

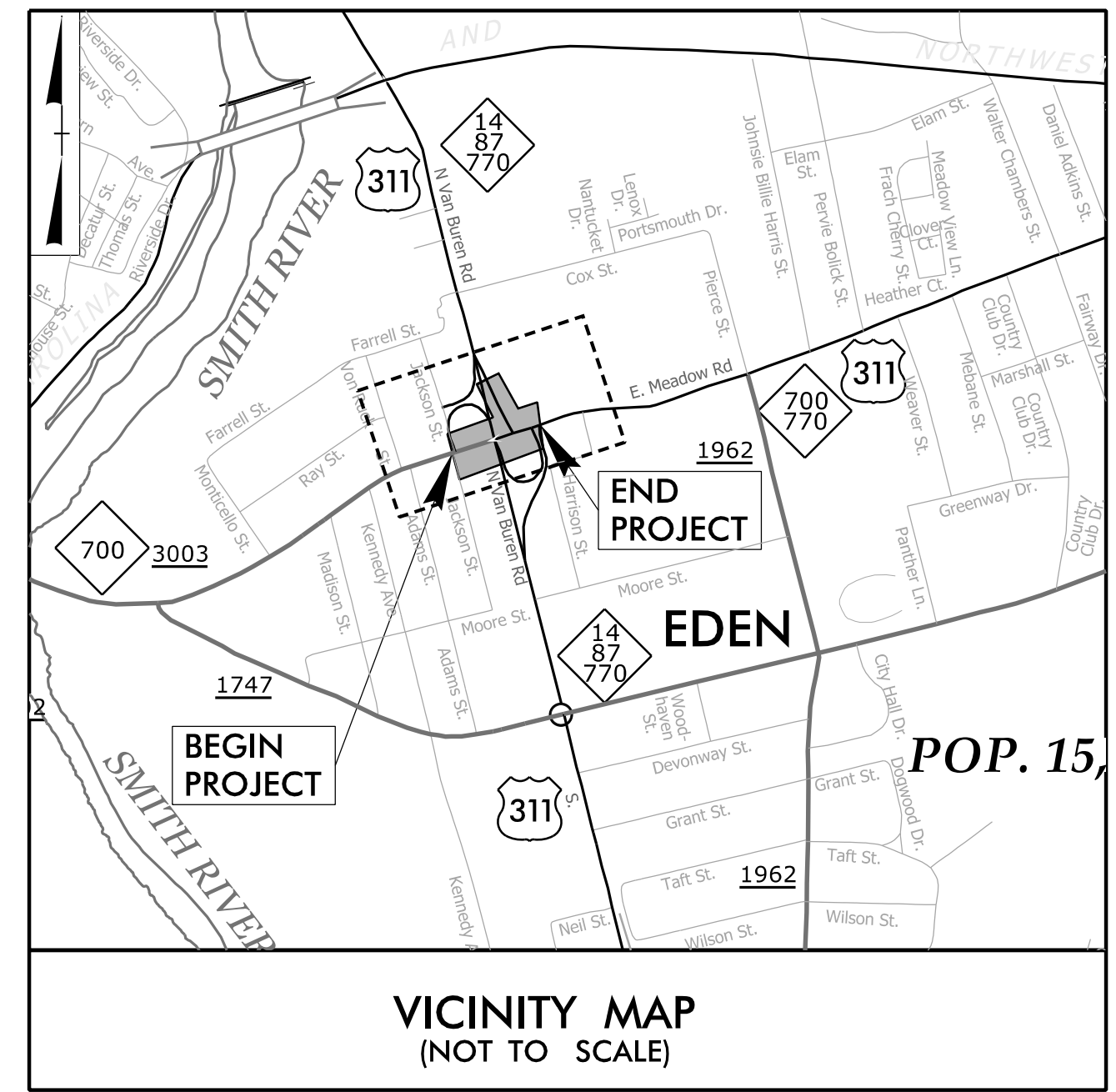
09_08/2019

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Piccob

TIP PROJECT: B-5737

CONTRACT: C204480

STRUCTURES



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

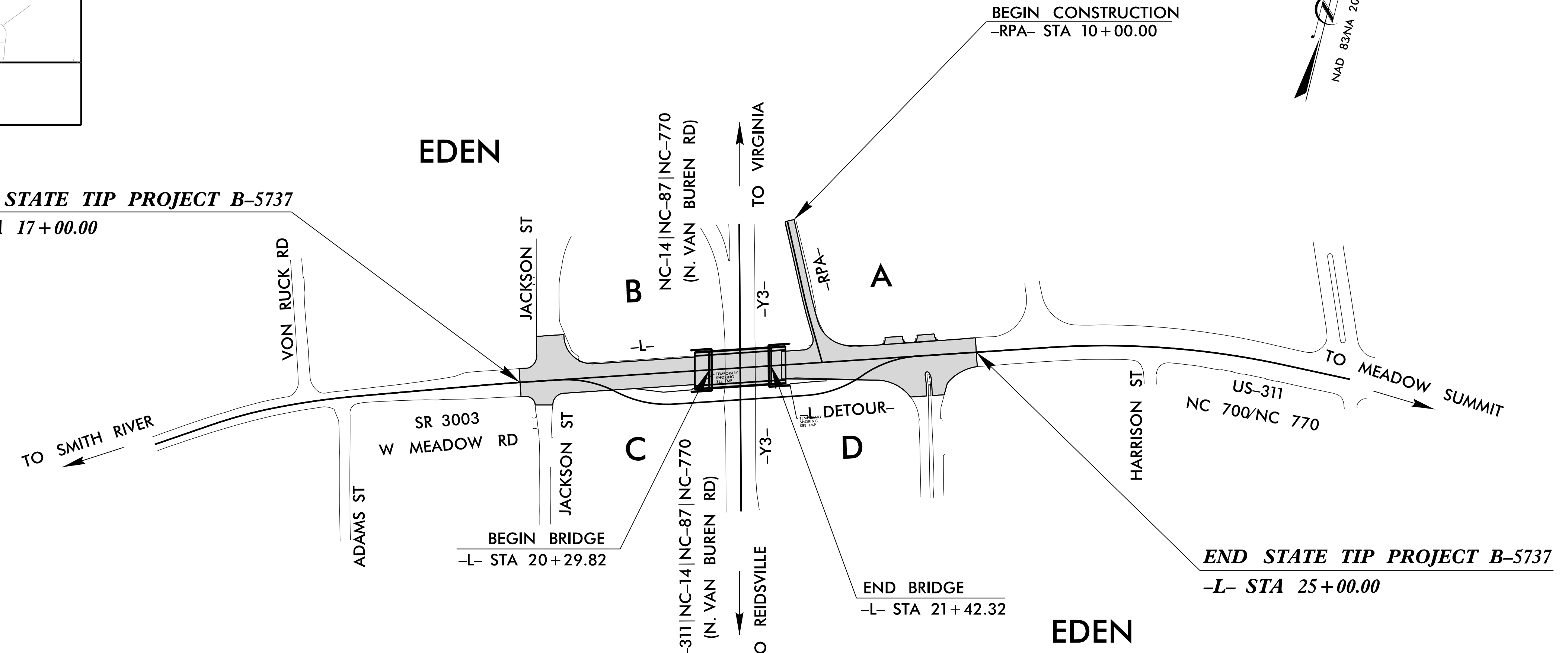
ROCKINGHAM COUNTY

**LOCATION: REPLACE BRIDGE NO.108 OVER US 311 / NC 14 / NC 87 / NC 770
ON US 311 / NC 700 / NC 770, SR 3003 (W. MEADOW RD)**

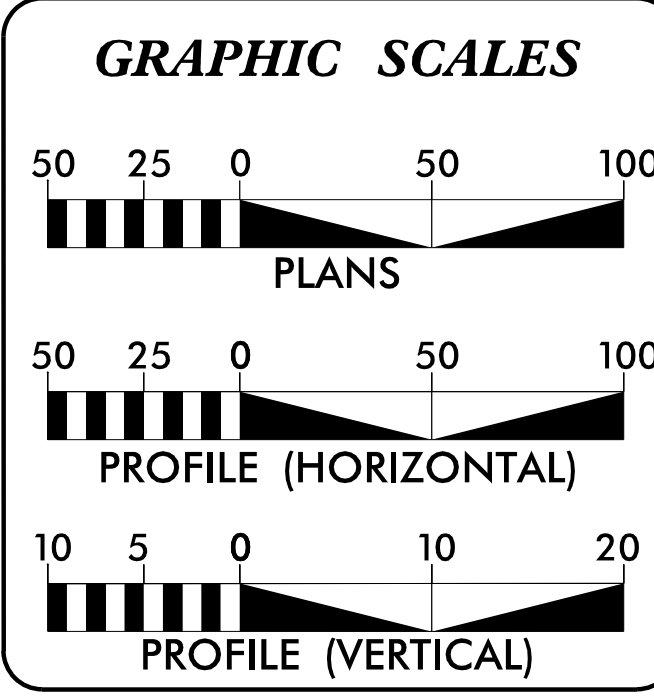
TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5737	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45693.1.1	N/A	P.E.	
45693.2.1	N/A	ROW /UTIL.	
45693.3.1	N/A	CONST.	

**BEGIN STATE TIP PROJECT B-5737
-L- STA 17+00.00**



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2022 =	11,380
ADT 2042 =	12,180
K =	8 %
D =	55 %
T =	14 % *
V =	40 MPH
* TTST =	12% DUAL = 2%
FUNC CLASS =	MINOR-ARTERIAL
REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5737 =	0.131
LENGTH STRUCTURE TIP PROJECT B-5737 =	0.021
TOTAL LENGTH TIP PROJECT B-5737 =	0.152

Prepared for NCDOT in the Office of:

moftatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4883 FAX
NC License No.: F-0105

2018 STANDARD SPECIFICATIONS

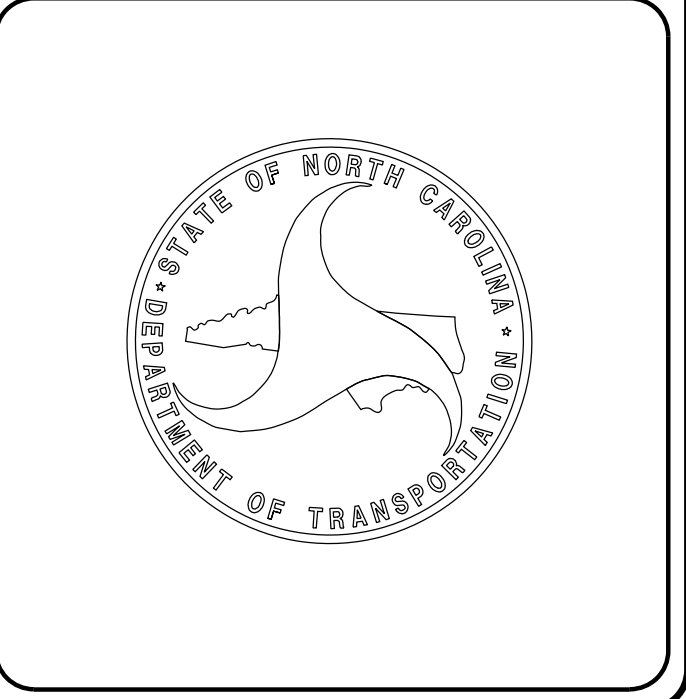
RIGHT OF WAY DATE:
JULY 6, 2021

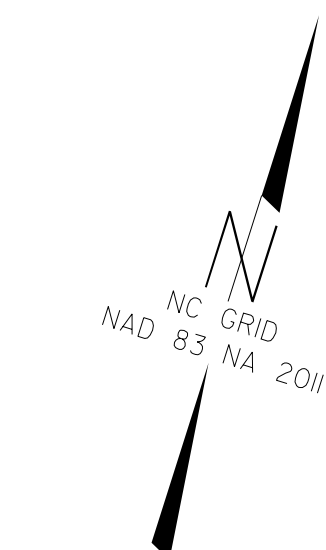
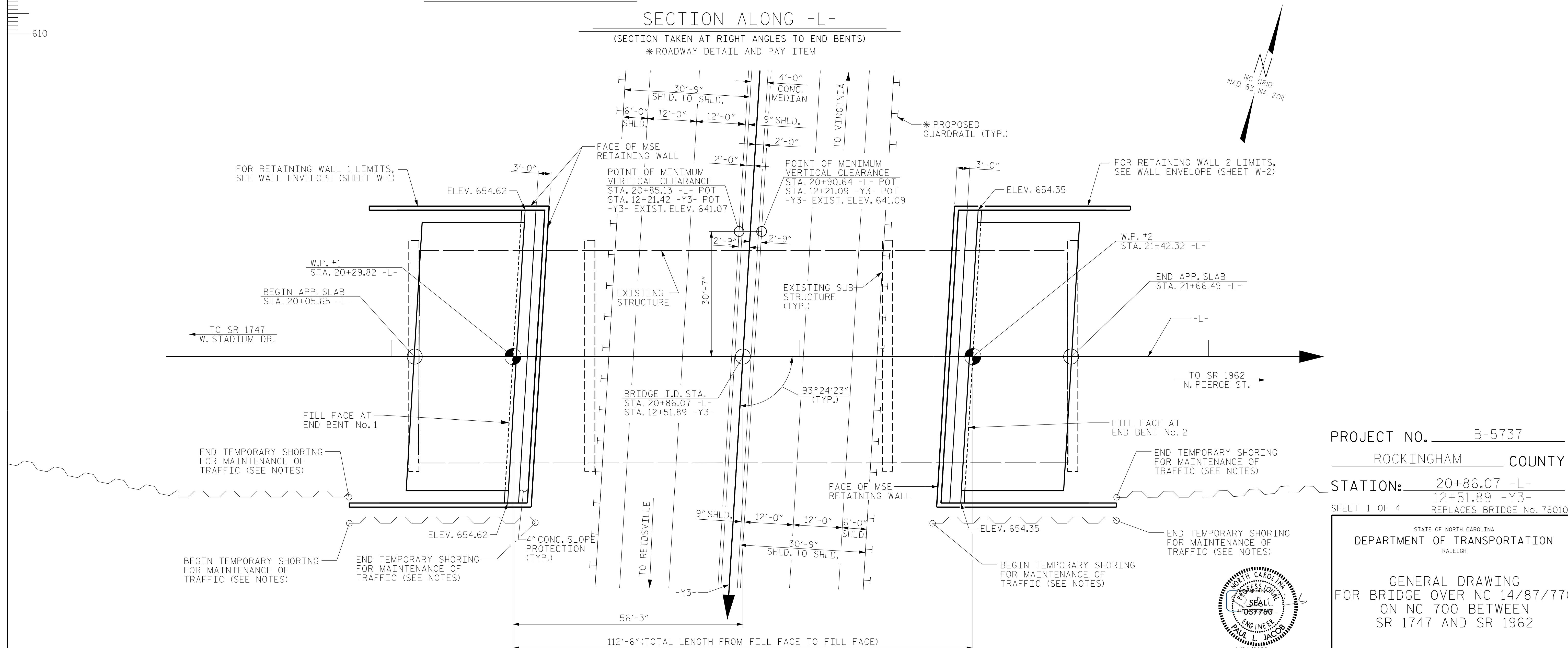
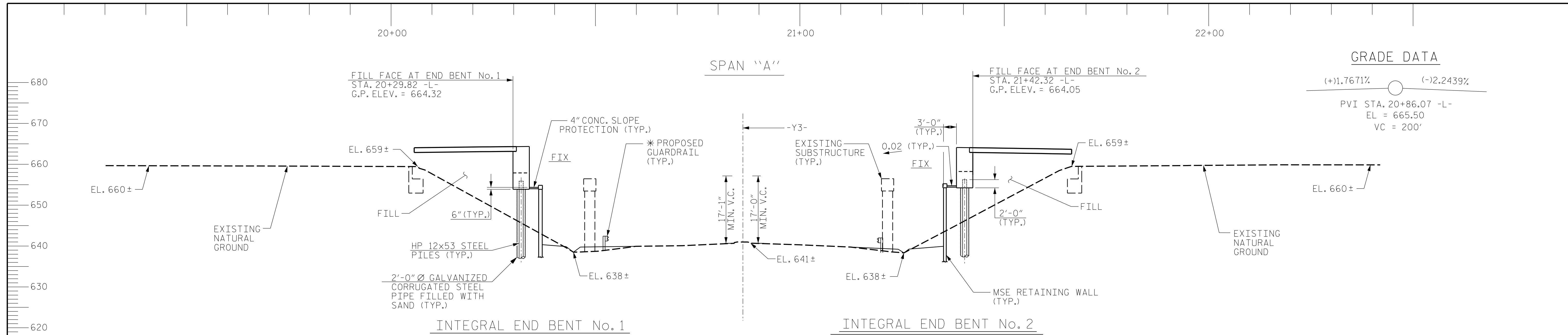
LETTING DATE:
MARCH 15, 2022

TRENT HUFFMAN, PE
PROJECT ENGINEER

PAUL JACOB, PE
PROJECT STRUCTURAL ENGINEER

DAVID STUTTS, P.E.
NCDOT CONTACT

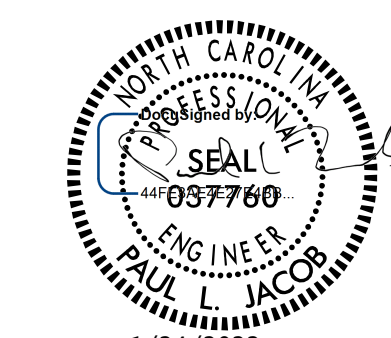




PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-
12+51.89 -Y3-
 SHEET 1 OF 4 REPLACES BRIDGE No. 780108

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER NC 14/87/770
 ON NC 700 BETWEEN
 SR 1747 AND SR 1962



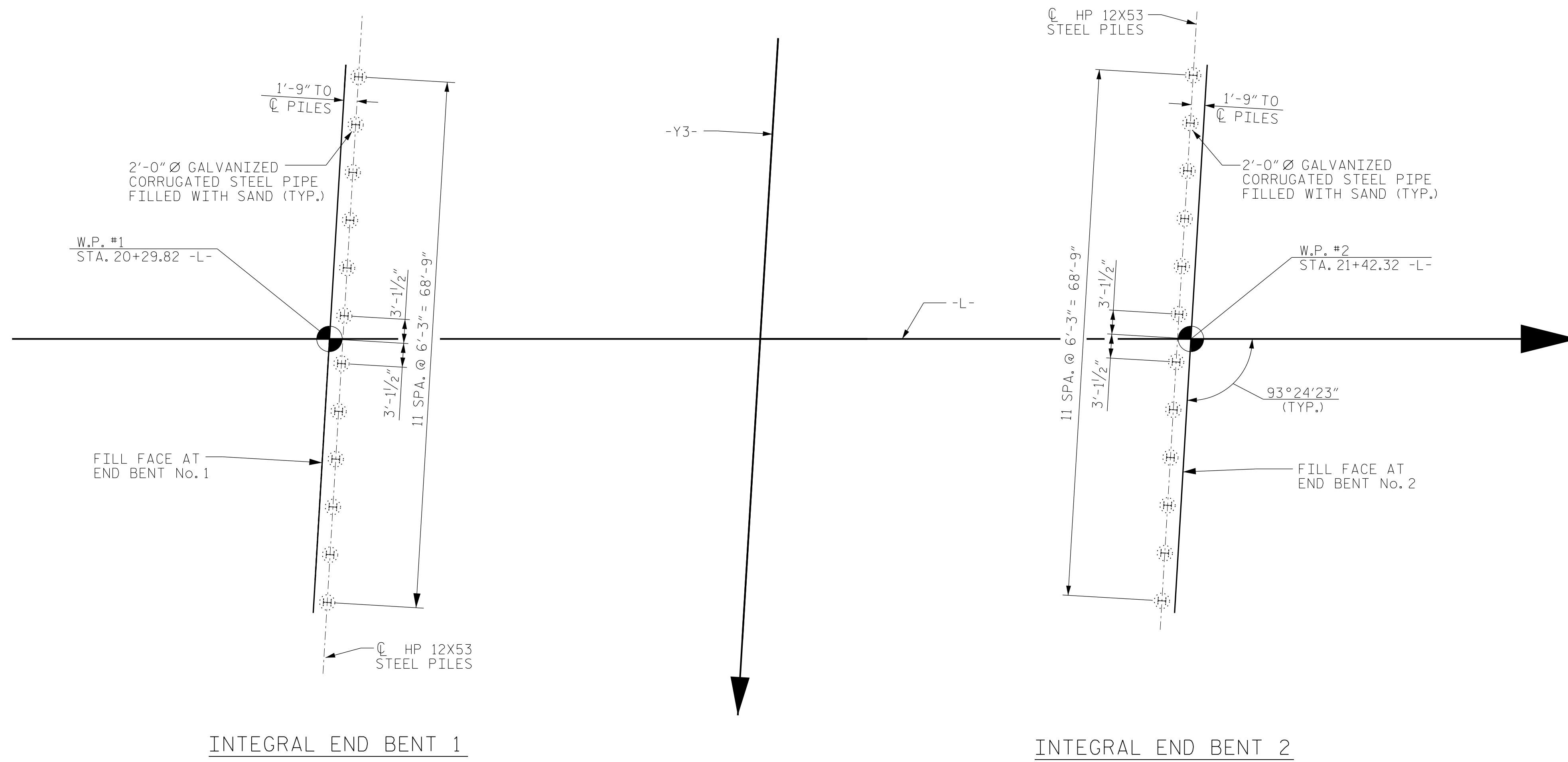
DRAWN BY : J. LOFTUS DATE : 01-2022
 CHECKED BY : P. JACOB DATE : 01-2022
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 01-2022

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

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

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 P. Jacob



INTEGRAL END BENT 1

INTEGRAL END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING THE PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF THE CAP.

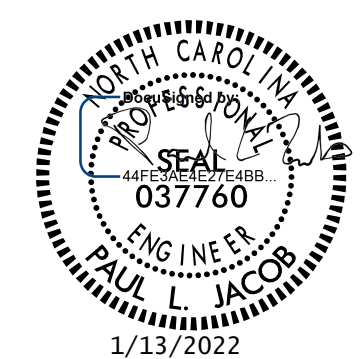
FOUNDATION NOTES:

- 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 120 TONS PER PILE.
- DO NOT DRIVE PILES AT END BENT NO. 1 OR END BENT NO. 2 IF BOTTOM OF DRILLED HOLES ARE IN NON-CRYSTALLINE ROCK. IF PILE DRIVING IS REQUIRED, DRIVE THE PILES TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.
- INSTALL PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A MINIMUM ELEVATION OF 10 FEET BELOW THE TOP OF THE RETAINING WALL LEVELING PAD.
- DRILLED-IN PILES ARE REQUIRED FOR INTEGRAL END BENT NO. 1 AND INTEGRAL END BENT NO. 2. EXCAVATE HOLES AT PILE LOCATIONS TO A MINIMUM ELEVATION OF 10 FEET BELOW THE TOP OF THE RETAINING WALL LEVELING PAD. FILL THE BOTTOM 3 FT OF HOLES FOR PILE EXCAVATION WITH CONCRETE OR GROUT AND THE REST OF HOLES WITH CLASS II OR III SELECT MATERIAL THAT MEETS SECTION 1016 OF THE STANDARD SPECIFICATIONS. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- INSTALL PILES AT END BENT NO. 1 AND END BENT NO. 2 BEFORE CONSTRUCTING RETAINING WALLS.
- PILE EXCAVATION FOR PILES AT END BENT NO. 1 AND END BENT NO. 2 SHOULD BE PERFORMED AFTER EXCAVATION FOR THE MSE WALLS DOWN TO THE ELEVATION OF THE LEVELING PAD.

PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

FOUNDATION LAYOUT



DRAWN BY : <u>J. LOFTUS</u>	DATE : <u>03-2021</u>
CHECKED BY : <u>P. JACOB</u>	DATE : <u>07-2021</u>
DESIGN ENGINEER OF RECORD: <u>J. LOFTUS</u>	DATE : <u>04-2021</u>

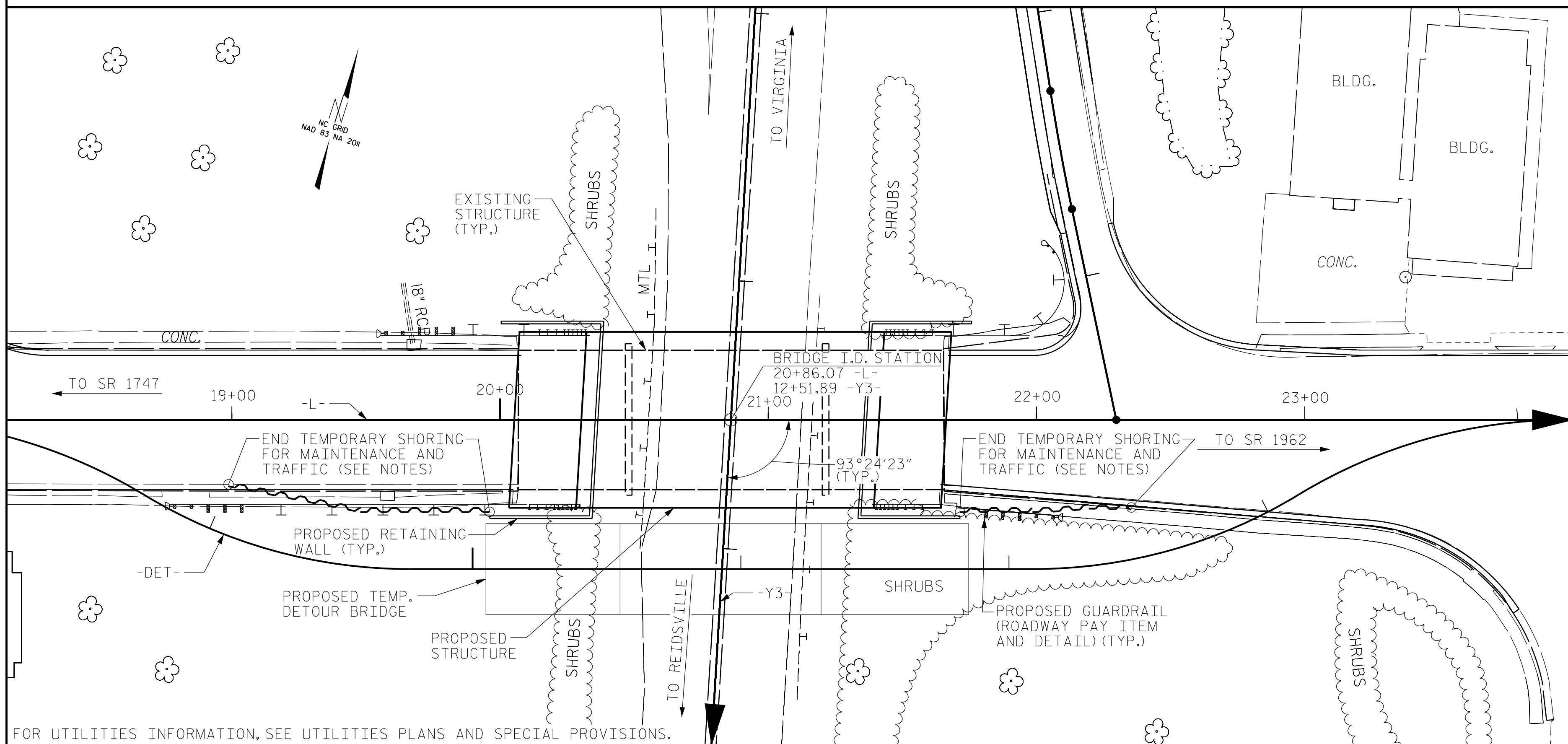
moffatt & nichol
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			29

1/12/2022 10:01:10 AM 1031\B5737\Structures\01-CADD\03-FinalDrawings\01_003.B5737_SMU.FI.02_002.780108.dgn
 P. JACOB

BM #2 - SPIKE IN 18" MAPLE, 216.7' LT. OF 18+80.99 -L-, EL. 656.51



LOCATION SKETCH

NOTES

- ASSUMED LIVE LOAD= HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF 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 EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- 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 ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE, PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE, REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- 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.
- INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR 'REMOVAL OF EXISTING STRUCTURE AT STATION 20+86.07 -L-.'
- THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
- THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 20+92.99 -DET- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.
- THE EXISTING STRUCTURE, BRIDGE 108, CONSISTING OF THREE SPANS (44', 71' & 44') OF A REINFORCED CONCRETE DECK ON STEEL I-BEAMS WITH A 52'-0" CLEAR ROADWAY ON REINFORCED CONCRETE CAPS WITH SPREAD FOOTINGS AT THE END BENTS AND A REINFORCED CONCRETE BENT ON SPREAD FOOTINGS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THE INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
- FOR FOUNDATION NOTES, SEE SHEET S-2.

TOTAL BILL OF MATERIAL

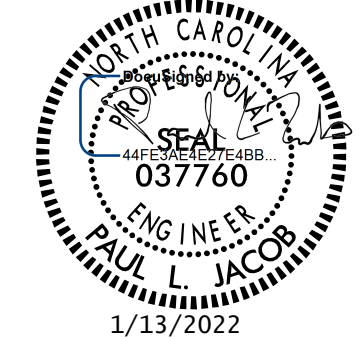
	CONSTRUCTION MAINTENANCE & REMOVAL OF TEMPORARY STRUCTURE AT STA. 20+92.99 -DET-	REMOVAL OF EXISTING STRUCTURE AT STA. 20+86.07 -L-	ASBESTOS ASSESSMENT	PILE EXCAVATION NOT IN SOIL	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS STA. 20+86.07 -L-	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	THREE BAR METAL RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS		
	LUMP SUM	LUMP SUM	LUMP SUM	LIN.FT.	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	EACH	NO.	LIN.FT.	SQ.YDS.	LUMP SUM	
SUPERSTRUCTURE					7,269	7,783				7	772.84				306.50		
END BENT NO.1				120					7,037		12	12	360		16		
END BENT NO.2				120					7,037		12	12	360		16		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	240	7,269	7,783	82.1	LUMP SUM	14,074	7	772.84	24	24	720	306.50	32	LUMP SUM

PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER NC 14/87/770
 ON NC 700 BETWEEN
 SR 1747 AND SR 1962



DRAWN BY : J. LOFTUS DATE : 03-2021
 CHECKED BY : P. JACOB DATE : 07-2021
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021

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

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

1/12/2022 10:01:10 AM 103\B5737\Structures\01-CADD\03-Final Drawings\01_005_B5737_SML\1503_003_780108.dgn
 P. Jacob

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING Ⓝ	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (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 (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	1.08	--	1.75	0.83	1.51	A	EL	54.5	0.96	1.29	A	I	10.3	0.80	0.74	1.08	A	I	54.5		
	HL-93 (OPERATING)	N/A		1.71	--	1.35	0.83	1.96	A	EL	54.5	0.96	1.71	A	I	10.3	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	Ⓝ2	1.54	55.60	1.75	0.83	2.15	A	EL	54.5	0.96	1.81	A	I	10.3	0.80	0.74	1.54	A	I	54.5		
	HS-20 (OPERATING)	36.000		2.38	85.79	1.35	0.83	2.79	A	EL	54.5	0.96	2.38	A	I	10.3	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.71	50.04	1.40	0.83	6.45	A	EL	54.5	0.96	5.88	A	I	10.3	0.80	0.74	3.71	A	I	54.5	
		SNGARBS2	20.000		2.67	53.31	1.40	0.83	4.64	A	EL	54.5	0.96	4.06	A	I	10.3	0.80	0.74	2.67	A	I	54.5	
		SNAGRIS2	22.000		2.49	54.69	1.40	0.83	4.33	A	EL	54.5	0.96	3.73	A	I	10.3	0.80	0.74	2.49	A	I	54.5	
		SNCOTTS3	27.250		1.84	50.19	1.40	0.83	3.21	A	EL	54.5	0.96	2.86	A	I	10.3	0.80	0.74	1.84	A	I	54.5	
		SNAGGRS4	34.925		1.50	52.45	1.40	0.83	2.61	A	EL	54.5	0.96	2.30	A	I	10.3	0.80	0.74	1.50	A	I	54.5	
		SNS5A	35.550		1.47	52.30	1.40	0.83	2.56	A	EL	54.5	0.96	2.30	A	I	10.3	0.80	0.74	1.47	A	I	54.5	
		SNS6A	39.950		1.33	53.32	1.40	0.83	2.32	A	EL	54.5	0.96	2.07	A	I	10.3	0.80	0.74	1.33	A	I	54.5	
	SNS7B	42.000		1.27	53.35	1.40	0.83	2.21	A	EL	54.5	0.96	2.00	A	I	10.3	0.80	0.74	1.27	A	I	54.5		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.62	53.56	1.40	0.83	2.83	A	EL	54.5	0.96	2.50	A	I	10.3	0.80	0.74	1.62	A	I	54.5	
		TNT4A	33.075		1.63	53.78	1.40	0.83	2.83	A	EL	54.5	0.96	2.45	A	I	10.3	0.80	0.74	1.63	A	I	54.5	
		TNT6A	41.600		1.32	54.73	1.40	0.83	2.29	A	EL	54.5	0.96	2.10	A	I	10.3	0.80	0.74	1.32	A	I	54.5	
		TNT7A	42.000		1.31	55.22	1.40	0.83	2.29	A	EL	54.5	0.96	2.06	A	I	10.3	0.80	0.74	1.31	A	I	54.5	
		TNT7B	42.000		1.34	56.37	1.40	0.83	2.34	A	EL	54.5	0.96	1.97	A	I	10.3	0.80	0.74	1.34	A	I	54.5	
		TNAGRIT4	43.000		1.29	55.47	1.40	0.83	2.25	A	EL	54.5	0.96	1.91	A	I	10.3	0.80	0.74	1.29	A	I	54.5	
TNAGT5A		45.000		1.22	55.02	1.40	0.83	2.13	A	EL	54.5	0.96	1.87	A	I	10.3	0.80	0.74	1.22	A	I	54.5		
TNAGT5B	45.000		Ⓝ3	1.21	54.61	1.40	0.83	2.11	A	EL	54.5	0.96	1.82	A	I	10.3	0.80	0.74	1.21	A	I	54.5		

LOAD FACTORS:

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

NOTES:

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

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

Ⓝ CONTROLLING LOAD RATING

Ⓝ1 DESIGN LOAD RATING (HL-93)

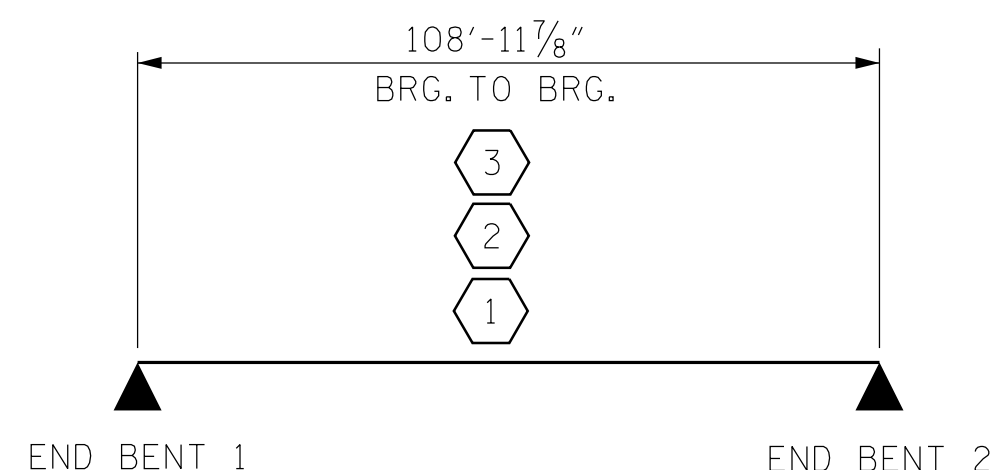
Ⓝ2 DESIGN LOAD RATING (HS-20)

Ⓝ3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

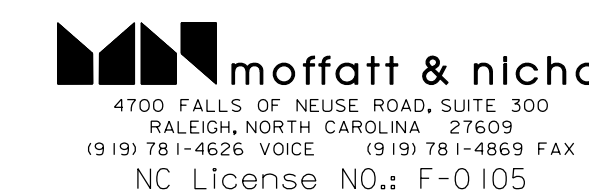
PROJECT NO. B-5737

ROCKINGHAM COUNTY

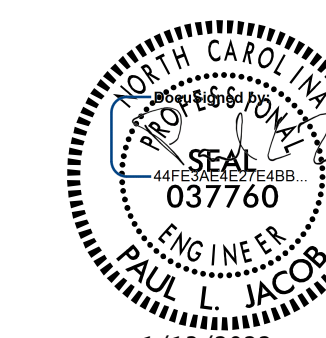
STATION: 20+86.07 -L-

SHEET 4 OF 4

ASSEMBLED BY : J. LOFTUS	DATE : 03/2021
CHECKED BY : P. JACOB	DATE : 07/2021
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

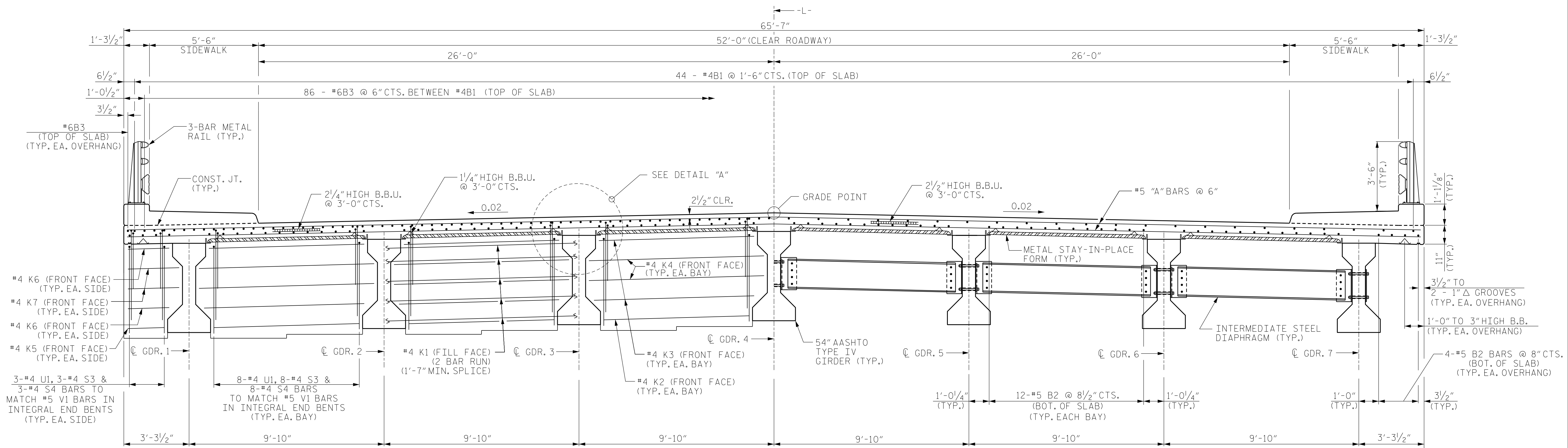


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
PRESTRESSED
CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

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

STD. NO. LRFR1

1/12/2022 02:19:10 PM I:\001-103\B5737\Structures\01-CADD\03-Final Drawings\01_007_B5737_SMU_LRFR04_004_780108.dgn p.jacob



HALF SECTION AT INTEGRAL END BENT DIAPHRAGM

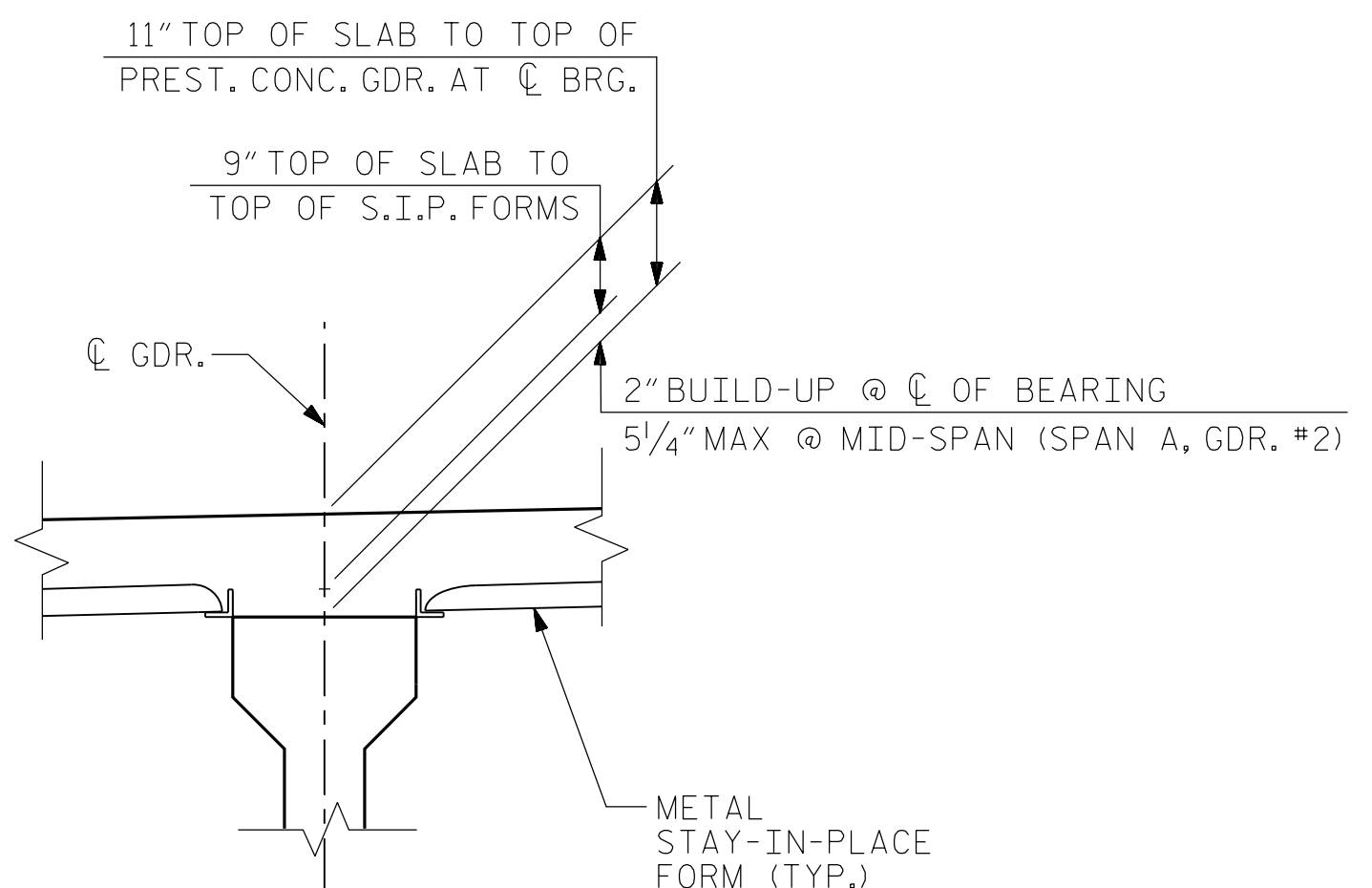
HALF SECTION AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.

NOTES

- PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 3'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS WHEN USING REMOVABLE FORMS. PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2/2" ABOVE THE TOP OF THE REMOVABLE FORM.
- LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.
- PREVIOUSLY CAST CONCRETE SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI. BEFORE ADDITIONAL CONCRETE IS CAST IN THE SPAN.

