

* = ARC LENGTH ALONG -Y15FLYBD-
 ⊕ = RADIAL DIMENSION
 † = MEASURED PERPENDICULAR TO BENT CONTROL LINE OR END BENT FILL FACE
 ⊗ = FIELD SPLICE TYPE

- ANGLES TO SHORT CHORD**
- ① 93°08'25"
 - ② 86°51'35"
 - ③ 93°51'23"
 - ④ 86°08'37"
 - ⑤ 93°27'09"
 - ⑥ 86°32'51"

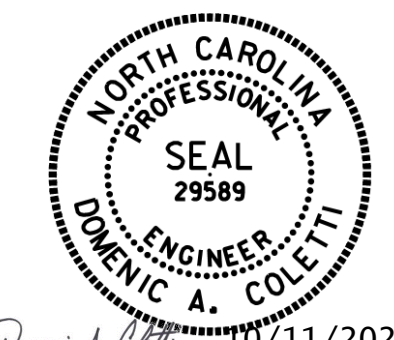
NOTE:
 SEE SHEET "SUPERSTRUCTURE FRAMING PLAN UNIT 1" FOR STRUCTURAL STEEL NOTES

FRAMING PLAN - UNIT 2

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE FRAMING PLAN UNIT 2



Dominic A. Coletti 10/11/2021

REVISIONS						SHEET NO. S05-031
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 116
2	--	--	4	--	--	

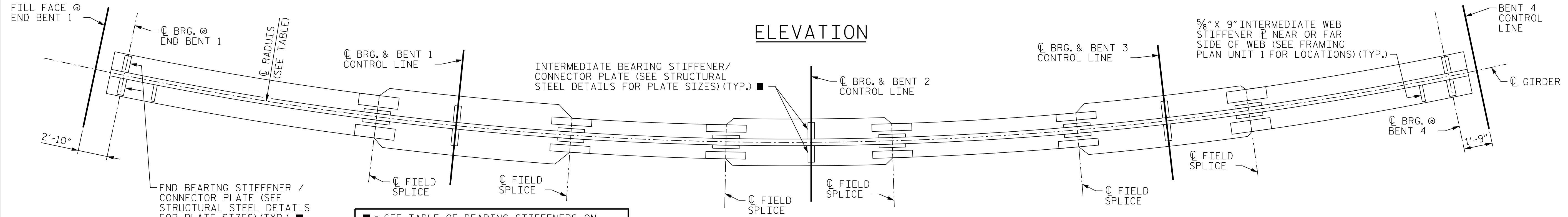
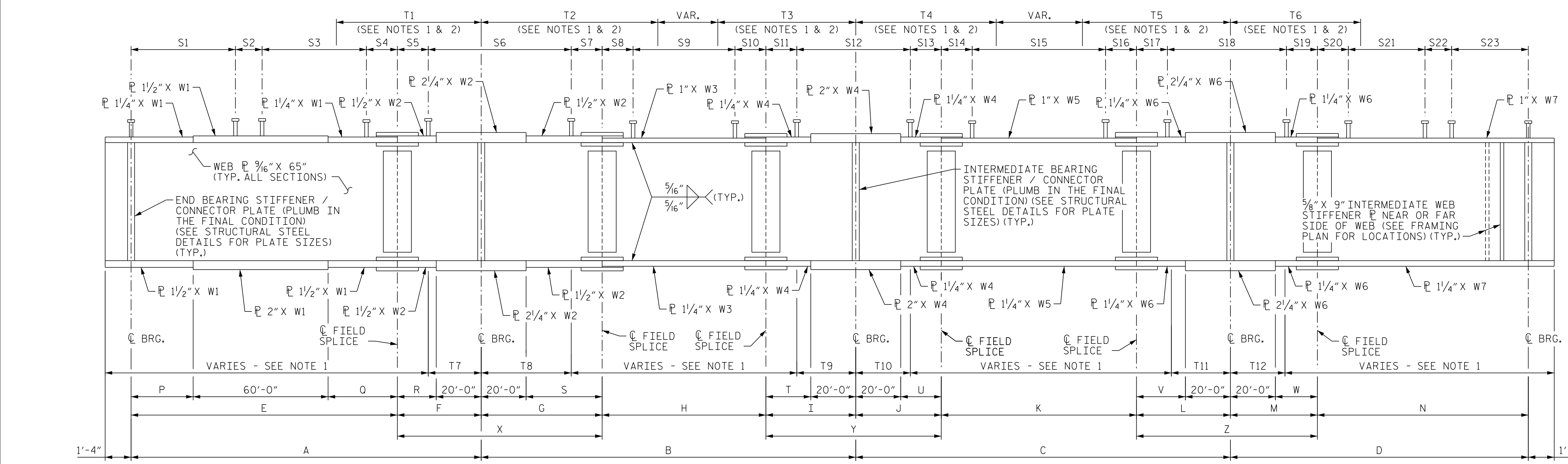
HDR HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLOT DRIVER: NCDOT... PENTABLE: NCDOT... STRUCTURES DEFAULT PEN.tbl
 USER: PPETERSO DATE: 10/11/2021 TIME: 8:24:54 AM
 FILE: ... \SUPERS

DES BY: <u>A. MILLER</u>	DATE: <u>09/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>07/19</u>
DES CHK: <u>M. NEIHEISEL</u>	DATE: <u>09/19</u>	CHK BY: <u>D. OLDS</u>	DATE: <u>10/19</u>

NOTES
SEE "SUPERSTRUCTURE GIRDER DETAILS, UNIT 2" SHEET FOR NOTES.



ELEVATION
PLAN OF BOTTOM FLANGE

■ = SEE TABLE OF BEARING STIFFENERS ON "STRUCTURAL STEEL DETAILS" SHEET 1 OF 2.

GIRDER DIMENSIONS																										
GIRDER	CL RADIUS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
1	1538'-0"	161'-9 3/4"	166'-7 3/8"	166'-7 3/8"	141'-2 1/16"	124'-10 1/8"	36'-11 5/8"	53'-2 7/8"	73'-11 1/4"	39'-5 1/4"	37'-5 9/16"	87'-8 5/16"	41'-4 7/8"	41'-4 7/8"	99'-9 9/16"	33'-8 5/8"	31'-1 1/2"	16'-11 5/8"	33'-2 7/8"	19'-5 1/4"	17'-5 9/16"	21'-4 7/8"	21'-4 7/8"	90'-2 1/2"	76'-10 3/16"	82'-9 3/4"
2	1550'-0"	163'-1 1/8"	167'-11"	167'-11"	142'-3 7/8"	125'-10"	37'-3 3/8"	53'-7 7/8"	74'-6 3/16"	39'-8 5/16"	37'-9 1/16"	88'-5 3/16"	41'-8 3/4"	41'-8 3/4"	100'-7 1/8"	34'-2 3/4"	31'-7 1/4"	17'-3 1/8"	33'-7 7/8"	19'-8 5/16"	17'-9 1/16"	21'-8 3/4"	21'-8 3/4"	90'-11"	77'-6"	83'-5 1/2"
3	1562'-0"	164'-4 9/16"	169'-2 5/8"	169'-2 5/8"	143'-5 1/4"	126'-10"	37'-6 9/16"	54'-0 3/16"	75'-1 3/16"	40'-0 5/8"	38'-0 9/16"	89'-1 1/16"	42'-0 5/8"	42'-0 5/8"	101'-4 5/8"	34'-9 1/16"	32'-0 5/16"	17'-6 9/16"	34'-0 1/16"	20'-0 5/8"	18'-0 9/16"	22'-0 5/8"	22'-0 5/8"	91'-7 3/8"	78'-1 3/16"	84'-1 1/4"
4	1574'-0"	165'-8"	170'-6 3/16"	170'-6 3/16"	144'-6 5/8"	127'-9 5/16"	37'-10 1/16"	54'-5 1/16"	75'-8 1/16"	40'-4 5/16"	38'-4 1/16"	89'-9 5/8"	42'-4 1/2"	42'-4 1/2"	102'-2 1/8"	35'-3 1/4"	32'-6 1/16"	17'-10 1/16"	34'-5 1/16"	20'-4 1/16"	18'-4 1/16"	22'-4 1/2"	22'-4 1/2"	92'-3 7/8"	78'-8 3/8"	84'-9"

STUD SPACING DIMENSIONS												
GIRDER	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	
1	22 SPA. @ 9"	9"	97 SPA. @ 1'-1"	2'-6 1/16"	2'-7 1/4"	85 SPA. @ 1'-0"	2'-7 1/4"	1'-9 9/8"	65 SPA. @ 1'-1"	1'-9 9/8"	1'-11 7/16"	
2	18 SPA. @ 11"	9"	98 SPA. @ 1'-1"	2'-5 1/16"	2'-8"	79 SPA. @ 1'-1"	2'-8"	2'-0 5/8"	65 SPA. @ 1'-1"	2'-0 5/8"	1'-11"	
3	18 SPA. @ 11"	9"	99 SPA. @ 1'-1"	2'-4"	2'-5 1/16"	80 SPA. @ 1'-1"	2'-5 1/16"	2'-4 1/16"	65 SPA. @ 1'-1"	2'-4 1/16"	2'-2 5/8"	
4	26 SPA. @ 9"	8 1/2"	101 SPA. @ 1'-0 1/2"	2'-4 5/16"	2'-4 5/16"	84 SPA. @ 1'-0 1/2"	2'-4 5/16"	1'-10 3/16"	69 SPA. @ 1'-0 1/2"	1'-10 3/16"	1'-11 1/16"	

GIRDER	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
1	73 SPA. @ 1'-0"	1'-11 7/16"	2'-2"	77 SPA. @ 1'-1"	2'-2"	2'-4 7/8"	78 SPA. @ 1'-0"	2'-4 7/8"	2'-0"	76 SPA. @ 1'-1"	5 9/16"	20 SPA. @ 9"
2	68 SPA. @ 1'-1"	1'-11"	1'-11 7/16"	78 SPA. @ 1'-1"	1'-11 7/16"	2'-2 1/4"	73 SPA. @ 1'-1"	2'-2 1/4"	2'-0"	76 SPA. @ 1'-1"	8 1/16"	17 SPA. @ 11"
3	68 SPA. @ 1'-1"	2'-2 5/8"	2'-3 1/16"	78 SPA. @ 1'-1"	2'-3 1/16"	2'-6 1/8"	73 SPA. @ 1'-1"	2'-6 1/8"	2'-0"	76 SPA. @ 1'-1"	6 5/8"	18 SPA. @ 11"
4	78 SPA. @ 11 1/2"	1'-11 1/16"	1'-10 3/16"	86 SPA. @ 1'-0"	1'-10 3/16"	2'-4 1/2"	80 SPA. @ 1'-0"	2'-4 1/2"	2'-2"	77 SPA. @ 1'-1"	10 1/16"	21 SPA. @ 9"

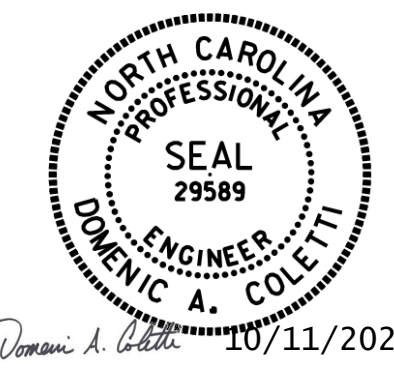
LIMITS OF TENSION FLANGES FOR CHARPY V-NOTCH TESTS												
GIRDER	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
1	57'-0"	83'-3"	83'-3"	62'-0"	65'-0"	69'-0"	29'-0"	34'-0"	26'-7"	26'-0"	30'-8"	27'-6"
2	53'-0"	72'-0"	61'-0"	55'-0"	59'-0"	55'-0"	30'-5"	36'-0"	27'-11"	27'-0"	31'-11"	28'-7"
3	54'-0"	78'-0"	65'-0"	57'-0"	62'-0"	56'-0"	29'-9"	37'-0"	27'-3"	26'-0"	32'-3"	28'-8"
4	57'-0"	85'-3"	85'-3"	64'-0"	67'-0"	60'-0"	29'-0"	38'-0"	27'-6"	25'-0"	32'-6"	27'-10"

GIRDER FLANGE WIDTHS							
GIRDER	FLANGE	W1	W2	W3	W4	W5	W7
1, 2 & 3	TOP	20"	28"	16"	22"	16"	20"
	BOTTOM	24"	32"	24"	28"	24"	26"
4	TOP	24"	32"	18"	28"	18"	22"
	BOTTOM	28"	36"	26"	30"	26"	30"

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

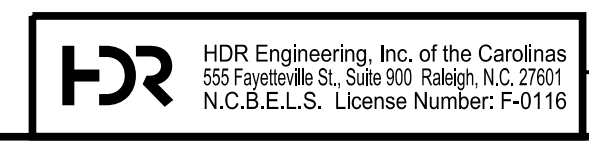
SUPERSTRUCTURE GIRDER DETAILS UNIT 1



REVISIONS						SHEET NO.	
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2	--	--	4	--	--	116	

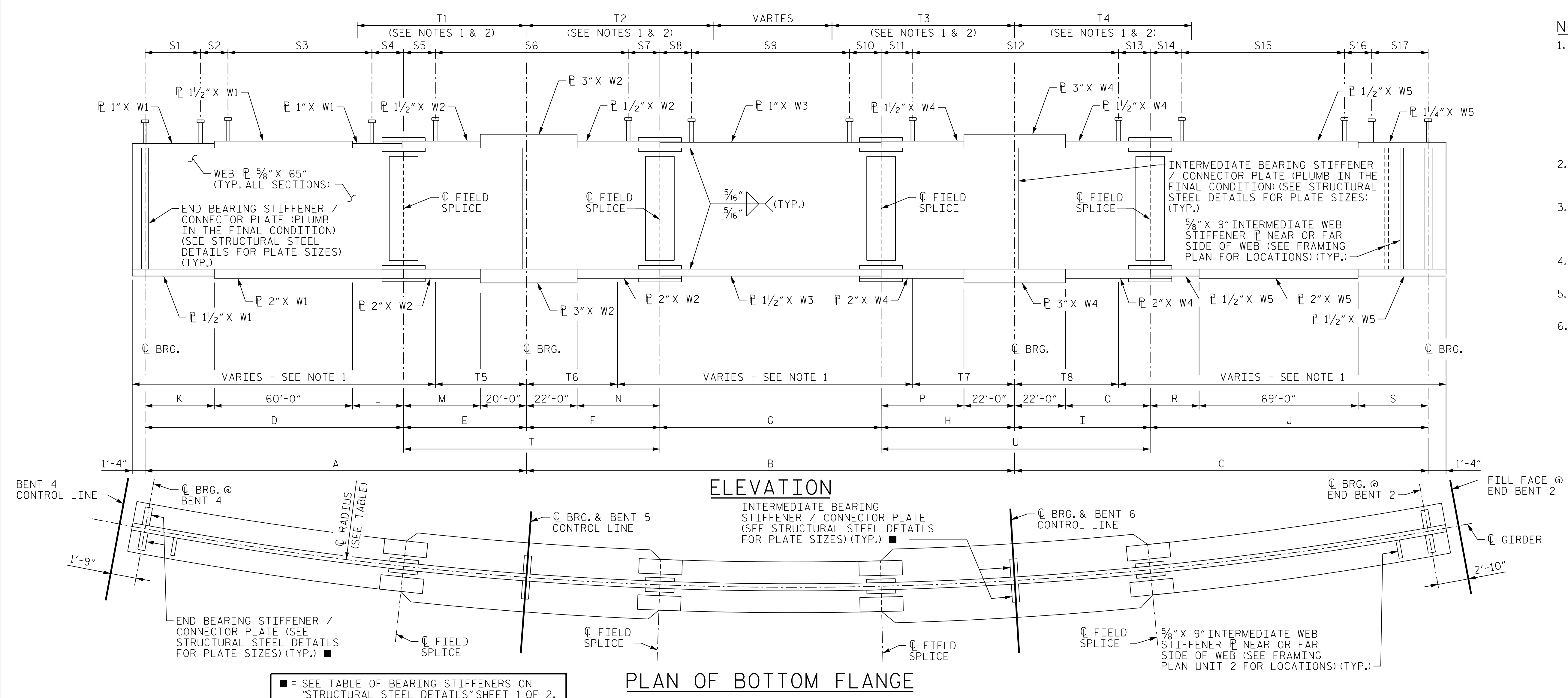
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 TIME: 8:22:01 AM

DES BY: S. NIFONG DATE: 07/19 DWG BY: B. PETERSON DATE: 07/19
 DES CHK: G. SCHMITZ DATE: 07/19 CHK BY: S. NIFONG DATE: 08/19



10/11/2021
 DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

- NOTES**
1. CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS, ALL WEB PLATES, AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.
 2. NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.
 3. DIMENSIONS ARE HORIZONTAL ARC DIMENSIONS ALONG THE C OF GIRDER. NO CORRECTIONS HAVE BEEN MADE TO ADJUST FOR THE DISTANCE ALONG THE GRADE.
 4. FOR SHEAR CONNECTOR TRANSVERSE SPACING, SEE "STRUCTURAL STEEL DETAILS" SHEET.
 5. FOR CHARPY V-NOTCH TEST, SEE SPECIAL PROVISIONS.
 6. SEE SHEET "FRAMING PLAN - UNIT 1" OR "FRAMING PLAN - UNIT 2" FOR FIELD SPLICE TYPES.



STUD SPACING DIMENSIONS

GIRDER	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17
1	44 SPA. @ 9"	10 1/2"	69 SPA. @ 1'-1 1/2"	2'-7 1/8"	2'-2 1/16"	94 SPA. @ 1'-1 1/2"	2'-0 1/16"	2'-4 1/16"	88 SPA. @ 1'-0"	2'-4 1/16"	2'-5 1/8"	102 SPA. @ 1'-1"	2'-5 1/8"	2'-6 3/16"	73 SPA. @ 1'-2"	10"	43 SPA. @ 10"
2	36 SPA. @ 11"	8"	70 SPA. @ 1'-1 1/2"	2'-6 5/16"	2'-3 1/16"	88 SPA. @ 1'-2 1/2"	2'-1 1/16"	2'-2 3/8"	89 SPA. @ 1'-0"	2'-2 3/8"	2'-5 1/4"	99 SPA. @ 1'-1 1/2"	2'-5 1/4"	2'-8 9/16"	92 SPA. @ 1'-1 1/2"	9 1/2"	20 SPA. @ 11"
3	38 SPA. @ 11"	8"	69 SPA. @ 1'-1 1/2"	2'-9 5/16"	2'-2"	89 SPA. @ 1'-2 1/2"	1'-11 3/16"	2'-3 1/4"	86 SPA. @ 1'-0 1/2"	2'-3 1/4"	2'-3 3/8"	100 SPA. @ 1'-1 1/2"	2'-3 3/8"	2'-9 1/2"	93 SPA. @ 1'-1 1/2"	7"	20 SPA. @ 11"
4	45 SPA. @ 9"	10"	74 SPA. @ 1'-1"	2'-0 5/8"	2'-0"	100 SPA. @ 1'-1"	2'-2"	1'-11 1/16"	91 SPA. @ 1'-0"	1'-11 1/16"	2'-1 9/16"	109 SPA. @ 1'-0 1/2"	2'-4 9/16"	2'-4 7/8"	78 SPA. @ 1'-1 1/2"	6"	44 SPA. @ 10"

GIRDER DIMENSIONS

GIRDER	C RADIUS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U
1	1538'-0"	166'-10 1/16"	207'-0 7/16"	182'-6 3/16"	114'-1 1/8"	52'-8 5/16"	57'-2 3/16"	92'-8 1/16"	57'-2 3/16"	58'-2"	124'-4 3/16"	33'-9 3/4"	20'-3 3/8"	32'-8 5/16"	35'-2 3/16"	35'-2 3/16"	36'-2"	19'-2 3/4"	36'-1 1/16"	109'-11 1/8"	115'-4 3/16"
2	1550'-0"	168'-1 7/8"	208'-7 7/8"	183'-11 9/16"	115'-0"	53'-1 1/8"	57'-7 9/16"	93'-4 3/4"	57'-7 9/16"	58'-7 7/16"	125'-4 1/8"	34'-3 3/8"	20'-8 1/8"	33'-1 7/8"	35'-7 9/16"	35'-7 9/16"	36'-7 7/16"	19'-7 13/16"	36'-8 5/16"	110'-9 7/16"	116'-3"
3	1562'-0"	169'-5 5/8"	210'-3 1/4"	185'-4 7/8"	115'-10 3/16"	53'-6 13/16"	58'-0 7/8"	94'-1 1/2"	58'-0 7/8"	59'-0 15/16"	126'-3 15/16"	34'-10"	21'-0 13/16"	33'-6 13/16"	36'-0 7/8"	36'-0 7/8"	37'-0 15/16"	20'-0 13/16"	37'-3 3/8"	111'-7 11/16"	117'-1 13/16"
4	1574'-0"	170'-9 7/16"	211'-10 5/8"	186'-10 1/4"	116'-9 11/16"	53'-11 3/4"	58'-6 1/4"	94'-10 1/8"	58'-6 1/4"	59'-6 3/8"	127'-3 7/8"	35'-4 3/16"	21'-5 1/2"	33'-11 3/4"	36'-6 1/4"	36'-6 1/4"	37'-6 3/8"	20'-5 7/8"	37'-10"	112'-6"	118'-0 5/8"

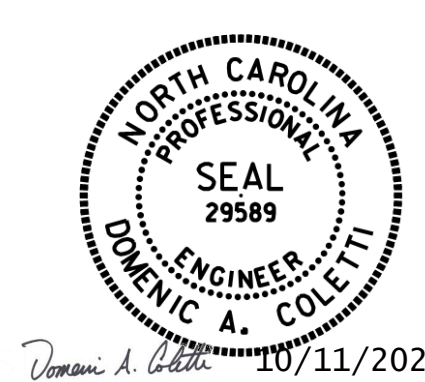
LIMITS OF TENSION FLANGES FOR CHARPY V-NOTCH TESTS

GIRDER	T1	T2	T3	T4	T5	T6	T7	T8
1	68' - 0"	75' - 0"	79' - 0"	67' - 0"	35' - 0"	39' - 0"	41' - 0"	36' - 0"
2	63' - 0"	70' - 0"	76' - 0"	62' - 0"	36' - 0"	40' - 0"	43' - 0"	38' - 0"
3	64' - 0"	74' - 0"	80' - 0"	64' - 0"	35' - 0"	41' - 0"	45' - 0"	36' - 0"
4	67' - 0"	81' - 0"	89' - 0"	66' - 0"	34' - 0"	41' - 0"	44' - 0"	36' - 0"

GIRDER FLANGE WIDTHS

GIRDER	FLANGE	W1	W2	W3	W4	W5
1, 2 & 3	TOP	22"	26"	20"	28"	26"
	BOTTOM	24"	32"	24"	34"	30"
4	TOP	24"	28"	20"	32"	30"
	BOTTOM	28"	32"	28"	36"	36"

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE GIRDER DETAILS
 UNIT 2**

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	SOS-033	
1	--	--	3	--	--	TOTAL SHEETS 116	
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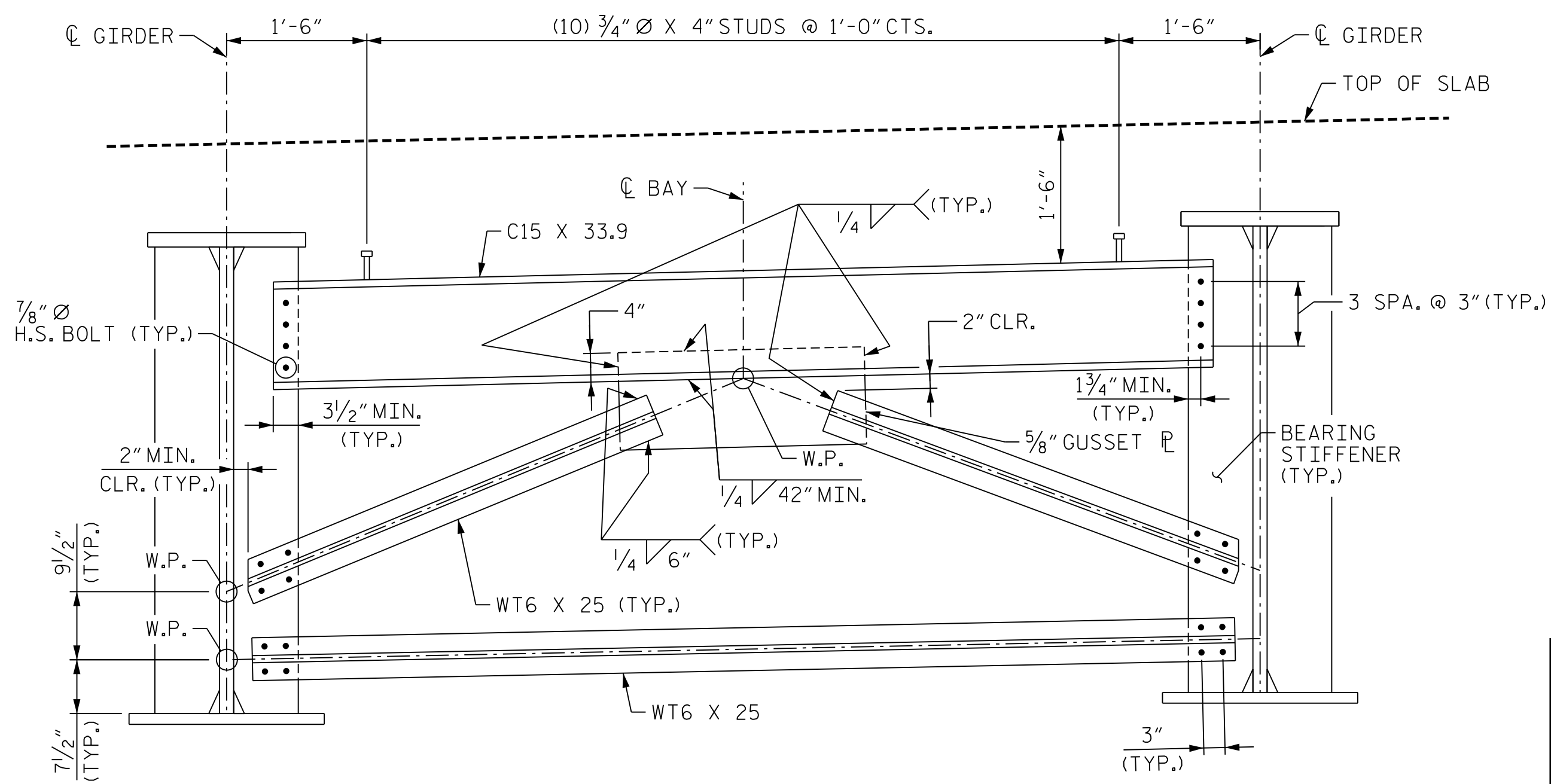
10/11/2021

DES BY: A. MILLER DATE: 09/19 DWG BY: B. PETERSON DATE: 07/19
 DES CHK: M. NEIHEISEL DATE: 09/19 CHK BY: D. OLDS DATE: 10/19

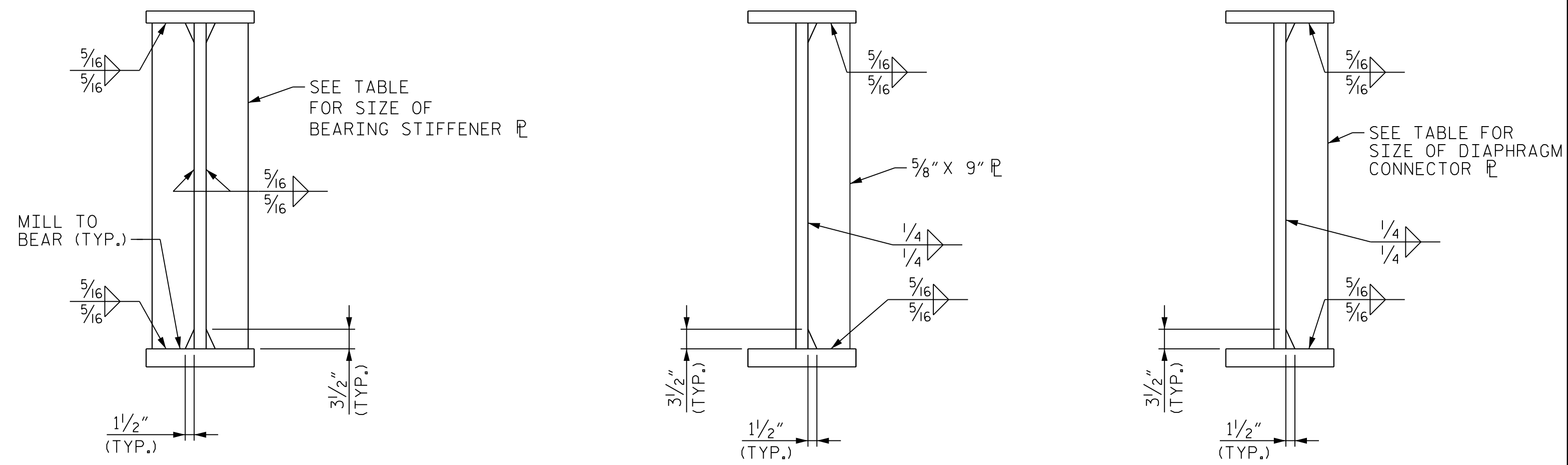


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PLOT DRIVER: NCDOT... DATE: 10/17/2021



END DIAPHRAGMS (D1)



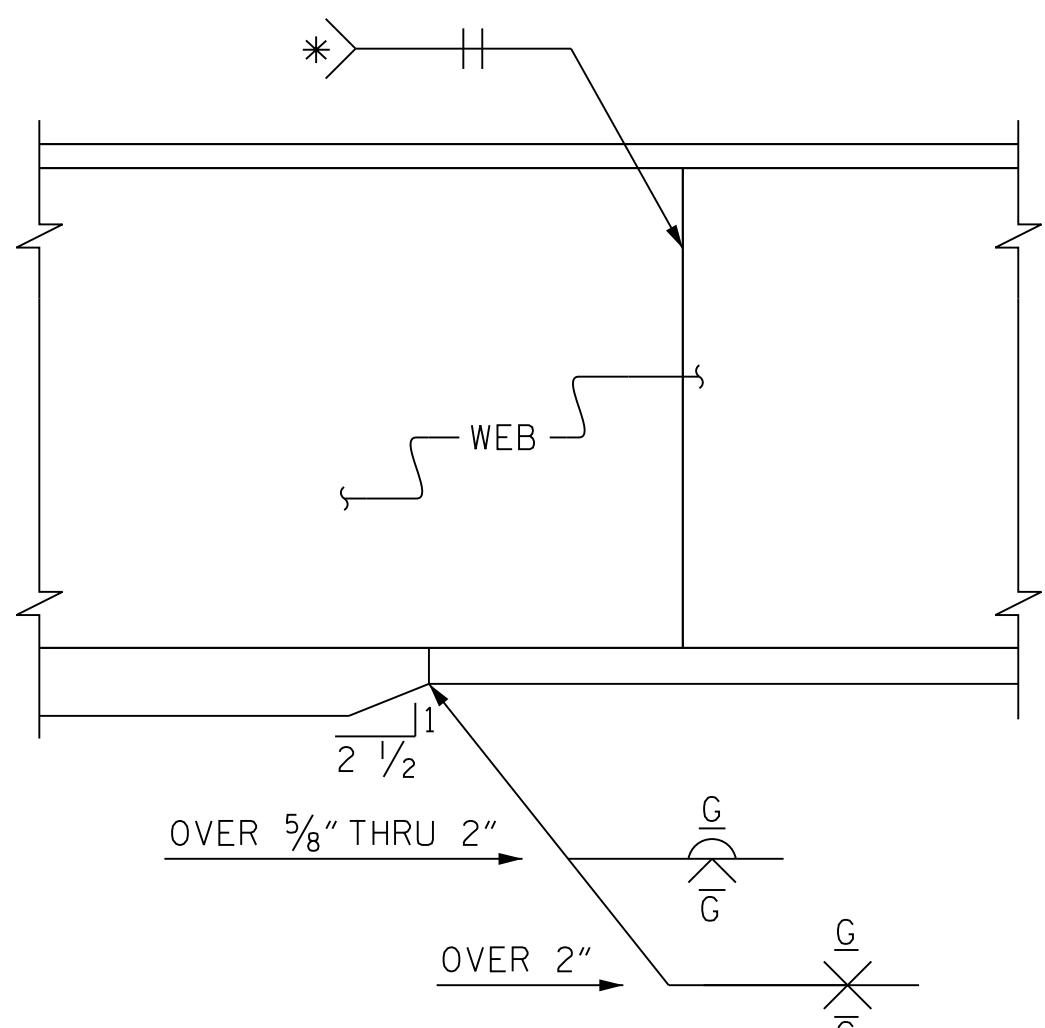
BEARING STIFFENER

NOTE: BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOT. FLANGE

BEARING STIFFENERS	
SIZE	LOCATIONS *
1" X 11"	END BENT 1, BENT 4 AH
1 1/2" X 15 1/2"	BENT 1, BENT 5, BENT 6
1 1/8" X 12"	BENT 2, BENT 3, BENT 4 BK
1 1/4" X 14"	END BENT 2

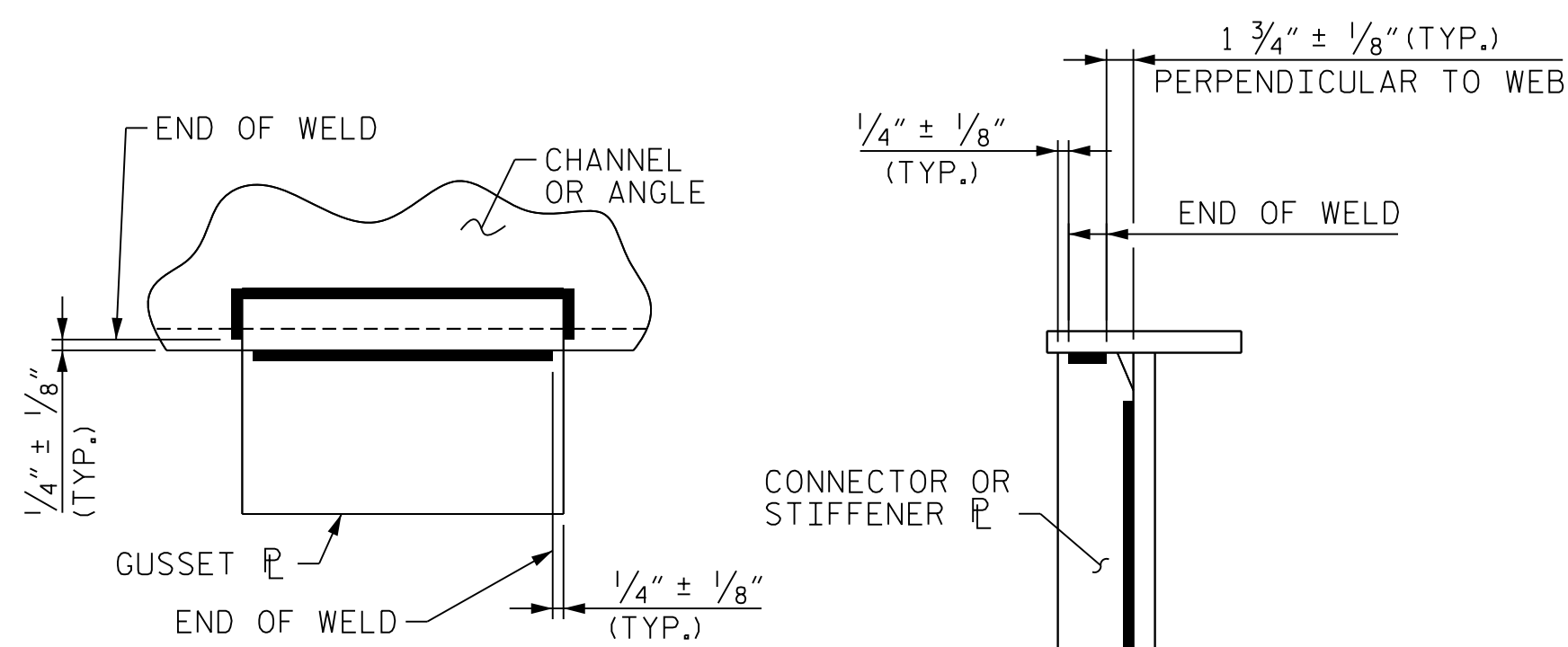
* NOTE: BK = BACK STATION
AH = AHEAD STATION

DIAPHRAGM CONNECTOR PLATES	
MAXIMUM FLANGE PLATE WIDTH	MIN. SIZE
≤ 34"	8 1/2" X 5/8"
36"	9" X 5/8"

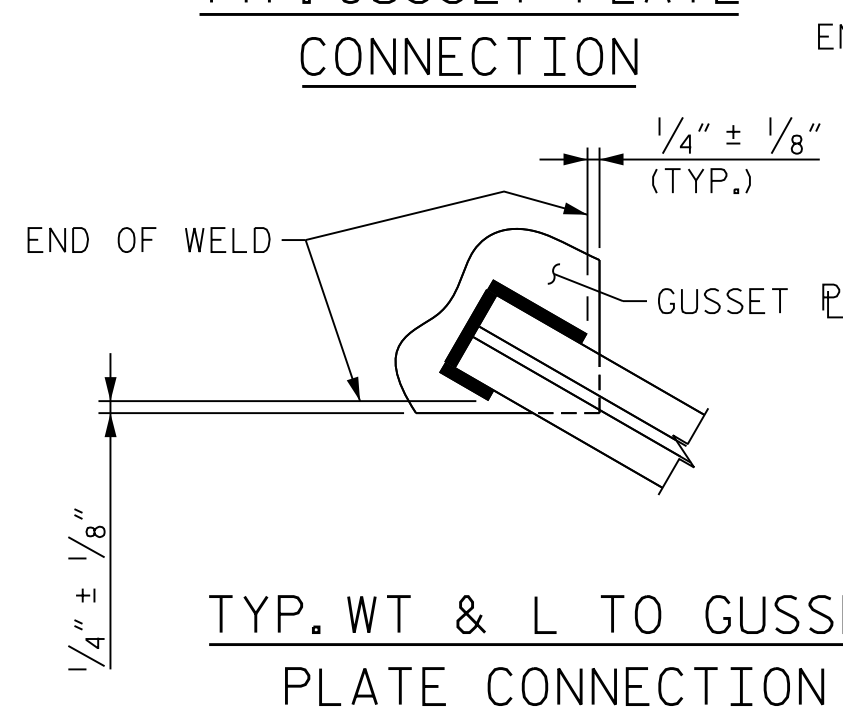


**TYPICAL FLANGE AND WEB BUTT JOINT
SHOP SPLICE DETAILS**

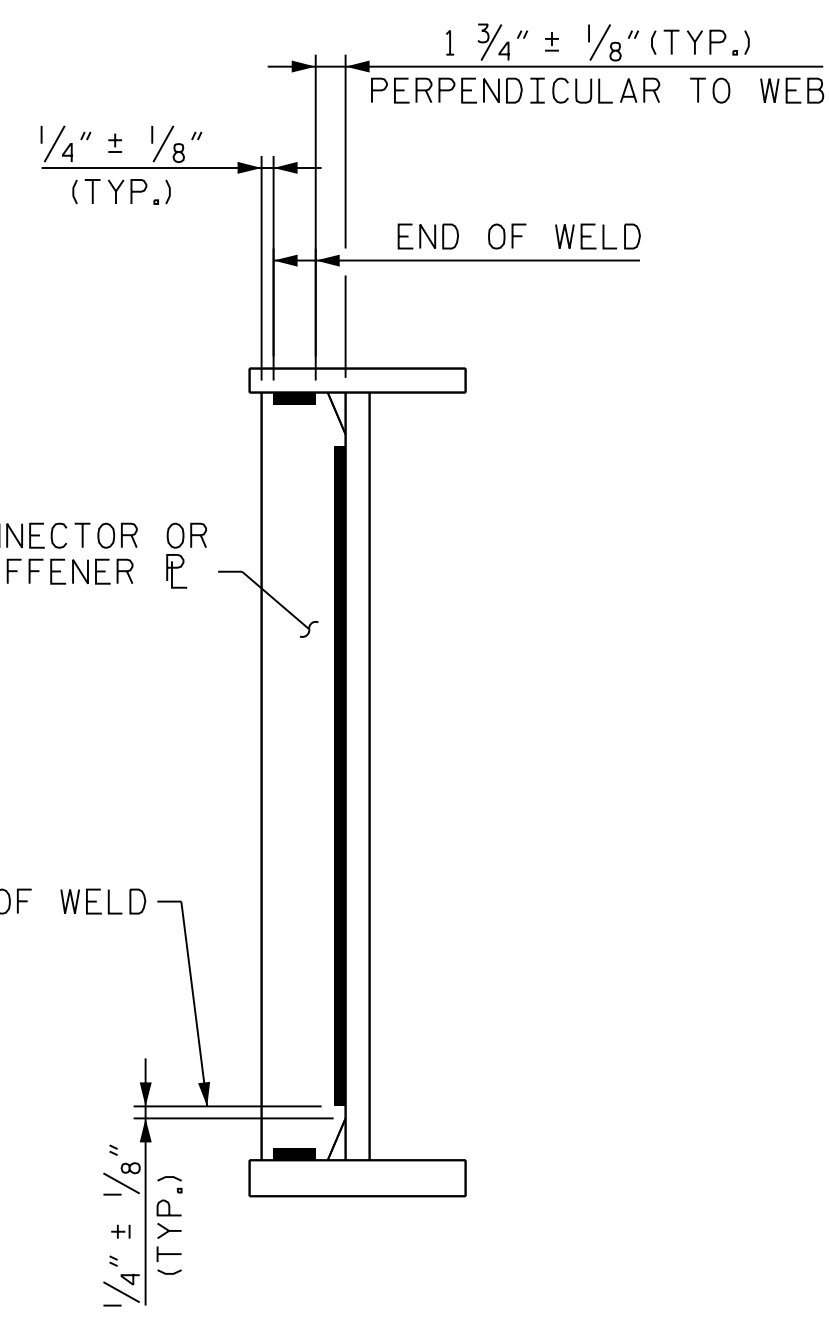
* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR BEAMS/ GIRDERS.



TYP. GUSSET PLATE CONNECTION

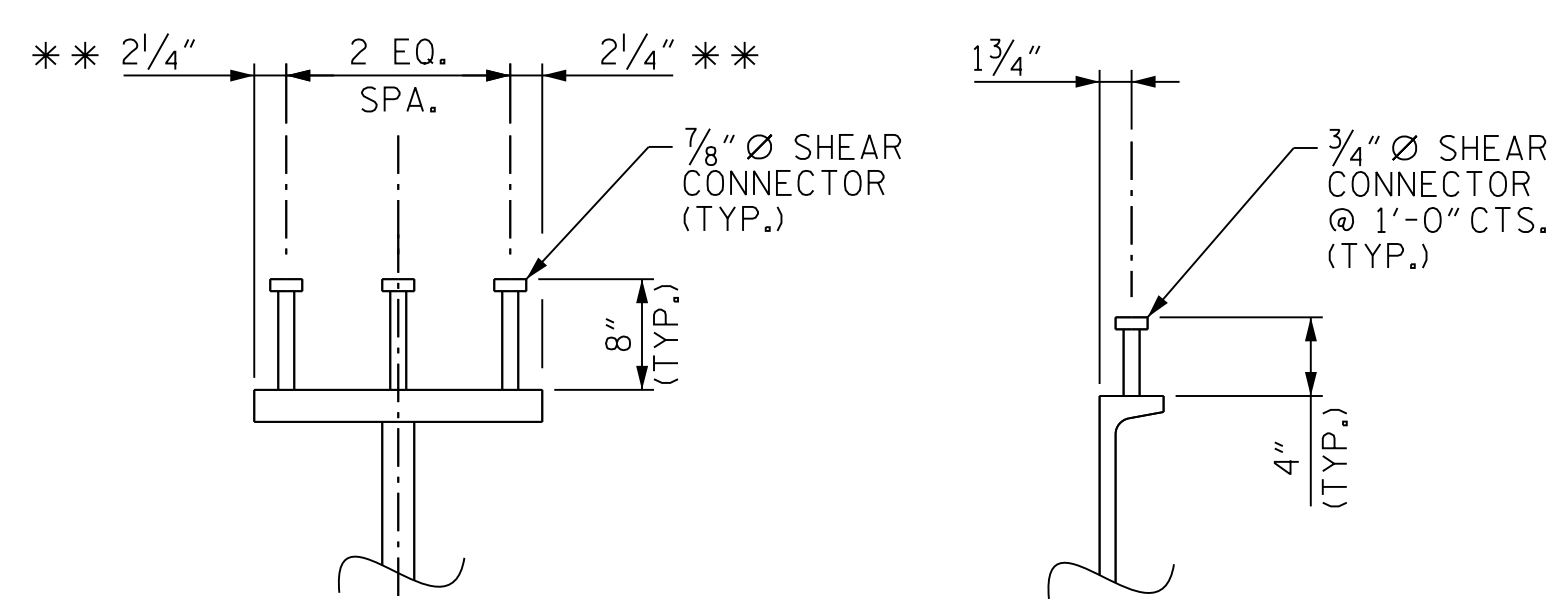


TYP. WT & L TO GUSSET PLATE CONNECTION



STIFFENER & CONNECTOR PLATE

WELD TERMINATION DETAILS



GIRDER SHEAR CONNECTORS

DIAPHRAGM SHEAR CONNECTORS

SHEAR CONNECTOR DETAILS

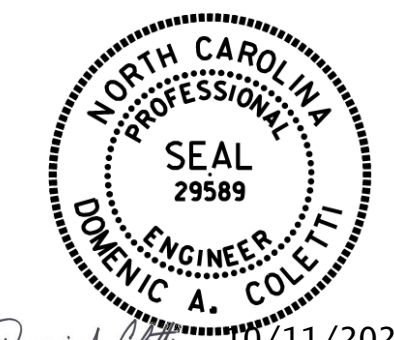
** FOR SPACING OF SHEAR CONNECTORS ON THE TOP PLATE OF FIELD SPLICES, SEE "SUPERSTRUCTURE BOLTED FIELD SPLICE DETAILS."

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS**

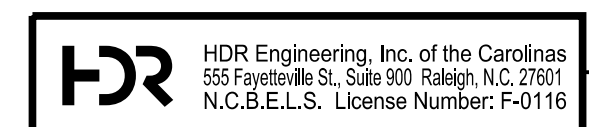


10/11/2021

REVISIONS

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

SHEET NO. S05-034
 TOTAL SHEETS 116

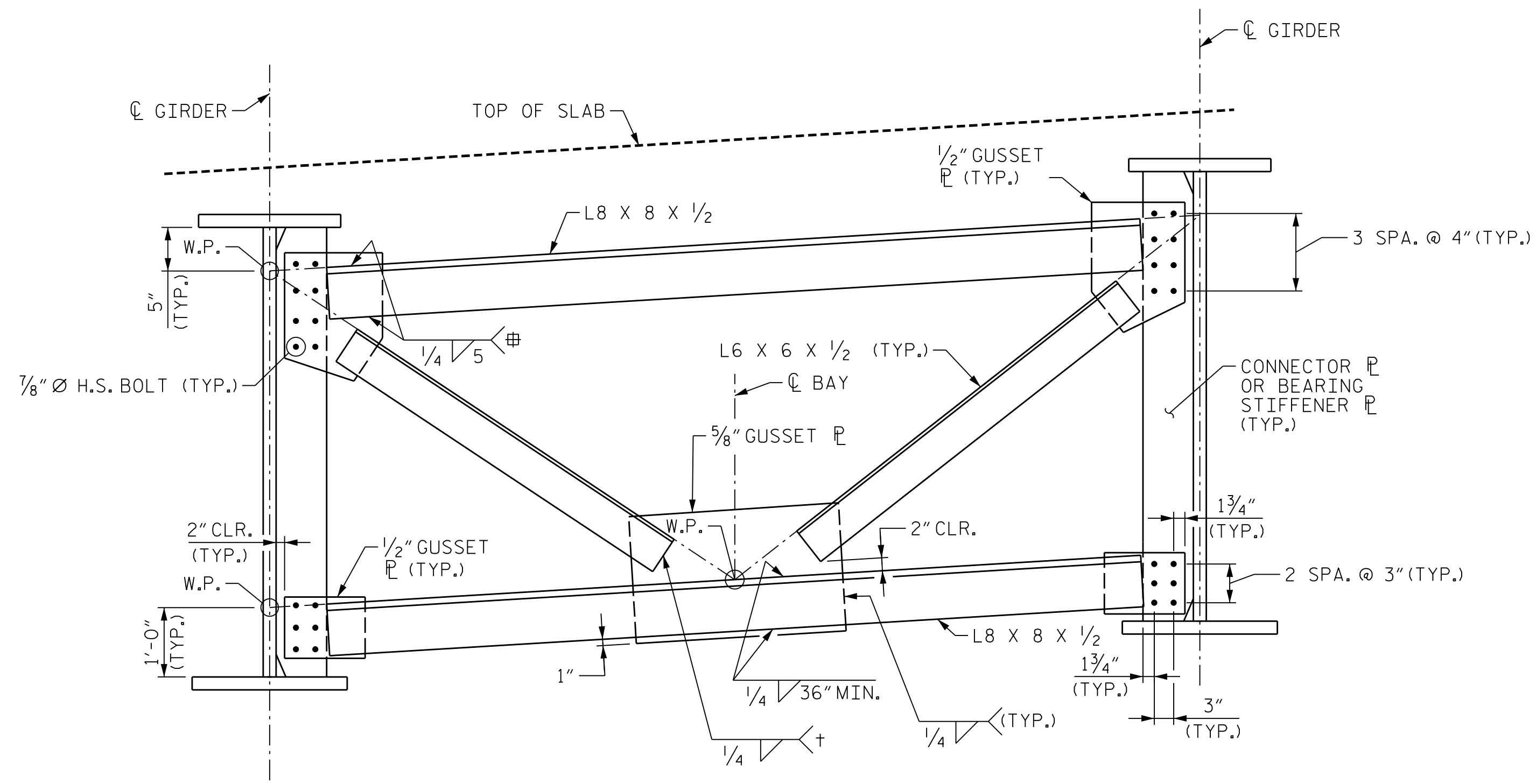


HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

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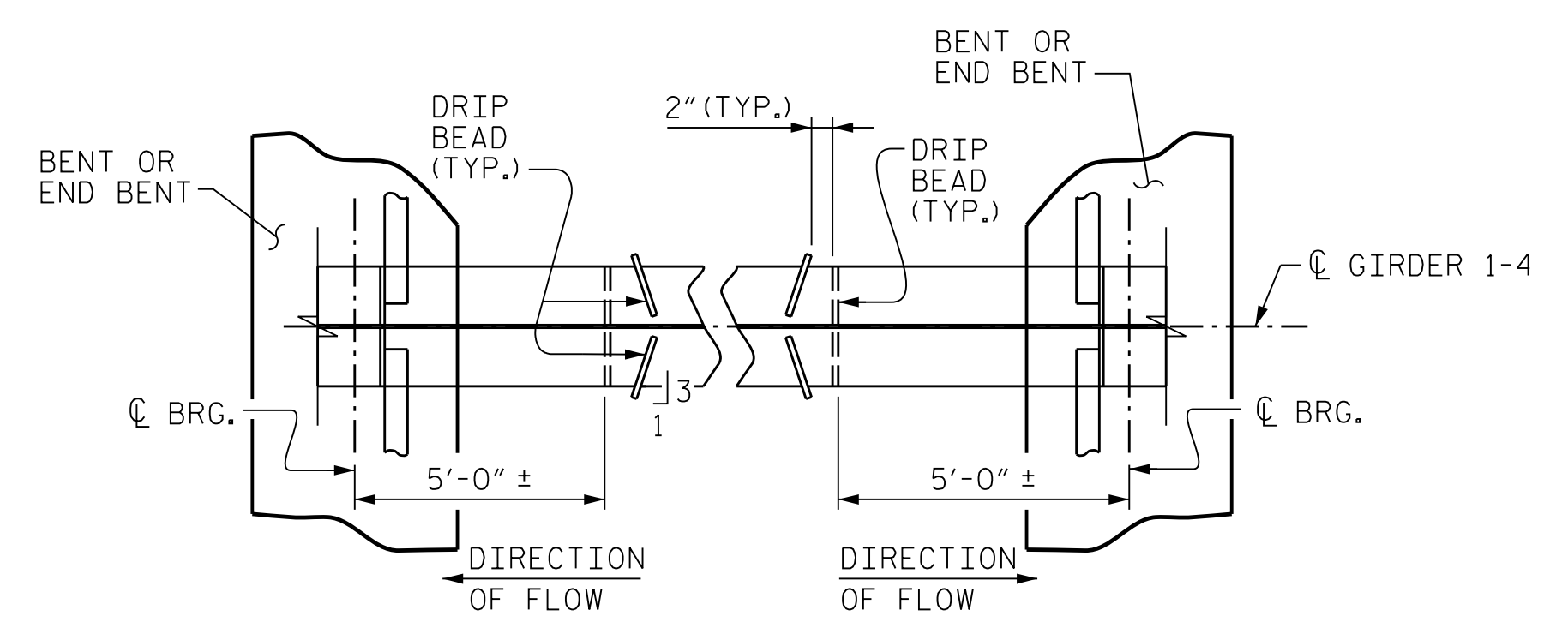
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 USER: PETERSON...
 DATE: 10/11/2021

DES BY: <u>S. NIFONG</u>	DATE: <u>07/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>07/19</u>
DES CHK: <u>G. SCHMITZ</u>	DATE: <u>07/19</u>	CHK BY: <u>G. SCHMITZ</u>	DATE: <u>08/19</u>

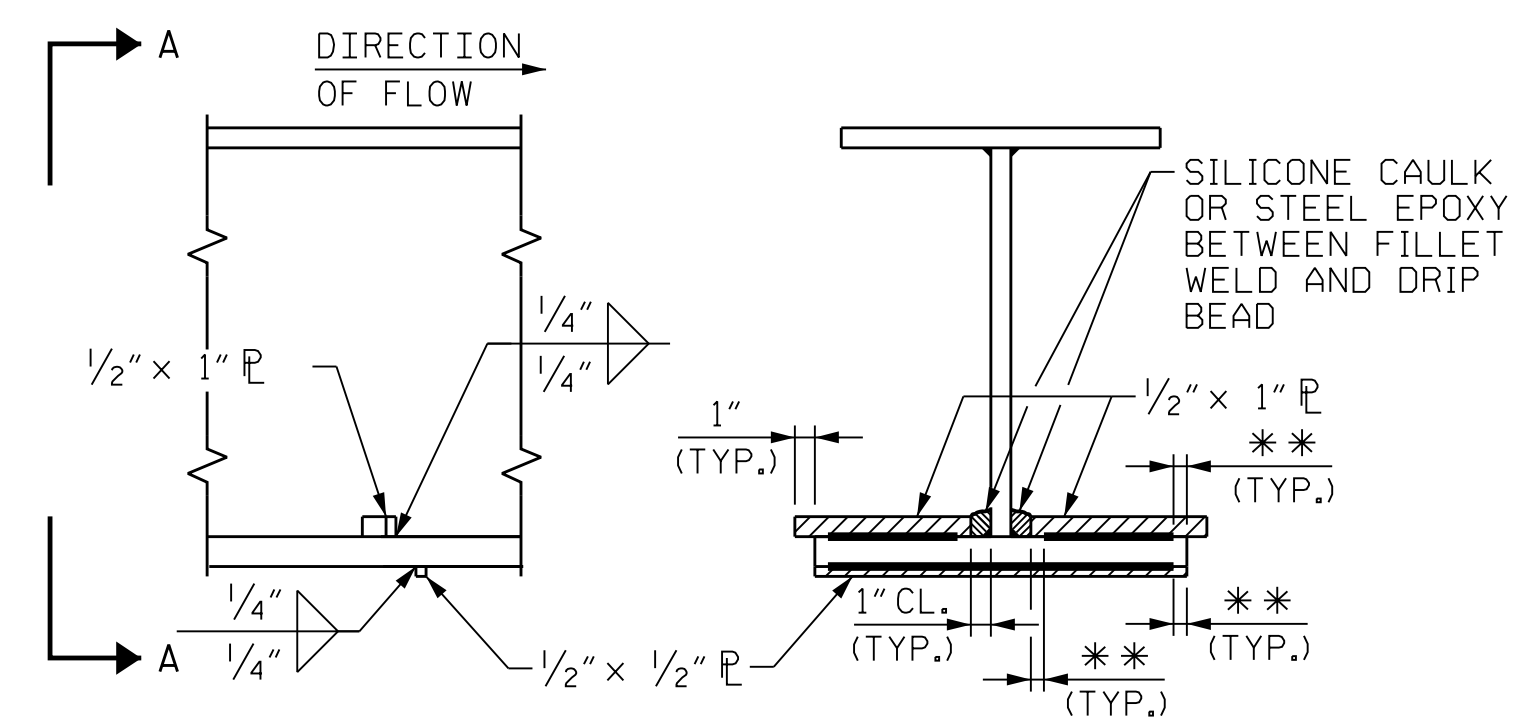


INTERMEDIATE DIAPHRAGMS AND BENT DIAPHRAGMS (D2)

⊕ = TYP, ALONG SIDES OF ALL ANGLES
 † = TYP @ ENDS OF ALL ANGLES



PART PLAN - BOTTOM FLANGE



SECTION

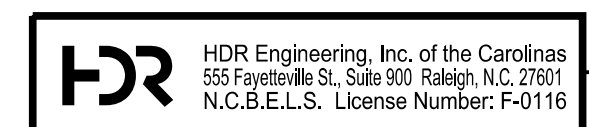
VIEW A-A

** SEE "WELD TERMINATION DETAILS"

DRIP BEAD DETAILS

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 TIME: 8:22:25 AM

DES BY: S. NIFONG	DATE: 07/19	DWG BY: B. PETERSON	DATE: 07/19
DES CHK: G. SCHMITZ	DATE: 07/19	CHK BY: G. SCHMITZ	DATE: 08/19



PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

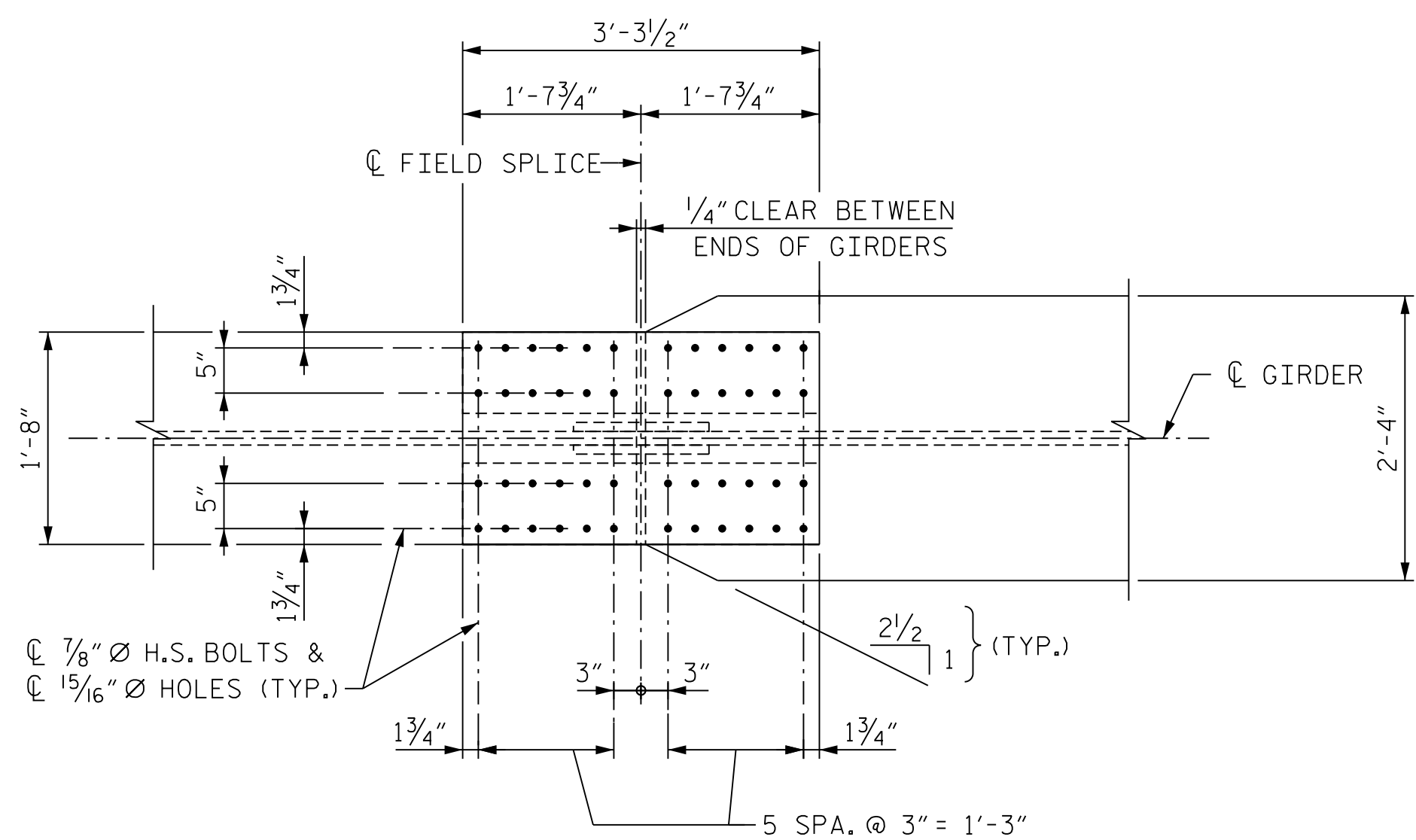
SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE STRUCTURAL STEEL DETAILS

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

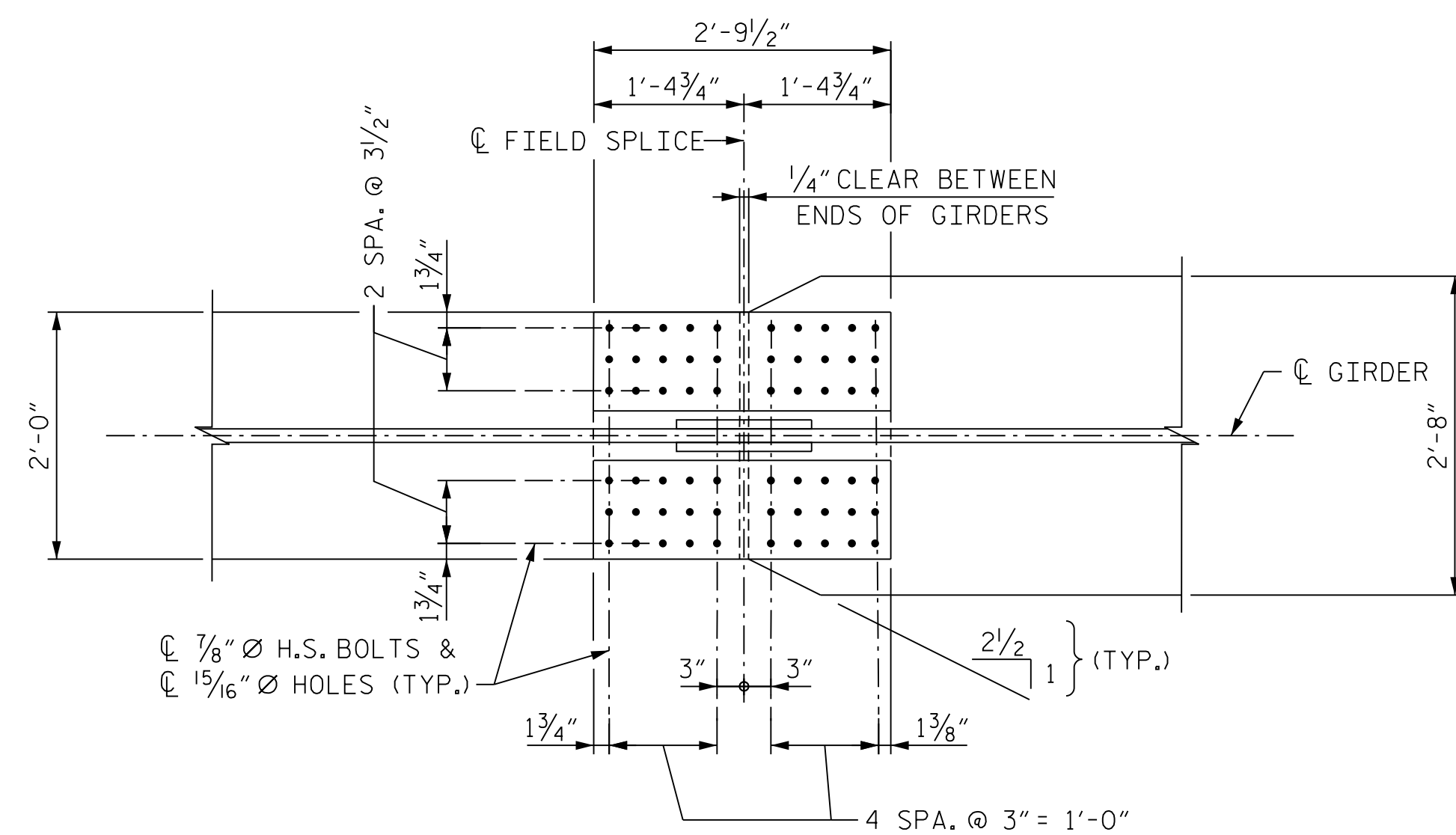
SHEET NO. <u>S05-035</u>
TOTAL SHEETS <u>116</u>



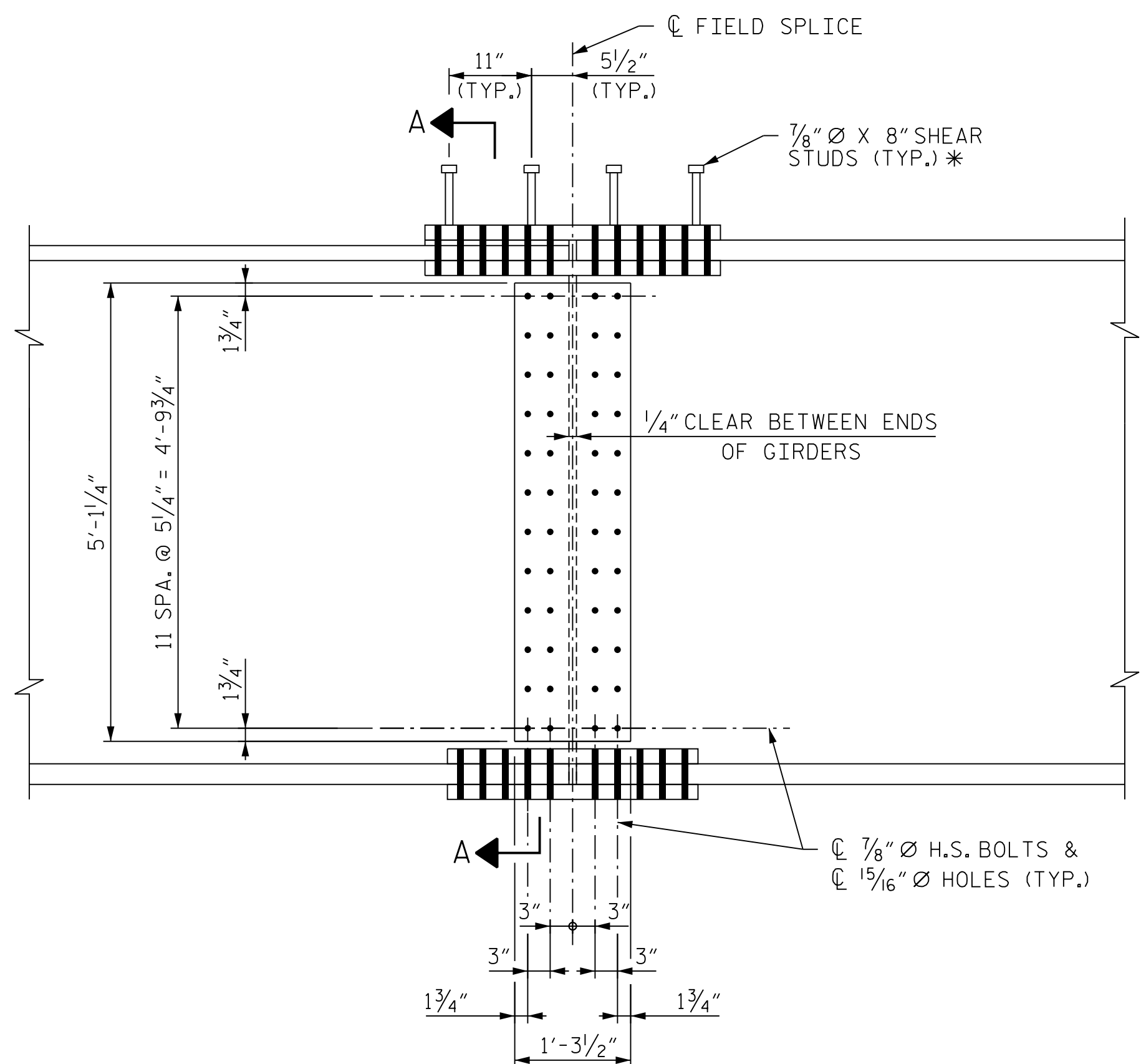
PLAN (TOP OF TOP FLANGE)

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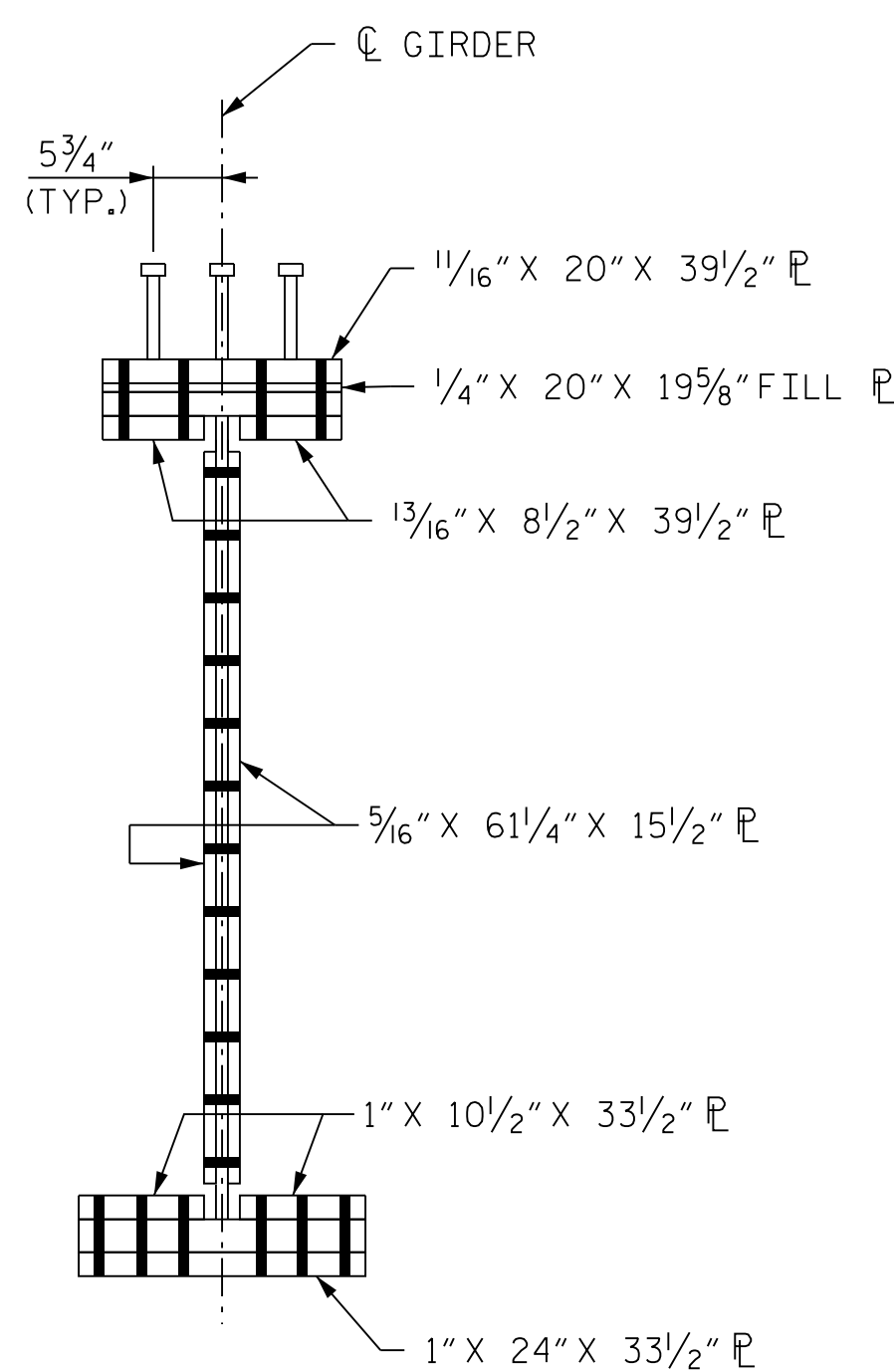
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-

SHEET 1 OF 14

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
BOLTED FIELD SPLICE
DETAILS - TYPE "A"**



10/11/2021

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
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2	--	--	4	--	--

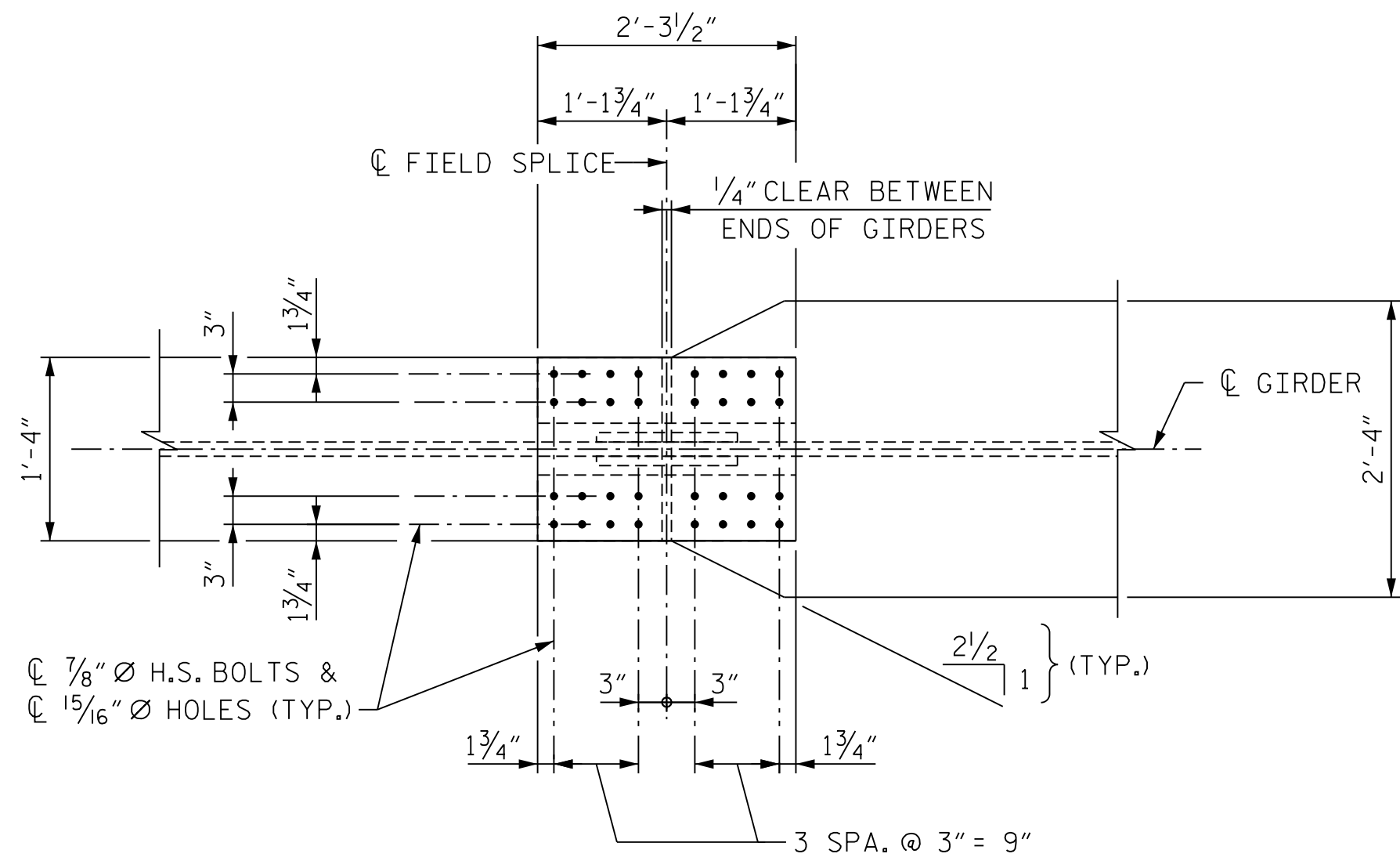
SHEET NO.
S05-036
TOTAL SHEETS
116



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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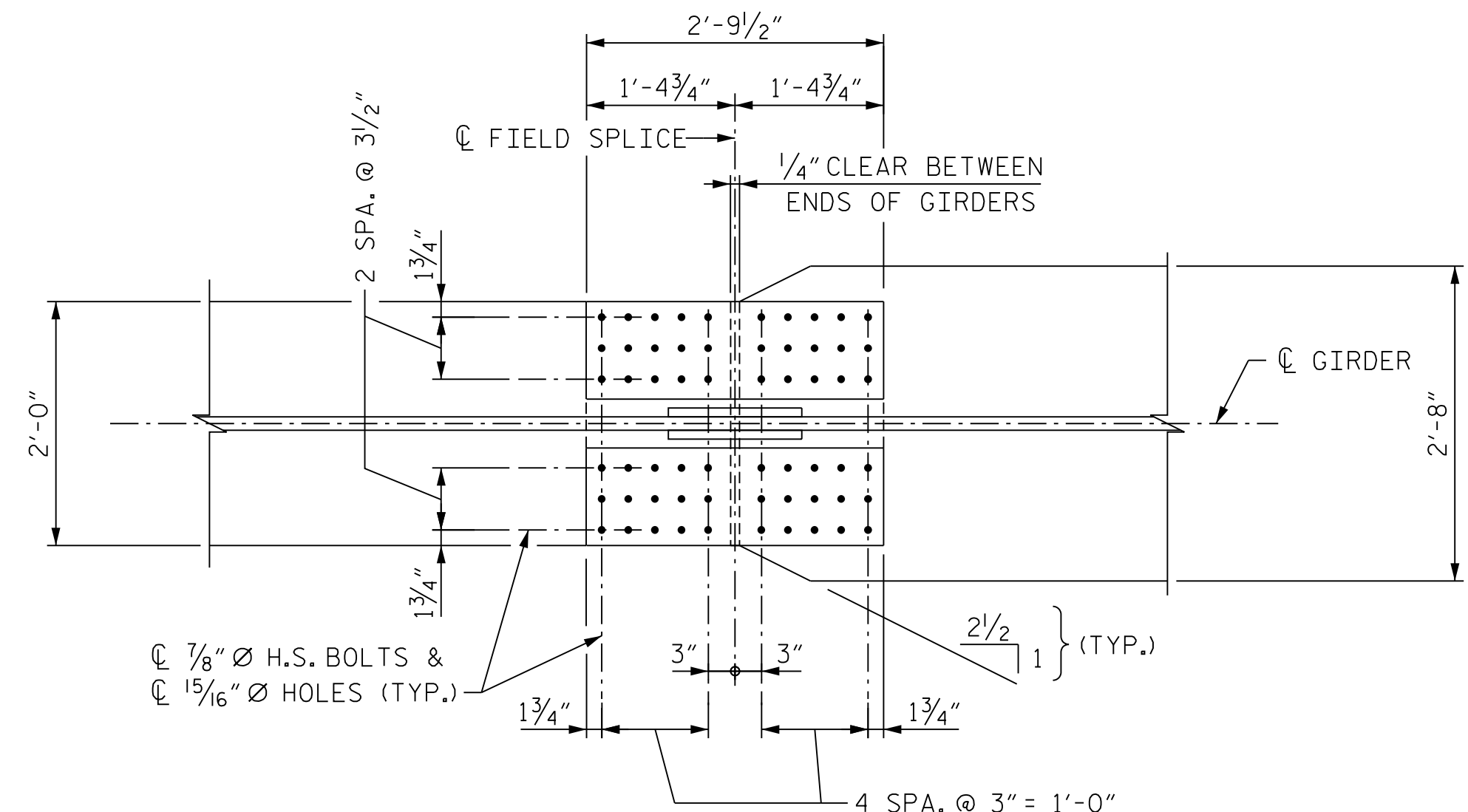
DES BY: S. NIFONG	DATE: 07/19	DWG BY: B. PETERSON	DATE: 07/19
DES CHK: G. SCHMITZ	DATE: 07/19	CHK BY: S. NIFONG	DATE: 08/19



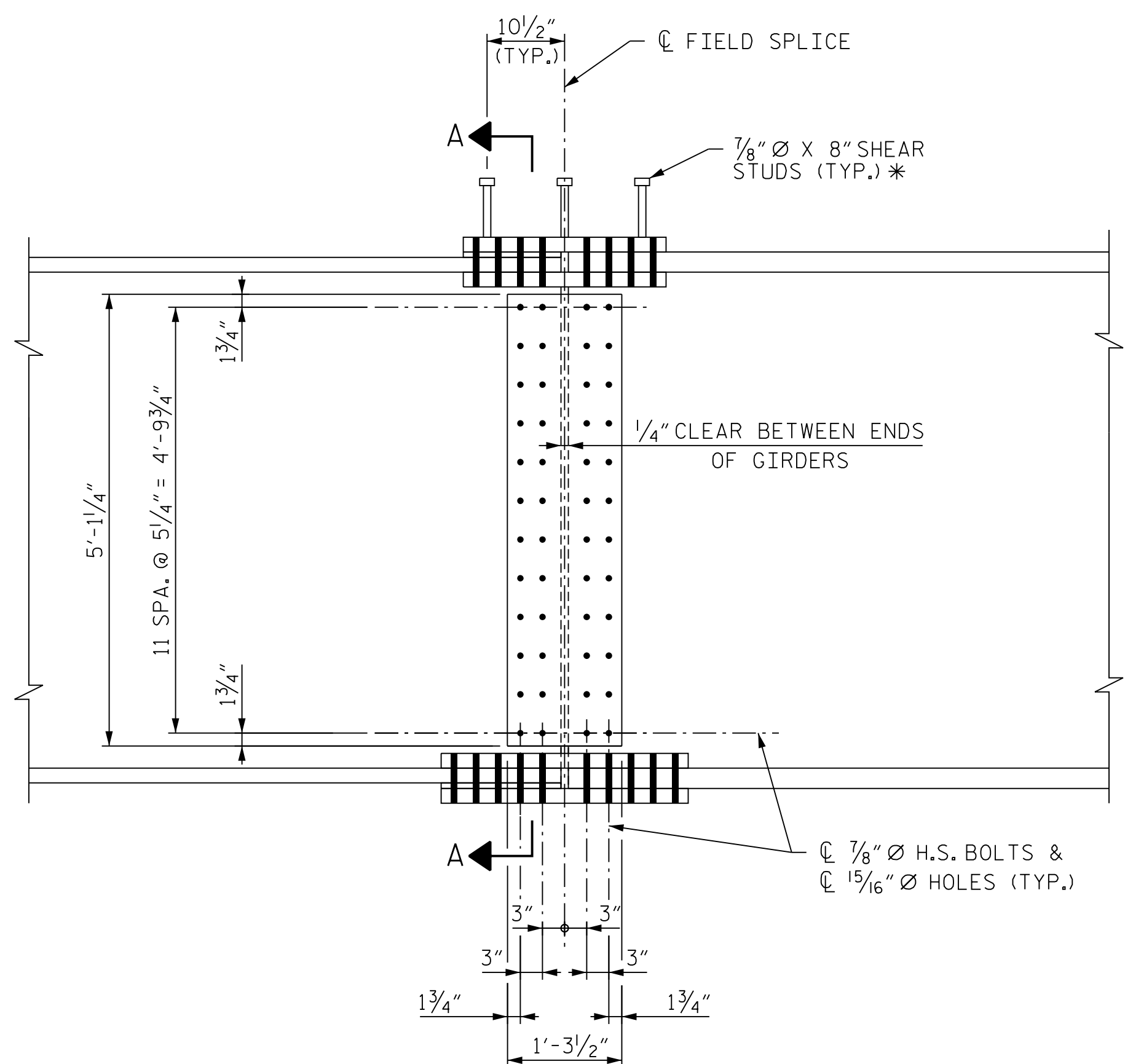
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(STUDS NOT SHOWN FOR CLARITY)

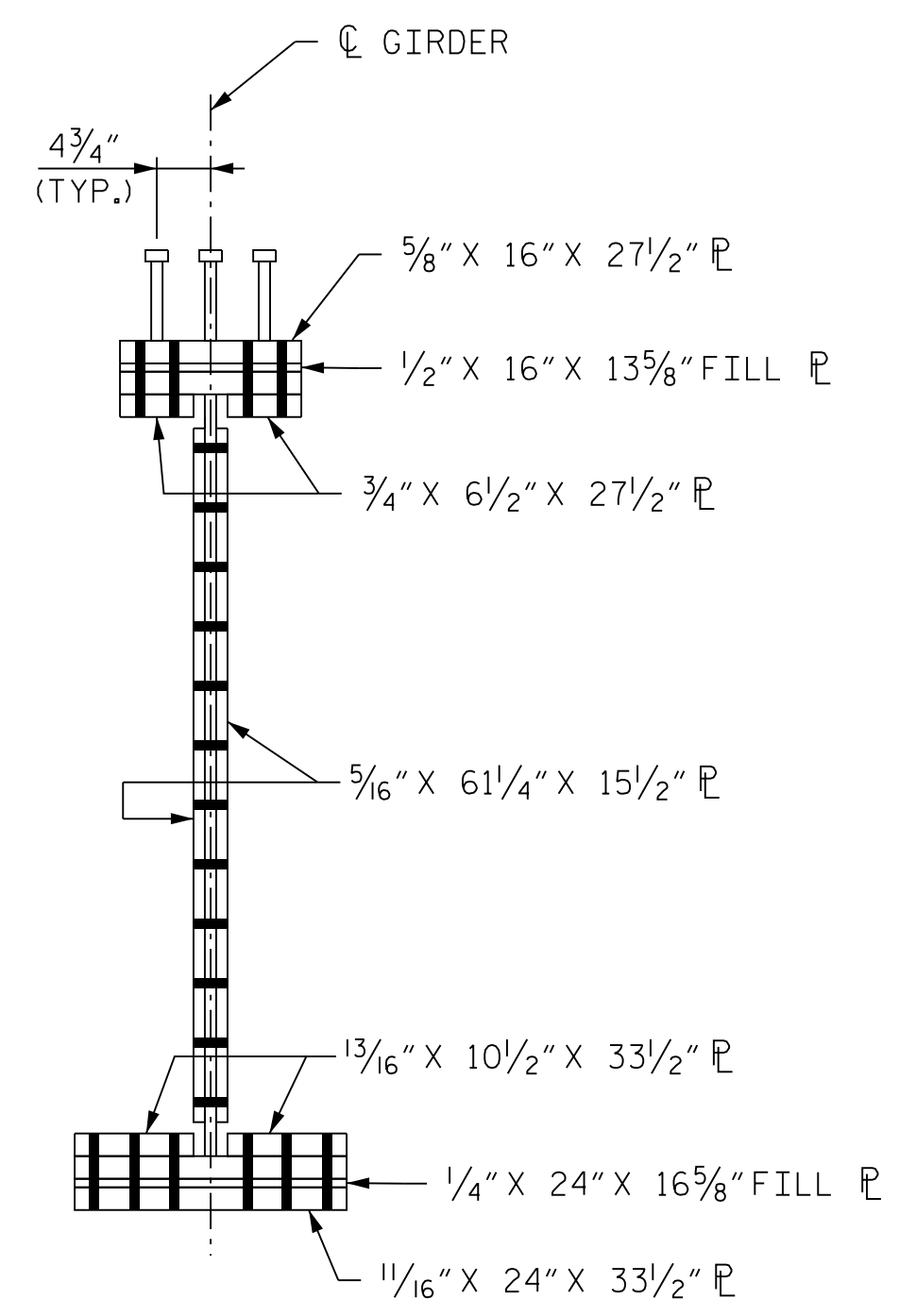
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 2 OF 14

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "B"**



10/11/2021

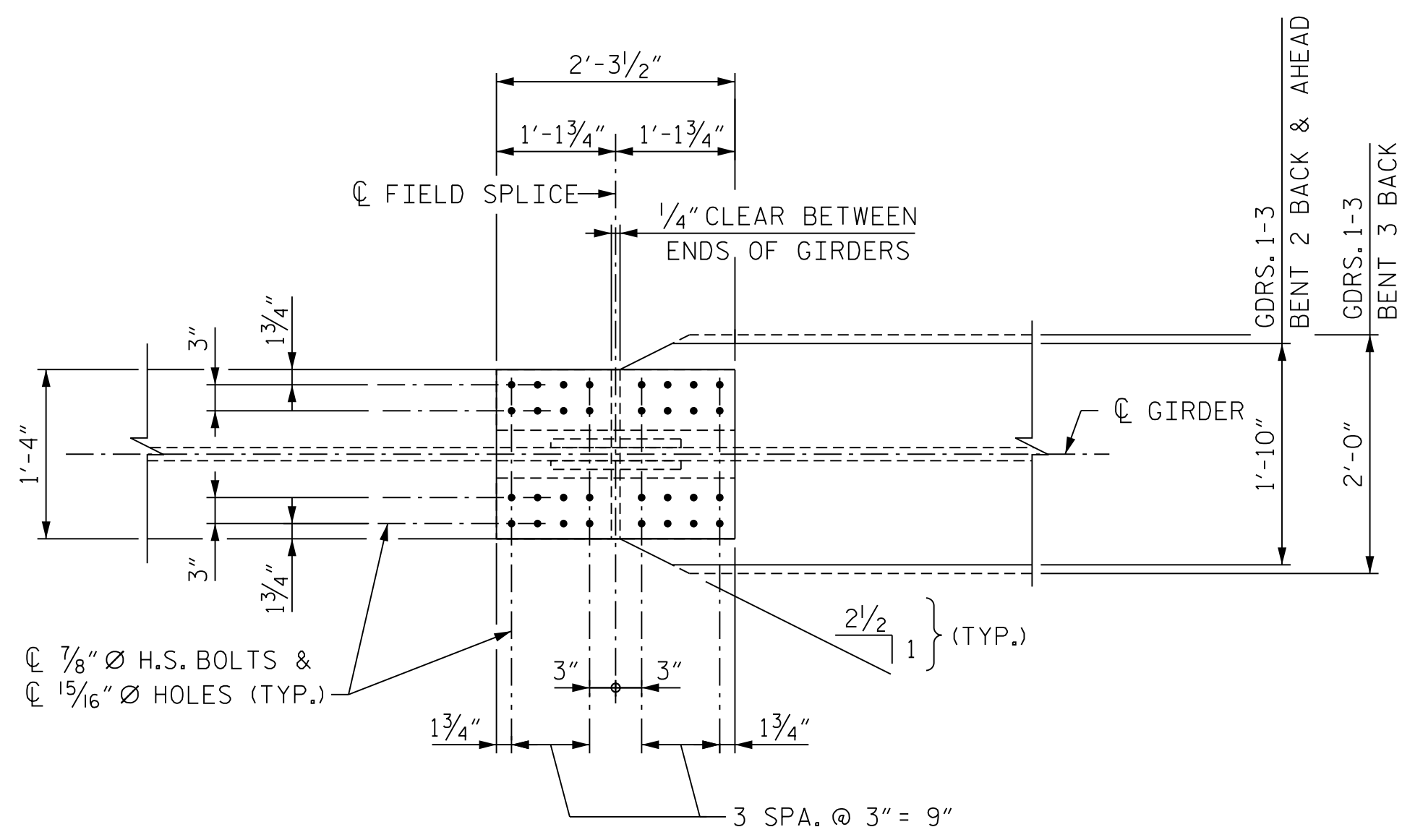
REVISIONS						SHEET NO. S05-037 TOTAL SHEETS 116
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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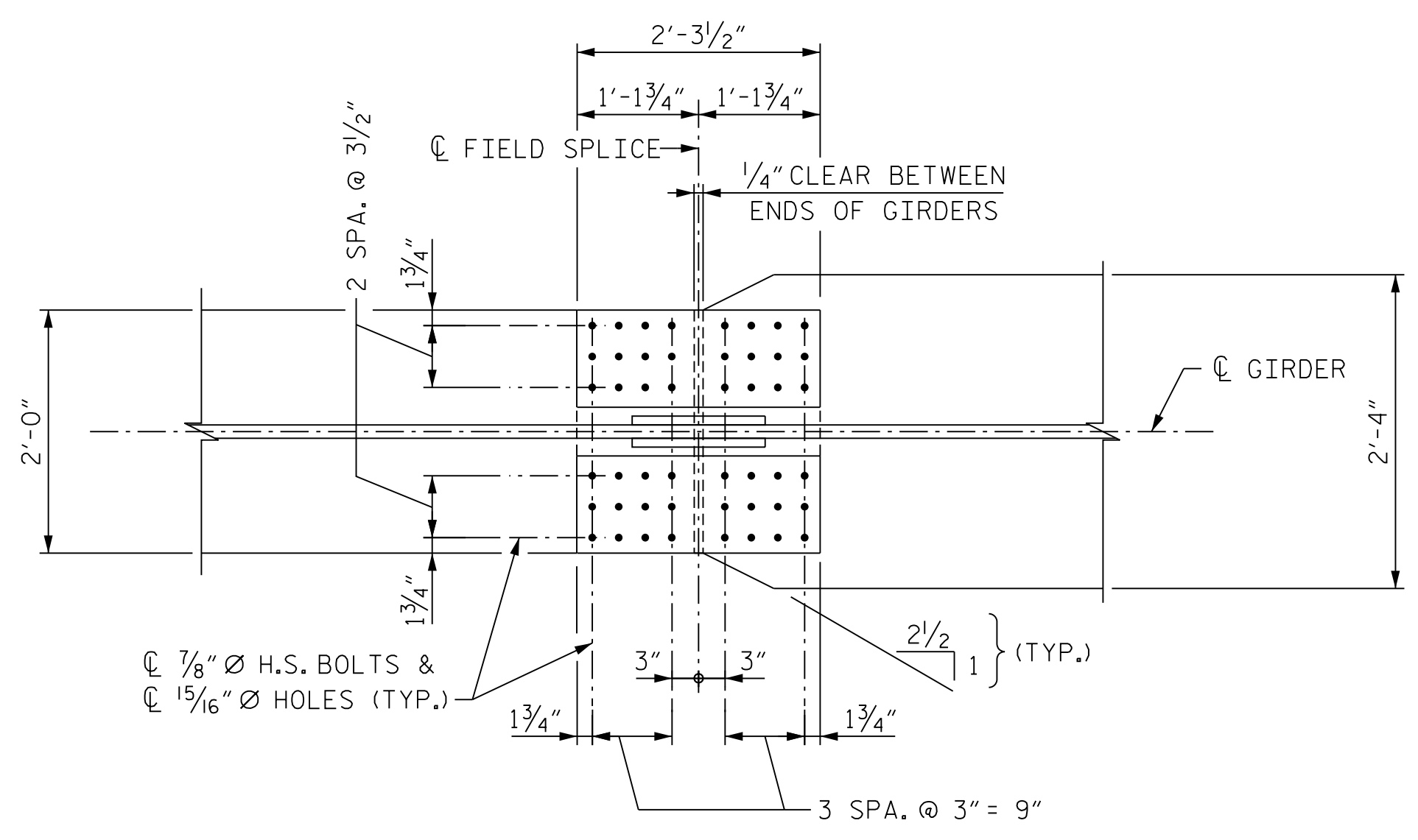
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DES CHK: G. SCHMITZ	DATE: 07/19	CHK BY: S. NIFONG	DATE: 08/19



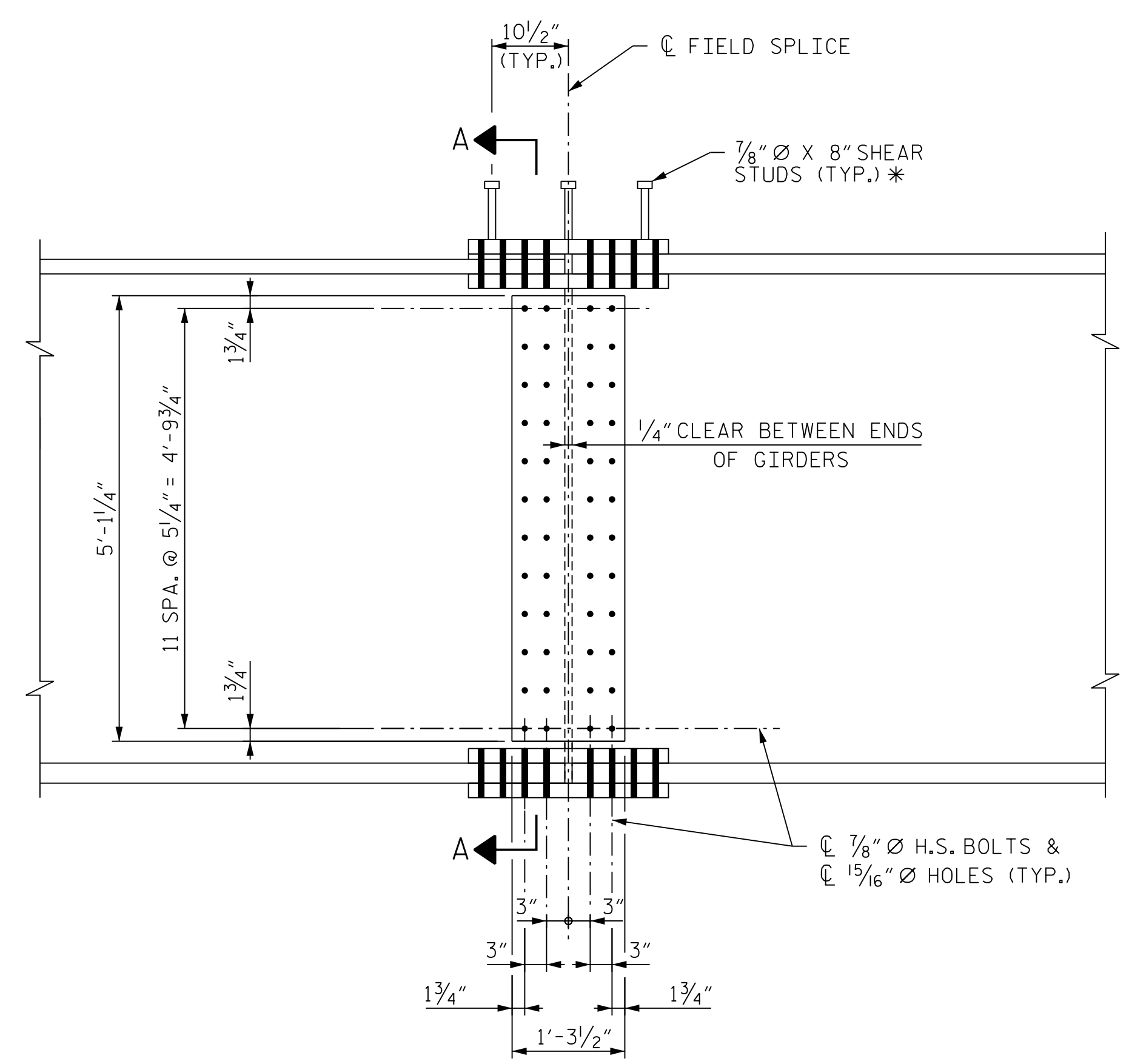
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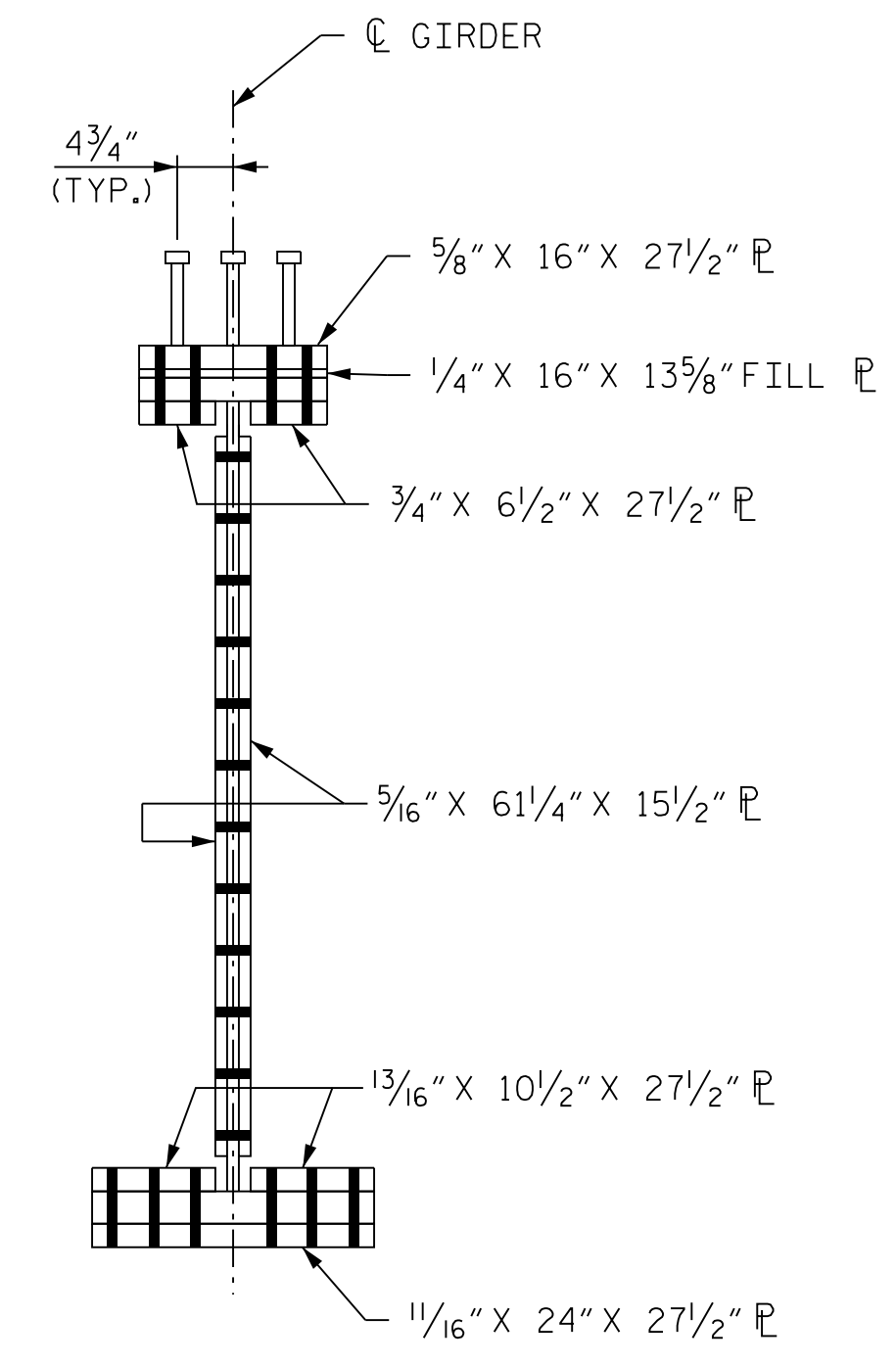
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 3 OF 14



10/11/2021

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "C"**

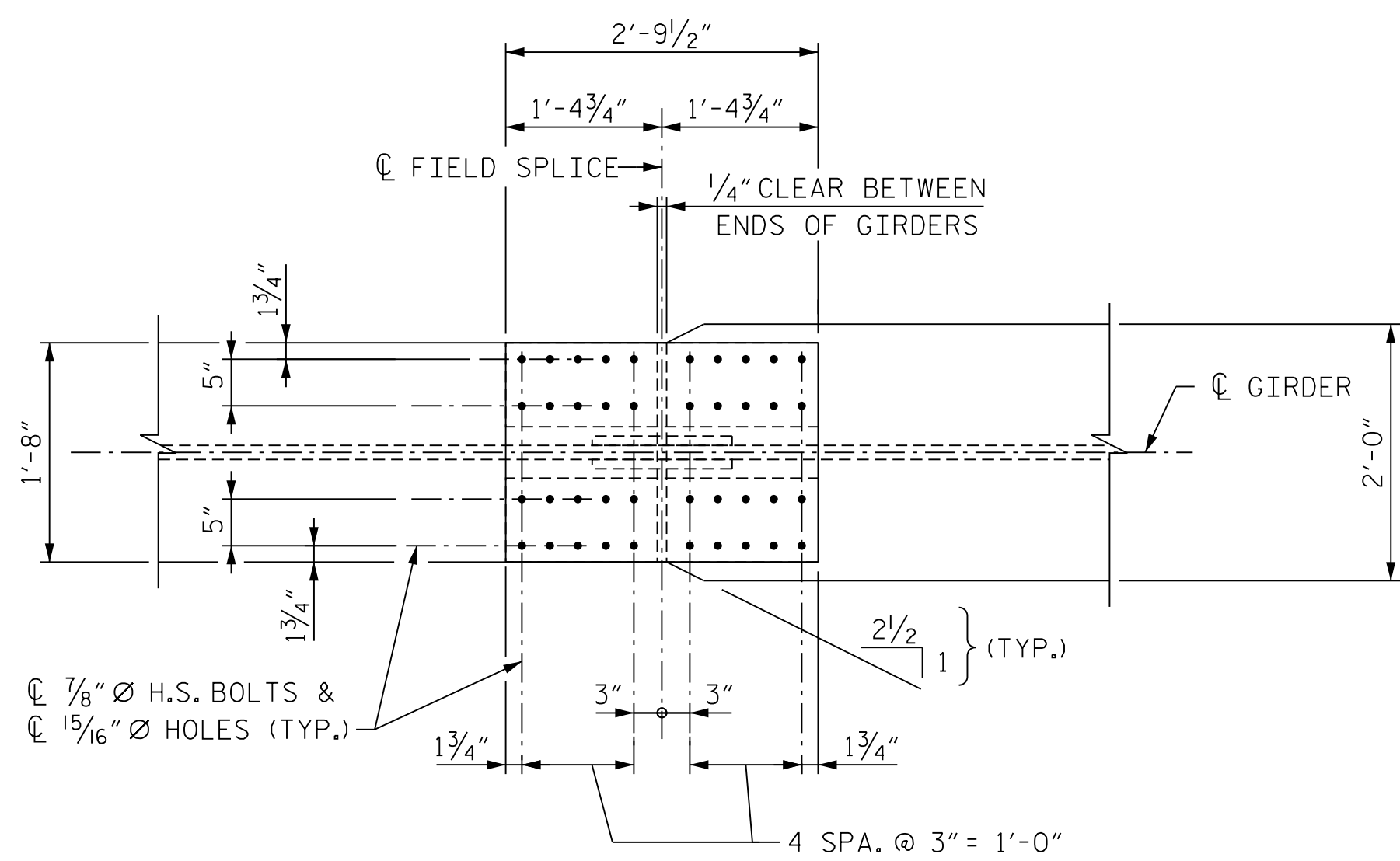
REVISIONS						SHEET NO. S05-038 TOTAL SHEETS 116
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2	--	--	4	--	--	



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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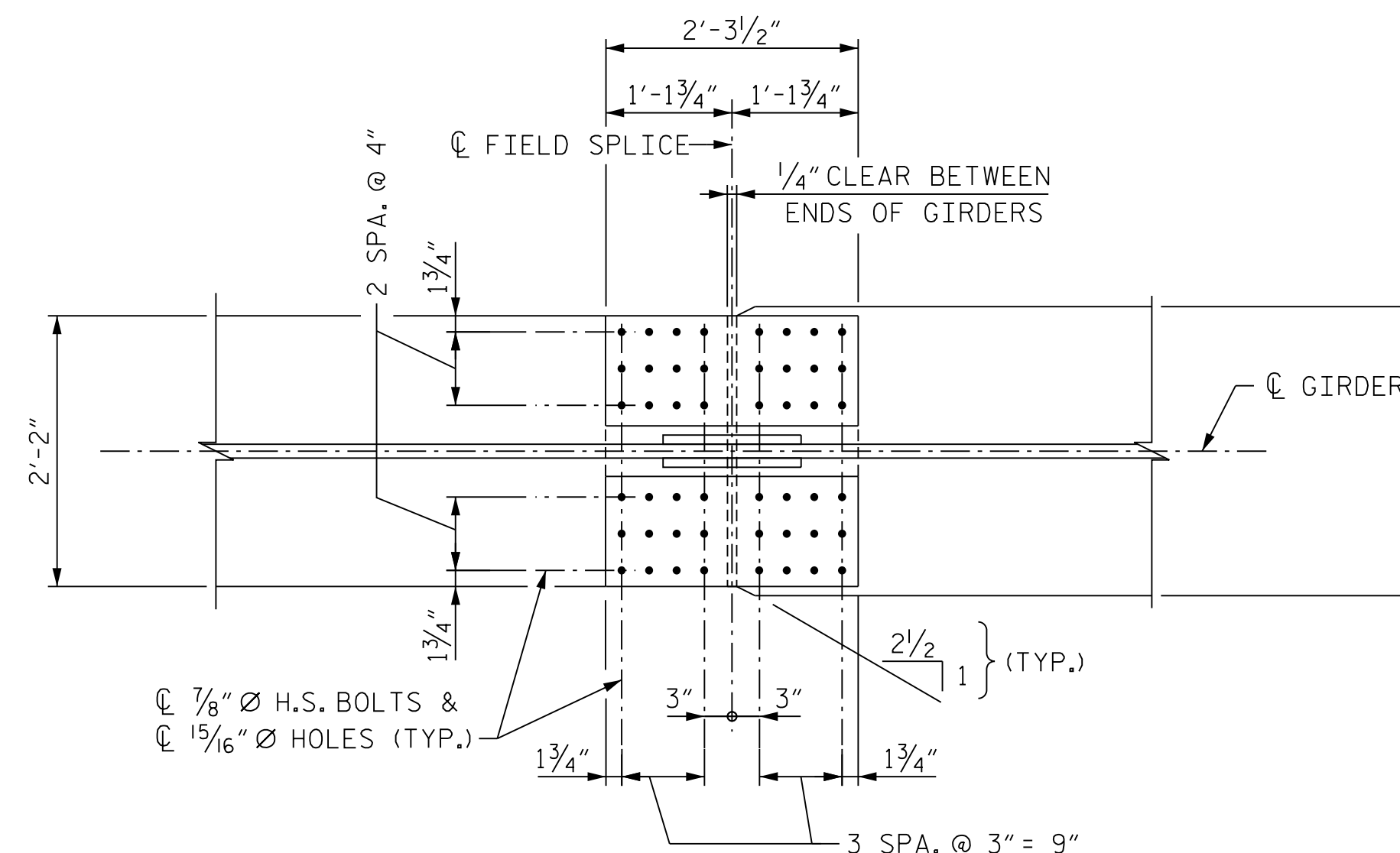
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DES CHK: G. SCHMITZ	DATE: 07/19	CHK BY: S. NIFONG	DATE: 08/19



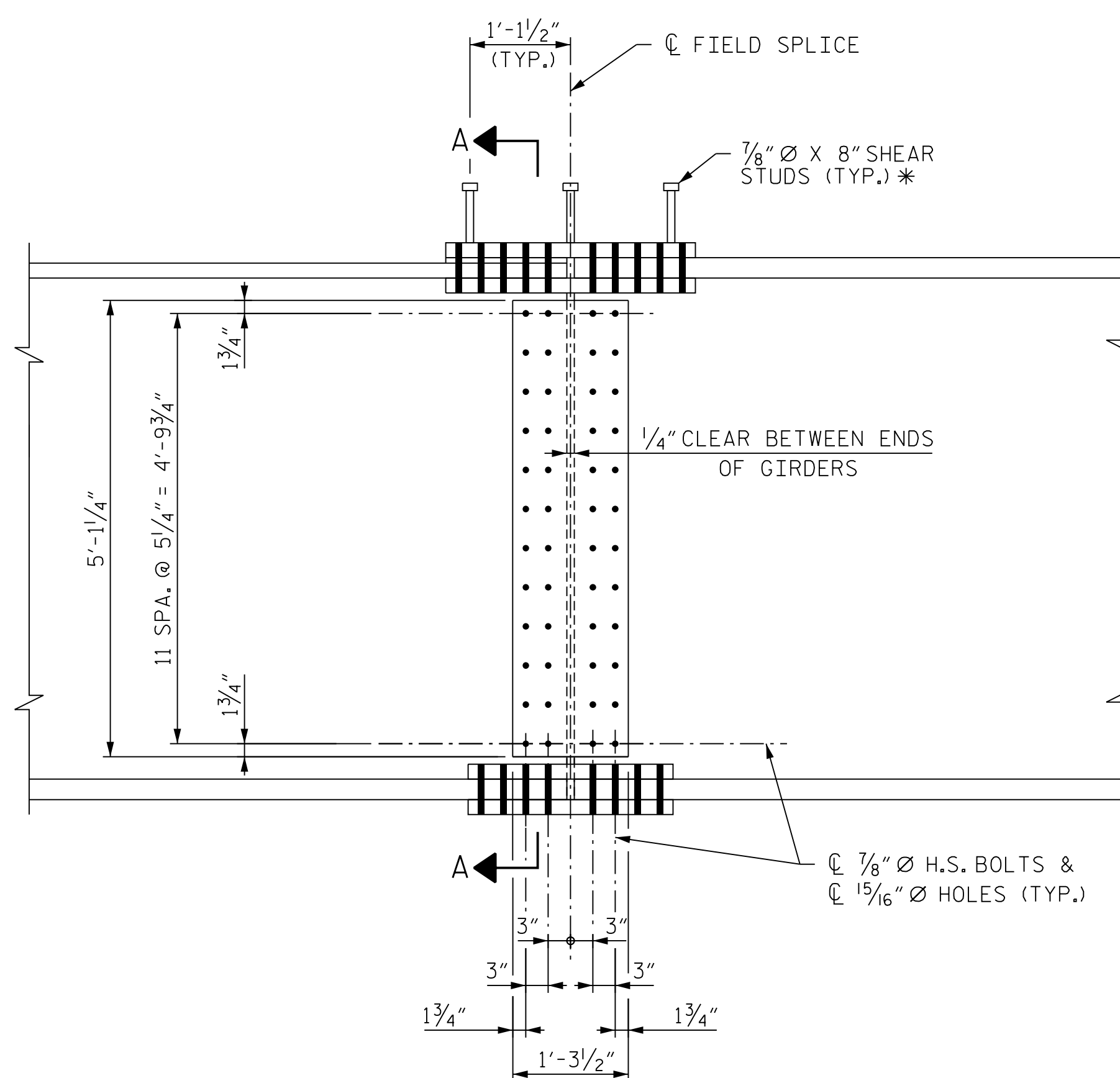
PLAN (TOP OF TOP FLANGE)

(STUDS NOT SHOWN FOR CLARITY)

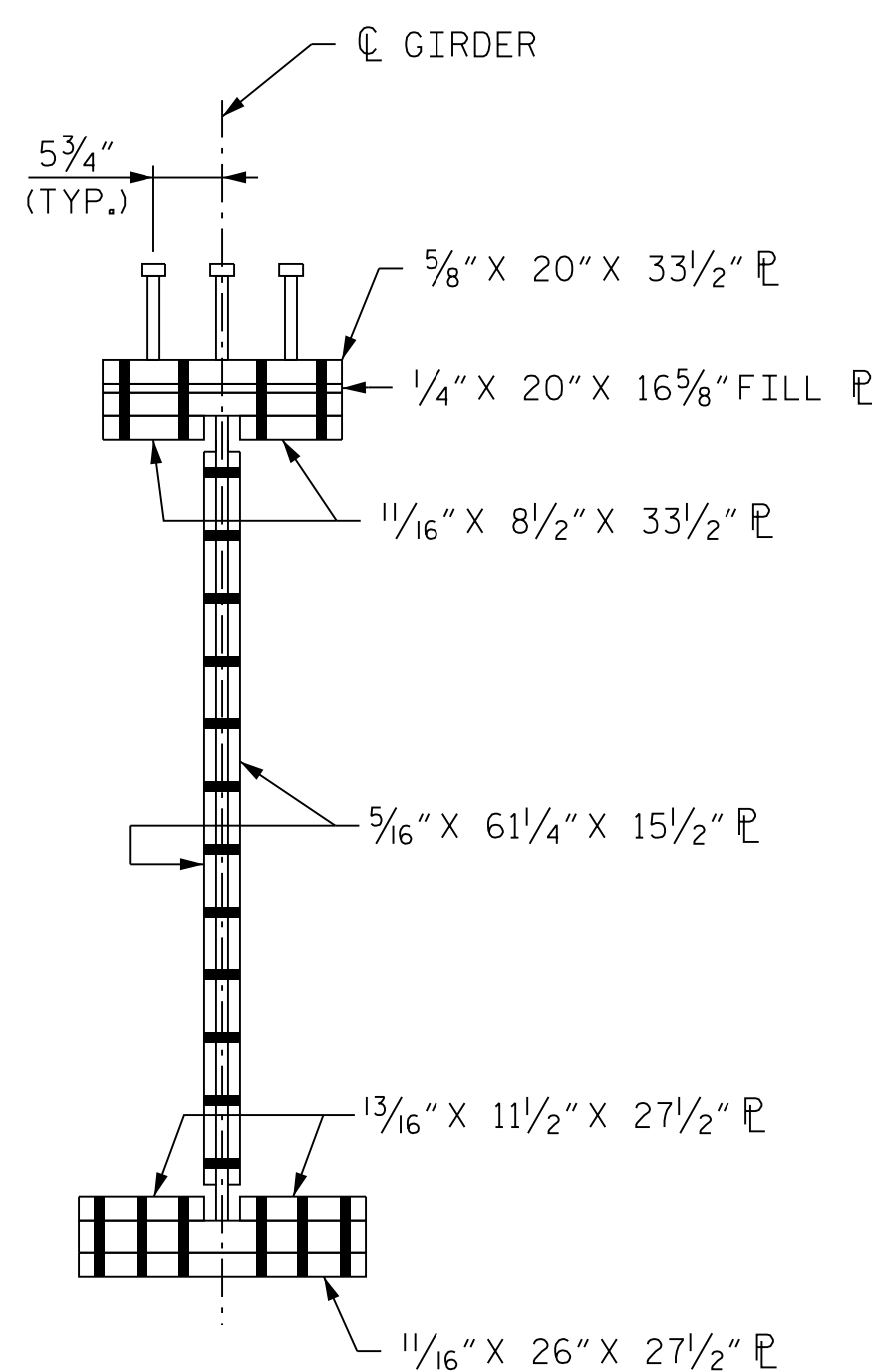
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-

SHEET 4 OF 14

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
BOLTED FIELD SPLICE
DETAILS - TYPE "D"**



