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TIP PROJECT: U-3109B

CONTRACT: C204106

STATE OF NORTH CAROLINA

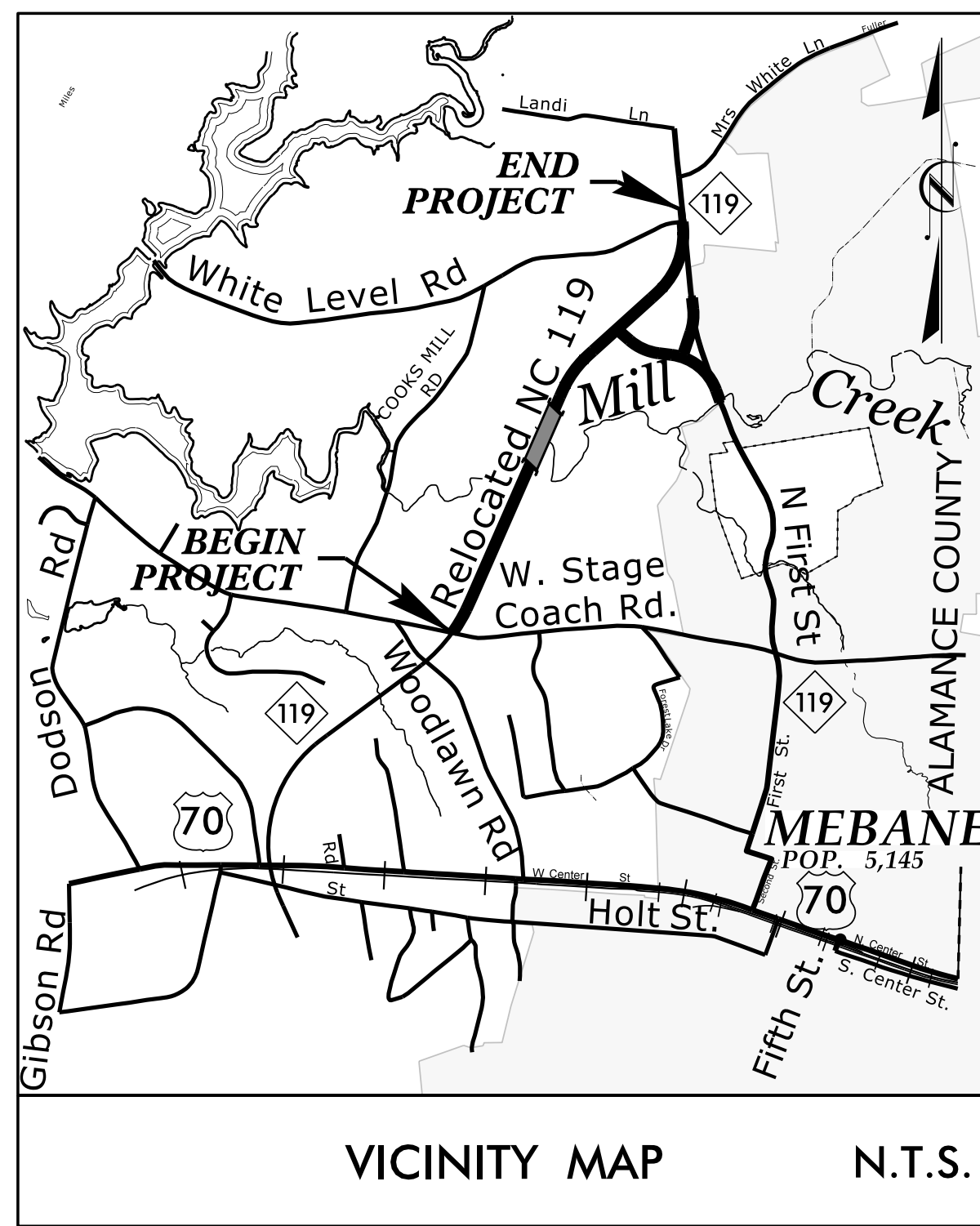
DIVISION OF HIGHWAYS

ALAMANCE COUNTY

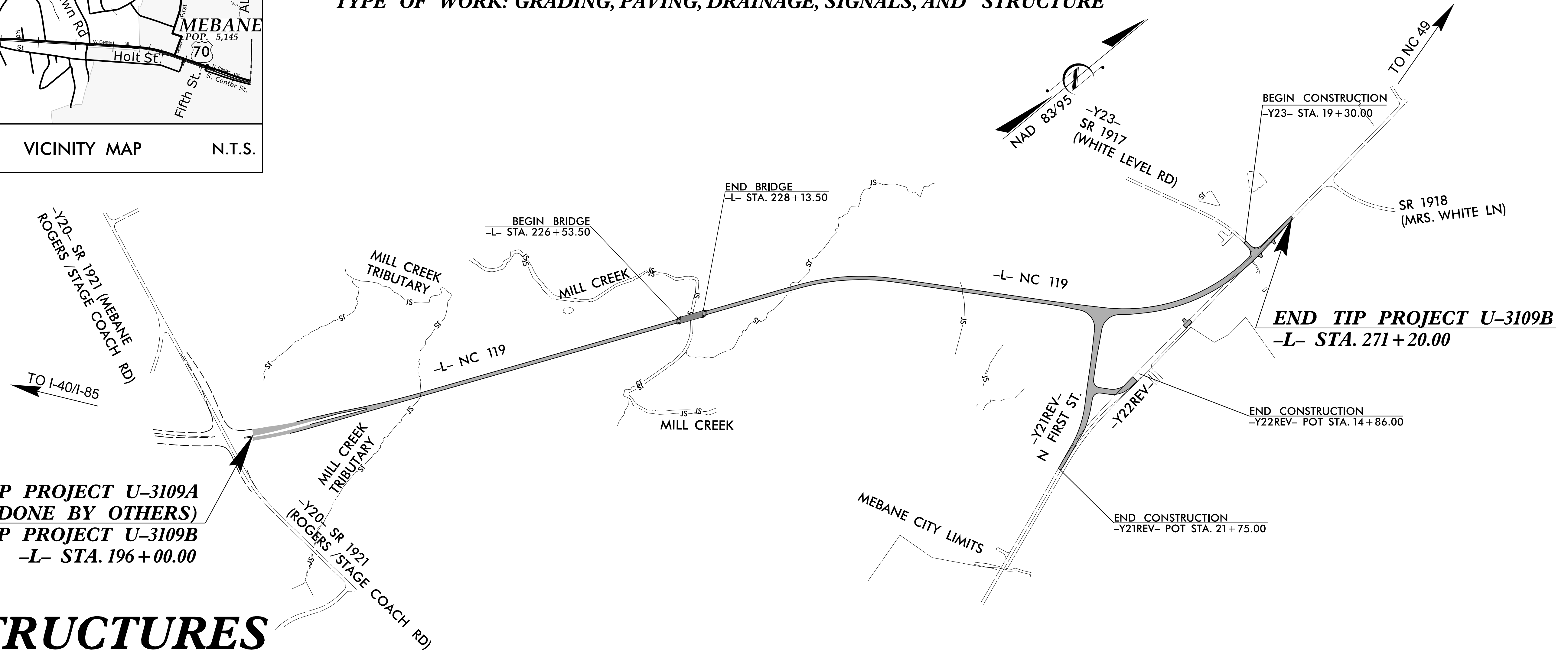
LOCATION: NC 119 RELOCATION FROM NORTH OF SR 1921 (ROGERS/STAGE COACH ROAD) TO SOUTH OF SR 1918 (MRS. WHITE LANE)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNALS, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3109B	1	26
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34900.1.FR3	STP-0119(11)	P.E.	
34900.2.3	STP-0119(8)	R/W	
34900.2.3	STP-0119(8)	UTILITIES	
34900.2.4	STP-0119(8)	CONSTRUCTION	

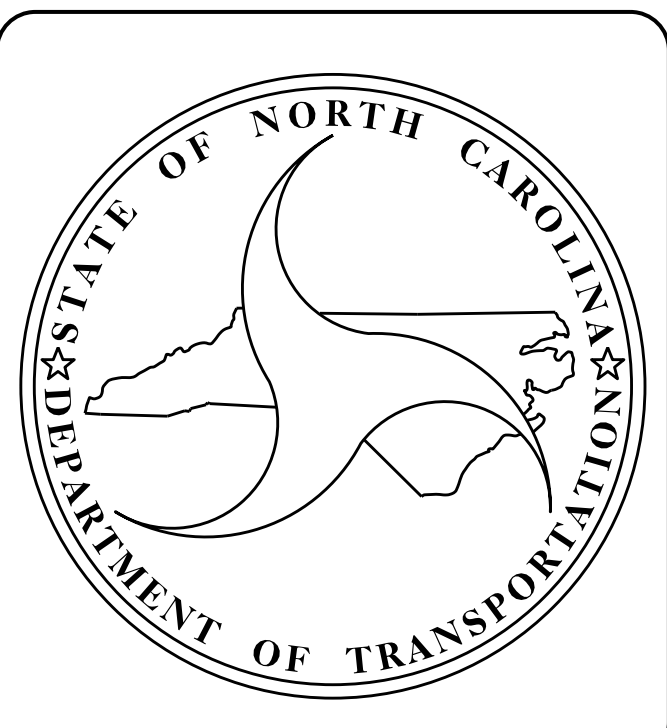


VICINITY MAP N.T.S.



**END TIP PROJECT U-3109A
(TO BE DONE BY OTHERS)
BEGIN TIP PROJECT U-3109B
-L- STA. 196 + 00.00**

STRUCTURES



DESIGN DATA

ADT (2018)	=	8,809
ADT (2038)	=	10,983
K	=	9%
D	=	65%
T	=	5%*
V	=	50 MPH
*TTST	=	4% + DUAL 1%
FUNC CLASS	=	MAJOR COLLECTOR
REGIONAL TIER		

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3109B	=	1.394 MILES
LENGTH STRUCTURE TIP PROJECT U-3109B	=	0.030 MILES
TOTAL LENGTH OF TIP PROJECT U-3109B	=	1.424 MILES

PREPARED BY:



5950 FAIRVIEW ROAD
SUITE 320
CHARLOTTE, NC 28210
(704) 332-2289
NC LICENSE NO. C-2213

PREPARED FOR:

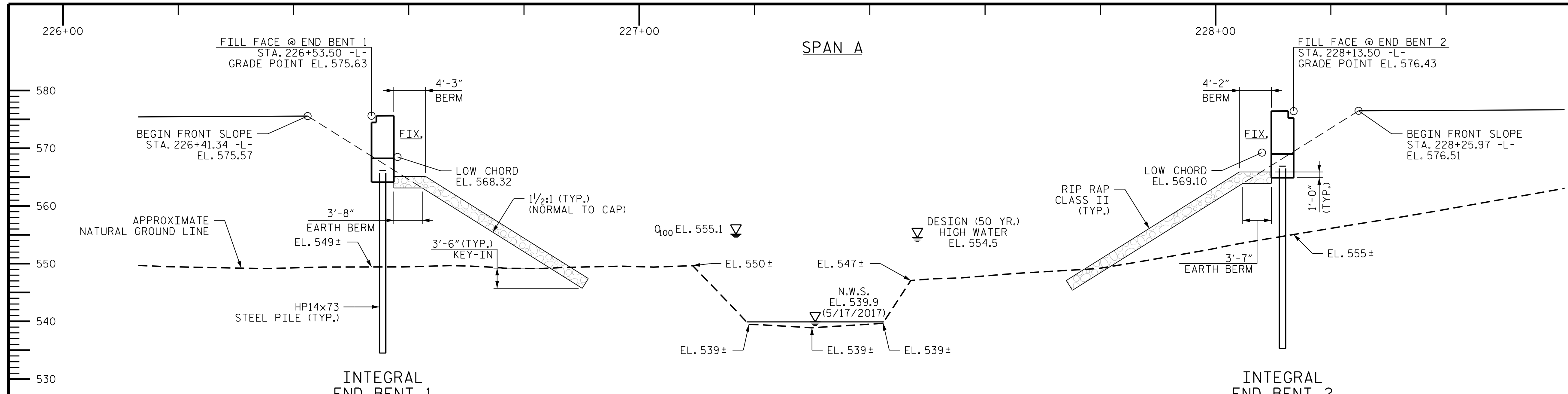
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2018 STANDARD SPECIFICATIONS

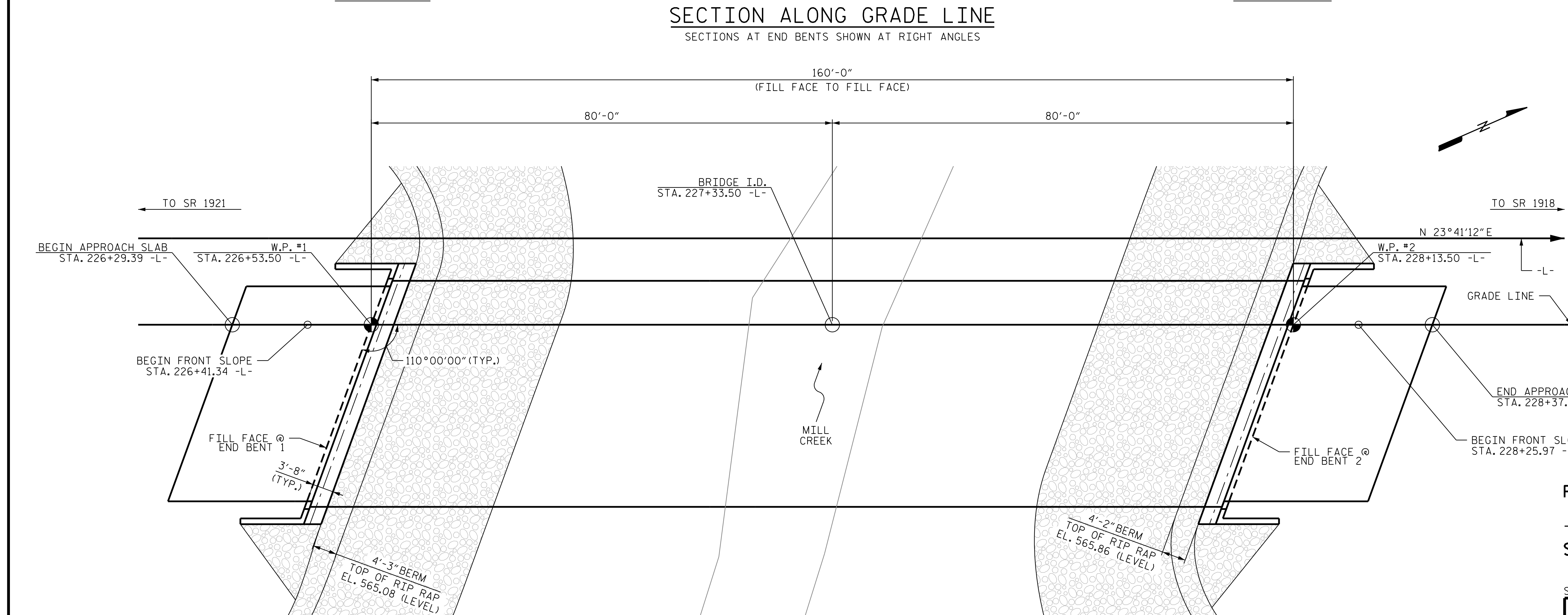
LETTING DATE : JULY 17, 2018

ROBERT A. ALONSO, PE, SE
PROJECT ENGINEER

RUDY M. CASTILLO, EI
PROJECT DESIGN ENGINEER



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



HYDRAULIC DATA

DESIGN DISCHARGE	= 3,290 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 554.5
DRAINAGE AREA	= 11.3 SQ. MI.
BASE DISCHARGE (Q100)	= 3,720 CFS
BASE HIGH WATER ELEVATION	= 555.1
OVERTOPPING DISCHARGE	= N/A
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YR.
OVERTOPPING FLOOD ELEVATION	= 574.8 SAG

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

DRMP
 5950 FAIRVIEW ROAD, SUITE 320
 CHARLOTTE, NC 28210
 (980) 229-4103
 NC LICENSE NO. C-2213

6/7/2018 6:39:25 PM EDT
 DRMP JOB NUMBER: 15-0323.002

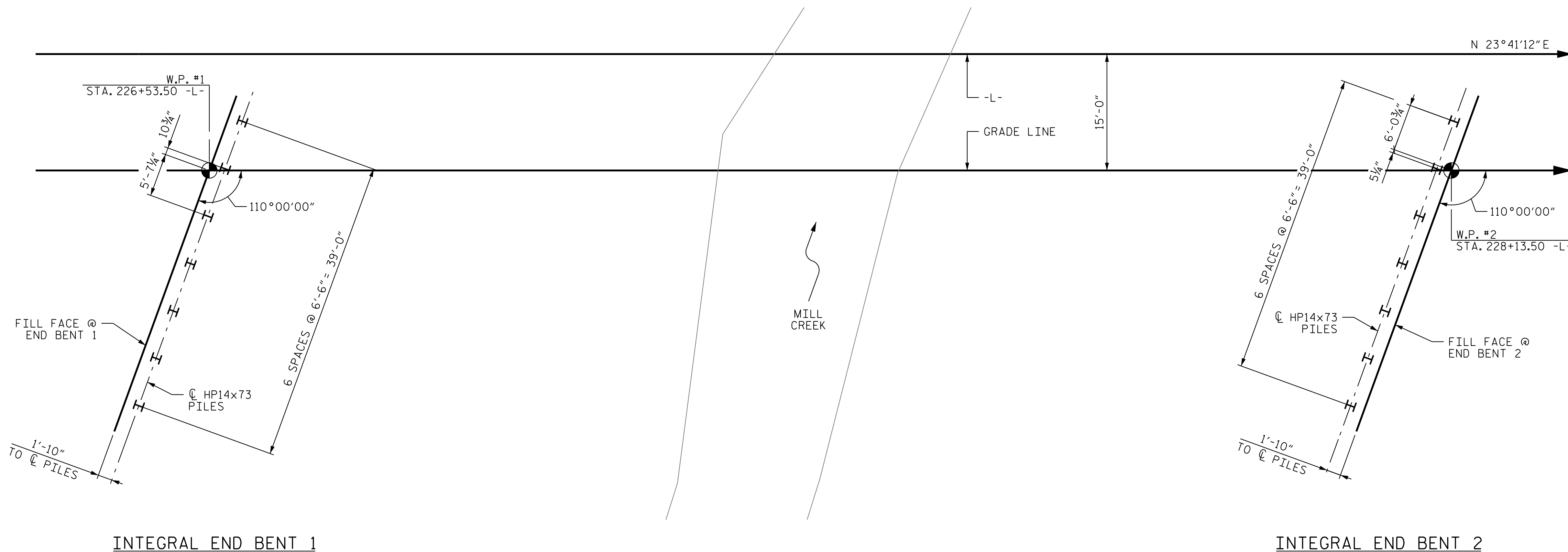
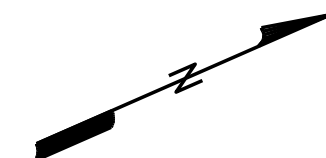
PROJECT NO. U-3109B
 ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 1 OF 3 BRIDGE NO. 440

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING

FOR BRIDGE ON NC 119
 OVER MILL CREEK
 BETWEEN SR 1921 & SR 1918

REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S-1
2			TOTAL SHEETS 29
3			
4			



FOUNDATION LAYOUT
(PILE LOCATION IS TO THE CENTERLINE OF PILE)

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 170 TONS PER PILE.

DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 285 TONS PER PILE.

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.1 AND END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40,000 TO 45,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE THE PILES AT END BENT NO.1 AND END BENT NO.2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 2 OF 3

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 SIGNATURES COMPLETED

DRMP
 5950 FAIRVIEW ROAD, SUITE 320
 CHARLOTTE, NC 28210
 (980) 229-4103
 NC LICENSE NO. C-2213

Seal of Professional Engineer **ADAM J. PETER**, No. 35695, State of North Carolina.

6/7/2018 6:39:25 PM EDT

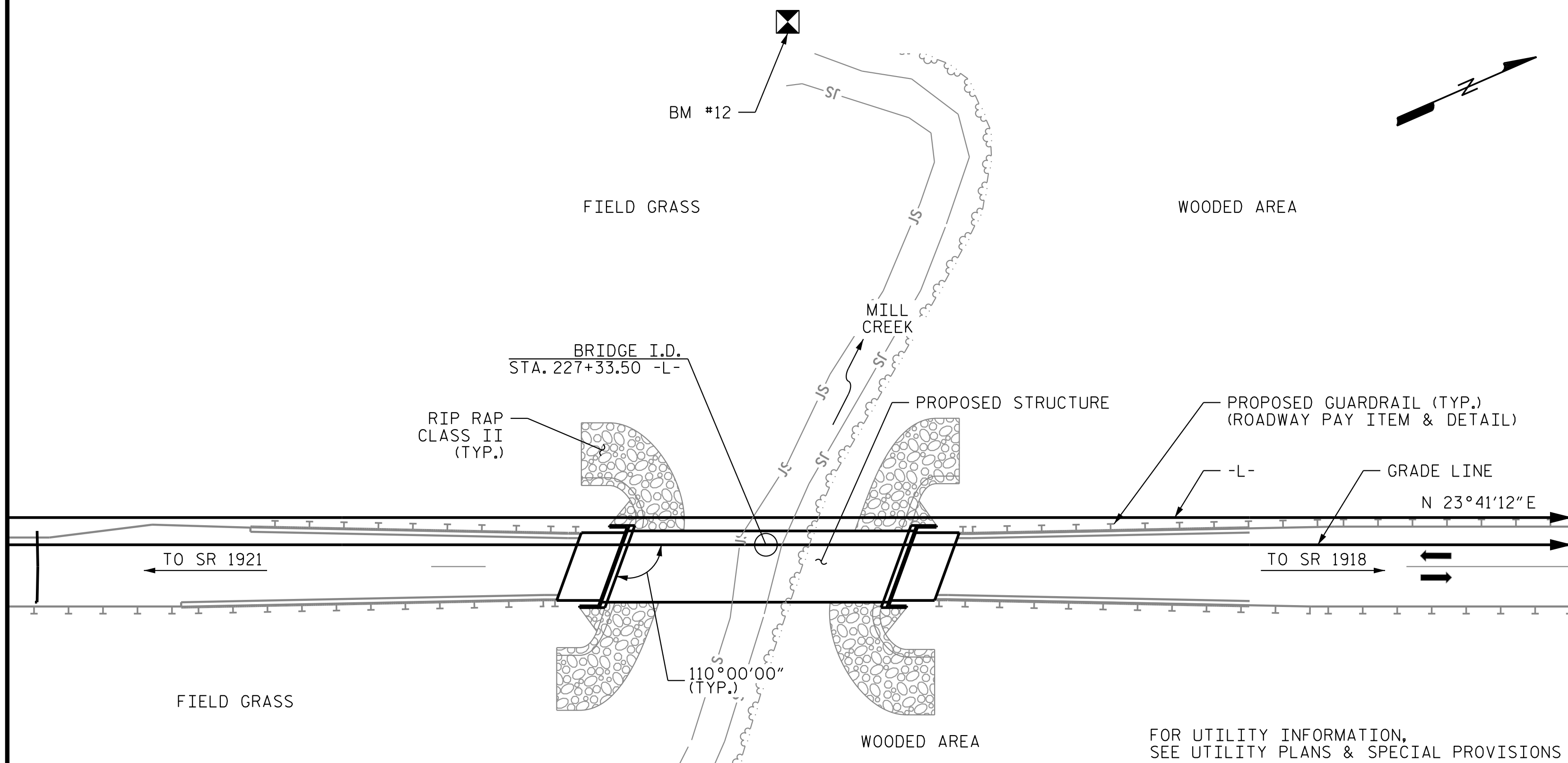
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING

FOR BRIDGE ON NC 119
 OVER MILL CREEK
 BETWEEN SR 1921 & SR 1918

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

BM #12: RR SPIKE IN BASE OF 30" SWEETGUM, 287' LEFT OF STA. 227+45 -L-, EL. 550.13'



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS:
 FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30" SAMPLE OF EACH SIZE BAR USED,
 AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30" SAMPLES OF EACH SIZE BAR USED.
 THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPICED WITH REPLACEMENT BARS OF THE SIZE AND
 LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.
 PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
 REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3
 OF THE STANDARD SPECIFICATIONS.
 NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE
 SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND
 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS
 CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
 ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR
 SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD
 SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

TOTAL BILL OF MATERIAL

LOCATION	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	STRUCTURAL STEEL APPROX. 238000 LBS.	PILE DRIVING EQUIPMENT SETUP FOR HP14x73 STEEL PILES	HP14x73 STEEL PILES		STEEL PILE POINTS	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LUMP SUM	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE		6,210	6,938				LUMP SUM					316.5			
END BENT NO. 1				39.1		5,756		7	7	210	7		710	789	
END BENT NO. 2				39.1		5,756		7	7	175	7		749	832	
TOTAL	1	6,210	6,938	78.2	LUMP SUM	11,512	LUMP SUM	14	14	385	14	316.5	1,459	1,621	LUMP SUM

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING

FOR BRIDGE ON NC 119
 OVER MILL CREEK
 BETWEEN SR 1921 & SR 1918

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-3
2			4			TOTAL SHEETS 29

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRMP
 5950 FAIRVIEW ROAD, SUITE 320
 CHARLOTTE, NC 28210
 (980) 229-4103
 NC LICENSE NO. C-2213

6/7/2018 6:39:25 PM EDT

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.38	--	1.75	0.75	1.65	A	I	78'-0 1/2"	1.13	1.38	A	I	0'-0"	1.30	0.75	1.52	A	I	78'-0 1/2"		
	HL-93 (OPERATING)	N/A		1.79	--	1.35	0.75	2.14	A	I	78'-0 1/2"	1.13	1.79	A	I	0'-0"	1.00	0.75	1.97	A	I	78'-0 1/2"		
	HS-20 (INVENTORY)	36.00	2	2.15	77.40	1.75	0.75	2.61	A	I	78'-0 1/2"	1.13	2.15	A	I	0'-0"	1.30	0.75	2.40	A	I	78'-0 1/2"		
	HS-20 (OPERATING)	36.00		2.79	100.44	1.35	0.75	3.38	A	I	78'-0 1/2"	1.13	2.79	A	I	0'-0"	1.00	0.75	3.12	A	I	78'-0 1/2"		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.96	80.46	1.40	0.75	8.11	A	I	78'-0 1/2"	1.13	6.85	A	I	0'-0"	1.30	0.75	5.96	A	I	78'-0 1/2"	
		SNGARBS2	20.000		4.19	83.80	1.40	0.75	5.71	A	I	78'-0 1/2"	1.13	4.72	A	I	0'-0"	1.30	0.75	4.19	A	I	78'-0 1/2"	
		SNAGRIS2	22.000		3.87	85.14	1.40	0.75	5.28	A	I	78'-0 1/2"	1.13	4.33	A	I	0'-0"	1.30	0.75	3.87	A	I	78'-0 1/2"	
		SNCOTTS3	27.250		2.95	80.39	1.40	0.75	4.02	A	I	78'-0 1/2"	1.13	3.41	A	I	0'-0"	1.30	0.75	2.95	A	I	78'-0 1/2"	
		SNAGGRS4	34.925		2.38	83.12	1.40	0.75	3.23	A	I	78'-0 1/2"	1.13	2.72	A	I	0'-0"	1.30	0.75	2.38	A	I	78'-0 1/2"	
		SNS5A	35.550		2.33	82.83	1.40	0.75	3.17	A	I	78'-0 1/2"	1.13	2.71	A	I	0'-0"	1.30	0.75	2.33	A	I	78'-0 1/2"	
		SNS6A	39.950		2.10	83.90	1.40	0.75	2.86	A	I	78'-0 1/2"	1.13	2.43	A	I	0'-0"	1.30	0.75	2.10	A	I	78'-0 1/2"	
		SNS7B	42.000		2.00	84.00	1.40	0.75	2.72	A	I	78'-0 1/2"	1.13	2.34	A	I	0'-0"	1.30	0.75	2.00	A	I	78'-0 1/2"	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.55	84.15	1.40	0.75	3.47	A	I	78'-0 1/2"	1.13	2.93	A	I	0'-0"	1.30	0.75	2.55	A	I	78'-0 1/2"	
		TNT4A	33.075		2.54	84.01	1.40	0.75	3.46	A	I	78'-0 1/2"	1.13	2.89	A	I	0'-0"	1.30	0.75	2.54	A	I	78'-0 1/2"	
		TNT6A	41.600		2.05	85.28	1.40	0.75	2.79	A	I	78'-0 1/2"	1.13	2.41	A	I	0'-0"	1.30	0.75	2.05	A	I	78'-0 1/2"	
		TNT7A	42.000		2.05	86.10	1.40	0.75	2.78	A	I	78'-0 1/2"	1.13	2.38	A	I	0'-0"	1.30	0.75	2.05	A	I	78'-0 1/2"	
		TNT7B	42.000		2.07	86.94	1.40	0.75	2.82	A	I	78'-0 1/2"	1.13	2.32	A	I	0'-0"	1.30	0.75	2.07	A	I	78'-0 1/2"	
		TNAGRIT4	43.000		1.99	85.57	1.40	0.75	2.71	A	I	78'-0 1/2"	1.13	2.25	A	I	0'-0"	1.30	0.75	1.99	A	I	78'-0 1/2"	
TNAGT5A	45.000		1.90	85.50	1.40	0.75	2.59	A	I	78'-0 1/2"	1.13	2.19	A	I	0'-0"	1.30	0.75	1.90	A	I	78'-0 1/2"			
TNAGT5B	45.000		3	1.89	85.05	1.40	0.75	2.58	A	I	78'-0 1/2"	1.13	2.16	A	I	0'-0"	1.30	0.75	1.89	A	I	78'-0 1/2"		
FATIGUE	HL-93 (INVENTORY)	γ _{LL} =0.75																						

LOAD FACTORS:

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

NOTES:

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

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

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93) **

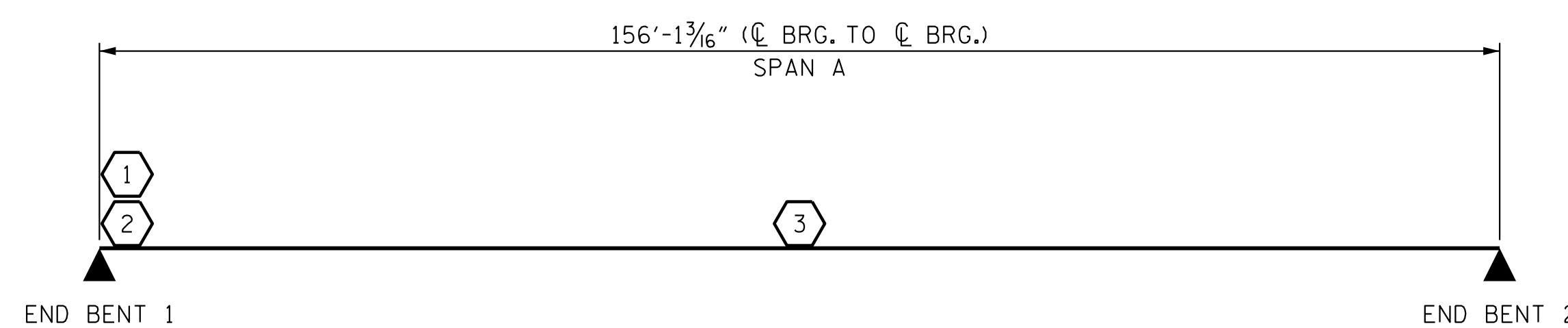
2 DESIGN LOAD RATING (HS-20) **

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

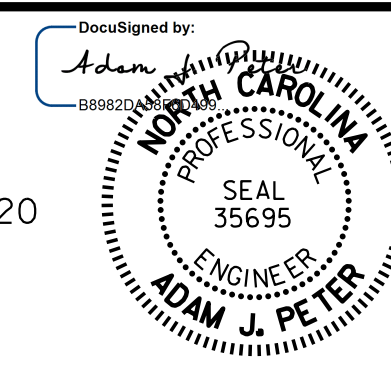
DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED

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CHARLOTTE, NC 28210
(980) 229-4103

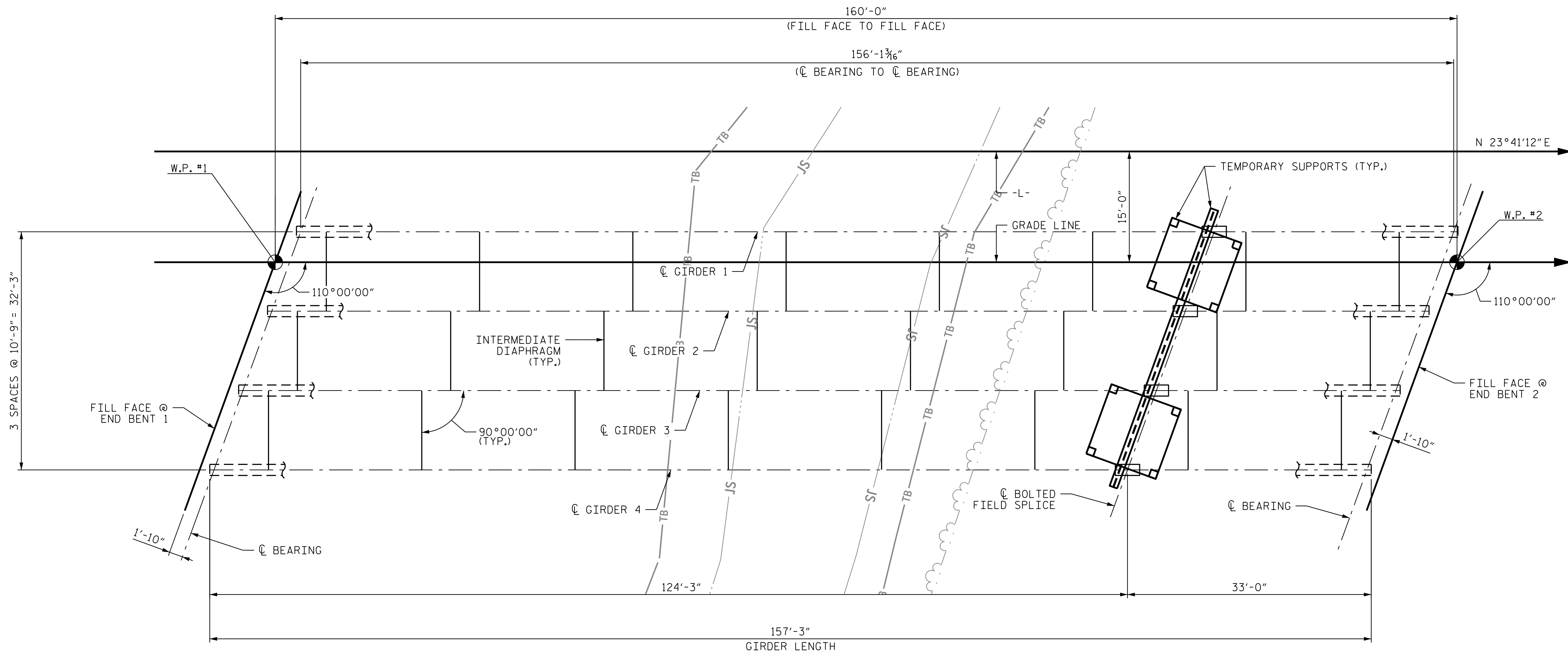
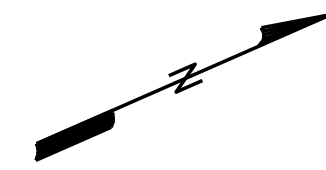
NC LICENSE NO. C-2213



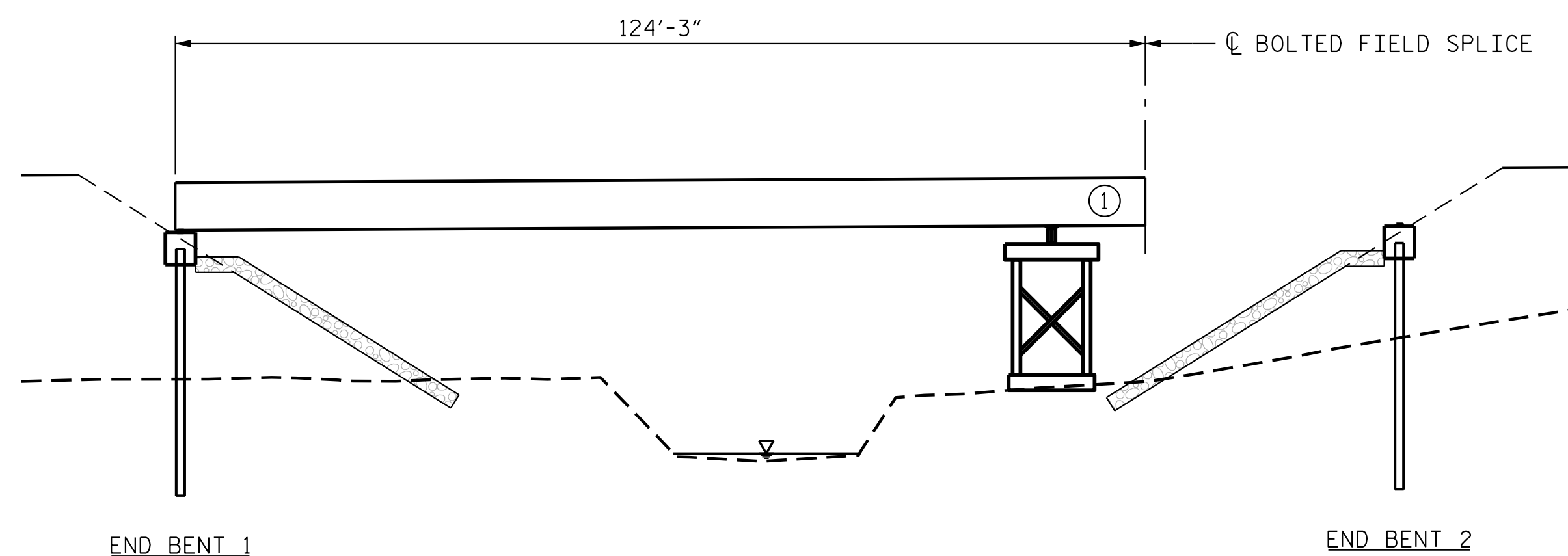
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY
FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

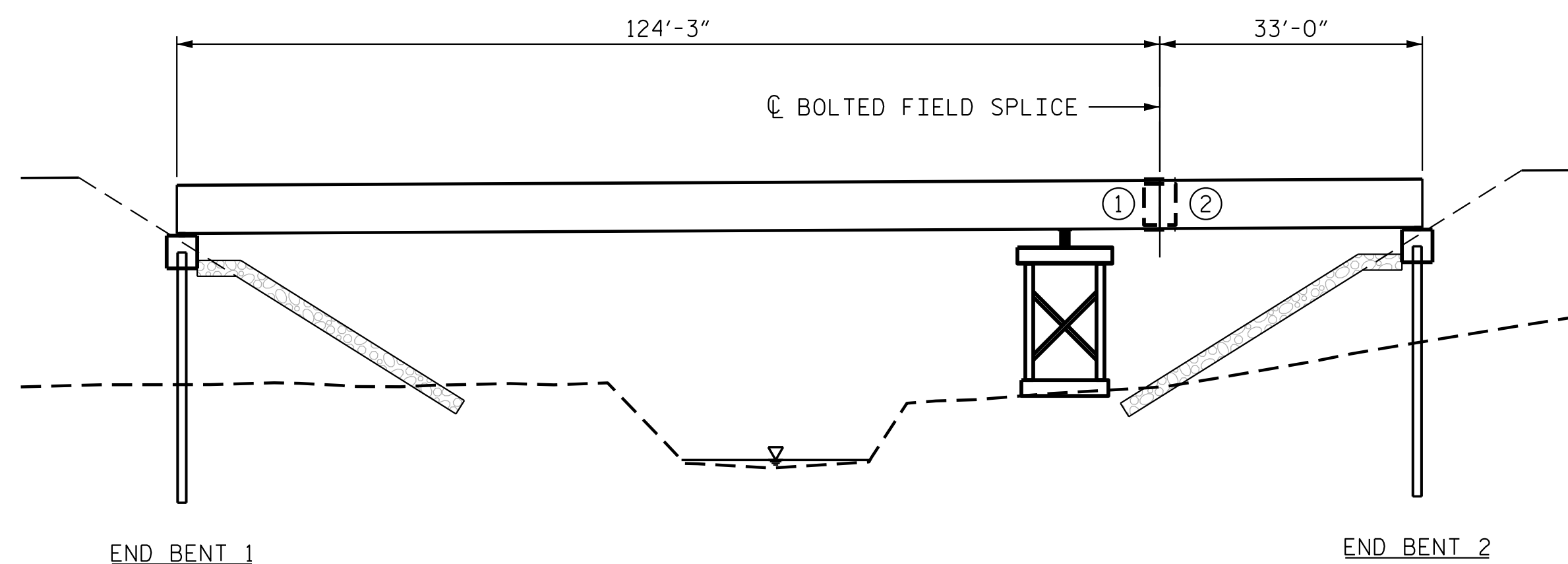
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			29



PLAN



ELEVATION - STAGE 1 OF 2



ELEVATION - STAGE 2 OF 2

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

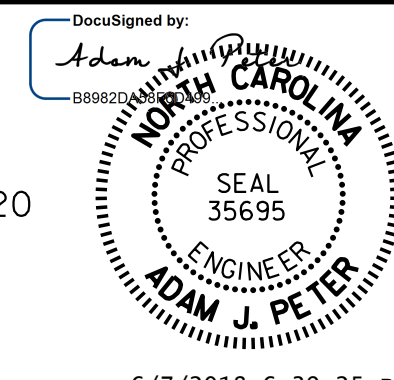
NOTES

1. DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT, AS REQUIRED, TO ENSURE STABILITY OF THE GIRDERS, AVOID UPLIFT OF THE GIRDERS AT THE TEMPORARY SUPPORT AND ENSURE PLUMBNESS OF THE GIRDERS IN THE FINAL CONDITION.
2. THE CONTRACTOR MAY SUBMIT AN ALTERNATE ERECTION METHOD TO THE ENGINEER FOR REVIEW AND APPROVAL.
3. FOR TEMPORARY BENTS, SEE SPECIAL PROVISIONS.