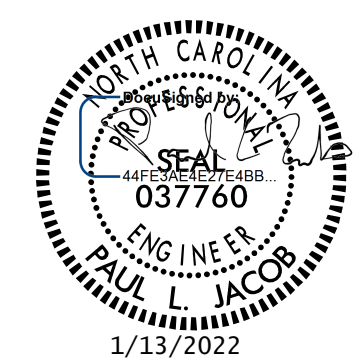


DETAIL "A"
(TYPICAL EACH GIRDER)
(SPAN A)

PROJECT NO. B-5737
 ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-
 SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TYPICAL SECTION



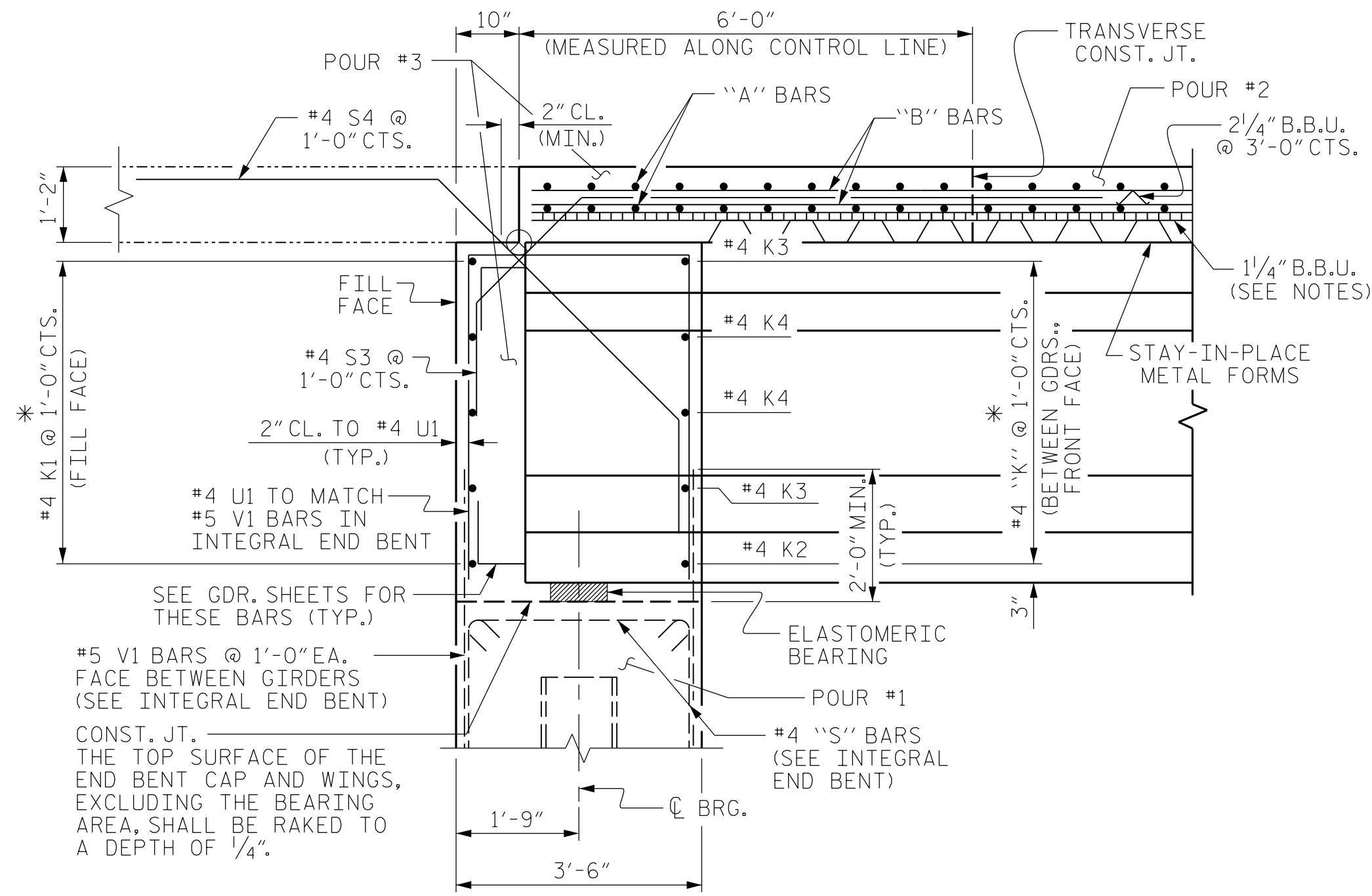
DRAWN BY : J. LOFTUS DATE : 03-2021
 CHECKED BY : P. JACOB DATE : 07-2021
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021

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

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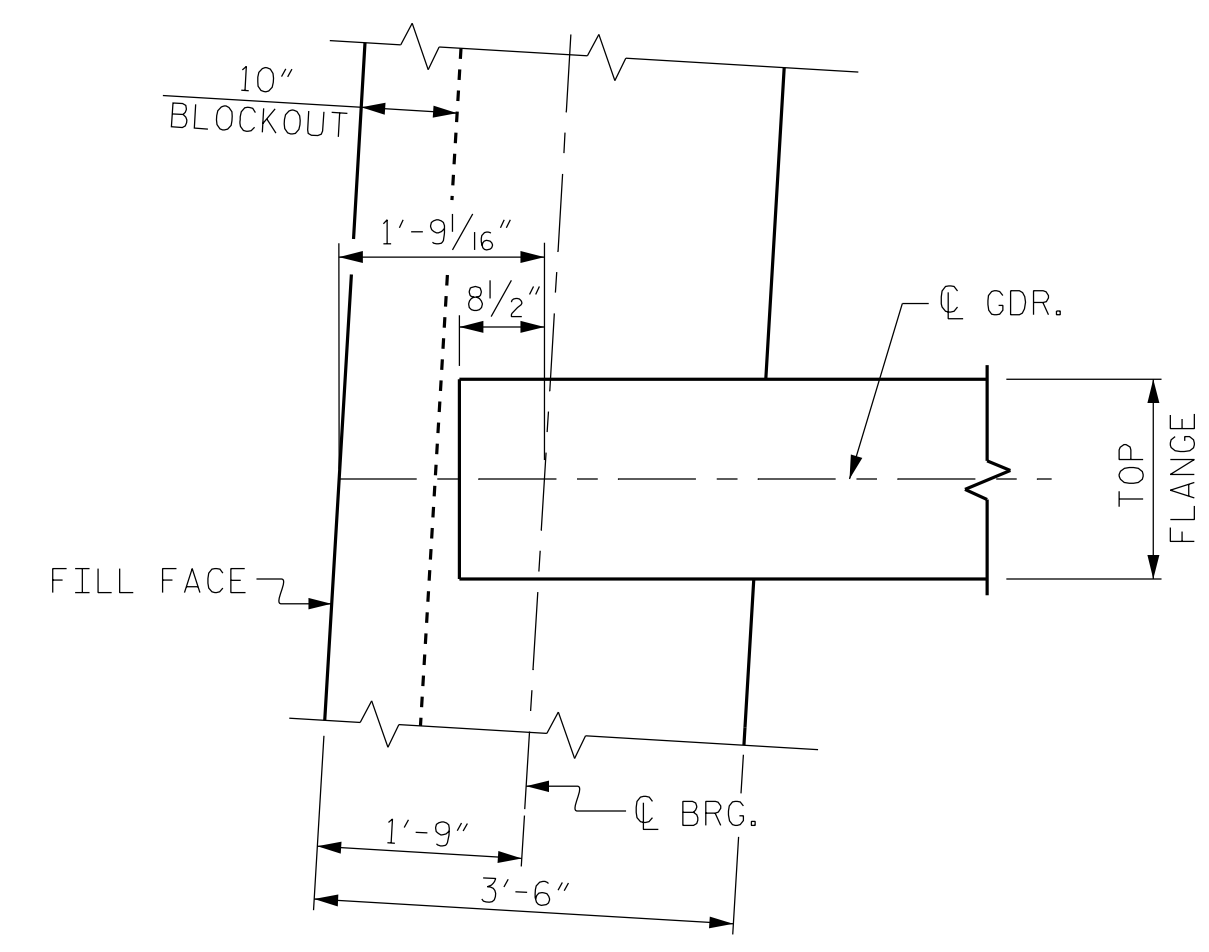
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			29

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SECTION THRU INTEGRAL END BENT DIAPHRAGM

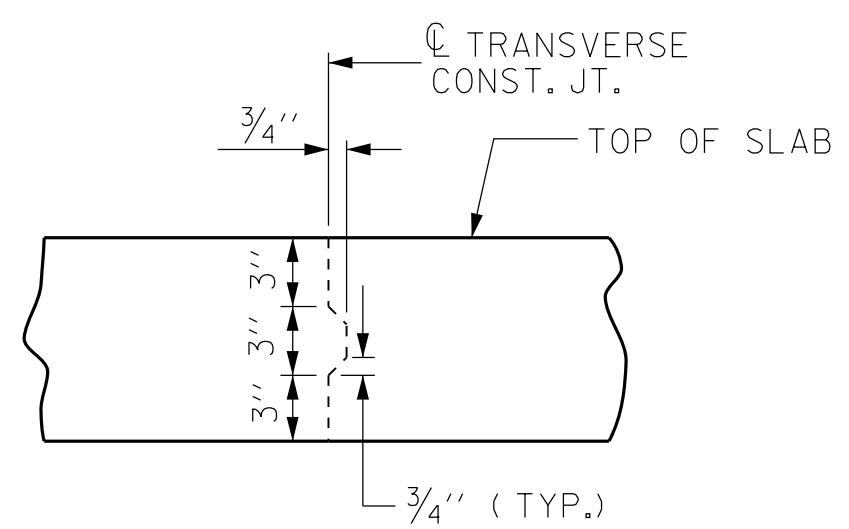
* 1'-0" CTS. IS MAX. SPACING



INTEGRAL END BENT

PLAN OF GIRDER

END BENT #1 SHOWN, END BENT #2 SIMILAR



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. B-5737

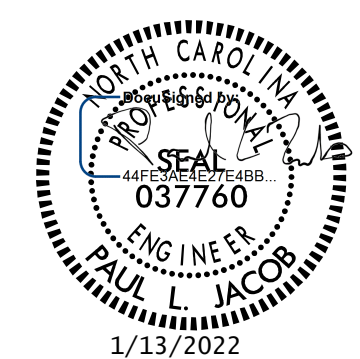
ROCKINGHAM COUNTY

STATION: 20+86.07 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION
DETAILS



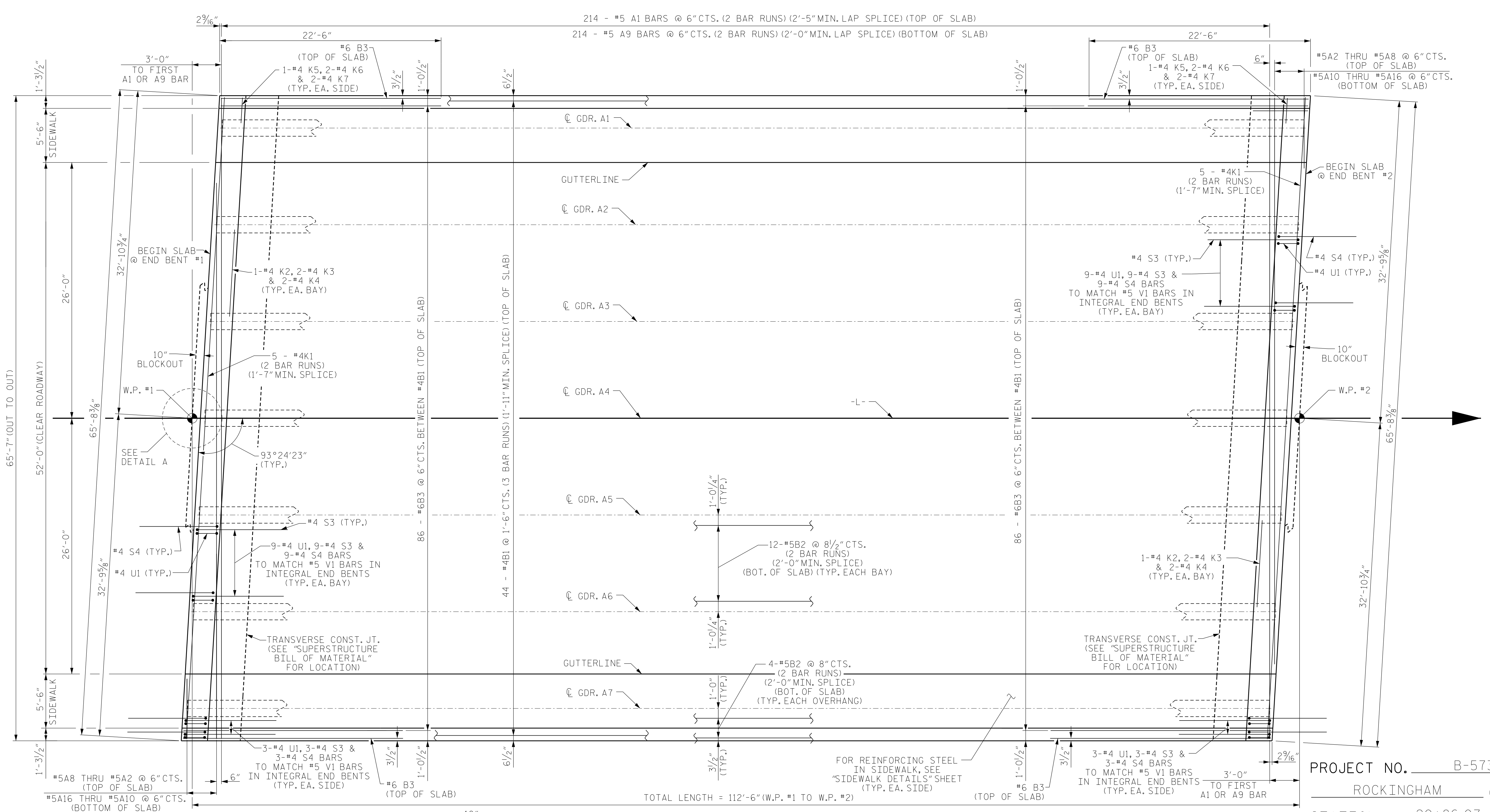
DRAWN BY :	J. LOFTUS	DATE :	03-2021
CHECKED BY :	P. JACOB	DATE :	07-2021
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE :	04-2021

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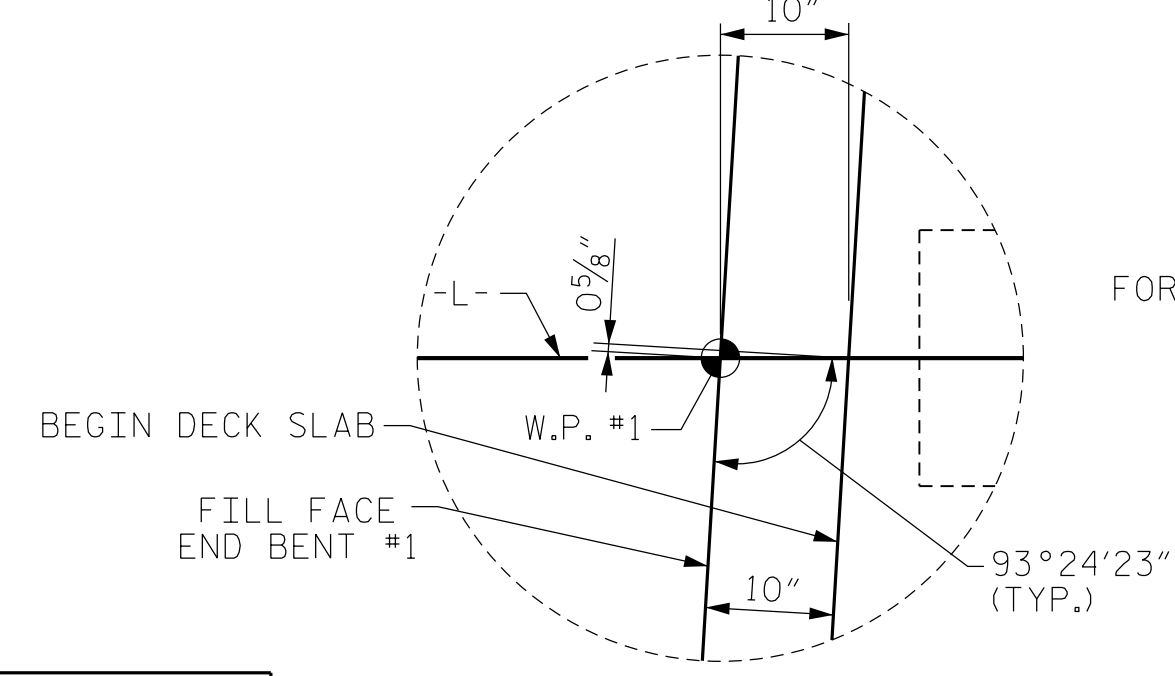
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PLAN OF SPAN A

FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE "FRAMING PLAN".
FOR PARAPET REINFORCING STEEL AND DETAILS, SEE "3 BAR METAL RAIL" SHEETS.

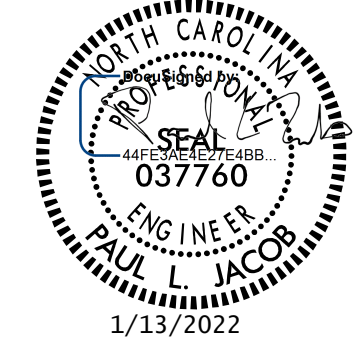


DETAIL A
END BENT #1 SHOWN, END BENT #2 SIMILAR

PROJECT NO. B-5737
 ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PLAN OF SPAN
 SPAN "A"



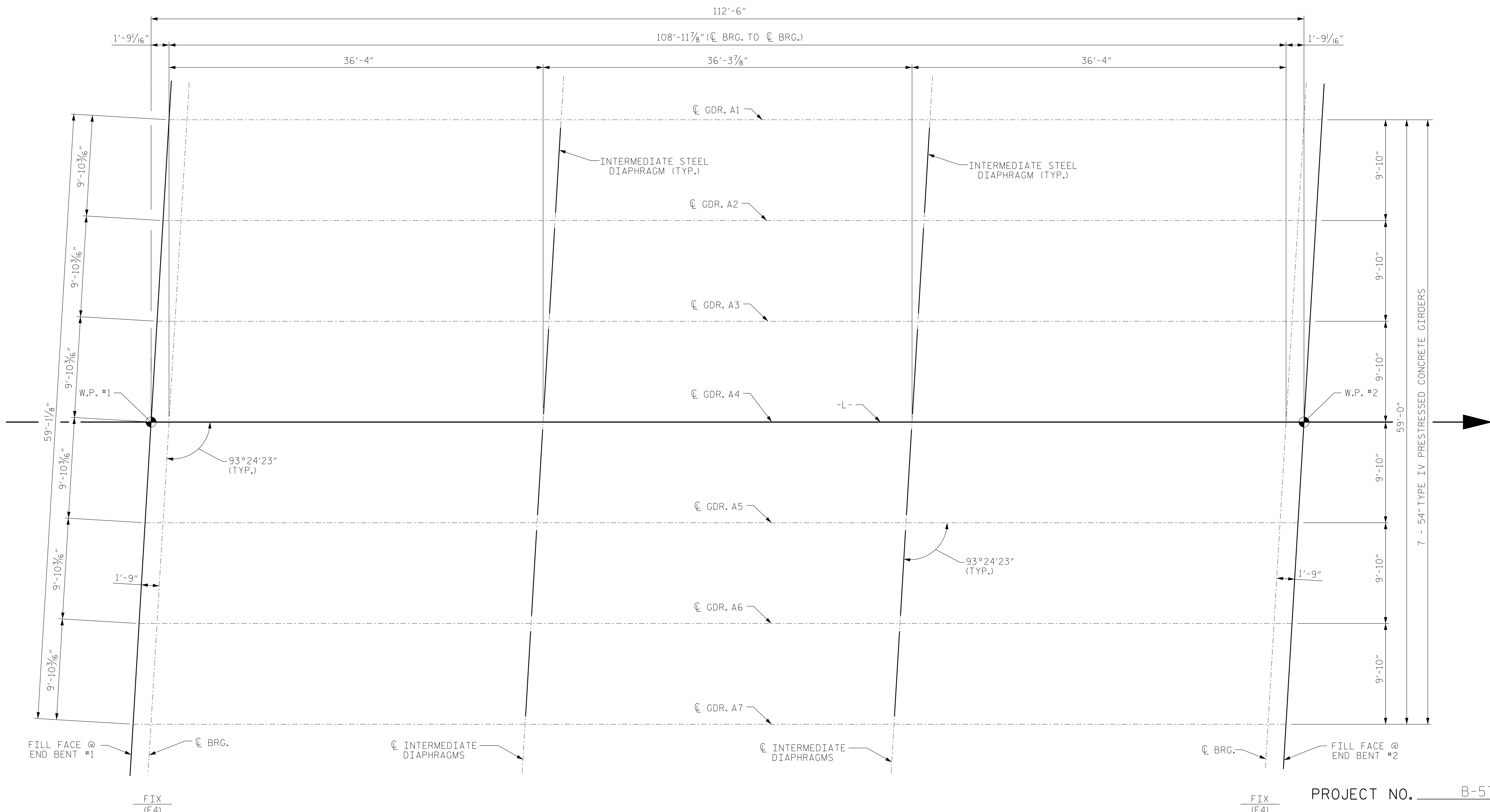
DRAWN BY: J. LOFTUS DATE: 03-2021
 CHECKED BY: P. JACOB DATE: 07-2021
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 04-2021

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2			4			

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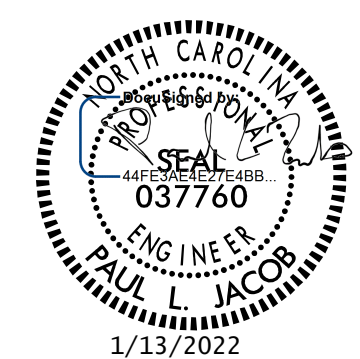


FRAMING PLAN

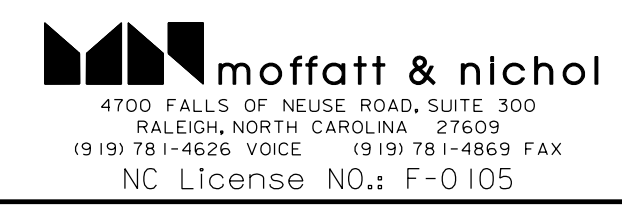
PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

FRAMING PLAN



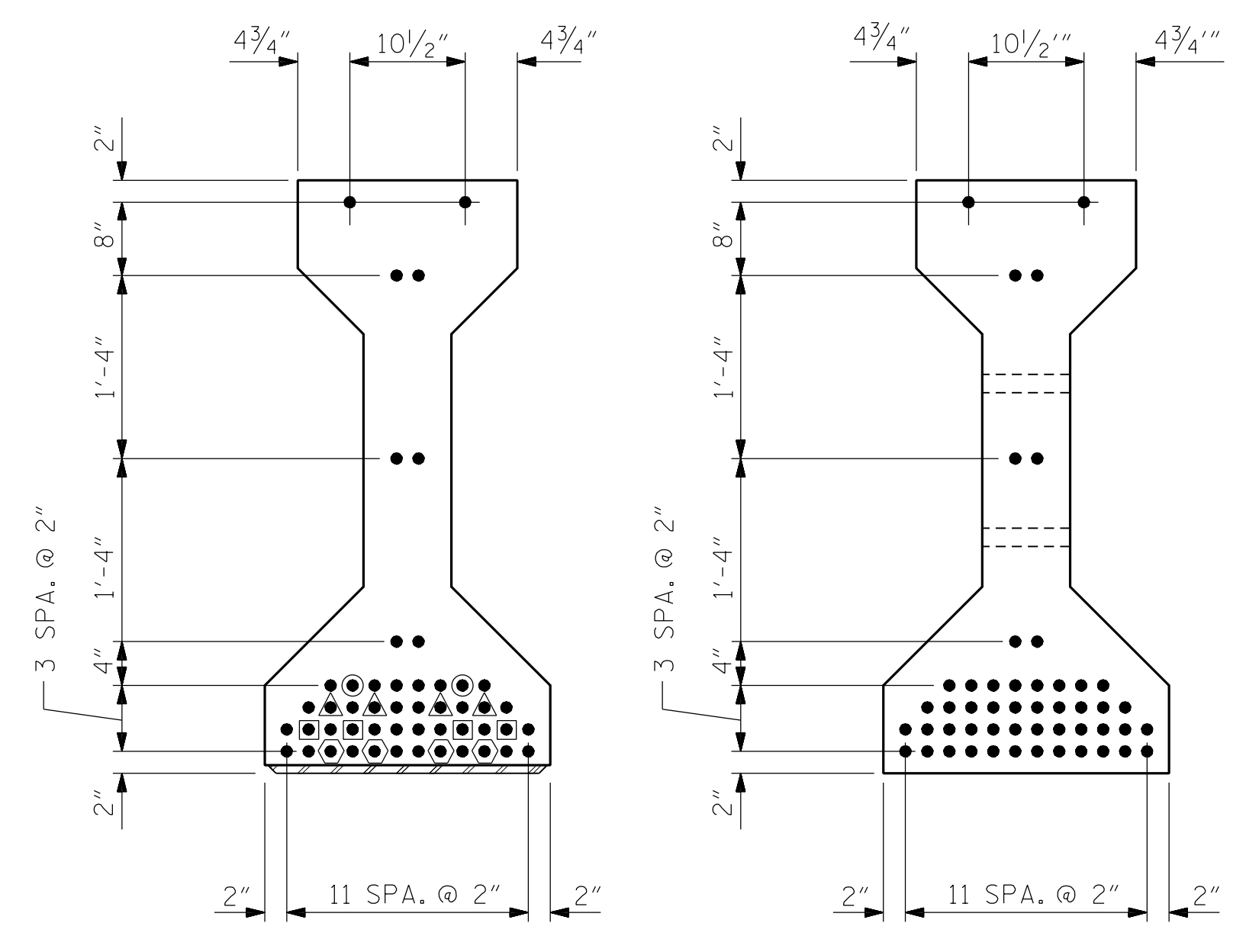
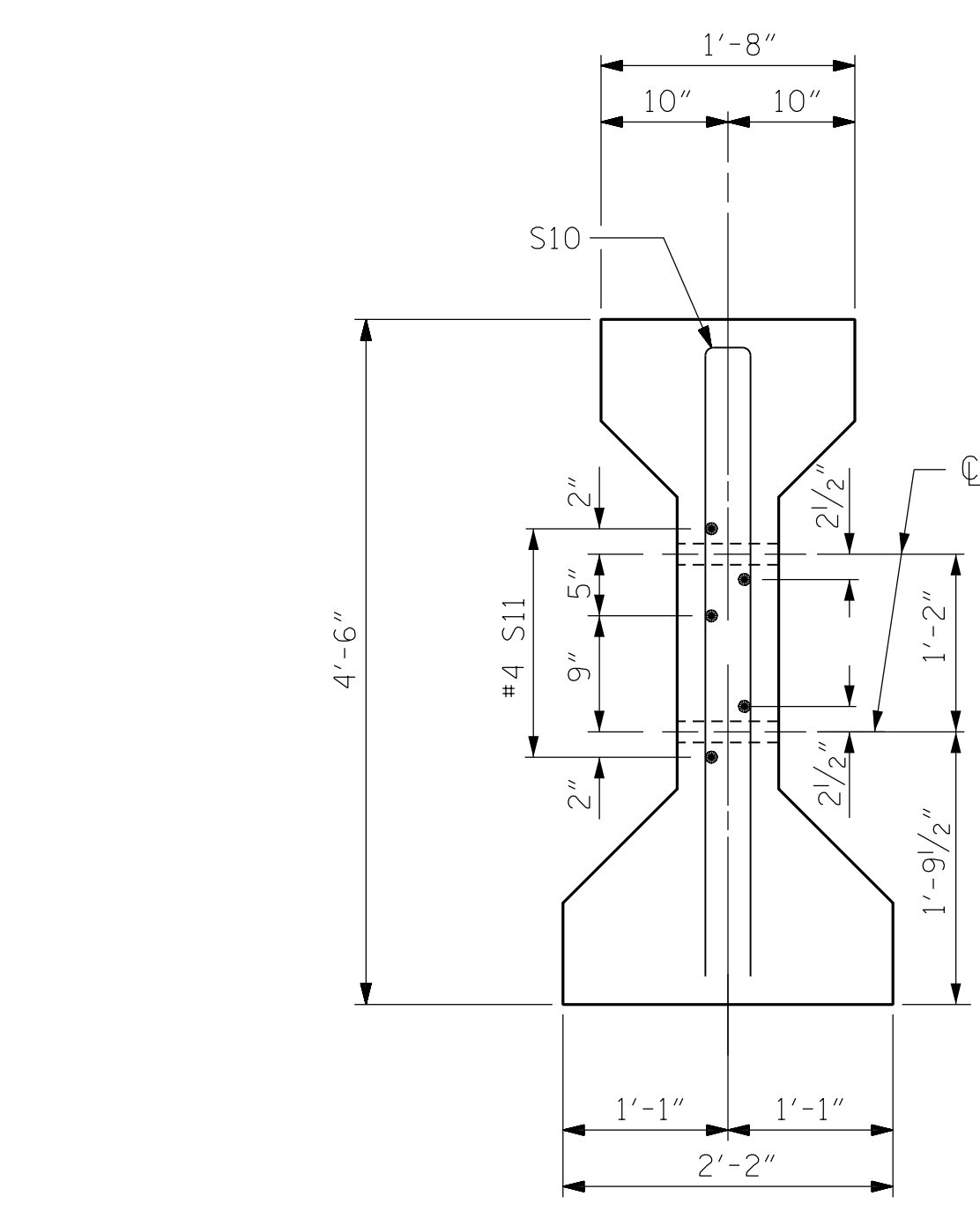
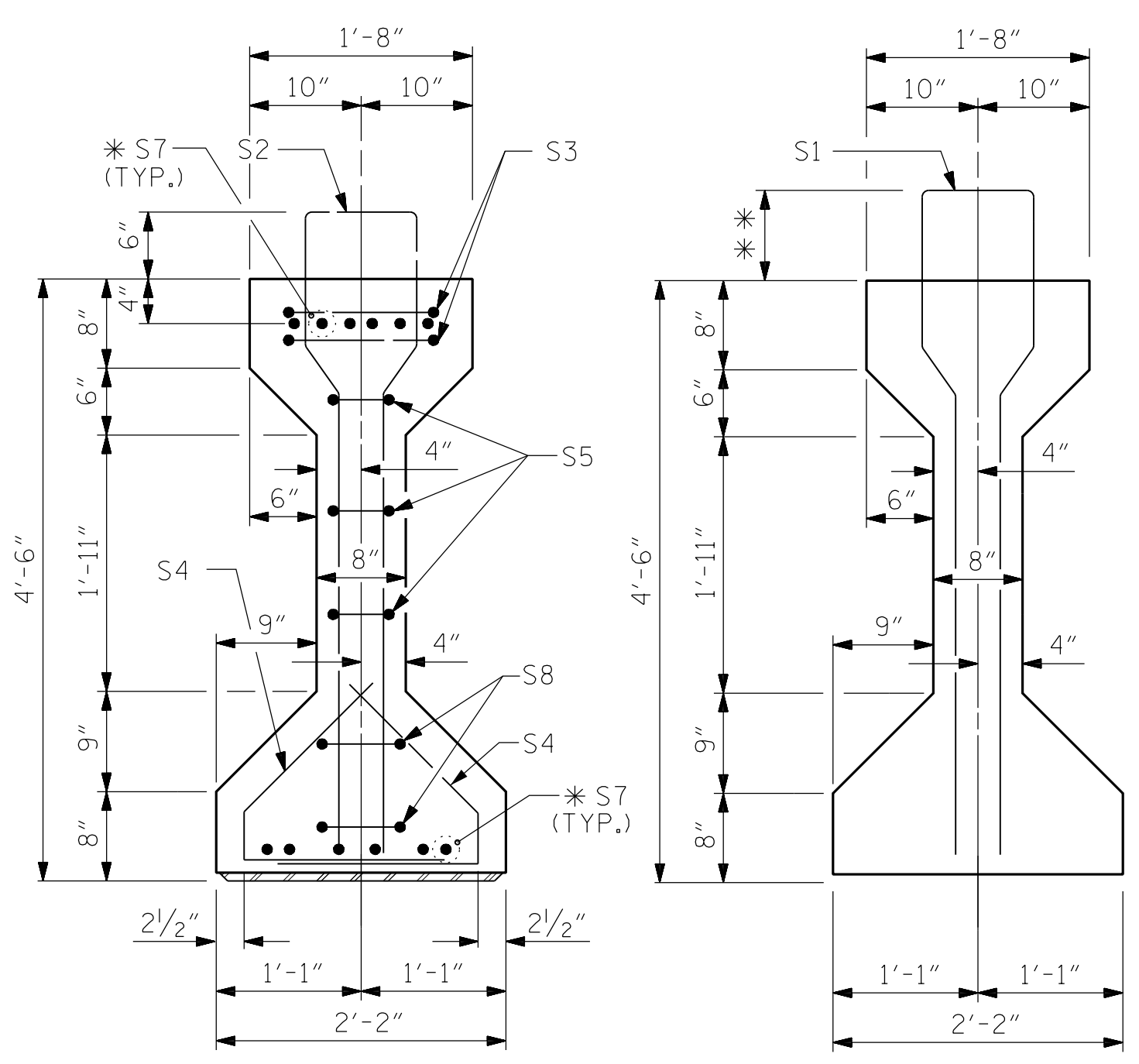
DRAWN BY : J. LOFTUS DATE : 03-2021
 CHECKED BY : P. JACOB DATE : 07-2021
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021



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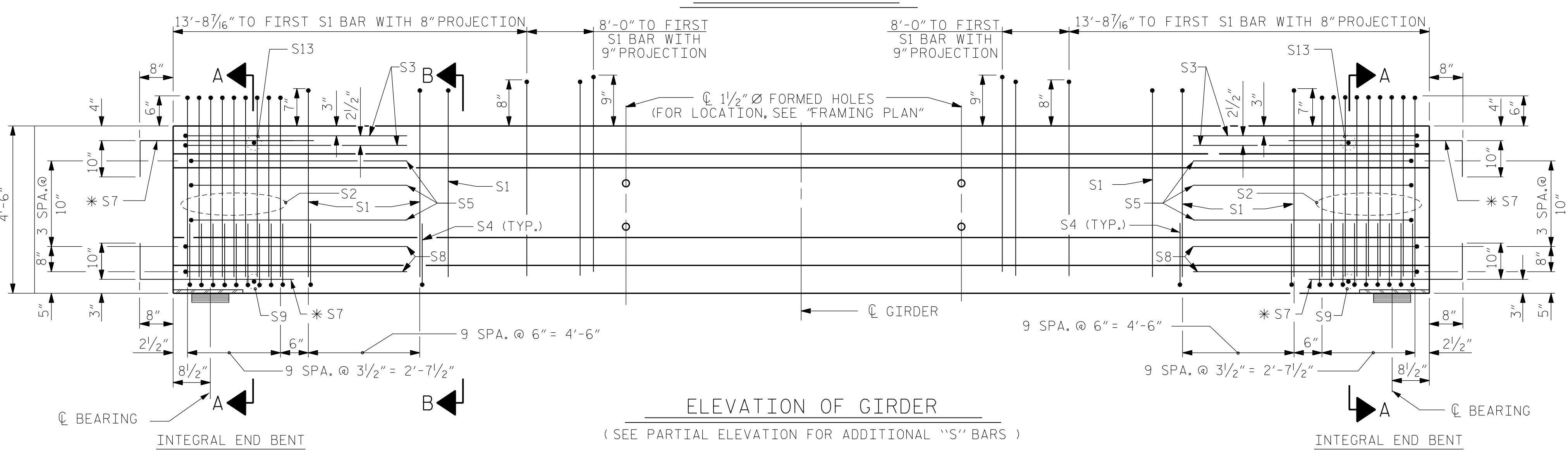
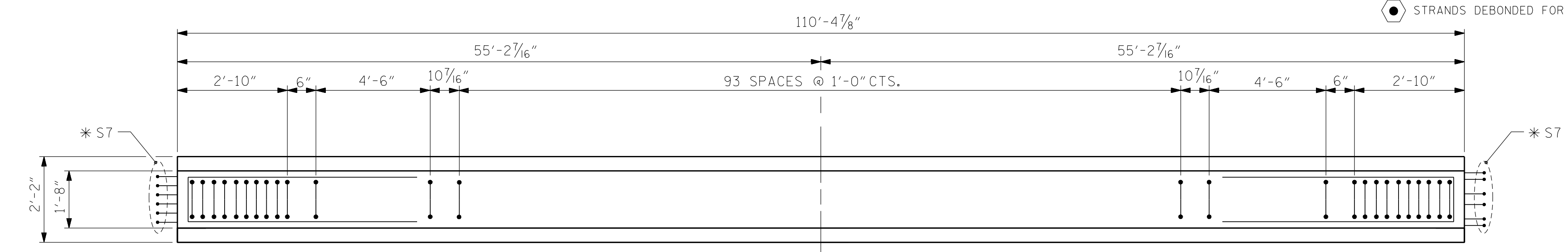
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
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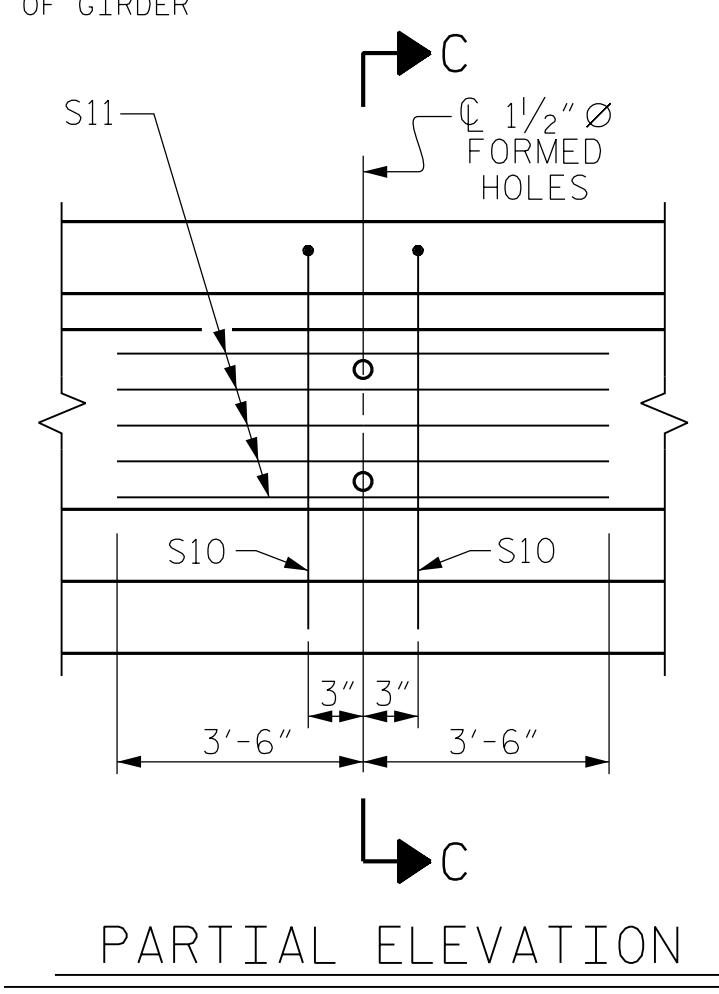


* FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

** S1 PROJECTION VARIES ALONG BEAM, SEE ELEVATION OF GIRDER FOR DETAILS



- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
 - △ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
 - ◇ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



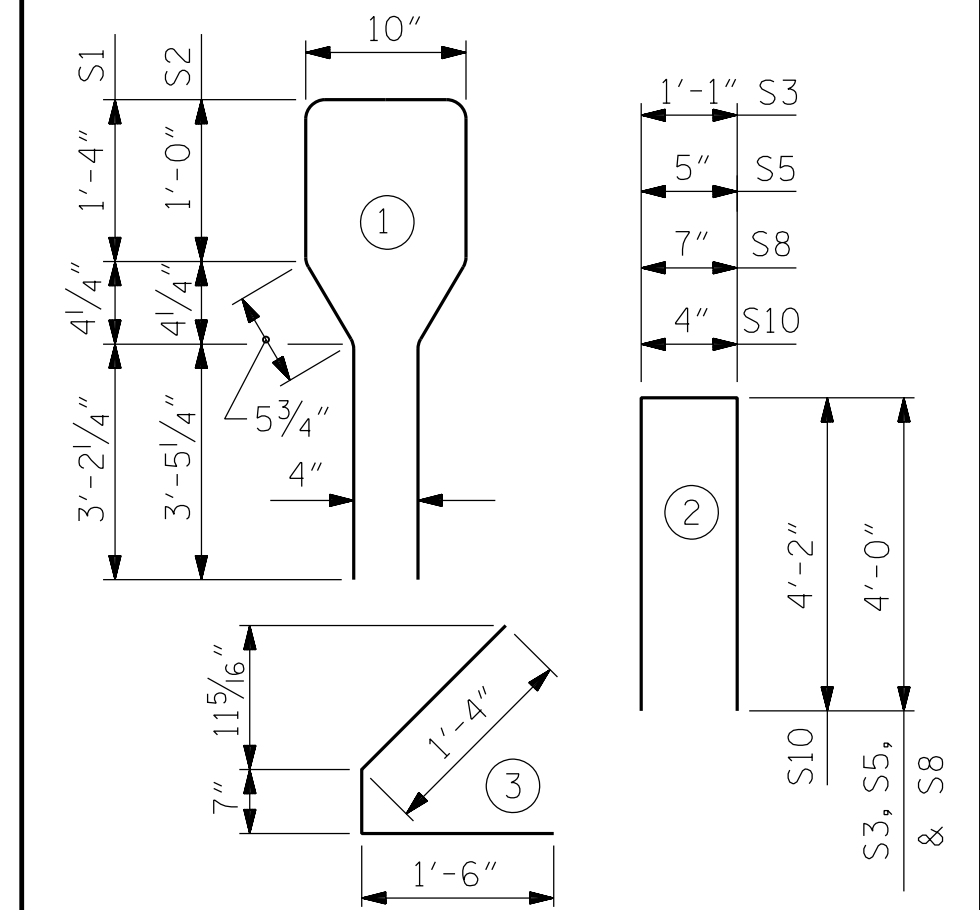
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	114	#4	1	10'-10"	825
S2	20	#6	1	10'-8"	320
S3	4	#4	2	9'-1"	24
S4	76	#4	3	3'-5"	173
S5	6	#4	2	8'-5"	34
* S7	24	#5	STR	3'-8"	88
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	4	#5	2	8'-8"	36
S11	10	#4	STR	7'-0"	47
S13	2	#3	STR	1'-4"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



	REINFORCING STEEL	10,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	1,572	22.4	50
INTERIOR GIRDER	1,572	22.4	50

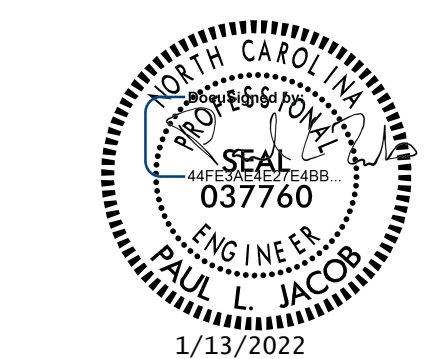
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
7	110'-4 7/8"	772'-10 7/8"

PROJECT NO. B-5737
 ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 AASHTO TYPE IV
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD

ASSEMBLED BY : J. LOFTUS	DATE : 03-2021
CHECKED BY : P. JACOB	DATE : 07-2021
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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1			3		
2			4		

SHEET NO.	S-9
TOTAL SHEETS	29

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

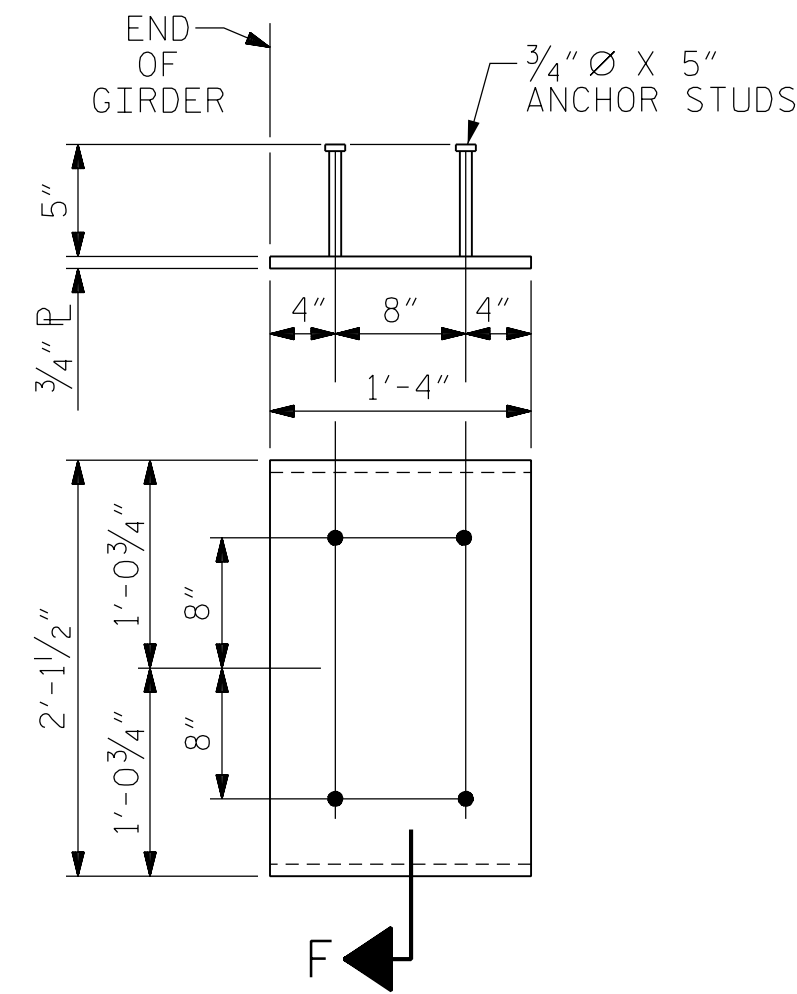
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,500 PSI.