10/11/2021

REVISIONS

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

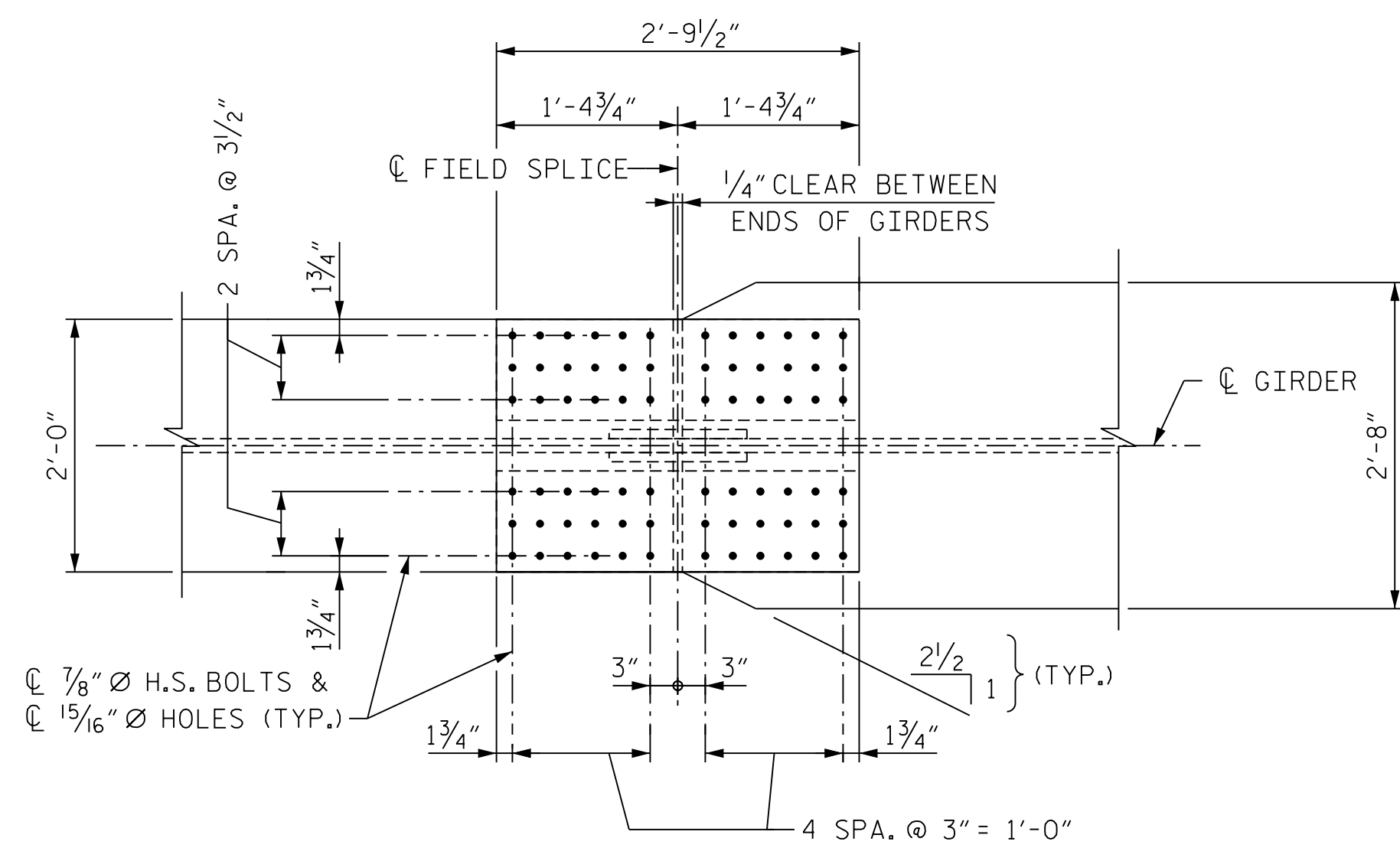
SHEET NO.
S05-039
TOTAL SHEETS
116



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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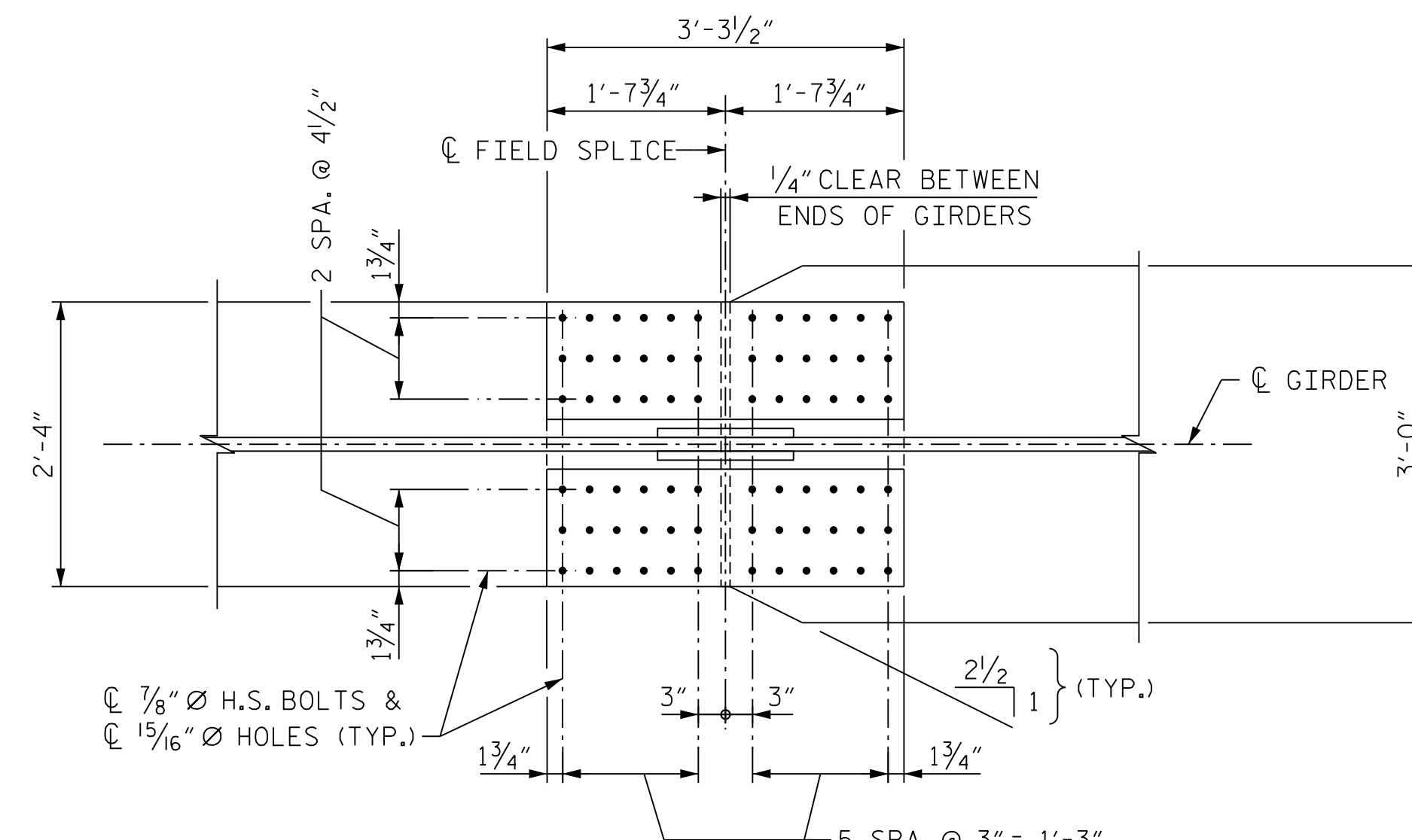
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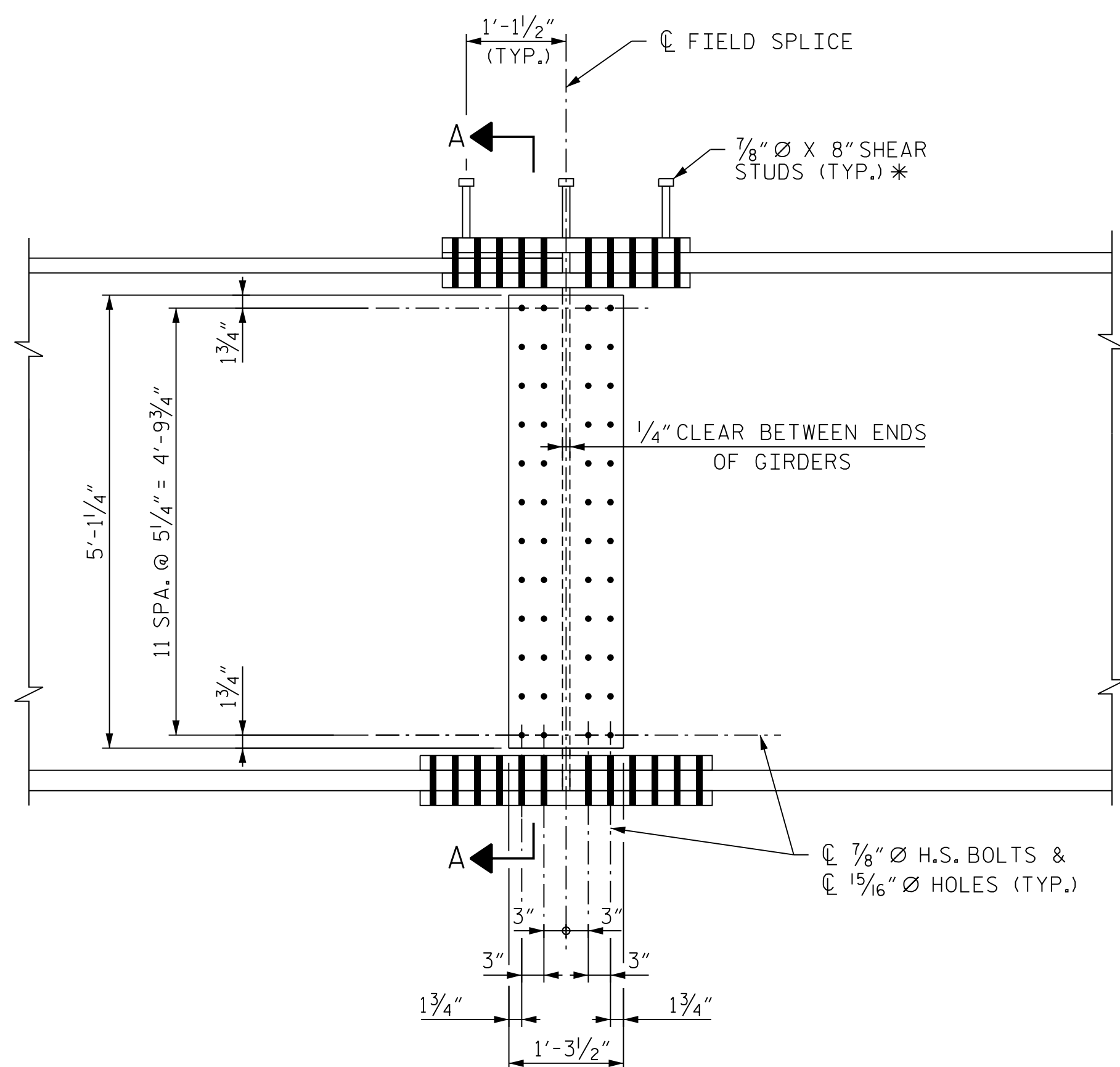
PLAN (TOP OF TOP FLANGE)

(STUDS NOT SHOWN FOR CLARITY)

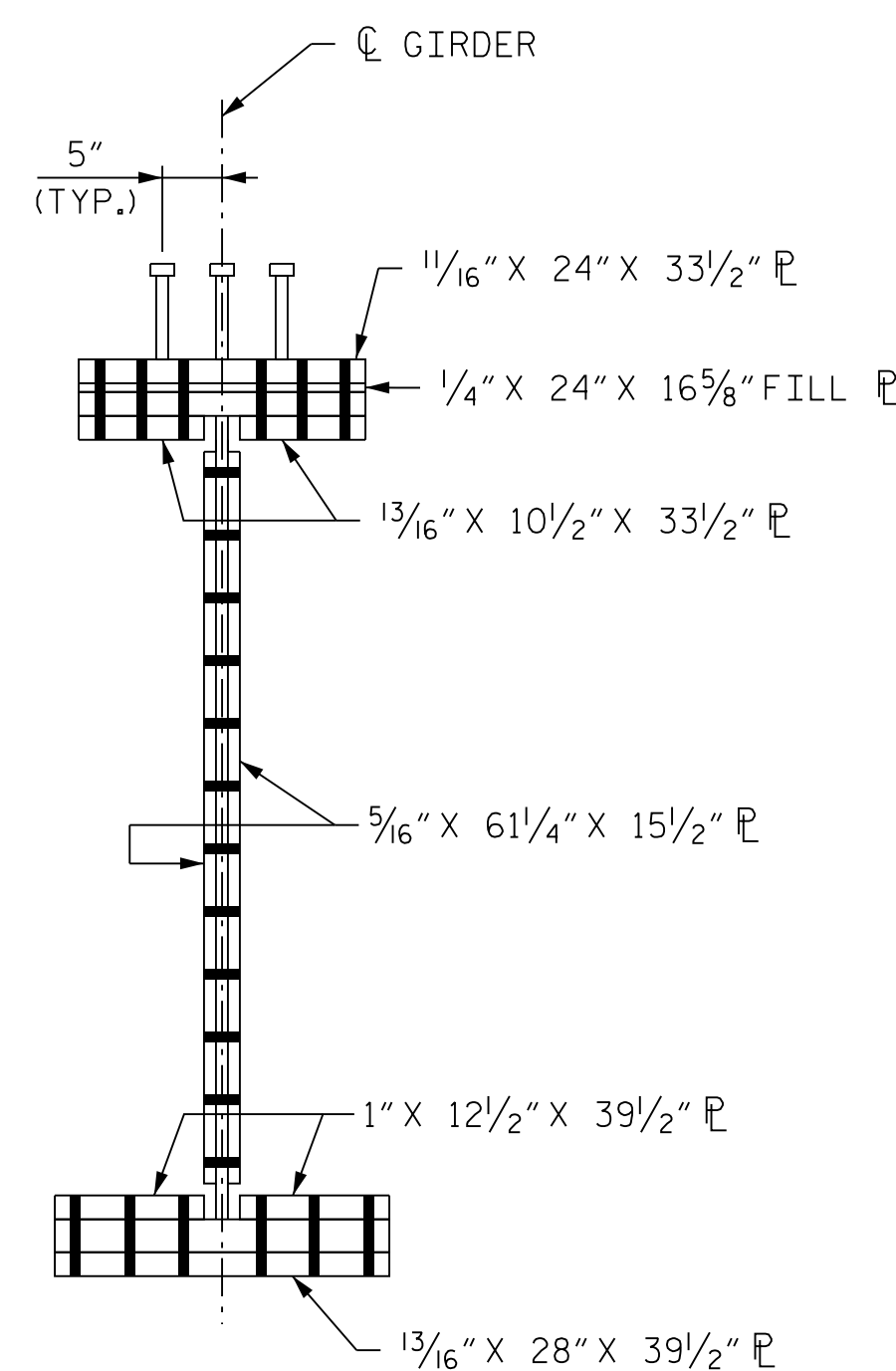
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-

SHEET 5 OF 14

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
BOLTED FIELD SPLICE
DETAILS - TYPE "E"**



10/11/2021

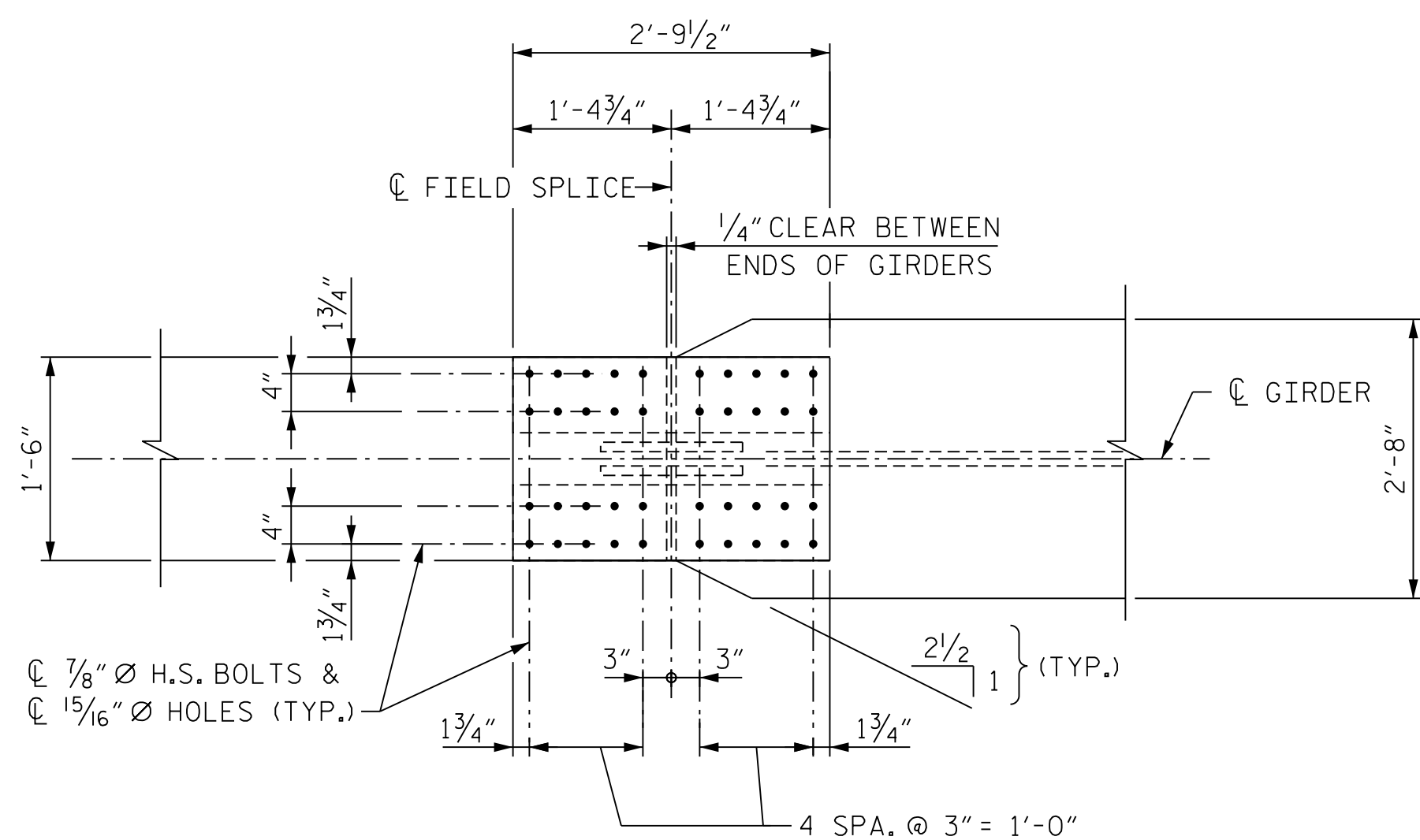
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UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S05-040 TOTAL SHEETS 116
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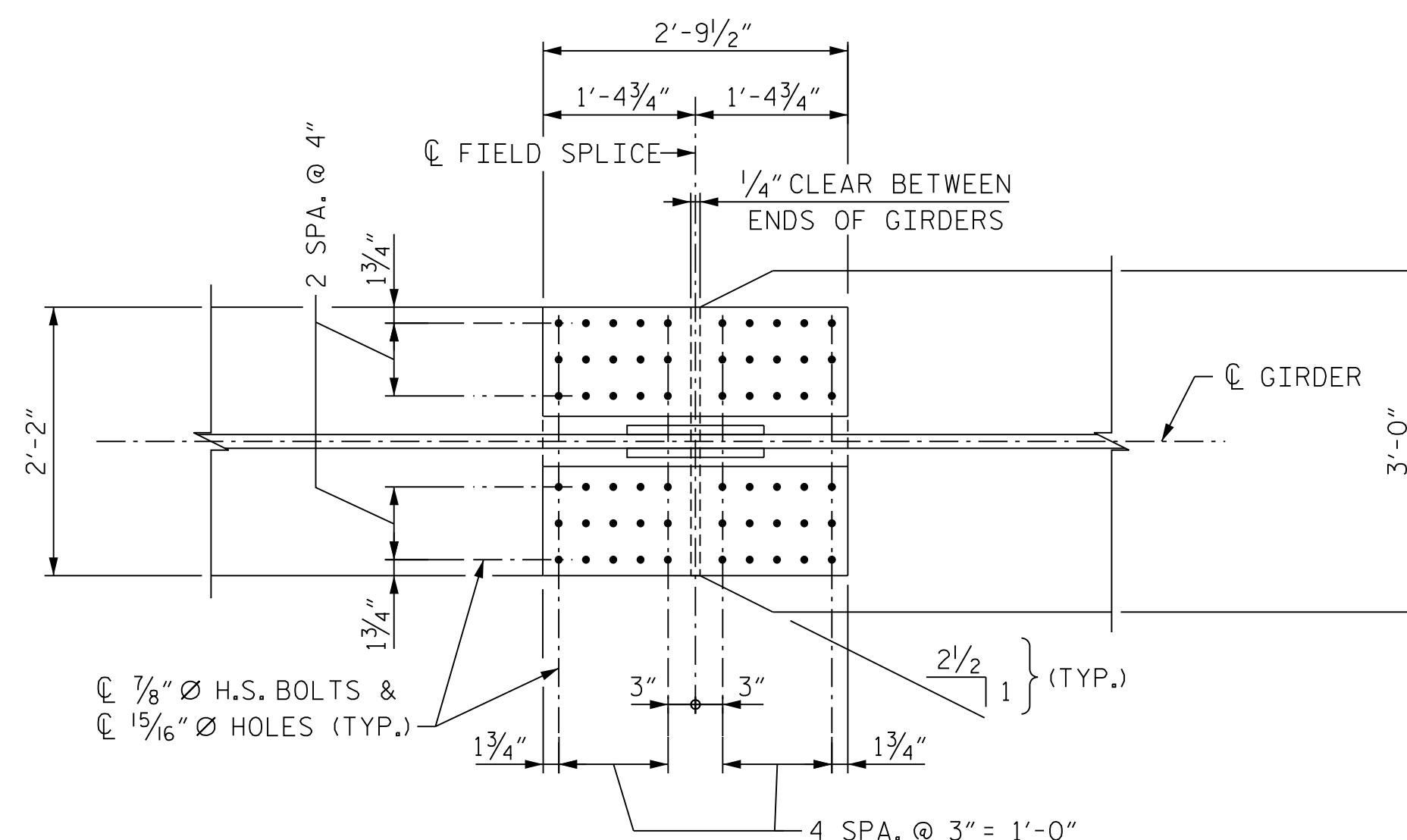
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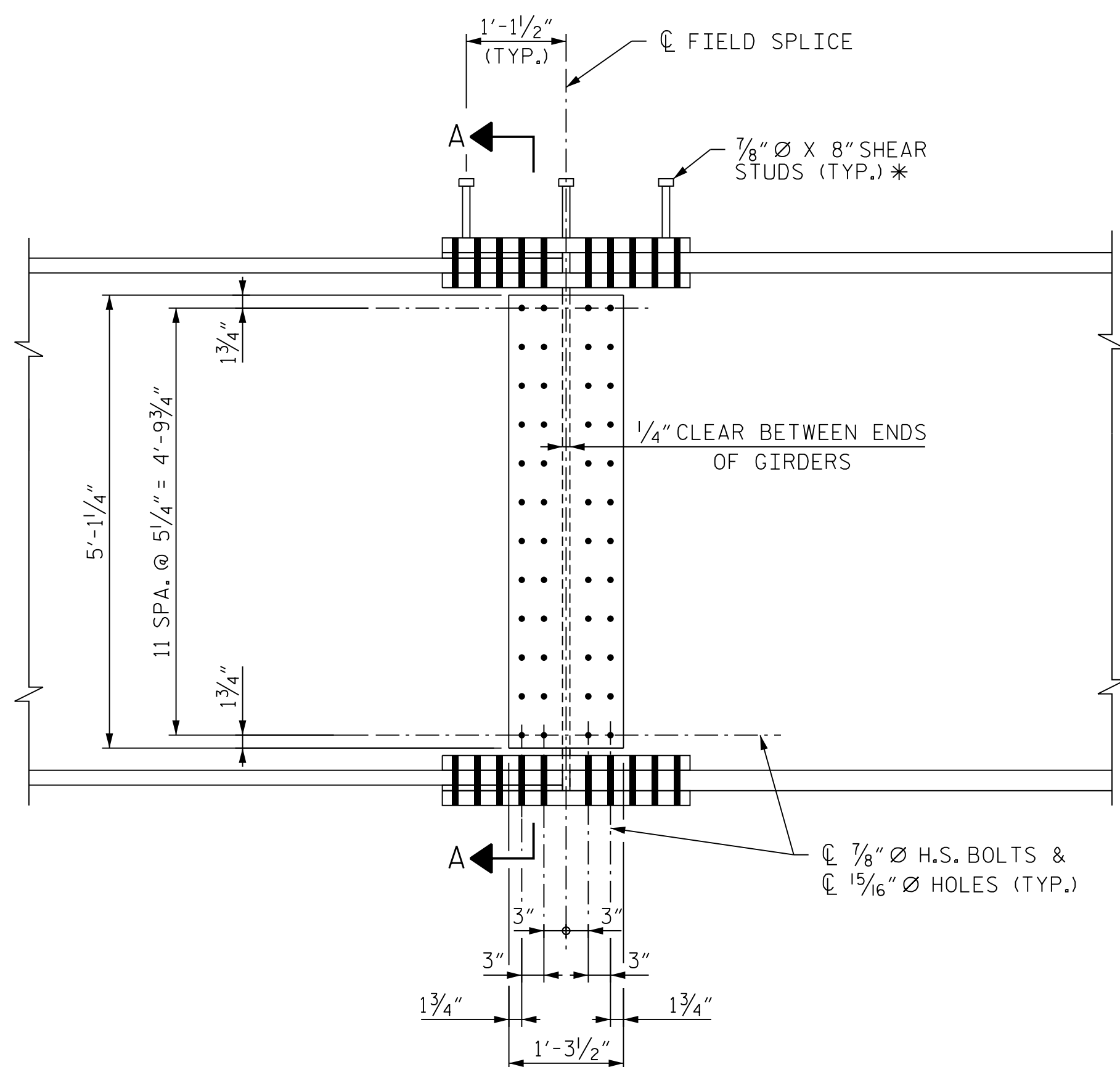
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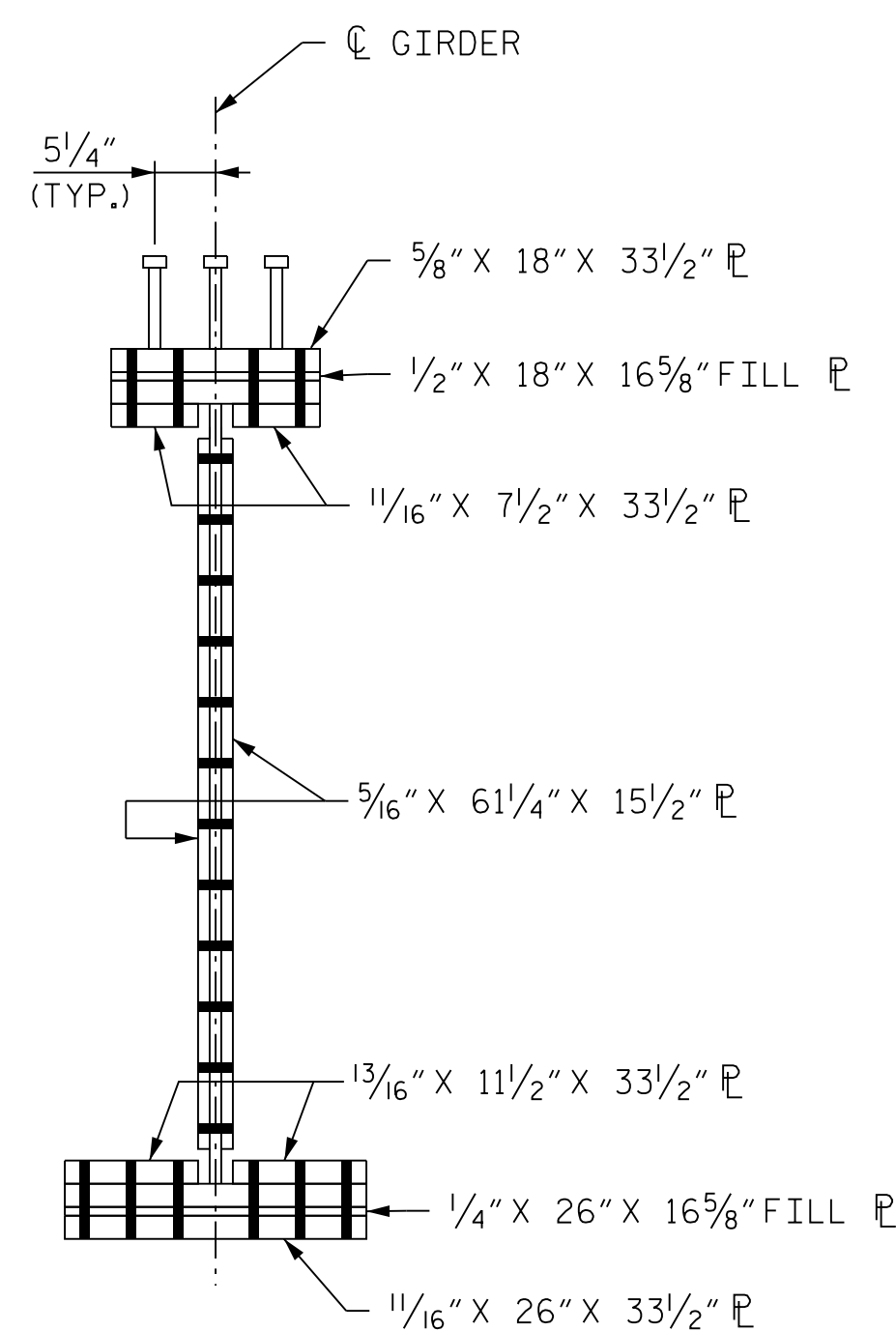
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

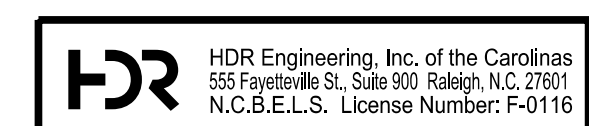
PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-

SHEET 6 OF 14



10/11/2021

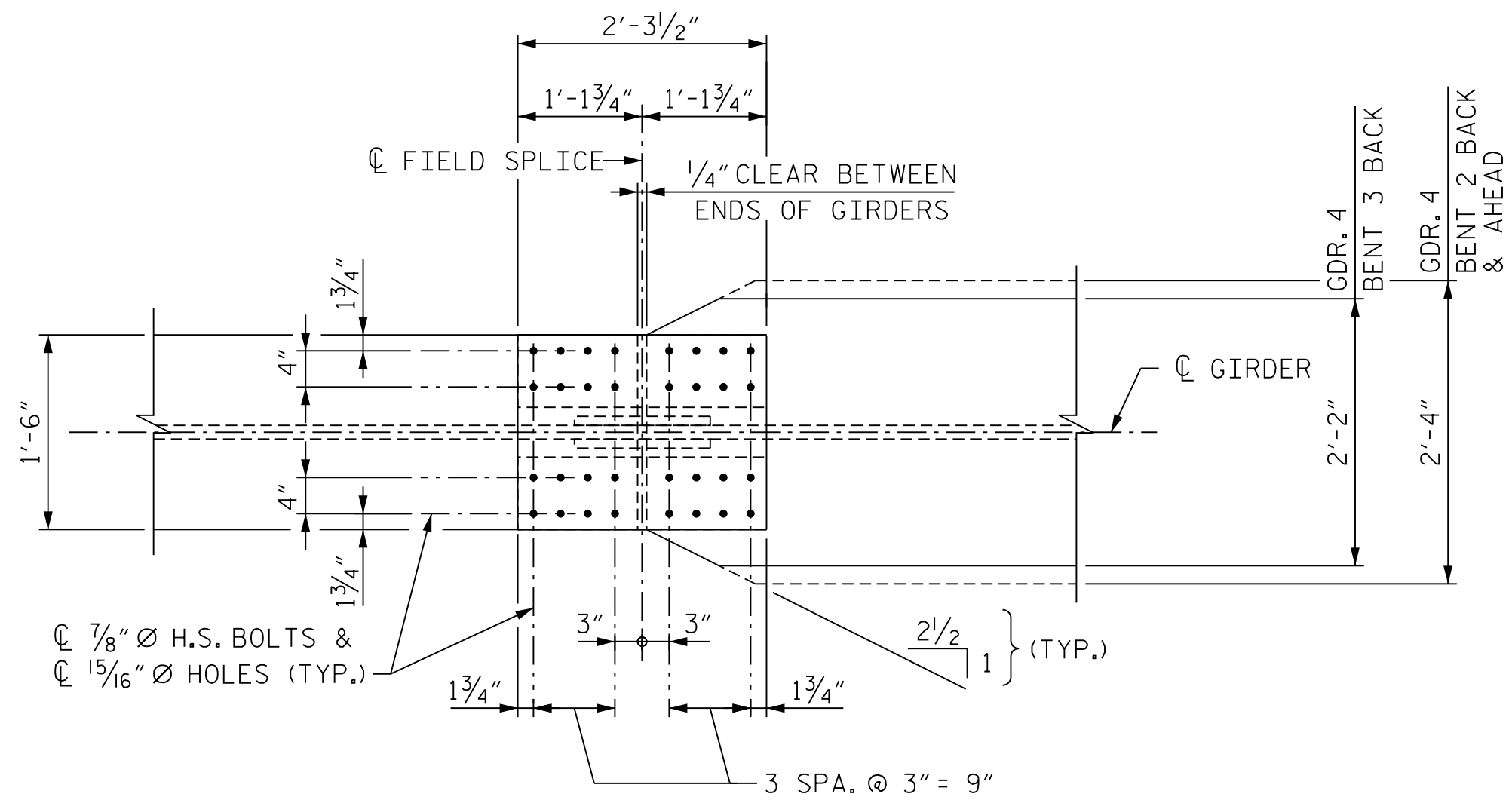
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE BOLTED FIELD SPLICE DETAILS - TYPE "F"					
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1	--	--	3	--	--
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					SHEET NO. S05-041 TOTAL SHEETS 116



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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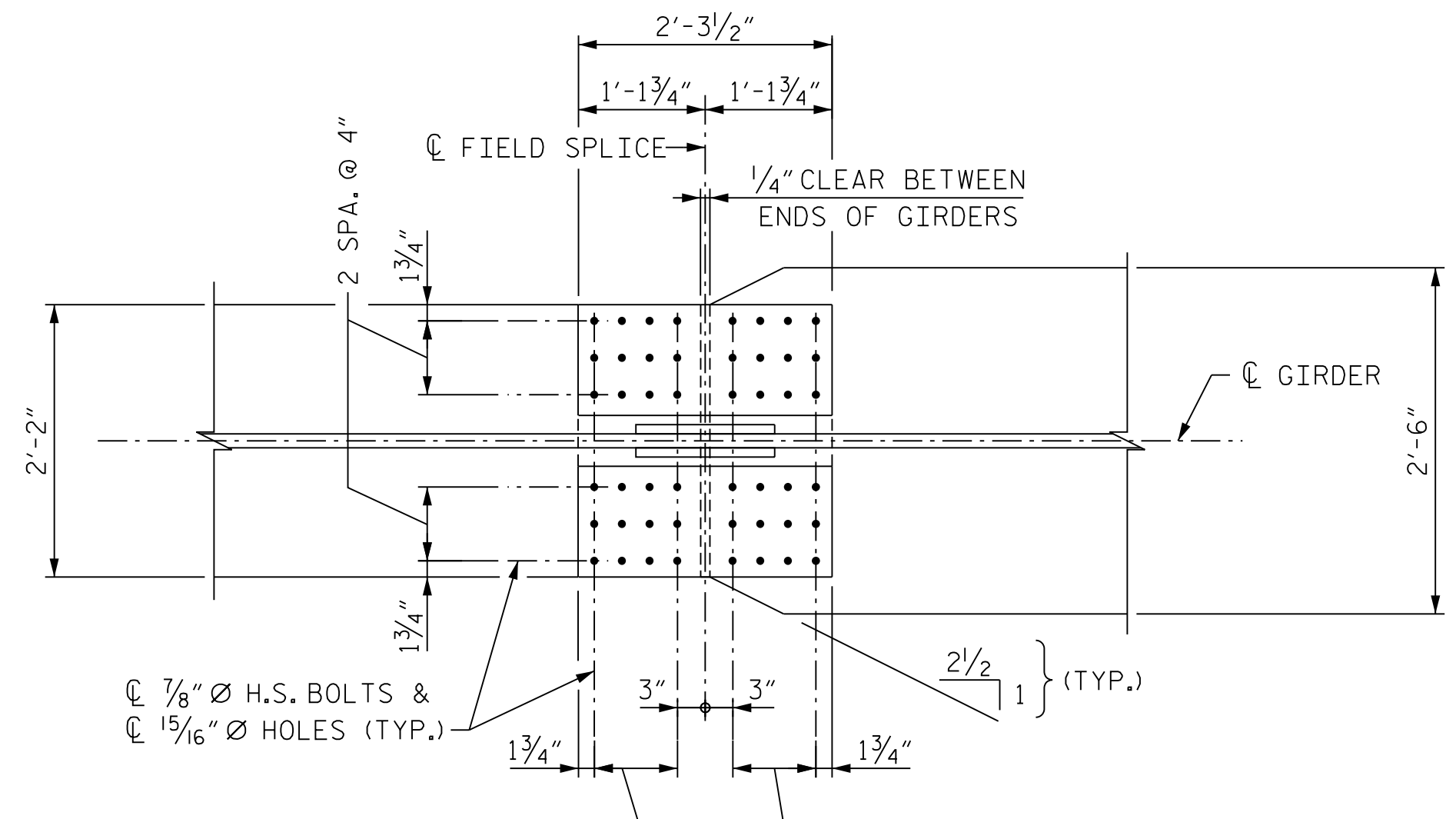
DES BY: S. NIFONG	DATE: 07/19	DWG BY: B. PETERSON	DATE: 07/19
DES CHK: G. SCHMITZ	DATE: 07/19	CHK BY: S. NIFONG	DATE: 08/19



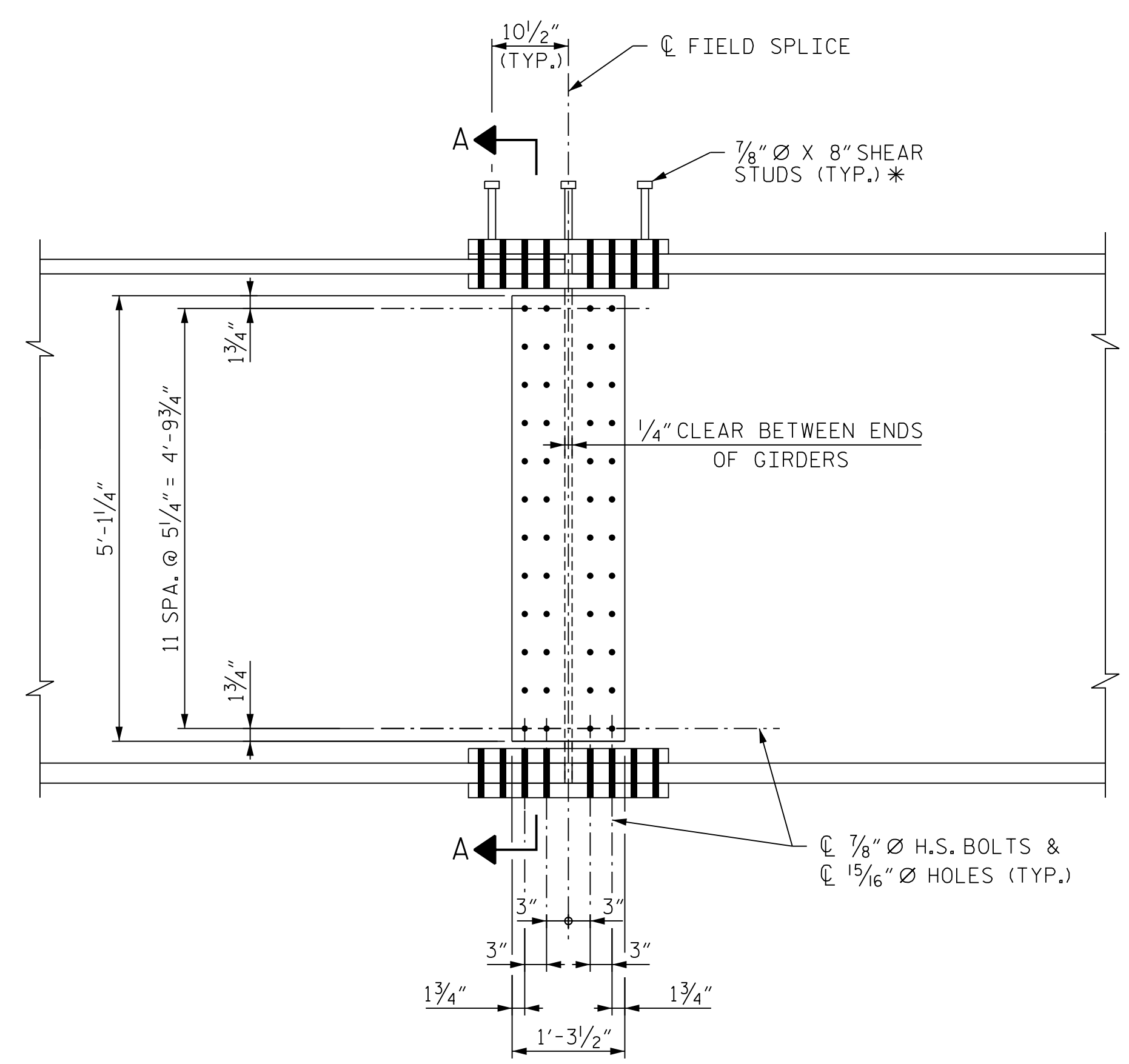
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(STUDS NOT SHOWN FOR CLARITY)

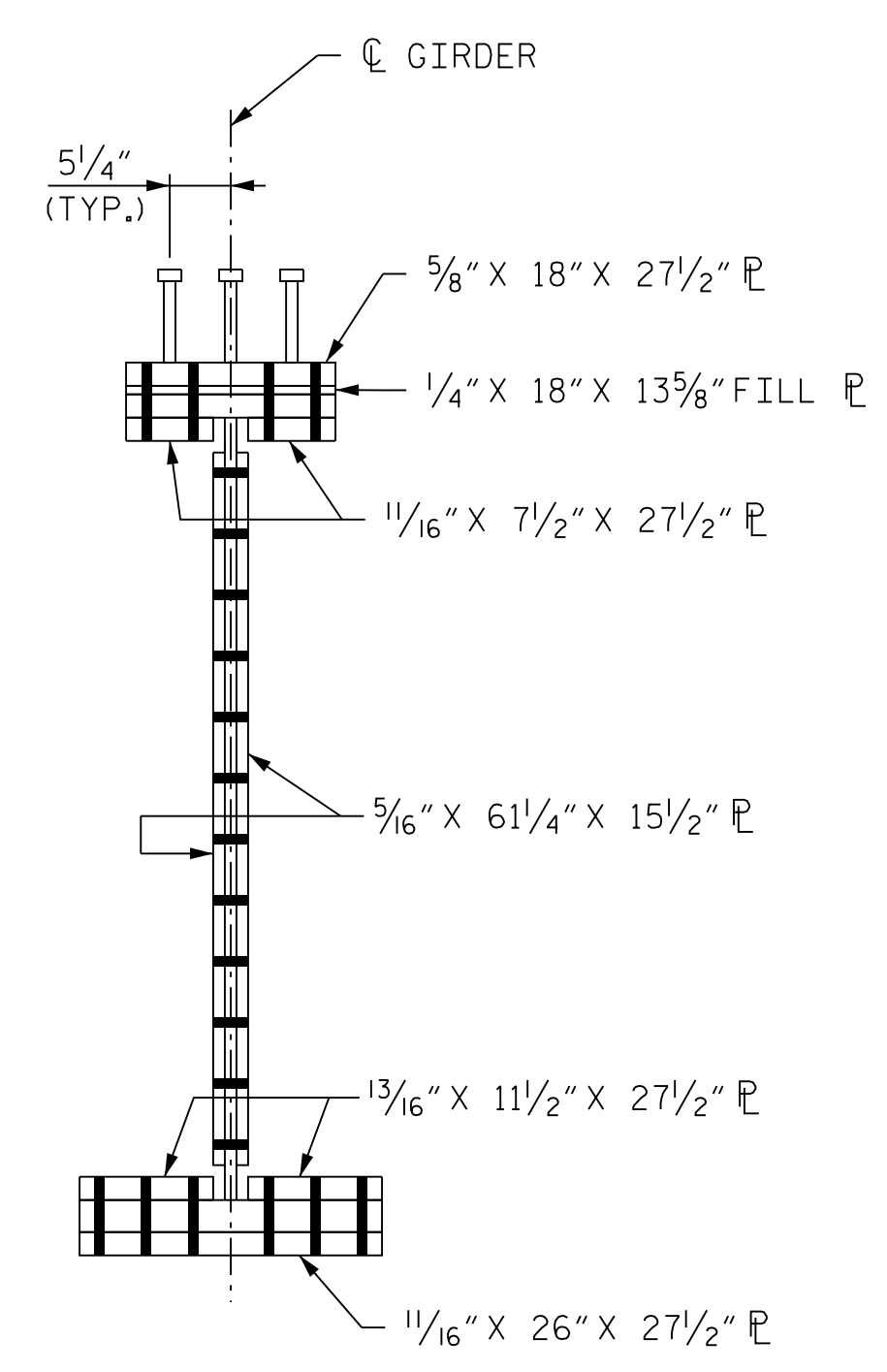
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 7 OF 14

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "G"**



10/11/2021

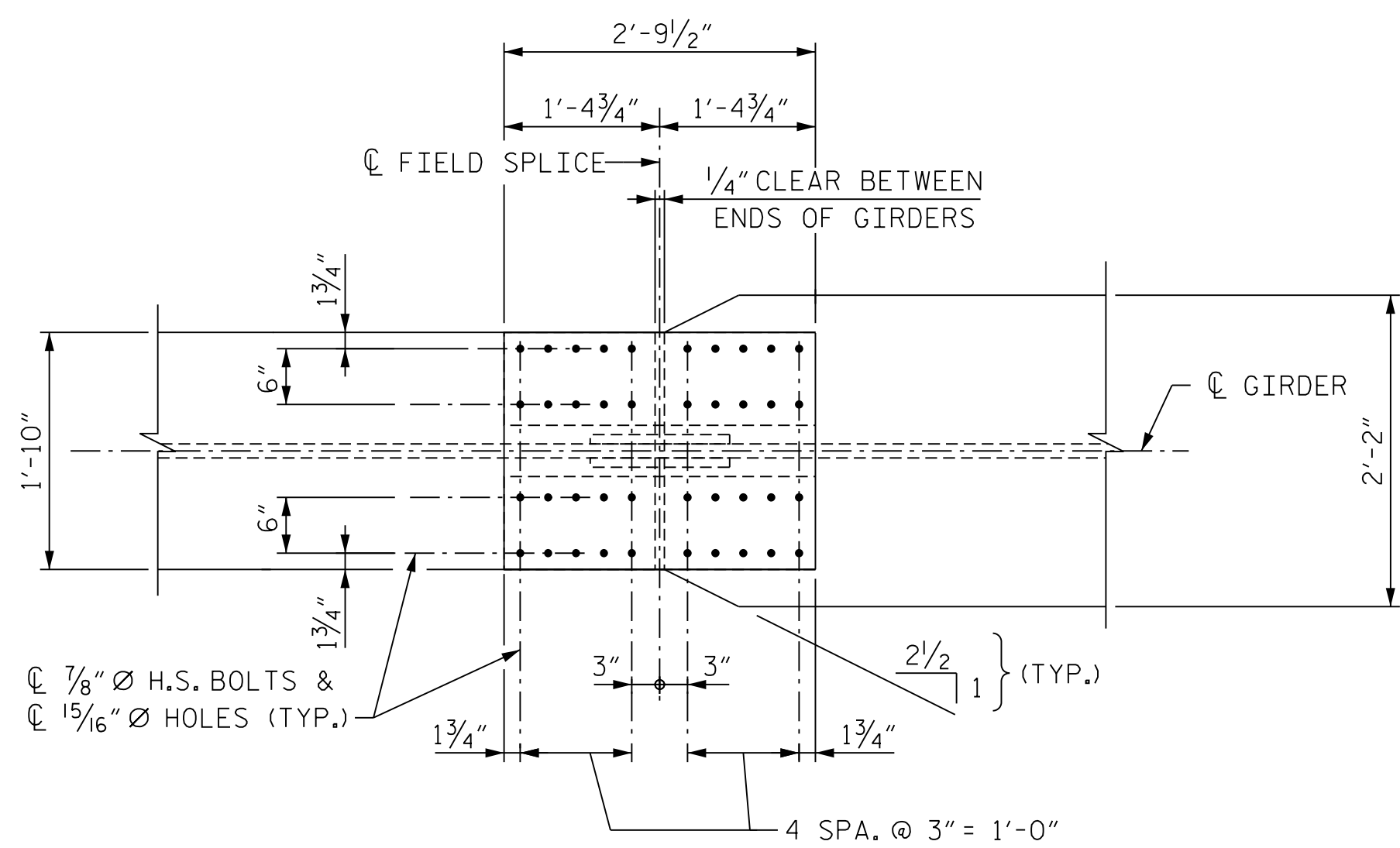
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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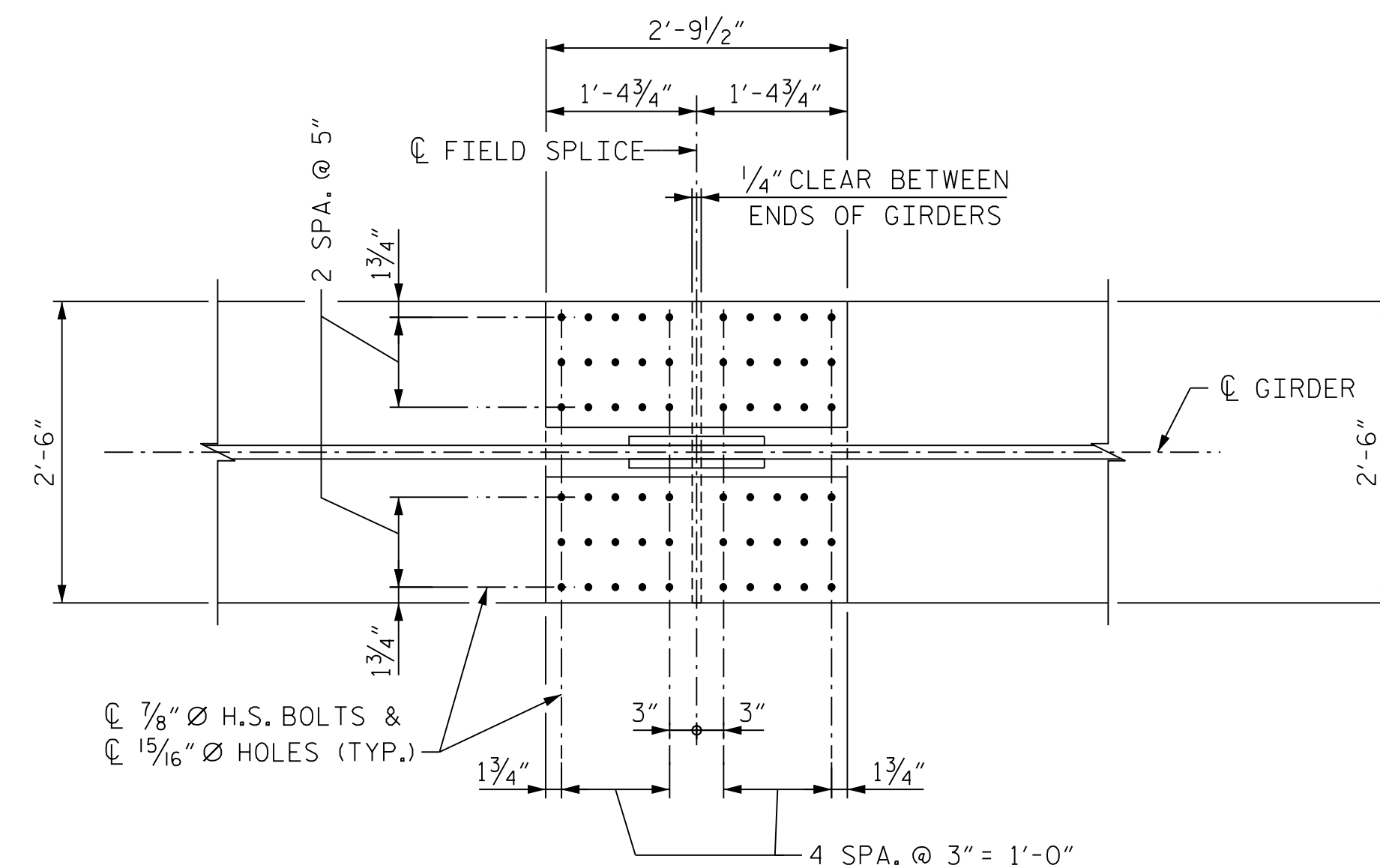
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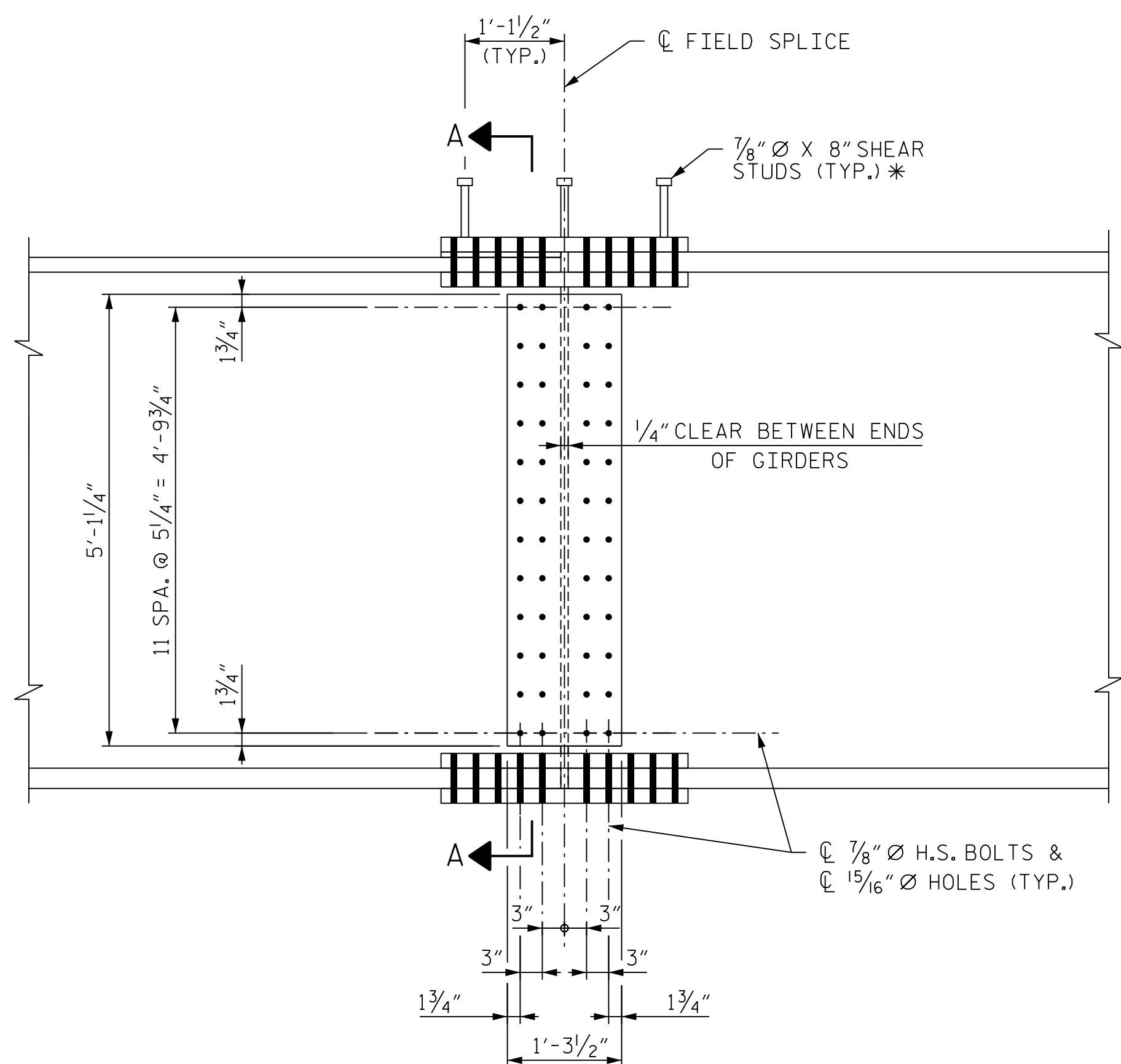
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(STUDS NOT SHOWN FOR CLARITY)

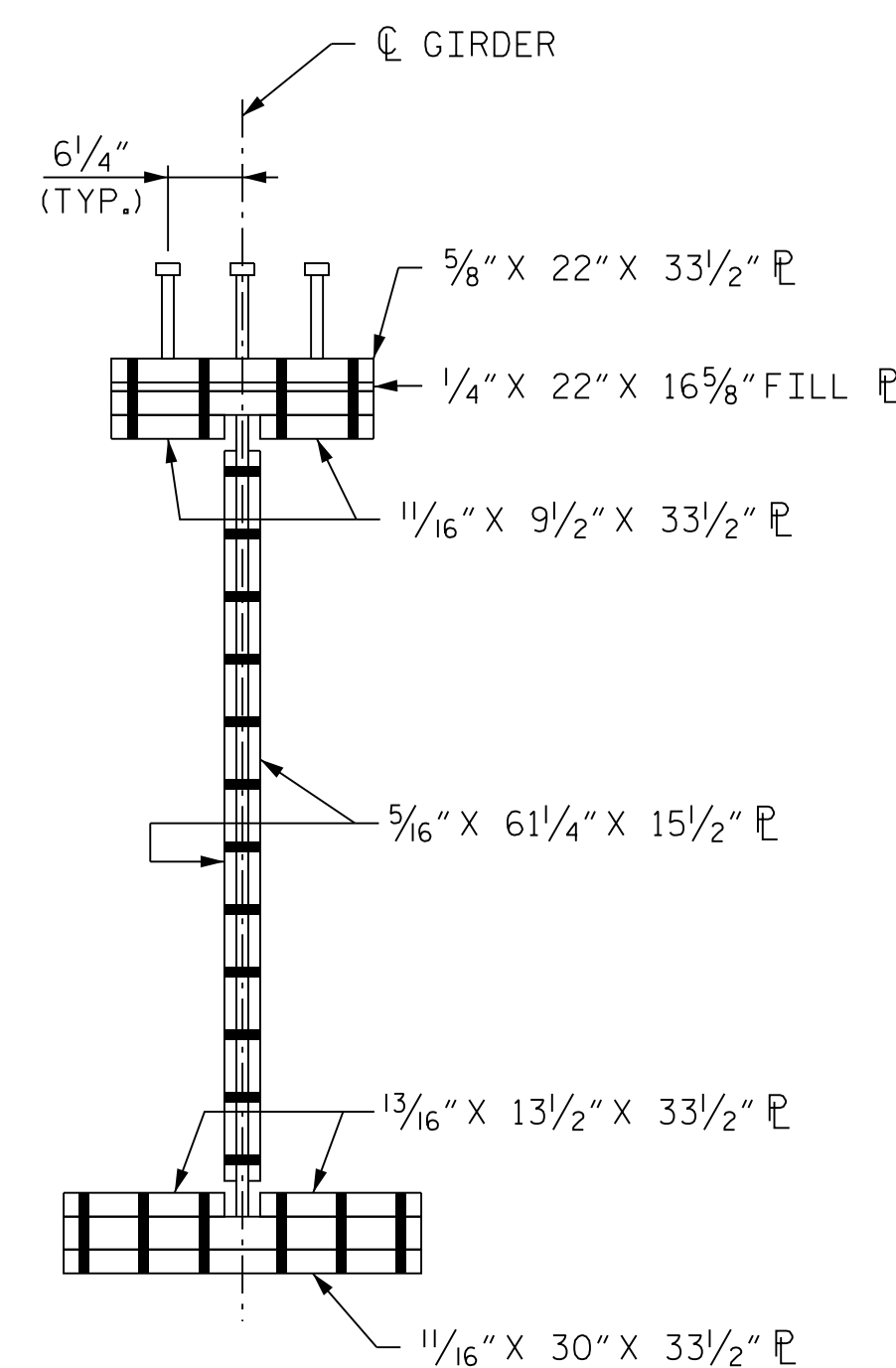
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 8 OF 14

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "H"**



Dominic A. Coletti 10/11/2021

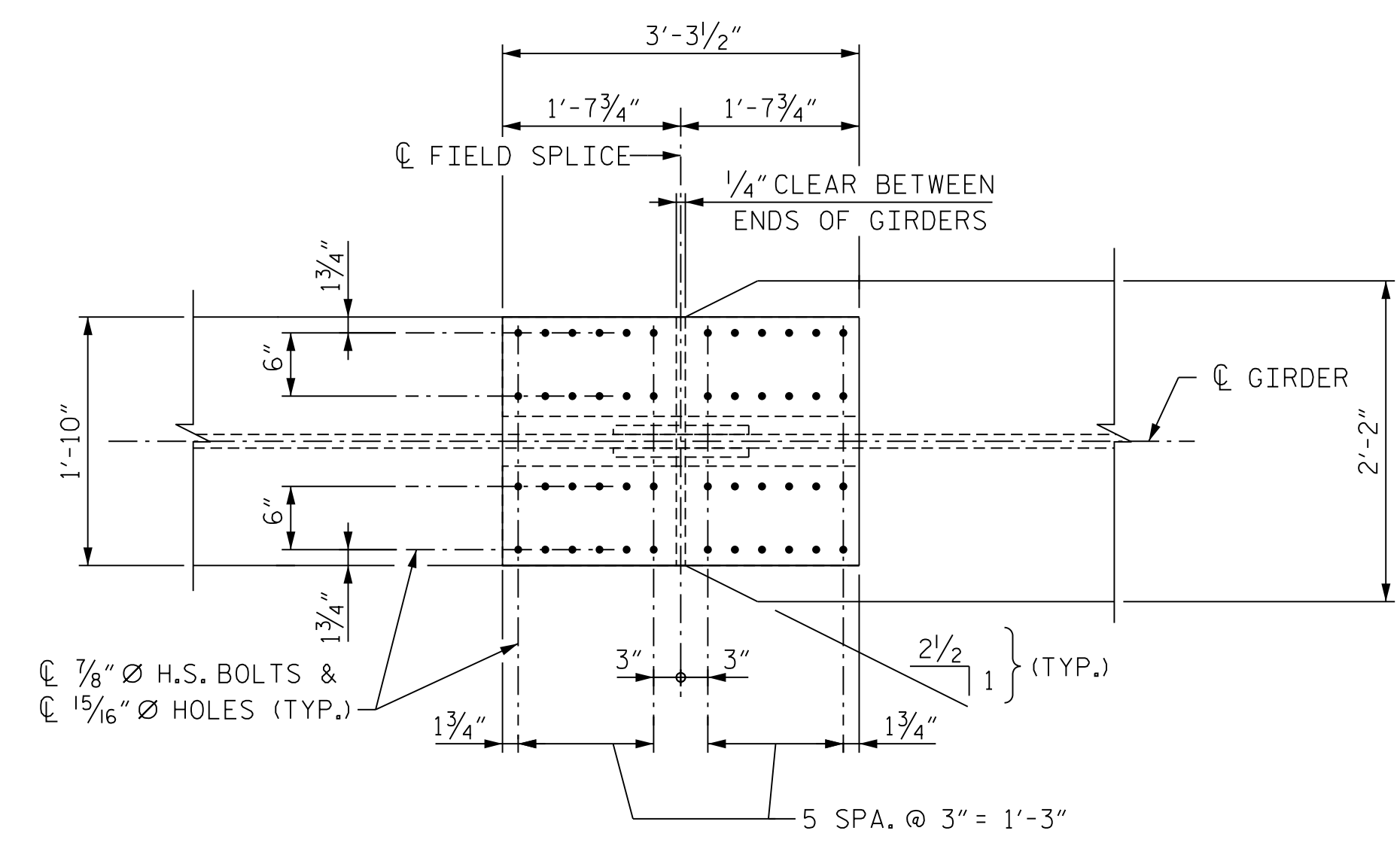
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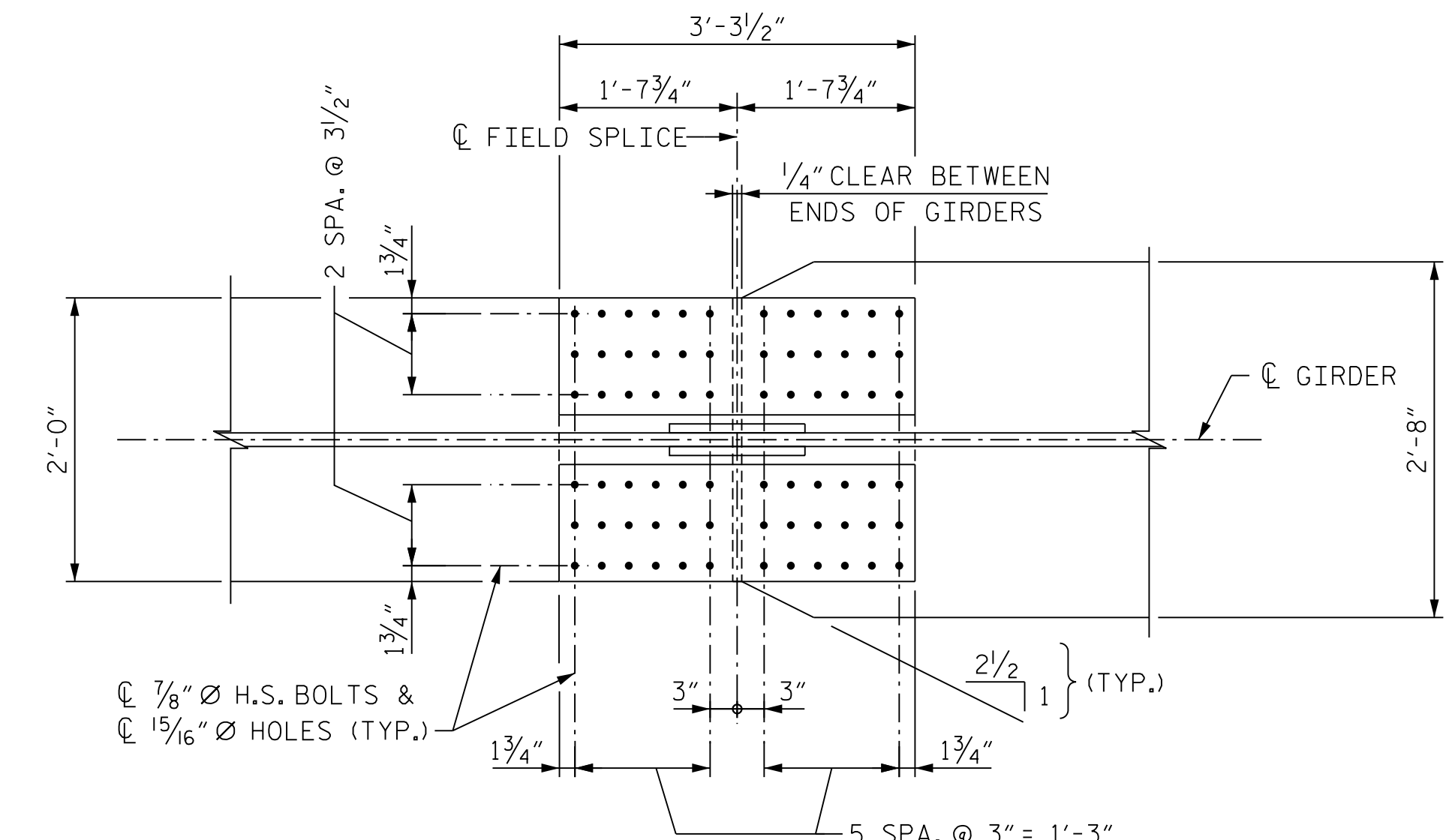
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

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DES BY: <u>S. NIFONG</u>	DATE: <u>07/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>07/19</u>
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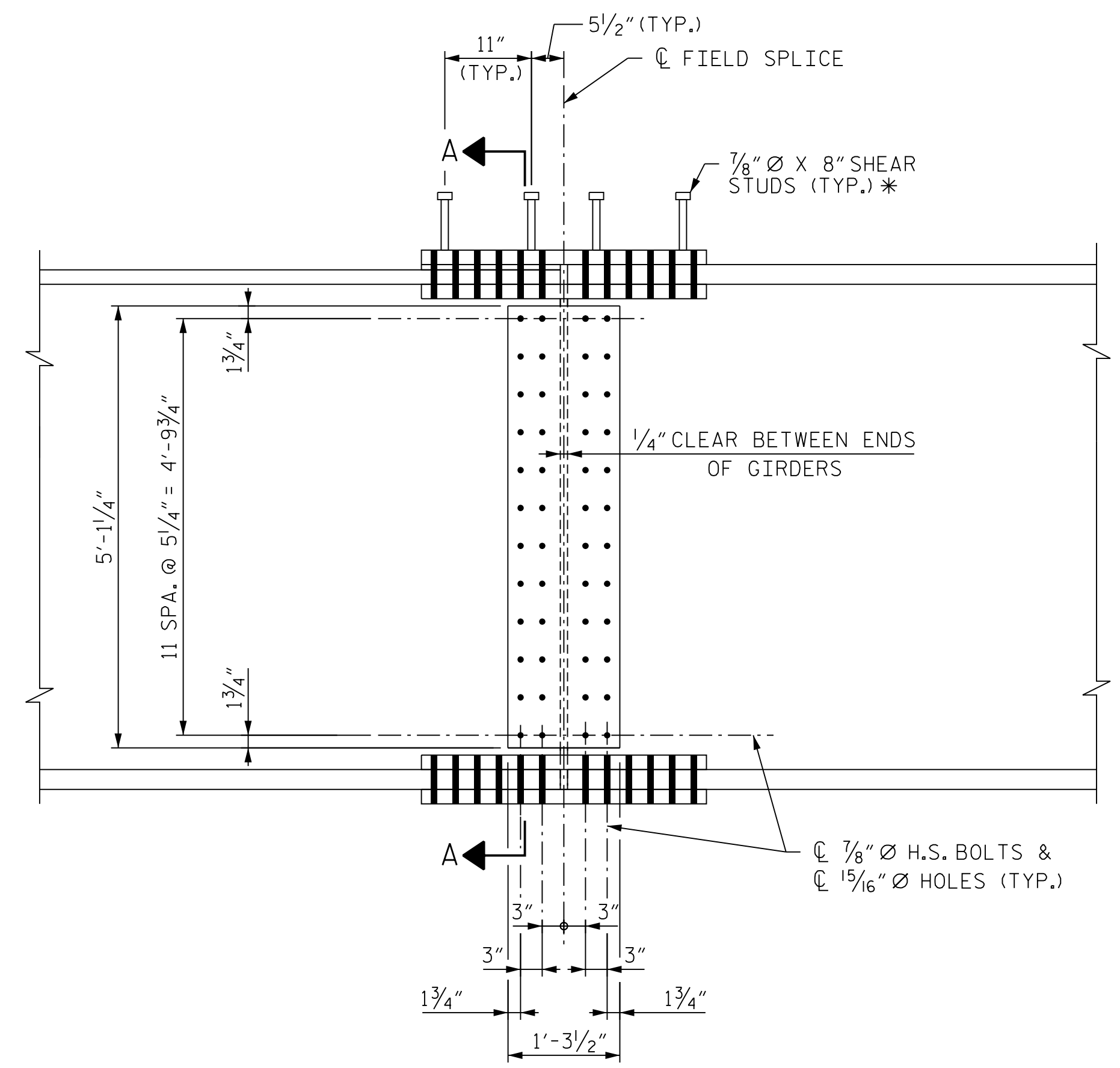


PLAN (TOP OF TOP FLANGE)
(STUDS NOT SHOWN FOR CLARITY)

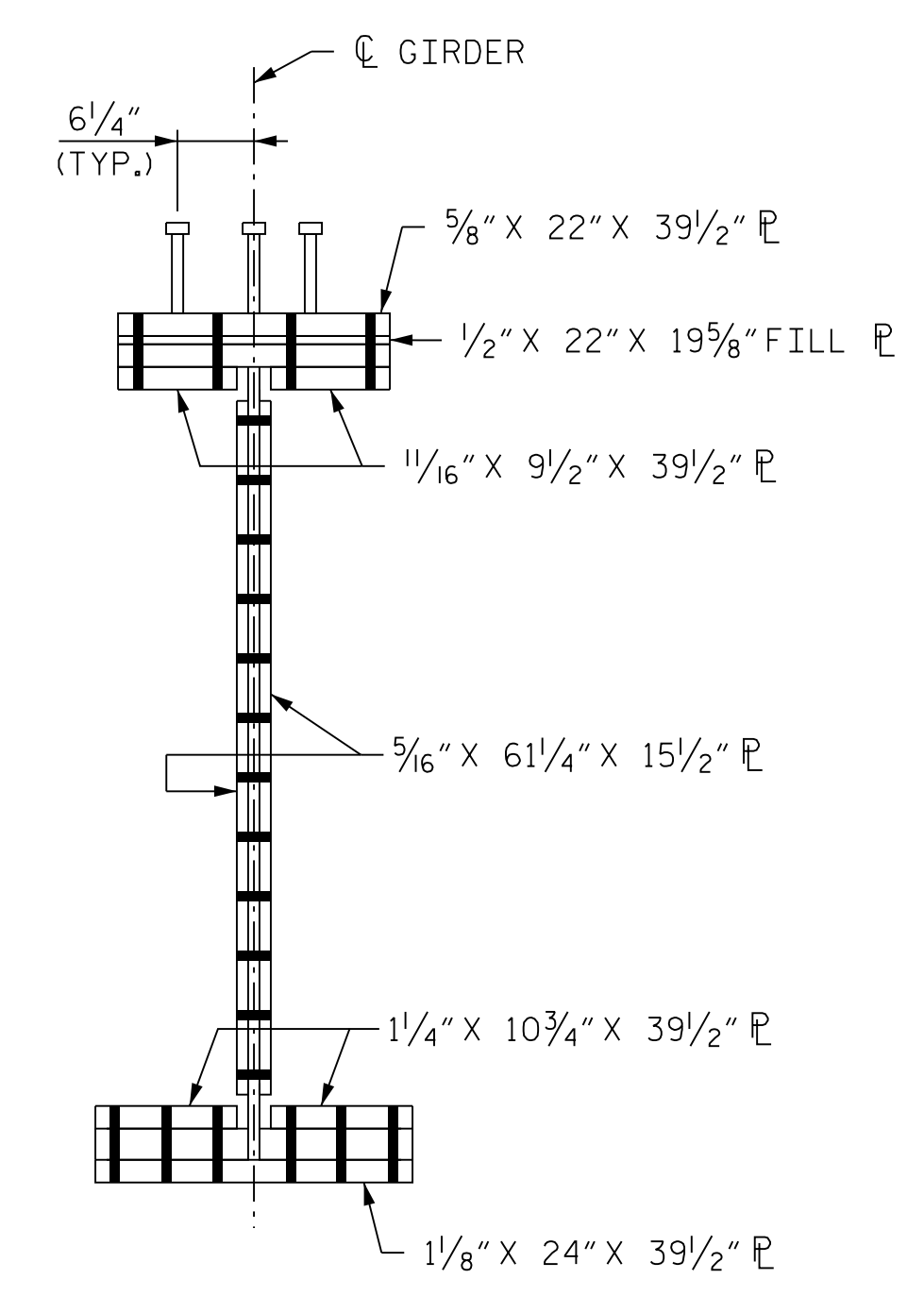


PLAN (TOP OF BOTTOM FLANGE)

* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



ELEVATION



SECTION A-A

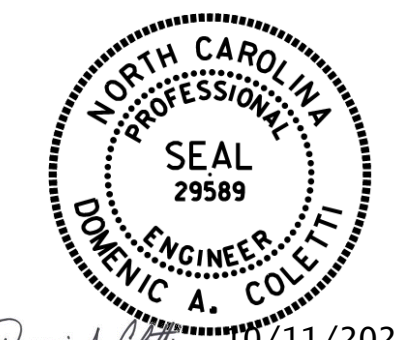
NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 9 OF 14

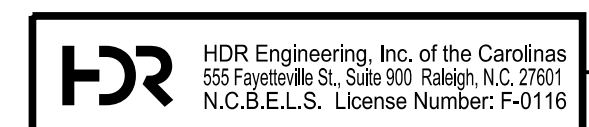
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "I"**



Dominic A. Coletti 10/11/2021

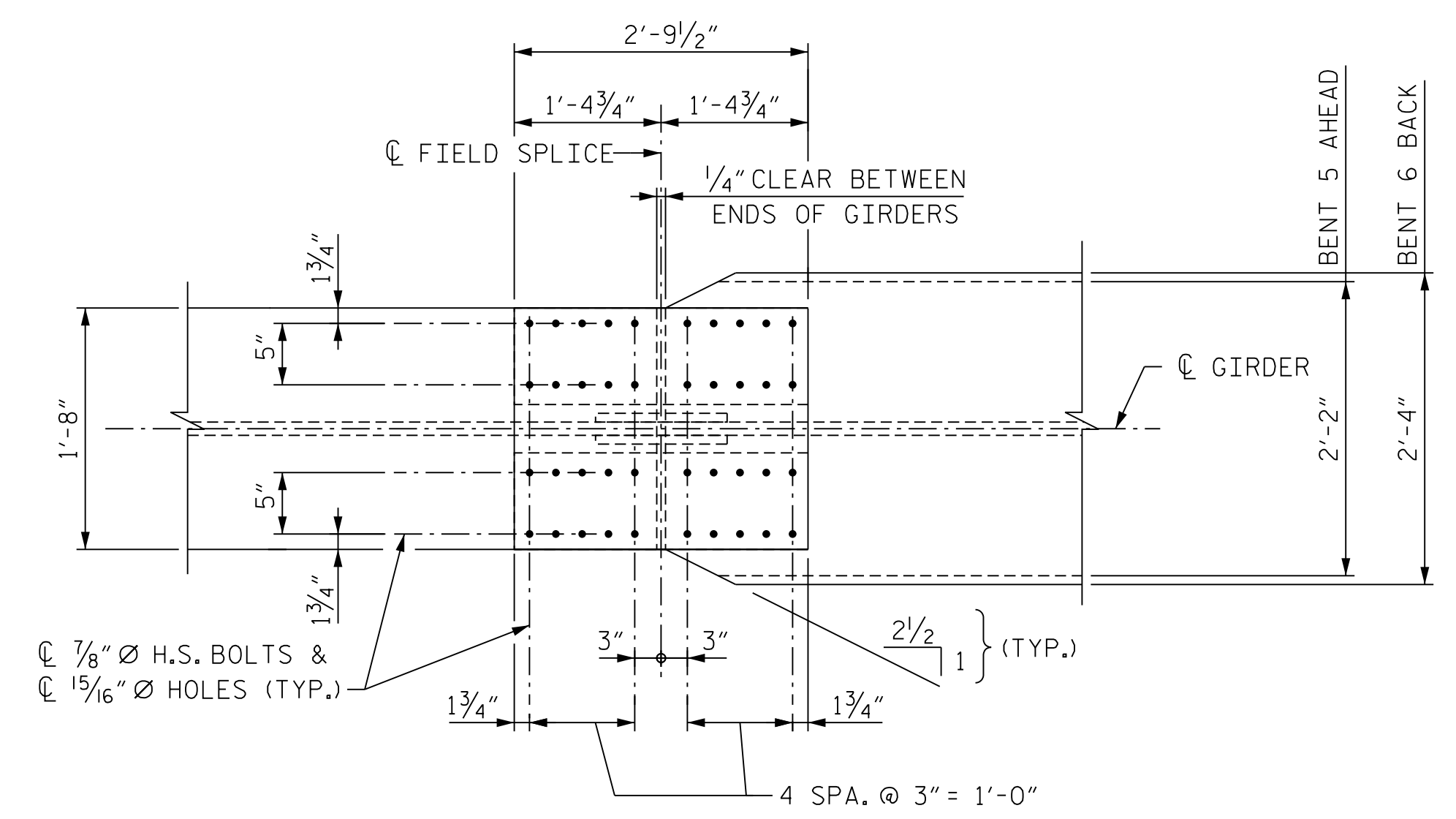
REVISIONS						SHEET NO. S05-044 TOTAL SHEETS 116
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 UNLESS ALL SIGNATURES COMPLETED**

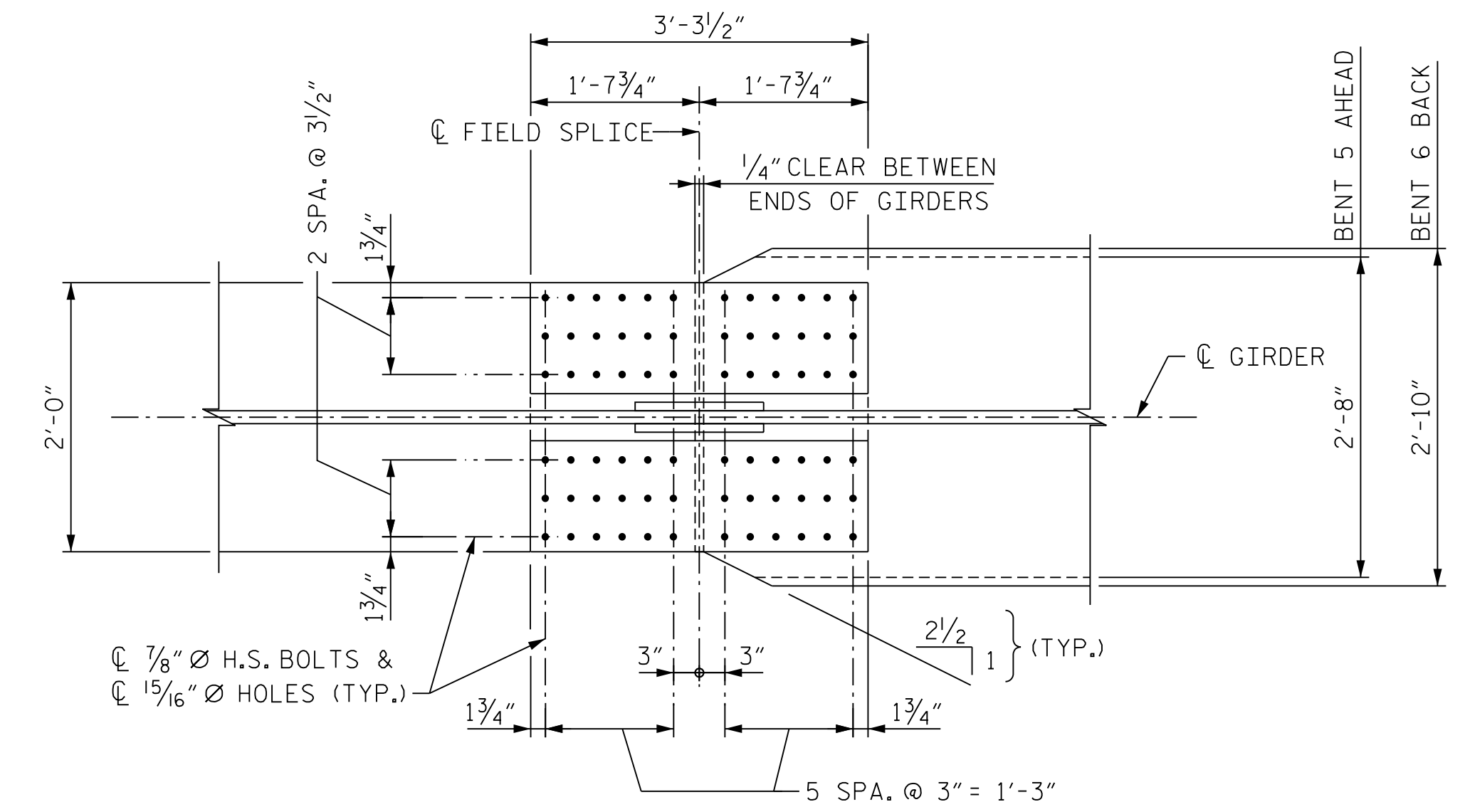
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DES BY: <u>A. MILLER</u>	DATE: <u>08/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>07/19</u>
DES CHK: <u>M. NEIHEISEL</u>	DATE: <u>08/19</u>	CHK BY: <u>D. OLDS</u>	DATE: <u>10/19</u>

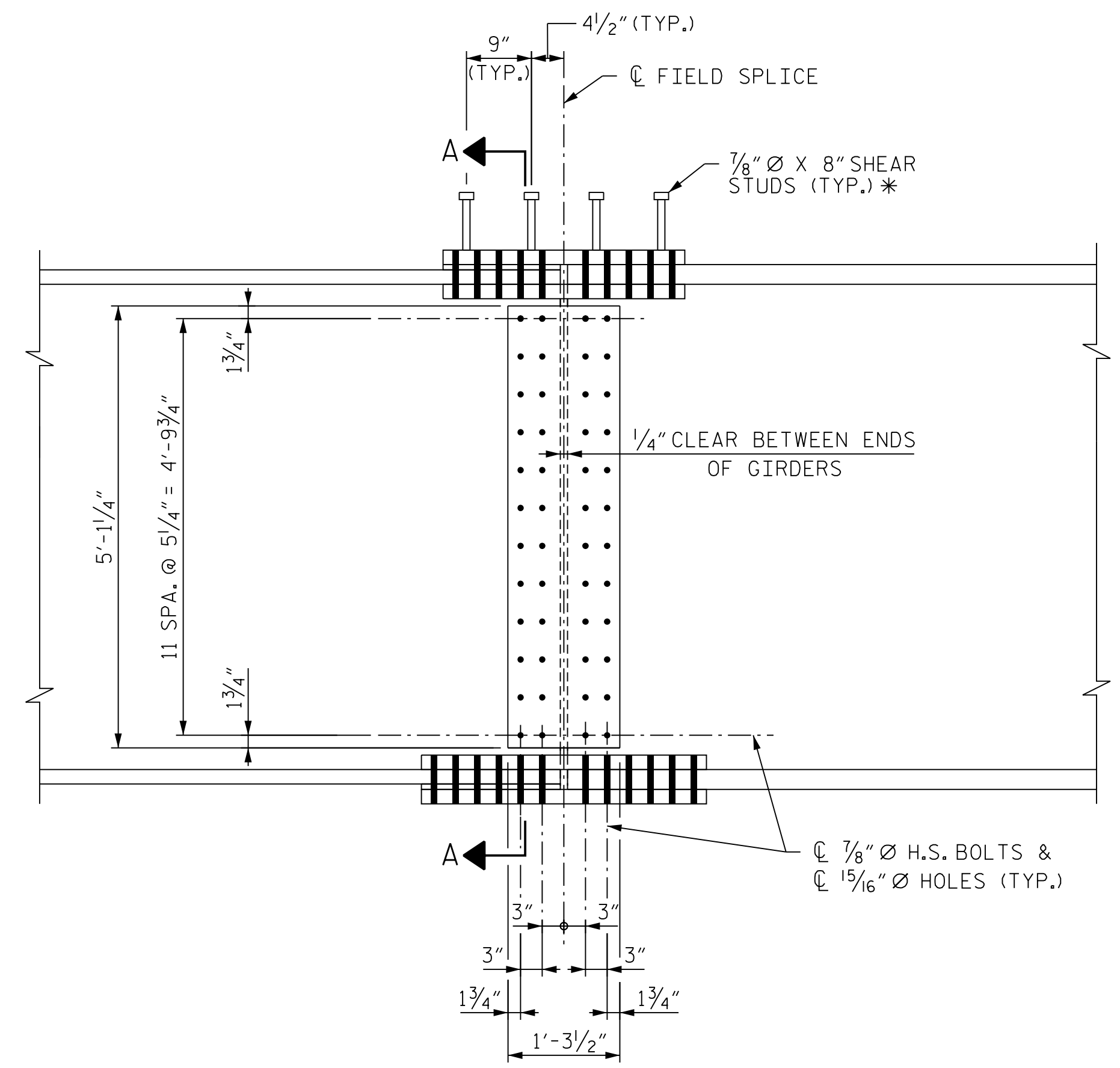


PLAN (TOP OF TOP FLANGE)
(STUDS NOT SHOWN FOR CLARITY)

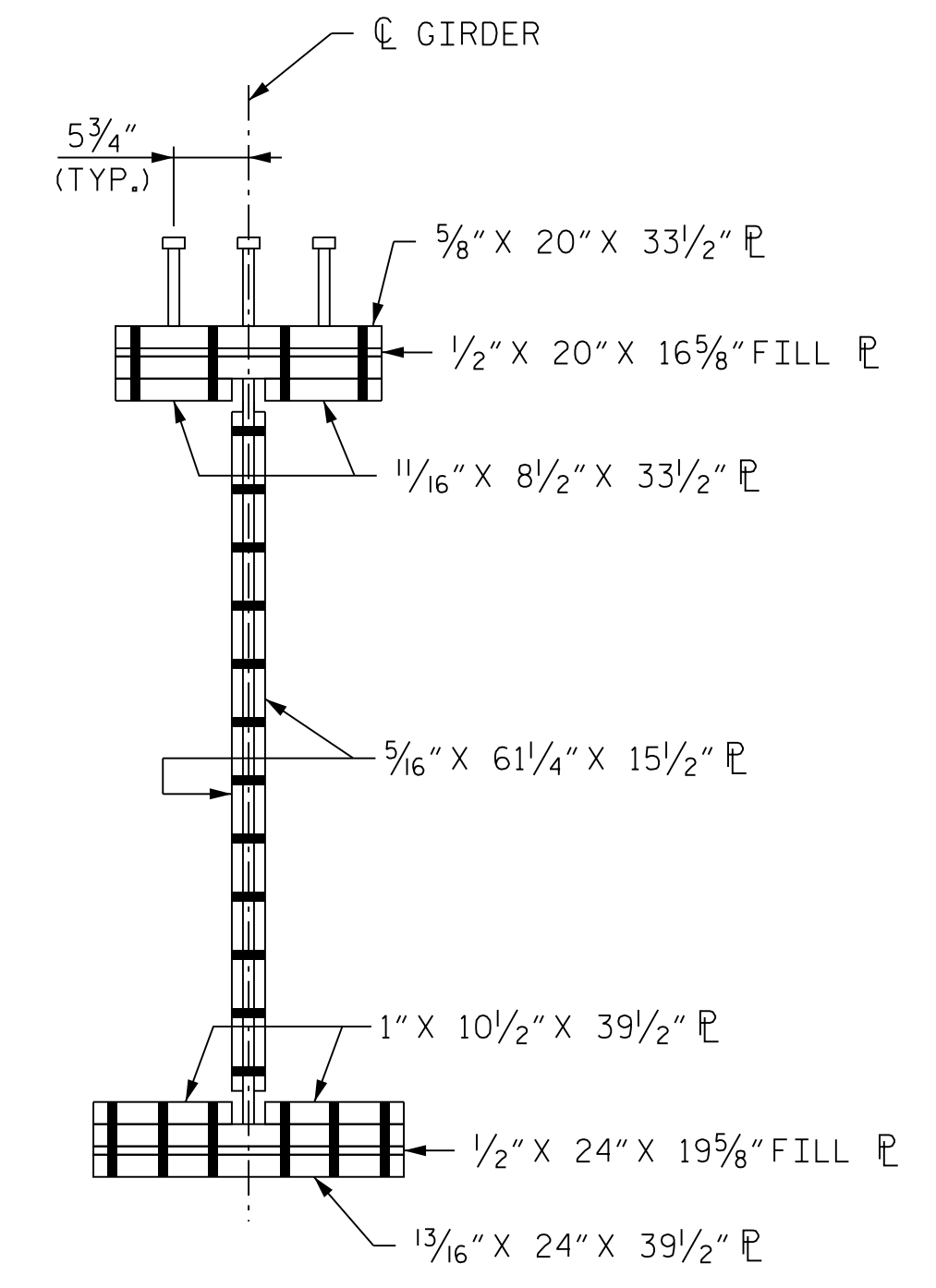
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 10 OF 14

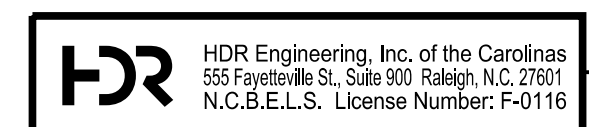


10/11/2021

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "J"**

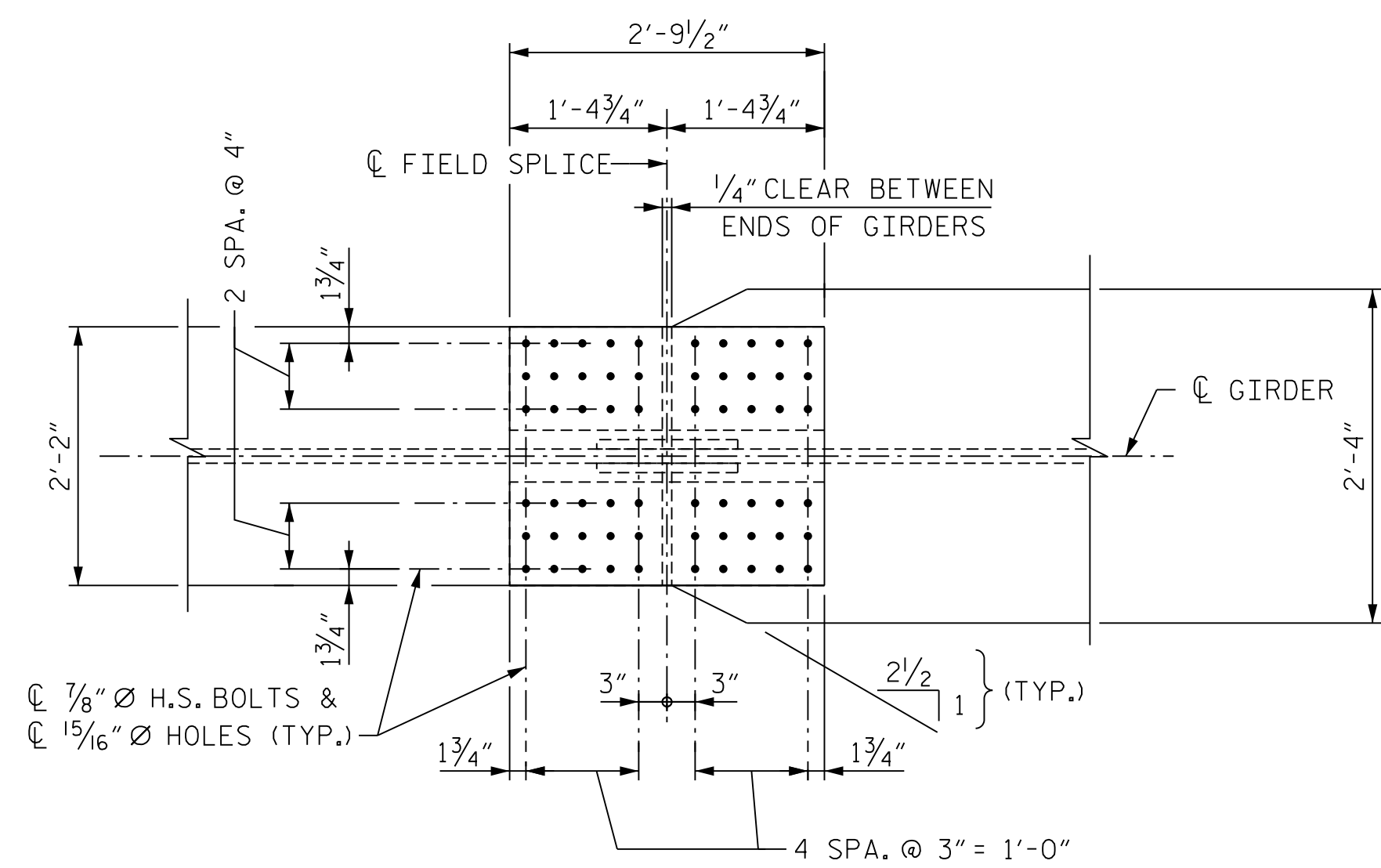
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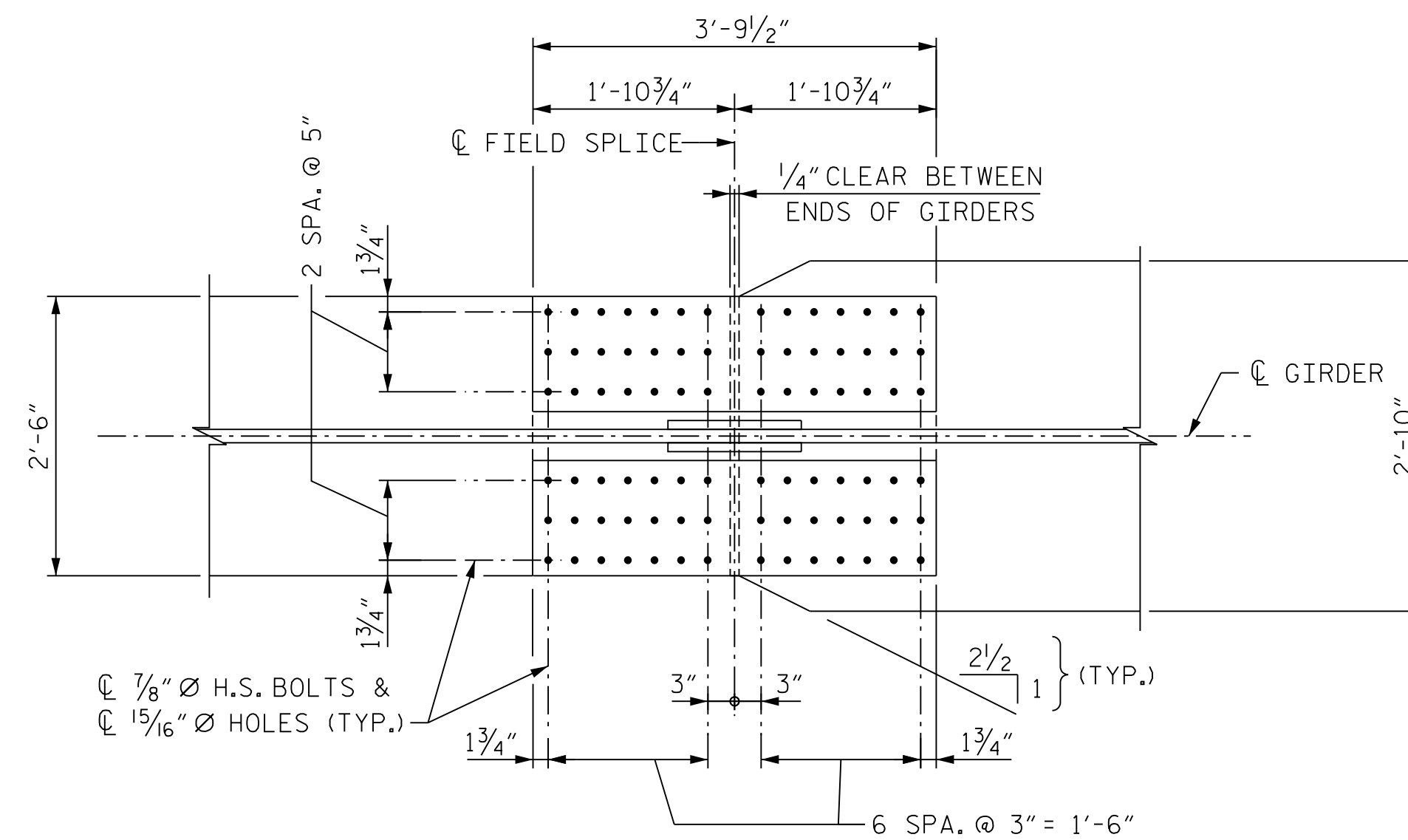
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DES CHK: <u>M. NEIHEISEL</u>	DATE: <u>08/19</u>	CHK BY: <u>D. OLDS</u>	DATE: <u>10/19</u>



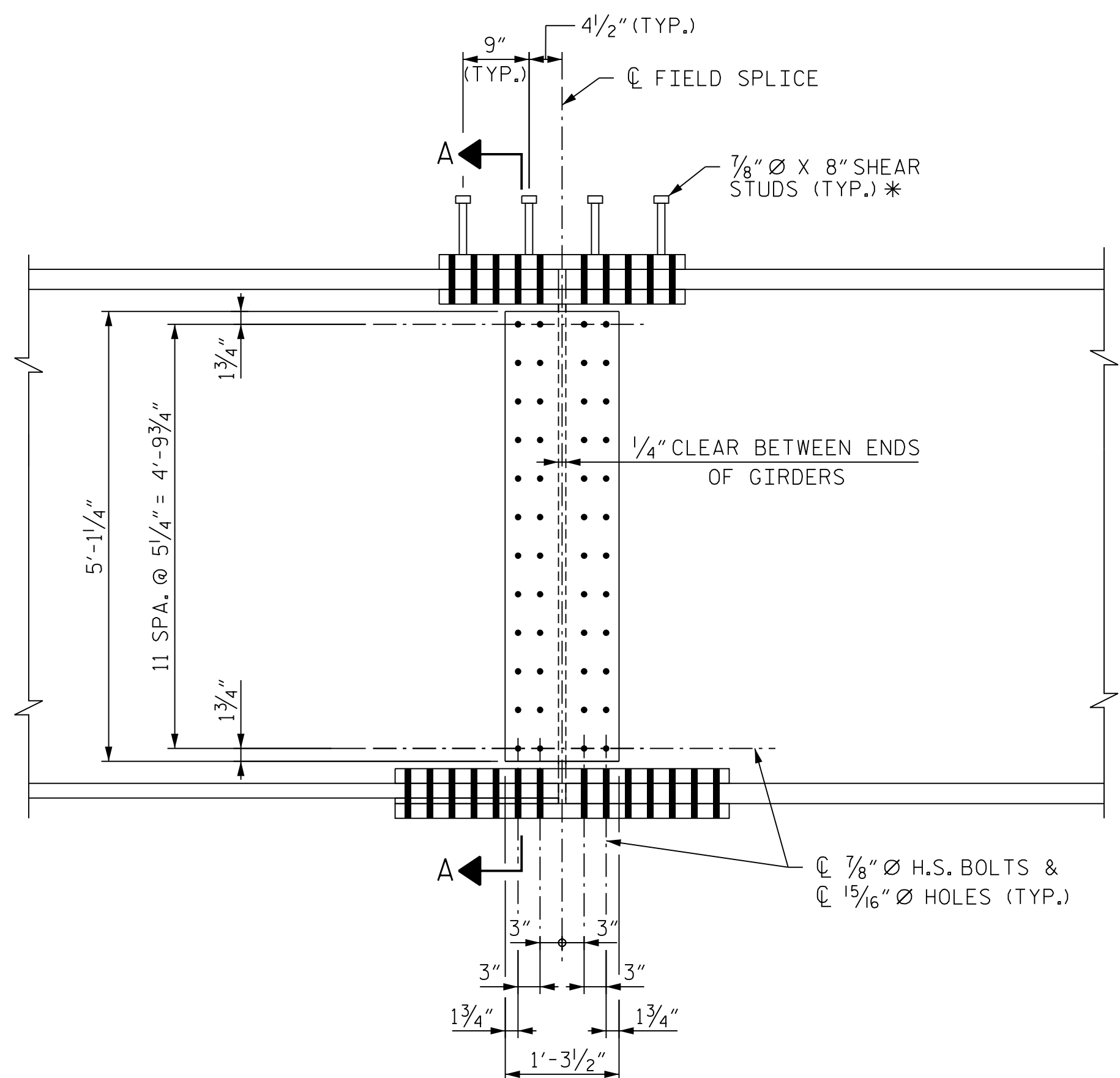
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(STUDS NOT SHOWN FOR CLARITY)

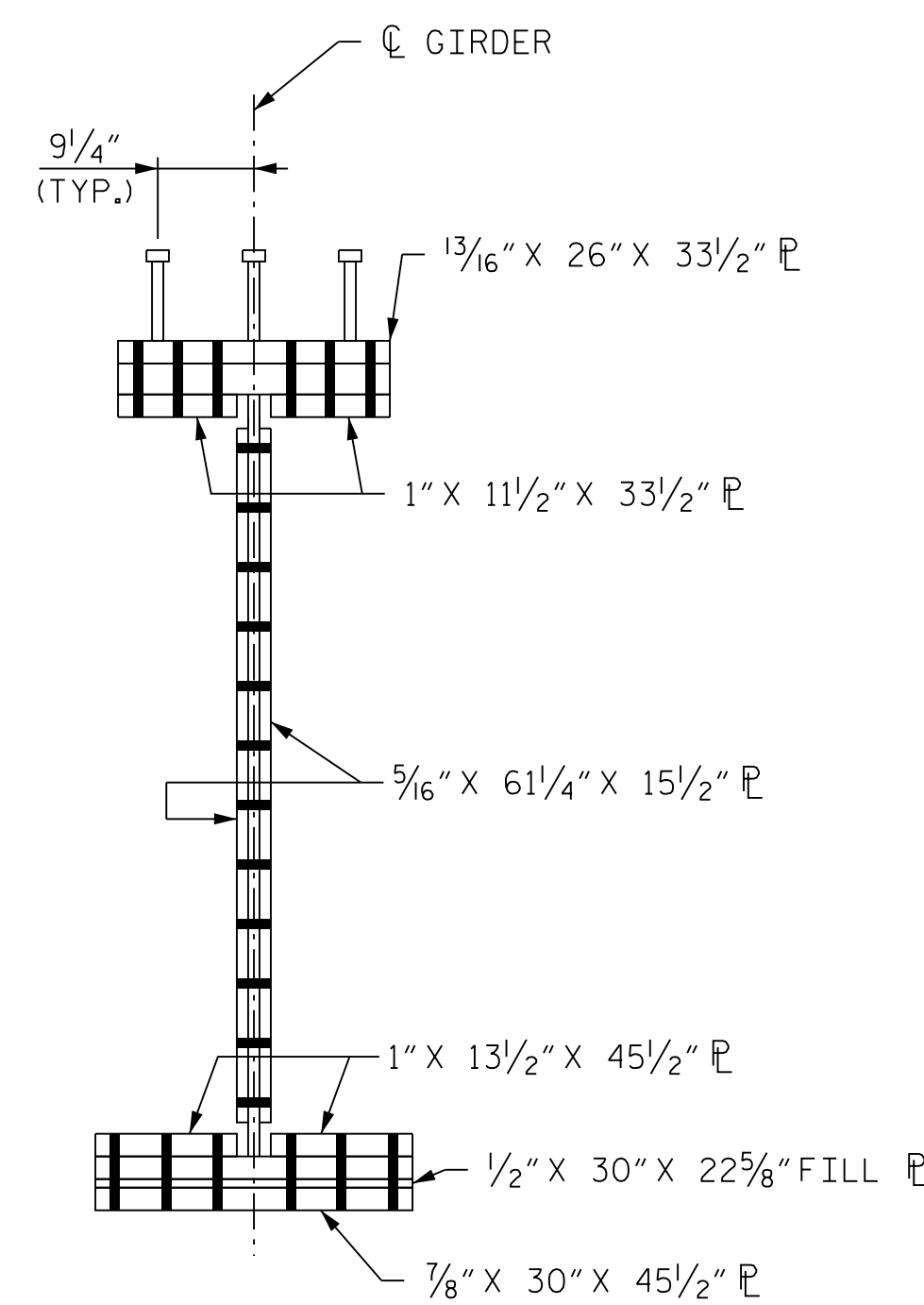
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 11 OF 14

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "K"**



Dominic A. Coletti 10/11/2021

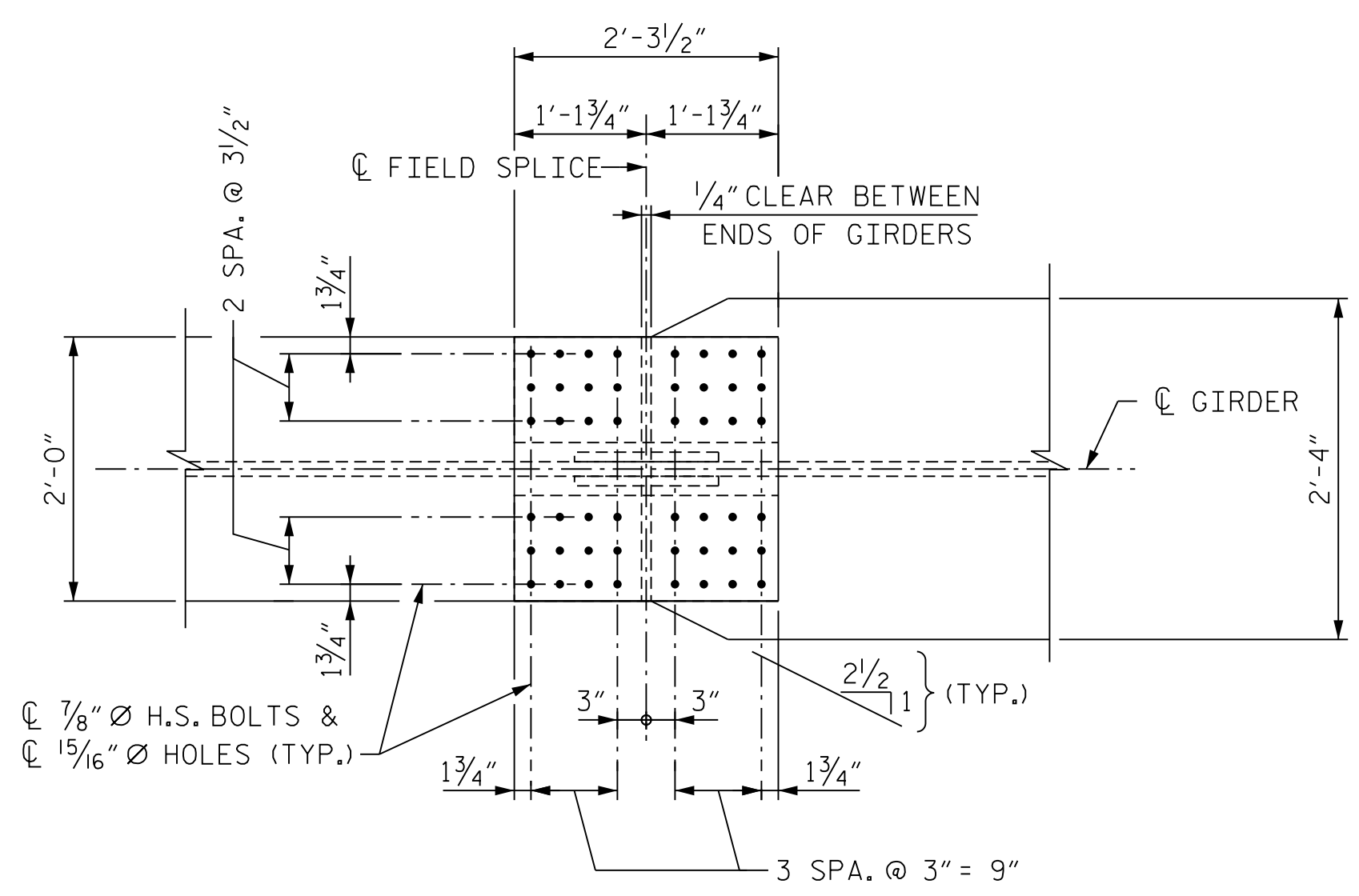
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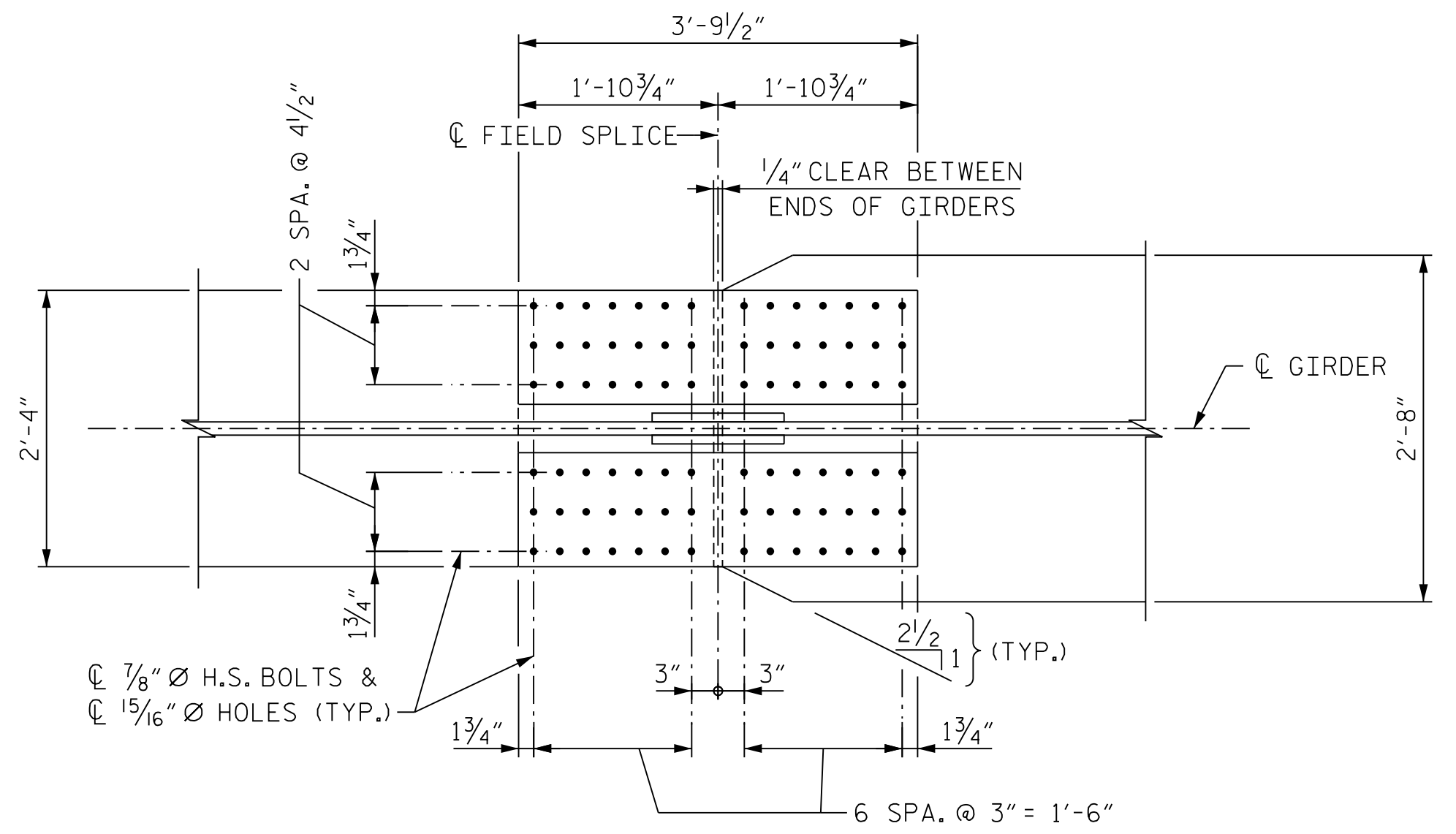
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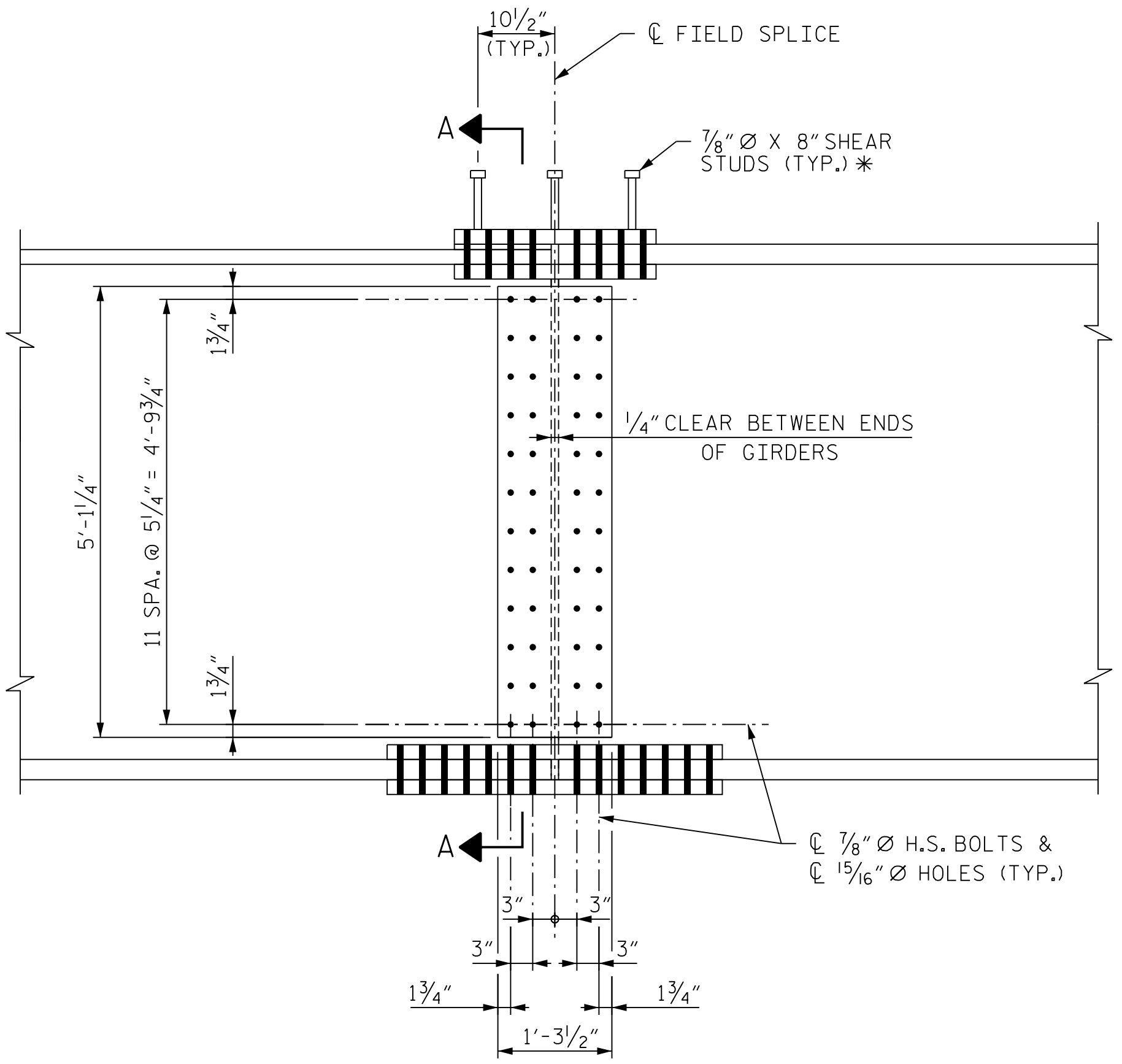


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(STUDS NOT SHOWN FOR CLARITY)

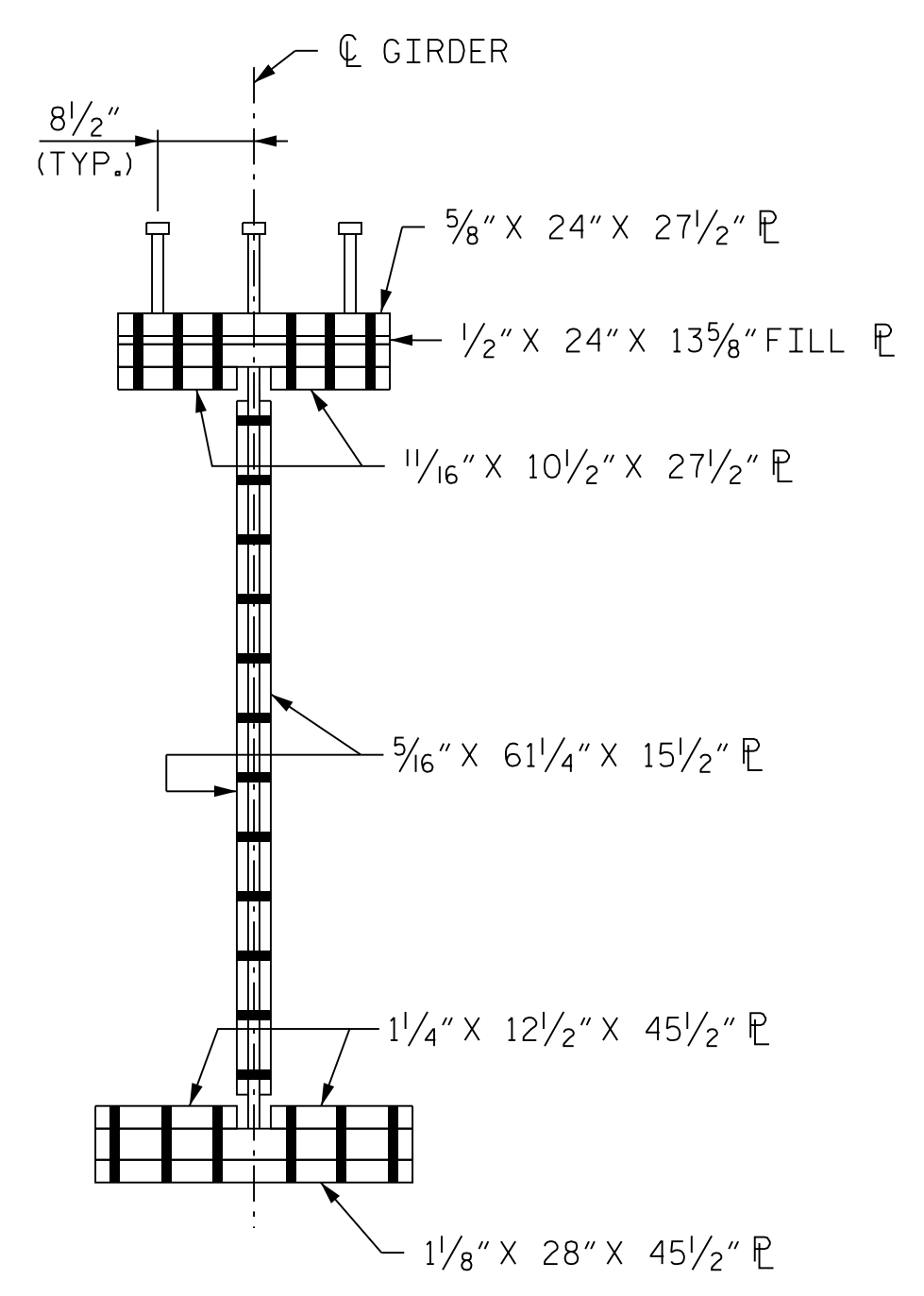
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PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 12 OF 14

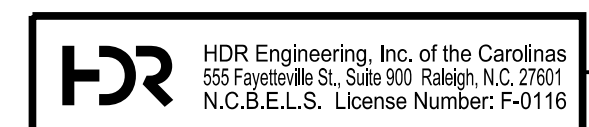
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "L"**