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

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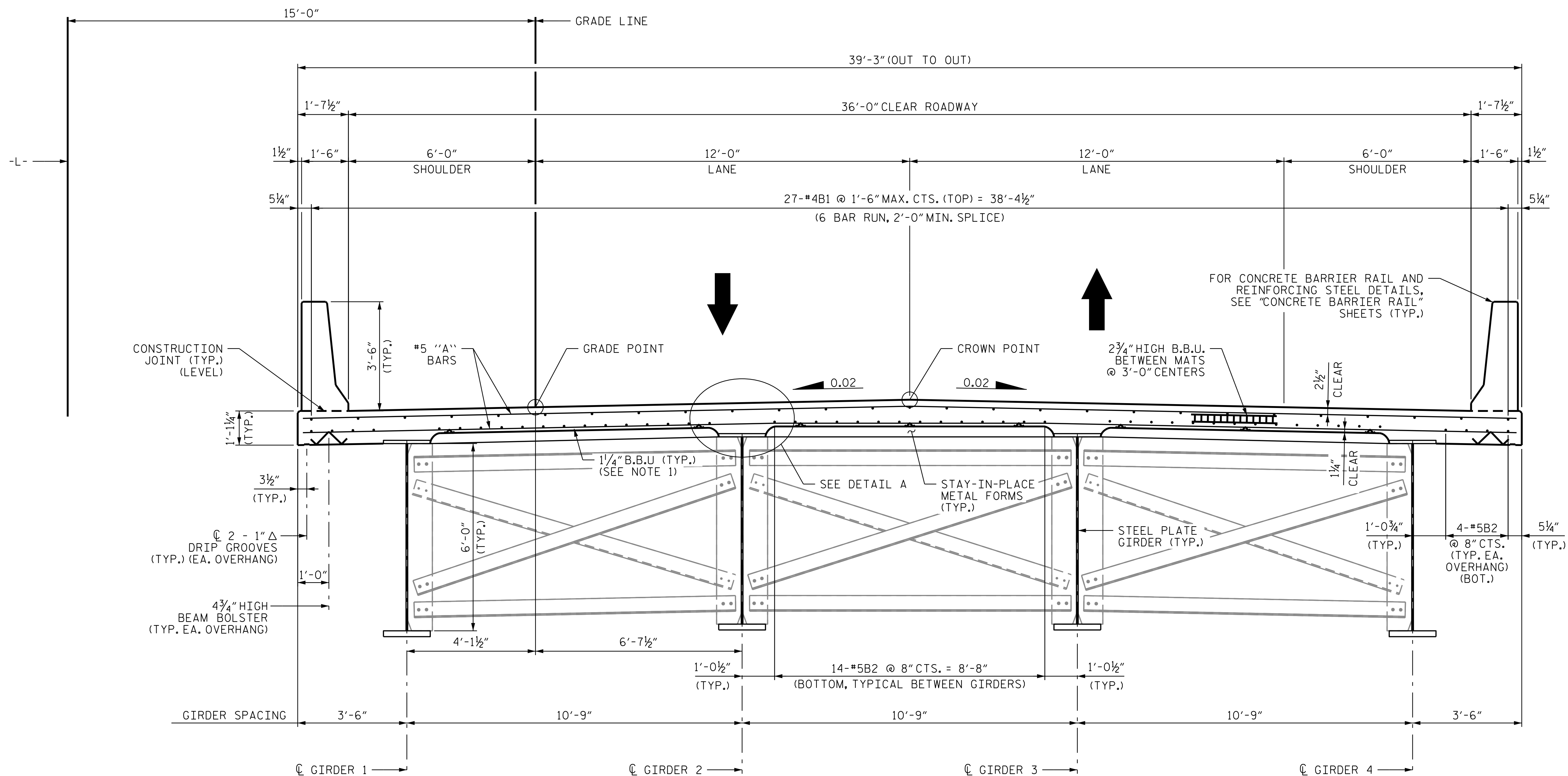
DRMP
 5950 FAIRVIEW ROAD, SUITE 320
 CHARLOTTE, NC 28210
 (980) 229-4103
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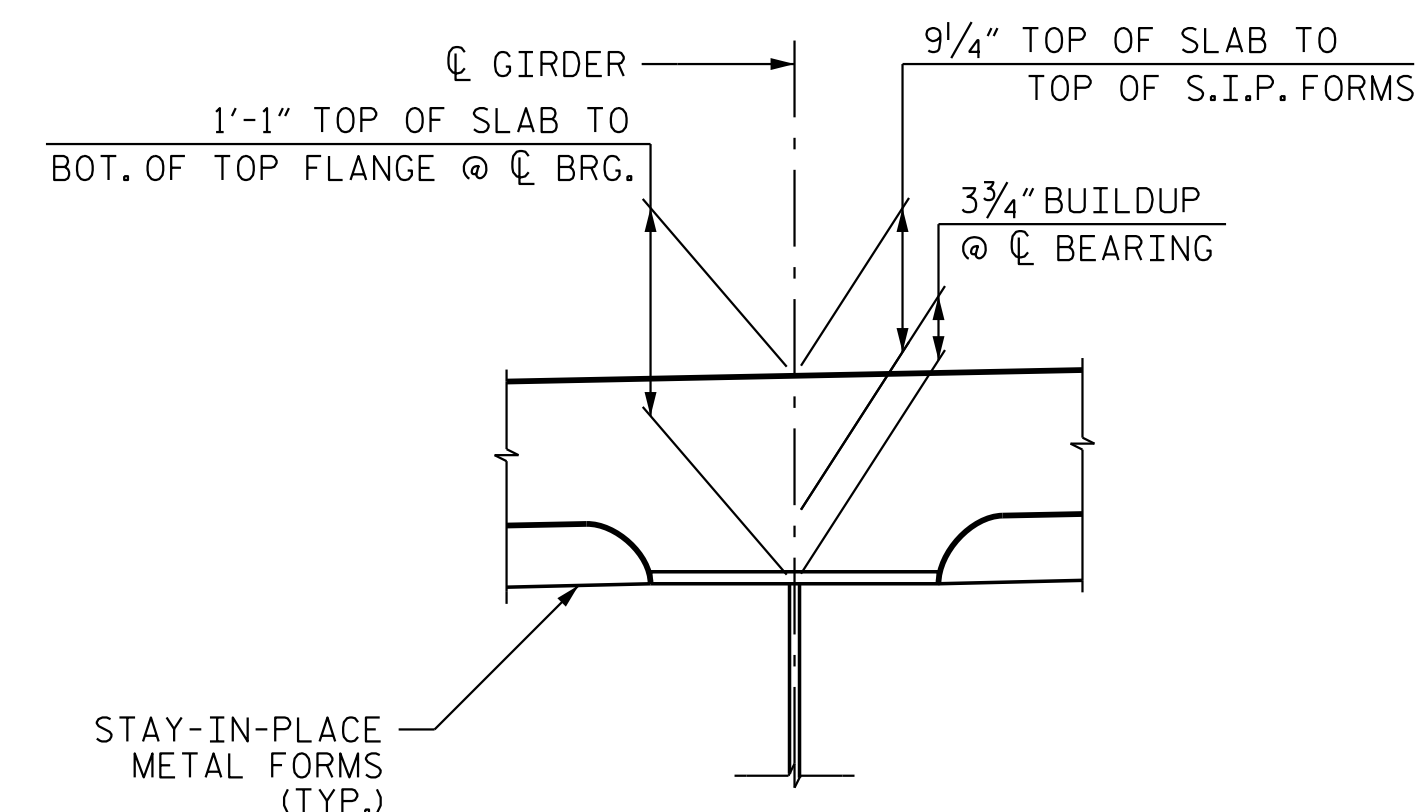
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 GIRDER ERECTION SEQUENCE

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

TOTAL SHEETS: 29



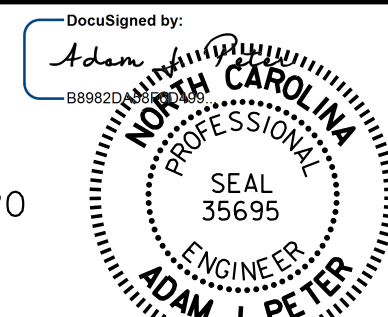
TYPICAL SECTION
 (AT INTERMEDIATE DIAPHRAGMS)



DETAIL "A"
 (TYP. EACH GIRDER)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRMP
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 CHARLOTTE, NC 28210
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PROJECT NO. U-3109B
 ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION

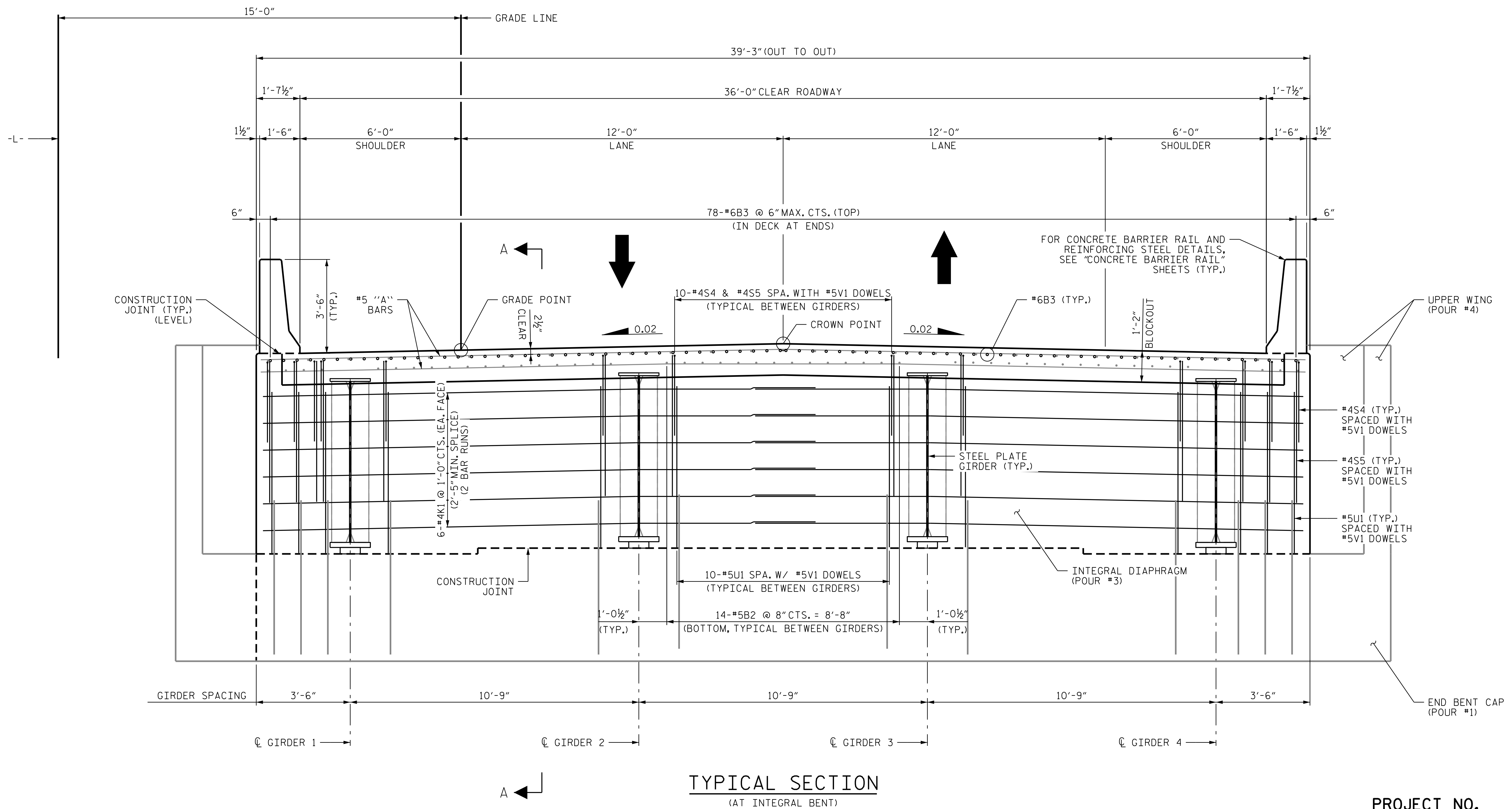
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

S-6
 TOTAL SHEETS 29

NOTES

- PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" MAXIMUM SPACING ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" MAXIMUM SPACING WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.
- METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.
- CONCRETE BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.
- PREVIOUSLY CAST CONCRETE IN A SPAN MUST HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE SPAN.
- THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018



TYPICAL SECTION
(AT INTEGRAL BENT)

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 2 OF 3

NOTES

1. APPROACH SLAB REINFORCING NOT SHOWN FOR CLARITY.
2. FOR SECTION A-A, SEE SHEET 3 OF 3.

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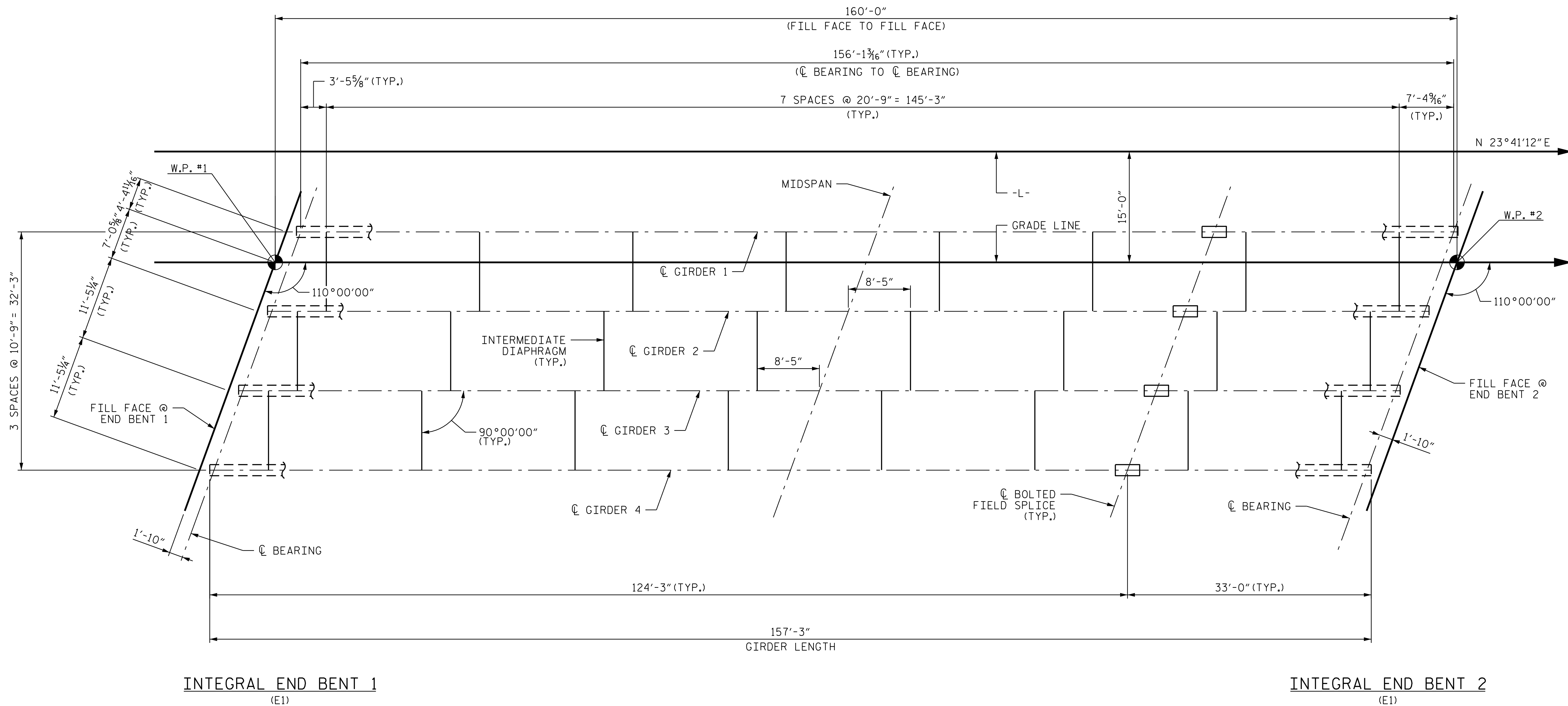
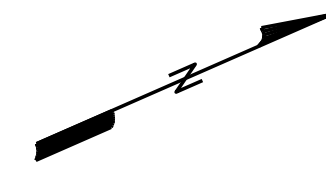
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 NORTH CAROLINA
 PROFESSIONAL
 ENGINEER
 SEAL
 35695
 ADAM J. PETER

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1			3			TOTAL SHEETS
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FRAMING PLAN - SPAN "A"

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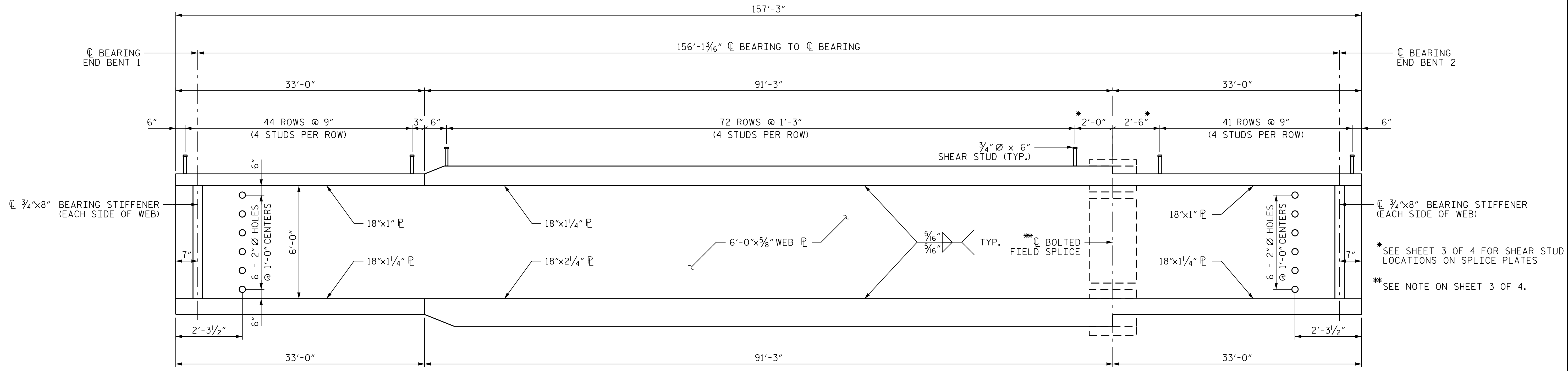
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STATE OF NORTH CAROLINA
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 SUPERSTRUCTURE
 FRAMING PLAN

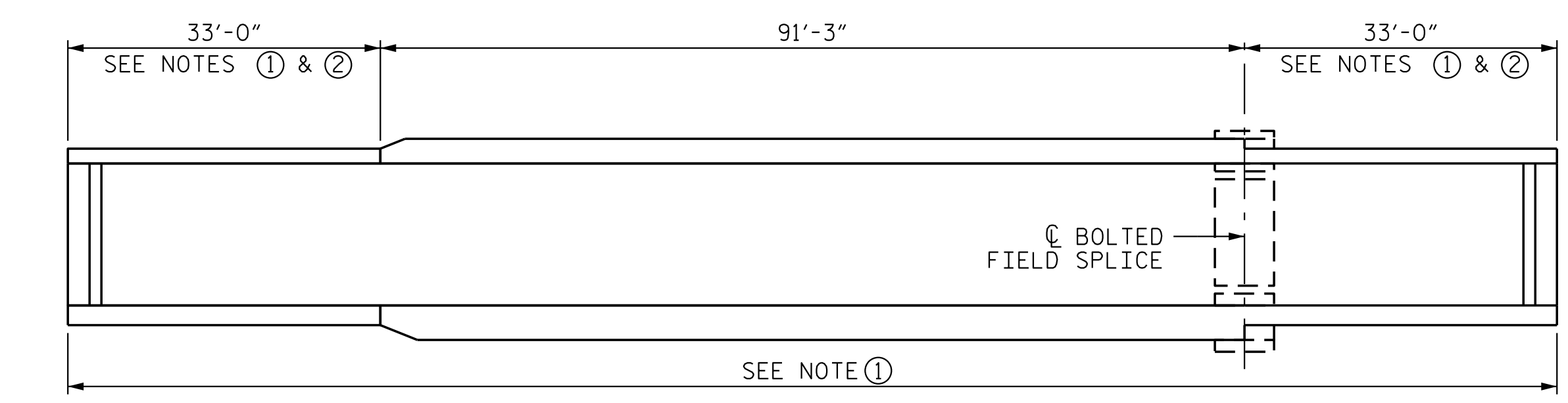
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2			4		

S-10
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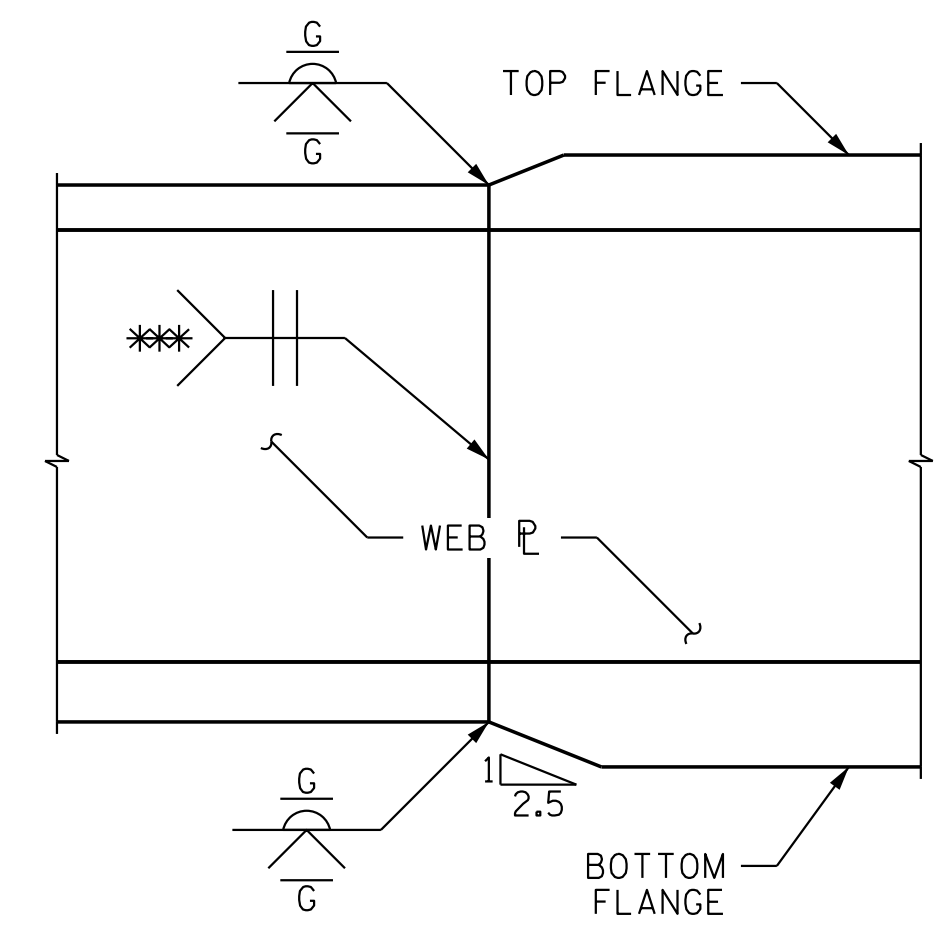
GIRDER ELEVATION



NOTE ①: CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS, ALL WEB PLATES, AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

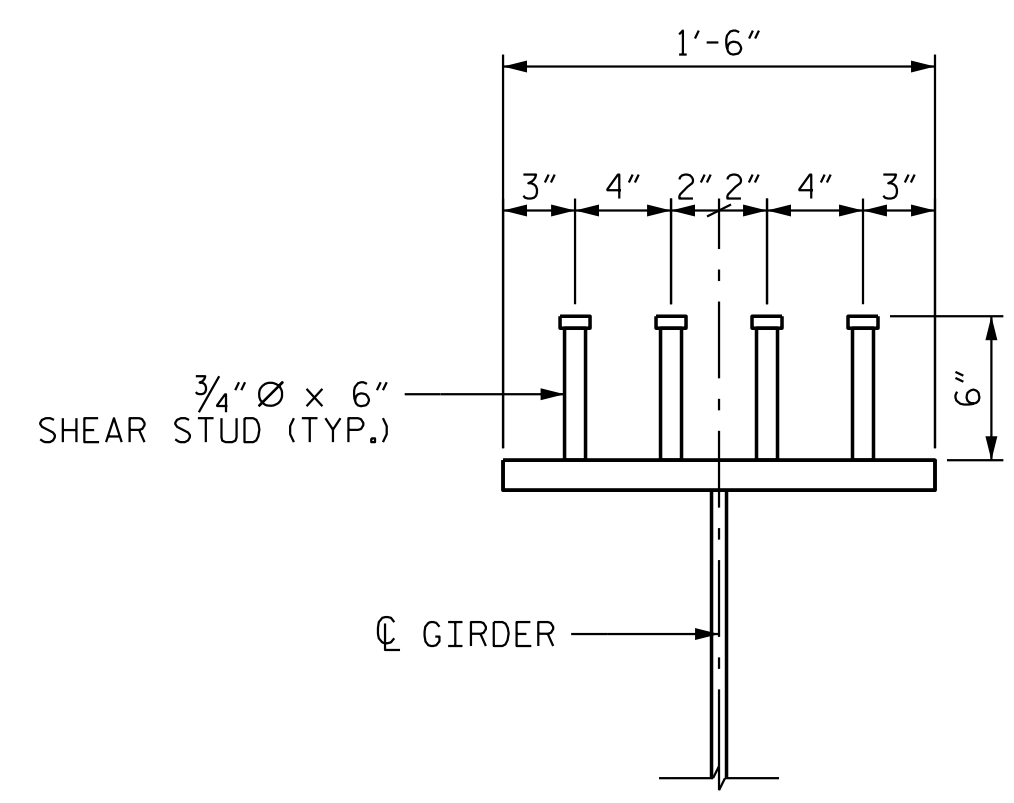
NOTE ②: NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.

CHARPY V-NOTCH TESTS FOR PLATE GIRDERS



SHOP SPLICE DETAIL

*** GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS



SHEAR STUD DETAIL

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

NOTES

- ALL FIELD CONNECTIONS TO BE 7/8" dia HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.
- TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.
- PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MIDSPAN. KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.
- END OF GIRDERS MUST BE PLUMB.
- BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.
- SHEAR STUDS MAY BE SHIFTED UP TO 1" TO CLEAR FLANGE SPLICE WELD.
- ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
- ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.
- STRUCTURAL STEEL ERECTION IN SPAN SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED.

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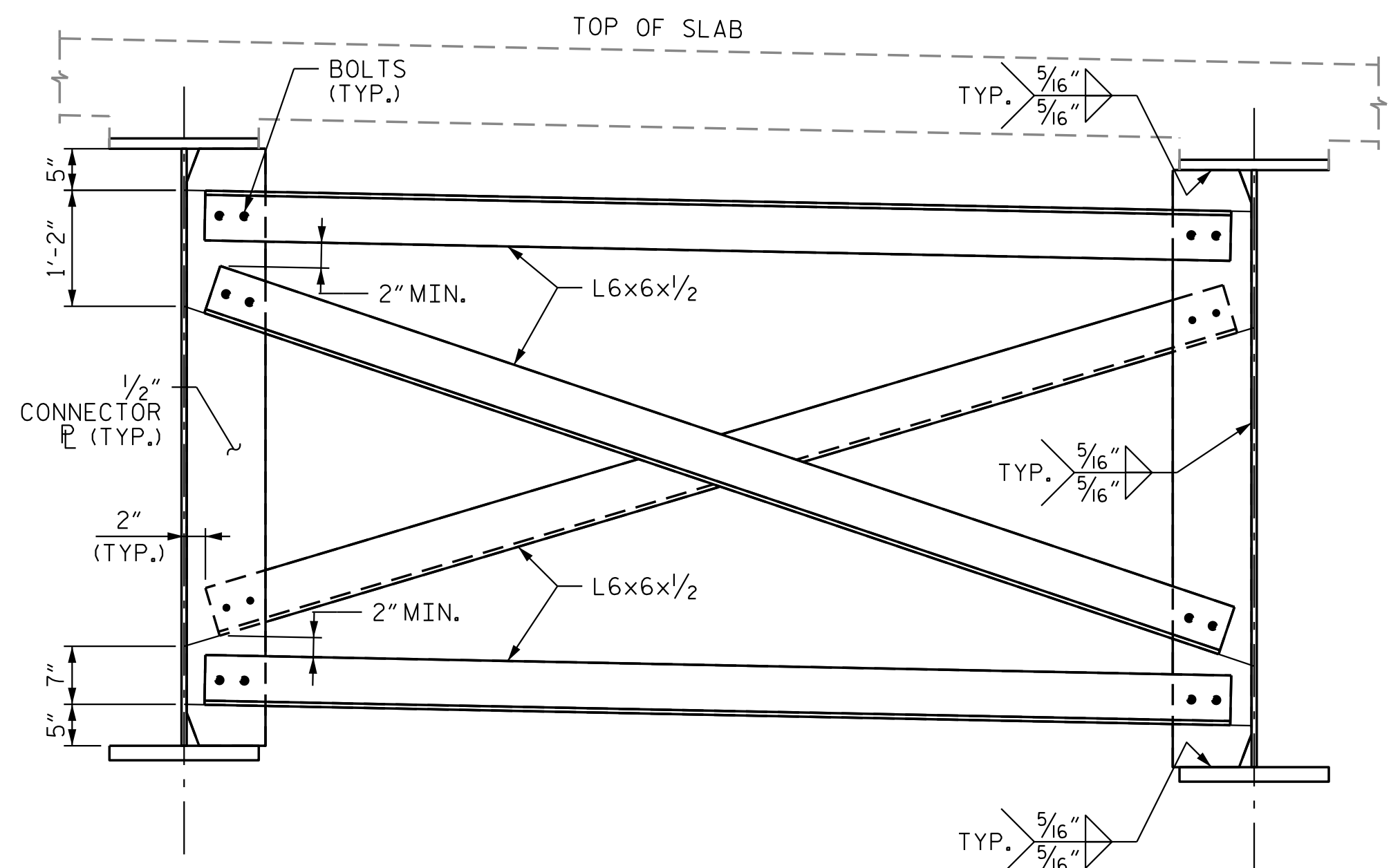
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 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 35695
 ADAM J. PETER

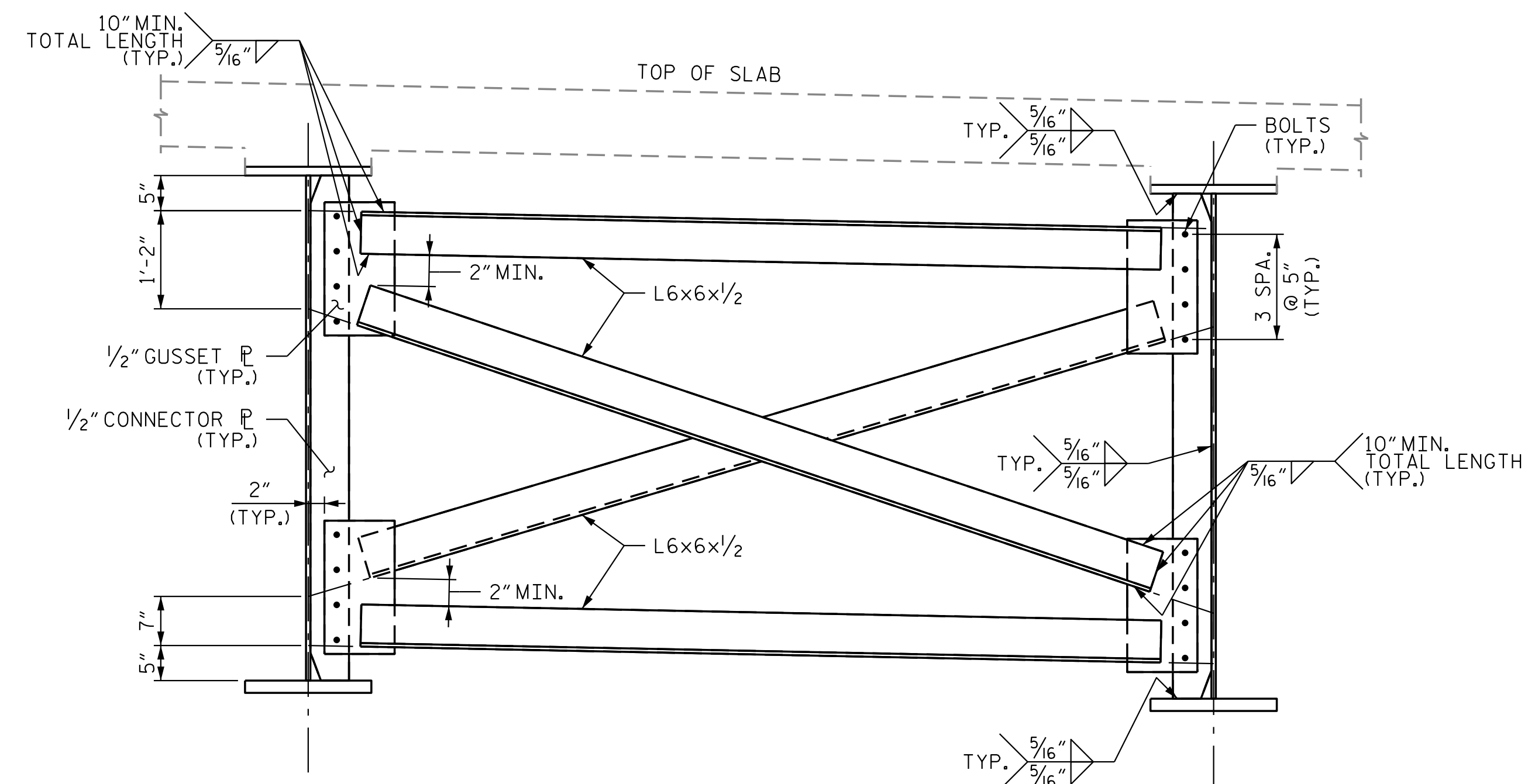
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 STRUCTURAL STEEL
 DETAILS

