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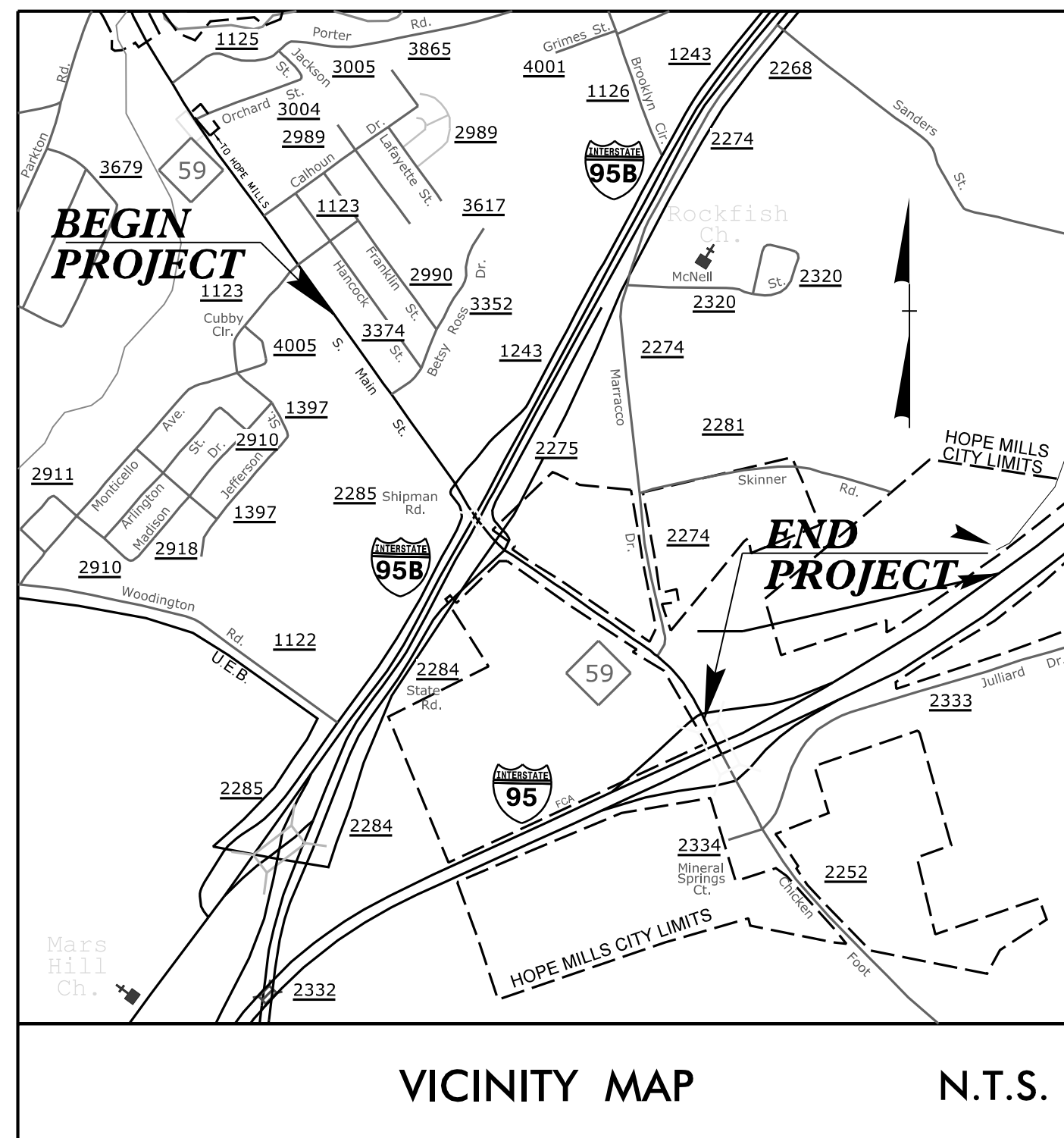
TIP PROJECT: B-4491

CONTRACT: C204076

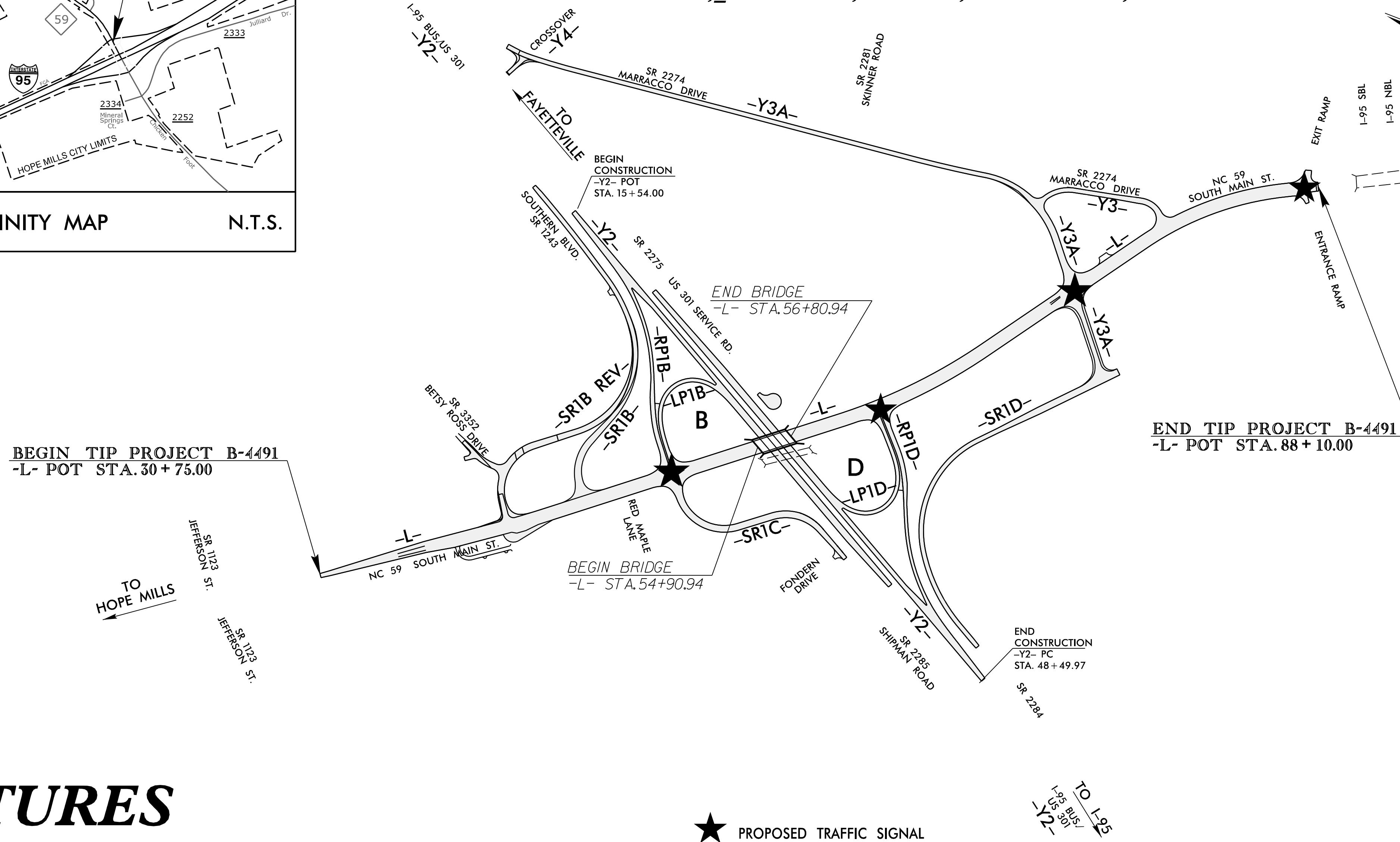
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

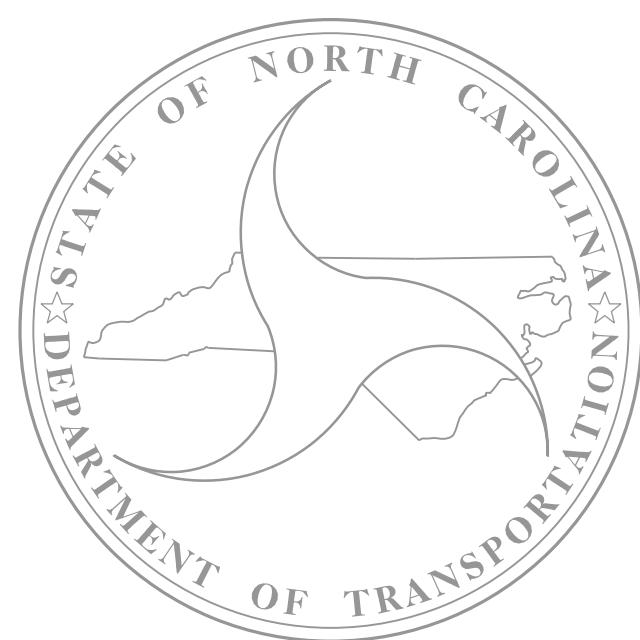
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4491	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
38389.1.1	BRSTP-0059(005)	P.E.	
38389.3.3	BRSTP-0059(005)	CONST.	



LOCATION: BRIDGE NO. 22 OVER I-95 BUSINESS /US 301 ON NC 59
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE, SIGNING AND SIGNALS.



STRUCTURES



DESIGN DATA

ADT (2018) = 21,580
ADT (2038) = 33,490
K = 9 %
D = 55 %
T = 9 % **
* V = 50 MPH
** (TTST 4 %, DUAL 5 %)
FUNC CLASS = COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4491 = 1.050 MILES
LENGTH STRUCTURE TIP PROJECT B-4491 = 0.036 MILES
TOTAL LENGTH TIP PROJECT B-4491 = 1.086 MILES

Prepared In the Office of:

moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX (F-0105)

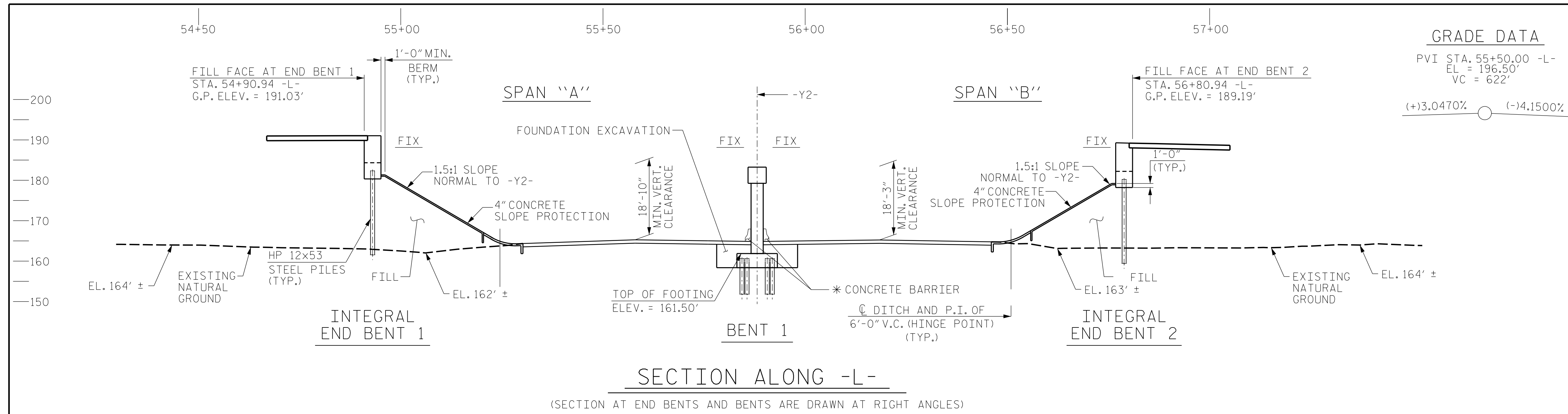
2018 STANDARD SPECIFICATIONS

LETTING DATE :

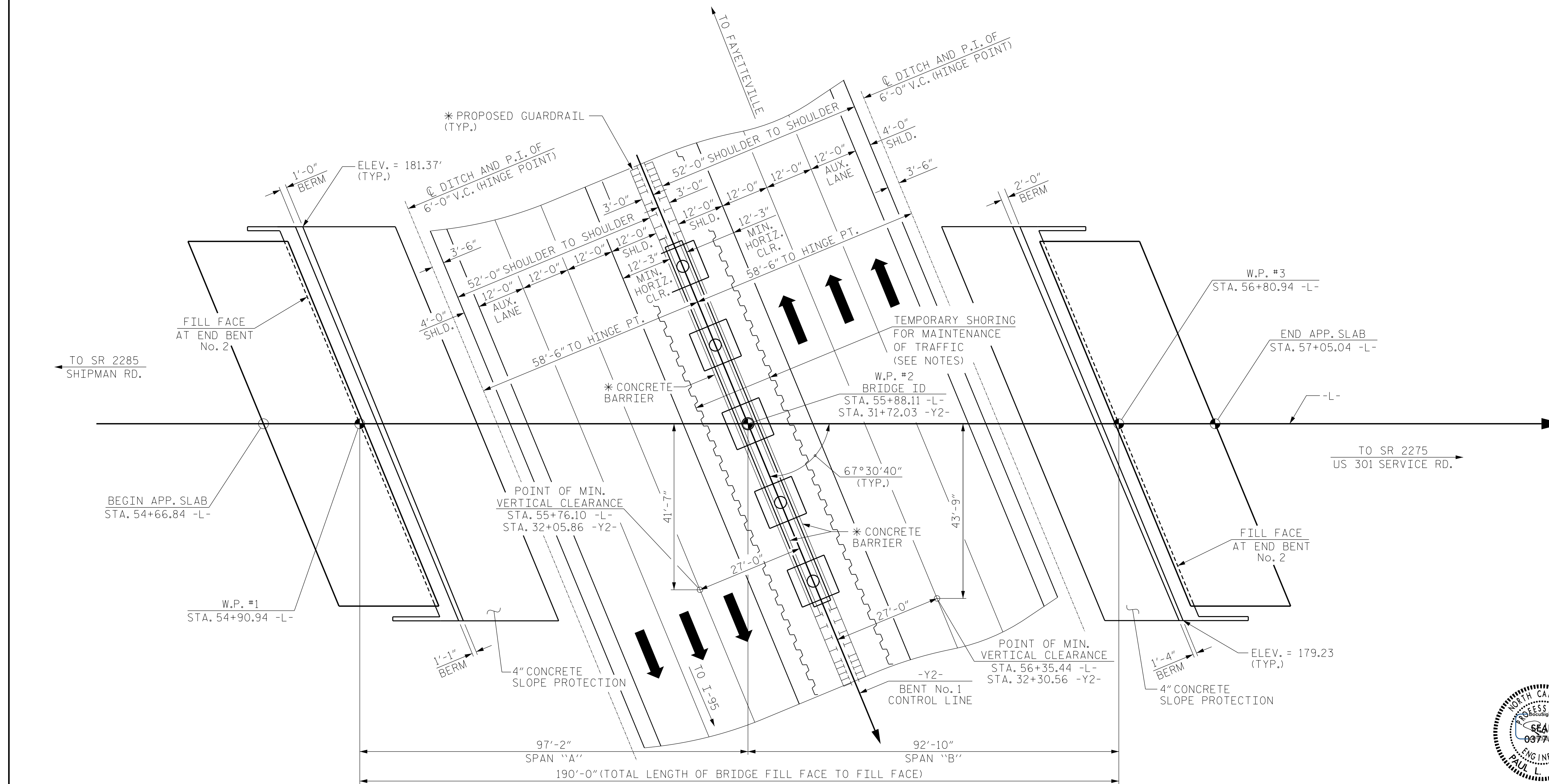
MARCH 20, 2018

PAUL L. JACOB, P.E.
PROJECT ENGINEER

DAVID STUTTS, P.E.
NCDOT CONTACT

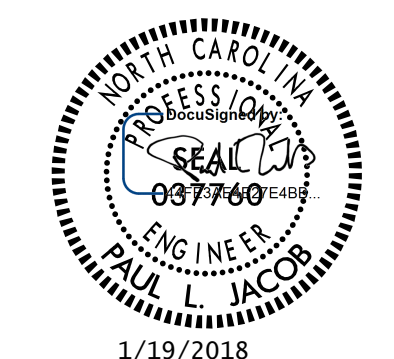


GRADE DATA
 PVI STA. 55+50.00 -L-
 EL. = 196.50'
 VC = 622'
 (+)3.0470% (-)4.1500%



PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
31+72.03 -Y2-
 SHEET 1 OF 3 REPLACES BRIDGE NO. 22

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON NC 59
 OVER I-95 BUSINESS / US 301
 BETWEEN SR 2285 AND SR 2275



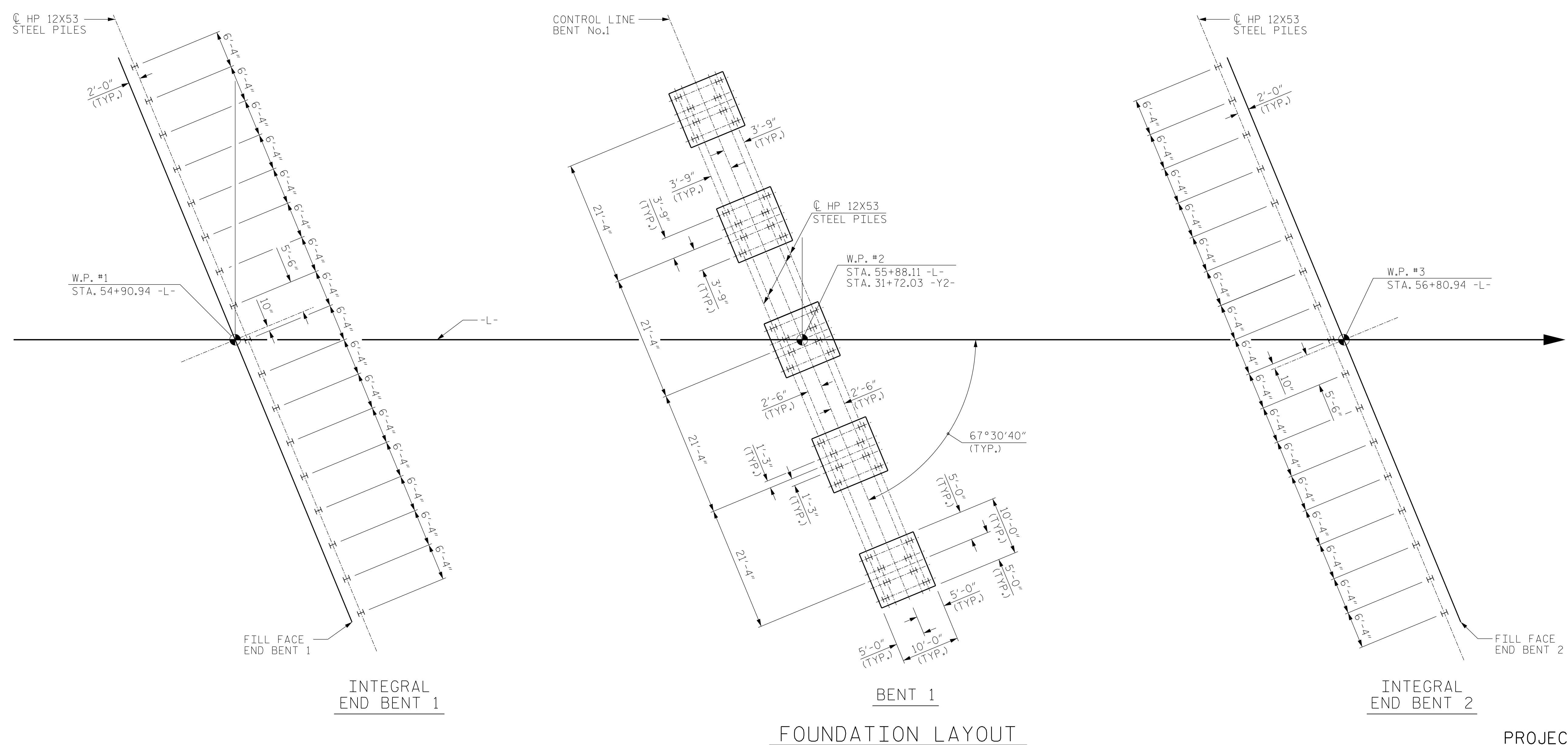
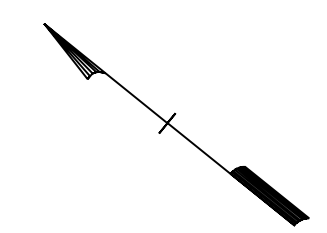
DRAWN BY : A. CHILKEPALLI DATE : 01/2018
 CHECKED BY : P. JACOB DATE : 01/2018
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 01/2018

moffatt & nichol
 4700 FALLS OF NEUSE ROAD, SUITE 300
 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License No.: F-0105

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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

1/19/2018 04:19:32:40\9240-03 B-4491\CADD\Working\B4491_SMLL\01_250022.dgn
 P. Jacob



NOTES

1. OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO.1 AND END BENT NO.2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS
2. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
3. PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.
4. PILES AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.
5. DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE.
6. DRIVE PILES AT BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.
7. TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

FOUNDATION LAYOUT



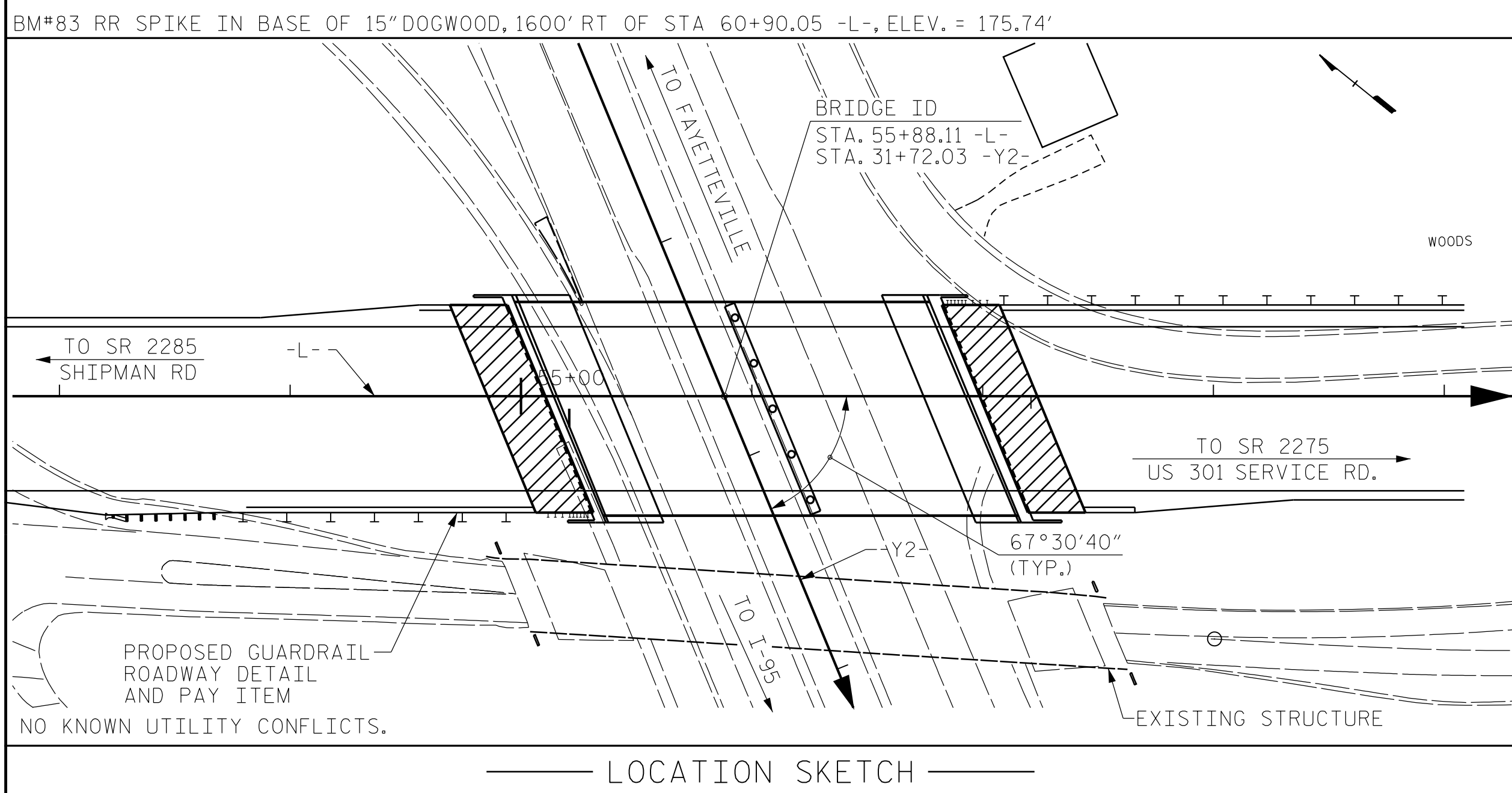
moffatt & nichol
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 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License NO.: F-0105

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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			35

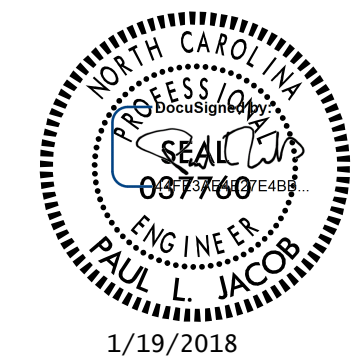
DRAWN BY : A. CHILKEPALLI DATE : 01/2018
 CHECKED BY : P. JACOB DATE : 01/2018
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 01/2018

1/19/2018 2:40:32 PM C:\Users\pjacob\OneDrive\Documents\B-4491\CADD\Working\B-4491_SMLL\F.L.250022.dgn
 P. JACOB



NOTES

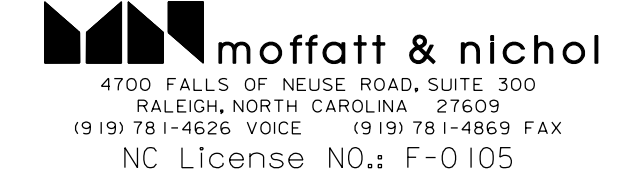
1. ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
2. THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
3. THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
4. FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
5. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
6. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
7. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
8. FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
9. 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 BAR SIZE 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.
10. THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATIONS 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.
11. FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
12. PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
13. REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-03 OF THE STANDARD SPECIFICATIONS.
14. NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
15. 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.
16. AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE, CONSISTING OF 59.91'-2@70.08'-59.75', REINFORCED CONCRETE DECK ON I-BEAMS, 28' CLEAR ROADWAY, AND LOCATED 80' SOUTH OF PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
17. 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.
18. FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
19. FOR FOUNDATION NOTES, SEE SHEET 2.
20. FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION & RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.



TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION AT BENT	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	PILE REDRIVES	TWO BAR METAL RAIL	1'-2" X 3'-2 3/4" CONCRETE PARAPET	4" SLOPE PROTECTION	ASBESTOS ASSESSMENT	ELASTOMERIC BEARINGS	
	LUMP SUM	LUMP SUM	SO.FT.	SO.FT.	CU.YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN.FT.	EACH	NO.	LIN.FT.	EA.	LIN.FT.	SO.YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			17424	20636		LUMP SUM			18	1676.25			360.43	376.39				LUMP SUM
END BENT NO.1					75.6		10294				17	1530	9		326.4			
BENT NO.1		LUMP SUM			163.3		32938	2122			40	2400	20					LUMP SUM
END BENT NO.2					81.0		10812				17	1445	9		255.1			
TOTAL	LUMP SUM	LUMP SUM	17424	20636	319.9	LUMP SUM	54044	2122	18	1676.25	74	5375	38	360.43	376.39	581.5	LUMP SUM	

DRAWN BY : _____ A. CHILKEPALLI _____ DATE : 01/2018
 CHECKED BY : _____ P. JACOB _____ DATE : 01/2018
 DESIGN ENGINEER OF RECORD: _____ P. JACOB _____ DATE : 01/2018



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 59
 OVER I-95 BUSINESS / US 301
 BETWEEN SR 2285 AND SR 2275

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

1/19/2018 9:24:03 AM \\PRA\9240\9240-03 B-4491\CADD\Working\B4491_SMLL\003_250022.dgn p.jacob

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ _{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	1.05	--	1.75	0.900	1.82	A	ER	46.9	1.083	1.05	A	I	89.2	0.80	0.900	1.37	A	ER	46.9		
	HL-93 (OPERATING)	N/A		1.38	--	1.35	0.900	2.36	A	ER	46.9	1.083	1.38	A	I	89.2	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.50	54.00	1.75	0.900	2.47	A	ER	46.9	1.083	1.50	A	I	89.1	0.80	0.900	1.87	A	ER	46.9		
	HS-20 (OPERATING)	36.000		1.96	70.56	1.35	0.900	3.20	A	ER	46.9	1.083	1.96	A	I	89.1	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.35	58.72	1.40	0.900	7.20	A	ER	46.9	1.083	4.84	A	I	89.1	0.80	0.900	4.35	A	ER	46.9	
		SNGARBS2	20.000		3.17	63.40	1.40	0.900	5.24	A	ER	46.9	1.083	3.39	A	I	89.1	0.80	0.900	3.17	A	ER	46.9	
		SNAGRIS2	22.000		2.97	65.34	1.40	0.900	4.91	A	ER	46.9	1.083	3.11	A	I	89.1	0.80	0.900	2.97	A	ER	46.9	
		SNCOTTS3	27.250		2.15	58.58	1.40	0.900	3.57	A	ER	46.9	1.083	2.71	A	I	89.1	0.80	0.900	2.15	A	ER	46.9	
		SNAGGRS4	34.925		1.78	62.16	1.40	0.900	2.95	A	ER	46.9	1.083	1.91	A	I	89.1	0.80	0.900	1.78	A	ER	46.9	
		SNS5A	35.550		1.75	62.21	1.40	0.900	2.89	A	ER	37.4	1.083	1.90	A	I	89.1	0.80	0.900	1.75	A	ER	46.9	
		SNS6A	39.950		1.60	63.92	1.40	0.900	2.63	A	ER	37.4	1.083	1.71	A	I	89.1	0.80	0.900	1.60	A	ER	46.9	
	SNS7B	42.000		1.52	63.84	1.40	0.900	2.51	A	ER	37.4	1.083	1.65	A	I	89.1	0.80	0.900	1.52	A	ER	46.9		
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		1.95	64.35	1.40	0.900	3.23	A	ER	46.9	1.083	2.05	A	I	89.1	0.80	0.900	1.95	A	ER	46.9	
		TNT4A	33.075		1.94	64.16	1.40	0.900	3.20	A	ER	37.4	1.083	2.08	A	I	89.1	0.80	0.900	1.94	A	ER	46.9	
		TNT6A	41.600		1.58	65.72	1.40	0.900	2.62	A	ER	46.9	1.083	1.71	A	I	89.1	0.80	0.900	1.58	A	ER	46.9	
		TNT7A	42.000		1.59	66.78	1.40	0.900	2.62	A	ER	37.4	1.083	1.69	A	I	89.1	0.80	0.900	1.59	A	ER	46.9	
		TNT7B	42.000		1.62	68.04	1.40	0.900	2.66	A	ER	37.4	1.083	1.64	A	I	89.1	0.80	0.900	1.62	A	ER	46.9	
		TNAGRIT4	43.000		1.56	67.08	1.40	0.900	2.58	A	ER	46.9	1.083	1.60	A	I	89.1	0.80	0.900	1.56	A	ER	46.9	
TNAGT5A		45.000		1.48	66.60	1.40	0.900	2.44	A	ER	37.4	1.083	1.54	A	I	89.1	0.80	0.900	1.48	A	ER	46.9		
TNAGT5B	45.000	③	1.46	65.25	1.40	0.900	2.41	A	ER	46.9	1.083	1.52	A	I	89.1	0.80	0.900	1.46	A	ER	46.9			

LOAD FACTORS:

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

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

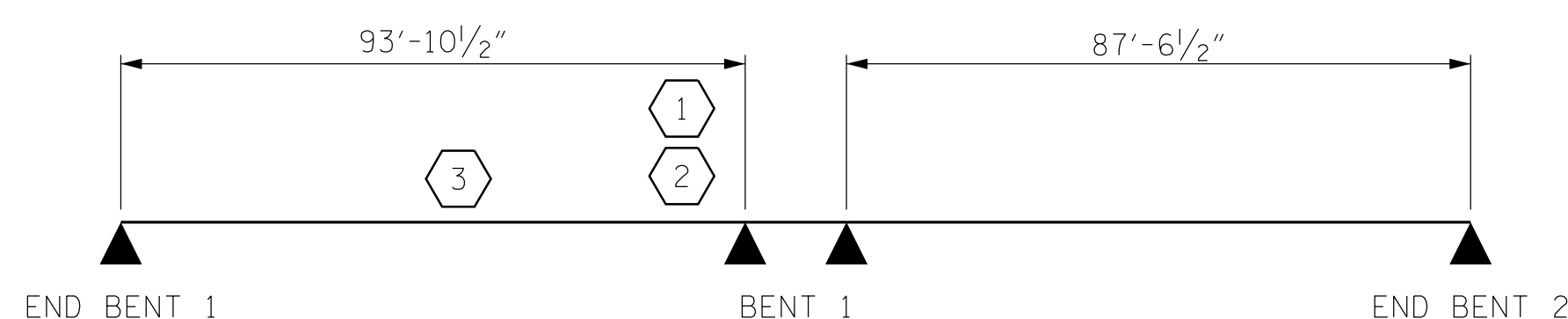
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



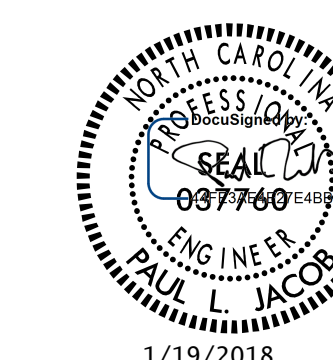
LRFR SUMMARY

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

ASSEMBLED BY : M. COKER DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DRAWN BY : MAA 1/08
 CHECKED BY : GM/DI 2/08

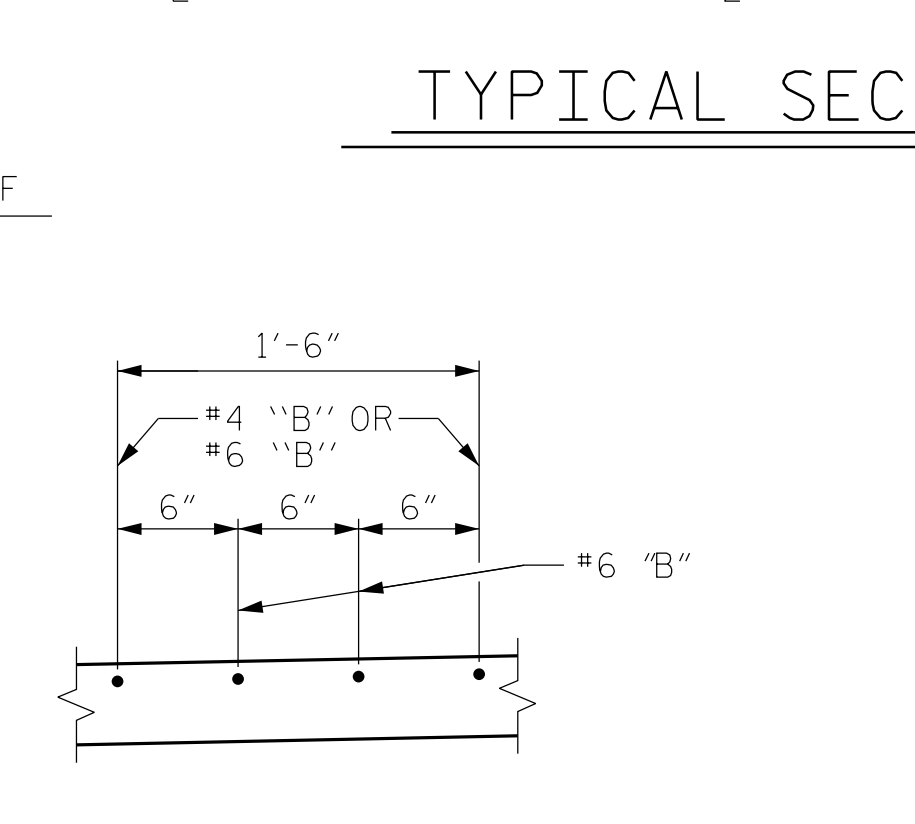
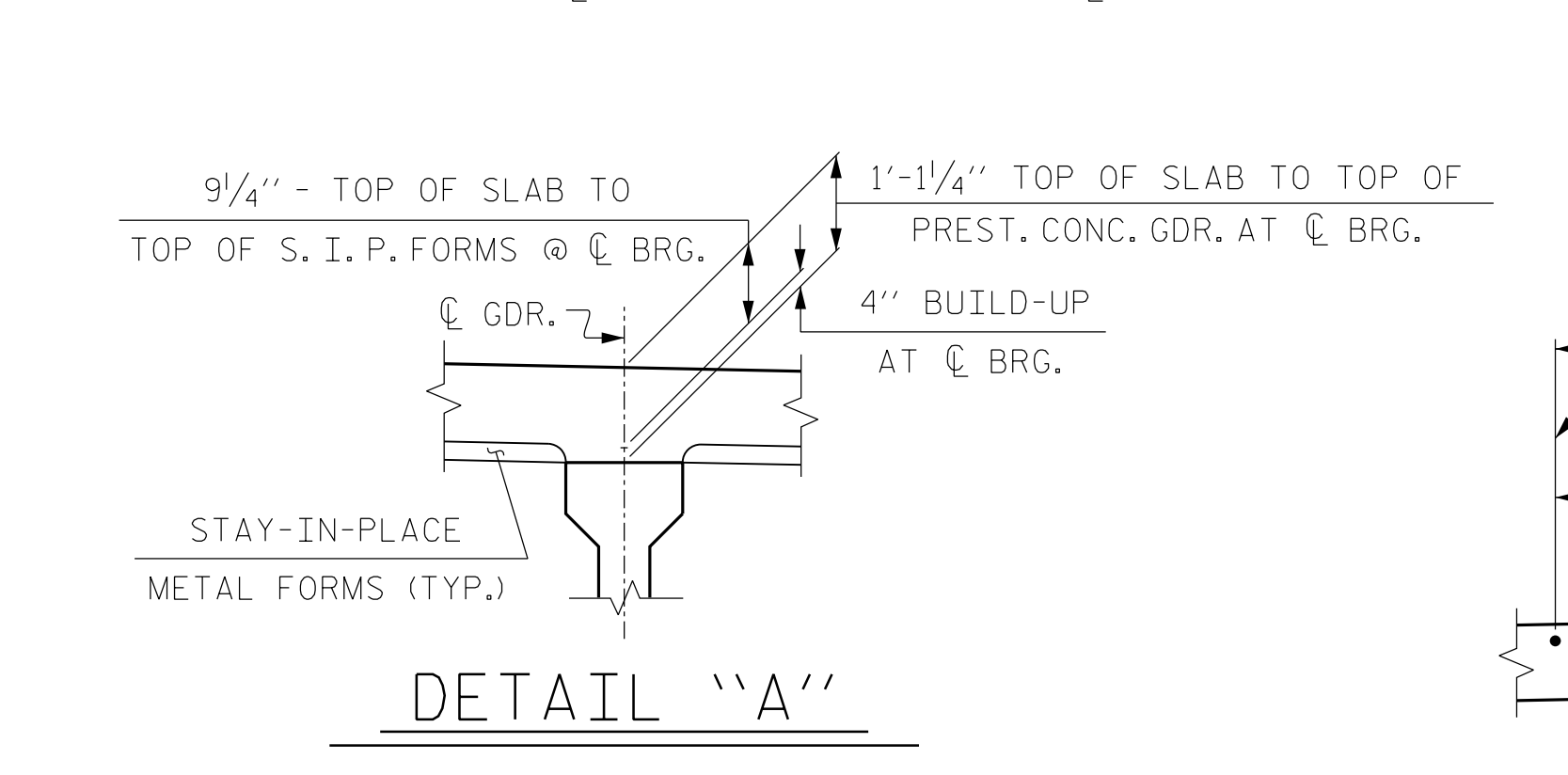
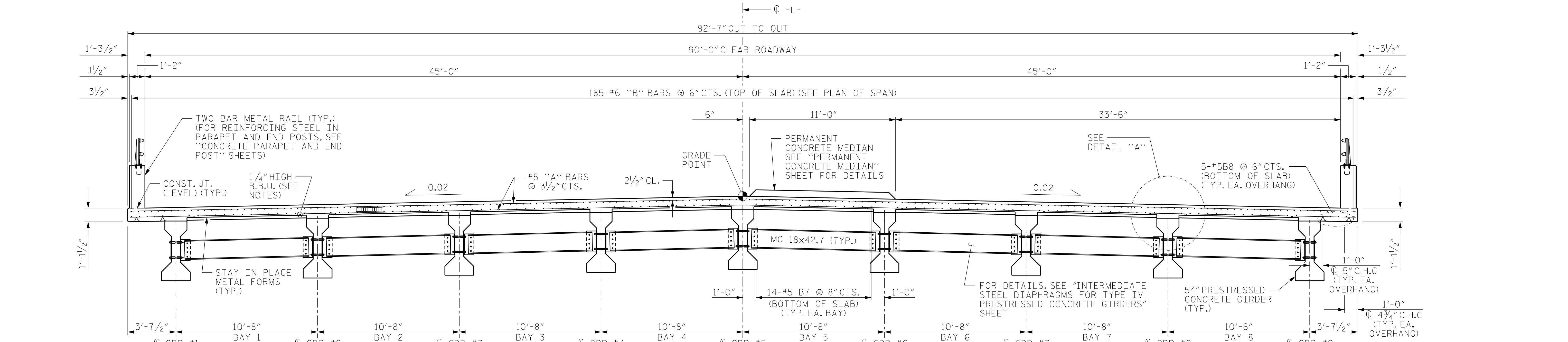
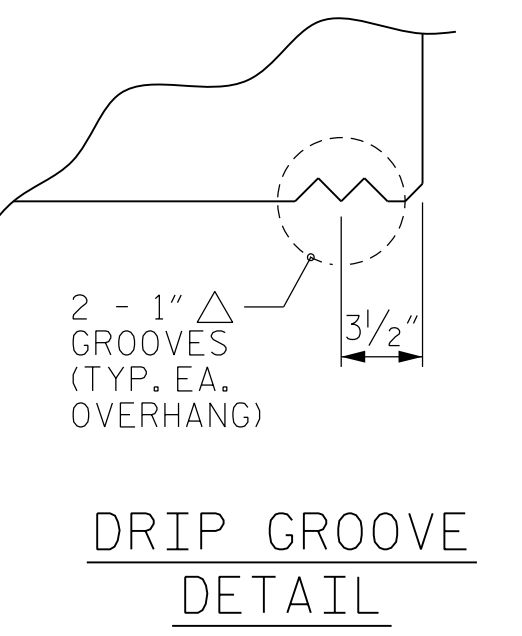
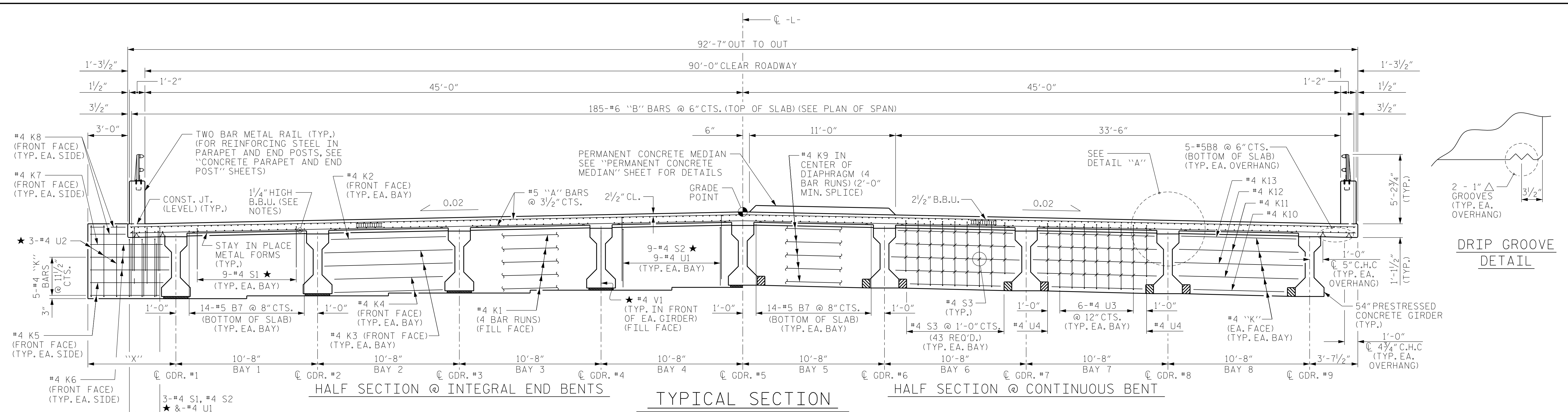
REV. 11/2/08RR MAA/GM
 REV. 10/1/11 MAA/GM

moffatt & nichol
 4700 FALLS OF NEUSE ROAD, SUITE 300
 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License NO.: F-0105



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 SIGNATURES COMPLETED

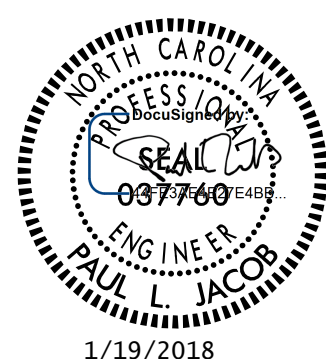
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC)					
REVISIONS					SHEET NO. S-4
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 35



BEAM TO END OF CAP DIMENSION "X" (MEASURED ALONG FRONT FACE)		
	LT.	RT.
EB 1	7'-2 3/4"	7'-3"
EB 2	7'-3"	7'-2 3/4"

SHOWING TOP OF SLAB "B" BAR SPACING @ INTEGRAL END BENT OR INTERIOR BENT

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 1 OF 6



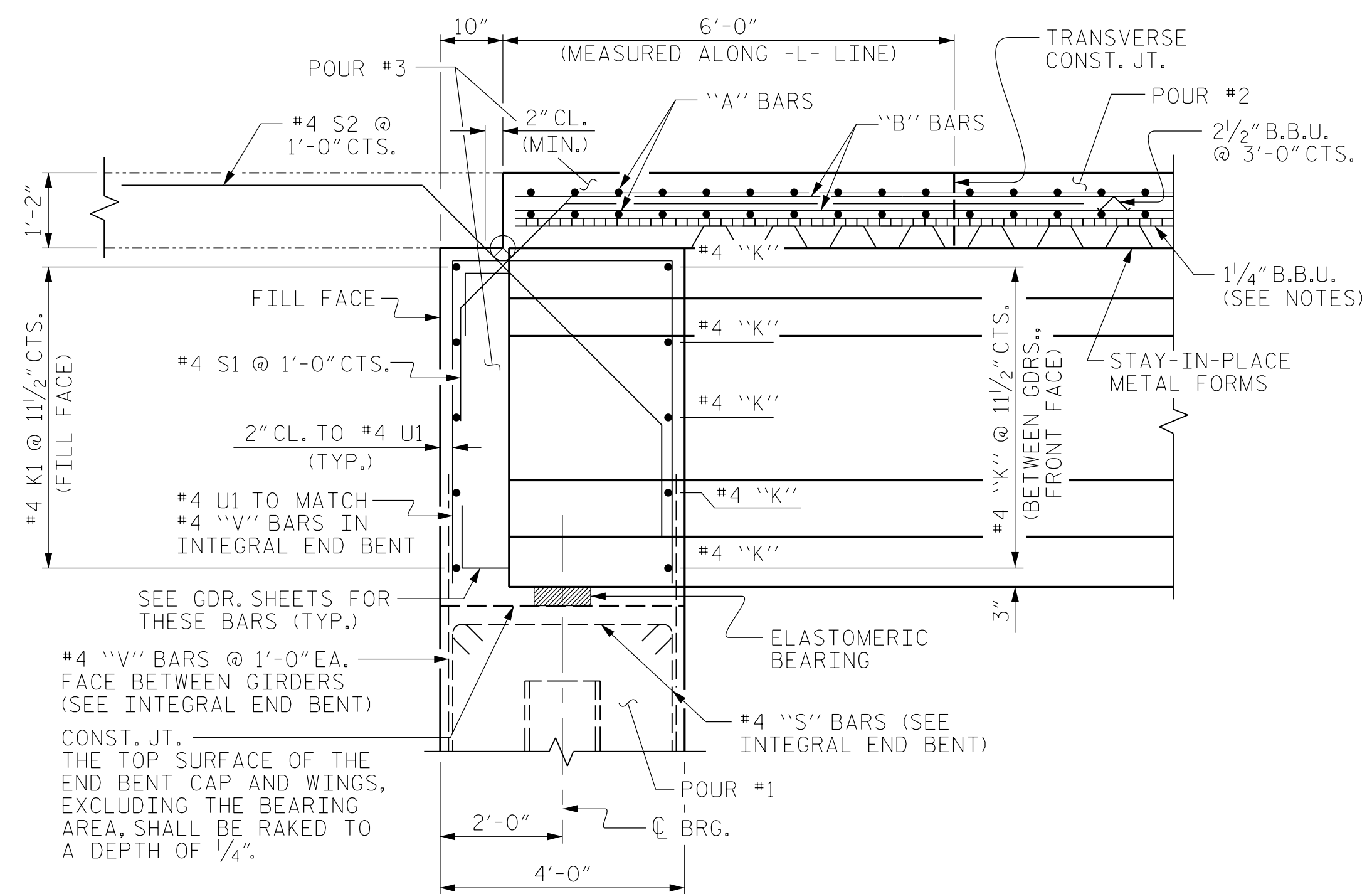
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION

DRAWN BY : M. COKER DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD : P. JACOB DATE : 05/2017

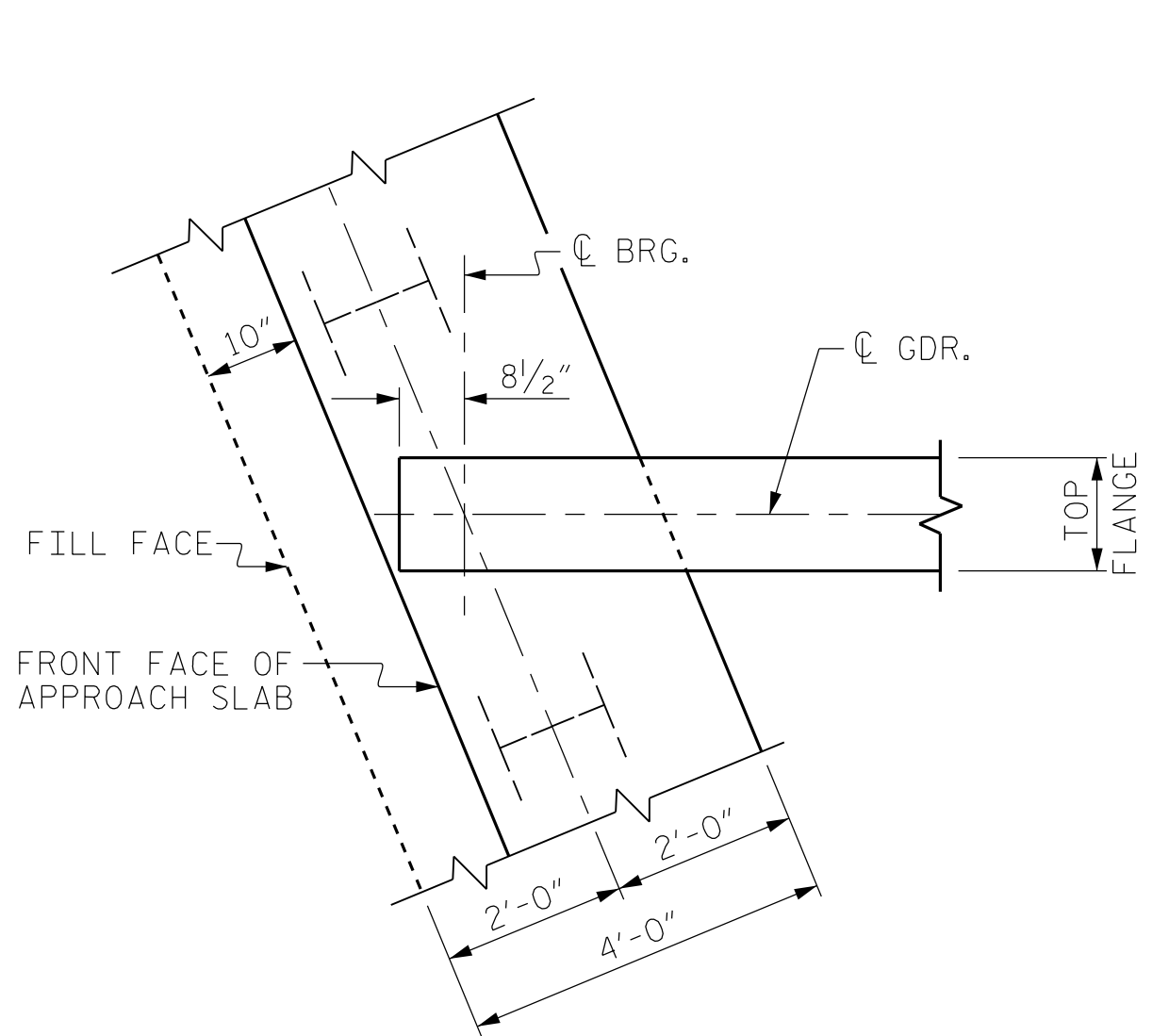
moffatt & nichol
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 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License NO.: F-0105

REVISIONS						SHEET NO. S-5 TOTAL SHEETS 35
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

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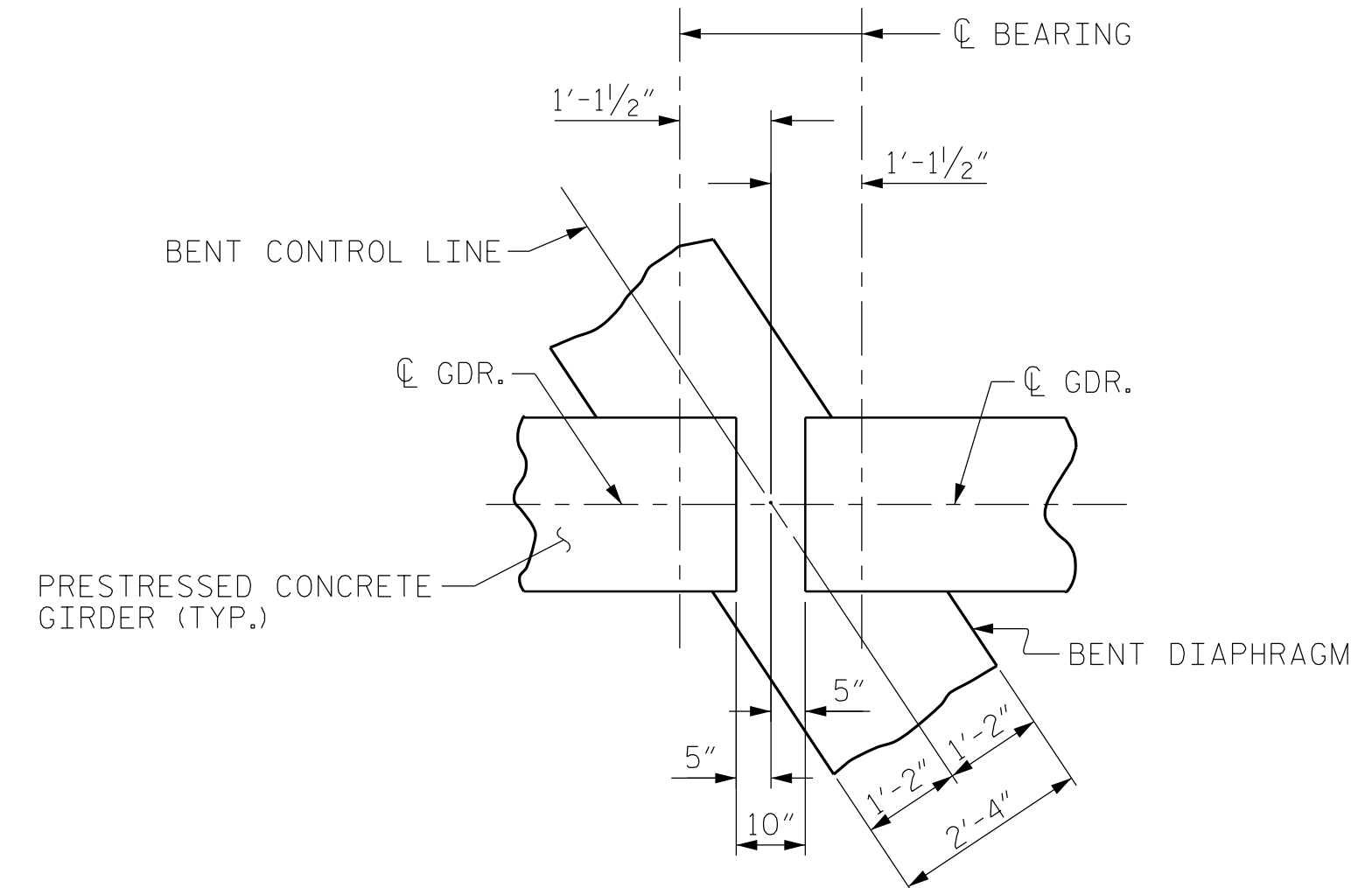


END OF GIRDER DETAIL AT INTEGRAL END BENT

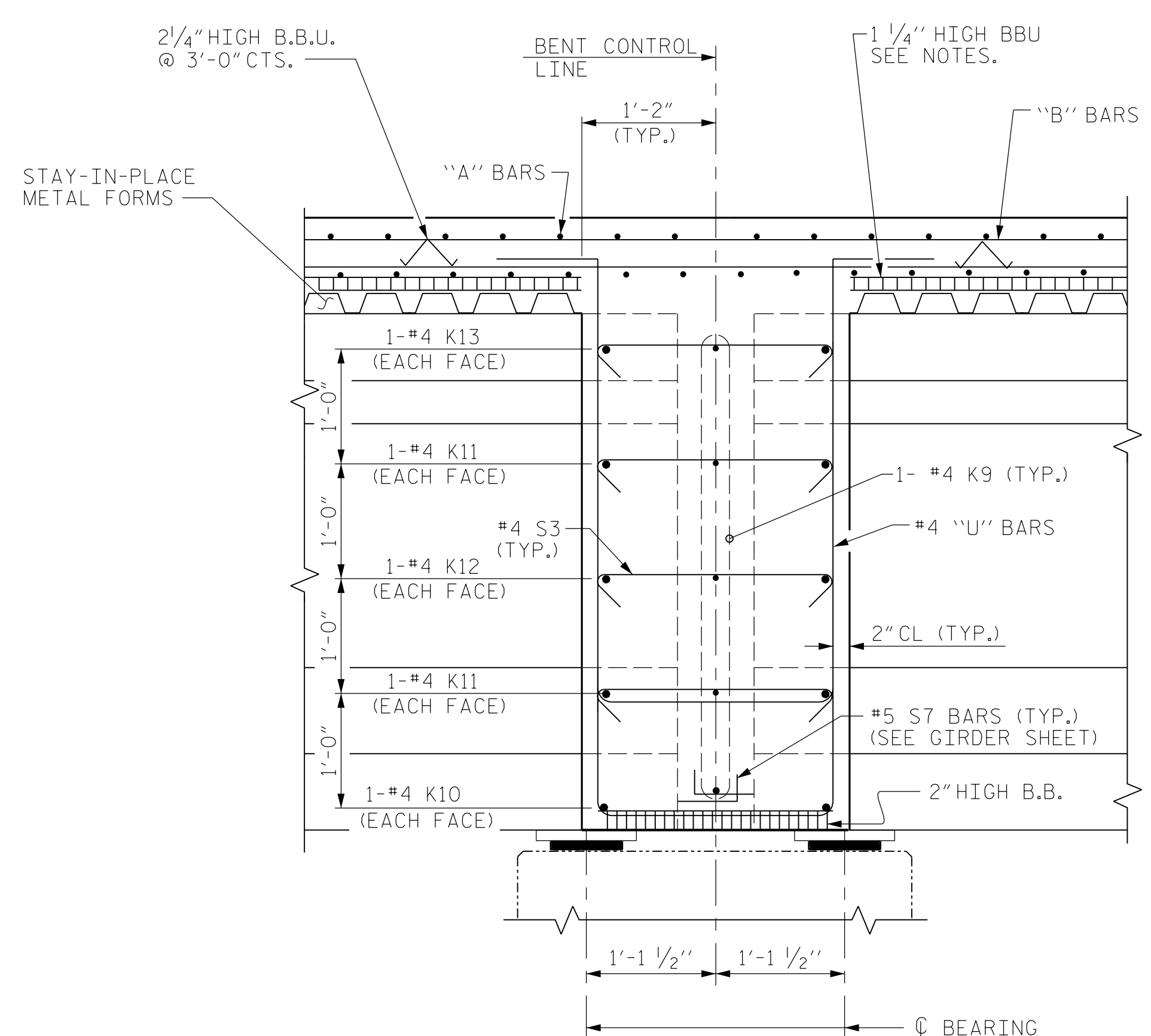


PLAN OF GIRDER AT INTEGRAL END BENT NO. 1

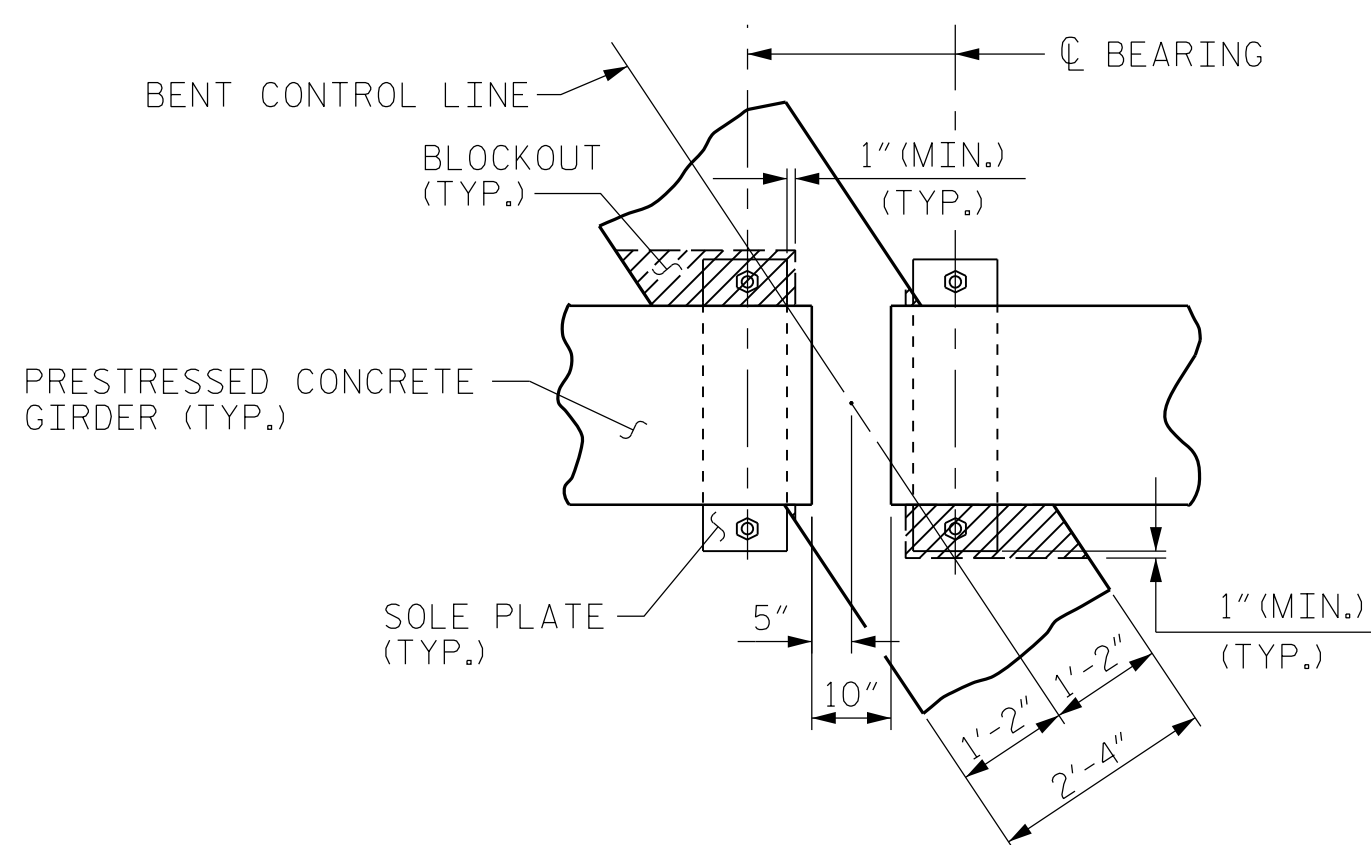
PLAN OF GIRDER AT INTEGRAL END BENT NO. 2 IS SIMILAR



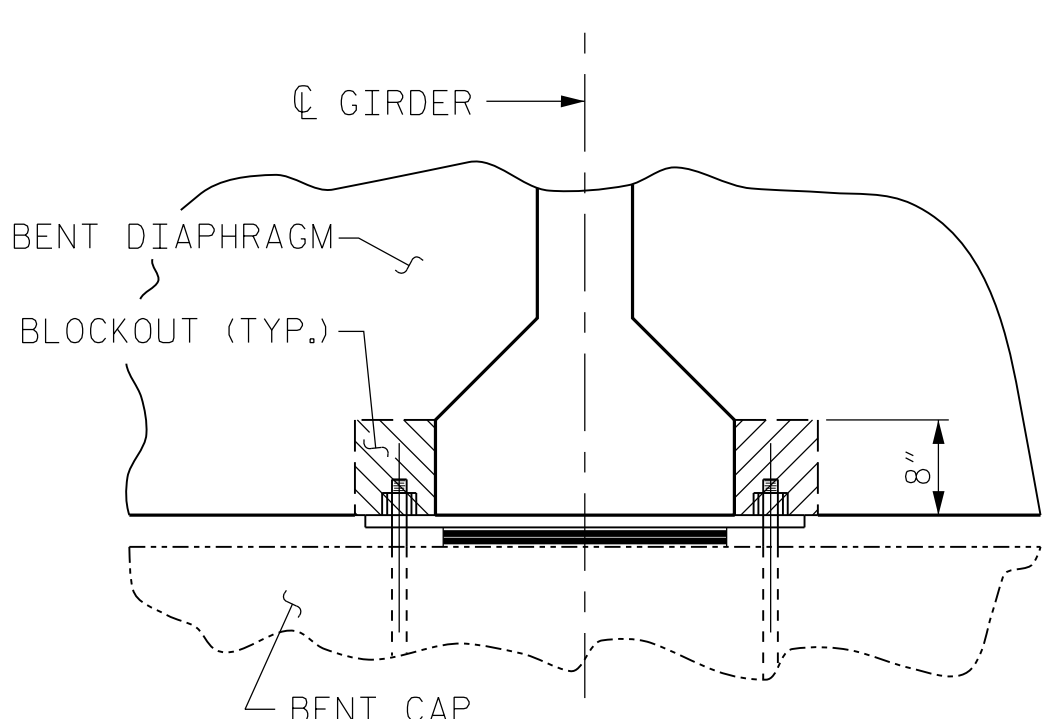
PLAN OF GIRDER AT BENT



SECTION THROUGH BENT DIAPHRAGM



PLAN



SECTION

BENT DIAPHRAGM BLOCK-OUT DETAIL

NOTES

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

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

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

CONCRETE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN UNIT HAS BEEN CAST AND HAS REACHED A COMPRESSIVE STRENGTH OF 3000 PSI.