10/11/2021

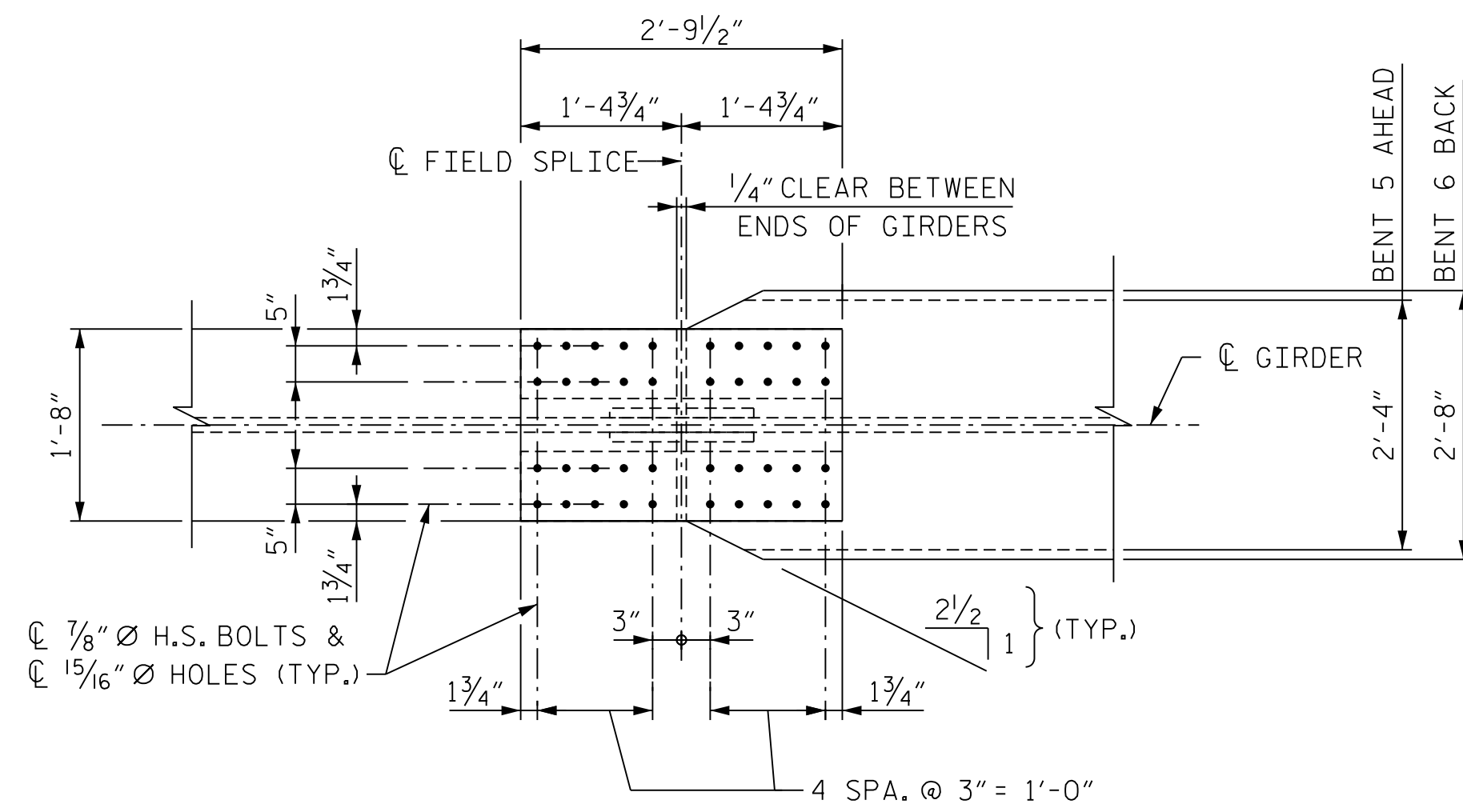
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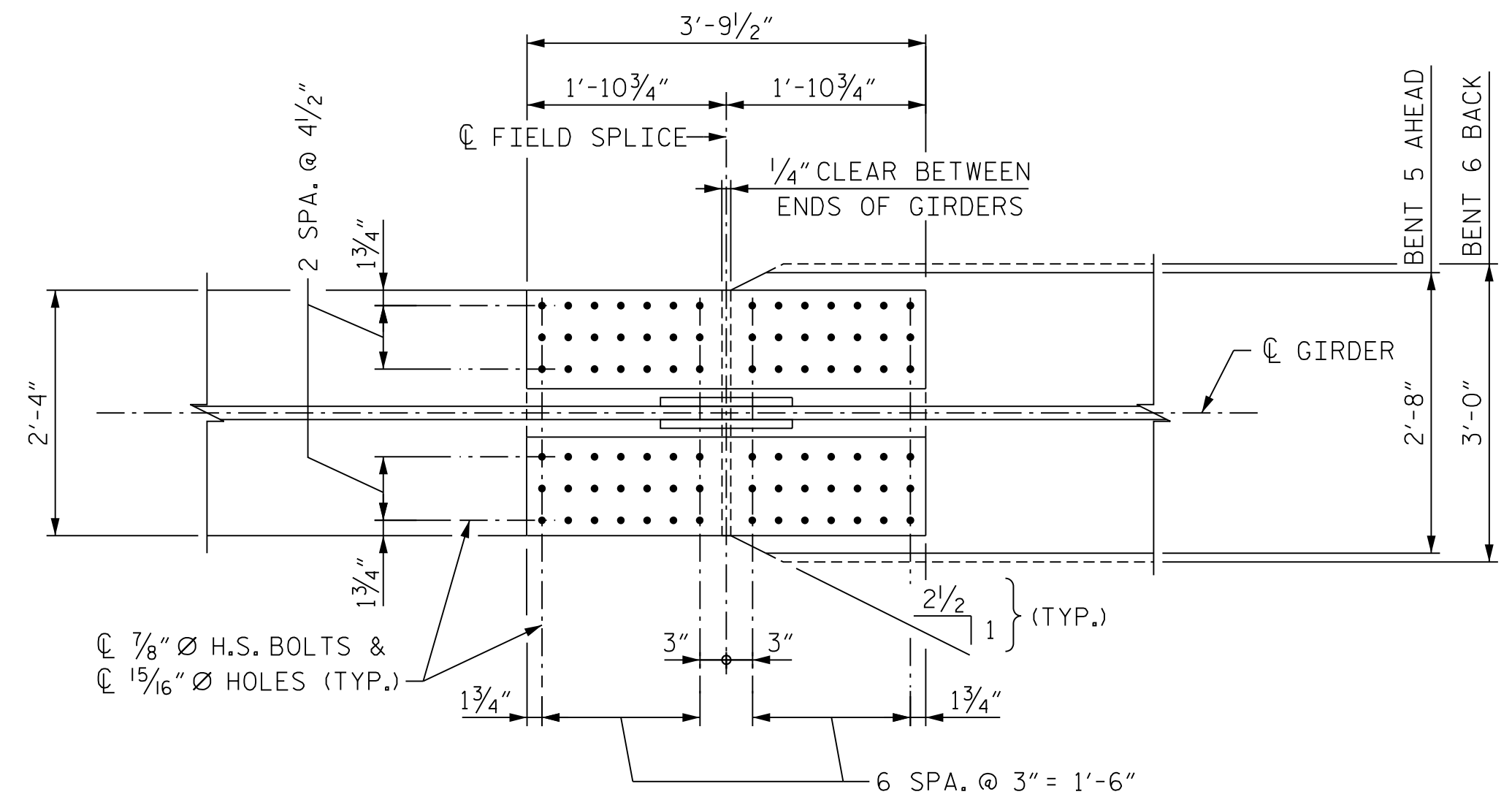
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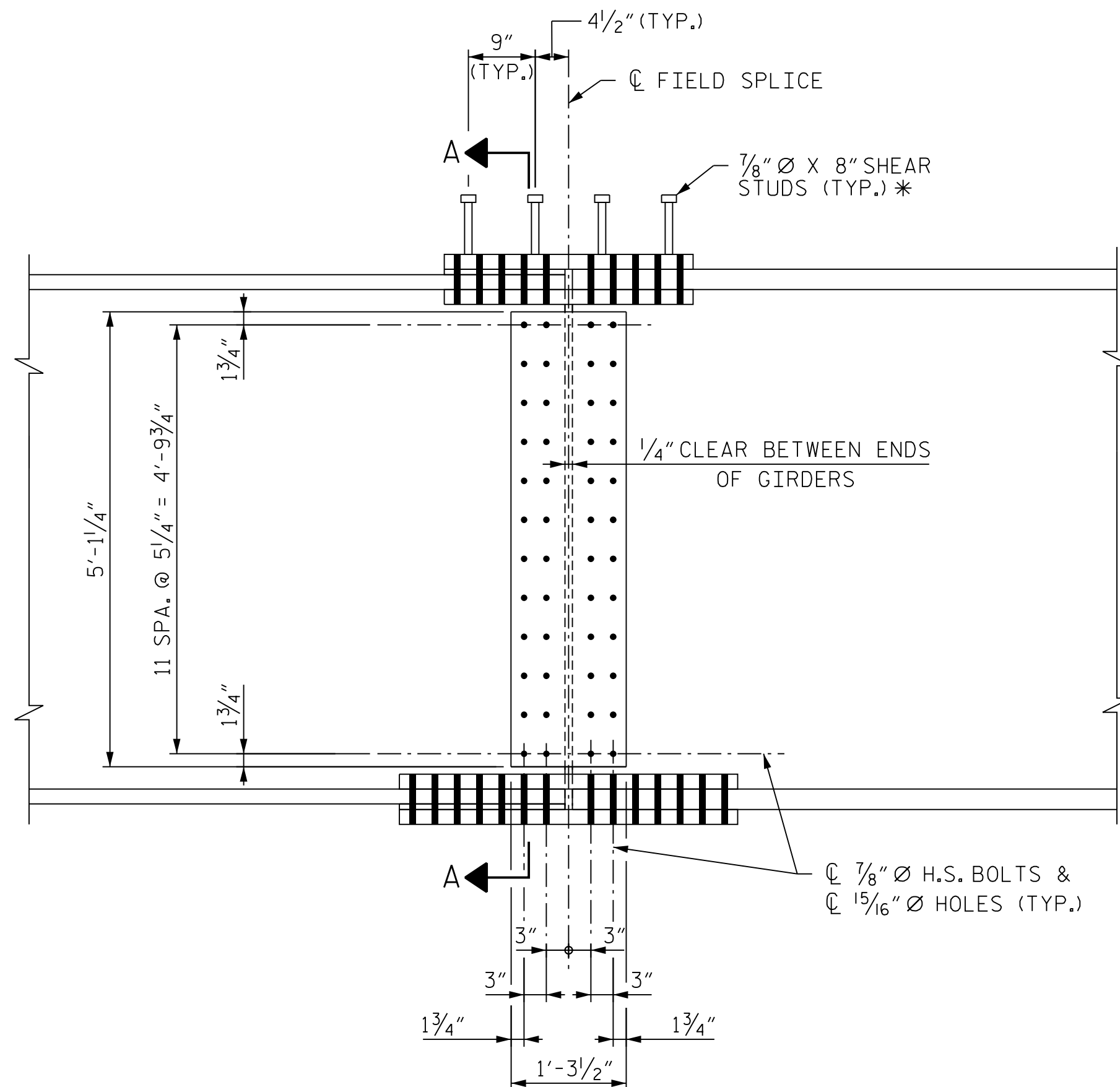
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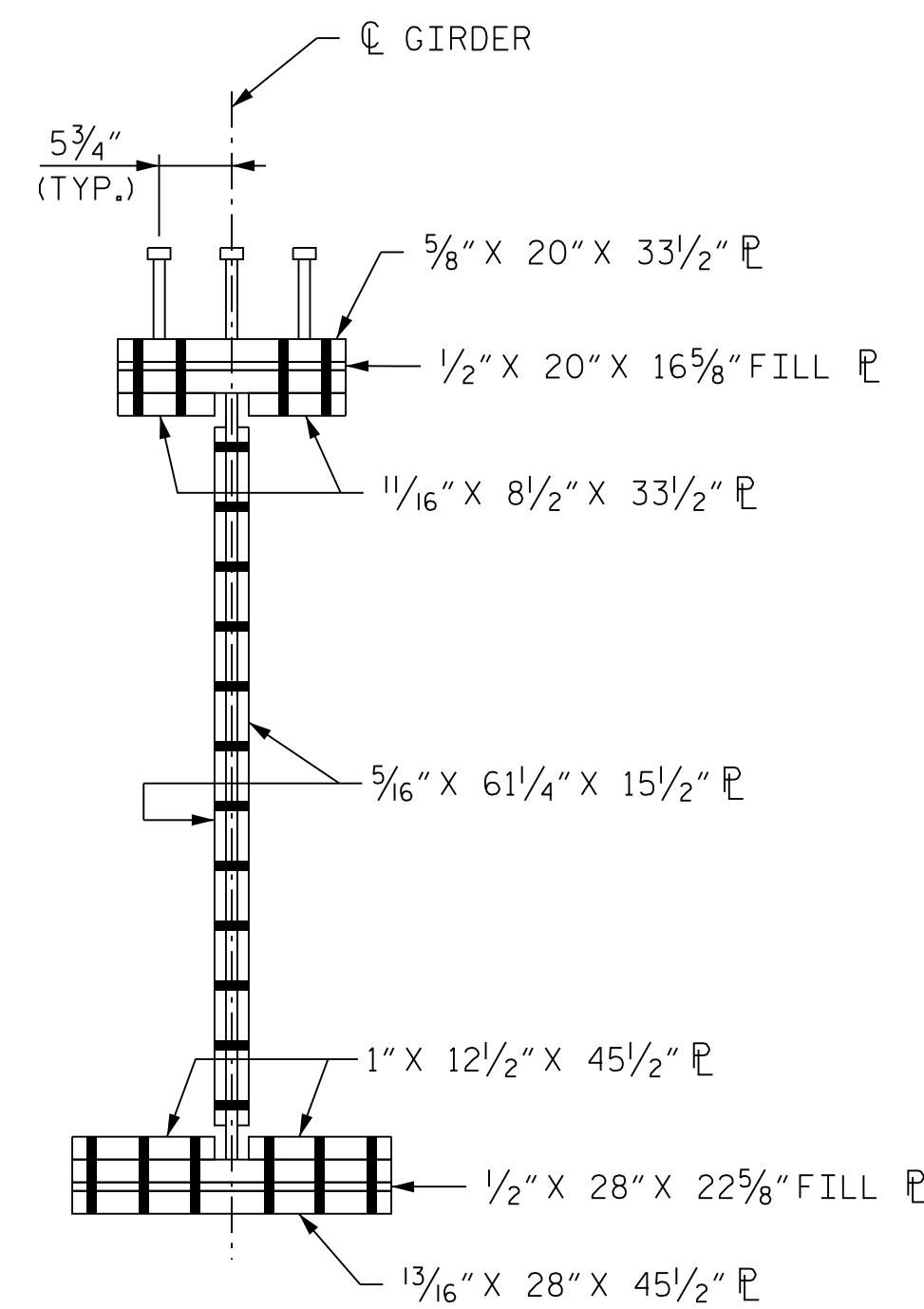
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 13 OF 14

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "M"**



10/11/2021

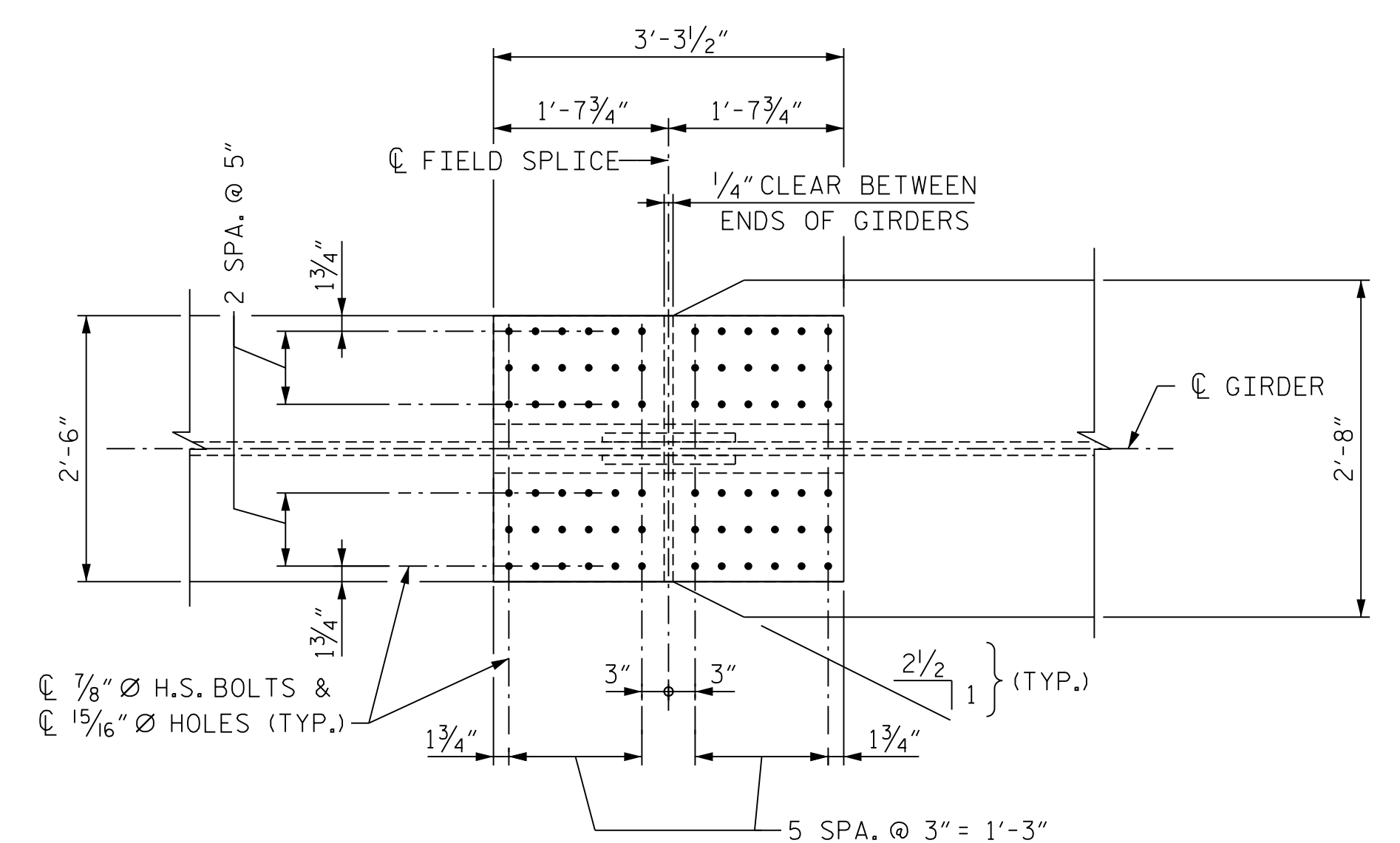
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DES CHK: <u>M. NEIHEISEL</u>	DATE: <u>08/19</u>	CHK BY: <u>D. OLDS</u>	DATE: <u>10/19</u>



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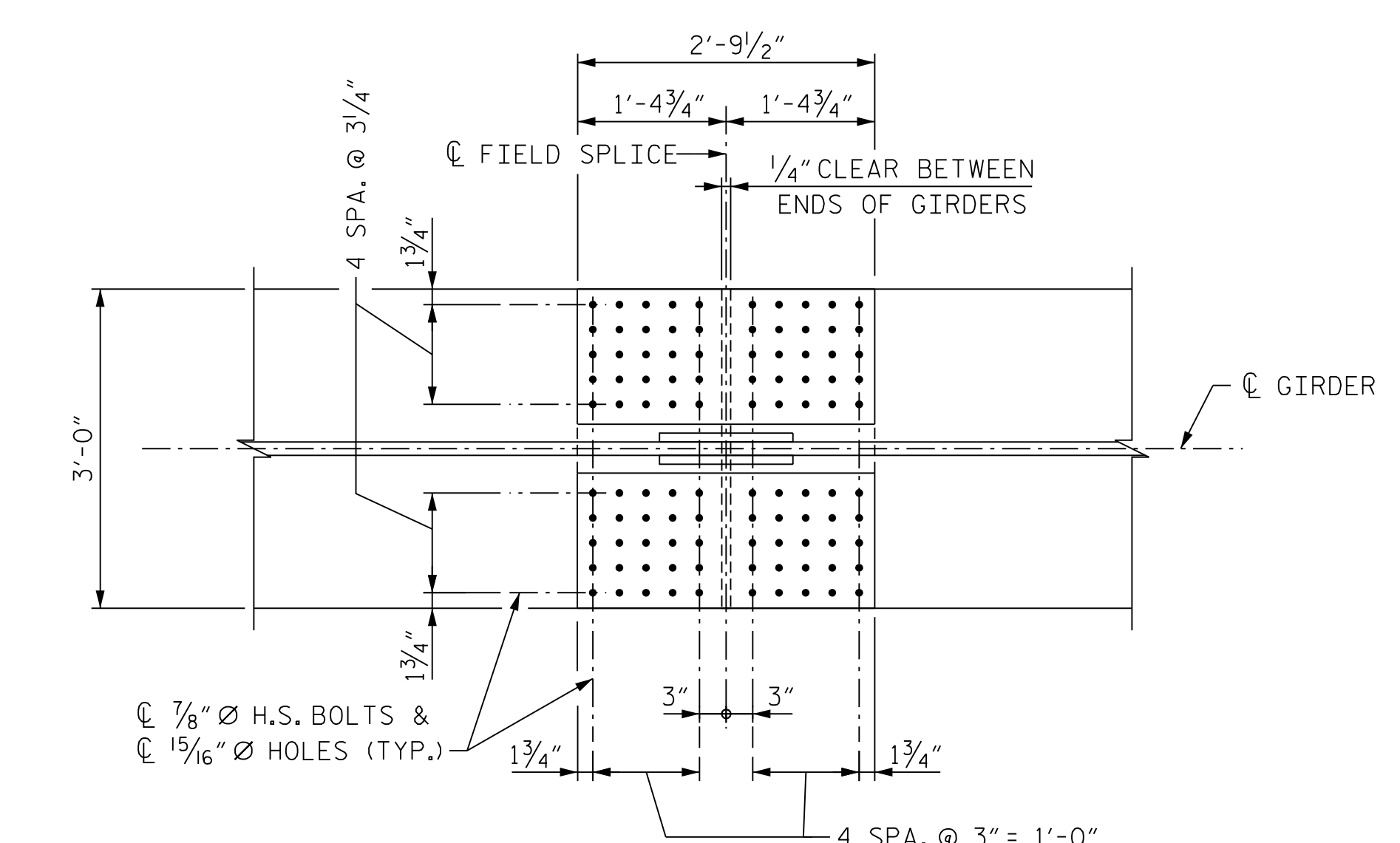
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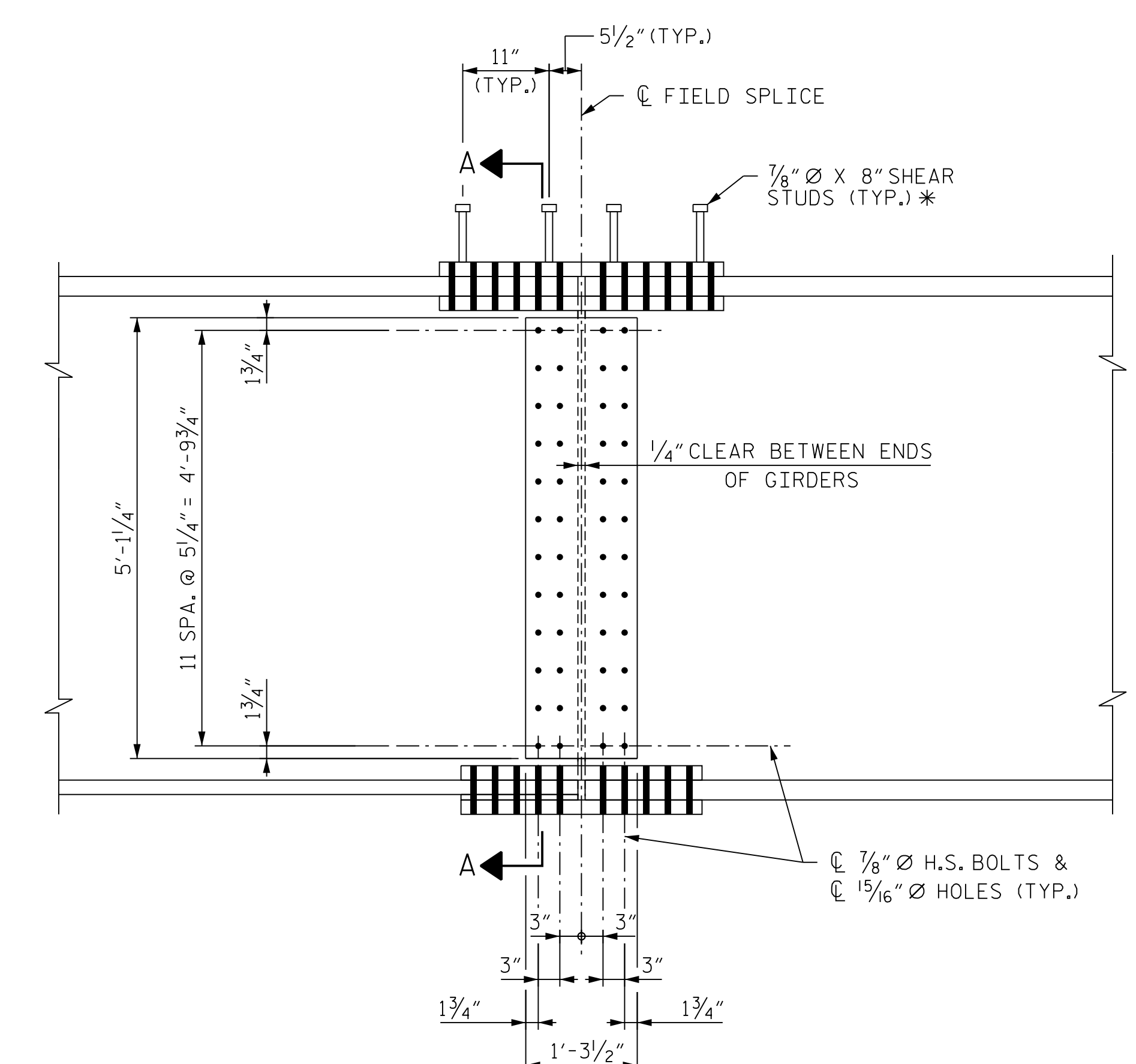


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(STUDS NOT SHOWN FOR CLARITY)

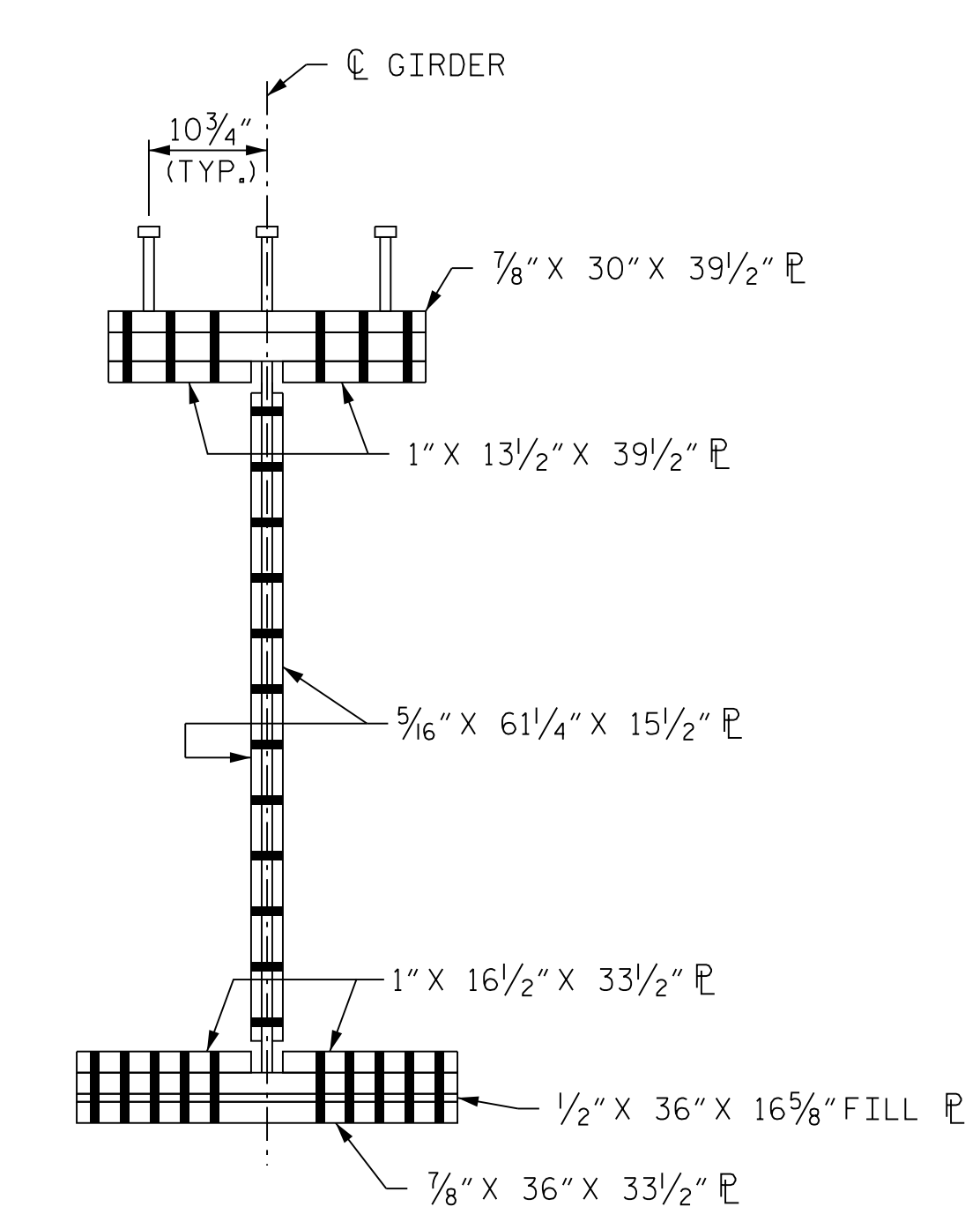
* = SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTE
ORIENTATION OF PLAN AND ELEVATION VIEWS MAY VARY BASED ON FIELD SPLICE LOCATION

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 14 OF 14

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 BOLTED FIELD SPLICE
 DETAILS - TYPE "N"**



10/11/2021

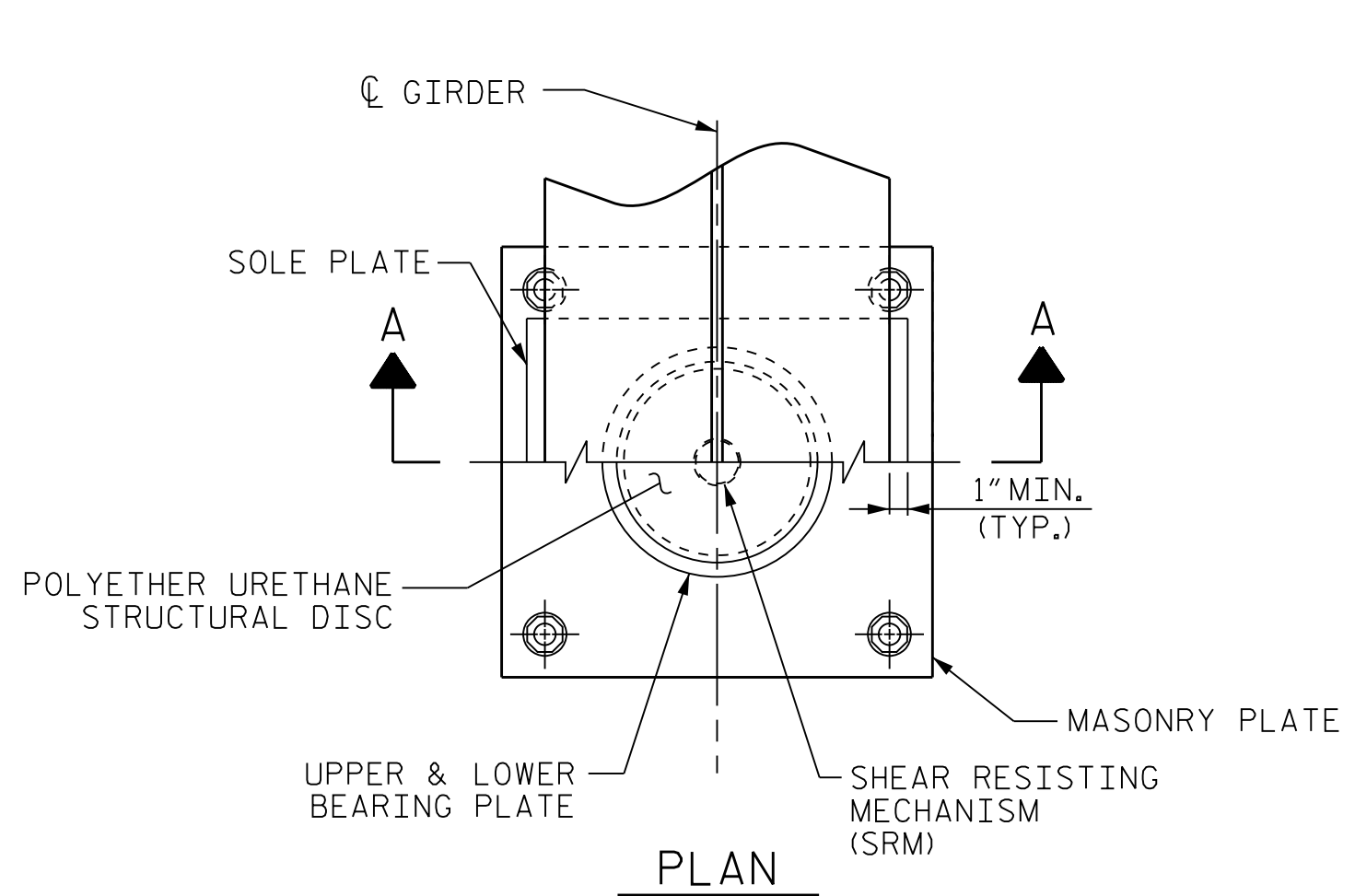
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HDR HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

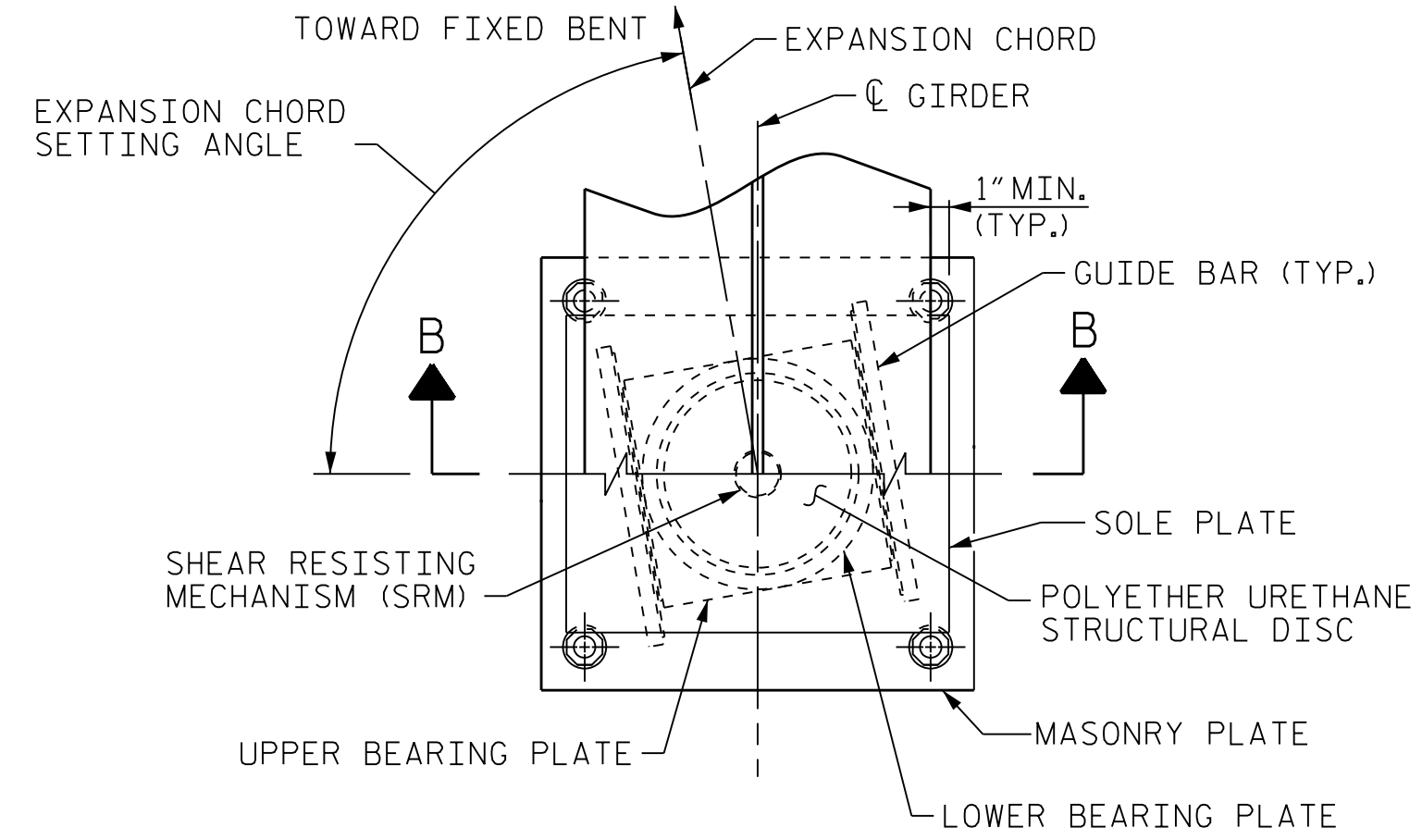
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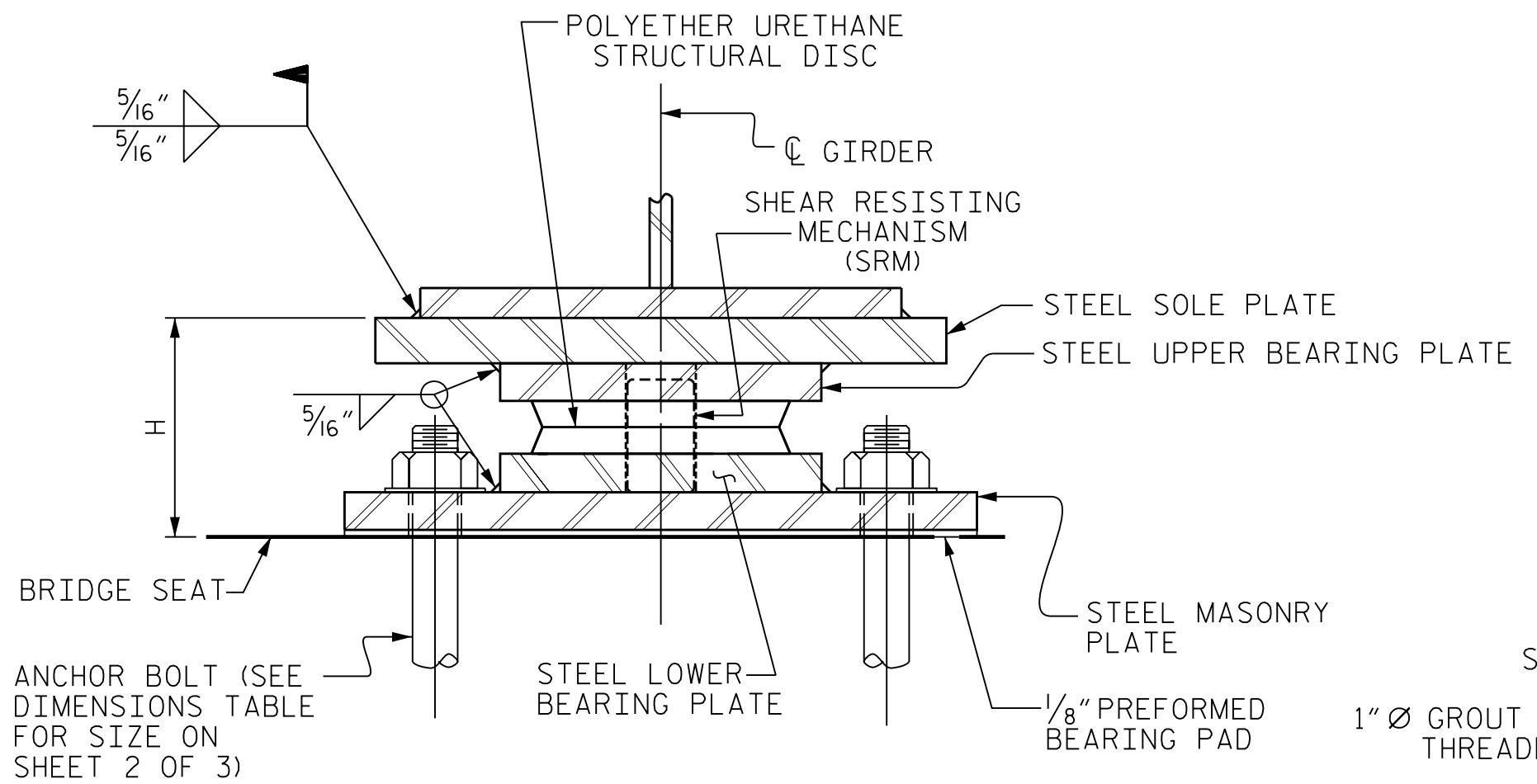
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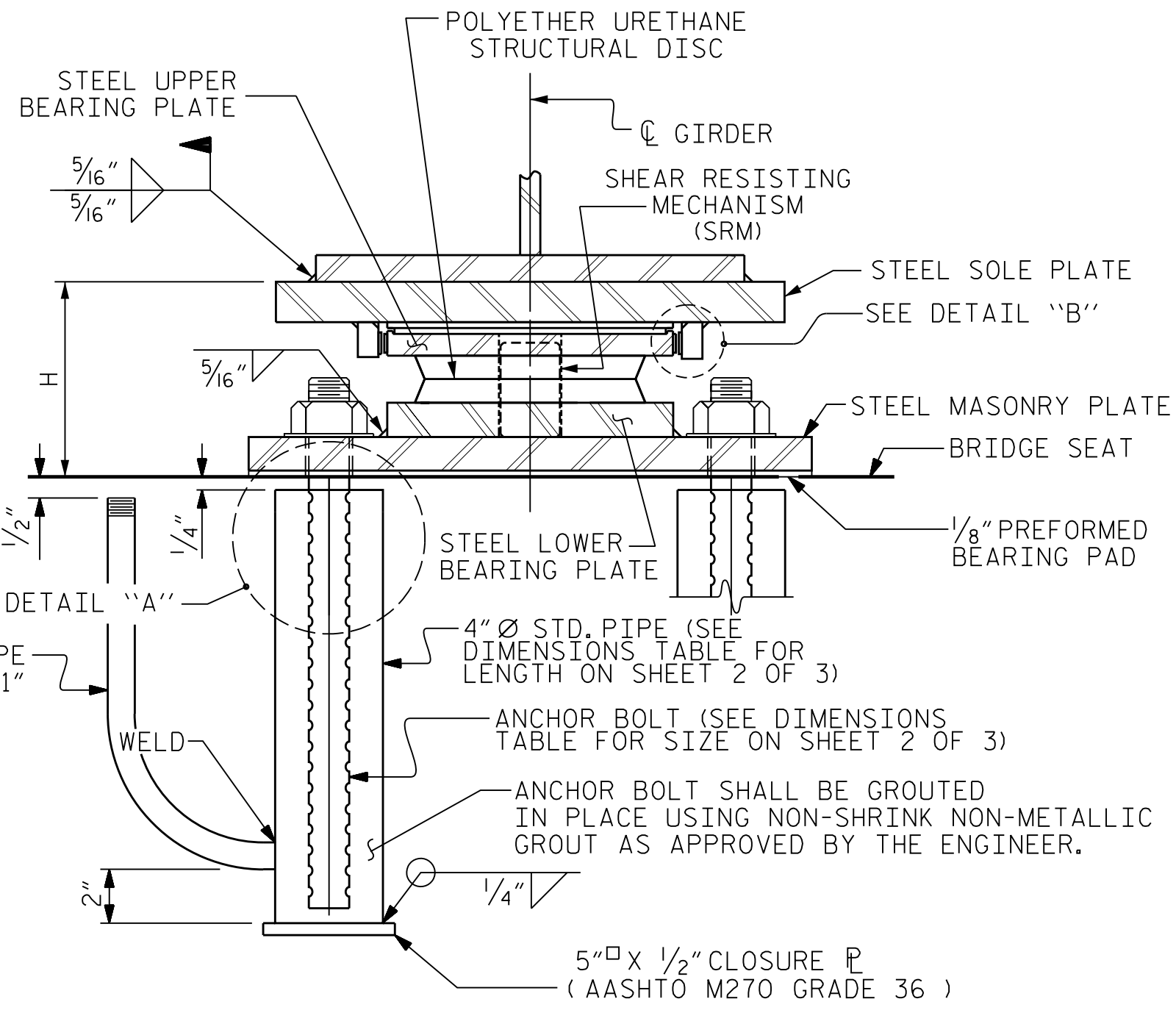
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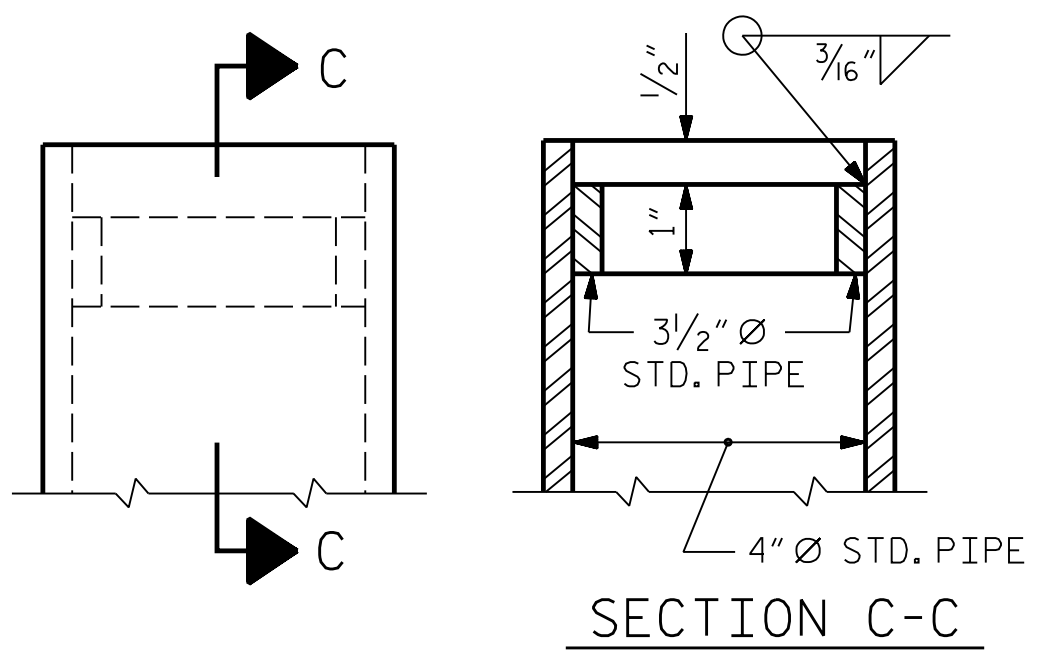
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SECTION A-A
FIXED



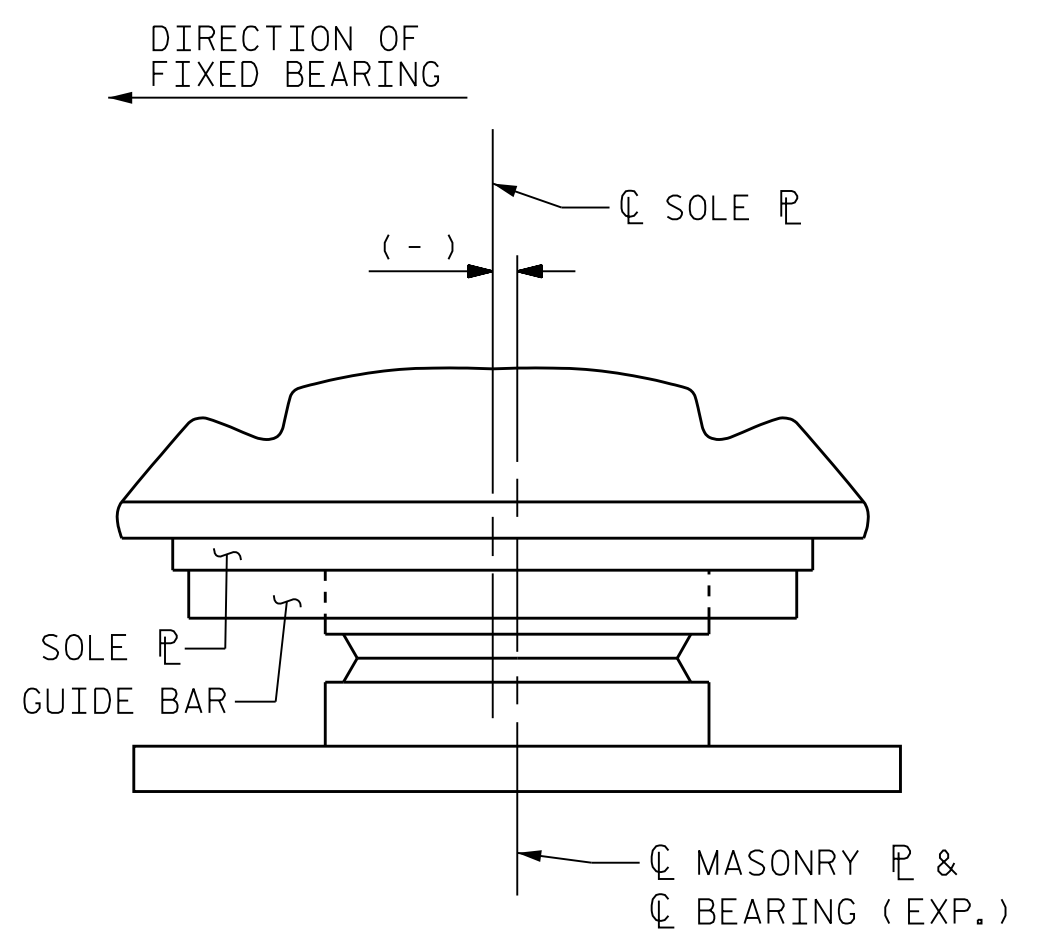
SECTION B-B
EXPANSION



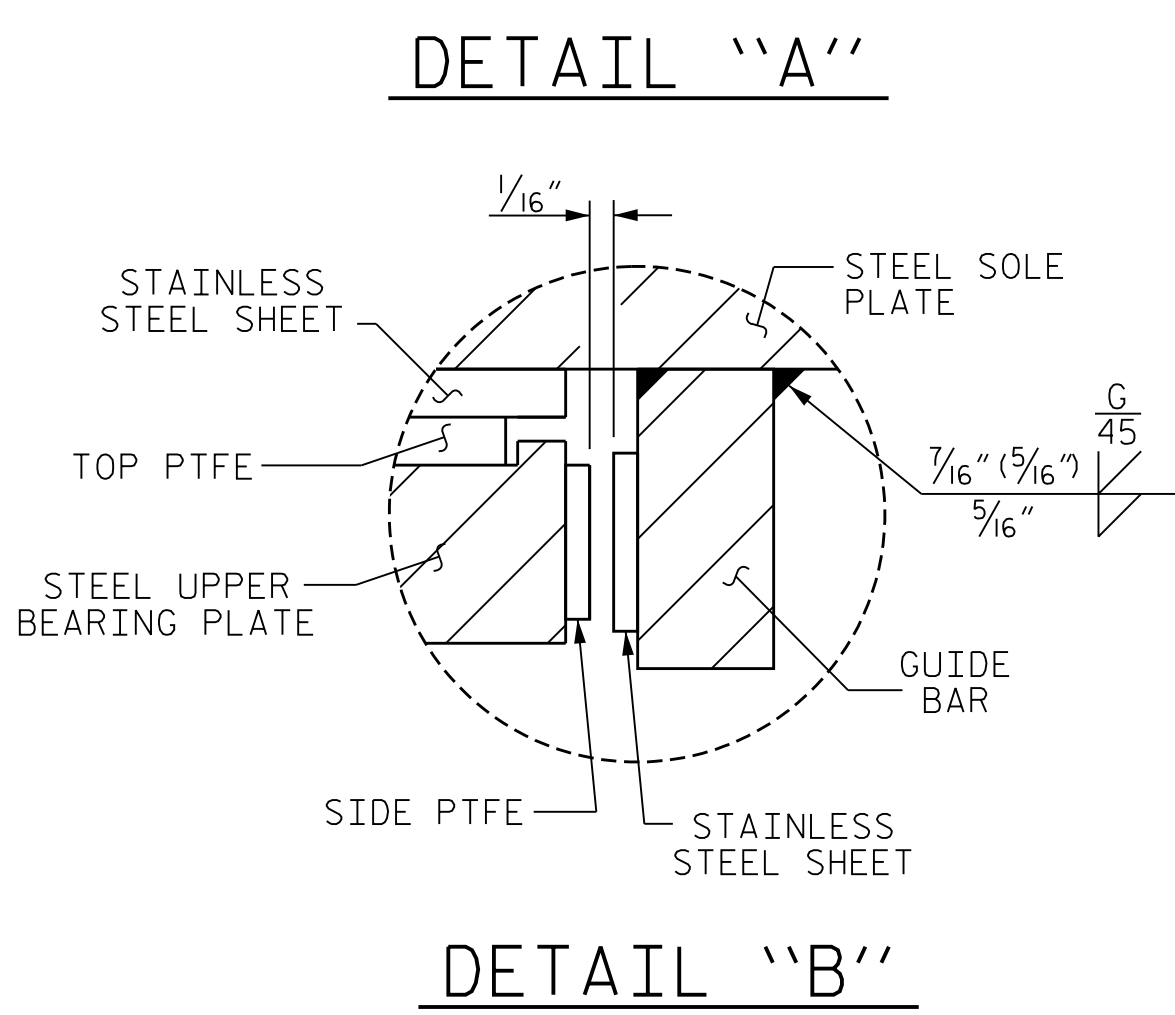
SECTION C-C

LOCATION	TEMPERATURE AT TIME OF SETTING			*
	45° F	60° F	90° F	
END BENT 1	-3/8"	0"	3/4"	-1/4"
BENT 1	-3/16"	0"	3/8"	1/8"
BENT 3	-3/16"	0"	3/8"	0"
BENT 4 BK	-3/8"	0"	3/4"	-1/4"
BENT 4 AHD	-3/8"	0"	1 1/16"	-3/16"
END BENT 2	-5/16"	0"	5/8"	-5/16"

* CORRECTION FOR END ROTATION DUE TO WEIGHT OF SLAB AND COMPOSITE DEAD LOAD.



TEMPERATURE SETTING DETAIL



DETAIL "A"

DETAIL "B"

NOTES

- FOR DISC BEARINGS, SEE SPECIAL PROVISIONS.
- ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50W OR GRADE 50.
- AT ALL POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS SHALL BE FINGER-TIGHTENED PLUS AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.
- WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR URETHANE DISC.
- AFTER BEARING ASSEMBLY IS IN PLACE AND ANCHOR BOLTS HAVE BEEN FINALLY POSITIONED, THEY SHALL BE GROUTED IN PLACE AS SHOWN.
- THE CLOSURE PLATE, GROUT PIPE, AND STANDARD PIPE FOR THIS ASSEMBLY NEED NOT BE GALVANIZED.
- SOLE PLATES SHOULD BE WELDED TO GIRDER FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.
- ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.
- FOR ATTACHMENT OF THE STAINLESS STEEL SHEETS TO THE STEEL SOLE PLATE AND GUIDE BARS, AS WELL AS THE TOP AND SIDE PTFE SHEETS TO THE STEEL UPPER BEARING PLATE, SEE SPECIAL PROVISIONS.
- FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
- THE MINIMUM ROTATIONAL CAPACITY FOR ALL BEARINGS SHALL BE 0.02 RADIAN.
- SEE SHEET 2 OF 3 FOR SOLE PLATE DETAILS.
- SEE TABLE ON SHEET 2 OF 3 FOR BEARING AND MASONRY PLATE DESIGNATIONS, LOCATIONS, BEARING HEIGHTS, MASONRY PLATE DIMENSIONS, TOP OF SOLE PLATE SLOPE, LOADS AND MOVEMENTS.
- SEE SHEET 3 OF 3 FOR EXPANSION CHORD SETTING ANGLES.

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

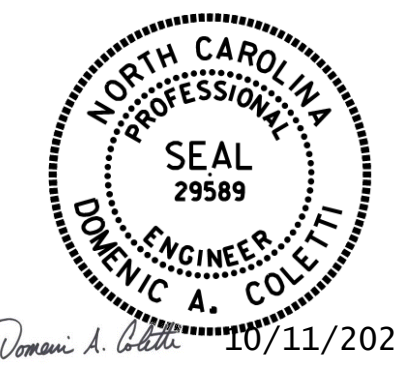
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 DISC BEARING
 DETAILS

REVISIONS					
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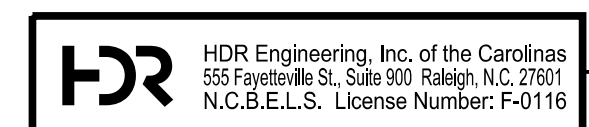
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10/11/2021

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DES BY: S. NIFONG DATE: 07/19
 DES CHK: D. COLETTI DATE: 07/19
 DWG BY: B. PETERSON DATE: 07/19
 CHK BY: G. SCHMITZ DATE: 11/19

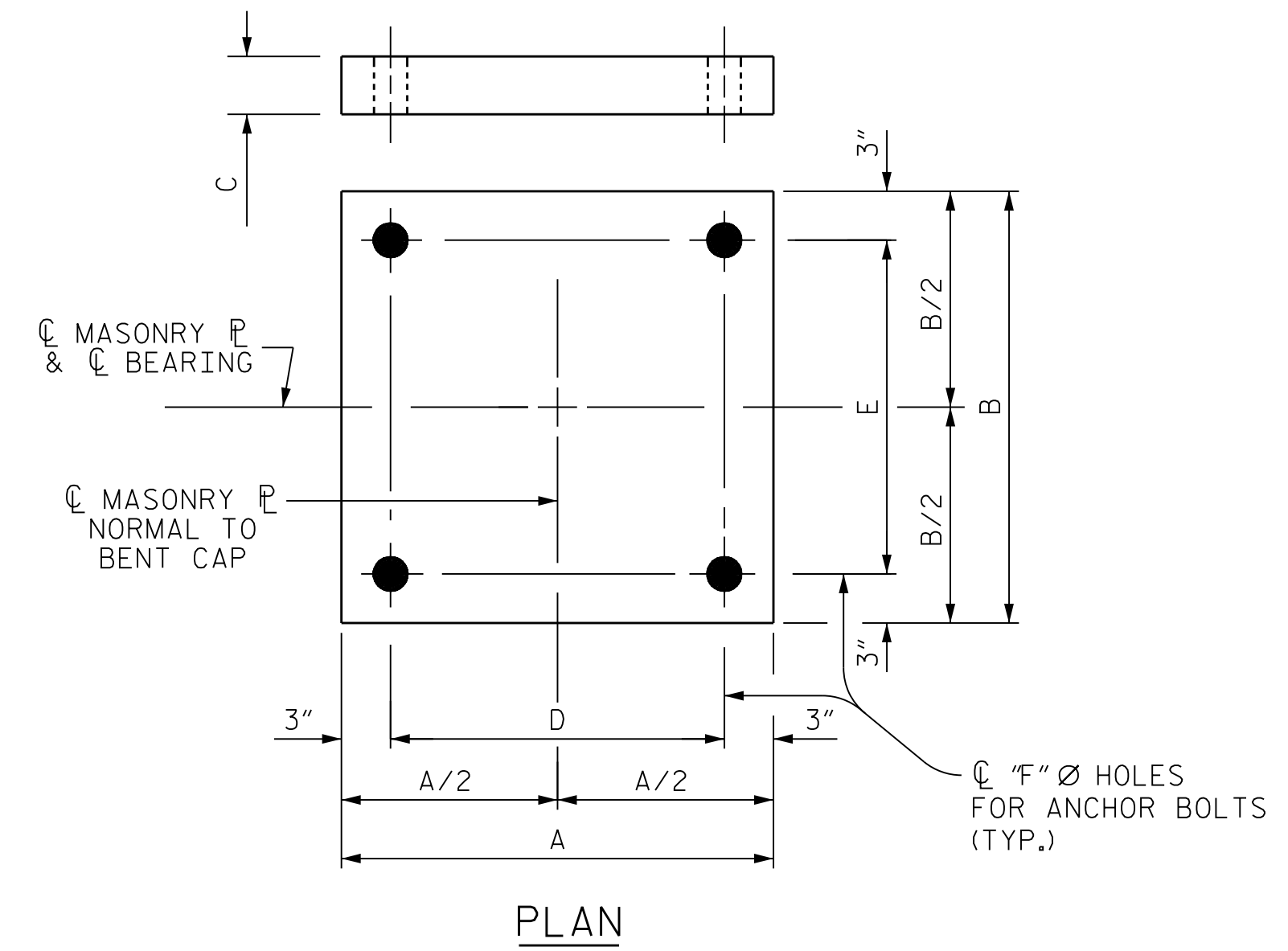


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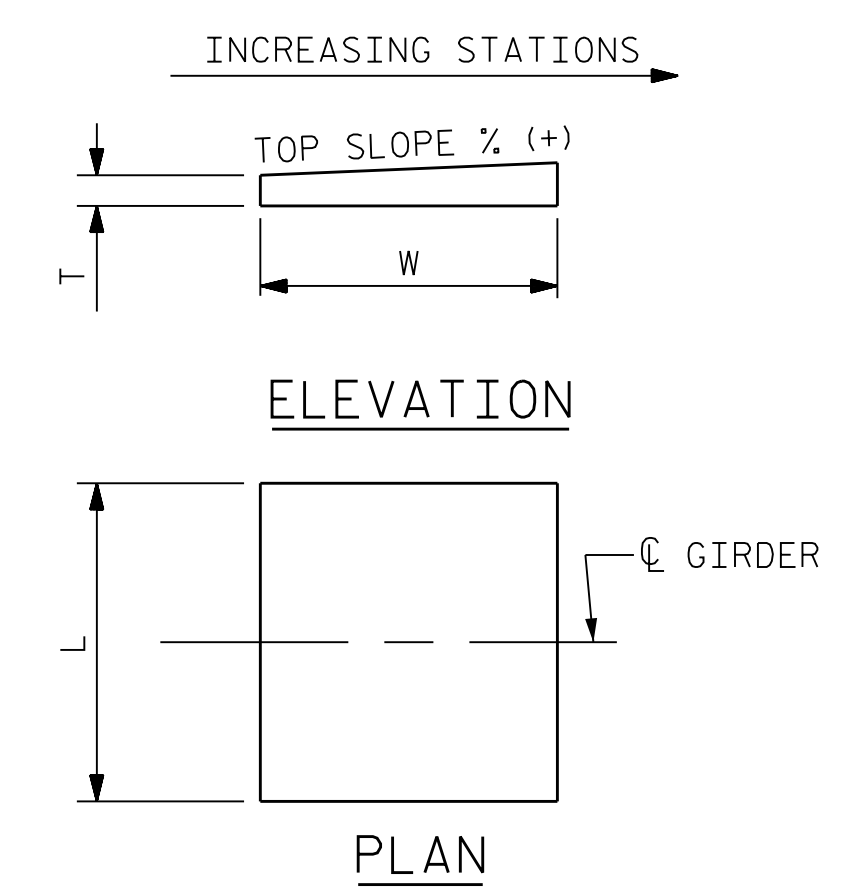
DESIGNATIONS				DIMENSIONS											LOADS AND MOVEMENT					
BEARINGS	MASONRY	LOCATION	NUMBER OF BEARINGS	BEARING	MASONRY PLATE						SOLE PLATE	ANCHOR BOLT DIAMETER (IN.)	ANCHOR BOLT PROJECTION	TOTAL ANCHOR BOLT LENGTH	4" Ø STD. PIPE LENGTH (IN.)	UNFACTORED VERTICAL LOAD (KIPS)			FACTORED HORIZONTAL LOAD (KIPS)	** ONE-WAY MOVEMENT
					H	A	B	C	D	E						F	TOP SLOPE (%)	DC		
DB1 (EXP.)	M1	END BENT 1	4	6 1/2"	2'-3"	2'-3"	3/4"	1'-9"	1'-9"	1 15/16"	4.1000%	1 1/2"	2 1/8"	1'-6"	1'-3 1/4"	173	22	140	67	2 9/16"
DB2 (EXP.)	M2	BENT 1	4	9 3/8"	3'-0"	3'-0"	1"	2'-6"	2'-6"	2 7/16"	4.1000%	2"	2 1/2"	1'-10"	1'-6 1/4"	493	59	264	171	1 5/16"
DB3 (FIXED)	M3	BENT 2	4	7"	2'-2 1/2"	2'-2 1/2"	1"	1'-8 1/2"	1'-8 1/2"	1 15/16"	4.1000%	1 1/2"	2 1/8"	1'-6 1/4"	N/A	392	50	252	142	0"
DB4 (EXP.)	M4	BENT 3	4	8 3/4"	2'-10 1/2"	2'-10 1/2"	1"	2'-4 1/2"	2'-4 1/2"	2 7/16"	3.8161%	2"	2 1/2"	1'-10"	1'-6 1/4"	441	55	253	156	1 5/16"
DB5 (EXP.)	M1	BENT 4 BK	4	6 1/4"	2'-3"	2'-3"	3/4"	1'-9"	1'-9"	1 15/16"	2.9184%	1 1/2"	2 1/8"	1'-6"	1'-3 1/4"	135	18	129	55	2 1/16"
DB6 (EXP.)	M1	BENT 4 AHD	4	6 1/4"	2'-3"	2'-3"	3/4"	1'-9"	1'-9"	1 15/16"	2.9000%	1 1/2"	2 1/8"	1'-6"	1'-3 1/4"	170	22	143	66	2 9/16"
DB7 (FIXED)	M5	BENT 5	4	7 1/2"	2'-6"	2'-6"	1"	2'-0"	2'-0"	2 7/16"	1.8300%	2"	2 1/2"	1'-10"	N/A	550	65	274	188	0"
DB8 (FIXED)	M6	BENT 6	4	7 3/4"	2'-8"	2'-8"	1 1/4"	2'-2"	2'-2"	2 7/16"	0.5200%	2"	2 1/2"	1'-10"	N/A	591	69	283	201	0"
DB9 (EXP.)	M1	END BENT 2	4	6"	2'-3"	2'-3"	3/4"	1'-9"	1'-9"	1 15/16"	-0.6400%	1 1/2"	2 1/8"	1'-6"	1'-3 1/4"	203	25	149	76	2 1/16"

** "ONE-WAY MOVEMENT" REPRESENTS THE FULL MOVEMENT RANGE EXPECTED TO OCCUR OVER A TEMPERATURE RANGE FROM 10° F TO 110° F. THE BEARING SOLE PLATE AND UPPER SLIDING SURFACE SHOULD BE CENTERED ON THE BEARING AT 60° F. SEE TABLE FOR "PLATE SETTING DATA" FOR SETTING DATA FOR OTHER TEMPERATURES.

▲ ANCHOR BOLT PROJECTION IS MEASURED ABOVE TOP OF BEARING SEAT CONCRETE.



MASONRY PLATE DETAILS



NOTE: DIMENSIONS "L", "W", AND "T" SHALL BE DETERMINED BY THE BEARING MANUFACTURER, SET DIMENSION "L" SUCH THAT THE MINIMUM EDGE DISTANCE TO THE GIRDER FLANGE IS 1".

SOLE PLATE DETAILS

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 2 OF 3

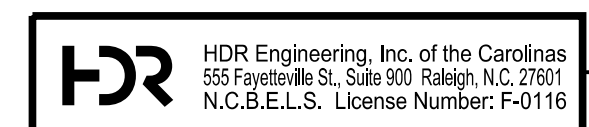


10/11/2021

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 DISC BEARING
 DETAILS**

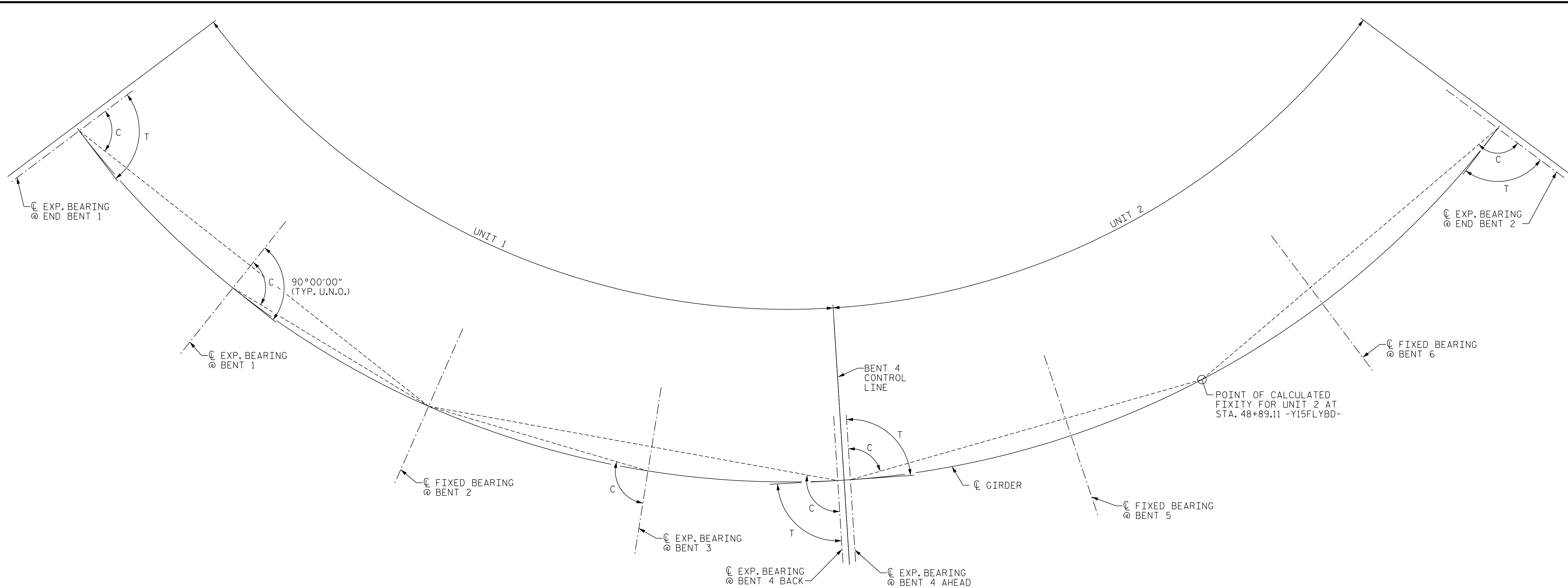
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DES BY: <u>S. NIFONG</u>	DATE: <u>07/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>07/19</u>
DES CHK: <u>D. COLETTI</u>	DATE: <u>07/19</u>	CHK BY: <u>G. SCHMITZ</u>	DATE: <u>11/19</u>



EXPANSION BEARING ORIENTATION DIAGRAM

LOCATION	EXPANSION CHORD SETTING ANGLES									
	END BENT 1		BENT 1	BENT 3	BENT 4 (BACK)		BENT 4 (AHEAD)		END BENT 2	
	T	C	C	C	T	C	T	C	T	C
GIRDERS 1-4	89°53'43"	83°46'38"	86°53'47"	93°06'13"	90°03'52"	95°47'55"	89°56'08"	84°28'50"	90°06'14"	95°00'50"

NOTES

- C = ANGLE FROM \varnothing BRG TO EXPANSION CHORD
- T = ANGLE FROM \varnothing BRG TO LOCAL TANGENT TO CURVE

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 DISC BEARING
 DETAILS



Dominic A. Coletti 10/11/2021

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SHEET NO.
 S05-052
 TOTAL SHEETS
 116

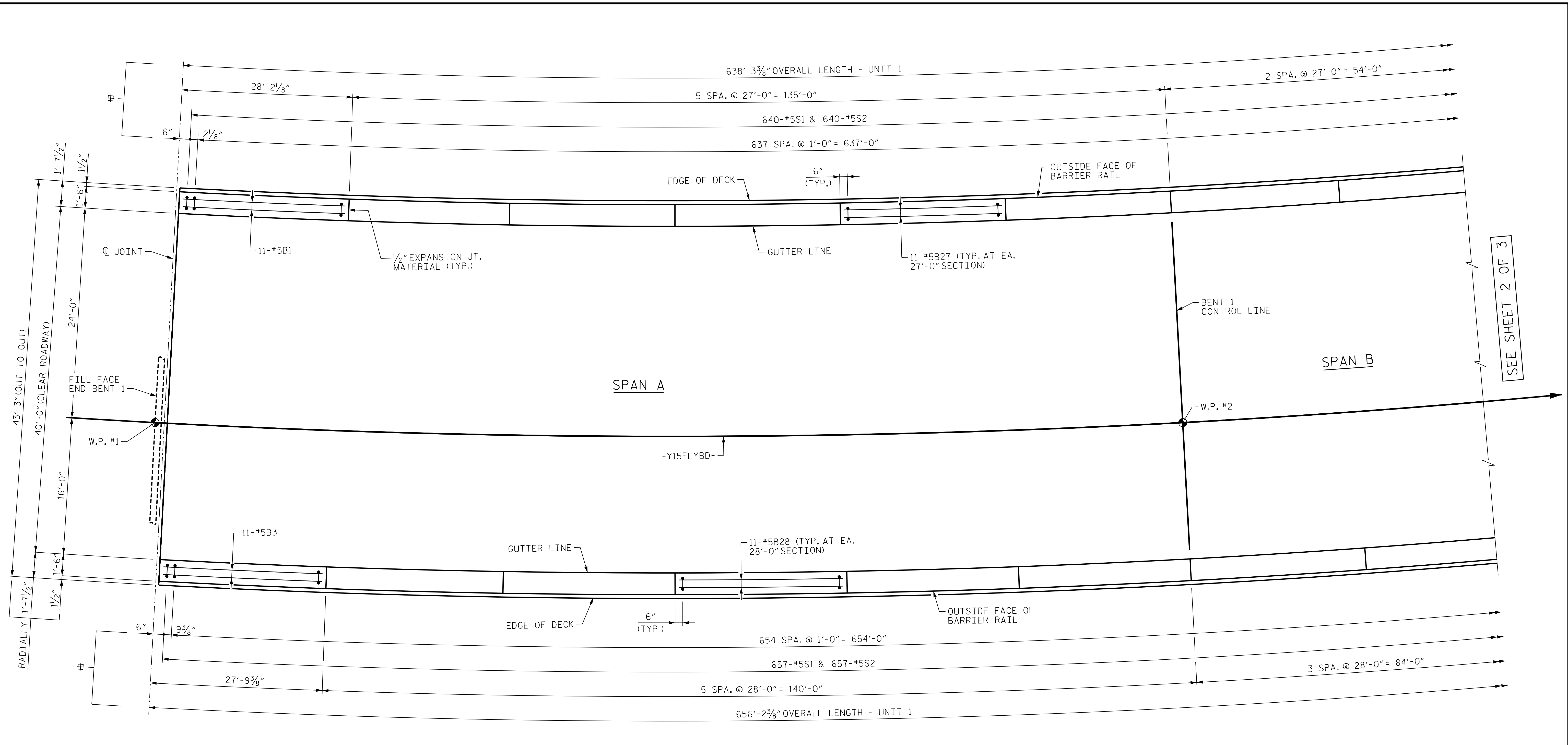
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DES CHK: <u>D. COLETTI</u>	DATE: <u>07/19</u>	CHK BY: <u>G. SCHMITZ</u>	DATE: <u>11/19</u>



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PARTIAL PLAN OF BARRIER RAIL - UNIT 1
 # = MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL

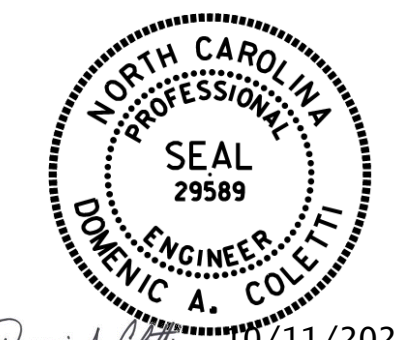
PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 CONCRETE
 BARRIER RAIL
 UNIT 1**

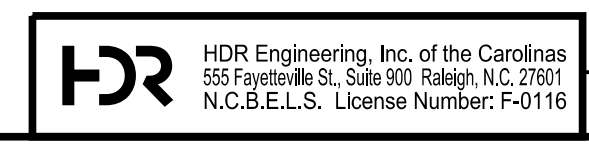
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SHEET NO. 505-060
TOTAL SHEETS 116



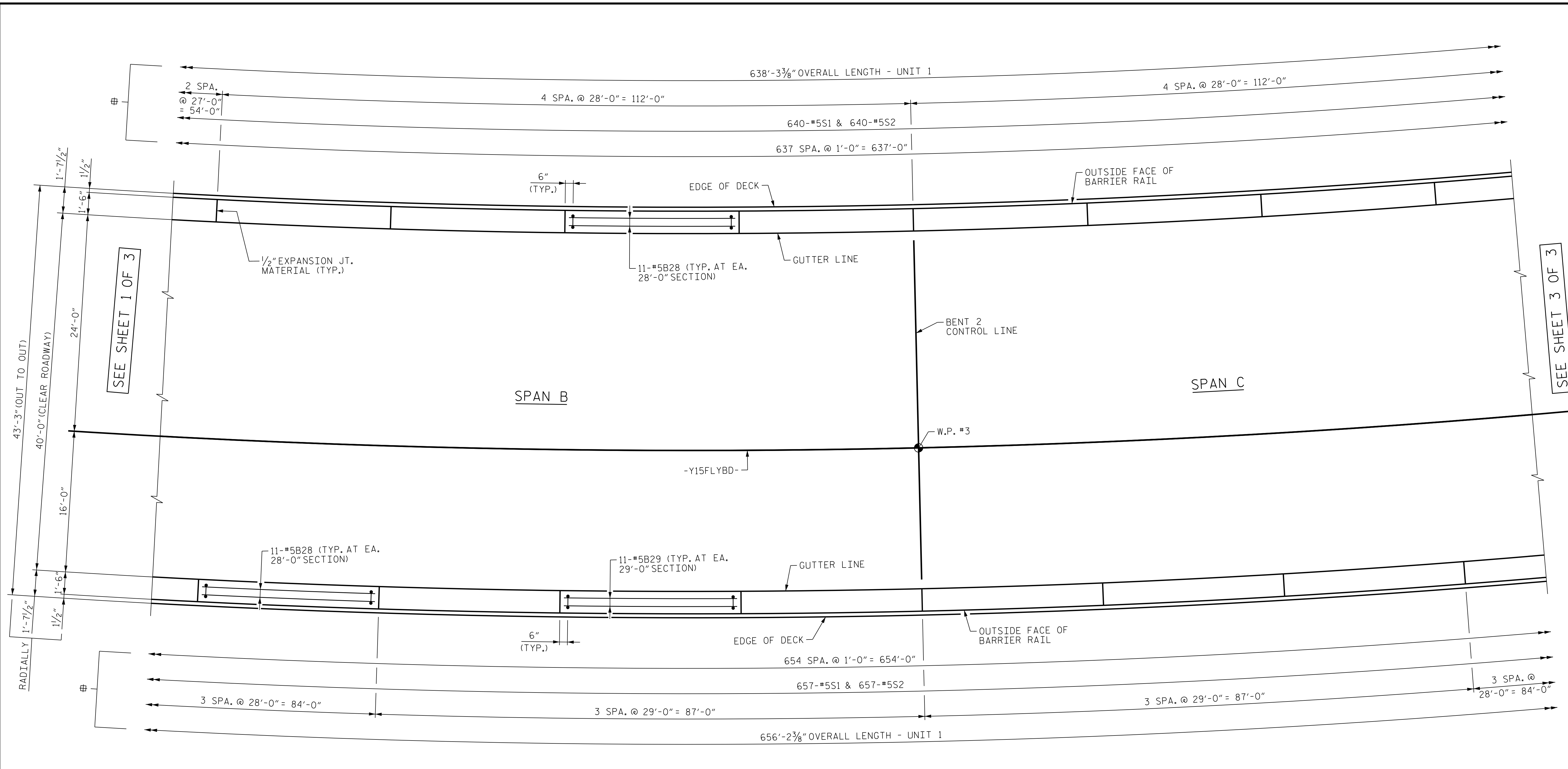
Dominic A. Coletti 10/11/2021

DES BY: <u>L. ZAMPETTI</u>	DATE: <u>07/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>07/19</u>
DES CHK: <u>J. ROBERTS</u>	DATE: <u>07/19</u>	CHK BY: <u>S. NIFONG</u>	DATE: <u>11/19</u>



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 UNLESS ALL SIGNATURES COMPLETED**

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PARTIAL PLAN OF BARRIER RAIL - UNIT 1
 # = MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 2 OF 3

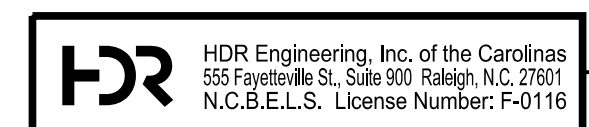
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 CONCRETE
 BARRIER RAIL
 UNIT 1**



Dominic A. Coletti 10/11/2021

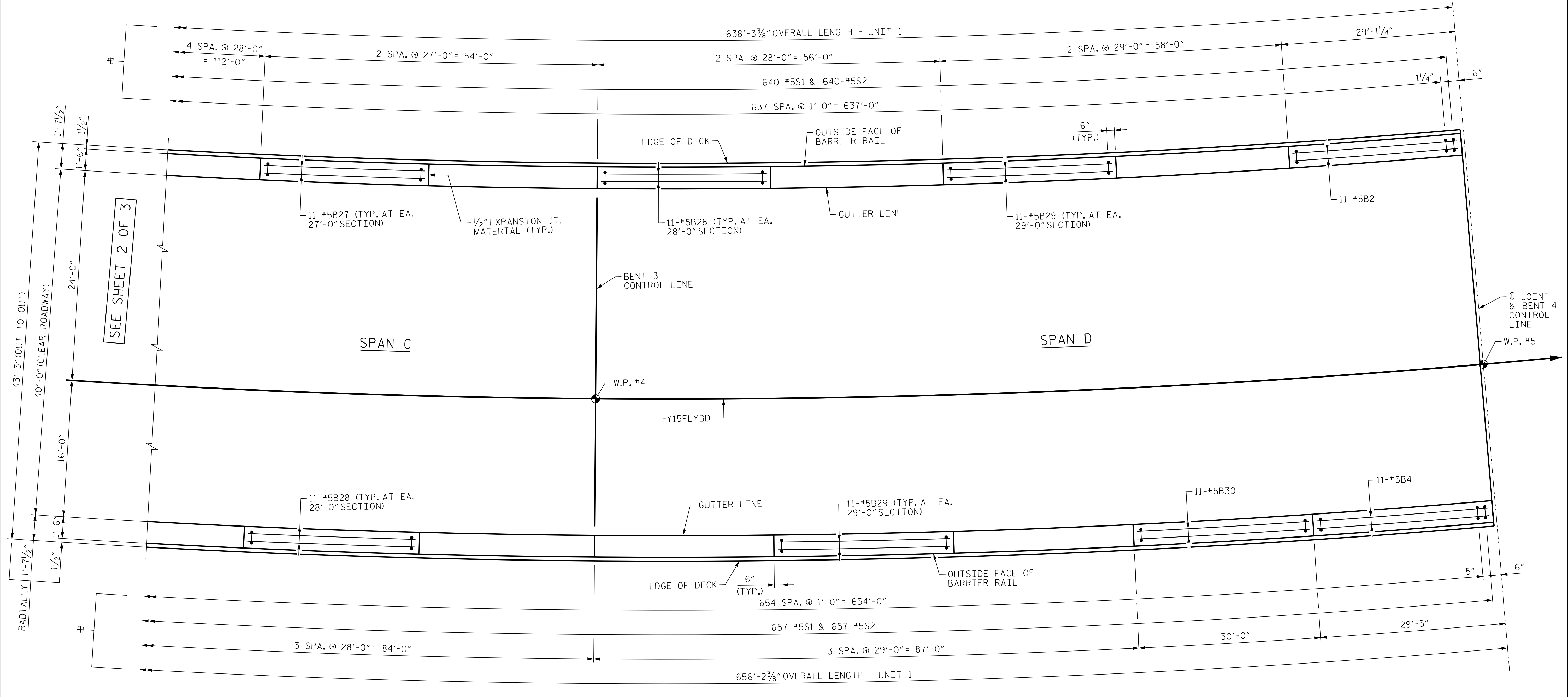
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DES CHK: <u>J. ROBERTS</u>	DATE: <u>07/19</u>	CHK BY: <u>S. NIFONG</u>	DATE: <u>11/19</u>



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SHEET NO. <u>S05-061</u>
TOTAL SHEETS <u>116</u>

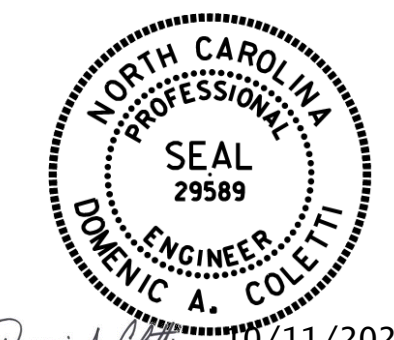


PARTIAL PLAN OF BARRIER RAIL - UNIT 1
 # = MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 3 OF 3

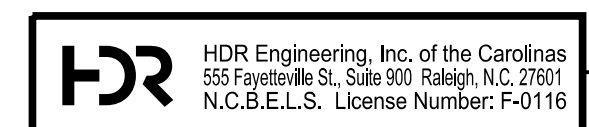
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 CONCRETE
 BARRIER RAIL
 UNIT 1**



10/11/2021

DES BY: L. ZAMPETTI	DATE: 07/19	DWG BY: B. PETERSON	DATE: 07/19
DES CHK: J. ROBERTS	DATE: 07/19	CHK BY: S. NIFONG	DATE: 11/19



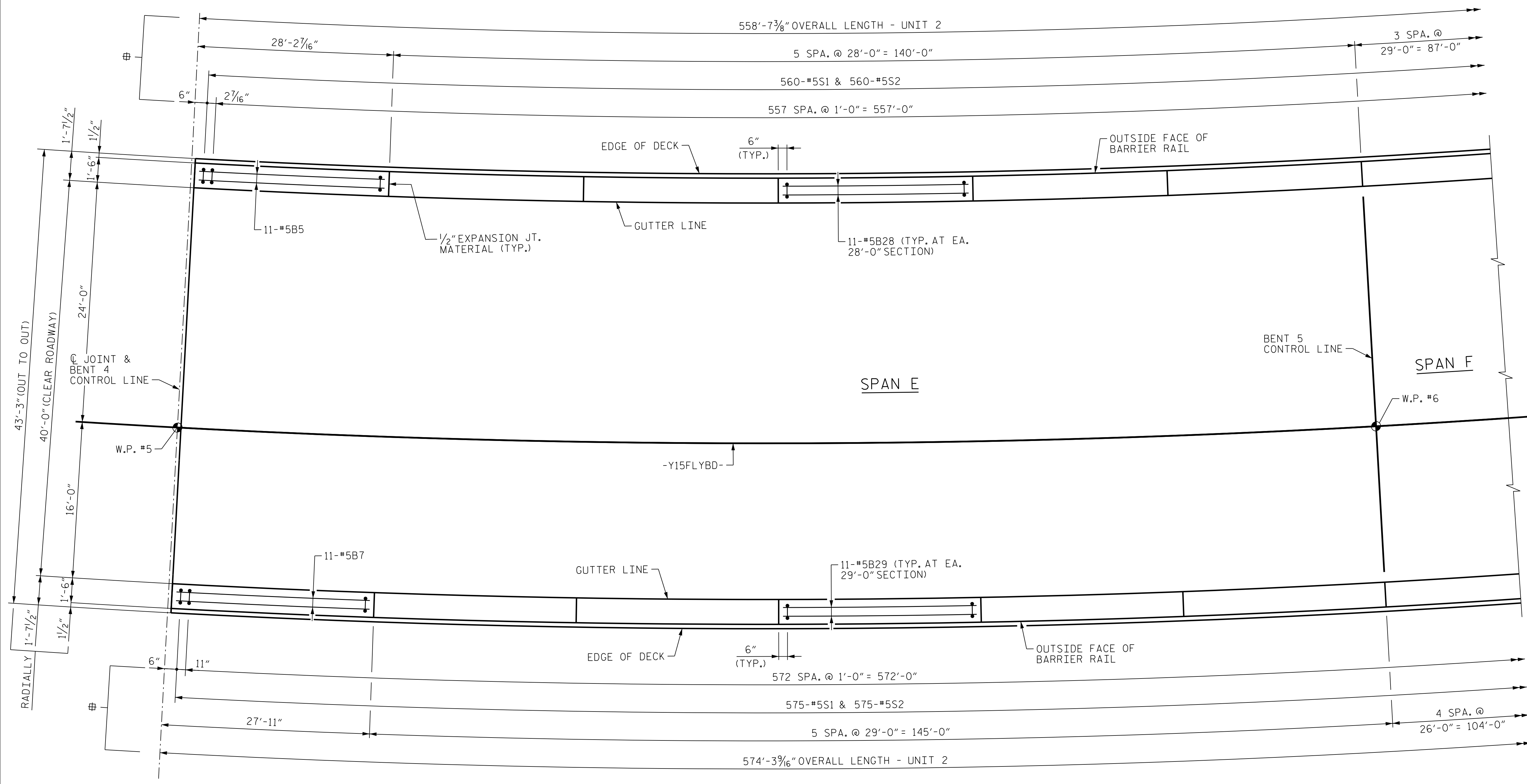
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SHEET NO. S05-062
 TOTAL SHEETS 116

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SEE SHEET 2 OF 3

PARTIAL PLAN OF BARRIER RAIL - UNIT 2
 # = MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 CONCRETE
 BARRIER RAIL
 UNIT 2**



10/11/2021

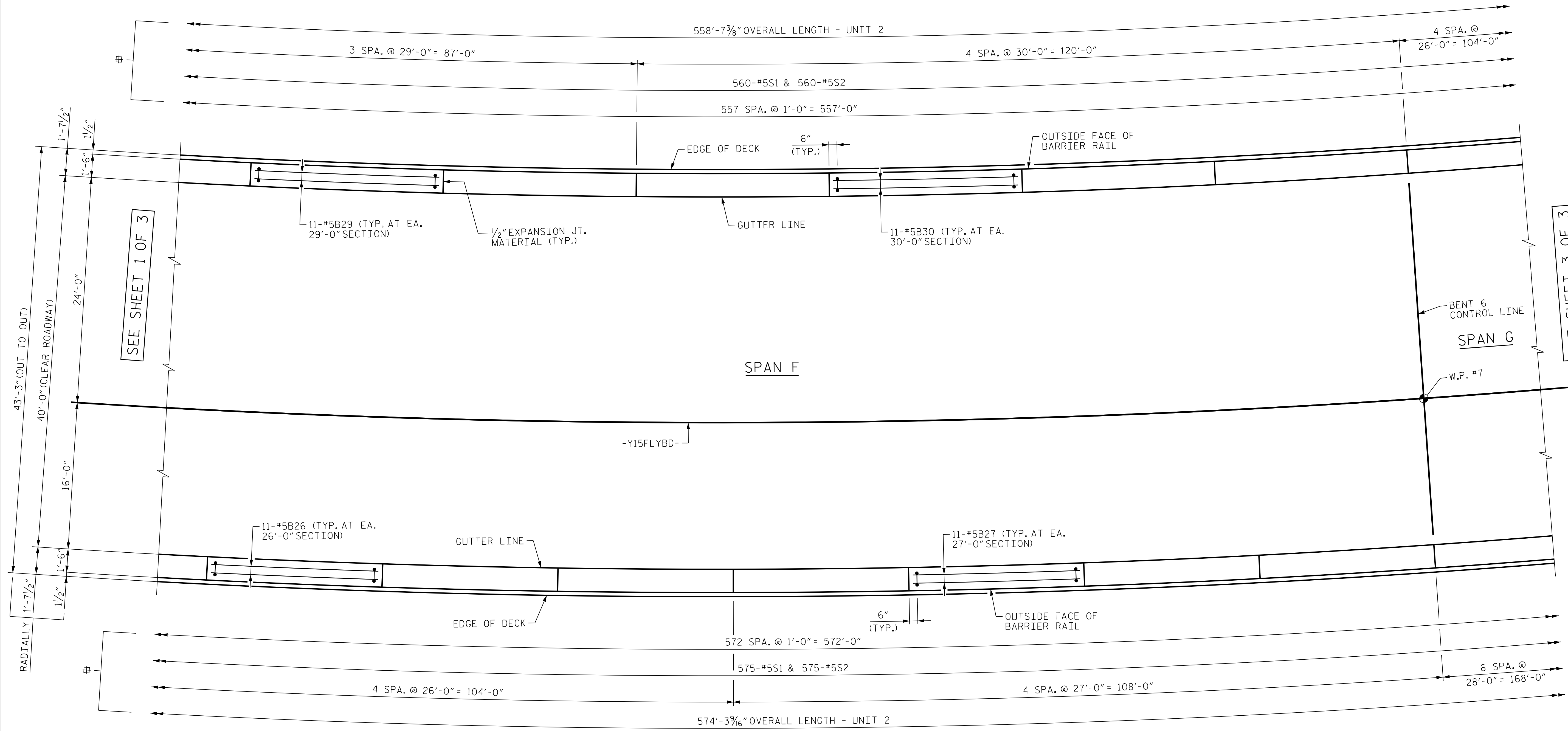
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DES CHK: J. ROBERTS	DATE: 07/19	CHK BY: S. NIFONG	DATE: 11/19



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SHEET NO. S05-063
TOTAL SHEETS 116



PARTIAL PLAN OF BARRIER RAIL - UNIT 2
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PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

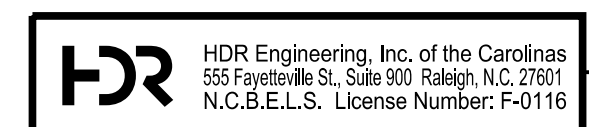
**SUPERSTRUCTURE
 CONCRETE
 BARRIER RAIL
 UNIT 2**



Dominic A. Coletti 10/11/2021

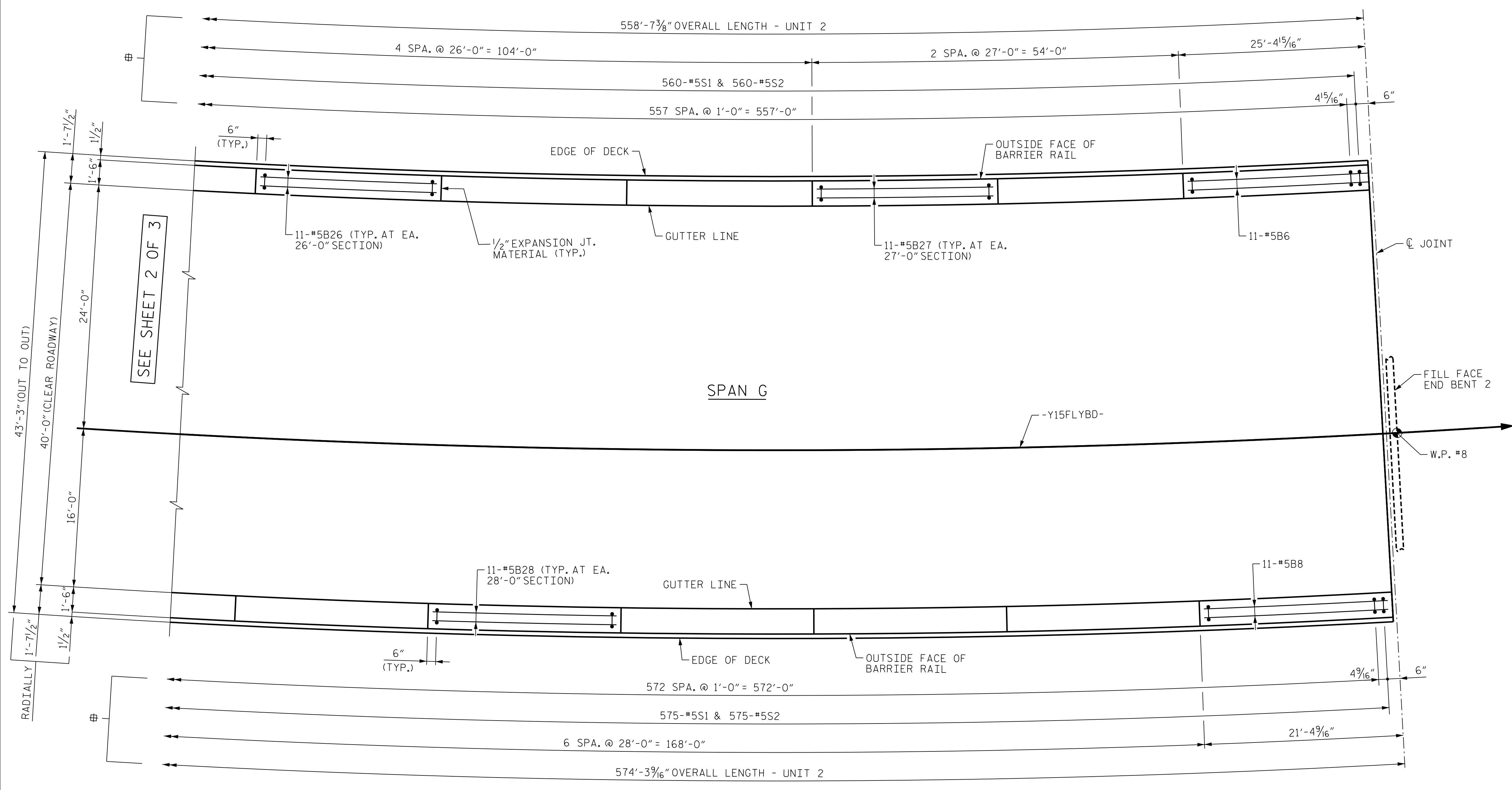
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DES BY: <u>L. ZAMPETTI</u>	DATE: <u>07/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>07/19</u>
DES CHK: <u>J. ROBERTS</u>	DATE: <u>07/19</u>	CHK BY: <u>S. NIFONG</u>	DATE: <u>11/19</u>



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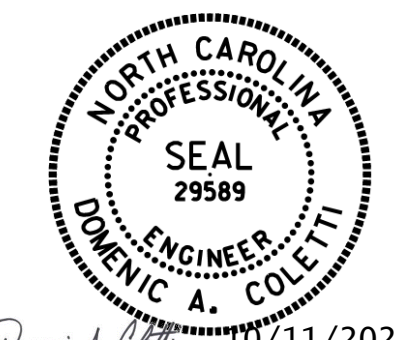


PARTIAL PLAN OF BARRIER RAIL - UNIT 2
 # = MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 3 OF 3

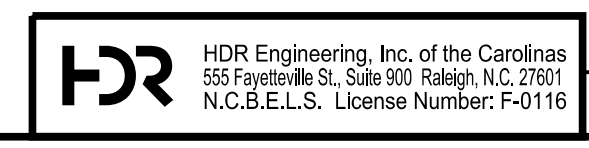
STATE OF NORTH CAROLINA
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 RALEIGH

**SUPERSTRUCTURE
 CONCRETE
 BARRIER RAIL
 UNIT 2**



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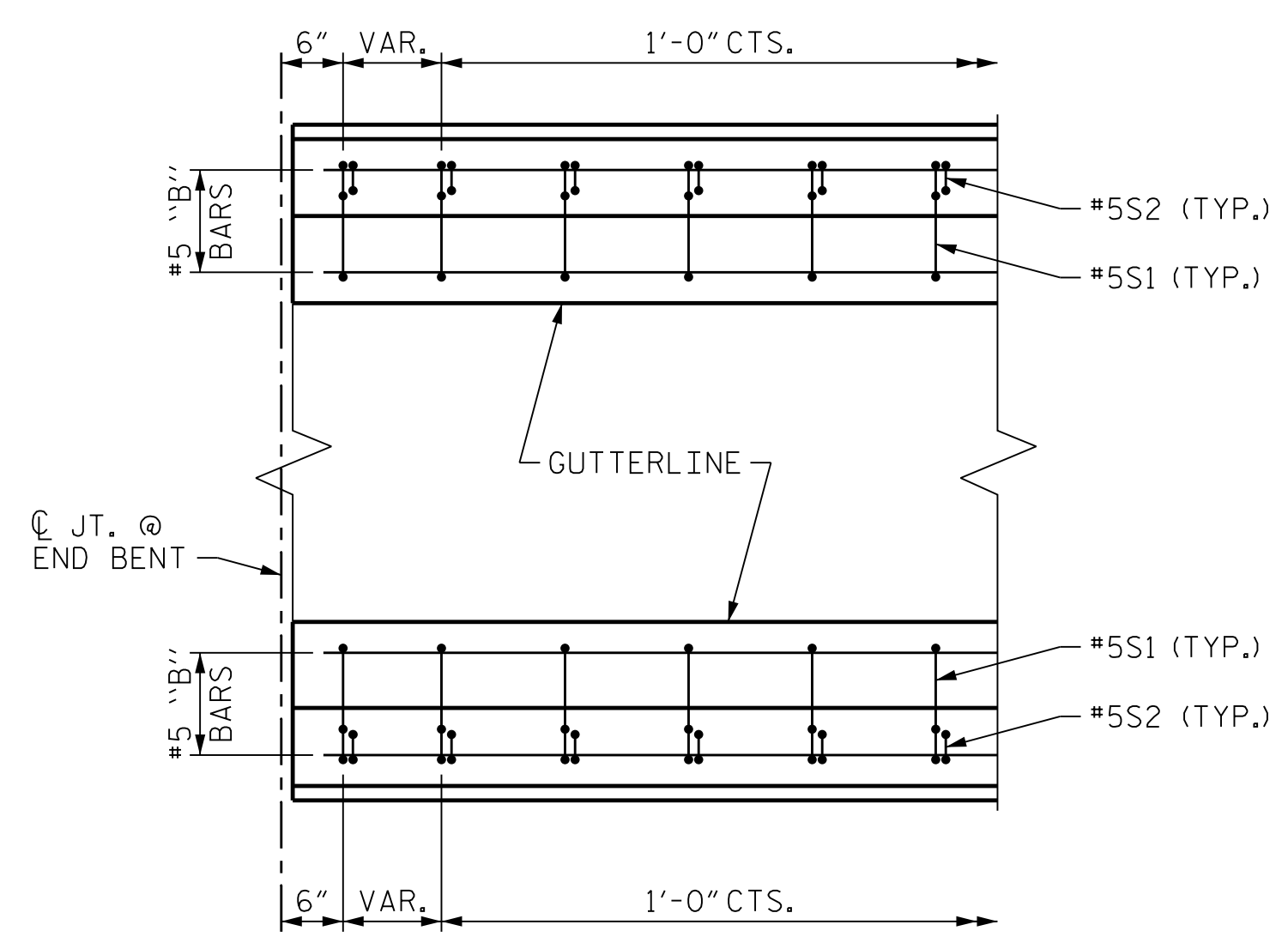
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DES CHK: J. ROBERTS	DATE: 07/19	CHK BY: S. NIFONG	DATE: 11/19



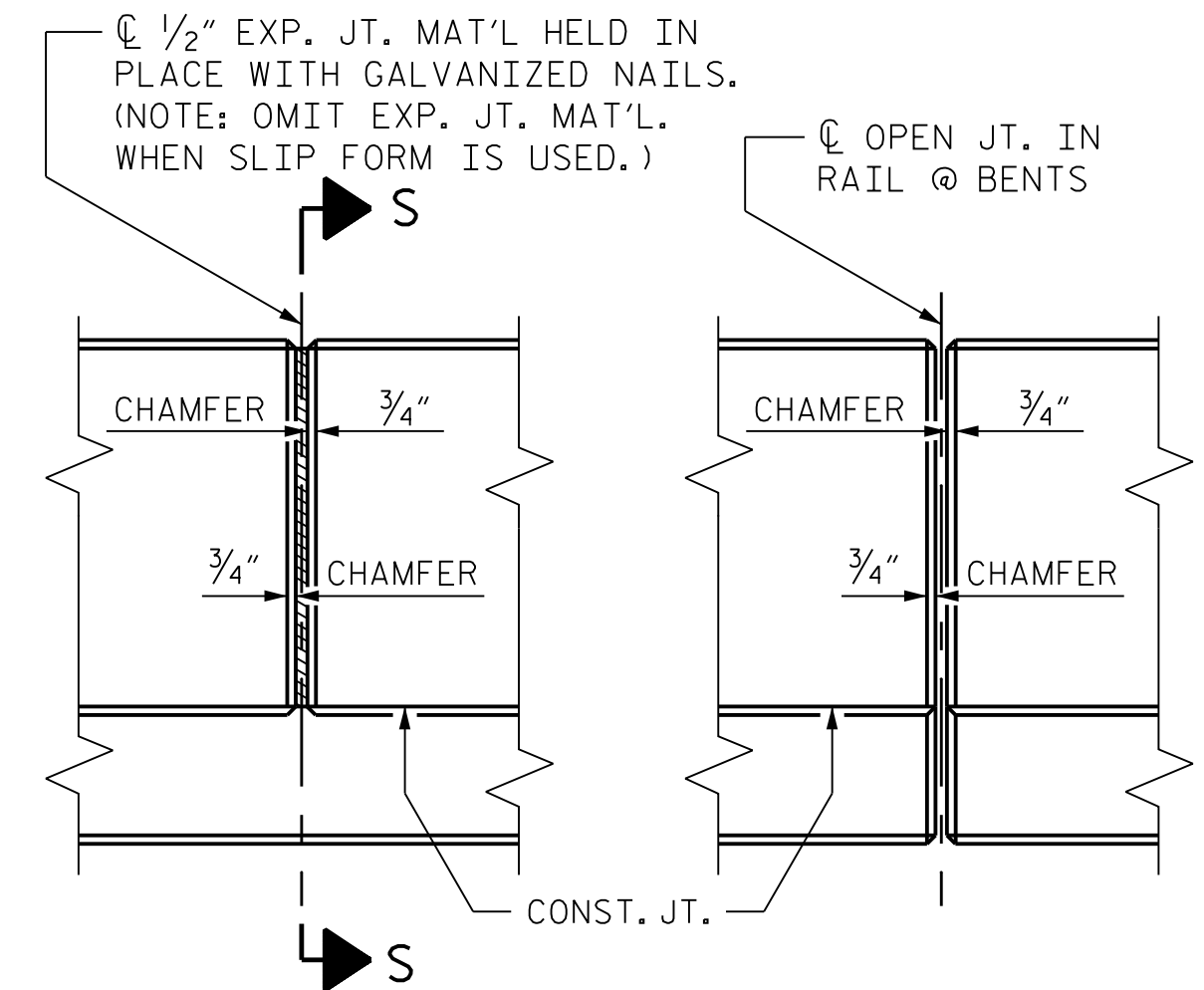
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SHEET NO. S05-065
TOTAL SHEETS 116



PLAN
RAIL DETAILS AT EXPANSION JOINTS



ELEVATION AT EXPANSION JOINTS

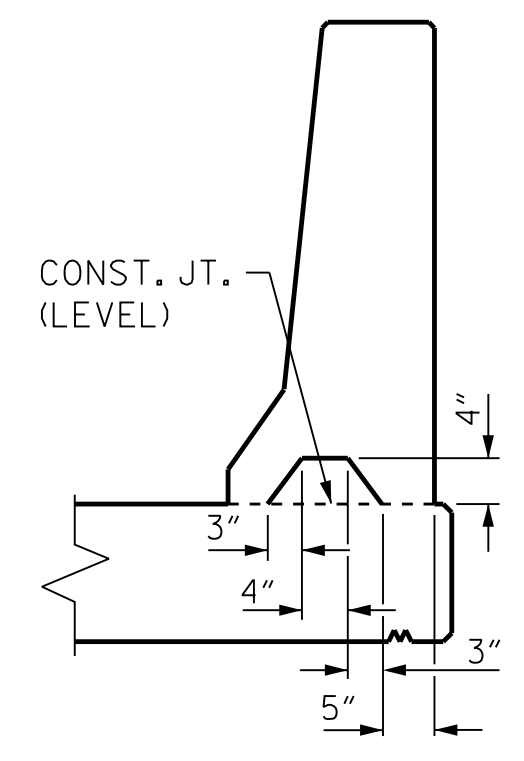
NOTES

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

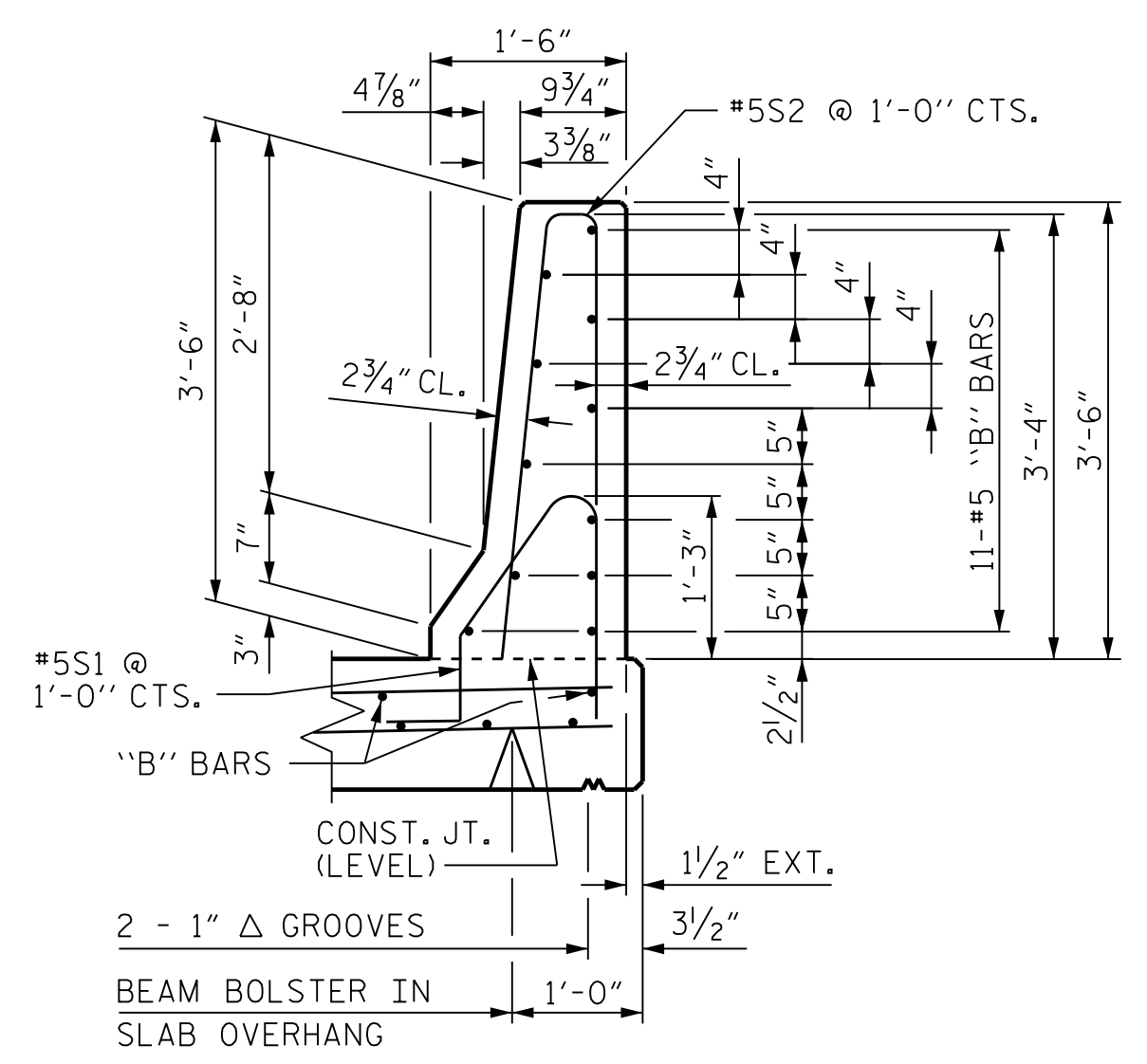
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

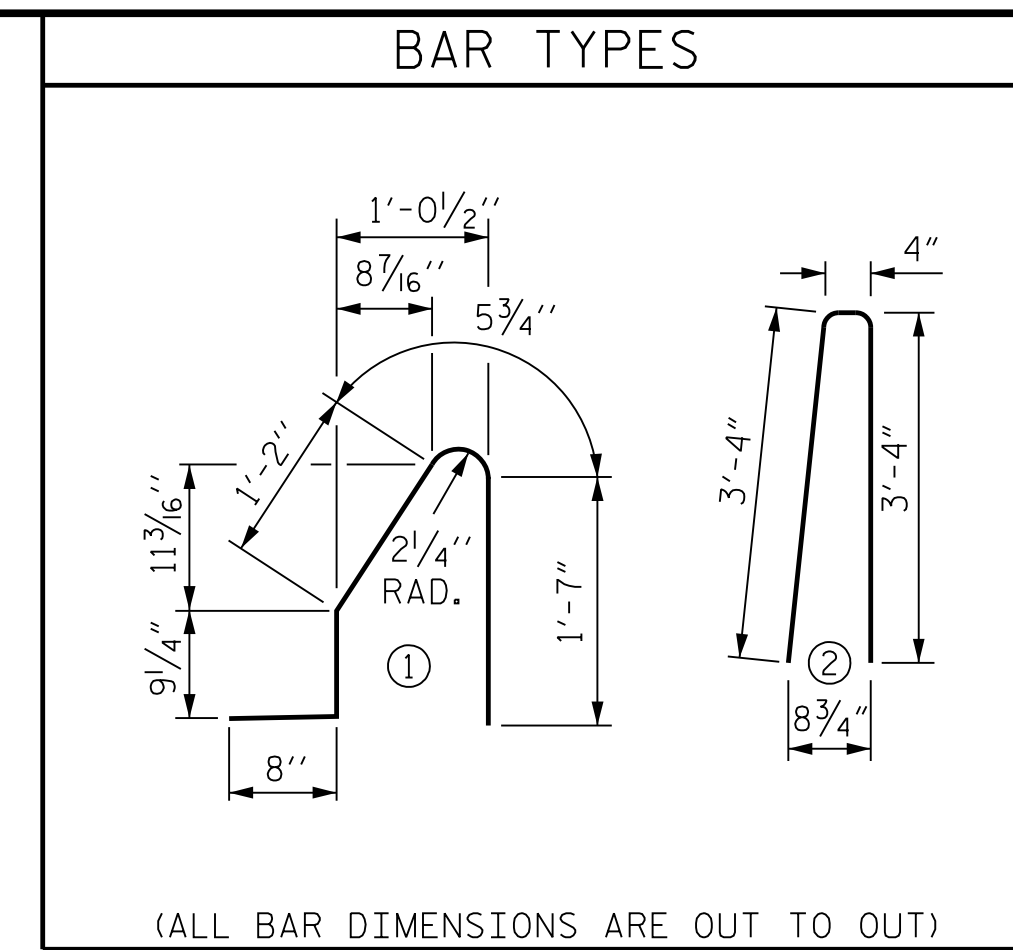
SEE "BRIDGE APPROACH SLAB" SHEETS FOR BARRIER RAIL CONSTRUCTED ON APPROACH SLABS AND END OF RAIL DETAILS.



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



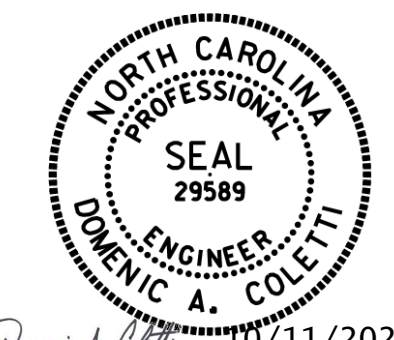
SECTION THROUGH RAIL
BARRIER RAIL DETAILS



(ALL BAR DIMENSIONS ARE OUT TO OUT)

BILL OF MATERIAL					
FOR CONCRETE BARRIER RAIL ON BRIDGE DECK ONLY					
UNIT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
*B1	11	# 5	STR	27'-8"	318
*B2	11	# 5	STR	28'-7"	328
*B3	11	# 5	STR	27'-3"	313
*B4	11	# 5	STR	28'-10"	331
*B27	99	# 5	STR	26'-7"	2,745
*B28	231	# 5	STR	27'-7"	6,646
*B29	121	# 5	STR	28'-7"	3,608
*B30	11	# 5	STR	29'-7"	340
*S1	1,297	# 5	1	4'-8"	6,313
*S2	1,297	# 5	2	7'-0"	9,470
* EPOXY COATED REINFORCING STEEL					30,412 LBS.
CLASS AA CONCRETE					175.9 CU. YDS.
CONCRETE BARRIER RAIL					1,294.5 LIN. FT.
UNIT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
*B5	11	# 5	STR	27'-8"	318
*B6	11	# 5	STR	24'-11"	286
*B7	11	# 5	STR	27'-4"	314
*B8	11	# 5	STR	20'-11"	240
*B26	88	# 5	STR	25'-7"	2,349
*B27	66	# 5	STR	26'-7"	1,830
*B28	121	# 5	STR	27'-7"	3,482
*B29	88	# 5	STR	28'-7"	2,624
*B30	44	# 5	STR	29'-7"	1,358
*S1	1,135	# 5	1	4'-8"	5,525
*S2	1,135	# 5	2	7'-0"	8,287
* EPOXY COATED REINFORCING STEEL					26,613 LBS.
CLASS AA CONCRETE					154.0 CU. YDS.
CONCRETE BARRIER RAIL					1,132.9 LIN. FT.