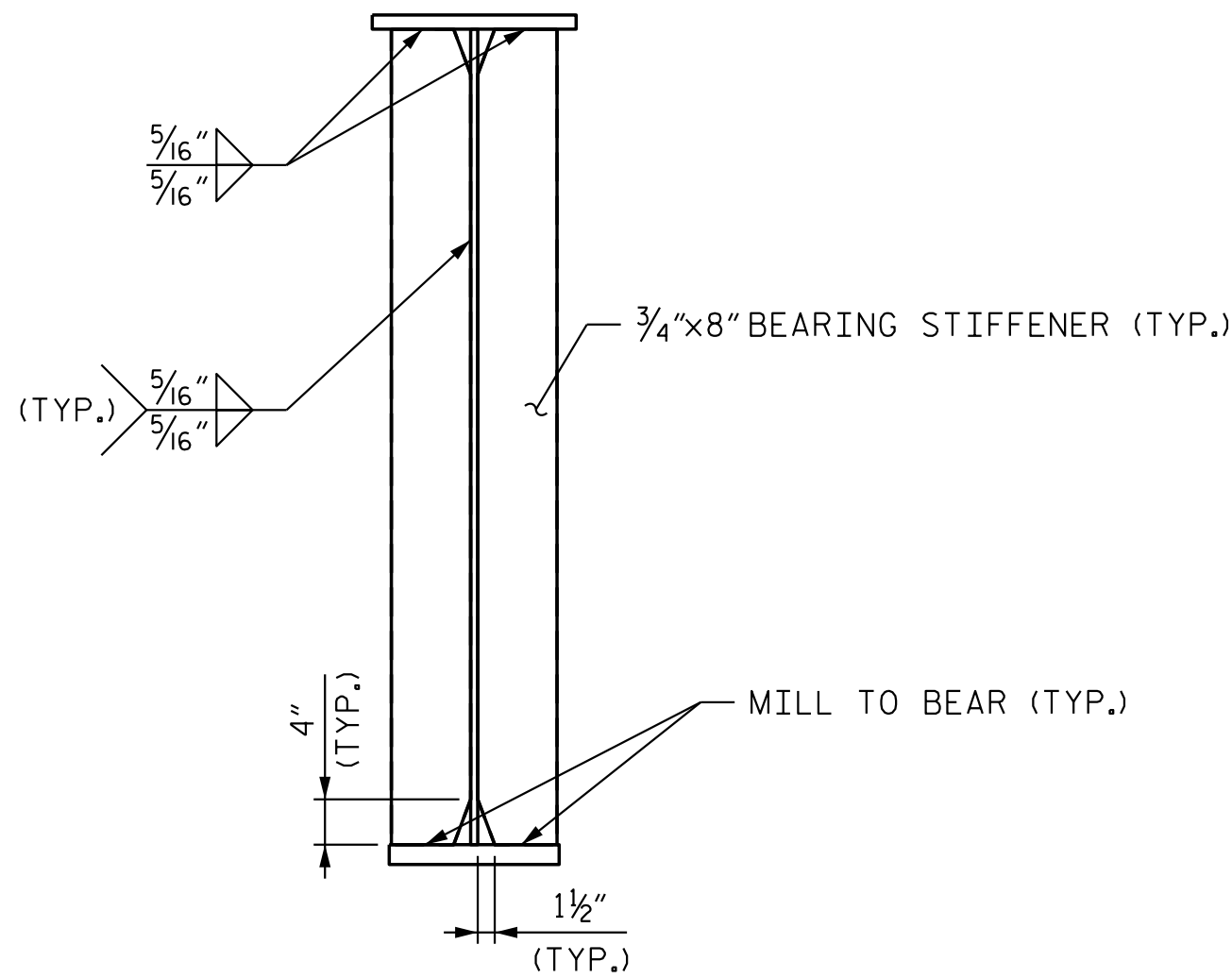
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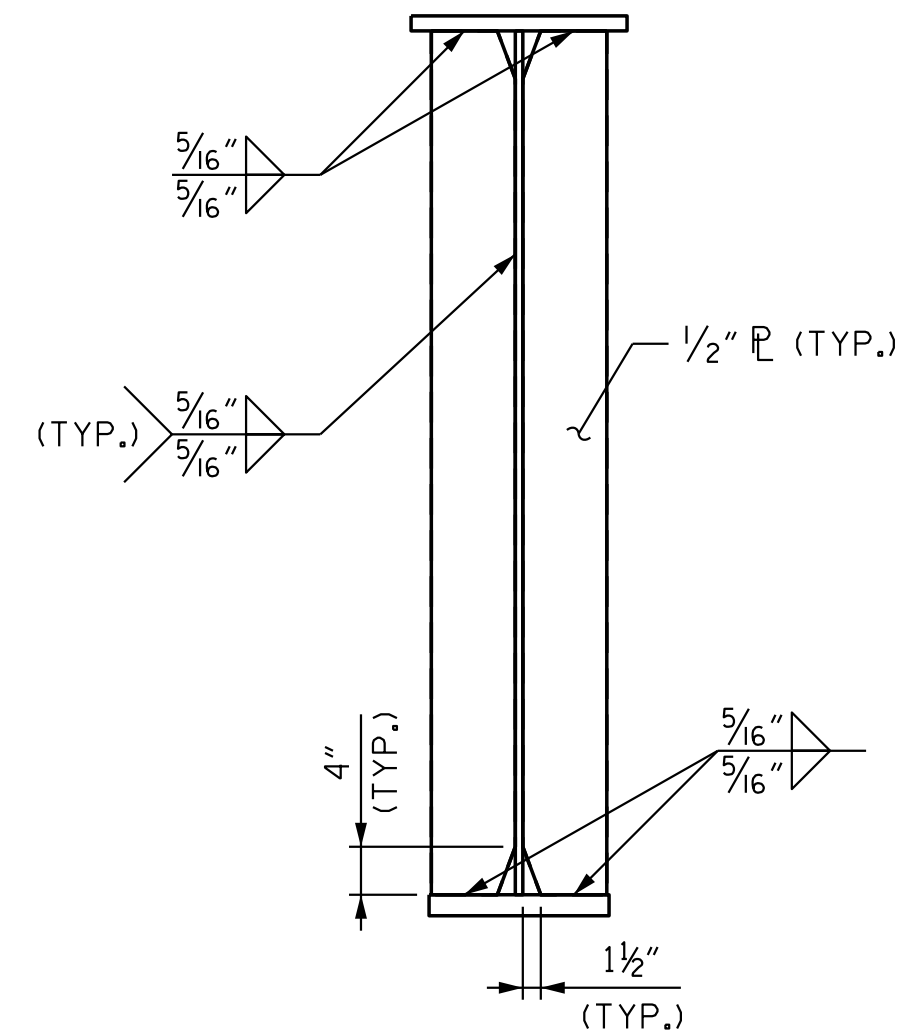
TYPICAL INTERMEDIATE DIAPHRAGM



TYPICAL OPTIONAL INTERMEDIATE DIAPHRAGM



BEARING STIFFENER DETAIL



CONNECTOR PLATE DETAIL

NOTES

1. AT THE CONTRACTOR'S OPTION, THE OPTIONAL INTERMEDIATE DIAPHRAGM WITH THE WELDED GUSSET PLATES MAY BE USED IN LIEU OF THE INTERMEDIATE DIAPHRAGM WITH BOLTED ANGLES AT NO ADDITIONAL COST TO THE DEPARTMENT.
2. FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

PROJECT NO. U-3109B
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SHEET 2 OF 4

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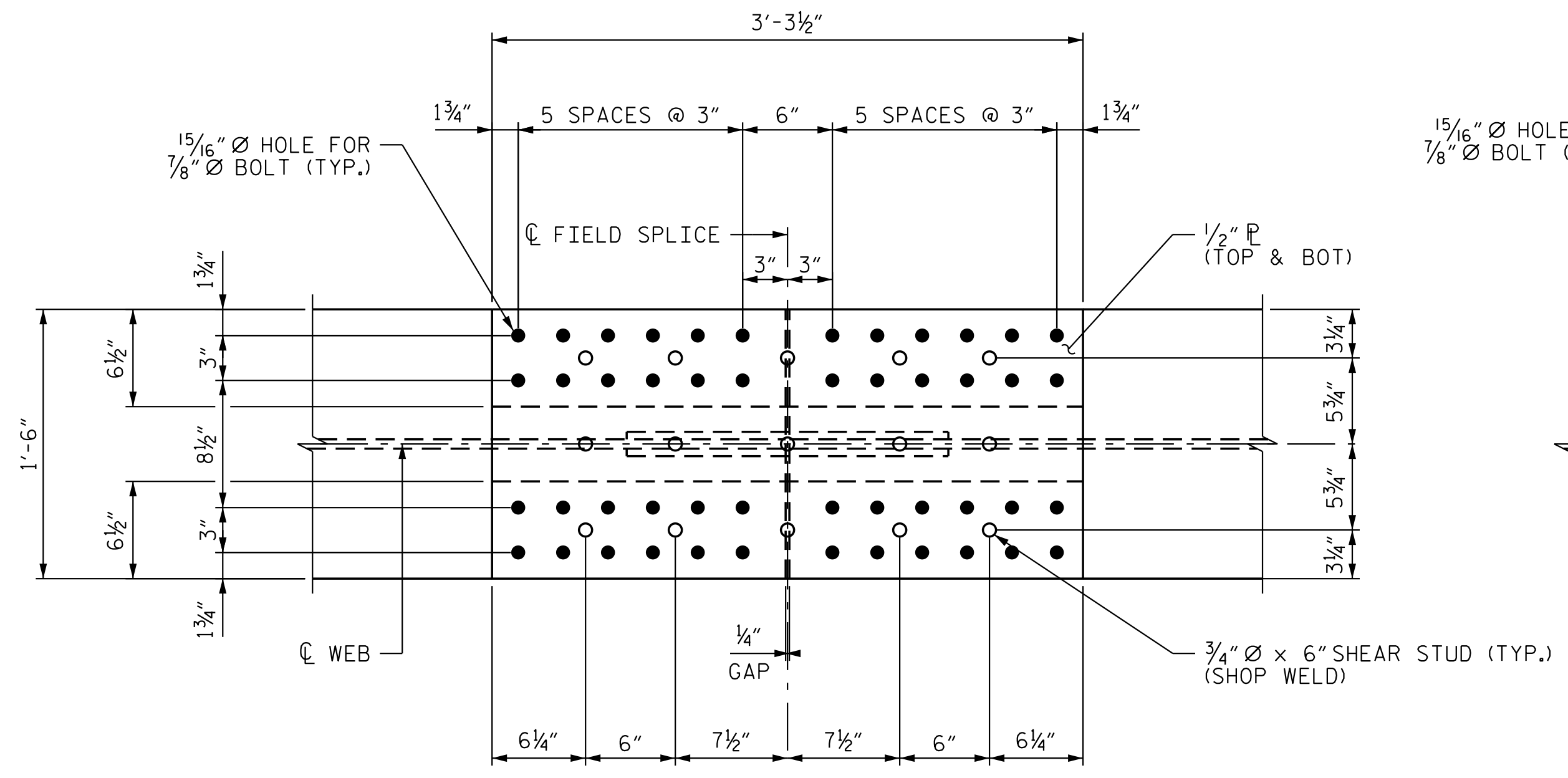
Seal of Adam J. Peter, Professional Engineer, North Carolina, License No. 35695.

STATE OF NORTH CAROLINA
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 STRUCTURAL STEEL DETAILS

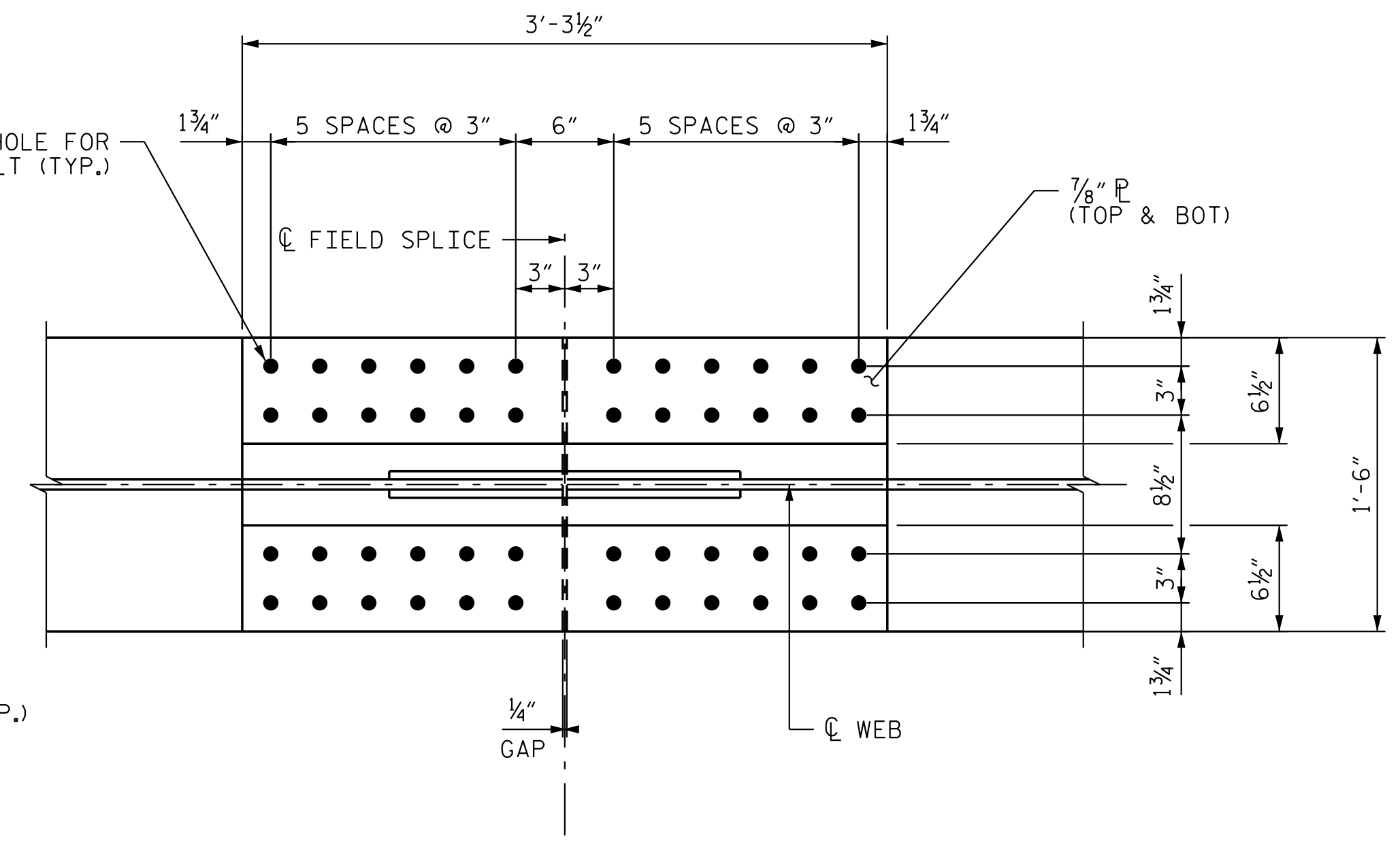
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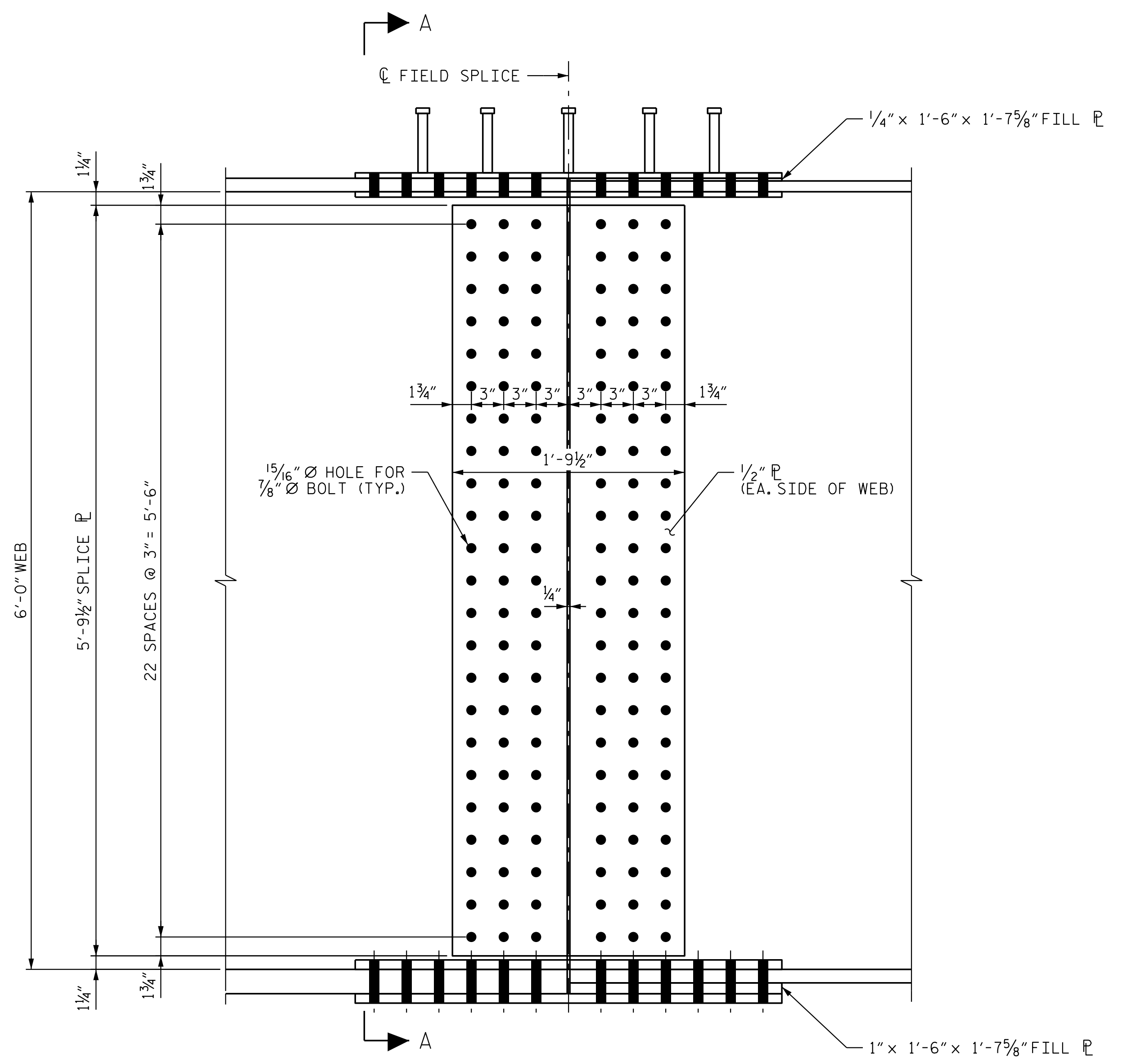
DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
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 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018



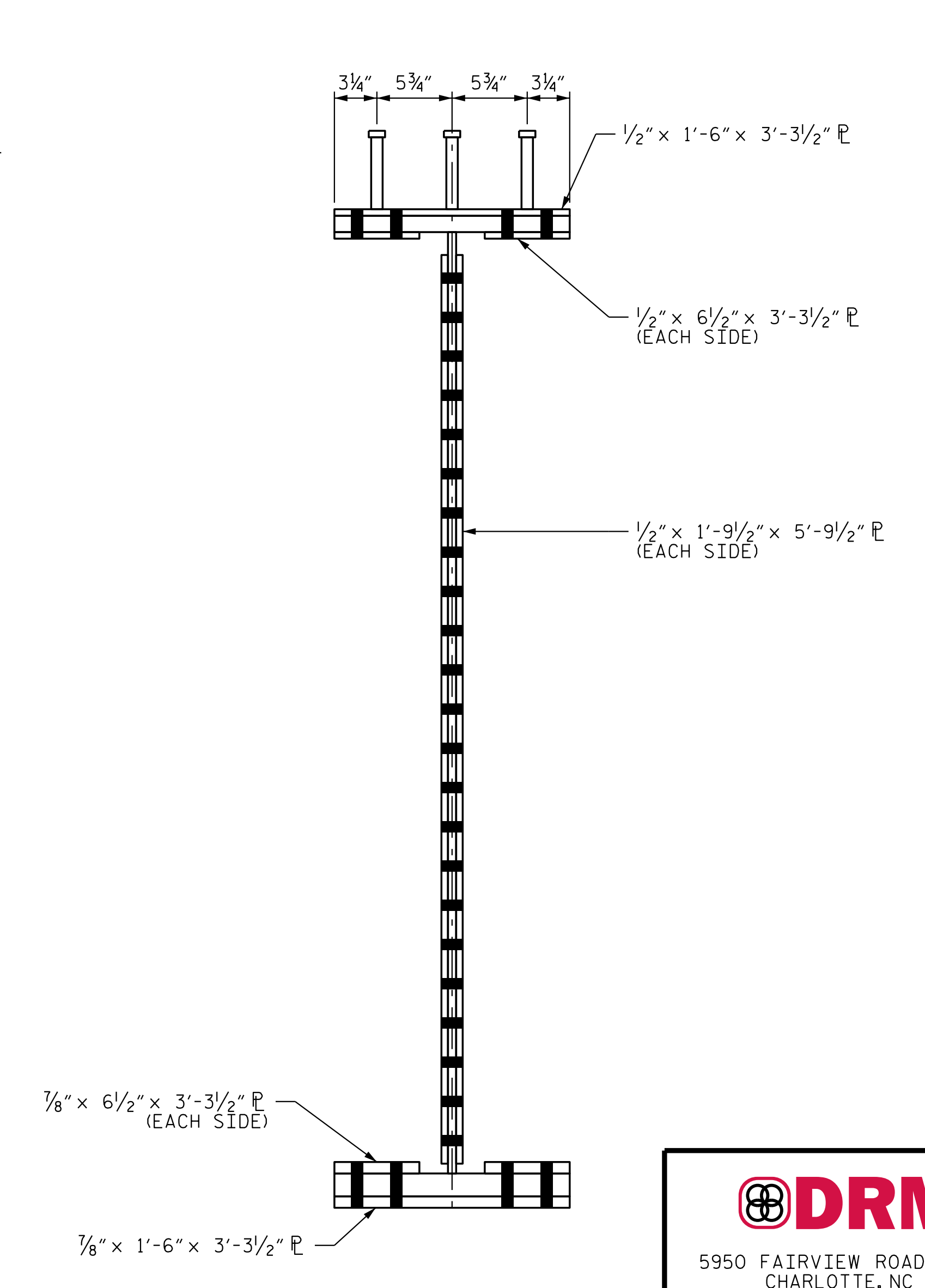
PLAN OF TOP FLANGE SPLICE



PLAN OF BOTTOM FLANGE SPLICE



SPLICE ELEVATION

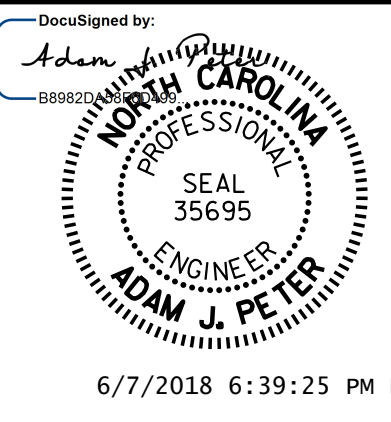


SECTION A-A

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
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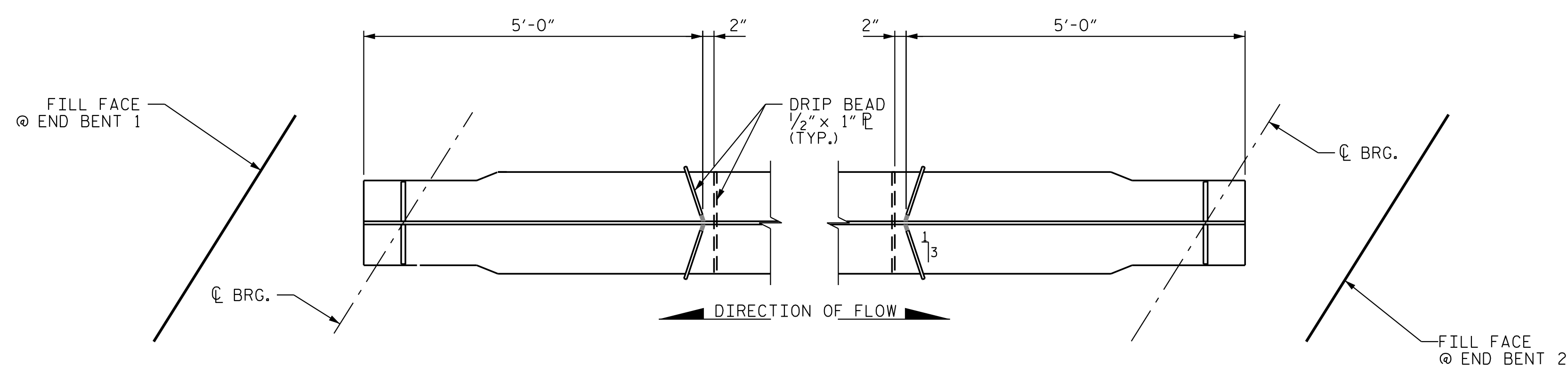


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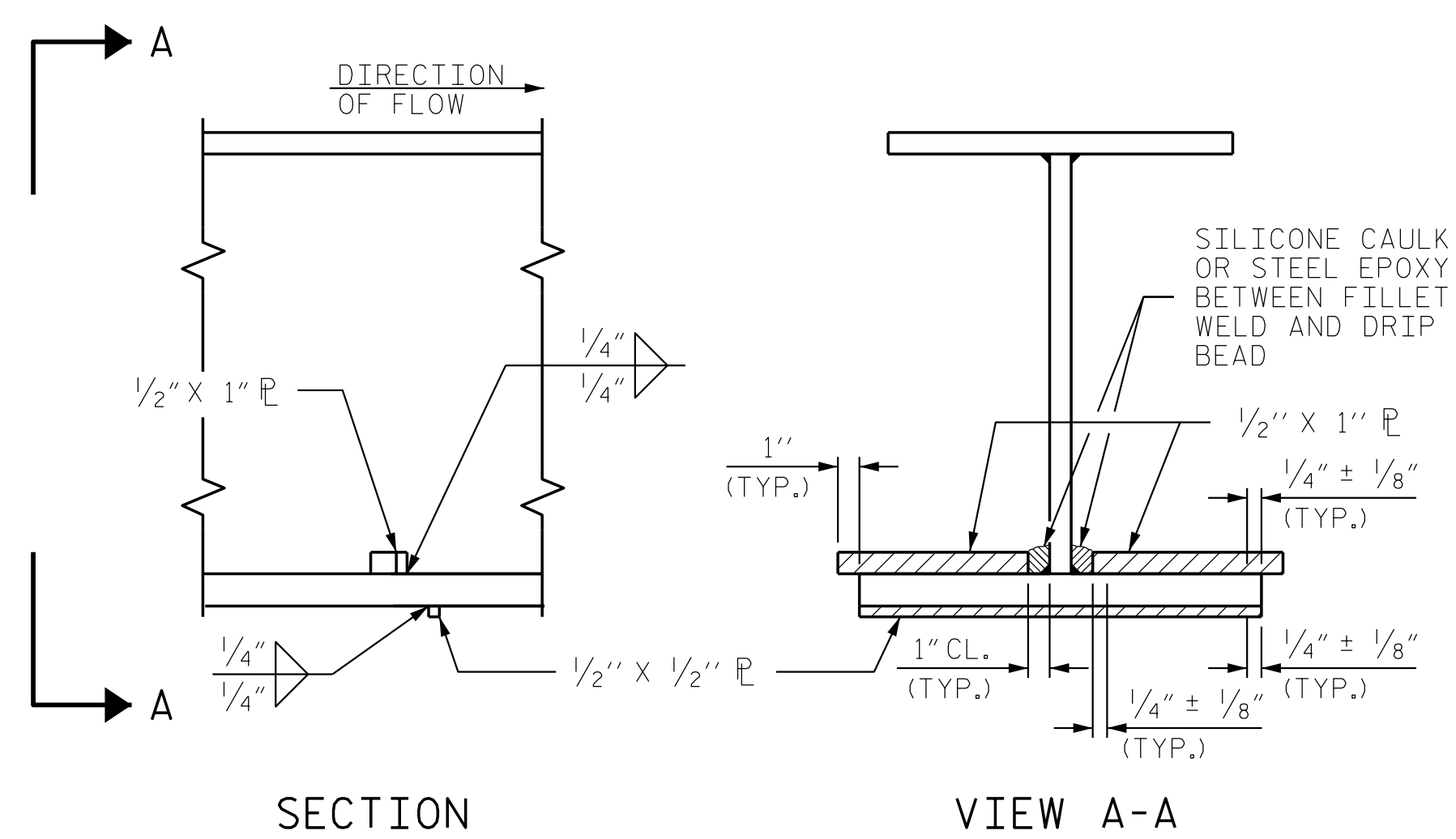
STATE OF NORTH CAROLINA
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 SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS

REVISIONS				SHEET NO.
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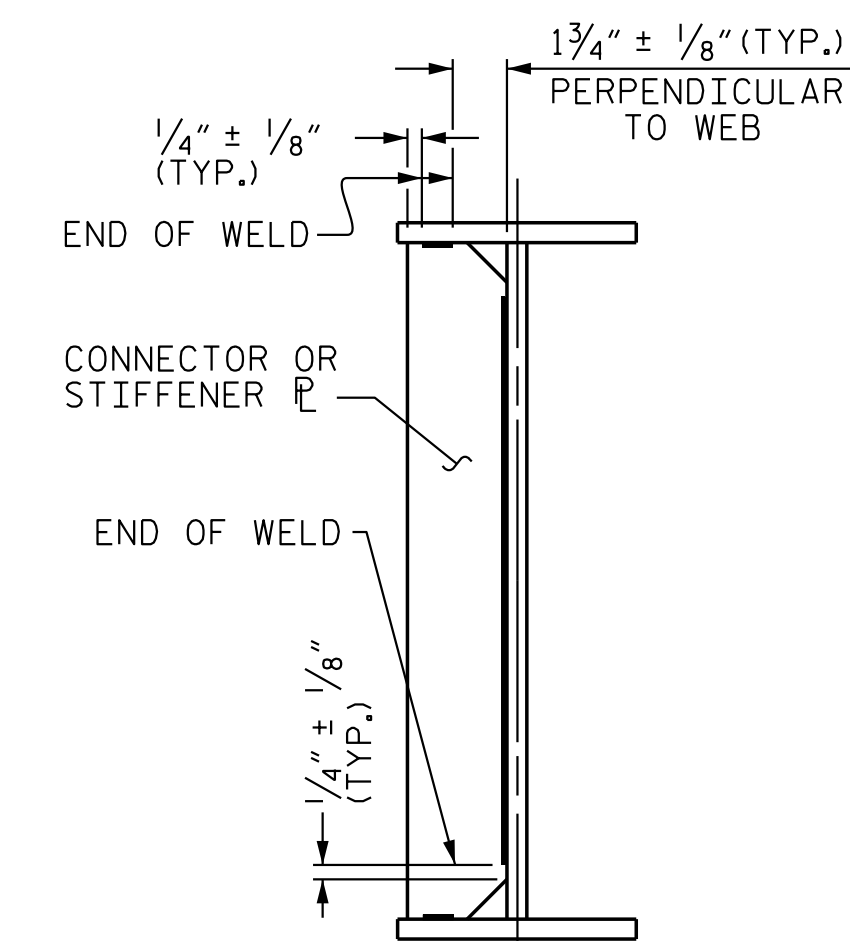
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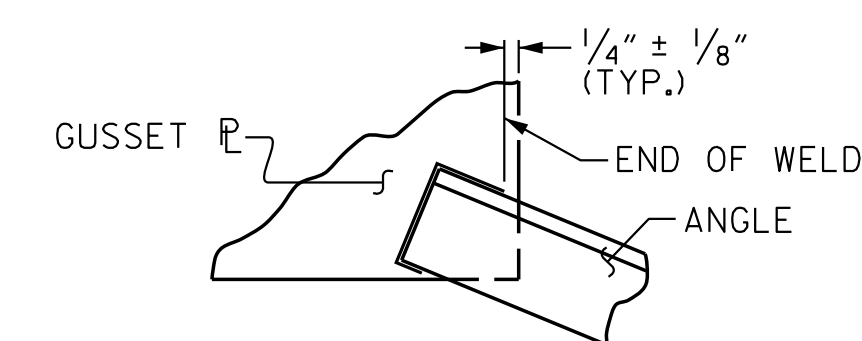
PLAN OF BOTTOM FLANGE



DRIP BEAD DETAILS



STIFFENER OR CONNECTOR PLATE



ANGLE TO GUSSET PLATE CONNECTION

WELD TERMINATION DETAILS

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 4 OF 4

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 RALEIGH
 SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS

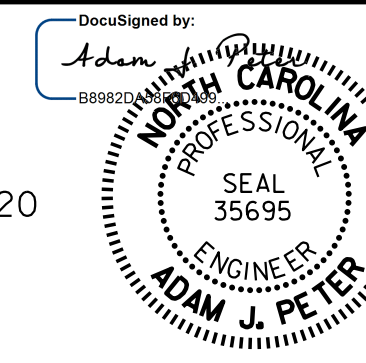
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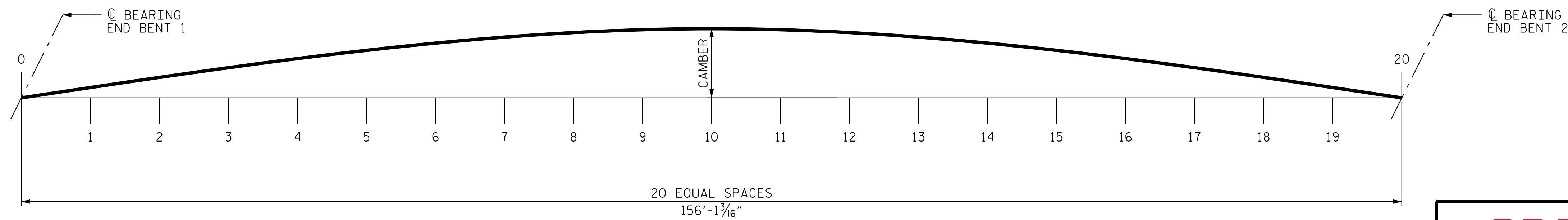
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DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
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 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

DEAD LOAD DEFLECTION TABLE FOR STEEL GIRDERS

GIRDER	TWENTIETH POINTS	SPAN A																					
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
GIRDER 1	DEFLECTION DUE TO WEIGHT OF GIRDER	↓	0	0.026	0.051	0.074	0.094	0.112	0.127	0.139	0.148	0.153	0.155	0.153	0.148	0.139	0.127	0.112	0.094	0.074	0.051	0.026	0
	DEFLECTION DUE TO WEIGHT OF SLAB	↓	0	0.011	0.101	0.184	0.258	0.322	0.375	0.419	0.450	0.469	0.476	0.469	0.450	0.419	0.375	0.322	0.258	0.184	0.101	0.011	0
	DEFLECTION DUE TO WEIGHT OF BARRIER	↓	0	0.009	0.017	0.025	0.033	0.039	0.044	0.048	0.051	0.053	0.053	0.053	0.051	0.048	0.044	0.039	0.033	0.025	0.017	0.009	0
	TOTAL DEAD LOAD DEFLECTION	↓	0	0.046	0.169	0.283	0.385	0.473	0.546	0.606	0.649	0.675	0.684	0.675	0.649	0.606	0.546	0.473	0.385	0.283	0.169	0.046	0
	VERTICAL CURVE ORDINATE	↑	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SUPERELEVATION ORDINATE	↑	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	REQUIRED CAMBER	↑	0"	3/16"	2"	3 3/8"	4 5/8"	5 1/16"	6 9/16"	7 1/4"	7 13/16"	8 1/8"	8 3/16"	8 1/8"	7 13/16"	7 1/4"	6 9/16"	5 1/16"	4 5/8"	3 3/8"	2"	3/16"	0"
GIRDER 2	DEFLECTION DUE TO WEIGHT OF GIRDER	↓	0	0.026	0.051	0.074	0.094	0.112	0.127	0.139	0.148	0.153	0.155	0.153	0.148	0.139	0.127	0.112	0.094	0.074	0.051	0.026	0
	DEFLECTION DUE TO WEIGHT OF SLAB	↓	0	0.011	0.102	0.185	0.260	0.324	0.377	0.421	0.453	0.472	0.478	0.472	0.453	0.421	0.377	0.324	0.260	0.185	0.102	0.011	0
	DEFLECTION DUE TO WEIGHT OF BARRIER	↓	0	0.006	0.012	0.018	0.023	0.029	0.031	0.034	0.036	0.037	0.038	0.037	0.036	0.034	0.031	0.029	0.023	0.018	0.012	0.006	0
	TOTAL DEAD LOAD DEFLECTION	↓	0	0.043	0.165	0.277	0.377	0.465	0.535	0.594	0.637	0.662	0.671	0.662	0.637	0.594	0.535	0.465	0.377	0.277	0.165	0.043	0
	VERTICAL CURVE ORDINATE	↑	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SUPERELEVATION ORDINATE	↑	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	REQUIRED CAMBER	↑	0"	1/2"	2"	3 5/16"	4 1/2"	5 9/16"	6 7/16"	7 1/8"	7 15/16"	7 15/16"	8 1/16"	7 15/16"	7 15/16"	7 1/8"	6 7/16"	5 9/16"	4 1/2"	3 5/16"	2"	1/2"	0"
GIRDER 3	DEFLECTION DUE TO WEIGHT OF GIRDER	↓	0	0.026	0.051	0.074	0.094	0.112	0.127	0.139	0.148	0.153	0.155	0.153	0.148	0.139	0.127	0.112	0.094	0.074	0.051	0.026	0
	DEFLECTION DUE TO WEIGHT OF SLAB	↓	0	0.011	0.102	0.185	0.260	0.324	0.377	0.421	0.453	0.472	0.478	0.472	0.453	0.421	0.377	0.324	0.260	0.185	0.102	0.011	0
	DEFLECTION DUE TO WEIGHT OF BARRIER	↓	0	0.006	0.012	0.018	0.023	0.029	0.031	0.034	0.036	0.037	0.038	0.037	0.036	0.034	0.031	0.029	0.023	0.018	0.012	0.006	0
	TOTAL DEAD LOAD DEFLECTION	↓	0	0.043	0.165	0.277	0.377	0.465	0.535	0.594	0.637	0.662	0.671	0.662	0.637	0.594	0.535	0.465	0.377	0.277	0.165	0.043	0
	VERTICAL CURVE ORDINATE	↑	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	SUPERELEVATION ORDINATE	↑	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	REQUIRED CAMBER	↑	0"	1/2"	2"	3 5/16"	4 1/2"	5 9/16"	6 7/16"	7 1/8"	7 15/16"	7 15/16"	8 1/16"	7 15/16"	7 15/16"	7 1/8"	6 7/16"	5 9/16"	4 1/2"	3 5/16"	2"	1/2"	0"
GIRDER 4	DEFLECTION DUE TO WEIGHT OF GIRDER	↓	0	0.026	0.051	0.074	0.094	0.112	0.127	0.139	0.148	0.153	0.155	0.153	0.148	0.139	0.127	0.112	0.094	0.074	0.051	0.026	0
	DEFLECTION DUE TO WEIGHT OF SLAB	↓	0	0.011	0.101	0.184	0.258	0.322	0.375	0.419	0.450	0.469	0.476	0.469	0.450	0.419	0.375	0.322	0.258	0.184	0.101	0.011	0
	DEFLECTION DUE TO WEIGHT OF BARRIER	↓	0	0.009	0.017	0.025	0.033	0.039	0.044	0.048	0.051	0.053	0.053	0.053	0.051	0.048	0.044	0.039	0.033	0.025	0.017	0.009	0
	TOTAL DEAD LOAD DEFLECTION	↓	0	0.046	0.169	0.283	0.385	0.473	0.546	0.606	0.649	0.675	0.684	0.675	0.649	0.606	0.546	0.473	0.385	0.283	0.169	0.046	0
	VERTICAL CURVE ORDINATE	↑	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	SUPERELEVATION ORDINATE	↑	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	REQUIRED CAMBER	↑	0"	3/16"	2"	3 3/8"	4 5/8"	5 1/16"	6 9/16"	7 1/4"	7 13/16"	8 1/8"	8 3/16"	8 1/8"	7 13/16"	7 1/4"	6 9/16"	5 1/16"	4 5/8"	3 3/8"	2"	3/16"	0"

* INCLUDES SLAB, BUILDUP, & STAY-IN-PLACE FORMS
ALL VALUES ARE SHOWN IN DECIMAL FEET, EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN FRACTIONAL INCHES.