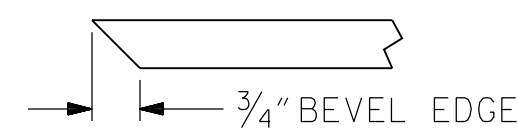
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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



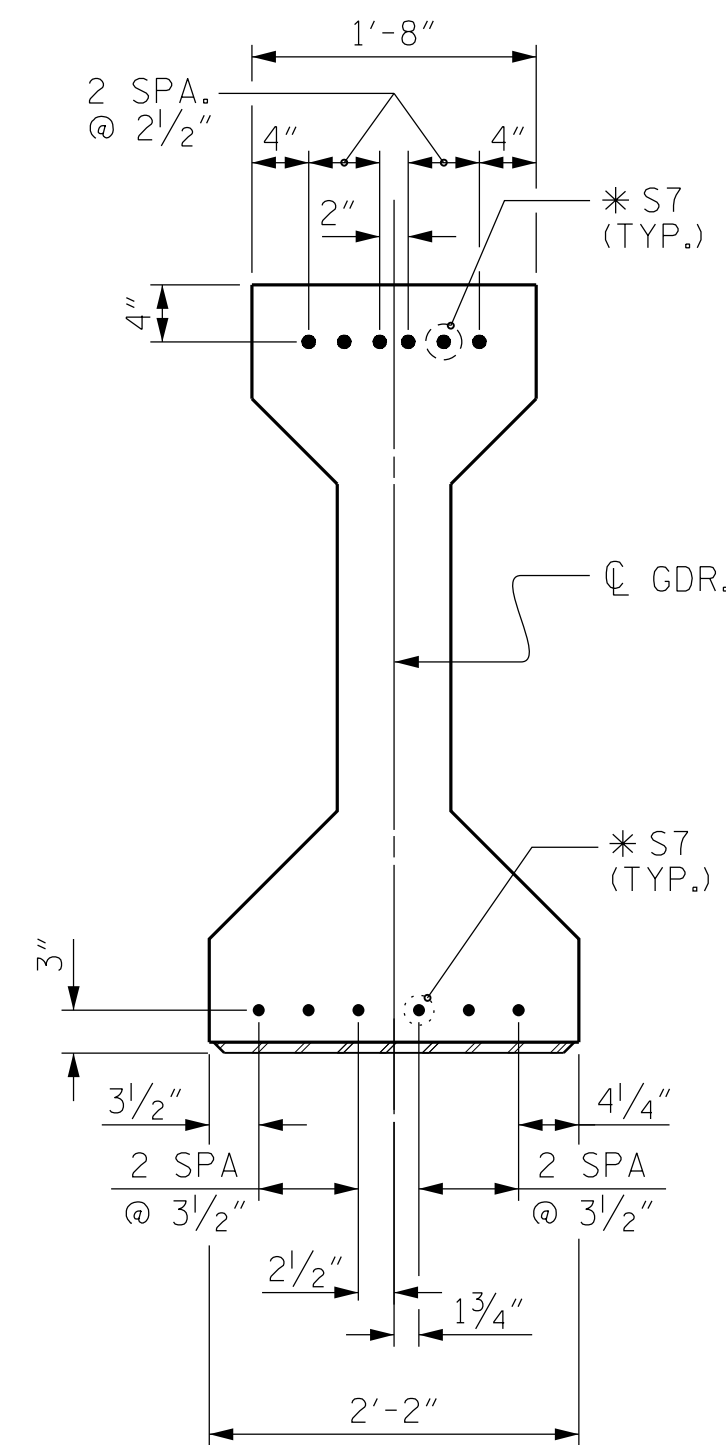
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

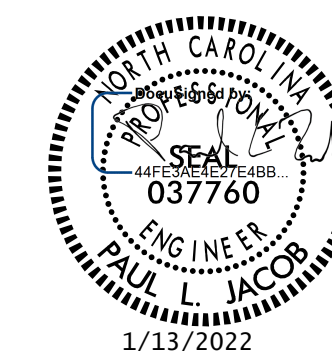
PROJECT NO. B-5737

ROCKINGHAM COUNTY

STATION: 20+86.07 -L-

SHEET 2 OF 3

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



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STD. NO. PCG9 (Sht. 3a)

ASSEMBLED BY : J. LOFTUS	DATE : 03-2021
CHECKED BY : P. JACOB	DATE : 07-2021
DRAWN BY : ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC

STRUCTURAL STEEL NOTES

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

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

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

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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

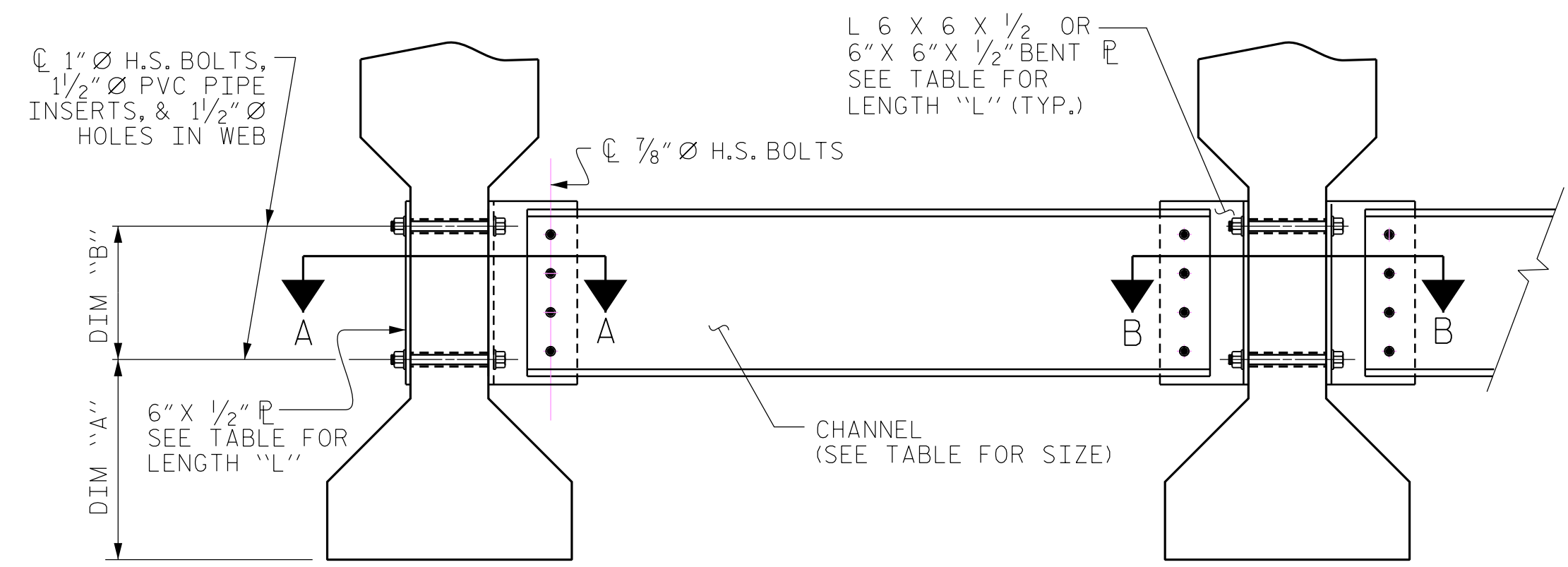
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

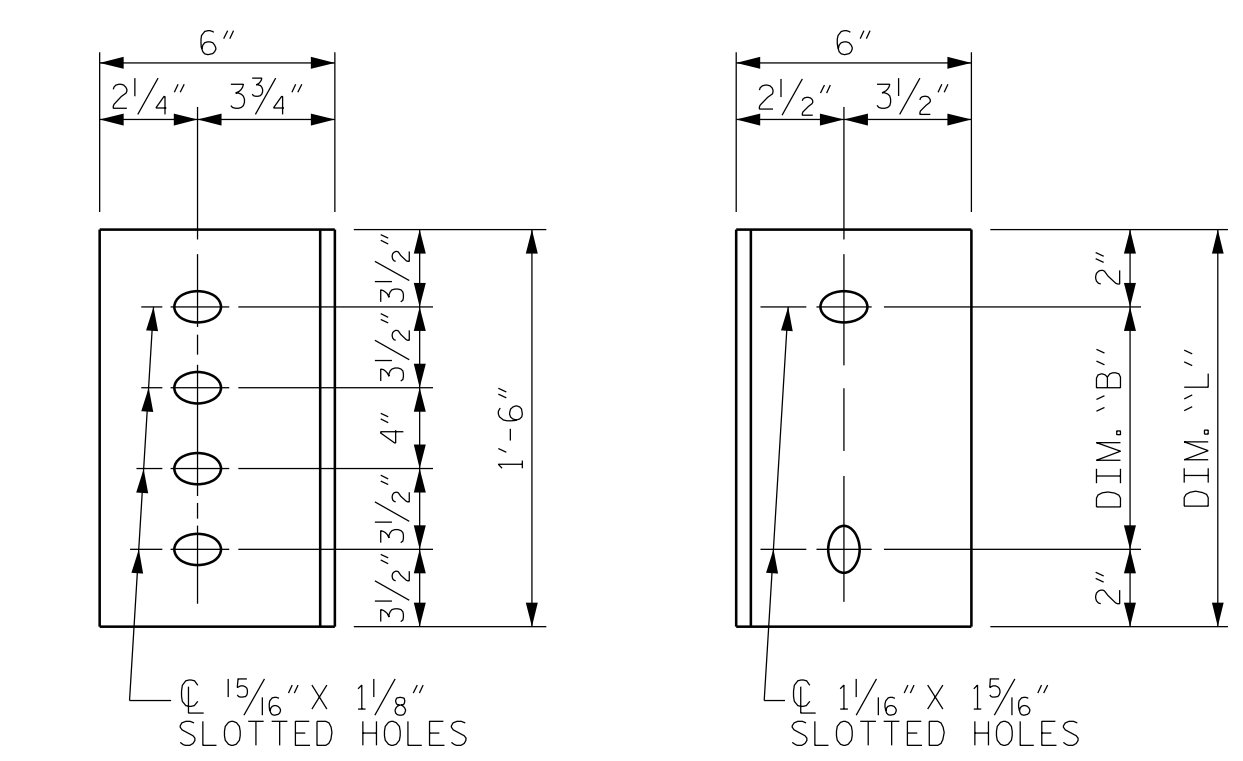
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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



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



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

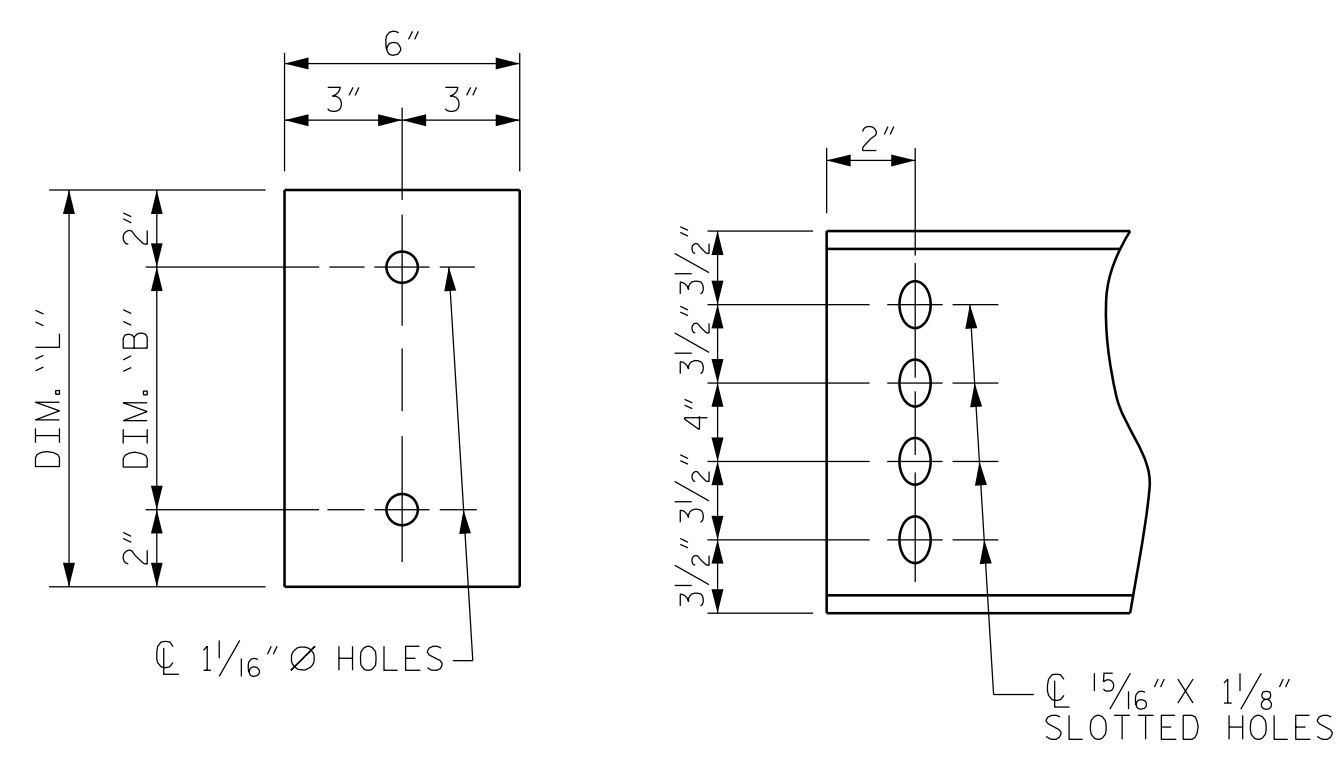
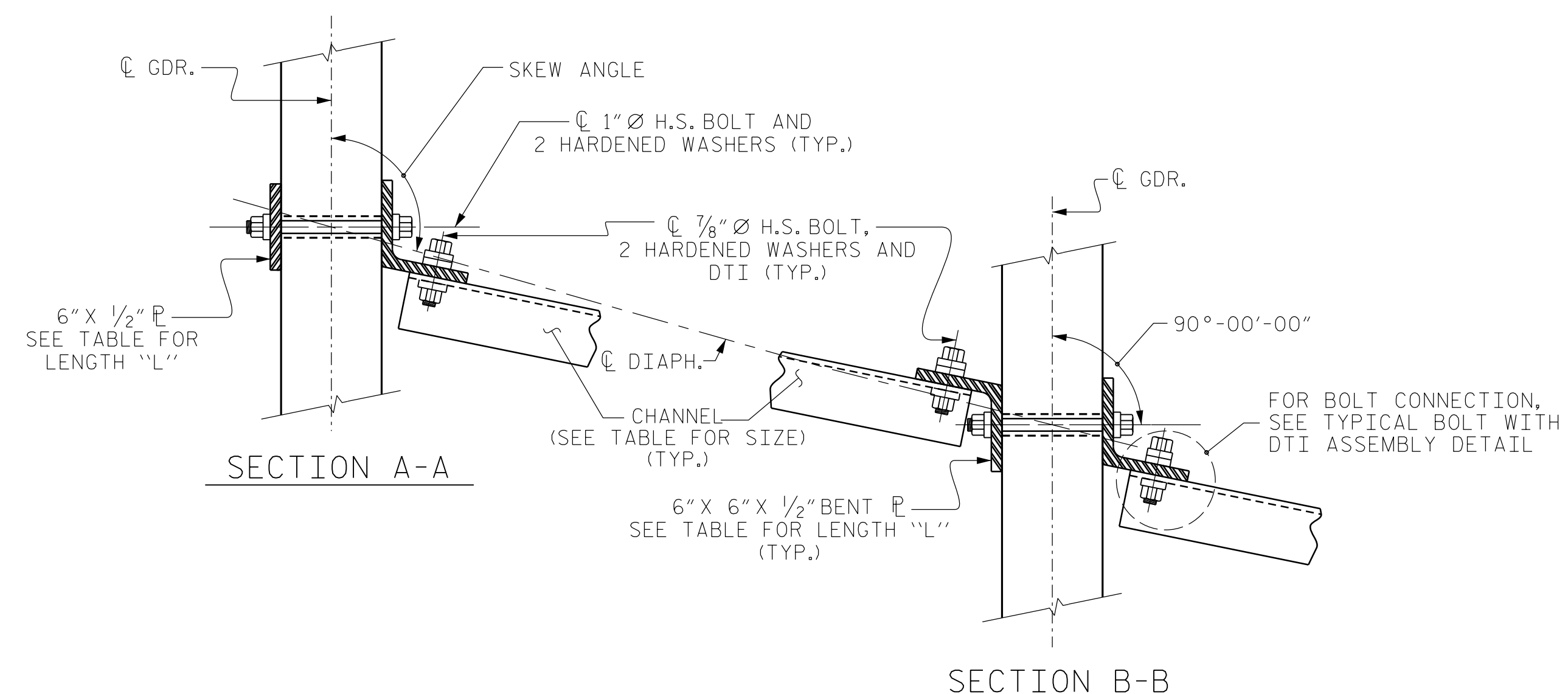
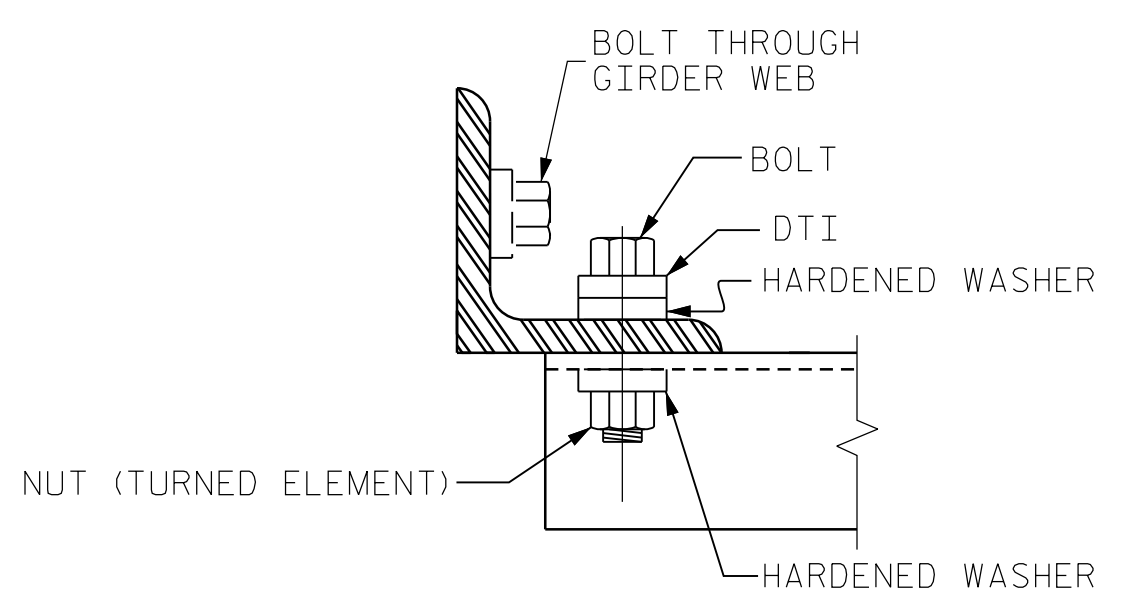


PLATE DETAILS
CHANNEL END
(TYPE IV GDR.)



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

TABLE

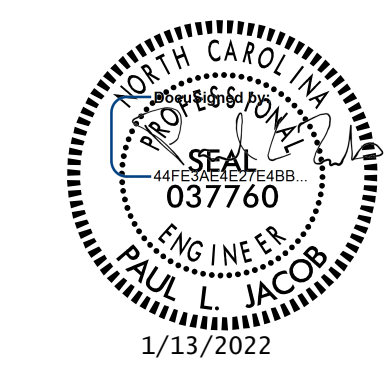
GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"

PROJECT NO. B-5737

ROCKINGHAM COUNTY

STATION: 20+86.07 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS
FOR TYPE IV
PRESTRESSED CONCRETE
GIRDERS

ASSEMBLED BY : J. LOFTUS	DATE : 03-2021
CHECKED BY : P. JACOB	DATE : 07-2021
DRAWN BY : TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

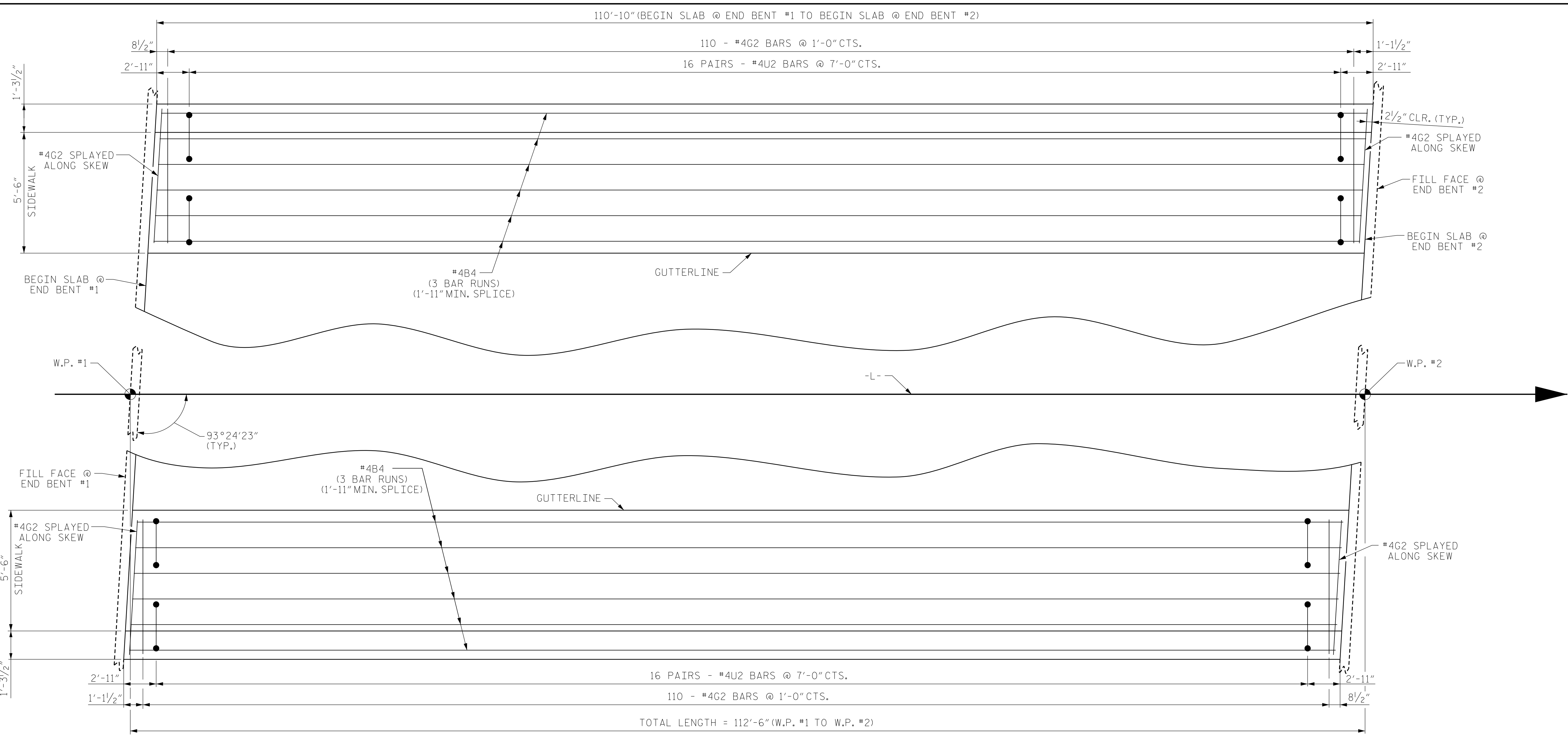
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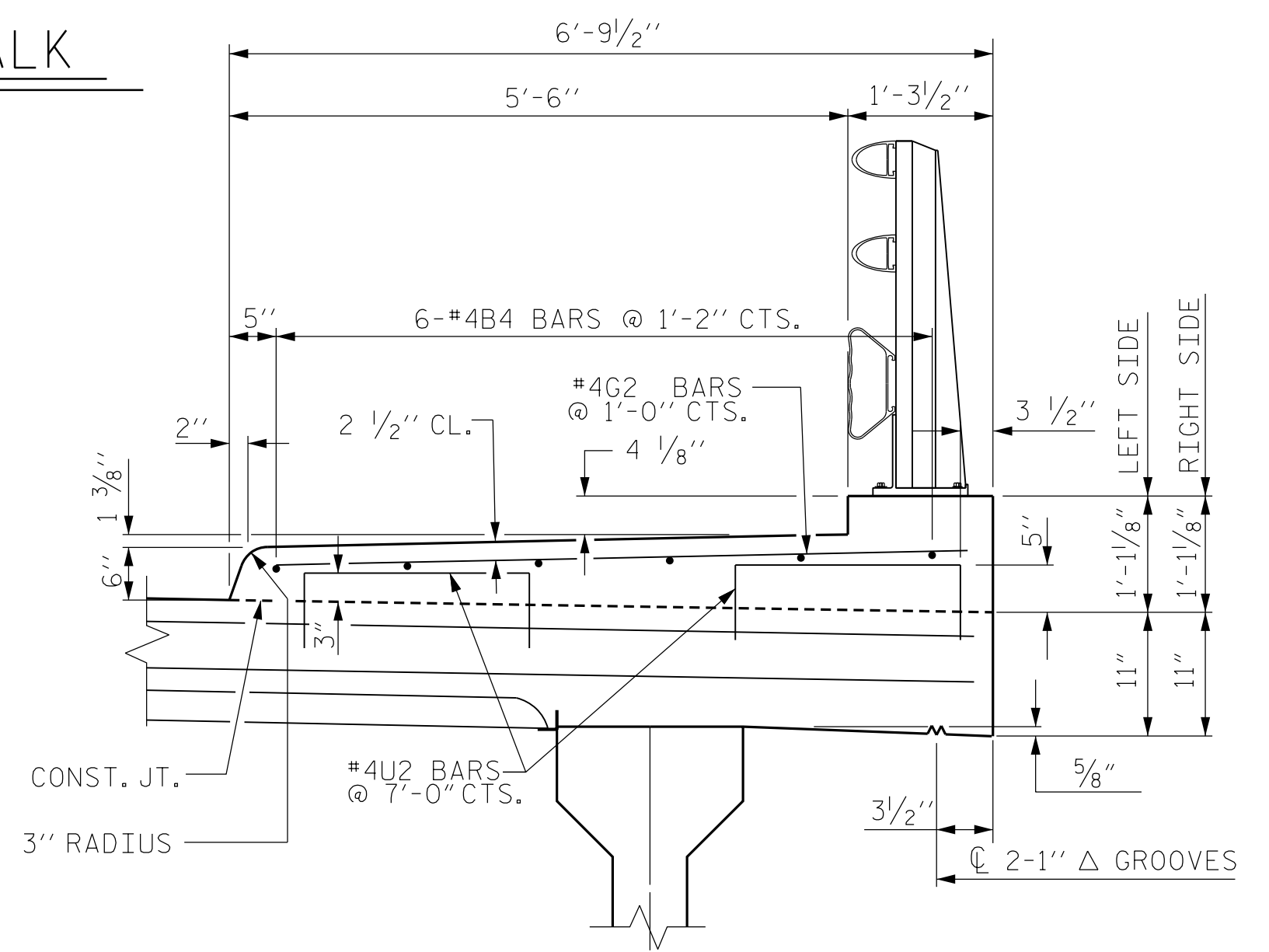
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1/12/2022 02:19:10 PM 10101-103\B5737-Structure\01-CADD\03-Final Drawings\01_023_B5737_SMU_SW01_012_780108.dgn
 P. JACOB



PLAN SIDEWALK



SECTION THRU SIDEWALK

NOTES

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

ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FT. IN LENGTH.

FOR SIDEWALK REINFORCING STEEL AND CONCRETE QUANTITIES SEE SUPERSTRUCTURE "BILL OF MATERIAL" SHEET.

PAYMENT FOR SIDEWALK SHALL BE INCLUDED IN PAY ITEM FOR "REINFORCED CONCRETE DECK SLAB".

U1 DOWEL BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SIDEWALK DETAILS



DRAWN BY :	J. LOFTUS	DATE :	03-2021
CHECKED BY :	P. JACOB	DATE :	07-2021
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE :	04-2021

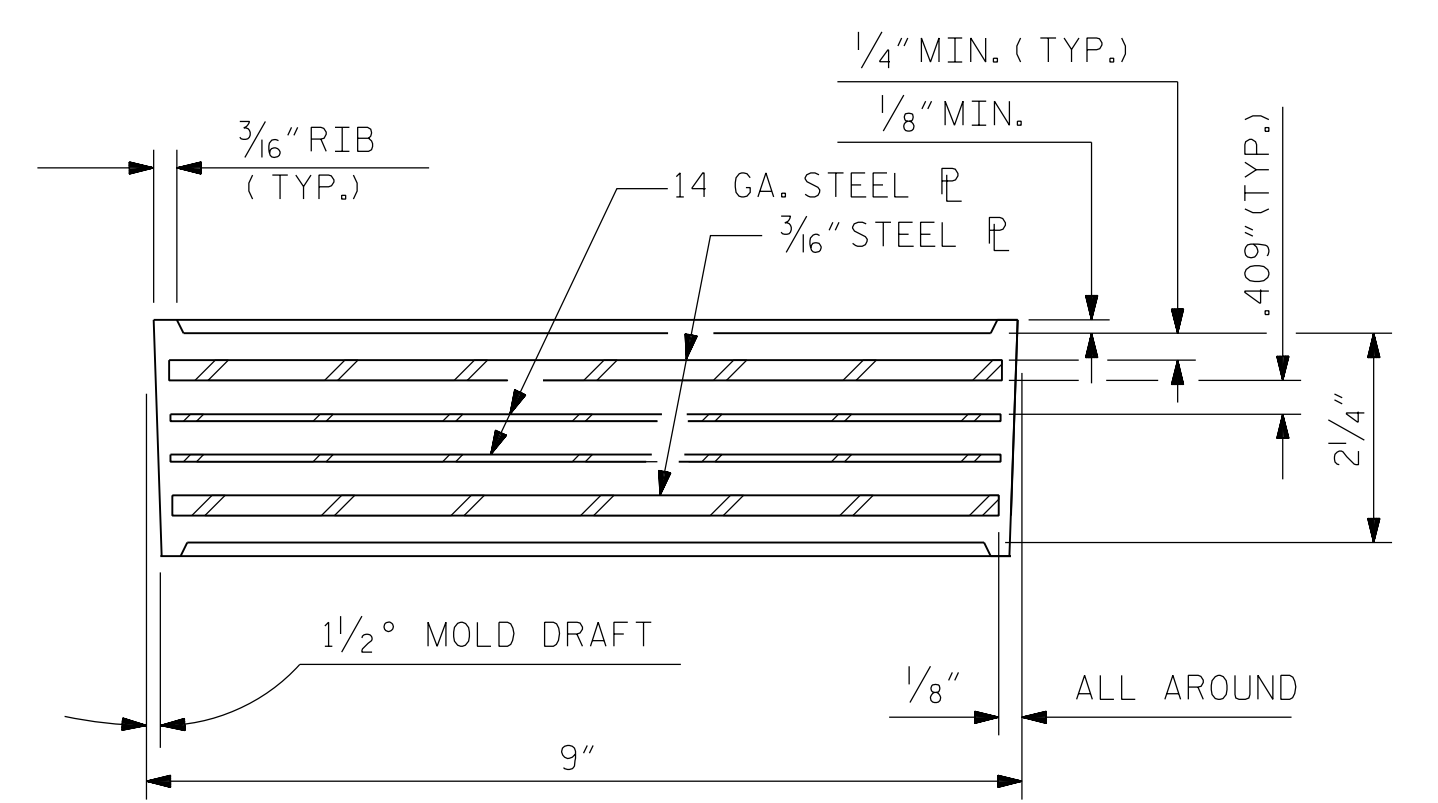
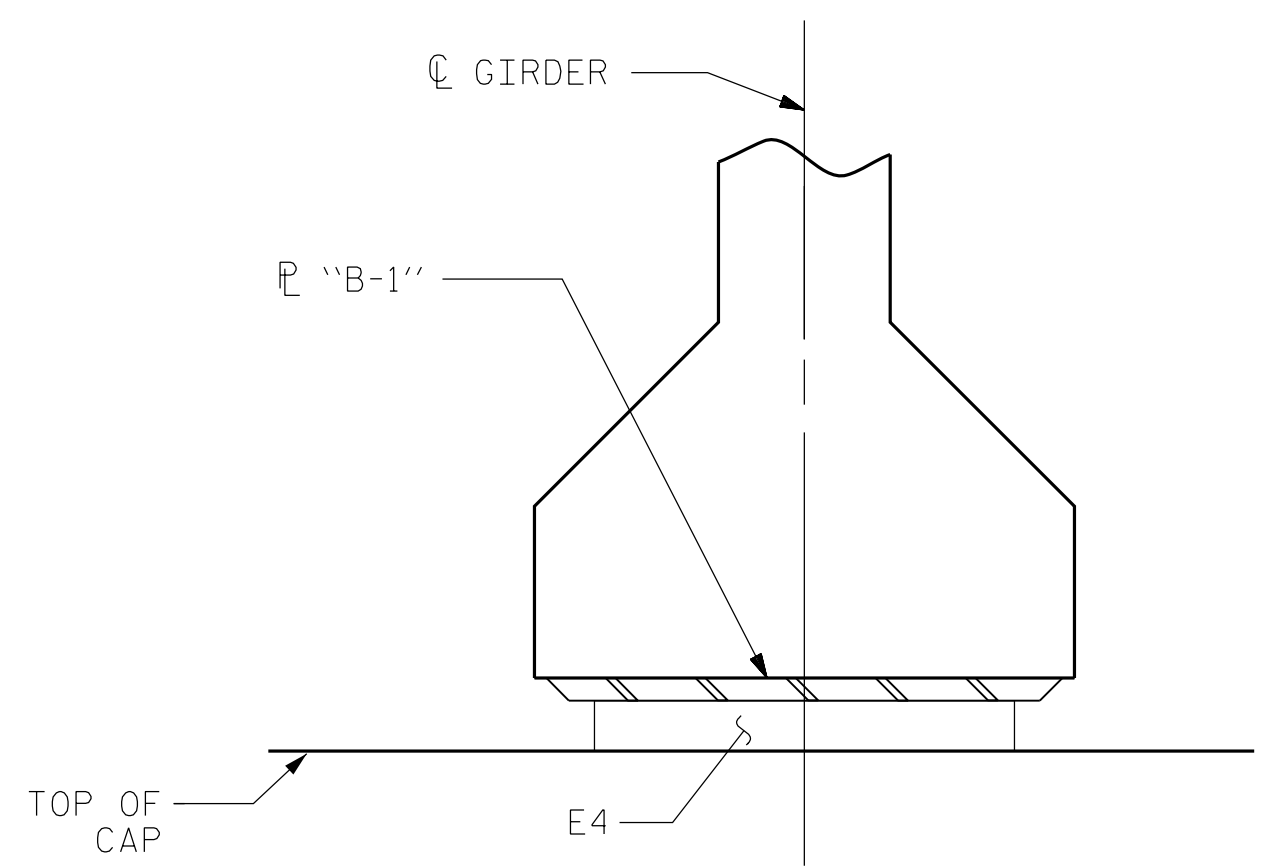
moffatt & nichol
 4700 FALLS OF NEUSE ROAD, SUITE 300
 RALEIGH, NORTH CAROLINA 27609
 (919) 781-4626 VOICE (919) 781-4869 FAX
 NC License NO.: F-0105

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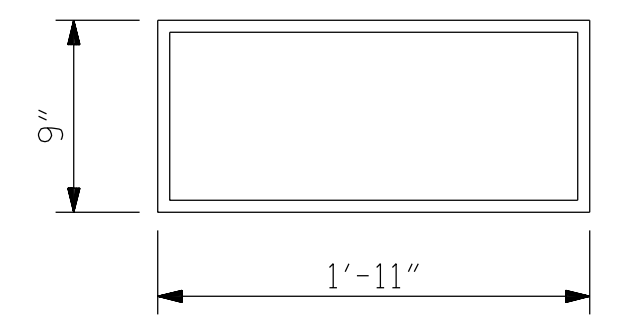
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NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			29
2			4			

NOTES

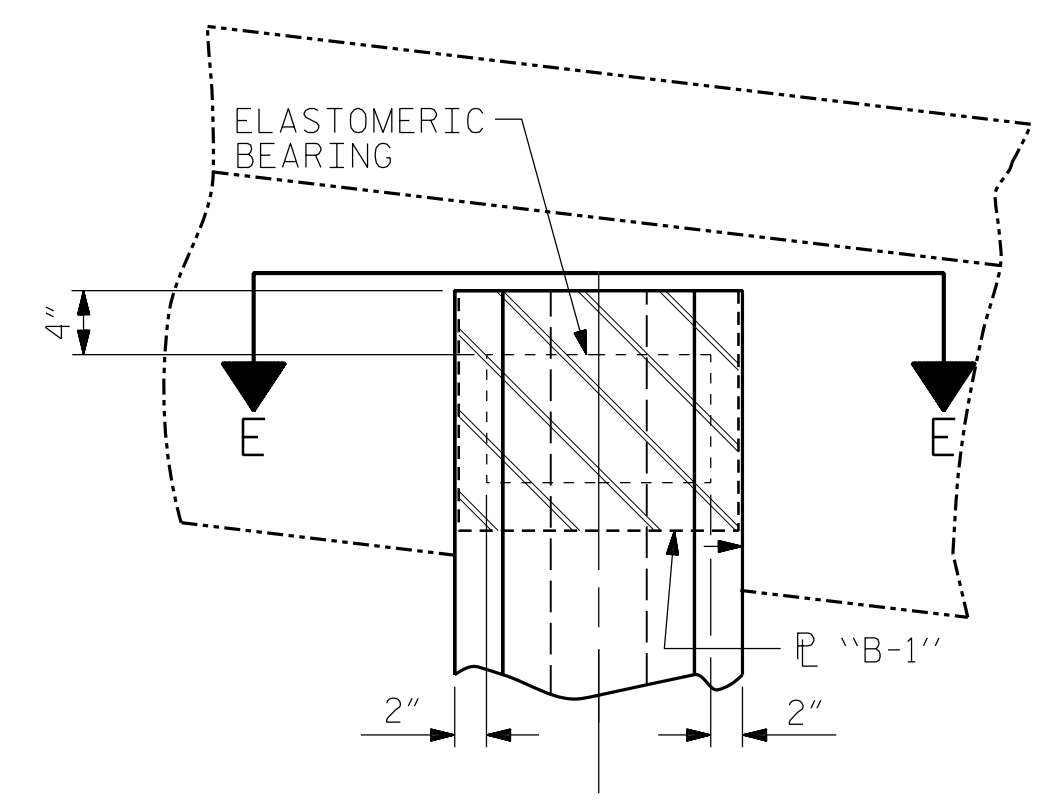
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.
 THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.
 FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



TYPICAL SECTION OF ELASTOMERIC BEARINGS



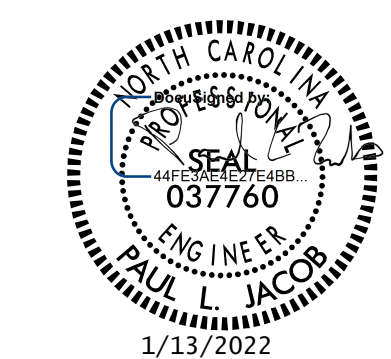
E4 (14 REQ'D)
 PLAN VIEW OF ELASTOMERIC BEARING
 TYPE V



END BENT #2
 (END BENT #1 SIMILAR)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k

PROJECT NO. B-5737
 ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-



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

ASSEMBLED BY : J. LOFTUS	DATE : 03-2021
CHECKED BY : P. JACOB	DATE : 07-2021
DRAWN BY : EEM 2/97	REV. 6/13 AAC/MAA
CHECKED BY : VAP 2/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			29

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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 33 columns and 5 rows. Headers: SPAN A, GIRDERS A1 & A7. Rows: 0.6" Ø LOW RELAXATION, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), * DEFLECTION DUE TO SUPERIMPOSED D.L., FINAL CAMBER.

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 33 columns and 5 rows. Headers: SPAN A, GIRDERS A2 & A6. Rows: 0.6" Ø LOW RELAXATION, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), * DEFLECTION DUE TO SUPERIMPOSED D.L., FINAL CAMBER.

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 33 columns and 5 rows. Headers: SPAN A, GIRDERS A3 & A5. Rows: 0.6" Ø LOW RELAXATION, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), * DEFLECTION DUE TO SUPERIMPOSED D.L., FINAL CAMBER.

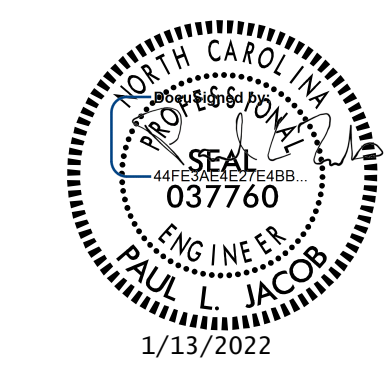
* INCLUDES FUTURE WEARING SURFACE ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

Table with 33 columns and 5 rows. Headers: SPAN A, GIRDER A4. Rows: 0.6" Ø LOW RELAXATION, FORTIETH POINTS, CAMBER (GIRDER ALONE IN PLACE), * DEFLECTION DUE TO SUPERIMPOSED D.L., FINAL CAMBER.