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

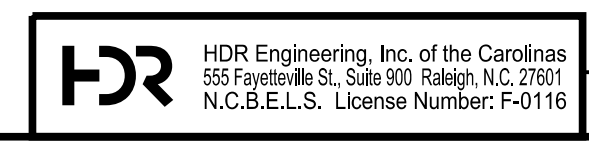
**SUPERSTRUCTURE
 CONCRETE BARRIER
 RAIL DETAILS**

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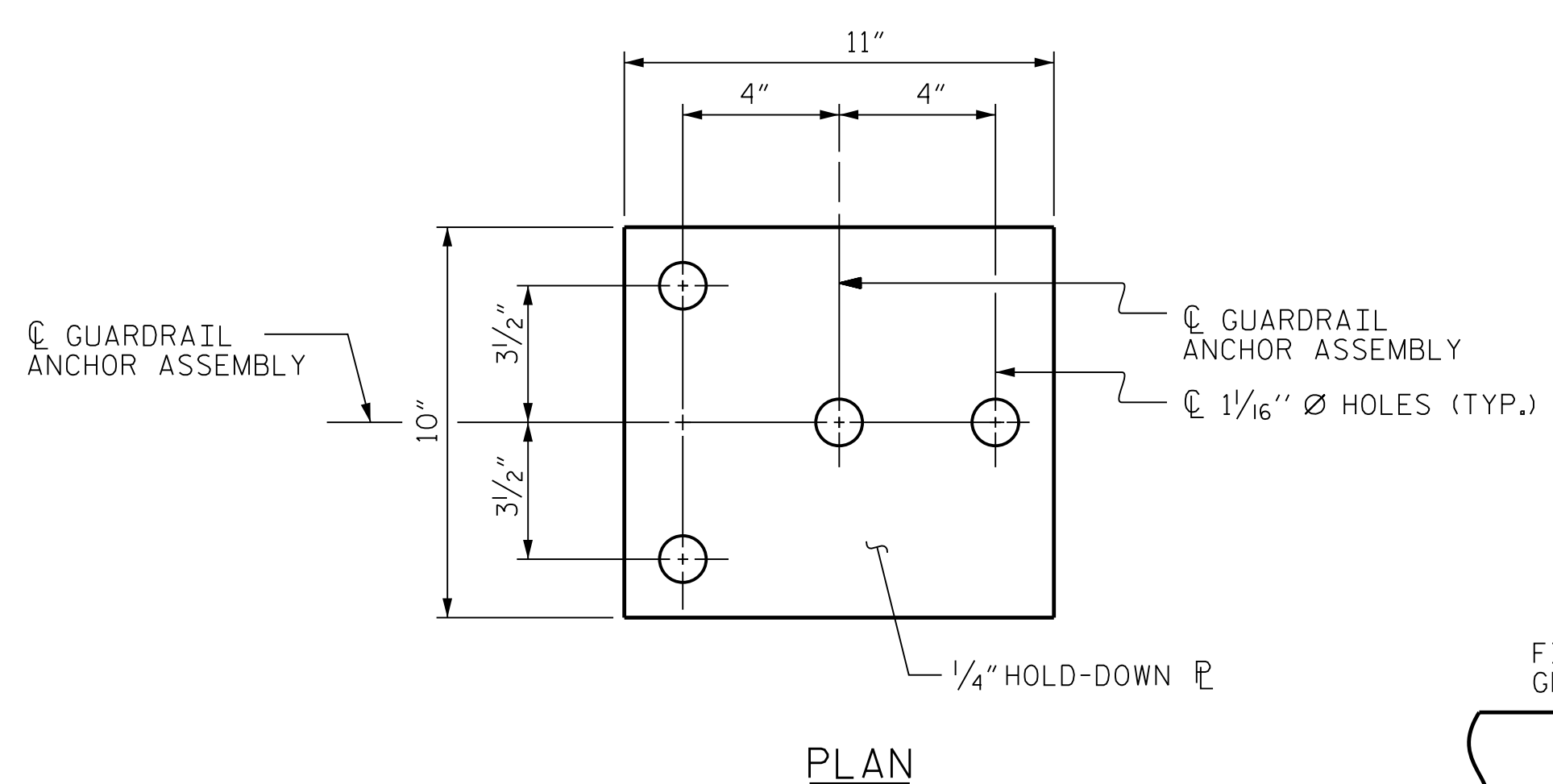
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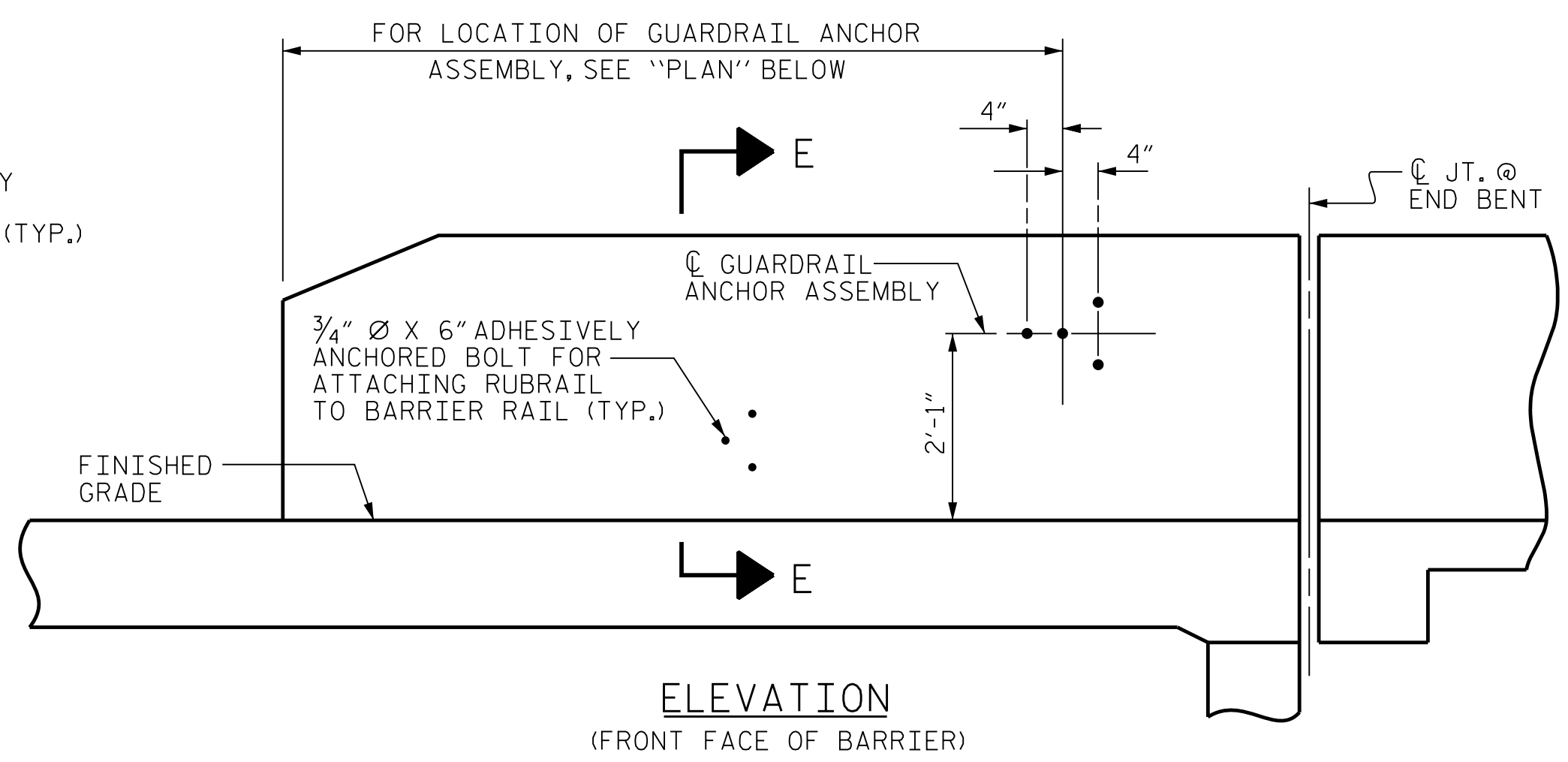
DES BY: L. ZAMPETTI DATE: 07/19
 DES CHK: J. ROBERTS DATE: 07/19
 DWG BY: M. SELLS DATE: 07/19
 CHK BY: S. NIFONG DATE: 11/19



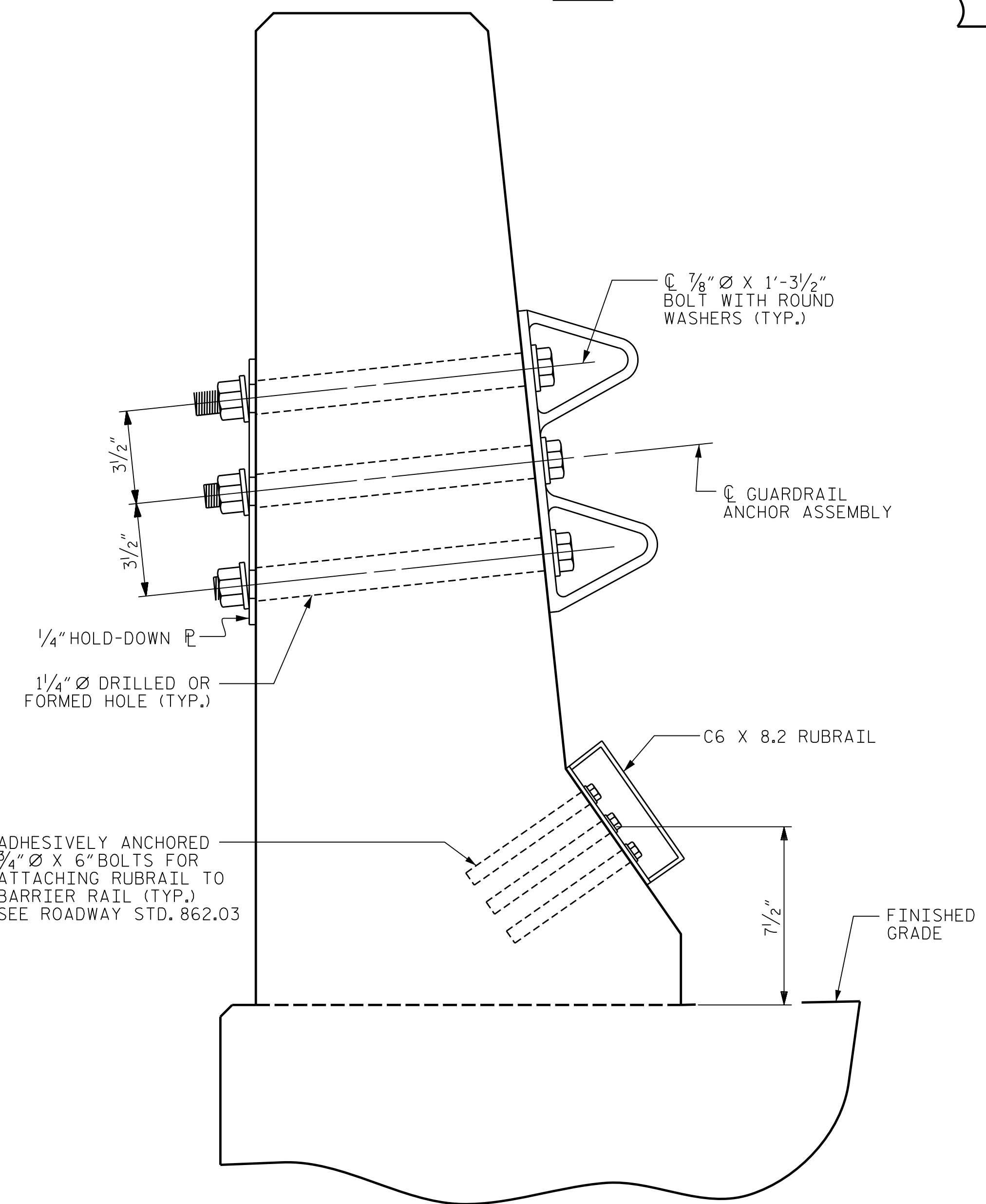
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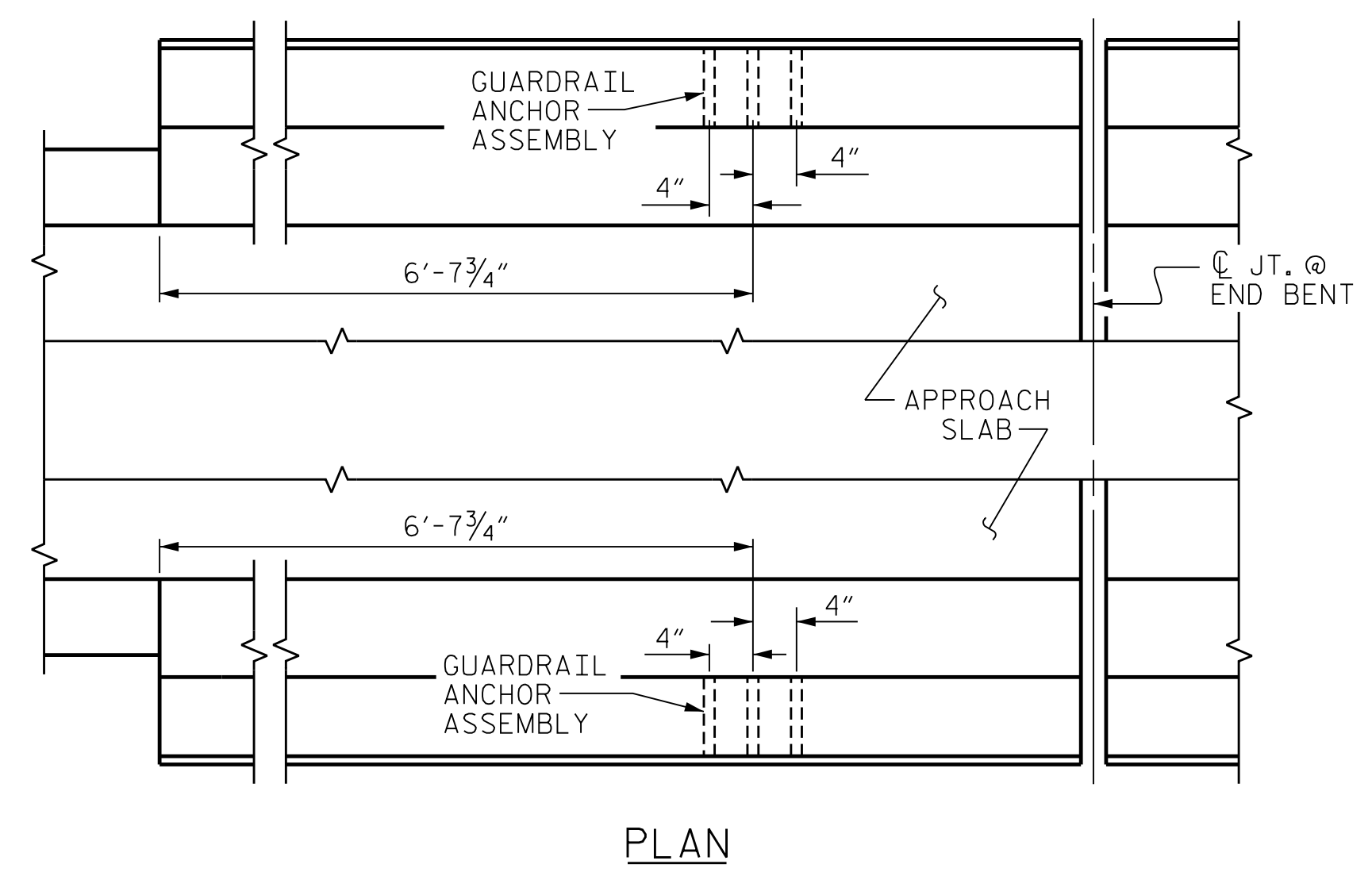
PLAN



ELEVATION
(FRONT FACE OF BARRIER)



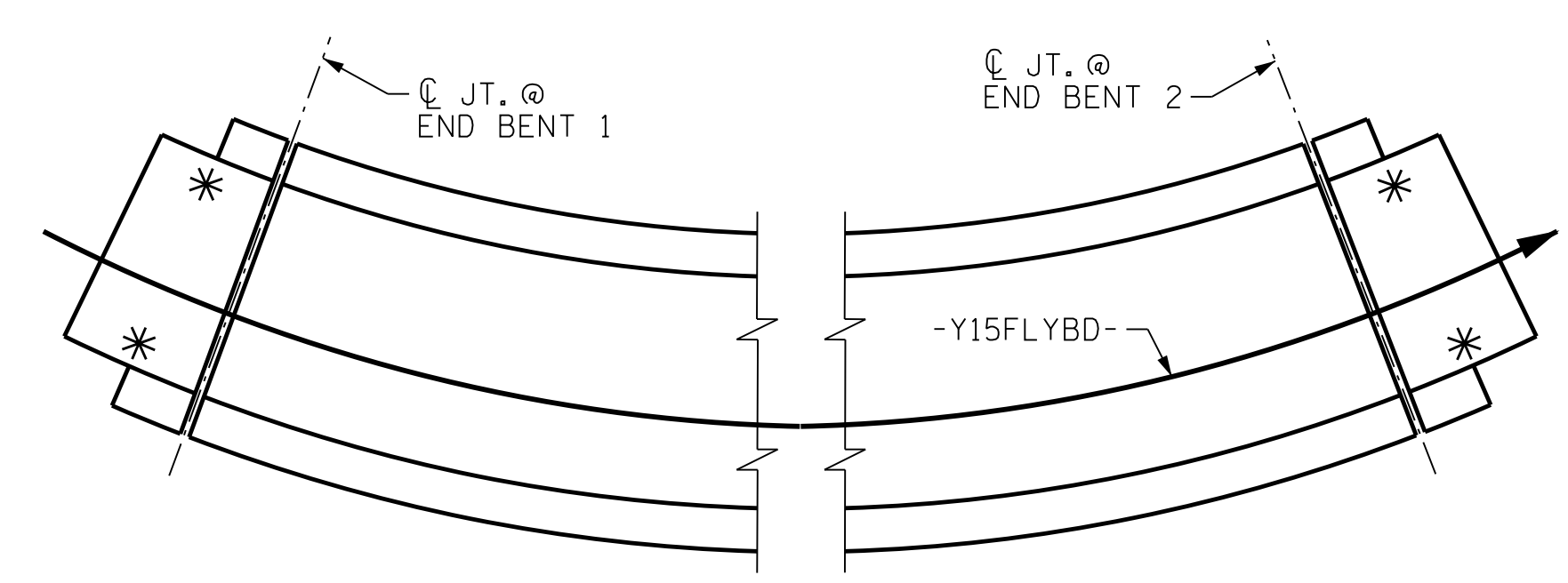
SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



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

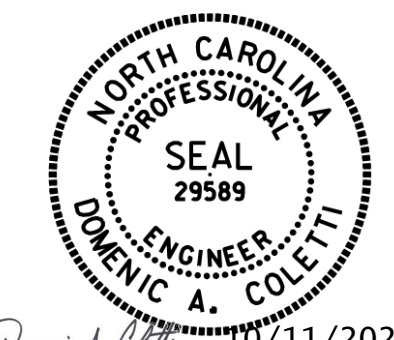
NOTES

- THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD-DOWN PLATE AND 4 - 1/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.
- THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.
- BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.
- AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.
- THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.
- THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.
- THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS
* = DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-



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

ASSEMBLED BY : M. SELLS	DATE : 07/19
CHECKED BY : S. NIFONG	DATE : 11/19
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC



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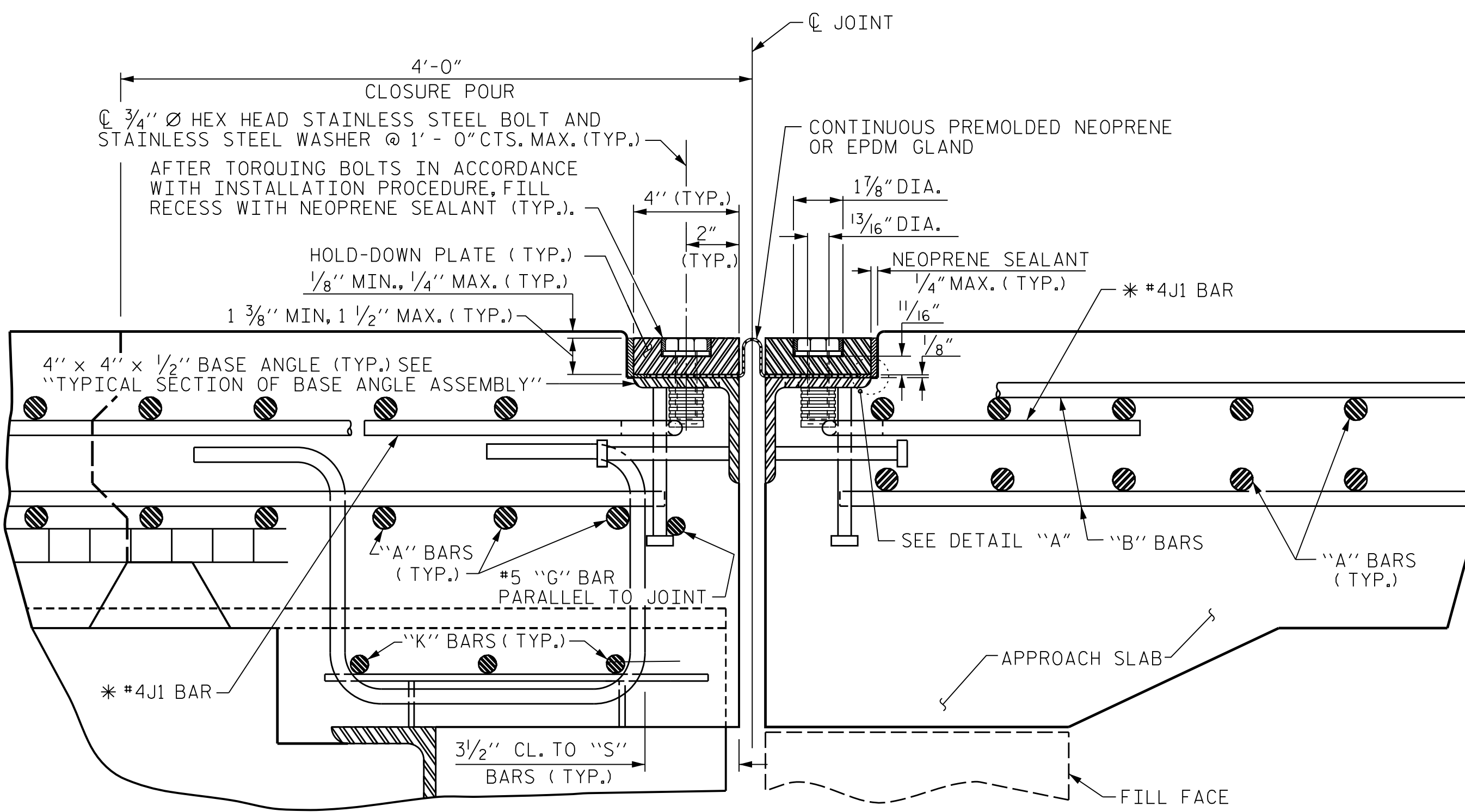
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SHEET NO. S05-067
TOTAL SHEETS 116

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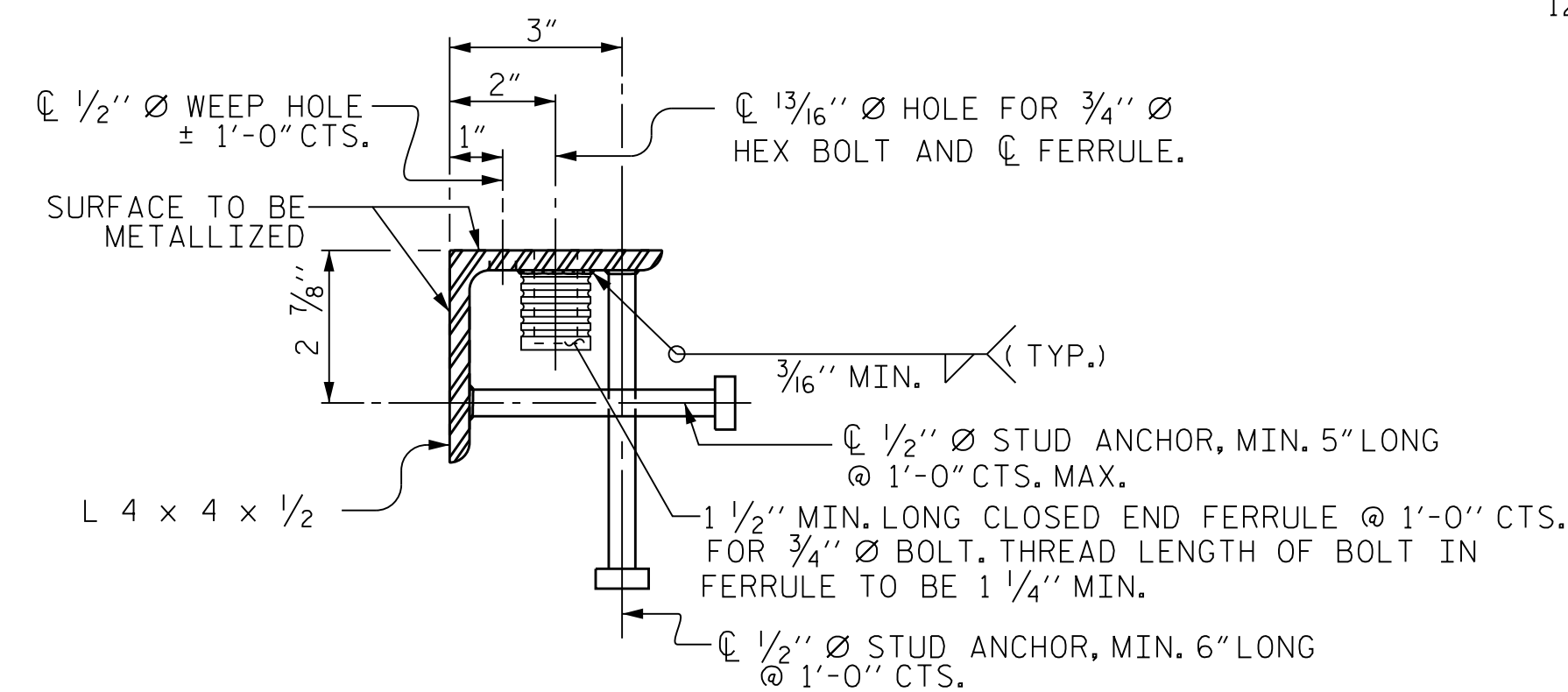
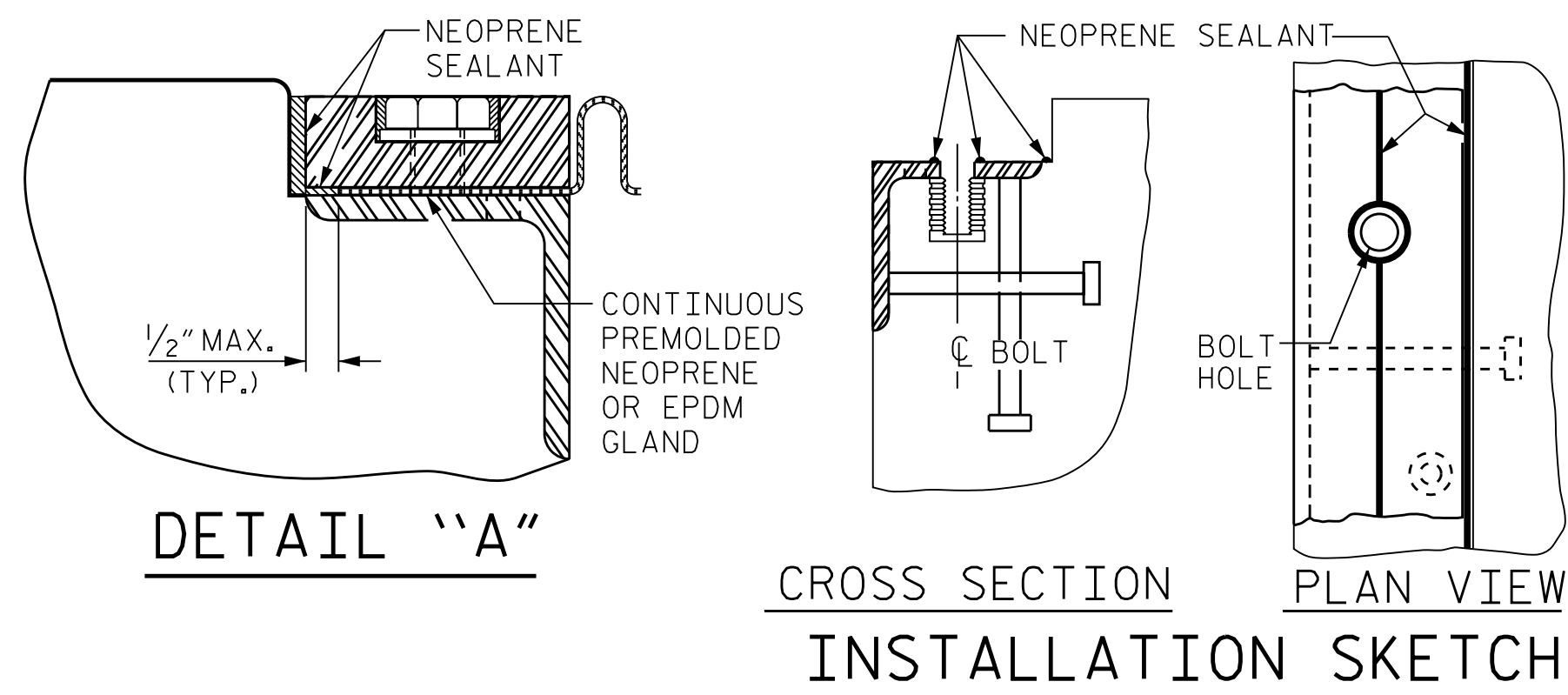
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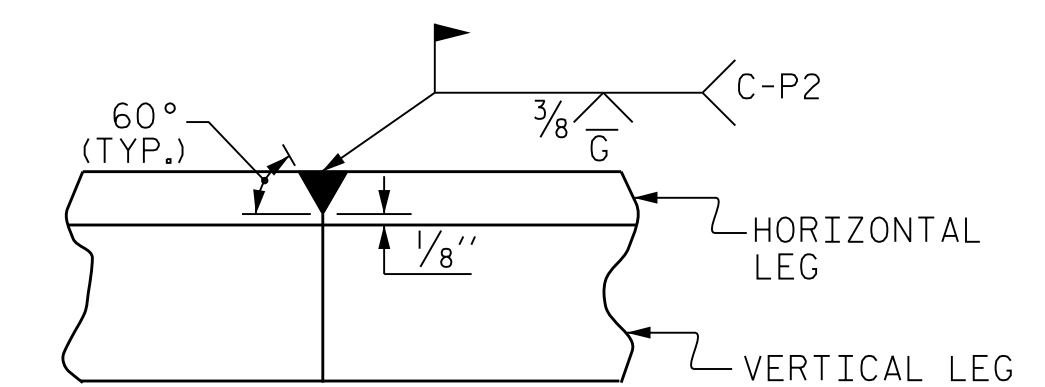
EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- STEEL SUPERSTRUCTURE

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



TYPICAL SECTION OF BASE ANGLE ASSEMBLY



DETAIL - FIELD WELD SPLICE OF BASE ANGLE

INSTALLATION PROCEDURE

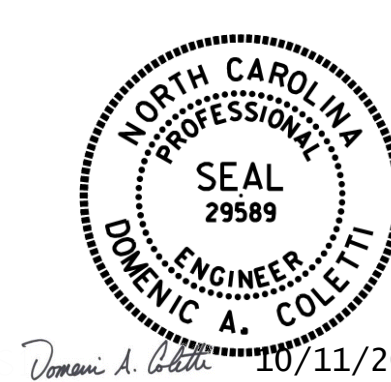
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO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

GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" DIA BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" DIA THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.

MOVEMENT AND SETTING AT JOINT					
LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG CL RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT #1	90°00'00"	2 3/16"	2 1/16"	2 3/16"	1 1/2"
END BENT #2	90°00'00"	2 1/16"	2 3/8"	2 1/16"	1 1/16"

PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

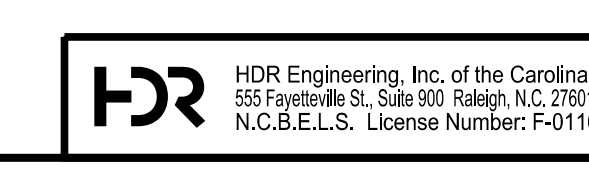


10/11/2021

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

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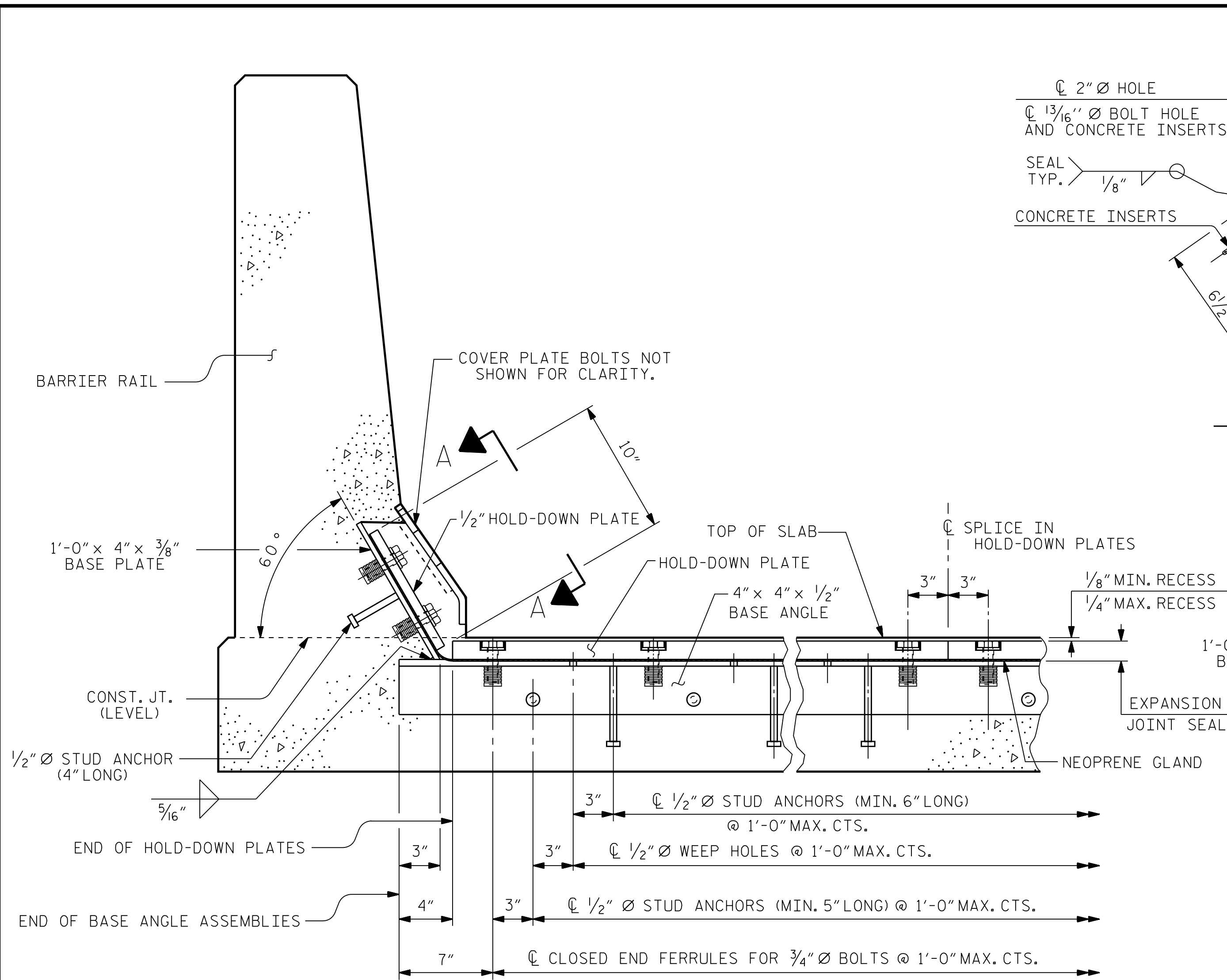
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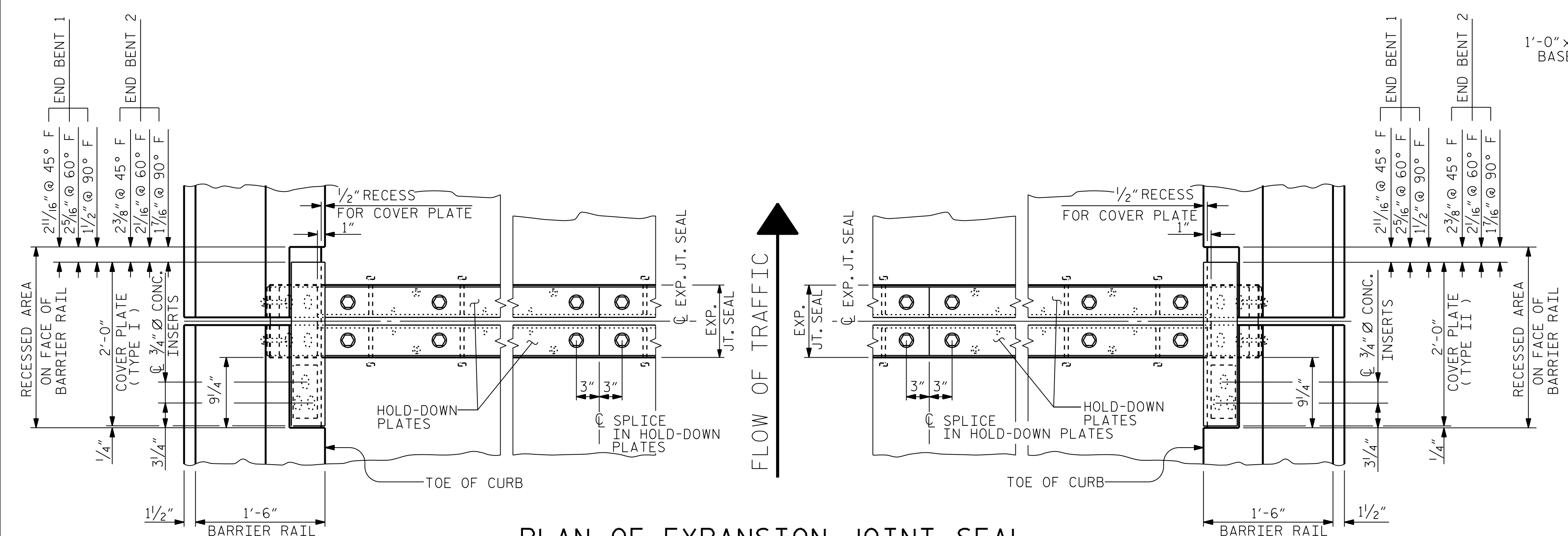
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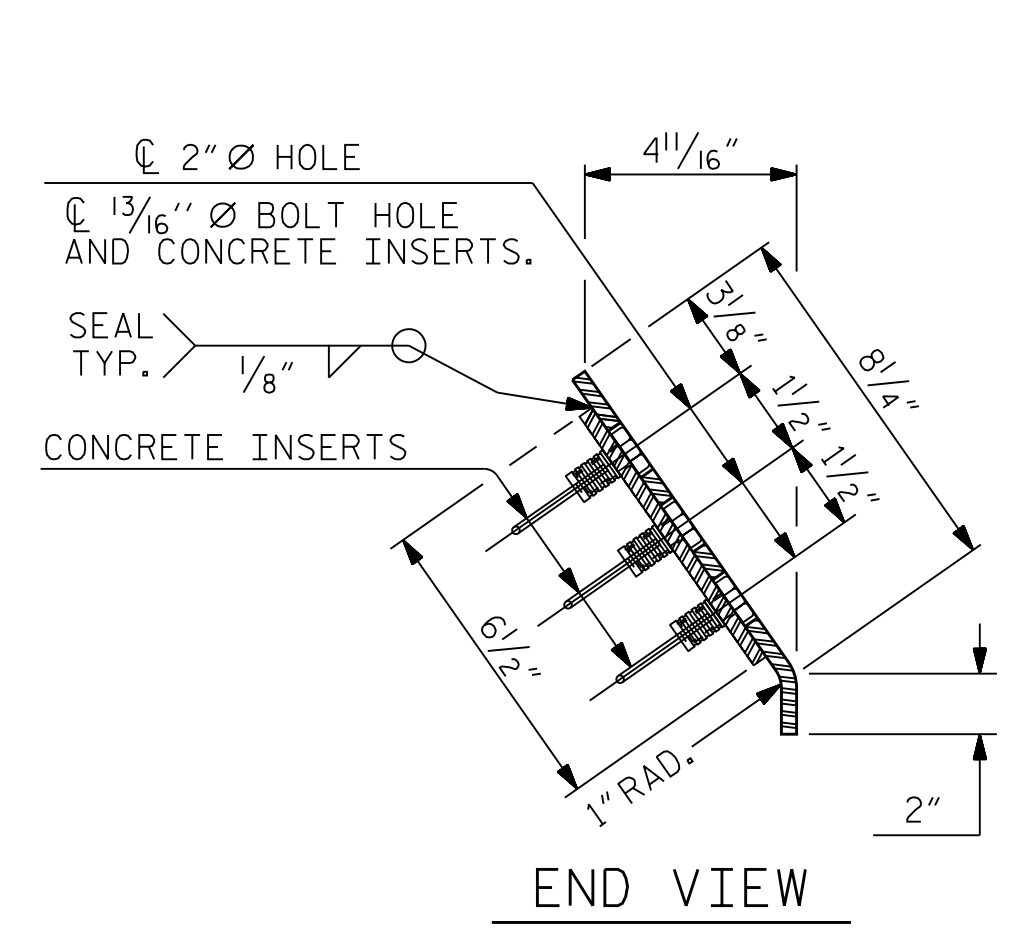
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REV. 10/17	MAA/THC
REV. 6/18	MAA/THC



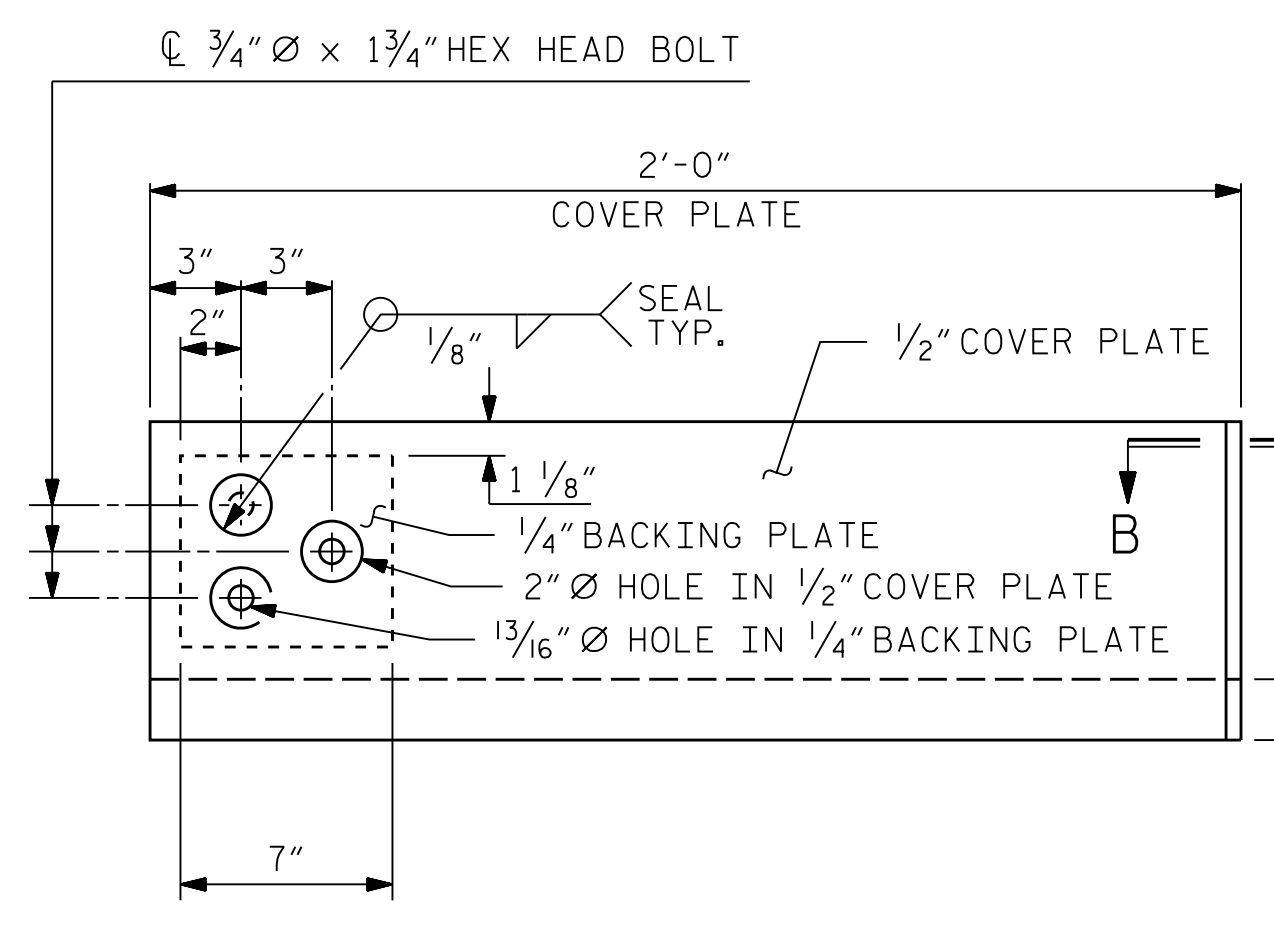
SECTION THRU RAIL NORMAL TO JOINT



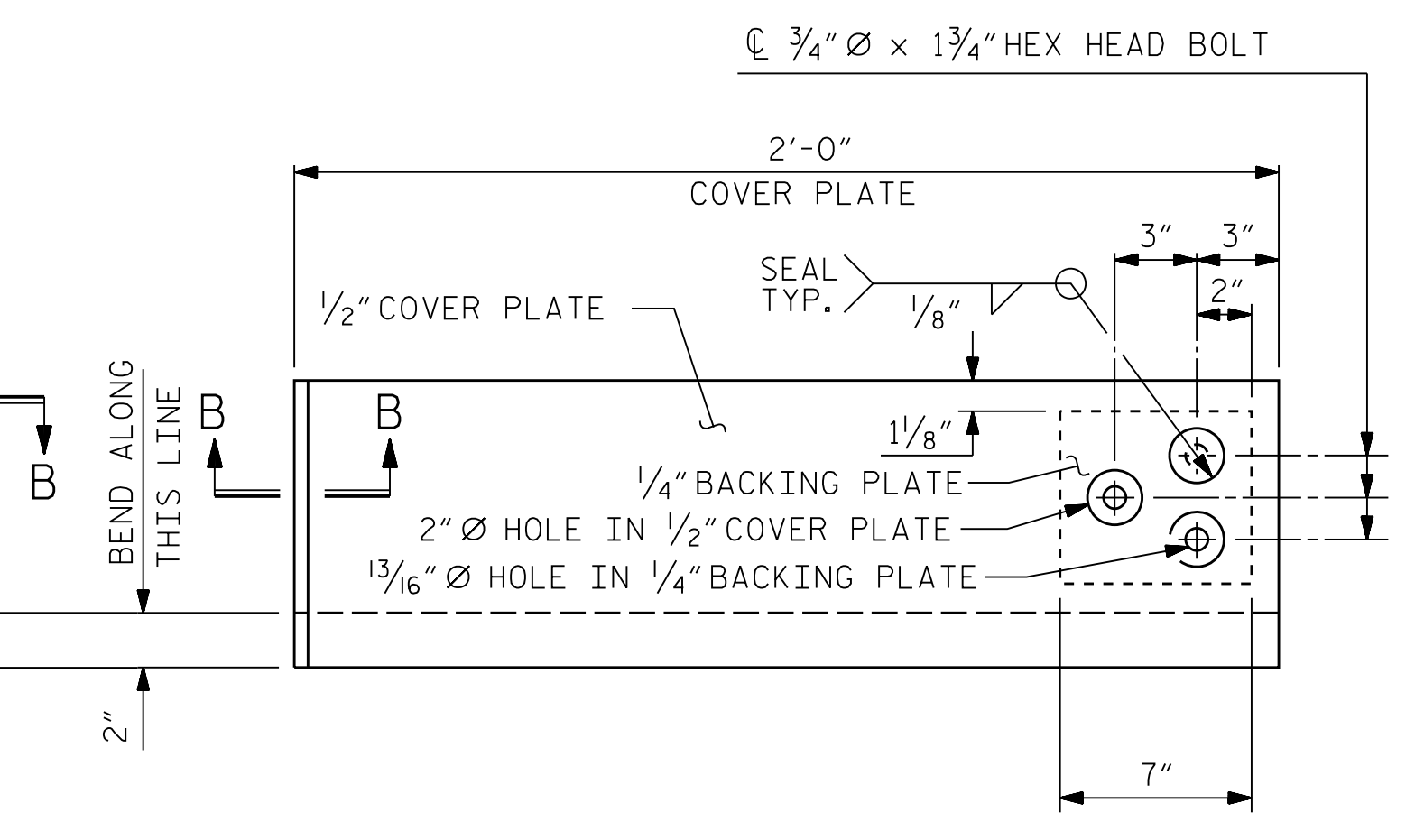
PLAN OF EXPANSION JOINT SEAL



END VIEW

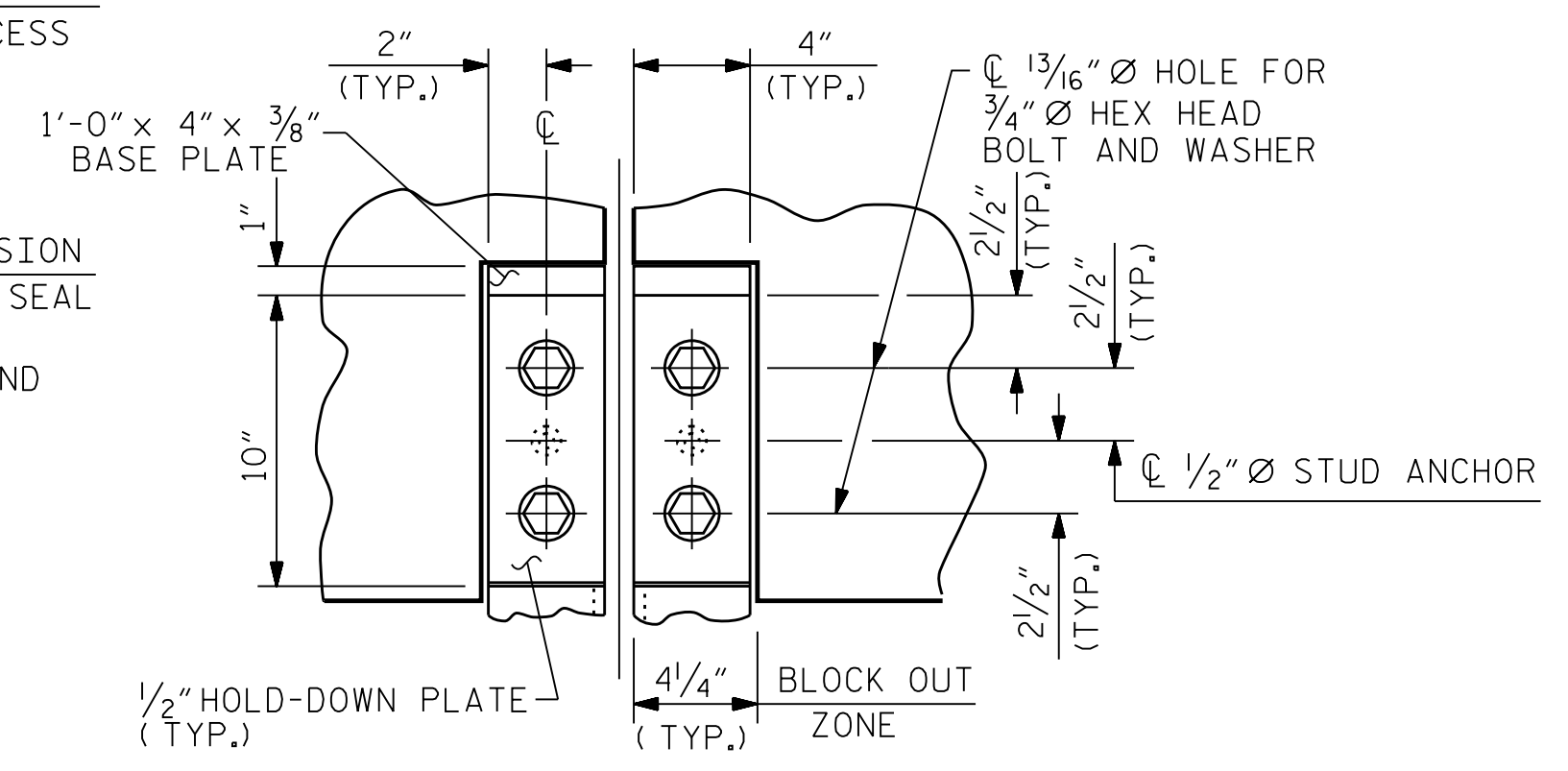


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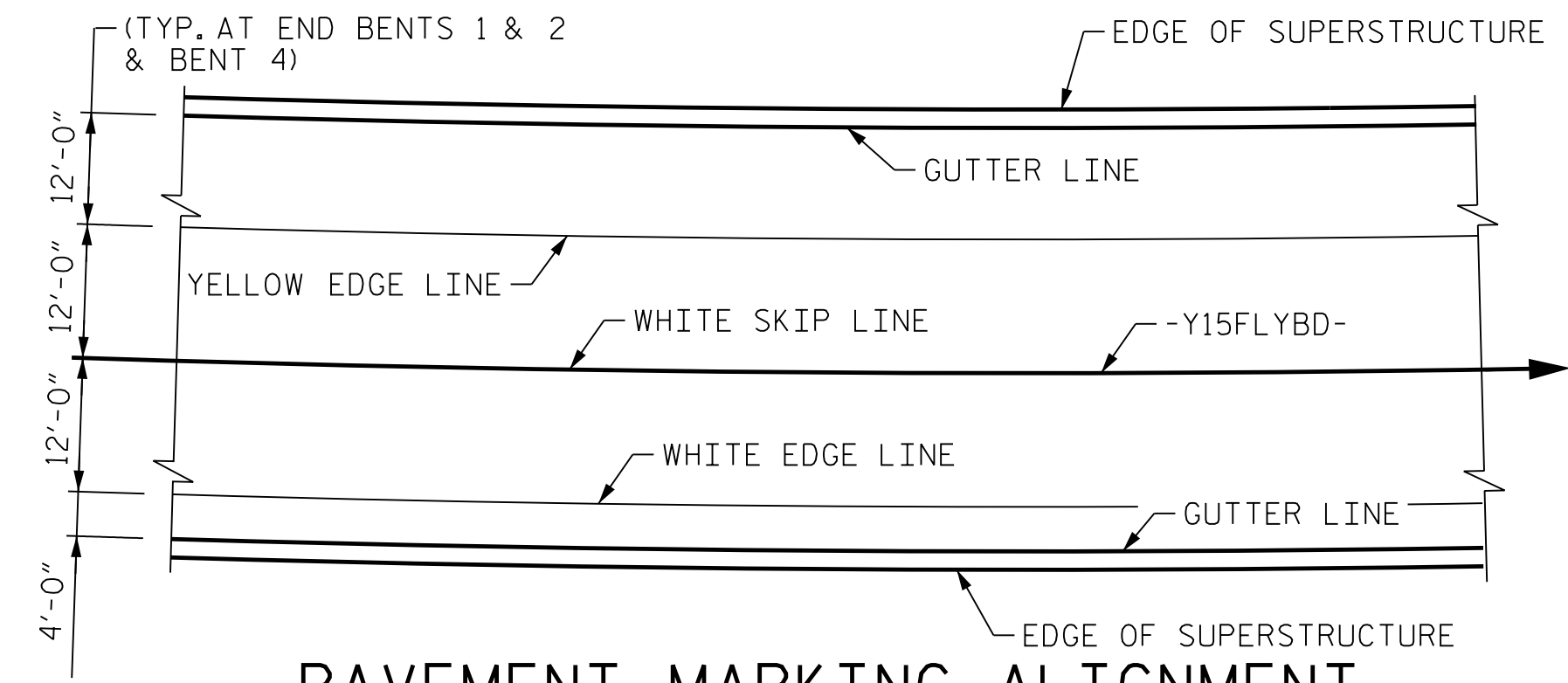


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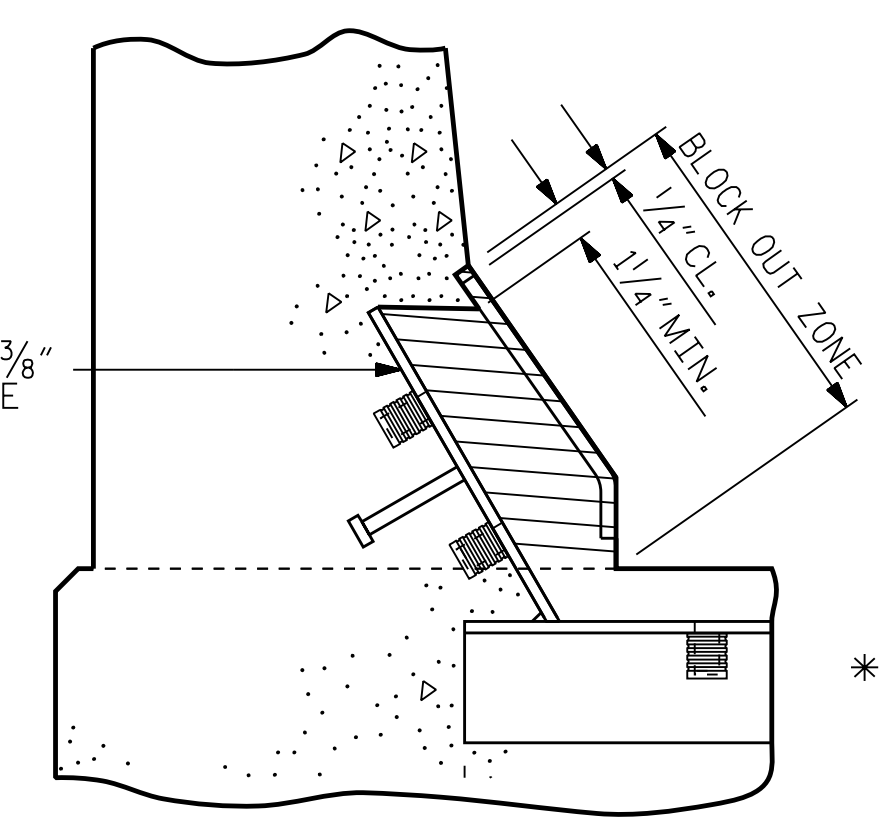
COVER PLATE DETAILS



SECTION A-A

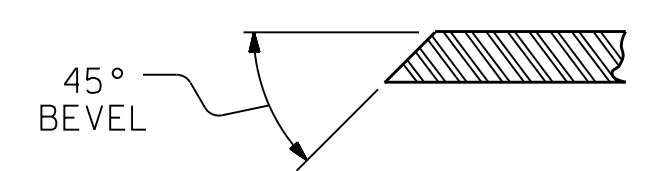


PAVEMENT MARKING ALIGNMENT

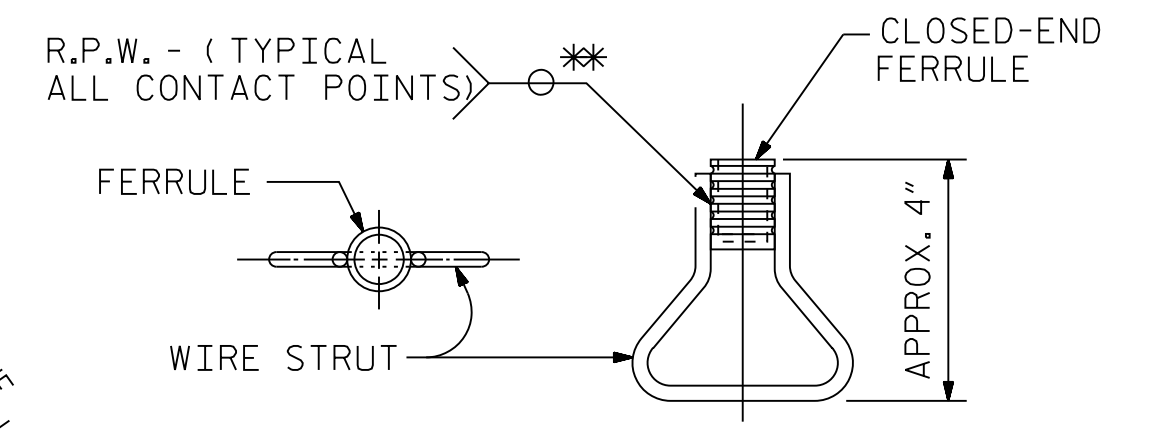


BLOCK OUT DETAIL

SEE "SECTION A - A" FOR OTHER DETAILS.



SECTION B - B

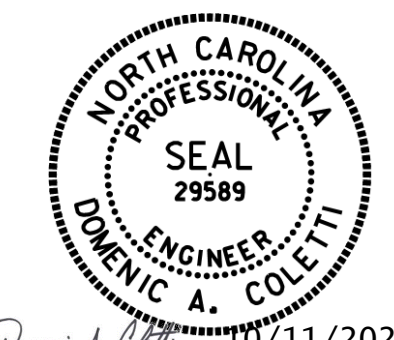


CONCRETE INSERT

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

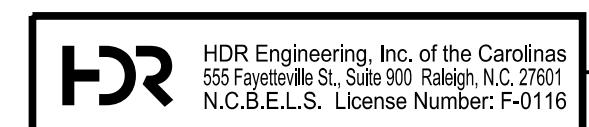
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 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

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



10/11/2021

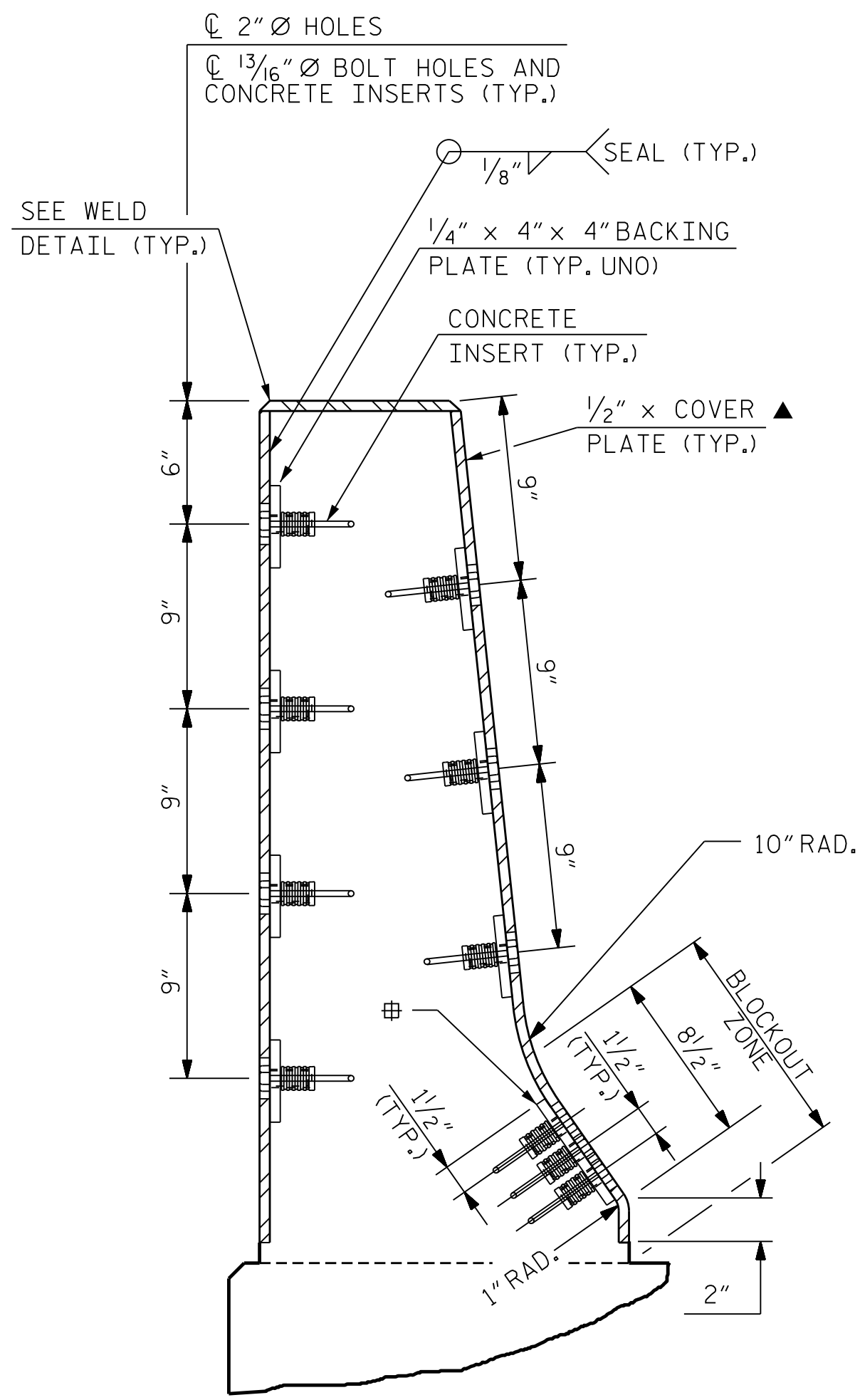
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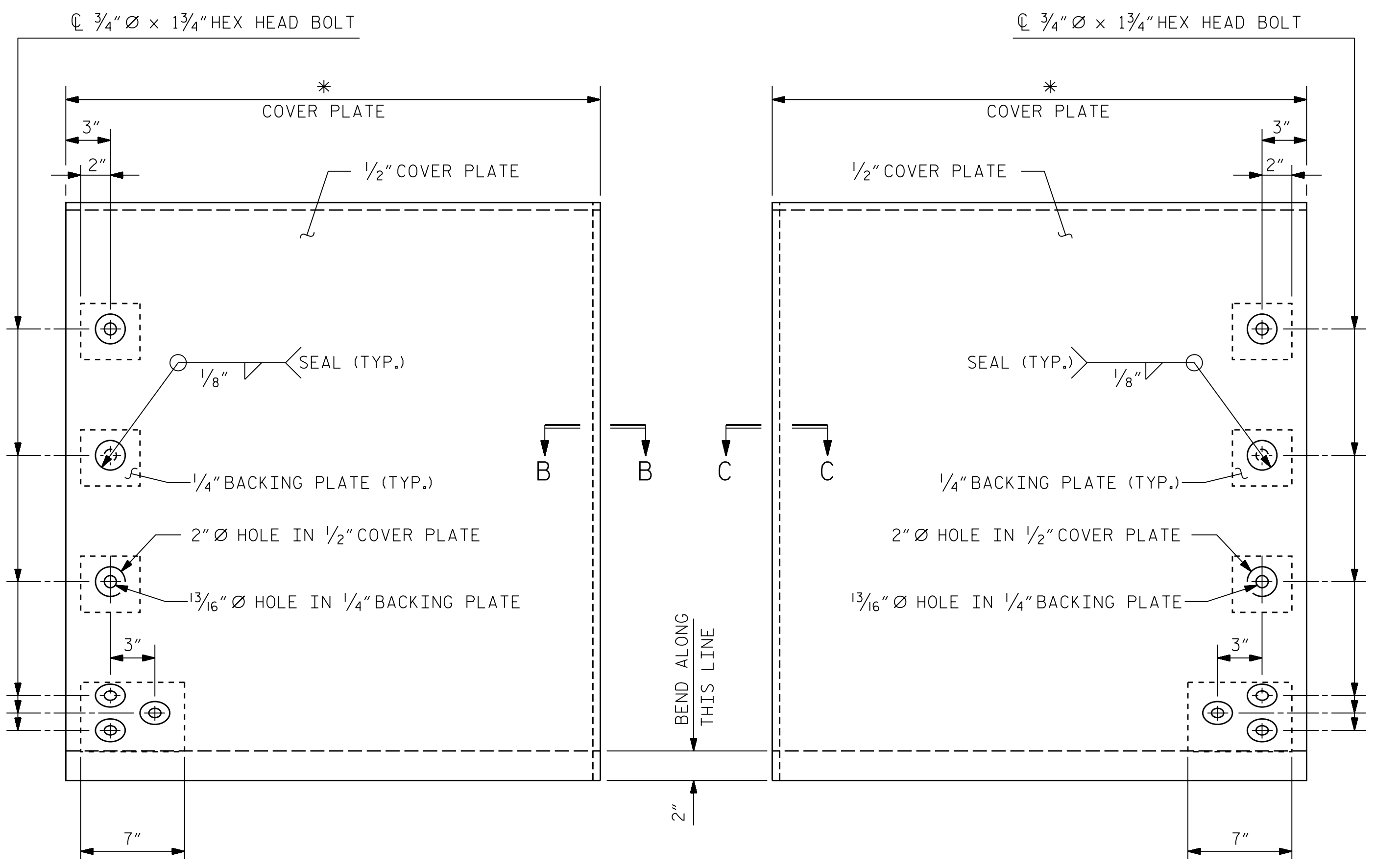
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END VIEW



TYPE I - ELEVATION VIEW

TYPE II - ELEVATION VIEW

NOTES

FOR MODULAR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL AND BE PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. AT THE CONTRACTOR'S OPTION, THE PLATES MAY BE METALLIZED AFTER FABRICATION. SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

THE 3/4" Ø HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

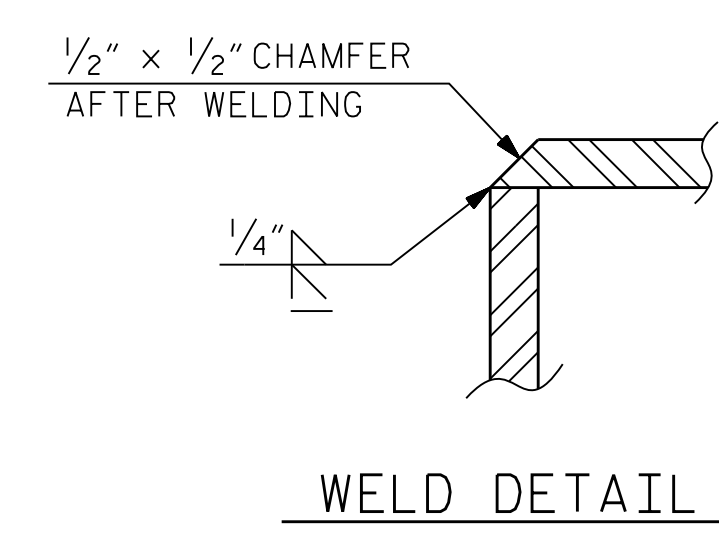
THE 3/4" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

APPLY A BOND BREAKER COATING TO THE INSIDE SURFACES OF THE STEEL COVER AND BACKING PLATES.

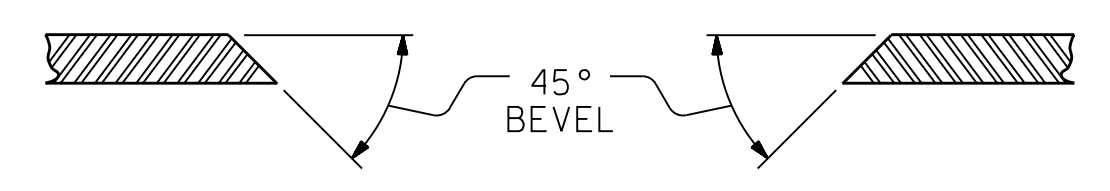
NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "MODULAR EXPANSION JOINT SEALS".

FOR PAVEMENT MARKING ALIGNMENT SKETCH, SEE EXPANSION JOINT SEAL DETAILS SHEET.

LOCATION	SKWEW ANGLE	TOTAL MOVEMENT ALONG C.R. ROADWAY
BENT 4	90°00'00"	5 7/8"

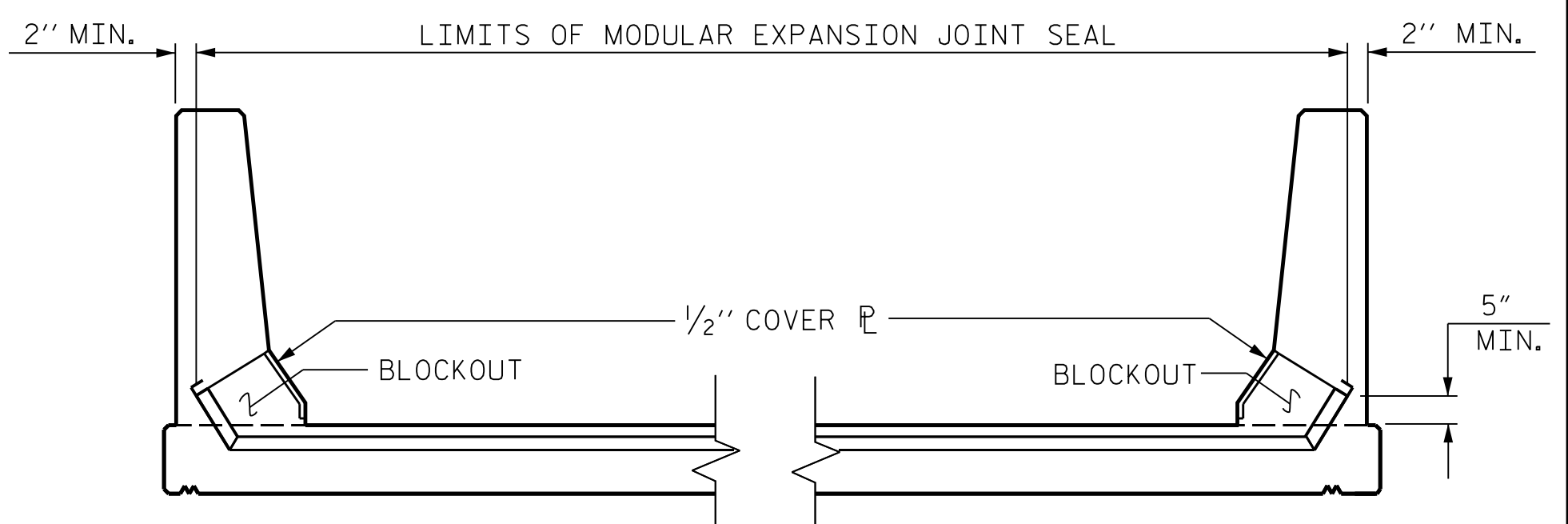


WELD DETAIL



SECTION B-B

SECTION C-C



SKETCH SHOWING LIMITS OF MODULAR EXPANSION JOINT SEAL-BARRIER RAIL

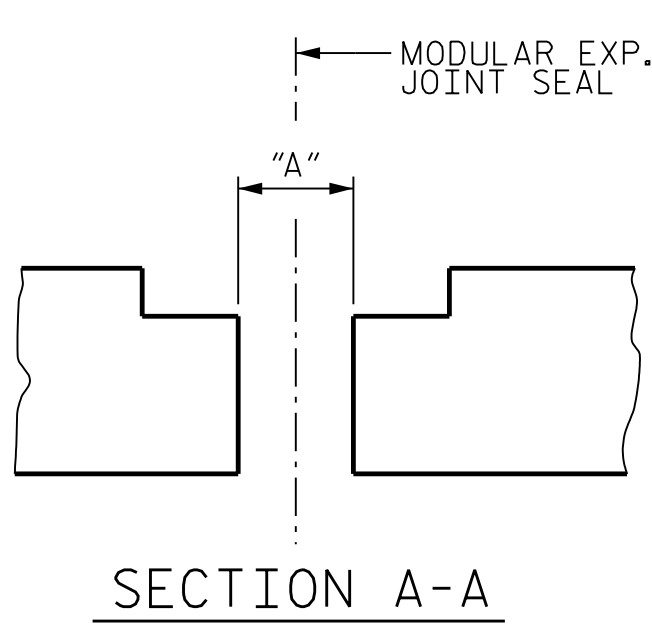
▲ = OUTSIDE DIMENSIONS OF COVER PLATE TO MATCH OUTSIDE DIMENSIONS OF CONCRETE BARRIER RAIL
 # = 1/4" x 6" x 7" BACKING PLATE

COVER PLATE DETAILS

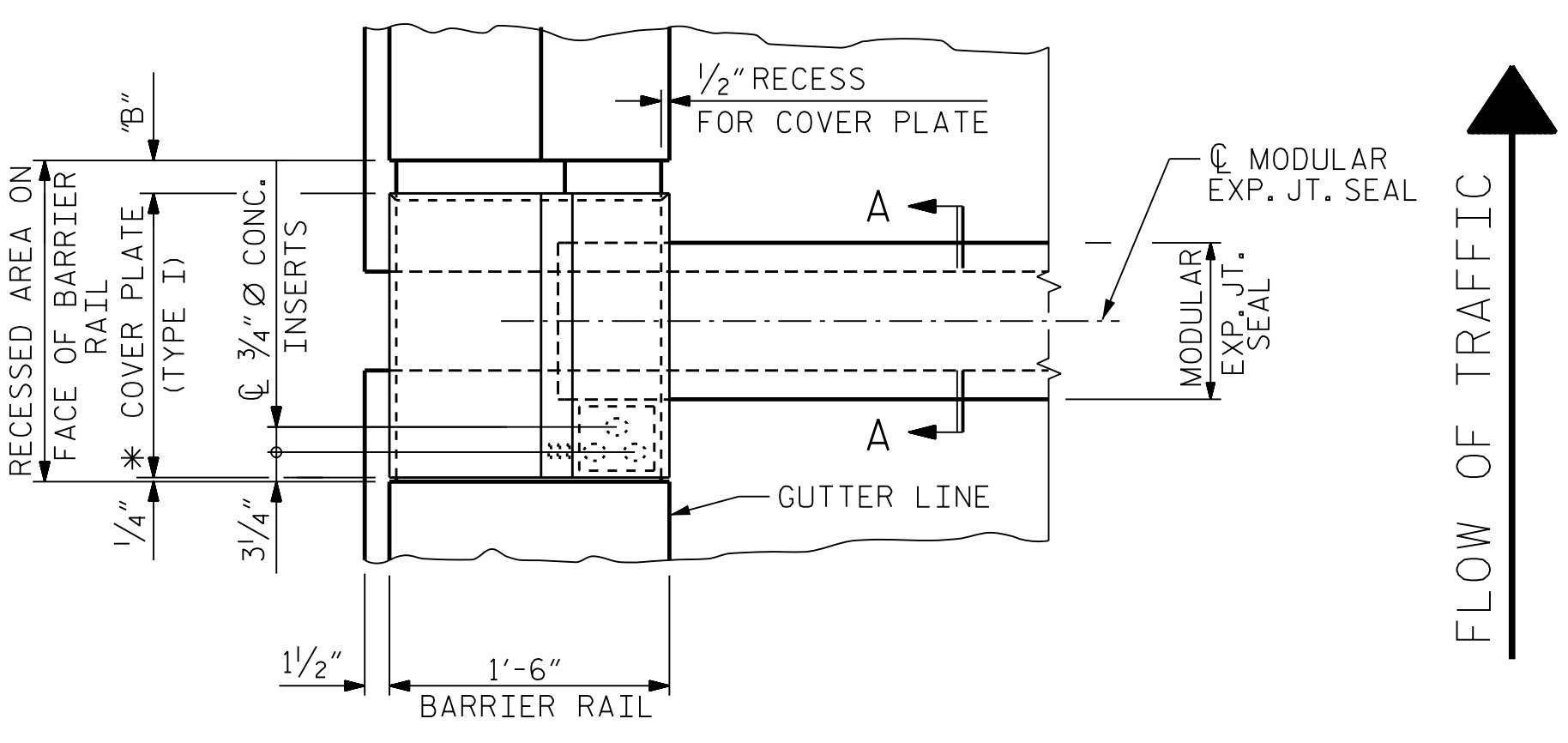
* = DETAILS OF COVER PLATES ARE SUBJECT TO CHANGE DEPENDING ON THE DETAILS OF THE MODULAR EXPANSION JOINT SEALS FURNISHED.

LOCATION	"A" (in.)		
	45° F	60° F	90° F
BENT 4	4 7/16"	3 5/8"	2 1/16"

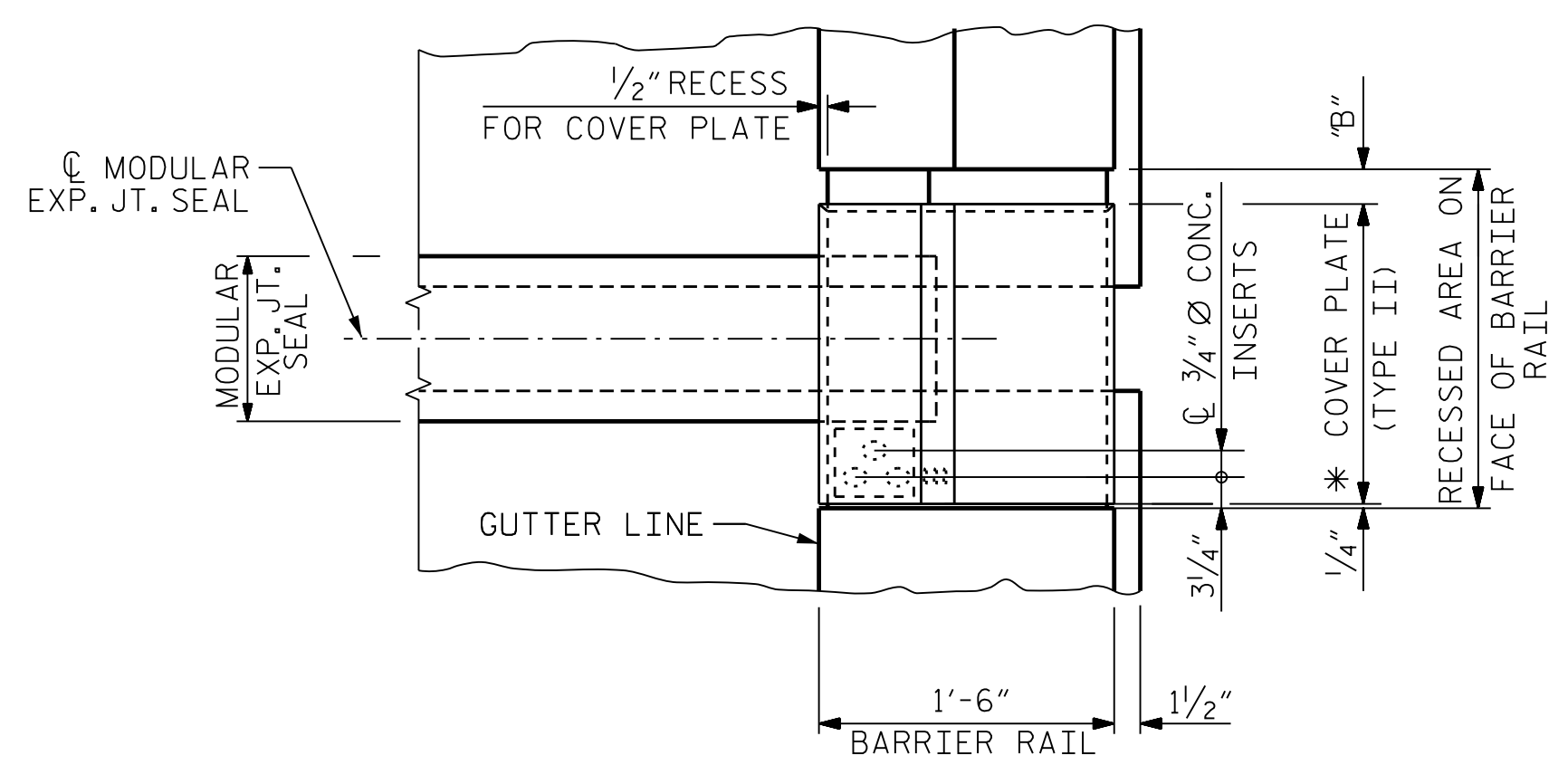
LOCATION	"B" (in.)		
	45° F	60° F	90° F
BENT 4	4 7/16"	3 5/8"	2 1/16"



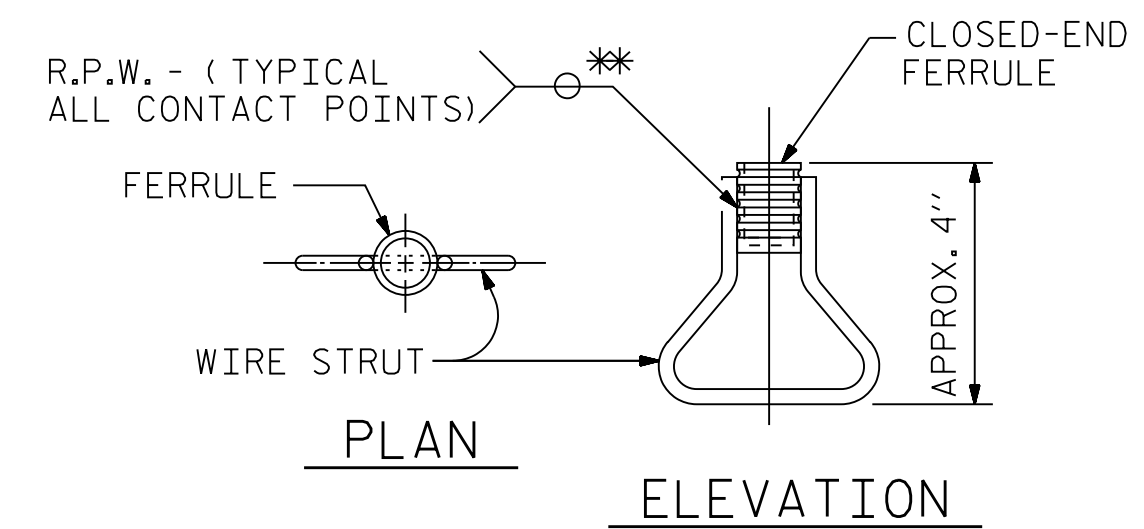
SECTION A-A



PLAN OF MODULAR EXPANSION JOINT SEAL - LEFT SIDE

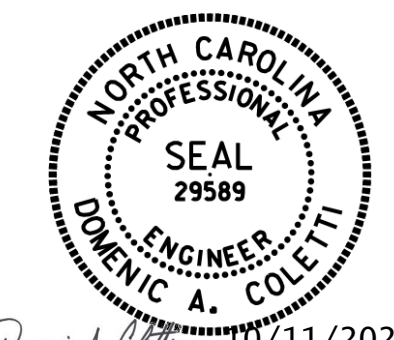


PLAN OF MODULAR EXPANSION JOINT SEAL - RIGHT SIDE



CONCRETE INSERT

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



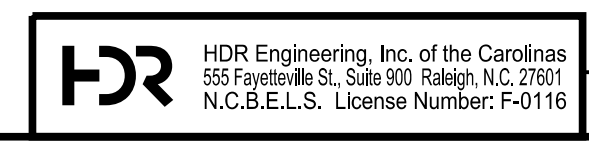
PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

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

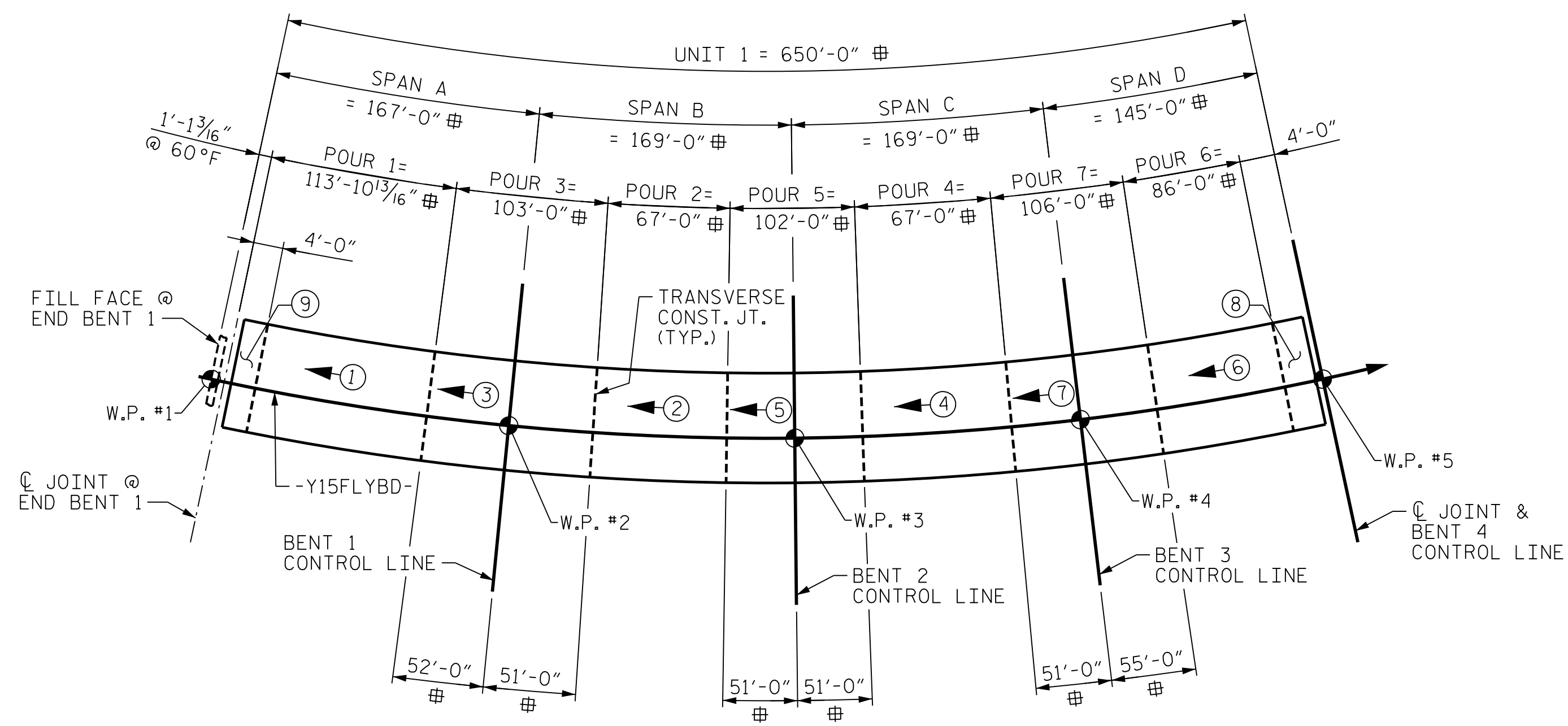
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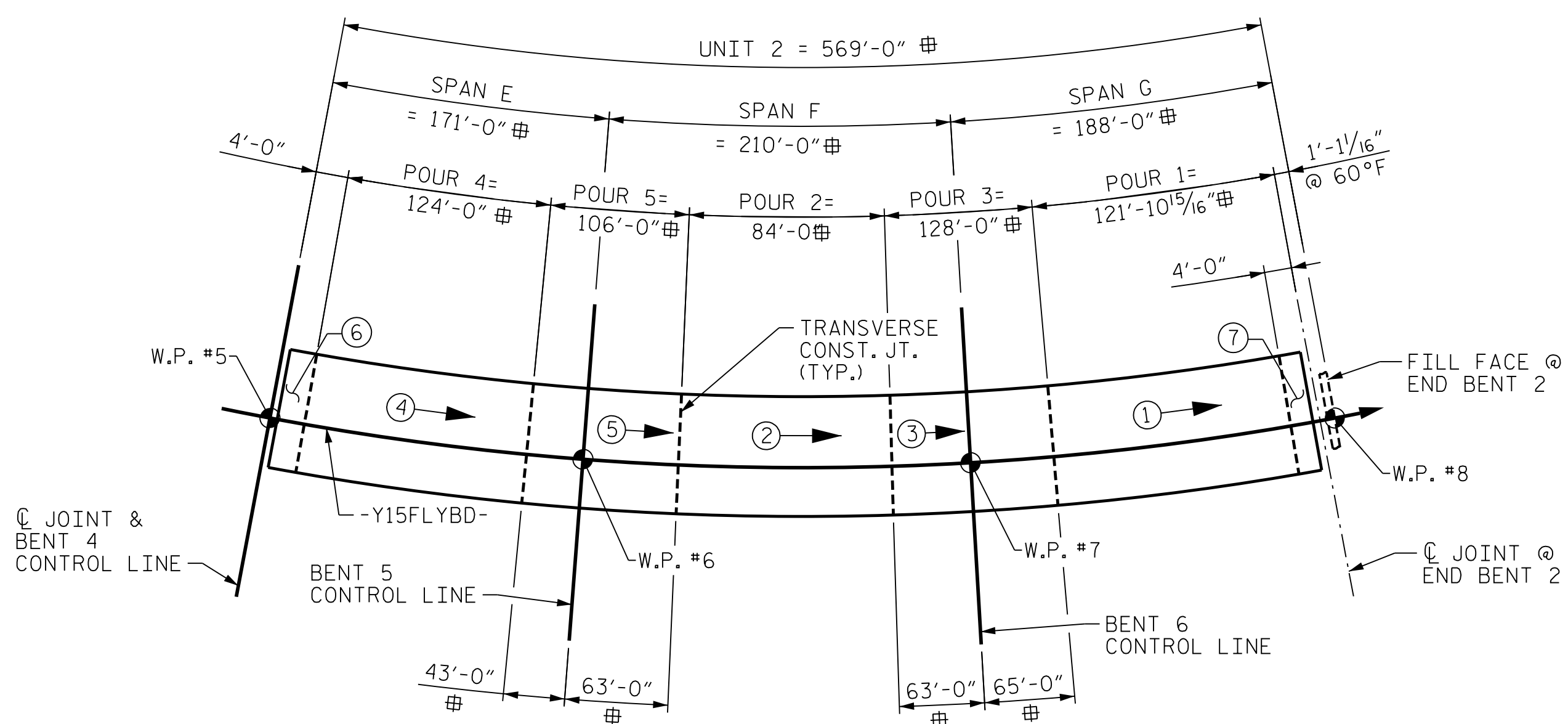
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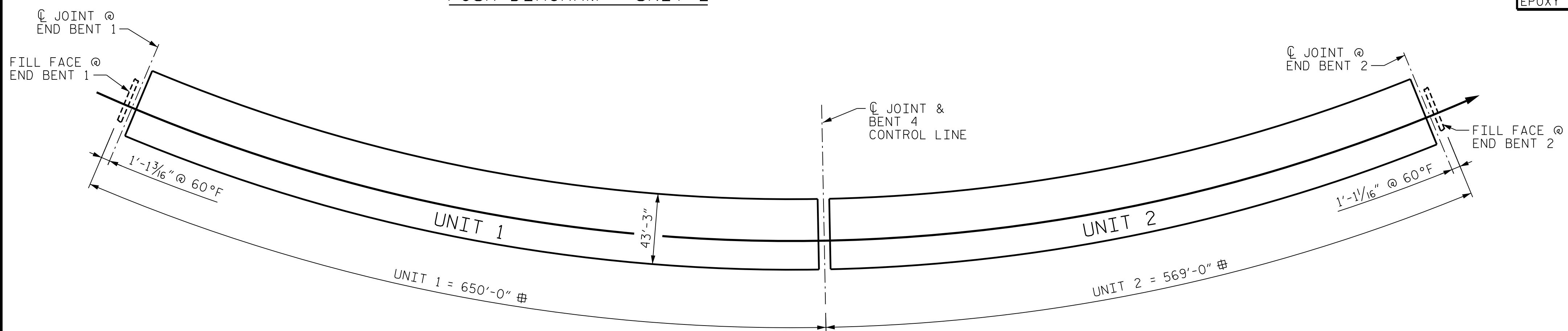
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POUR DIAGRAM - UNIT 1



POUR DIAGRAM - UNIT 2



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FEET = 52,471)

CONCRETE BREAKDOWN			
POUR	UNIT 1 CU. YDS.	UNIT 2 CU. YDS.	
1	172.8	186.8	
2	105.3	132.8	
3	162.5	201.1	
4	105.3	195.4	
5	160.5	166.1	
6	135.4	8.5	
7	166.8	8.5	
8	8.5	-	
9	8.5	-	
TOTAL	1,025.6	899.2	

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,812 SQ.FT.
BRIDGE DECK	44,799 SQ.FT.
TOTAL	46,611 SQ.FT.

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

= DIMENSIONS ARE MEASURED ALONG -Y15FLYBD-

NOTES

** = QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

PERFORM BRIDGE DECK GROOVING IN ACCORDANCE WITH STANDARD SPEC. ITEM 420-14.

THE CONCRETE DECK QUANTITIES INCLUDE CONCRETE IN THE STAY-IN-PLACE FORM FLUTES, AN ADDITIONAL 1" OF DECK THICKNESS WAS CONSIDERED WHERE STAY-IN-PLACE FORMS ARE USED.

DECK SLAB TRANSVERSE CONSTRUCTION JOINTS ARE RADIAL (EXCEPT JOINTS FOR 4'-0" CLOSURE POURS AT EXPANSION JOINTS).

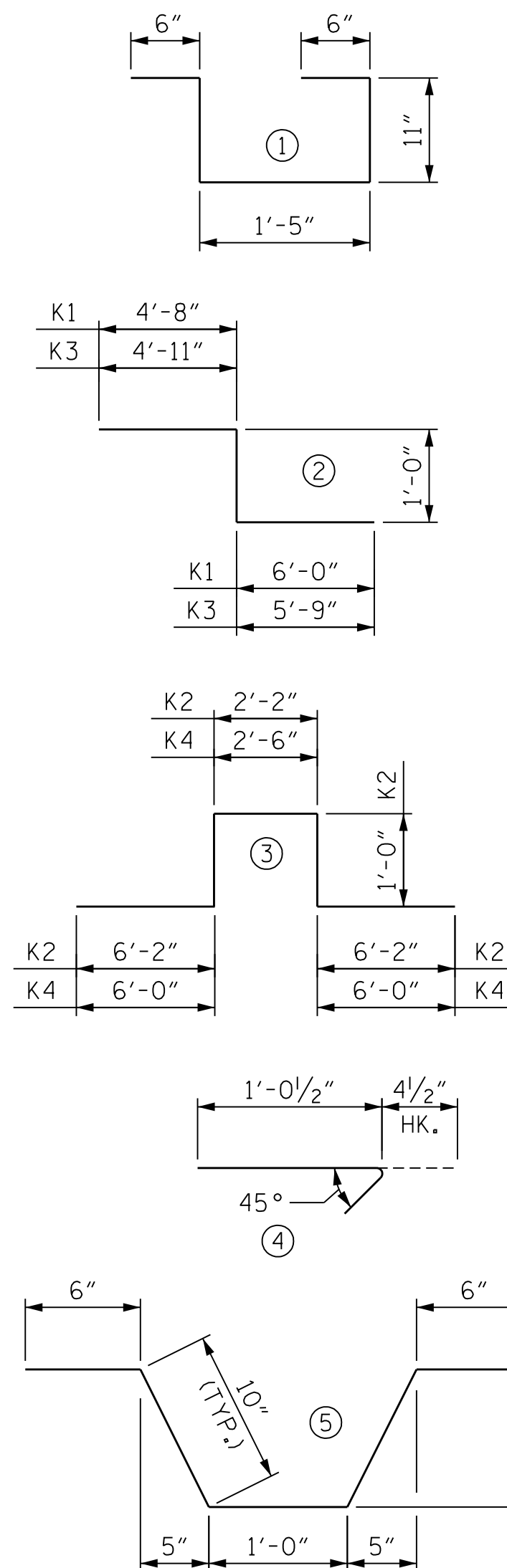
BILL OF MATERIAL DECK & DIAPHRAGM-UNIT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	1,574	#5	STR	42'-11"	70,456
A2	1,574	#5	STR	42'-11"	70,456
* B1	16	#4	STR	29'-2"	312
* B2	108	#4	STR	32'-2"	2,321
* B3	261	#6	STR	60'-0"	23,521
* B4	87	#6	STR	50'-10"	6,643
* B5	62	#4	STR	39'-1"	1,619
* B6	87	#6	STR	27'-10"	3,637
* B7	93	#4	STR	31'-9"	1,972
* B8	87	#6	STR	29'-10"	3,898
* B9	78	#4	STR	35'-1"	1,828
* B10	15	#4	STR	32'-1"	321
B101	732	#5	STR	56'-6"	43,136
* G1	1	#5	STR	42'-11"	45
* G2	11	#5	5	3'-8"	42
* J1	41	#4	4	1'-5"	39
* K1	12	#5	2	11'-8"	146
* K2	12	#5	3	16'-6"	207
* S1	79	#4	1	4'-3"	224
* EPOXY COATED BARS					
REINFORCING STEEL					LBS. 113,592
EPOXY COATED REINF. STEEL					LBS. 117,231

BILL OF MATERIAL DECK & DIAPHRAGM-UNIT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	1,378	#5	STR	42'-11"	61,682
A2	1,378	#5	STR	42'-11"	61,682
* B11	16	#4	STR	28'-10"	308
* B12	77	#4	STR	31'-10"	1,637
* B13	348	#6	STR	36'-2"	18,904
* B14	93	#4	STR	31'-7"	1,962
* B15	261	#6	STR	50'-3"	19,699
* B16	109	#4	STR	32'-0"	2,330
* B17	15	#4	STR	29'-0"	291
B102	610	#5	STR	59'-2"	37,644
* G1	1	#5	STR	42'-11"	45
* G2	11	#5	5	3'-8"	42
* J1	41	#4	4	1'-5"	39
* K1	6	#5	2	11'-8"	73
* K2	6	#5	3	16'-6"	103
* K3	6	#5	2	11'-8"	73
* K4	6	#5	3	16'-6"	103
* S1	79	#4	1	4'-3"	224
* EPOXY COATED BARS					
REINFORCING STEEL					LBS. 99,326
EPOXY COATED REINF. STEEL					LBS. 107,515

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	CU. YARDS	LBS.	LBS.
UNIT 1	1,025.6	113,592	117,231
UNIT 2	899.2	99,326	107,515
TOTAL **	1,924.8	212,918	224,746

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-



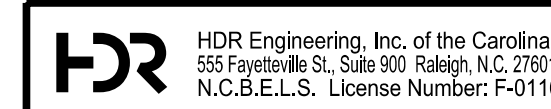
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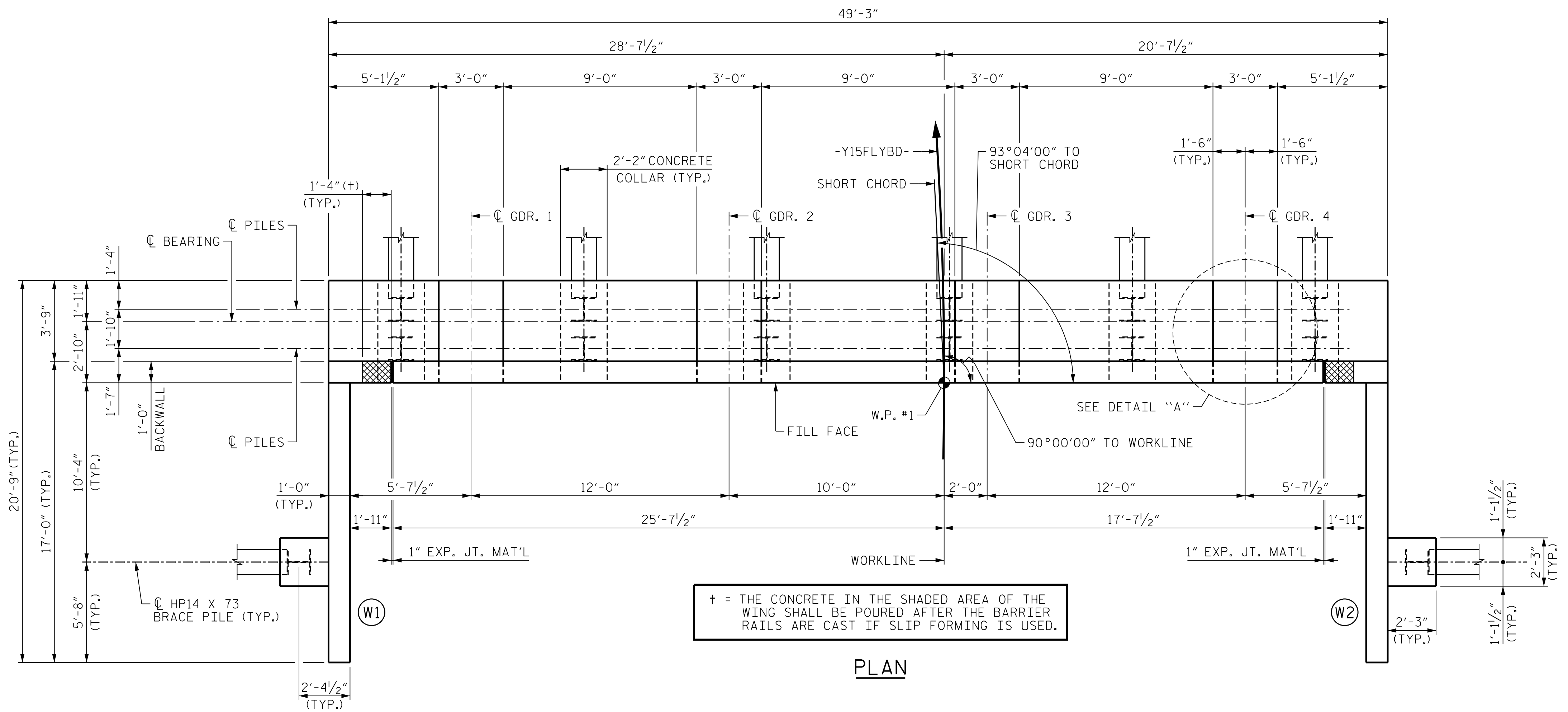
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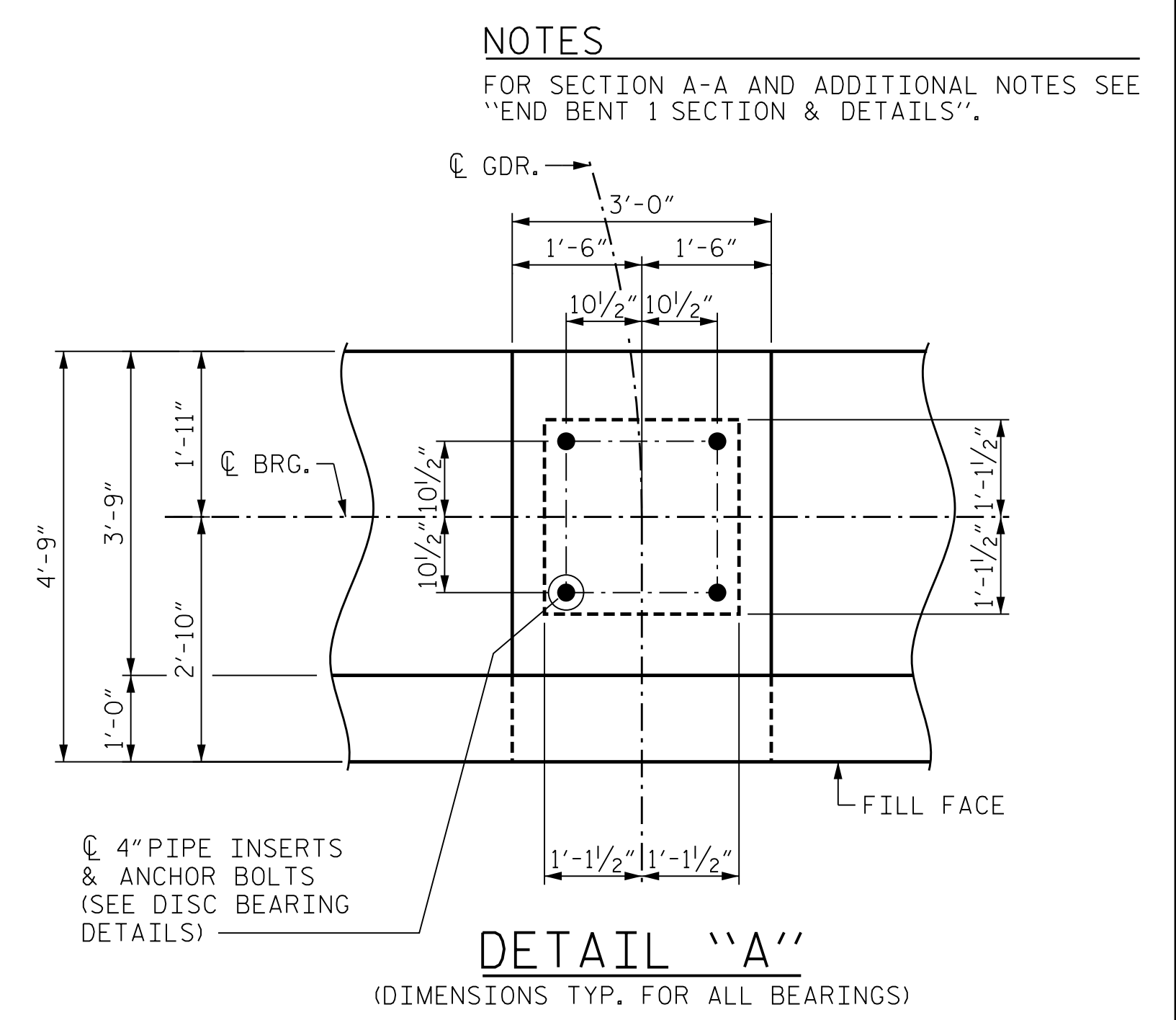
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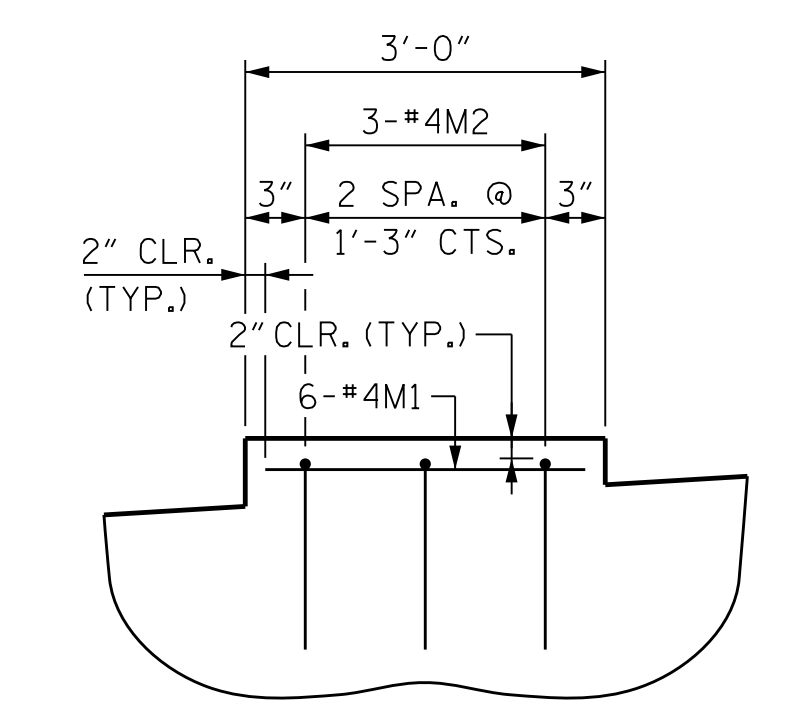
PLAN

† = THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.