SCHEMATIC CAMBER ORDINATES
SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

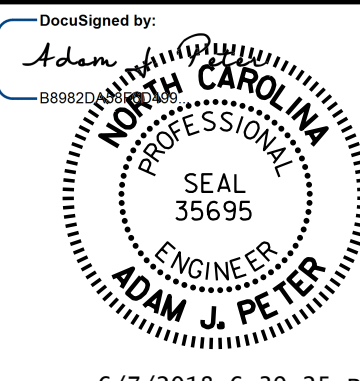
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 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

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PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

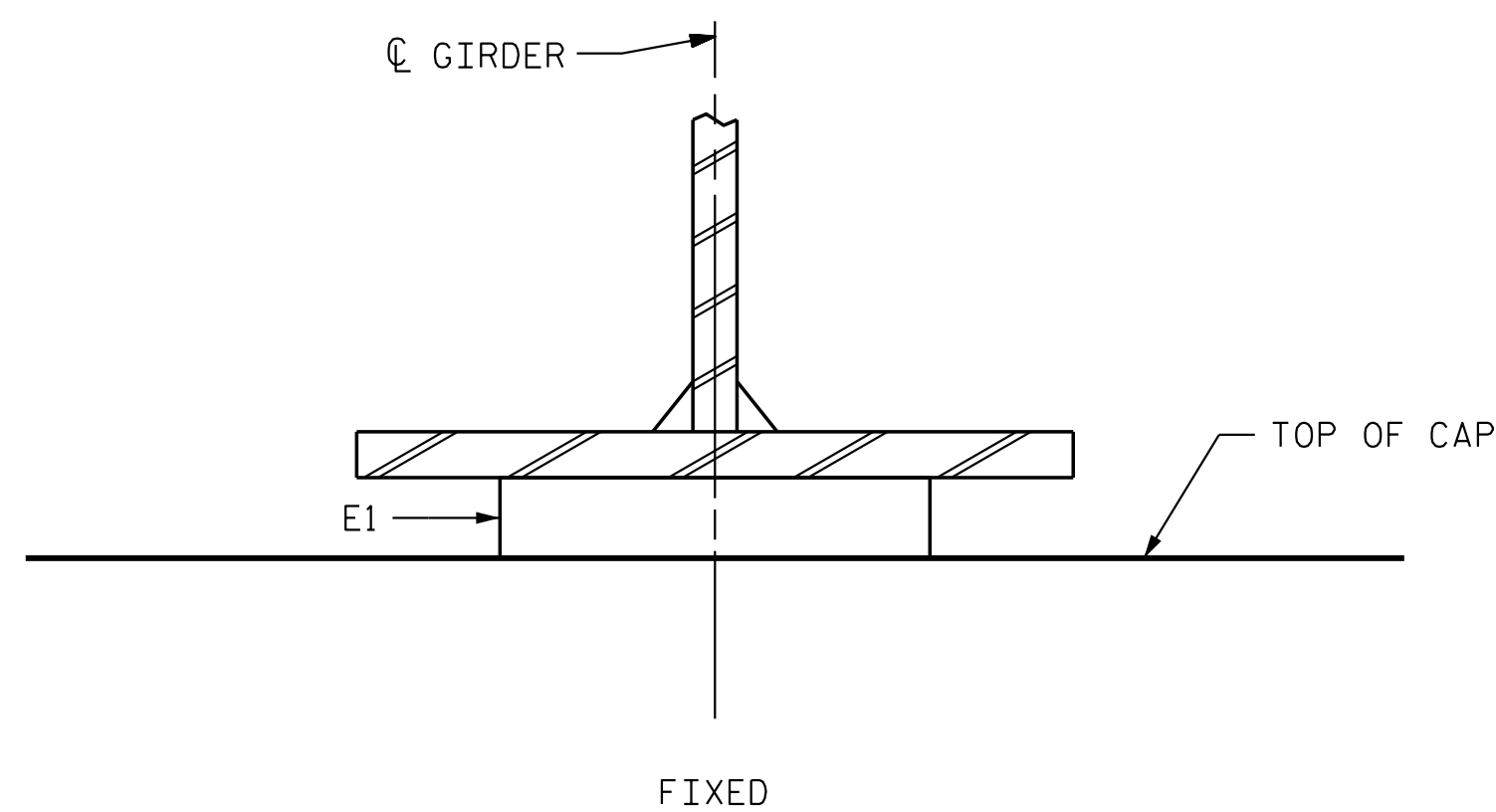
DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			29

NOTES

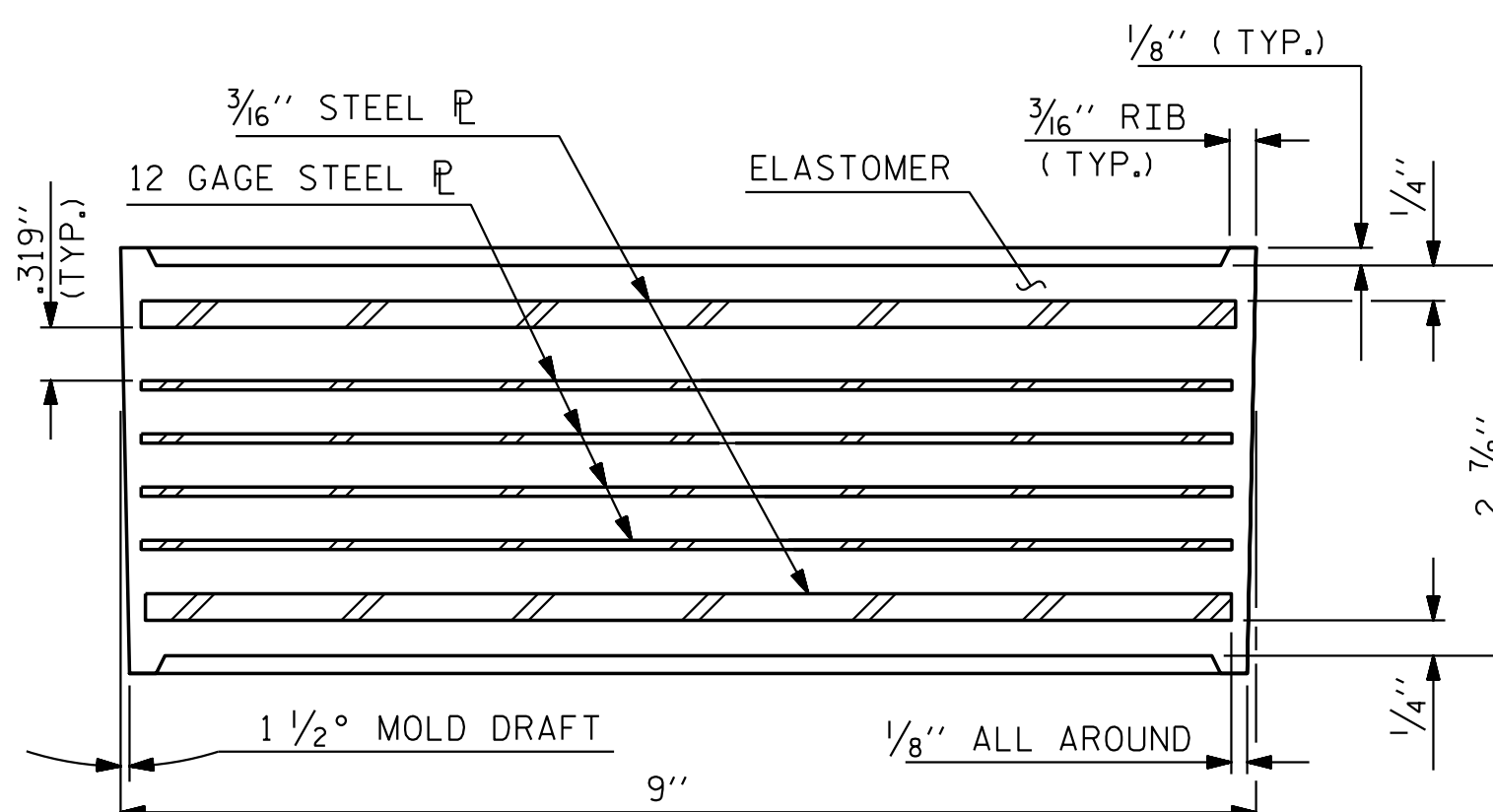
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

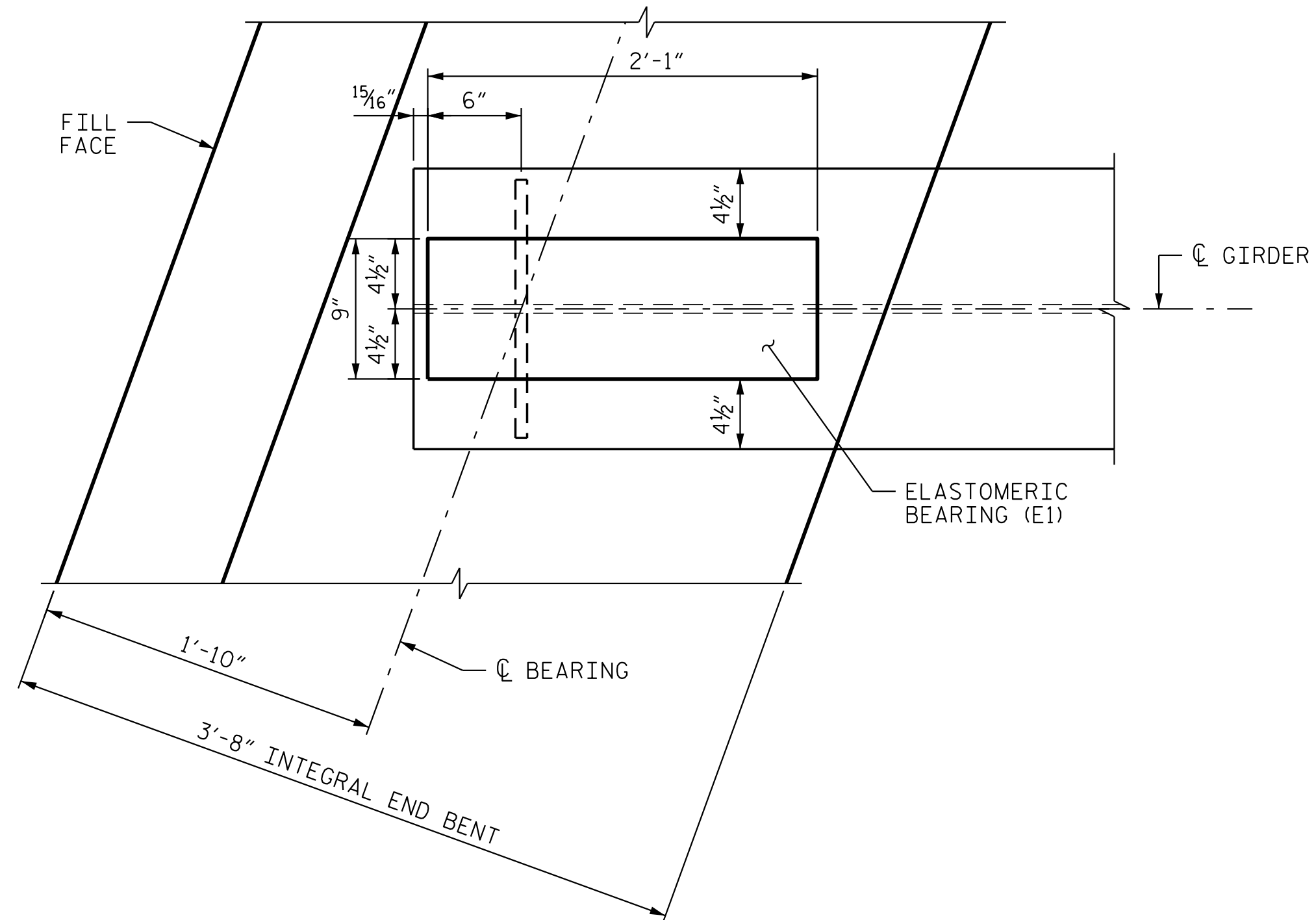


END VIEW

(AT INTEGRAL END BENT)

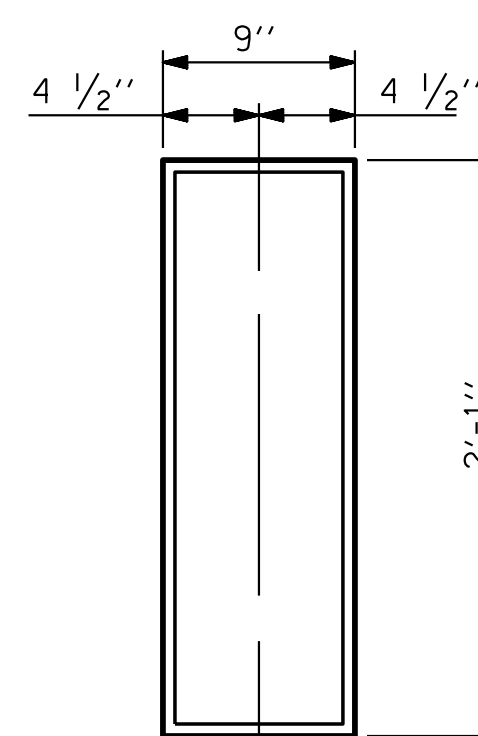


TYPICAL SECTION OF ELASTOMERIC BEARINGS



PLAN VIEW

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



E1 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE III

MAXIMUM ALLOWABLE SERVICE DEAD LOADS	
TYPE III	255 k

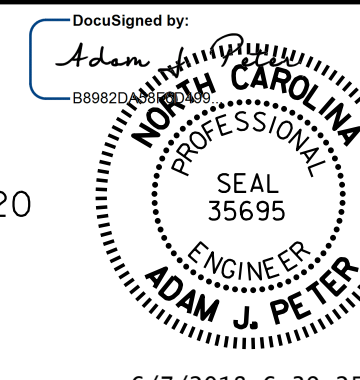
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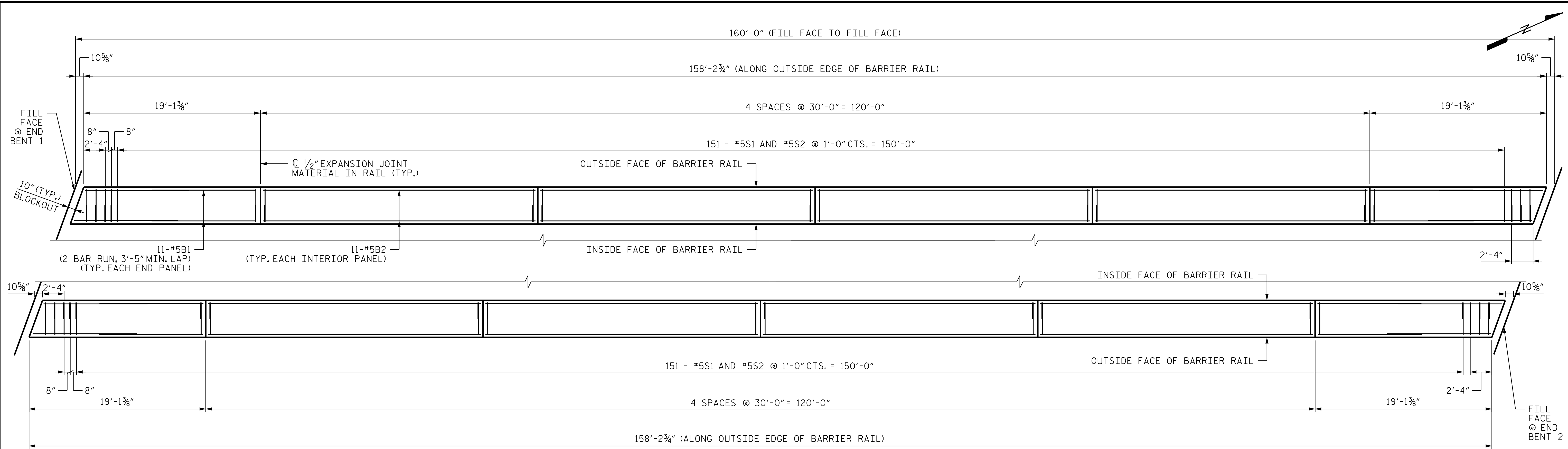
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ELASTOMERIC BEARING DETAILS

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2			4			TOTAL SHEETS 29

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PLAN OF CONCRETE BARRIER RAIL

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 CONCRETE
 BARRIER RAIL

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DocuSigned by:
 Adam J. Peter
 NORTH CAROLINA
 PROFESSIONAL
 ENGINEER
 SEAL
 35695
 ADAM J. PETER

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 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

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2			4			29

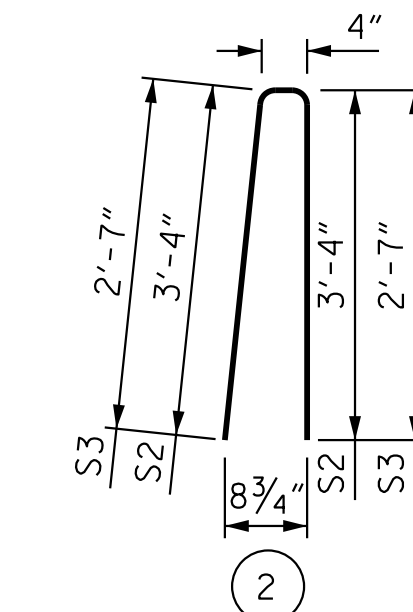
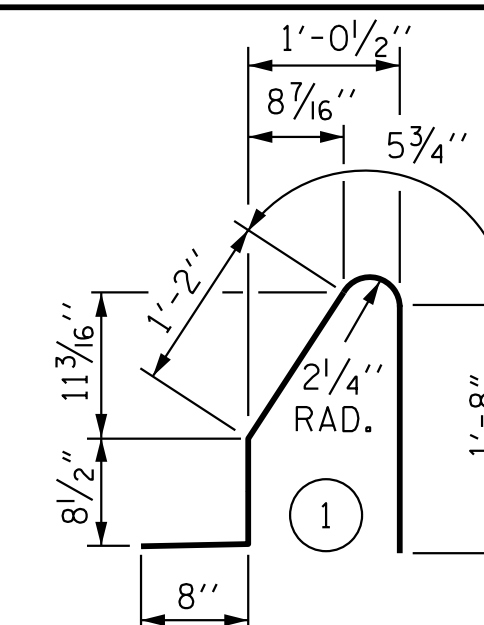
NOTES

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

ALL REINFORCING STEEL IN 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.

BAR TYPES



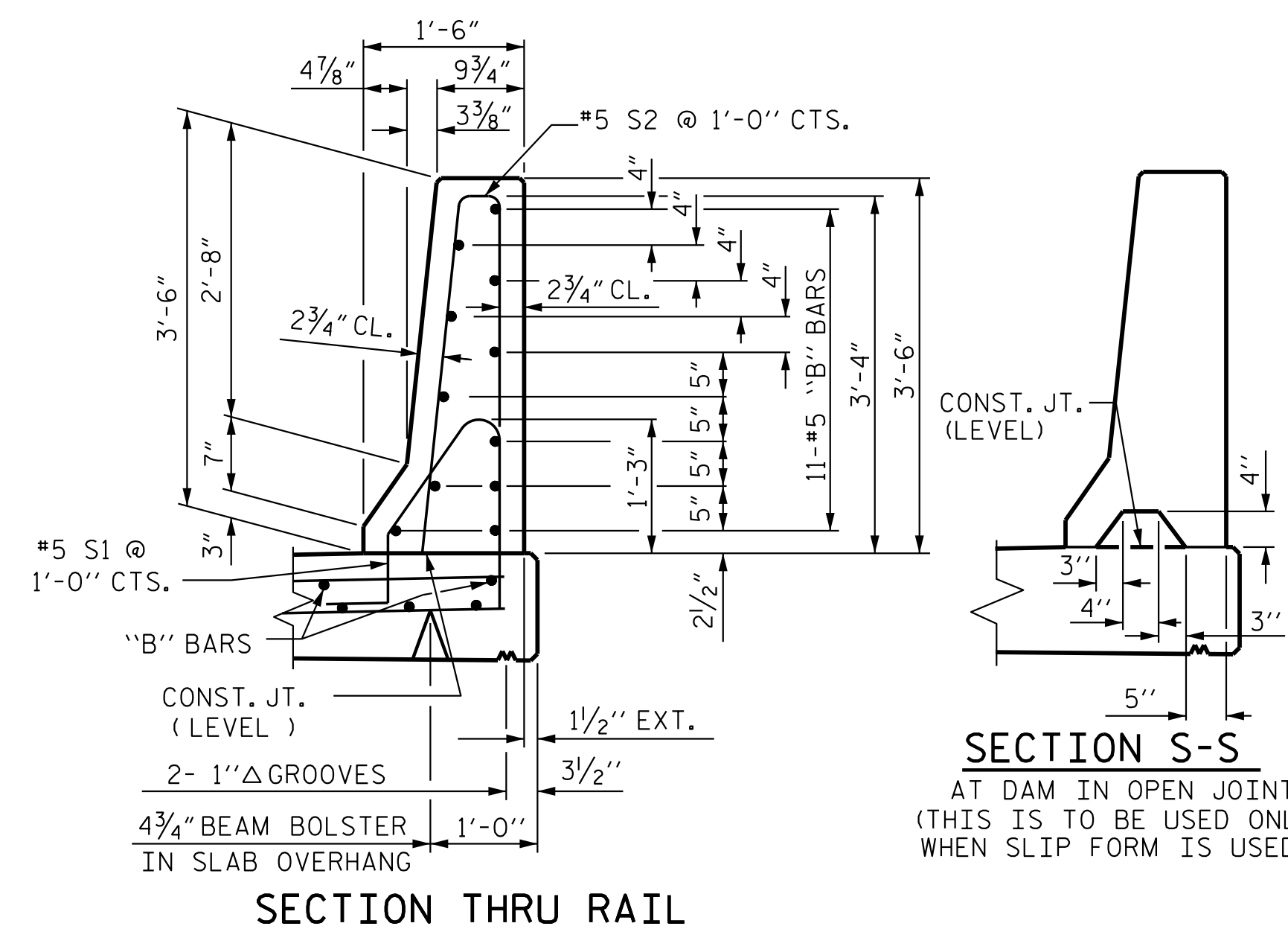
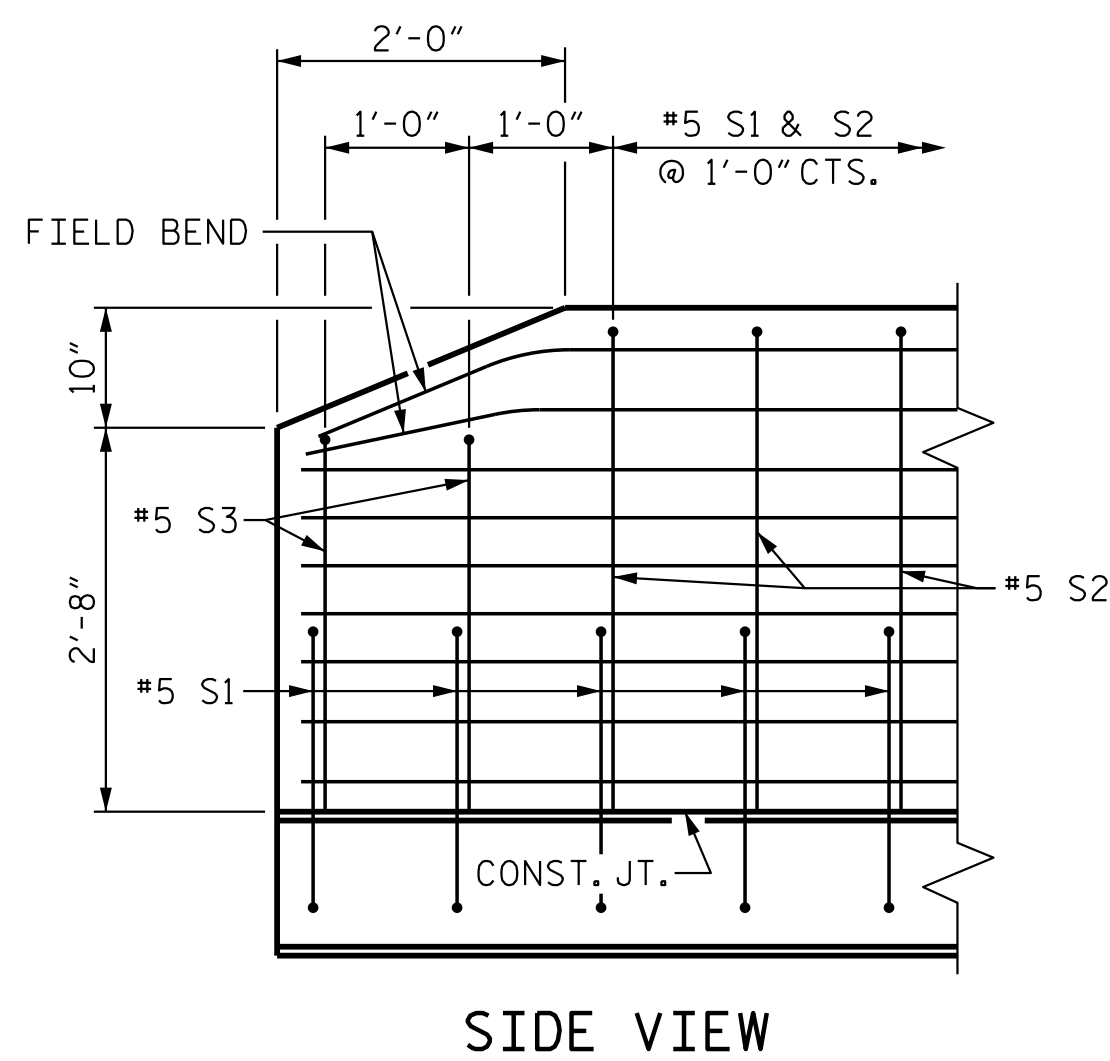
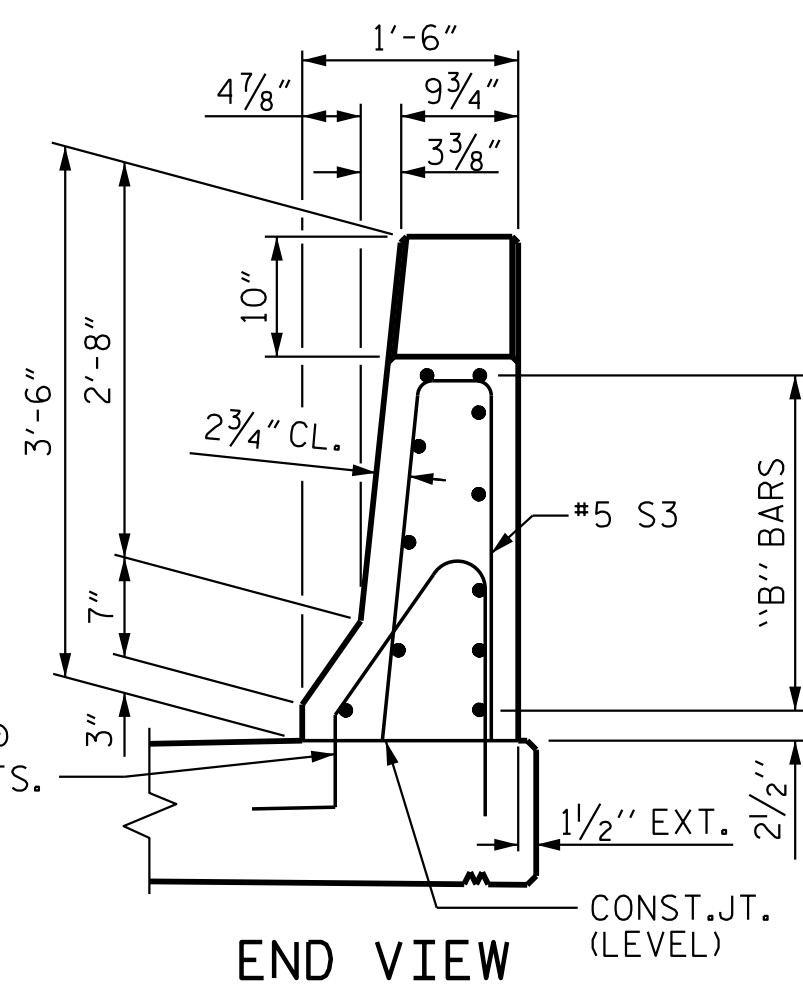
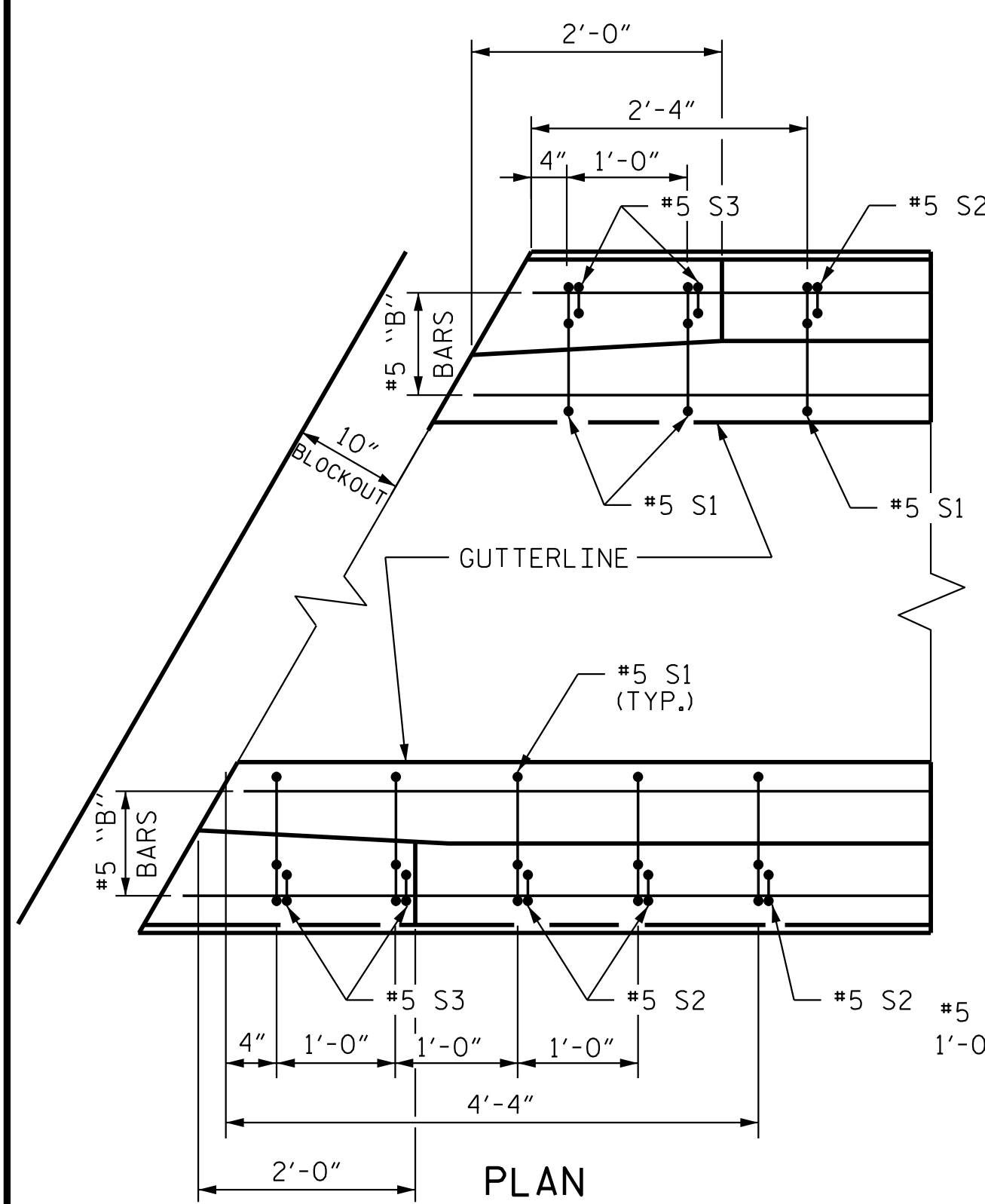
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY (2 RAILS)

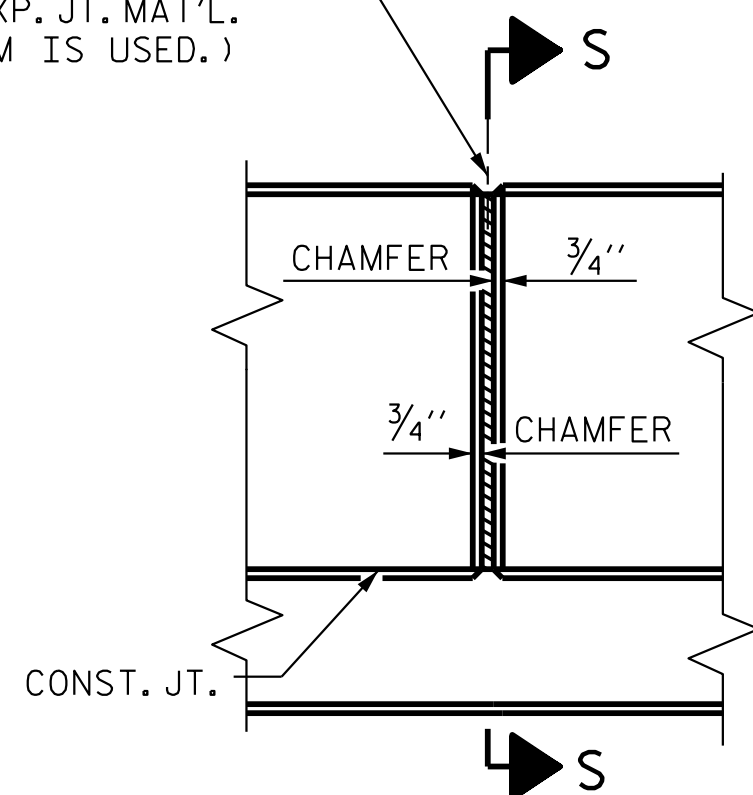
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	316	#5	1	4'-8"	1,538
* S2	308	#5	2	7'-0"	2,249
* S3	8	#5	2	5'-6"	35
* B1	88	#5	STR	11'-8"	1,071
* B2	88	#5	STR	29'-6"	2,708

* EPOXY COATED REINFORCING STEEL	7,600	LBS.
CLASS AA CONCRETE	43.0	CU. YDS.
CONCRETE BARRIER RAIL	316.5	LN. FT.