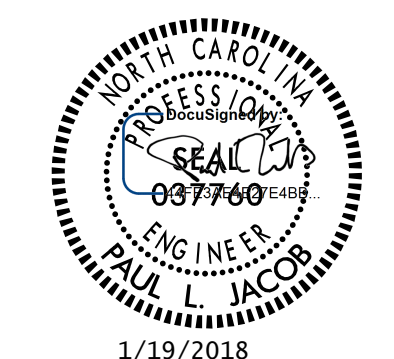
PROJECT NO. B-4491

CUMBERLAND COUNTY

STATION: 55+88.11 -L-

SHEET 2 OF 6

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



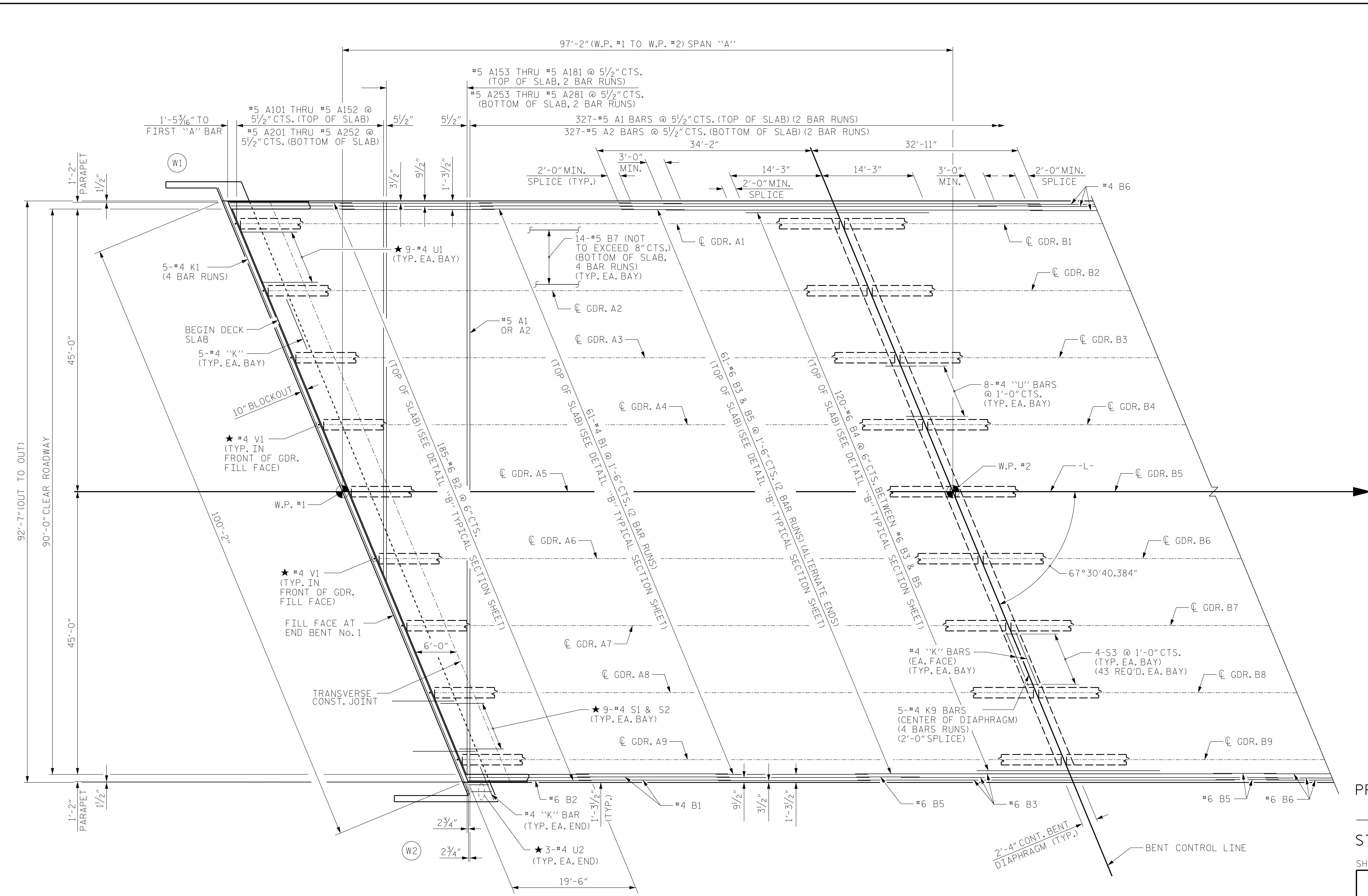
1/19/2018

DRAWN BY : M. RAY DATE : 05/2017
CHECKED BY : P. JACOB DATE : 05/2017
DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			35



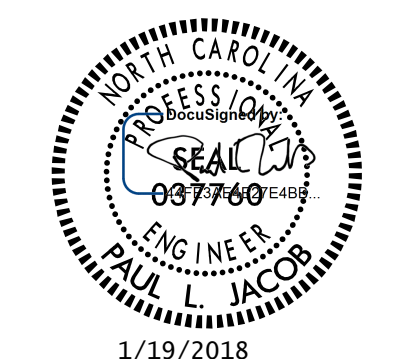
SPAN "A"

* #4 U1, #4 U2, #4 S1, #4 S2 & #4 V1 BARS TO MATCH "V" BARS IN INTEGRAL END BENT CAP.

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 3 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPANS
 SPAN "A"



1/19/2018

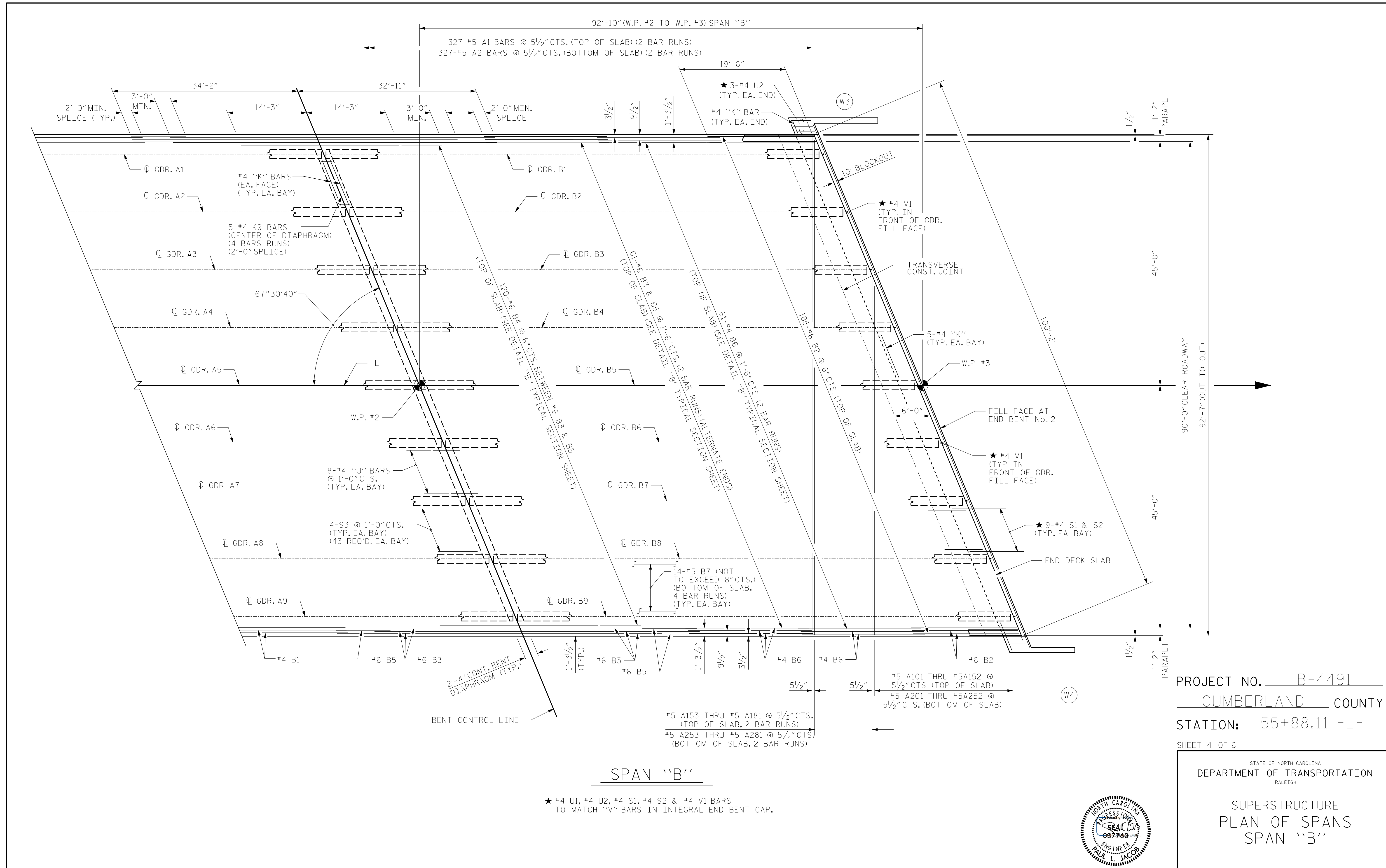
DRAWN BY : M. RAY DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			35

1/19/2018 2:40:32 PM C:\CADD\Working\B4491\SMULS1.250022.dgn P. JACOB



SPAN "B"

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PROJECT NO. B-4491

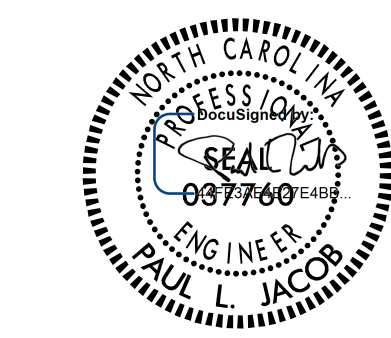
CUMBERLAND COUNTY

STATION: 55+88.11 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
SPAN "B"



1/19/2018

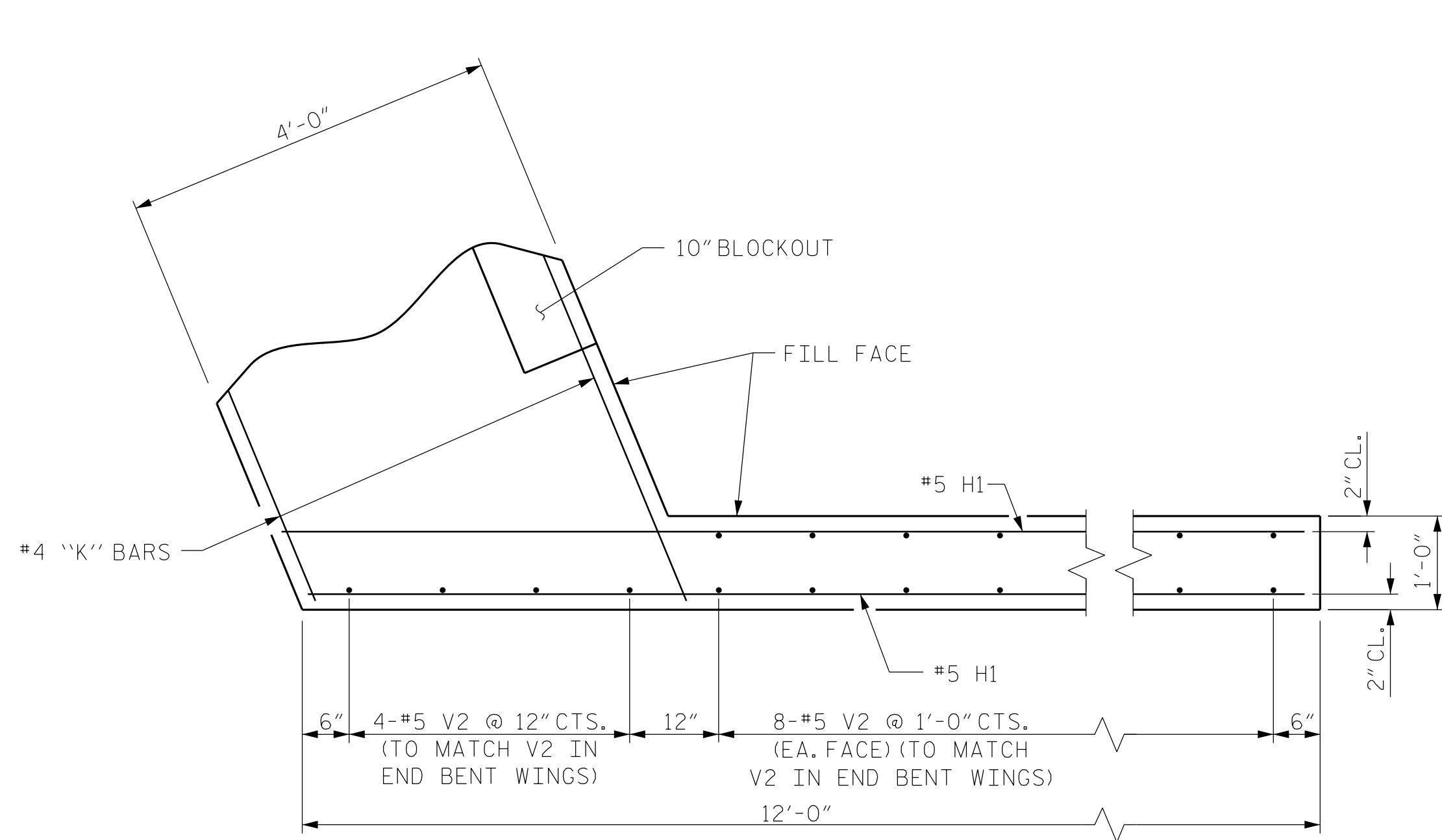
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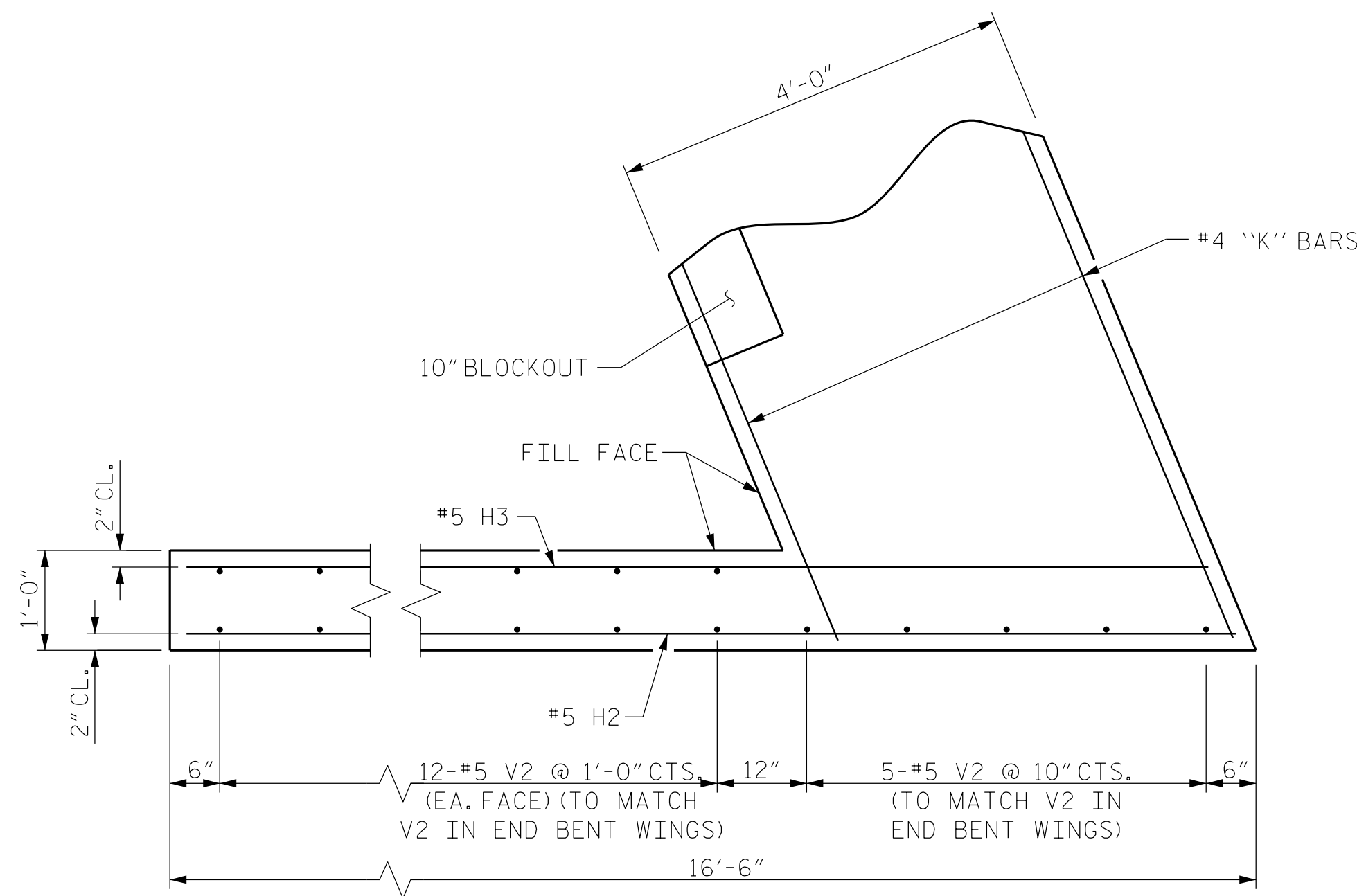
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			35

DRAWN BY :	M. RAY	DATE :	05/2017
CHECKED BY :	P. JACOB	DATE :	05/2017
DESIGN ENGINEER OF RECORD:	P. JACOB	DATE :	05/2017

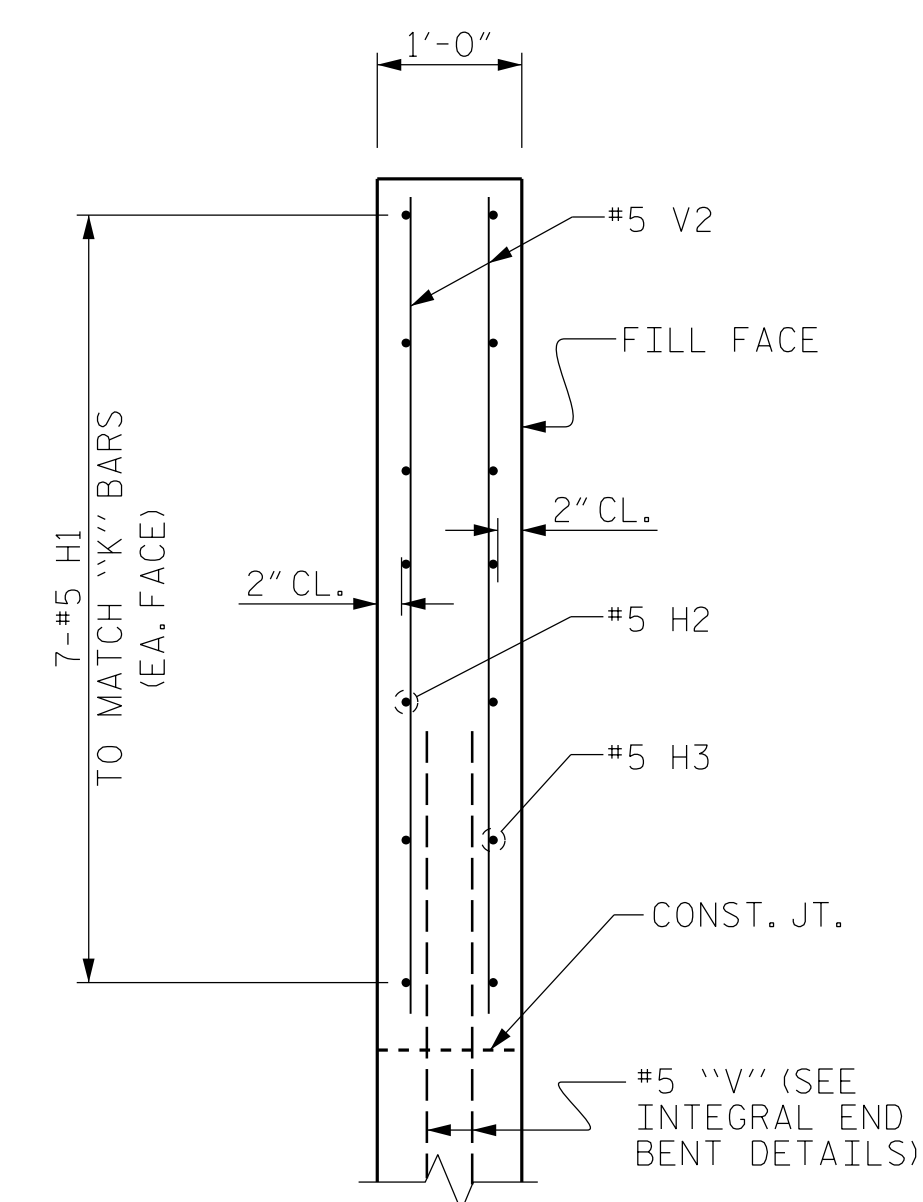
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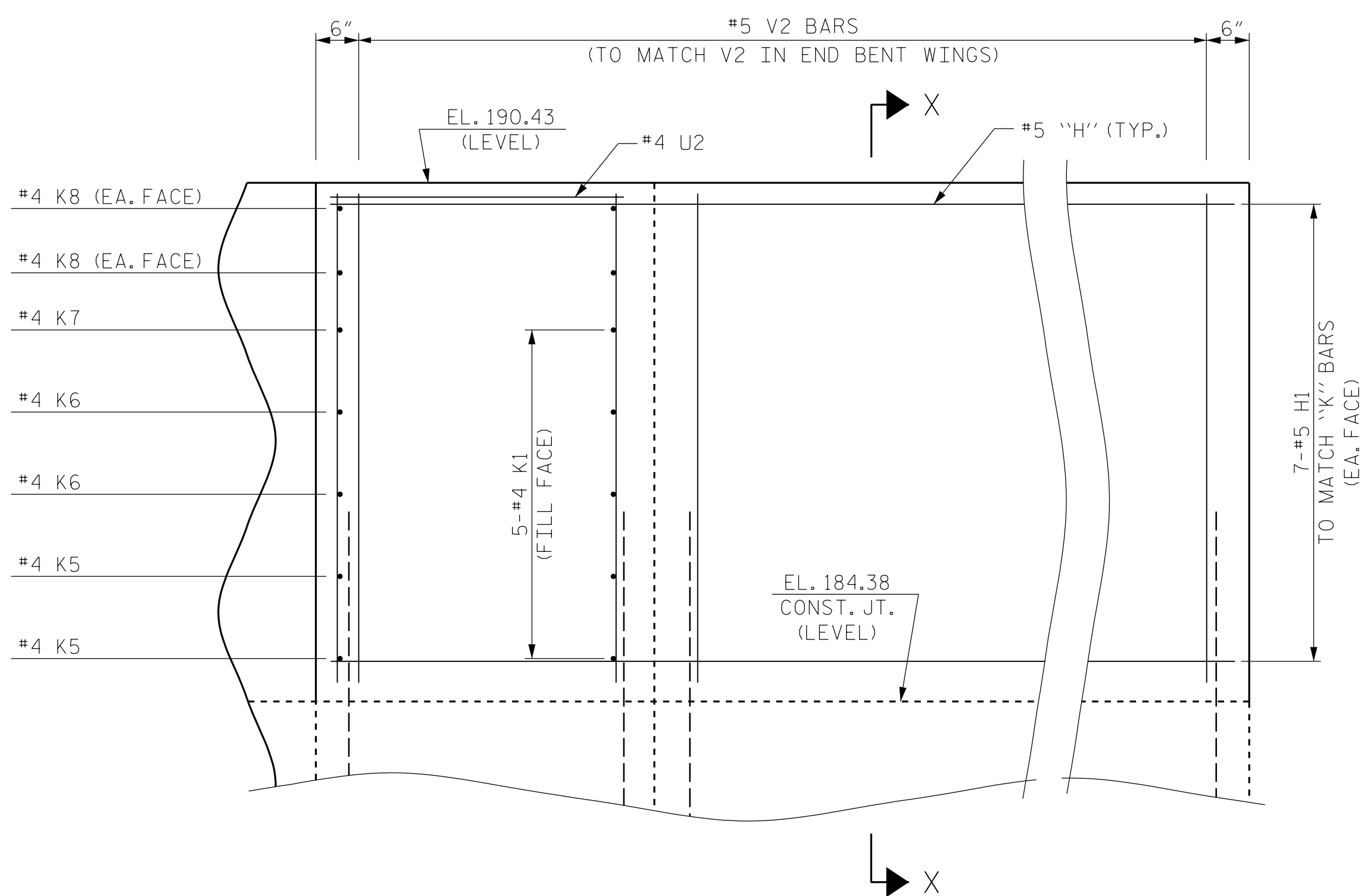
PLAN OF WING (W1)



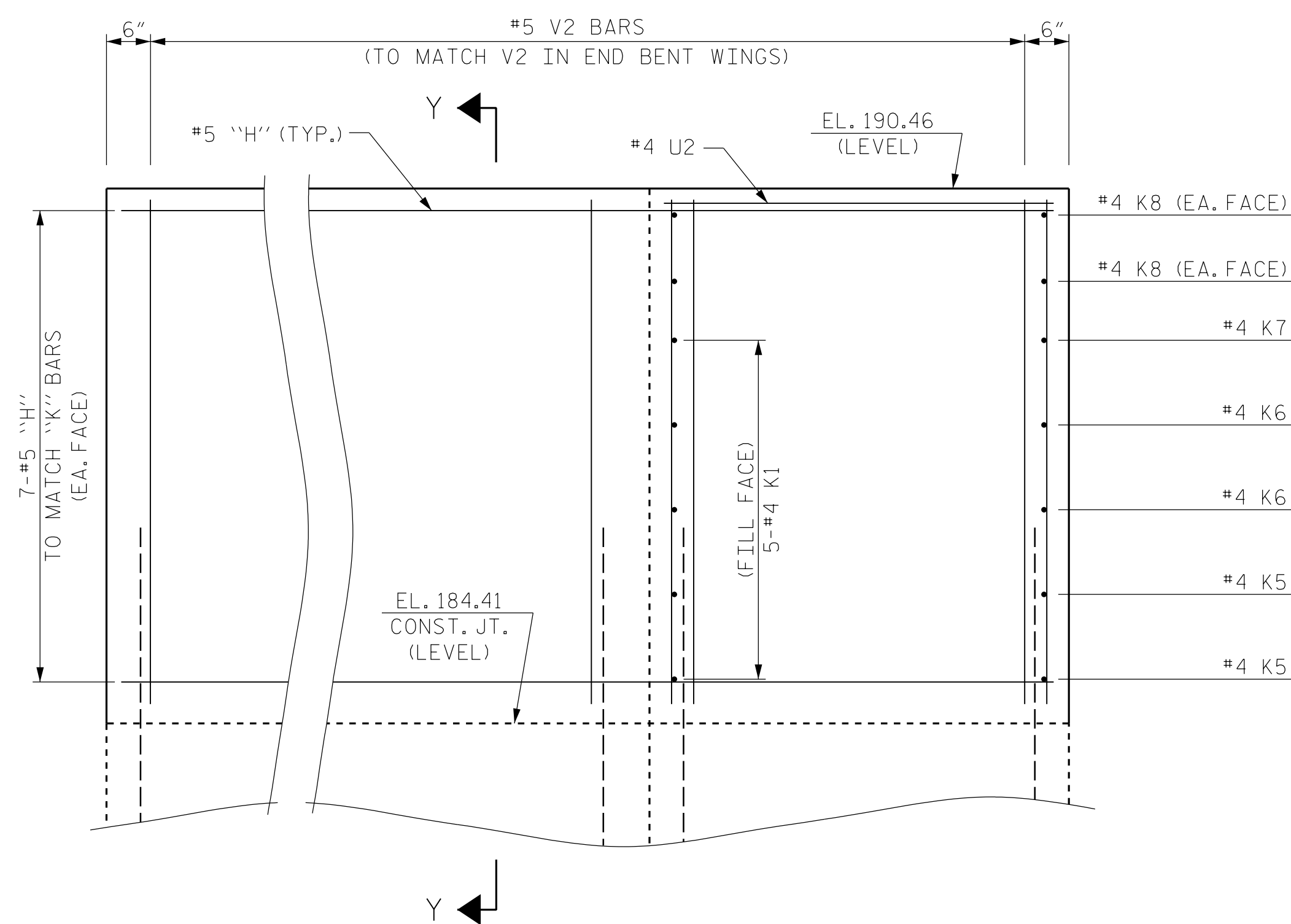
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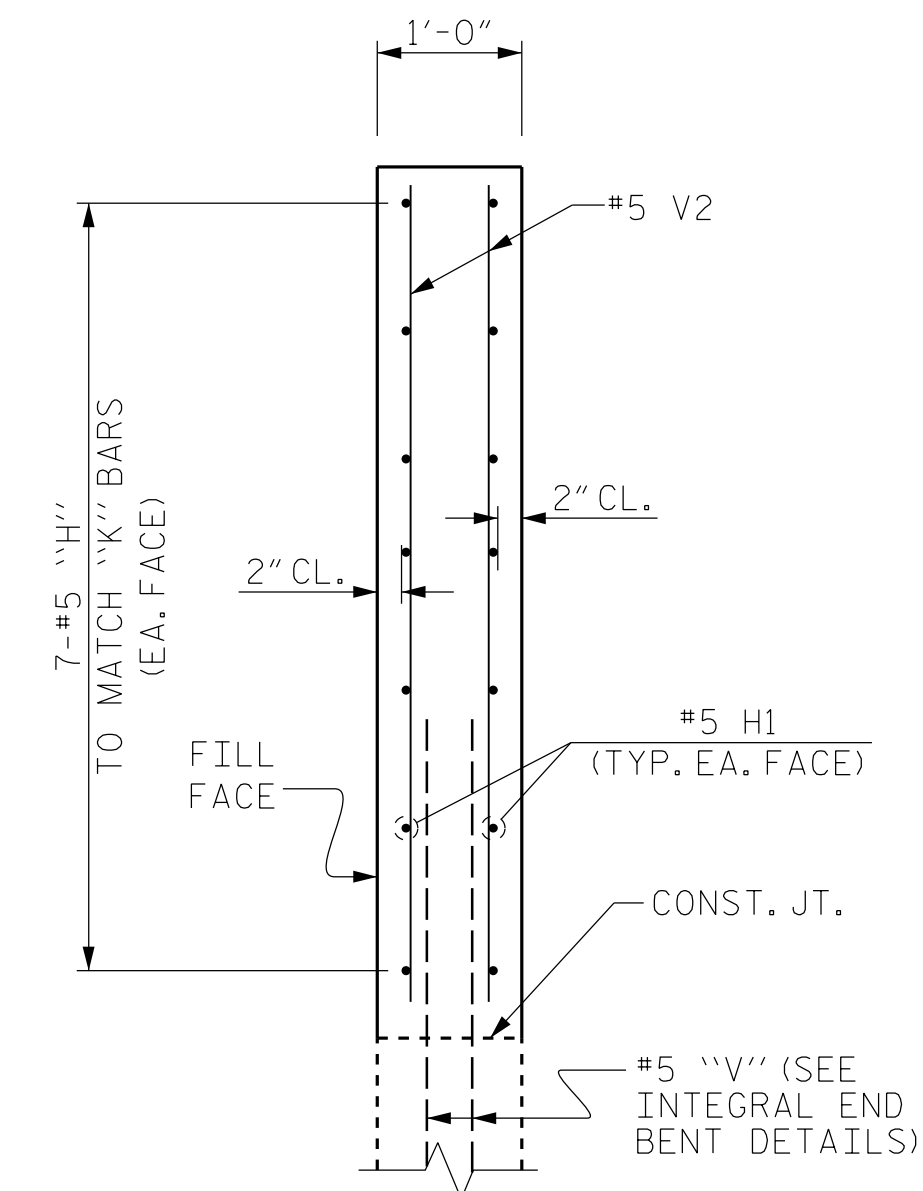
SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



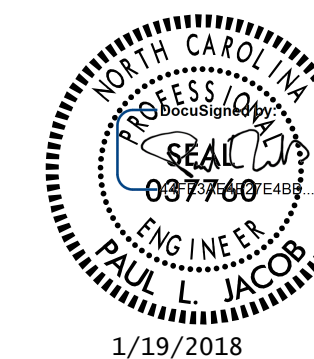
SECTION X-X

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPANS
 DETAILS



1/19/2018

DRAWN BY : M. RAY DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017

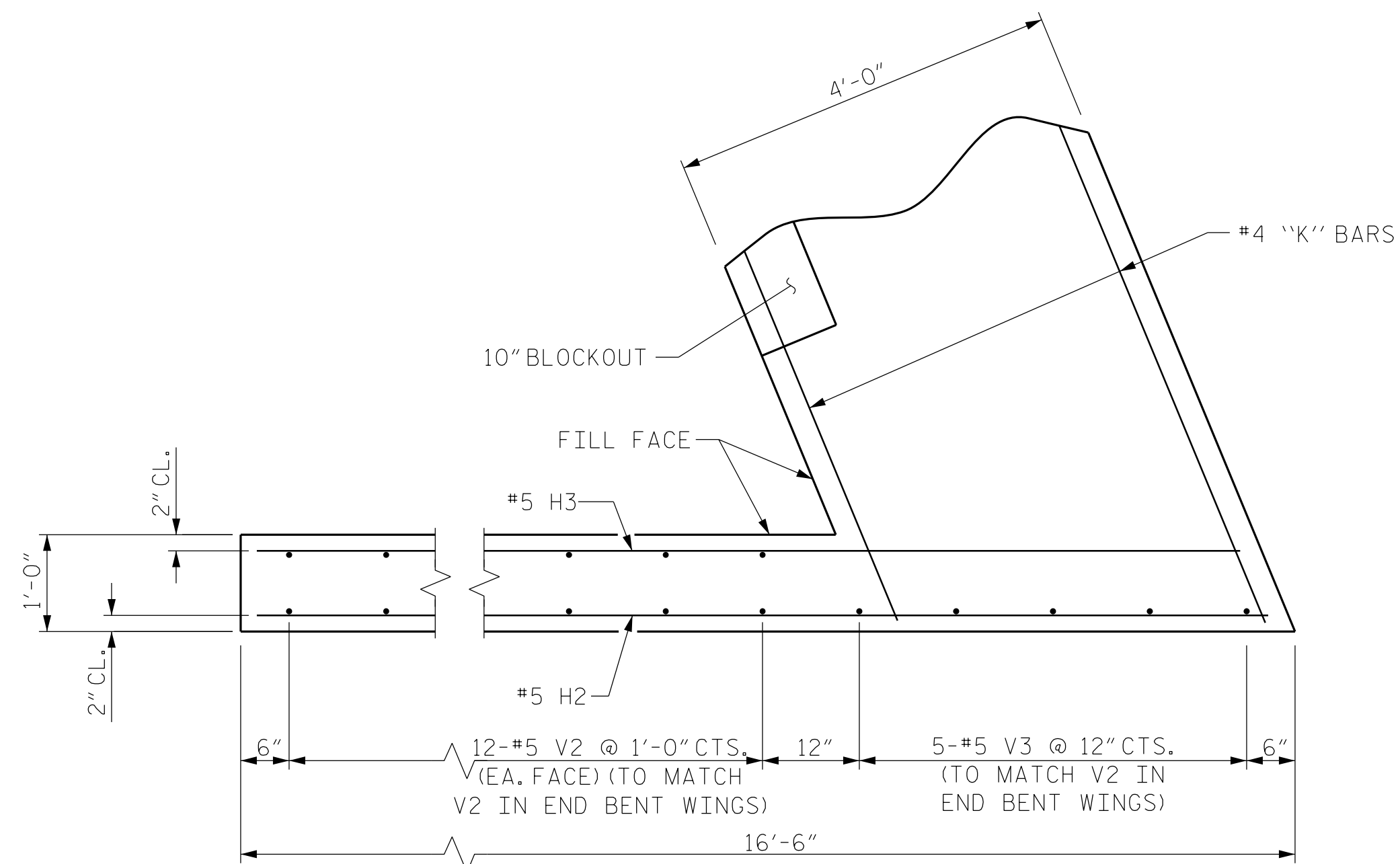
ABUTMENT WINGS @ INTEGRAL END BENT
 (FOR INTEGRAL END BENT REINFORCING STEEL AND DETAILS,
 SEE "SUBSTRUCTURE INTEGRAL END BENT" SHEETS)

moffatt & nichol
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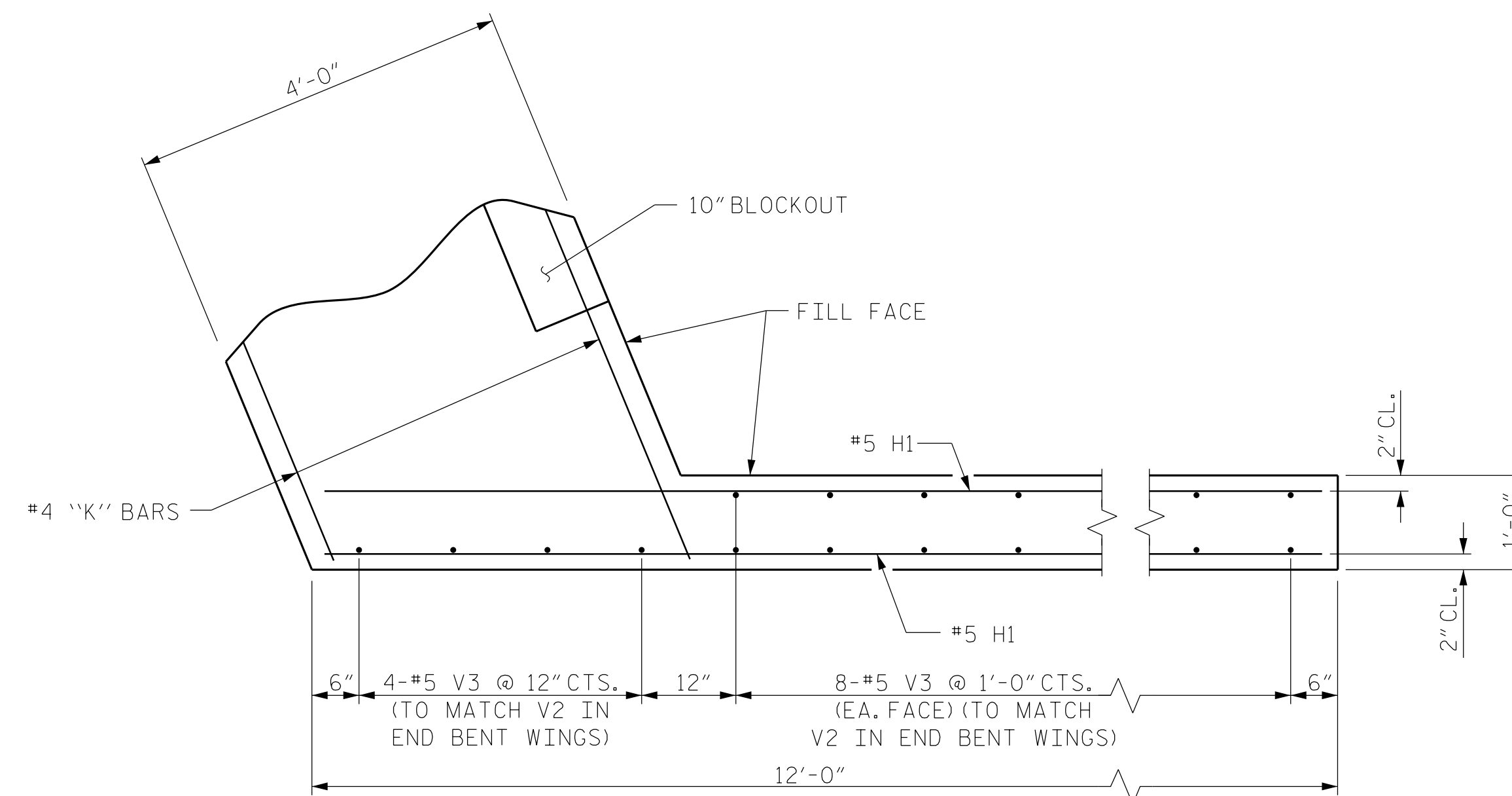
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			35

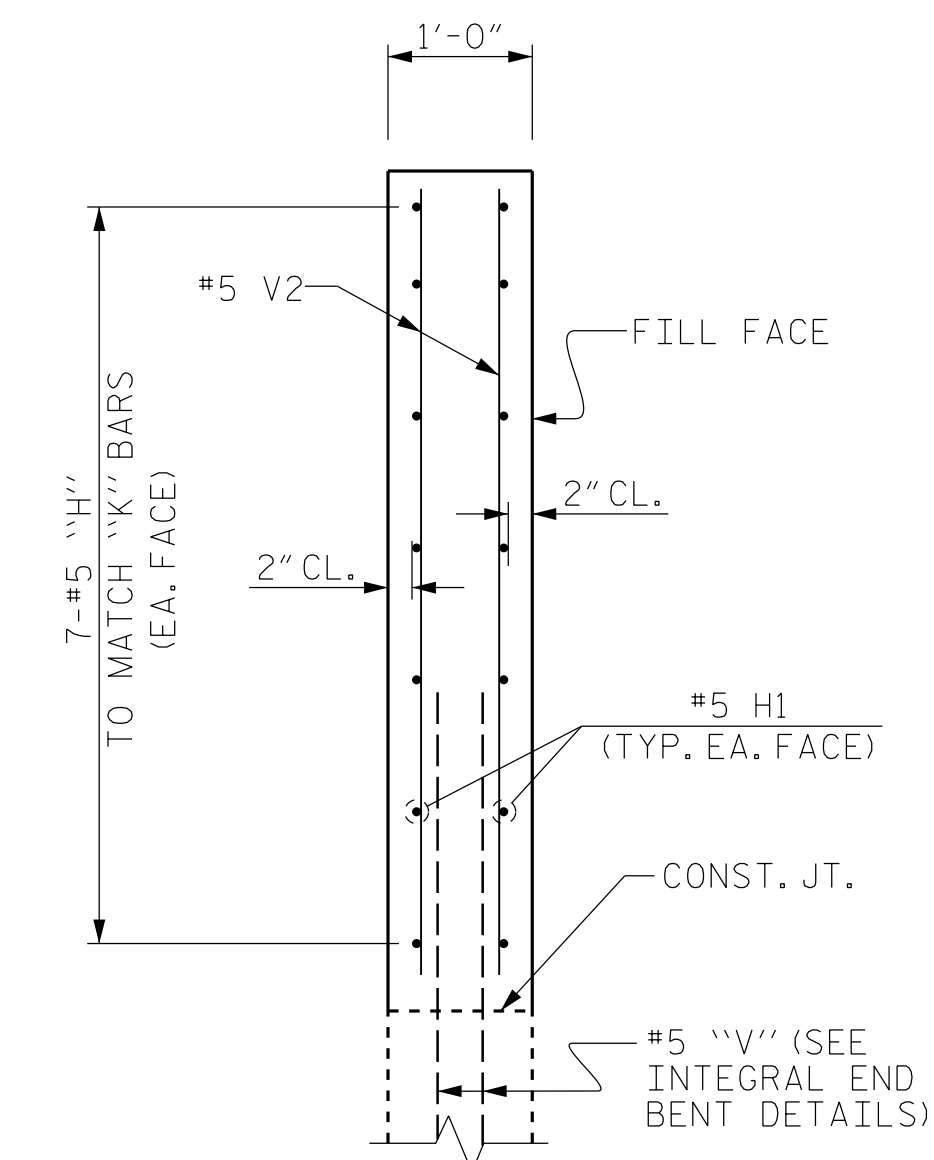
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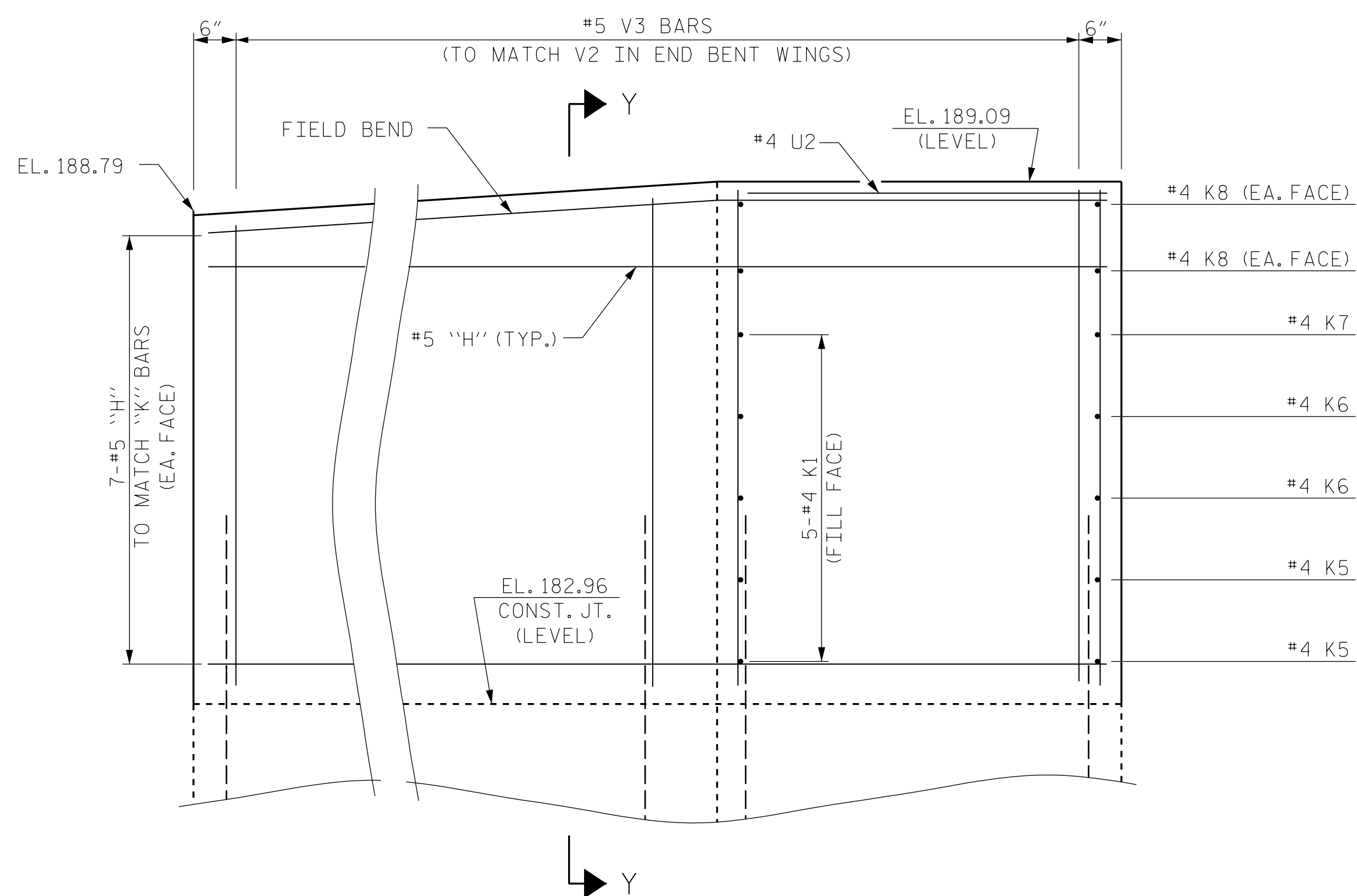
PLAN OF WING (W3)



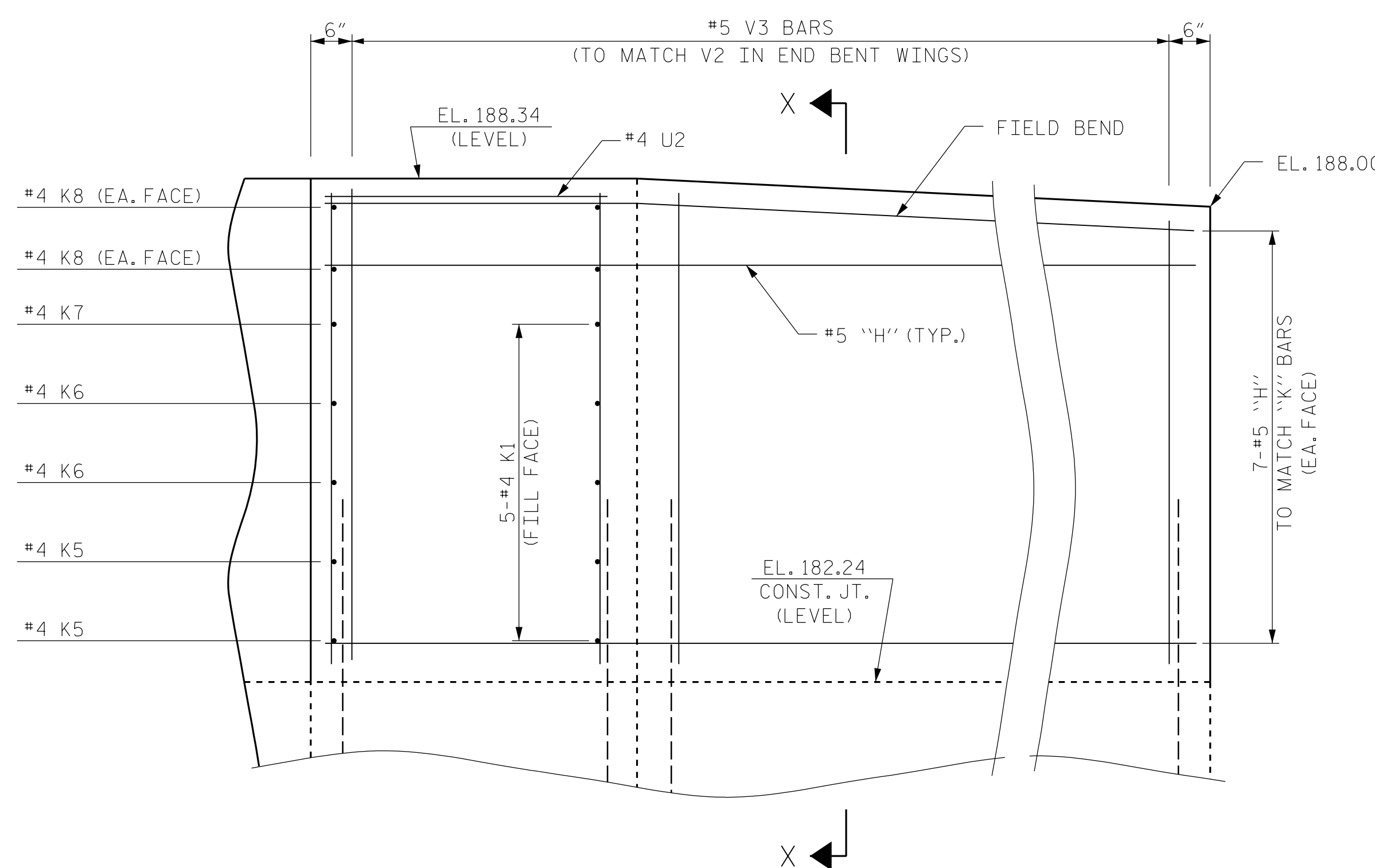
PLAN OF WING (W4)



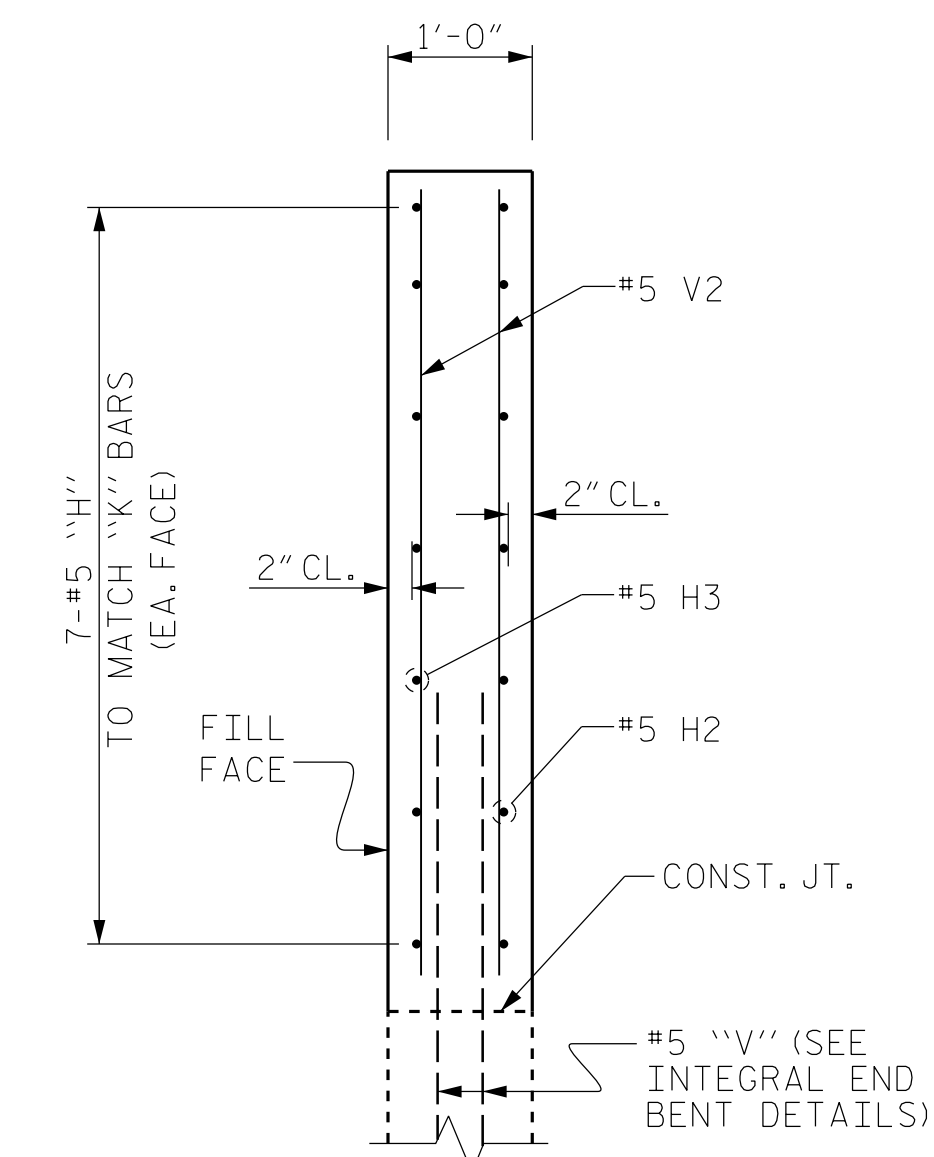
SECTION X-X



ELEVATION OF WING (W3)



ELEVATION OF WING (W4)

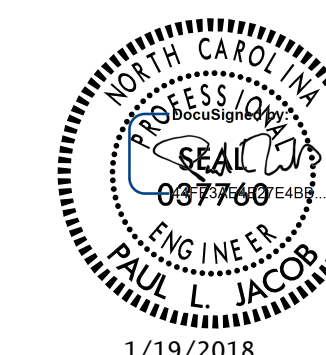


SECTION Y-Y

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SHEET 6 OF 6

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



1/19/2018

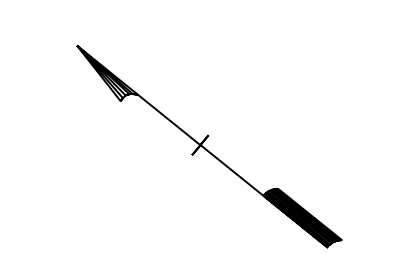
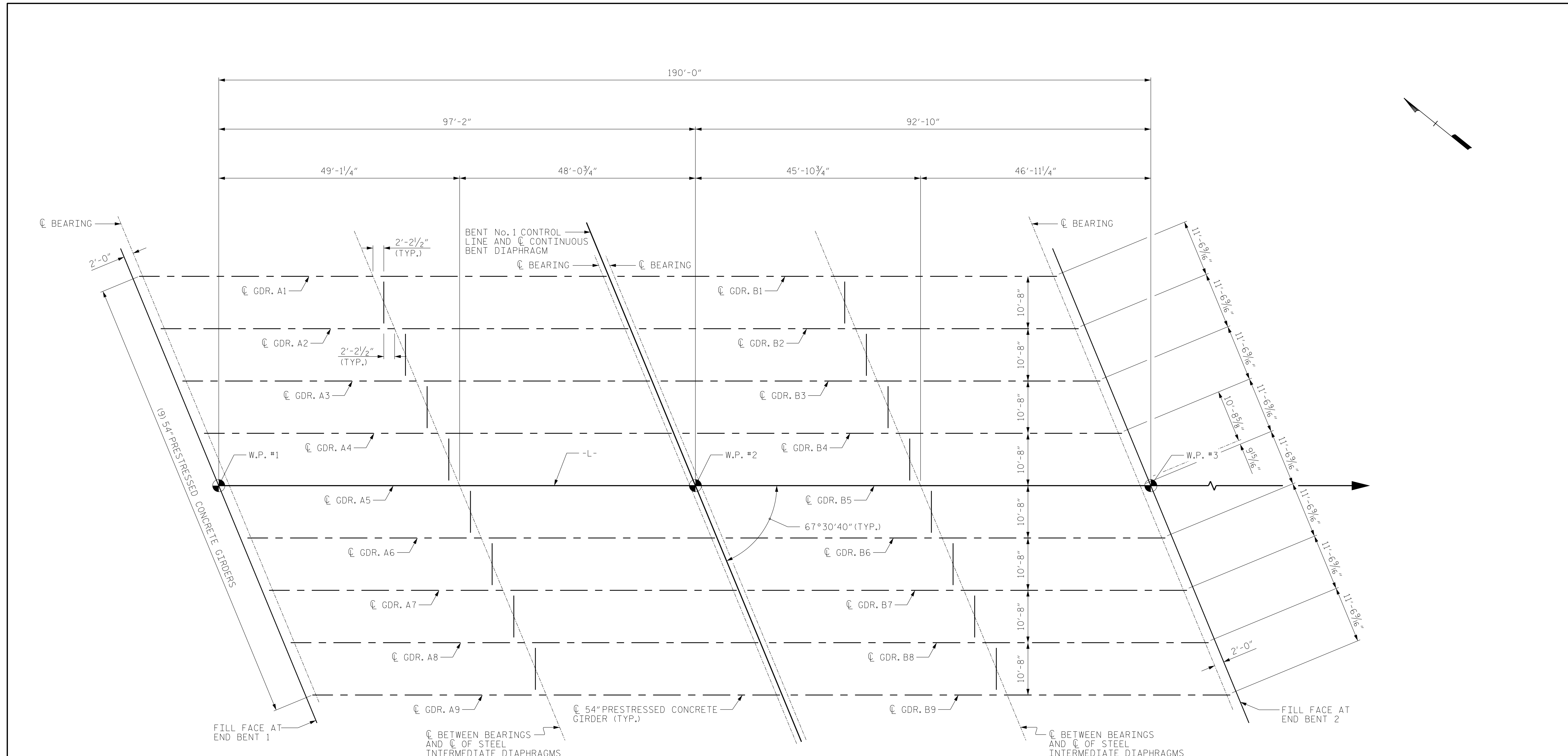
DRAWN BY : M. RAY DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017

ABUTMENT WINGS @ INTEGRAL END BENT
 (FOR INTEGRAL END BENT REINFORCING STEEL AND DETAILS,
 SEE "SUBSTRUCTURE INTEGRAL END BENT" SHEETS)

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 4700 FALLS OF NEUSE ROAD, SUITE 300
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			35



INTEGRAL
E4

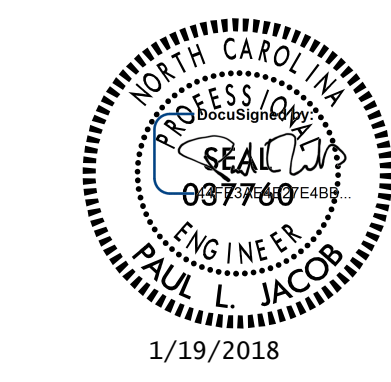
FIX
E4, P1 FIX
E4, P2

INTEGRAL
E4

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SPAN "A"

SPAN "B"