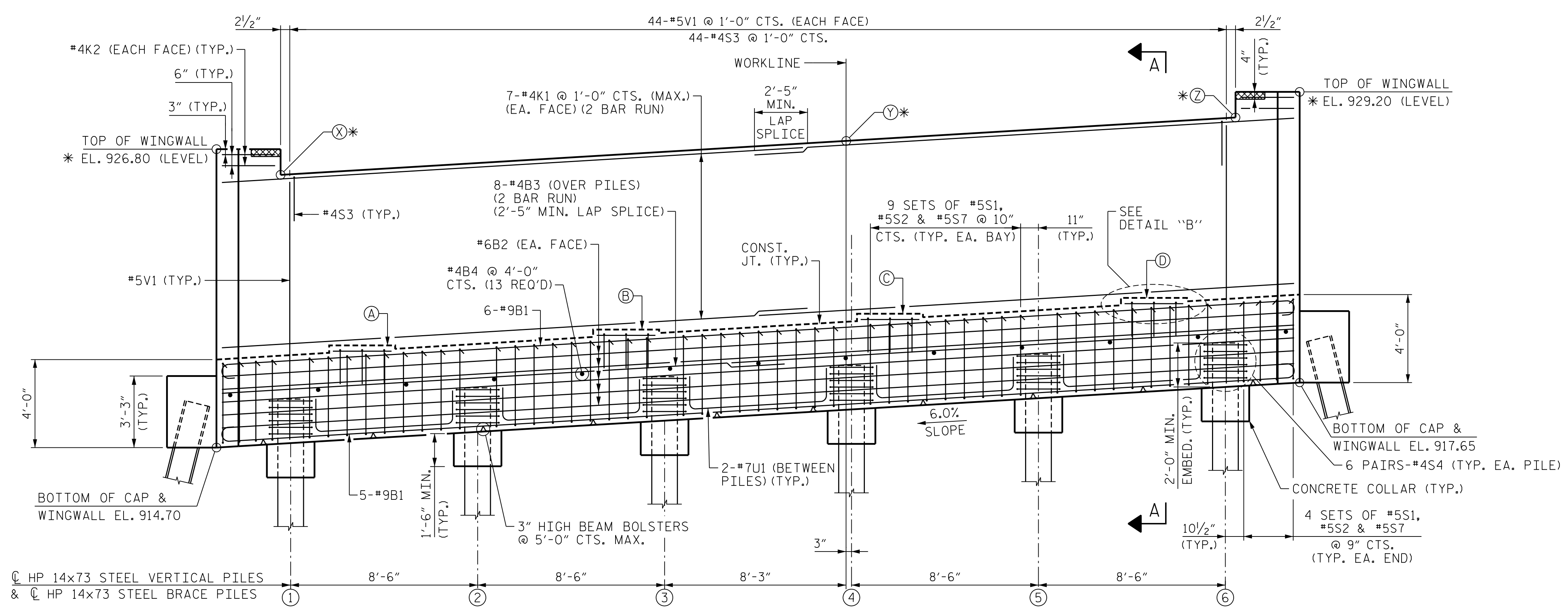
DETAIL "A"

(DIMENSIONS TYP. FOR ALL BEARINGS)



DETAIL "B"

(TYP. FOR ALL GIRDERS)

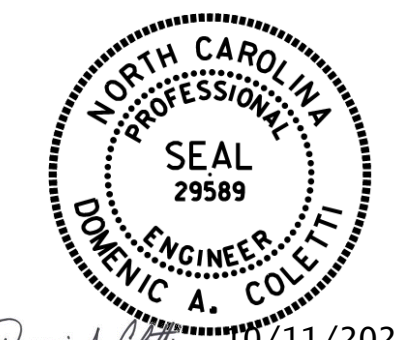


ELEVATION

ELEVATION TABLE	
LOCATION	ELEVATION
A	919.35
B	920.07
C	920.79
D	921.51
* X	925.04
* Y	926.58
* Z	927.63
* AT FILL FACE	

TOP OF PILE ELEVATIONS	
LOCATION	ELEVATION
1	916.94
2	917.45
3	917.96
4	918.47
5	918.98
6	919.49

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 1 OF 3



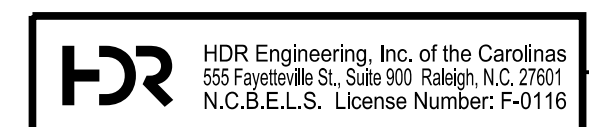
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 1
 PLAN AND ELEVATION**

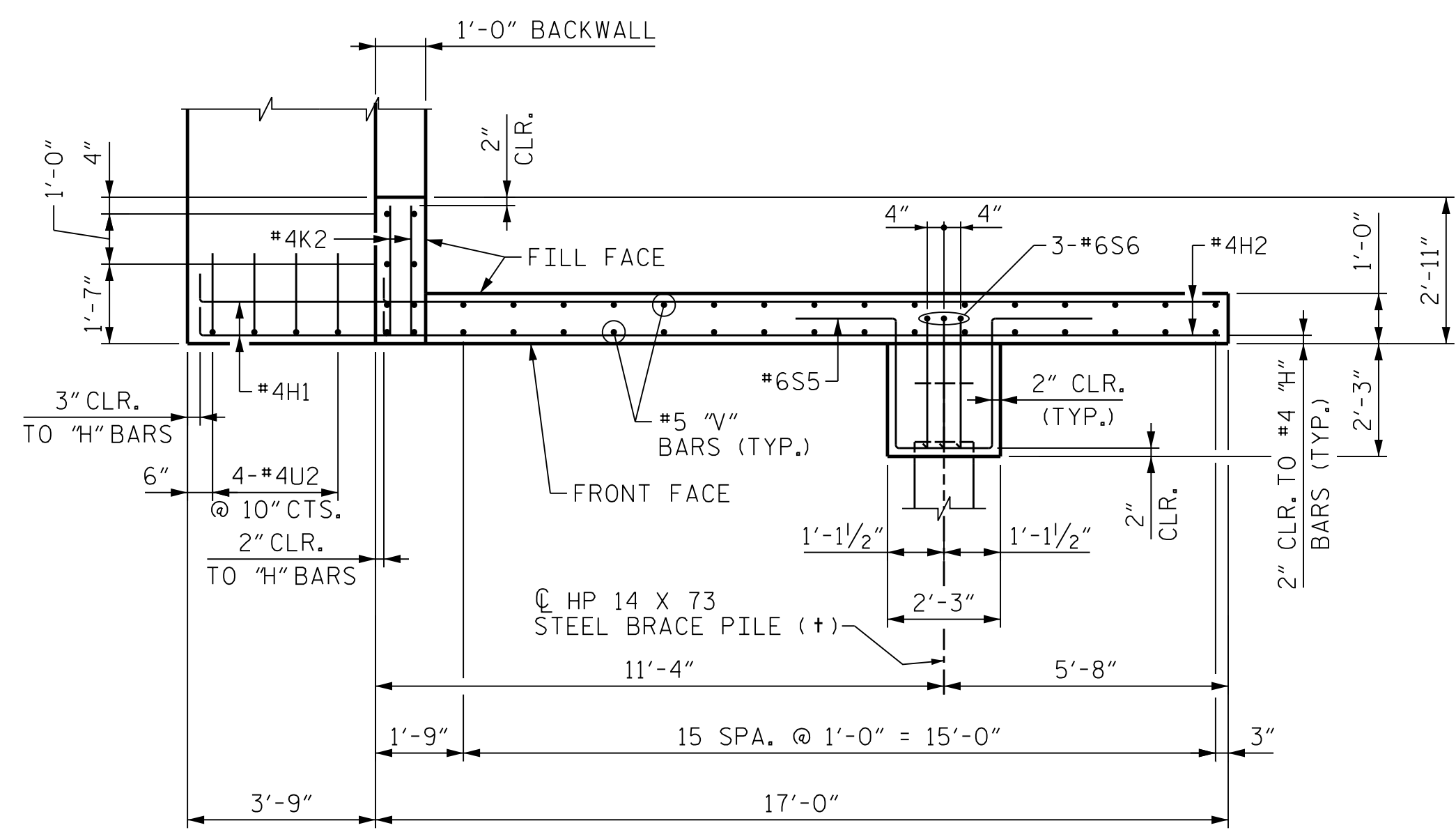
REVISIONS						SHEET NO. S05-072 TOTAL SHEETS 116
NO.	BY:	DATE:	NO.	BY:	DATE:	
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2	--	--	4	--	--	

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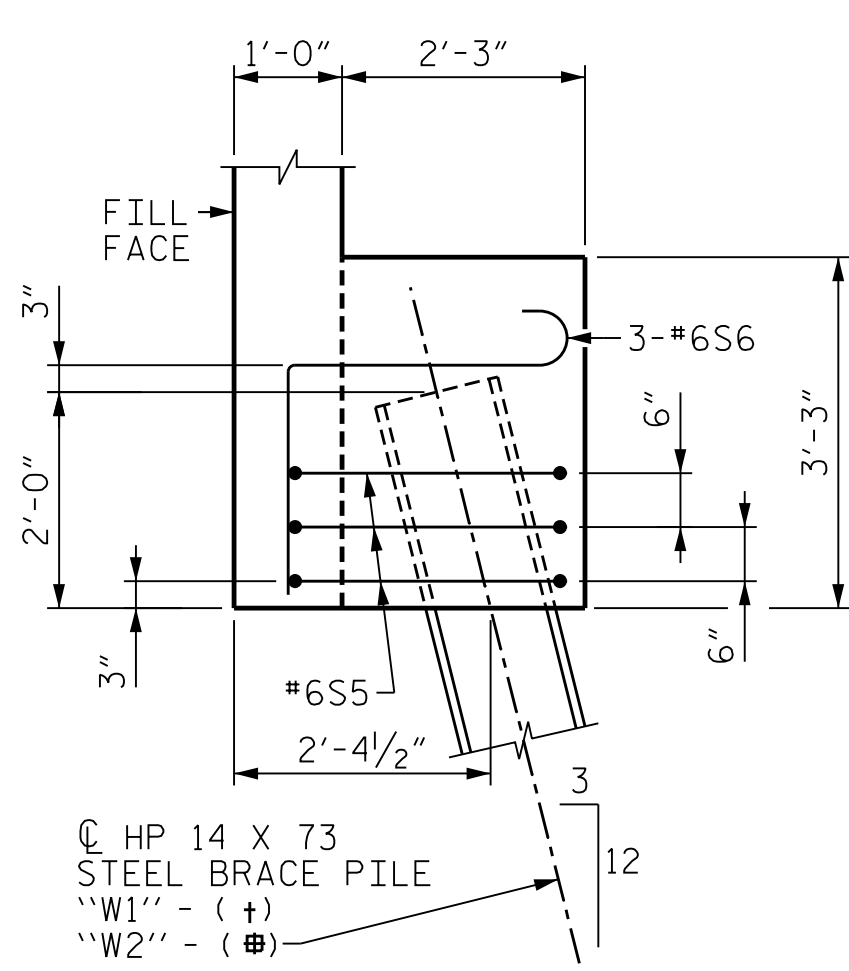
DES BY: A. ZEITOUNI DATE: 07/19
 DES CHK: J. EARNEST DATE: 07/19
 DWG BY: B. PETERSON DATE: 07/19
 CHK BY: J. EARNEST DATE: 08/19



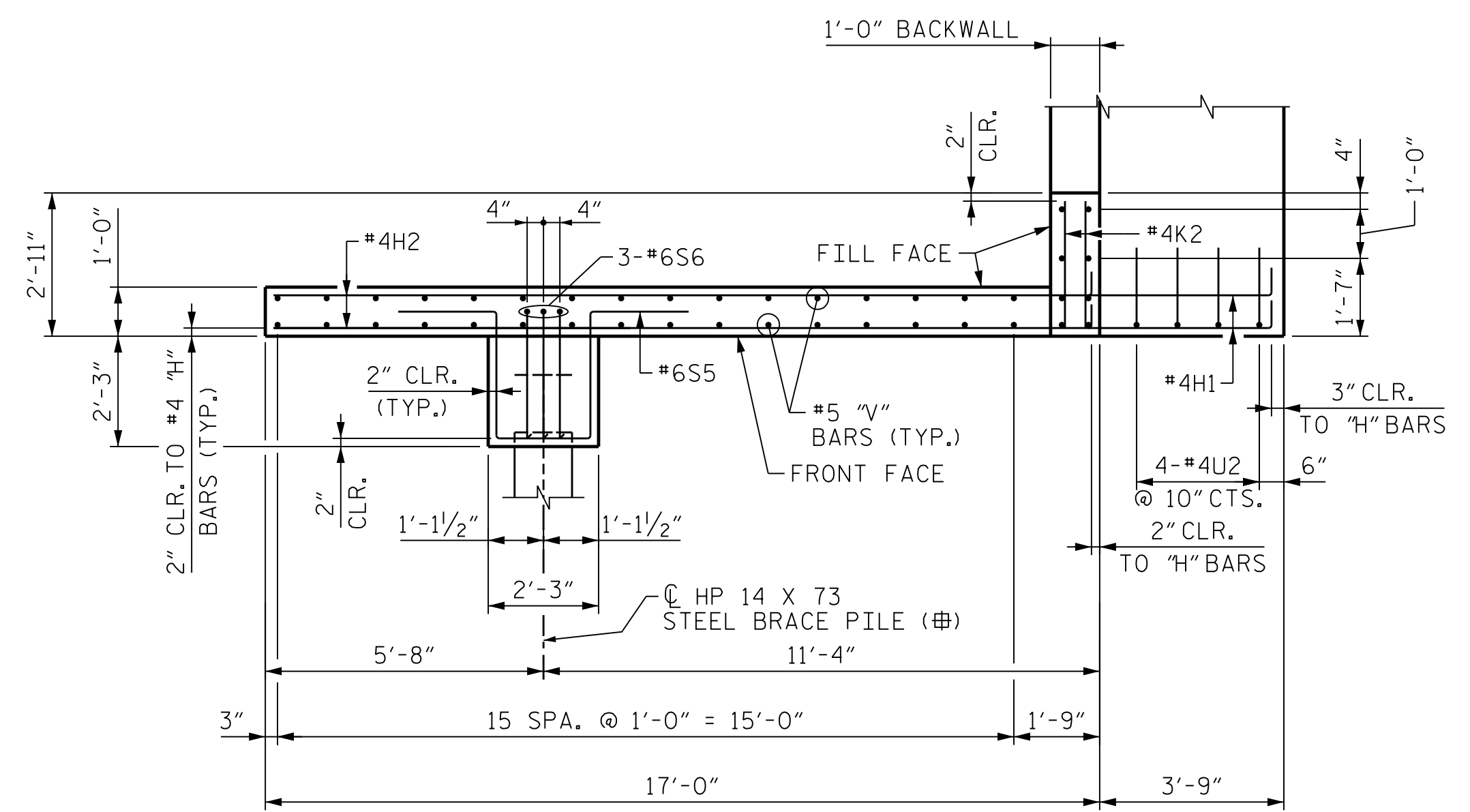
10/11/2021
 DOCUMENT NOT CONSIDERED FINAL
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PLAN - WINGWALL "W1"

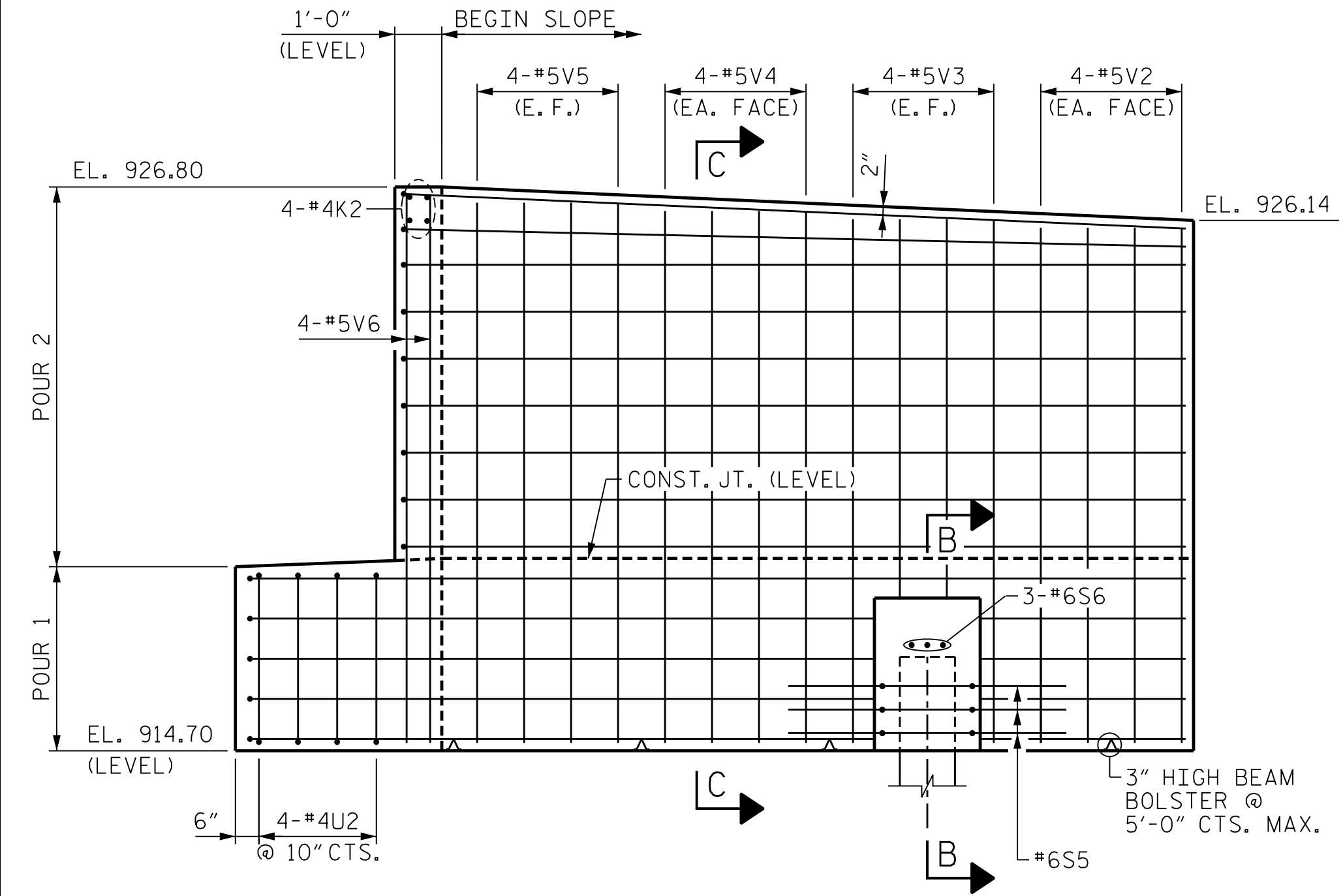


SECTION B-B

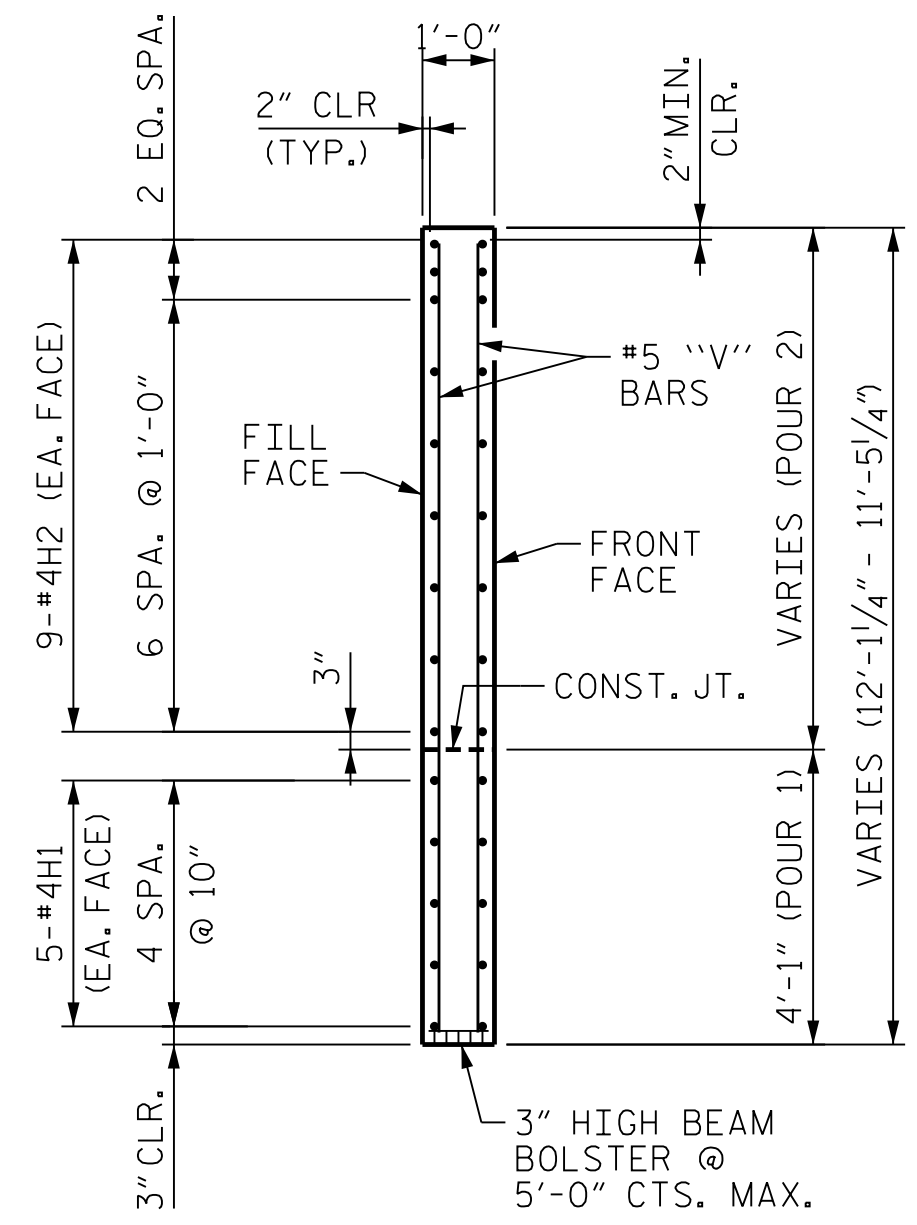


PLAN - WINGWALL "W2"

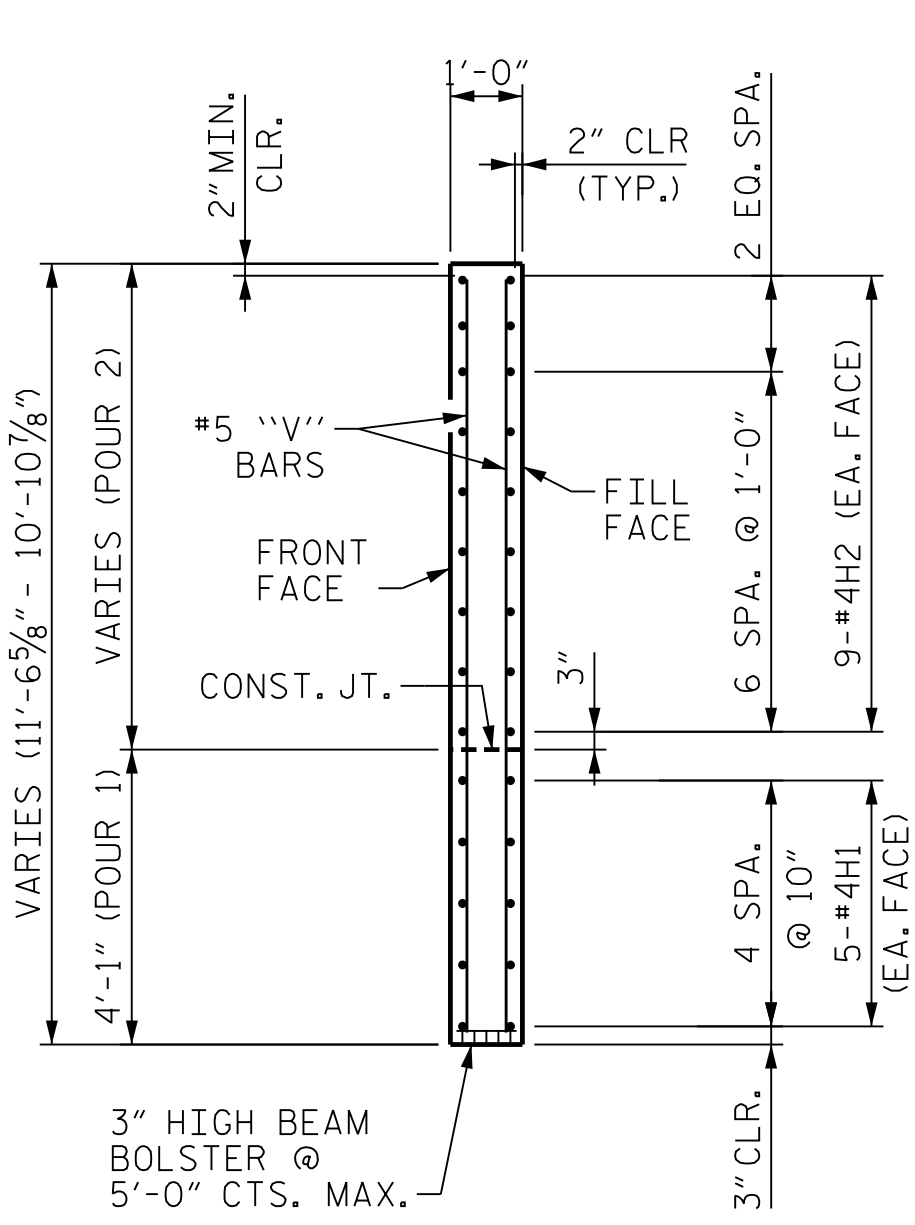
† = PILE CUTOFF ELEVATION 916.70
 # = PILE CUTOFF ELEVATION 919.65



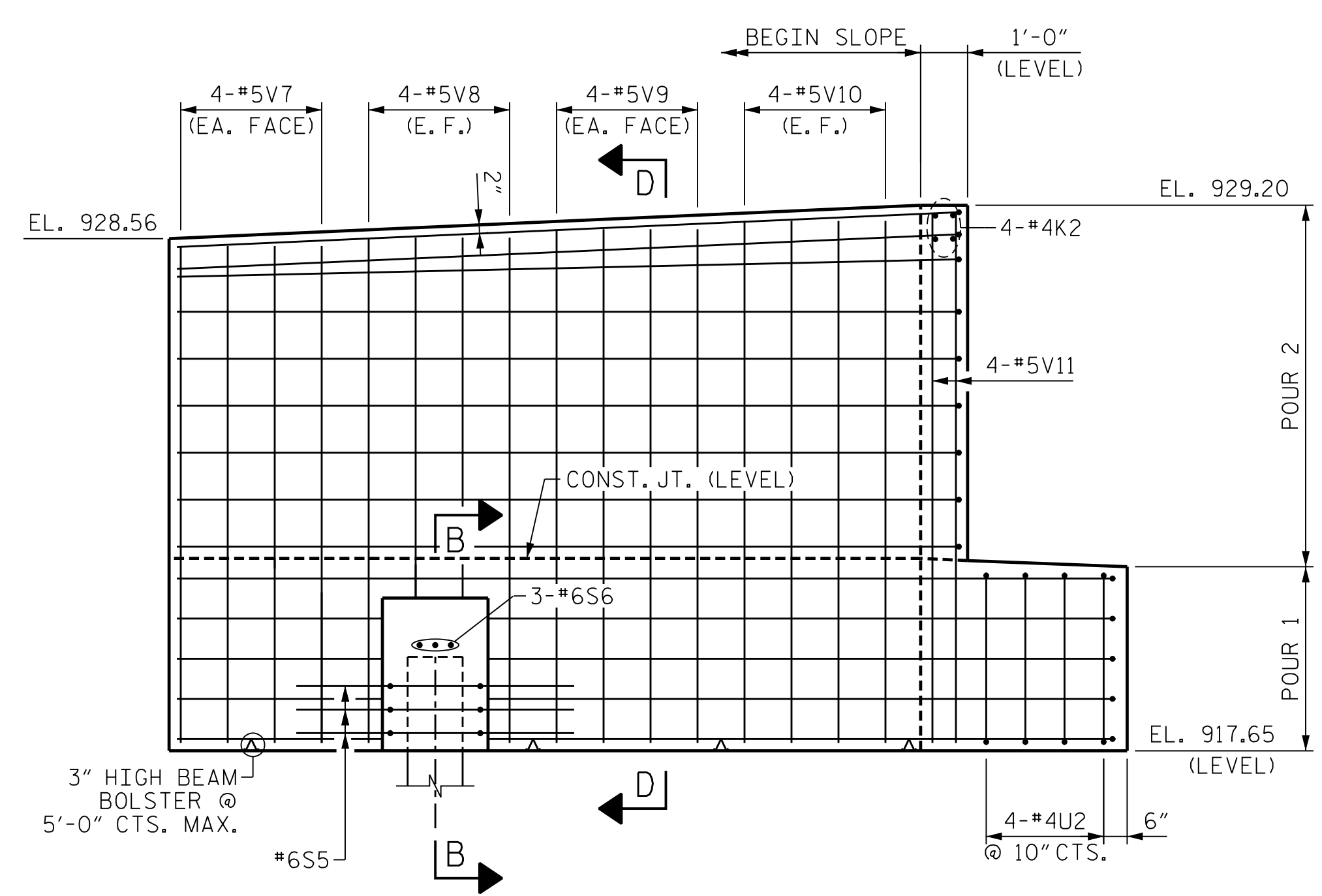
ELEVATION - WINGWALL "W1"



SECTION C-C



SECTION D-D



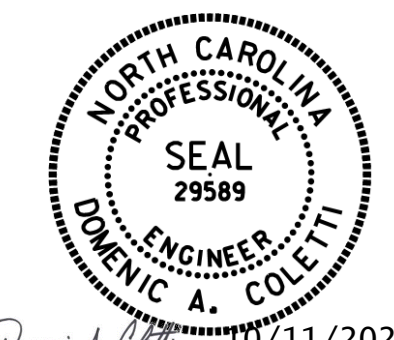
ELEVATION - WINGWALL "W2"

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 1
 WING DETAILS**



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

DES BY: A. ZEITOUNI	DATE: 07/19	DWG BY: B. PETERSON	DATE: 07/19
DES CHK: J. EARNEST	DATE: 07/19	CHK BY: J. EARNEST	DATE: 08/19

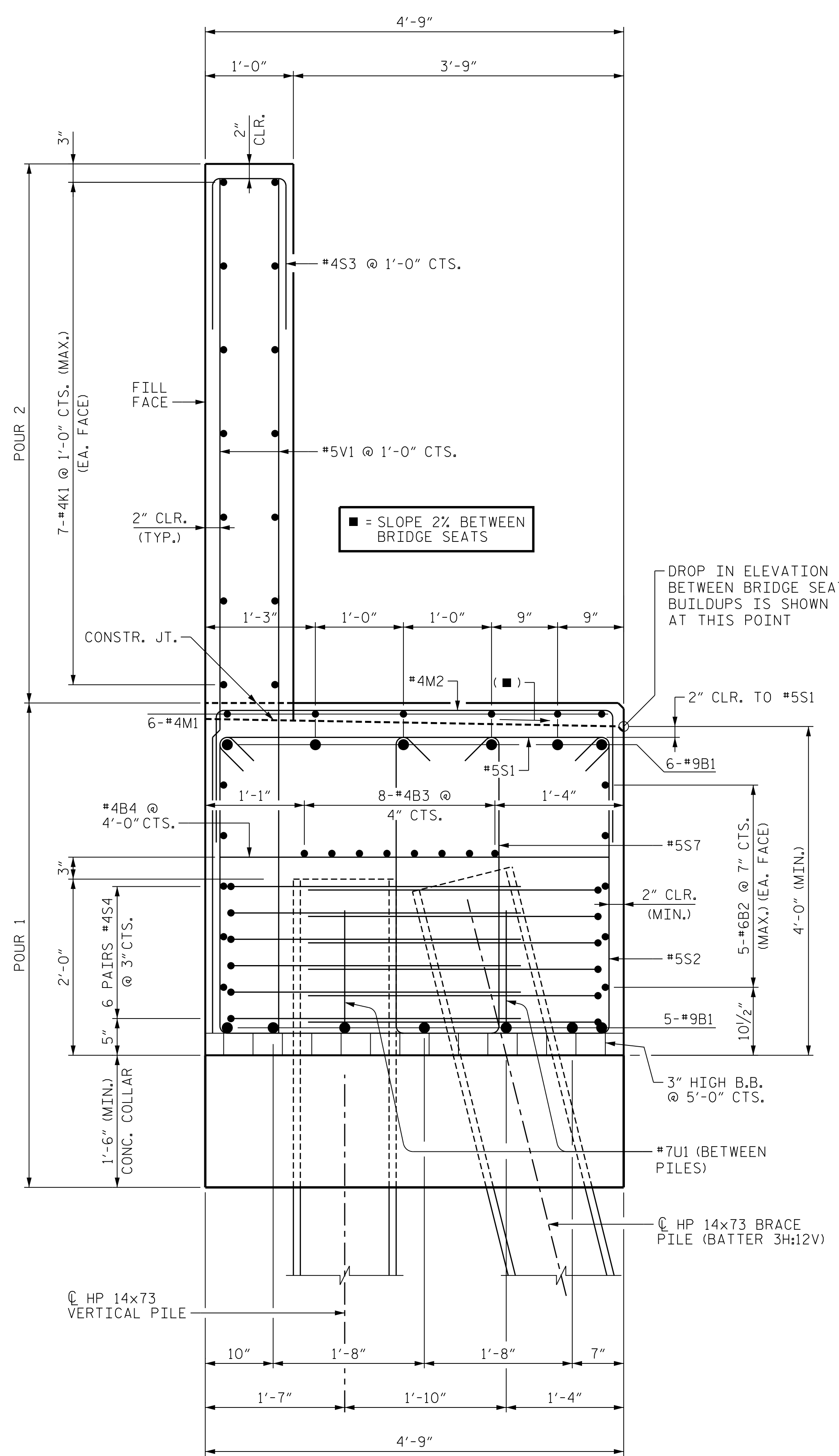
HDR HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

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SHEET NO. S05-073
TOTAL SHEETS 116

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 USER: PPETERSO DATE: 10/11/2021
 FILE: ...SUBSTR

PLOT DRIVER: NCDOT... PEN: FBI... DATE: 10/11/2021... FILE: ...SUBSTR



SECTION A-A

NOTES:

FOR PIPE INSERT DETAILS, SEE BEARING SHEETS.

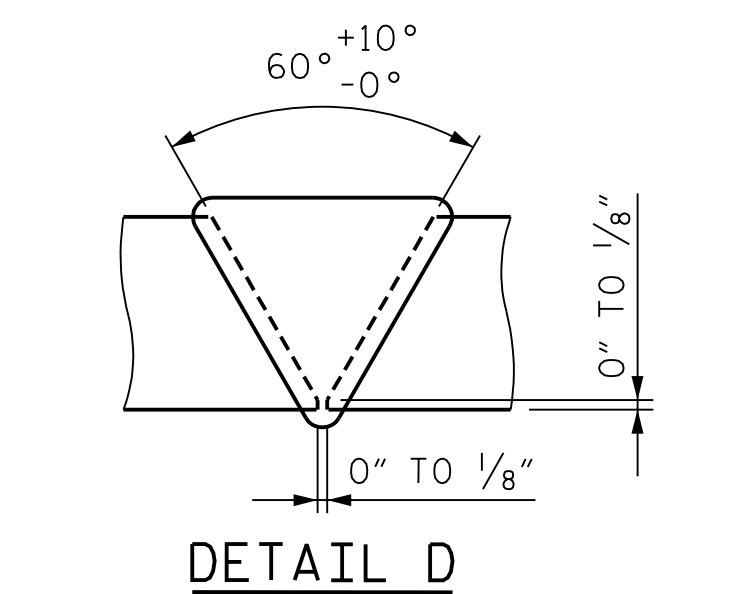
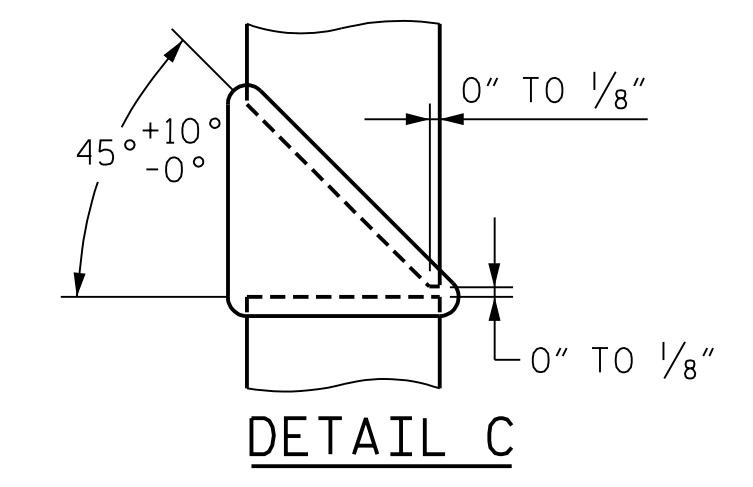
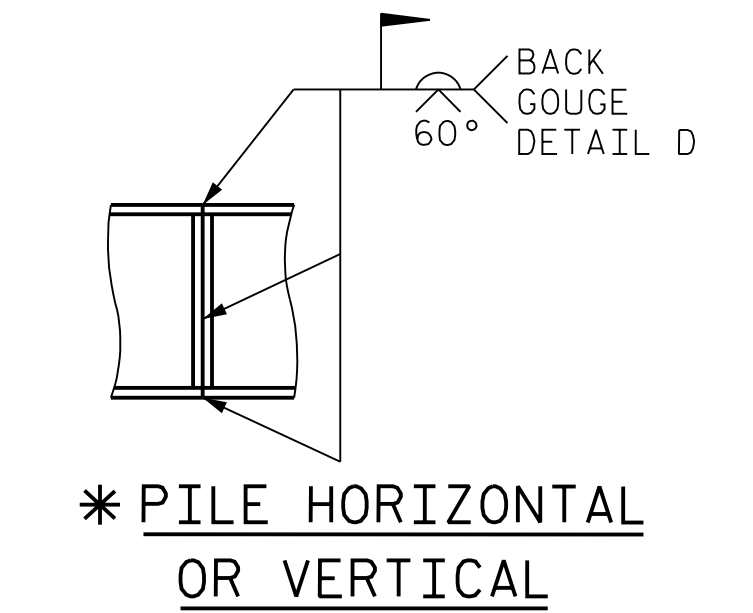
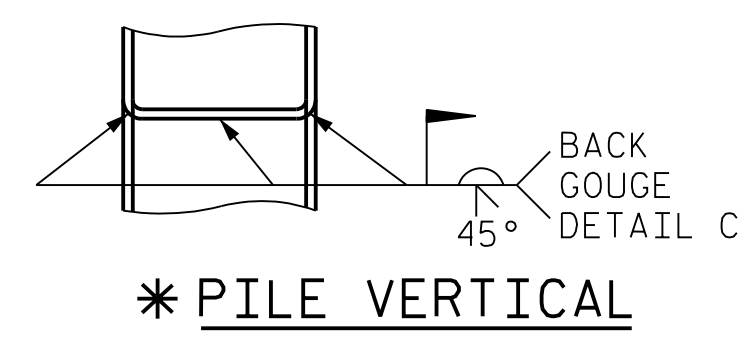
THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

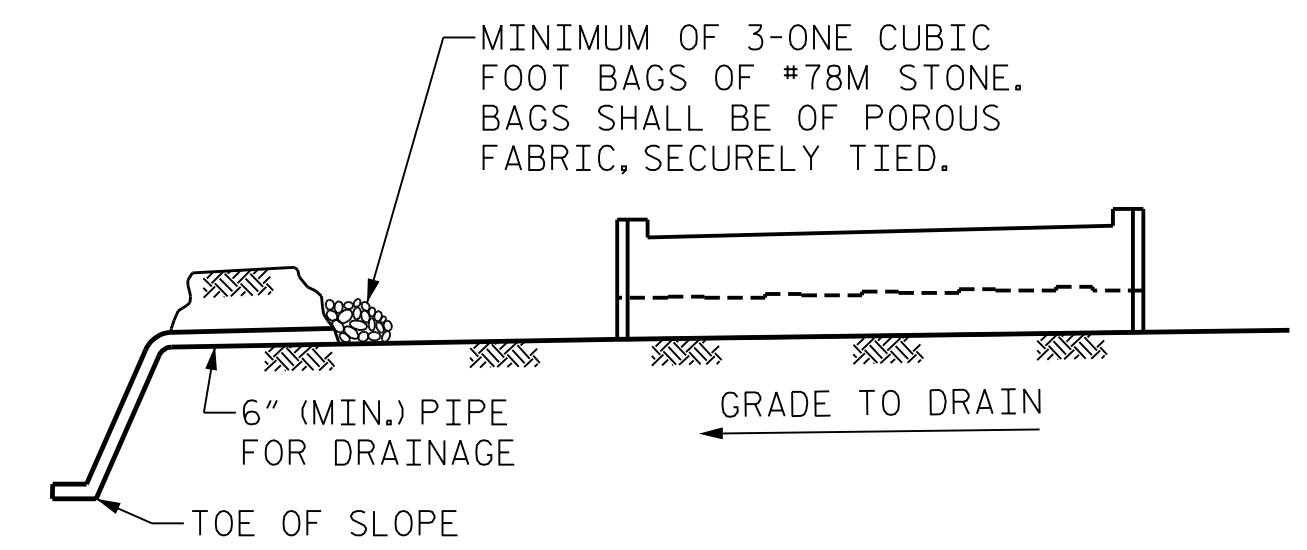
THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BRIDGE SEAT BUILDUPS, SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

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

SEE GENERAL DRAWING "FOUNDATION LAYOUT" FOR ADDITIONAL NOTES FOR DRIVING PILES.



PILE SPLICE DETAILS
* = POSITION OF PILE DURING WELDING



NOTES:

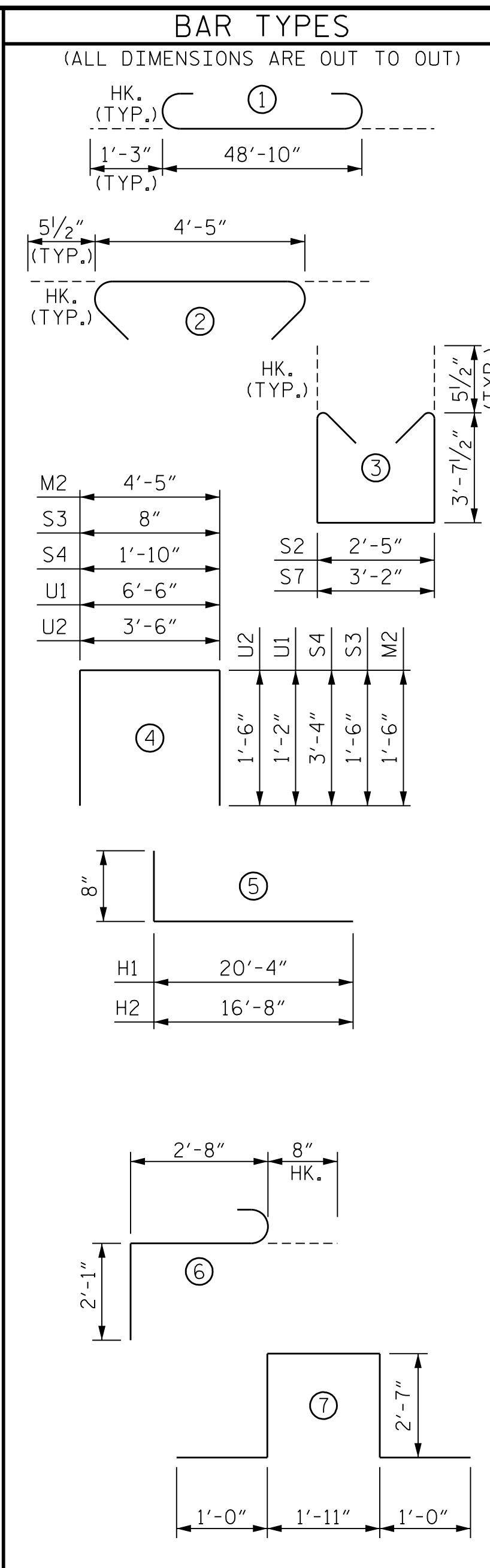
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

BILL OF MATERIAL					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	11	#9	1	51'-4"	1920
B2	10	#6	STR	49'-0"	736
B3	16	#4	STR	25'-9"	276
B4	13	#4	STR	4'-5"	39
H1	20	#4	5	21'-0"	281
H2	36	#4	5	17'-4"	417
K1	28	#4	STR	25'-9"	482
K2	8	#4	STR	2'-7"	14
M1	24	#4	STR	2'-8"	43
M2	12	#4	4	7'-5"	60
S1	53	#5	2	5'-4"	295
S2	53	#5	3	10'-7"	586
S3	44	#4	4	3'-8"	108
S4	72	#4	4	8'-6"	409
S5	6	#6	7	9'-1"	82
S6	6	#6	6	5'-5"	49
S7	53	#5	3	11'-4"	627
U1	10	#7	4	8'-10"	181
U2	8	#4	4	6'-6"	35
V1	88	#5	STR	9'-8"	888
V2	8	#5	STR	11'-0"	92
V3	8	#5	STR	11'-2"	94
V4	8	#5	STR	11'-4"	95
V5	8	#5	STR	11'-6"	96
V6	8	#5	STR	11'-8"	98
V7	8	#5	STR	10'-5"	87
V8	8	#5	STR	10'-7"	89
V9	8	#5	STR	10'-9"	90
V10	8	#5	STR	10'-11"	92
V11	8	#5	STR	11'-1"	93
REINFORCING STEEL					LBS. 8454
CLASS "A" CONCRETE					
POUR 1: COLLAR, CAP, LOWER PART OF WINGS				CU. YDS.	45.5
POUR 2: BACKWALL & UPPER PART OF WINGS				CU. YDS.	20.9
TOTAL CONCRETE				CU. YDS.	66.4
HP 14x73 STEEL PILES					
				NO.	14
				LF	1260
PILE DRIVING EQUIPMENT SETUP FOR HP 14x73 STEEL PILES				EA.	14



PROJECT NO. U-2579AB

FORSYTH COUNTY

STATION: 47+63.62 -Y15FLYBD-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
END BENT 1
SECTION & DETAILS**

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-074	
1	--	--	3	--	--	TOTAL SHEETS 116	
2	--	--	4	--	--		

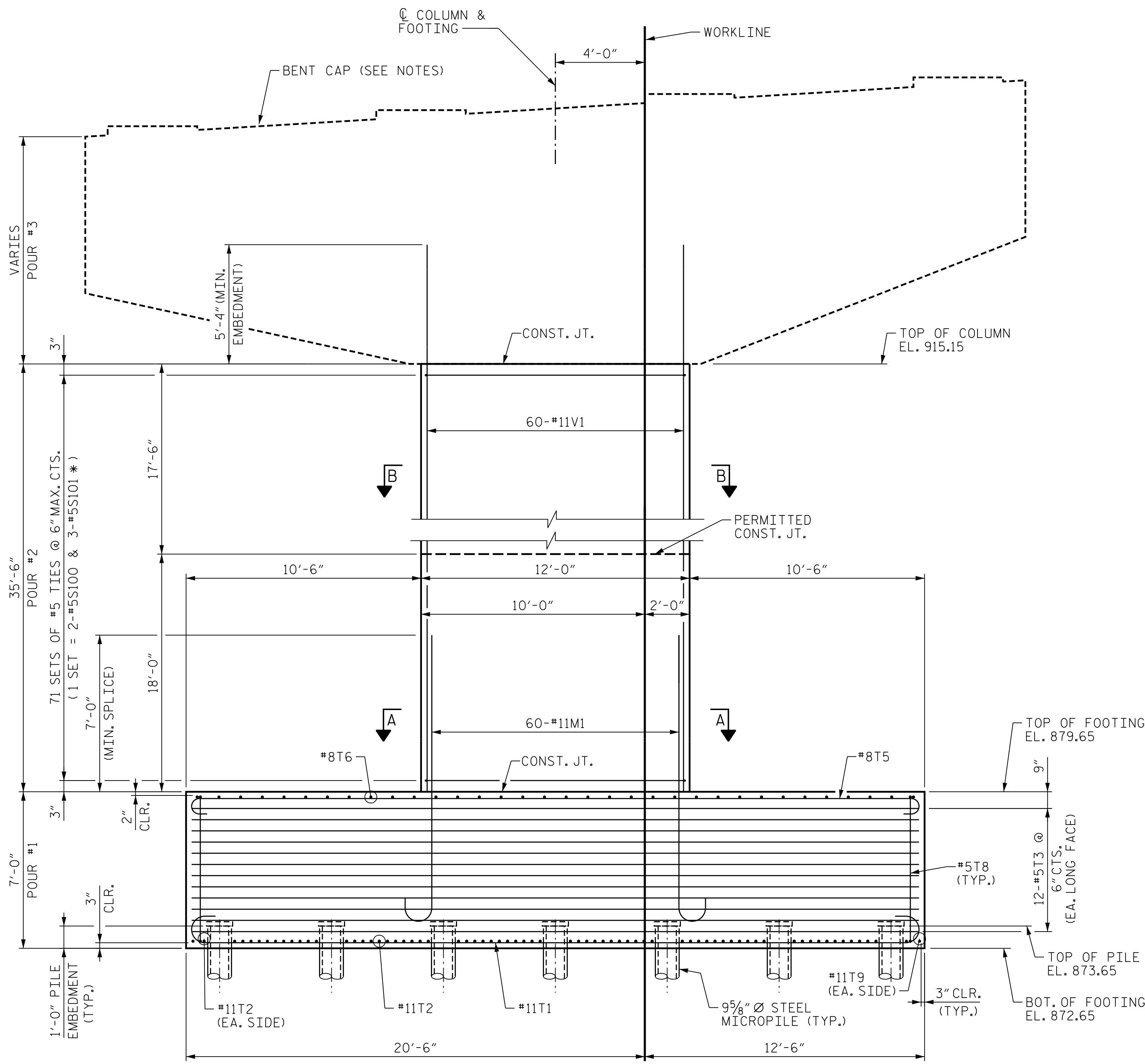
Professional Engineer Seal: DOMINIC A. COLETTI, No. 29589, dated 10/11/2021.

DES BY: <u>A. ZEITOUNI</u>	DATE: <u>07/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>07/19</u>
DES CHK: <u>J. EARNEST</u>	DATE: <u>07/19</u>	CHK BY: <u>J. EARNEST</u>	DATE: <u>08/19</u>



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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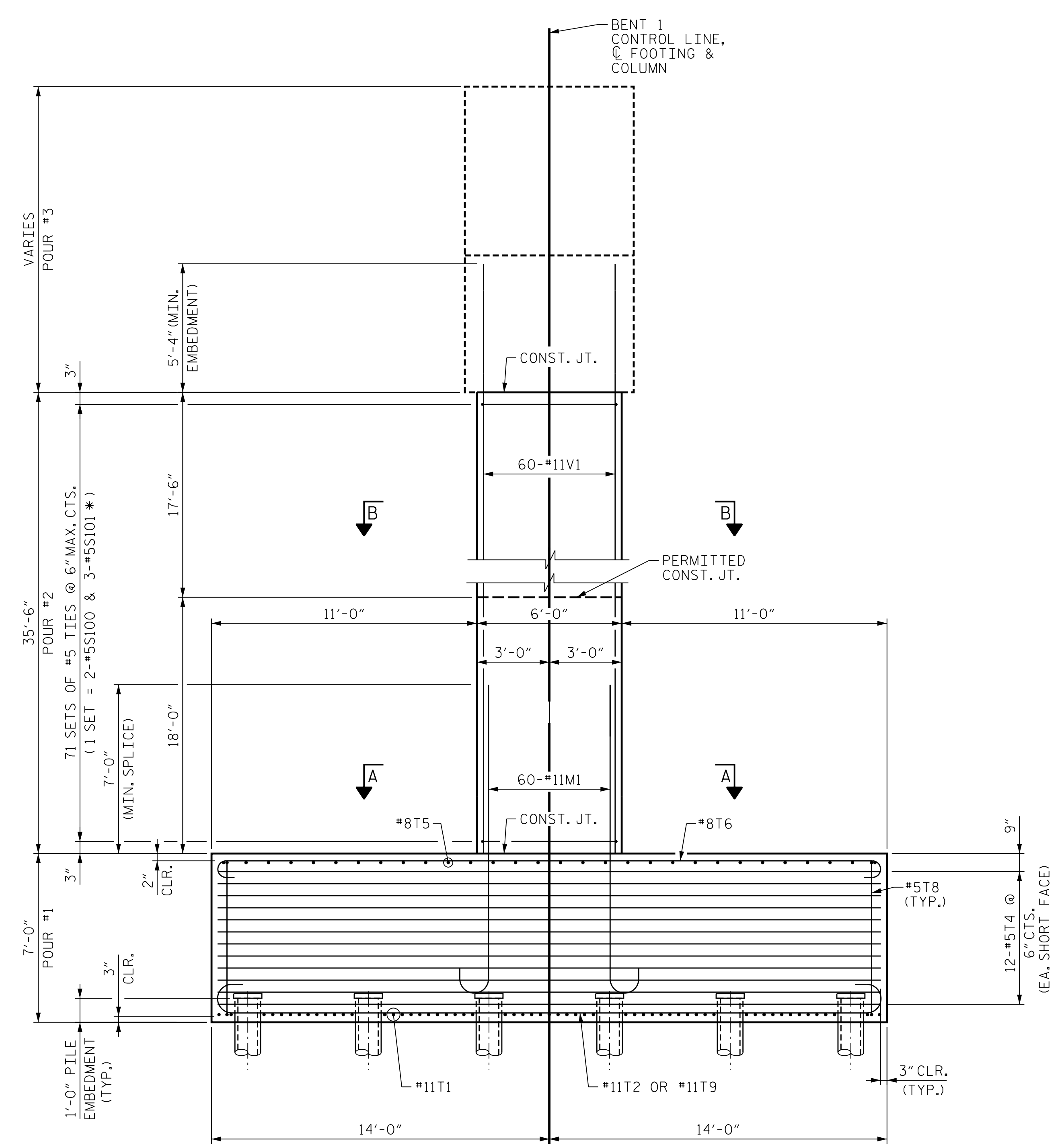
FRONT ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S101 TIES

NOTES FOR BENTS 1 THROUGH 6

- HOOKS ON T7 (BENT 2 ONLY) AND M1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- "T" BARS IN TOP OF FOOTING MAY BE SHIFTED AS NECESSARY, WITHOUT VIOLATING THE 1'-0" MAXIMUM SPACING, TO CLEAR M1 BARS EXTENDING INTO COLUMN.
- FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.
- FOR HP PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1", SHEET 3 OF 3.
- PLANS AND CALCULATIONS FOR ANY TEMPORARY SUPPORTS ATTACHED TO FOOTINGS, COLUMNS OR BENT CAPS SHALL BE SUBMITTED FOR REVIEW AND APPROVED BY THE ENGINEER PRIOR TO START OF BENT CONSTRUCTION. ANY ATTACHMENT PROVISIONS SHALL BE REMOVED AFTER USE AND THE FOOTINGS, COLUMNS OR BENT CAPS REPAIRED IN SUCH A WAY AS TO NOT COMPROMISE THE INTEGRITY OF THE BENT IN ANY WAY.

DETAILED DRAWINGS FOR FALSWORK AND FORMS FOR ALL HAMMERHEAD BENTS SHALL BE SUBMITTED. SEE SPECIAL PROVISIONS FOR FORMWORK AND FALSWORK.



END ELEVATION

NOTES FOR BENT 1

- FOR FOOTING PLAN, SECTION A-A AND SECTION B-B, SEE "SUBSTRUCTURE BENT 1 FOOTING & COLUMN DETAILS", SHEET 2 OF 5.
- FOR DETAILS OF BENT CAP, SEE "SUBSTRUCTURE BENT 1 BENT CAP PLAN AND ELEVATION", SHEET 3 OF 5 AND "SUBSTRUCTURE BENT 1 BENT CAP DETAILS", SHEET 4 OF 5.
- FOR MICROPILE DETAILS, SEE "SUBSTRUCTURE MICROPILE DETAILS" SHEET.

PROJECT NO. U-2579AB

FORSYTH COUNTY

STATION: 47+63.62 -Y15FLYBD-

SHEET 1 OF 5



10/11/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
BENT 1
ELEVATIONS**

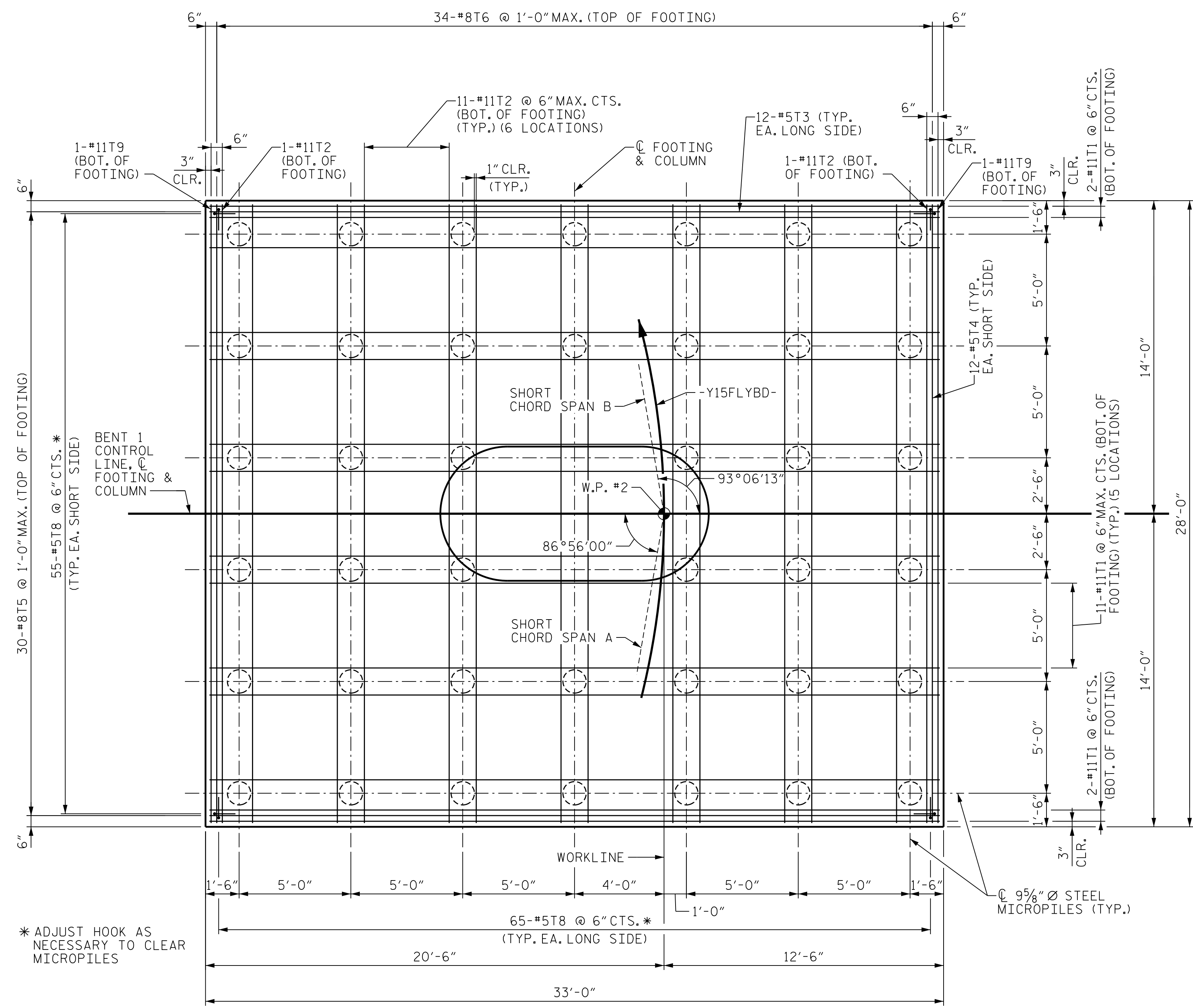
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SHEET NO. S05-075
TOTAL SHEETS 116

DES BY: <u>K. OLIVER</u>	DATE: <u>11/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>N. LIU</u>	DATE: <u>11/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

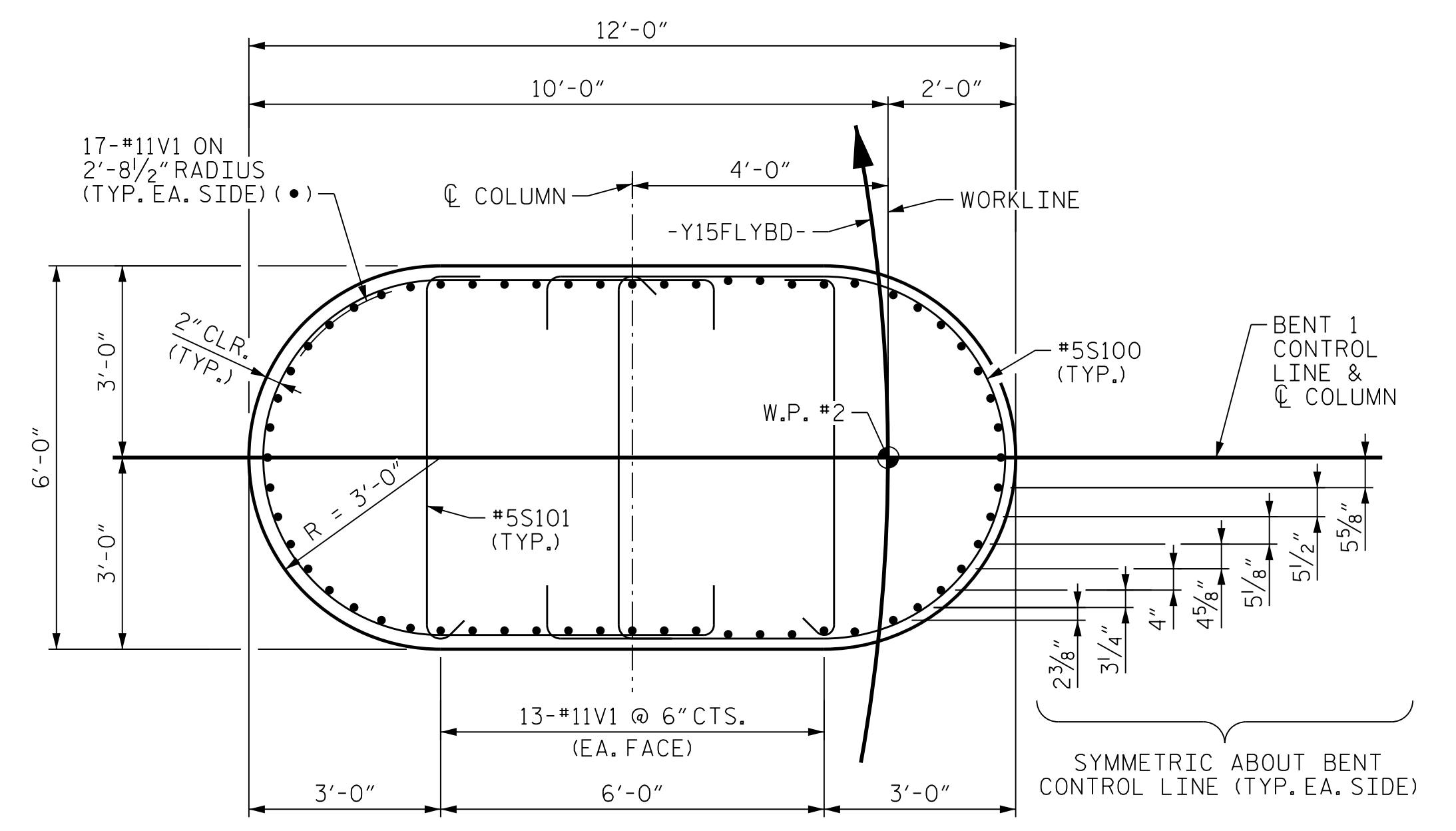


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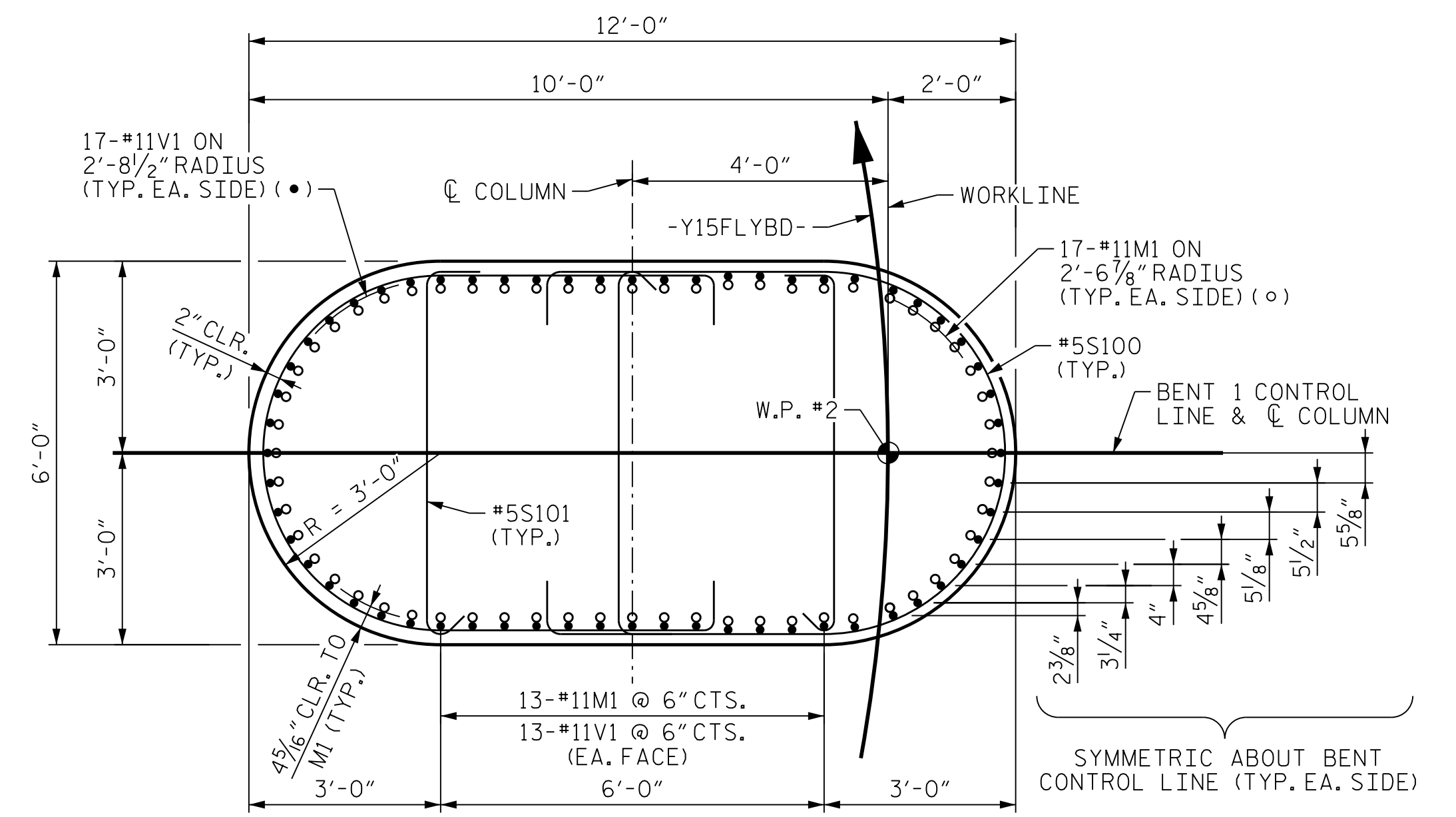


FOOTING PLAN

NOTES
 FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.
 FOR MICROPILE DETAILS, SEE "SUBSTRUCTURE MICROPILE DETAILS" SHEET.

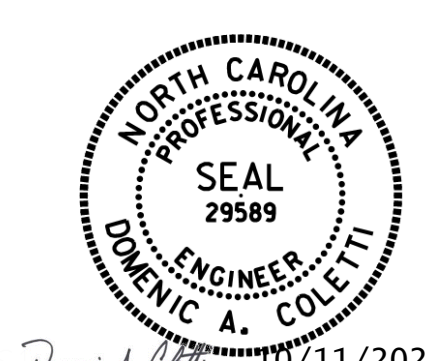


SECTION B-B



SECTION A-A

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 2 OF 5



10/11/2021

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 BENT 1
 FOOTING & COLUMN
 DETAILS**

REVISIONS						SHEET NO. S05-076 TOTAL SHEETS 116
NO.	BY:	DATE:	NO.	BY:	DATE:	
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2	--	--	4	--	--	

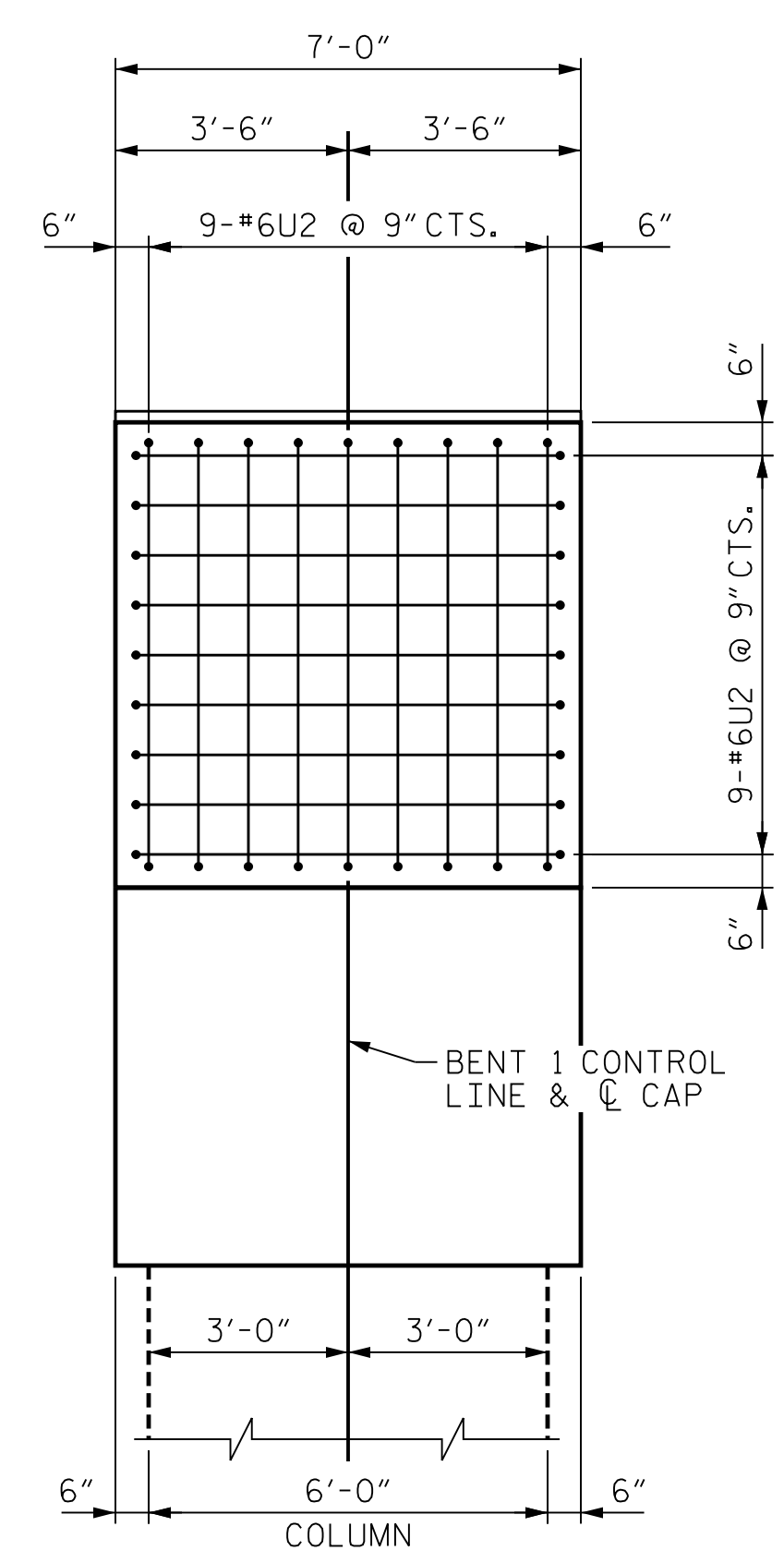
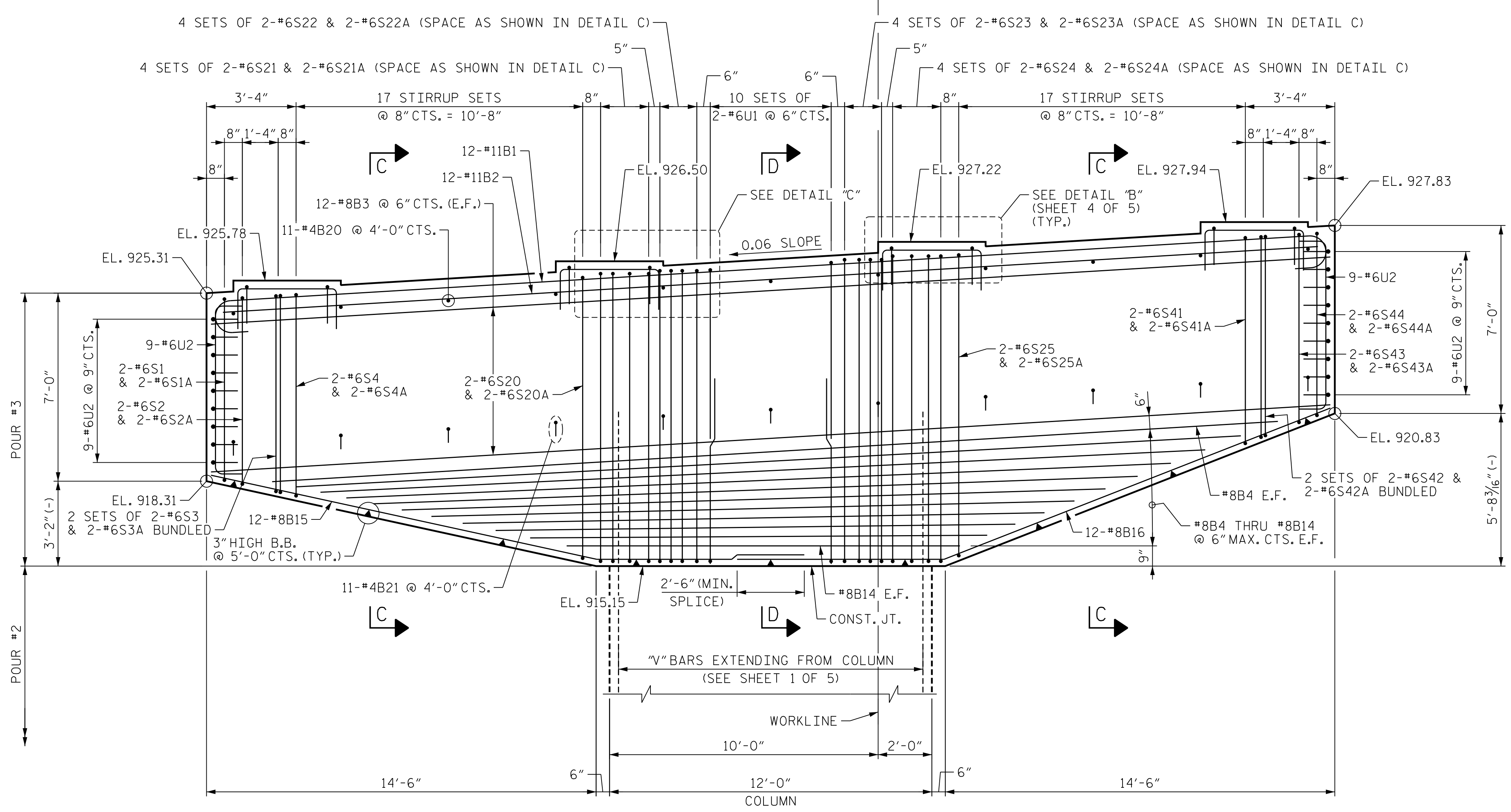
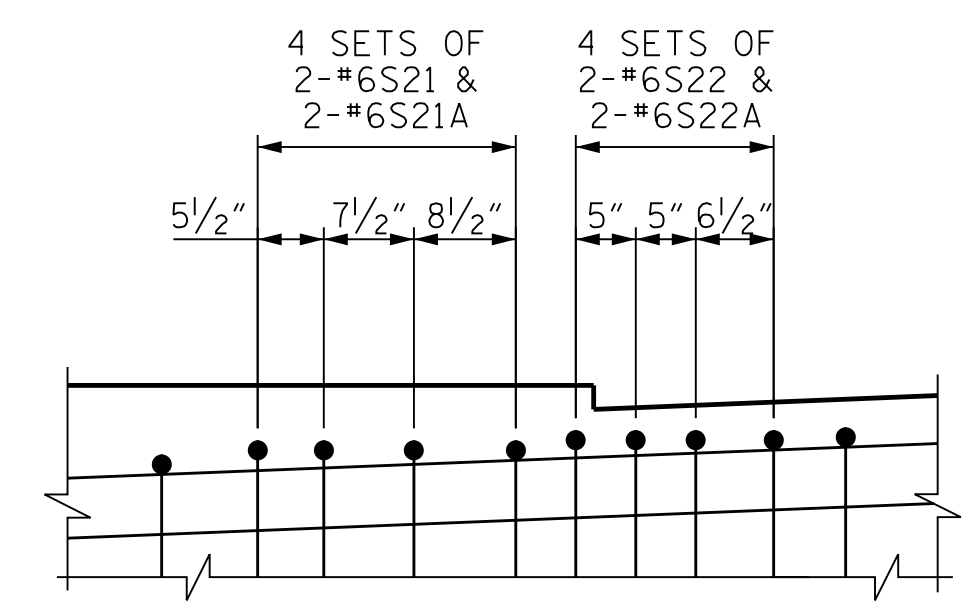
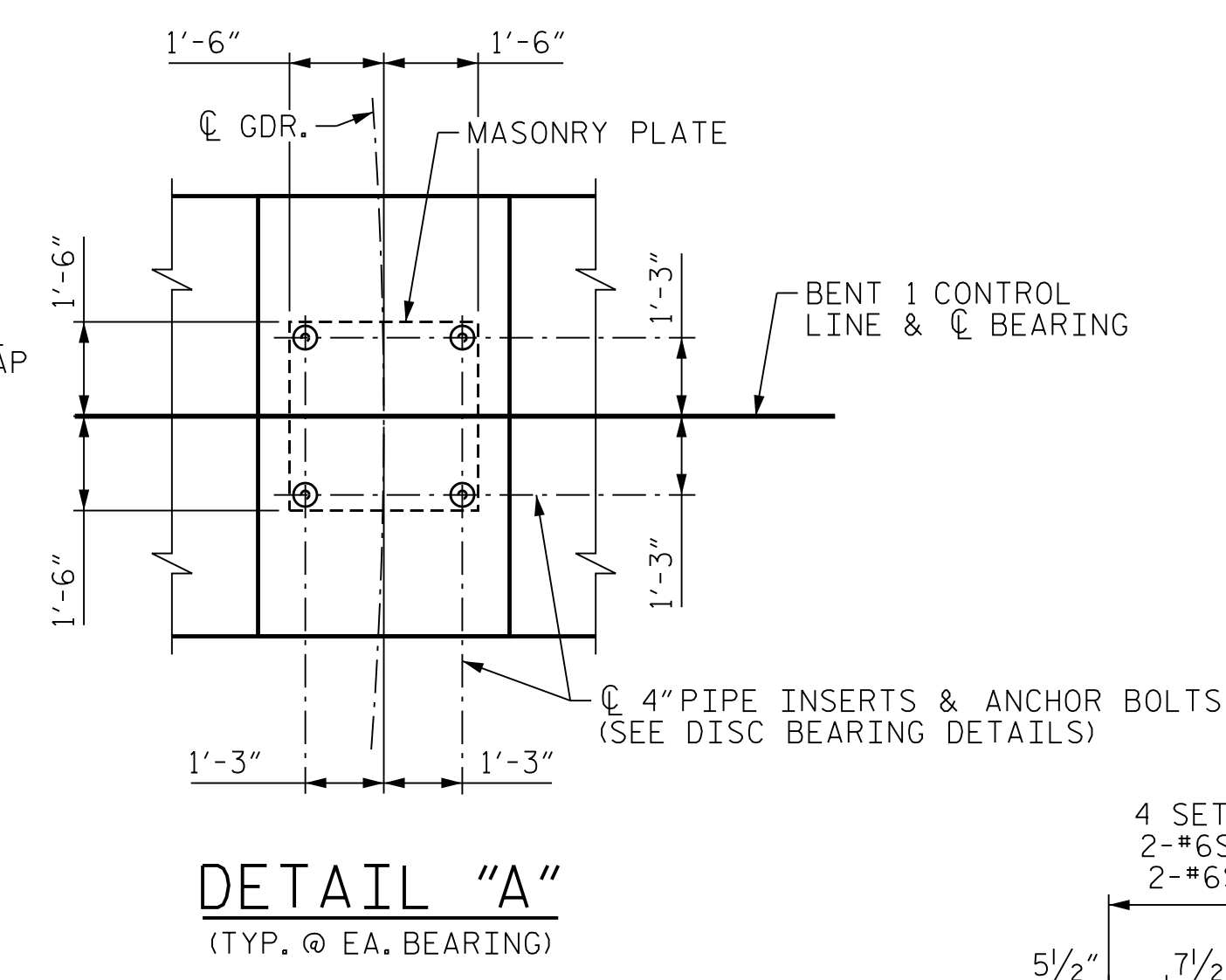
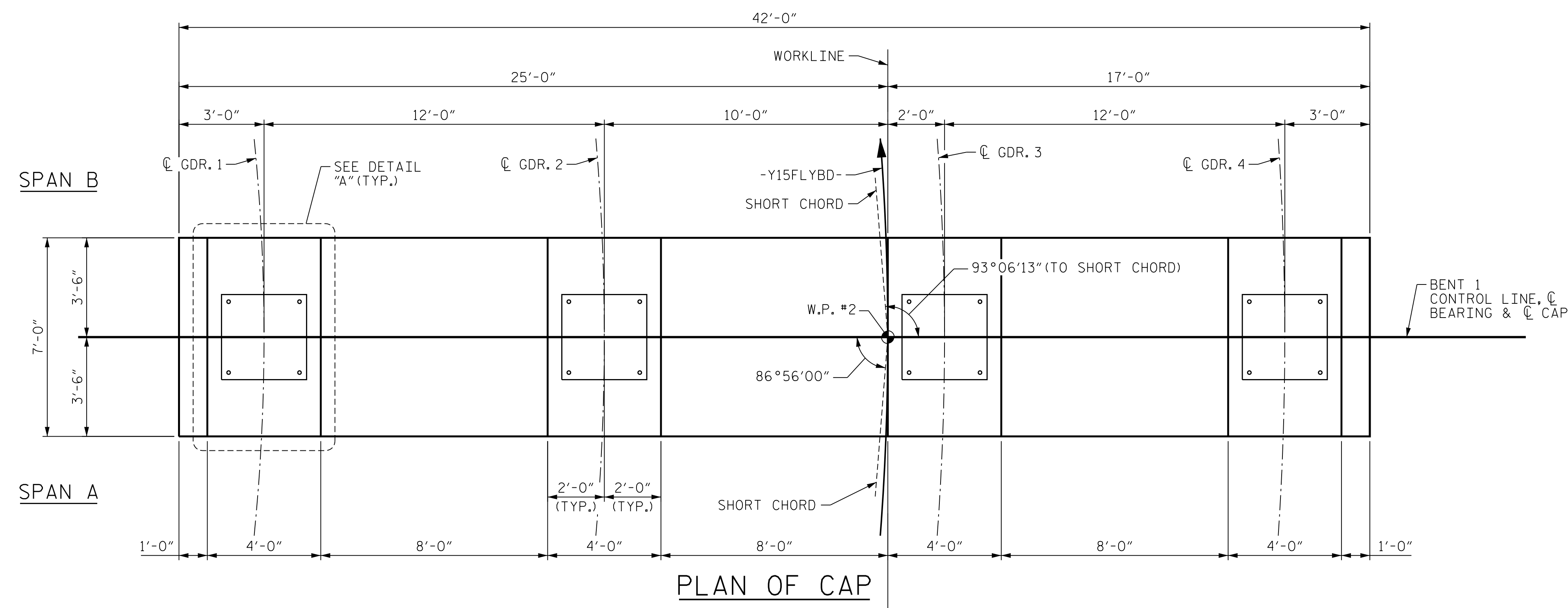


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DES BY: <u>K. OLIVER</u>	DATE: <u>11/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>N. LIU</u>	DATE: <u>11/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

NOTES
FOR SECTIONS C-C AND D-D, SEE
"SUBSTRUCTURE BENT 1 BENT CAP
DETAILS", SHEET 4 OF 5.
FOR ADDITIONAL NOTES, SEE SHEET 1 OF 5.



DETAIL "C"
DETAIL SHOWN AT LEFT SIDE OF CAP
(SPACING OF STIRRUPS MIRRORED AT
RIGHT SIDE OF CAP WITH BARS
#6S23/#6S23A AND #6S24/#6S24A AS
SHOWN ON THE ELEVATION)

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 3 OF 5

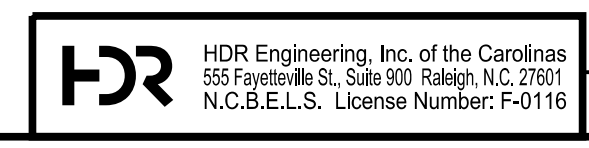


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1
BENT CAP PLAN
AND ELEVATION

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-077	
1	--	--	3	--	--	TOTAL SHEETS	
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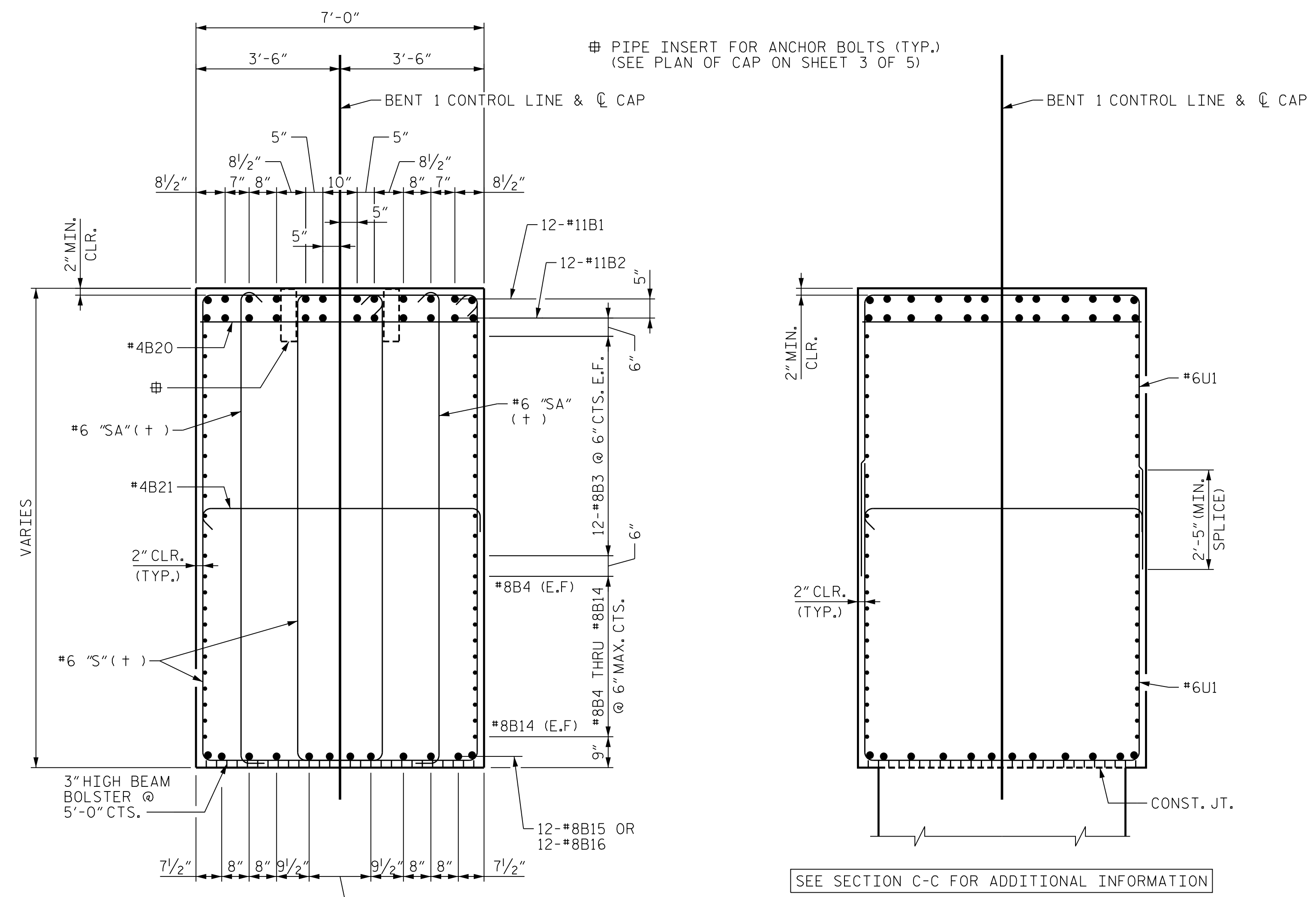
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DES CHK: M. WERNER	DATE: 10/19	CHK BY: N. LIU	DATE: 12/19



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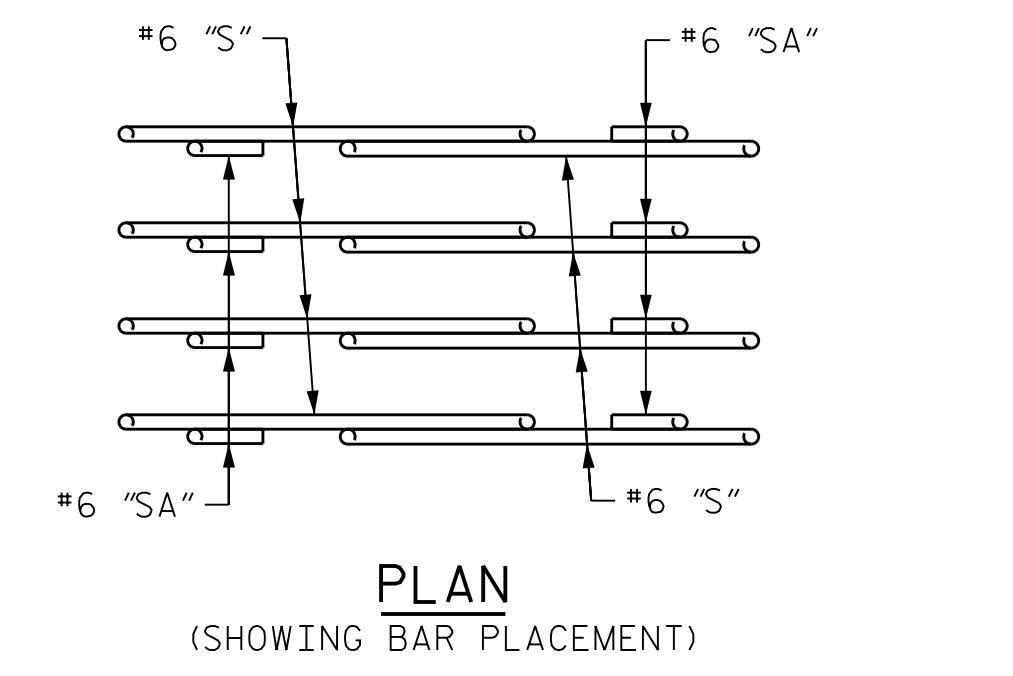
NOTE
SEE SHEET 1 OF 5 FOR NOTES.



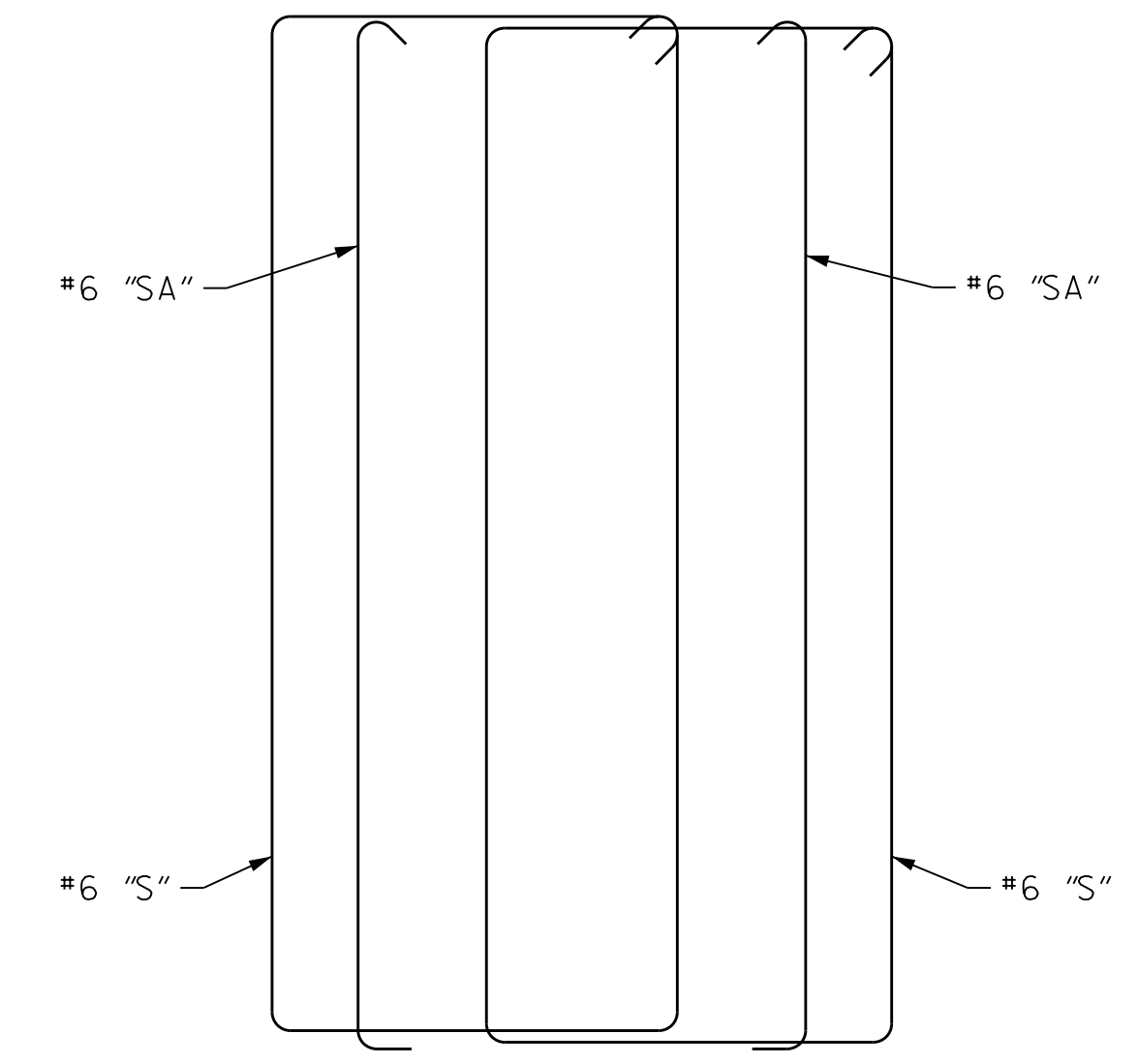
SECTION C-C
(+) SEE "STIRRUP SET DETAIL"

SEE SECTION C-C FOR ADDITIONAL INFORMATION

SECTION D-D
COLUMN REINFORCING STEEL NOT SHOWN FOR CLARITY

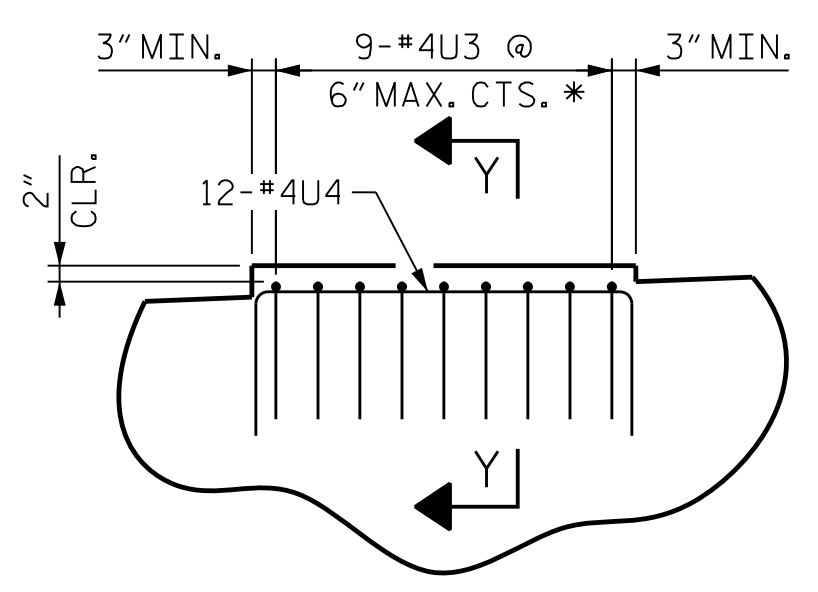


PLAN
(SHOWING BAR PLACEMENT)

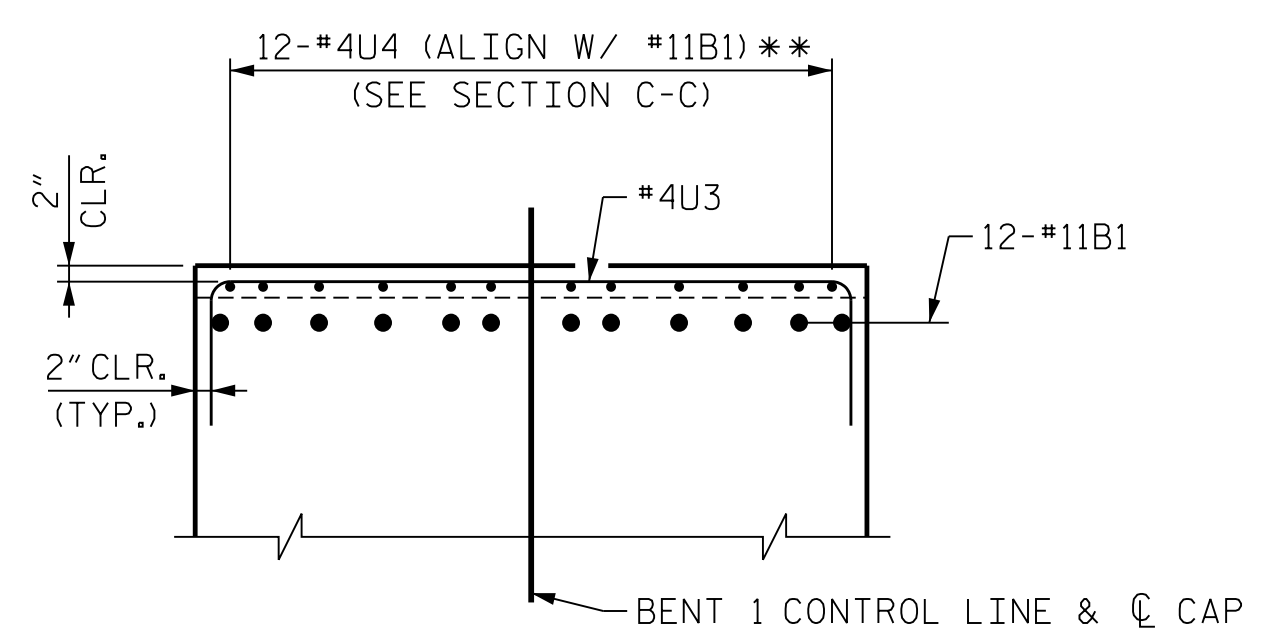


ELEVATION
(SCHEMATIC)

STIRRUP SET DETAIL



DETAIL "B"



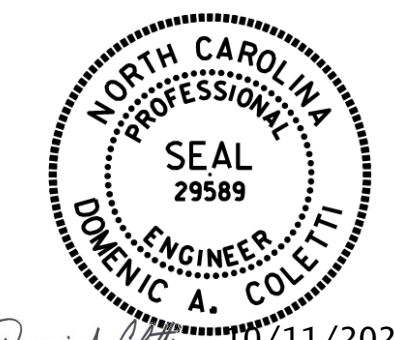
SECTION Y-Y

* NOTE:
#4U3 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR PIPE INSERTS FOR ANCHOR BOLTS.
** NOTE:
#4U4 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR #11B1 AND #11B2 BARS.

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
BENT 1
BENT CAP DETAILS**



10/11/2021

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 USER: PPETERSO DATE: 10/11/2021 TIME: 8:26:10 AM
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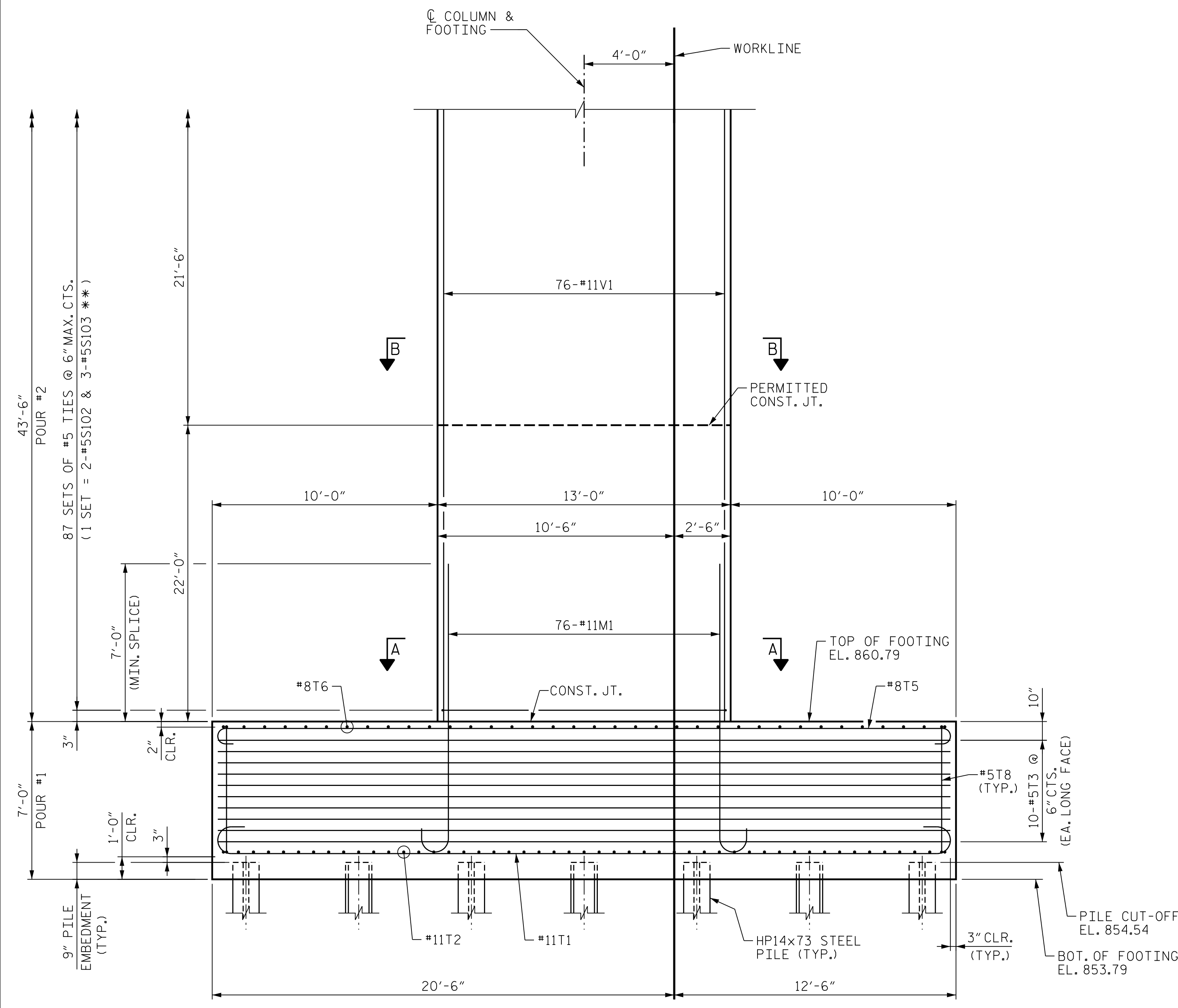
DES BY: <u>K. OLIVER</u>	DATE: <u>10/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>M. WERNER</u>	DATE: <u>10/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

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555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

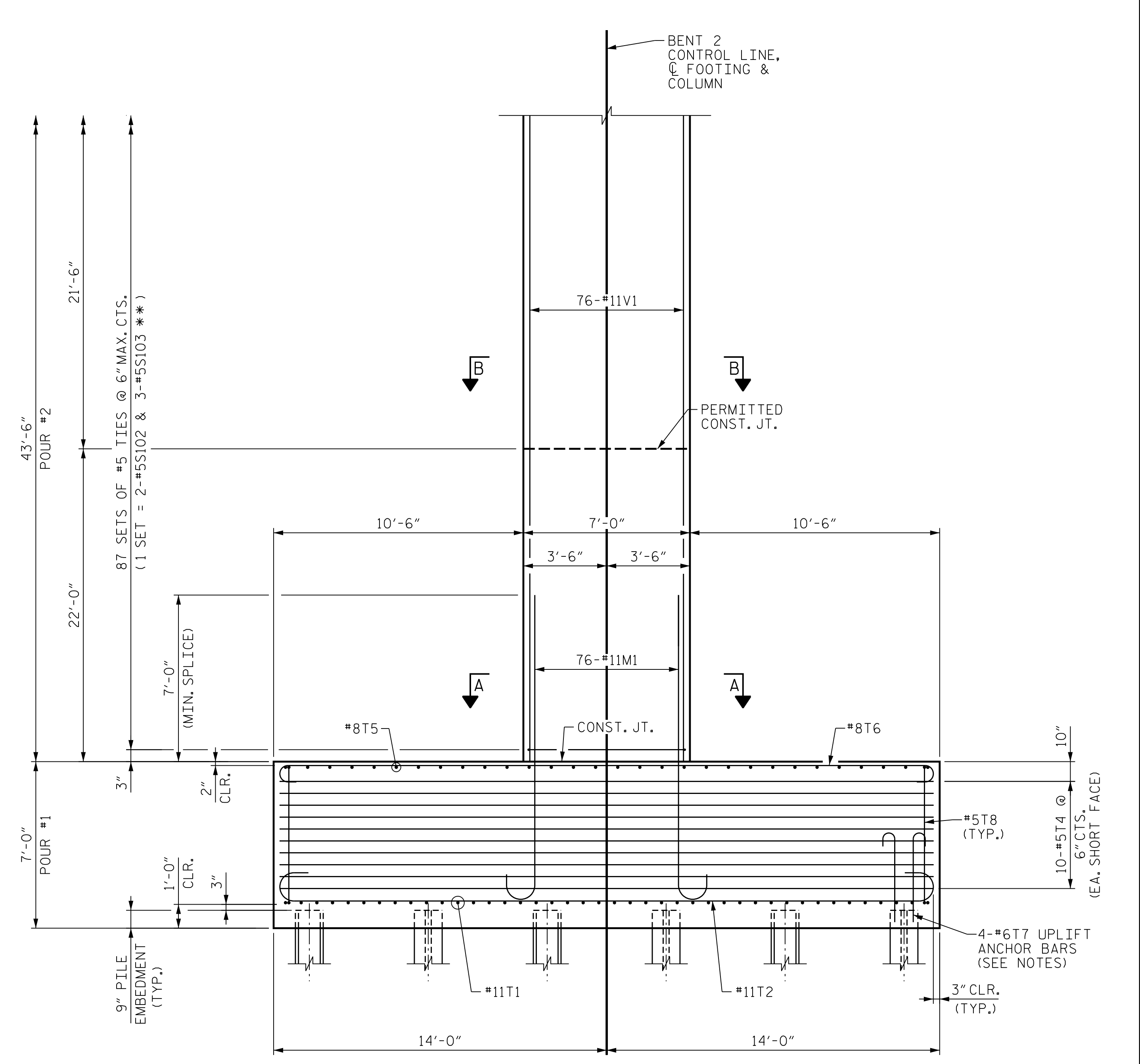
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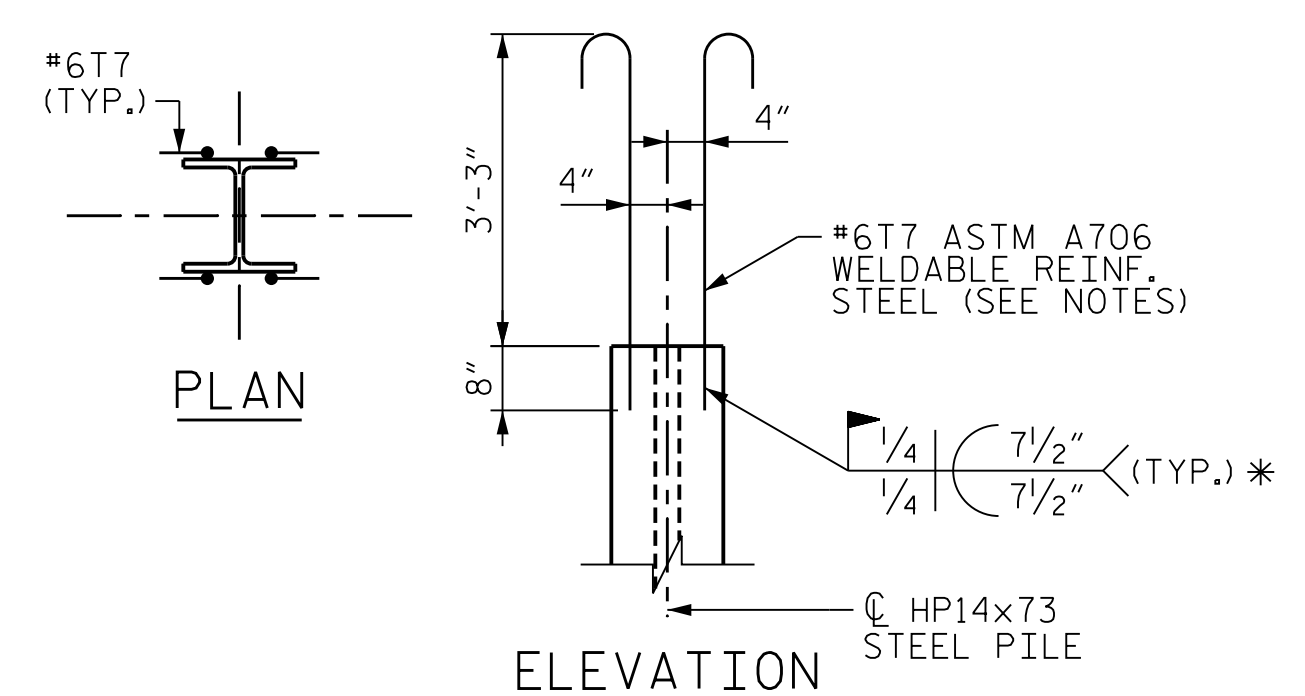
PLOT DRIVER: NCDOT... PEN: FBI... USER: PPETERSO... DATE: 10/17/2021... FILE: ...SUBSTR



PARTIAL FRONT ELEVATION



PARTIAL END ELEVATION



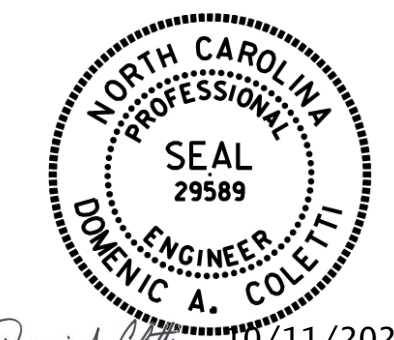
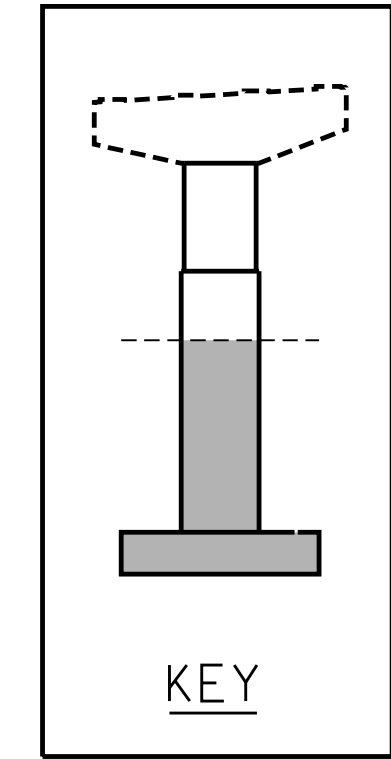
PILE UPLIFT ANCHOR DETAILS

(TYP. AT PILES NOTED THUS: # ON SUBSTRUCTURE FOOTING & COLUMN DETAILS SHEET)

** INVERT ORIENTATION OF ALTERNATE #5S103 TIES

NOTES

FOR FOOTING PLAN, SECTION A-A AND SECTION B-B, SEE "SUBSTRUCTURE BENT 2 FOOTING & COLUMN DETAILS", SHEET 3 OF 6. FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5. 4-#6T7 UPLIFT ANCHOR BARS AT NOTED PILES - SEE "SUBSTRUCTURE BENT 2 FOOTING & COLUMN DETAILS", SHEET 3 OF 6 FOR LOCATIONS.



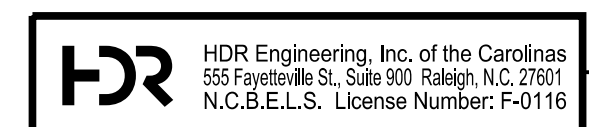
PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 1 OF 6

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

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

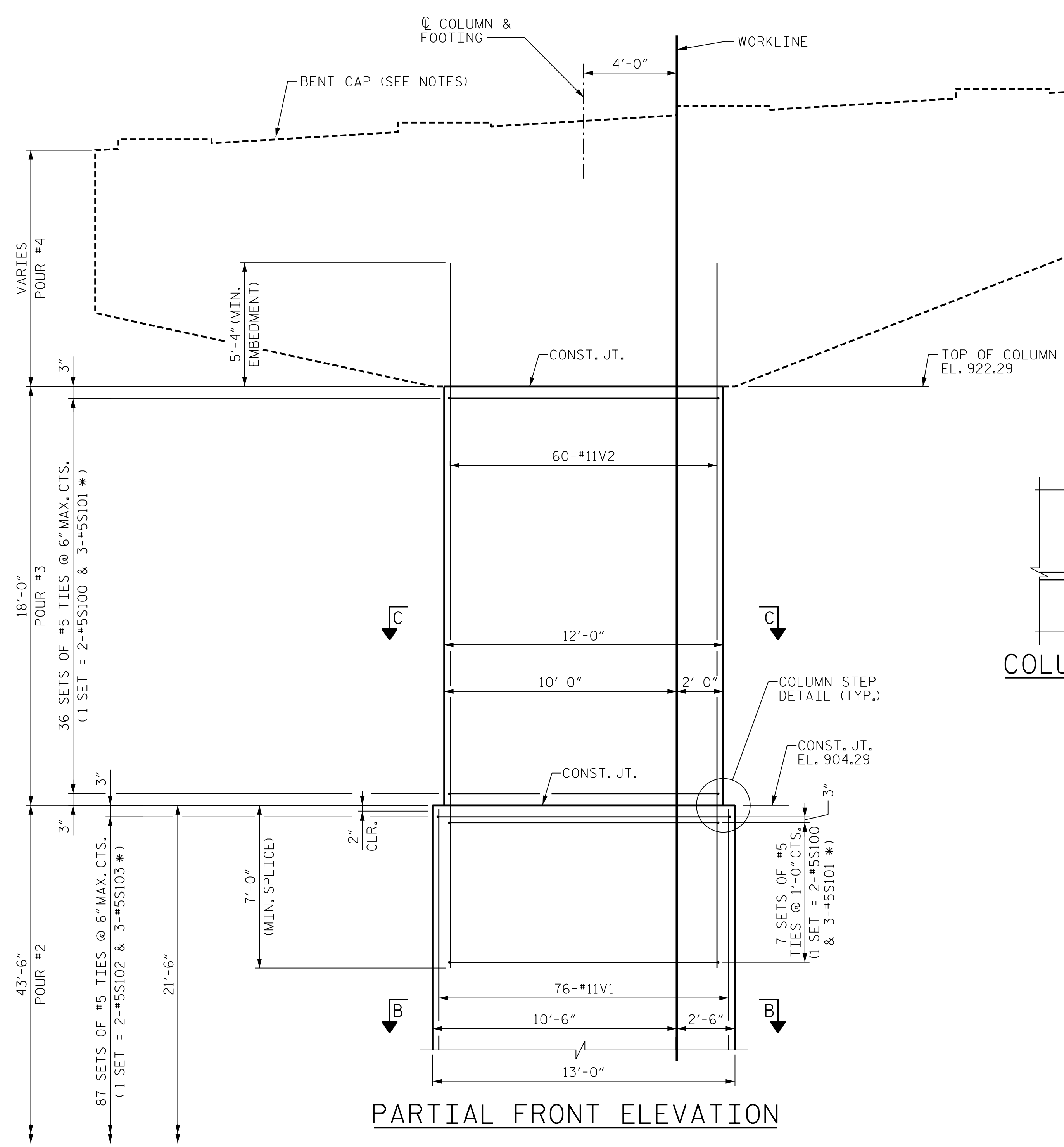
SHEET NO. 505-080
TOTAL SHEETS 116

DES BY: K. OLIVER	DATE: 11/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19



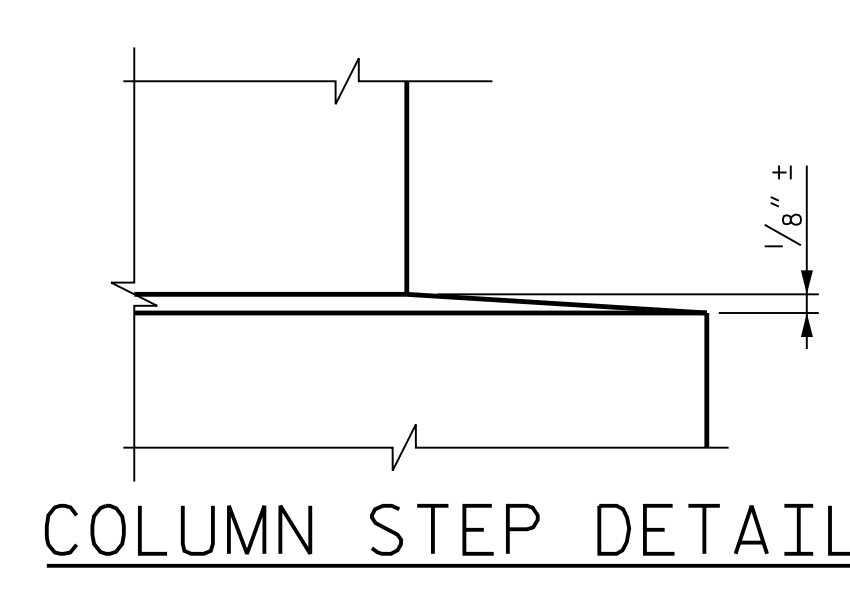
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLOT DRIVER: NCDOT... PENTABLE: NCDOT STRUCTURES DEFAULT PEN.tbl
 USER: PPETERSO DATE: 10/17/2021 TIME: 8:26:33 AM
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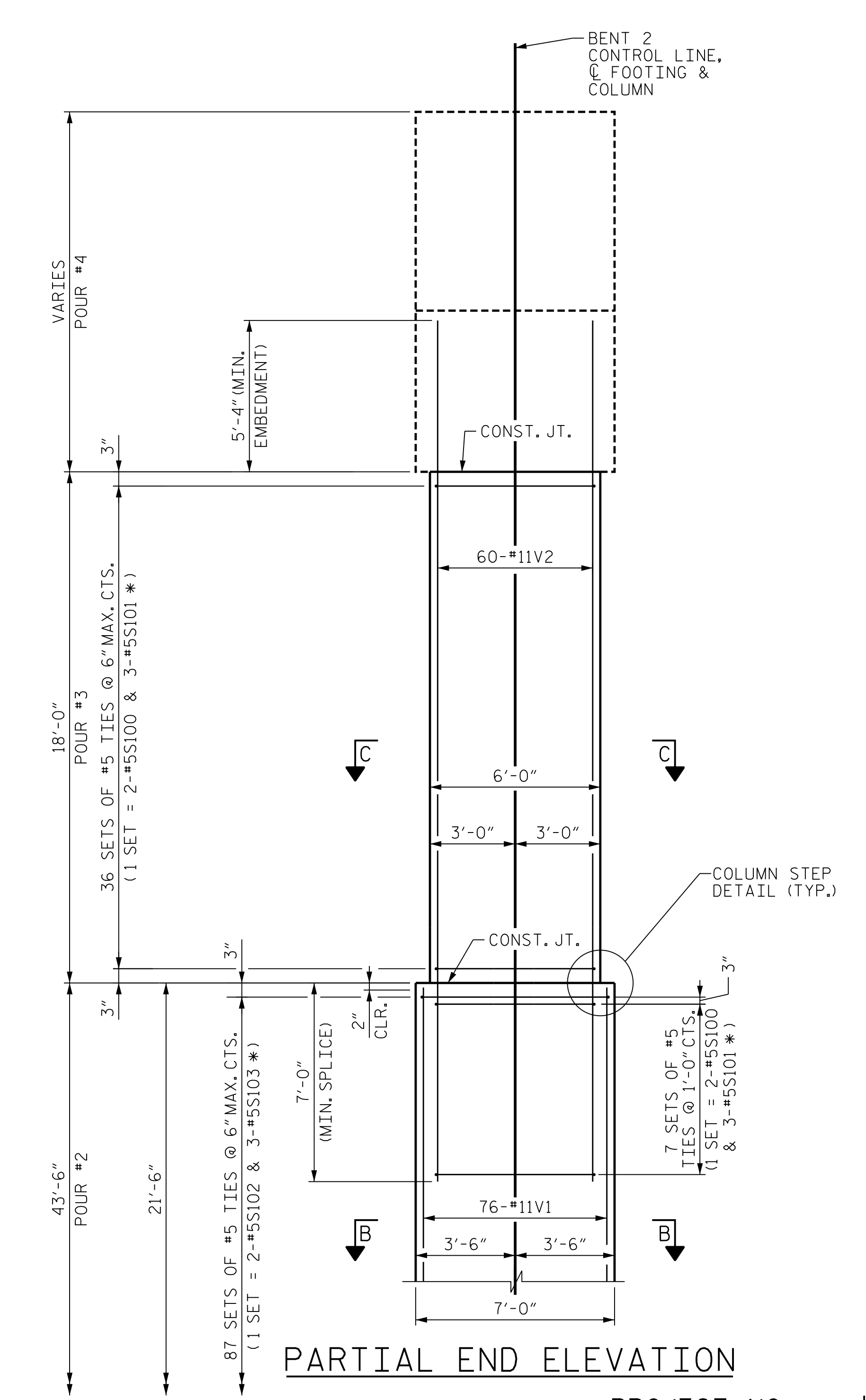


PARTIAL FRONT ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S101 AND #5S103 TIES



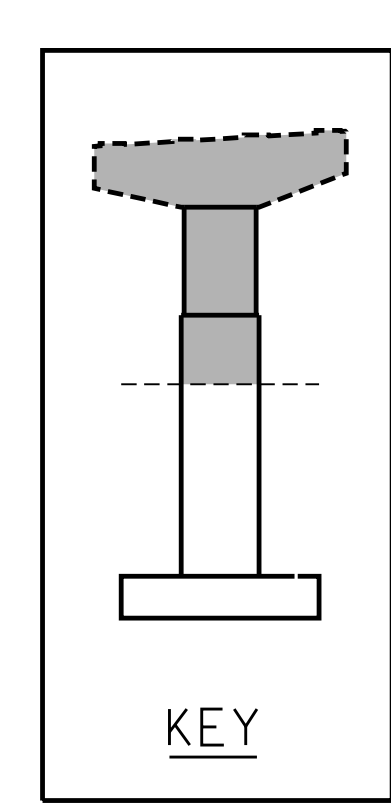
COLUMN STEP DETAIL



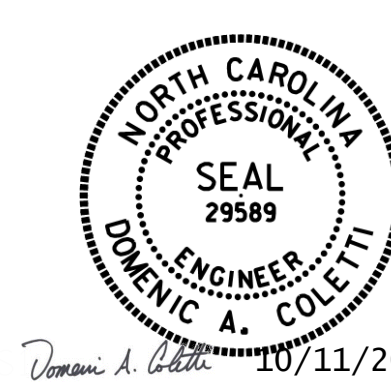
PARTIAL END ELEVATION

NOTES

- FOR SECTION B-B, SEE "SUBSTRUCTURE BENT 2 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.
- FOR SECTION C-C, SEE "SUBSTRUCTURE BENT 2 BENT CAP DETAILS", SHEET 5 OF 6.
- FOR DETAILS OF BENT CAP, SEE "SUBSTRUCTURE BENT 2 BENT CAP PLAN AND ELEVATION", SHEET 4 OF 6 AND "SUBSTRUCTURE BENT 2 BENT CAP DETAILS", SHEET 5 OF 6.
- FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.



KEY



PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 2 OF 6

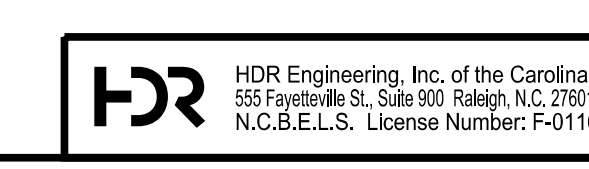
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 2 ELEVATIONS

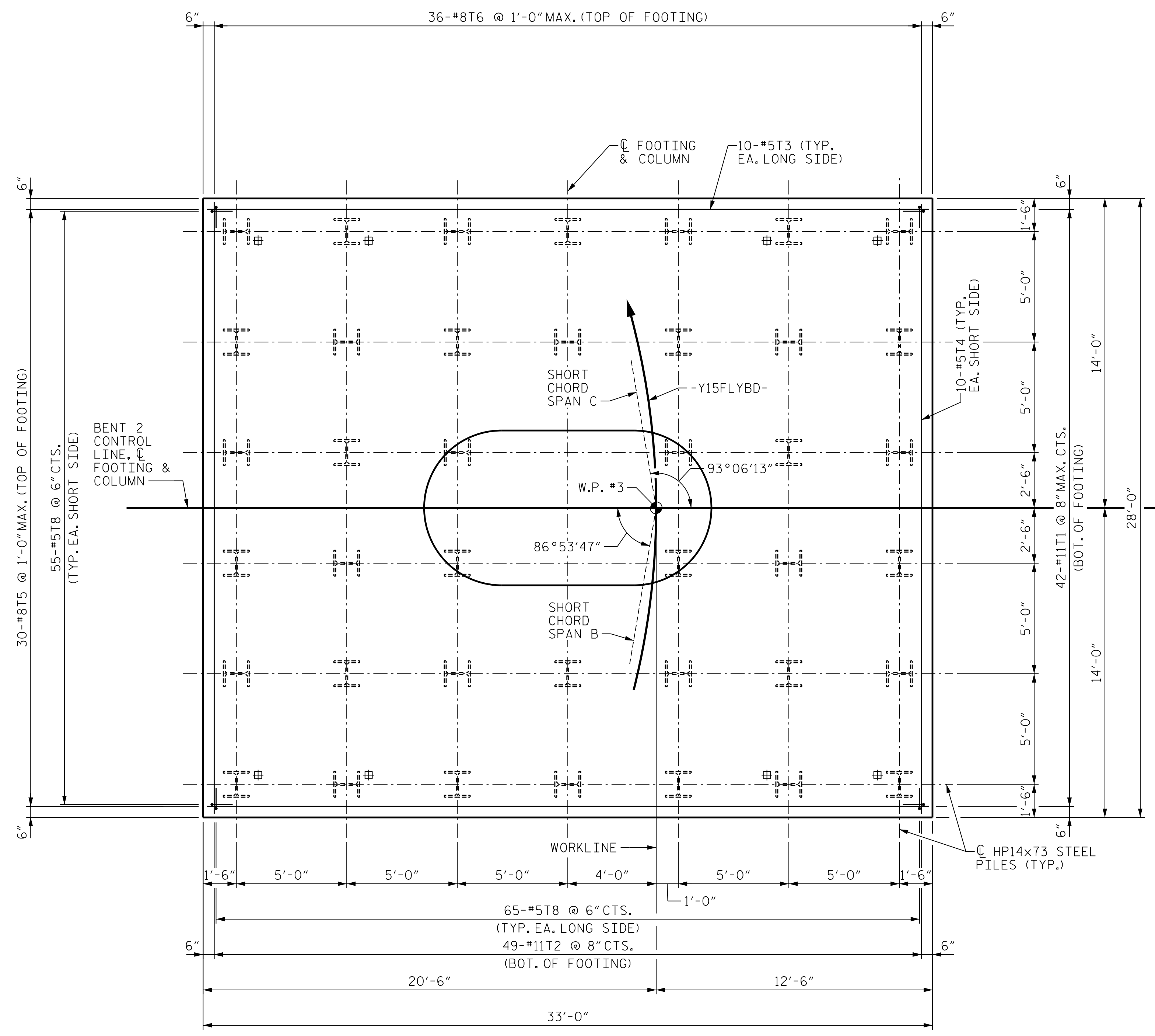
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SHEET NO. S05-081
 TOTAL SHEETS 116

DES BY: K. OLIVER	DATE: 11/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19

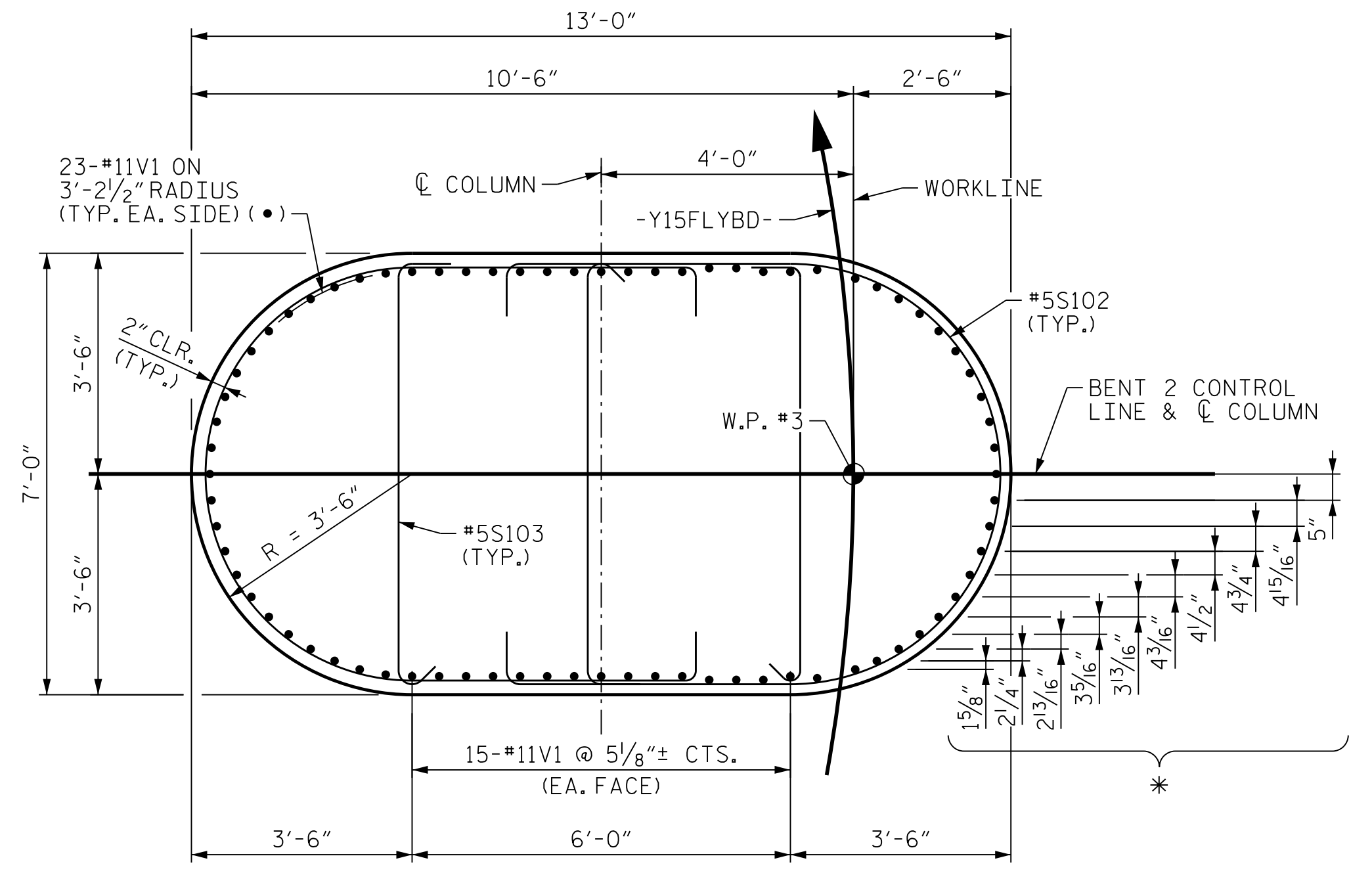


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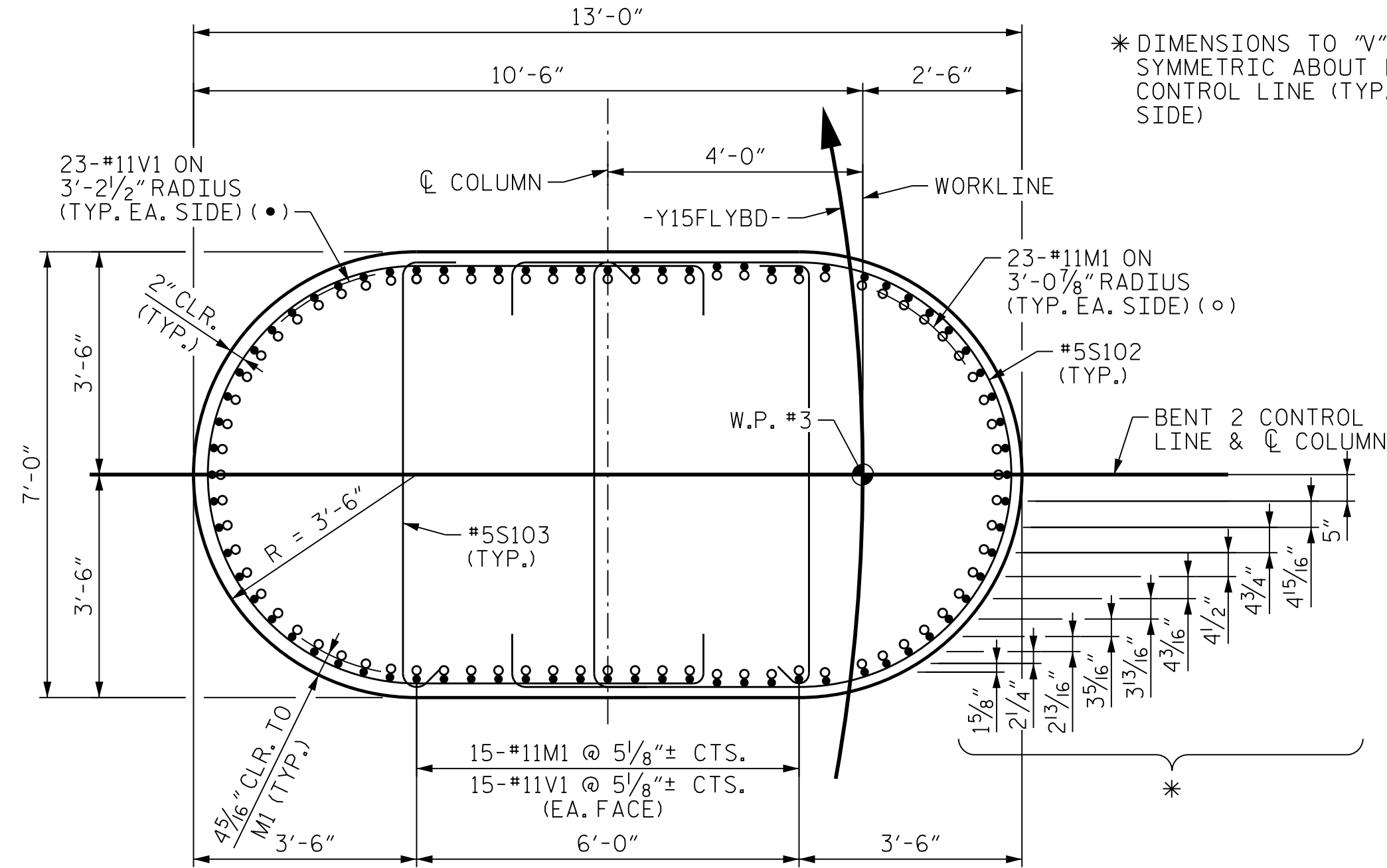


FOOTING PLAN

4-#6T7 PILE UPLIFT ANCHOR BARS ARE REEQD. AT PILES INDICATED THUS: #



SECTION B-B



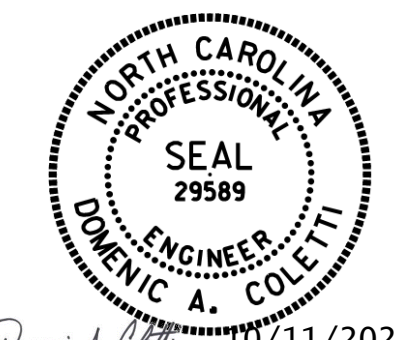
SECTION A-A

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 3 OF 6

NOTES
 FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.
 FOR PILE UPLIFT ANCHOR DETAIL, SEE "SUBSTRUCTURE BENT 2 ELEVATIONS", SHEET 1 OF 6.