END OF RAIL DETAILS

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



**ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS**

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD

CONCRETE
 BARRIER RAIL

REVISIONS

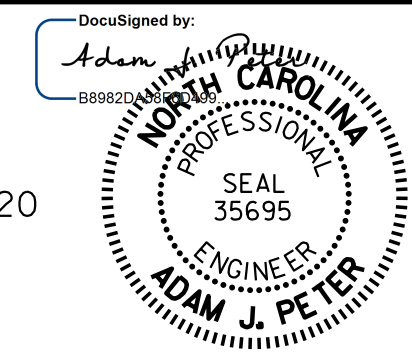
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2			4			TOTAL SHEETS 29

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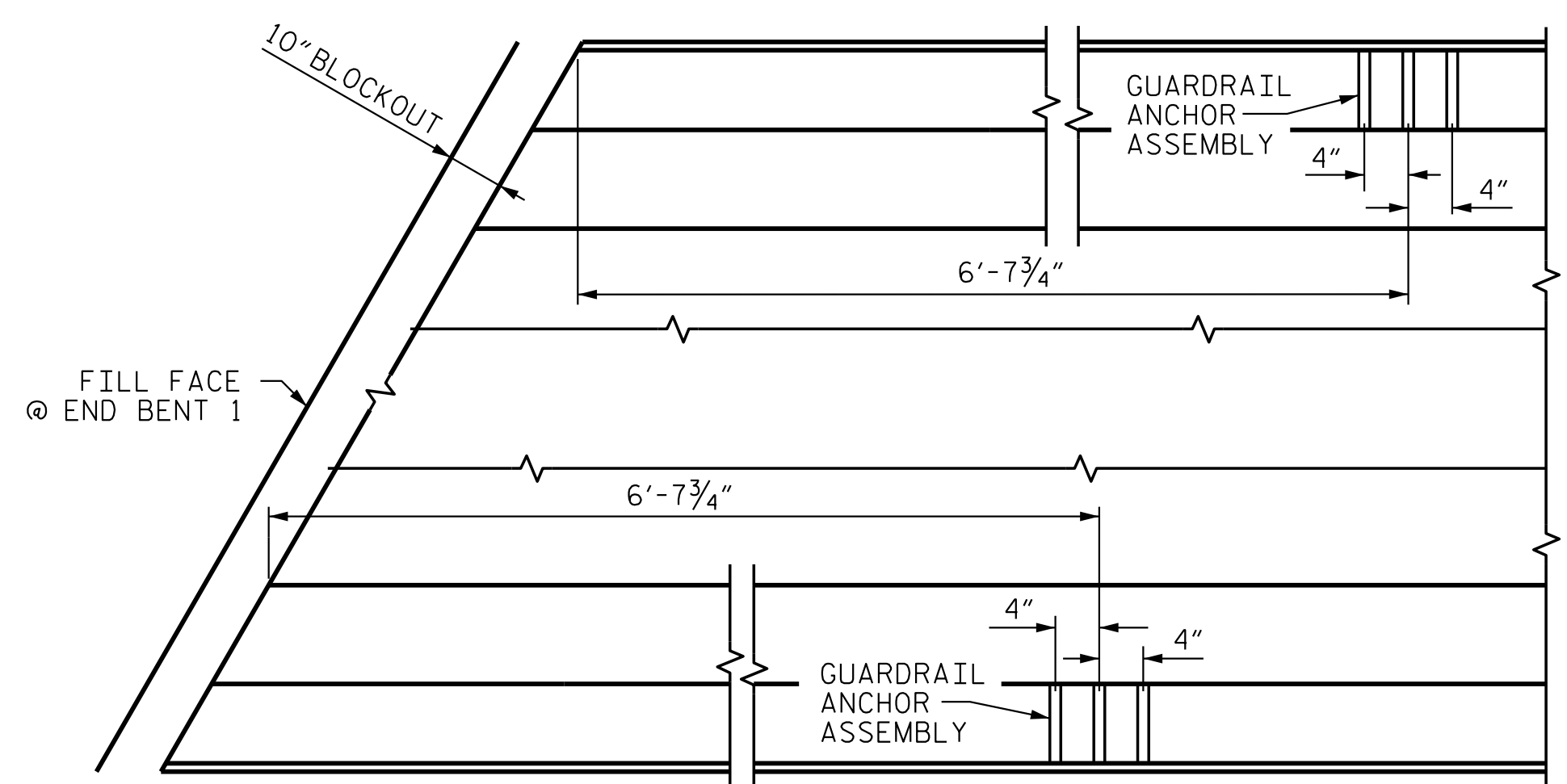
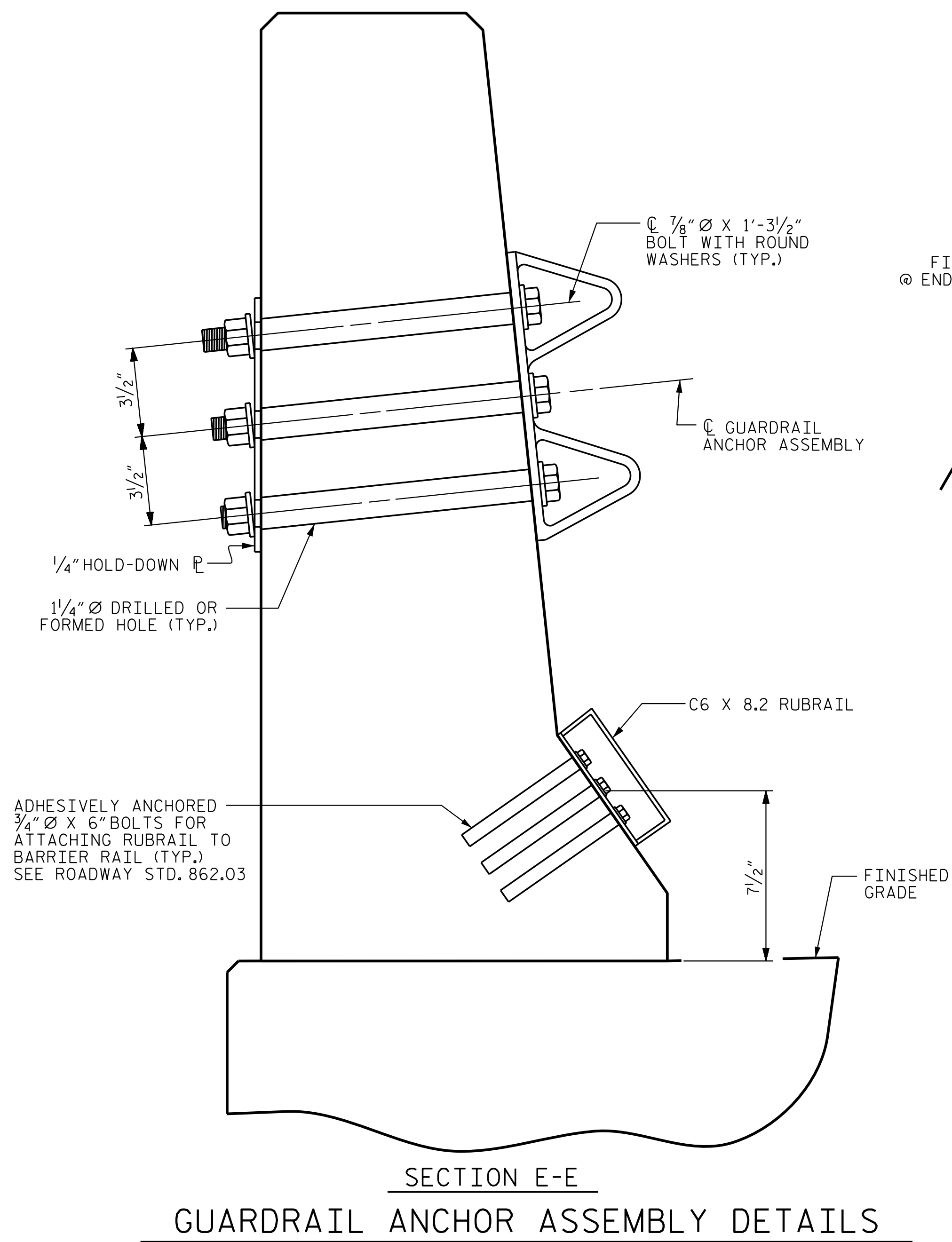
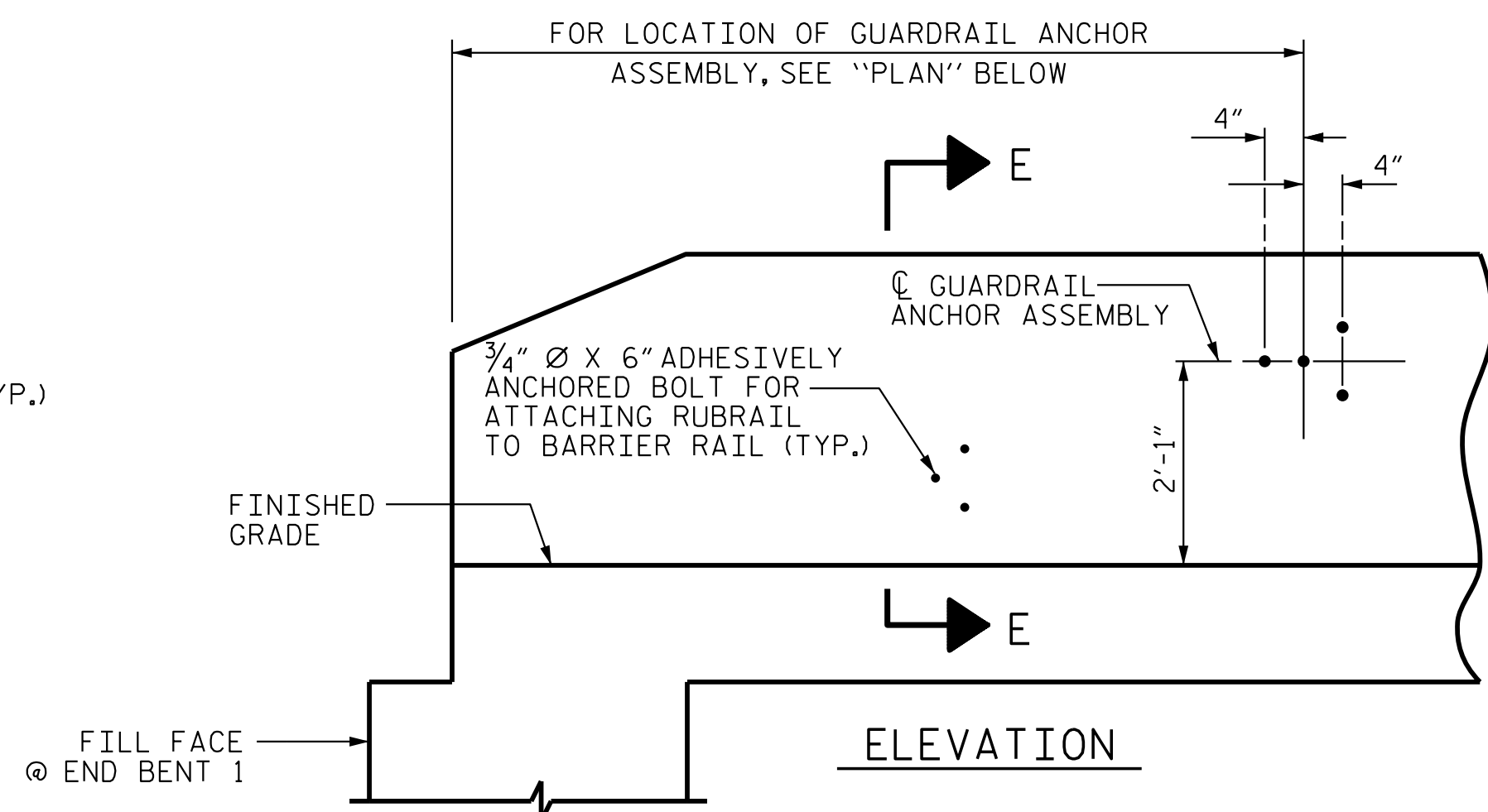
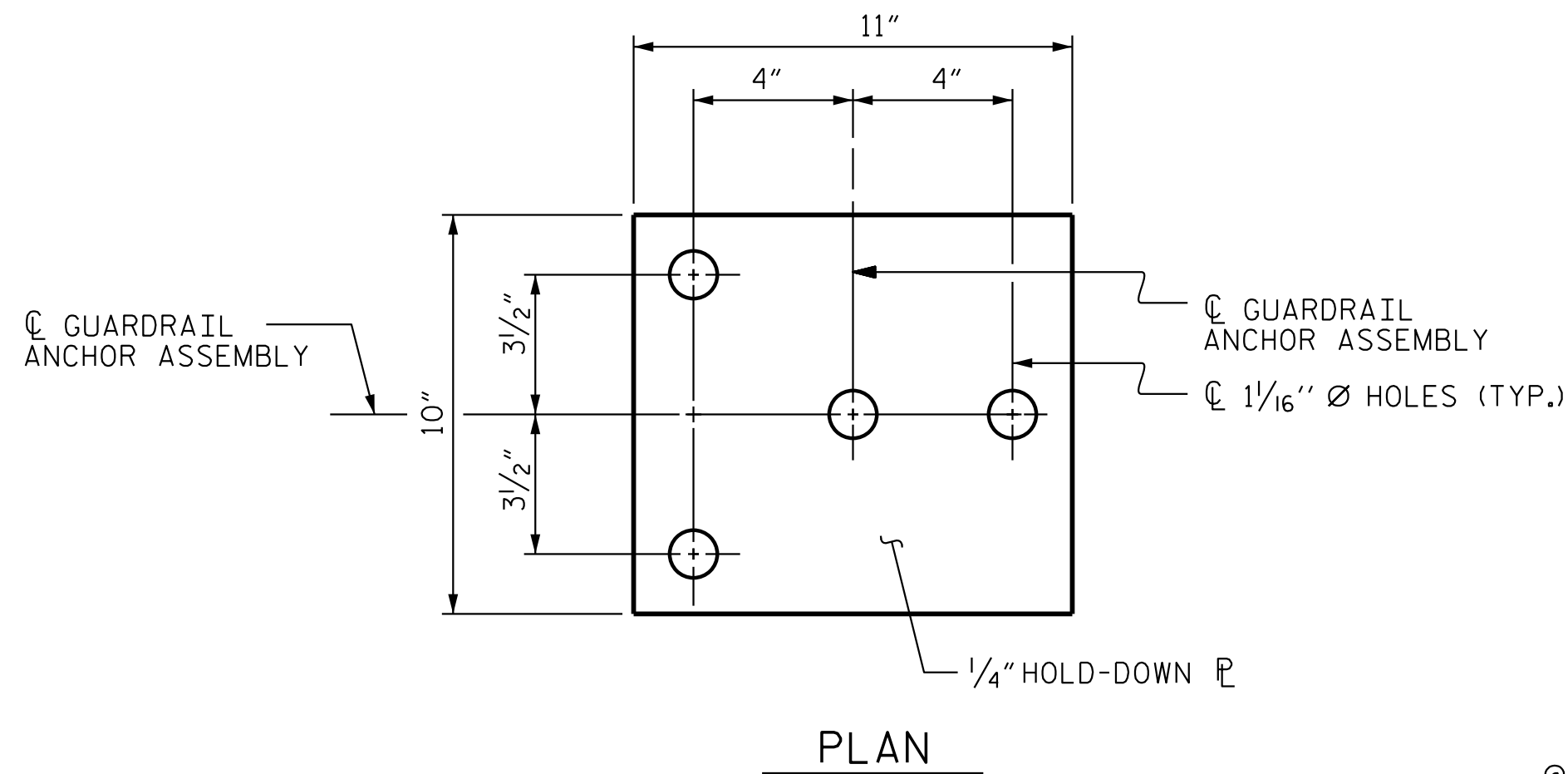


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DRMP JOB NUMBER: 15-0323.002

STD. NO. CBR1

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 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018



PLAN
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 - 7/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

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

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

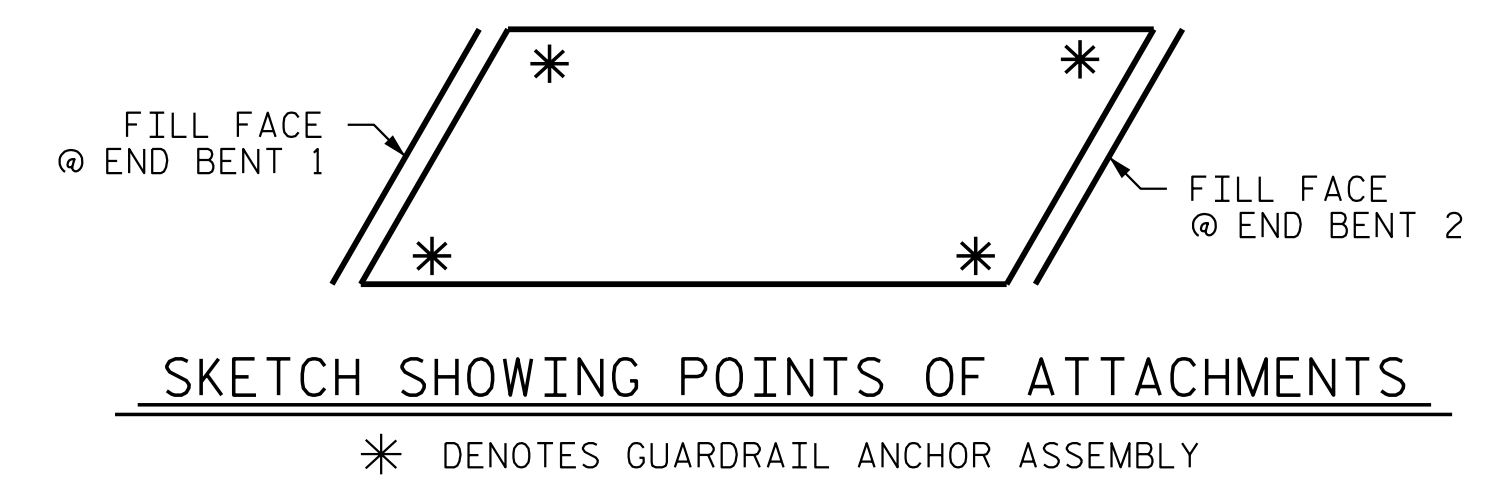
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



PROJECT NO. U-3109B
ALAMANCE COUNTY
STATION: 227+33.50 -L-

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NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 35695
ADAM J. PETER

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

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1			3		
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S-19
TOTAL SHEETS 29

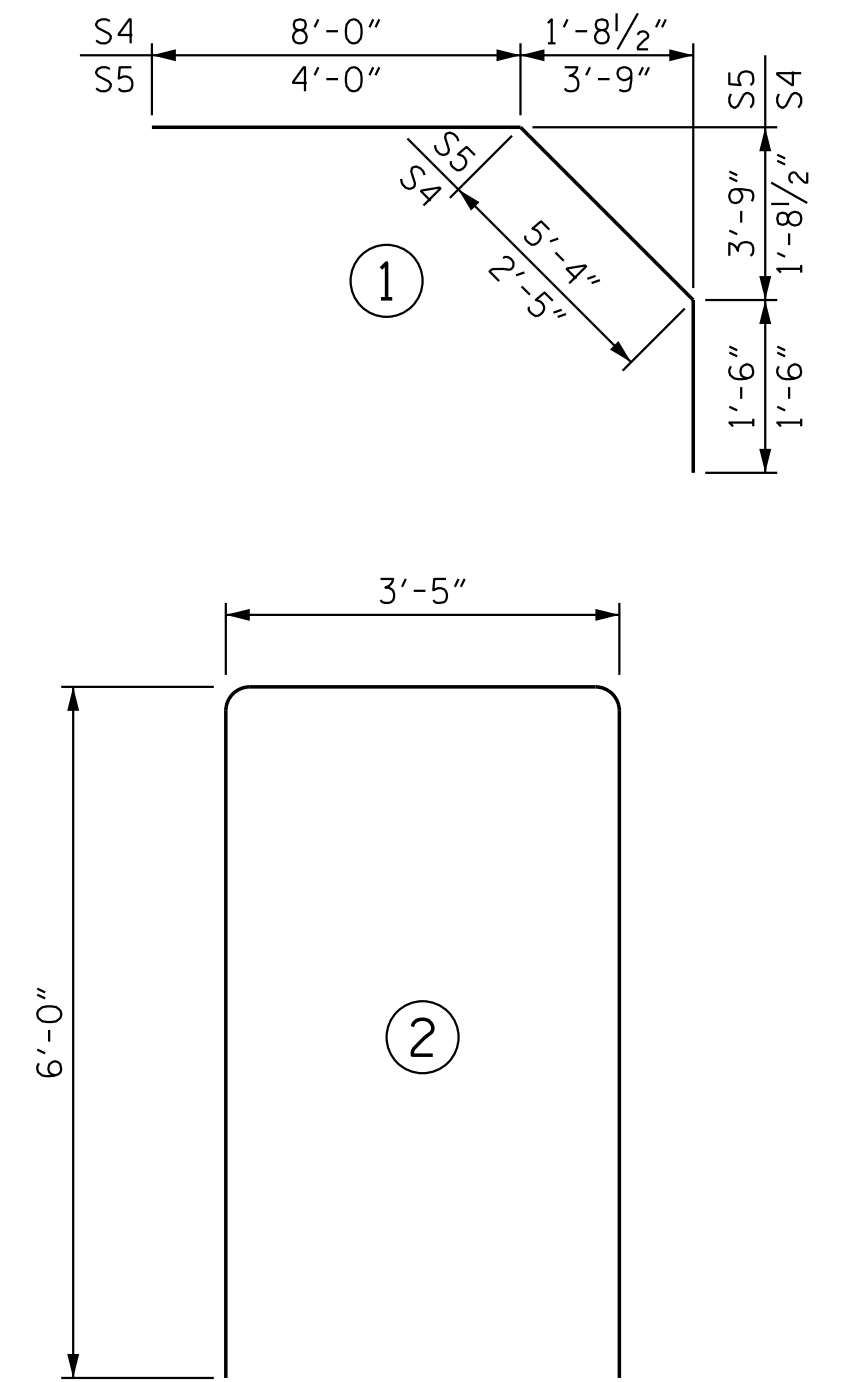
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DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

REINFORCING BAR SCHEDULE

BRIDGE DECK						BRIDGE DECK						BRIDGE DECK					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A100	314	5	STR	38'-10"	12,718	A200	314	5	STR	38'-10"	12,718	* B1	162	4	STR	28'-0"	3,030
* A101	2	5	STR	37'-10"	79	A201	2	5	STR	37'-10"	79	B2	150	5	STR	54'-1"	8,461
* A102	2	5	STR	36'-6"	76	A202	2	5	STR	36'-6"	76	* B3	156	6	STR	35'-0"	8,201
* A103	2	5	STR	35'-3"	74	A203	2	5	STR	35'-3"	74						
* A104	2	5	STR	34'-0"	71	A204	2	5	STR	34'-0"	71	K1	48	4	STR	21'-11"	703
* A105	2	5	STR	32'-9"	68	A205	2	5	STR	32'-9"	68						
* A106	2	5	STR	31'-6"	66	A206	2	5	STR	31'-6"	66	* S4	72	4	1	11'-11"	573
* A107	2	5	STR	30'-3"	63	A207	2	5	STR	30'-3"	63	* S5	72	4	1	10'-10"	521
* A108	2	5	STR	29'-0"	60	A208	2	5	STR	29'-0"	60						
* A109	2	5	STR	27'-9"	58	A209	2	5	STR	27'-9"	58						
* A110	2	5	STR	26'-5"	55	A210	2	5	STR	26'-5"	55						
* A111	2	5	STR	25'-2"	52	A211	2	5	STR	25'-2"	52						
* A112	2	5	STR	23'-11"	50	A212	2	5	STR	23'-11"	50						
* A113	2	5	STR	22'-8"	47	A213	2	5	STR	22'-8"	47						
* A114	2	5	STR	21'-5"	45	A214	2	5	STR	21'-5"	45						
* A115	2	5	STR	20'-2"	42	A215	2	5	STR	20'-2"	42						
* A116	2	5	STR	18'-11"	39	A216	2	5	STR	18'-11"	39						
* A117	2	5	STR	17'-8"	37	A217	2	5	STR	17'-8"	37						
* A118	2	5	STR	16'-5"	34	A218	2	5	STR	16'-5"	34						
* A119	2	5	STR	15'-1"	31	A219	2	5	STR	15'-1"	31						
* A120	2	5	STR	13'-10"	29	A220	2	5	STR	13'-10"	29						
* A121	2	5	STR	12'-7"	26	A221	2	5	STR	12'-7"	26						
* A122	2	5	STR	11'-4"	24	A222	2	5	STR	11'-4"	24						
* A123	2	5	STR	10'-1"	21	A223	2	5	STR	10'-1"	21						
* A124	2	5	STR	8'-10"	18	A224	2	5	STR	8'-10"	18						
* A125	2	5	STR	7'-7"	16	A225	2	5	STR	7'-7"	16						
* A126	2	5	STR	6'-4"	13	A226	2	5	STR	6'-4"	13						
* A127	2	5	STR	5'-1"	11	A227	2	5	STR	5'-1"	11						
* A128	2	5	STR	3'-9"	8	A228	2	5	STR	3'-9"	8						
* A129	2	5	STR	2'-6"	5	A229	2	5	STR	2'-6"	5						
* A130	2	5	STR	1'-3"	3	A230	2	5	STR	1'-3"	3						
TOTAL																	
						REINFORCING STEEL						24,268 LBS					
						* EPOXY COATED REINFORCING STEEL						26,265 LBS					

ALL BAR DIMENSIONS ARE OUT TO OUT

BAR TYPES



CLASS AA CONCRETE BREAKDOWN		
POUR 2 (DECK)	180.1	C.Y.
POUR 3 (INTEGRAL END DIAPHRAGMS)	89.6	C.Y.

*FOR POUR 1 AND POUR 4, SEE INTEGRAL END BENT SHEETS.

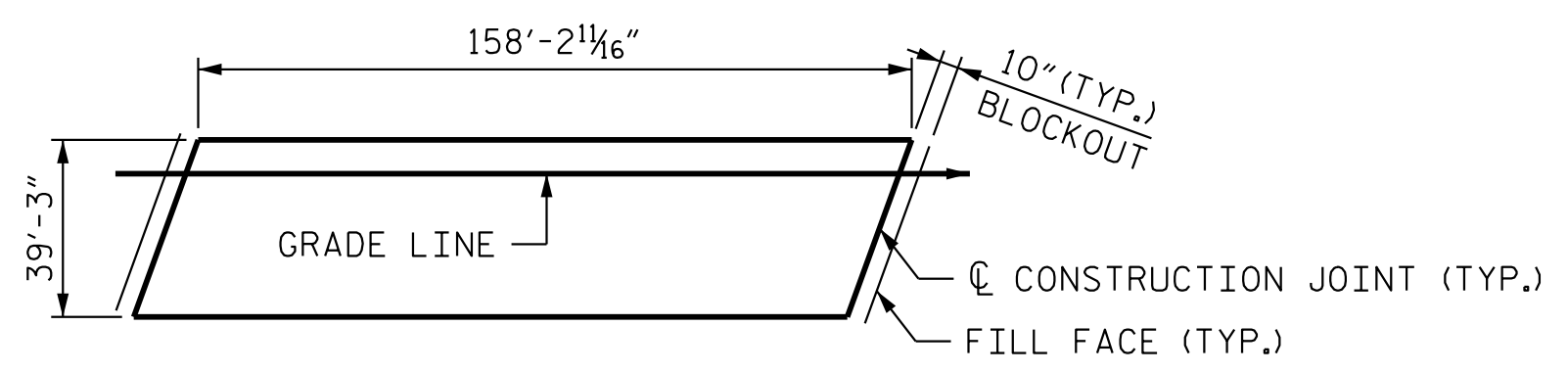
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS					
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS)	(LBS.)	(LBS.)
TOTALS**	269.7	24,268	26,265

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

GROOVING BRIDGE FLOORS		
APPROACH SLABS	1,717	SQ. FT.
BRIDGE DECK	5,221	SQ. FT.
TOTAL	6,938	SQ. FT.

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(SQ. FT = 6,210)

NOTE
 THE COST OF THE UPPER PORTION OF THE INTEGRAL END BENTS ABOVE THE CONSTRUCTION JOINT (POUR #3) SHALL BE INCLUDED IN THE UNIT PRICE FOR REINFORCED CONCRETE DECK SLAB.

DRAWN BY : <u>ROBERT A. ALONSO, P.E.</u>	DATE : <u>02/2018</u>
CHECKED BY : <u>RUDY M. CASTILLO, E.I.</u>	DATE : <u>02/2018</u>
DESIGN ENGINEER OF RECORD: <u>ROBERT A. ALONSO</u>	DATE : <u>02/2018</u>

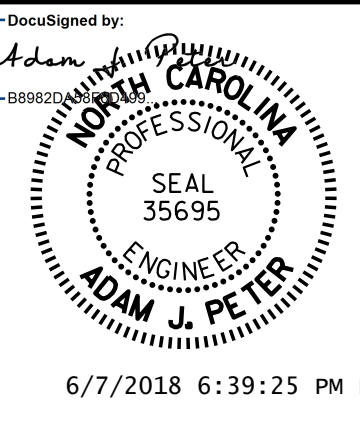
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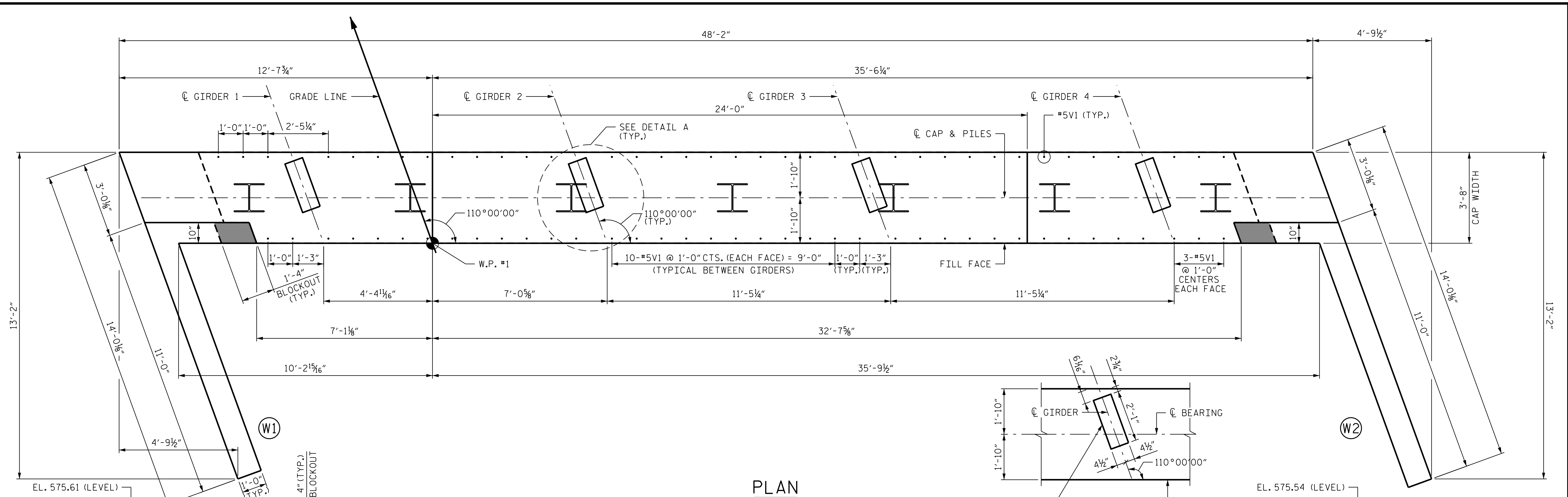
DEPARTMENT OF TRANSPORTATION

RALEIGH

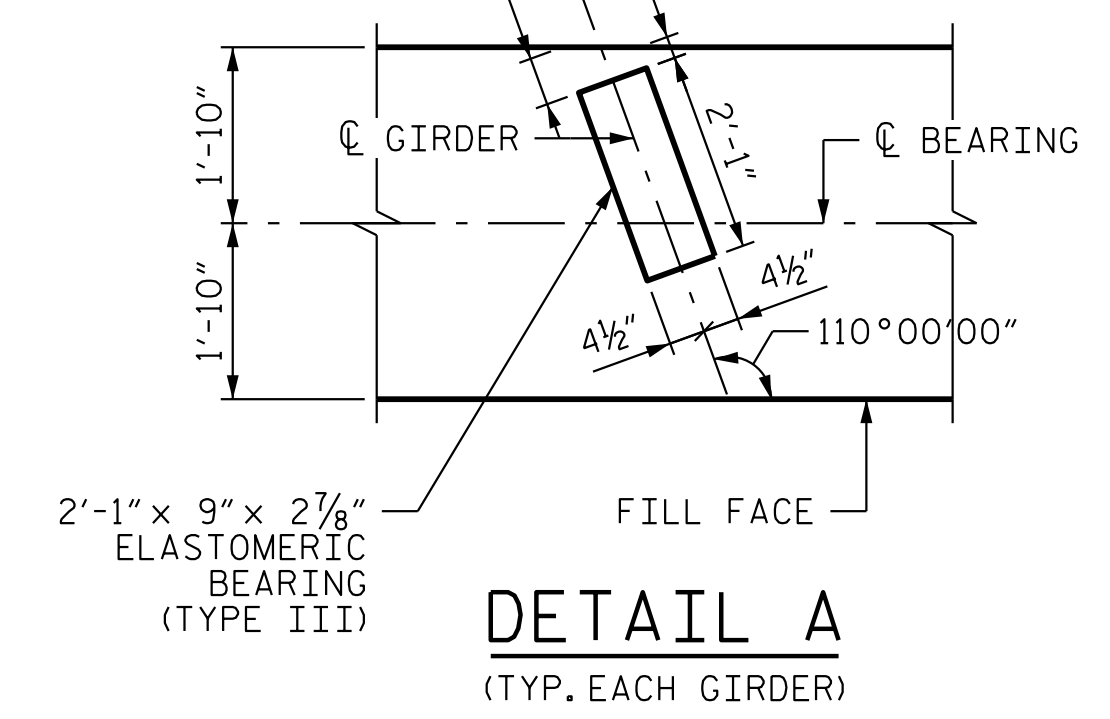
SUPERSTRUCTURE

BILL OF MATERIAL

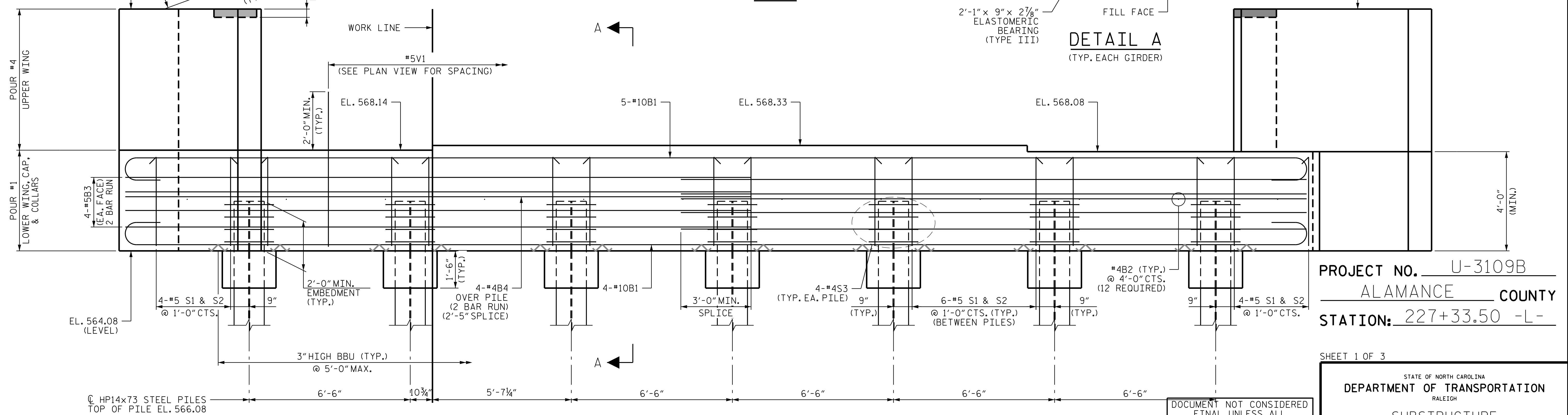
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1			3			S-20
2			4			TOTAL SHEETS 29



PLAN



DETAIL A
(TYP. EACH GIRDER)



ELEVATION

- NOTES**
1. THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".
 2. THE CONCRETE IN THE SHADED AREA OF THE WING WALL SHALL BE POURED AFTER THE CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
 3. FOR SECTION A-A, SEE SHEET 3 OF 3.

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
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 RALEIGH

SUBSTRUCTURE

INTEGRAL
 END BENT 1

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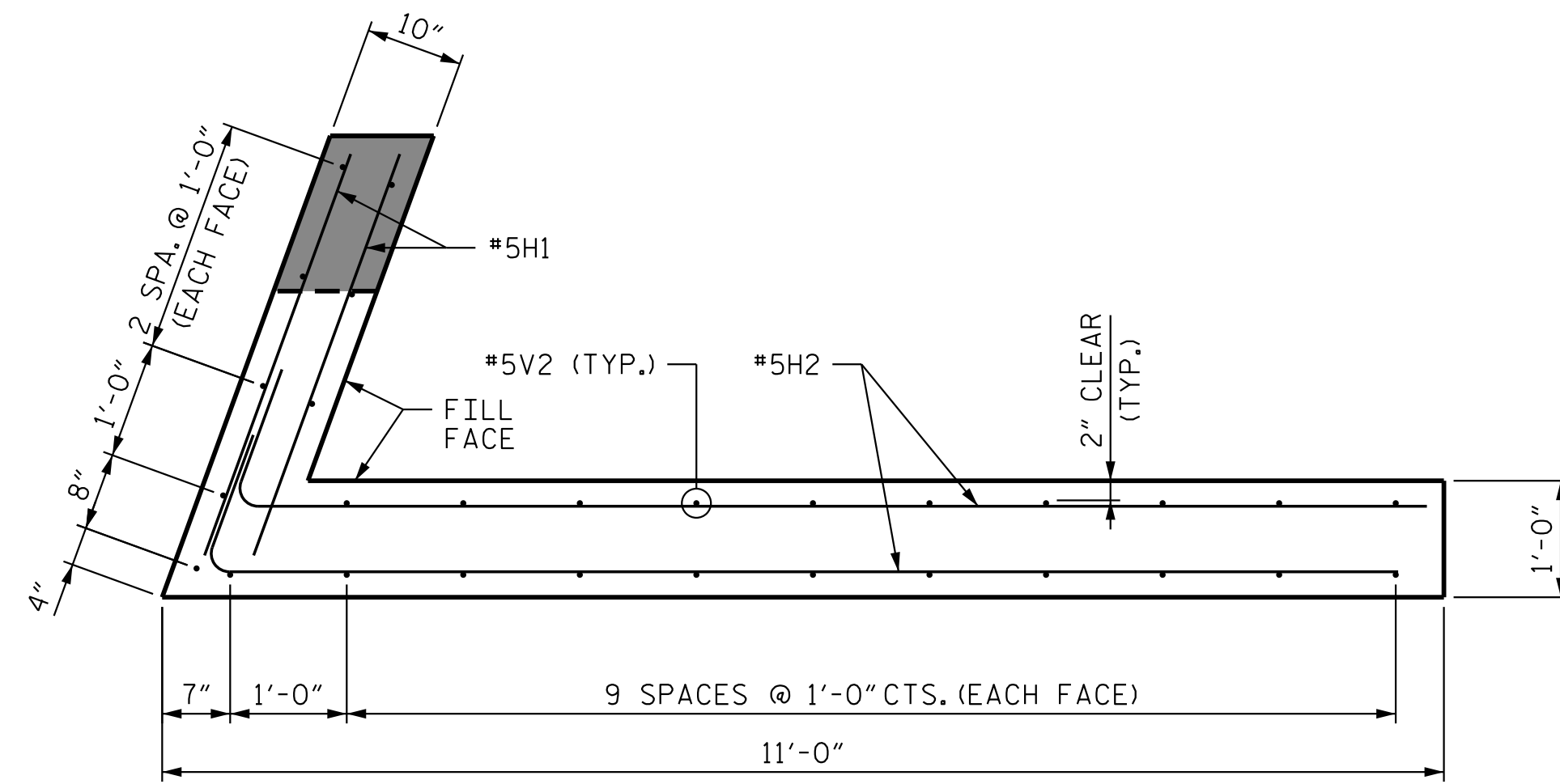
DRMP JOB NUMBER: 15-0323.002

Seal of Adam J. Peter, Professional Engineer, No. 35695, State of North Carolina.