1/19/2018

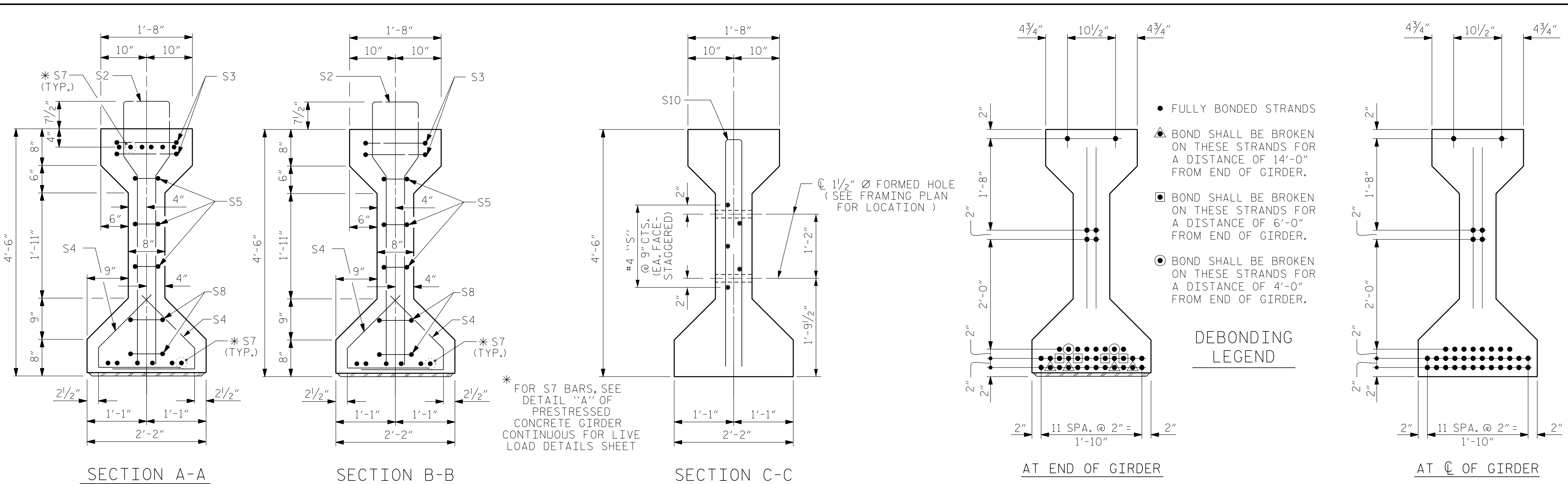
DRAWN BY : M. RAY DATE : 03/2017
 CHECKED BY : P. JACOB DATE : 03/2017
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 03/2017

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE FRAMING PLAN					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					35

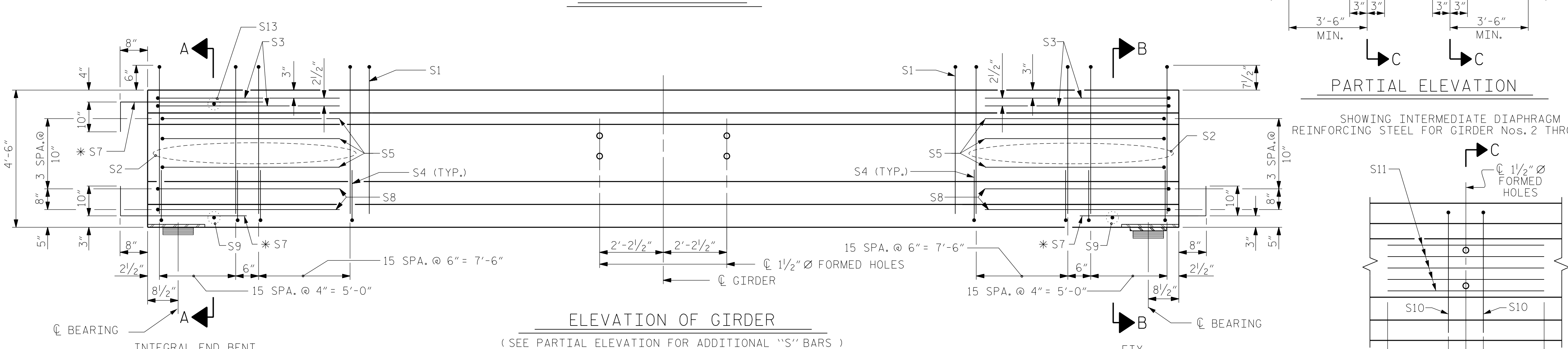
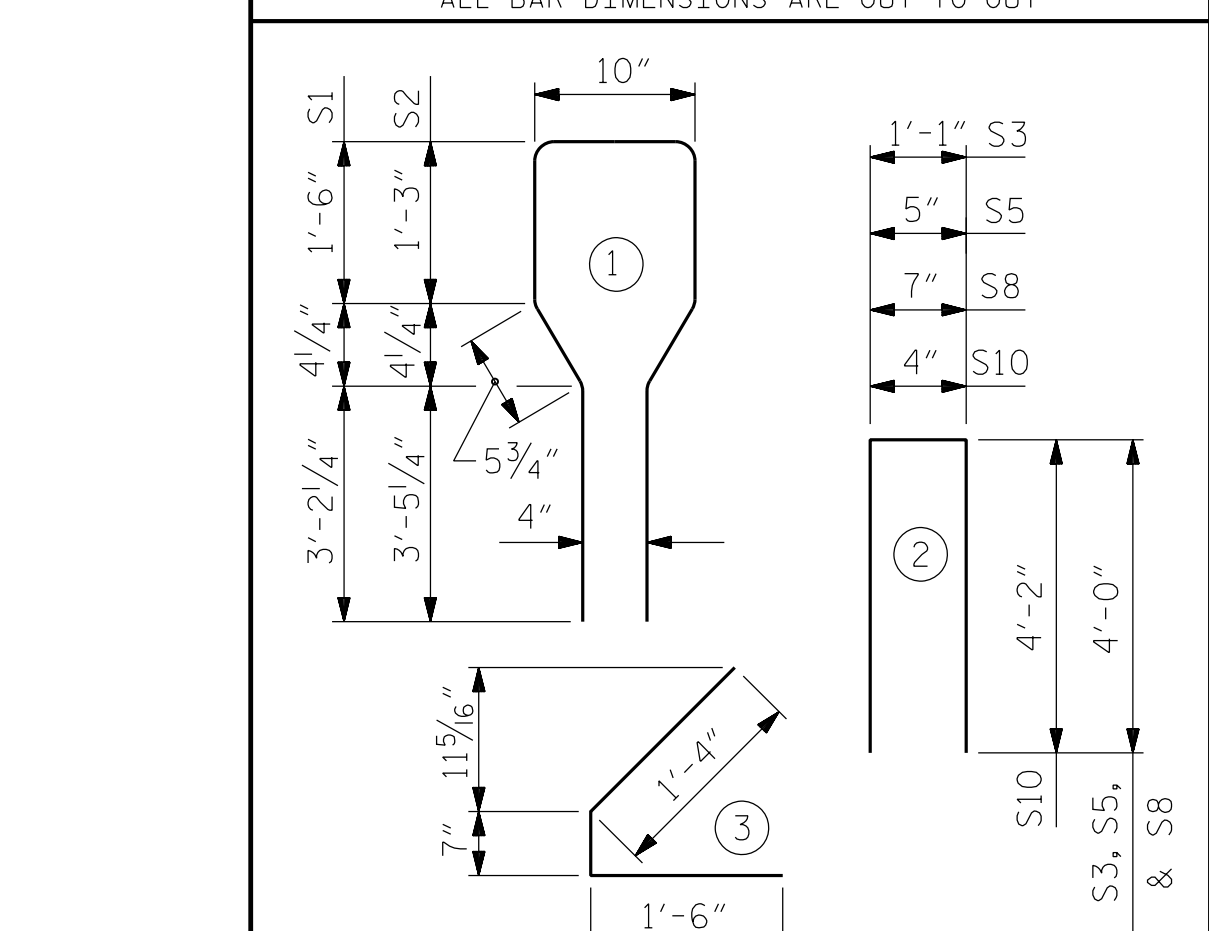
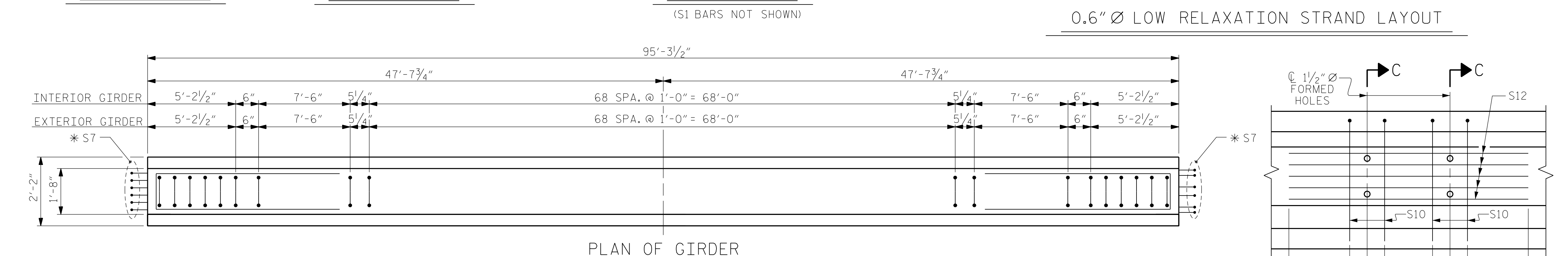
1/19/2018 02:19:32 PM C:\Users\pjacob\OneDrive\Documents\B-4491\SMUL\FP_250022.dgn
 P. JACOB



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

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
EXTERIOR GDR.	S1	69	#4	11'-2"	515
INTERIOR GDR.	S1	69	#4	11'-2"	515
	S2	64	#6	10'-5"	1001
	S3	4	#4	2	24
	S4	128	#4	3	292
	S5	6	#4	2	34
	* S7	18	#5	STR	69
	S8	4	#4	2	23
	S9	2	#3	STR	1
EXTERIOR GDR.	S10	2	#5	2	18
INTERIOR GDR.	S10	4	#5	2	36
EXTERIOR GDR.	S11	5	#4	STR	23
INTERIOR GDR.	S12	5	#4	STR	38
	S13	1	#3	STR	1

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

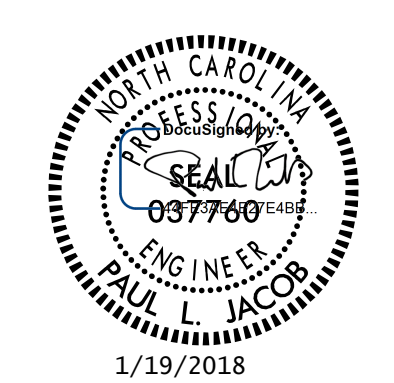


QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	7000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	2001	19.3	38
INTERIOR GIRDER	2034	19.3	38

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
9	95'-3 1/2"	857'-7 1/2"



ASSEMBLED BY : A. CHILKEPALLI DATE : 01/2018
 CHECKED BY : P. JACOB DATE : 01/2018
 DRAWN BY : ELR 8/91 REV. 5/1/06R TLA/GM
 CHECKED BY : GRP 8/91 REV. 10/1/11 MAA/GM
 REV. 1/15 MAA/TMG



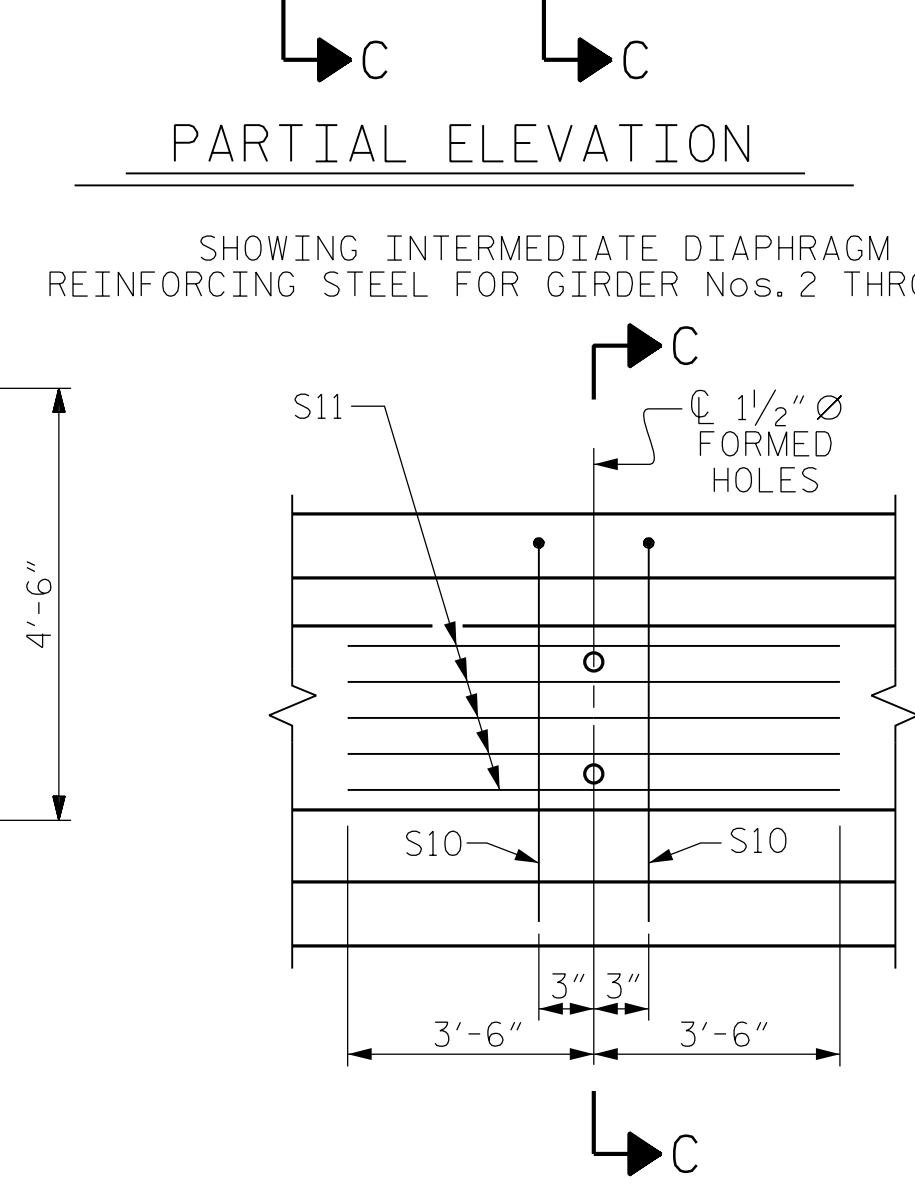
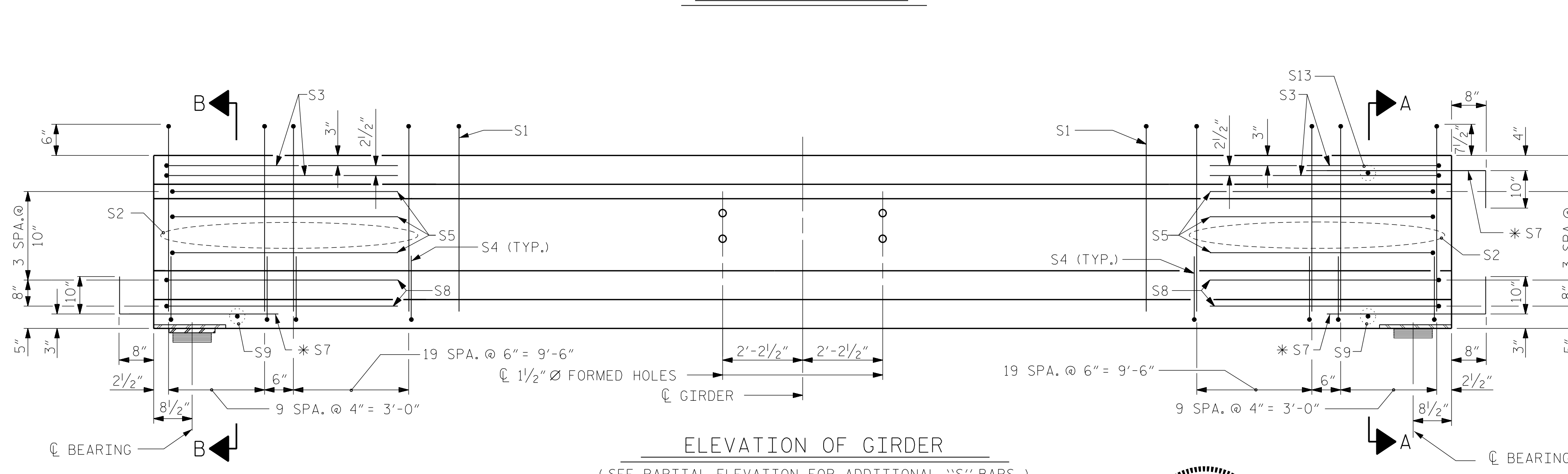
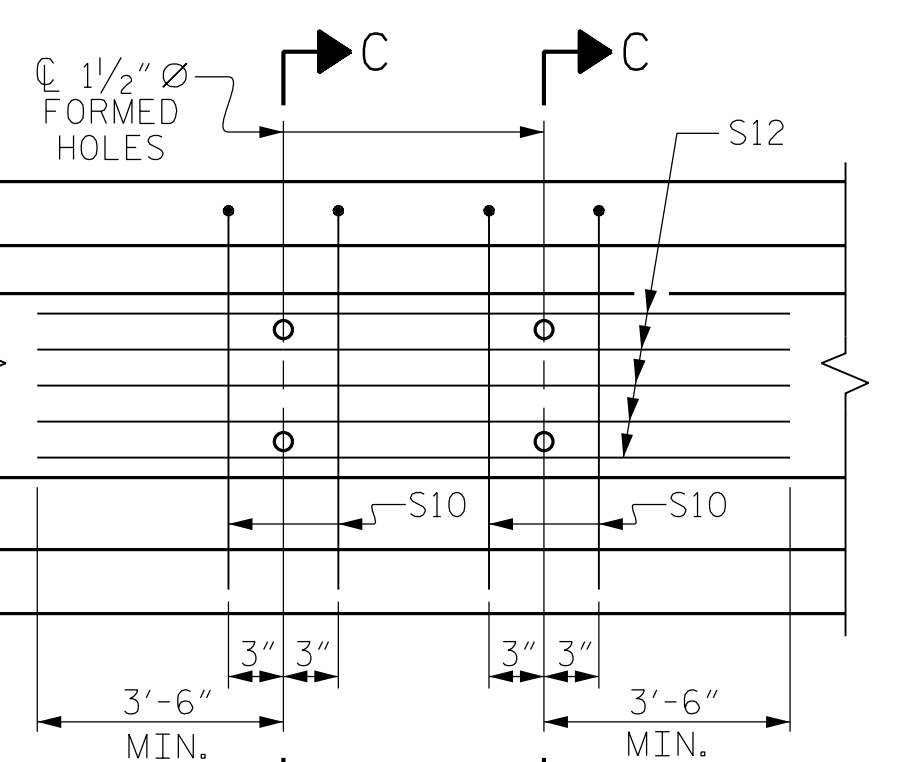
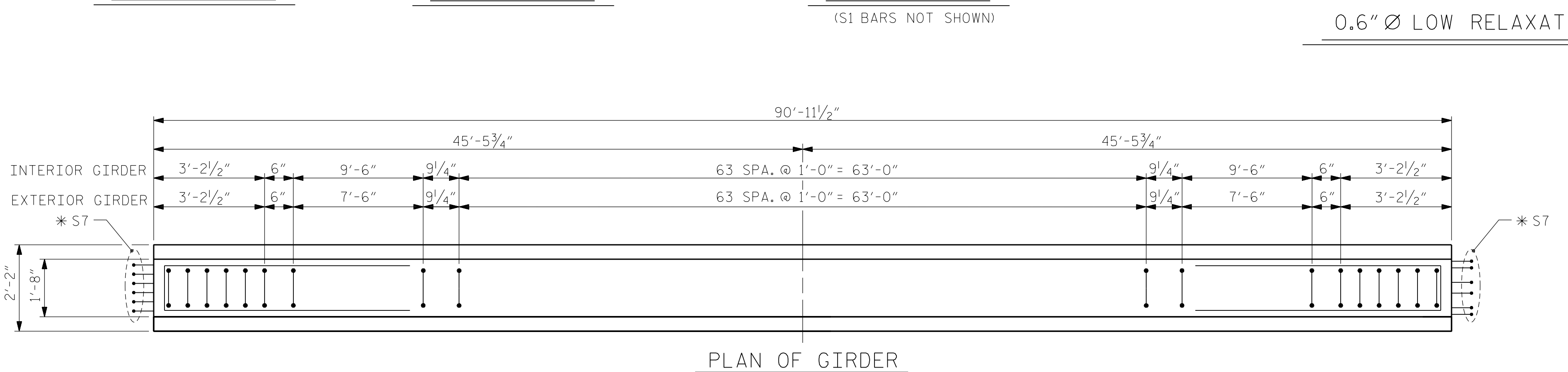
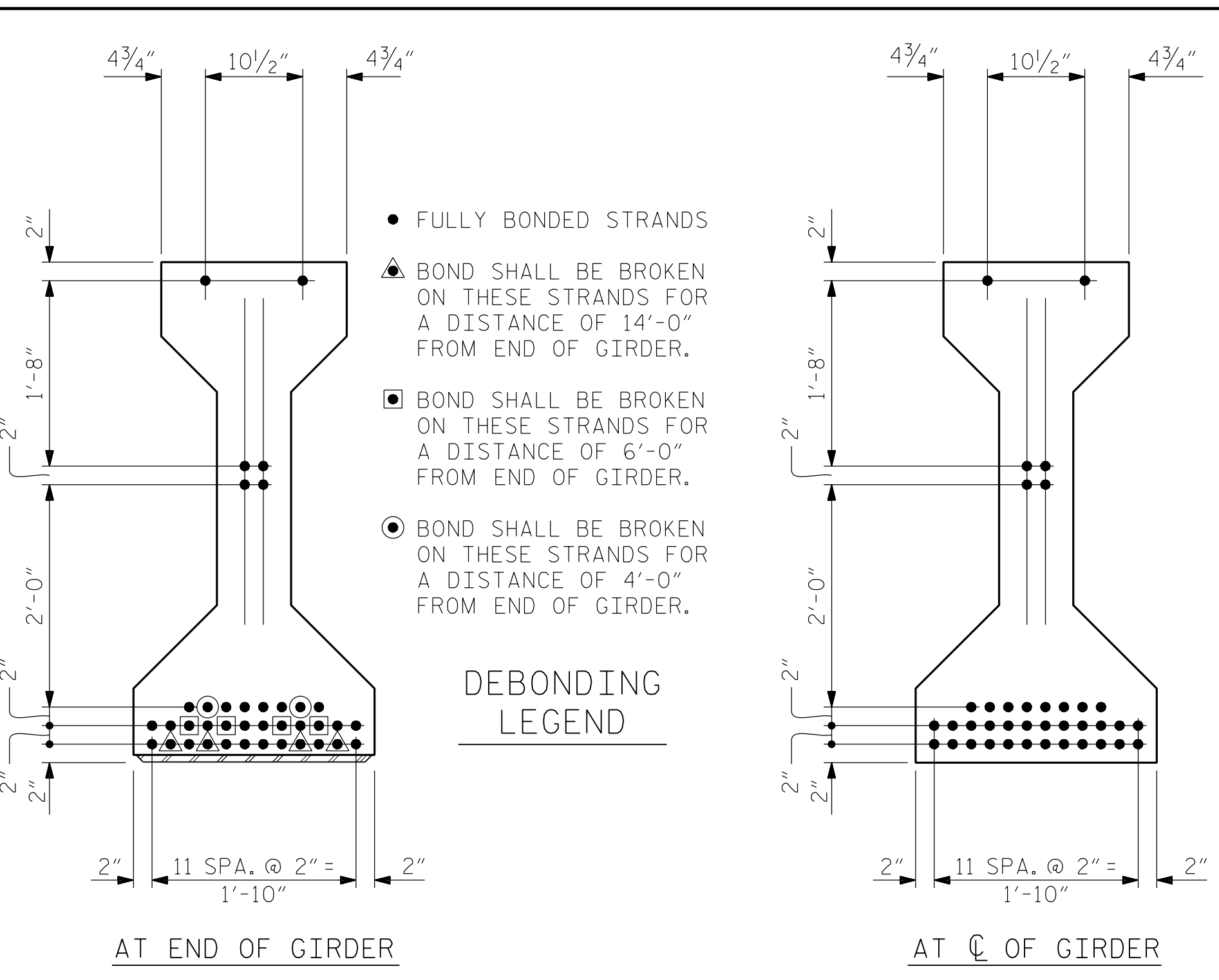
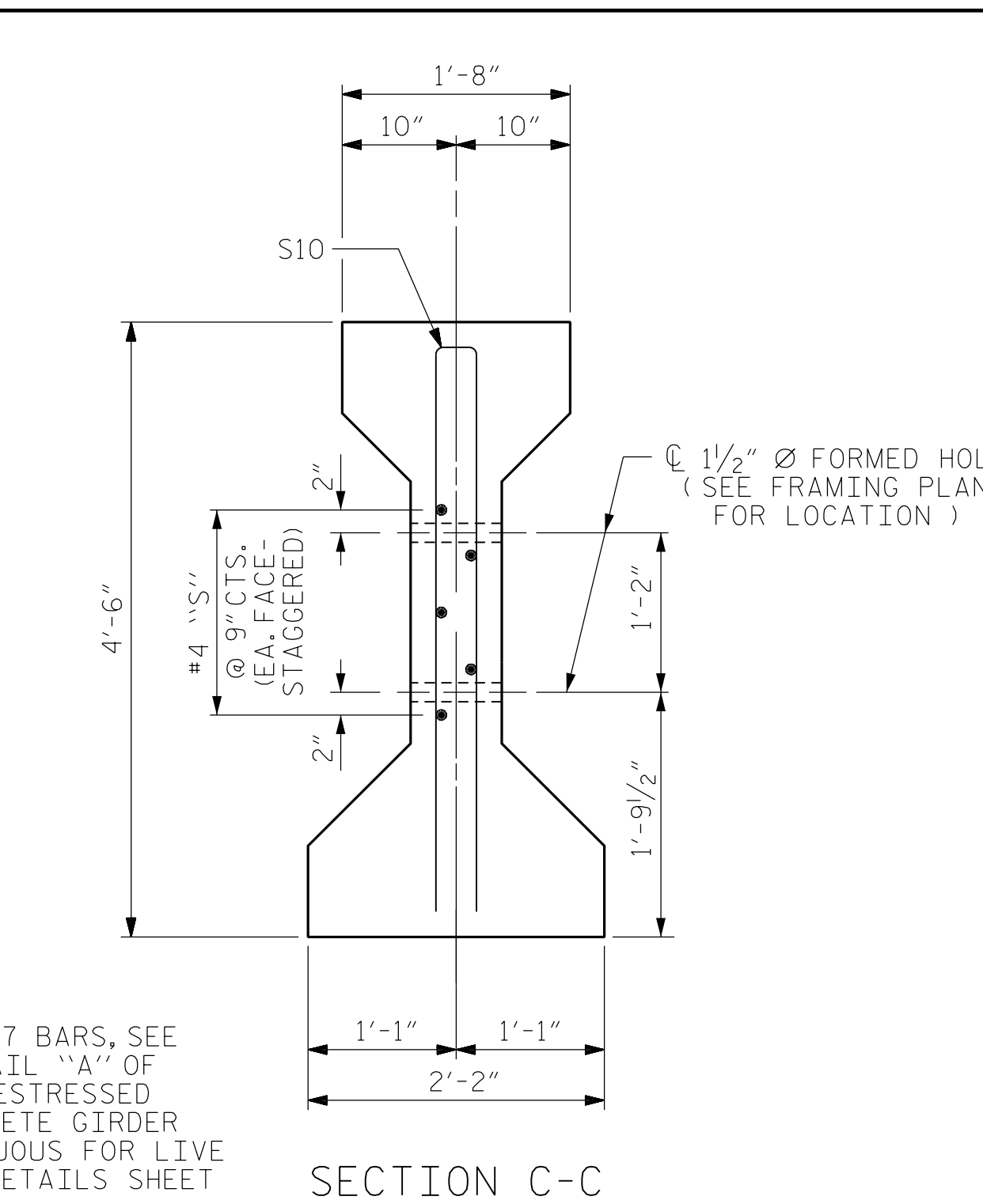
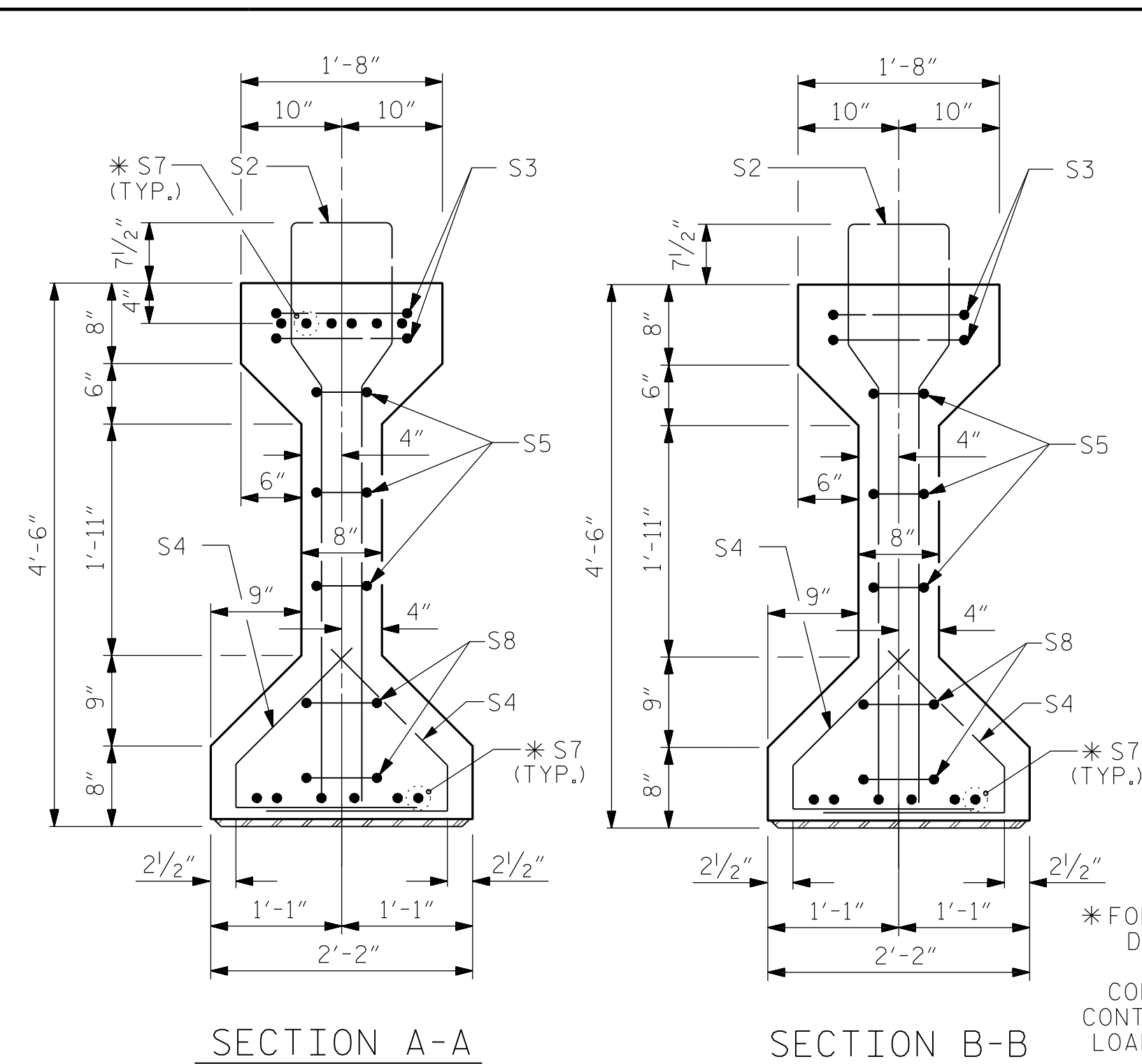
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PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 1 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN "A"					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	
TOTAL SHEETS	35

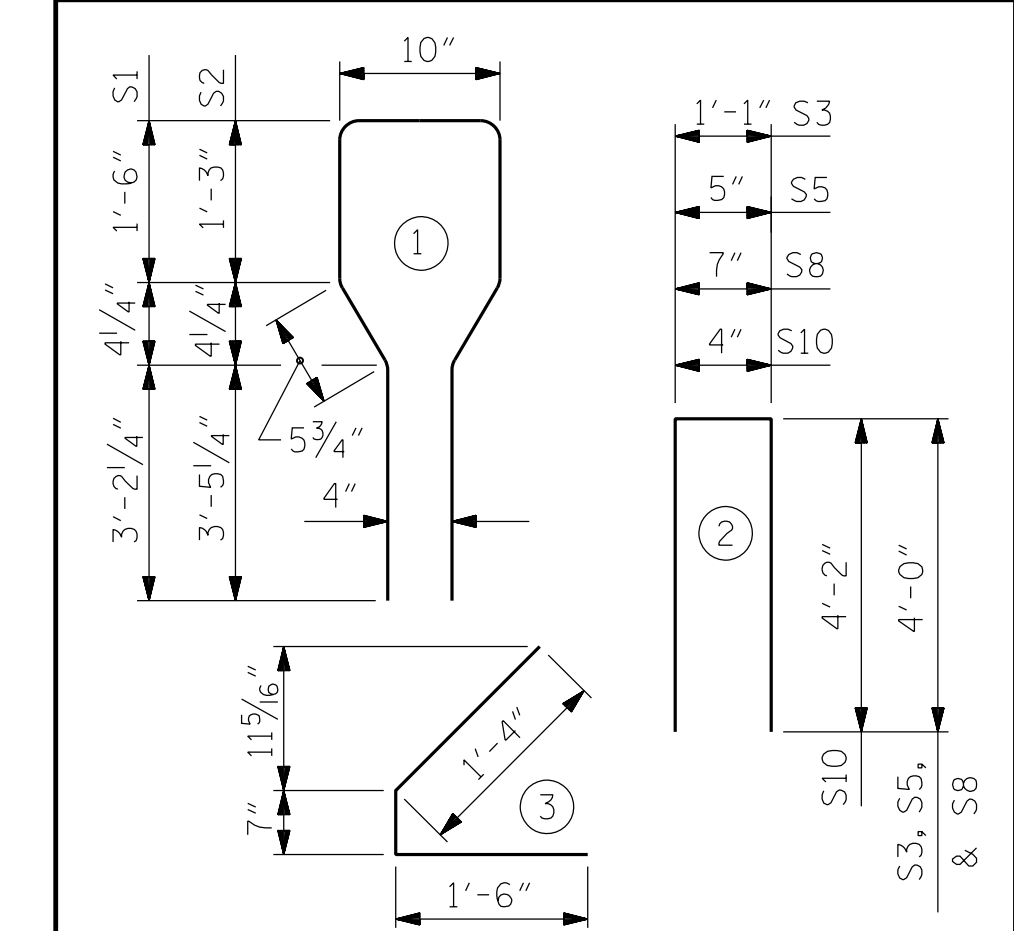


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
EXTERIOR GDR.	S1	64	#4	1	11'-2"	477
INTERIOR GDR.	S1	64	#4	1	11'-2"	477
	S2	60	#6	1	10'-5"	939
	S3	4	#4	2	9'-1"	24
	S4	120	#4	3	3'-5"	274
	S5	6	#4	2	8'-5"	34
	* S7	18	#5	STR	3'-8"	69
	S8	4	#4	2	8'-7"	23
	S9	2	#3	STR	1'-10"	1
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S11	5	#4	STR	7'-0"	23
INTERIOR GDR.	S12	5	#4	STR	11'-5"	38
	S13	1	#3	STR	1'-4"	1

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

BAR TYPES
ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	7000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
EXTERIOR GIRDER	1883	18.5	38
INTERIOR GIRDER	1916	18.5	38

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
9	90'-11 1/2"	818'-7 1/2"

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 2 OF 4

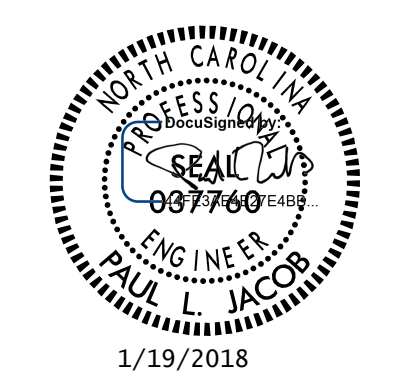
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 AASHTO TYPE IV
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 SPAN "B"

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

SHEET NO. S-13
 TOTAL SHEETS 35

ASSEMBLED BY : A. CHILKEPALLI DATE : 01/2018
 CHECKED BY : P. JACOB DATE : 01/2018
 DRAWN BY : ELR 8/91 REV. 5/1/06R TLA/GM
 CHECKED BY : GRP 8/91 REV. 10/1/11 MAA/GM
 REV. 1/15 MAA/TMG



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 NC License No.: F-0105

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NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

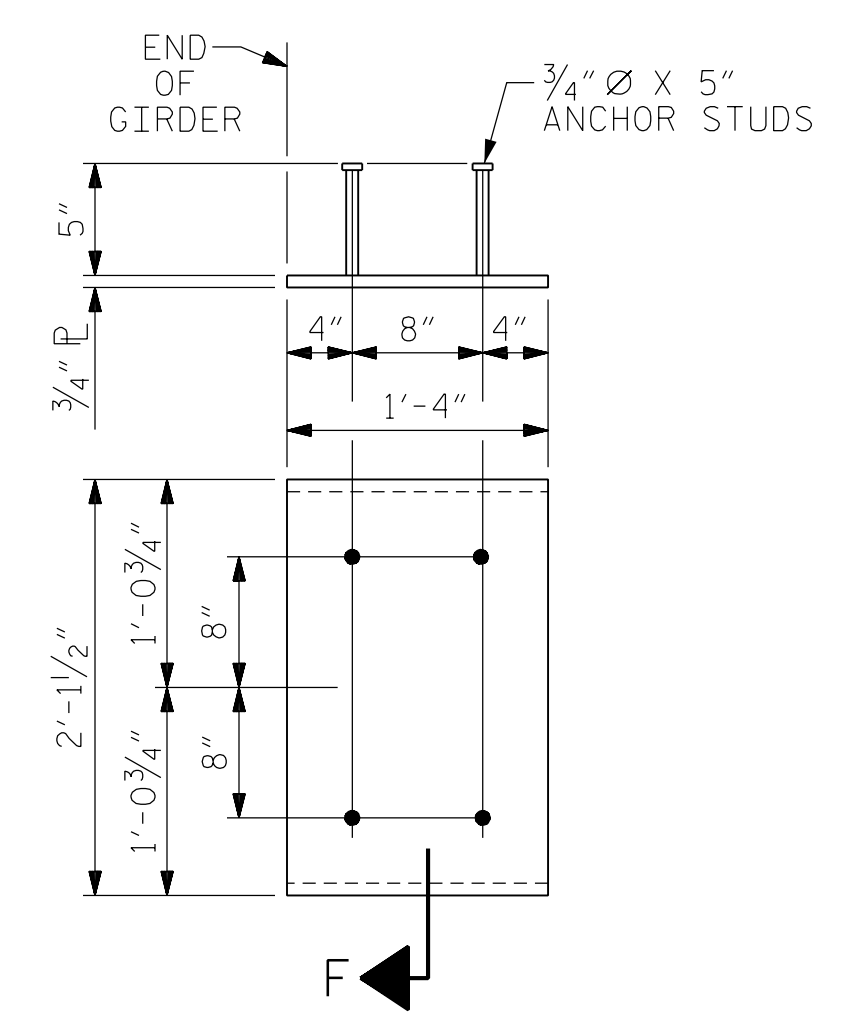
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

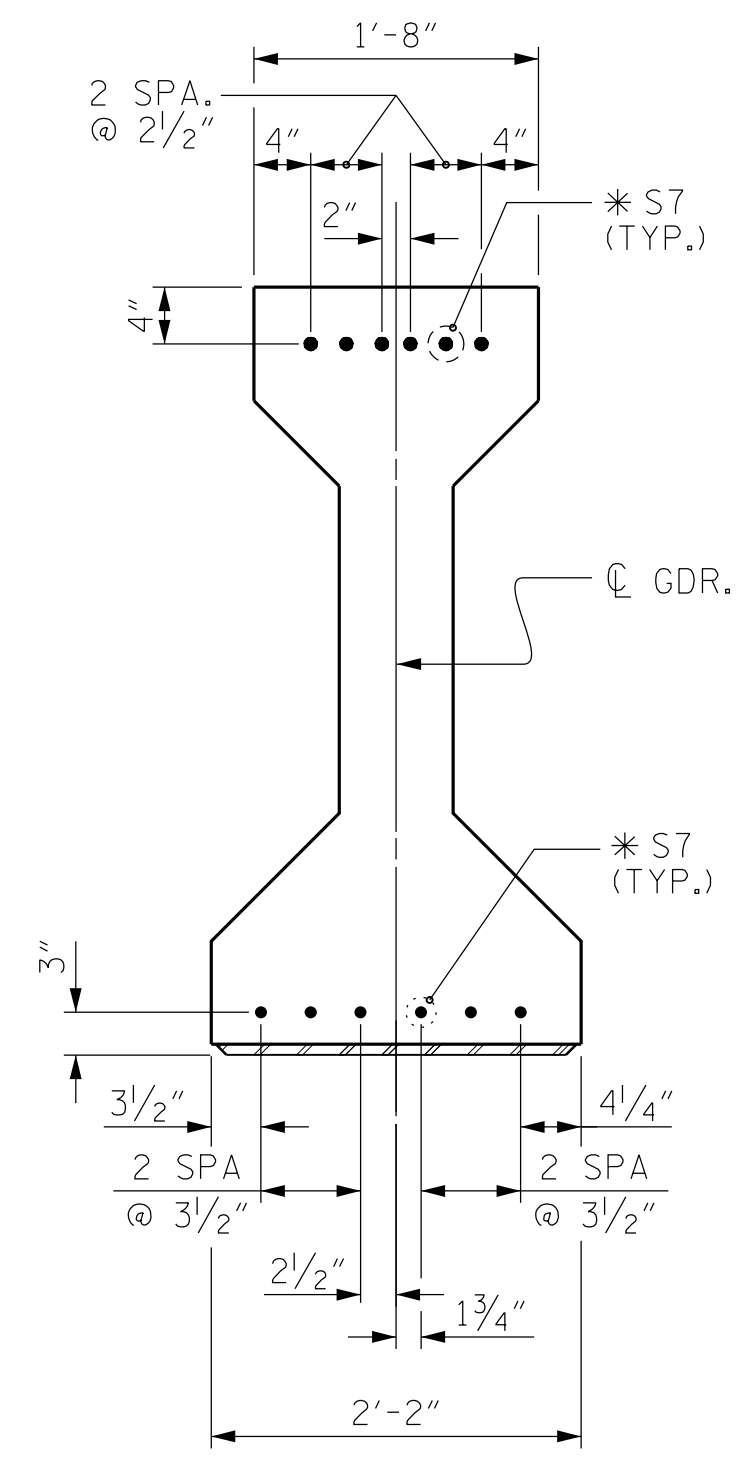
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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



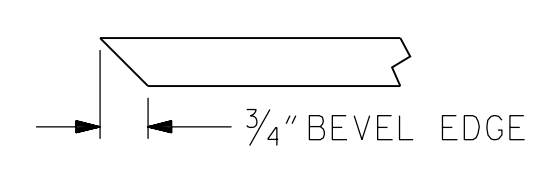
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

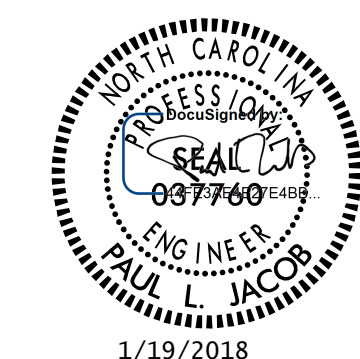


SECTION "F"

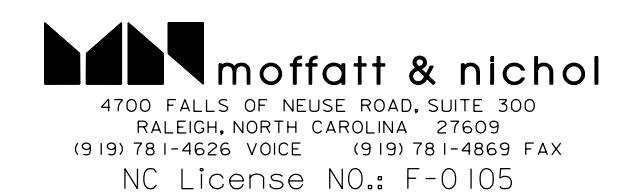
(SEE NOTES)

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SHEET 3 OF 4



1/19/2018

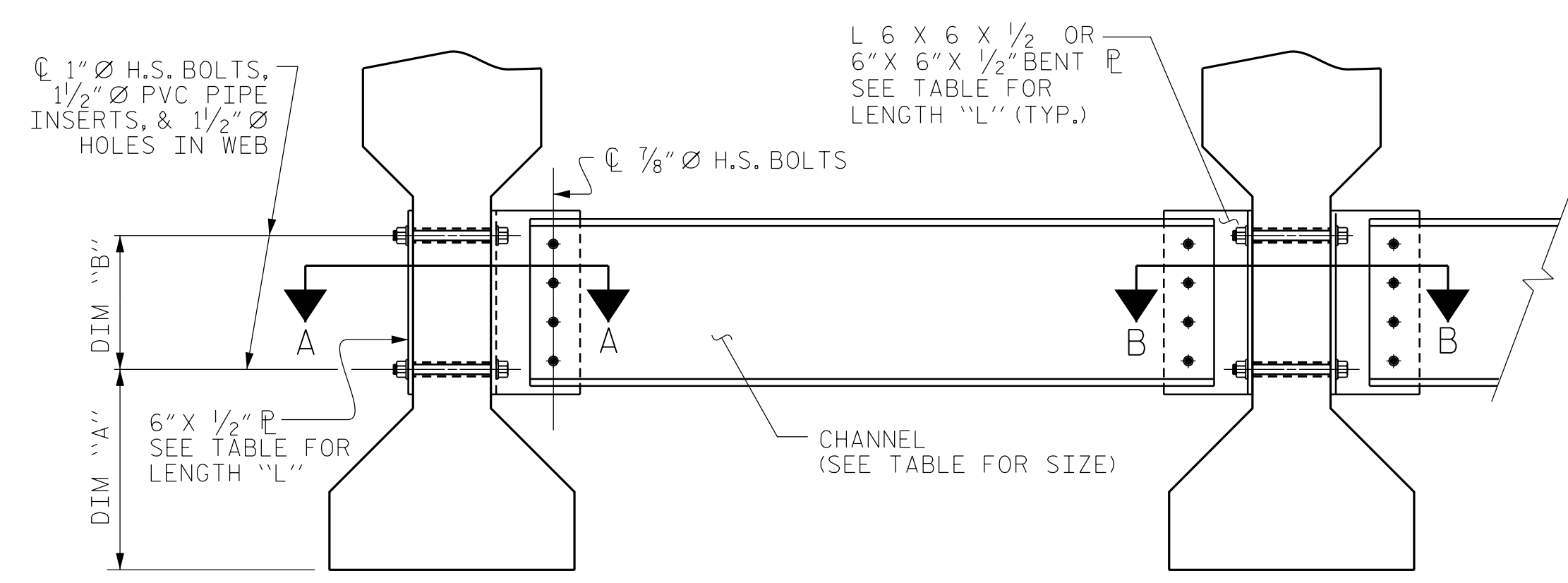


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

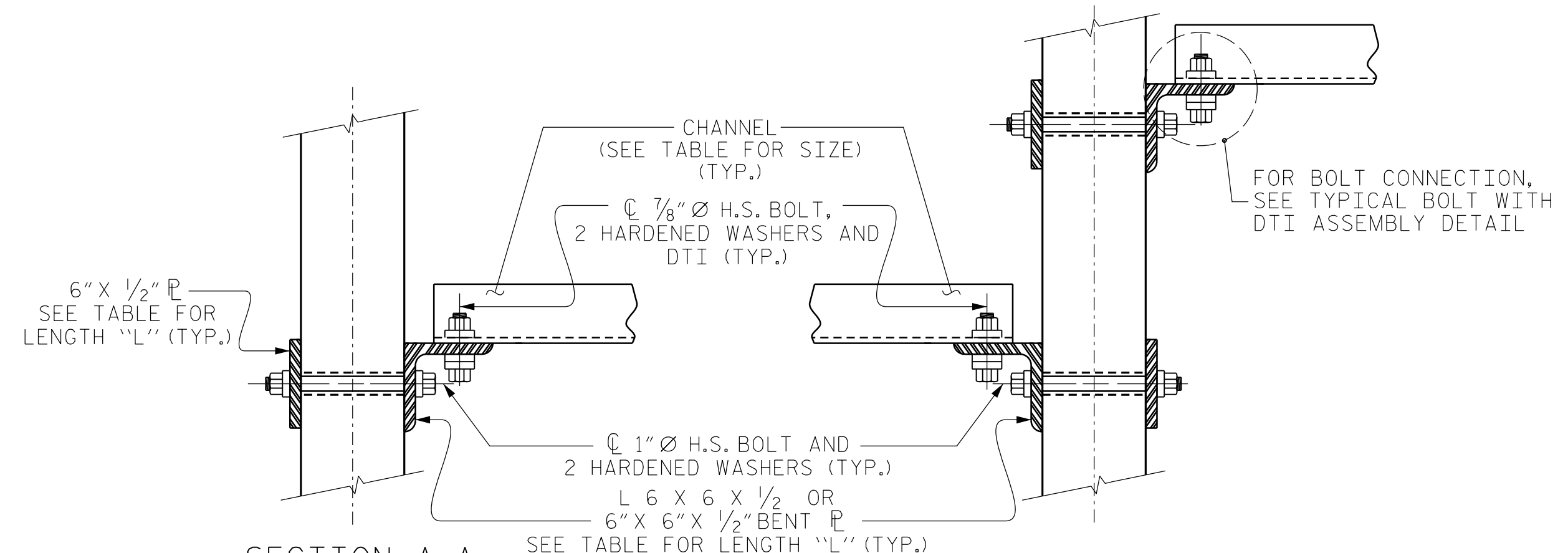
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			35

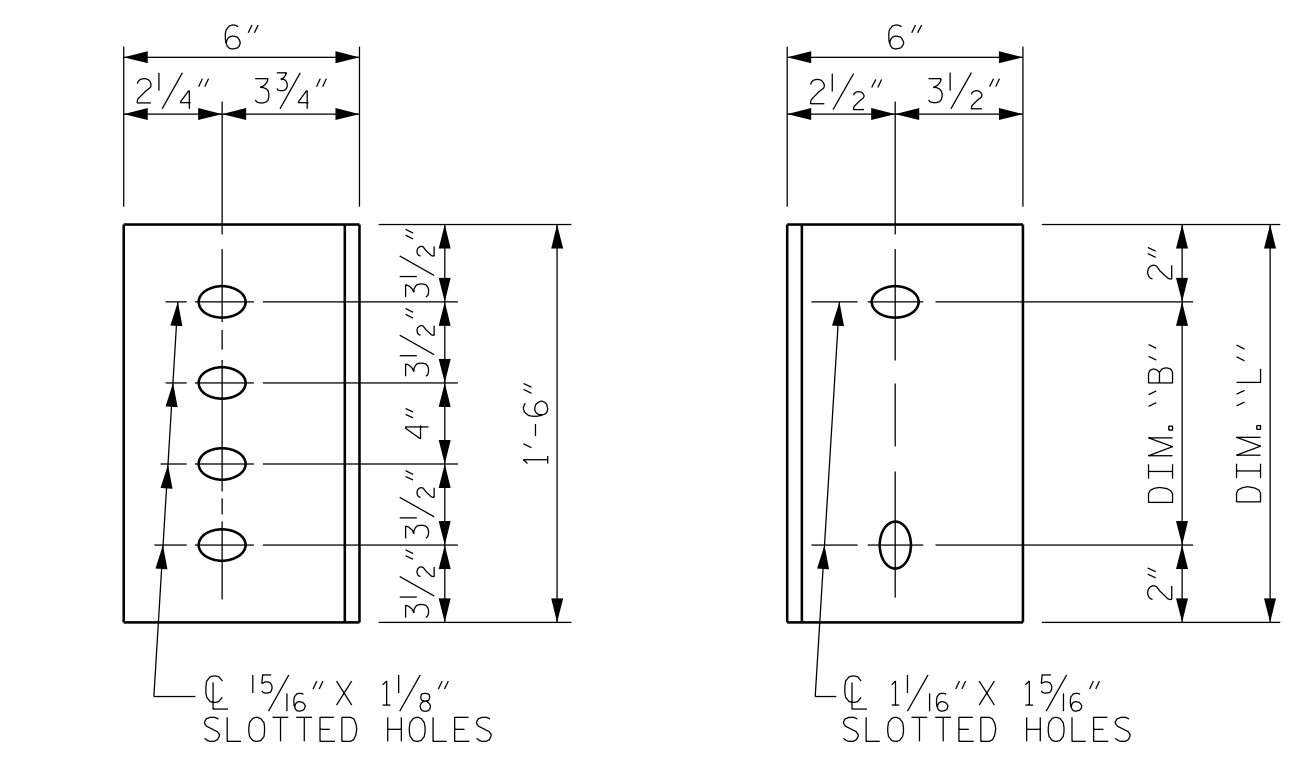
ASSEMBLED BY : A. CHILKEPALLI	DATE : 01/2018
CHECKED BY : P. JACOB	DATE : 01/2018
DRAWN BY : ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC



EXTERIOR GIRDER INTERIOR GIRDER
 PART SECTION AT INTERMEDIATE DIAPHRAGM
 (TYPE III OR TYPE IV GIRDER SHOWN)



SECTION A-A SECTION B-B
 CONNECTION DETAILS



DIAPHRAGM FACE WEB FACE
 (TYPE III OR TYPE IV GDR.)
 CONNECTOR PLATE DETAILS

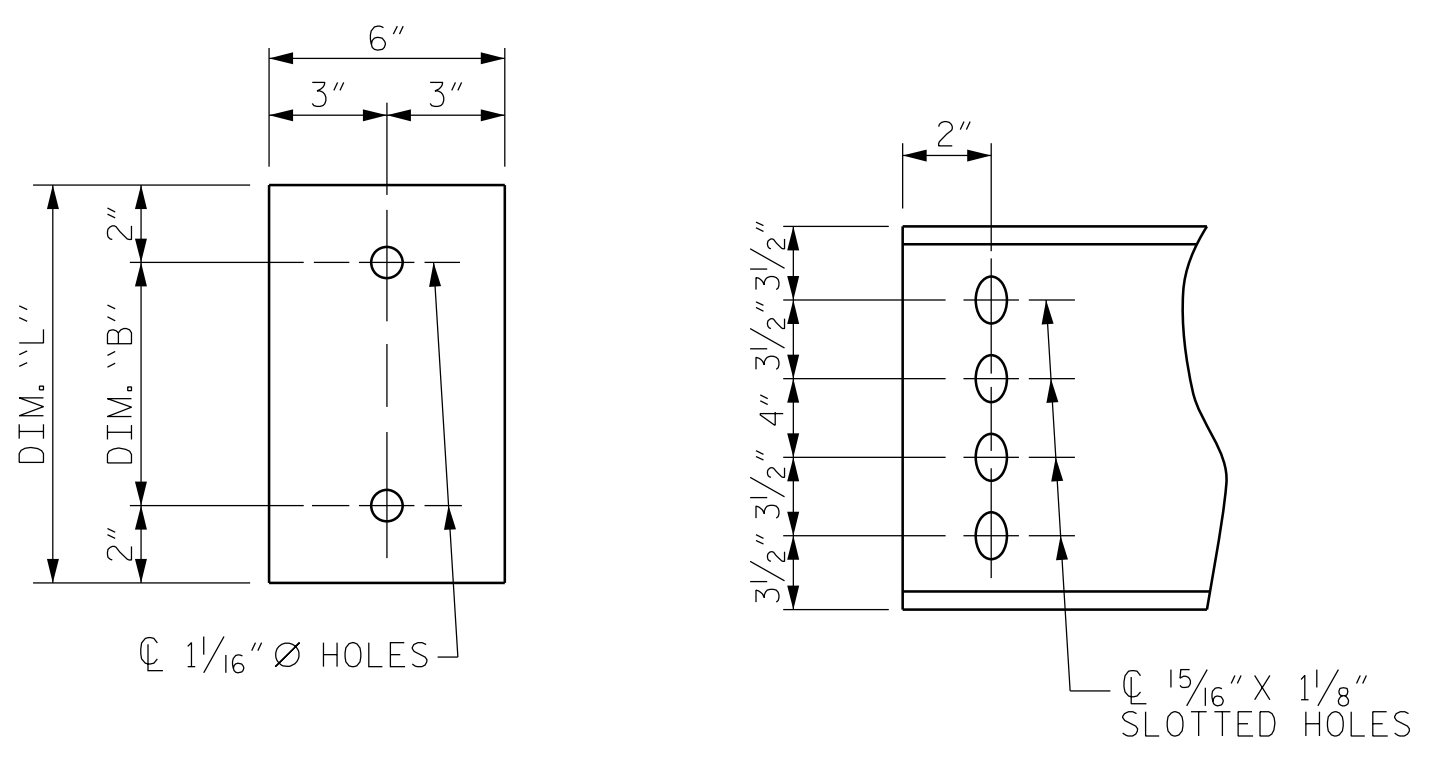
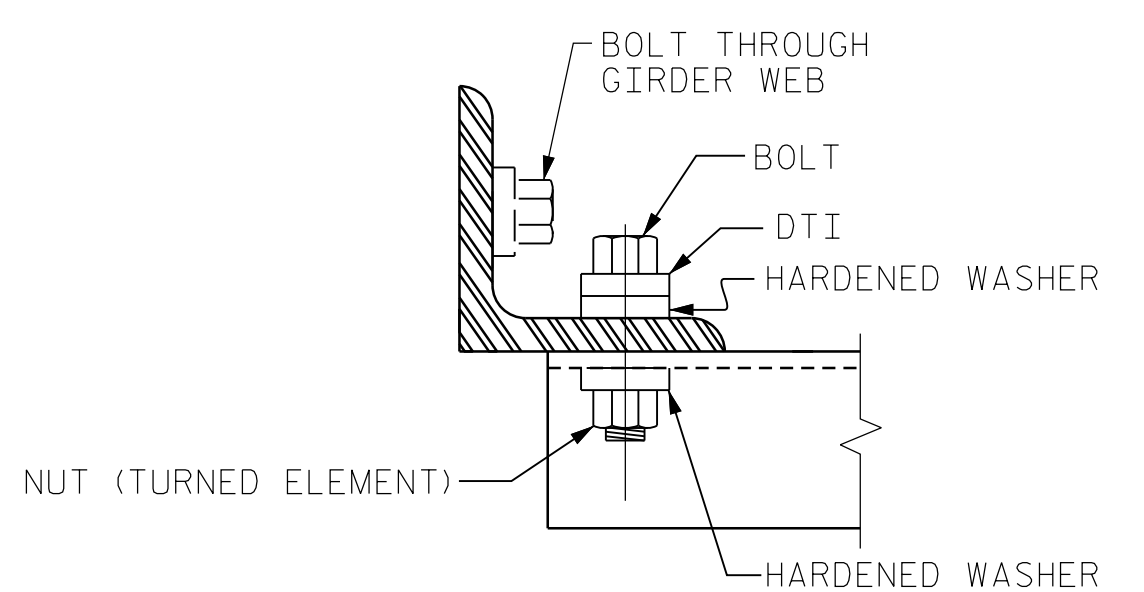


PLATE DETAILS CHANNEL END
 (TYPE III OR TYPE IV GDR.)