DES BY: <u>K. OLIVER</u>	DATE: <u>11/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>N. LIU</u>	DATE: <u>11/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

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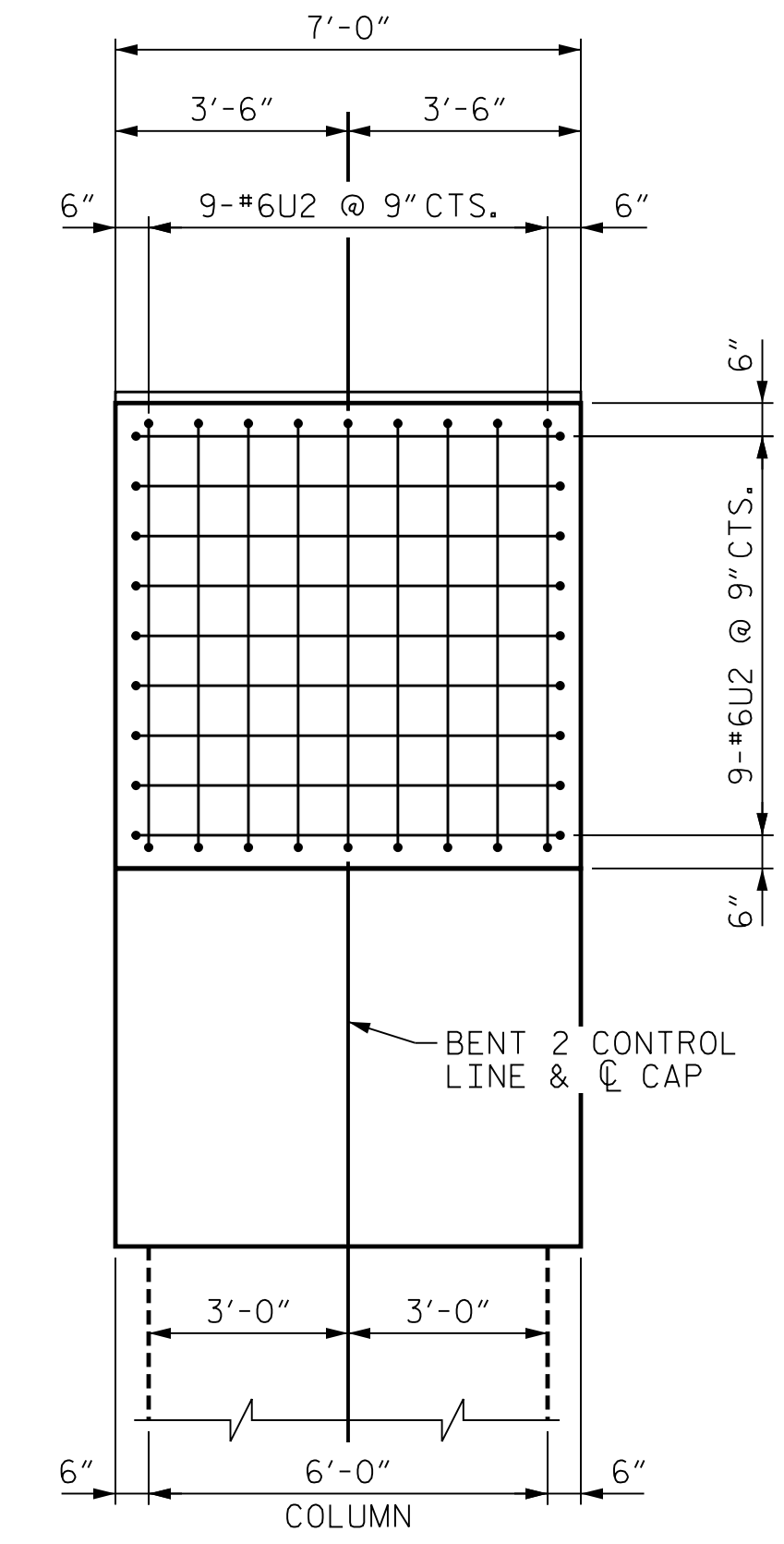
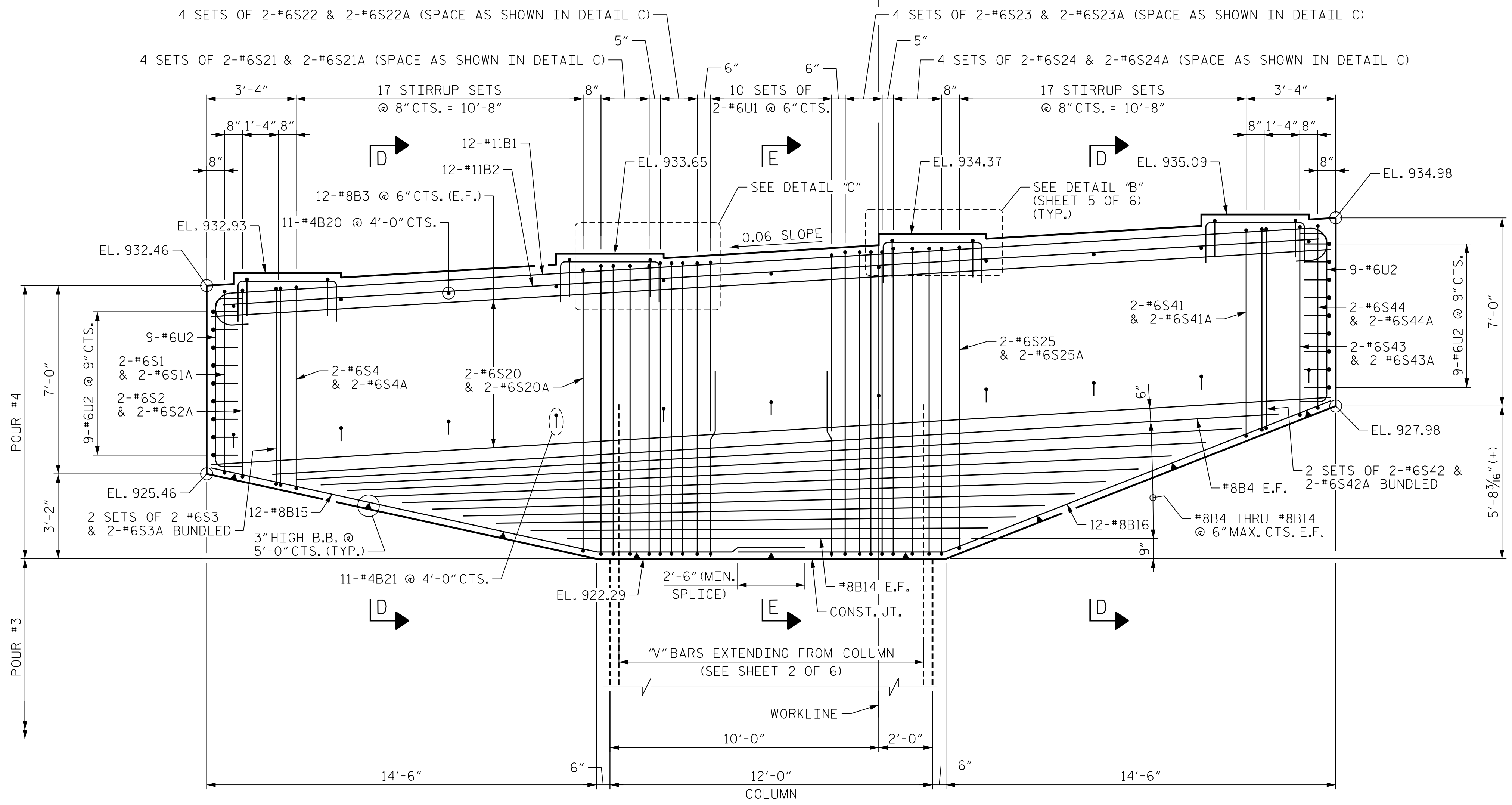
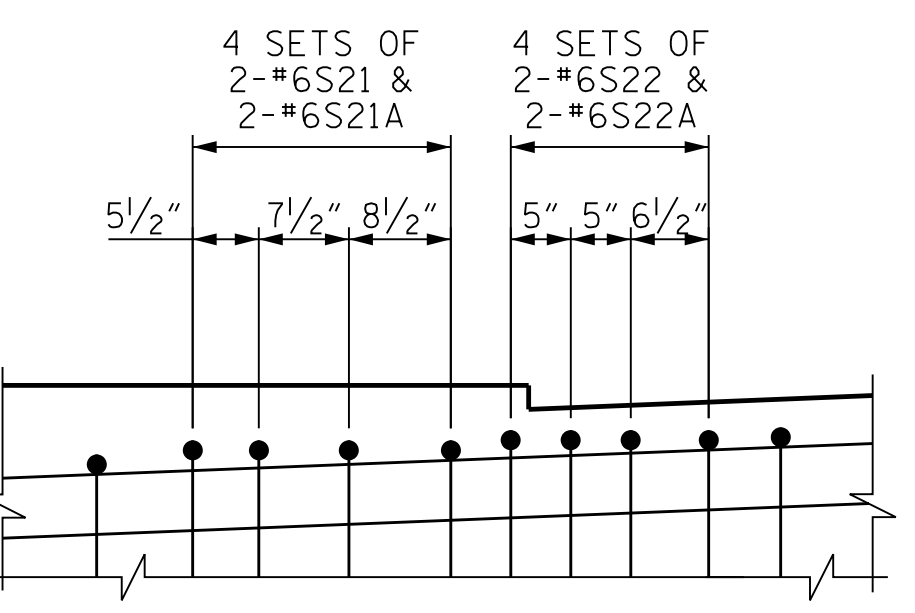
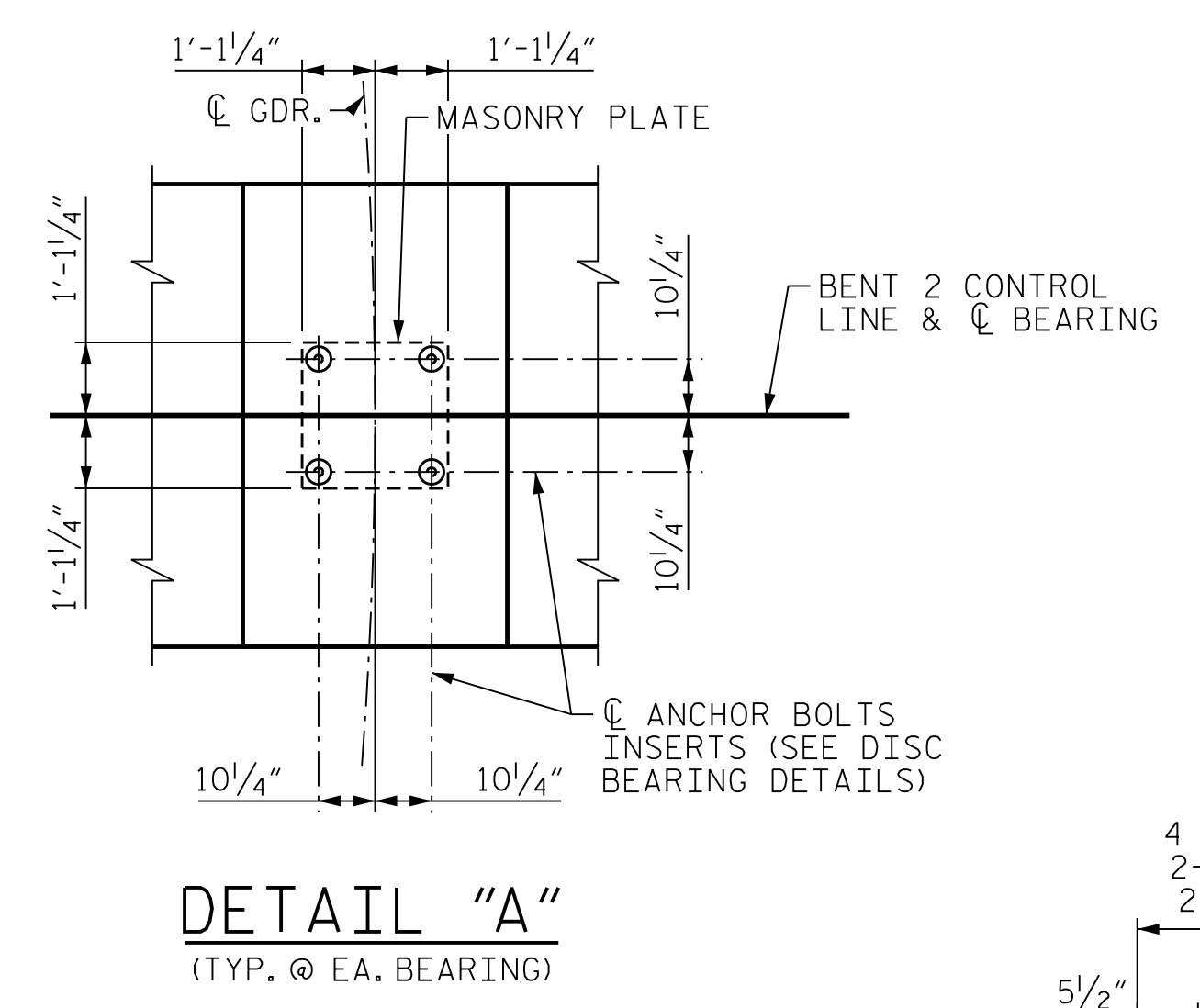
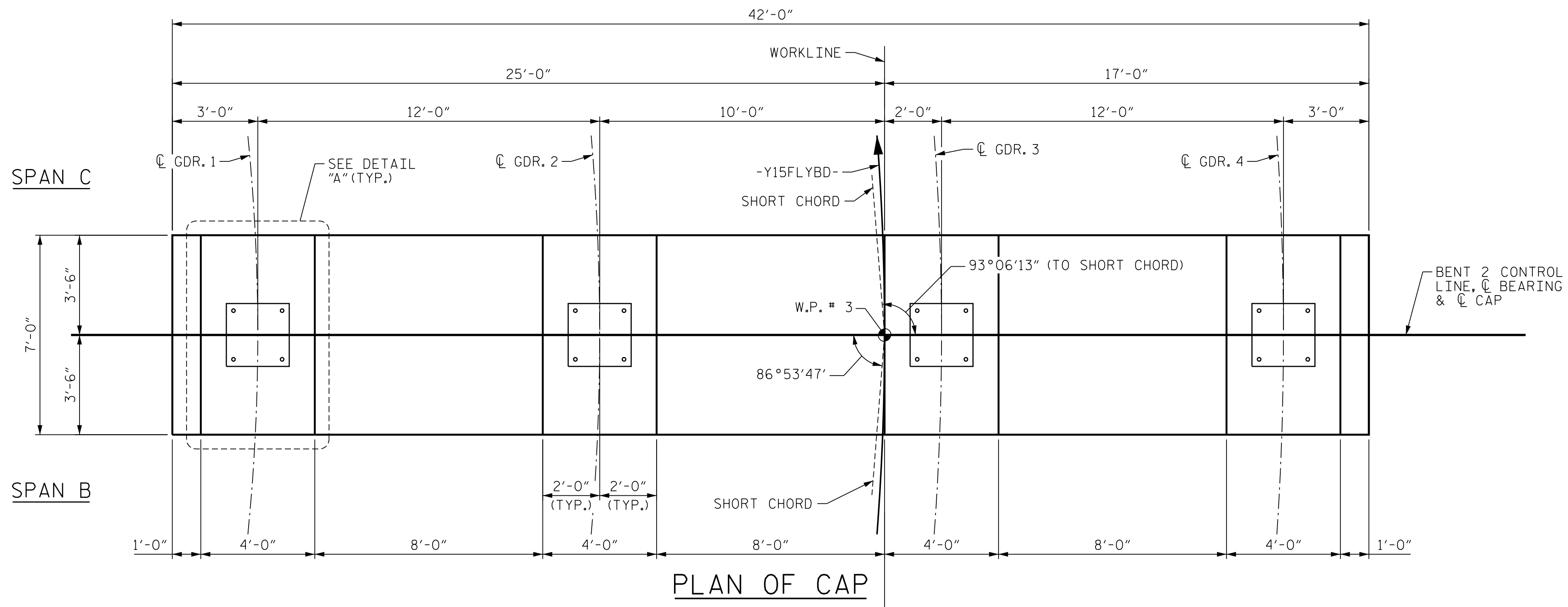
10/11/2021

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REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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SHEET NO. <u>S05-082</u>
TOTAL SHEETS <u>116</u>

PLOT DRIVER: NCDOT_pdf_color_eng-50dpi
 USER: PPETERSO DATE: 10/17/2021
 FILE: ...SUBSTR



DETAIL SHOWN AT LEFT SIDE OF CAP SPACING OF STIRRUPS MIRRORED AT RIGHT SIDE OF CAP WITH BARS #6S23/#6S23A AND #6S24/#6S24A AS SHOWN ON THE ELEVATION!

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 4 OF 6



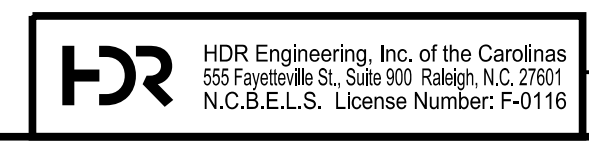
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 2 BENT CAP PLAN AND ELEVATION

REVISIONS						SHEET NO. S05-083 TOTAL SHEETS 116
NO.	BY:	DATE:	NO.	BY:	DATE:	
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2	--	--	4	--	--	

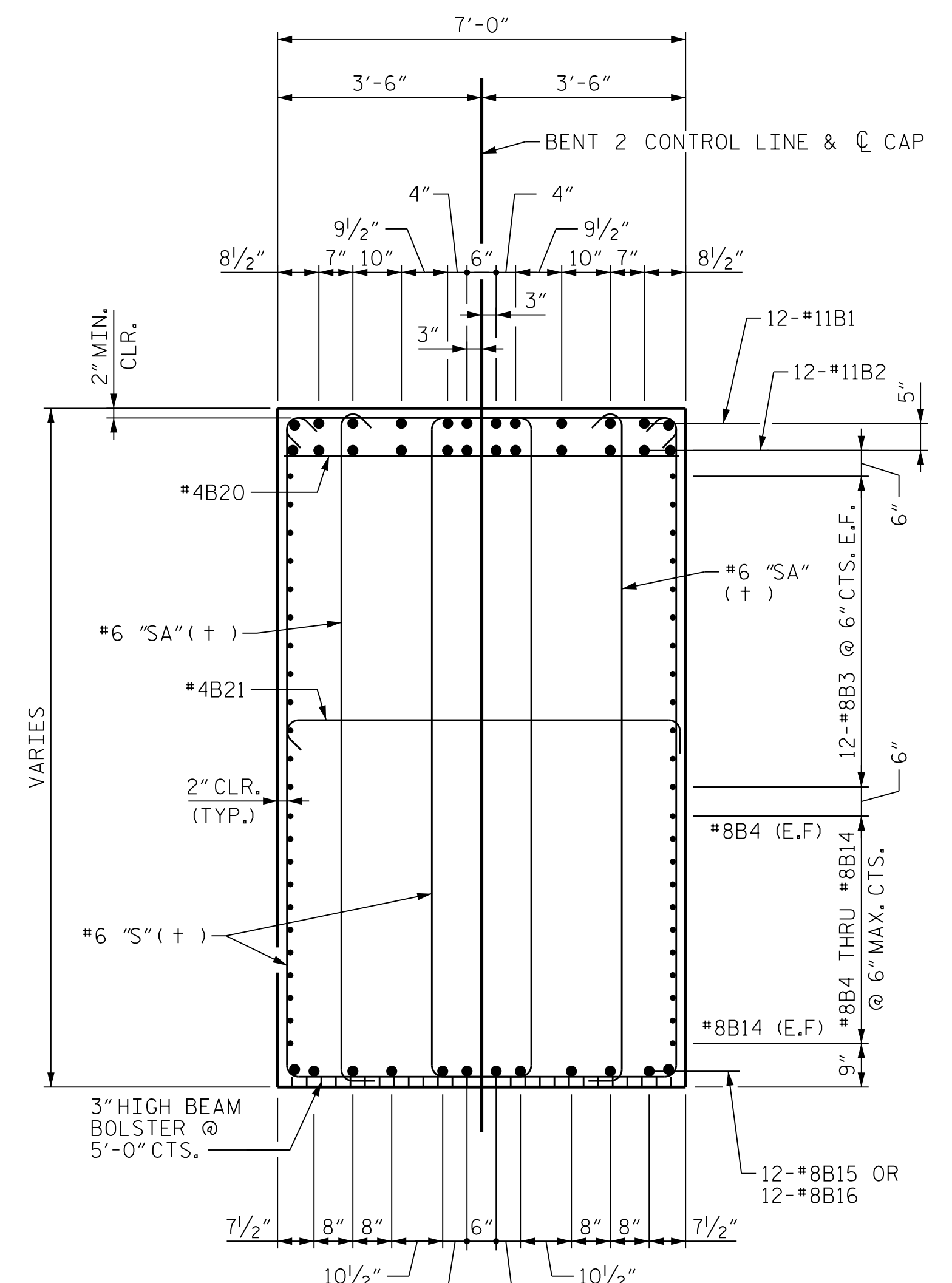
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DES BY: <u>K. OLIVER</u>	DATE: <u>10/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>M. WERNER</u>	DATE: <u>10/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

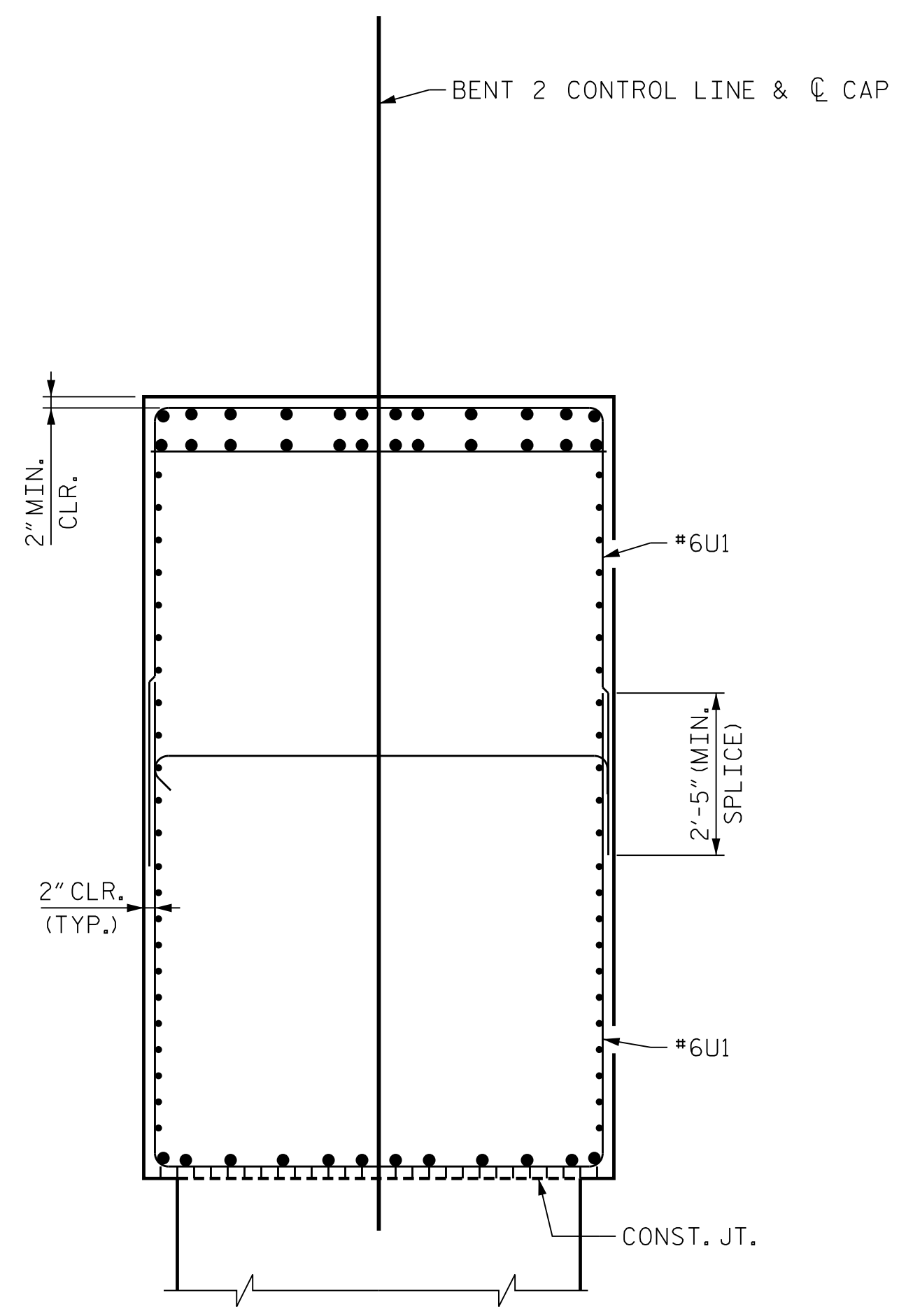


10/11/2021
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTE
SEE SHEETS 1 AND 2 OF 6 FOR NOTES.

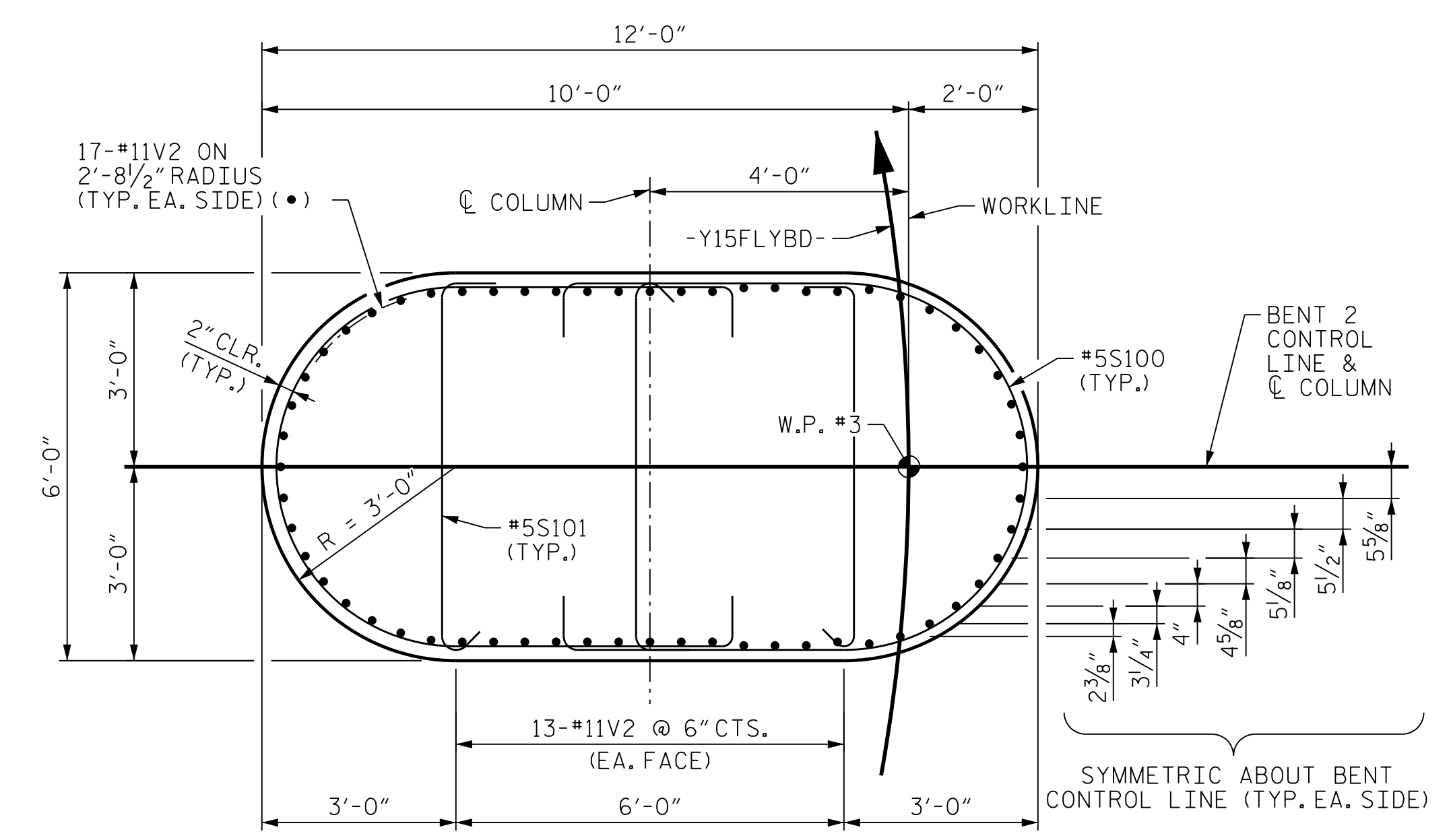


SECTION D-D
(+) SEE "STIRRUP SET DETAIL"

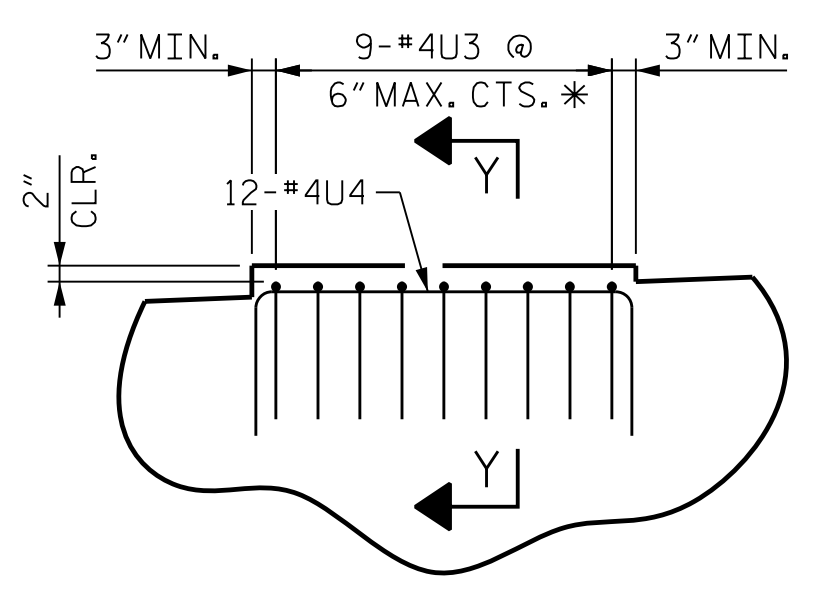


SEE SECTION D-D FOR ADDITIONAL INFORMATION

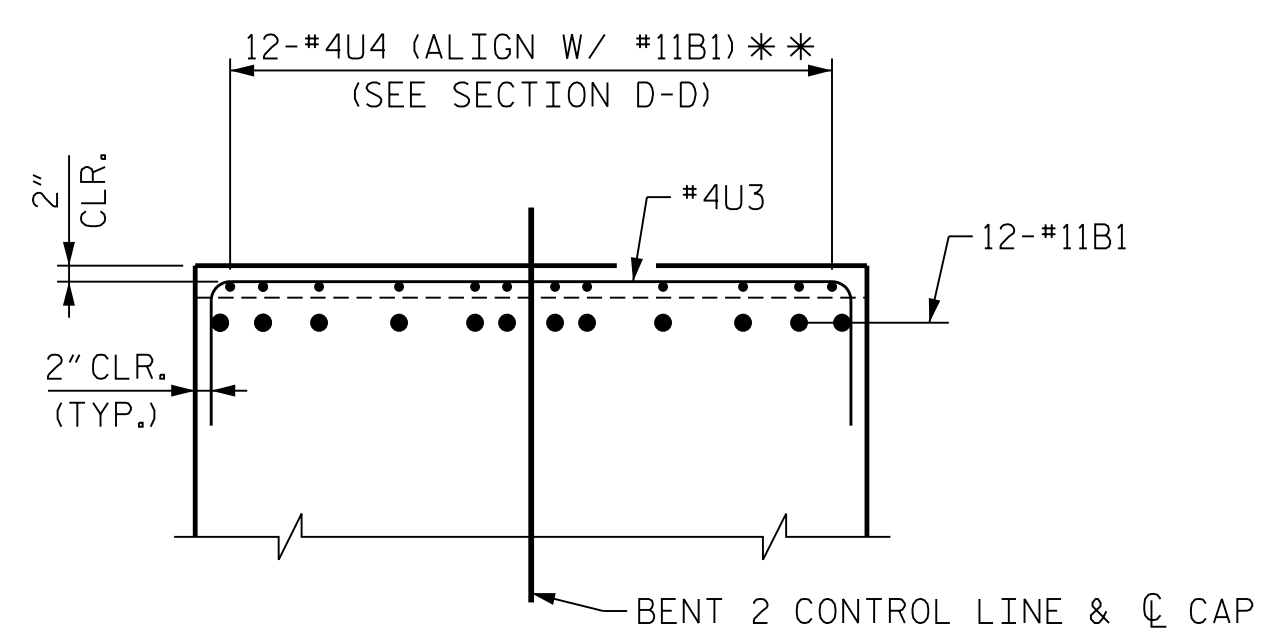
SECTION E-E
COLUMN REINFORCING STEEL NOT SHOWN FOR CLARITY



SECTION C-C

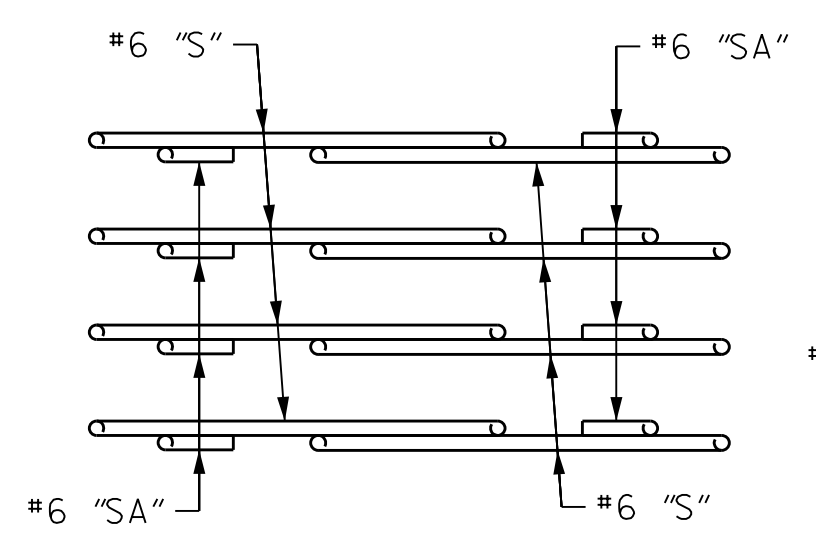


DETAIL "B"

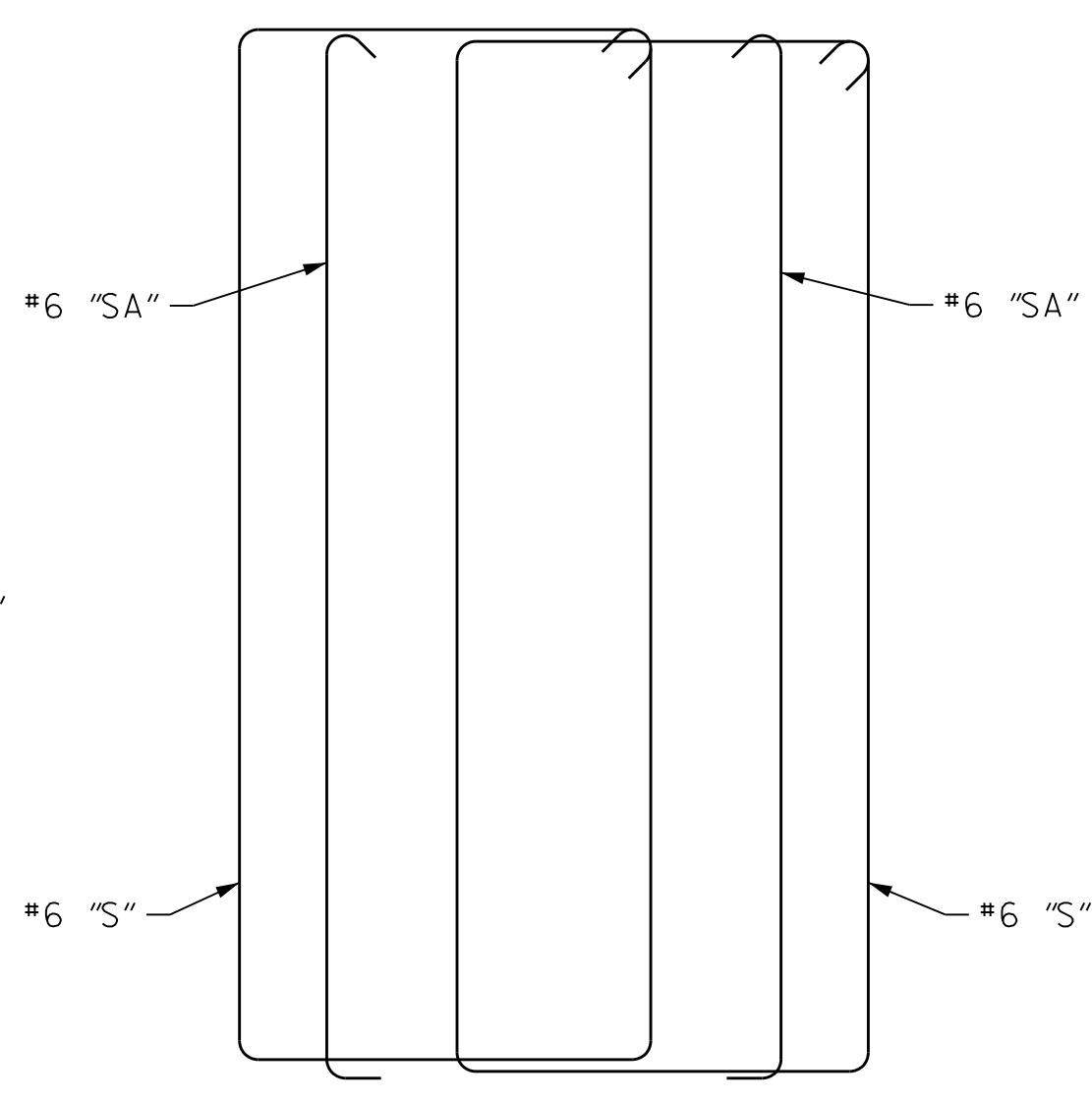


SECTION Y-Y

* NOTE:
#4U3 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR PIPE INSERTS FOR ANCHOR BOLTS.
** NOTE:
#4U4 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR #11B1 AND #11B2 BARS.



PLAN
(SHOWING BAR PLACEMENT)



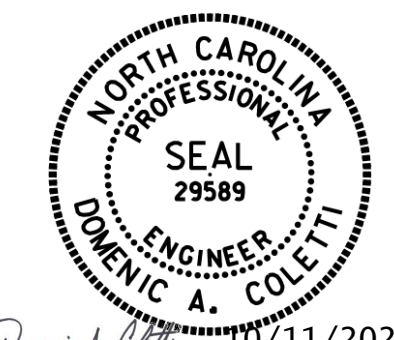
ELEVATION
(SCHEMATIC)

STIRRUP SET DETAIL

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
BENT 2
BENT CAP DETAILS**



10/11/2021

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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SHEET NO. S05-084
TOTAL SHEETS 116

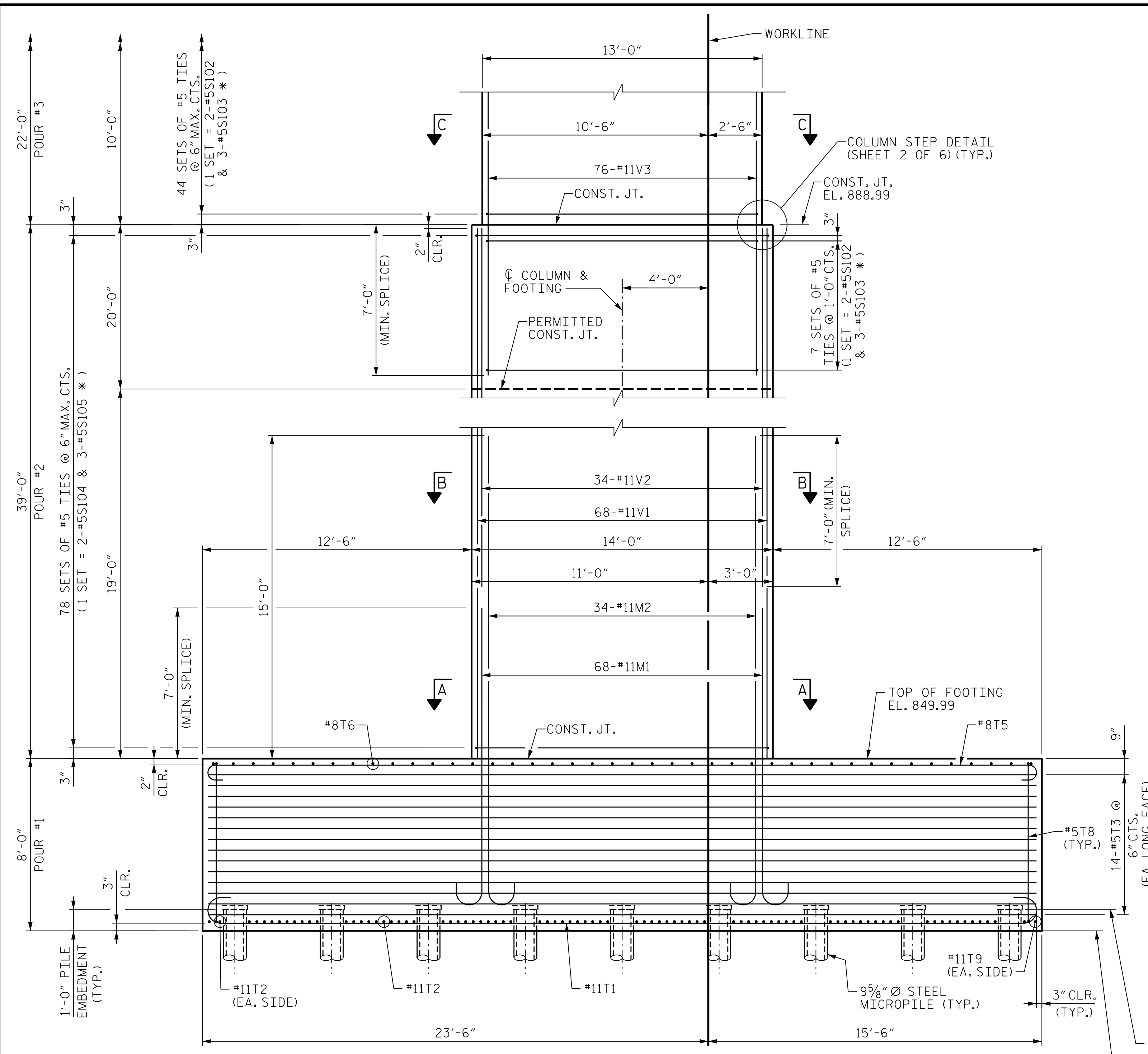
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PLOT DRIVER: NCDOT.pdf_color_eng-50dpi
USER: PPETERSO DATE: 10/11/2021
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DES BY: <u>K. OLIVER</u>	DATE: <u>10/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>M. WERNER</u>	DATE: <u>10/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

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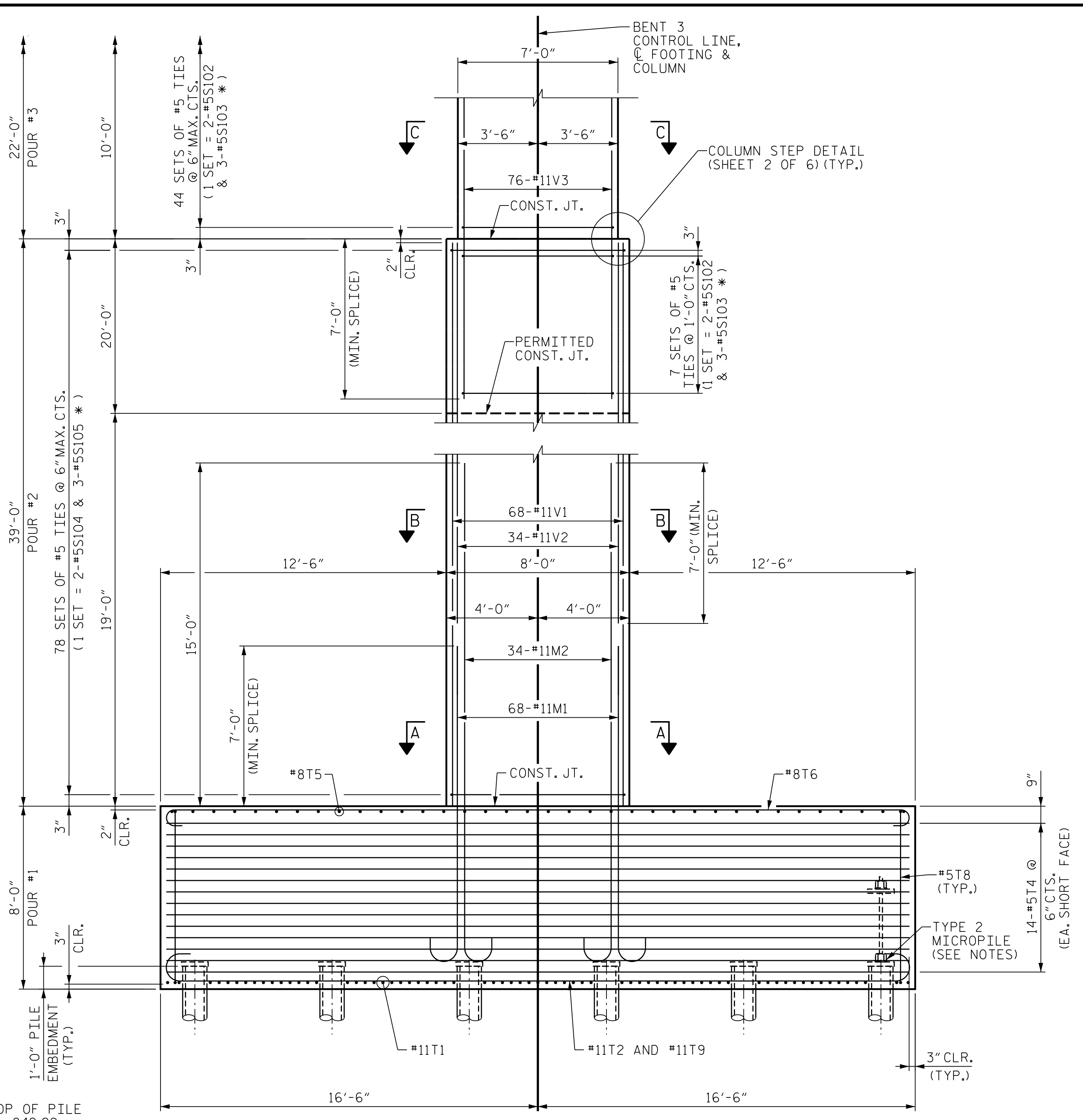


PARTIAL FRONT ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S103 AND #5S105 TIES

NOTES

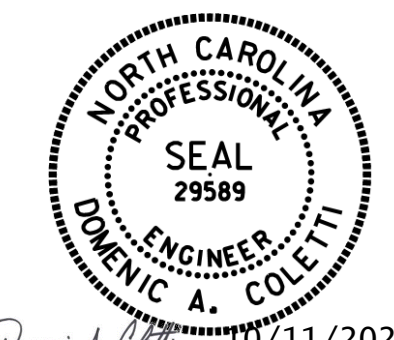
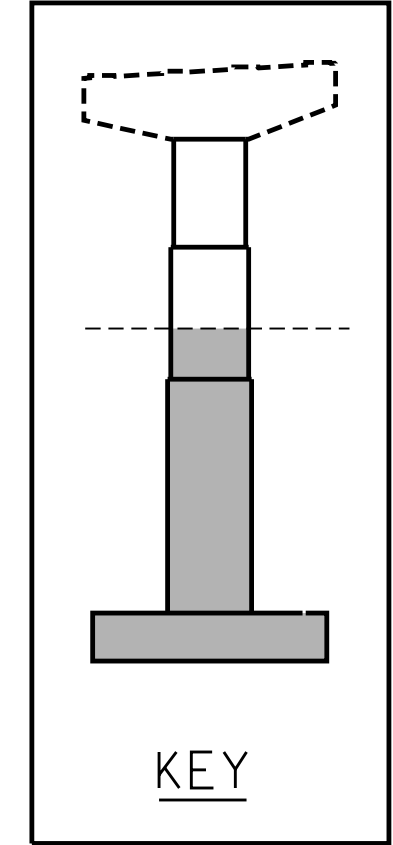
- FOR FOOTING PLAN, SECTION A-A AND SECTION B-B, SEE "SUBSTRUCTURE BENT 3 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.
- FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.
- FOR SECTION C-C, SEE "SUBSTRUCTURE BENT 3 BENT CAP DETAILS", SHEET 5 OF 6.
- FOR MICROPILE DETAILS, SEE "SUBSTRUCTURE MICROPILE DETAILS" SHEET.
- FOR LOCATIONS OF TYPE 2 MICROPILES, SEE "SUBSTRUCTURE BENT 3 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.



PARTIAL END ELEVATION

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 1 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 3 ELEVATIONS

DES BY: K. OLIVER	DATE: 11/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19

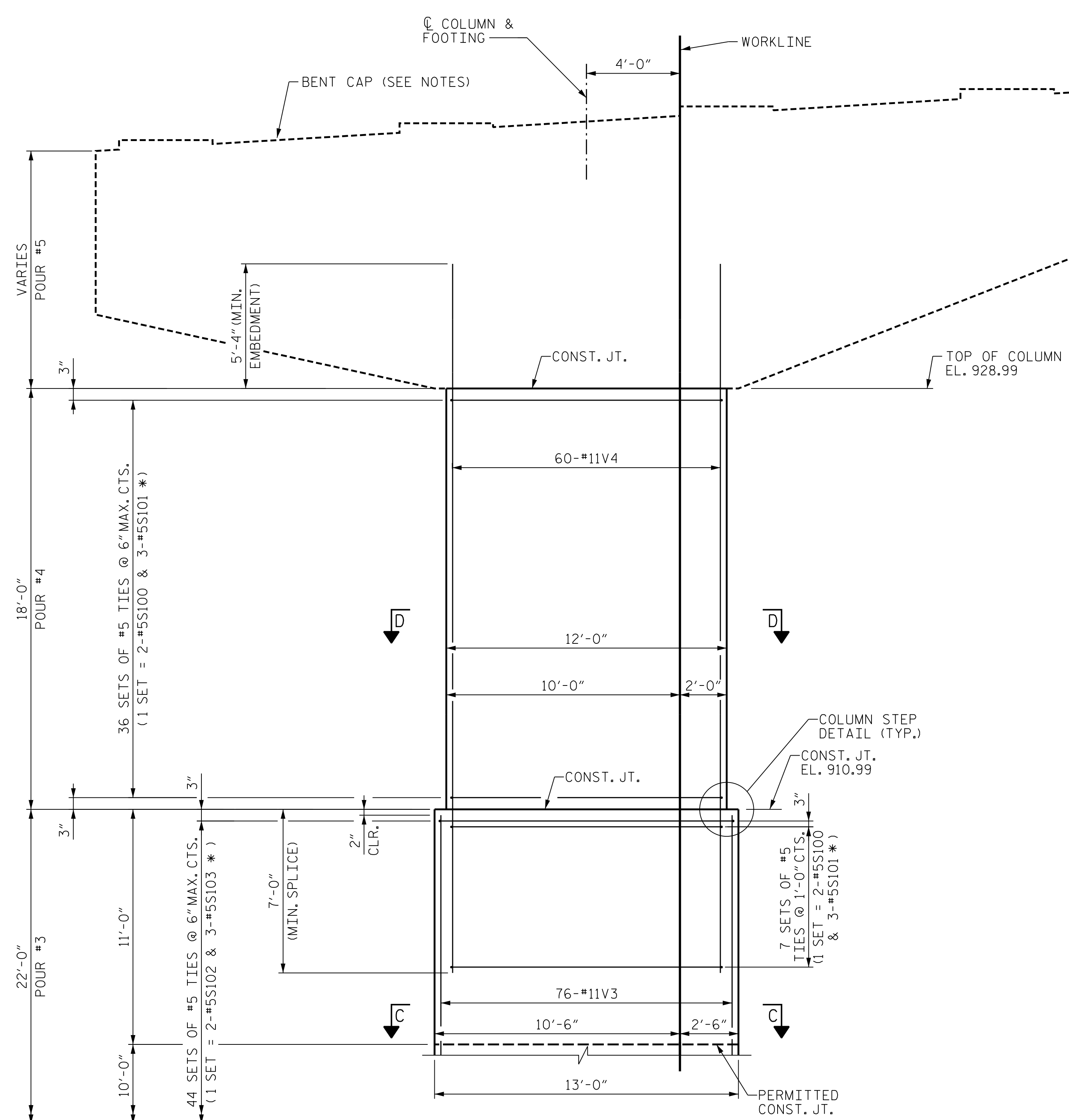
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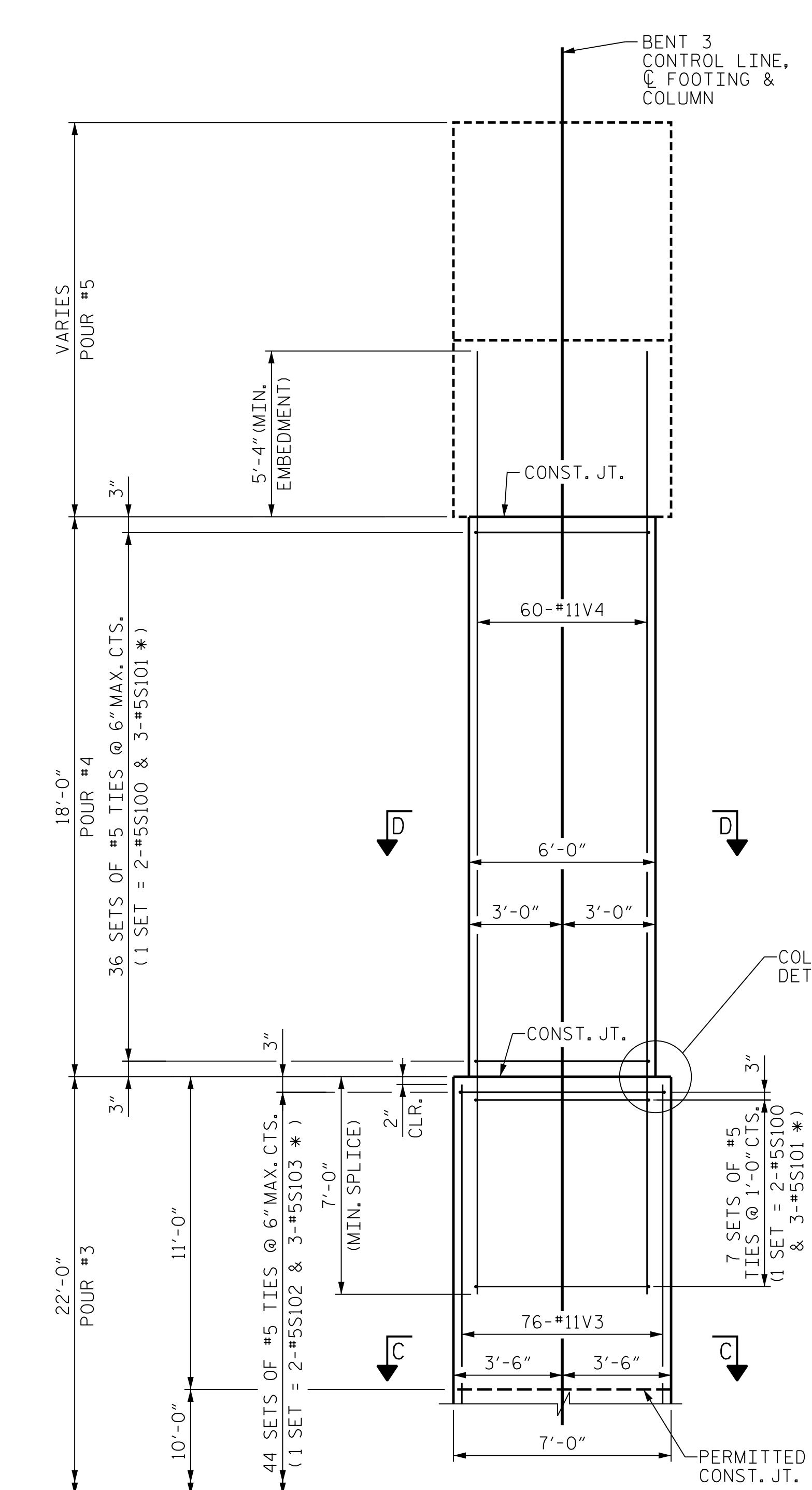
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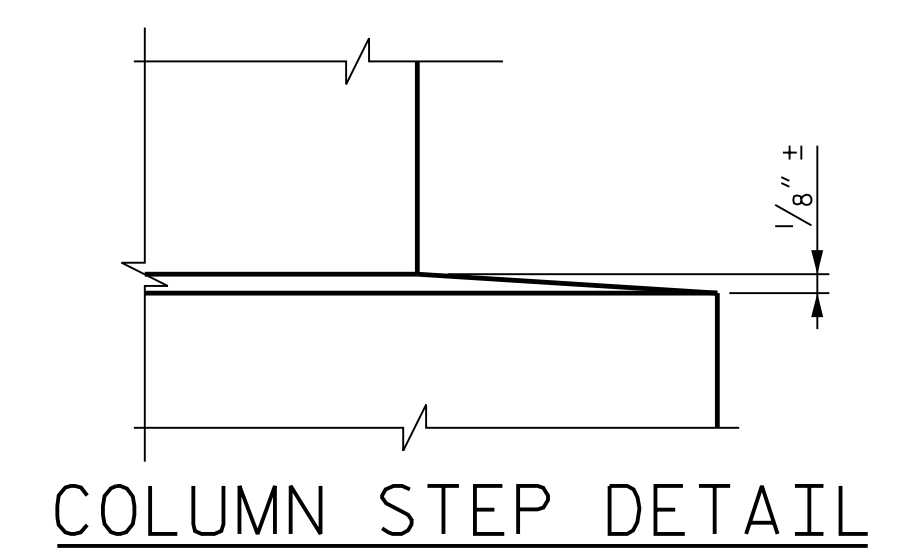


PARTIAL FRONT ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S101 AND #5S103 TIES



PARTIAL END ELEVATION

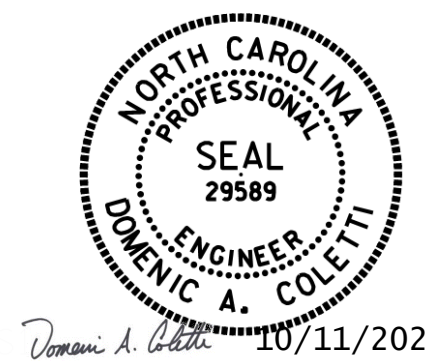
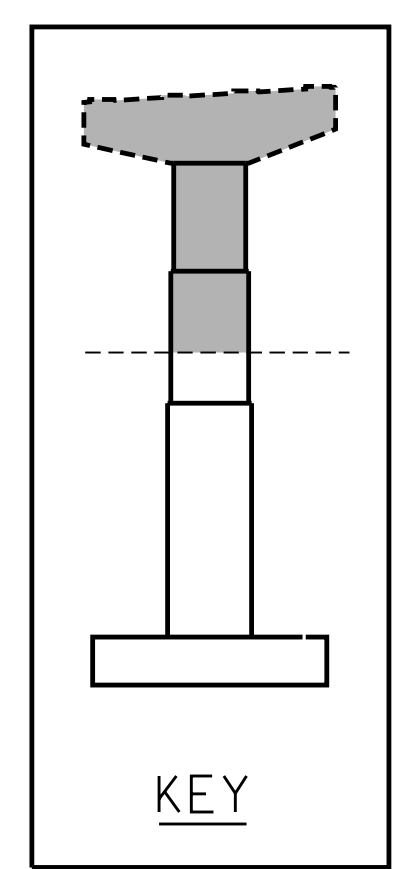


NOTES

FOR SECTION C-C AND SECTION D-D, SEE "SUBSTRUCTURE BENT 3 BENT CAP DETAILS", SHEET 5 OF 6.

FOR DETAILS OF BENT CAP, SEE "SUBSTRUCTURE BENT 3 BENT CAP PLAN AND ELEVATION", SHEET 4 OF 6 AND "SUBSTRUCTURE BENT 3 BENT CAP DETAILS", SHEET 5 OF 6.

FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.



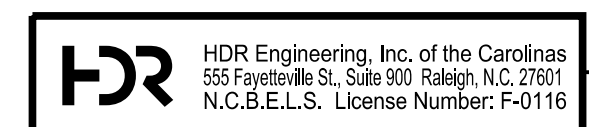
PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

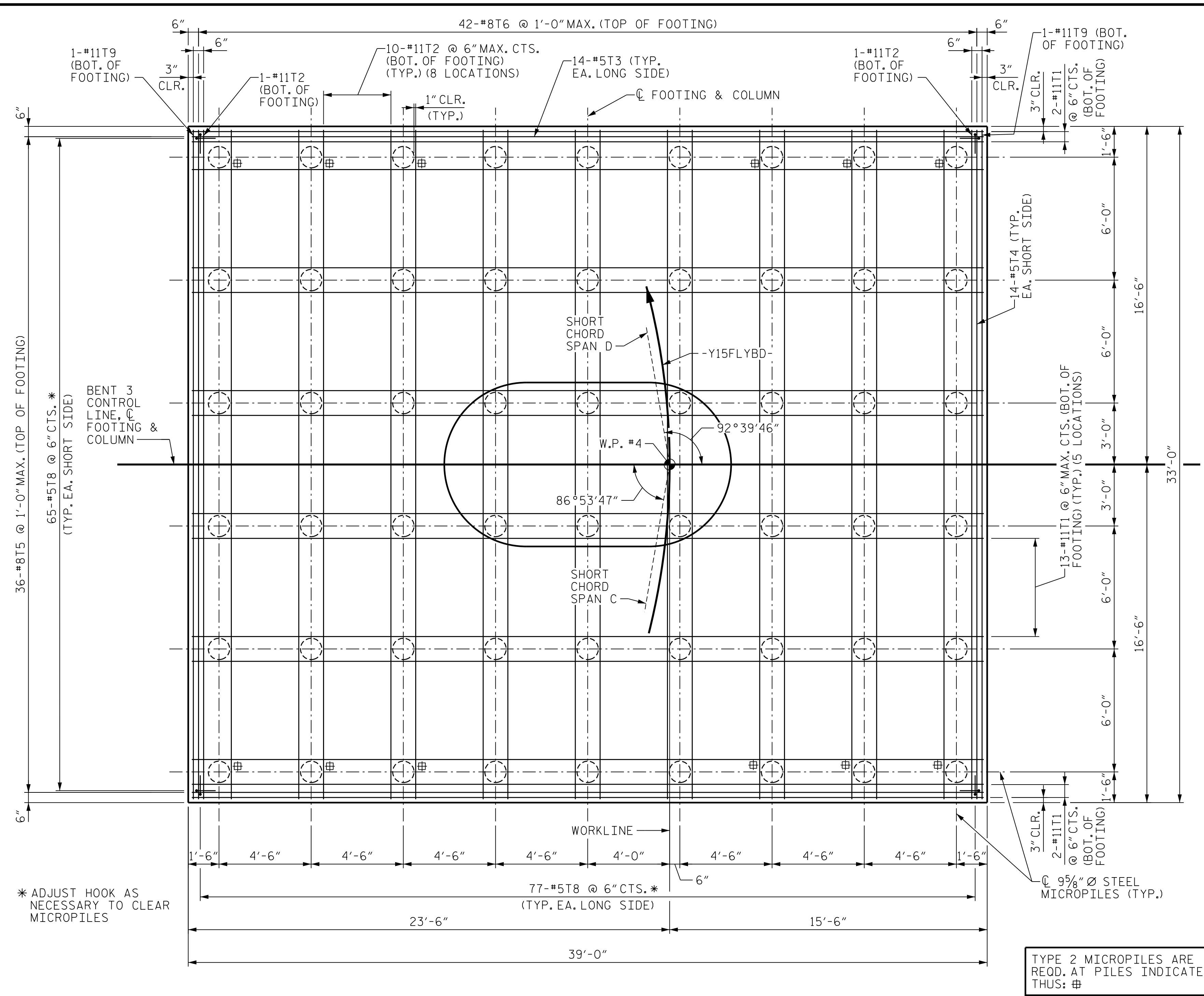
SUBSTRUCTURE BENT 3 ELEVATIONS

DES BY: K. OLIVER	DATE: 11/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19



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REVISIONS						SHEET NO. S05-087 TOTAL SHEETS 116
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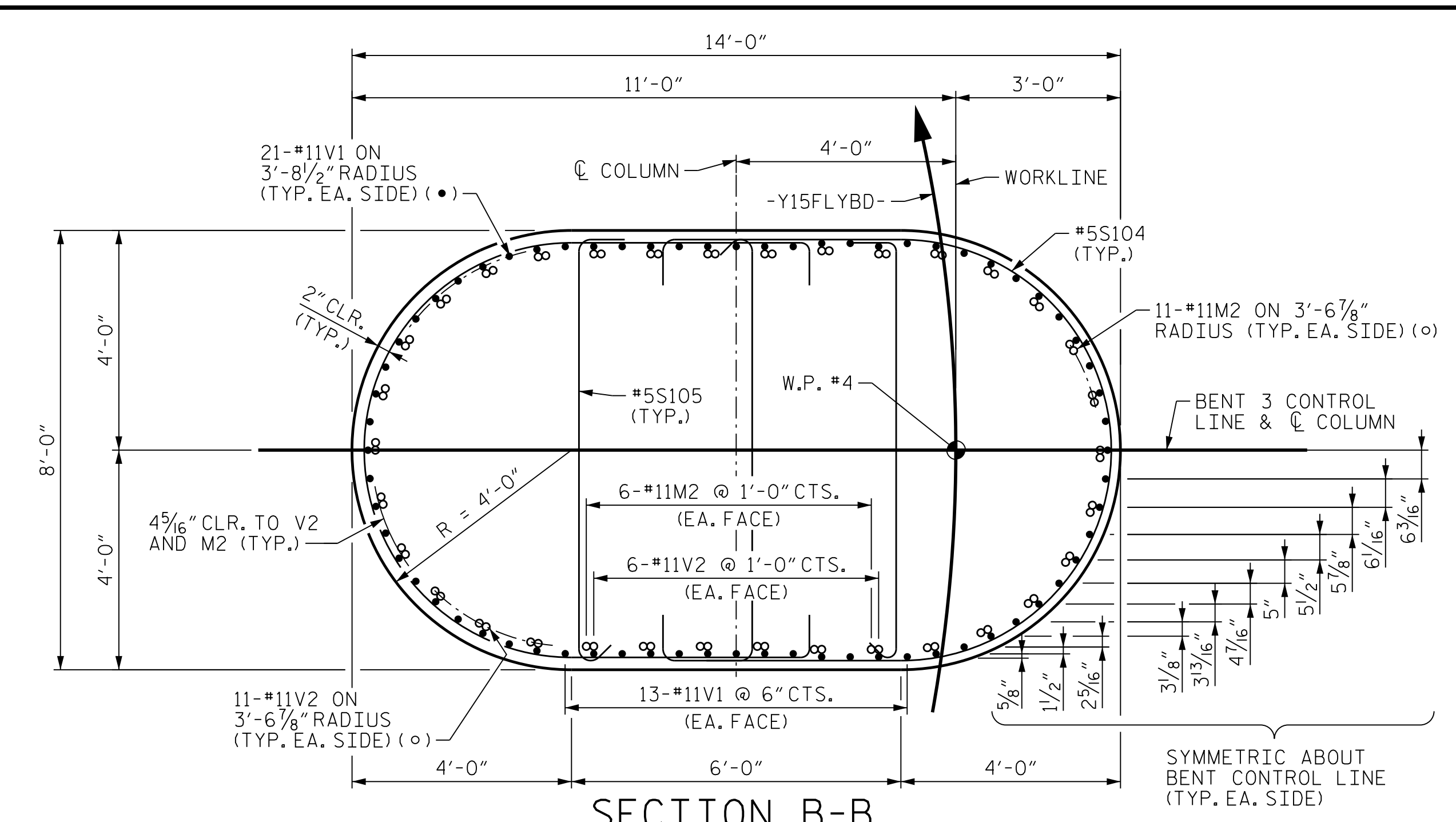


FOOTING PLAN

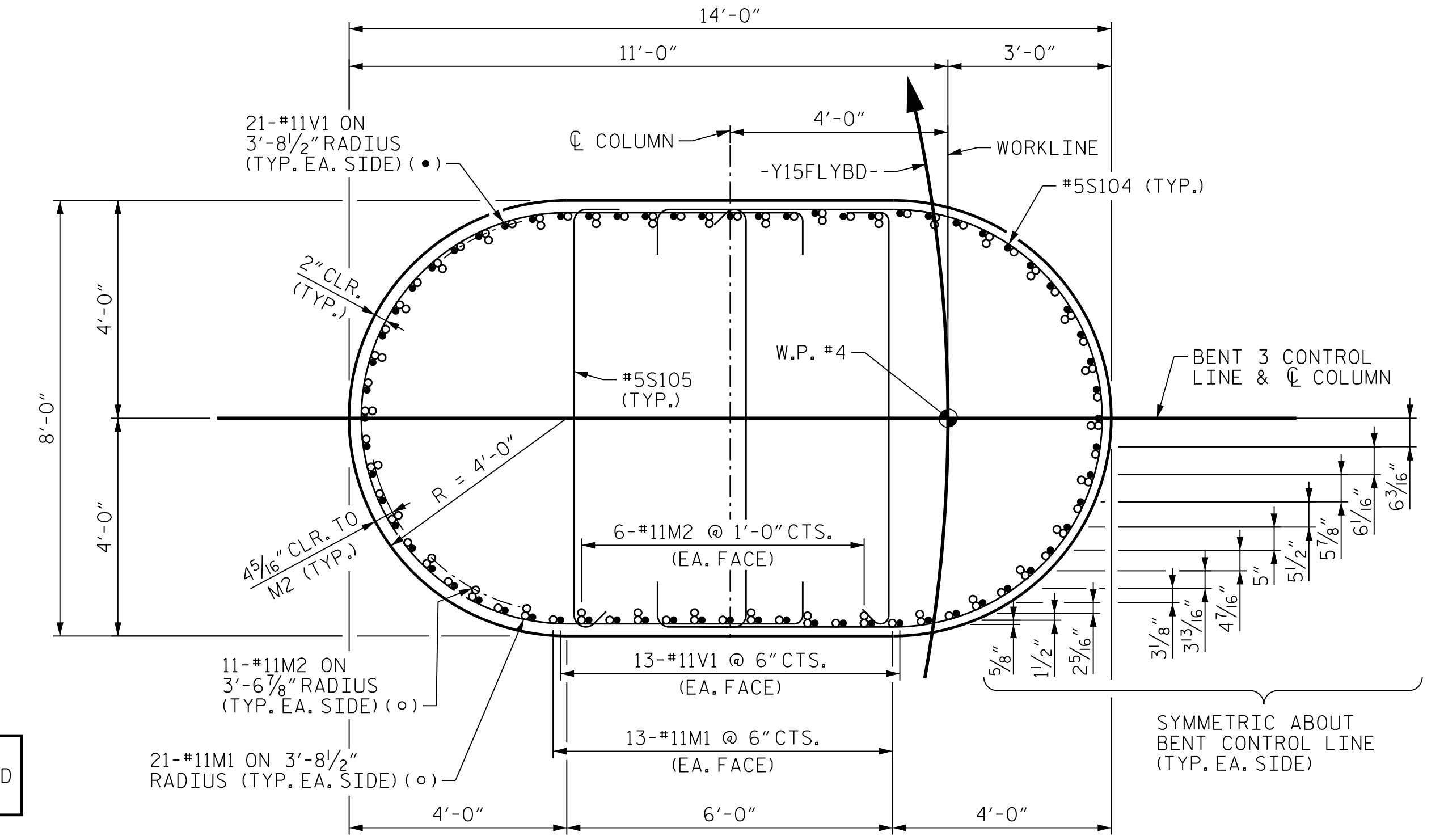
NOTES
 FOR MICROPILE DETAILS, SEE "SUBSTRUCTURE MICROPILE DETAILS" SHEET.
 FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.

DES BY: K. OLIVER	DATE: 11/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19

TYPE 2 MICROPILES ARE REOD. AT PILES INDICATED THUS:



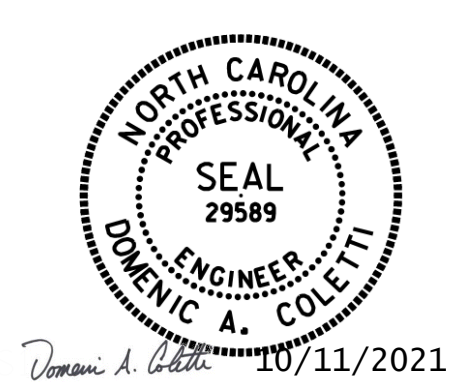
SECTION B-B



SECTION A-A

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 3 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 3 FOOTING & COLUMN DETAILS

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1	--	--	3	--	--
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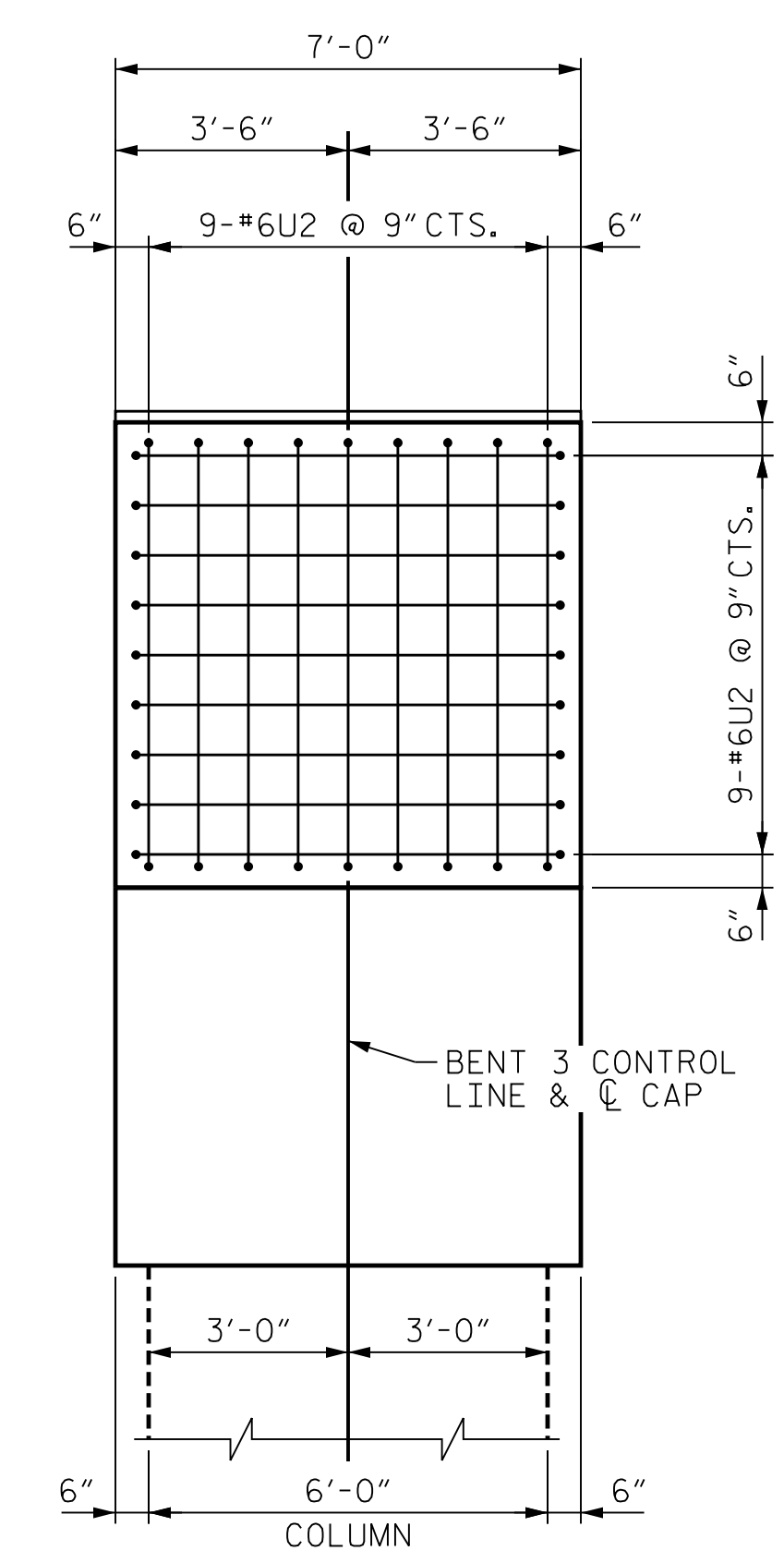
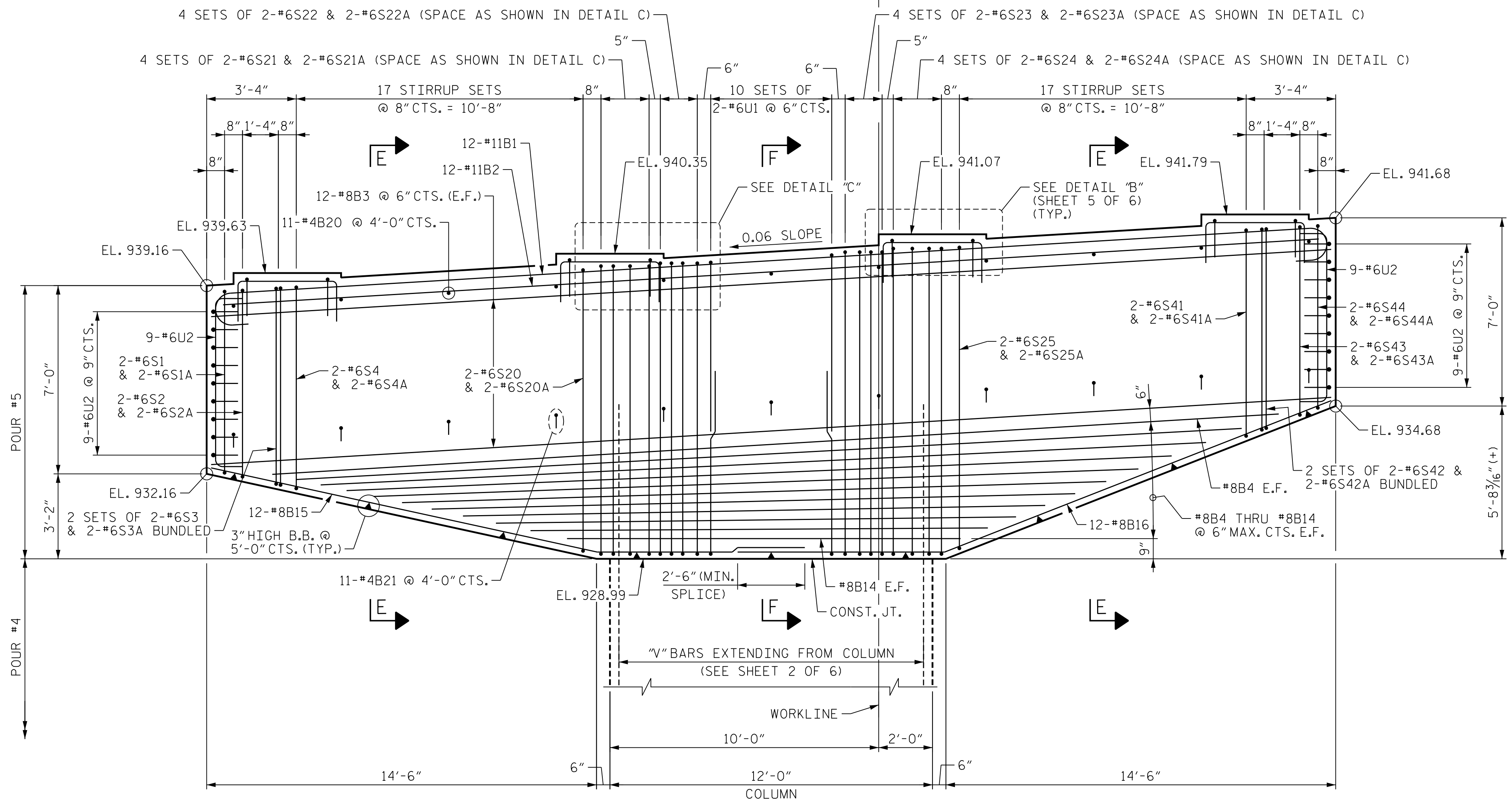
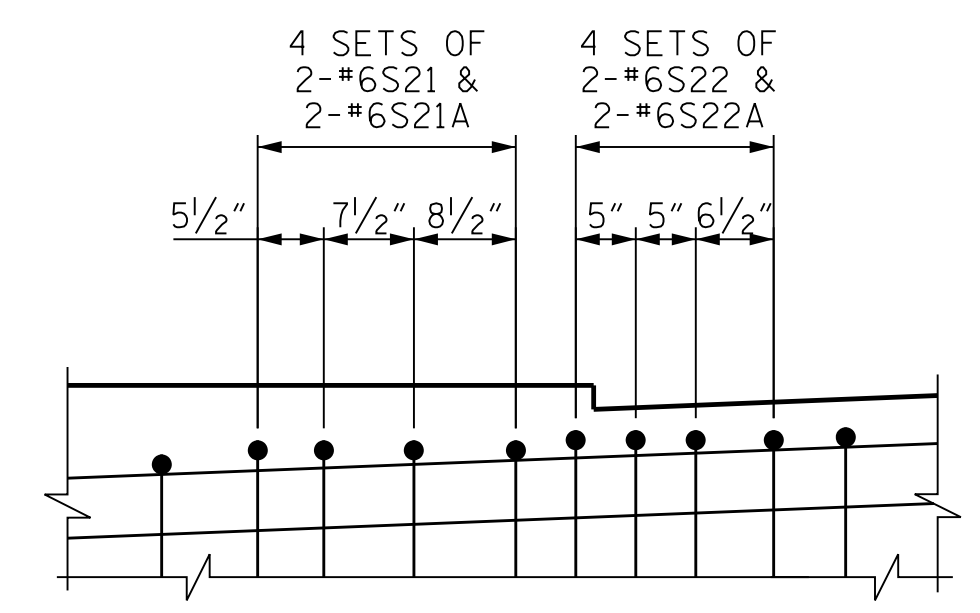
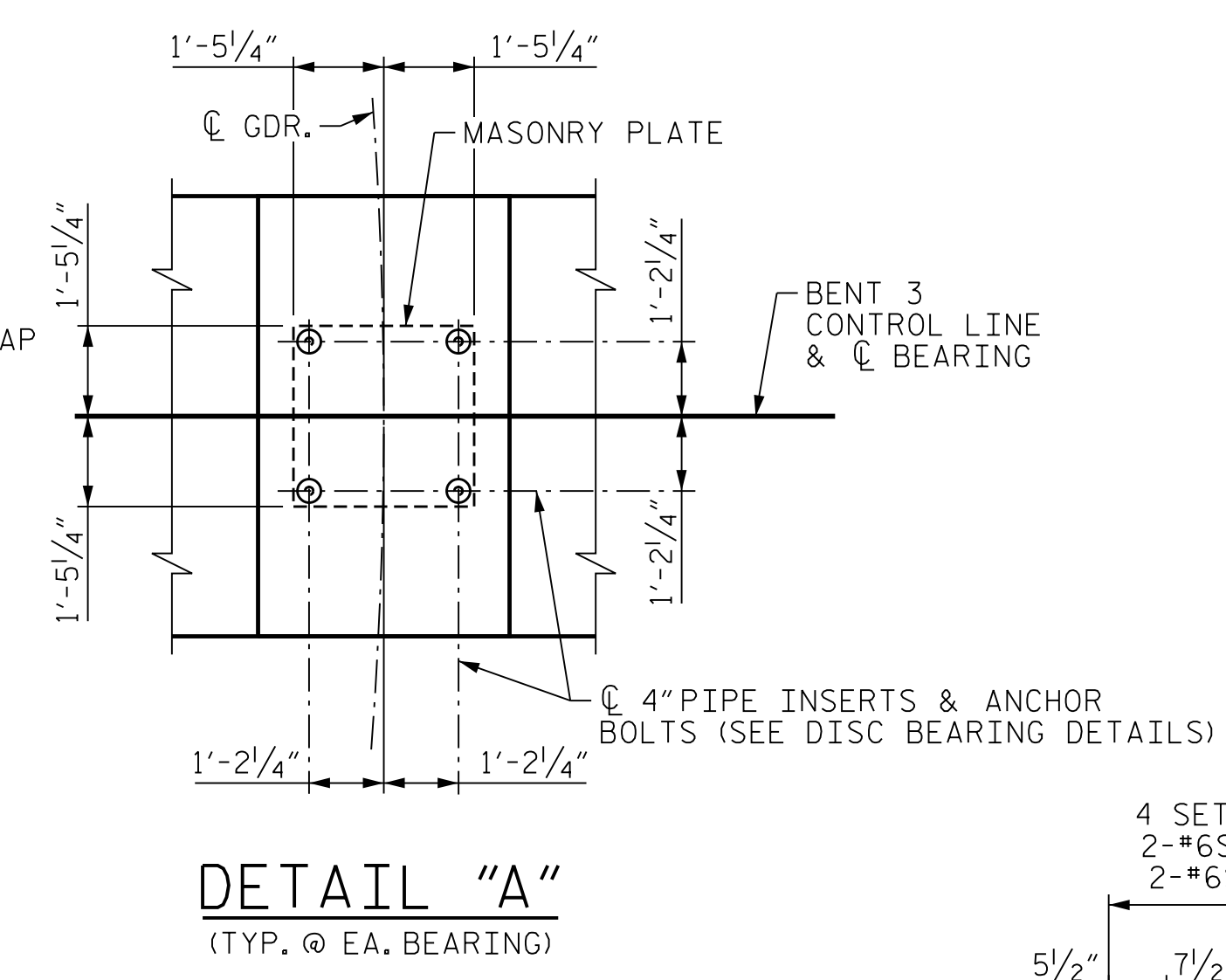
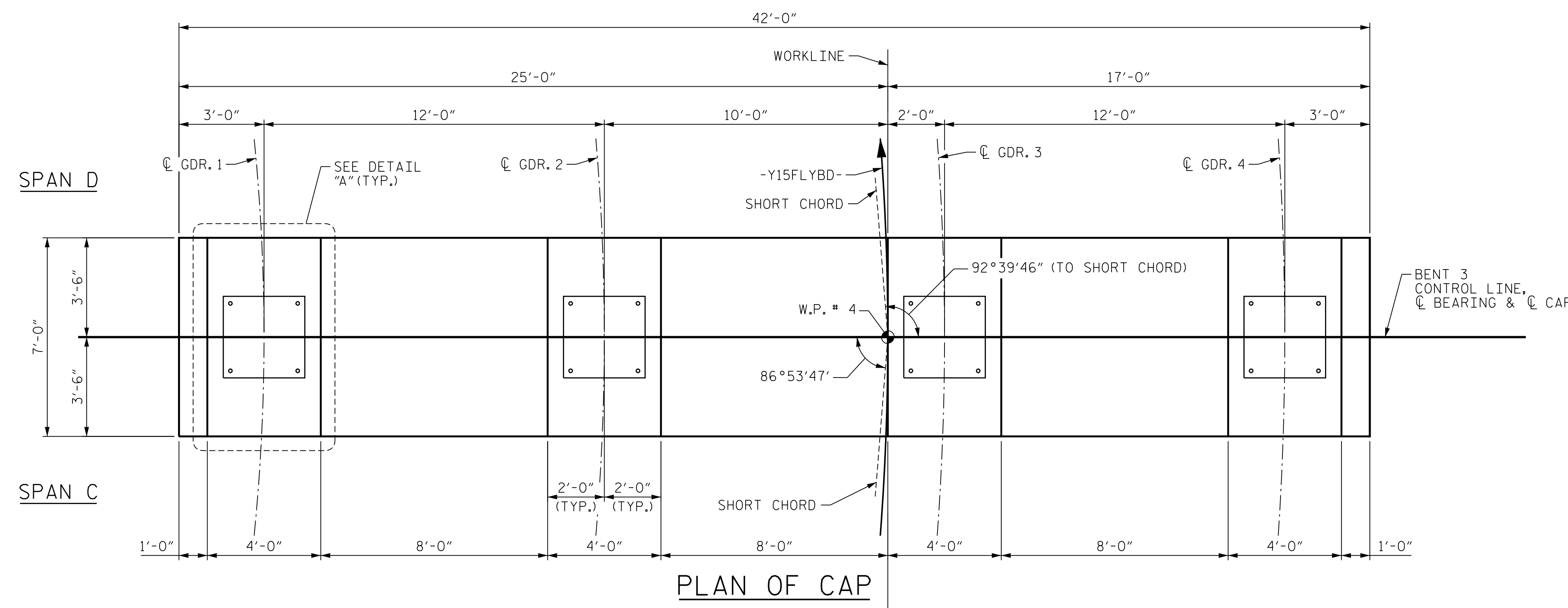
SHEET NO. S05-088
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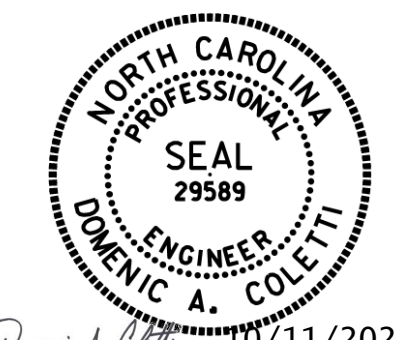
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 TIME: 8:27:31 AM

NOTES
FOR SECTIONS E-E AND F-F, SEE "SUBSTRUCTURE BENT 3 BENT CAP DETAILS", SHEET 5 OF 6.
FOR ADDITIONAL NOTES, SEE SHEETS 1 AND 2 OF 6.



DETAIL "C"
DETAIL SHOWN AT LEFT SIDE OF CAP SPACING OF STIRRUPS MIRRORED AT RIGHT SIDE OF CAP WITH BARS #6S23/#6S23A AND #6S24/#6S24A AS SHOWN ON THE ELEVATION!

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 4 OF 6

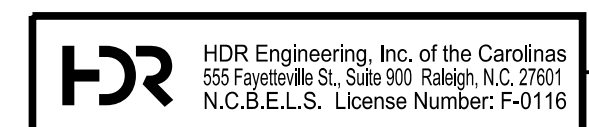


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
BENT 3
BENT CAP PLAN AND
ELEVATION

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

SHEET NO. S05-089
TOTAL SHEETS 116

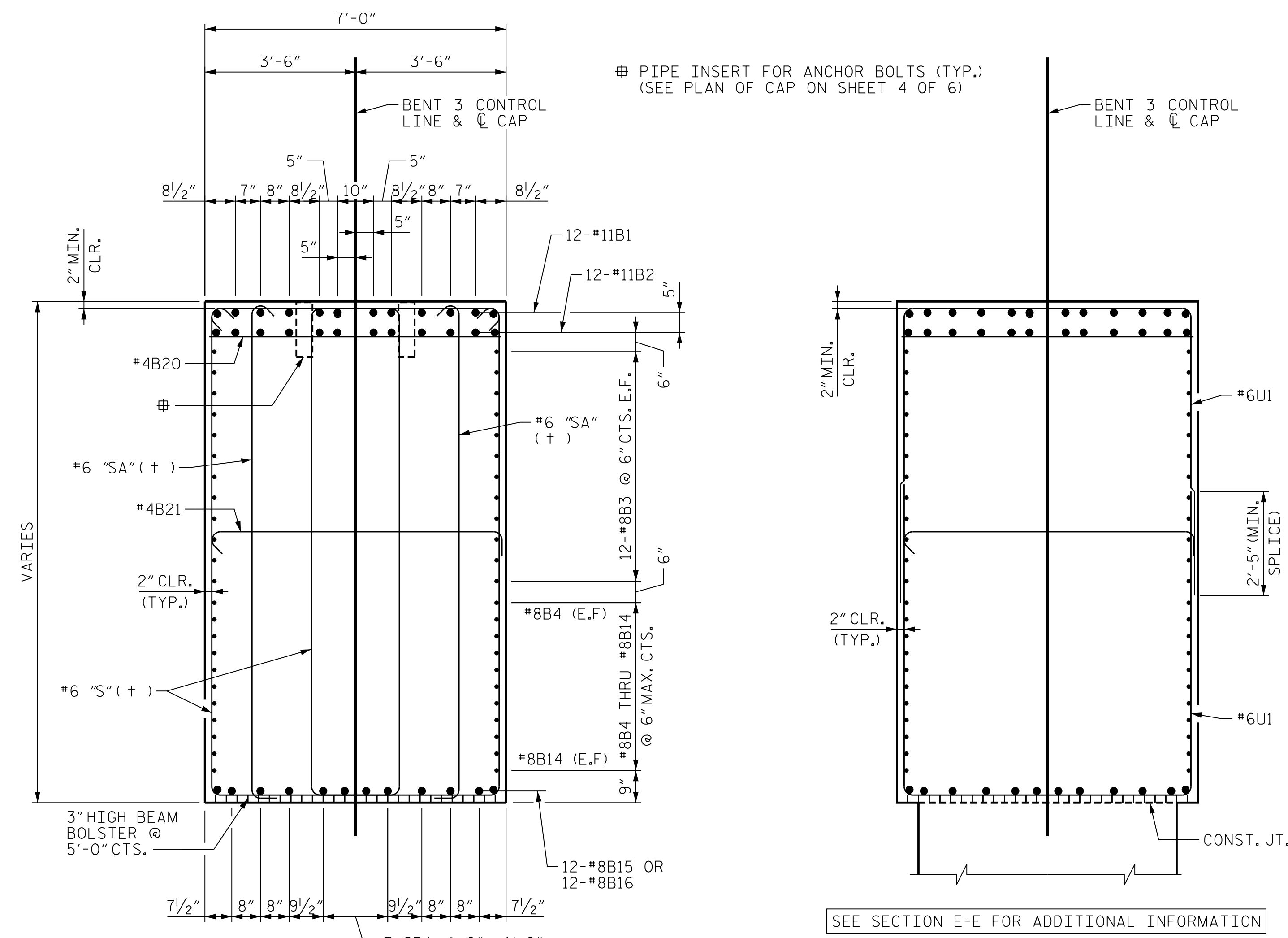
DES BY: K. OLIVER	DATE: 10/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: M. WERNER	DATE: 10/19	CHK BY: N. LIU	DATE: 12/19



10/11/2021
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

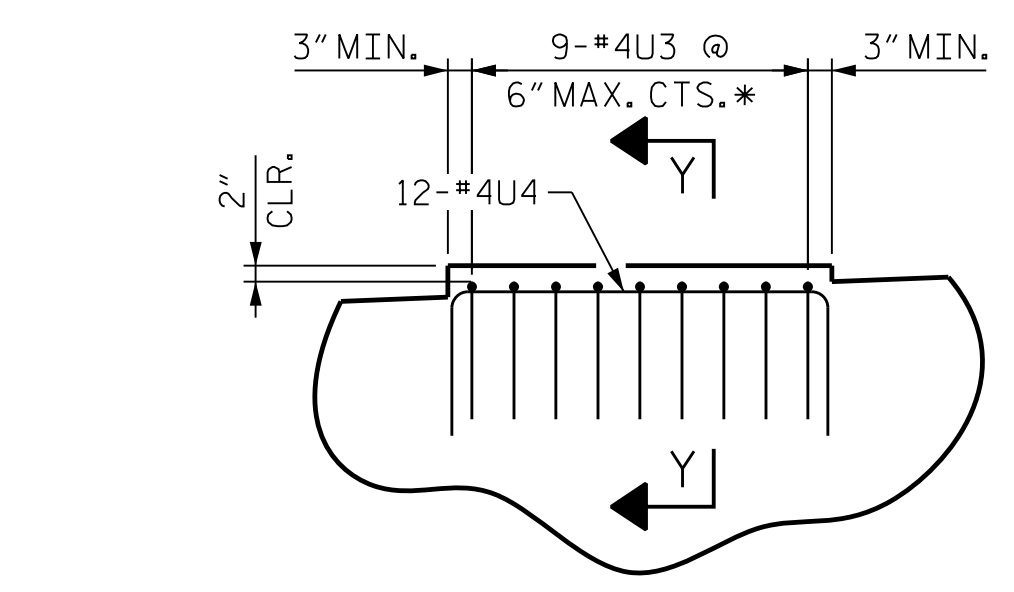
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USER: PPETERSO
DATE: 10/17/2021
FILE: ...SUBSTR

NOTE
SEE SHEETS 1 AND 2 OF 6 FOR NOTES.

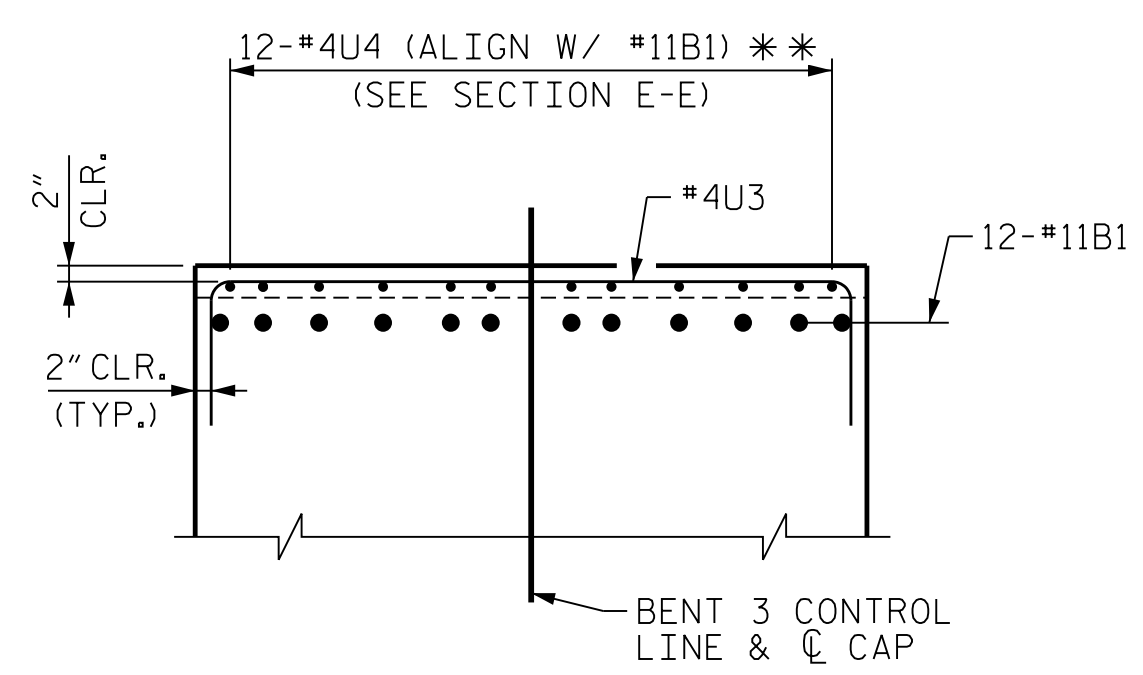


SECTION E-E
(+) SEE "STIRRUP SET DETAIL"

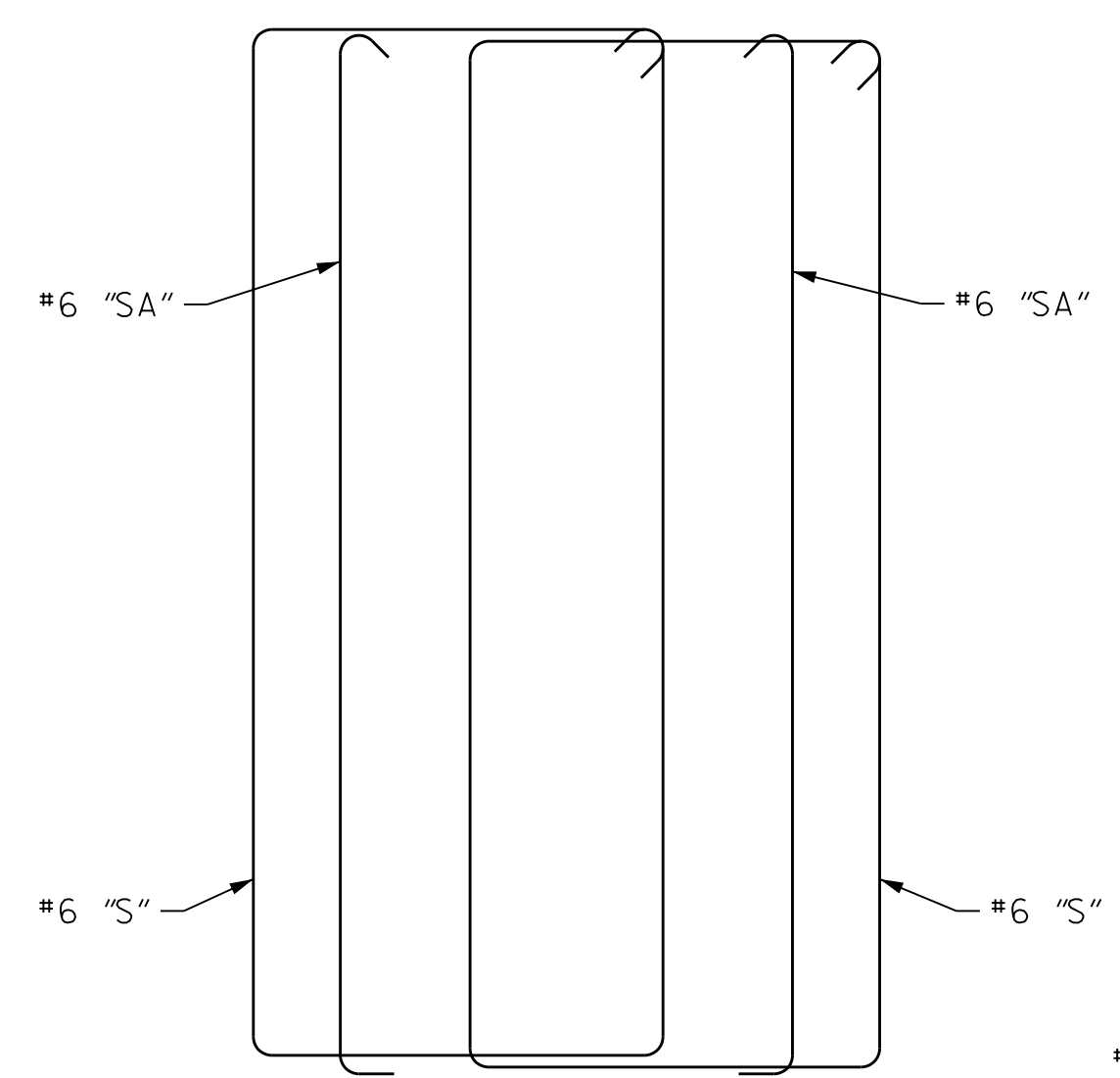
SECTION F-F
COLUMN REINFORCING STEEL NOT SHOWN FOR CLARITY



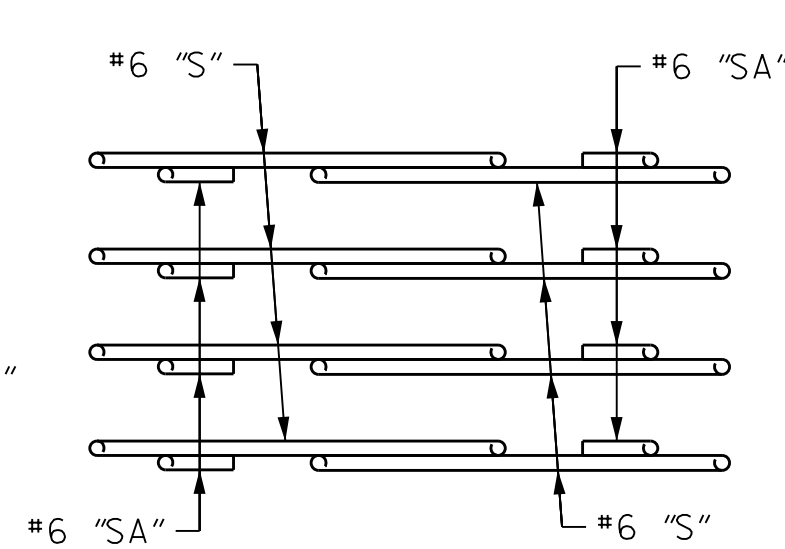
DETAIL "B"



SECTION Y-Y



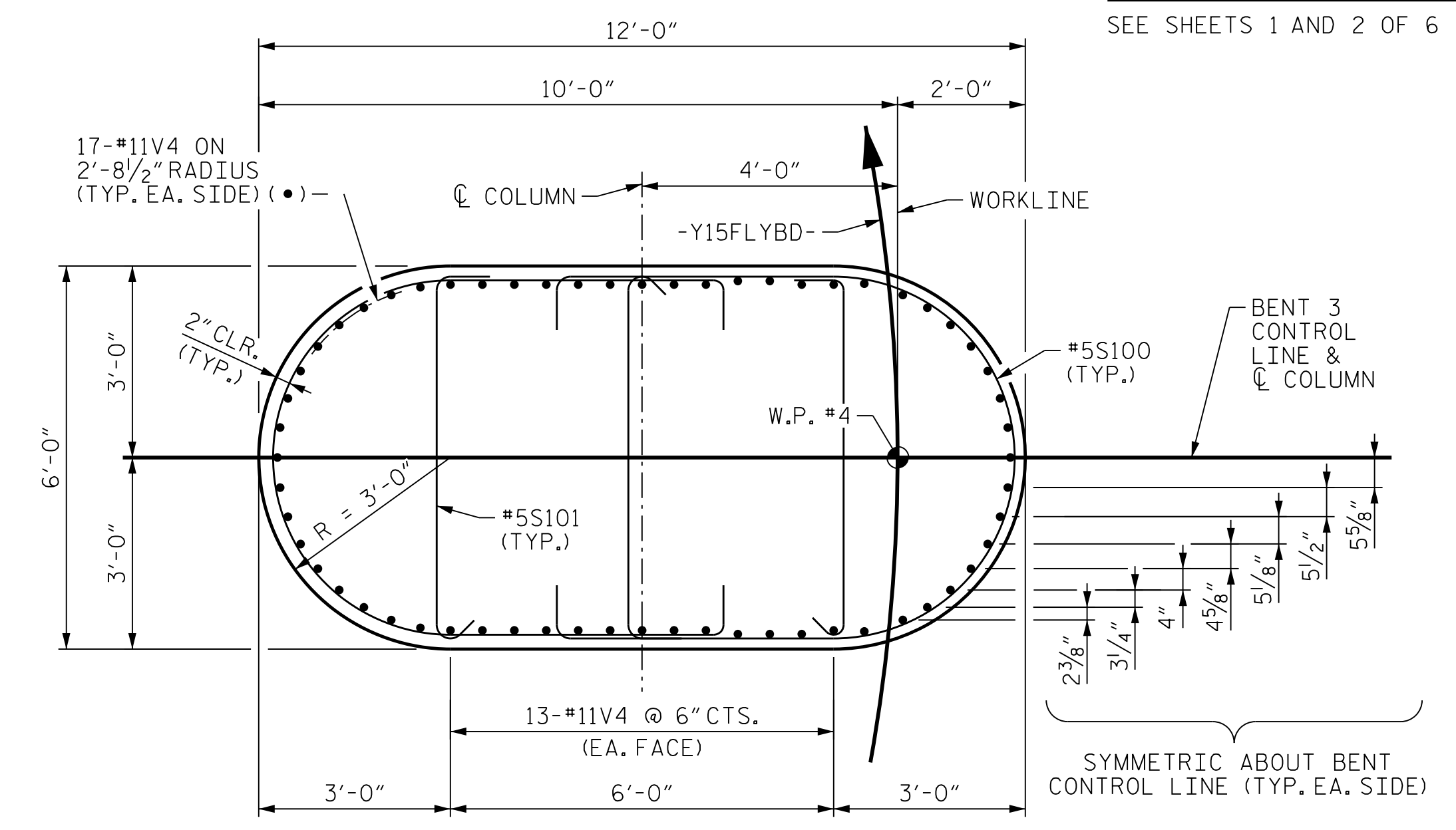
ELEVATION
(SCHEMATIC)



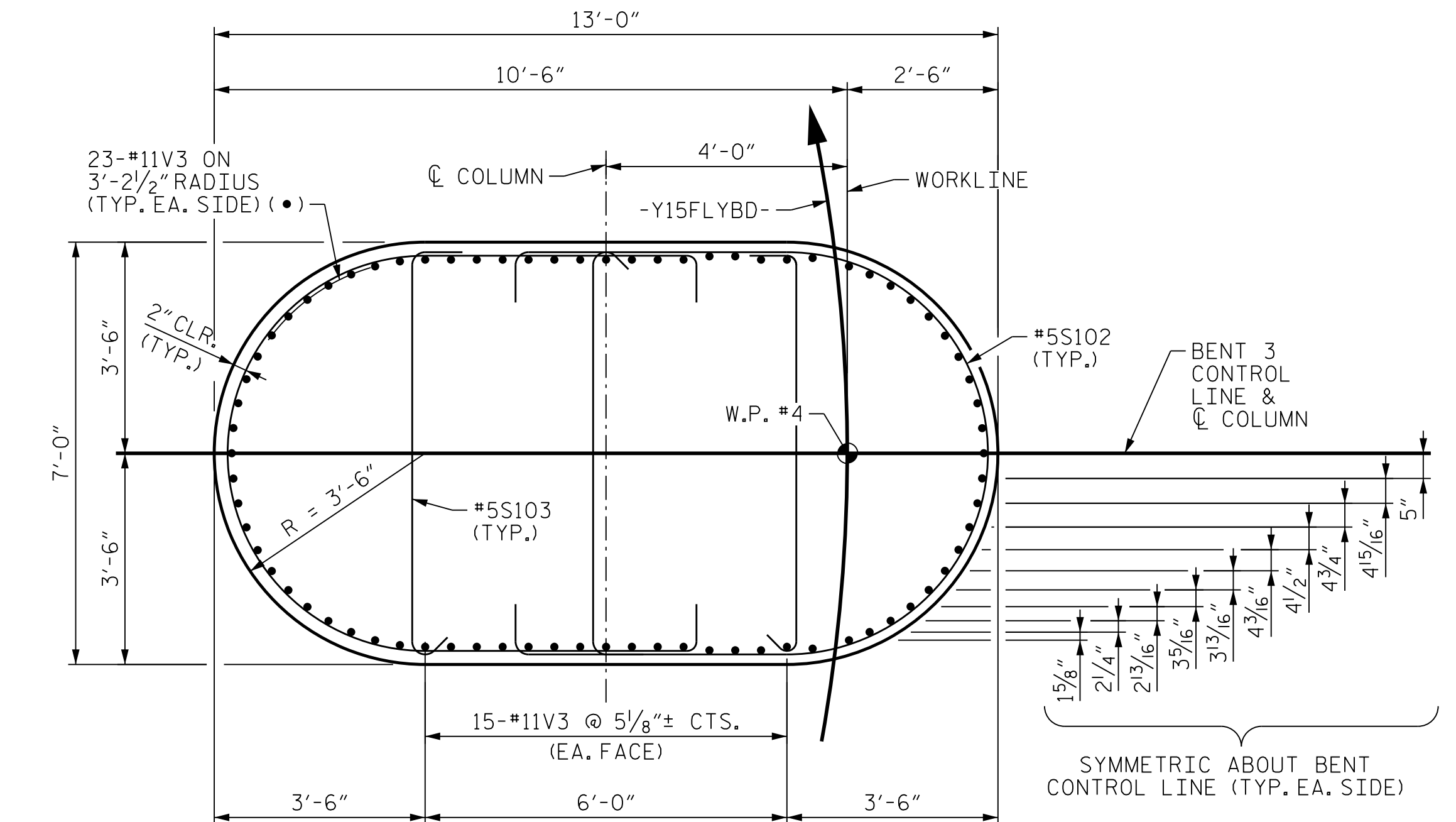
PLAN
(SHOWING BAR PLACEMENT)

* NOTE:
#4U3 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR PIPE INSERTS FOR ANCHOR BOLTS.

** NOTE:
#4U4 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR #11B1 AND #11B2 BARS.

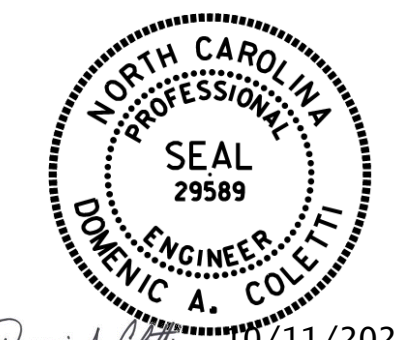


SECTION D-D



SECTION C-C

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 5 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 BENT 3
 BENT CAP DETAILS**

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



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 UNLESS ALL SIGNATURES COMPLETED

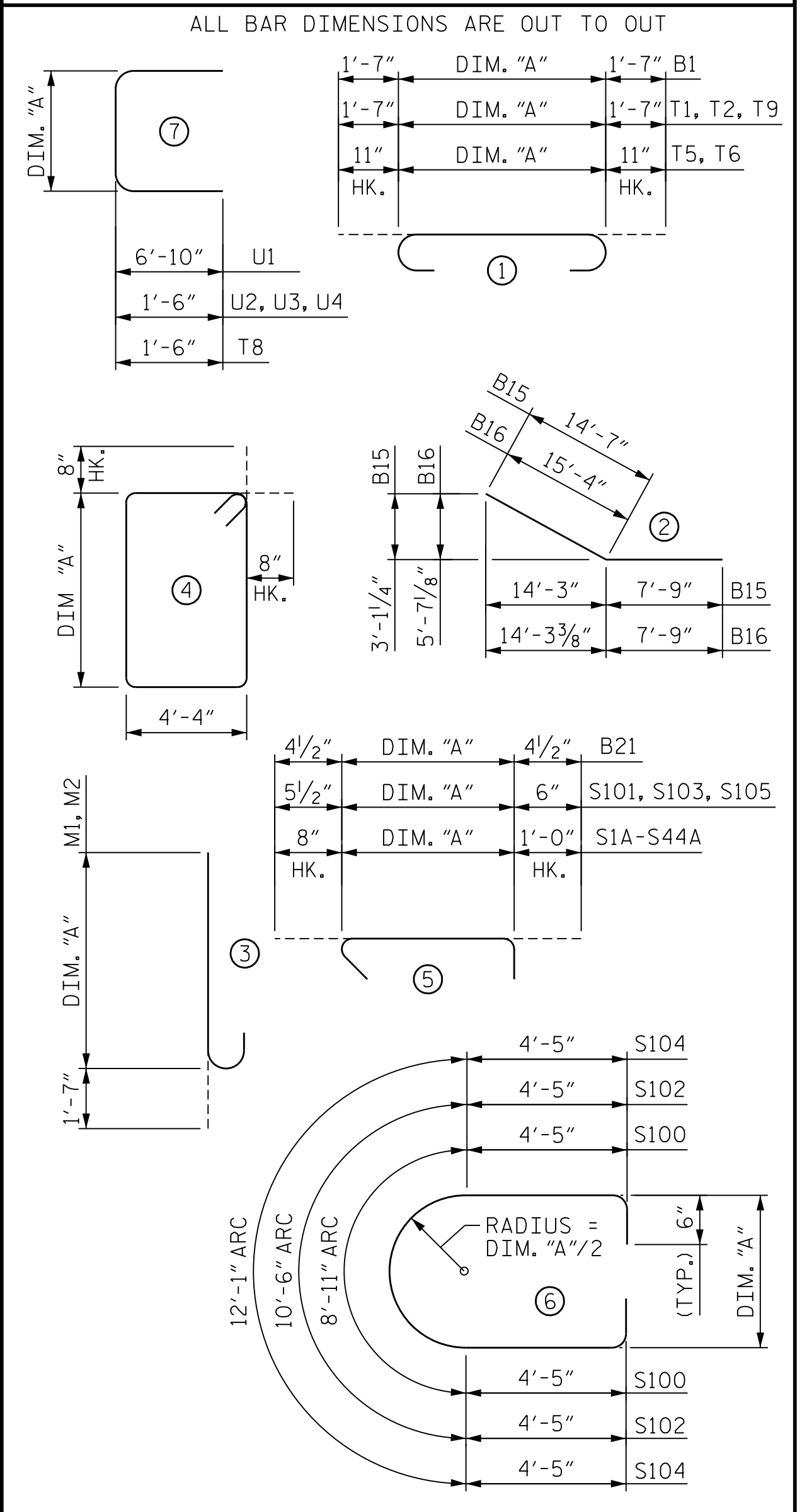
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 DATE: 10/11/2021

DES BY: K. OLIVER	DATE: 10/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: M. WERNER	DATE: 10/19	CHK BY: N. LIU	DATE: 12/19

BILL OF MATERIAL - BENT 3

Table with columns: BAR NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT, BAR NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT. Lists various reinforcement bars (B1-B21, M1-M2, S1-S44, T1-T9, U1-U4, V1-V4) with their respective dimensions and weights.

BAR TYPES



SUMMARY OF QUANTITIES - BENT 3

Summary table with columns: REINFORCING STEEL, LBS., and CLASS AA CONCRETE. Lists quantities for steel (125,959 lbs) and concrete (POUR #1-5) for Bent 3.

* SEE 'SUBSTRUCTURE MICROPILE DETAILS' SHEET FOR MICROPILE DETAILS, QUANTITIES, AND NOTES.

NOTE SEE SHEETS 1 AND 2 OF 6 FOR NOTES.

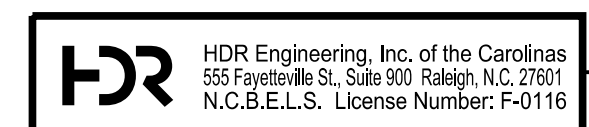
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PROJECT NO. U-2579AB FORSYTH COUNTY STATION: 47+63.62 -Y15FLYBD- SHEET 6 OF 6



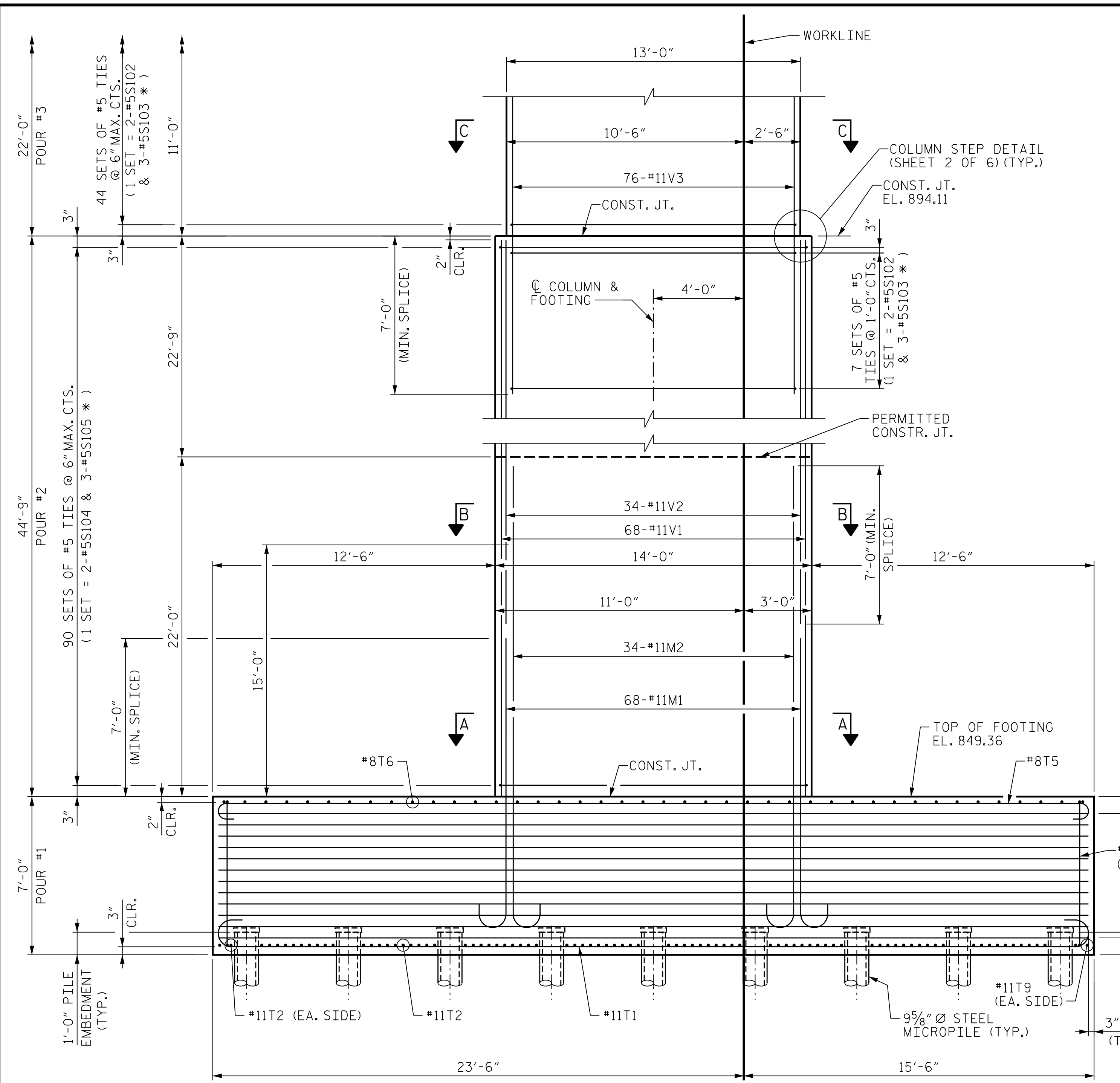
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE BENT 3 BILL OF MATERIALS

REVISIONS table with columns: NO., BY, DATE, NO., BY, DATE. Shows two revisions to the drawing.