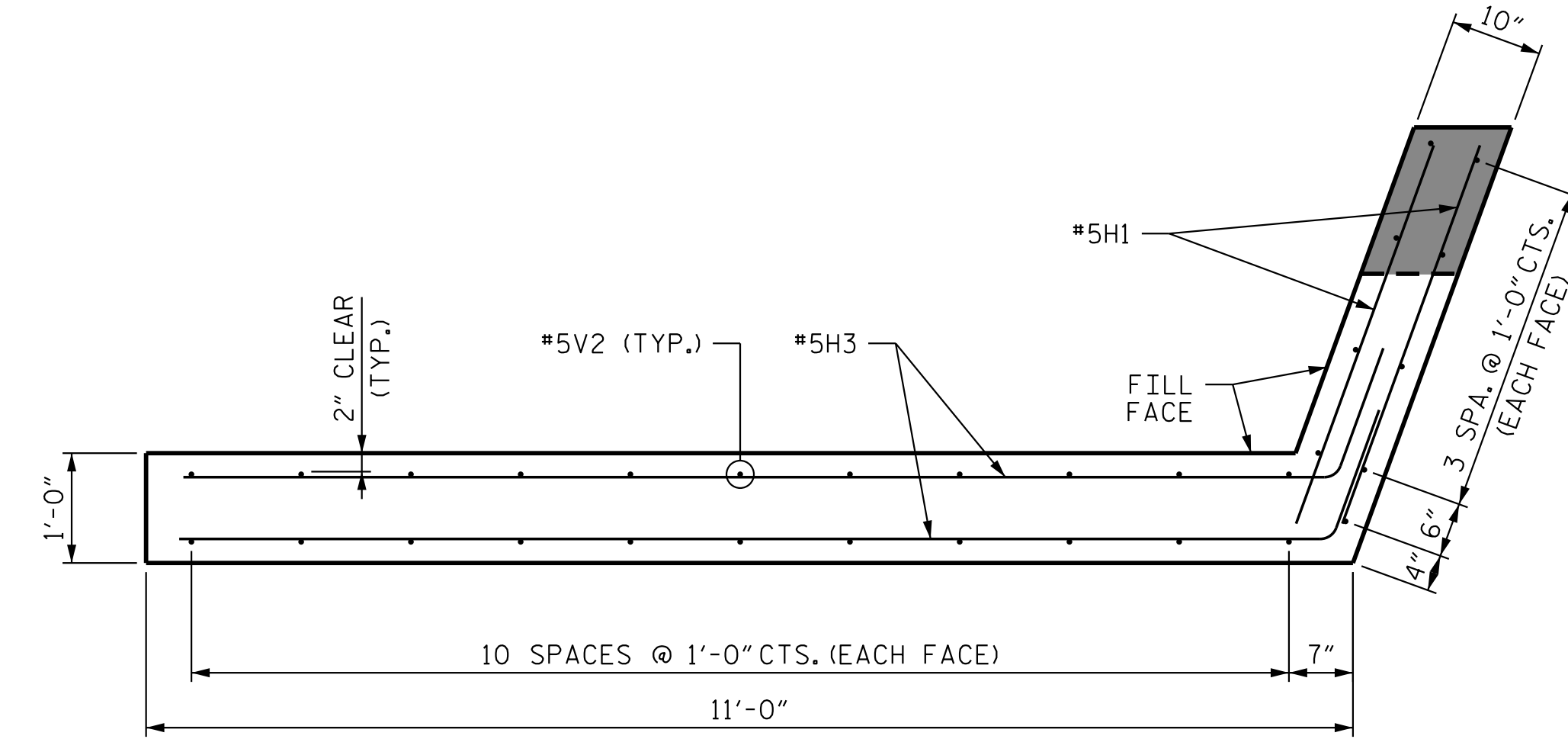
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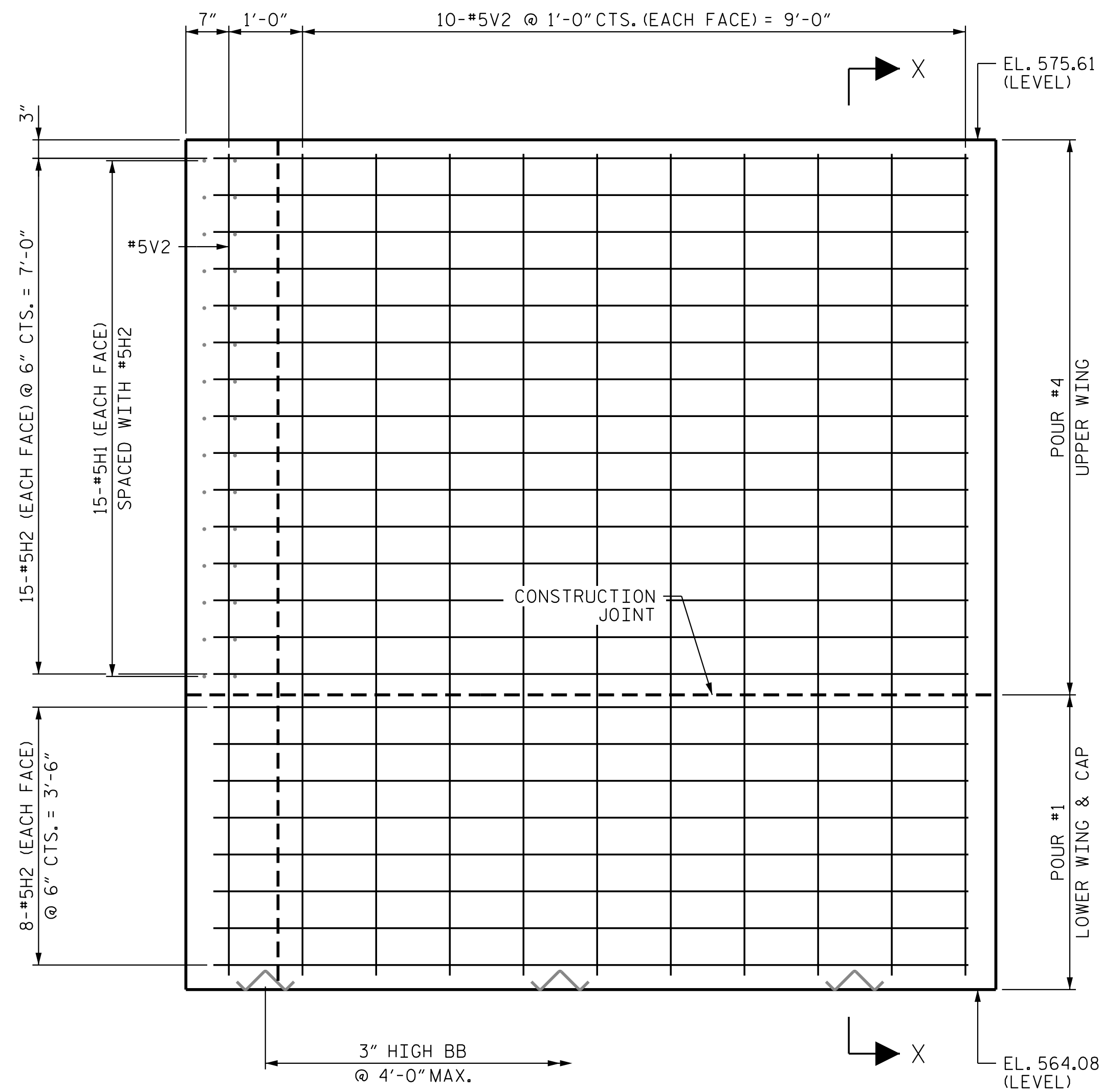
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 TOTAL SHEETS
 29



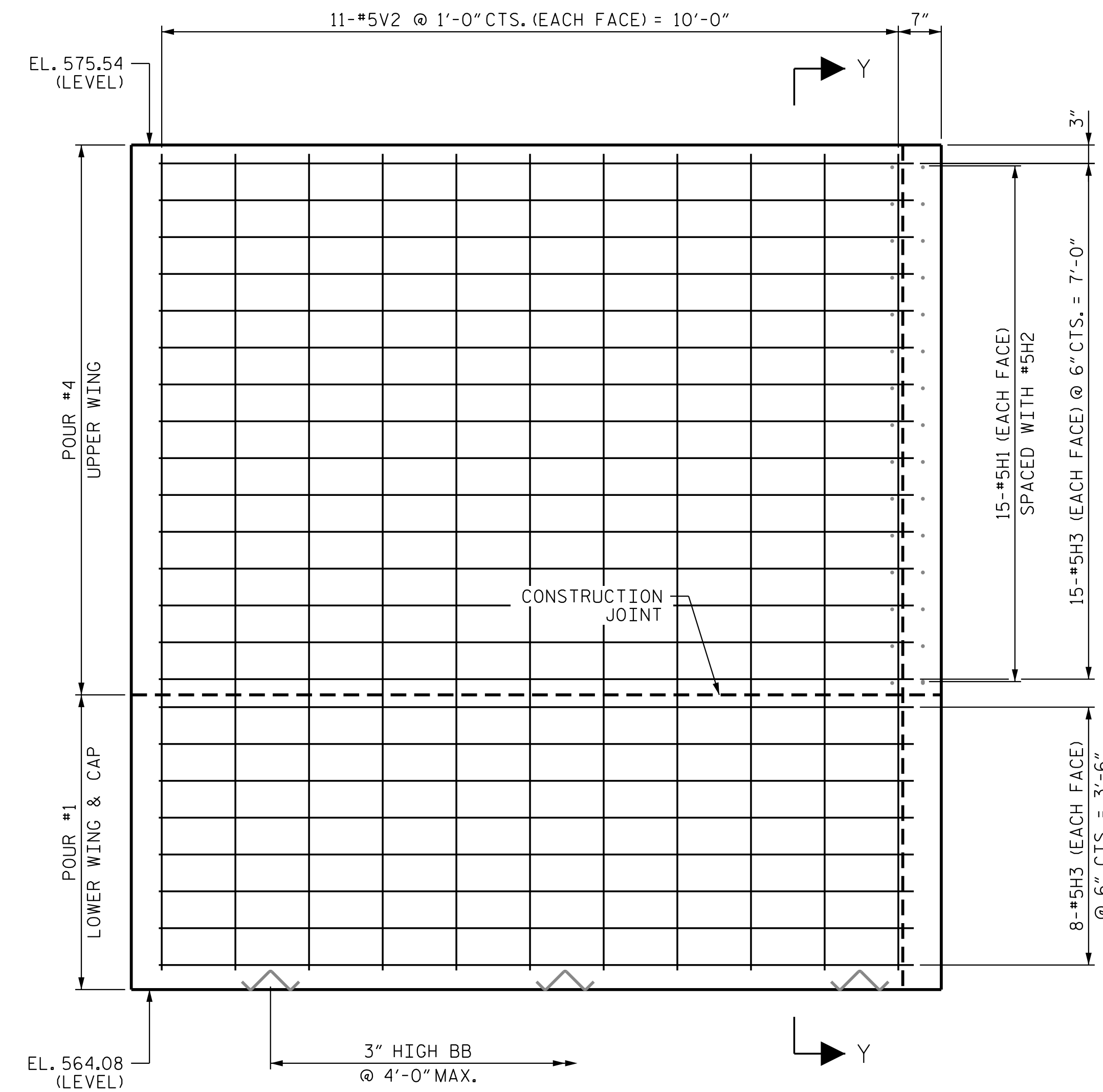
PLAN OF WING W1



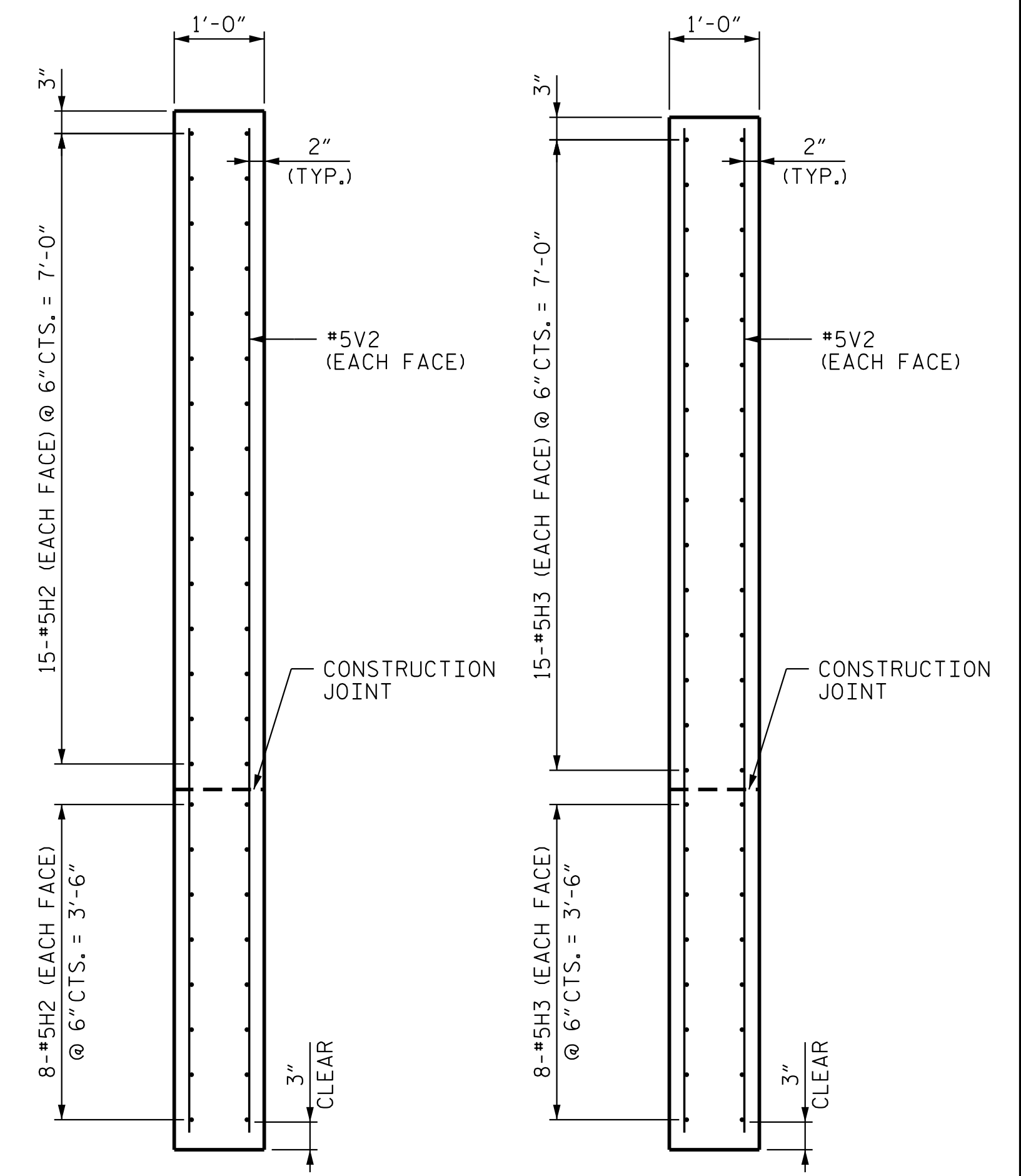
PLAN OF WING W2



ELEVATION OF WING W1



ELEVATION OF WING W2



SECTION X-X

SECTION Y-Y

PROJECT NO. U-3109B
 ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 2 OF 3

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

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 SIGNATURES COMPLETED

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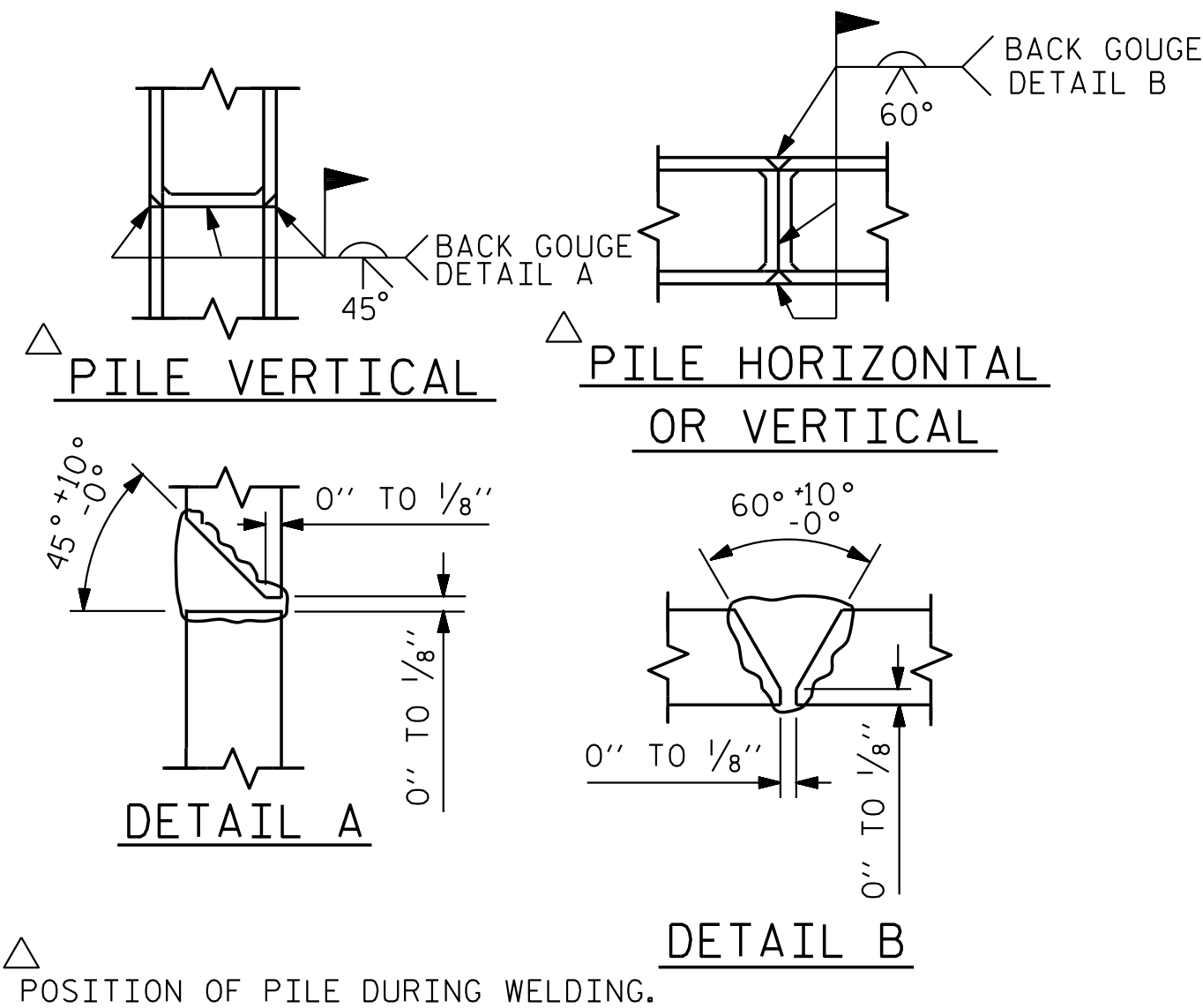
DocuSigned by:
 Adam J. Peter
 NORTH CAROLINA
 PROFESSIONAL
 ENGINEER
 SEAL
 35695
 ADAM J. PETER

6/7/2018 6:39:25 PM EDT
 DRMP JOB NUMBER: 15-0323.002

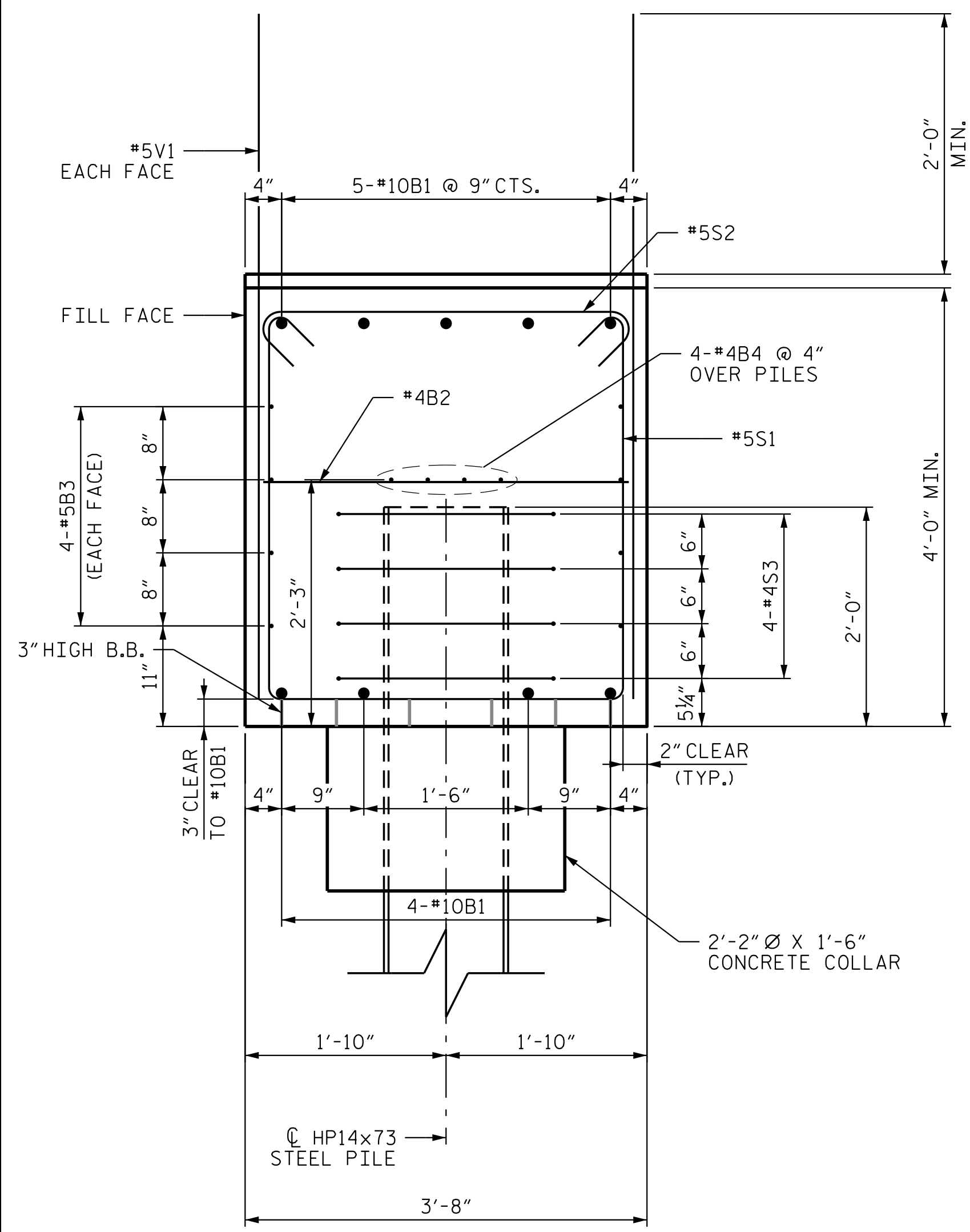
DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

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

TOTAL SHEETS: 29

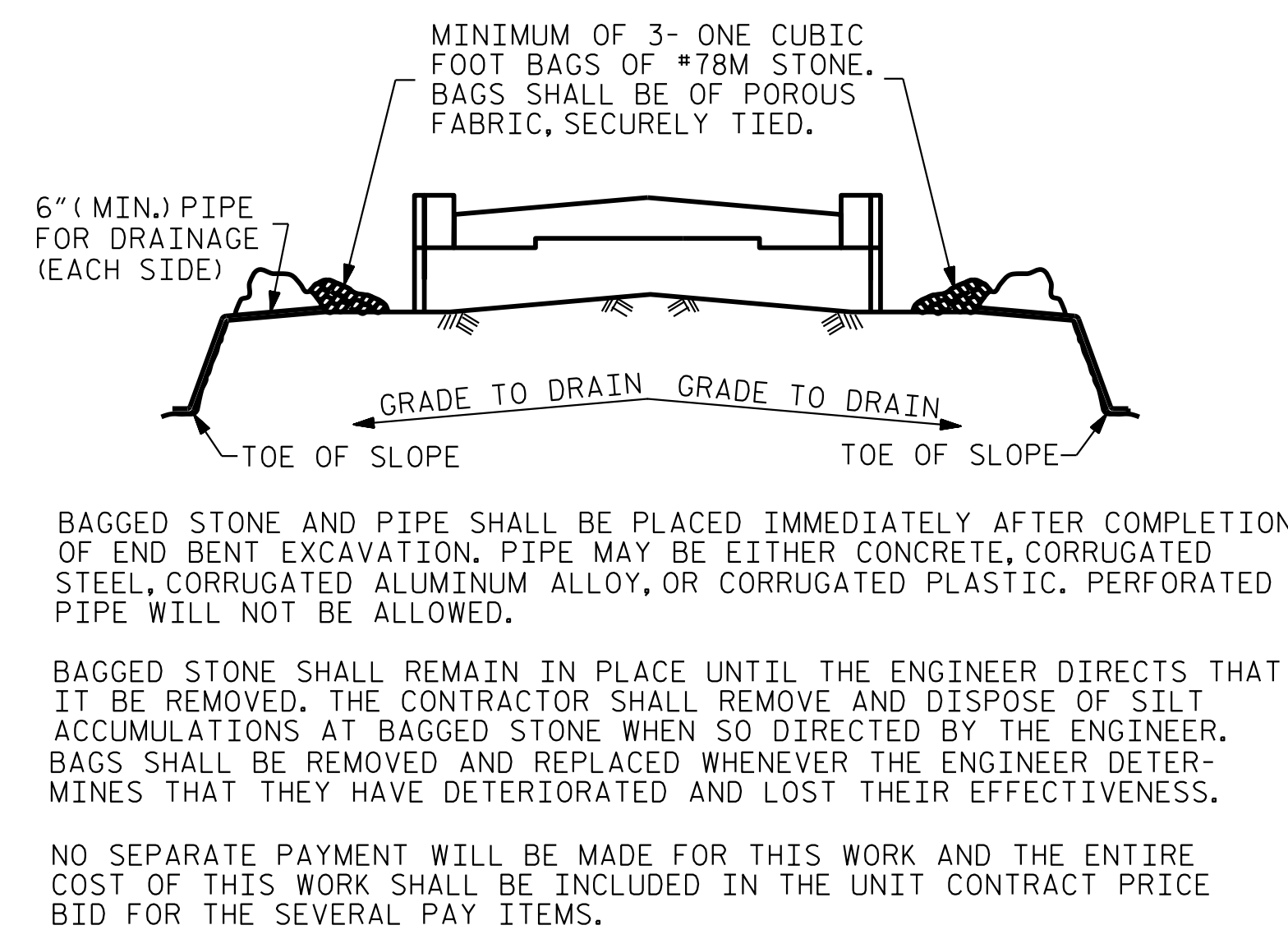


PILE SPlice DETAILS



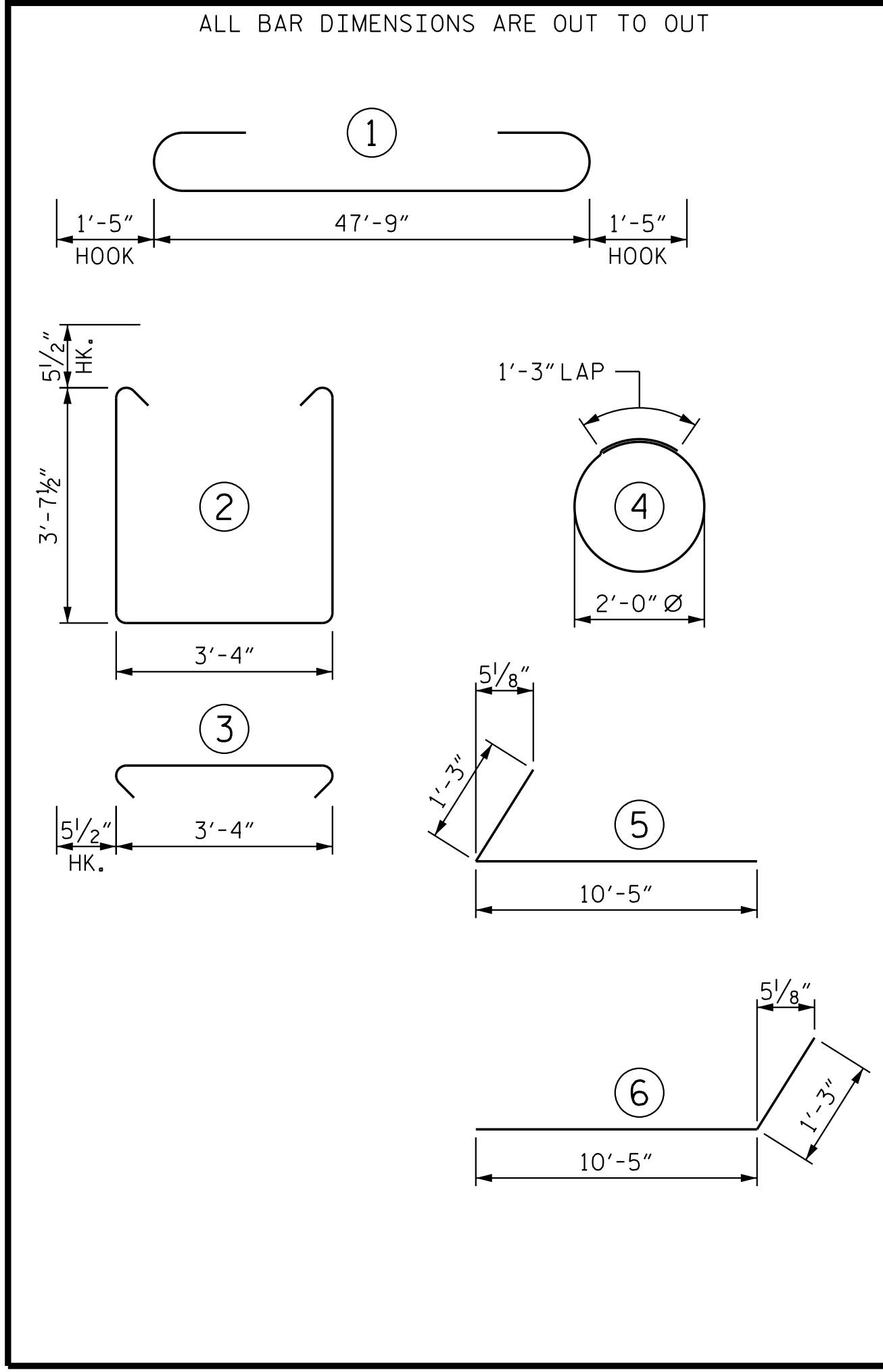
SECTION A-A

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TEMPORARY DRAINAGE AT END BENT

BAR TYPES



BILL OF MATERIAL

FOR END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	10		50'-7"	1,959
B2	12	4	STR	3'-4"	27
B3	16	4	STR	26'-6"	283
B4	8	4	STR	26'-2"	140
H1	60	5	STR	3'-10"	240
H2	46	5	5	11'-8"	560
H3	46	5	6	11'-8"	560
S1	44	5	2	11'-6"	528
S2	44	5	3	4'-3"	195
S3	28	4	4	7'-7"	142
V1	74	5	STR	5'-10"	450
V2	60	5	STR	10'-9"	673
TOTAL					
REINFORCING STEEL				5,756	LBS.
CLASS A CONCRETE					
POUR 1 (CAP & LOWER WING)				31.5	C.Y.
POUR 4 (UPPER WING)				7.6	C.Y.
CLASS A CONCRETE TOTAL				39.1	C.Y.
HP14x73 STEEL PILES					
NO. 7				210	LIN. FT.
PILE DRIVING EQUIPMENT SETUP FOR HP14x73 STEEL PILES				7	EA
STEEL PILE POINTS				7	EA

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 3 OF 3

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 Adam J. Peter
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 35695
 ADAM J. PETER
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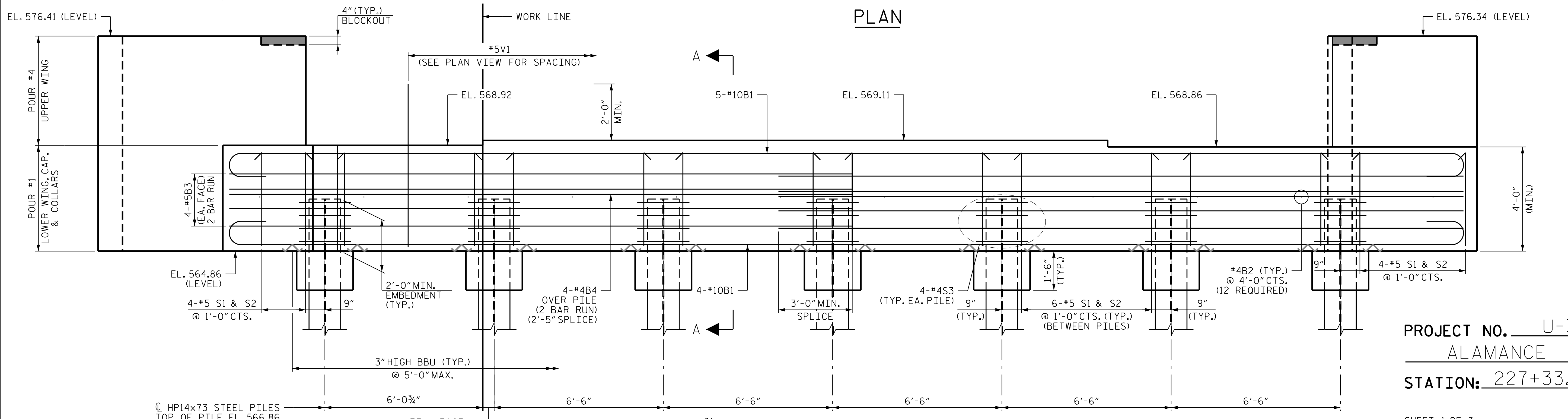
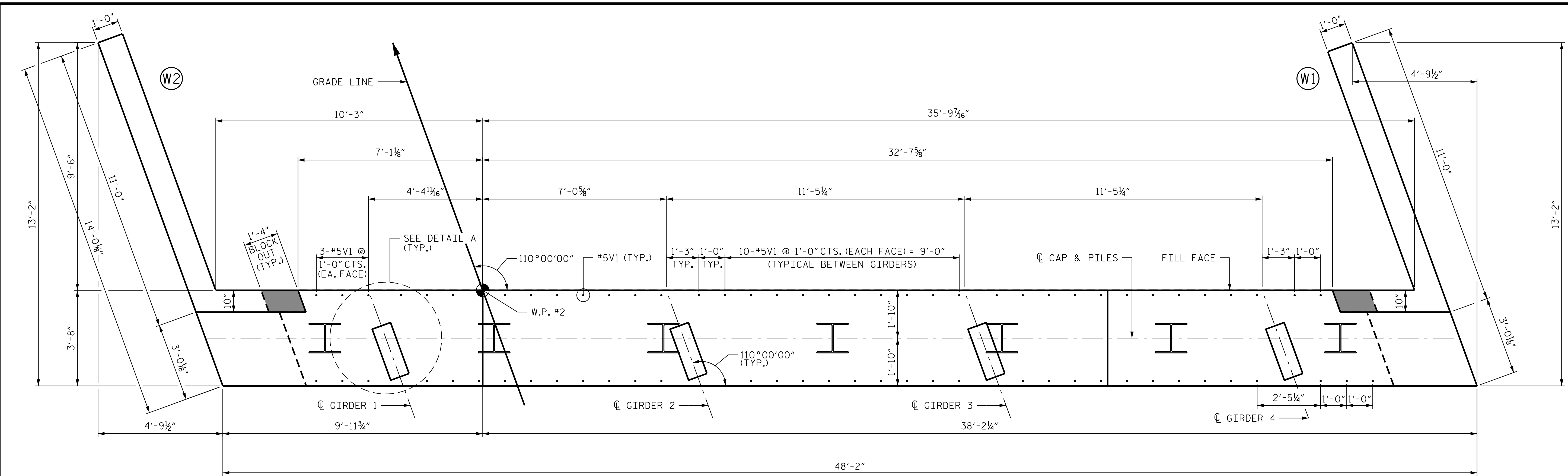
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE

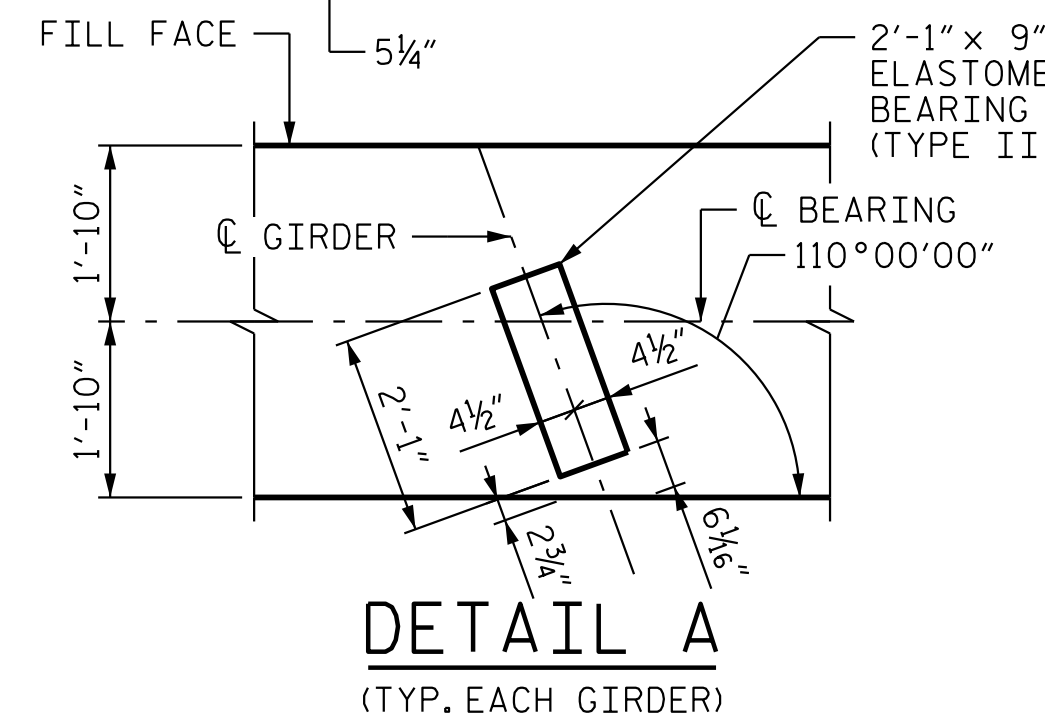
INTEGRAL END BENT 1

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

SHEET NO. S-23
 TOTAL SHEETS 29



- NOTES**
1. THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".
 2. THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
 3. FOR SECTION A-A, SEE SHEET 3 OF 3.



PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 INTEGRAL END BENT 2

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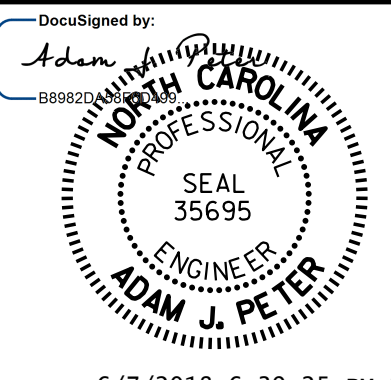
DRMP

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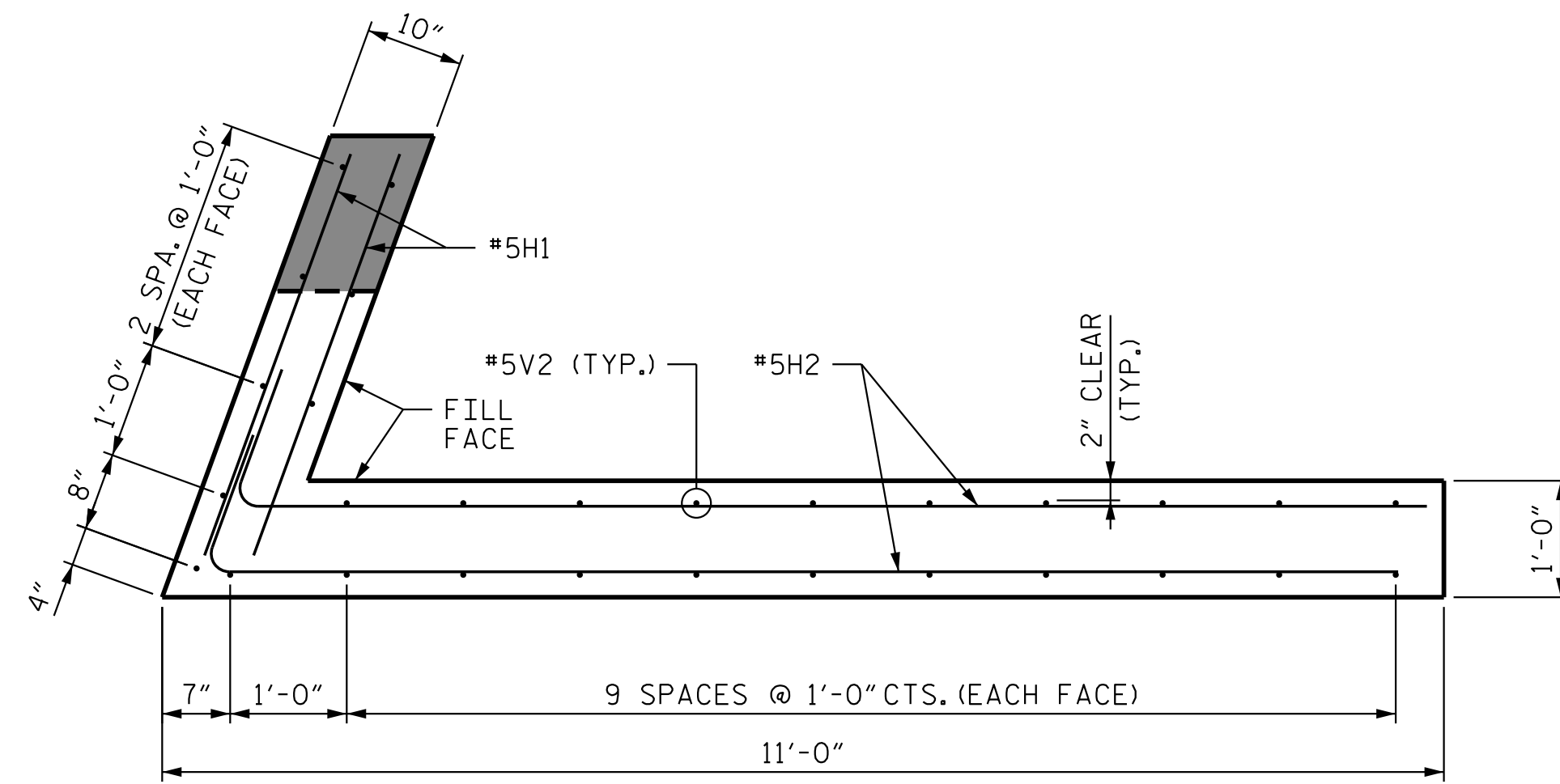
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DRMP JOB NUMBER: 15-0323.002

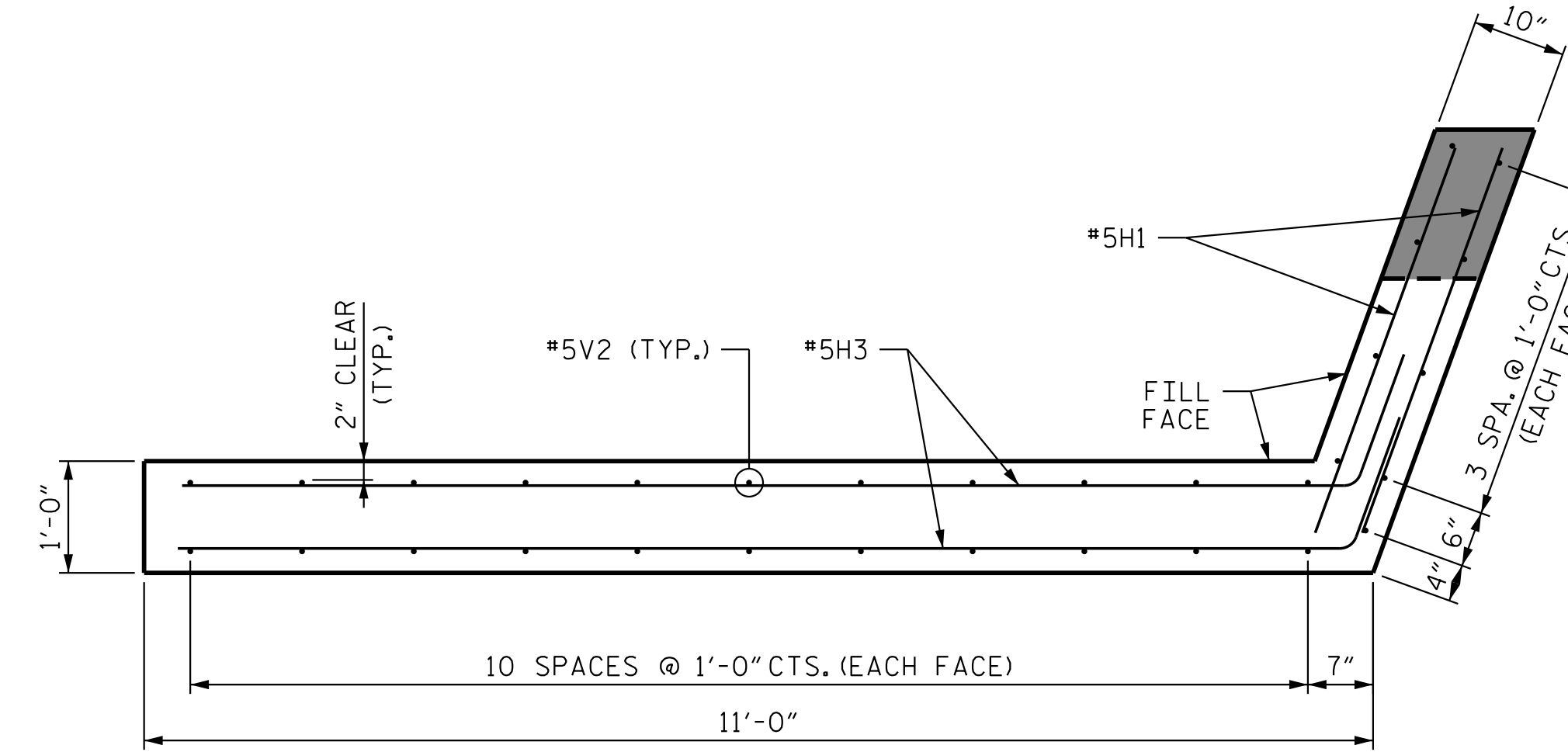


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 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018

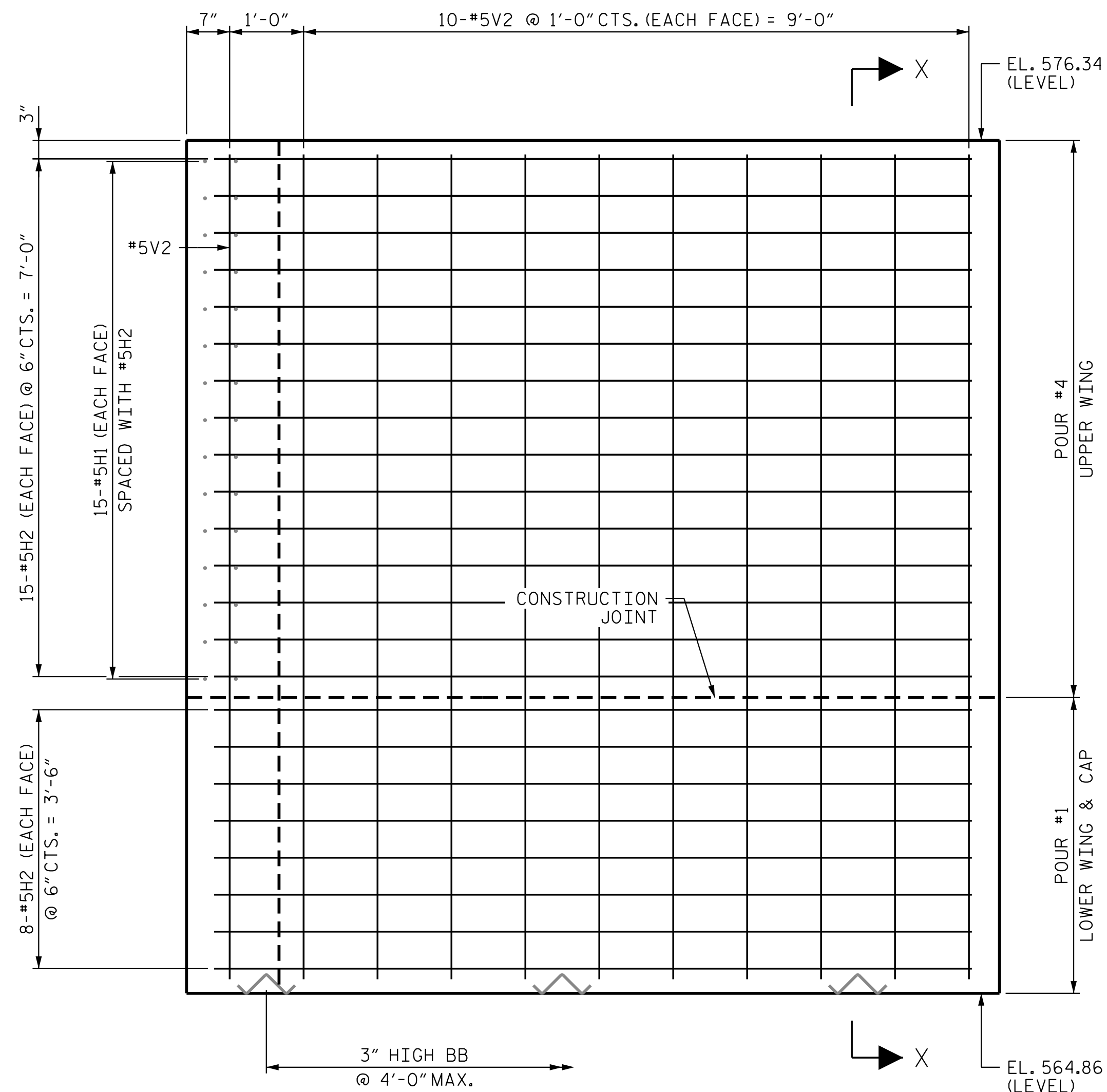
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			29



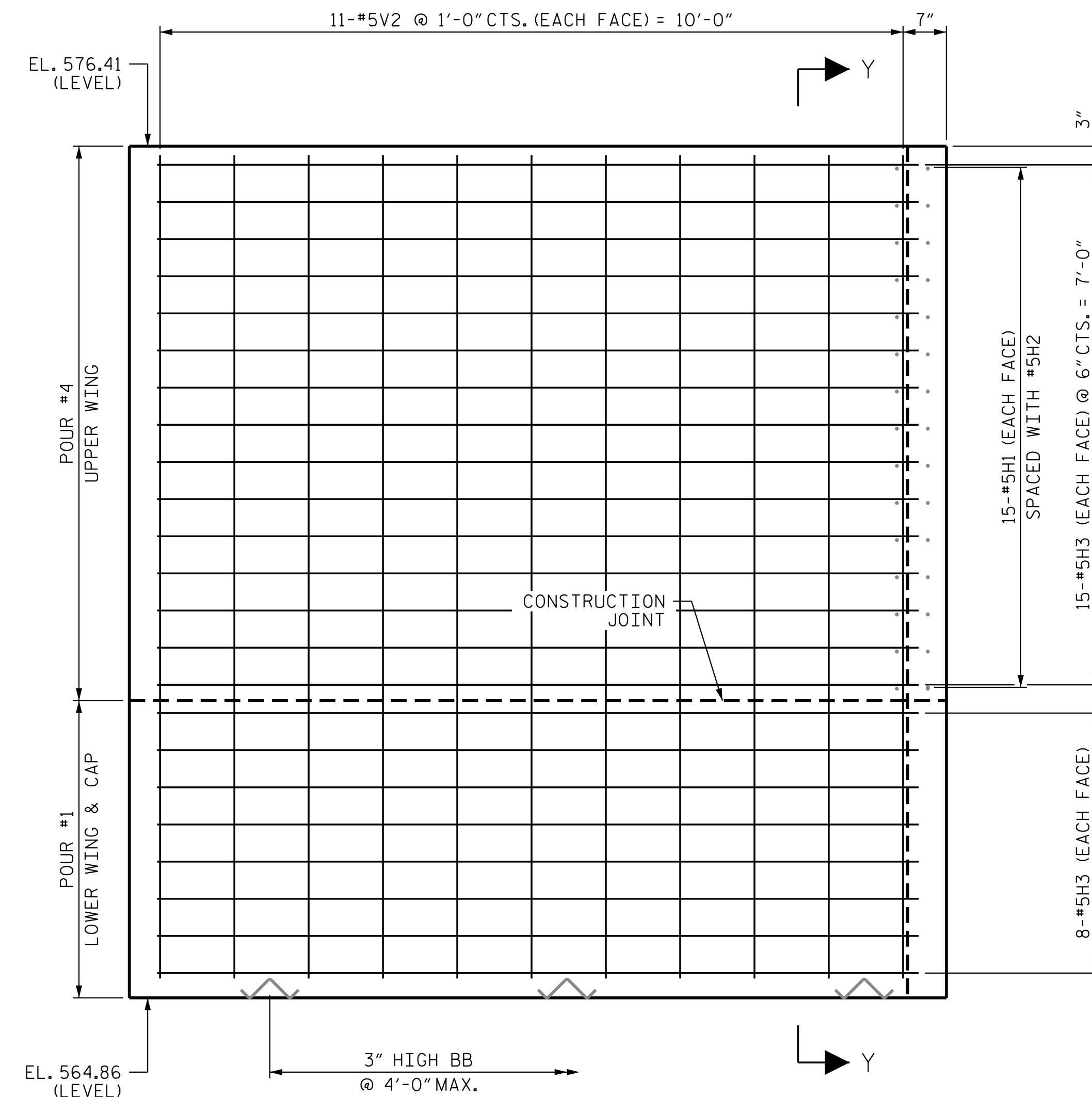
PLAN OF WING W1



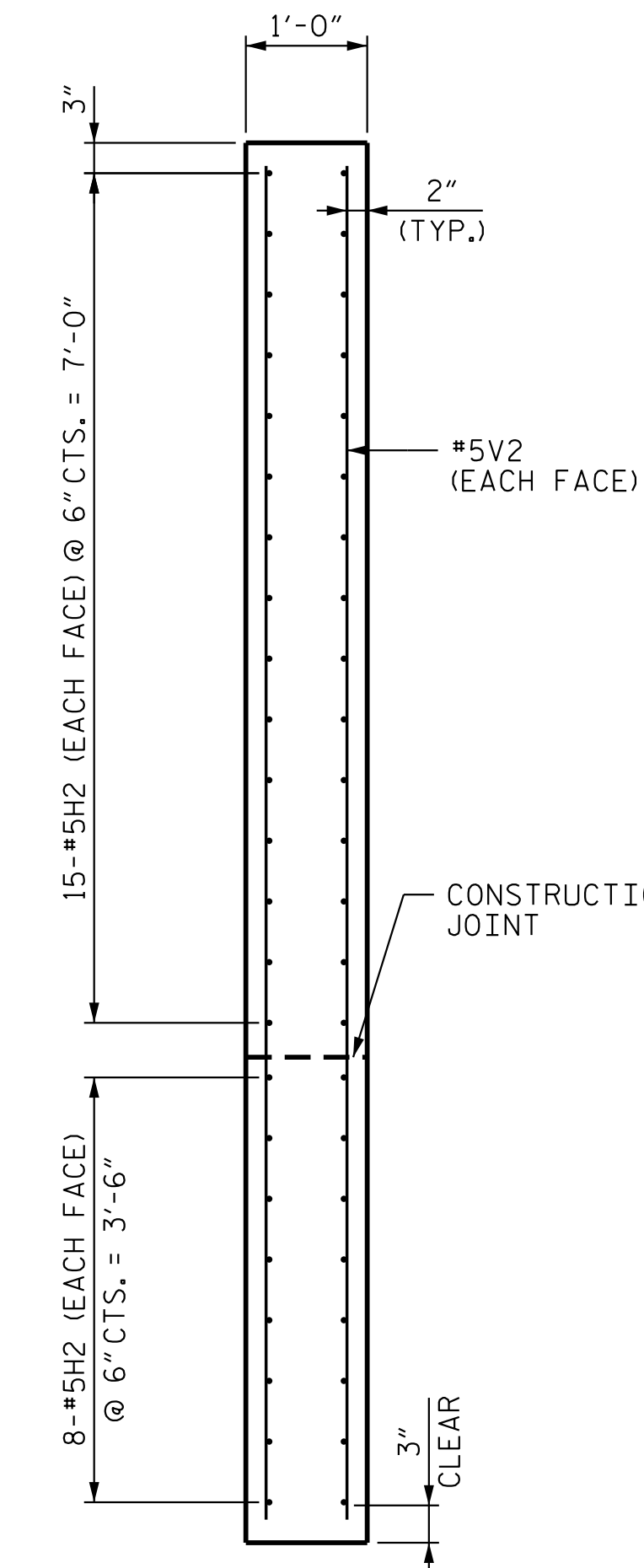
PLAN OF WING W2



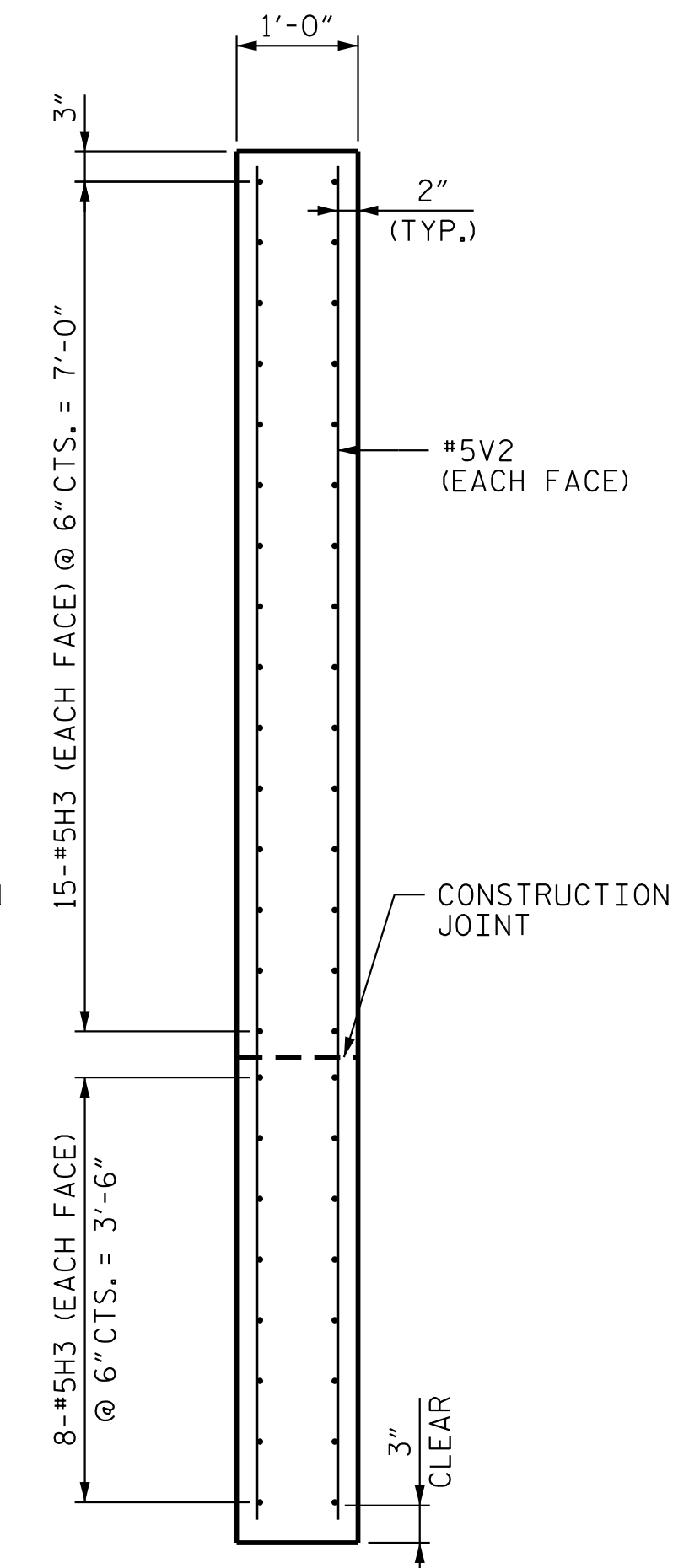
ELEVATION OF WING W1



ELEVATION OF WING W2



SECTION X-X



SECTION Y-Y

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE

INTEGRAL
 END BENT 2

REVISIONS

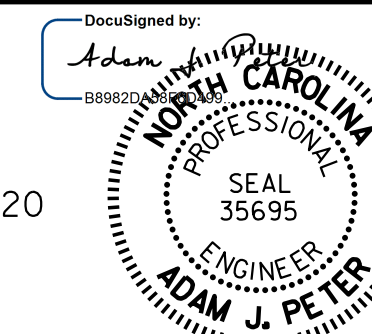
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1			3			S-25
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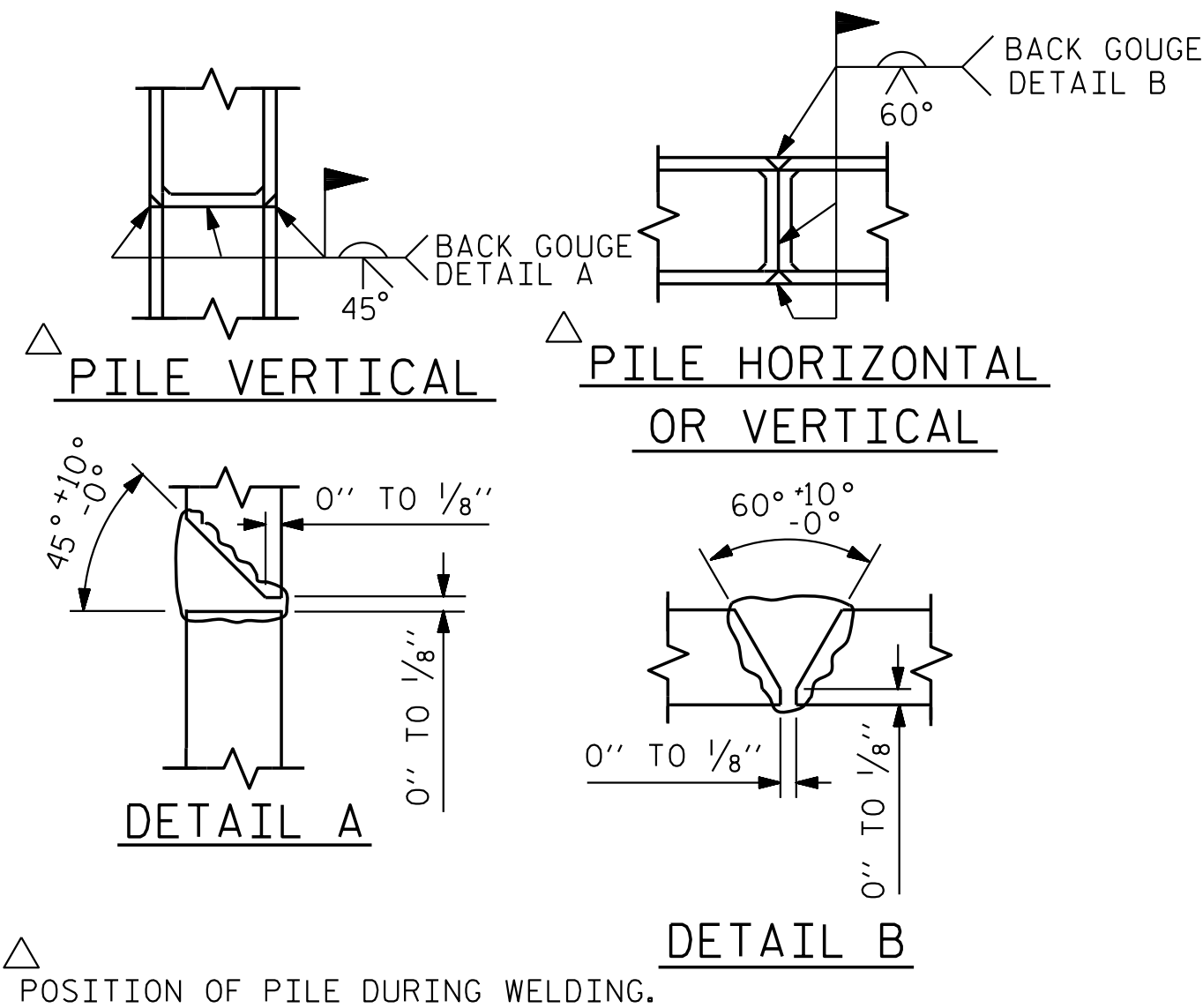
5950 FAIRVIEW ROAD, SUITE 320
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 (980) 229-4103

NC LICENSE NO. C-2213

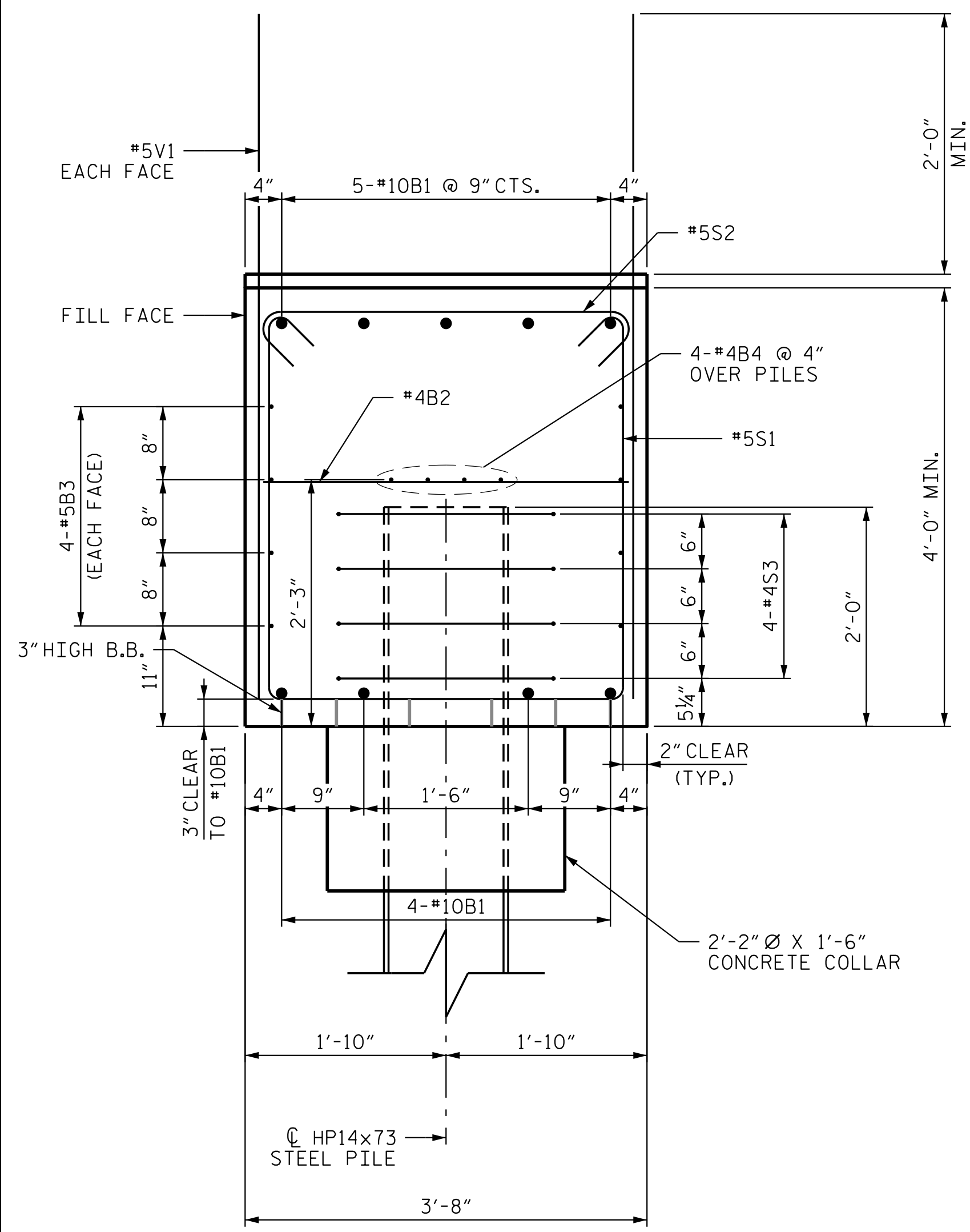


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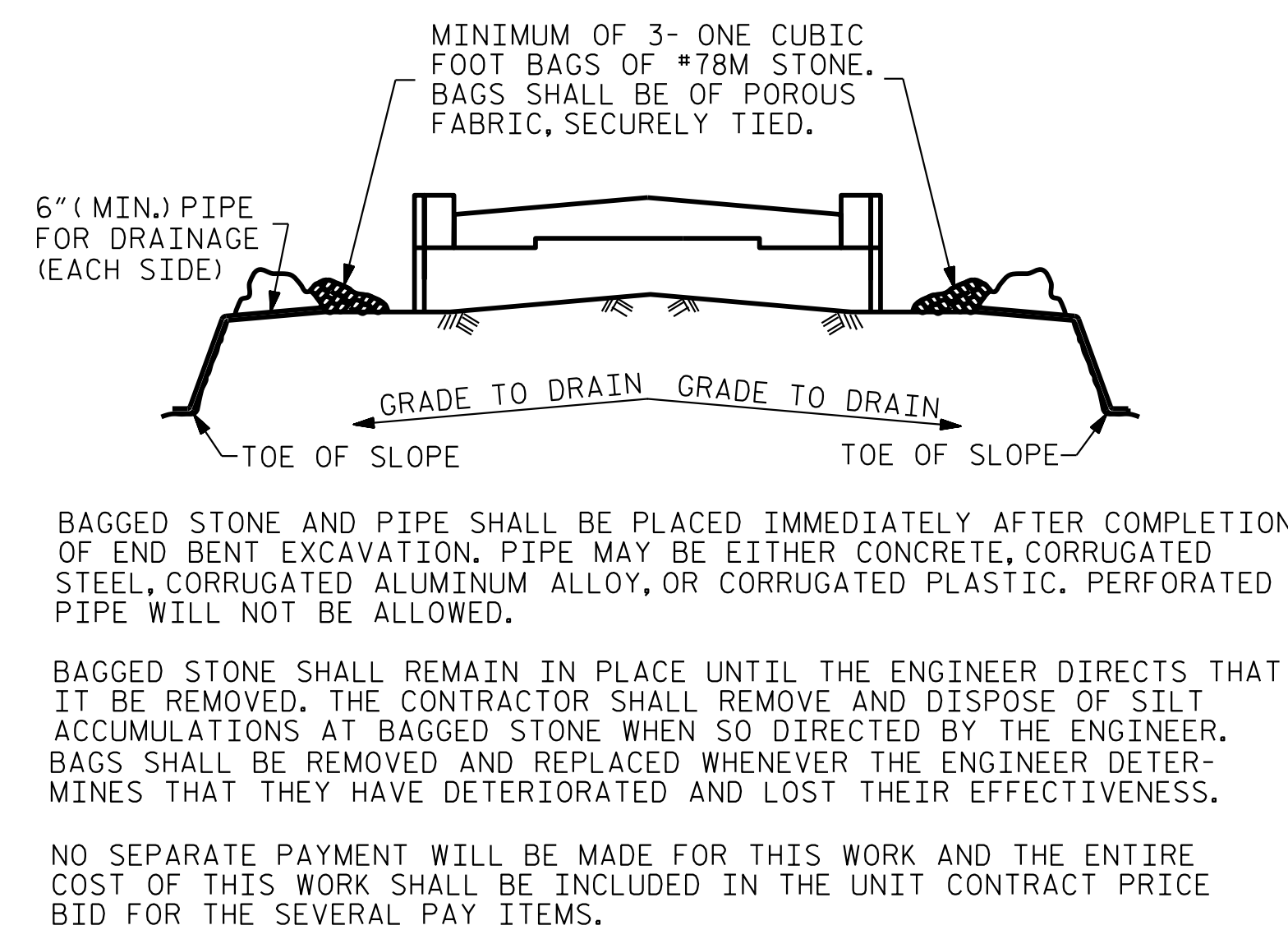


PILE SPlice DETAILS



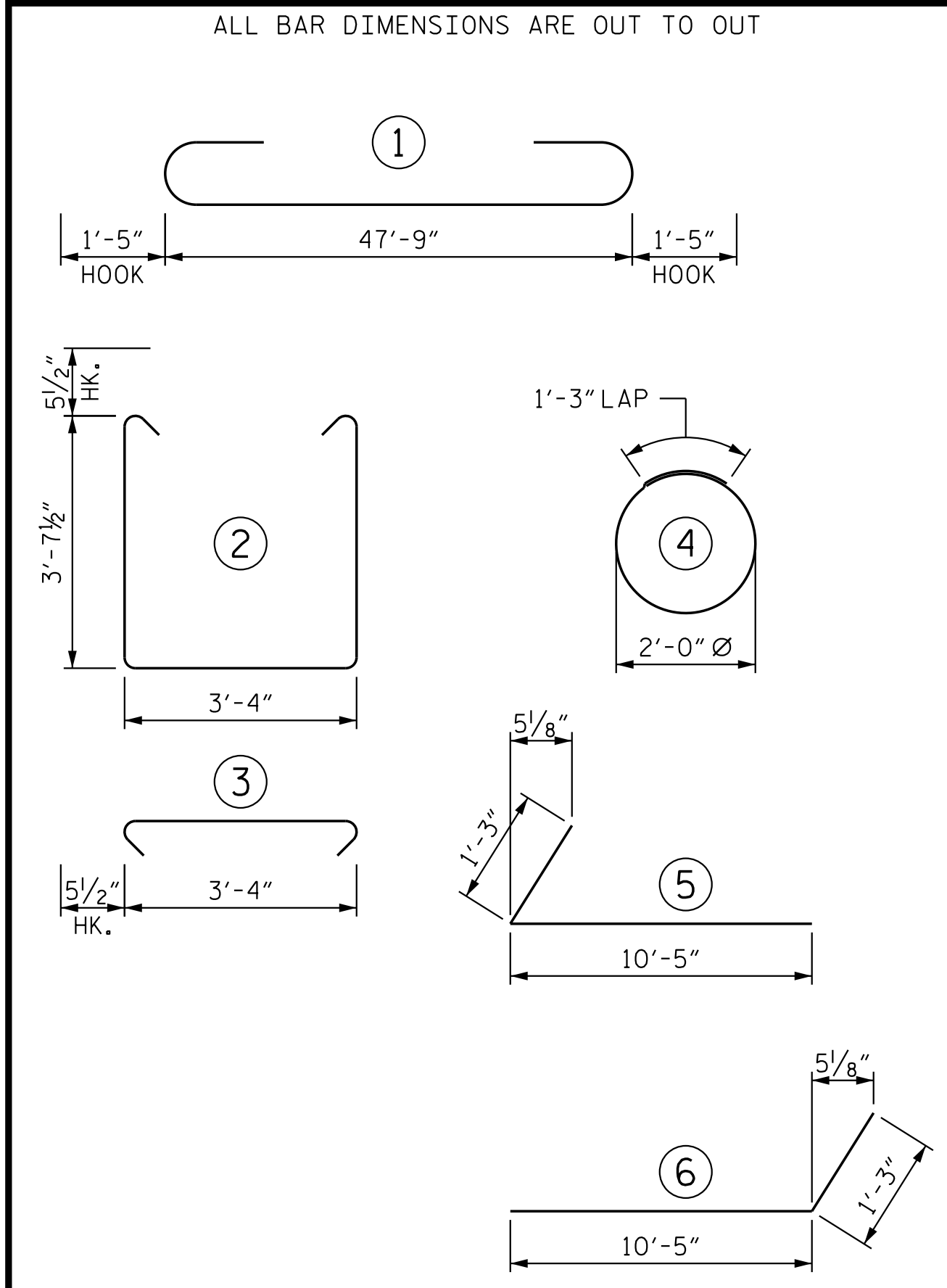
SECTION A-A

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 02/2018
 CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 02/2018
 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018



TEMPORARY DRAINAGE AT END BENT

BAR TYPES



BILL OF MATERIAL

FOR END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	10		50'-7"	1,959
B2	12	4	STR	3'-4"	27
B3	16	4	STR	26'-6"	283
B4	8	4	STR	26'-2"	140
H1	60	5	STR	3'-10"	240
H2	46	5	5	11'-8"	560
H3	46	5	6	11'-8"	560
S1	44	5	2	11'-6"	528
S2	44	5	3	4'-3"	195
S3	28	4	4	7'-7"	142
V1	74	5	STR	5'-10"	450
V2	60	5	STR	10'-9"	673
TOTAL					
REINFORCING STEEL				5,756	LBS.
CLASS A CONCRETE					
POUR 1 (CAP & LOWER WING)				31.5	C.Y.
POUR 4 (UPPER WING)				7.6	C.Y.
CLASS A CONCRETE TOTAL				39.1	C.Y.
HP14x73 STEEL PILES					
NO. 7				175	LIN. FT.
PILE DRIVING EQUIPMENT SETUP FOR HP14x73 STEEL PILES				7	EA
STEEL PILE POINTS				7	EA