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

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

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

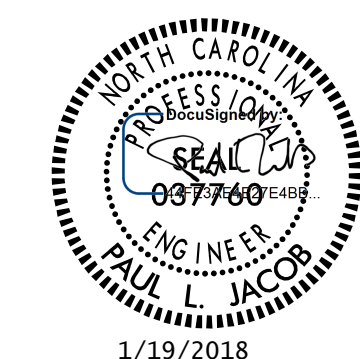
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

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

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SHEET 4 OF 4



1/19/2018

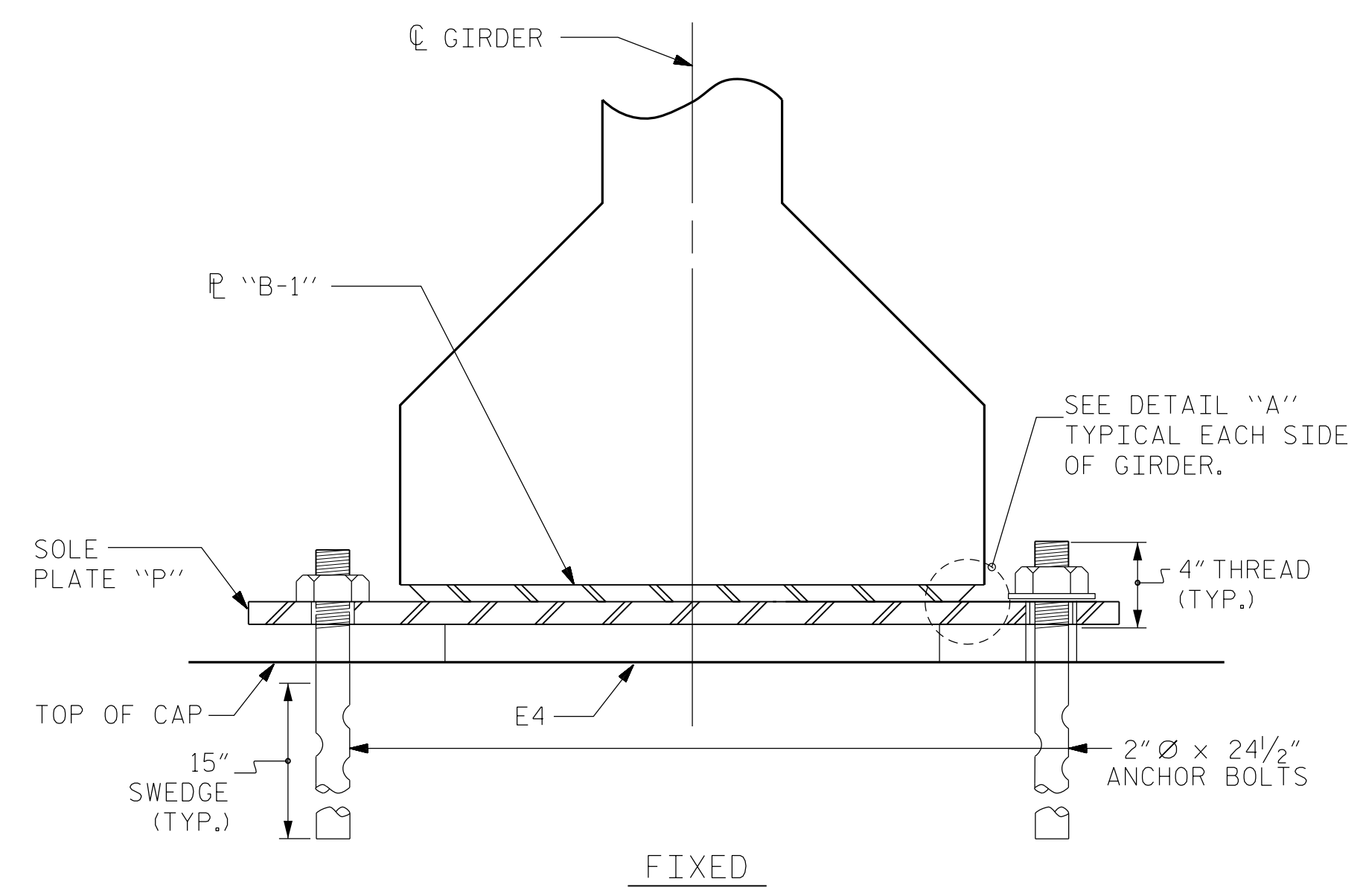
ASSEMBLED BY : A. CHILKEPALLI DATE : 01/2018
 CHECKED BY : P. JACOB DATE : 01/2018
 DRAWN BY : TLA 6/05 REV. 5/1/06RRR KMM/GM
 CHECKED BY : VC 6/05 REV. 10/1/11 MAA/GM
 REV. 12/17 MAA/THC

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 NC License NO.: F-0105

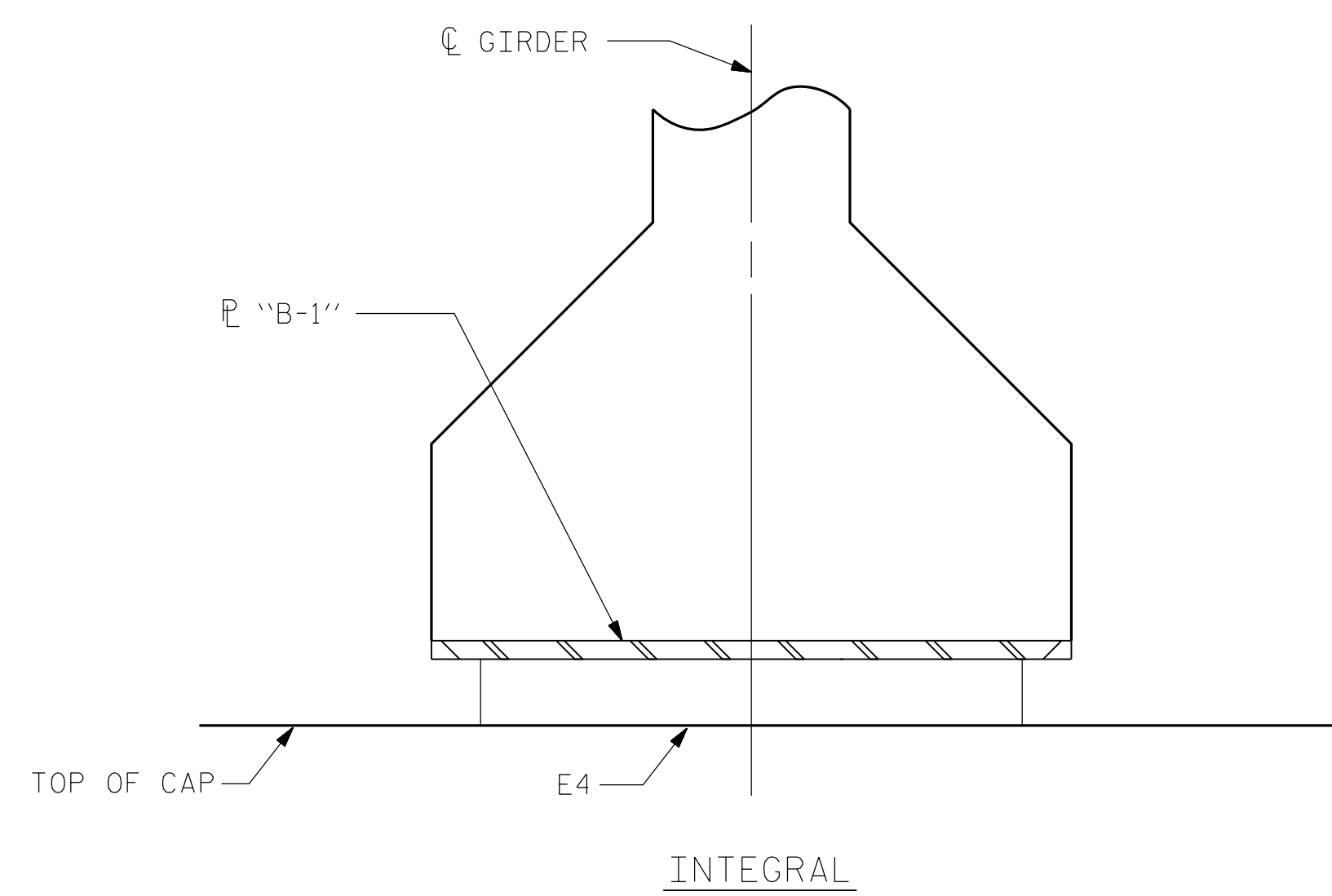
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			35

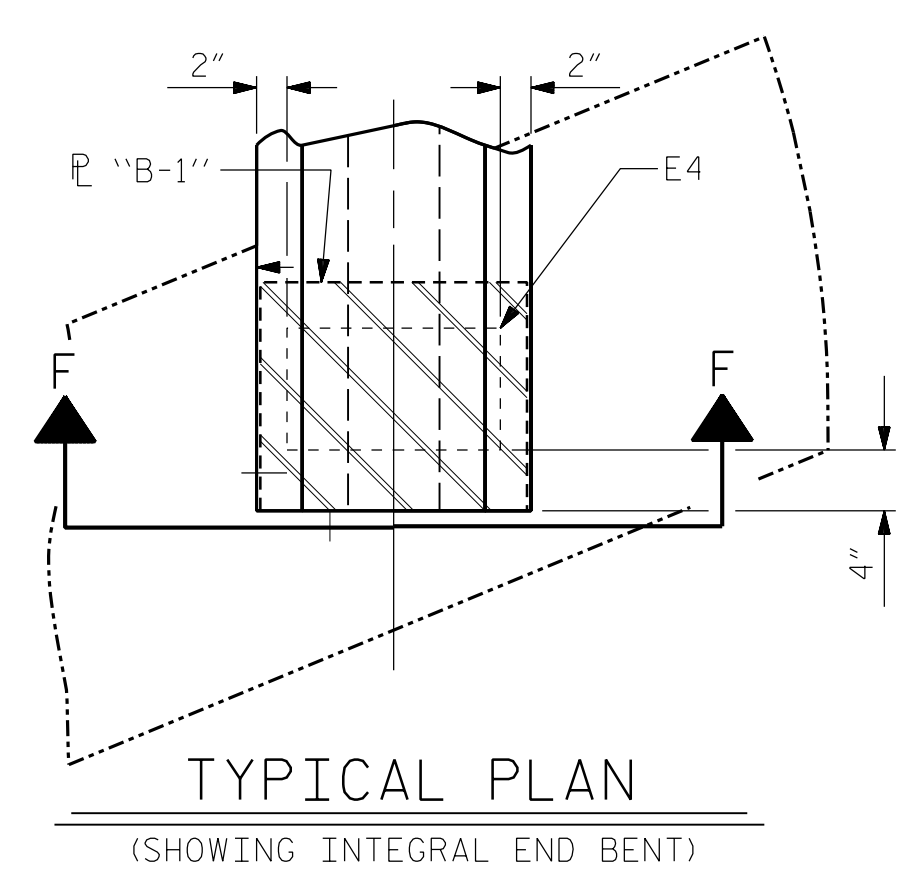
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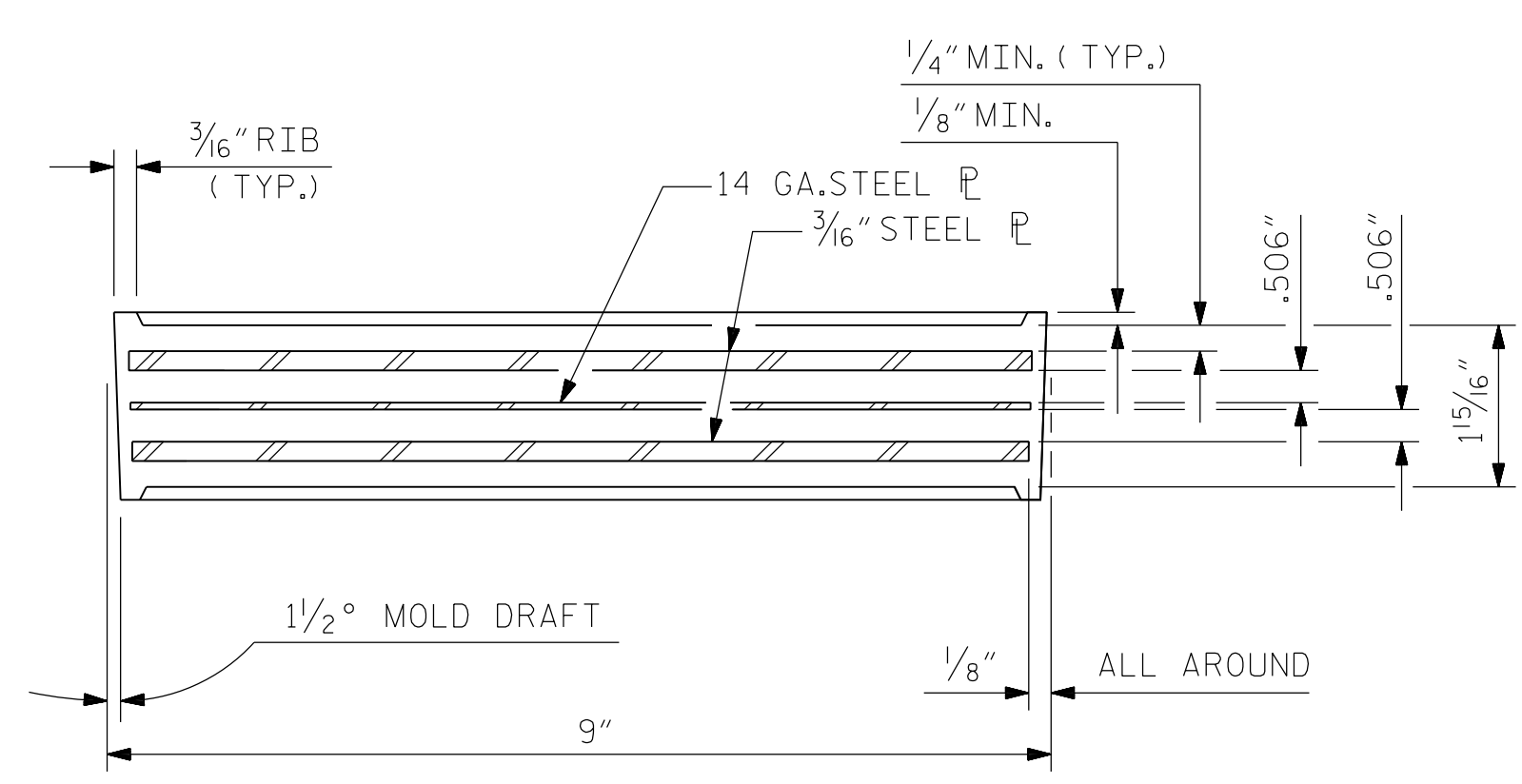
FIXED
SECTION E-E



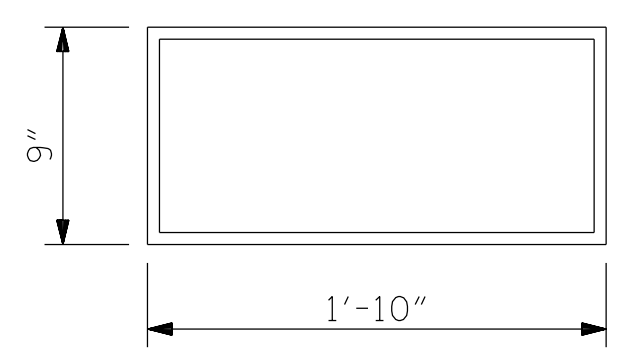
INTEGRAL
SECTION F-F



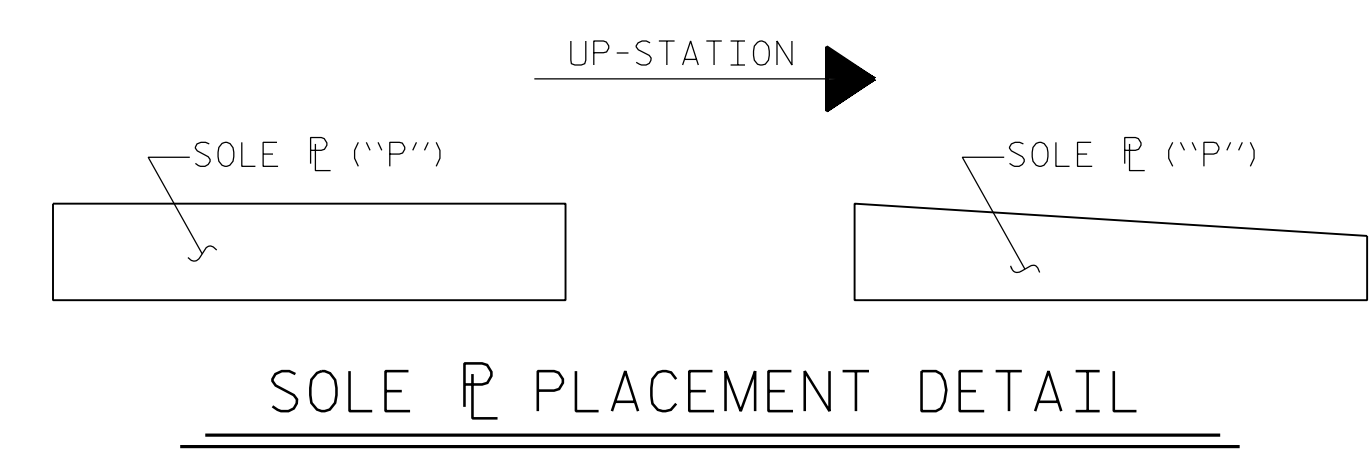
TYPICAL PLAN
(SHOWING INTEGRAL END BENT)



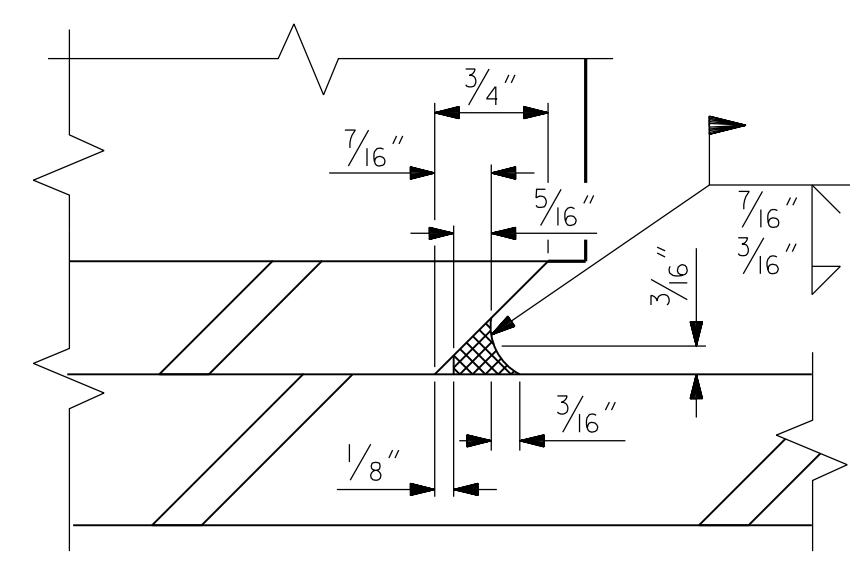
TYPICAL SECTION OF ELASTOMERIC BEARINGS



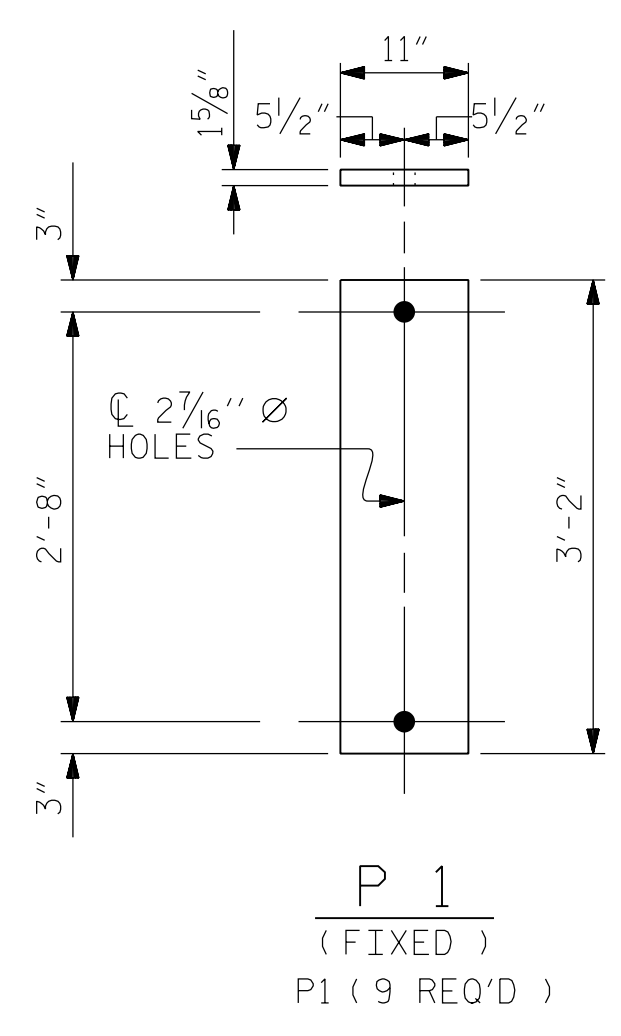
E4 (36 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE IV



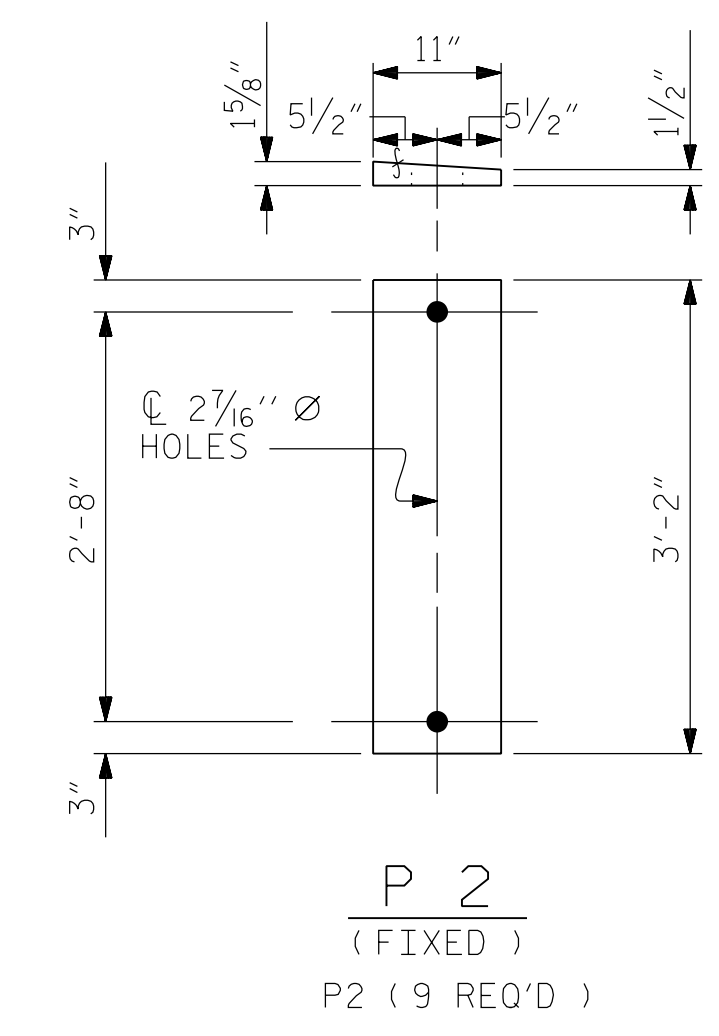
SOLE PLACEMENT DETAIL



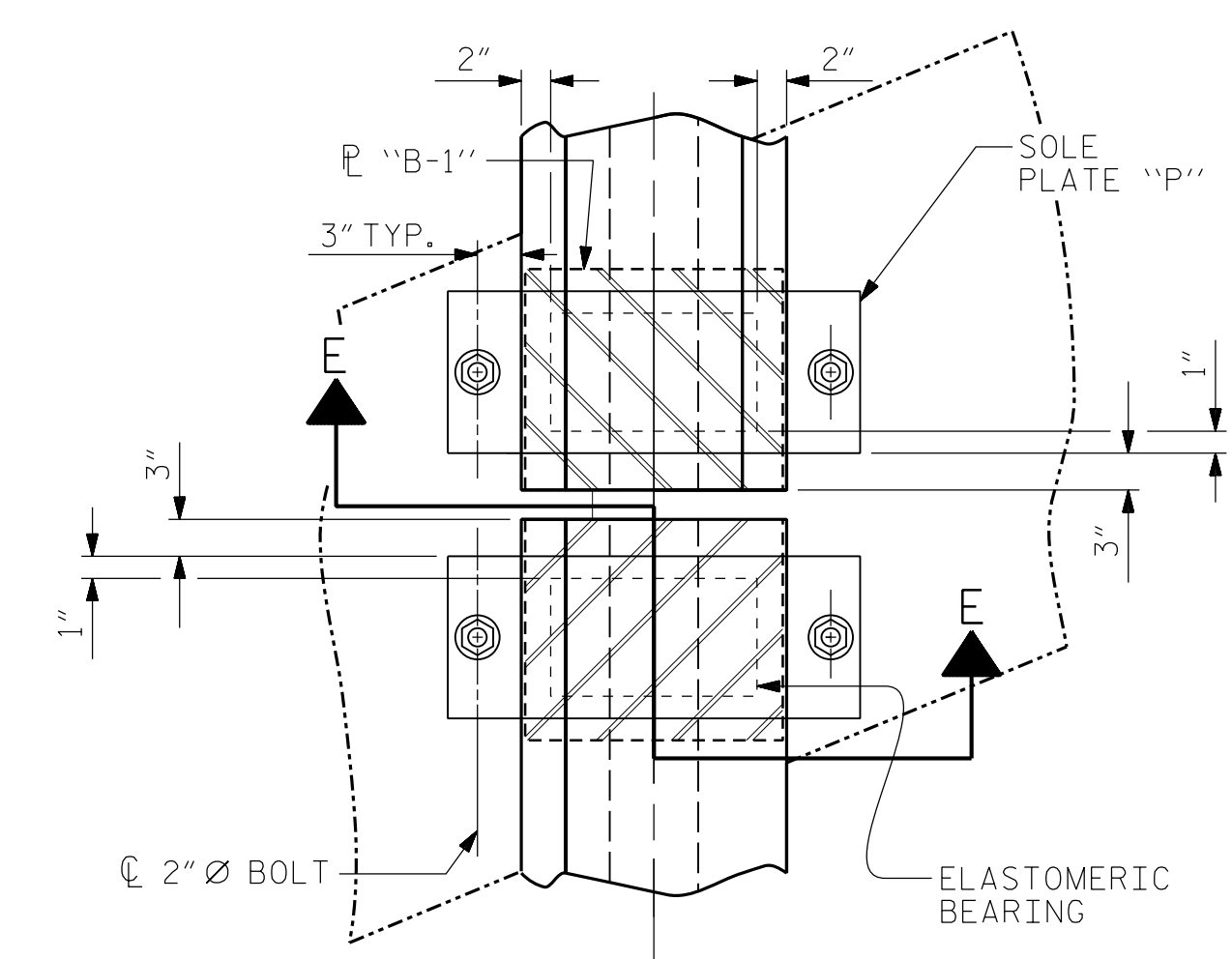
DETAIL "A"



P 1
(FIXED)
P1 (9 REQ'D)



P 2
(FIXED)
P2 (9 REQ'D)



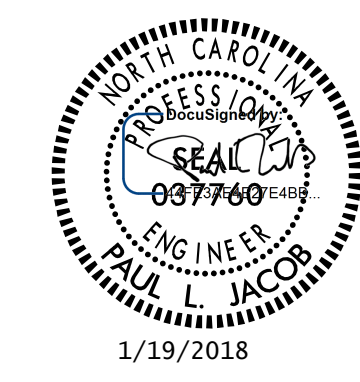
TYPICAL PLAN
(SHOWING CONTINUOUS BENT)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

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.
- STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.
- SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.
- ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.
- ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.
- THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.
- FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.
- ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

PROJECT NO. B-4491
CUMBERLAND COUNTY
STATION: 55+88.11 -L-



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ELASTOMERIC BEARING
DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			35

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ASSEMBLED BY : A. CHILKEPALLI	DATE : 01/2018
CHECKED BY : P. JACOB	DATE : 01/2018
DRAWN BY : WJH	8/89
CHECKED BY : CRK	8/89
REV. 6/13	AAC/MAA
REV. 1/15	MAA/TMG
REV. 12/17	MAA/THC

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																	
1/2" Ø LOW RELAXATION	SPAN A											SPAN A											SPAN A										
	GIRDER 1 & 9											GIRDER 2 & 8											GIRDER 3										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.066	0.126	0.172	0.201	0.211	0.201	0.172	0.126	0.066	0	0	0.066	0.126	0.172	0.201	0.211	0.201	0.172	0.126	0.066	0	0	0.066	0.126	0.172	0.201	0.211	0.201	0.172	0.126	0.066	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.047	0.093	0.129	0.151	0.158	0.149	0.126	0.090	0.045	0	0	0.051	0.100	0.138	0.162	0.170	0.161	0.135	0.097	0.049	0	0	0.050	0.099	0.136	0.160	0.110	0.159	0.134	0.096	0.048	0
FINAL CAMBER ↑	0	1/4	3/8	1/2	5/8	5/8	5/8	9/16	7/16	1/4	0	0	3/16	5/16	3/8	1/2	1/2	1/2	7/16	3/8	3/16	0	0	3/16	5/16	7/16	1/2	1/2	1/2	7/16	3/8	3/16	0

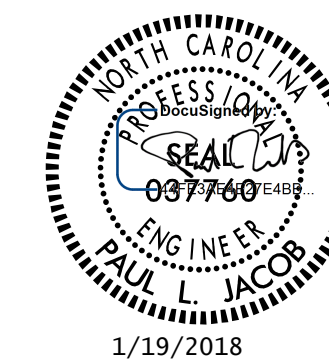
DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																	
1/2" Ø LOW RELAXATION	SPAN A											SPAN A											SPAN A										
	GIRDER 4											GIRDERS 5 & 6											GIRDER 7										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.066	0.126	0.172	0.201	0.211	0.201	0.172	0.126	0.066	0	0	0.066	0.126	0.172	0.201	0.211	0.201	0.172	0.126	0.066	0	0	0.066	0.126	0.172	0.201	0.211	0.201	0.172	0.126	0.066	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.049	0.097	0.134	0.158	0.166	0.157	0.133	0.095	0.048	0	0	0.050	0.098	0.136	0.160	0.168	0.159	0.134	0.096	0.048	0	0	0.051	0.100	0.138	0.162	0.170	0.161	0.135	0.097	0.049	0
FINAL CAMBER ↑	0	3/16	5/16	7/16	1/2	9/16	1/2	1/2	3/8	1/4	0	0	3/16	5/16	7/16	1/2	1/2	1/2	7/16	3/8	3/16	0	0	3/16	5/16	3/8	7/16	1/2	1/2	7/16	3/8	3/16	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																	
1/2" Ø LOW RELAXATION	SPAN B											SPAN B											SPAN B										
	GIRDERS 1 & 9											GIRDERS 2 & 8											GIRDER 3										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.064	0.121	0.166	0.194	0.204	0.194	0.166	0.121	0.064	0	0	0.064	0.121	0.166	0.194	0.204	0.196	0.166	0.121	0.064	0	0	0.064	0.121	0.166	0.194	0.204	0.194	0.166	0.121	0.064	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.036	0.073	0.103	0.122	0.129	0.124	0.106	0.076	0.039	0	0	0.040	0.080	0.111	0.132	0.140	0.133	0.114	0.082	0.042	0	0	0.040	0.079	0.110	0.131	0.138	0.132	0.112	0.081	0.041	0
FINAL CAMBER ↑	0	5/16	9/16	3/4	7/8	7/8	3/4	13/16	9/16	5/16	0	0	5/16	1/2	11/16	3/4	3/4	3/4	5/8	7/16	1/4	0	0	5/16	1/2	11/16	3/4	13/16	13/16	5/8	1/2	1/4	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																	
1/2" Ø LOW RELAXATION	SPAN B											SPAN B											SPAN B										
	GIRDER 4											GIRDERS 5 & 6											GIRDER 7										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.064	0.121	0.166	0.194	0.204	0.194	0.166	0.121	0.064	0	0	0.064	0.121	0.166	0.194	0.204	0.194	0.166	0.121	0.064	0	0	0.064	0.121	0.166	0.194	0.204	0.194	0.166	0.121	0.064	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.039	0.078	0.109	0.129	0.137	0.130	0.111	0.080	0.041	0	0	0.039	0.079	0.110	0.130	0.138	0.132	0.112	0.081	0.041	0	0	0.039	0.079	0.111	0.132	0.140	0.133	0.114	0.082	0.042	0
FINAL CAMBER ↑	0	5/16	1/2	11/16	3/4	13/16	3/4	11/16	1/2	1/4	0	0	5/16	1/2	11/16	3/4	13/16	3/4	5/8	1/2	1/4	0	0	5/16	1/2	11/16	3/4	3/4	3/4	5/8	7/16	1/4	0

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

PROJECT NO. B-4491
CUMBERLAND COUNTY
STATION: 55+88.11 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DEAD LOAD DEFLECTIONS FOR PRESTRESSED CONCRETE GIRDERS

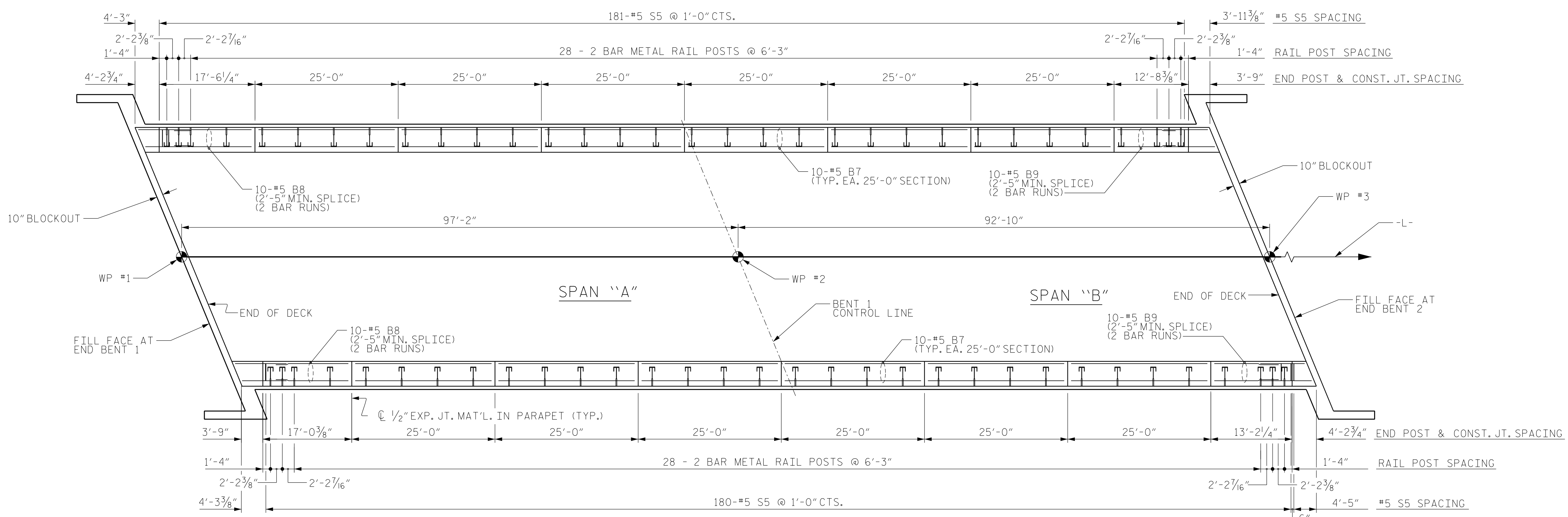
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-17
2			4			TOTAL SHEETS 35

DRAWN BY : M. RAY DATE : 03/2017
CHECKED BY : P. JACOB DATE : 03/2017
DESIGN ENGINEER OF RECORD: P. JACOB DATE : 03/2017

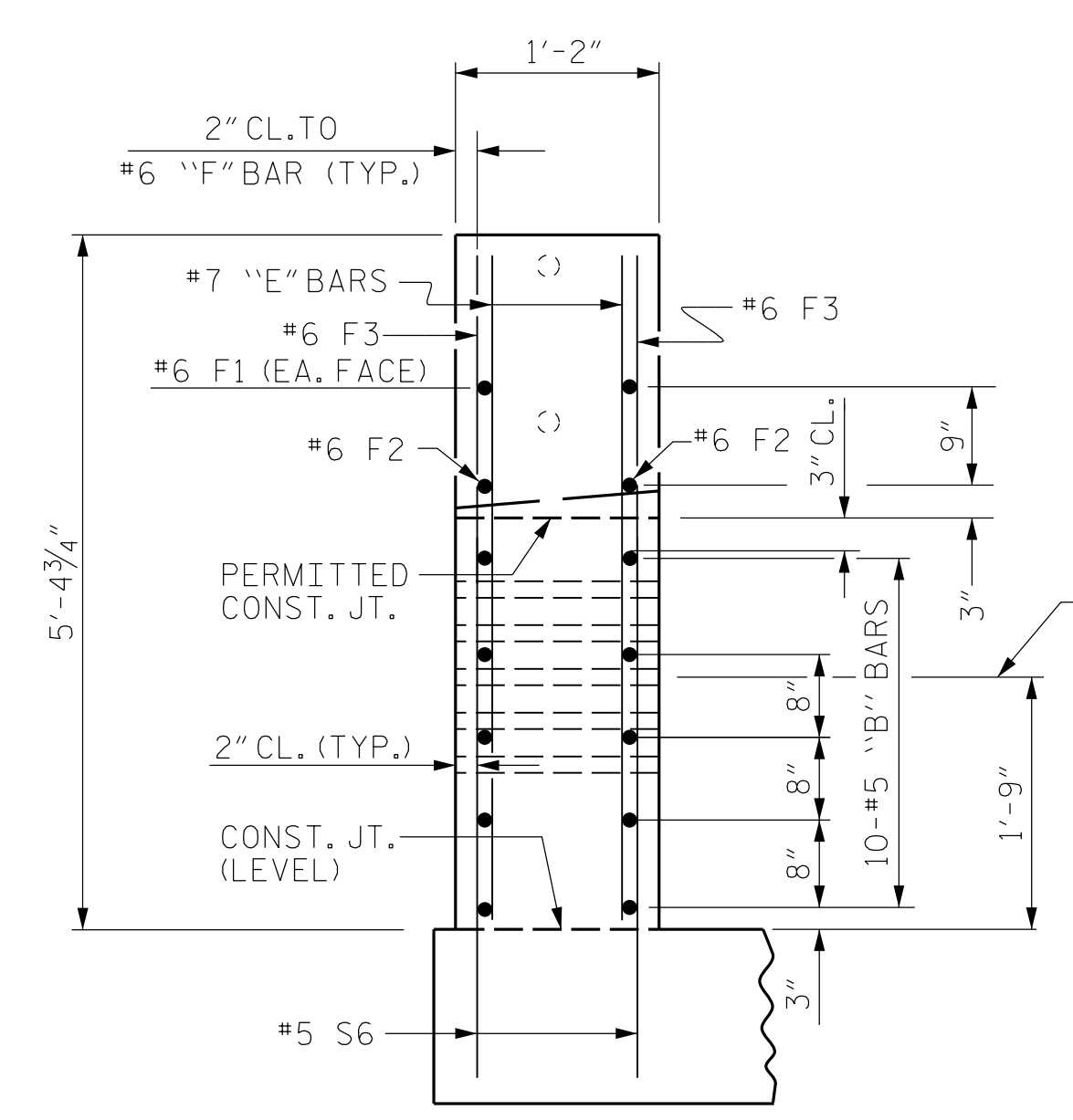
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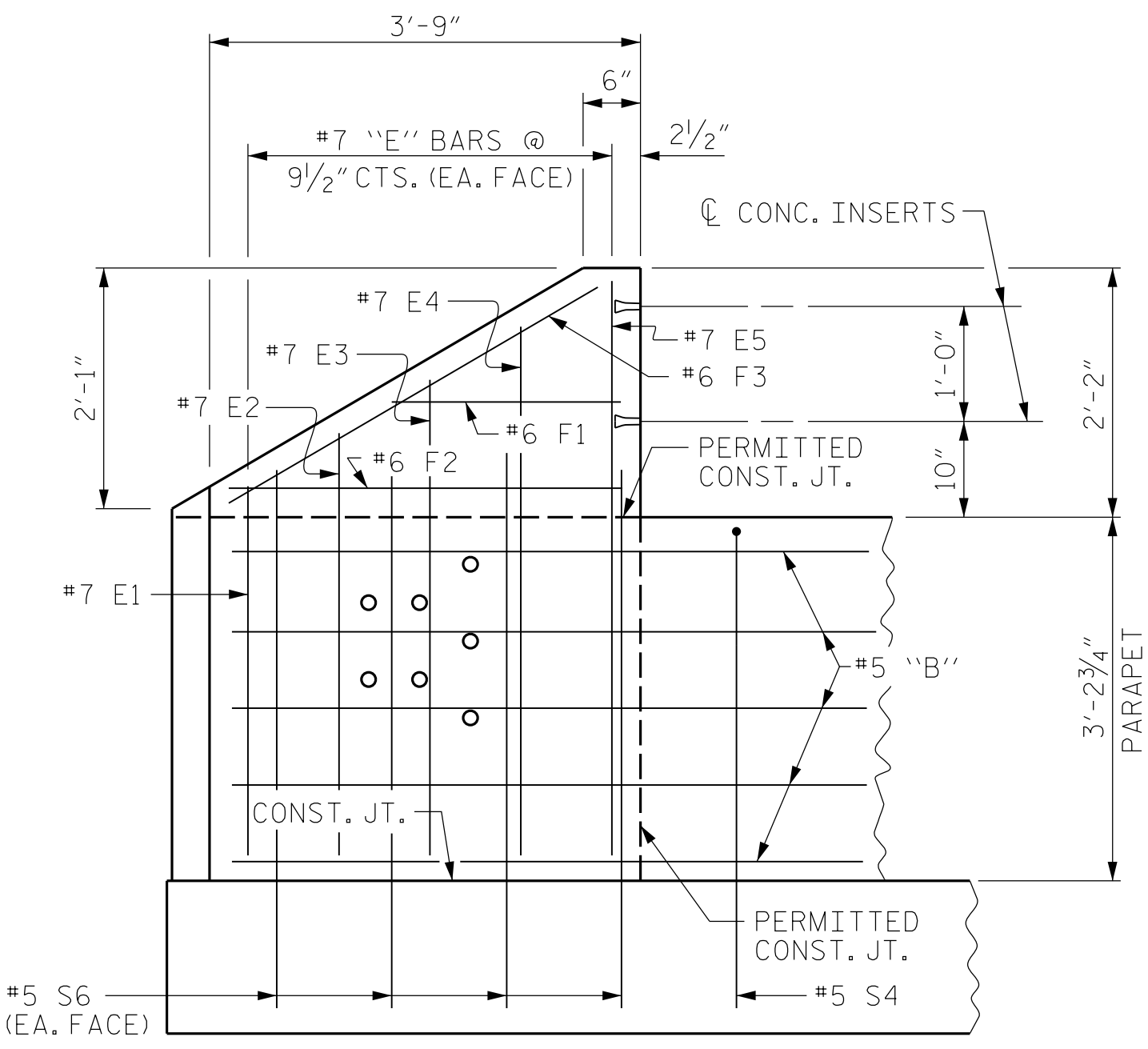
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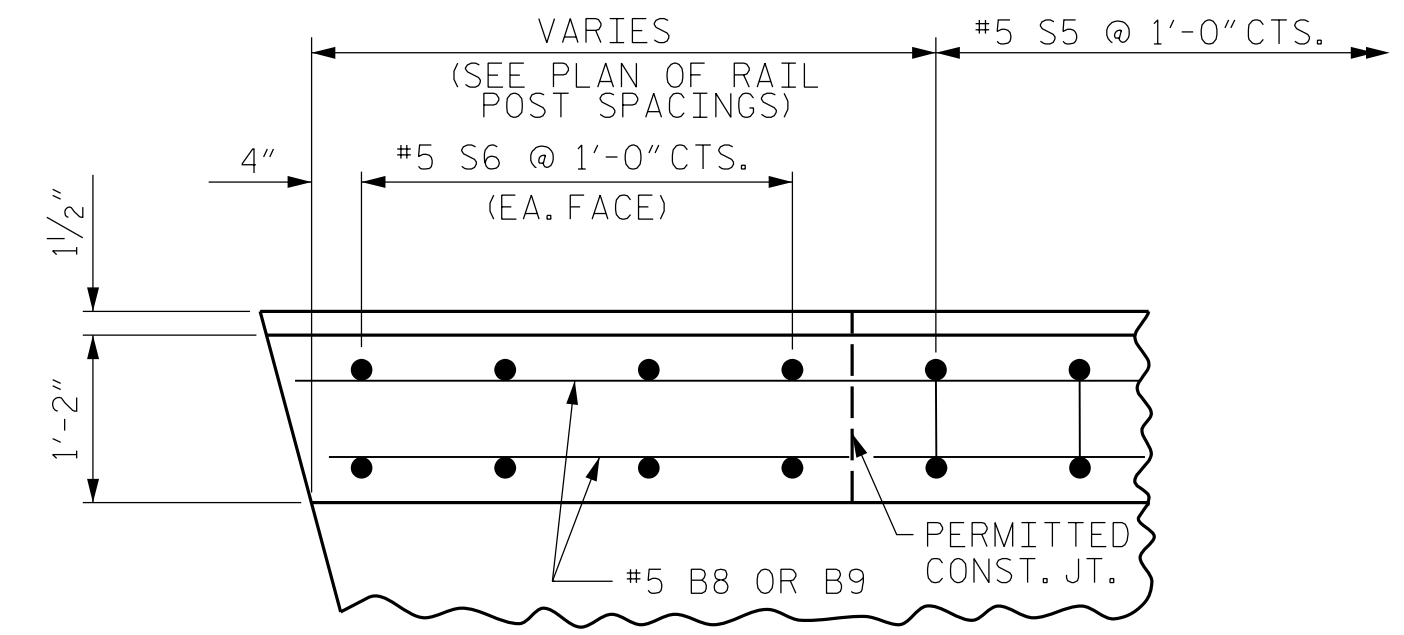
PLAN OF RAIL POST SPACINGS



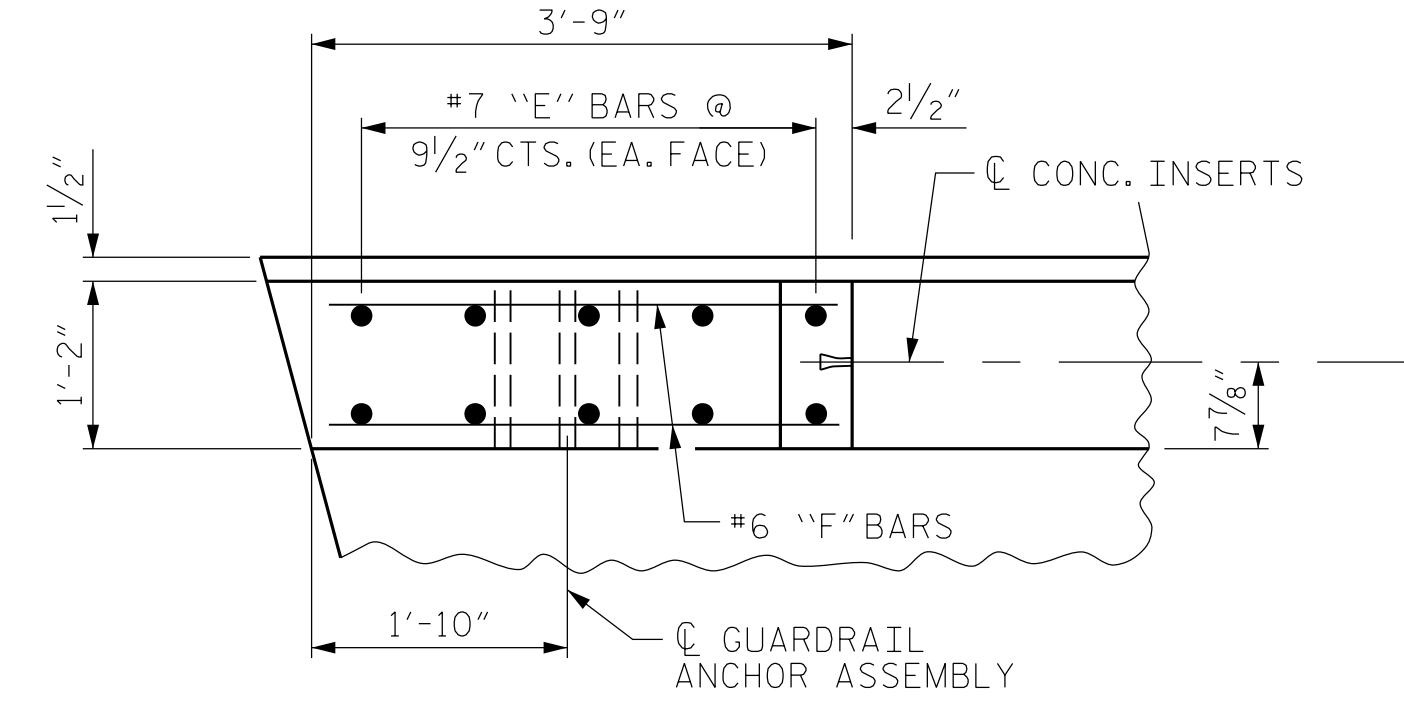
END VIEW



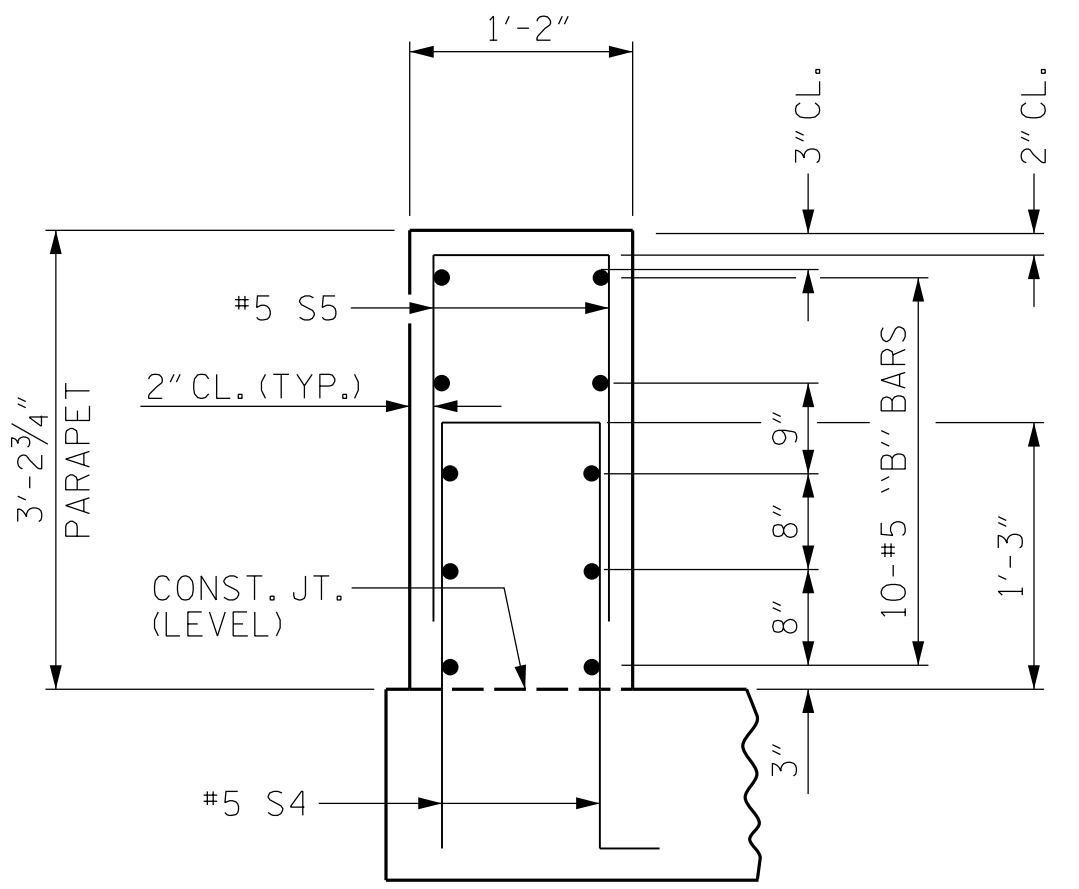
ELEVATION



PLAN OF PARAPET



PLAN OF END POST

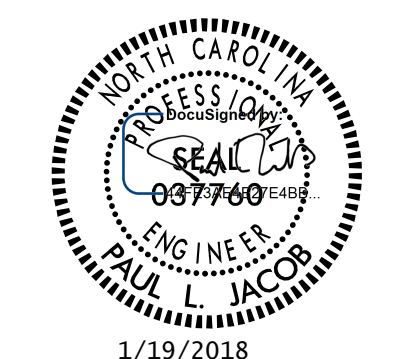


SECTION THRU PARAPET

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CONCRETE PARAPET AND END POSTS



DRAWN BY : A. CHILKEPALLI DATE : 01/2018
 CHECKED BY : P. JACOB DATE : 01/2018
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 01/2018

PARAPET AND END POST FOR TWO BAR RAIL

moffatt & nichol
 4700 FALLS OF NEUSE ROAD, SUITE 300
 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License No.: F-0105

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			35

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NOTES

STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
 - B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

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

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

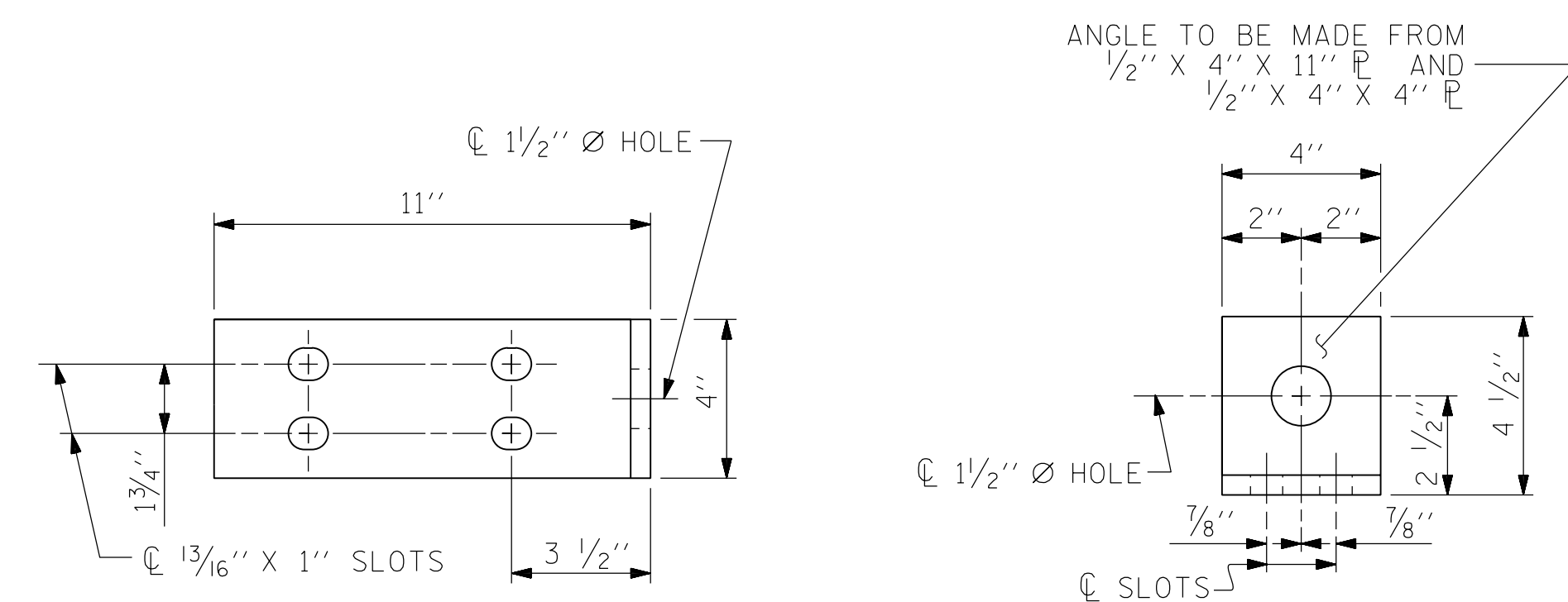
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

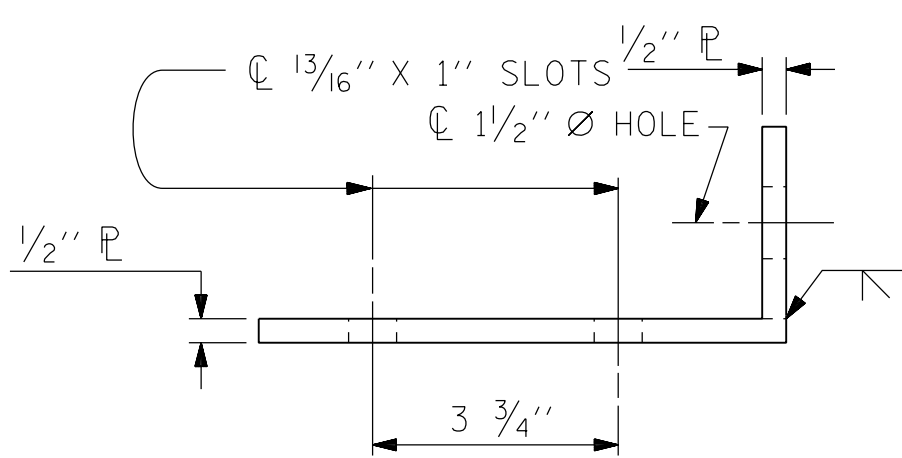
FOR RAIL POST SPACINGS, SEE SHEET 1 OF 4.

PLAN OF RAIL POST SPACINGS

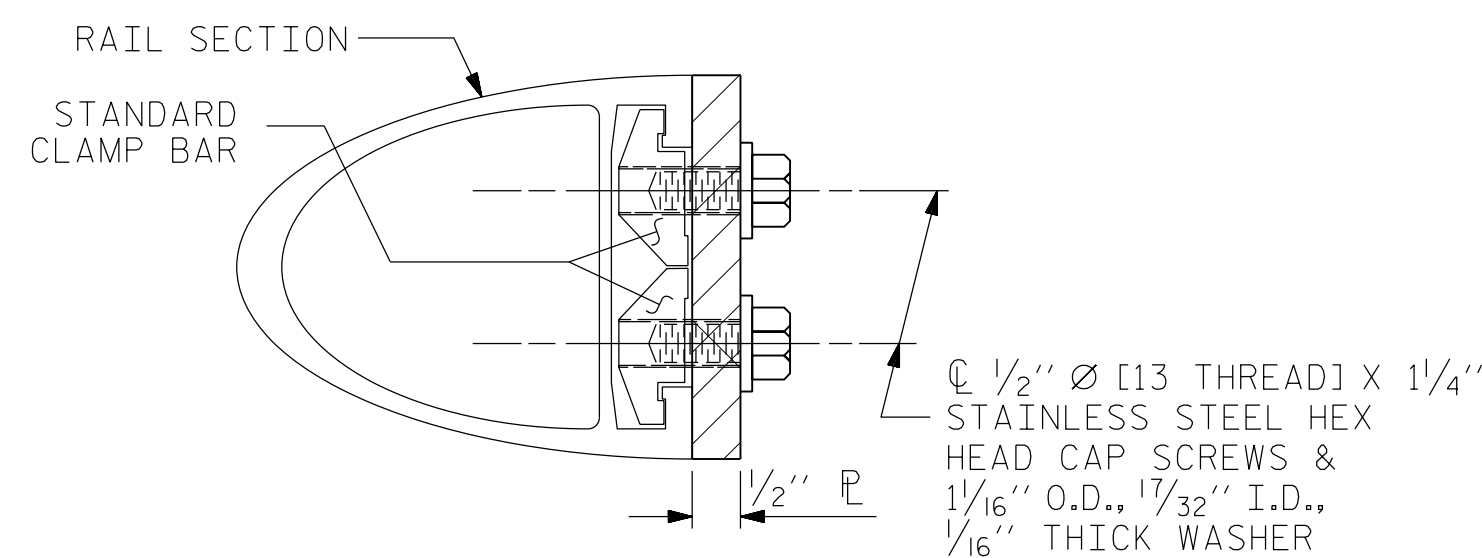


ELEVATION

END VIEW (FIX AND EXP.)

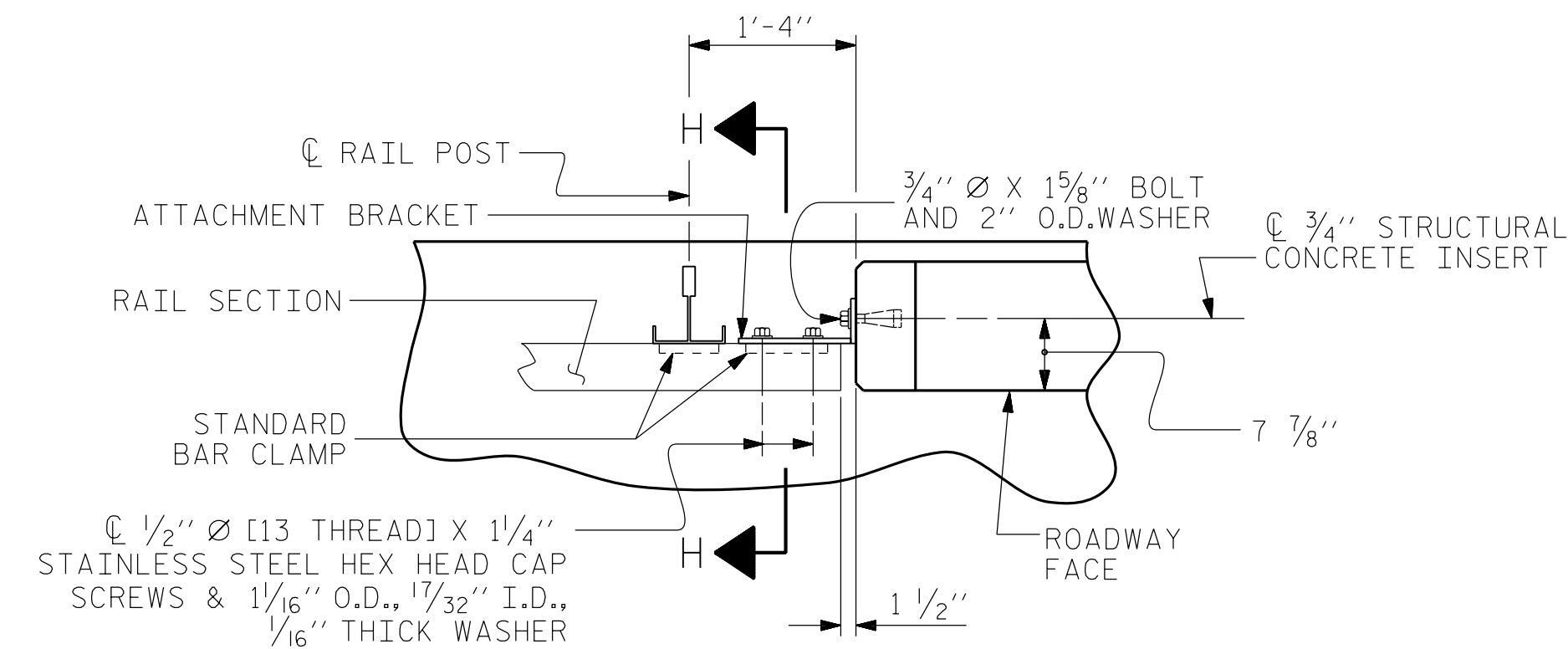


TOP VIEW

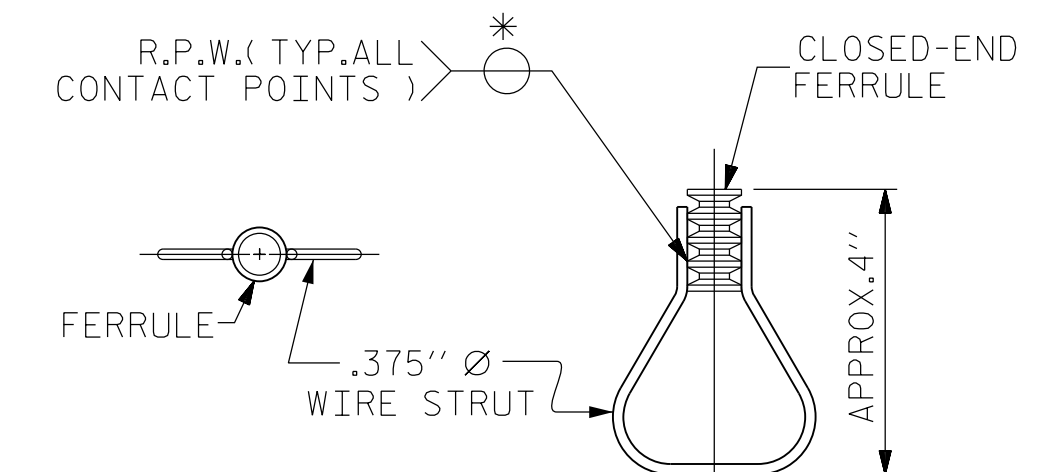


SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST



PLAN ELEVATION

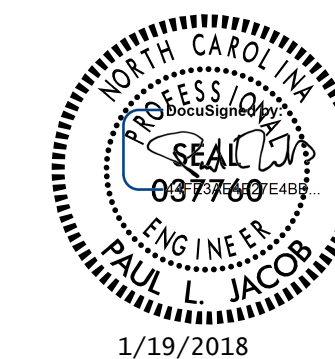
STRUCTURAL CONCRETE INSERT

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

PROJECT NO. B-4491
 CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RAIL POST SPACINGS
 AND
 END OF RAIL DETAILS
 FOR ONE OR TWO BAR METAL RAILS



1/19/2018

DETAILS FOR ATTACHING METAL RAIL TO END POST



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			35

STD. NO. BMR2

ASSEMBLED BY :	M. RAY	DATE :	03/2017
CHECKED BY :	P. JACOB	DATE :	03/2017
DRAWN BY :	FCJ 1/88	REV. 5/7/03	RWW/JTE
CHECKED BY :	CRK 3/89	REV. 5/1/06	TLA/GM
		REV. 10/1/11	MAA/GM

1/19/2018 02:18:32 AM \\sra\3240\3240-03 B-4491\CADD\Working\B4491_SMLL2MR2_250022.dgn p.jacob

NOTES

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

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

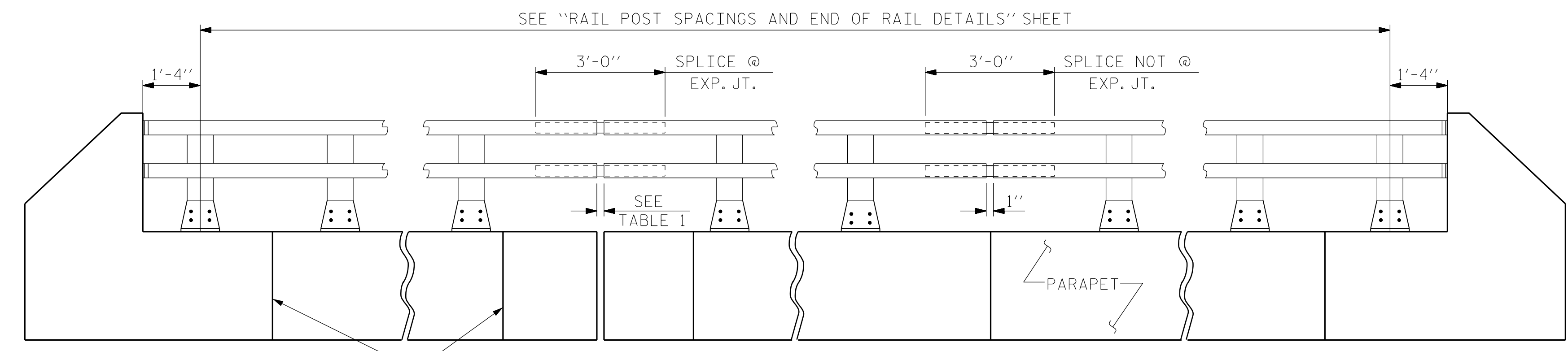
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

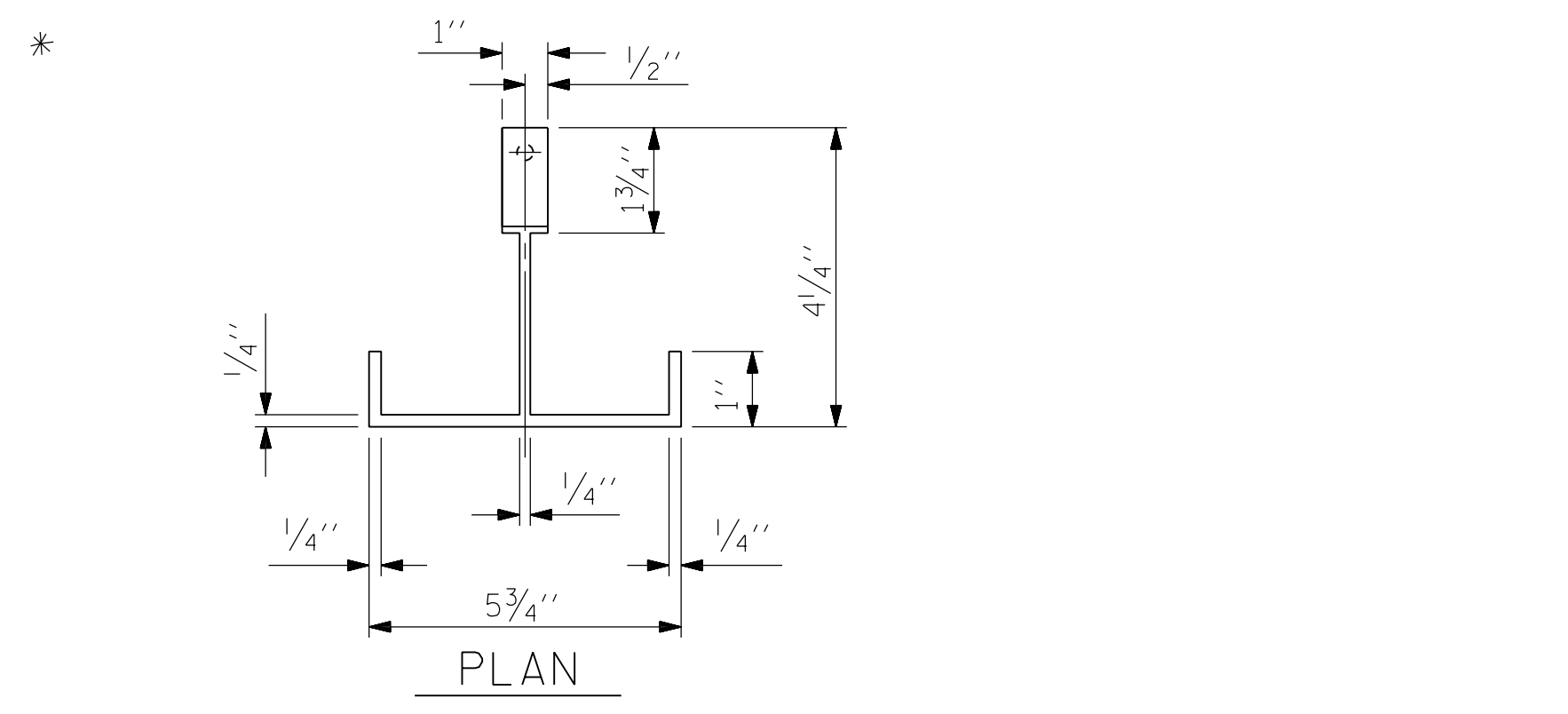
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

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

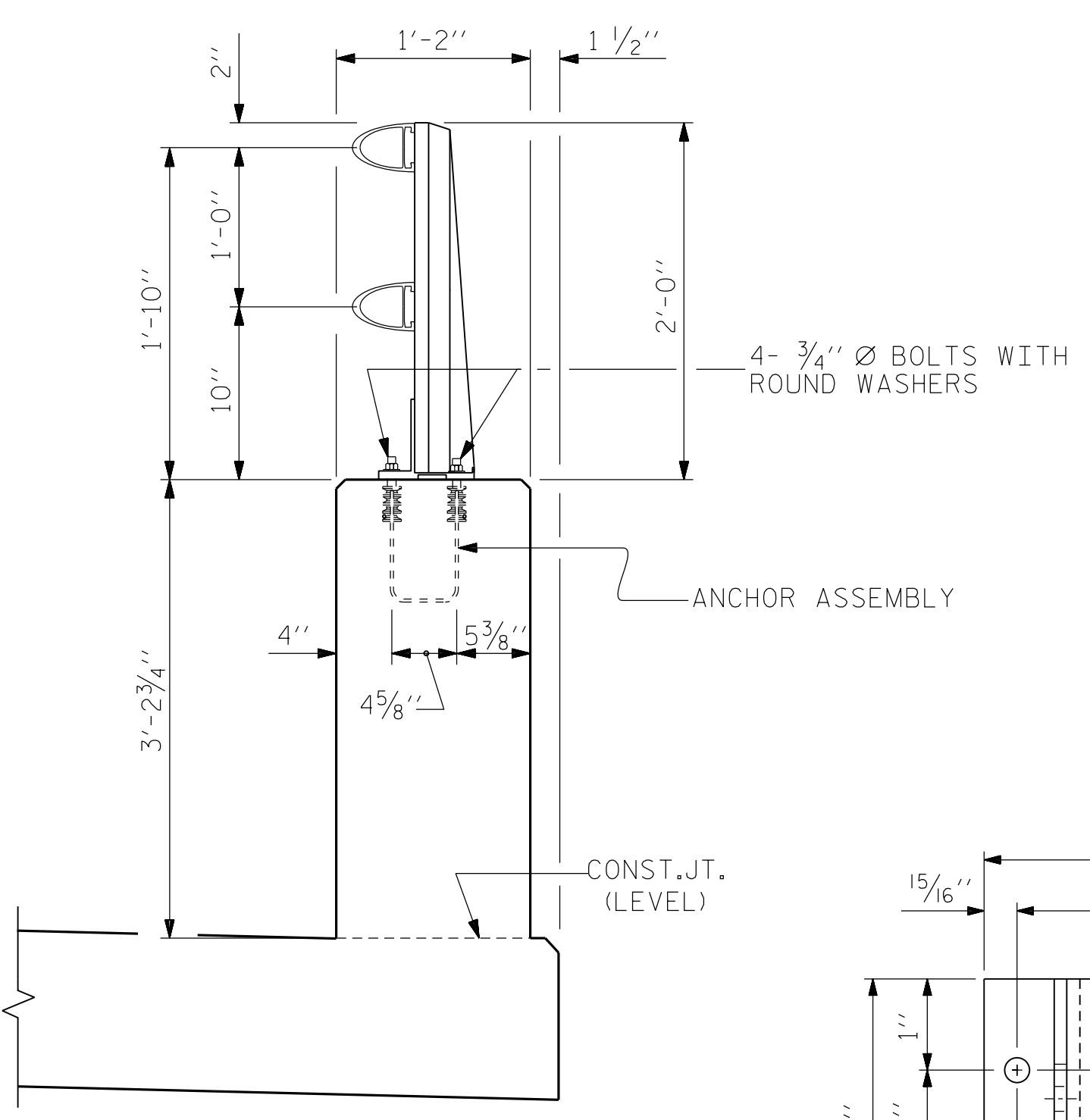
PAY LENGTH = 360.43 LIN. FT.