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

PROJECT NO. B-5737
ROCKINGHAM COUNTY
STATION: 20+86.07 -L-



DEPARTMENT OF TRANSPORTATION
RALEIGH
DEAD LOAD DEFLECTIONS

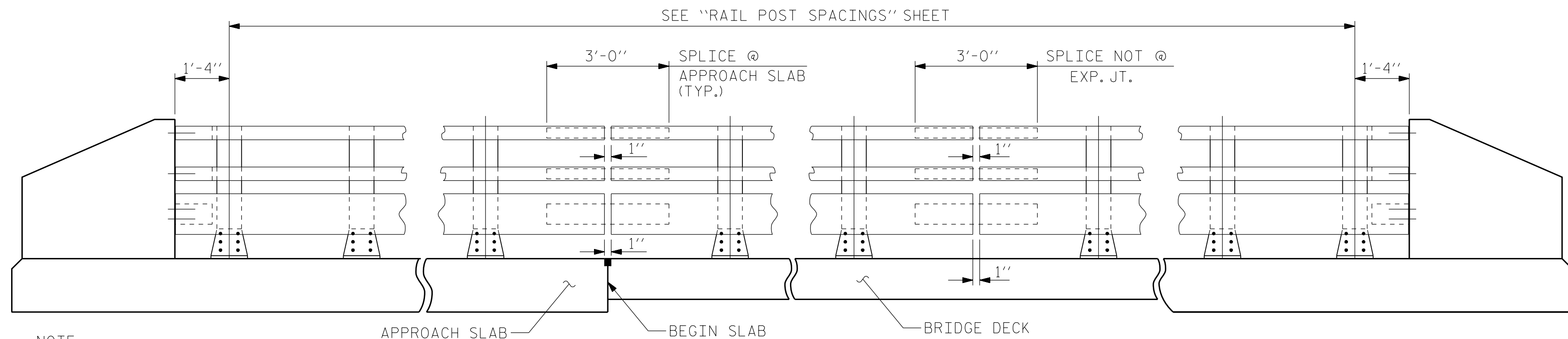
DRAWN BY : J. LOFTUS DATE : 03-2021
CHECKED BY : P. JACOB DATE : 07-2021
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021

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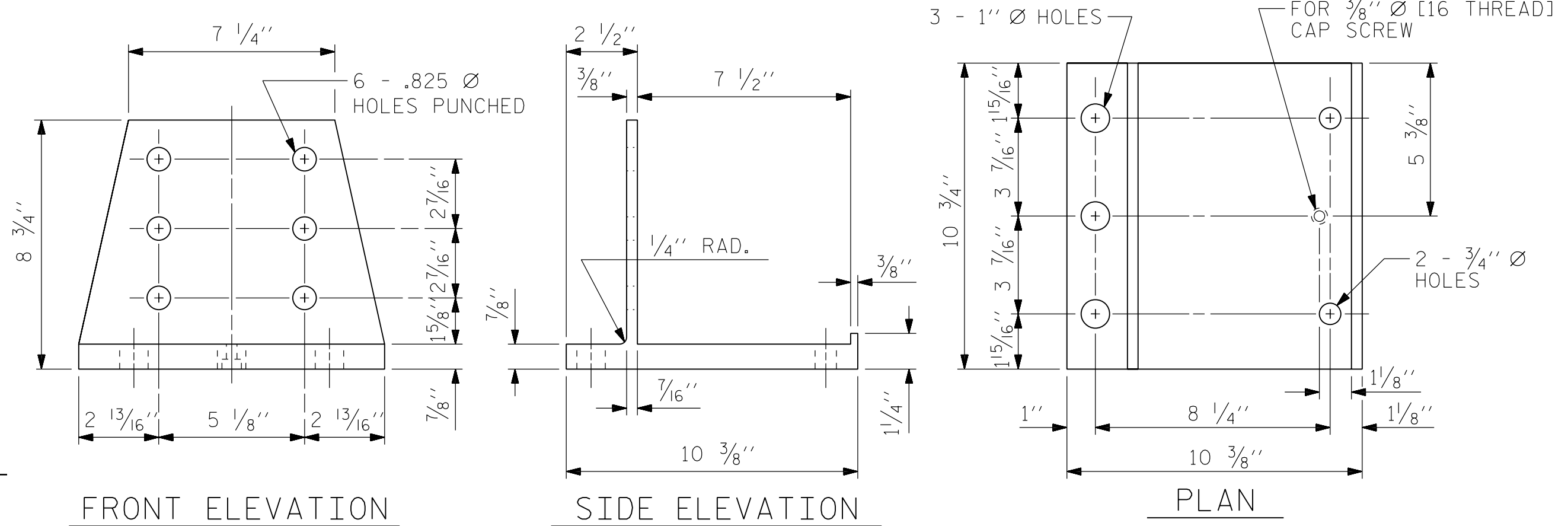
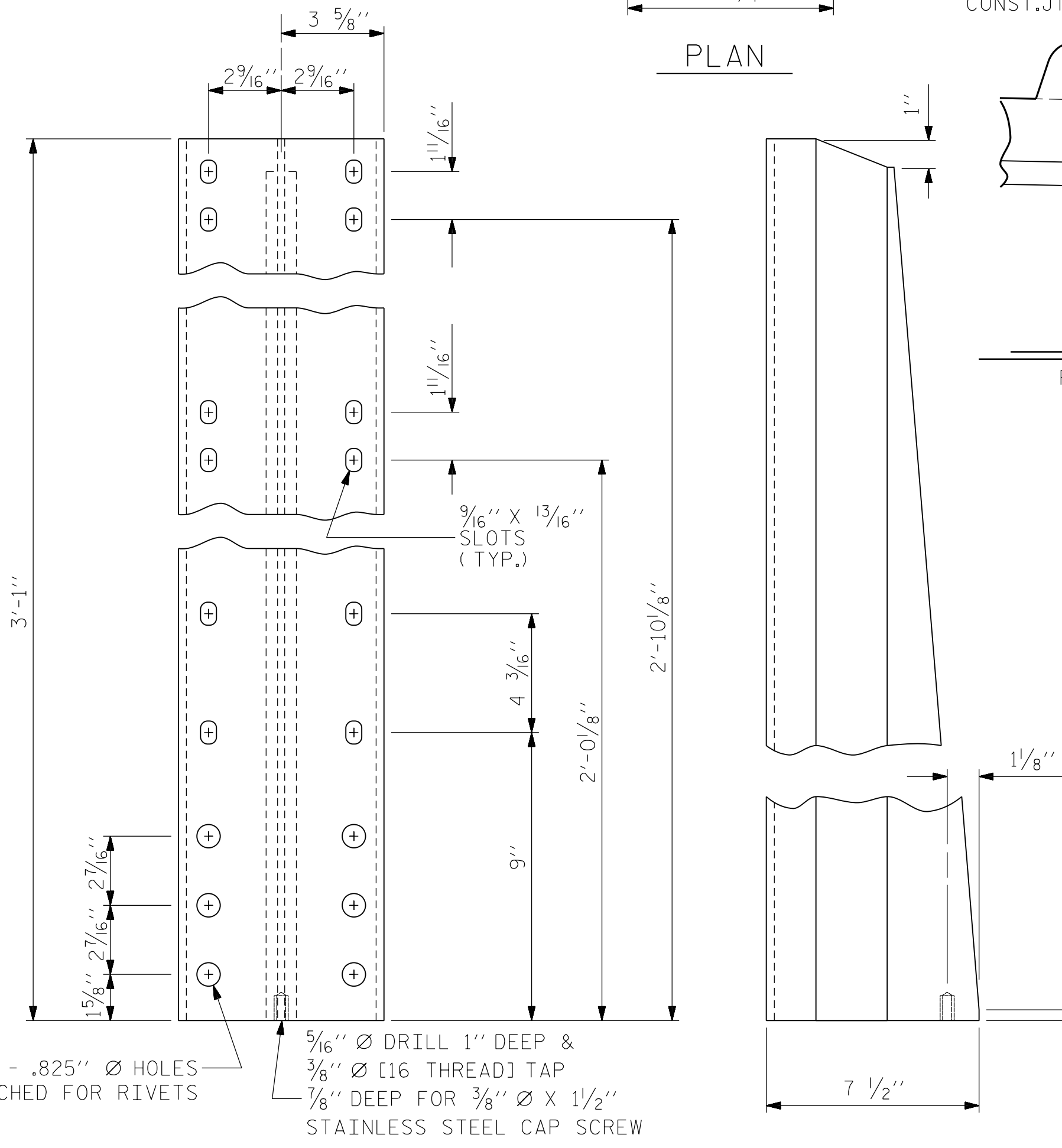
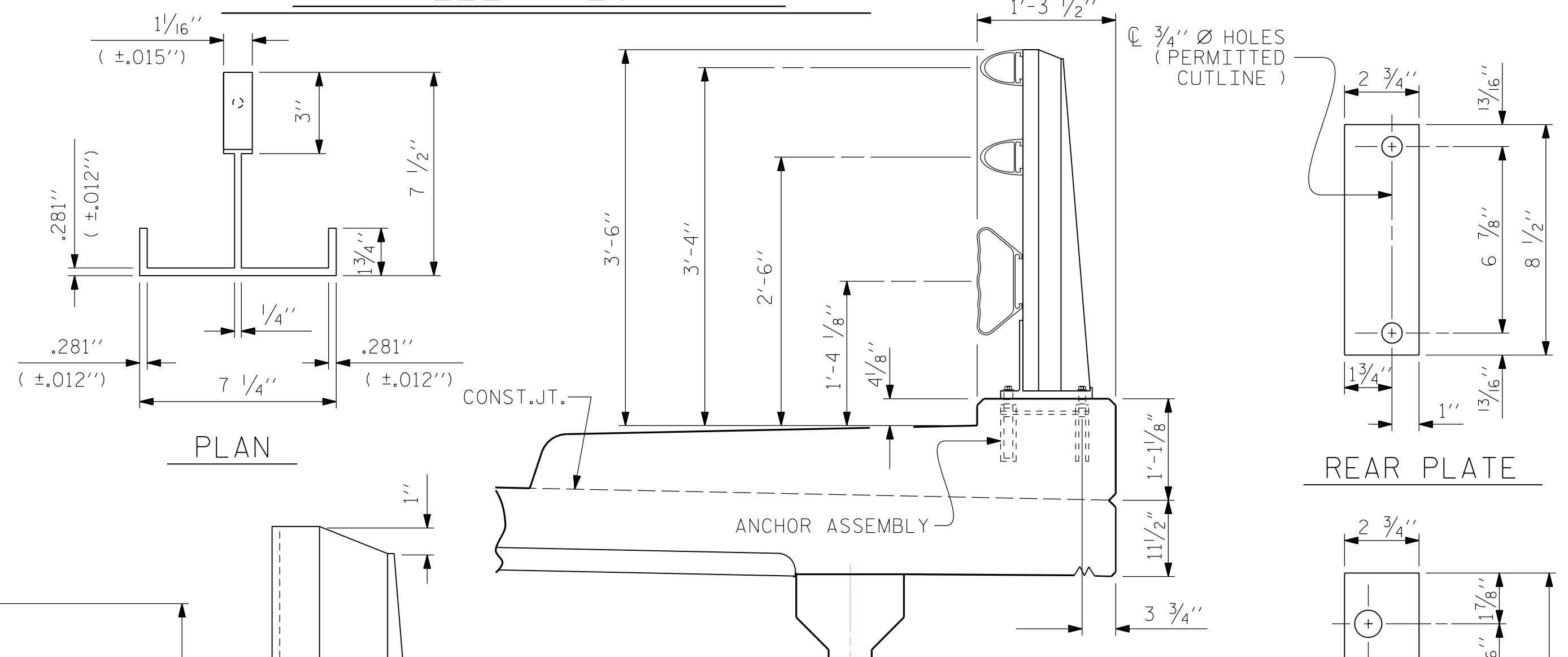
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NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 3 OF 4.

ELEVATION



NOTES

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

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

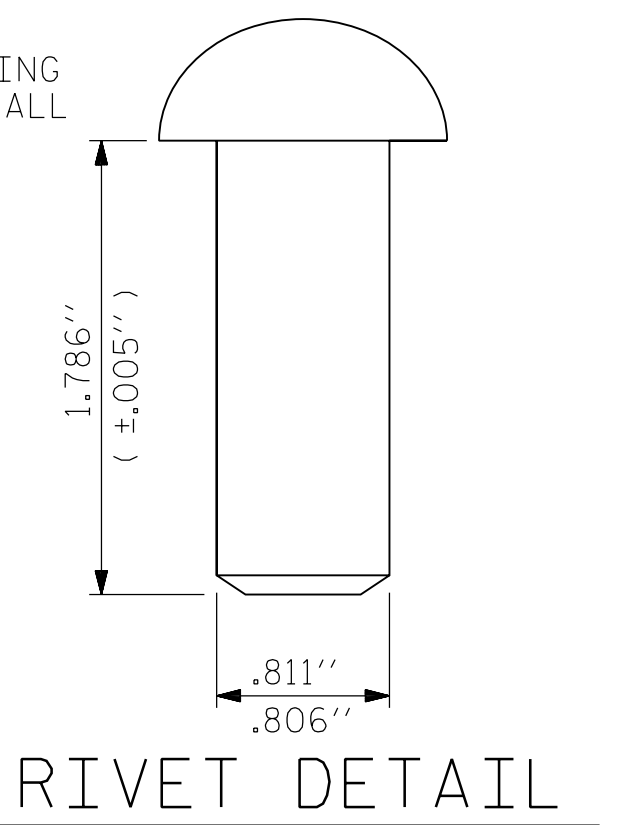
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

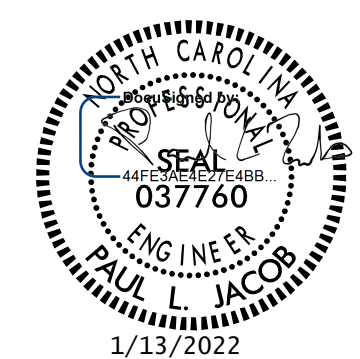
PAY LENGTH = 306.50 LIN.FT.



PROJECT NO. B-5737
ROCKINGHAM COUNTY
STATION: 20+86.07 -L-

SHEET 1 OF 4

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

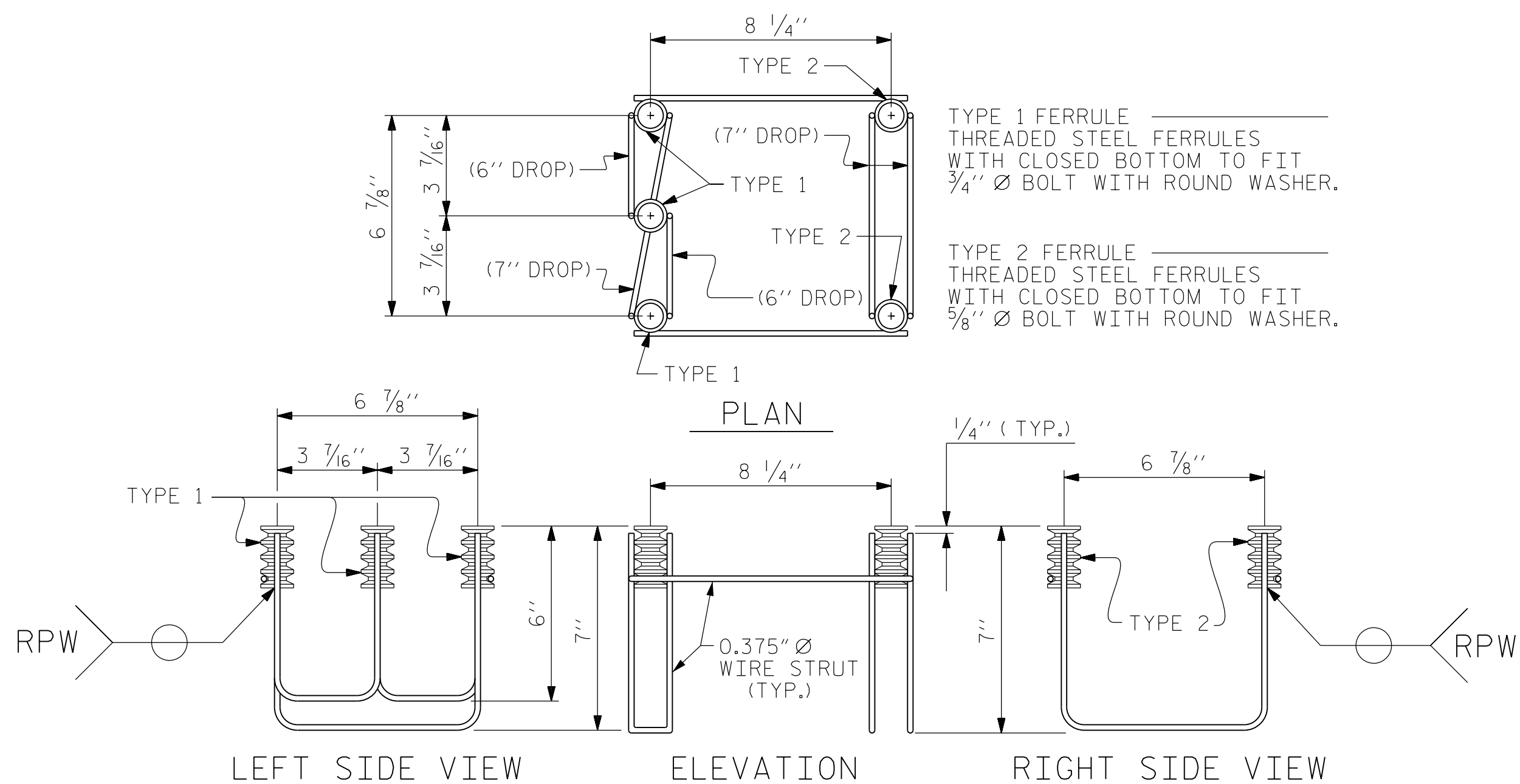


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			29

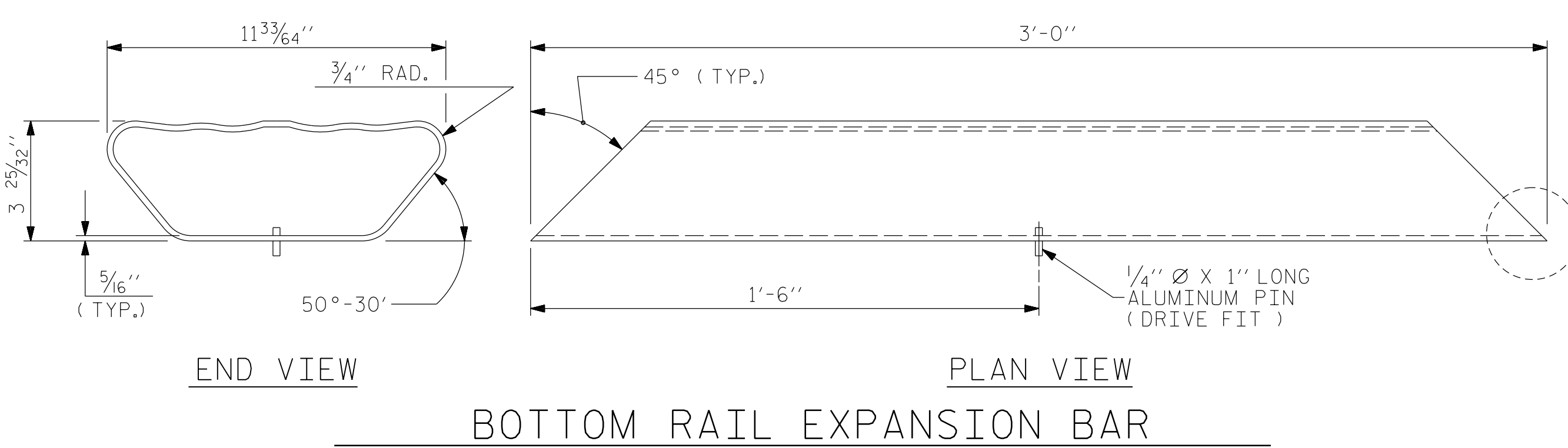
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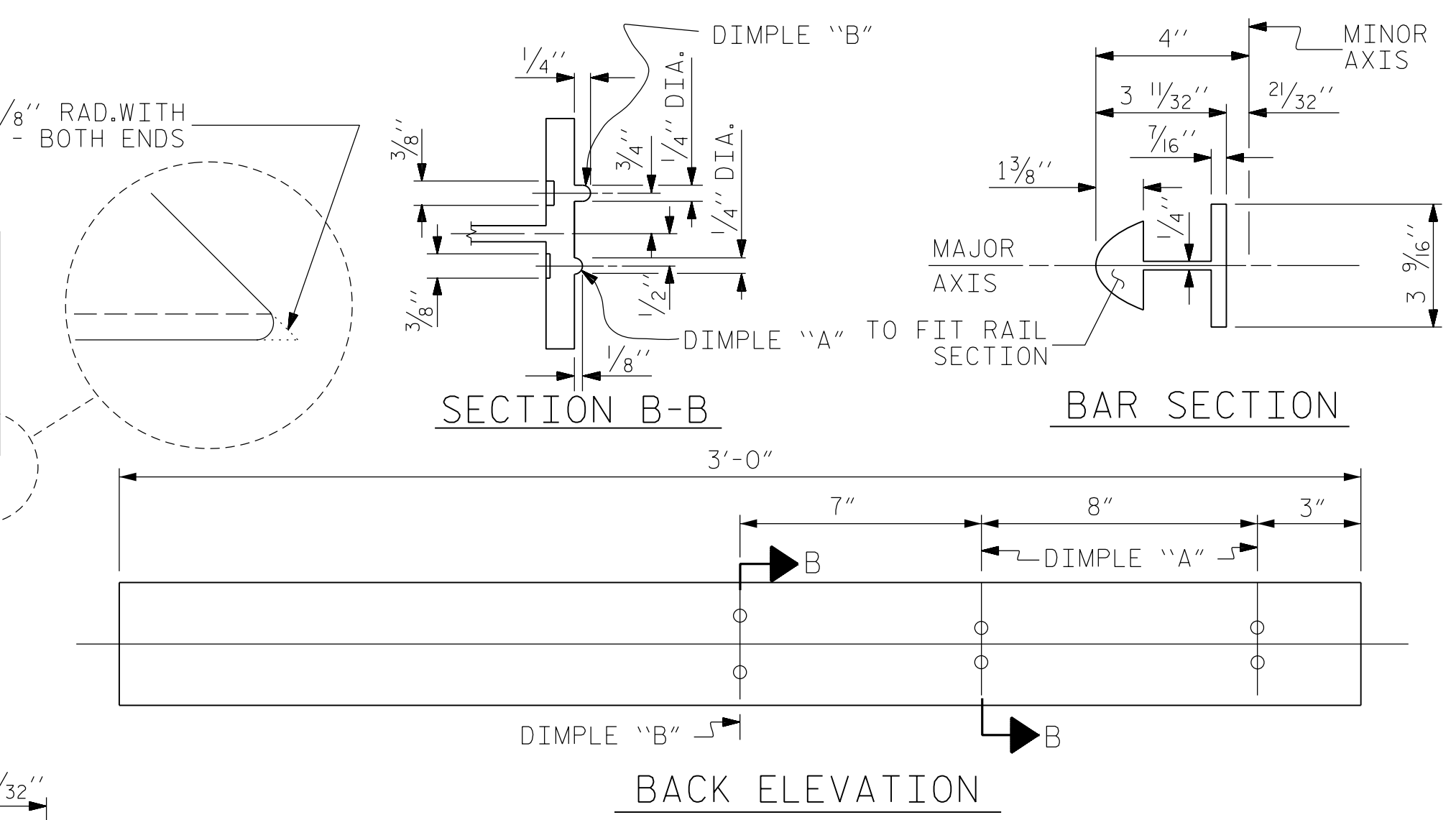
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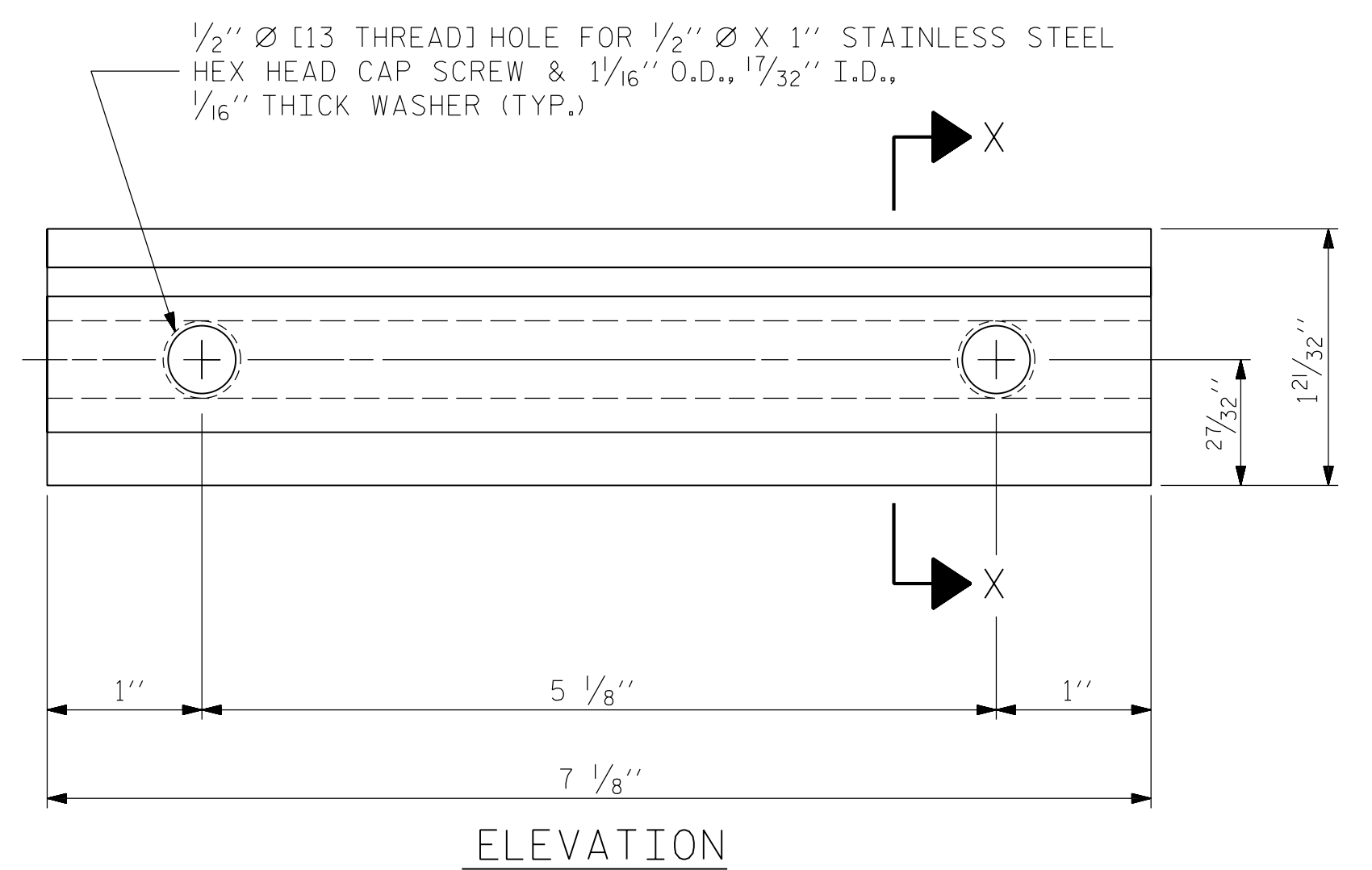
5-BOLT METAL RAIL ANCHOR ASSEMBLY
(58 ASSEMBLIES REQUIRED)



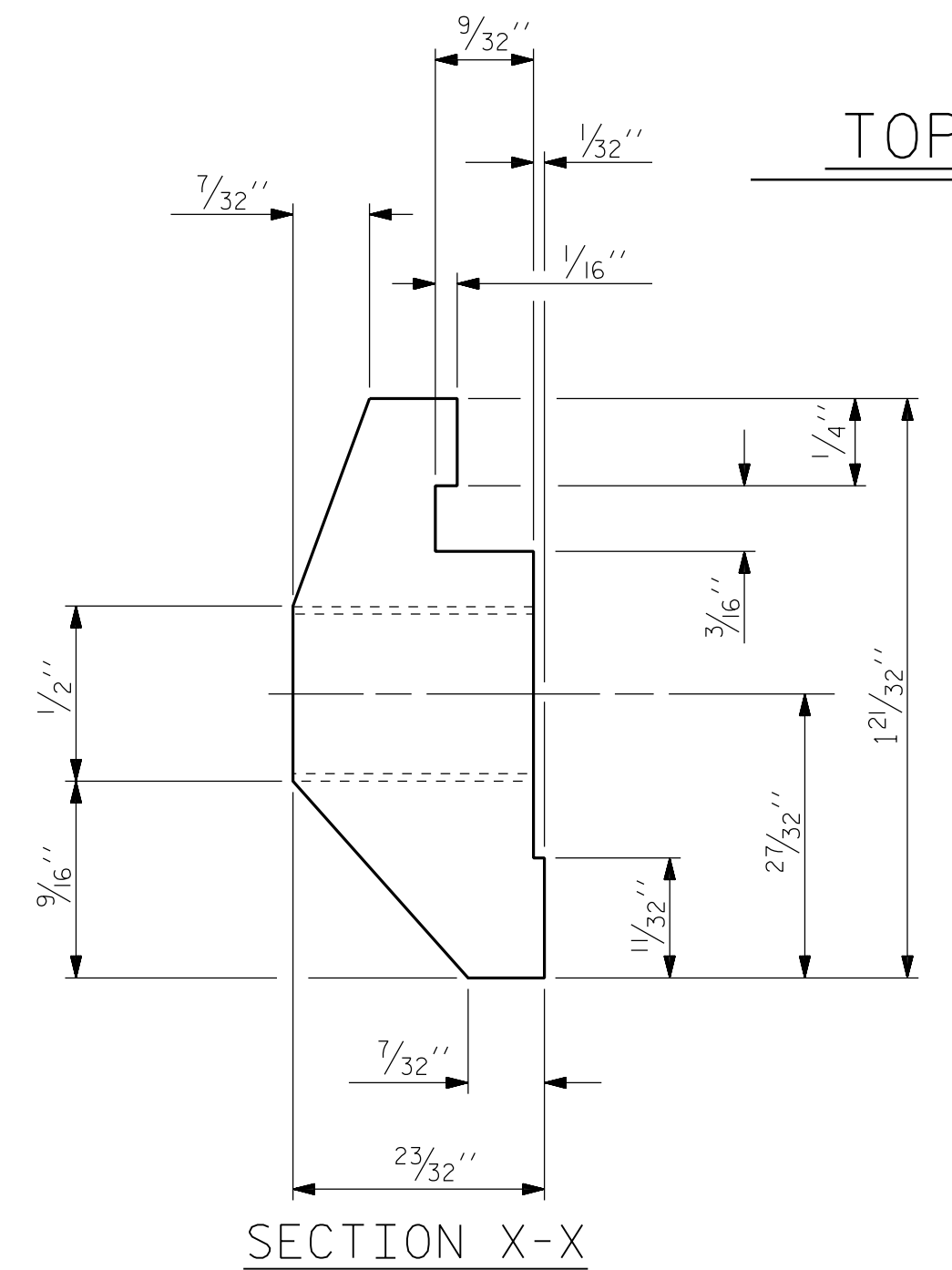
BOTTOM RAIL EXPANSION BAR



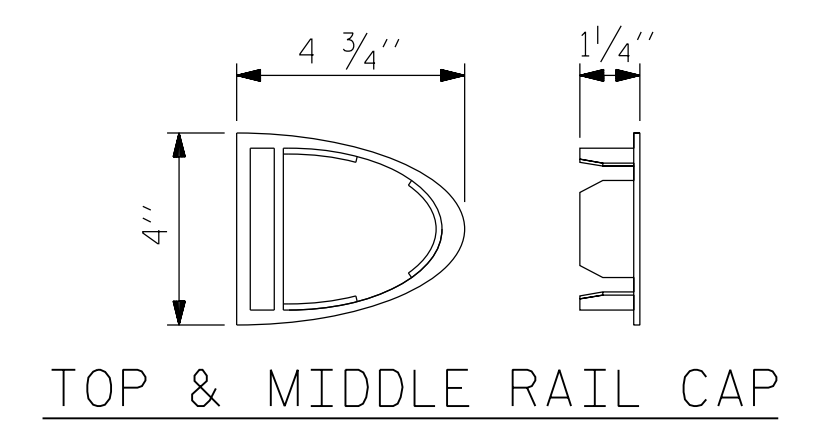
TOP & MIDDLE RAIL EXPANSION BAR



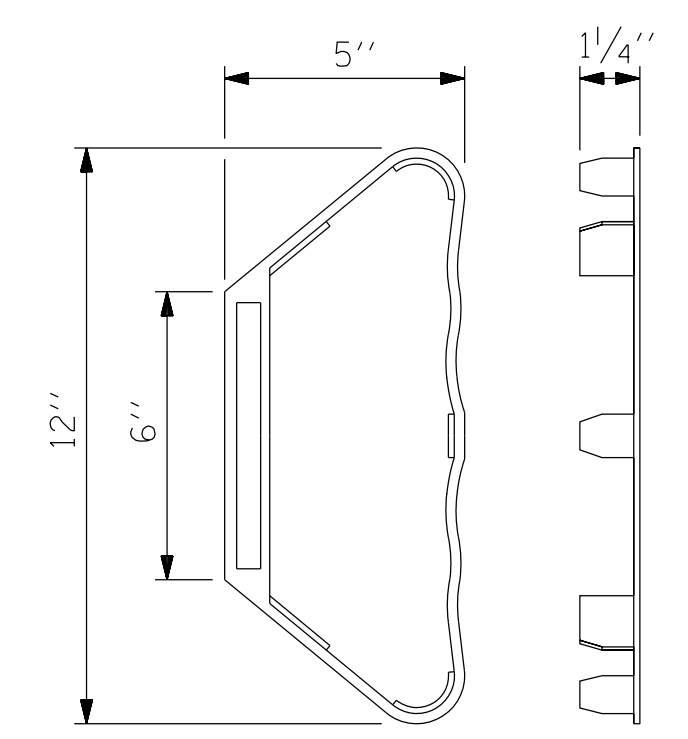
CLAMP BAR DETAIL
(6 REQUIRED PER POST)



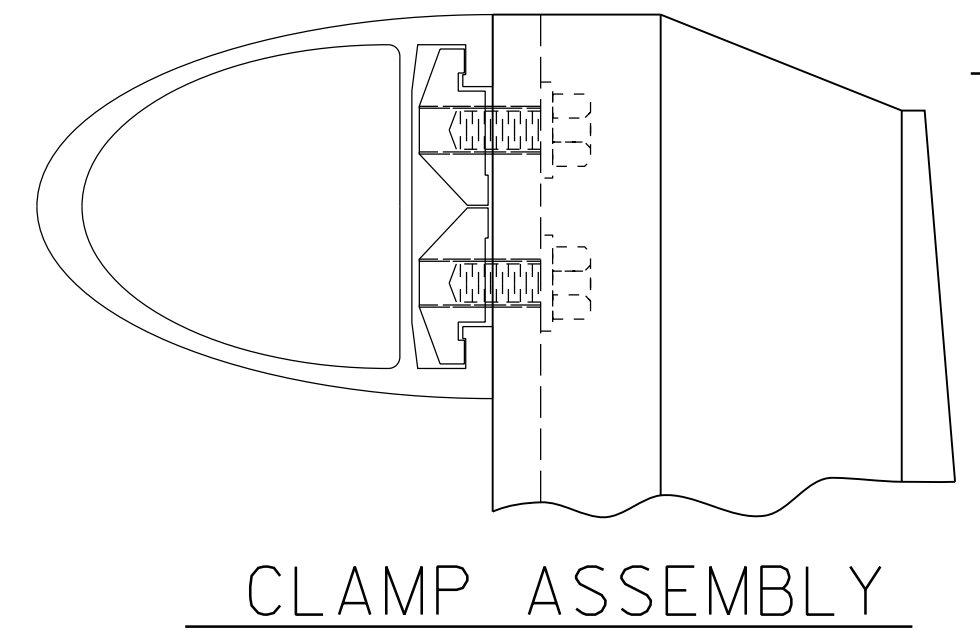
SECTION X-X



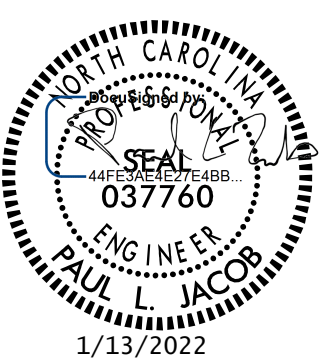
TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY
(MIDDLE & BOTTOM RAIL ARE SIMILAR)



1/13/2022

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ASSEMBLED BY : J. LOFTUS	DATE : 3-2021
CHECKED BY : P. JACOB	DATE : 07-2021
DRAWN BY : JMB 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

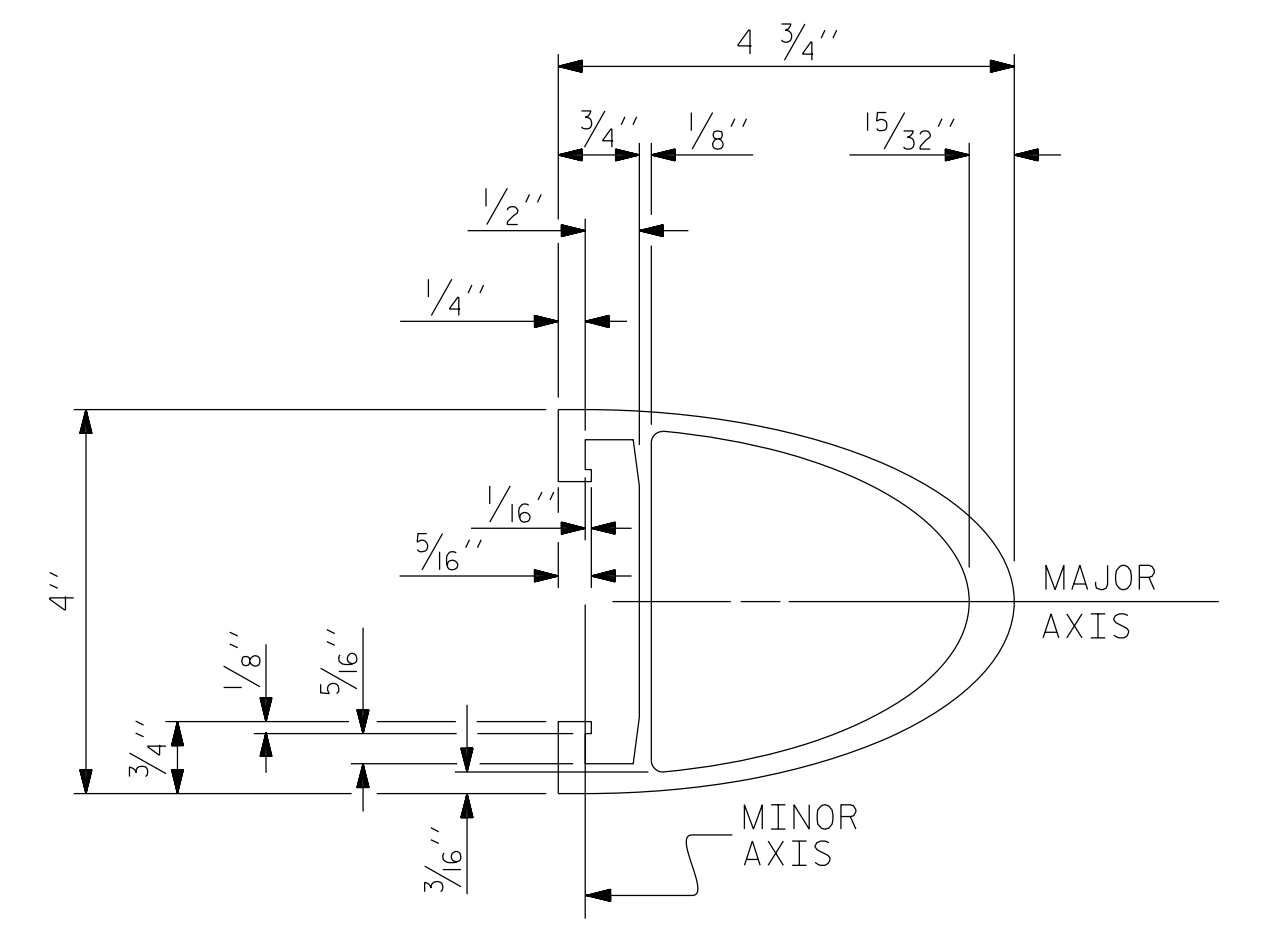
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PROJECT NO. B-5737
ROCKINGHAM COUNTY
STATION: 20+86.07 -L-
SHEET 2 OF 4

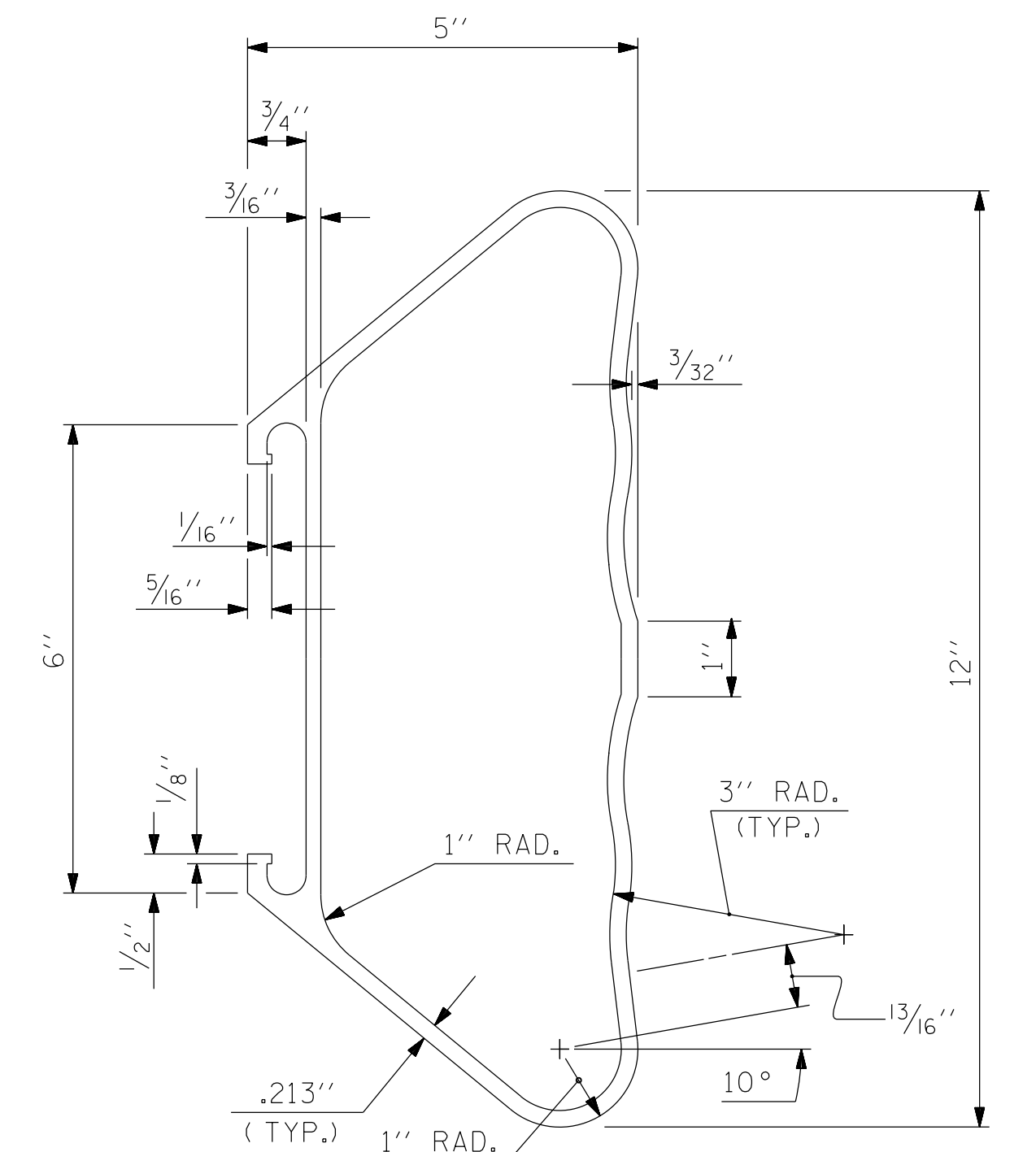
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
3 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-16
TOTAL SHEETS					29

STD. NO. BMR6

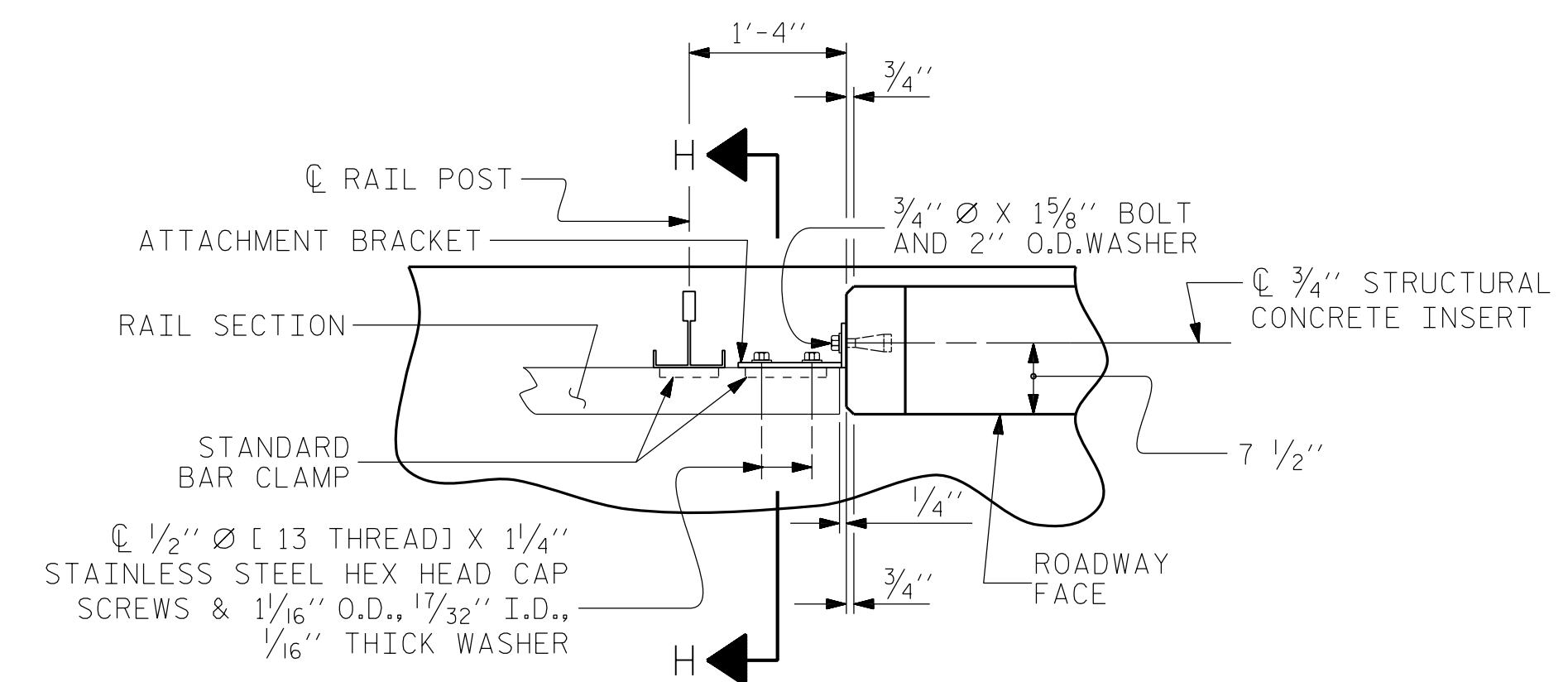
- NOTES**
STRUCTURAL CONCRETE ANCHOR ASSEMBLY
- THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 3/4" FOR 5/8" FERRULES.
 - 3 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
 - 2 - 5/8" Ø X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
 - WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
 - THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
 - THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
 - BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



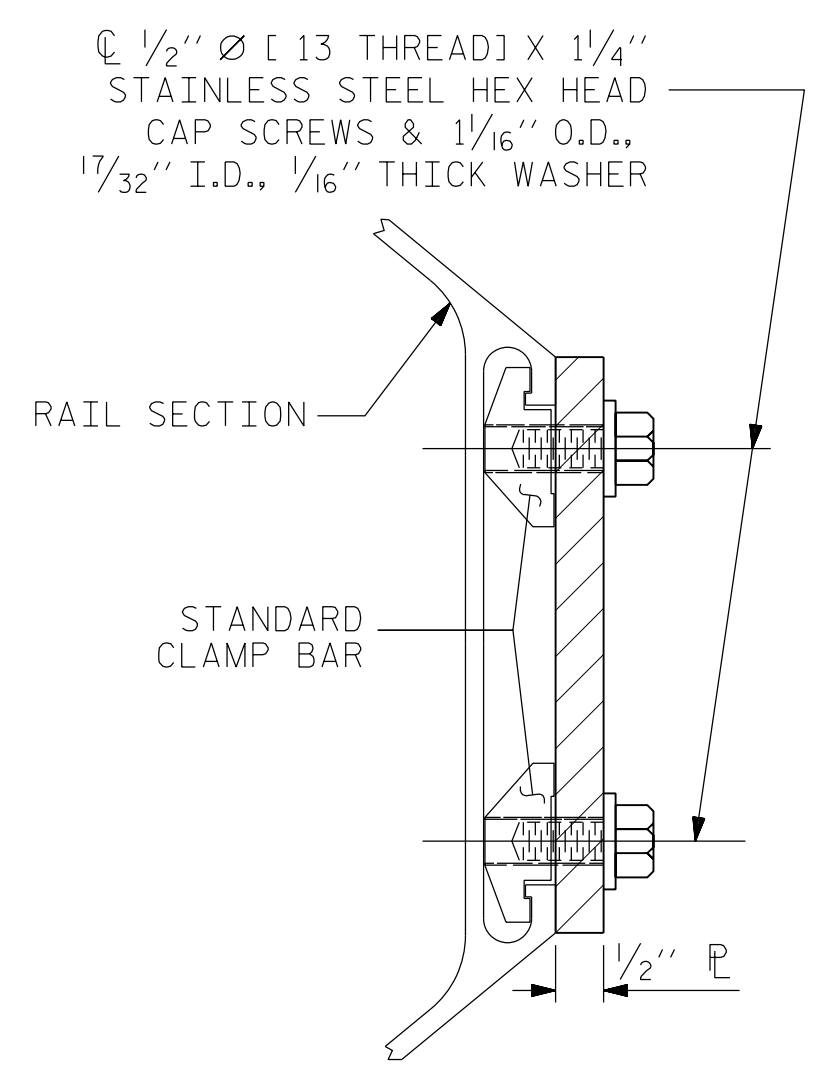
TOP & MIDDLE RAIL SECTION



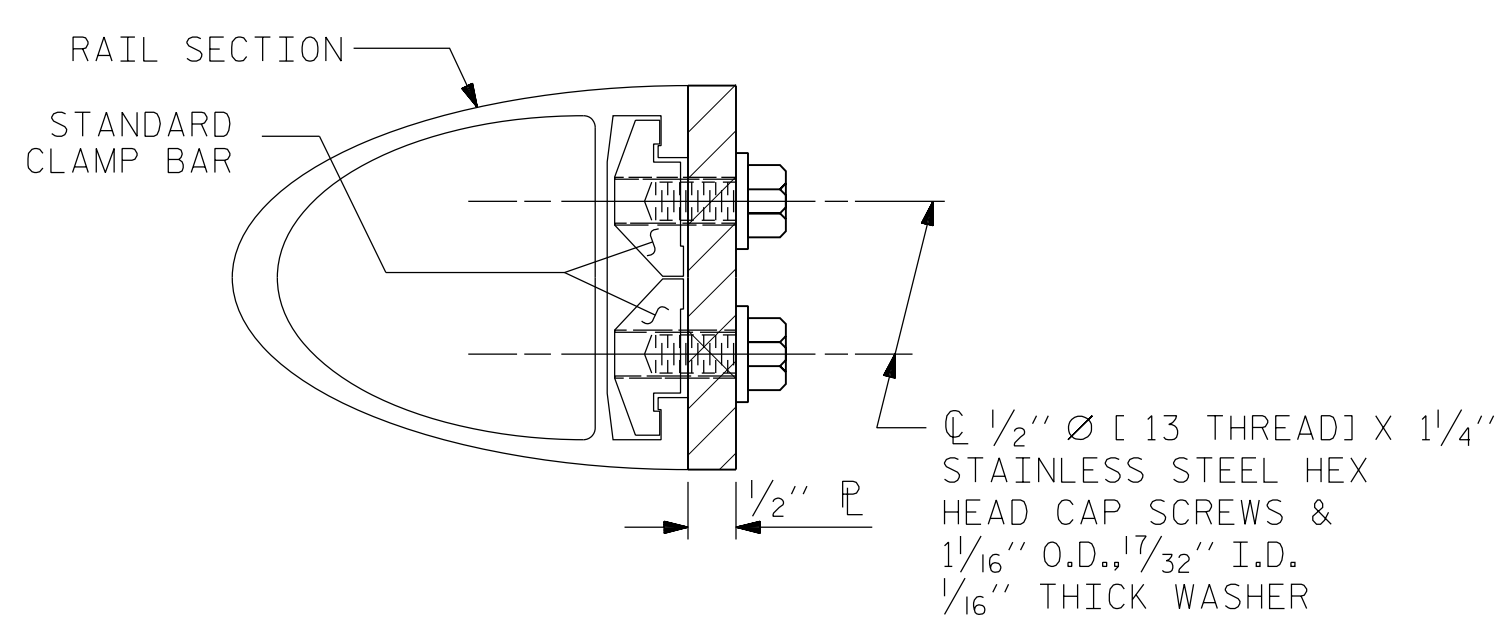
BOTTOM RAIL SECTION



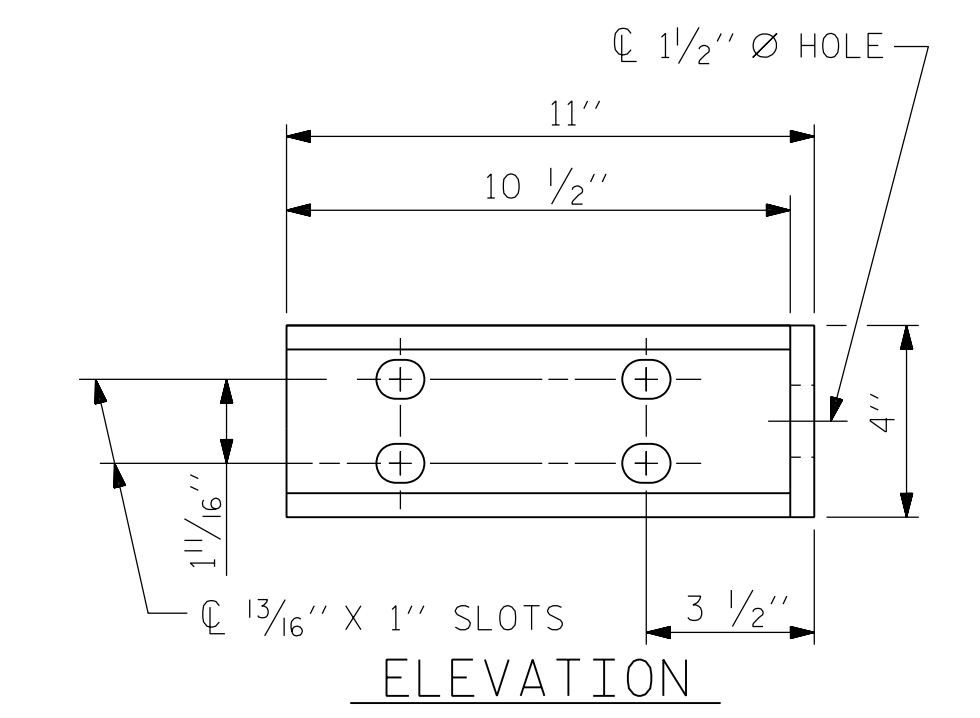
PLAN OF RAIL AND END POST
(STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)



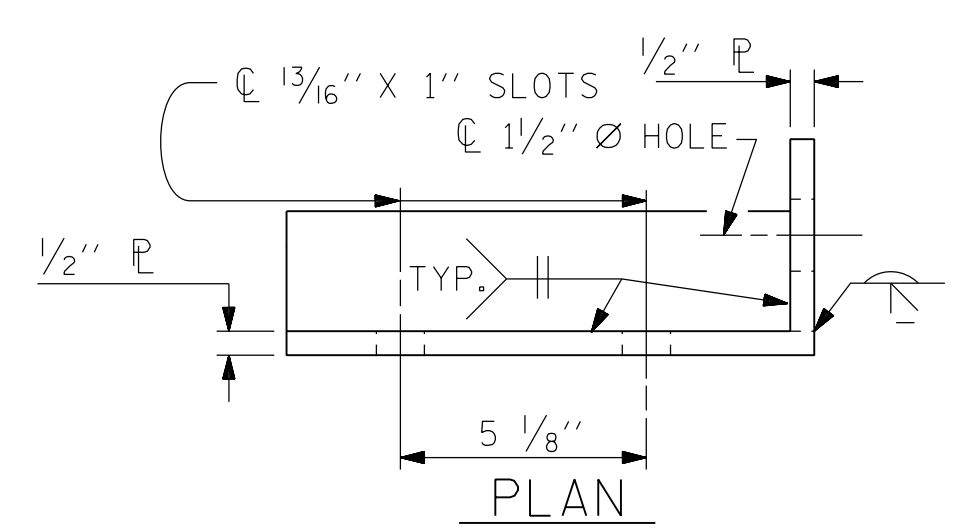
SECTION H-H
(FOR BOTTOM RAIL)



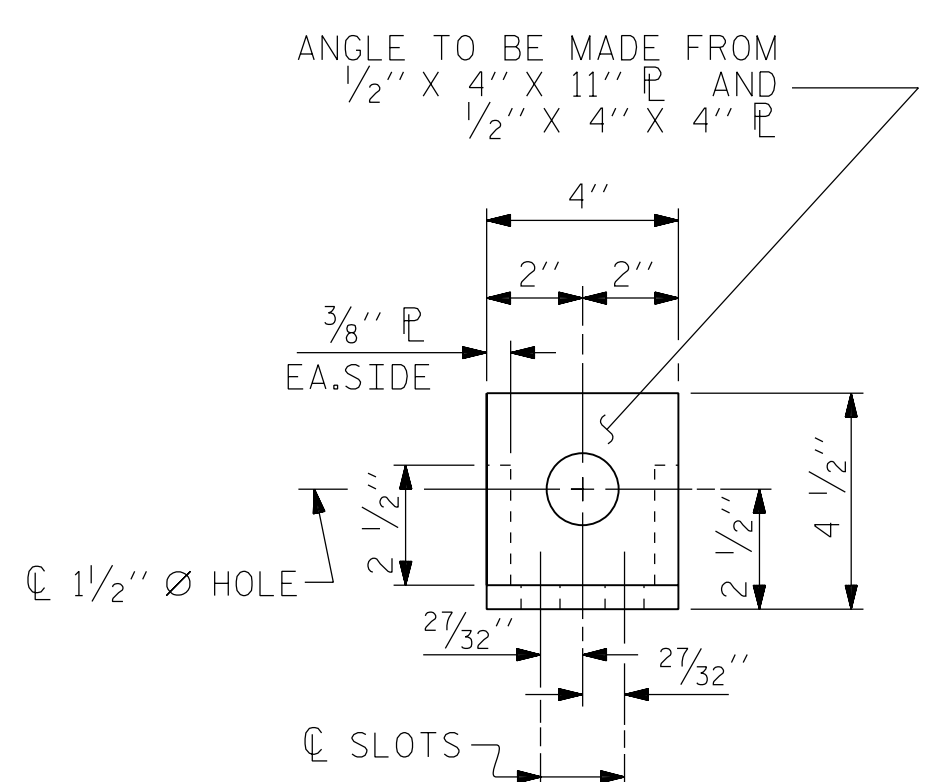
SECTION H-H
(FOR TOP & MIDDLE RAIL)



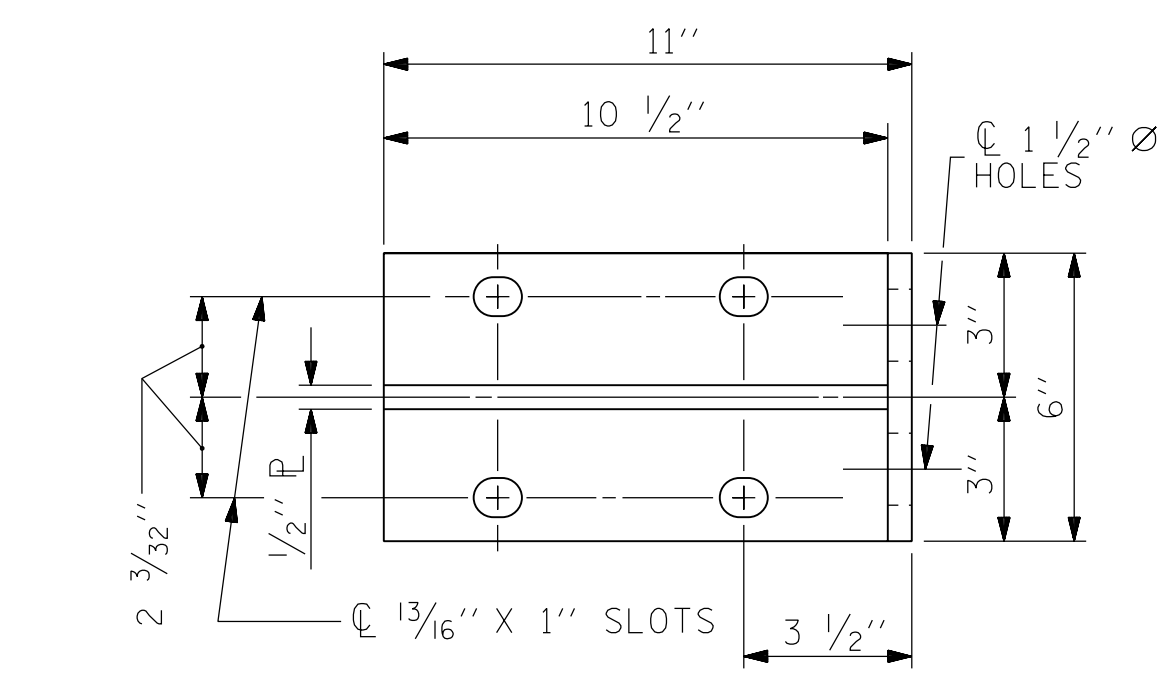
ELEVATION



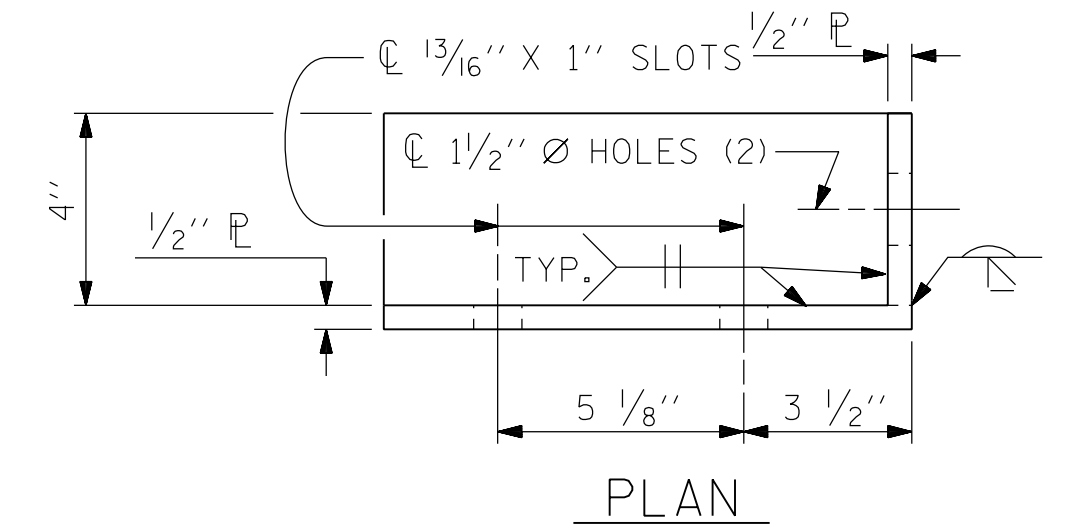
PLAN



END VIEW
(FIX. AND EXP.)

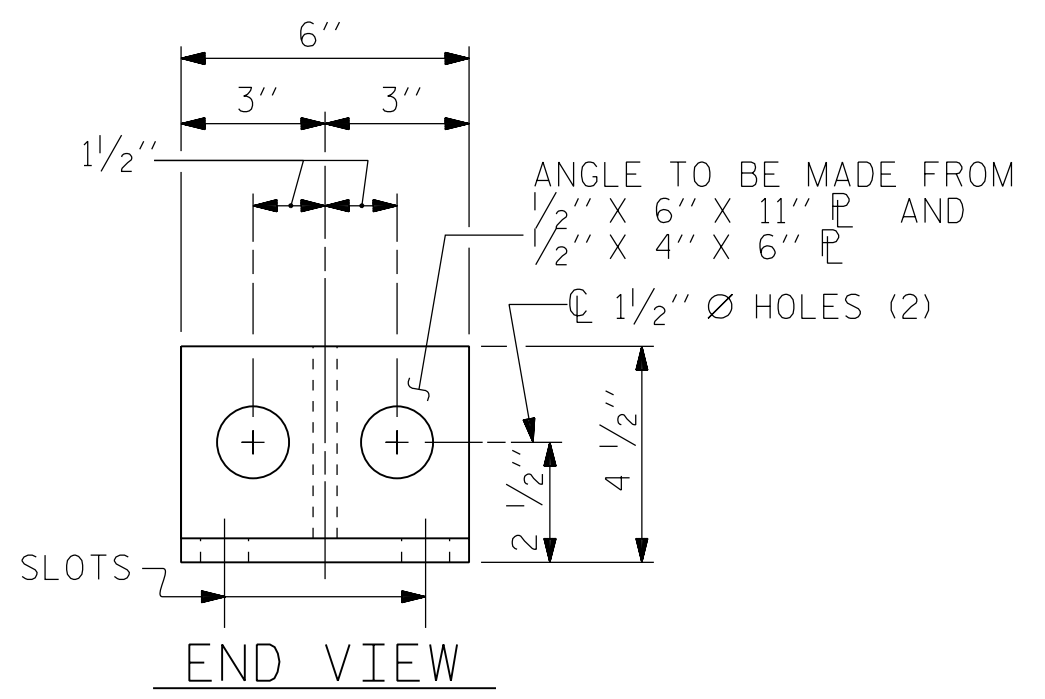


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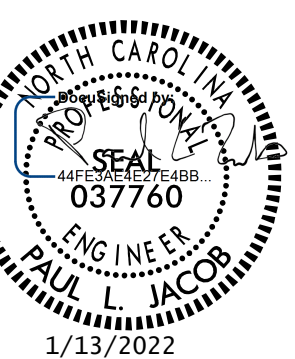


PLAN

DETAILS FOR ATTACHMENT BRACKET
(BOTTOM RAIL ONLY)



END VIEW



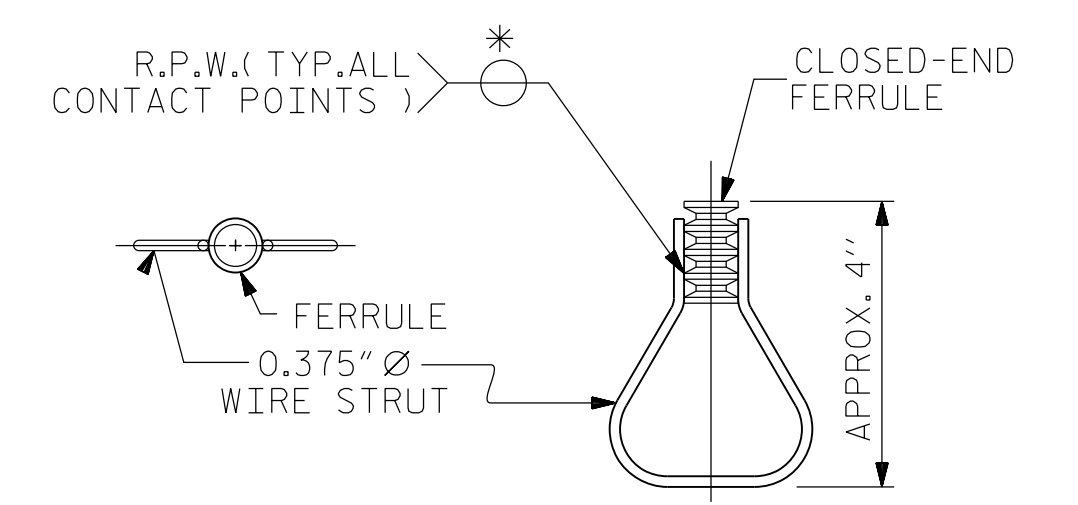
1/13/2022

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REVISIONS

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



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. B-5737
ROCKINGHAM COUNTY
STATION: 20+86.07 -L-

SHEET 3 OF 4

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

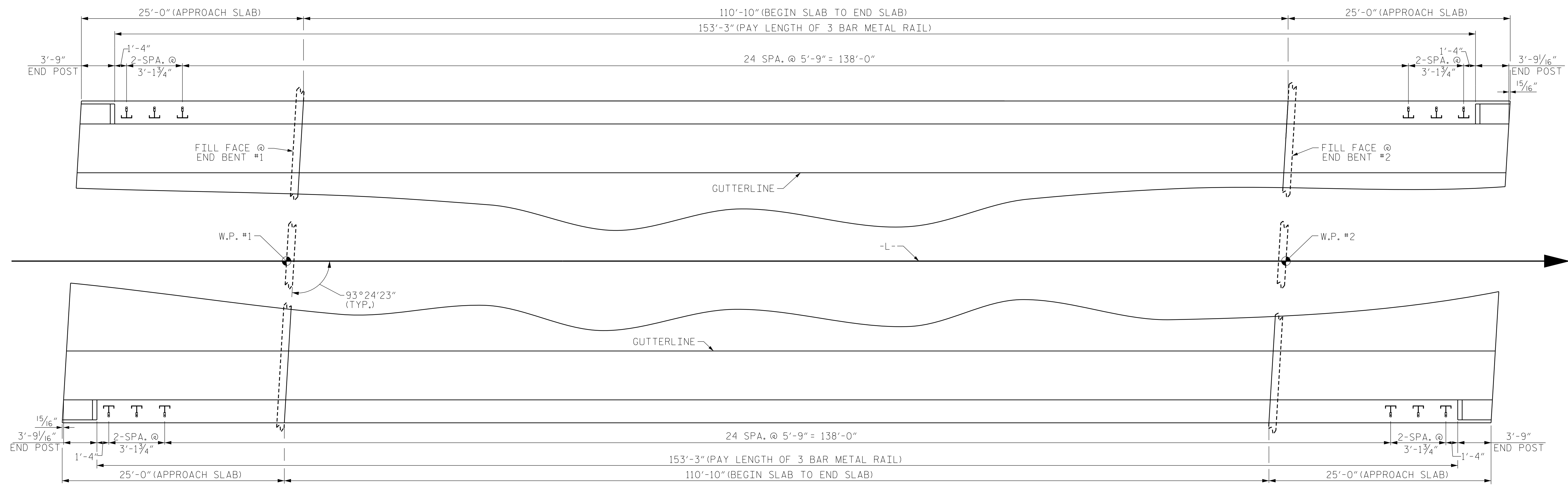
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SHEET NO.
S-17
TOTAL SHEETS
29

STD. NO. BMR7

1/12/2022 02:19:10 PM 10101-103\B5737-Structures\01-CADD\03-Final Drawings\01_033_B5737_SMU_3MRO3_017_780108.dgn p.jacob

ASSEMBLED BY : J. LOFTUS	DATE : 03-2021
CHECKED BY : P. JACOB	DATE : 07-2021
DRAWN BY : JMB 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



PLAN OF RAIL POST SPACINGS

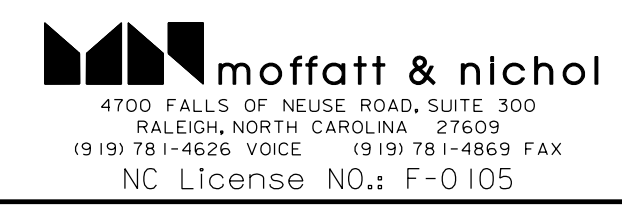
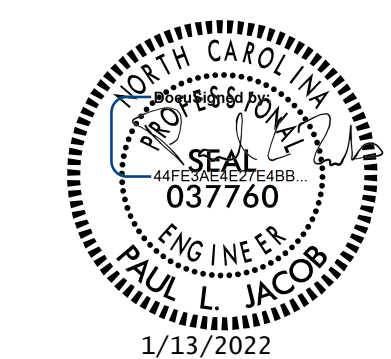
NOTES

- FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS" SHEET.
- FOR END POST DETAILS SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.
- FOR REINFORCING STEEL AND CONCRETE IN END POSTS, SEE APPROACH SLAB "BILL OF MATERIAL" SHEET.

PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-
 SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

RAIL POST SPACINGS

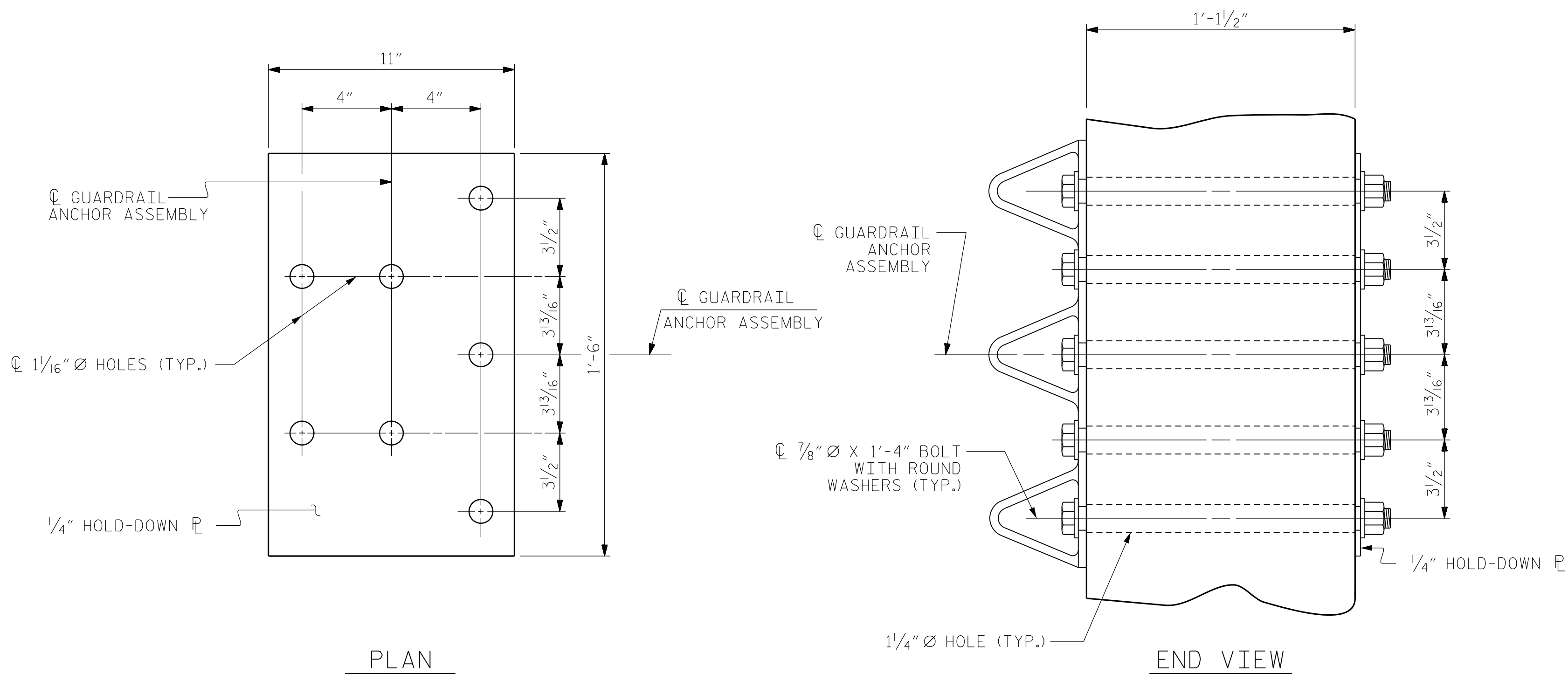


DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

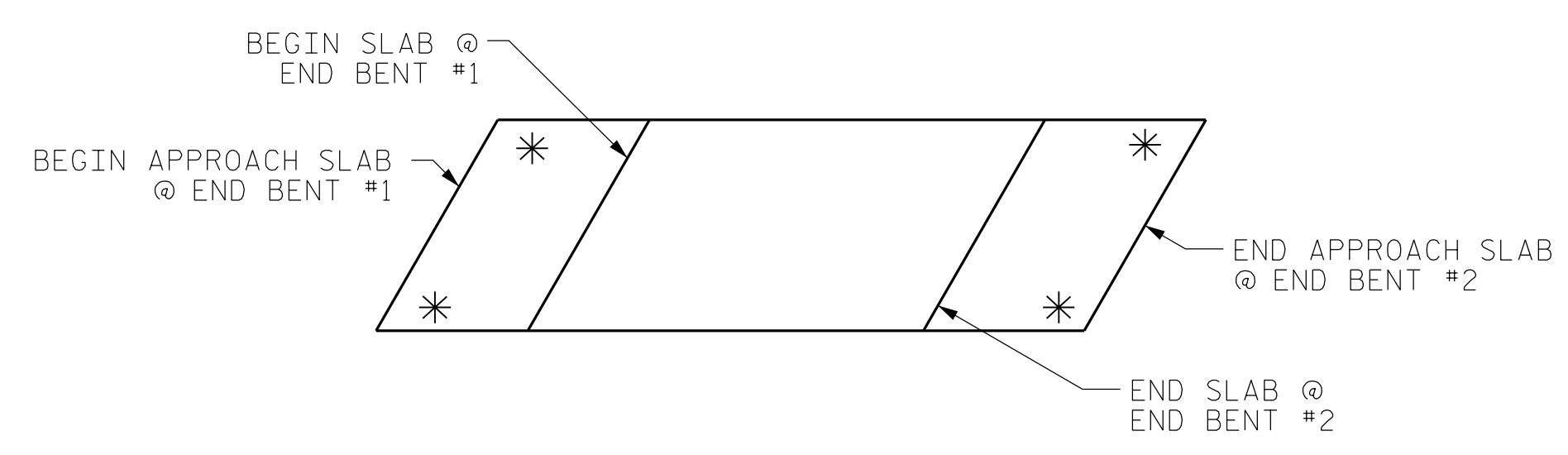
DRAWN BY : J. LOFTUS DATE : 03-2021
 CHECKED BY : P. JACOB DATE : 07-2021
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			29

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 P. Jacob

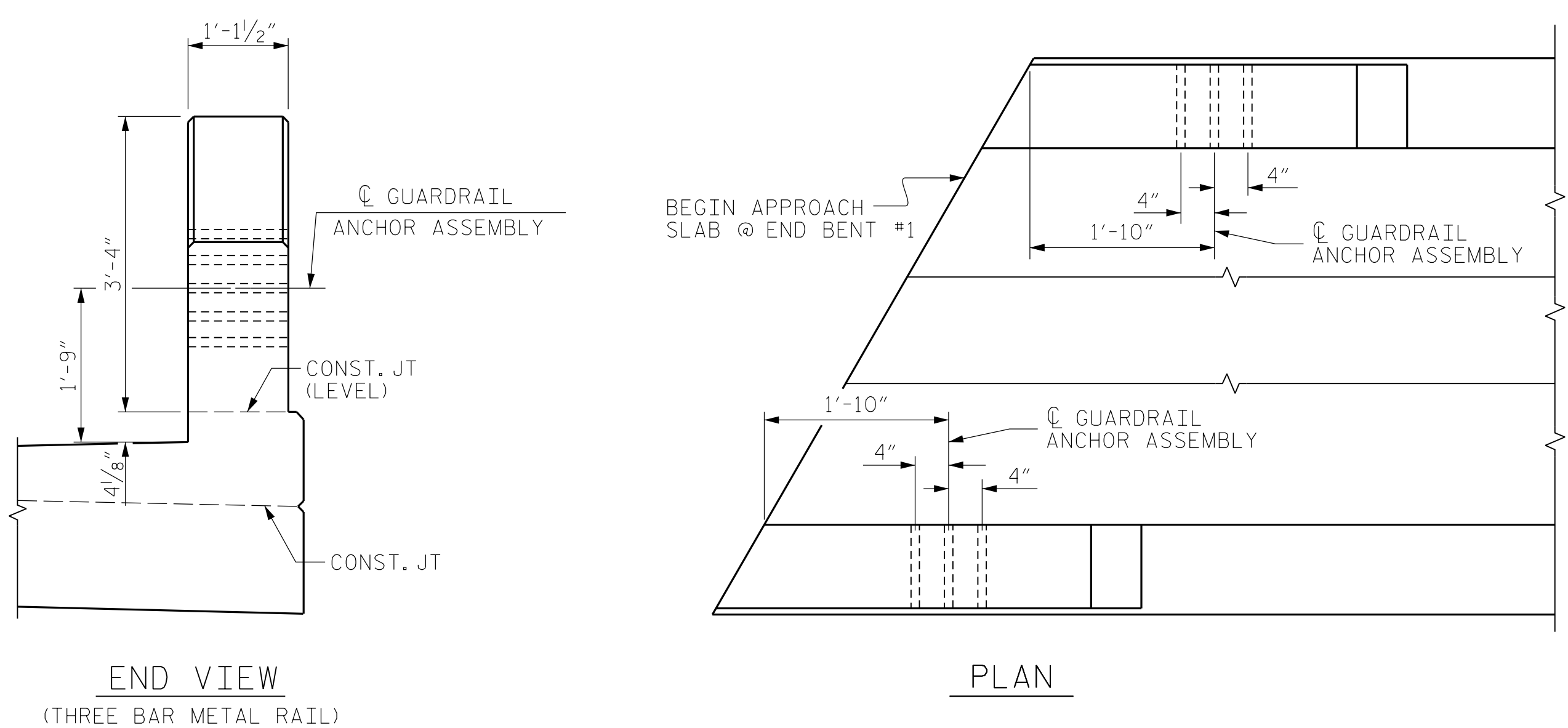


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

APPROACH SLAB #1 SHOWN, APPROACH SLAB #2 SIMILAR

NOTES

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

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

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

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

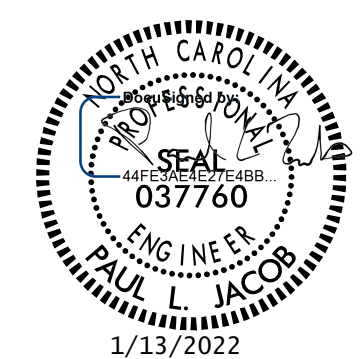
AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

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

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

THE 1/4" 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.

PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-



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

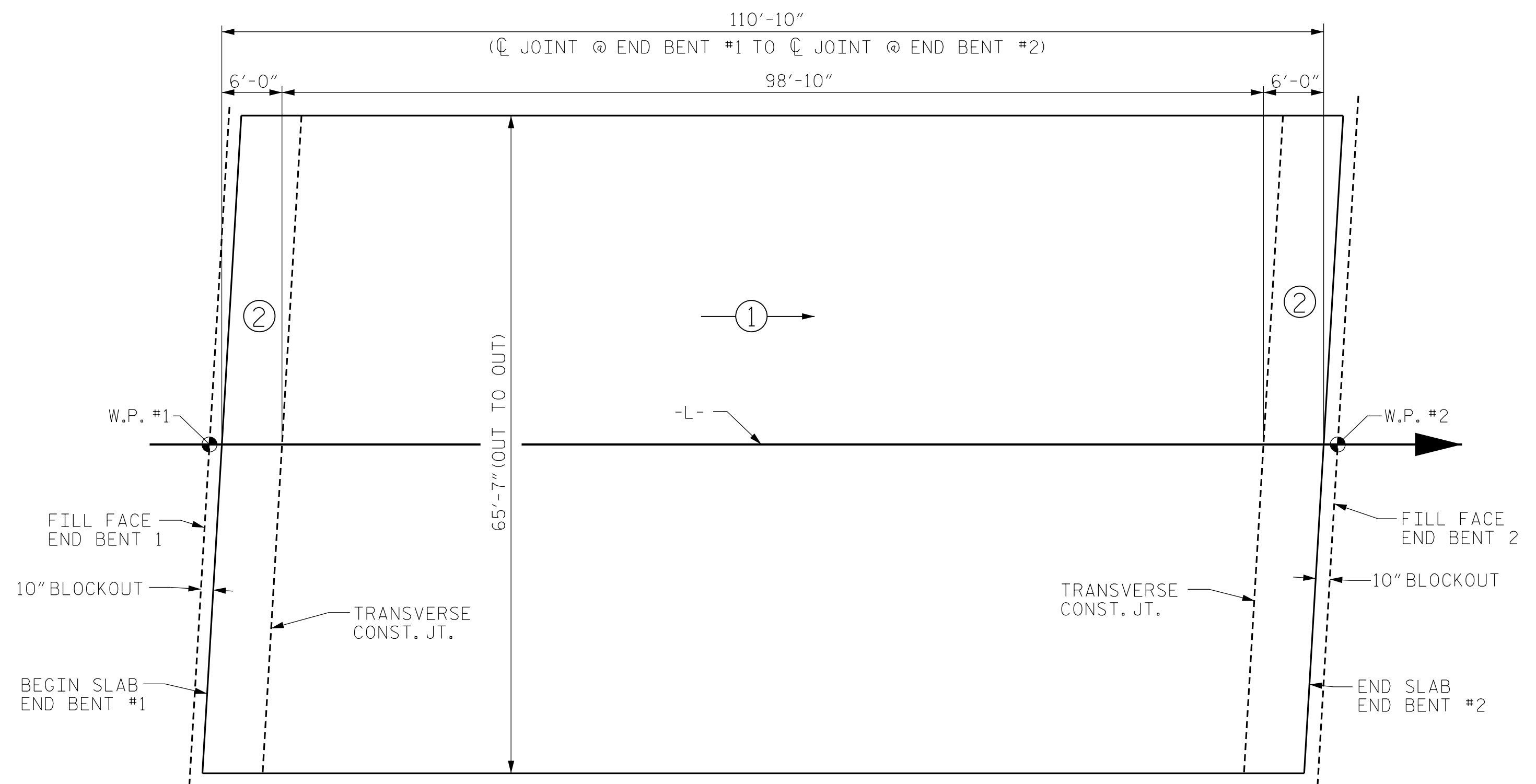
ASSEMBLED BY : J. LOFTUS	DATE : 03-2021
CHECKED BY : P. JACOB	DATE : 07-2021
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

moffatt & nichol
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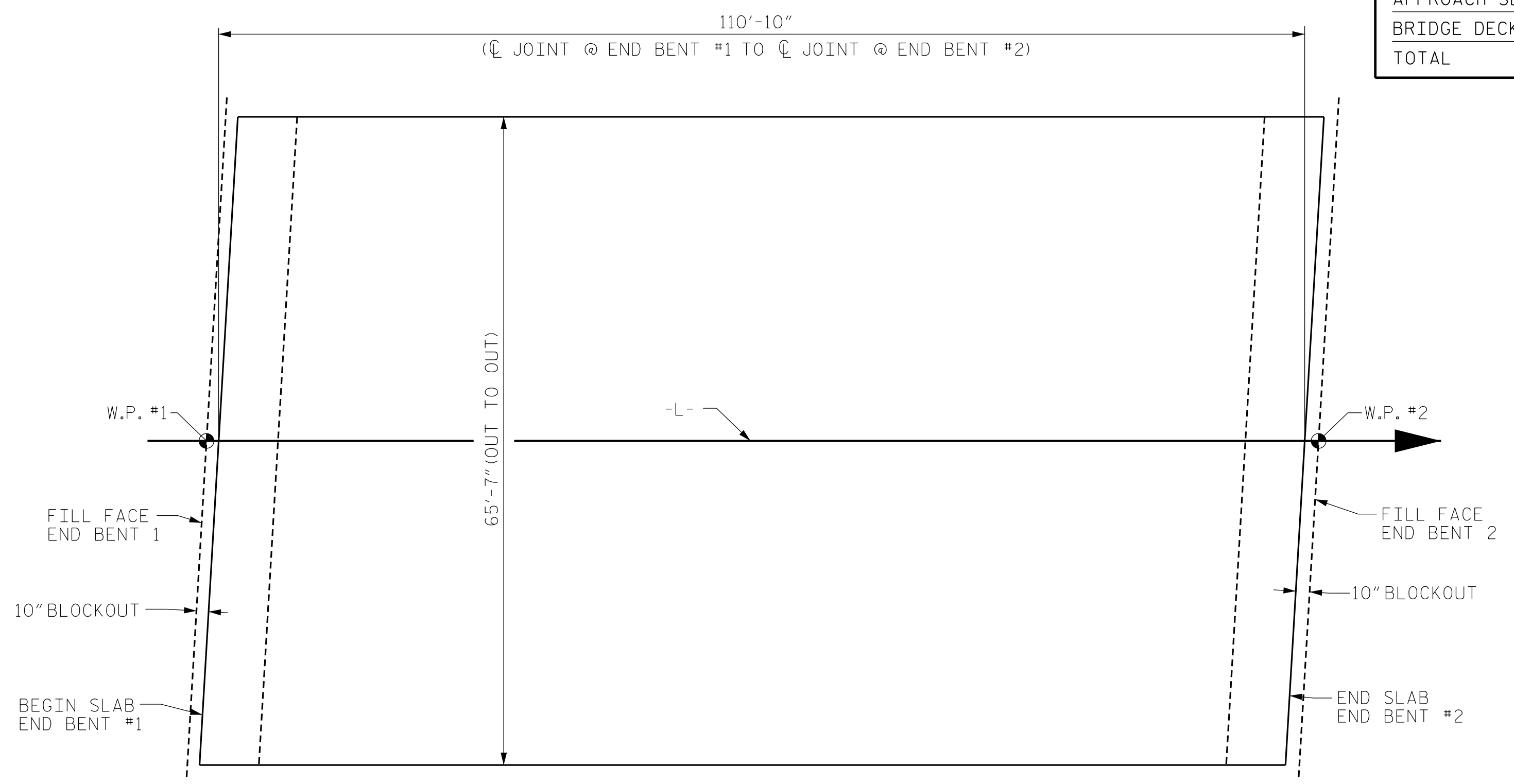
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POURING SEQUENCE



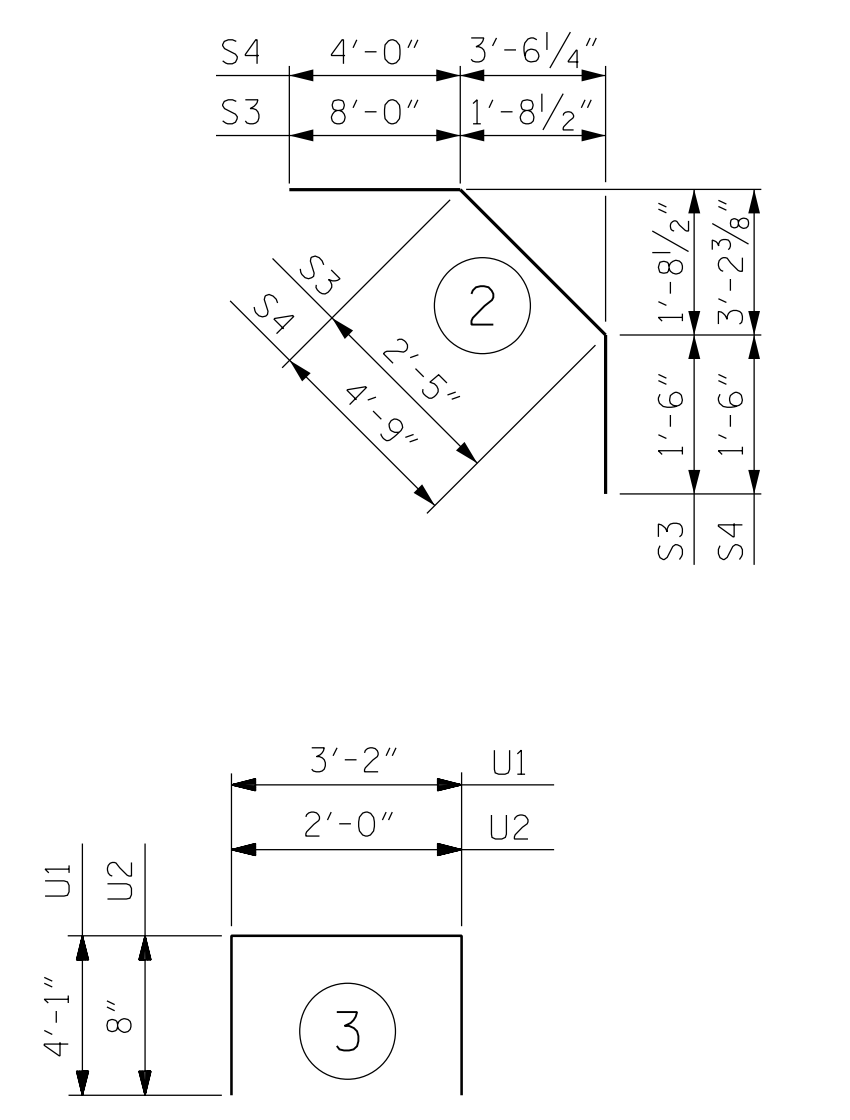
LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 7,269)

GROOVING BRIDGE FLOORS		
APPROACH SLABS	2,368	SQ.FT.
BRIDGE DECK	5,415	SQ.FT.
TOTAL	7,783	SQ.FT.

BILL OF MATERIAL						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	428	#5	STR	33'-10"	15,103	
* A2	2	#5	STR	57'-0"	119	
* A3	2	#5	STR	48'-7"	101	
* A4	2	#5	STR	40'-3"	84	
* A5	2	#5	STR	31'-10"	66	
* A6	2	#5	STR	23'-5"	49	
* A7	2	#5	STR	15'-0"	31	
* A8	2	#5	STR	6'-7"	14	
A9	428	#5	STR	33'-7"	14,992	
A10	2	#5	STR	57'-0"	119	
A11	2	#5	STR	48'-7"	101	
A12	2	#5	STR	40'-3"	84	
A13	2	#5	STR	31'-10"	66	
A14	2	#5	STR	23'-5"	49	
A15	2	#5	STR	15'-0"	31	
A16	2	#5	STR	6'-7"	14	
* B1	132	#4	STR	38'-2"	3,365	
B2	160	#5	STR	56'-3"	9,387	
* B3	176	#6	STR	22'-4"	5,904	
* B4	36	#4	STR	38'-2"	918	
* G2	224	#4	STR	6'-3"	935	
K1	20	#4	STR	33'-5"	446	
K2	12	#4	STR	7'-4"	59	
K3	24	#4	STR	7'-10"	126	
K4	24	#4	STR	8'-10"	142	
K5	4	#4	STR	1'-9"	5	
K6	8	#4	STR	2'-0"	11	
K7	8	#4	STR	2'-6"	13	
* S3	108	#4	2	11'-11"	860	
* S4	108	#4	2	10'-3"	739	
U1	108	#4	3	11'-4"	818	
* U2	64	#4	3	3'-4"	143	

* EPOXY COATED

BAR TYPES



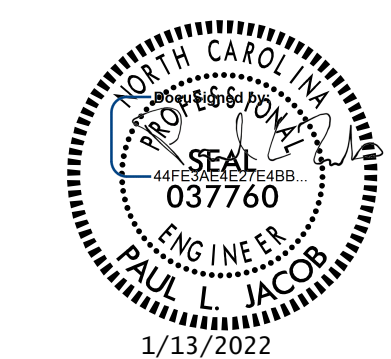
ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	* EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	208.9		
POUR 2	104.1		
SIDEWALK	38.7		
TOTALS	351.6	26,463	28,431

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	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"			

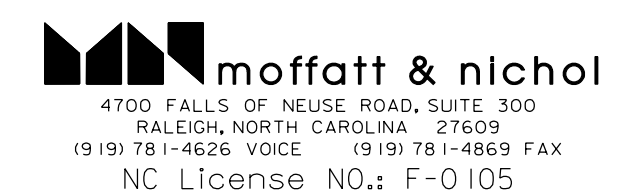
PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

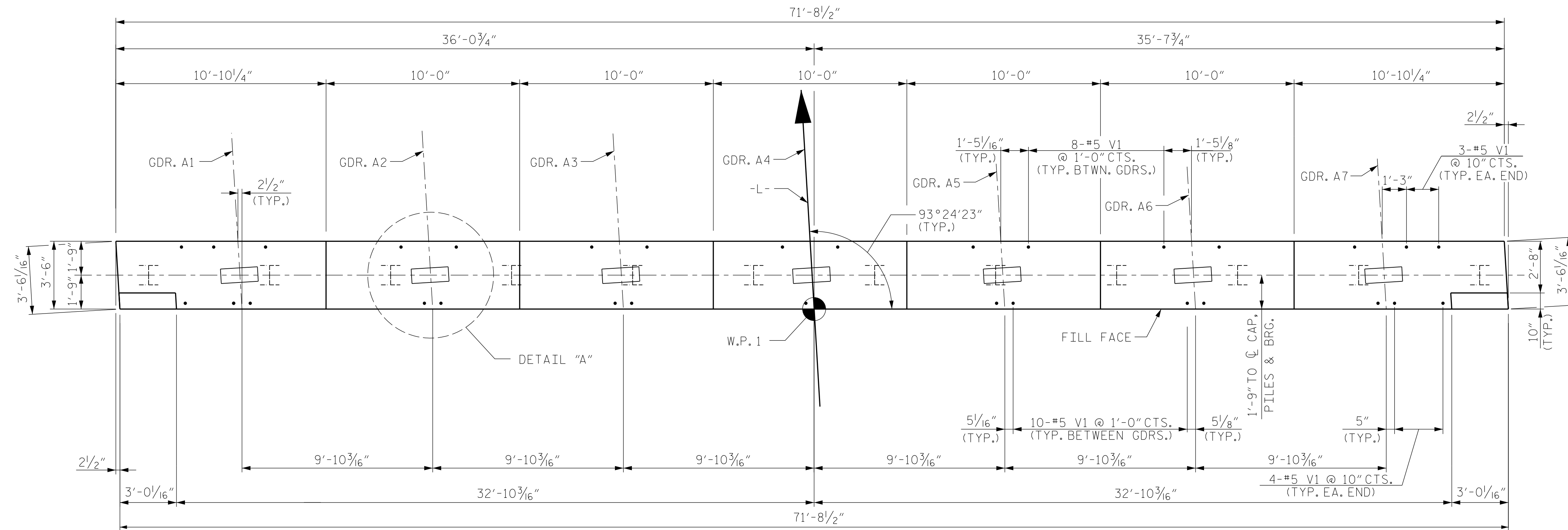
DRAWN BY :	J. LOFTUS	DATE :	03-2021
CHECKED BY :	P. JACOB	DATE :	07-2021
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE :	04-2021



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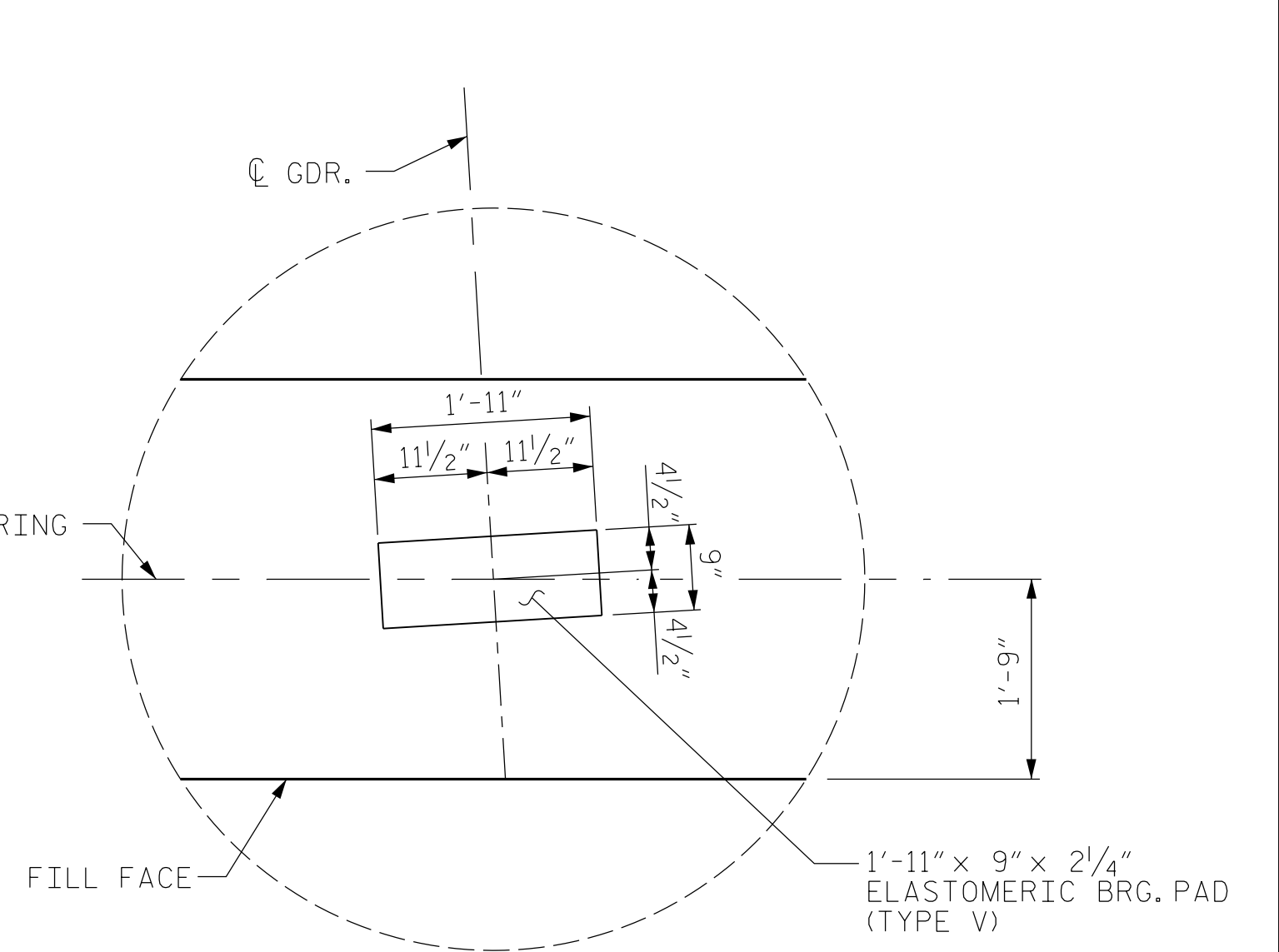
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NO.	BY:	DATE:	NO.	BY:	DATE:	
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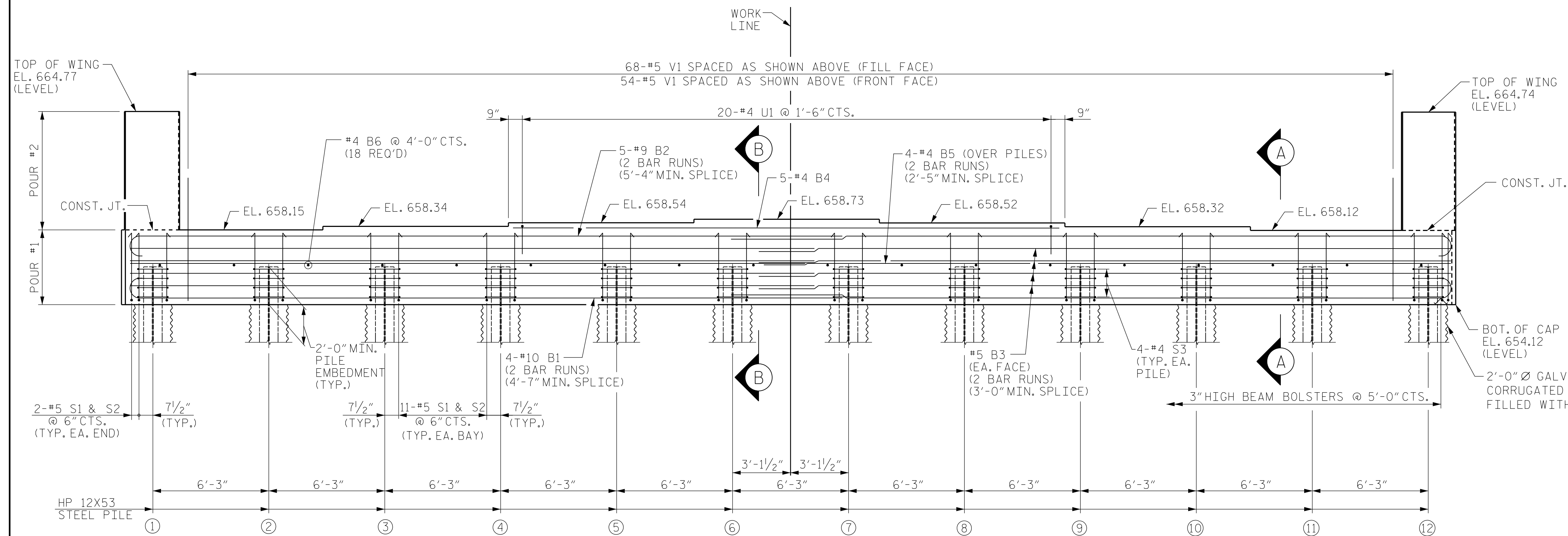


PLAN OF CAP

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

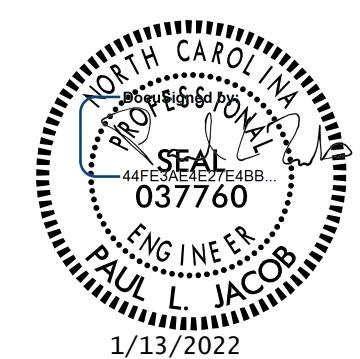


DETAIL "A"
(TYP. EACH GIRDER)



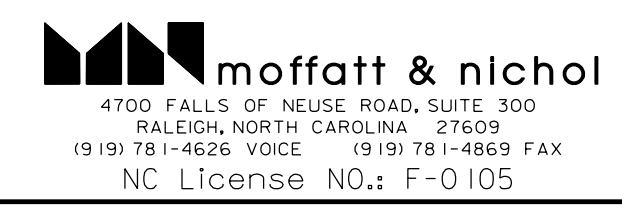
ELEVATION

PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-
 SHEET 1 OF 4



DRAWN BY : J. LOFTUS DATE : 03-2021
 CHECKED BY : P. JACOB DATE : 07-2021
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021

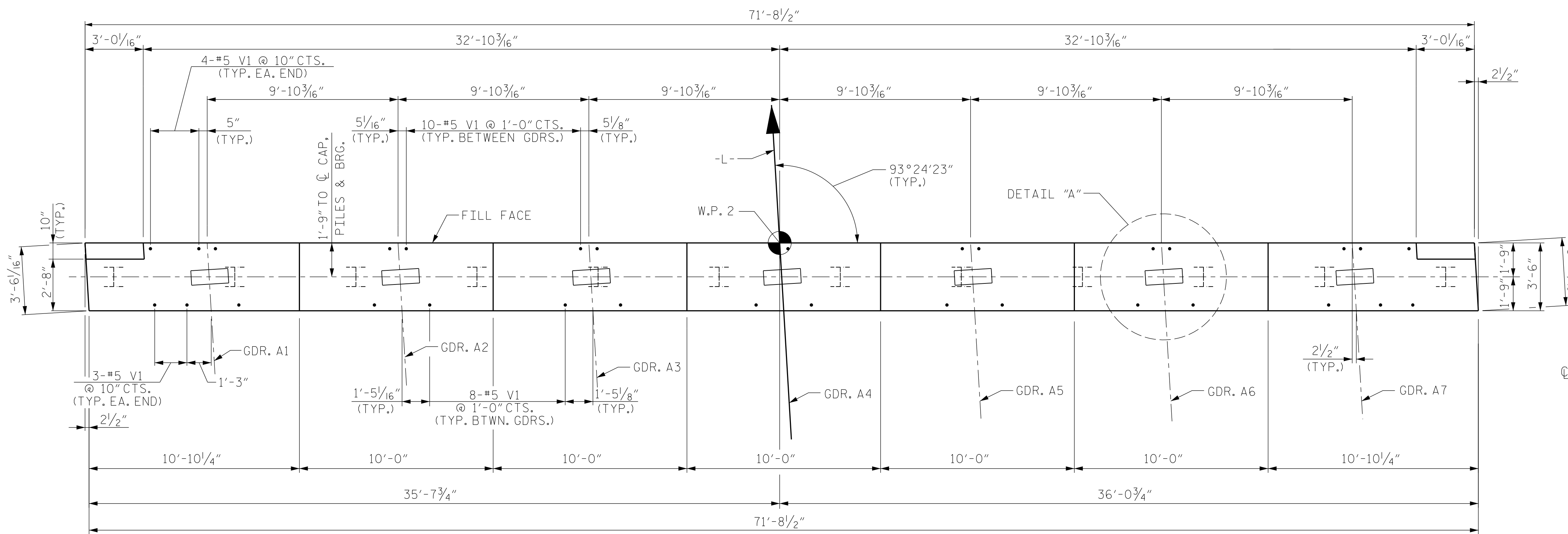
FOR SECTIONS A-A AND B-B, SEE SHEET 4 OF 4



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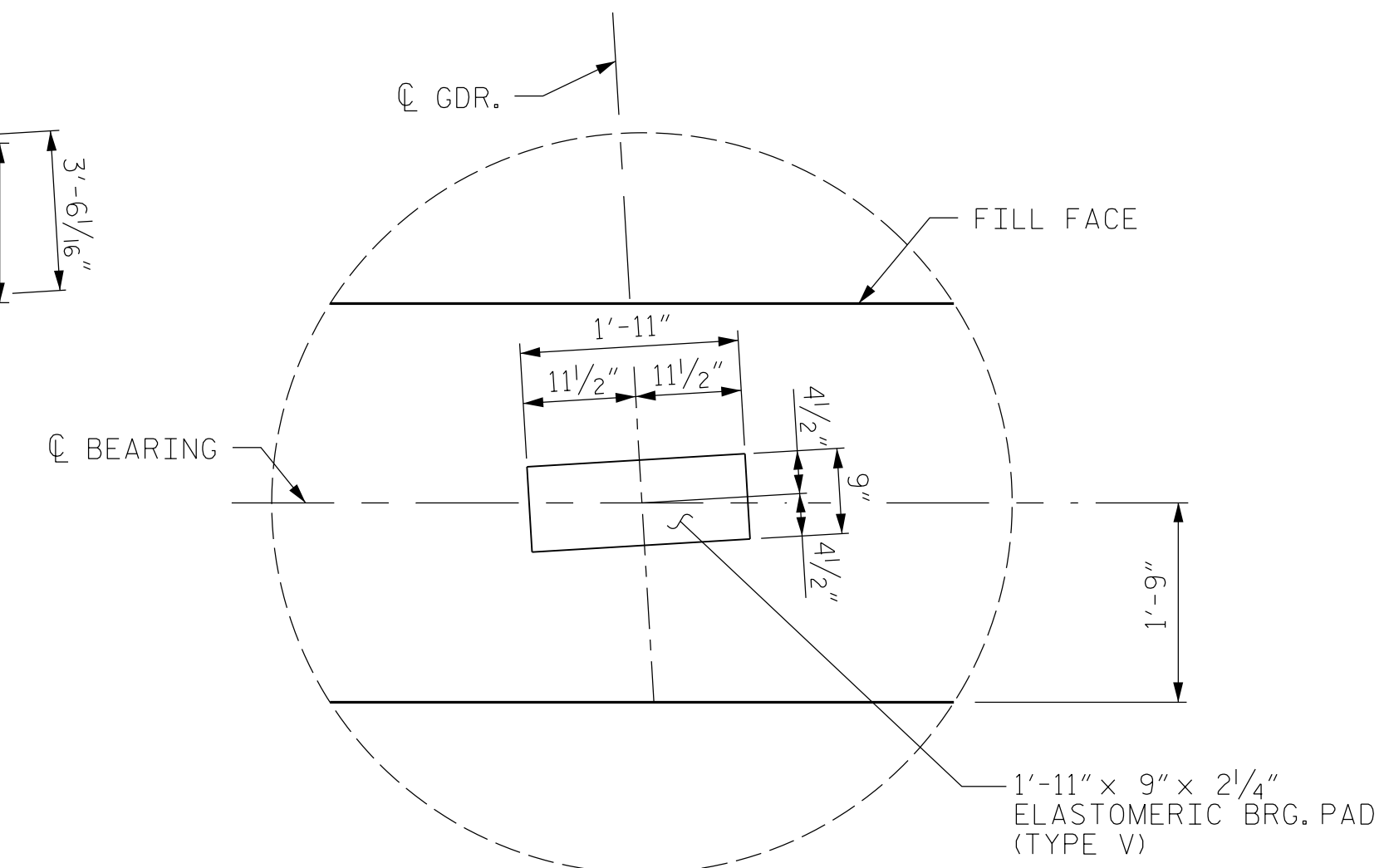
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
INTEGRAL END BENT #1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-21
					TOTAL SHEETS 29

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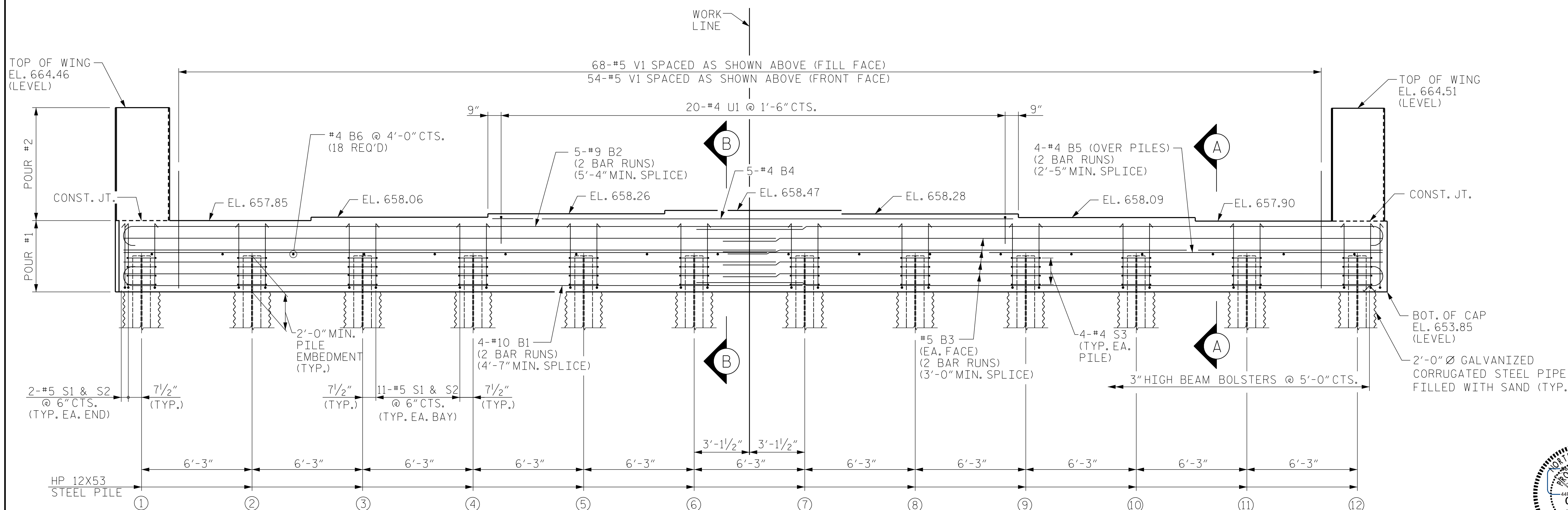
PLAN OF CAP

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



DETAIL "A"

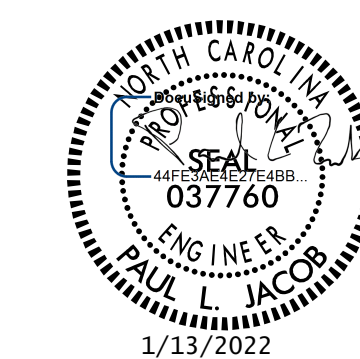
(TYP. EACH GIRDER)



ELEVATION

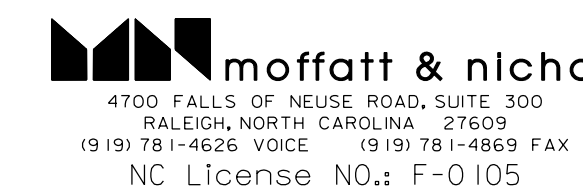
FOR SECTIONS A-A AND B-B, SEE SHEET 4 OF 4

PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-
 SHEET 2 OF 4



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

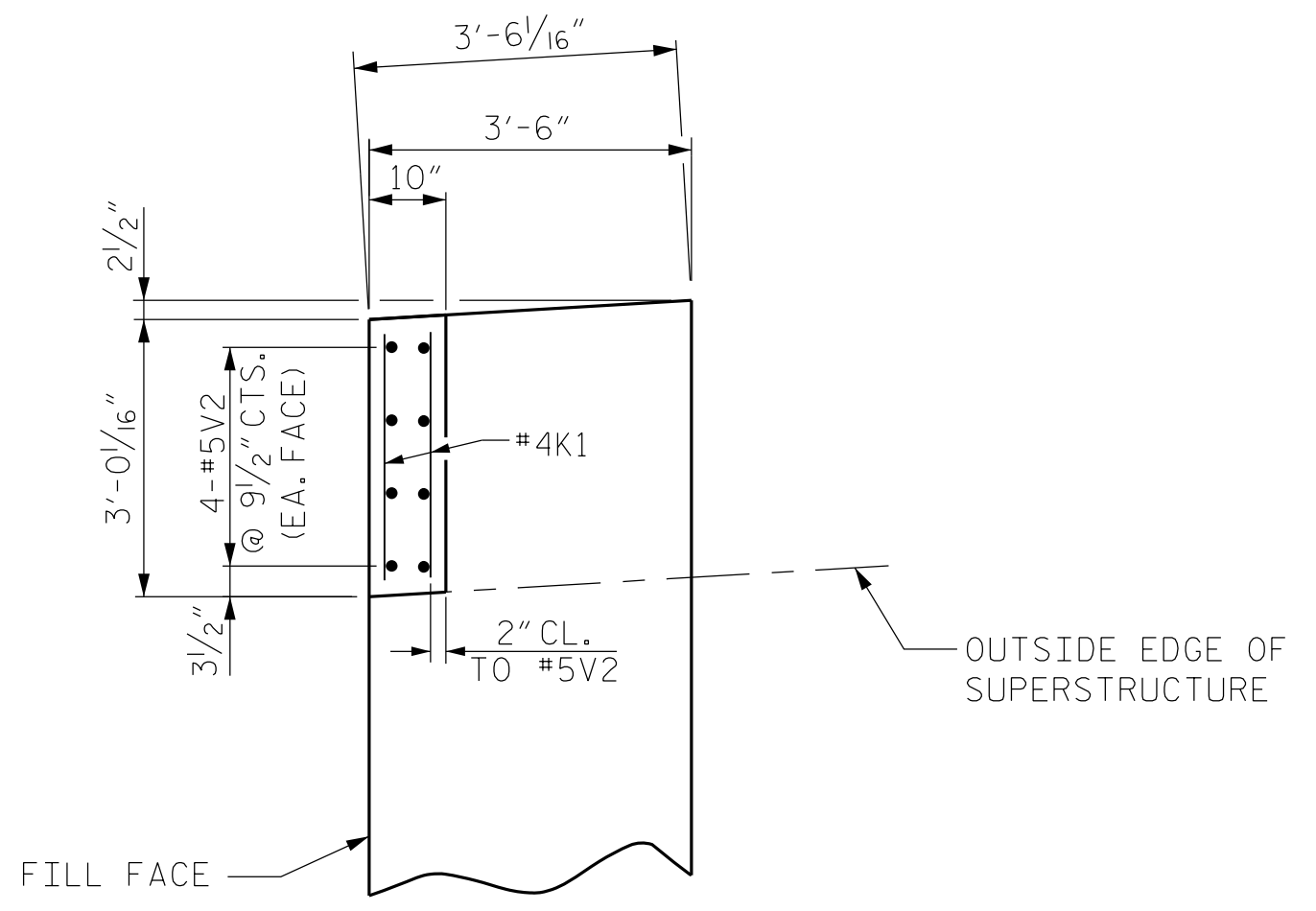
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 CHECKED BY : P. JACOB DATE : 07-2021
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021



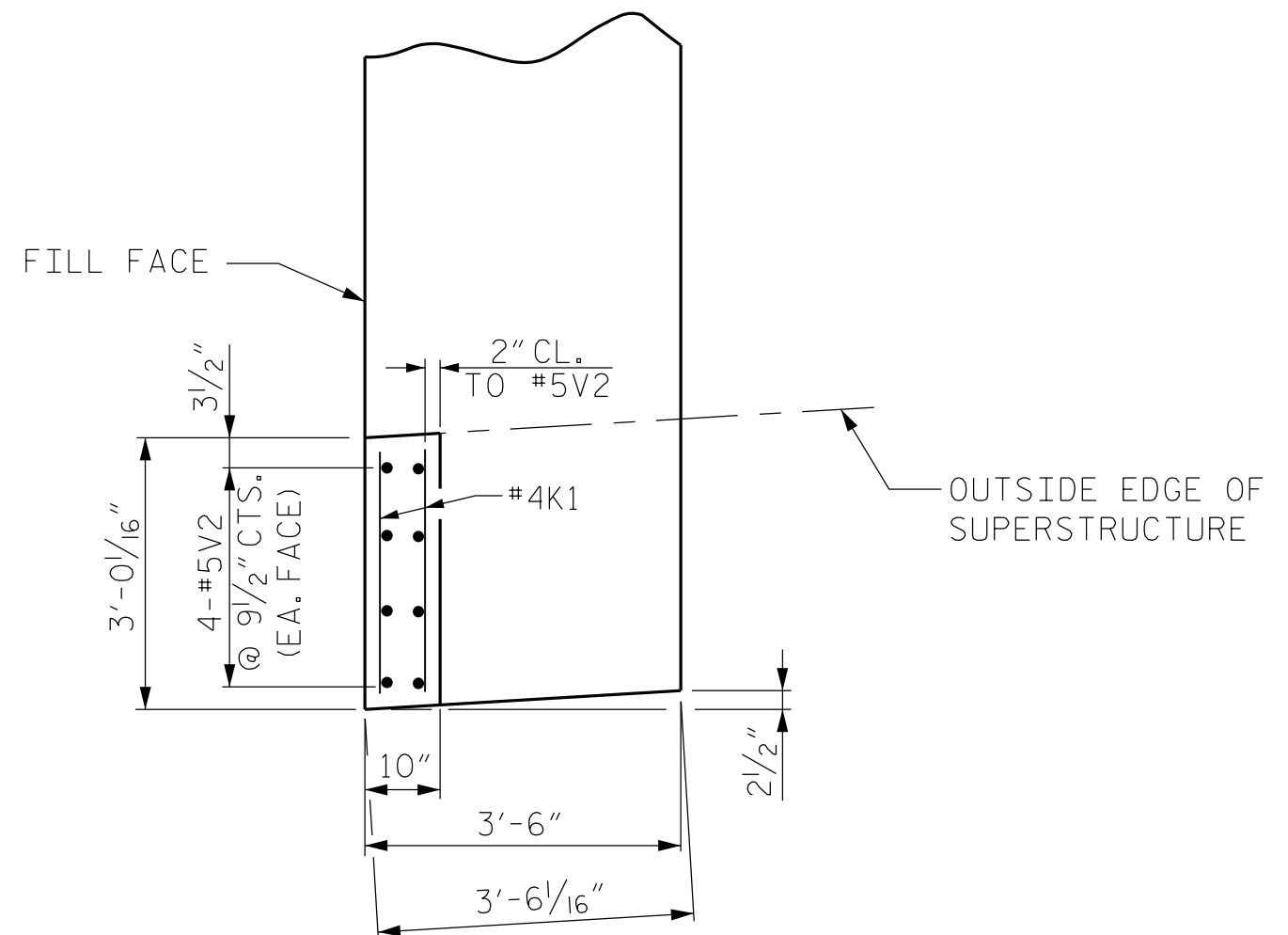
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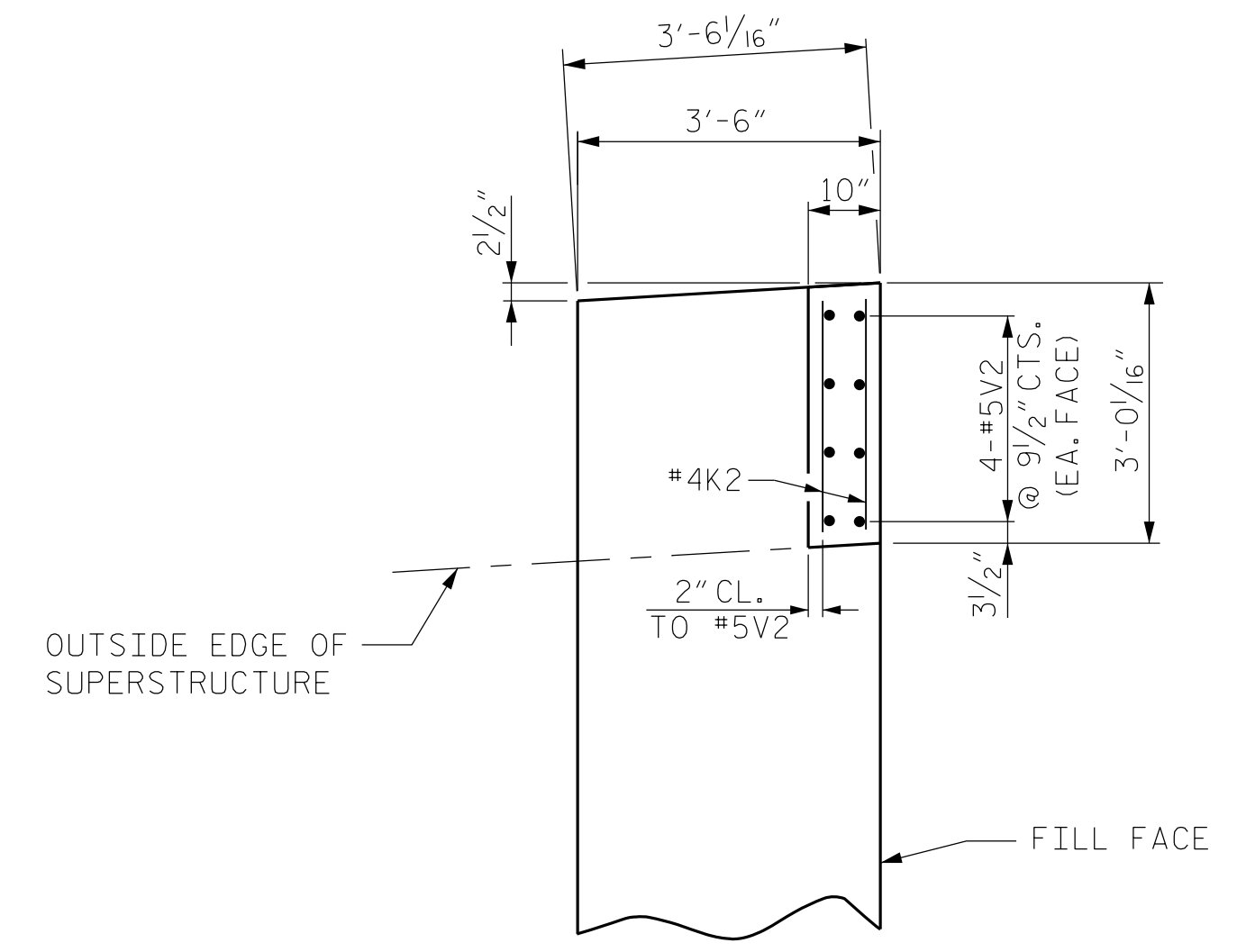
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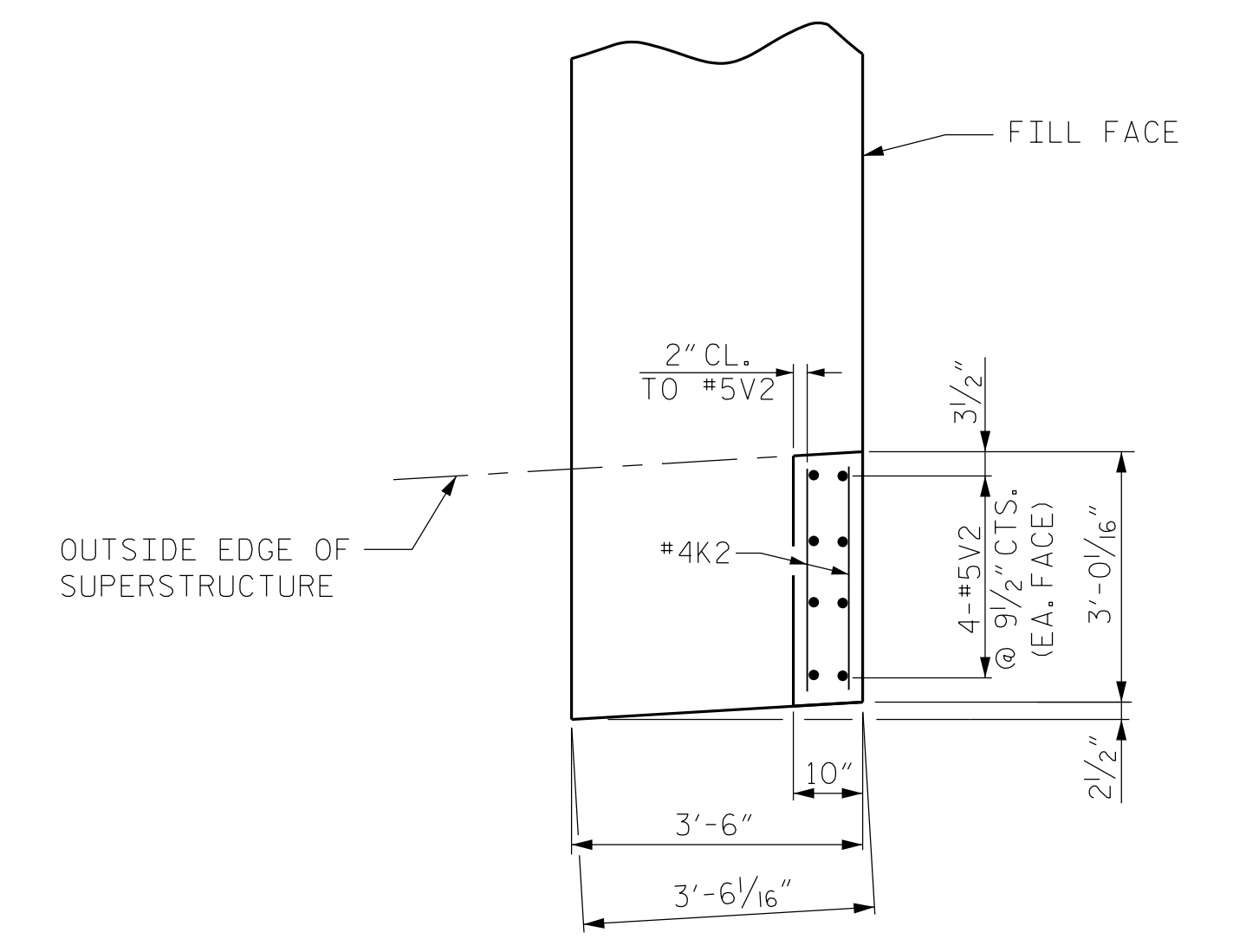
PLAN OF END BENT #1, LEFT SIDE



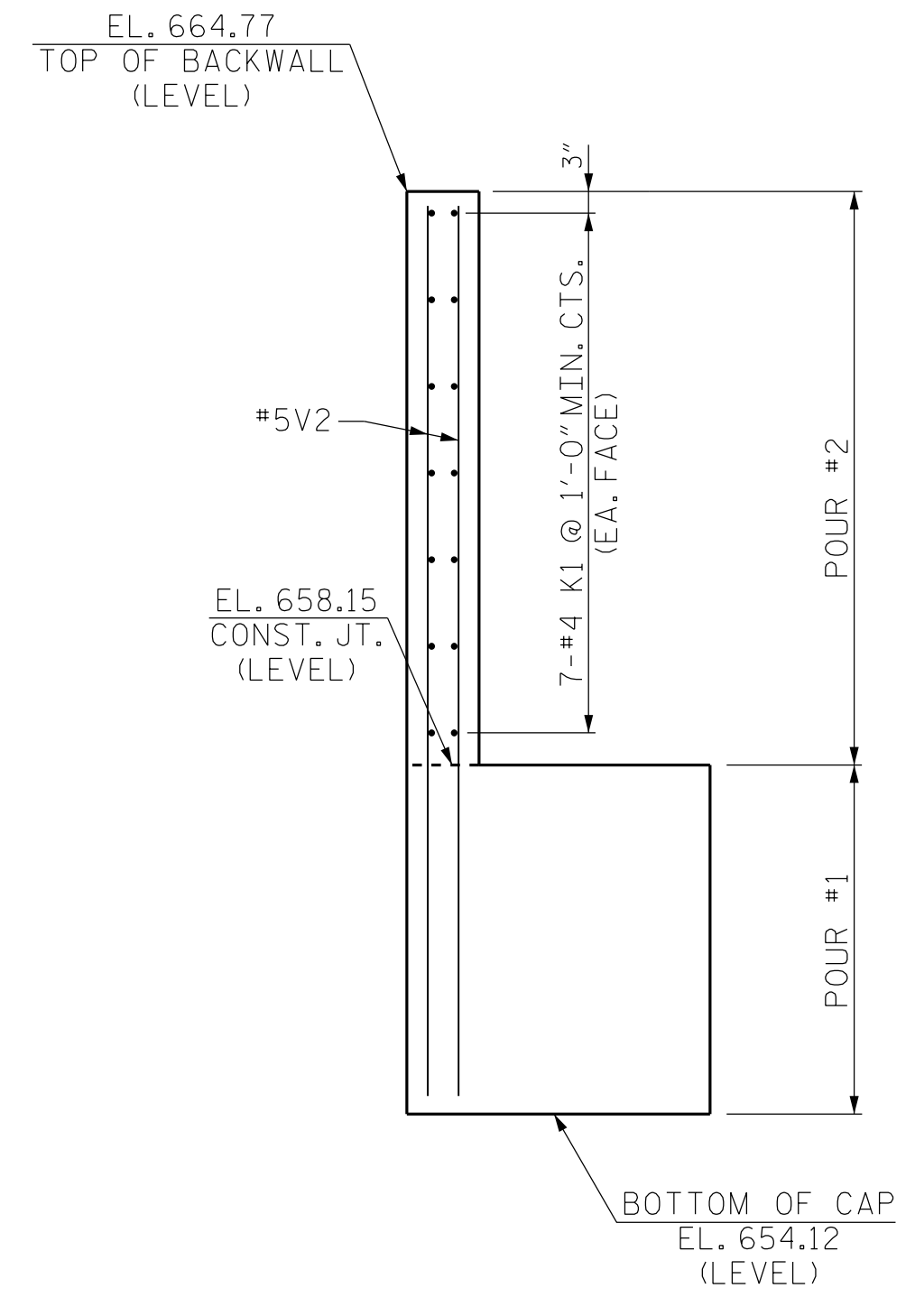
PLAN OF END BENT #1, RIGHT SIDE



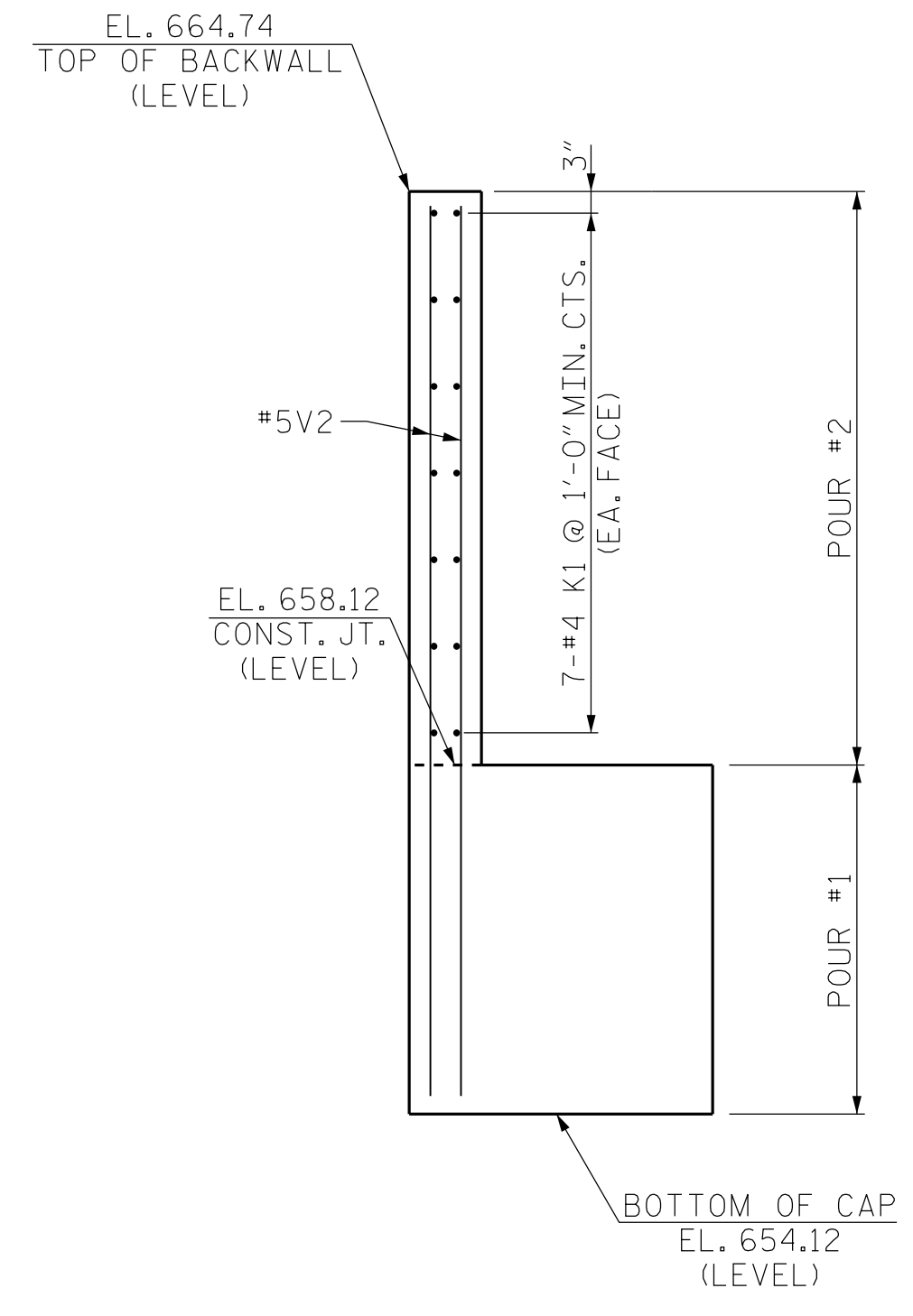
PLAN OF END BENT #2, LEFT SIDE



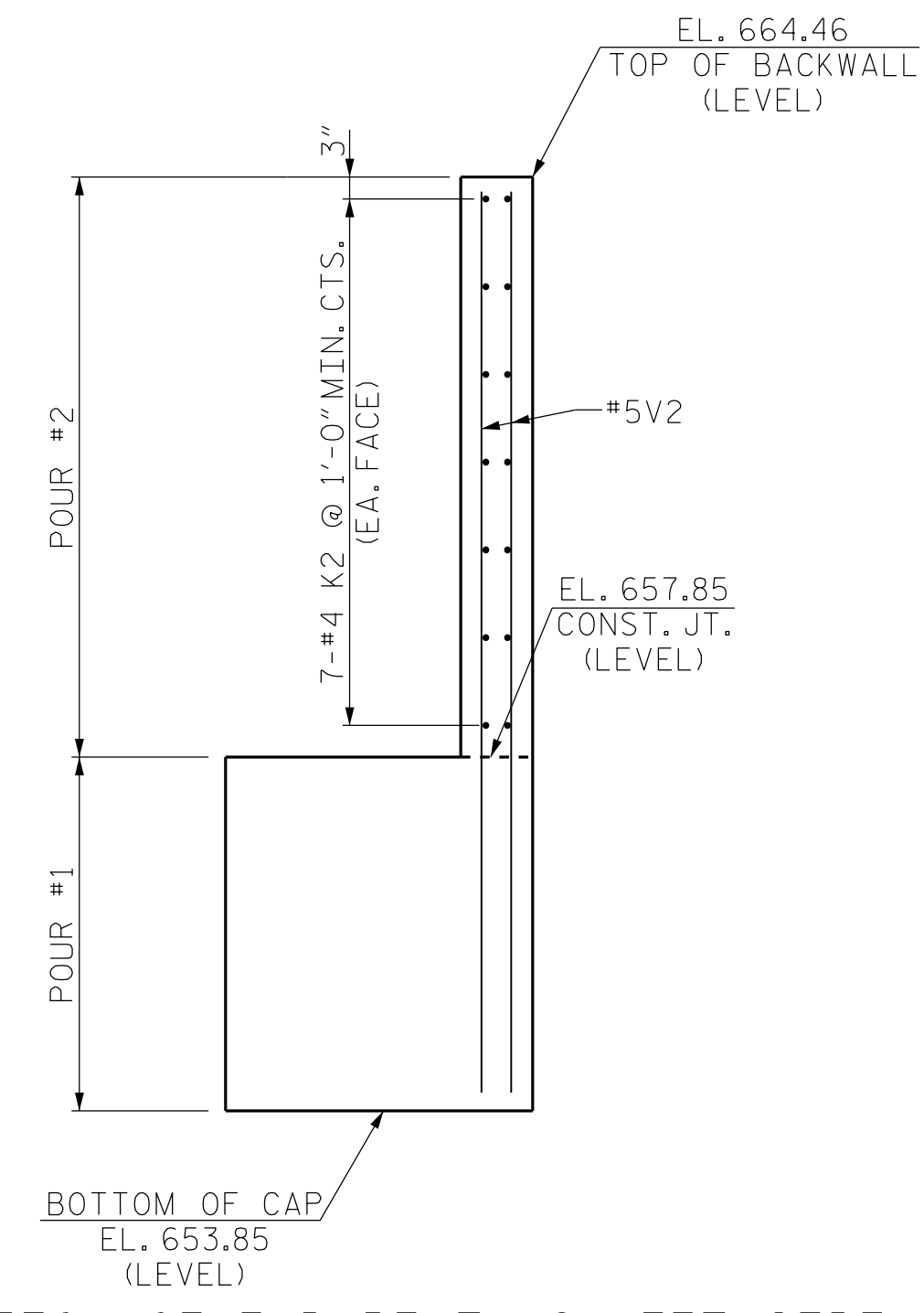
PLAN OF END BENT #2, RIGHT SIDE



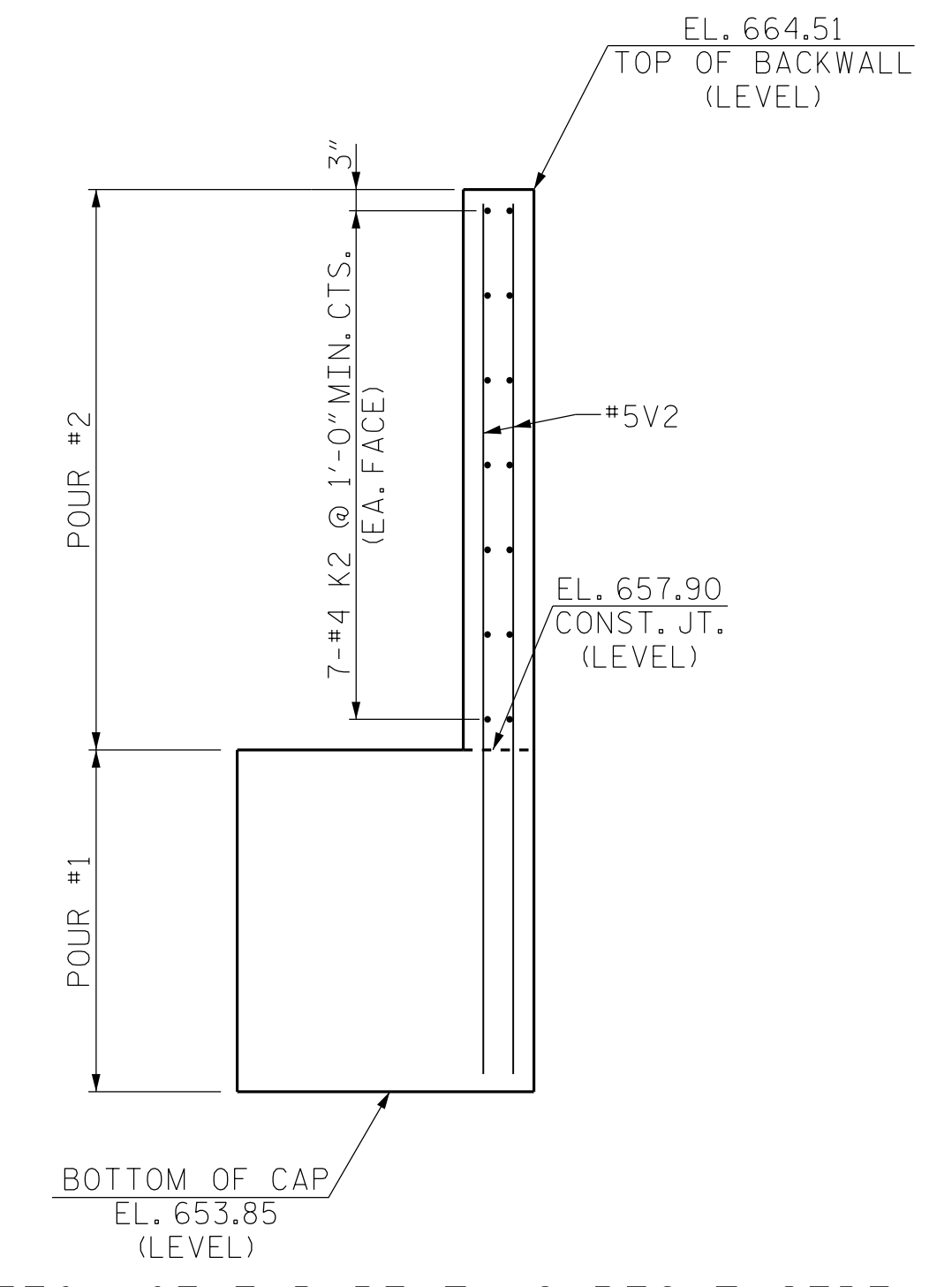
ELEVATION OF END BENT #1, LEFT SIDE



ELEVATION OF END BENT #1, RIGHT SIDE

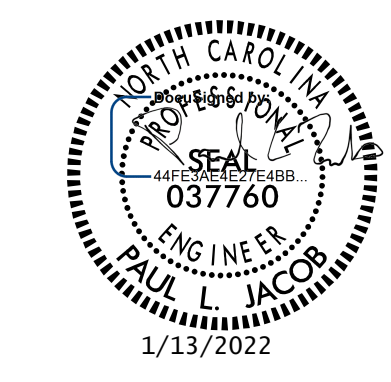


ELEVATION OF END BENT #2, LEFT SIDE



ELEVATION OF END BENT #2, RIGHT SIDE

PROJECT NO. B-5737
 ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-
 SHEET 3 OF 4



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

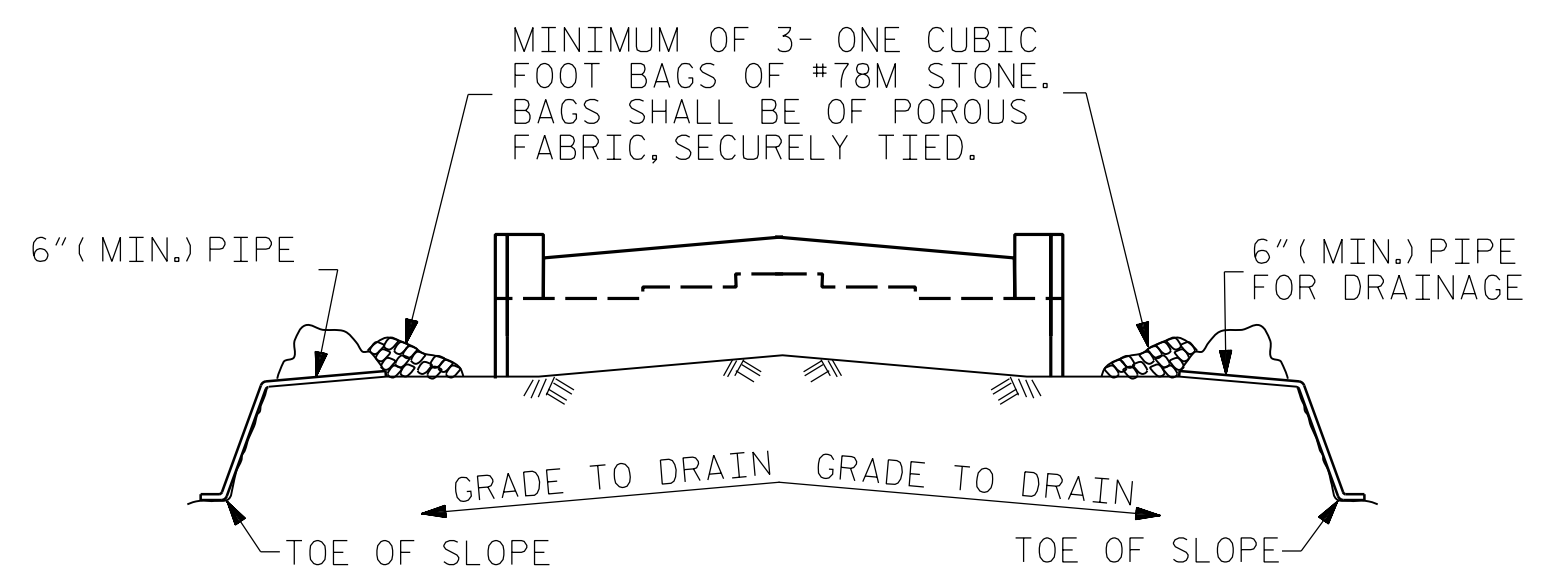
DRAWN BY : J. LOFTUS DATE : 03-2021
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 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021

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 P. Jacob

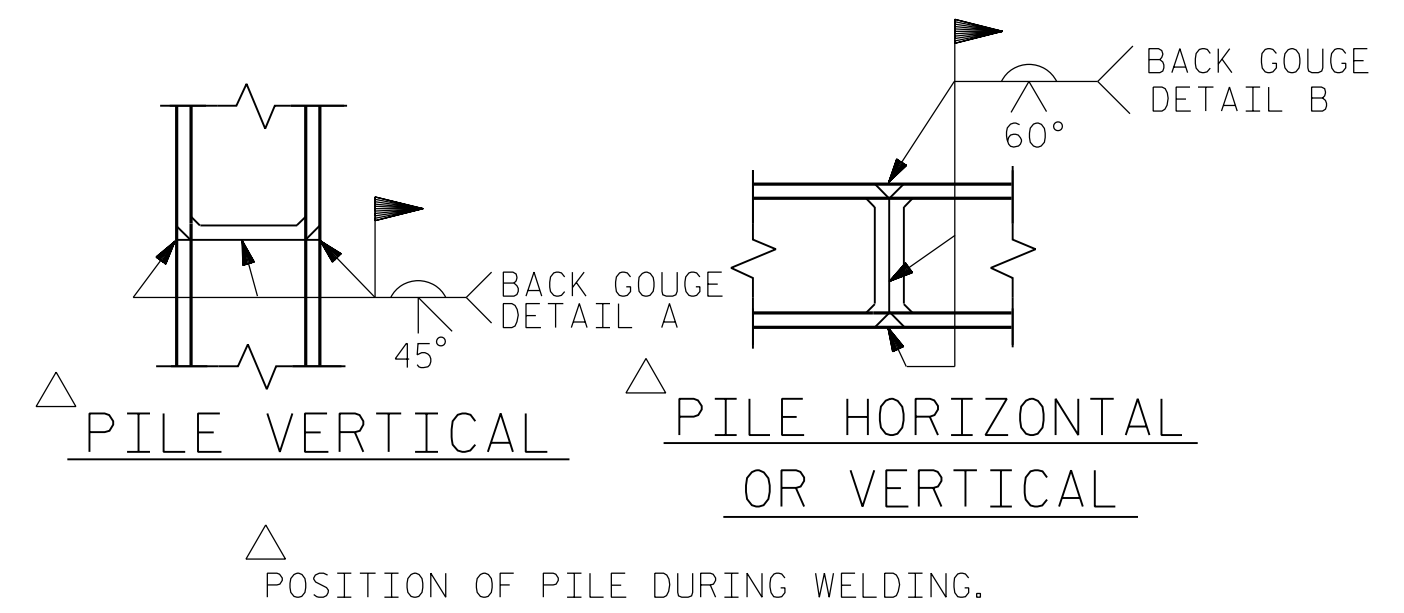
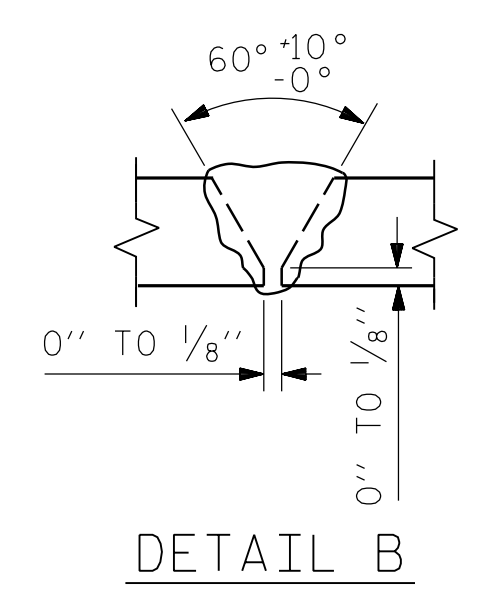
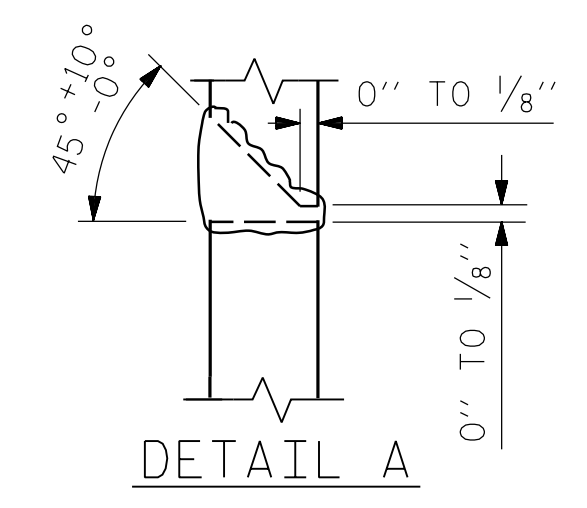


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

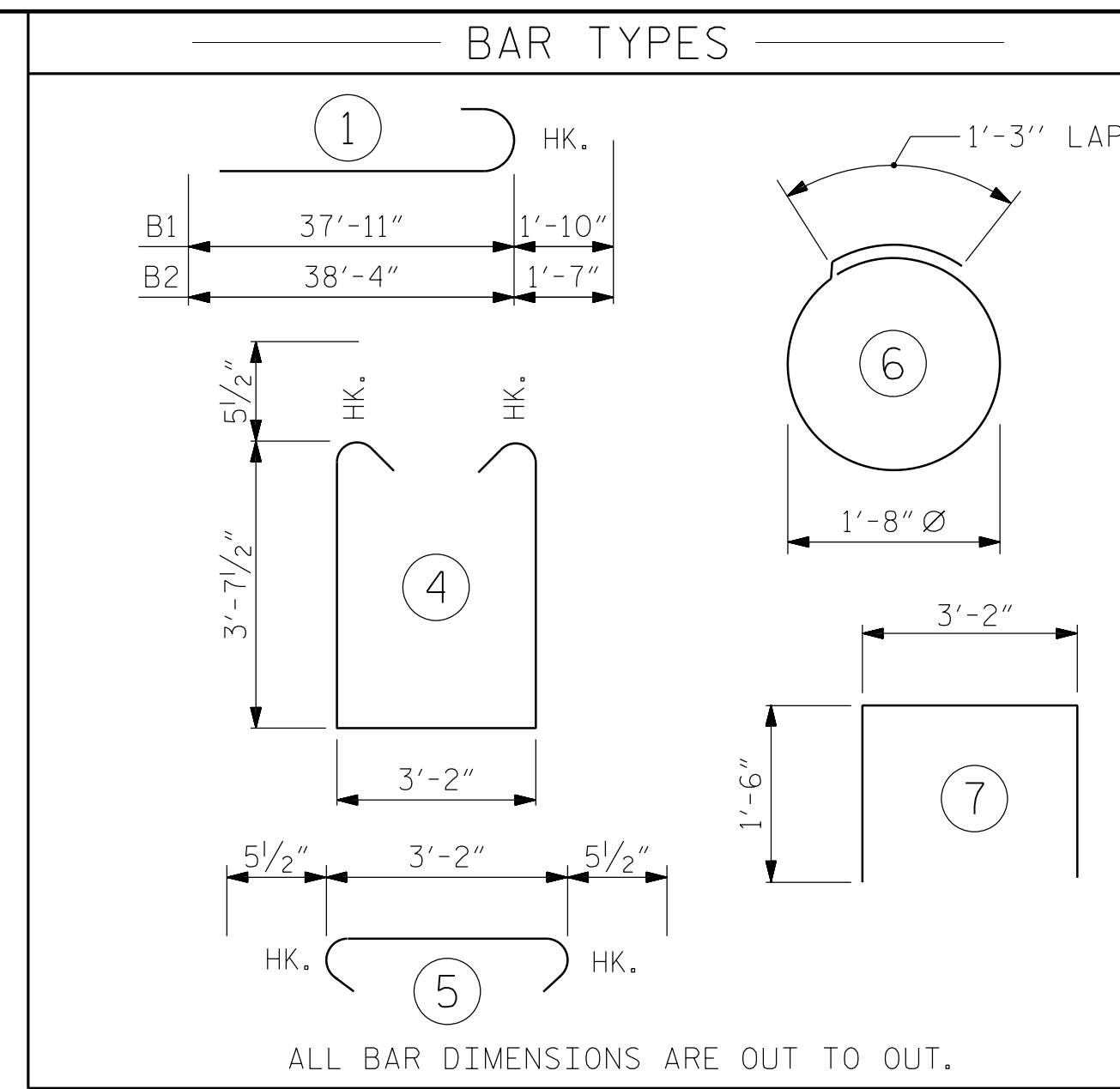
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

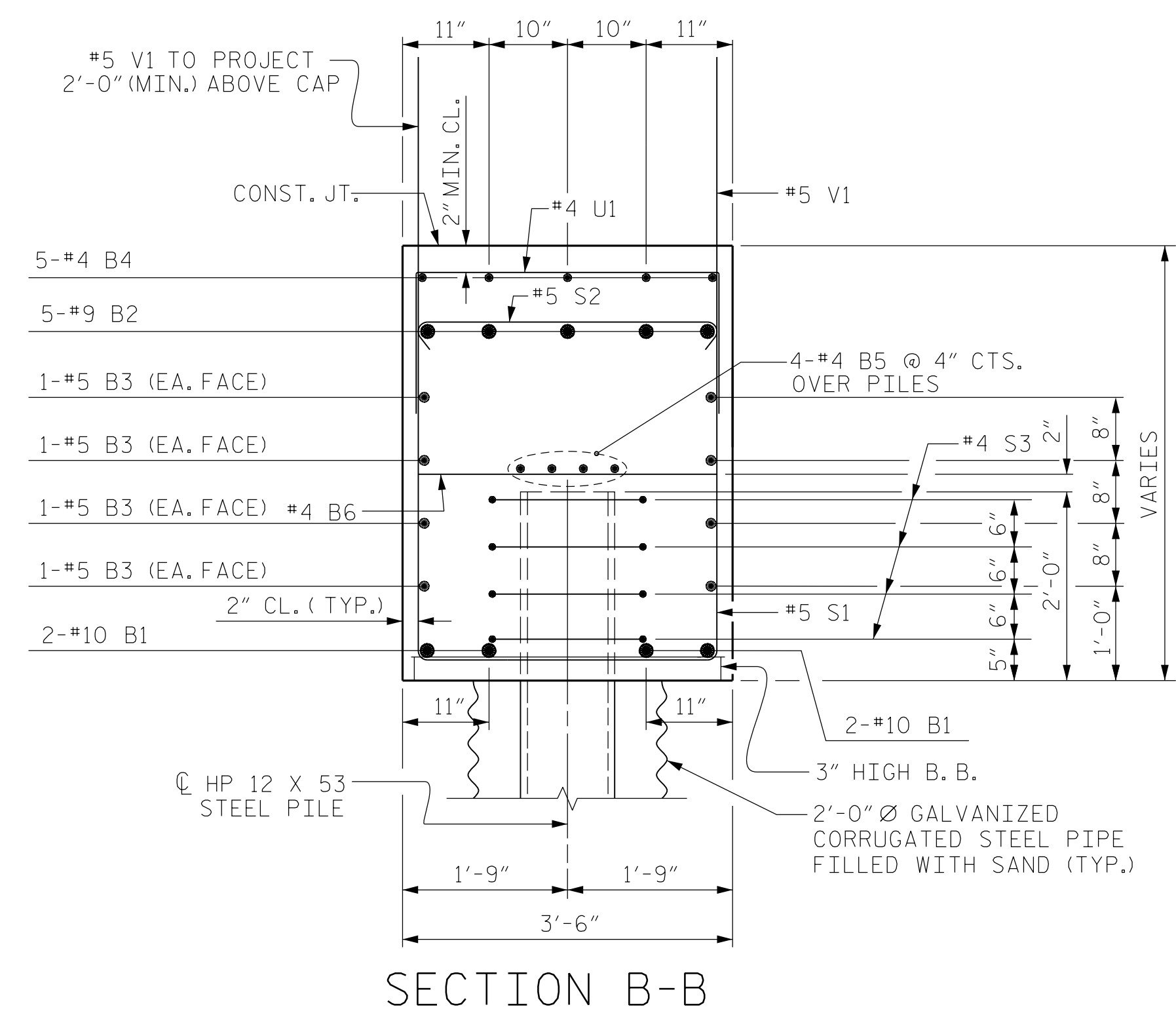
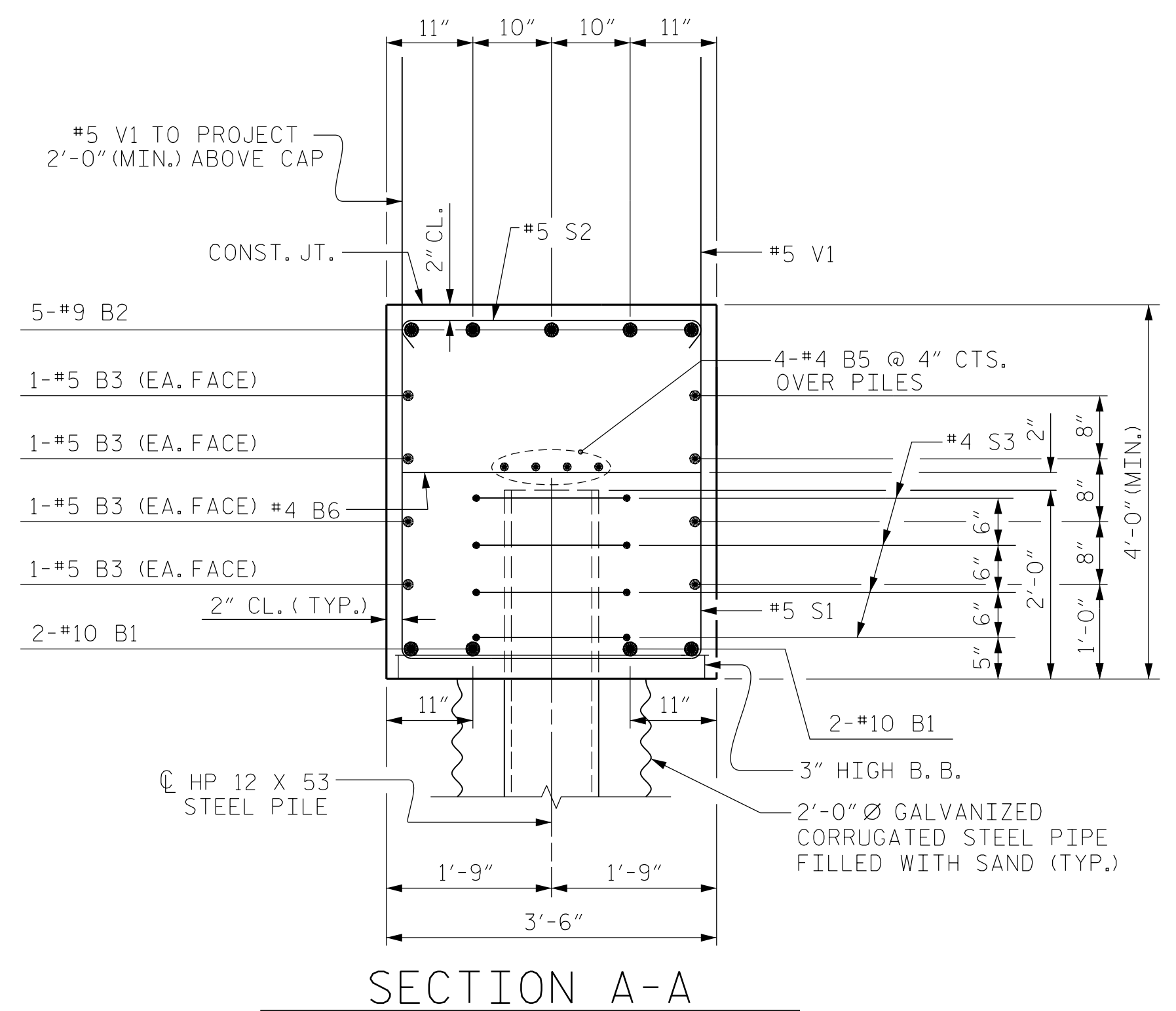
TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS



BILL OF MATERIAL FOR END BENT #1						BILL OF MATERIAL FOR END BENT #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	39'-9"	1,368	B1	8	#10	1	39'-9"	1,368
B2	10	#9	1	39'-11"	1,357	B2	10	#9	1	39'-11"	1,357
B3	16	#5	STR	37'-2"	620	B3	16	#5	STR	37'-2"	620
B4	5	#4	STR	29'-6"	99	B4	5	#4	STR	29'-6"	99
B5	8	#4	STR	36'-11"	197	B5	8	#4	STR	36'-11"	197
B6	18	#4	STR	3'-2"	38	B6	18	#4	STR	3'-2"	38
K1	28	#4	STR	2'-8"	50	K2	28	#4	STR	2'-8"	50
S1	125	#5	4	11'-4"	1478	S1	125	#5	4	11'-4"	1478
S2	125	#5	5	4'-1"	532	S2	125	#5	5	4'-1"	532
S3	48	#4	6	6'-6"	208	S3	48	#4	6	6'-6"	208
U1	20	#4	7	6'-2"	82	U1	20	#4	7	6'-2"	82
V1	122	#5	STR	6'-7"	838	V1	122	#5	STR	6'-7"	838
V2	16	#5	STR	10'-2"	170	V2	16	#5	STR	10'-2"	170
REINFORCING STEEL (FOR END BENT #1)						REINFORCING STEEL (FOR END BENT #2)					
7,037 LBS.						7,037 LBS.					
CLASS A CONCRETE BREAKDOWN (FOR END BENT #1)						CLASS A CONCRETE BREAKDOWN (FOR END BENT #2)					
POUR #1 CAP & LOWER PART OF WINGS 39.7 C.Y.						POUR #1 CAP & LOWER PART OF WINGS 39.8 C.Y.					
POUR #2 UPPER PART OF WINGS 1.3 C.Y.						POUR #2 UPPER PART OF WINGS 1.3 C.Y.					
TOTAL CLASS A CONCRETE 41.0 C.Y.						TOTAL CLASS A CONCRETE 41.1 C.Y.					
HP 12 X 53 STEEL PILES NO: 12 LIN. FT. = 360						HP 12 X 53 STEEL PILES NO: 12 LIN. FT. = 360					
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 12						PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 12					
PILE EXCAVATION NOT IN SOIL LIN. FT. = 120						PILE EXCAVATION NOT IN SOIL LIN. FT. = 120					

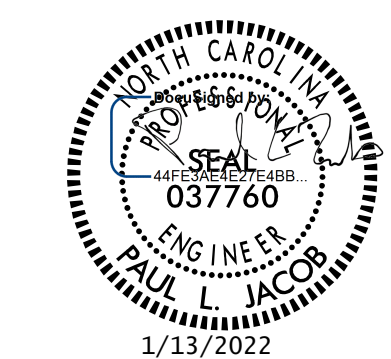


PROJECT NO. B-5737

ROCKINGHAM COUNTY

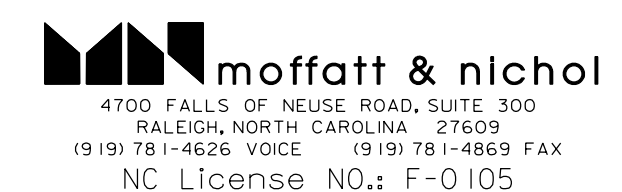
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SHEET 4 OF 4



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

DRAWN BY : J. LOFTUS DATE : 03-2021
 CHECKED BY : P. JACOB DATE : 07-2021
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021

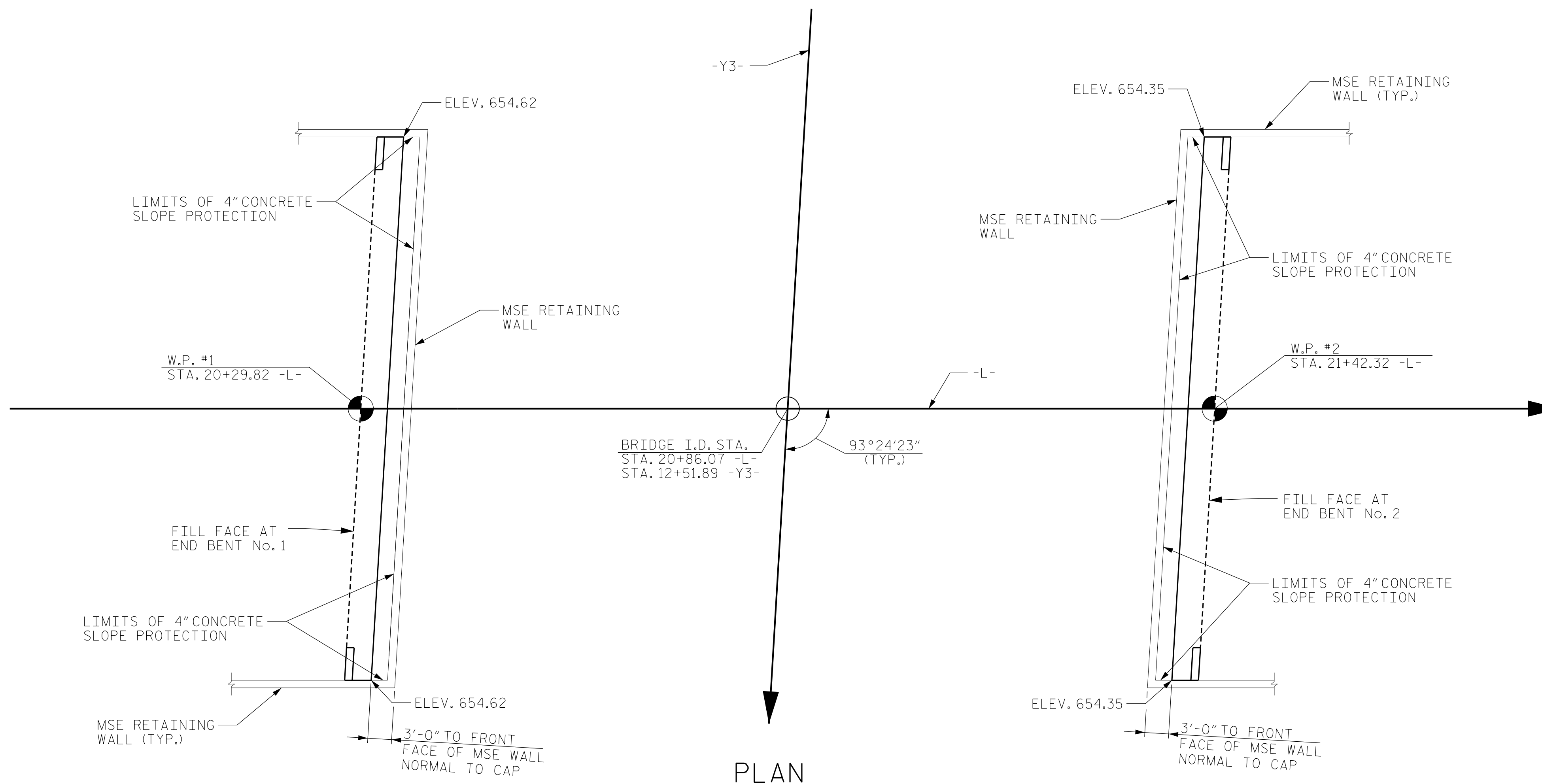


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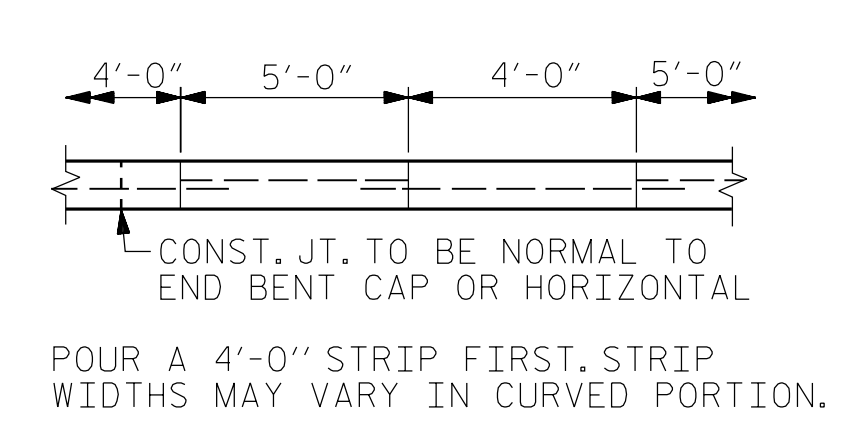
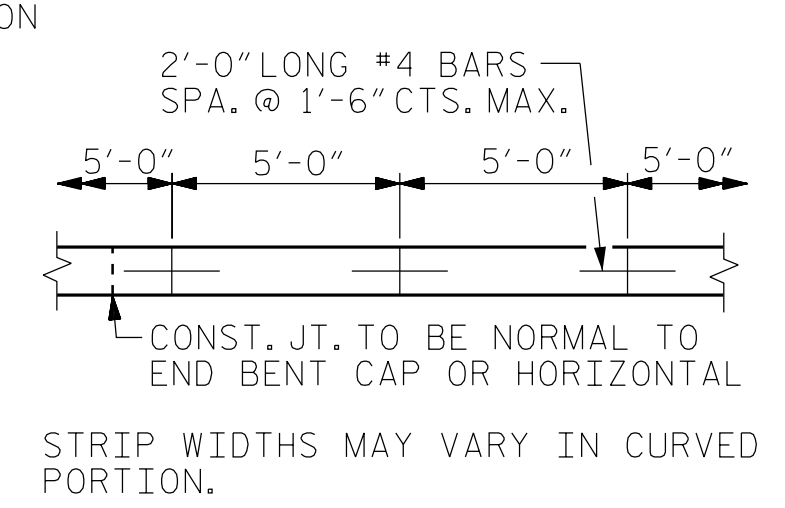
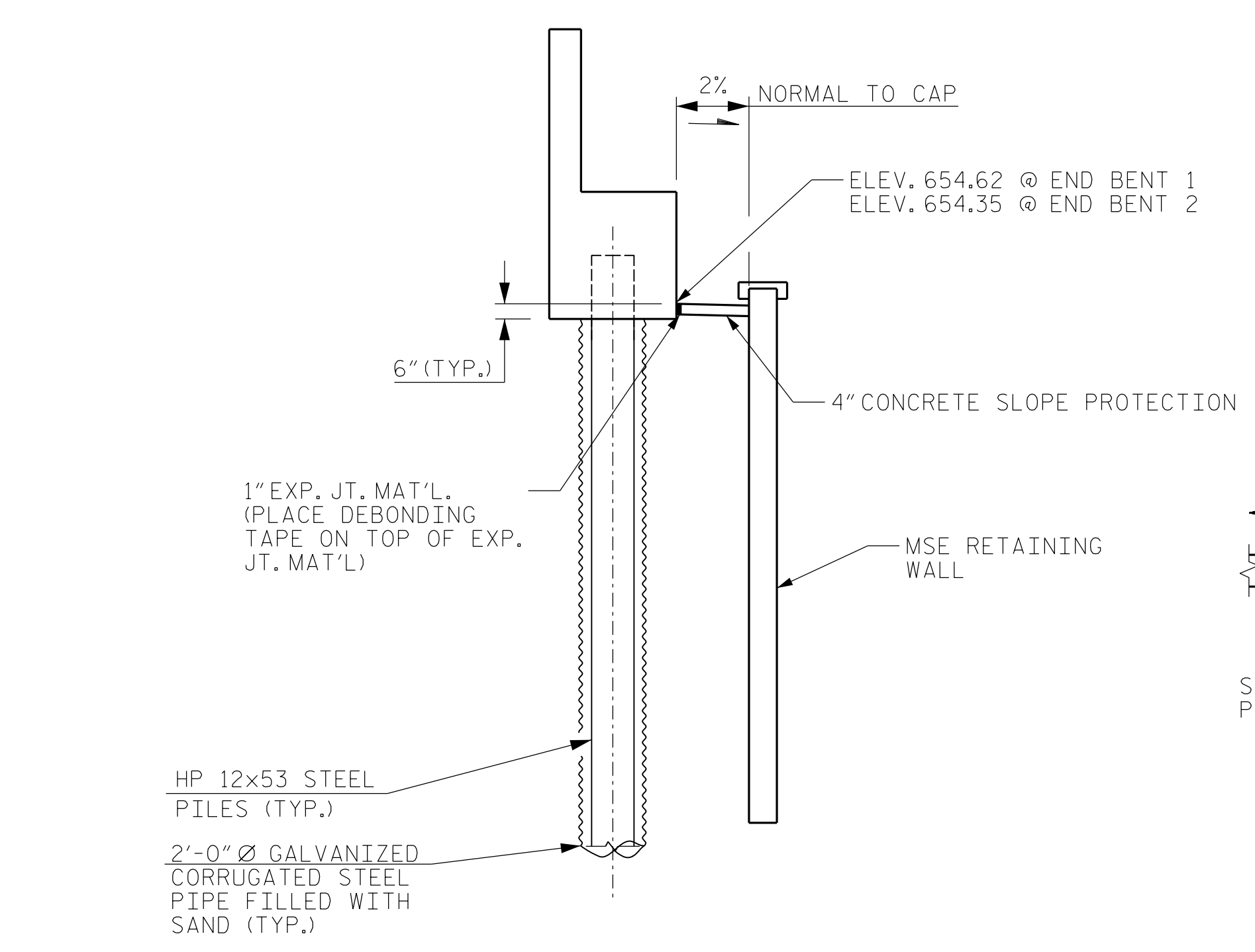
TOTAL SHEETS 29

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GENERAL NOTES

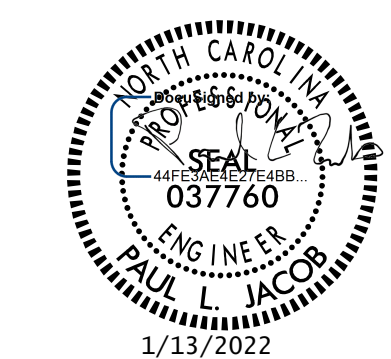
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL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



BRIDGE @ STA. 20+86.07 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	16	30
END BENT 2	16	30

* QUANTITY SHOWN IS BASED ON 5' POURS.
QUANTITIES ASSUME 2'-0" OF SLOPE PROTECTION

PROJECT NO. B-5737
ROCKINGHAM COUNTY
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SLOPE PROTECTION
 DETAILS

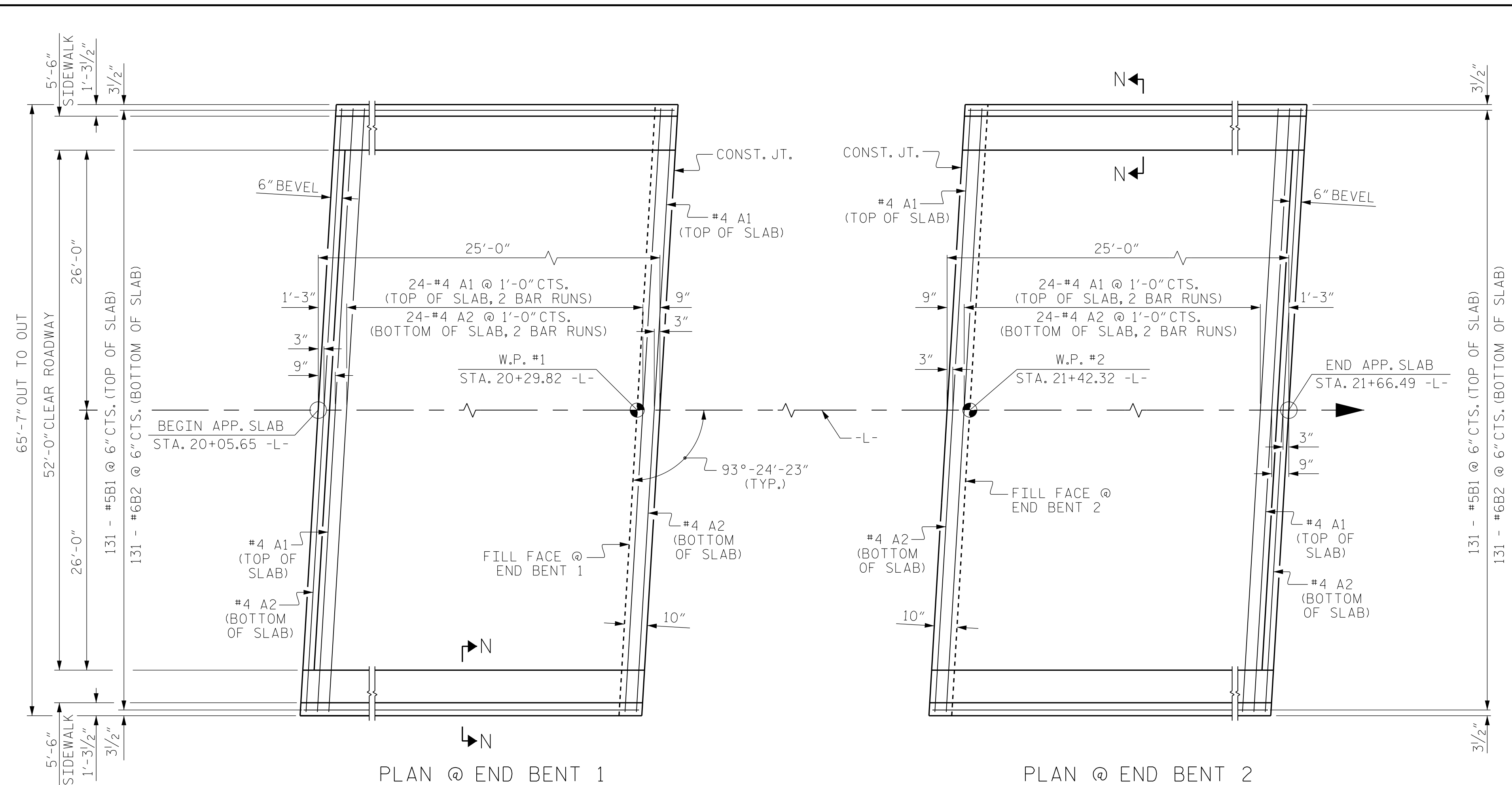
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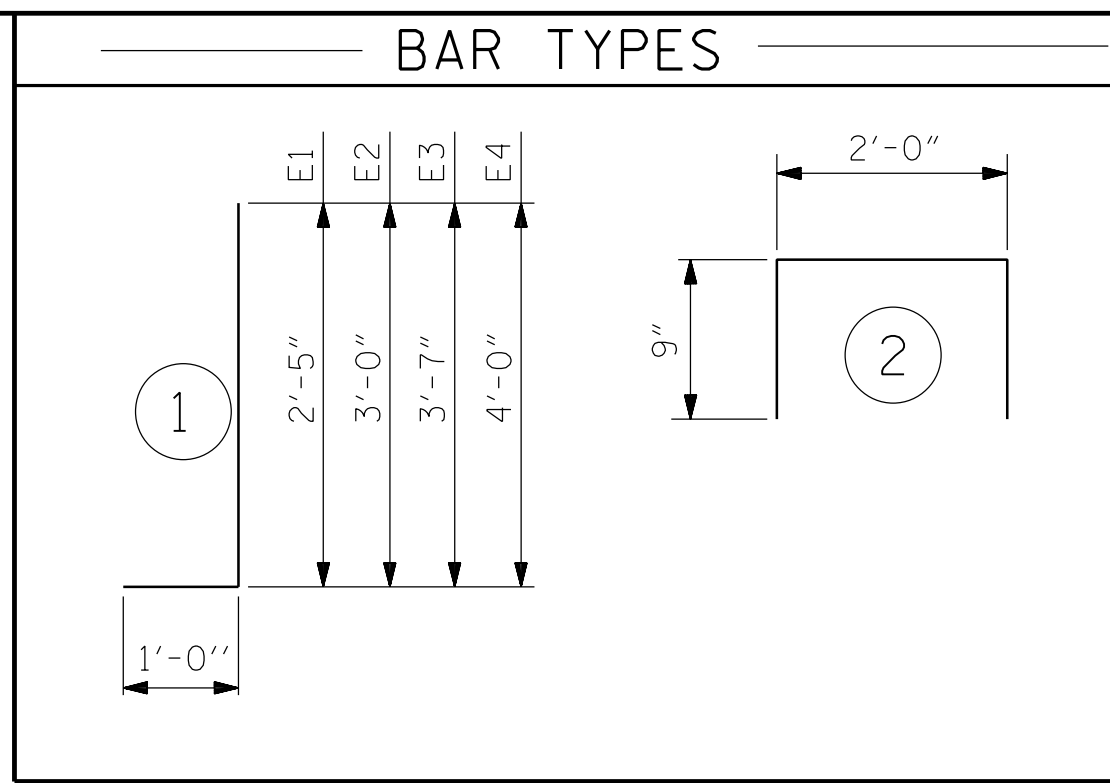
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 P. JACOB



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
FOR SECTION N-N, SEE SHEET 2 OF 3.



BILL OF MATERIAL					
APPROACH SLAB AT BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR	33'-8"	1,169
A2	52	#4	STR	33'-6"	1,164
*B1	131	#5	STR	24'-2"	3,302
B2	131	#6	STR	24'-8"	4,853
*B3	12	#4	STR	24'-8"	198
*E1	4	#7	1	3'-5"	28
*E2	4	#7	1	4'-0"	33
*E3	4	#7	1	4'-7"	37
*E4	4	#7	1	5'-0"	41
*F1	4	#6	STR	1'-9"	11
*F2	4	#6	STR	3'-2"	19
*F3	8	#6	STR	3'-5"	41
*F4	4	#6	STR	3'-8"	22
*G3	50	#4	STR	6'-3"	209
*U3	16	#4	2	3'-6"	37
REINFORCING STEEL				6,017 LBS.	
*EPOXY COATED REINFORCING STEEL				5,147 LBS.	
CLASS AA CONCRETE				80.2 C.Y.	

NOTES

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT AND BACKFILL MATERIAL SEE ROADWAY PLANS.

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

MSE WALL BACKFILL (TYPE III) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

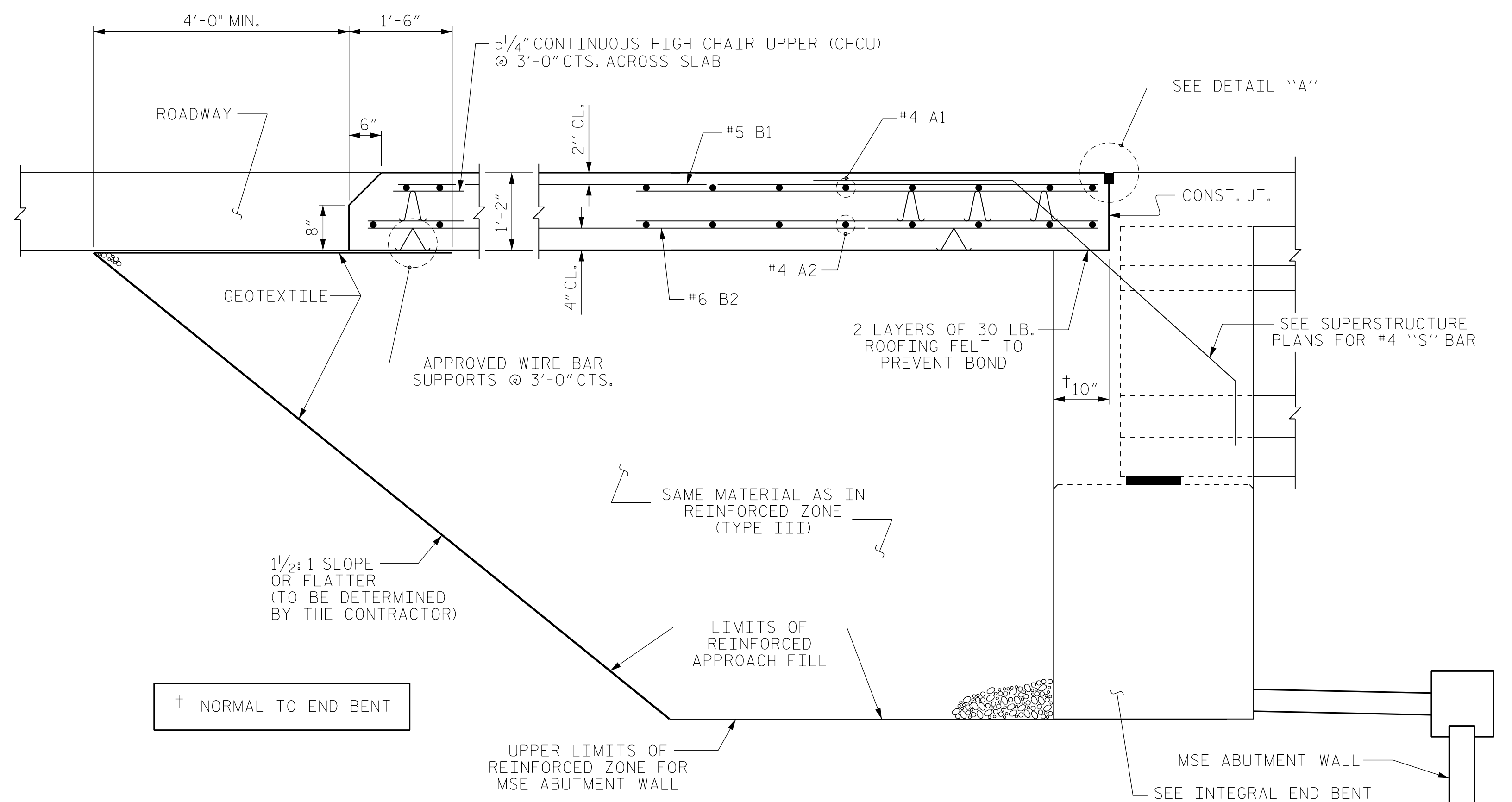
MSE WALL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

AREA BETWEEN THE MSE WALL 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.

FOR REINFORCING IN SIDEWALK AND SIDEWALK DETAILS, SEE SHEET 2 OF 3.

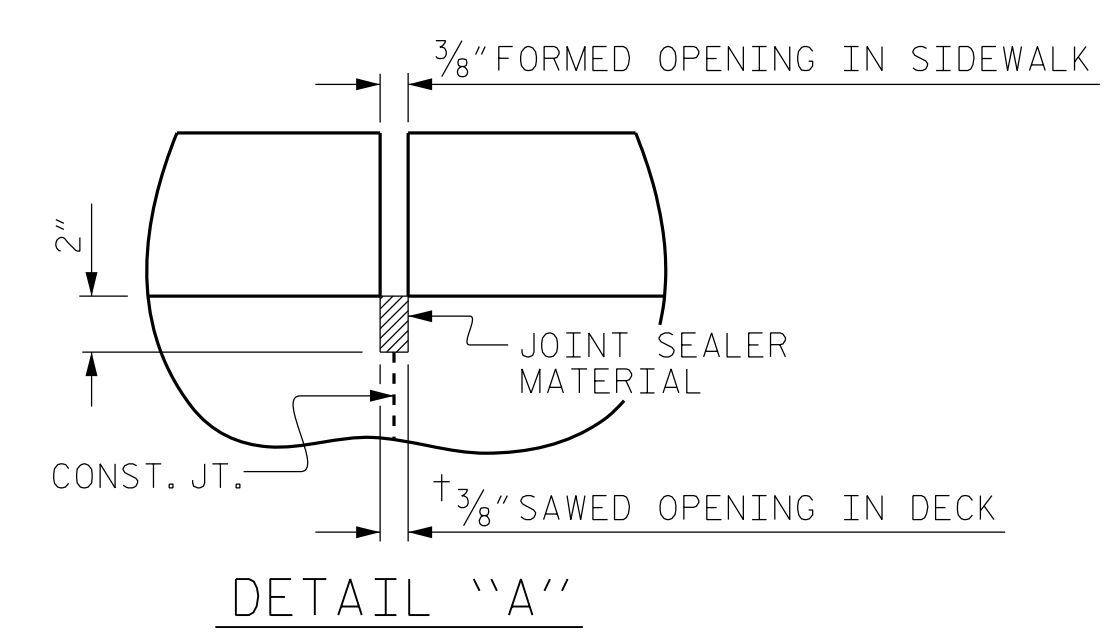
FOR REINFORCING IN END POSTS AND END POSTS DETAILS, SEE SHEET 2 OF 3.



SECTION THRU SLAB

(TYPE III - REINFORCED APPROACH FILL)

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



DETAIL "A"

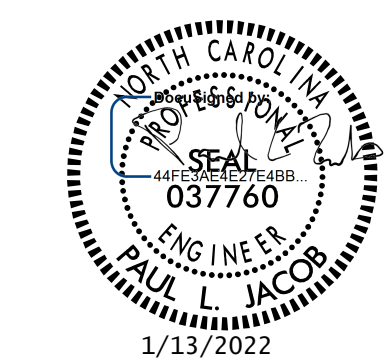
APPROACH SLAB AT BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR	33'-8"	1,169
A2	52	#4	STR	33'-6"	1,164
*B1	131	#5	STR	24'-2"	3,302
B2	131	#6	STR	24'-8"	4,853
*B3	12	#4	STR	24'-8"	198
*E1	4	#7	1	3'-5"	28
*E2	4	#7	1	4'-0"	33
*E3	4	#7	1	4'-7"	37
*E4	4	#7	1	5'-0"	41
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*G3	50	#4	STR	6'-3"	209
*U3	16	#4	2	3'-6"	37
REINFORCING STEEL				6,017 LBS.	
*EPOXY COATED REINFORCING STEEL				5,147 LBS.	
CLASS AA CONCRETE				80.2 C.Y.	

PROJECT NO. B-5737
ROCKINGHAM COUNTY
STATION: 20+86.07 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT



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DESIGN ENGINEER OF RECORD : J. LOFTUS DATE : 04-2021

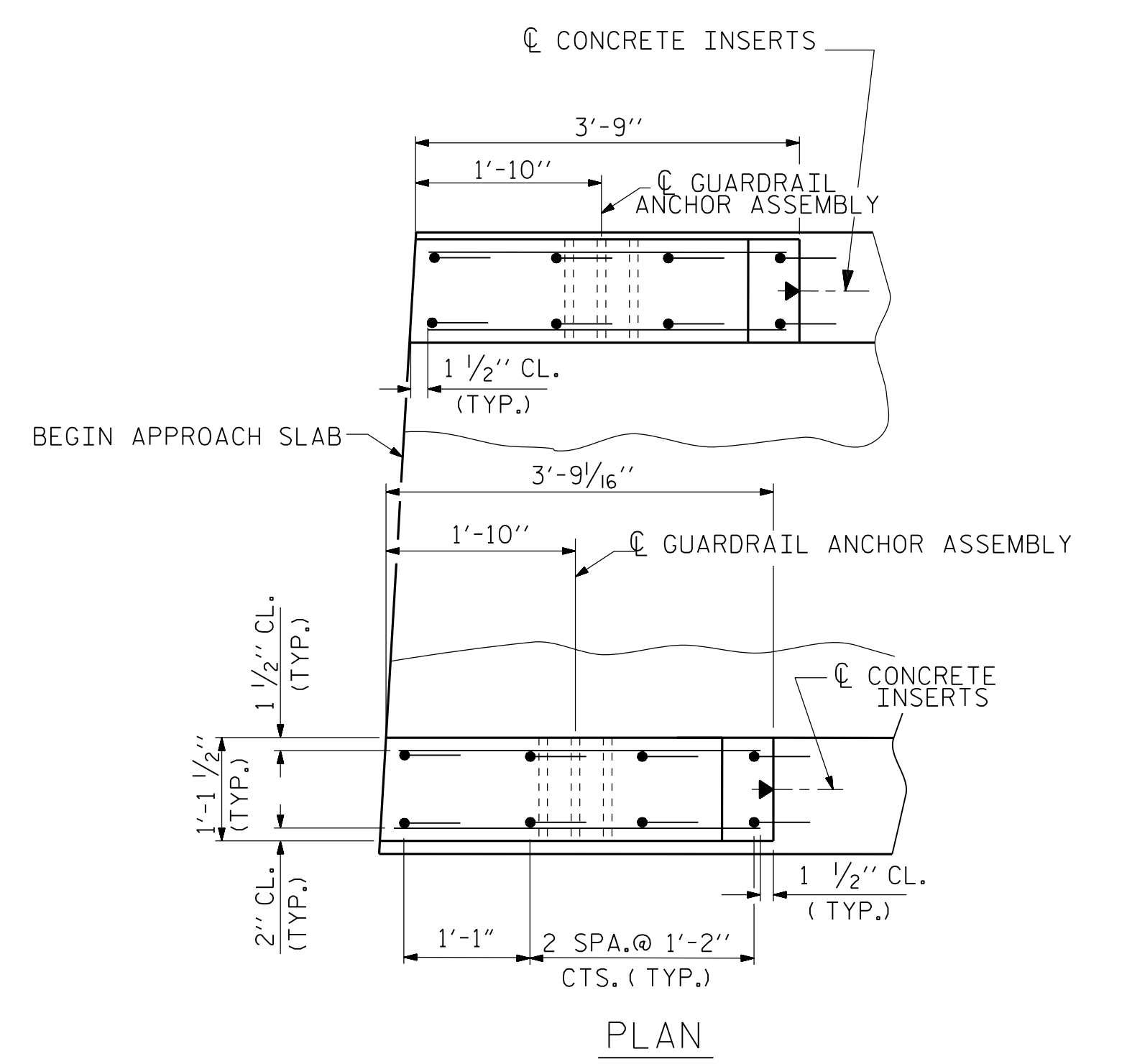
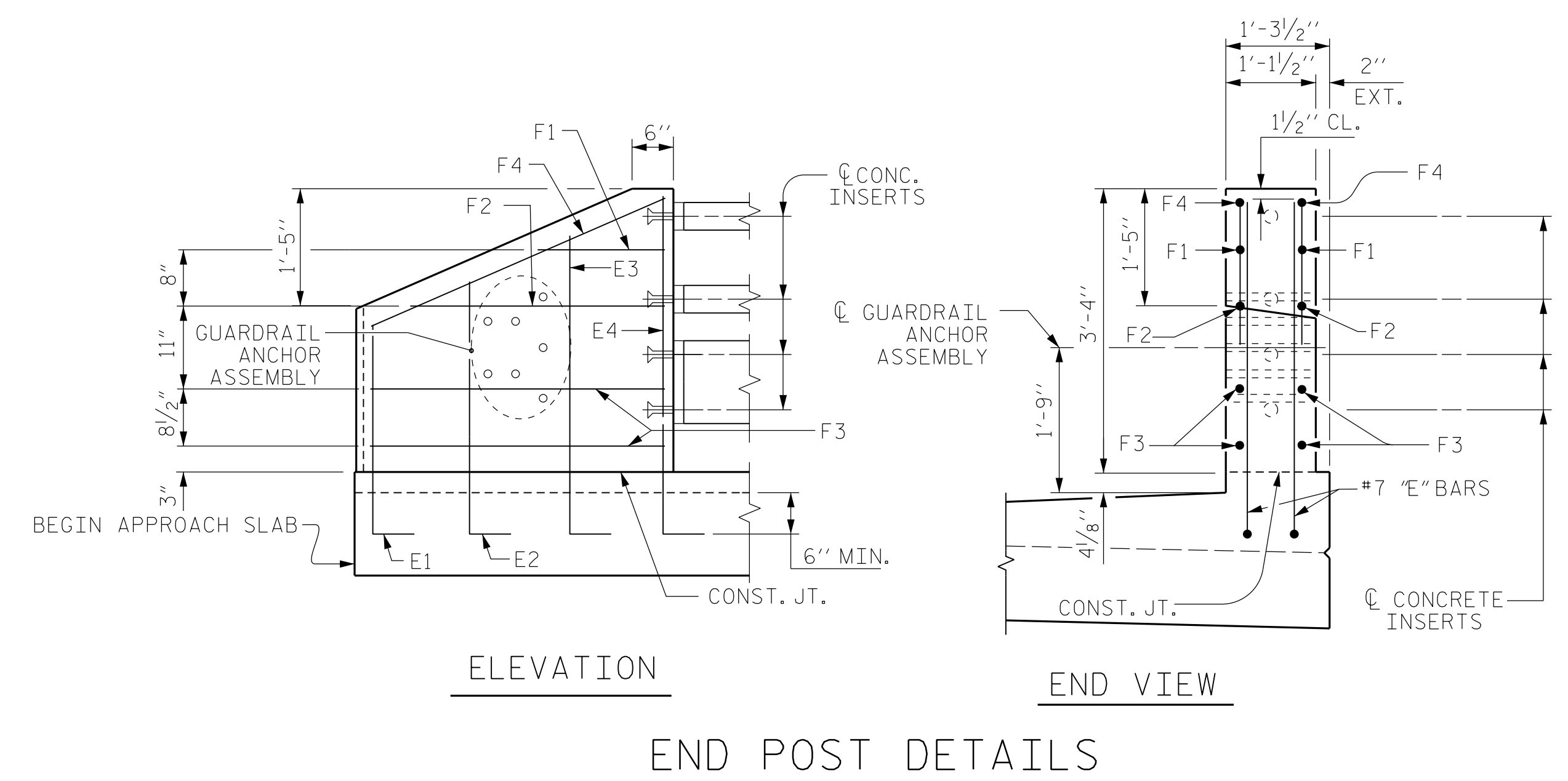
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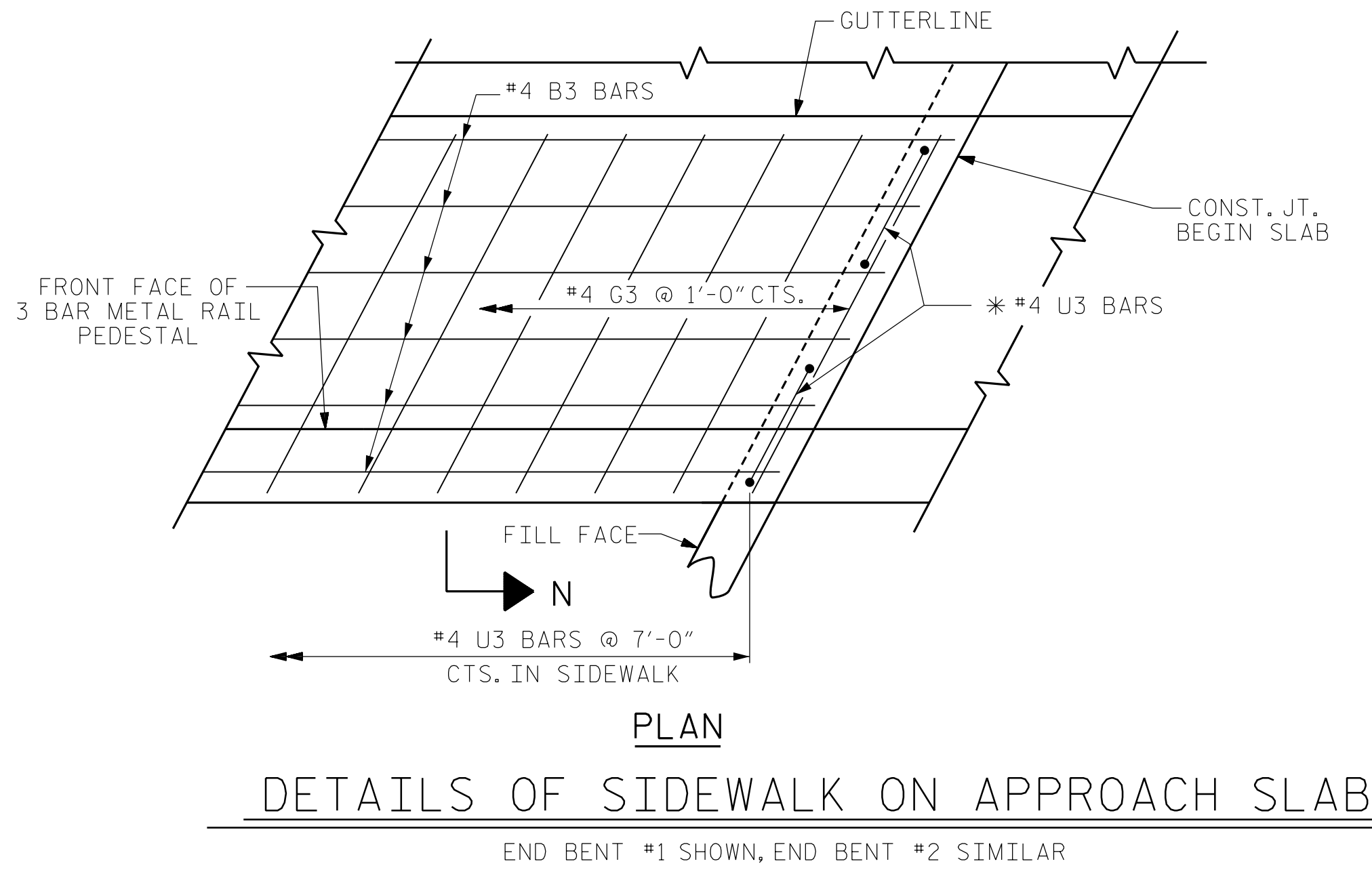
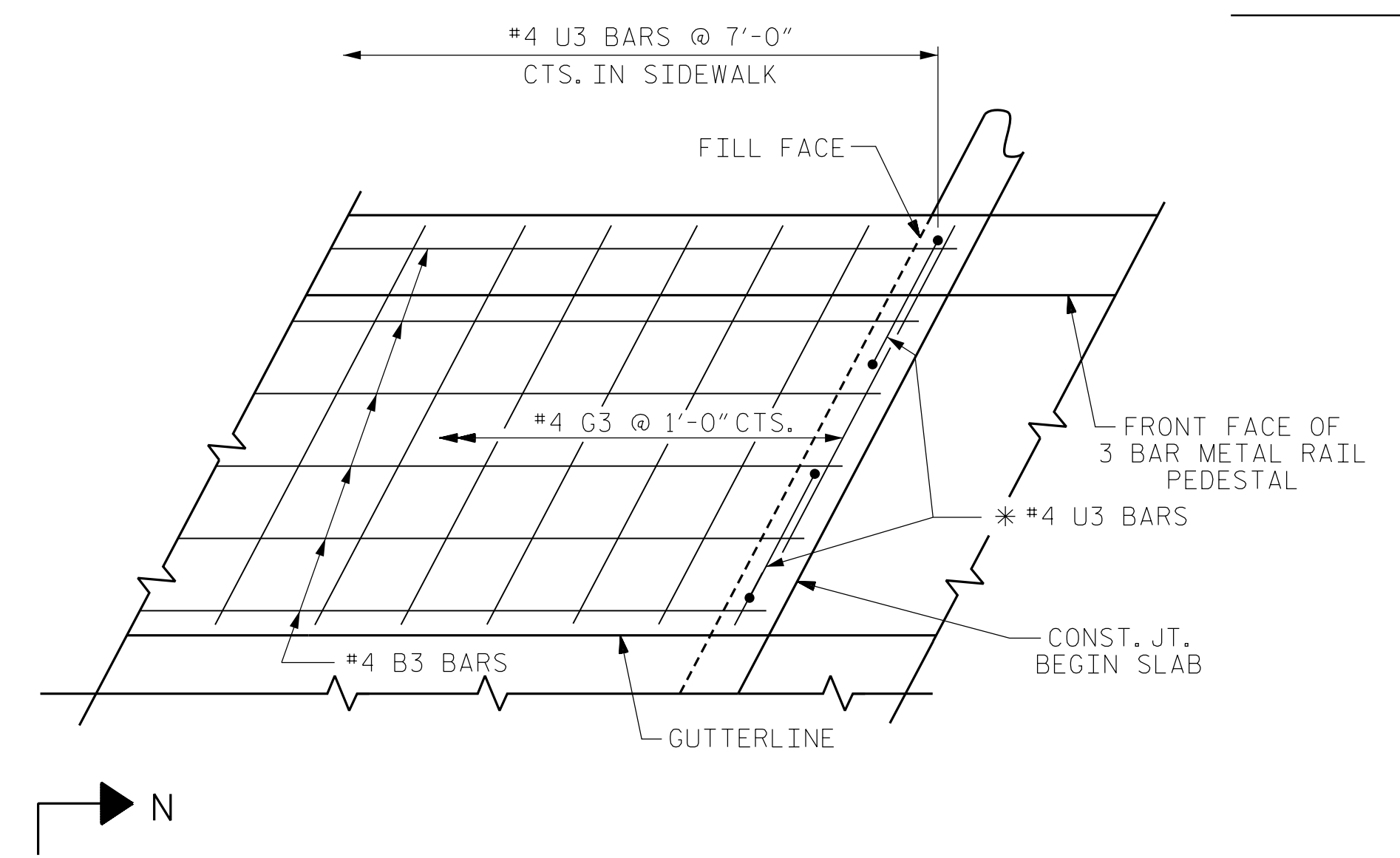
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TOTAL SHEETS 29

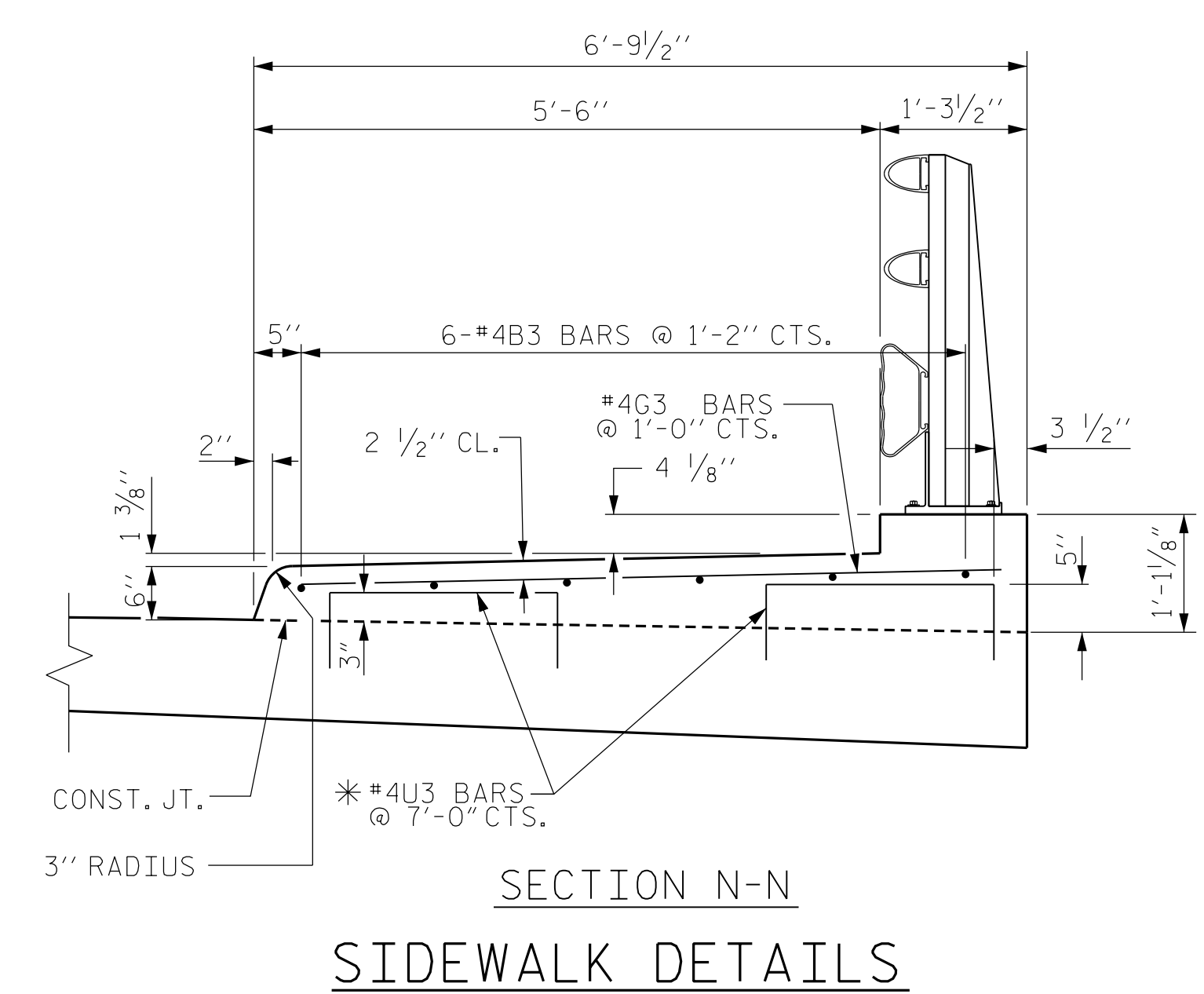
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END POST DETAILS



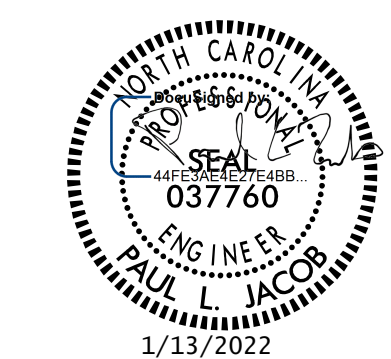
DETAILS OF SIDEWALK ON APPROACH SLAB
END BENT #1 SHOWN, END BENT #2 SIMILAR



SECTION N-N
SIDEWALK DETAILS

NOTES:
ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.
GROOVED CONTRACTION JOINTS, 1/32" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH THE ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FT. IN LENGTH.
*U3 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER THE APPROACH SLAB HAS BEEN SCREEDED OFF.

PROJECT NO. B-5737
ROCKINGHAM COUNTY
STATION: 20+86.07 -L-
SHEET 2 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH
SLAB DETAILS

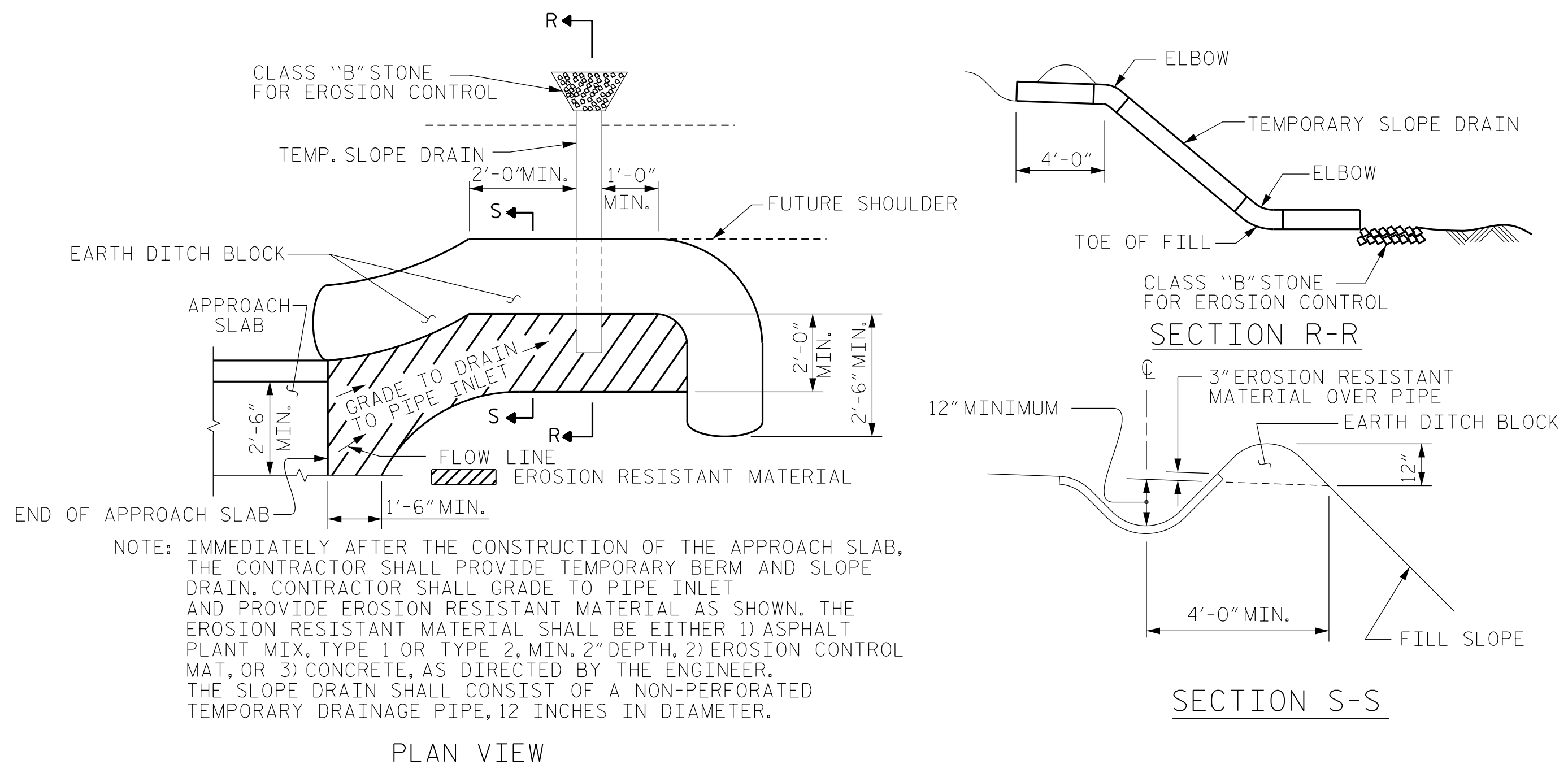
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DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE :	04-2021

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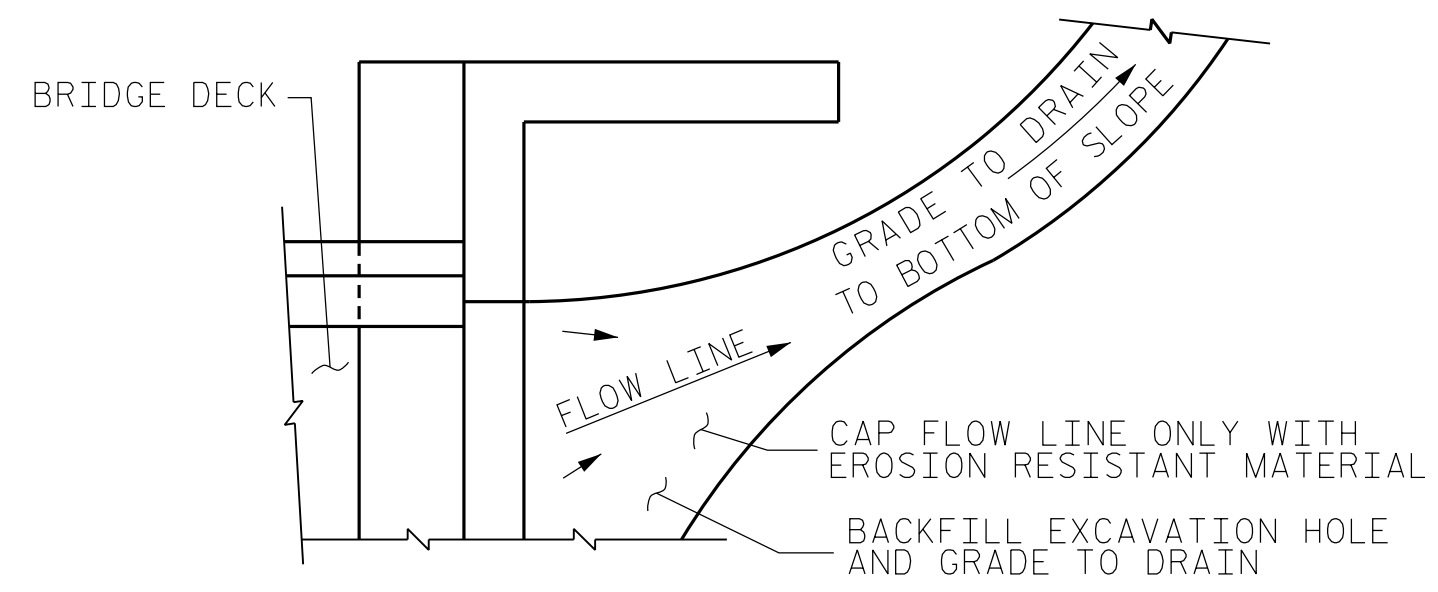
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 P. JACOB



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

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

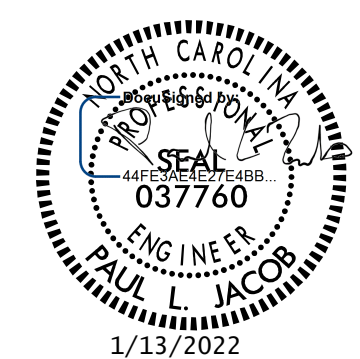
TEMPORARY DRAINAGE DETAIL

PROJECT NO. B-5737
ROCKINGHAM COUNTY
 STATION: 20+86.07 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BRIDGE APPROACH
 SLAB DETAILS



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 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 04-2021

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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

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