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 3 OF 3

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DocuSigned by:
 Adam J. Peter
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 35695
 ADAM J. PETER
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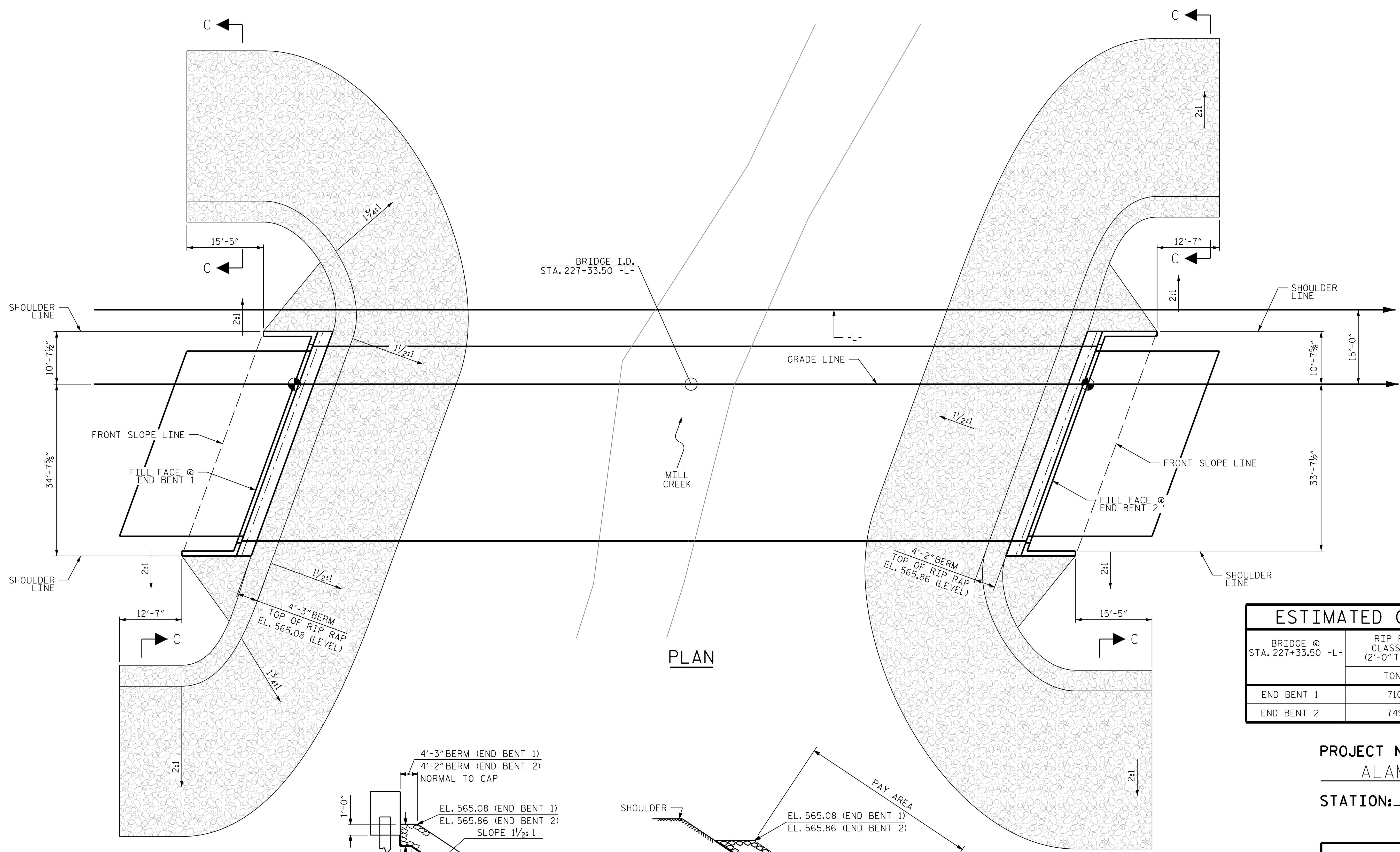
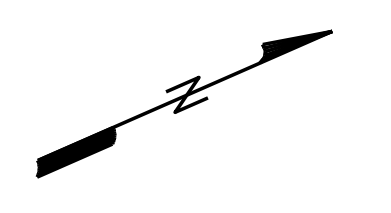
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

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

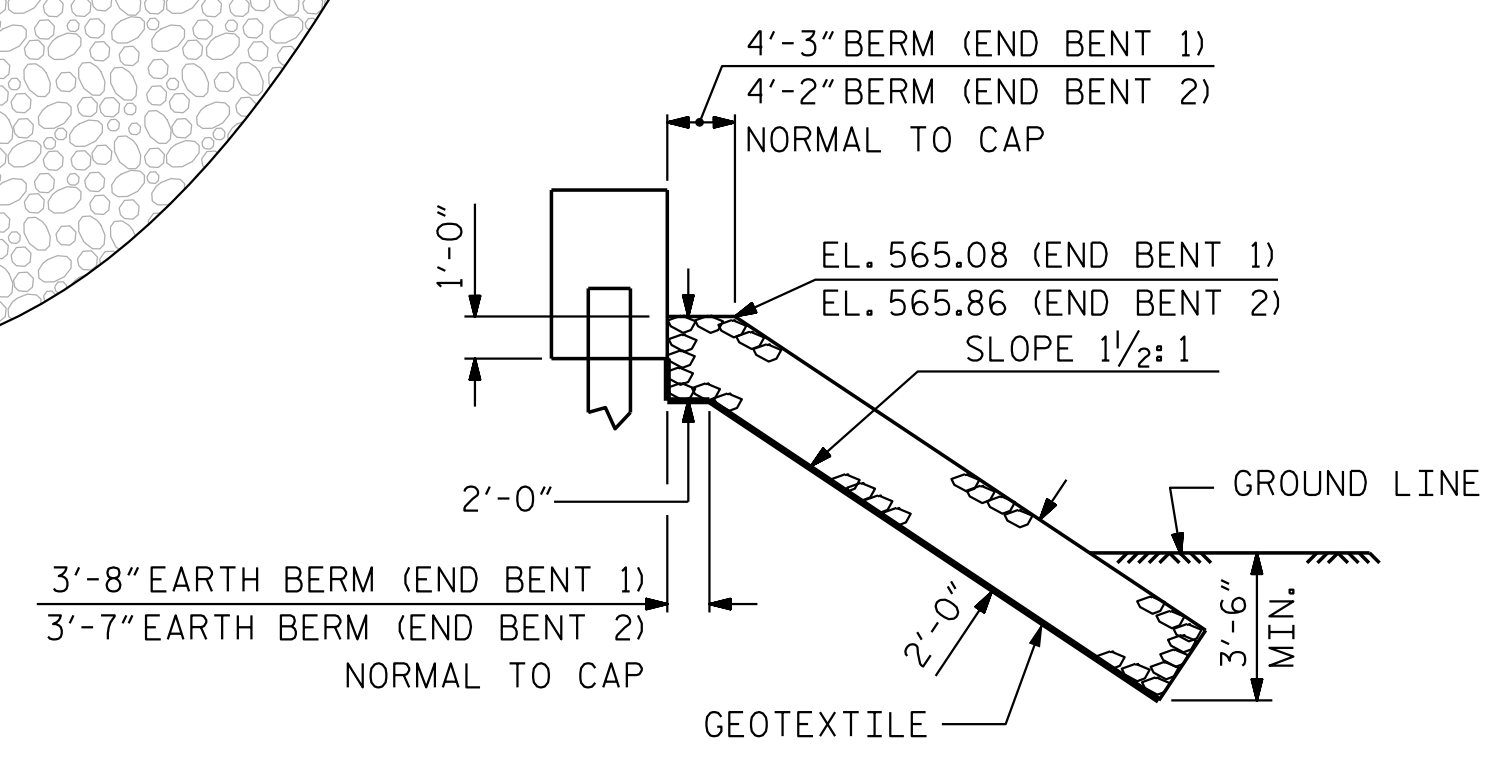
SHEET NO. S-26
 TOTAL SHEETS 29



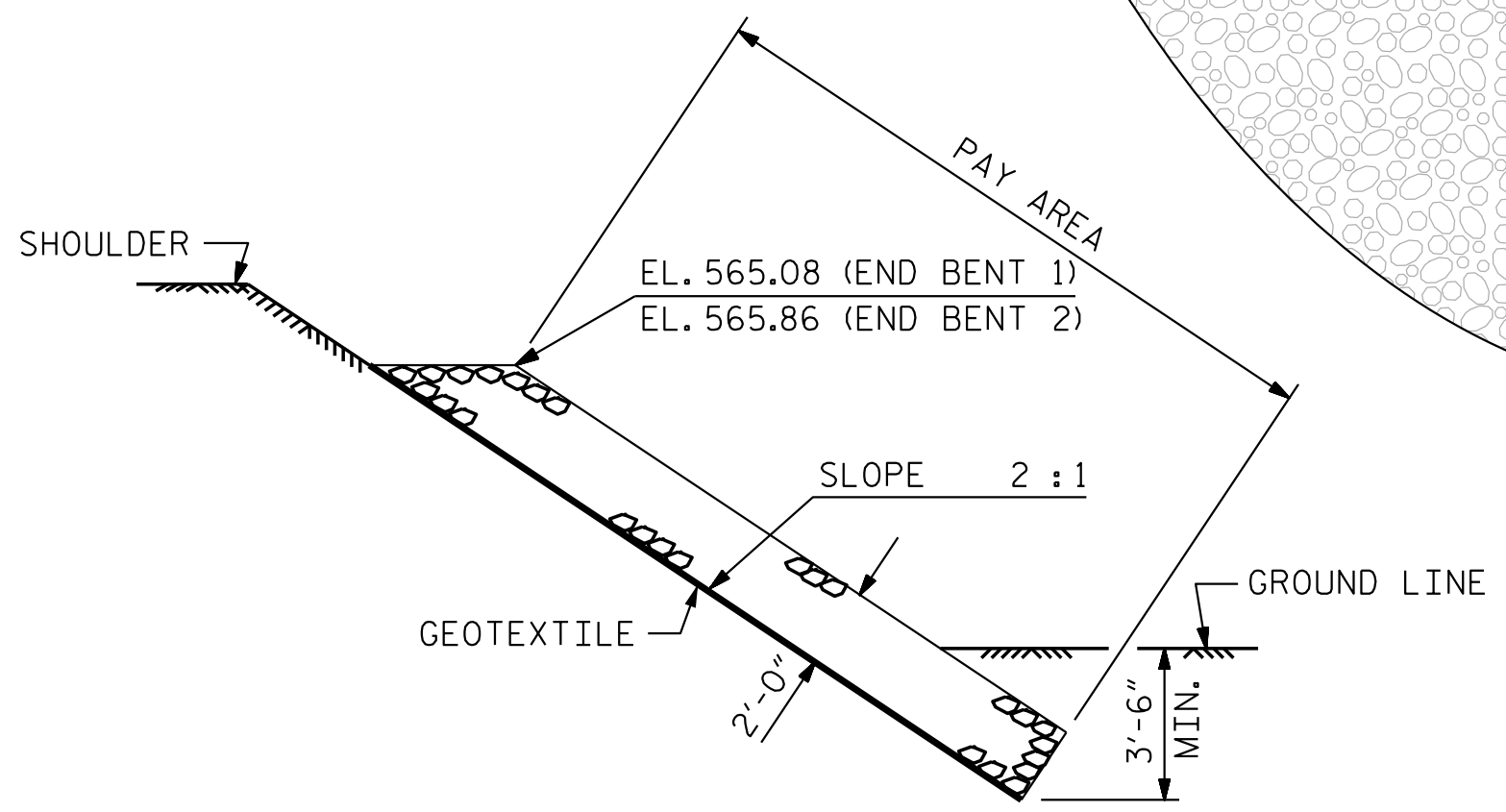
PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 227+33.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	710	789
END BENT 2	749	832

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-



SECTION C-C
 BERM RIP RAPPED



SECTION C-C

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 NORTH CAROLINA
 PROFESSIONAL
 ENGINEER
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 35695
 ADAM J. PETER

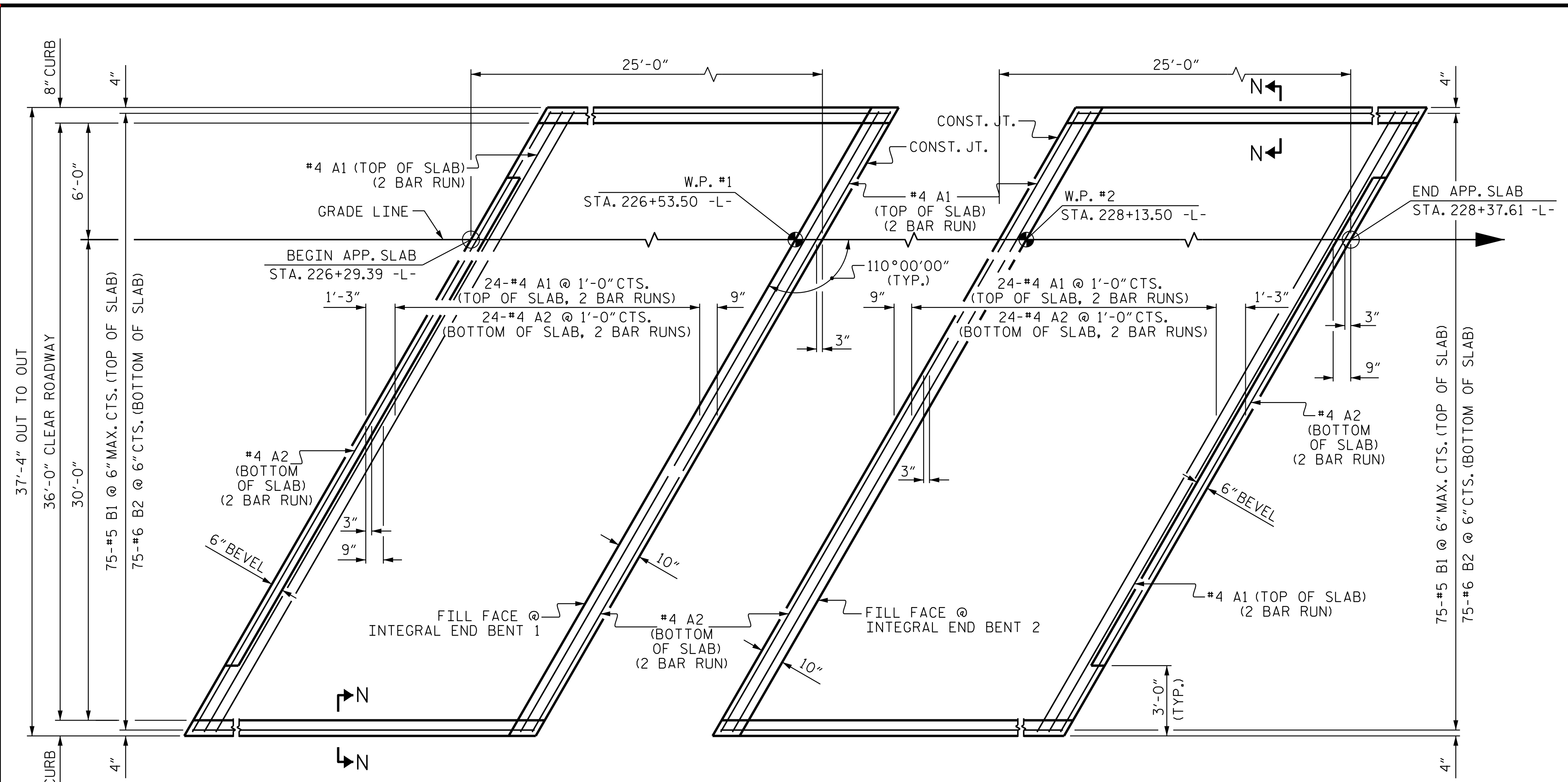
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			29

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 DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 02/2018



PLAN @ END BENT 1
PLAN @ END BENT 2
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

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

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

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

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

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

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

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

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

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

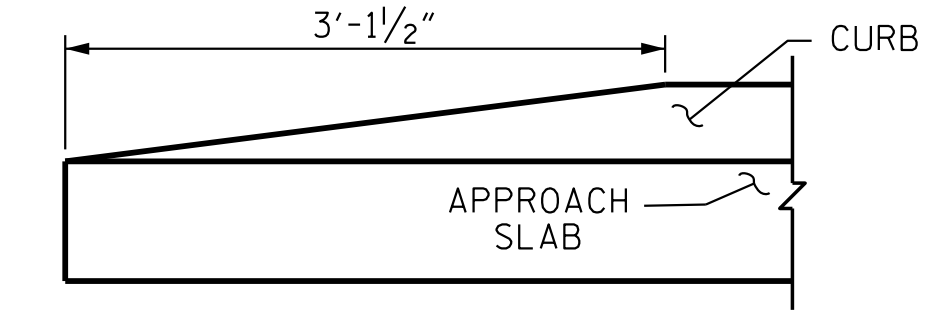
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

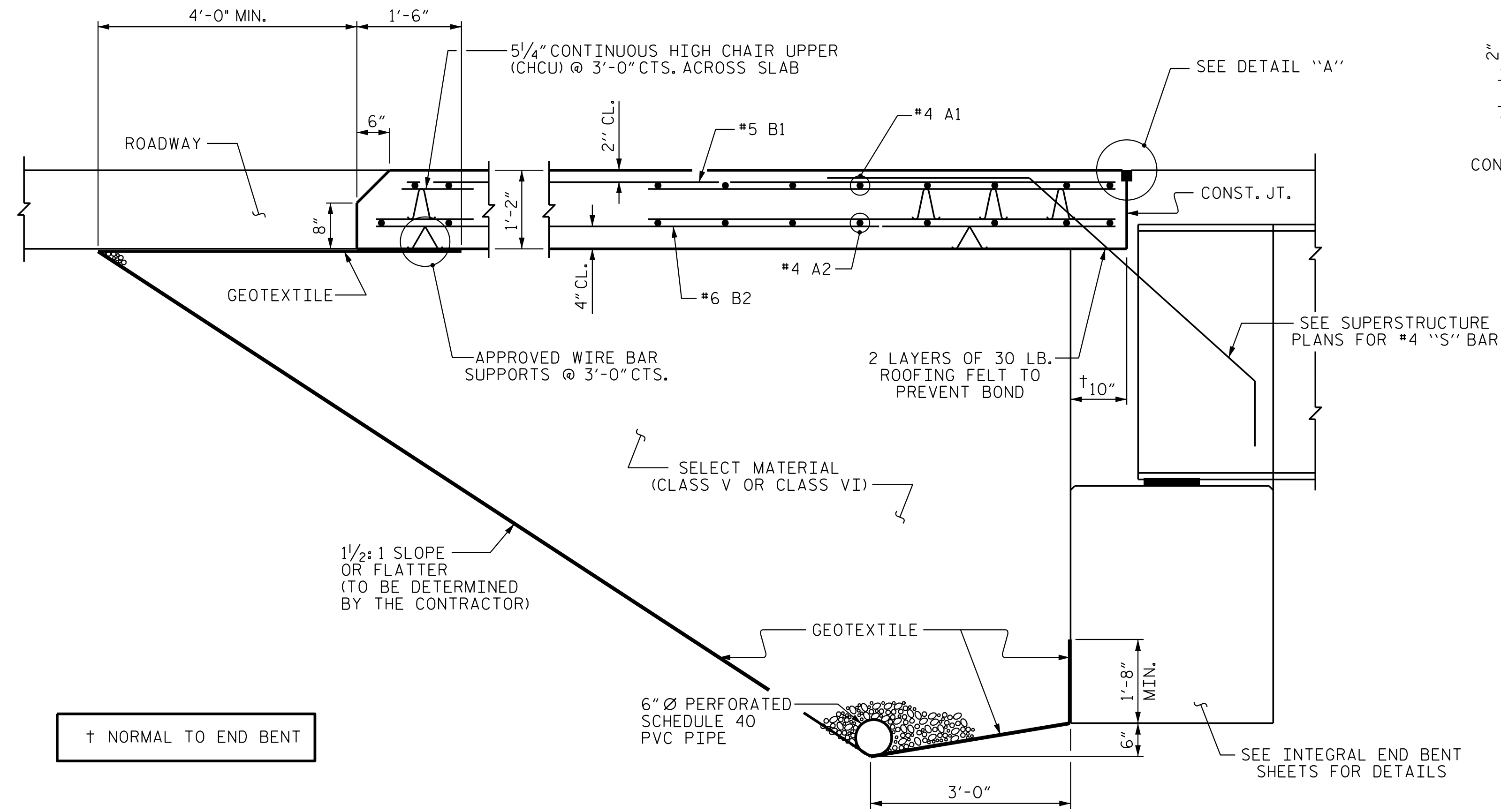
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	20'-9"	721
A2	52	#4	STR	20'-7"	715
* B1	75	#5	STR	24'-2"	1,890
B2	75	#6	STR	24'-8"	2,779
REINFORCING STEEL				2,611	LBS.
* EPOXY COATED REINFORCING STEEL				3,494	LBS.
CLASS AA CONCRETE				40.3	C.Y.

SPLICE LENGTHS

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

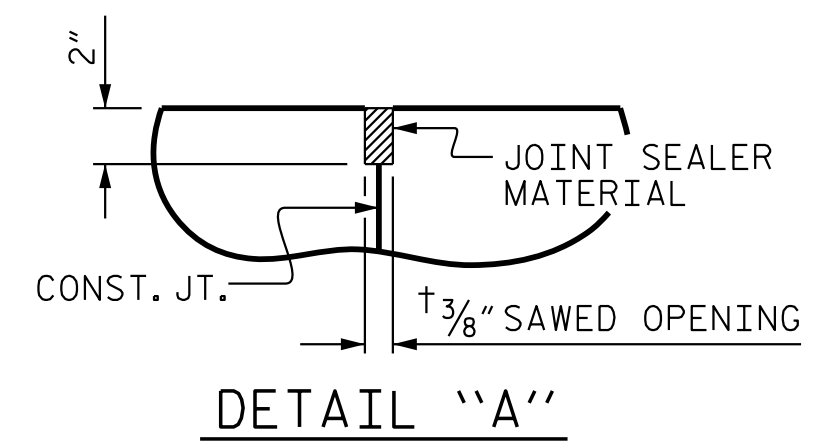


END OF CURB WITHOUT SHOULDER BERM GUTTER

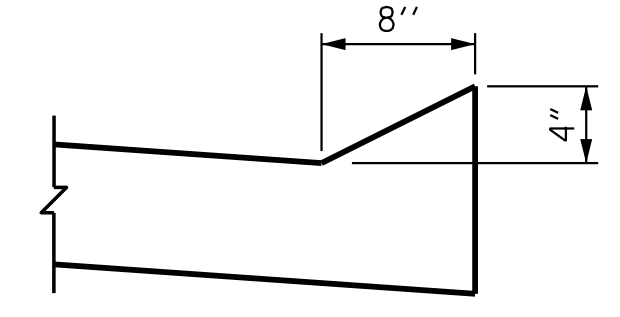


SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)



DETAIL "A"



SECTION N-N

PROJECT NO. U-3109B
ALAMANCE COUNTY
STATION: 227+33.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

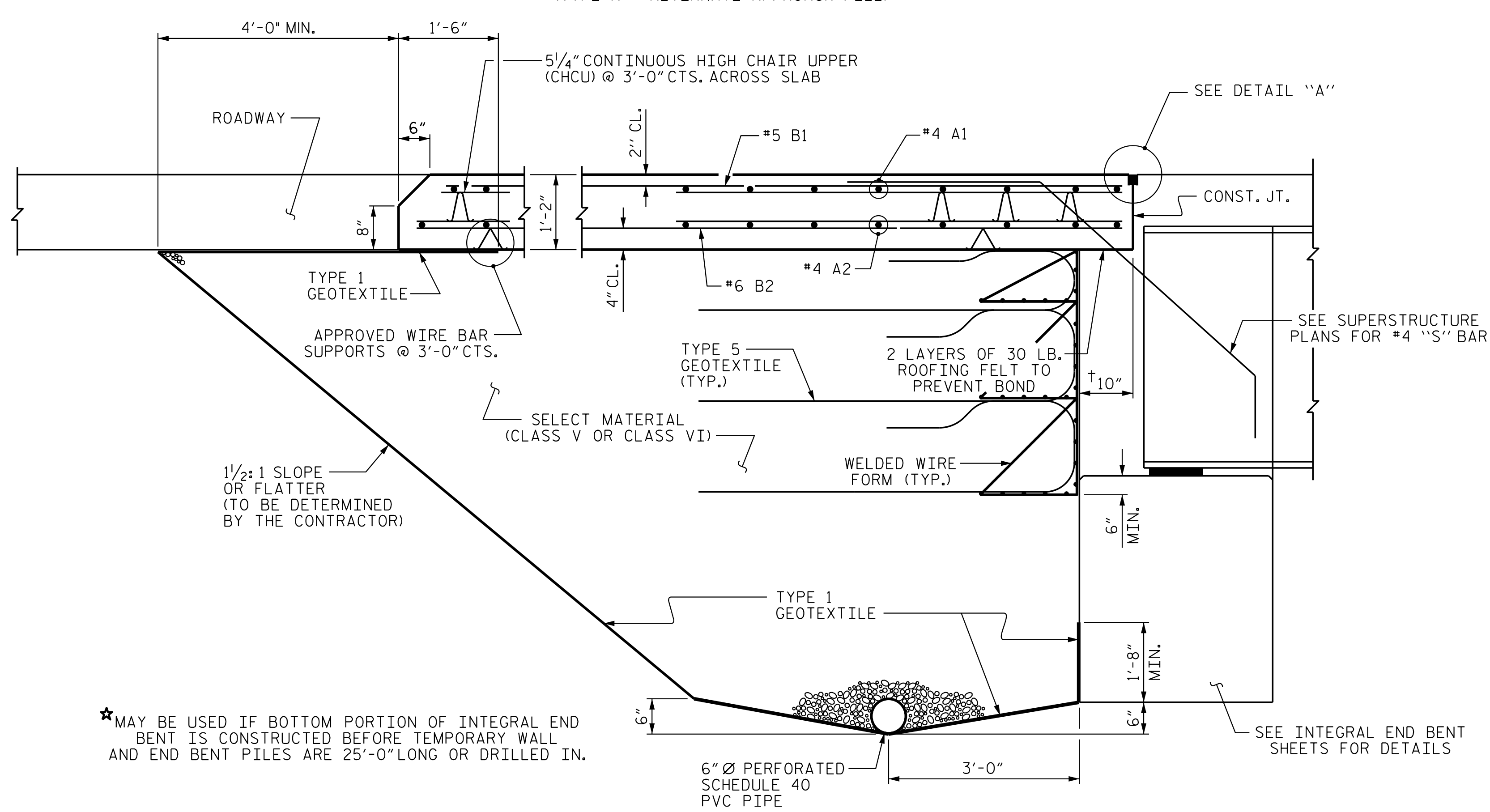
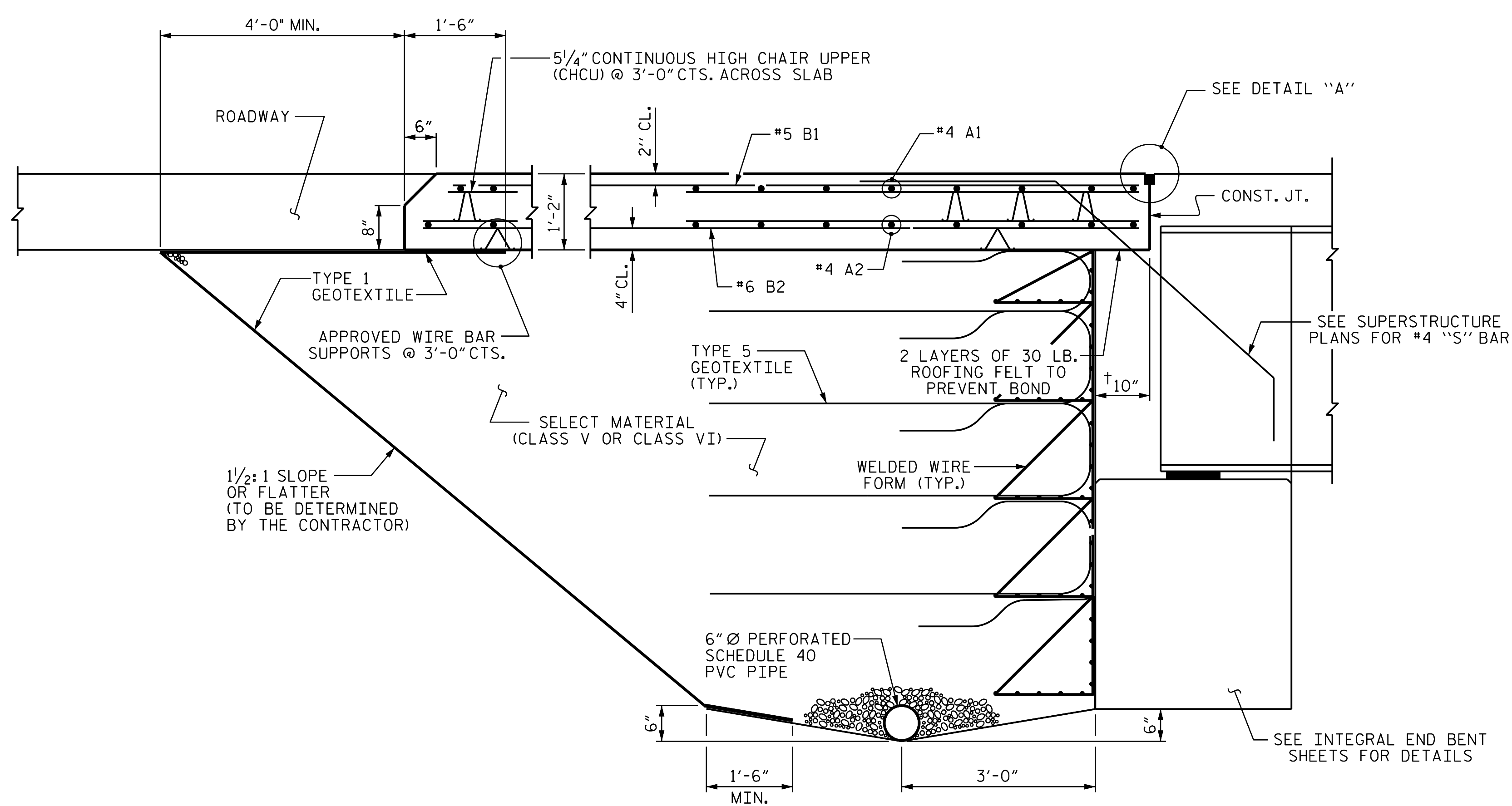
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-28
					TOTAL SHEETS 29

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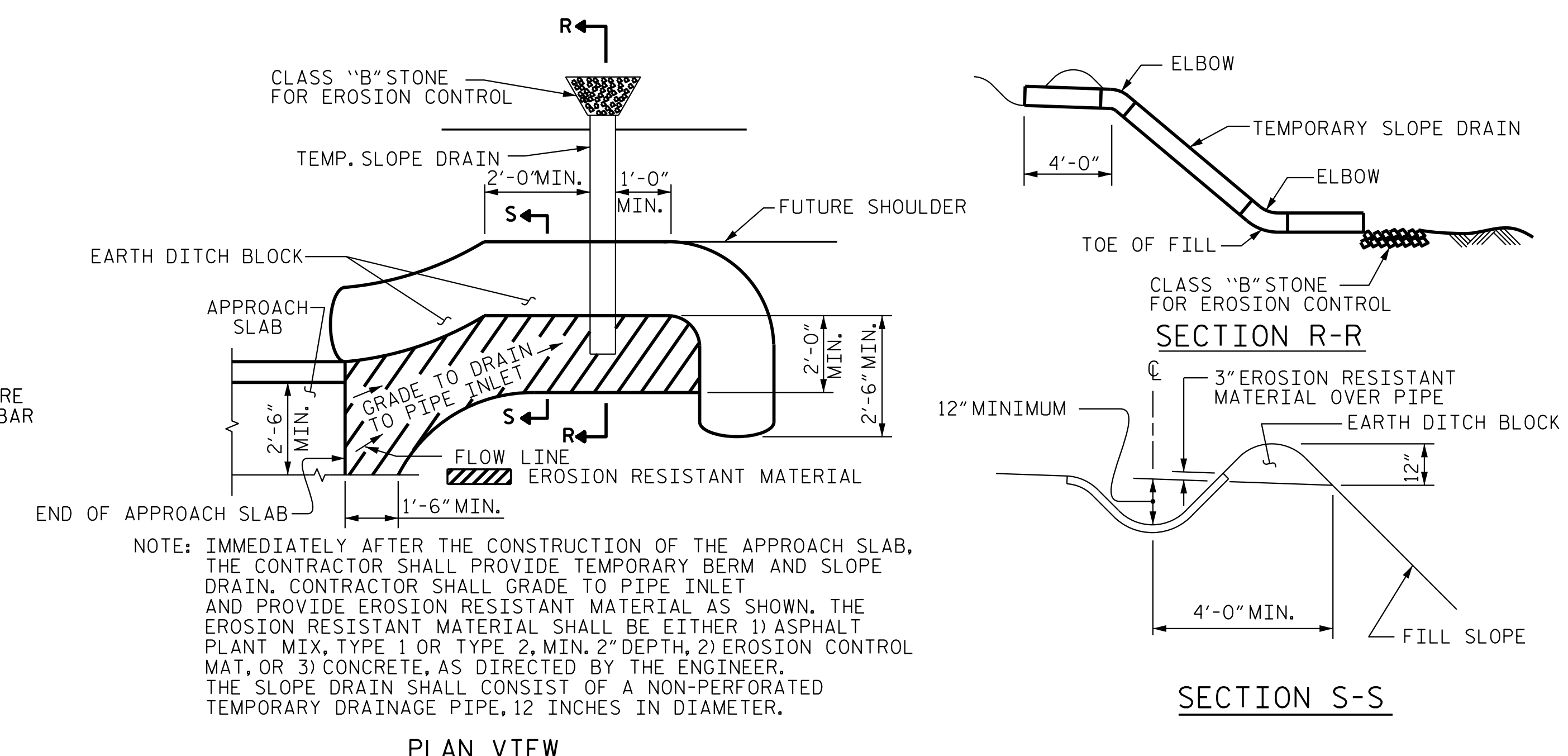
DocuSigned by:
Adrian J. Peter
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 35695
ADRIAN J. PETER
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DRAWN BY: ROBERT A. ALONSO, P.E. DATE: 02/2018
CHECKED BY: RUDY M. CASTILLO, E.I. DATE: 02/2018
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE: 02/2018



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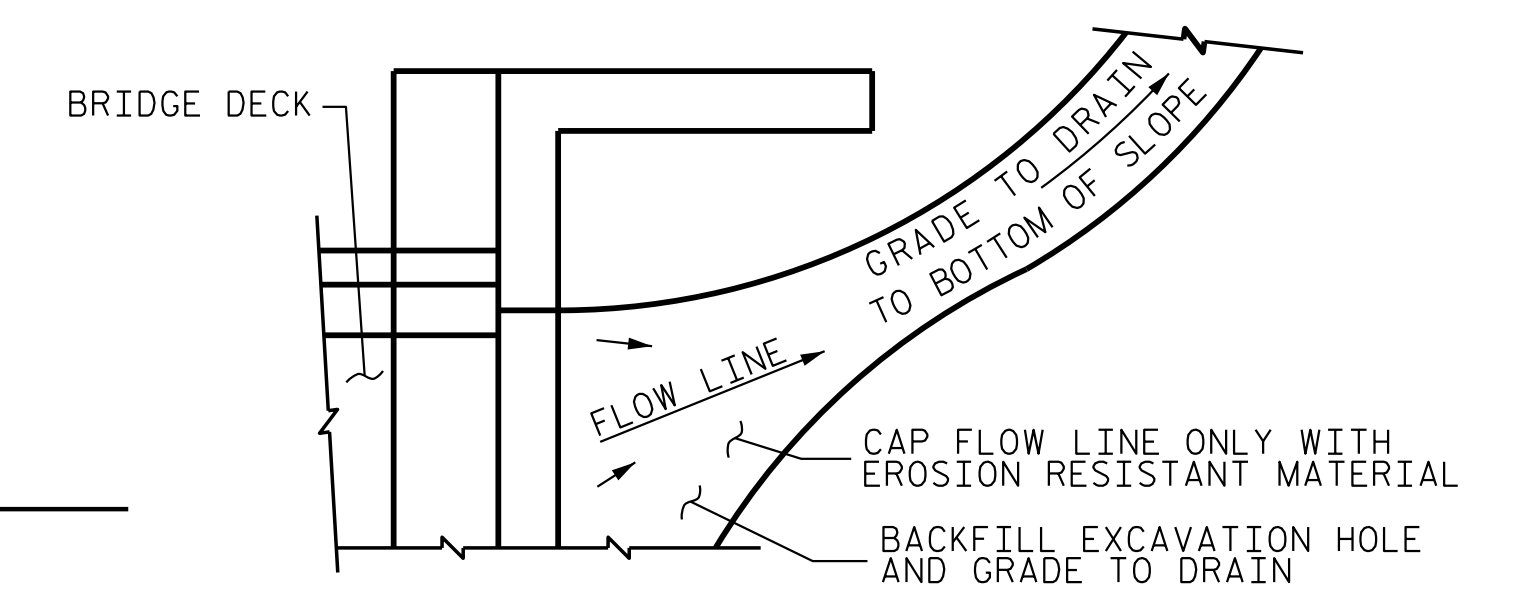
SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)



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

NOTES

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



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

PROJECT NO. U-3109B
 ALAMANCE COUNTY
 STATION: 227+33.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD			
BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT			
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S-29
2			TOTAL SHEETS 29

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 CHARLOTTE, NC 28210
 (980) 229-4103
 NC LICENSE NO. C-2213

Seal of North Carolina Professional Engineer
 ADAM J. PETER
 SEAL 35695
 6/7/2018 6:39:25 PM EDT

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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


SPECIAL NOTES:

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

PROJECT NO. U-3109B
ALAMANCE COUNTY
 STATION: 227+33.50 -L-

DRAWN BY :	ROBERT A. ALONSO, P.E.	DATE :	02/2018
CHECKED BY :	RUDY M. CASTILLO, E.I.	DATE :	02/2018
DESIGN ENGINEER OF RECORD:	ROBERT A. ALONSO	DATE :	02/2018

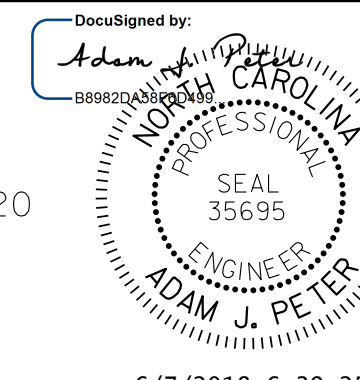
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NOTES					
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO.
					TOTAL SHEETS