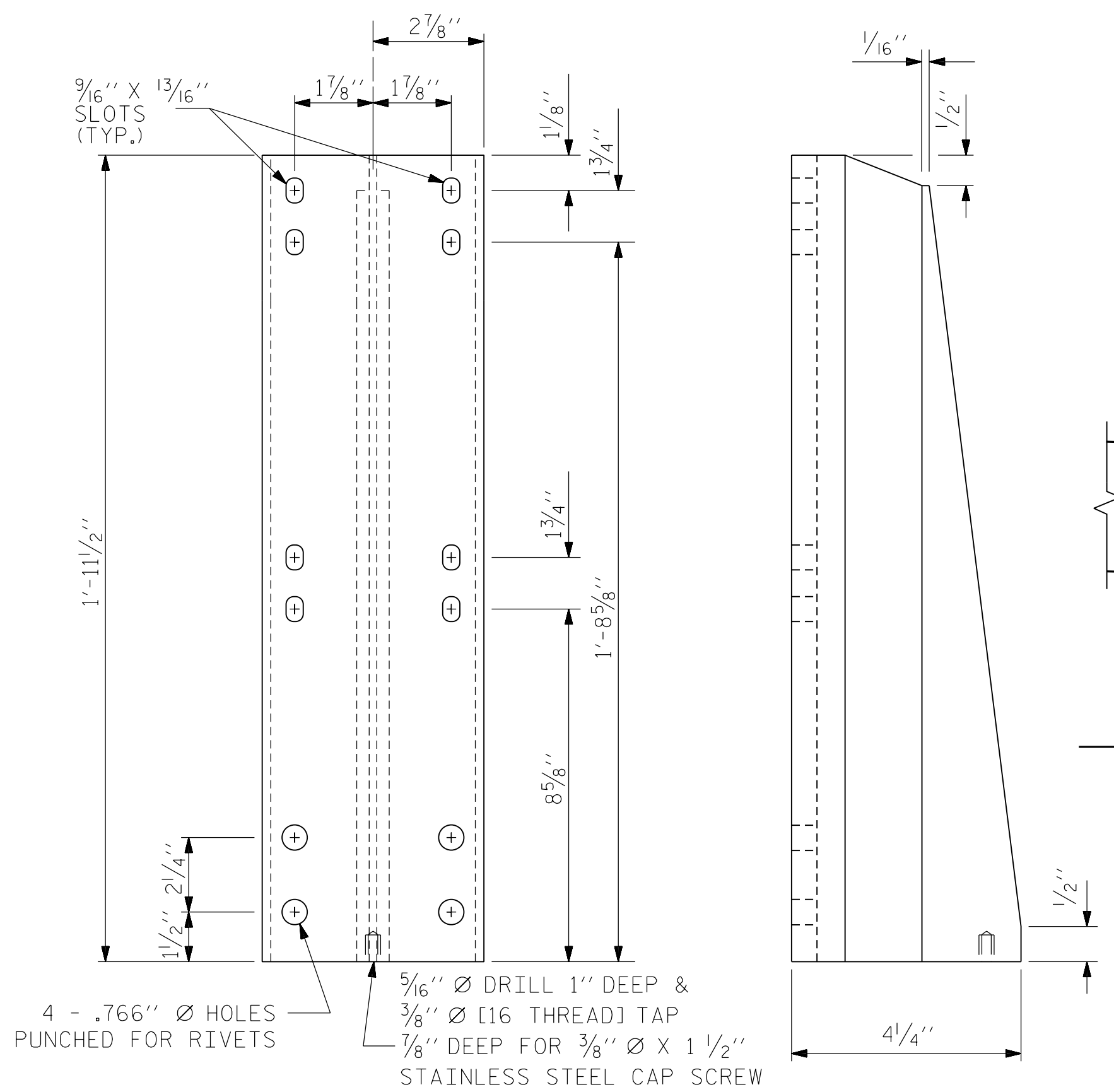
ELEVATION
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



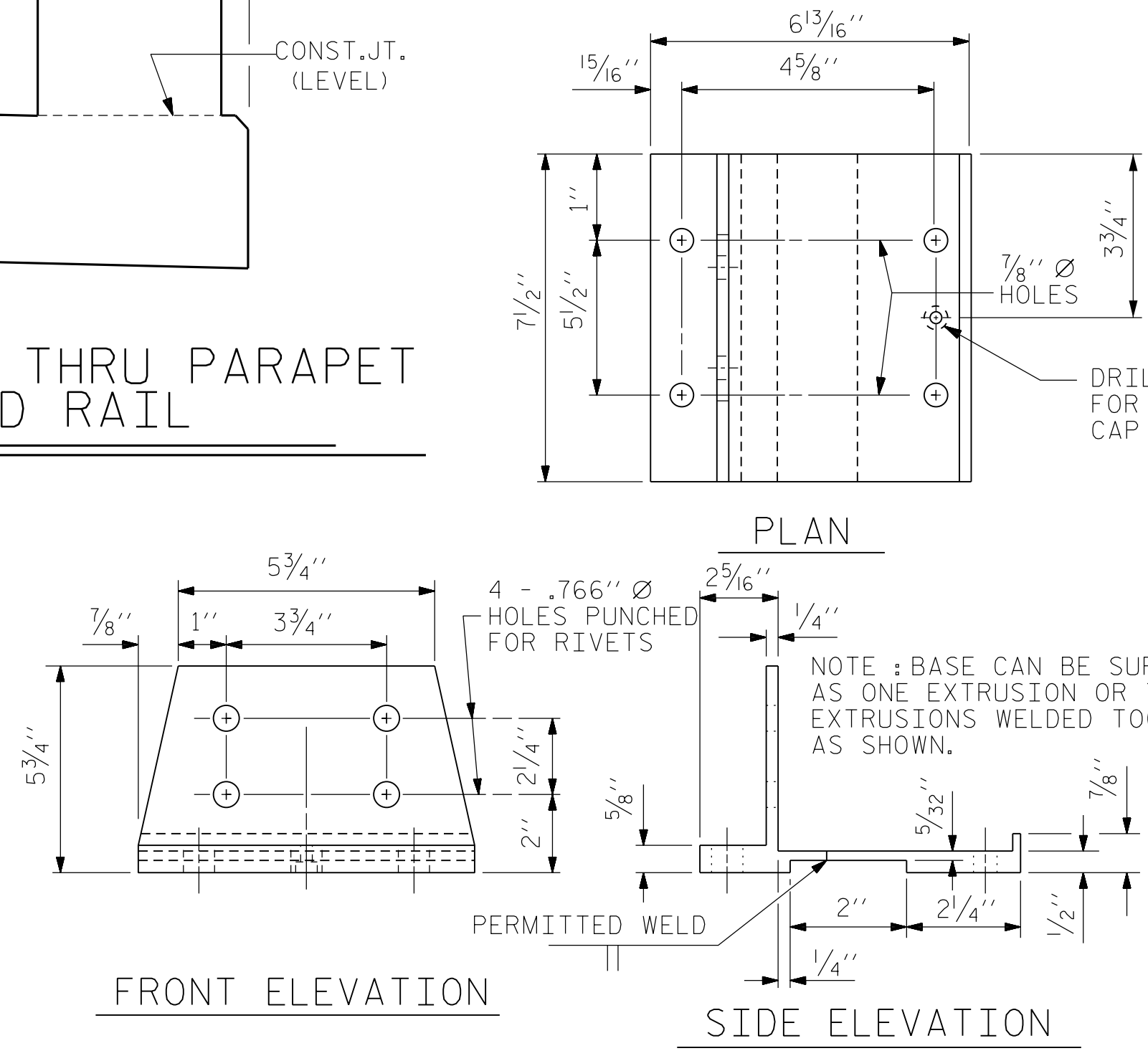
PLAN



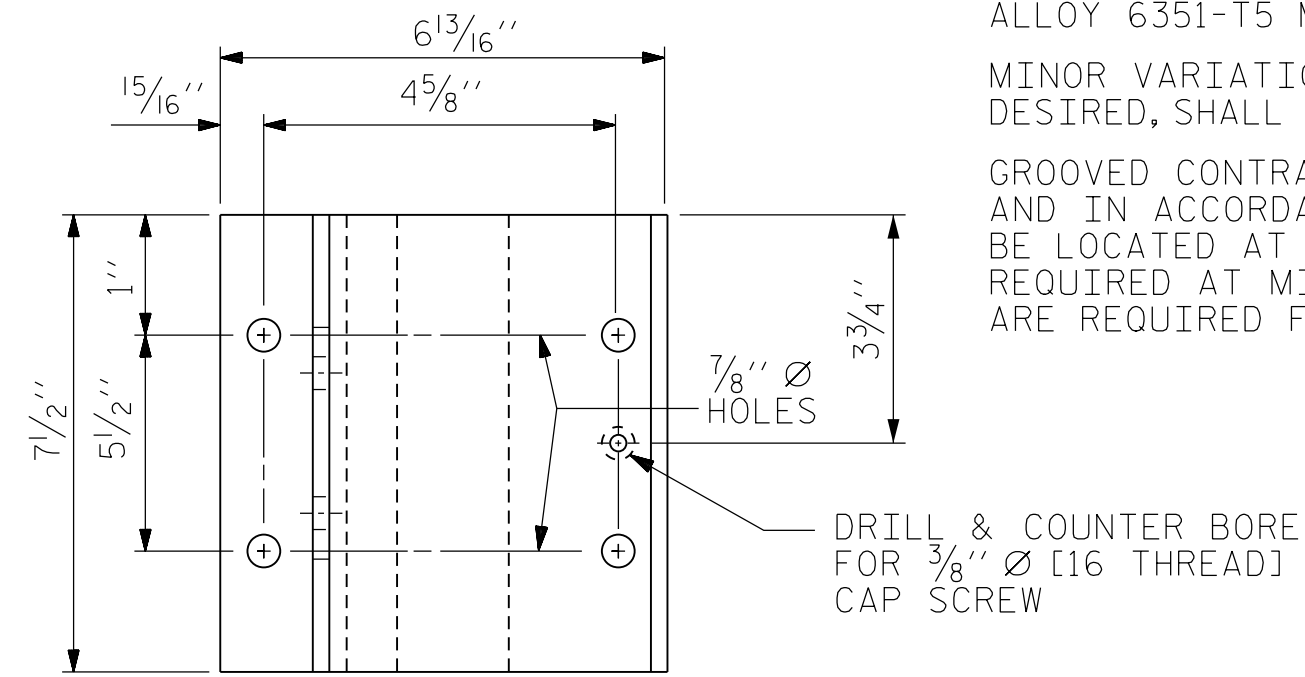
SECTION THRU PARAPET AND RAIL



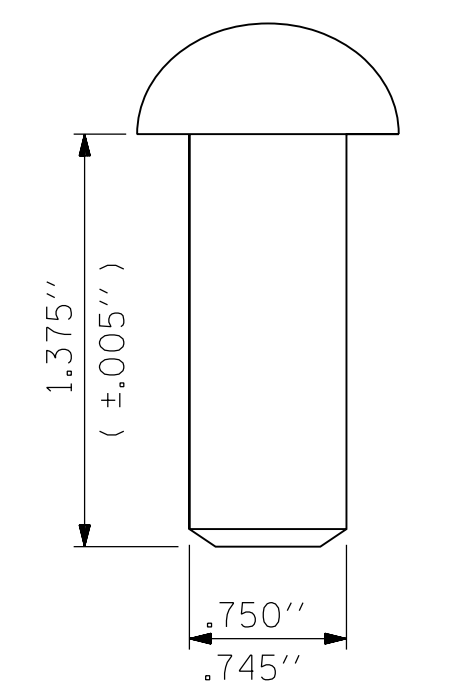
FRONT ELEVATION **SIDE ELEVATION**
DETAILS OF POST



FRONT ELEVATION **SIDE ELEVATION**
POST BASE DETAILS

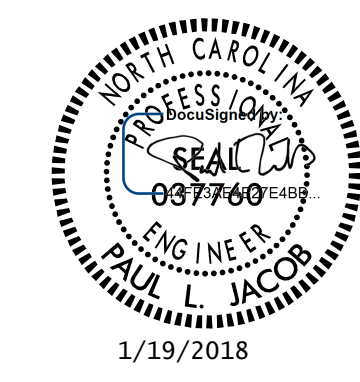


PLAN



RIVET DETAIL

moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License No.: F-0105



PROJECT NO. B-4491
CUMBERLAND COUNTY
STATION: 55+88.11 -L-
SHEET 3 OF 4

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			35

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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NOTES

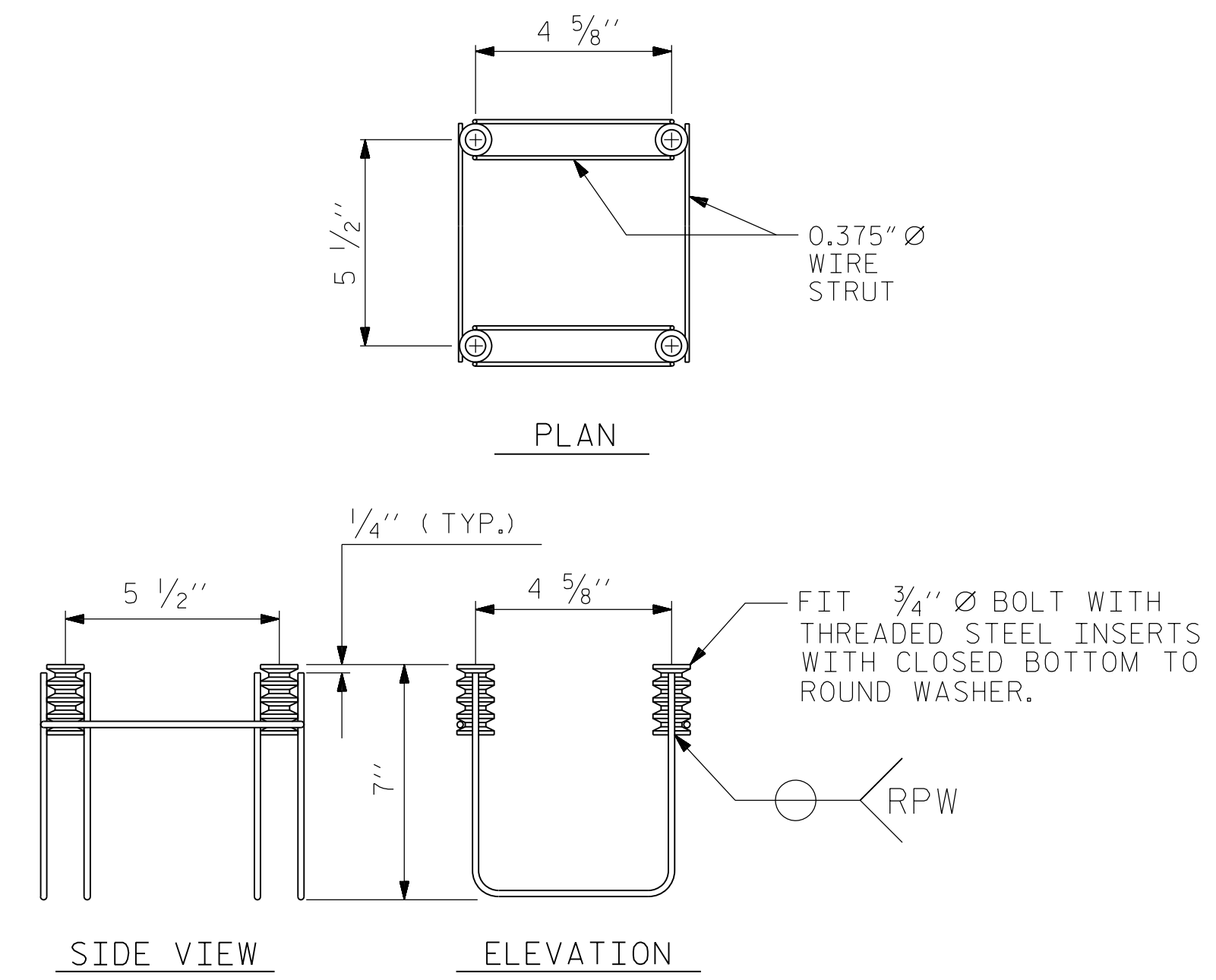
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

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

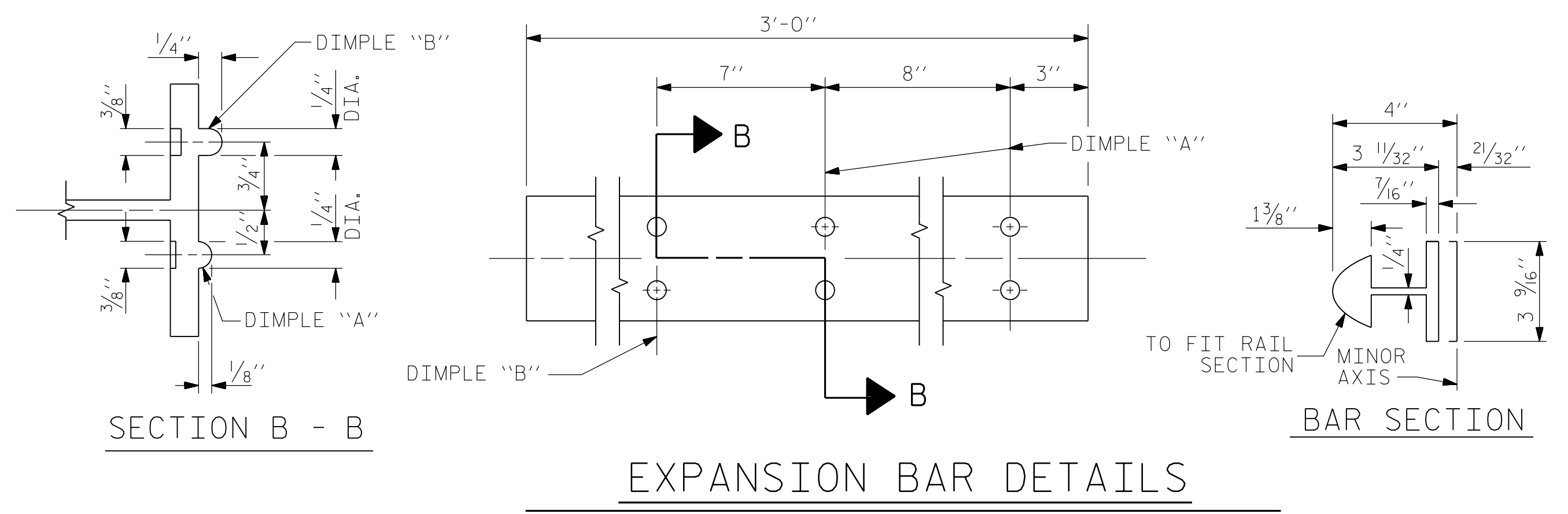
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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

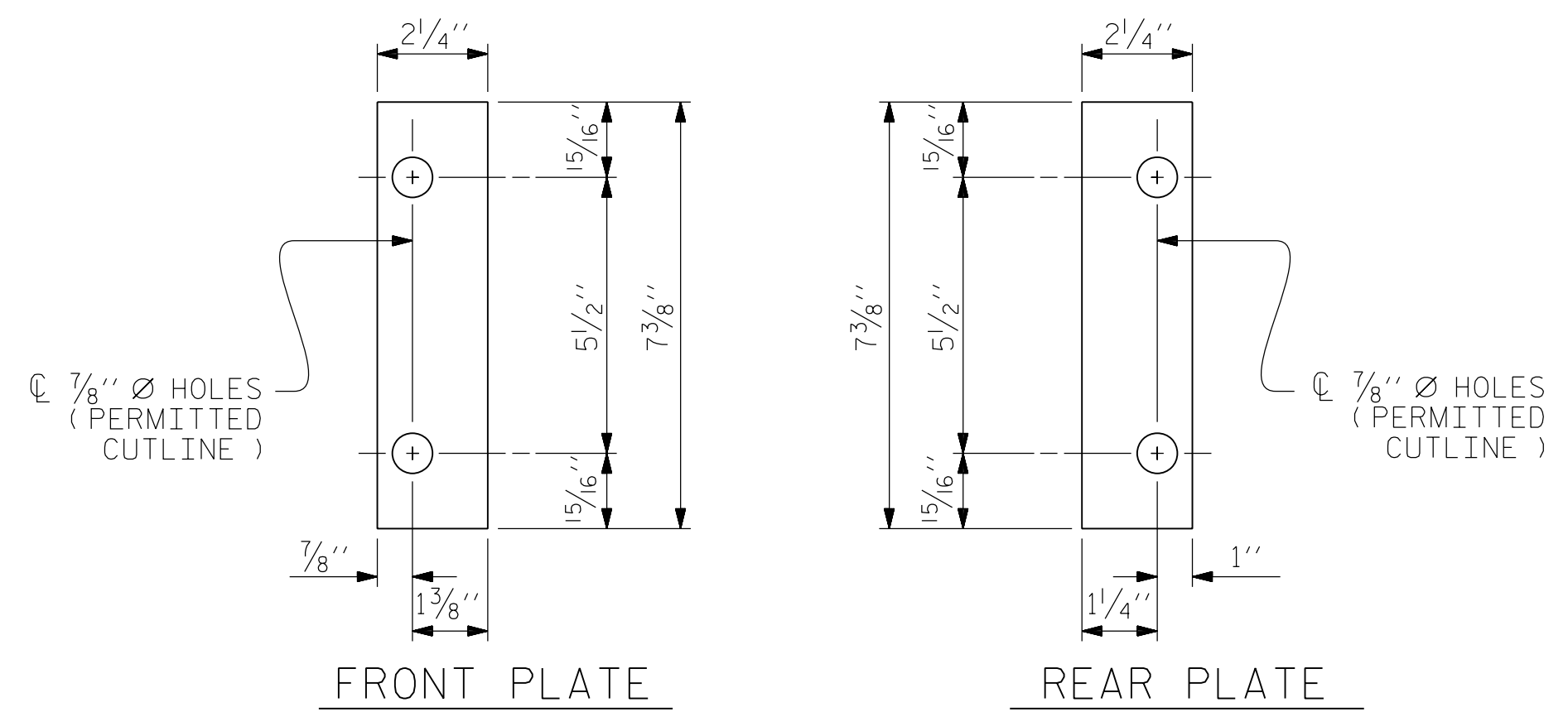


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(64 ASSEMBLIES REQUIRED)

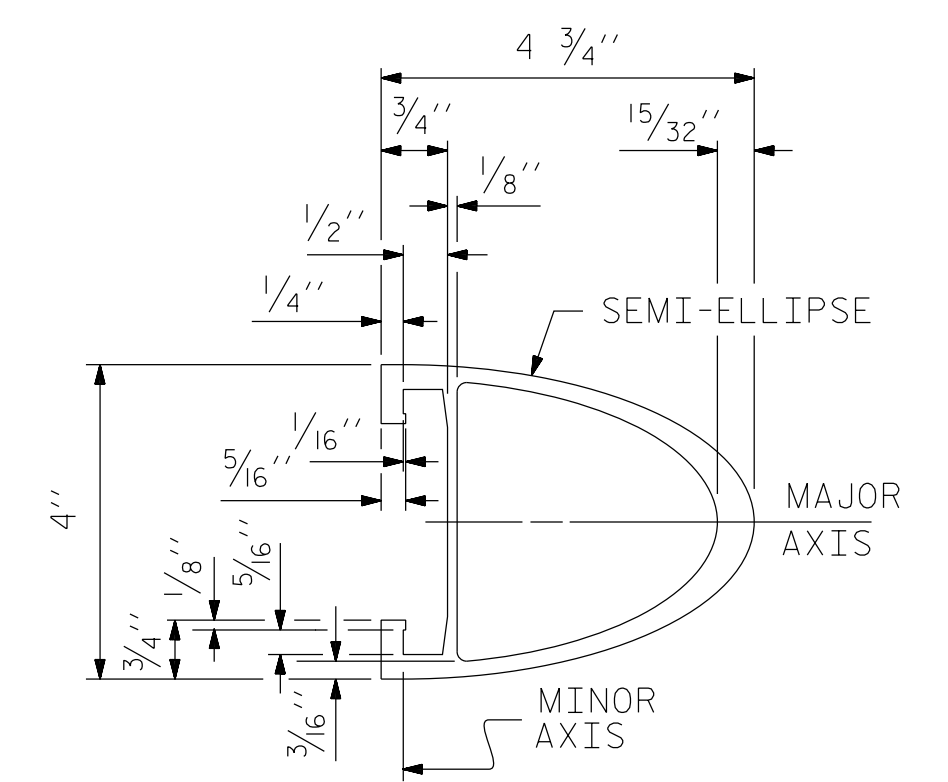


EXPANSION BAR DETAILS

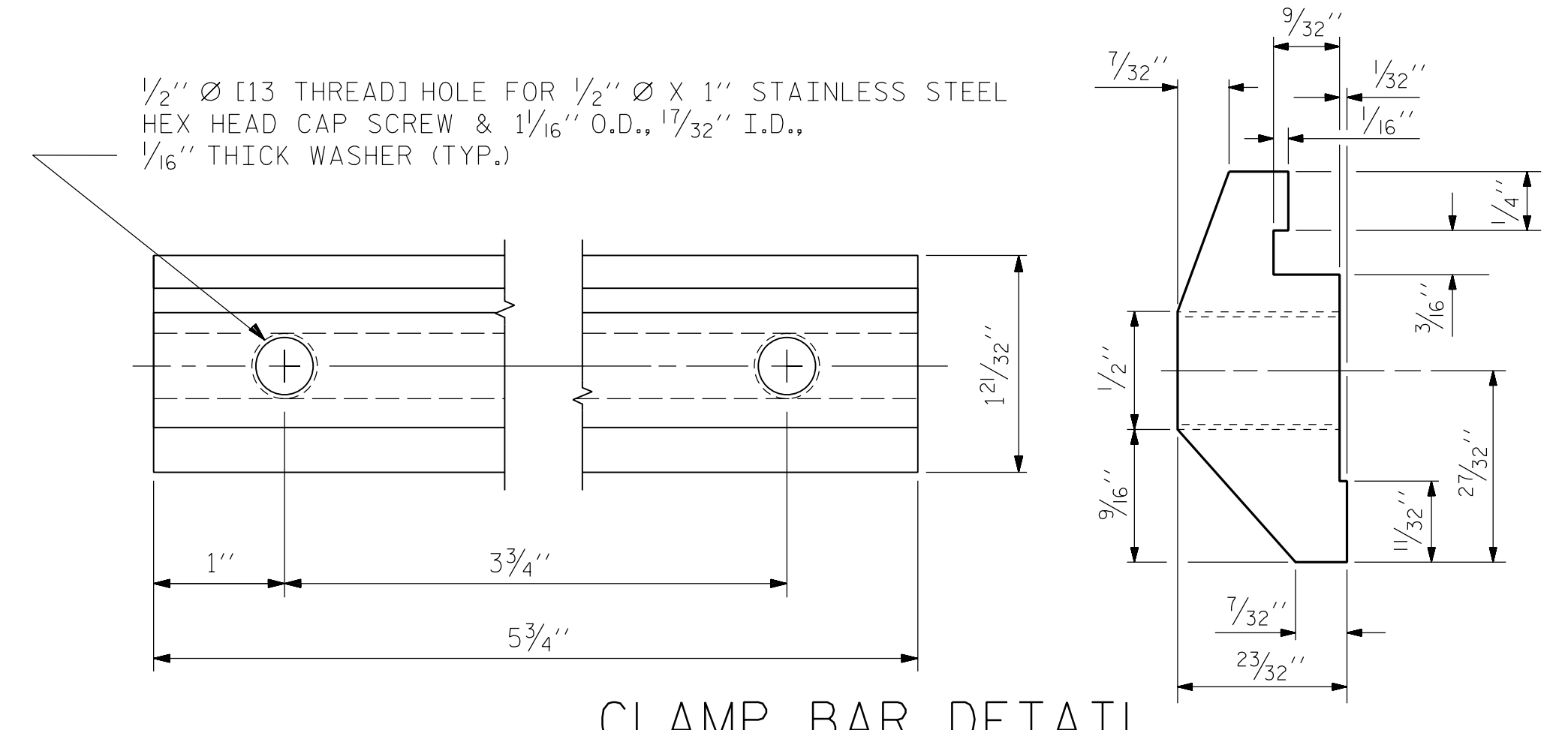


SHIM DETAILS

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

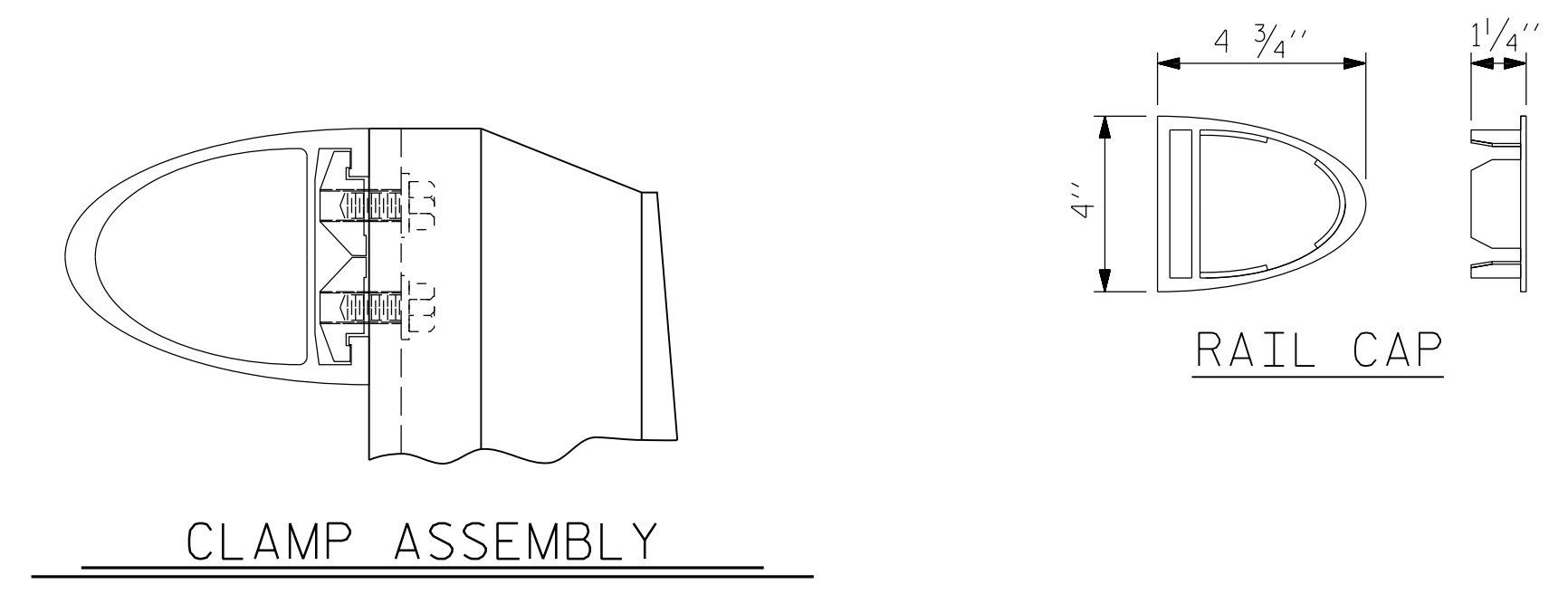


RAIL SECTION



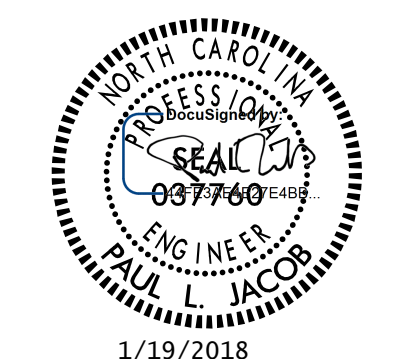
CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

RAIL CAP



PROJECT NO. B-4491
 CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 4 OF 4

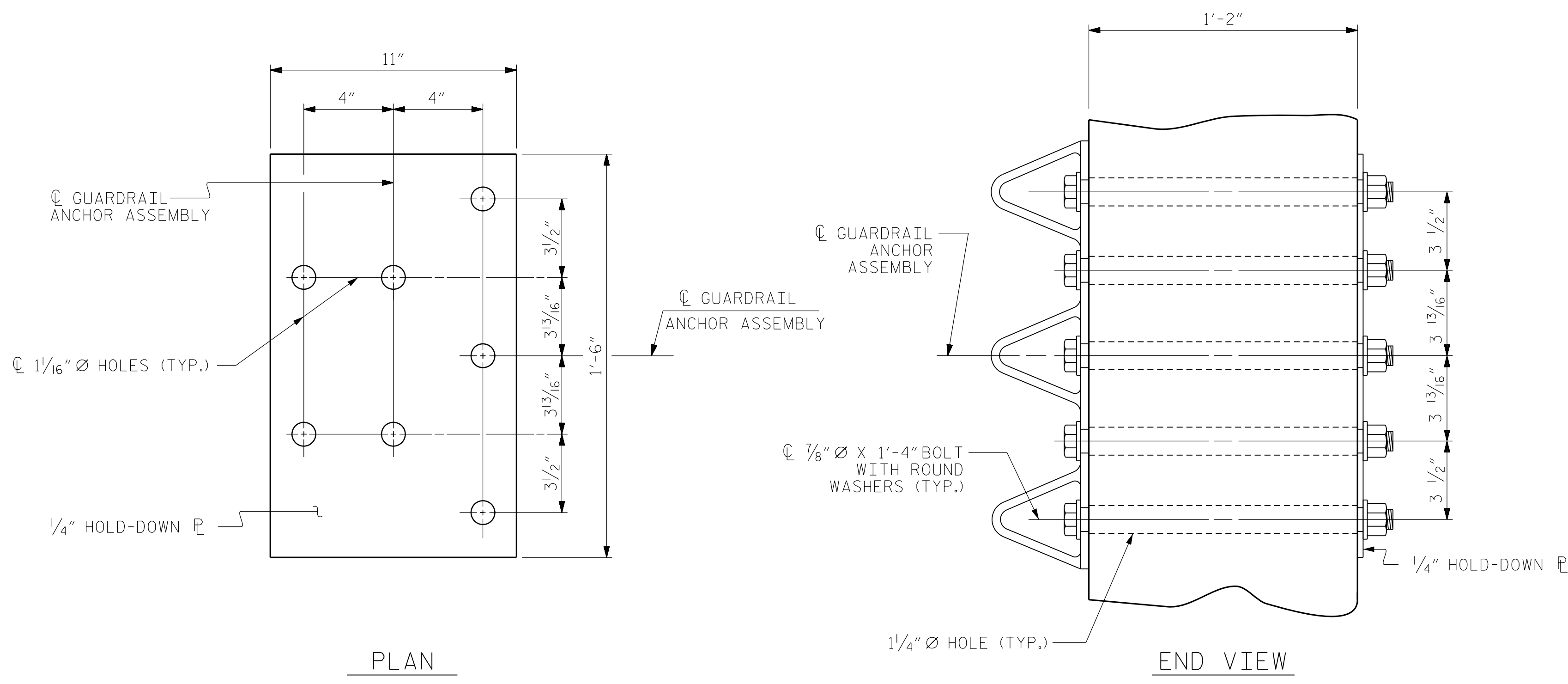
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD 2 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

ASSEMBLED BY : M. RAY	DATE : 03/2017
CHECKED BY : P. JACOB	DATE : 03/2017
DRAWN BY : EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM

moffatt & nichol
 4700 FALLS OF NEUSE ROAD, SUITE 300
 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License NO.: F-0105

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 FINAL UNLESS ALL
 SIGNATURES COMPLETED

SHEET NO.
 S-21
 TOTAL SHEETS
 35



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

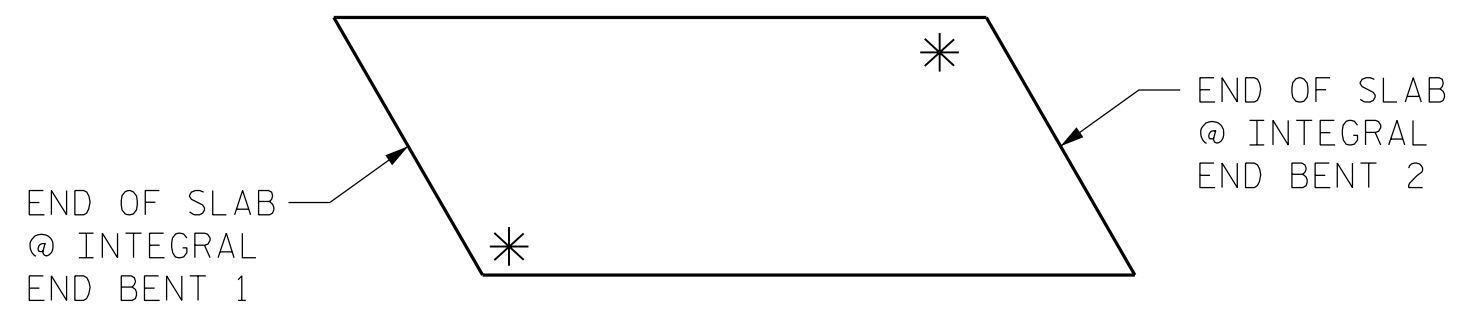
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

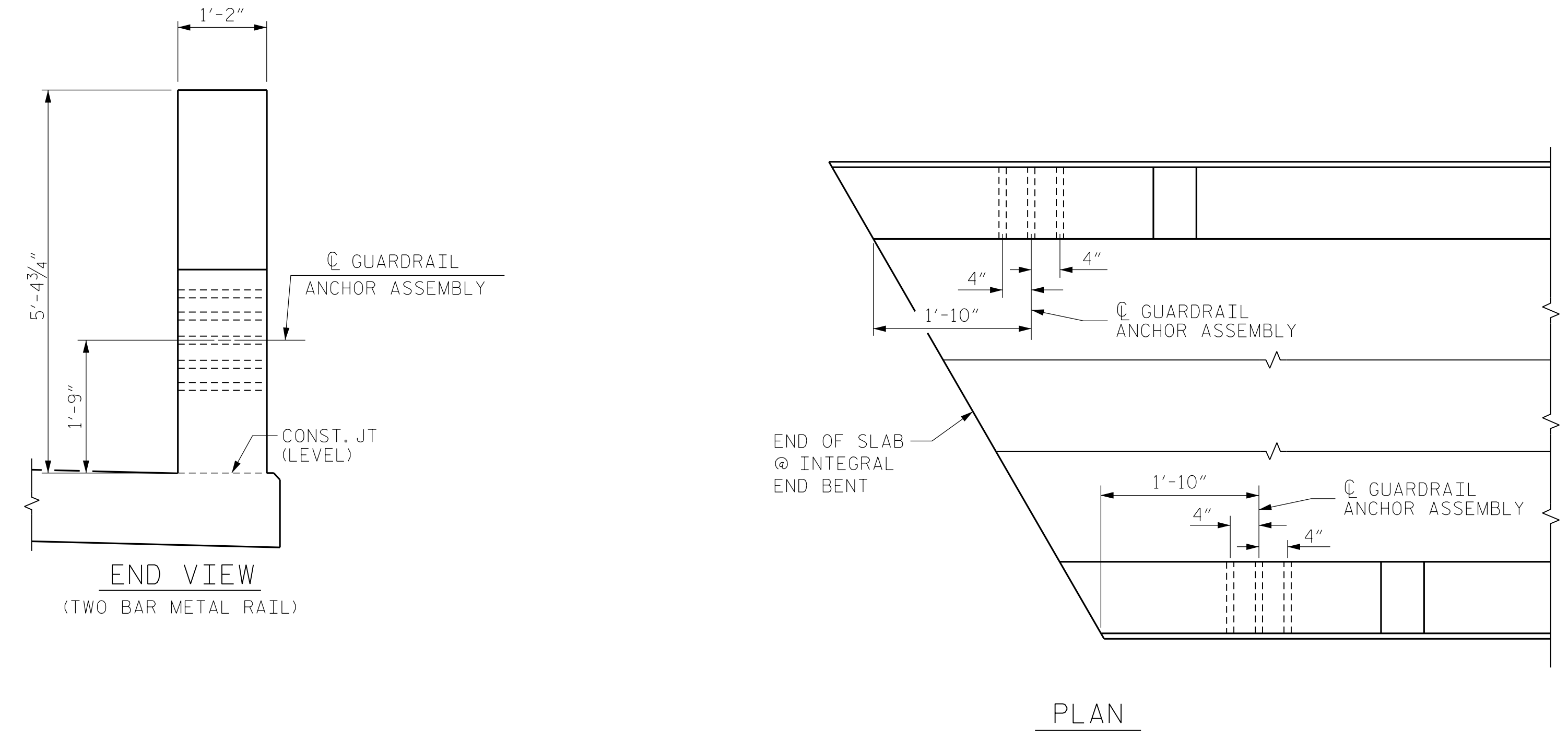
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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



SKETCH SHOWING POINTS OF ATTACHMENT

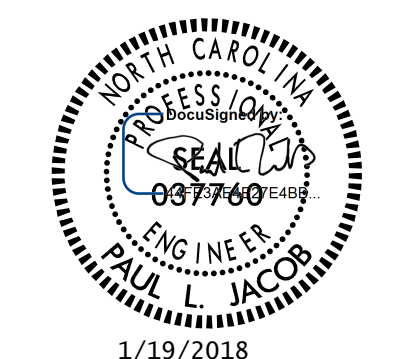
* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

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



ASSEMBLED BY : A. CHILKEPALLI	DATE : 01/2018
CHECKED BY : P. JACOB	DATE : 01/2018
DRAWN BY : MAA 5/10	REV. 6/13 MAA/GM
CHECKED BY : GM 5/10	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

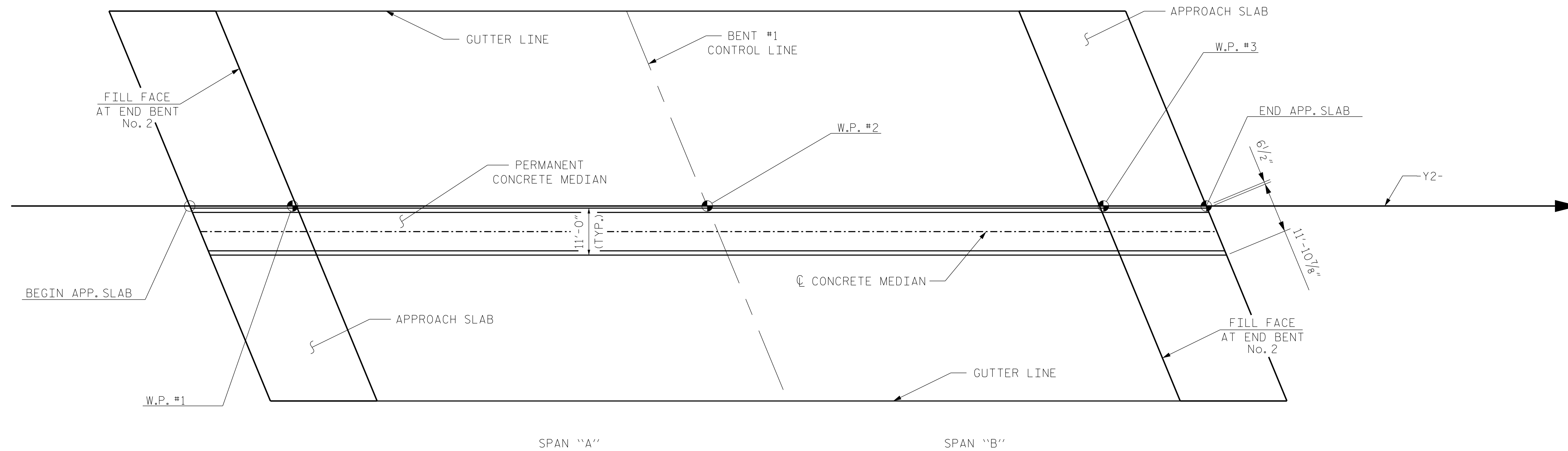
moffatt & nichol
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 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License No.: F-0105

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-22
1			3			TOTAL SHEETS
2			4			35

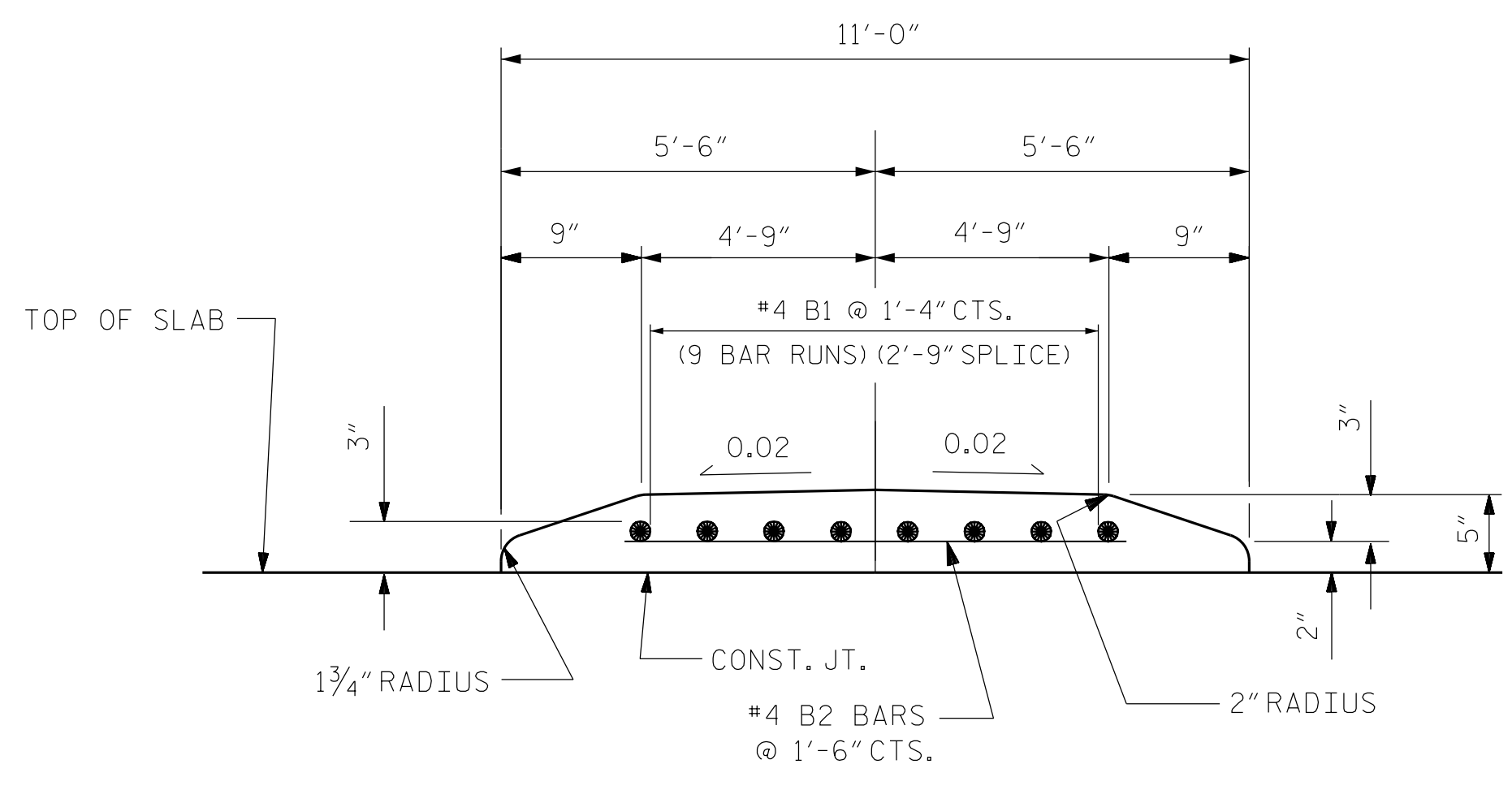
(SHT 2b) STD. NO. GRA3

1/19/2018 10:32:40 9240-03 B-4491\CADD\Working\B4491_SMLL_GRP_250022.dgn p.jacob



PLAN

BILL OF MATERIAL					
CONCRETE MEDIAN					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	72	#4	STR	29'-0"	1395
B2	159	#4	STR	9'-8"	1027
REINFORCING STEEL					2422 LBS.
CLASS AA CONCRETE					46.75 C.Y.



SECTION THRU CONCRETE MEDIAN
PERMANENT CONCRETE MEDIAN DETAIL

NOTES

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT THE CONCRETE MEDIAN. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR THE CONCRETE BRIDGE DECK.
FOR LOCATION OF CONCRETE MEDIAN, SEE ROADWAY PLANS.
#4 BARS TO BE FIELD BENT AS NECESSARY.
INSERT 1" EXPANSION JOINT MATERIAL BETWEEN THE CONCRETE MEDIAN AND THE ROADWAY MEDIAN AT THE END OF THE APPROACH SLABS.

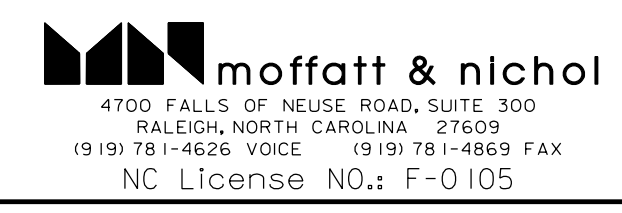
PROJECT NO. B-4491
CUMBERLAND COUNTY
STATION: 55+88.11 -L-
SHEET 1 OF 1



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PERMANENT CONCRETE MEDIAN

DRAWN BY : D. CANTRELL DATE : 05/2017
CHECKED BY : P. JACOB DATE : 05/2017
DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017



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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
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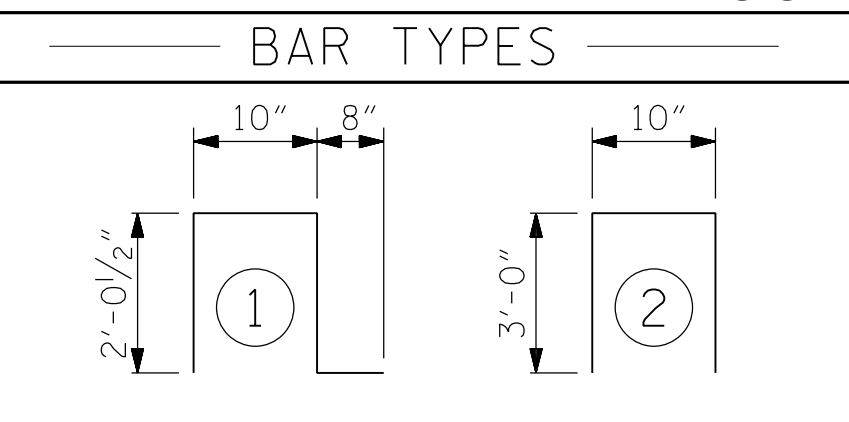
BILL OF MATERIAL

Table with columns: BAR NO., SIZE, TYPE, LENGTH, WEIGHT. Lists materials for various bridge components including slabs, parapets, and end posts.

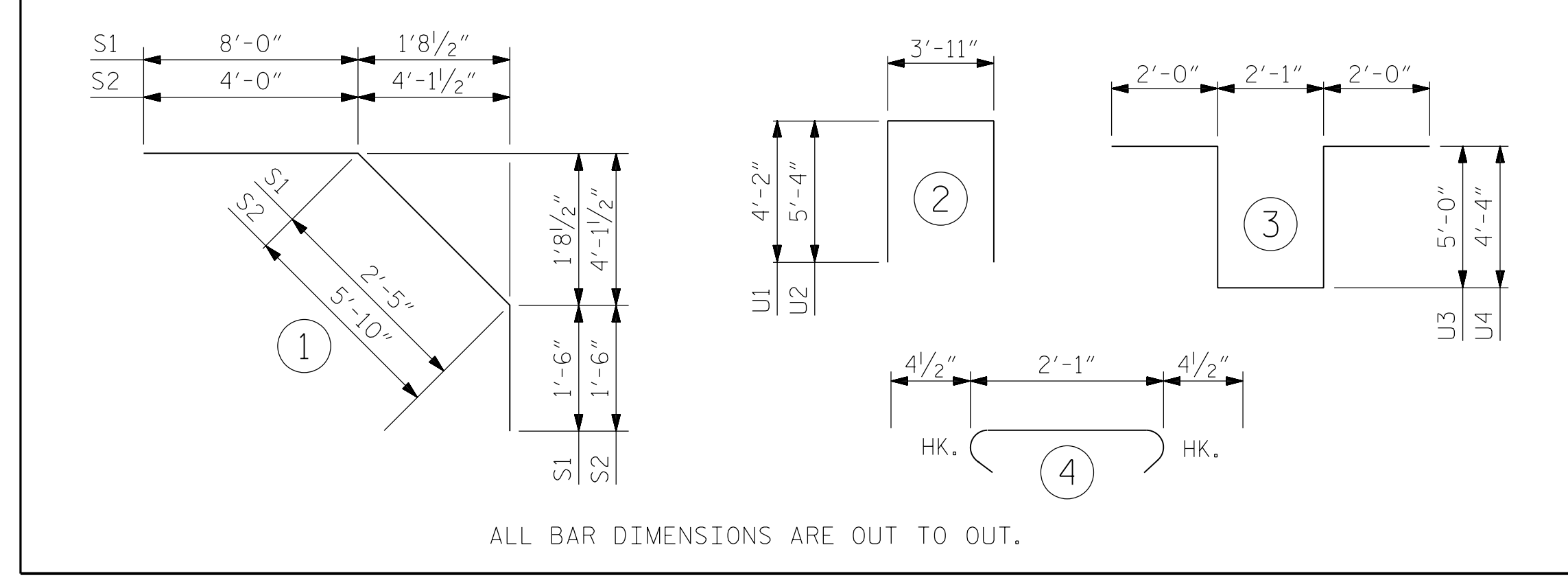
BILL OF MATERIALS FOR PARAPET & END POSTS

Table with columns: BAR NO., SIZE, TYPE, LENGTH, WEIGHT. Lists materials for parapets and end posts.

* EPOXY COATED REINFORCING STEEL LBS. 9314
CLASS AA CONCRETE CU. YDS. 54
TOTAL LIN. FT. OF CONCRETE PARAPET 376.39



BAR TYPES

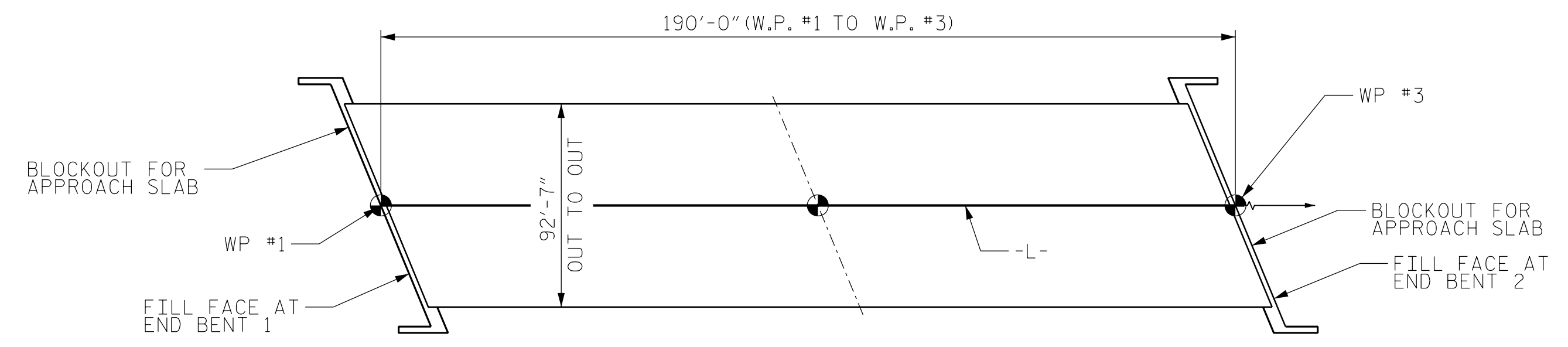


ALL BAR DIMENSIONS ARE OUT TO OUT.

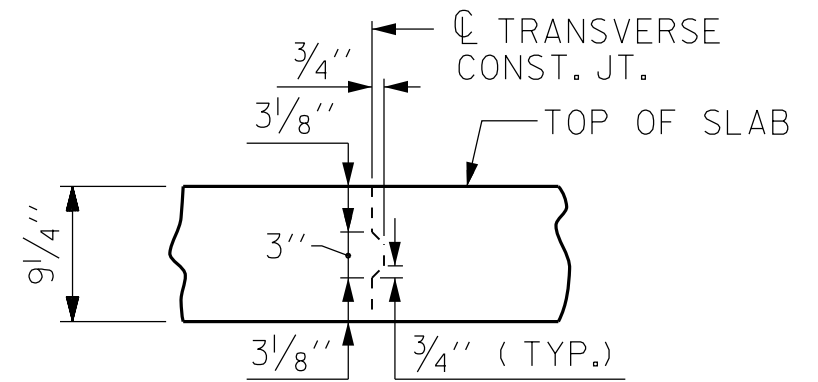
SUPERSTRUCTURE BILL OF MATERIAL

Table with columns: CLASS AA CONCRETE, REINFORCING STEEL, EPOXY COATED REINFORCING STEEL. Lists quantities for different pour numbers.

POUR #4 QUANTITY INCLUDES UPPER POUR OF WINGS AND INTEGRAL END BENT.
QUANTITIES FOR PARAPET, END POSTS, AND CONCRETE MEDIAN ARE NOT INCLUDED.

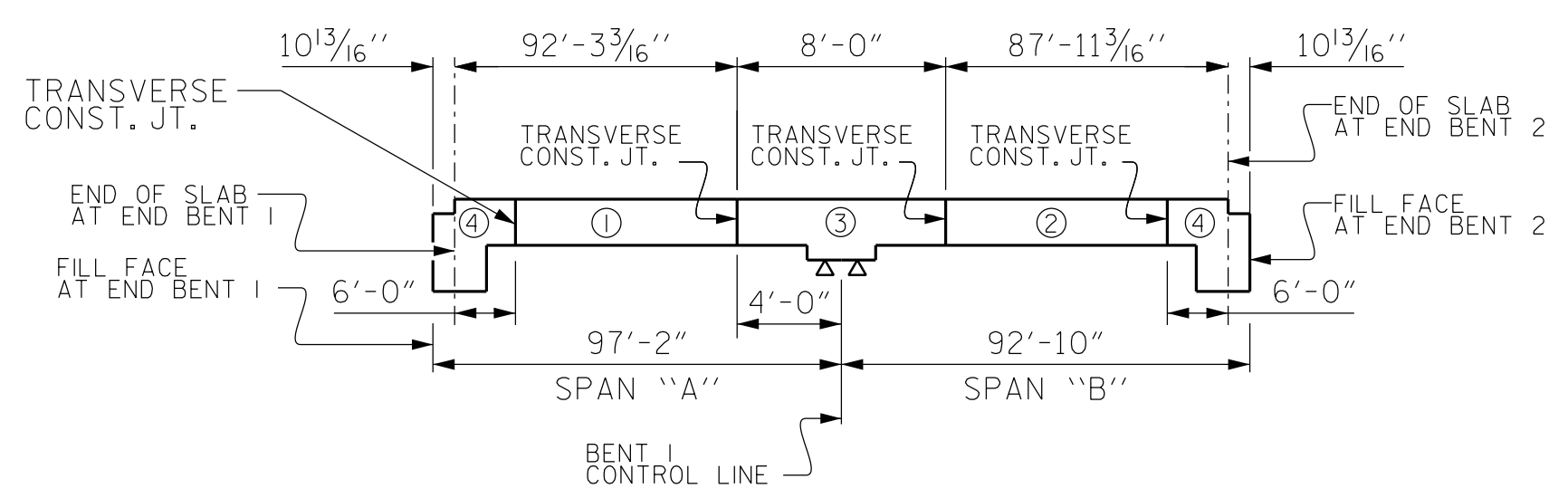


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 17,424)



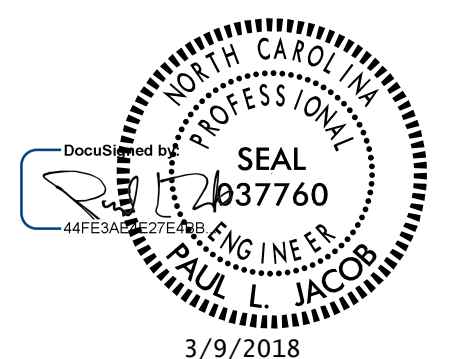
TRANSVERSE CONSTRUCTION JOINT DETAIL

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



POURING SEQUENCE

(CONTINUOUS FOR LIVE LOAD)
KEY
@ = INDICATES POUR NUMBER



PROJECT NO. B-4491
CUMBERLAND COUNTY
STATION: 55+88.11 -L-

DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE BILL OF MATERIAL
REVISIONS table

GROOVING BRIDGE FLOORS table with columns: APPROACH SLABS, BRIDGE DECK, TOTAL and SQ. FT.

