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

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2			4		

SHEET NO.
S-14
 TOTAL SHEETS
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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.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR PAINTED STRUCTURAL STEEL (EXCLUDING AASHTO M270 GRADE 50W), SOLE PLATES, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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.

WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, 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.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

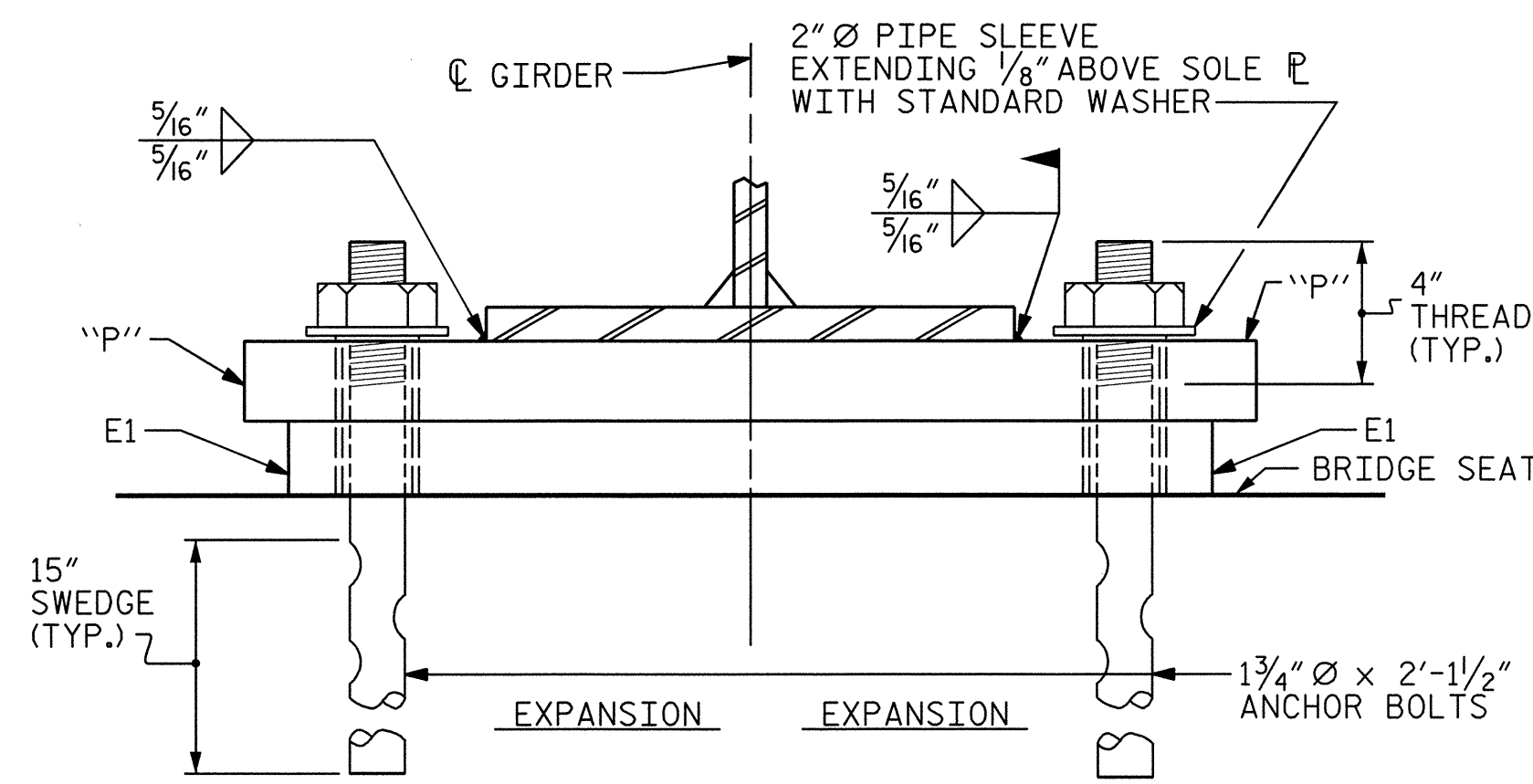
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

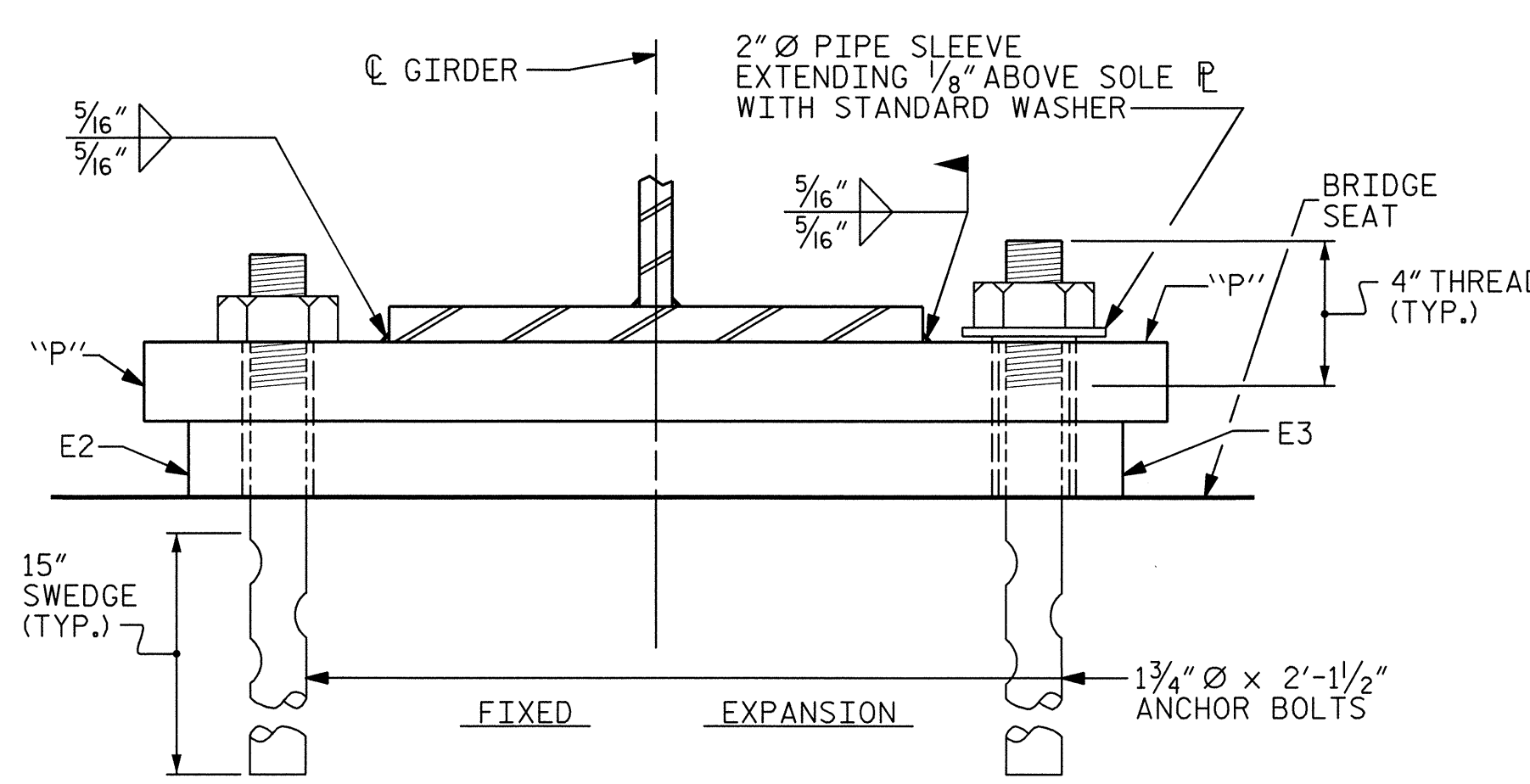
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED AND THE ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.

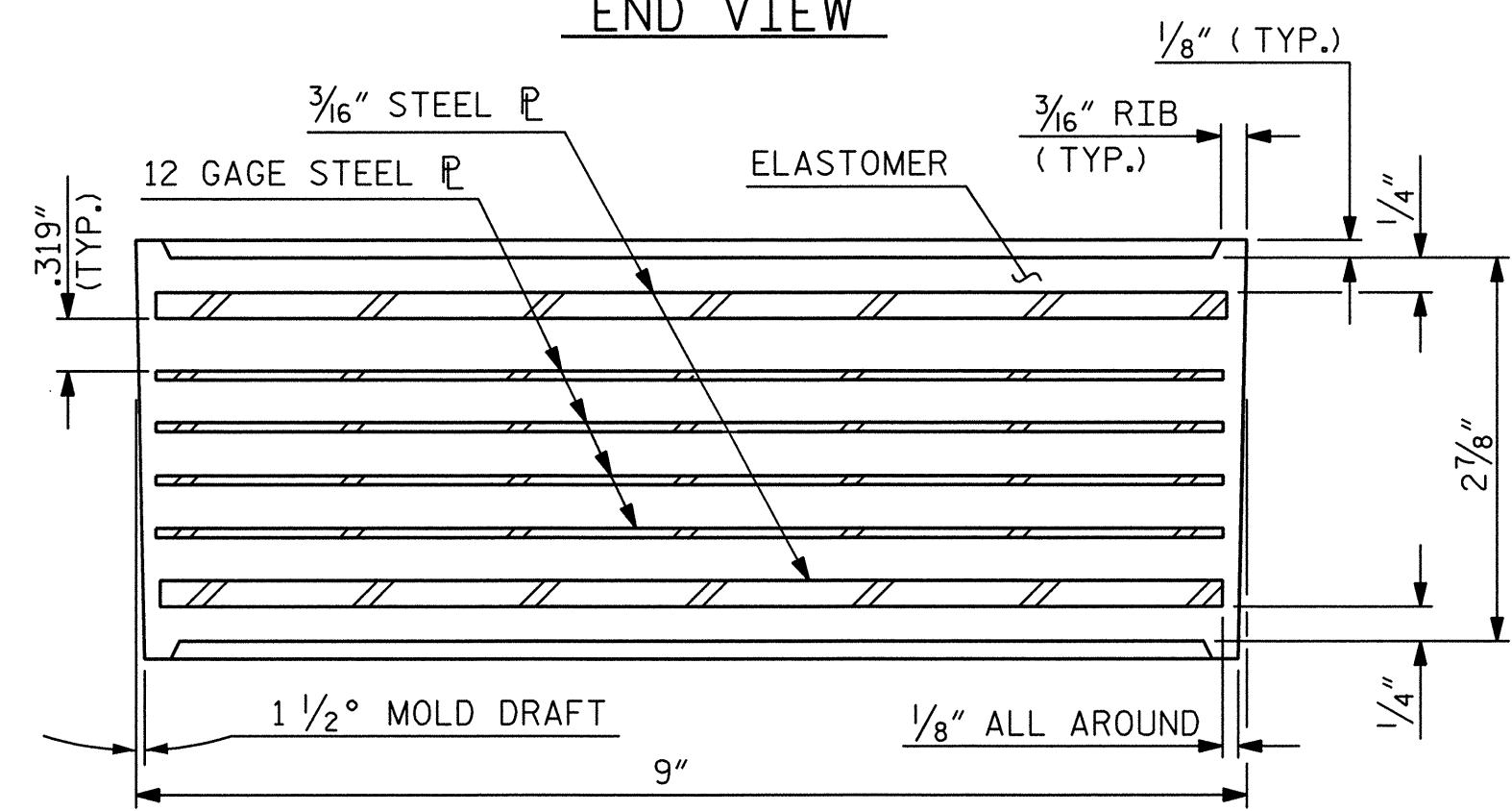
THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.



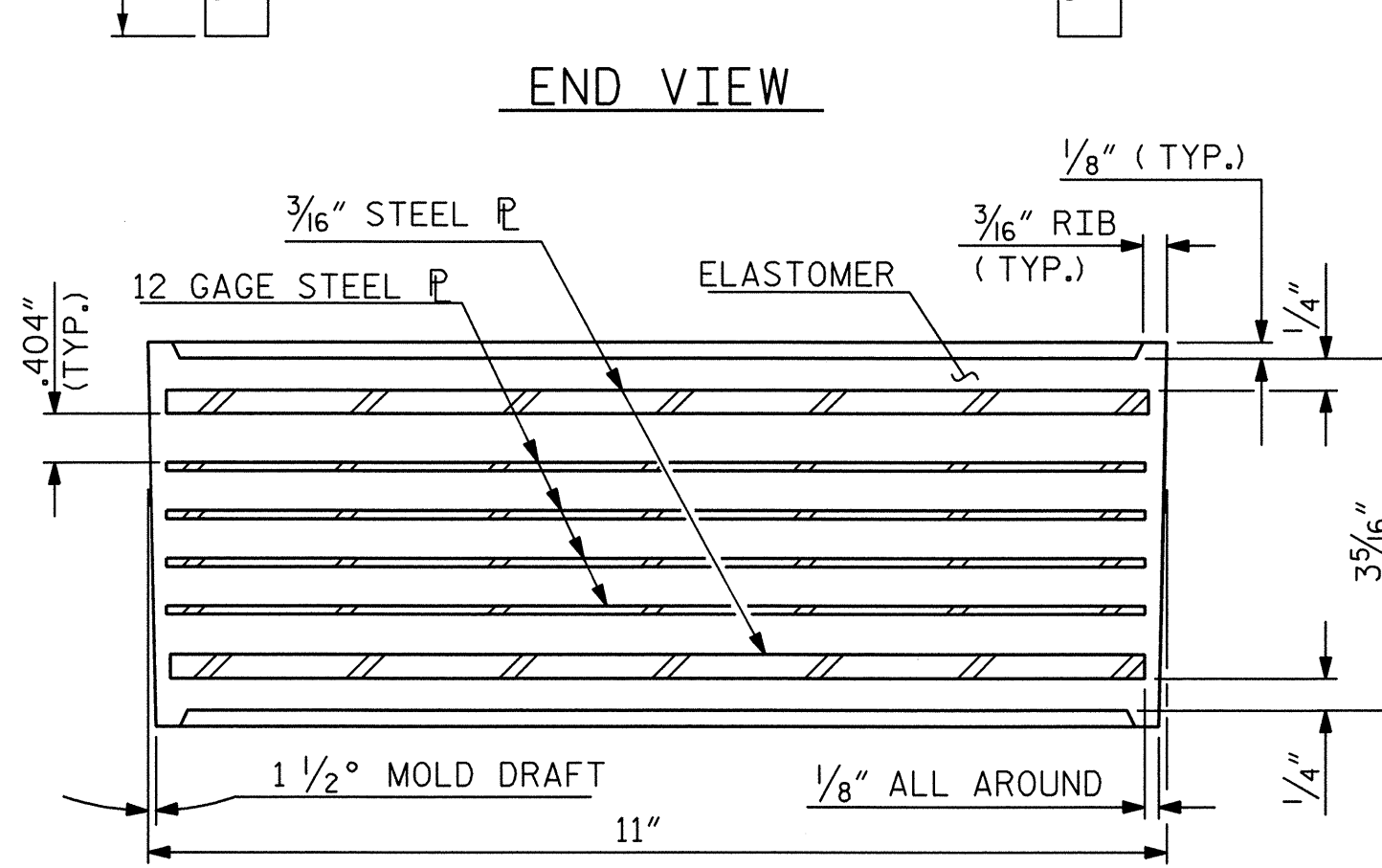
END VIEW



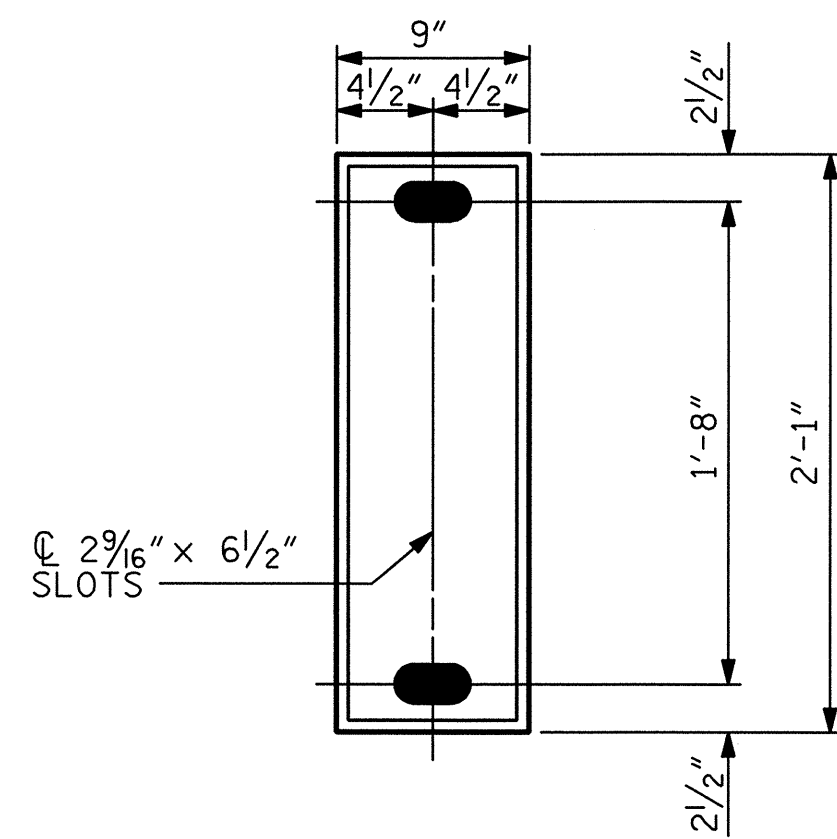
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TYPICAL SECTION OF ELASTOMERIC BEARING

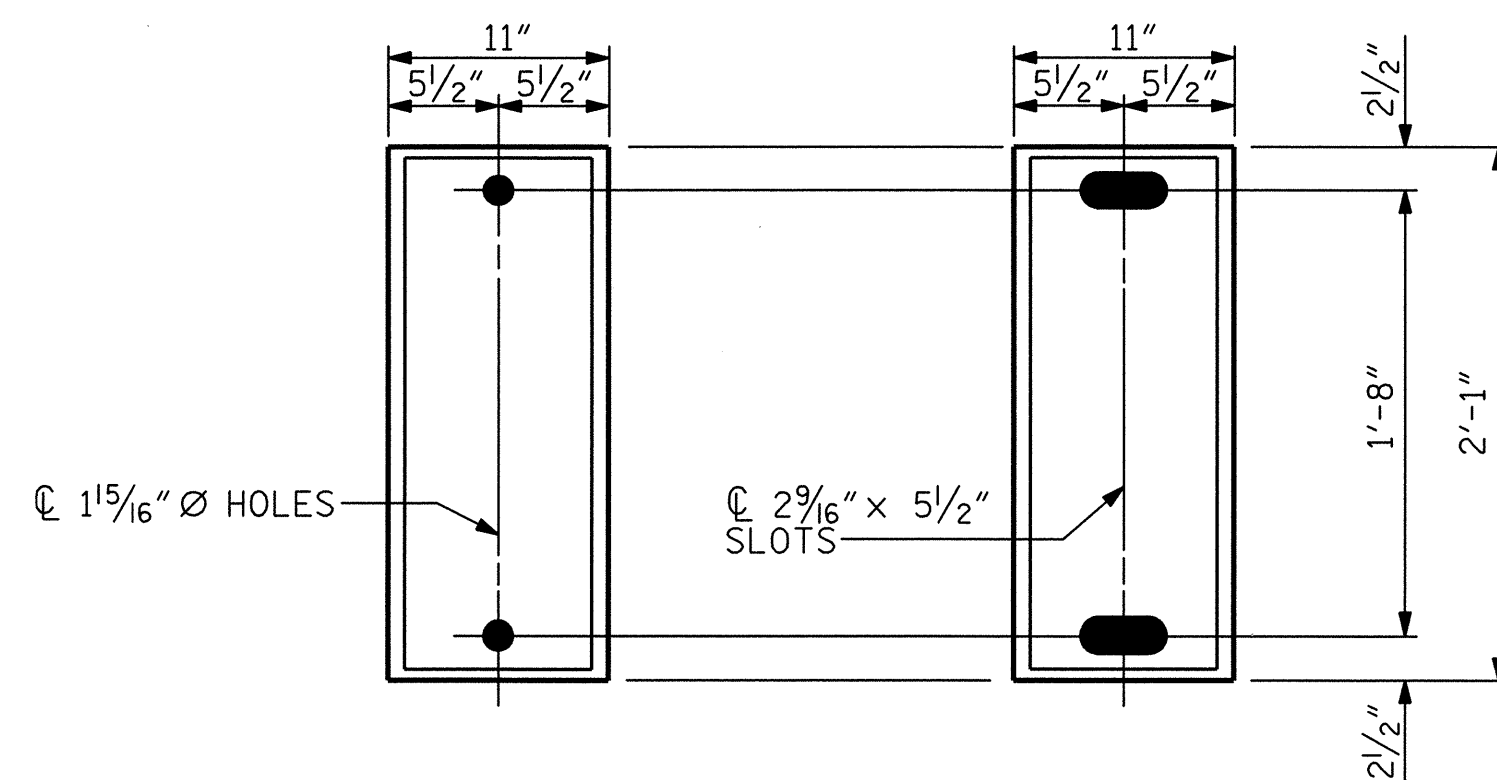


TYPICAL SECTION OF ELASTOMERIC BEARING



E1 (12 REQ'D.)

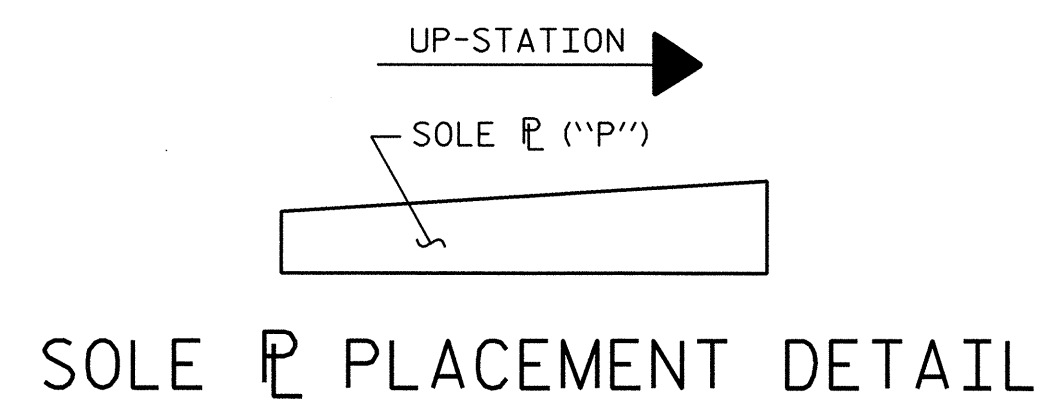
PLAN VIEW OF ELASTOMERIC BEARING TYPE III



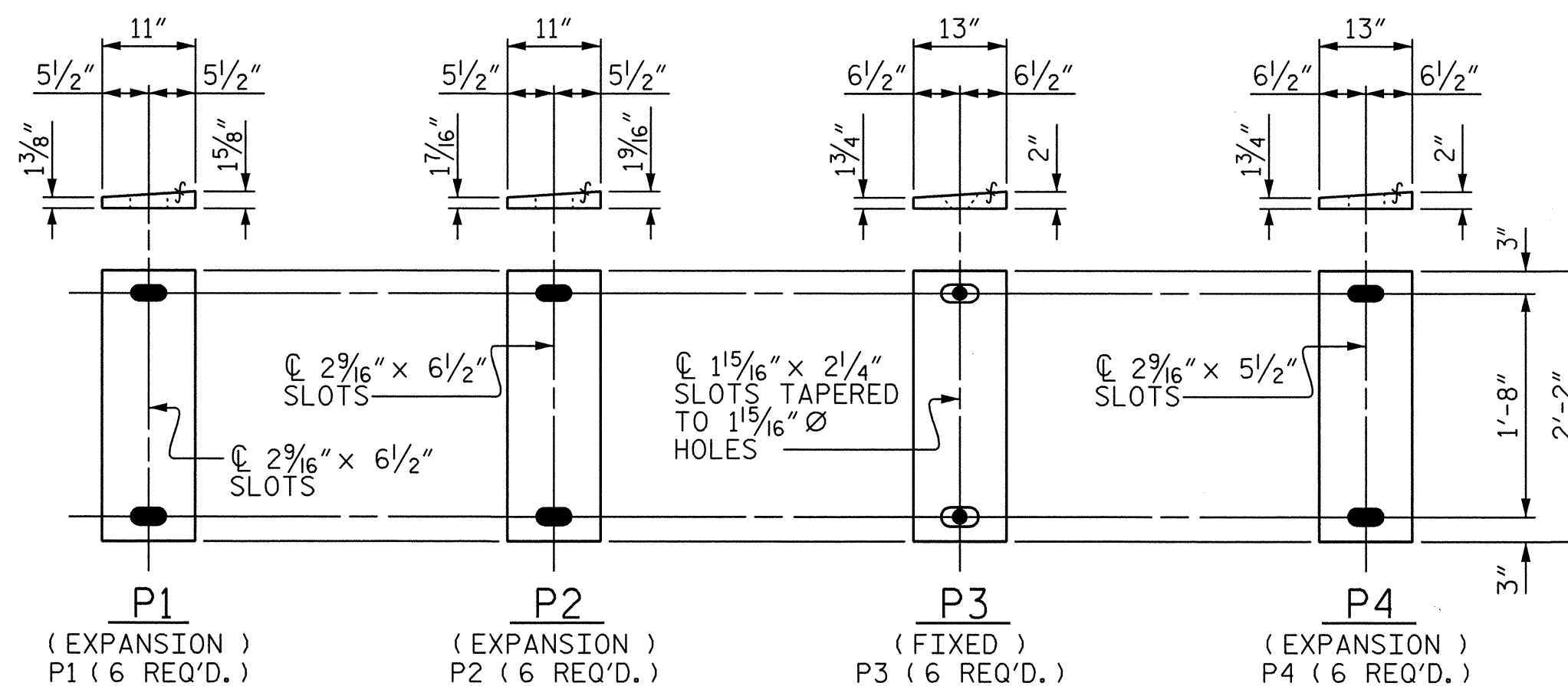
E2 (6 REQ'D.)

E3 (6 REQ'D.)

PLAN VIEW OF ELASTOMERIC BEARING TYPE IV

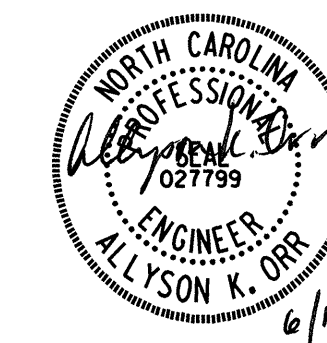


SOLE PLATE PLACEMENT DETAIL



SOLE PLATE DETAILS ('P')

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	255 k
TYPE IV	310 k

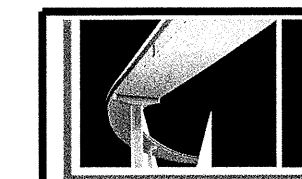


6/17/2013

PROJECT NO. B-4621
ROCKINGHAM COUNTY
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STATE OF NORTH CAROLINA
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 RALEIGH
 SUPERSTRUCTURE
 ELASTOMERIC
 BEARING DETAILS

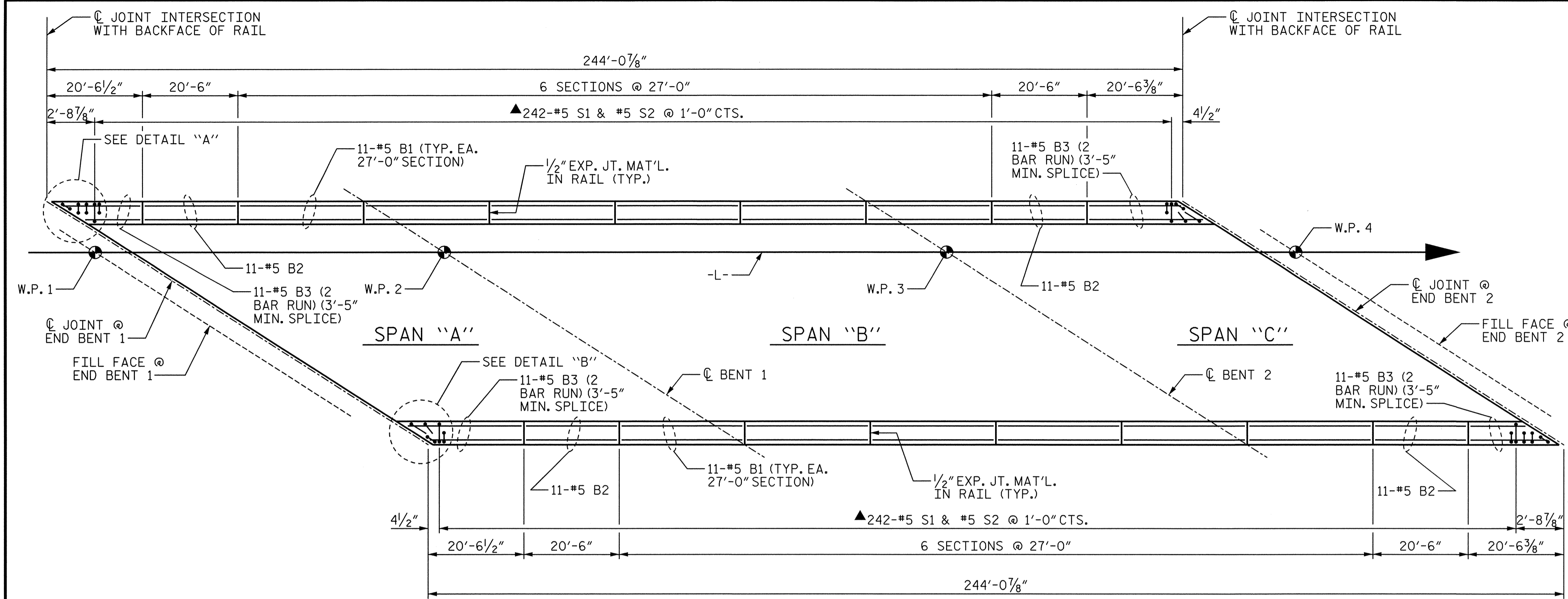
DRAWN BY: B.E. LANNING DATE: 02/13
 CHECKED BY: A.K. ORR DATE: 02/13
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 06/13



MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER: P-0671

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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-15
2			4			TOTAL SHEETS 42

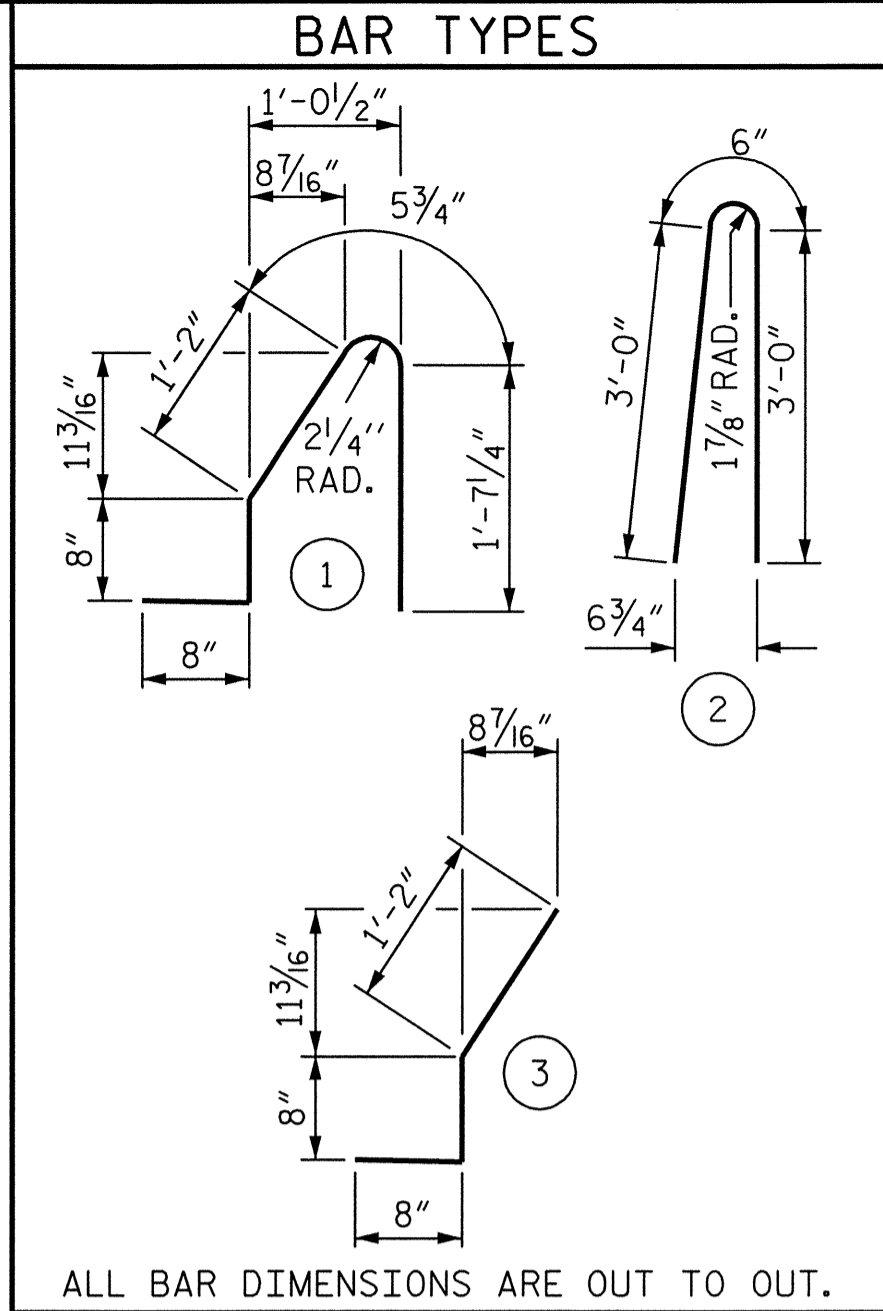
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PLAN

MEASUREMENTS TAKEN ALONG BACK FACE OF BARRIER RAIL

▲ #5 S1 & #5 S2 MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	132	#5	STR.	26'-7"	3660
*B2	44	#5	STR.	20'-1"	922
*B3	88	#5	STR.	12'-8"	1163
*S1	484	#5	1	4'-7"	2314
*S2	492	#5	2	6'-6"	3336
*S3	4	#5	3	2'-6"	10

* EPOXY COATED REINFORCING STEEL	11,405 LBS.
CLASS AA CONCRETE	66.4 CU. YDS.
CONCRETE BARRIER RAIL SUPERSTRUCTURE	487.76 LIN. FT.
APPROACH SLABS	44.34 LIN. FT.
TOTAL	532.10 LIN. FT.

⊗ FOR EPOXY COATED REINFORCING STEEL AND CLASS AA CONCRETE IN THE BARRIER RAIL ON THE APPROACH SLABS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.

NOTES

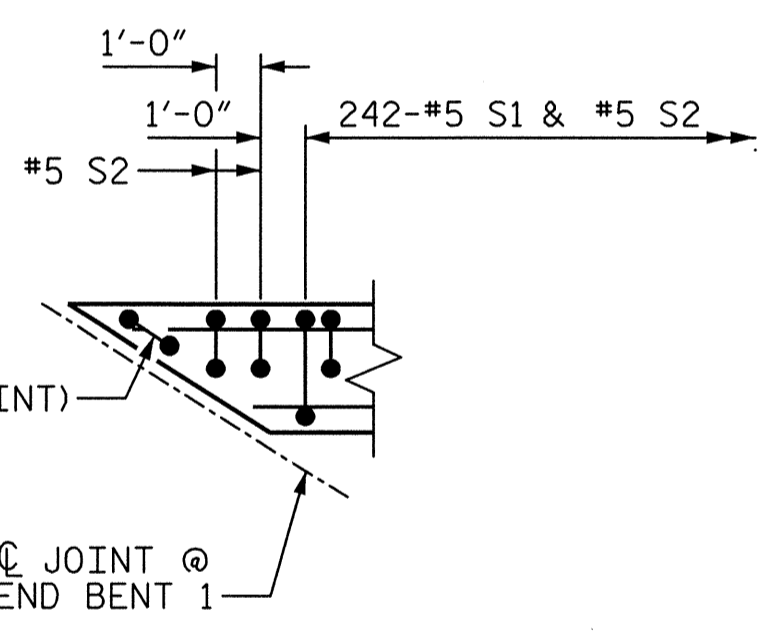
THE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

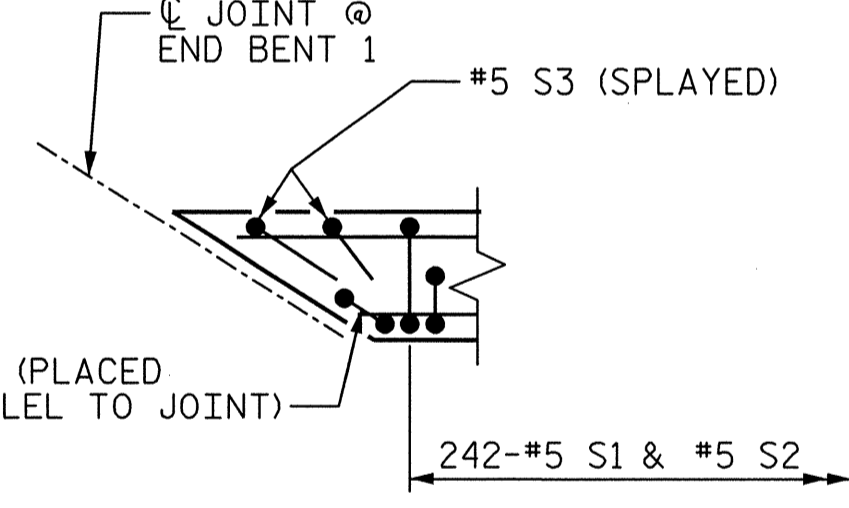
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS, THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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

THE #5 S1 & #5 S2 BARS MAY BE SHIFTED SLIGHTLY IN THE AREA OF THE GUARDRAIL ANCHOR ASSEMBLY TO CLEAR ASSEMBLY BOLTS.

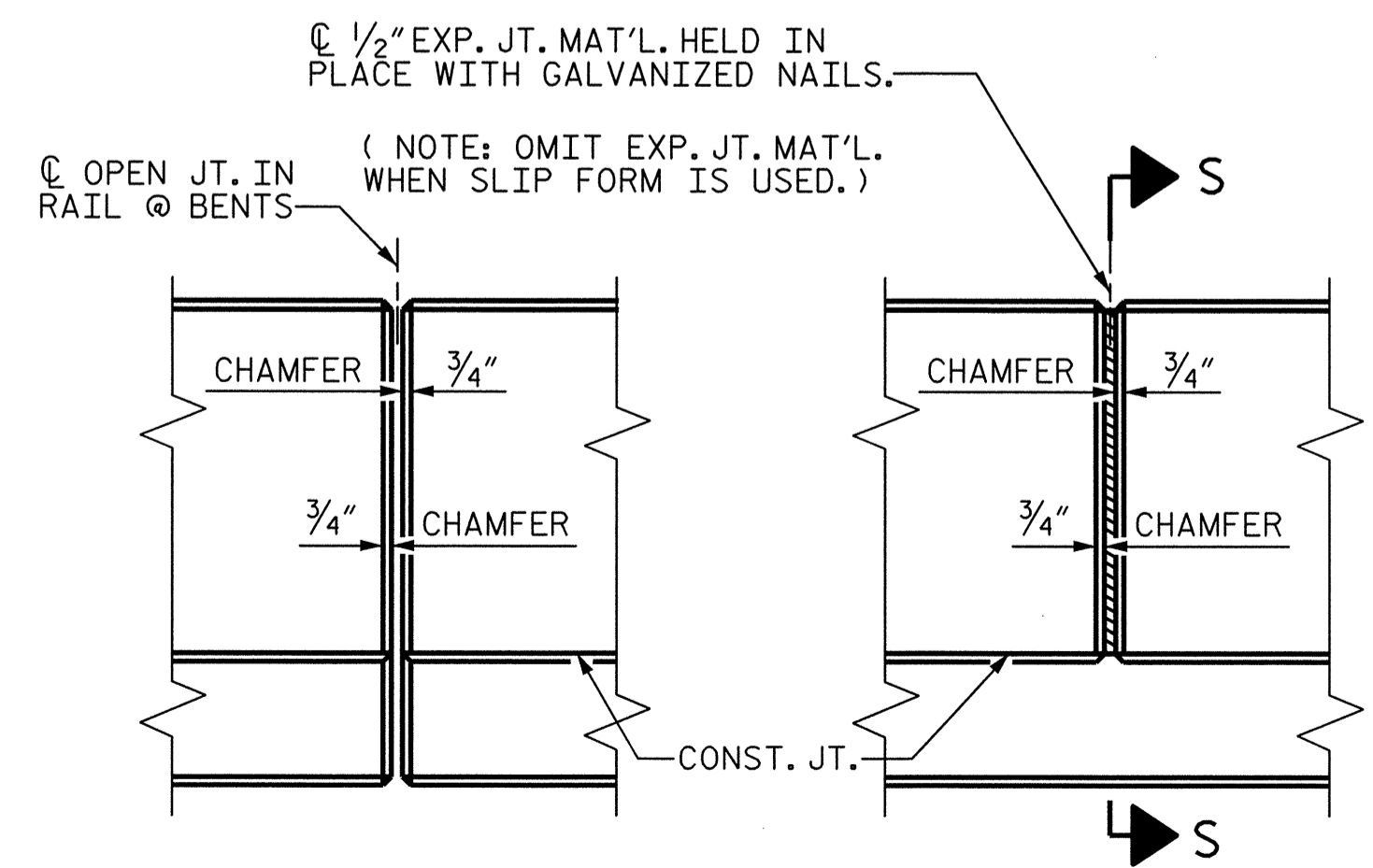
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ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-



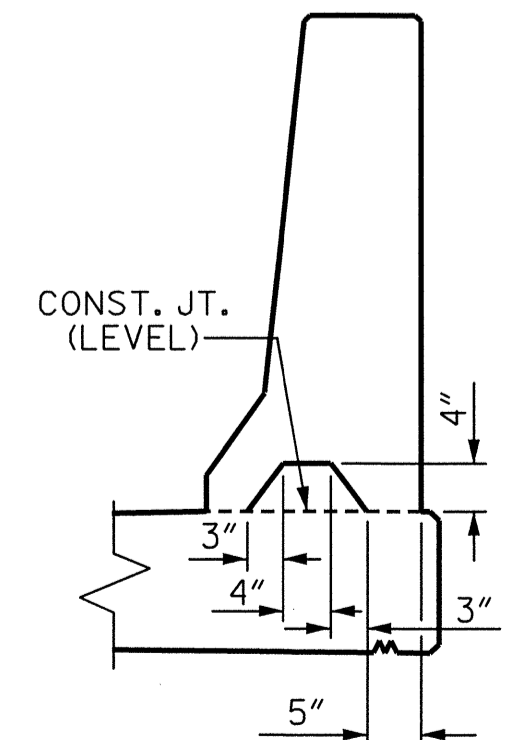
DETAIL "A"
END BENT 2 SIMILAR BY ROTATION



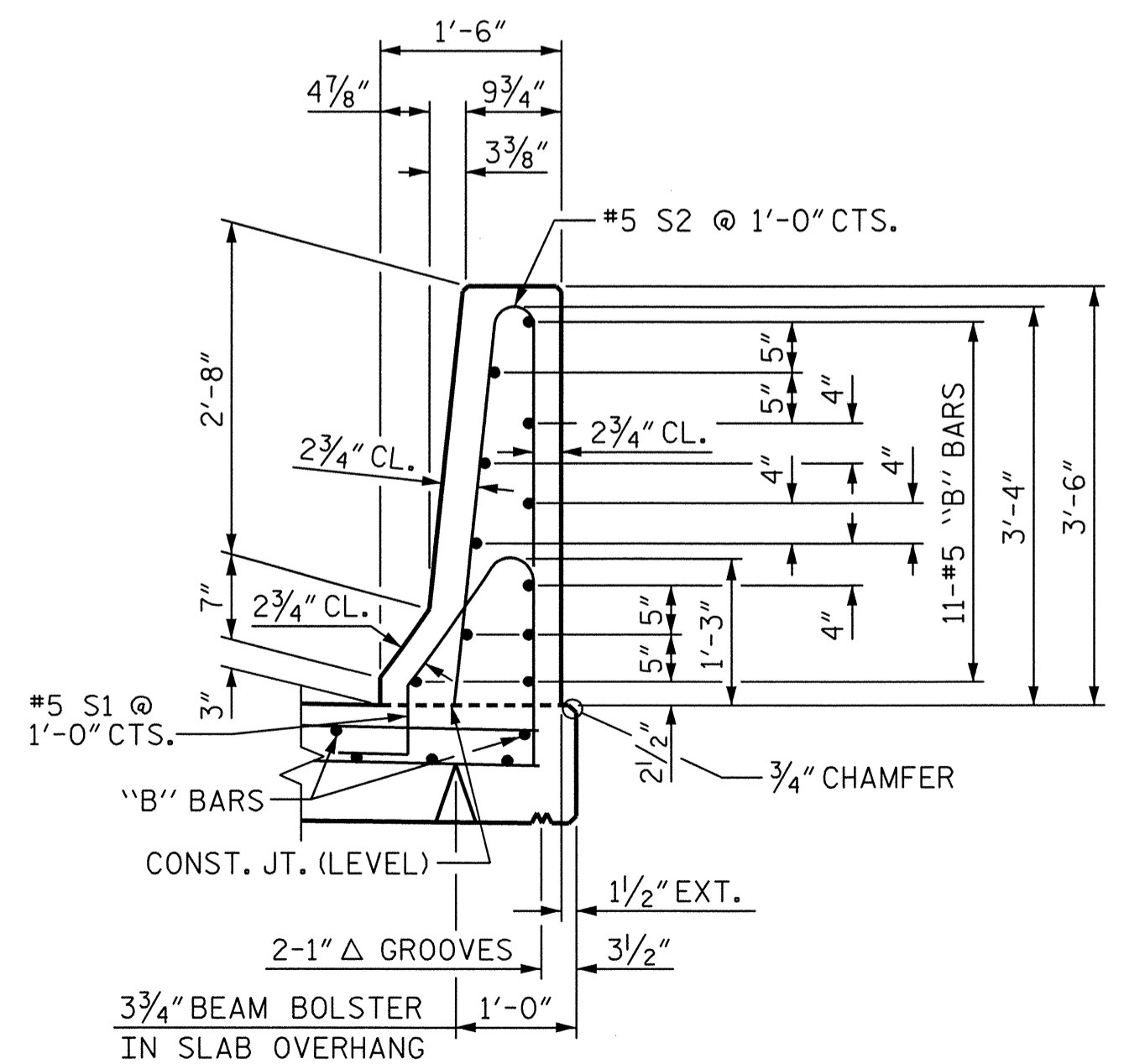
DETAIL "B"
END BENT 2 SIMILAR BY ROTATION



ELEVATION AT EXPANSION JOINTS



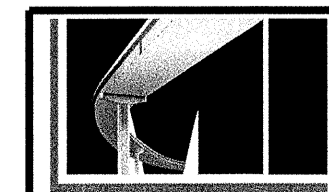
SECTION S-S



SECTION THRU RAIL

BARRIER RAIL DETAILS

DRAWN BY: B.E. LANNING DATE: 02/13
 CHECKED BY: A.K. ORR DATE: 02/13
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/13



MI ENGINEERING
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 (919) 851-6606
 FIRM PE NUMBER: P-0671

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2			4			TOTAL SHEETS 42

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NOTES

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

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

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

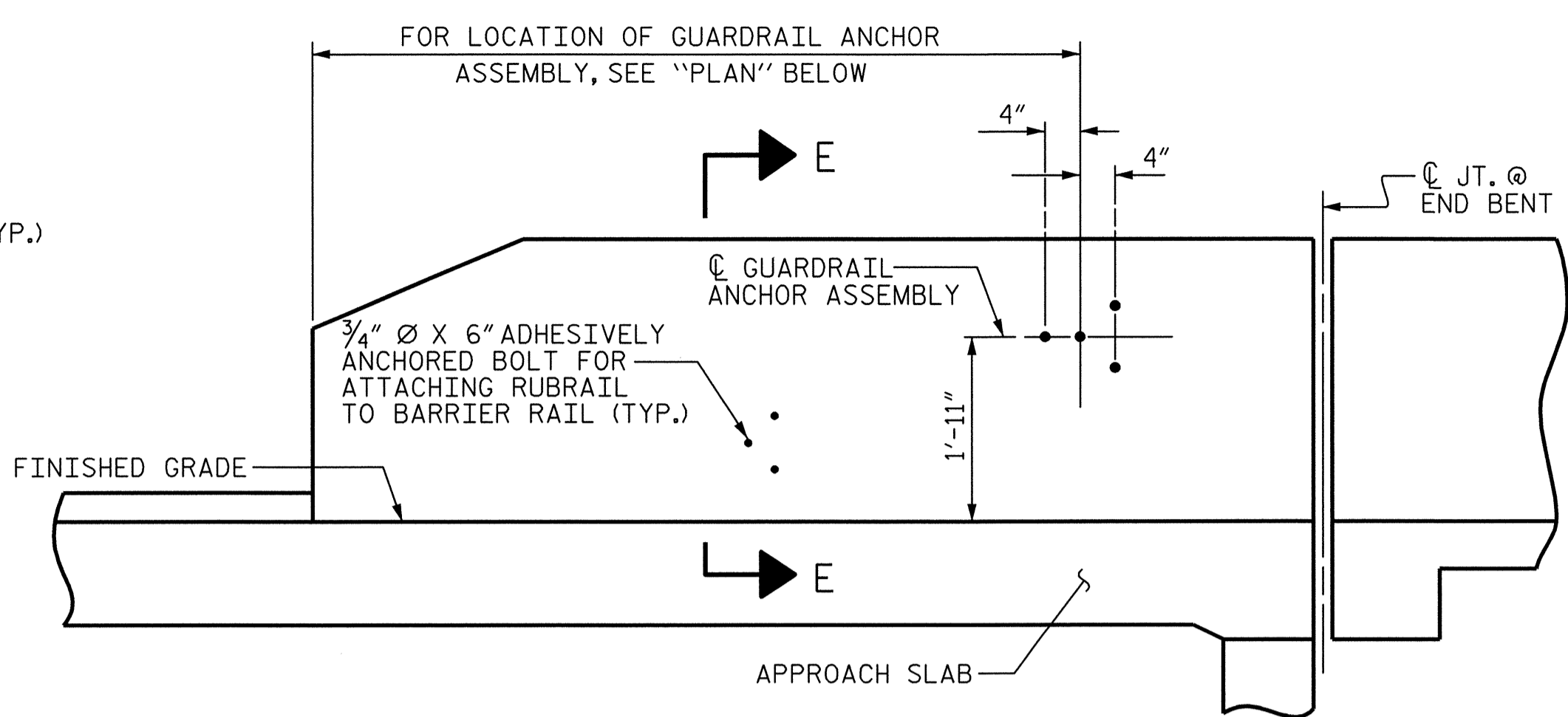
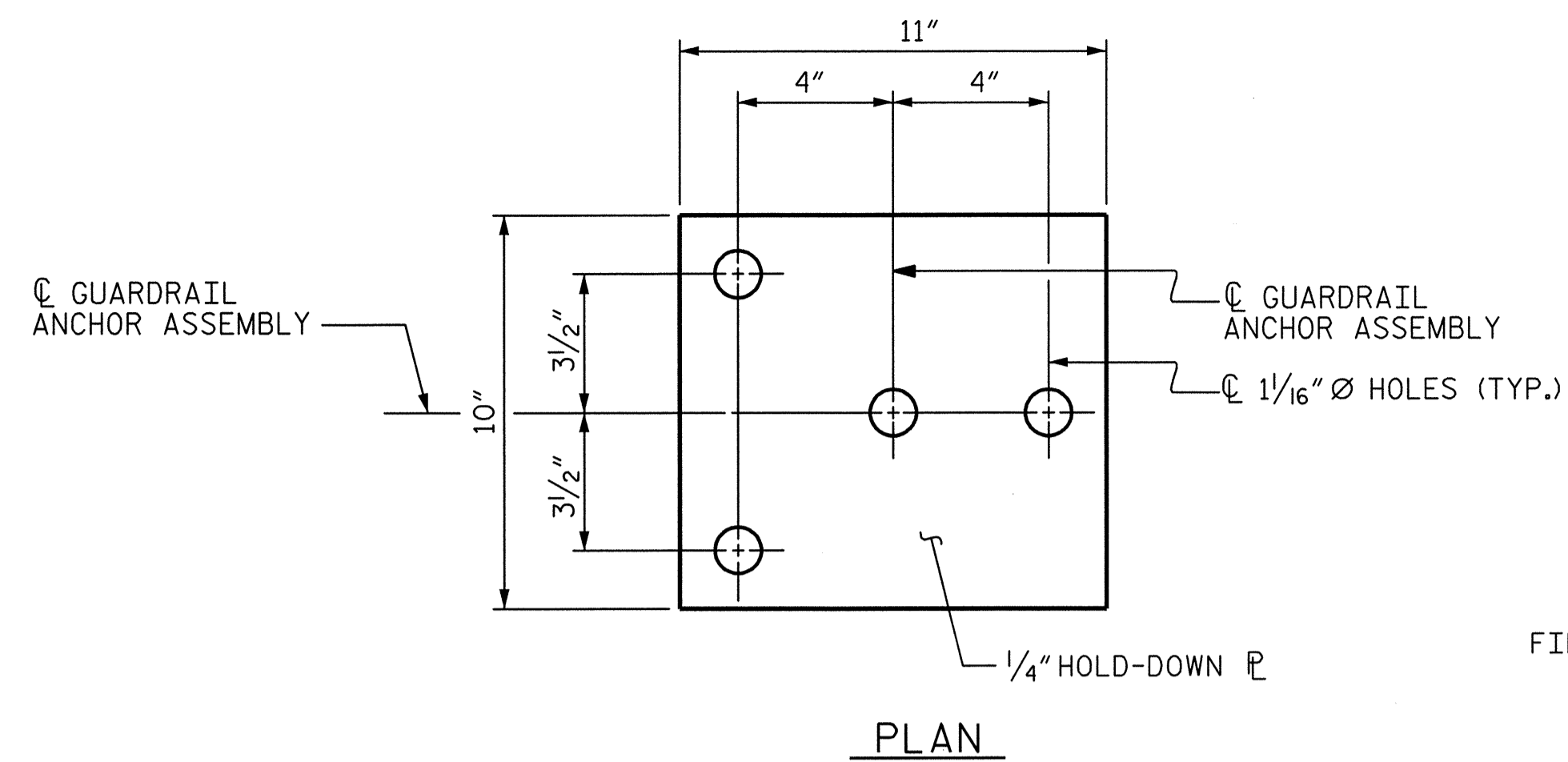
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

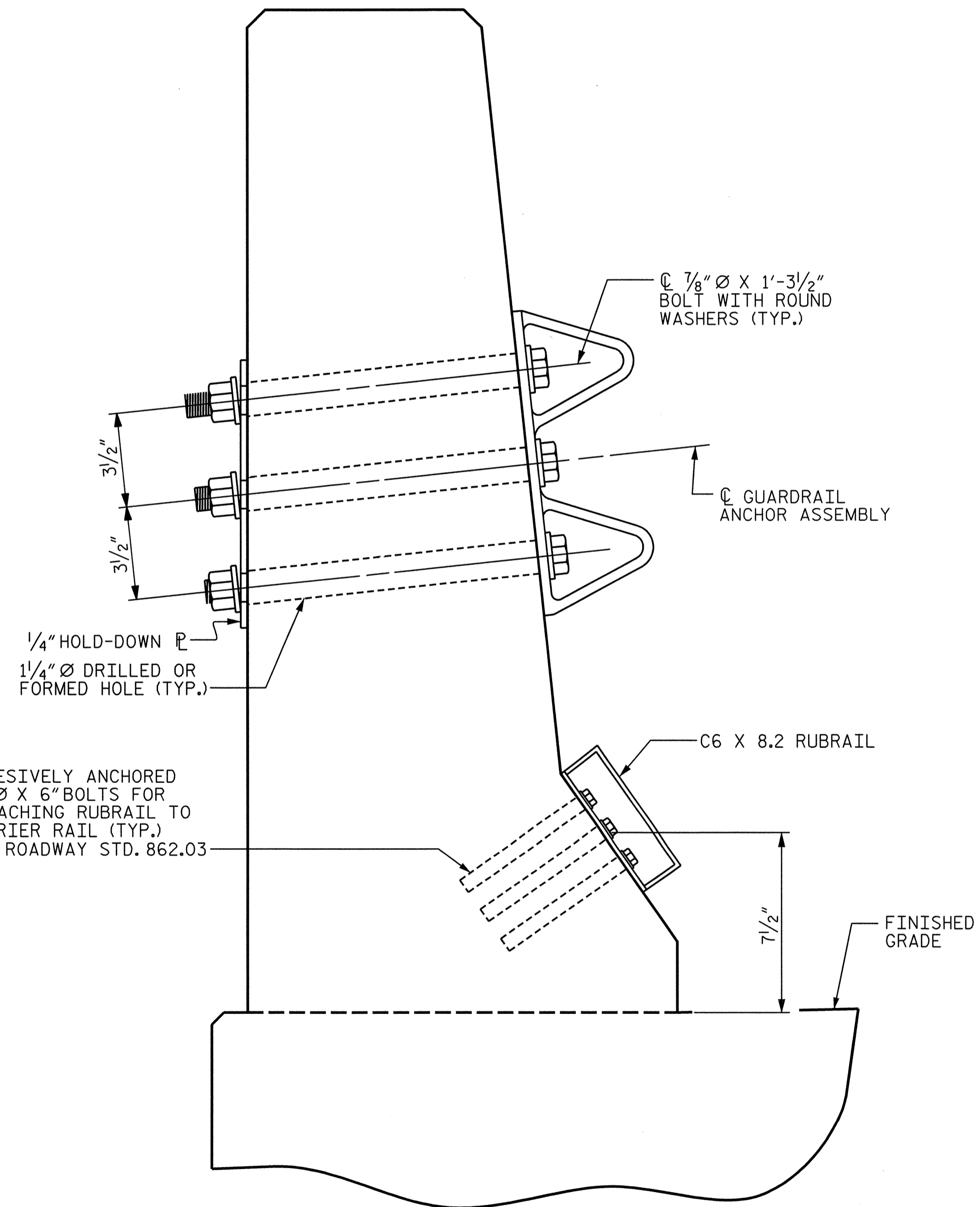
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

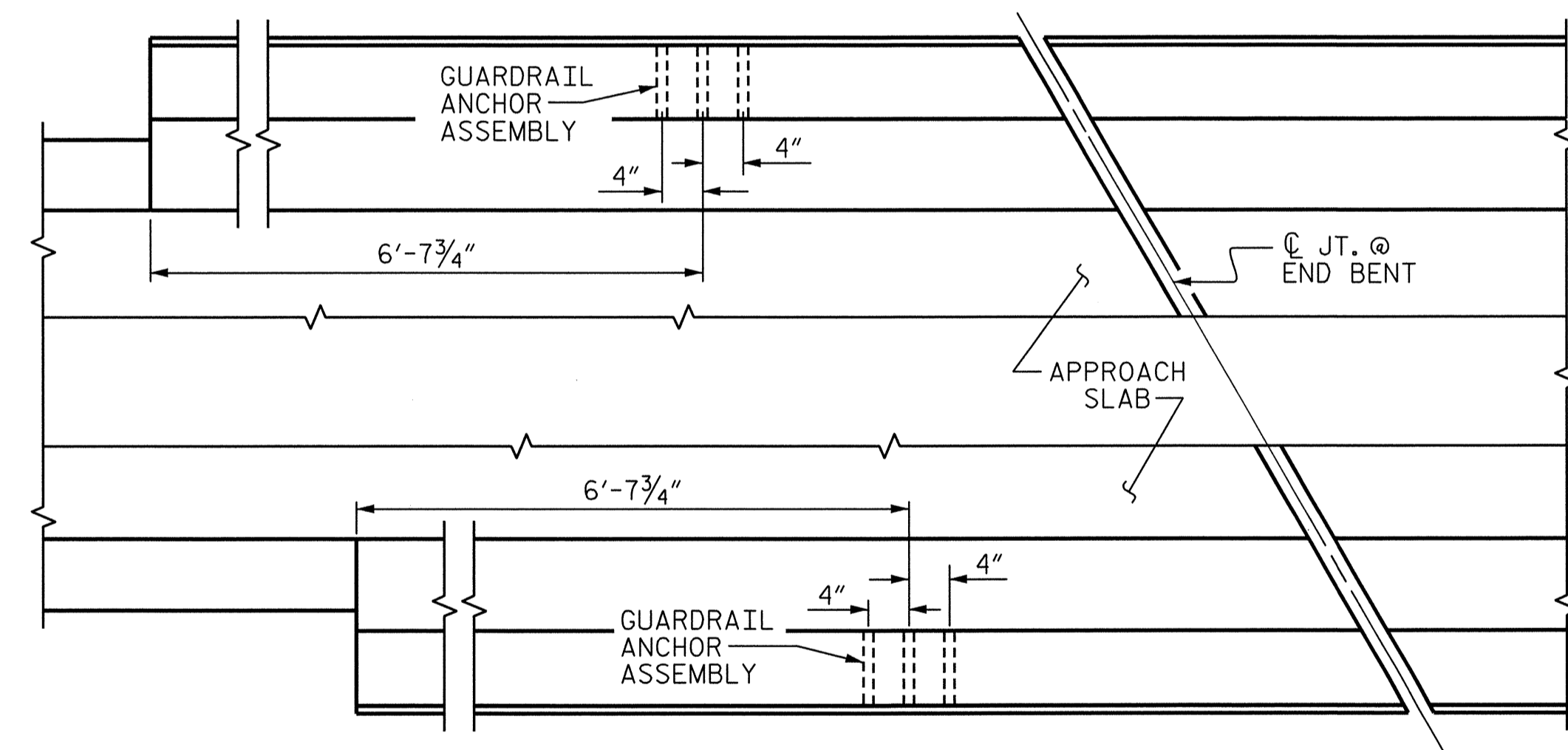
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



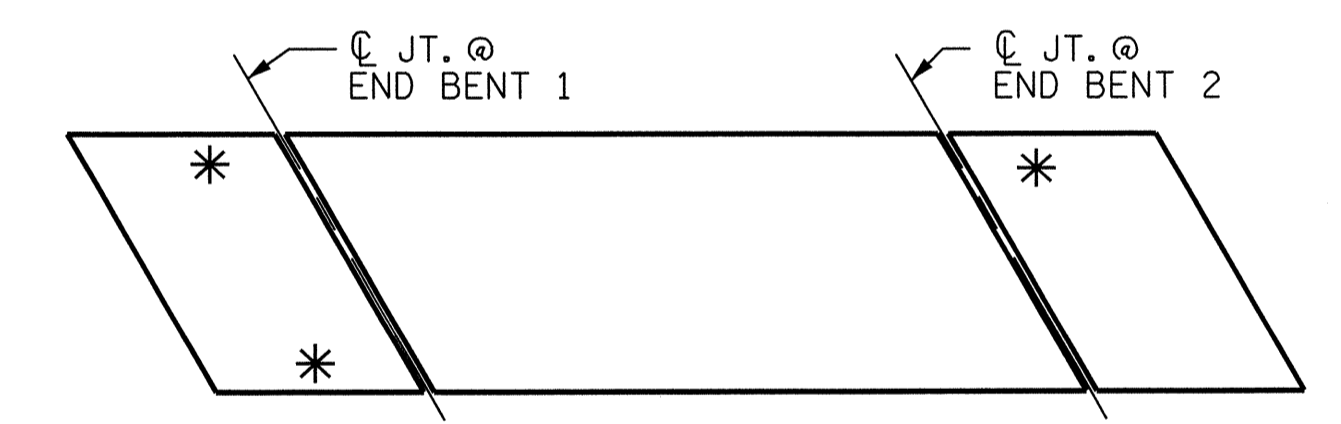
ELEVATION
FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN
LOCATION OF ANCHORS FOR GUARDRAIL
END BENT 1 SHOWN, END BENT 2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4621
ROCKINGHAM COUNTY
STATION: 25+66.99 -L-



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

ASSEMBLED BY : B.E. LANNING	DATE : 02/13
CHECKED BY : A.K. ORR	DATE : 02/13
DESIGN ENGINEER	
OF RECORD : A.K. ORR	DATE : 06/13
DRAWN BY : TLA 5/06	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/06	REV. 7/12 MAA/GM
	REV. 10/12 MAA/GM

MI ENGINEERING						REVISIONS		SHEET NO.					
1011 SCHAUB DRIVE, SUITE 100						NO.	BY:	DATE:	NO.	BY:	DATE:	S-20	
(919) 851-6606						1			3			TOTAL SHEETS	
FIRM PE NUMBER : P-0671						2			4			42	

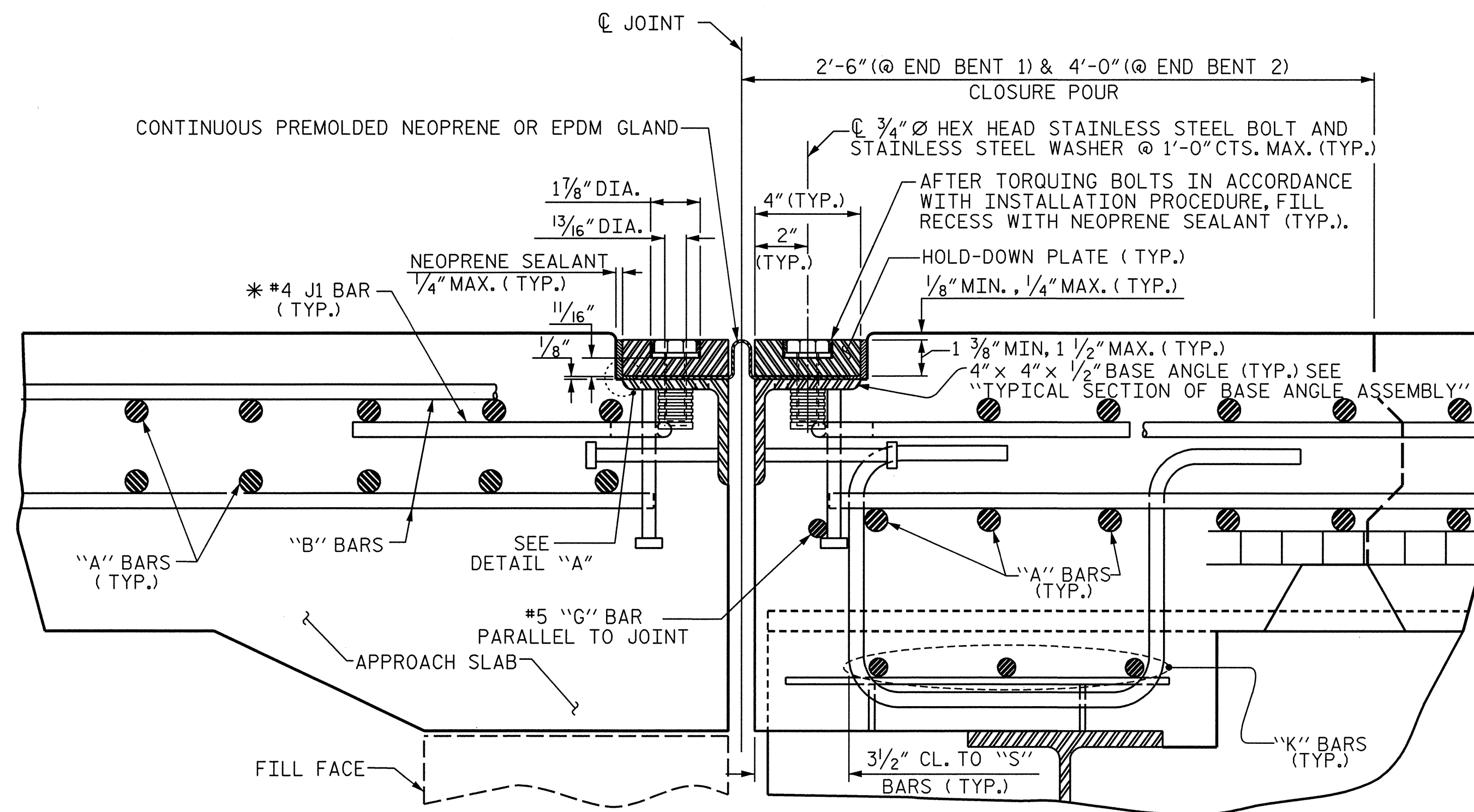
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INSTALLATION PROCEDURE

GENERAL NOTES

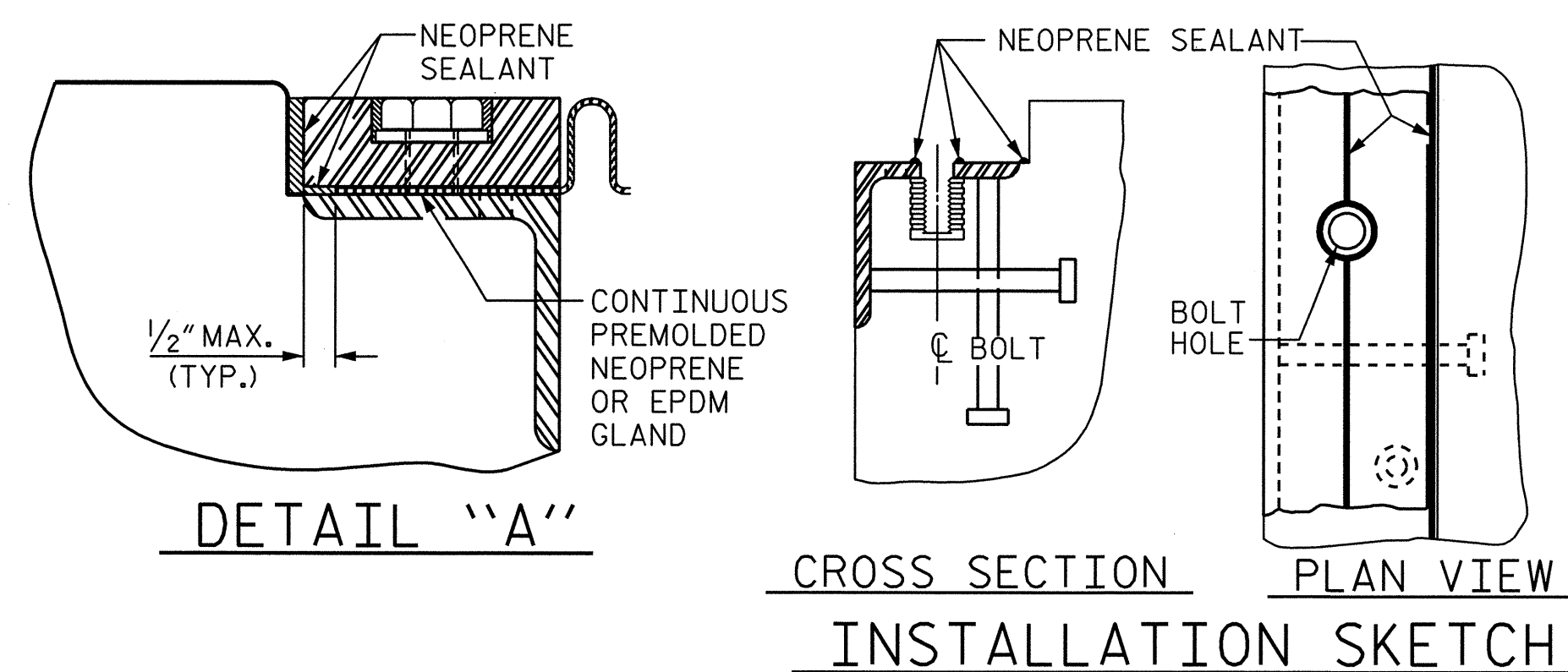
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 1/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES AND THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, COMPLETELY FILL THESE RECESSES WITH NEOPRENE SEALANT.

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MIN.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
7. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
8. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
9. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
10. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

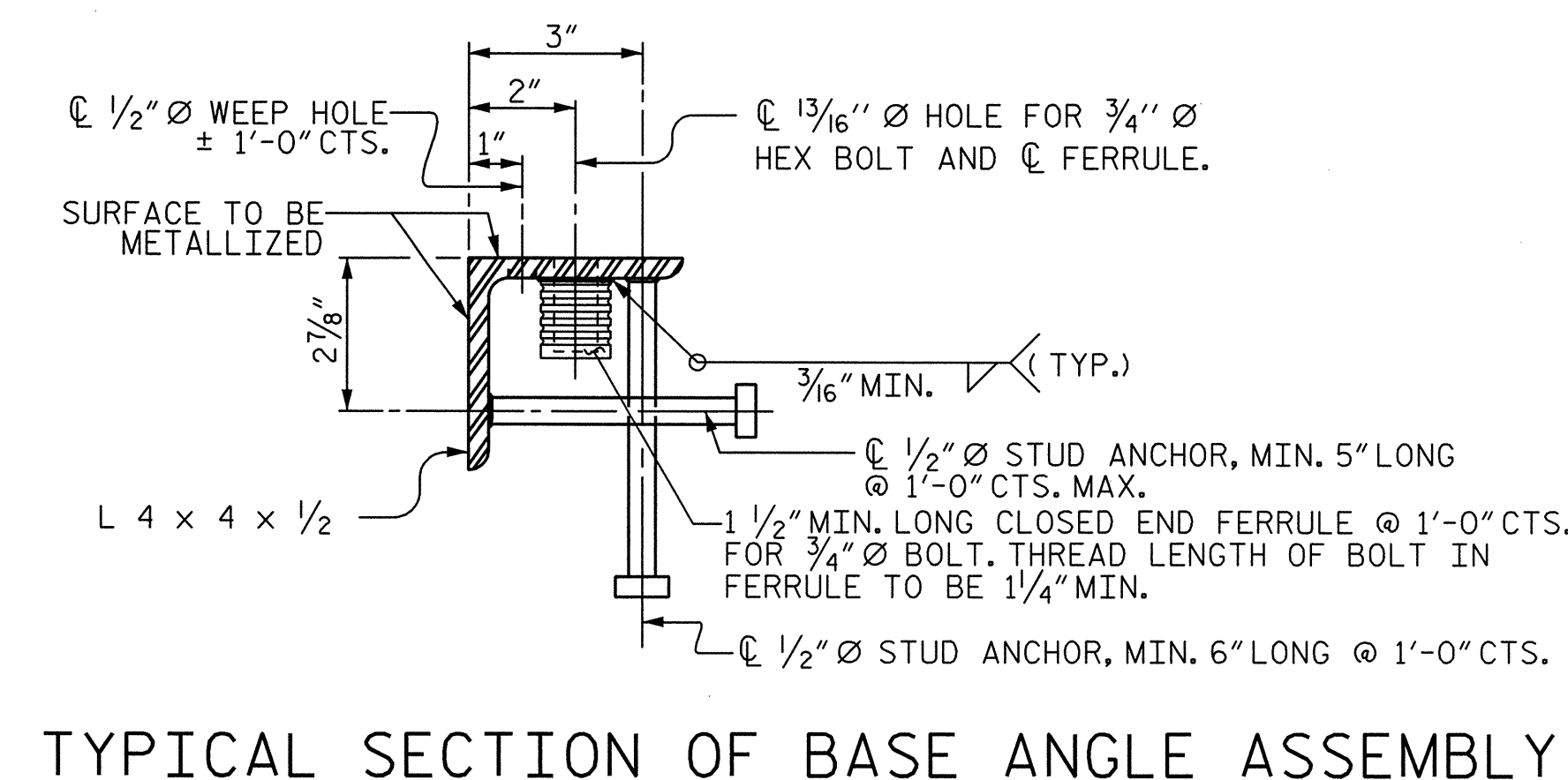
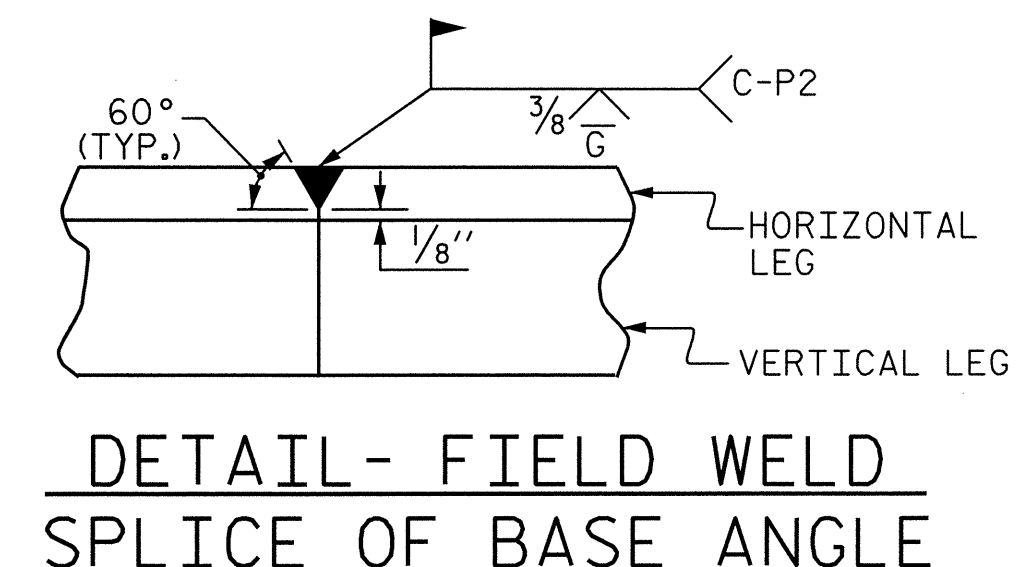


EXPANSION JOINT DETAILS

* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



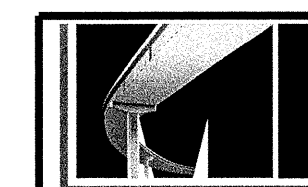
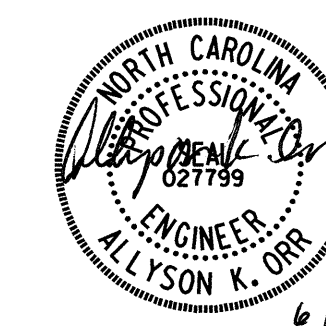
END BENT NO.	SKEW ANGLE	MOVEMENT AND SETTING AT JOINT			
		TOTAL MOVEMENT (ALONG C RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	32°-24'-22"	1/2"	1 1/16"	1 1/8"	1 1/16"
2	32°-24'-22"	1 3/8"	1 1/2"	1 3/8"	1 1/8"



PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 EXPANSION JOINT
 SEAL DETAILS



MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

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2			4			

STD. NO. EJS1

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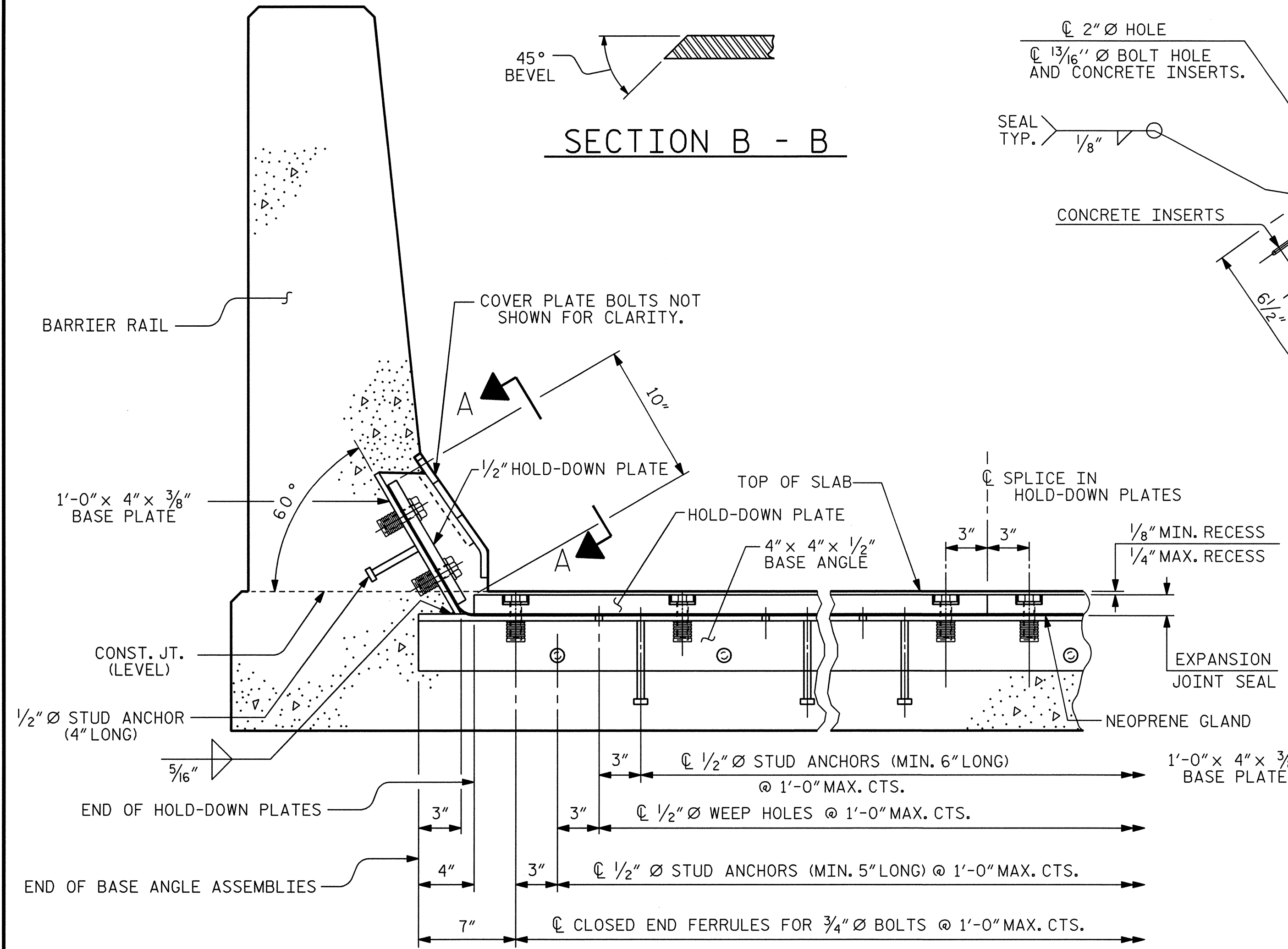
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CHECKED BY : A.K. ORR	DATE : 02/13
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DRAWN BY : REK 9/87	REV. 5/7/03R RWW/JTE
CHECKED BY : CRK 10/87	REV. 5/1/06R TLA/GM
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6/17/2013
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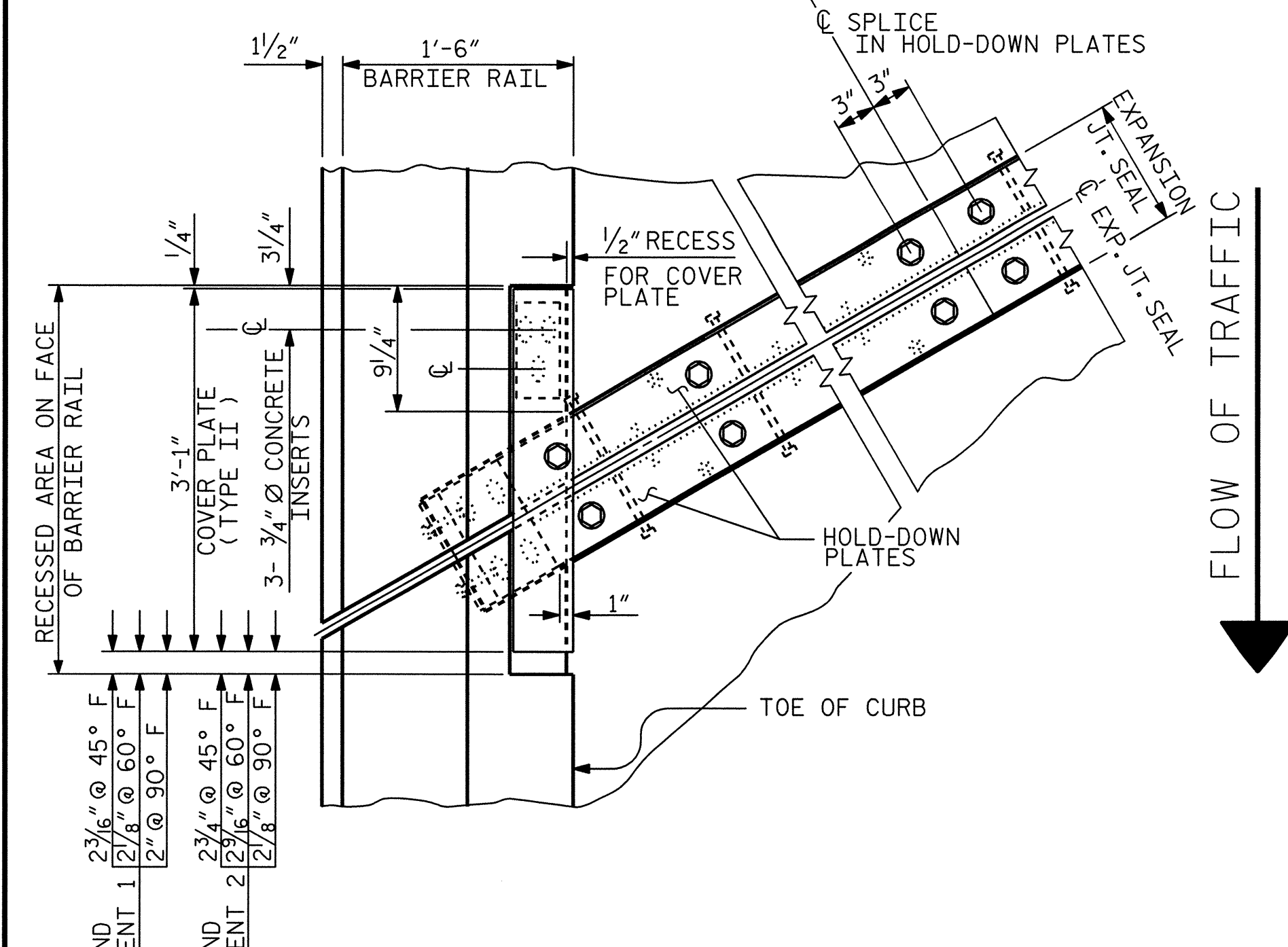
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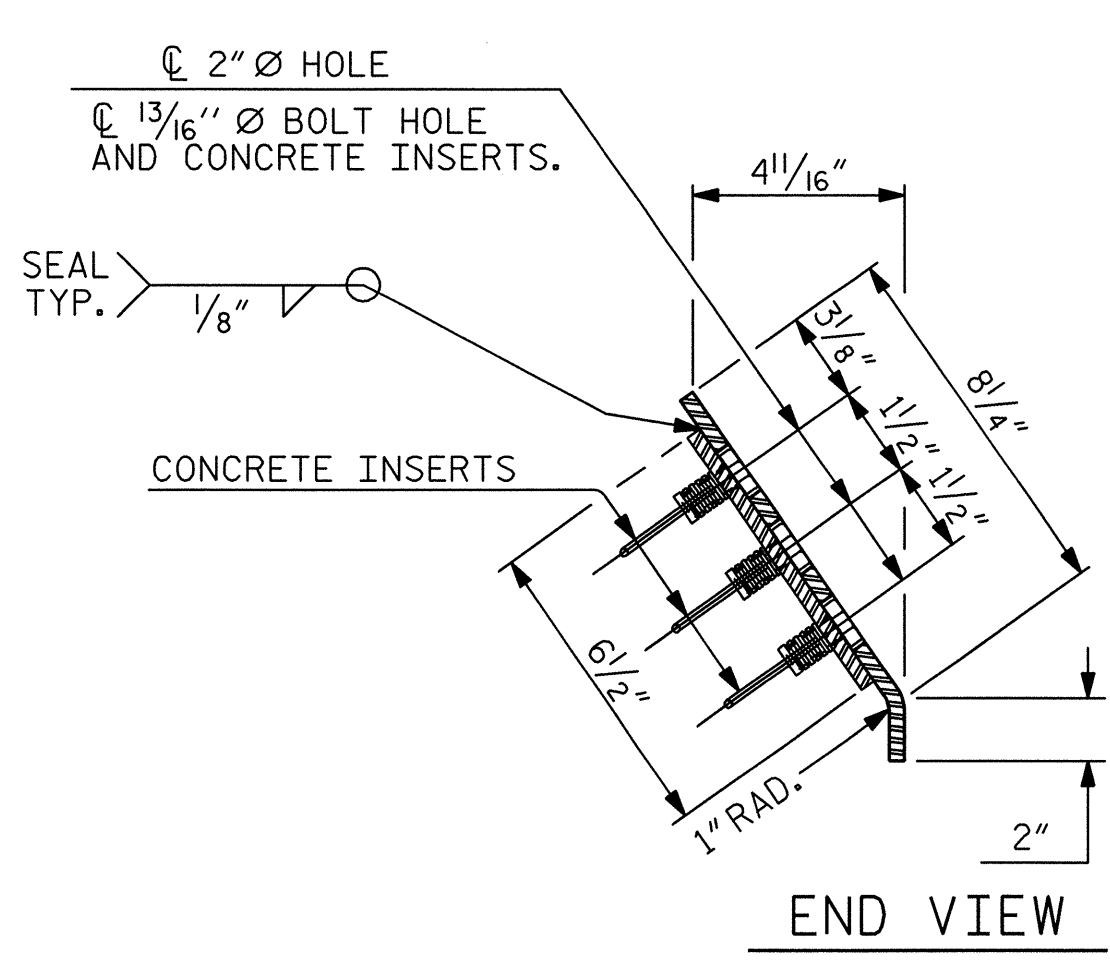
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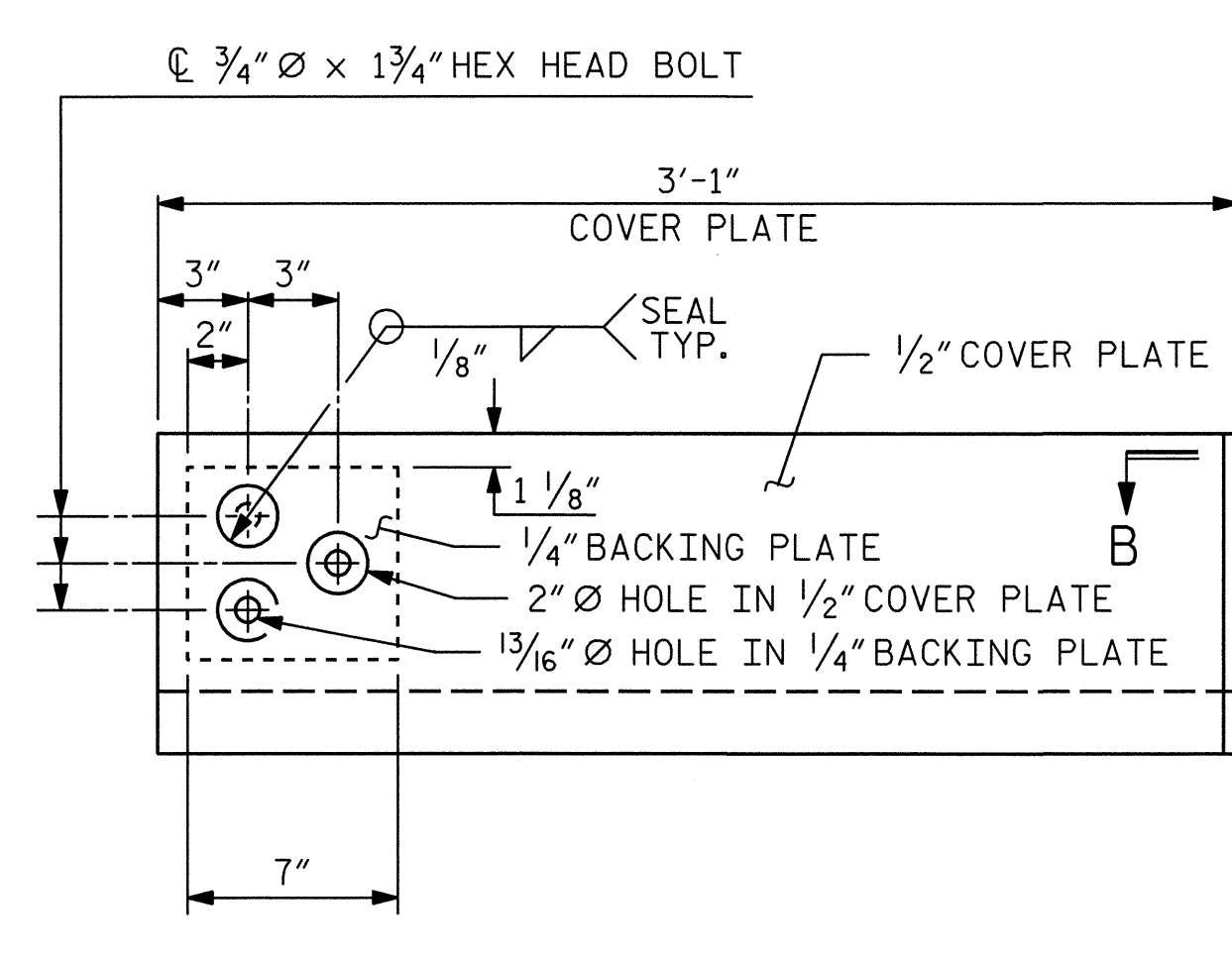
SECTION THRU RAIL NORMAL TO JOINT



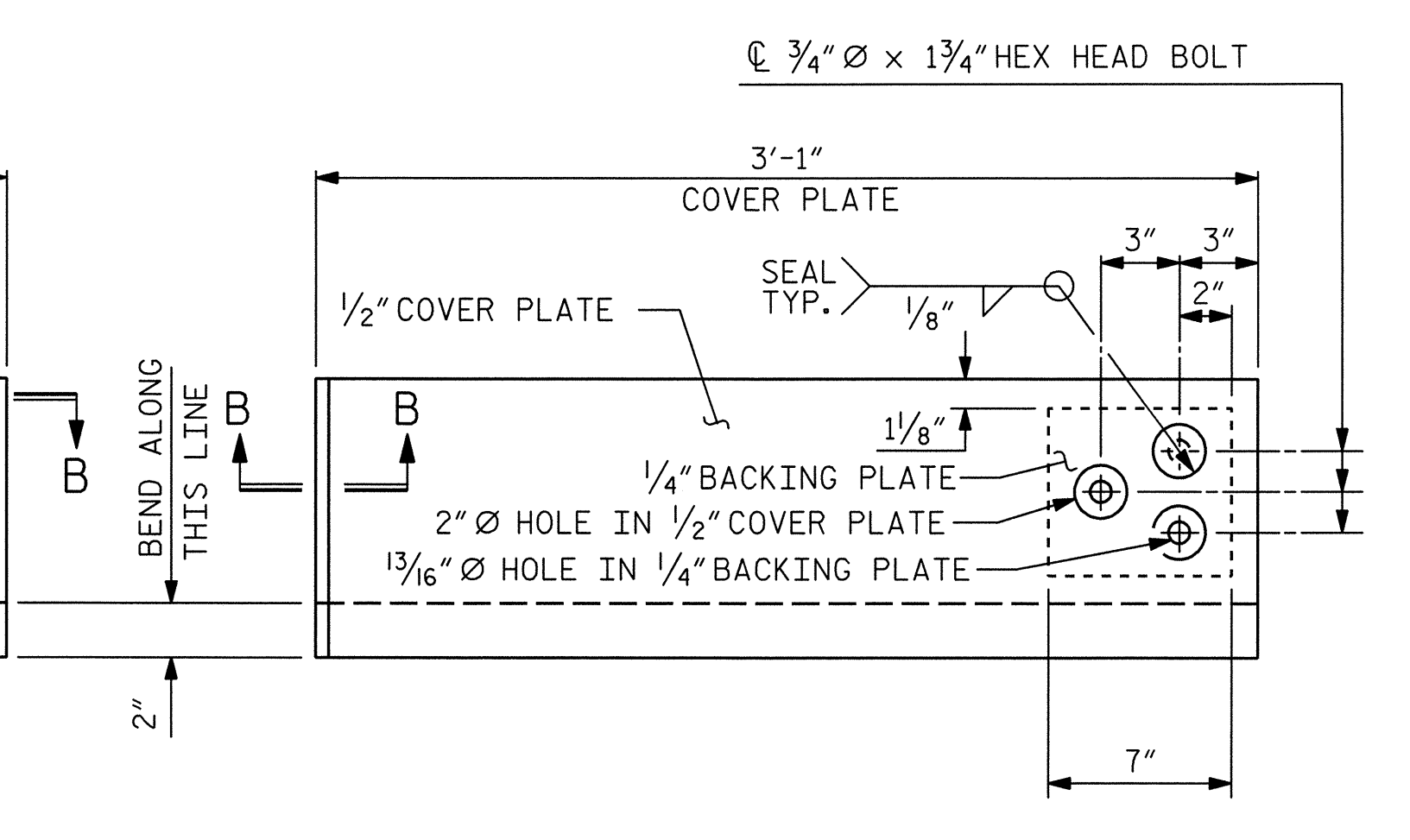
PLAN OF EXPANSION JOINT SEAL



END VIEW

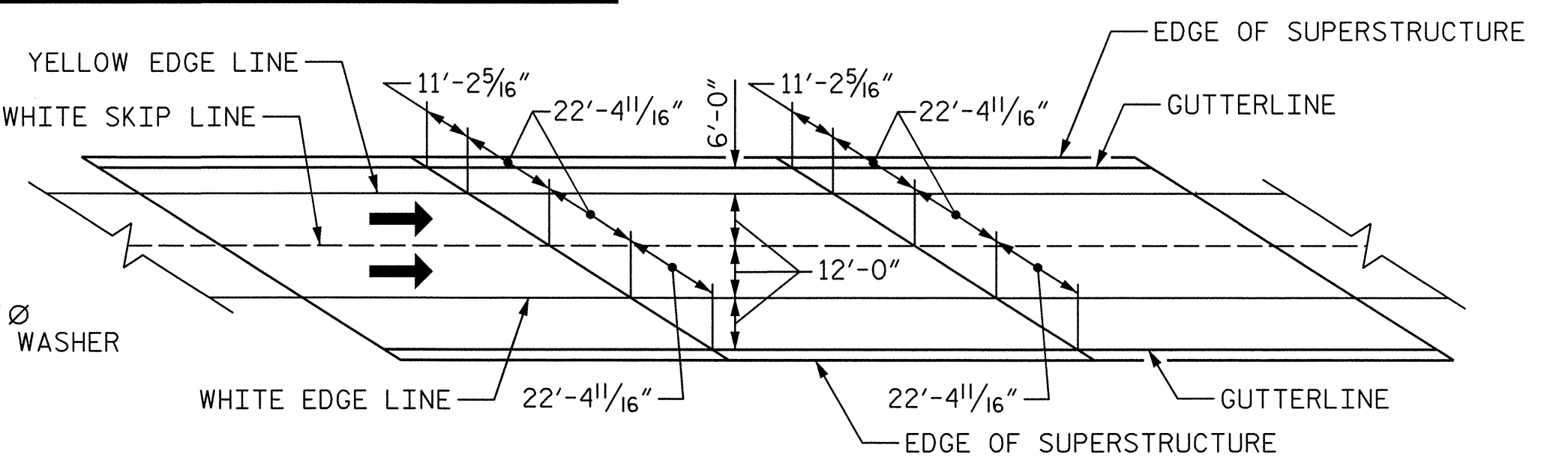


TYPE I - ELEVATION VIEW

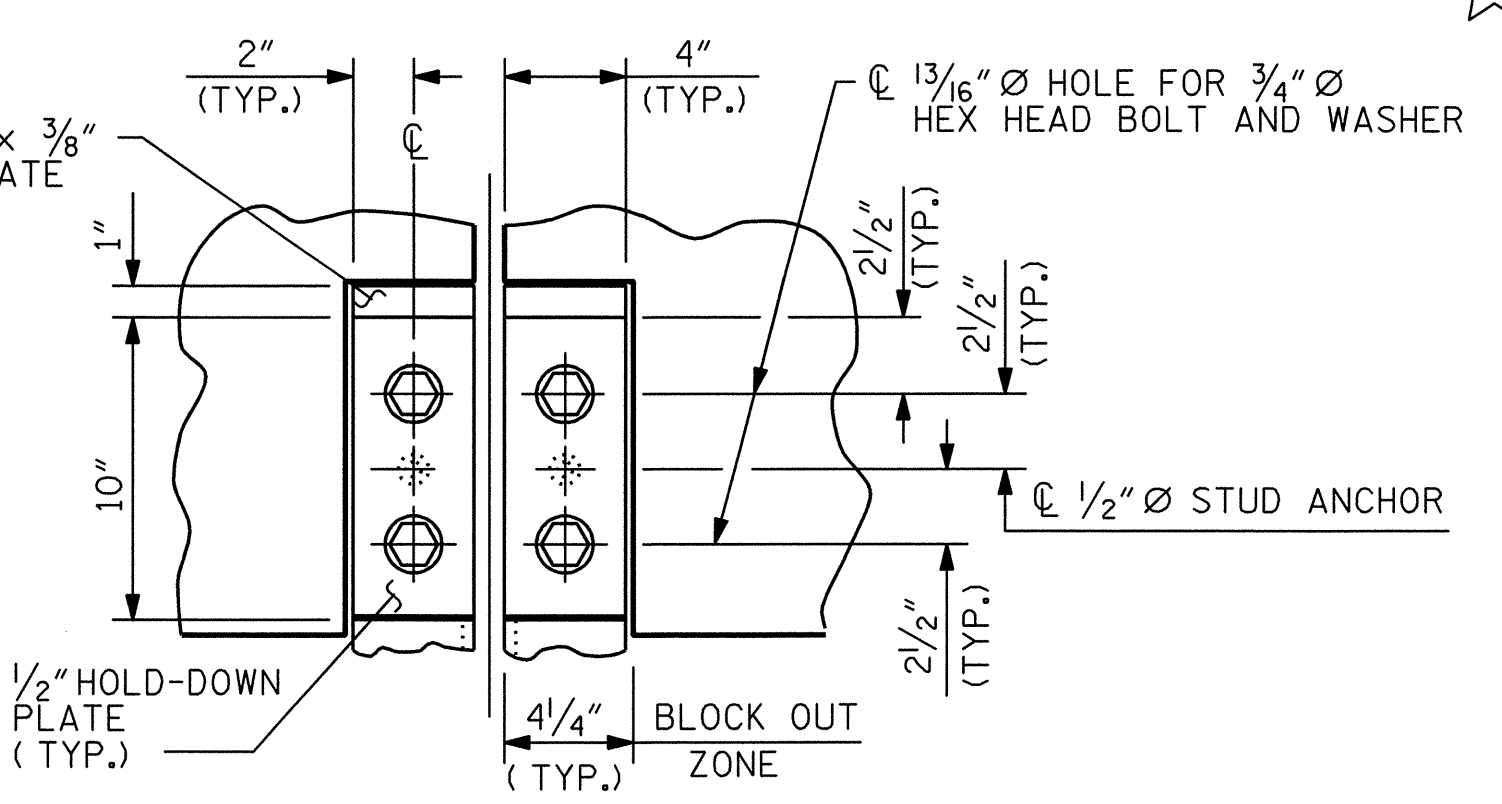


TYPE II - ELEVATION VIEW

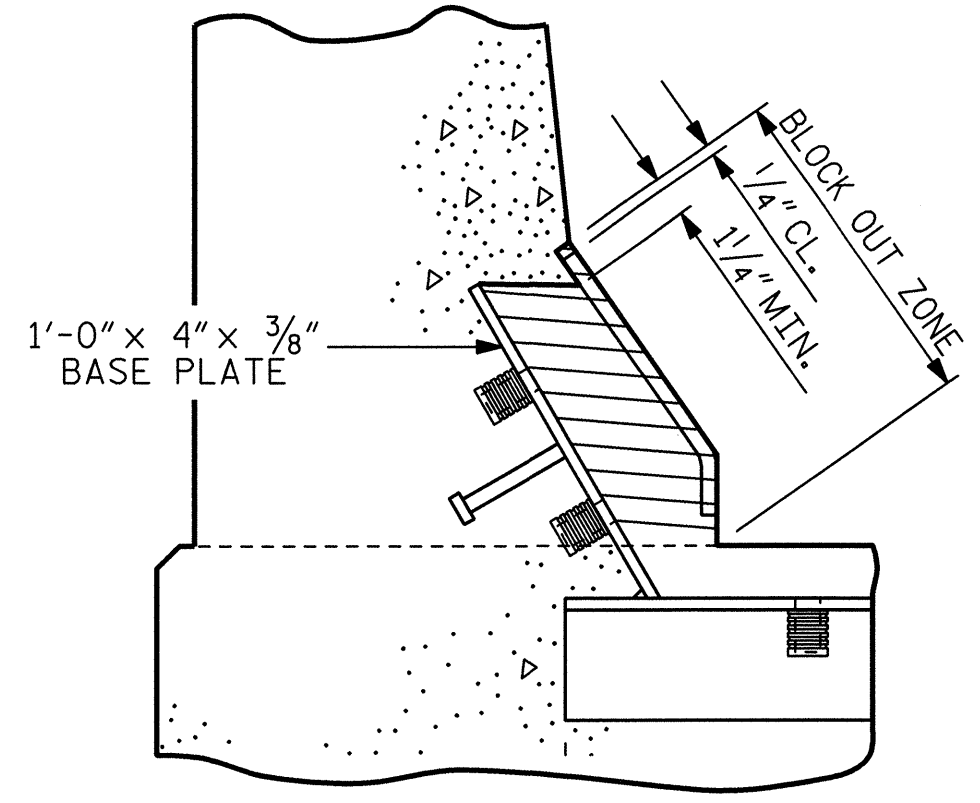
COVER PLATE DETAILS



PAVEMENT MARKING ALIGNMENT

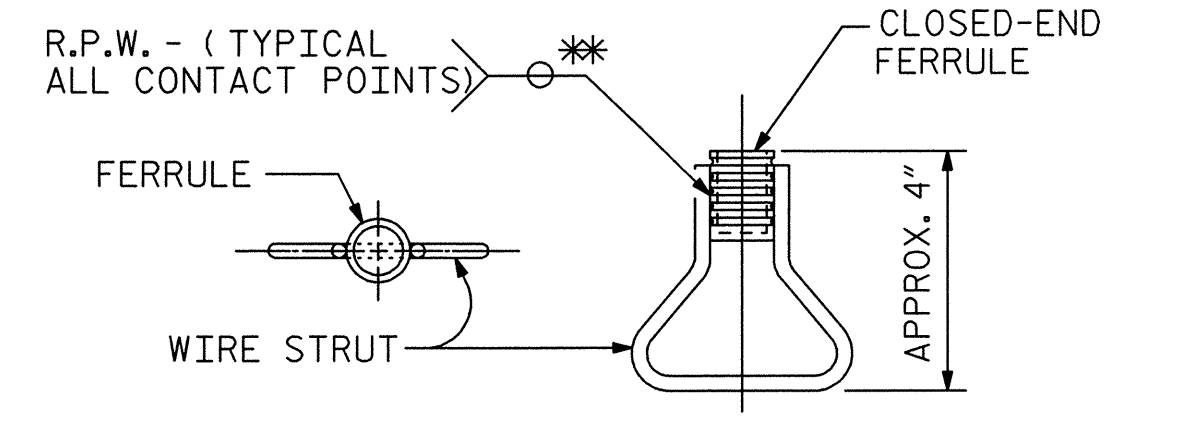


SECTION A - A



BLOCK OUT DETAIL

SEE "SECTION A - A" FOR OTHER DETAILS.

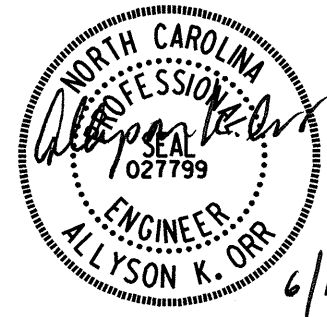


CONCRETE INSERT

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

PROJECT NO. B-4621
ROCKINGHAM COUNTY
STATION: 25+66.99 -L-

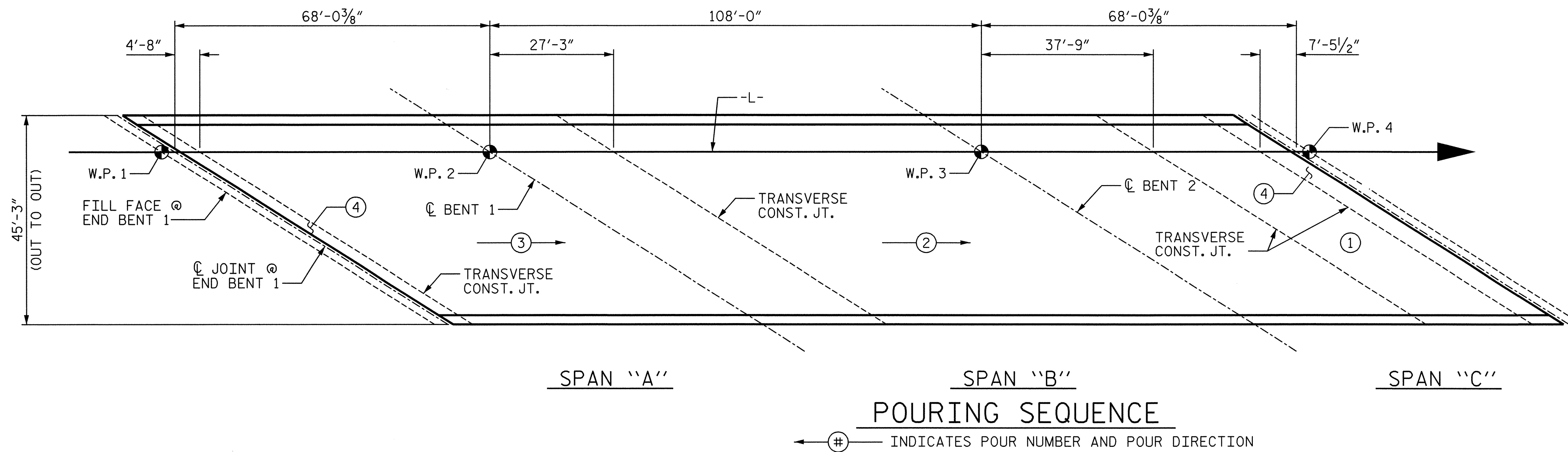
SHEET 2 OF 2



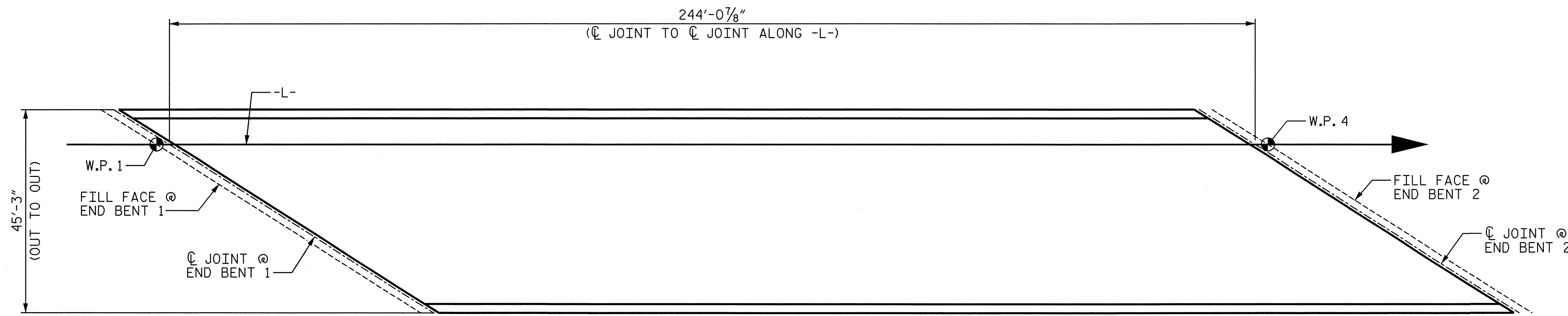
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
EXPANSION JOINT
SEAL DETAILS
FOR BARRIER RAIL

MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS		SHEET NO. S-22
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

STD. NO. EJS2



← (#) — INDICATES POUR NUMBER AND POUR DIRECTION



LAYOUT FOR COMPUTING AREA
OF REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 11,045)

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1781 SQ.FT.
BRIDGE DECK	9439 SQ.FT.
TOTAL	11220 SQ.FT.

— SUPERSTRUCTURE BILL OF MATERIAL —			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	30.4	-	-
POUR #2	157.8	-	-
POUR #3	120.7	-	-
POUR #4	22.5	-	-
TOTALS**	331.4	37,992	45,224

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BILL OF MATERIAL**



	MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS		SHEET NO. S-23
	NO. 1 BY: [Signature] DATE: [Date]	NO. 2 BY: [Signature] DATE: [Date]	NO. 3 BY: [Signature] DATE: [Date]	NO. 4 BY: [Signature] DATE: [Date]	TOTAL SHEETS 42

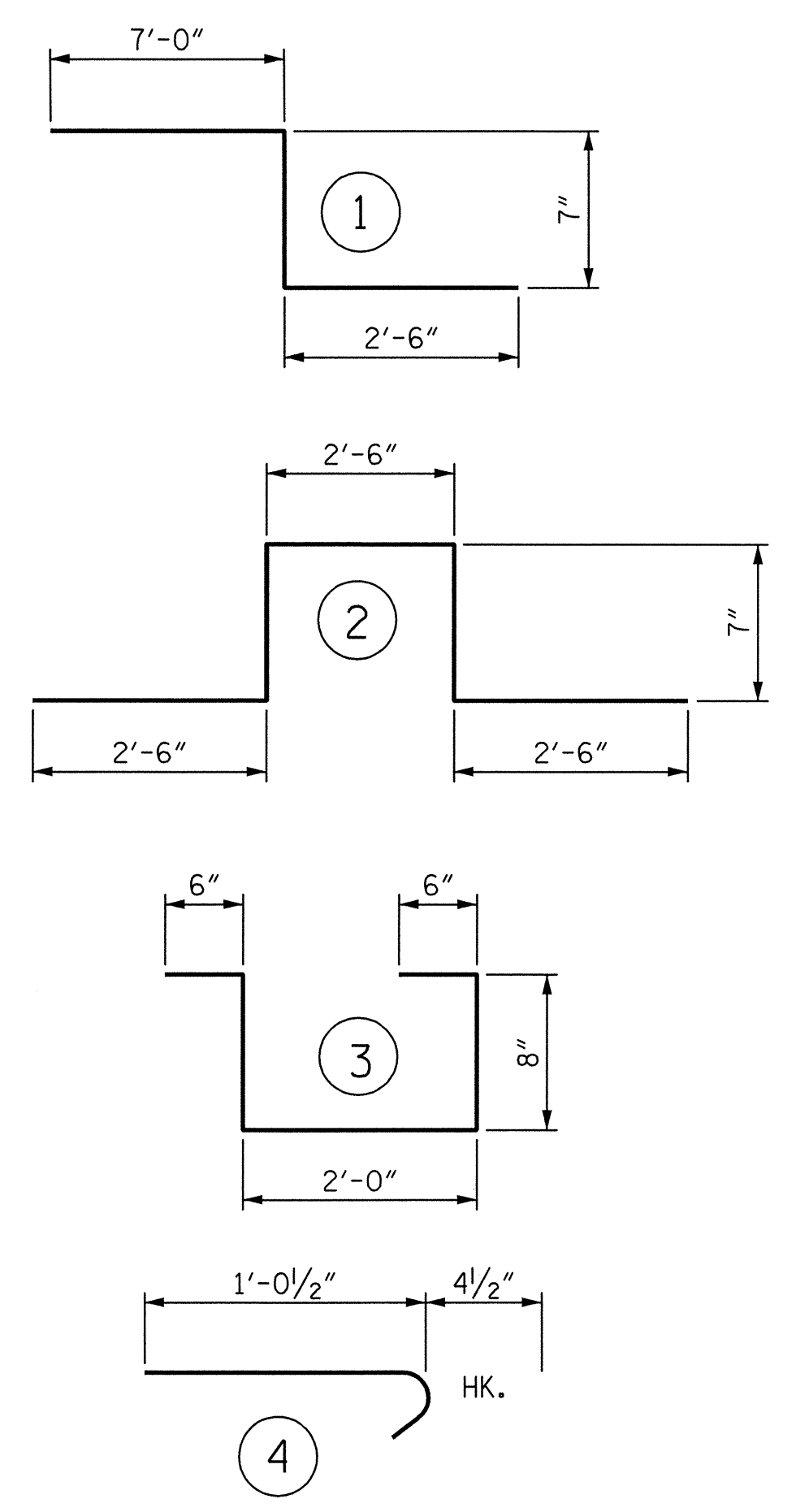
DRAWN BY : B.E. LANNING DATE : 02/13
 CHECKED BY : A.K. ORR DATE : 02/13
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 06/13

6/17/2013 11:01:13 AM User: jjsraoelndm File: P:\NC Projects\MI2004 - B-4621\Rockingham\B-4621\Structures\B-4621_SD_BMI.dgn

REINFORCING BAR SCHEDULE

Table with columns: BAR NO., SIZE, TYPE, LENGTH, WEIGHT. Lists reinforcing bars A1 through A400 with their respective specifications.

BAR TYPES



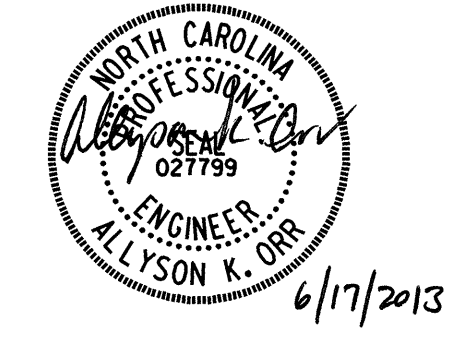
ALL BAR DIMENSIONS ARE OUT TO OUT.

Table with title 'SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS'. Columns: BAR SIZE, SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL, APPROACH SLABS, PARAPET AND BARRIER RAIL. Rows: #4, #5, #6, #7, #8.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
STATION: 25+66.99 -L-

SHEET 2 OF 2

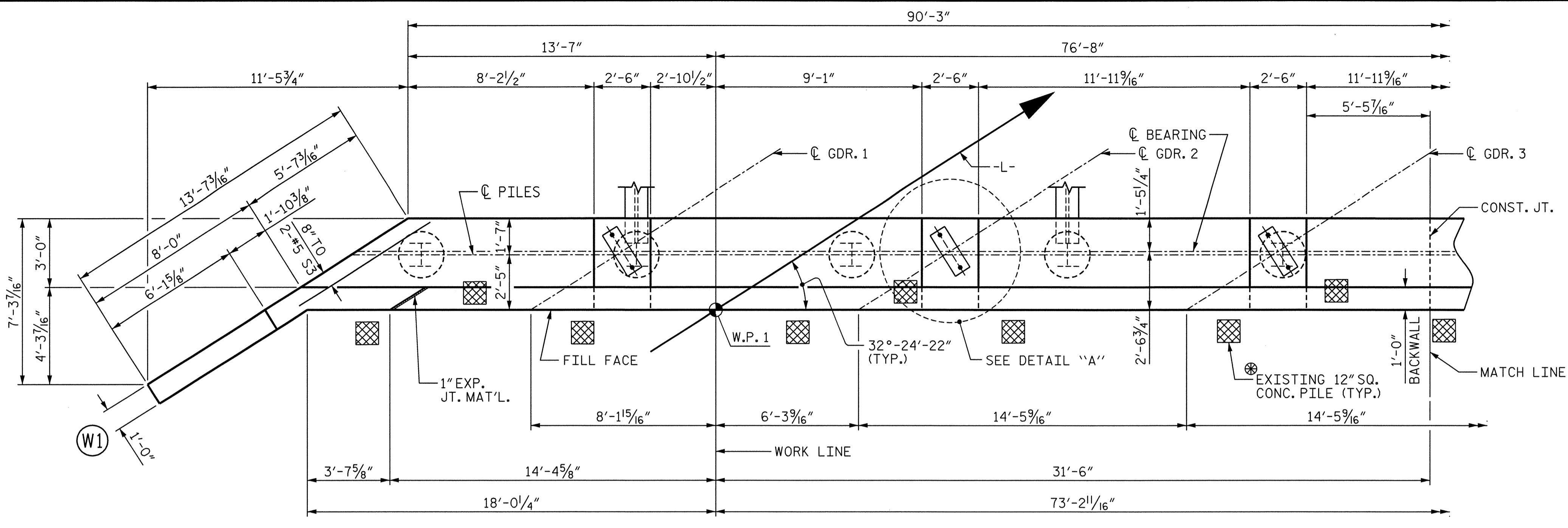
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
BILL OF MATERIAL



MI ENGINEERING logo and address: 1011 SCHAUB DRIVE, SUITE 100, RALEIGH, NC 27606. Includes a REVISIONS table and SHEET NO. S-24.

DRAWN BY: B.E. LANNING DATE: 02/13
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DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 06/13

6/17/2013 11:01:43 AM User: jlsrceinoin File: C:\Projects\MI2004 - B-4621\Structures\B-4621_SD_BM2.dgn



NOTES

STIRRUPS AND #4 U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

#5 V1 BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM THE BOTTOM OF CAP.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

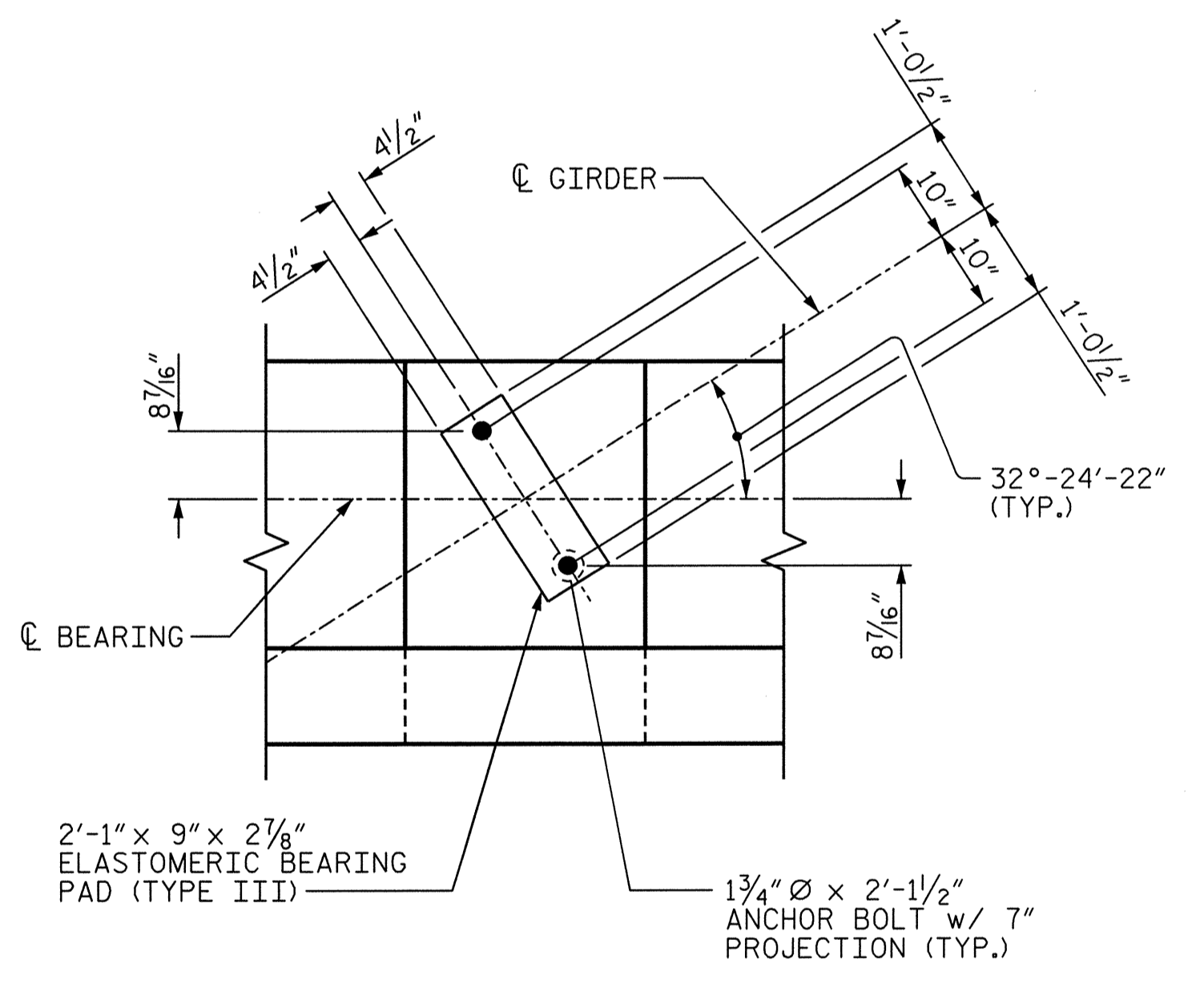
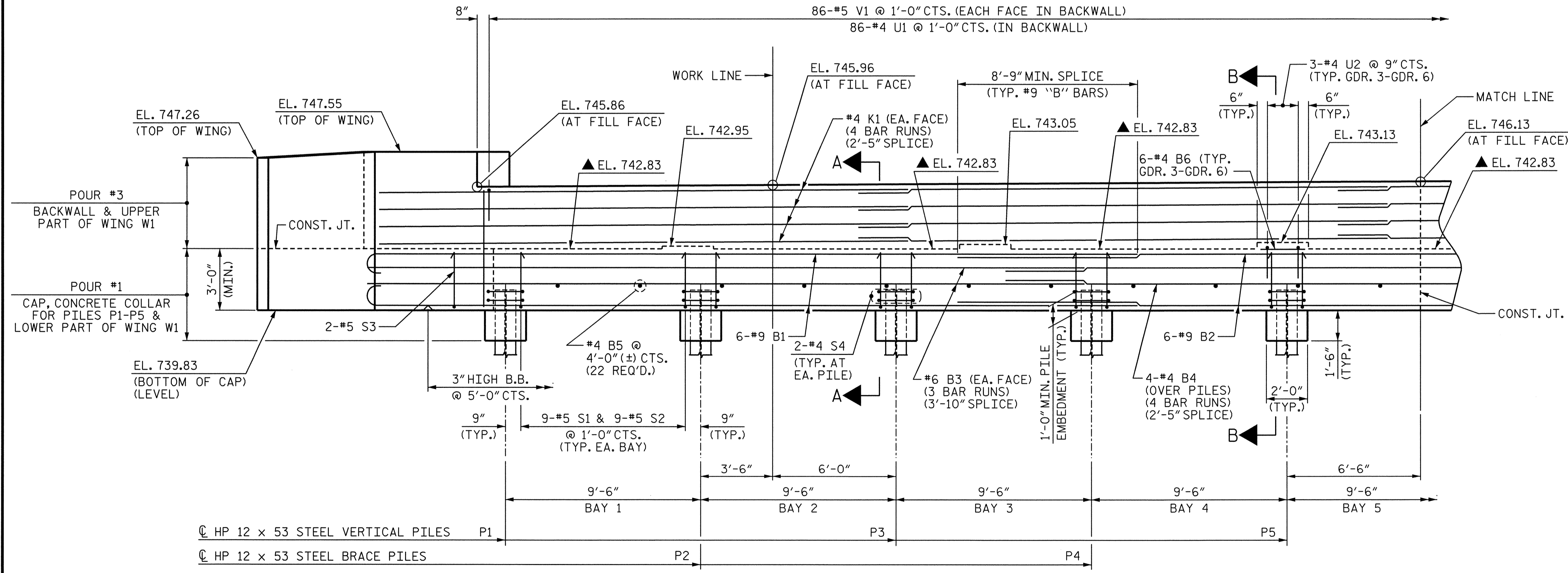
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A ON SHEET 4 OF 4.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" Ø DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

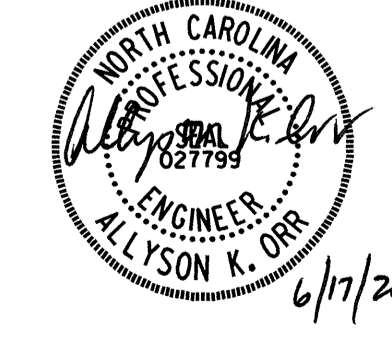
FOR SECTION A-A, SECTION B-B, PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 4 OF 4.

⊗ CONTRACTOR TO VERIFY THE LOCATION OF EXISTING PILES. EXISTING PILES TO REMAIN IN PLACE. CUT EXISTING PILES TO 1'-6" BELOW BOTTOM OF CAP ELEVATION.



PROJECT NO. B-4621
 ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-
 SHEET 1 OF 4

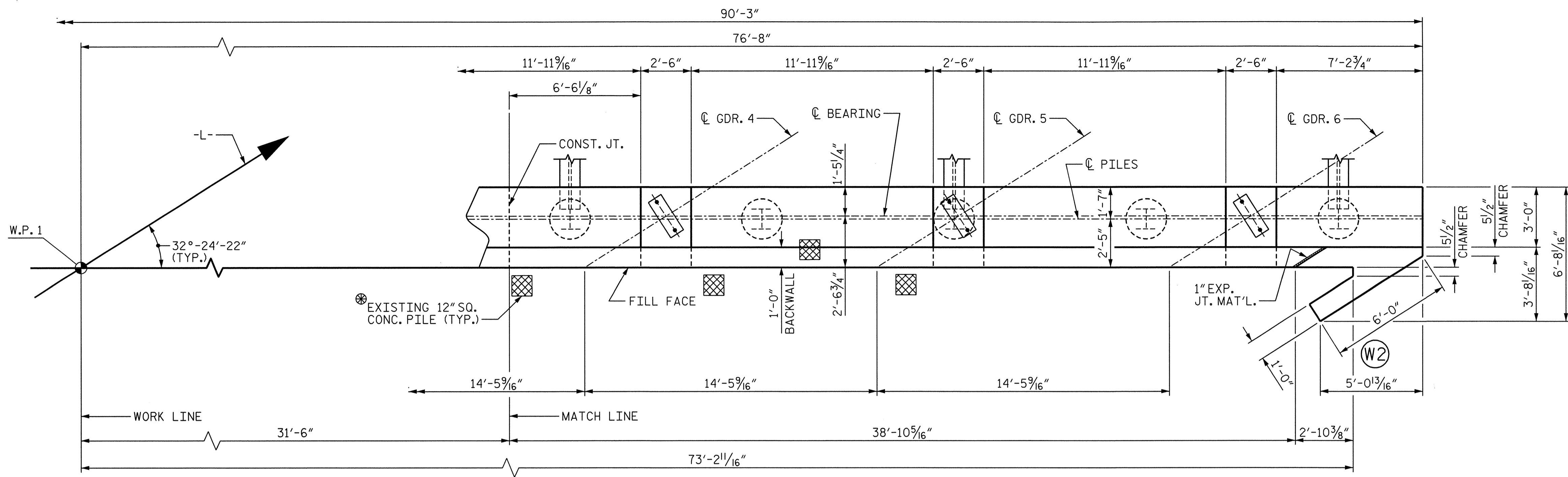
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT I



MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS		SHEET NO. S-25	
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		
					TOTAL SHEETS 42

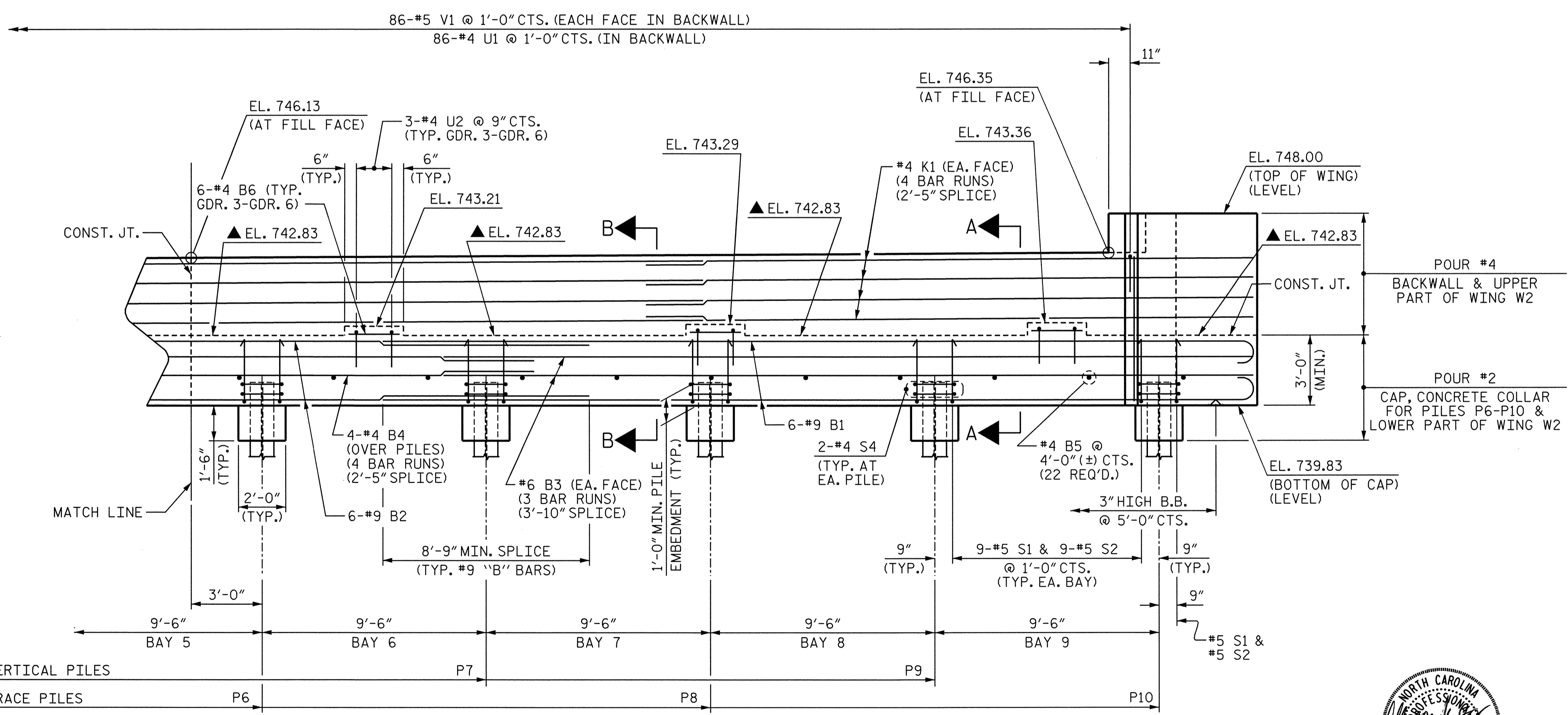
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DRAWN BY : B.E. LANNING DATE : 02/13
 CHECKED BY : A.K. ORR DATE : 02/13
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 06/13



PLAN

⊗ CONTRACTOR TO VERIFY THE LOCATION OF EXISTING PILES. EXISTING PILES TO REMAIN IN PLACE. CUT EXISTING PILES TO 1'-6" BELOW BOTTOM OF CAP ELEVATION.

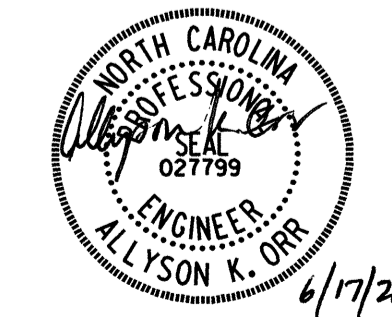


ELEVATION

NOTE: FOR SECTION A-A AND SECTION B-B, SEE SHEET 4 OF 4.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-
 SHEET 2 OF 4

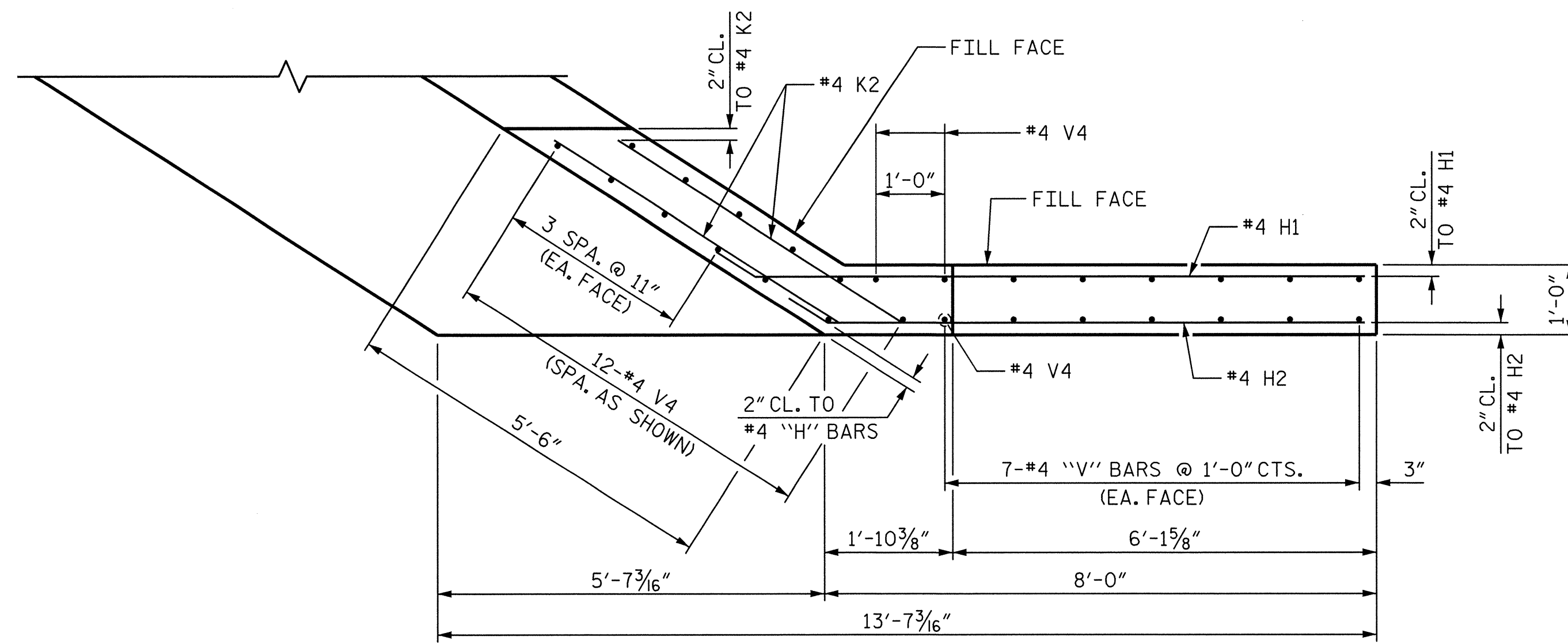
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT I



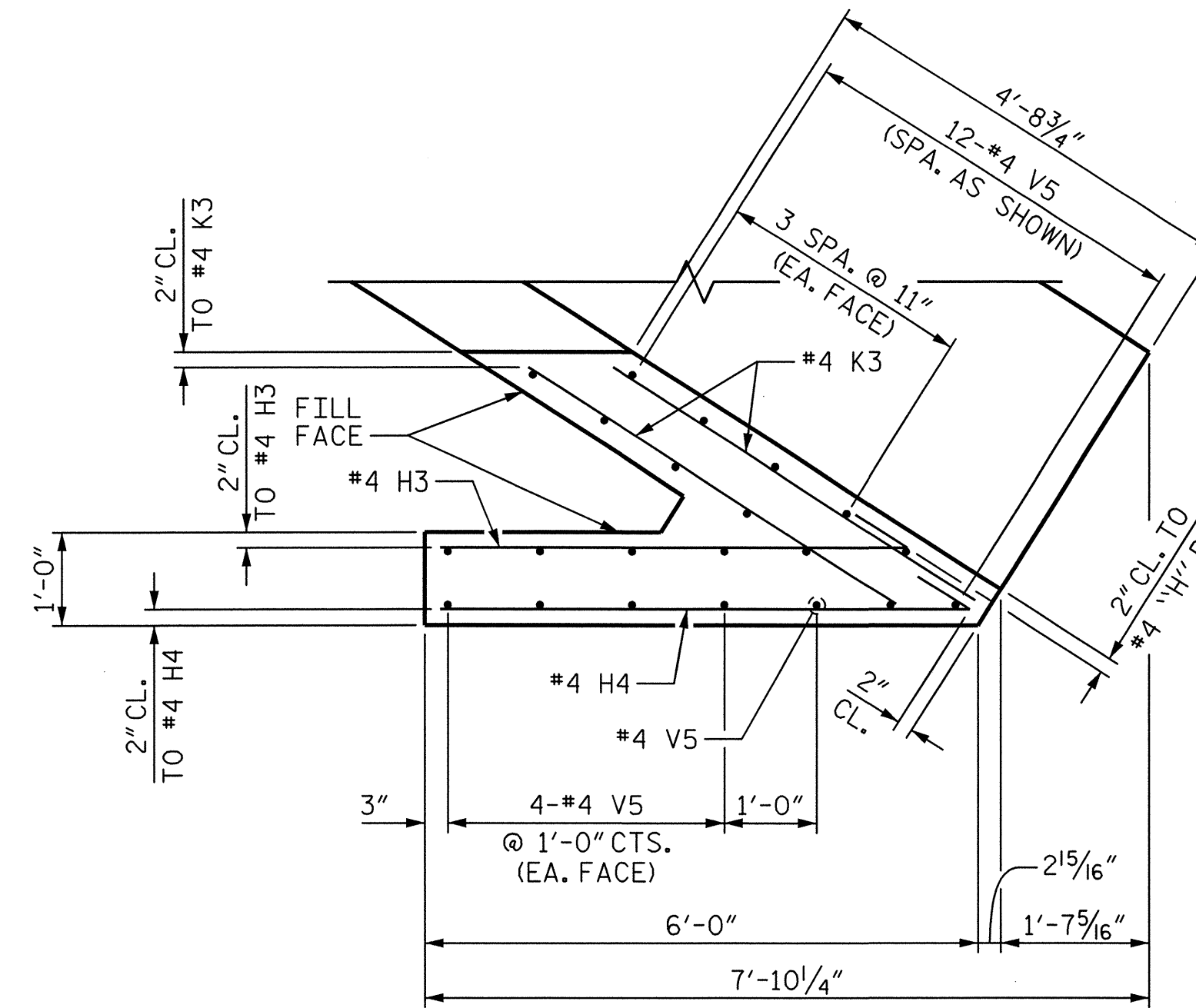
MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 42

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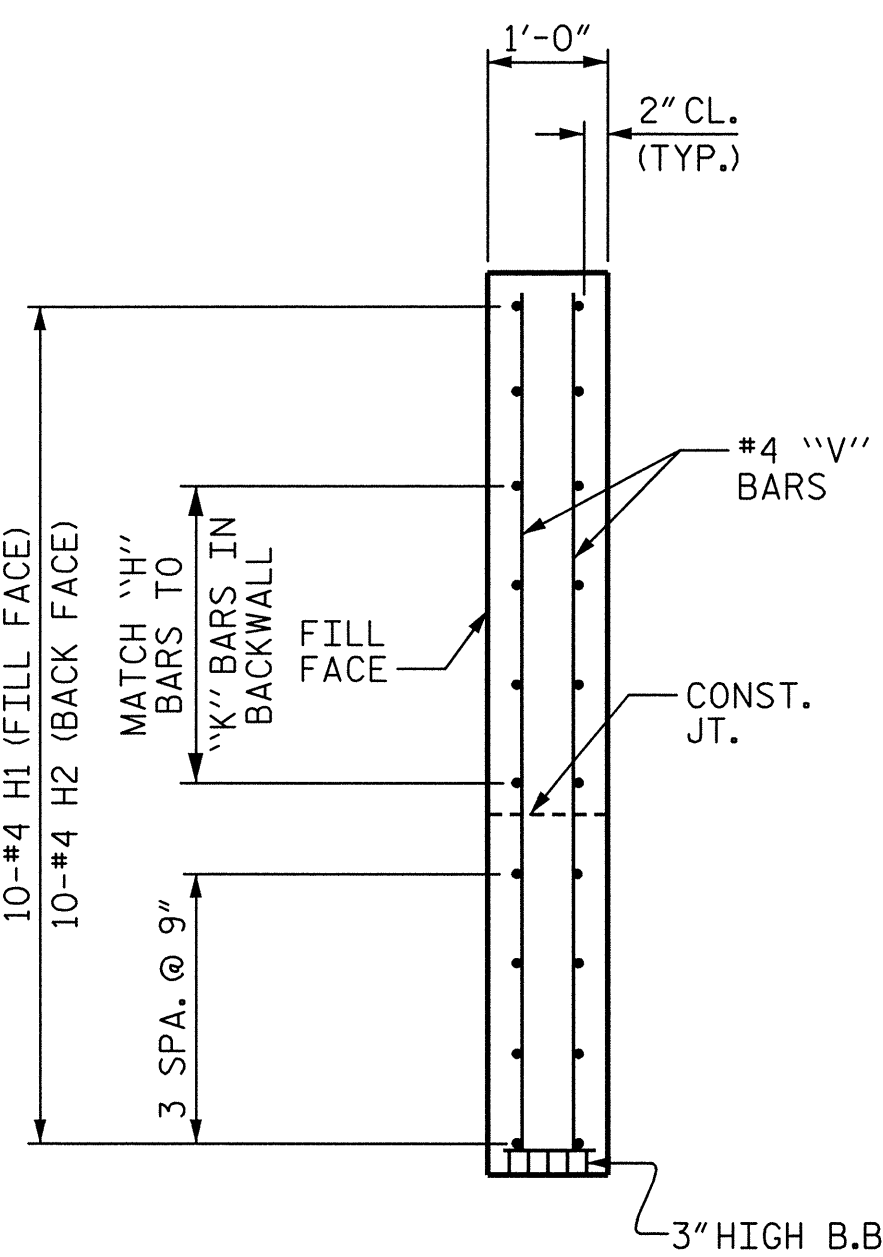
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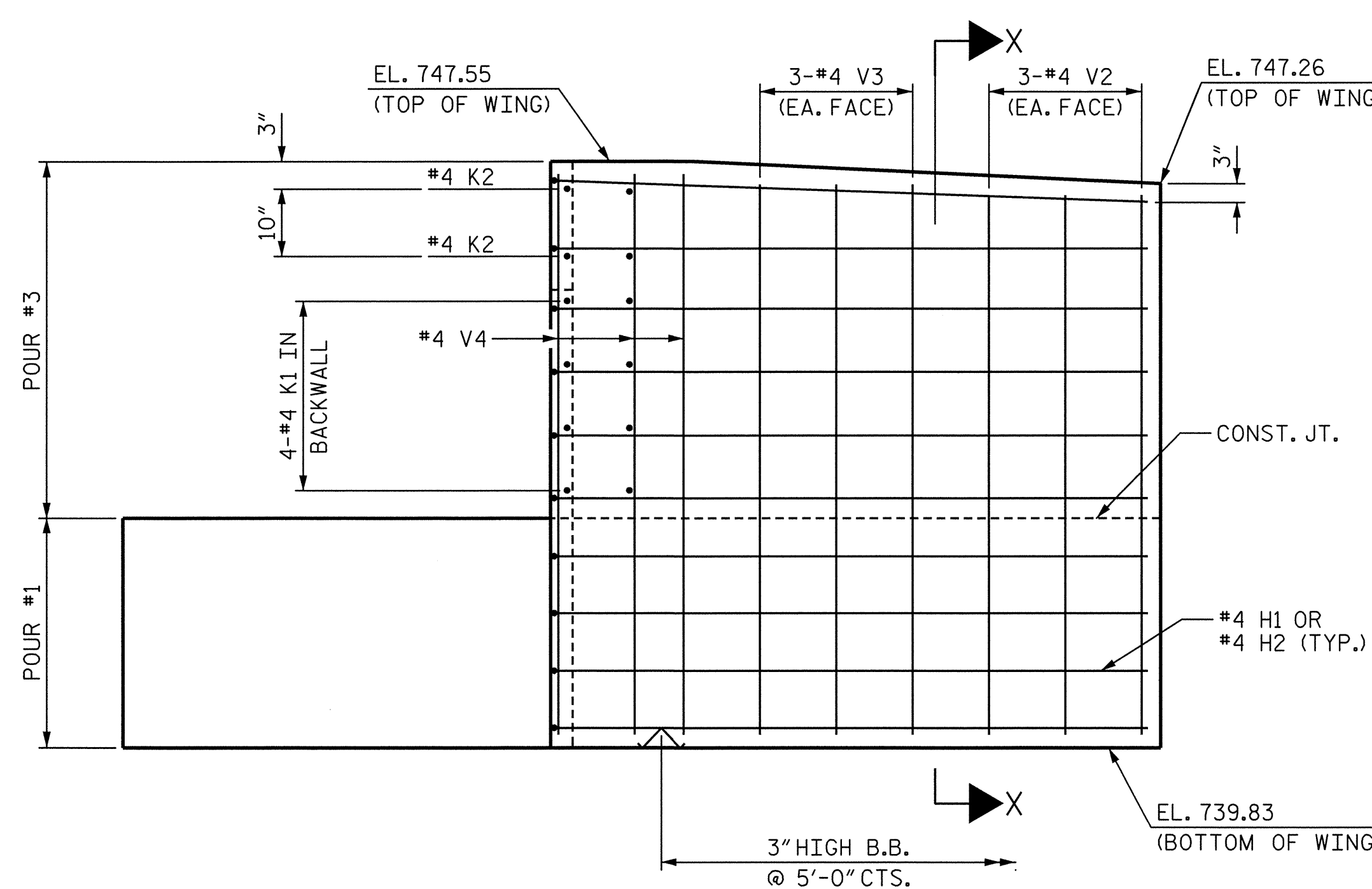
PLAN OF WING (W1)



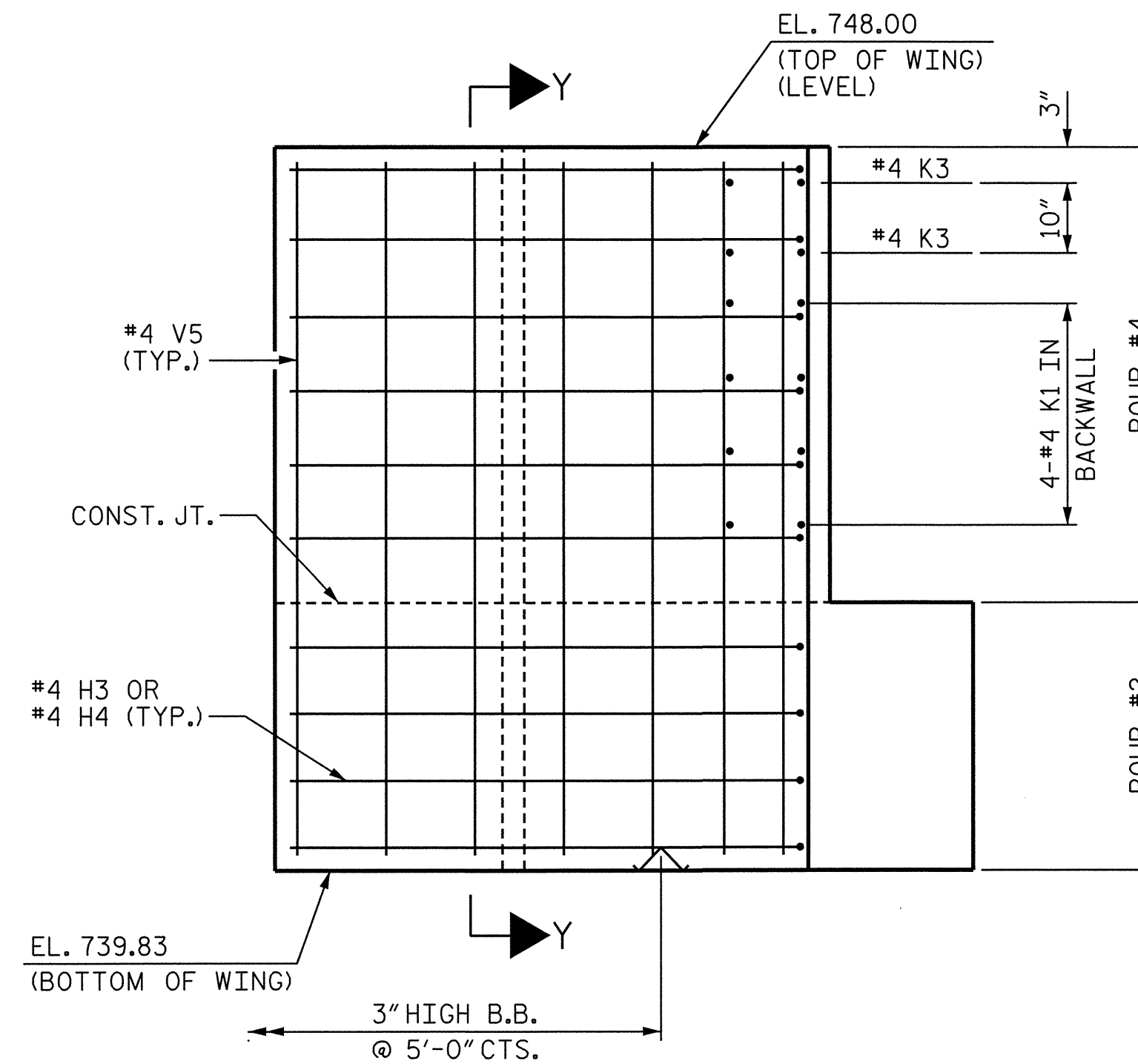
PLAN OF WING (W2)



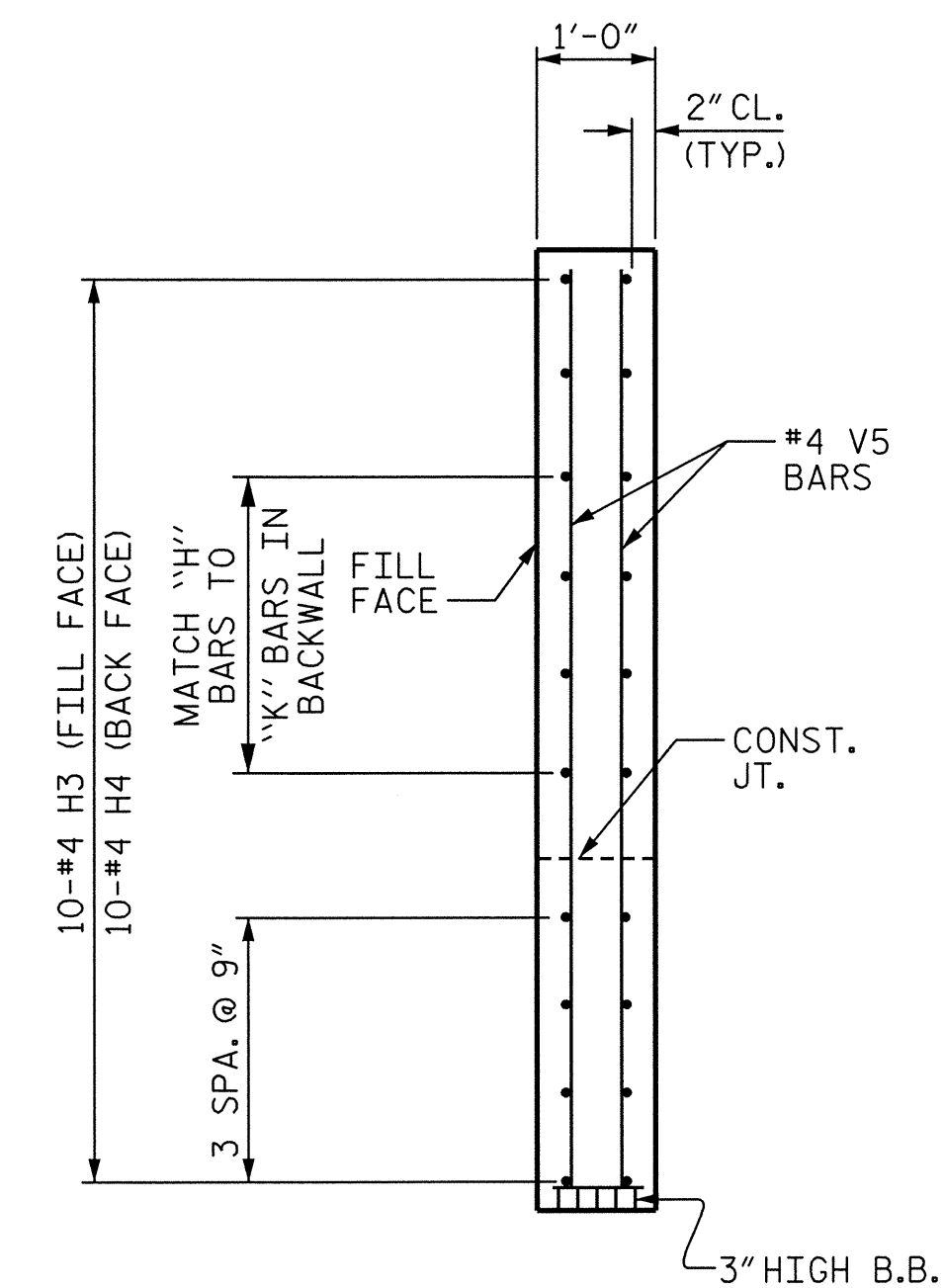
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

PROJECT NO. B-4621
 ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

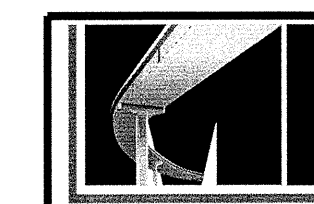
SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT I



6/17/2013

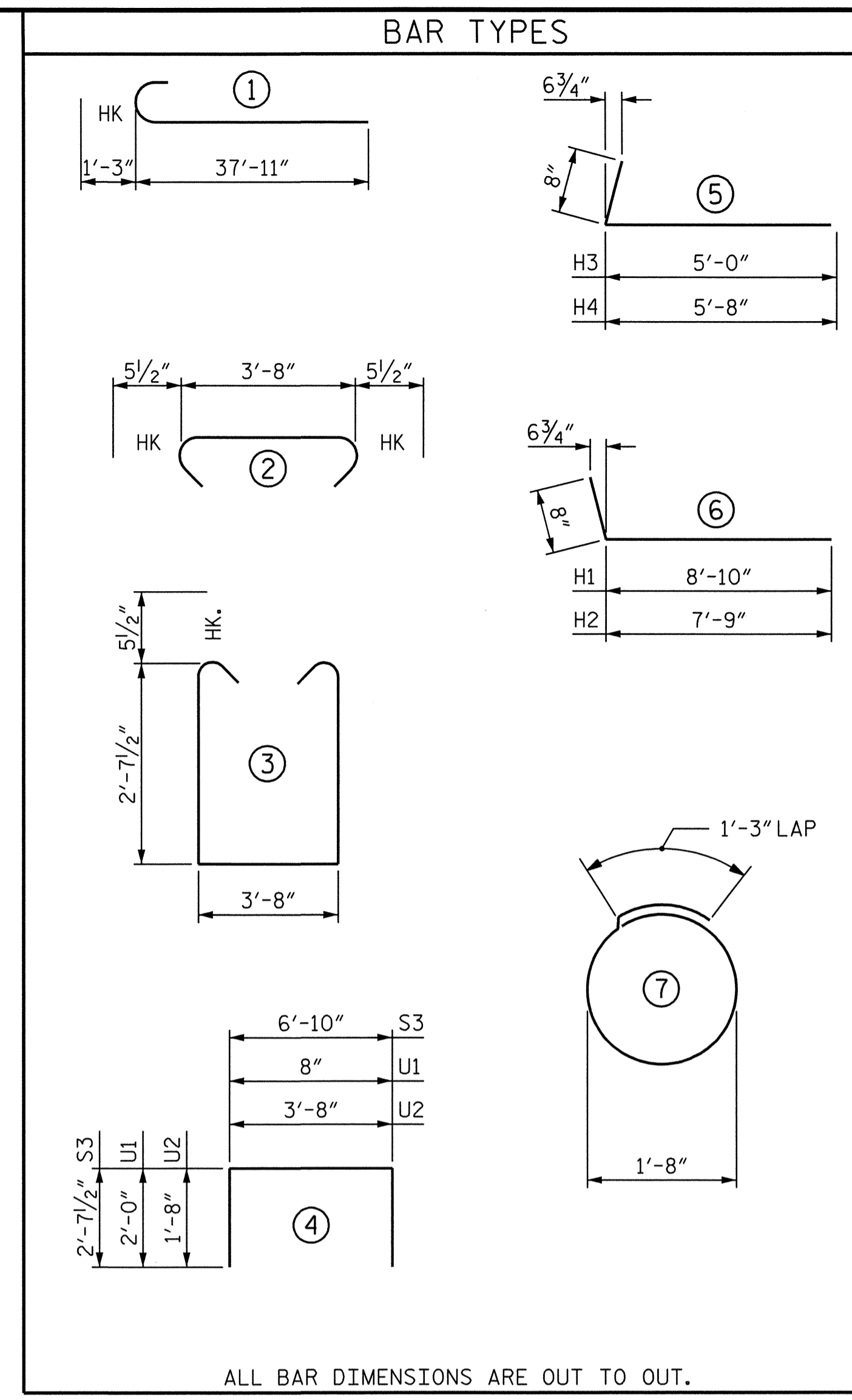
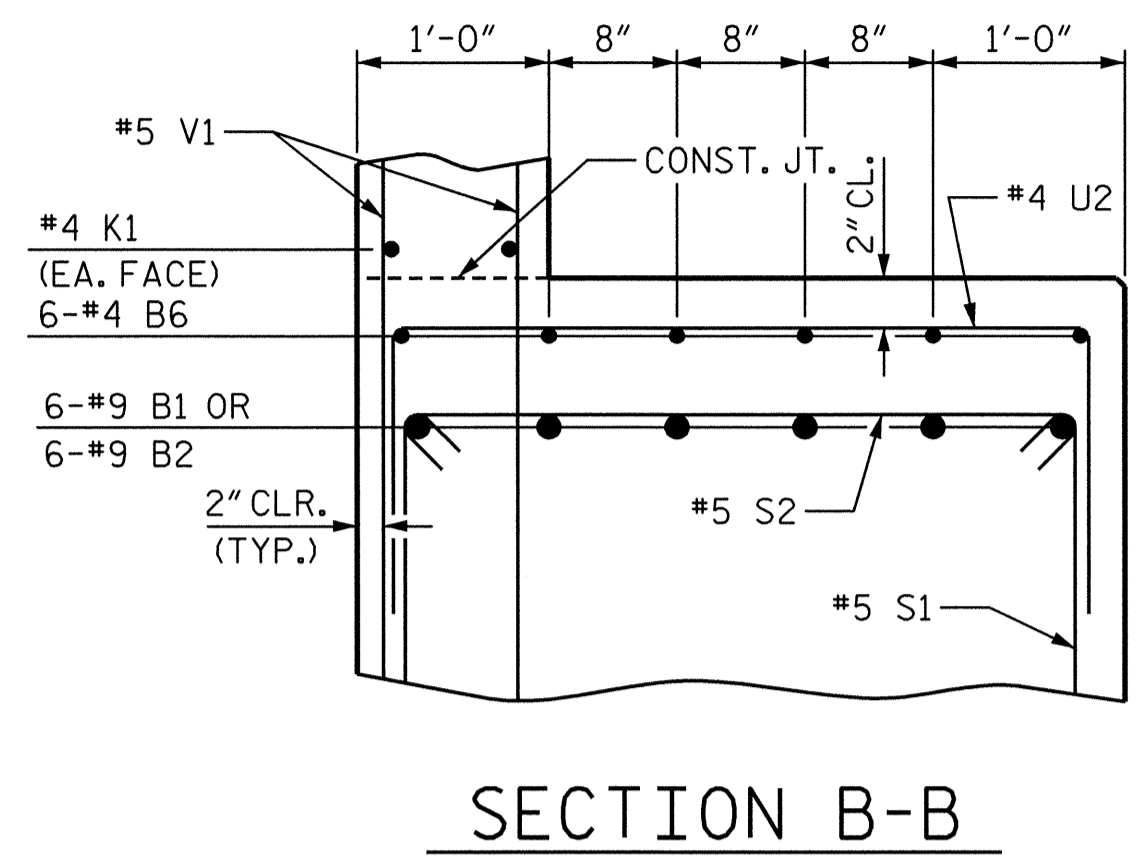
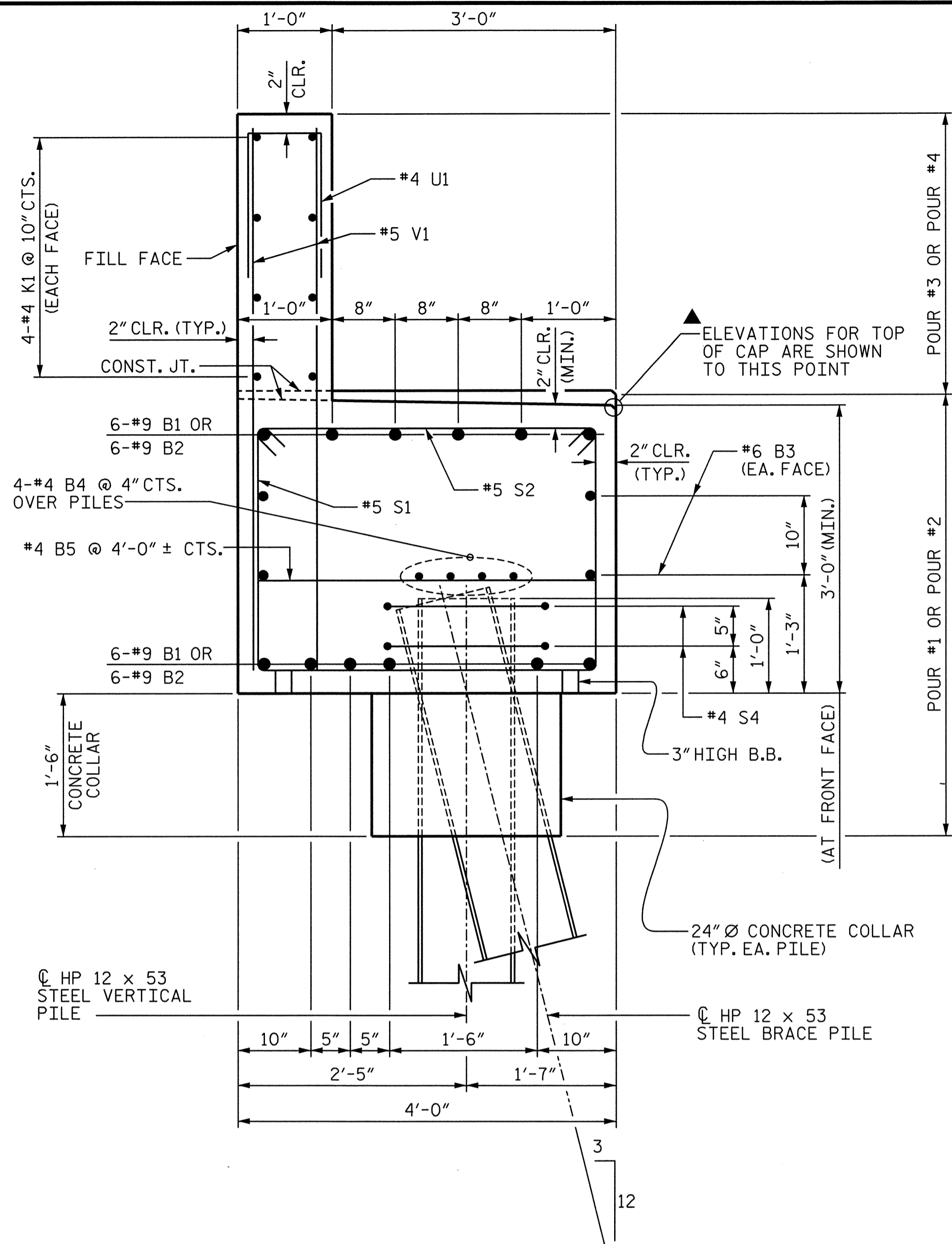
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MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

REVISIONS				SHEET NO.			
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27	
1			3			TOTAL SHEETS	
2			4			42	

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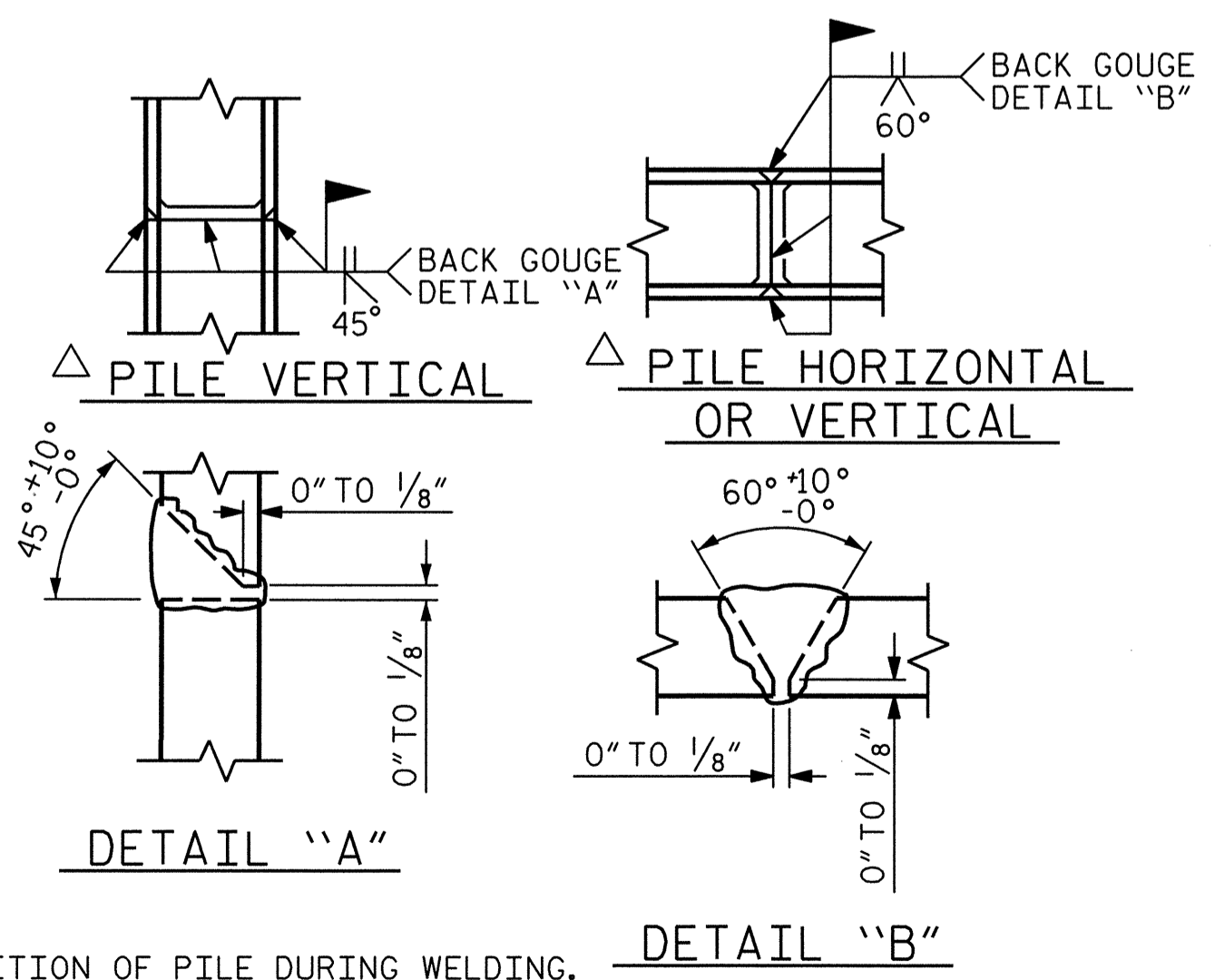


BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	24	#9	1	39'-2"	3196
B2	12	#9	STR	37'-11"	1547
B3	12	#6	STR	34'-7"	623
B4	16	#4	STR	25'-10"	276
B5	22	#4	STR	3'-8"	54
B6	24	#4	STR	2'-2"	35
H1	10	#4	6	9'-6"	63
H2	10	#4	6	8'-5"	56
H3	10	#4	5	5'-8"	38
H4	10	#4	5	6'-4"	42
K1	32	#4	STR	25'-10"	552
K2	4	#4	STR	4'-10"	13
K3	4	#4	STR	4'-7"	12
S1	82	#5	3	9'-10"	841
S2	82	#5	2	4'-7"	392
S3	2	#5	4	12'-1"	25
S4	20	#4	7	6'-6"	87
U1	86	#4	4	4'-8"	268
U2	12	#4	4	7'-0"	56
V1	172	#5	STR	5'-8"	1017
V2	6	#4	STR	7'-1"	28
V3	6	#4	STR	7'-2"	29
V4	15	#4	STR	7'-4"	73
V5	21	#4	STR	7'-10"	110
REINFORCING STEEL					9,433 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (CAP, COLLARS FOR P1-P5 & LOWER WING W1)					23.6 C.Y.
POUR #2 (CAP, COLLARS FOR P6-P10 & LOWER WING W2)					22.2 C.Y.
POUR #3 (BACKWALL & UPPER WING W1)					7.2 C.Y.
POUR #4 (BACKWALL & UPPER WING W2)					6.5 C.Y.
TOTAL CLASS A CONCRETE					59.5 C.Y.
HP 12 x 53 STEEL PILES					
NO. 10					360.0 LIN. FT.

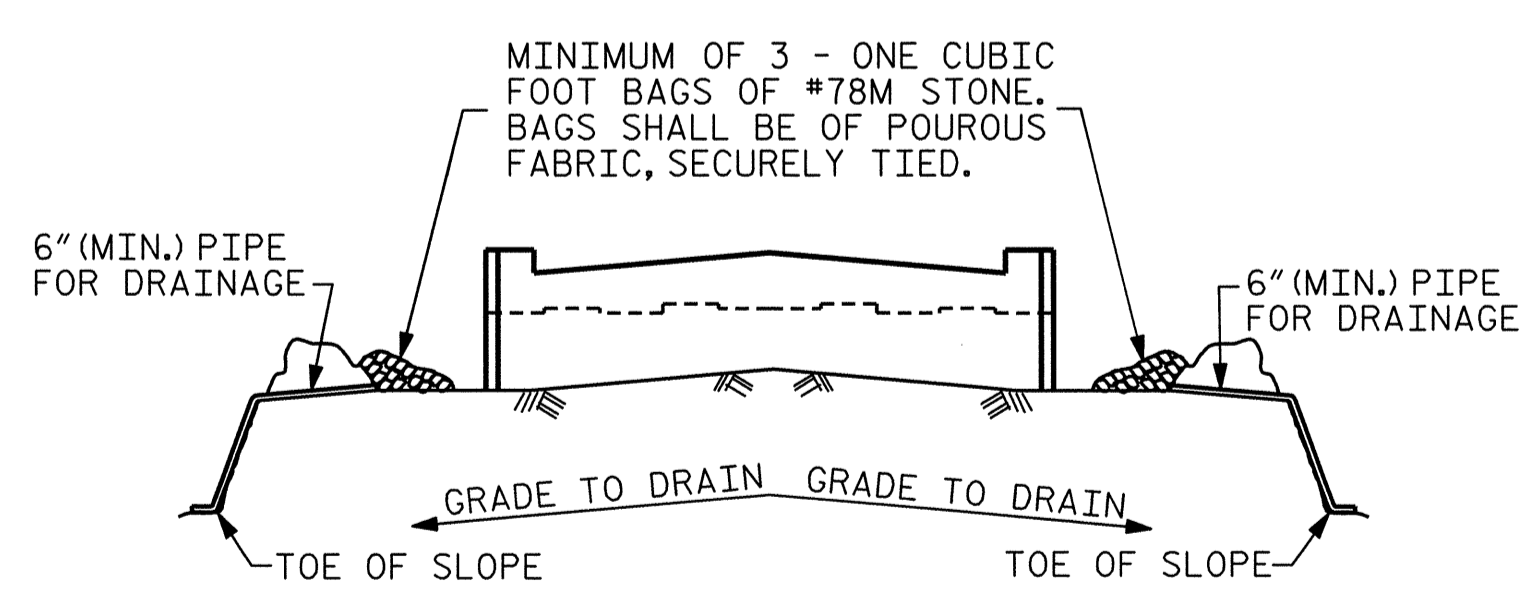
ALL BAR DIMENSIONS ARE OUT TO OUT.

SECTION A-A

SECTION B-B



PILE SPLICE DETAILS



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

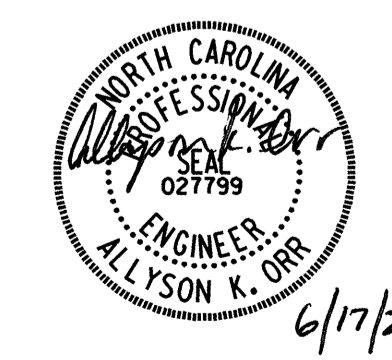
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-
 SHEET 4 OF 4

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



MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

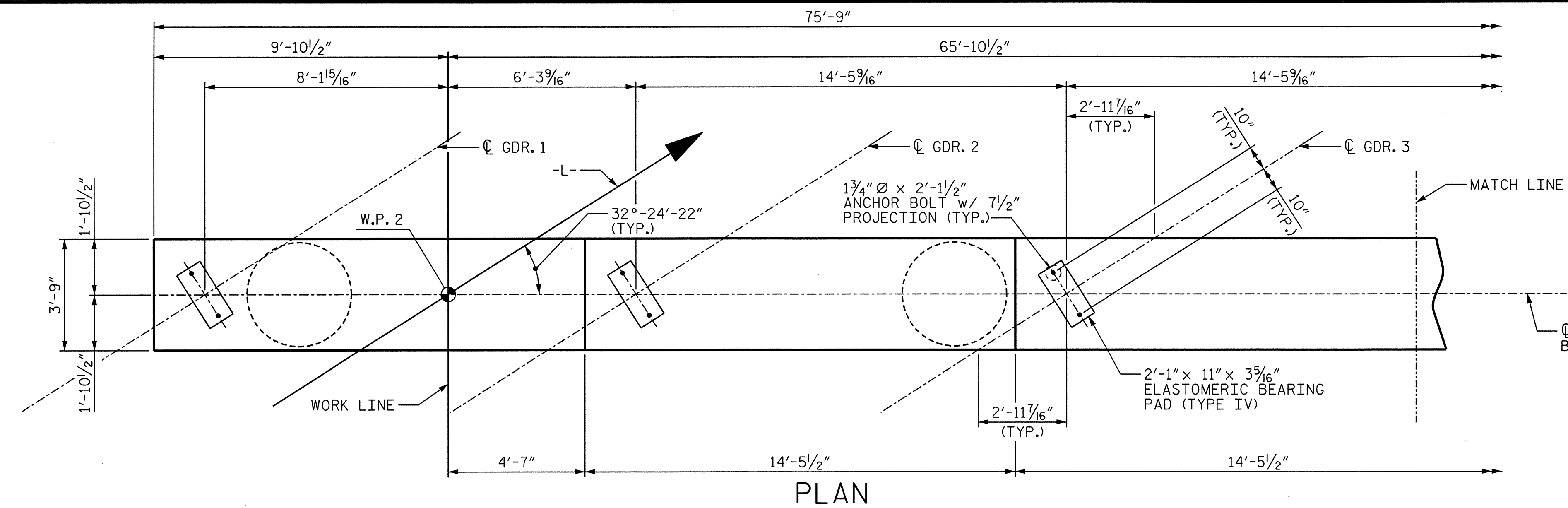
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SHEET NO.	
S-28	TOTAL SHEETS 42

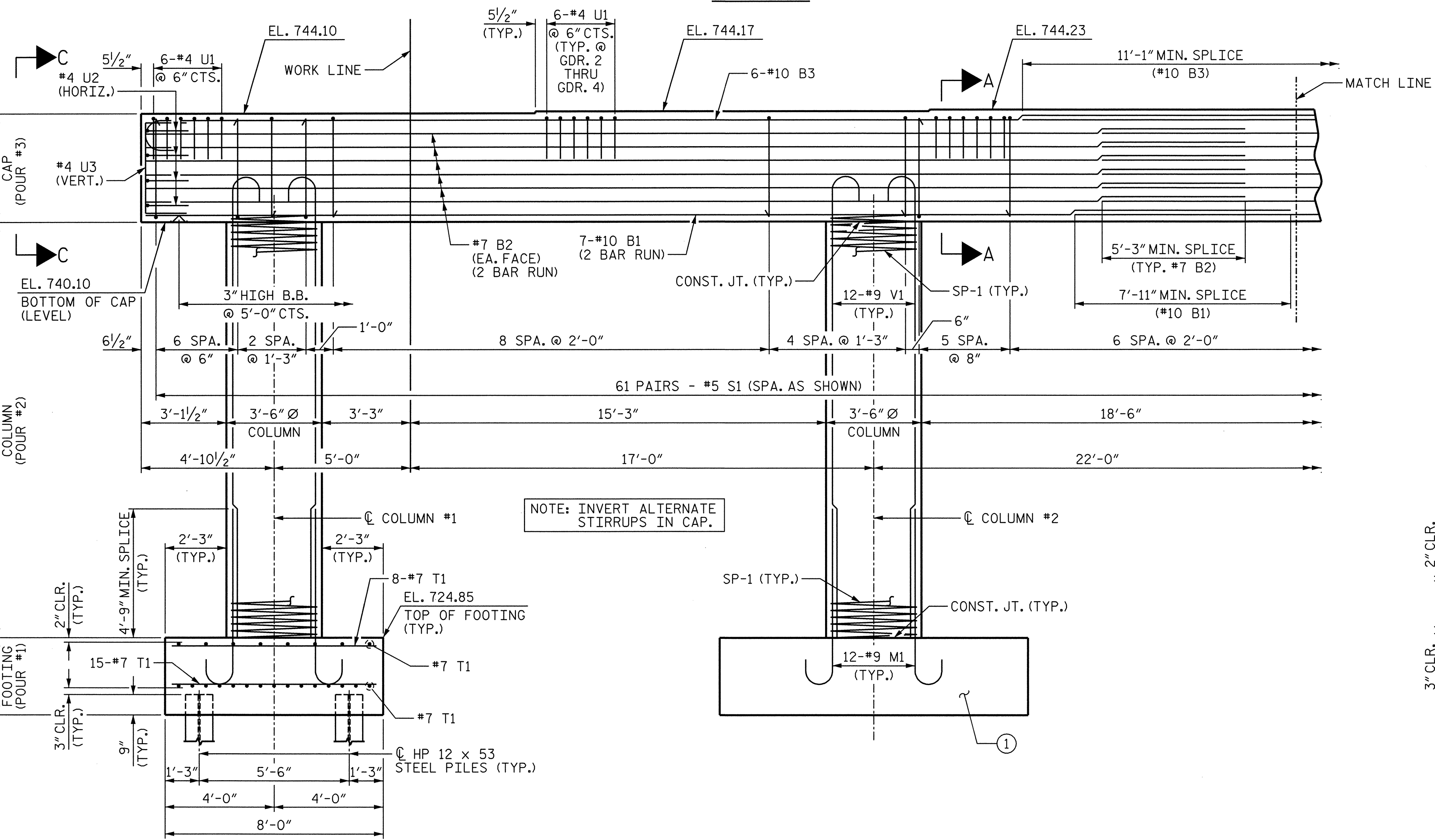
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CHECKED BY : A.K. ORR	DATE : 02/13
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 06/13

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PLAN



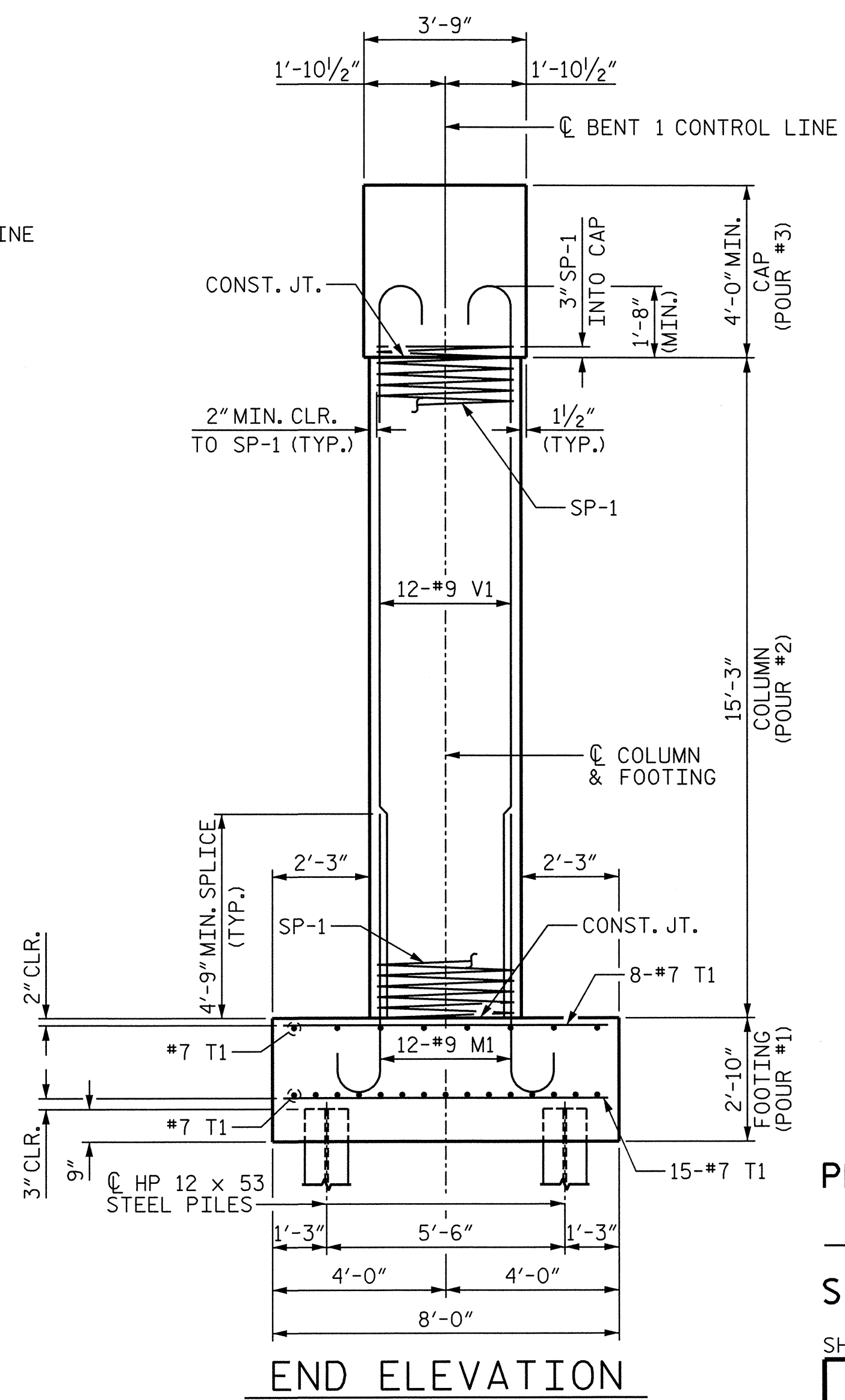
ELEVATION

① FOOTING #2 & #3 ARE ROTATED 45° TO AVOID CONFLICT WITH EXISTING CONCRETE PILES. FOR DETAILS, SEE PLAN OF COLUMNS AND FOOTINGS, SHEET 3 OF 3.

REINFORCING STEEL, DIMENSIONS, AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING UNLESS NOTED OTHERWISE.

NOTES

- STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- FOR PILE SPLICE DETAILS, SEE END BENT 1 SHEET 4 OF 4.
- FOR SECTION A-A, SEE SHEET 3 OF 3.
- FOR VIEW C-C, SEE SHEET 2 OF 3.
- CONTRACTOR TO VERIFY LOCATION OF EXISTING PILES. EXISTING PILES TO REMAIN IN PLACE. CUT EXISTING PILES TO BOTTOM OF FOOTING ELEVATION.



END ELEVATION

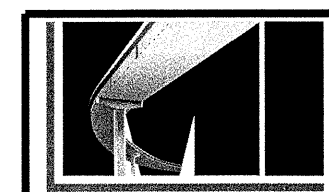
PROJECT NO. B-4621
ROCKINGHAM COUNTY
STATION: 25+66.99 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
BENT I



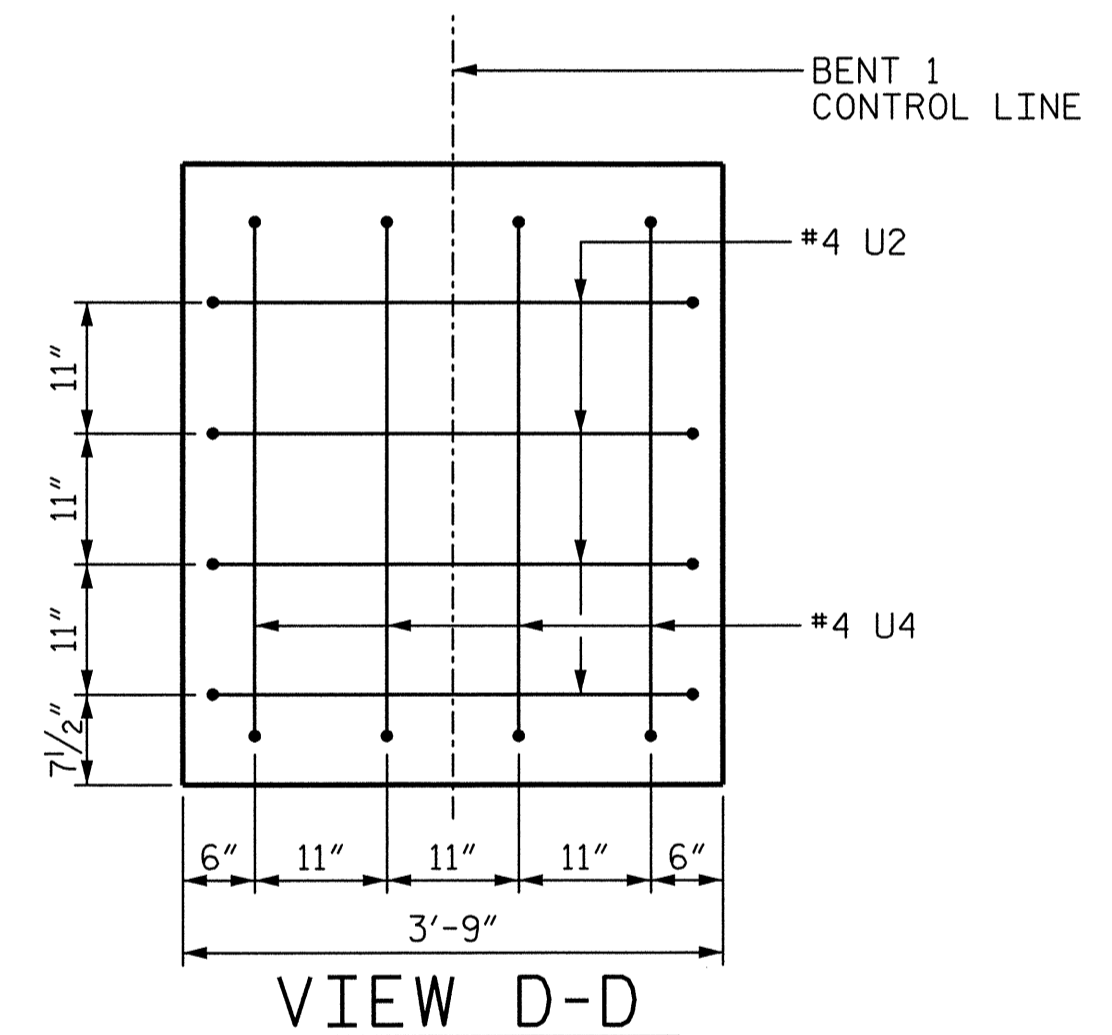
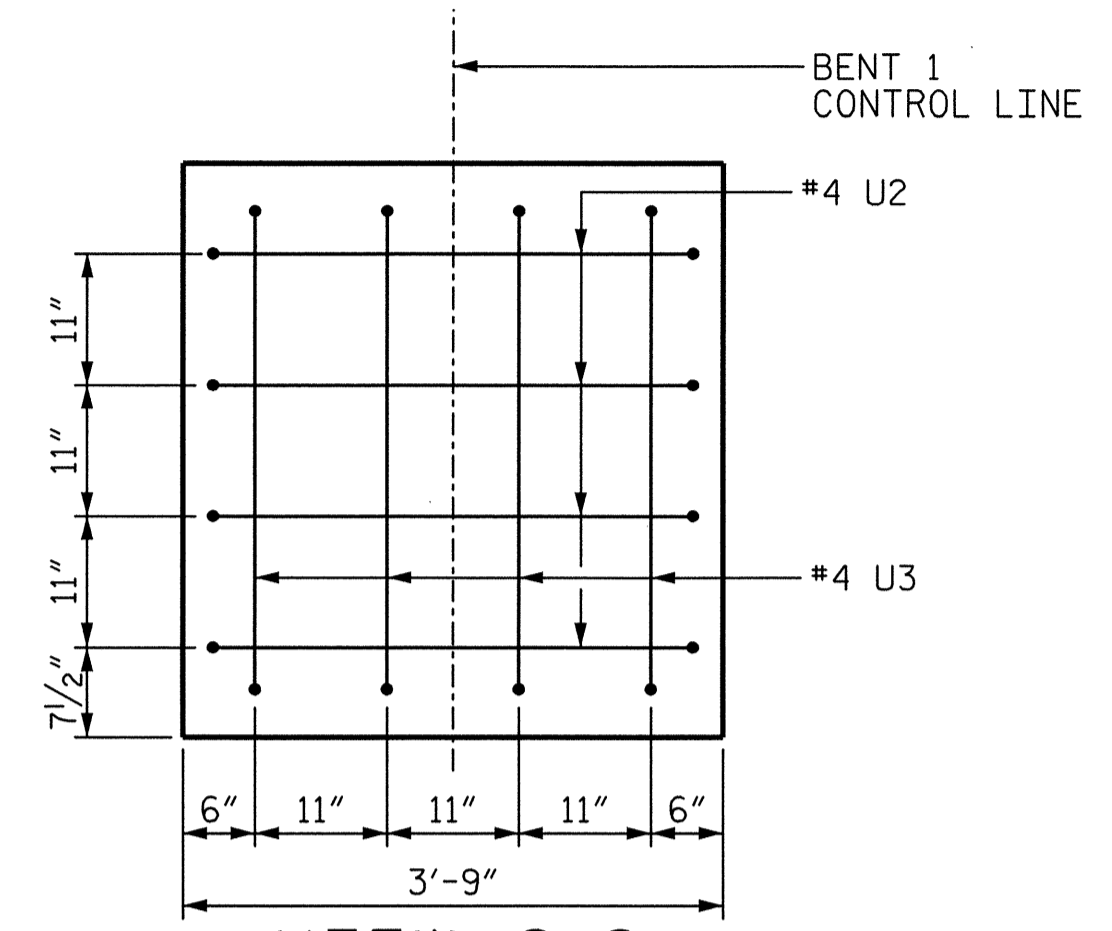
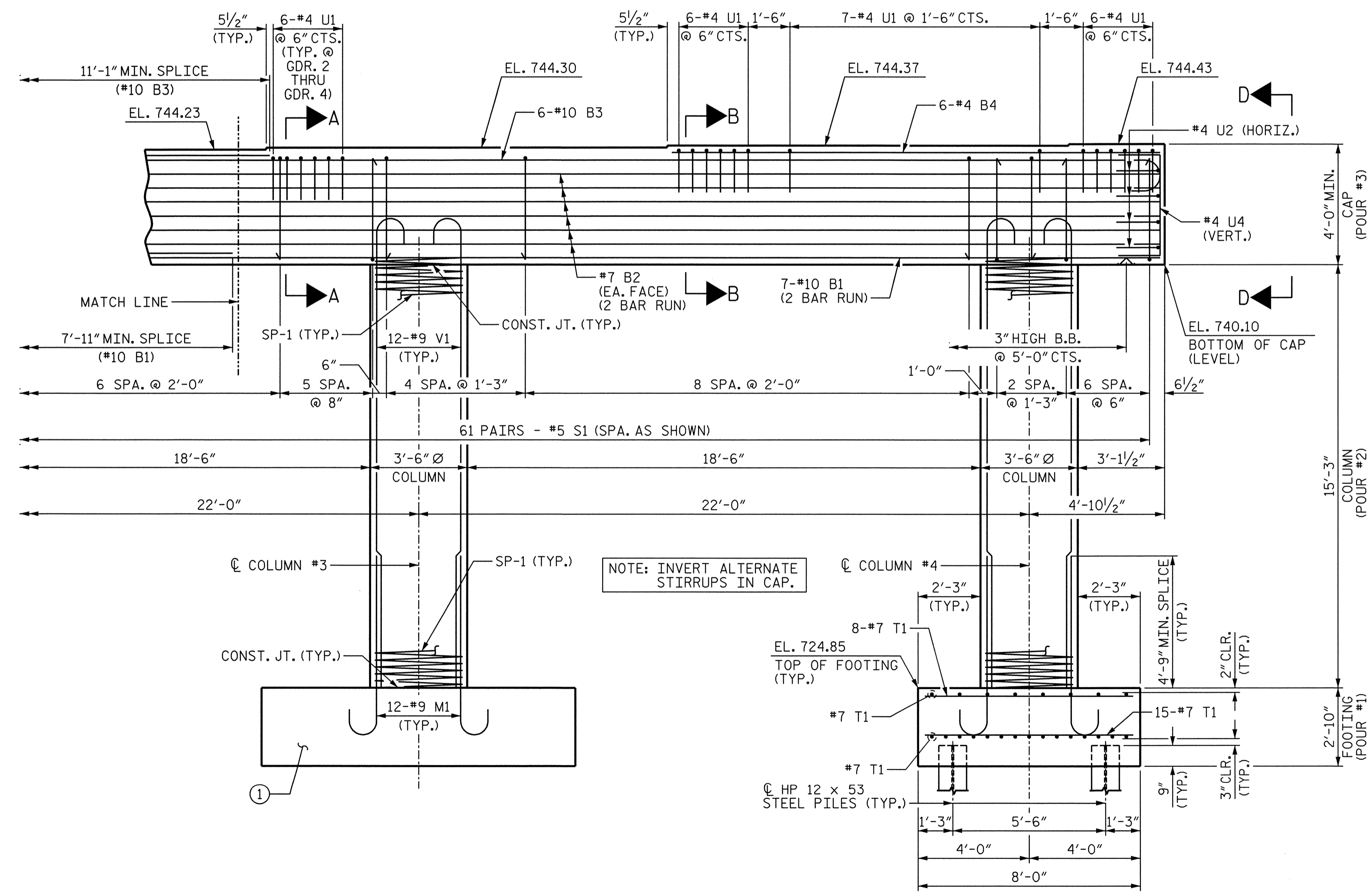
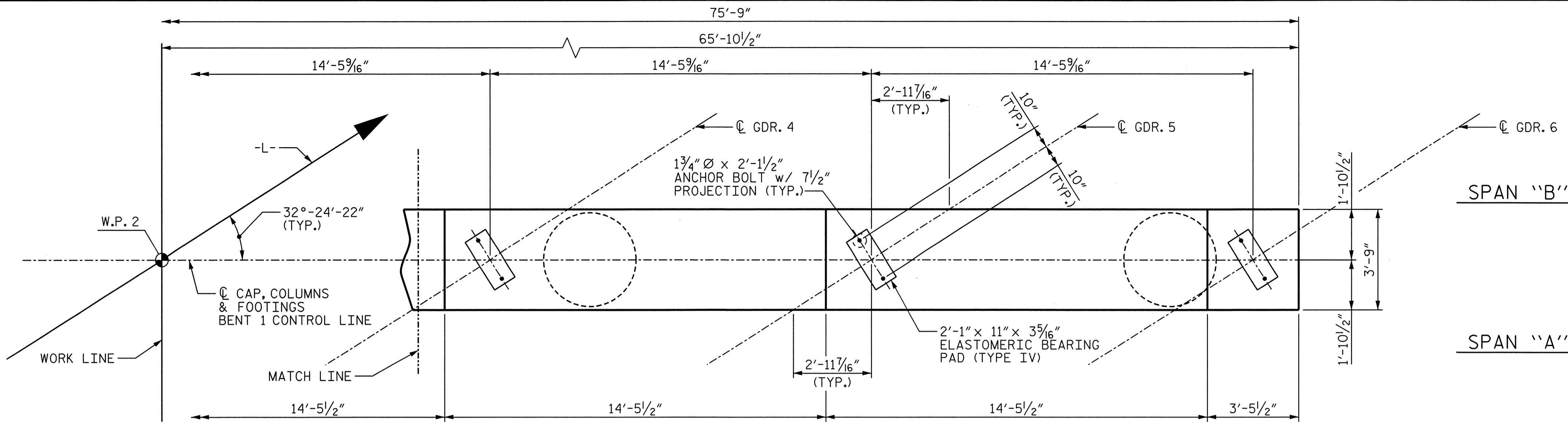
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DESIGN ENGINEER OF RECORD: <u>A.K. ORR</u>	DATE: <u>06/13</u>



MI ENGINEERING
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			42
2			4			

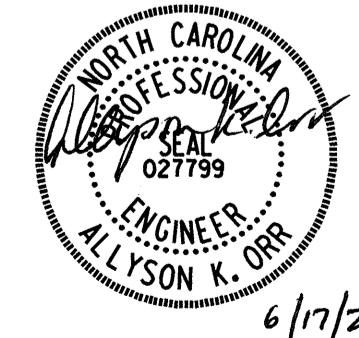
NOTES
 FOR NOTES SEE SHEET 1 OF 3.
 FOR SECTIONS A-A AND B-B, SEE SHEET 3 OF 3.
 FOR END ELEVATION, SEE SHEET 1 OF 3.



PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT I

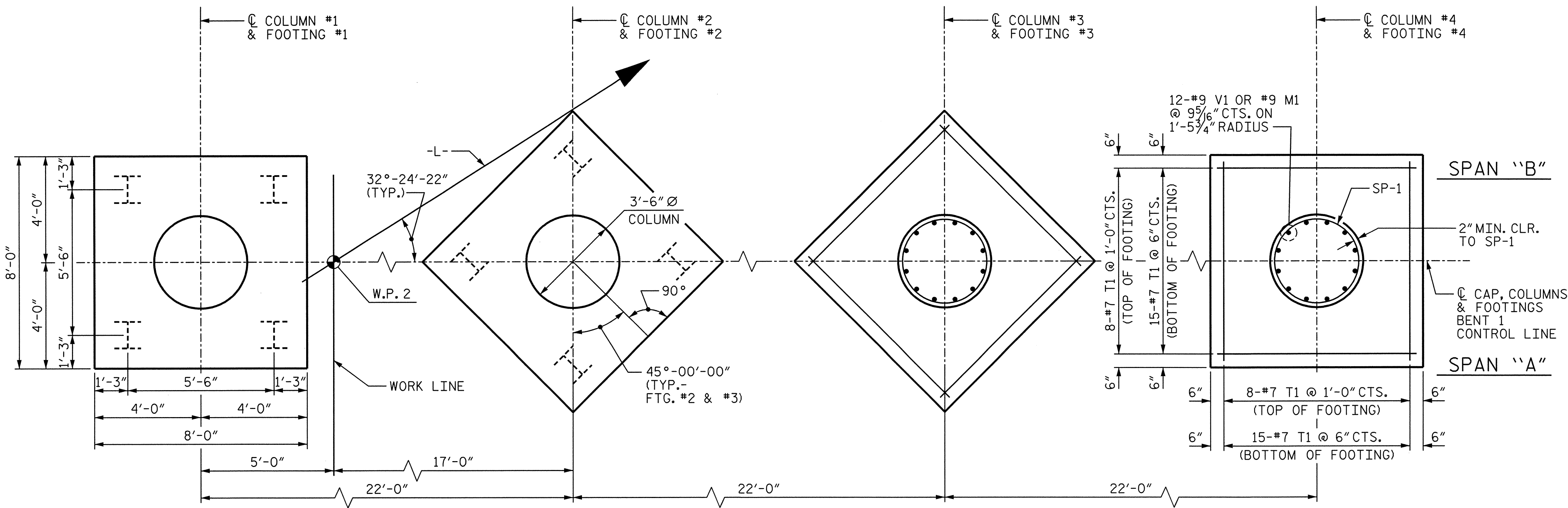


MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS NO. BY: DATE: NO. BY: DATE: 1 3 2 4			SHEET NO. S-30 TOTAL SHEETS 42
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6/17/2013 11:03:32 AM
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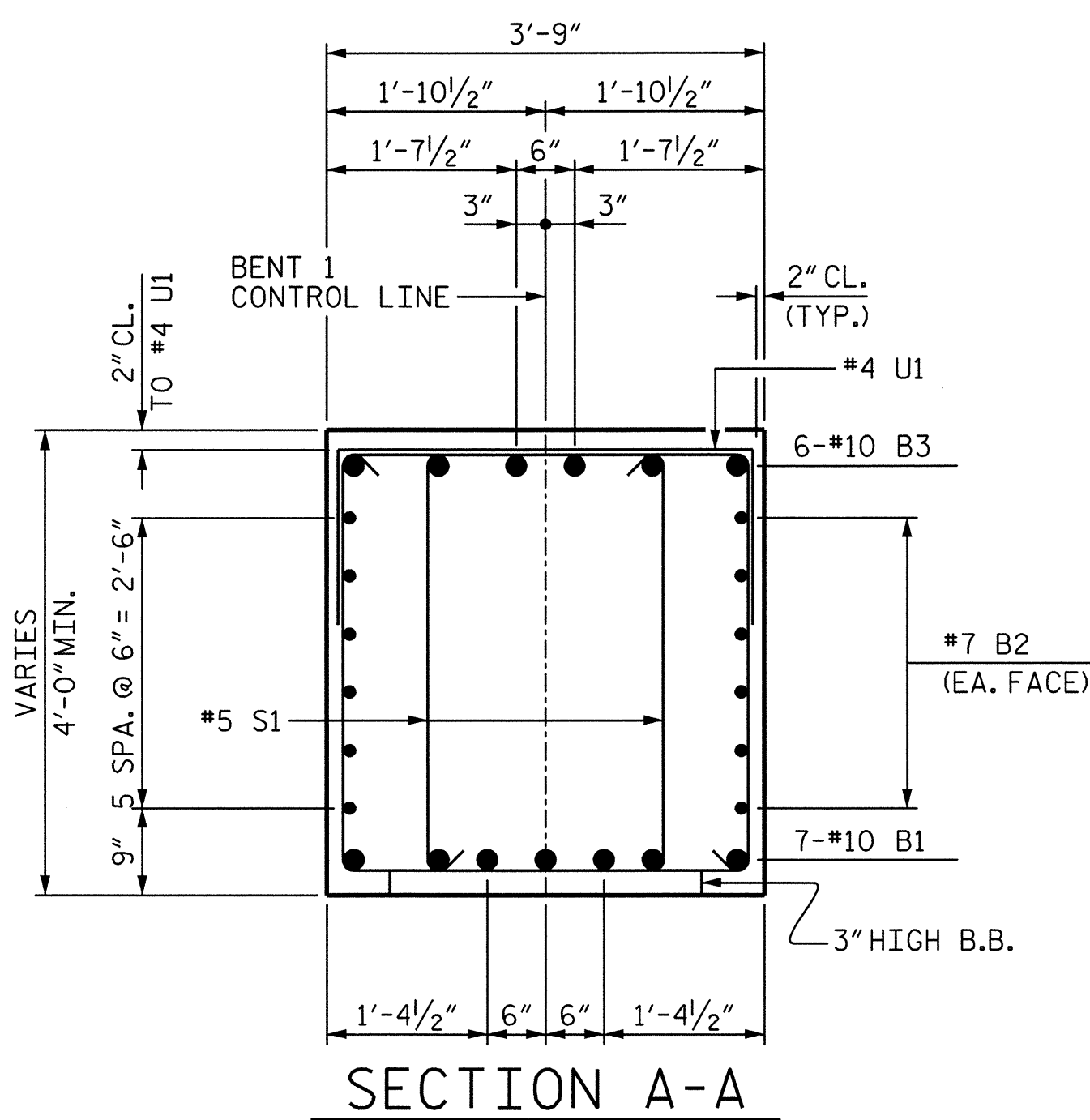
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CHECKED BY : <u>G.R. COLS</u>	DATE : <u>02/13</u>
DESIGN ENGINEER OF RECORD : <u>A.K. ORR</u>	DATE : <u>06/13</u>

① FOOTING #2 & #3 ARE ROTATED 45° TO AVOID CONFLICT WITH EXISTING CONCRETE PILES. FOR DETAILS, SEE PLAN OF COLUMNS AND FOOTINGS, SHEET 3 OF 3.
 REINFORCING STEEL, DIMENSIONS, AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING UNLESS NOTED OTHERWISE.

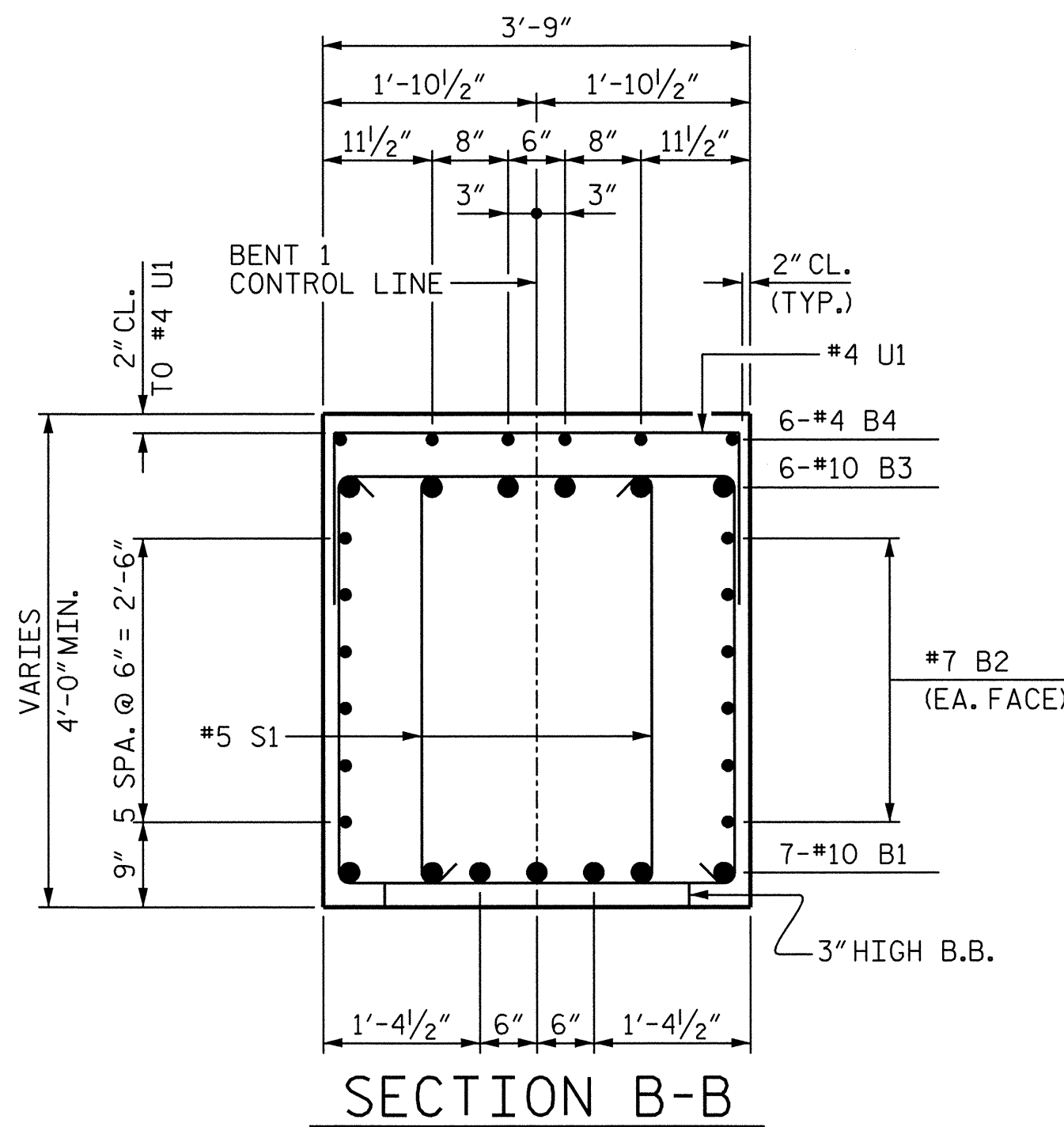


PLAN OF COLUMNS AND FOOTINGS

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING)
 NOTE: CONTRACTOR'S ATTENTION IS CALLED TO THE ORIENTATION OF THE "M" BARS IN THE FOOTING AT COLUMN 3 (COLUMN 2 SIMILAR).



SECTION A-A



SECTION B-B

BAR TYPES				BILL OF MATERIAL			
BENT 1							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	14	#10	STR	41'-8"	2510		
B2	24	#7	STR	40'-4"	1979		
B3	12	#10	1	44'-8"	2306		
B4	6	#4	STR	17'-7"	70		
M1	48	#9	1	7'-8"	1251		
S1	122	#5	3	10'-11"	1389		
T1	184	#7	STR	7'-6"	2821		
U1	43	#4	2	6'-11"	199		
U2	8	#4	2	6'-3"	33		
U3	4	#4	2	6'-6"	17		
U4	4	#4	2	6'-10"	18		
V1	48	#9	1	18'-2"	2965		
SP-1	4	**	4	637'-3"	1703		

REINFORCING STEEL	15,558 LBS.
SPIRAL COLUMN REINFORCING STEEL	1,703 LBS.
CLASS A CONCRETE BREAKDOWN	
POUR #1 (FOOTINGS)	26.9 C.Y.
POUR #2 (COLUMNS)	21.8 C.Y.
POUR #3 (CAP)	43.6 C.Y.
TOTAL	92.3 C.Y.

HP 12 x 53 STEEL PILES	572.0 LIN. FT.
NO. 16 FOUNDATION EXCAVATION	LUMP SUM

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

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 1



	MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS			SHEET NO. S-31
	NO.	BY:	DATE:	NO.	BY:	DATE:
1			3			TOTAL SHEETS
2			4			42

DRAWN BY : <u>B.E. LANNING</u>	DATE : <u>02/13</u>
CHECKED BY : <u>G.R. COLS</u>	DATE : <u>02/13</u>
DESIGN ENGINEER OF RECORD : <u>A.K. ORR</u>	DATE : <u>06/13</u>

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NOTES

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

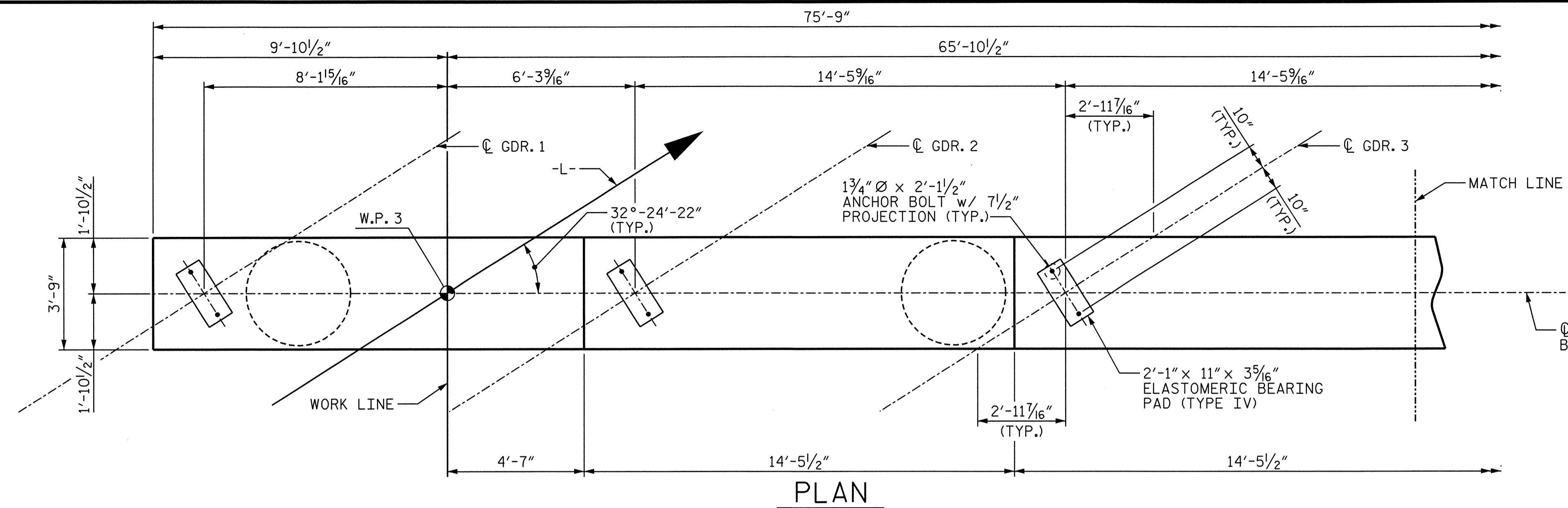
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR PILE SPLICE DETAILS, SEE END BENT 1 SHEET 4 OF 4.

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

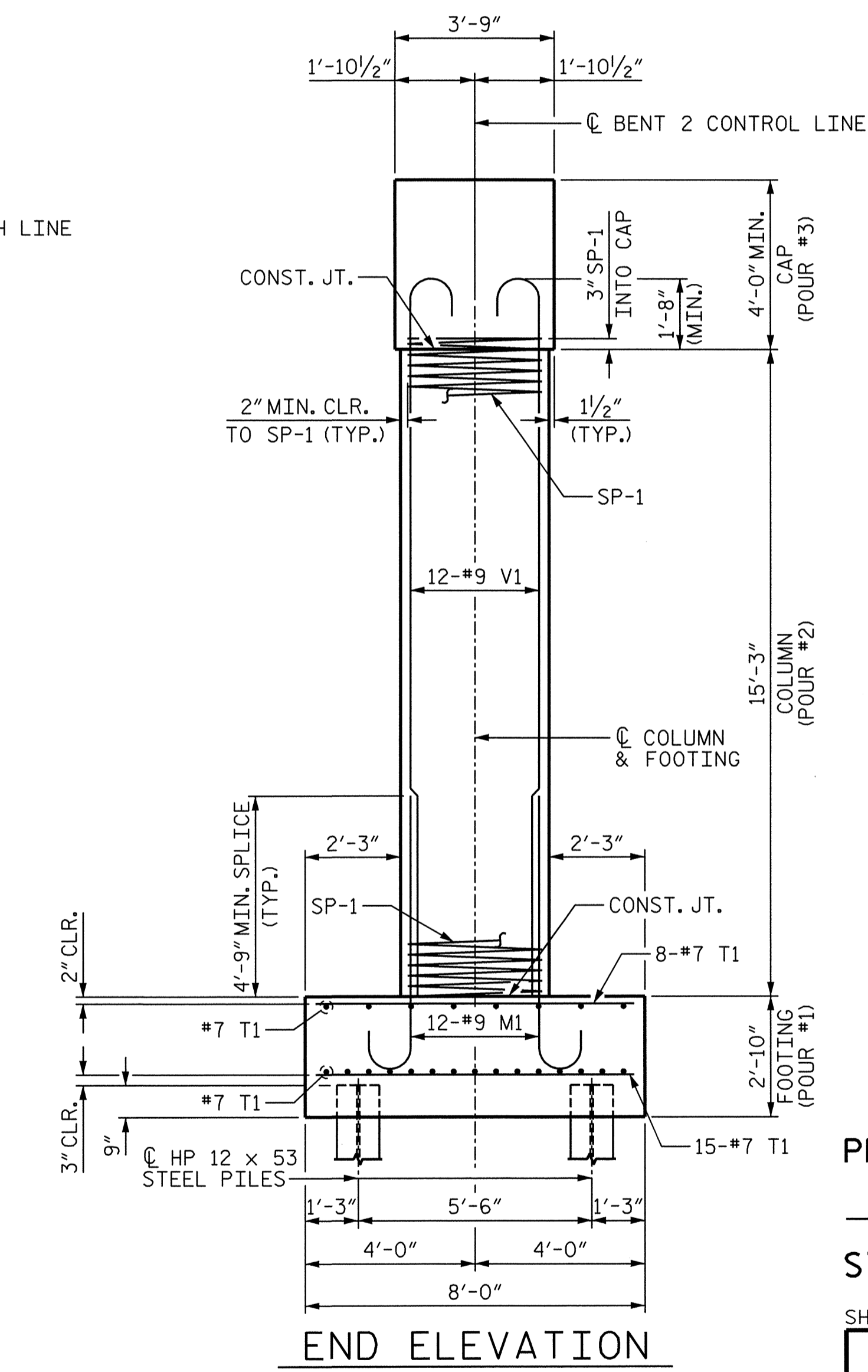
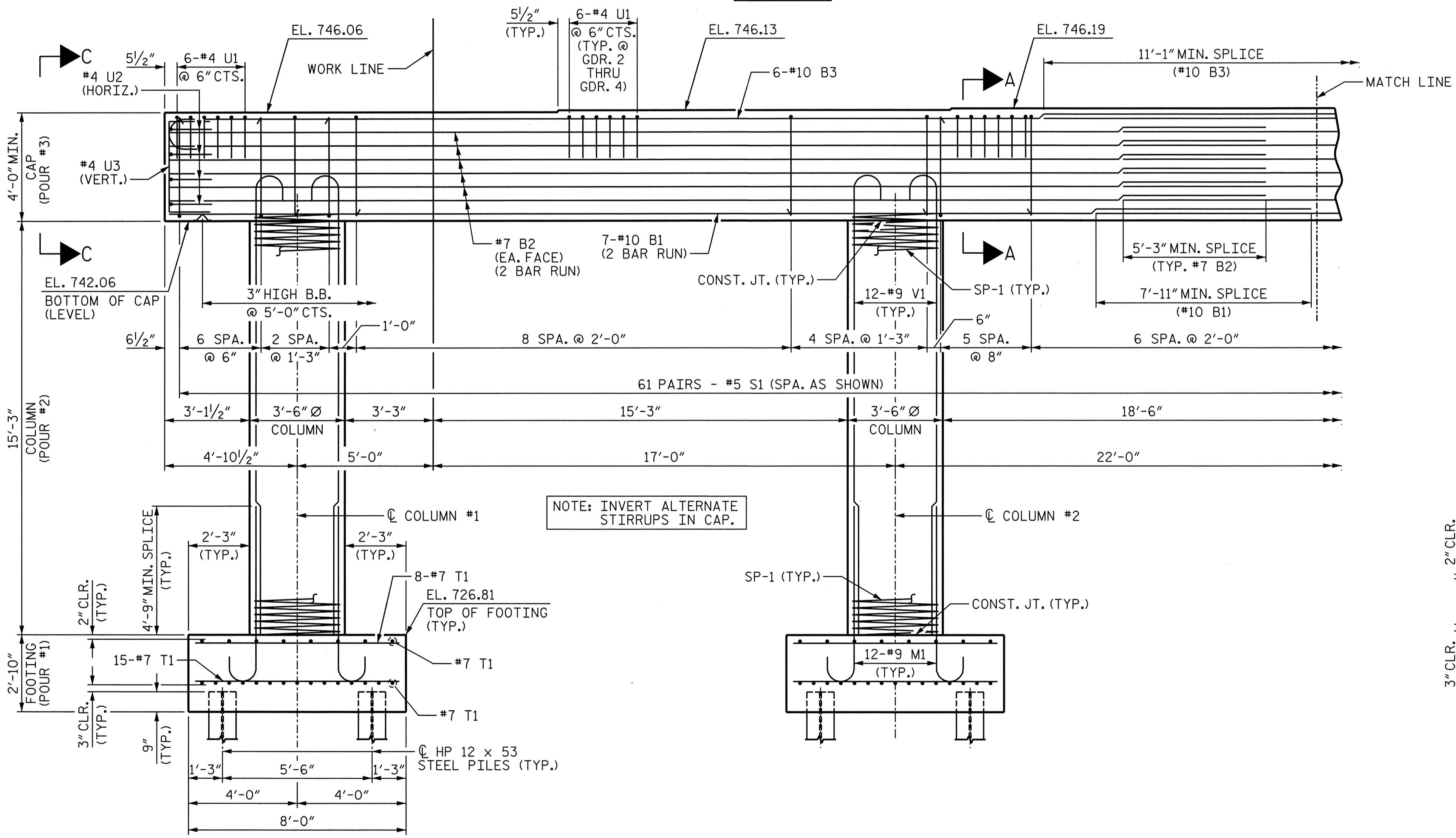
FOR VIEW C-C, SEE SHEET 2 OF 3.

CONTRACTOR TO VERIFY LOCATION OF EXISTING PILES. EXISTING PILES TO REMAIN IN PLACE. CUT EXISTING PILES TO BOTTOM OF FOOTING ELEVATION.



SPAN "C"

SPAN "B"



ELEVATION

REINFORCING STEEL, DIMENSIONS, AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING UNLESS NOTED OTHERWISE.

PROJECT NO. B-4621

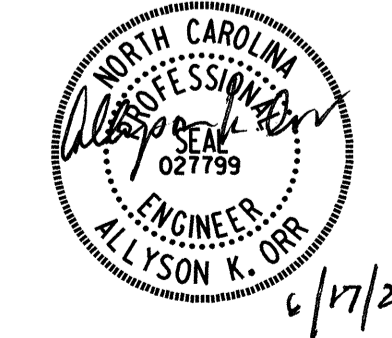
ROCKINGHAM COUNTY

STATION: 25+66.99 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
BENT 2**

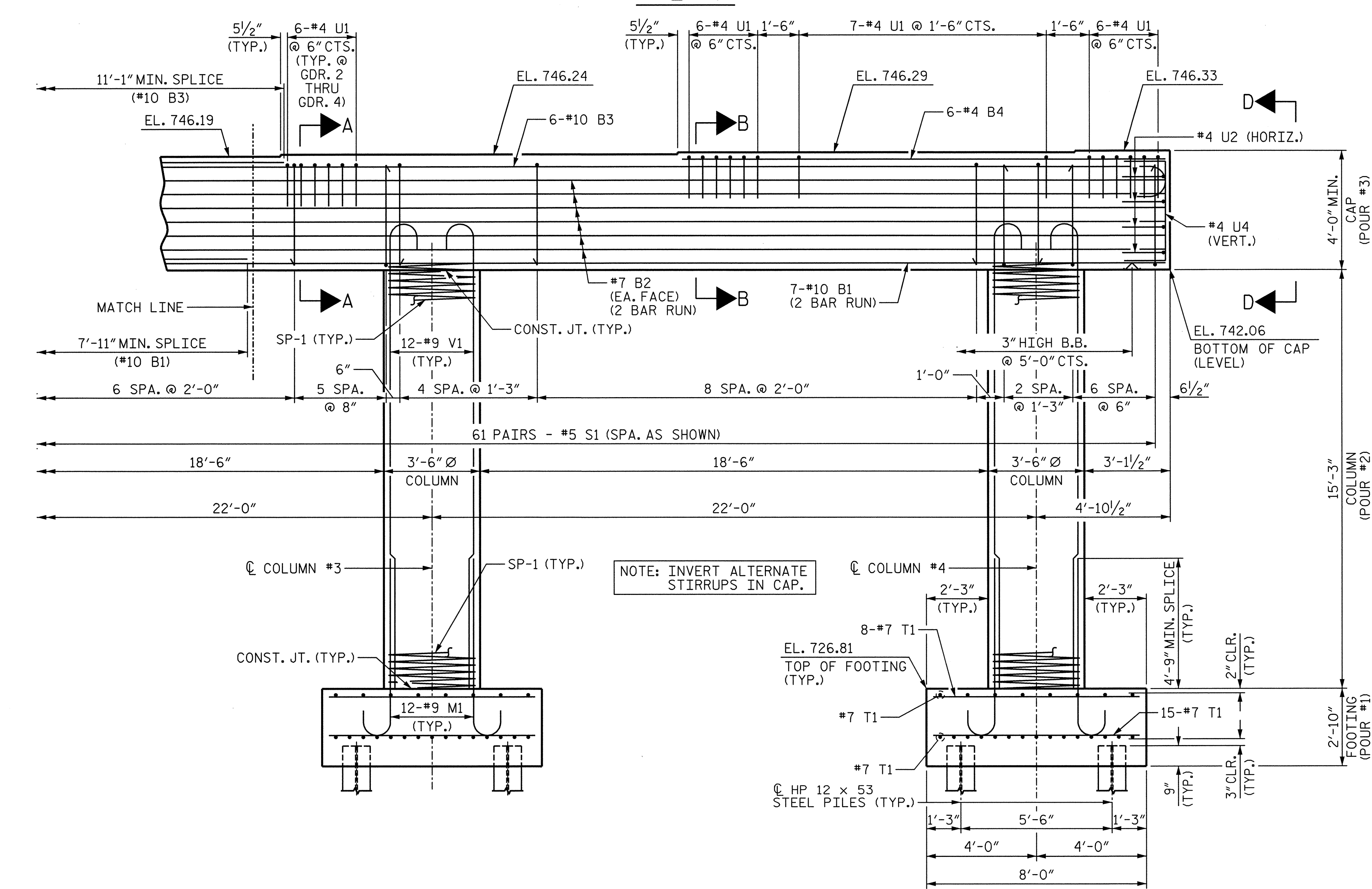
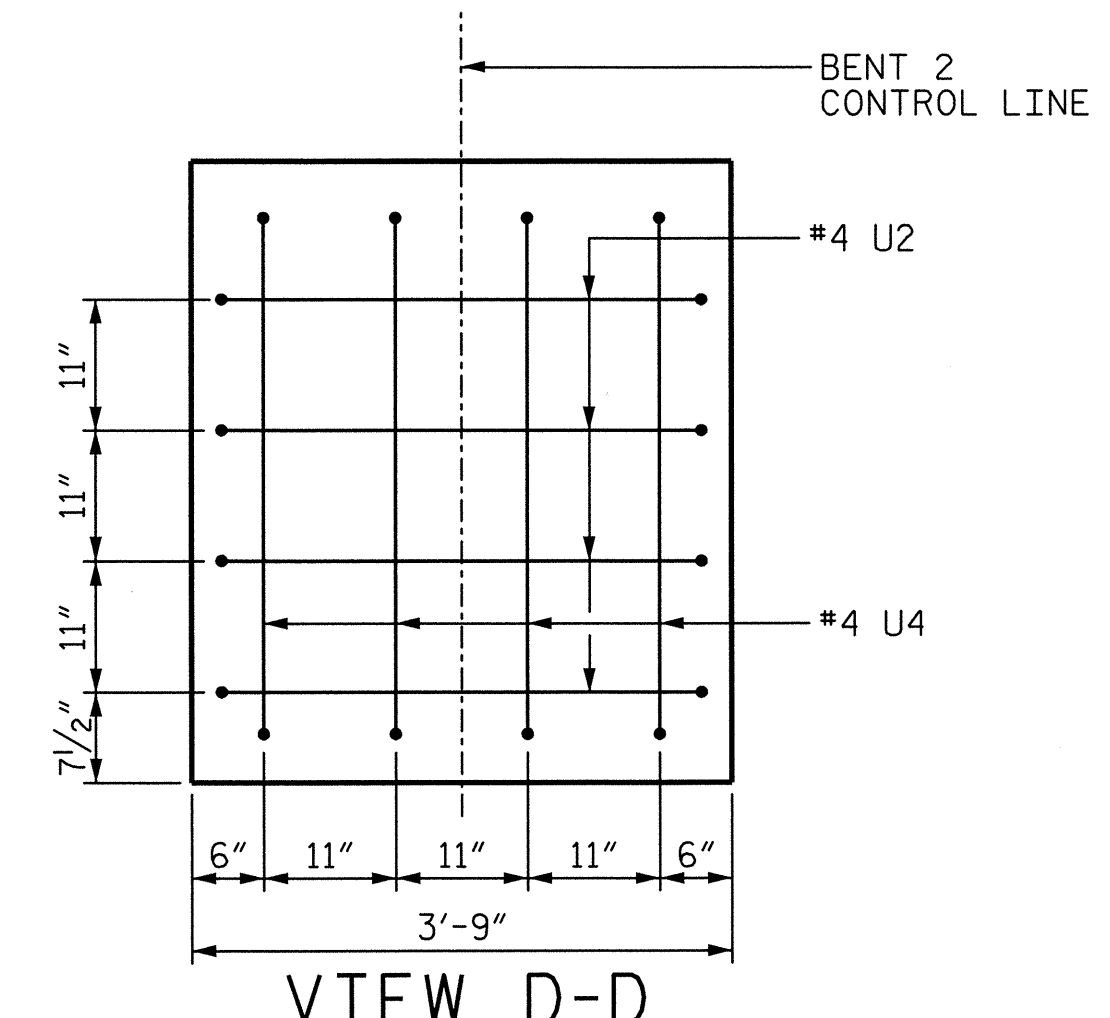
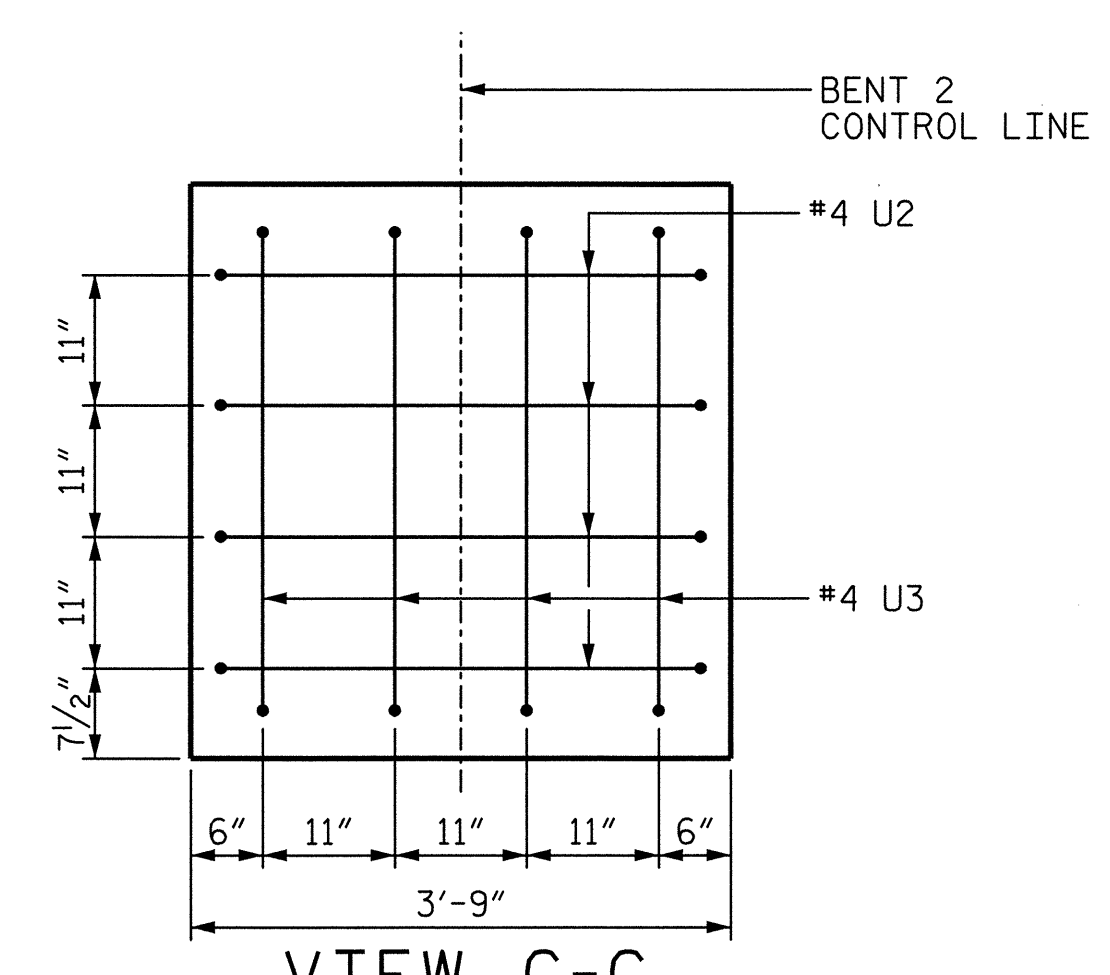
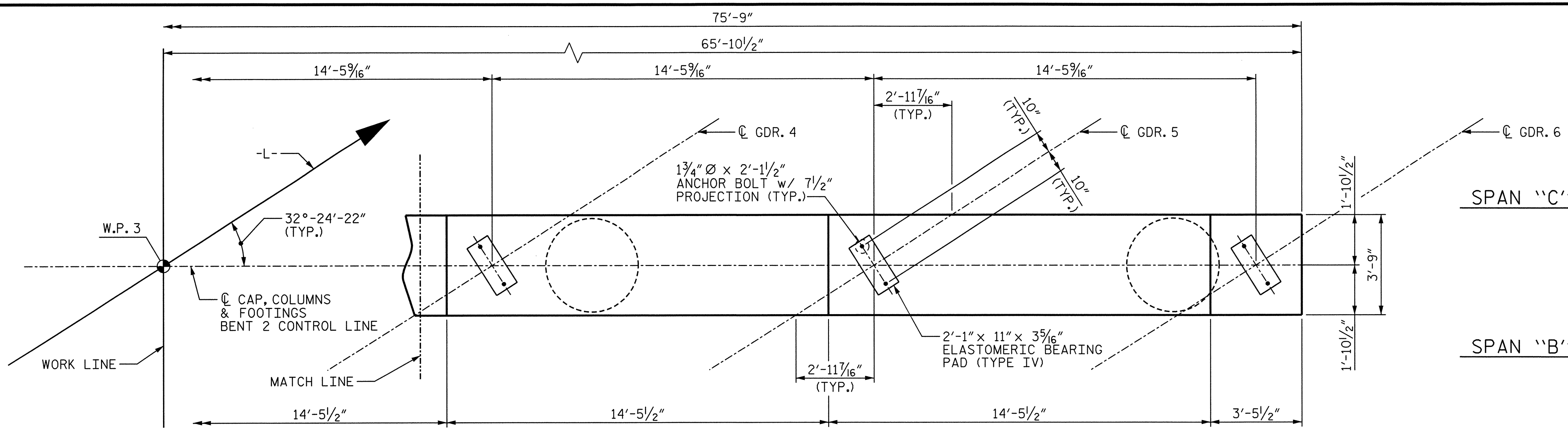


MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 42

6/17/2013 11:11:21 AM User: jlsrce@ncdm File: P:\NC Projects\MI2004 - B-4621\Rockingham\B-4621\Structures\B-4621_SD_B2A.dgn

DRAWN BY: <u>B.E. LANNING</u>	DATE: <u>02/13</u>
CHECKED BY: <u>A.K. ORR</u>	DATE: <u>02/13</u>
DESIGN ENGINEER OF RECORD: <u>A.K. ORR</u>	DATE: <u>06/13</u>

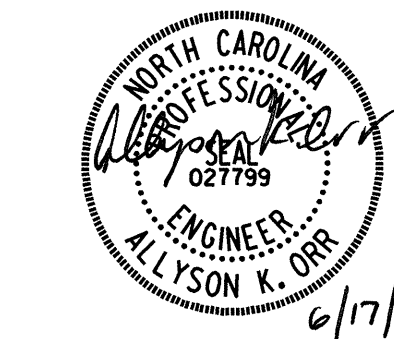
NOTES
 FOR NOTES SEE SHEET 1 OF 3.
 FOR SECTIONS A-A AND B-B, SEE SHEET 3 OF 3.
 FOR END ELEVATION, SEE SHEET 1 OF 3.



ELEVATION
 REINFORCING STEEL, DIMENSIONS, AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING UNLESS NOTED OTHERWISE.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-
 SHEET 2 OF 3

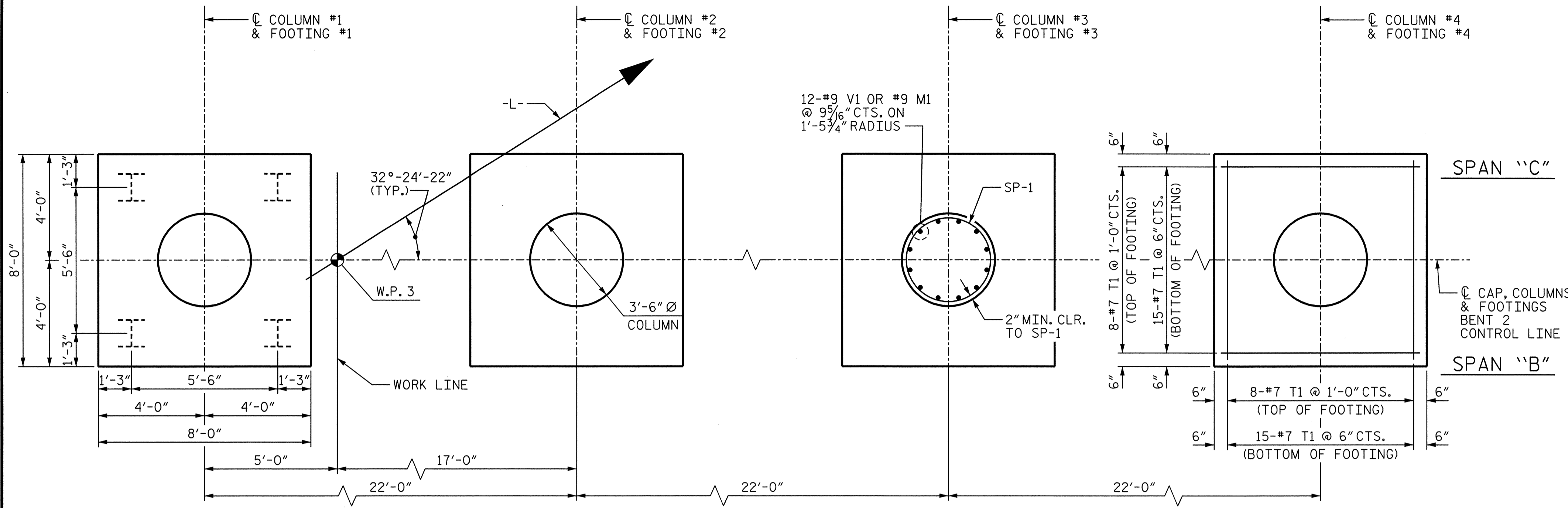
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-33					TOTAL SHEETS 42



MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

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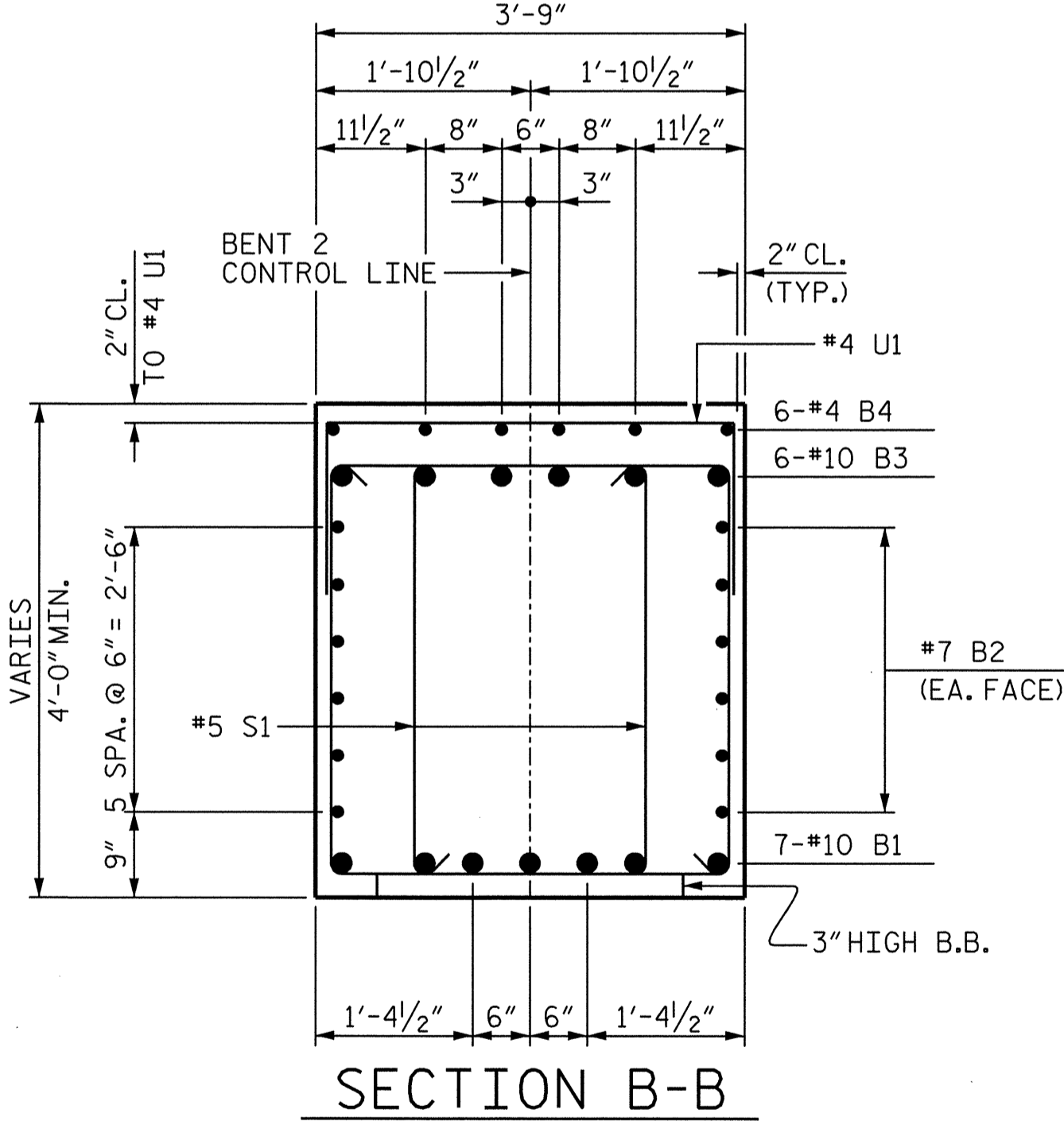
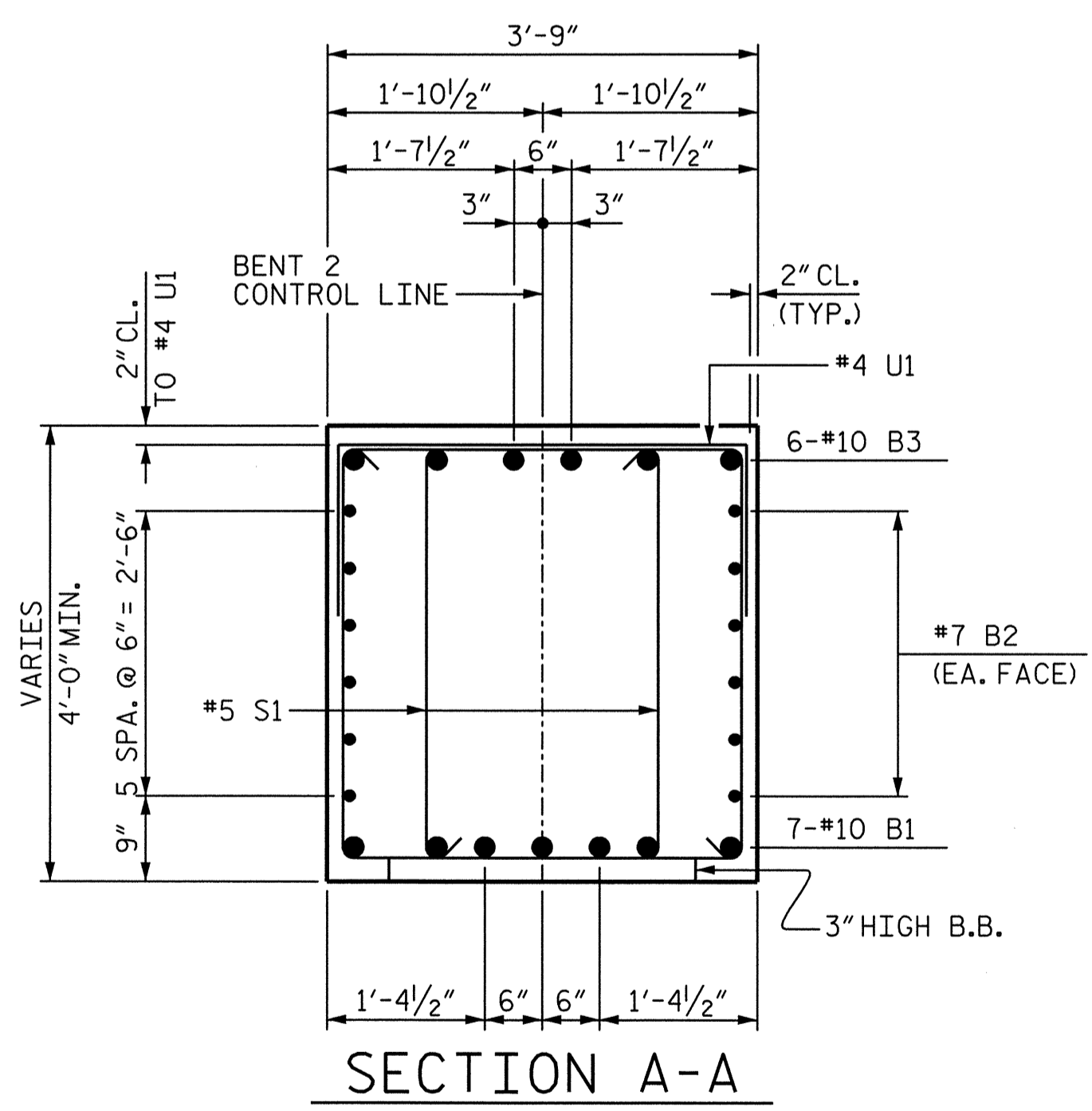
DRAWN BY : B.E. LANNING DATE : 02/13
 CHECKED BY : A.K. ORR DATE : 02/13
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 06/13



PLAN OF COLUMNS AND FOOTINGS
 (DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING)
 NOTE: CONTRACTOR'S ATTENTION IS CALLED TO THE ORIENTATION OF THE "M" BARS IN THE FOOTINGS.

BAR TYPES				BILL OF MATERIAL			
				BENT 2			
B1	14	#10	STR	41'-8"	2510		
B2	24	#7	STR	40'-4"	1979		
B3	12	#10	1	44'-8"	2306		
B4	6	#4	STR	17'-7"	70		
M1	48	#9	1	7'-8"	1251		
S1	122	#5	3	10'-11"	1389		
T1	184	#7	STR	7'-6"	2821		
U1	43	#4	2	6'-11"	199		
U2	8	#4	2	6'-3"	33		
U3	4	#4	2	6'-6"	17		
U4	4	#4	2	6'-10"	18		
V1	48	#9	1	18'-2"	2965		
SP-1	4	**	4	637'-3"	1703		
				REINFORCING STEEL 15,558 LBS. SPIRAL COLUMN REINFORCING STEEL 1,703 LBS. CLASS A CONCRETE BREAKDOWN POUR #1 (FOOTINGS) 26.9 C.Y. POUR #2 (COLUMNS) 21.8 C.Y. POUR #3 (CAP) 43.6 C.Y. TOTAL 92.3 C.Y.			
				HP 12 x 53 STEEL PILES NO. 16 492.0 LIN. FT. FOUNDATION EXCAVATION LUMP SUM			
				** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.			

ALL BAR DIMENSIONS ARE OUT TO OUT.



PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-
 SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
BENT 2



	MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS				SHEET NO. S-34
	NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 42
	1			3			
	2			4			

DRAWN BY : <u>B.E. LANNING</u>	DATE : <u>02/13</u>
CHECKED BY : <u>A.K. ORR</u>	DATE : <u>02/13</u>
DESIGN ENGINEER OF RECORD : <u>A.K. ORR</u>	DATE : <u>06/13</u>

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NOTES

STIRRUPS AND #4 U. BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

#5 V1 BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM THE BOTTOM OF CAP.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

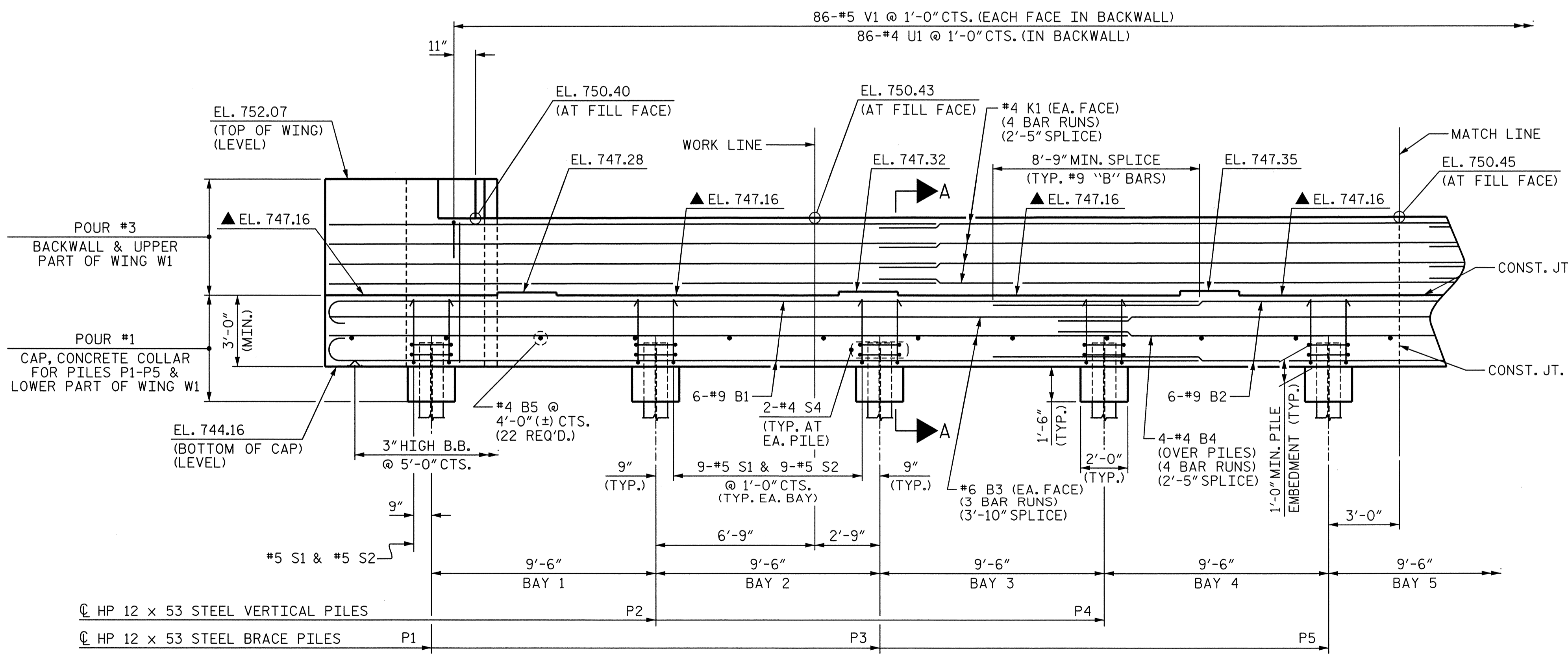
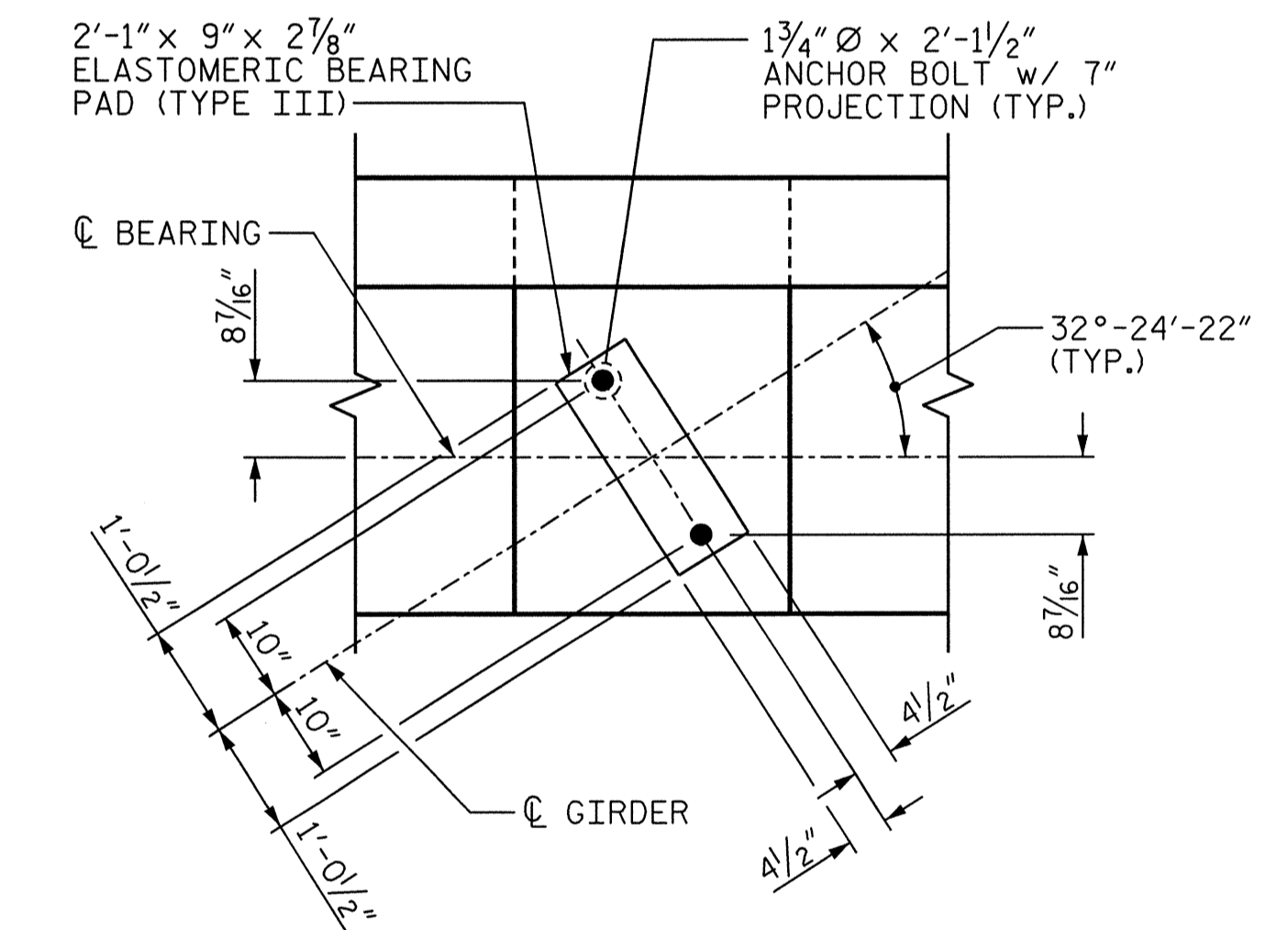
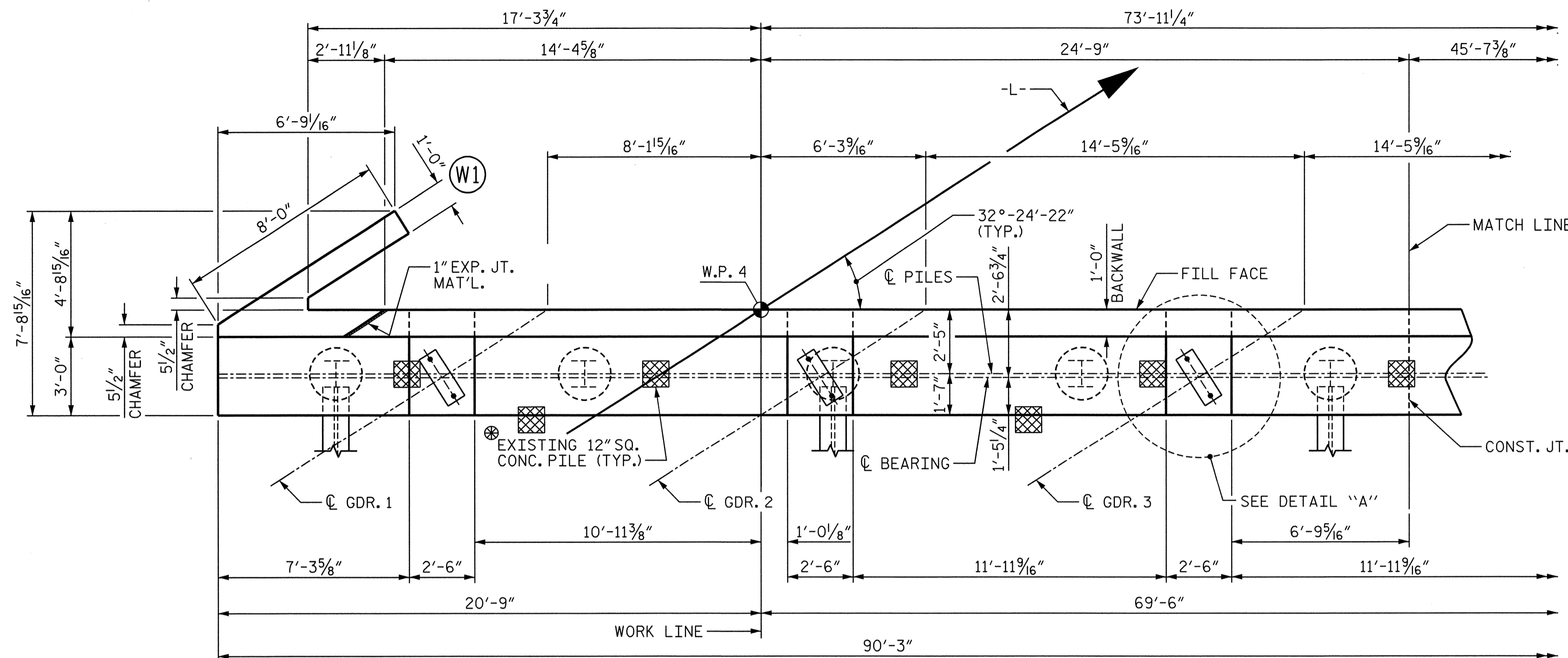
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A ON SHEET 4 OF 4.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" Ø DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

FOR SECTION A-A, PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 4 OF 4.

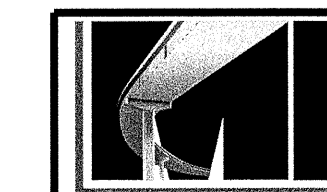
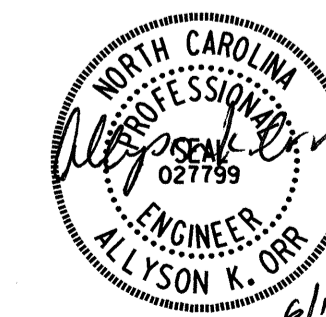
⊕ CONTRACTOR TO VERIFY THE LOCATION OF EXISTING PILES. EXISTING PILES TO REMAIN IN PLACE. CUT EXISTING PILES TO 1'-6" BELOW BOTTOM OF CAP ELEVATION.



PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 1 OF 4

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

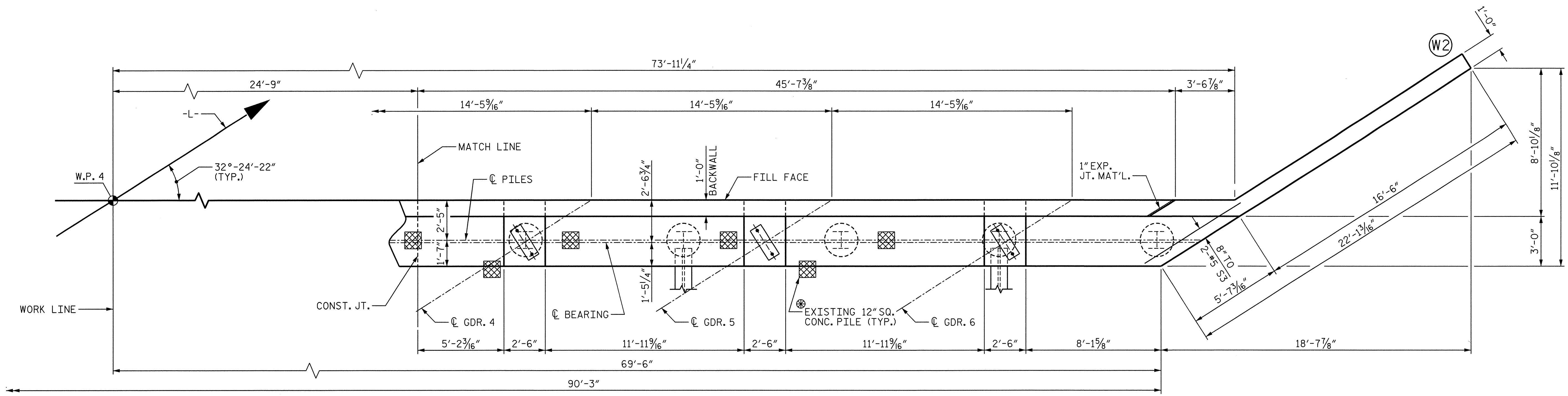


MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			42

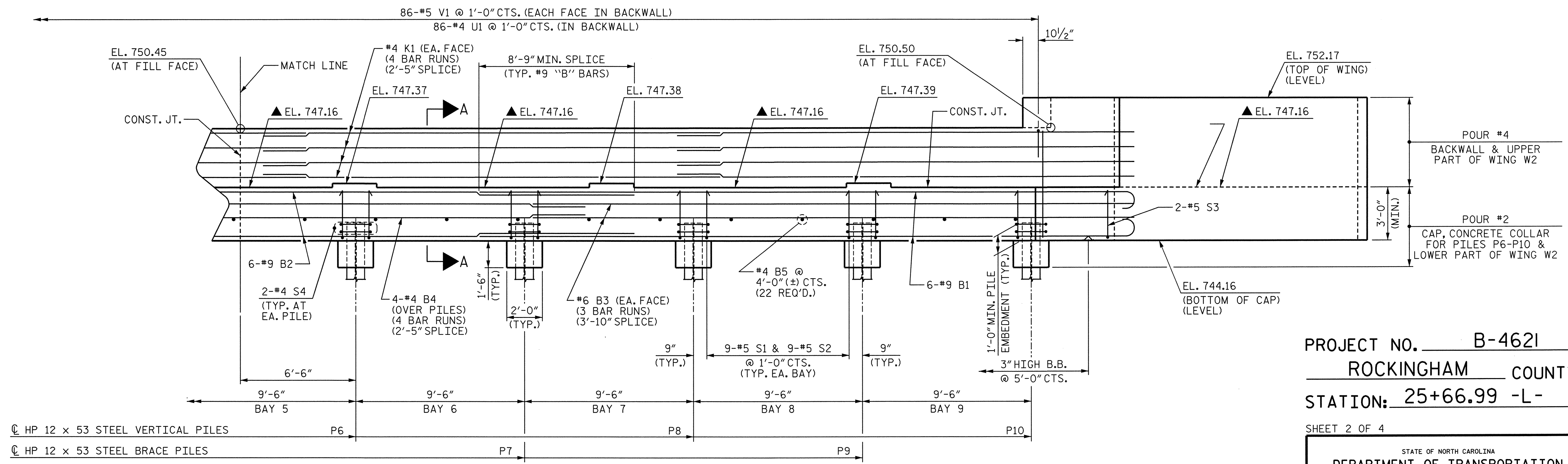
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CHECKED BY : A.K. ORR	DATE : 02/13
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/13

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 User: jlsraein@ncm
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PLAN

⊗ CONTRACTOR TO VERIFY THE LOCATION OF EXISTING PILES. EXISTING PILES TO REMAIN IN PLACE. CUT EXISTING PILES TO 1'-6" BELOW BOTTOM OF CAP ELEVATION.

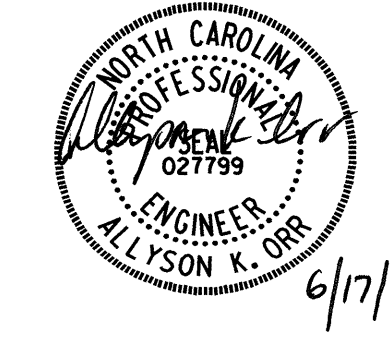


ELEVATION

NOTE: FOR SECTION A-A SEE SHEET 4 OF 4.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-
 SHEET 2 OF 4

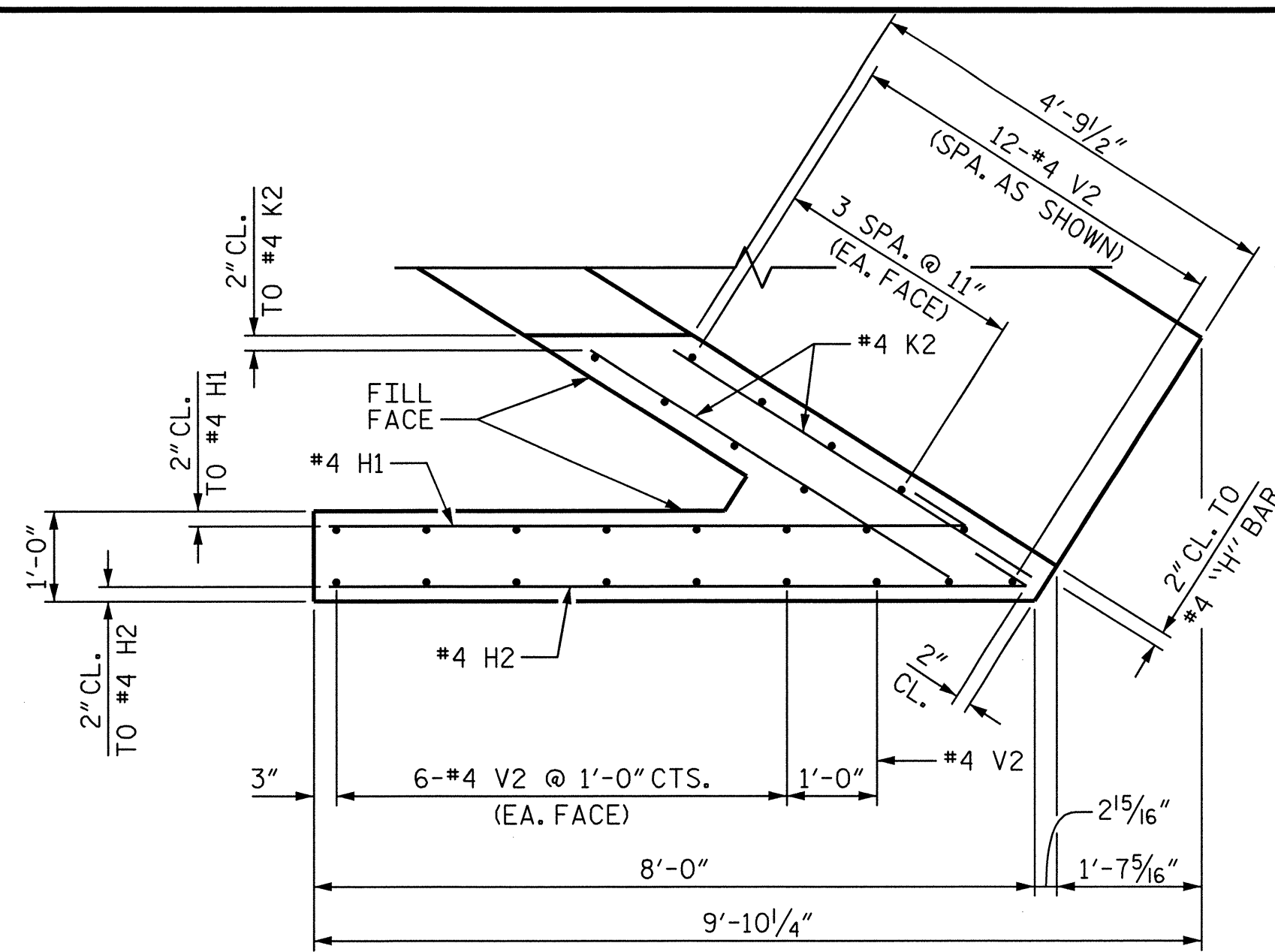
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2



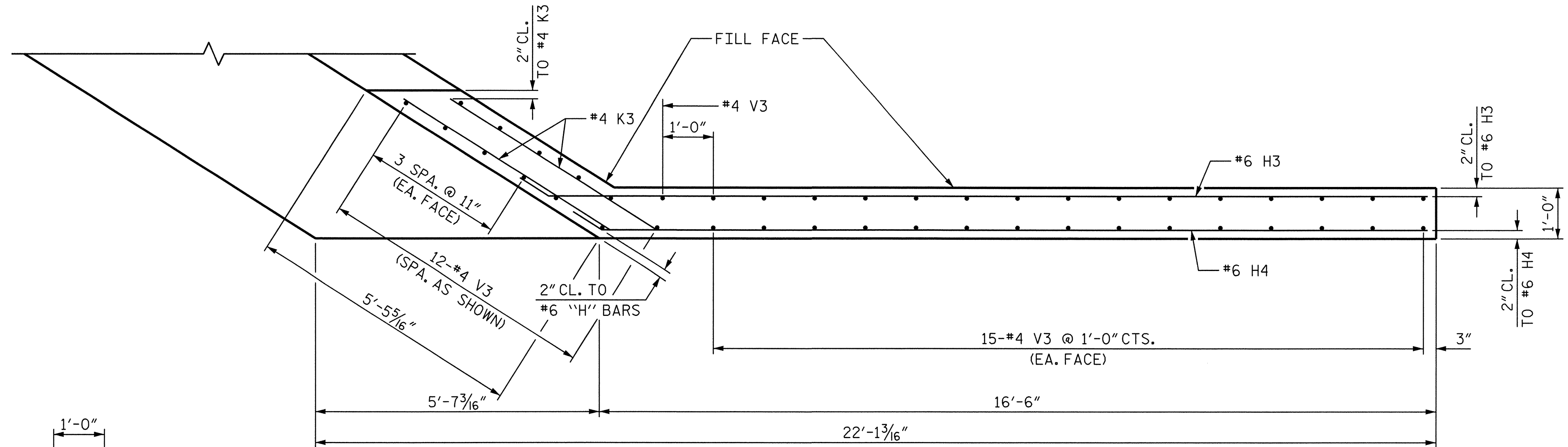
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 42

DRAWN BY: <u>B.E. LANNING</u>	DATE: <u>02/13</u>
CHECKED BY: <u>A.K. ORR</u>	DATE: <u>02/13</u>
DESIGN ENGINEER OF RECORD: <u>A.K. ORR</u>	DATE: <u>06/13</u>

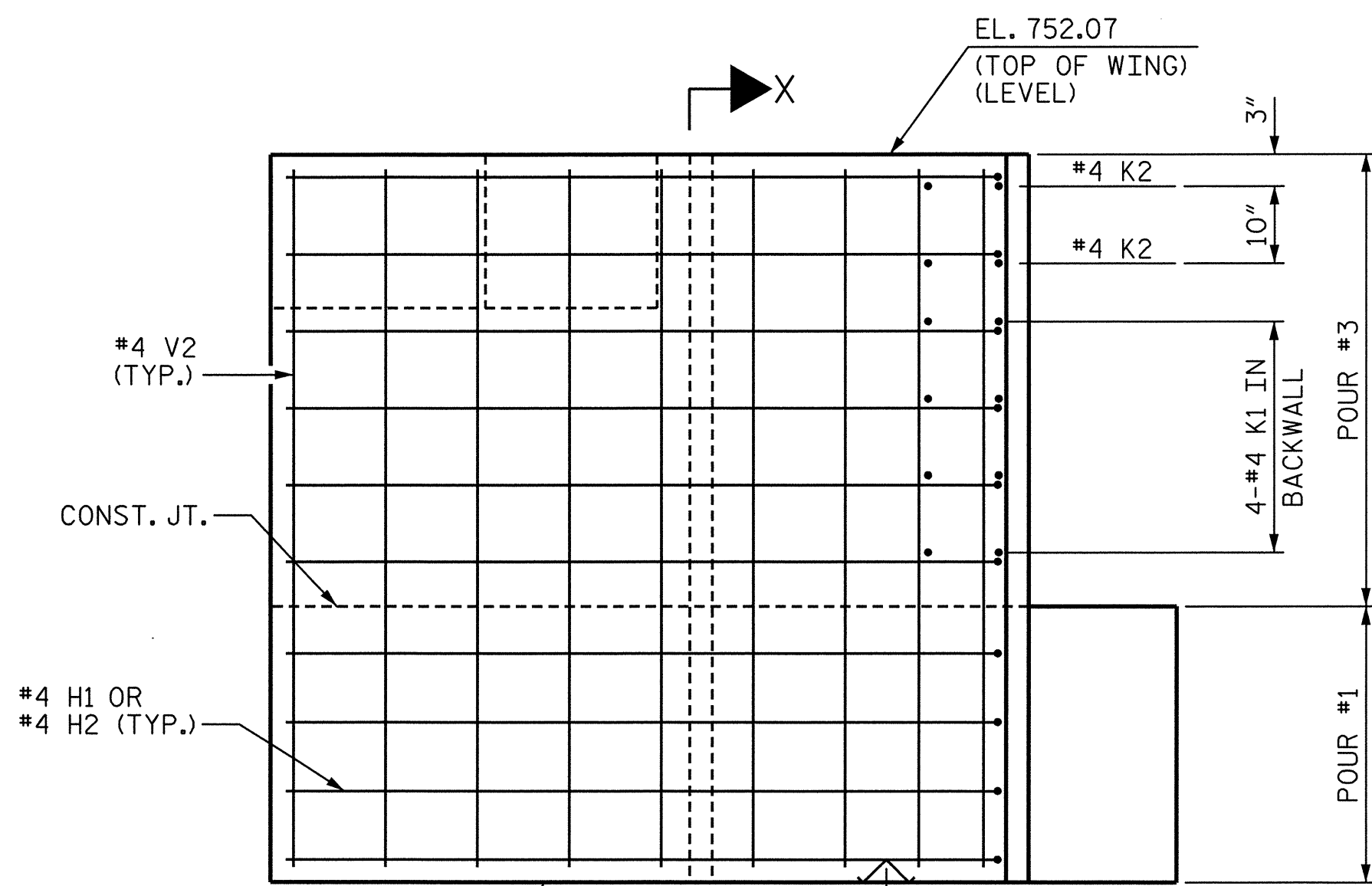
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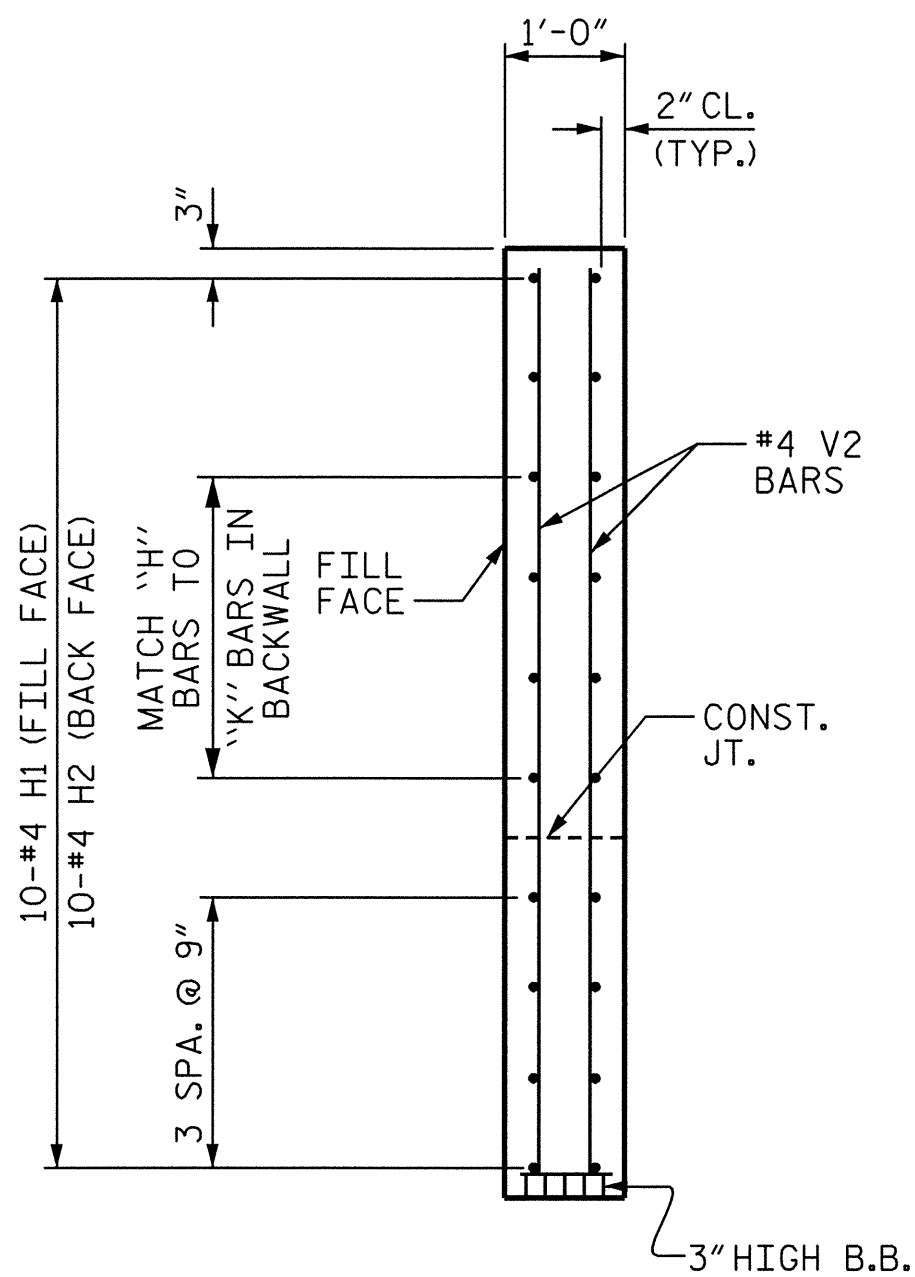
PLAN OF WING (W1)



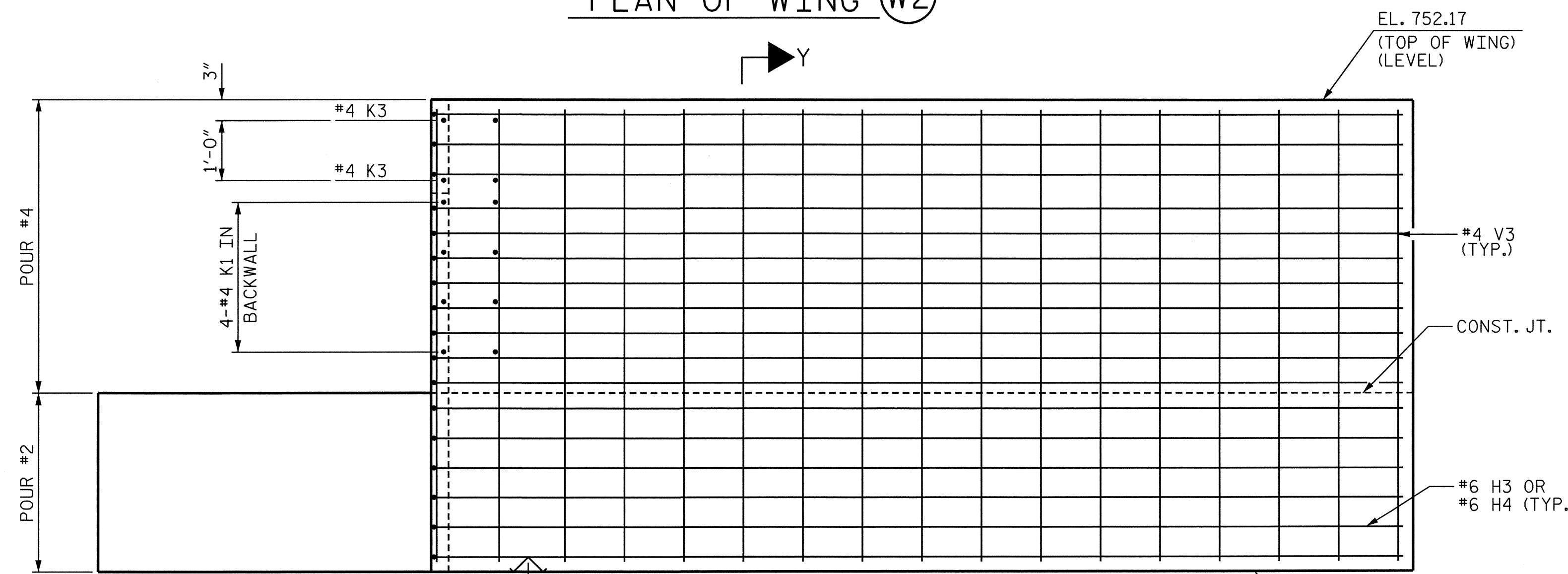
PLAN OF WING (W2)



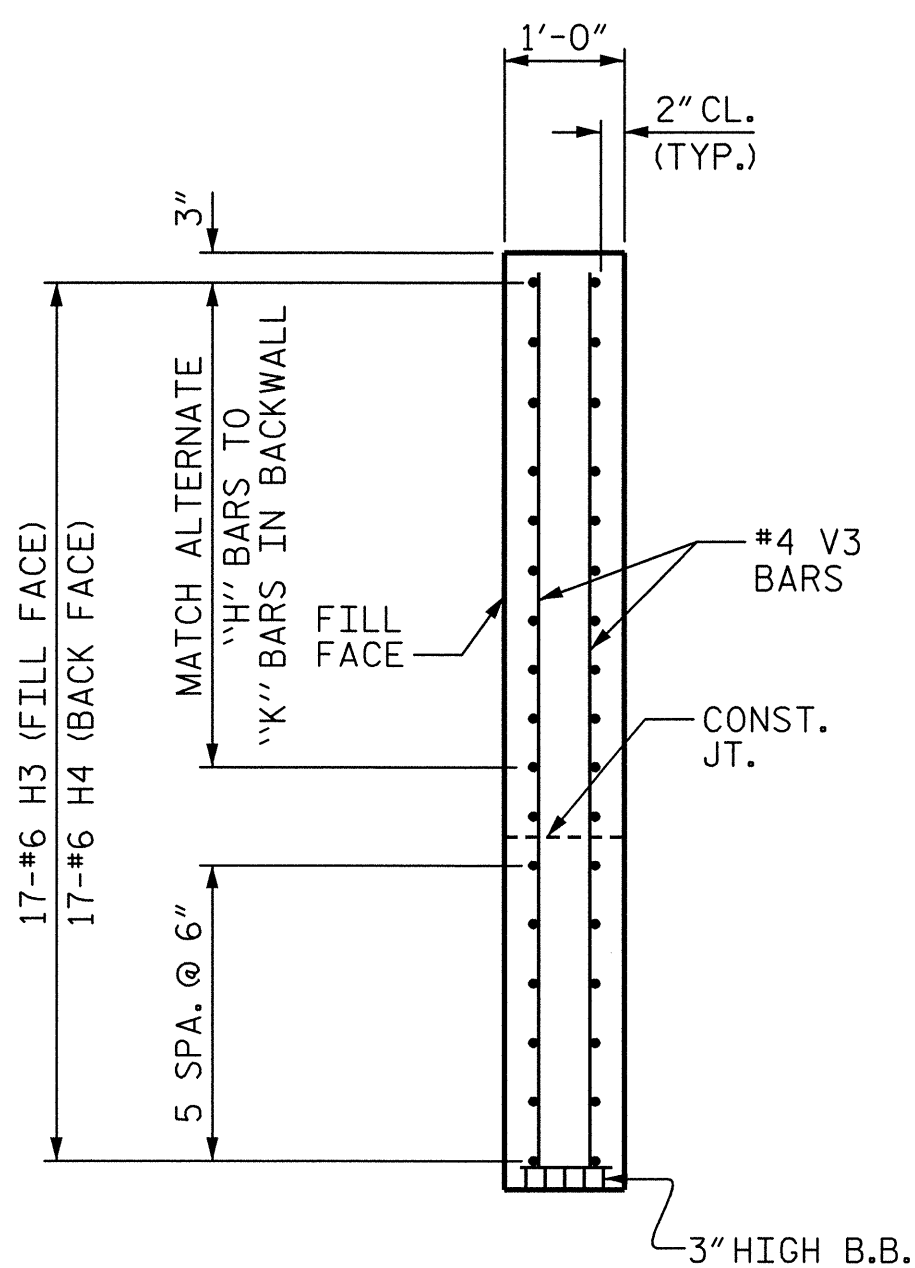
ELEVATION OF WING (W1)



SECTION X-X



ELEVATION OF WING (W2)

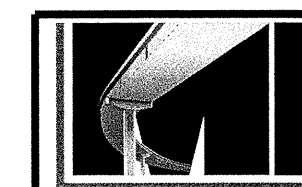
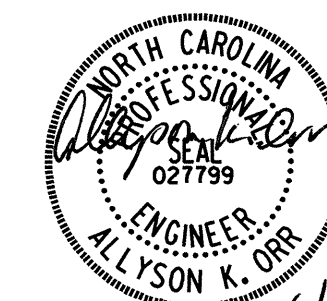


SECTION Y-Y

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 3 OF 4

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

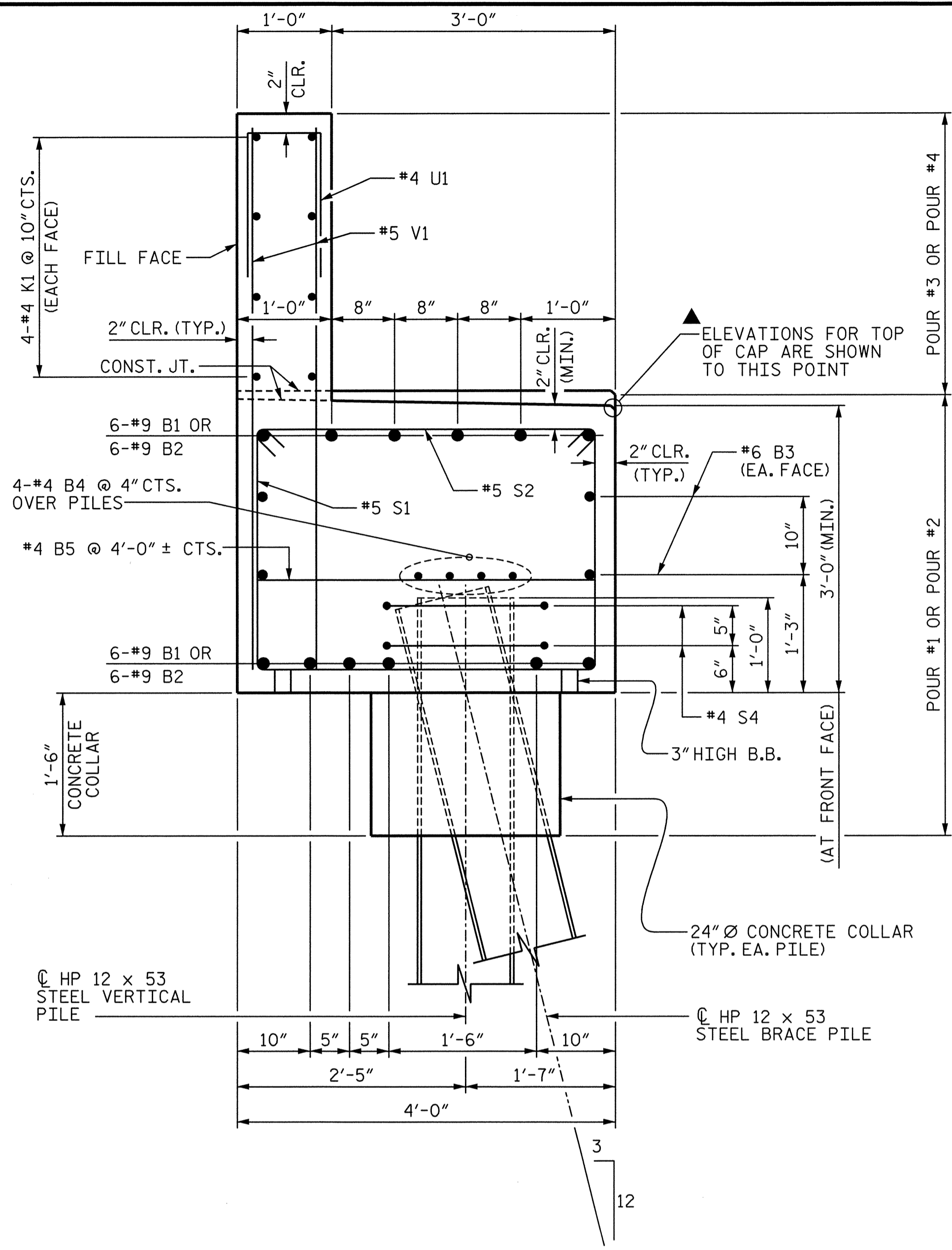


MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

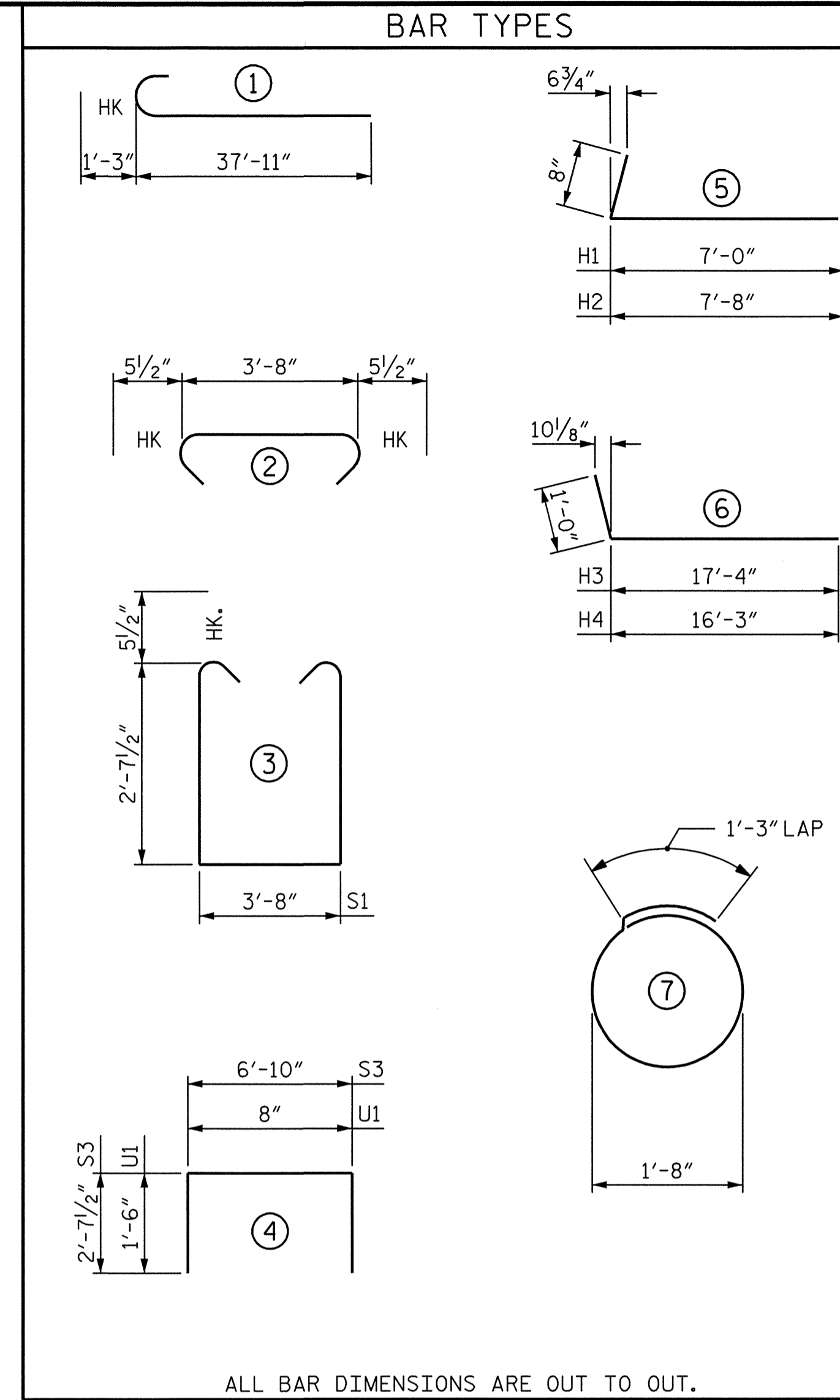
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-37	
1			3			TOTAL SHEETS	
2			4			42	

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DRAWN BY : B.E. LANNING DATE : 02/13
 CHECKED BY : A.K. ORR DATE : 02/13
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 06/13

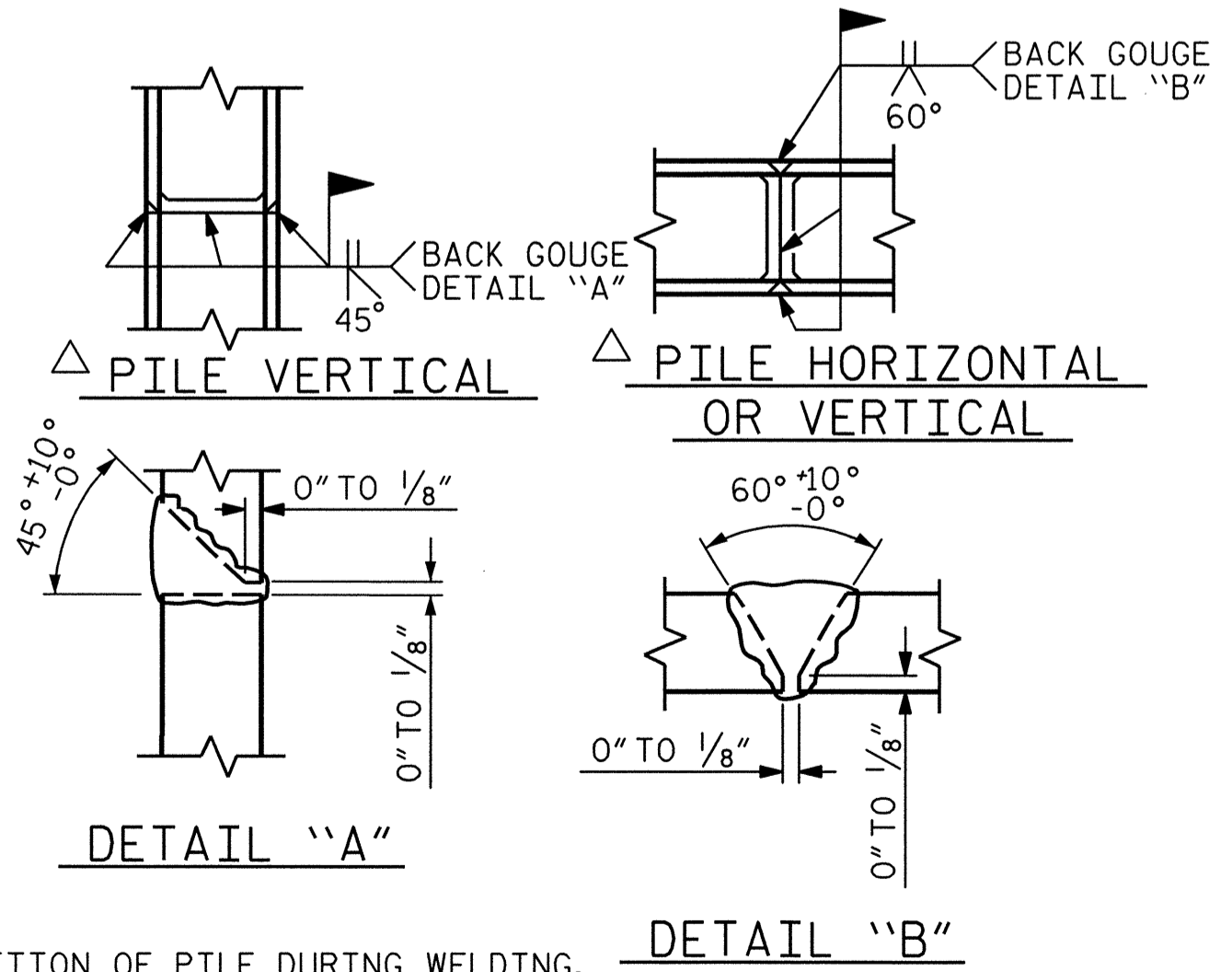


SECTION A-A

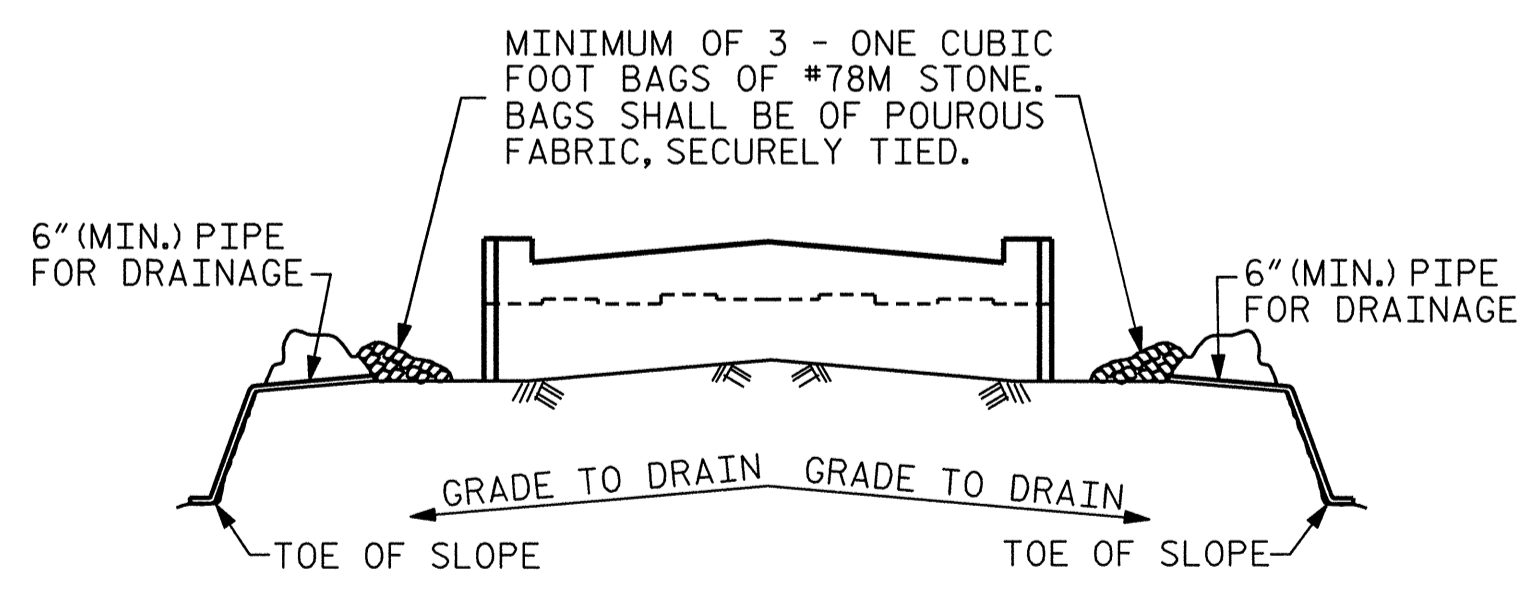


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	24	#9	1	39'-2"	3196
B2	12	#9	STR	37'-11"	1547
B3	12	#6	STR	34'-7"	623
B4	16	#4	STR	25'-10"	276
B5	22	#4	STR	3'-8"	54
H1	10	#4	5	7'-8"	51
H2	10	#4	5	8'-4"	56
H3	17	#6	6	18'-4"	468
H4	17	#6	6	17'-3"	440
K1	32	#4	STR	25'-10"	552
K2	4	#4	STR	4'-7"	12
K3	4	#4	STR	4'-9"	13
S1	82	#5	3	9'-10"	841
S2	82	#5	2	4'-7"	392
S3	2	#5	4	12'-1"	25
S4	20	#4	7	6'-6"	87
U1	86	#4	4	3'-8"	211
V1	172	#5	STR	5'-10"	1046
V2	25	#4	STR	7'-6"	125
V3	43	#4	STR	7'-8"	220
REINFORCING STEEL					10,235 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (CAP, COLLARS FOR P1-P5 & LOWER WING W1)					22.2 C.Y.
POUR #2 (CAP, COLLARS FOR P6-P10 & LOWER WING W2)					24.6 C.Y.
POUR #3 (BACKWALL & UPPER WING W1)					6.7 C.Y.
POUR #4 (BACKWALL & UPPER WING W2)					9.2 C.Y.
TOTAL CLASS A CONCRETE					62.7 C.Y.
HP 12 x 53 STEEL PILES					310.0 LIN. FT.
NO. 10					



PILE SPLICE DETAILS



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

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

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

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

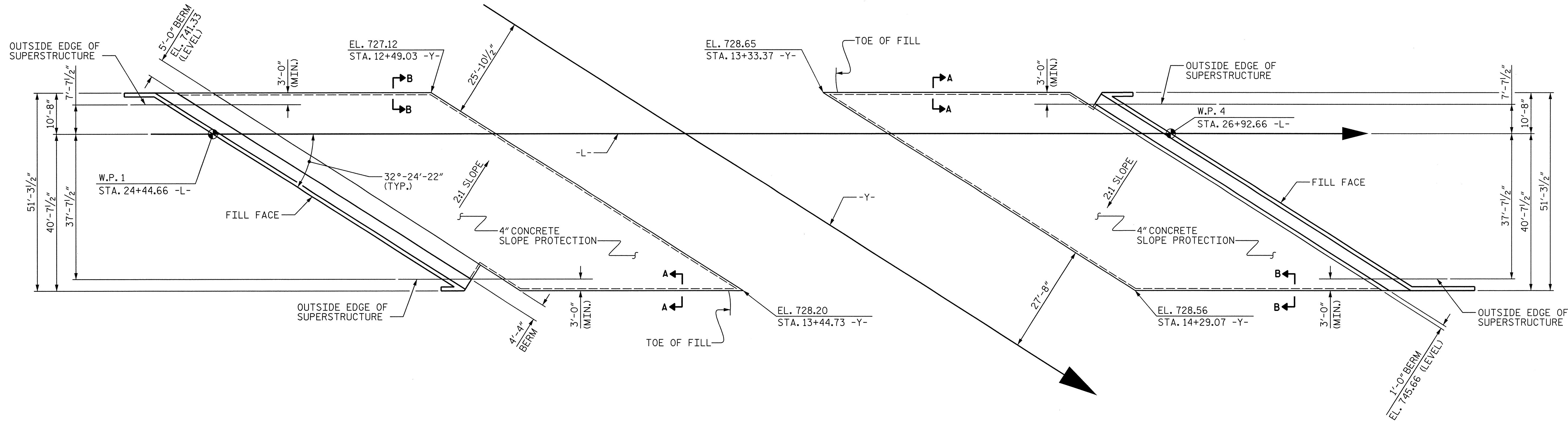
SUBSTRUCTURE
 END BENT 2



MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671		REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 42

DRAWN BY : B.E. LANNING	DATE : 02/13
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PLAN AT END BENT 1

PLAN AT END BENT 2

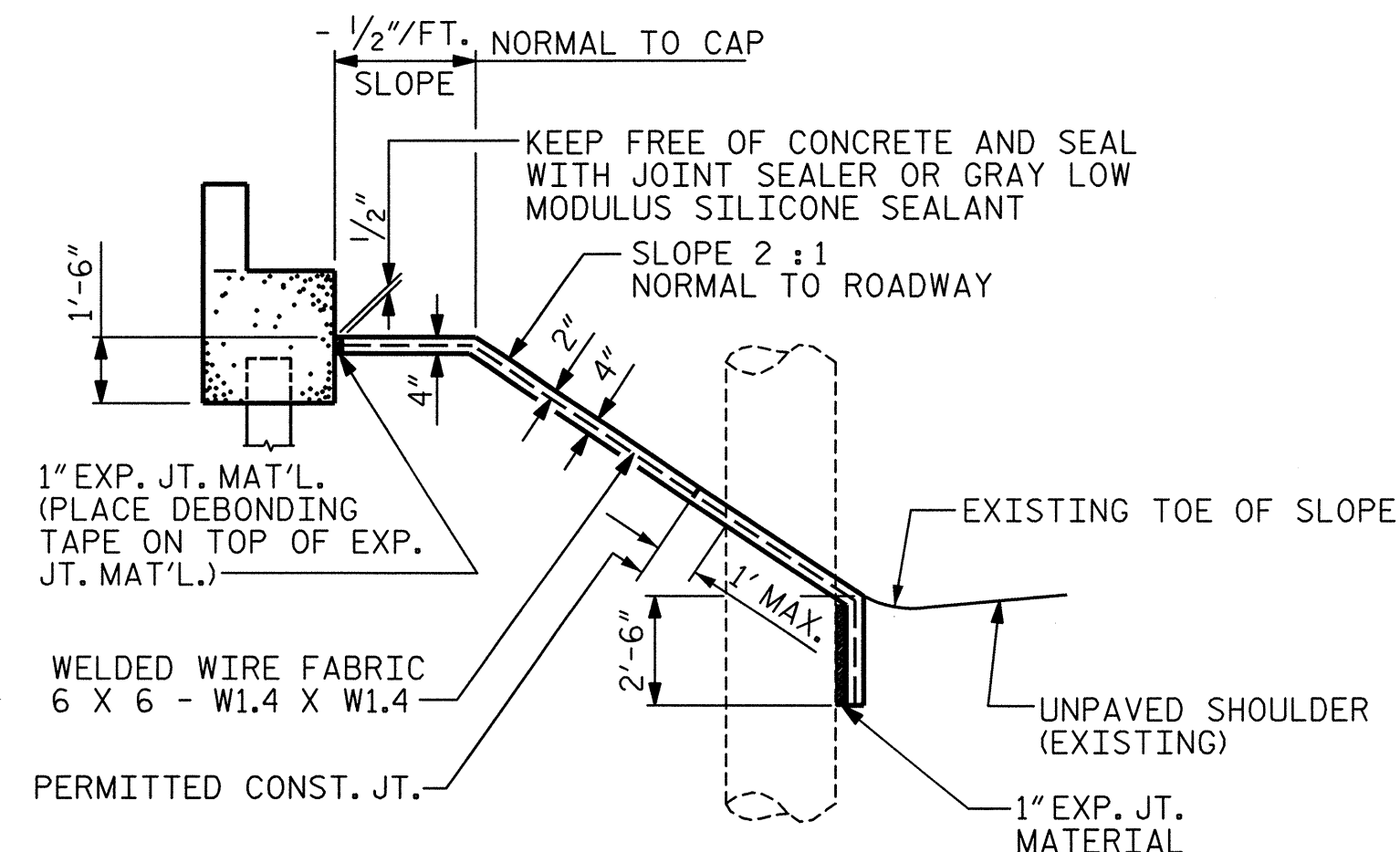
NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE PLANS.

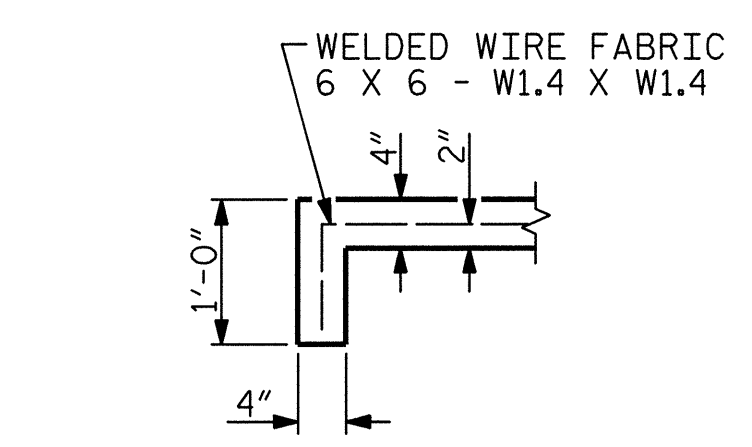
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL 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.

BRIDGE @ STA. 25+66.99 -L-	4 INCH SLOPE PROTECTION	WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	416	748
END BENT 2	424	763
TOTAL	840	1511

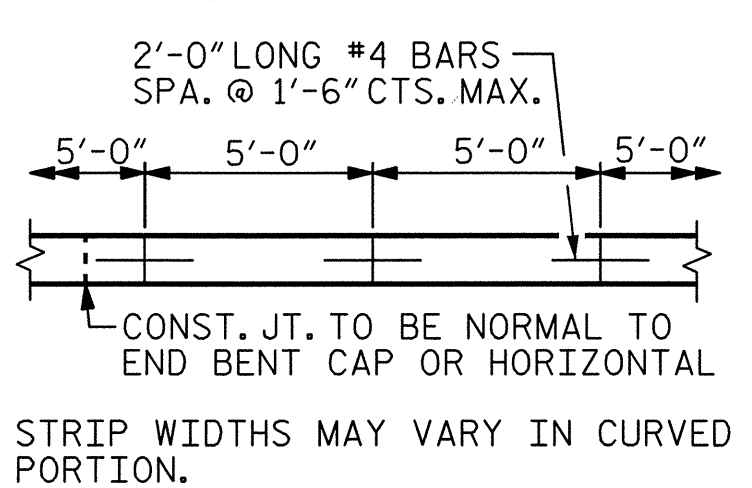
* QUANTITY SHOWN IS BASED ON 5' POURS.



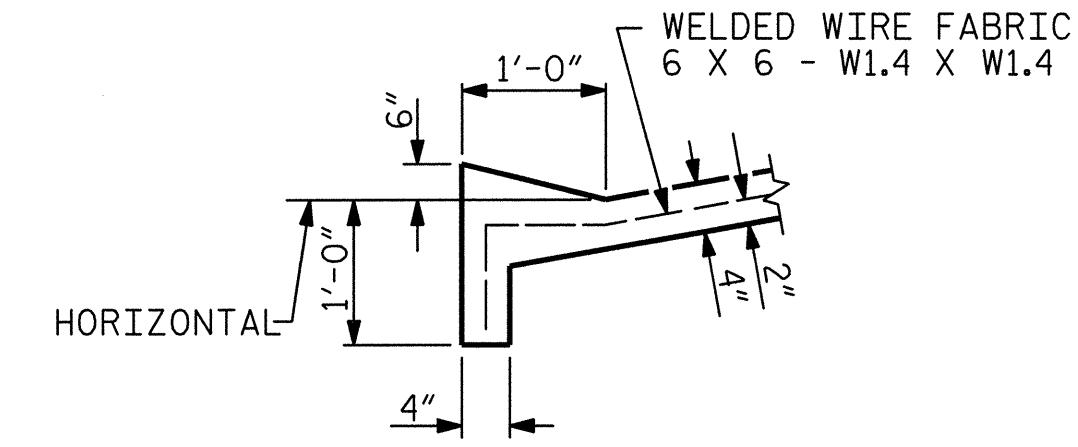
SECTION ALONG \bar{C} ROADWAY WITH SHOULDER PIER



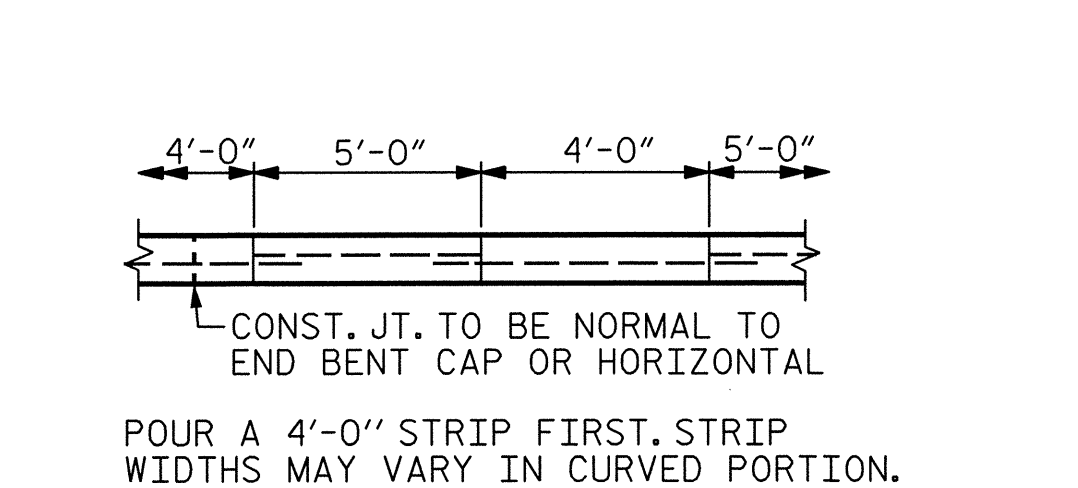
SECTION A-A



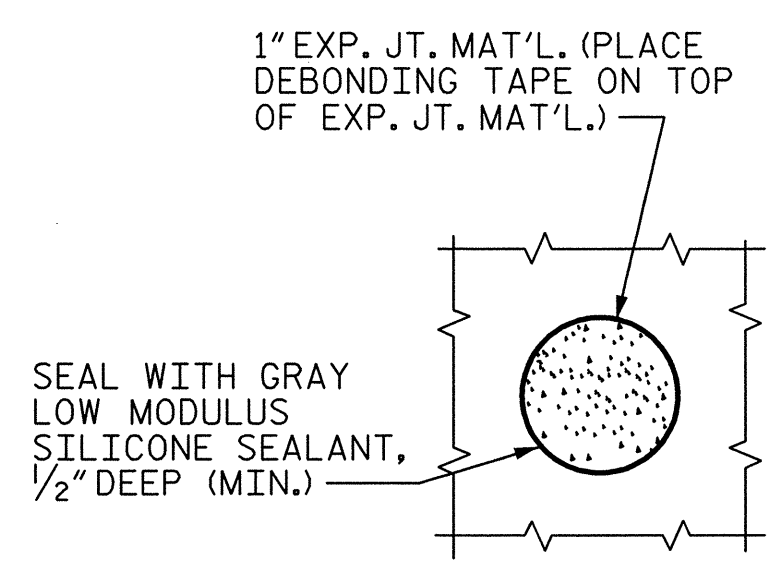
POURING DETAIL



SECTION B-B



OPTIONAL POURING DETAIL



PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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SLOPE PROTECTION DETAILS

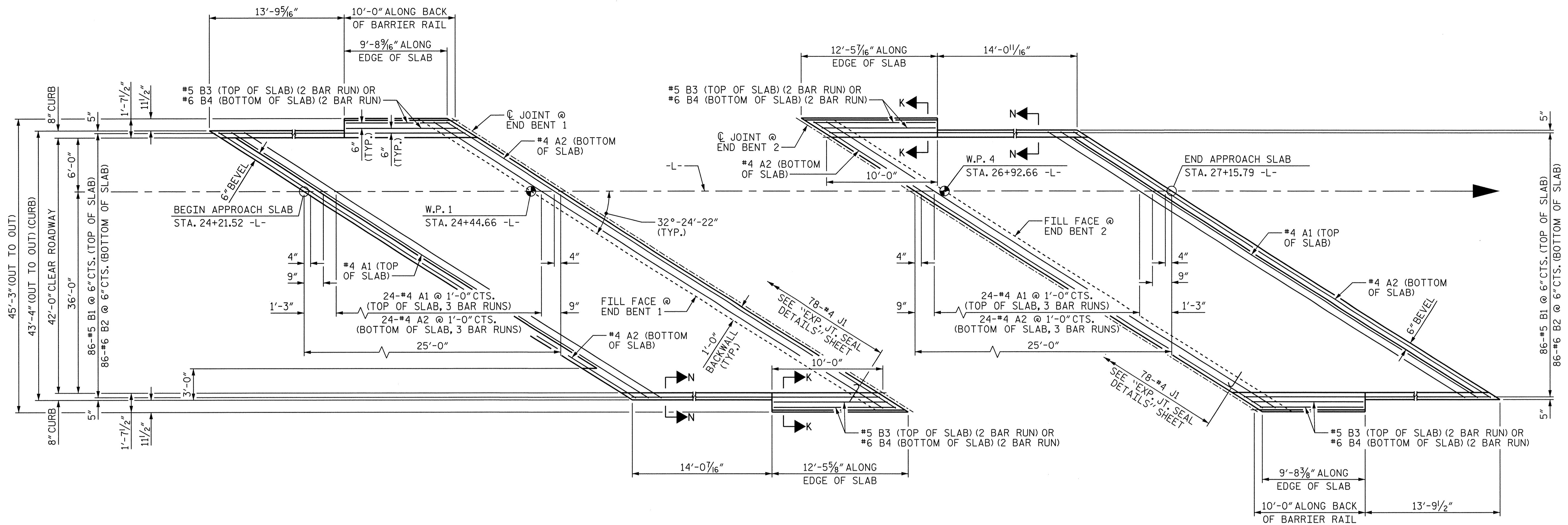


MI ENGINEERING
 1011 SCHAUB DRIVE, SUITE 100
 RALEIGH, NC 27606
 (919) 851-6006
 FIRM PE NUMBER: P-0671

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2			4				

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AT END BENT 1

AT END BENT 2

PLAN OF APPROACH SLABS

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS.

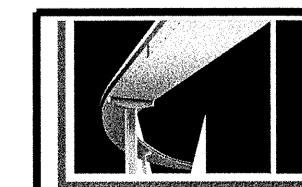
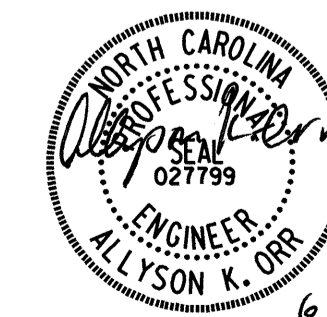
FOR SECTIONS K-K AND N-N, SEE SHEET 2 OF 3.

PROJECT NO. B-4621
ROCKINGHAM COUNTY
 STATION: 25+66.99 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT**



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 RALEIGH, NC 27606
 (919) 851-6606
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
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2			4			42

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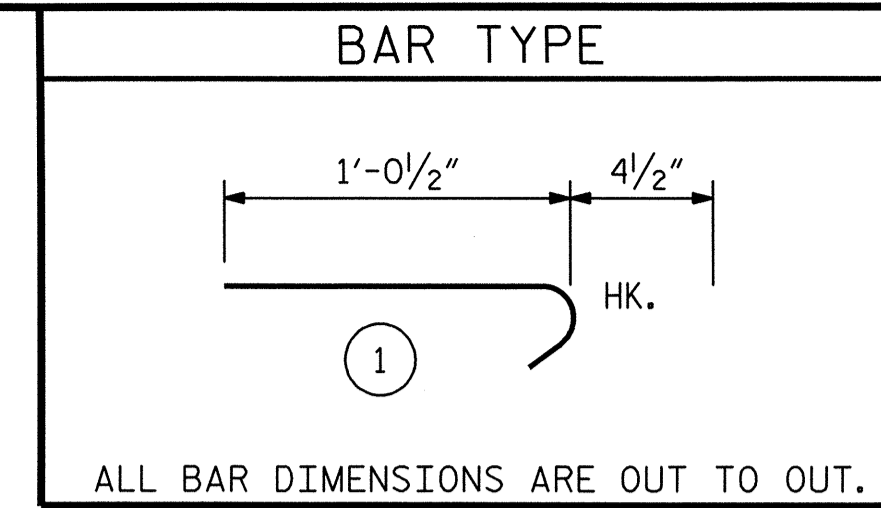
NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, 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.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.



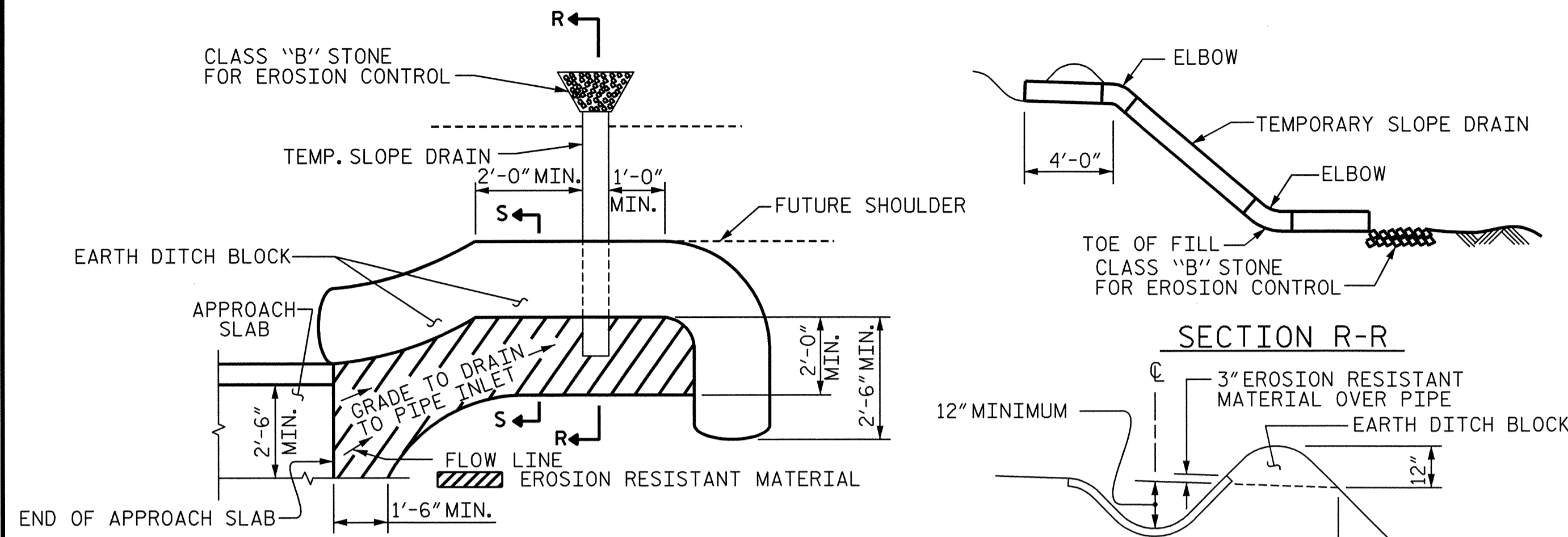
ALL BAR DIMENSIONS ARE OUT TO OUT.

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

BILL OF MATERIAL						
APPROACH SLAB AT EB 1						
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	75	#4	STR	29'-4"	1470	
A2	78	#4	STR	29'-2"	1520	
*B1	86	#5	STR	22'-11"	2056	
B2	86	#6	STR	24'-4"	3143	
*B3	8	#5	STR	7'-1"	59	
B4	8	#6	STR	7'-2"	86	
*J1	78	#4	1	1'-5"	74	
REINFORCING STEEL **					LBS.	4749
*EPOXY COATED REINFORCING STEEL **					LBS.	3659
CLASS AA CONCRETE **					C. Y.	48.0
APPROACH SLAB AT EB 2						
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	75	#4	STR	29'-4"	1470	
A2	78	#4	STR	29'-2"	1520	
*B1	86	#5	STR	22'-11"	2056	
B2	86	#6	STR	24'-4"	3143	
*B3	8	#5	STR	7'-1"	59	
B4	8	#6	STR	7'-2"	86	
*J1	78	#4	1	1'-5"	74	
REINFORCING STEEL **					LBS.	4749
*EPOXY COATED REINFORCING STEEL **					LBS.	3659
CLASS AA CONCRETE **					C. Y.	48.0

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 3 OF 3.

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

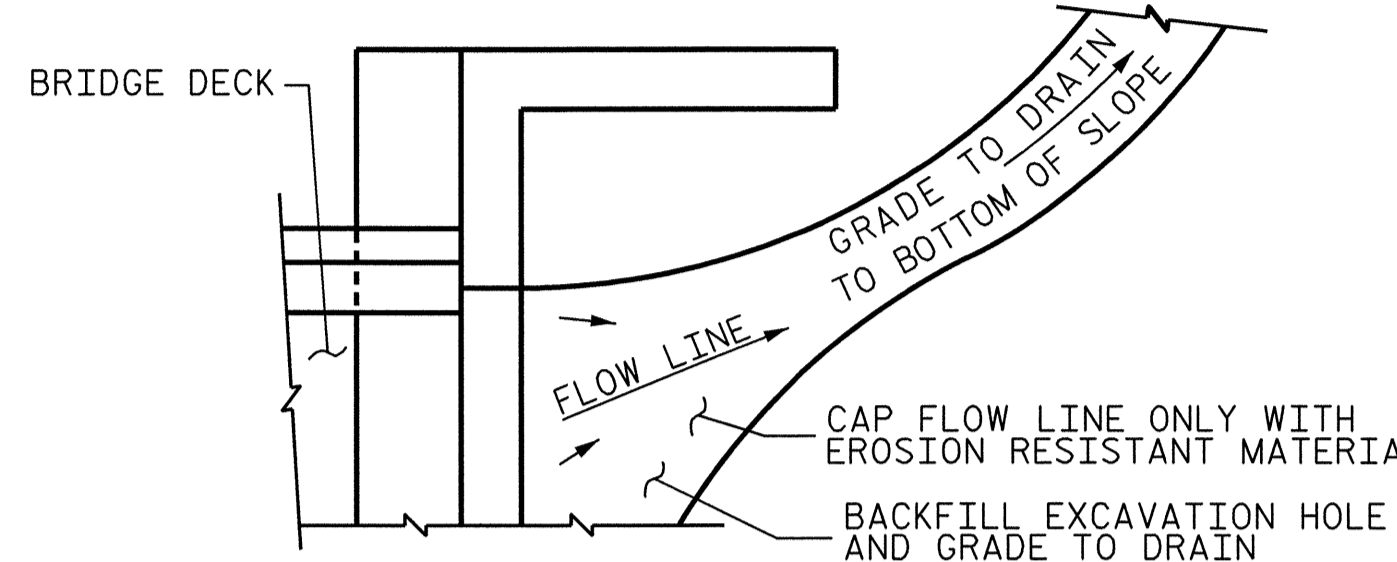
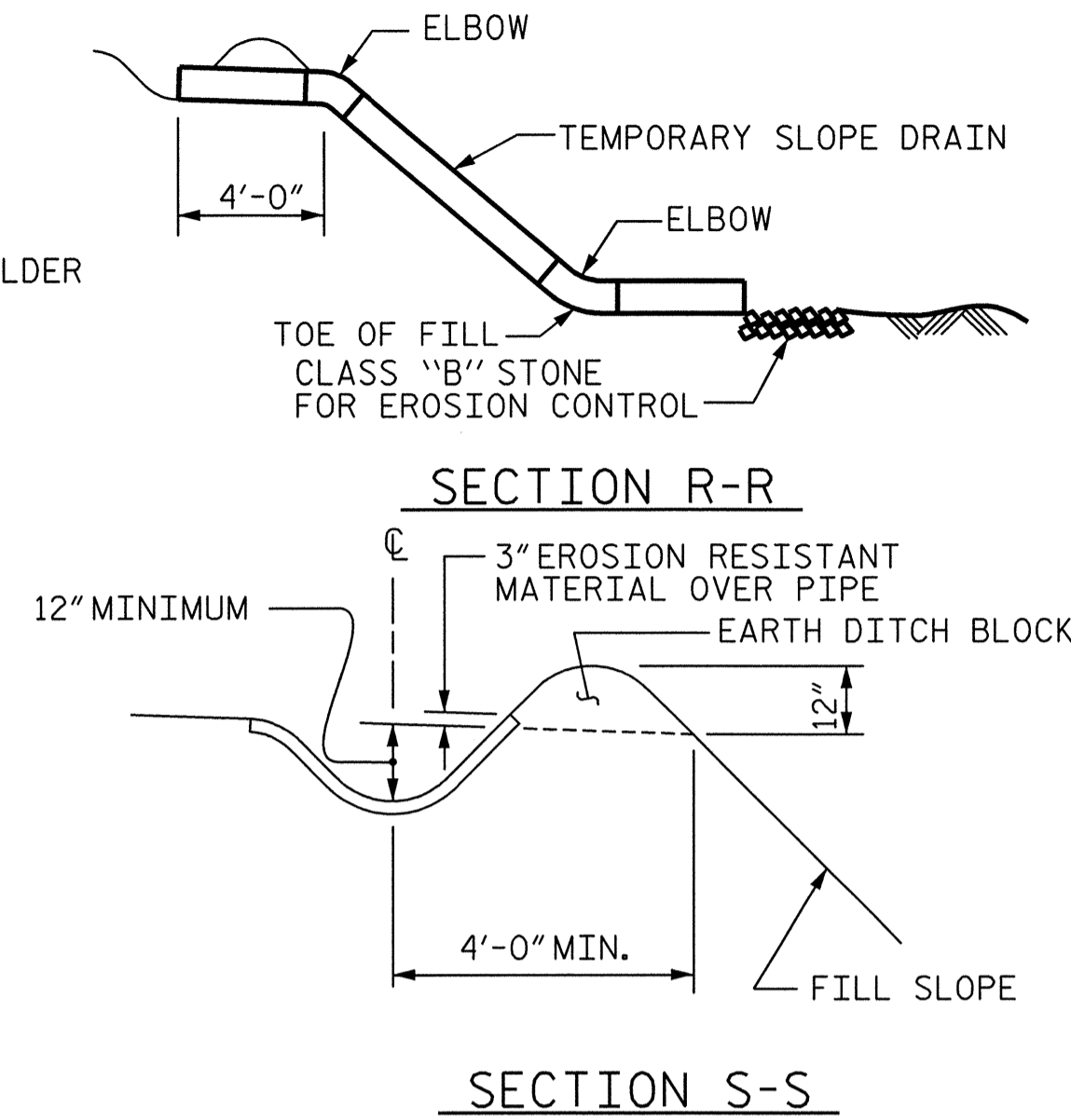


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW

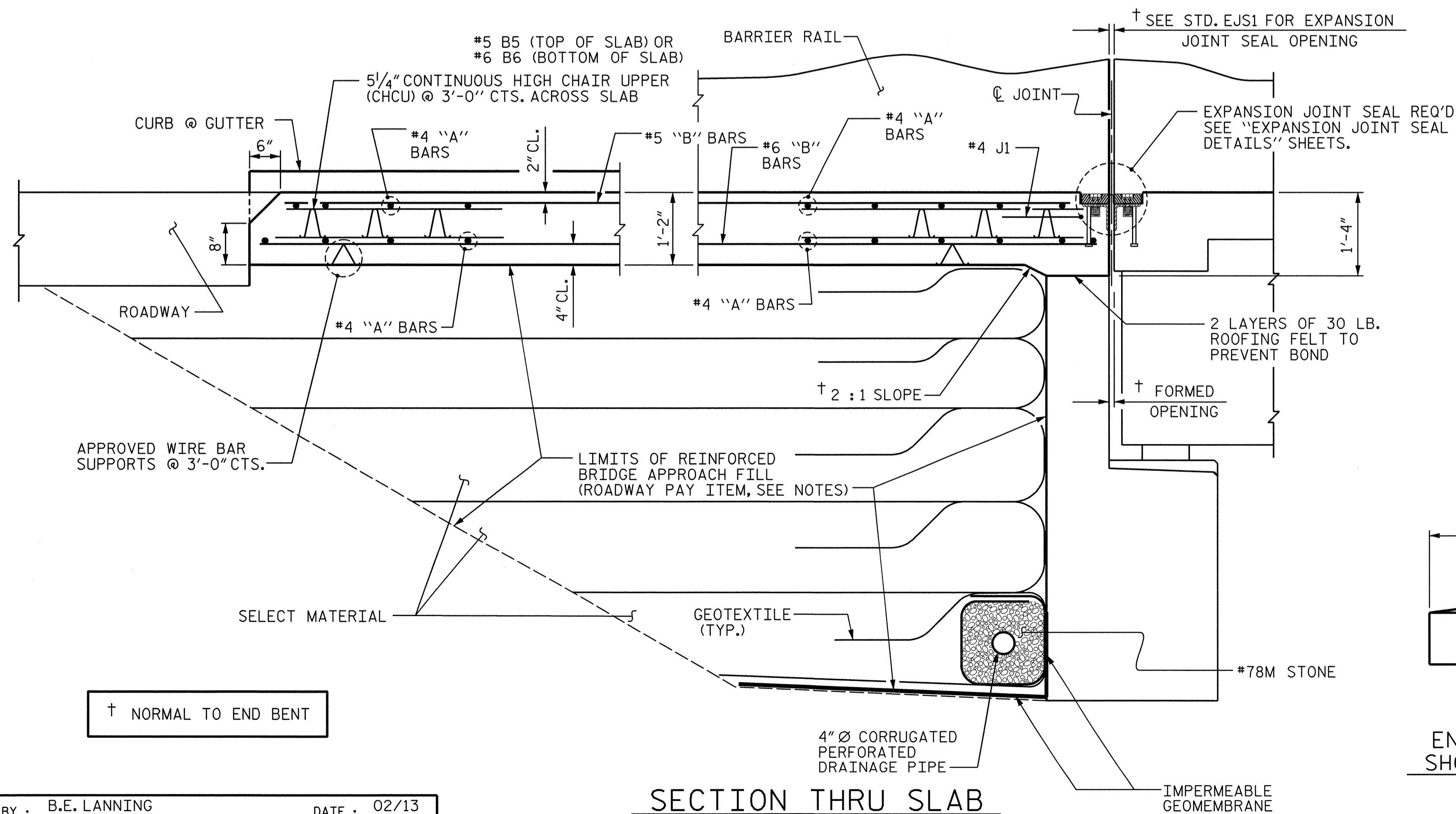
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

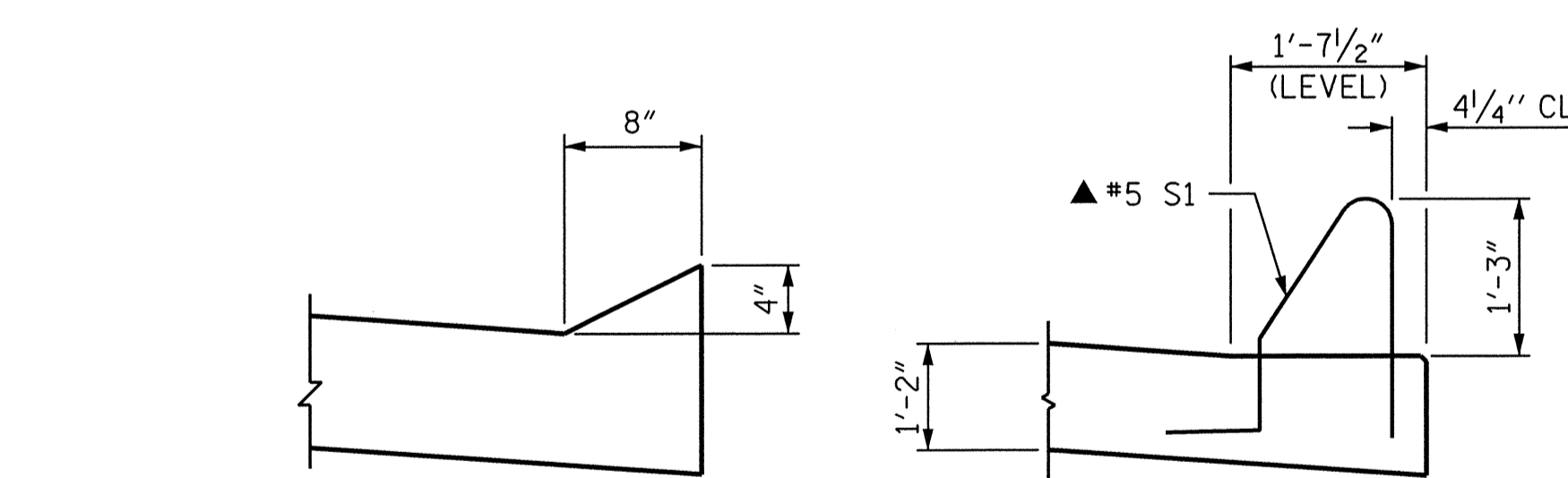


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

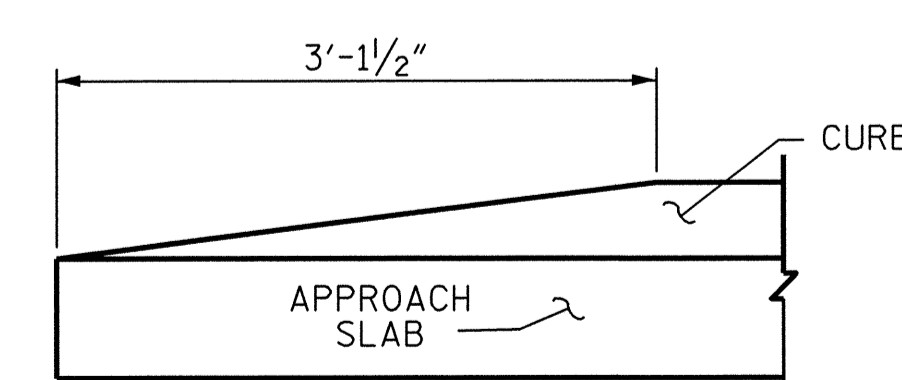


SECTION THRU SLAB



SECTION N-N

SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. B-4621

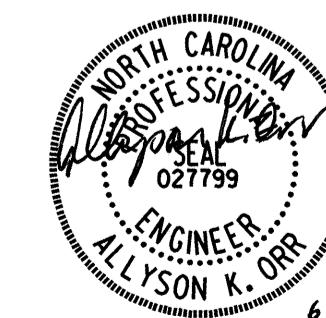
ROCKINGHAM COUNTY

STATION: 25+66.99 -L-

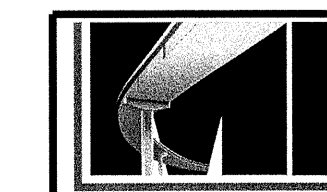
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT



6/17/2013

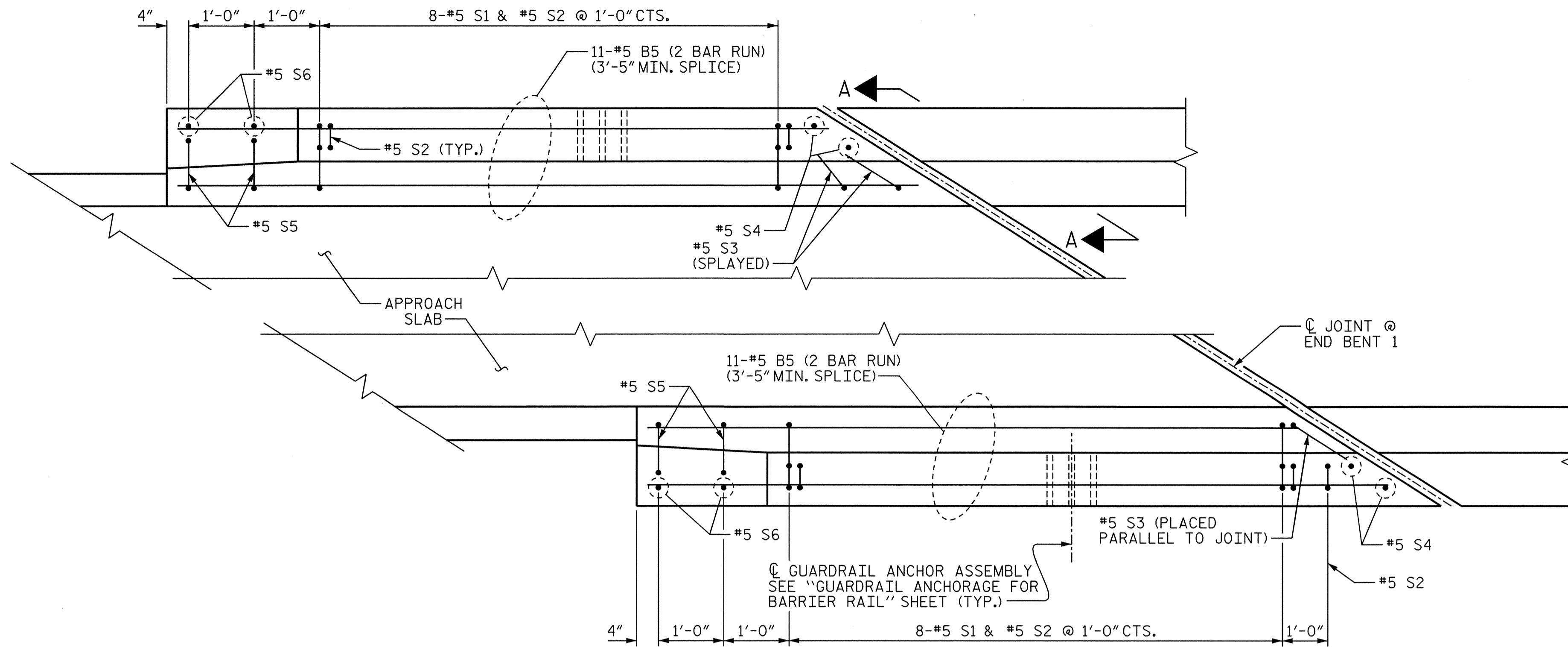


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1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

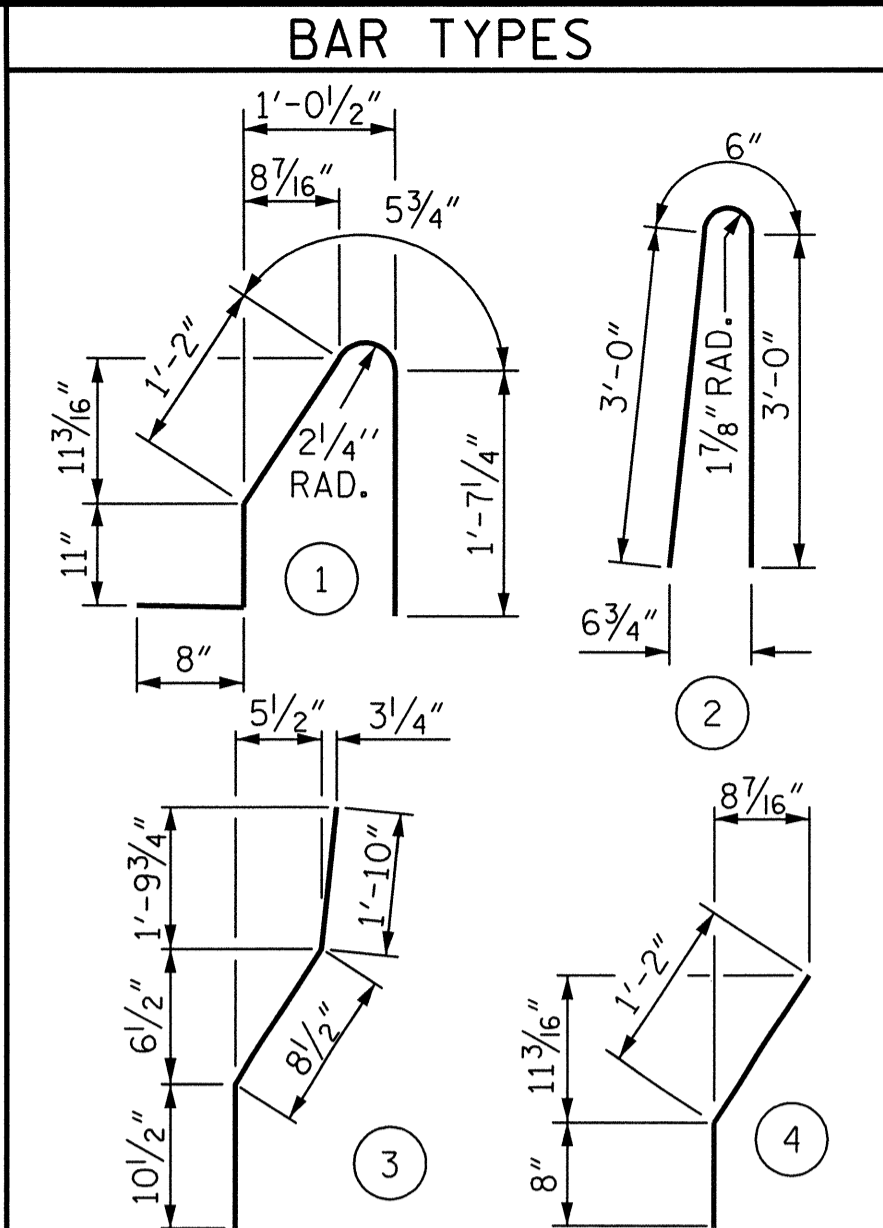
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PLAN OF BARRIER RAIL
END BENT 1 SHOWN, END BENT 2 IS SIMILAR



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
*B5	88	#5 STR	7'-6"	688
*S1	32	#5 1	4'-10"	161
*S2	34	#5 2	6'-6"	231
*S3	6	#5 4	1'-10"	11
*S4	8	#5 STR	3'-8"	31
*S5	8	#5 3	3'-5"	29
*S6	8	#5 STR	3'-3"	27

* EPOXY COATED REINFORCING STEEL 1,178 LBS.
CLASS AA CONCRETE 6.0 CU. YDS.
CONCRETE BARRIER RAIL 44.34 LIN. FT.

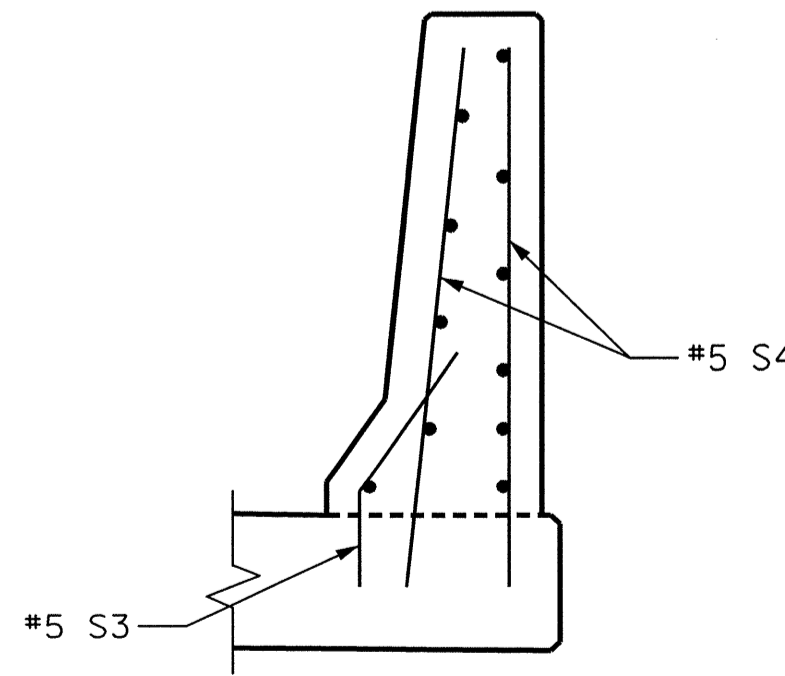
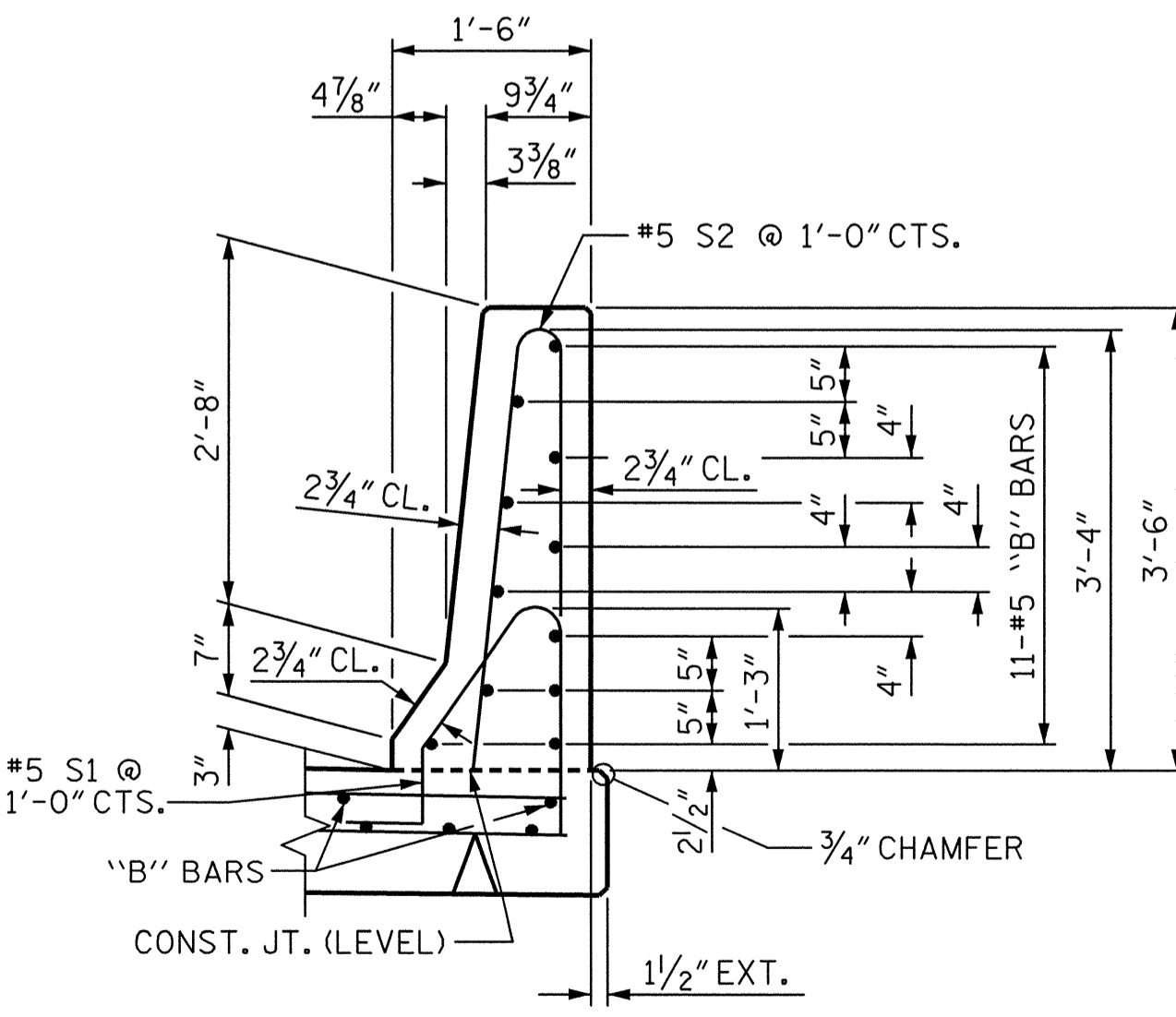
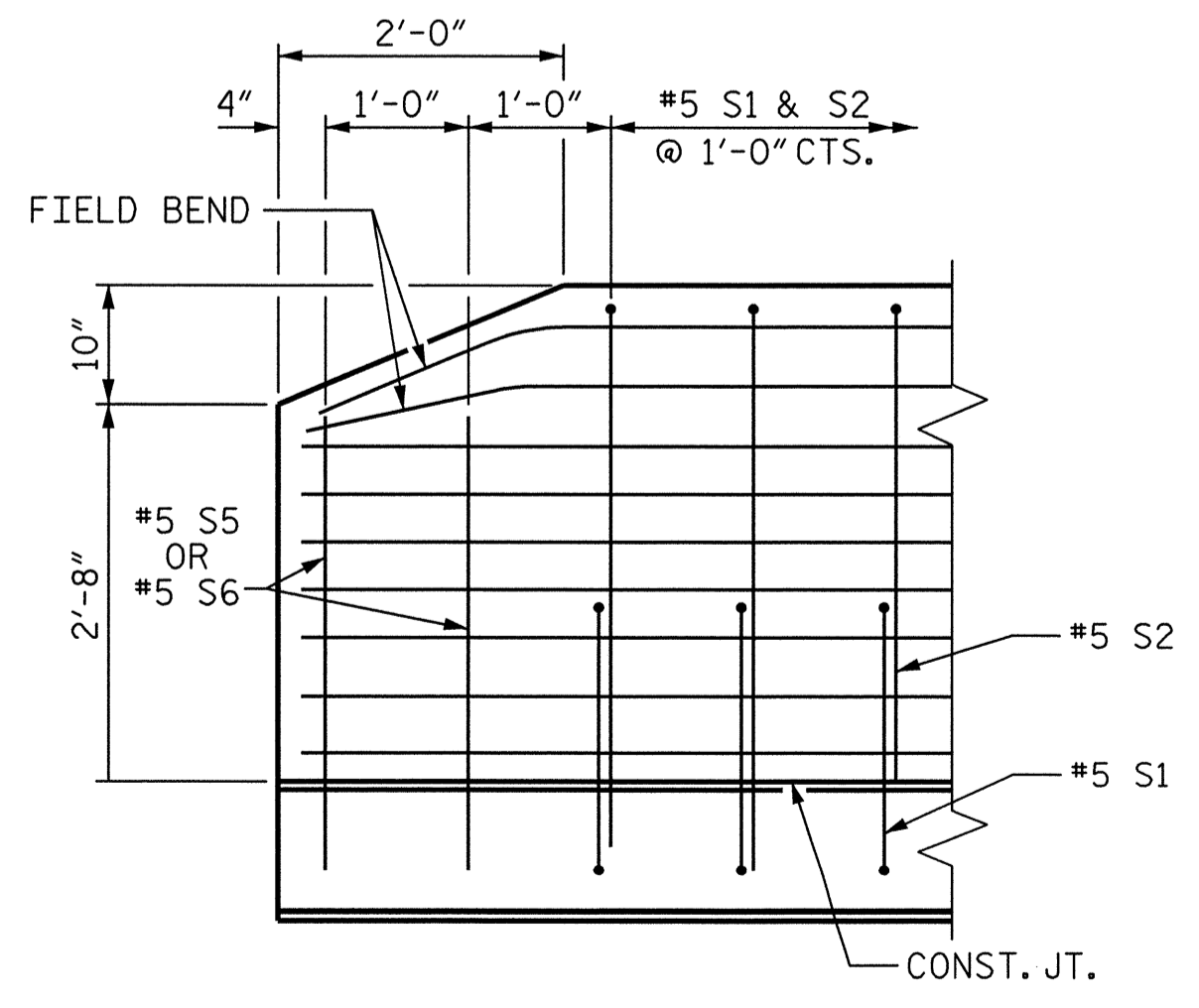
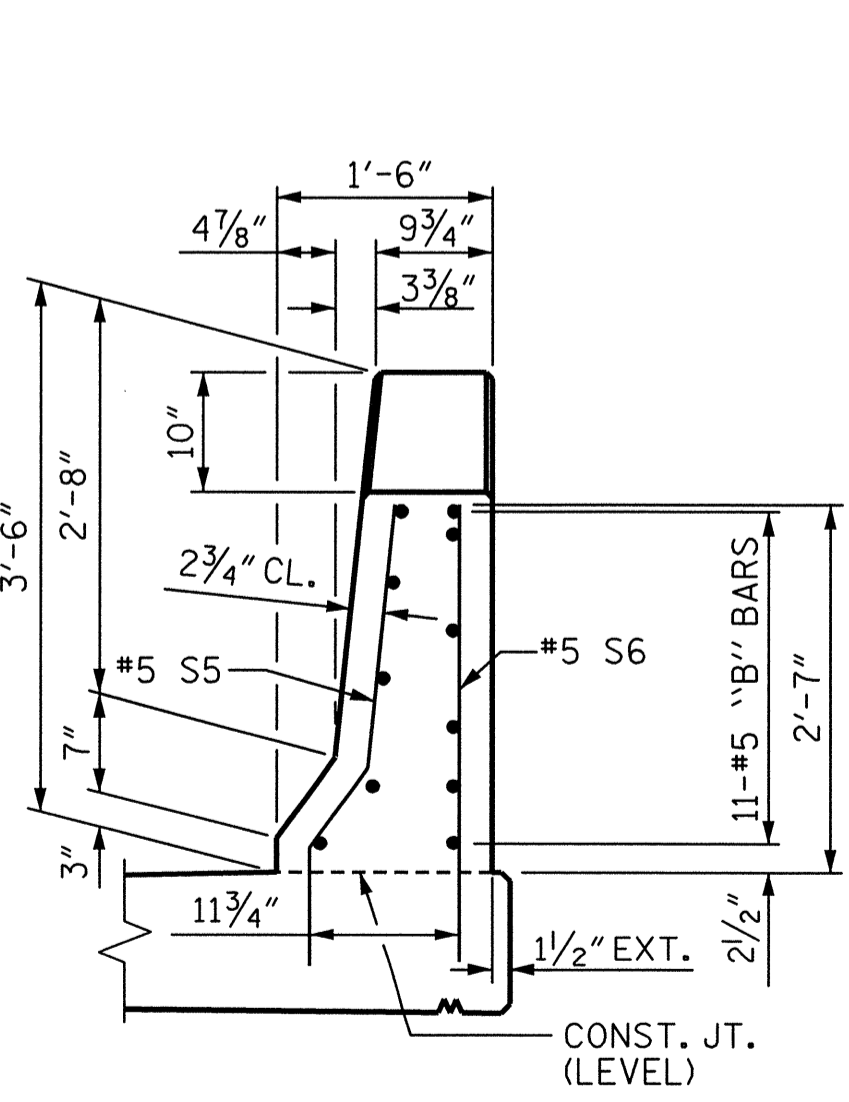
NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

QUANTITIES ARE FOR RAILS ON BOTH APPROACH SLABS.



END VIEW

SIDE VIEW

SECTION THRU RAIL

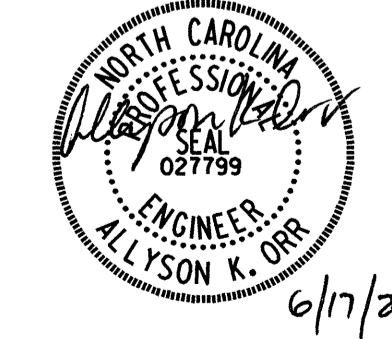
VIEW A-A

END OF RAIL DETAILS

PROJECT NO. B-4621
ROCKINGHAM COUNTY
STATION: 25+66.99 -L-
SHEET 3 OF 3

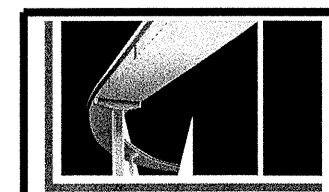
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT



6/17/2013

DRAWN BY : B.E. LANNING DATE : 02/13
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RALEIGH, NC 27606
(919) 851-6606
FIRM PE NUMBER : P-0671

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2			4			42

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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

REINFORCING STEEL:

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

STRUCTURAL STEEL:

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

HANDRAILS AND POSTS:

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990