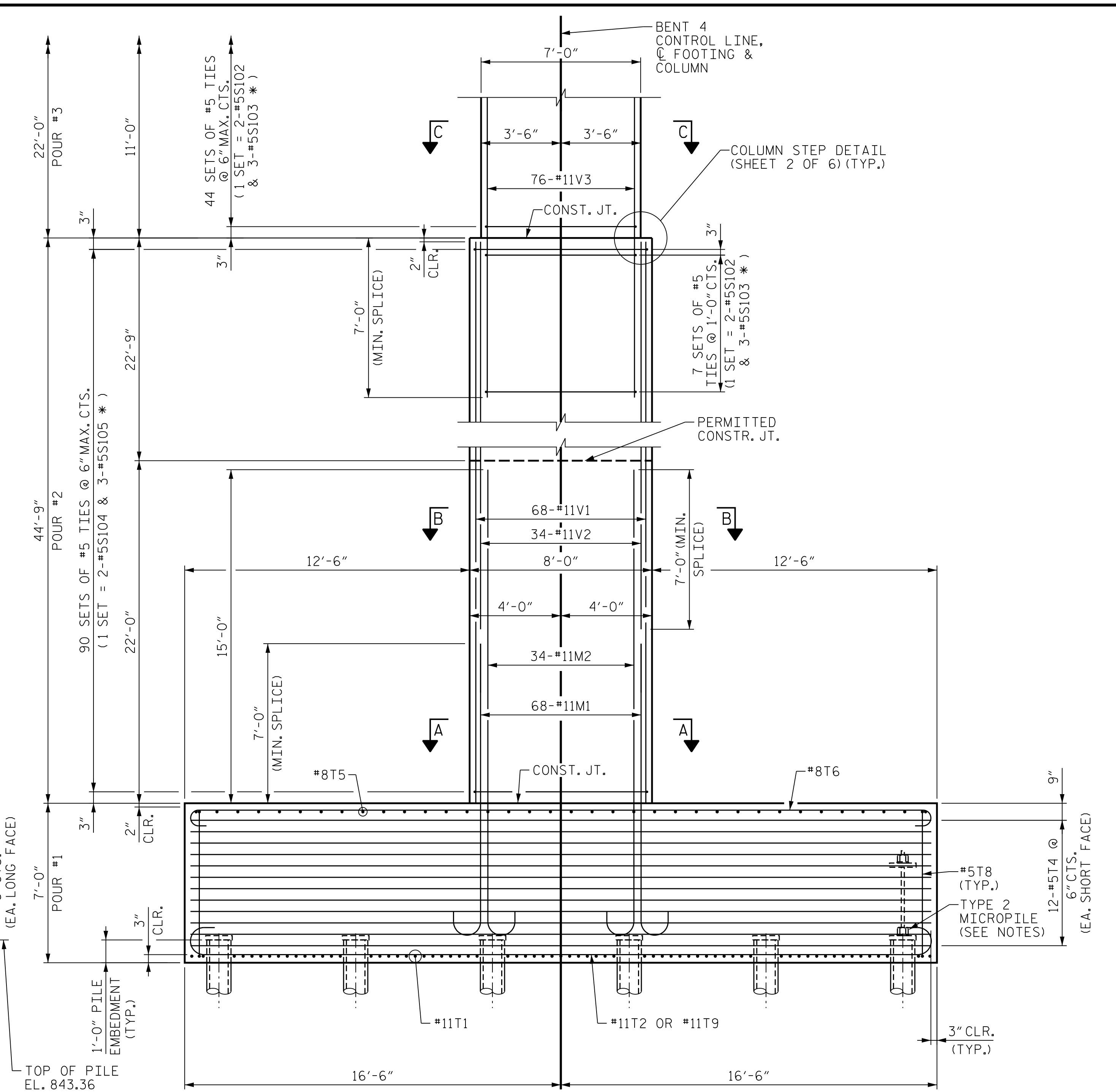


10/11/2021 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DES BY: B. PETERSON DATE: 11/19 DWG BY: B. PETERSON DATE: 11/19 DES CHK: S. NIFONG DATE: 12/19 CHK BY: M. WERNER DATE: 12/19



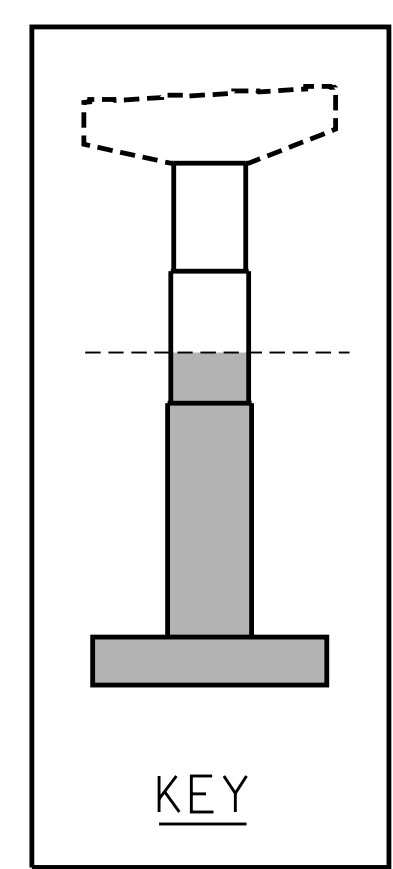
PARTIAL FRONT ELEVATION



PARTIAL END ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S103 AND #5S105 TIES

- NOTES**
- FOR FOOTING PLAN, SECTION A-A AND SECTION B-B, SEE "SUBSTRUCTURE BENT 4 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.
 - FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.
 - FOR SECTION C-C, SEE "SUBSTRUCTURE BENT 4 BENT CAP DETAILS", SHEET 5 OF 6.
 - FOR MICROPILE DETAILS, SEE "SUBSTRUCTURE MICROPILE DETAILS" SHEET.
 - FOR LOCATIONS OF TYPE 2 MICROPILES, SEE "SUBSTRUCTURE BENT 4 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.

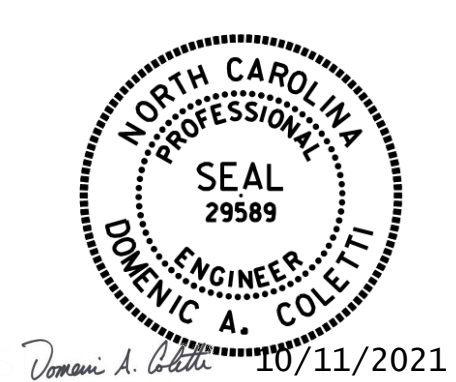


PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 4 ELEVATIONS



REVISIONS						SHEET NO. S05-092 TOTAL SHEETS 116
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	
2	--	--	4	--	--	

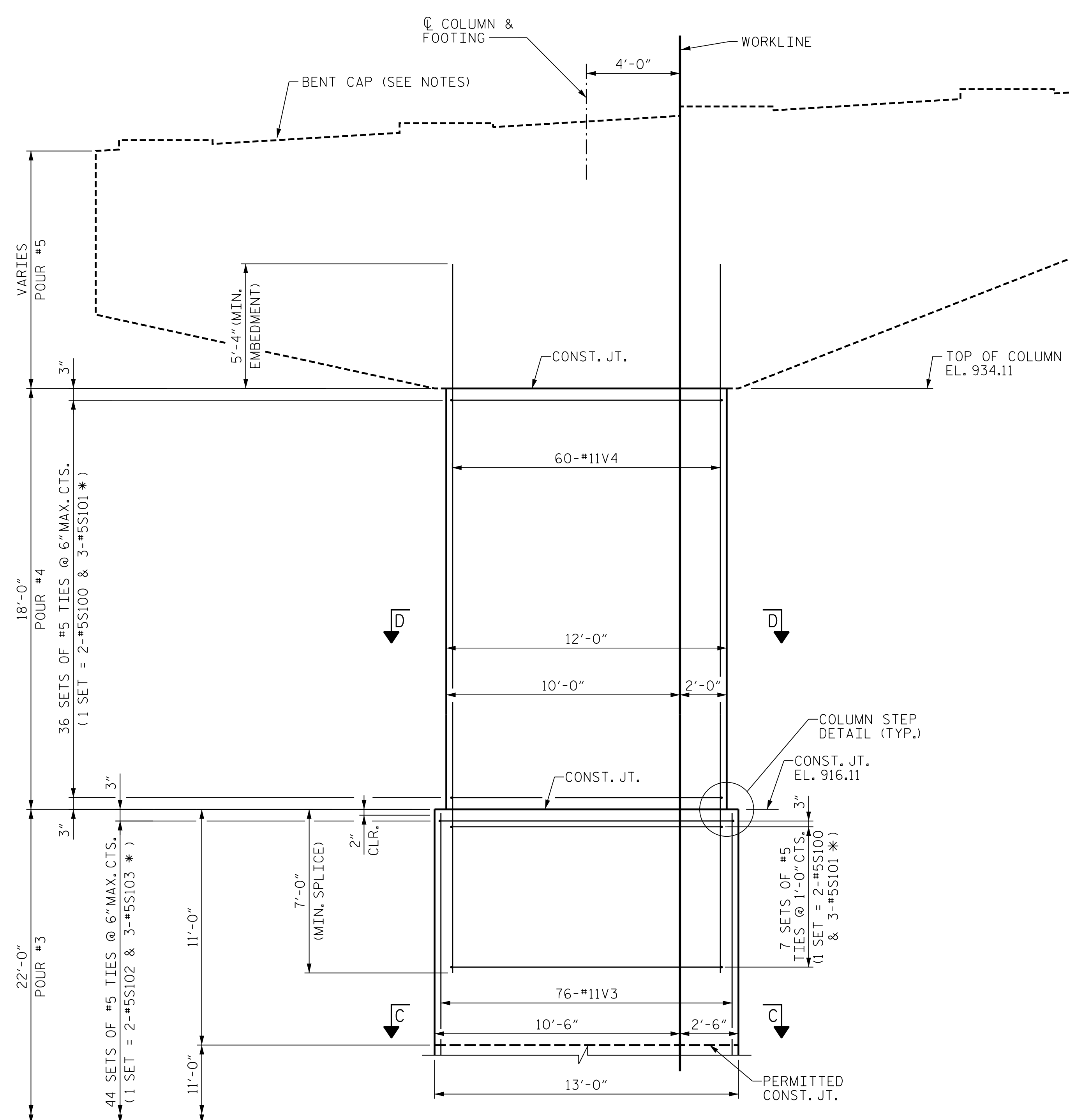
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DES BY: <u>K. OLIVER</u>	DATE: <u>11/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>N. LIU</u>	DATE: <u>11/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

HDR HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

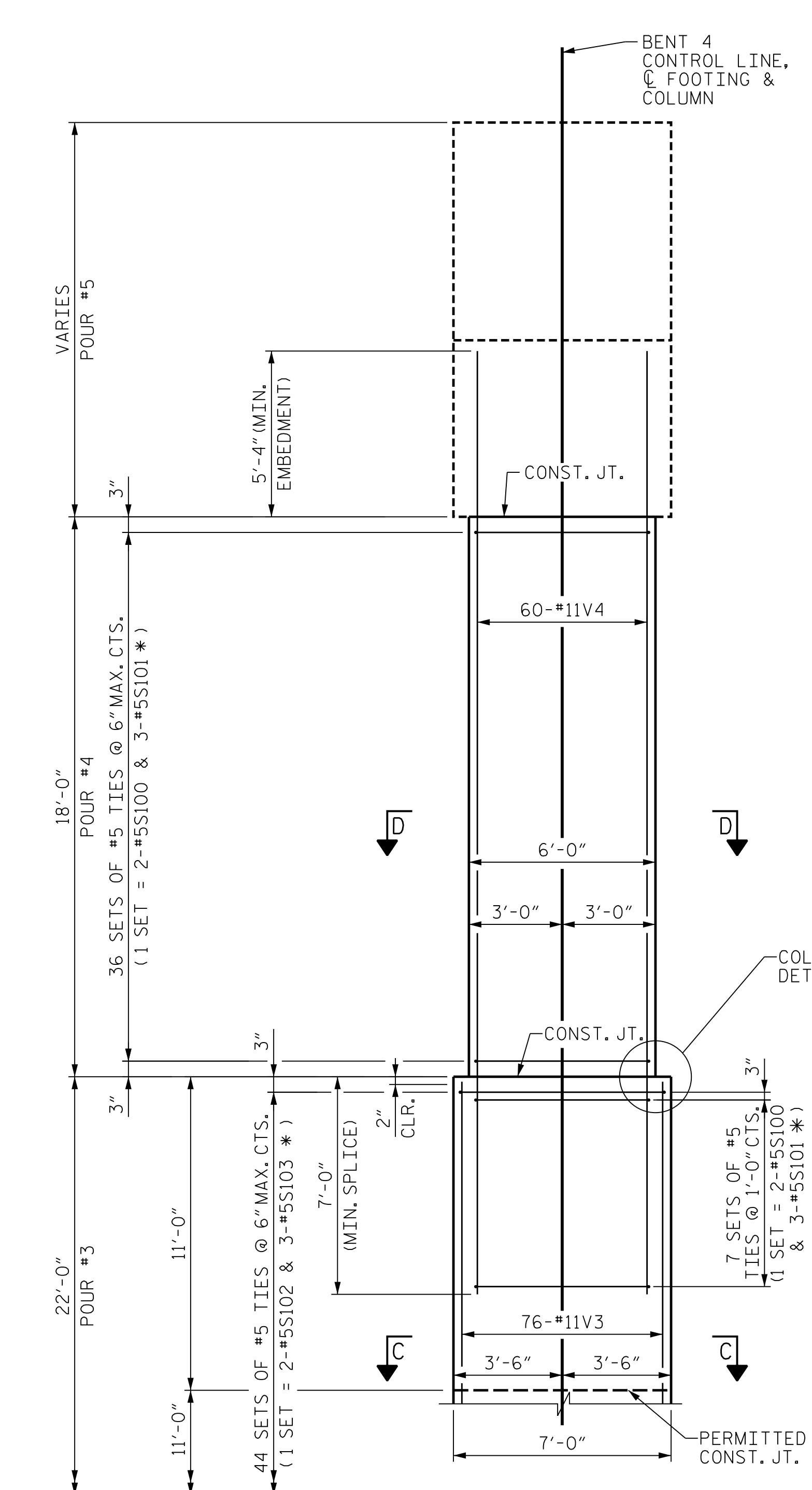
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 UNLESS ALL SIGNATURES COMPLETED

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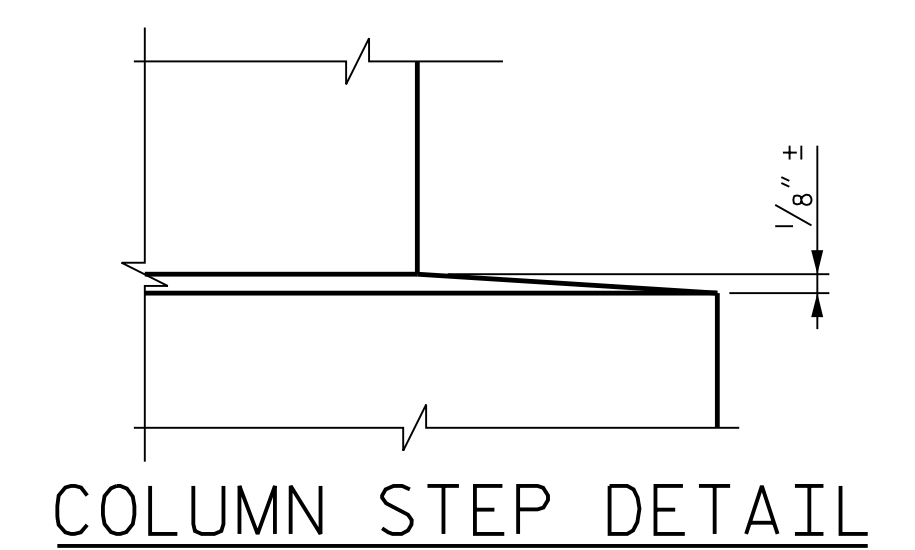


PARTIAL FRONT ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S101 AND #5S103 TIES



PARTIAL END ELEVATION



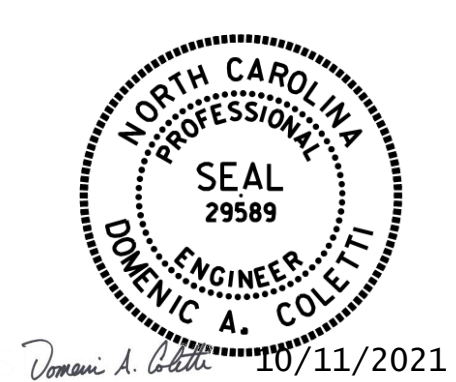
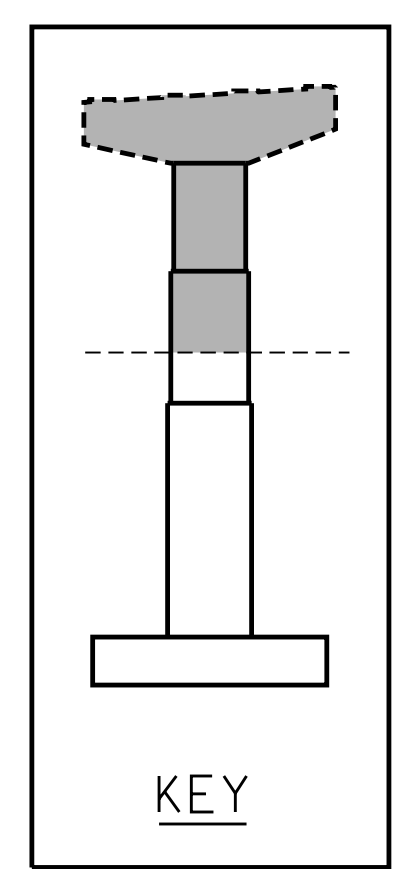
NOTES

FOR SECTION C-C AND SECTION D-D, SEE "SUBSTRUCTURE BENT 4 BENT CAP DETAILS", SHEET 5 OF 6.

FOR DETAILS OF BENT CAP, SEE "SUBSTRUCTURE BENT 4 BENT CAP PLAN AND ELEVATION", SHEET 4 OF 6 AND "SUBSTRUCTURE BENT 4 BENT CAP DETAILS", SHEET 5 OF 6.

FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.

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



PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 2 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 4 ELEVATIONS

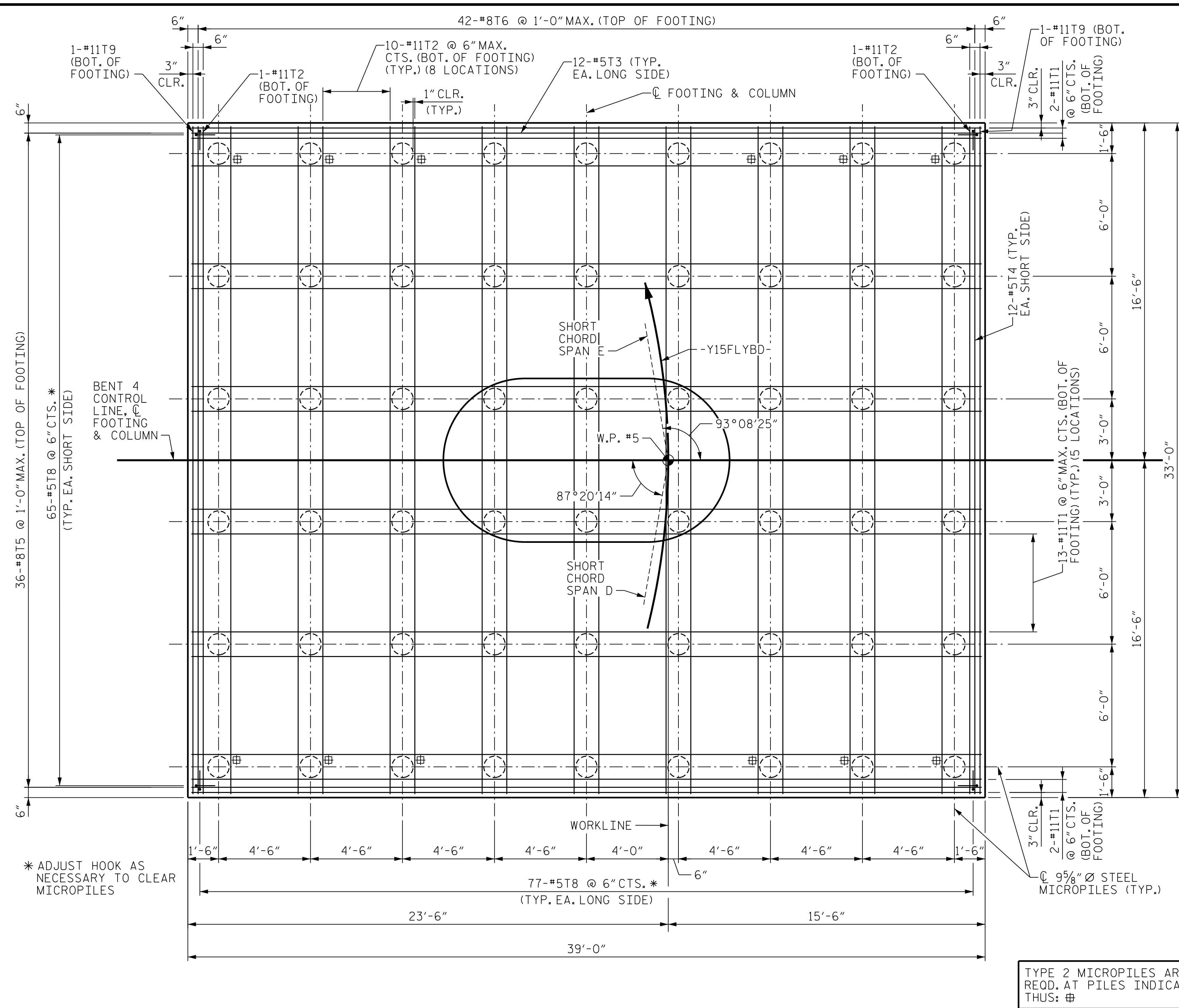
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2	--	--	4	--	--

SHEET NO. S05-093
 TOTAL SHEETS 116

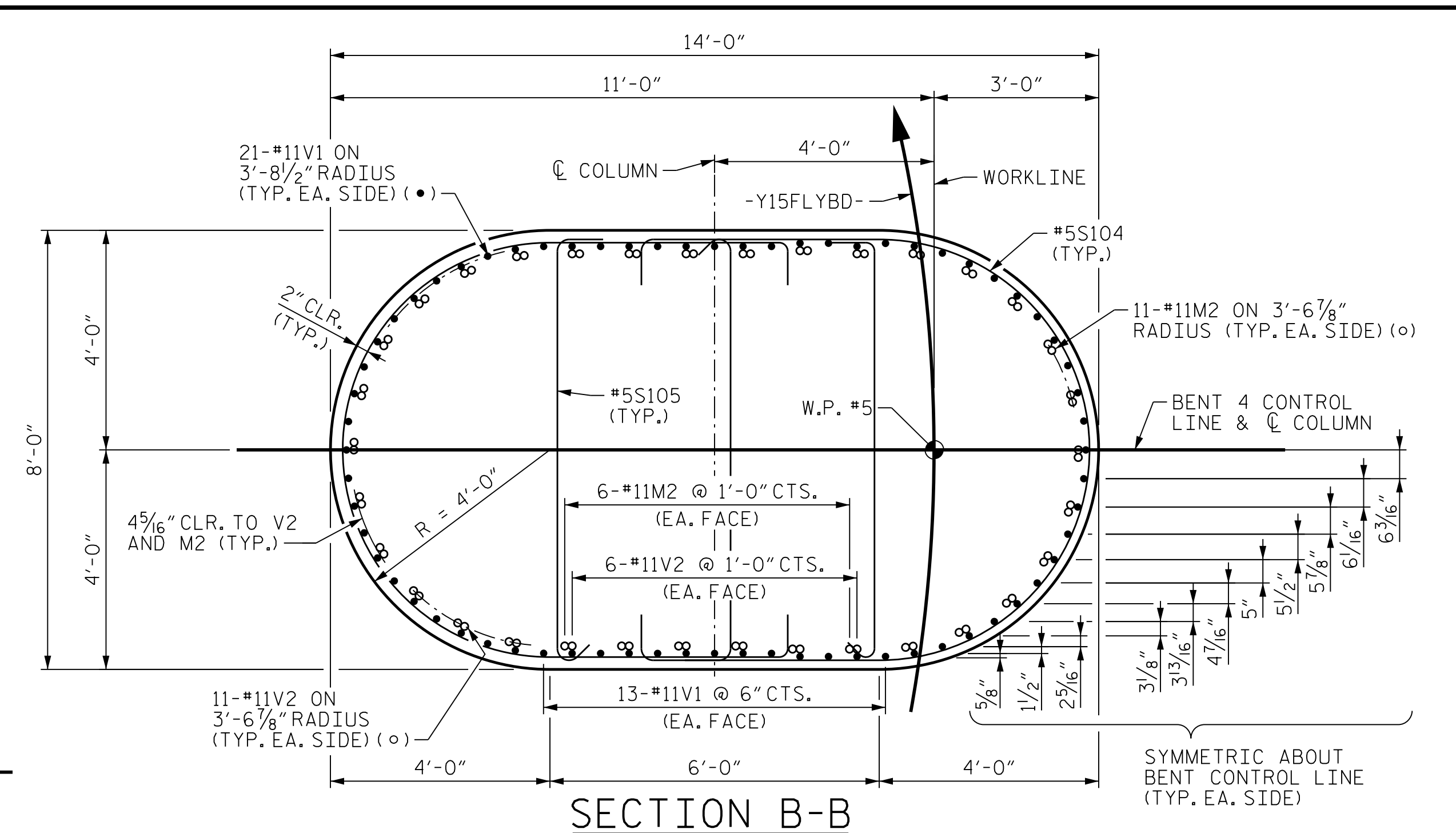
DES BY: K. OLIVER	DATE: 11/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19

HDR HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

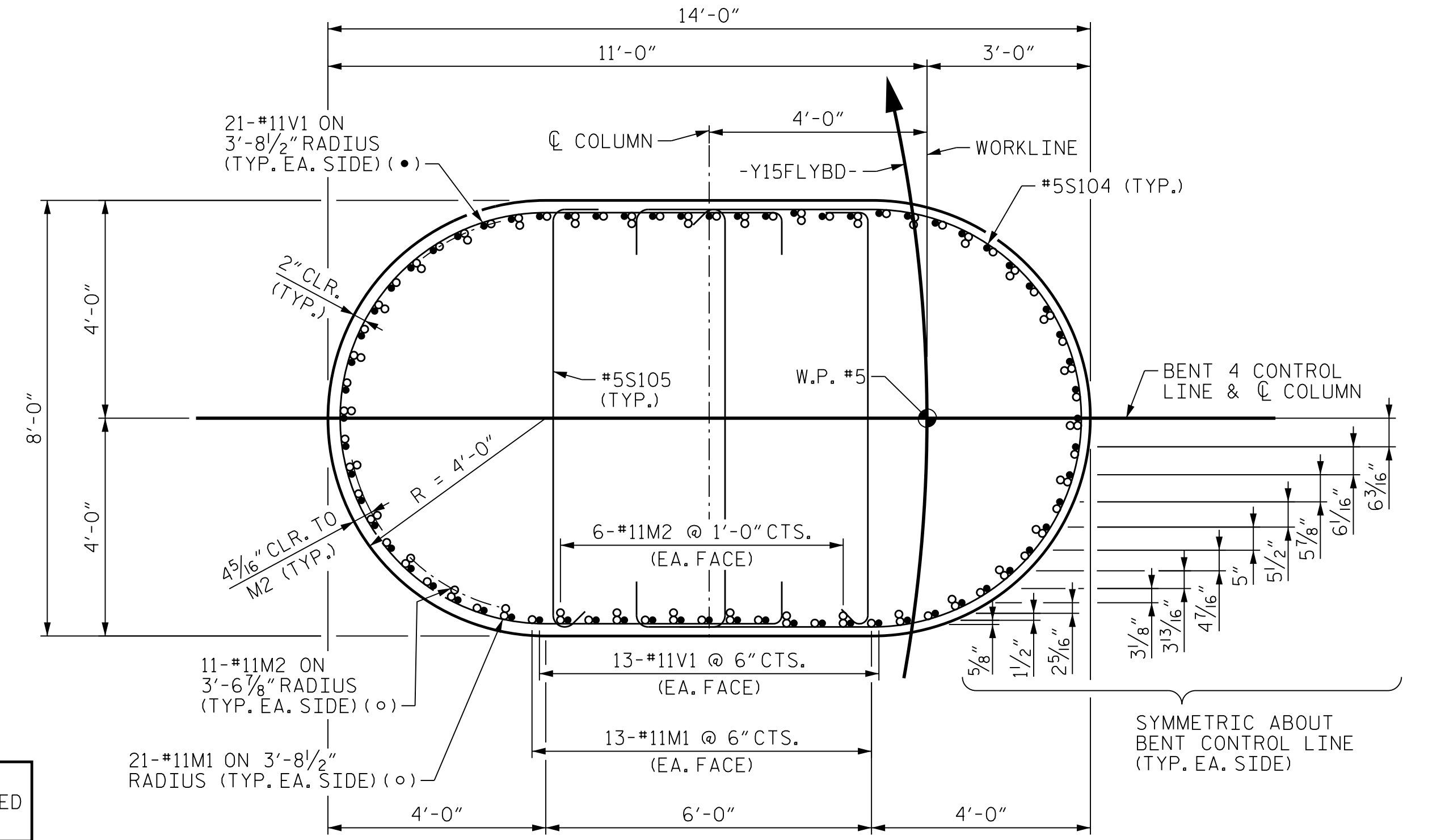
DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED



FOOTING PLAN



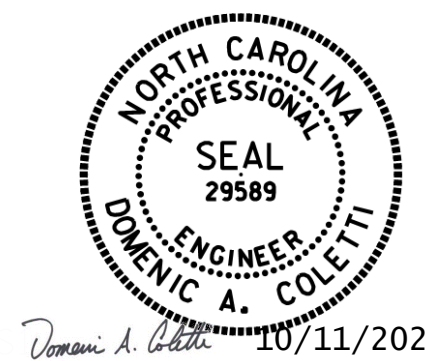
SECTION B-B



SECTION A-A

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

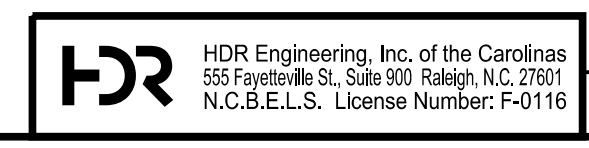
NOTES
 FOR MICROPILE DETAILS, SEE
 "SUBSTRUCTURE MICROPILE DETAILS" SHEET.
 FOR ADDITIONAL NOTES, SEE
 "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET
 1 OF 5.



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 4
 FOOTING & COLUMN
 DETAILS

DES BY: K. OLIVER	DATE: 11/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19



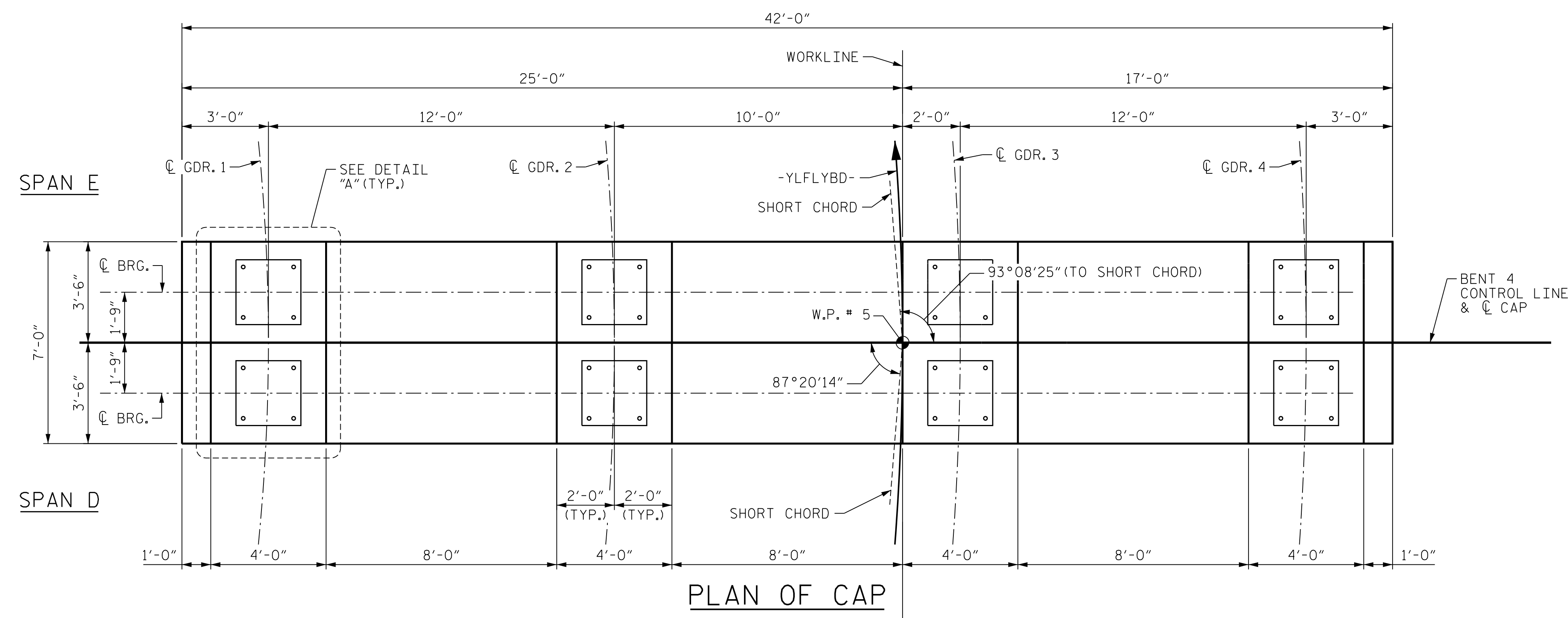
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 UNLESS ALL SIGNATURES COMPLETED

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NO.	BY:	DATE:	NO.	BY:	DATE:
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2	--	--	4	--	--

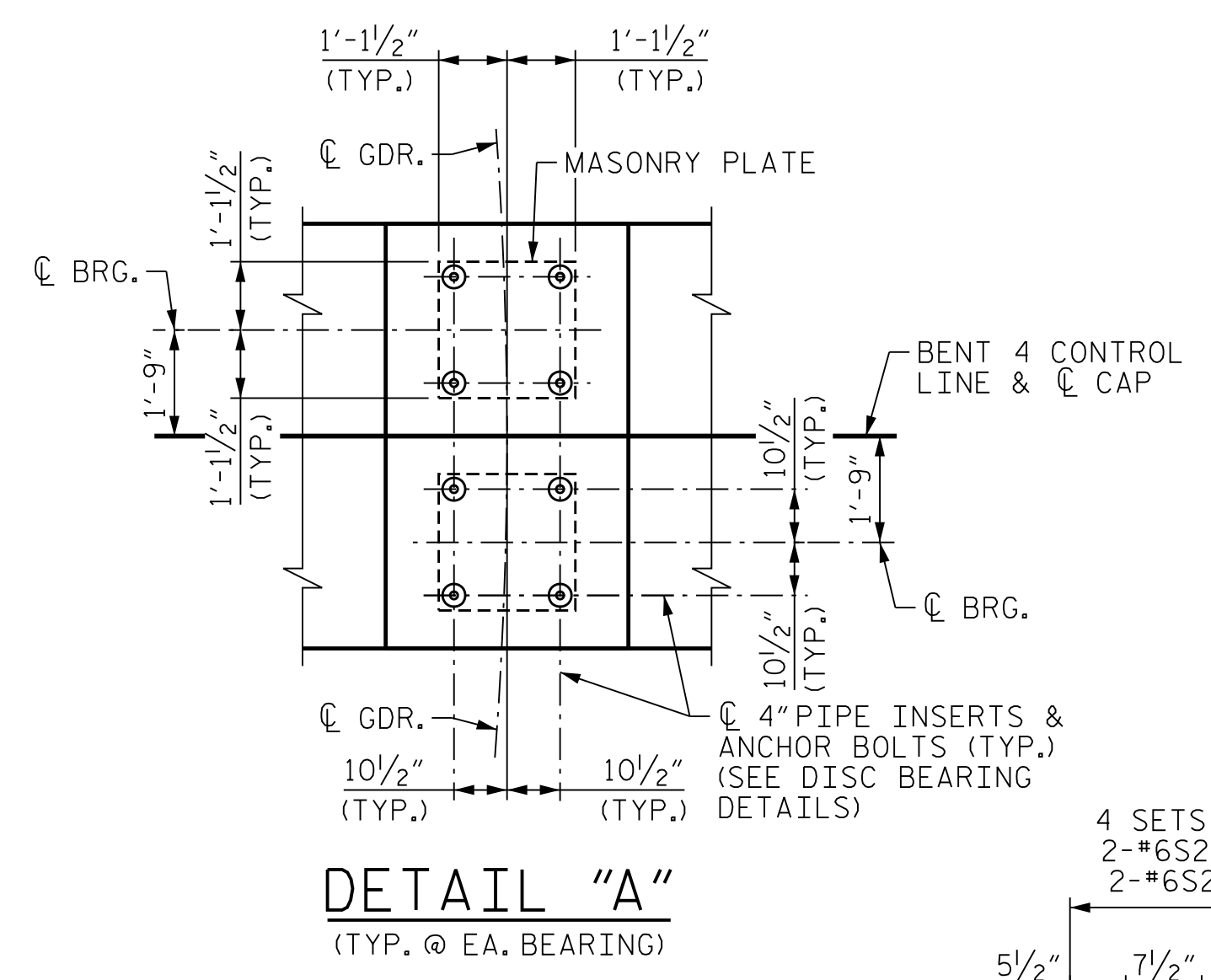
SHEET NO. S05-094	TOTAL SHEETS 116
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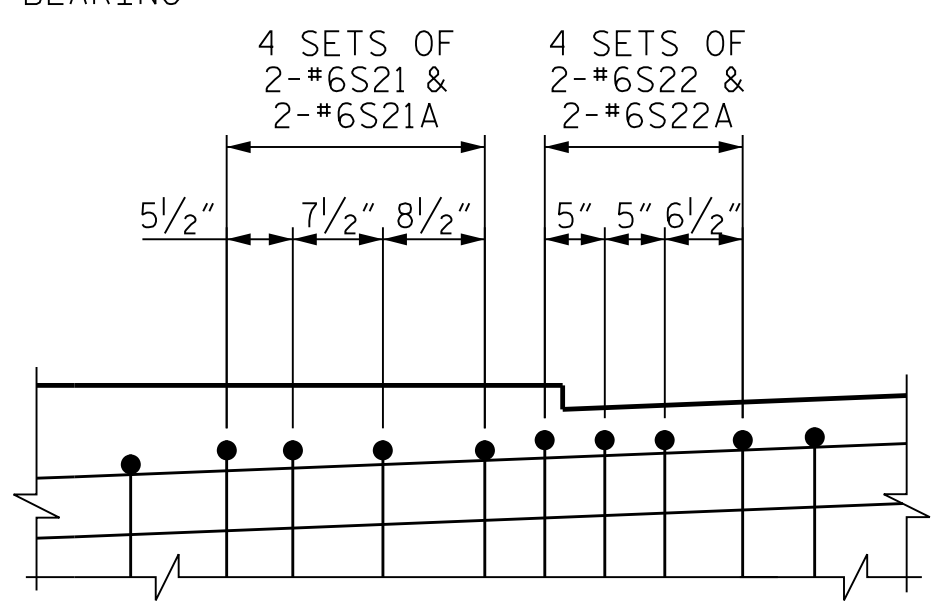
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PLAN OF CAP

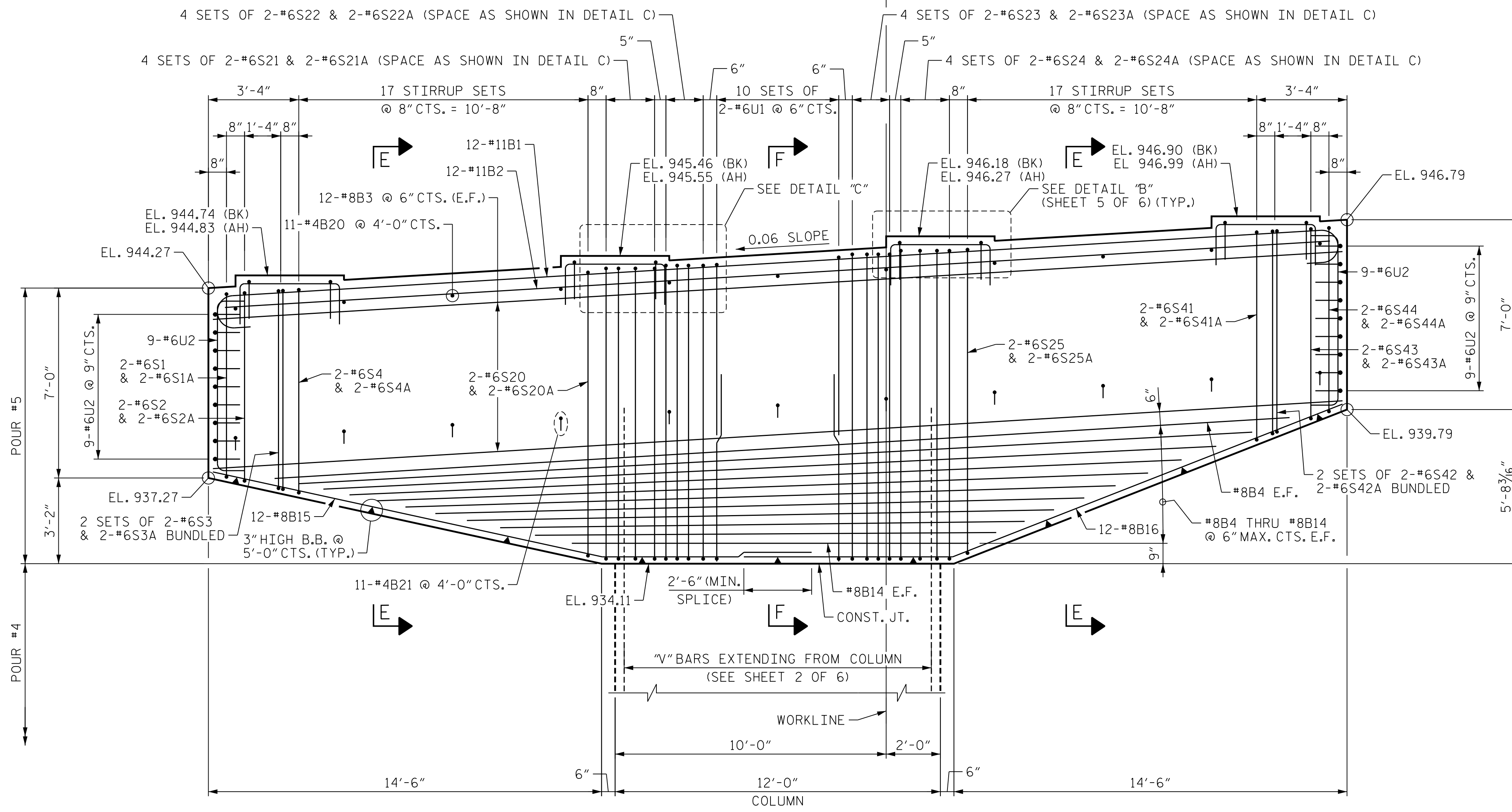


DETAIL "A"
(TYP. @ EA. BEARING)

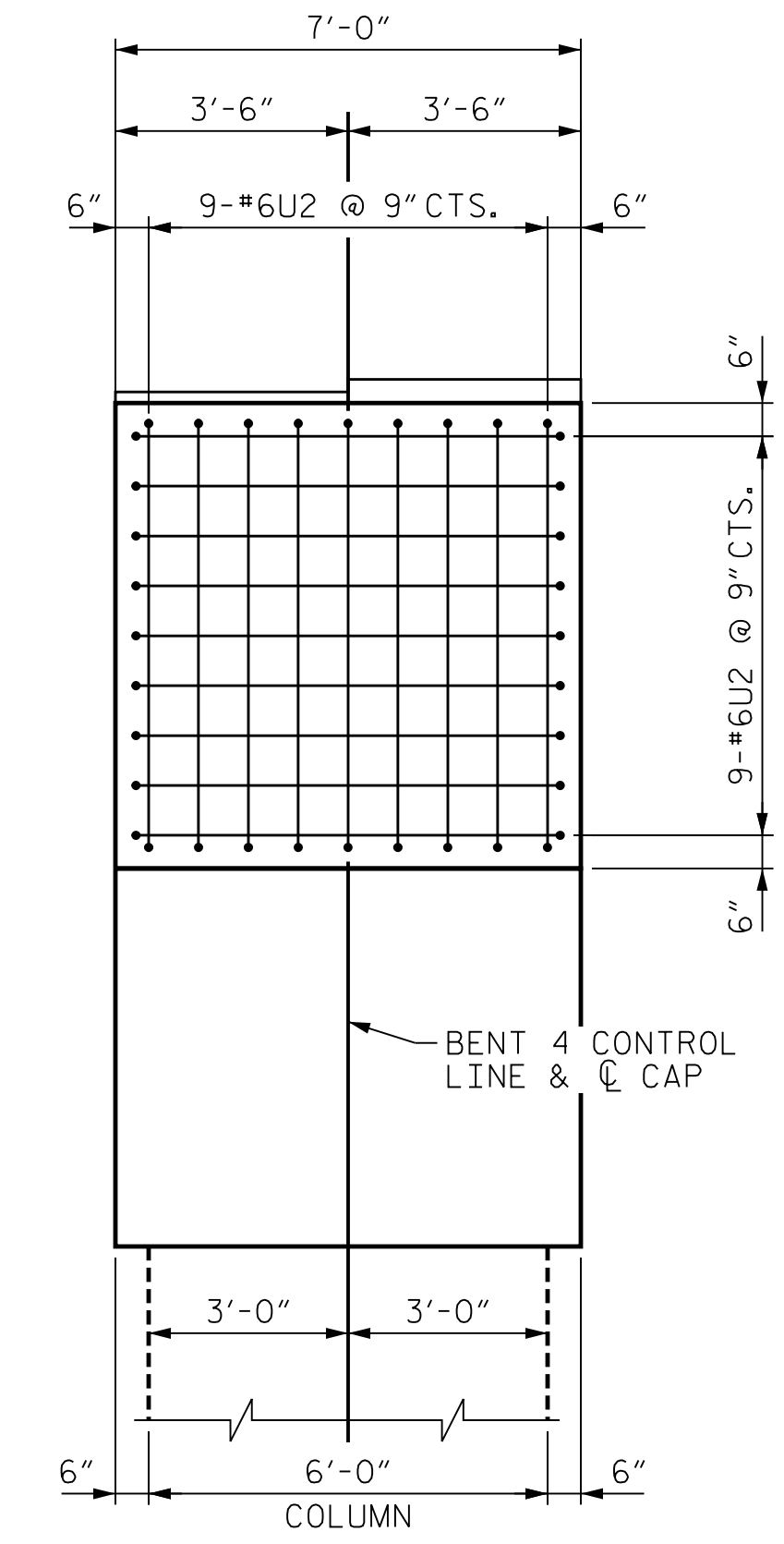


DETAIL "C"

DETAIL SHOWN AT LEFT SIDE OF CAP (SPACING OF STIRRUPS MIRRORED AT RIGHT SIDE OF CAP WITH BARS #6S23/#6S23A AND #6S24/#6S24A AS SHOWN ON THE ELEVATION)



ELEVATION OF CAP



END VIEW

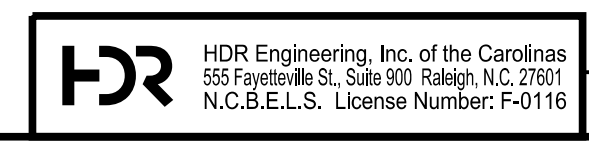
PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 4 OF 6



10/11/2021

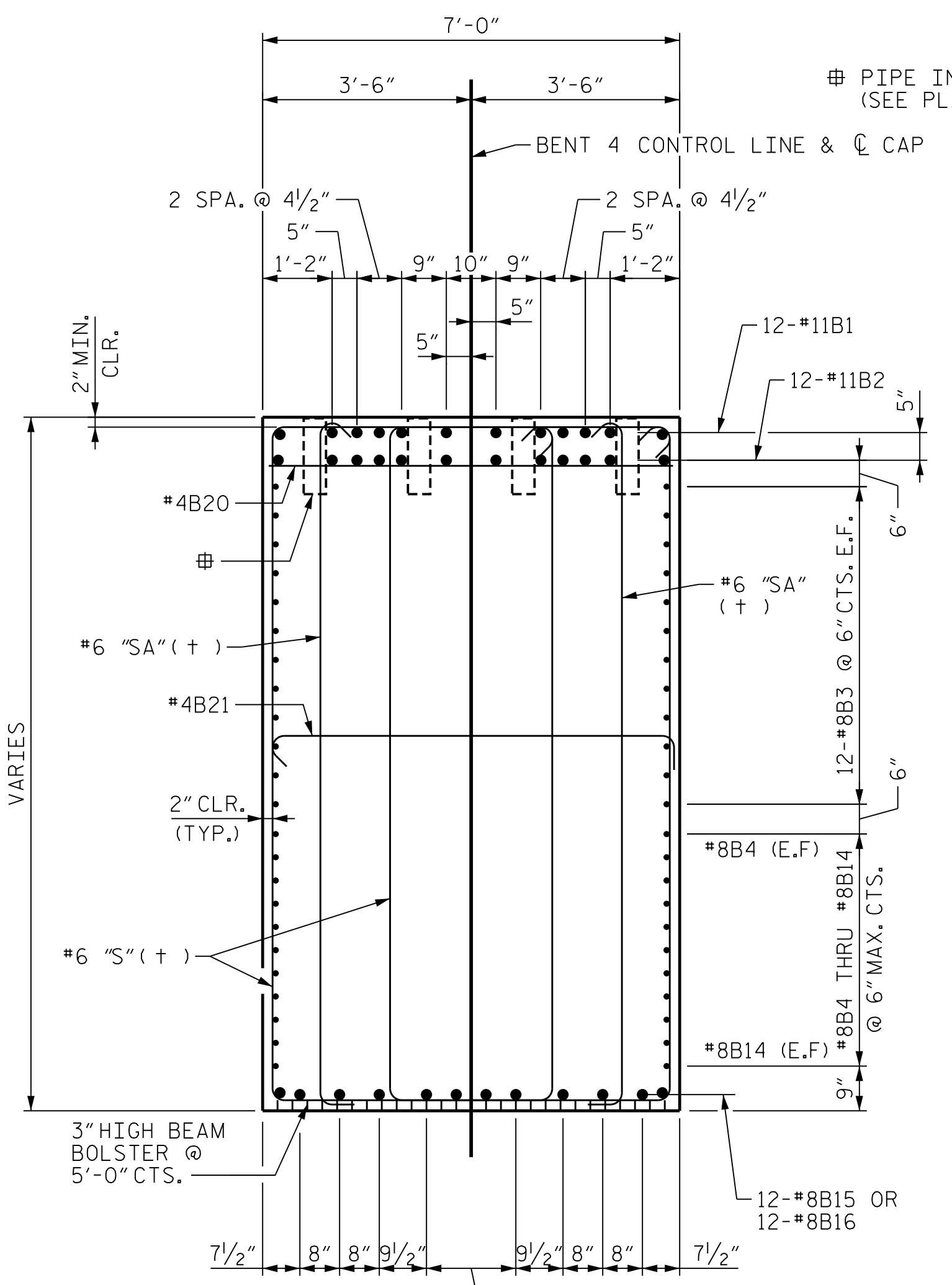
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 4 BENT CAP PLAN AND ELEVATION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1	--	--	3	--	--
2	--	--	4	--	--
					SHEET NO. S05-095
					TOTAL SHEETS 116

DES BY: K. OLIVER	DATE: 10/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: M. WERNER	DATE: 10/19	CHK BY: N. LIU	DATE: 12/19

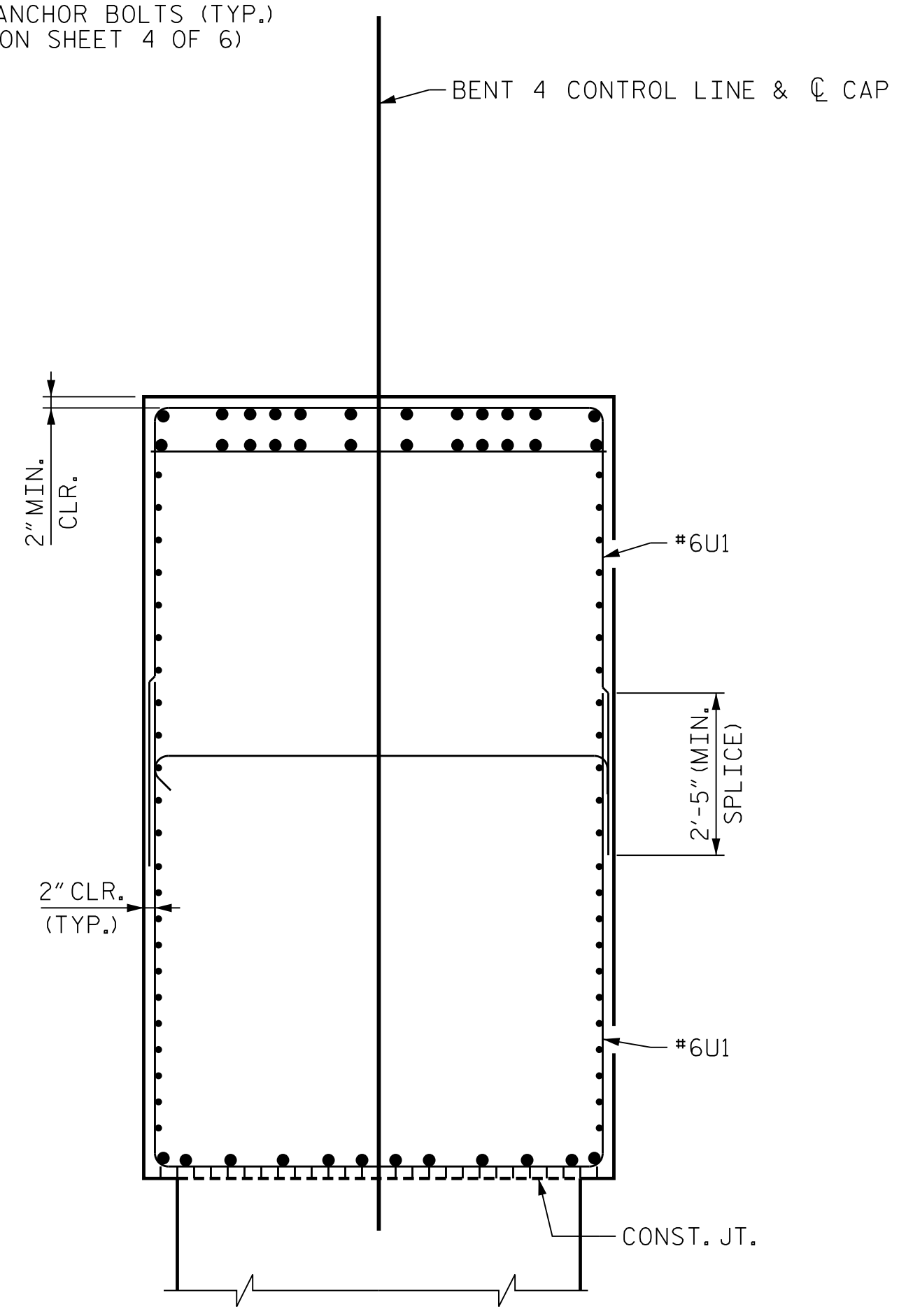


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTE
SEE SHEETS 1 AND 2 OF 6 FOR NOTES.

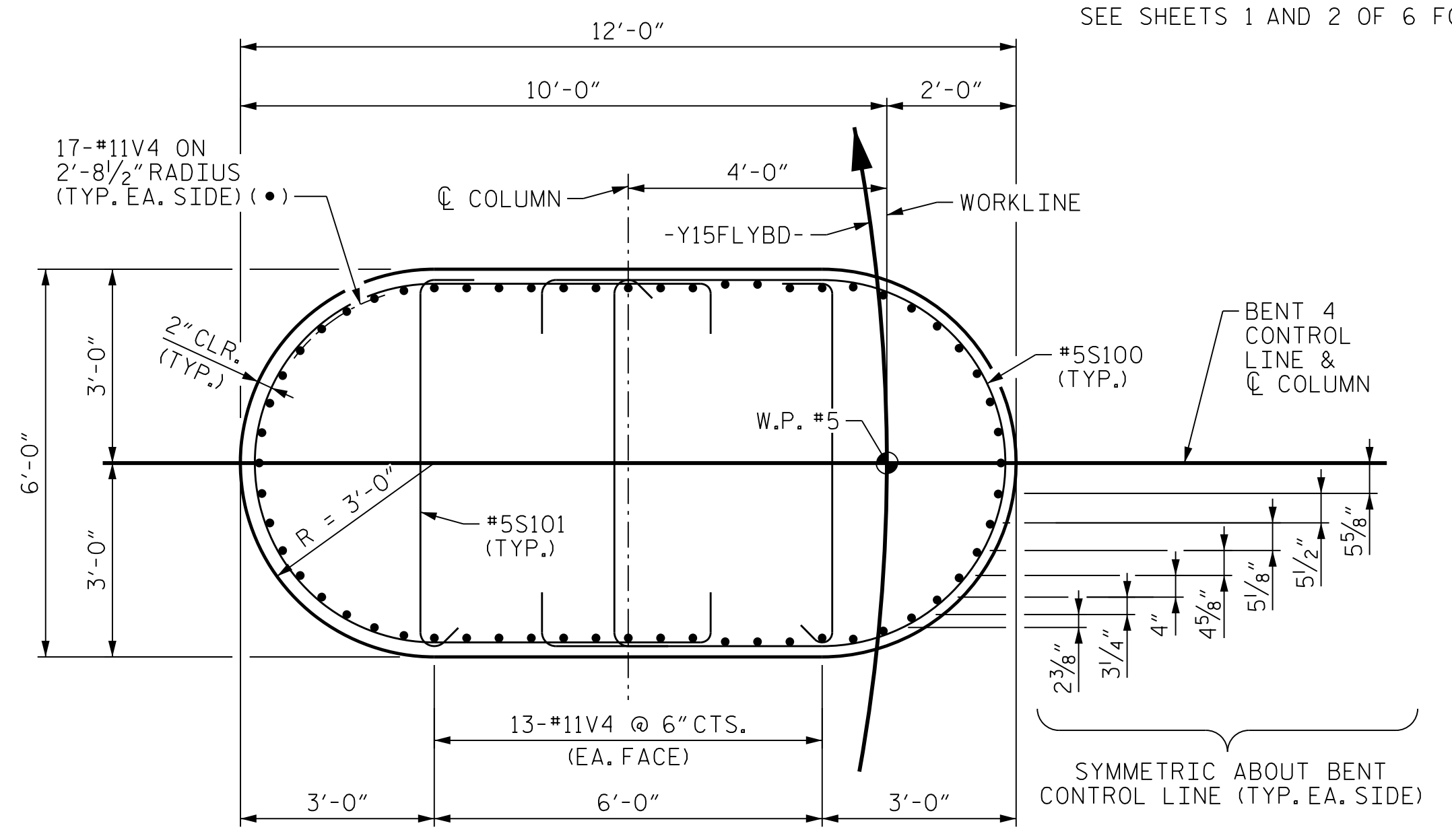


SECTION E-E
(+) SEE "STIRRUP SET DETAIL"

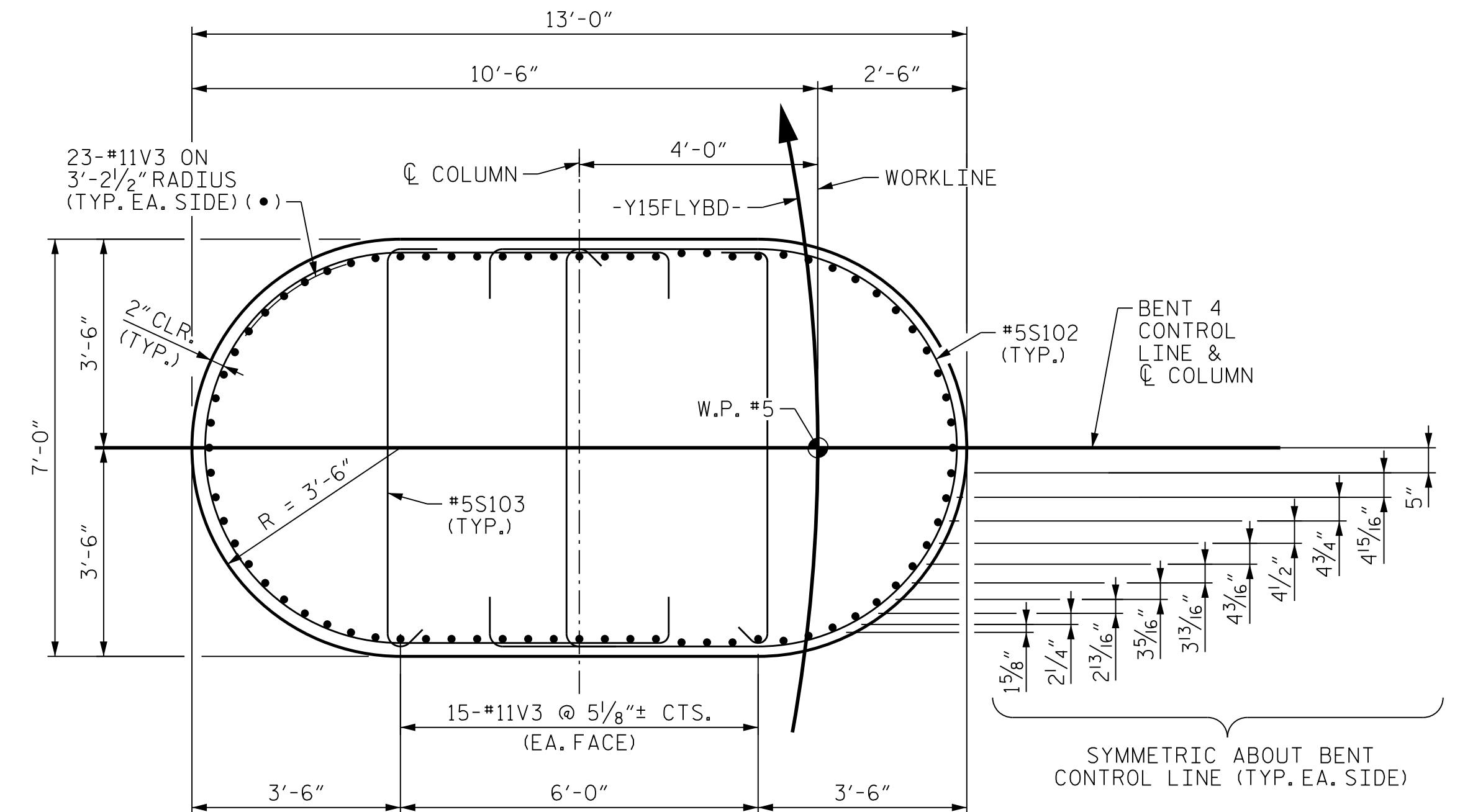


SEE SECTION E-E FOR ADDITIONAL INFORMATION

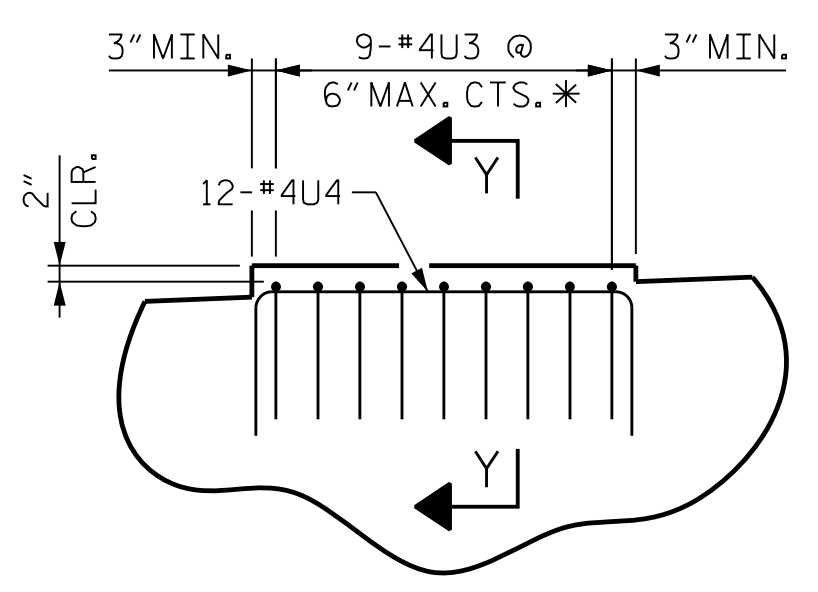
SECTION F-F
COLUMN REINFORCING STEEL NOT SHOWN FOR CLARITY



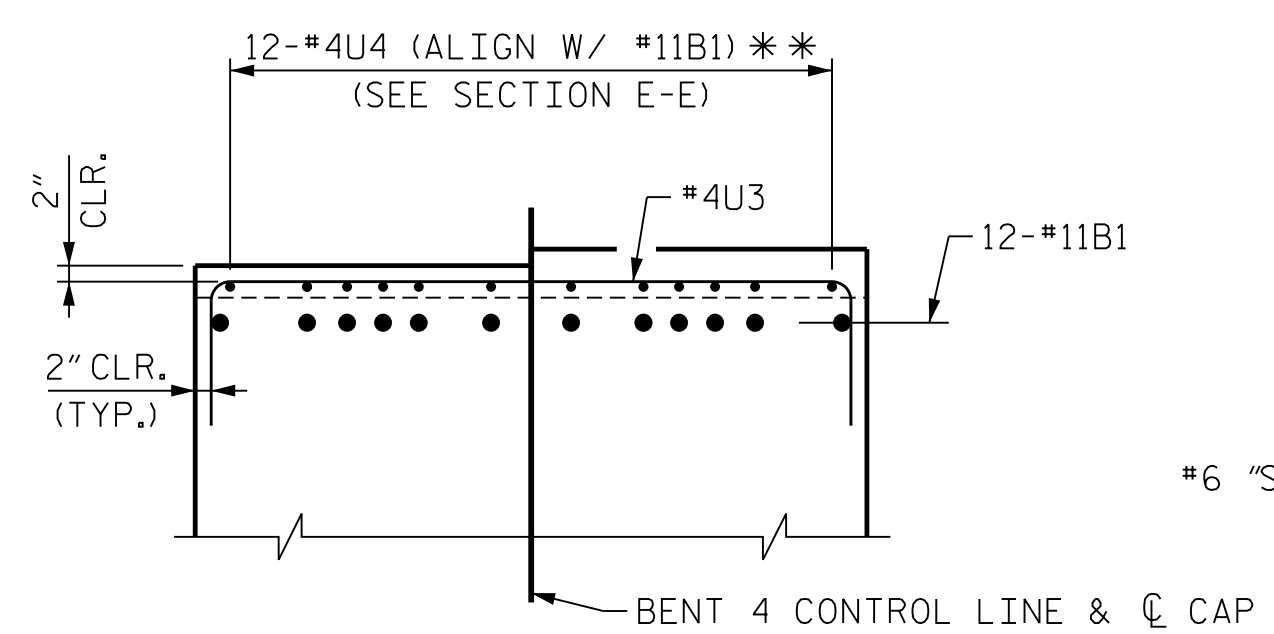
SECTION D-D



SECTION C-C

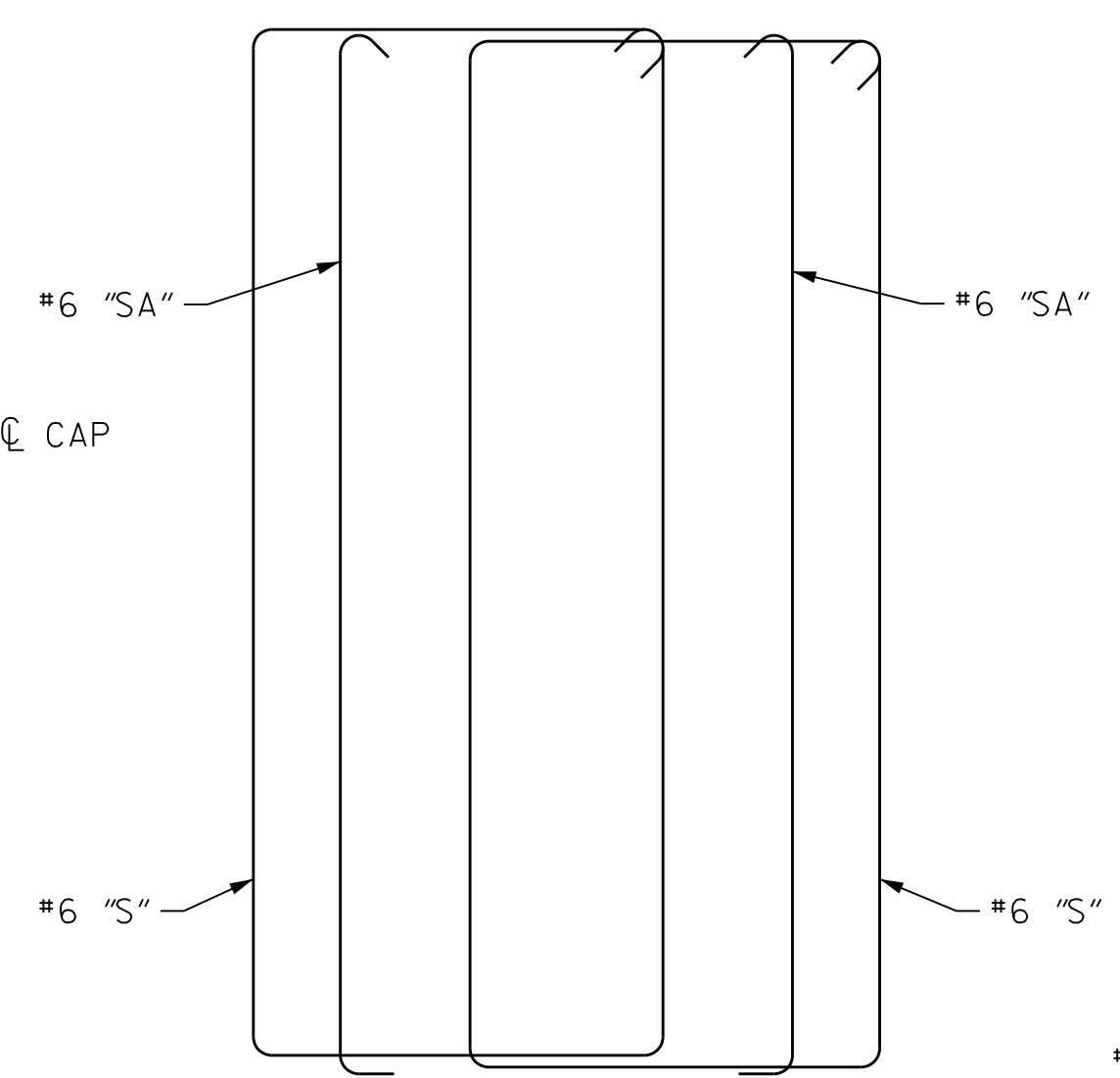


DETAIL "B"

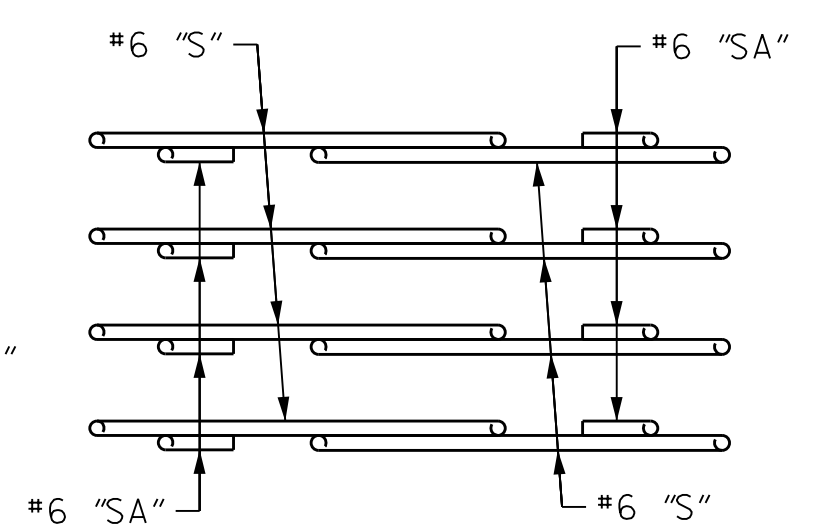


SECTION Y-Y

* NOTE:
#4U3 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR PIPE INSERTS FOR ANCHOR BOLTS.
** NOTE:
#4U4 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR #11B1 AND #11B2 BARS.



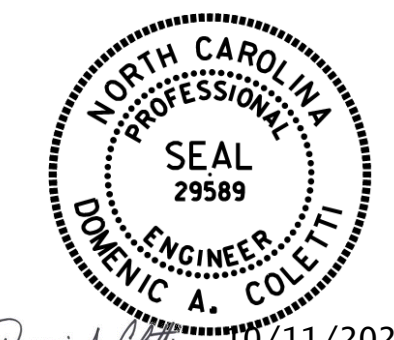
ELEVATION
(SCHEMATIC)



PLAN
(SHOWING BAR PLACEMENT)

STIRRUP SET DETAIL

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 5 OF 6



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
BENT 4
BENT CAP DETAILS**

REVISIONS						SHEET NO. S05-096 TOTAL SHEETS 116
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	
2	--	--	4	--	--	



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PLOT DRIVER: NCDOT...
 USER: PPETERSO...
 FILE: ...SUBSTR...
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 TIME: 8:28:43 AM

DES BY: <u>K. OLIVER</u>	DATE: <u>10/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>M. WERNER</u>	DATE: <u>10/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

BILL OF MATERIAL - BENT 4

Table with columns: BAR, NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT, BAR, NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT. Rows 1-16.

Table with columns: BAR, NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT, BAR, NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT. Rows 17-34.

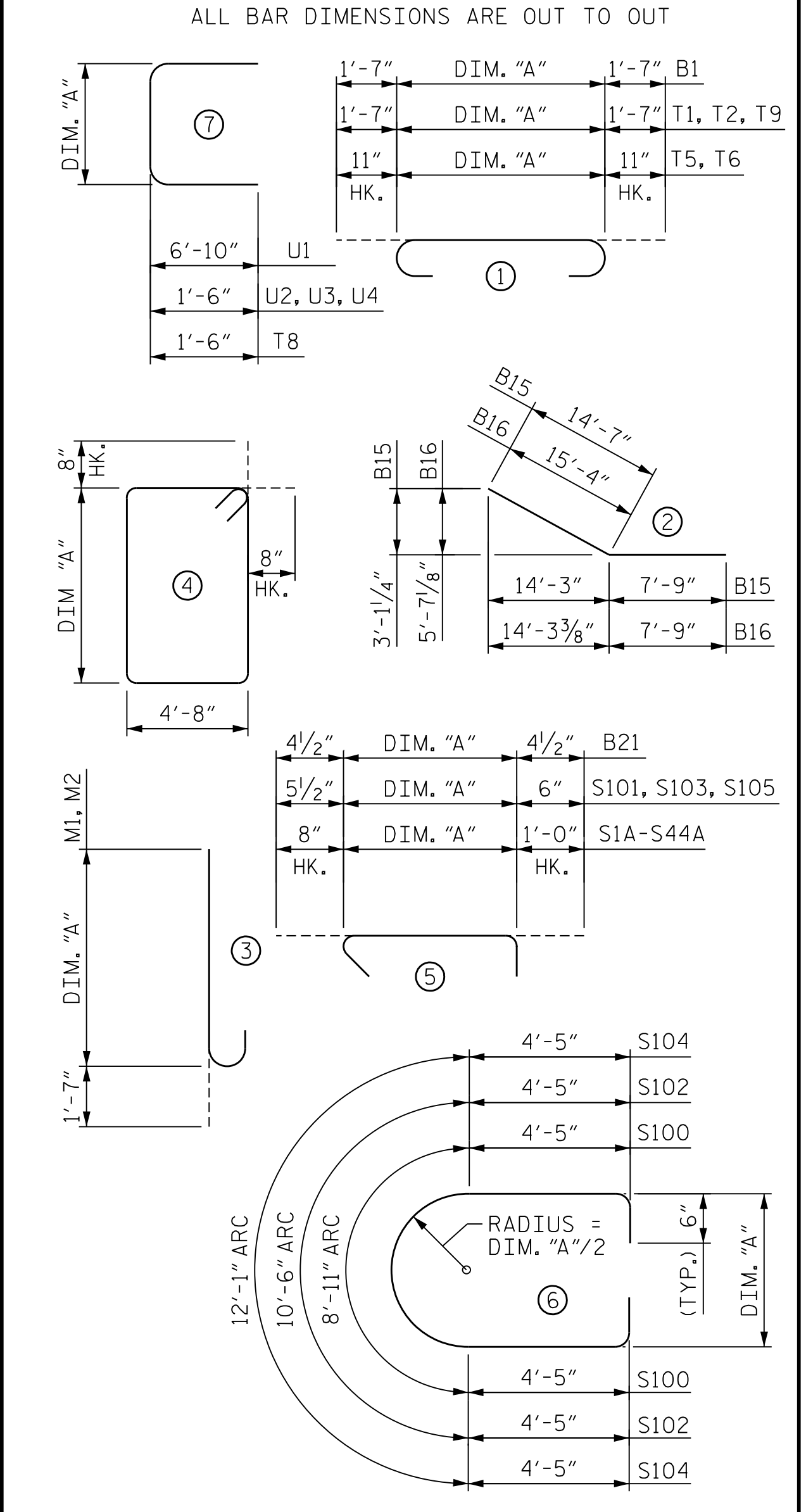
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Table with columns: BAR, NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT, BAR, NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT. Rows 71-88.

Table with columns: DES BY, DATE, DWG BY, DATE, CHK BY, DATE. Summary row for B. PETERSON, 11/19.

BAR TYPES



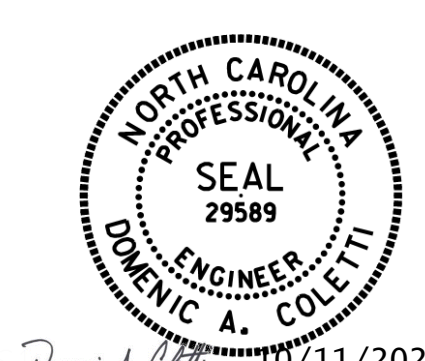
SUMMARY OF QUANTITIES - BENT 4

Table showing quantities for REINFORCING STEEL and CLASS AA CONCRETE. Includes items like POUR #1-5 and 9/8 inch steel micropiles.

* SEE 'SUBSTRUCTURE MICROPILE DETAILS' SHEET FOR MICROPILE DETAILS, QUANTITIES, AND NOTES.

NOTE: SEE SHEETS 1 AND 2 OF 6 FOR NOTES.

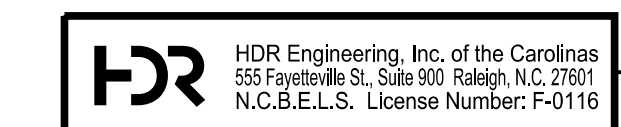
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PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-

DEPARTMENT OF TRANSPORTATION
SUBSTRUCTURE BENT 4 BILL OF MATERIALS

Table with 2 columns: NO., BY, DATE, NO., BY, DATE. Revisions table.



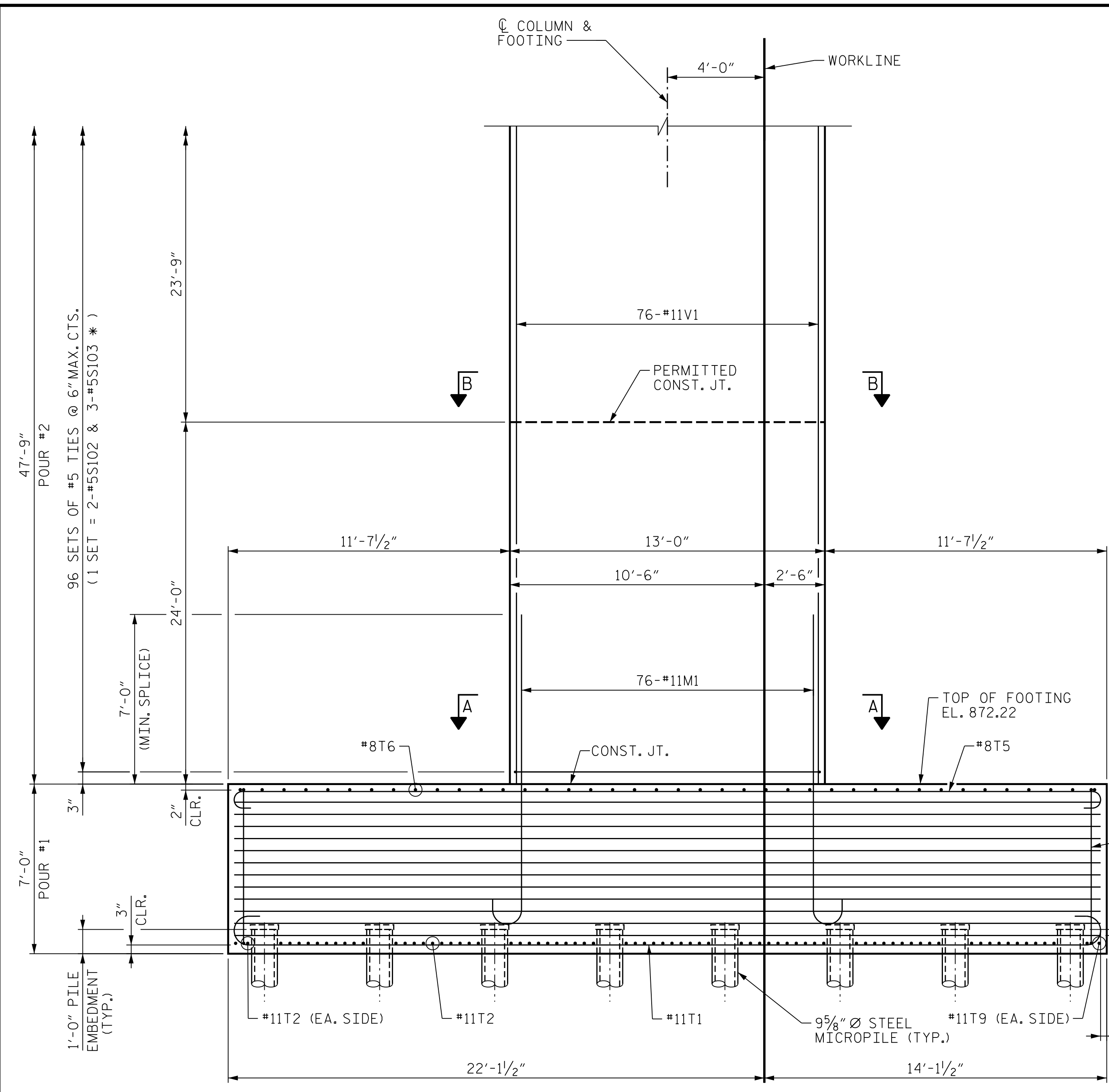
HDR Engineering, Inc. of the Carolinas
335 Fayetteville St., Suite 900 Raleigh, N.C. 27601

10/11/2021

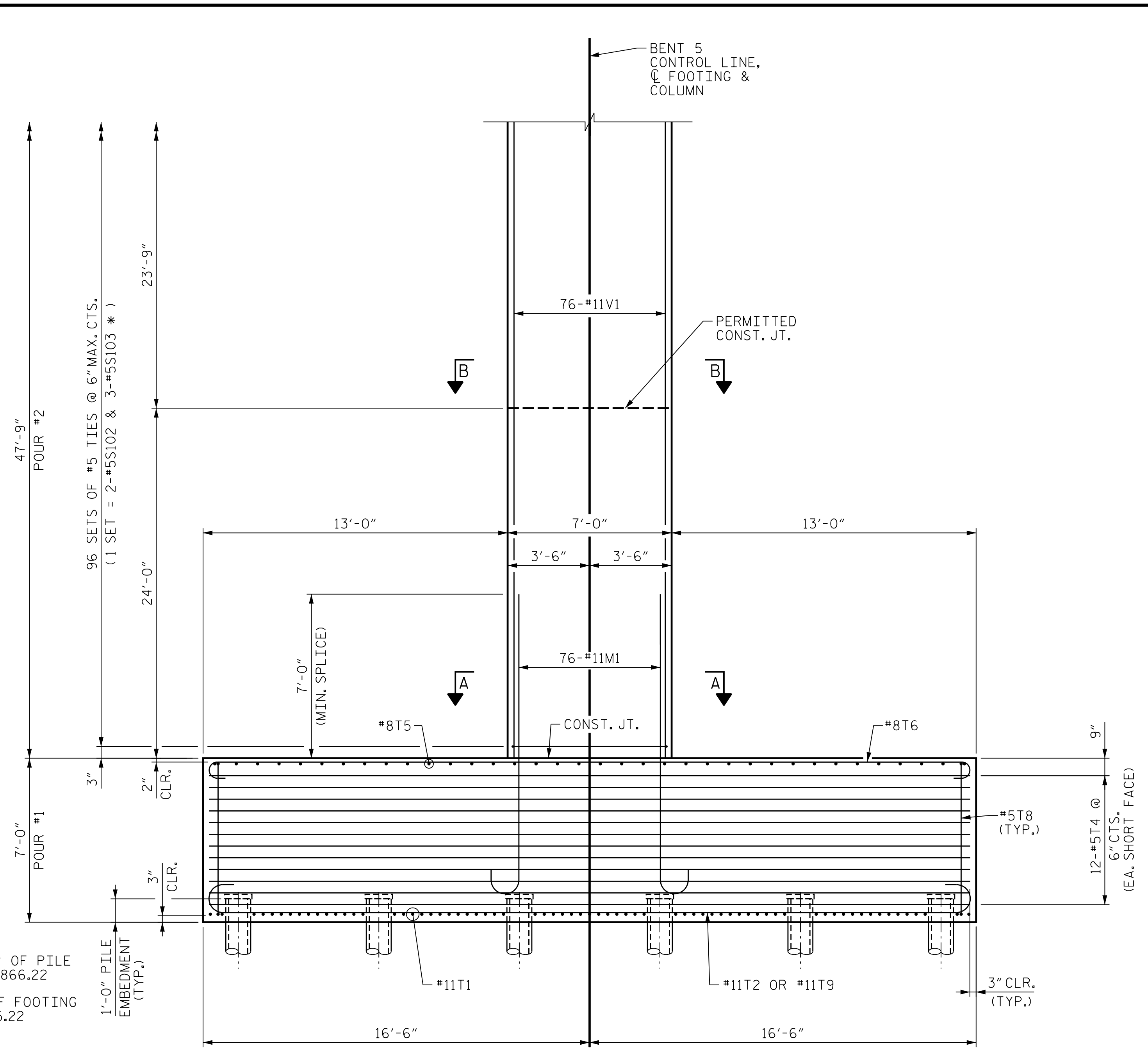
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SHEET NO. S05-097 TOTAL SHEETS 116

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PARTIAL FRONT ELEVATION

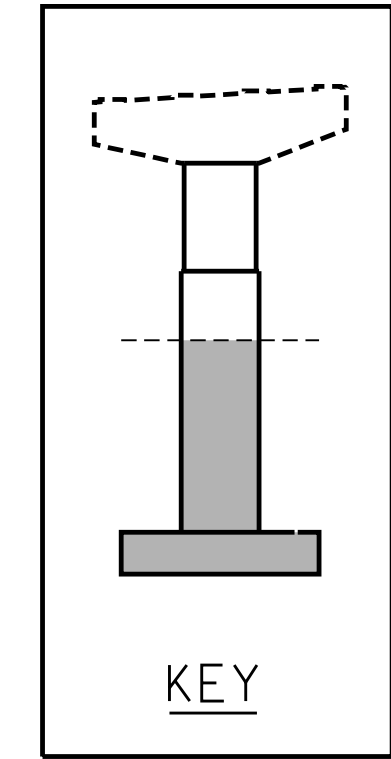


PARTIAL END ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S103 TIES

NOTES

- FOR FOOTING PLAN, SECTION A-A AND SECTION B-B, SEE "SUBSTRUCTURE BENT 5 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.
- FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.
- FOR MICROPILE DETAILS, SEE "SUBSTRUCTURE MICROPILE DETAILS" SHEET.



PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 1 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 5 ELEVATIONS

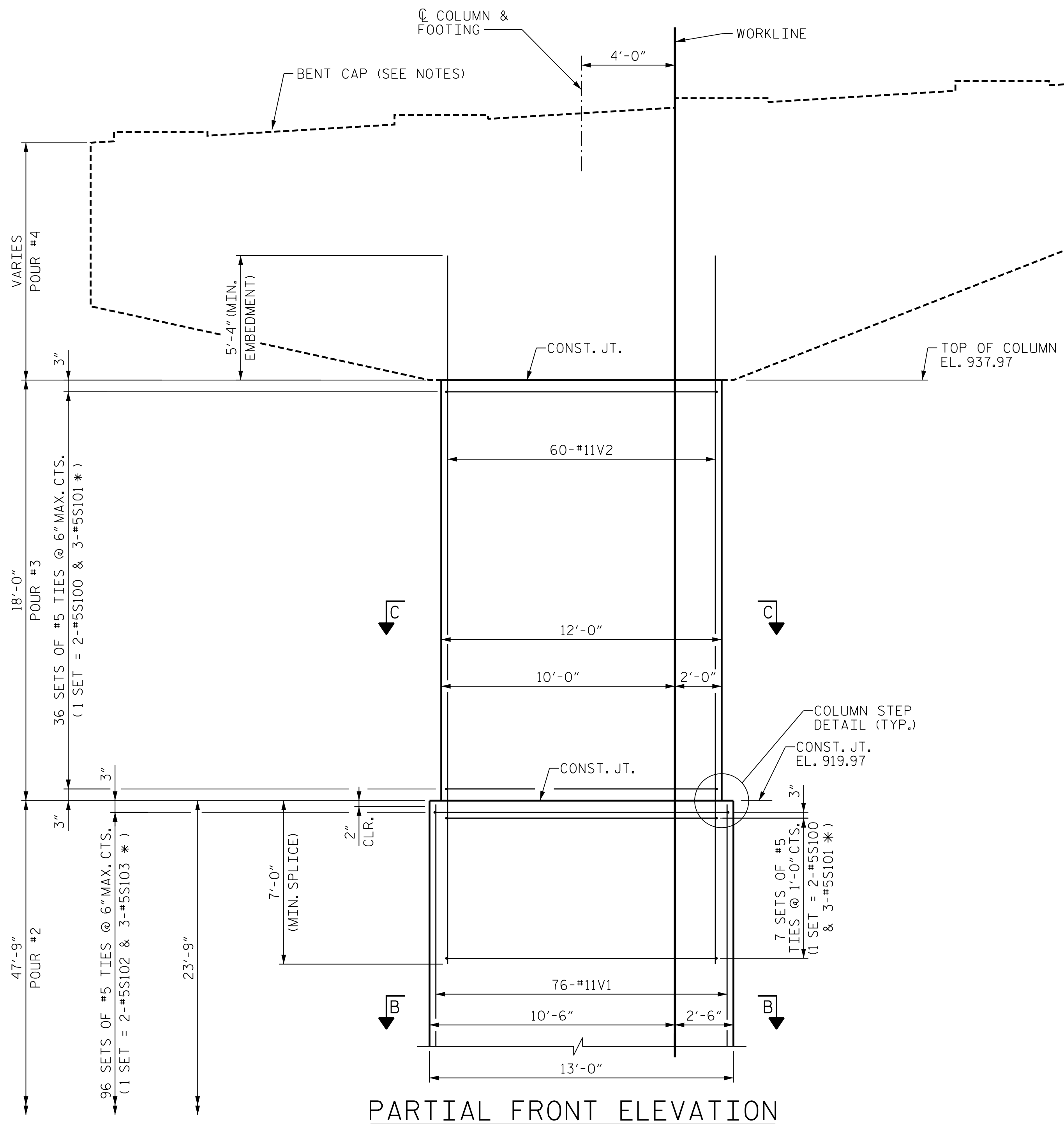
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2	--	--	4	--	--

SHEET NO. S05-09B
 TOTAL SHEETS 116

DES BY: <u>K. OLIVER</u>	DATE: <u>11/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>N. LIU</u>	DATE: <u>11/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

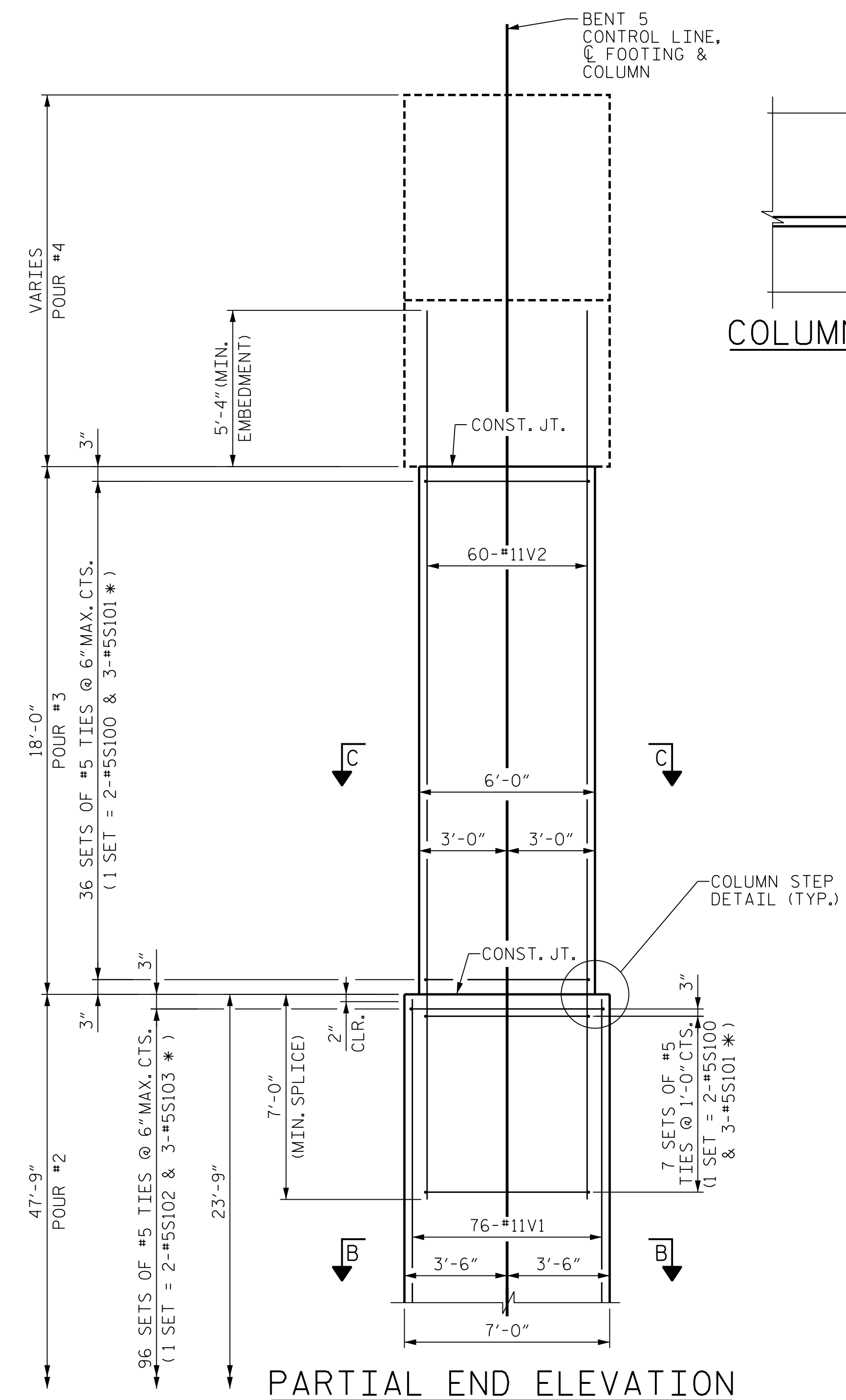


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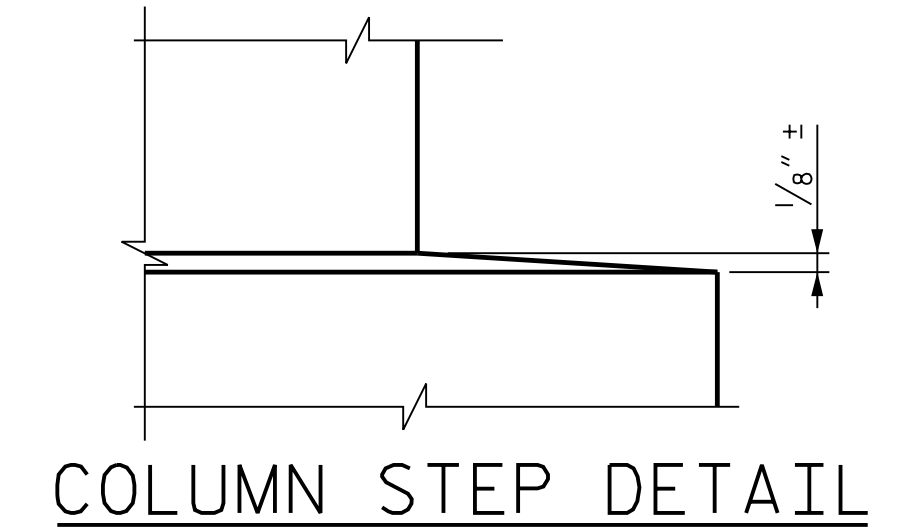


PARTIAL FRONT ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S101 AND #5S103 TIES



PARTIAL END ELEVATION



COLUMN STEP DETAIL

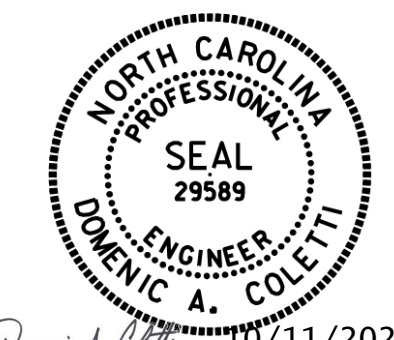
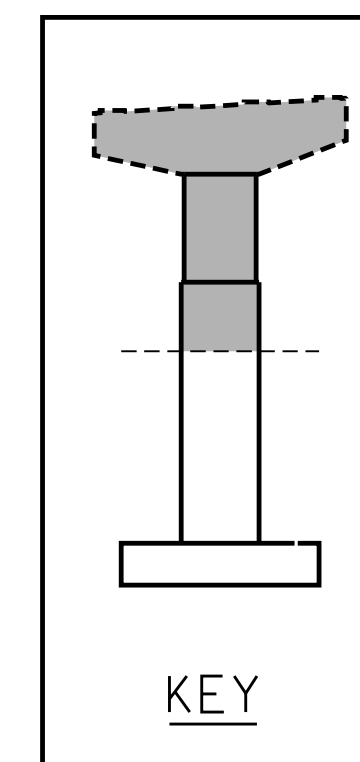
NOTES

FOR SECTION B-B, SEE "SUBSTRUCTURE BENT 5 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.

FOR SECTION C-C, SEE "SUBSTRUCTURE BENT 5 BENT CAP DETAILS", SHEET 5 OF 6.

FOR DETAILS OF BENT CAP, SEE "SUBSTRUCTURE BENT 5 BENT CAP PLAN AND ELEVATION", SHEET 4 OF 6 AND "SUBSTRUCTURE BENT 5 BENT CAP DETAILS", SHEET 5 OF 6.

FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.



PROJECT NO. U-2579AB

FORSYTH COUNTY

STATION: 47+63.62 -Y15FLYBD-

SHEET 2 OF 6

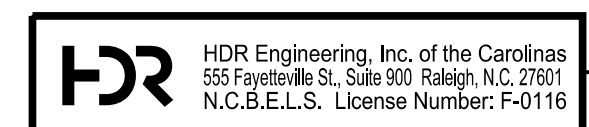
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 5
ELEVATIONS

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
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2	--	--	4	--	--

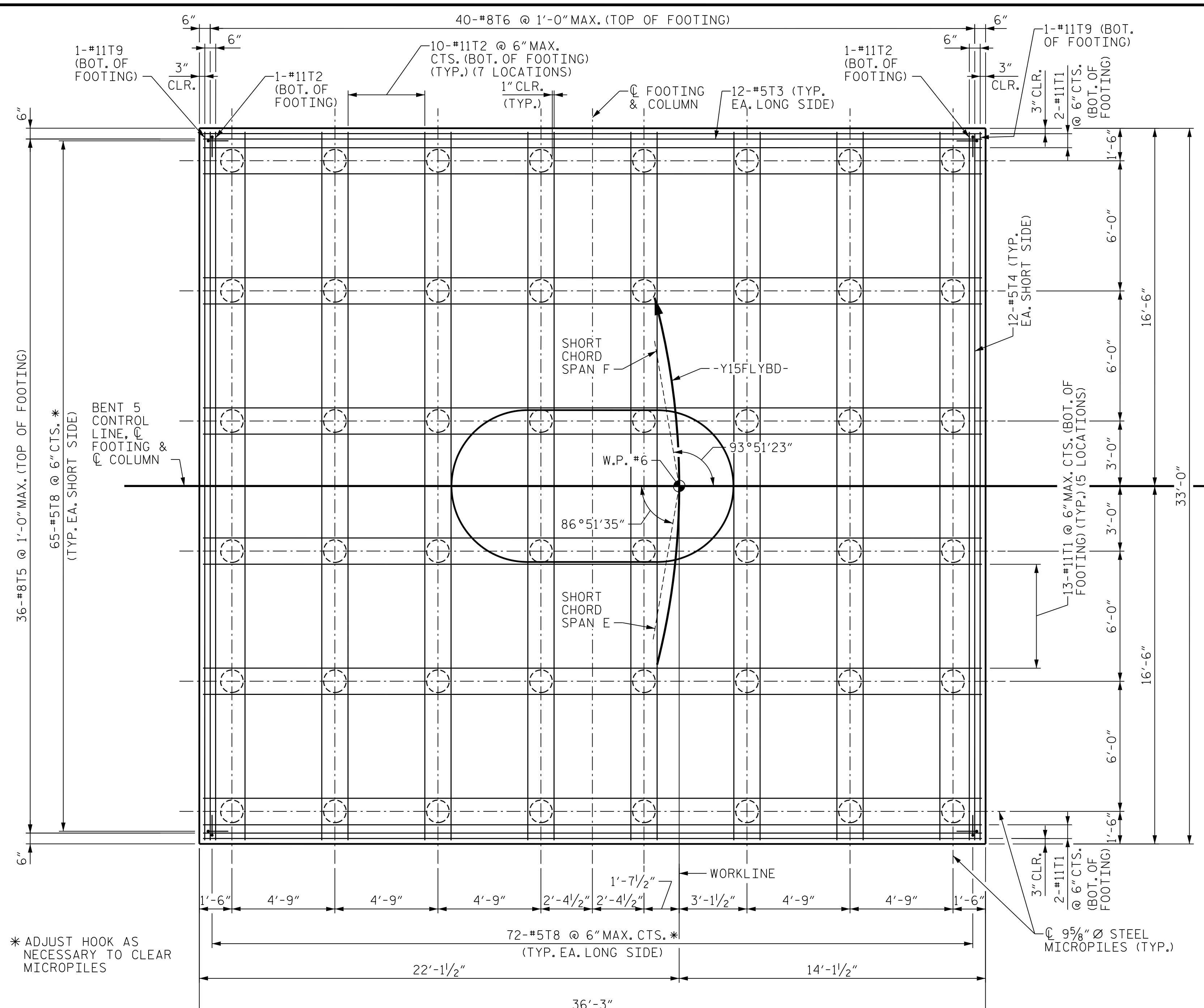
SHEET NO.
S05-099
TOTAL SHEETS
116



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UNLESS ALL SIGNATURES COMPLETED

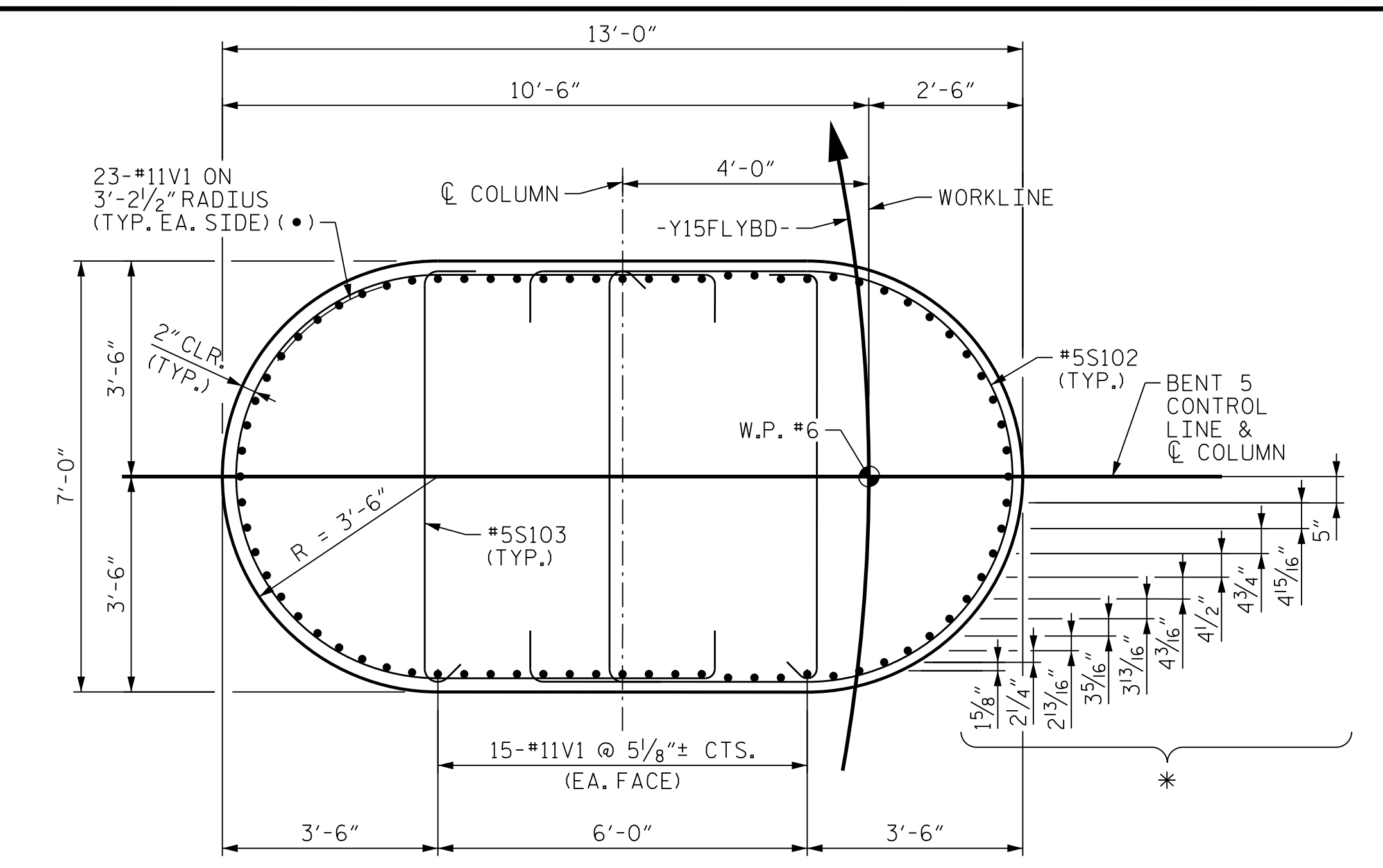
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DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19

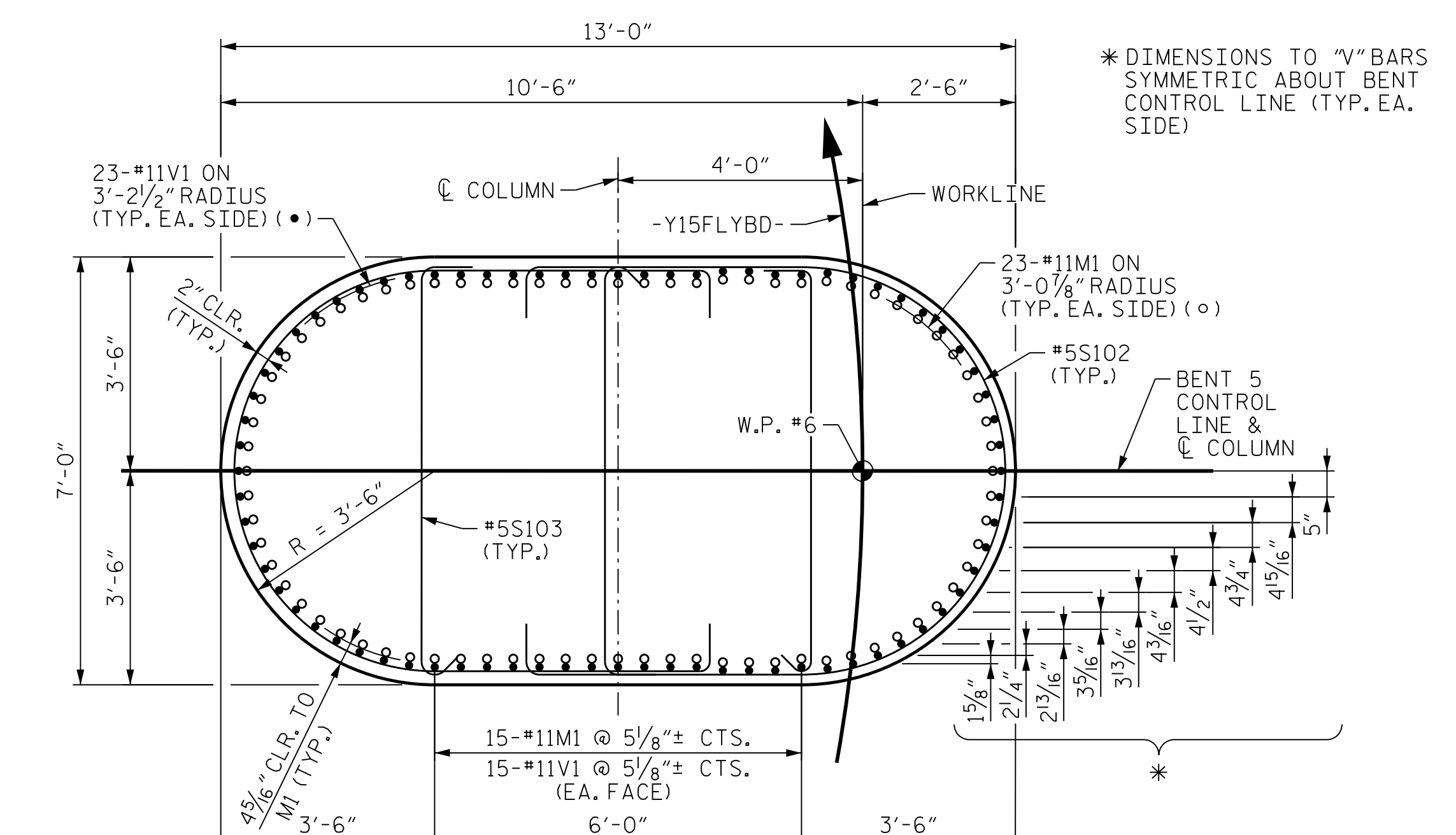


FOOTING PLAN

NOTES
 FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.
 FOR MICROPILE DETAILS, SEE "SUBSTRUCTURE MICROPILE DETAILS" SHEET.



SECTION B-B



SECTION A-A

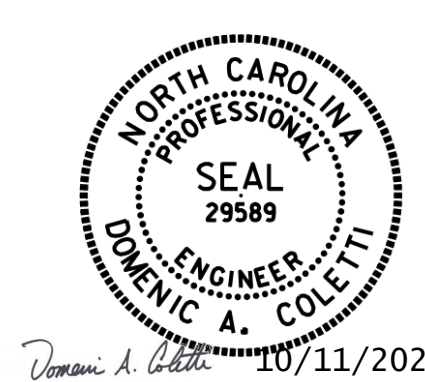
* DIMENSIONS TO "V" BARS SYMMETRIC ABOUT BENT CONTROL LINE (TYP. EA. SIDE)

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

SHEET 3 OF 6

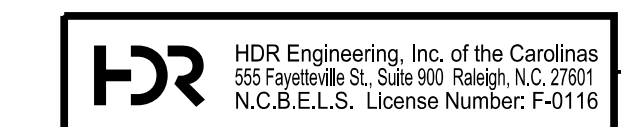
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 5 FOOTING & COLUMN DETAILS



10/11/2021

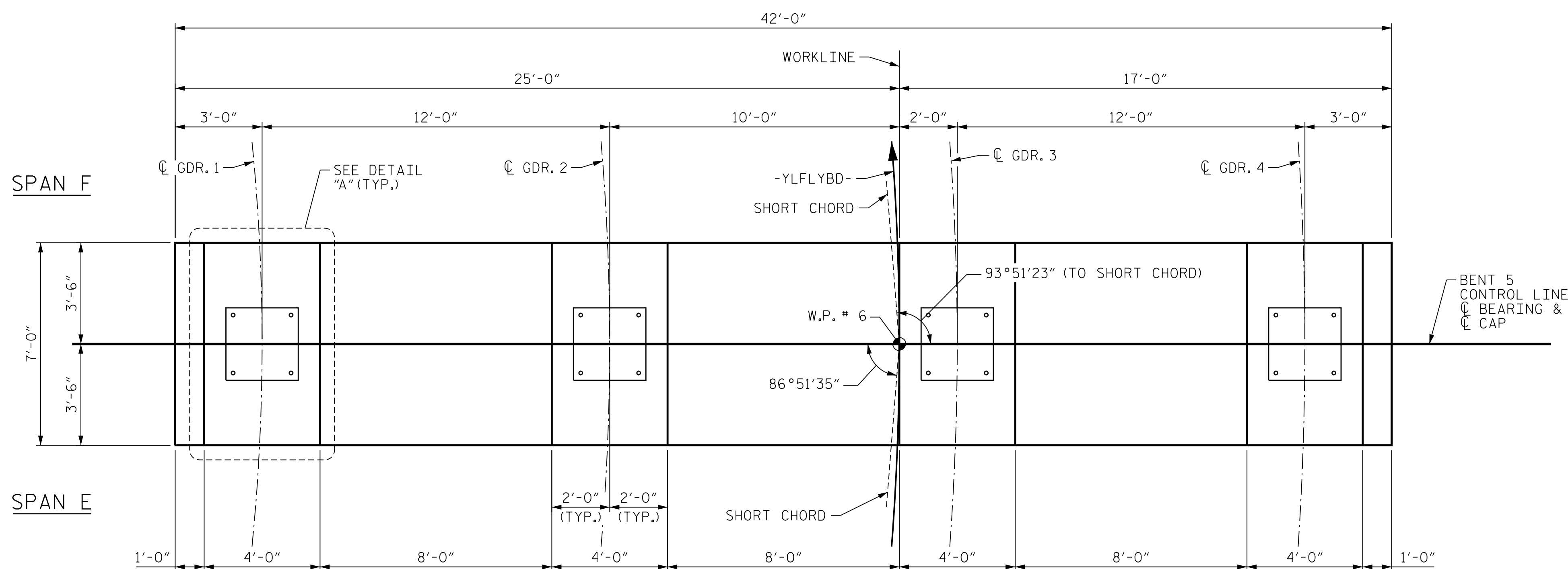
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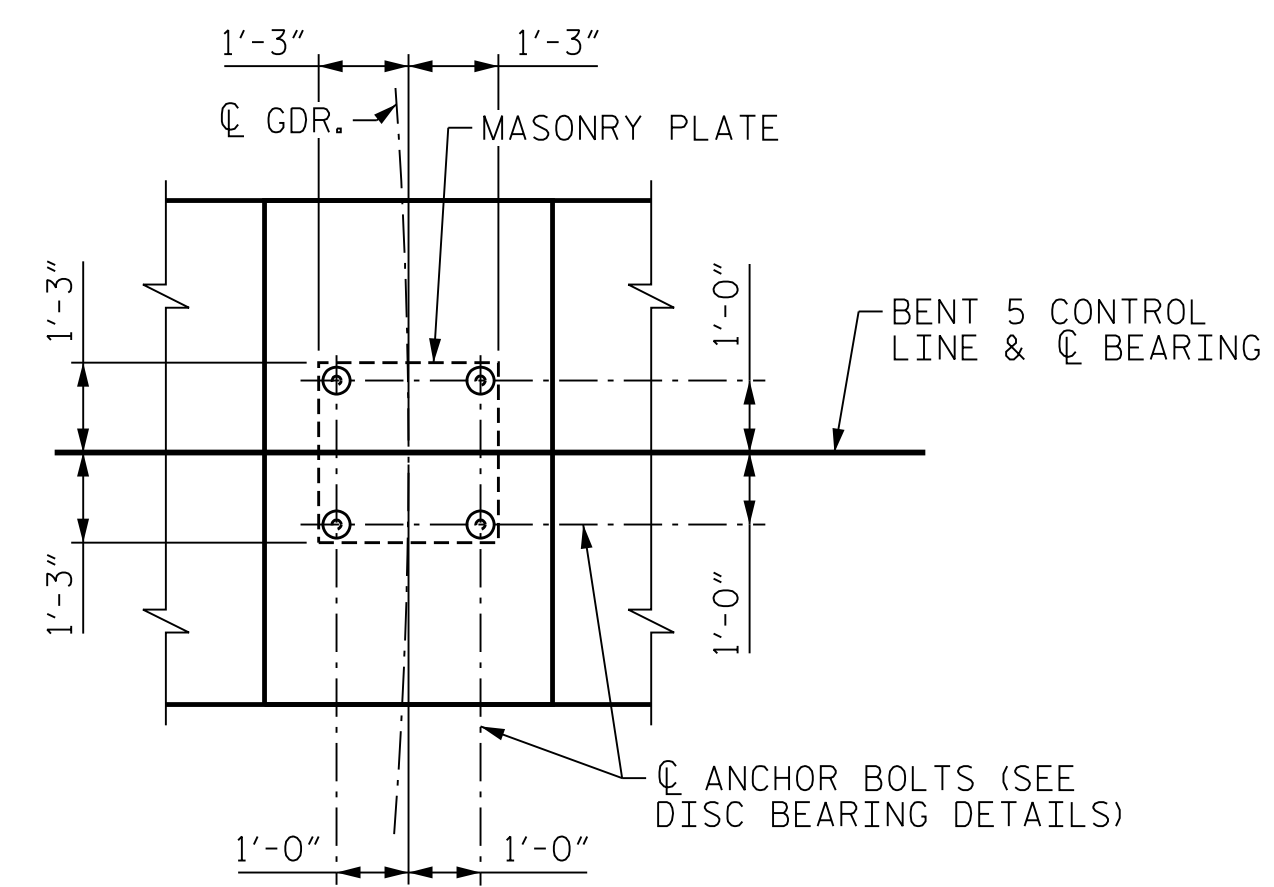
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. 505-100	
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2	--	--	4	--	--		

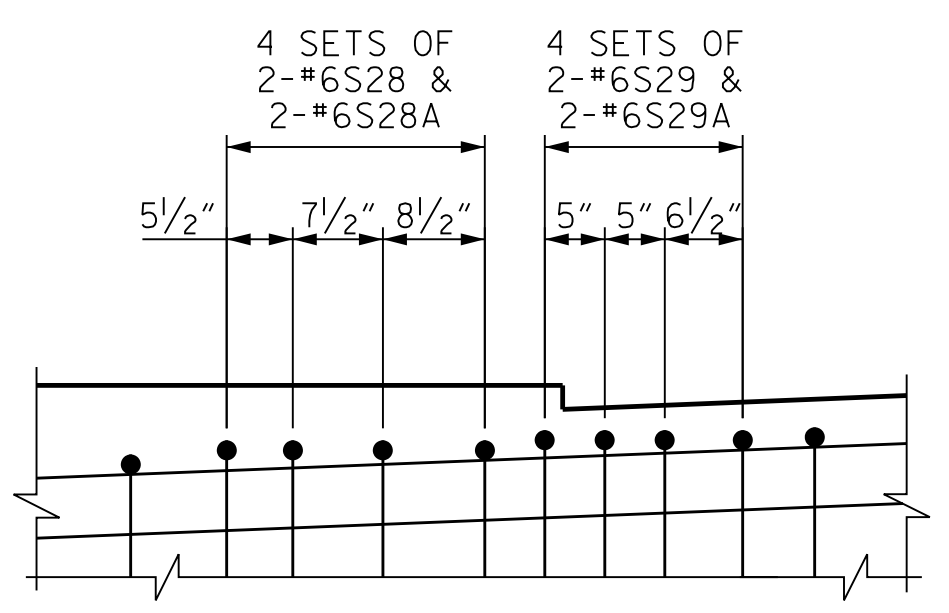
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 DATE: 10/11/2021
 TIME: 8:29:16 AM
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PLAN OF CAP

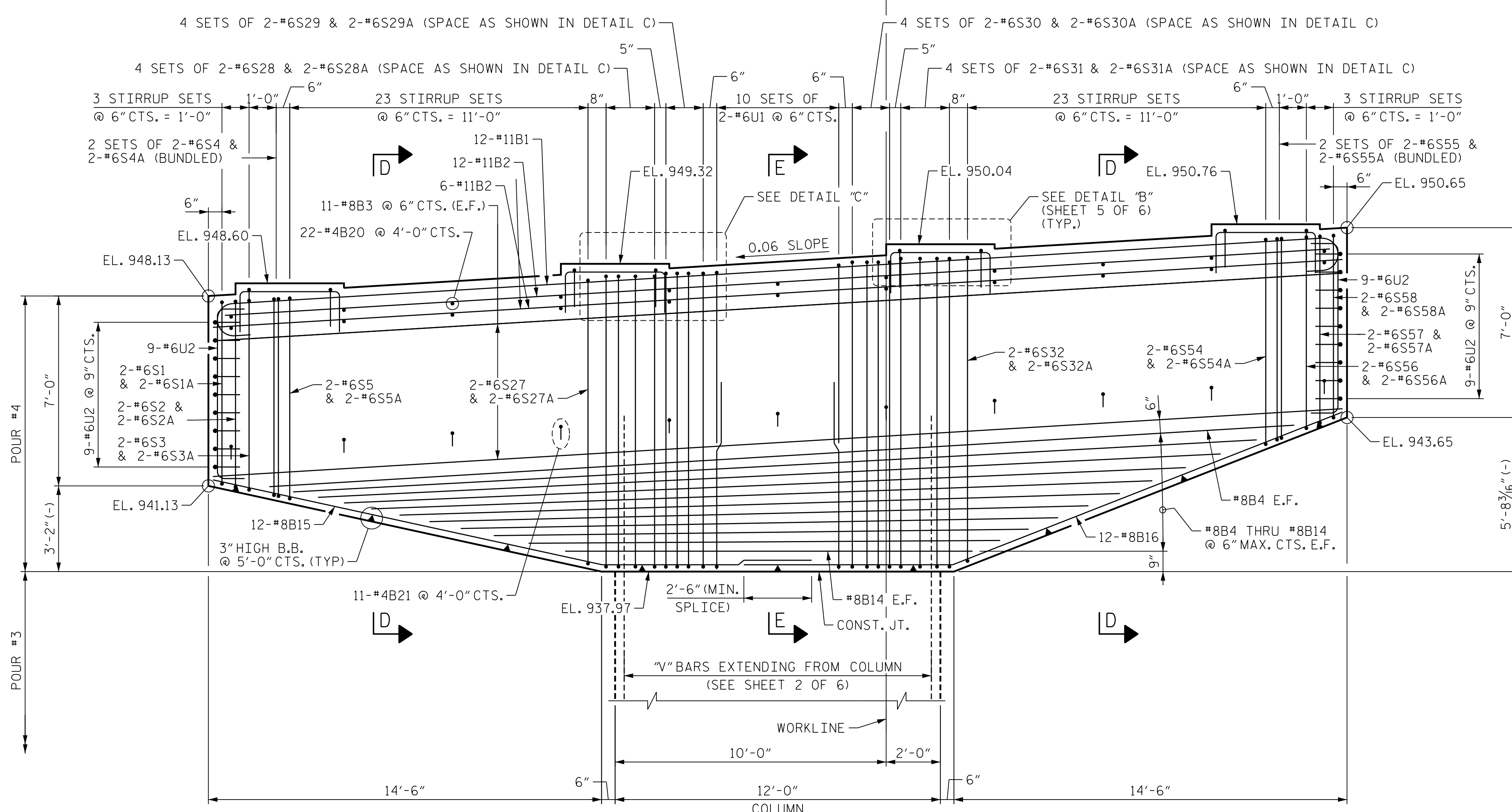


DETAIL "A"
(TYP. @ EA. BEARING)

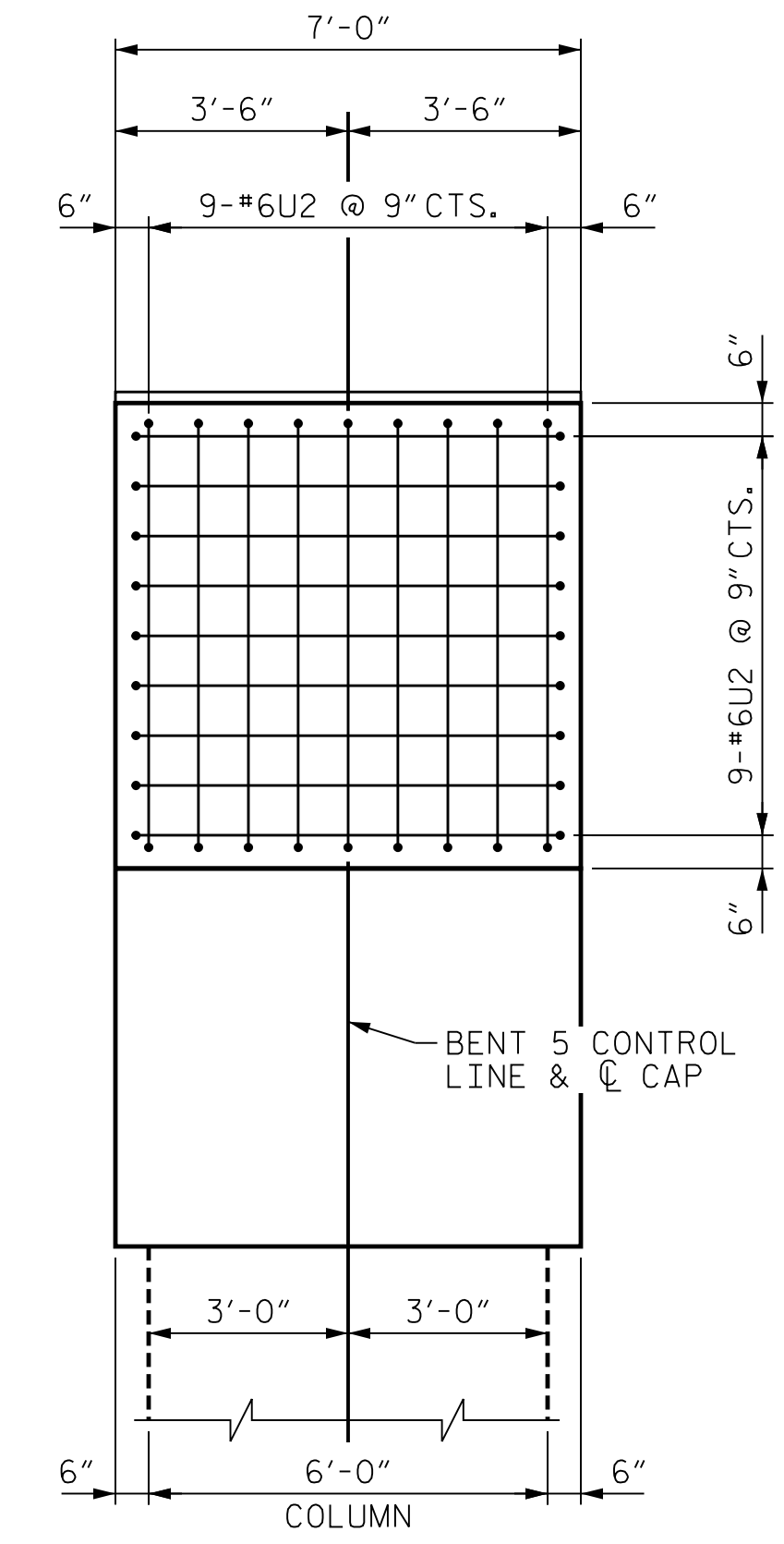


DETAIL "C"

DETAIL SHOWN AT LEFT SIDE OF CAP (SPACING OF STIRRUPS MIRRORED AT RIGHT SIDE OF CAP WITH BARS #6S30/#6S30A AND #6S31/#6S31A AS SHOWN ON THE ELEVATION)



ELEVATION OF CAP



END VIEW

PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 4 OF 6



10/11/2021

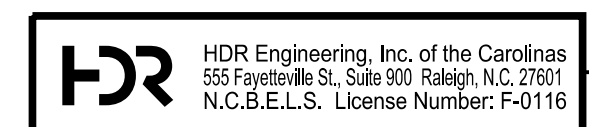
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 5 BENT CAP PLAN AND ELEVATION

REVISIONS						SHEET NO. 505-101
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 116
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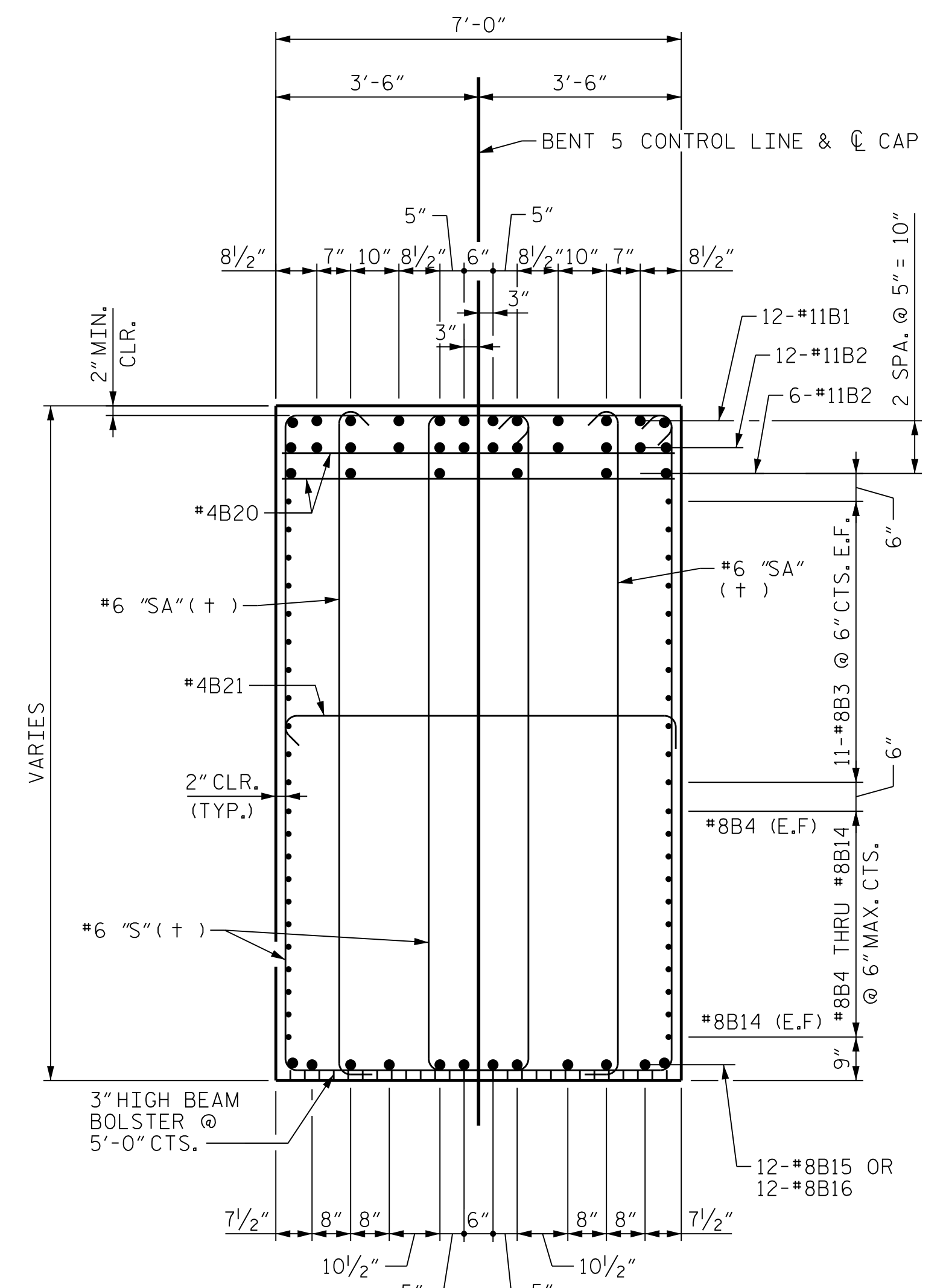
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DES CHK: <u>M. WERNER</u>	DATE: <u>10/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

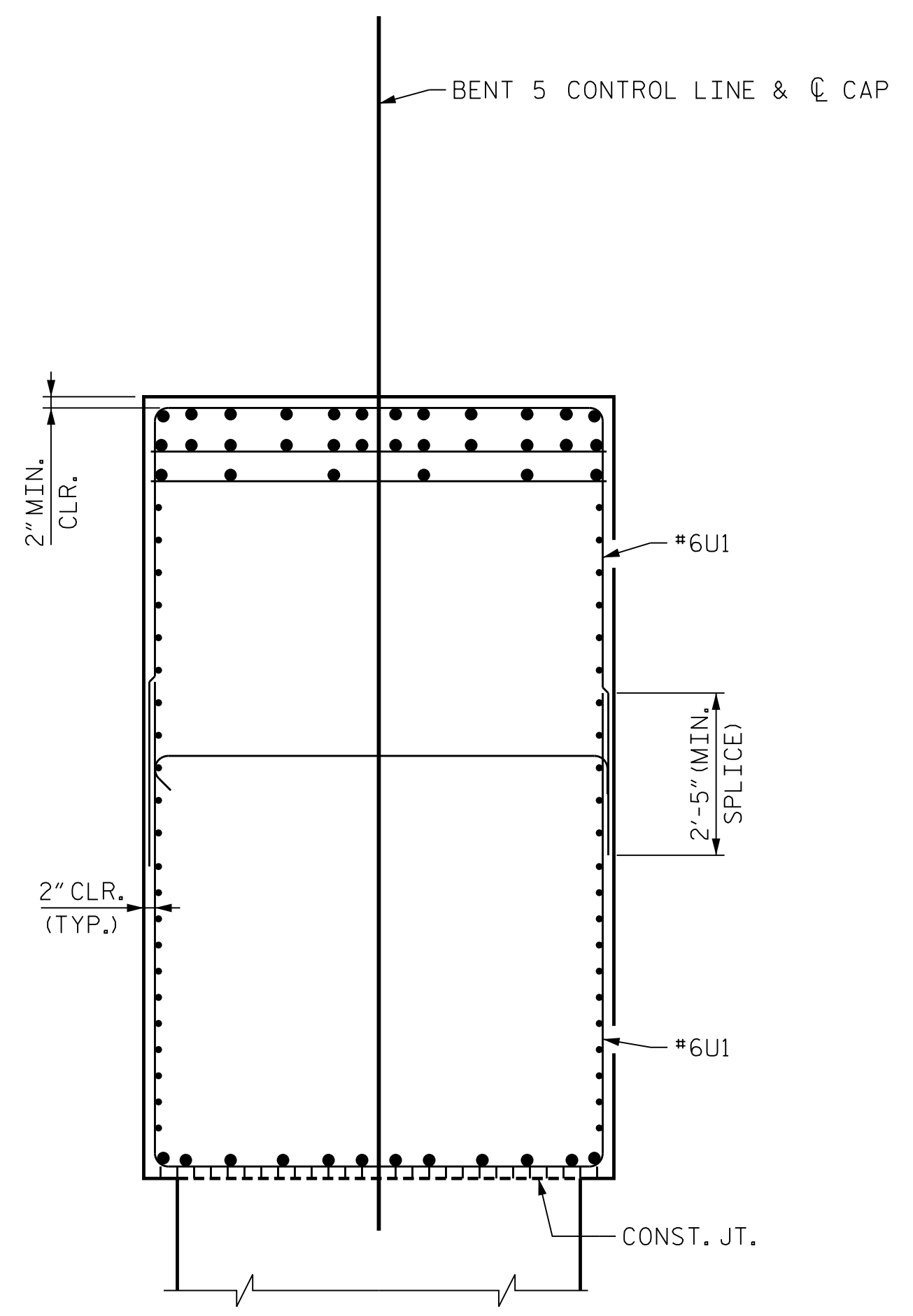


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NOTE
SEE SHEETS 1 AND 2 OF 6 FOR NOTES.

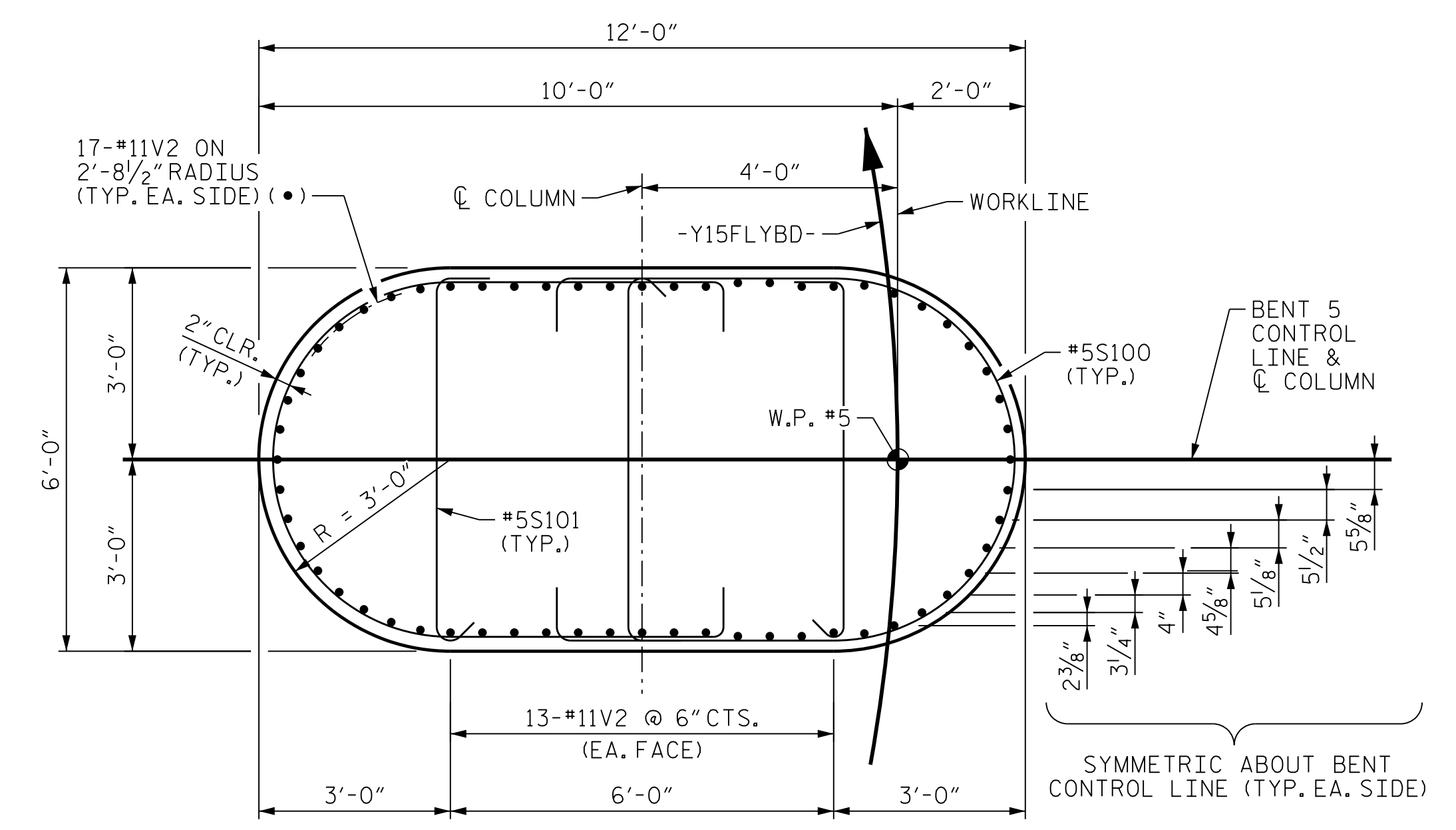


SECTION D-D
(+) SEE "STIRRUP SET DETAIL"



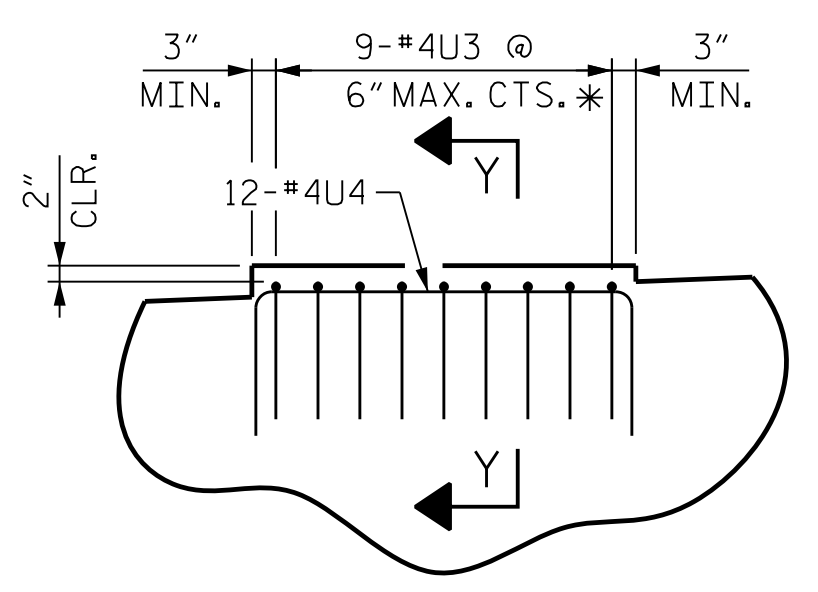
SEE SECTION D-D FOR ADDITIONAL INFORMATION

SECTION E-E
COLUMN REINFORCING STEEL NOT SHOWN FOR CLARITY

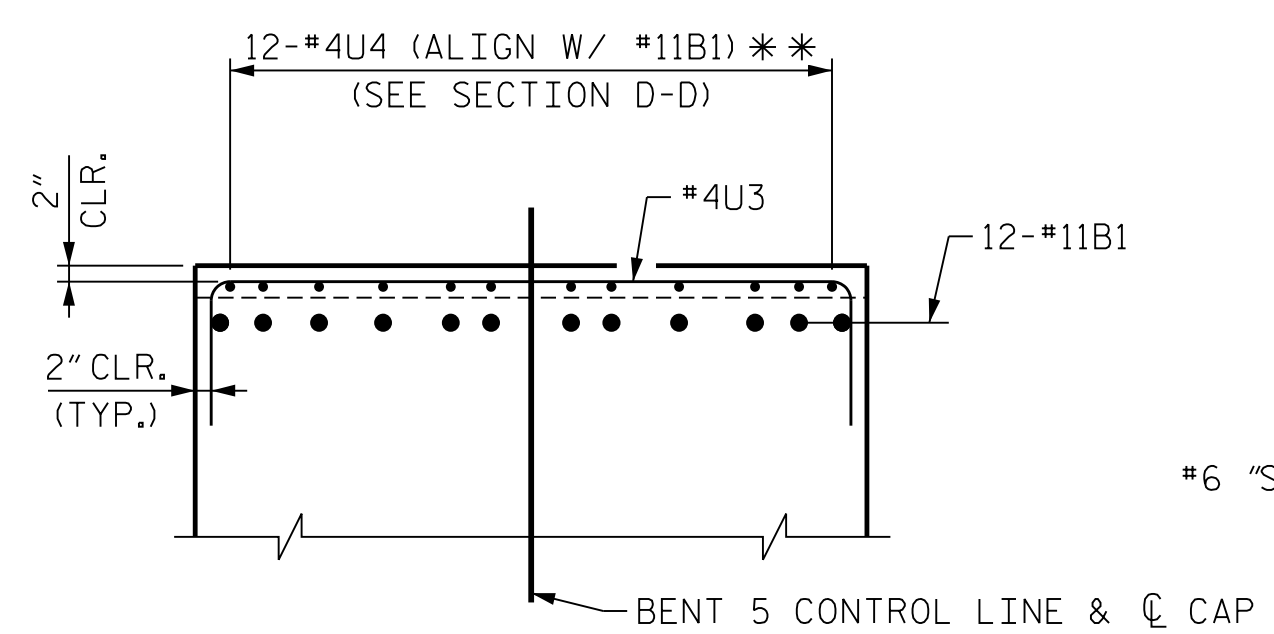


SECTION C-C

SYMMETRIC ABOUT BENT CONTROL LINE (TYP. EA. SIDE)

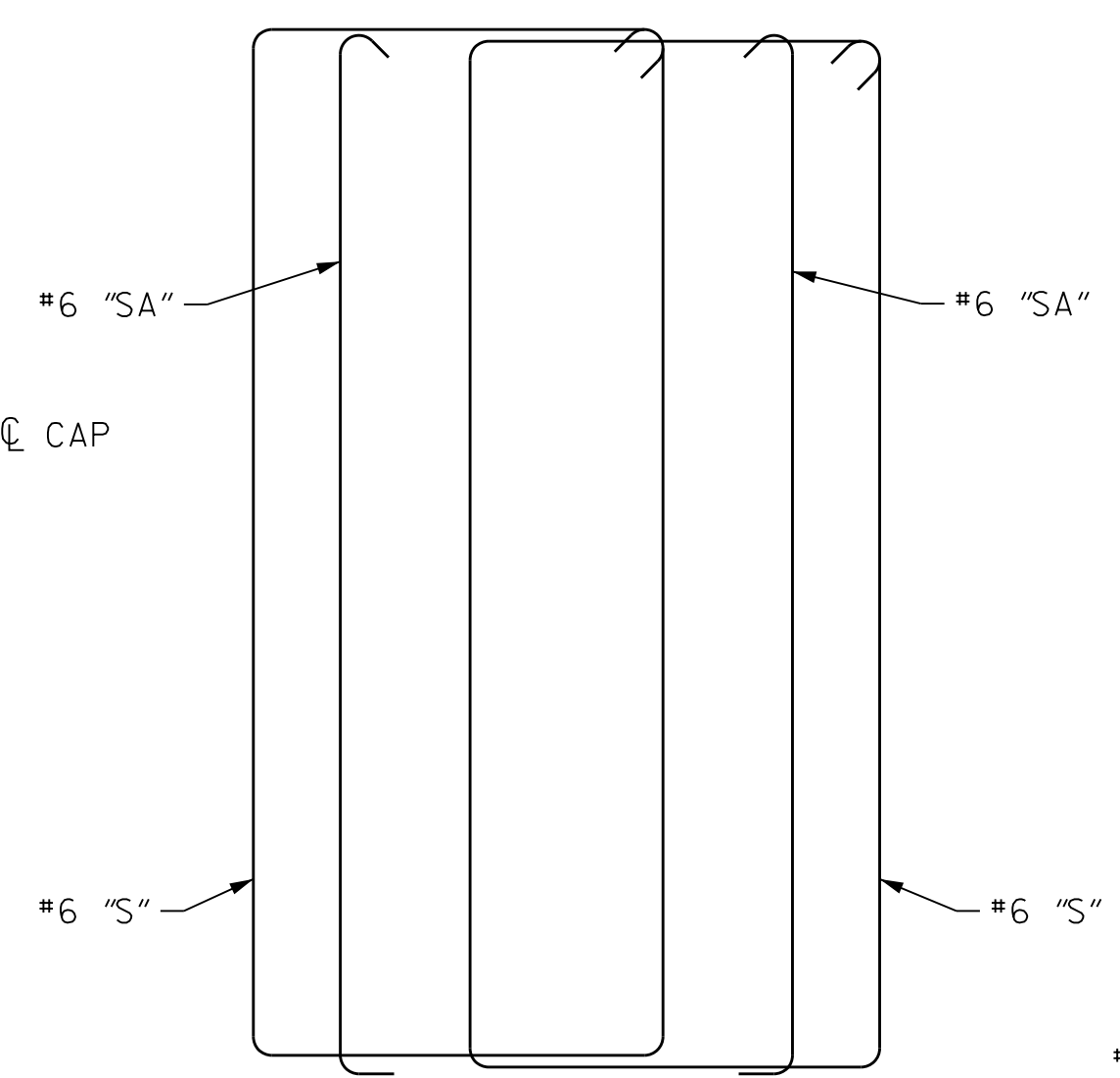


DETAIL "B"

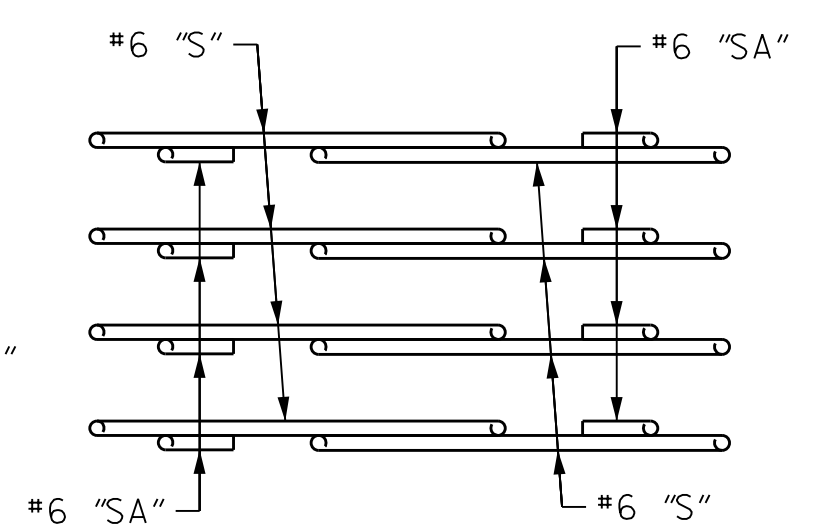


SECTION Y-Y

* NOTE:
#4U3 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.
** NOTE:
#4U4 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR #11B1 AND #11B2 BARS.



ELEVATION
(SCHEMATIC)



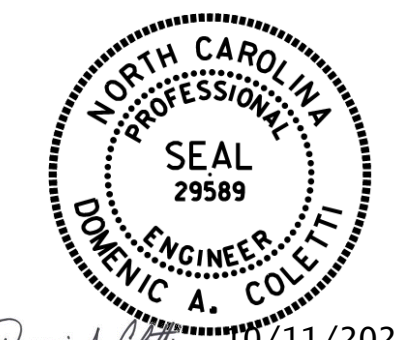
PLAN
(SHOWING BAR PLACEMENT)

STIRRUP SET DETAIL

PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 5
BENT CAP DETAILS



10/11/2021

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

SHEET NO. S05-102
TOTAL SHEETS 116

HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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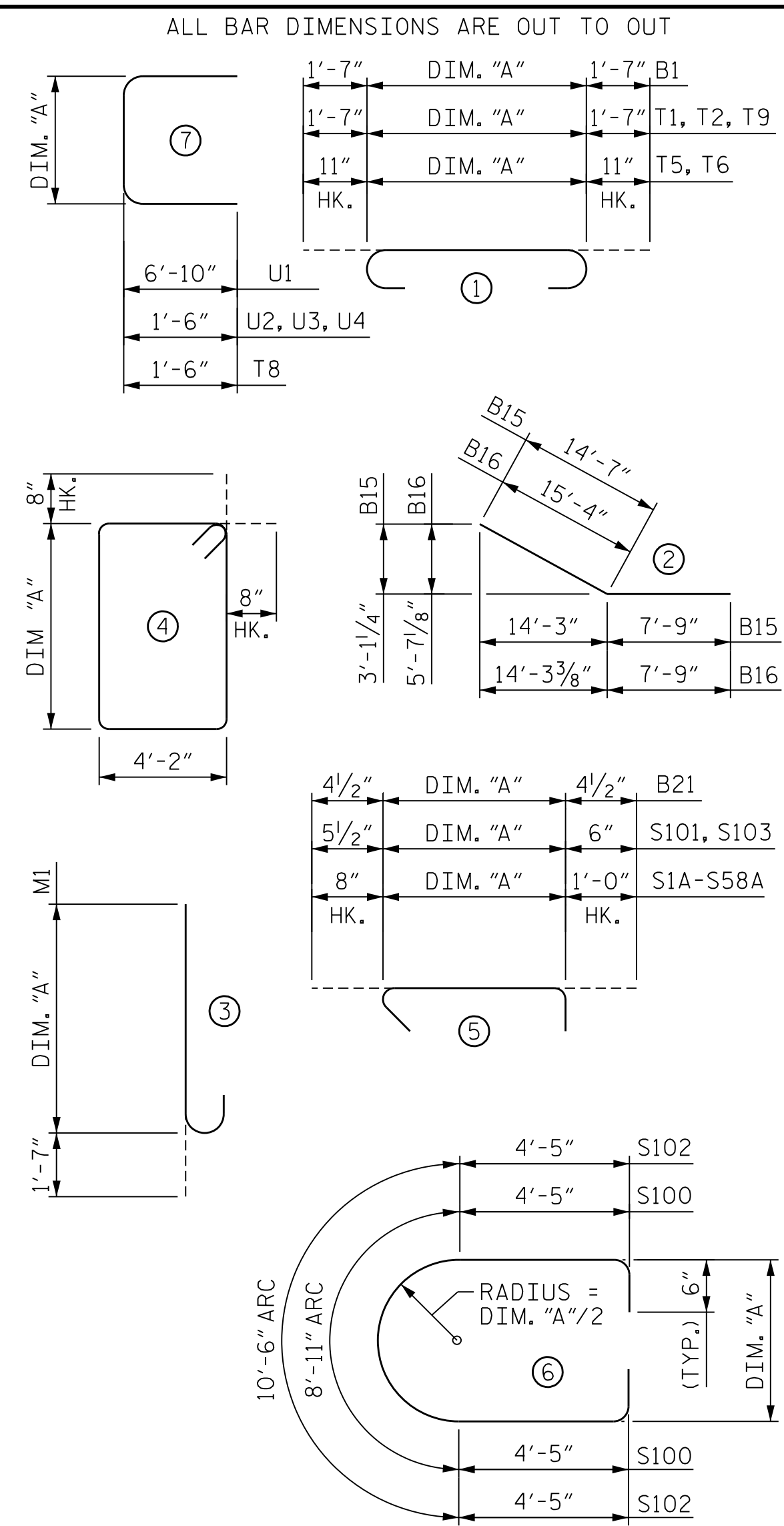
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DES BY: K. OLIVER	DATE: 10/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: M. WERNER	DATE: 10/19	CHK BY: N. LIU	DATE: 12/19

BILL OF MATERIAL - BENT 5

Table with columns: BAR NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT, BAR NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT, BAR NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT. Includes bar types U1-U4, T1-T9, S1-S37, S100-S103, S102, S101, S103, S1A-S58A, T1-T4, and 9 5/8" steel micropiles.

BAR TYPES



SUMMARY OF QUANTITIES - BENT 5

Summary table with columns: REINFORCING STEEL (LBS. 105,878), CLASS AA CONCRETE (POUR #1-4), TOTAL (604.5 C.Y.), and 9 5/8" STEEL MICROPILES (NO. 48).

NOTE

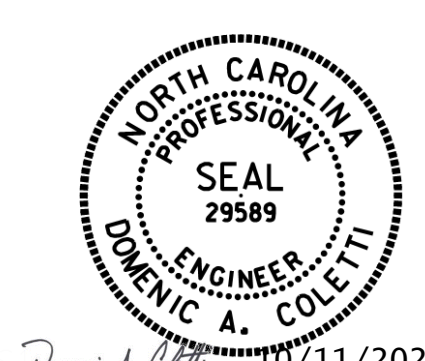
SEE SHEETS 1 AND 2 OF 6 FOR NOTES.

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PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-

SHEET 6 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE BENT 5 BILL OF MATERIALS



* SEE "SUBSTRUCTURE MICROPILE DETAILS" SHEET FOR MICROPILE DETAILS, QUANTITIES, AND NOTES.

10/11/2021

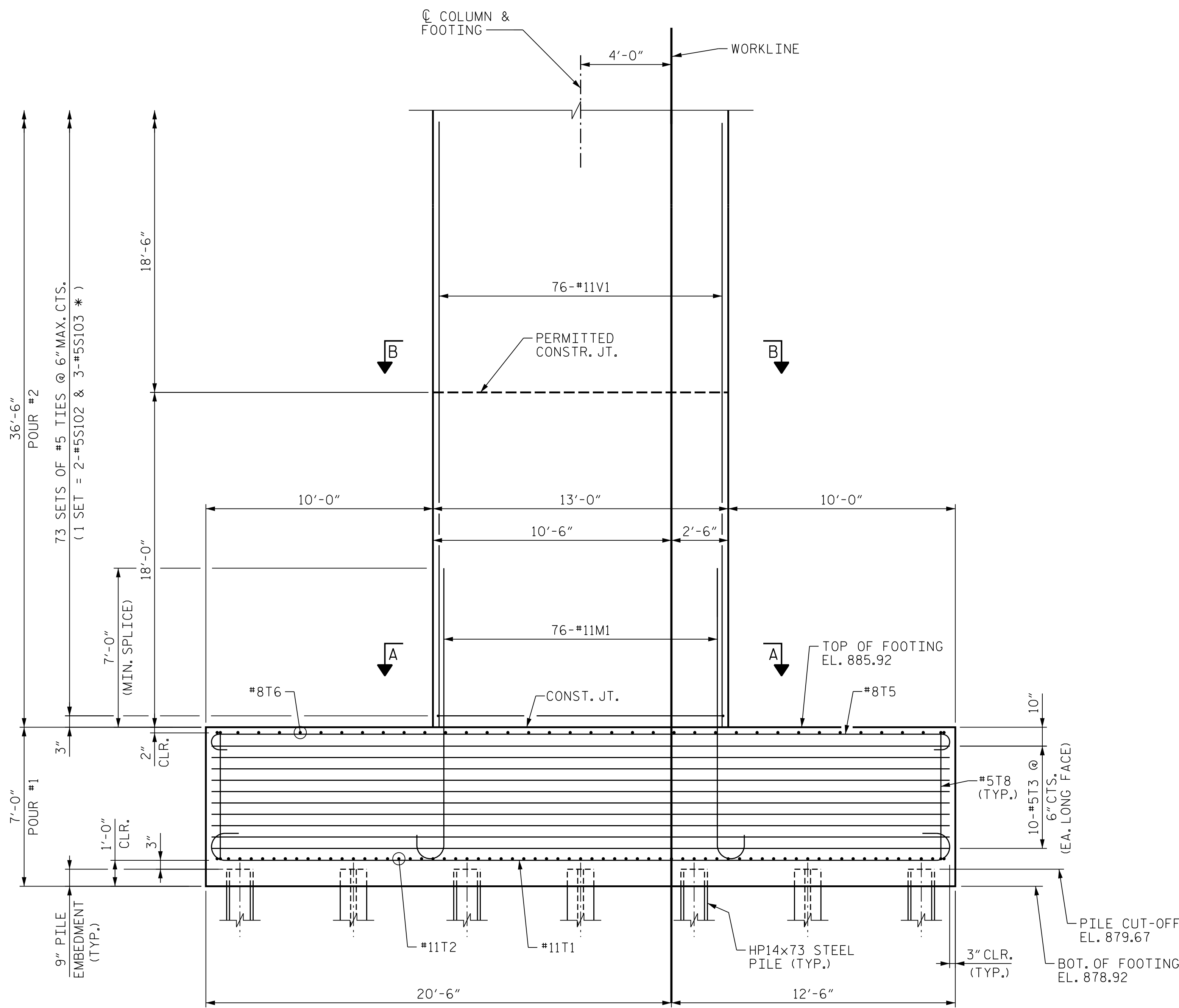
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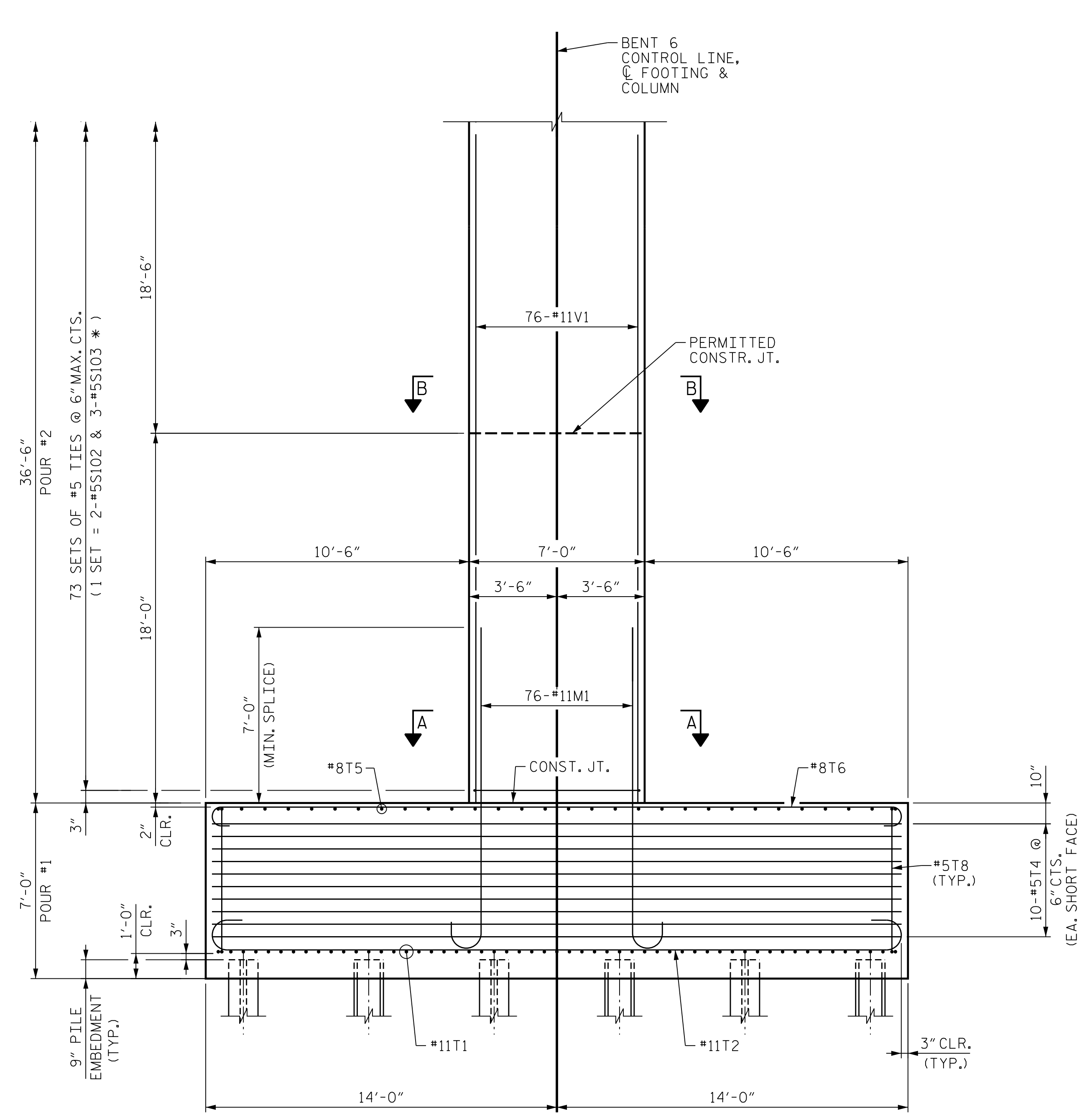
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SHEET NO. 505-103 TOTAL SHEETS 116



PARTIAL FRONT ELEVATION

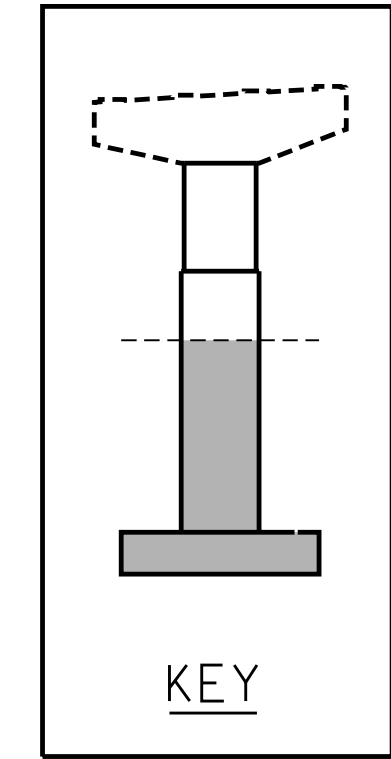


PARTIAL END ELEVATION

* INVERT ORIENTATION OF ALTERNATE #5S103 TIES

NOTES

FOR FOOTING PLAN, SECTION A-A AND SECTION B-B, SEE "SUBSTRUCTURE BENT 6 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.
 FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.

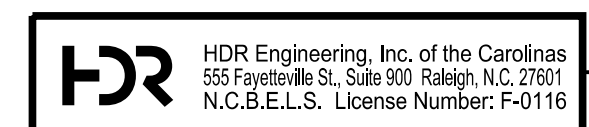


PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 1 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 6 ELEVATIONS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1	--	--	3	--	--
2	--	--	4	--	--
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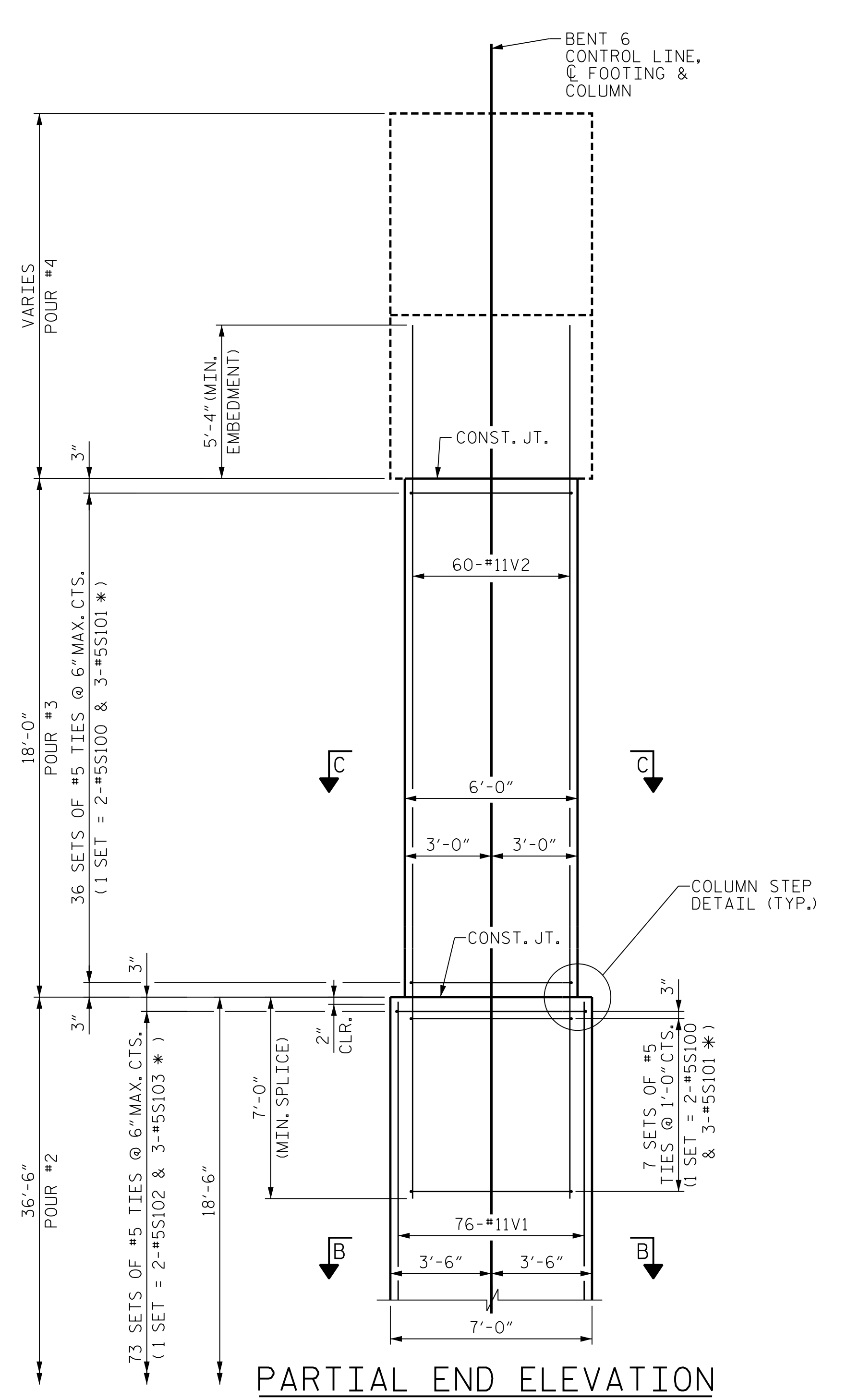
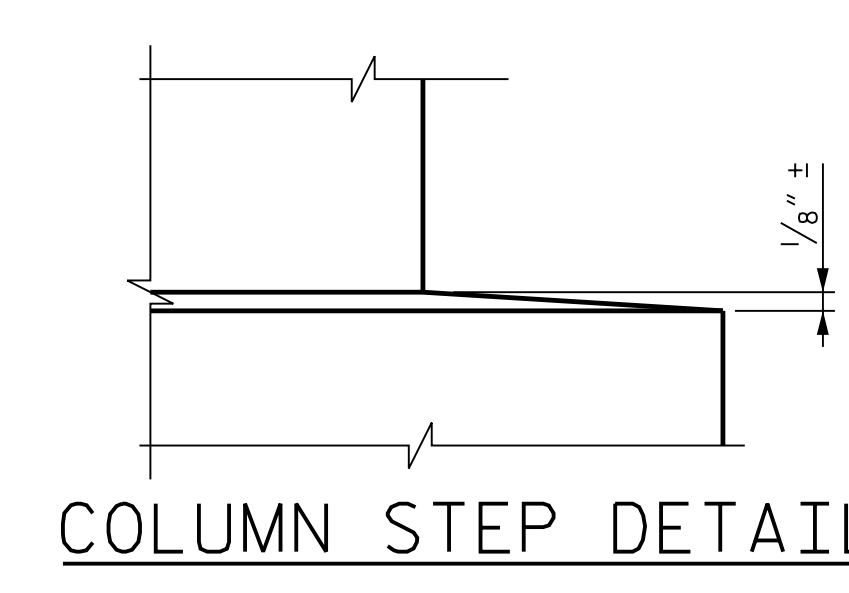
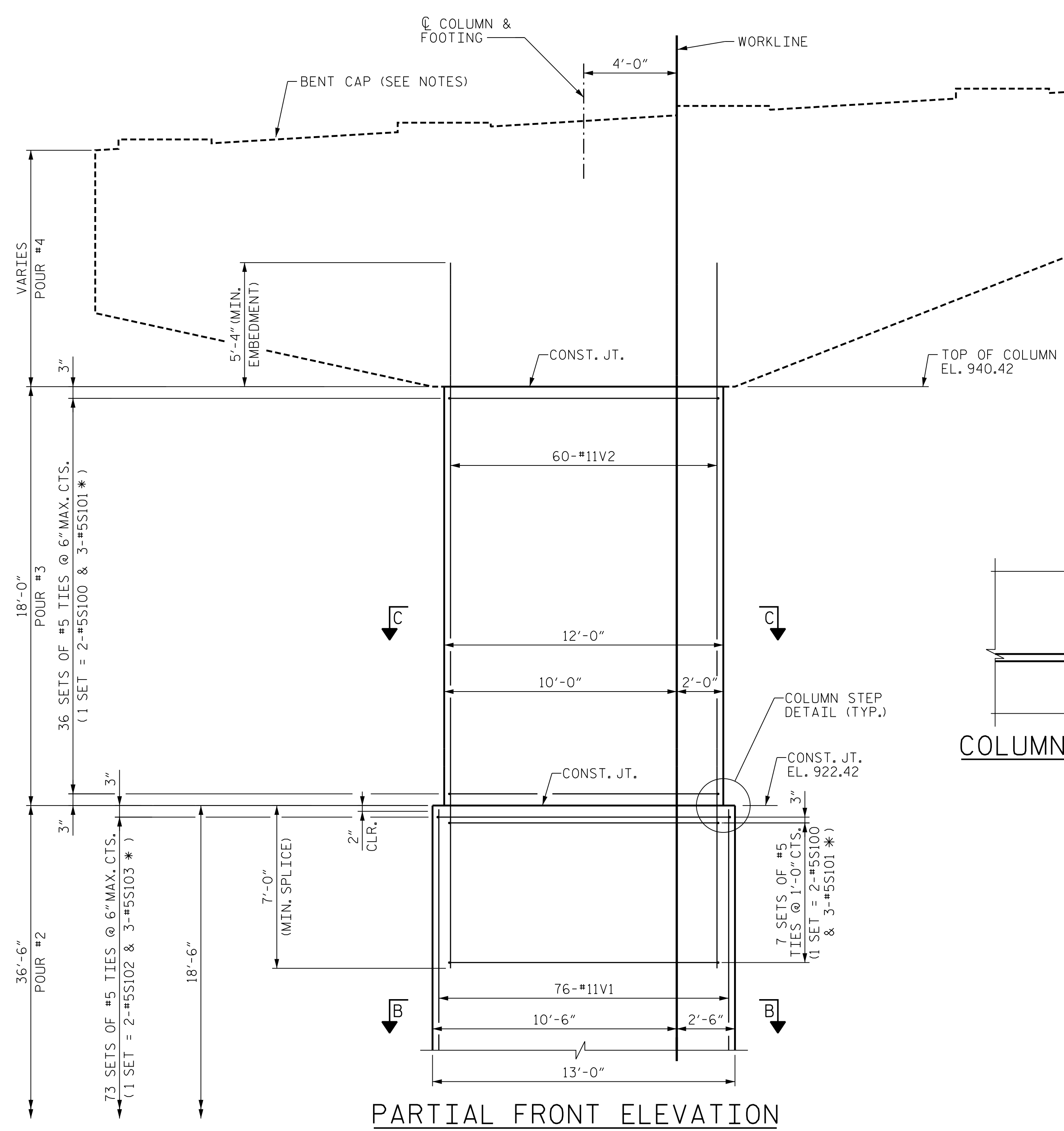
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DES CHK: N. LIU	DATE: 11/19	CHK BY: N. LIU	DATE: 12/19



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

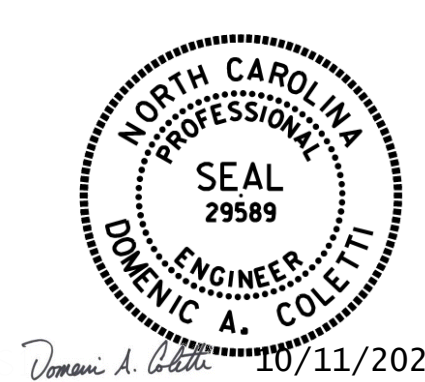
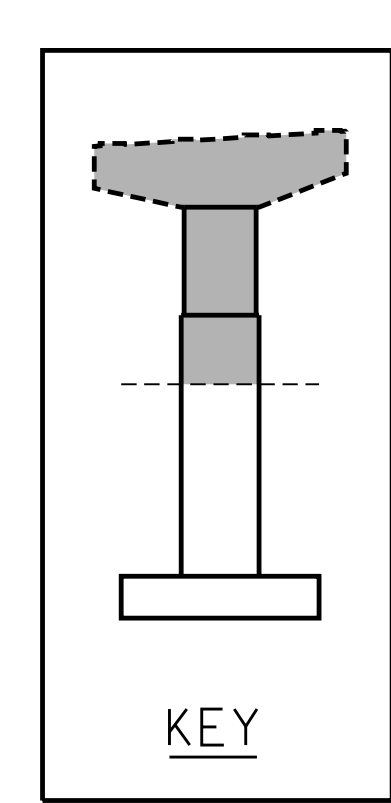
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* INVERT ORIENTATION OF ALTERNATE #5S101 AND #5S103 TIES

NOTES

- FOR SECTION B-B, SEE "SUBSTRUCTURE BENT 6 FOOTING & COLUMN DETAILS", SHEET 3 OF 6.
- FOR SECTION C-C, SEE "SUBSTRUCTURE BENT 6 BENT CAP DETAILS", SHEET 5 OF 6.
- FOR DETAILS OF BENT CAP, SEE "SUBSTRUCTURE BENT 6 BENT CAP PLAN AND ELEVATION", SHEET 4 OF 6 AND "SUBSTRUCTURE BENT 6 BENT CAP DETAILS", SHEET 5 OF 6.
- FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.



PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 2 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 6 ELEVATIONS

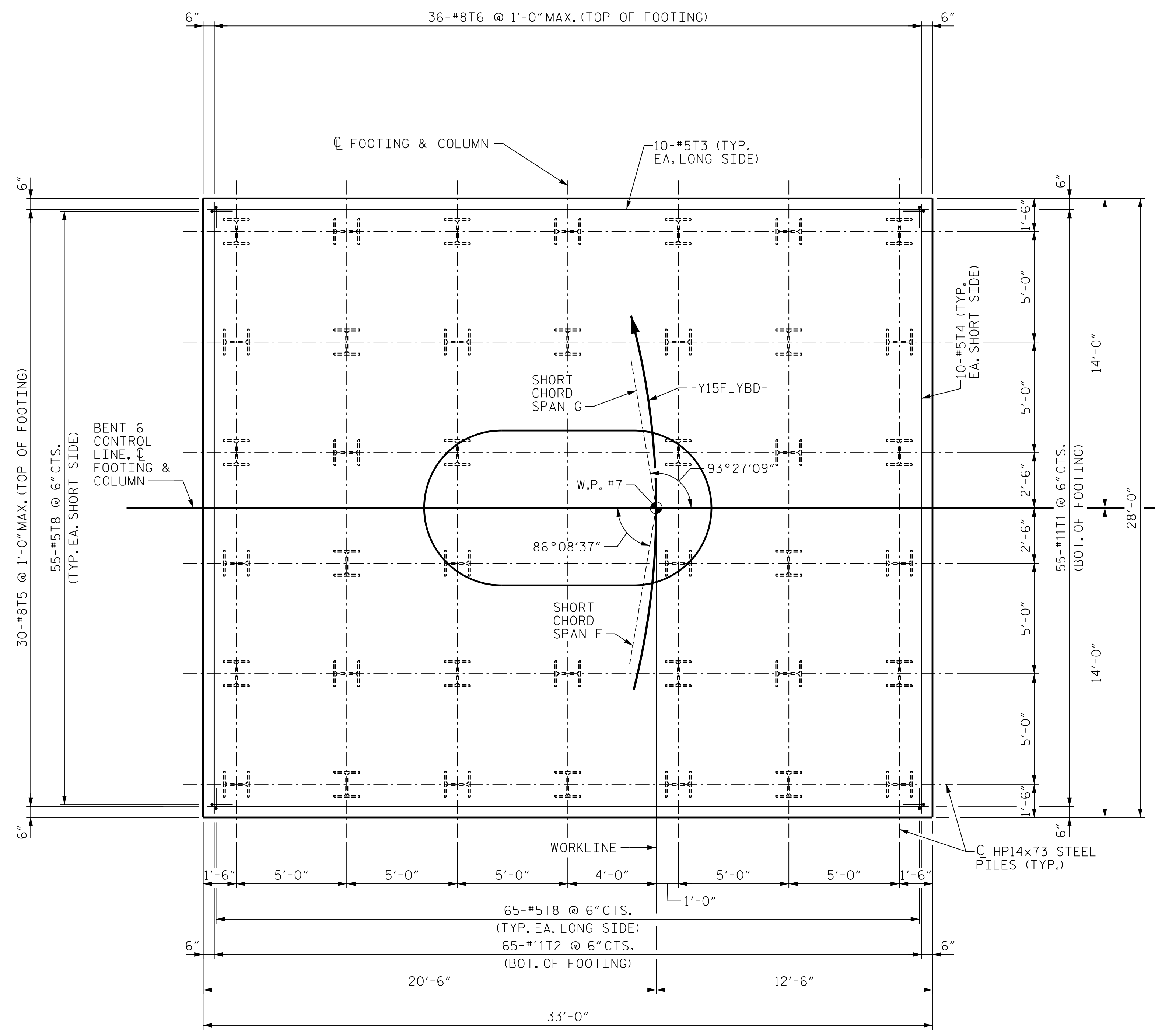
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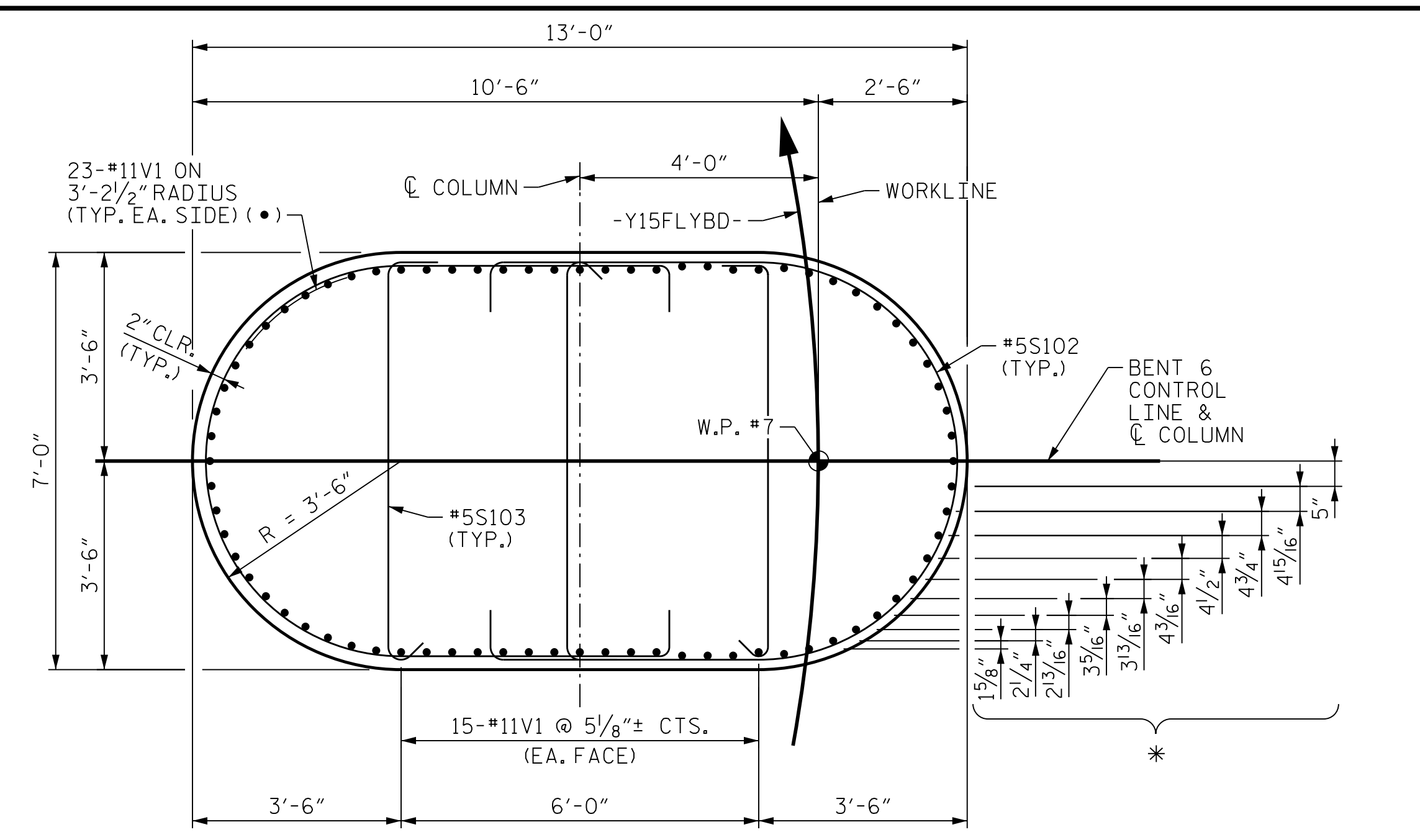
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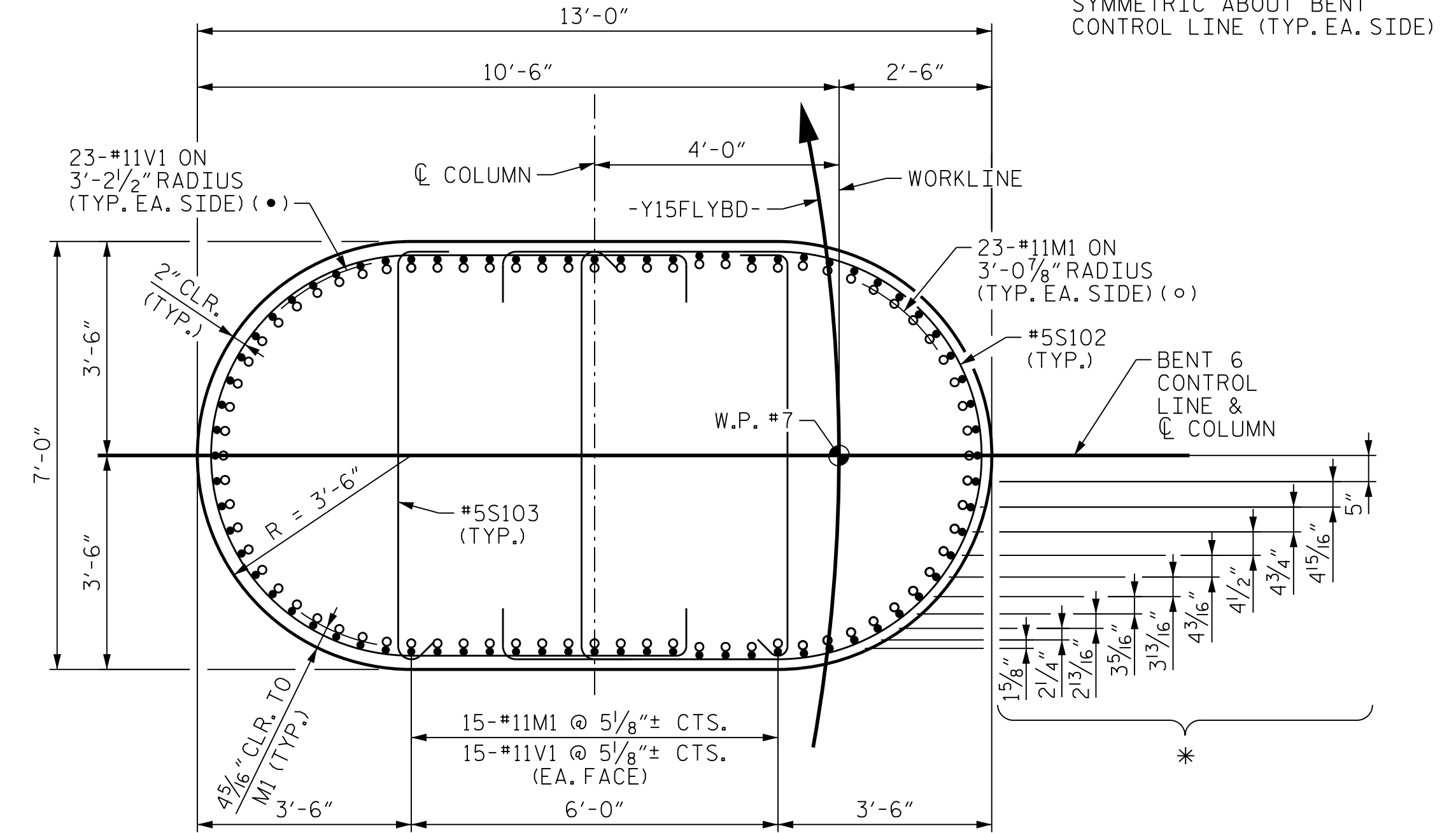
SHEET NO. S05-105
 TOTAL SHEETS 116



FOOTING PLAN



SECTION B-B



SECTION A-A

* DIMENSIONS TO "V" BARS SYMMETRIC ABOUT BENT CONTROL LINE (TYP. EA. SIDE)

NOTE
FOR ADDITIONAL NOTES, SEE "SUBSTRUCTURE BENT 1 ELEVATIONS", SHEET 1 OF 5.

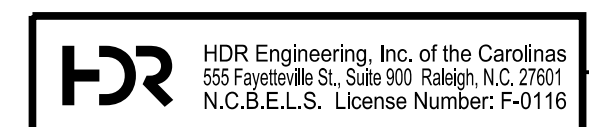
PROJECT NO. U-2579AB
FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 3 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 BENT 6
 FOOTING & COLUMN
 DETAILS**

REVISIONS						SHEET NO. S05-106 TOTAL SHEETS 116
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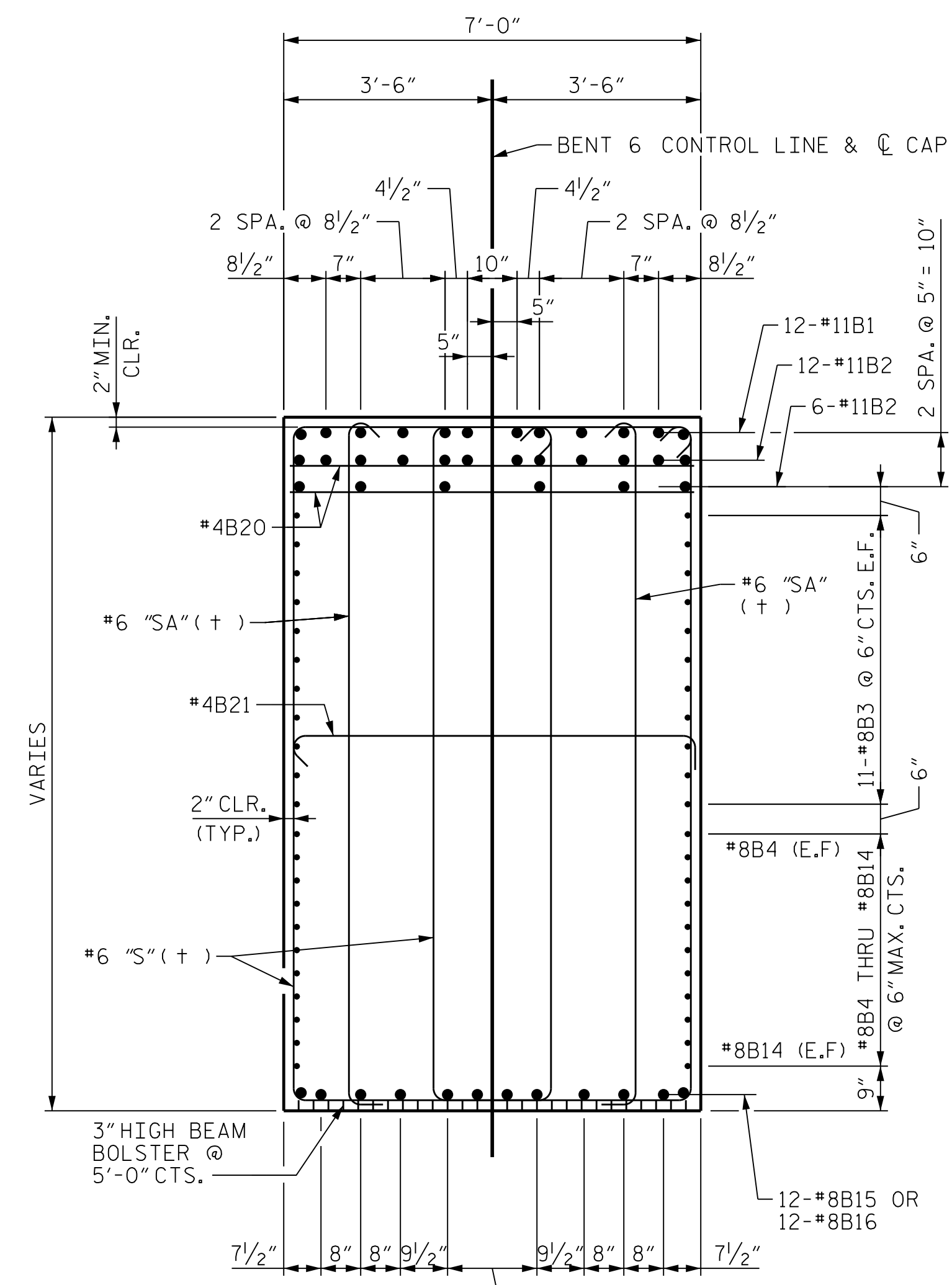


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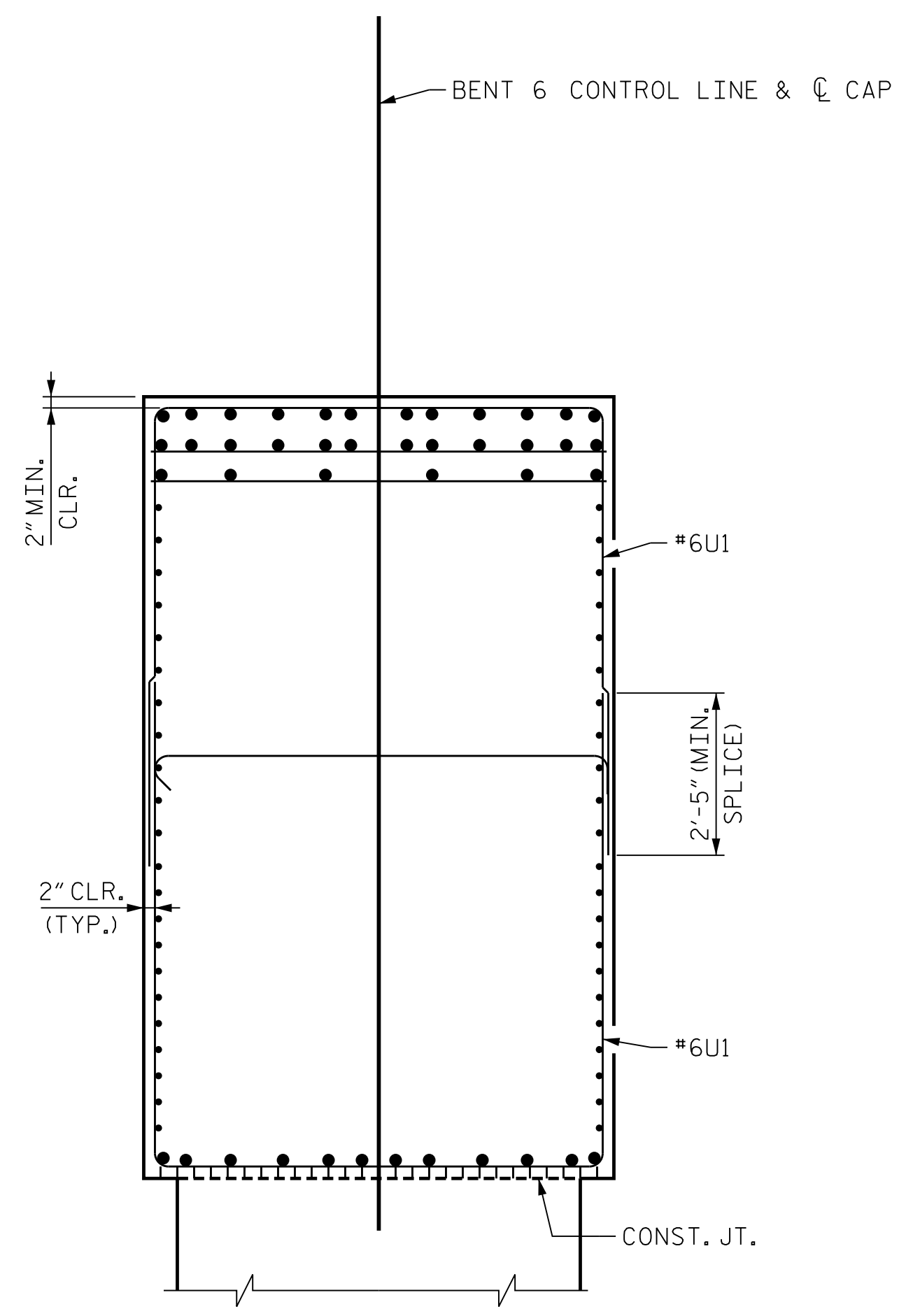
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DES BY: <u>K. OLIVER</u>	DATE: <u>11/19</u>	DWG BY: <u>B. PETERSON</u>	DATE: <u>11/19</u>
DES CHK: <u>N. LIU</u>	DATE: <u>11/19</u>	CHK BY: <u>N. LIU</u>	DATE: <u>12/19</u>

NOTE
SEE SHEETS 1 AND 2 OF 6 FOR NOTES.

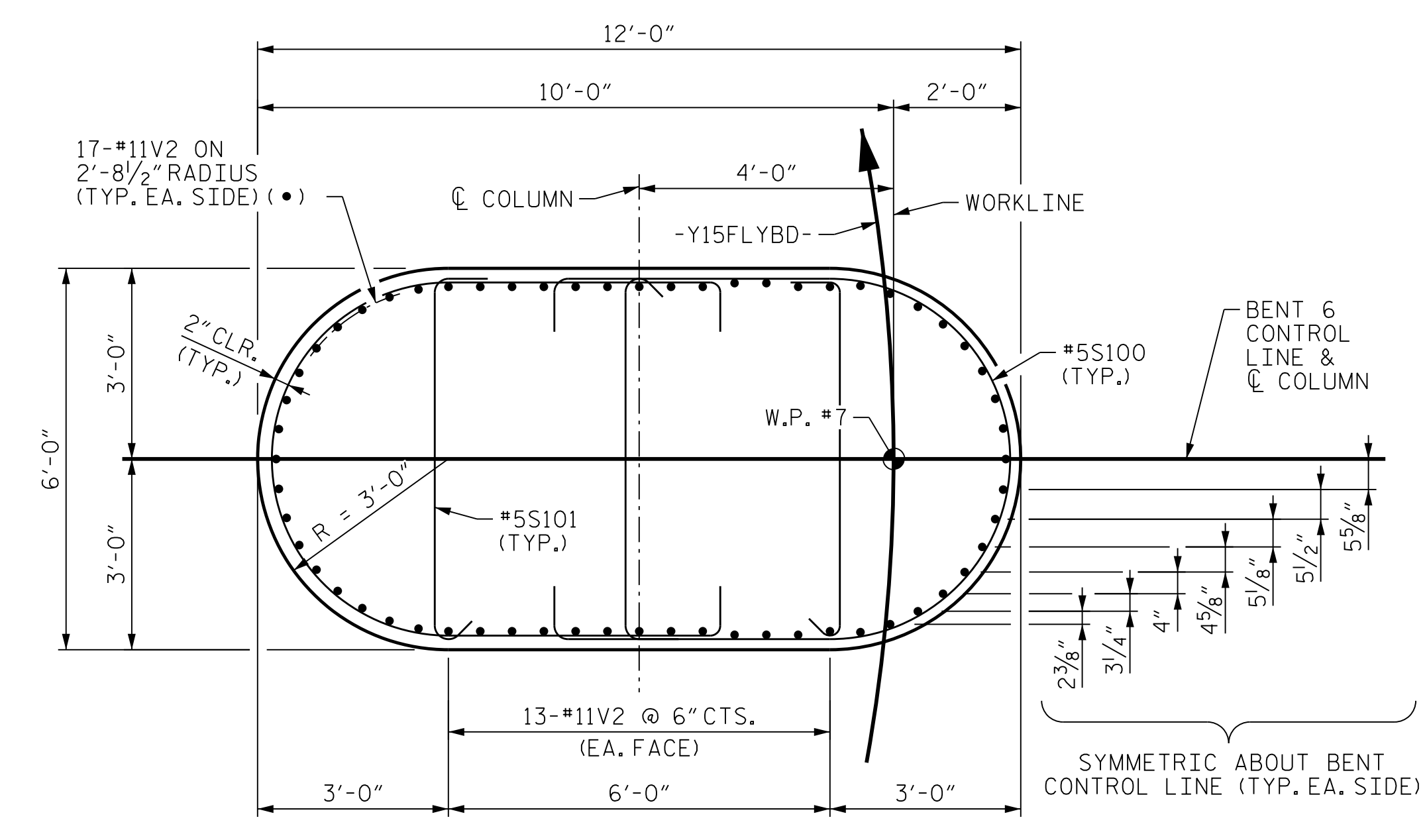


SECTION D-D
(+) SEE "STIRRUP SET DETAIL"

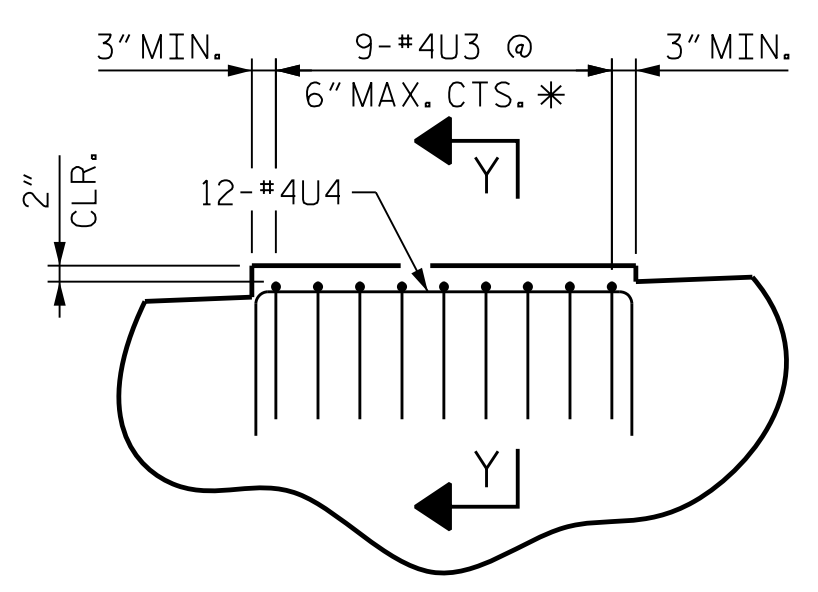


SEE SECTION D-D FOR ADDITIONAL INFORMATION

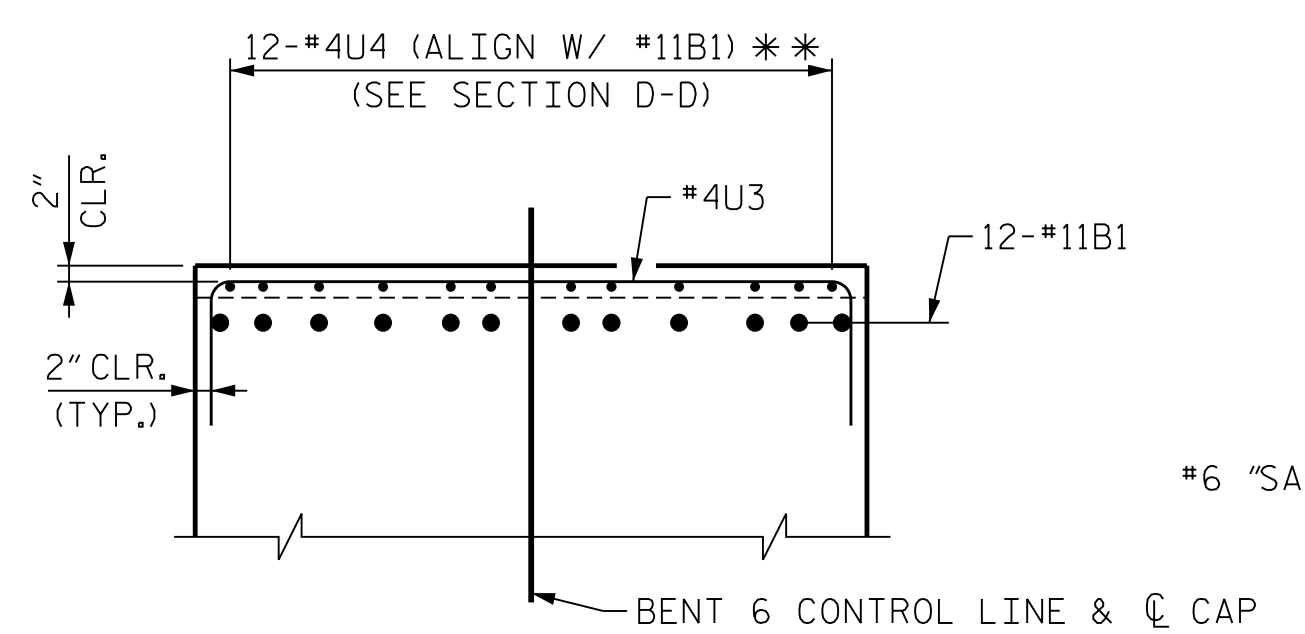
SECTION E-E
COLUMN REINFORCING STEEL NOT SHOWN FOR CLARITY



SECTION C-C

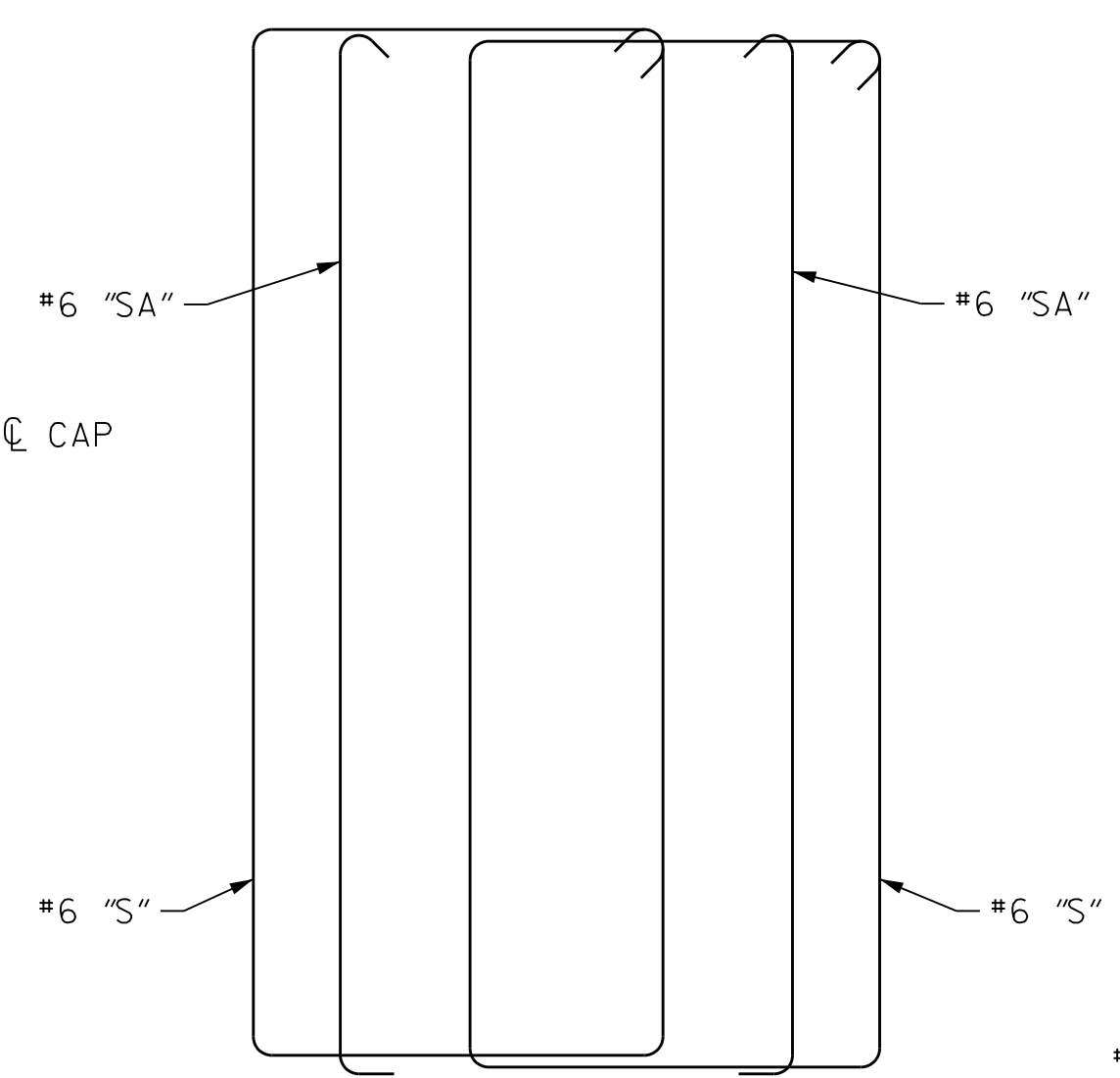


DETAIL "B"

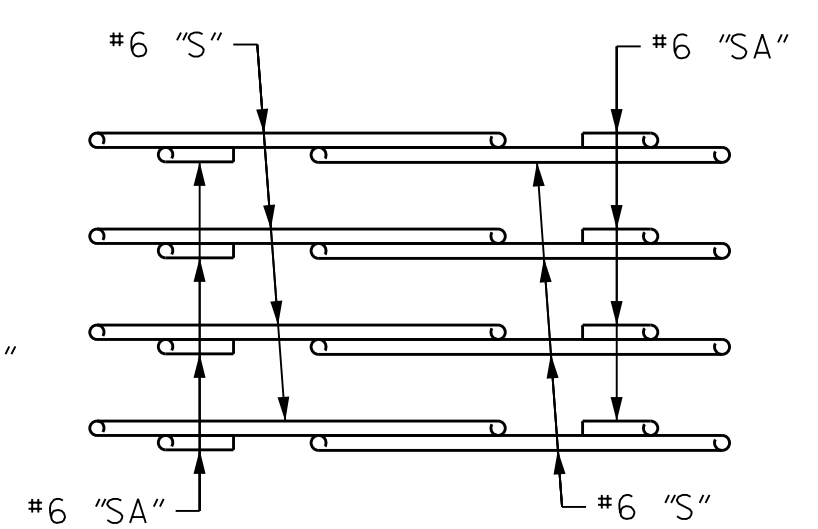


SECTION Y-Y

* NOTE:
#4U3 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.
** NOTE:
#4U4 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR #11B1 AND #11B2 BARS.



ELEVATION
(SCHEMATIC)

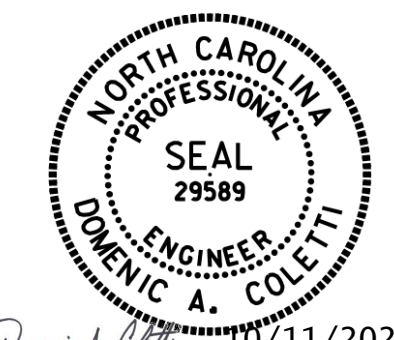


PLAN
(SHOWING BAR PLACEMENT)

STIRRUP SET DETAIL

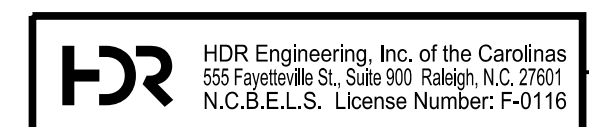
PROJECT NO. U-2579AB
FORSYTH COUNTY
STATION: 47+63.62 -Y15FLYBD-
SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
BENT 6
BENT CAP DETAILS



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

SHEET NO. 505-108
TOTAL SHEETS 116



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PLOT DRIVER: NCDOT.pdf_color_eng-50dpi
USER: PPETERSO DATE: 10/17/2021
FILE: ...SUBSTR

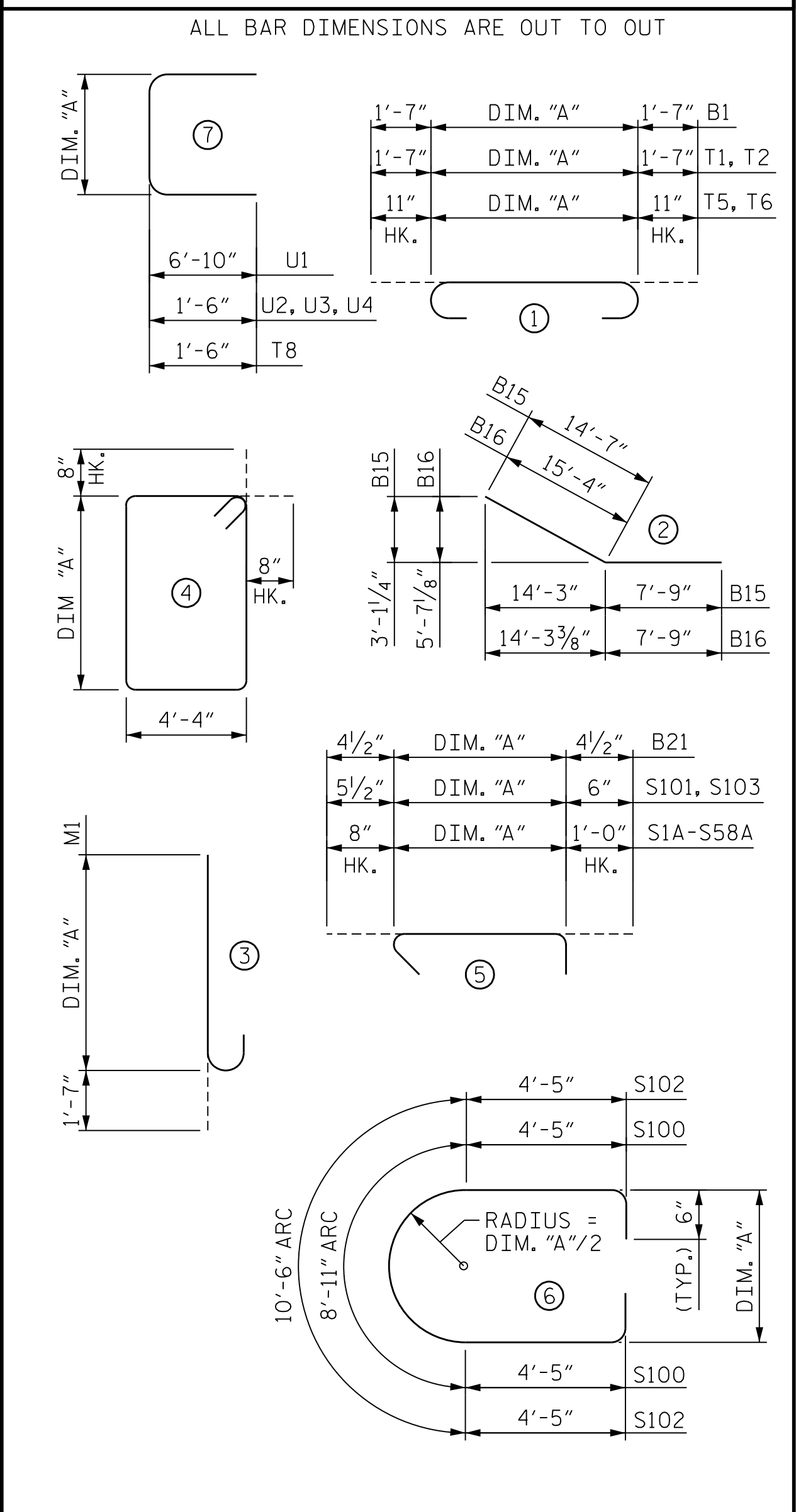
DES BY: K. OLIVER	DATE: 10/19	DWG BY: B. PETERSON	DATE: 11/19
DES CHK: M. WERNER	DATE: 10/19	CHK BY: N. LIU	DATE: 12/19

BILL OF MATERIAL - BENT 6

Table with columns: BAR NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT, BAR NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT. Lists materials for bars B1 through B56 and M1 through M8.

Table with columns: BAR NO., SIZE, TYPE, DIM. 'A', LENGTH, WEIGHT. Lists materials for bars U1 through V2.

BAR TYPES



SUMMARY OF QUANTITIES - BENT 6

Table with columns: REINFORCING STEEL, LBS., 90,191; CLASS AA CONCRETE; POUR #1 - FOOTING, C.Y., 239.6; POUR #2 - COLUMN, C.Y., 108.9; POUR #3 - COLUMN, C.Y., 42.9; POUR #4 - CAP, C.Y., 109.0; TOTAL, C.Y., 500.4; HP 14x73 STEEL PILES, NO., 40; LF, 2,200; PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES, EA., 40.

NOTE SEE SHEET 1 OF 6 FOR NOTES.

PROJECT NO. U-2579AB FORSYTH COUNTY STATION: 47+63.62 -Y15FLYBD-

SHEET 6 OF 6

Professional Engineer Seal for Dominic A. Coletti, State of North Carolina, License No. 29589.

Table with columns: NO., BY, DATE, NO., BY, DATE. Shows revision history with entries 1, 2, 3, 4.

HDR Engineering, Inc. of the Carolinas logo and address: 555 Fayetteville St., Suite 900, Raleigh, N.C. 27601. License Number: P-0116.

PLOT DRIVER: NCDOT... DATE: 10/11/2021

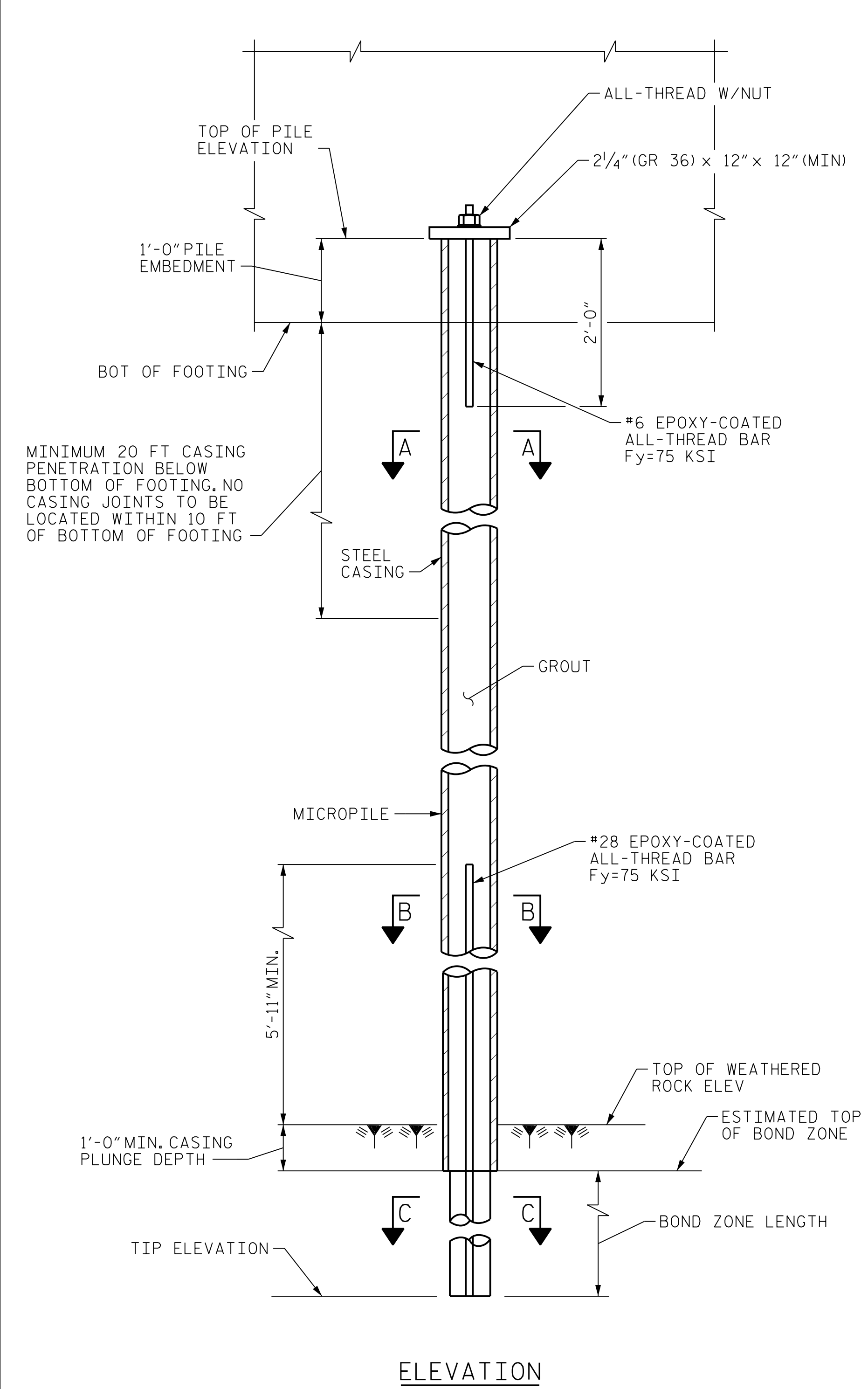
DES BY: B. PETERSON DATE: 11/19 DWG BY: B. PETERSON DATE: 11/19 DES CHK: S. NIFONG DATE: 12/19 CHK BY: M. WERNER DATE: 12/19

10/11/2021

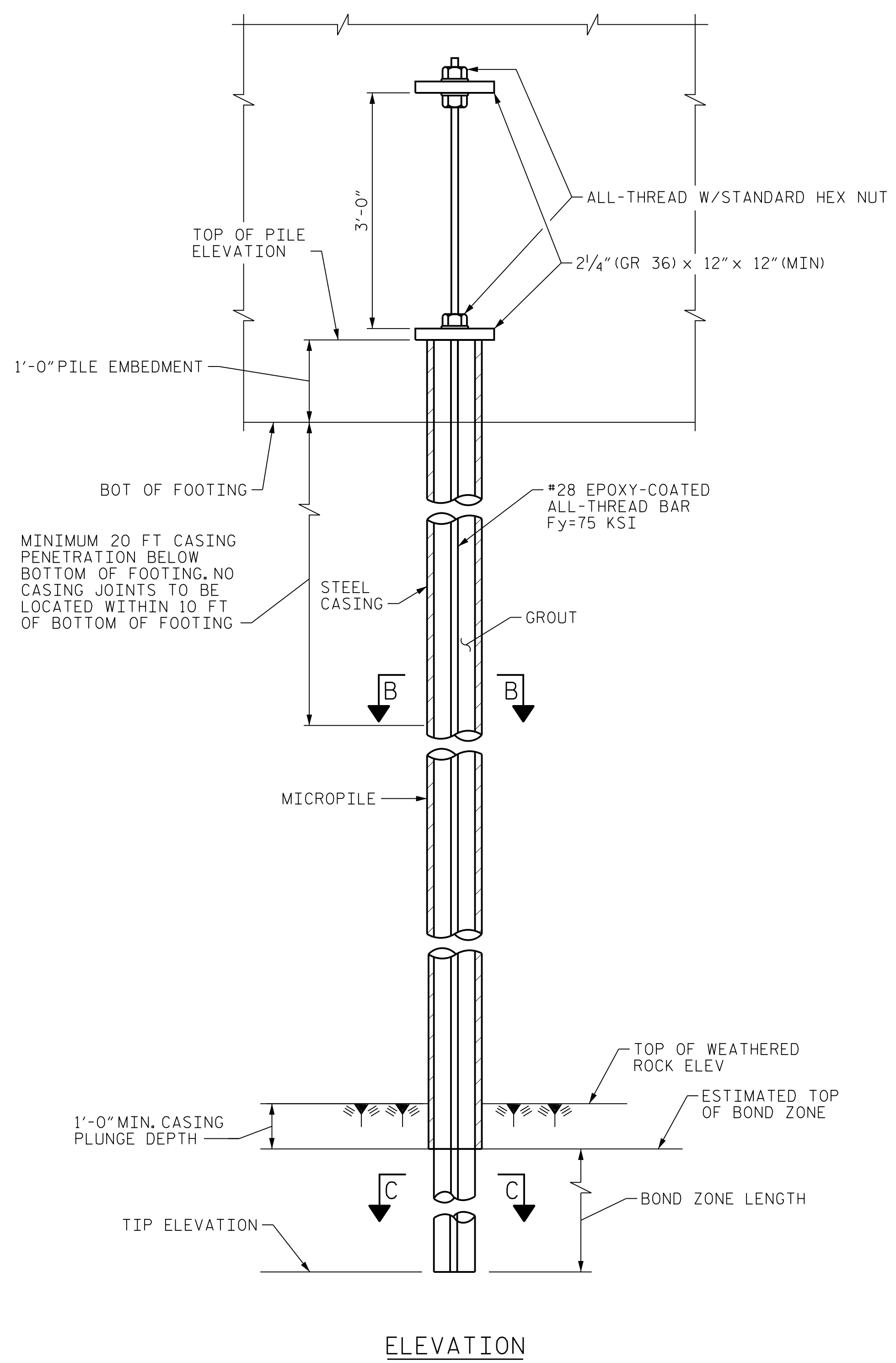
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SHEET NO. 505-109 TOTAL SHEETS 116

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 DATE: 10/11/2021...
 TIME: 8:30:41 AM...
 FILE: ...MICROP



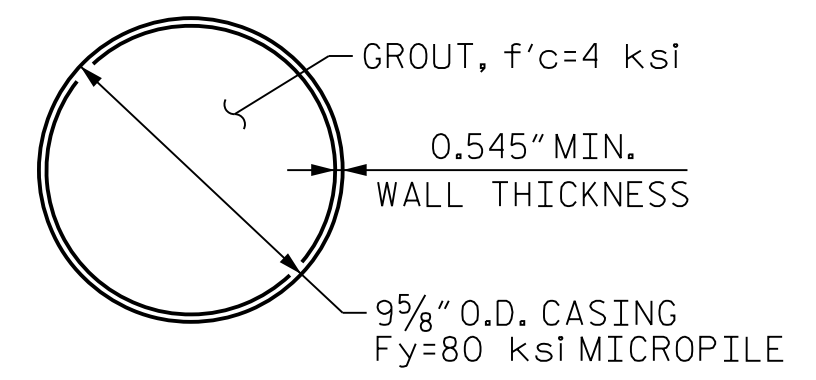
MICROPILE TYPE 1 DETAIL



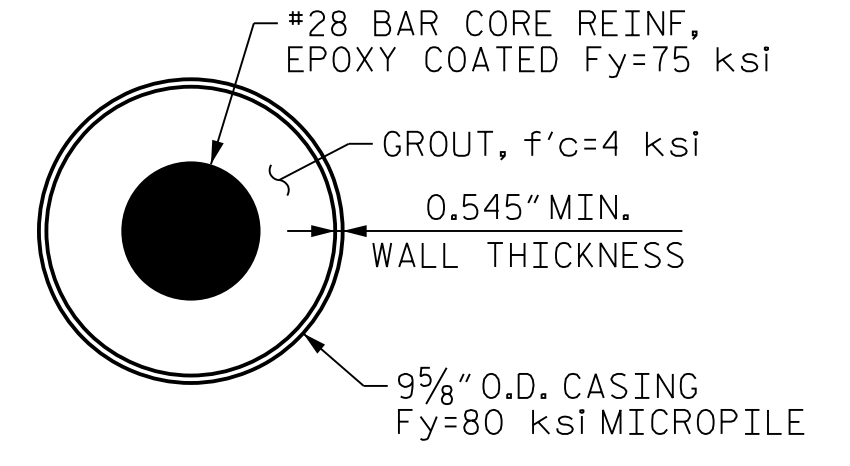
MICROPILE TYPE 2 DETAIL

MICROPILE NOTES:

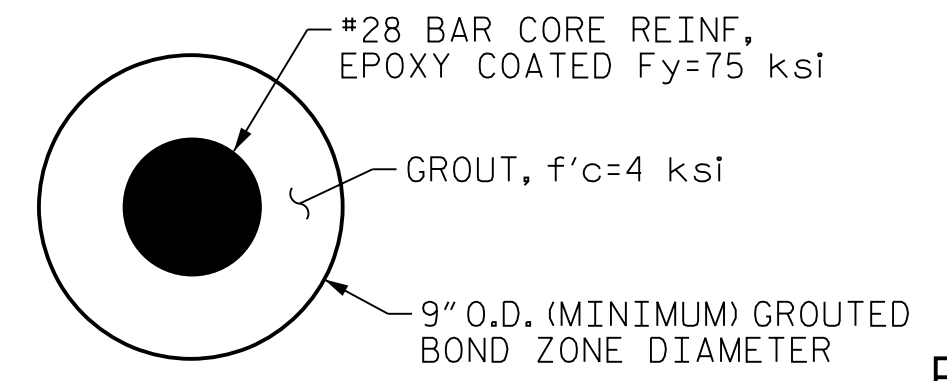
- FOR MICROPILES, SEE MICROPILE PROVISION.
- USE PRIME DOMESTIC REINFORCING CASINGS WITH YIELD STRENGTHS OF AT LEAST 80 KSI AND A NOMINAL WALL THICKNESS OF 0.545 IN FOR MICROPILES AT BENT NOS. 1, 3, 4, AND 5.
- REINFORCING CASING FOR MICROPILES ARE TO BE INSTALLED TO A DEPTH OF 20 FT BELOW THE BOTTOM OF FOOTING ELEVATION. MINIMUM CASING LENGTH IS REQUIRED TO RESIST A LATERAL FACTORED LOAD OF 7 KIPS PER PILE. NO CASING JOINTS WILL BE LOCATED WITHIN 10 FEET BELOW BOTTOM OF FOOTING.
- MICROPILE ESTIMATED LENGTHS ARE BASED ON NCDOT GEOTECHNICAL DESIGN ASSUMPTION AND IS FOR INFORMATION PURPOSES ONLY. CONTRACTOR TO VERIFY MICROPILE LENGTHS FOR ESTIMATING PURPOSES.
- A MINIMUM OF ONE VERIFICATION TEST IS REQUIRED ON A DEMONSTRATION MICROPILE INSTALLED AT THE SITE. ADDITIONAL VERIFICATION TEST AND DEMONSTRATION PILES MAYBE REQUIRED TO VERIFY ALL GEOTECHNICAL DESIGN BOND ASSUMPTIONS. PERFORM VERIFICATION TEST ON DEMONSTRATION PILE AT BENT NO. 3. LOCATION OF DEMONSTRATION PILE TO BE APPROVED BY ENGINEER.
- PROOF TESTING IS REQUIRED AT EACH BENT LOCATION.
- USE TYPE 2 MICROPILES FOR ALL TENSION PILES AS NOTED ON THE STRUCTURE PLANS AND ALL TEST PILES. USE TYPE 1 MICROPILES IN ALL OTHER LOCATIONS.
- USE MICROPILE SUPPORTED FOUNDATIONS AT BENT NOS. 1, 3, 4, AND 5. SEE MICROPILE DATA TABLE FOR FACTORED RESISTANCE, MINIMUM CASING TIP, MINIMUM TIP ELEVATION, AND MINIMUM WEATHERED ROCK AND ROCK PENETRATION.



SECTION A-A



SECTION B-B



SECTION C-C

MICROPILE DATA TABLE									
BENT NO.	BOTTOM OF FOOTING ELEVATION (FT)	NUMBER OF MICROPILES	FACTORED AXIAL RESISTANCE (KIPS)	FACTORED LATERAL RESISTANCE (KIPS)	FACTORED UPLIFT RESISTANCE (KIPS)	MIN. CASING TIP ELEV. FOR LATERAL RESISTANCE (FT)	ESTIMATED MICROPILE LENGTH (FT)	MIN. WEATHERED ROCK PENETRATION (FT)	MIN. ROCK PENETRATION (FT)
1	872.65	40	270	6.9	N/A	852.5	60.0	20.0	10
3	841.99	54	270	5.3	30	822.0	65.0	20.0	10
4	842.36	54	235	3.9	35	822.0	65.0	20.0	10
5	865.22	48	265	3.8	N/A	845.0	75.0	20.0	10

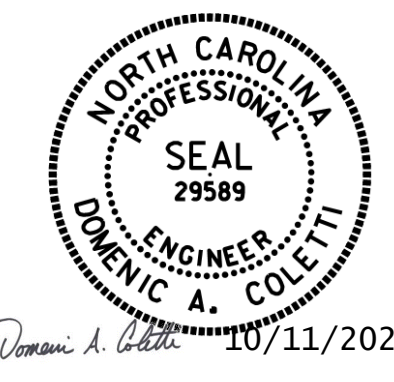
PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
MICROPILE DETAILS**

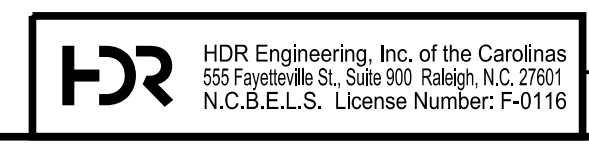
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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SHEET NO. S05-110
 TOTAL SHEETS 116

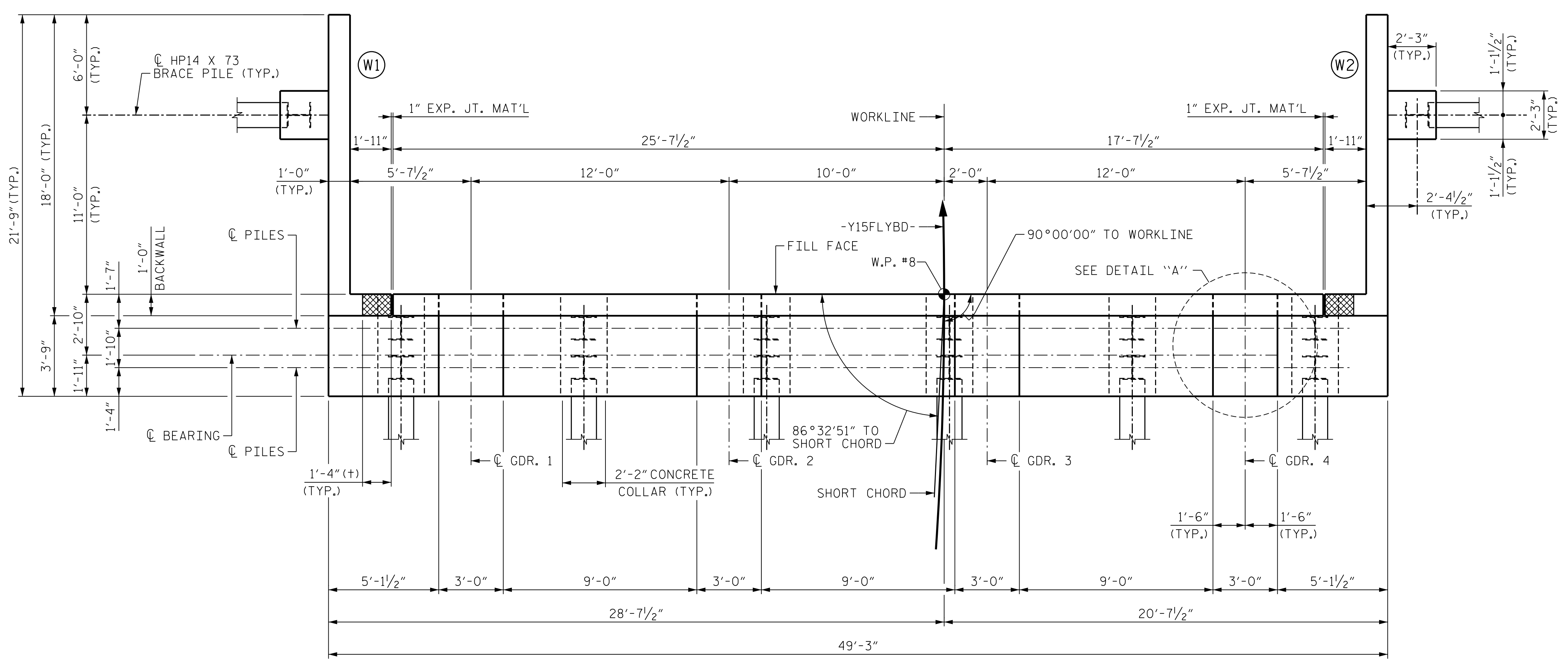


10/11/2021

DES BY: K. OLIVER DATE: 12/19 DWG BY: K. RYAN DATE: 12/19
 DES CHK: N. LIU DATE: 12/19 CHK BY: N. LIU DATE: 1/20



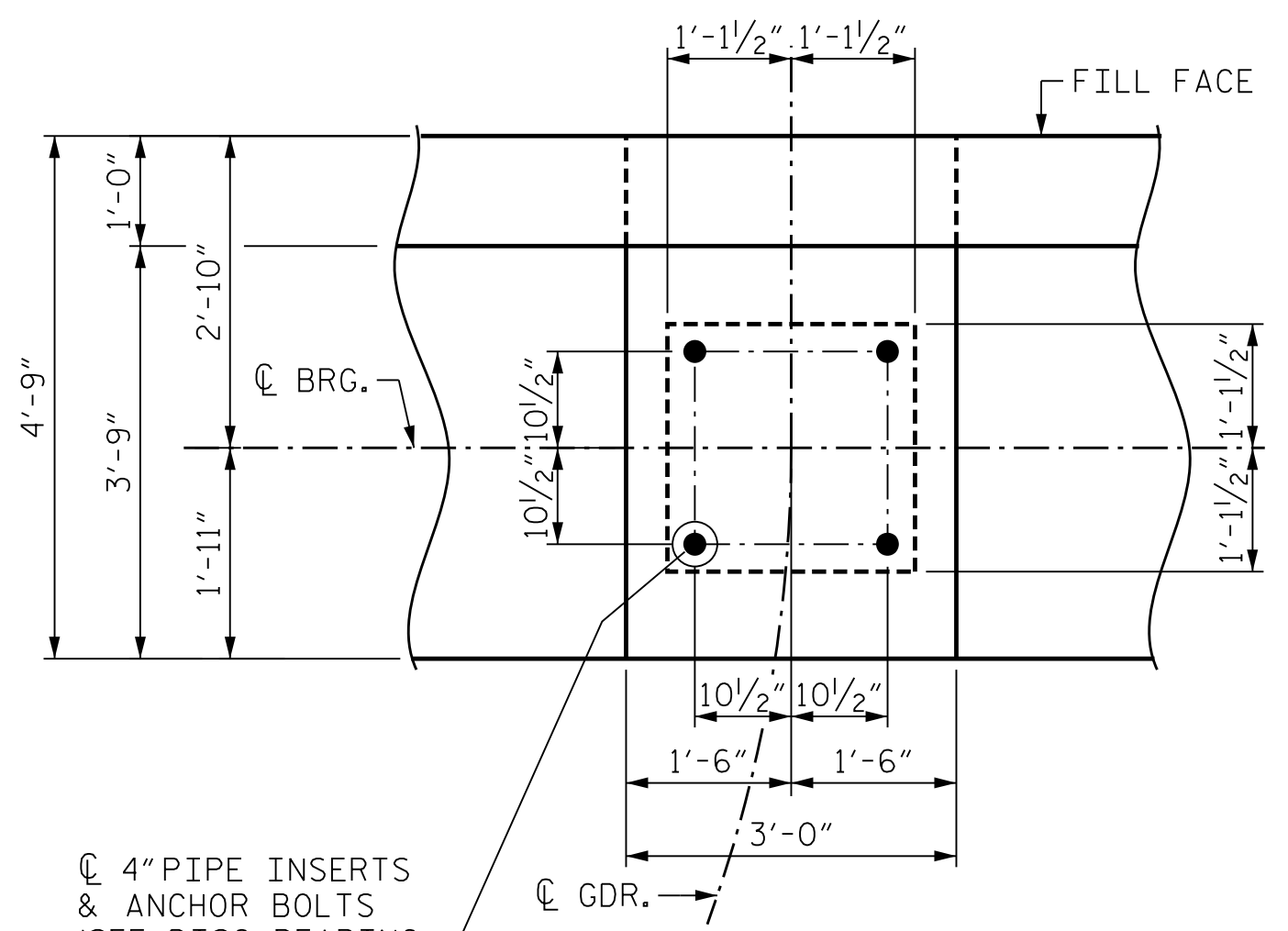
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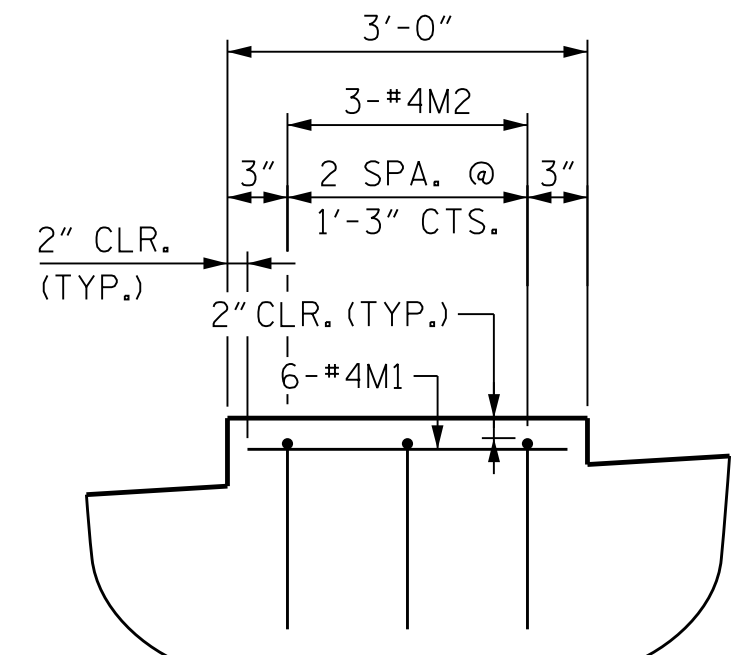
PLAN

† = THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

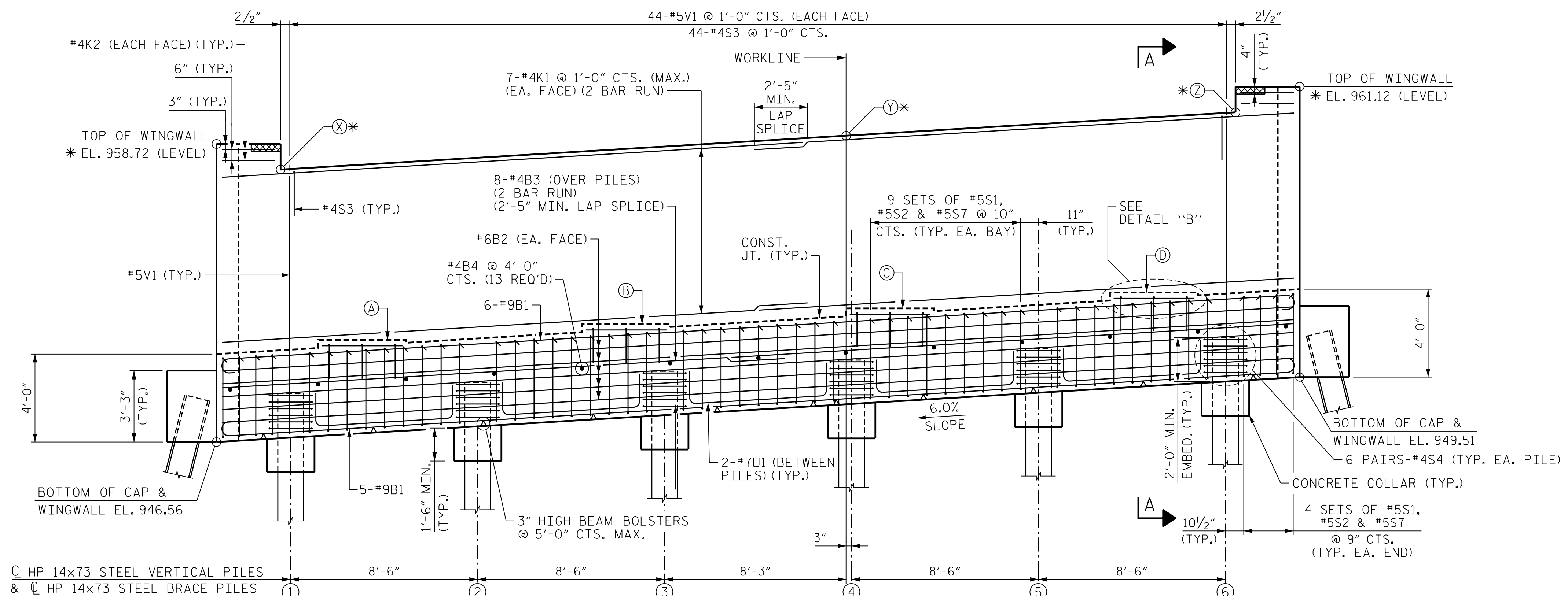
NOTES
FOR SECTION A-A AND ADDITIONAL NOTES SEE "END BENT 2 SECTION & DETAILS".



DETAIL "A"
(DIMENSIONS TYP. FOR ALL BEARINGS)



DETAIL "B"
(TYP. FOR ALL GIRDERS)



ELEVATION

ELEVATION TABLE	
LOCATION	ELEVATION
A	951.21
B	951.93
C	952.65
D	953.37
* X	956.95
* Y	958.49
* Z	959.55
* AT FILL FACE	

TOP OF PILE ELEVATIONS		
LOCATION	ELEVATION	
1	948.79	
2	949.30	
3	949.81	
4	950.32	
5	950.83	
6	951.34	



PROJECT NO. U-2579AB
 FORSYTH COUNTY
 STATION: 47+63.62 -Y15FLYBD-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2
 PLAN AND ELEVATION

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

SHEET NO.
S05-111
TOTAL SHEETS
116

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 TIME: 8:30:49 AM
 FILE: ...SUBSTR

DES BY: A. ZEITOUNI DATE: 07/19
 DES CHK: J. EARNEST DATE: 07/19
 DWG BY: B. PETERSON DATE: 07/19
 CHK BY: J. EARNEST DATE: 08/19

HDR HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

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