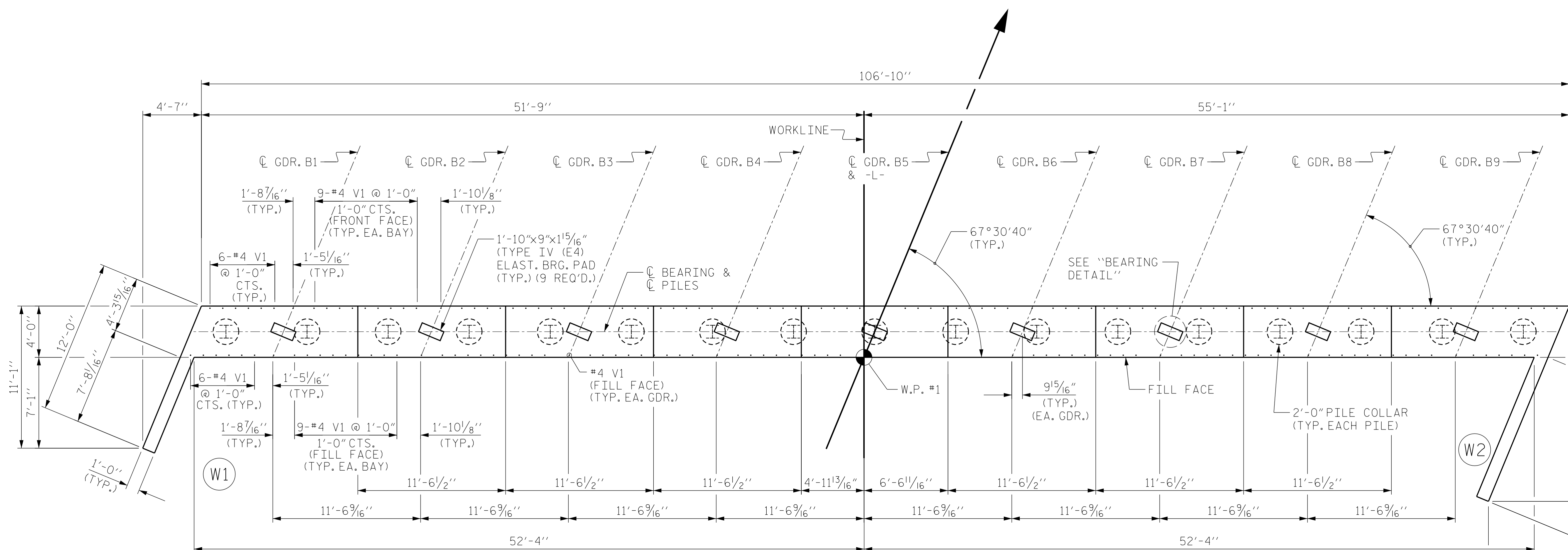
DRAWN BY: A. CHILKEPALLI DATE: 01/2018
CHECKED BY: P. JACOB DATE: 01/2018
DESIGN ENGINEER OF RECORD: P. JACOB DATE: 01/2018

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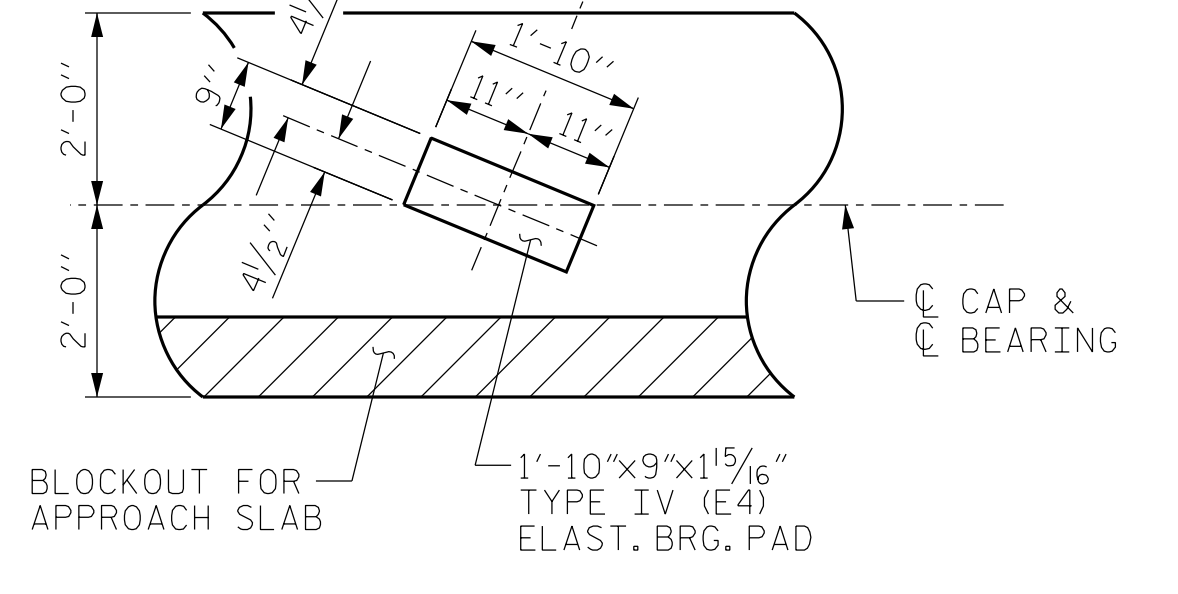
REVISIONS table with columns: NO., BY, DATE, NO., BY, DATE. Includes revision 1 by MSR on 03/2018.

SHEET NO. S-24 TOTAL SHEETS 35



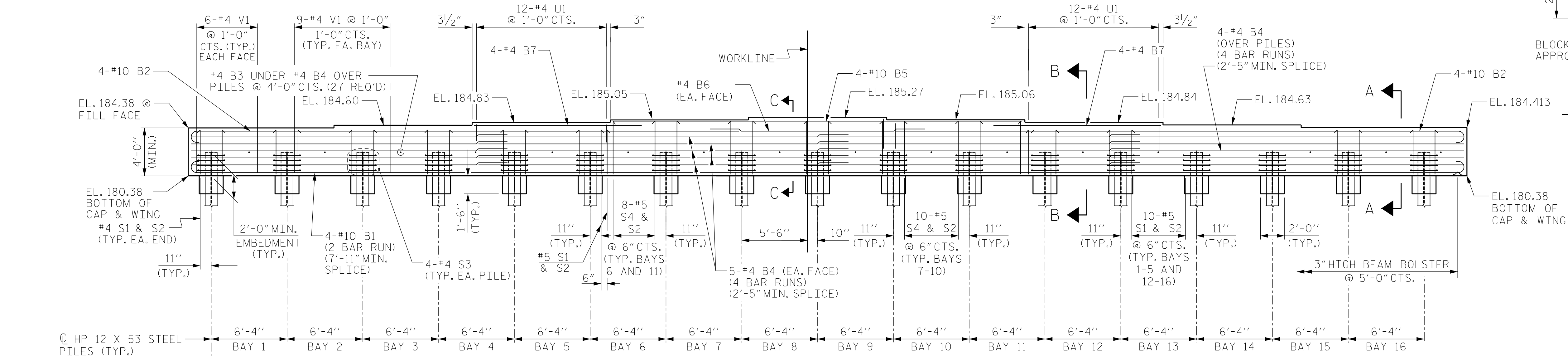
END BENT No. 1 PLAN

NOTES
 STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA SHALL BE RAKED TO A DEPTH OF 1/4".
 THE #4 V1 BARS SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.
 THE UPPER PORTION OF THE WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL. FOR DETAILS, SEE SUPERSTRUCTURE PLANS.
 FOR CONCRETE COLLAR DETAIL, SEE SHEET 3 OF 3.



BEARING DETAIL

(DIMENSION TYPICAL EA. GIRDER)
 (PILES NOT SHOWN FOR CLARITY)



END BENT No. 1 ELEVATION

WINGS NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, B-B, AND C-C SEE SHEET 3 OF 3.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 INTEGRAL END BENT
 No. 1 PLAN



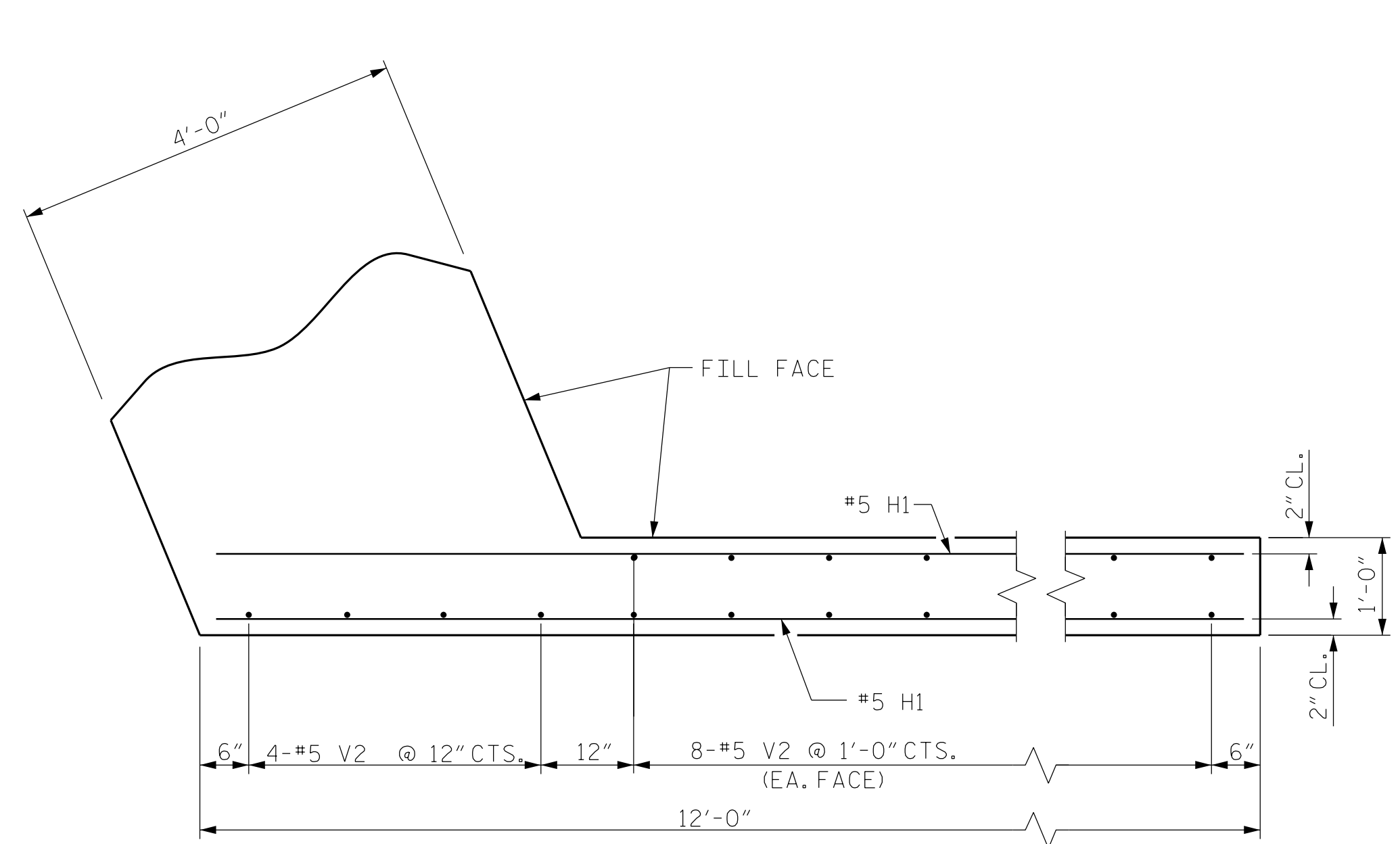
DRAWN BY : A. CHILKEPALLI DATE : 01/2018
 CHECKED BY : P. JACOB DATE : 01/2018
 DESIGN ENGINEER OF RECORD : P. JACOB DATE : 01/2018

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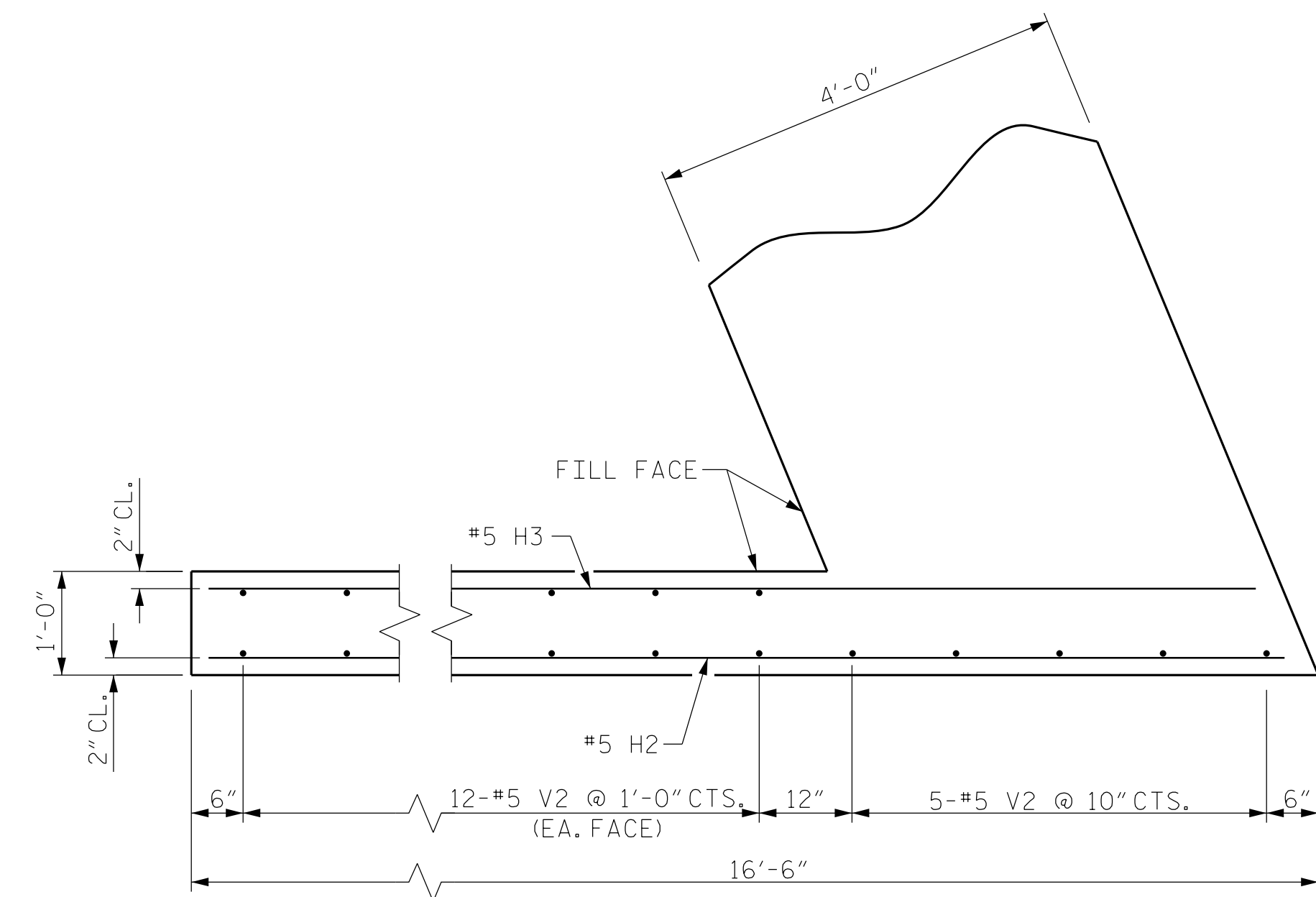
DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
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2			4			35

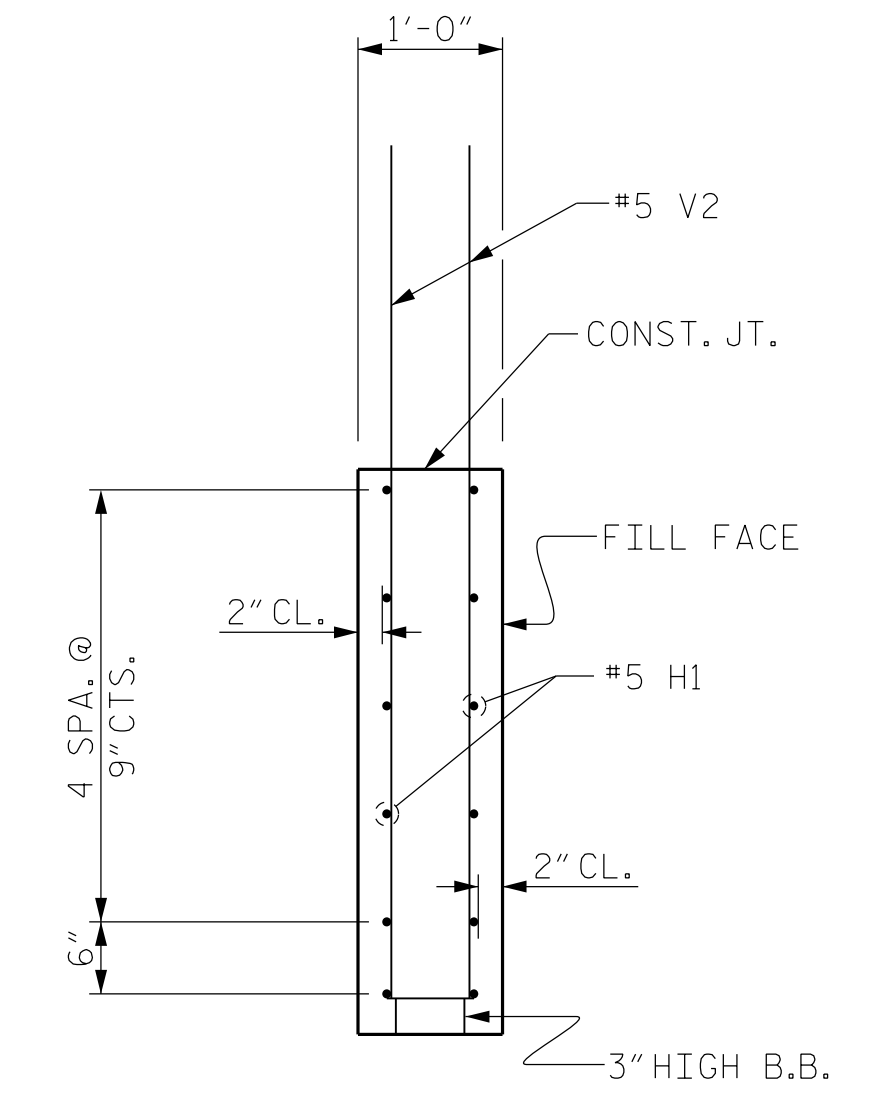
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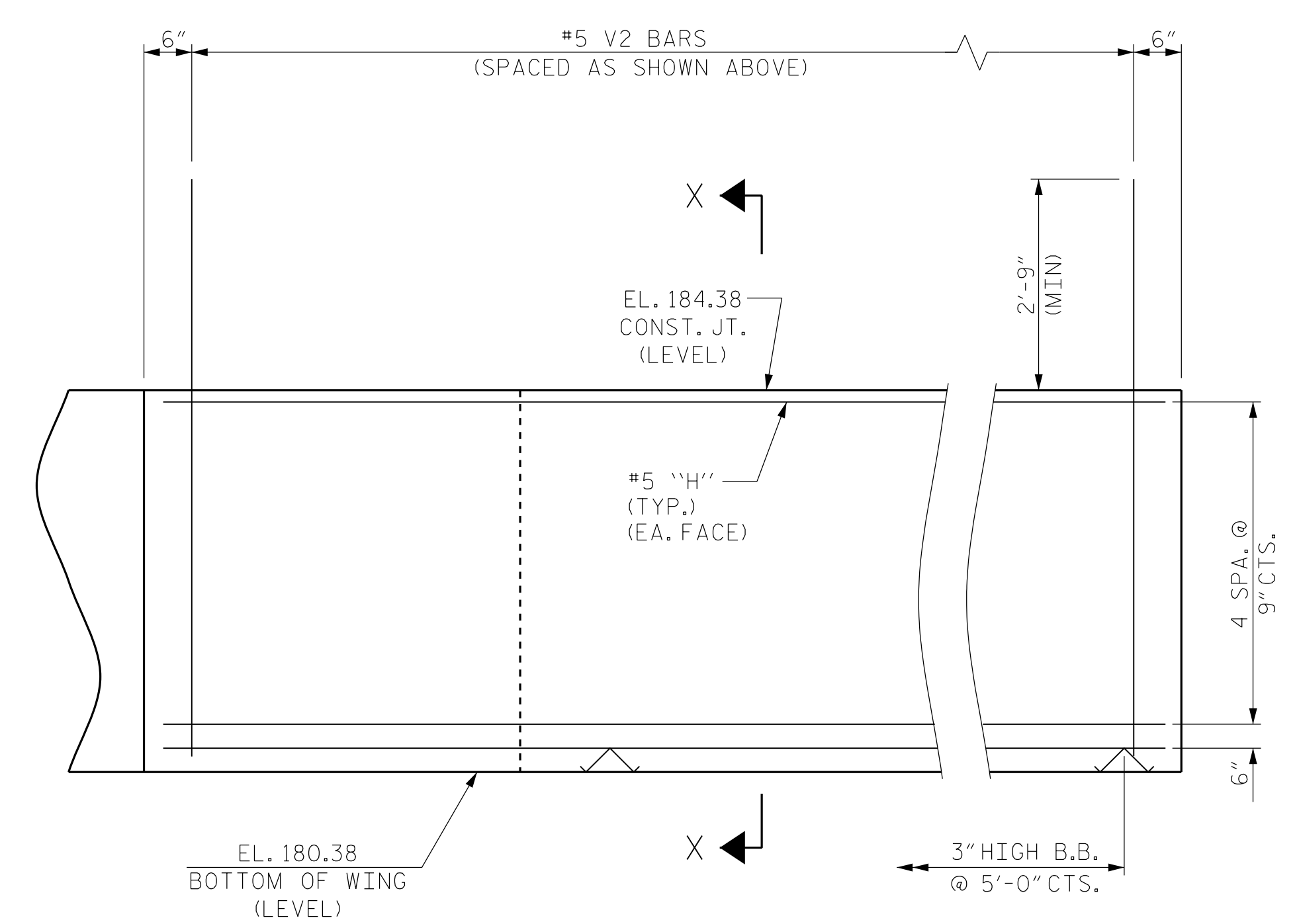
PLAN OF WING (W1)



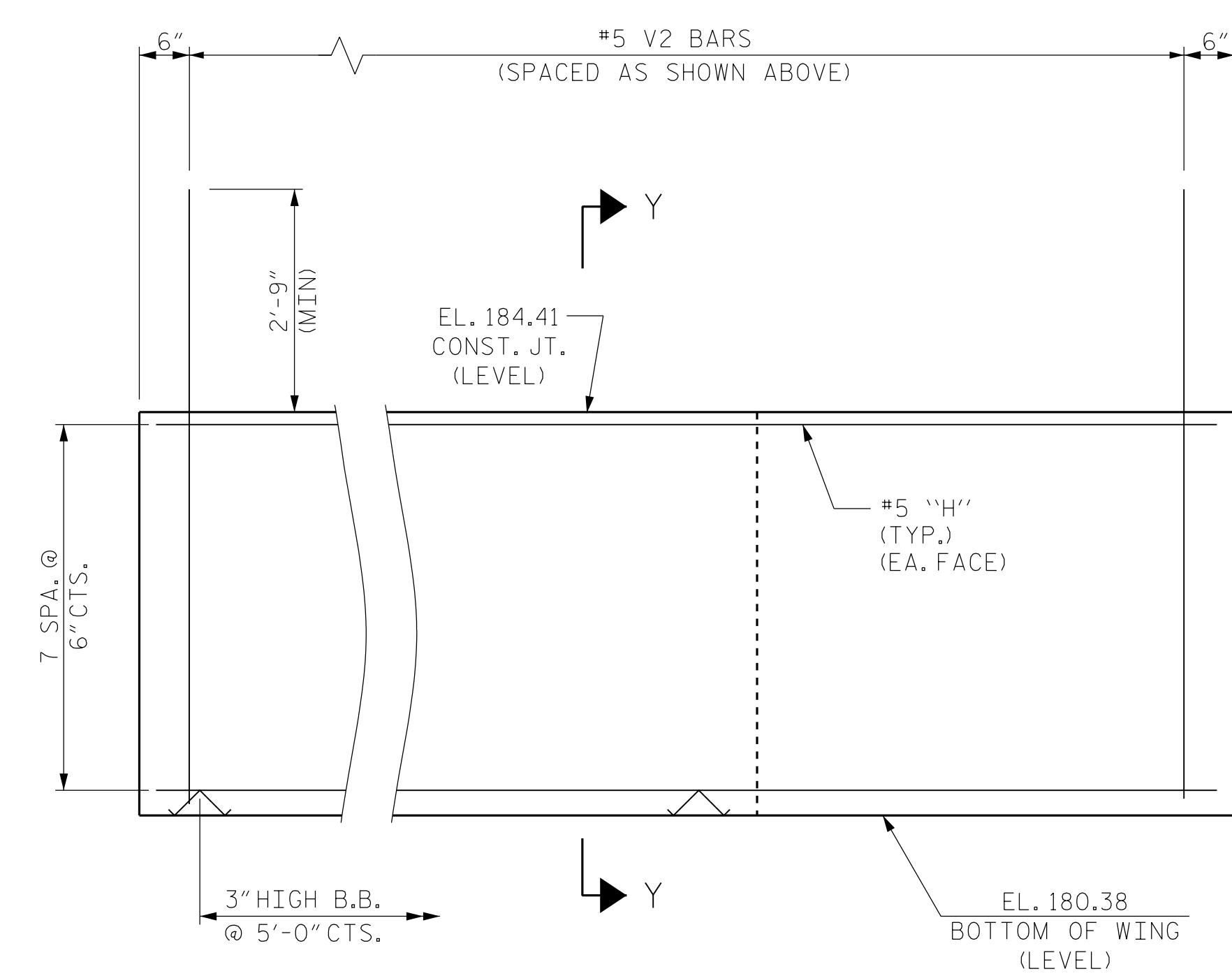
PLAN OF WING (W2)



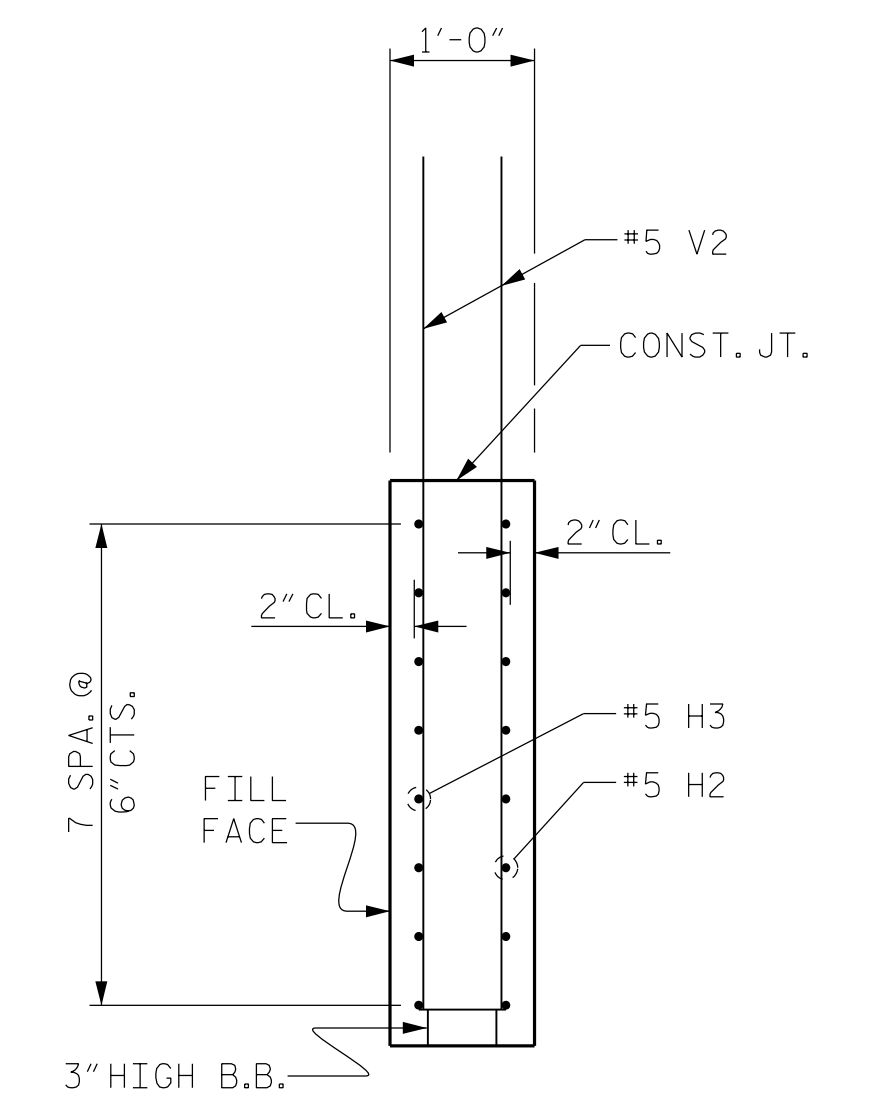
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

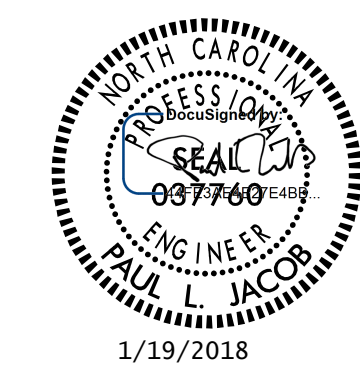


SECTION Y-Y

WING DETAILS

DRAWN BY : M. RAY DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017

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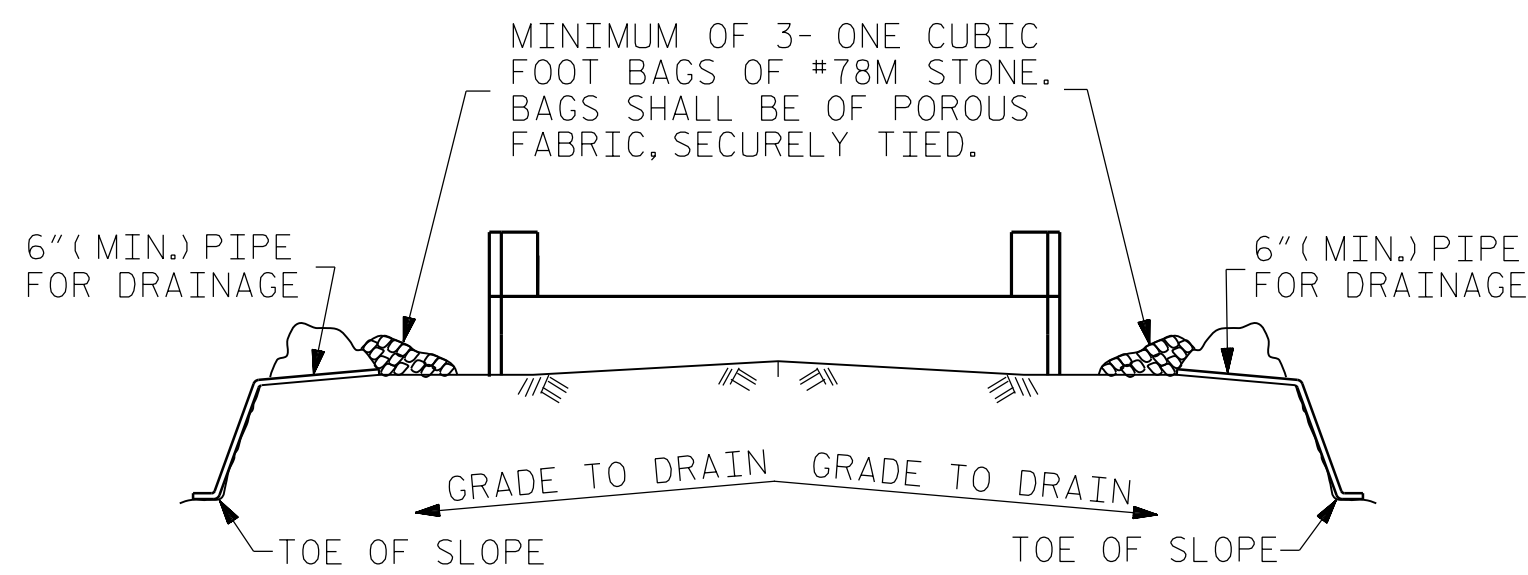


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PROJECT NO. B-4491
 CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE INTEGRAL END BENT No. 1 WING DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-26
					TOTAL SHEETS 35

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 P. JACOB

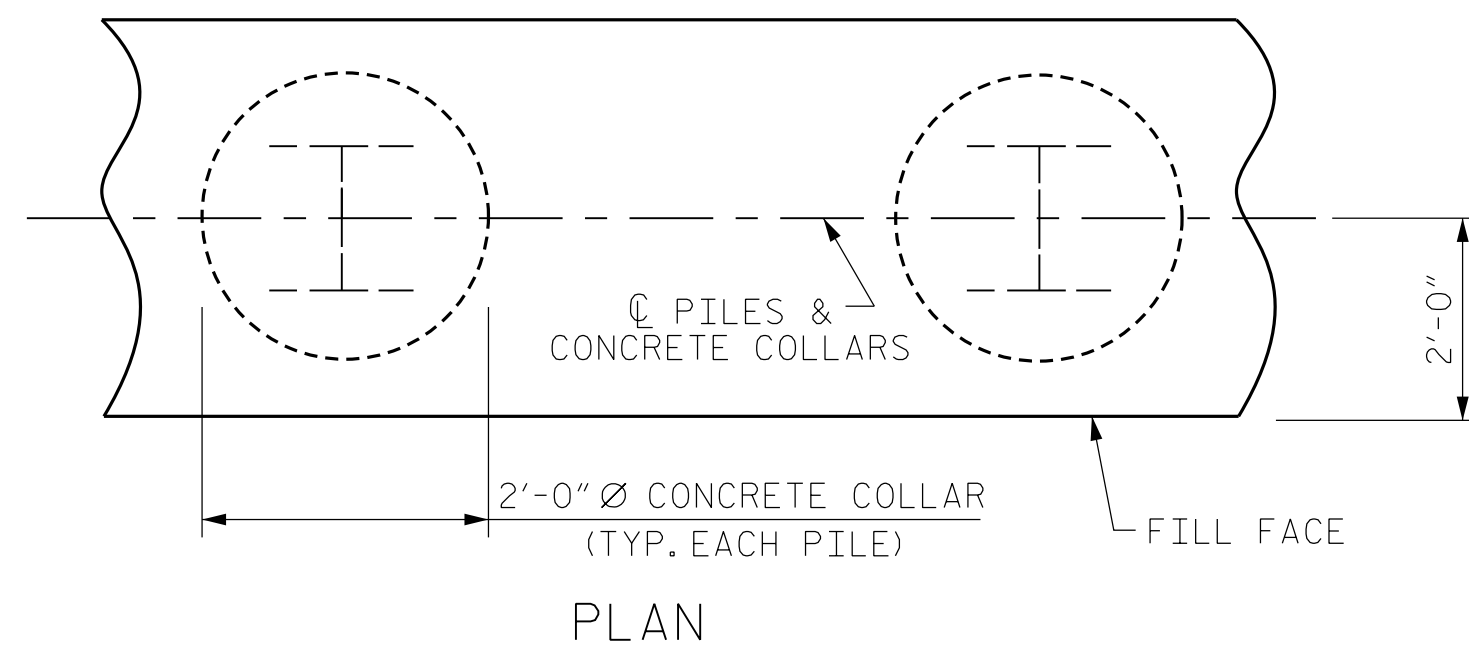


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

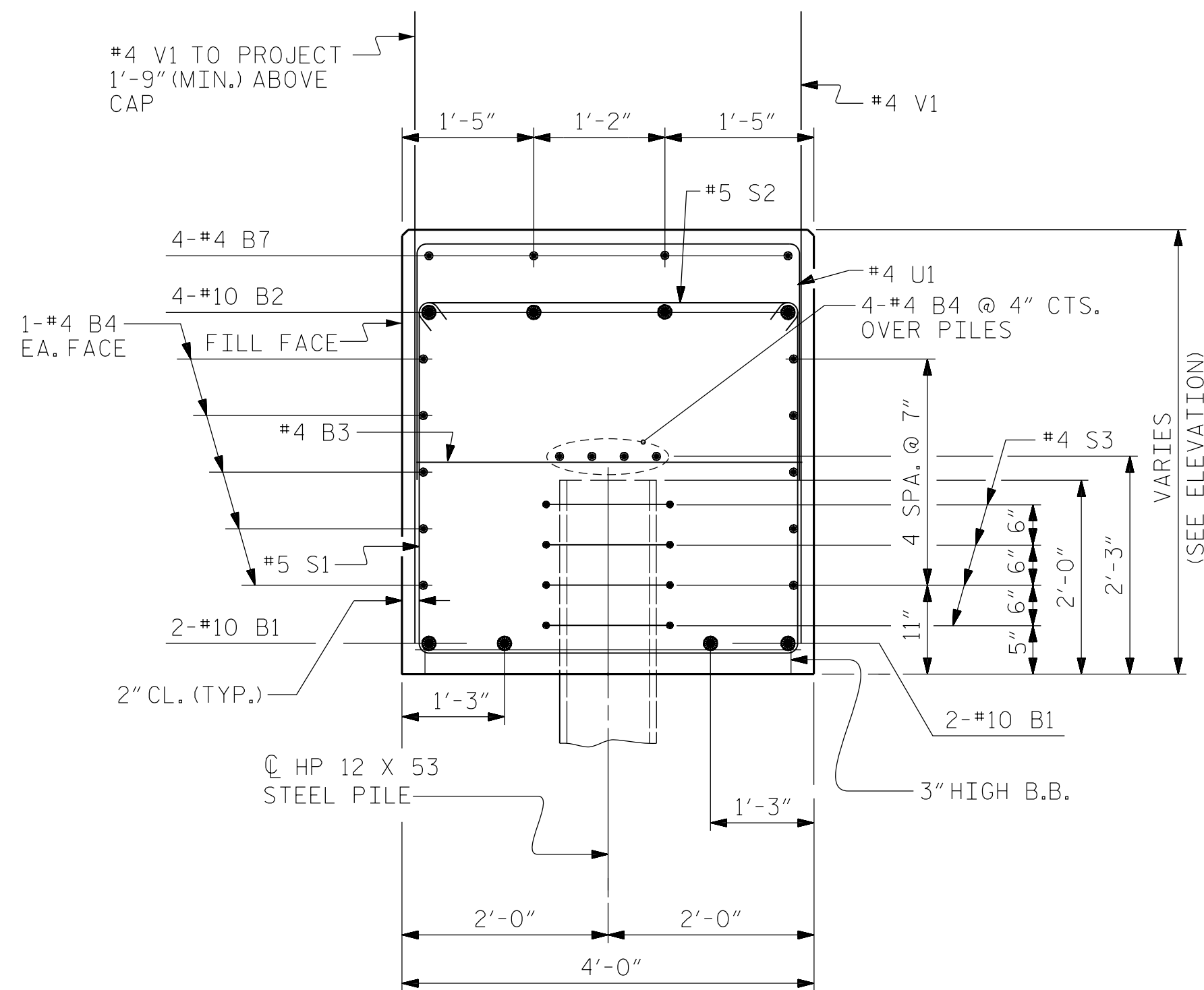
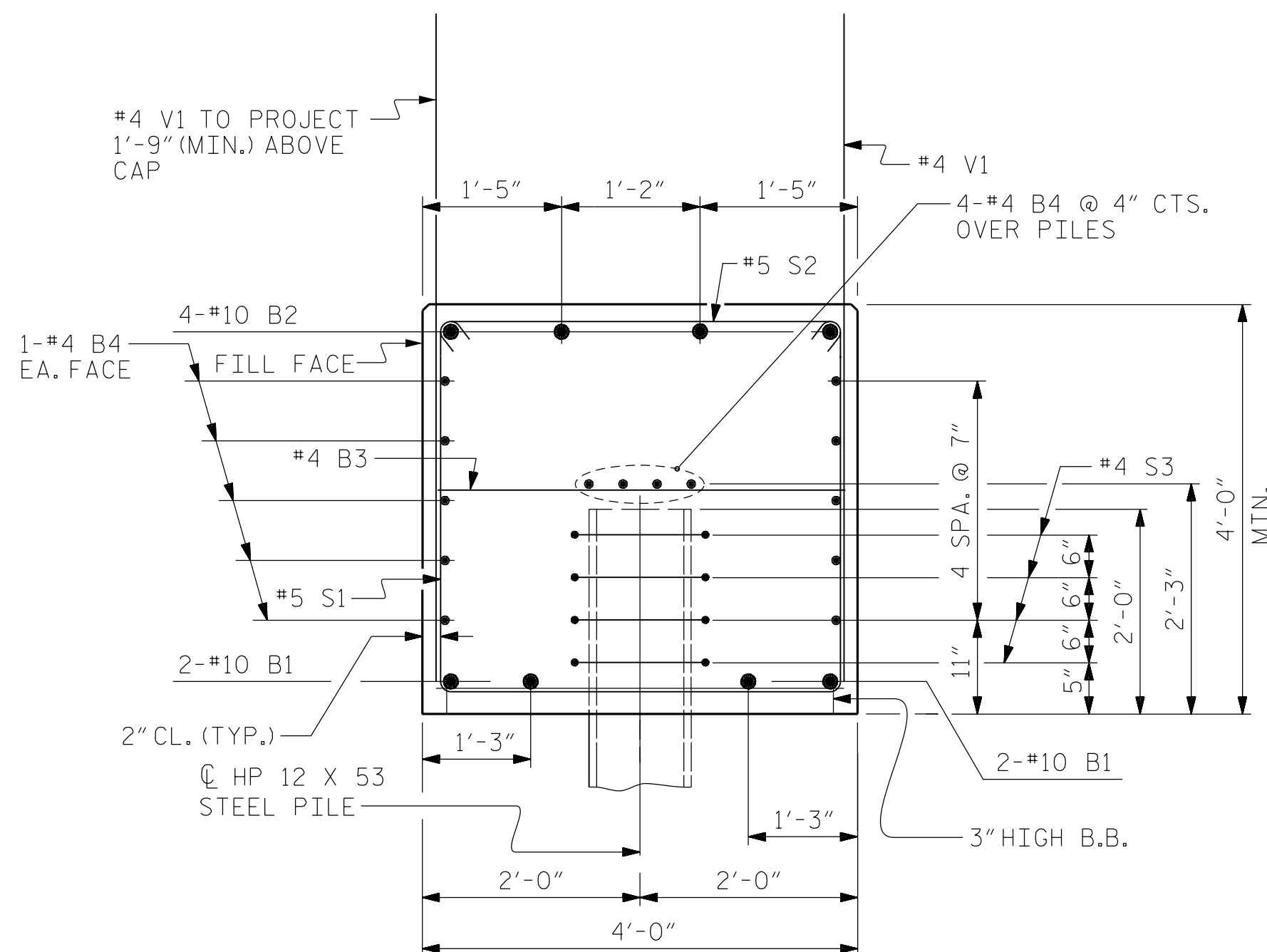
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

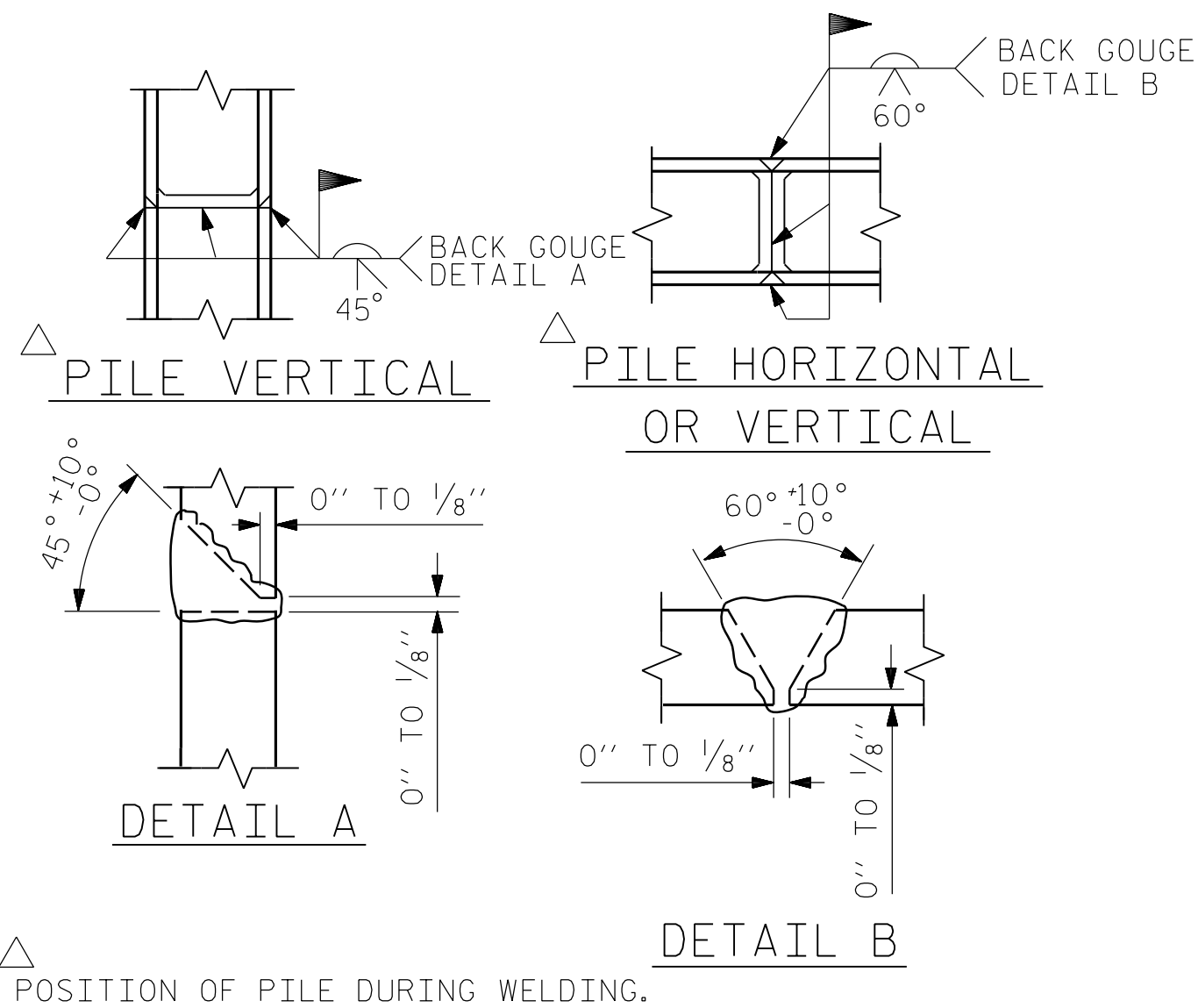


CORROSION PROTECTION FOR STEEL PILES DETAIL
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

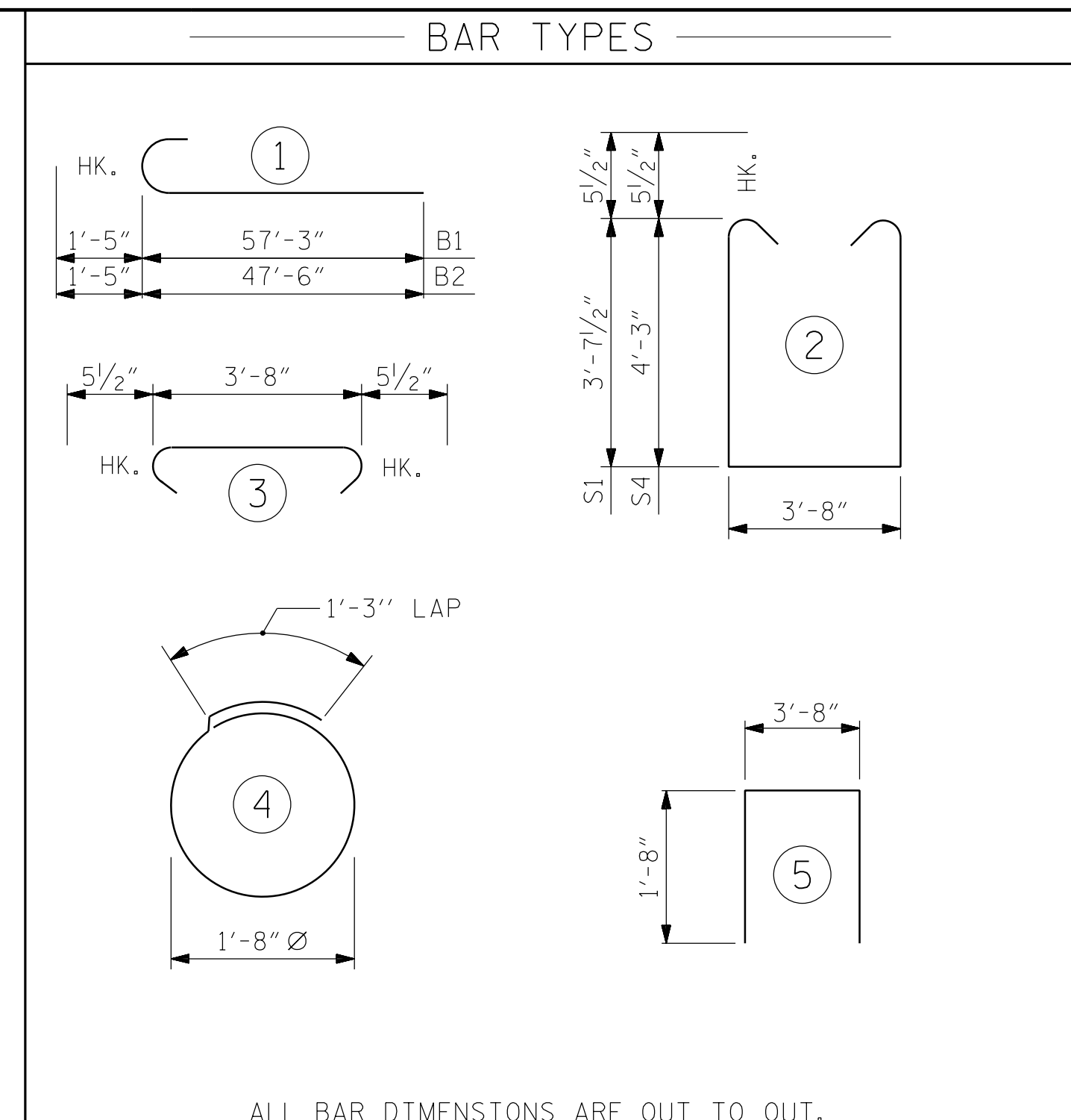
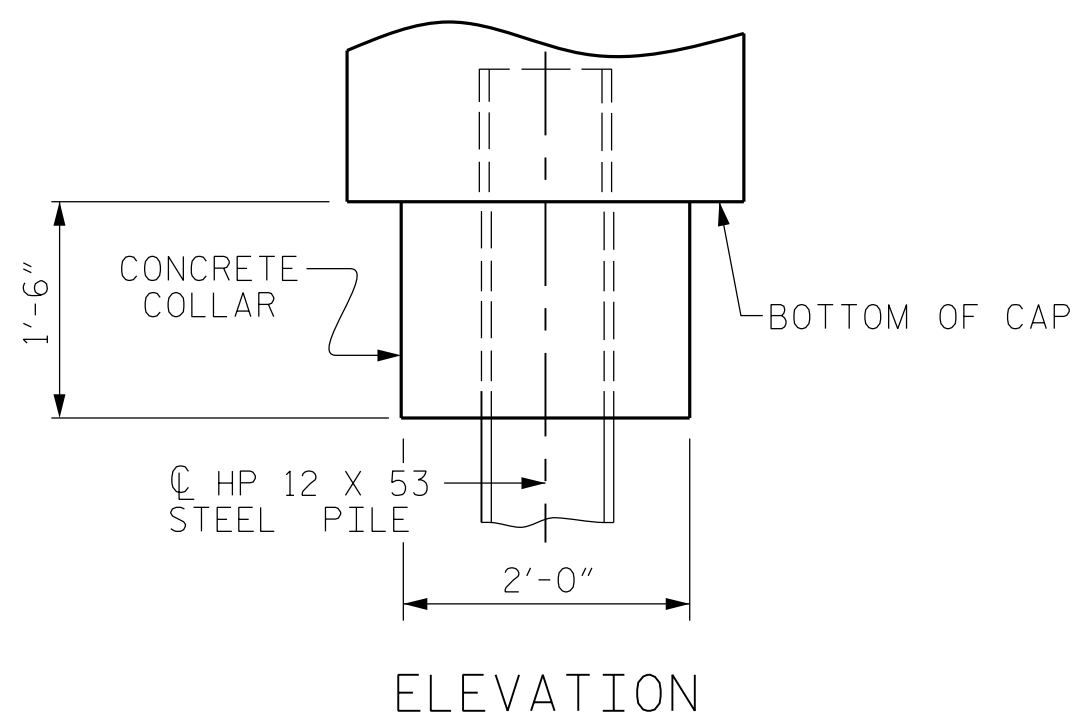


SECTION B-B

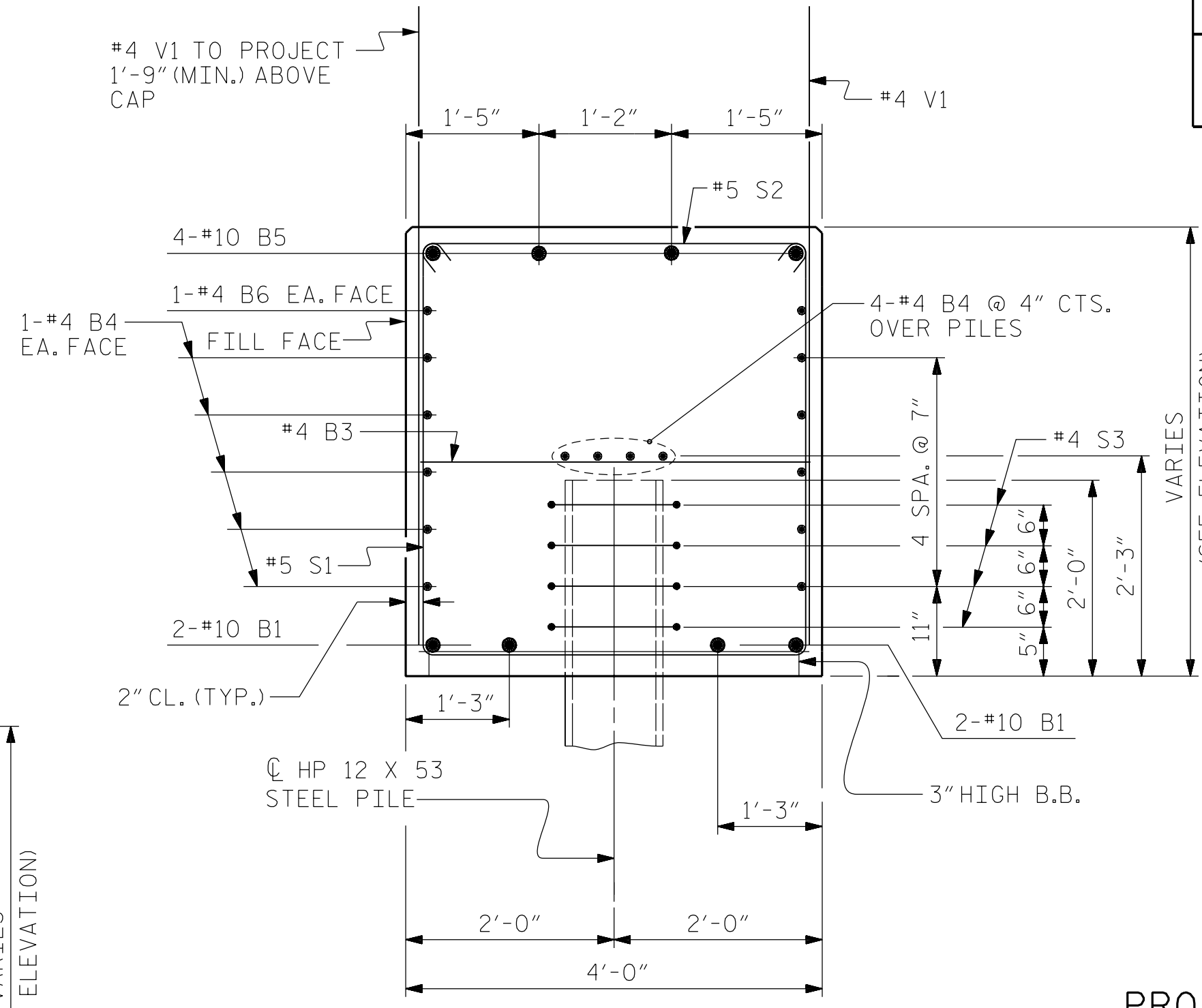
(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



PILE SPLICE DETAILS



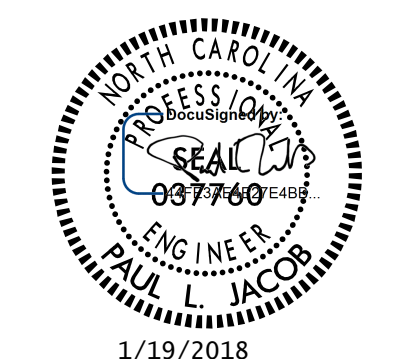
BILL OF MATERIAL FOR ONE END BENT					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	58'-8"	2020
B2	8	#10	1	48'-11"	1684
B3	27	#4	STR	3'-8"	66
B4	56	#4	STR	28'-6"	1066
B5	4	#10	STR	34'-1"	587
B6	2	#4	STR	16'-4"	22
B6	8	#4	STR	14'-0"	75
H1	12	#5	STR	11'-8"	146
H2	8	#5	STR	16'-0"	134
H3	8	#5	STR	15'-8"	131
S1	106	#5	2	11'-10"	1303
S2	162	#5	3	4'-7"	774
S3	68	#4	4	6'-6"	295
S4	56	#5	2	13'-1"	764
U1	24	#4	5	7'-0"	112
V1	177	#4	STR	6'-6"	769
V2	49	#5	STR	6'-8"	341
REINFORCING STEEL (FOR END BENT)				10294	LBS.
CLASS A CONCRETE				75.6	C.Y.
HP 12 X 53 STEEL PILES NO: 17				1530	LIN. FT.
PILE REDRIVES				9	EA.
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES				17	EA.



SECTION C-C

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 3 OF 3



1/19/2018

DRAWN BY : M. RAY DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017

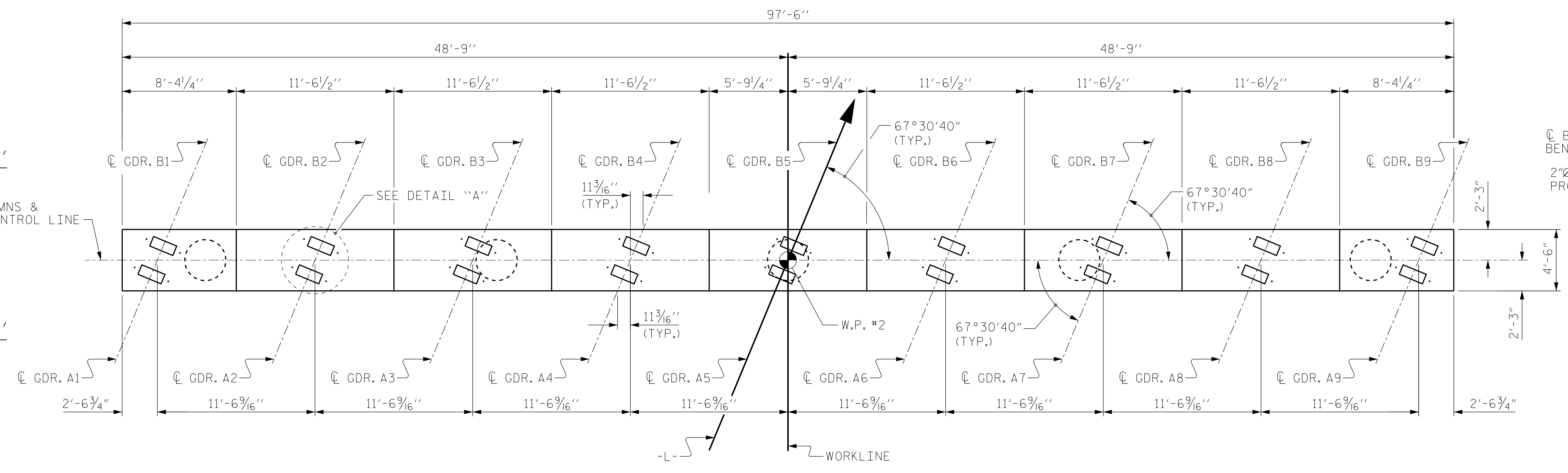
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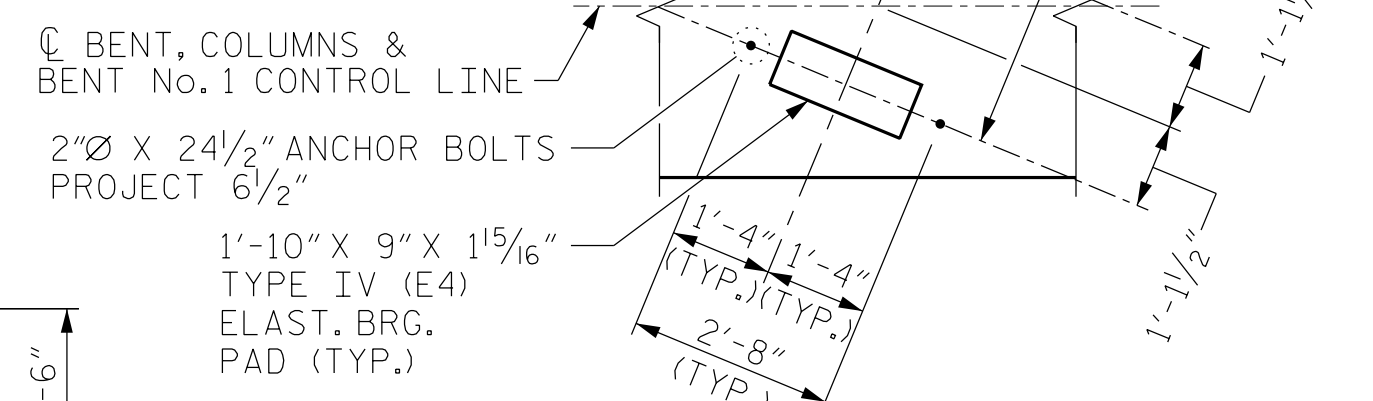
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS 35
2			4			

1/19/2018
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 p.jacob

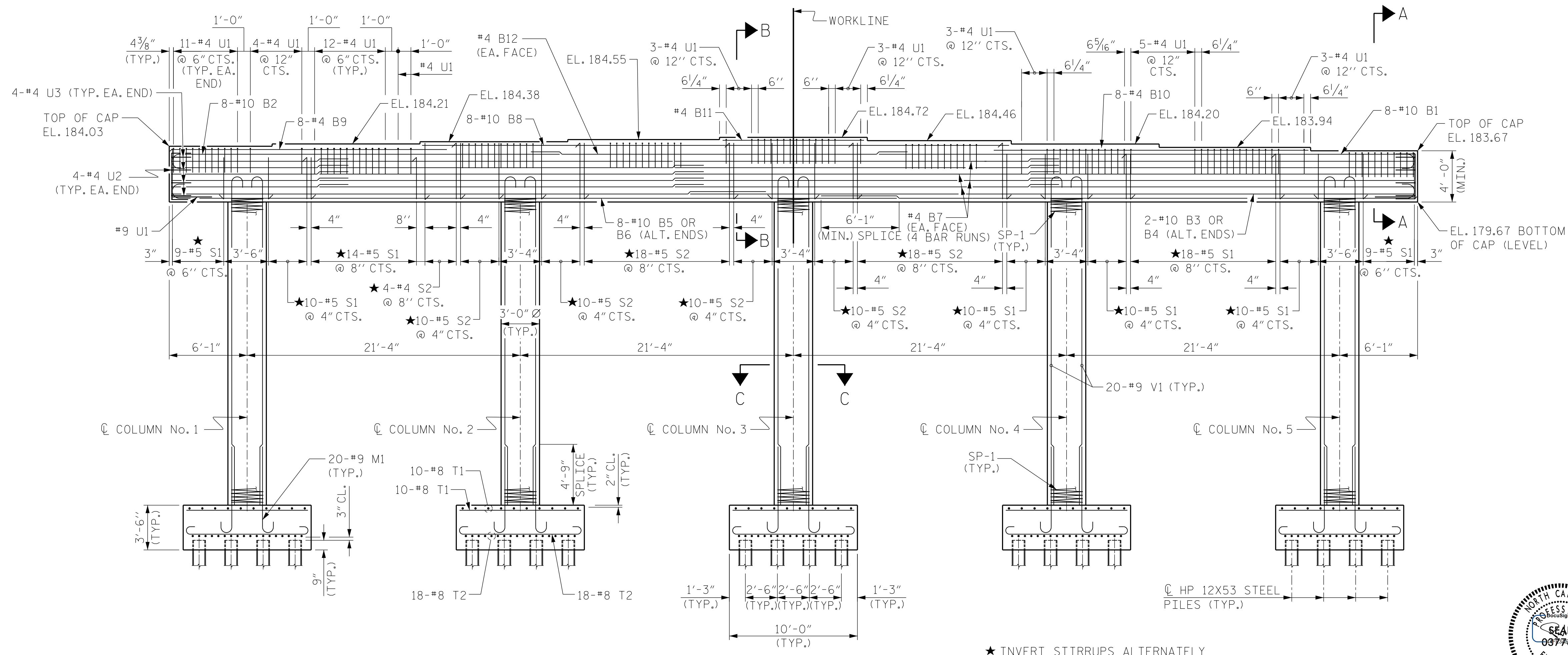
SPAN "B"
SPAN "A"



PLAN

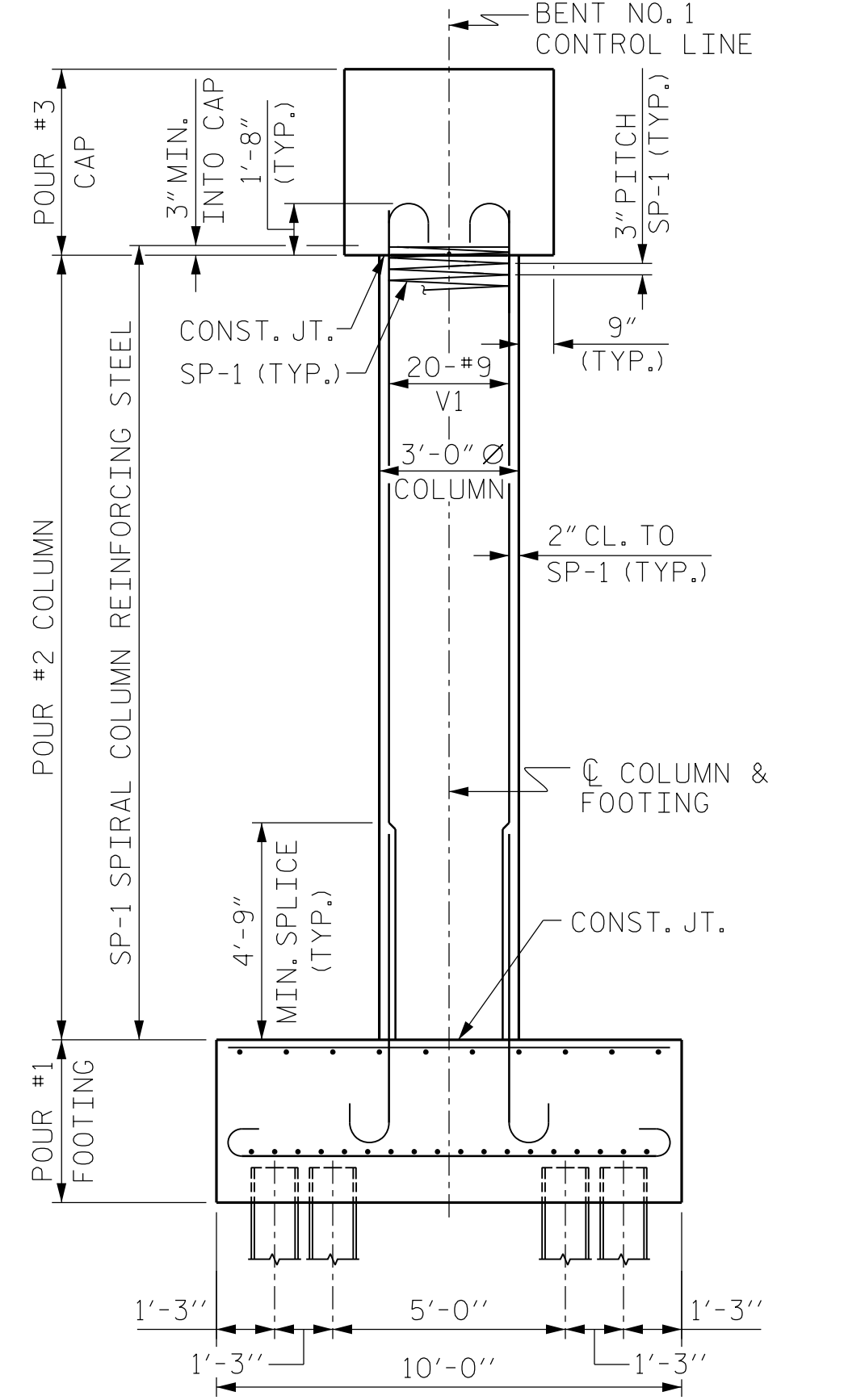


DETAIL "A"
(TYP. EACH GIRDER)



ELEVATION

FOR SECTIONS A-A, B-B, AND C-C, SEE SHEET 2 OF 2.

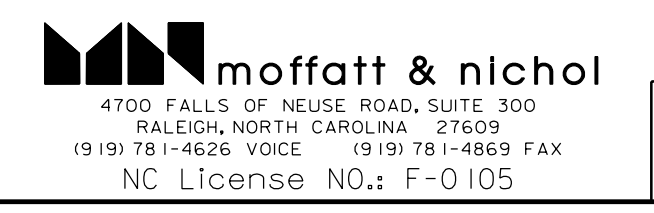
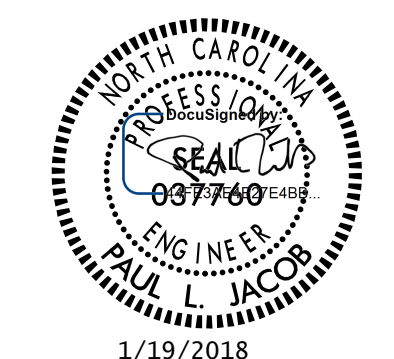


END ELEVATION

PROJECT NO. B-4491
CUMBERLAND COUNTY
STATION: 55+88.11 -L-
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**SUBSTRUCTURE
BENT No. 1 PLAN**

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

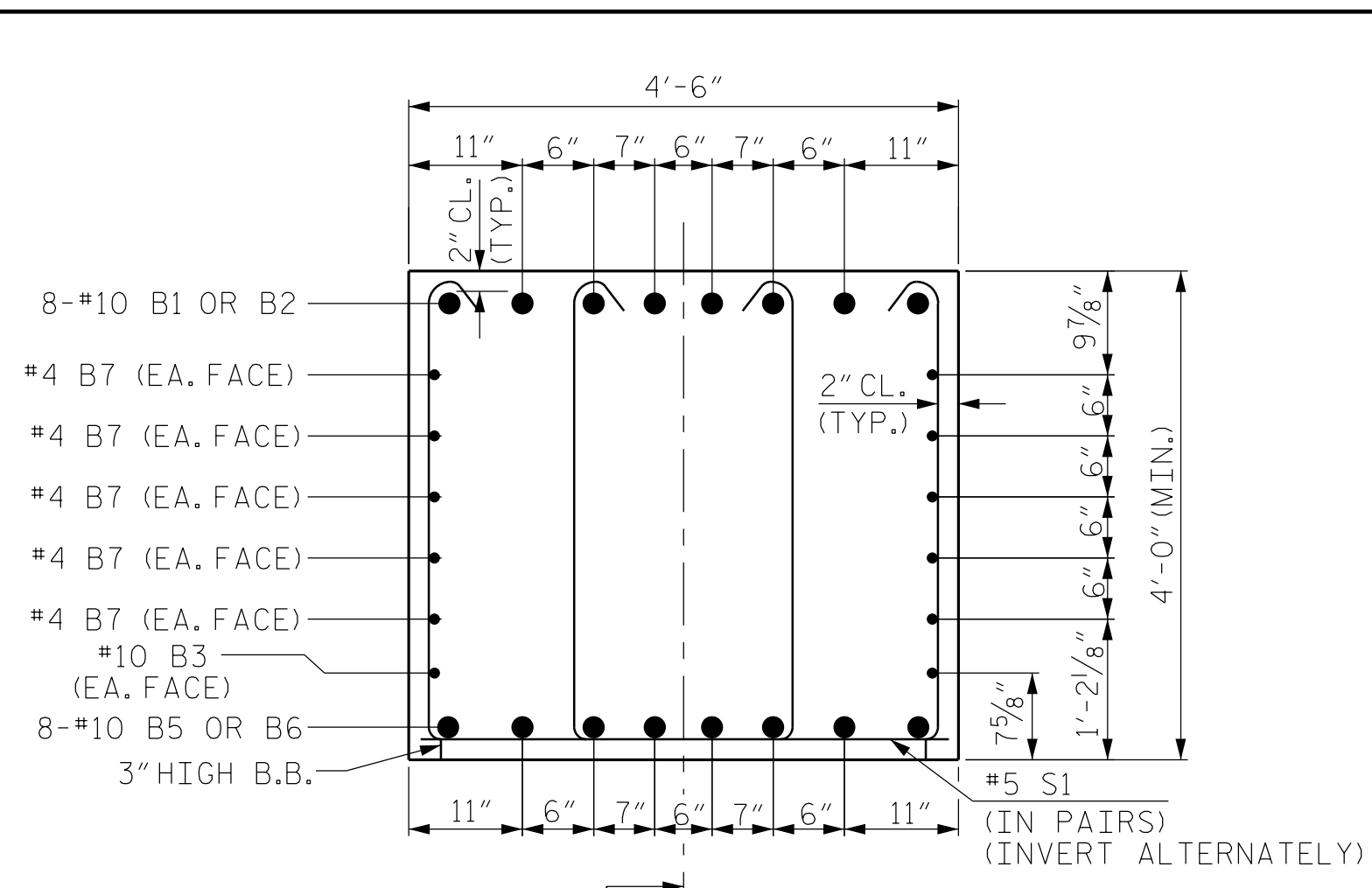


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SIGNATURES COMPLETED

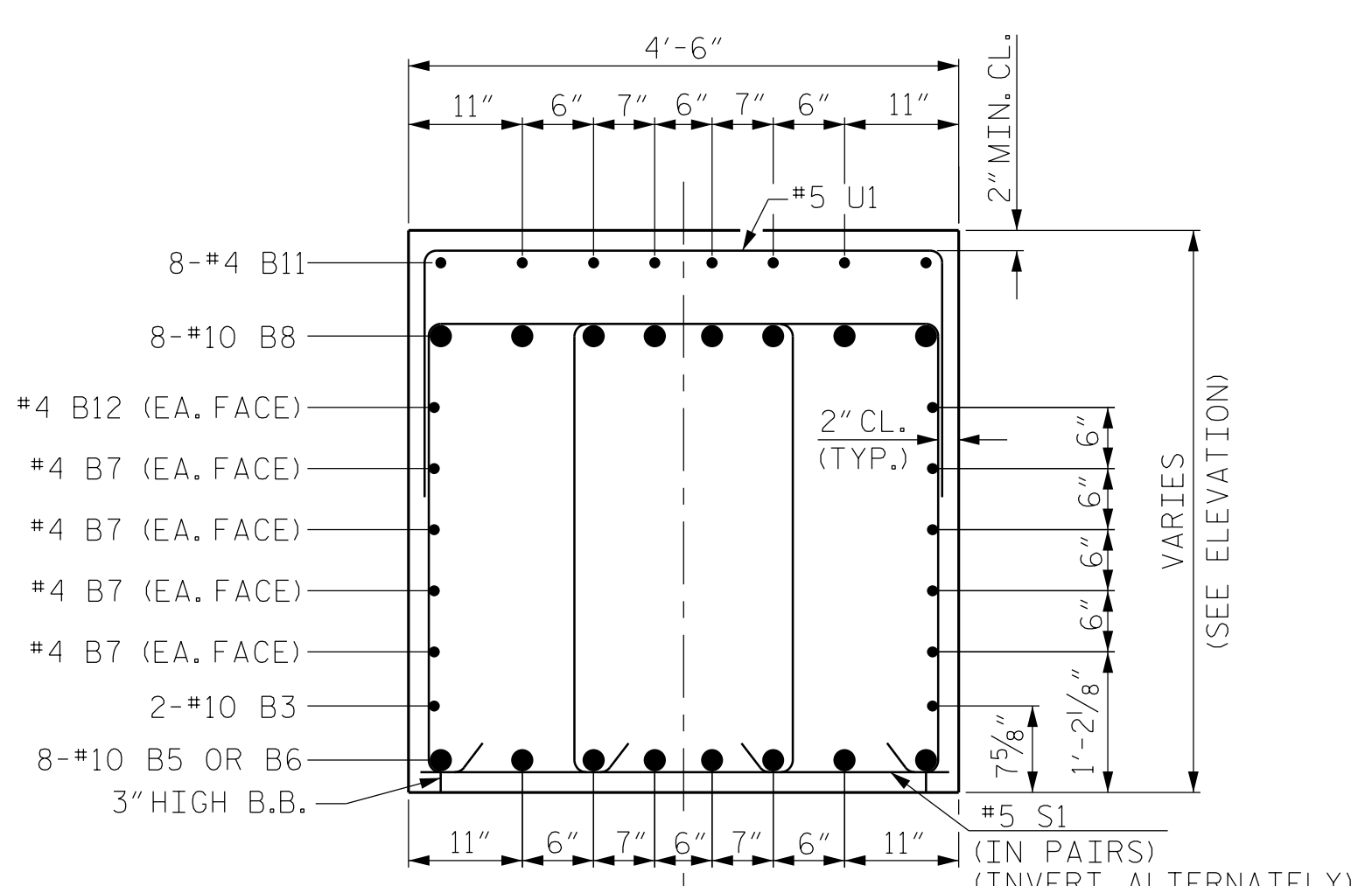
DRAWN BY : N. SMILEK DATE : 05/2017
CHECKED BY : P. JACOB DATE : 05/2017
DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017

SHEET NO.
S-28
TOTAL SHEETS
35

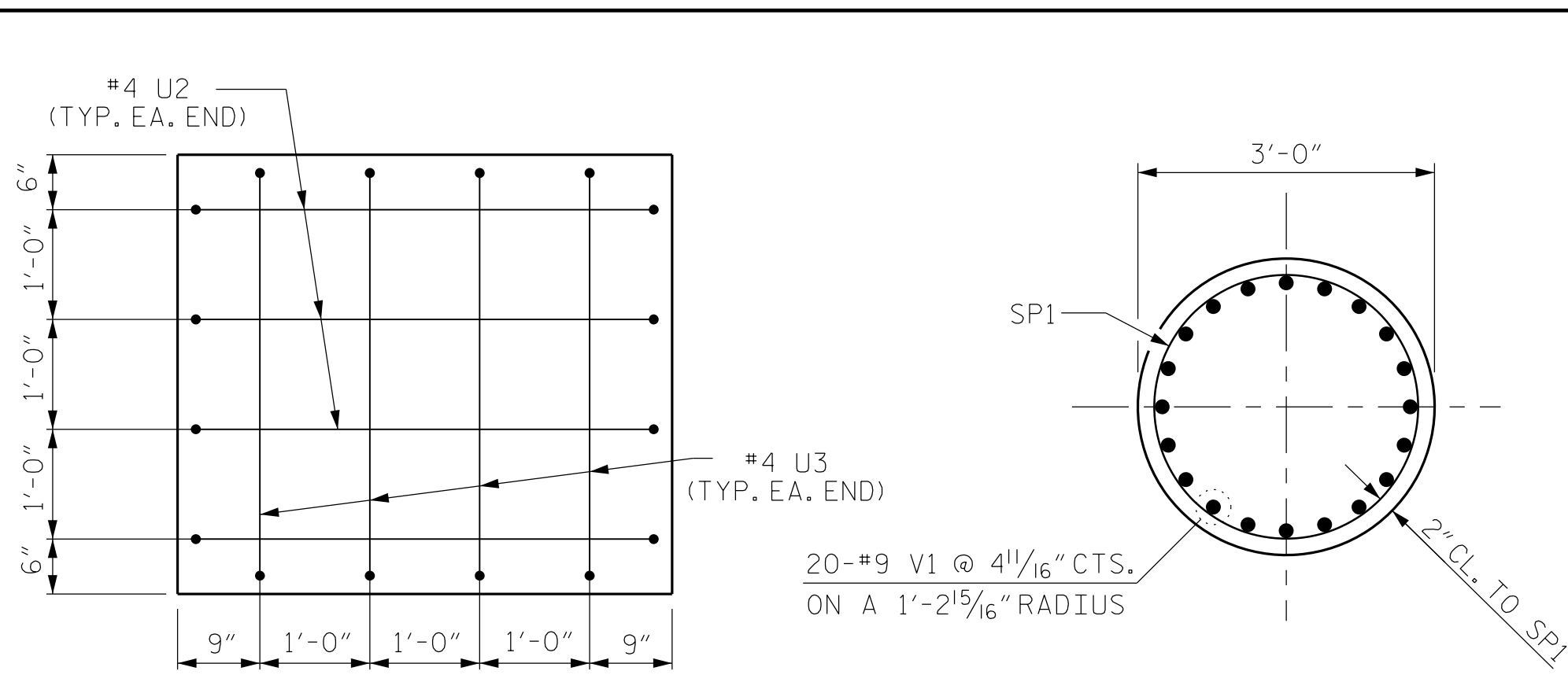
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SECTION A-A

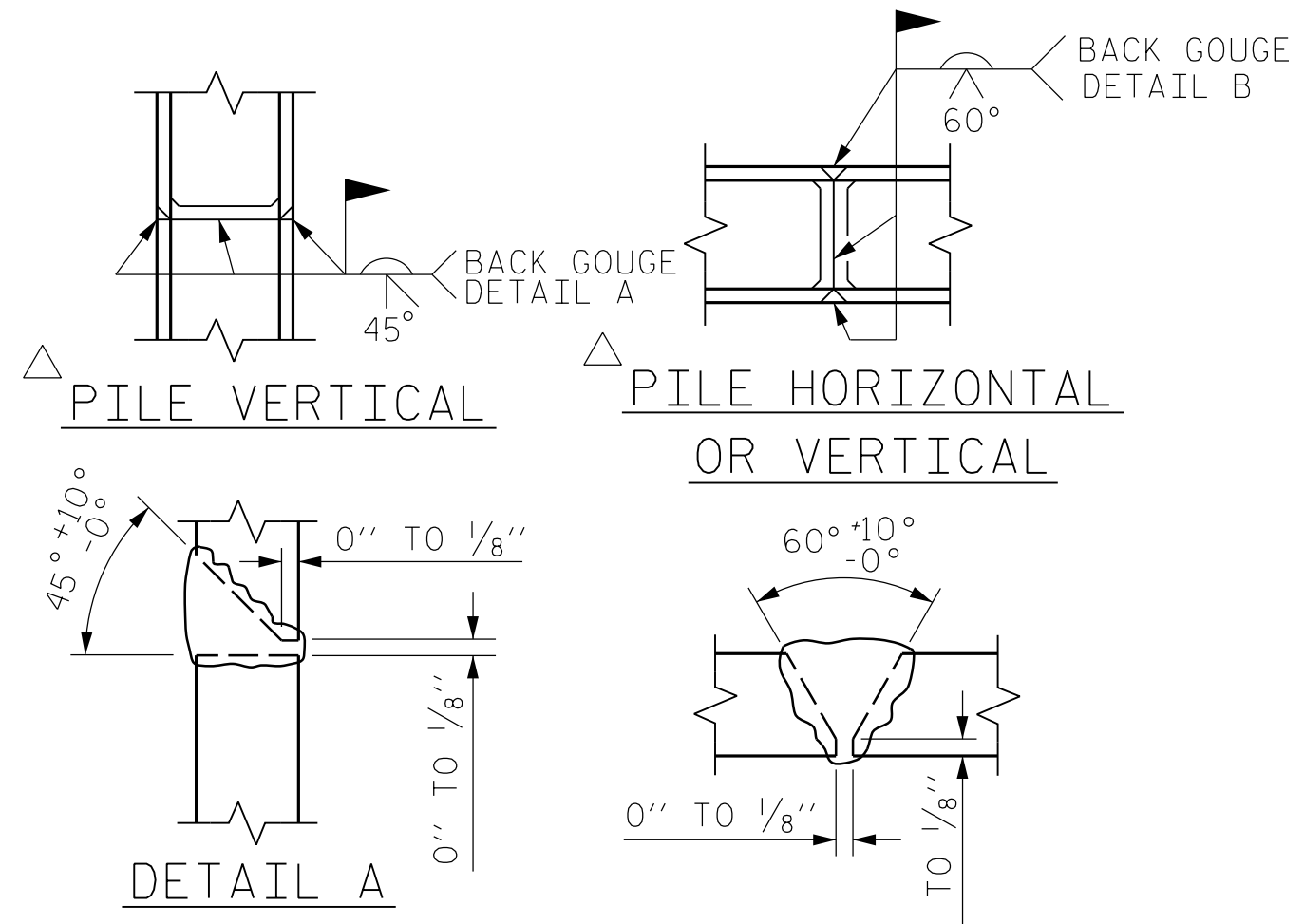


SECTION B-B



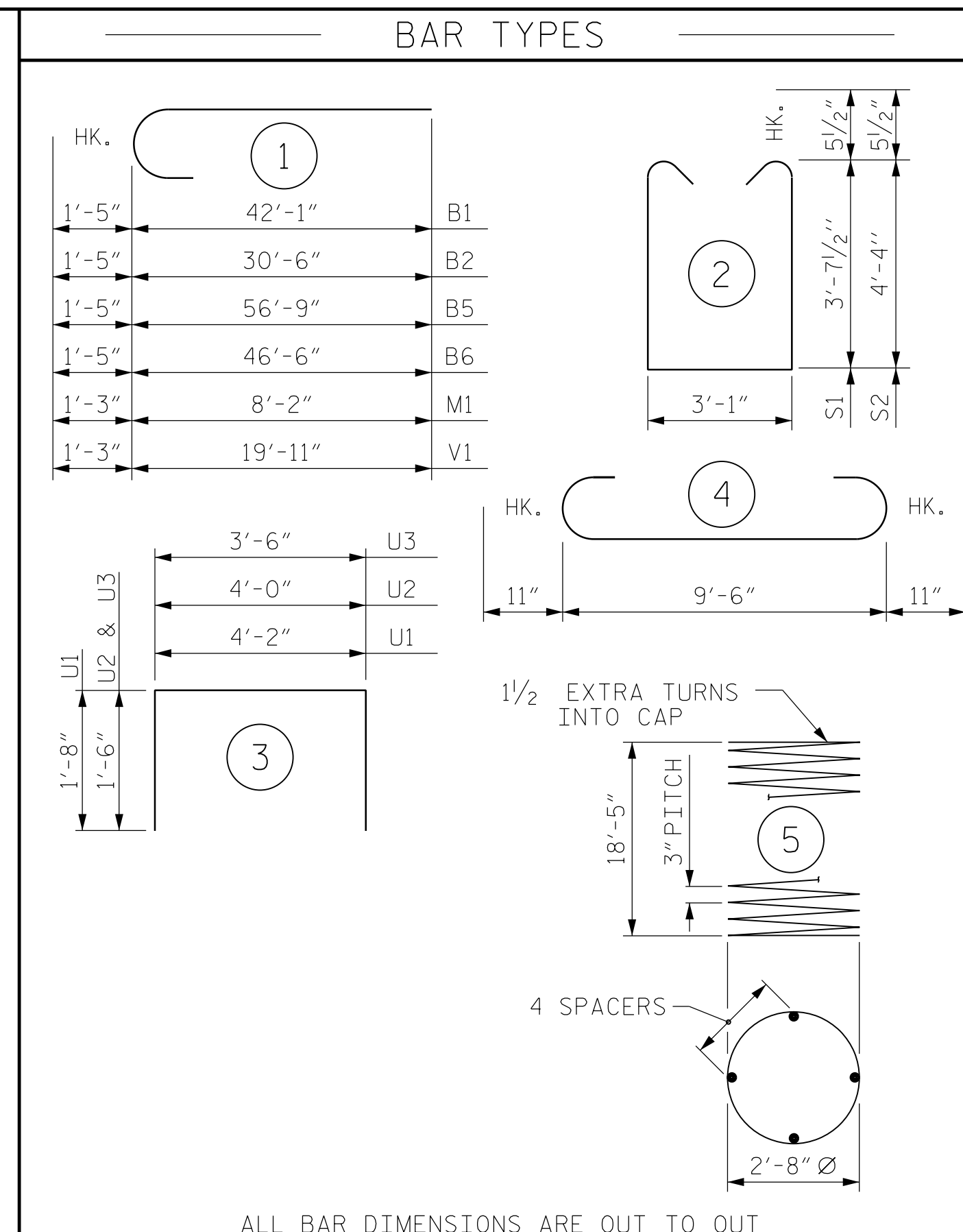
END OF CAP VIEW

SECTION C-C



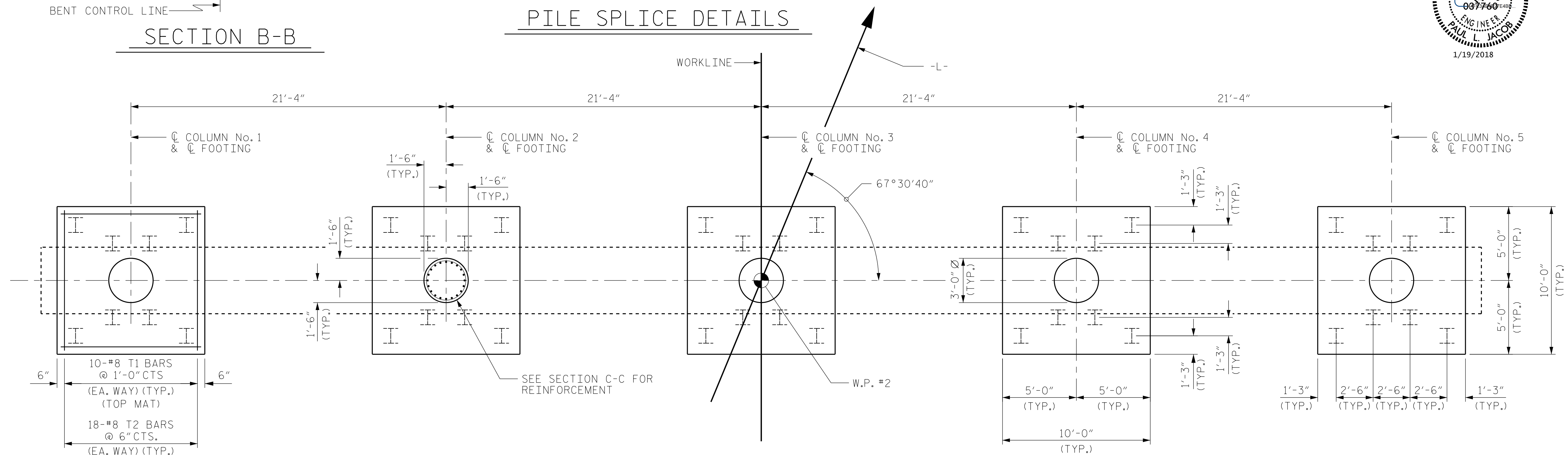
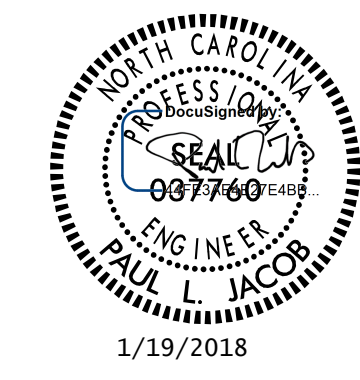
PILE SPLICE DETAILS

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



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR BENT NO. 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	43'-6"	1497
B2	8	#10	1	31'-11"	1099
B3	2	#10	STR.	56'-9"	488
B4	2	#10	STR.	46'-6"	400
B5	8	#10	1	58'-2"	2002
B6	8	#10	1	47'-11"	1650
B7	32	#4	STR.	26'-2"	559
B8	8	#10	STR.	45'-8"	1572
B9	8	#4	STR.	21'-5"	114
B10	8	#4	STR.	24'-7"	131
B11	8	#4	STR.	11'-2"	60
B12	2	#4	STR.	29'-5"	39
M1	100	#9	1	9'-5"	3202
S1	180	#5	2	11'-3"	2112
S2	160	#5	2	12'-8"	2114
T1	100	#8	STR.	9'-6"	2537
T2	180	#8	4	11'-4"	5447
U1	129	#4	3	7'-6"	646
U2	8	#4	3	7'-0"	37
U3	8	#4	3	6'-6"	35
V1	100	#9	1	21'-2"	7197
REINFORCING STEEL (FOR BENT NO. 1)				32938 LBS.	
SP-1	5	*	5	635'-4"	2122
SPIRAL COLUMN REINFORCING STEEL (FOR BENT NO. 1)				2122 LBS.	
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
HP 12x53 STEEL PLATES No. 40				LENGTH = 2400 LIN. FT.	
PILE REDRIVES				20 EA.	
CLASS A CONCRETE BREAKDOWN (FOR BENT NO. 1)					
POUR #1 (FOOTINGS)				64.8 C.Y.	
POUR #2 (COLUMNS)				23.8 C.Y.	
POUR #3 (CAP)				74.7 C.Y.	
TOTAL CLASS A CONCRETE				163.3 C.Y.	
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES				40 EA.	



PLAN OF FOOTINGS

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT No. 1
 DETAILS

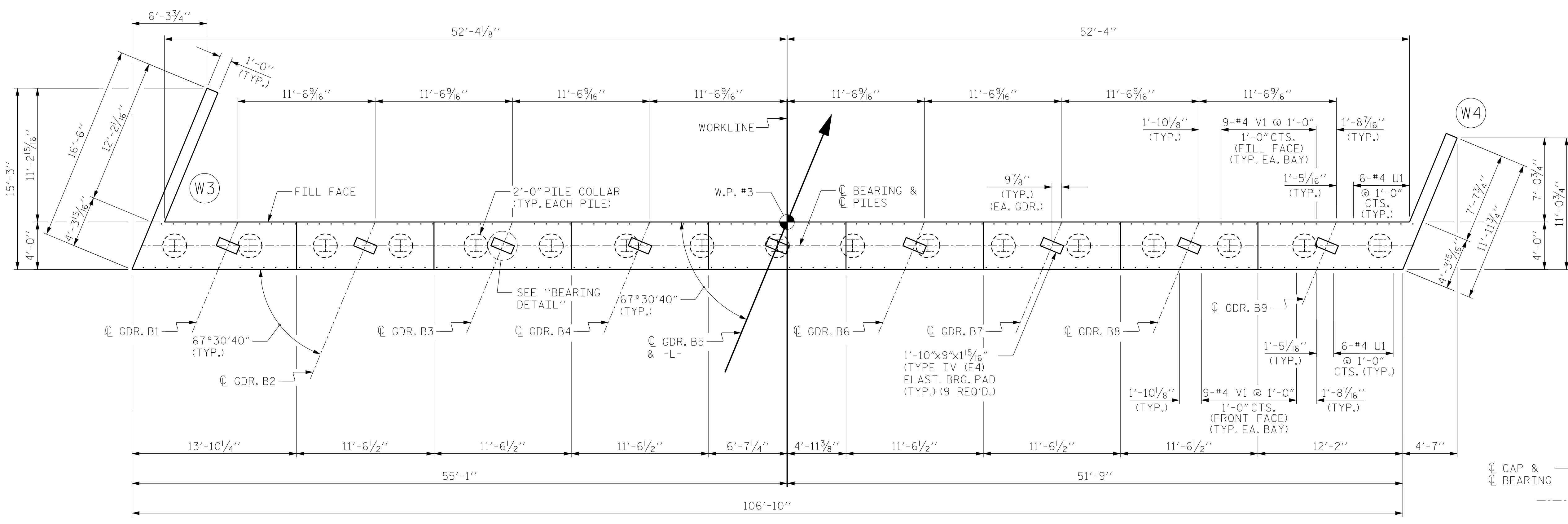
DRAWN BY : A. CHILKEPALLI DATE : 01/2018
 CHECKED BY : P. JACOB DATE : 01/2018
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 01/2018

moffatt & nichol
 4700 FALLS OF NEUSE ROAD, SUITE 300
 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License No.: F-0105

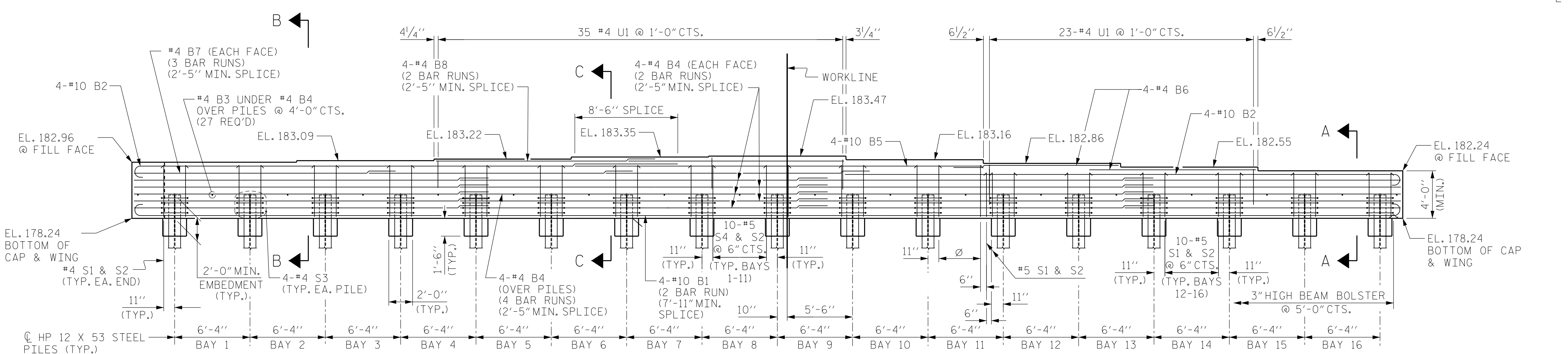
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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

SHEET NO.
 S-29
 TOTAL SHEETS
 35



END BENT No. 2 PLAN



END BENT No. 2 ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, B-B, AND C-C, SEE SHEET 3 OF 3.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

NOTES

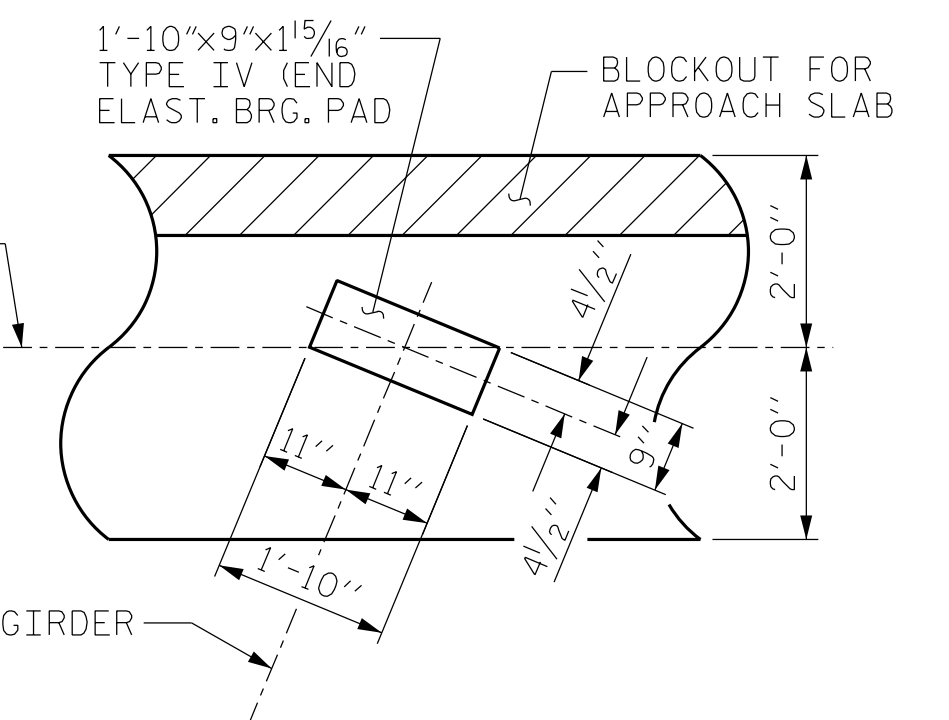
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

THE #4 V1 BARS SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

THE UPPER PORTION OF THE WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL. FOR DETAILS, SEE SUPERSTRUCTURE PLANS.

FOR CONCRETE COLLAR DETAIL, SEE SHEET 3 OF 3.



BEARING DETAIL

(DIMENSION TYPICAL EA. GIRDER)
(PILES NOT SHOWN FOR CLARITY)

PROJECT NO. B-4491
CUMBERLAND COUNTY
STATION: 55+88.11 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL END BENT
No. 2 PLAN



DRAWN BY : A. CHILKEPALLI DATE : 01/2018
CHECKED BY : P. JACOB DATE : 01/2018
DESIGN ENGINEER OF RECORD: P. JACOB DATE : 01/2018

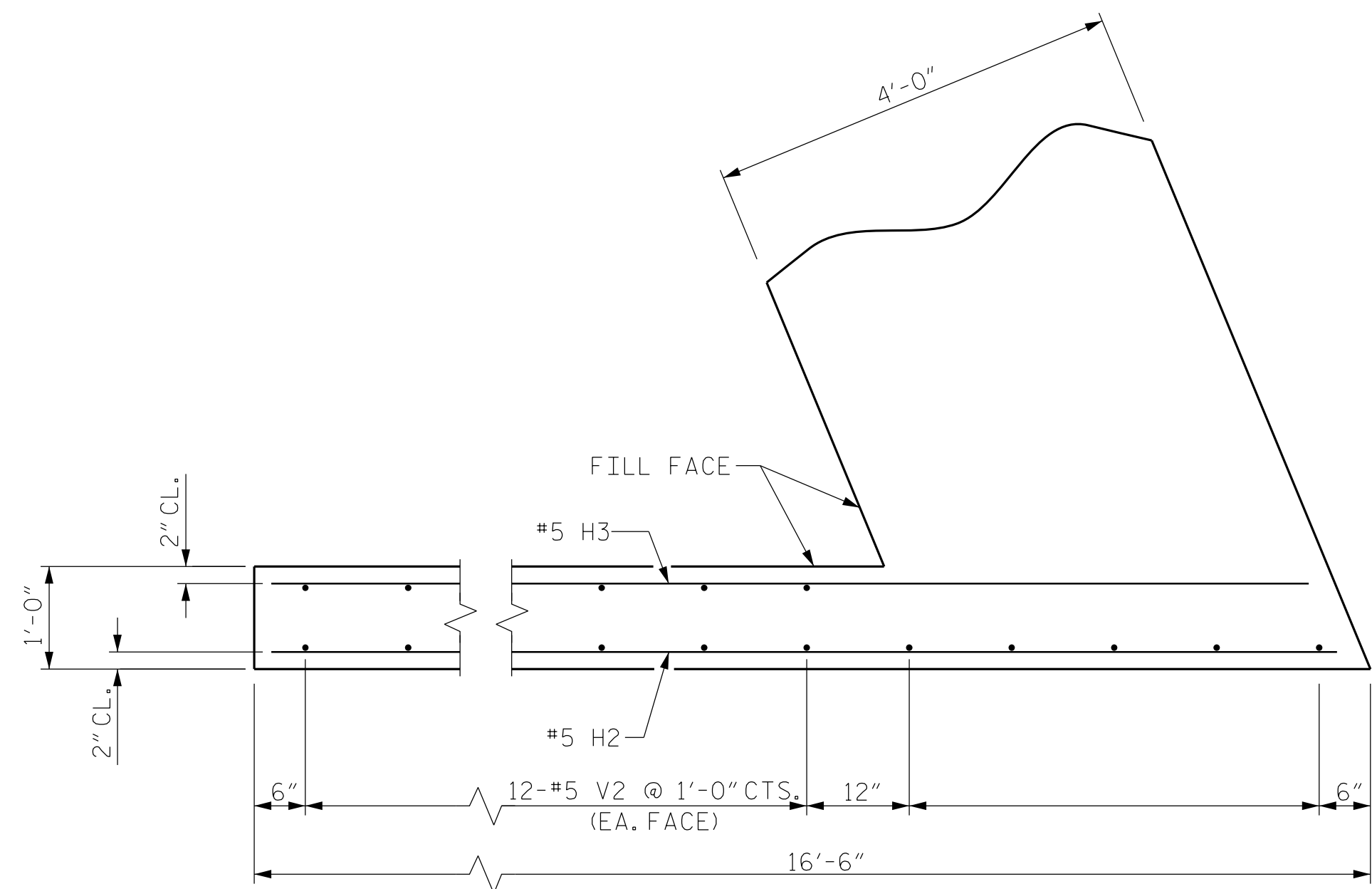
moffatt & nichol
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RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License No.: F-0105

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

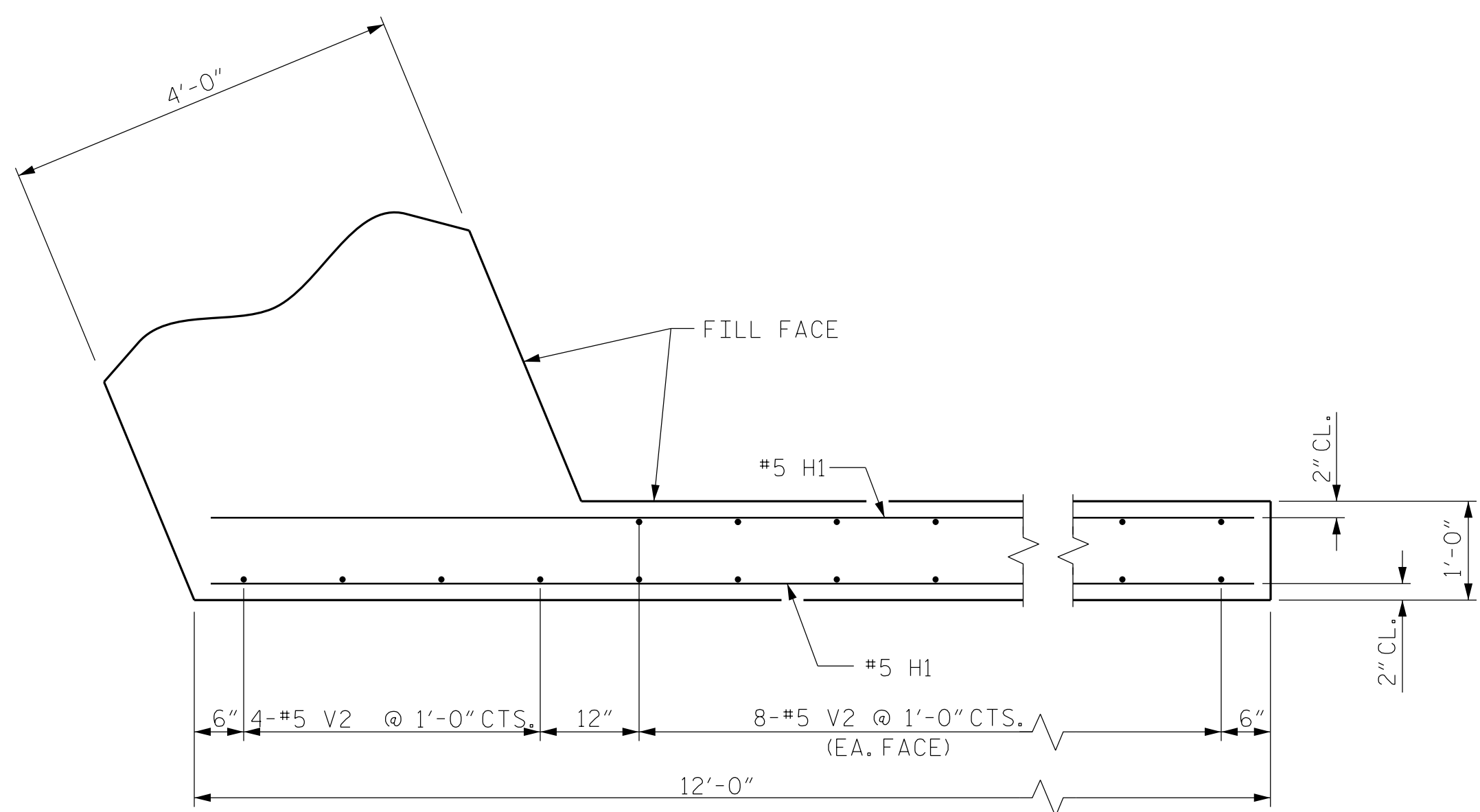
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 35

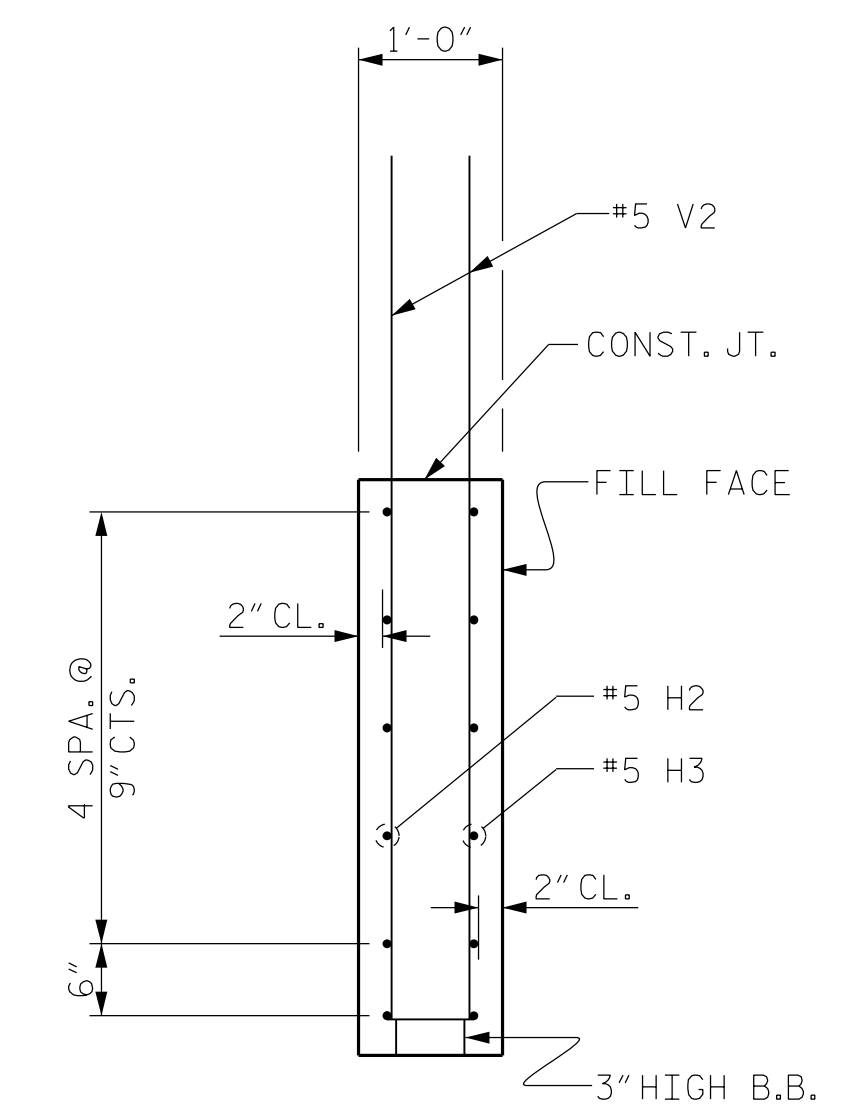
1/19/2018 2:41:32 PM C:\Users\pjacob\OneDrive\Work\B-4491\SMU\EA_250022.dgn
 P. JACOB



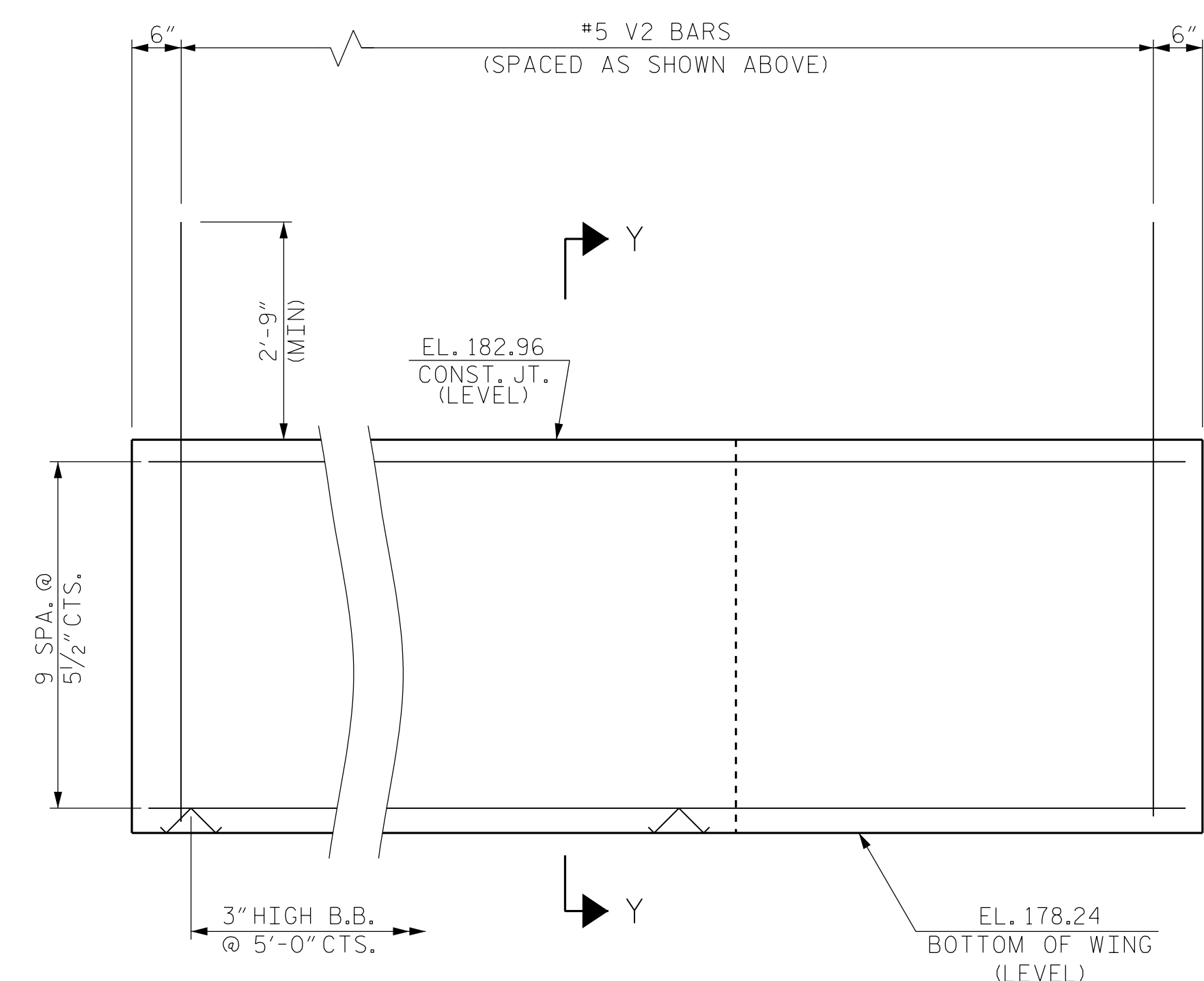
PLAN OF WING (W3)



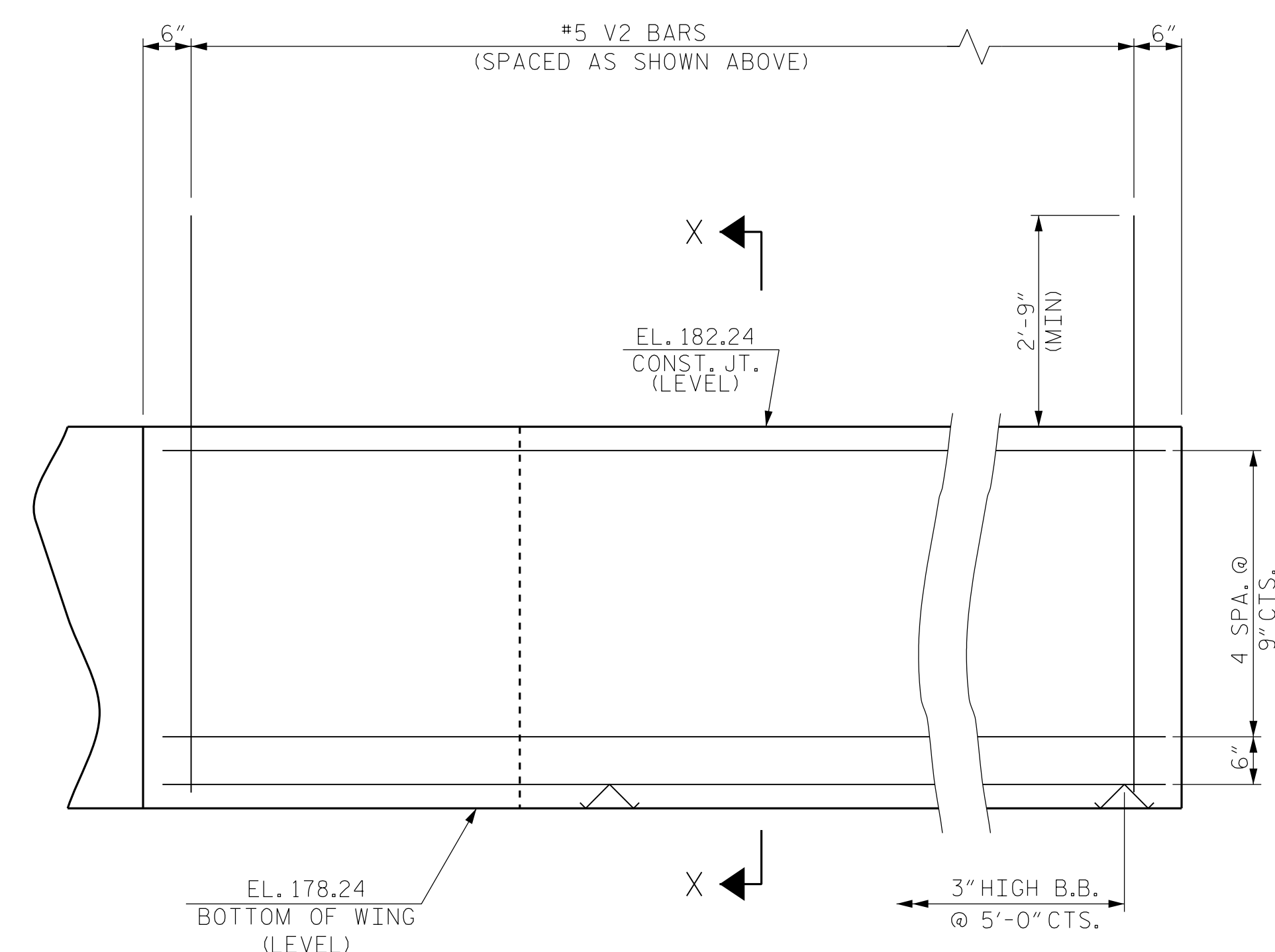
PLAN OF WING (W4)



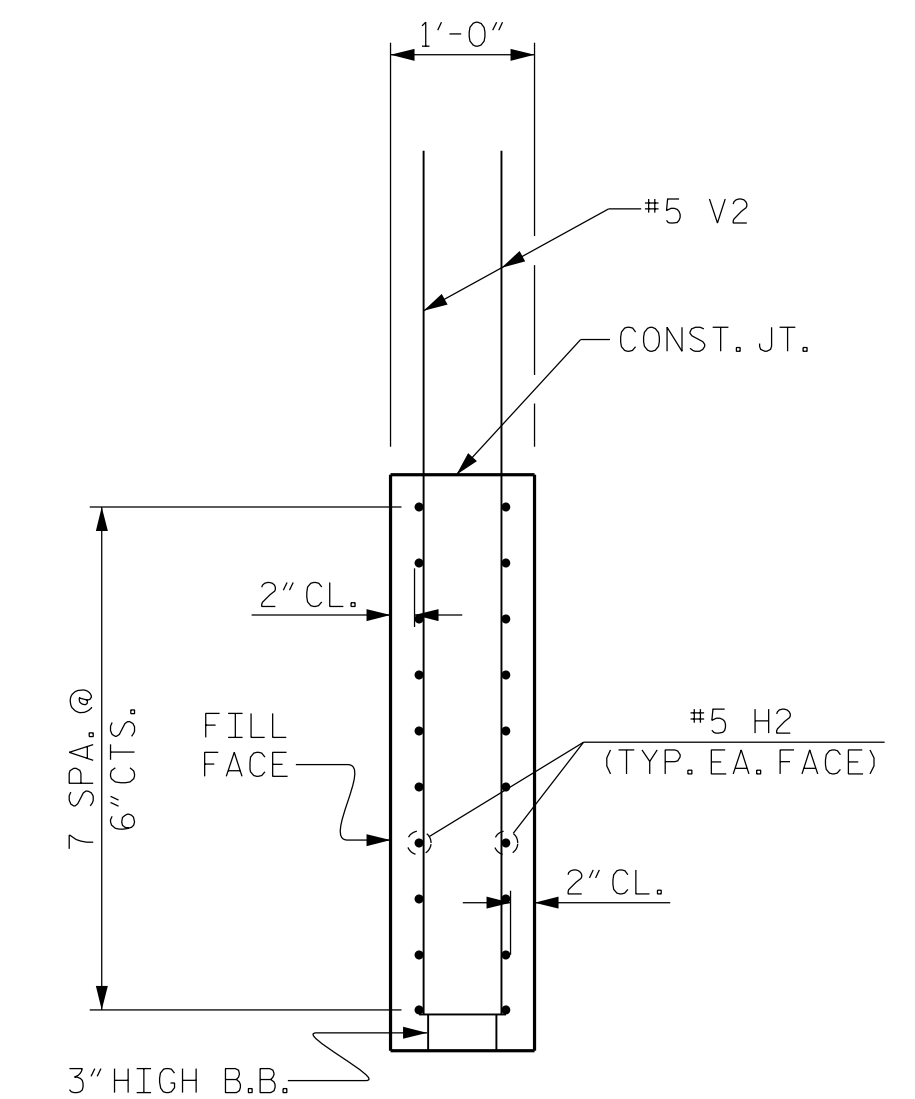
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

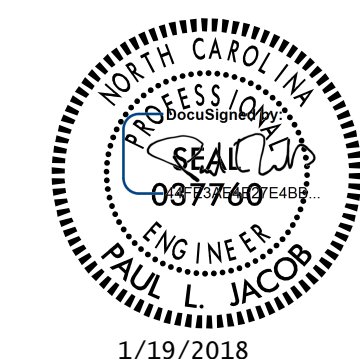


SECTION Y-Y

WING DETAILS

DRAWN BY : M. RAY DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD : P. JACOB DATE : 05/2017

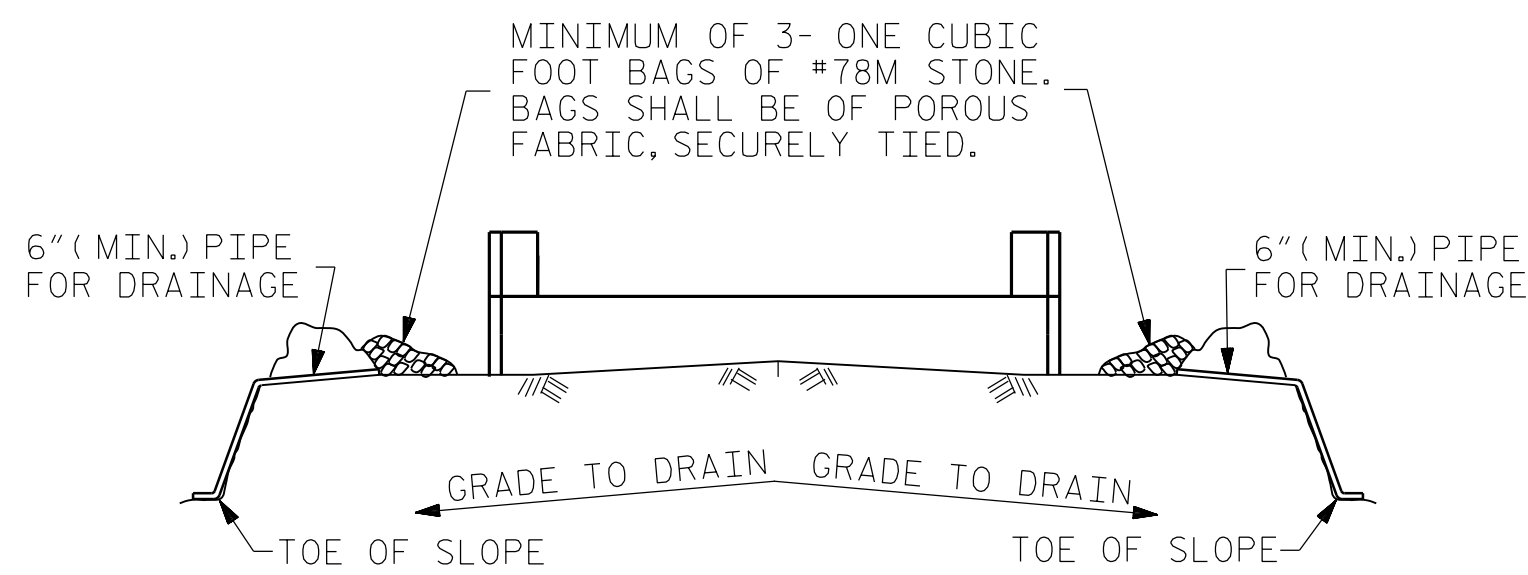
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 (919) 781-4626 VOICE (919) 781-4869 FAX
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PROJECT NO. B-4491
 CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE INTEGRAL END BENT No. 2 WING DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-31
					TOTAL SHEETS 35

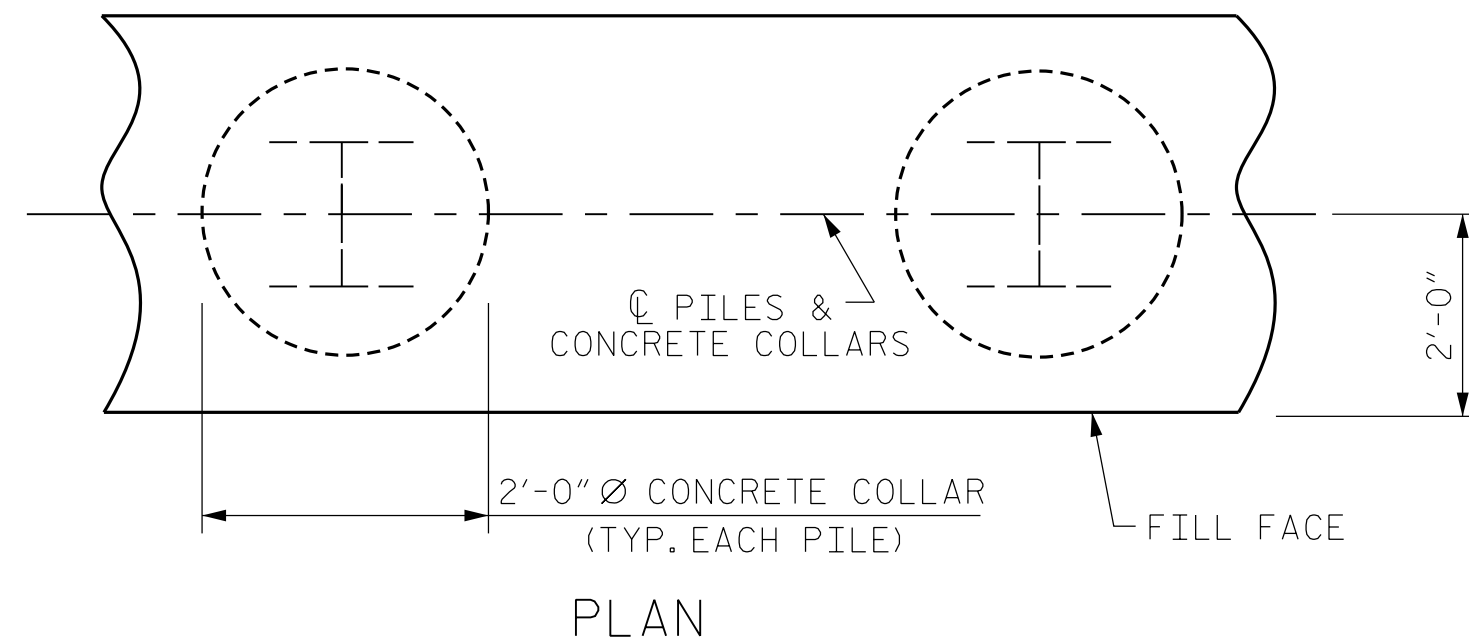


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

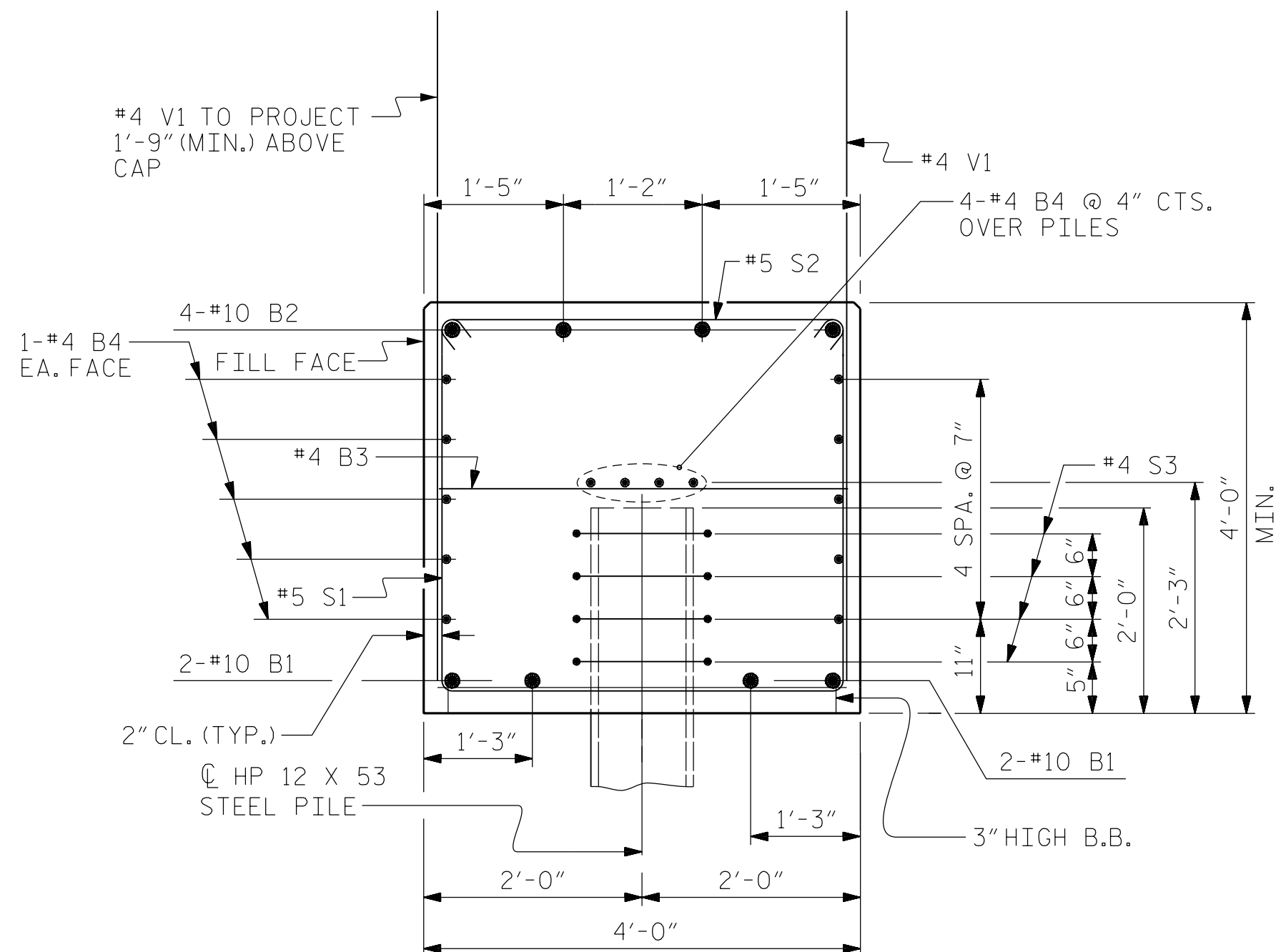
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

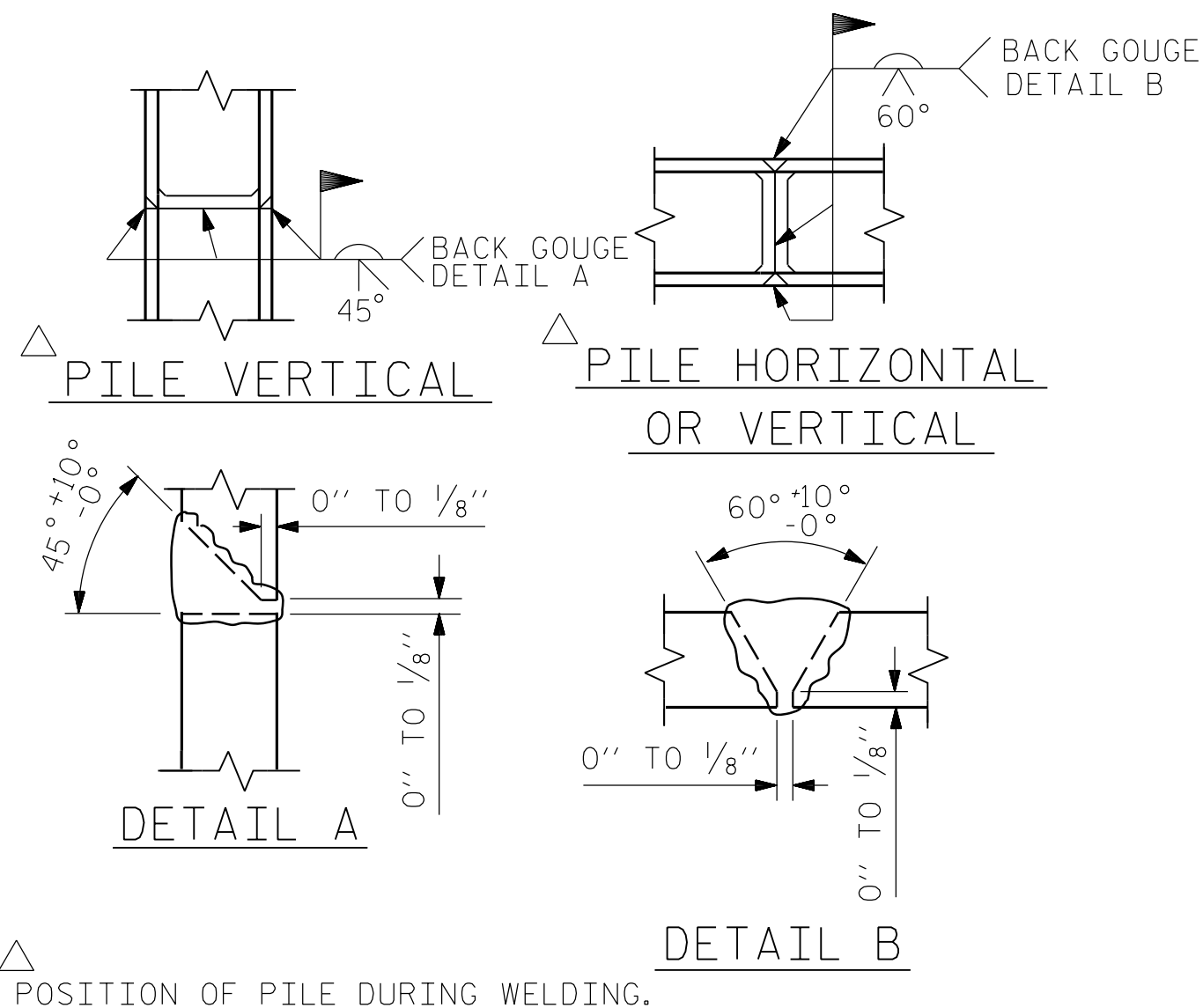


CORROSION PROTECTION FOR STEEL PILES DETAIL
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

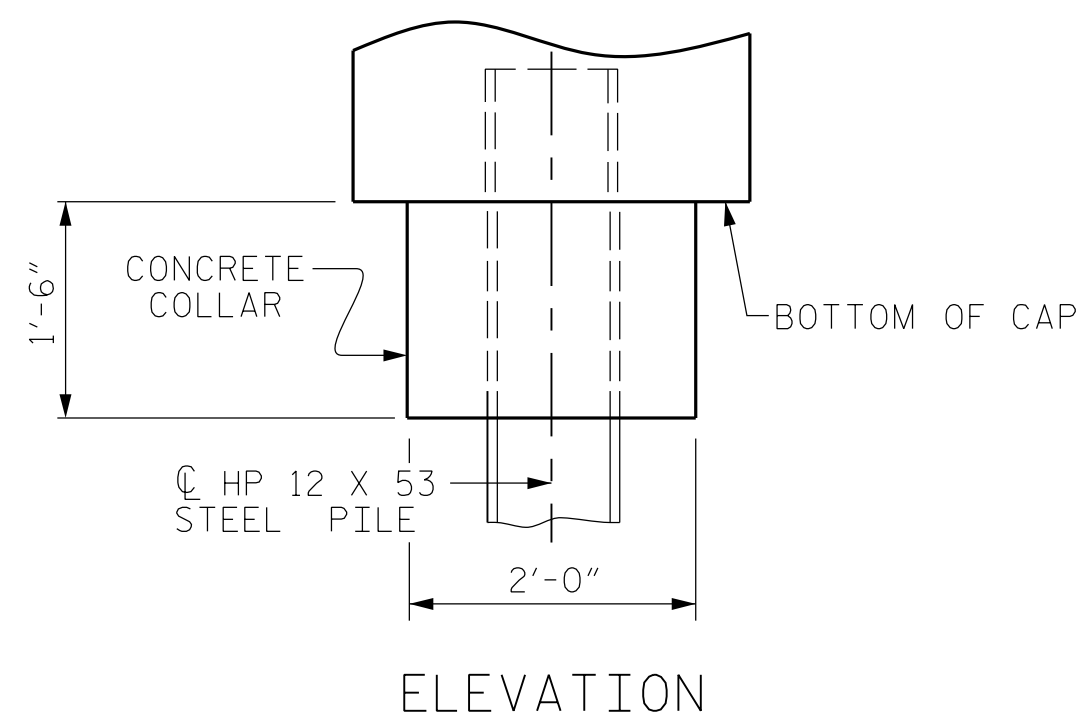


SECTION A-A

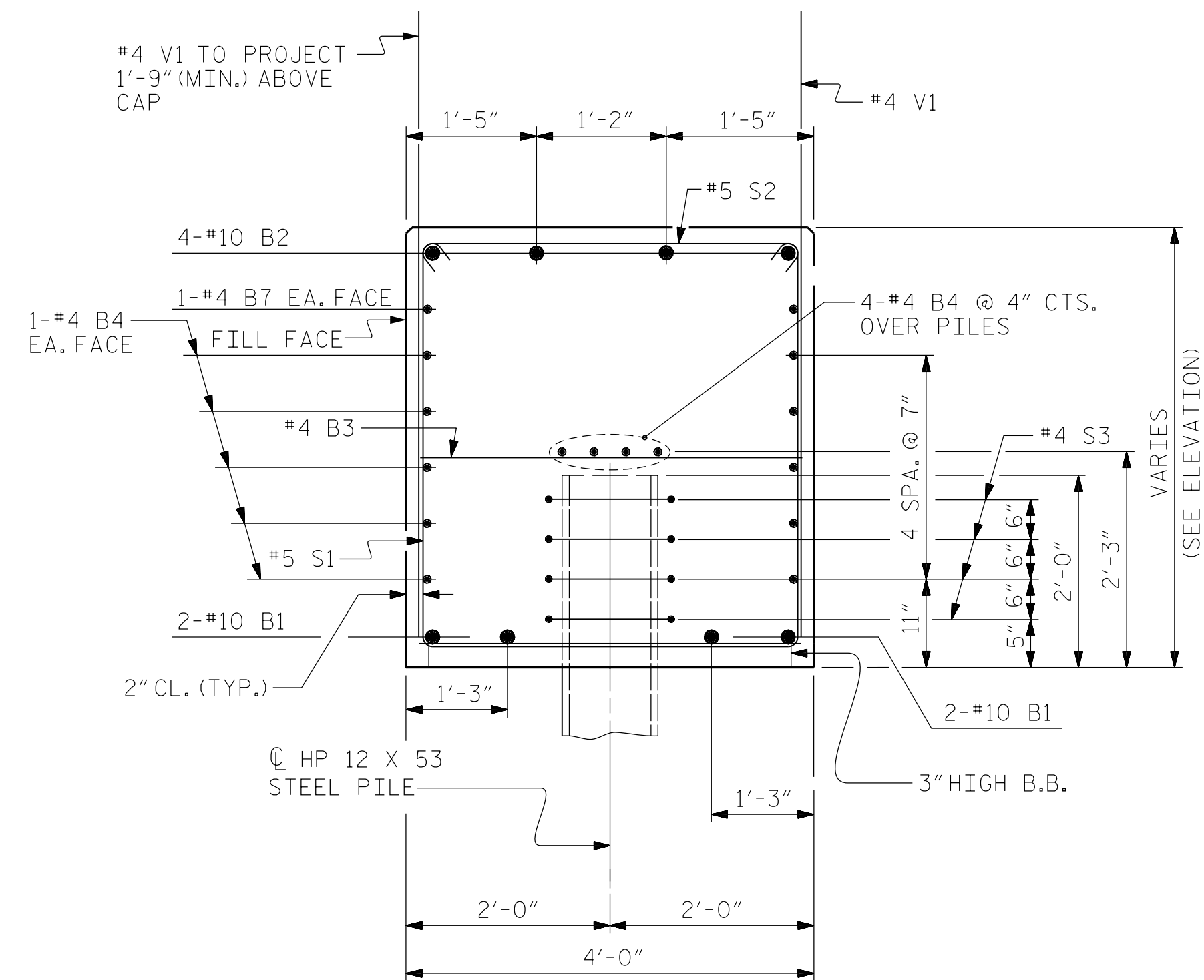
(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



PILE SPLICE DETAILS

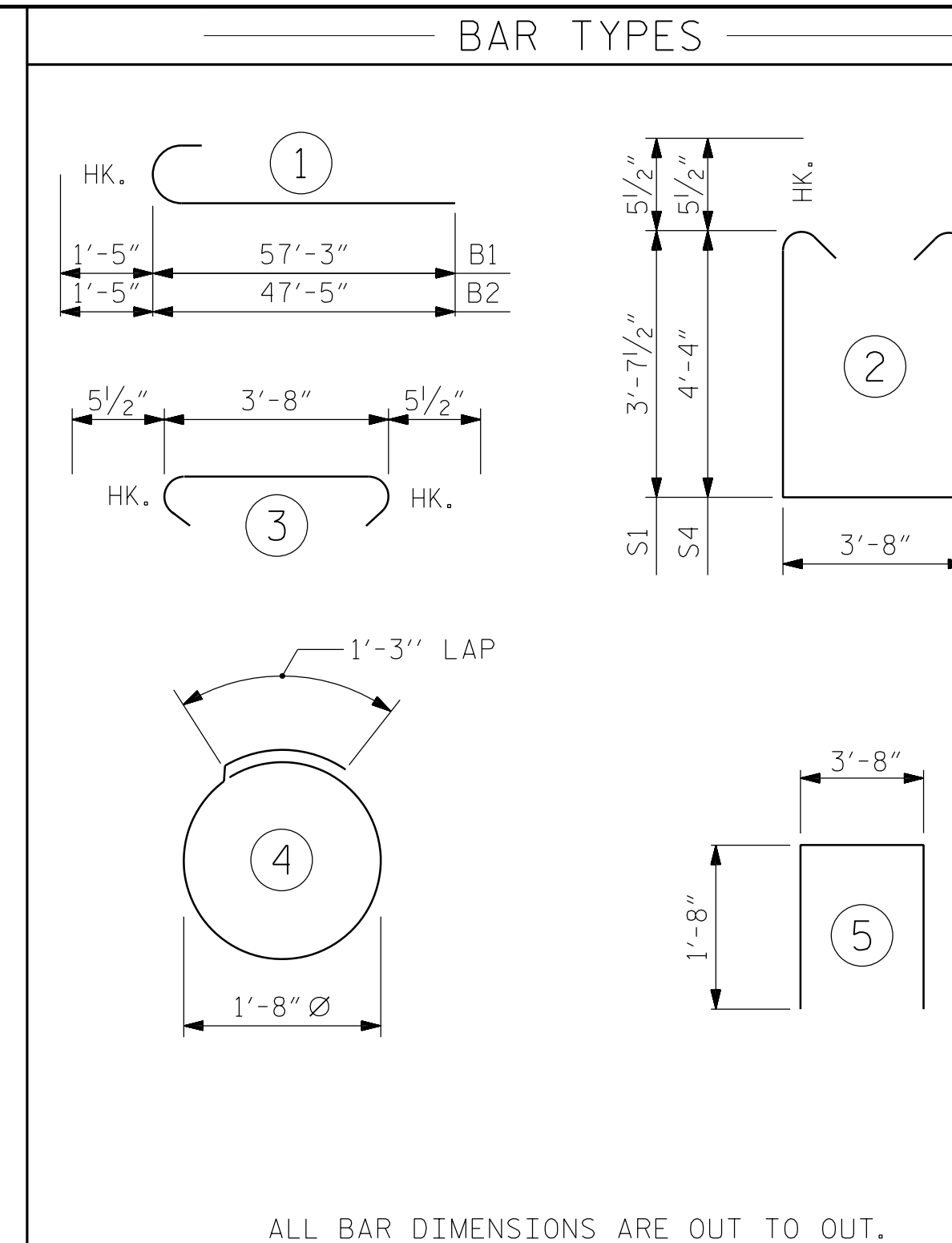


ELEVATION



SECTION B-B

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE END BENT

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	58'-8"	2020
B2	8	#10	1	48'-10"	1681
B3	27	#4	STR	3'-8"	66
B4	56	#4	STR	28'-6"	1066
B5	4	#10	STR	32'-8"	562
B6	8	#4	STR	14'-0"	75
B7	7	#4	STR	22'-2"	89
B8	8	#4	STR	18'-5"	98
H1	12	#5	STR	11'-8"	146
H2	8	#5	STR	16'-0"	167
H3	8	#5	STR	15'-8"	163
S1	53	#5	2	11'-10"	654
S2	162	#5	3	4'-7"	774
S3	68	#4	4	6'-6"	295
S4	109	#5	2	13'-3"	1506
U1	58	#4	5	7'-0"	271
V1	177	#4	STR	6'-10"	808
V2	49	#5	STR	7'-3"	371

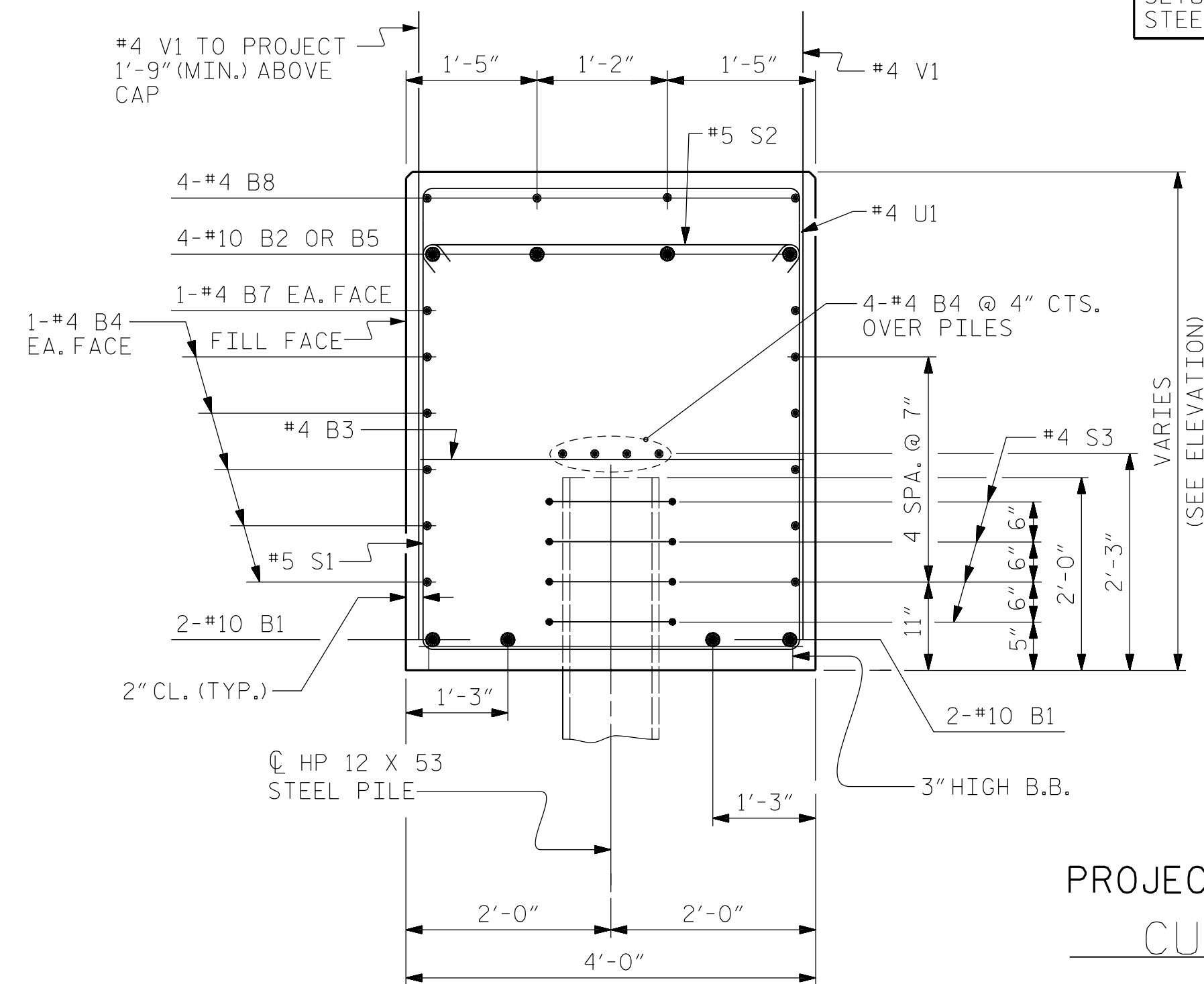
REINFORCING STEEL (FOR END BENT) 10812 LBS.

CLASS A CONCRETE 81.0 C.Y.

HP 12 X 53 STEEL PILES NO: 17 LIN. FT. = 1445

PILE REDRIVES 9 EA.

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES 17 EA.

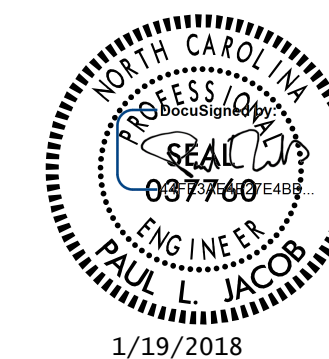


SECTION C-C

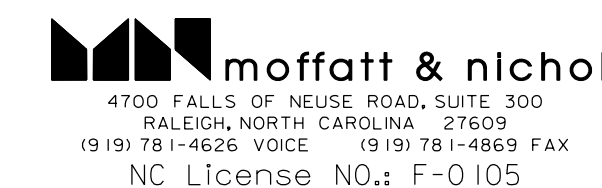
(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

SHEET 3 OF 3



1/19/2018



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 INTEGRAL
 END BENT No. 2
 DETAILS

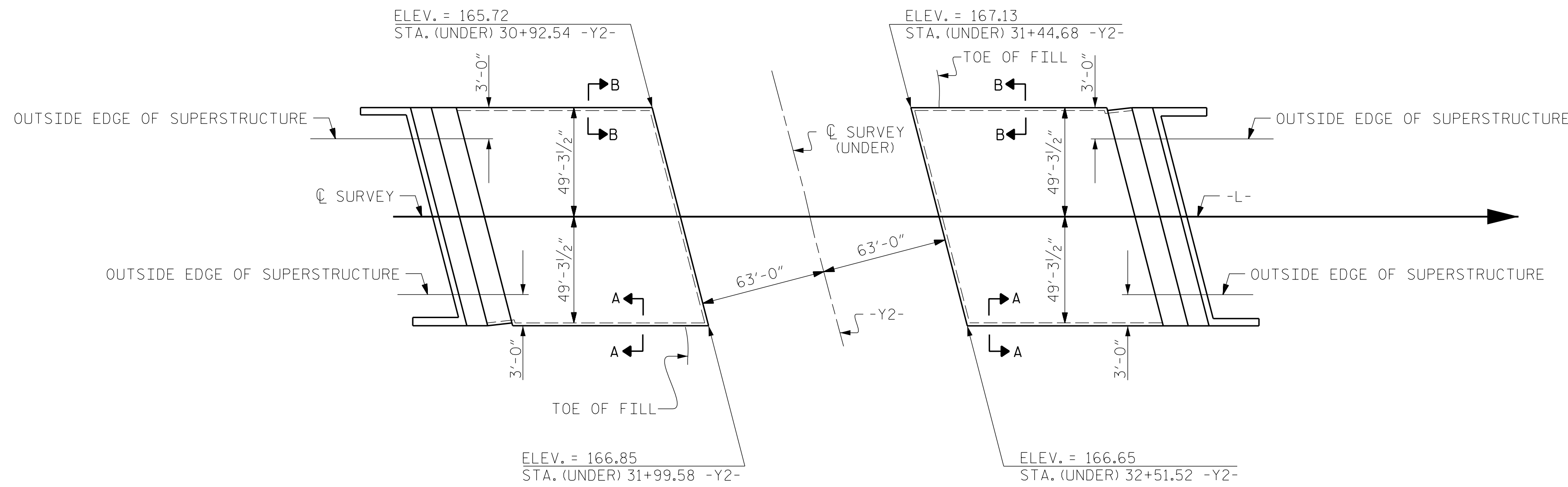
REVISIONS

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

SHEET NO.

S-32
 TOTAL SHEETS 35

DRAWN BY : M. RAY DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017



GENERAL NOTES

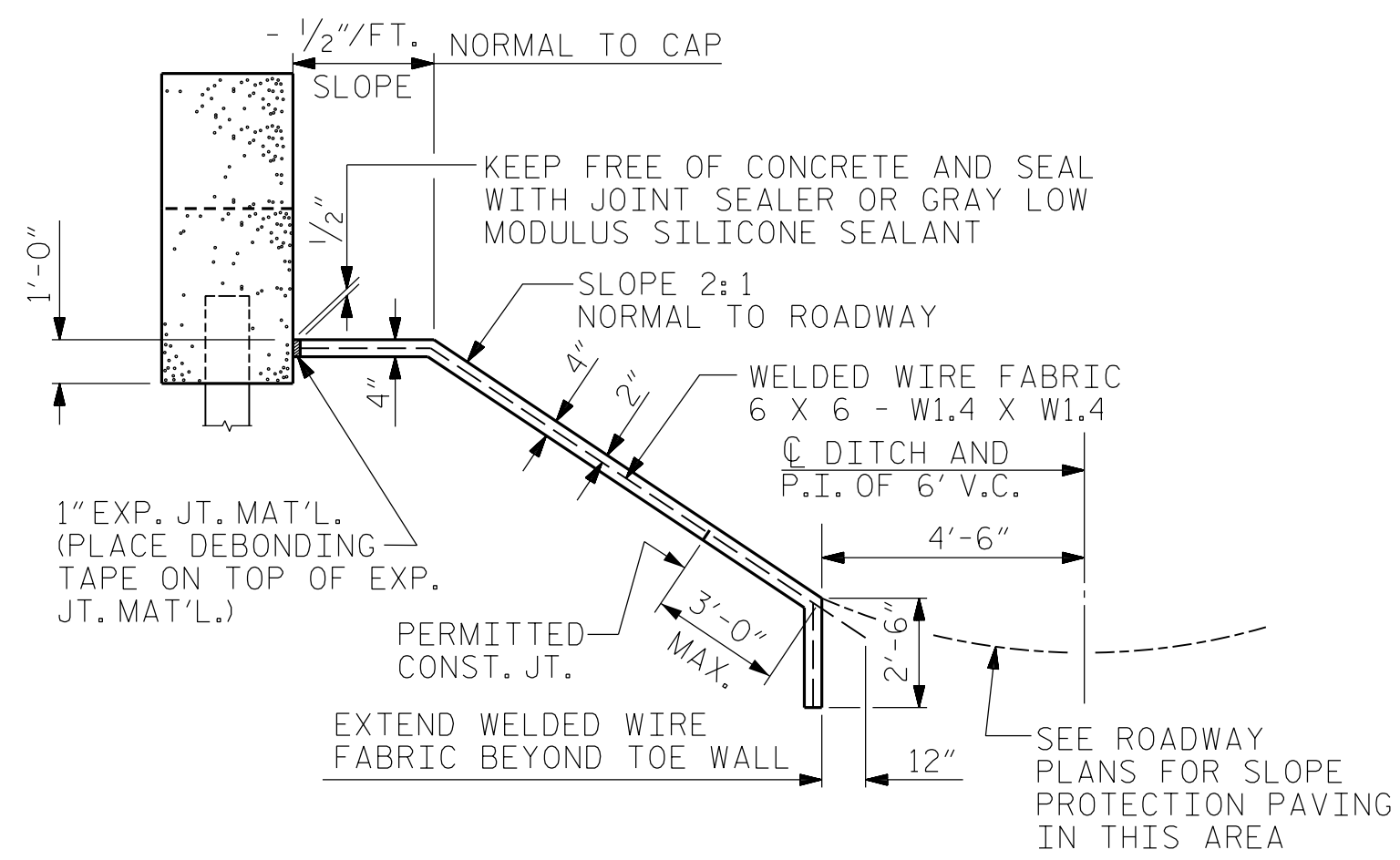
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

ALTERNATE "A"

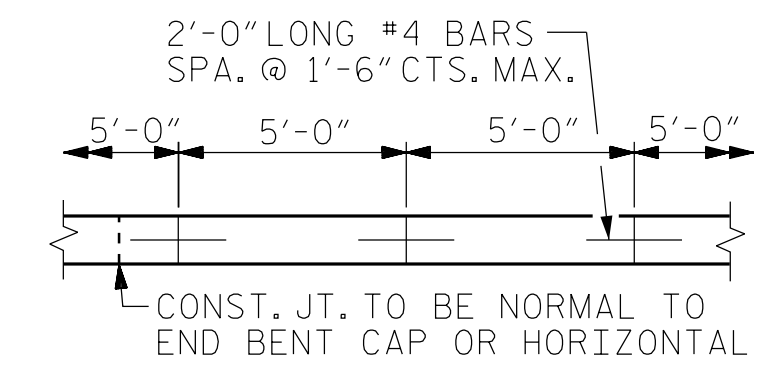
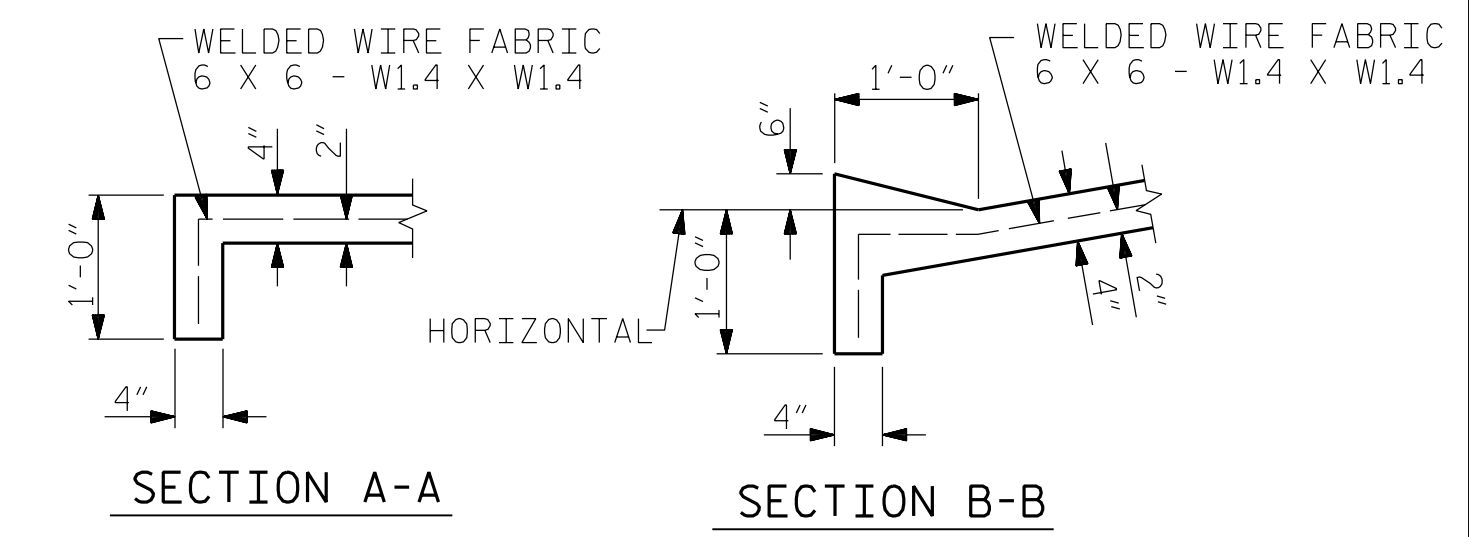
ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE 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. 55+88.11 -L-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	326.4	651
END BENT 2	255.1	504

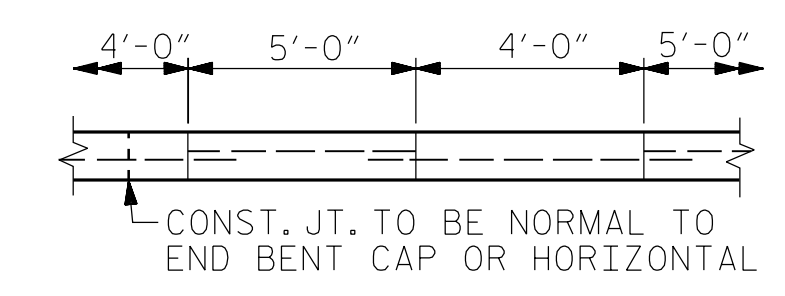
* QUANTITY SHOWN IS BASED ON 5' POURS.



SECTION ALONG C SURVEY WHEN FILL CATCHES IN DITCH



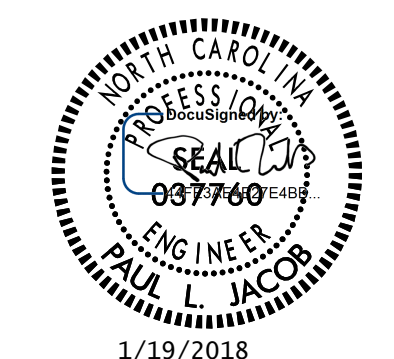
POURING DETAIL



OPTIONAL POURING DETAIL

DRAWN BY : J. BORT DATE : 05/2017
 CHECKED BY : P. JACOB DATE : 05/2017
 DESIGN ENGINEER OF RECORD: P. JACOB DATE : 05/2017

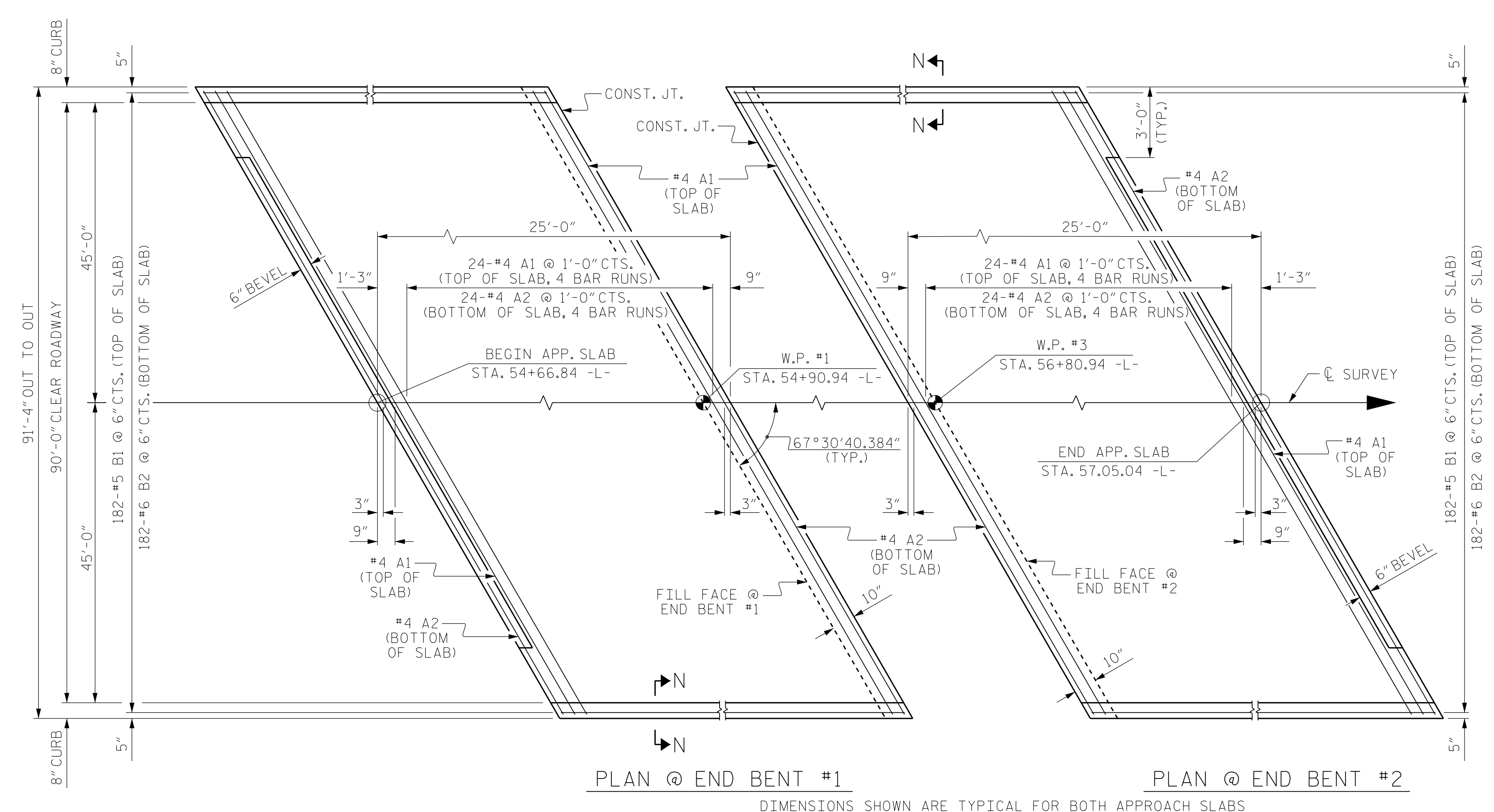
moffatt & nichol
 4700 FALLS OF NEUSE ROAD, SUITE 300
 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License NO.: F-0105



PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-33
1			3			TOTAL SHEETS
2			4			35

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SLOPE PROTECTION
 DETAILS



NOTES

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

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

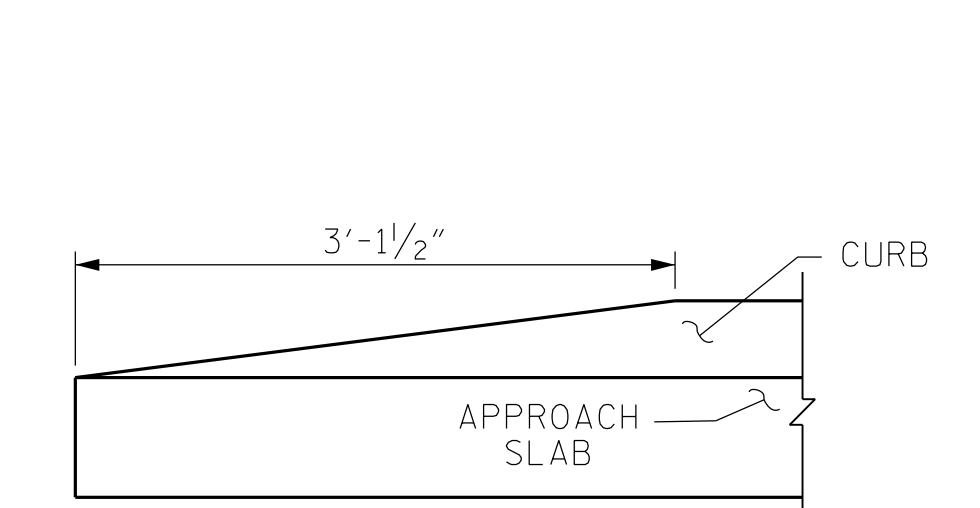
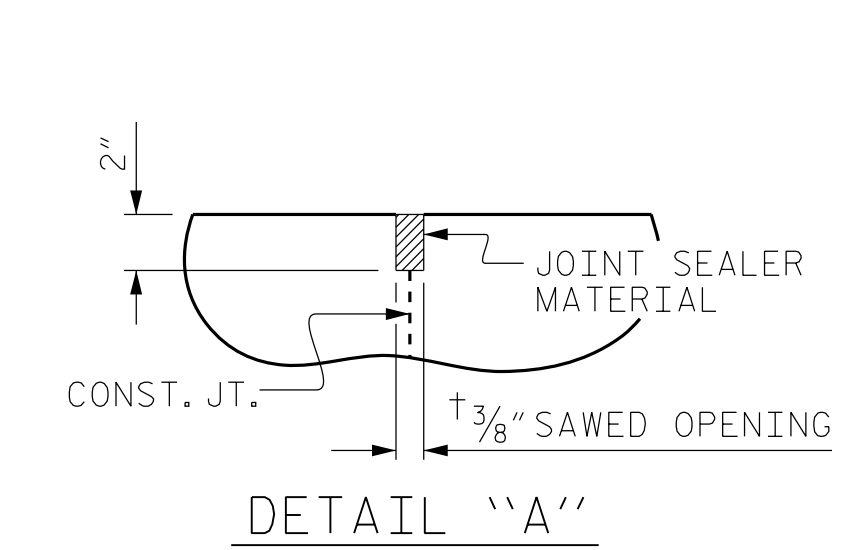
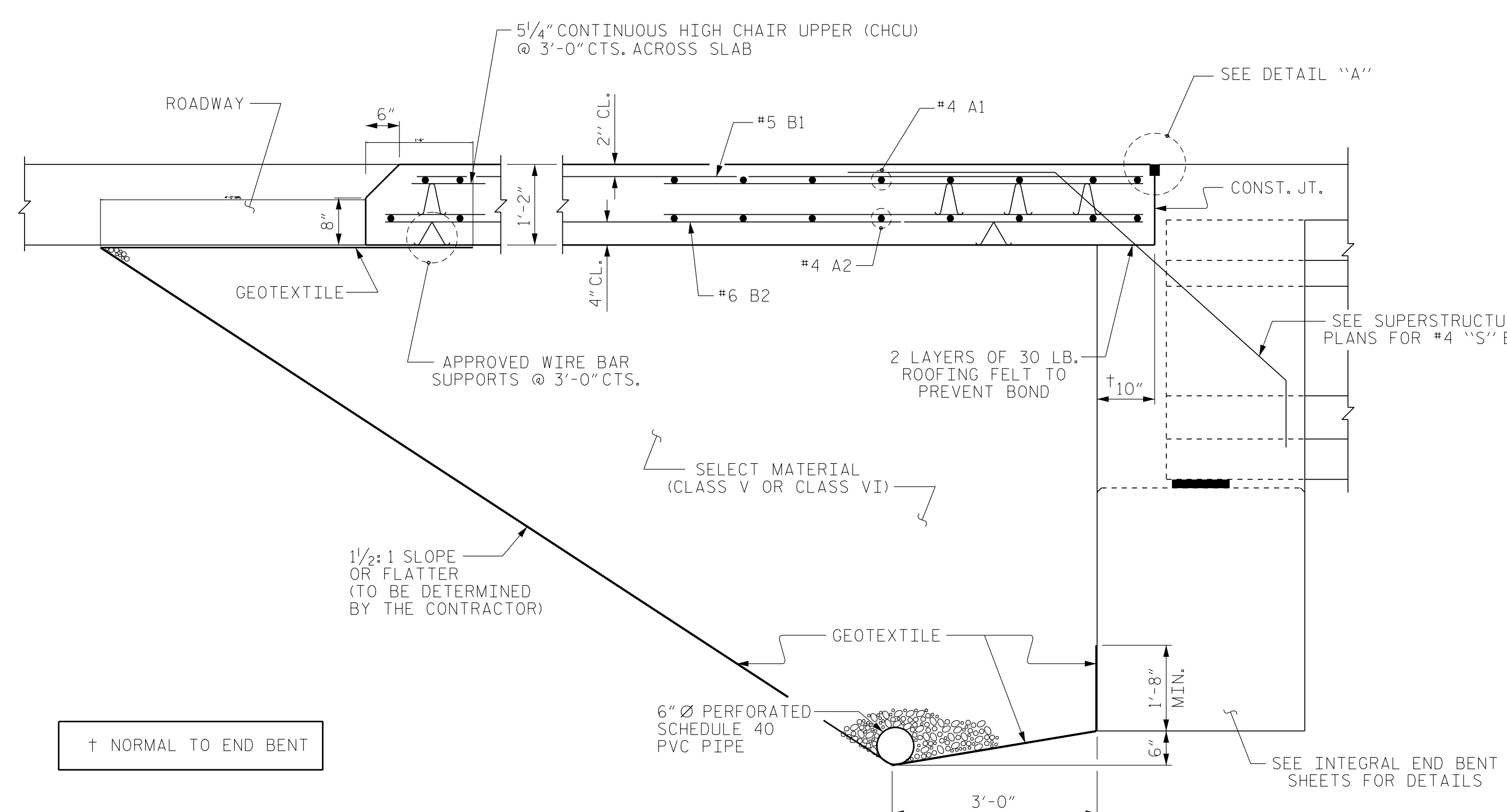
AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

BILL OF MATERIAL
 FOR ONE APPROACH SLAB
 (2 REQ'D)

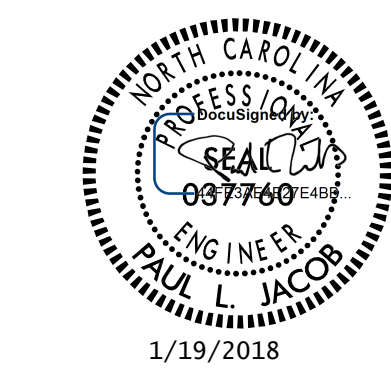
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	96	#4	STR	26'-2"	1678
A2	96	#4	STR	26'-0"	1667
* B1	182	#5	STR	24'-2"	4588
B2	182	#6	STR	24'-8"	6743
REINFORCING STEEL				LBS. 8410	
* EPOXY COATED REINFORCING STEEL				LBS. 6266	
CLASS AA CONCRETE				C. Y. 98.5	

SPLICE LENGTHS

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



END OF CURB WITHOUT SHOULDER BERM GUTTER



PROJECT NO. B-4491
CUMBERLAND COUNTY
 STATION: 55+88.11 -L-
 SHEET 1 OF 2

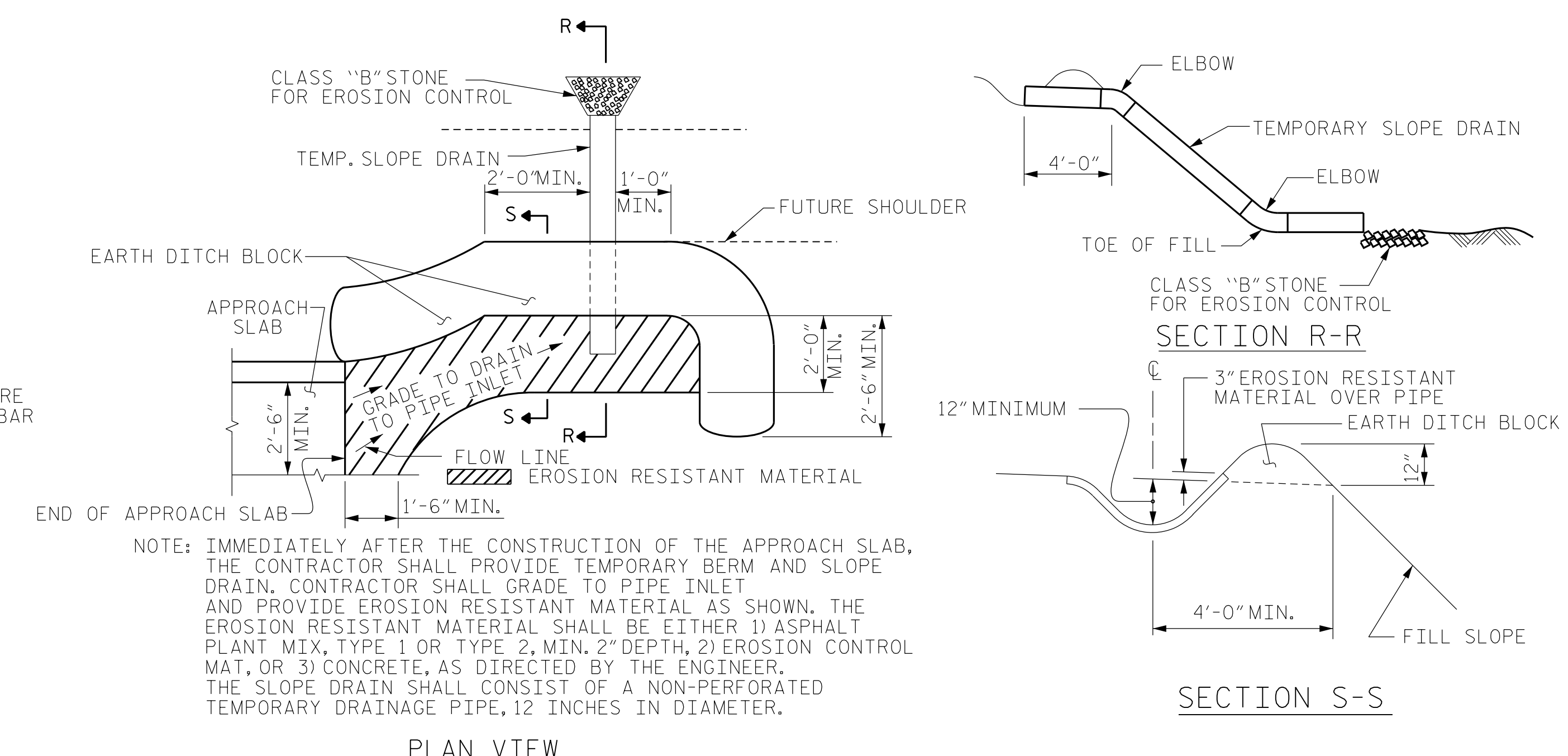
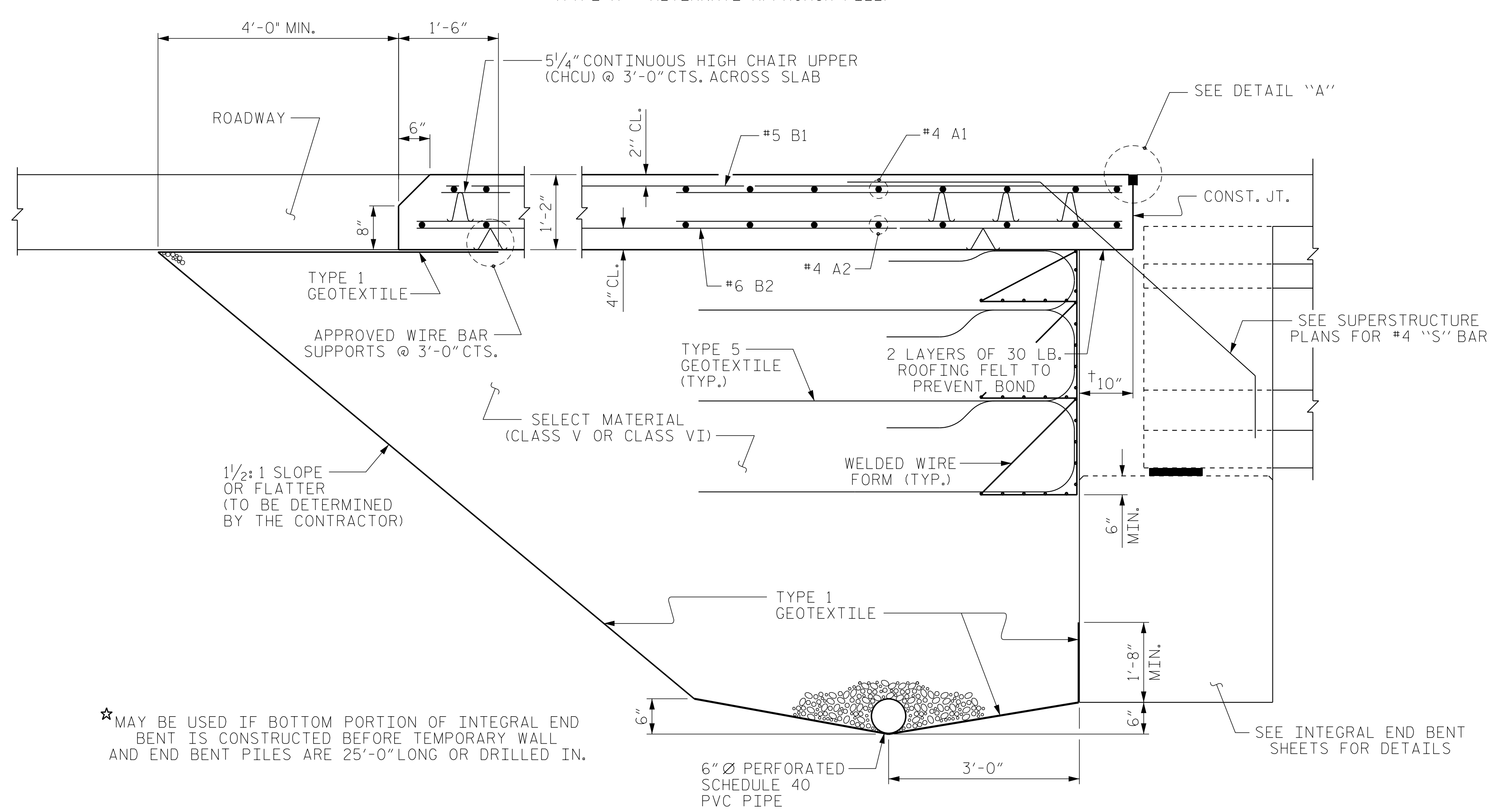
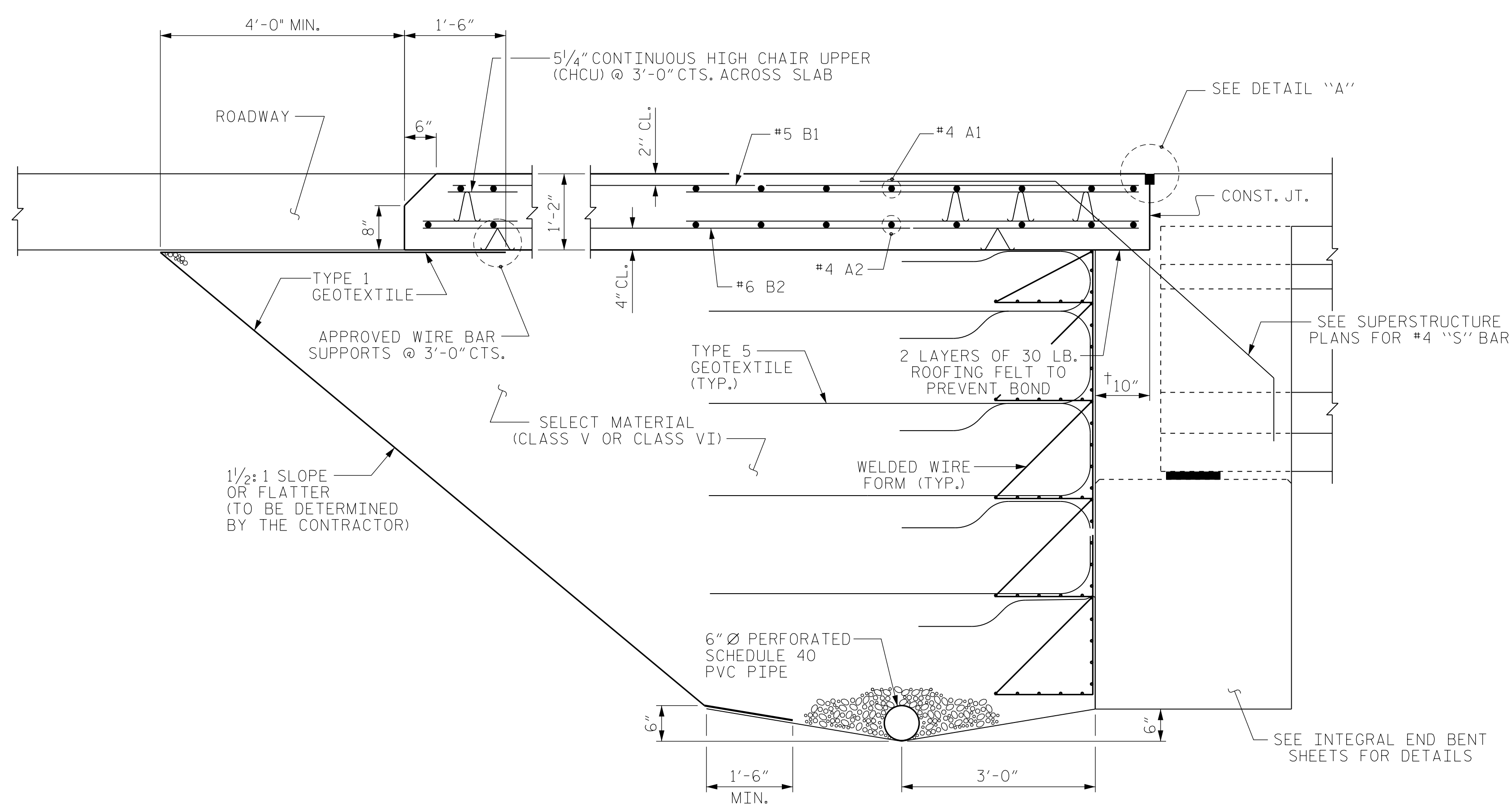
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR INTEGRAL ABUTMENT
 WITH FLEXIBLE PAVEMENT

ASSEMBLED BY : M. RAY	DATE : 11/2017
CHECKED BY : P. JACOB	DATE : 11/2017
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 10/17 MAA/THC

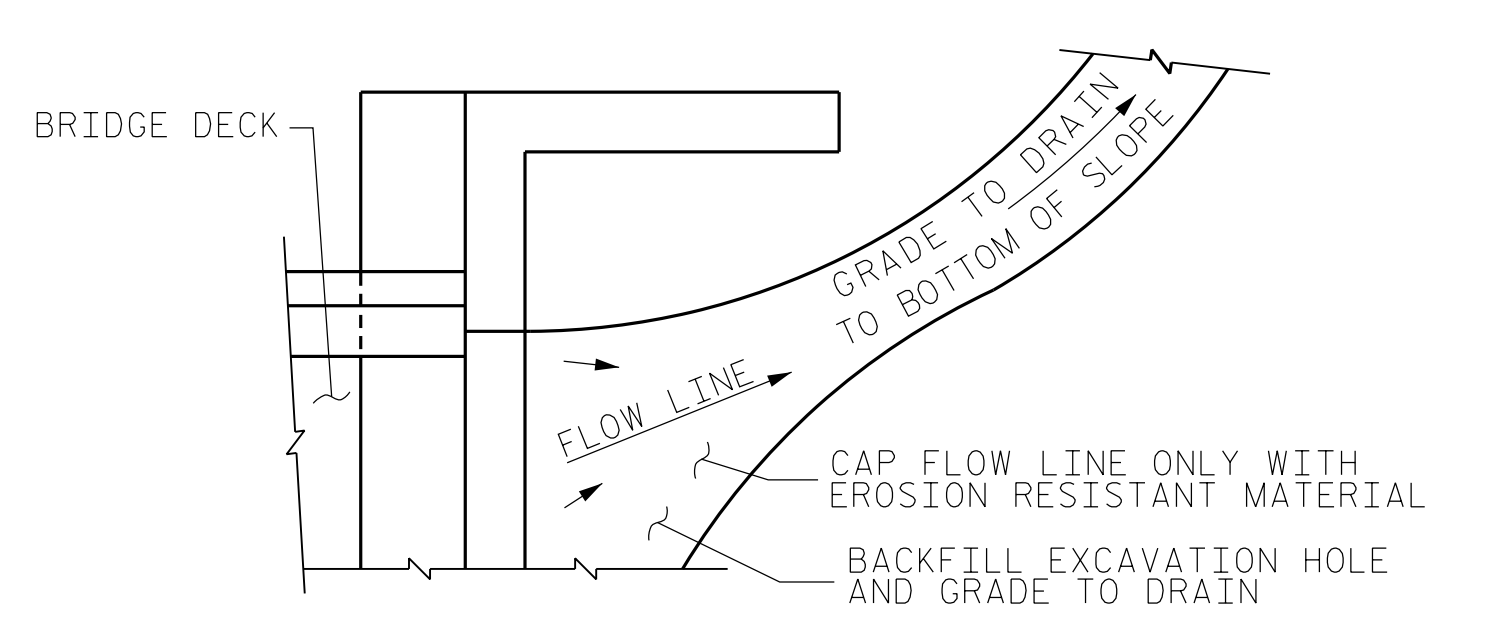
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 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License No.: F-0105

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			35



TEMPORARY BERM AND SLOPE DRAIN DETAILS
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

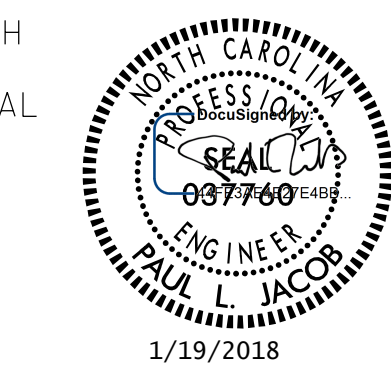


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

NOTES

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

★ MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.



ASSEMBLED BY : M. RAY	DATE : 11/2017
CHECKED BY : P. JACOB	DATE : 11/2017
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 10/17 MAA/THC

SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)

moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License No.: F-0105

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT NO. B-4491
CUMBERLAND COUNTY
STATION: 55+88.11 -L-
SHEET 2 OF 2

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

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 2018 "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 $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$ " 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 $\frac{1}{4}$ " 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 $\frac{7}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset 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 $\frac{5}{16}$ " 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 $\frac{1}{16}$ " INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN