

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

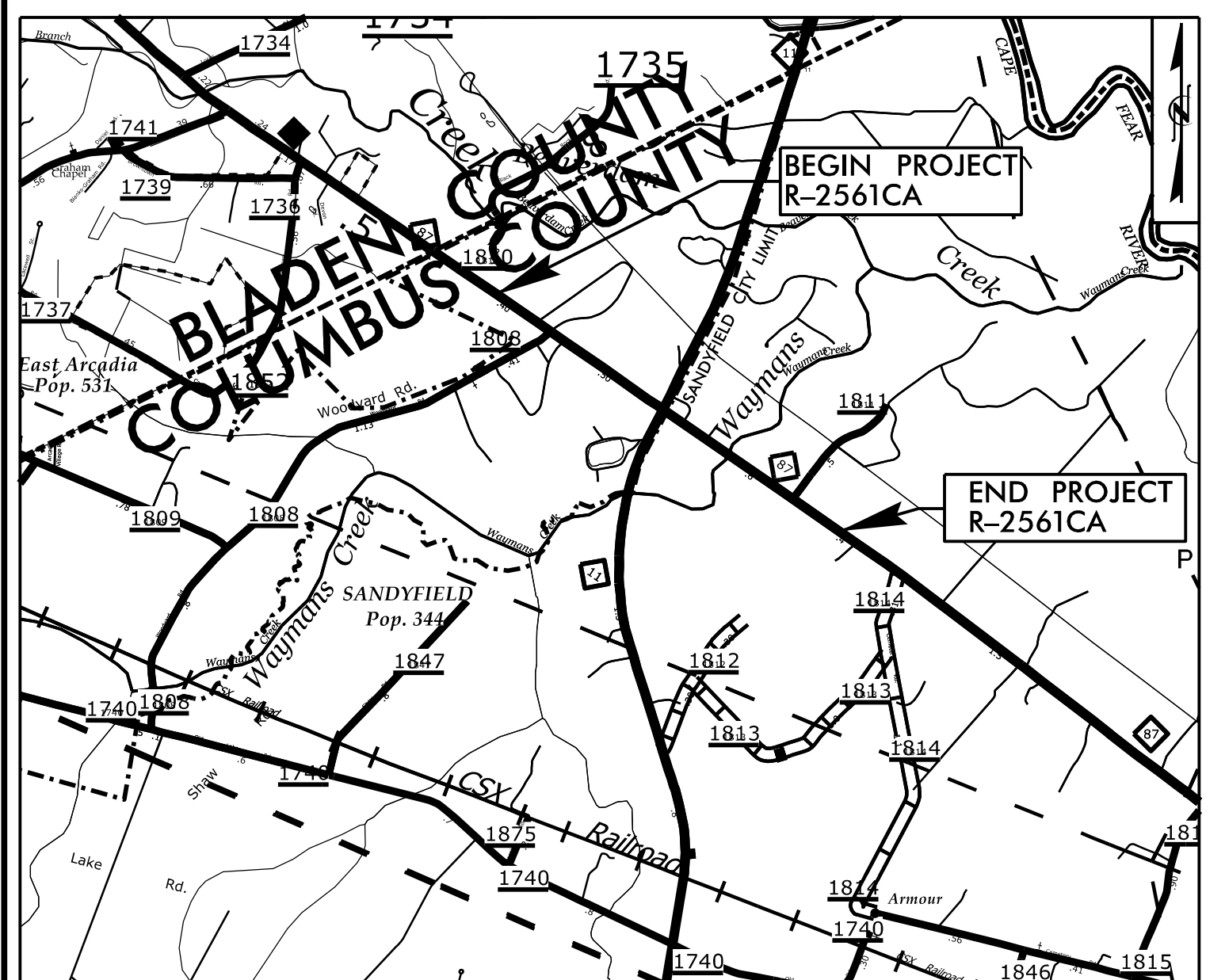
COLUMBUS COUNTY

LOCATION: NC 87 (OLD STAGE RD.)/NC 11 (GENERAL HOWE RD.) INTERCHANGE
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES

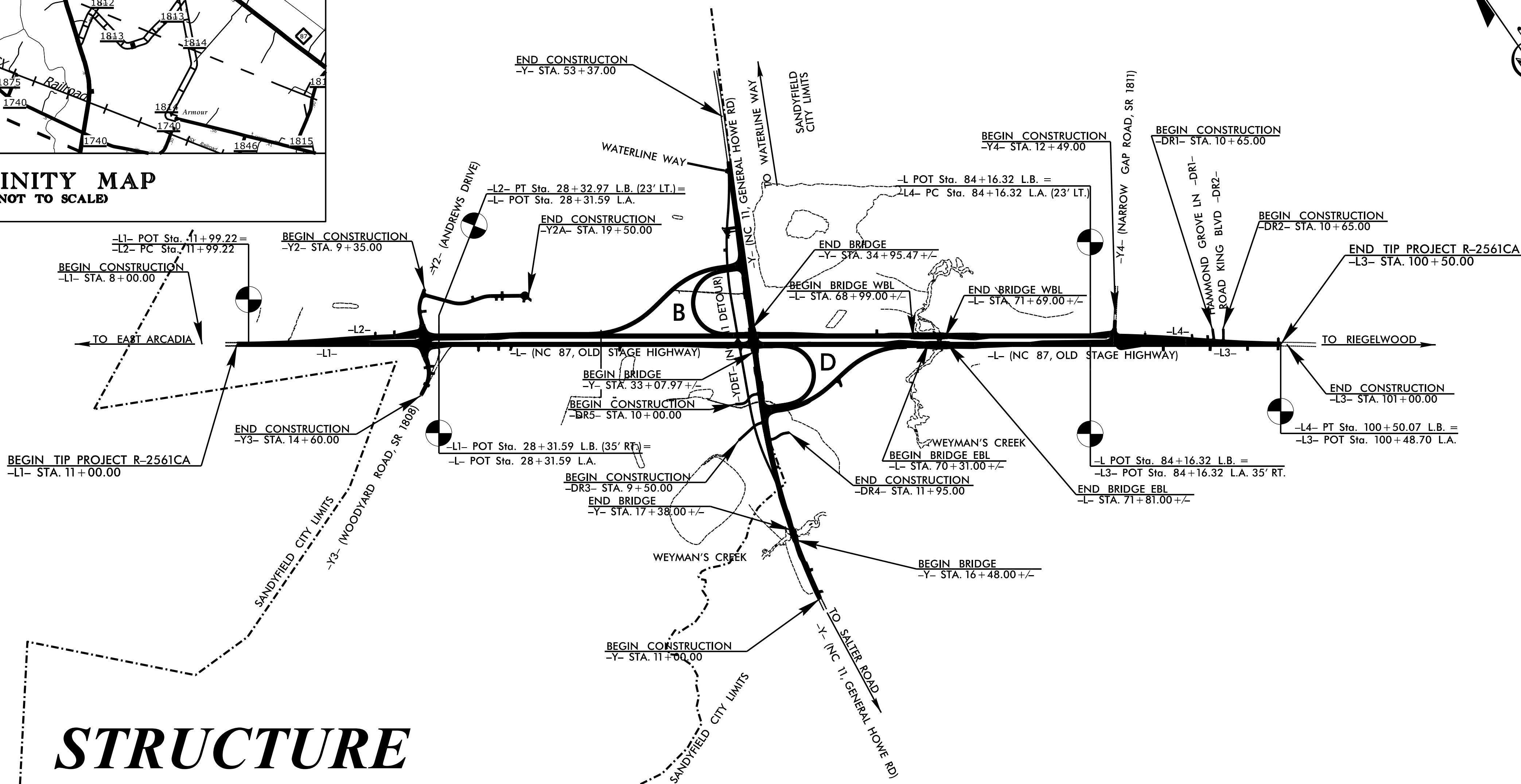
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2561CA	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
34466.4.5	N/A	P.E.	
34466.3.8	N/A	RW & UTILITIES	
34466.1.5	N/A	CONST.	

TIP PROJECT: R-2561CA

CONTRACT: C204570



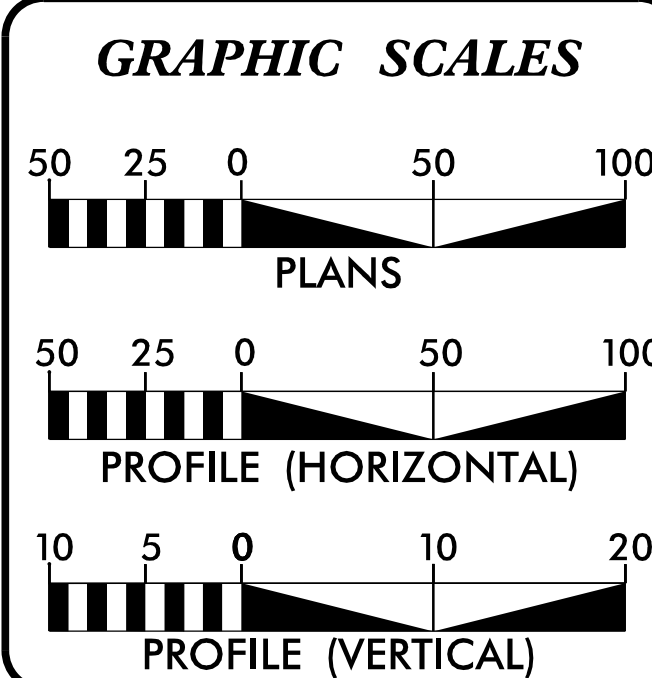
VICINITY MAP
(NOT TO SCALE)



STRUCTURE

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2021 =	7273
ADT 2040 =	9000
K =	9 %
D =	60 %
T =	24 % *
V =	60 MPH
* TTST =	20% DUAL = 4%
FUNC CLASS =	MINOR ARTERIAL "REGIONAL TIER"

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-2561CA =	1.644 MILES
LENGTH OF STRUCTURE TIP PROJECT R-2561CA =	0.051 MILES
TOTAL LENGTH OF TIP PROJECT R-2561CA =	1.695 MILES

PLANS PREPARED FOR THE NCDOT BY:

KCI
KCI Associates of N.C., P.A.
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266
http://www.kci.com

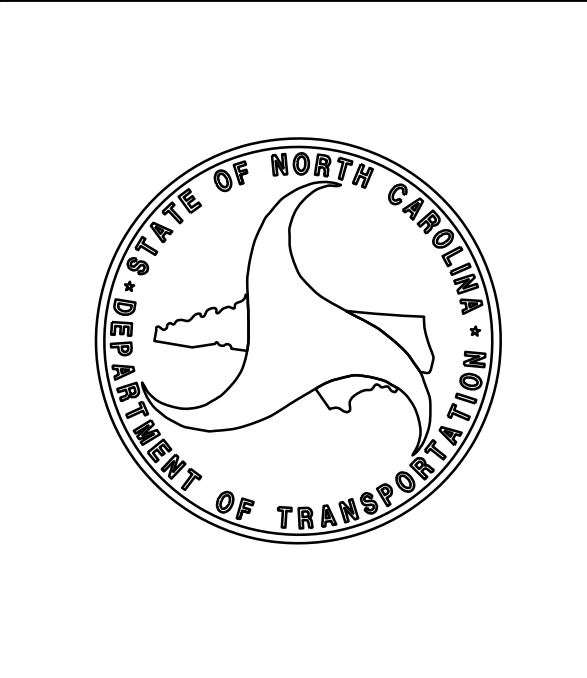
2018 STANDARD SPECIFICATIONS

ROBERT F DECOLA, P.E.
PROJECT ENGINEER

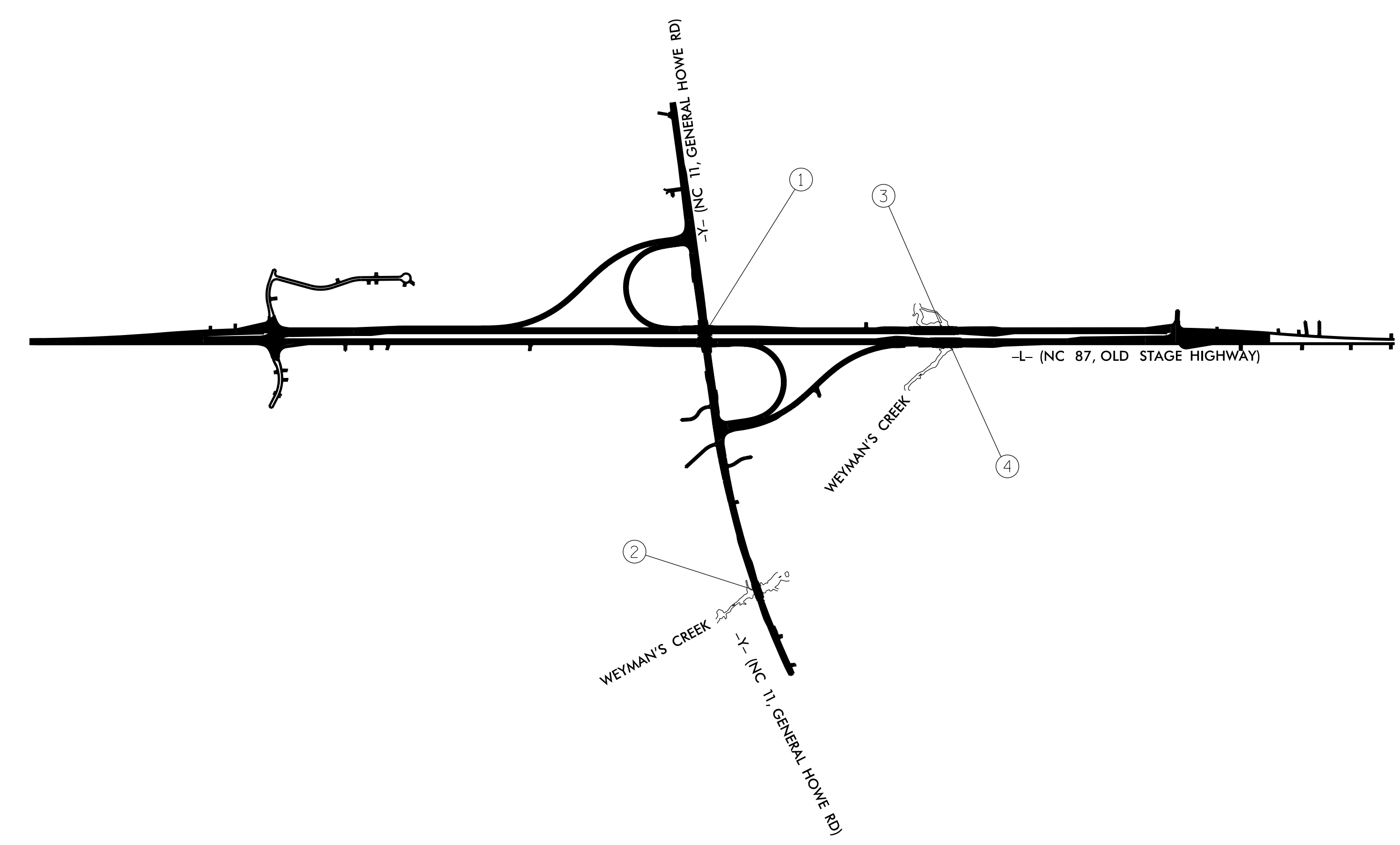
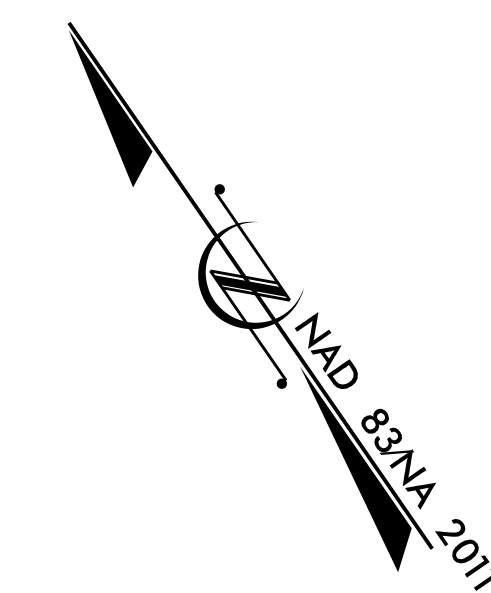
ZONG-JHY SU, P.E.
PROJECT DESIGN ENGINEER

JOHN B. GAUTHIER
NCDOT CONTACT

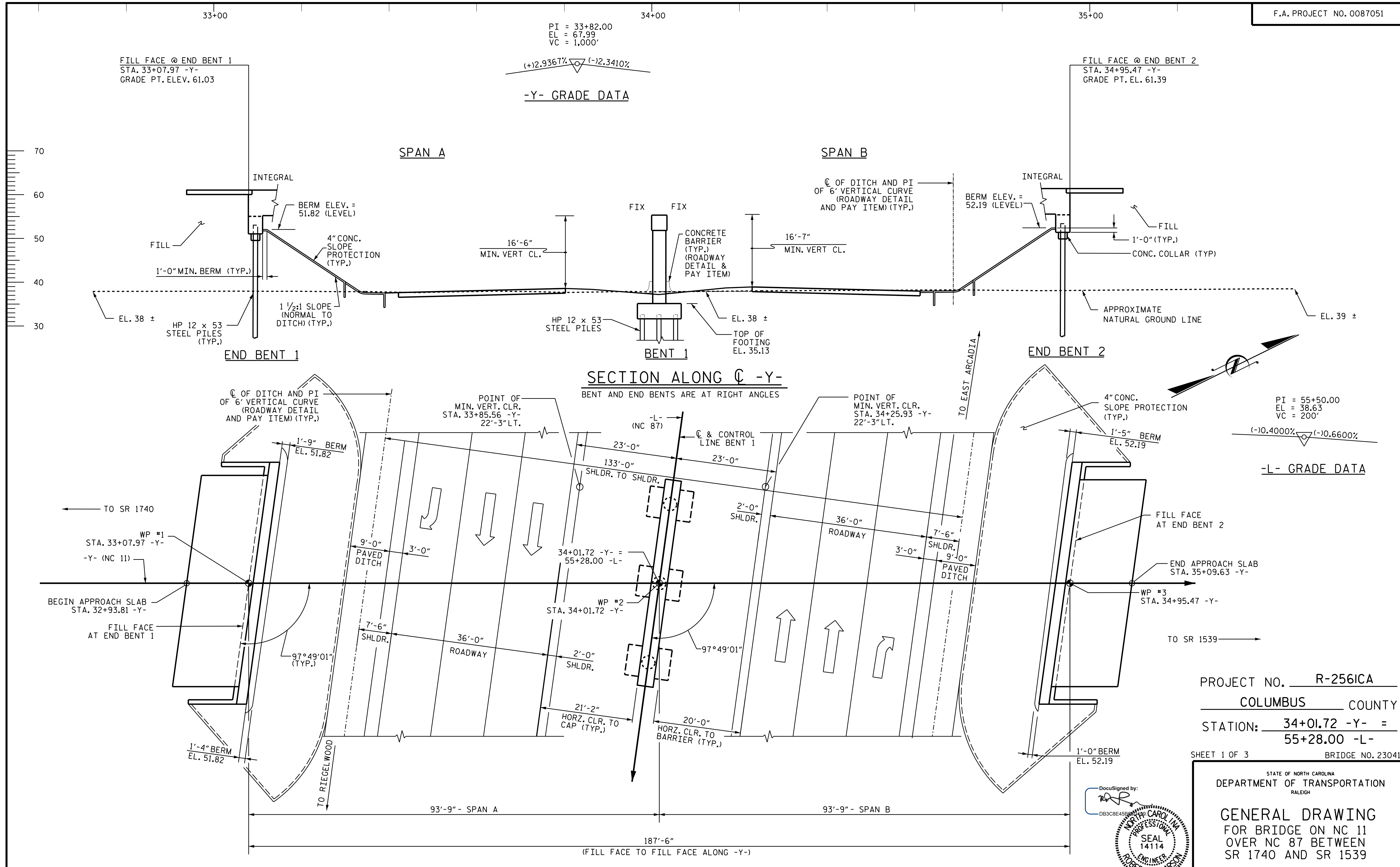
LETTING DATE:
MAY 16, 2023



\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DDN\$\$\$\$\$
\$\$\$\$\$SERNAME\$\$\$\$\$



INDEX		
STR. NO.	DESCRIPTION	SHEETS
①	BRIDGE ON NC 11 OVER NC 87 BETWEEN SR 1470 AND SR 1539	S1-1 THRU S1-28
②	BRIDGE ON NC 11 OVER WEYMAN CREEK BETWEEN SR 1812 AND NC 87	S2-1 THRU S2-24
③	BRIDGE ON NC 87 OVER WEYMAN CREEK BETWEEN NC 11 AND SR 1811 (LEFT LANE)	S3-1 THRU S3-30
④	BRIDGE ON NC 87 OVER WEYMAN CREEK BETWEEN NC 11 AND SR 1811 (RIGHT LANE)	S4-1 THRU S4-29



SECTION ALONG C -Y-

BENT AND END BENTS ARE AT RIGHT ANGLES

PLAN

PILES NOT SHOWN IN PLAN VIEW

DESIGN ENGINEER OF RECORD: *[Signature]* DATE: 9/26/2022
 DRAWN BY: R.J. FLORY DATE: 06/11/19
 CHECKED BY: R.C. LARSON DATE: 06/13/19

DocuSigned by:
[Signature]
 DB3CBE458B...
 STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL 14114
 ROBERT C. LARSON
 9/26/2022

PROJECT NO. R-256ICA
 COLUMBUS COUNTY
 STATION: 34+01.72 -Y- = 55+28.00 -L-
 SHEET 1 OF 3 BRIDGE NO. 230419

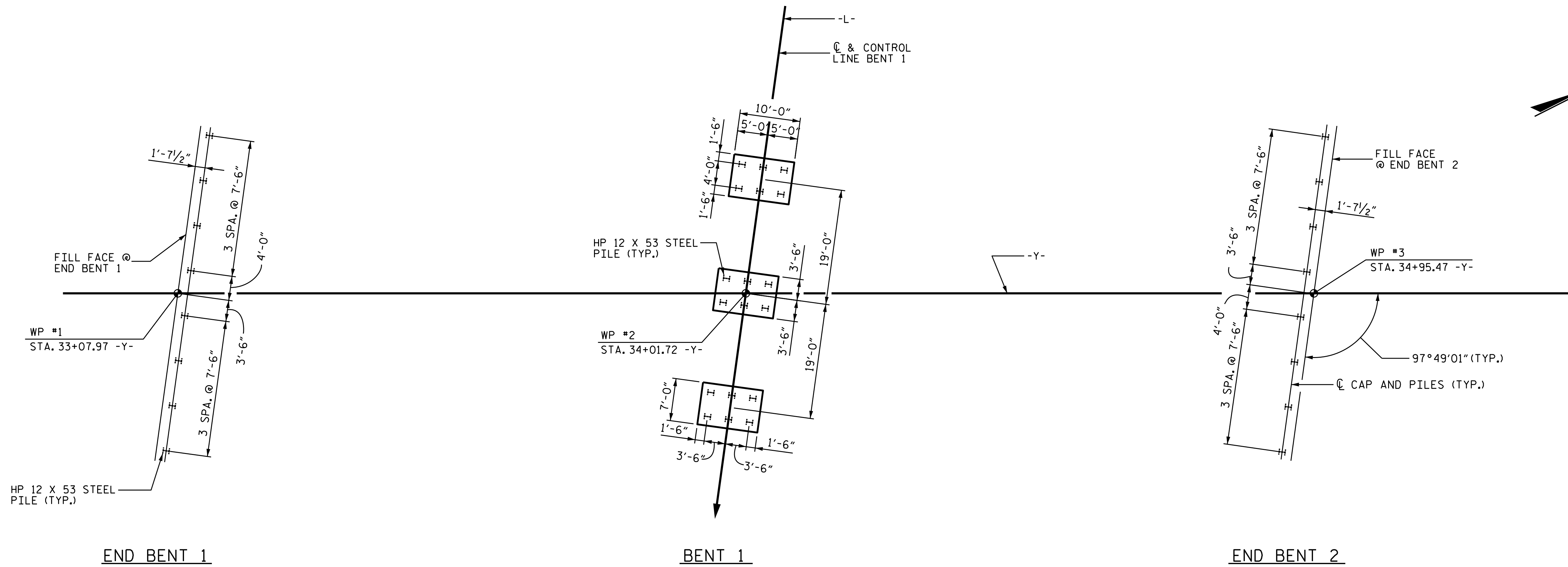
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 FOR BRIDGE ON NC 11
 OVER NC 87 BETWEEN
 SR 1740 AND SR 1539

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

TOTAL SHEETS: 28

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
 of North Carolina, P.A.
 4205 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone: 919-785-9241



FOUNDATION LAYOUT PLAN

ALL PILES ARE VERTICAL
 ALL BENT 1 FOOTINGS ARE IDENTICAL
 DIMENSIONS LOCATING PILES ARE TO C PILE

FOUNDATION NOTES

OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT 1 AND END BENT 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

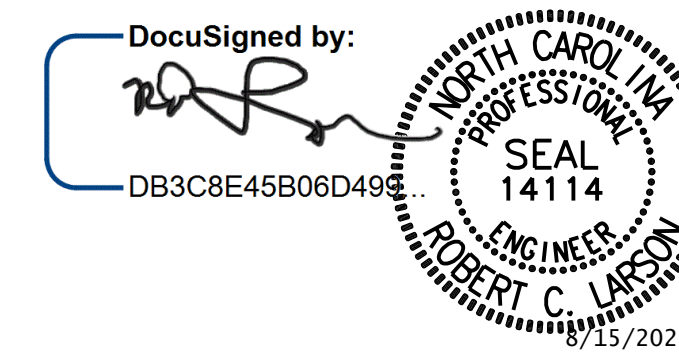
TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT 1 OR END BENT 2 AND AT BENT 1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 11
 OVER NC 87 BETWEEN
 SR 1740 AND SR 1539



DESIGN ENGINEER OF RECORD: RCL DATE: 8/15/2022
 DRAWN BY: R. C. LARSON DATE: 04/19/20
 CHECKED BY: R. F. DECOLA DATE: 05/08/20

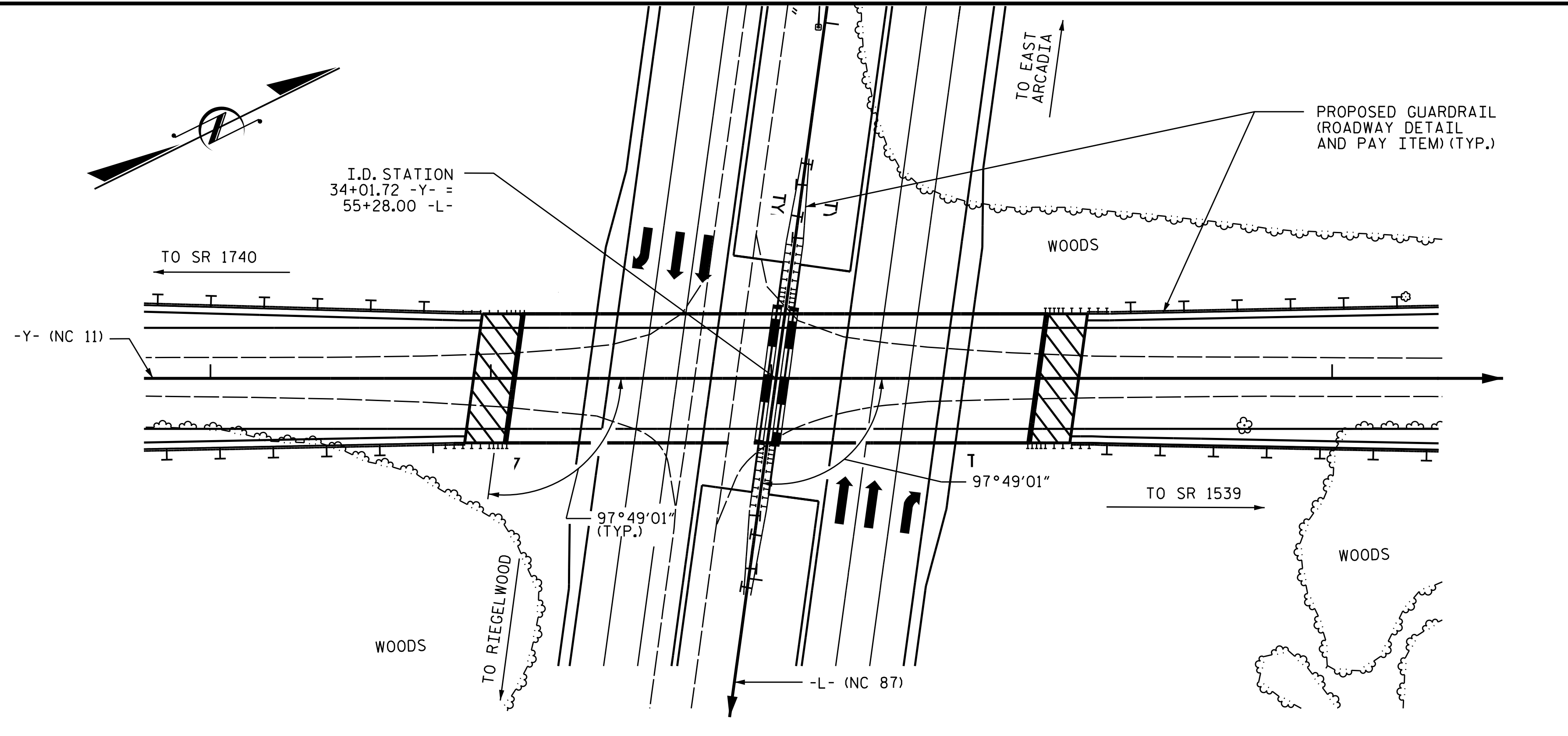
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6370 Phone: 919-785-9241

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

TOTAL SHEETS: 28

BENCH MARK: BM7 BENCH TIE SET IN 10" OAK -Y- STA. 30+42.87 43.07' RT. ELEV. 38.39 NAVD 88



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
 THE ELEVATION(S) AND CLEARANCE(S) SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE, REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
 FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
 PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-INPLACE 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.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND $f_y = 60\text{ksi}$.

TOTAL BILL OF MATERIAL

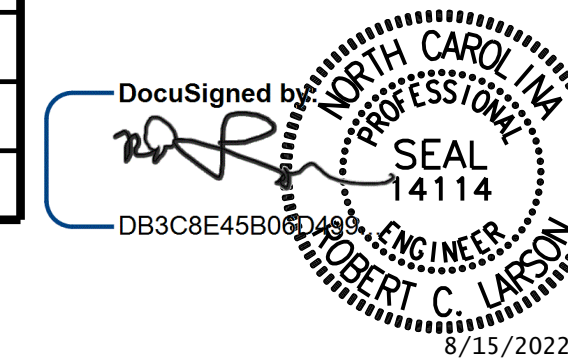
	FOUNDATION EXCAVATION FOR BENT 1 @ STA. 34+01.72-Y-	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS @ STA. 34+01.72-Y-	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
									NO.	LIN.FT.		EA.	NO.				
SUPERSTRUCTURE	LUMP SUM	EA.	SO.FT.	SO.FT.	CU.YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN.FT.	EA.	NO.	LIN.FT.	EA.	LIN.FT.	SO.YDS.	LUMP SUM
END BENT 1					38.0		5435				8	8	560	4		210	
BENT 1	LUMP SUM				63.9		10,006	1157			18	18	1080	9			
END BENT 2					38.0		5435				8	8	560	4		210	
TOTAL	LUMP SUM	2	9152	9183	139.9	LUMP SUM	20,876	1157	10	922.08	34	34	2200	17	371.64	420	LUMP SUM

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 11
 OVER NC 87 BETWEEN
 SR 1740 AND SR 1539



DESIGN ENGINEER OF RECORD: R. J. FLORY DATE: 8/15/2022
 DRAWN BY: R. J. FLORY DATE: 06/11/19
 CHECKED BY: R. C. LARSON DATE: 06/13/19

DOCUMENT NOT CONSIDERED FINAL
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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

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

TOTAL SHEETS: 28

LOAD FACTORS:

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

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 (CL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	LIVE-LOAD FACTORS (CL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.14	--	1.75	0.854	1.60	A	E	45.4	1.005	1.20	A	I	17.7	0.80	0.807	1.14	A	I	45.4		
	HL-93 (OPERATING)	N/A		1.60	--	1.35	0.854	2.08	A	E	45.4	1.005	1.60	A	I	17.7	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.56	55.80	1.75	0.854	2.19	A	E	45.4	1.005	1.57	A	I	17.7	0.80	0.807	1.56	A	I	45.4		
	HS-20 (OPERATING)	36.000		2.08	73.80	1.35	0.854	2.84	A	E	45.4	1.005	2.08	A	I	17.7	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.67	49.14	1.40	0.854	6.41	A	E	45.4	1.005	5.02	A	I	17.7	0.80	0.807	3.67	A	I	45.4	
		SNGARBS2	20.000		2.67	53.00	1.40	0.854	4.66	A	E	45.4	1.005	3.50	A	I	17.7	0.80	0.807	2.67	A	I	45.4	
		SNAGRIS2	22.000		2.51	54.78	1.40	0.854	4.38	A	E	45.4	1.005	3.24	A	I	17.7	0.80	0.807	2.51	A	I	45.4	
		SNCOTTS3	27.250		1.82	49.32	1.40	0.854	3.19	A	E	45.4	1.005	2.43	A	I	17.7	0.80	0.807	1.82	A	I	45.4	
		SNAGGRS4	34.925		1.50	52.03	1.40	0.854	2.62	A	E	45.4	1.005	1.98	A	I	17.7	0.80	0.807	1.50	A	I	45.4	
		SNS5A	35.550		1.47	51.90	1.40	0.854	2.57	A	E	45.4	1.005	2.00	A	I	17.7	0.80	0.807	1.47	A	I	45.4	
		SNS6A	39.950		1.34	53.13	1.40	0.854	2.34	A	E	45.4	1.005	1.81	A	I	17.7	0.80	0.807	1.34	A	I	45.4	
		SNS7B	42.000		1.27	53.34	1.40	0.854	2.23	A	E	45.4	1.005	1.77	A	I	17.7	0.80	0.807	1.27	A	I	45.4	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.63	53.46	1.40	0.854	2.85	A	E	45.4	1.005	2.18	A	I	17.7	0.80	0.807	1.63	A	I	45.4	
		TNT4A	33.075		1.63	53.58	1.40	0.854	2.86	A	E	45.4	1.005	2.13	A	I	17.7	0.80	0.807	1.63	A	I	45.4	
		TNT6A	41.600		1.33	54.91	1.40	0.854	2.32	A	E	45.4	1.005	1.88	A	I	17.7	0.80	0.807	1.33	A	I	45.4	
		TNT7A	42.000		1.33	55.44	1.40	0.854	2.32	A	E	45.4	1.005	1.84	A	I	17.7	0.80	0.807	1.33	A	I	45.4	
		TNT7B	42.000		1.36	56.70	1.40	0.854	2.32	A	E	45.4	1.005	1.73	A	I	17.7	0.80	0.807	1.36	A	I	45.4	
		TNAGRIT4	43.000		1.31	55.90	1.40	0.854	2.28	A	E	45.4	1.005	1.67	A	I	17.7	0.80	0.807	1.31	A	I	45.4	
TNAGT5A	45.000		1.24	55.35	1.40	0.854	2.16	A	E	45.4	1.005	1.65	A	I	17.7	0.80	0.807	1.24	A	I	45.4			
TNAGT5B	45.000	③	1.22	54.90	1.40	0.854	2.14	A	E	45.4	1.005	1.58	A	I	17.7	0.80	0.807	1.22	A	I	45.4			

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)

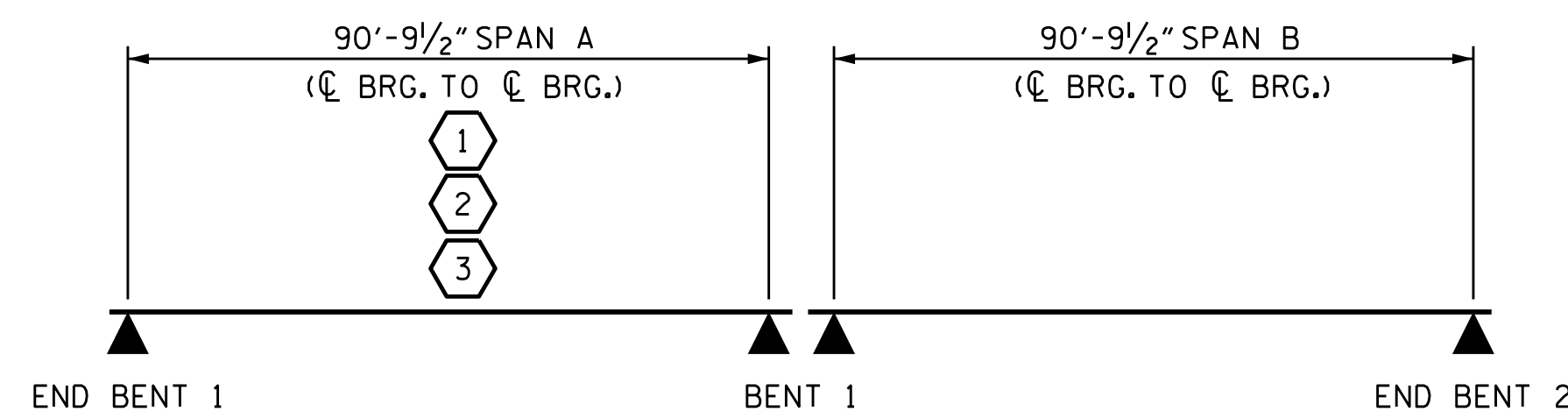
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

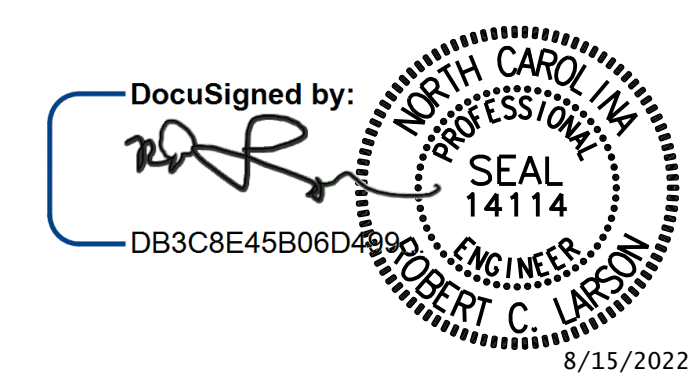
I - INTERIOR GIRDER
E - EXTERIOR GIRDER



LRFR SUMMARY

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

DESIGN ENGINEER OF RECORD:	DATE: 8/15/2022
ASSEMBLED BY: C. E. LARSON	DATE: 08/01/19
CHECKED BY: R. C. LARSON	DATE: 08/07/19
DRAWN BY: MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY: GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



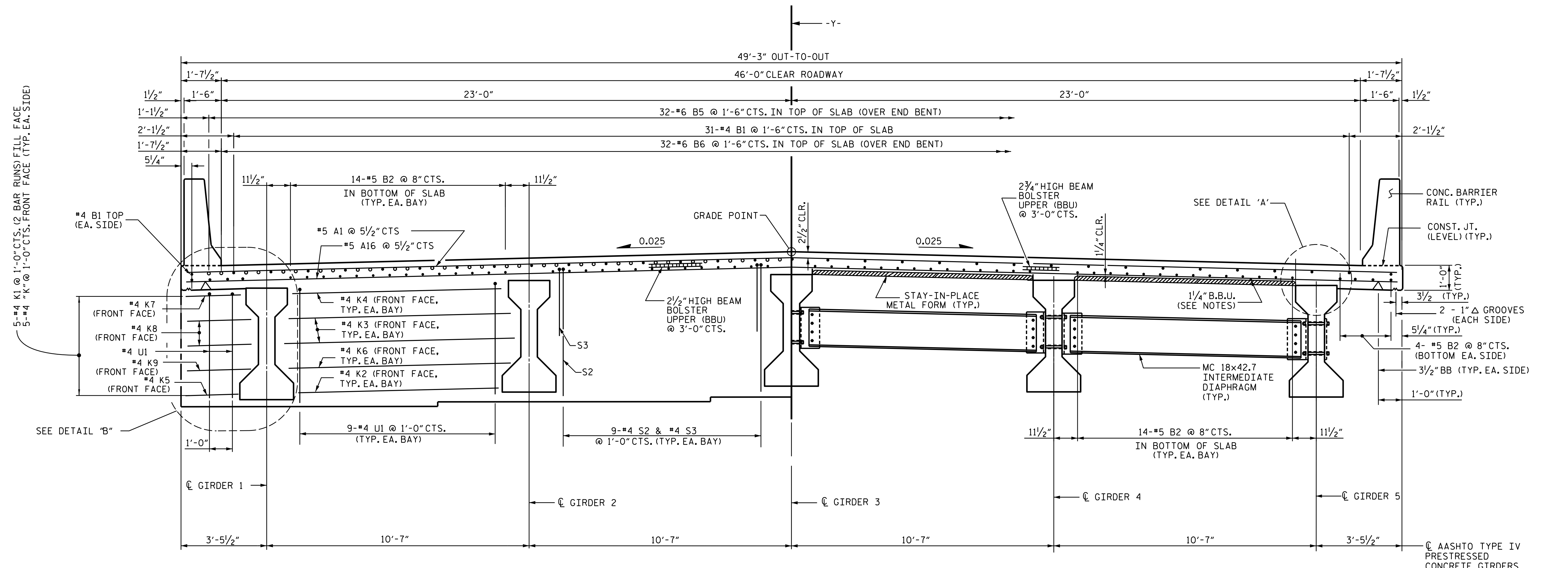
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 LRFR SUMMARY FOR
 PRESTRESSED
 CONCRETE GIRDERS
 (NON-INTERSTATE TRAFFIC)

**DOCUMENT NOT CONSIDERED FINAL
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REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S1-4
TOTAL SHEETS	28

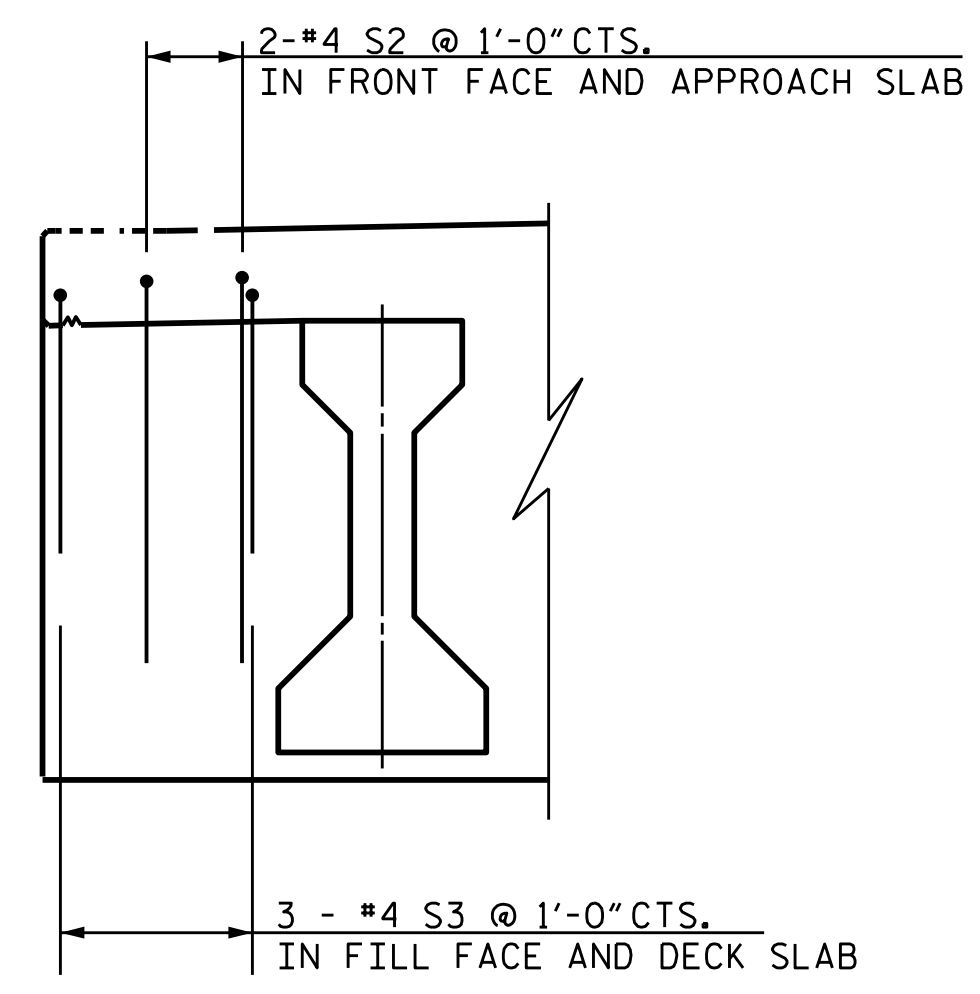


TYPICAL HALF SECTION AT INTEGRAL END BENT 1 & 2 DIAPHRAGM

TYPICAL SECTION

TYPICAL HALF SECTION AT INTERMEDIATE DIAPHRAGM

- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING OVER END BENT



DETAIL B
(TYP. EA. SIDE @ END BENTS)

NOTES

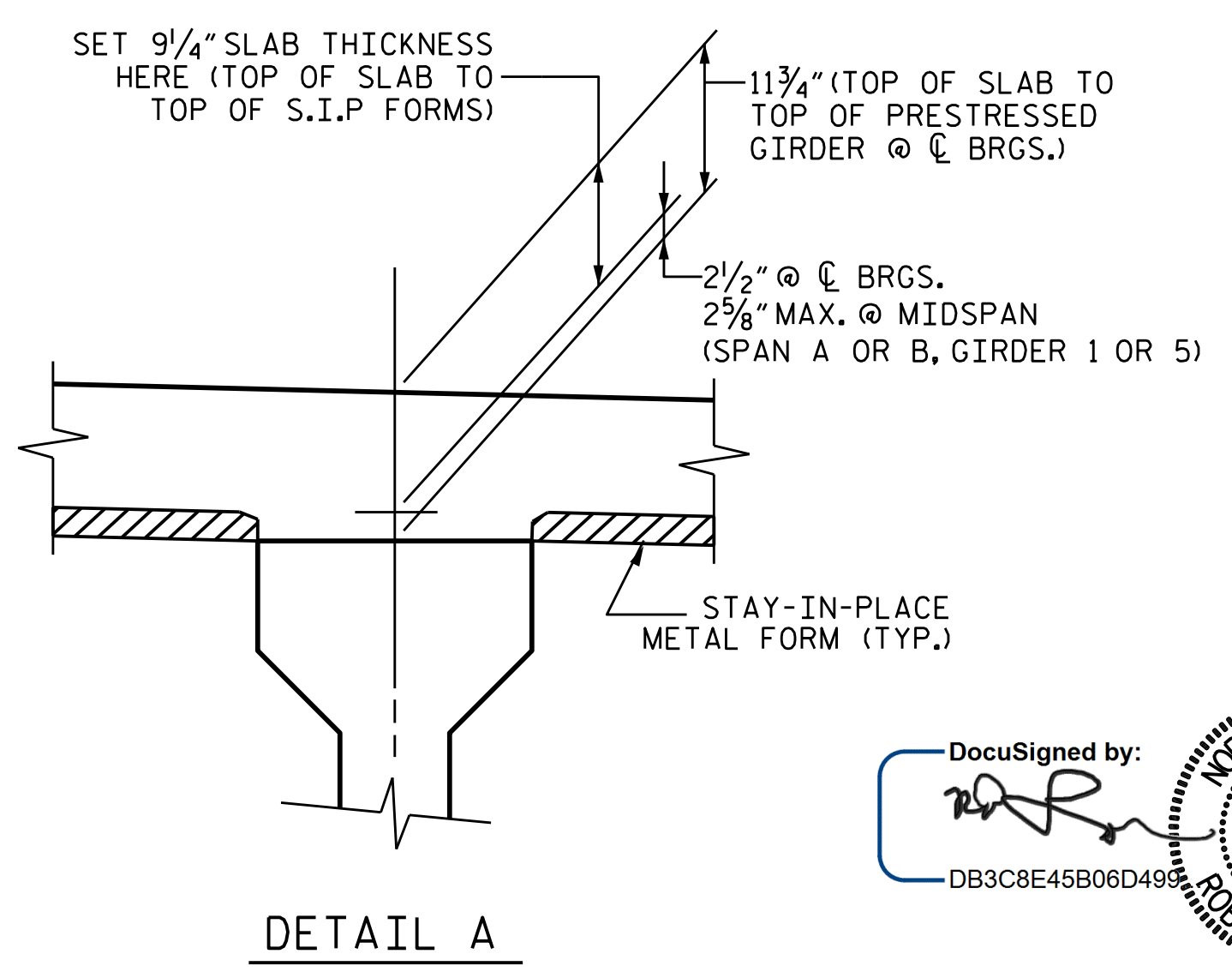
PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2"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

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

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

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

SEE BARRIER RAIL DRAWINGS FOR ADDITIONAL REINFORCING STEEL EMBEDDED IN DECK.



DETAIL A

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 TYPICAL SECTION**

DocuSigned by:

 DB3C8E45B06D498

PROFESSIONAL ENGINEER
 SEAL
 14114
 ROBERT C. LARSON
 8/15/2022

DESIGN ENGINEER OF RECORD: DATE: 8/15/2022

DRAWN BY: A. K. ALLANKI DATE: 07/22/19

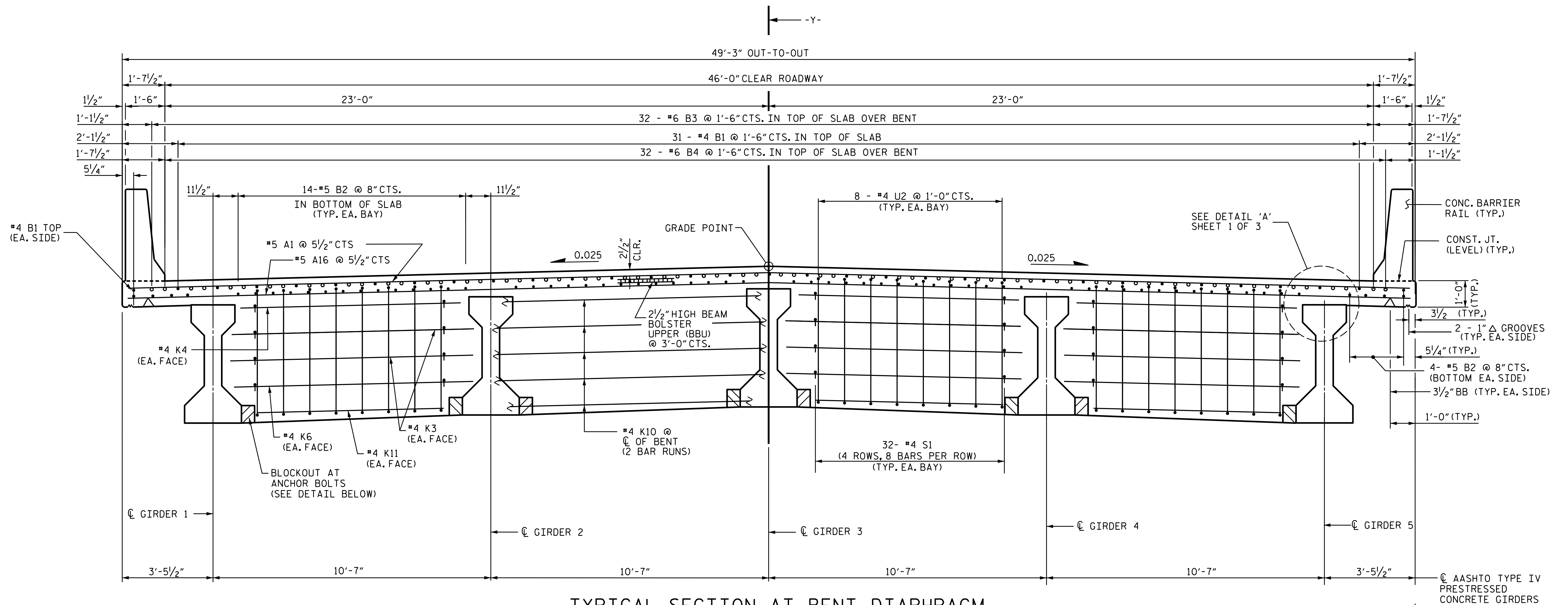
CHECKED BY: R. C. LARSON DATE: 07/26/19

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 UNLESS ALL SIGNATURES COMPLETED**

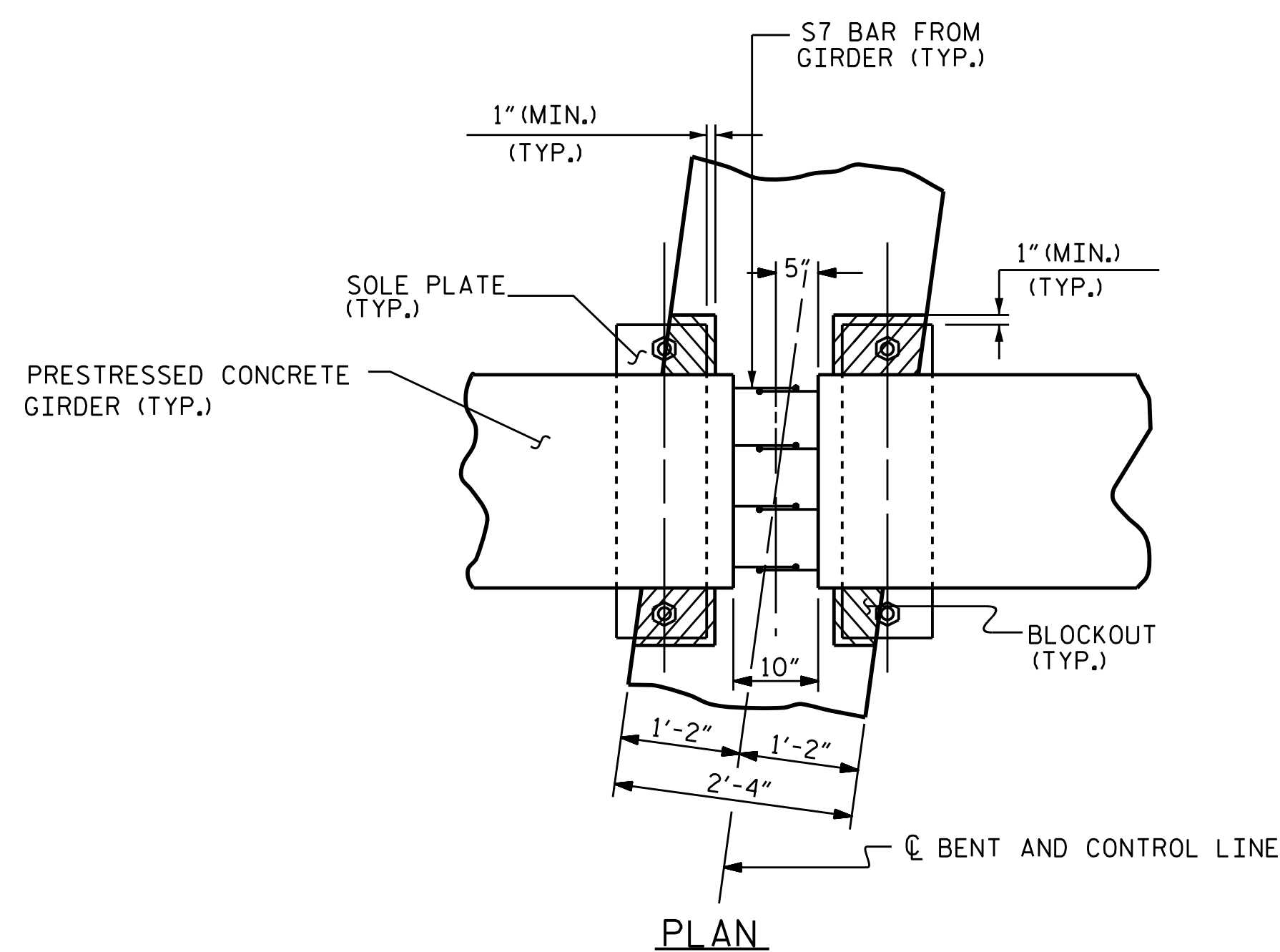
ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-9241

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

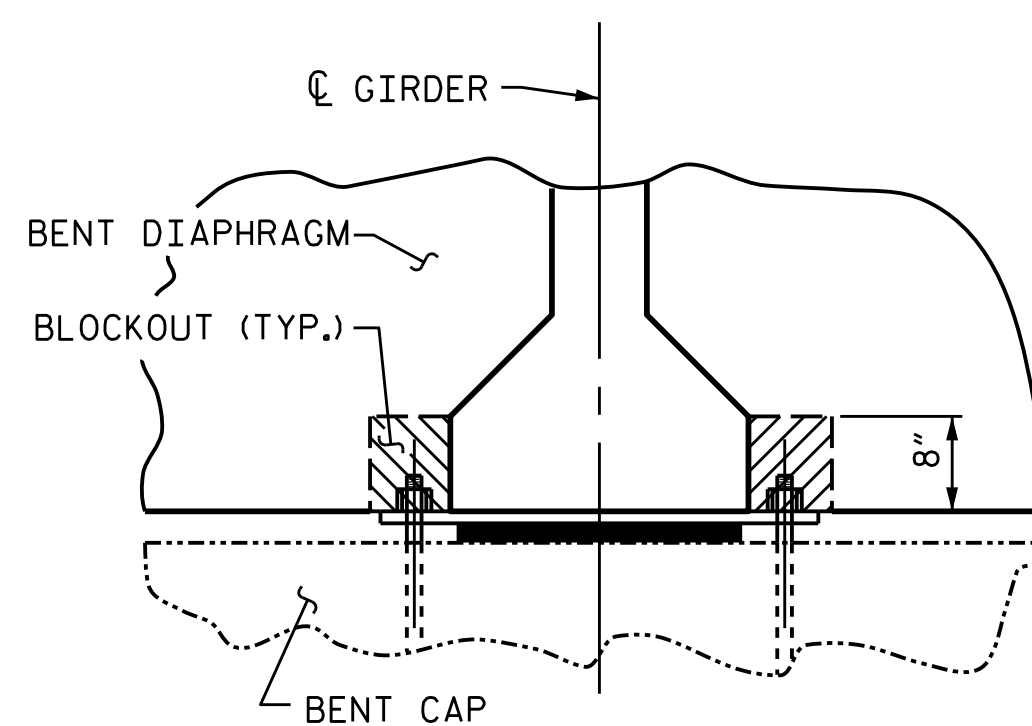
TOTAL SHEETS: 28



TYPICAL SECTION AT BENT DIAPHRAGM



BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION

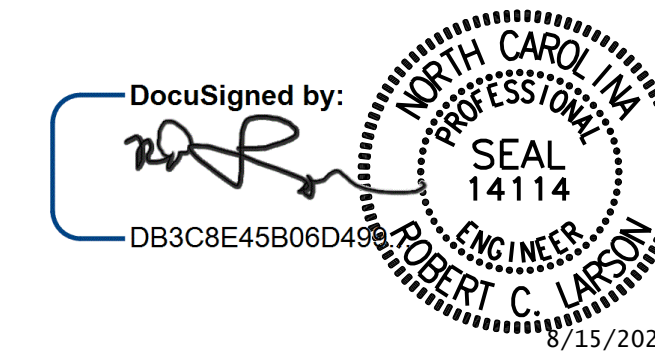
- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING OVER BENT

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION



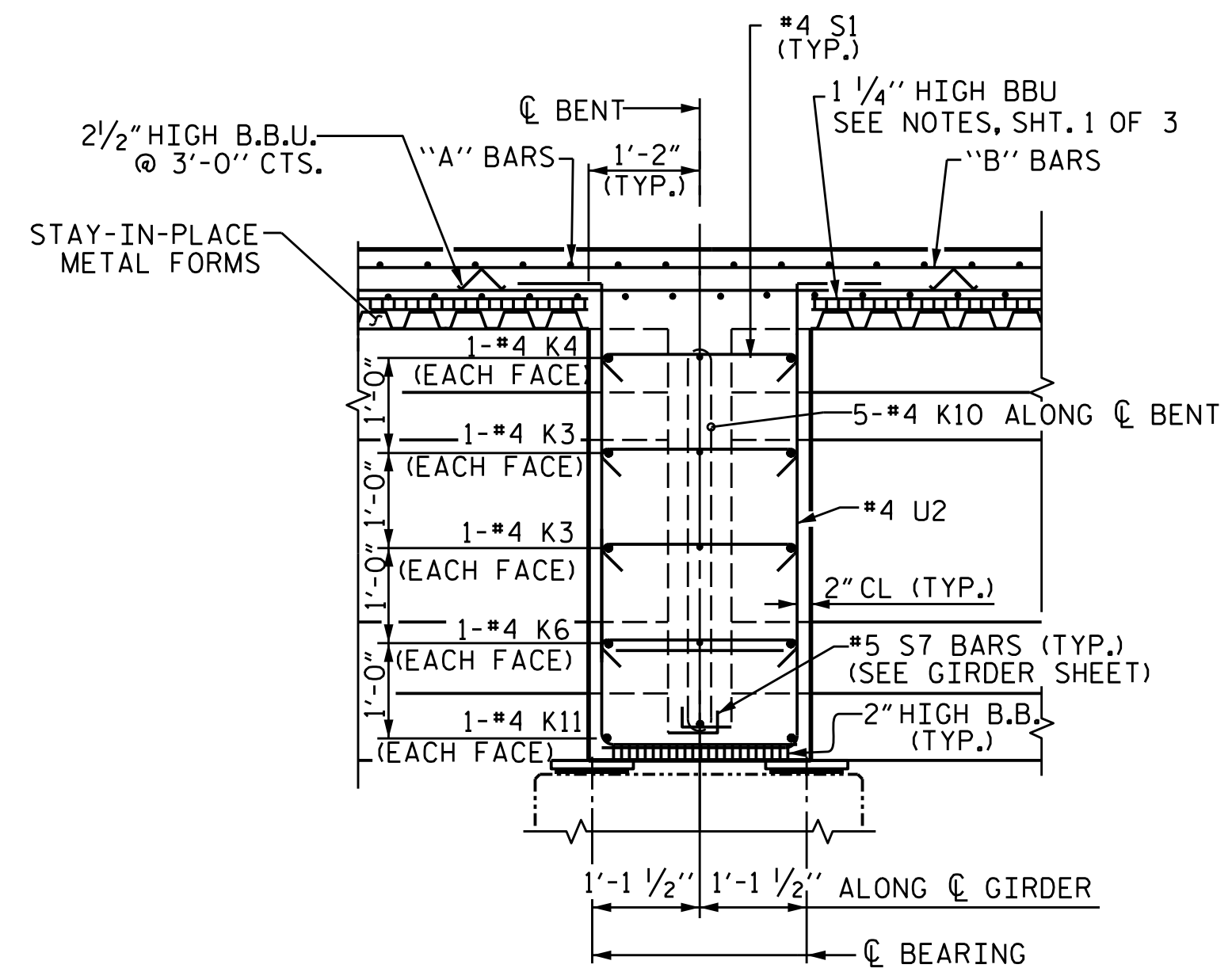
DESIGN ENGINEER OF RECORD [Signature] DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 07/24/19
 CHECKED BY: R. C. LARSON DATE: 07/27/19

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

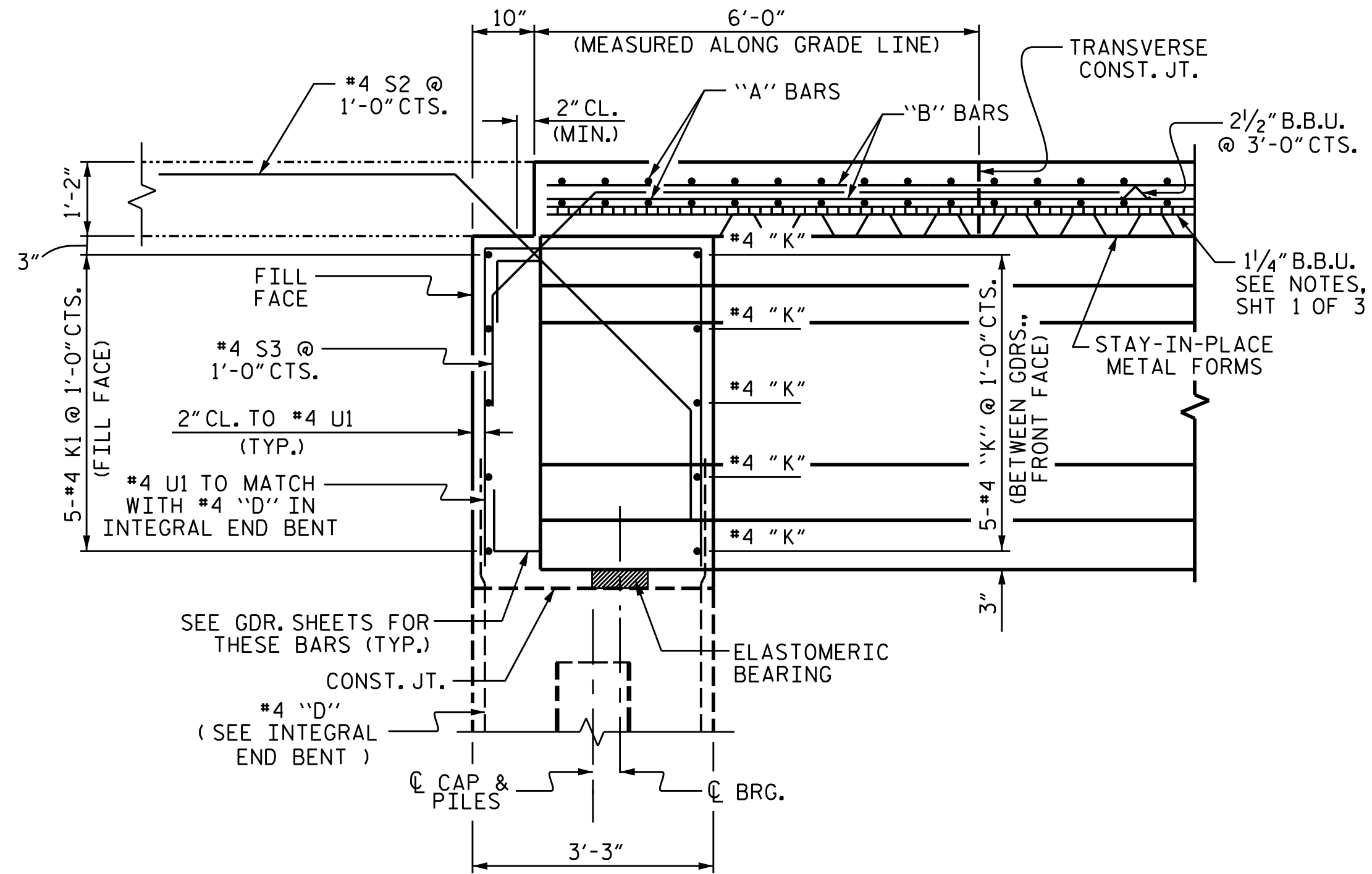
ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone: (919) 785-9241

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

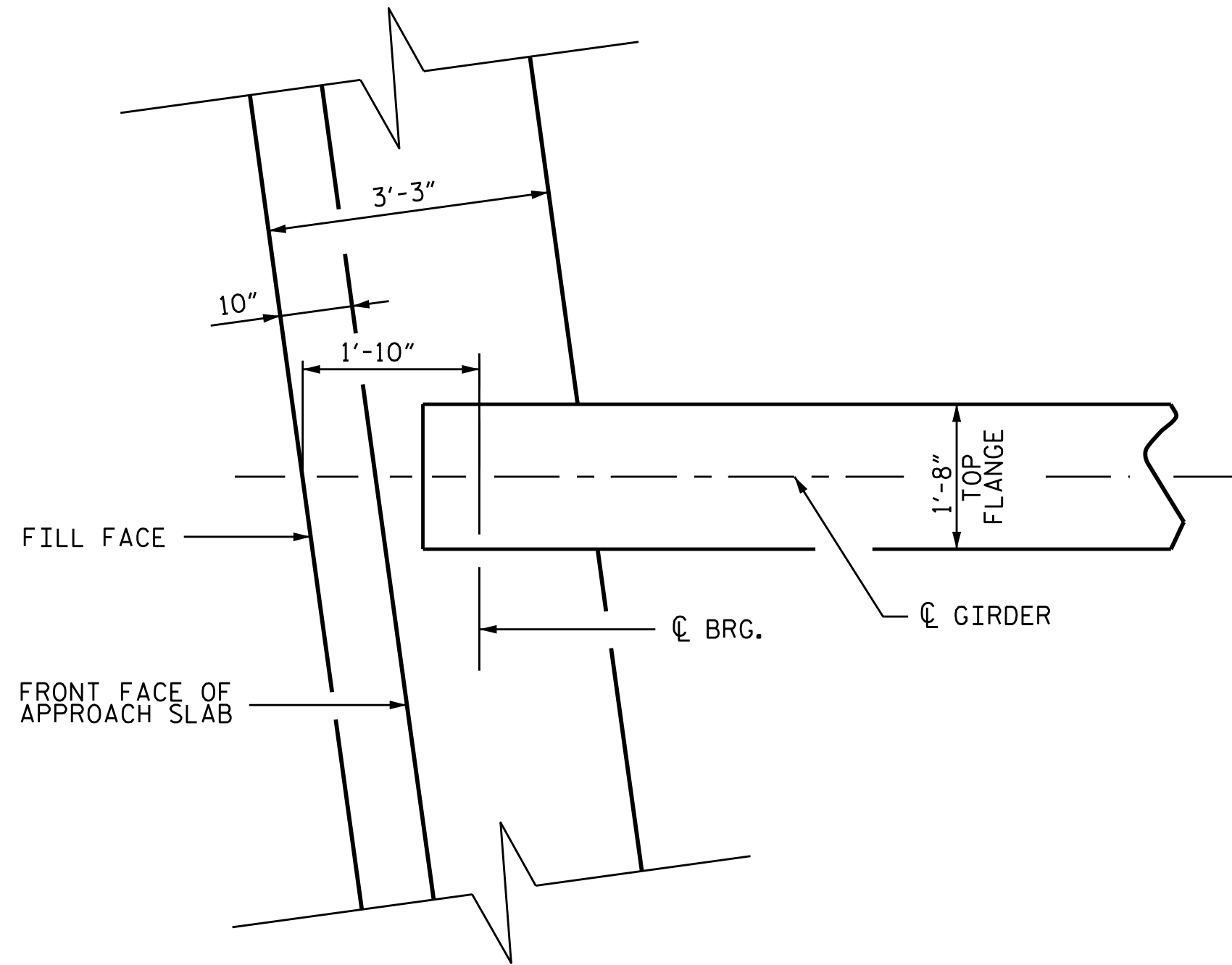
TOTAL SHEETS: 28



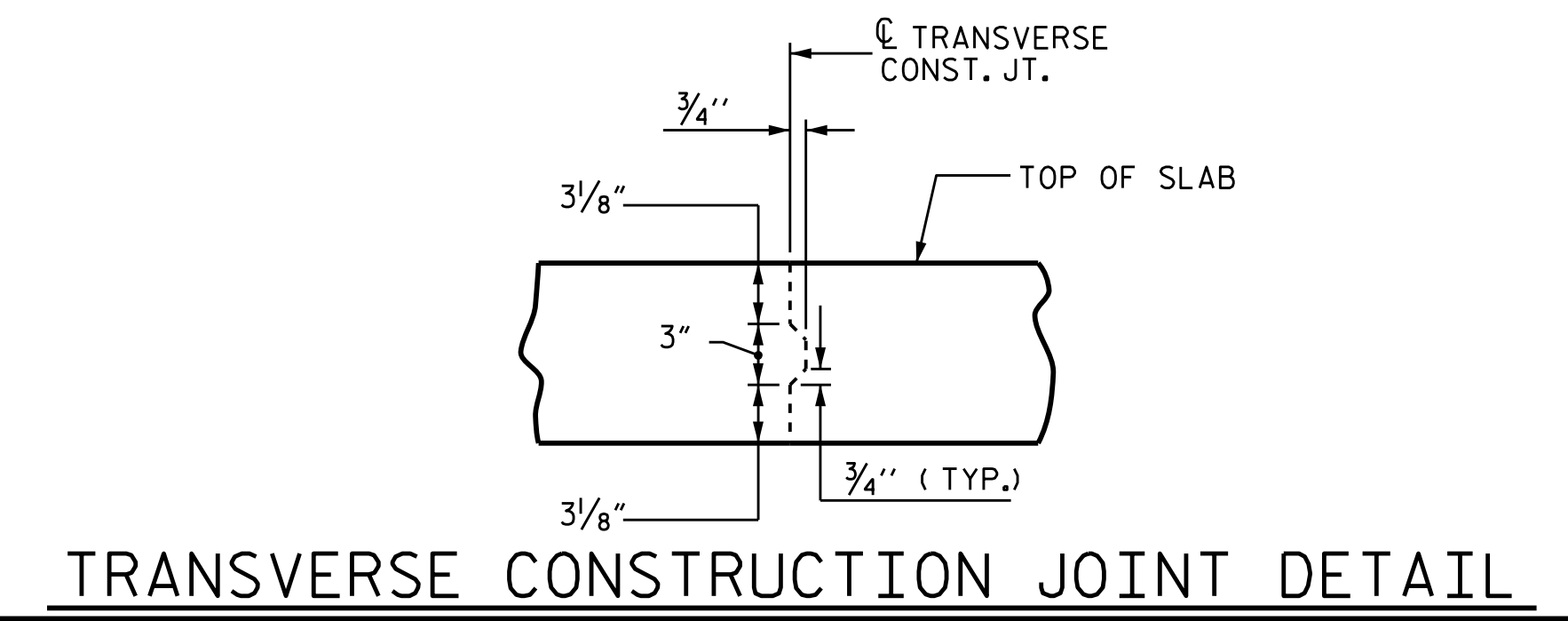
SECTION THRU BENT DIAPHRAGM



SECTION THRU INTEGRAL END BENT



PLAN OF GIRDER AT INTEGRAL END BENT



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

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 TYPICAL SECTION**

DocuSigned by:

 DB3C8E45B06D498
 NORTH CAROLINA PROFESSIONAL SEAL 14114
 ENGINEER
 ROBERT C. LARSON
 8/15/2022

DESIGN ENGINEER OF RECORD:	DATE: 8/15/2022
DRAWN BY: A. K. ALLANKI	DATE: 07/24/19
CHECKED BY: R. C. LARSON	DATE: 07/29/19

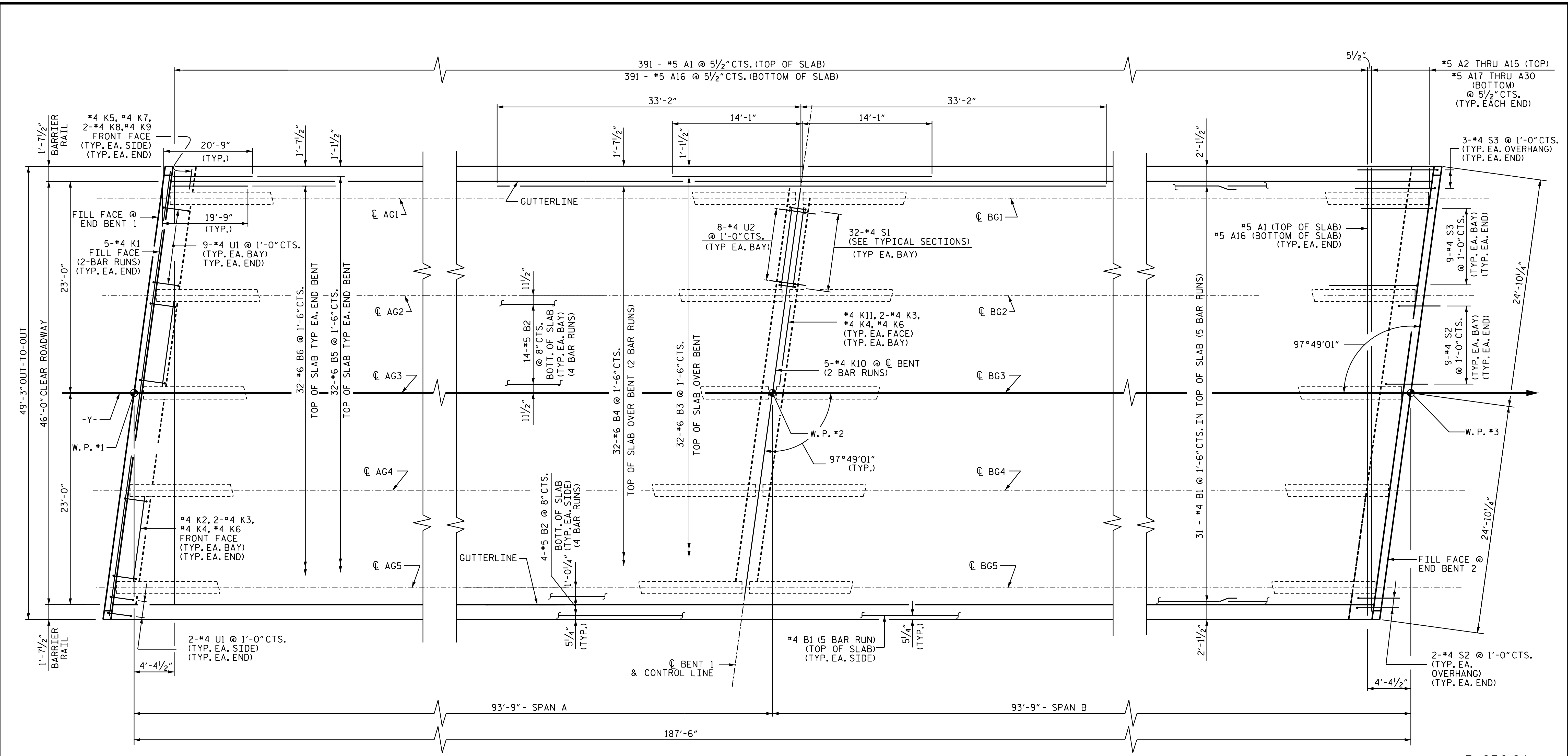
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REVISIONS		SHEET NO.	
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1		3	
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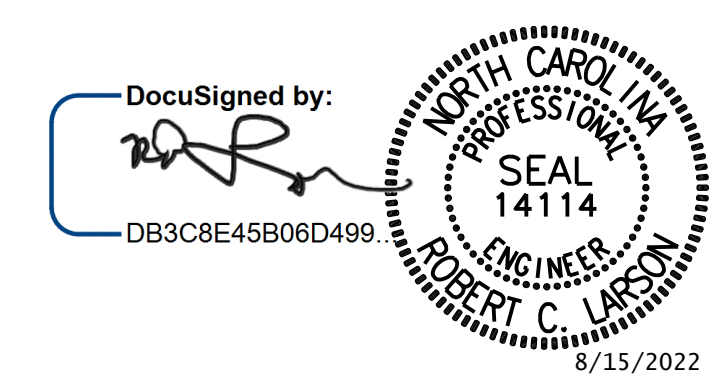
PLAN - SPAN A & B

SEE SUPERSTRUCTURE BILL OF MATERIAL FOR REINFORCING SPLICE LENGTHS.
SEE GIRDER LAYOUT FOR INTERMEDIATE STEEL DIAPHRAGM LOCATIONS.

PROJECT NO. R-256ICA
COLUMBUS COUNTY
STATION: 34+01.72 -Y-

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DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
PLAN OF SPANS**



DESIGN ENGINEER OF RECORD: *[Signature]* DATE: 8/15/2022

DRAWN BY: A. K. ALLANKI DATE: 07/24/19

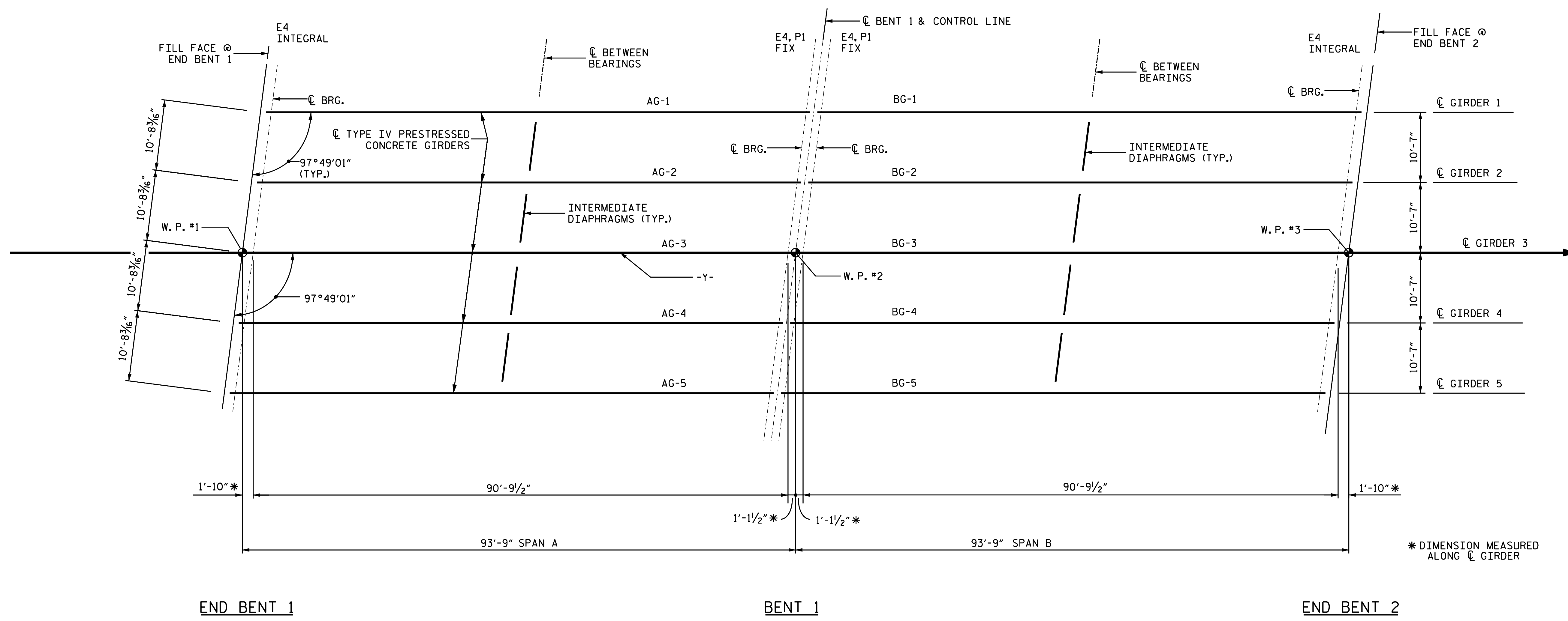
CHECKED BY: R. C. LARSON DATE: 07/27/19

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

TOTAL SHEETS: 28



* DIMENSION MEASURED ALONG GIRDER

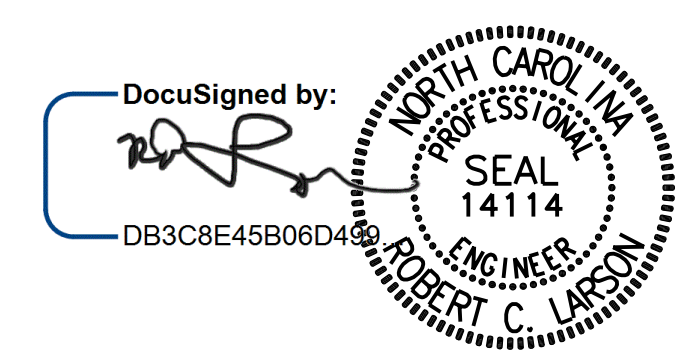
GIRDER LAYOUT

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "STANDARD STEEL INTERMEDIATE DIAPHRAGMS" SHEET

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 GIRDER LAYOUT**



DESIGN ENGINEER OF RECORD:	DATE:
<i>Z. KADI</i>	8/15/2022
DRAWN BY:	DATE:
Z. KADI	7/1/19
CHECKED BY:	DATE:
R.C. LARSON	7/29/19

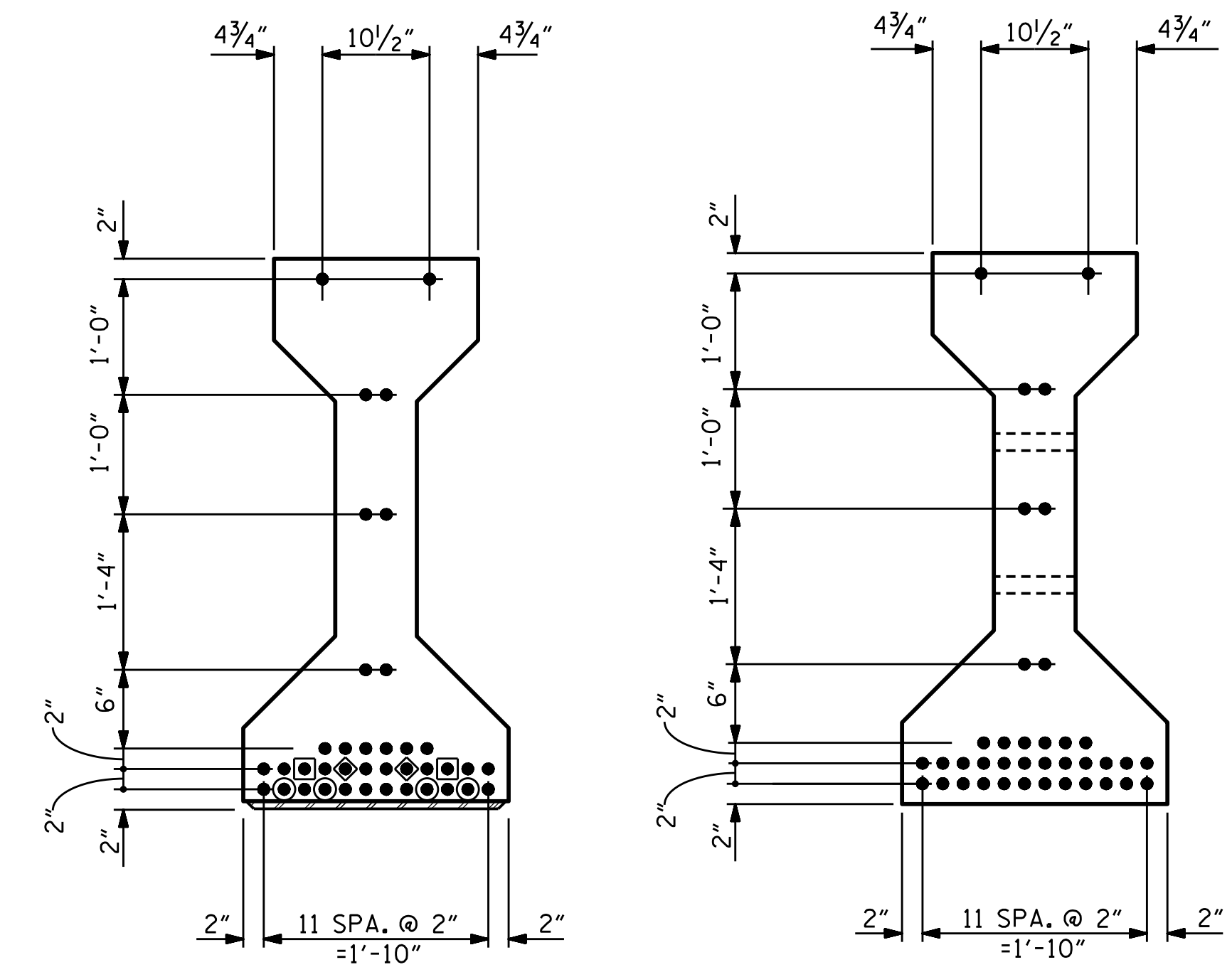
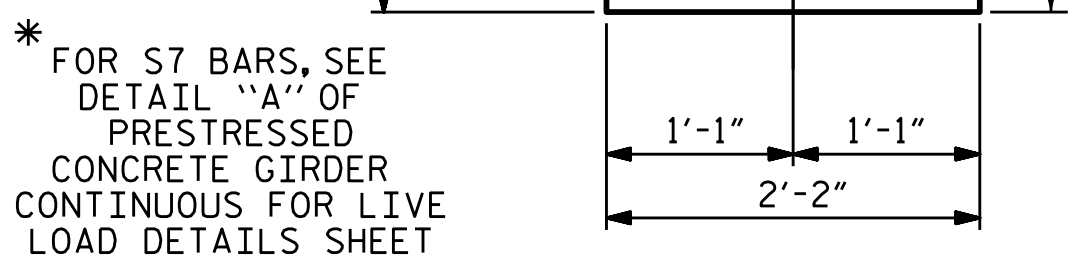
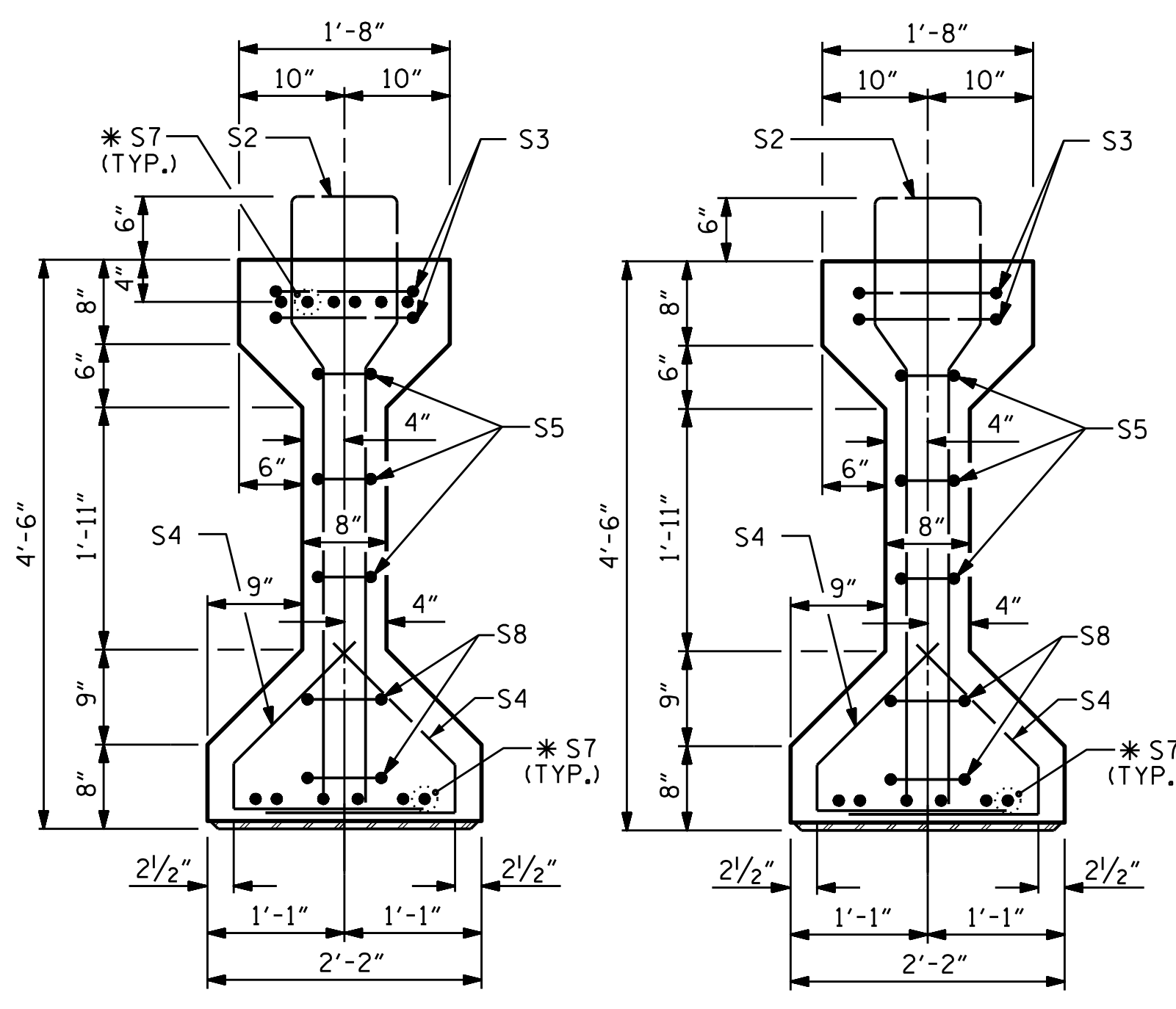
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REVISIONS				SHEET NO.	
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1			3		
2			4		

TOTAL SHEETS: 28

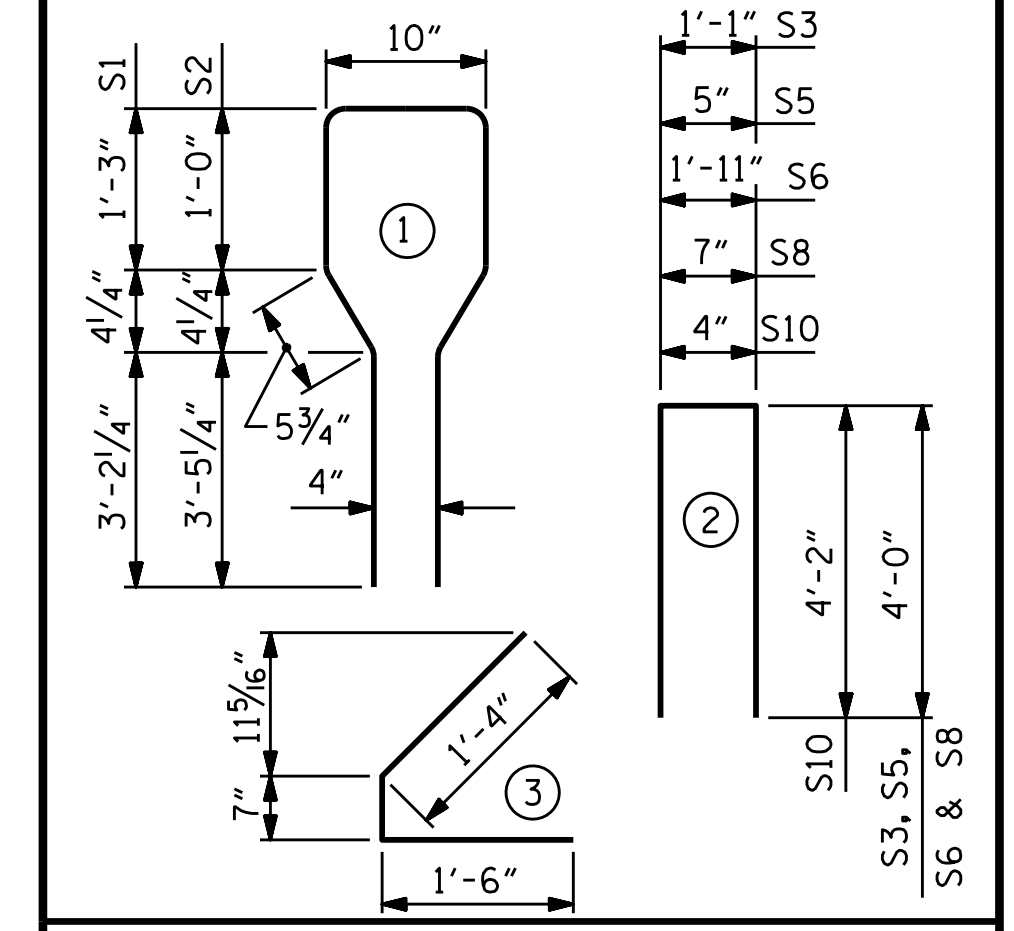


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	72	#4	1	10'-8"	513
S2	16	#6	1	10'-8"	256
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
*S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

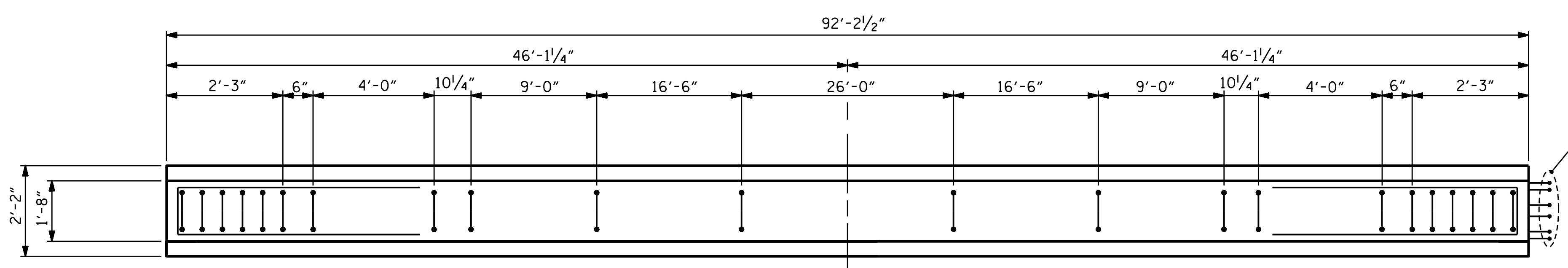
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES
ALL BAR DIMENSIONS ARE OUT-TO-OUT

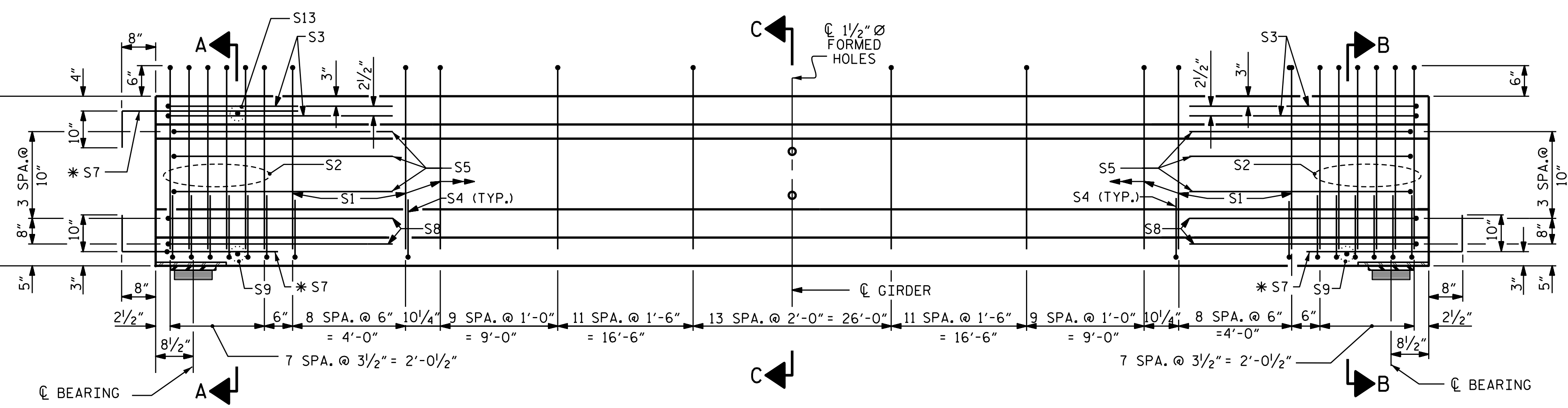


- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 10'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- ◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 18'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

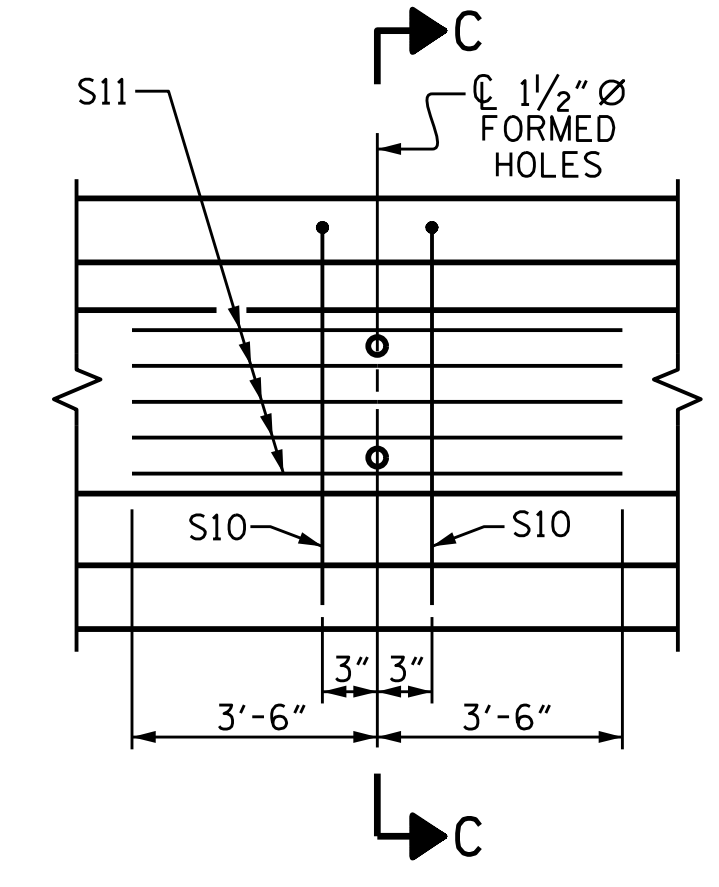


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
SPAN A SHOWN; SPAN B SIMILAR BY REFLECTION ABOUT C GIRDER



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	6500 PSI CONCRETE	0.6" Ø L. R. STRANDS	
LB.	C.Y.	No.	
1117	18.7	38	

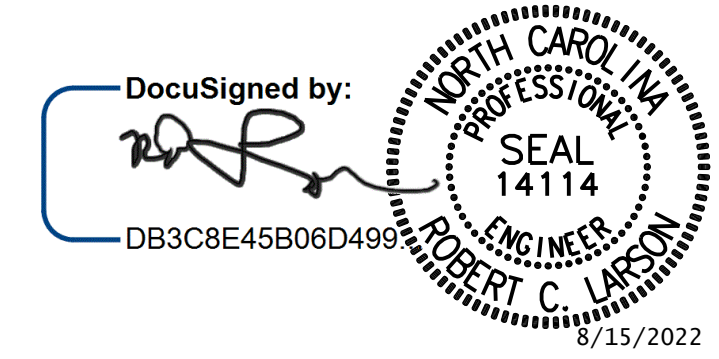
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
10	92'-2 1/2"	922'-1"

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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



DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: A. K. ALLANK	DATE:	07/28/19
CHECKED BY: R. C. LARSON	DATE:	07/30/19
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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 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone 919.783.5204

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NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			28

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.

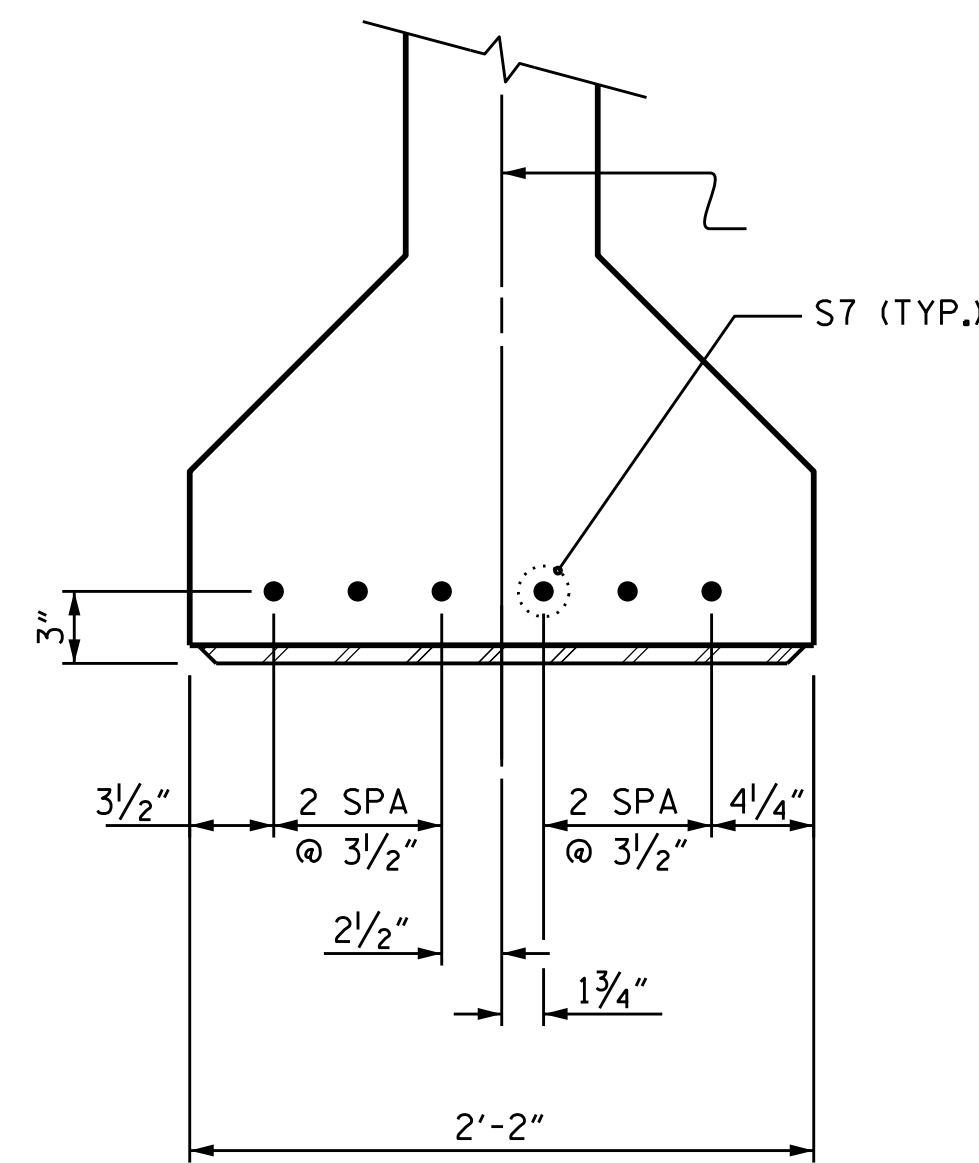
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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 5200 PSI.

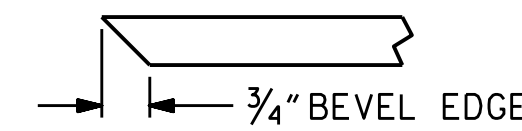
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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



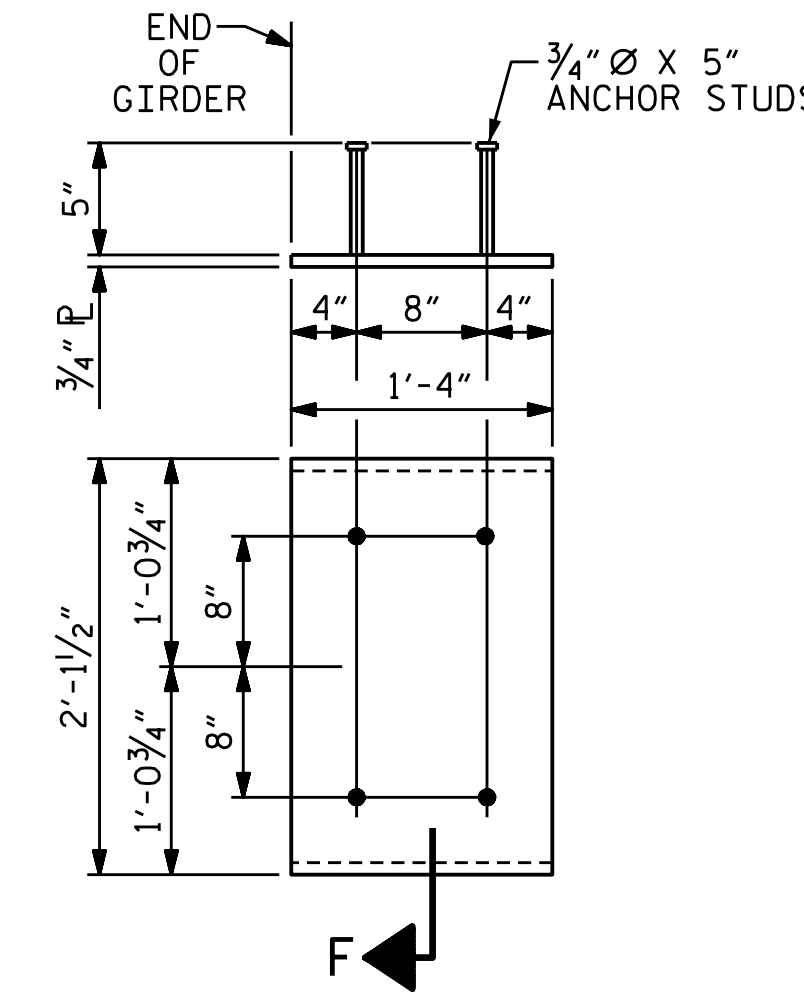
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



SECTION "F"

(SEE NOTES)



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

(2 REQ'D PER GIRDER)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.6" Ø LOW RELAXATION	SPAN A OR B (INTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.031	0.062	0.091	0.117	0.141	0.160	0.176	0.188	0.195	0.197	0.195	0.188	0.176	0.160	0.141	0.117	0.091	0.062	0.031	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.022	0.040	0.063	0.079	0.097	0.110	0.122	0.129	0.134	0.136	0.134	0.129	0.122	0.110	0.097	0.079	0.063	0.040	0.022	0
FINAL CAMBER	↑	0	1/8"	1/4"	5/16"	7/16"	1/2"	5/8"	5/8"	11/16"	3/4"	3/4"	3/4"	11/16"	5/8"	5/8"	1/2"	7/16"	5/16"	1/4"	1/8"	0

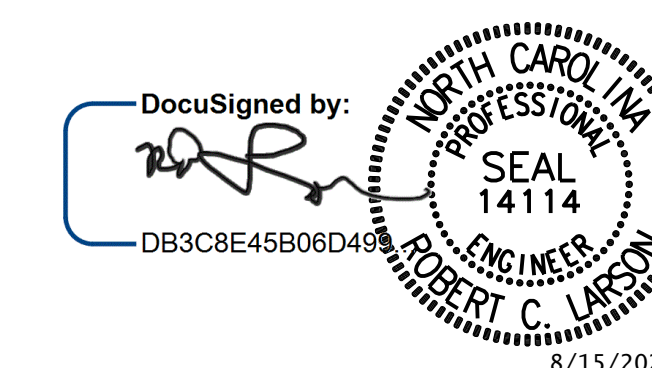
DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.6" Ø LOW RELAXATION	SPAN A OR B (EXTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.031	0.062	0.091	0.117	0.141	0.160	0.176	0.188	0.195	0.197	0.195	0.188	0.176	0.160	0.141	0.117	0.091	0.062	0.031	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.025	0.046	0.072	0.091	0.111	0.126	0.139	0.148	0.154	0.156	0.154	0.148	0.139	0.126	0.111	0.091	0.072	0.046	0.025	0
FINAL CAMBER	↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0

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

PROJECT NO. R-256ICA
COLUMBUS COUNTY
STATION: 34+01.72 -Y-

SHEET 2 OF 2

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



DESIGN ENGINEER OF RECORD	DocuSigned by: [Signature]	DATE: 8/15/2022
ASSEMBLED BY: C. E. LARSON	DATE: 07/31/19	
CHECKED BY: R. C. LARSON	DATE: 07/31/19	
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

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS	LICENSE NUMBER: C-0784
KCI Associates	
of North Carolina, P.A.	
4205 Folsom Road, Suite 400, Raleigh, NC 27609-6270	Phone 919-781-9244

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11	
1			3			TOTAL SHEETS	
2			4			28	

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.

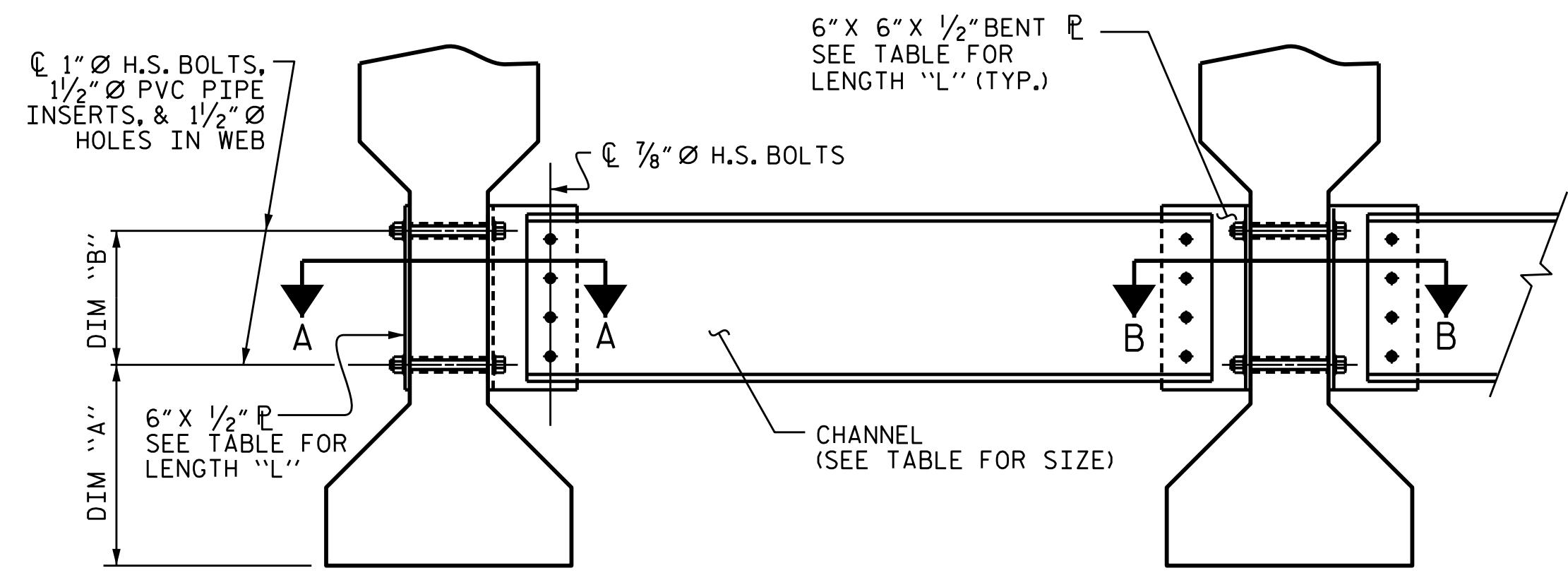
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS, AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

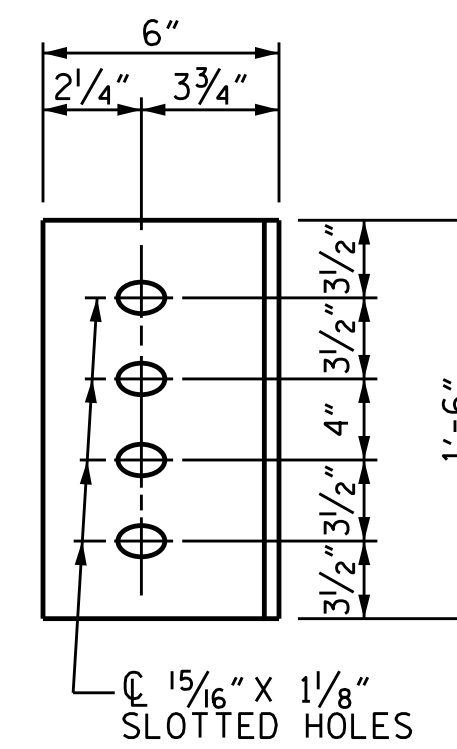
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

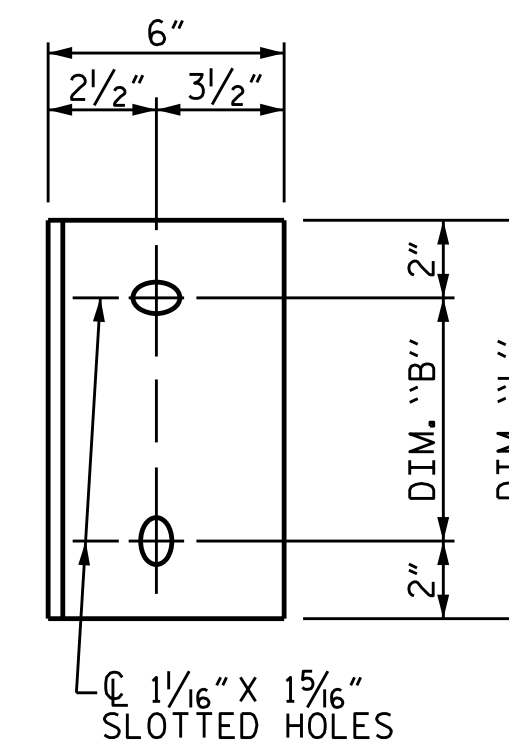
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



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



DIAPHRAGM FACE
 (TYPE IV GDR.)



WEB FACE

CONNECTOR PLATE DETAILS

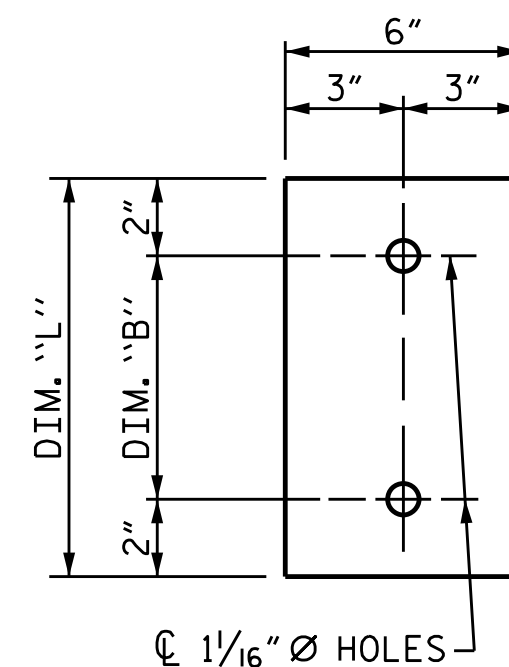
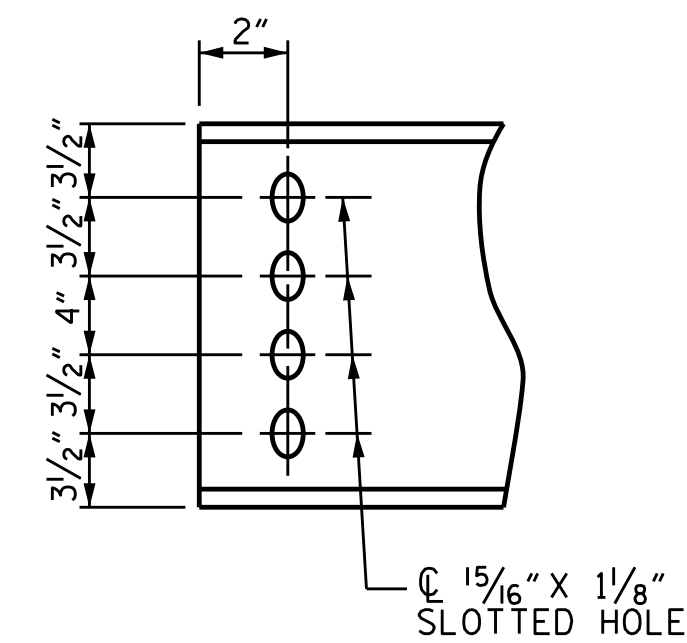
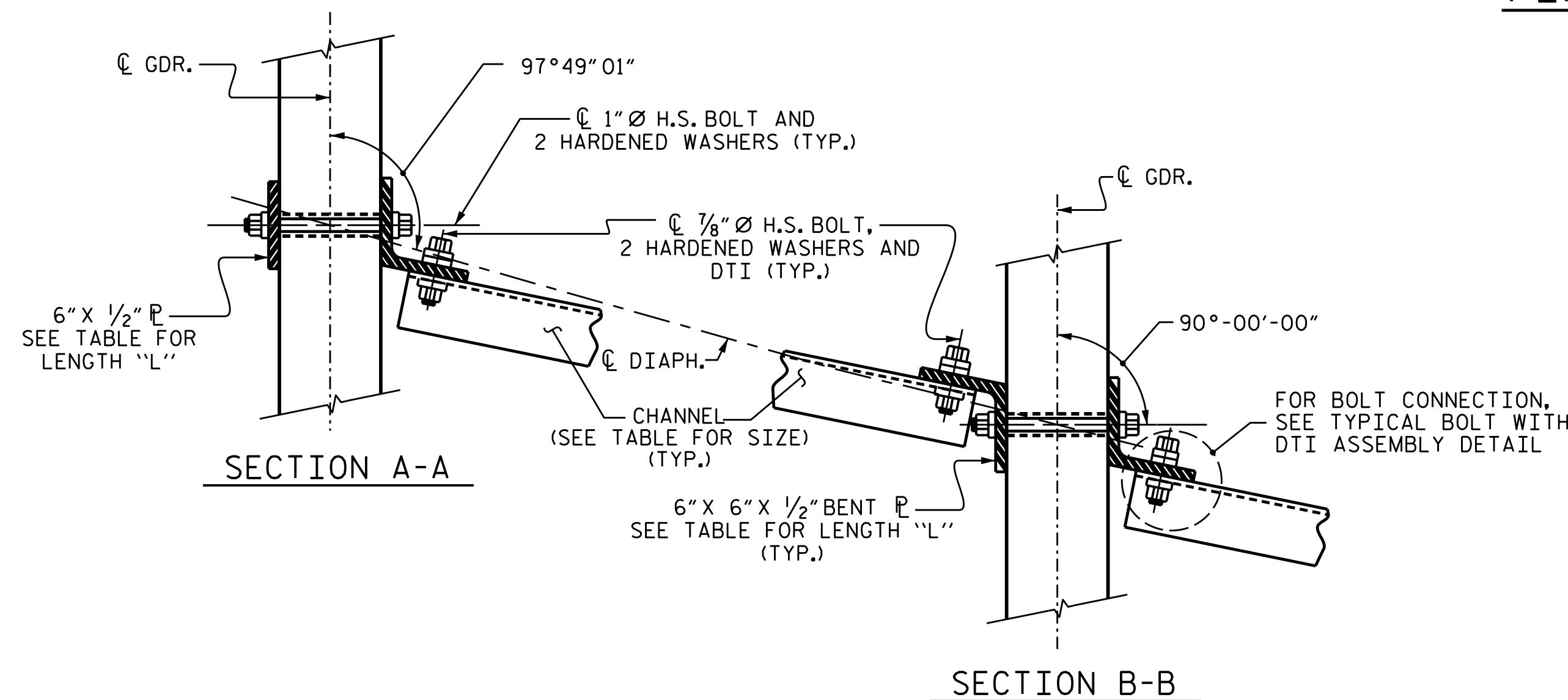


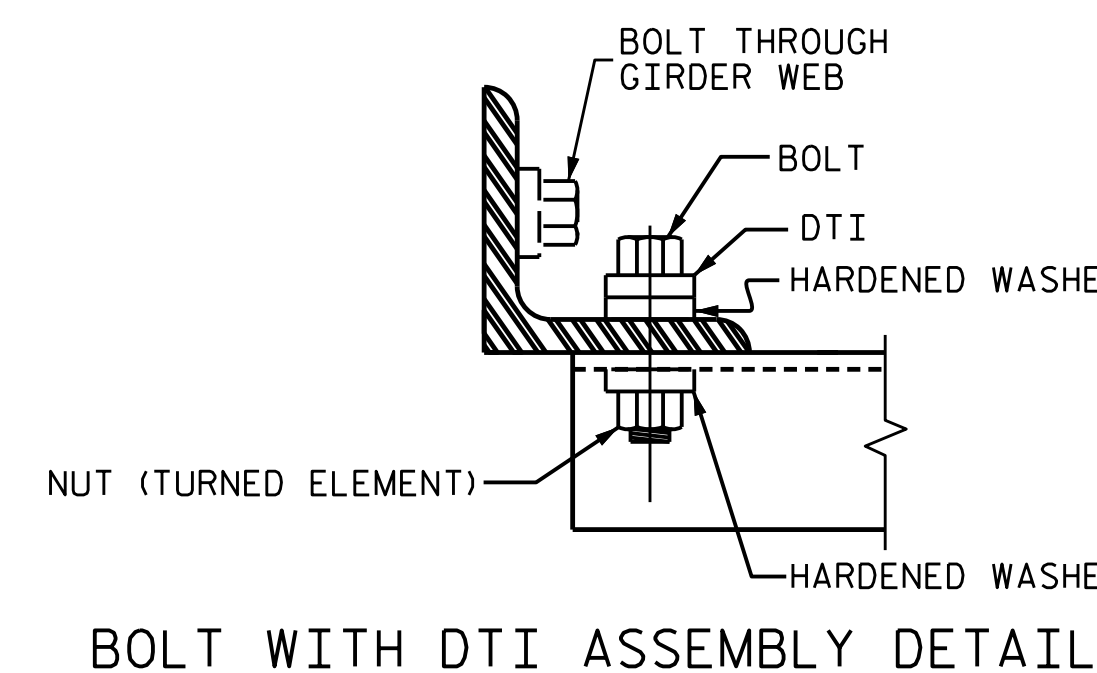
PLATE DETAILS



CHANNEL END
 (TYPE IV GDR.)



CONNECTION DETAILS



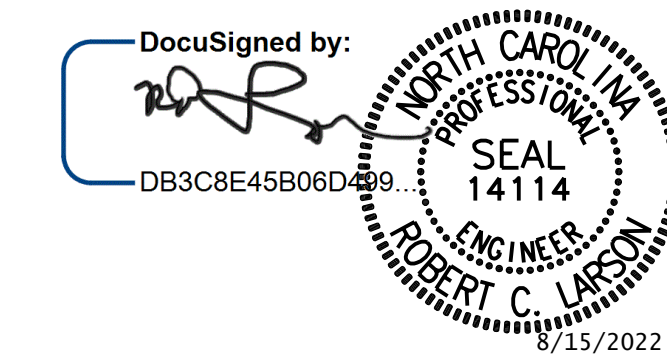
BOLT WITH DTI ASSEMBLY DETAIL

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. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

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



DESIGN ENGINEER OF RECORD	DATE: 8/15/2022
ASSEMBLED BY: A. K. ALLANKI	DATE: 7/25/19
CHECKED BY: R. C. LARSON	DATE: 7/29/19
DRAWN BY: TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY: VC 6/05	REV. 10/11/11 MAA/GM
	REV. 12/17 MAA/THC

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

TOTAL SHEETS: 28

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

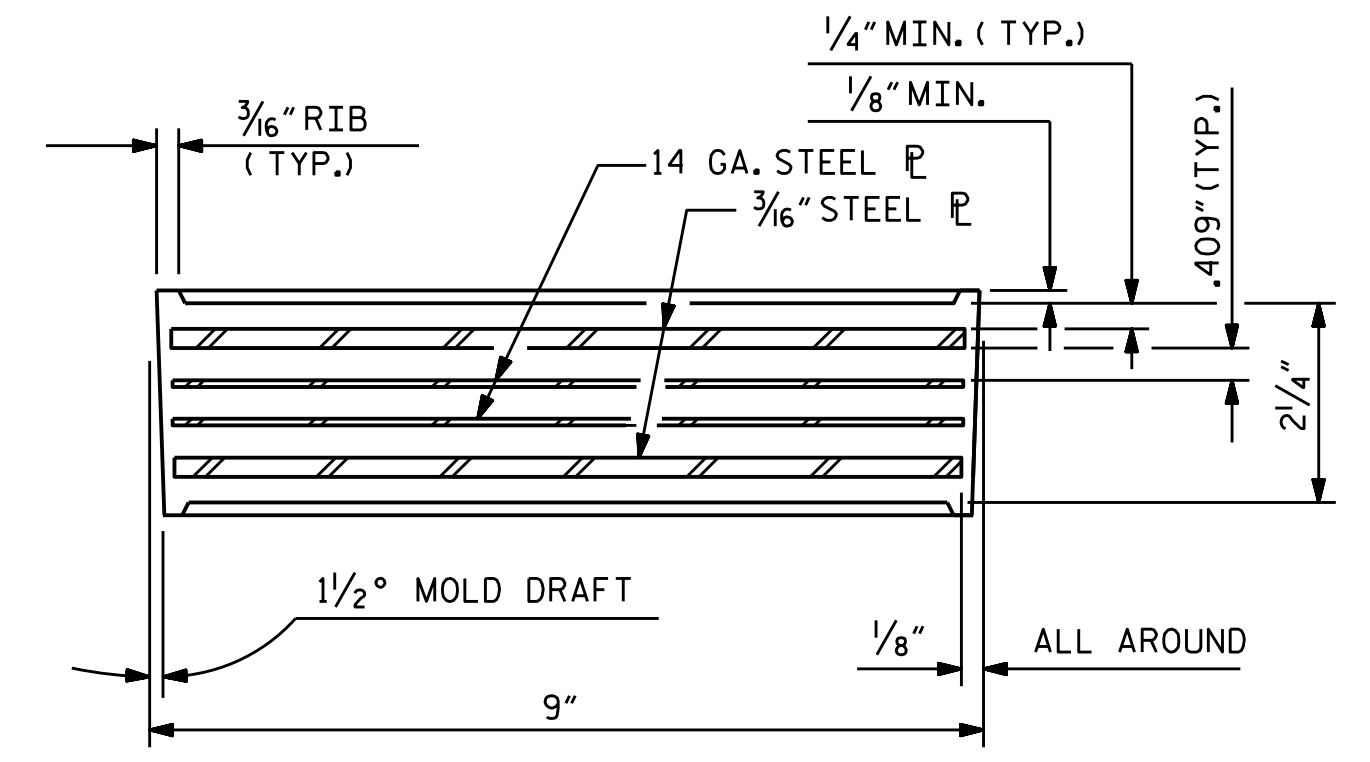
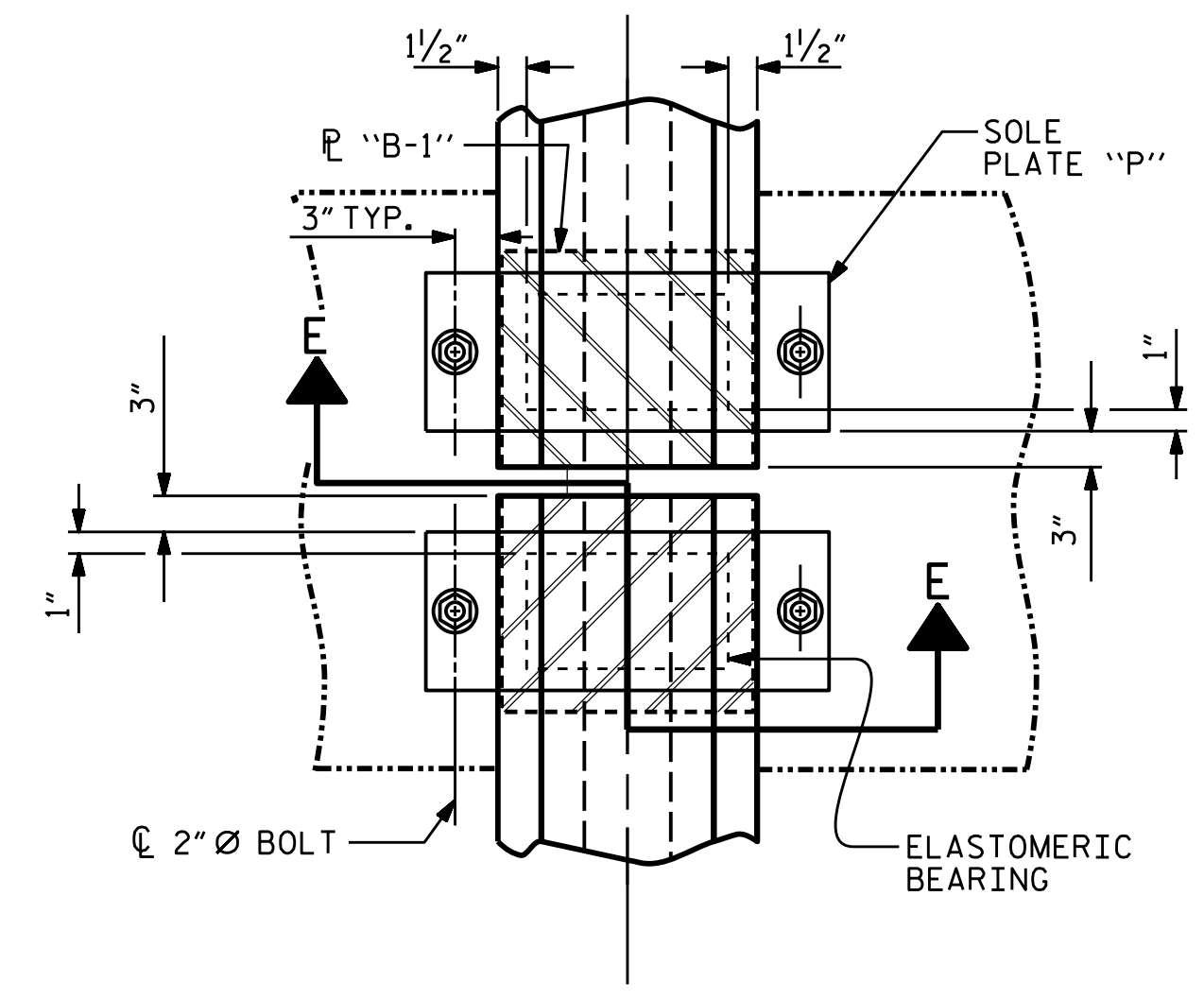
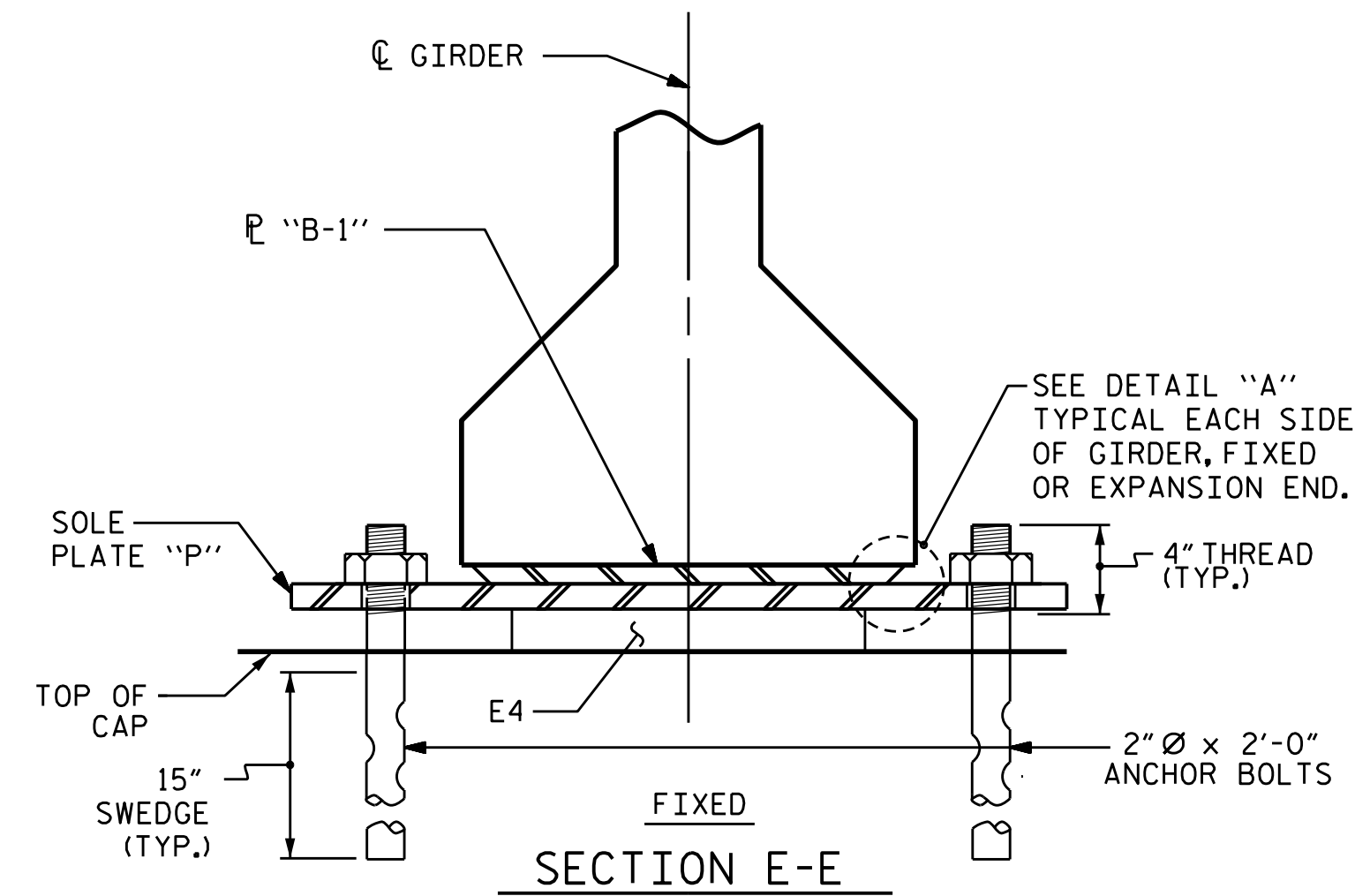
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

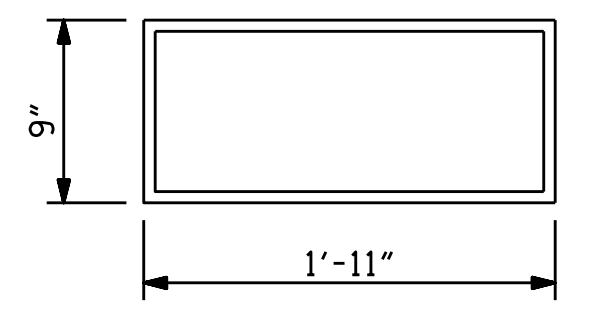
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

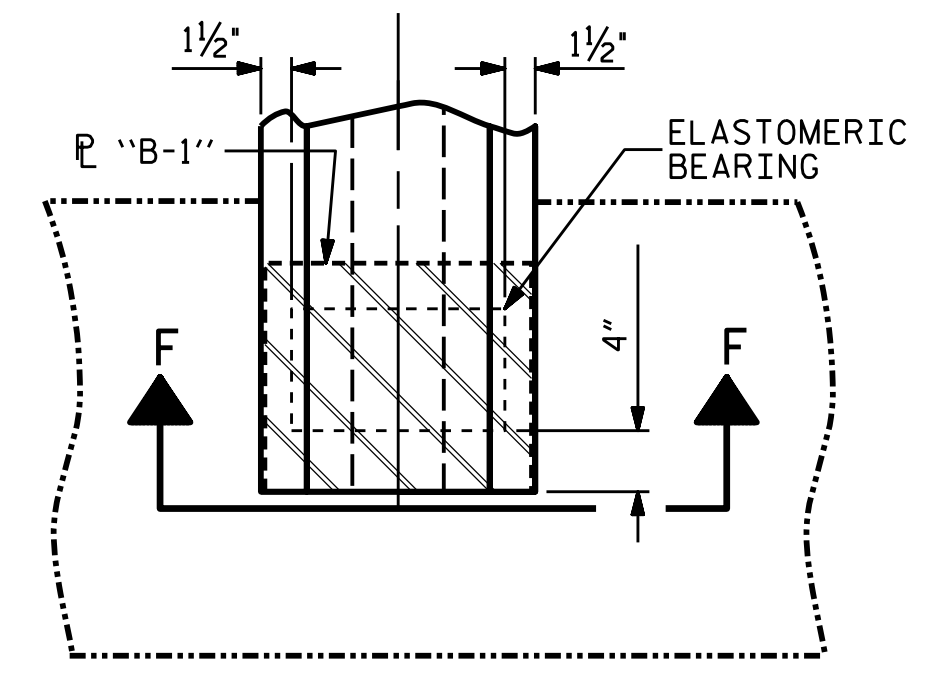


TYPICAL SECTION OF ELASTOMERIC BEARINGS



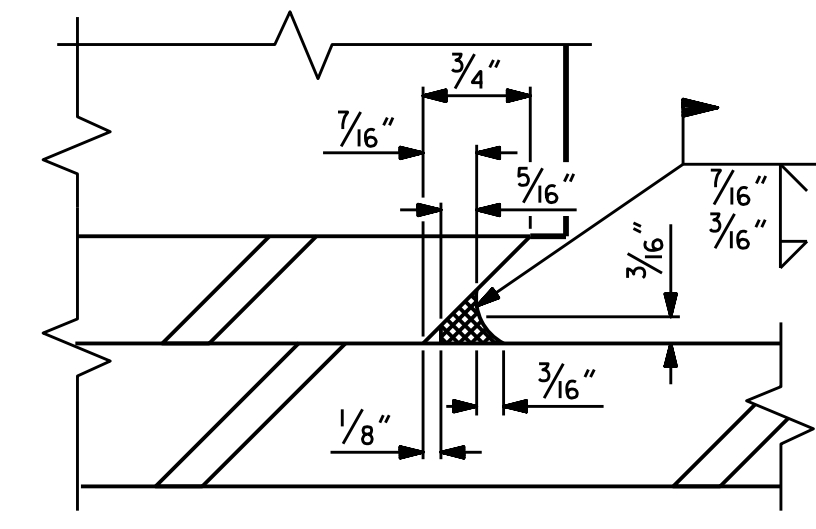
E4 (20 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

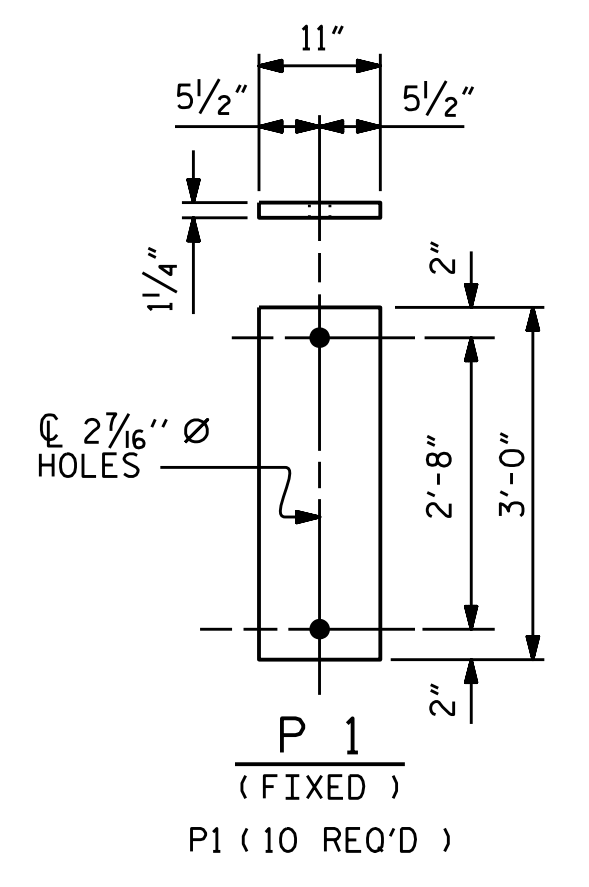


TYPICAL PLAN AT INTEGRAL END BENT

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



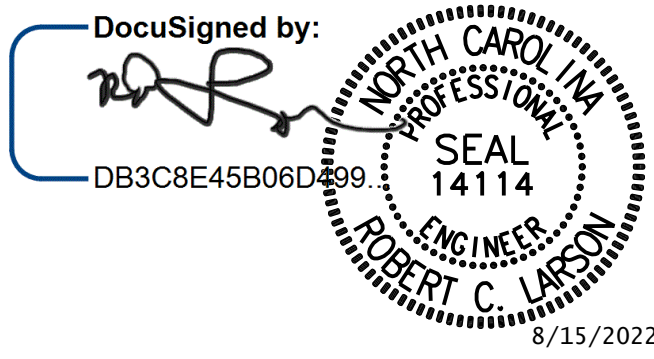
DETAIL "A"



SOLE PLATE DETAILS ("P")

DESIGN ENGINEER OF RECORD: <i>[Signature]</i>	DocuSigned by: DATE: 8/15/2022
ASSEMBLED BY: Z. KADI	DATE: 07/01/19
CHECKED BY: R. C. LARSON	DATE: 07/31/19
DRAWN BY: WJH 8/89	REV. 6/13 AAC/MAA
CHECKED BY: CRK 8/89	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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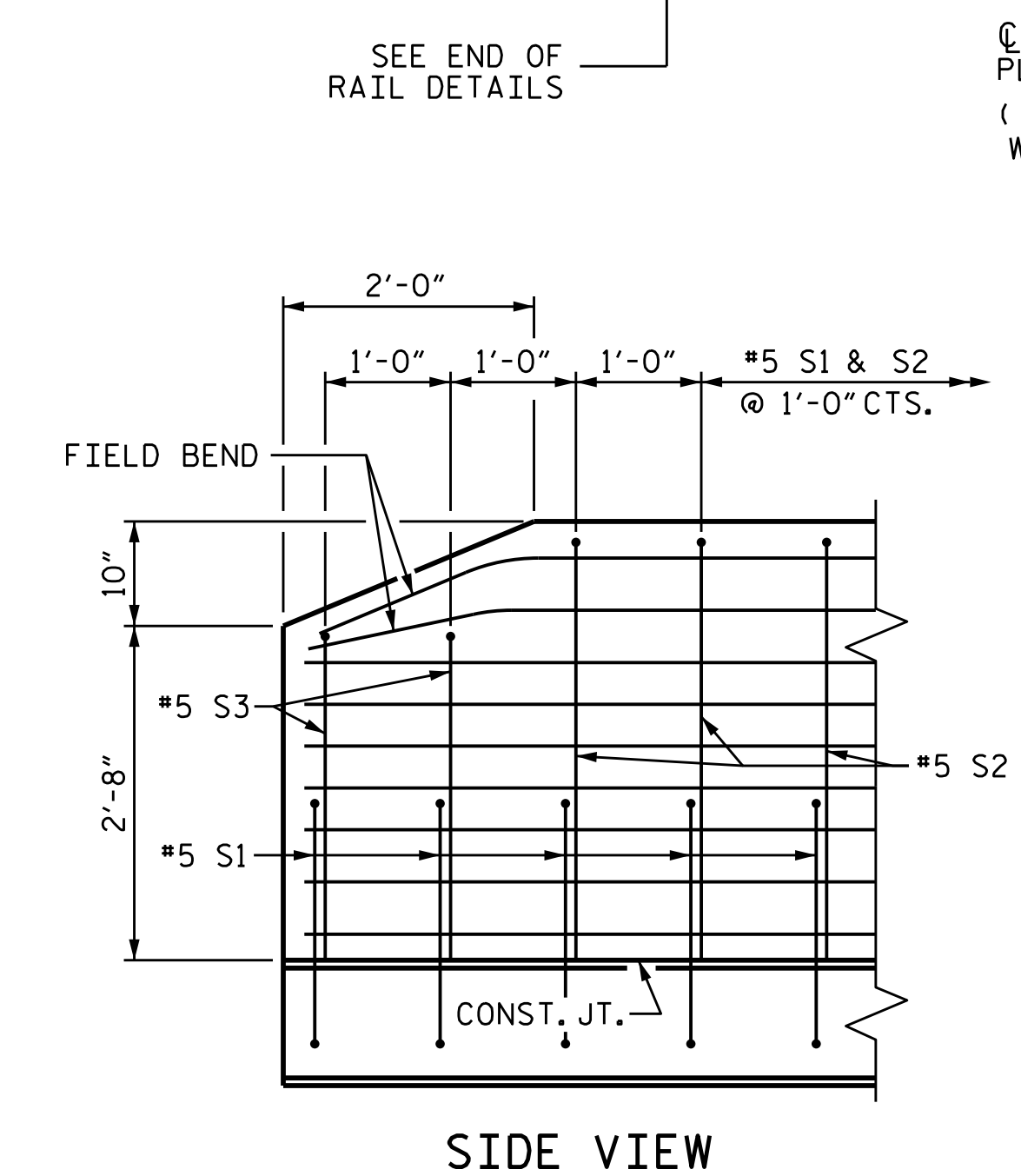
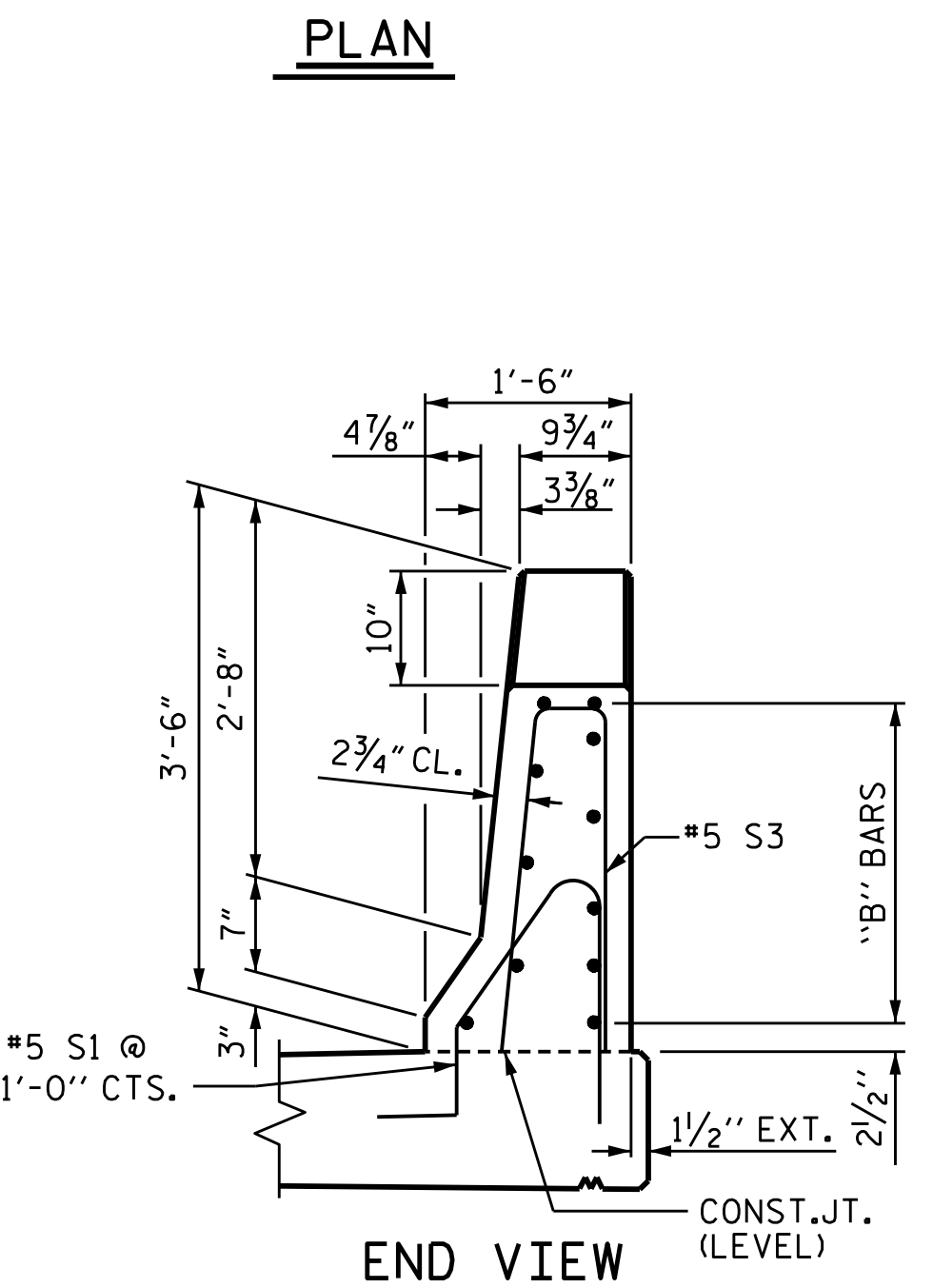
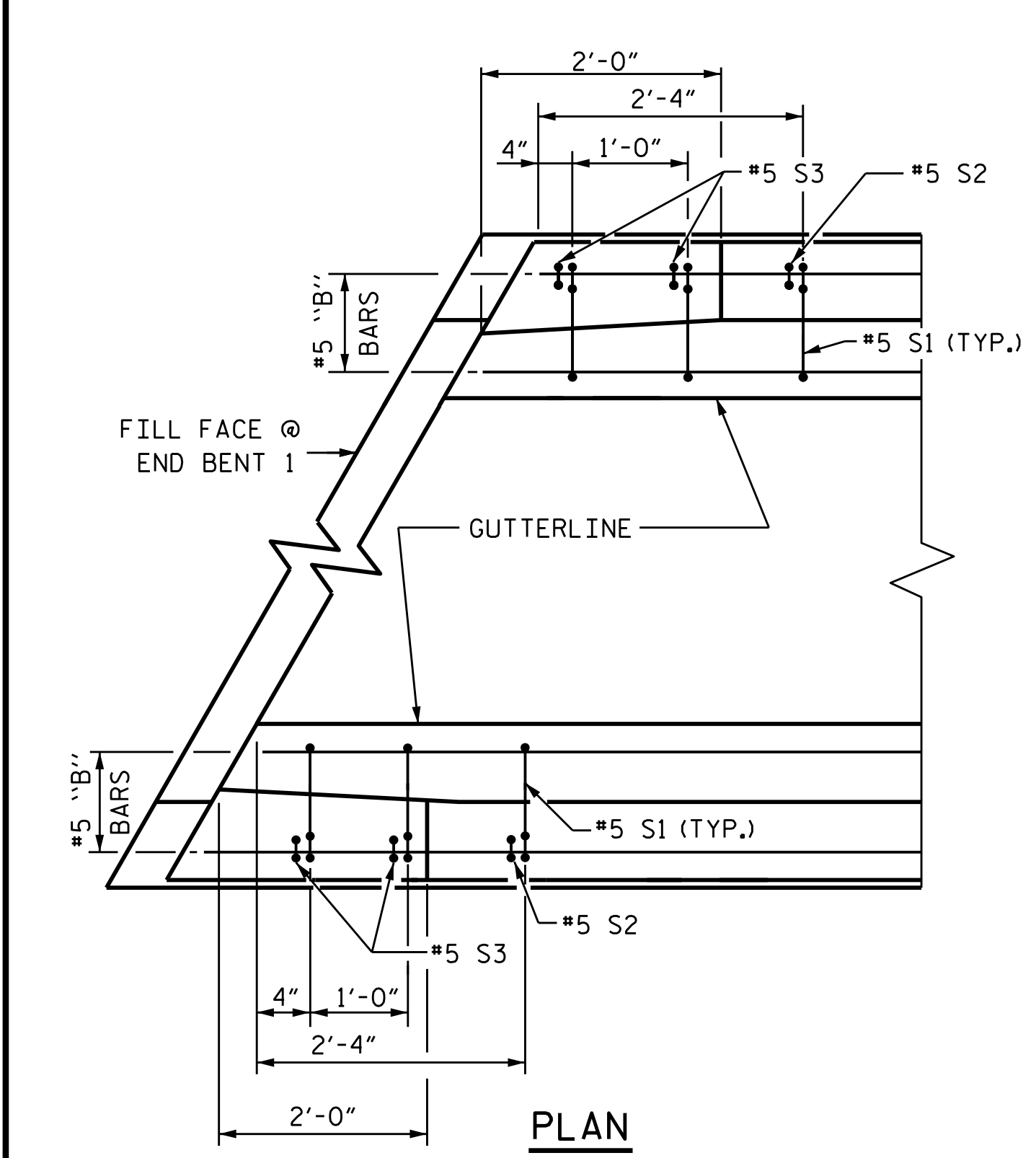
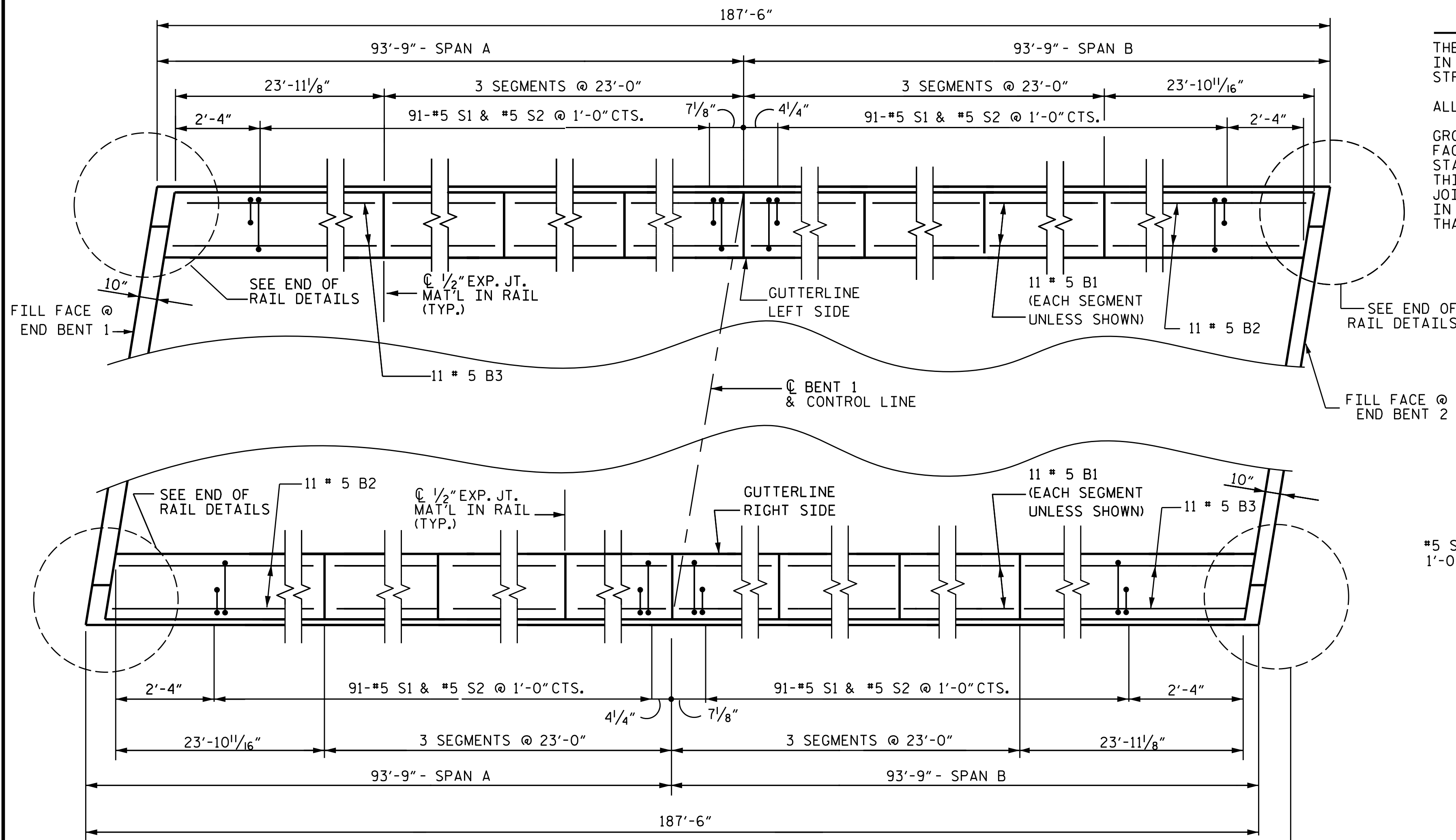


PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 34+01.72 -Y-

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			28
2			4			

ENGINEERS PLANNERS SCIENTISTS CONSTRUCTION MANAGERS LICENSE NUMBER: C-074
KCI Associates
of North Carolina, P.A.
4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-1270 Phone 919-783-9241



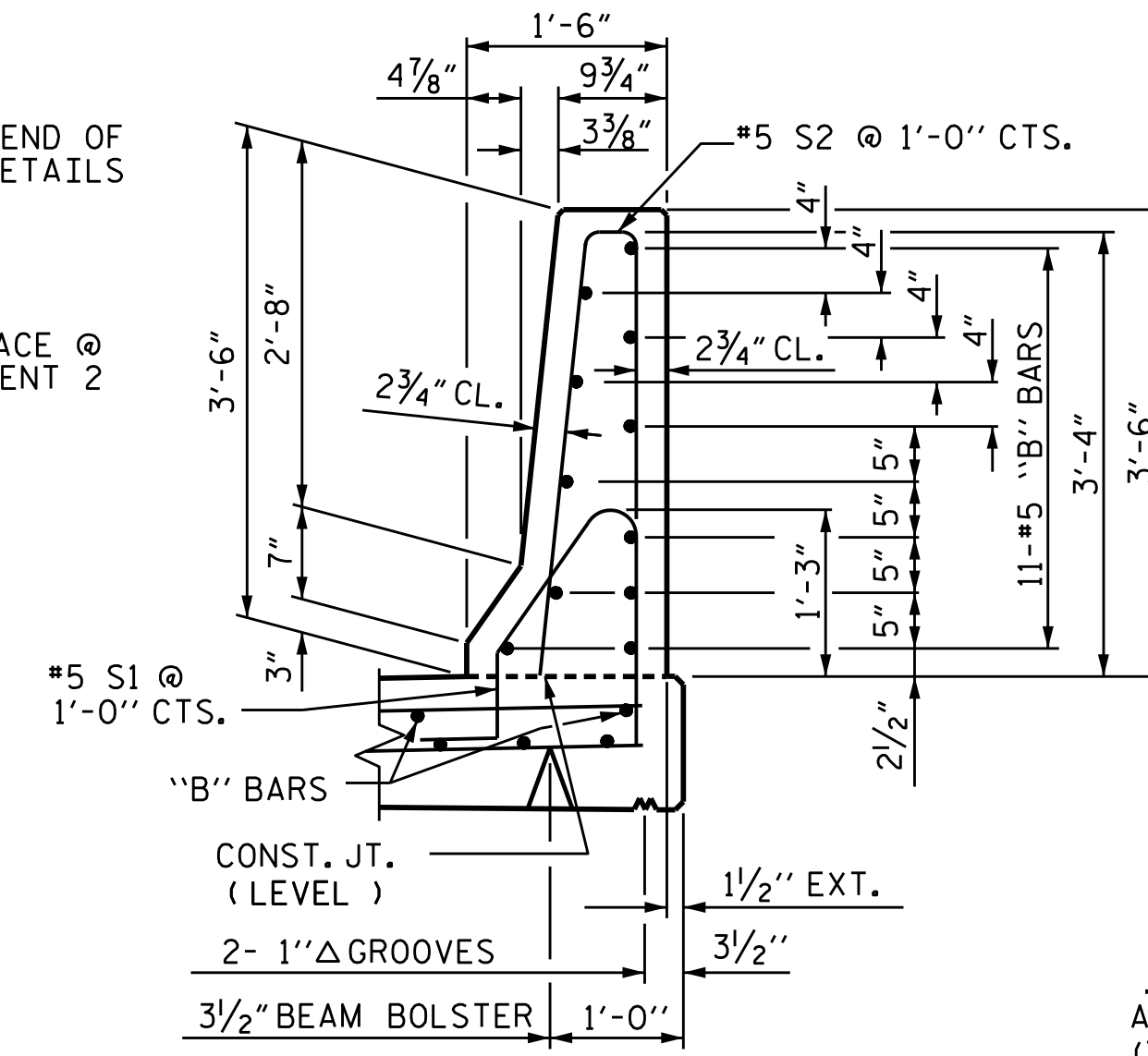
END OF RAIL DETAILS

NOTES

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

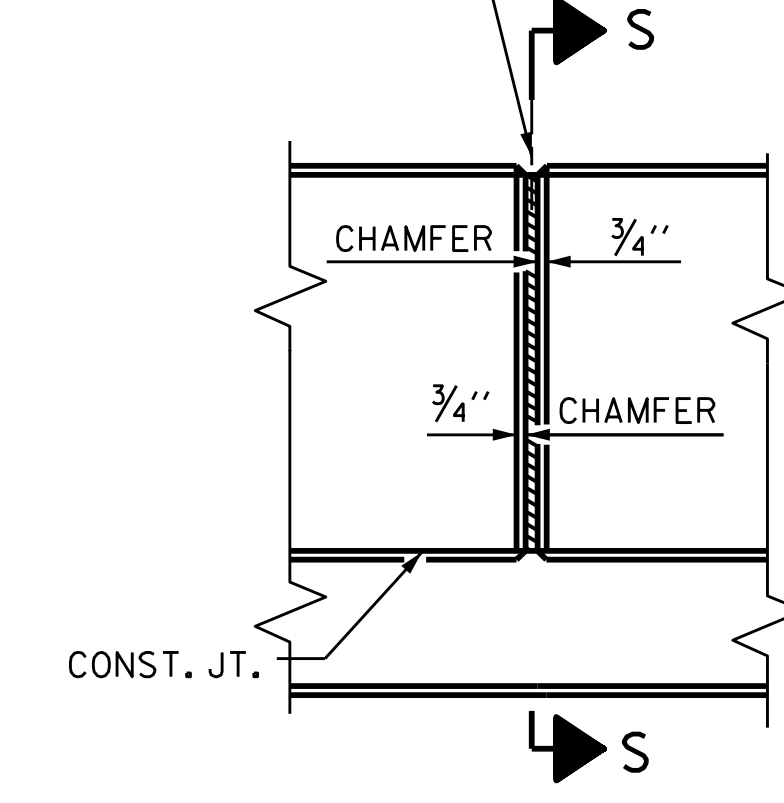
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

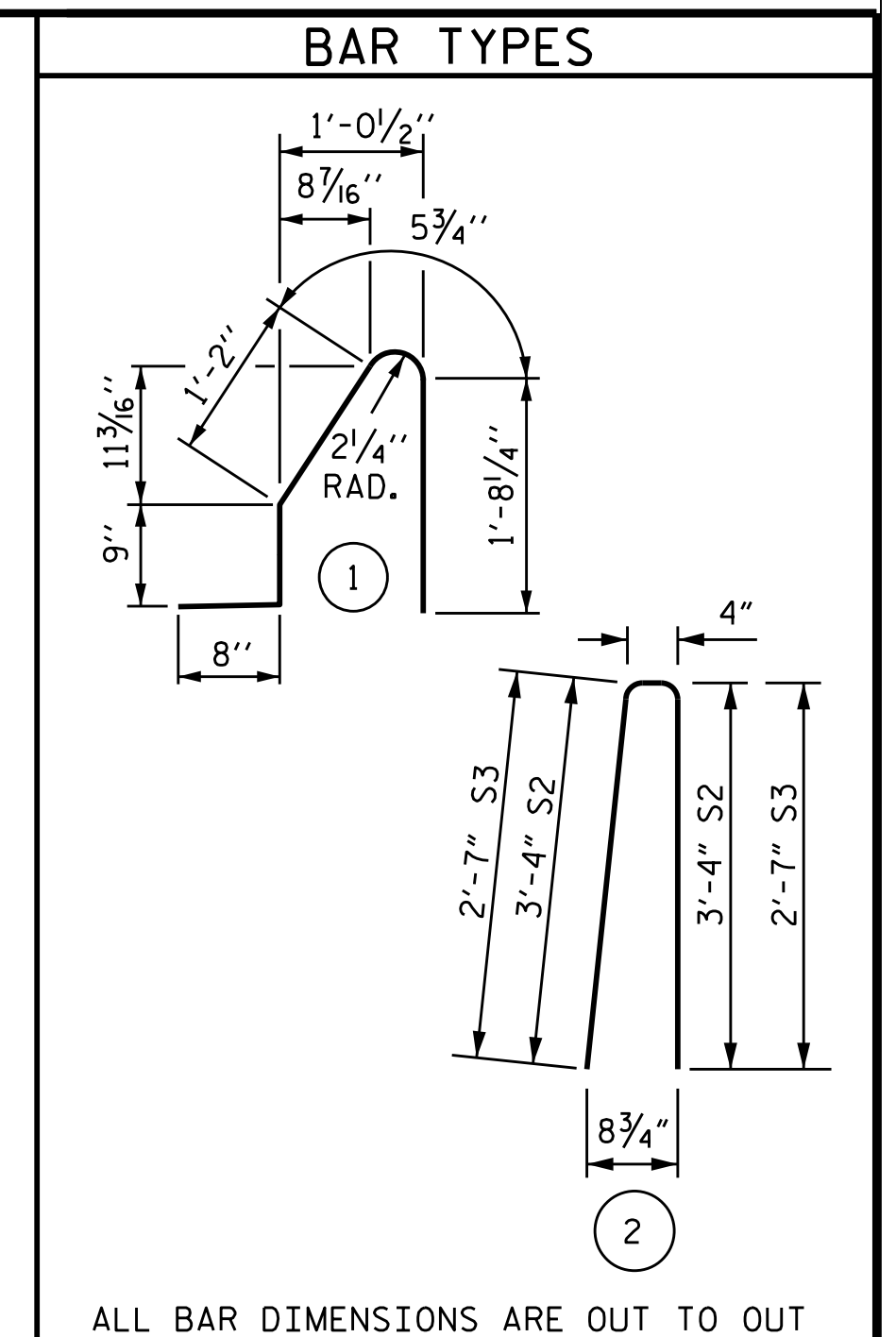


SECTION THRU RAIL

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



ELEVATION AT EXPANSION JOINTS BARRIER RAIL DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT

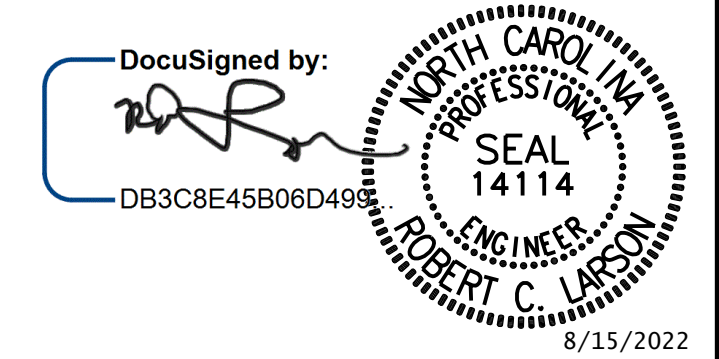
BILL OF MATERIAL
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	372	#5	1	4'-1"	1584
* S2	364	#5	2	7'-0"	2658
* S3	8	#5	2	5'-6"	46
* B1	132	#5	STR	22'-8"	3121
* B2	22	#5	STR	23'-4"	535
* B3	22	#5	STR	23'-7"	541

* EPOXY COATED REINFORCING STEEL 8485 LBS.
CLASS AA CONCRETE 50.5 CU. YDS.
CONCRETE BARRIER RAIL 371.64 LIN. FT.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 34+01.72 -Y-

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



DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022

ASSEMBLED BY: Z. KADI DATE: 6/26/2019

CHECKED BY: R. C. LARSON DATE: 7/26/2019

DRAWN BY: ARB 5/87 MAA/GM

CHECKED BY: SJD 9/87 REV. 6/13 MAA/GM

REV. 7/12 MAA/THC

REV. 12/17

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KCI Associates of North Carolina, P.A.
2109-6270 Phone 199-181-104

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

SHEET NO. S1-14
TOTAL SHEETS 28

NOTES

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

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

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

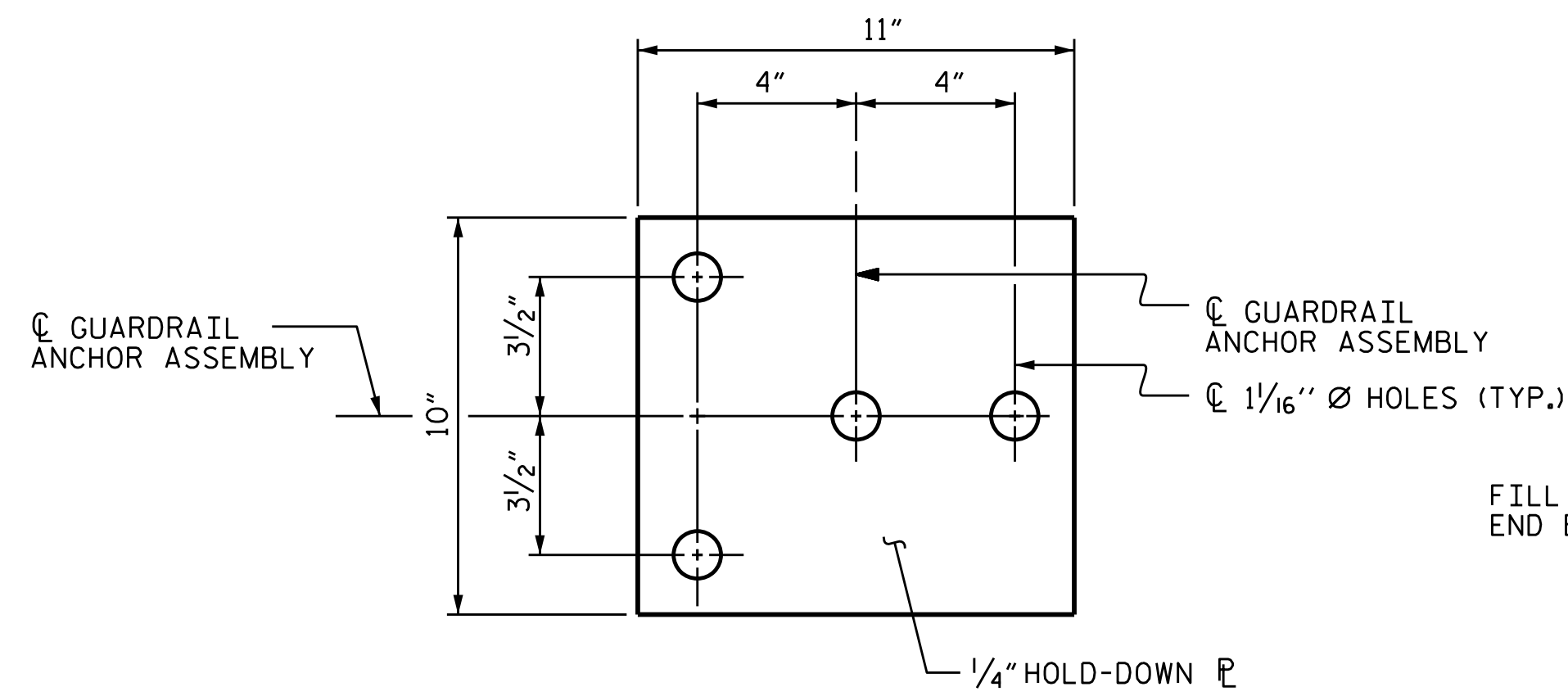
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

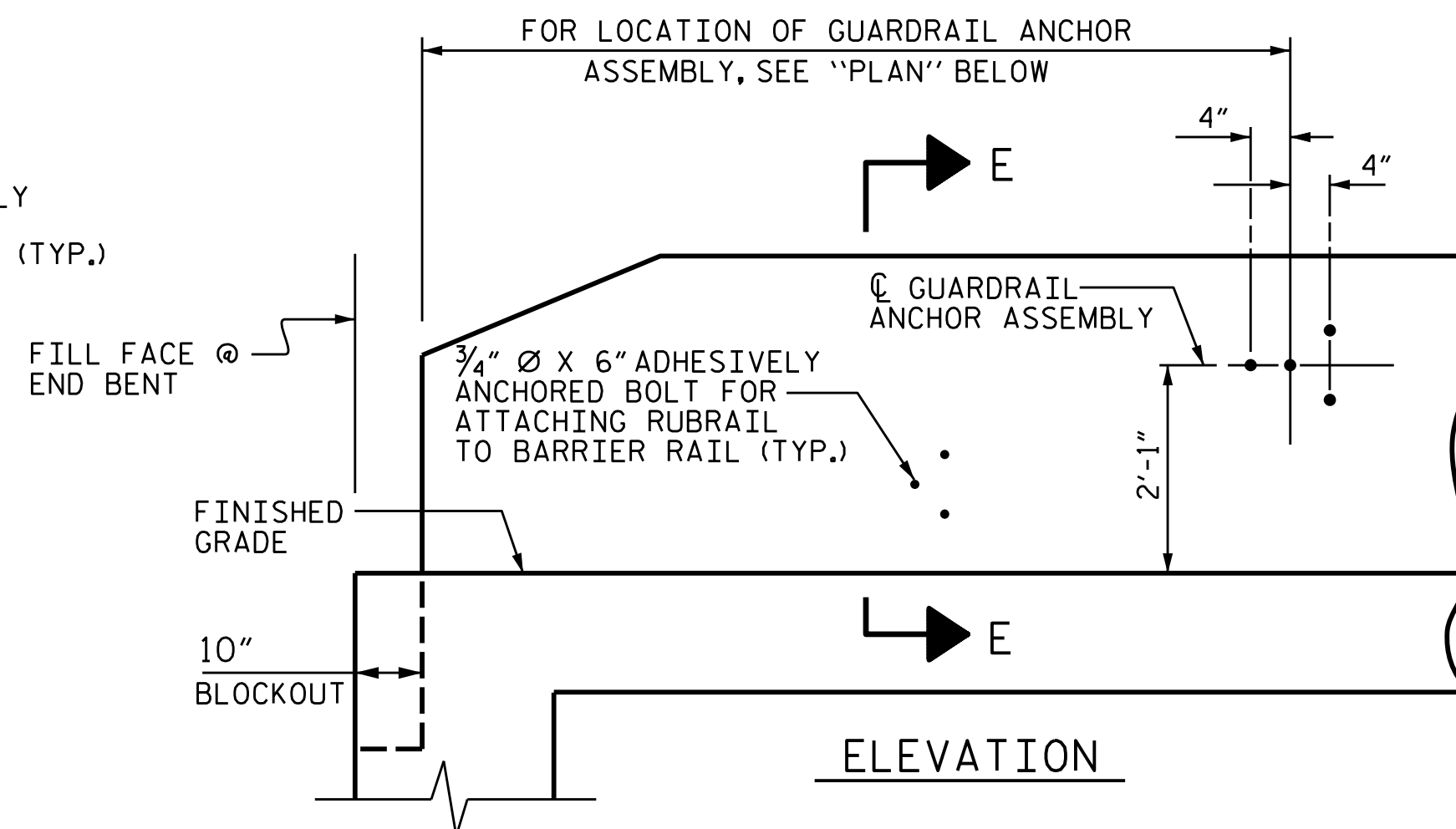
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

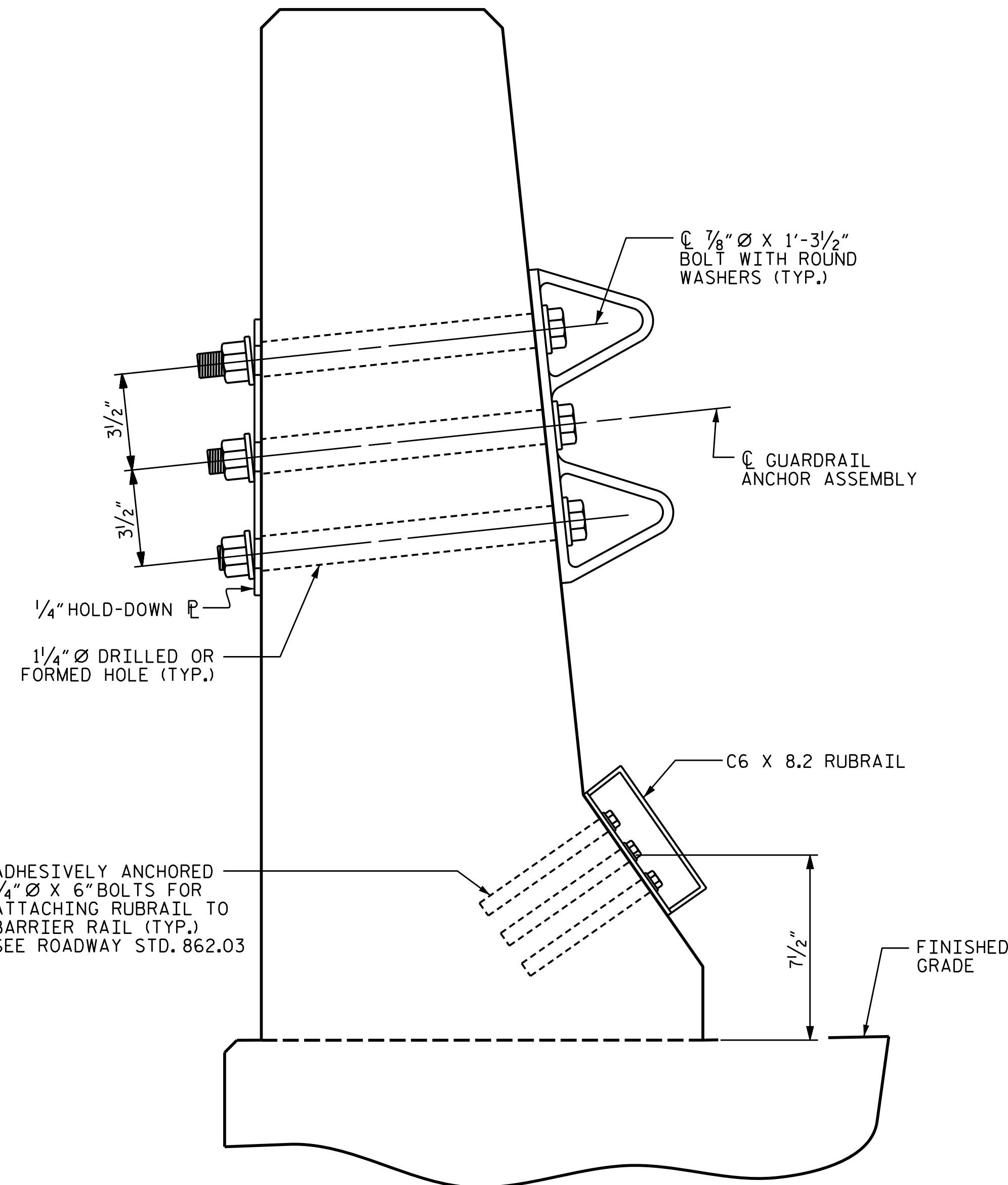
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR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



PLAN

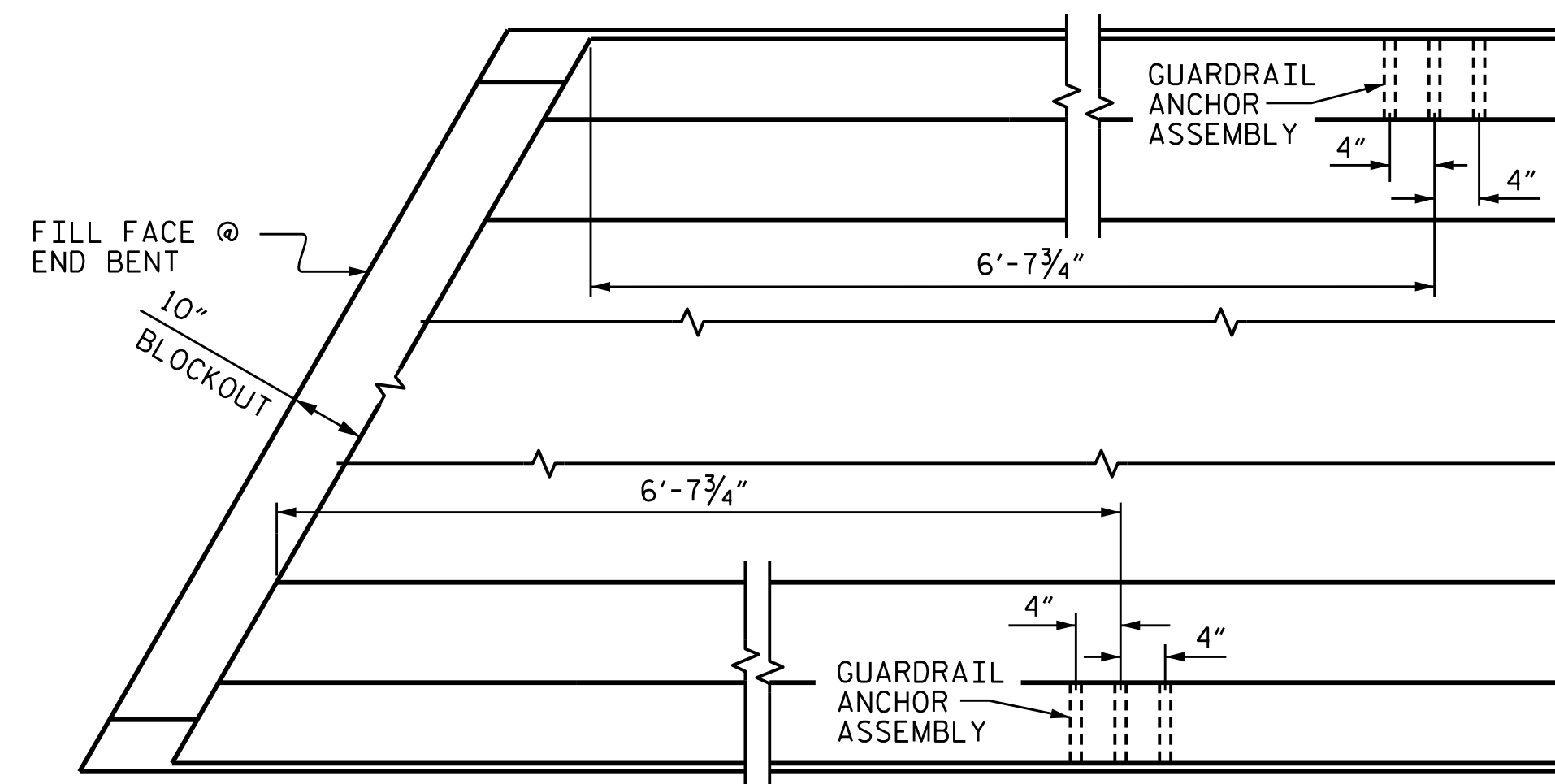


ELEVATION



SECTION E-E

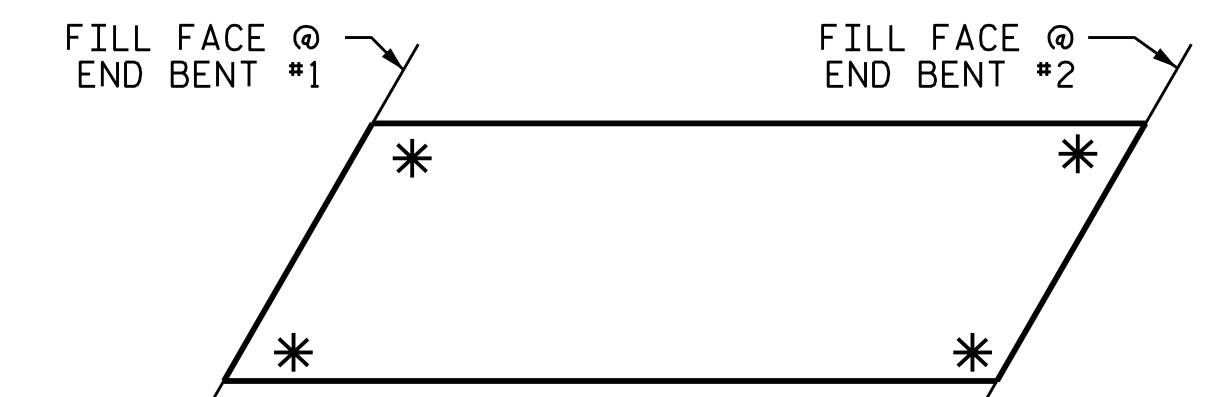
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

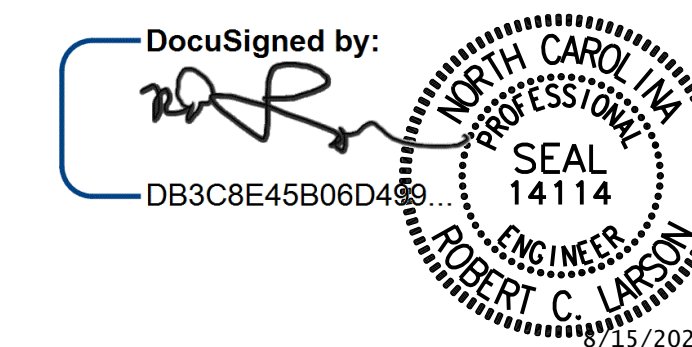


SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 34+01.72 -Y-

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



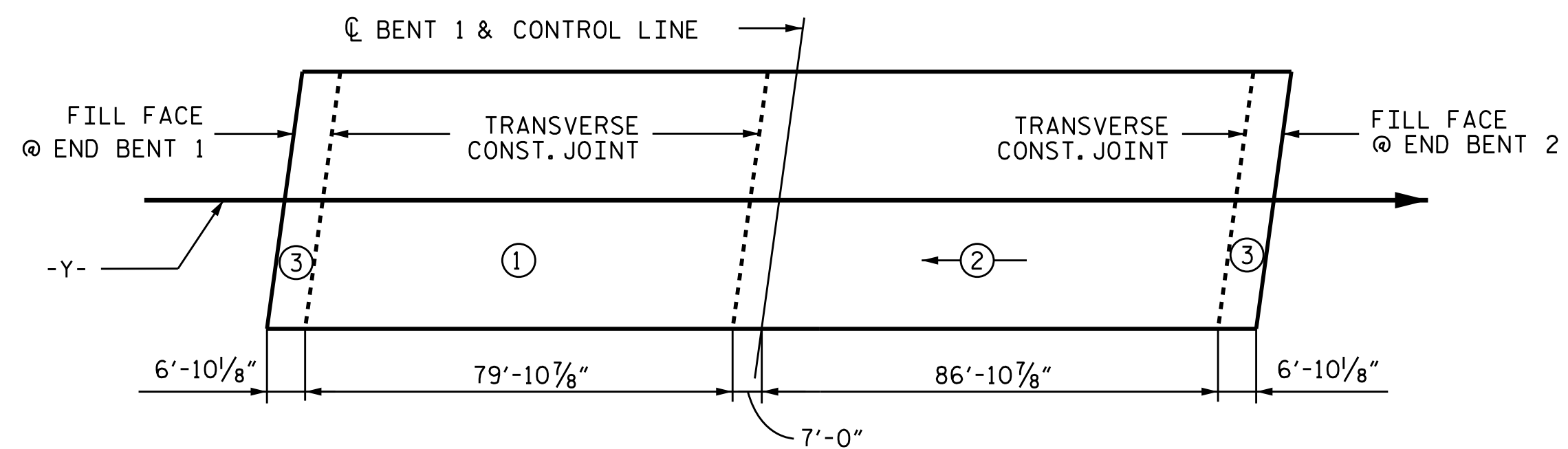
DESIGN ENGINEER OF RECORD: <i>[Signature]</i>	DATE: 8/15/2022
ASSEMBLED BY: R. C. LARSON	DATE: 08/02/19
CHECKED BY: R. F. DECOLA	DATE: 05/29/20
DRAWN BY: TLA 5/06	REV. 7/12
CHECKED BY: GM 5/06	REV. 6/13
	REV. 12/17
MAA/GM	
MAA/GM	
MAA/THC	

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1905 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone 919-783-9241

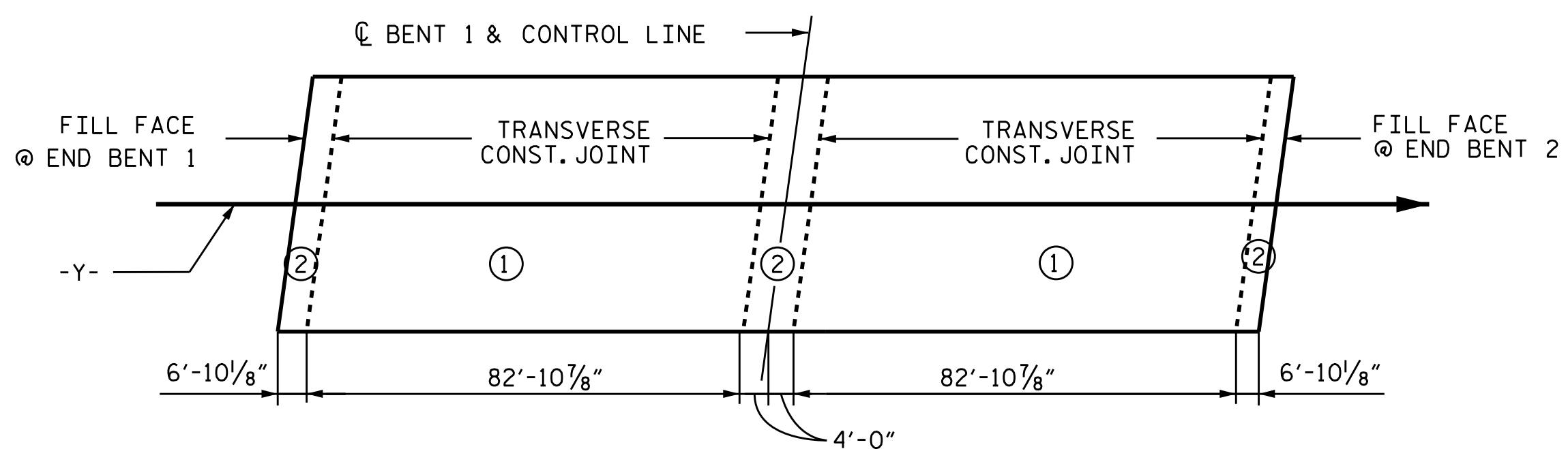
REVISIONS						SHEET NO. S1-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 28
2			4			

(SHT 1b) STD. NO. GRA2



DECK POURING SEQUENCE

② → INDICATES POUR SEQUENCE AND DIRECTION



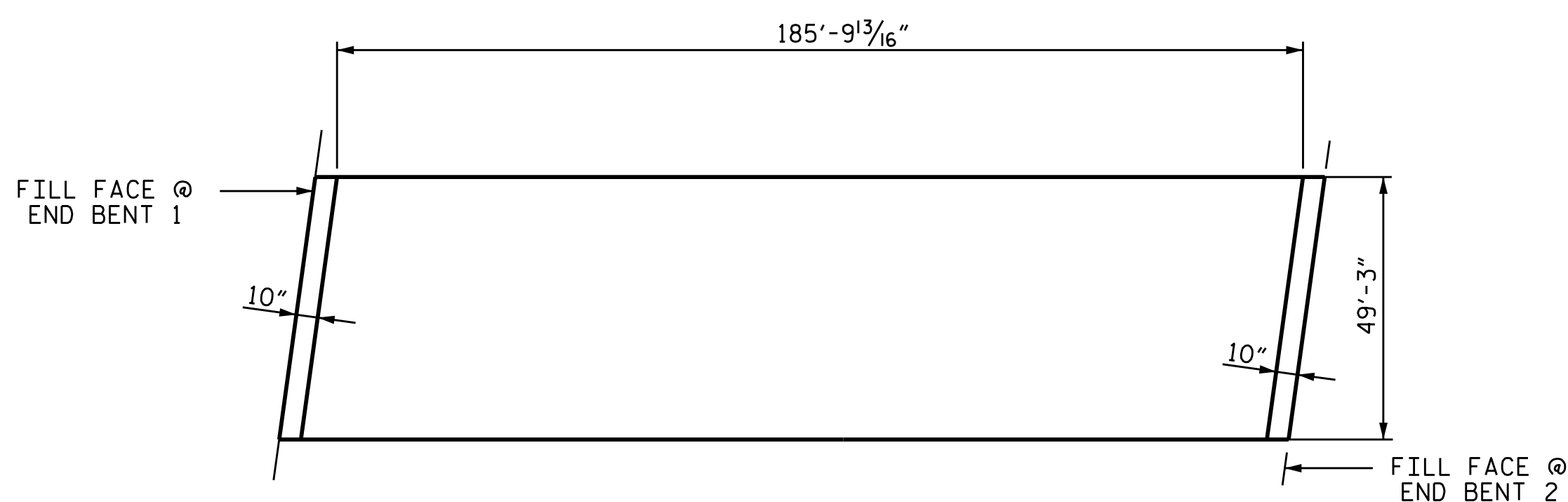
OPTIONAL DECK POURING SEQUENCE

② INDICATES POUR SEQUENCE

NO POUR 2 MAY BE STARTED UNTIL BOTH ADJACENT POURS 1 HAVE REACHED A MINIMUM STRENGTH OF 3000 PSI.

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

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

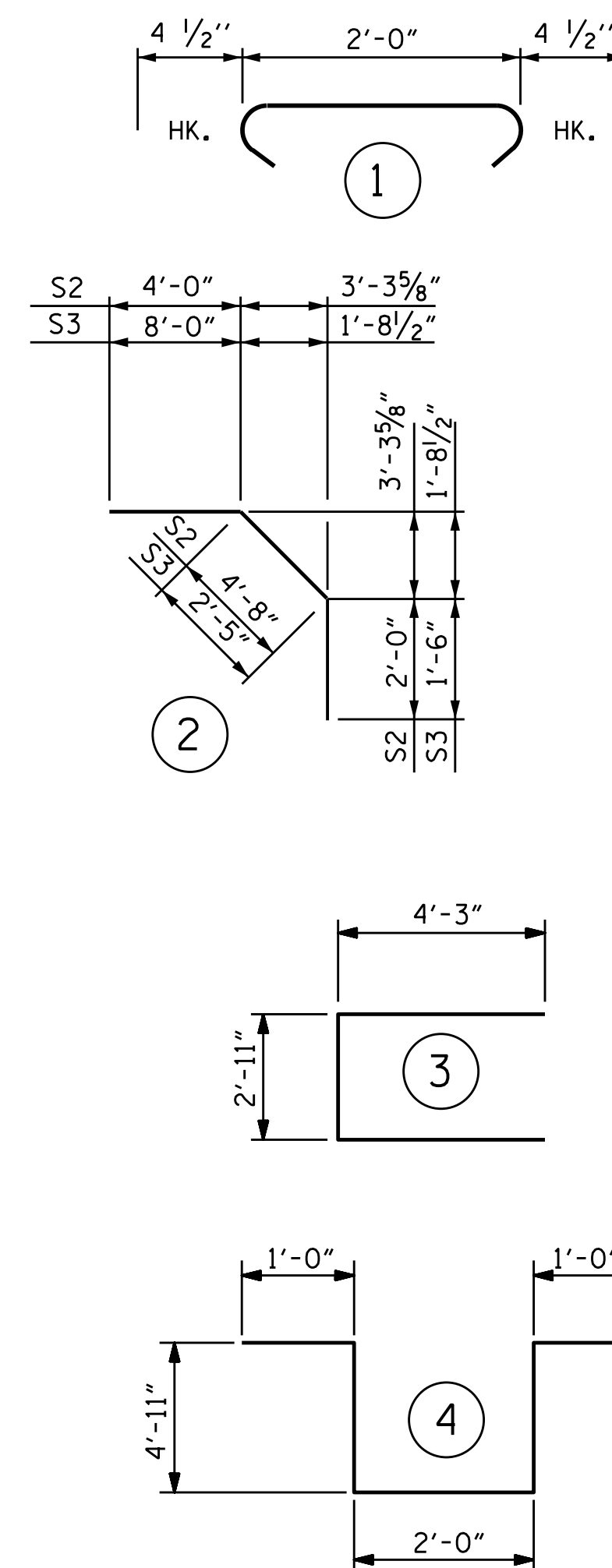


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 9152)

BILL OF MATERIAL											
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	391	5	STR.	48'-11"	19949	A29	2	5	STR.	5'-7"	12
* A2	2	5	STR.	45'-8"	95	A30	2	5	STR.	2'-3"	5
* A3	2	5	STR.	42'-3"	88	* B1	165	4	STR.	38'-8"	4262
* A4	2	5	STR.	38'-11"	81	B2	256	5	STR.	47'-11"	12794
* A5	2	5	STR.	35'-7"	74	* B3	32	6	STR.	28'-2"	1354
* A6	2	5	STR.	32'-3"	67	* B4	64	6	STR.	34'-7"	3324
* A7	2	5	STR.	28'-11"	60	* B5	64	6	STR.	19'-9"	1899
* A8	2	5	STR.	25'-7"	53	* B6	64	6	STR.	18'-9"	1802
* A9	2	5	STR.	22'-3"	46						
* A10	2	5	STR.	18'-11"	39						
* A11	2	5	STR.	15'-7"	33	K1	20	4	STR.	25'-0"	334
* A12	2	5	STR.	12'-3"	26	K2	8	4	STR.	8'-2"	44
* A13	2	5	STR.	8'-11"	19	K3	32	4	STR.	9'-8"	207
* A14	2	5	STR.	5'-7"	12	K4	16	4	STR.	8'-8"	93
* A15	2	5	STR.	2'-3"	5	K5	4	4	STR.	2'-1"	5
A16	391	5	STR.	48'-11"	19949	K6	16	4	STR.	9'-4"	100
A17	2	5	STR.	45'-8"	95	K7	4	4	STR.	2'-4"	6
A18	2	5	STR.	42'-3"	88	K8	8	4	STR.	2'-10"	15
A19	2	5	STR.	38'-11"	81	K9	4	4	STR.	2'-8"	7
A20	2	5	STR.	35'-7"	74	K10	10	4	STR.	23'-6"	157
A21	2	5	STR.	32'-3"	67	K11	8	4	STR.	7'-2"	38
A22	2	5	STR.	28'-11"	60						
A23	2	5	STR.	25'-7"	53	S1	128	4	1	2'-9"	235
A24	2	5	STR.	22'-3"	46	* S2	80	4	2	10'-10"	579
A25	2	5	STR.	18'-11"	39	* S3	84	4	2	11'-11"	669
A26	2	5	STR.	15'-7"	33						
A27	2	5	STR.	12'-3"	26	U1	80	4	3	11'-5"	610
A28	2	5	STR.	8'-11"	19	U2	32	4	4	13'-10"	296

* EPOXY COATED REINFORCING STEEL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

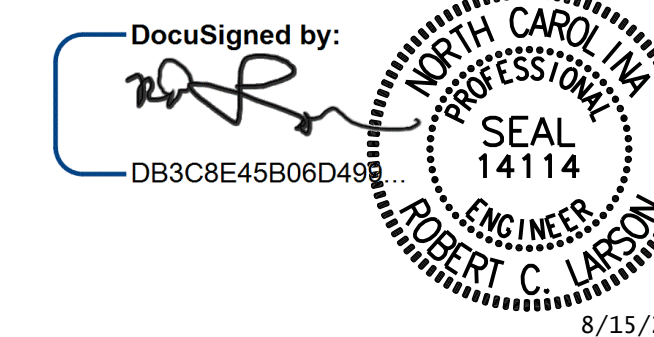
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	128.2		
POUR 2	166.8		
POUR 3	72.5		
TOTALS**	367.5	35,588	34,536

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1203 SQ.FT.
BRIDGE DECK	7980 SQ.FT.
TOTAL	9183 SQ.FT.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-



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

DESIGN ENGINEER OF RECORD: RCL DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 07/29/19
 CHECKED BY: R. C. LARSON DATE: 08/01/19

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-5241

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

TOTAL SHEETS: 28

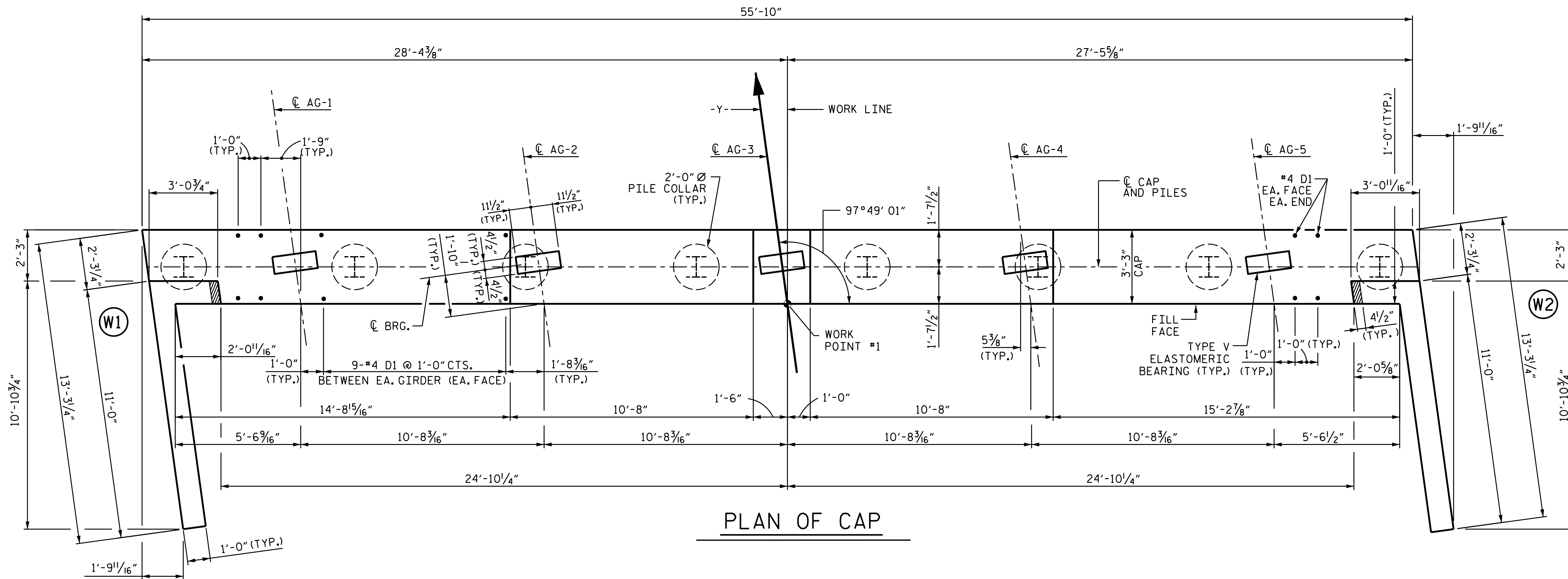
NOTES

THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1) EXCEPT THE BEARING AREAS AND THE AREA OUTSIDE OF THE SUPERSTRUCTURE SHALL BE RAKED TO A DPTH OF 1/4".

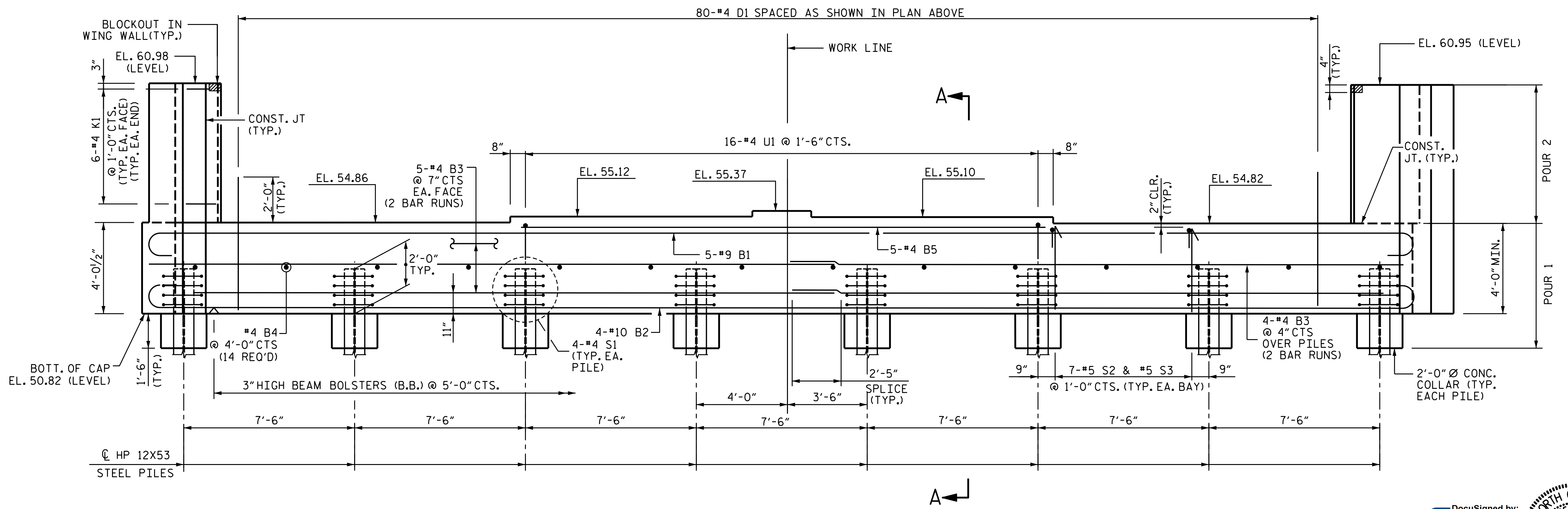
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIPFORMING IS USED.

FOR "TEMPORARY DRAINAGE AT END BENT", SEE END BENT 2.

FOR SECTION A-A SEE SHEET 3 OF 3.



PLAN OF CAP



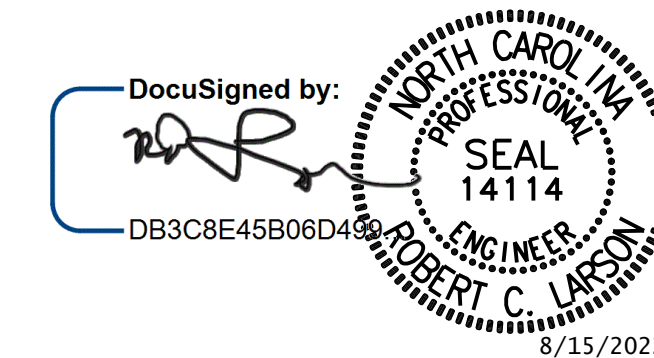
ELEVATION

PROJECT NO. R-256ICA
 COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1



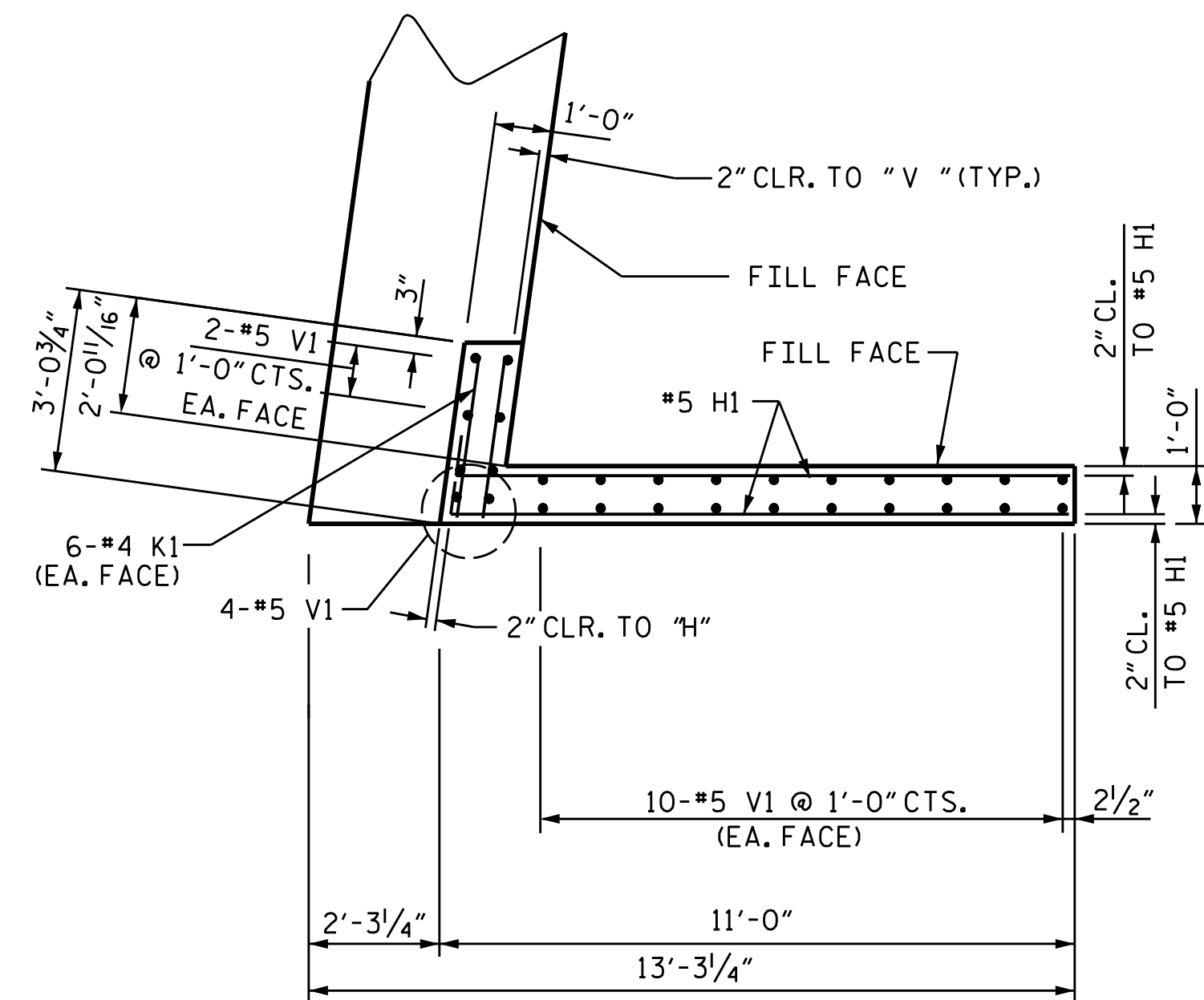
DESIGN ENGINEER OF RECORD: *[Signature]* DATE: 8/15/2022
 DRAWN BY: R.J. FLORY DATE: 03/07/20
 CHECKED BY: R.C. LARSON DATE: 03/20/20

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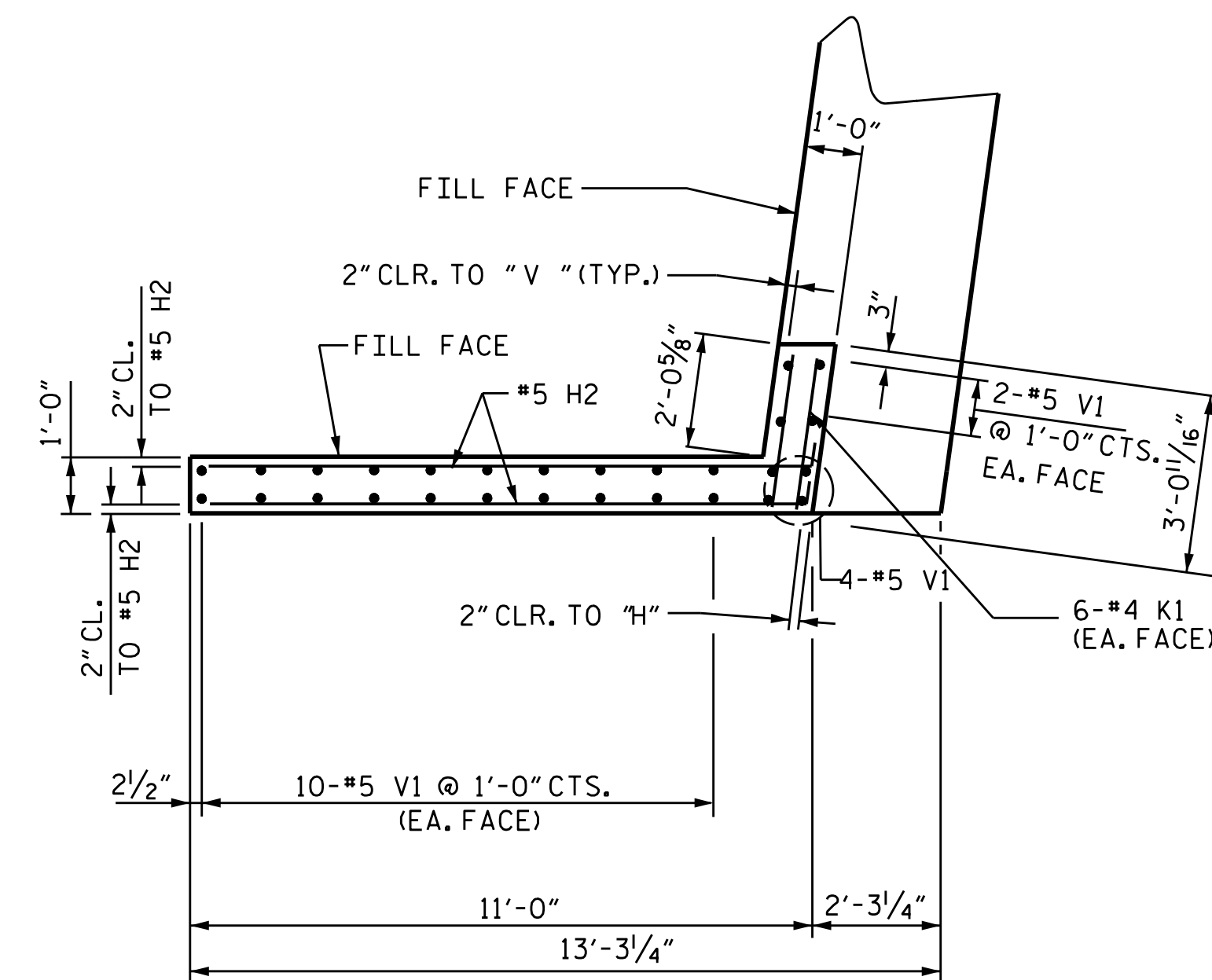
KCI Associates
 of North Carolina, P.A.
 2505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-9241

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

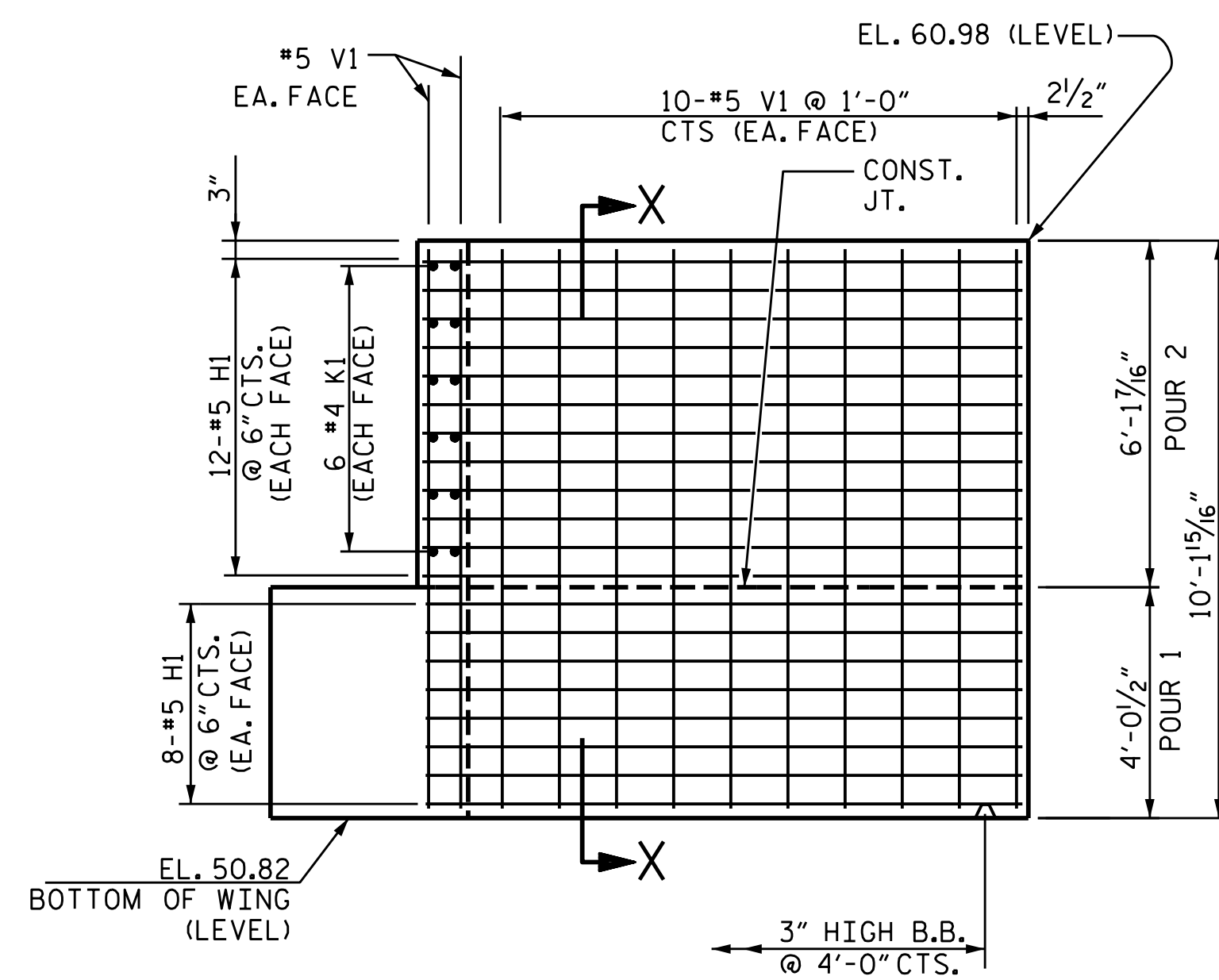
TOTAL SHEETS: 28



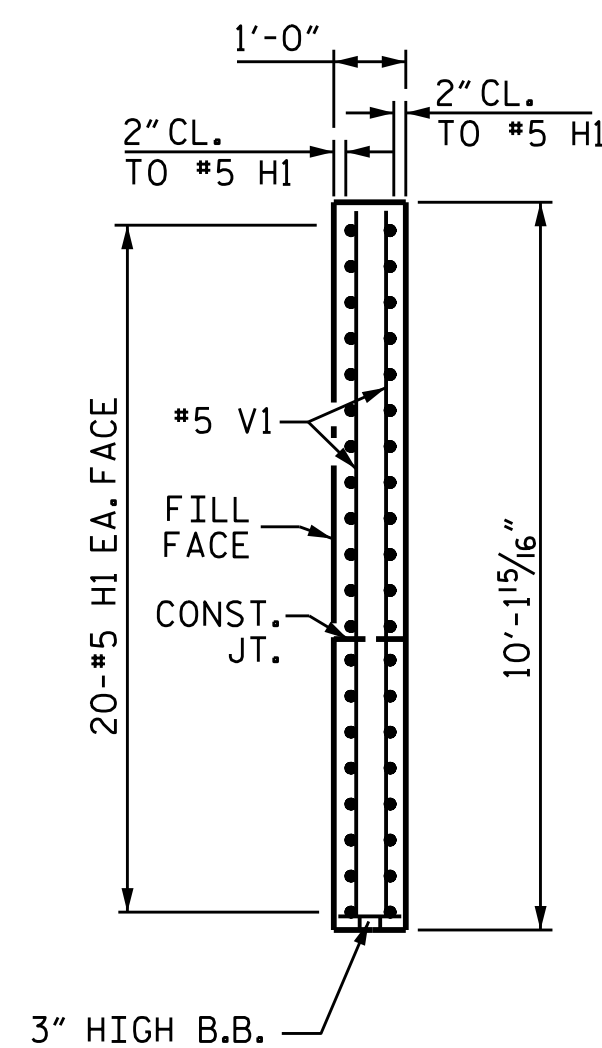
PLAN W1



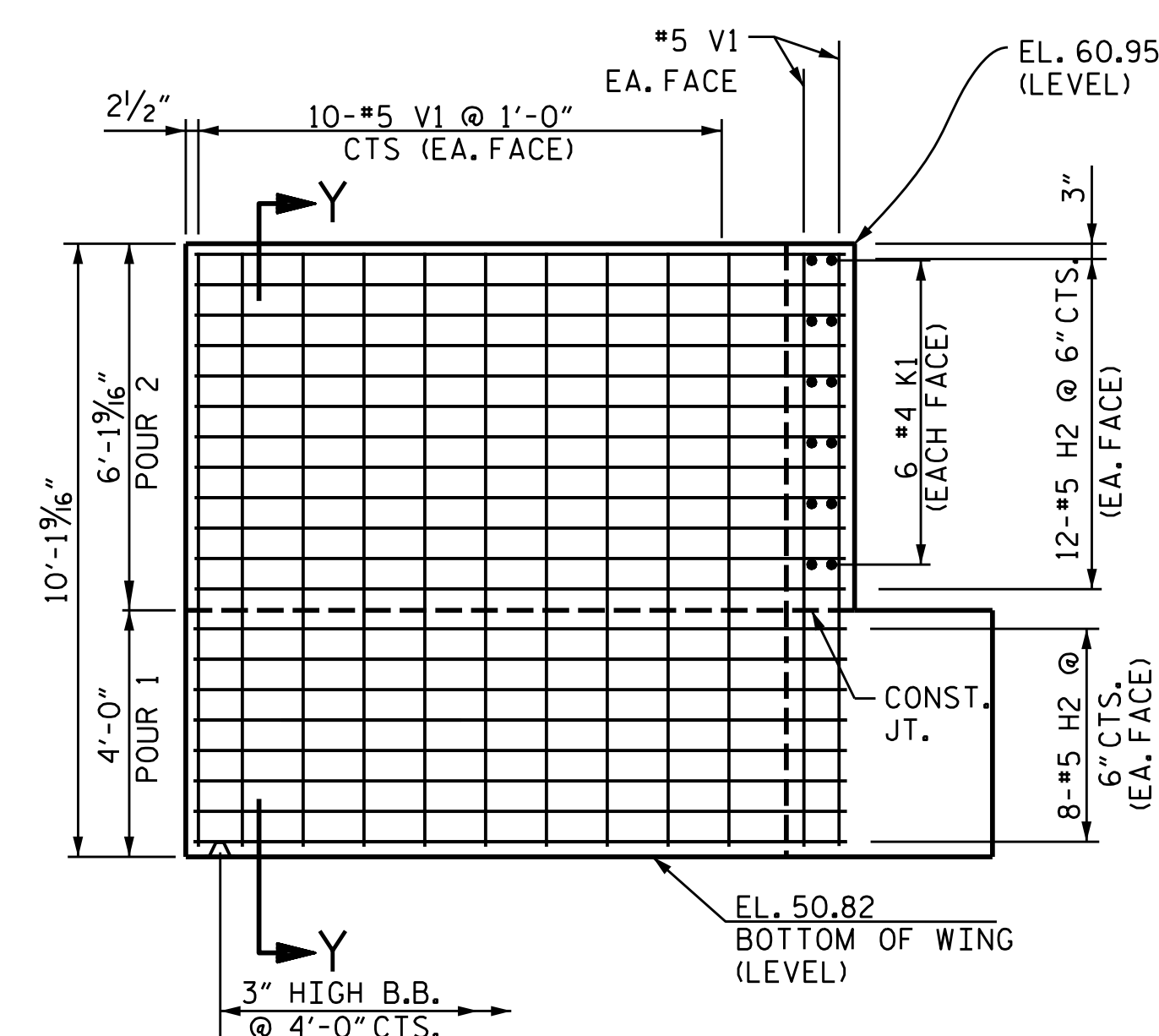
PLAN W2



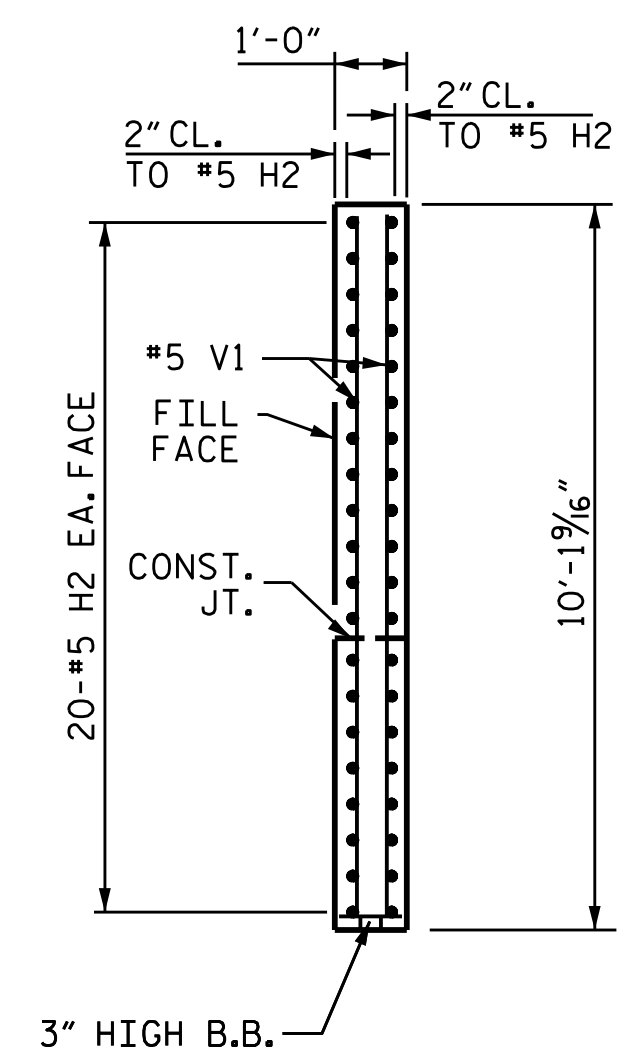
ELEVATION W1



SECTION X-X



ELEVATION W2



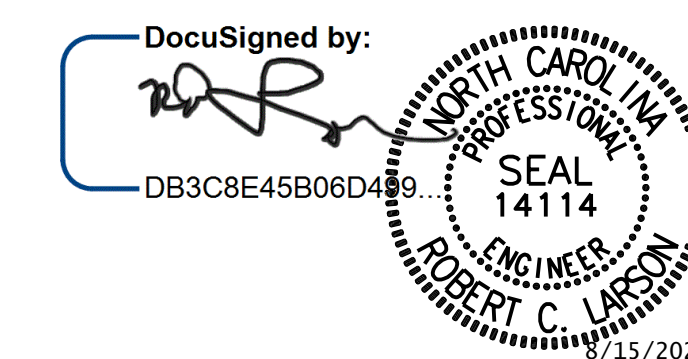
SECTION Y-Y


PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1



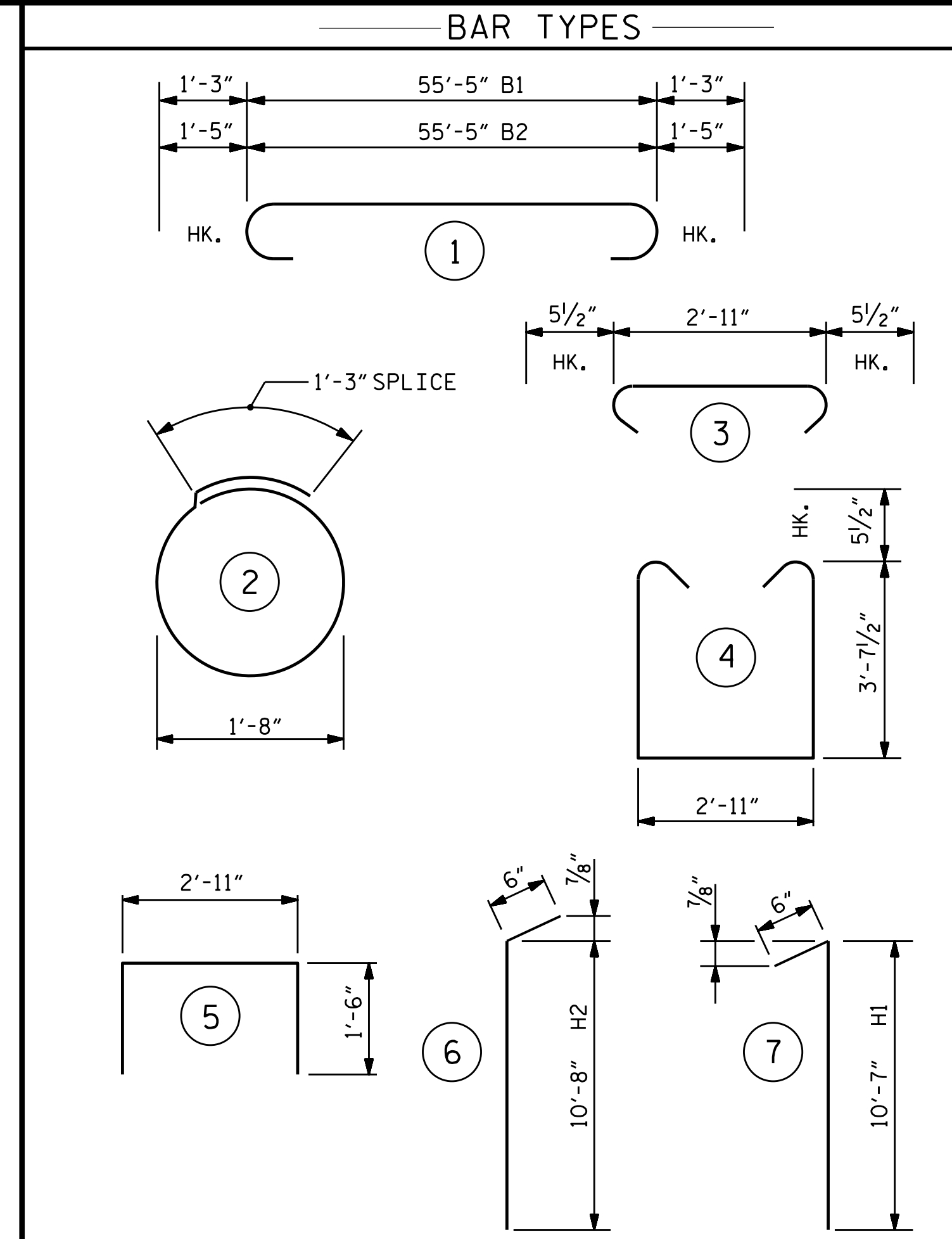
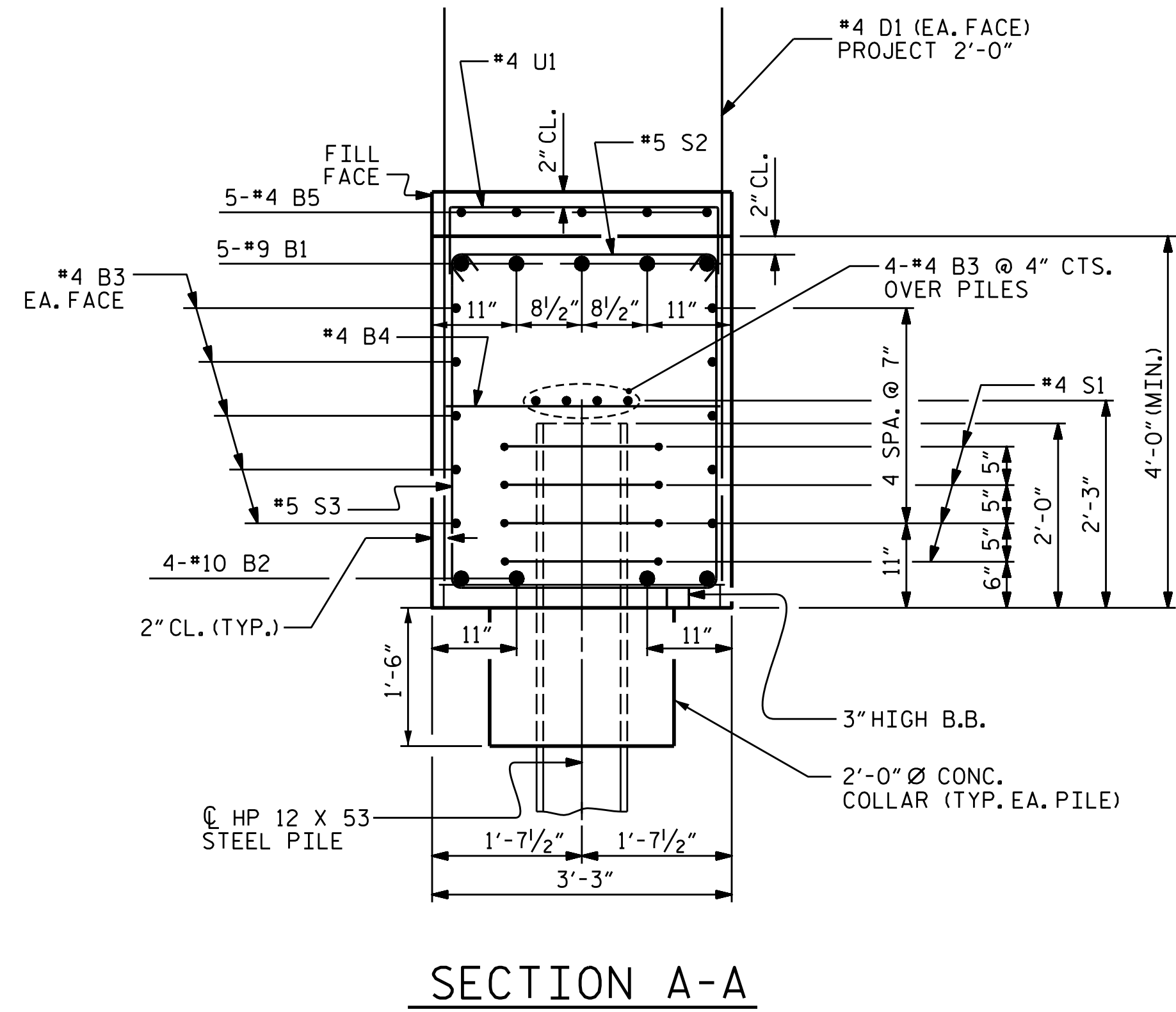
DESIGN ENGINEER OF RECORD  DATE: 8/15/2022
 DRAWN BY: R. J. FLORY DATE: 03/30/20
 CHECKED BY: R. C. LARSON DATE: 04/02/20

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ENGINEERS, PLANNERS & SCIENTISTS IN CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6370 Phone: (919) 785-5241

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

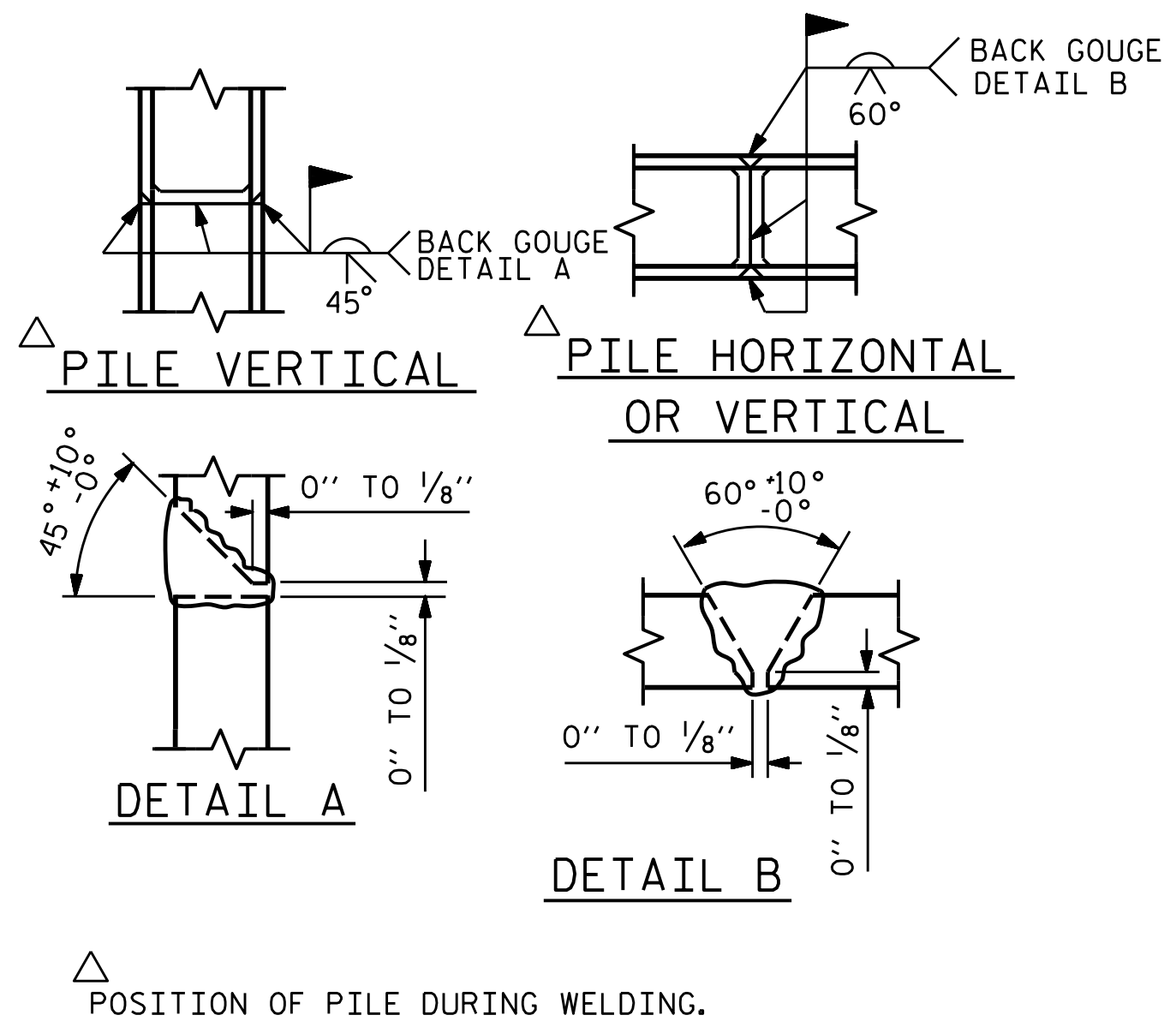
TOTAL SHEETS: 28



ALL BAR DIMENSIONS ARE OUT TO OUT.

- * POUR 1: CAPS, LOWER PART OF WINGS, COLLARS
- * POUR 2: UPPER PART OF WINGS

BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	9	1	58'-3"	990
B2	4	10	1	57'-11"	997
B3	28	4	STR.	28'-1"	525
B4	14	4	STR.	2'-11"	27
B5	5	4	STR.	24'-0"	80
D1	80	4	STR.	5'-10"	312
H1	40	5	7	11'-1"	462
H2	40	5	6	11'-2"	466
K1	24	4	STR.	2'-8"	43
S1	32	4	2	6'-6"	139
S2	49	5	3	3'-10"	196
S3	49	5	4	11'-1"	566
U1	16	4	5	5'-11"	63
V1	56	5	STR.	9'-9"	569
REINFORCING STEEL, LBS.					5435
CLASS A CONCRETE, CY * POUR 1					32.1
* POUR 2					5.9
TOTAL					38.0
HP 12X53 STEEL PILES				NO.	8
				L.F.	560
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES, EA.					8
PILE REDRIVES, EA.					4



PILE SPLICE DETAILS

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 1**

DocuSigned by:

 DB3C8E45B06D499
 NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14114 ROBERT C. LARSON 8/15/2022

DESIGN ENGINEER OF RECORD	DATE:
	8/15/2022
DRAWN BY: R.J. FLORY	DATE: 03/30/20
CHECKED BY: R.C. LARSON	DATE: 04/02/20

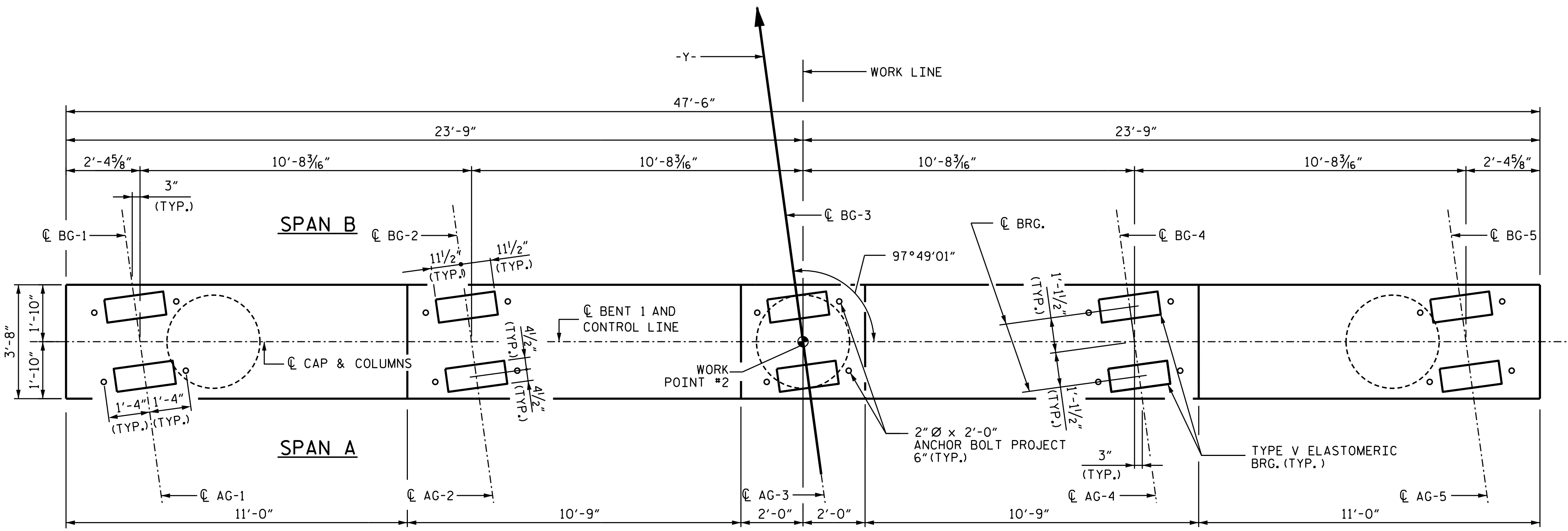
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					28

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

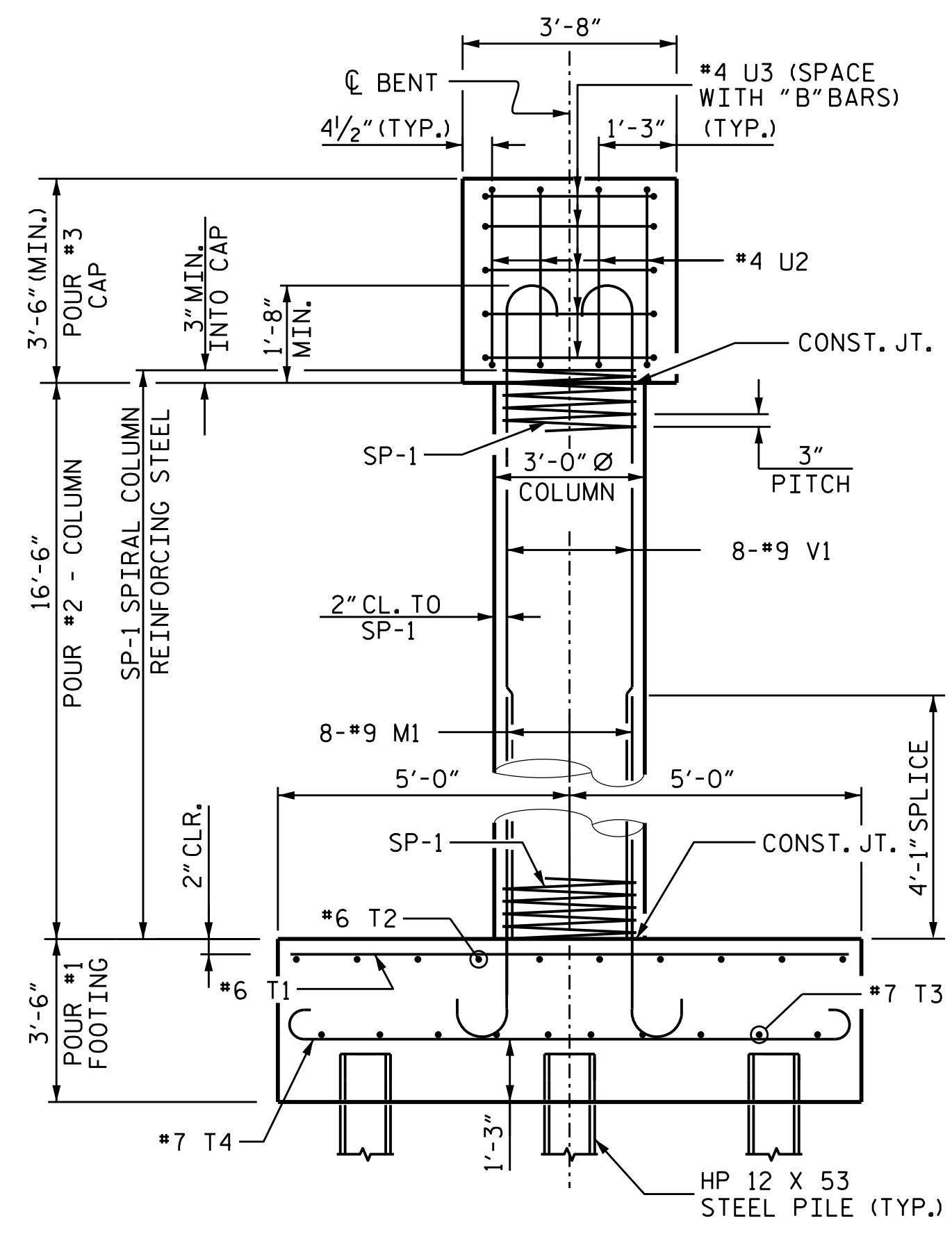
ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone: (919) 785-5241

NOTES

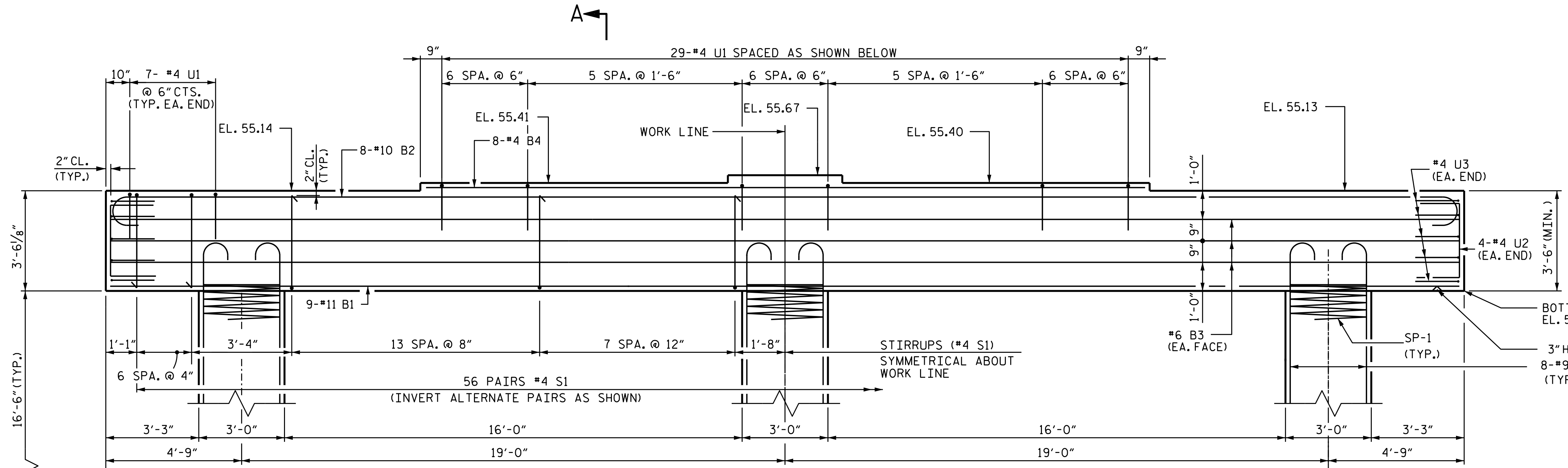
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACEMENT OF REINFORCING.
 FOR SECTION THRU BENT CAP SEE SHEET 2 OF 2



PLAN OF CAP



END ELEVATION



ELEVATION

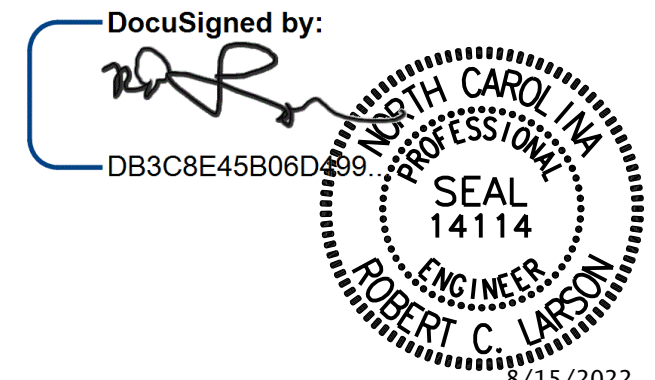
(FOOTING REINFORCING TYPICAL)

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 1



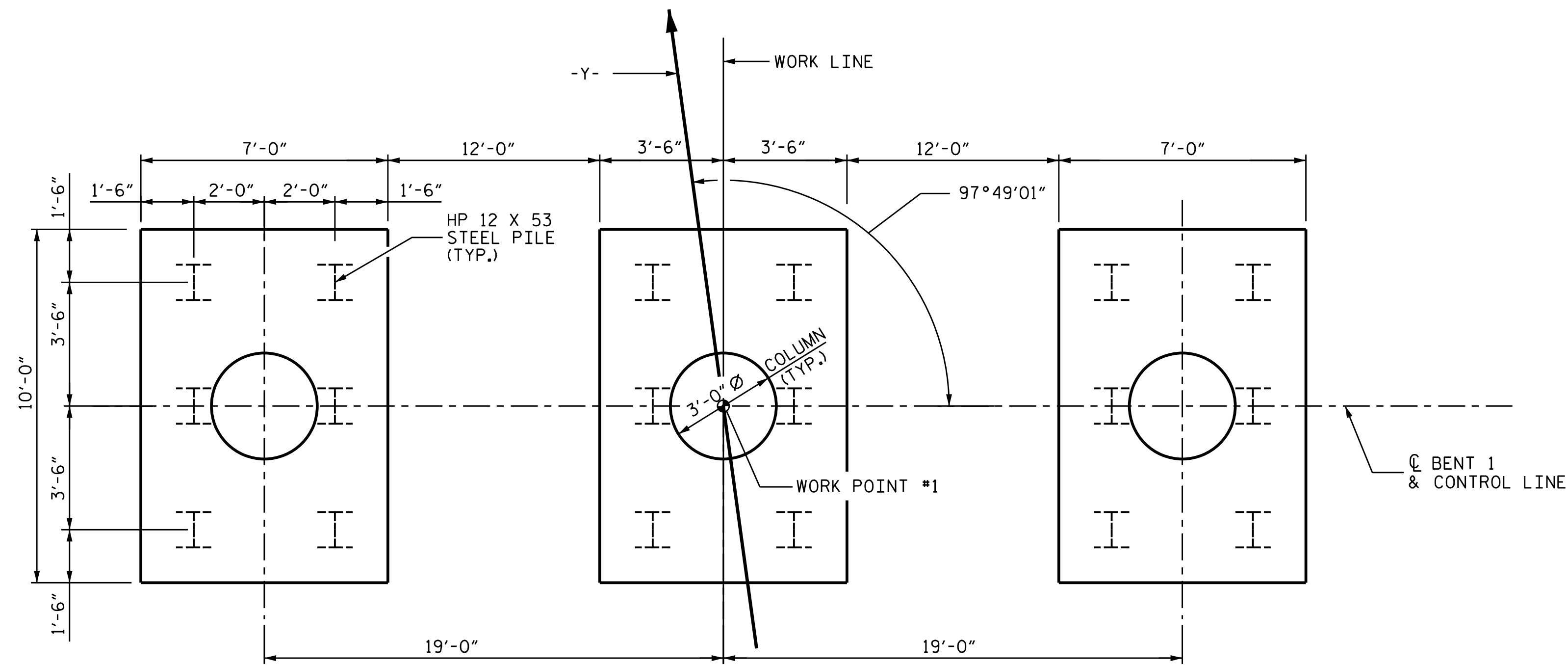
DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 03/18/20
 CHECKED BY: R. C. LARSON DATE: 03/23/20

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

DocuSigned by:
[Signature]
 DB3C8E45B06D

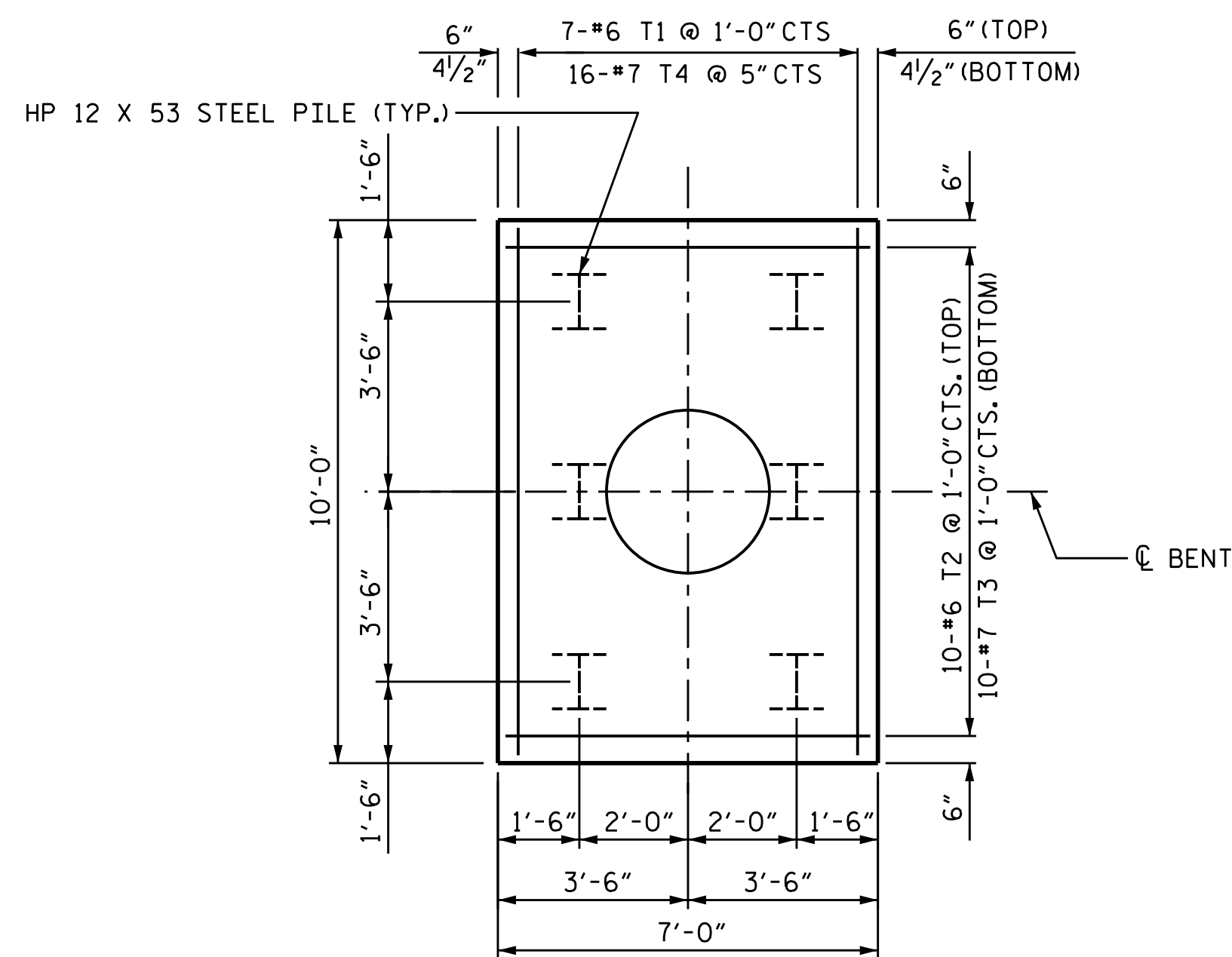
REVISIONS		SHEET NO.	
NO.	DATE	NO.	DATE
1		3	
2		4	

TOTAL SHEETS: 28

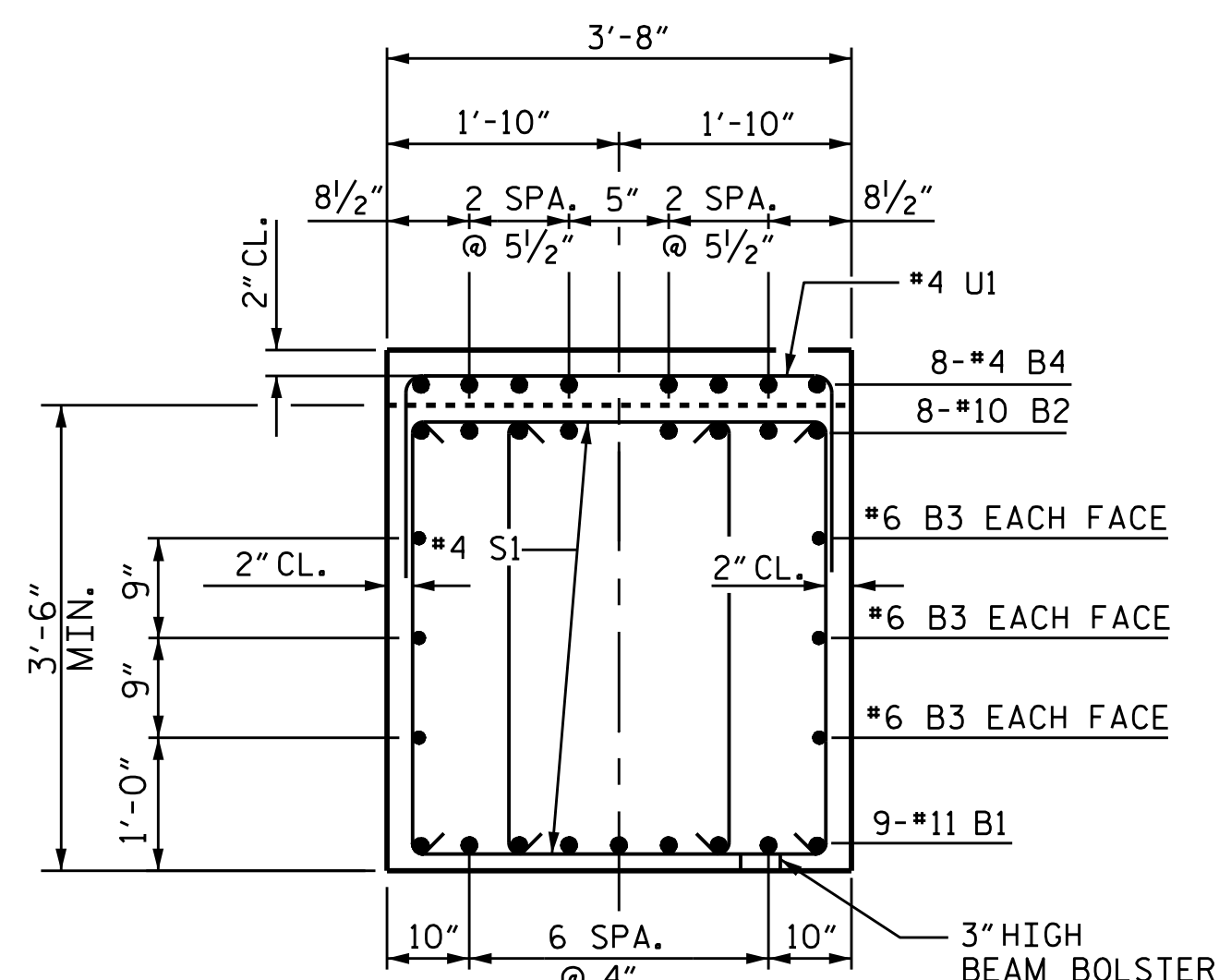


PLAN OF FOOTINGS

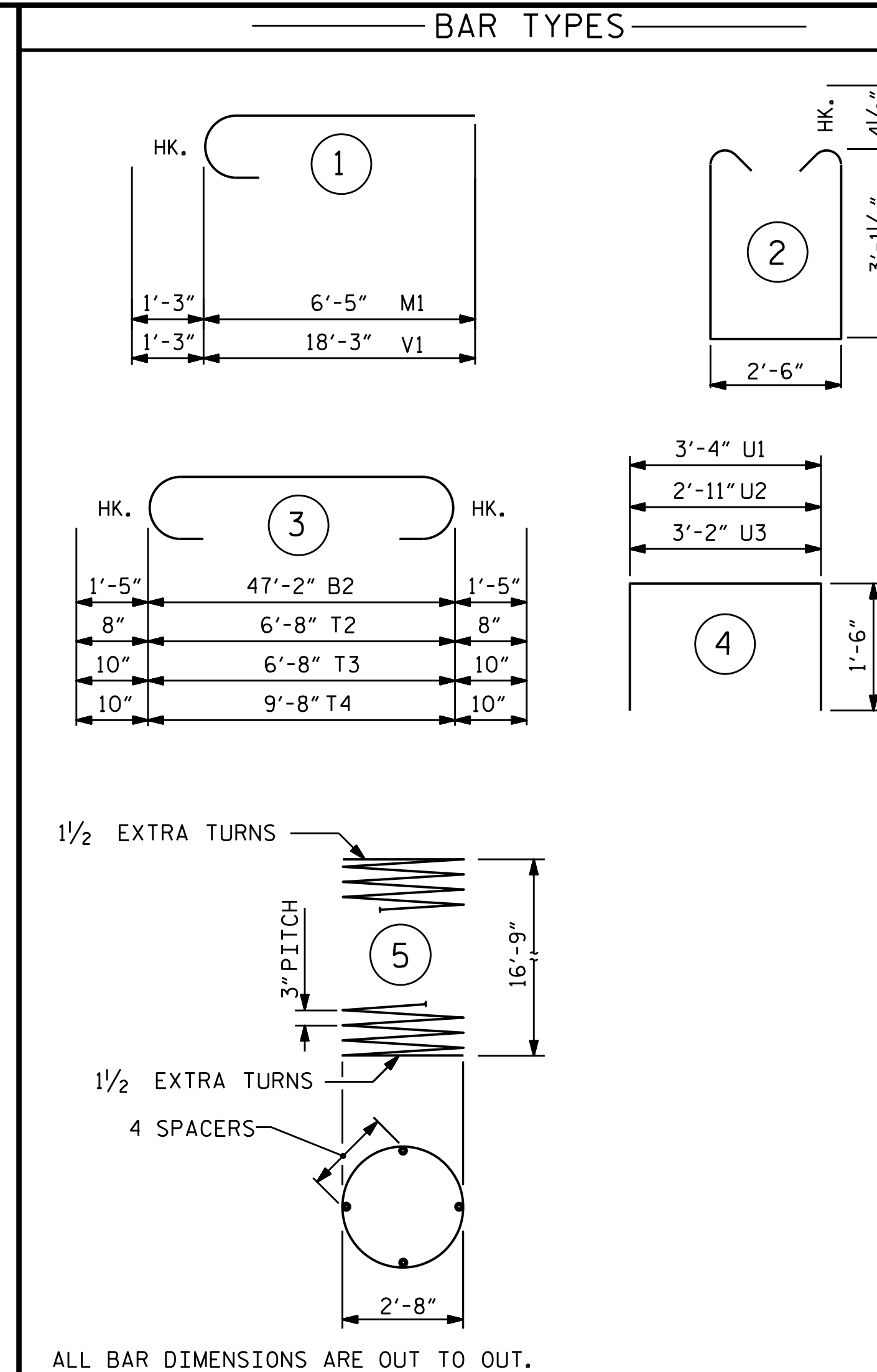
ALL FOOTINGS ARE IDENTICAL



TYPICAL FOOTING PLAN

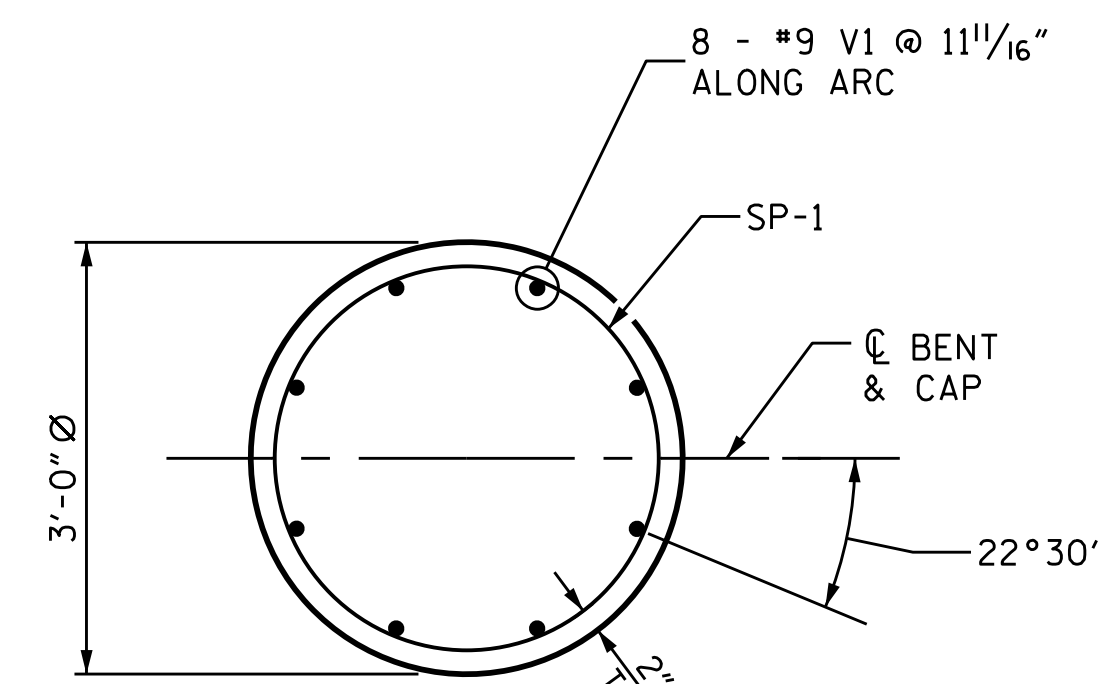


SECTION A-A

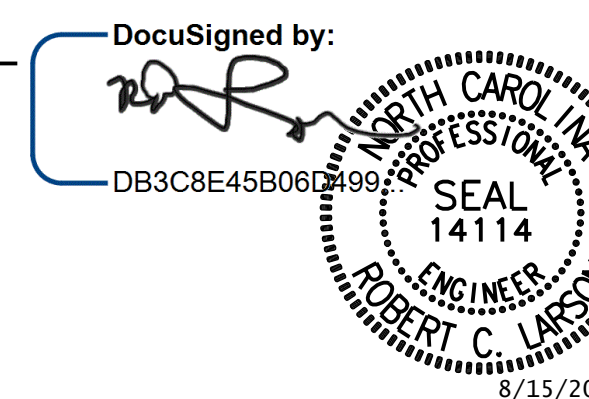


ALL BAR DIMENSIONS ARE OUT TO OUT.

* THE "SP-1" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



SECTION B-B



BILL OF MATERIAL FOR BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	9	11	STR.	47'-2"	2255
B2	8	10	3	50'-0"	1721
B3	6	6	STR.	47'-2"	425
B4	8	4	STR.	25'-2"	134
M1	24	9	1	7'-8"	626
S1	112	4	2	9'-6"	711
T1	21	6	STR.	9'-8"	305
T2	30	6	3	8'-0"	360
T3	30	7	3	8'-4"	511
T4	48	7	3	11'-4"	1112
U1	43	4	4	6'-4"	182
U2	8	4	4	5'-11"	32
U3	10	4	4	6'-2"	41
V1	24	9	1	19'-6"	1591
SP-1	3	*	5	577'-7"	1157

REINFORCING STEEL, LB.	10,006
SPIRAL COLUMN REINFORCING STEEL, LB.	1157
CLASS A CONCRETE, CU. YD.	
POUR 1 (FOOTING)	27.2
POUR 2 (COLUMNS)	13.0
POUR 3 (CAP)	23.7
TOTAL	63.9
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES, EA.	18
HP 12 X 53 STEEL PILES, NO.	18
LIN. FT.	1080
PILE REDRIVES, EA.	9
FOUNDATION EXCAVATION	LUMP SUM

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 1

DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 03/18/20
 CHECKED BY: R. C. LARSON DATE: 03/24/20

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0154
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone: (919) 785-5241

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S1-21
2			4			TOTAL SHEETS 28

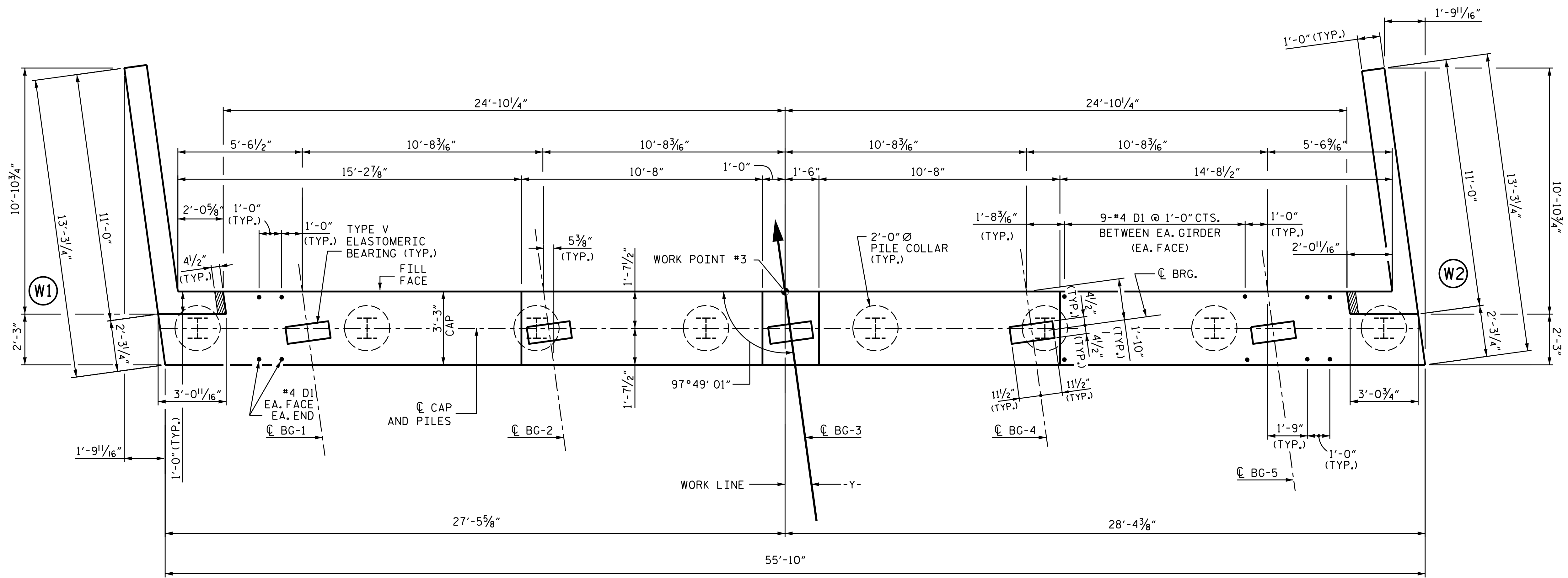
NOTES

THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1) EXCEPT THE BEARING AREAS AND THE AREA OUTSIDE OF THE SUPERSTRUCTURE SHALL BE RAKED TO A DEPTH OF 1/4".

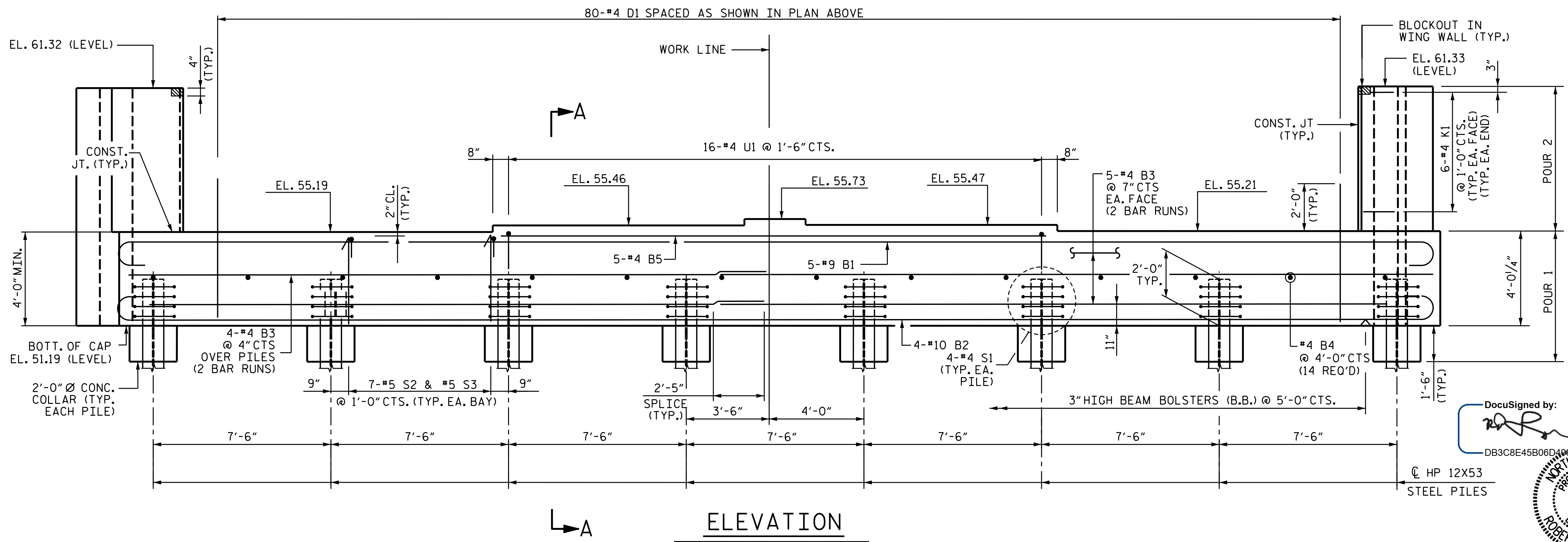
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIPFORMING IS USED.

FOR "PILE SPLICE DETAILS", SEE END BENT 1.

FOR SECTION A-A SEE SHEET 3 OF 3.



PLAN OF CAP



ELEVATION

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 1 OF 3

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

DocuSigned by:

 DB3C8E45B06D
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 14114
 ROBERT C. LARSON
 8/15/2022

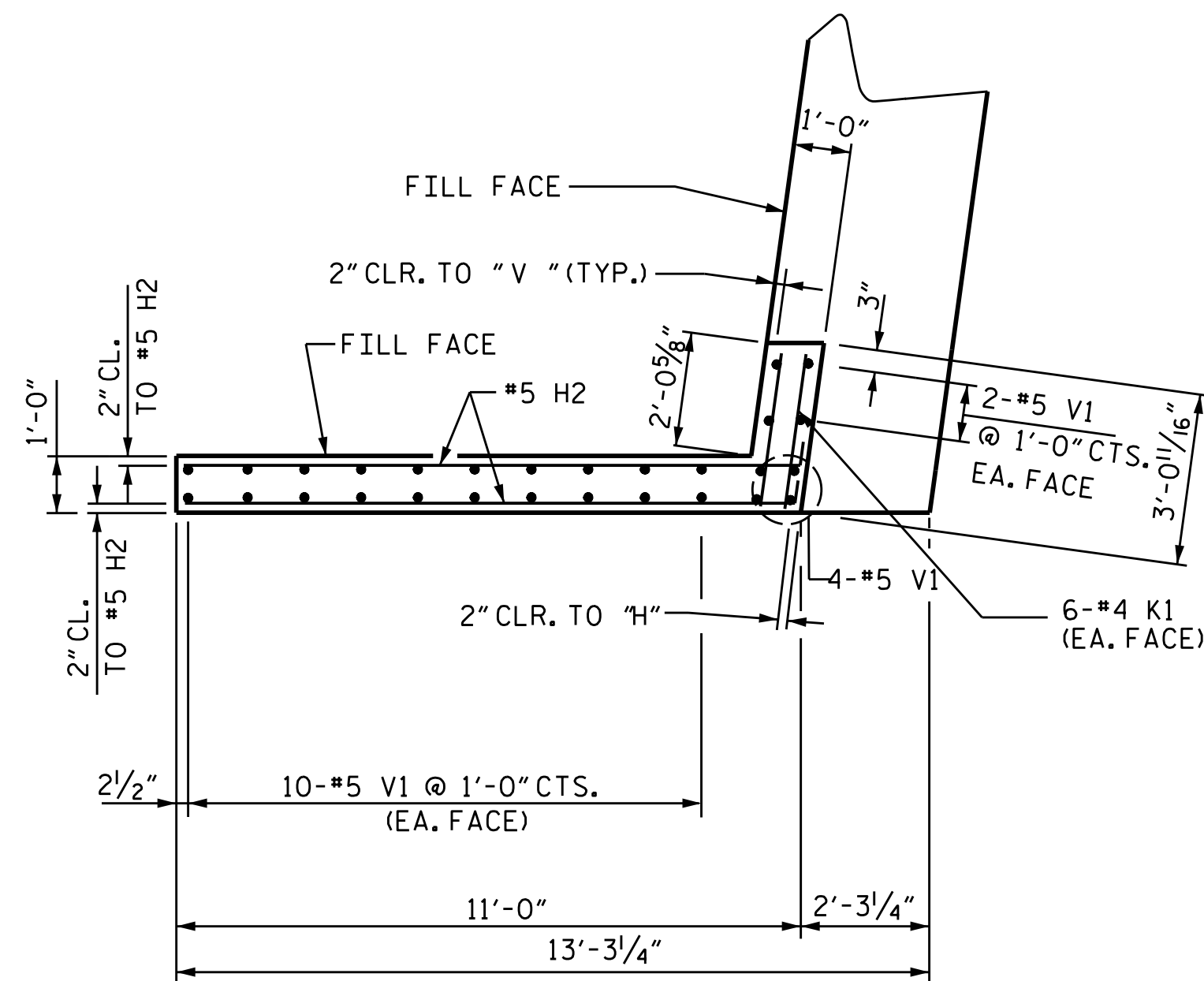
DESIGN ENGINEER OF RECORD: DATE: 8/15/2022
 DRAWN BY: R.J. FLORY DATE: 03/07/20
 CHECKED BY: R.C. LARSON DATE: 03/20/20

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

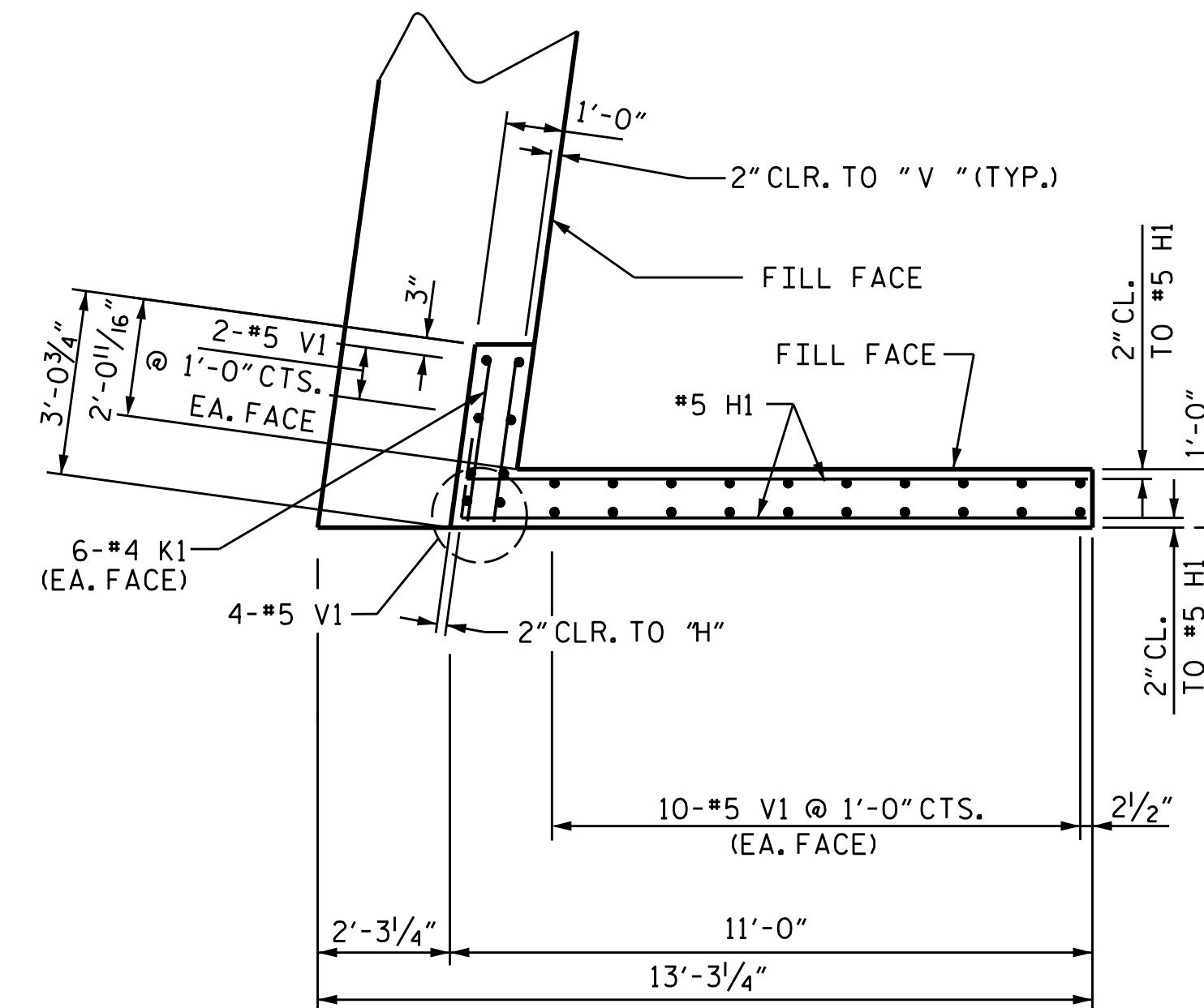
ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-9241

REVISIONS				SHEET NO.	
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2			4		

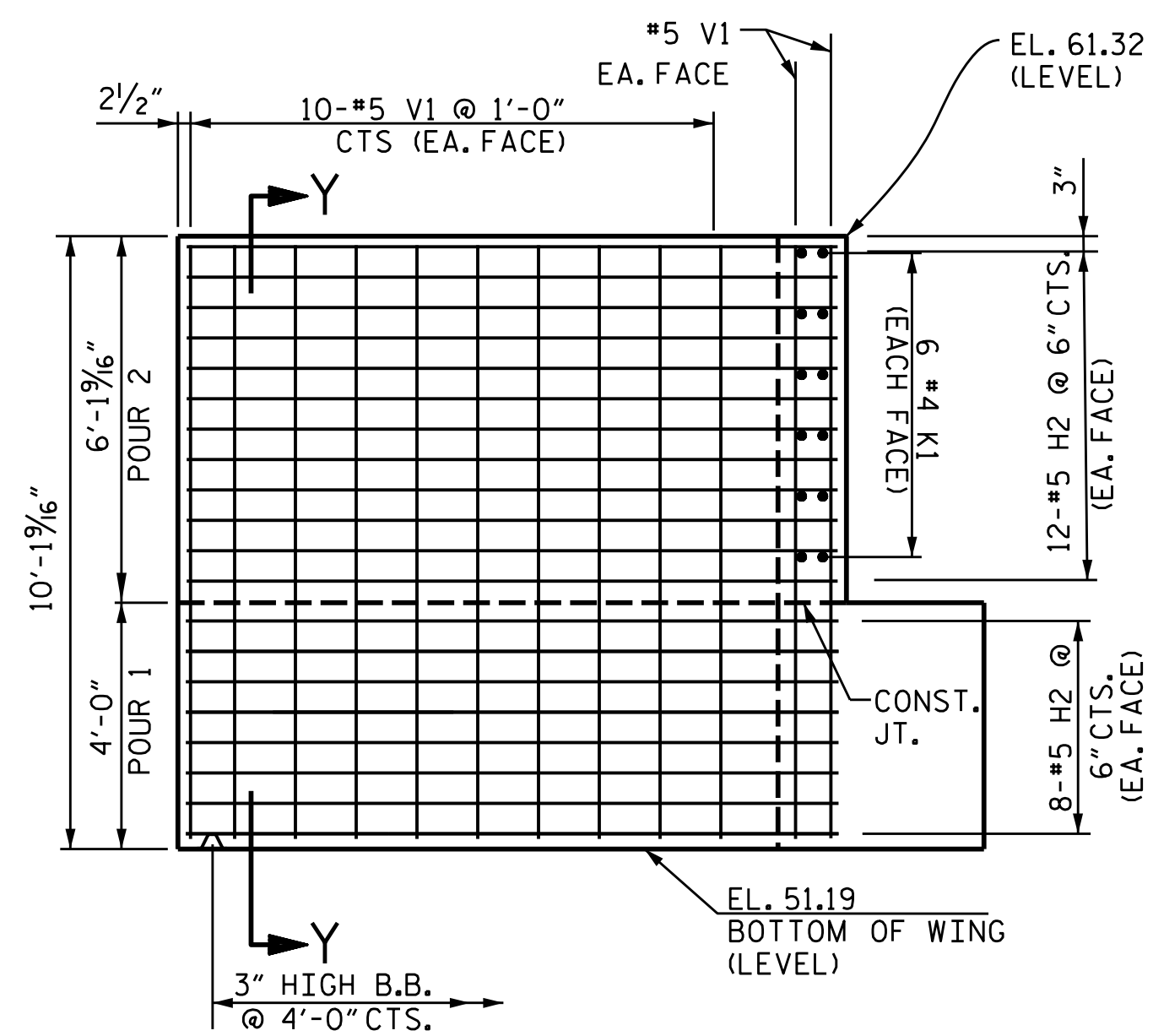
TOTAL SHEETS: 28



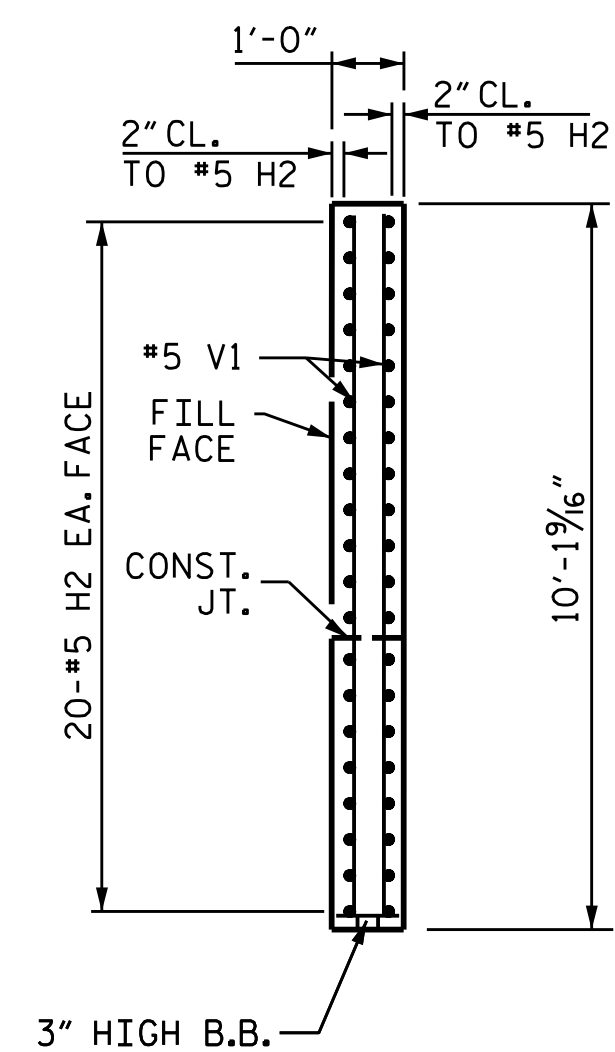
PLAN W1



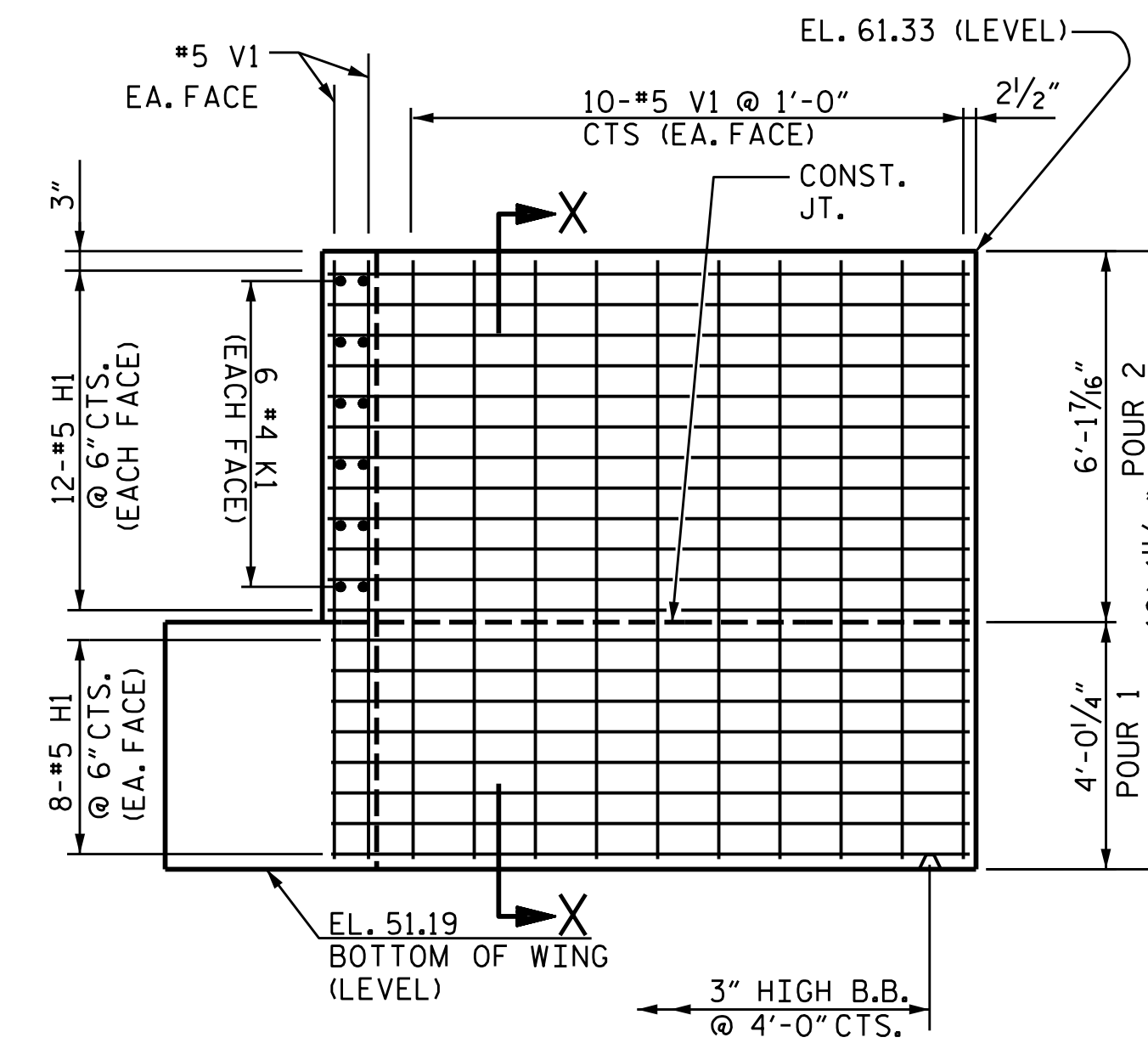
PLAN W2



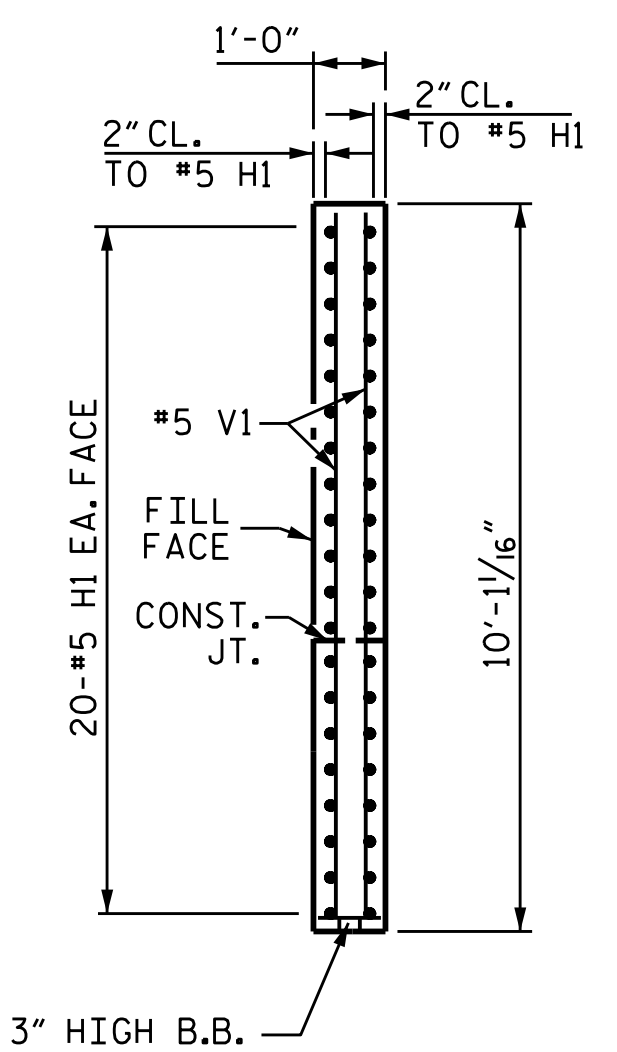
ELEVATION W1



SECTION Y-Y



ELEVATION W2



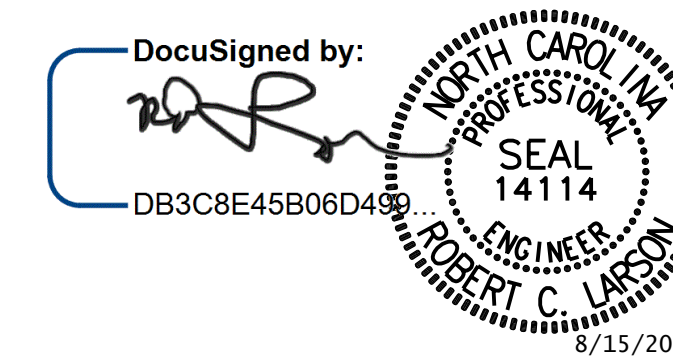
SECTION X-X

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2

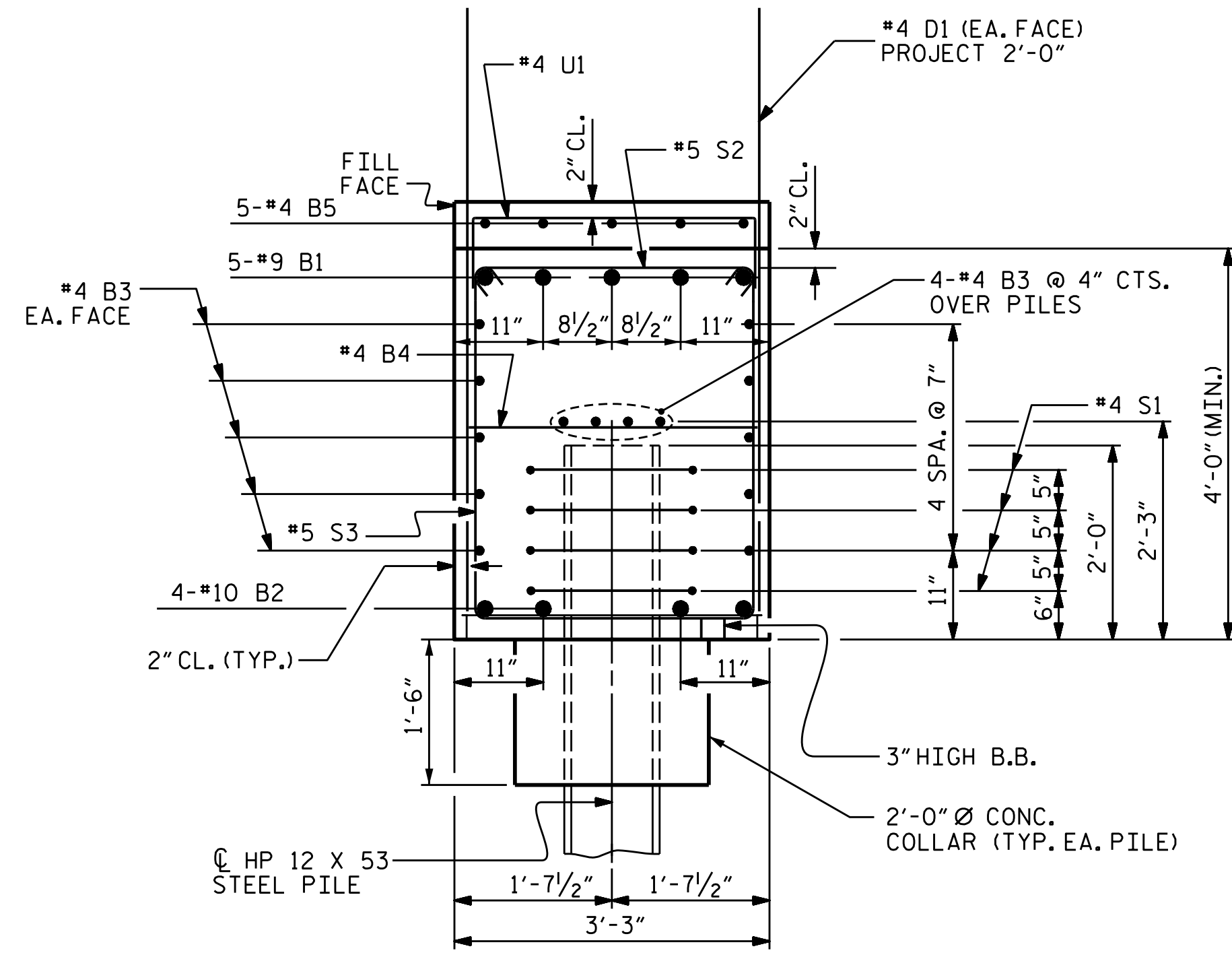


DESIGN ENGINEER OF RECORD: R. J. FLORY DATE: 03/30/20
 DRAWN BY: R. J. FLORY DATE: 03/30/20
 CHECKED BY: R. C. LARSON DATE: 04/02/20

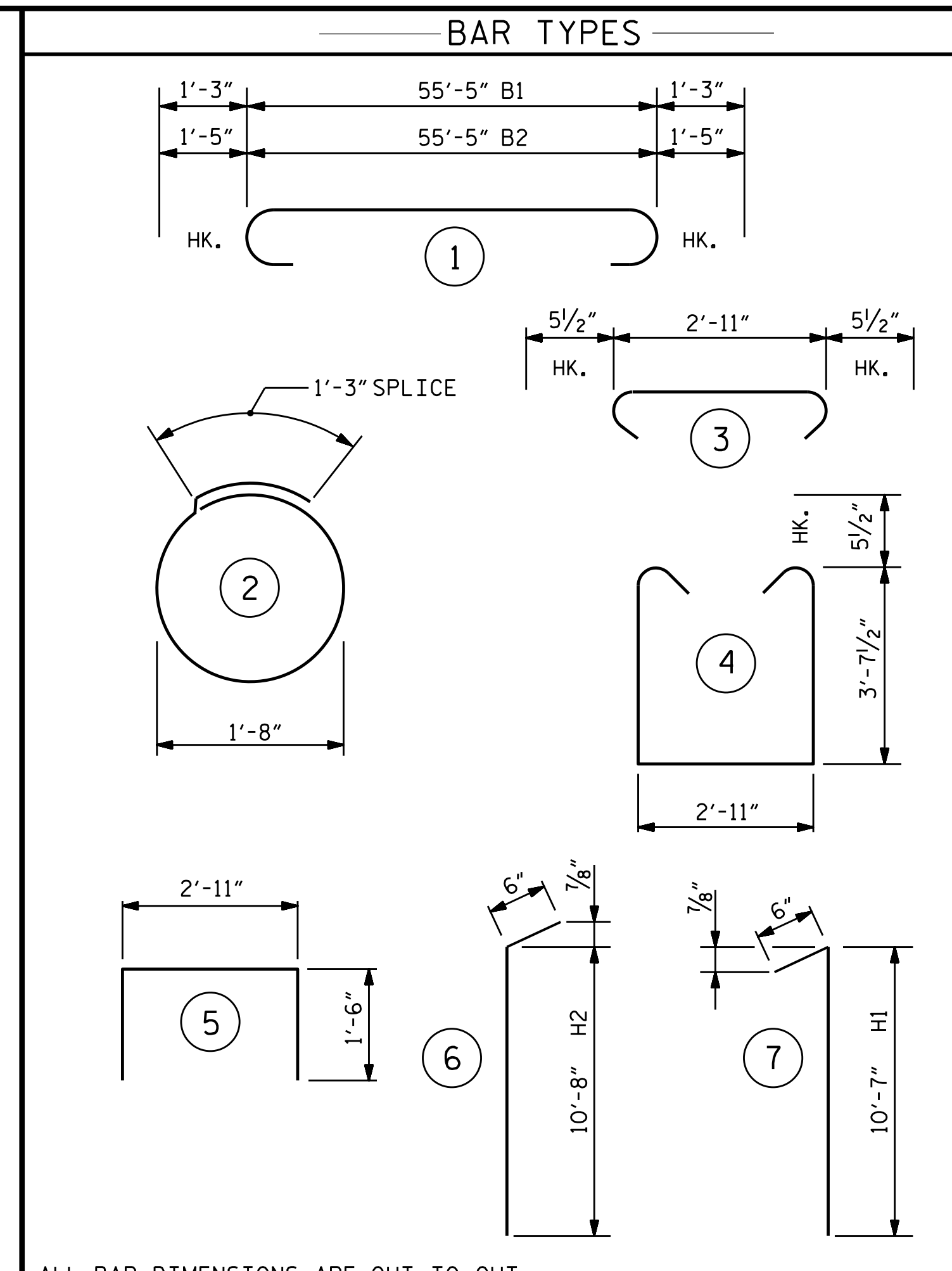
DOCUMENT NOT CONSIDERED FINAL
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ENGINEERS, PLANNERS & SCIENTISTS IN CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone: 919-785-5244

REVISIONS		SHEET NO.	
NO.	DATE	NO.	DATE
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2		4	
		S1-23	
		TOTAL SHEETS 28	



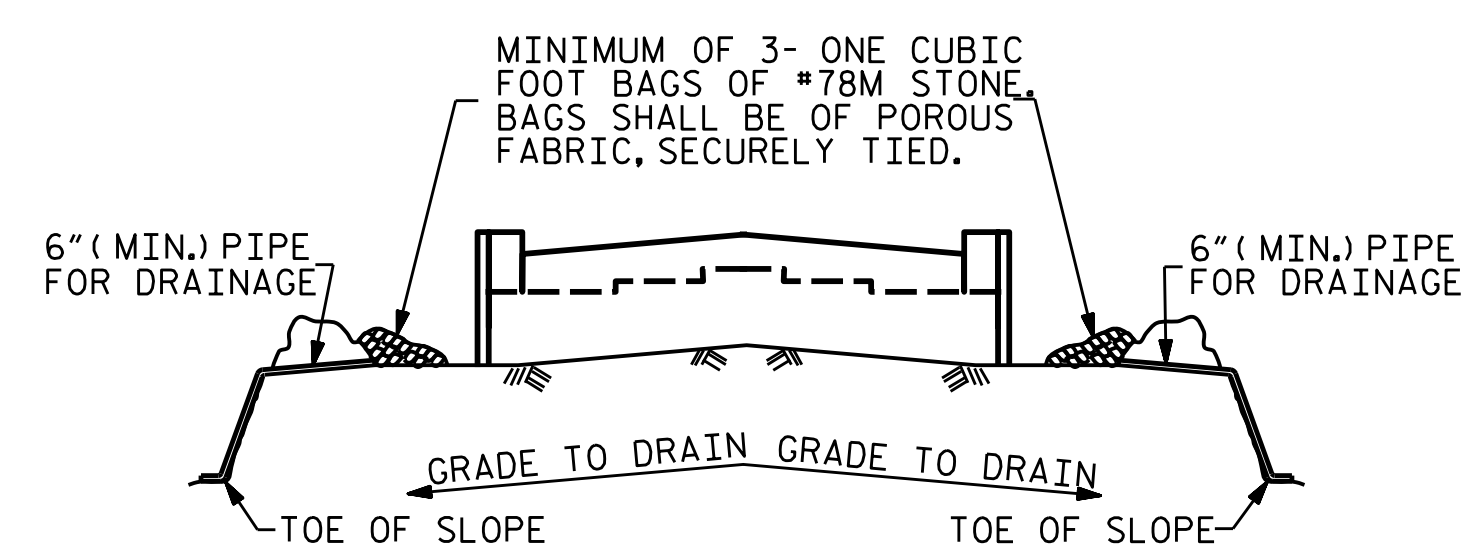
SECTION A-A



ALL BAR DIMENSIONS ARE OUT TO OUT.

- * POUR 1: CAPS, LOWER PART OF WINGS, COLLARS
- * POUR 2: UPPER PART OF WINGS

BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	9	1	58'-3"	990
B2	4	10	1	57'-11"	997
B3	28	4	STR.	28'-1"	525
B4	14	4	STR.	2'-11"	27
B5	5	4	STR.	24'-0"	80
D1	80	4	STR.	5'-10"	312
H1	40	5	7	11'-1"	462
H2	40	5	6	11'-2"	466
K1	24	4	STR.	2'-8"	43
S1	32	4	2	6'-6"	139
S2	49	5	3	3'-10"	196
S3	49	5	4	11'-1"	566
U1	16	4	5	5'-11"	63
V1	56	5	STR.	9'-9"	569
REINFORCING STEEL, LBS.					5435
CLASS A CONCRETE, CY * POUR 1					32.1
* POUR 2					5.9
TOTAL					38.0
HP 12X53 STEEL PILES NO.					8
L.F.					560
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES, EA.					8
PILE REDRIVES, EA.					4



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

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

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

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 2**

DocuSigned by:

 DB3C8E45B06
 NORTH CAROLINA PROFESSIONAL SEAL 14114
 ENGINEER
 ROBERT C. LARSON
 8/15/2022

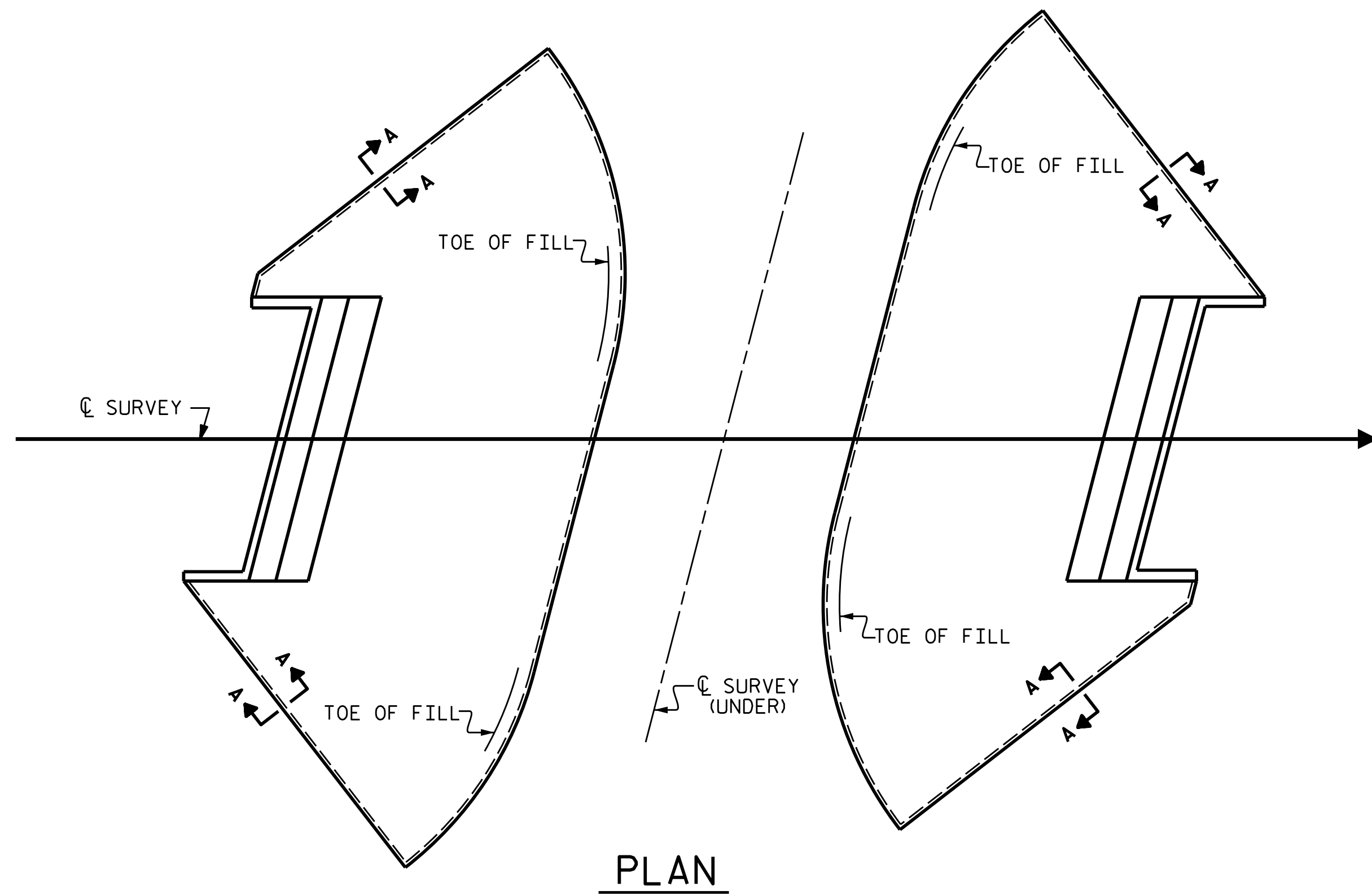
DESIGN ENGINEER OF RECORD:	DATE:
	8/15/2022
DRAWN BY: R.J. FLORY	DATE: 03/30/20
CHECKED BY: R.C. LARSON	DATE: 04/02/20

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-5241

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
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TOTAL SHEETS: 28



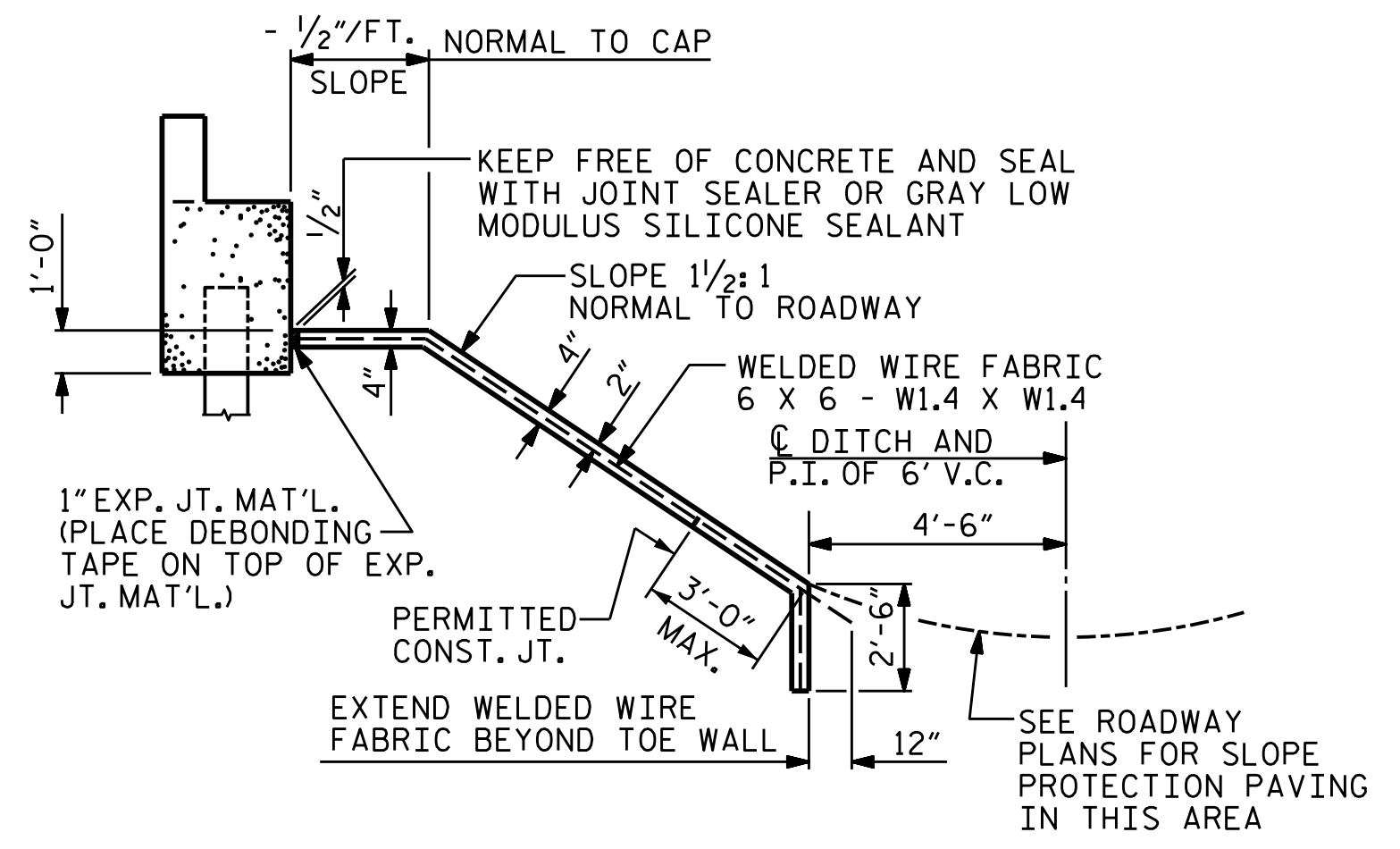
PLAN

GENERAL NOTES

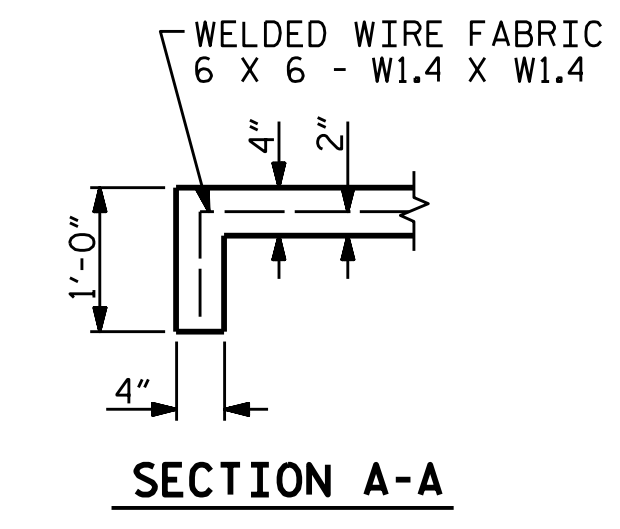
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE 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. 34+01.72 -Y-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	210	380
END BENT 2	210	380

* QUANTITY SHOWN IS BASED ON 5' POURS.



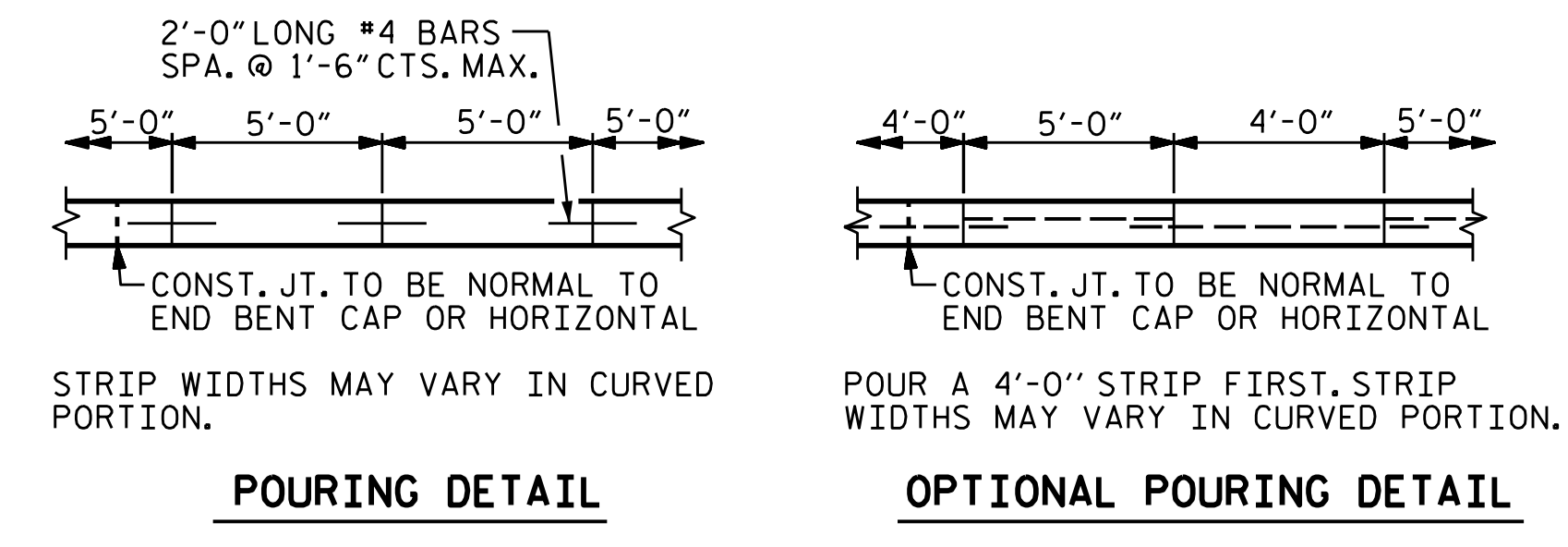
SECTION ALONG SURVEY WHEN FILL CATCHES IN DITCH



SECTION A-A

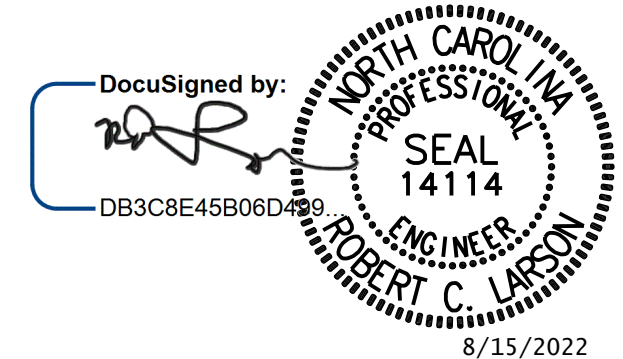
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 1 OF 2



POURING DETAIL

OPTIONAL POURING DETAIL



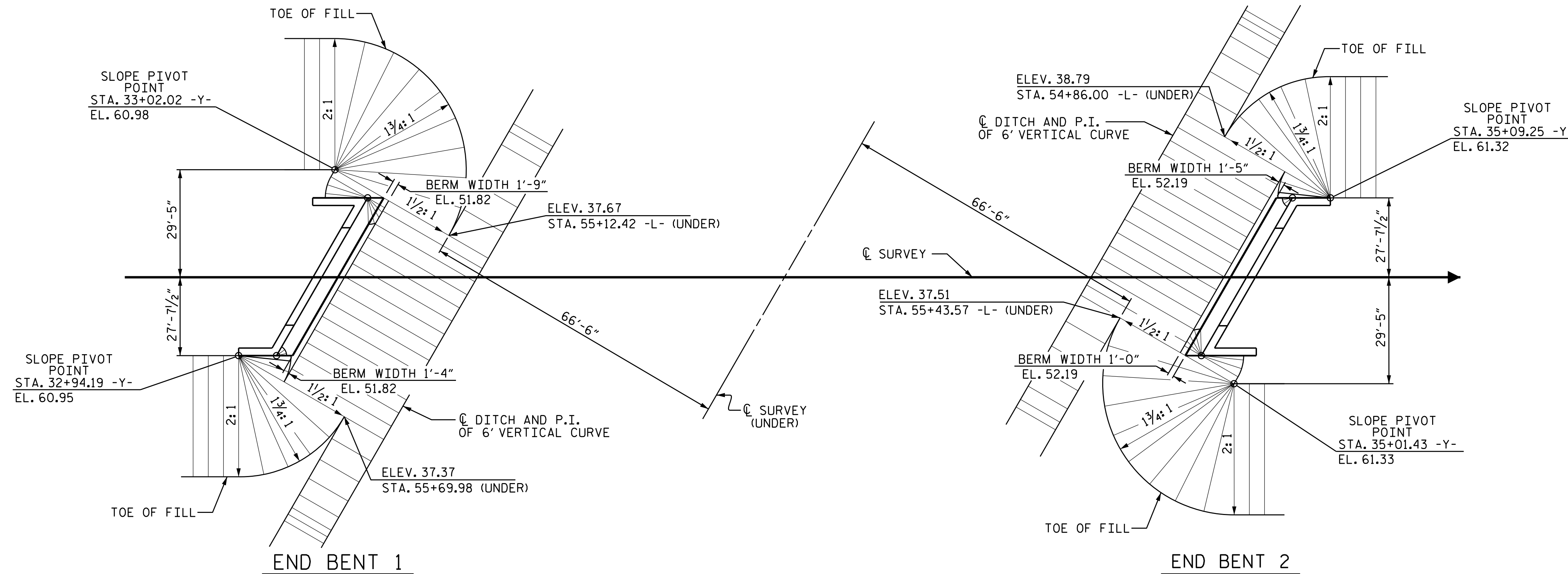
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SLOPE PROTECTION
 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-25
1			3			TOTAL SHEETS
2			4			28

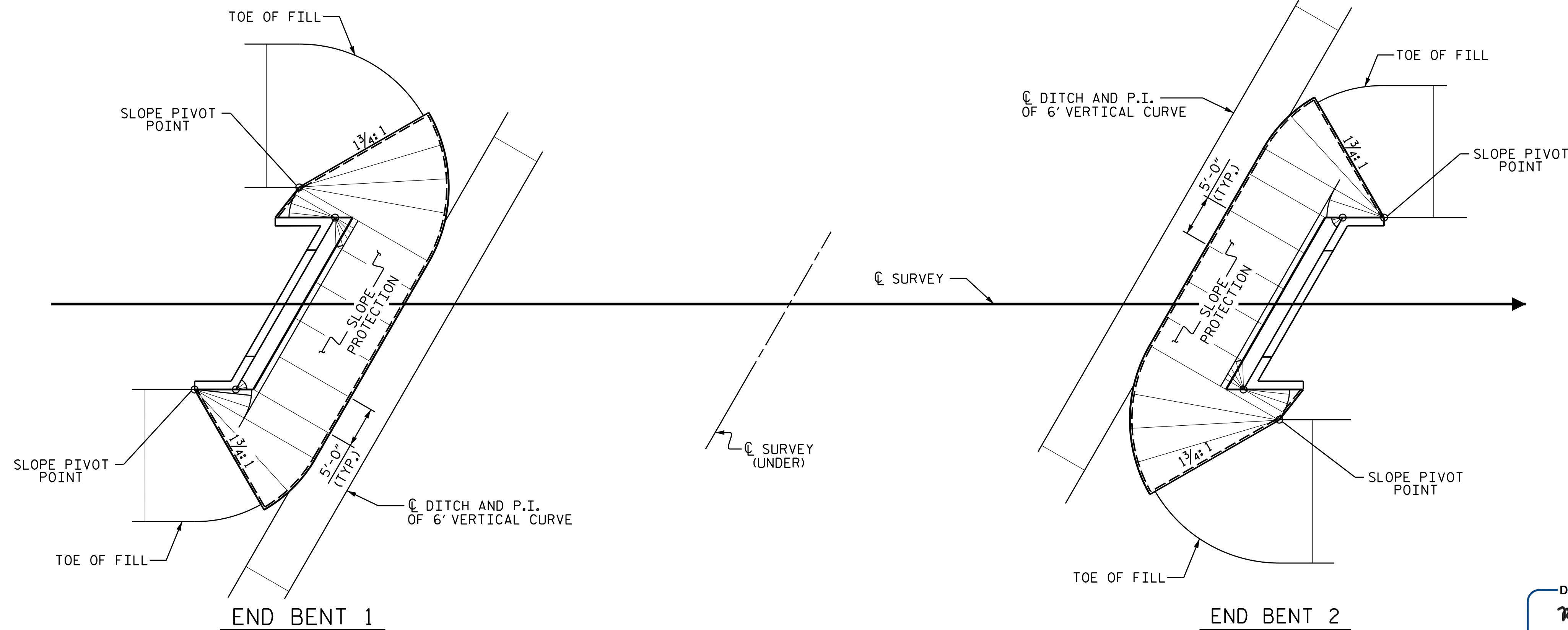
DESIGN ENGINEER OF RECORD:	DATE: 8/15/2022
ASSEMBLED BY: R. C. LARSON	DATE: 03/27/20
CHECKED BY: R. F. DECOLA	DATE: 05/29/20
DRAWN BY: ELR 5/92	MAA/GM
CHECKED BY: GRP 6/92	MAA/TMG
	MAA/THC

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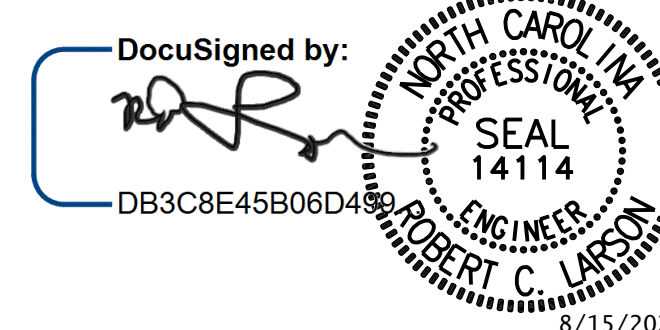
PLAN - GRADING



PLAN - CONCRETE PLACEMENT

PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 34+01.72 -Y-
 SHEET 2 OF 2

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

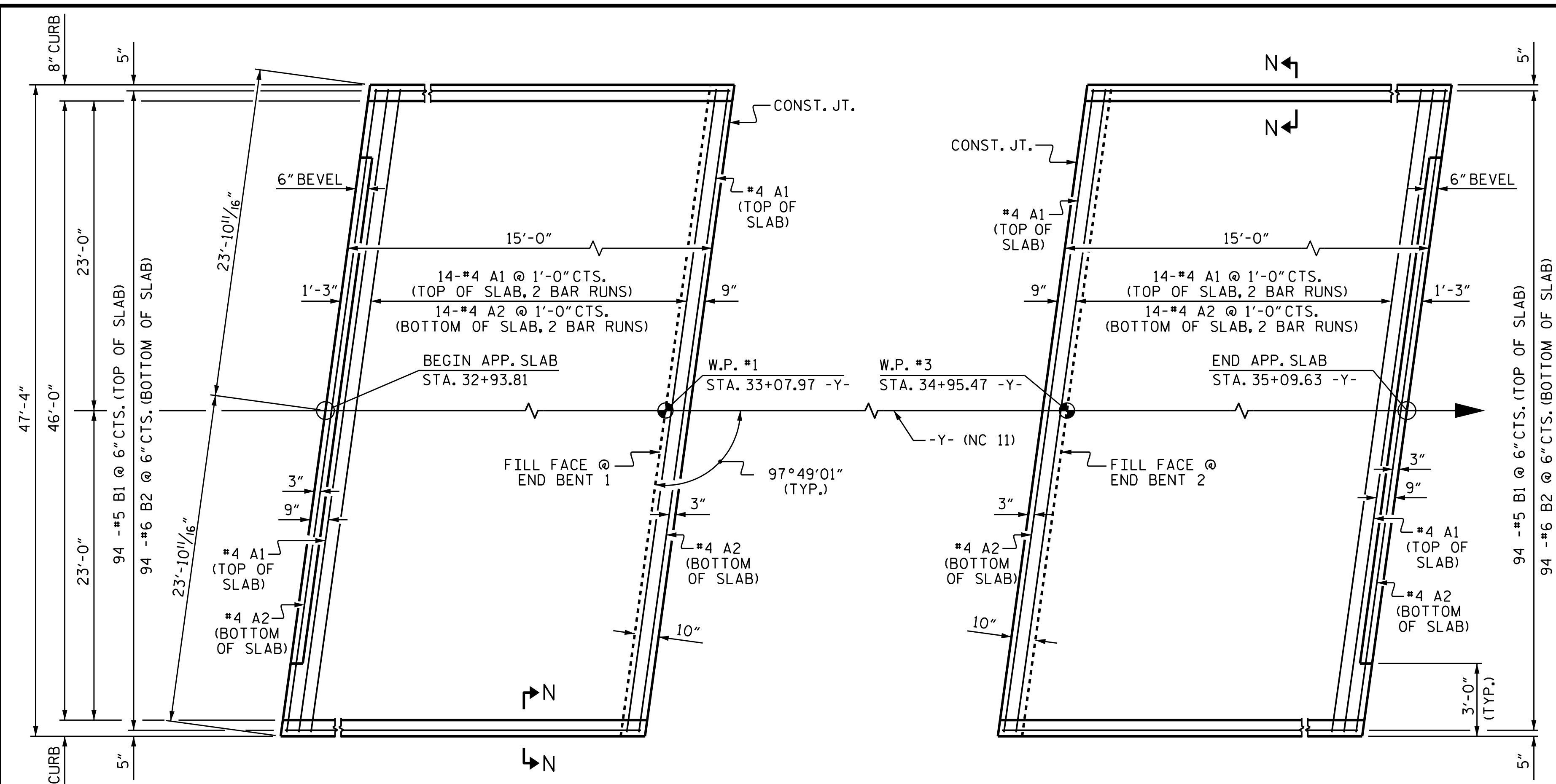


DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: R. C. LARSON	DATE:	03/27/20
CHECKED BY: R. F. DECOLA	DATE:	05/29/20
DRAWN BY: WJH 10/88	REV. 10/1/11	MAA/GM
CHECKED BY: FCJ 10/88	REV. 1/16	MAA/TMG
	REV. 12/17	MAA/THC

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KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone 919-783-9201

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-26
1			3			TOTAL SHEETS
2			4			28



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

NOTES

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

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

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

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

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

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

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

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

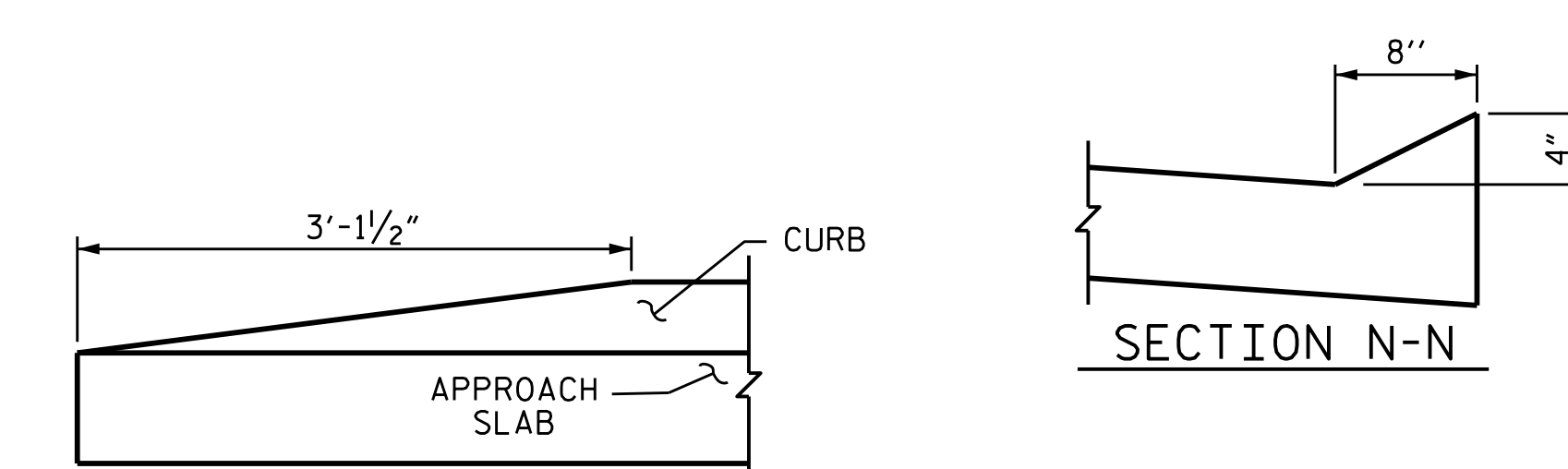
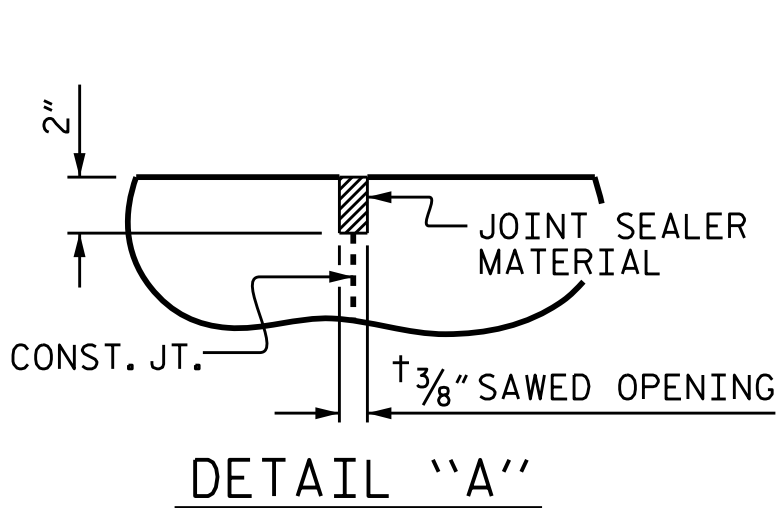
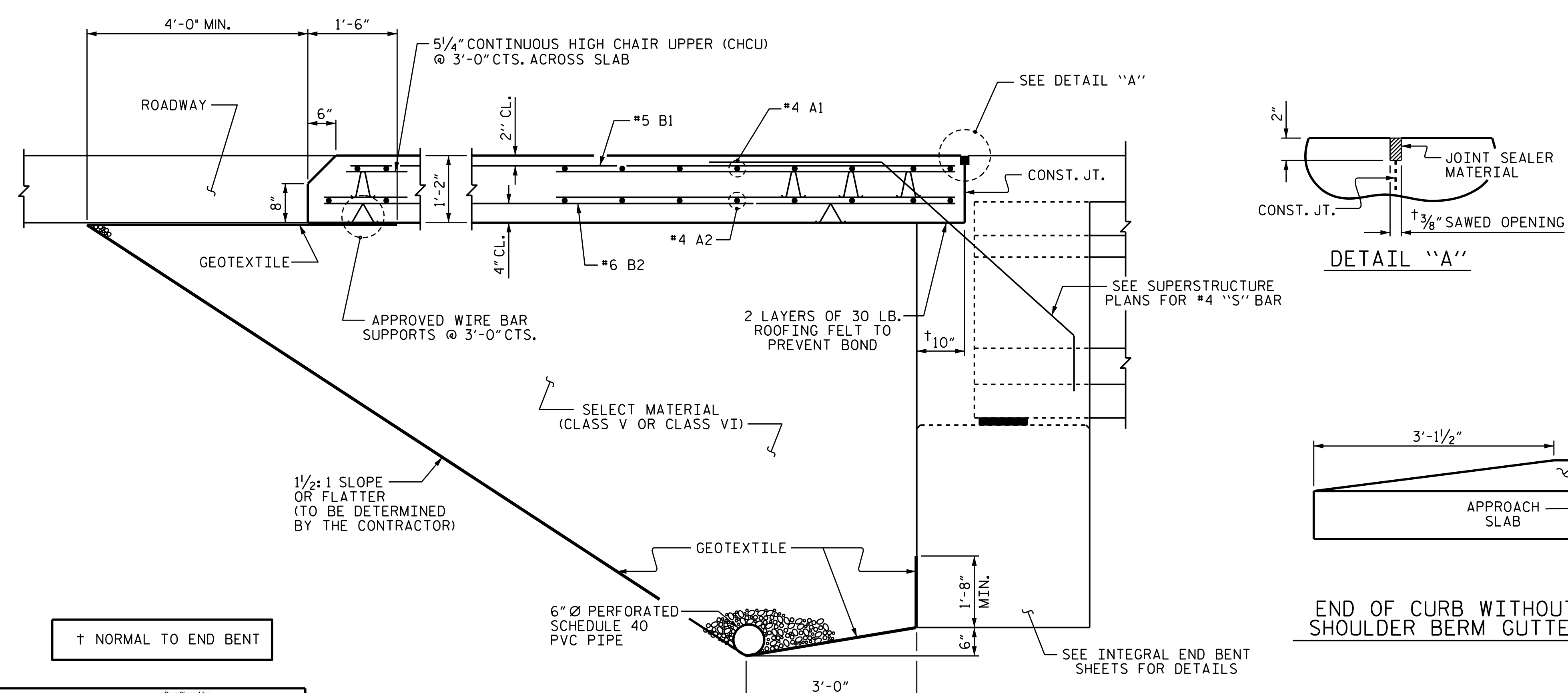
AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

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

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	32	#4	STR	24'-8"	527
A2	32	#4	STR	24'-6"	524
* B1	94	#5	STR	14'-1"	1381
B2	94	#6	STR	14'-7"	2059
REINFORCING STEEL				LBS.	2583
* EPOXY COATED REINFORCING STEEL				LBS.	1908
CLASS AA CONCRETE				C. Y.	30.6

SPLICE LENGTHS

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



SECTION THRU SLAB
 (TYPE I - STANDARD APPROACH FILL)

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-

SHEET 1 OF 2

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

DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022

ASSEMBLED BY: Z. KADI DATE: 07/01/19
 CHECKED BY: R. C. LARSON DATE: 07/29/19

DRAWN BY: TLA 10/05 REV. 6/13 MAA/GM
 CHECKED BY: GM 5/06 REV. 12/17 MAA/THC
 REV. 06/19 BNB/THC

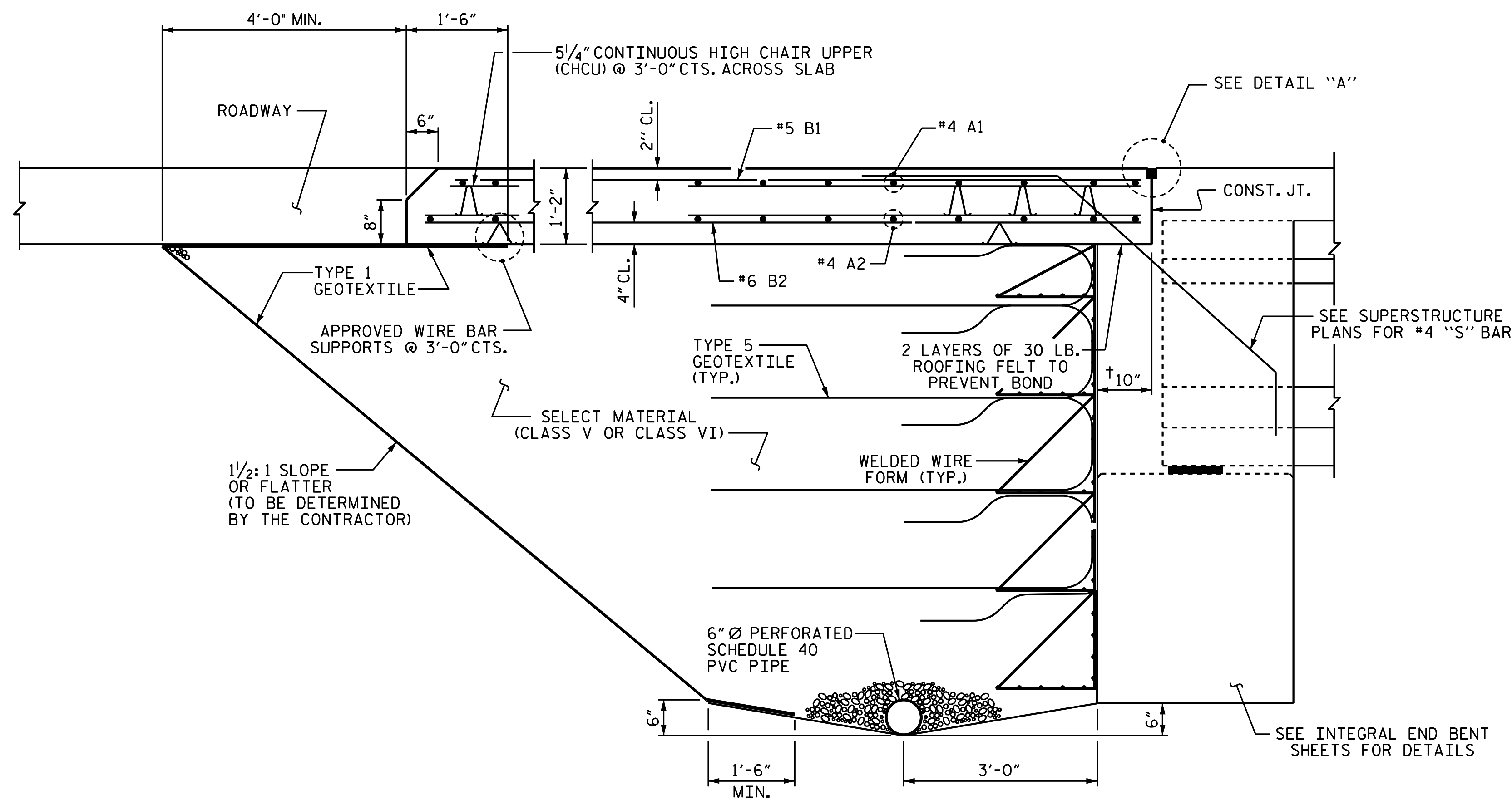
DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
[Signature]
 SEAL 14114
 ENGINEER
 ROBERT C. LARSON
 8/15/2022

ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone: 919-785-9244

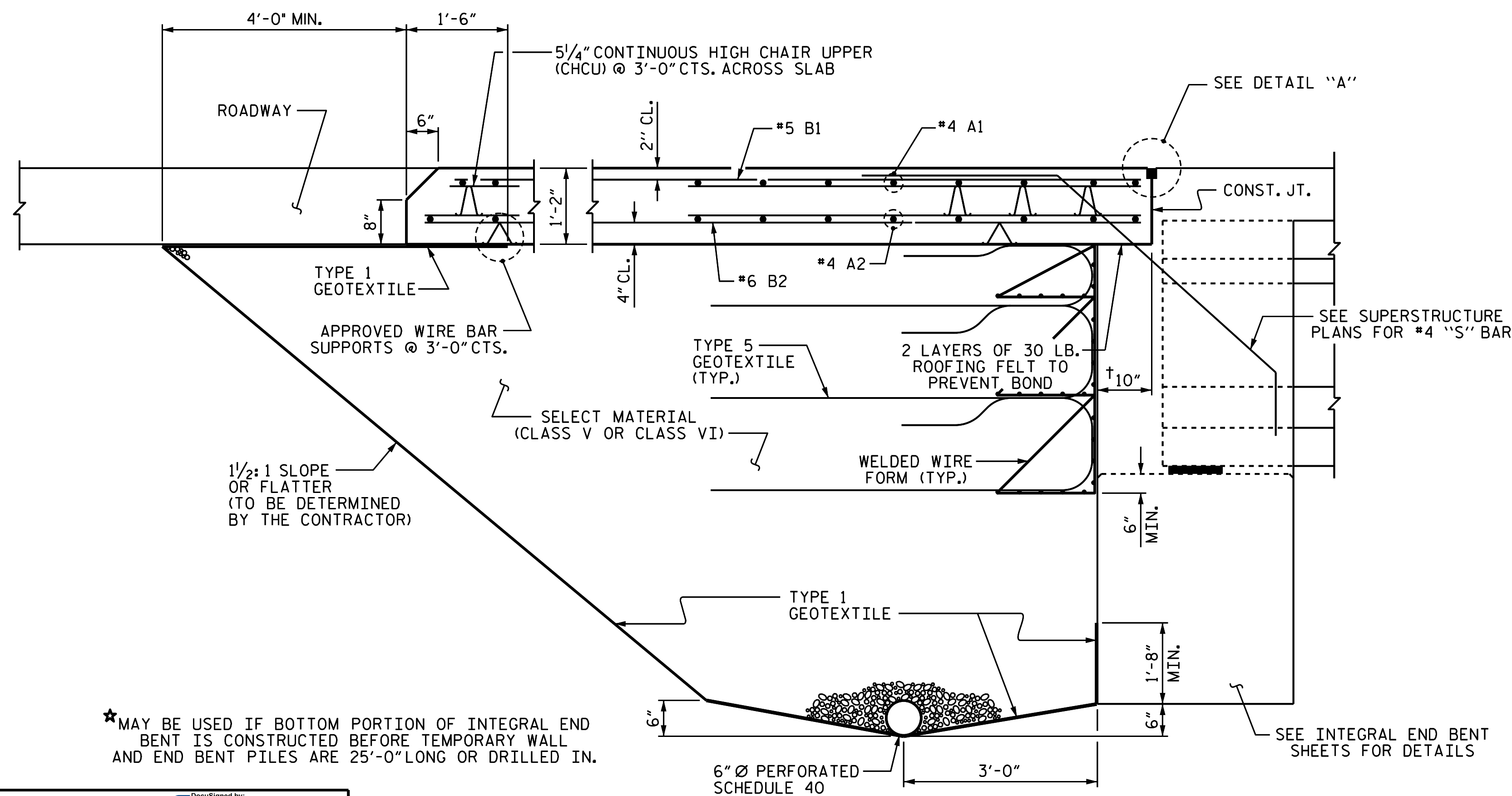
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-27
 TOTAL SHEETS 28



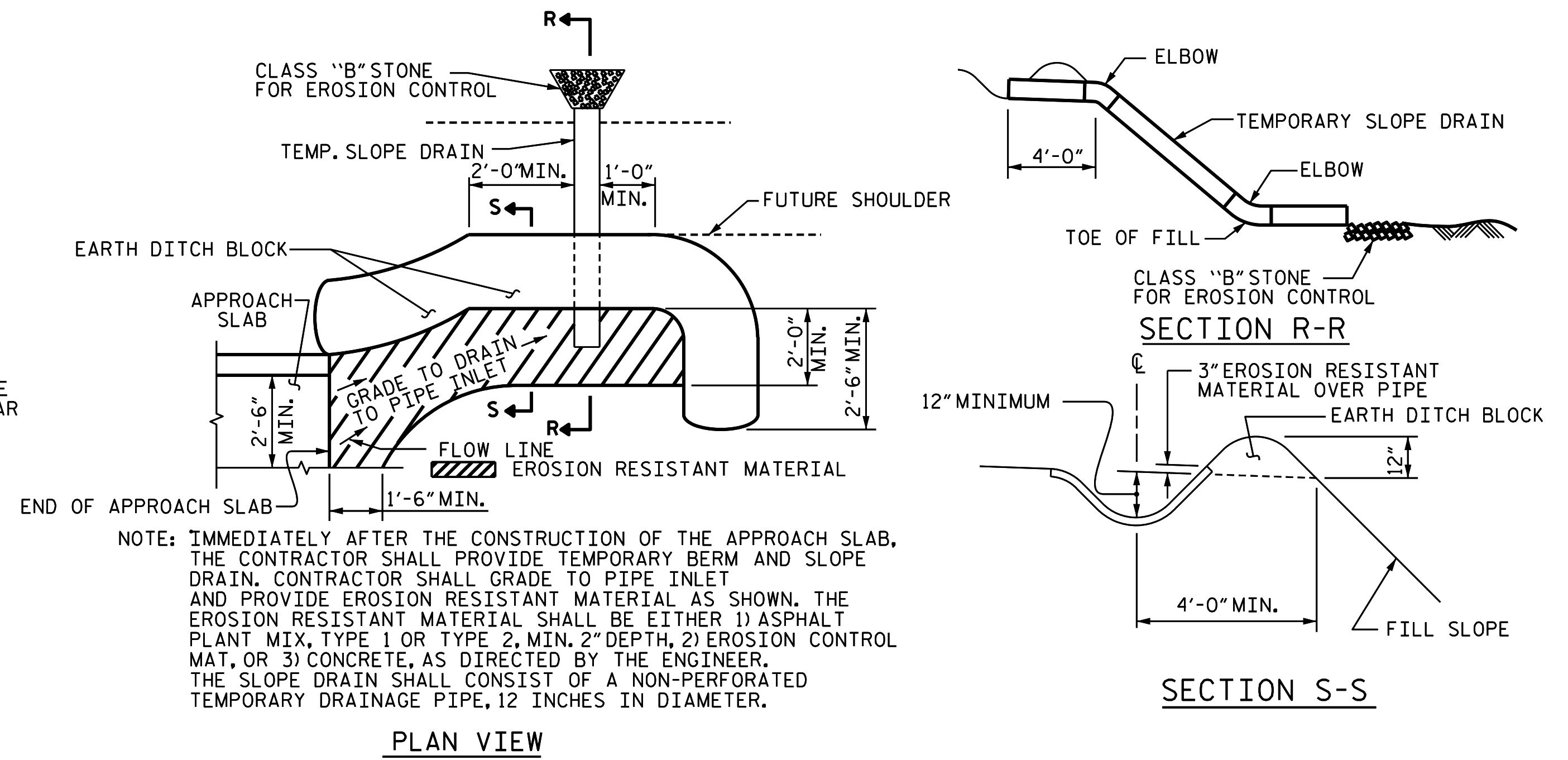
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



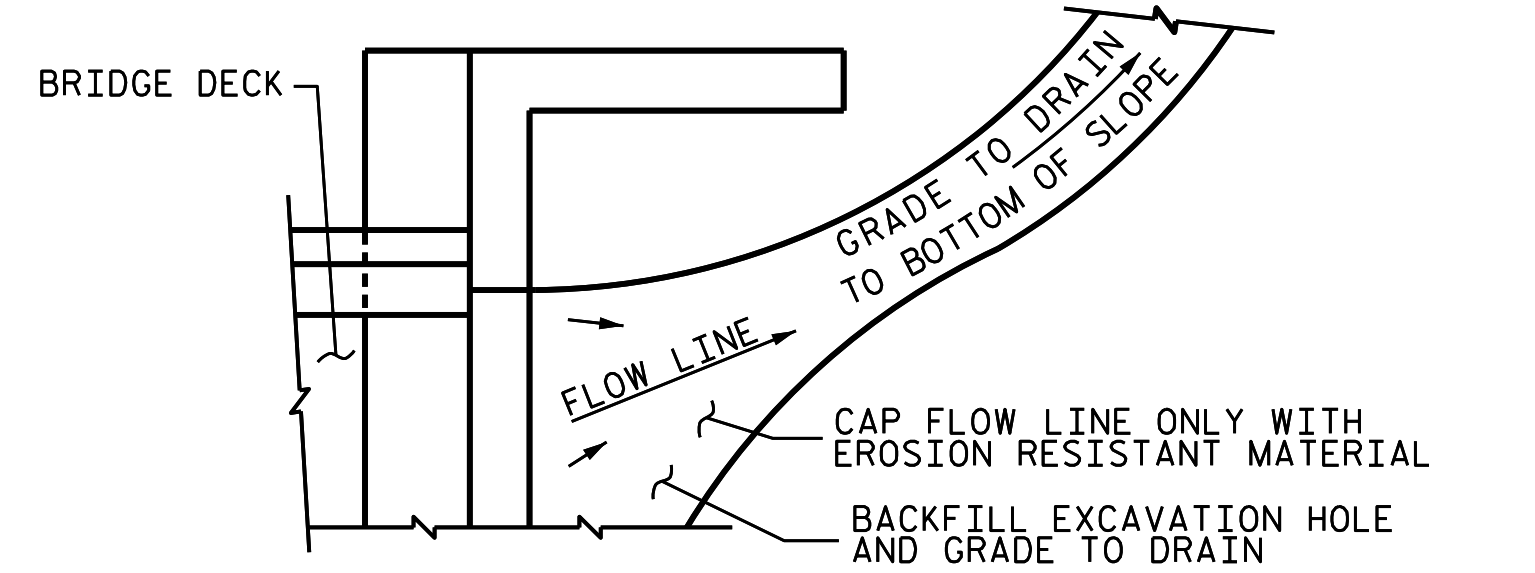
SECTION THRU SLAB

*(TYPE A - ALTERNATE APPROACH FILL)



TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

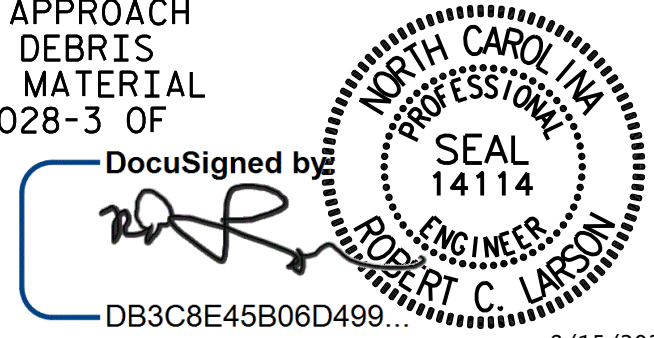


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

NOTES

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWSHED 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.



DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: Z. KADI	DATE:	07/01/19
CHECKED BY: R. C. LARSON	DATE:	07/29/19
DRAWN BY: TLA 10/05	REV. 12/21/11	MAA/GM
CHECKED BY: GM 5/06	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

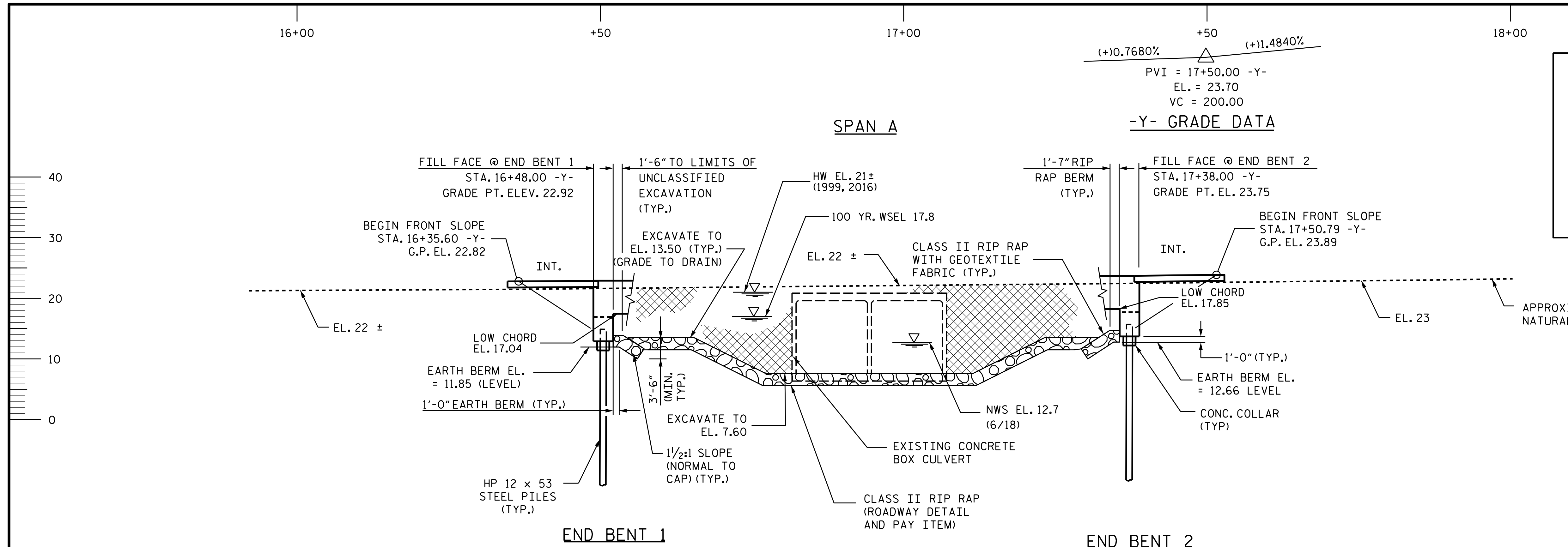
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PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 34+01.72 -Y-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-28 TOTAL 28

STD. NO. BASS

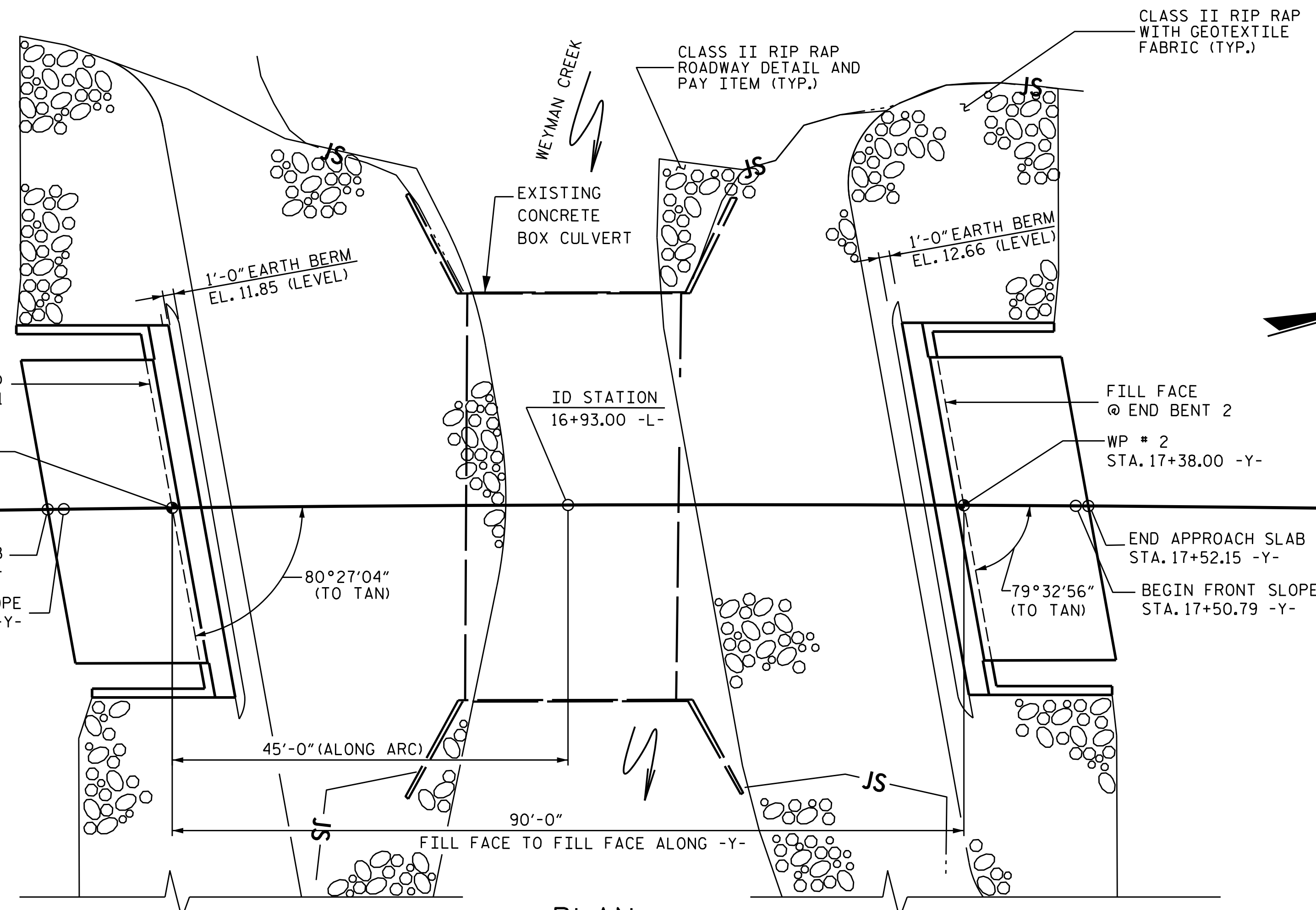


BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 1620	CFS
FREQUENCY OF DESIGN FLOOD	= 50	YRS
DESIGN HW ELEVATION	= 16.8	FT
DRAINAGE AREA	= 15.9	SO. MI.
BASE DISCHARGE (Q ₁₀₀)	= 2104	CFS
BASE HW ELEVATION	= 17.8	FT
OVERTOPPING FLOOD DATA		
OVERTOPPING DISCHARGE	= 4000	CFS
FREQUENCY OF OVERTOPPING FLOOD	= >500	YRS
OVERTOPPING FLOOD ELEVATION	= 22.7 *	FT

* OVERTOPPING @ STA. 14+58.05 -Y- LT

SECTION ALONG -Y-
(END BENTS ALONG SECTION AT RIGHT ANGLES)

-Y- HORIZONTAL CURVE DATA
 PI STA. 19+51.92 -Y-
 Δ = 17°57'59.5" (RT)
 D = 1°00'09.7"
 L = 1791.81'
 T = 903.32'
 R = 5714.14'



PLAN

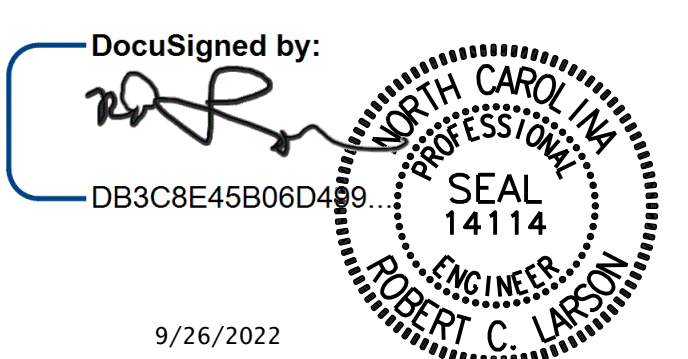
(PILES NOT SHOWN IN PLAN VIEW)

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 1 OF 3 REPLACES BRIDGE NO. 230374

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON NC II
 (GENERAL HOWE ROAD)
 OVER WEYMAN CREEK BETWEEN
 SR 1812 (SALTER RD.) AND NC 87



DESIGN ENGINEER OF RECORD:	DATE:
R.J. FLORY	9/26/2022
CHECKED BY:	DATE:
R.C. LARSON	04/08/20

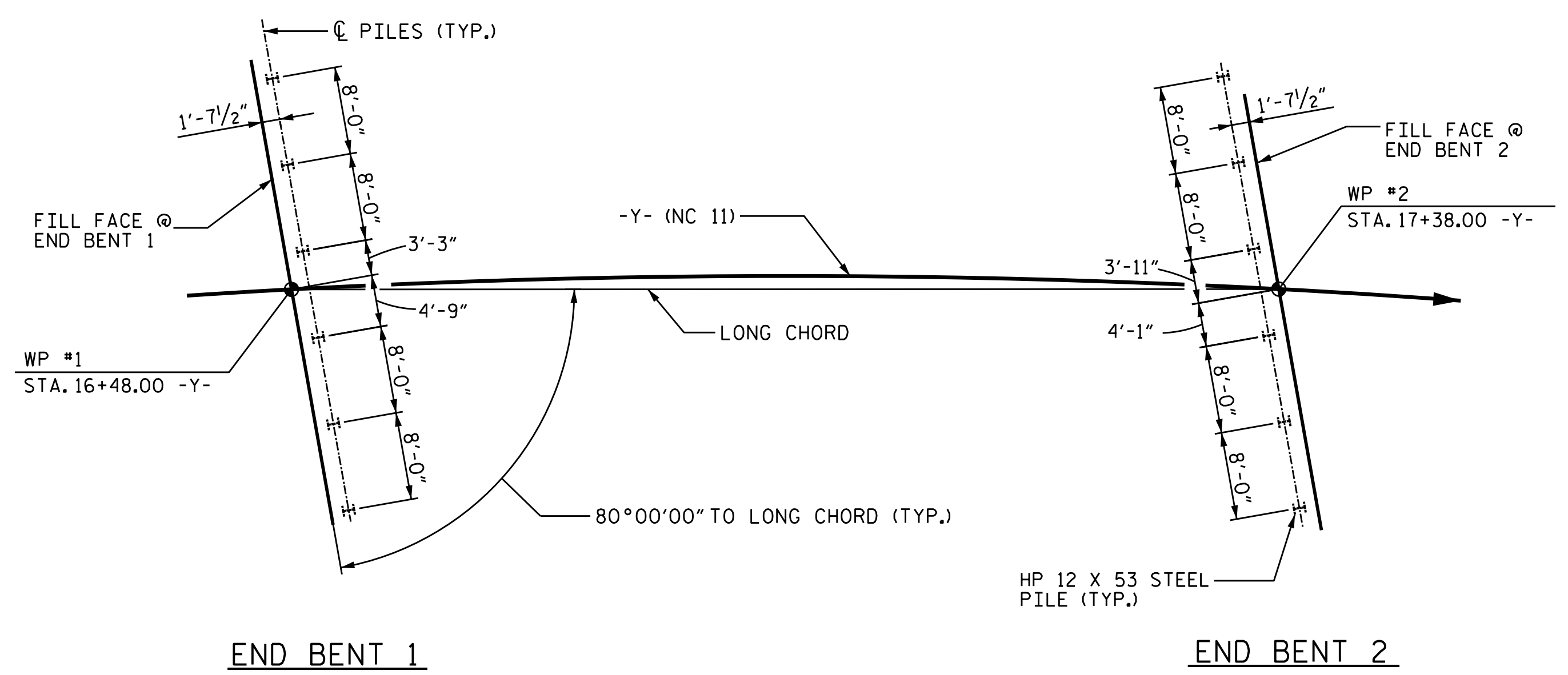
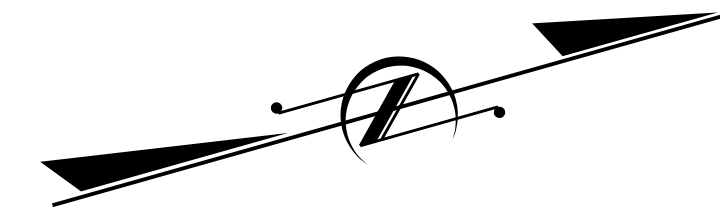
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KCI Associates
 of North Carolina, P.A.
2505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-6270 Phone: (919) 785-9241

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

TOTAL SHEETS: 24

\$FILED\$ \$TIME\$ \$USER\$ \$PLOTDRVS\$ \$PENTBL\$ \$DATE\$ \$PROJECT NO. 241704391.04\$



FOUNDATION LAYOUT PLAN

ALL PILES ARE VERTICAL
DIMENSIONS LOCATING PILES ARE SHOWN TO ϕ PILE

FOUNDATION NOTES

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.
- DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.
- TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 11
 (GENERAL HOWE ROAD)
 OVER WEYMAN CREEK BETWEEN
 SR 1812 (SALTER RD.) AND NC 87

DocuSigned by:

 DB3C8E45B06D499

PROFESSIONAL SEAL
 14114
 ENGINEER
 ROBERT C. LARSON
 8/15/2022

DESIGN ENGINEER OF RECORD:	DATE:
	8/15/2022
DRAWN BY: R. J. FLORY	DATE: 05/04/20
CHECKED BY: R. C. LARSON	DATE: 07/07/20

**DOCUMENT NOT CONSIDERED FINAL
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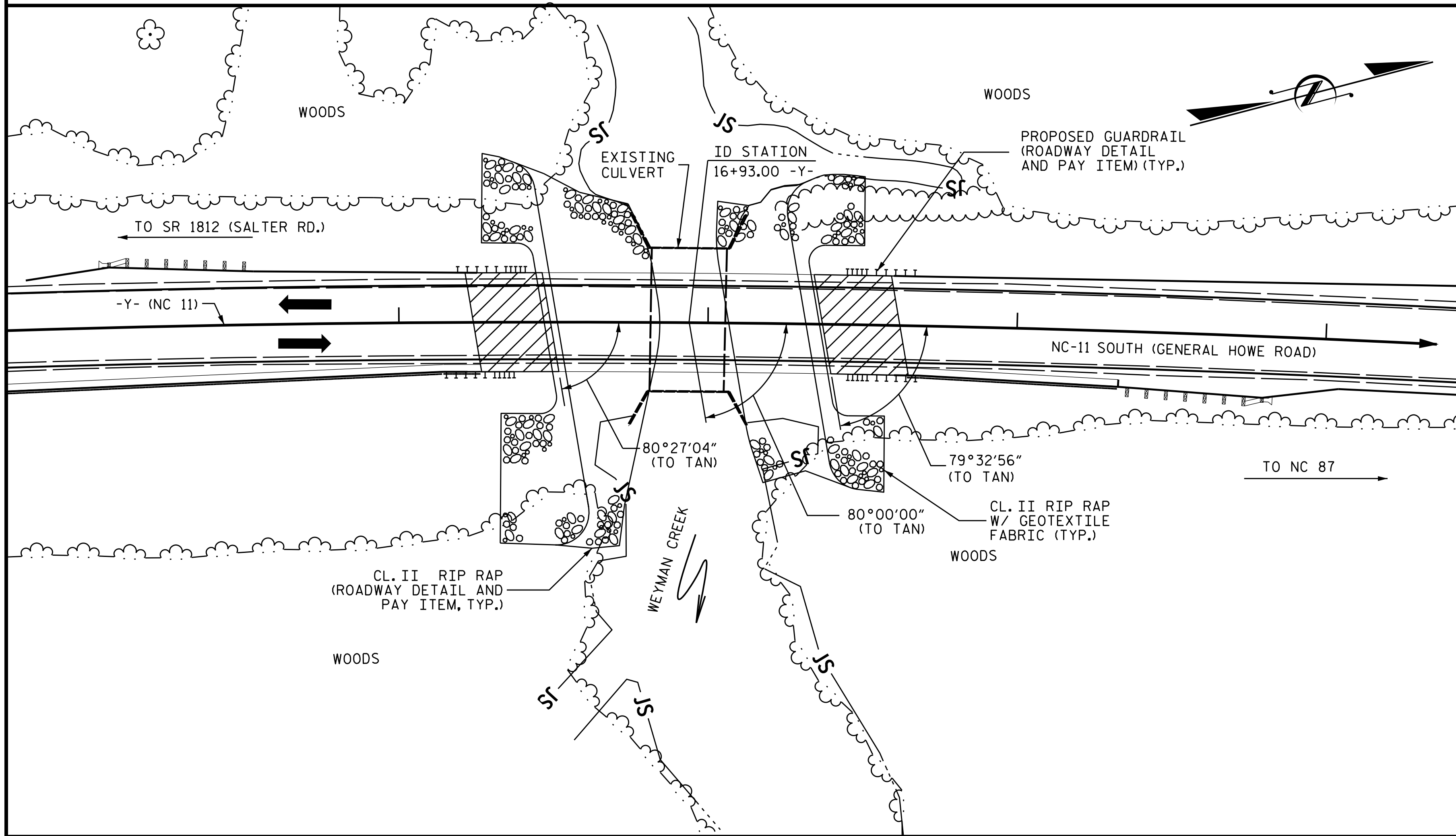
KCI Associates
 of North Carolina, P.A.
4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-9241

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

TOTAL SHEETS: 24

\$FILEL\$ \$DATES\$ \$TIME\$ \$USER\$ \$PLTDRVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04

BENCH MARK: BM 6 - BENCH TIE SET IN 14" PINE 33.63' RT. -Y- STA. 28+23.59 ELEV. 35.49 NAVD 88



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES:

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET 1 OF 3 SHALL BE EXCAVATED FOR A DISTANCE OF 55 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 47 LF DOUBLE BARREL 12' X 12' REINFORCED CONCRETE BOX CULVERT AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING CULVERT IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE CULVERT DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND $f_y = 60\text{ksi}$.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 16+93.00 -Y-	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 16+93.00 -Y-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS @ STA. 16+93.00 -Y-	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	PILE REDRIVES	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS		
	LUMP SUM	LUMP SUM	EACH	LUMP SUM	SO.FT.	SO.FT.	CU.YDS.	LUMP SUM	LBS.	NO.	LN.FT.	EA.	NO.	LN.FT.	EA.	LN.FT.	TON	SO. YDS	LUMP SUM
SUPERSTRUCTURE					3216	3538		LUMP SUM		4	351.33			176.62				LUMP SUM	
END BENT 1							36.7		5430			6	300	3		290	325		
END BENT 2							36.6		5432			6	330	3		215	240		
TOTAL	LUMP SUM	LUMP SUM	1	LUMP SUM	3216	3538	73.3	LUMP SUM	10,862	4	351.33	12	630	6	176.62	505	565	LUMP SUM	

NOTES (CONT'D):

REMOVAL OF THE EXISTING CULVERT SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE CULVERT IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18- EVALUATING SCOUR AT BRIDGES."

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

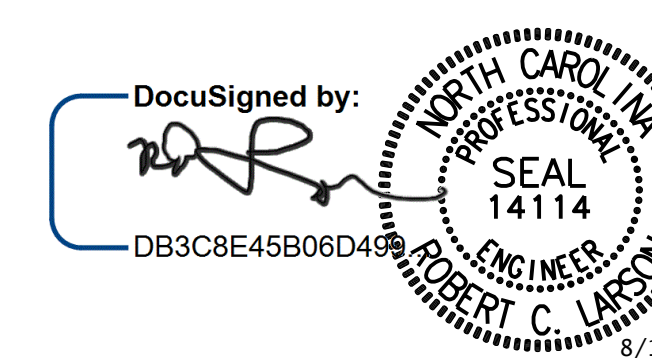
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

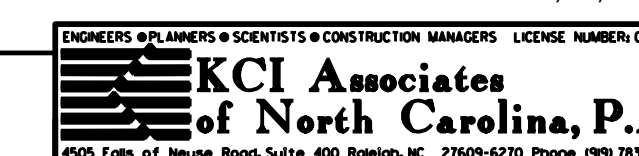
GENERAL DRAWING

FOR BRIDGE ON NC 11
 (GENERAL HOWE ROAD)
 OVER WEYMAN CREEK BETWEEN
 SR 1812 (SALTER RD.) AND NC 87



DESIGN ENGINEER OF RECORD	DATE: 8/15/2022
DRAWN BY: R.J. FLORY	DATE: 05/11/20
CHECKED BY: R.C. LARSON	DATE: 05/12/20

**DOCUMENT NOT CONSIDERED FINAL
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REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 24

\$FILED \$DATES \$TIME \$USER\$ \$PENTBL\$ \$PLTDRV\$ KCI PROJECT NO. 241704391.04

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE										COMMENT NUMBER
						MOMENT					SHEAR					MOMENT										
						LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS (γ _{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)				
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.11		1.75	0.844	1.46	A	E	43.2	0.976	1.25	A	I	69.6	0.80	0.772	1.11	A	I	43.2				
	HL-93 (OPERATING)	N/A		1.66		1.35	0.844	1.89	A	E	43.2	0.976	1.66	A	I	69.6	N/A	--	--	--	--	--				
	HS-20 (INVENTORY)	36.000	②	1.51	54.36	1.75	0.844	1.97	A	E	43.2	0.976	1.62	A	I	69.6	0.80	0.772	1.51	A	I	43.2				
	HS-20 (OPERATING)	36.000		2.13	76.68	1.35	0.844	2.55	A	E	43.2	0.976	2.13	A	I	69.6	N/A	--	--	--	--	--				
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.51	47.38	1.40	0.844	5.73	A	E	43.2	0.976	5.10	A	I	69.6	0.80	0.772	3.51	A	I	43.2			
		SNGARBS2	20.000		2.56	51.20	1.40	0.844	4.19	A	E	43.2	0.976	3.57	A	I	69.6	0.80	0.772	2.56	A	I	43.2			
		SNAGRIS2	22.000		2.41	53.02	1.40	0.844	3.94	A	E	43.2	0.976	3.31	A	I	69.6	0.80	0.772	2.41	A	I	43.2			
		SNCOTTS3	27.250		1.74	47.41	1.40	0.844	2.85	A	E	43.2	0.976	2.48	A	I	69.6	0.80	0.772	1.74	A	I	43.2			
		SNAGGRS4	34.925		1.44	50.29	1.40	0.844	2.35	A	E	43.2	0.976	2.03	A	I	69.6	0.80	0.772	1.44	A	I	43.2			
		SNS5A	35.550		1.41	50.12	1.40	0.844	2.30	A	E	43.2	0.976	2.05	A	I	69.6	0.80	0.772	1.41	A	I	43.2			
		SNS6A	39.950		1.29	51.40	1.40	0.844	2.10	A	E	43.2	0.976	1.86	A	I	69.6	0.80	0.772	1.29	A	I	43.2			
		SNS7B	42.000		1.22	51.24	1.40	0.844	2.00	A	E	43.2	0.976	1.82	A	I	69.6	0.80	0.772	1.22	A	I	43.2			
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.57	51.81	1.40	0.844	2.56	A	E	43.2	0.976	2.22	A	I	69.6	0.80	0.772	1.57	A	I	43.2			
		TNT4A	33.075		1.57	51.92	1.40	0.844	2.57	A	E	43.2	0.976	2.18	A	I	69.6	0.80	0.772	1.57	A	I	43.2			
		TNT6A	41.600		1.28	53.24	1.40	0.844	2.09	A	E	43.2	0.976	1.94	A	I	69.6	0.80	0.772	1.28	A	I	43.2			
		TNT7A	42.000		1.28	53.76	1.40	0.844	2.09	A	E	43.2	0.976	1.90	A	I	69.6	0.80	0.772	1.28	A	I	43.2			
		TNT7B	42.000		1.32	55.44	1.40	0.844	2.15	A	E	43.2	0.976	1.78	A	I	69.6	0.80	0.772	1.32	A	I	43.2			
		TNAGRIT4	43.000		1.26	54.18	1.40	0.844	2.06	A	E	43.2	0.976	1.72	A	I	69.6	0.80	0.772	1.26	A	I	43.2			
TNAGT5A	45.000		1.19	53.55	1.40	0.844	1.94	A	E	43.2	0.976	1.69	A	I	69.6	0.80	0.772	1.19	A	I	43.2					
TNAGT5B	45.000		③	1.18	53.10	1.40	0.844	1.92	A	E	43.2	0.976	1.63	A	I	69.6	0.80	0.772	1.18	A	I	43.2				

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)

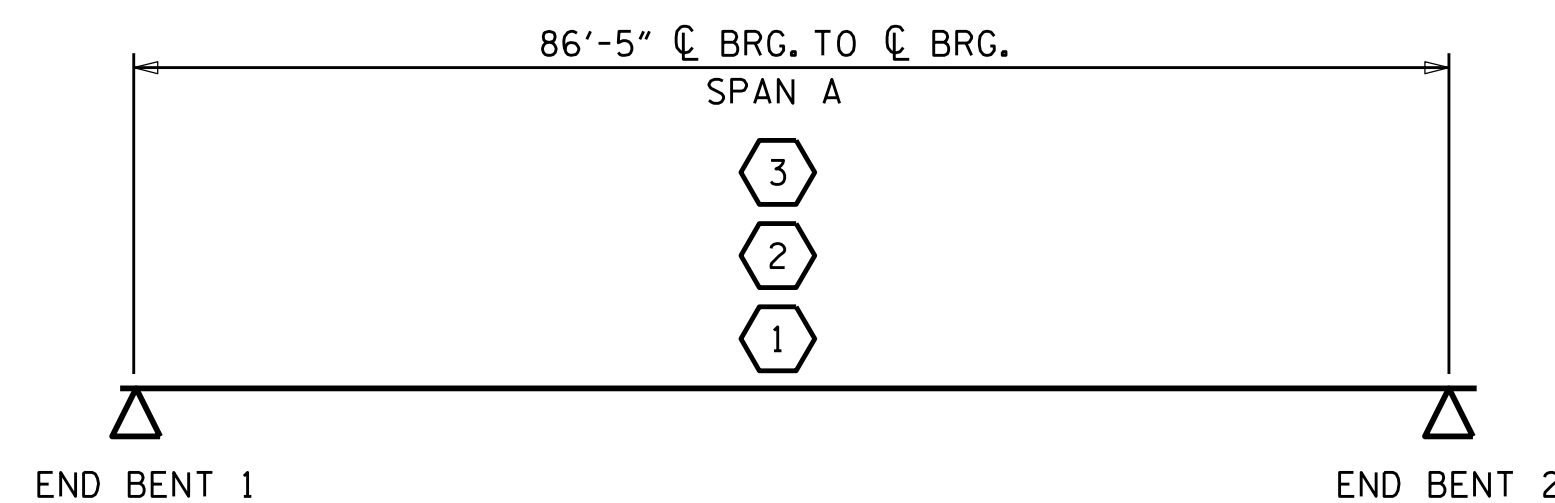
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

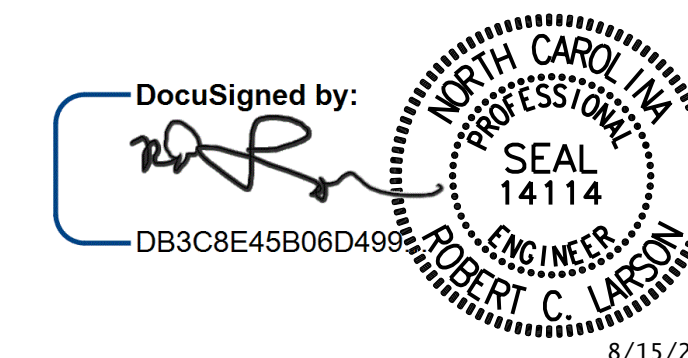
I - INTERIOR GIRDER
E - EXTERIOR



LRFR SUMMARY

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 16+93.00 -Y-

DESIGN ENGINEER OF RECORD: <i>[Signature]</i> DATE: 8/15/2022
ASSEMBLED BY: C. E. LARSON DATE: 04/10/20
CHECKED BY: R. F. DECOLA DATE: 06/25/20
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



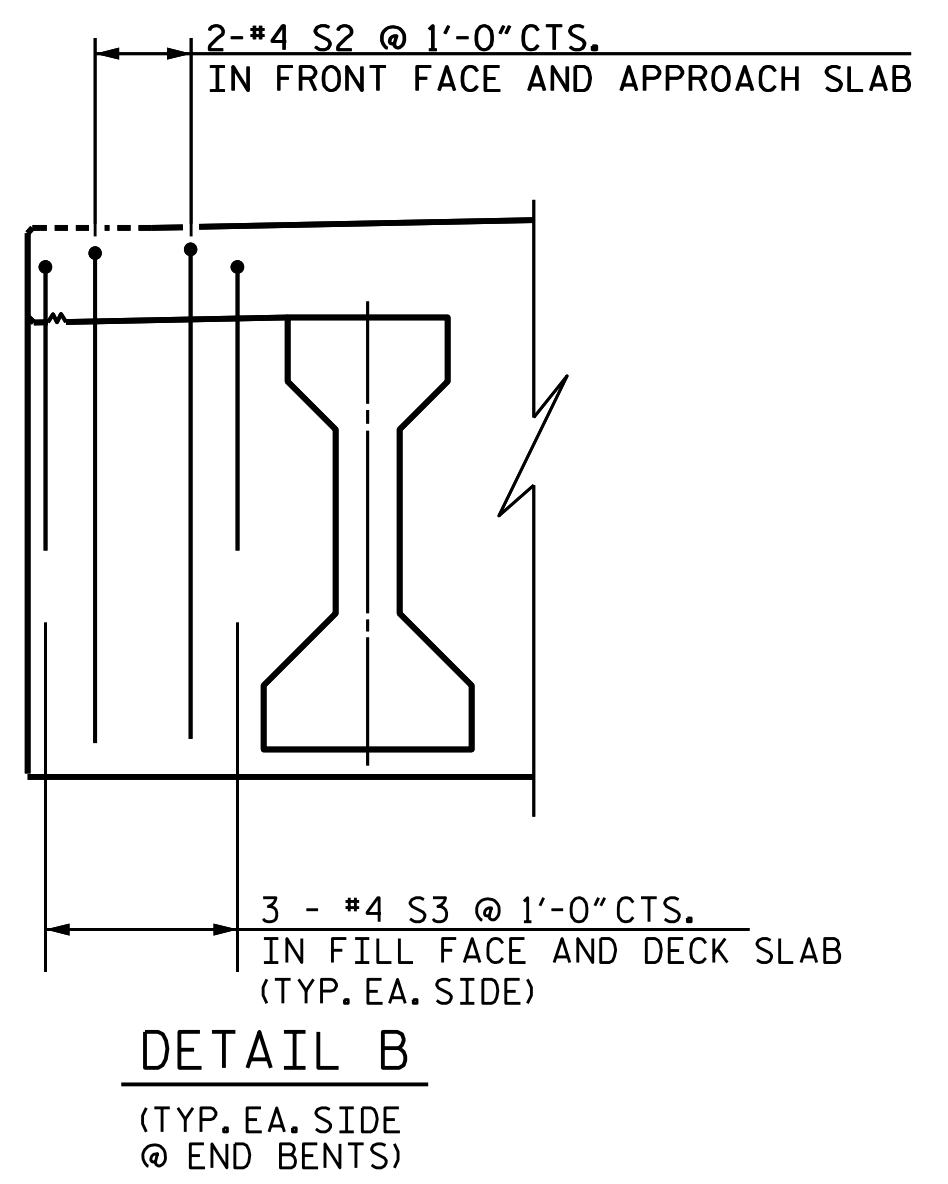
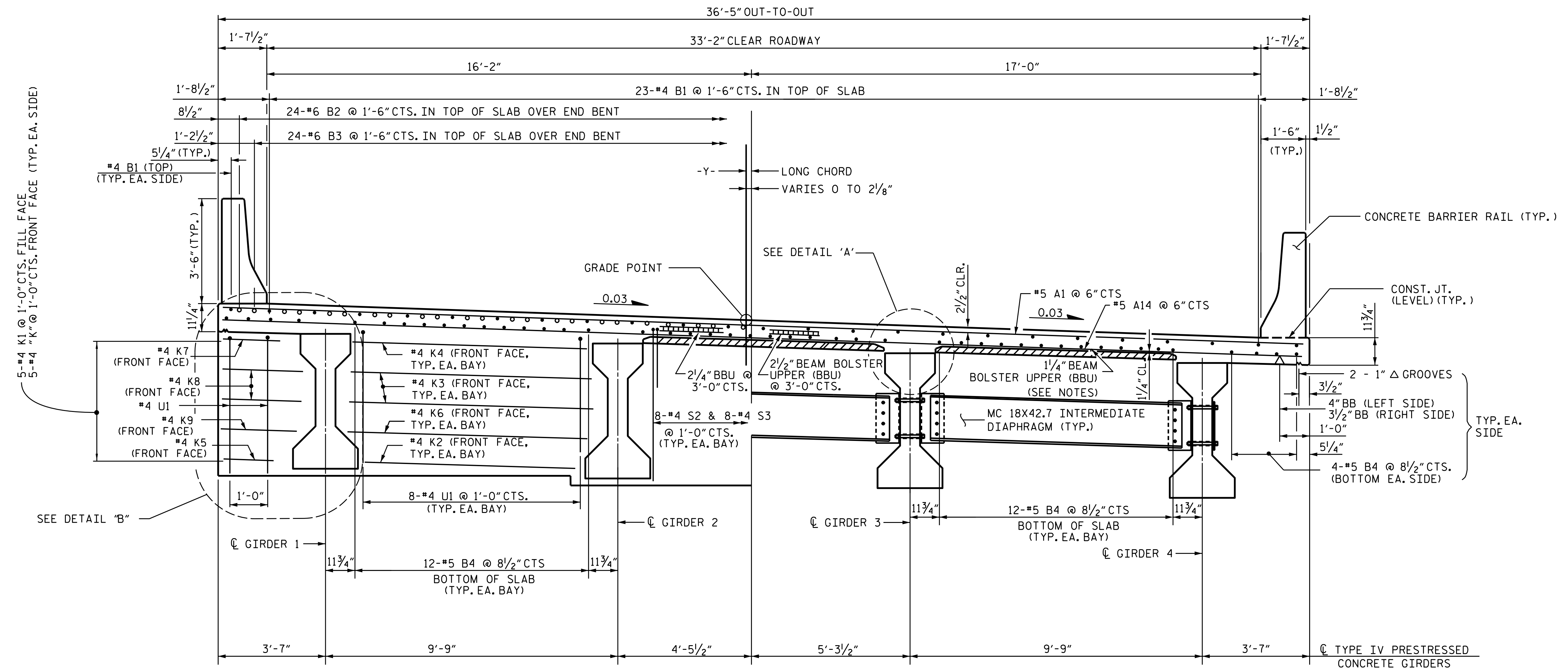
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR
PRESTRESSED
CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-4
1			3			TOTAL SHEETS 24
2			4			

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED





TYPICAL HALF SECTION AT INTEGRAL END BENT 1 & 2 DIAPHRAGM

TYPICAL HALF SECTION AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING AT END BENT

NOTES

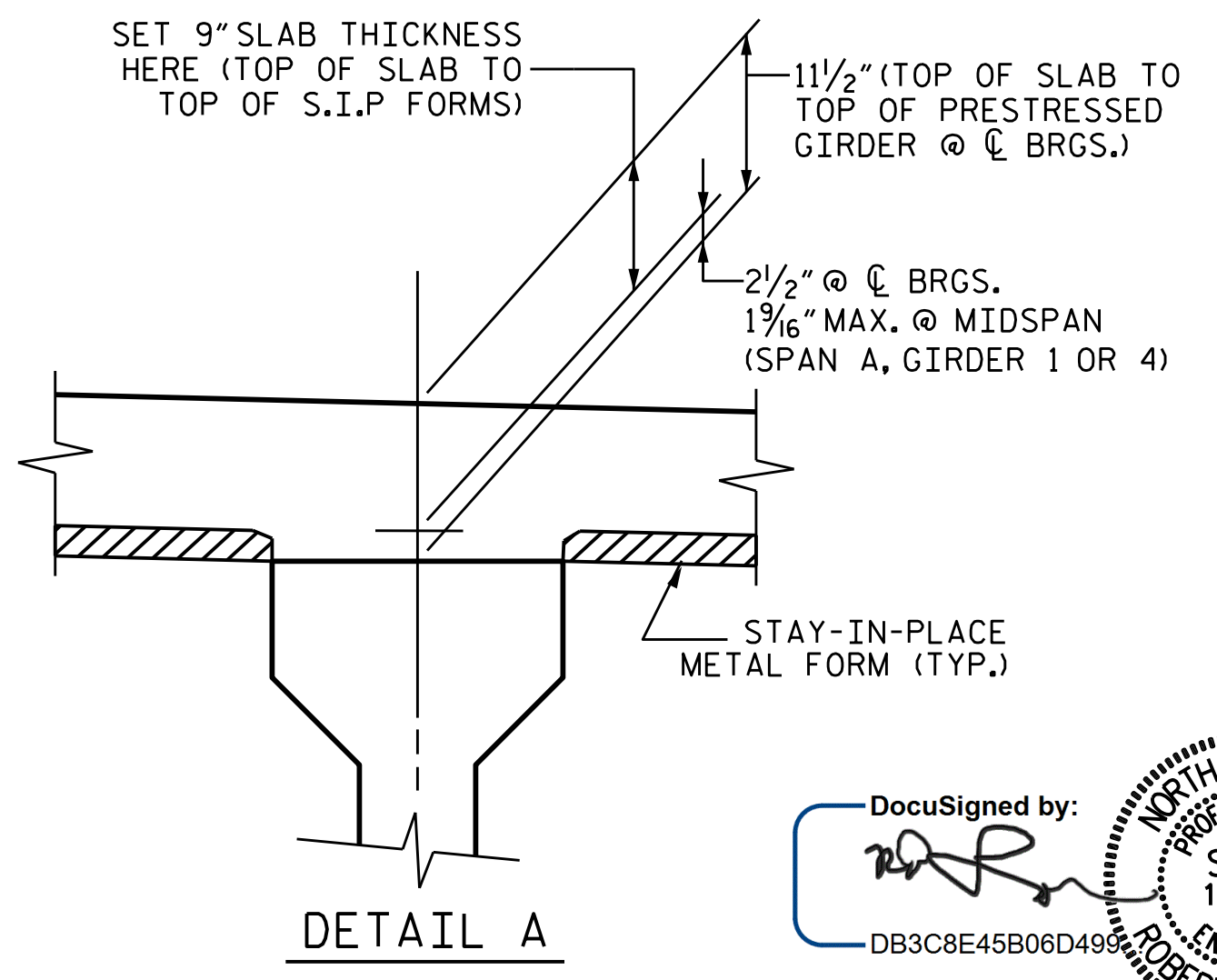
ALL HORIZONTAL DIMENSIONS ARE NORMAL TO LONG CHORD. BRIDGE TO BE CONSTRUCTED ALONG LONG CHORD WITH ADDITIONAL WIDTH AS SHOWN TO ALLOW FOR CURVATURE OF ROADWAY.

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

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.

SEE "CONCRETE BARRIER RAIL" FOR ADDITIONAL REINFORCING STEEL EMBEDDED IN SLAB.



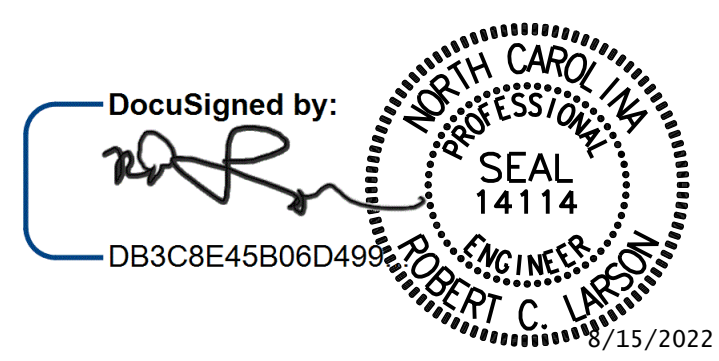
DETAIL A

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 TYPICAL SECTION**



DESIGN ENGINEER OF RECORD:	<i>[Signature]</i>	DATE:	8/15/2022
DRAWN BY:	A. K. ALLANKI	DATE:	07/17/19
CHECKED BY:	R. C. LARSON	DATE:	04/03/20

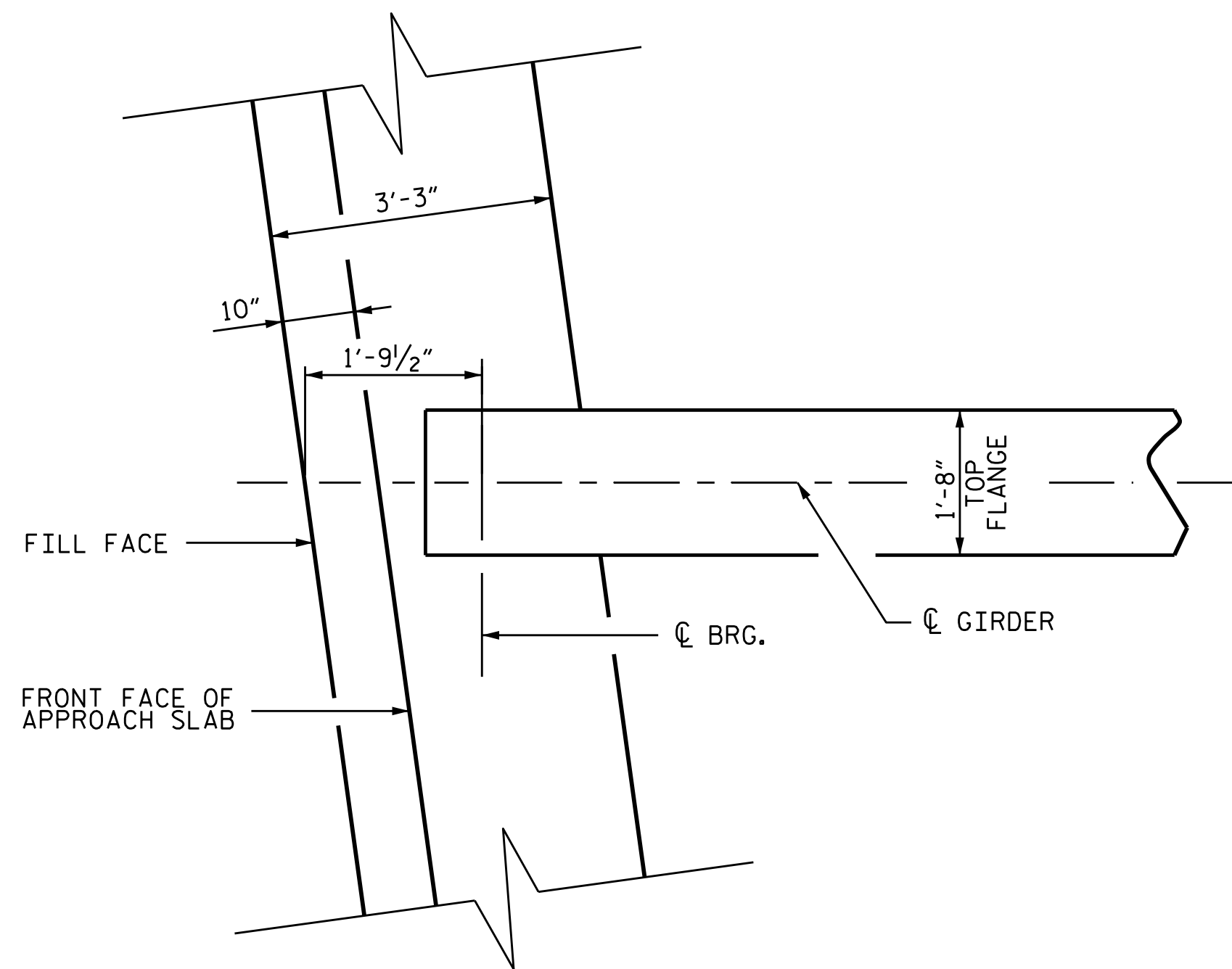
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

KCI Associates
 of North Carolina, P.A.
2505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

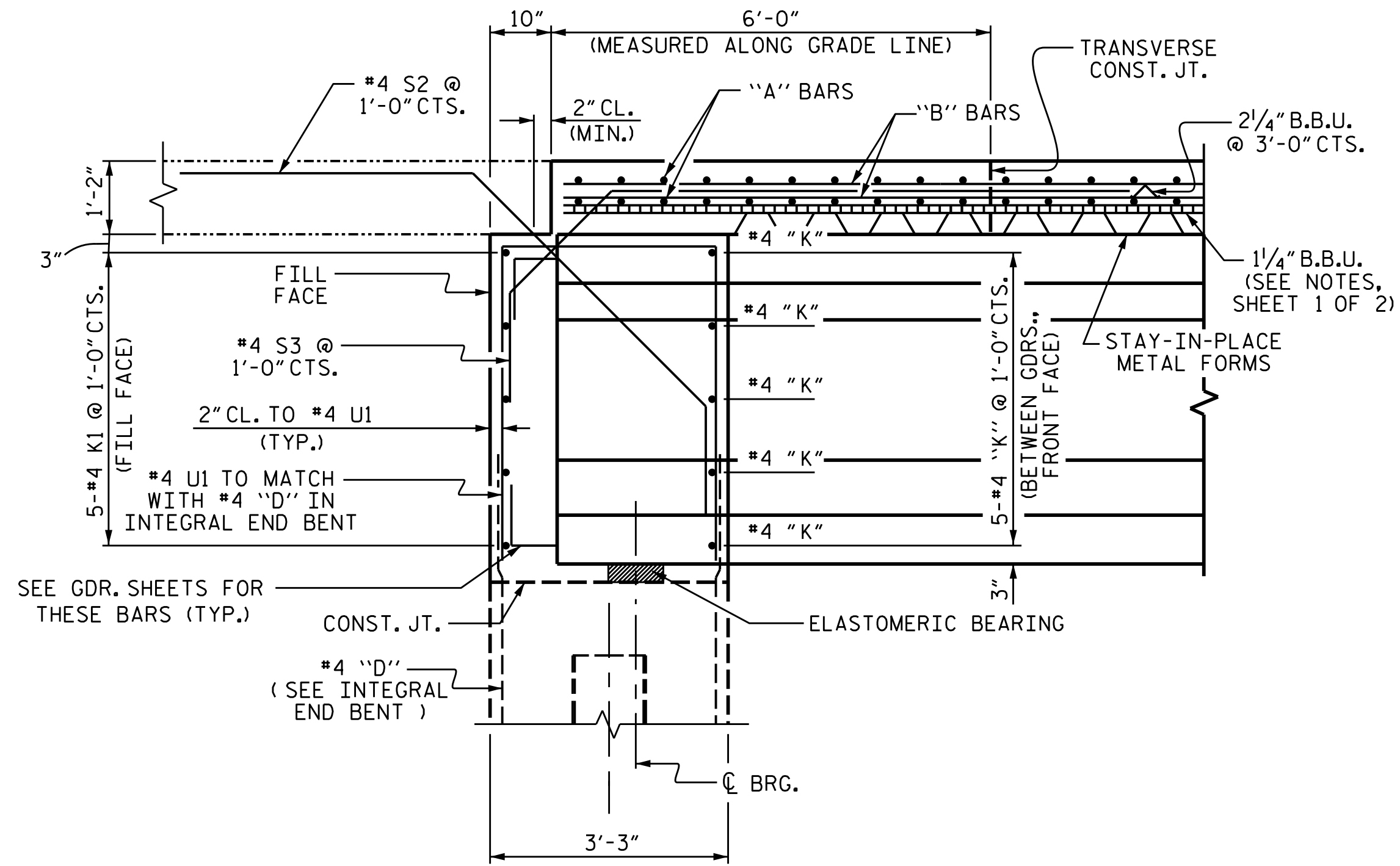
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 24

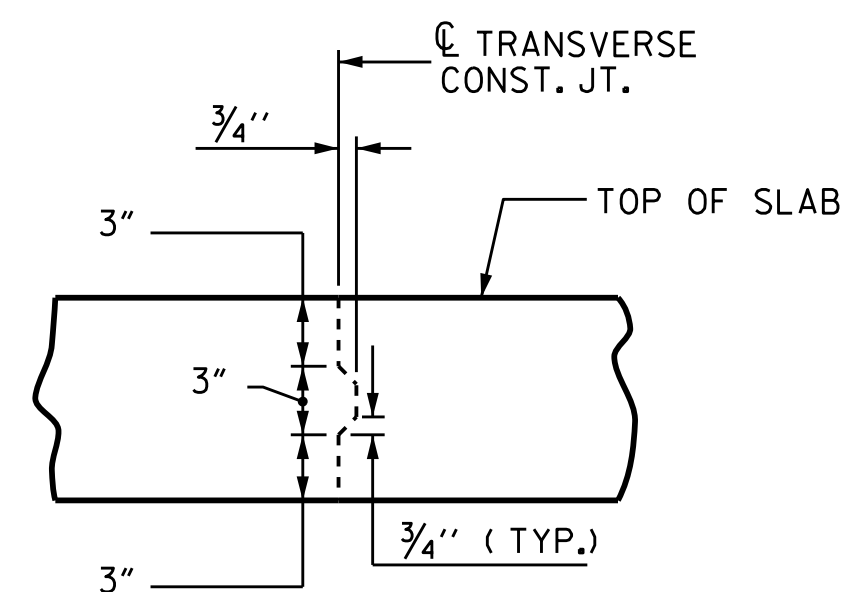
\$FILEL\$ \$DATES\$ \$TIME\$ \$USER\$ \$PLTDRVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04



PLAN OF GIRDER AT INTEGRAL END BENT



SECTION THRU INTEGRAL END BENT



TRANSVERSE CONSTRUCTION JOINT DETAIL

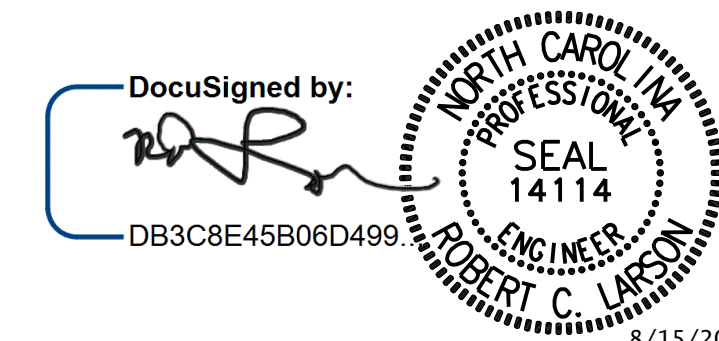
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN.
LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION



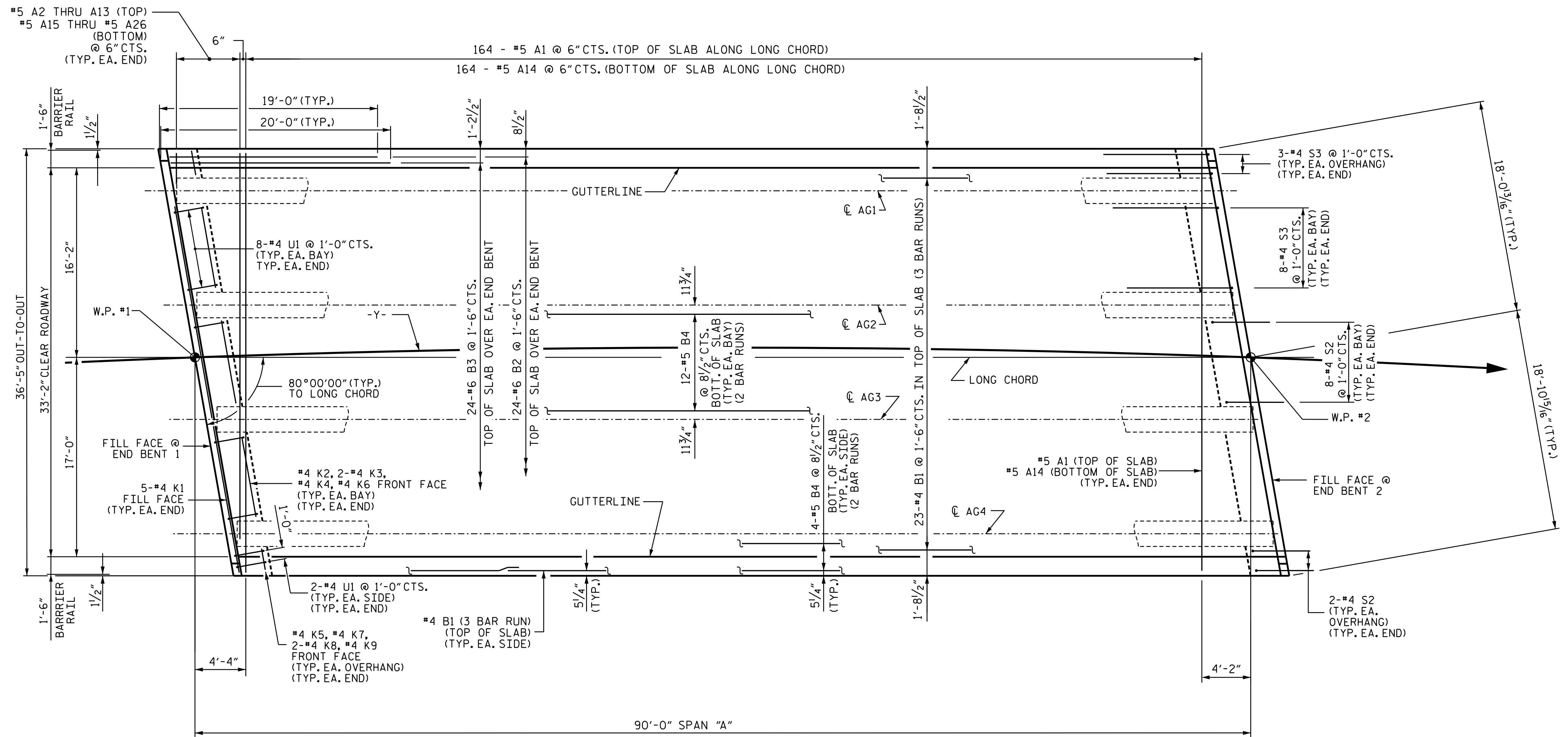
DESIGN ENGINEER OF RECORD:	DATE:
<i>[Signature]</i>	8/15/2022
DRAWN BY:	DATE:
A. K. ALLANKI	07/17/19
CHECKED BY:	DATE:
R. C. LARSON	04/03/20

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



REVISIONS		SHEET NO.
NO.	DATE	S2-6
1		TOTAL SHEETS 24
2		

\$FILEL\$ \$DATES\$ \$TIME\$ \$USER\$ \$PLTDRVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04



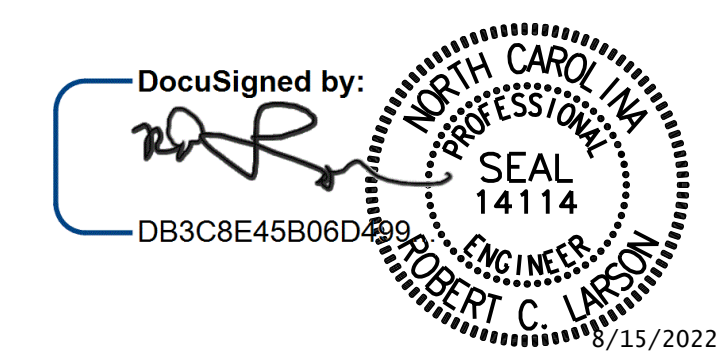
PLAN - SPAN A

SEE "SUPERSTRUCTURE BILL OF MATERIAL"
FOR REINFORCING SPLICE LENGTHS.
SEE "GIRDER LAYOUT" FOR INTERMEDIATE
STEEL DIAPHRAGM LOCATIONS.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPAN A



DESIGN ENGINEER OF RECORD	DATE: 8/15/2022
DRAWN BY: A. K. ALLANKI	DATE: 07/17/19
CHECKED BY: R. C. LARSON	DATE: 04/03/20

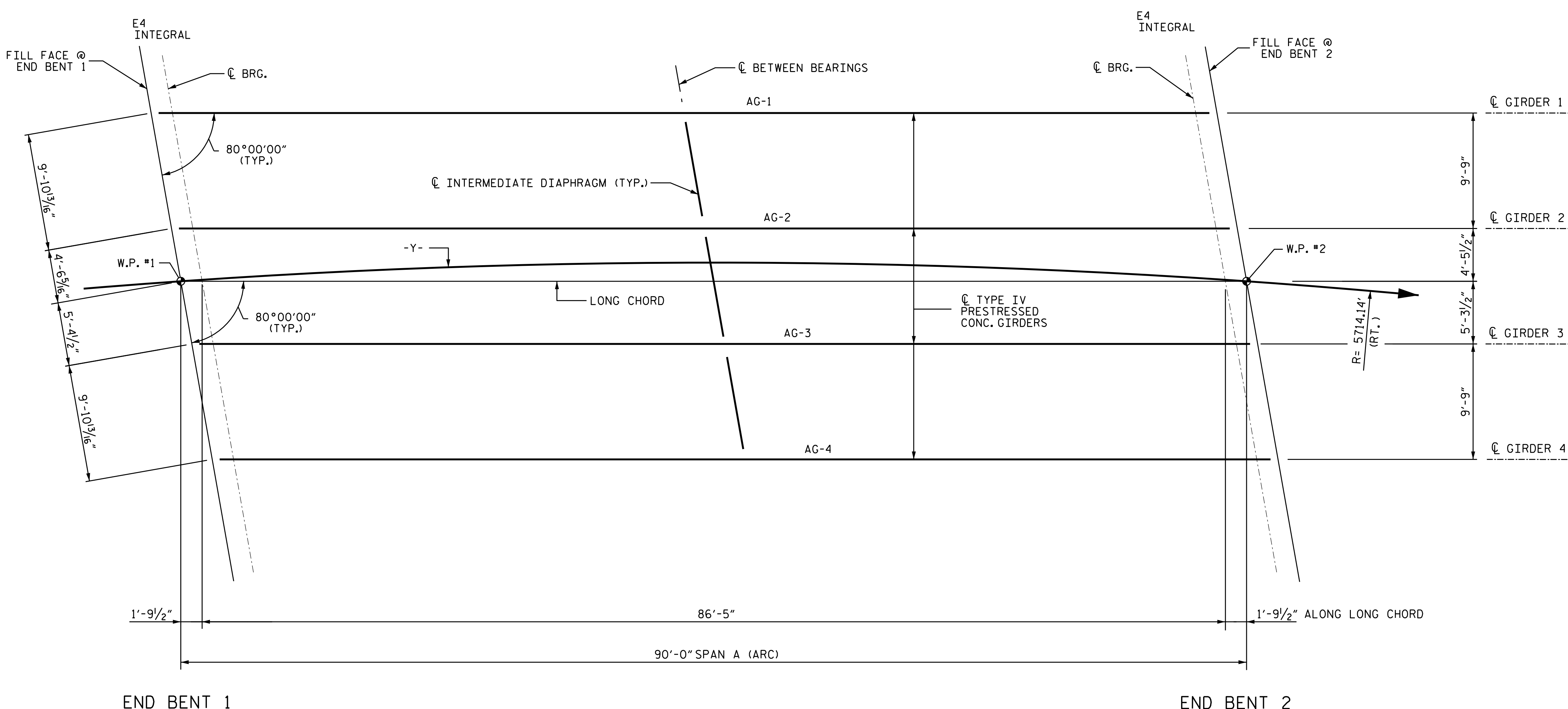
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**



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

TOTAL SHEETS: 24

\$FILEL\$ \$DATES\$ \$TIME\$ \$USER\$ \$PLTDRVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04



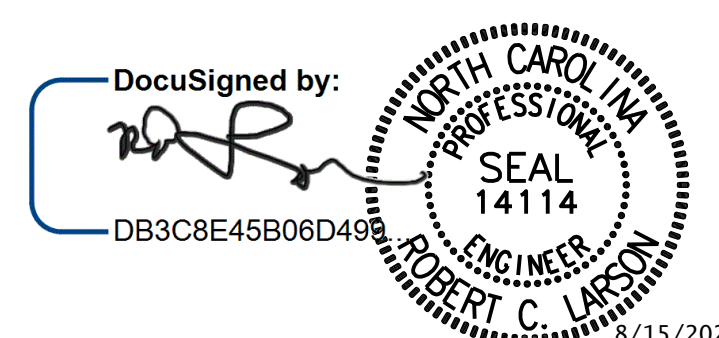
GIRDER LAYOUT

ALL GIRDERS ARE PARALLEL TO LONG CHORD.
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS
SEE "INTERMEDIATE STEEL DIAPHRAGM" SHEET.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE GIRDER LAYOUT



DESIGN ENGINEER OF RECORD:		DATE:	8/15/2022
DRAWN BY:	A. K. ALLANKI	DATE:	07/15/19
CHECKED BY:	R.C. LARSON	DATE:	04/06/20

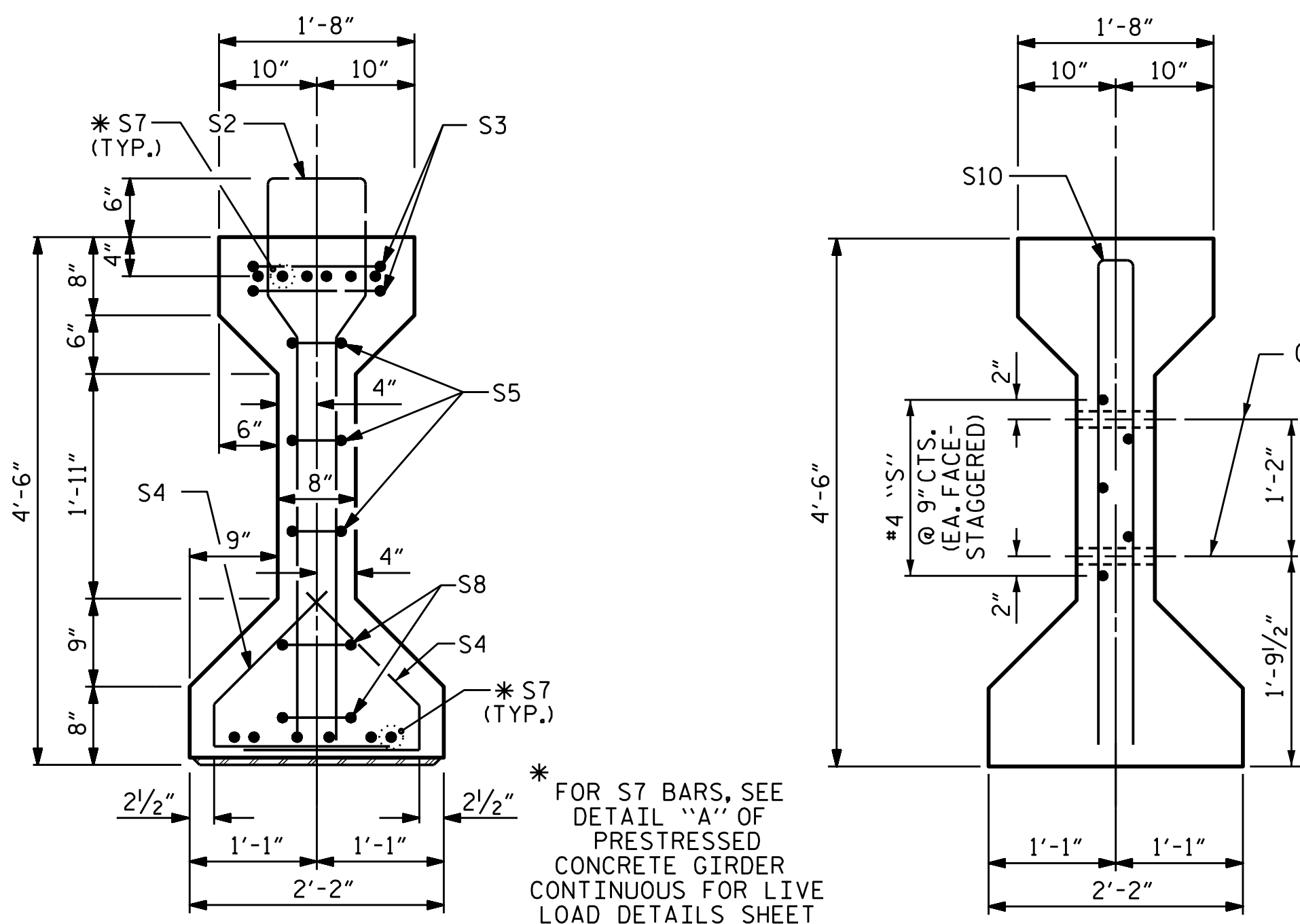
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**



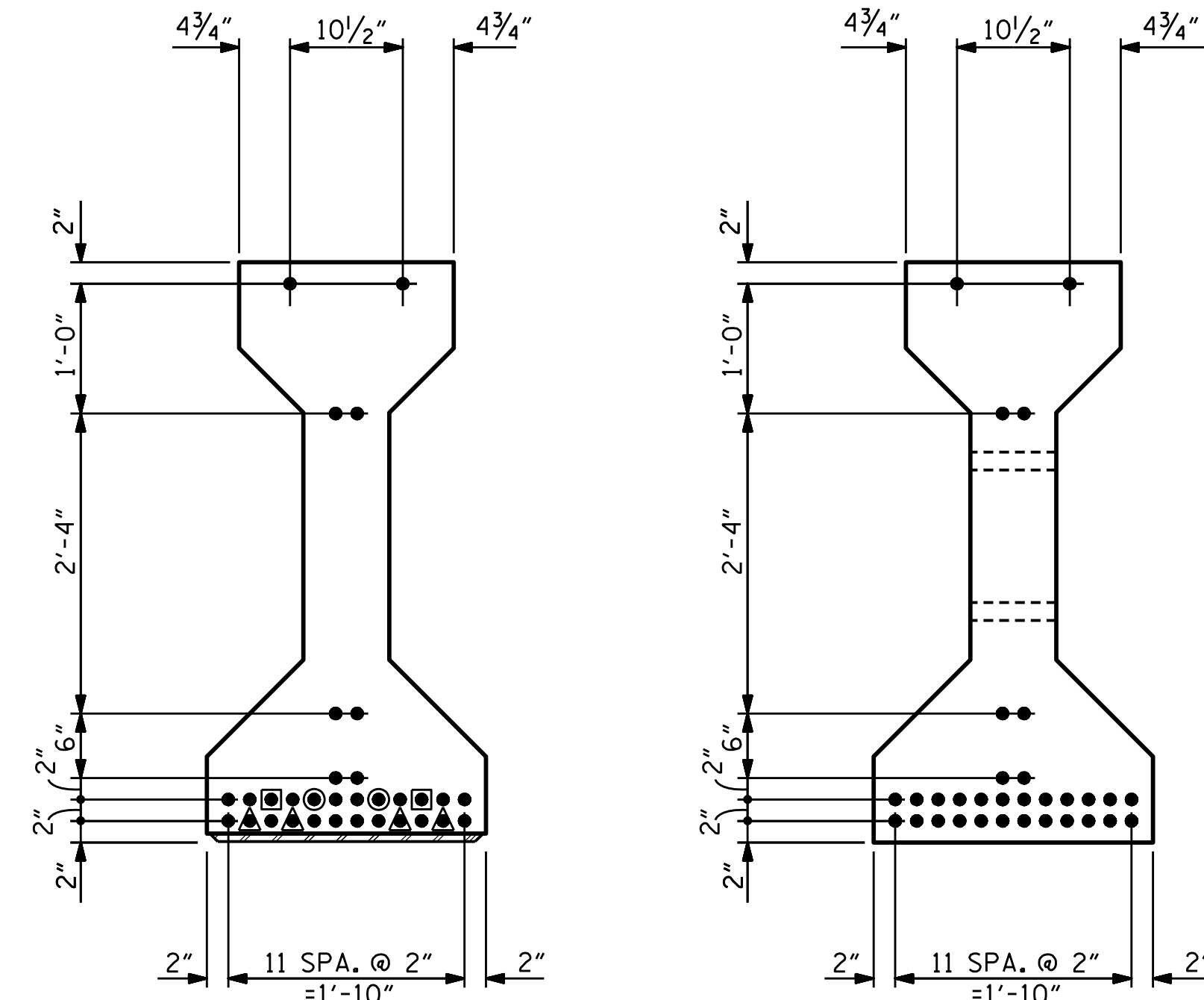
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 24

\$FILEL\$ \$DATE\$ \$TIME\$ \$USER\$ \$PLTDRVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04



- DEBONDING LEGEND**
- ▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
 - BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 8'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
 - BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 18'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.



0.6" Ø L. R. GRADE 270 STRANDS

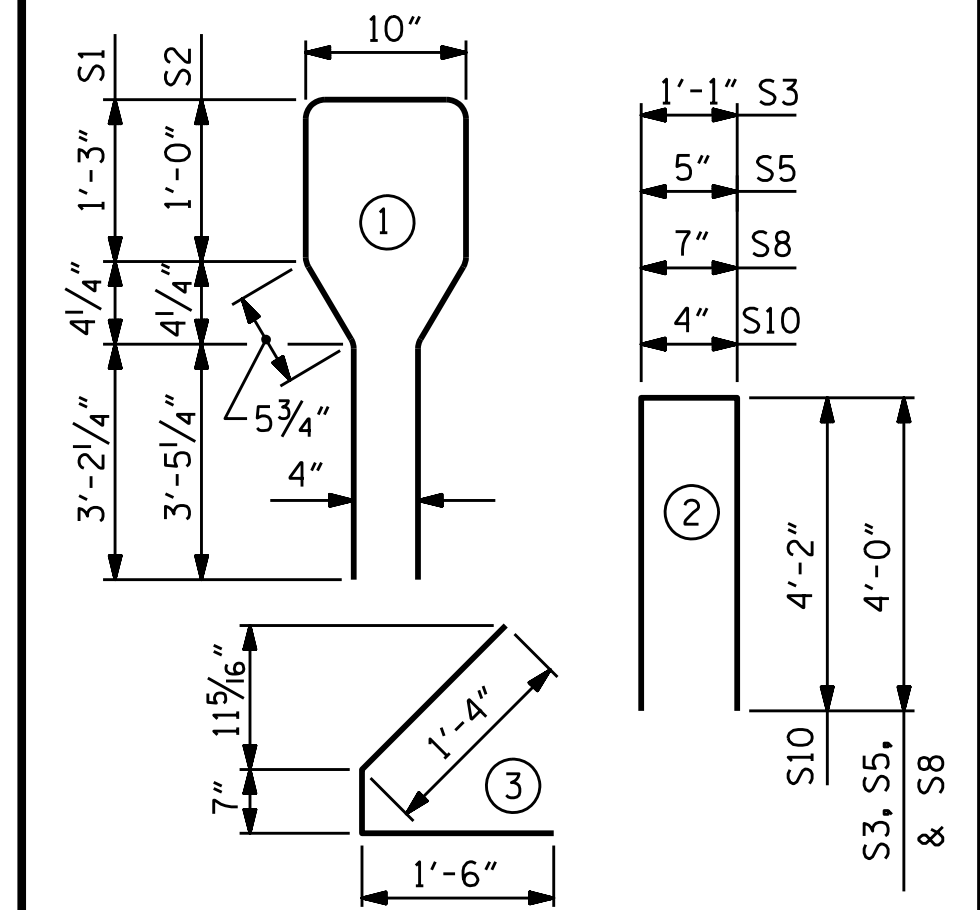
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	72	#4	1	10'-8"	513
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
* S7	24	#5	STR	3'-8"	92
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
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



QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	5500 PSI CONCRETE	0.6" Ø L. R. STRANDS
LB.	C.Y.	No.
1067	17.8	32

GIRDERS REQUIRED

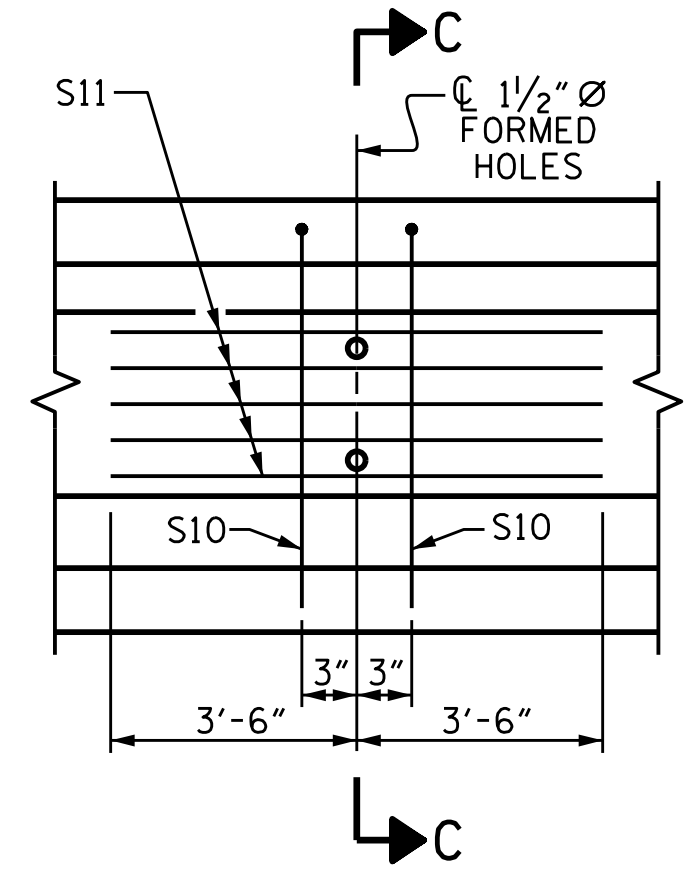
NUMBER	LENGTH	TOTAL LENGTH
4	87'-10"	351'-4"

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-
 SHEET 1 OF 2

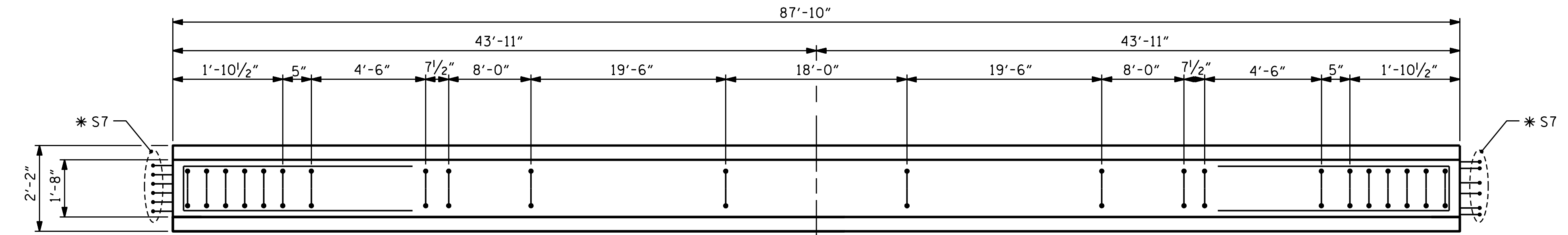
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 AASHTO TYPE IV
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 SPAN A

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

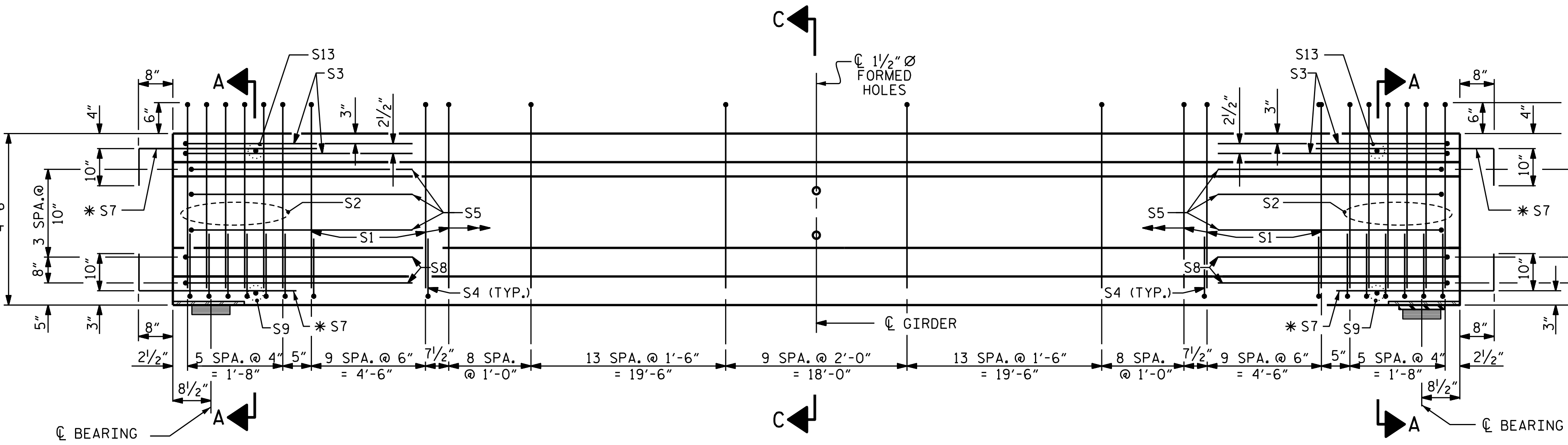
TOTAL SHEETS 24



PARTIAL ELEVATION
 SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS



PLAN OF GIRDER



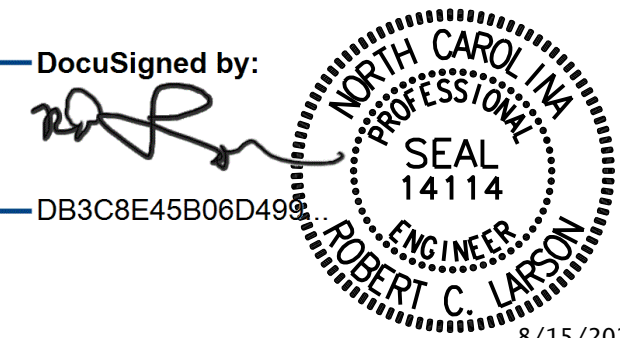
ELEVATION OF GIRDER
 (SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

DESIGN ENGINEER OF RECORD: *DocuSigned by: R. C. Larson* DATE: 8/15/2022

ASSEMBLED BY: A. K. ALLANKI DATE: 07/15/20
 CHECKED BY: R. C. LARSON DATE: 04/07/20

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

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



KCI Associates
 of North Carolina, P.A.
 2505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-9241

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.

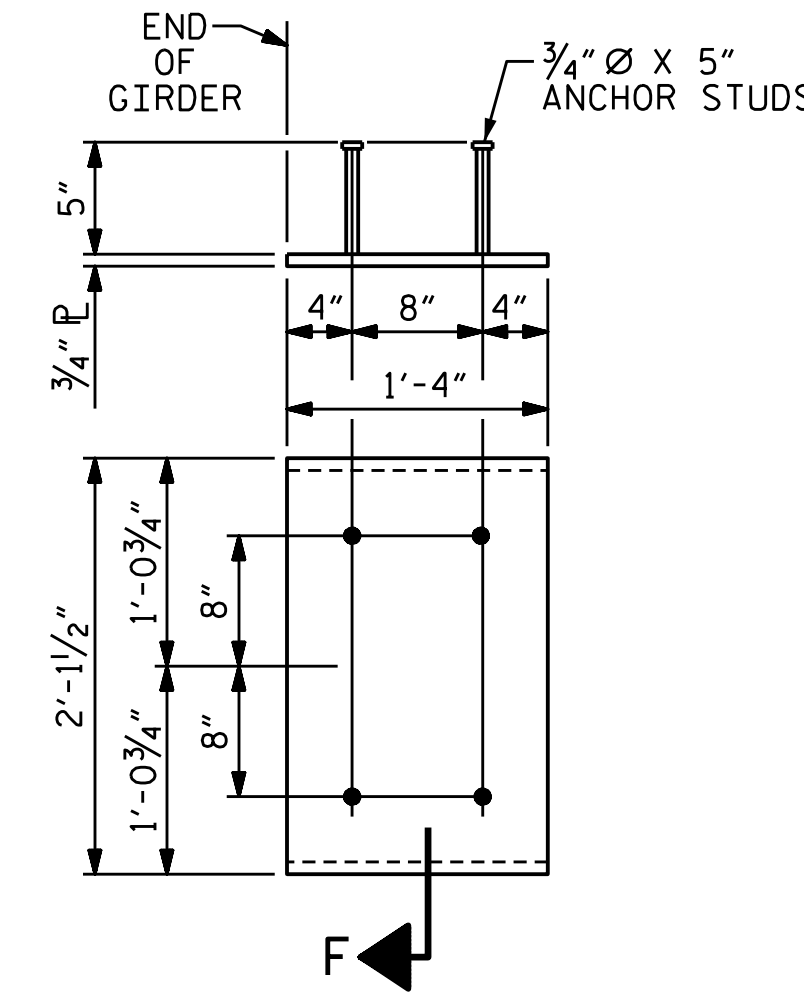
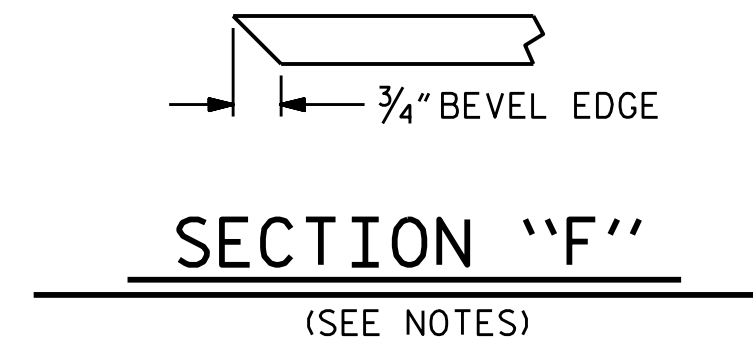
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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.

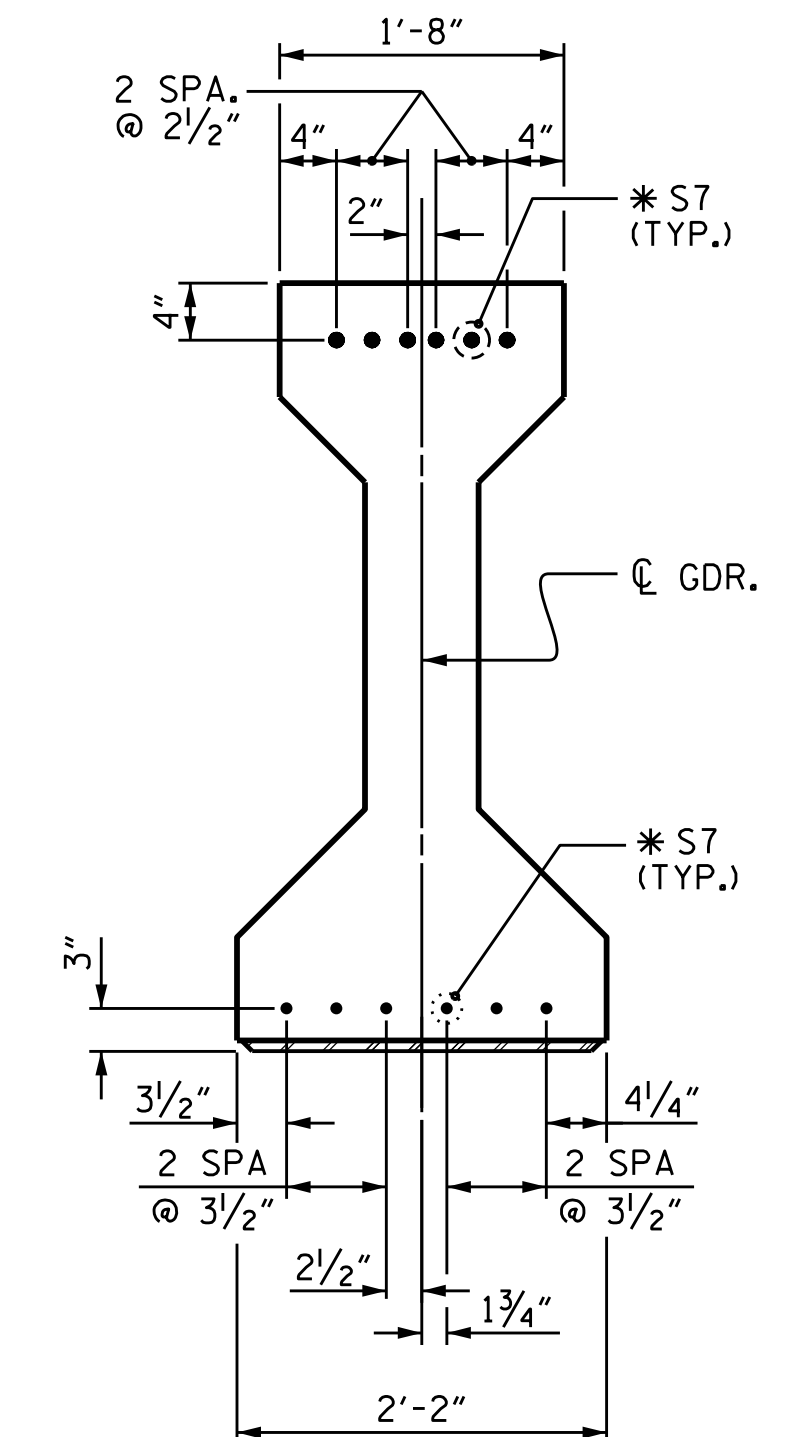
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4400 PSI.

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

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



EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER (2 REQ'D PER GIRDER)



DETAIL "A" (FOR AASHTO TYPE IV GIRDERS)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.6" Ø LOW RELAXATION	SPAN A (INTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.027	0.054	0.078	0.101	0.121	0.139	0.152	0.162	0.168	0.170	0.168	0.162	0.152	0.139	0.121	0.101	0.078	0.054	0.027	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.020	0.037	0.058	0.073	0.089	0.101	0.112	0.119	0.124	0.125	0.124	0.119	0.112	0.101	0.089	0.073	0.058	0.037	0.020	0
FINAL CAMBER	↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	1/2"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.6" Ø LOW RELAXATION	SPAN A (EXTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.027	0.054	0.078	0.101	0.121	0.139	0.152	0.162	0.168	0.170	0.168	0.162	0.152	0.139	0.121	0.101	0.078	0.054	0.027	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.018	0.033	0.052	0.066	0.081	0.091	0.101	0.108	0.112	0.113	0.112	0.108	0.101	0.091	0.081	0.066	0.052	0.033	0.018	0
FINAL CAMBER	↑	0	1/8"	1/4"	5/16"	7/16"	1/2"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	1/2"	7/16"	5/16"	1/4"	1/8"	0

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

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 16+93.00 -Y-

SHEET 2 OF 2

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

DocuSigned by:
[Signature]
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 14114
ROBERT C. LARSON
8/15/2022

DESIGN ENGINEER OF RECORD	DATE : 8/15/2022
ASSEMBLED BY : Z. KADI	DATE : 07/02/20
CHECKED BY : R. C. LARSON	DATE : 07/06/20
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

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KCI Associates
of North Carolina, P.A.
1905 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-9241

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

SHEET NO. S2- 10
TOTAL SHEETS 24

\$FILEL\$ \$DATE\$ \$TIME\$ \$USERS\$ \$PENTDRVS\$ \$PLTDVRS\$
 KCI PROJECT NO. 241704391.04

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.

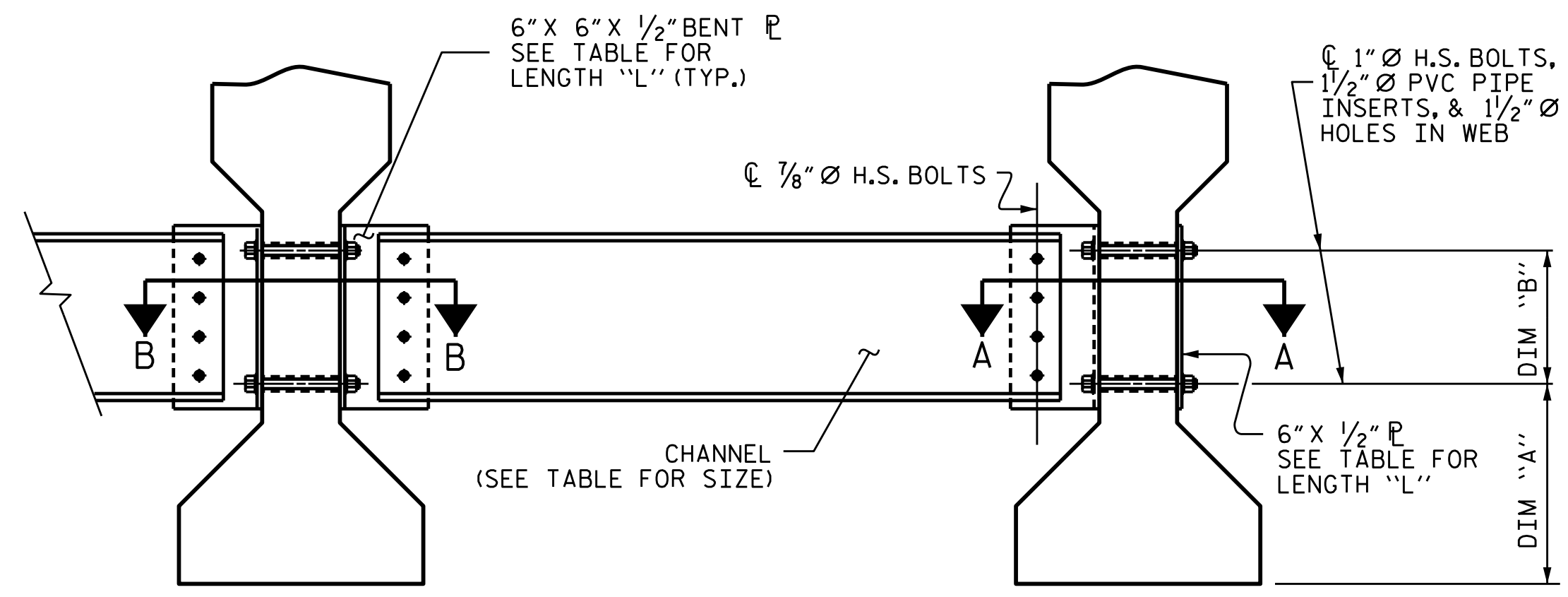
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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.

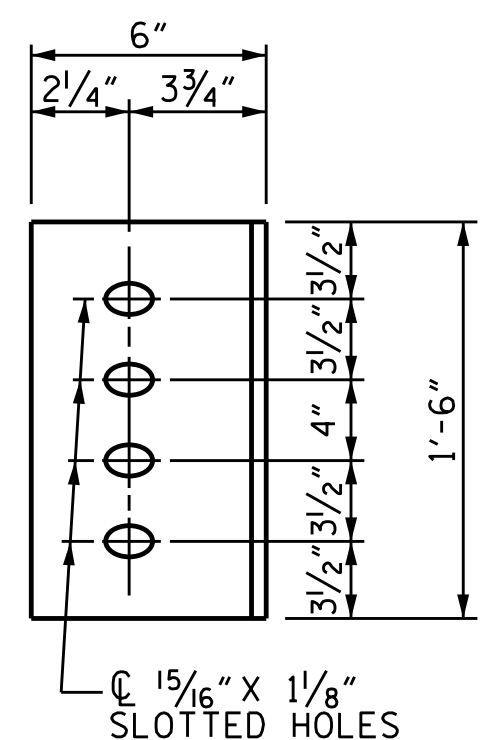
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



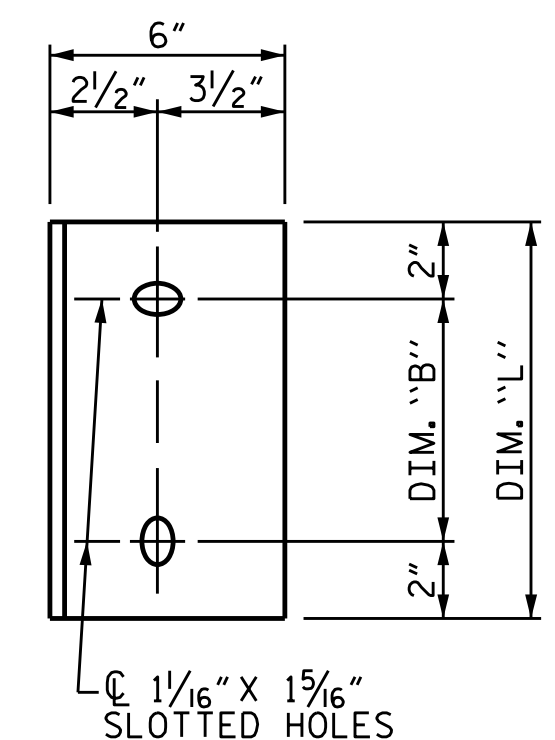
INTERIOR GIRDER

EXTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE
(TYPE IV GDR.)



WEB FACE

CONNECTOR PLATE DETAILS

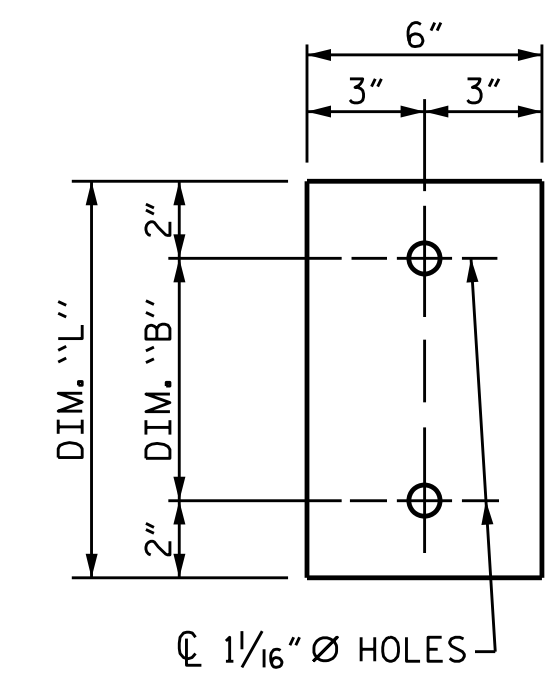
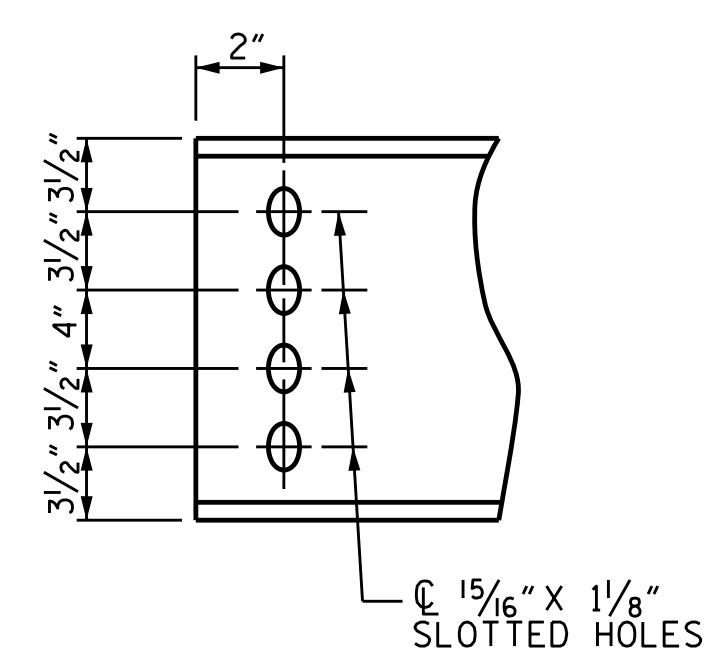
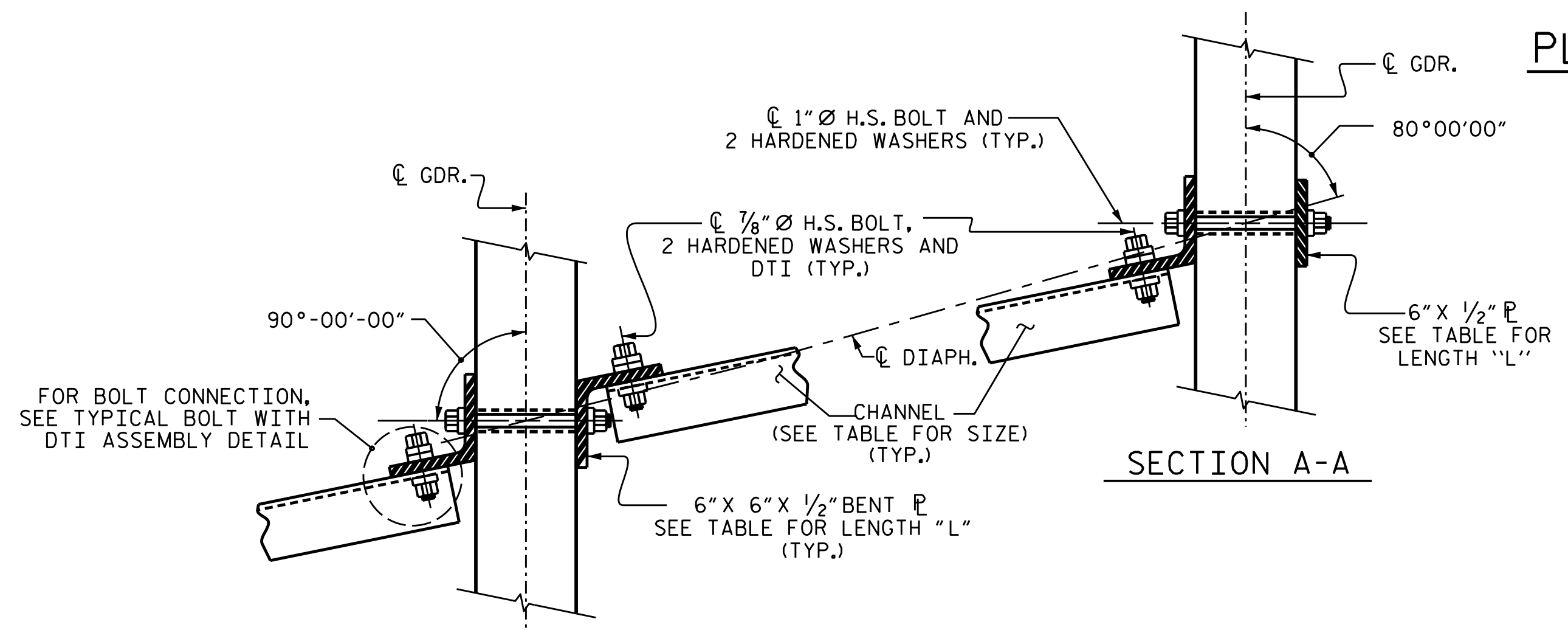


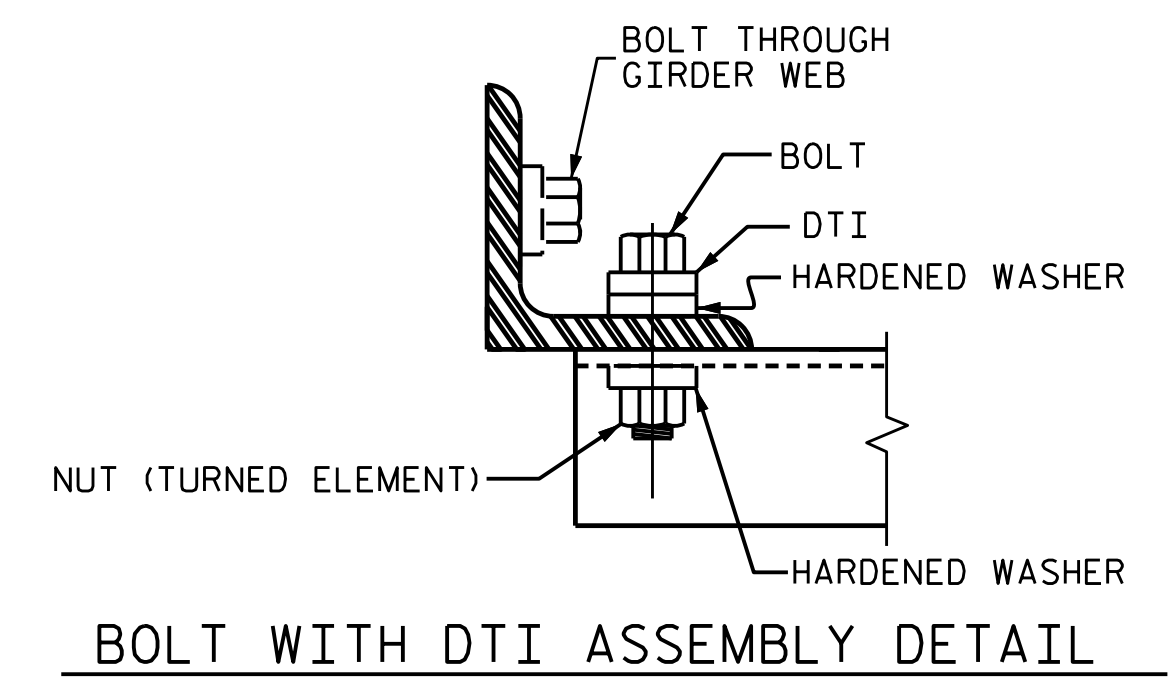
PLATE DETAILS



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. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

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

DocuSigned by:

 DB3C8E45B06D498
 8/15/2022

DESIGN ENGINEER OF RECORD:	DATE:
	8/15/2022
ASSEMBLED BY: A.K. ALLANKI	DATE: 07/15/19
CHECKED BY: R.C. LARSON	DATE: 04/07/20
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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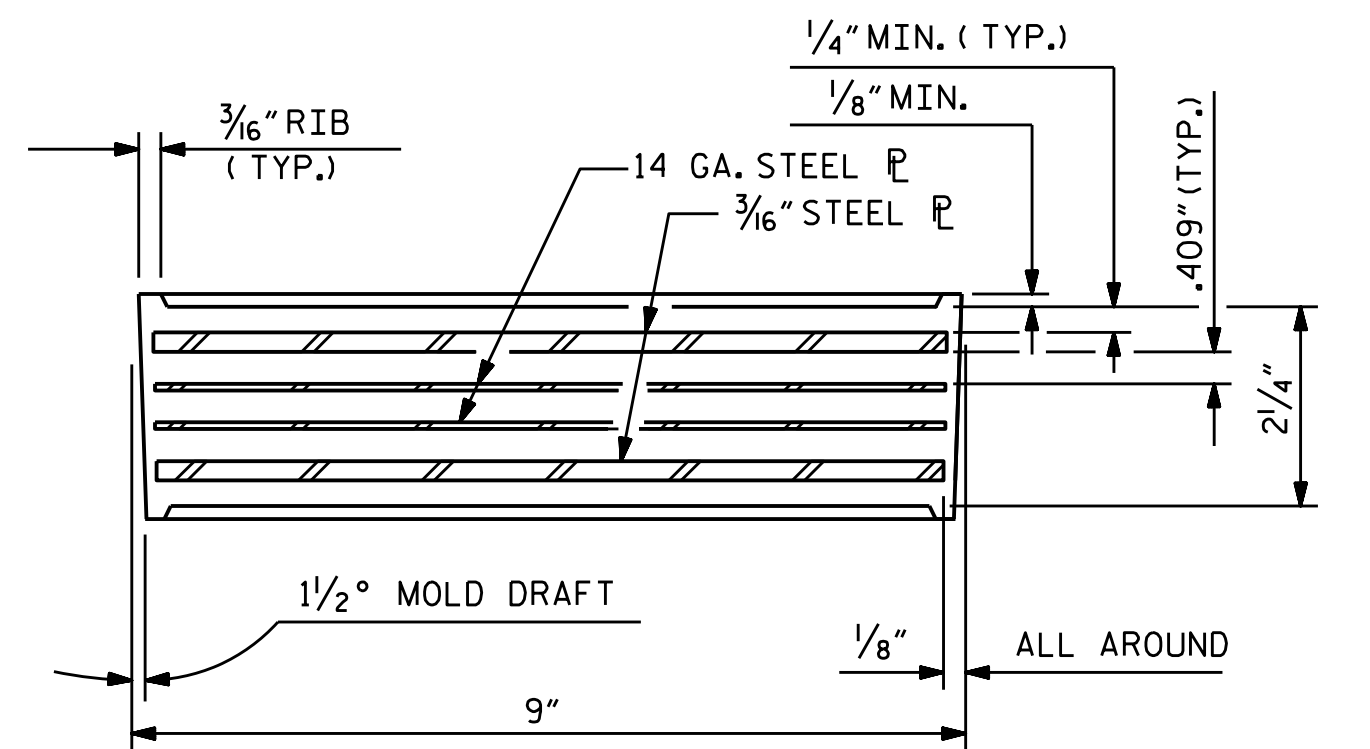
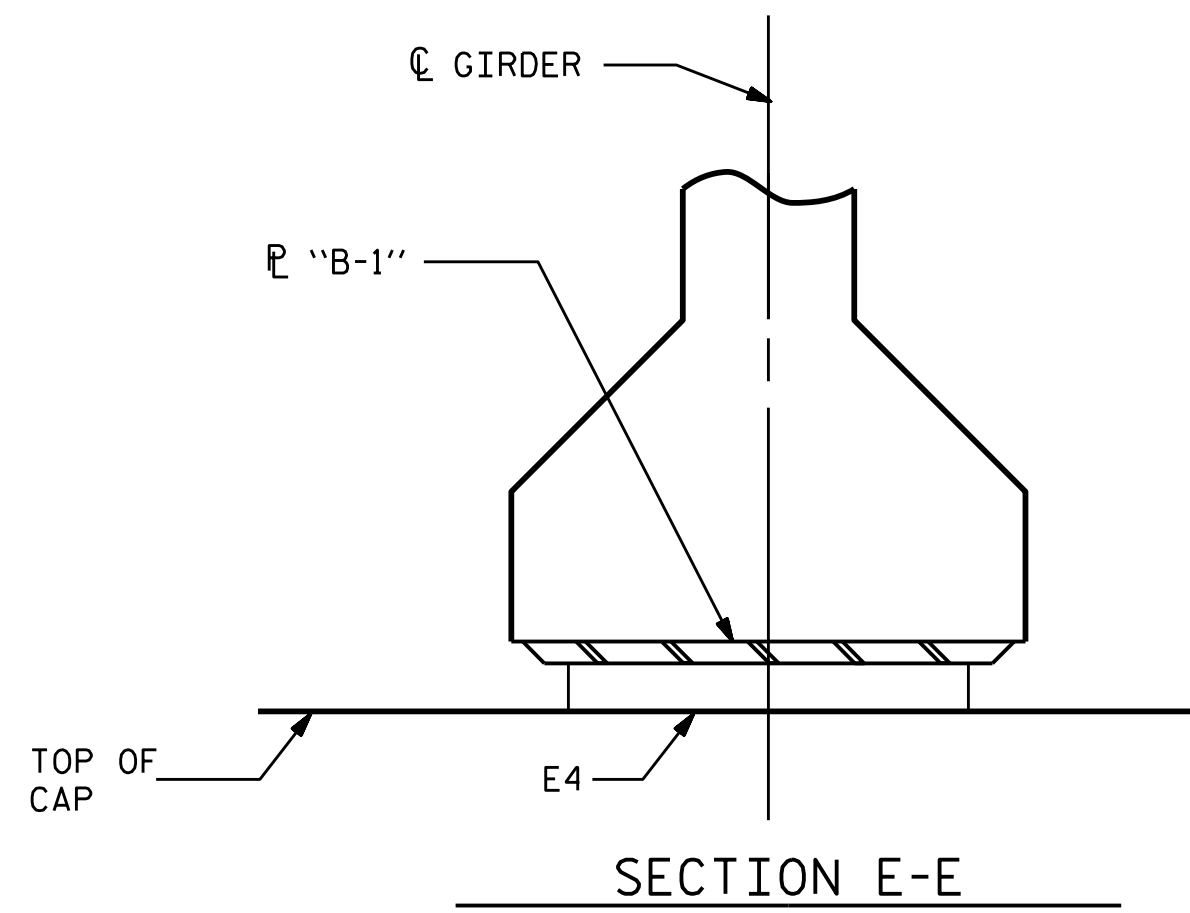
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1			3			TOTAL SHEETS
2			4			24

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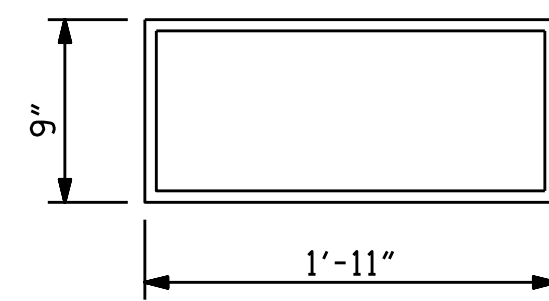
NOTES

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



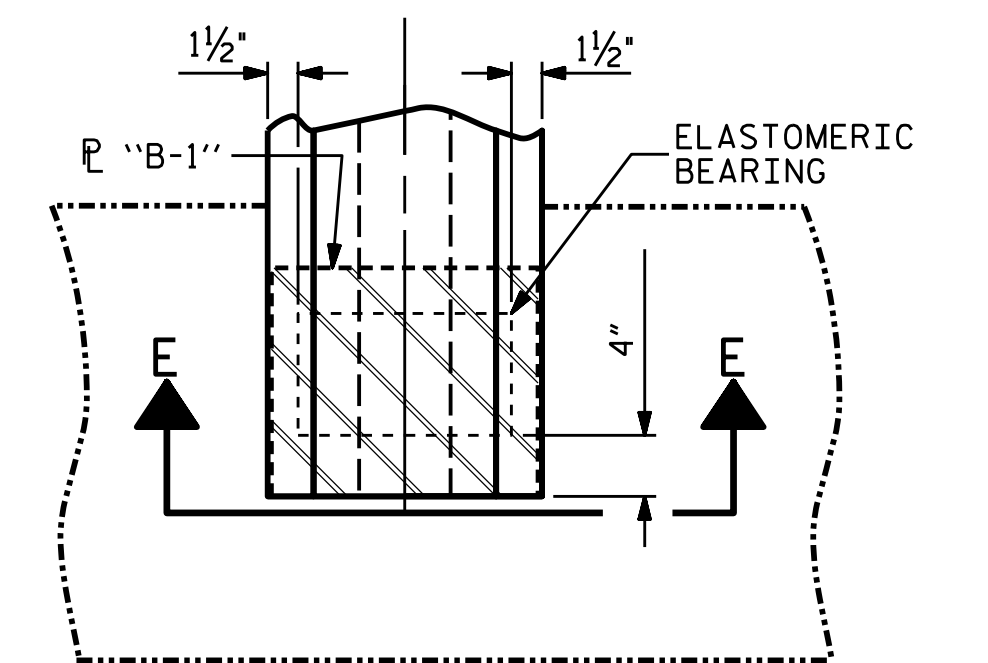
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



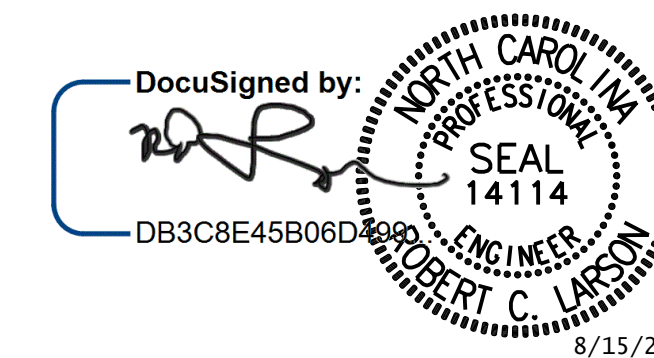
TYPICAL PLAN

(SHOWING INTEGRAL END BENT)

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

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

DESIGN ENGINEER OF RECORD	DocuSigned by:	DATE: 8/15/2022
ASSEMBLED BY: A. K. ALLANK	DATE: 07/19/19	
CHECKED BY: R. C. LARSON	DATE: 04/08/20	
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	



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

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STD. NO. EB4

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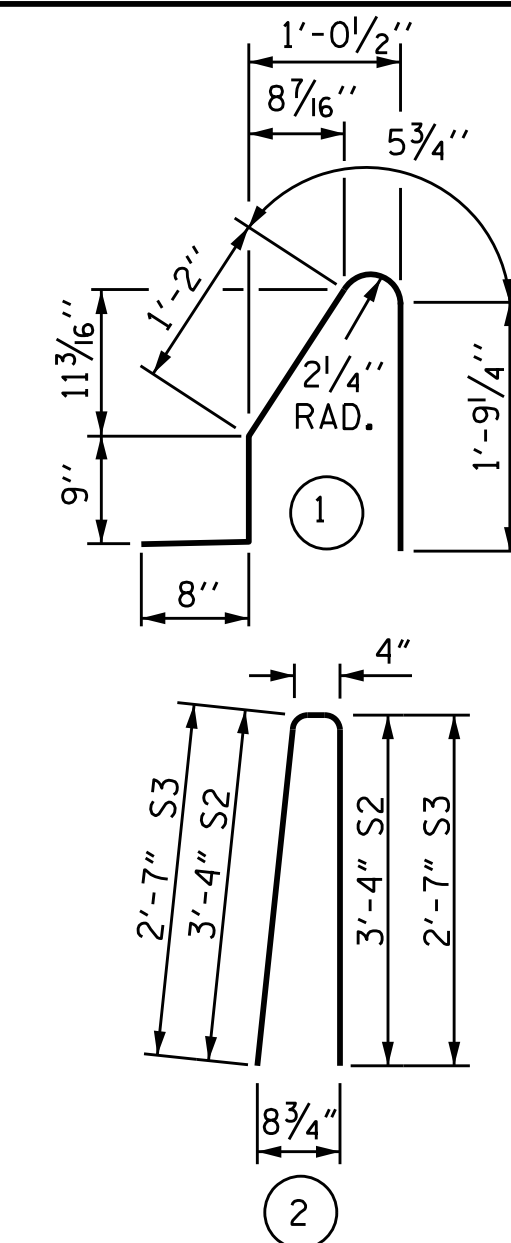
NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

BAR TYPES

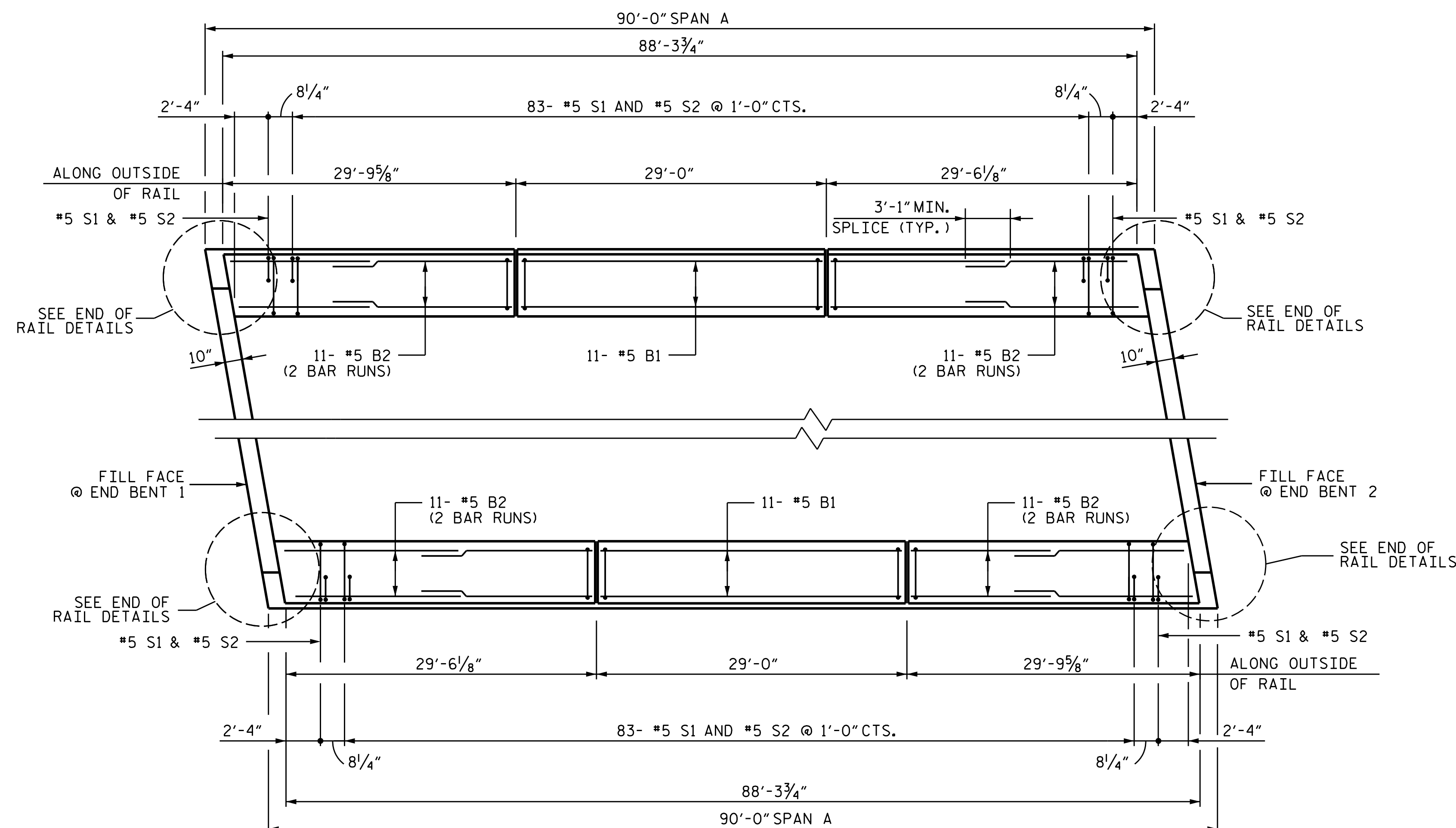


ALL BAR DIMENSIONS ARE OUT TO OUT

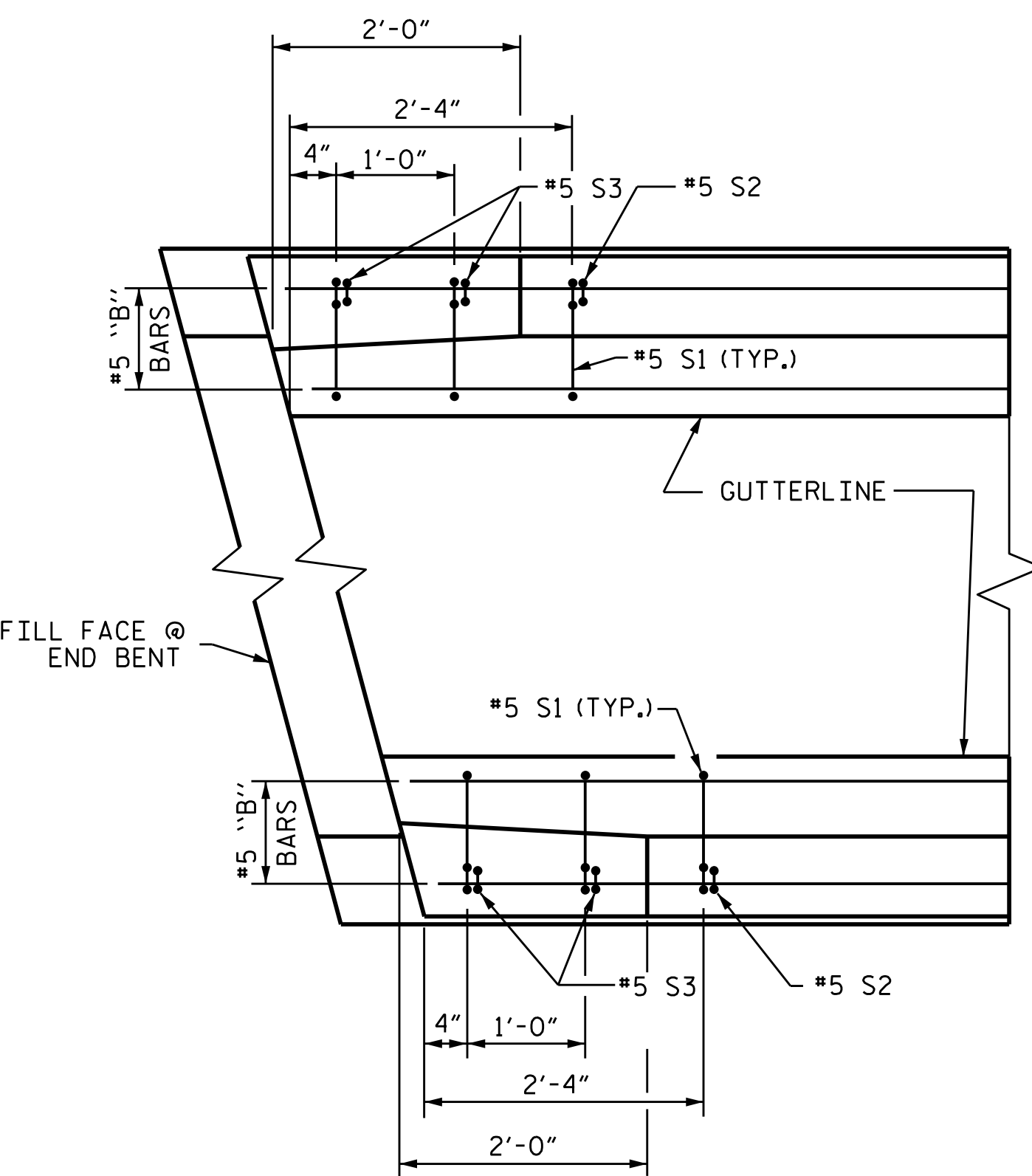
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

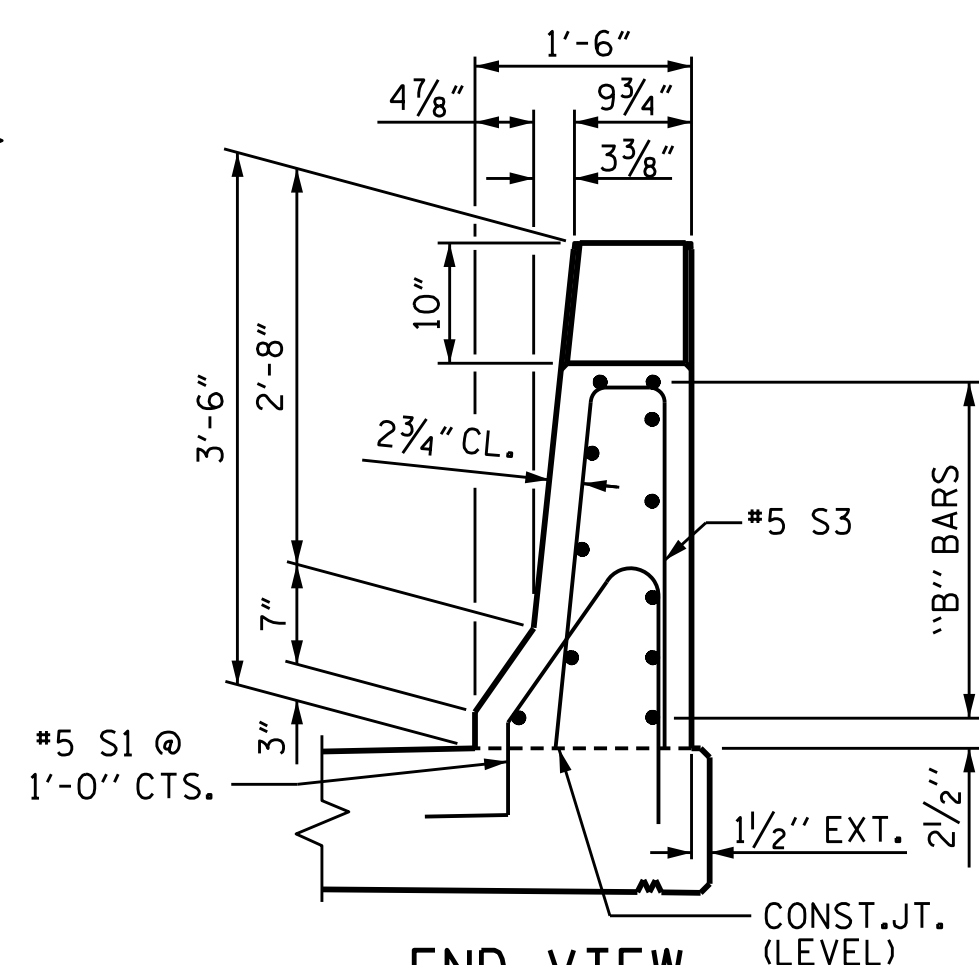
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	178 #5	1	4'-10"	897
* S2	170 #5	2	7'-0"	1241
* S3	8 #5	2	5'-6"	46
* B1	22 #5	STR	28'-8"	658
* B2	88 #5	STR	16'-4"	1499
* EPOXY COATED REINFORCING STEEL				4341 LBS.
CLASS AA CONCRETE				24.0 CU. YDS.
CONCRETE BARRIER RAIL				176.62 LIN. FT.



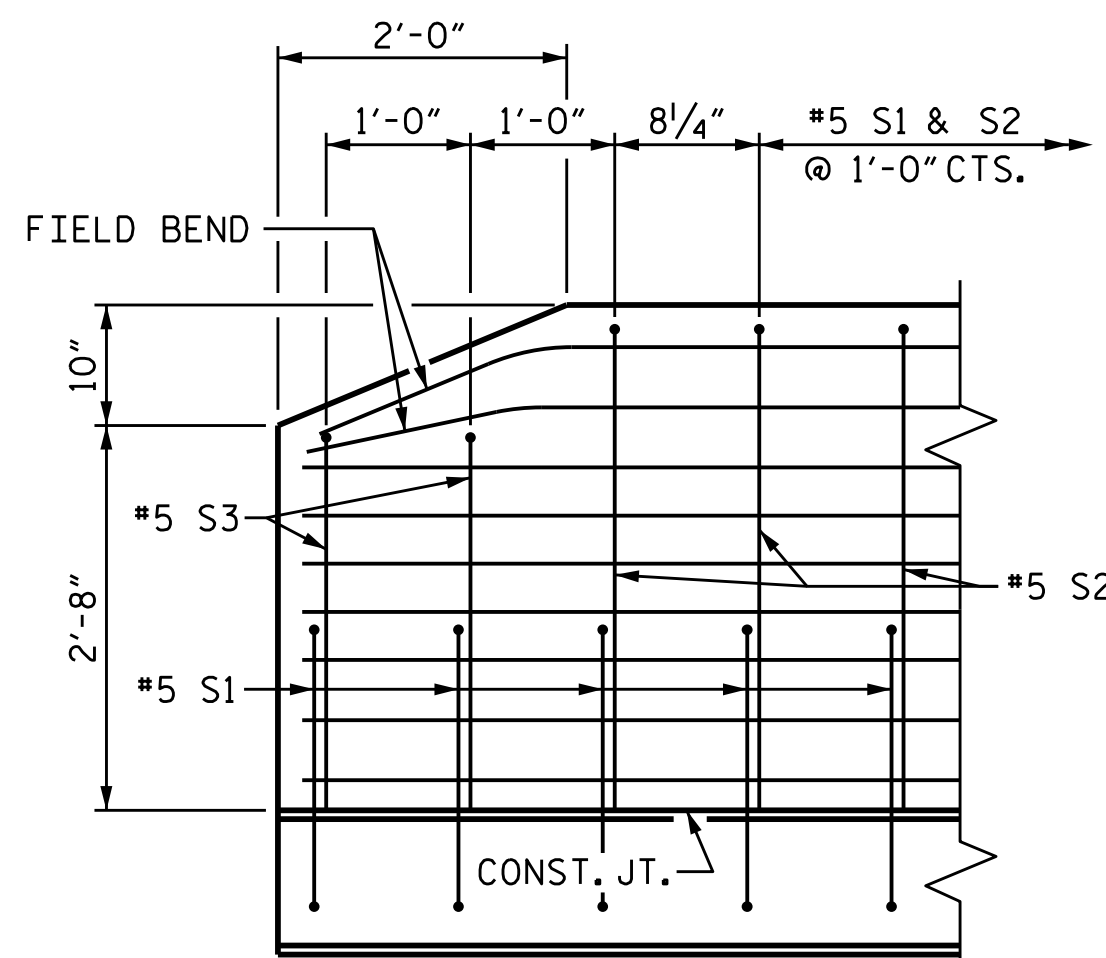
PLAN



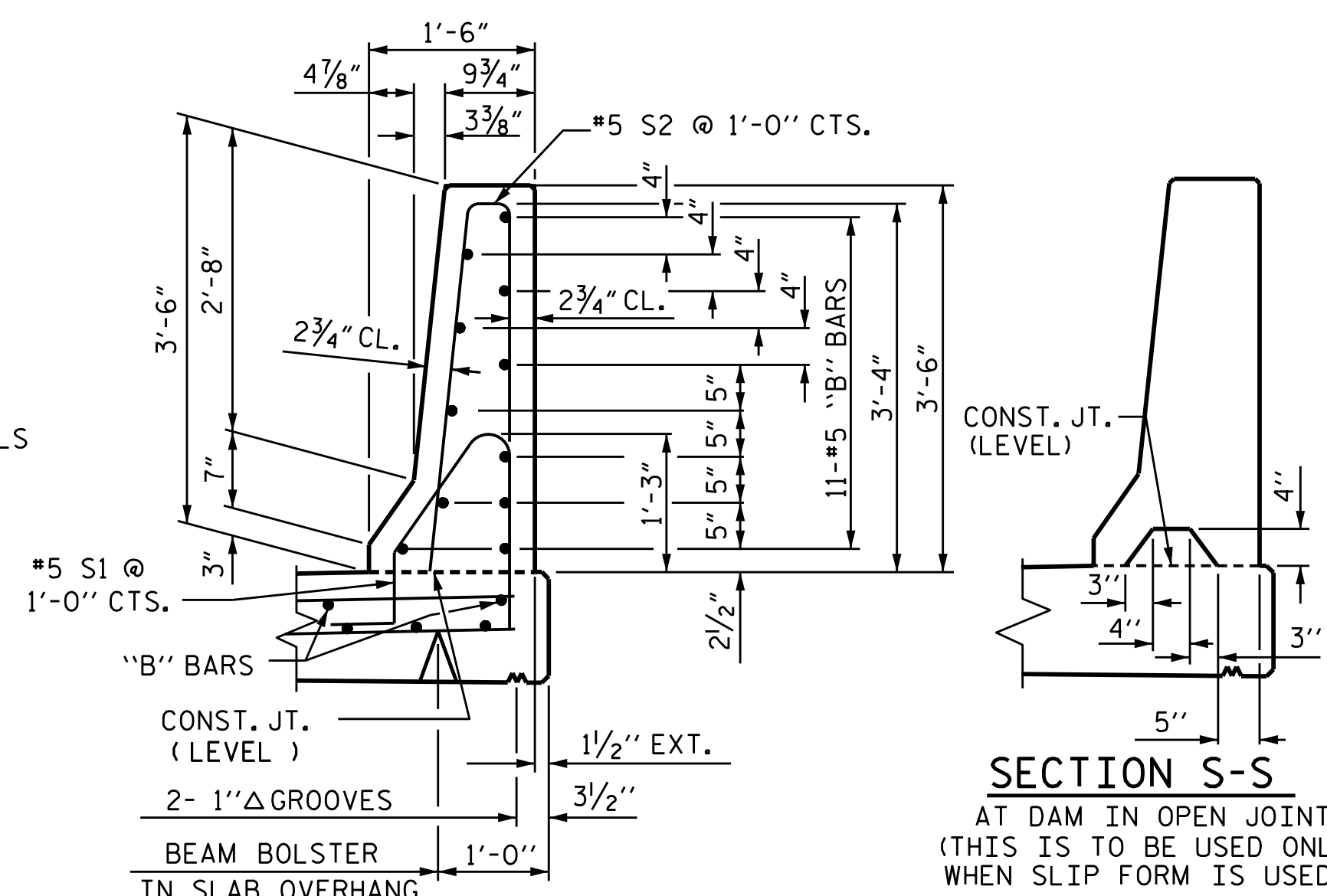
PLAN VIEW



END VIEW



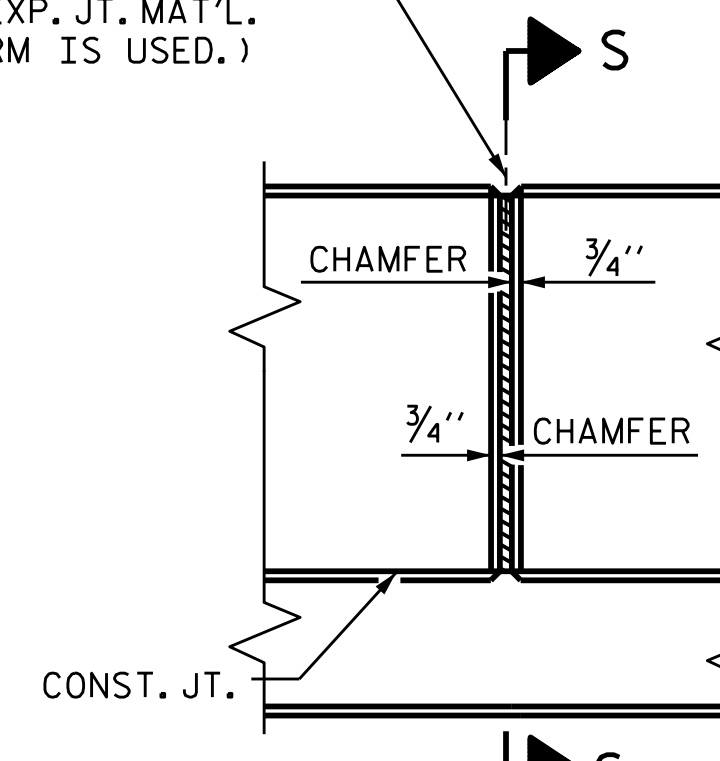
SIDE VIEW



SECTION THRU RAIL

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

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



ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS

DESIGN ENGINEER OF RECORD:	DATE: 8/15/2022
ASSEMBLED BY: A. K. ALLANKER	DATE: 07/21/19
CHECKED BY: R. C. LARSON	DATE: 04/06/20
DRAWN BY: ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY: SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

END OF RAIL DETAILS

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DocuSigned by: SEAL 14114 ENGINEER ROBERT C. LARSON 8/15/2022

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2			4		
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PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 16+93.00 -Y-

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

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2505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-9264

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS, THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

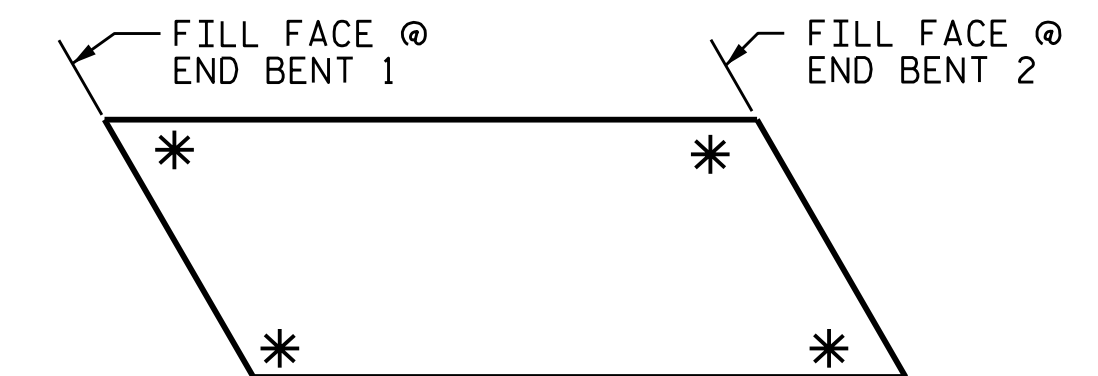
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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

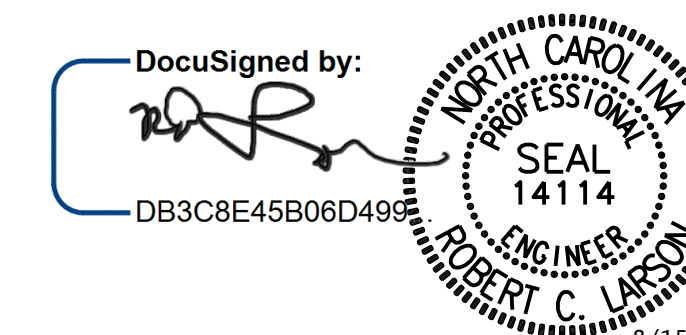


SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

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

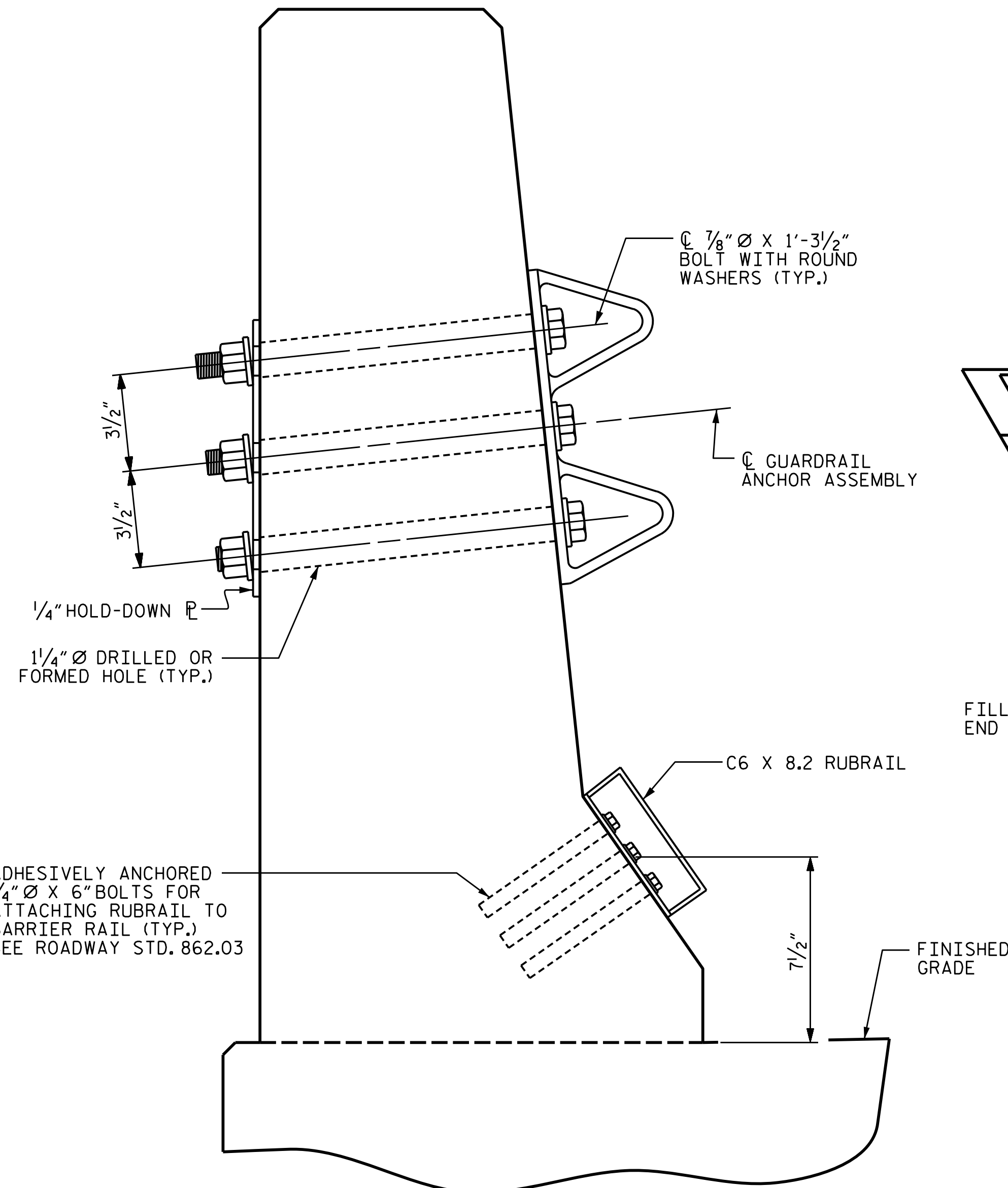
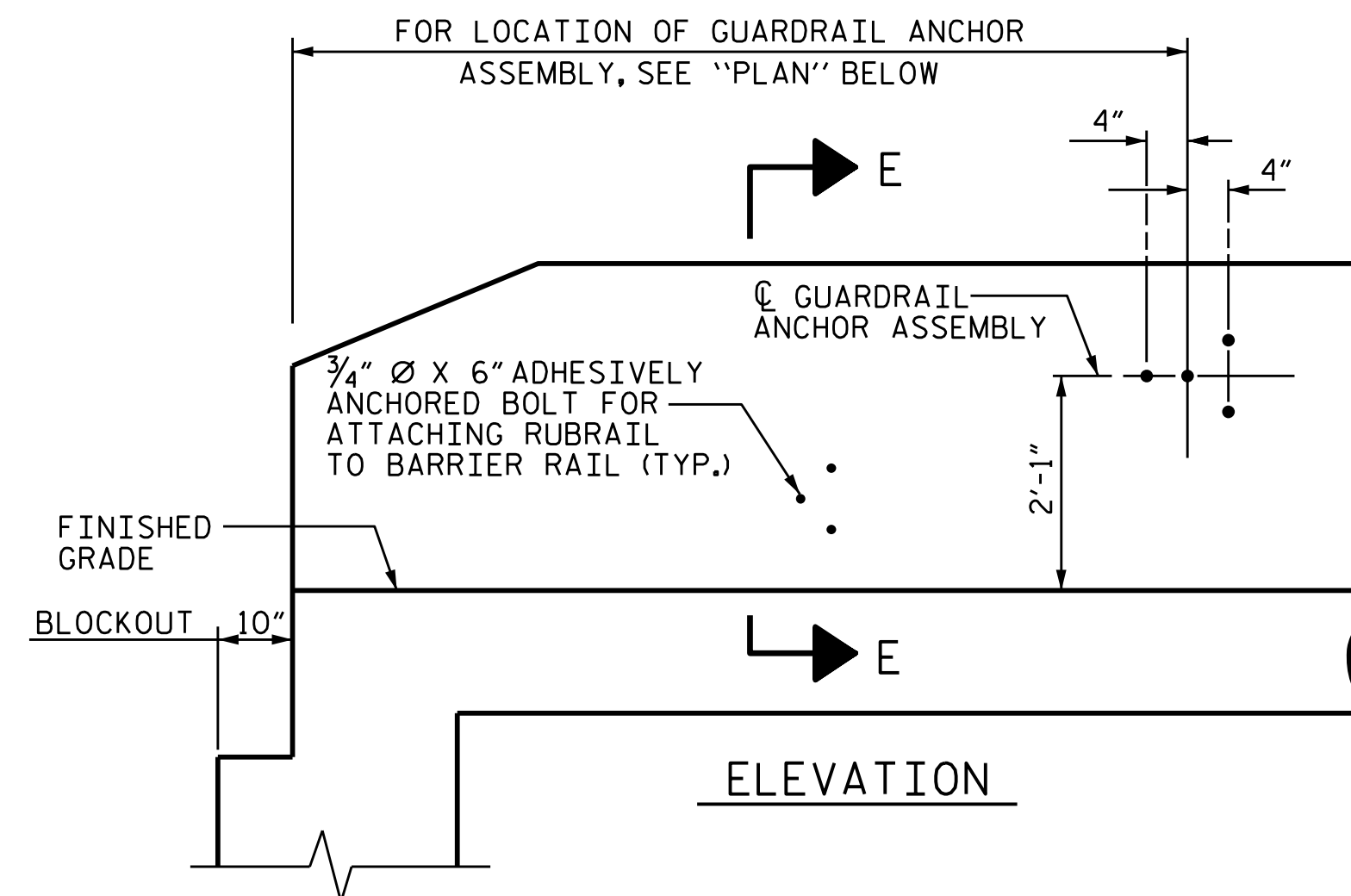
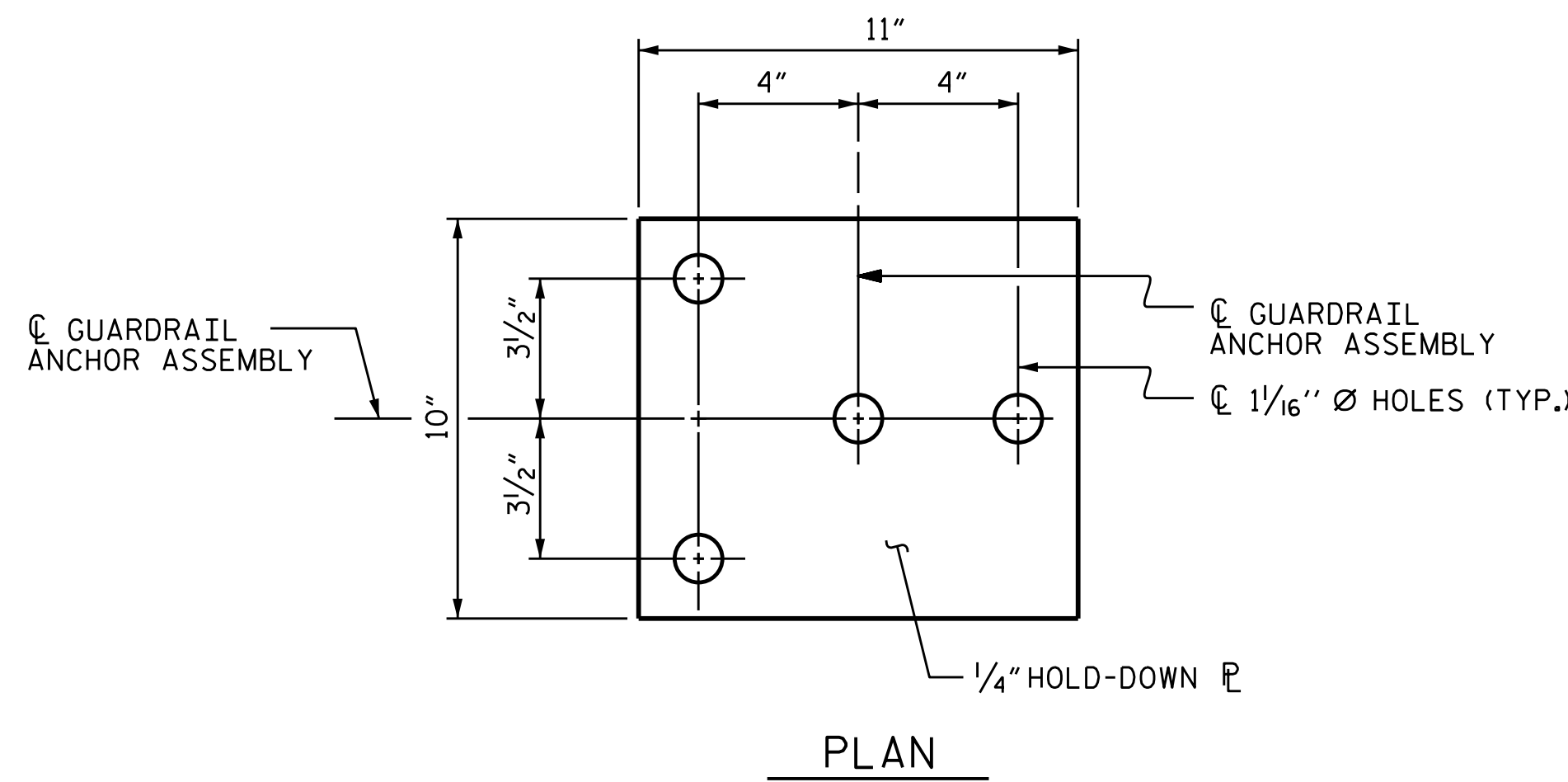


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2			4			

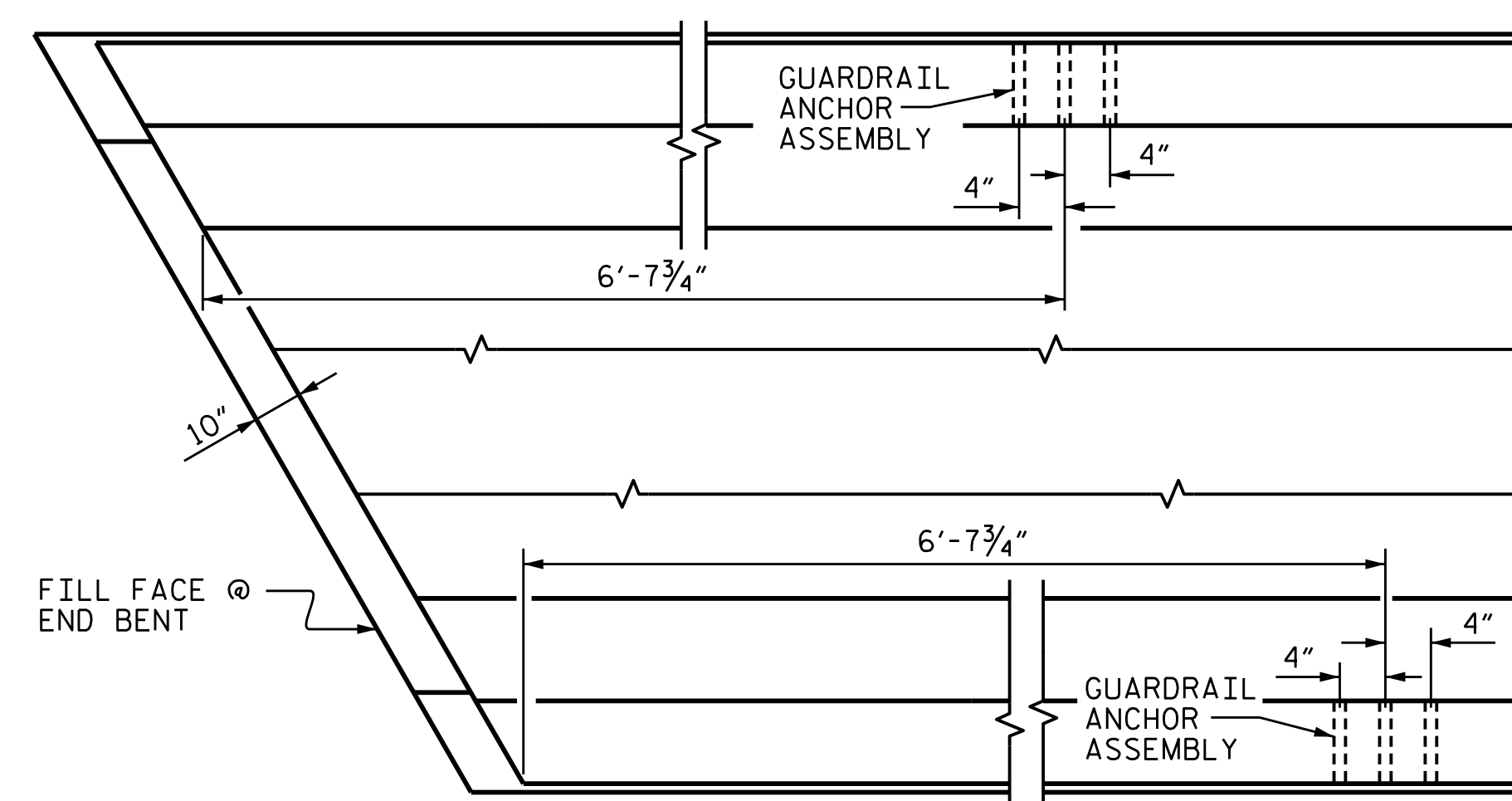
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(SHT 1a) STD. NO. GRA2



SECTION E-E
 GUARDRAIL ANCHOR ASSEMBLY DETAILS

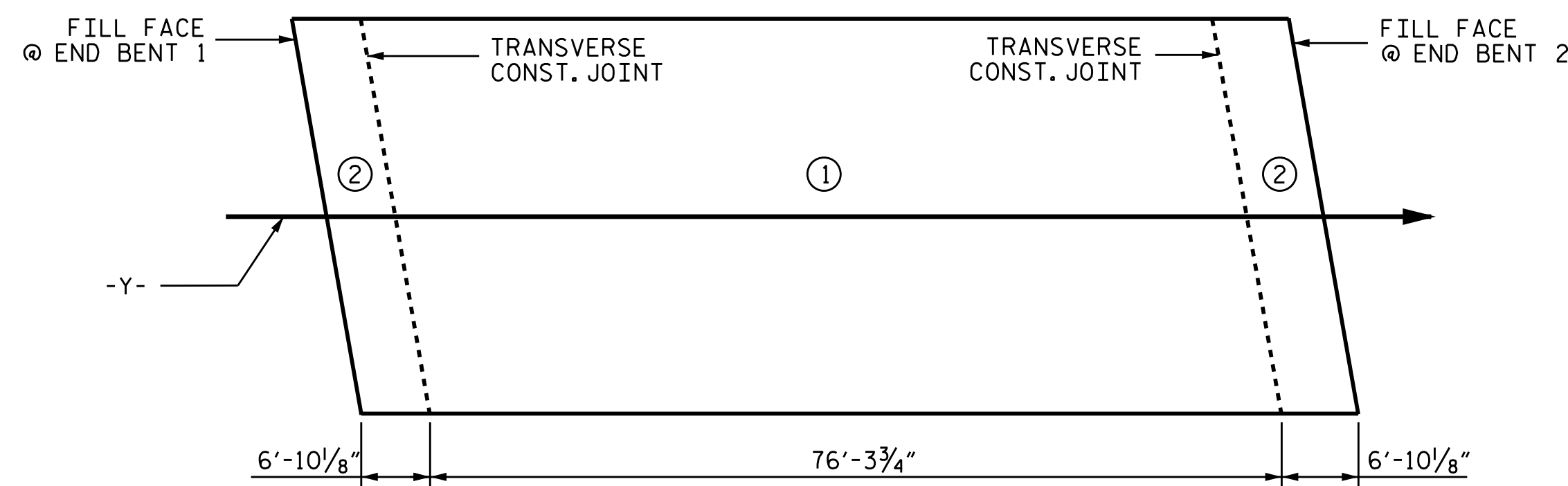


LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

DESIGN ENGINEER OF RECORD	DocuSigned by:	DATE:	8/15/2022
ASSEMBLED BY: R. C. LARSON	DATE:	11/12/20	
CHECKED BY: R. F. DECOLA	DATE:	11/12/20	
DRAWN BY: TLA 5/06	REV. 7/12	MAA/GM	
CHECKED BY: GM 5/06	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

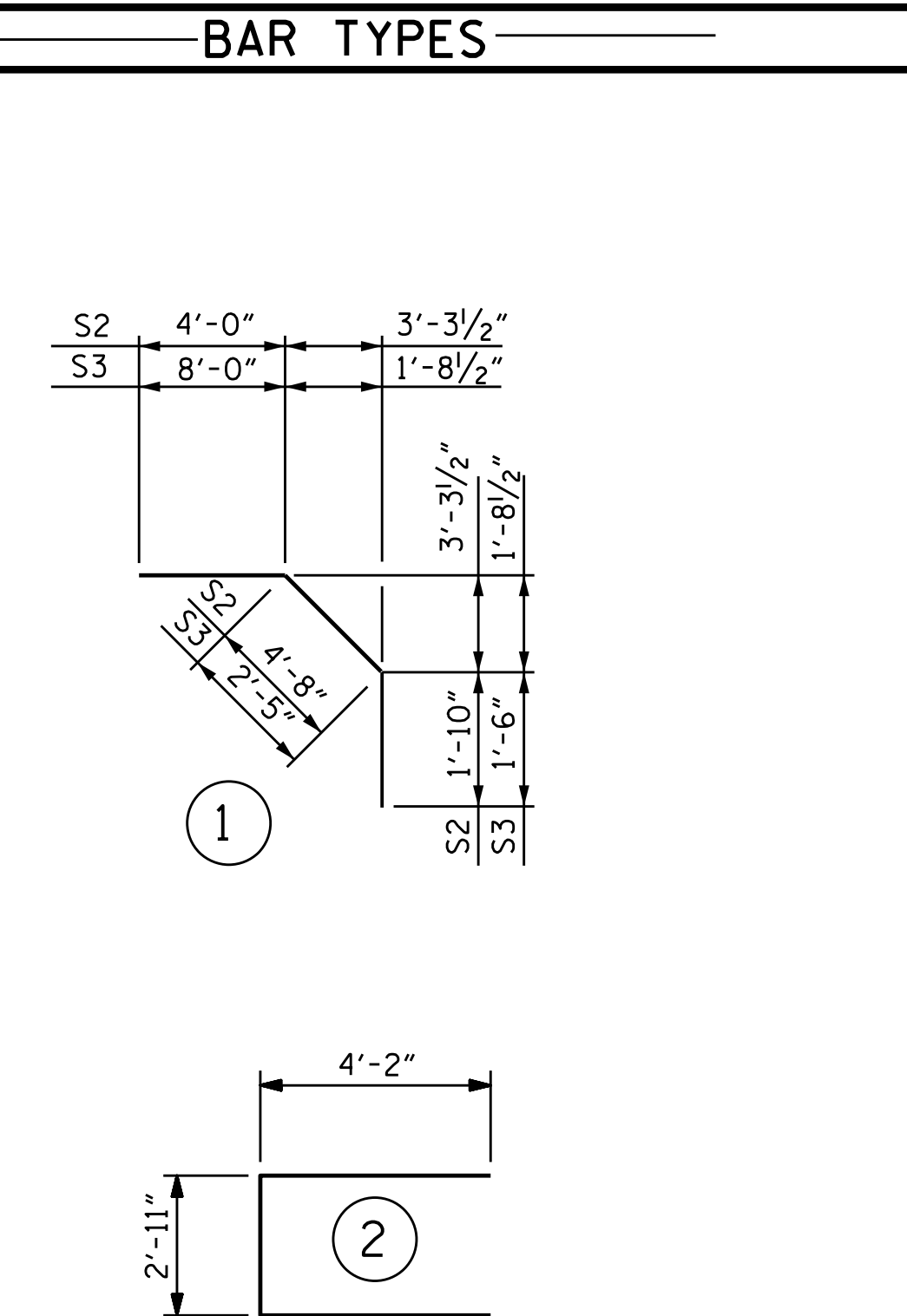
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DECK POURING SEQUENCE

① INDICATES POUR SEQUENCE

BILL OF MATERIAL											
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	164	5	STR.	36'-1"	6172	A24	2	5	STR.	8'-0"	17
* A2	2	5	STR.	33'-7"	70	A25	2	5	STR.	5'-2"	11
* A3	2	5	STR.	30'-9"	64	A26	2	5	STR.	2'-4"	5
* A4	2	5	STR.	27'-11"	58						
* A5	2	5	STR.	25'-1"	52	* B1	75	4	STR.	30'-8"	1537
* A6	2	5	STR.	22'-2"	46	* B2	48	6	STR.	18'-0"	1298
* A7	2	5	STR.	19'-4"	40	* B3	48	6	STR.	19'-0"	1370
* A8	2	5	STR.	16'-6"	34	B4	88	5	STR.	45'-3"	4153
* A9	2	5	STR.	13'-8"	29						
* A10	2	5	STR.	10'-10"	23	K1	10	4	STR.	36'-8"	245
* A11	2	5	STR.	8'-0"	17	K2	6	4	STR.	7'-4"	29
* A12	2	5	STR.	5'-2"	11	K3	12	4	STR.	8'-10"	71
* A13	2	5	STR.	2'-4"	5	K4	6	4	STR.	7'-10"	31
						K5	4	4	STR.	2'-2"	6
A14	164	5	STR.	36'-1"	6172	K6	6	4	STR.	8'-2"	33
A15	2	5	STR.	33'-7"	70	K7	4	4	STR.	2'-5"	6
A16	2	5	STR.	30'-9"	64	K8	8	4	STR.	3'-0"	16
A17	2	5	STR.	27'-11"	58	K9	4	4	STR.	2'-7"	7
A18	2	5	STR.	25'-1"	52						
A19	2	5	STR.	22'-2"	46	* S2	56	4	1	10'-6"	393
A20	2	5	STR.	19'-4"	40	* S3	60	4	1	11'-11"	478
A21	2	5	STR.	16'-6"	34						
A22	2	5	STR.	13'-8"	29	U1	56	4	2	11'-3"	421
A23	2	5	STR.	10'-10"	23						

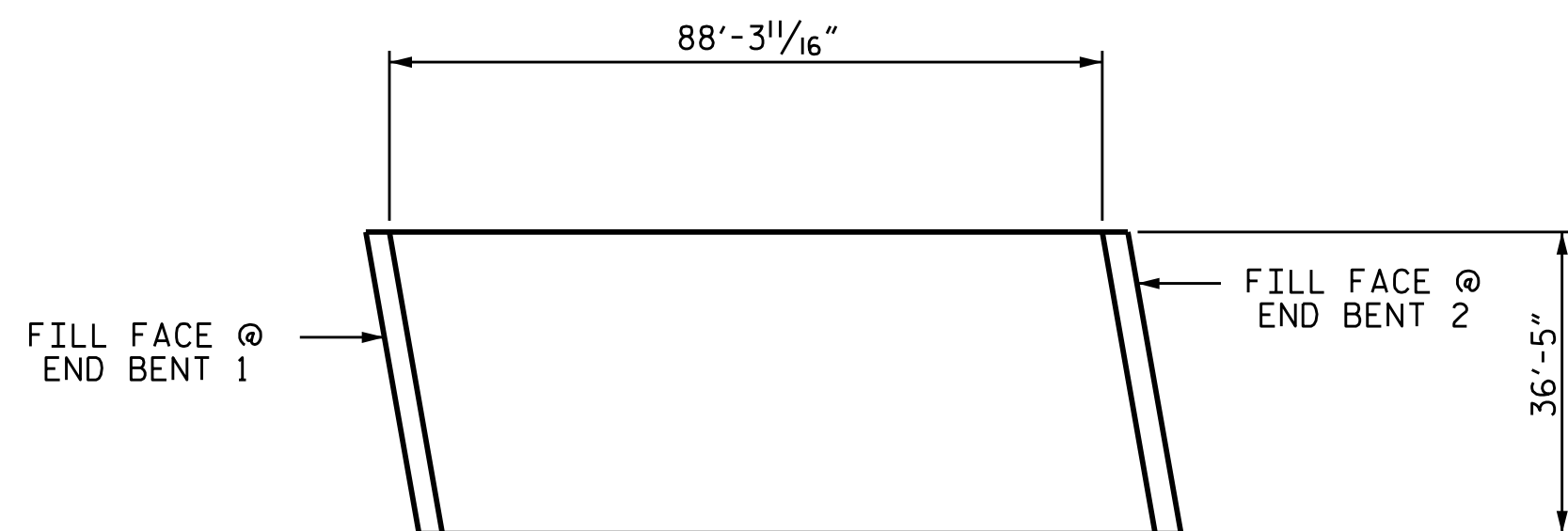


ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	90.1		
POUR 2	53.4		
TOTALS**	143.5	11,639	11,697

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 3216)

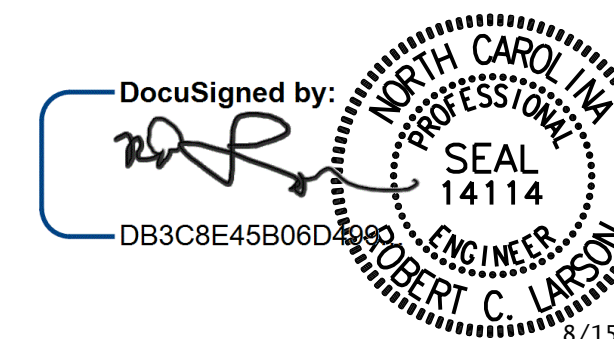
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

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"			

GROOVING BRIDGE FLOORS

APPROACH SLABS	874	SQ.FT.
BRIDGE DECK	2664	SQ.FT.
TOTAL	3538	SQ.FT.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 16+93.00 -Y-



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

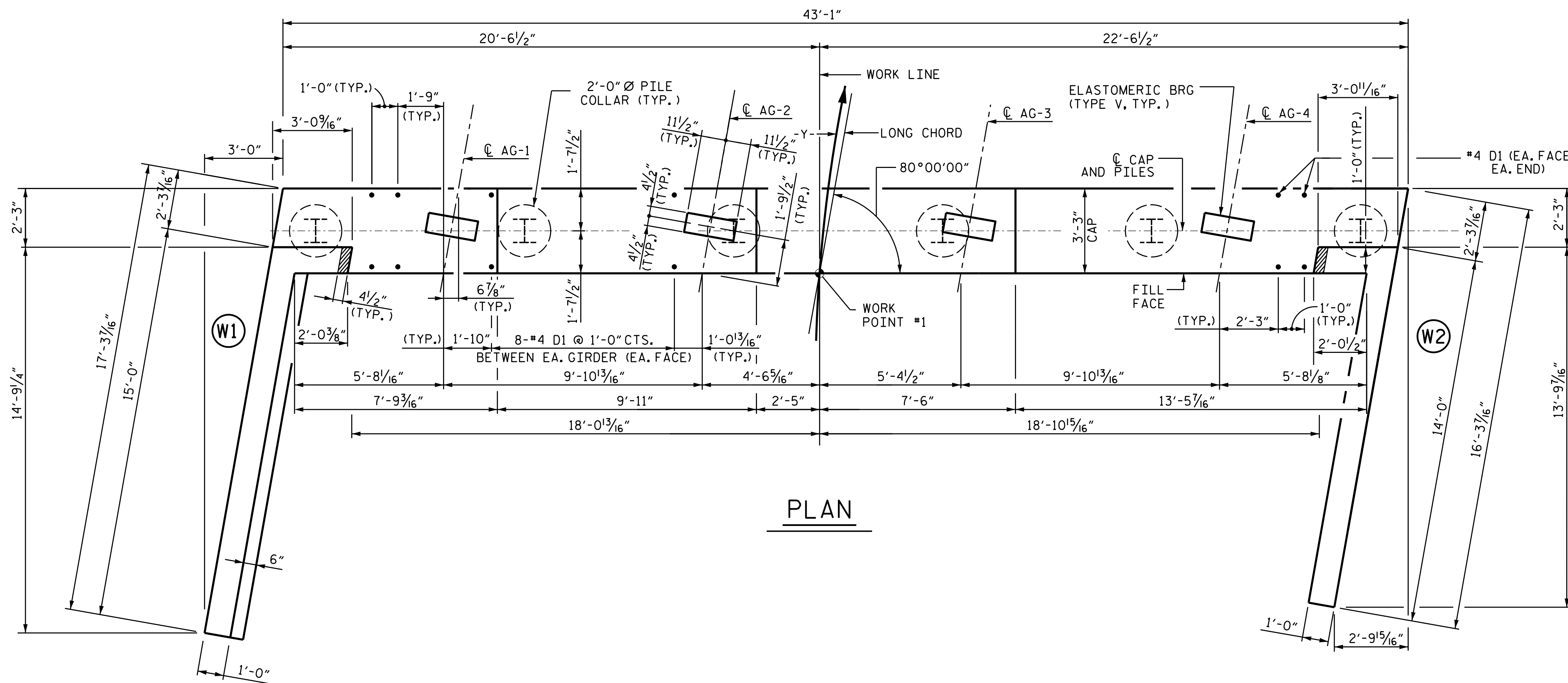
DESIGN ENGINEER OF RECORD:	DocuSigned by: R. C. LARSON	DATE:	8/15/2022
ASSEMBLED BY:	A. K. ALLANKI	DATE:	07/18/19
CHECKED BY:	R. C. LARSON	DATE:	04/05/20
DRAWN BY:	JMB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY:	SJD 9/87	REV. 12/17	MAA/THC
		REV. 06/19	BNB/THC

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REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	
				TOTAL SHEETS 24

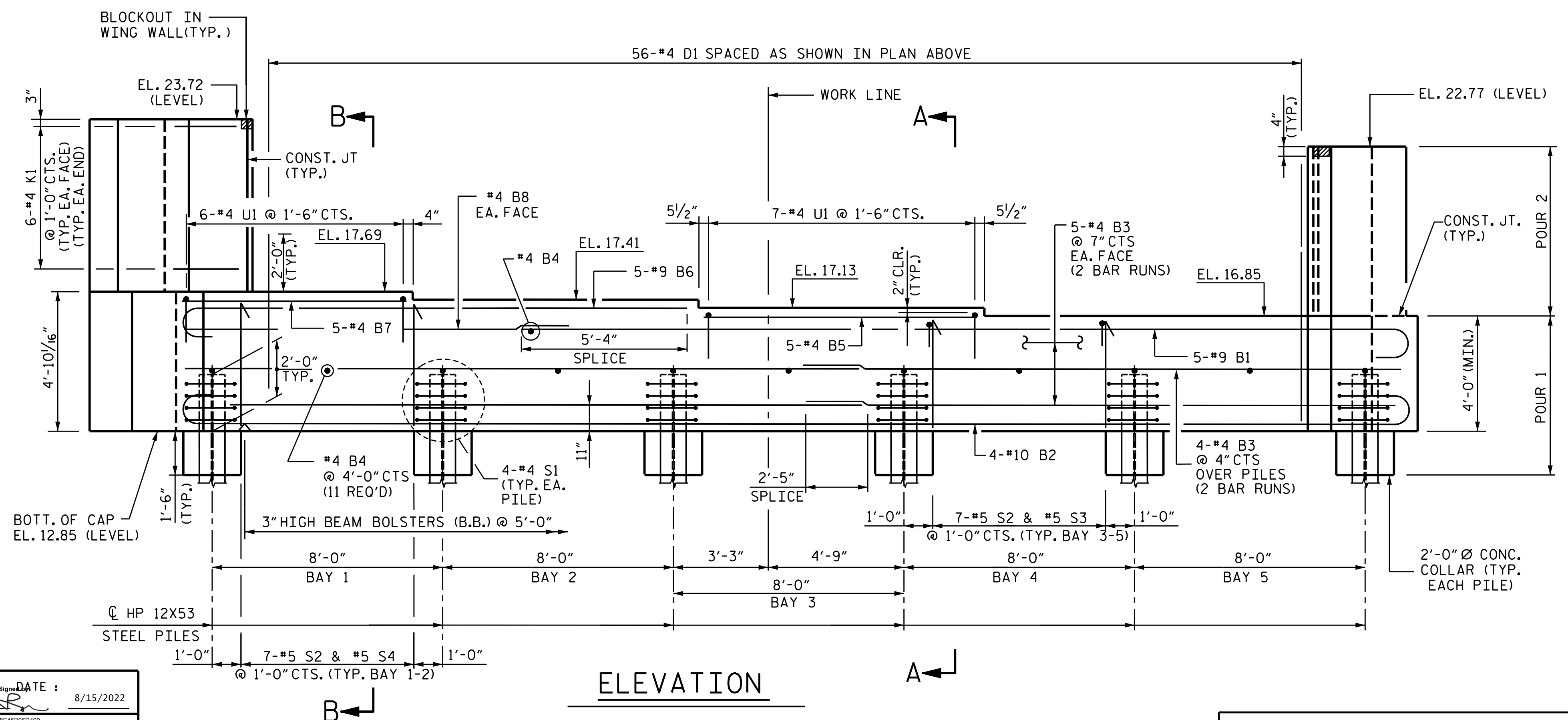
STD. NO. BOM2



PLAN

NOTES

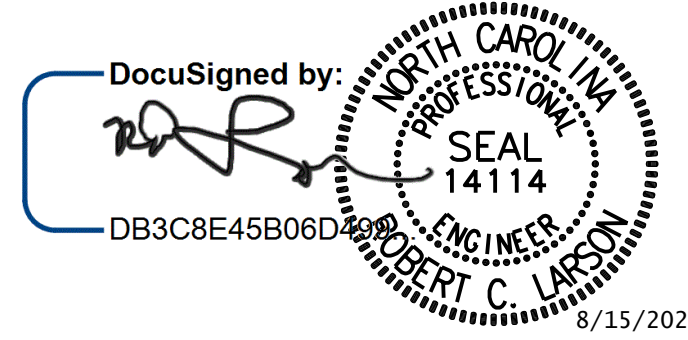
- THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1) EXCEPT THE BEARING AREAS AND THE AREA OUTSIDE OF THE SUPERSTRUCTURE SHALL BE RAKED TO A DEPTH OF 1/4".
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIPFORMING IS USED.
- FOR "TEMPORARY DRAINAGE AT END BENT", SEE END BENT 2.
- FOR SECTIONS THRU CAP SEE SHEET 3 OF 3.



ELEVATION

PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 1 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1



DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
DRAWN BY: A. K. ALLANKI	DATE:	04/06/20
CHECKED BY: R. F. DECOLA	DATE:	05/29/20

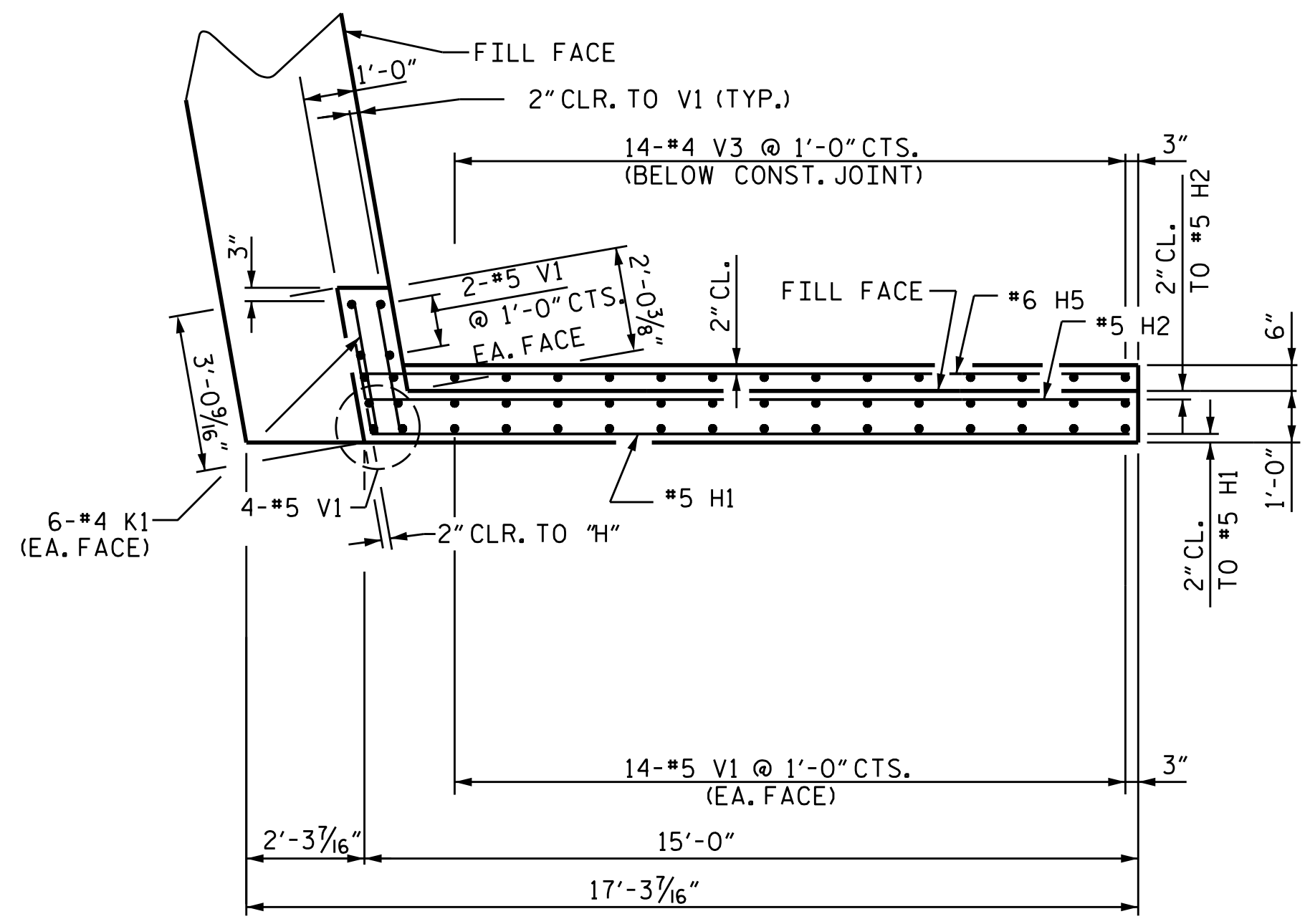
DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED



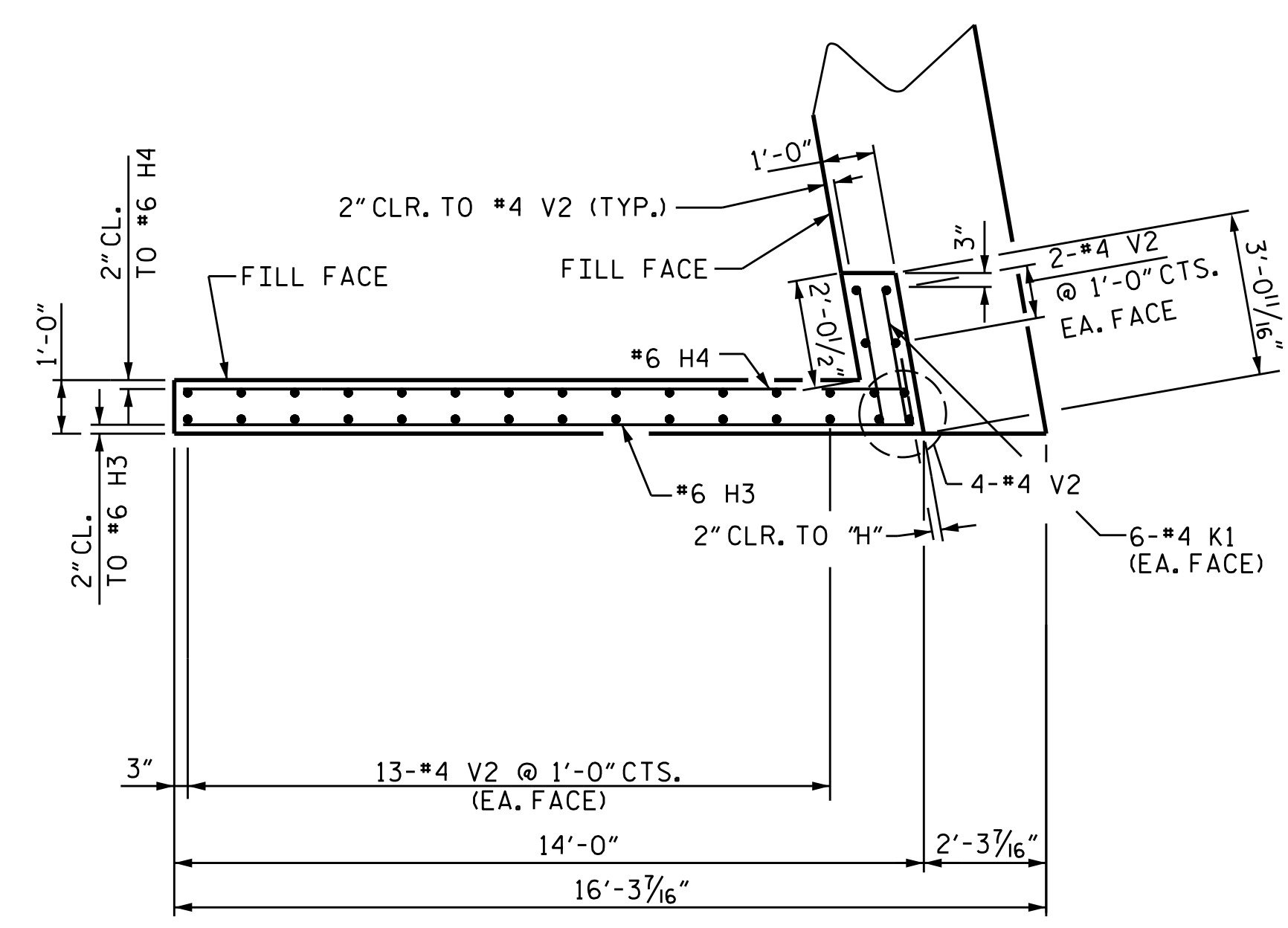
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NO.	DATE	NO.	DATE
1		3	
2		4	

TOTAL SHEETS: 24

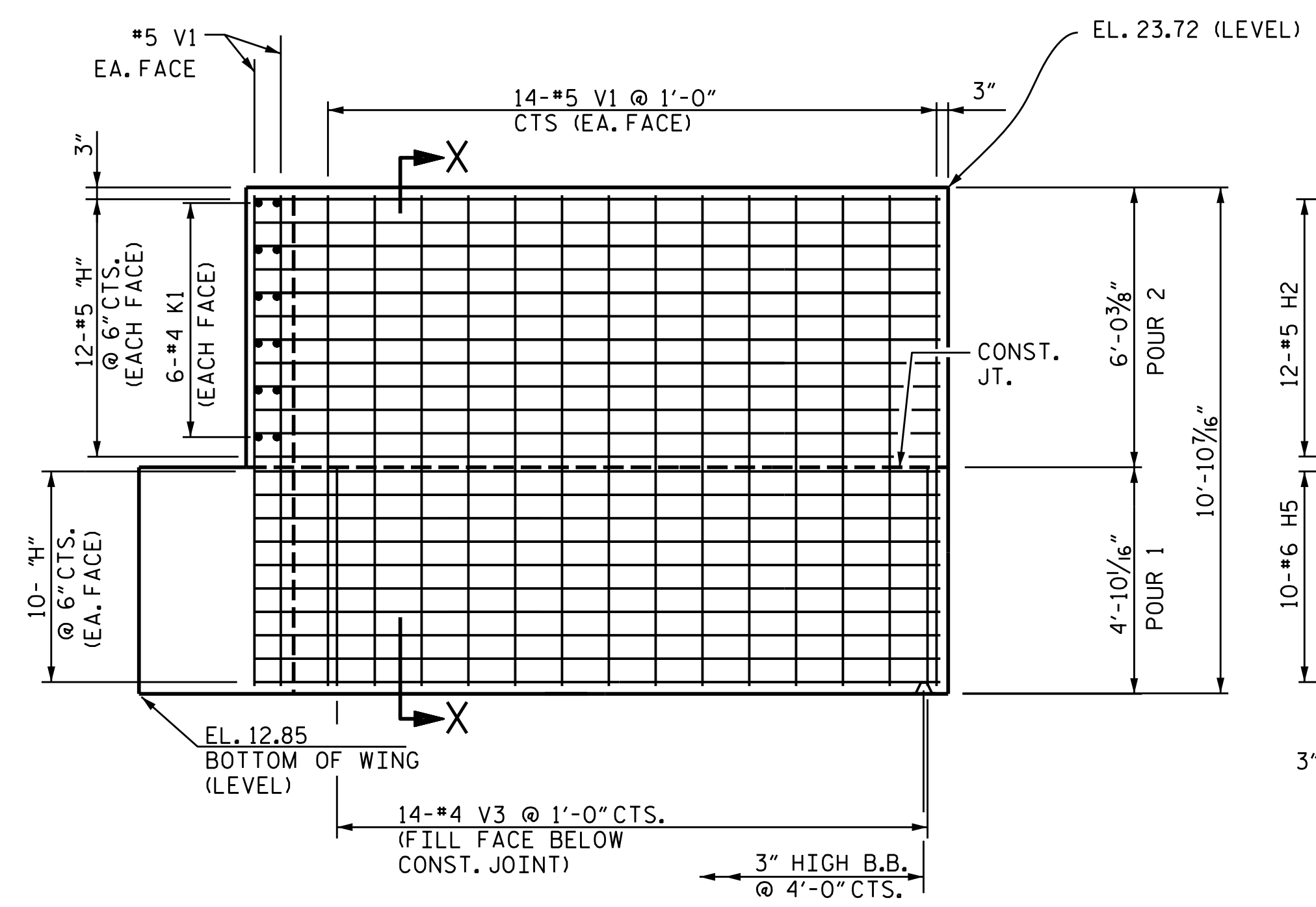
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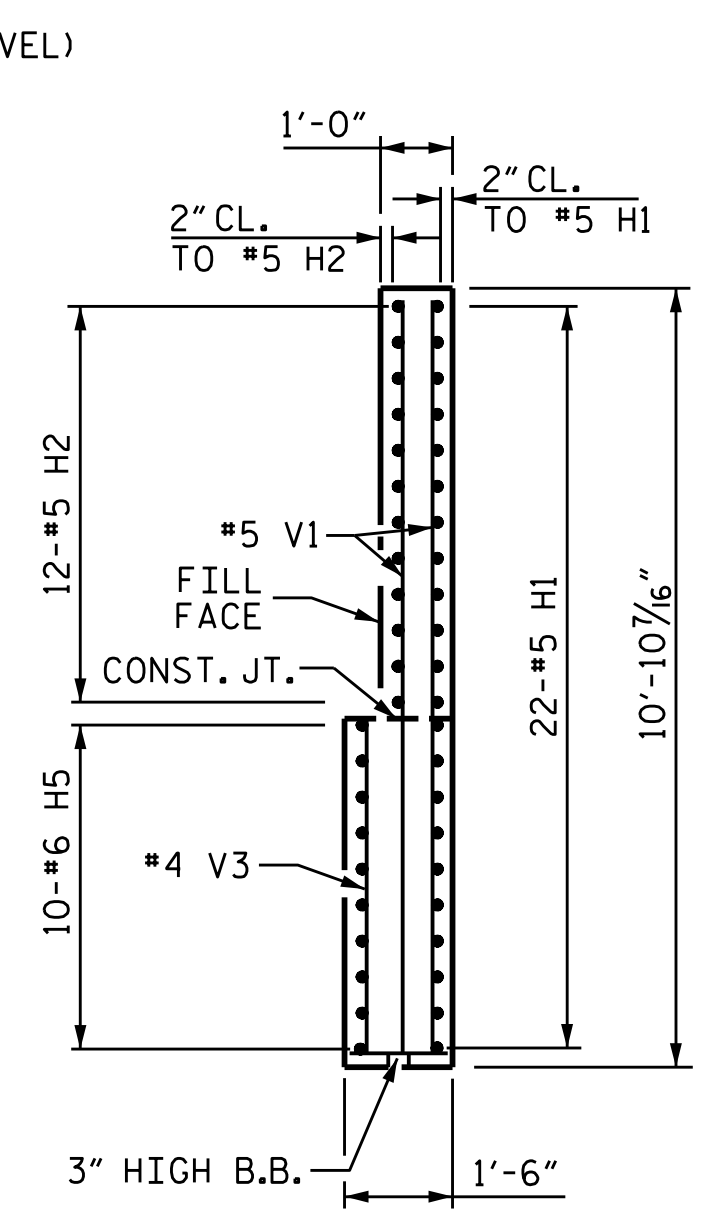
PLAN W1



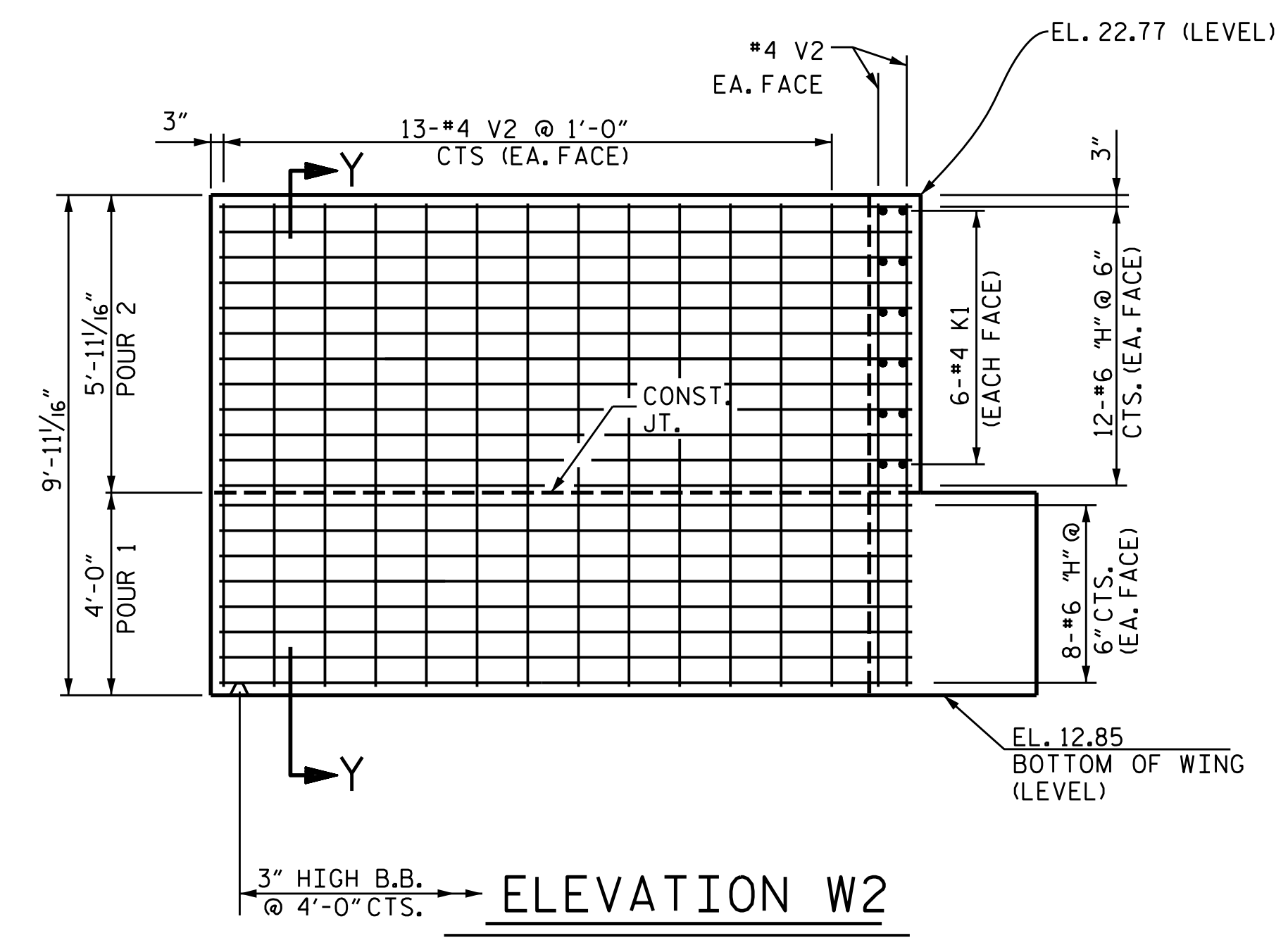
PLAN W2



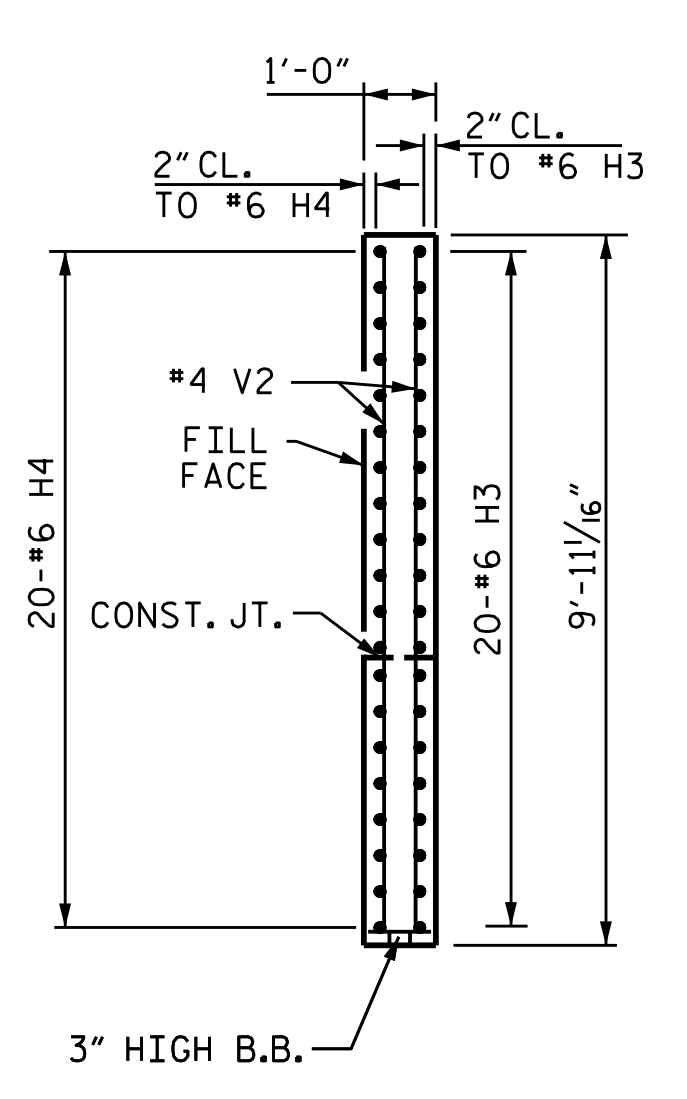
ELEVATION W1



SECTION X-X



ELEVATION W2

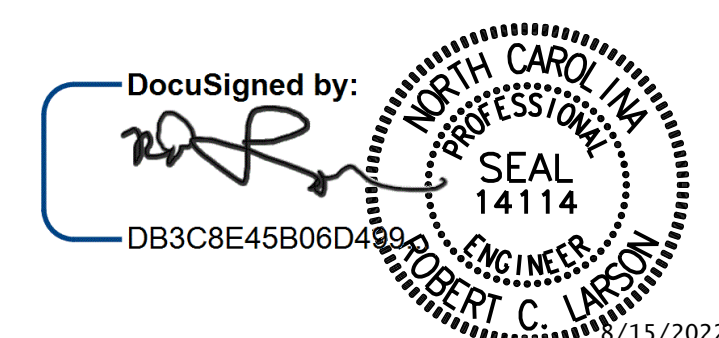


SECTION Y-Y

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 2 OF 3

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



DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 04/07/20
 CHECKED BY: R. F. DECOLA DATE: 05/29/20

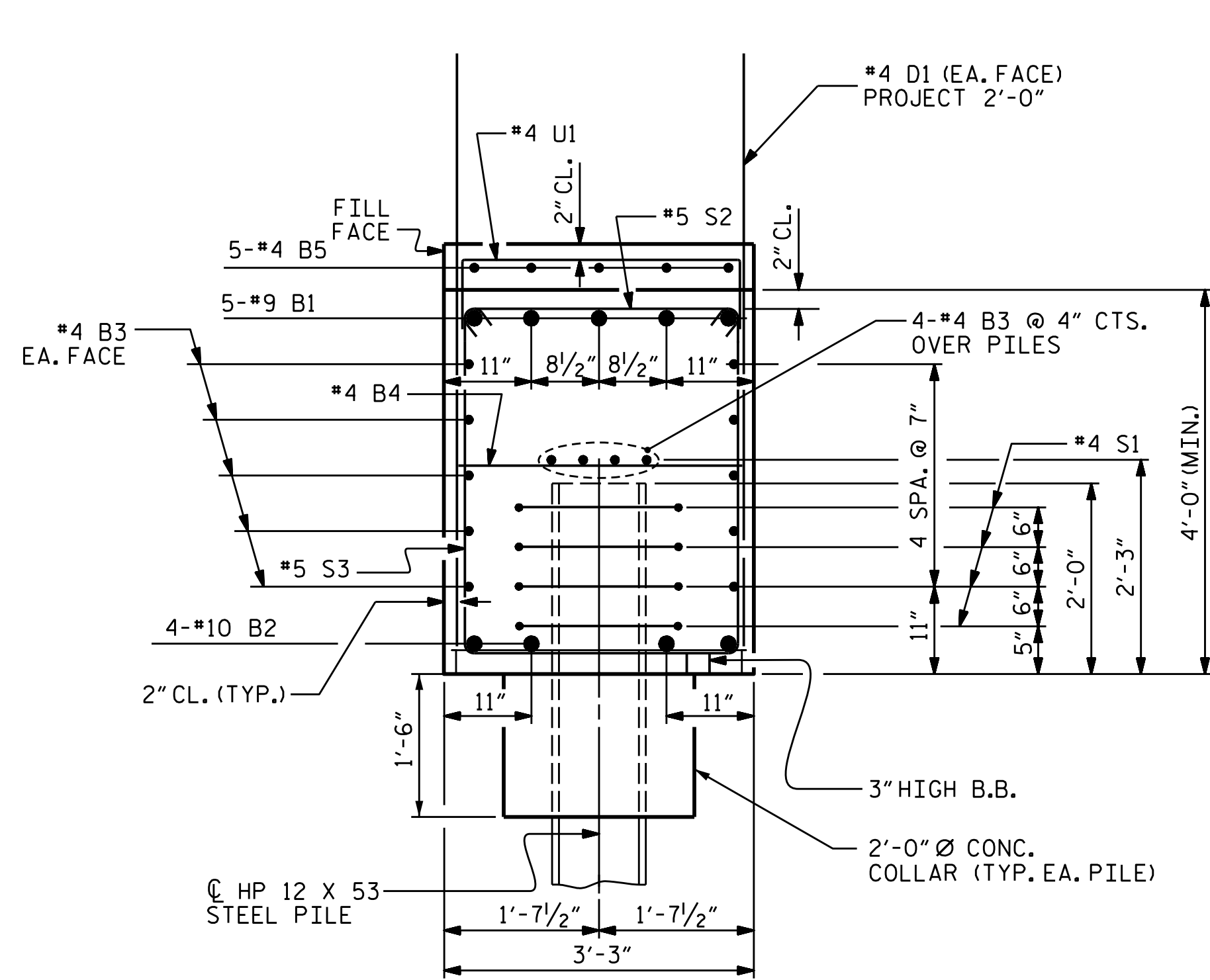
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KCI Associates
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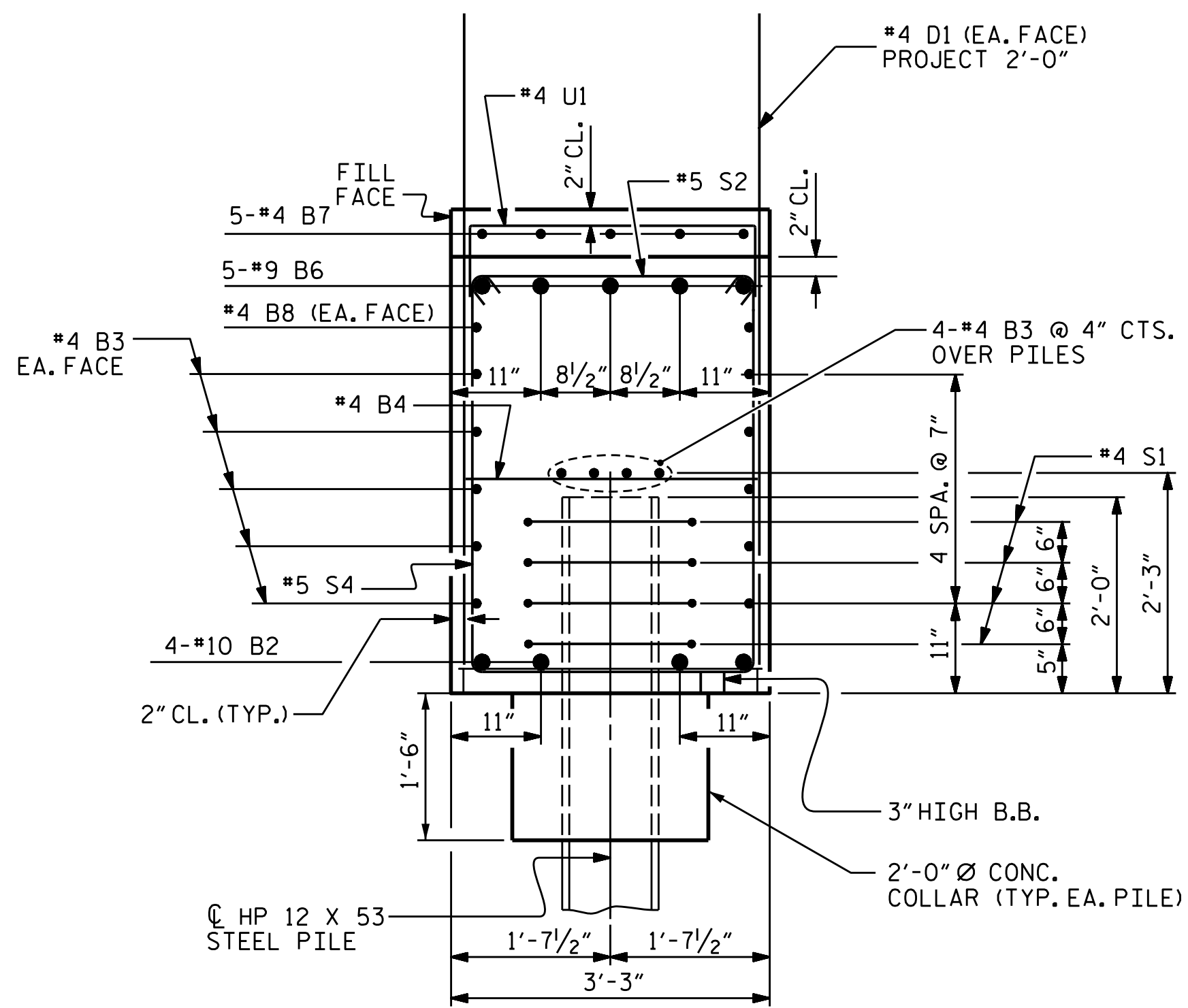
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 24

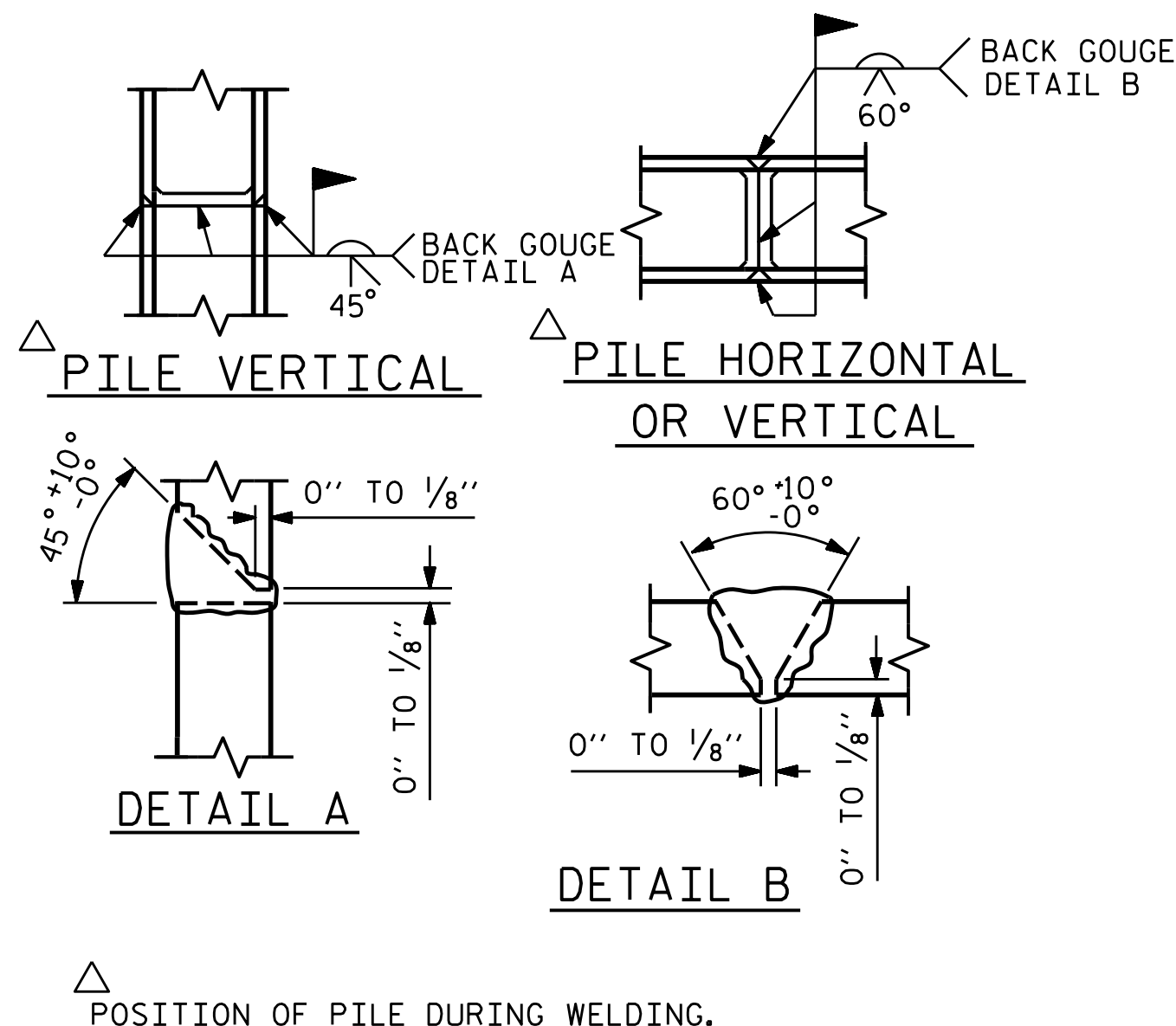
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 KCI PROJECT NO. 241704391.04



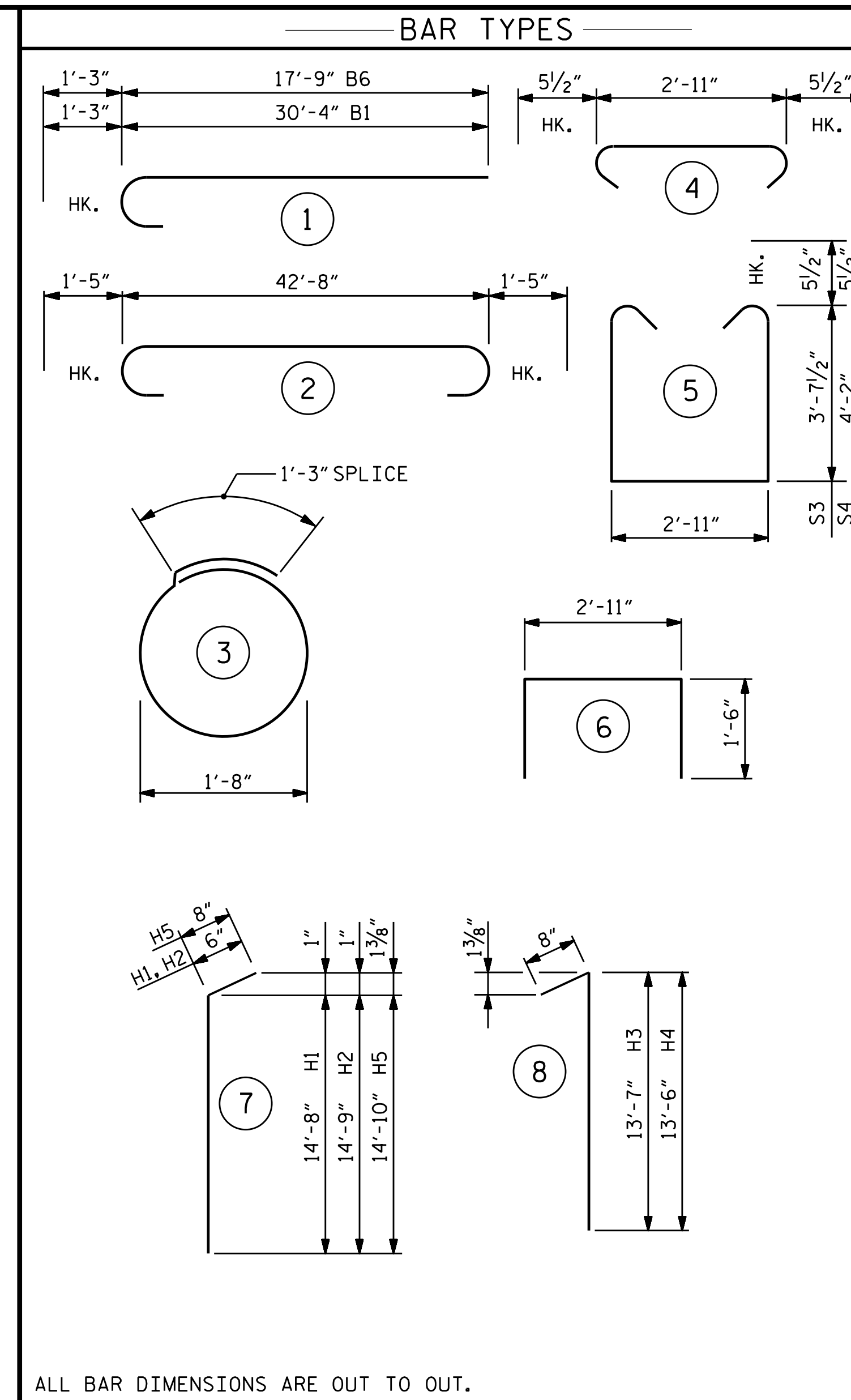
SECTION A-A



SECTION B-B



PILE SPLICE DETAILS



BILL OF MATERIAL					
END BENT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	5	9	1	31'-7"	537
B2	4	10	2	45'-6"	783
B3	28	4	STR.	22'-8"	424
B4	18	4	STR.	2'-11"	23
B5	5	4	STR.	11'-0"	37
B6	5	9	1	19'-0"	323
B7	5	4	STR.	7'-11"	26
B8	2	4	STR.	14'-9"	23
D1	56	4	STR.	5'-10"	218
H1	22	5	7	15'-2"	348
H2	12	5	7	15'-3"	191
H3	20	6	8	14'-3"	428
H4	20	6	8	14'-2"	426
H5	10	6	7	15'-6"	233
K1	24	4	STR.	2'-8"	43
S1	24	4	3	6'-6"	104
S2	35	5	4	3'-10"	140
S3	21	5	5	11'-1"	243
S4	14	5	5	12'-2"	178
U1	13	4	6	5'-11"	51
V1	36	5	STR.	10'-6"	394
V2	34	4	STR.	9'-6"	216
V3	14	4	STR.	4'-6"	42
REINFORCING STEEL, LBS.					5430
CLASS A CONCRETE, CY					
POUR 1 (CAP, LOWER PORTION OF WINGS AND COLLARS)					29.4
POUR 2 (UPPER PORTION OF WINGS)					7.3
TOTAL					36.7
HP 12X53 STEEL PILES					NO. 6
					L.F. 300
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES, EA.					6
PILE REDRIVES, EA.					3

ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 3 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1

DocuSigned by:

 DB3C8E45B06D499

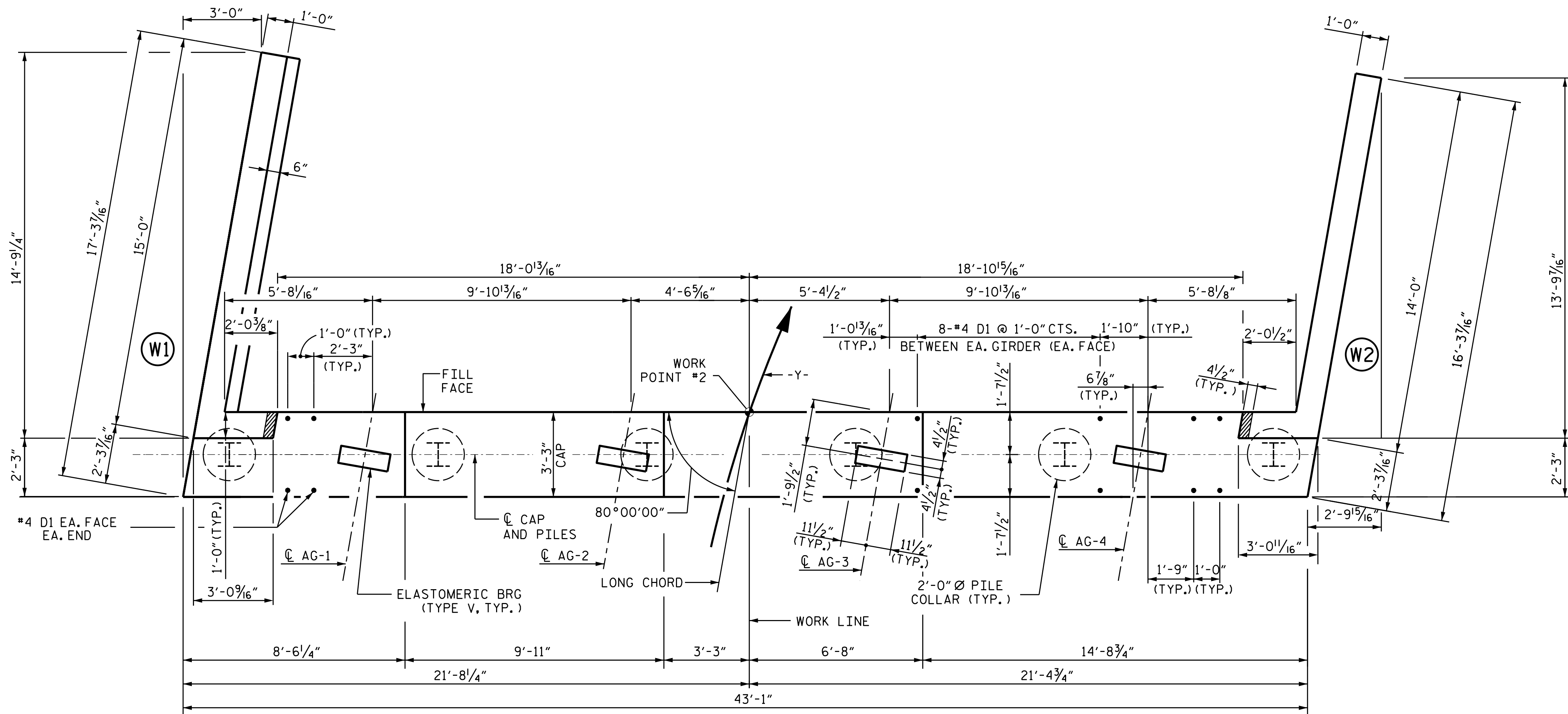
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0164
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6370 Phone: 919-785-9241

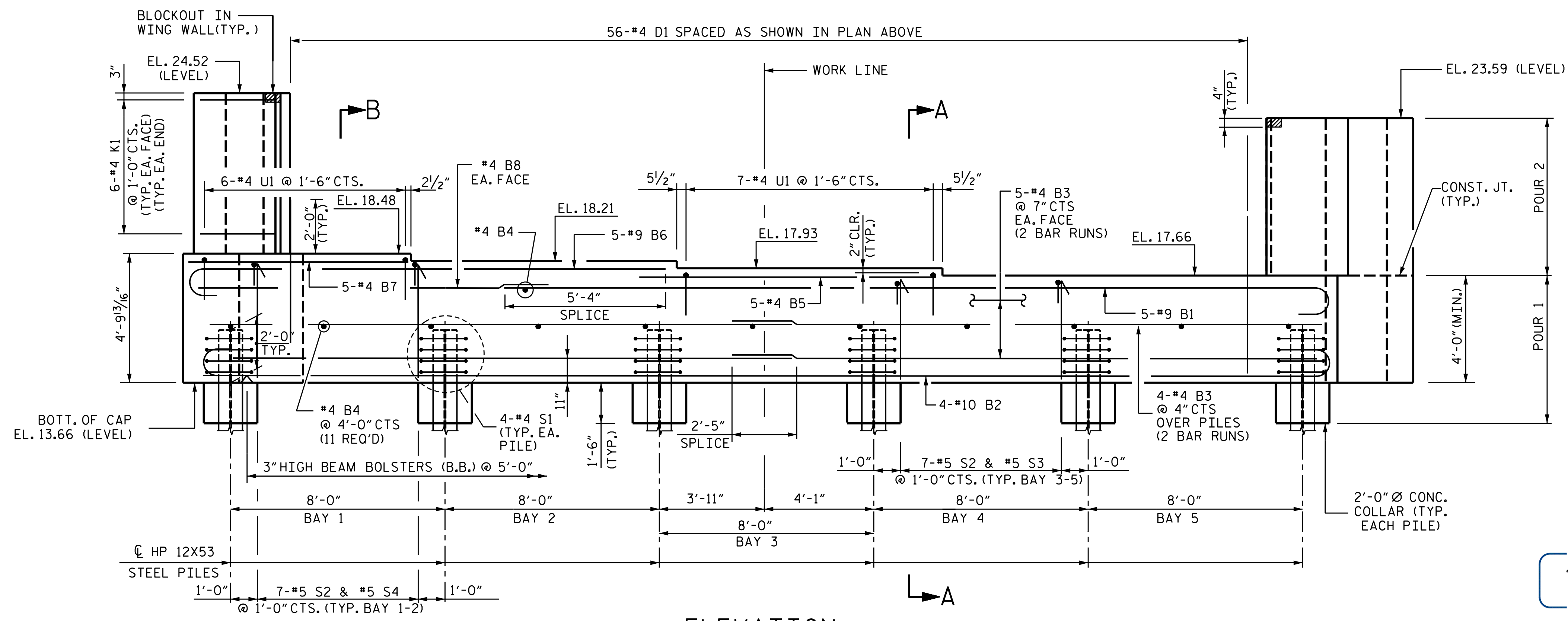
DESIGN ENGINEER OF RECORD: DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 04/14/20
 CHECKED BY: R. F. DECOLA DATE: 05/29/20

\$FILED \$DATES \$TIME \$USER\$ \$PENTBL\$ \$PLTDRV\$
 KCI PROJECT NO. 241704391.04



NOTES

- THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1) EXCEPT THE BEARING AREAS AND THE AREA OUTSIDE OF THE SUPERSTRUCTURE SHALL BE RAKED TO A DEPTH OF 1/4".
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIPFORMING IS USED.
- FOR "PILE SPLICE DETAILS", SEE END BENT 1.
- FOR SECTIONS THRU CAP SEE SHEET 3 OF 3.



PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 2**



DESIGN ENGINEER OF RECORD:	DATE:
<i>[Signature]</i>	8/15/2022
DRAWN BY: A. K. ALLANKI	DATE: 06/30/20
CHECKED BY: R. C. LARSON	DATE: 07/06/20

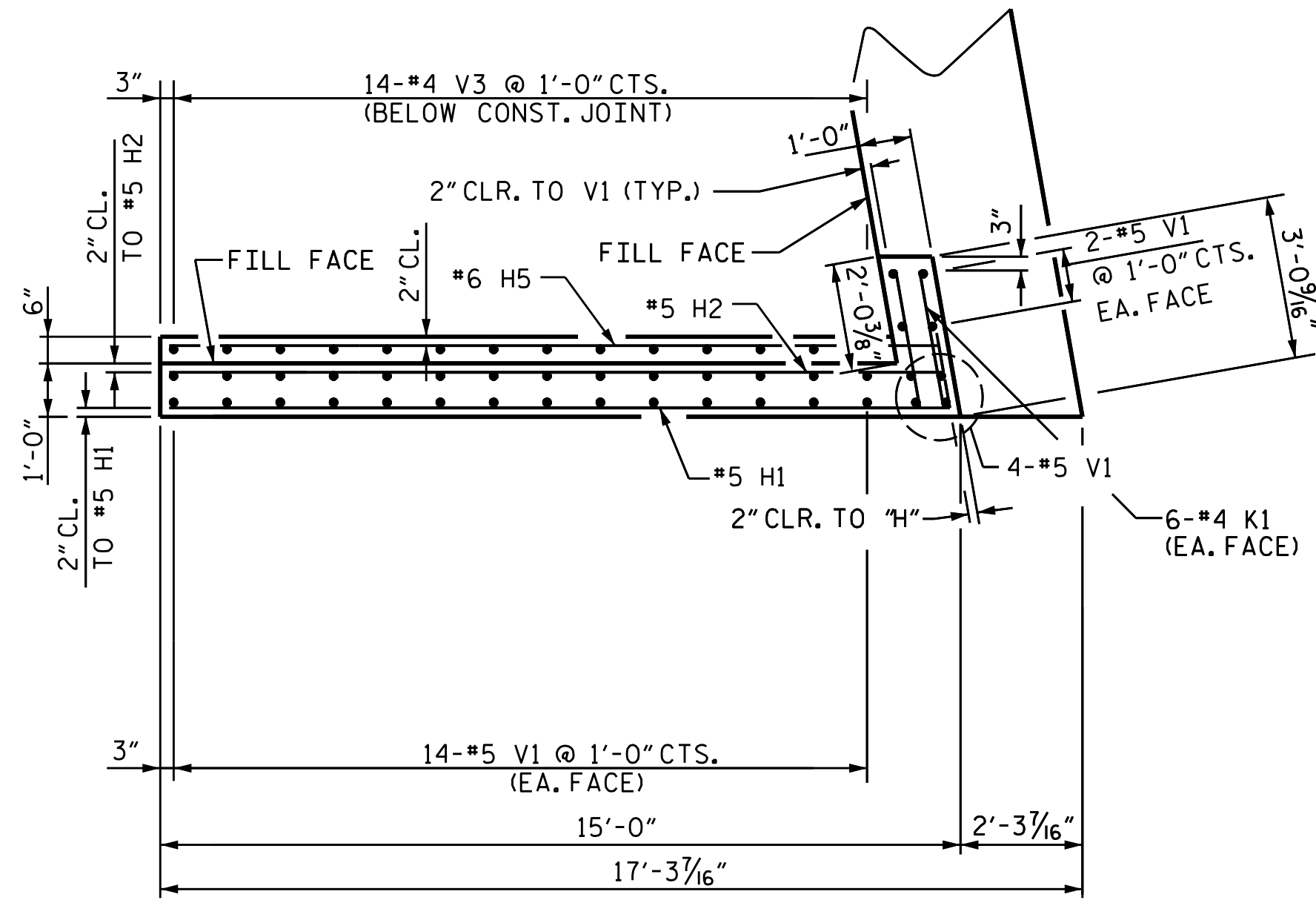
**DOCUMENT NOT CONSIDERED FINAL
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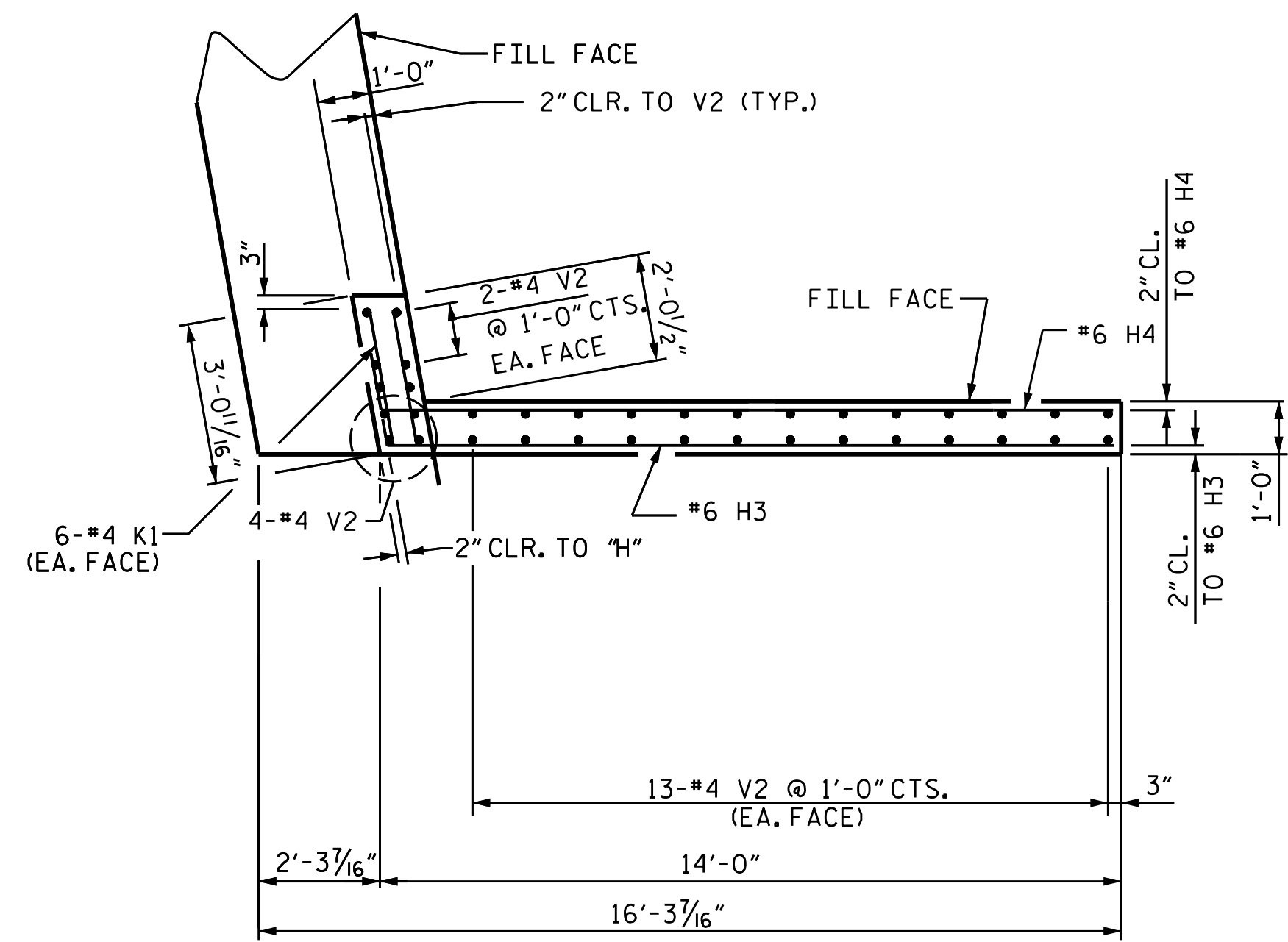
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NO.	DATE	NO.	DATE
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2		4	

TOTAL SHEETS: 24

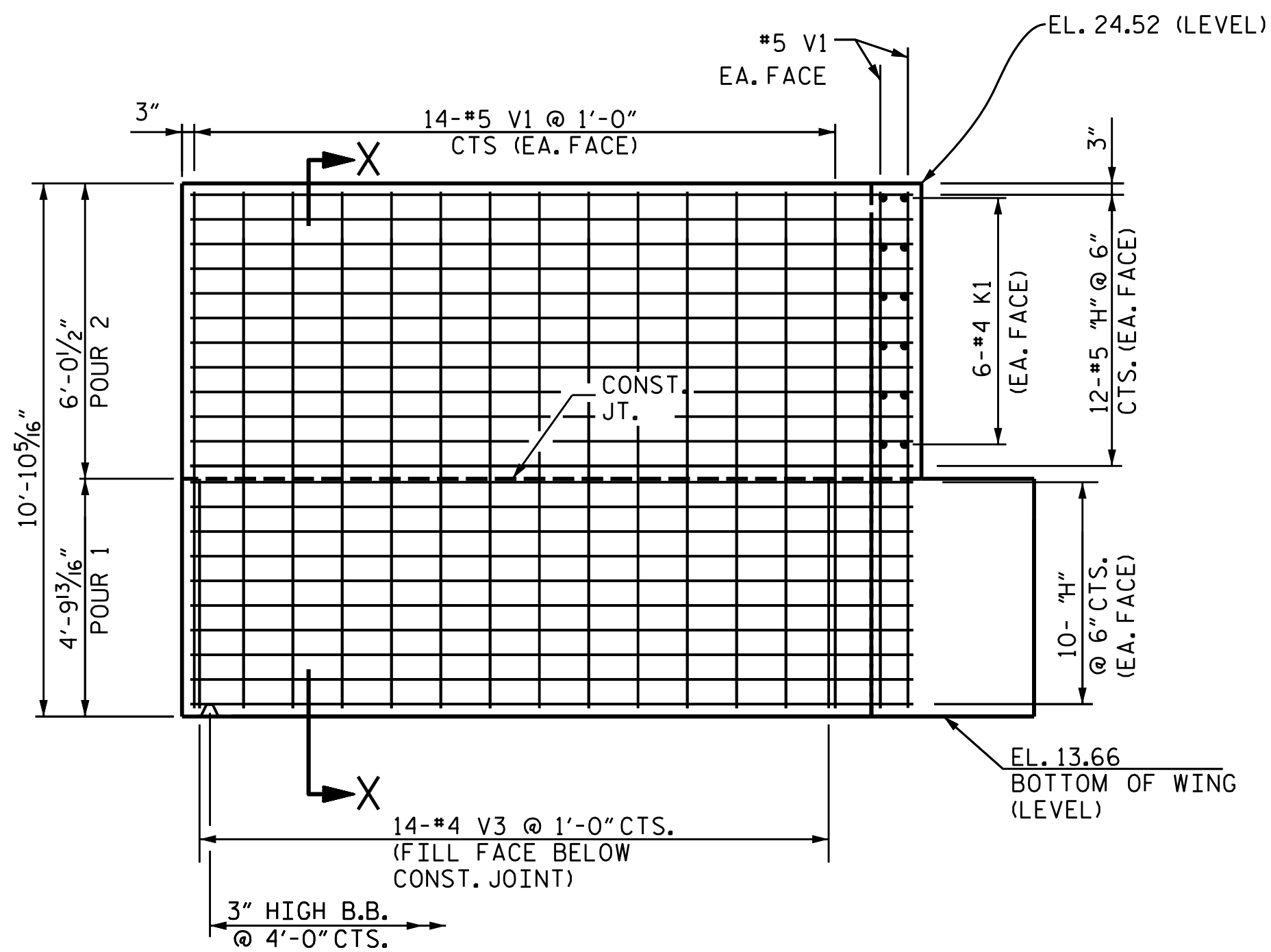
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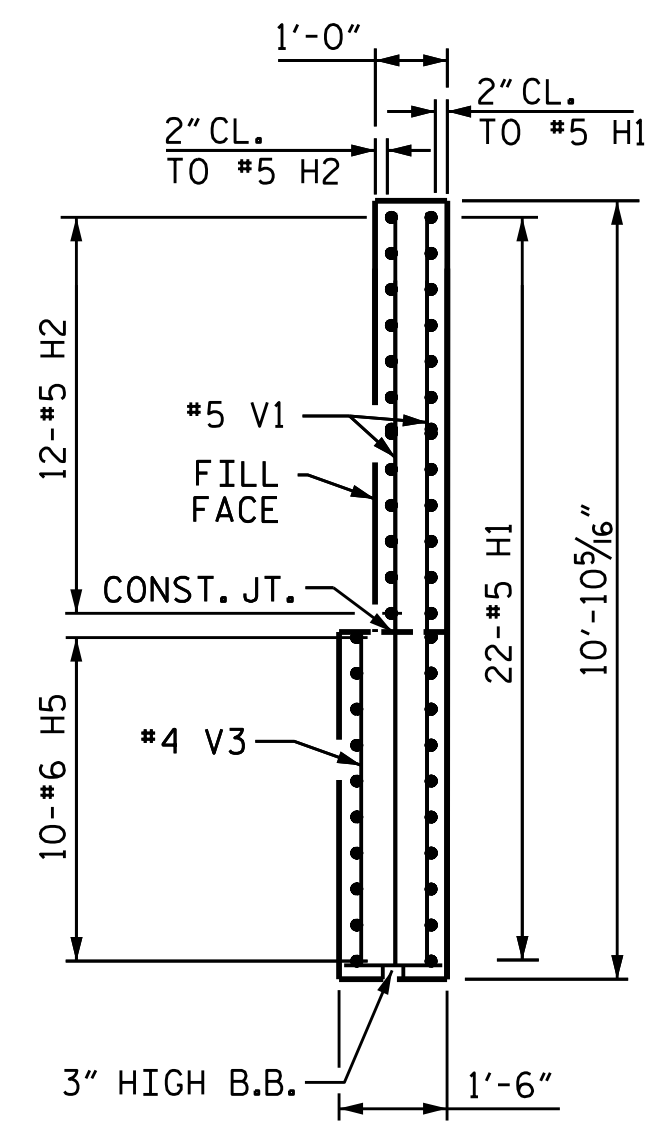
PLAN W1



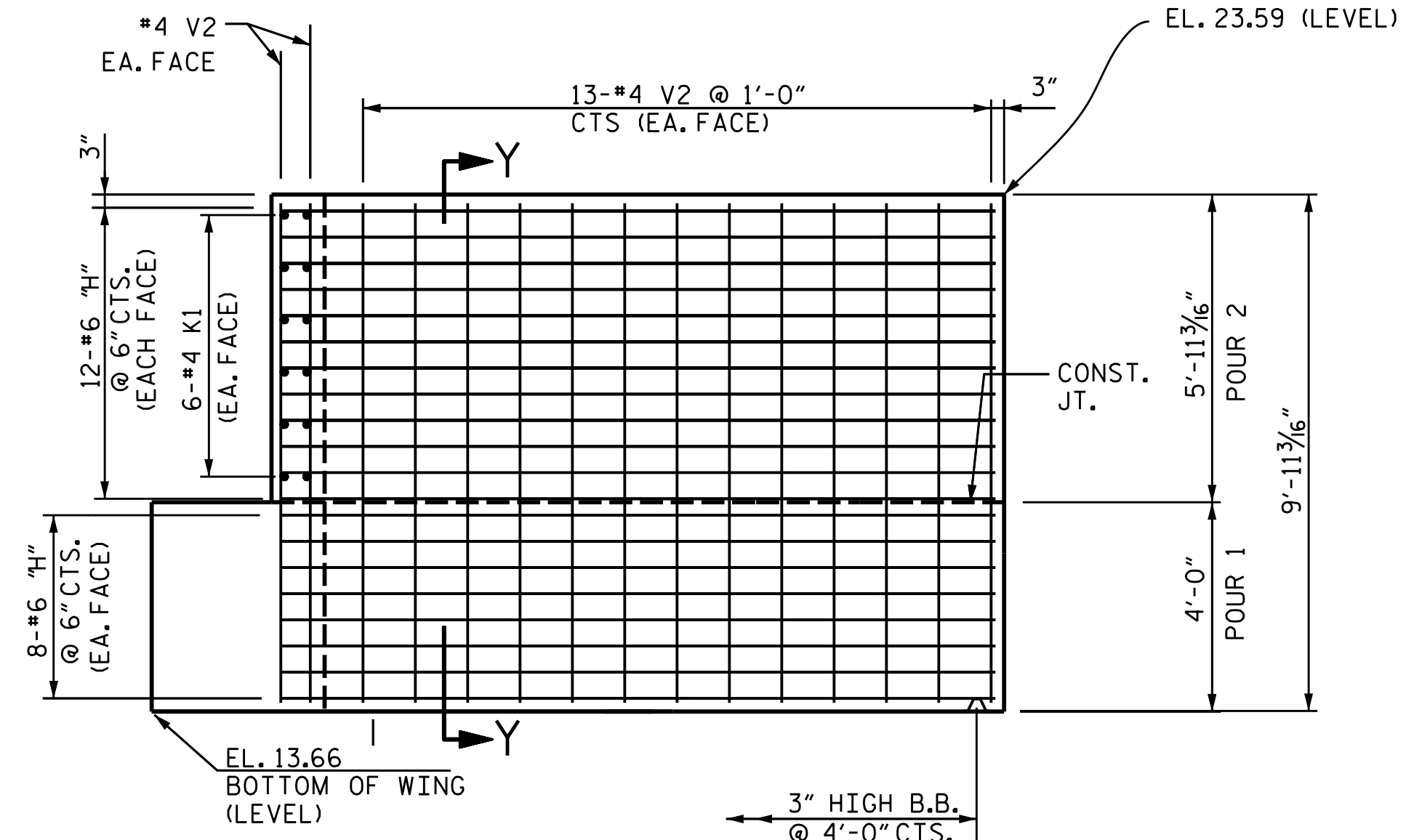
PLAN W2



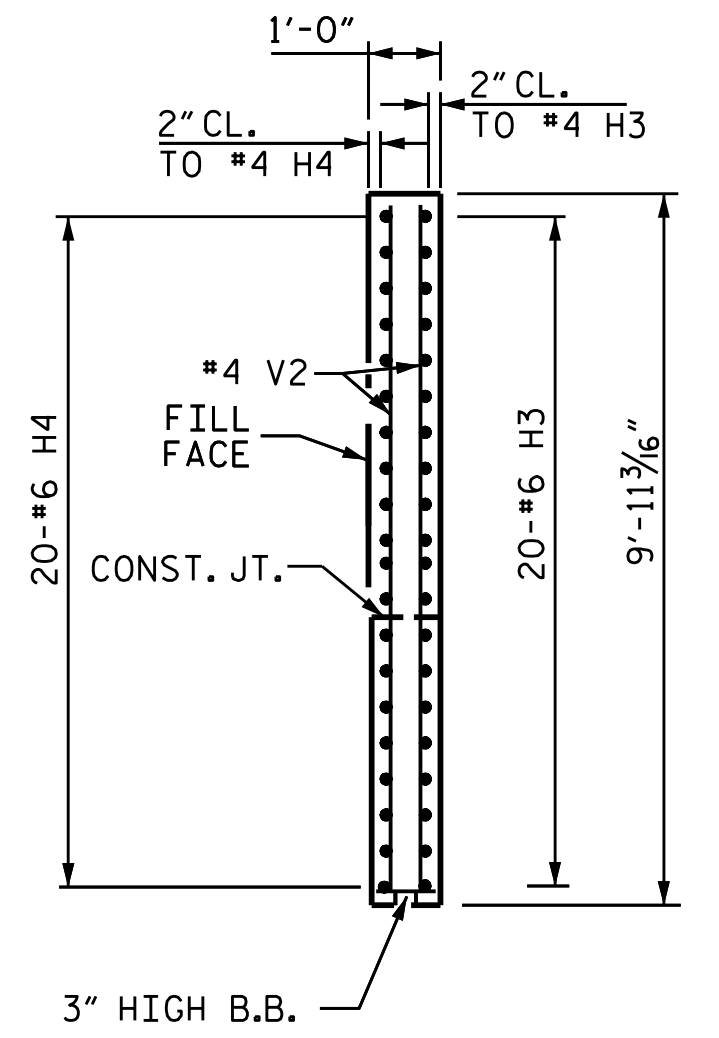
ELEVATION W1



SECTION X-X



ELEVATION W2



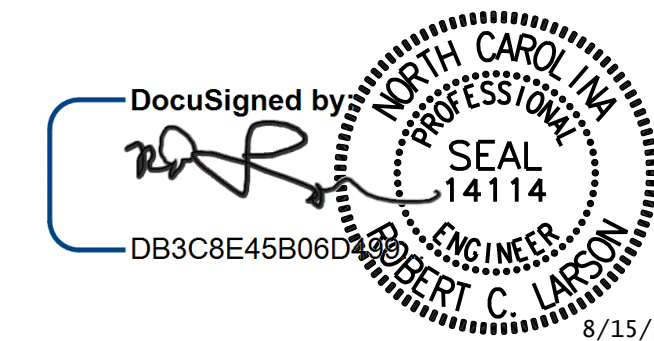
SECTION Y-Y

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 2**



DESIGN ENGINEER OF RECORD:	DATE:
<i>[Signature]</i>	8/15/2022
DRAWN BY:	DATE:
A. K. ALLANKI	06/30/20
CHECKED BY:	DATE:
R. C. LARSON	07/06/20

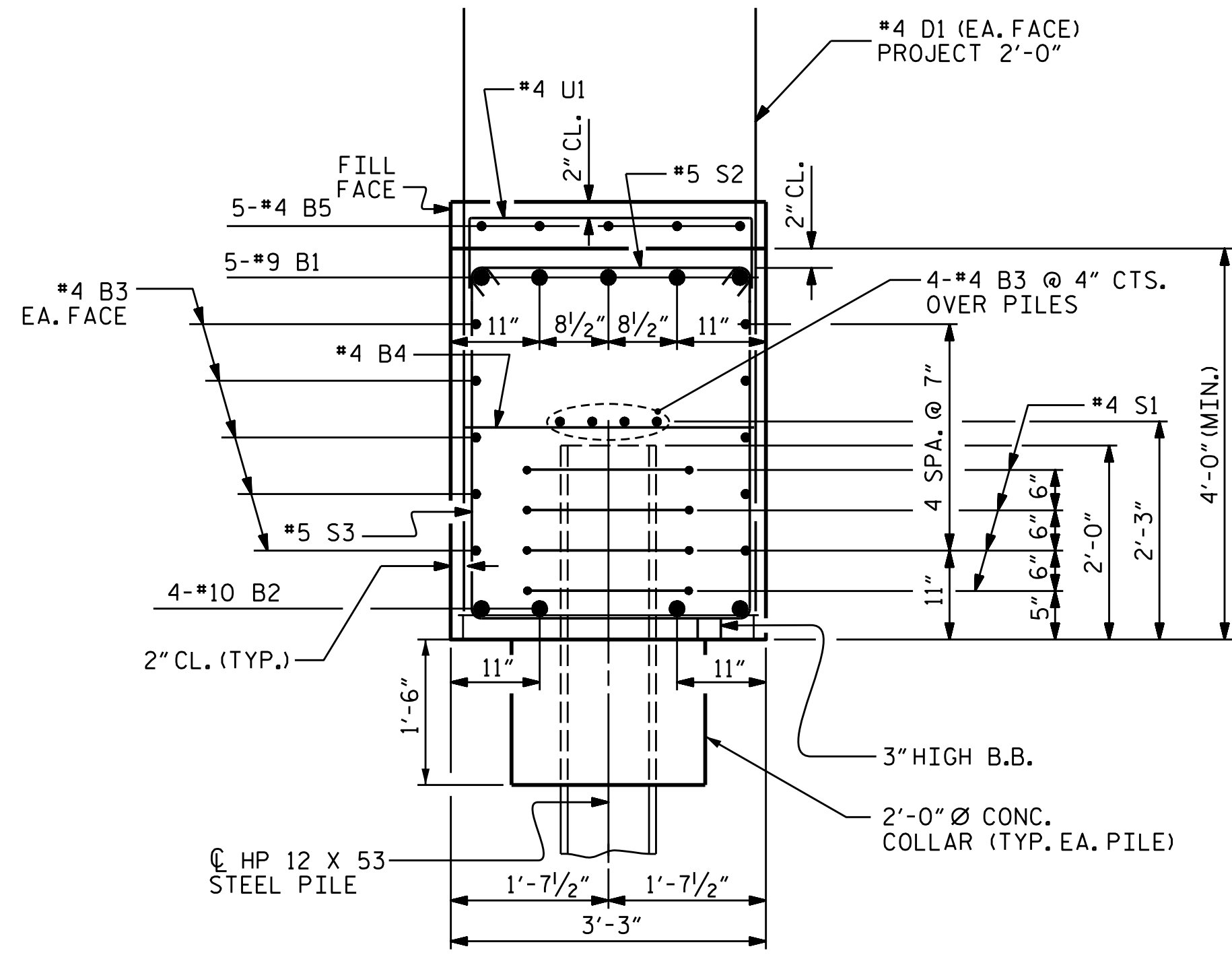
**DOCUMENT NOT CONSIDERED FINAL
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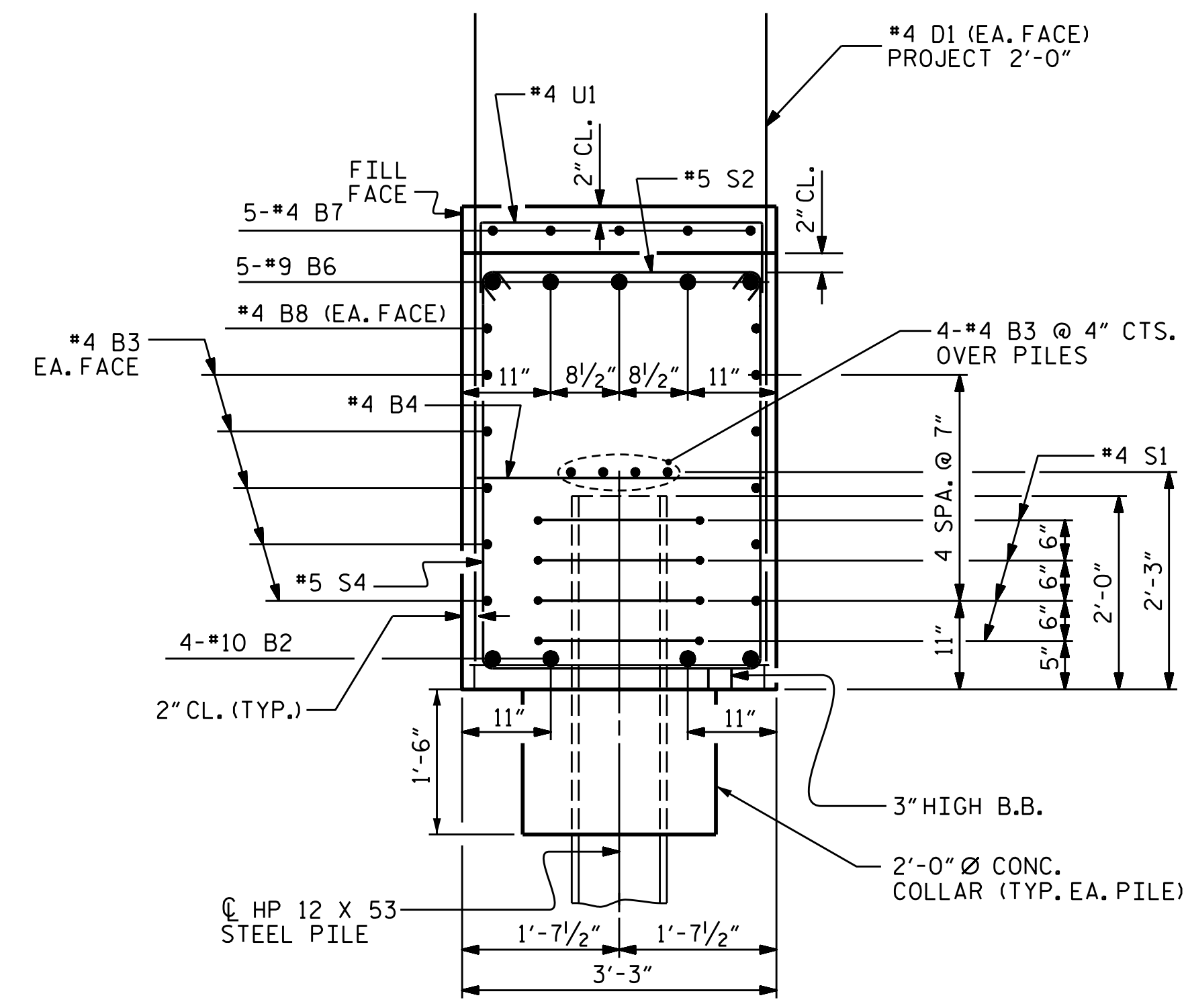
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NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

TOTAL SHEETS: 24

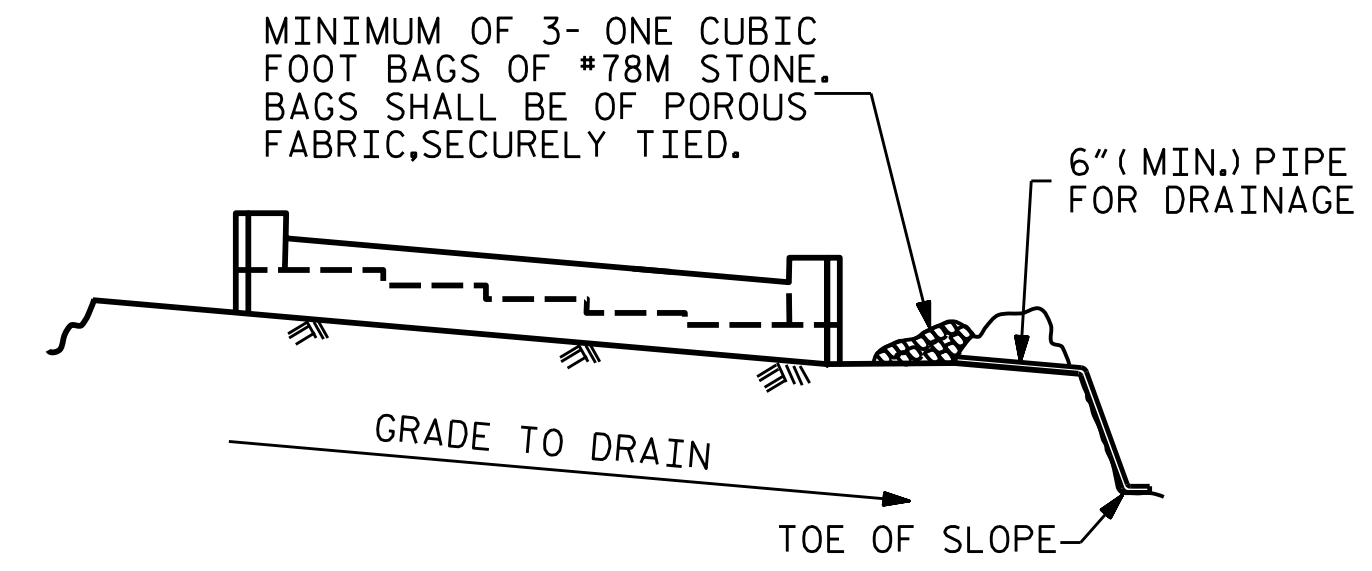
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 KCI PROJECT NO. 241704391.04



SECTION A-A



SECTION B-B



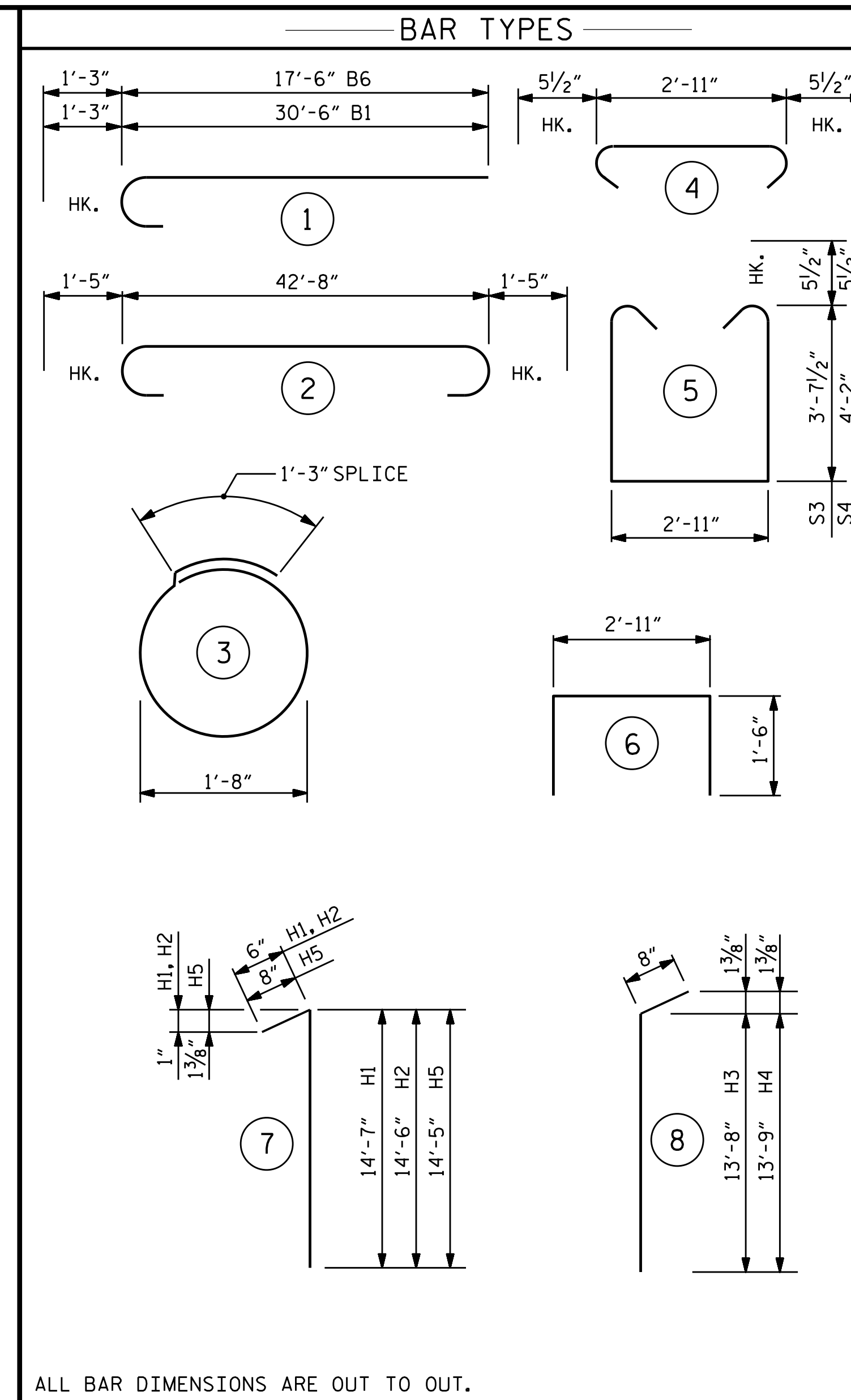
MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

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.

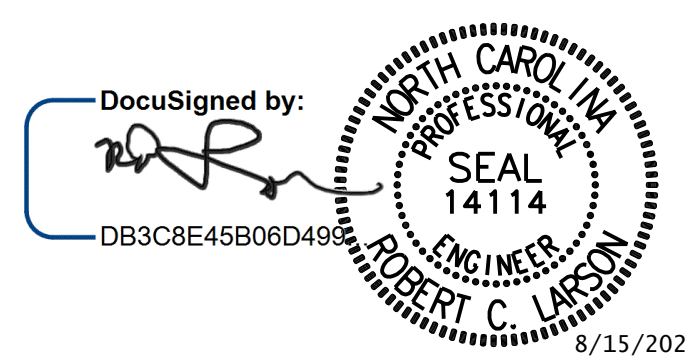
TEMPORARY DRAINAGE AT END BENT



BILL OF MATERIAL					
END BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	5	9	1	31'-9"	540
B2	4	10	2	45'-6"	783
B3	28	4	STR.	22'-8"	424
B4	12	4	STR.	2'-11"	23
B5	5	4	STR.	11'-0"	37
B6	5	9	1	19'-0"	323
B7	5	4	STR.	7'-11"	26
B8	2	4	STR.	14'-8"	20
D1	56	4	STR.	5'-10"	218
H1	22	5	7	15'-1"	346
H2	12	5	7	15'-0"	188
H3	20	6	8	14'-4"	431
H4	20	6	8	14'-5"	433
H5	10	6	7	15'-1"	227
K1	24	4	STR.	2'-8"	43
S1	24	4	3	6'-6"	104
S2	35	5	4	3'-10"	140
S3	21	5	5	11'-1"	243
S4	14	5	5	12'-2"	178
U1	13	4	6	5'-11"	51
V1	36	5	STR.	10'-6"	394
V2	34	4	STR.	9'-7"	218
V3	14	4	STR.	4'-6"	42
REINFORCING STEEL, LBS.				5432	
CLASS A CONCRETE, CY					
POUR 1 (CAP, LOWER PORTION OF WINGS AND COLLARS)				29.3	
POUR 2 (UPPER PORTION OF WINGS)				7.3	
TOTAL				36.6	
HP 12X53 STEEL PILES				NO. 6	
				L.F. 330	
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES, EA.				6	
PILE REDRIVES, EA.				3	

\$FILEL\$ \$DATES\$ \$TIME\$ \$USER\$ \$PENTBL\$ \$PLTDRVS\$
 KCI PROJECT NO. 241704391.04

DESIGN ENGINEER OF RECORD	DATE
<i>[Signature]</i>	8/15/2022
DRAWN BY	DATE
A. K. ALLANKI	07/06/20
CHECKED BY	DATE
R. C. LARSON	07/07/20

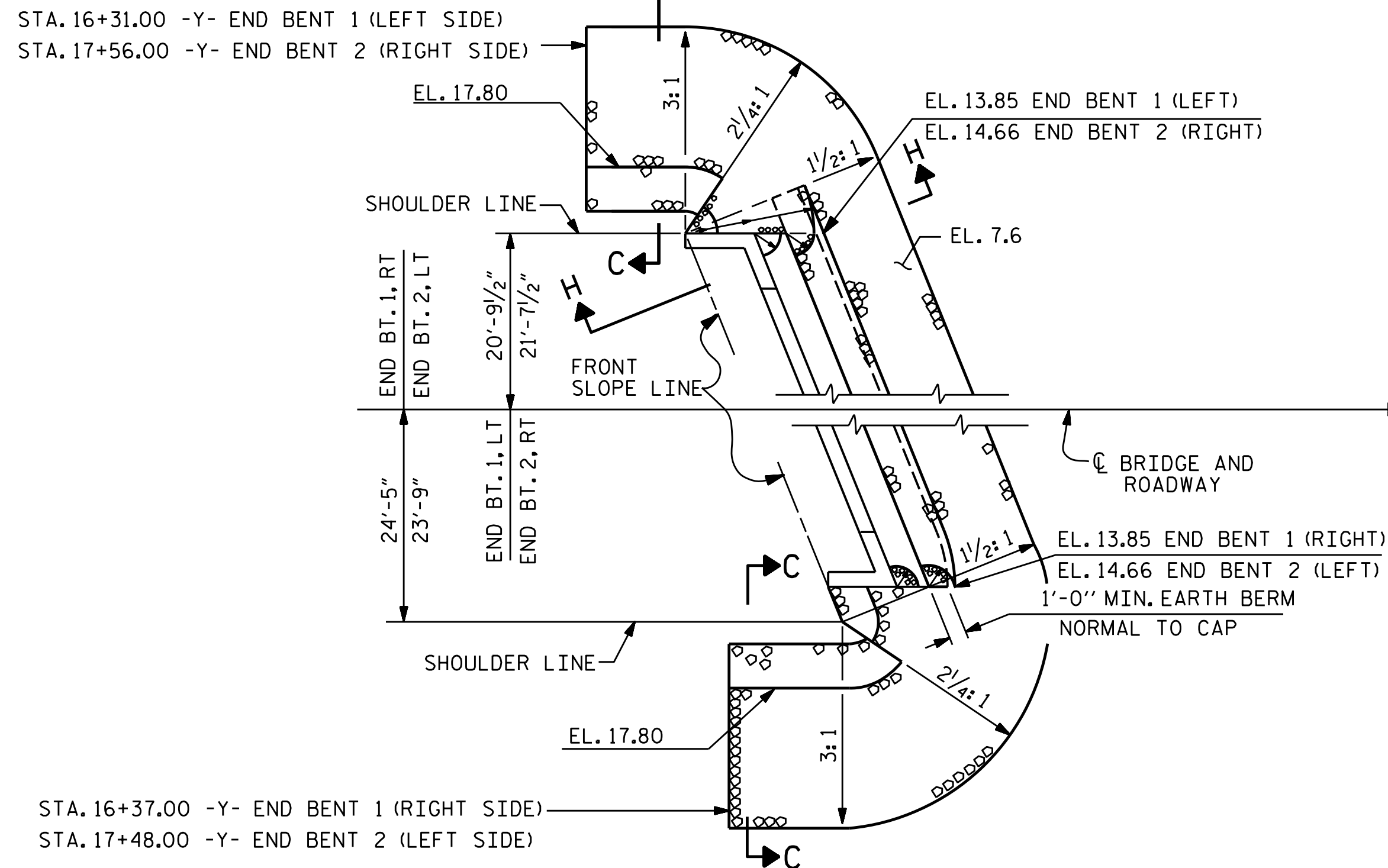


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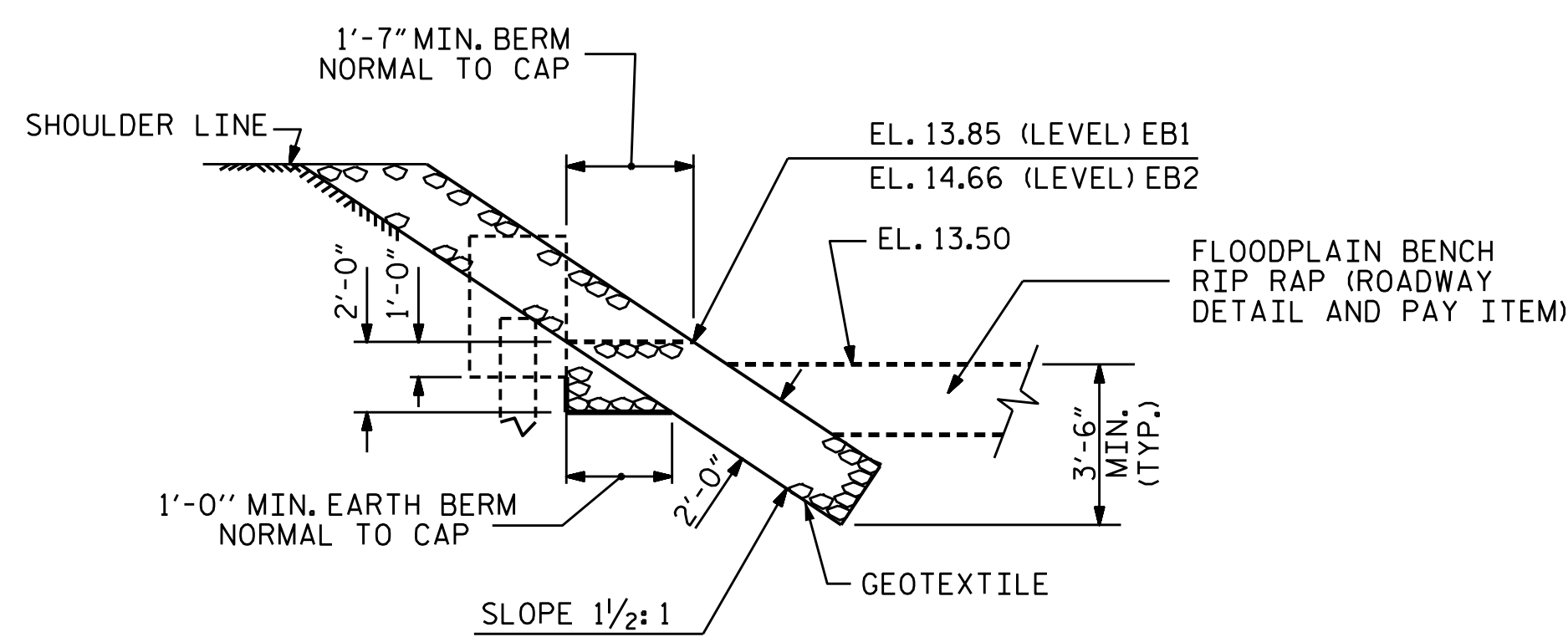
PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 3 OF 3				
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				
SUBSTRUCTURE END BENT 2				
REVISIONS				
NO.	BY:	DATE:	NO.	BY:
1			3	
2			4	
				SHEET NO. S2-21
				TOTAL SHEETS 24

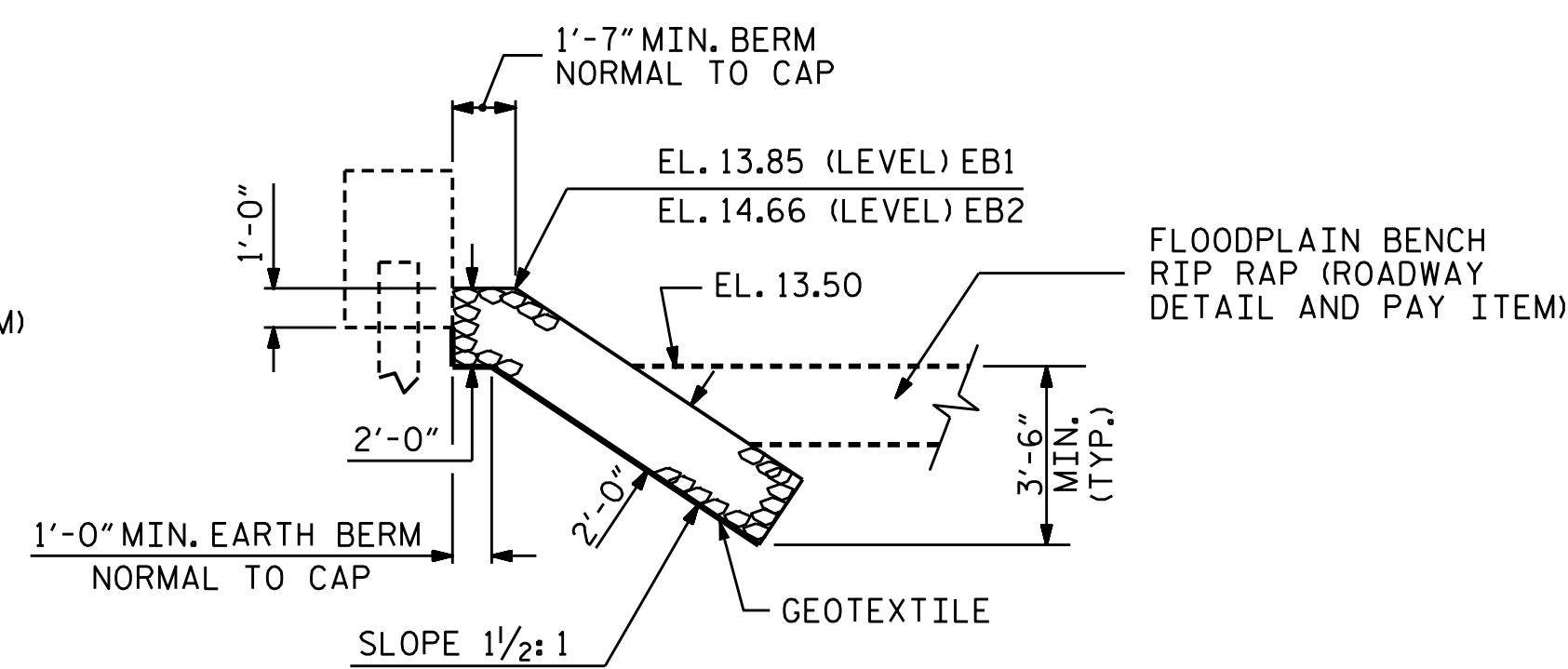


ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+93.00 -Y-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	290	325
END BENT 2	215	240

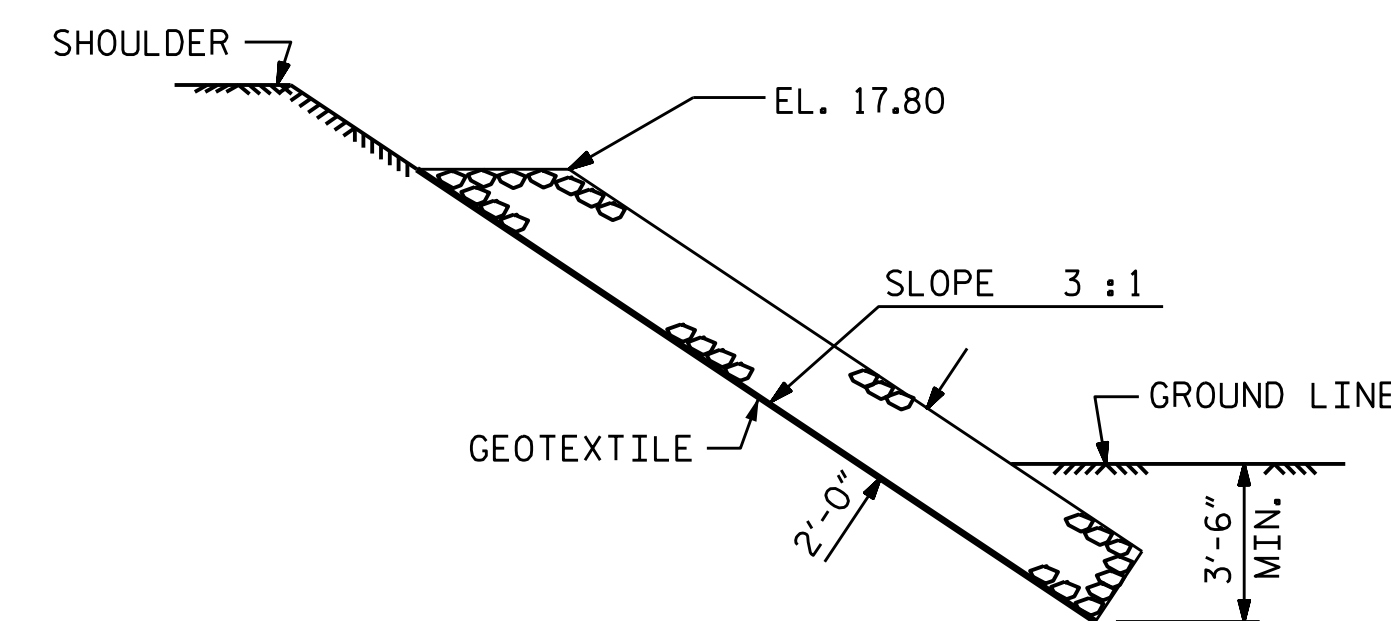
SHOULDER RIP RAP IS HIGHER THAN BERM RIP RAP



SECTION H-H



SECTION C-C
BERM RIP RAPPED



SECTION C-C

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-22
1			3			TOTAL SHEETS 24
2			4			

DocuSigned by:

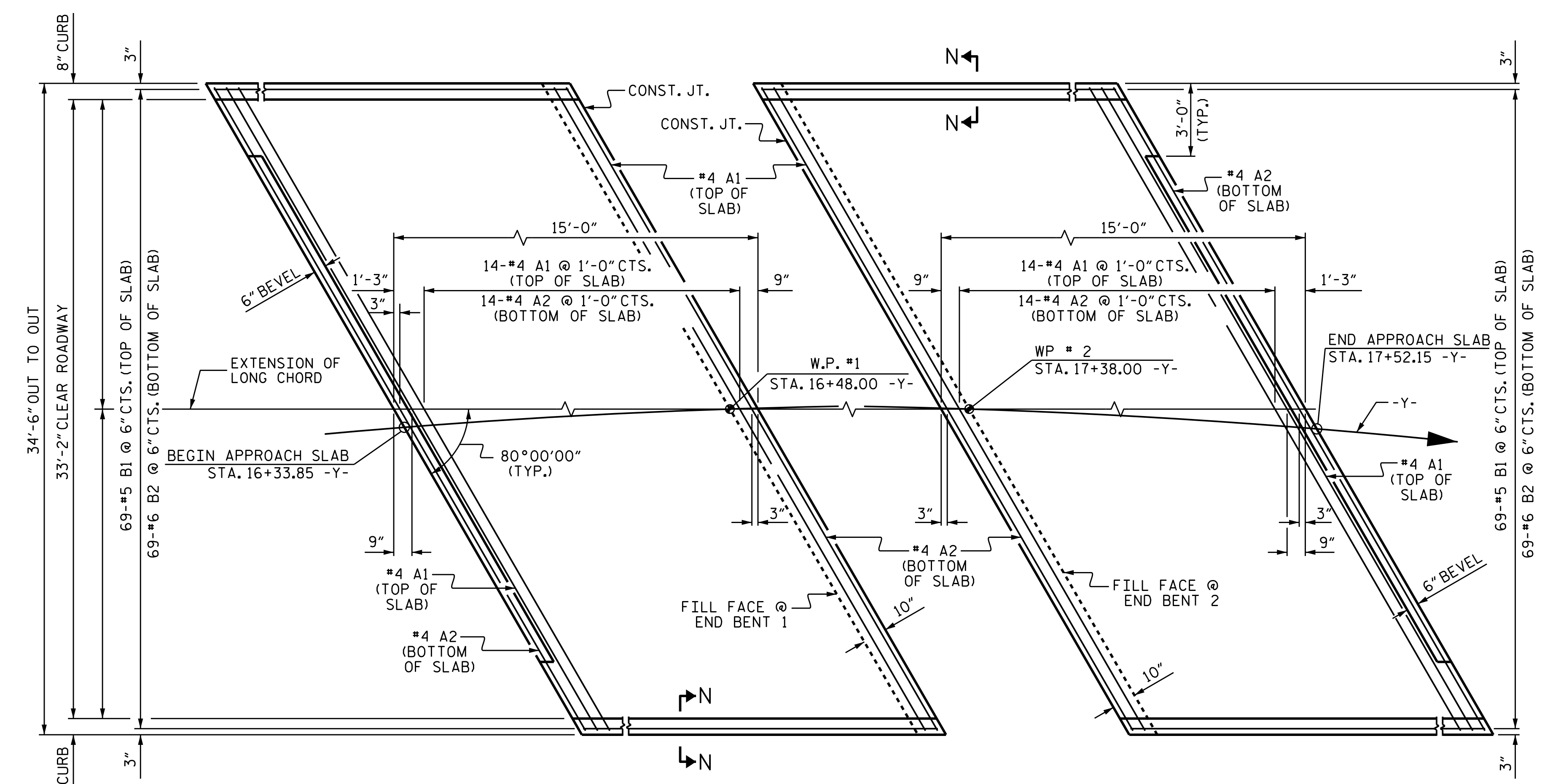
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 8/15/2022

DESIGN ENGINEER OF RECORD: DATE: 8/15/2022
 ASSEMBLED BY: A. SAMBOY DATE: 06/25/19
 CHECKED BY: R. C. LARSON DATE: 07/08/20
 DRAWN BY: REK 1/84 REV. 10/1/11 MAA/GM
 CHECKED BY: RDU 1/84 REV. 12/21/11 MAA/GM
 REV. 12/17 MAA/THC

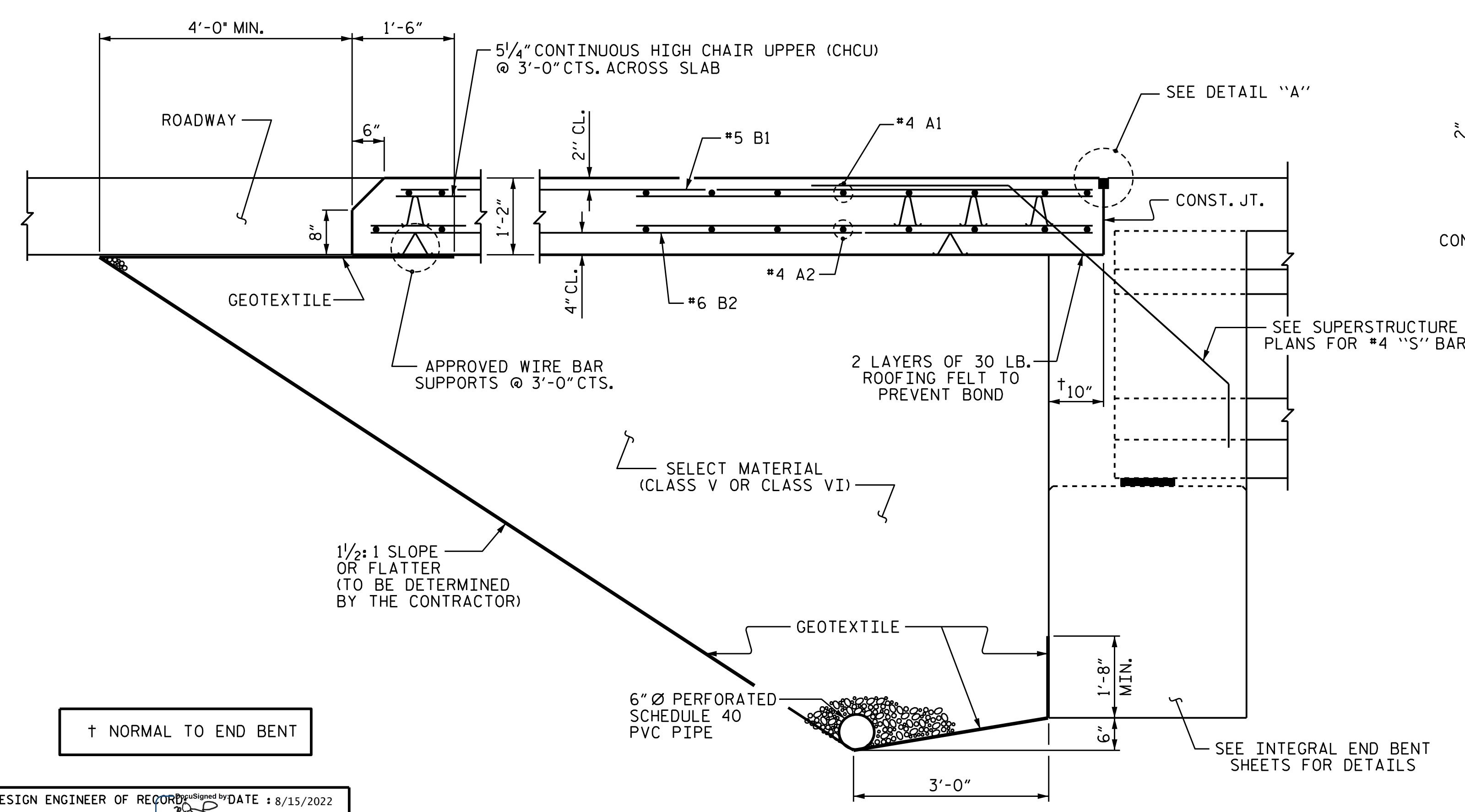
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ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764

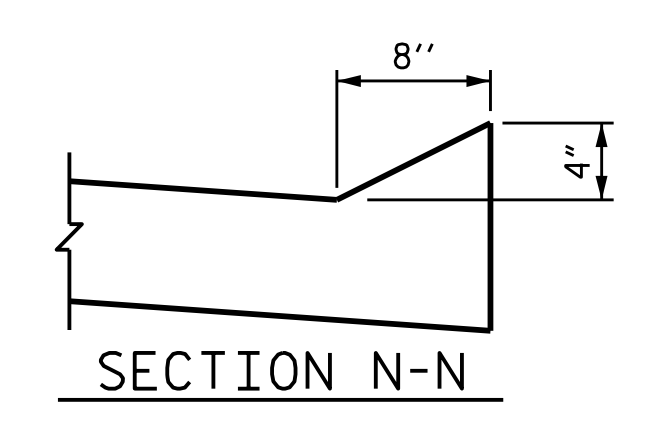
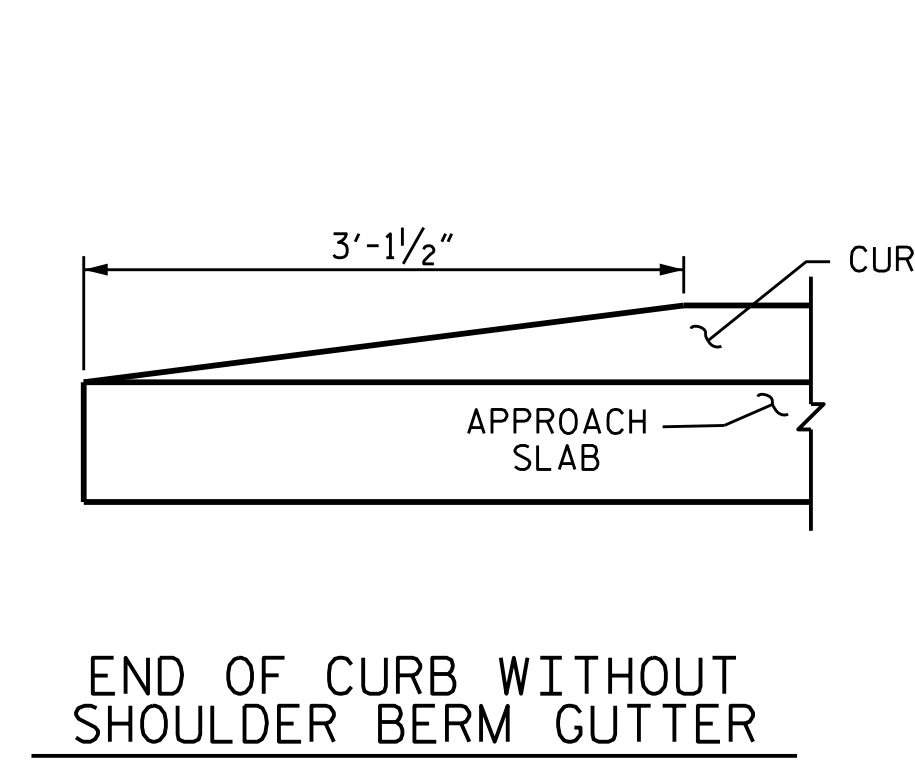
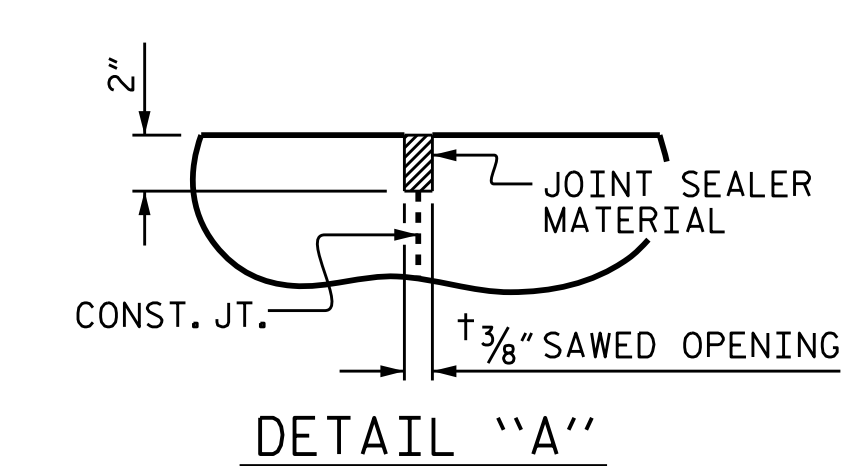
 2505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-9241



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



SECTION THRU SLAB
 (TYPE I - STANDARD APPROACH FILL)



NOTES

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

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

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

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

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

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

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

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

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

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

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	16	#4	STR	34'-8"	371
A2	16	#4	STR	34'-8"	371
* B1	69	#5	STR	14'-0"	1008
B2	69	#6	STR	14'-6"	1503
REINFORCING STEEL				LBS.	1874
* EPOXY COATED REINFORCING STEEL				LBS.	1379
CLASS AA CONCRETE				C. Y.	22.3

SPLICE LENGTHS

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

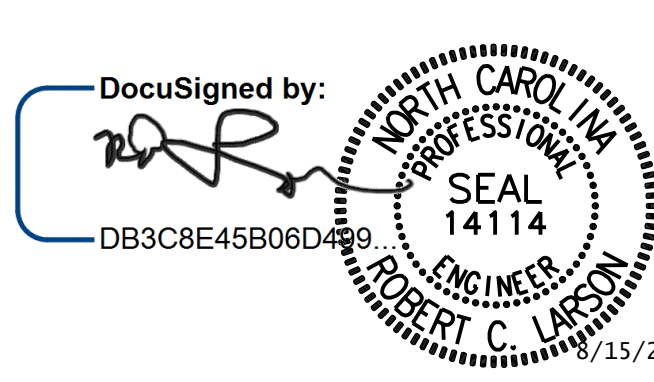
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DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022

ASSEMBLED BY: Z. KADI DATE: 07/01/19
 CHECKED BY: R. F. DECOLA DATE: 06/16/20

DRAWN BY: TLA 10/05 REV. 6/13 MAA/GM
 CHECKED BY: GM 5/06 REV. 12/17 MAA/THC
 REV. 06/19 BNB/THC

DOCUMENT NOT CONSIDERED FINAL
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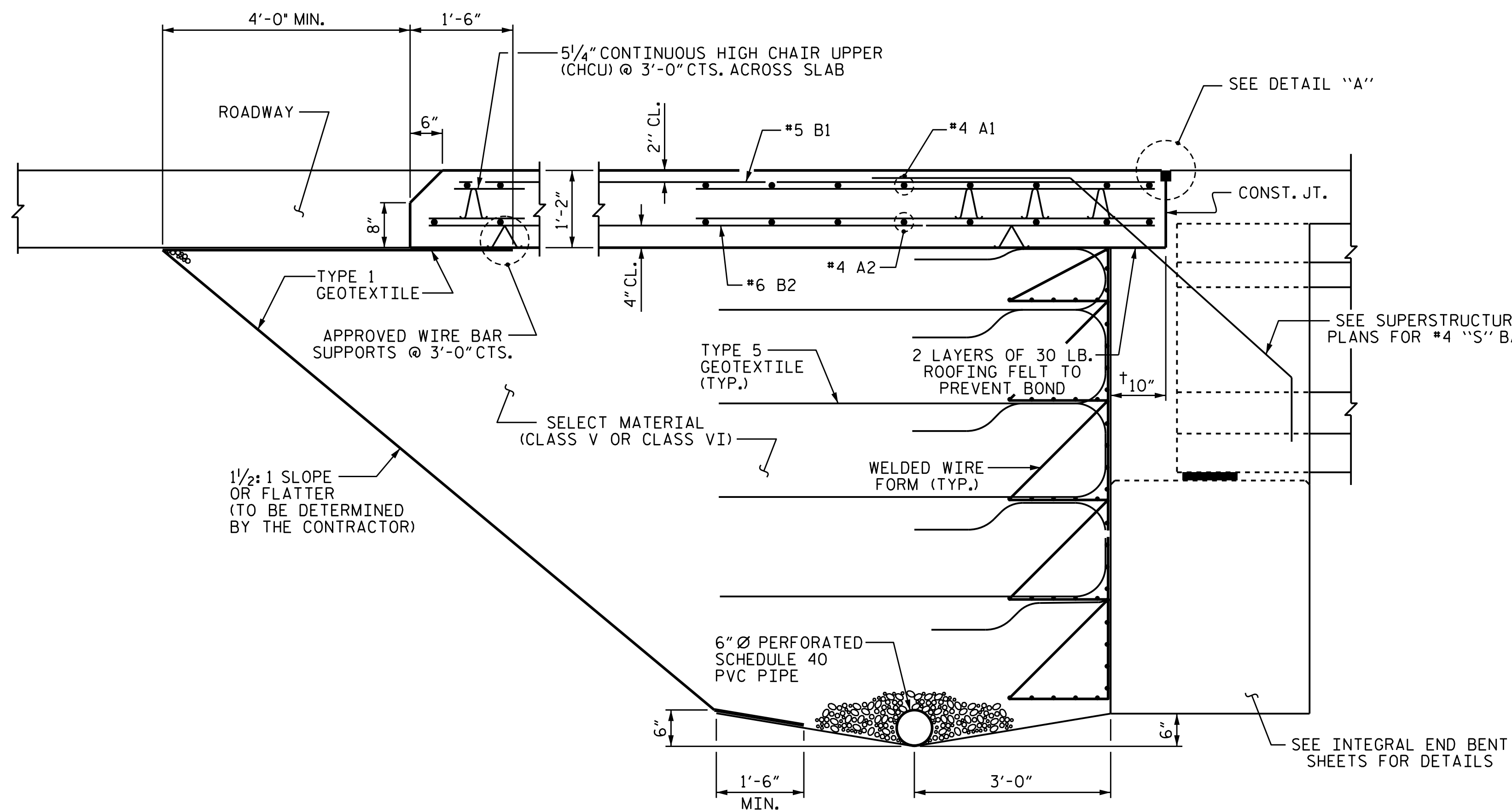


PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 16+93.00 -Y-

SHEET 1 OF 2

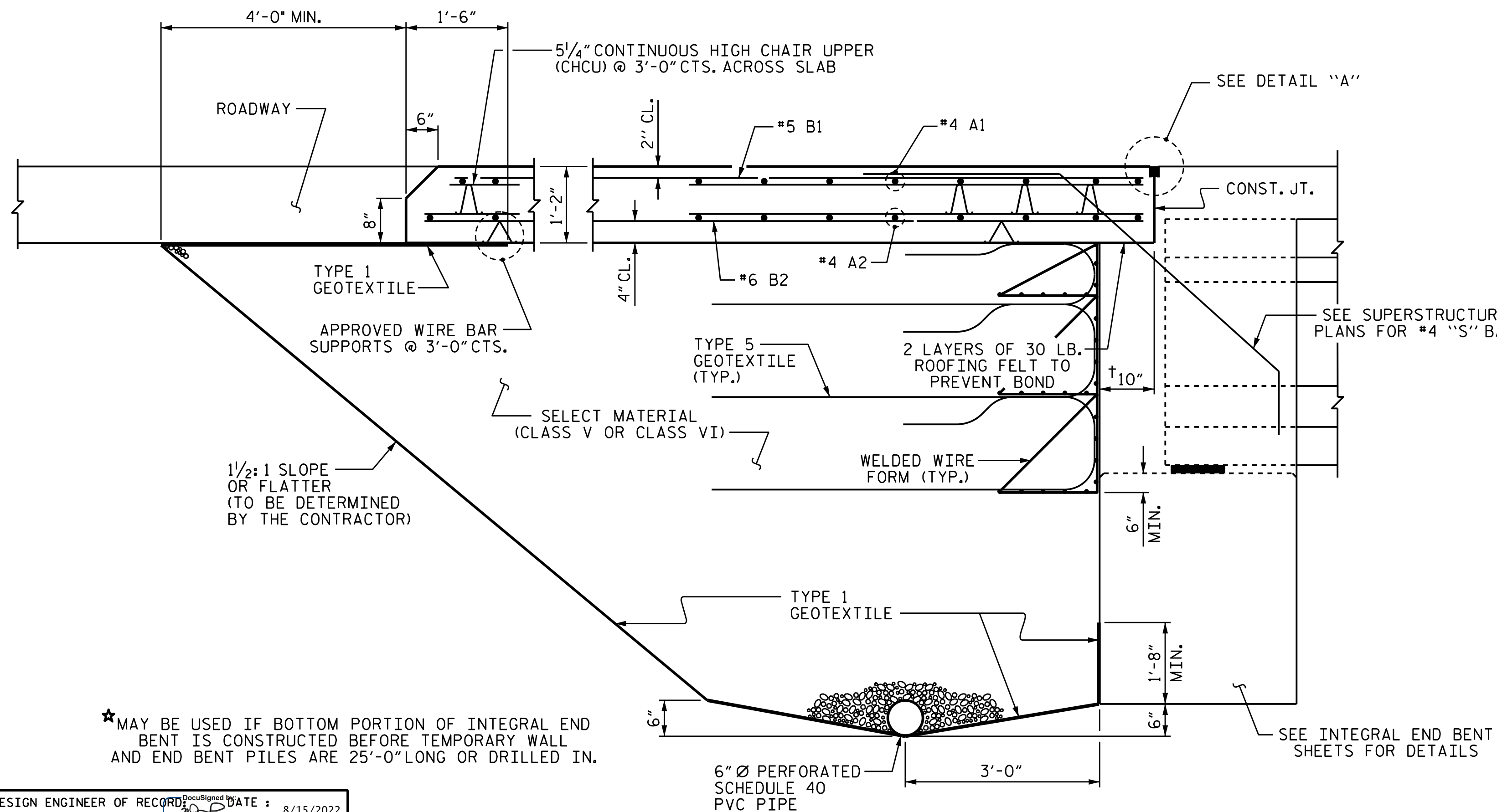
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S2-23
 TOTAL SHEETS 24



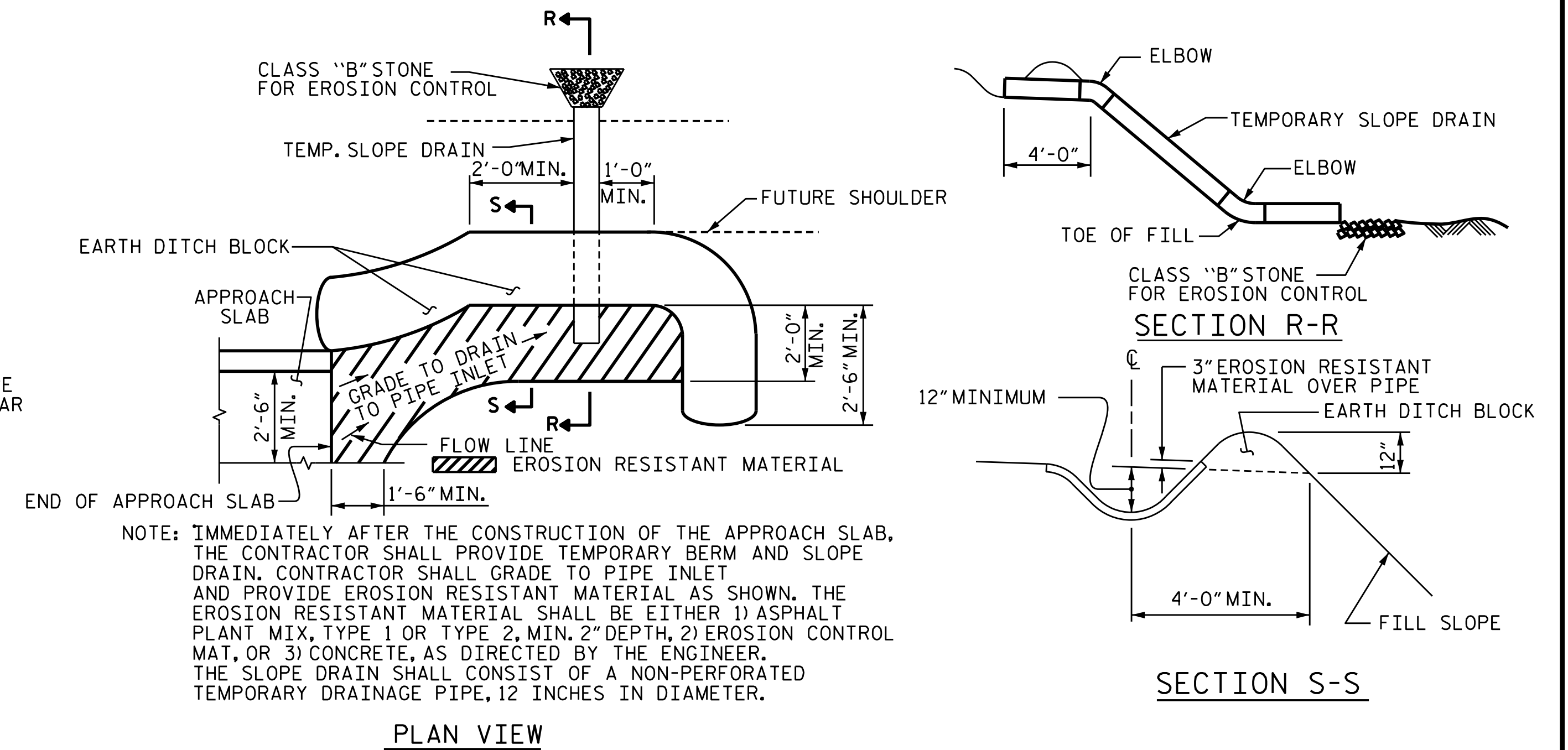
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



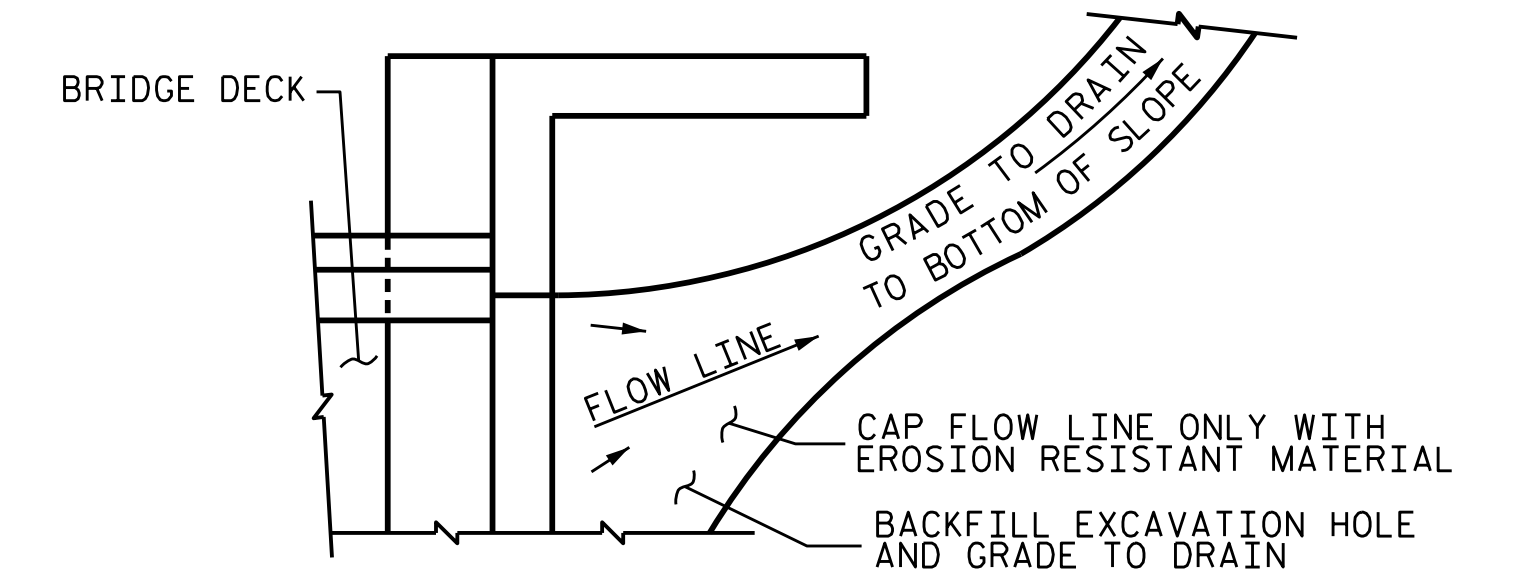
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



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.

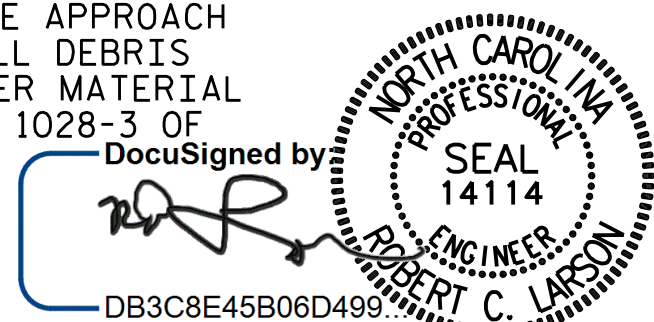
TEMPORARY DRAINAGE DETAIL

NOTES

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKFILL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB/DECK 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.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 16+93.00 -Y-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S2-24					TOTAL SHEETS 24



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

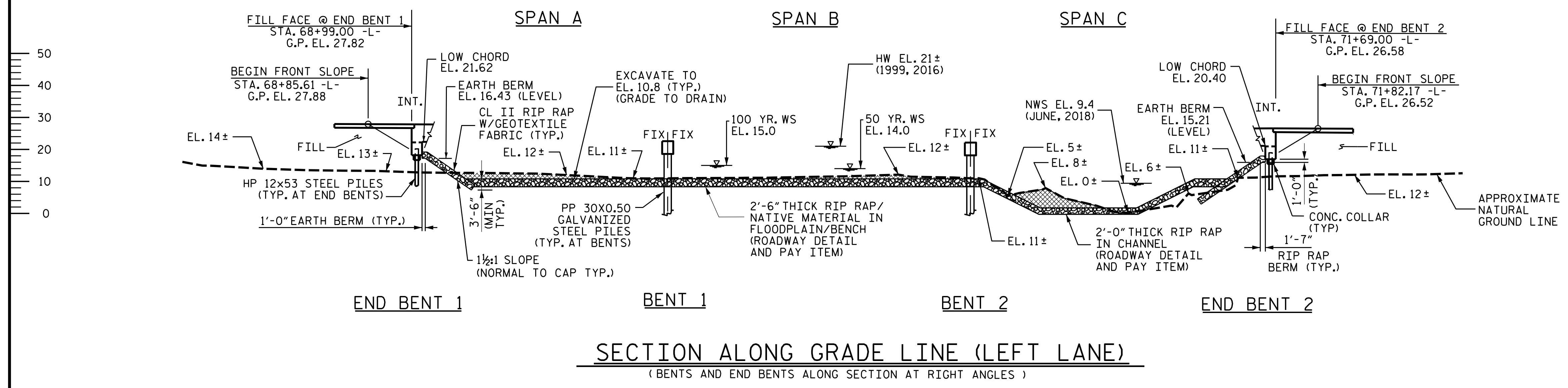
KCI Associates
 of North Carolina, P.A.
 2505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9241

STD. NO. BAS5

\$FILEL\$ \$TIME\$ \$USERS\$ \$PLTDORV\$ \$PENTBL\$ \$PLTDORV\$ \$DATE\$ \$PROJECT NO. 241704391.04

DESIGN ENGINEER OF RECORD	DATE: 8/15/2022
ASSEMBLED BY: Z. KADI	DATE: 07/01/19
CHECKED BY: R. F. DECOLA	DATE: 06/16/20
DRAWN BY: TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

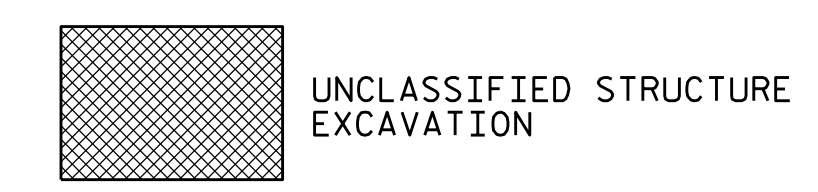
(-10.4585% (+)1.9086%
 PI = 73+50.00 -L-
 EL = 25.75
 VC = 330'
 -L- GRADE DATA



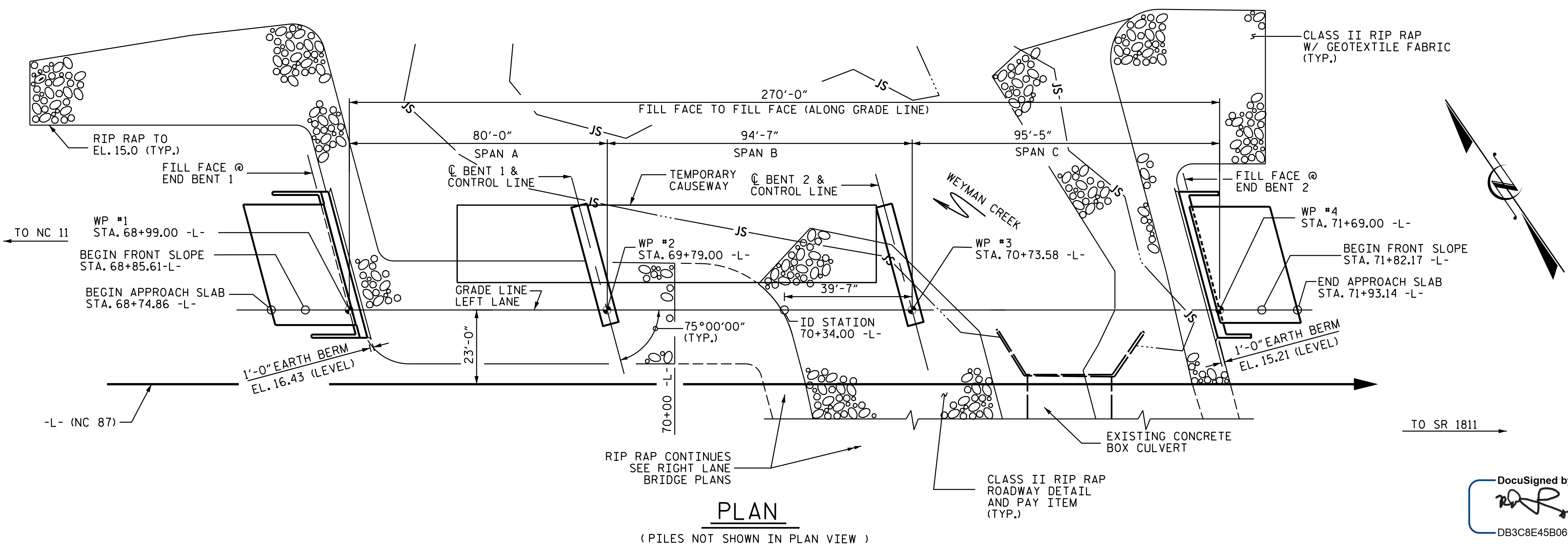
BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1710	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 14.0	FT
DRAINAGE AREA	= 17.3	SO. MI.
BASE DISCHARGE (Q ₁₀₀)	= 2257	CFS
BASE HW ELEVATION	= 15.0	FT
OVERTOPPING FLOOD DATA		
OVERTOPPING DISCHARGE	= 13,050	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 26.6	* FT

* SAG @ STA. 72+48.92 -L- HIGH SHOULDER



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

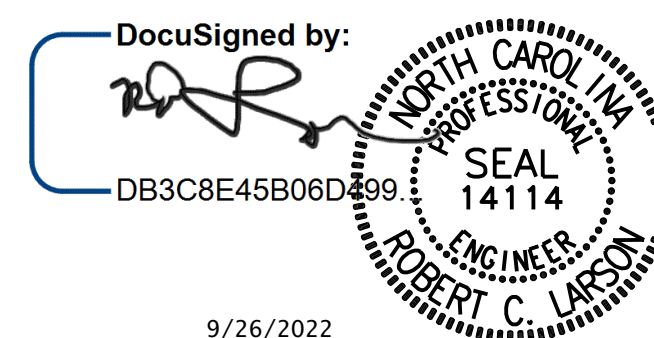


PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 1 OF 3 BRIDGE NO. 230418

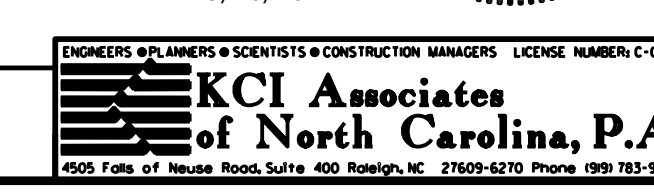
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 87
 OVER WEYMAN CREEK
 BETWEEN NC II AND
 SR 1811 (NARROW GAP RD.)
 LEFT LANE



DESIGN ENGINEER OF RECORD	DATE
<i>R.C. Larson</i>	9/26/2022
DRAWN BY	DATE
R.J. FLORY	03/26/20
CHECKED BY	DATE
R.C. LARSON	03/27/20

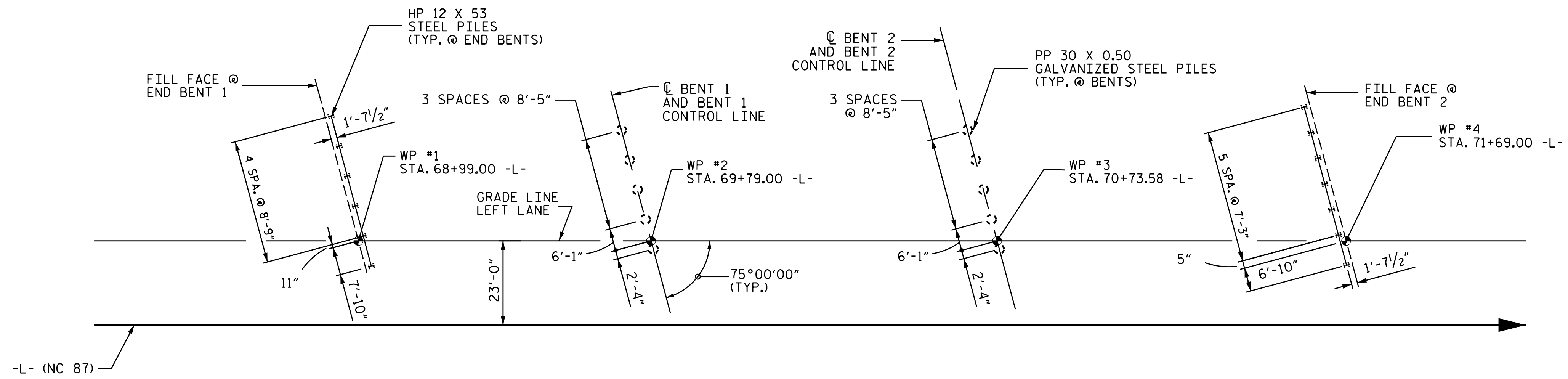
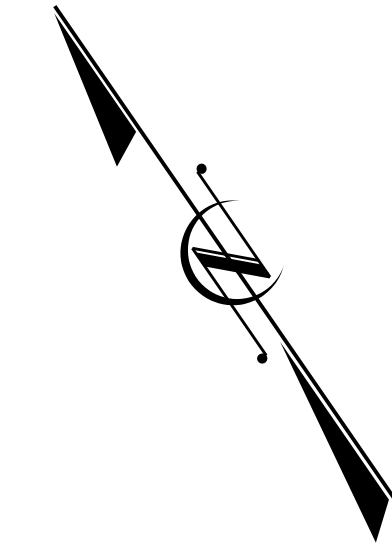
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**



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

TOTAL SHEETS: 30

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDV\$ \$S\$ \$KCI PROJECT NO. 241704391.04



FOUNDATION LAYOUT
 DIMENSIONS LOCATING PILES ARE TO C PILES
 ALL PILES ARE VERTICAL

FOUNDATION NOTES

OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 125 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

PILES AT BENT 1 AND BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 235 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 330 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

DRIVE PILES AT BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 390 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

INSTALL PILES AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN -24.5 FT.
 INSTALL PILES AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN -30.0 FT.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION -3.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS ELEVATION -12.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 48,500 TO 122,200 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 66,300 TO 122,200 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

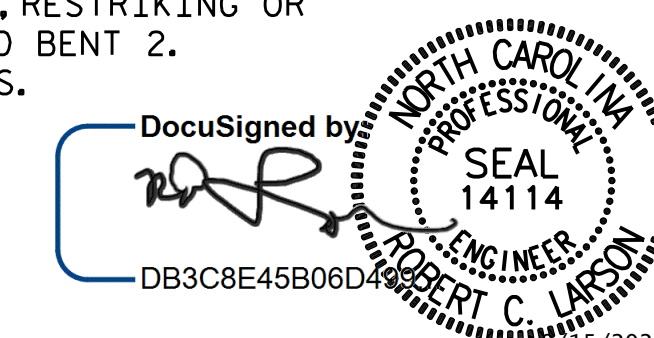
TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT 1 OR BENT 2 AND END BENT 1 OR END BENT 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 2 OF 3

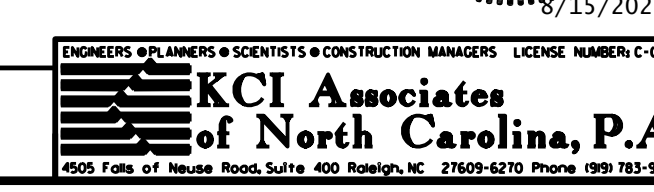
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 87
 OVER WEYMAN CREEK
 BETWEEN NC 11 AND
 SR 1811 (NARROW GAP RD.)
 LEFT LANE



DESIGN ENGINEER OF RECORD	DATE: 8/15/2022
DRAWN BY: R.J. FLORY	DATE: 03/26/20
CHECKED BY: R.C. LARSON	DATE: 08/17/20

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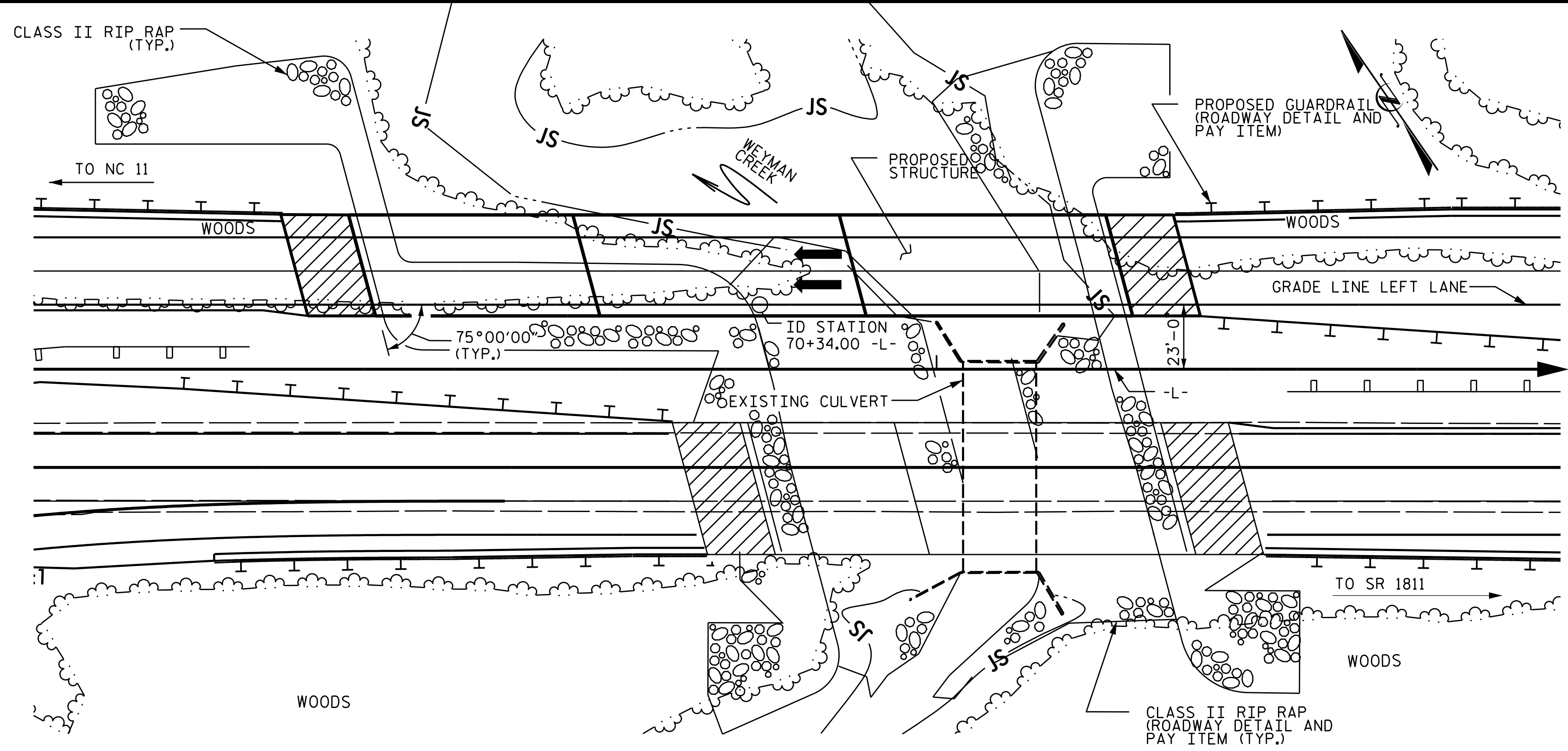


REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS	30
SHEET NO.	S3-2

\$FILEL\$ \$DATER\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDVRS\$
 KCI PROJECT NO. 241704391.04

BENCHMARK: BM 3 BENCH TIE SET IN 14" OAK 65.32' RT. -L- STA 73+46.04 EL. 22.44 NAVD 88



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
 SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND $f_y = 60\text{ksi}$.

FOR GROUT FOR STRUCTURES, 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.
 AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 70+34.00 -L-.
 NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMP. ACCESS AT STA. 70+34.00 -L-	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 70+34.00 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS @ STA. 70+34.00 -L-	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR PP 30 X 0.50 GALVANIZED STEEL PILES	HP 12 X 53 STEEL PILES	PP 30 X 0.50 GALVANIZED STEEL PILES	PILE REDRIVES	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS		
	LUMP SUM	EACH	LUMP SUM	SO.FT.	SO.FT.	CU.YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	EA.	EA.	NO.	LIN.FT.	NO.	LIN.FT.	EA.	LIN.FT.	TON	SQ. YDS
SUPERSTRUCTURE				10,530	10,469		LUMP SUM		12	1063.33					536.54				LUMP SUM	
END BENT 1						34.8		4788		6		6	360	3		640	710			
BENT 1						19.1		4460			5		425	3						
BENT 2						19.1		4460			5		425	3						
END BENT 2						35.0		4746		7		7	315	4		325	360			
TOTAL	LUMP SUM	2	LUMP SUM	10,530	10,469	108.0	LUMP SUM	18,454	12	1063.33	13	10	675	13	536.54	965	1070	LUMP SUM		

NOTES (CONT'D):

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET 1 OF 3 SHALL BE EXCAVATED FOR A DISTANCE OF 60 FT TO THE LEFT SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18- EVALUATING SCOUR AT BRIDGES."

FOR INTERIOR BENTS 1 & 2, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEET(S) FOR REQUIRED GALVANIZED LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON NC 87
 OVER WEYMAN CREEK
 BETWEEN NC 11 AND
 SR 1811 (NARROW GAP RD.)
 LEFT LANE



DESIGN ENGINEER OF RECORD: R. J. FLORY DATE: 8/15/2022
 DRAWN BY: R. J. FLORY DATE: 04/12/20
 CHECKED BY: R. C. LARSON DATE: 04/15/20

**DOCUMENT NOT CONSIDERED FINAL
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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5244

REVISIONS				SHEET NO.		
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			30
2			4			

\$FILEL\$ \$DATE\$ \$TIME\$ \$USER\$ \$PENTBL\$ \$PLTDV\$ \$PROJECT NO. 241704391.04

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	ϕ_c	ϕ_w
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

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
						LIVE-LOAD FACTORS (LL)	MOMENT					SHEAR					LIVE-LOAD FACTORS (LL)	MOMENT						
							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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.03		1.75	0.852	1.48	B	E	54.1	0.980	1.11	B	I	21.2	0.80	0.852	1.03	B	E	54.1		
	HL-93 (OPERATING)	N/A		1.49		1.35	0.852	1.91	B	E	54.1	0.980	1.49	B	I	21.2	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	2	1.46	52.56	1.75	0.852	2.10	B	E	54.1	0.980	1.53	B	I	21.2	0.80	0.852	1.46	B	E	54.1		
	HS-20 (OPERATING)	36.000		2.03	73.08	1.35	0.852	2.72	B	E	54.1	0.980	2.03	B	I	21.2	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SN5H	13.500		3.51	47.38	1.40	0.964	5.57	A	I	19.9	0.980	5.05	B	I	21.2	0.80	0.852	3.51	B	E	54.1	
		SNGARBS2	20.000		2.52	50.40	1.40	0.852	4.52	B	E	54.1	0.980	3.48	B	I	21.2	0.80	0.852	2.52	B	E	54.1	
		SNAGRIS2	22.000		2.35	51.70	1.40	0.852	4.23	B	E	54.1	0.980	3.21	B	I	21.2	0.80	0.852	2.35	B	E	54.1	
		SNCOTTS3	27.250		1.74	47.41	1.40	0.964	2.78	A	I	19.9	0.980	2.43	B	I	21.2	0.80	0.852	1.74	B	E	54.1	
		SNAGGRS4	34.925		1.42	49.59	1.40	0.964	2.49	A	I	19.9	0.980	1.95	B	I	21.2	0.80	0.852	1.42	B	E	54.1	
		SNS5A	35.550		1.39	49.41	1.40	0.964	2.43	A	I	19.9	0.980	1.96	B	I	21.2	0.80	0.852	1.39	B	E	54.1	
		SNS6A	39.950		1.26	50.33	1.40	0.852	2.27	B	E	54.1	0.980	1.76	B	I	21.2	0.80	0.852	1.26	B	E	54.1	
	SNS7B	42.000		1.20	50.40	1.40	0.852	2.16	B	E	54.1	0.980	1.71	B	I	21.2	0.80	0.852	1.20	B	E	54.1		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.54	50.82	1.40	0.852	2.76	B	E	54.1	0.980	2.14	B	I	21.2	0.80	0.852	1.54	B	E	54.1	
		TNT4A	33.075		1.54	50.93	1.40	0.852	2.76	B	E	54.1	0.980	2.08	B	I	21.2	0.80	0.852	1.54	B	E	54.1	
		TNT6A	41.600		1.25	52.00	1.40	0.852	2.24	B	E	54.1	0.980	1.80	B	I	21.2	0.80	0.852	1.25	B	E	54.1	
		TNT7A	42.000		1.24	52.08	1.40	0.852	2.24	B	E	54.1	0.980	1.77	B	I	21.2	0.80	0.852	1.24	B	E	54.1	
		TNT7B	42.000		1.27	53.34	1.40	0.852	2.28	B	E	54.1	0.980	1.68	B	I	21.2	0.80	0.852	1.27	B	E	54.1	
		TNAGRIT4	43.000		1.22	52.46	1.40	0.852	2.19	B	E	54.1	0.980	1.61	B	I	21.2	0.80	0.852	1.22	B	E	54.1	
TNAGT5A		45.000		1.16	52.20	1.40	0.852	2.08	B	E	54.1	0.980	1.58	B	I	21.2	0.80	0.852	1.16	B	E	54.1		
TNAGT5B	45.000		3	1.15	51.75	1.40	0.852	2.06	B	E	54.1	0.980	1.54	B	I	21.2	0.80	0.852	1.15	B	E	54.1		

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)

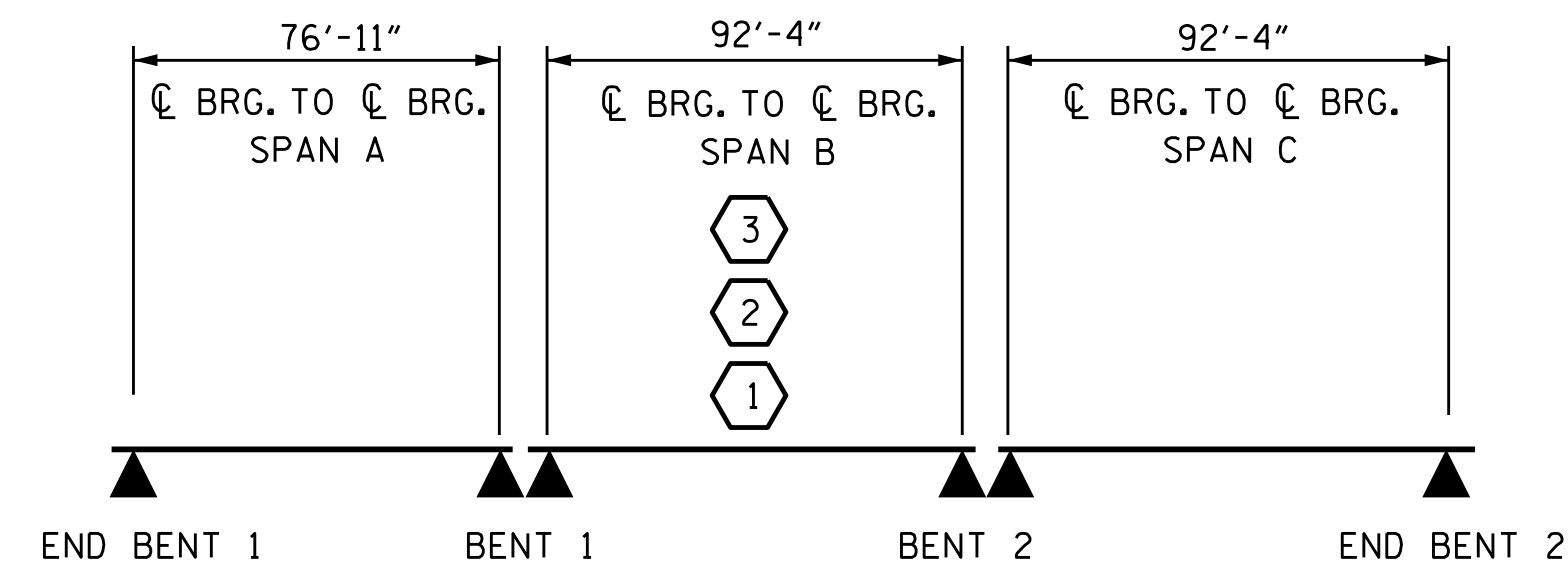
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
E - EXTERIOR



LRFR SUMMARY

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 70+34.00 -L-

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

DocuSigned by:
ROBERT C. LARSON
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 14114
8/15/2022

DESIGN ENGINEER OF RECORD:	DATE: 8/15/2022
ASSEMBLED BY: C. E. LARSON	DATE: 09/05/19
CHECKED BY: R. C. LARSON	DATE: 09/09/19
DRAWN BY: MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY: M/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

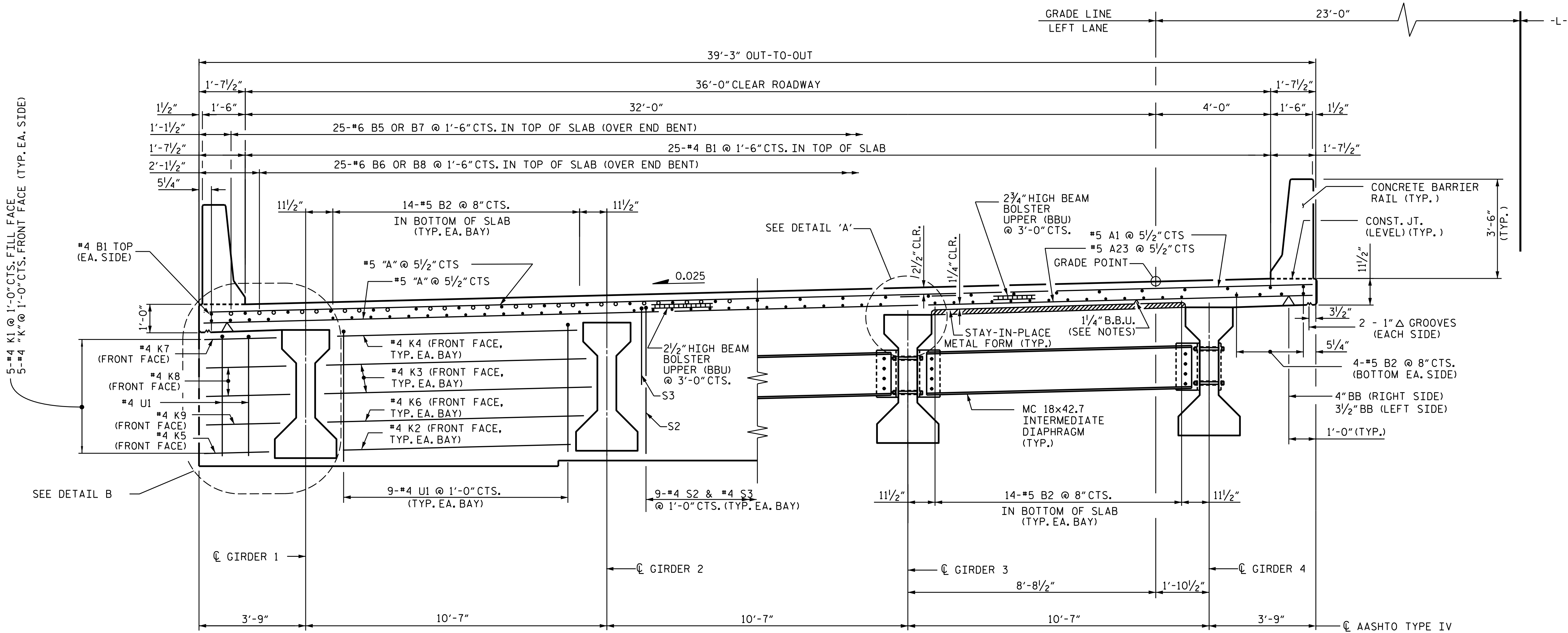
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

KCI Associates
of North Carolina, P.A.
1905 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-4270 Phone 919-783-9200

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3- 4
1			3			TOTAL SHEETS
2			4			30

STD. NO. LRFR1

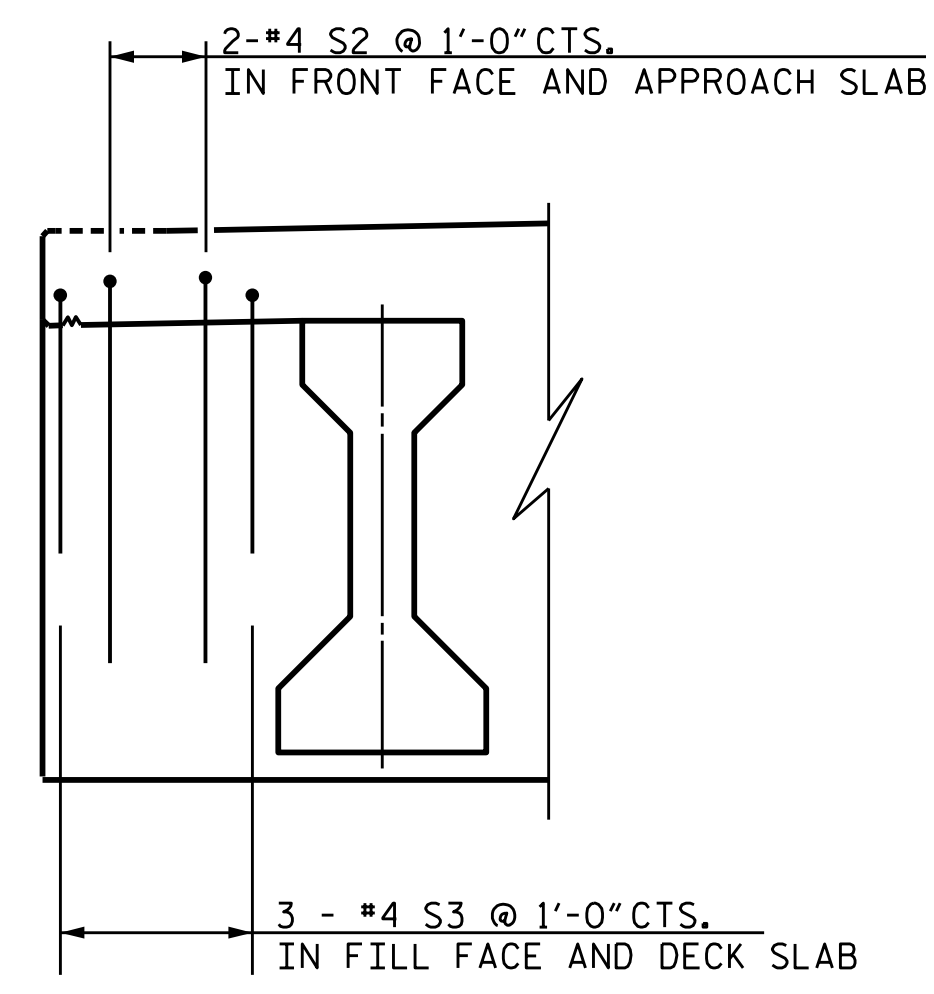
\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTDYVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04



TYPICAL HALF SECTION AT INTEGRAL END BENT 1 & 2 DIAPHRAGM

TYPICAL SECTION

TYPICAL HALF SECTION AT INTERMEDIATE DIAPHRAGM



DETAIL B
(TYP. EA. SIDE @ END BENTS)

NOTES

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

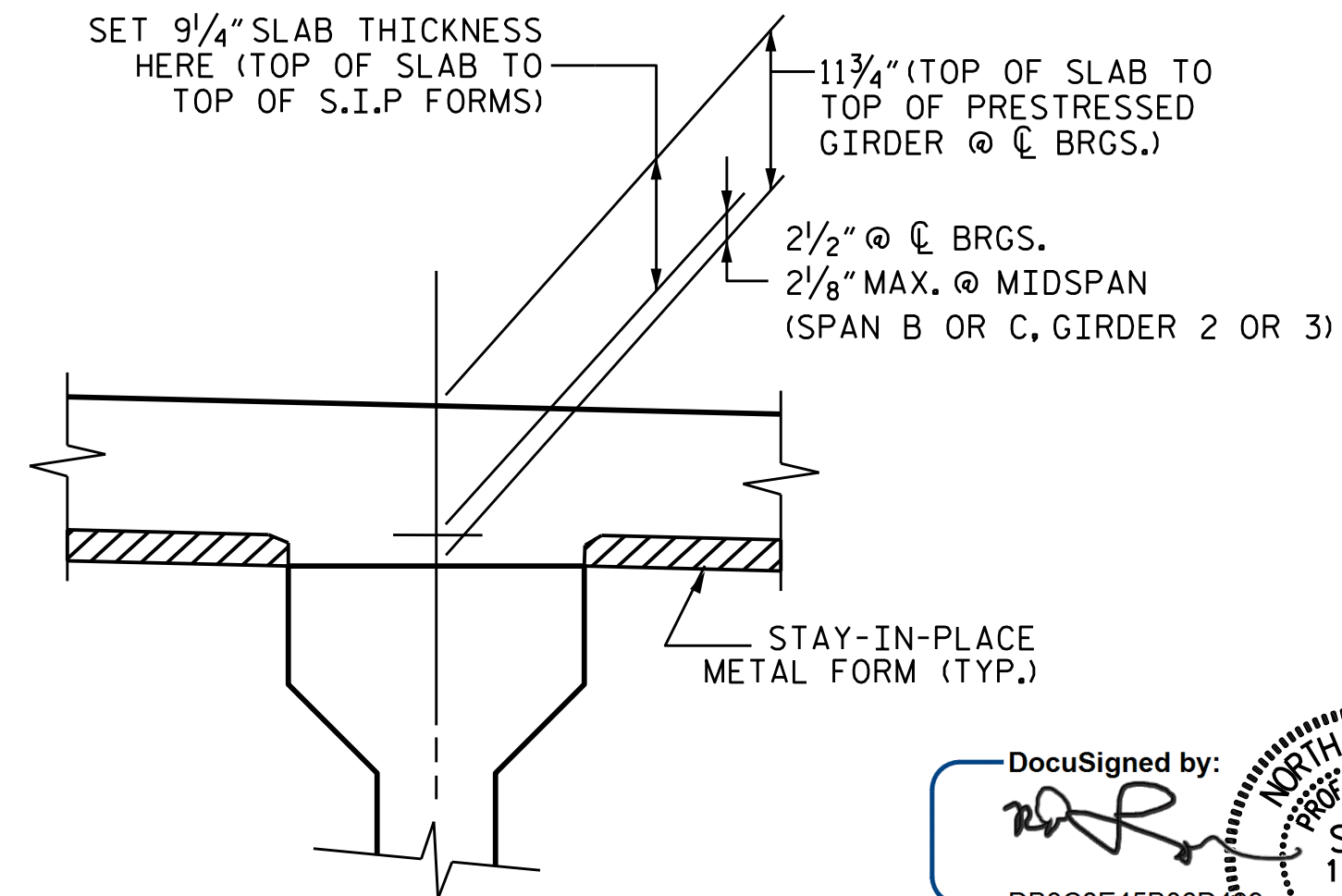
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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

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

SEE BARRIER RAIL DRAWINGS FOR ADDITIONAL REINFORCING STEEL EMBEDDED IN DECK.

- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING OVER END BENT



DETAIL A

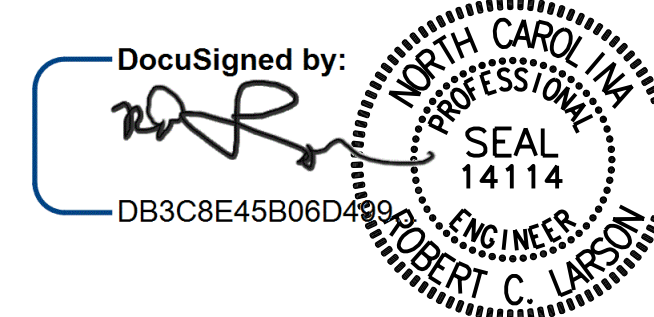
PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 70+34.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
TYPICAL SECTION**

LEFT LANE



DESIGN ENGINEER OF RECORD:	DATE:
<i>[Signature]</i>	8/15/2022
DRAWN BY: A. K. ALLANKI	DATE: 07/31/19
CHECKED BY: R. C. LARSON	DATE: 06/16/20

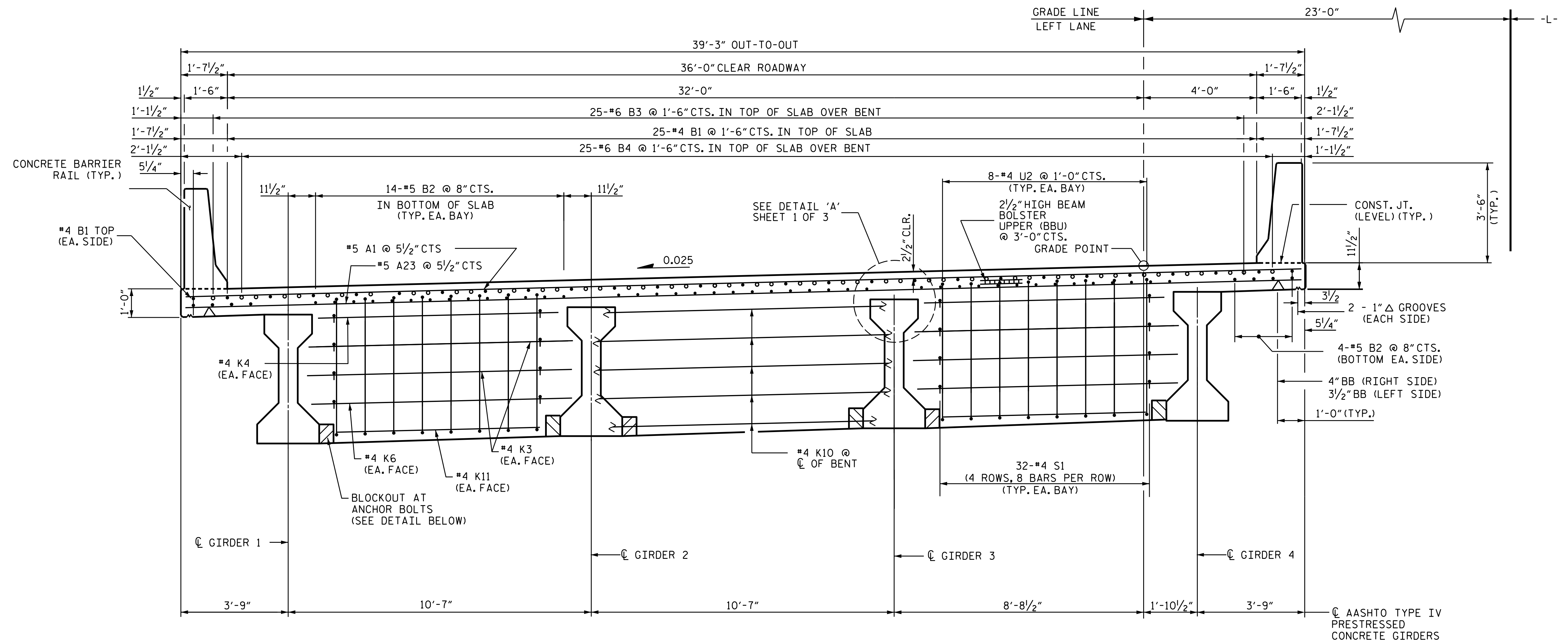
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS
KCI Associates
of North Carolina, P.A.
4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-9244

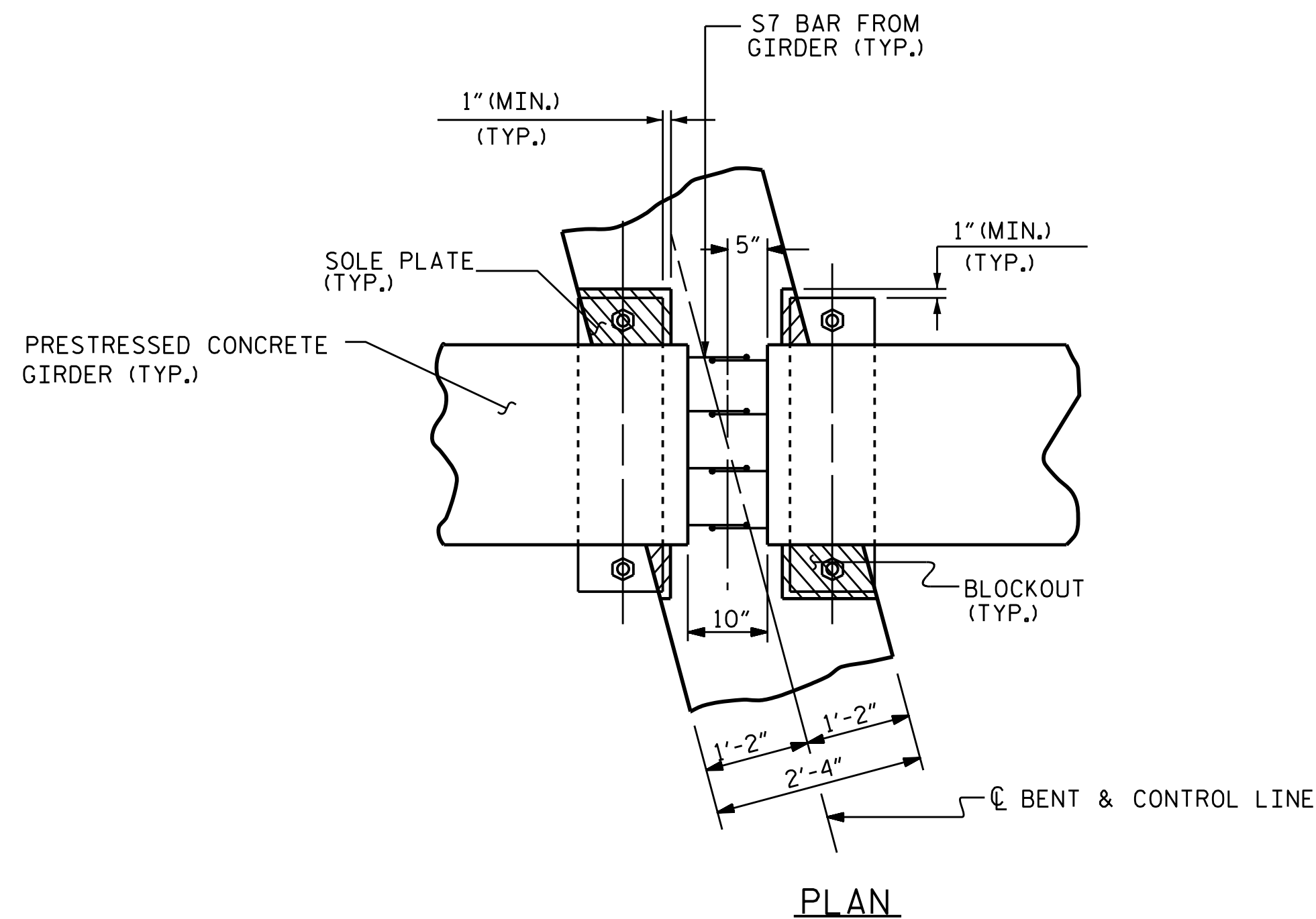
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

TOTAL SHEETS: 30

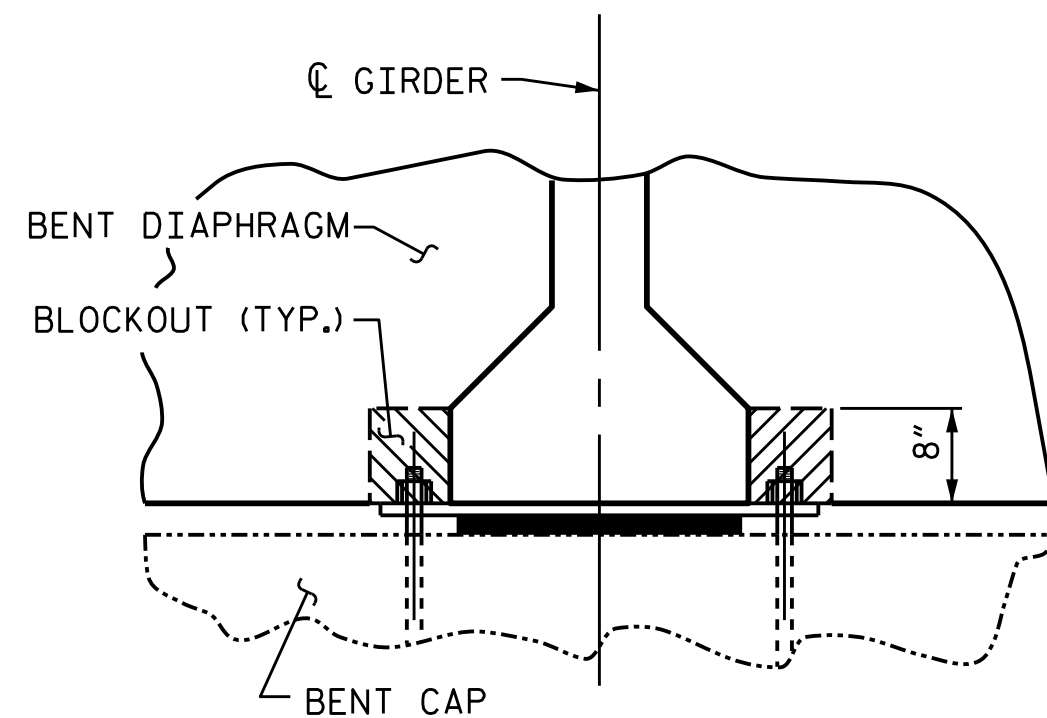
\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDVRS\$
 KCI PROJECT NO. 241704391.04



TYPICAL SECTION AT BENT DIAPHRAGM



BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION

- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING OVER BENT

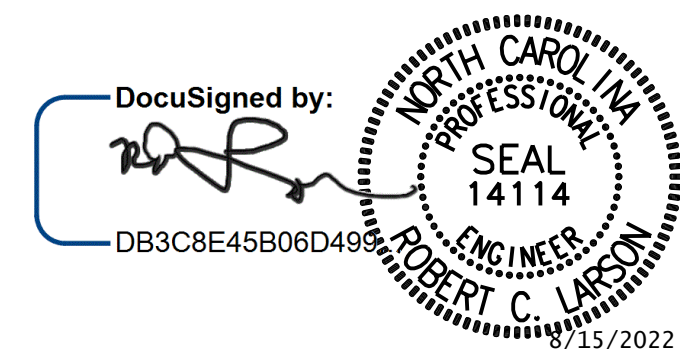
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION

LEFT LANE



DESIGN ENGINEER OF RECORD	DATE
<i>[Signature]</i>	8/15/2022
DRAWN BY	DATE
A. K. ALLANKI	07/30/19
CHECKED BY	DATE
R. C. LARSON	06/16/20

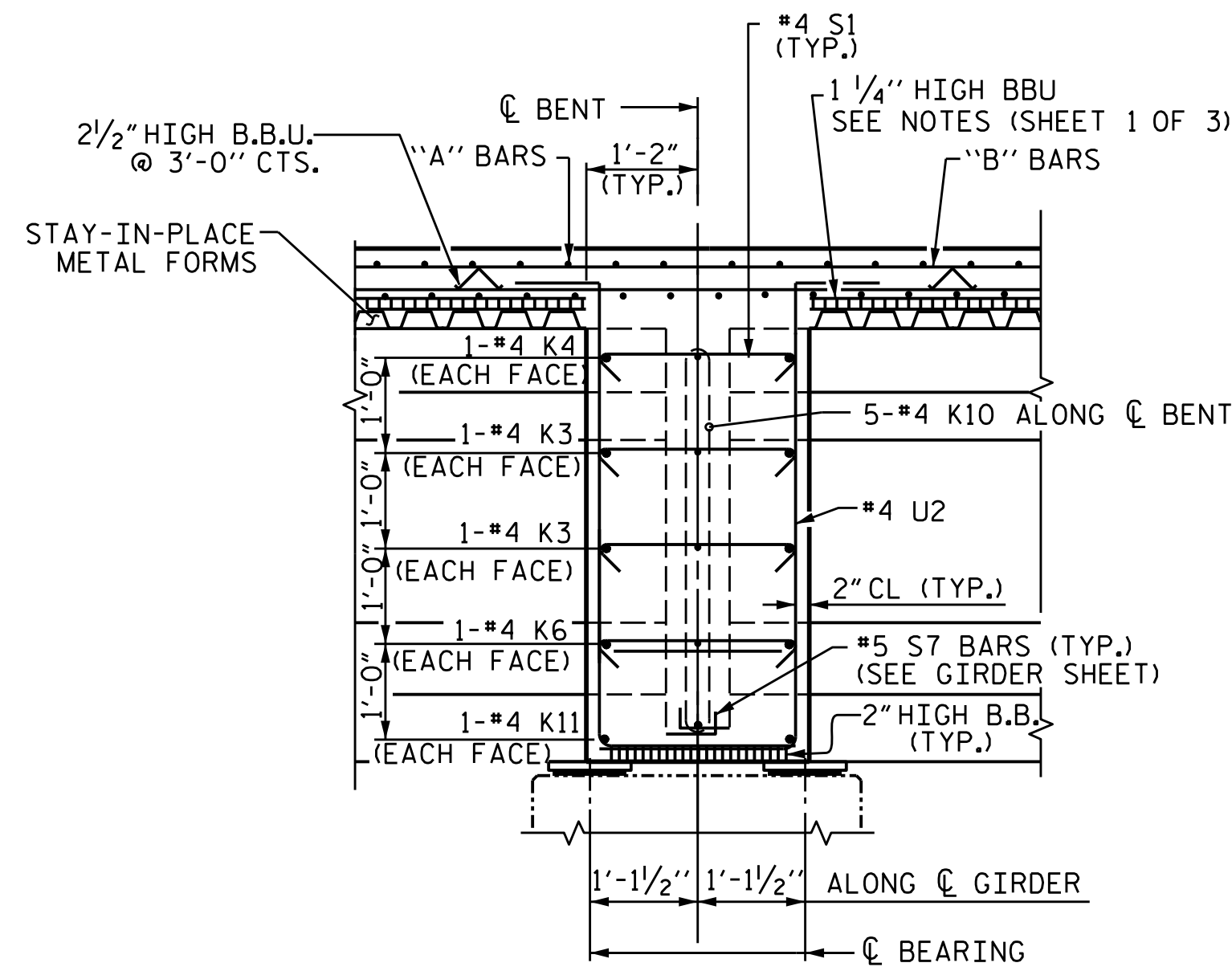
DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED



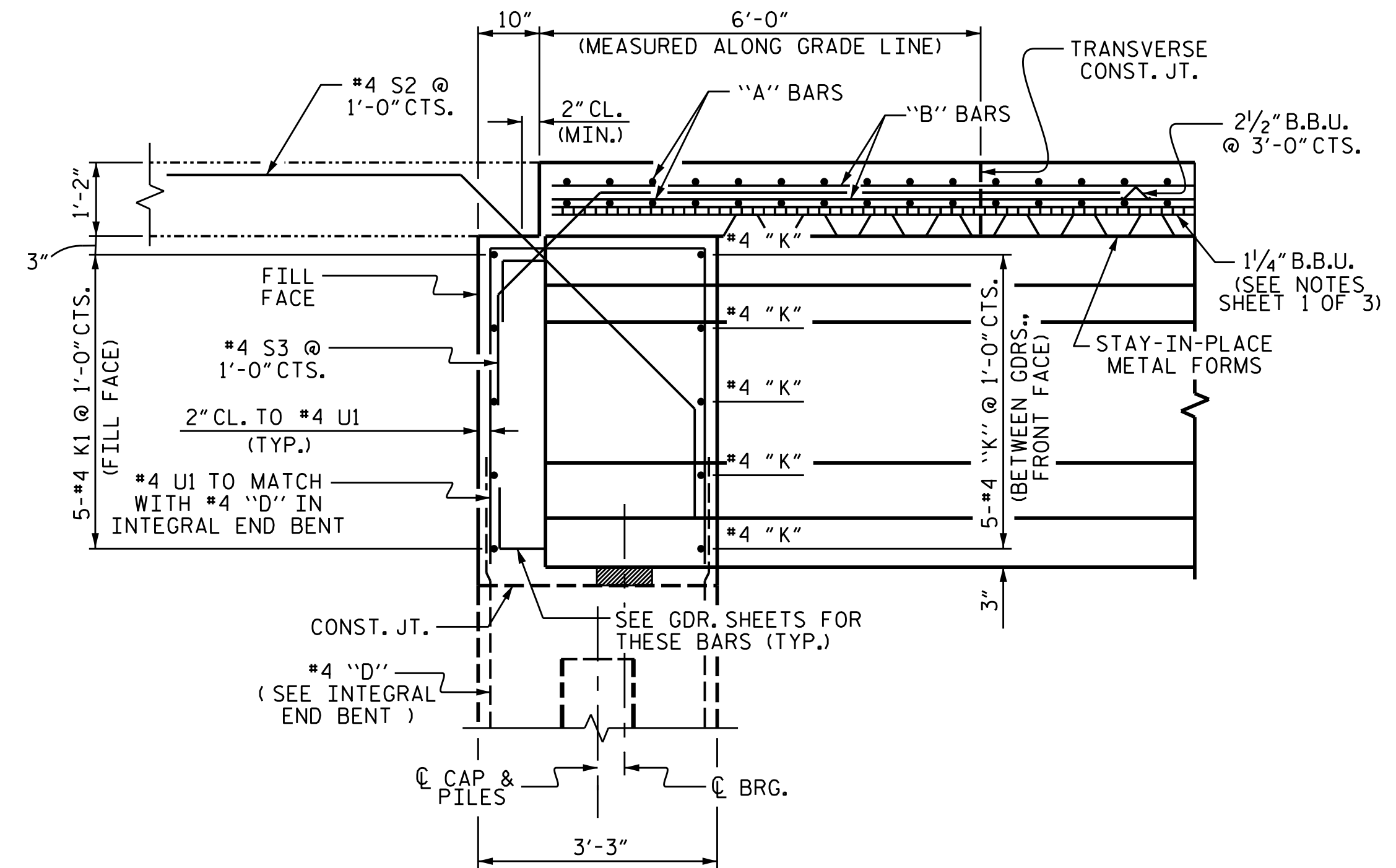
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 30

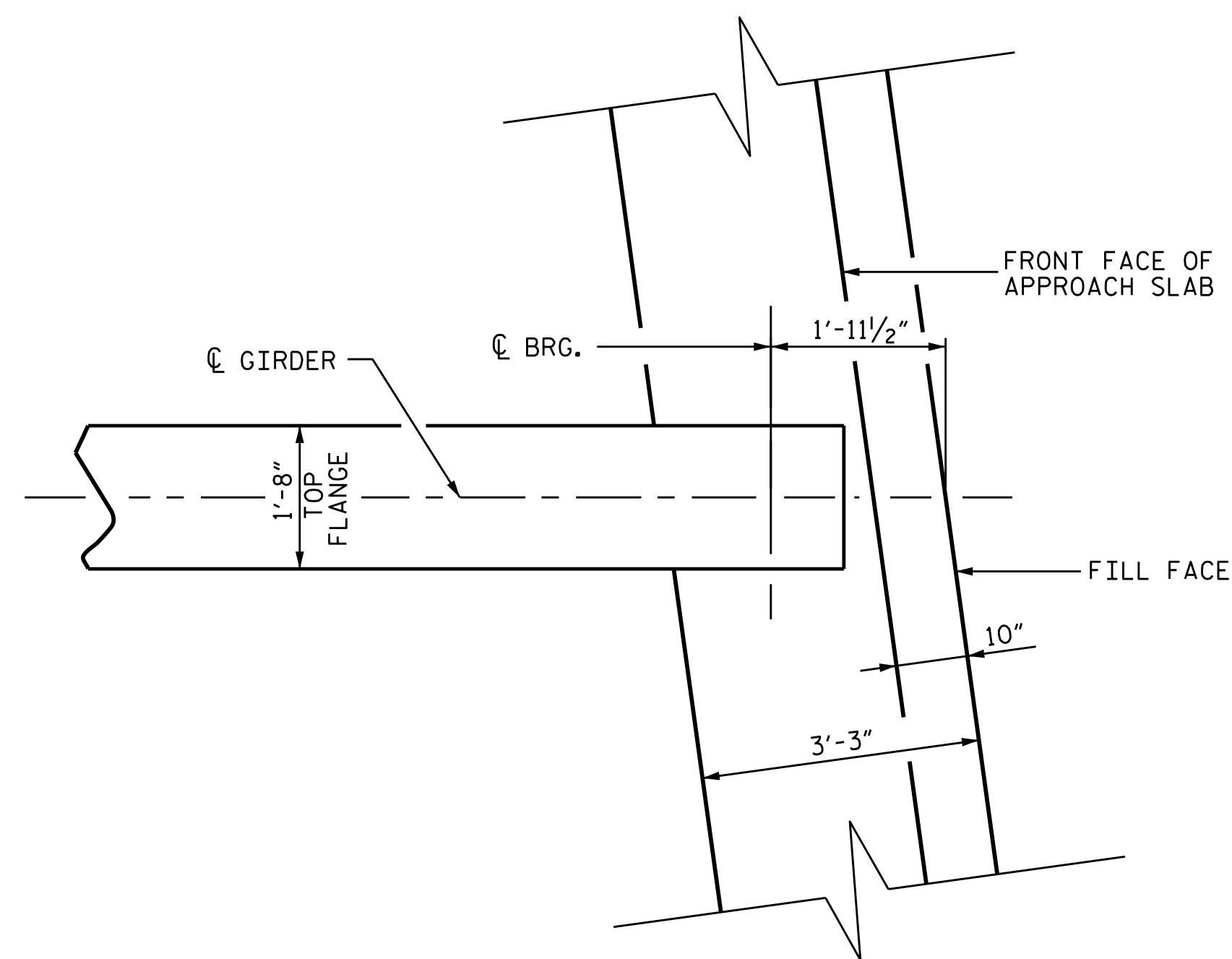
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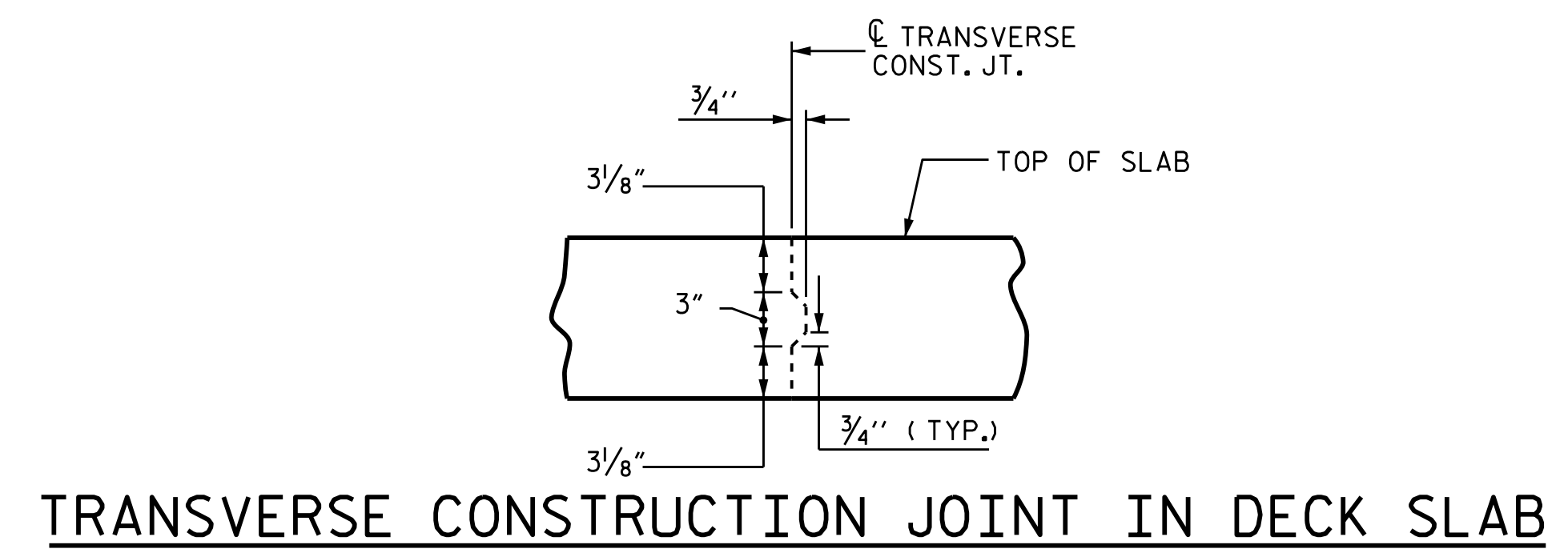
SECTION THRU BENT DIAPHRAGM



SECTION THRU INTEGRAL END BENT



PLAN OF GIRDER AT INTEGRAL END BENT



TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

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

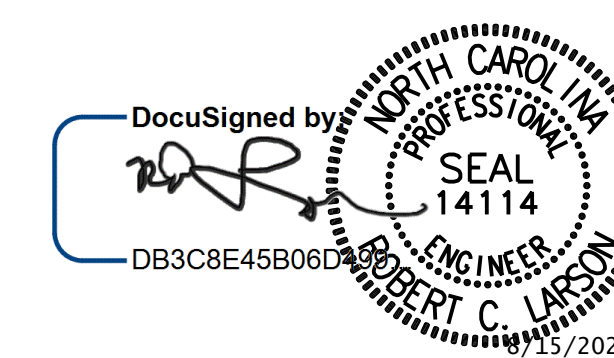
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

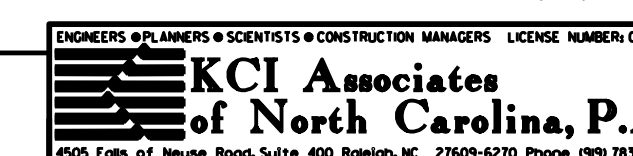
SUPERSTRUCTURE
 TYPICAL SECTION

LEFT LANE



DESIGN ENGINEER OF RECORD:	<i>[Signature]</i>	DATE:	8/15/2022
DRAWN BY:	A. K. ALLANKI	DATE:	07/24/19
CHECKED BY:	R. C. LARSON	DATE:	06/16/20

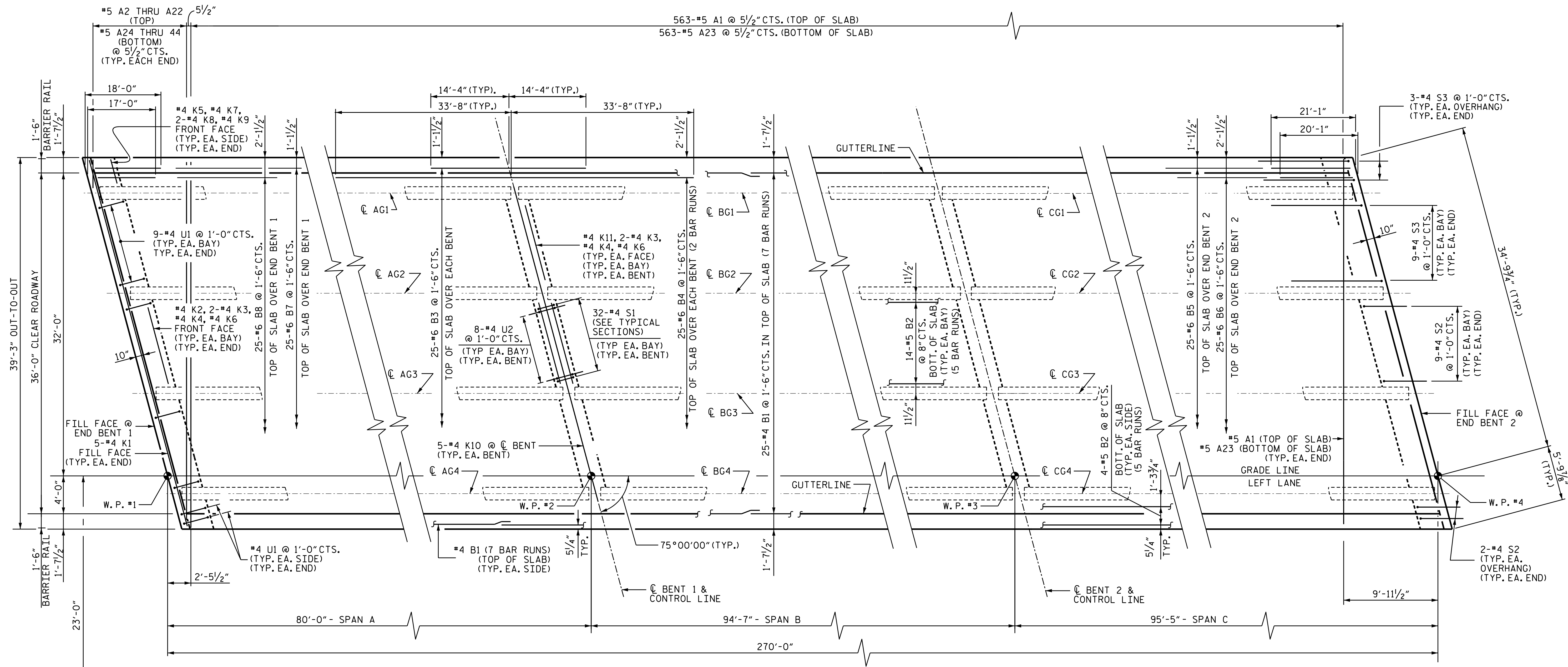
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 UNLESS ALL SIGNATURES COMPLETED**



REVISIONS				SHEET NO.	
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1			3		
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TOTAL SHEETS: 30

\$FILEL\$ \$TIME\$ \$USERS\$ \$PLTDVRS\$ \$PENTBLS\$ \$PLTDRVS\$
 KCI PROJECT NO. 241704391.04



PLAN - SPANS A, B & C

SEE SUPERSTRUCTURE BILL OF MATERIAL FOR REINFORCING SPLICE LENGTHS. FOR INTERMEDIATE STEEL DIAPHRAGM LOCATIONS, SEE "GIRDER LAYOUT"

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 PLAN OF SPANS**

LEFT LANE

DocuSigned by:

 DB3C8E45B06D499

**NORTH CAROLINA
 PROFESSIONAL
 SEAL
 14114
 ENGINEER
 ROBERT C. LARSON**

DESIGN ENGINEER OF RECORD: DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 08/20/19
 CHECKED BY: R. C. LARSON DATE: 06/17/20

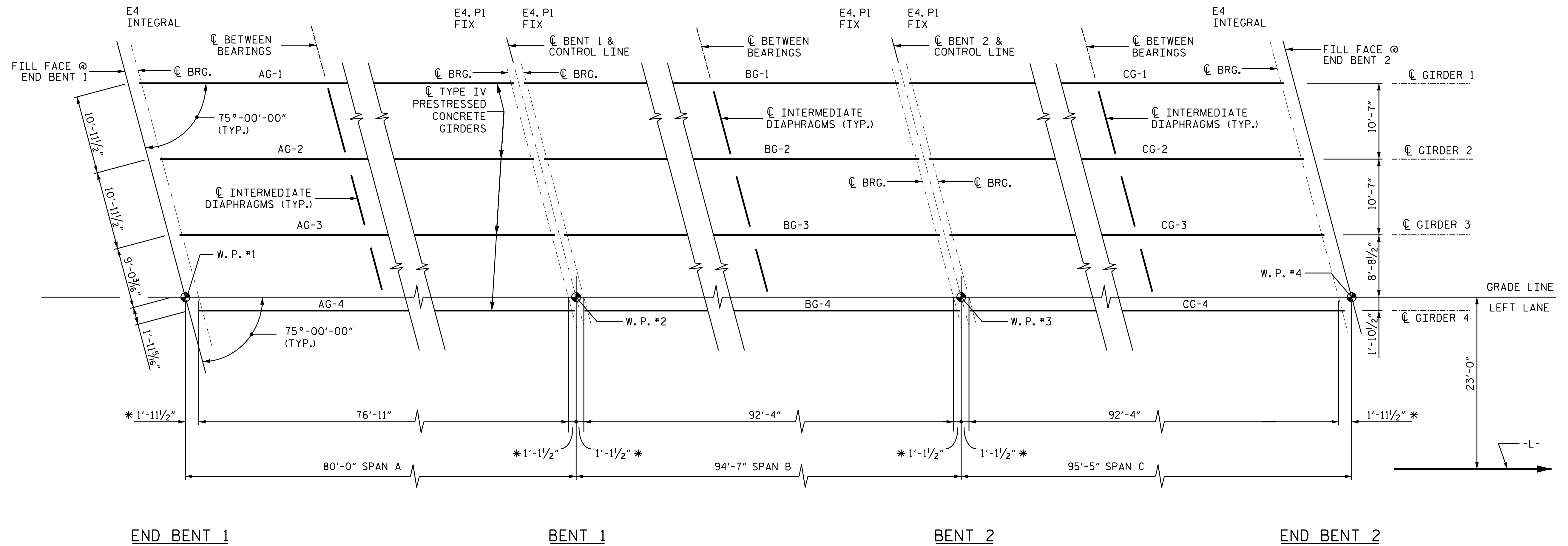
**DOCUMENT NOT CONSIDERED FINAL
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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

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

TOTAL SHEETS: 30

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTDRVS\$ \$PENTBLS\$ \$PLTDVRS\$
 KCI PROJECT NO. 241704391.04



* MEASURED ALONG \O GIRDERS

GIRDER LAYOUT

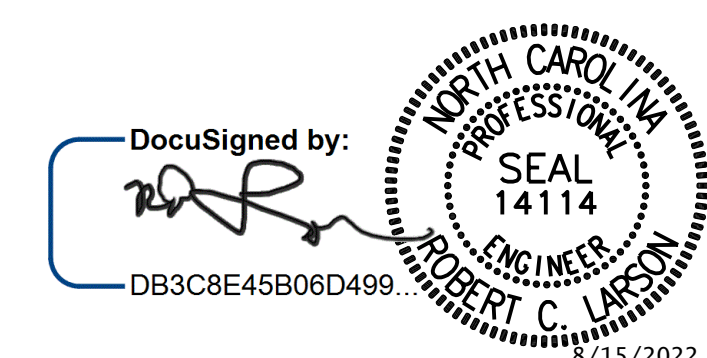
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS
SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE GIRDER LAYOUT

LEFT LANE



DESIGN ENGINEER OF RECORD:	DATE:
<i>[Signature]</i>	8/15/2022
DRAWN BY:	DATE:
A. K. ALLANKI	08/19/19
CHECKED BY:	DATE:
R. C. LARSON	06/17/20

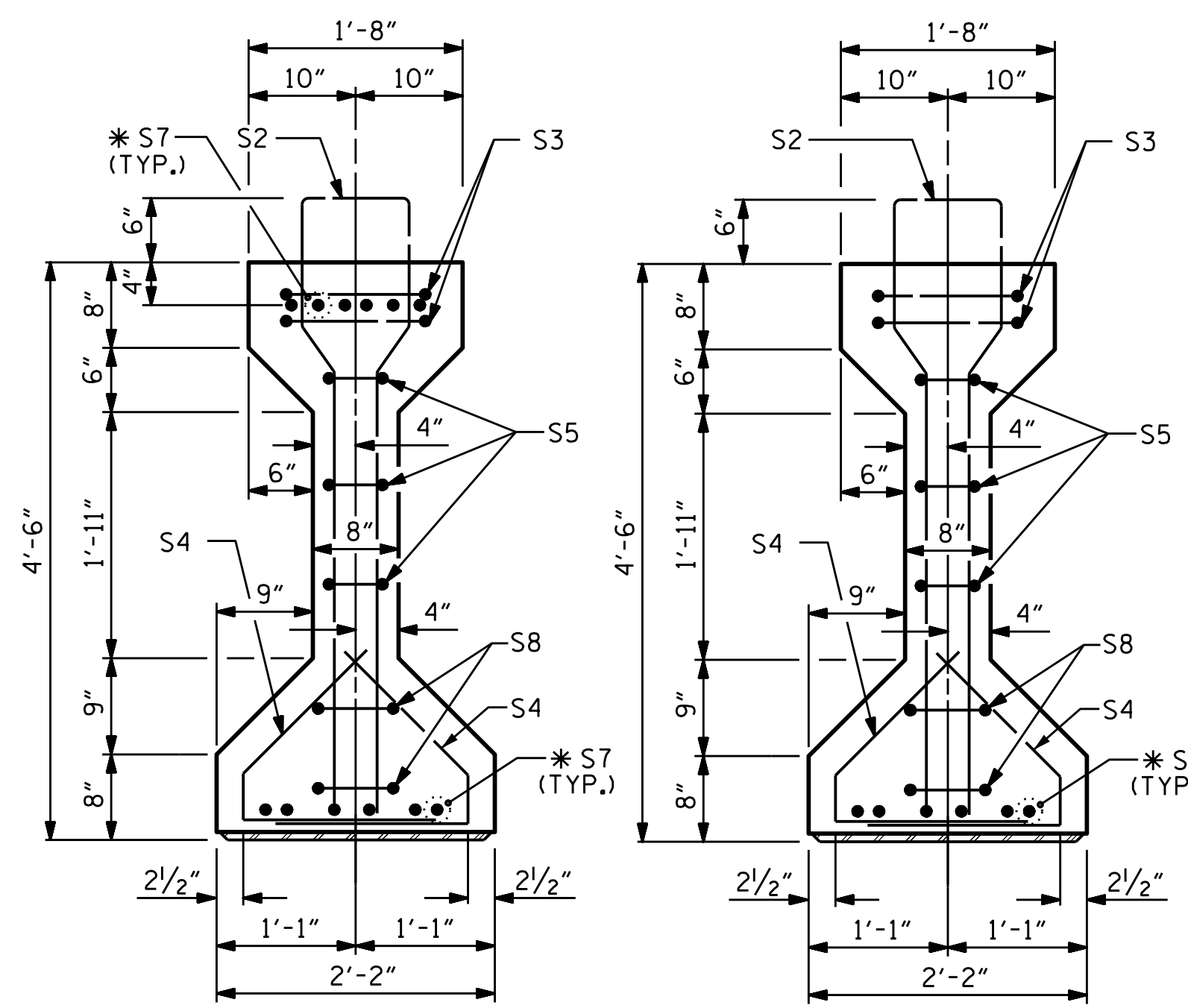
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**



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

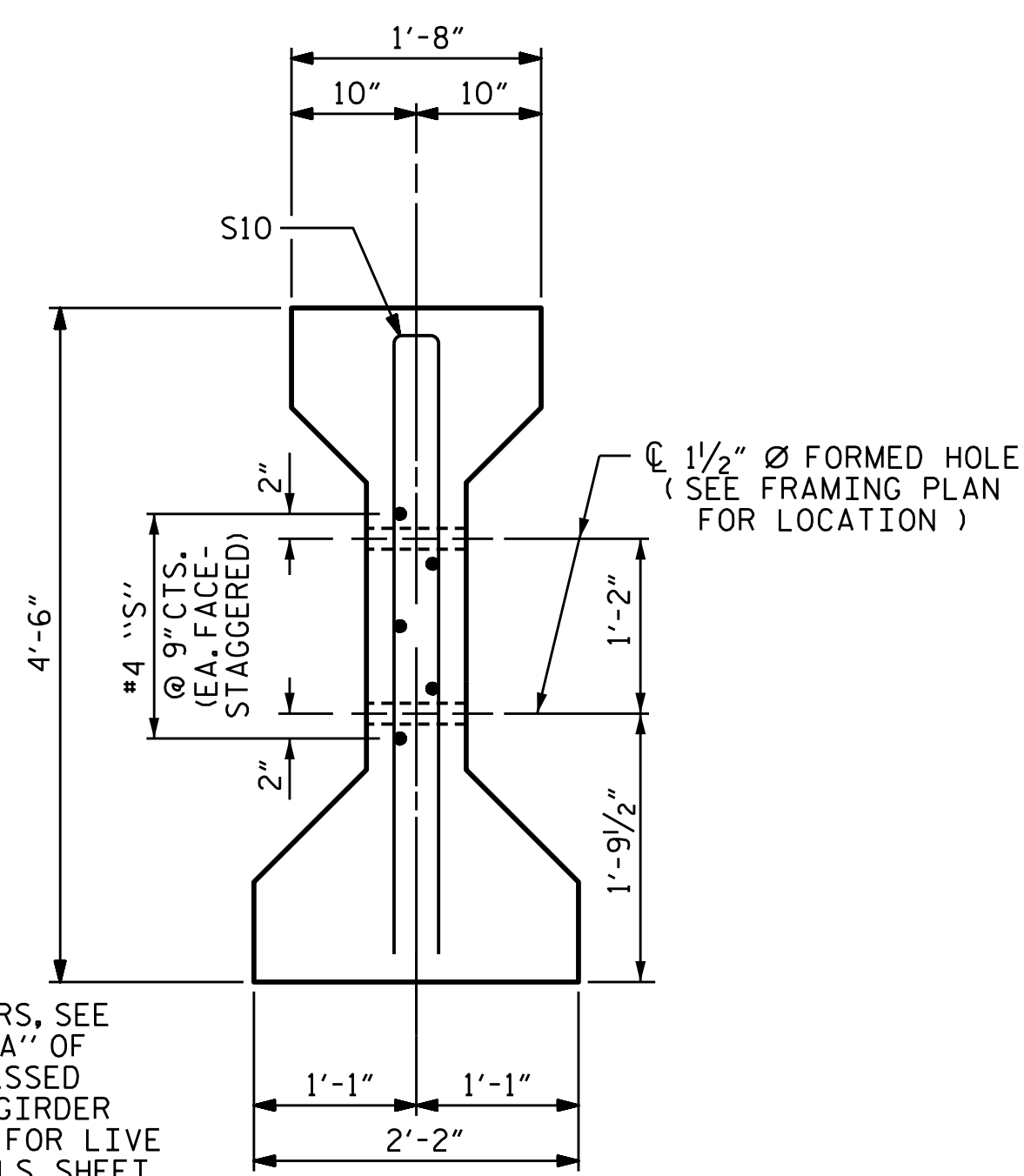
TOTAL SHEETS: 30

\$FILEL\$ \$DATE\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDV\$ \$KCI PROJECT NO. 241704391.04

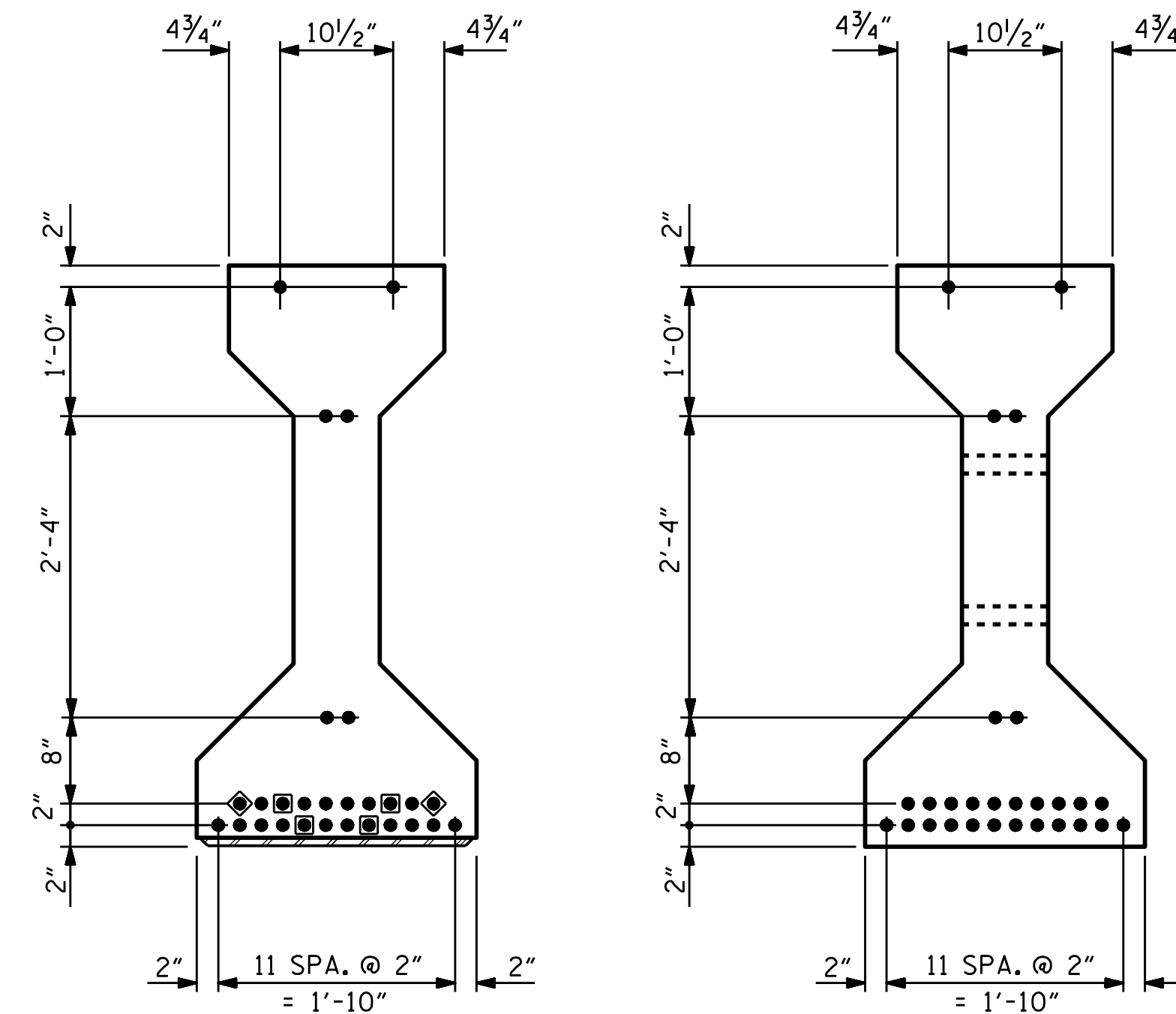


SECTION A-A

SECTION B-B



SECTION C-C
(S1 BARS NOT SHOWN)

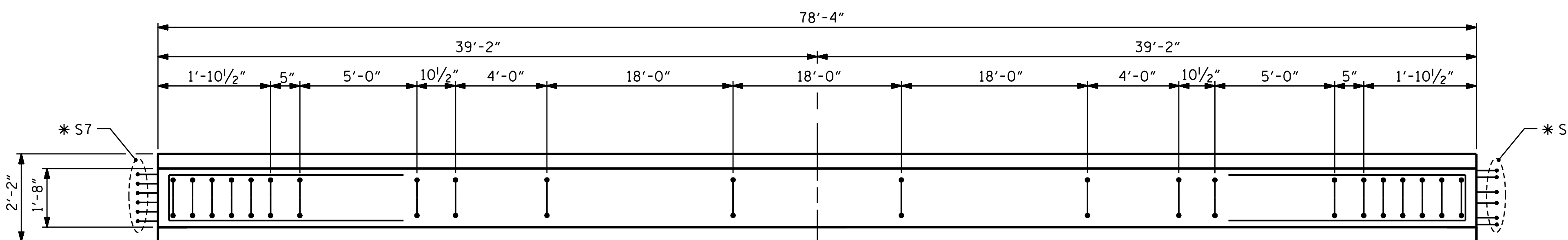


AT END OF GIRDER

AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

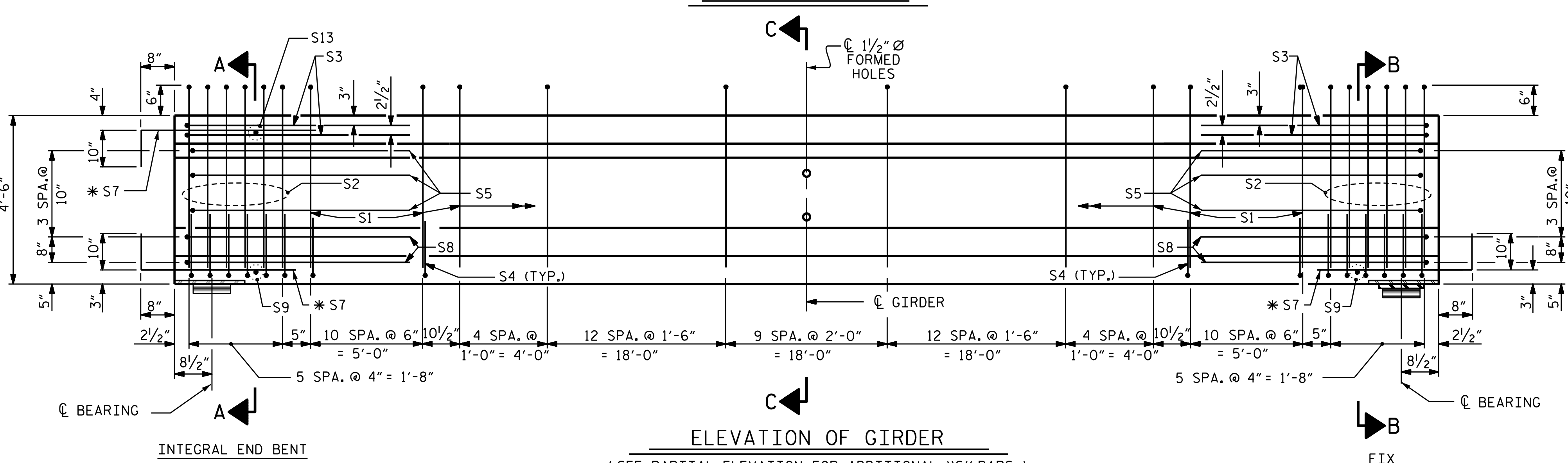
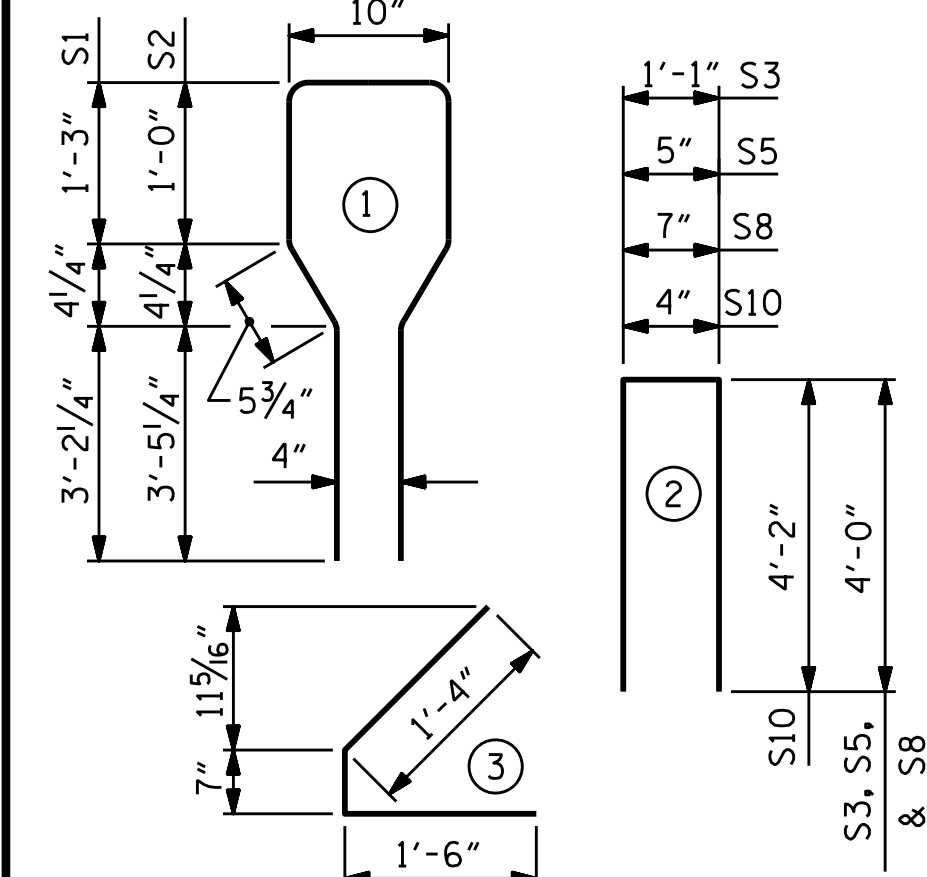
* FOR S7 BARS, SEE
DETAIL "A" OF
PRESTRESSED
CONCRETE GIRDER
CONTINUOUS FOR LIVE
LOAD DETAILS SHEET



PLAN OF GIRDER

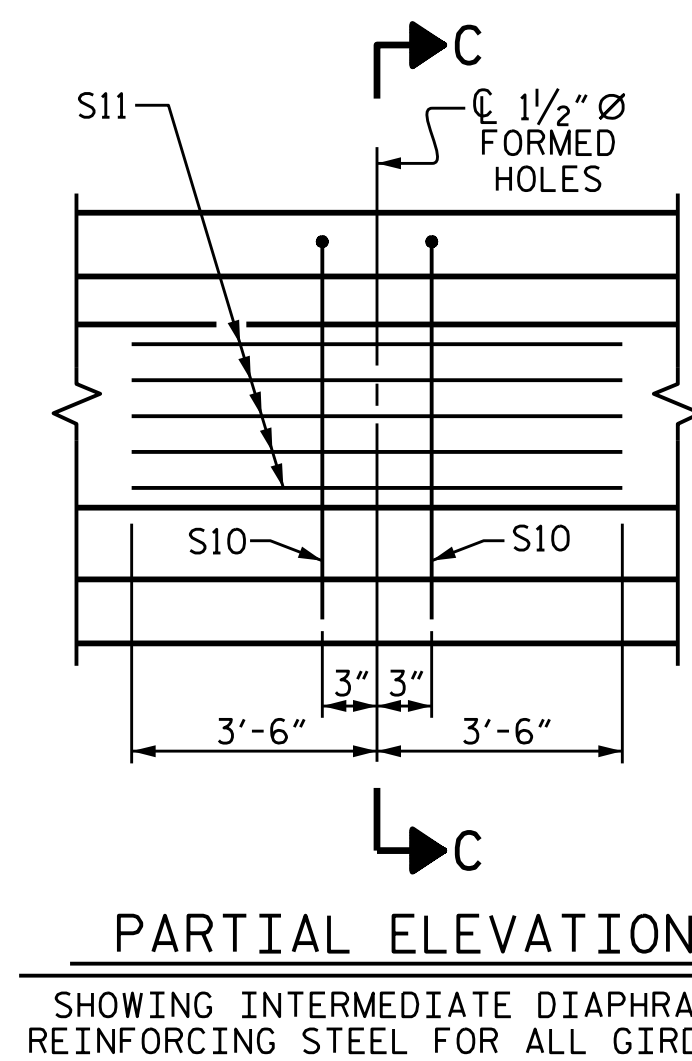
- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- ◇ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 14'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

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	64	#4	1	10'-8"	456
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	5000 PSI CONCRETE	0.6" Ø L. R. STRANDS
LB.	C.Y.	No.
996	15.9	28

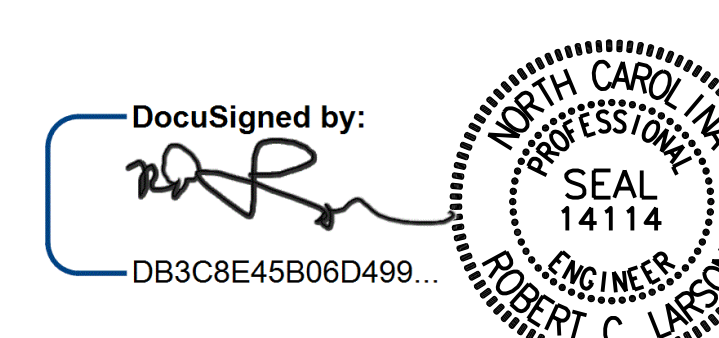
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	78'-4"	313'-4"

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 70+34.00 -L-

SHEET 1 OF 4

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



DocuSigned by:
DB3C8E45B06D499...

DESIGN ENGINEER OF RECORD:	DATE: 8/15/2022
ASSEMBLED BY: A. K. ALLANKI	DATE: 08/22/19
CHECKED BY: R. C. LARSON	DATE: 04/22/20
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

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

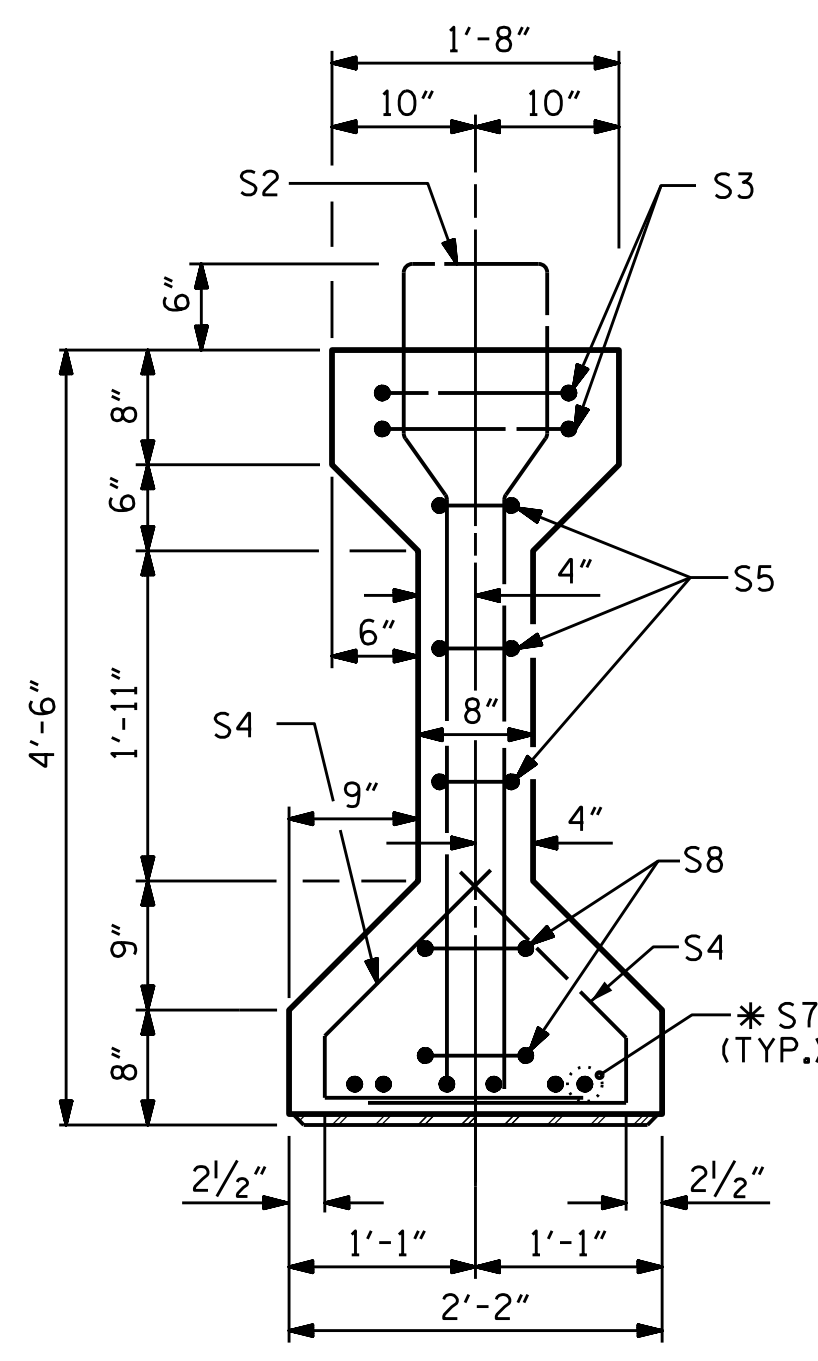
KCI Associates
of North Carolina, P.A.
4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

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

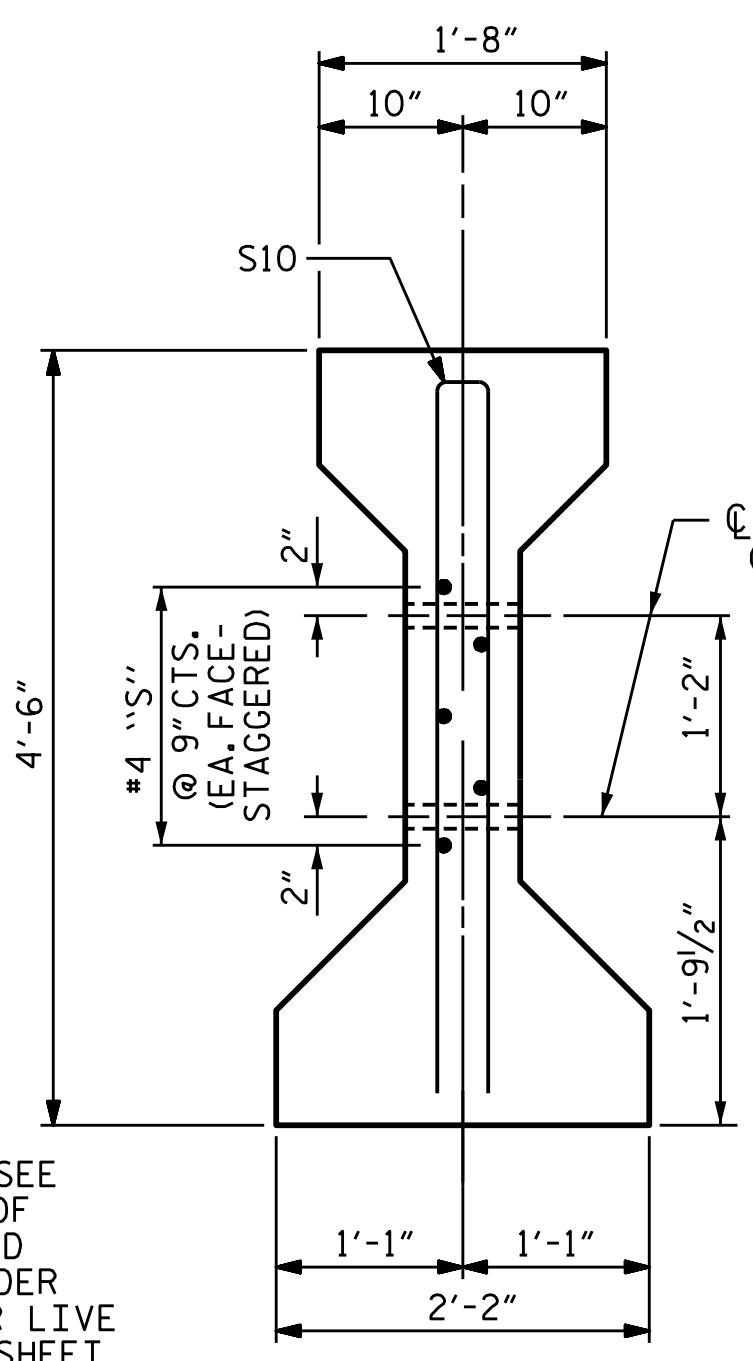
TOTAL SHEETS: 30

STD. NO. PCG6 (Sht. 2)

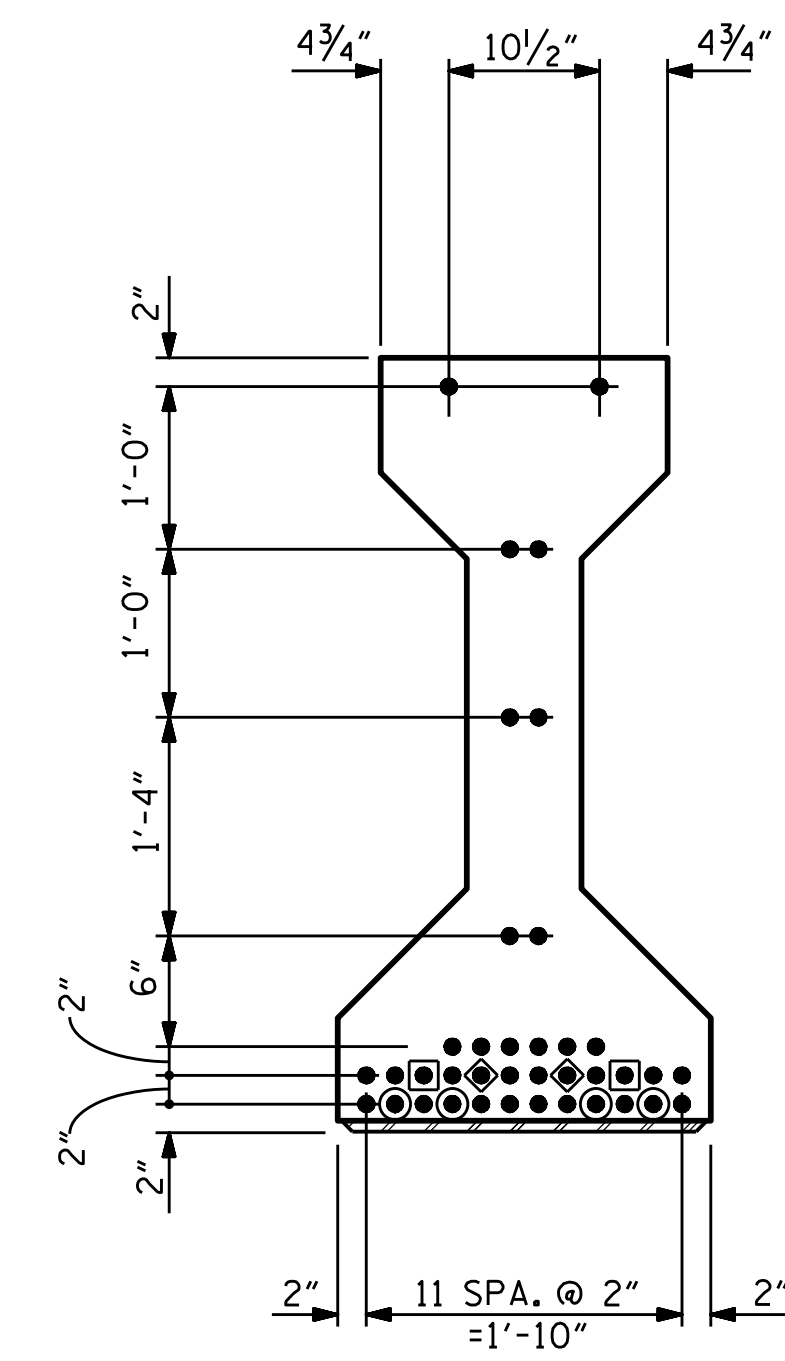
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 KCI PROJECT NO. 241704391.04



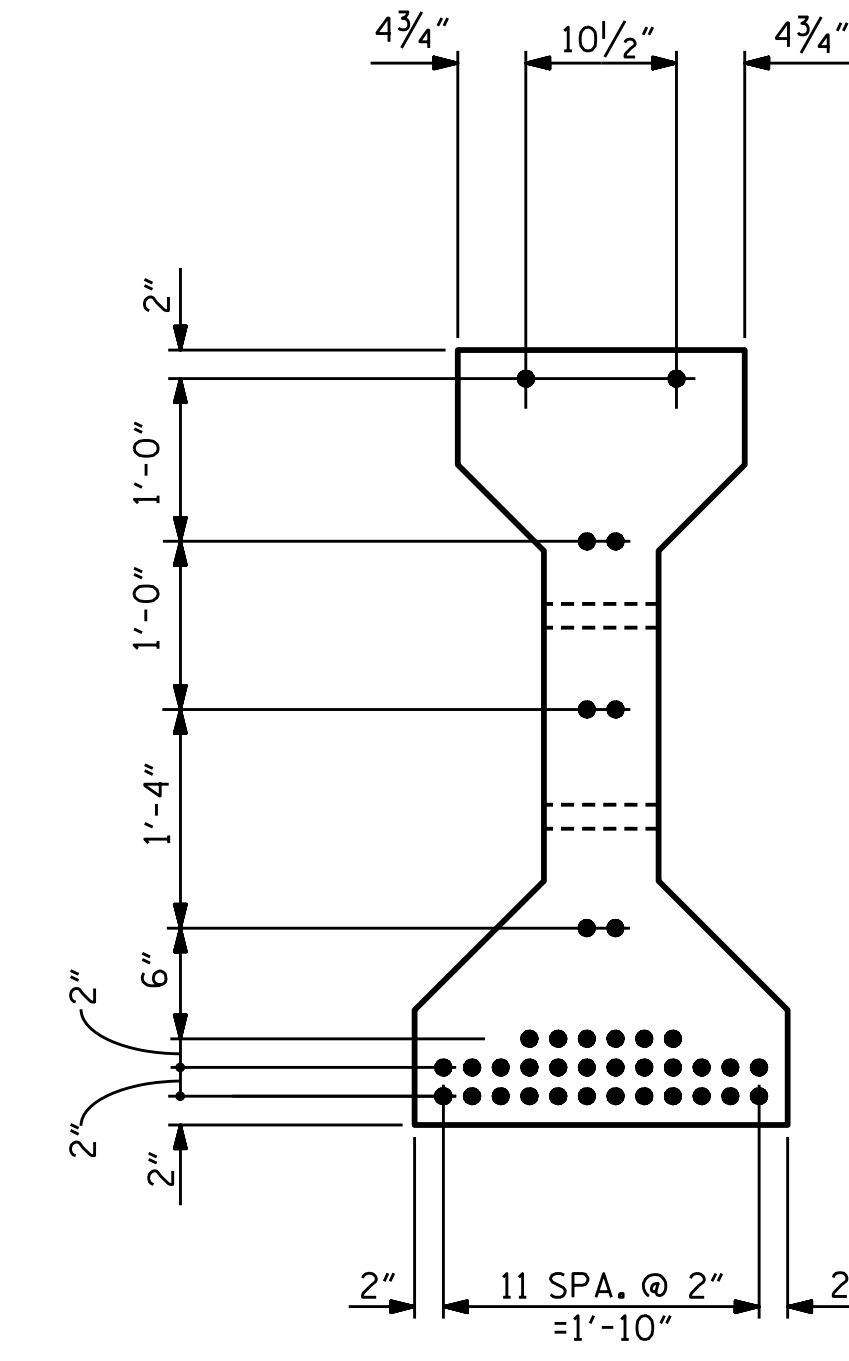
SECTION A-A



SECTION B-B
(S1 BARS NOT SHOWN)

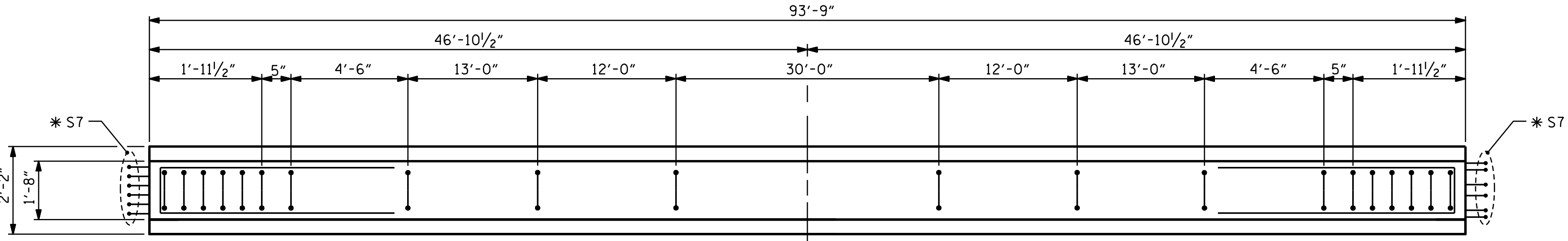


AT END OF GIRDER



AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 10'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- ◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 18'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

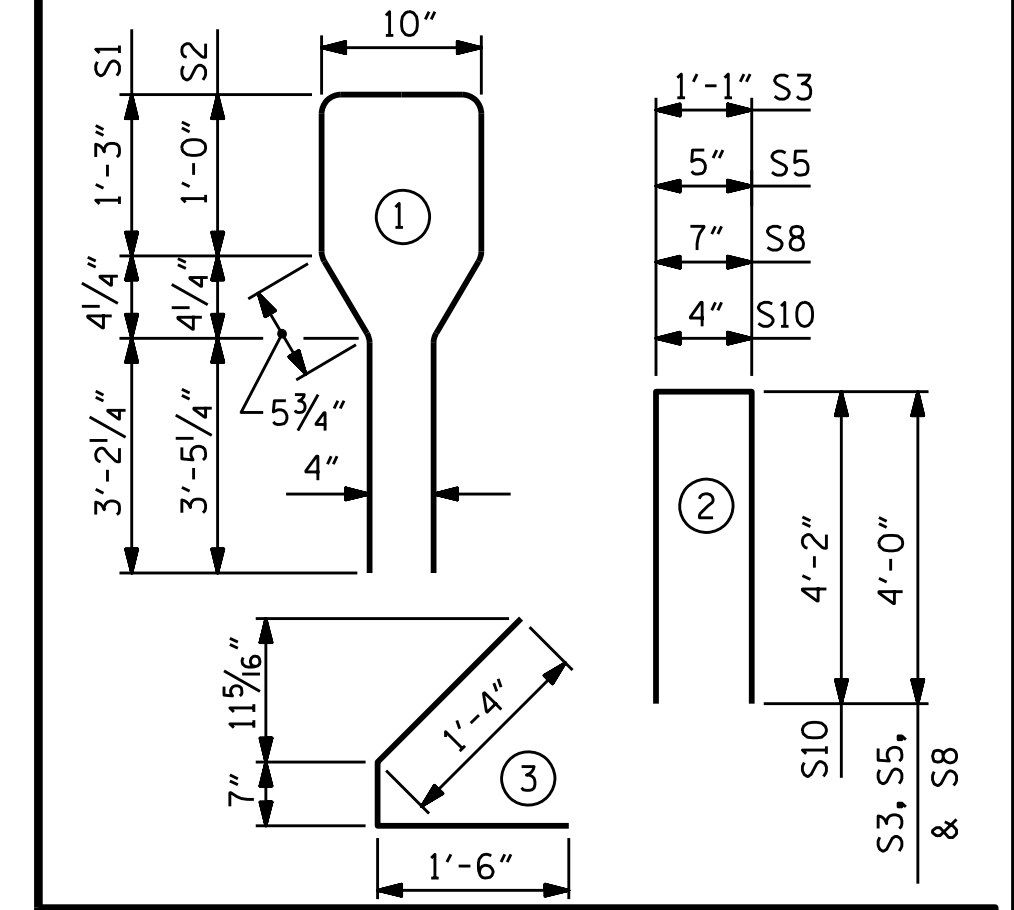
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	76	#4	1	10'-8"	542	
S2	14	#6	1	10'-8"	224	
S3	4	#4	2	9'-1"	24	
S4	68	#4	3	3'-5"	155	
S5	6	#4	2	8'-5"	34	
*S7	12	#5	STR	3'-8"	46	
S8	4	#4	2	8'-7"	23	
S9	2	#3	STR	1'-10"	1	
S10	2	#5	2	8'-8"	18	
S11	5	#4	STR	7'-0"	23	

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



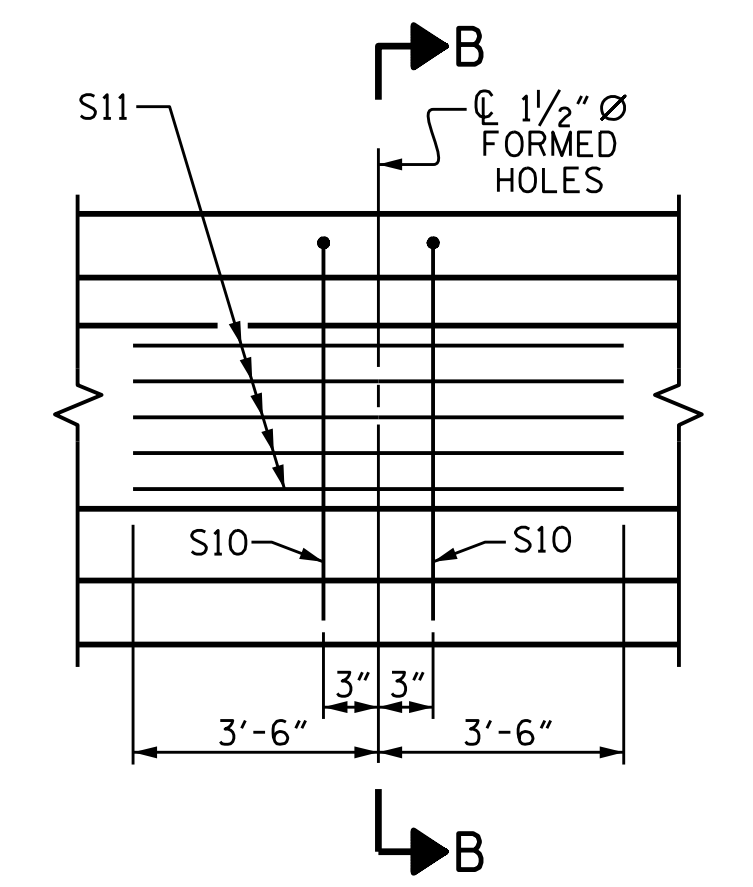
QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	6500 PST CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
	1090	19.0	38

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	93'-9"	375'-0"

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 70+34.00 -L-

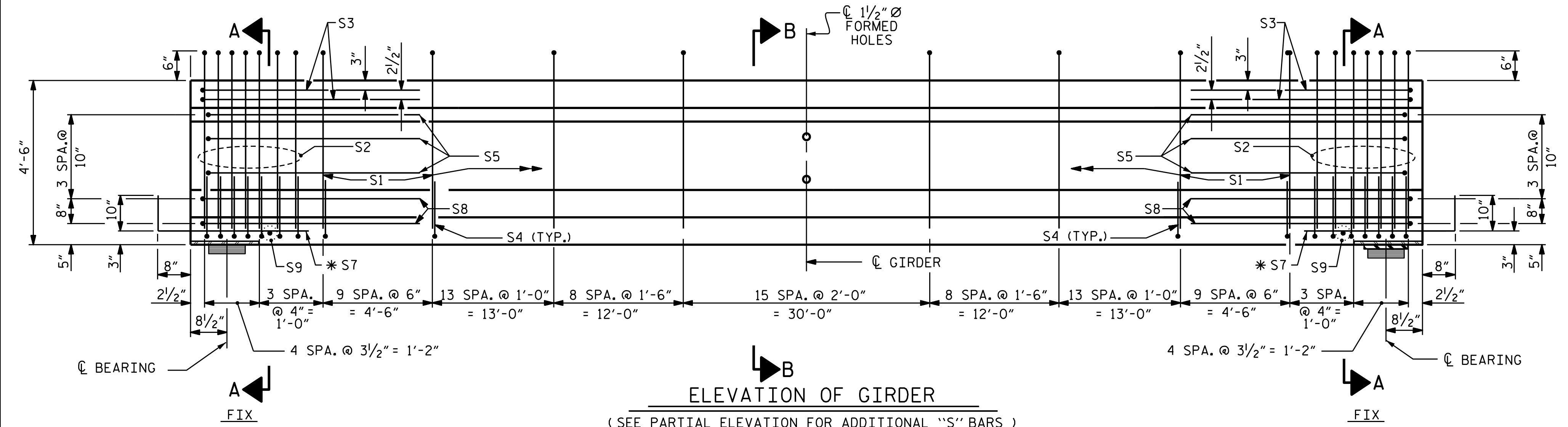
SHEET 2 OF 4

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



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

DESIGN ENGINEER OF RECORD:	DATE: 8/15/2022
ASSEMBLED BY: A. K. ALLANKI	DATE: 08/22/19
CHECKED BY: R. C. LARSON	DATE: 04/23/20
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:

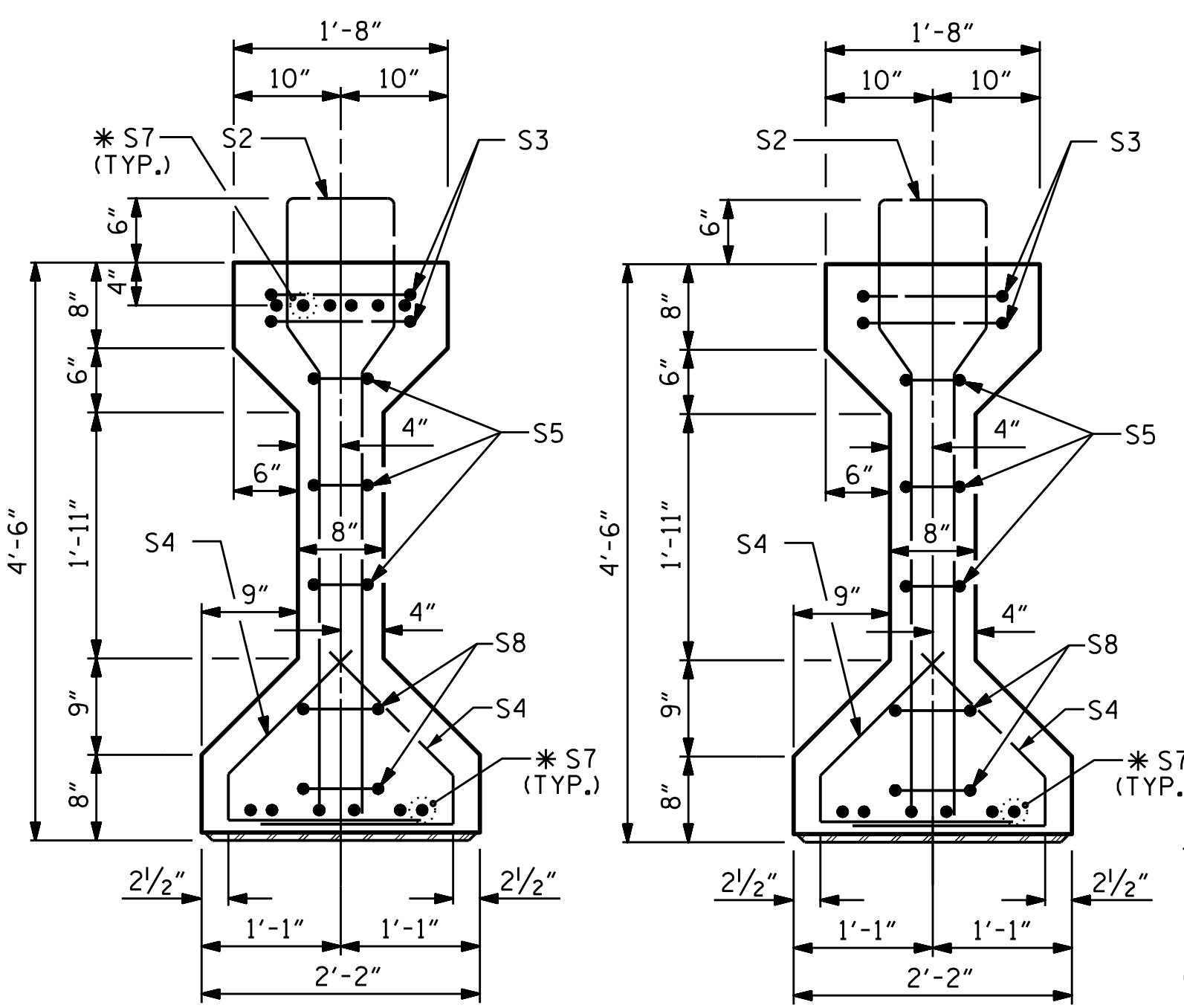
DB3C8E45B06D498
8/15/2022
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14114
ROBERT C. LARSON

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

TOTAL SHEETS 30
S3-11

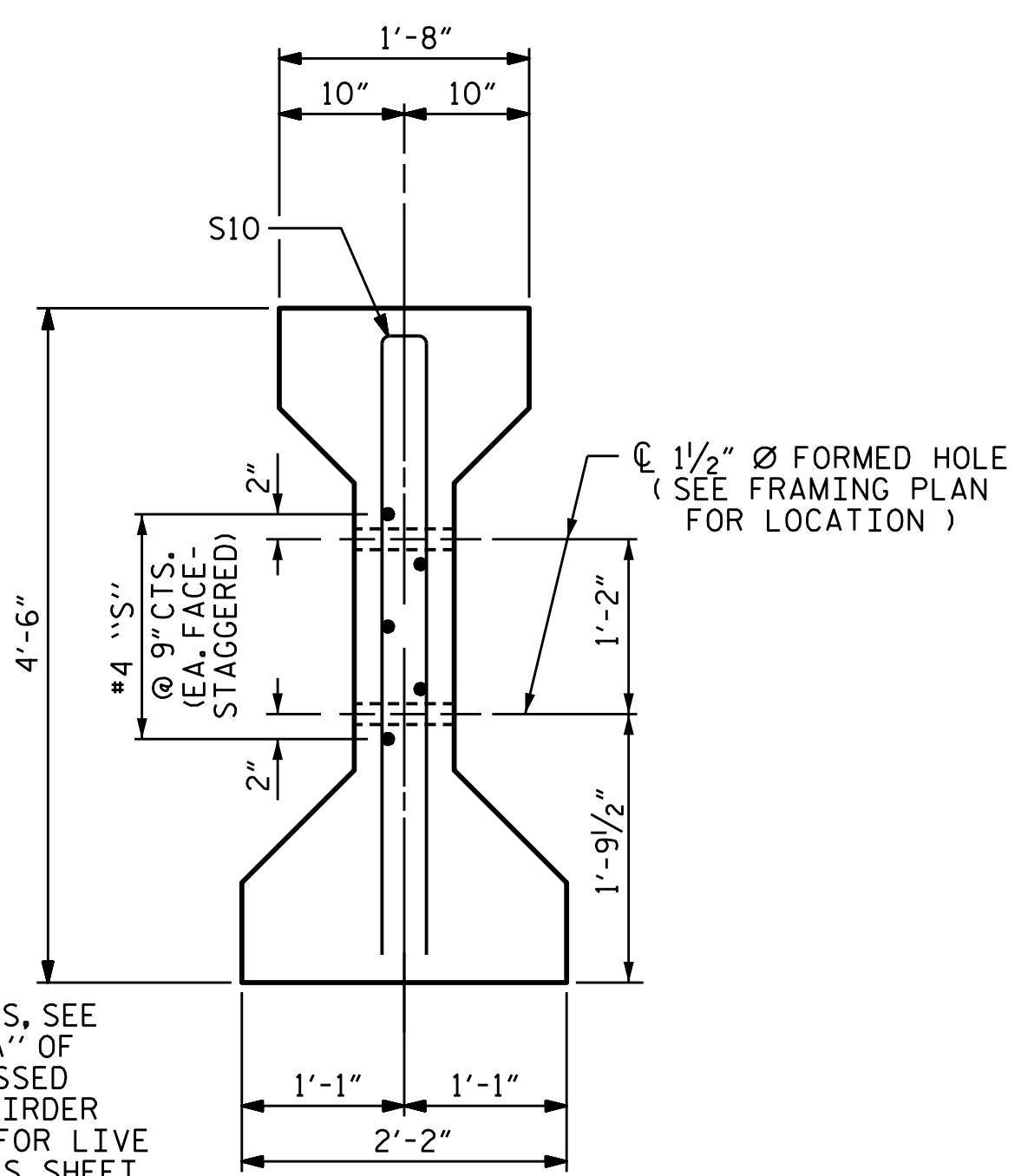
STD. NO. PCG6 (Sht. 2)

\$FILED\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDVRS\$
 \$DATES\$ \$PROJECT NO. 241704391.04\$



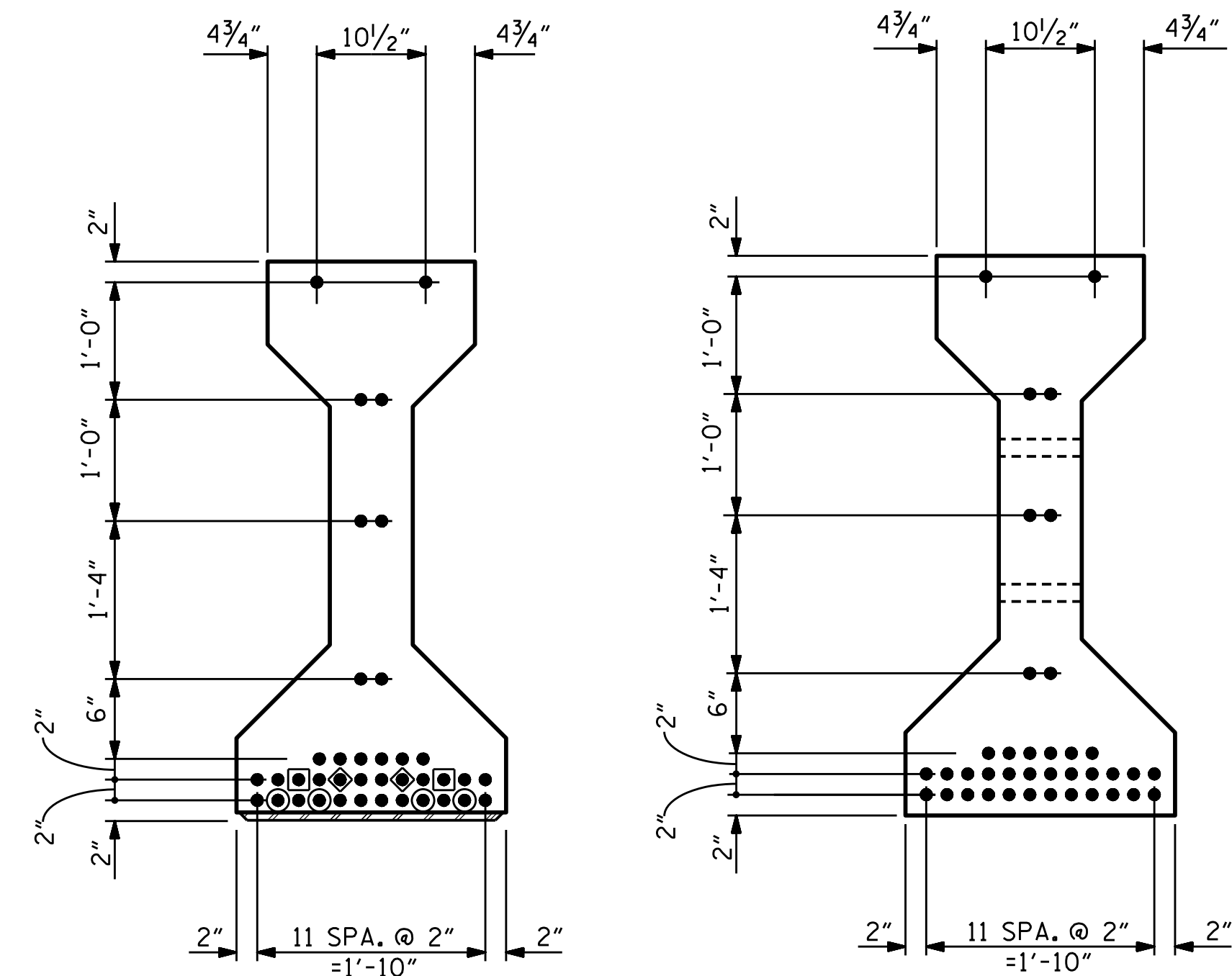
SECTION A-A

SECTION B-B



SECTION C-C
(S1 BARS NOT SHOWN)

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



AT END OF GIRDER

AT \bar{C} OF GIRDER

0.6" \bar{O} LOW RELAXATION STRAND LAYOUT

- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 10'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- ◇ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 18'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

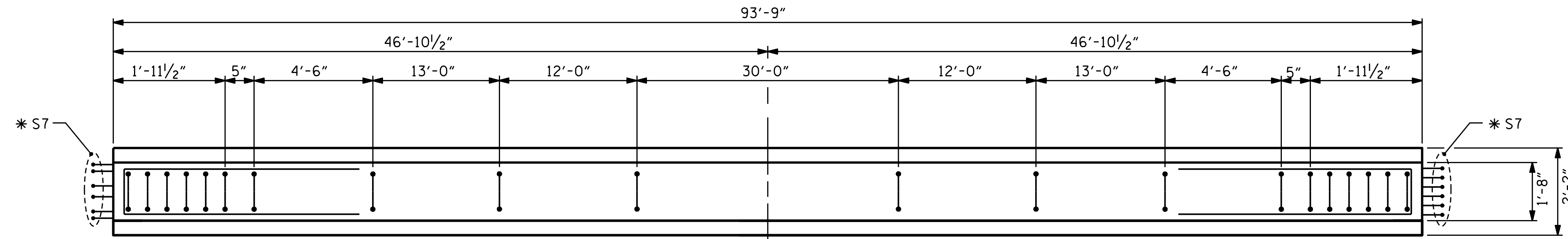
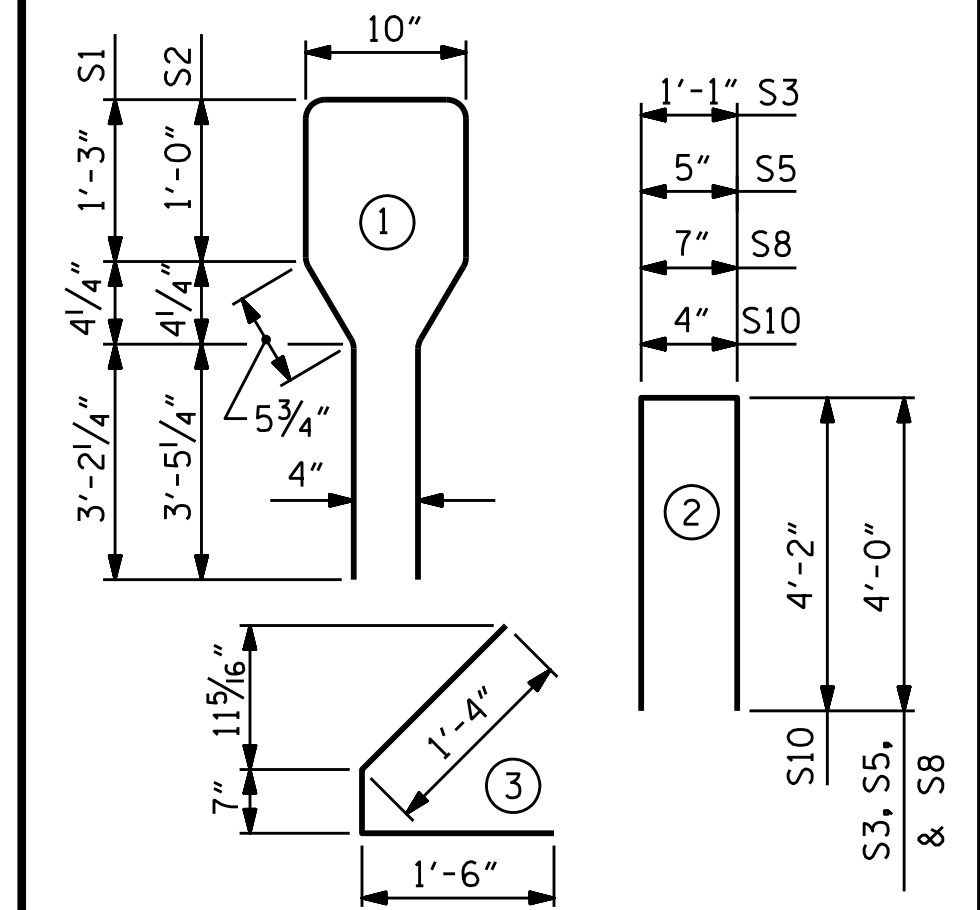
0.6" \bar{O} L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	76	#4	1	10'-8"	542
S2	14	#6	1	10'-8"	224
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

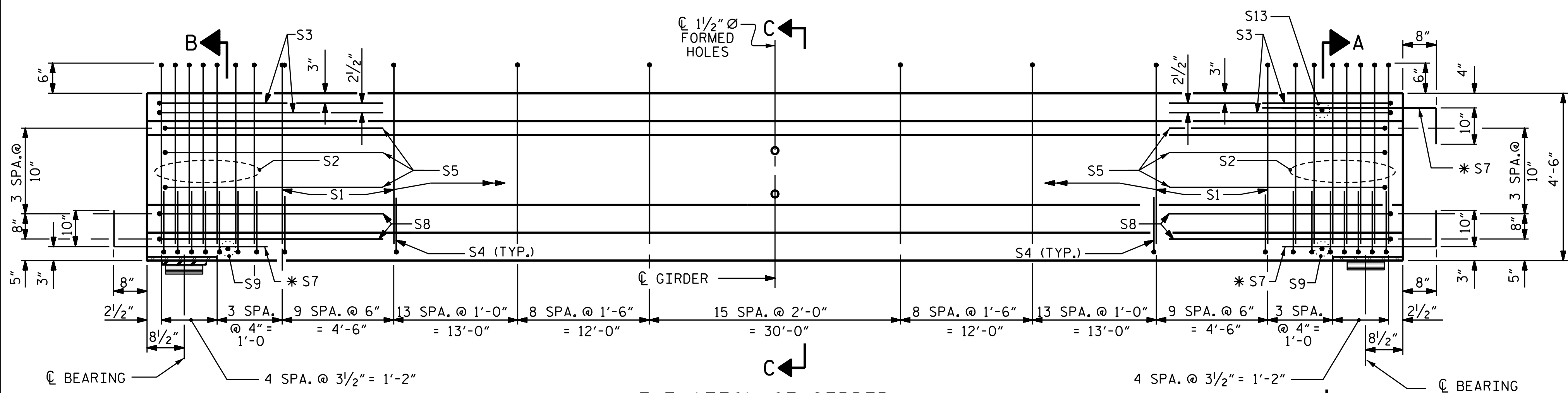
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

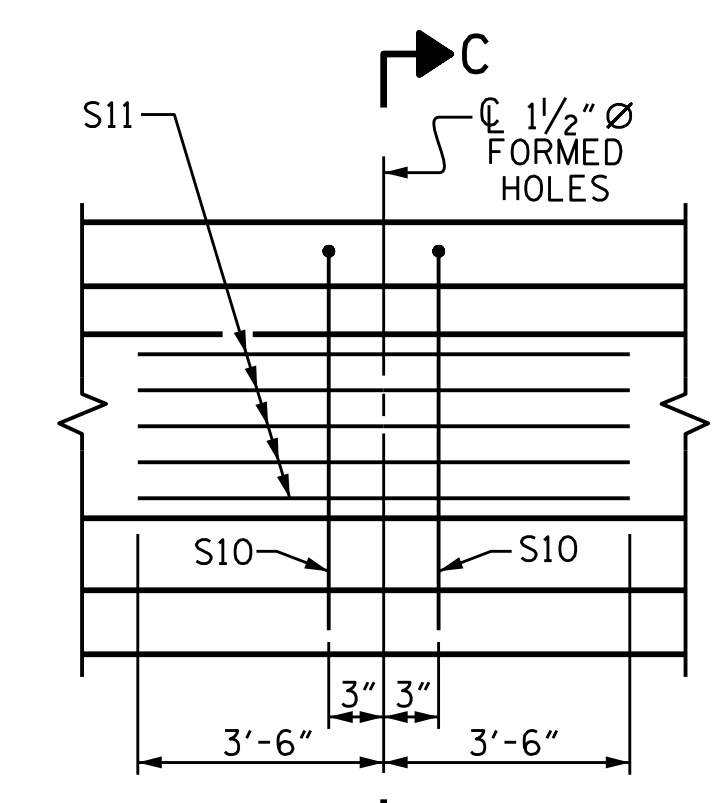


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

INTEGRAL END BENT

QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	6500 PSI CONCRETE	0.6" \bar{O} L. R. STRANDS	
LB.	C.Y.	No.	
1114	19.0	38	

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	93'-9"	375'-0"

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 3 OF 4

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

DocuSigned by:

 DB3C8E45B06D498



DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: A. K. ALLANKI	DATE:	08/22/19
CHECKED BY: R. C. LARSON	DATE:	04/23/20
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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 UNLESS ALL SIGNATURES COMPLETED

ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

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

SHEET NO.	S3-12
TOTAL SHEETS	30

\$FILEL\$ \$DATE\$ \$TIME\$ \$USER\$ \$PLTDRVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04

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.

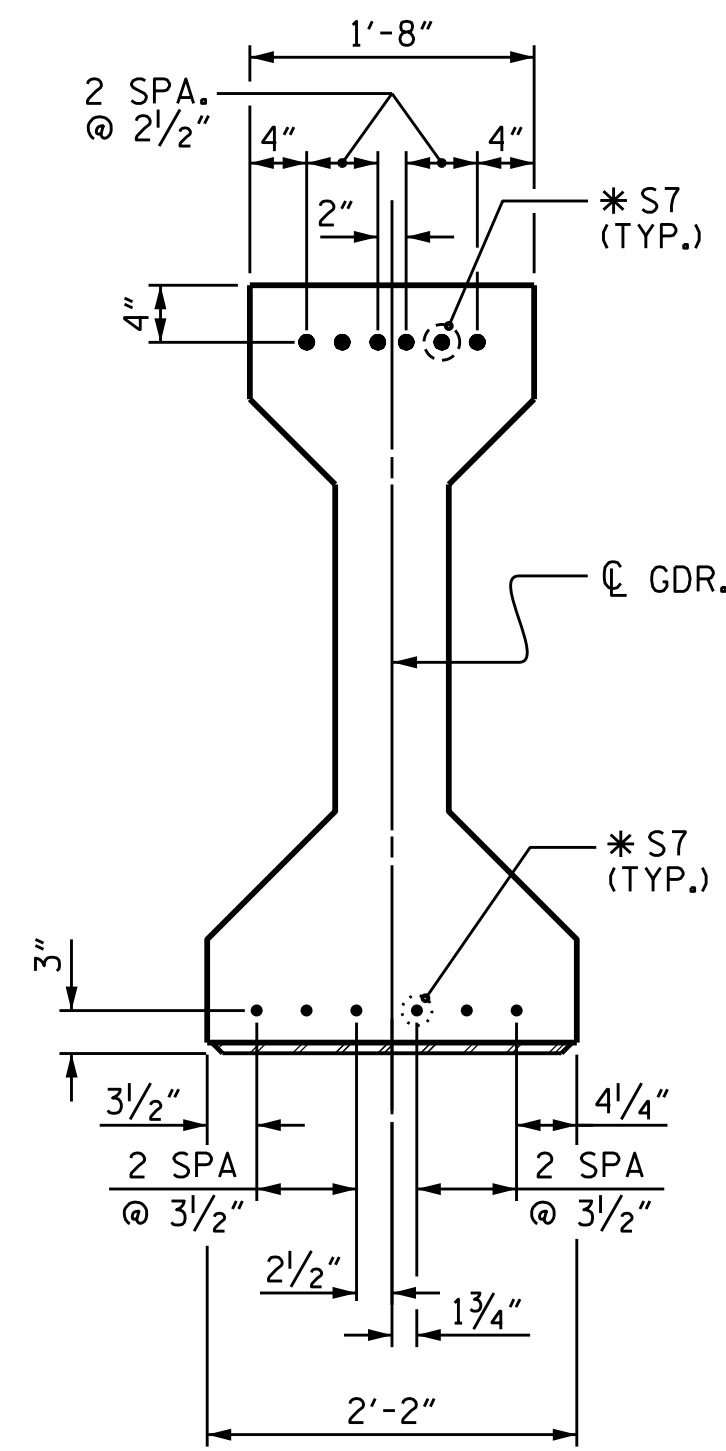
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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 4000 PSI FOR SPAN A AND 5200 PSI FOR SPANS B & C.

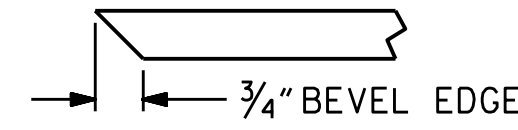
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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



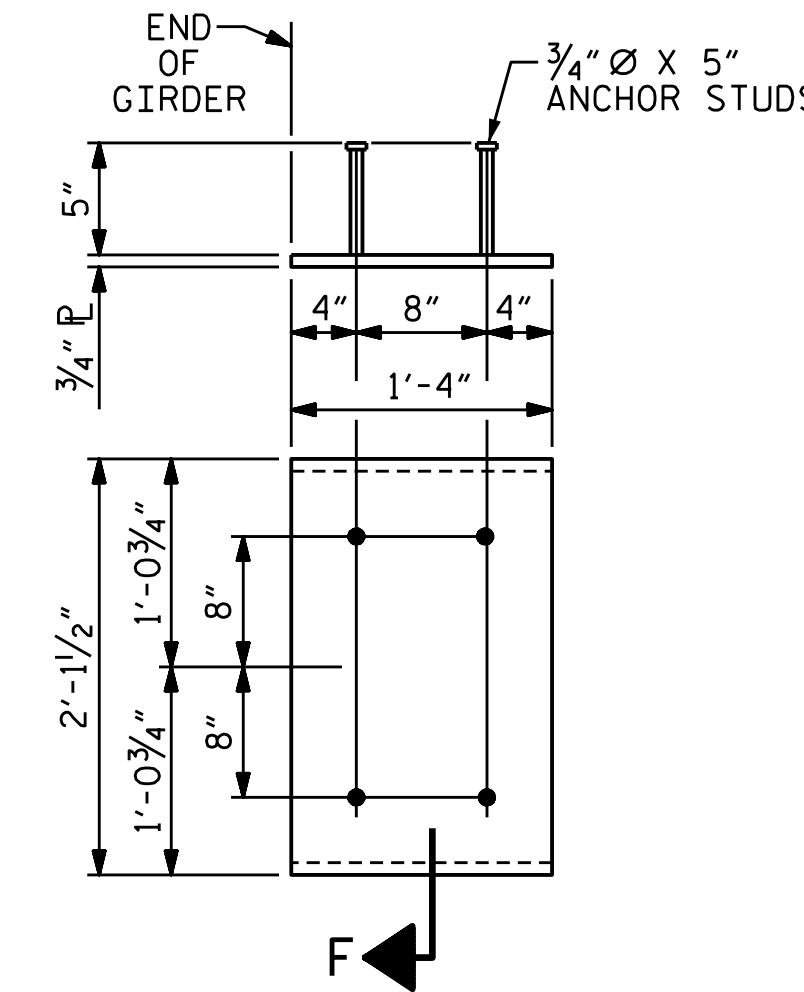
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



SECTION "F"

(SEE NOTES)



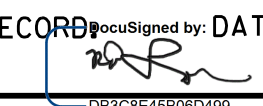
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER AND

(2 REQ'D PER GIRDER)

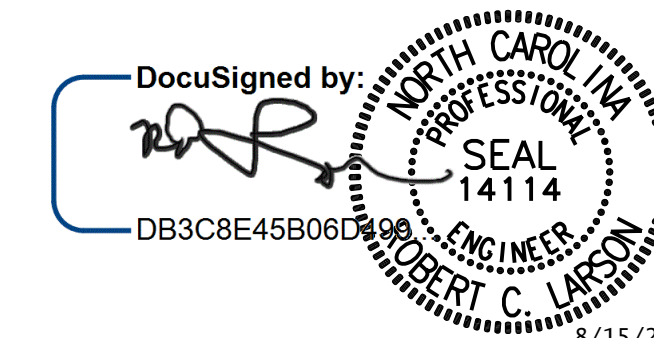
DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION		SPAN A (INTERIOR)																				
TWENTIETH POINTS		0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.021	0.041	0.060	0.078	0.093	0.106	0.117	0.124	0.129	0.131	0.129	0.124	0.117	0.106	0.093	0.078	0.060	0.041	0.021	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.014	0.026	0.041	0.051	0.063	0.072	0.079	0.084	0.088	0.089	0.088	0.084	0.079	0.072	0.063	0.051	0.041	0.026	0.014	0
FINAL CAMBER	↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0
0.6" Ø LOW RELAXATION		SPAN A (EXTERIOR)																				
TWENTIETH POINTS		0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.021	0.041	0.060	0.078	0.093	0.106	0.117	0.124	0.129	0.131	0.129	0.124	0.117	0.106	0.093	0.078	0.060	0.041	0.021	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.013	0.023	0.036	0.046	0.056	0.064	0.071	0.075	0.078	0.079	0.078	0.075	0.071	0.064	0.056	0.046	0.036	0.023	0.013	0
FINAL CAMBER	↑	0	1/8"	3/16"	5/16"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	3/16"	1/8"	0
0.6" Ø LOW RELAXATION		SPAN B OR C (INTERIOR)																				
TWENTIETH POINTS		0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.032	0.062	0.092	0.118	0.142	0.162	0.178	0.189	0.197	0.199	0.197	0.189	0.178	0.162	0.142	0.118	0.092	0.062	0.032	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.027	0.050	0.078	0.098	0.120	0.137	0.151	0.161	0.167	0.169	0.167	0.161	0.151	0.137	0.120	0.098	0.078	0.050	0.027	0
FINAL CAMBER	↑	0	1/16"	1/8"	3/16"	1/4"	1/4"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	5/16"	5/16"	1/4"	1/4"	3/16"	1/8"	1/16"	0
0.6" Ø LOW RELAXATION		SPAN B OR C (EXTERIOR)																				
TWENTIETH POINTS		0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.032	0.062	0.092	0.118	0.142	0.162	0.178	0.189	0.197	0.199	0.197	0.189	0.178	0.162	0.142	0.118	0.092	0.062	0.032	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.024	0.045	0.069	0.088	0.108	0.122	0.135	0.144	0.149	0.151	0.149	0.144	0.135	0.122	0.108	0.088	0.069	0.045	0.024	0
FINAL CAMBER	↑	0	1/16"	3/16"	1/4"	3/8"	7/16"	1/2"	1/2"	9/16"	9/16"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	3/8"	1/4"	3/16"	1/16"	0

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

DESIGN ENGINEER OF RECORD	DocuSigned by: 	DATE :	8/15/2022
ASSEMBLED BY : R. C. LARSON	DATE :	06/24/20	
CHECKED BY : R. F. DECOLA	DATE :	09/09/20	
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	

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PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 70+34.00 -L-

SHEET 4 OF 4

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

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S3- 13	
1			3			TOTAL SHEETS	
2			4			30	

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDYVS\$ \$PROJECT NO. 241704391.04

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.

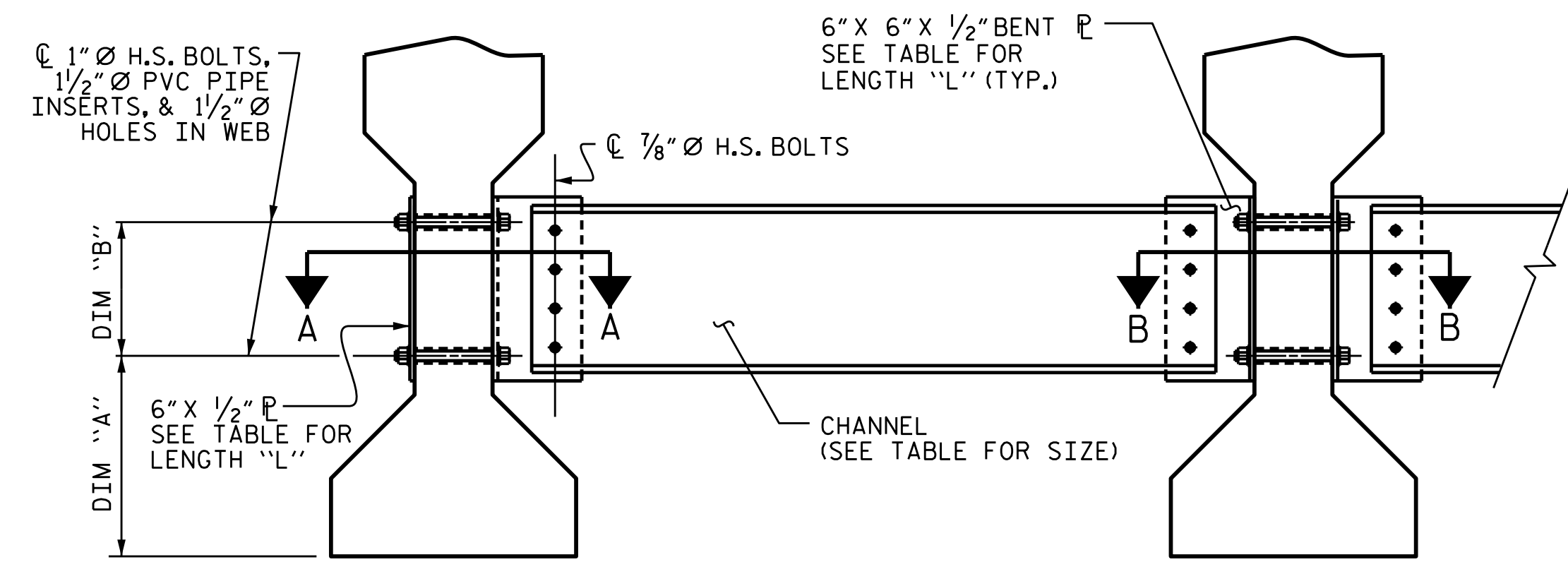
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

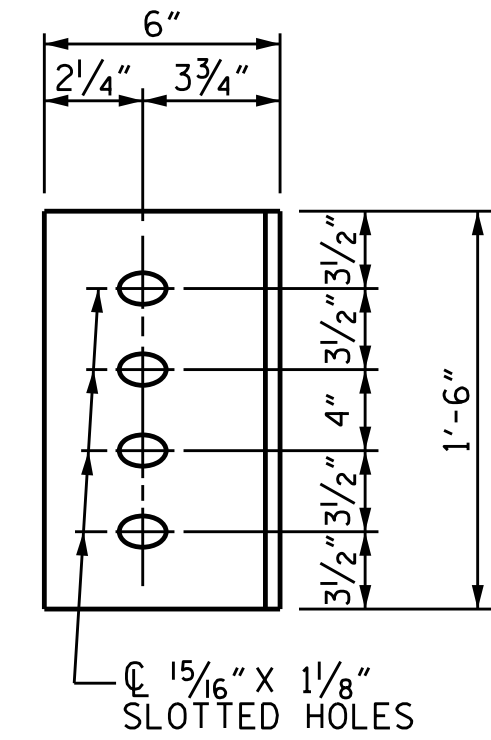
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

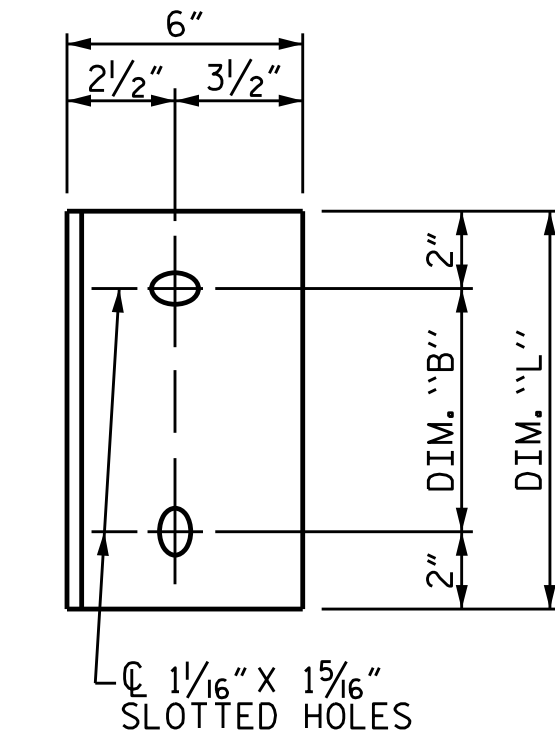
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



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



DIAPHRAGM FACE
 (TYPE IV GDR.)



WEB FACE

CONNECTOR PLATE DETAILS

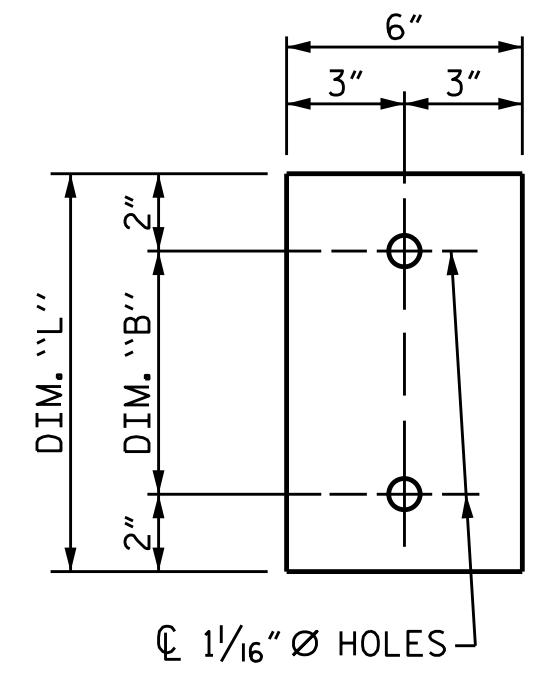
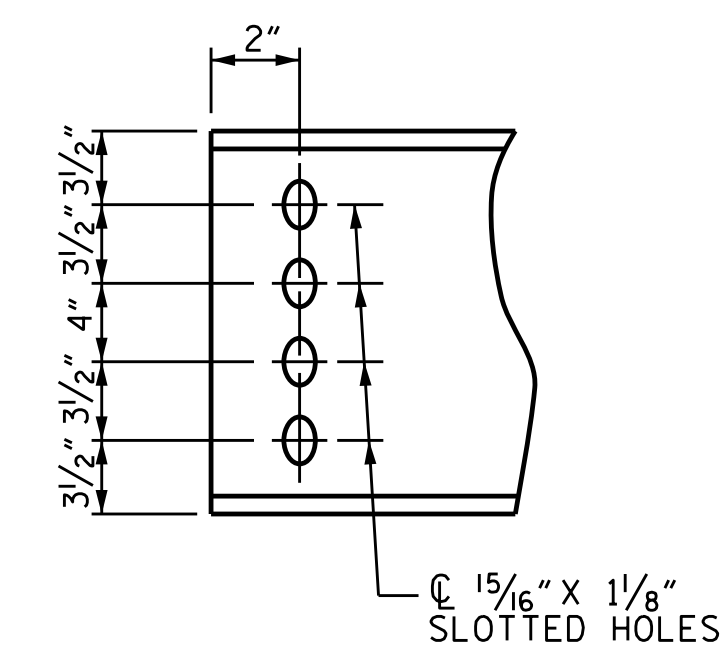
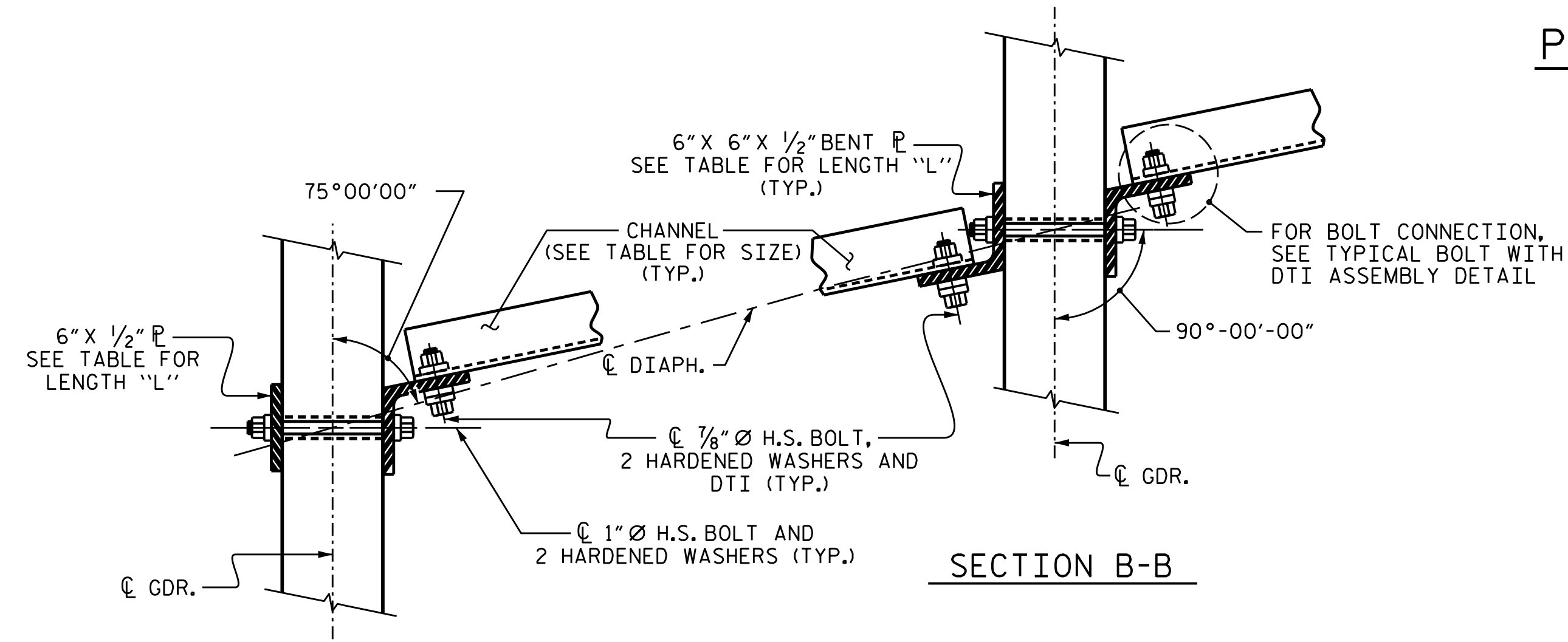


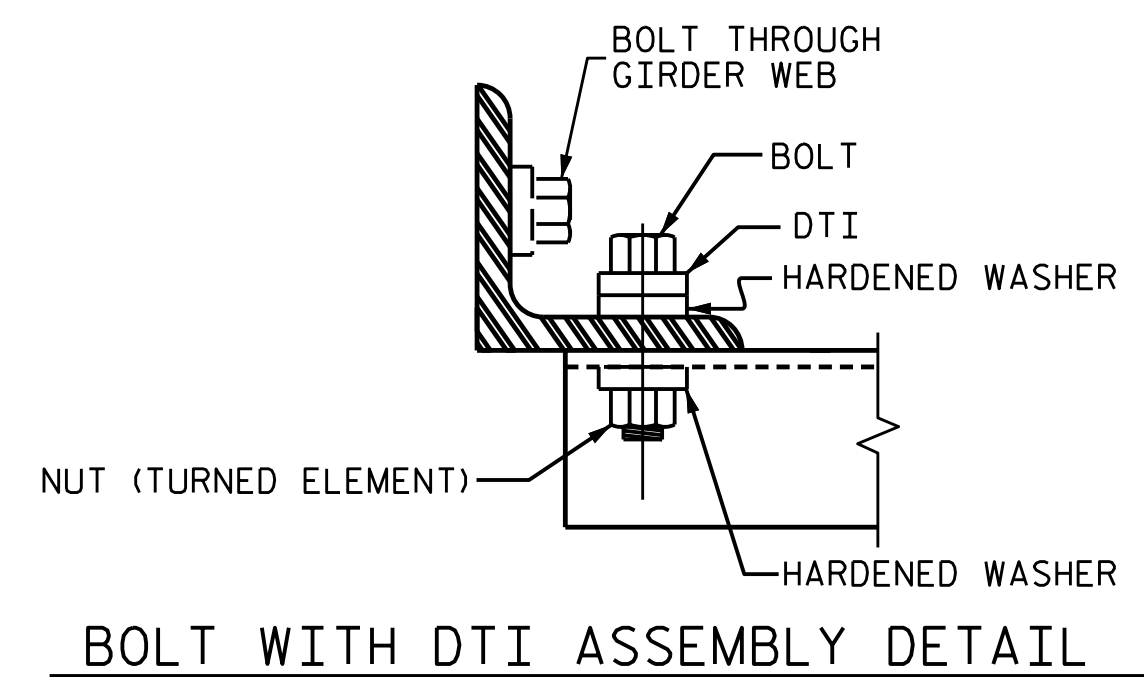
PLATE DETAILS



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. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

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

DocuSigned by:

 DB3C8E45B06D48
 8/15/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-14
1			3			TOTAL SHEETS
2			4			30

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-4270 Phone: 919-783-9294

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTDVYS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04

DESIGN ENGINEER OF RECORD: DATE: 8/15/2022
 ASSEMBLED BY: ALAN SAMBOY DATE: 06/09/20
 CHECKED BY: R. C. LARSON DATE: 06/19/20
 DRAWN BY: TLA 6/05 REV. 5/1/06RRR KMM/GM
 CHECKED BY: VC 6/05 REV. 10/1/18 MAA/GM
 REV. 12/17 MAA/THC

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

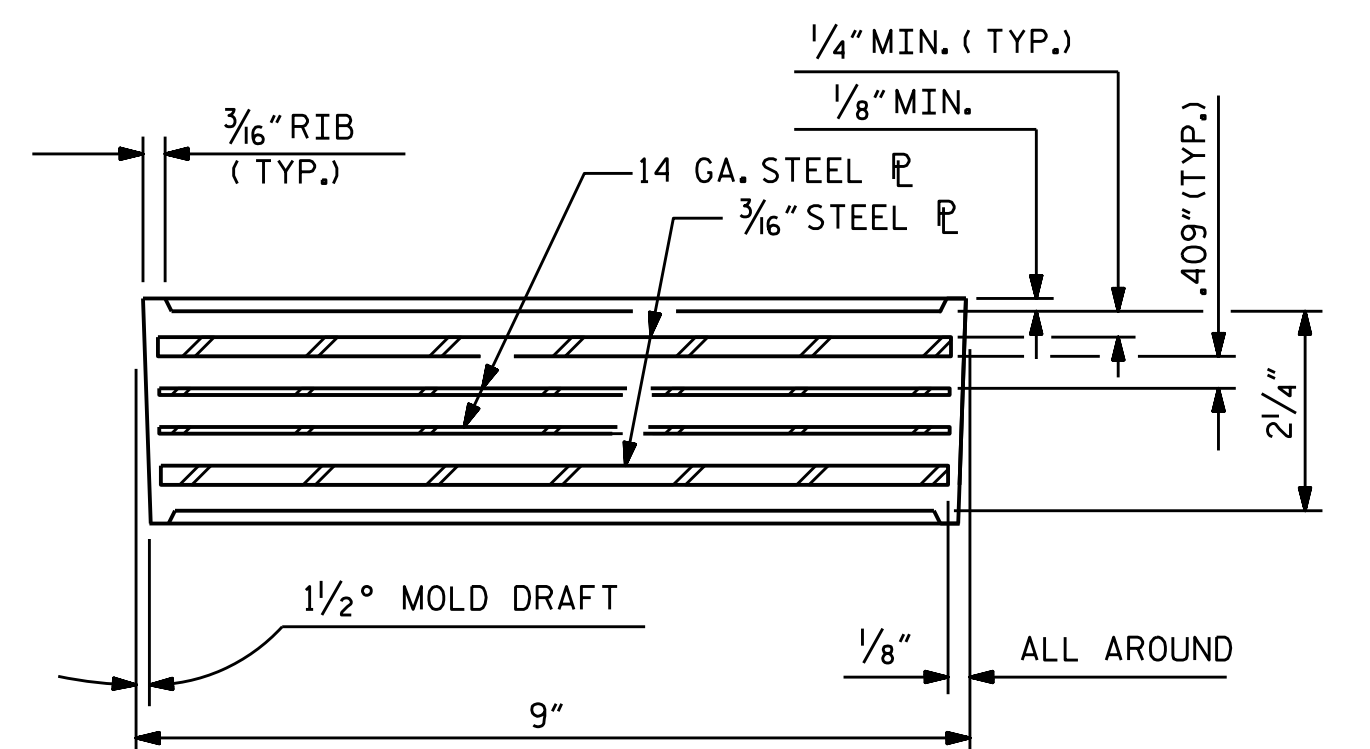
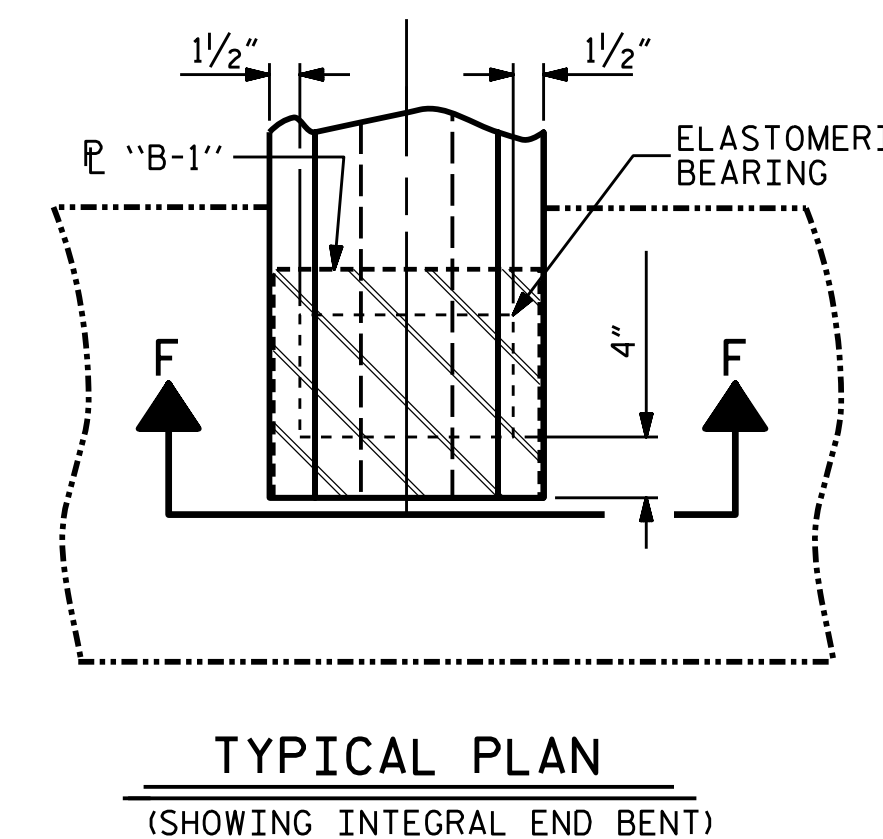
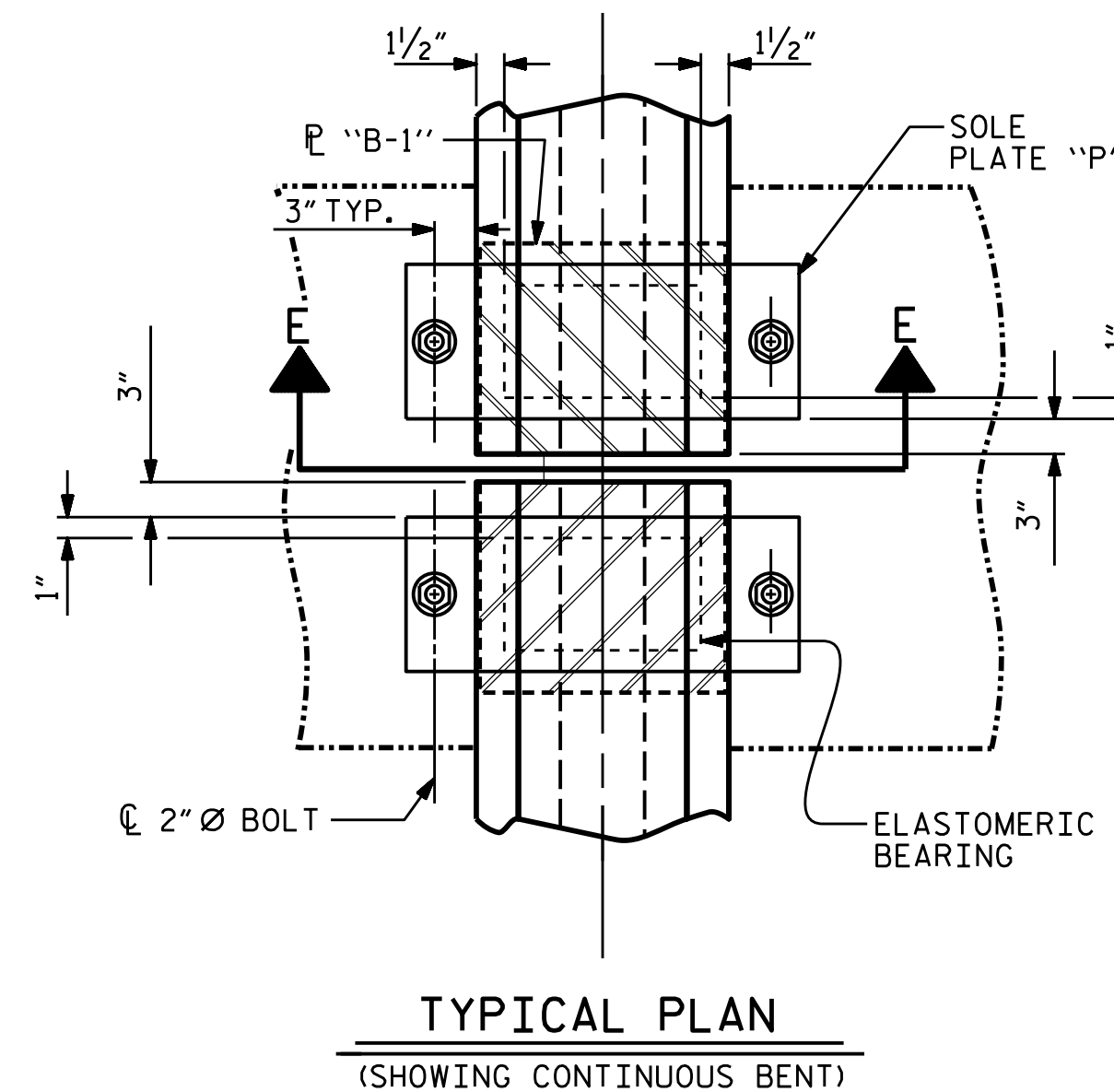
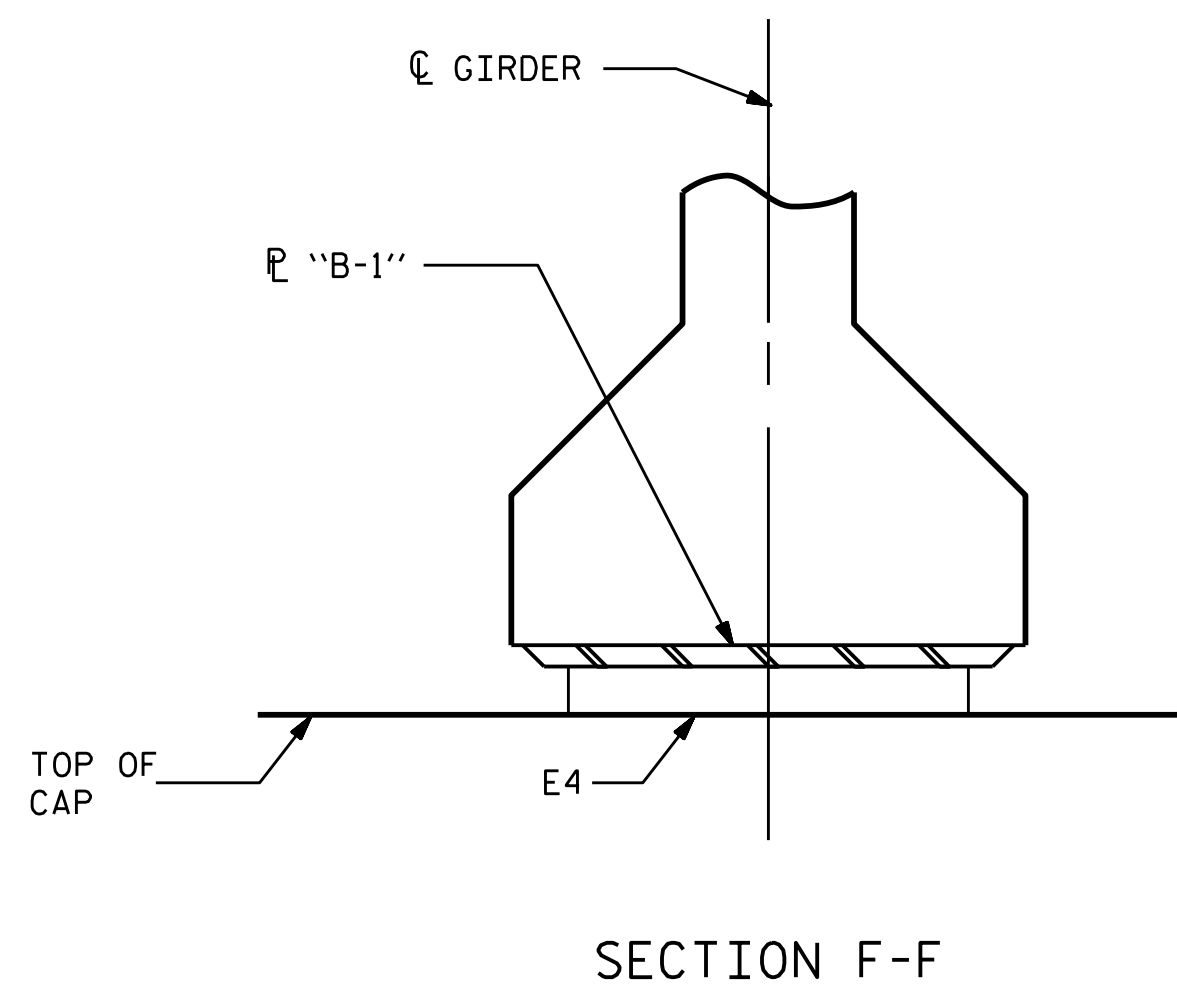
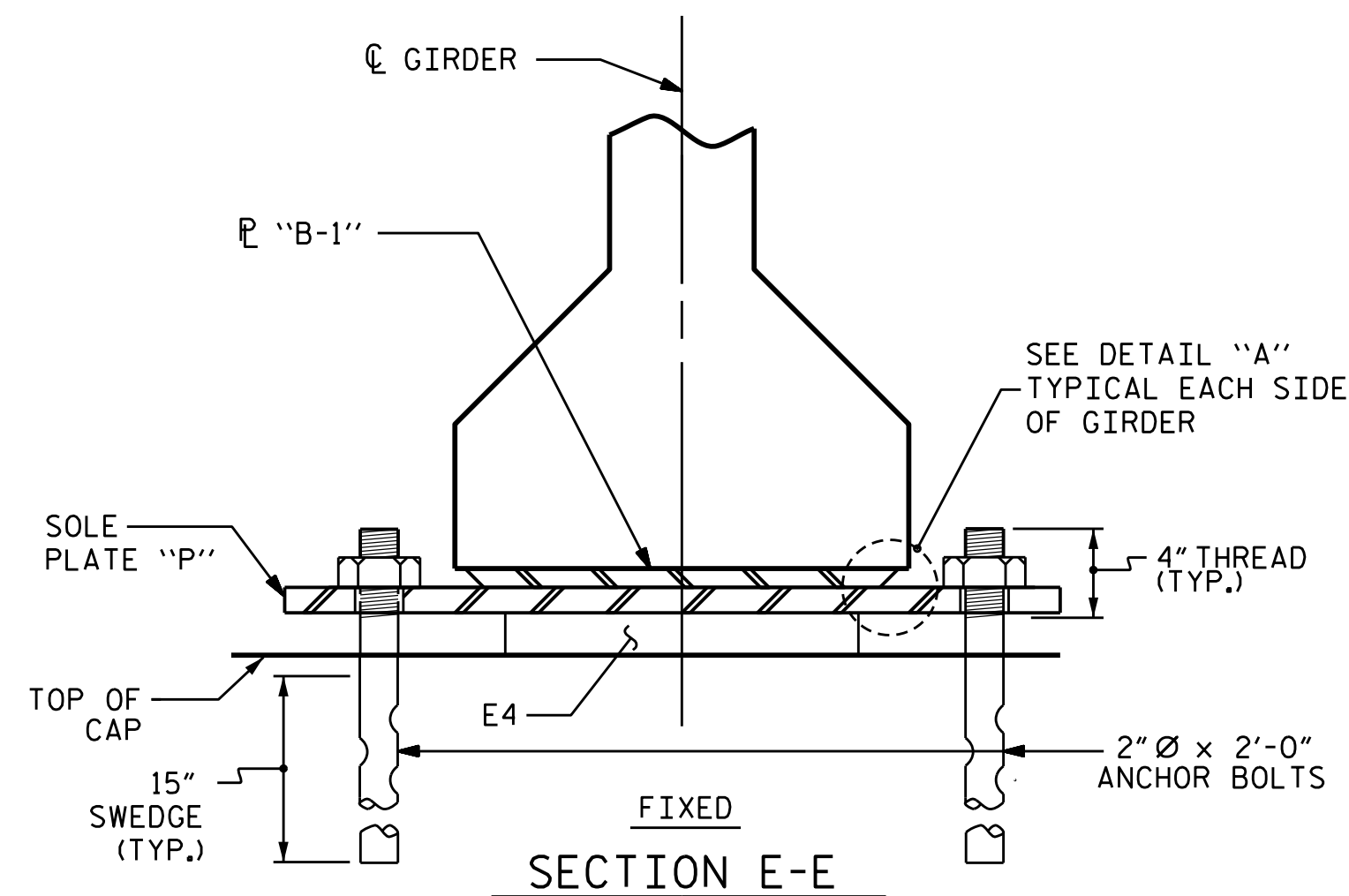
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

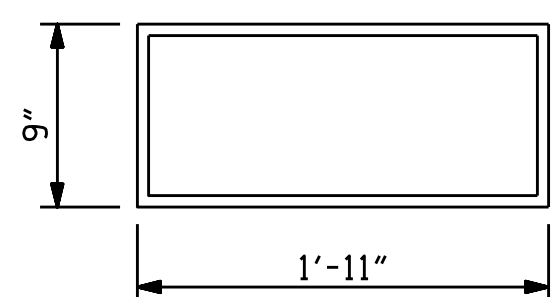
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



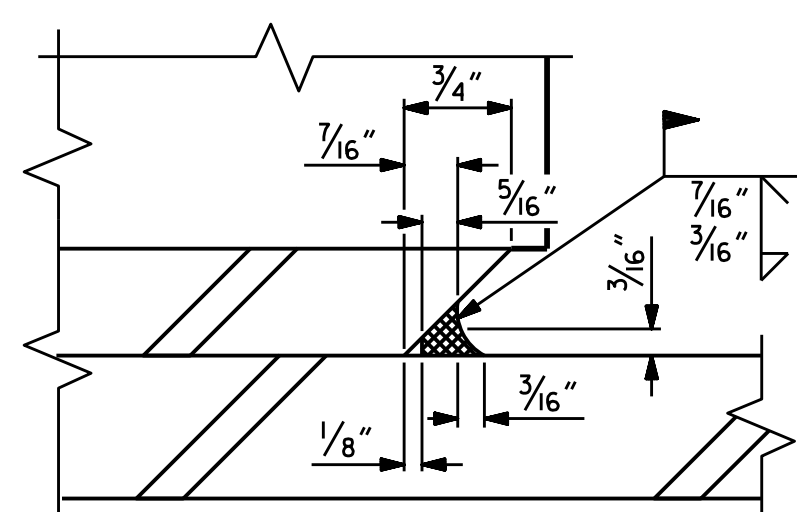
TYPICAL SECTION OF ELASTOMERIC BEARINGS



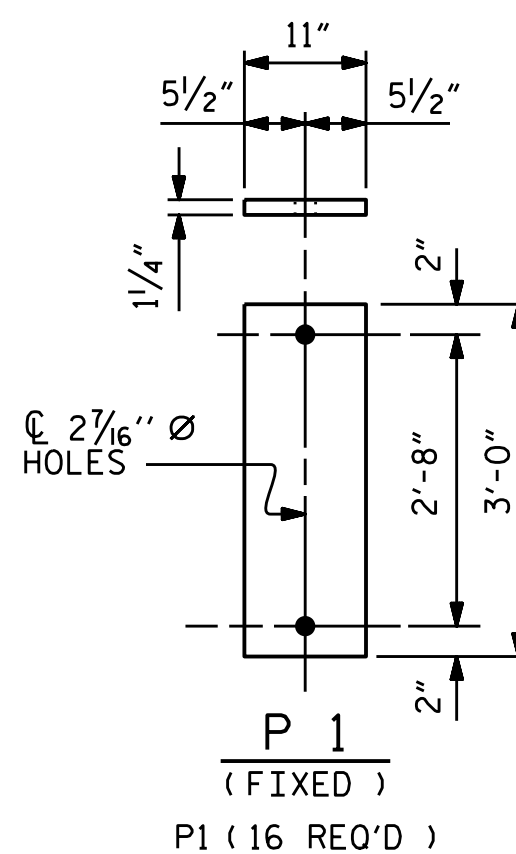
E4 (24 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



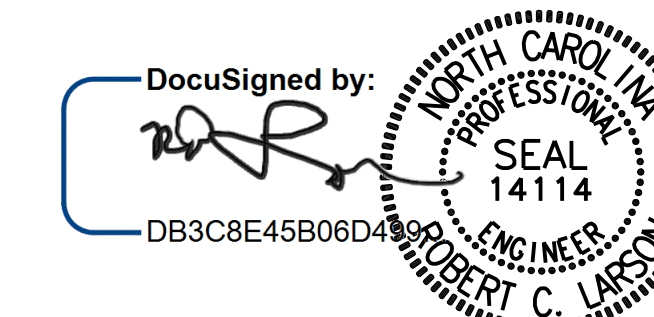
DETAIL "A"



SOLE PLATE DETAILS ("P")

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

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-



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

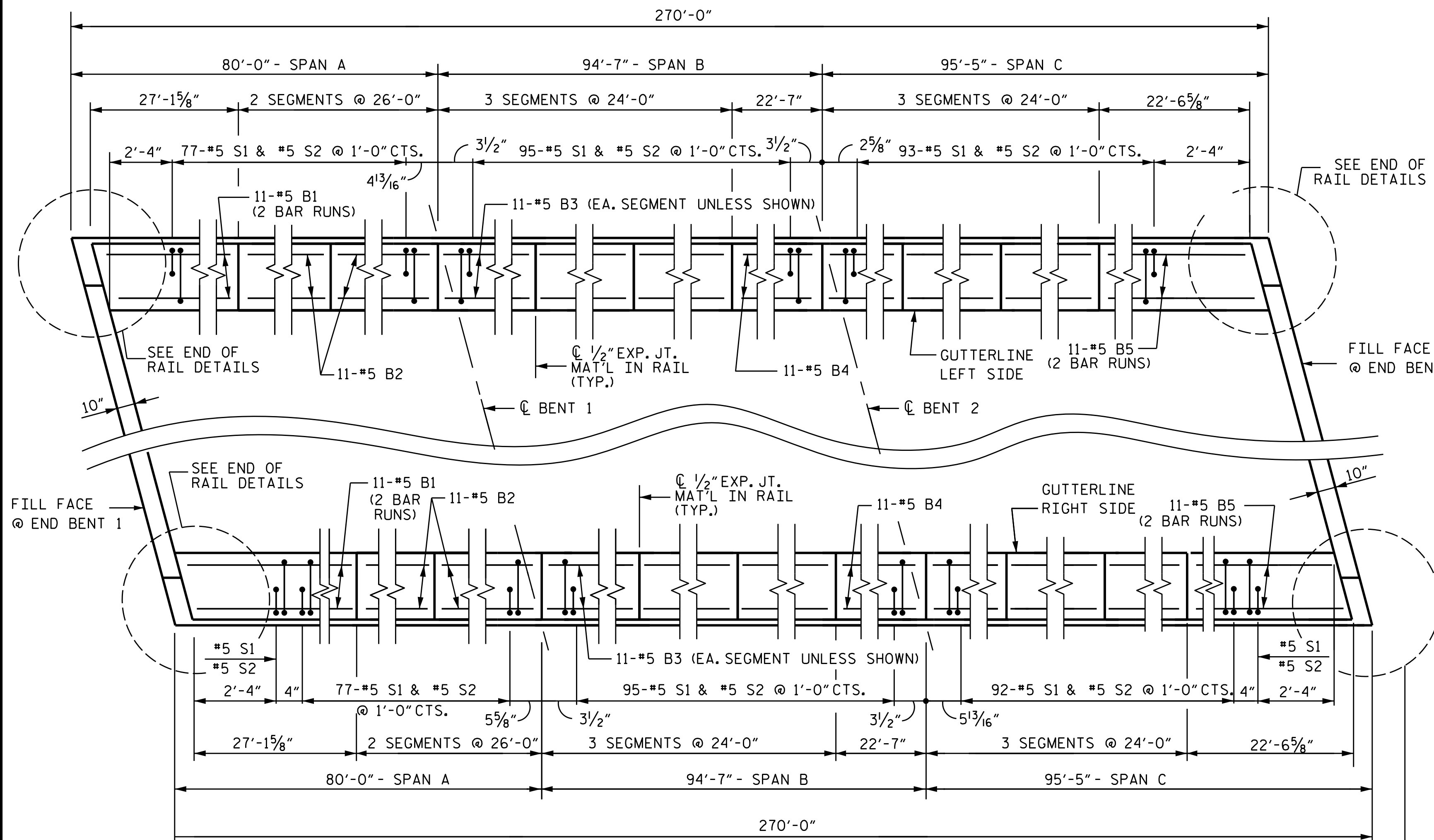
DESIGN ENGINEER OF RECORD: <i>[Signature]</i> DATE: 8/15/2022
ASSEMBLED BY: A. K. ALLANKAR DATE: 08/23/19
CHECKED BY: R. C. LARSON DATE: 06/22/20
DRAWN BY: EEM 2/97 REV. 6/13 AAC/MAA
CHECKED BY: VAP 2/97 REV. 1/15 MAA/TMC
REV. 12/17 MAA/THC

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

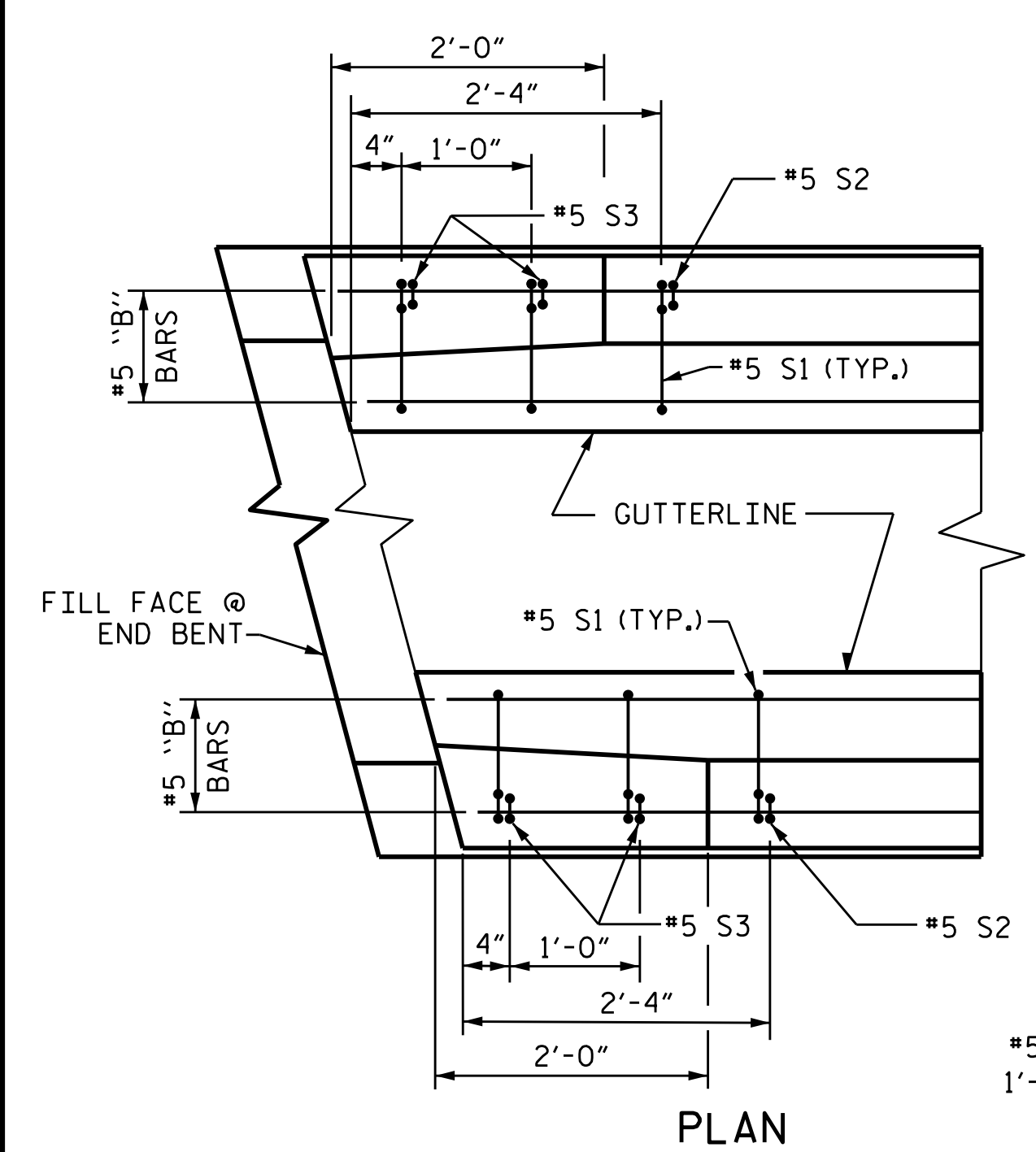
ENGINEERS PLANNERS SCIENTISTS CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-1270 Phone: 919-783-8200

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-15	
1			3			TOTAL SHEETS	
2			4			30	

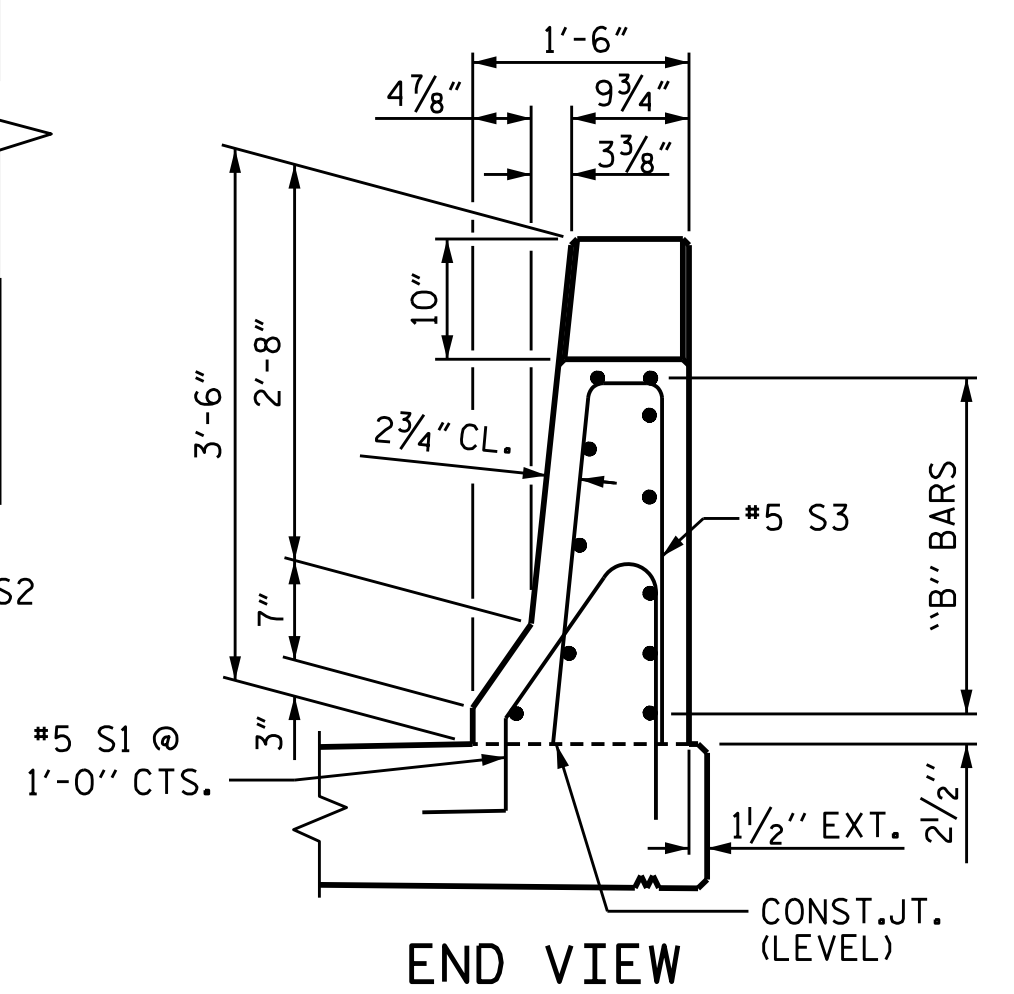
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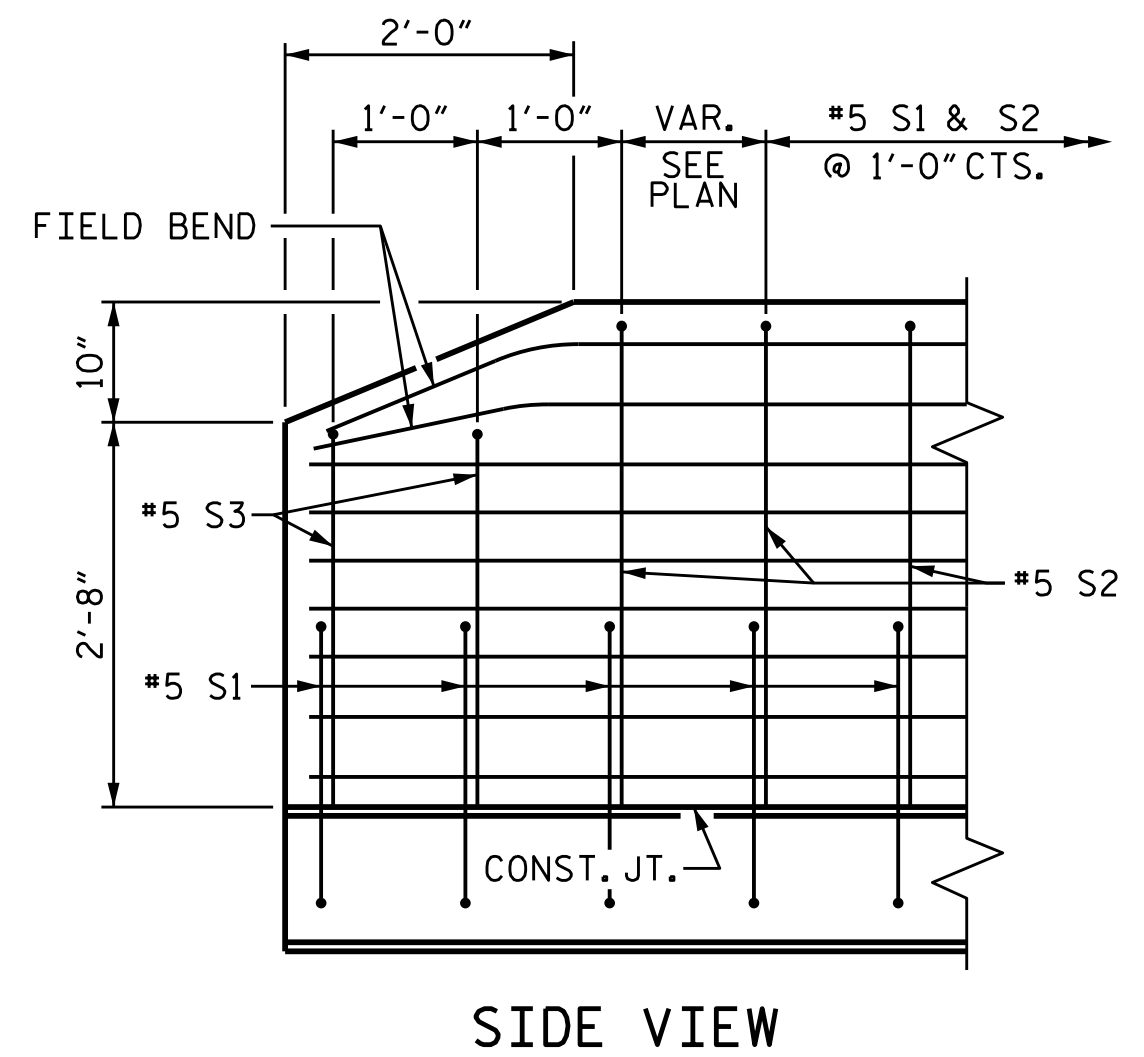
PLAN



PLAN



END VIEW



SIDE VIEW

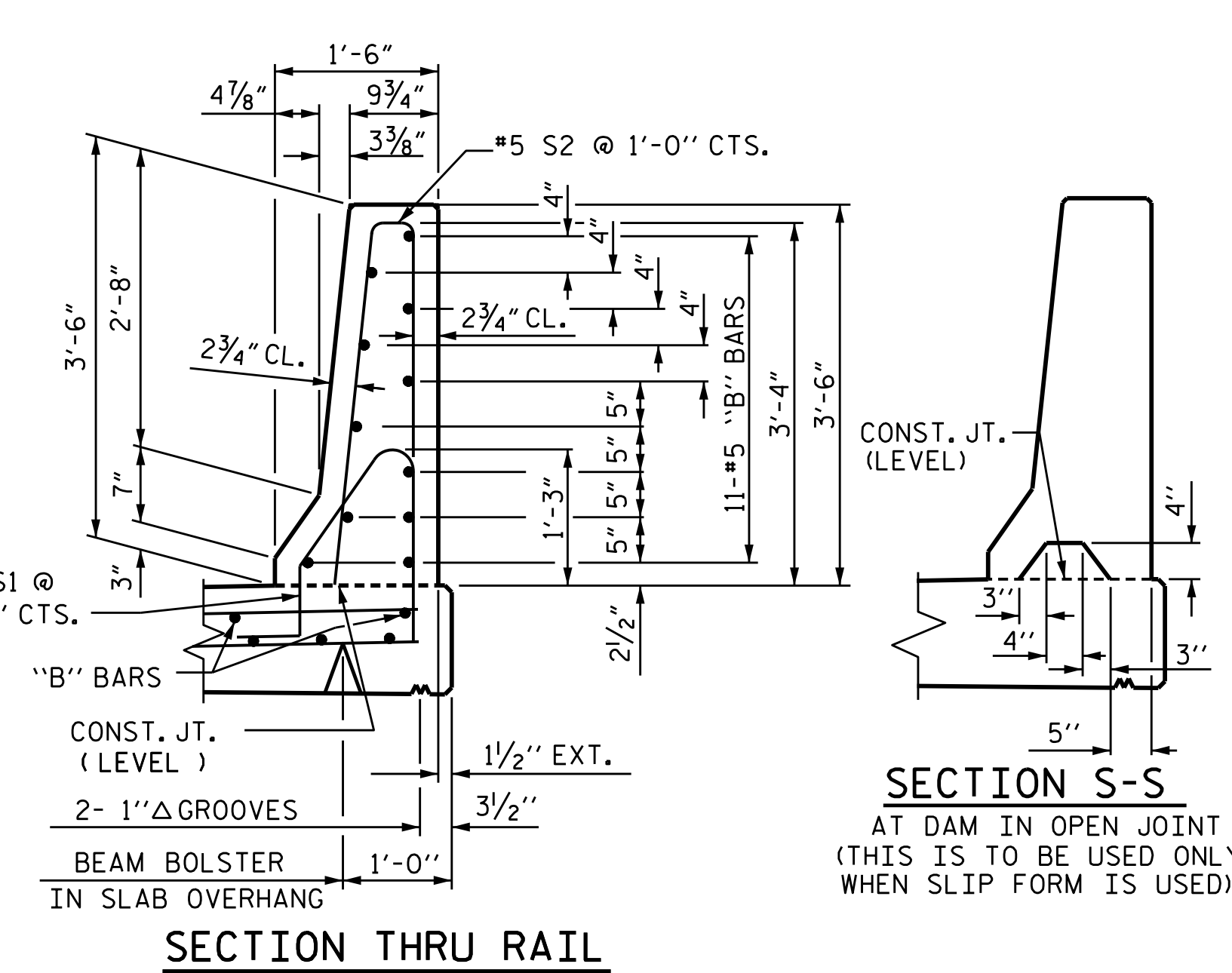
END OF RAIL DETAILS

NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

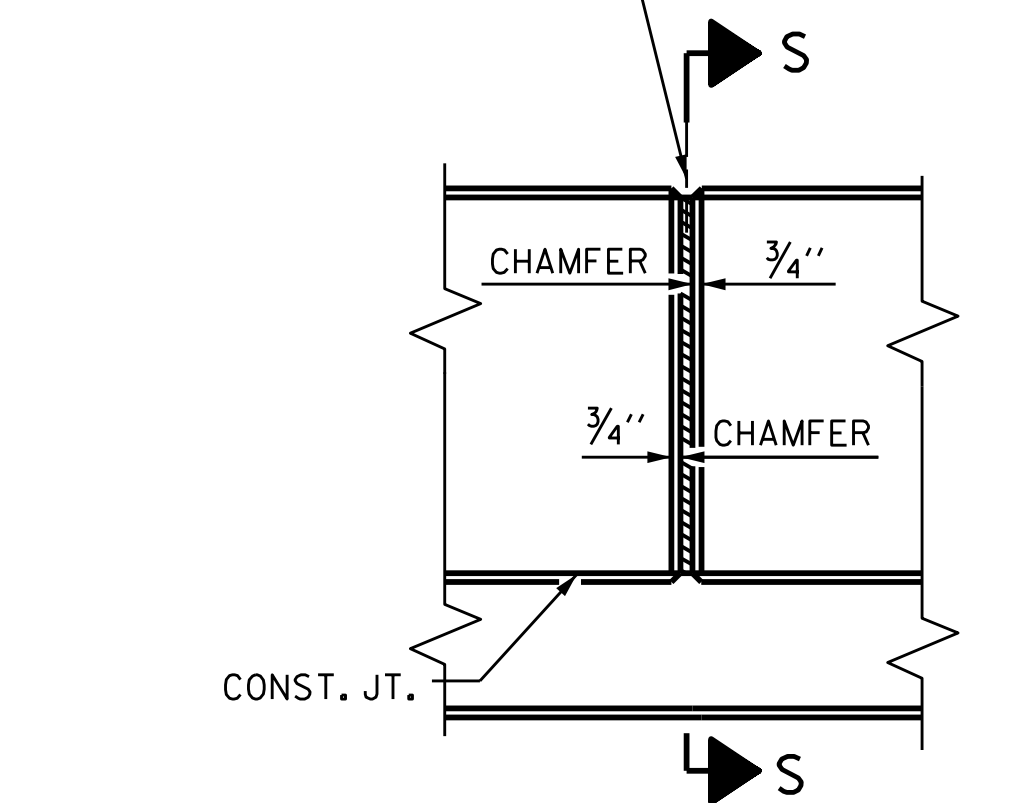
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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



SECTION S-S

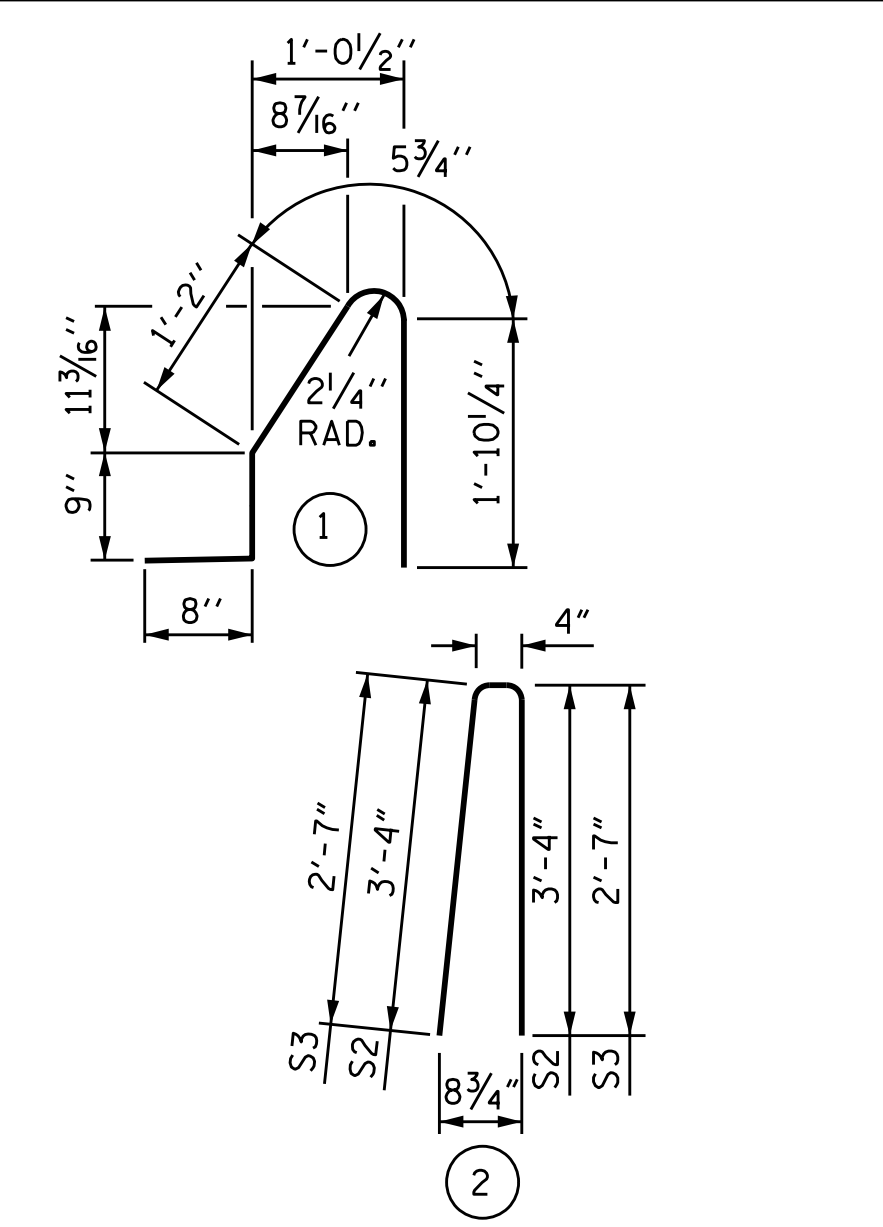
SECTION THRU RAIL

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



ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS

BAR TYPES

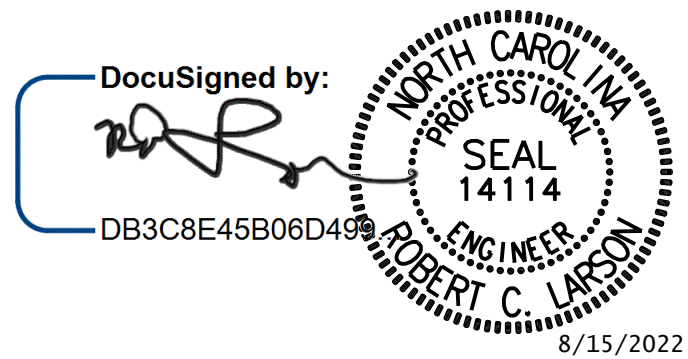


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
FOR CONCRETE BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	539	#5	1	4'-11"	2764
* S2	531	#5	2	7'-0"	3877
* S3	8	#5	2	5'-6"	46
* B1	44	#5	STR	15'-2"	696
* B2	44	#5	STR	25'-8"	1178
* B3	132	#5	STR	23'-8"	3258
* B4	22	#5	STR	22'-3"	511
* B5	44	#5	STR	12'-11"	593
* EPOXY COATED REINFORCING STEEL					12,923 LBS.
CLASS AA CONCRETE					72.9 CU. YDS.
CONCRETE BARRIER RAIL					536.54 LIN. FT.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 70+34.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE
BARRIER RAIL
LEFT LANE



DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022
ASSEMBLED BY: A. K. ALLANKAR DATE: 08/23/19
CHECKED BY: R. C. LARSON DATE: 06/17/20
DRAWN BY: ARB 5/87
CHECKED BY: SJD 9/87
REV. 7/12 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

KCI Associates
of North Carolina, P.A.
4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone 919-783-8264

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

SHEET NO.
S3-16
TOTAL SHEETS
30

\$FILED\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTDORVS\$ \$PENTBLBS\$ \$SPLTDORVS\$ \$PROJECT NO. 241704391.04

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

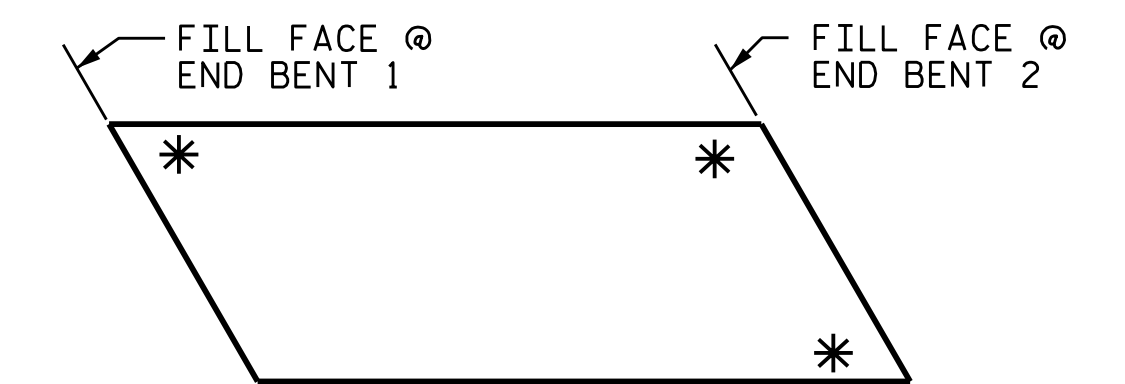
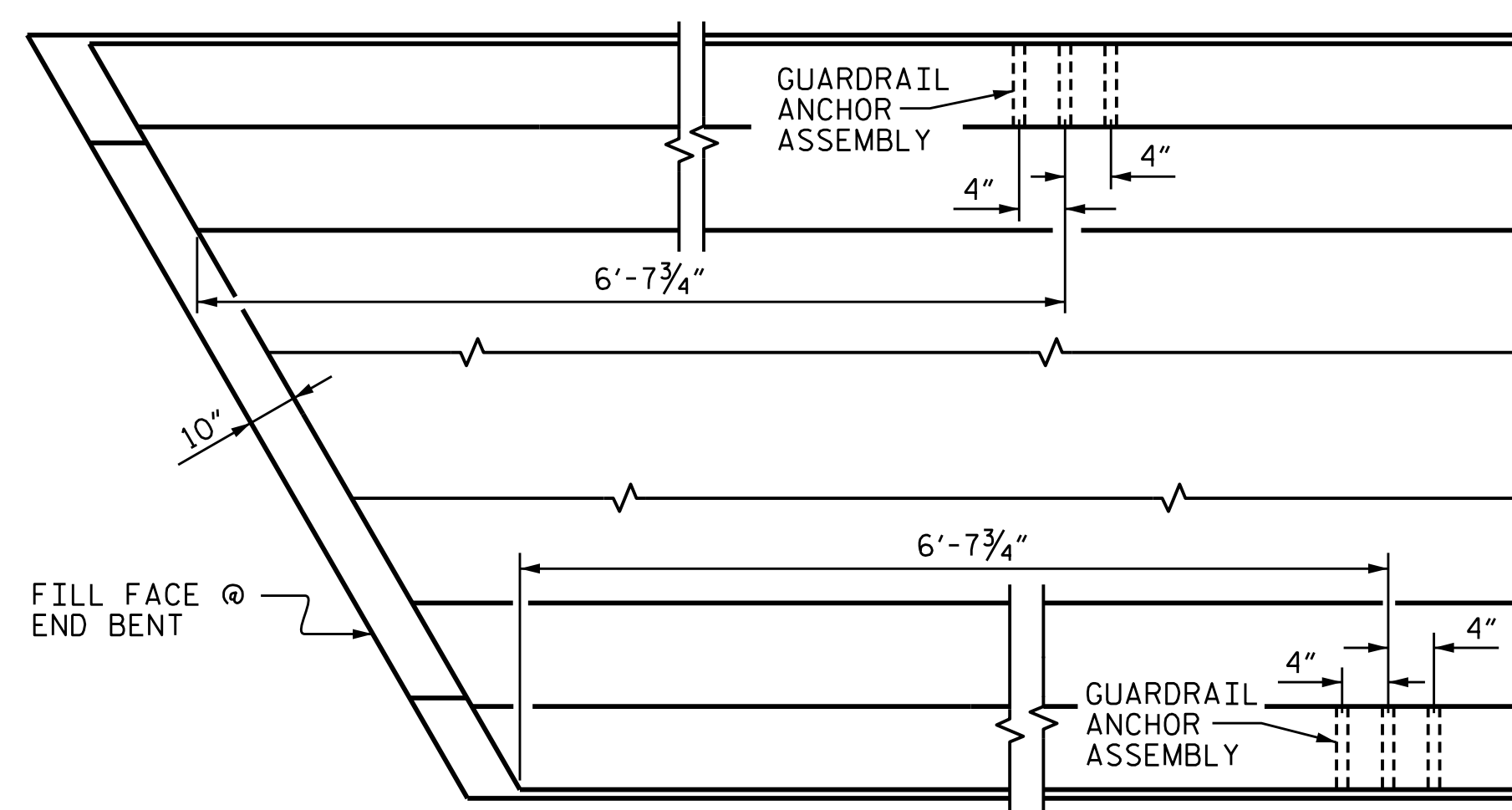
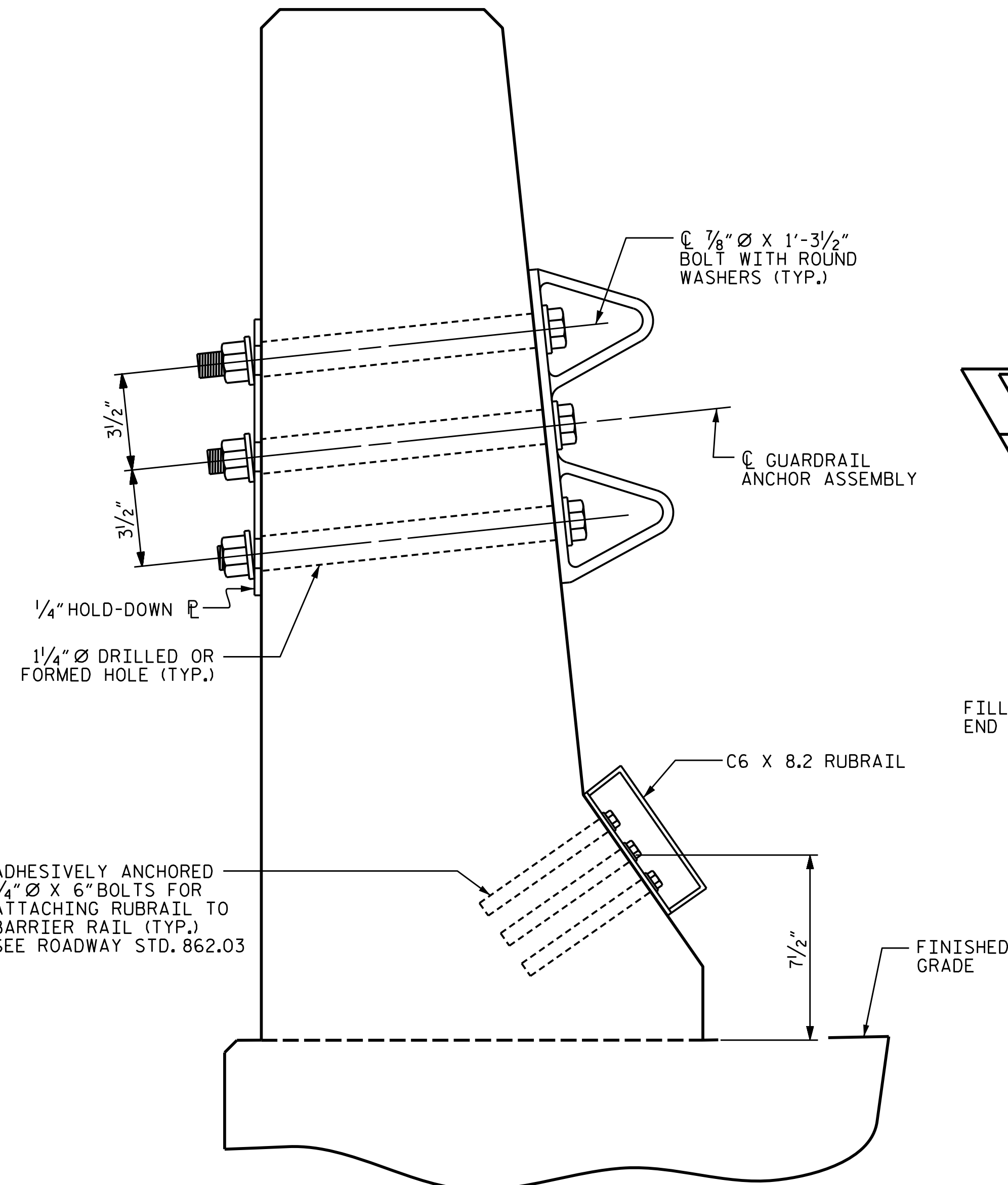
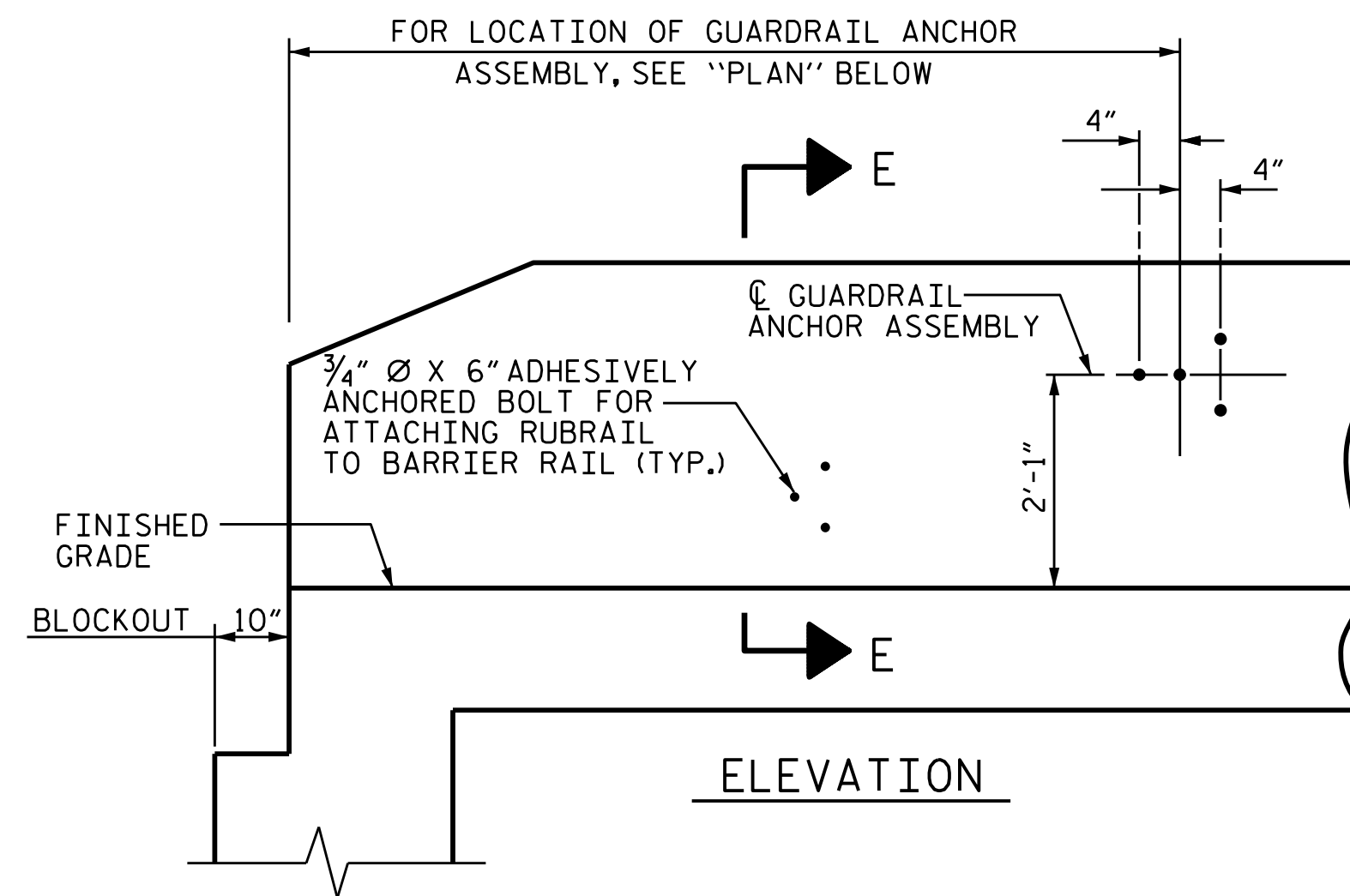
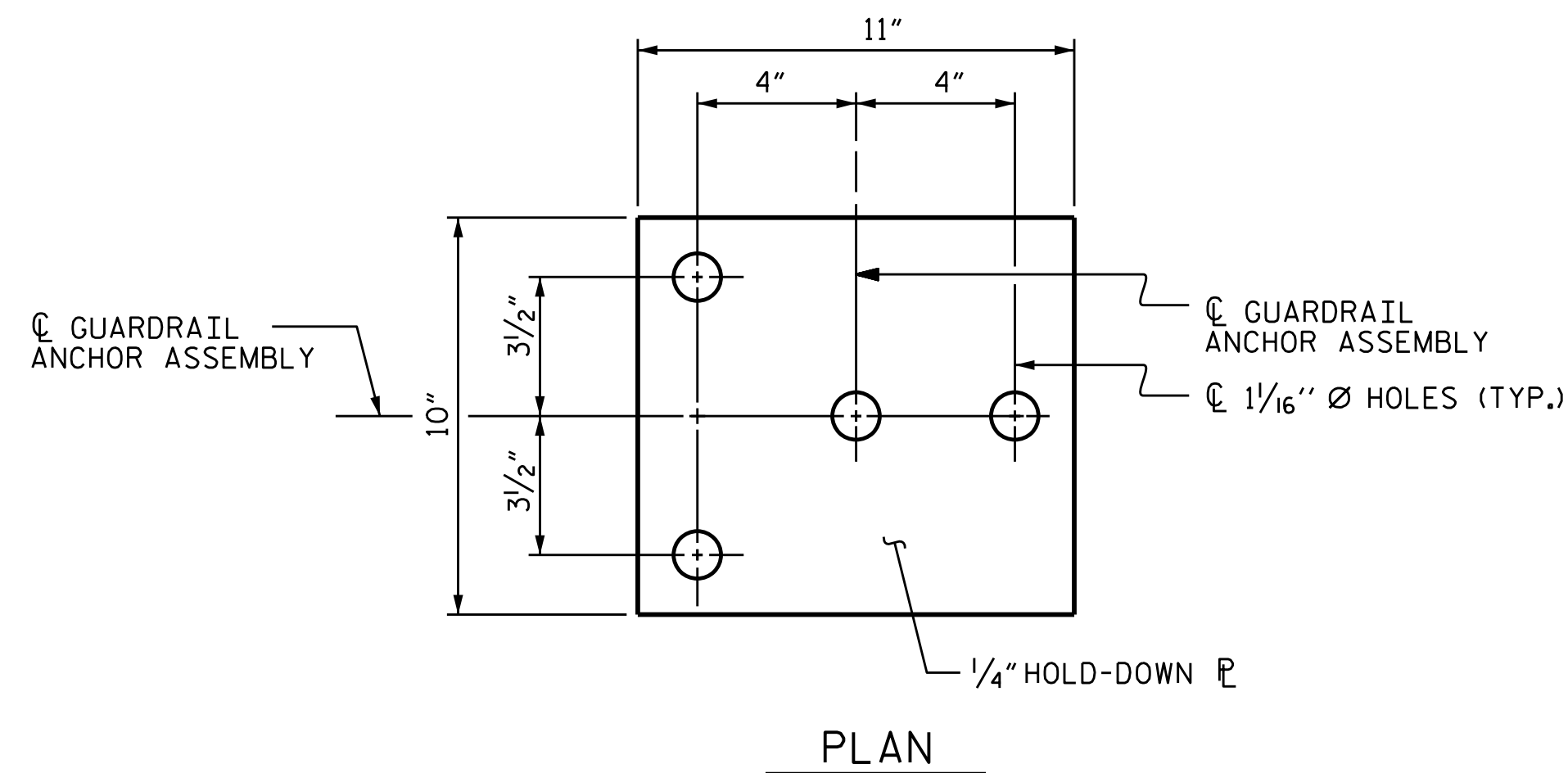
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



SKETCH SHOWING POINTS OF ATTACHMENTS

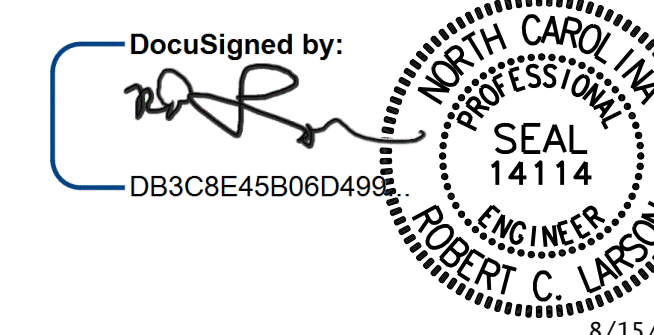
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 70+34.00 -L-

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



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S3- 17	
1			3			TOTAL SHEETS	
2			4			30	

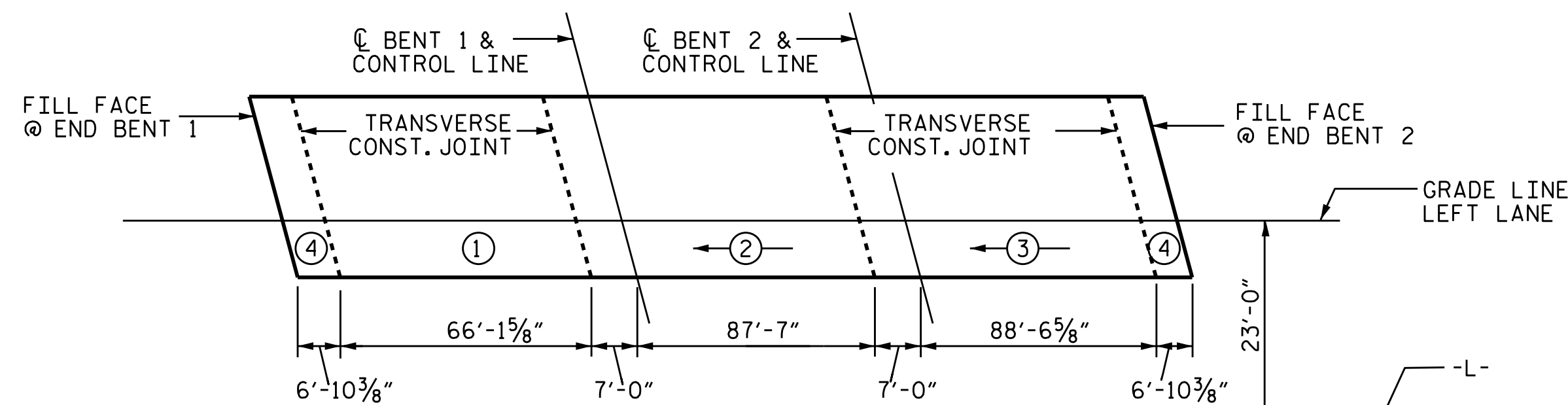
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(SHT 1a) STD. NO. GRA2

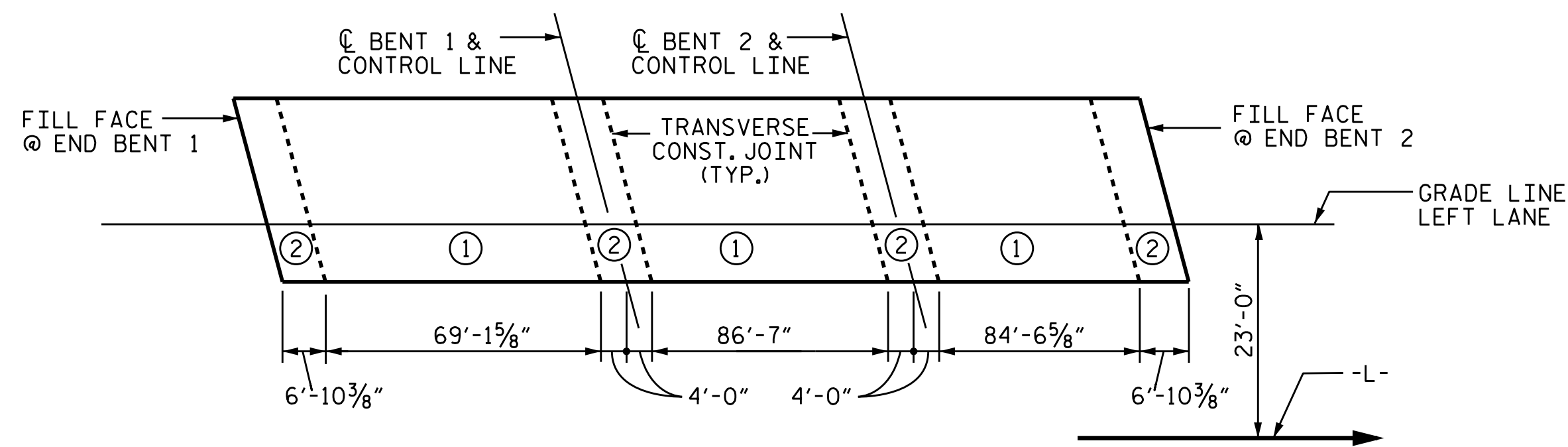
\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTDVYS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04\$

DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: A.K. ALLAN	DATE:	08/20/19
CHECKED BY: R.C. LARSON	DATE:	08/27/19
DRAWN BY: TLA 5/06	REV. 7/12	MAA/GM
CHECKED BY: GM 5/06	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC



DECK POURING SEQUENCE

② INDICATES POUR SEQUENCE AND DIRECTION



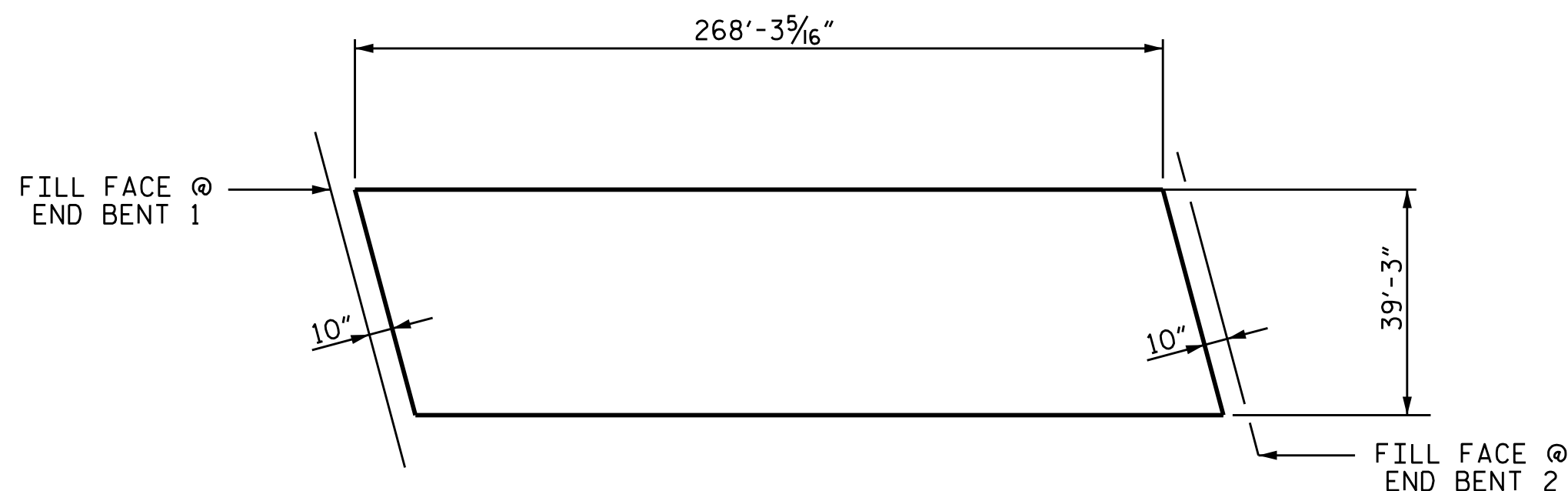
OPTIONAL DECK POURING SEQUENCE

② INDICATES POUR SEQUENCE

NO POUR 2 MAY BE STARTED UNTIL BOTH ADJACENT POURS 1 HAVE REACHED A MINIMUM STRENGTH OF 3000 PSI.

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

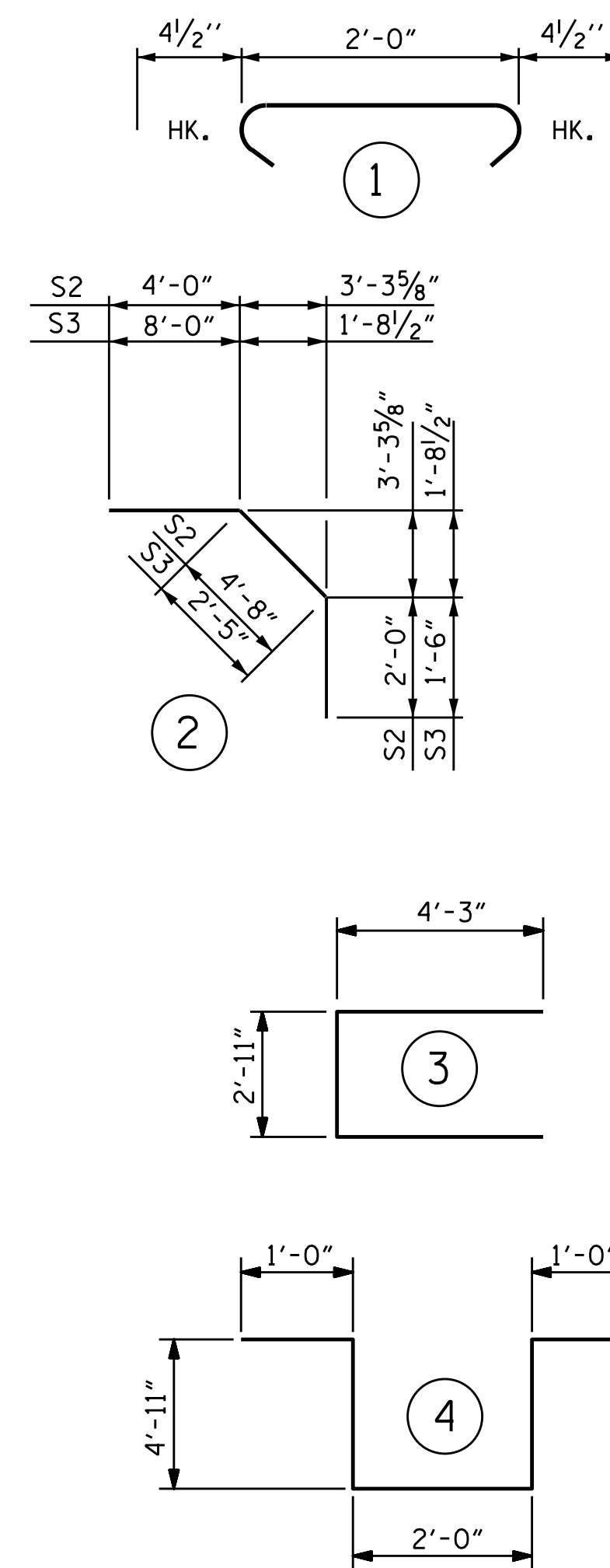
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10530)

BILL OF MATERIAL											
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	563	5	STR.	38'-11"	22852	A37	2	5	STR.	14'-10"	31
*A2	2	5	STR.	37'-1"	77	A38	2	5	STR.	13'-1"	27
*A3	2	5	STR.	35'-4"	74	A39	2	5	STR.	11'-5"	24
*A4	2	5	STR.	33'-8"	70	A40	2	5	STR.	9'-8"	20
*A5	2	5	STR.	31'-11"	67	A41	2	5	STR.	8'-0"	17
*A6	2	5	STR.	30'-3"	63	A42	2	5	STR.	6'-3"	13
*A7	2	5	STR.	28'-6"	59	A43	2	5	STR.	4'-7"	10
*A8	2	5	STR.	26'-9"	56	A44	2	5	STR.	2'-10"	6
*A9	2	5	STR.	25'-1"	52						
*A10	2	5	STR.	23'-4"	49	*B1	189	4	STR.	40'-0"	5050
*A11	2	5	STR.	21'-8"	45	B2	250	5	STR.	55'-7"	14493
*A12	2	5	STR.	19'-11"	42	*B3	50	6	STR.	28'-8"	2153
*A13	2	5	STR.	18'-3"	38	*B4	100	6	STR.	35'-1"	5269
*A14	2	5	STR.	16'-6"	34	*B5	25	6	STR.	20'-1"	754
*A15	2	5	STR.	14'-10"	31	*B6	25	6	STR.	19'-1"	717
*A16	2	5	STR.	13'-1"	27	*B7	25	6	STR.	17'-0"	638
*A17	2	5	STR.	11'-5"	24	*B8	25	6	STR.	16'-0"	601
*A18	2	5	STR.	9'-8"	20						
*A19	2	5	STR.	8'-0"	17	K1	10	4	STR.	40'-0"	267
*A20	2	5	STR.	6'-3"	13	K2	6	4	STR.	8'-4"	33
*A21	2	5	STR.	4'-7"	10	K3	36	4	STR.	9'-11"	238
*A22	2	5	STR.	2'-10"	6	K4	18	4	STR.	8'-11"	107
A23	563	5	STR.	38'-11"	22852	K5	4	4	STR.	2'-5"	6
A24	2	5	STR.	37'-1"	77	K6	18	4	STR.	9'-3"	111
A25	2	5	STR.	35'-4"	74	K7	4	4	STR.	2'-8"	7
A26	2	5	STR.	33'-8"	70	K8	8	4	STR.	3'-2"	17
A27	2	5	STR.	31'-11"	67	K9	4	4	STR.	2'-10"	8
A28	2	5	STR.	30'-3"	63	K10	10	4	STR.	33'-2"	222
A29	2	5	STR.	28'-6"	59	K11	12	4	STR.	7'-4"	59
A30	2	5	STR.	26'-9"	56						
A31	2	5	STR.	25'-1"	52	S1	192	4	1	2'-9"	353
A32	2	5	STR.	23'-4"	49	*S2	62	4	2	10'-8"	442
A33	2	5	STR.	21'-8"	45	*S3	66	4	2	11'-11"	525
A34	2	5	STR.	19'-11"	42						
A35	2	5	STR.	18'-3"	38	U1	62	4	3	11'-5"	473
A36	2	5	STR.	16'-6"	34	U2	48	4	4	13'-10"	444

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

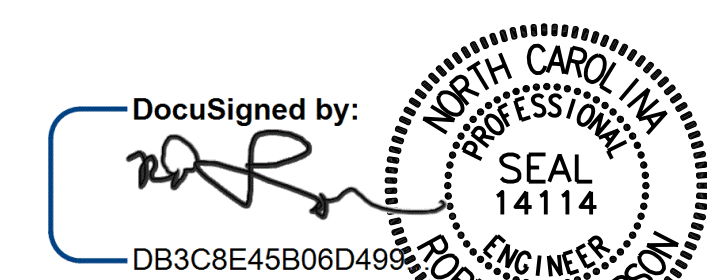
—SUPERSTRUCTURE BILL OF MATERIAL—

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	86.0		
POUR 2	135.3		
POUR 3	136.6		
POUR 4	59.0		
TOTALS**	416.9	40,564	39,875

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1616 SQ.FT.
BRIDGE DECK	8853 SQ.FT.
TOTAL	10,469 SQ.FT.



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

LEFT LANE

DESIGN ENGINEER OF RECORD:		DATE:	8/15/2022
DRAWN BY:	A. K. ALLANKI	DATE:	08/21/19
CHECKED BY:	R. C. LARSON	DATE:	06/17/20

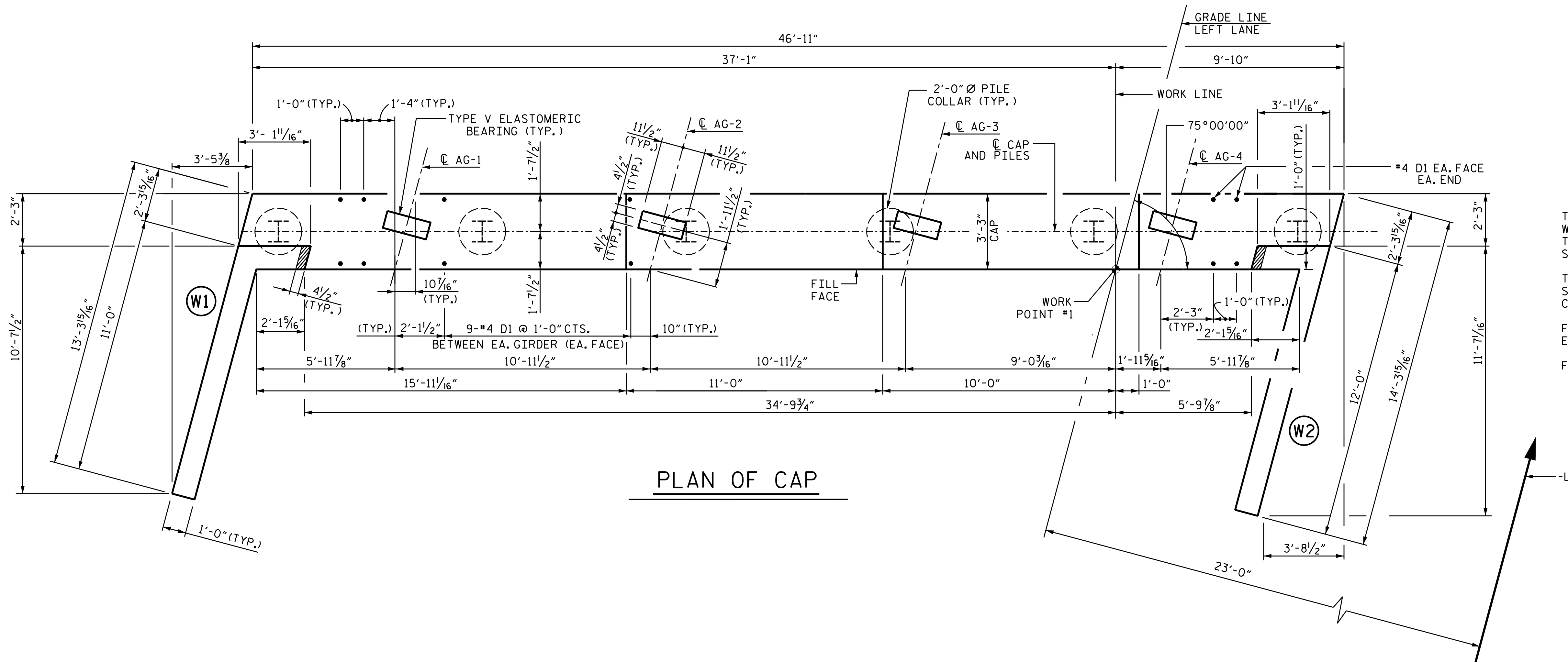
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KCI Associates
 of North Carolina, P.A.
2505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone 199-785-824

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

TOTAL SHEETS 30

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDVRS\$ \$PROJECT NO. 241704391.04



NOTES

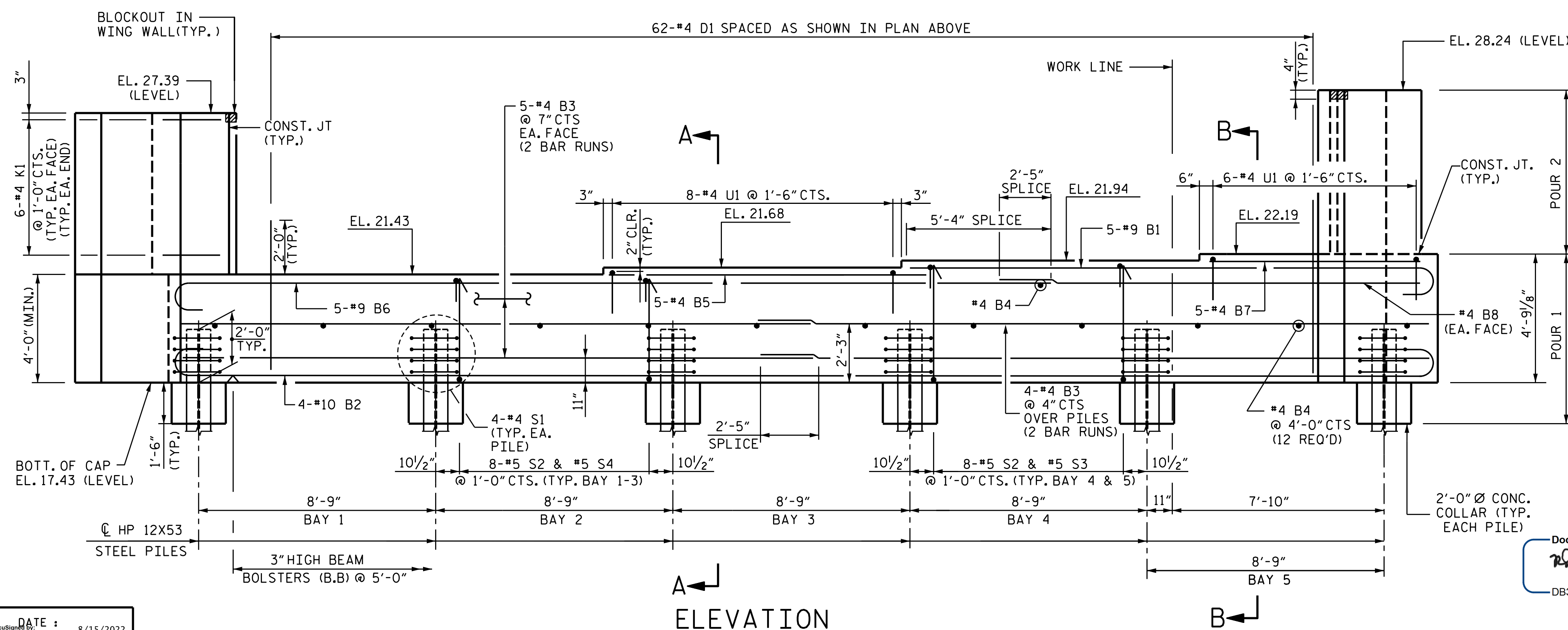
THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1) EXCEPT THE BEARING AREAS AND THE AREA OUTSIDE OF THE SUPERSTRUCTURE SHALL BE RAKED TO A DEPTH OF 1/4".

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIPFORMING IS USED.

FOR "TEMPORARY DRAINAGE AT END BENT", SEE END BENT 2.

FOR SECTIONS THRU CAP SEE SHEET 3 OF 3.

PLAN OF CAP



ELEVATION

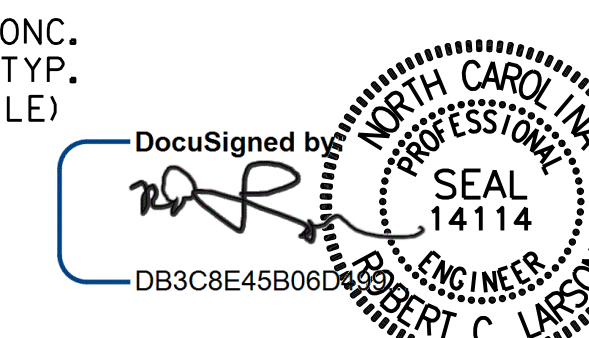
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

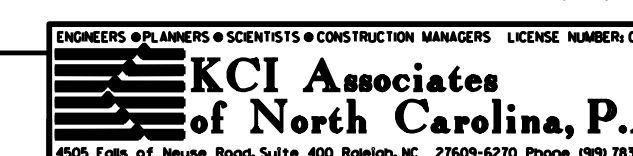
**SUBSTRUCTURE
 END BENT 1**

LEFT LANE



DESIGN ENGINEER OF RECORD:	DATE:
DRAWN BY: A. K. ALLANKI	DATE: 04/06/20
CHECKED BY: R. C. LARSON	DATE: 07/08/20

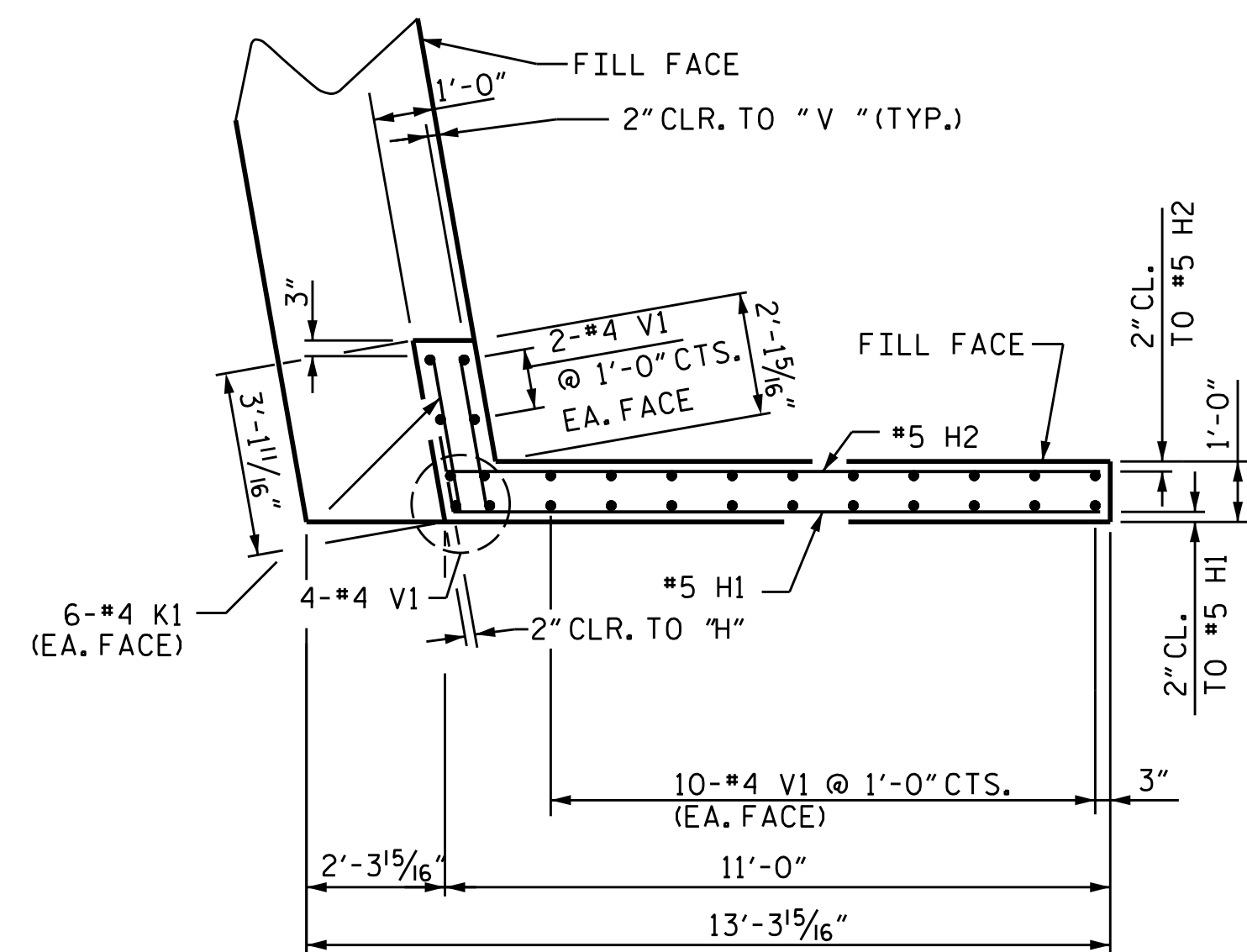
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**



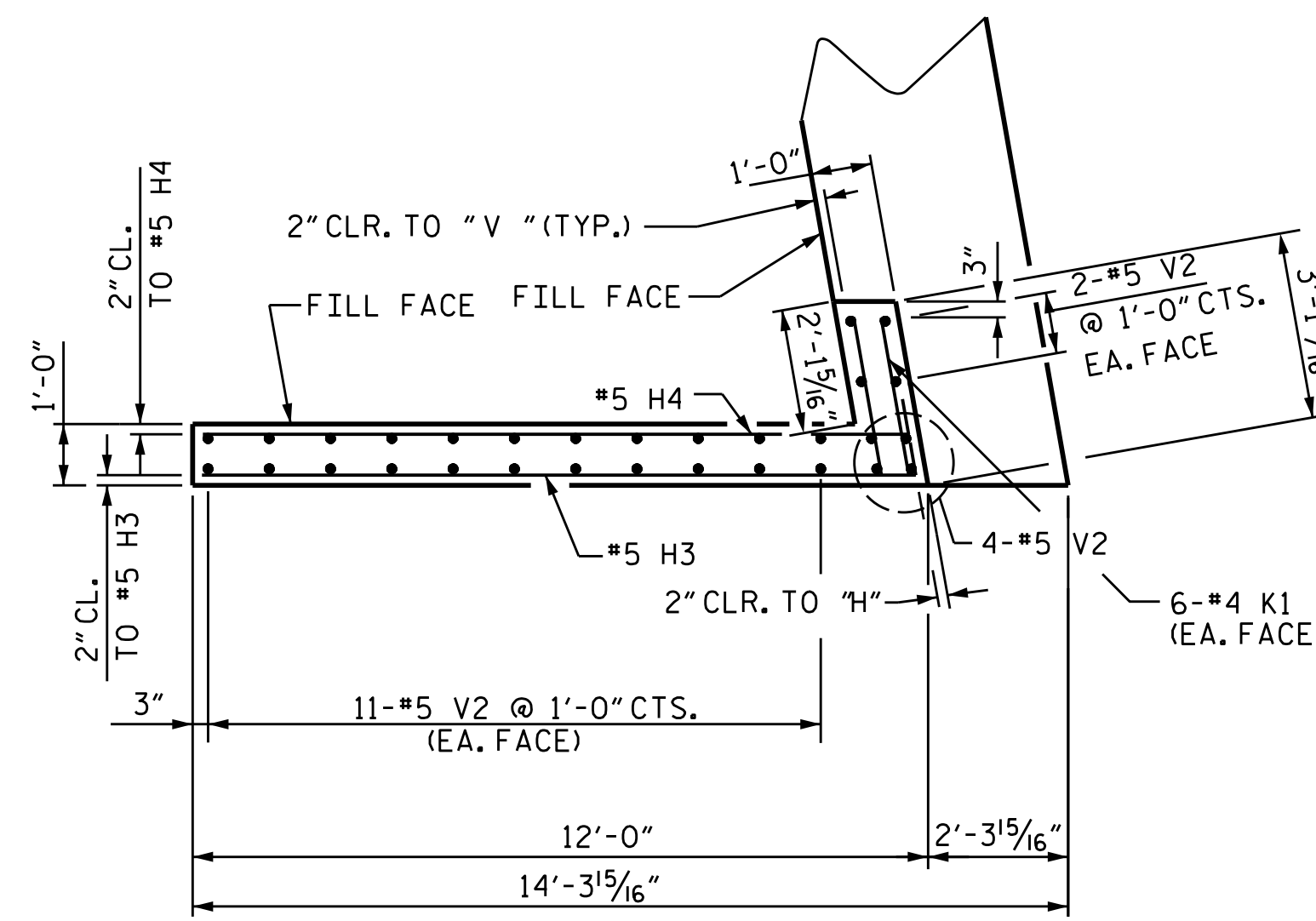
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 30

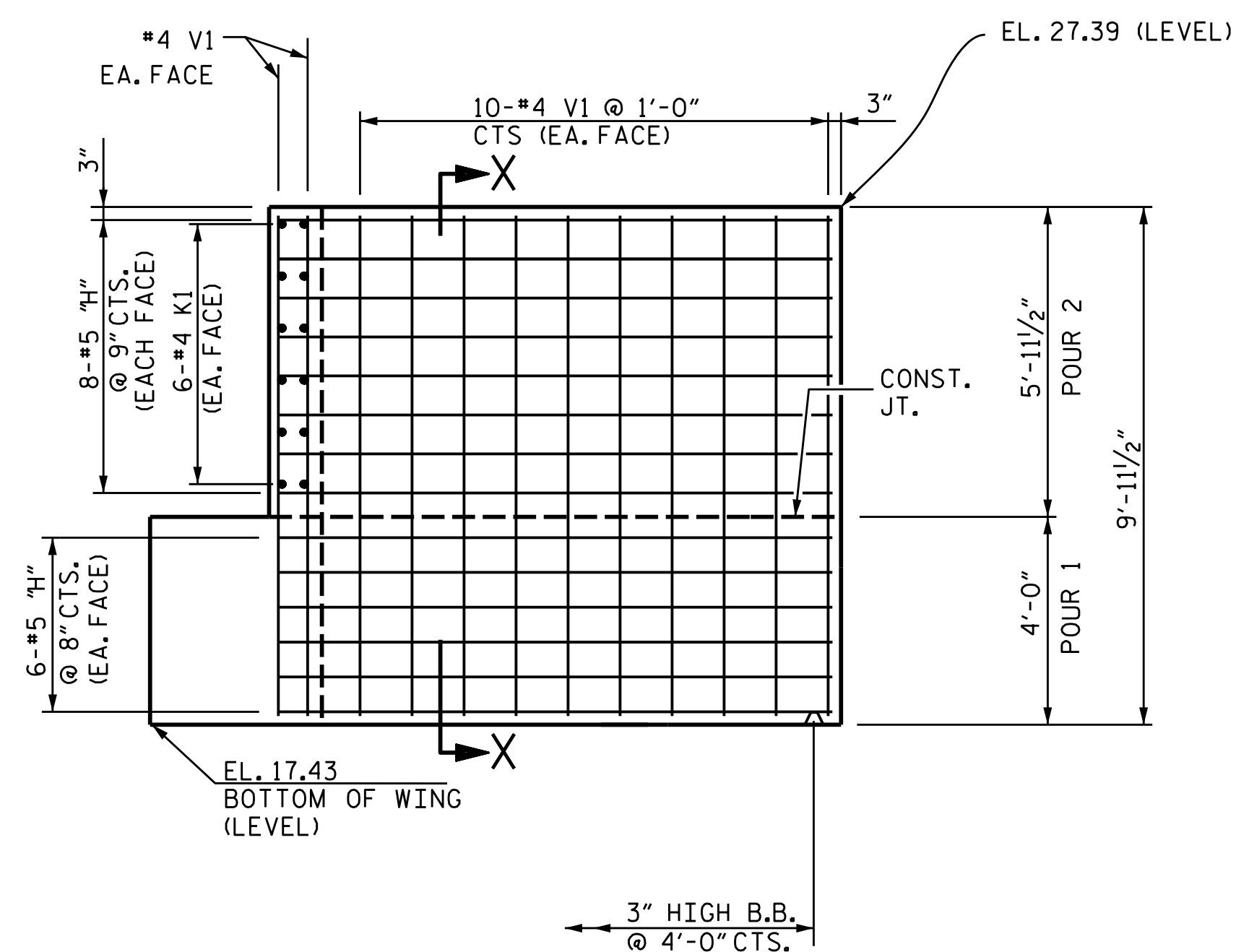
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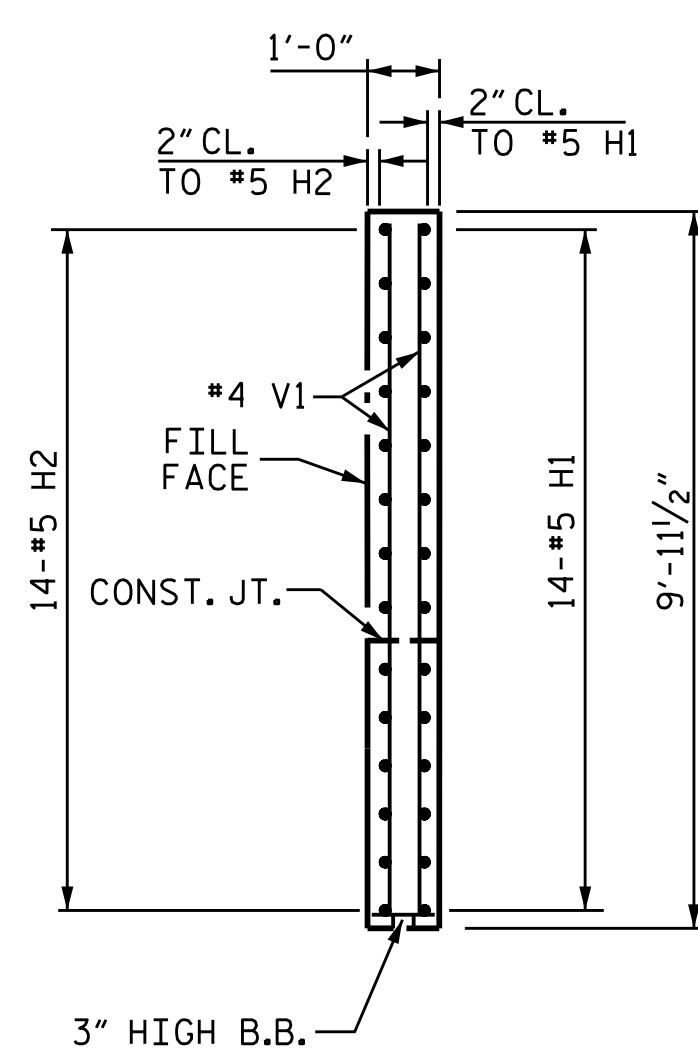
PLAN W1



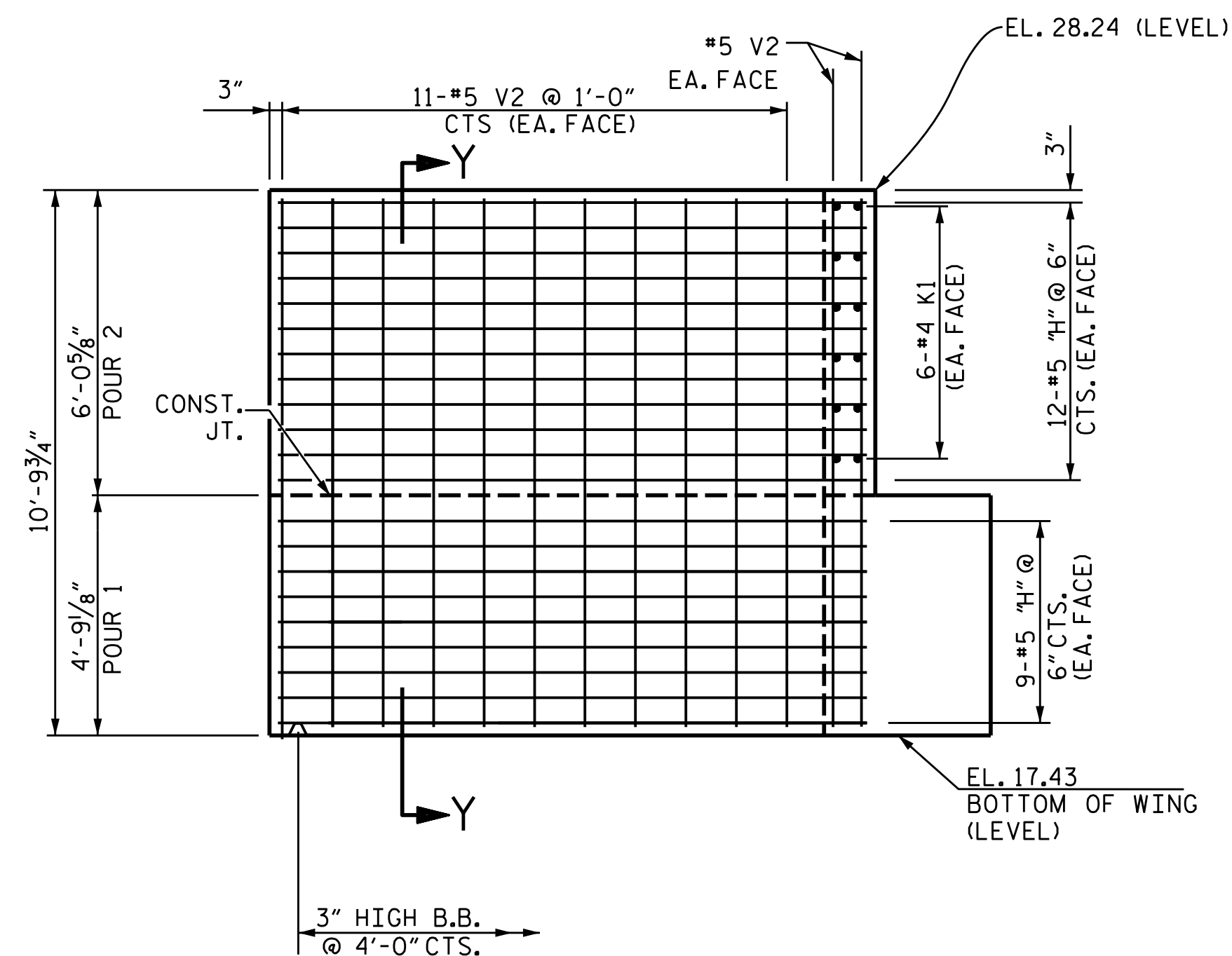
PLAN W2



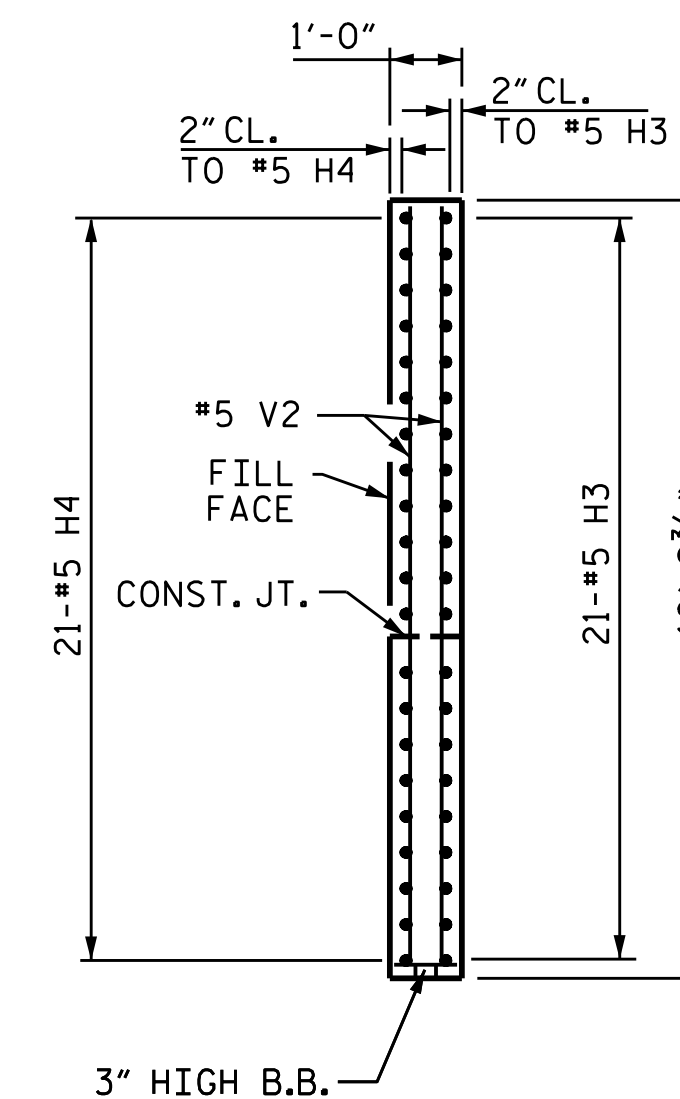
ELEVATION W1



SECTION X-X



ELEVATION W2



SECTION Y-Y

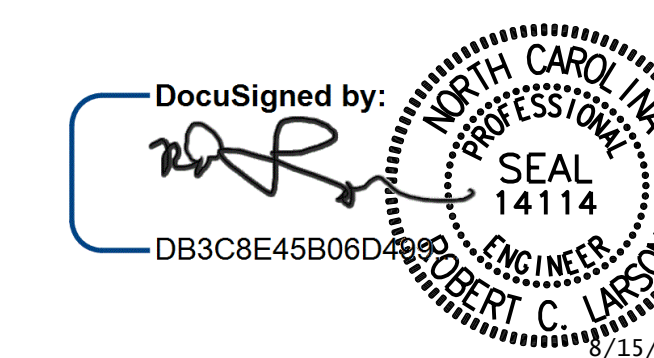
PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1

LEFT LANE



DESIGN ENGINEER OF RECORD:	DATE:
<i>[Signature]</i>	8/15/2022
DRAWN BY: A. K. ALLANKI	DATE: 04/07/20
CHECKED BY: R. C. LARSON	DATE: 07/08/20

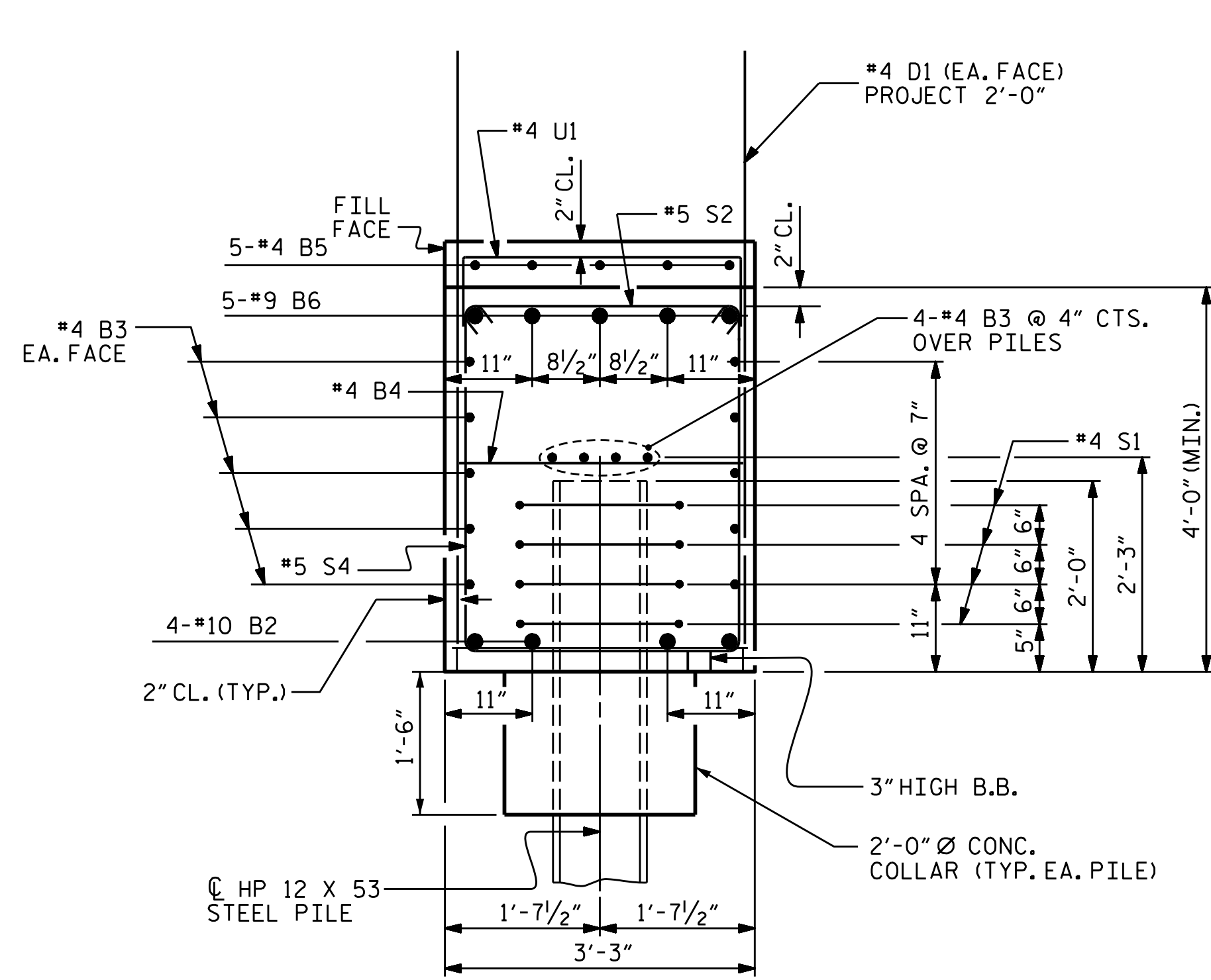
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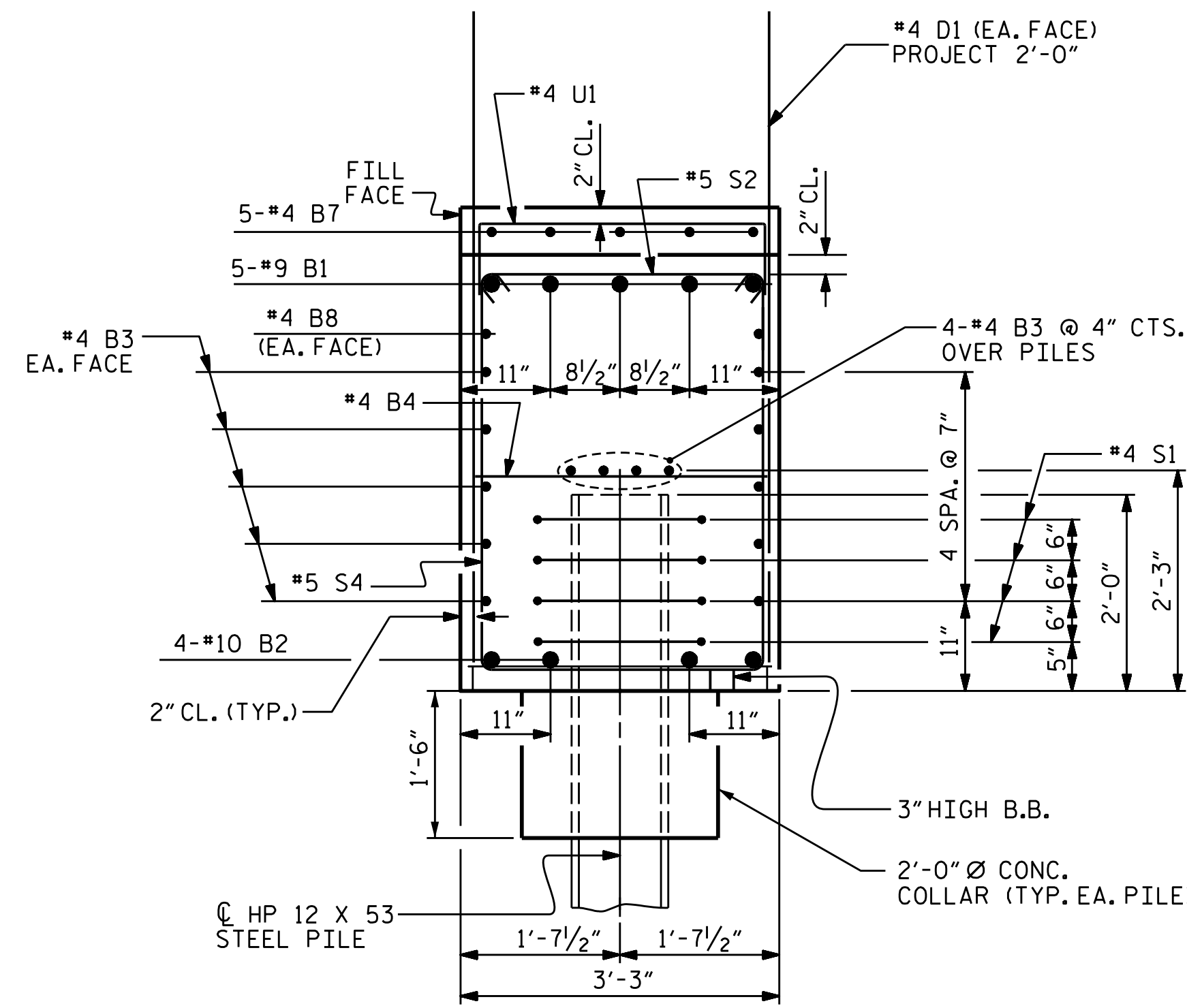
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NO.	BY:	DATE:	NO.	DATE:
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TOTAL SHEETS: 30

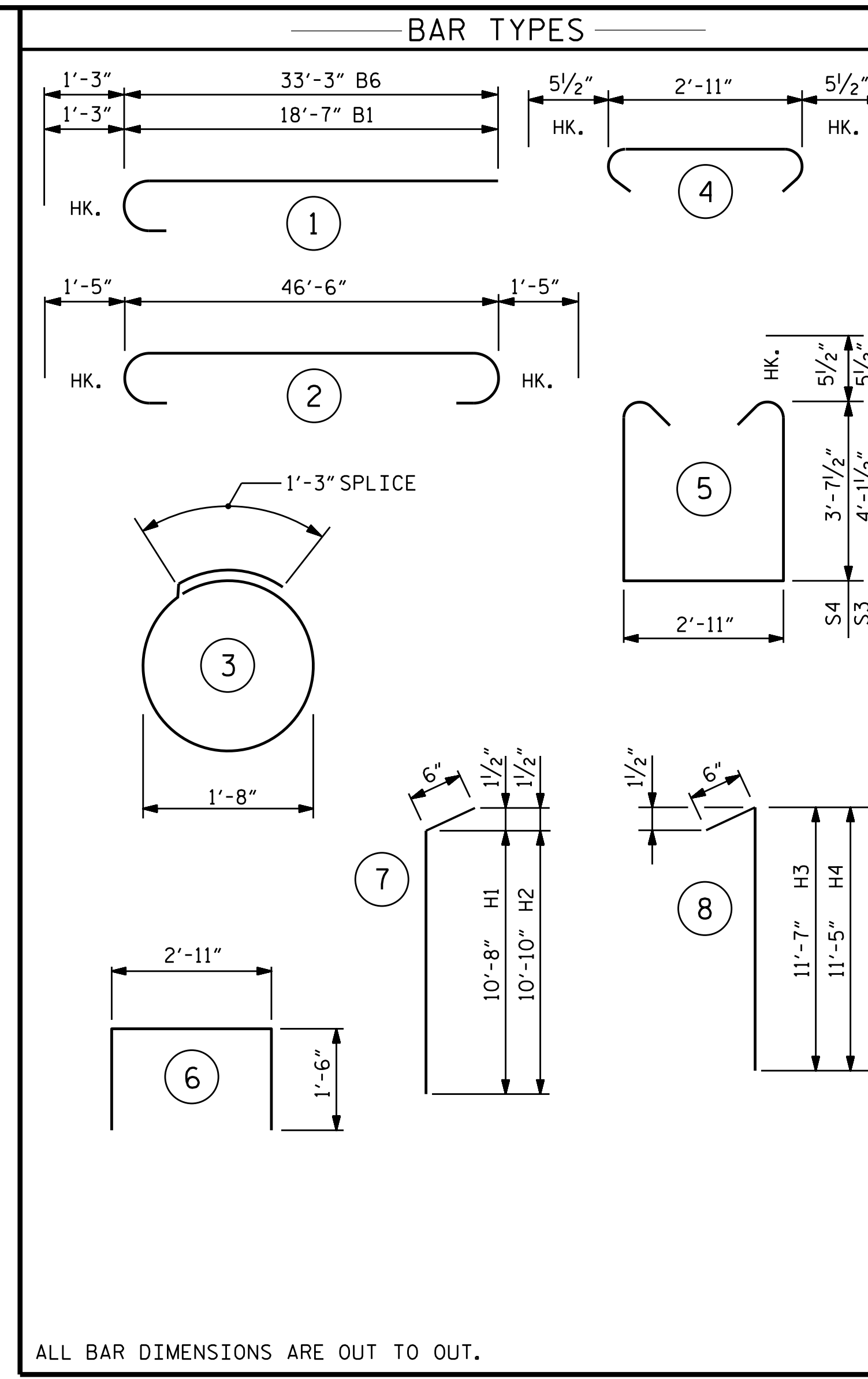
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 KCI PROJECT NO. 241704391.04



SECTION A-A

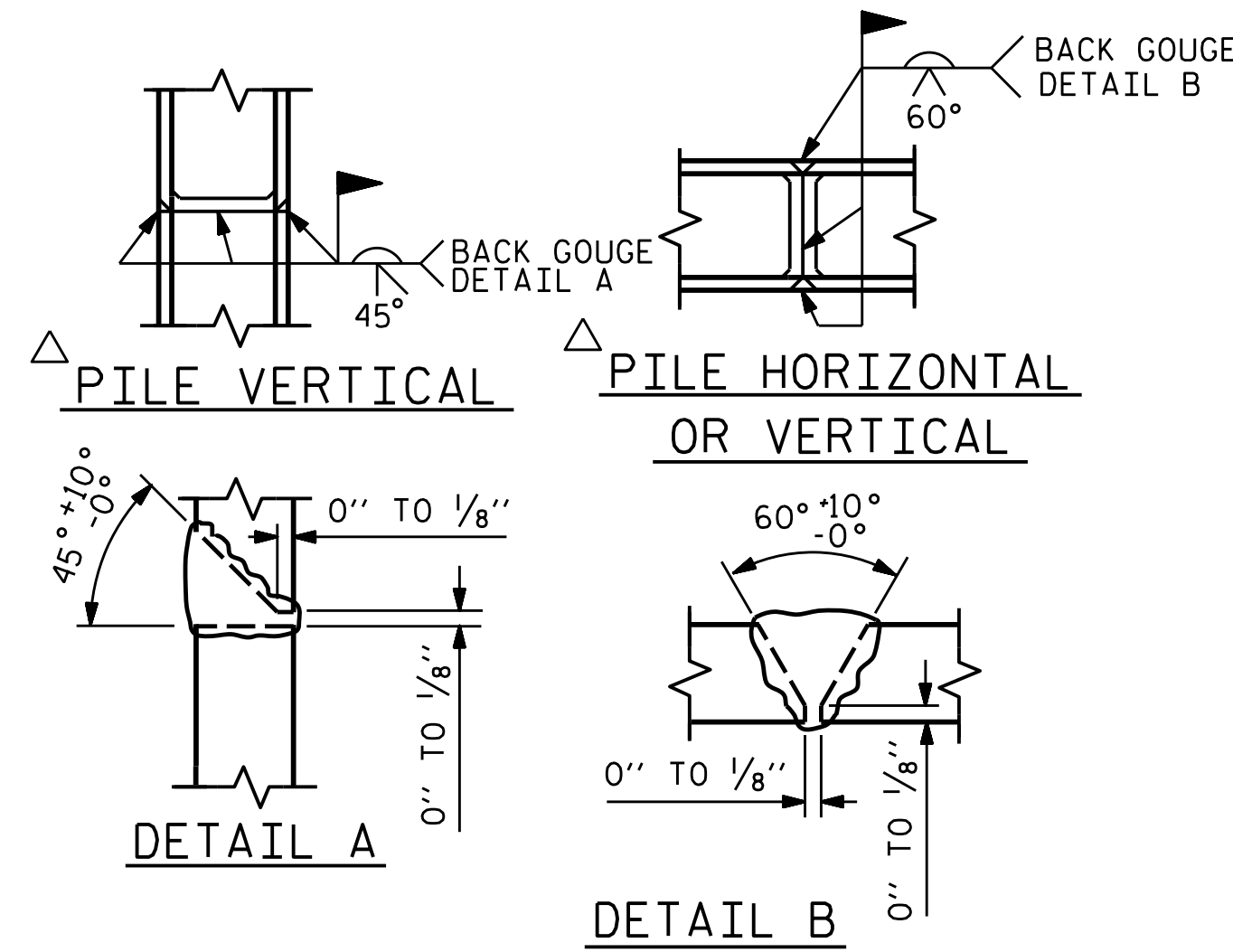


SECTION B-B



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	9	1	19'-10"	337
B2	4	10	2	49'-4"	849
B3	28	4	STR.	24'-6"	458
B4	13	4	STR.	2'-11"	25
B5	5	4	STR.	11'-10"	40
B6	5	9	1	34'-6"	587
B7	5	4	STR.	8'-6"	28
B8	2	4	STR.	15'-9"	21
D1	62	4	STR.	5'-10"	242
H1	14	5	7	11'-2"	163
H2	14	5	7	11'-4"	165
H3	21	5	8	12'-1"	265
H4	21	5	8	11'-11"	261
K1	24	4	STR.	2'-9"	44
S1	24	4	3	6'-6"	104
S2	40	5	4	3'-10"	160
S3	16	5	5	12'-1"	202
S4	24	5	5	11'-1"	277
U1	14	4	6	5'-11"	55
V1	28	4	STR.	9'-7"	179
V2	30	5	STR.	10'-5"	326
REINFORCING STEEL, LBS.					4788
CLASS A CONCRETE, CY					
POUR 1 (CAP, LOWER PORTION OF WINGS AND COLLARS)					28.8
POUR 2 (UPPER PORTION OF WINGS)					6.0
TOTAL					34.8
HP 12X53 STEEL PILES		NO.	6		
		L.F.	360		
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES, EA.					6
PILE REDRIVES, EA.					3



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

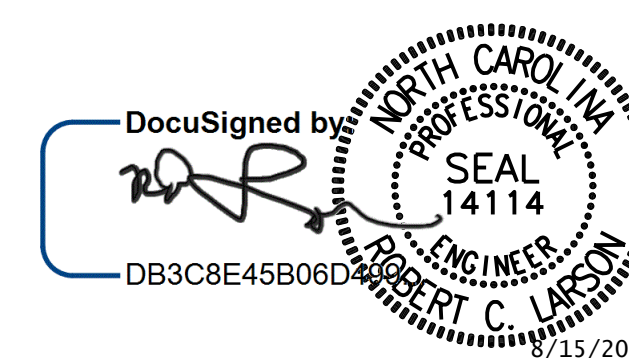
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 1

LEFT LANE



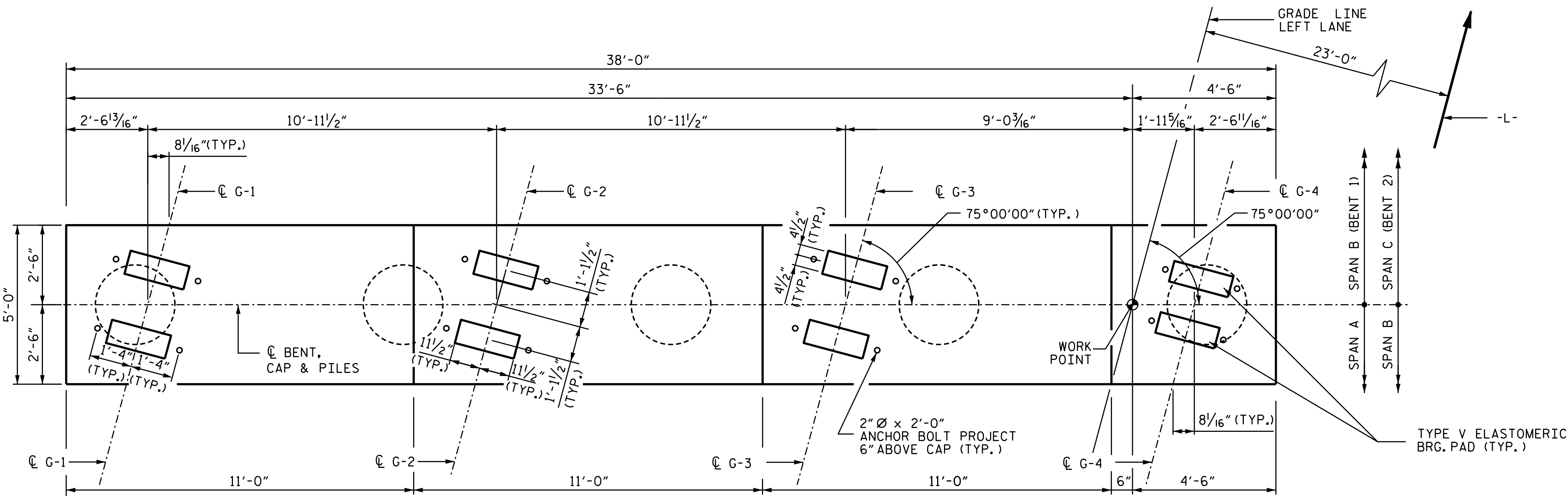
DESIGN ENGINEER OF RECORD	DATE :
	8/15/2022
DRAWN BY :	DATE :
A. K. ALLANKI	07/17/20
CHECKED BY :	DATE :
R. C. LARSON	07/27/20

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NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
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2			4			TOTAL SHEETS 30

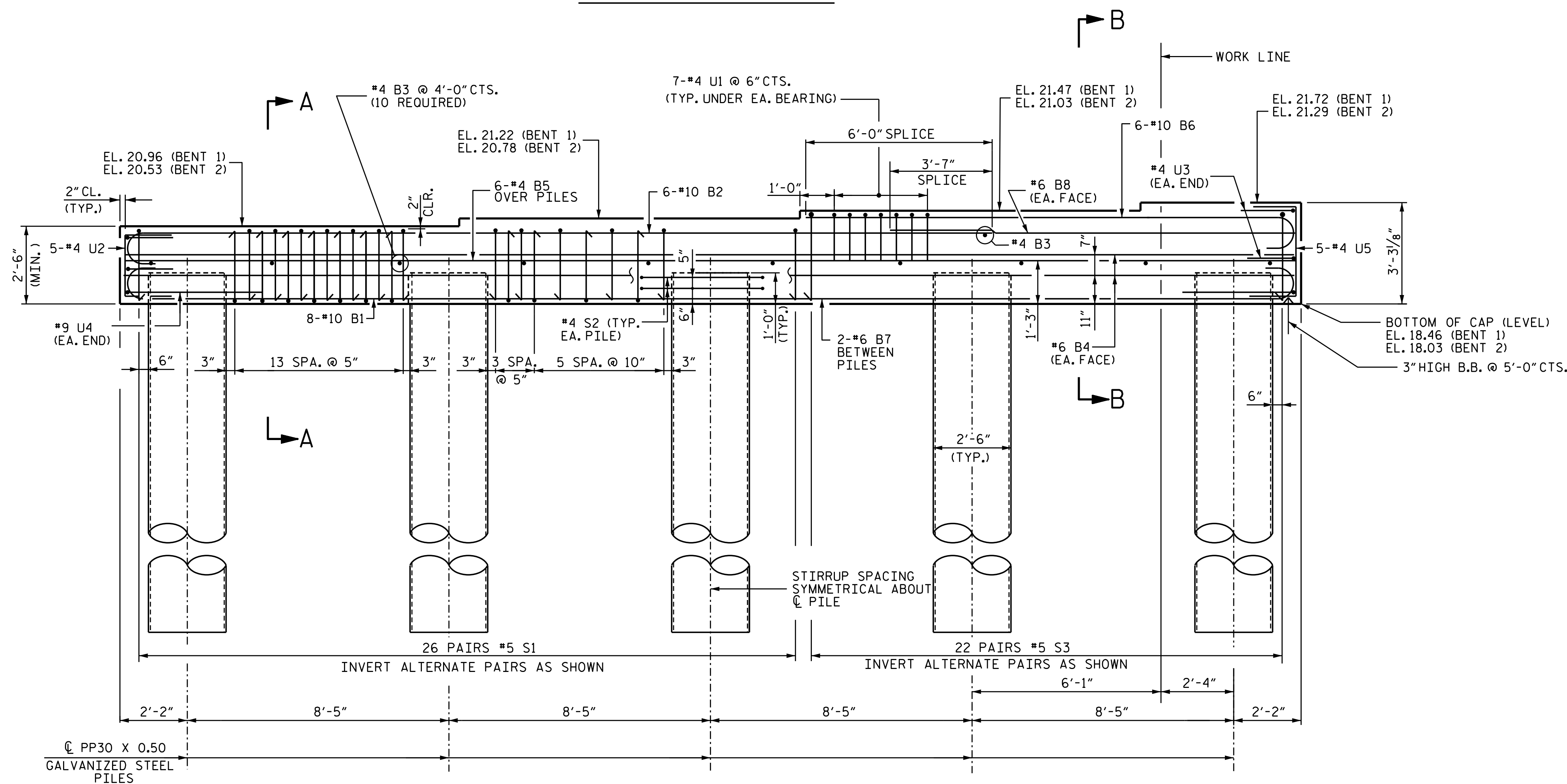
\$FILED\$ \$TIME\$ \$USERS\$ \$PLTDVRS\$ \$PENTBLS\$ \$SPLDRVRS\$ \$DATES\$ \$PROJECT NO. 241704391.04\$



PLAN OF CAP

NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 40'. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.
- FOR CONCRETE PLUG AND REINFORCING IN PILES SEE "30" STEEL PIPE PILE" SHEET.
- FOR SECTIONS THRU BENT CAP SEE SHEET 2 OF 2



ELEVATION

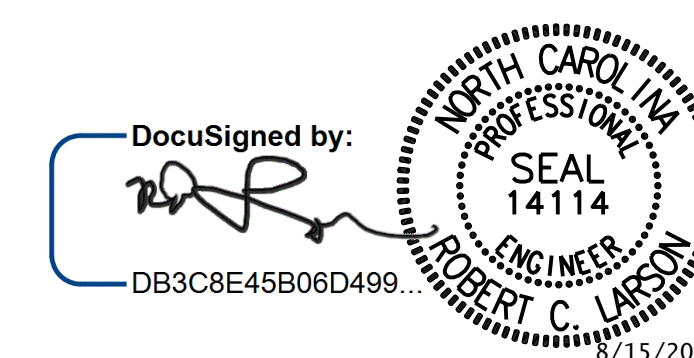
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 1 OR 2

LEFT LANE



DESIGN ENGINEER OF RECORD:	DATE:
<i>(Signature)</i>	8/15/2022
DRAWN BY: A. K. ALLANKI	DATE: 06/01/20
CHECKED BY: R. C. LARSON	DATE: 06/26/20

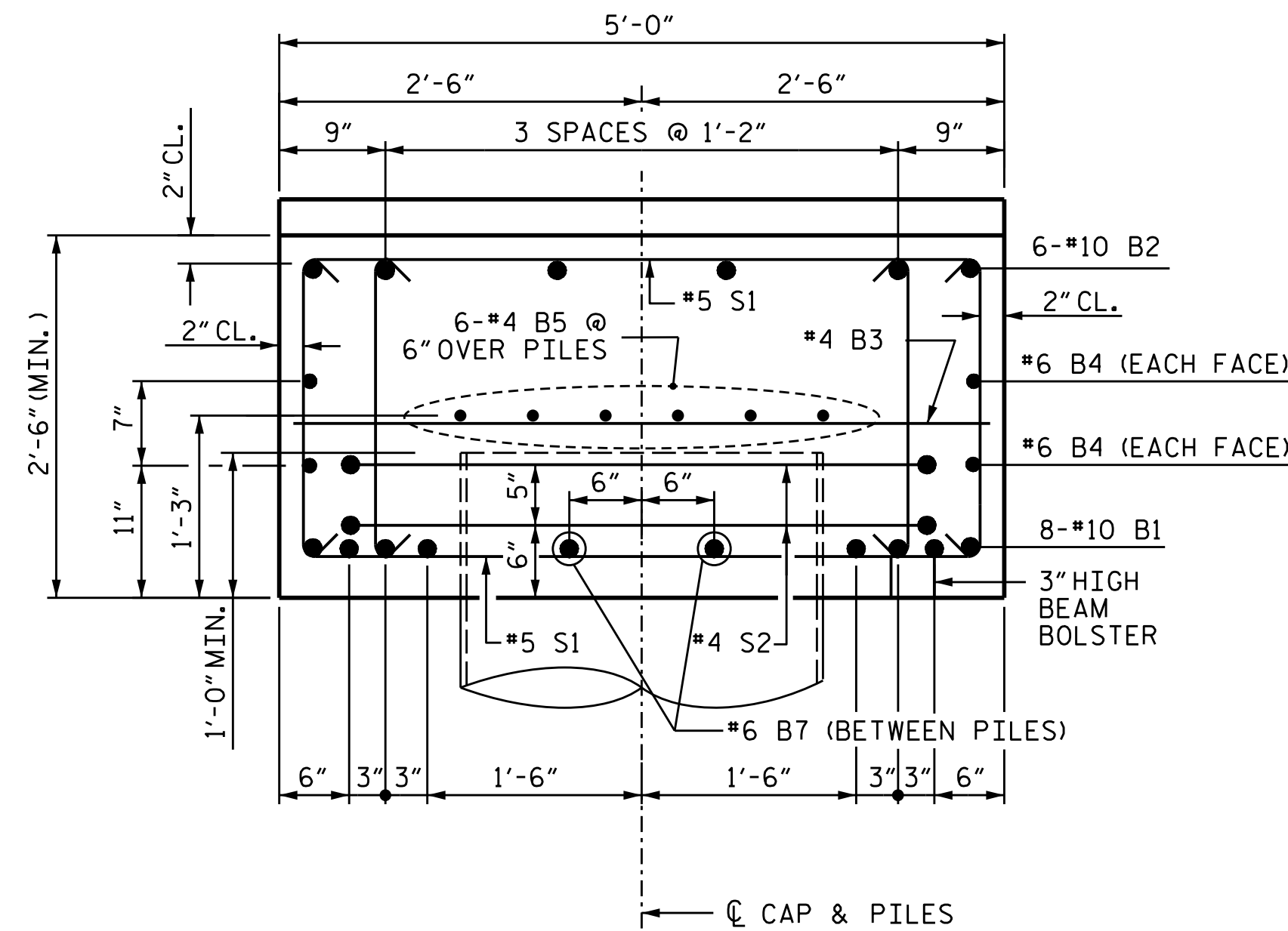
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KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

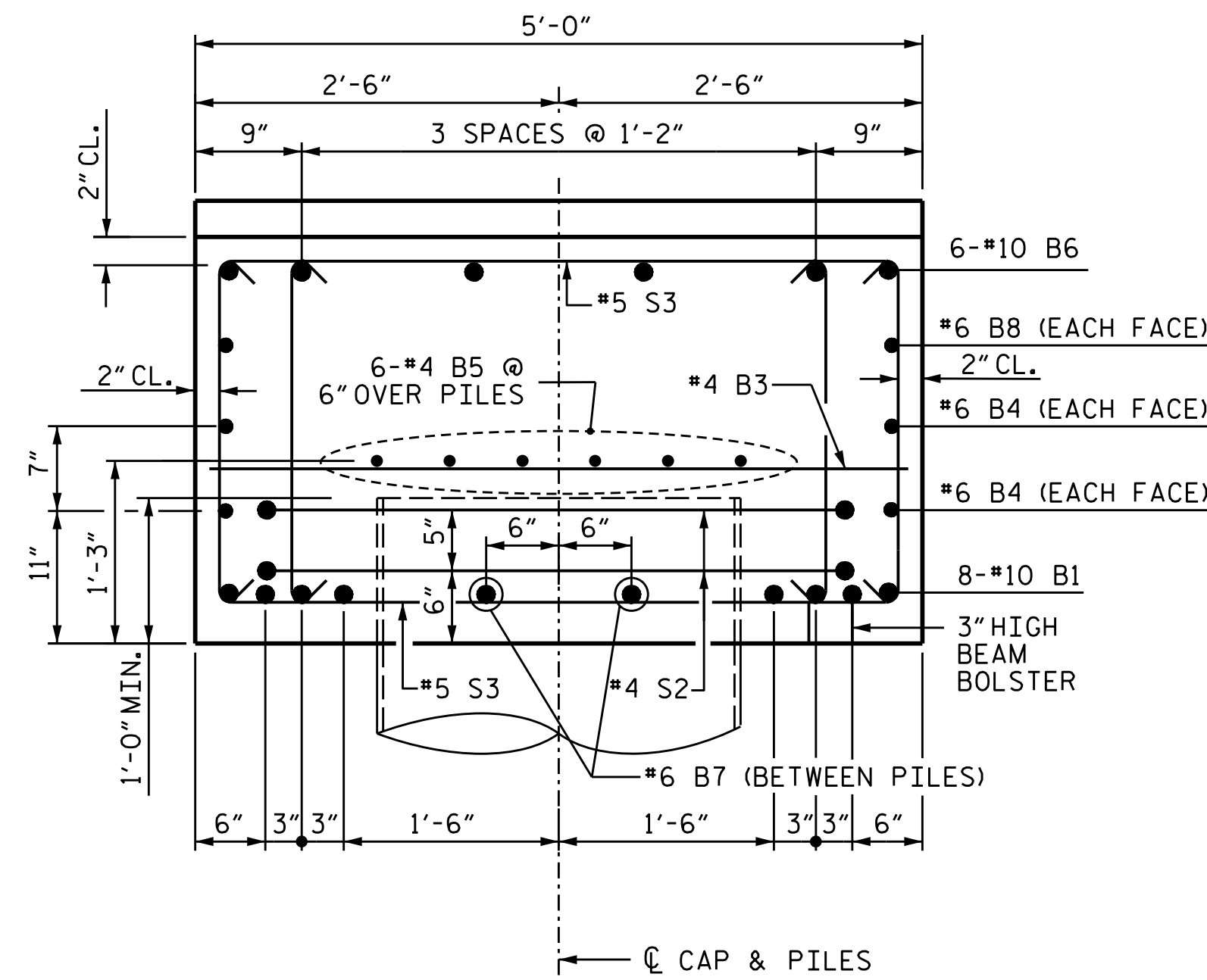
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TOTAL SHEETS: 30

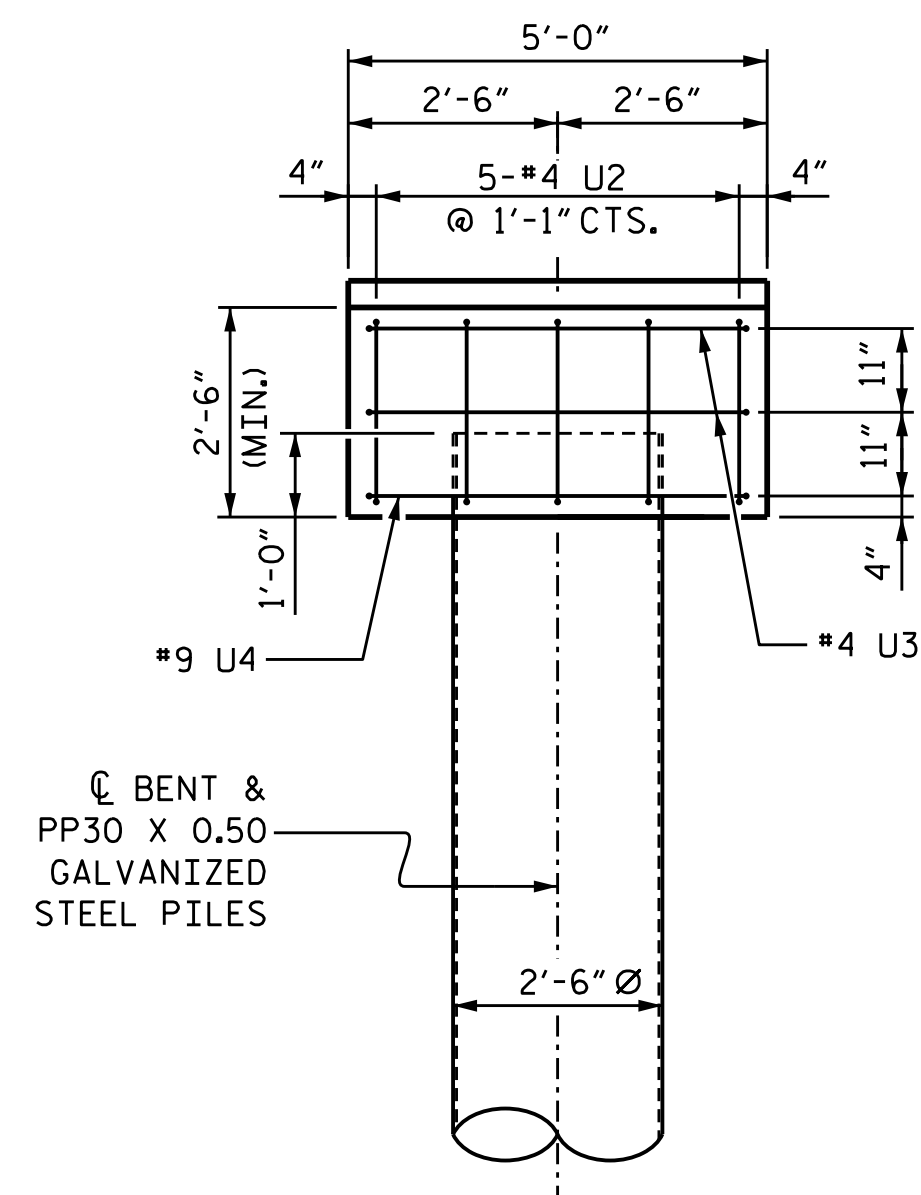
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 KCI PROJECT NO. 241704391.04



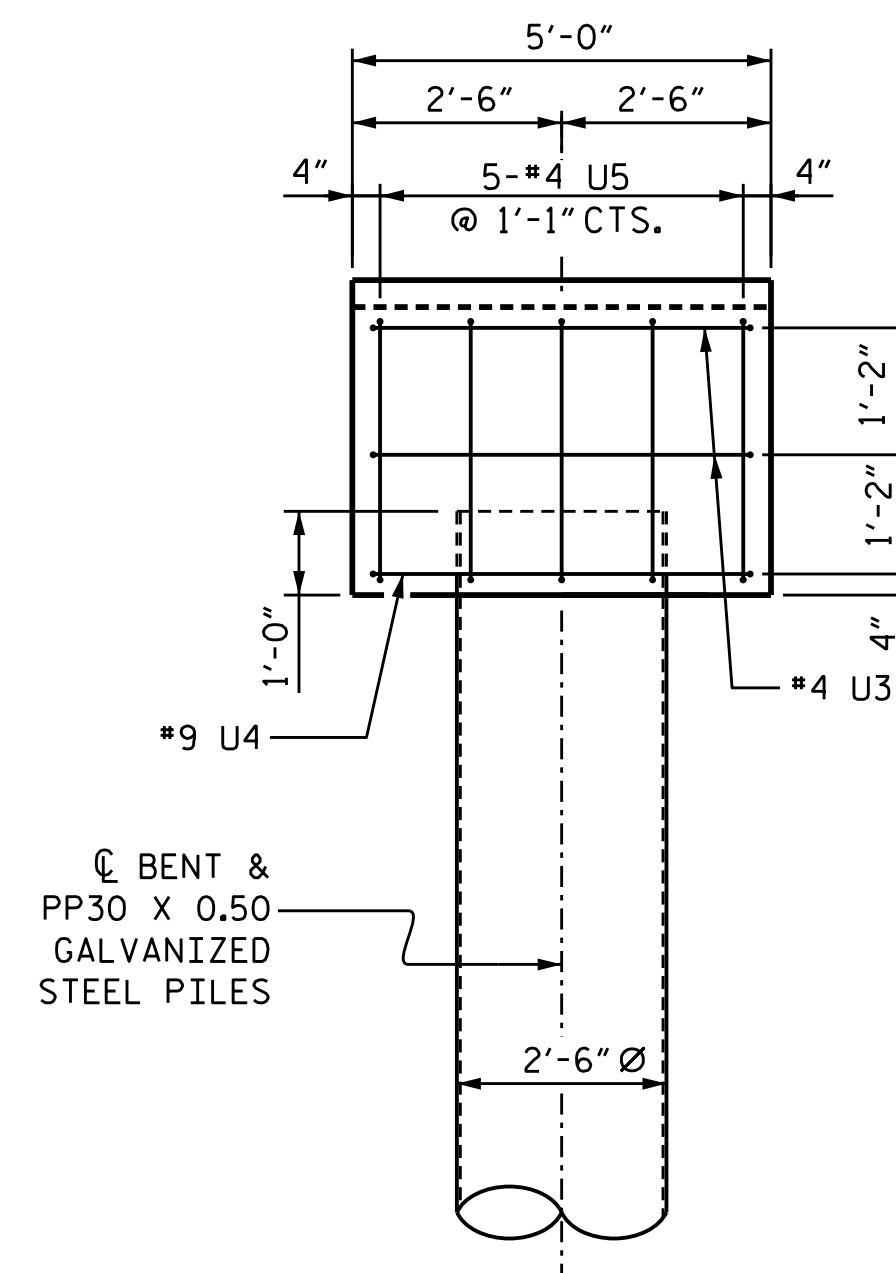
SECTION A-A



SECTION B-B

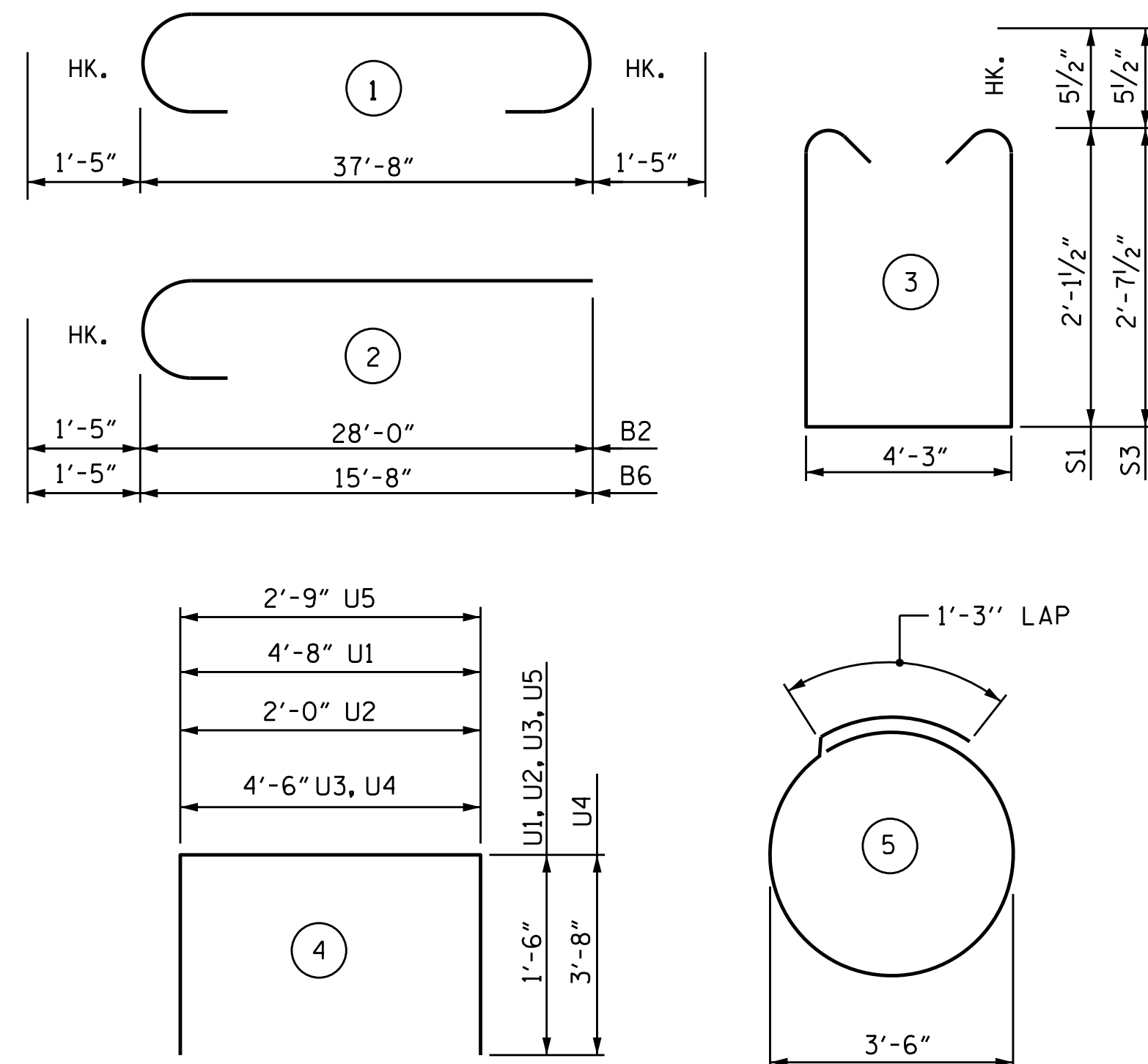


LEFT END ELEVATION



RIGHT END ELEVATION

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1 OR 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	40'-6"	1394
B2	6	10	2	29'-5"	759
B3	11	4	STR.	4'-8"	34
B4	4	6	STR.	37'-6"	225
B5	6	4	STR.	37'-6"	150
B6	6	10	2	17'-1"	441
B7	8	6	STR.	5'-7"	67
B8	2	6	STR.	13'-3"	40
S1	52	5	3	9'-5"	511
S2	10	4	5	12'-3"	82
S3	44	5	3	10'-5"	478
U1	28	4	4	7'-8"	143
U2	5	4	4	5'-0"	17
U3	4	4	4	7'-6"	20
U4	2	9	4	11'-10"	80
U5	5	4	4	5'-9"	19

REINFORCING STEEL, LBS.	4460
CLASS A CONCRETE, CU. YD.	19.1
PP 30 X 0.50 GALVANIZED STEEL PILES	
NO.	5
LIN. FT.	425
PILE DRIVING EQUIPMENT SETUP FOR PP 30 X 0.50 GALVANIZED STEEL PILES, EA.	5
PILE REDRIVES, EA.	3
(NOTE: PILE HEADS HAVE BEEN DEDUCTED FROM CLASS A CONCRETE)	

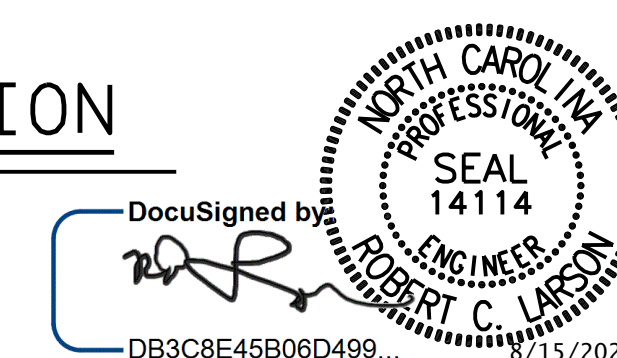
PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 1 OR 2

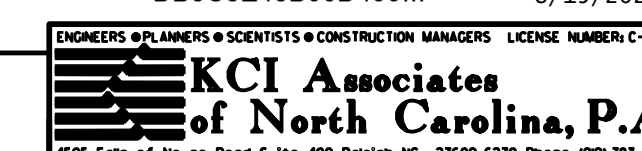
LEFT LANE



DocuSigned by
 DB3C8E45B06D499... 8/15/2022

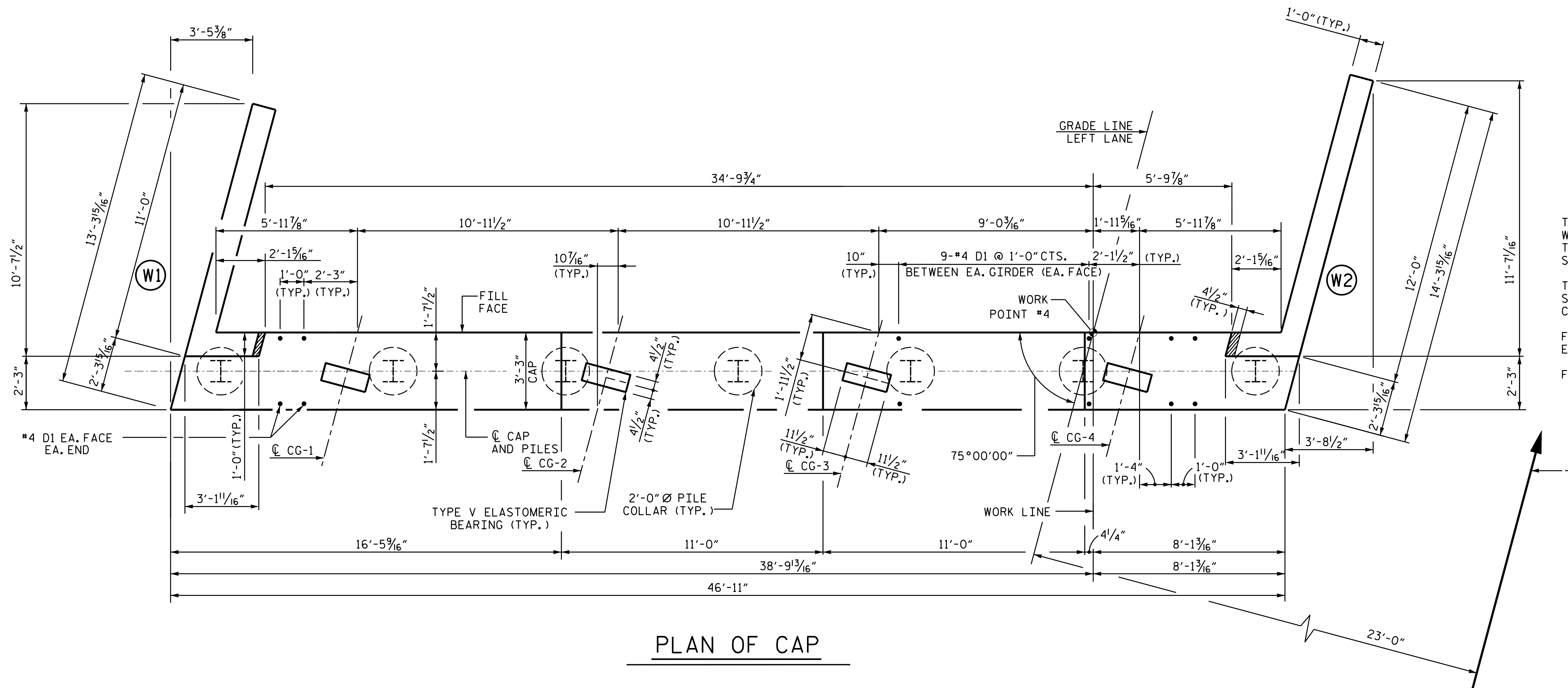
DESIGN ENGINEER OF RECORD:	DATE:
A. K. ALLANKI	8/15/2022
DRAWN BY:	DATE:
R. C. LARSON	06/04/20
CHECKED BY:	DATE:
R. C. LARSON	06/26/20

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2			4			TOTAL SHEETS 30

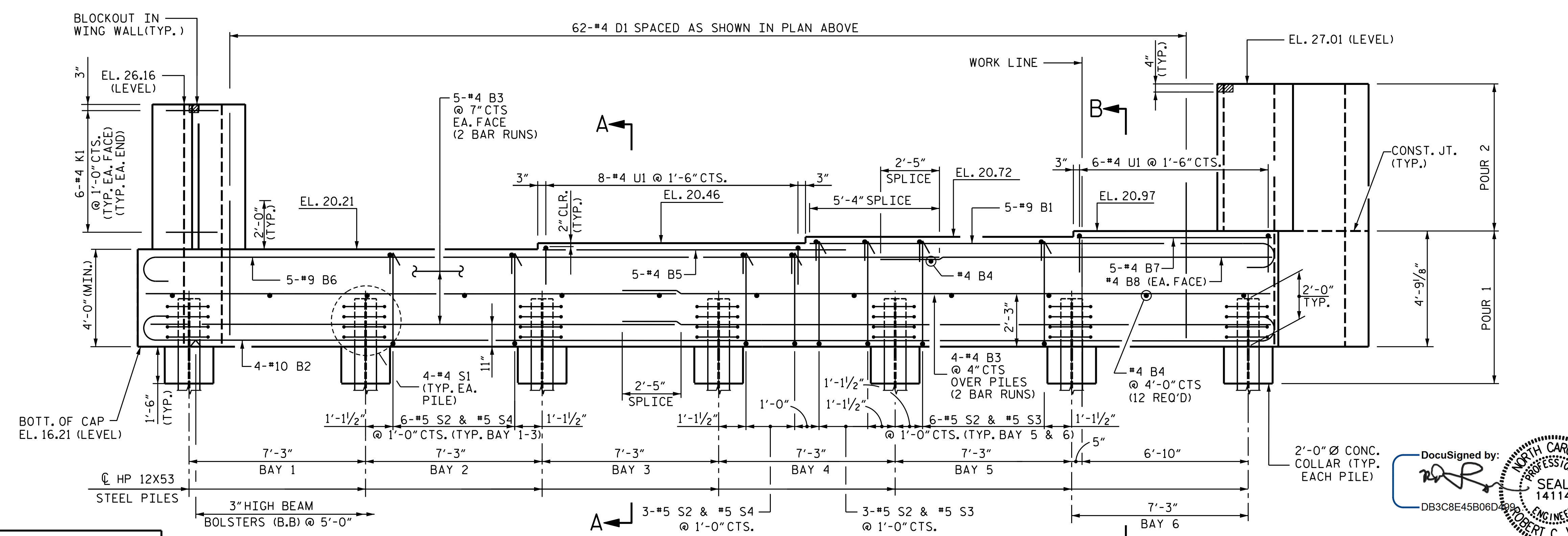
\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDVRS\$ \$PROJECT NO. 241704391.04



PLAN OF CAP

NOTES

- THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1) EXCEPT THE BEARING AREAS AND THE AREA OUTSIDE OF THE SUPERSTRUCTURE SHALL BE RAKED TO A DEPTH OF 1/4".
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIPFORMING IS USED.
- FOR "PILE SPLICE DETAILS", SEE END BENT 1.
- FOR SECTIONS THRU CAP SEE SHEET 3 OF 3.



ELEVATION

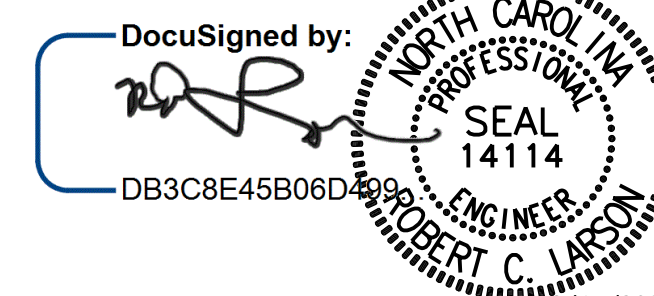
PROJECT NO. R-2561CA
 COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 2**

LEFT LANE



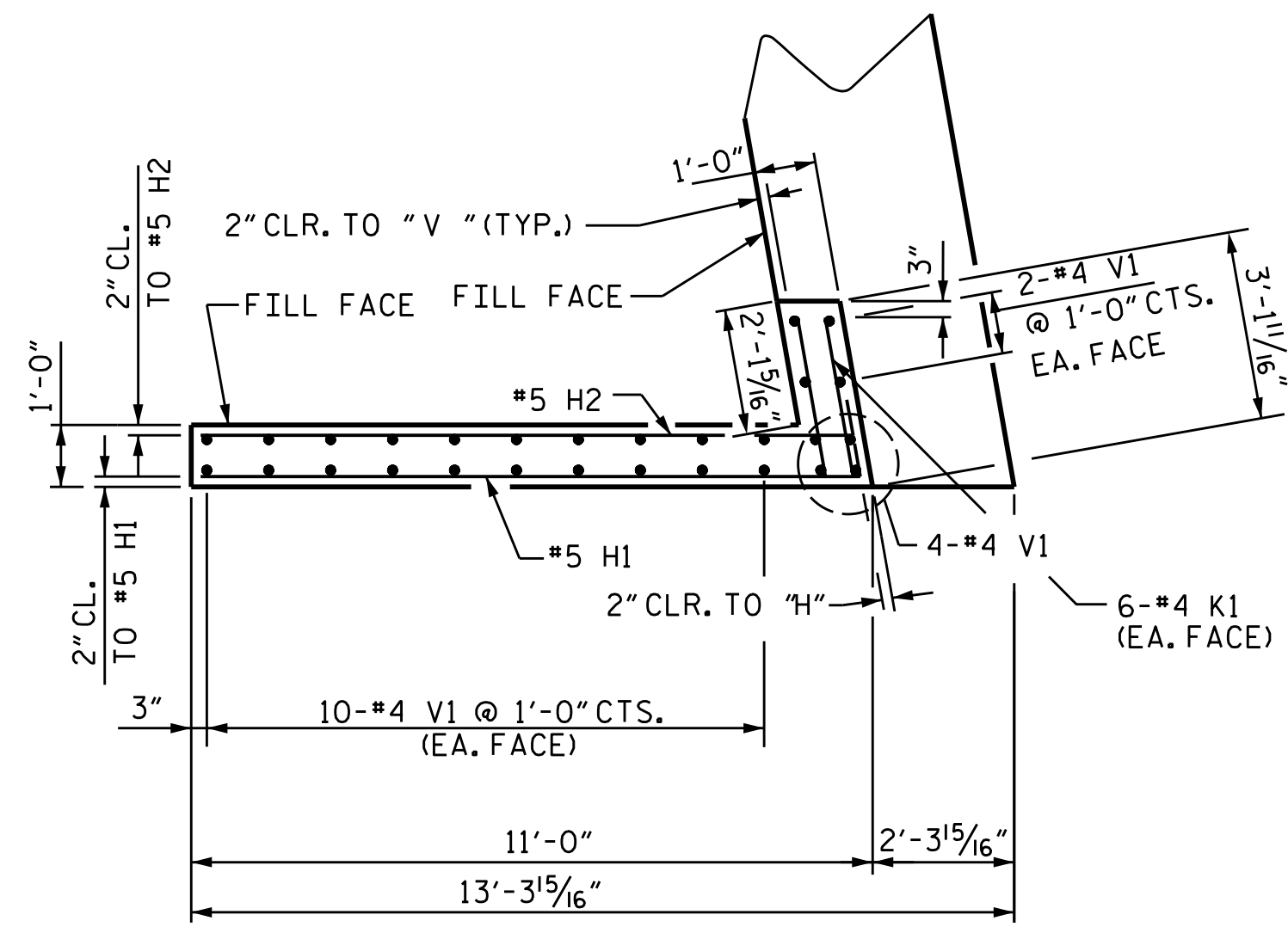
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 DRAWN BY: A. K. ALLANKI DATE: 07/24/20
 CHECKED BY: R. C. LARSON DATE: 07/28/20

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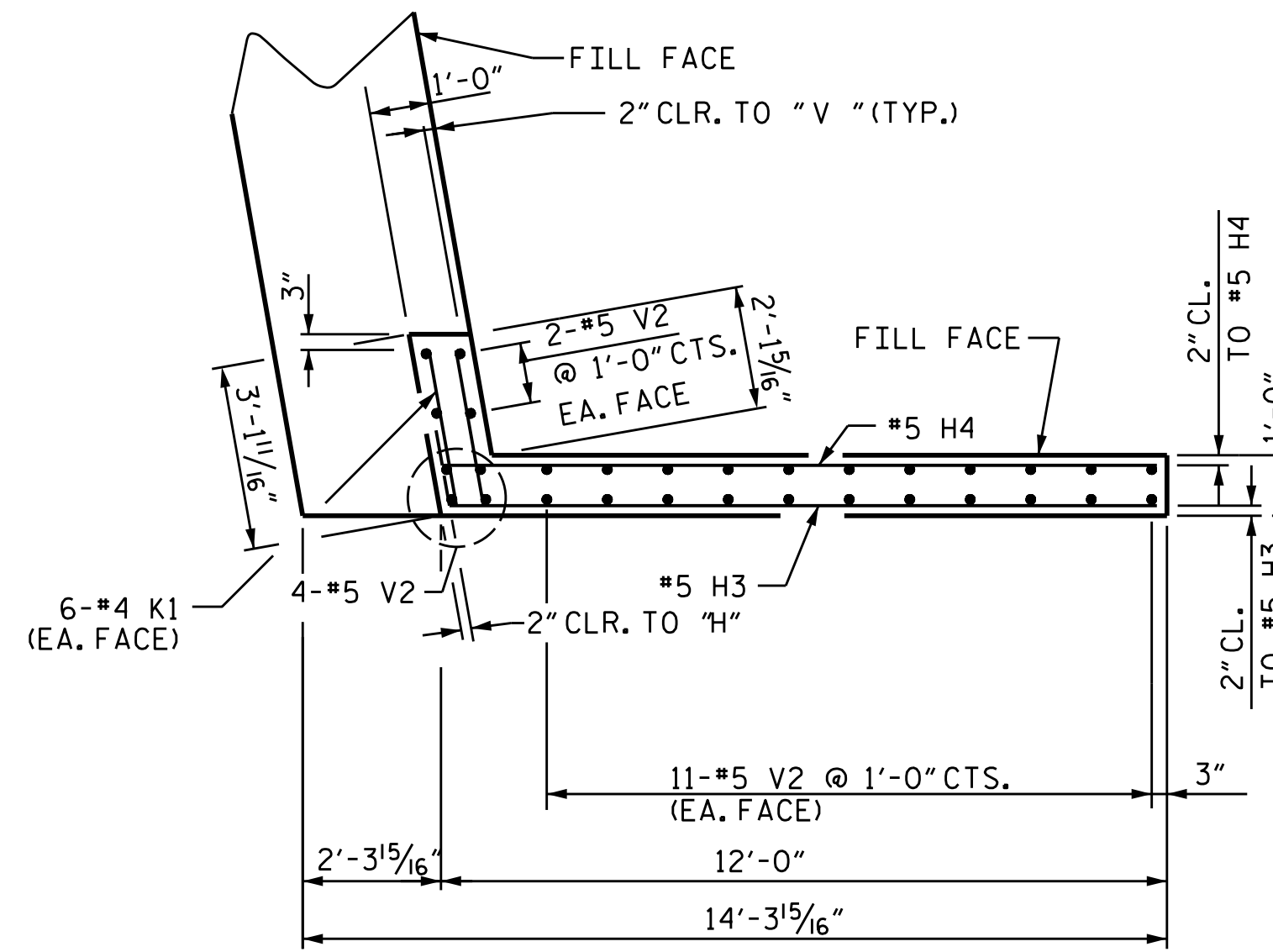
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TOTAL SHEETS: 30

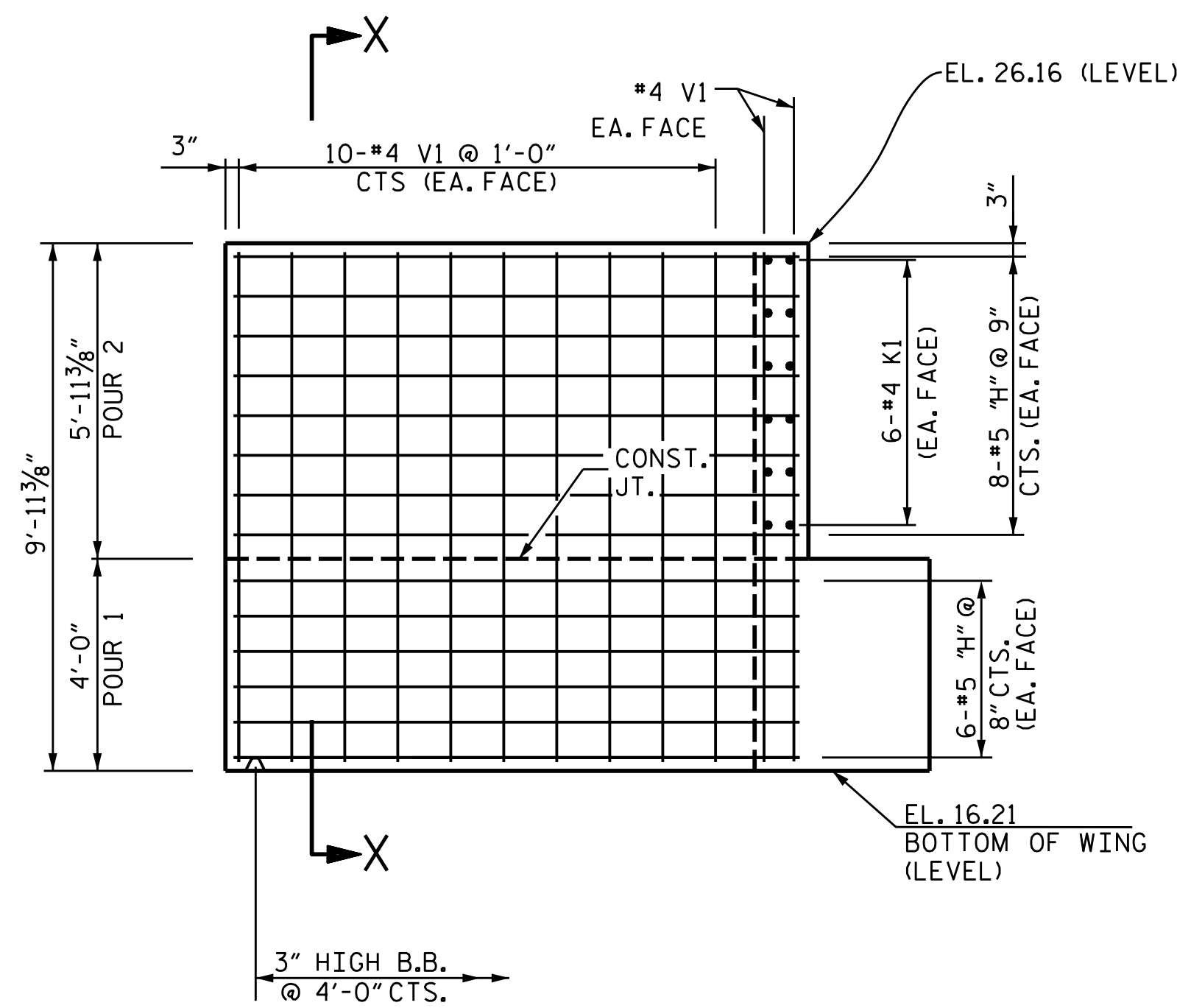
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 \$DATES \$ PROJECT NO. 241704391.04



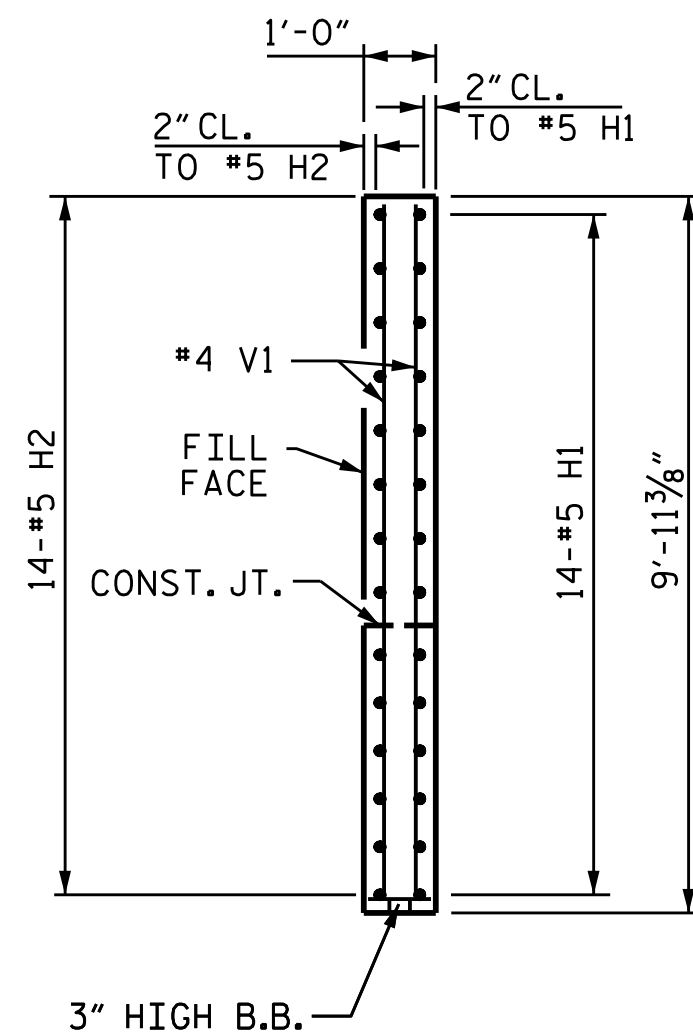
PLAN W1



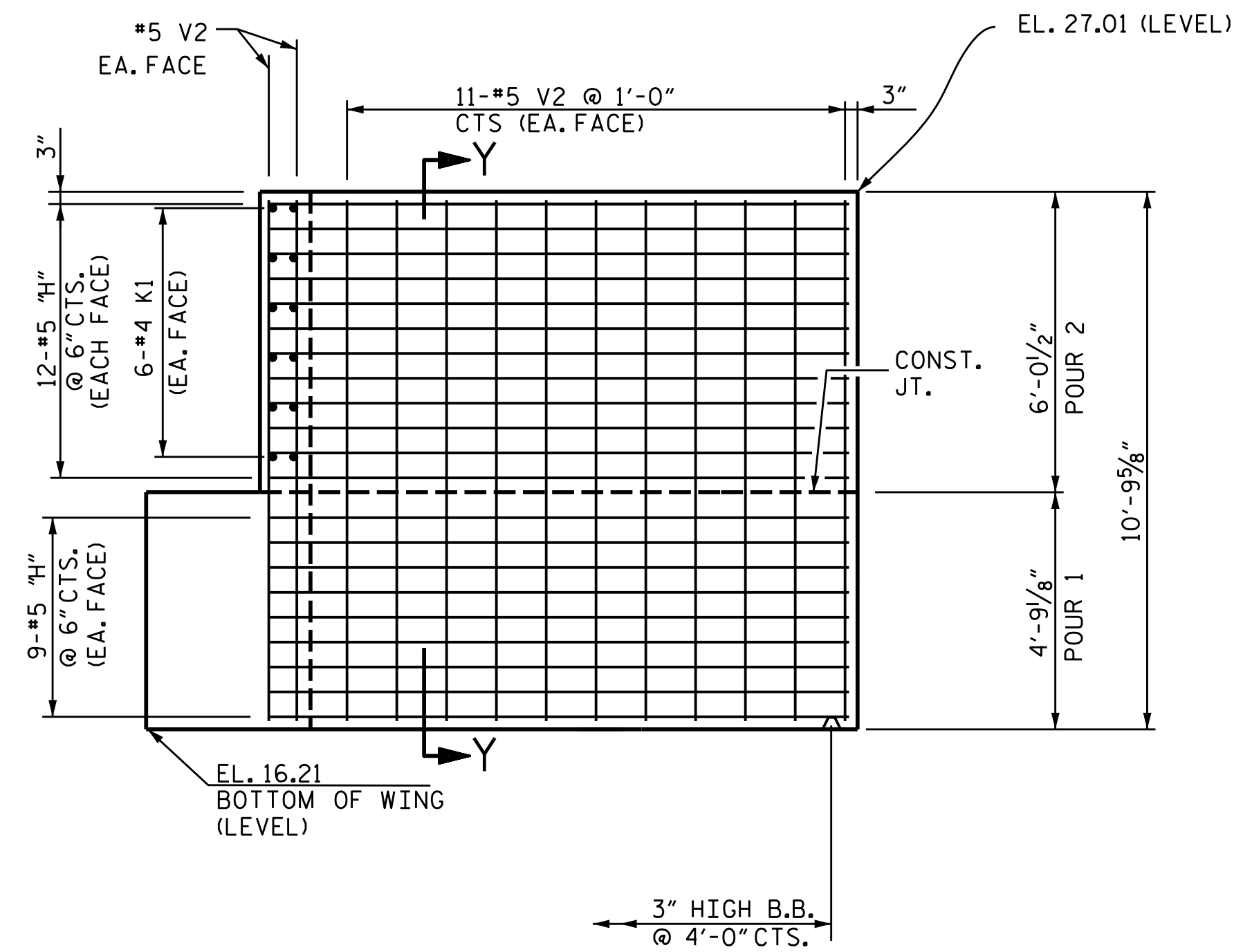
PLAN W2



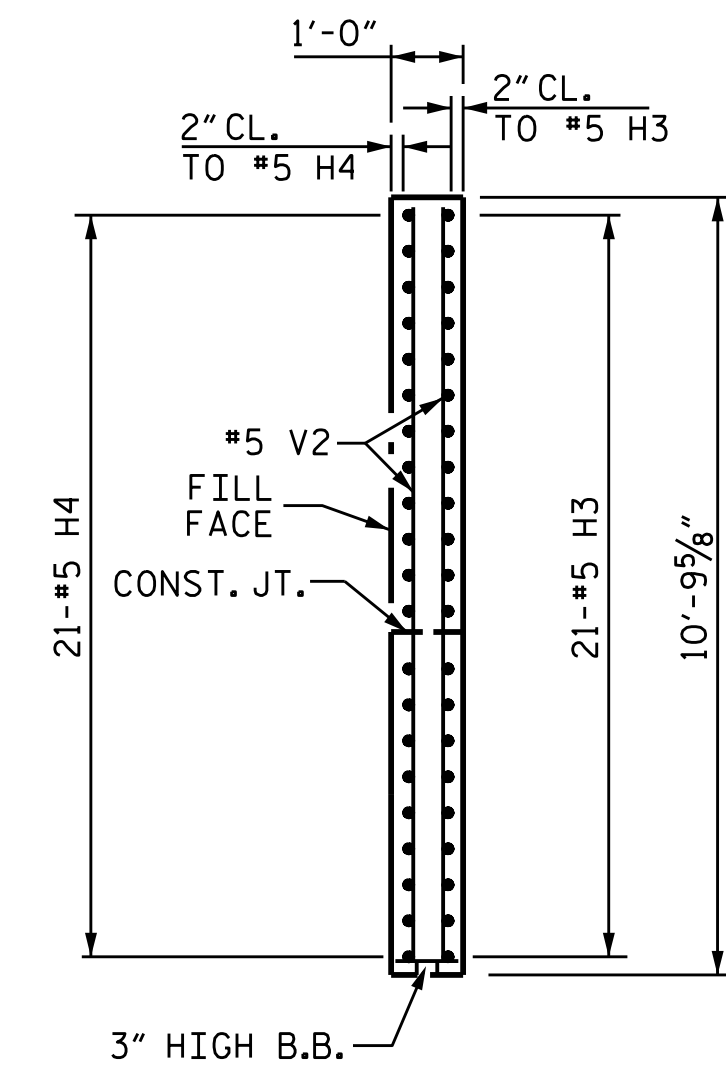
ELEVATION W1



SECTION X-X



ELEVATION W2



SECTION Y-Y

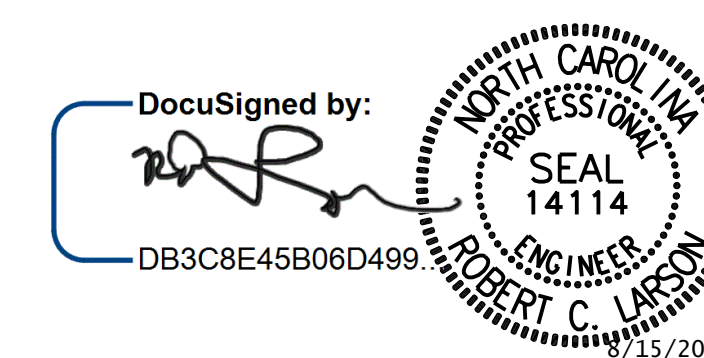
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2

LEFT LANE



DocuSigned by:

DB3C8E45B06D499

DESIGN ENGINEER OF RECORD	DATE :	8/15/2022
DRAWN BY :	A. K. ALLANKI	DATE : 07/24/20
CHECKED BY :	R. C. LARSON	DATE : 07/28/20

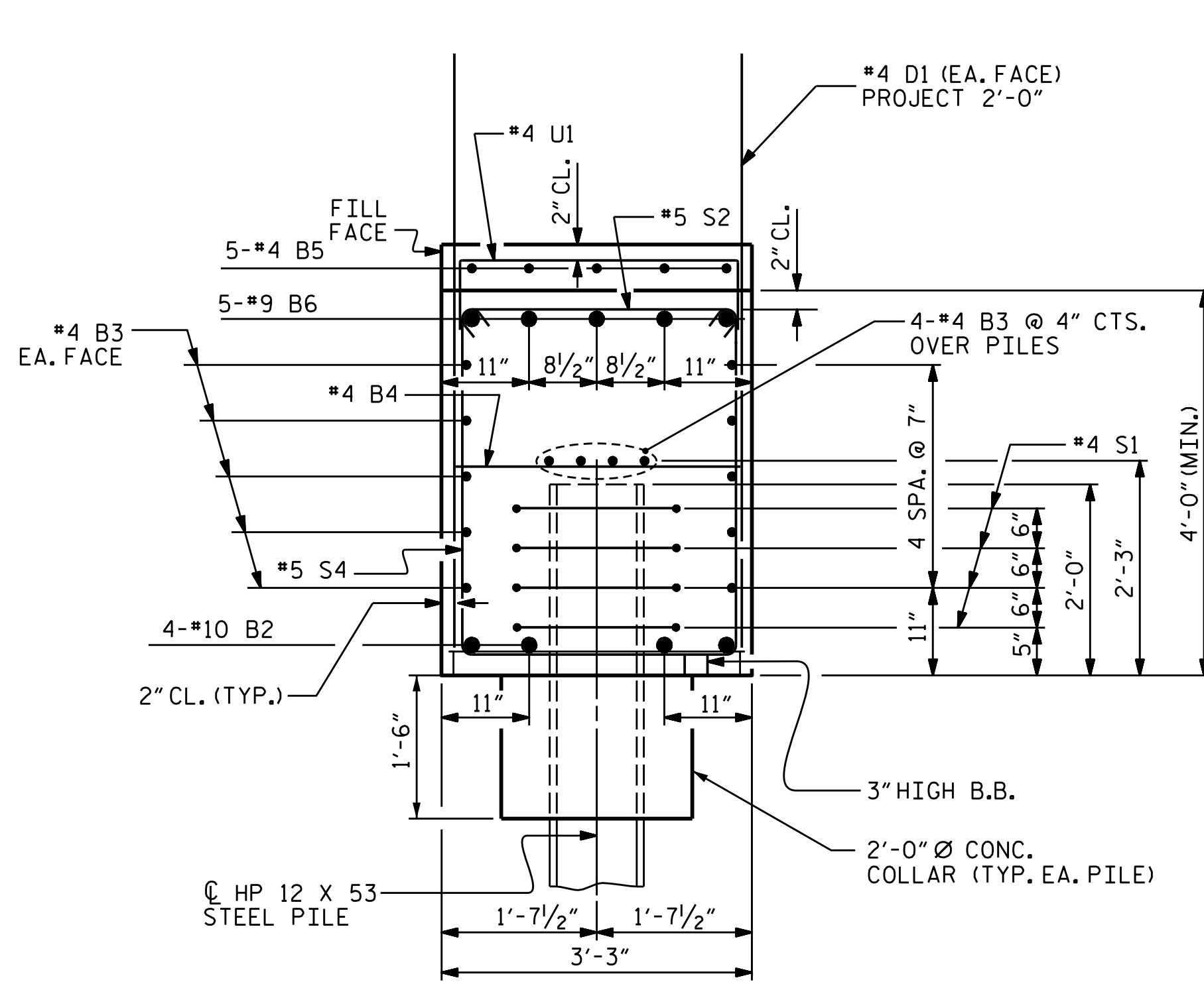
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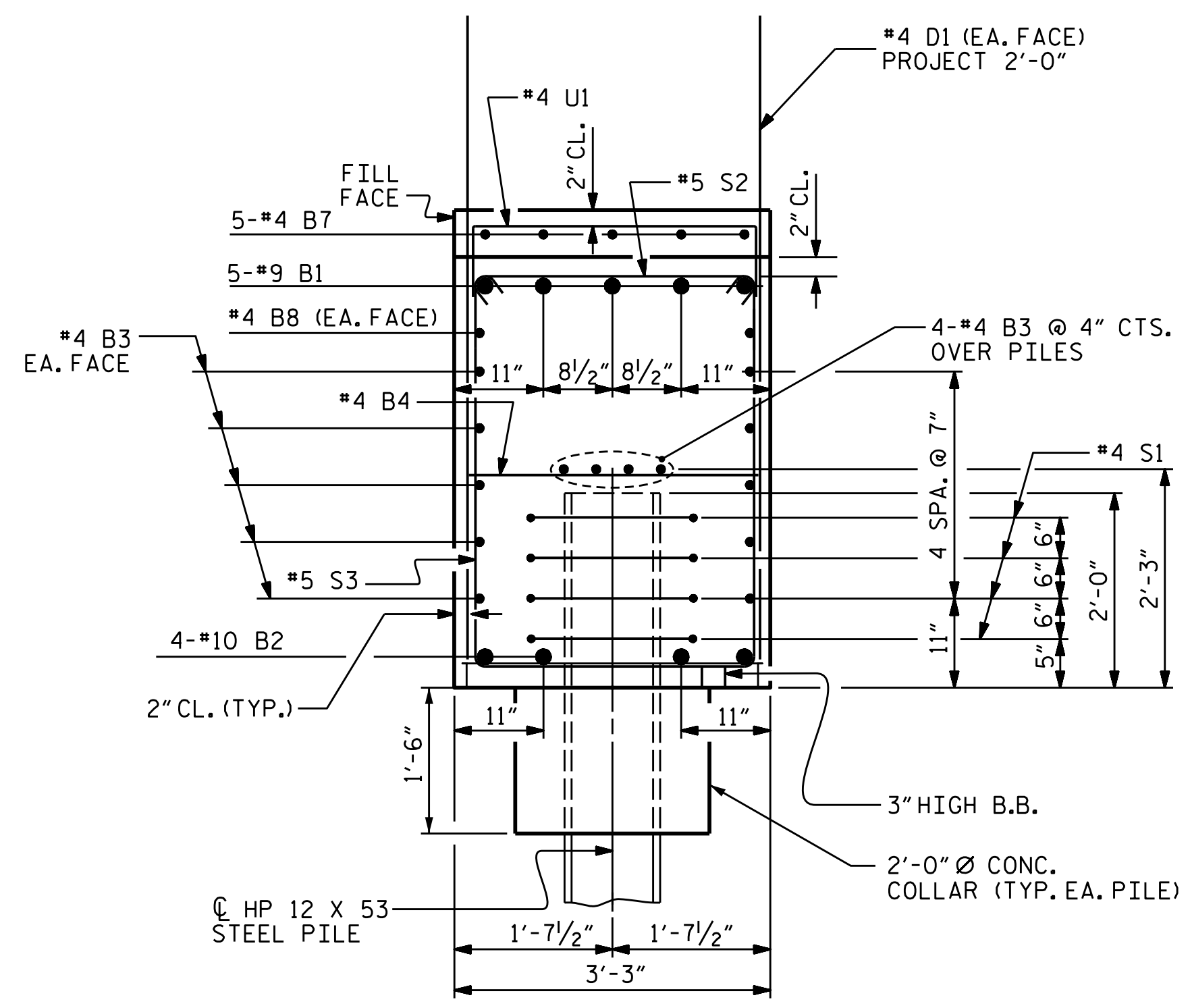
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TOTAL SHEETS: 30

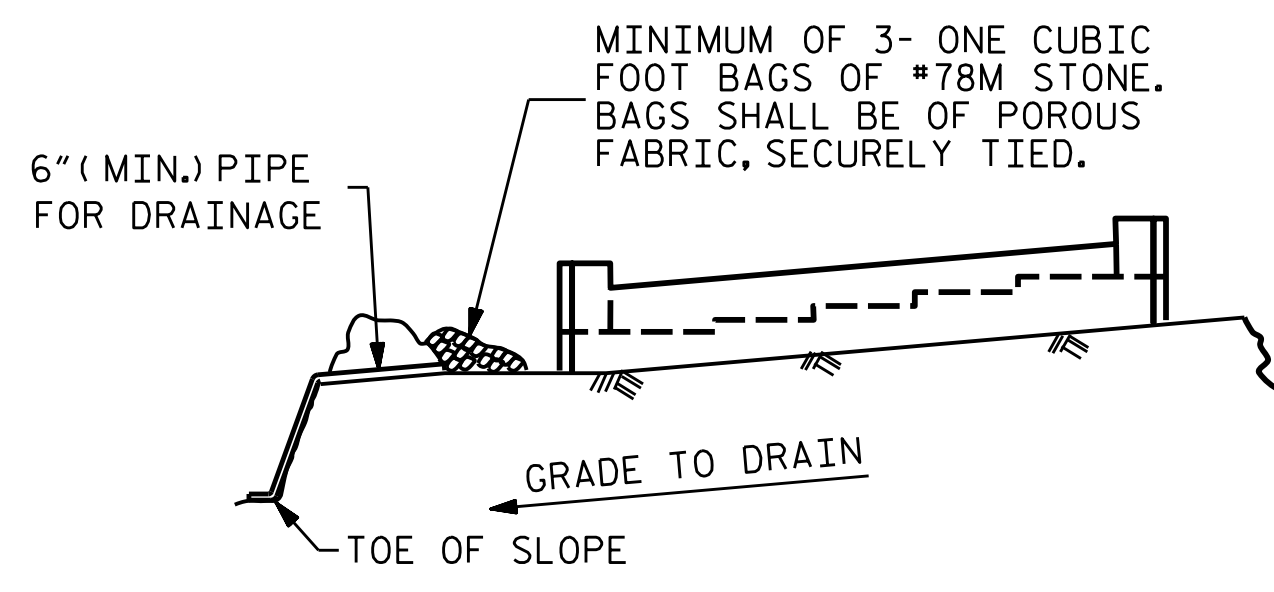
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 \$DATES\$ KCI PROJECT NO. 241704391.04



SECTION A-A



SECTION B-B

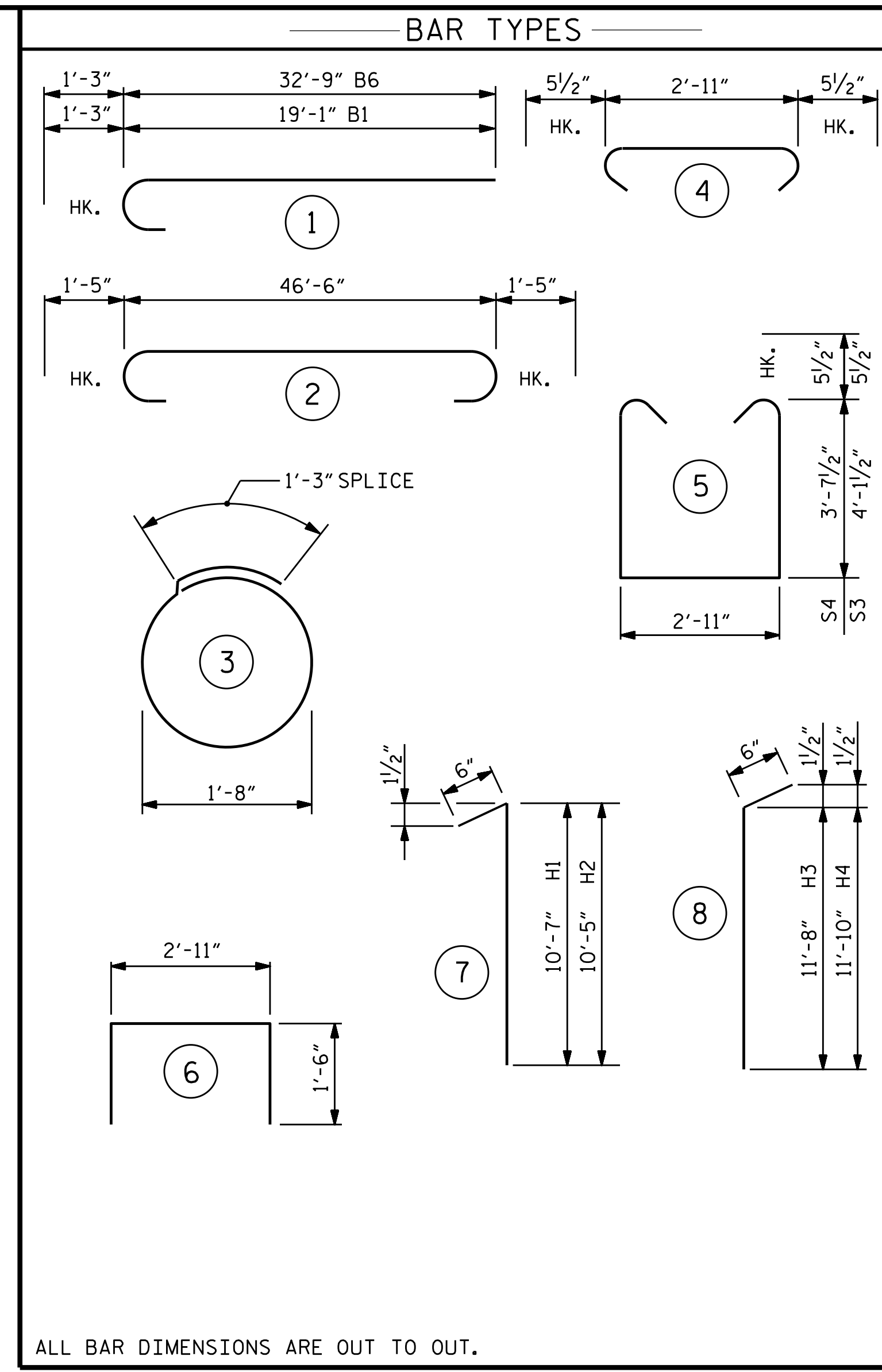


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 2					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	9	1	20'-4"	346
B2	4	10	2	49'-4"	849
B3	28	4	STR.	24'-6"	458
B4	13	4	STR.	2'-11"	25
B5	5	4	STR.	11'-10"	40
B6	5	9	1	34'-0"	578
B7	5	4	STR.	8'-1"	27
B8	2	4	STR.	16'-3"	22
D1	62	4	STR.	5'-10"	242
H1	14	5	7	11'-1"	162
H2	14	5	7	10'-11"	159
H3	21	5	8	12'-2"	266
H4	21	5	8	12'-4"	270
K1	24	4	STR.	2'-9"	44
S1	28	4	3	6'-6"	122
S2	36	5	4	3'-10"	144
S3	15	5	5	12'-1"	189
S4	21	5	5	11'-1"	243
U1	14	4	6	5'-11"	55
V1	28	4	STR.	9'-7"	179
V2	30	5	STR.	10'-5"	326
REINFORCING STEEL, LBS.					4746
CLASS A CONCRETE, CY					
POUR 1 (CAP, LOWER PORTION OF WINGS AND COLLARS)					29.0
POUR 2 (UPPER PORTION OF WINGS)					6.0
TOTAL					35.0
HP 12X53 STEEL PILES					NO. 7
					L.F. 315
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES, EA.					7
PILE REDRIVES, EA.					4

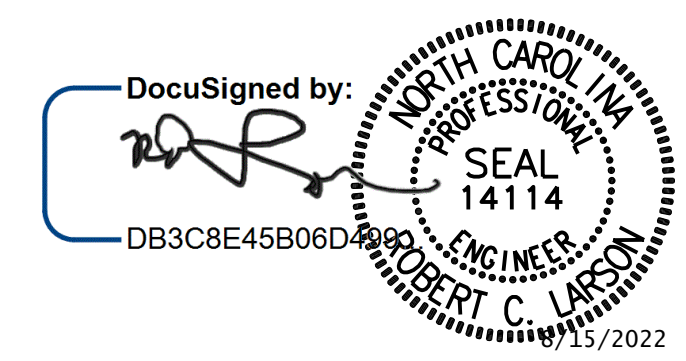
PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 2**

LEFT LANE



DESIGN ENGINEER OF RECORD:	DATE:
<i>RCL</i>	8/15/2022
DRAWN BY:	DATE:
A. K. ALLANKI	07/28/20
CHECKED BY:	DATE:
R. C. LARSON	07/29/20

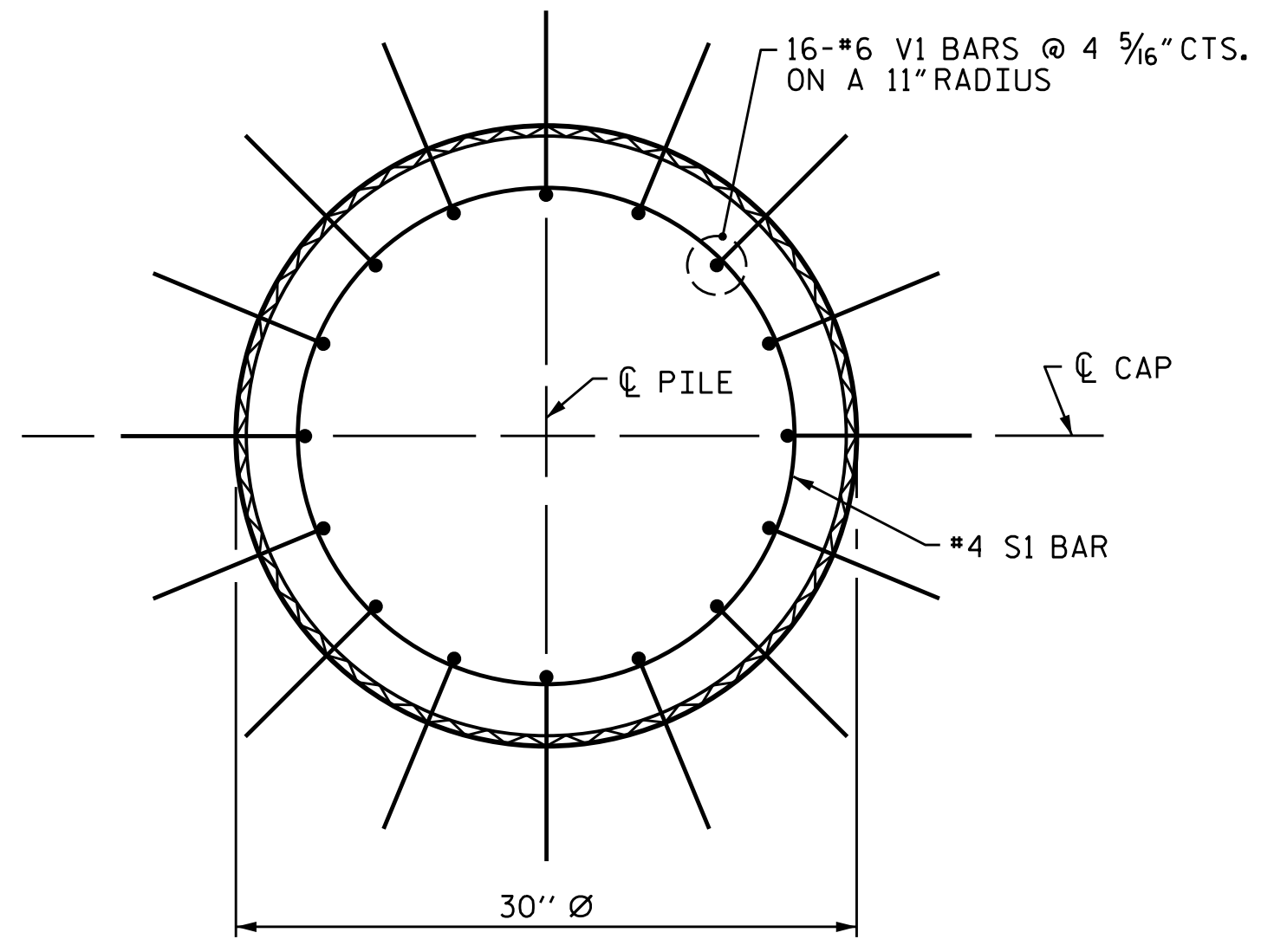
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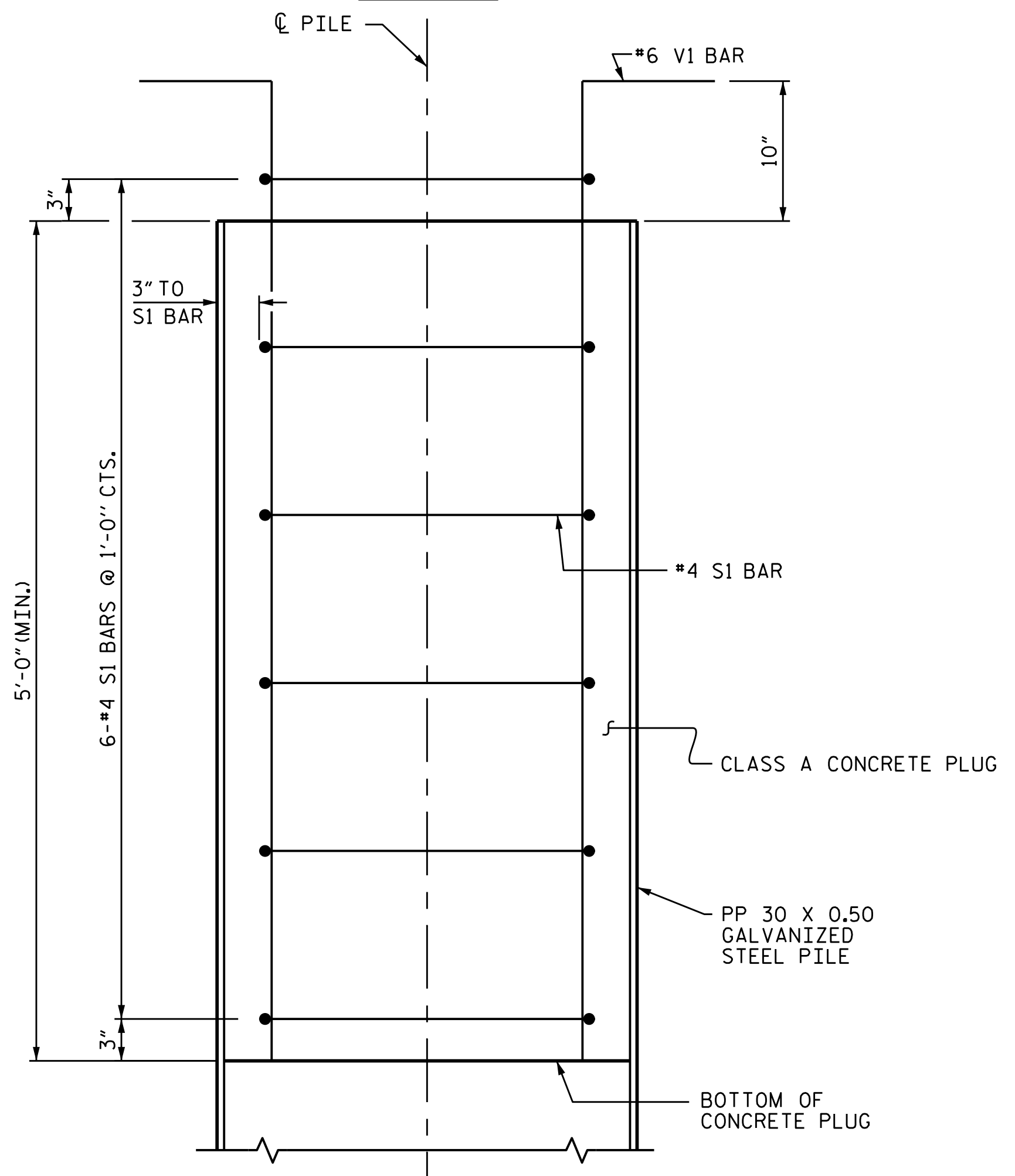
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NO.	BY:	DATE:	NO.	DATE:
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TOTAL SHEETS: 30

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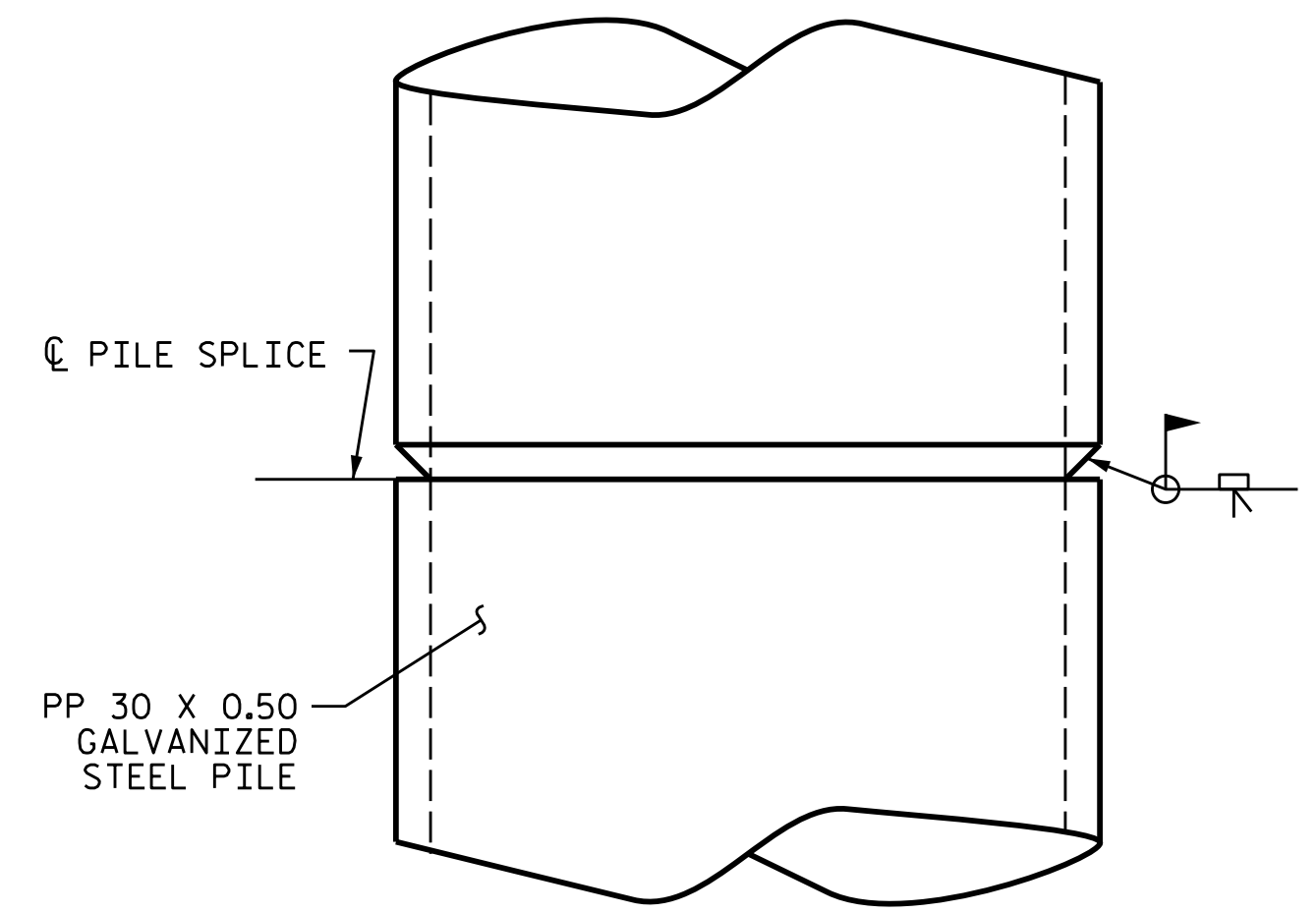


PLAN



ELEVATION

PP 30 X 0.50 GALVANIZED STEEL PILE
(OPEN END)



PIPE PILE SPLICE DETAIL

NOTES

PIPE PILES SHALL BE IN ACCORDANCE WITH SECTION 1084 OF THE STANDARD SPECIFICATIONS.

GALVANIZE STEEL PIPE PILES IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS UNLESS METALLIZING IS REQUIRED.

REMOVE AND REPLACE OR REPAIR TO THE SATISFACTION OF THE ENGINEER PILES THAT ARE DAMAGED, DEFORMED OR COLLAPSED DURING INSTALLATION OR DRIVING.

PILE SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

FOR OPEN END PIPE PILES, REMOVE ENOUGH SOIL AND WATER FROM INSIDE THE PILES TO CONSTRUCT THE CONCRETE PLUG WITHOUT FOULING THE CONCRETE.

FORM THE CONCRETE PLUG SUCH THAT THE REINFORCING STEEL OR CONCRETE DOES NOT MOVE AND THE CLEARANCE FROM THE REINFORCING STEEL TO THE INSIDE OF THE PILE IS MAINTAINED AFTER CONCRETE PLACEMENT. DO NOT PLACE CONCRETE IN THE BENT CAP UNTIL THE CONCRETE PLUG HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

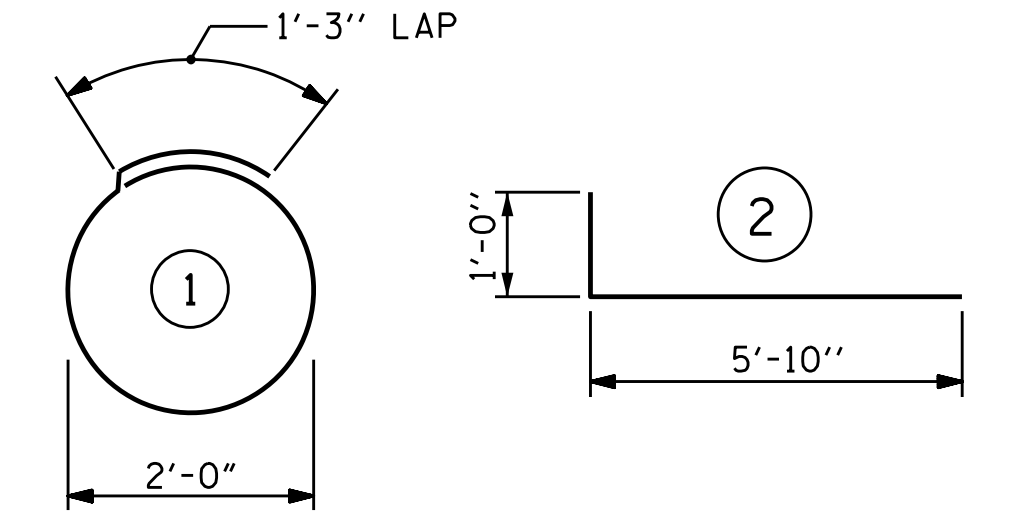
THE REINFORCING STEEL, CLASS A CONCRETE, AND GALVANIZING ARE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER LINEAR FOOT FOR PP 30 X 0.50 GALVANIZED STEEL PILES.

BILL OF MATERIAL FOR ONE
PP 30 X 0.50 GALVANIZED STEEL PILE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	6	#4	1	7'-7"	30
V1	16	#6	2	6'-10"	164
REINFORCING STEEL =				194	lbs

CLASS A CONCRETE	
5'-0" MINIMUM PLUG	0.8 CY

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 70+34.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
30" STEEL PIPE PILE
LEFT LANE

DocuSigned by:

DB3C8E45B06D498
NORTH CAROLINA PROFESSIONAL SEAL 14114
ENGINEER
ROBERT C. LARSON
8/15/2022

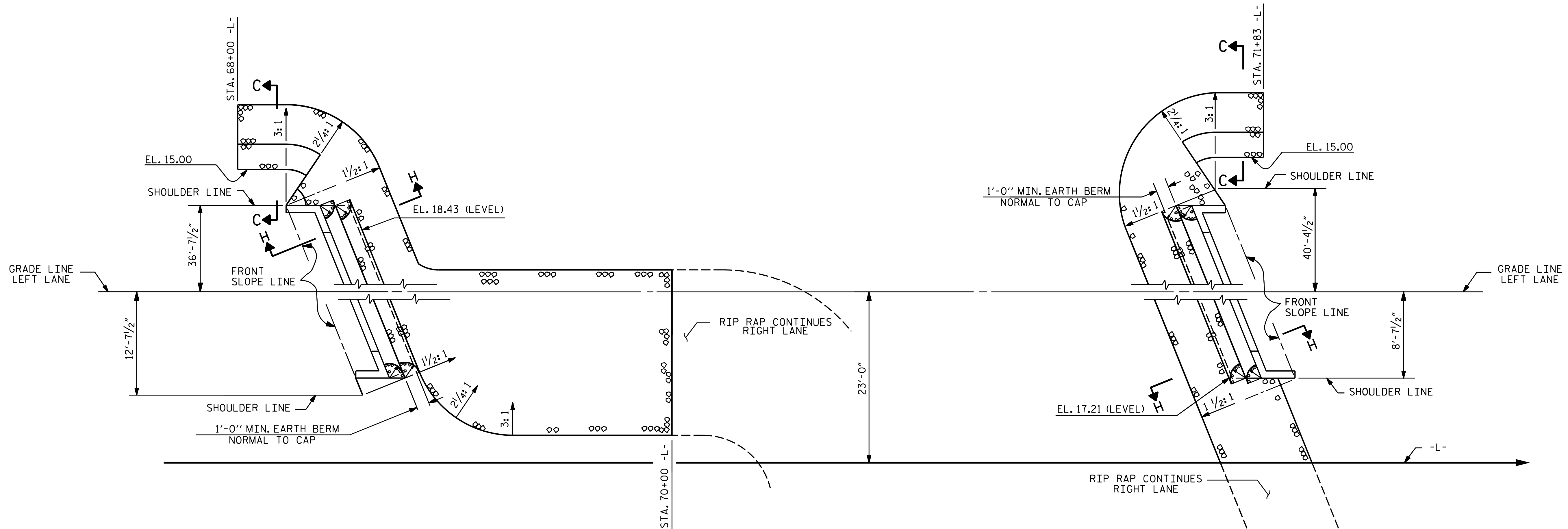
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ASSEMBLED BY: R. F. DeCOLA	DATE: 06/26/20
CHECKED BY: R. C. LARSON	DATE: 06/26/20
DRAWN BY: TLA 8/05	REV. 5/1/06R MAA/KMM
CHECKED BY: GM 9/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
of North Carolina, P.A.
4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone: (919) 785-9241

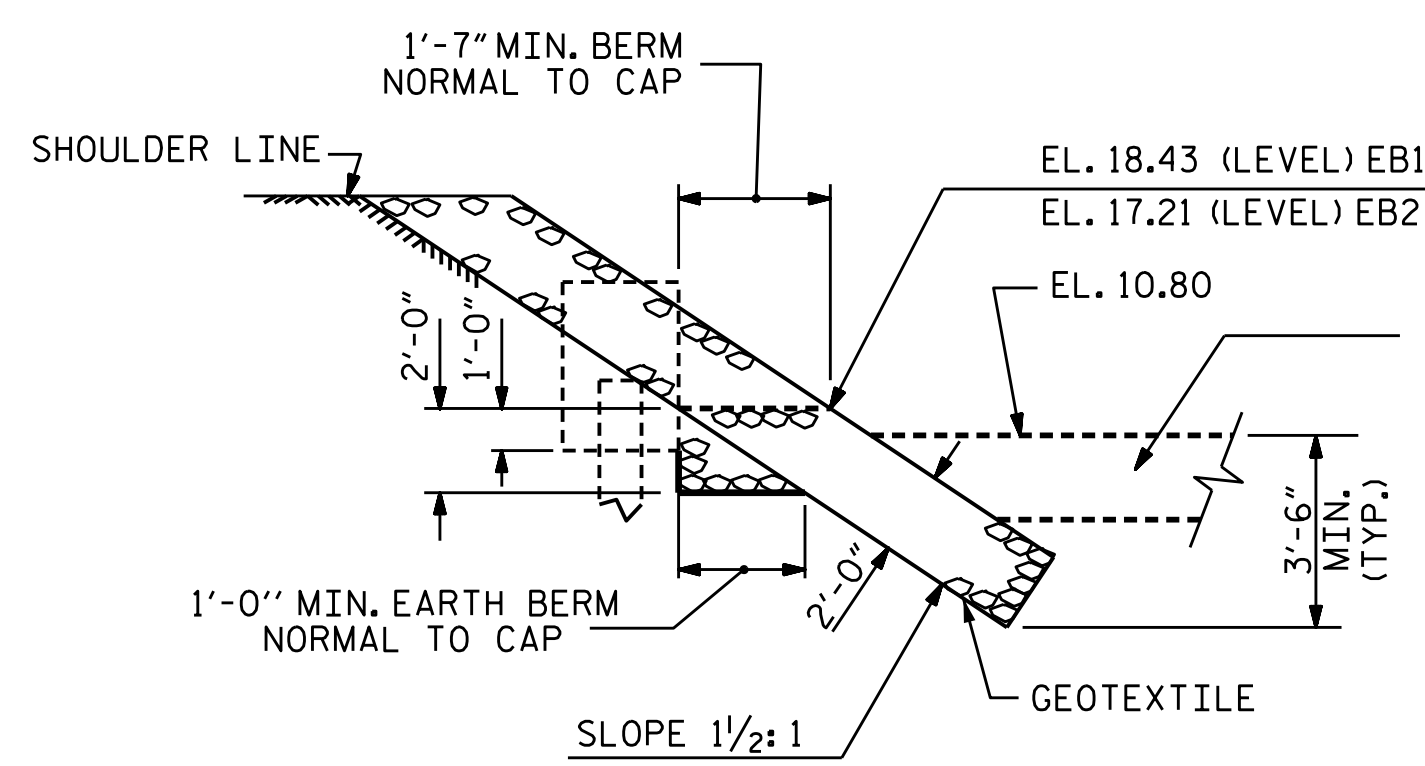
NO.		BY:		DATE:		REVISIONS		SHEET NO.	
1						3			S3-27
2						4			TOTAL SHEETS 30

\$FILEL\$ \$DATE\$ \$TIME\$ \$USER\$ \$PENTBL\$ \$PLTDV\$ \$KCI PROJECT NO. 241704391.04

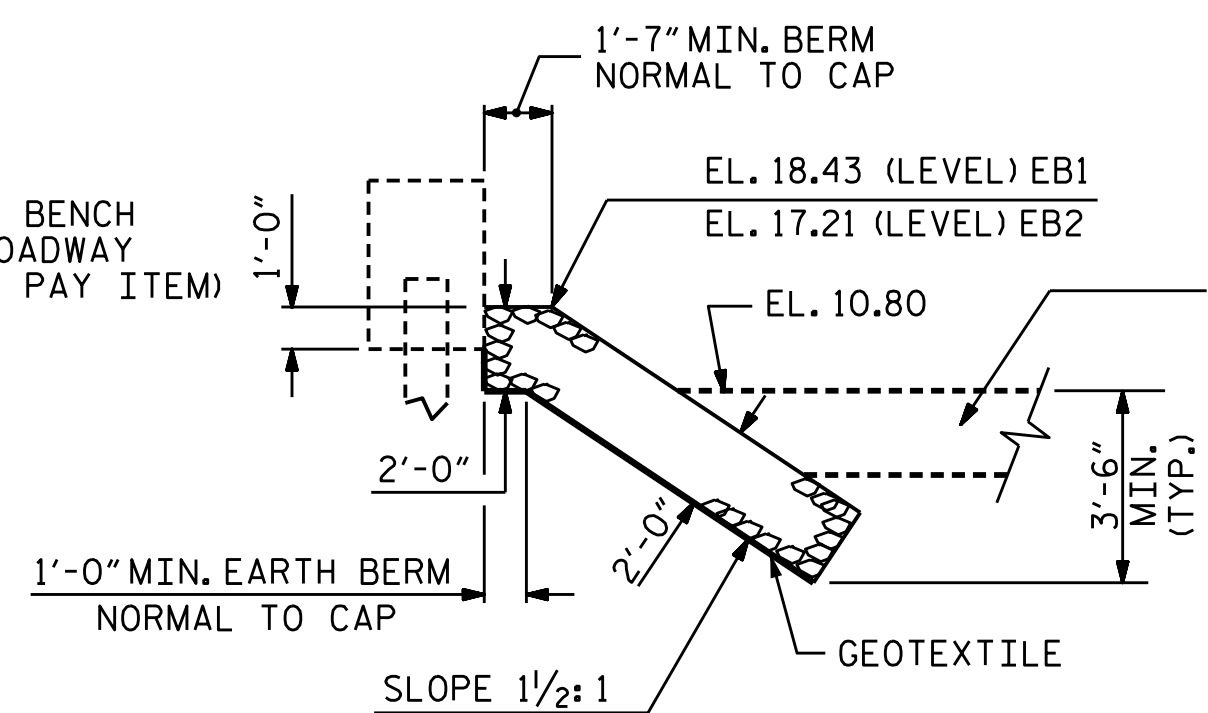


BERM RIP RAPPED

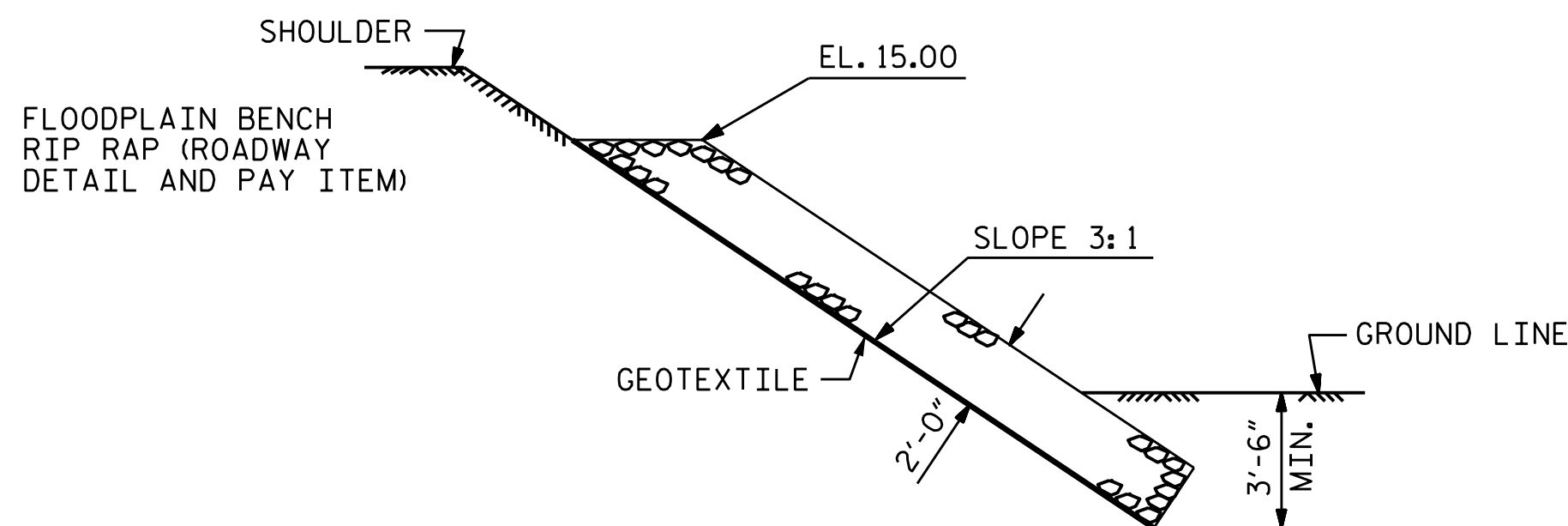
ESTIMATED QUANTITIES		
BRIDGE @ STA. 70+34.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	640	710
END BENT 2	325	360



SECTION H-H



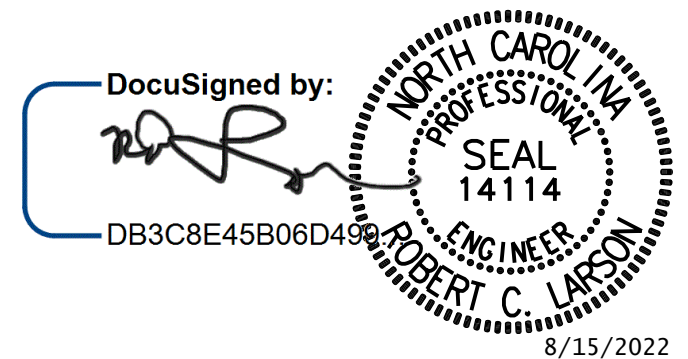
SECTION C-C



SECTION C-C

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 70+34.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RIP RAP DETAILS
 LEFT LANE



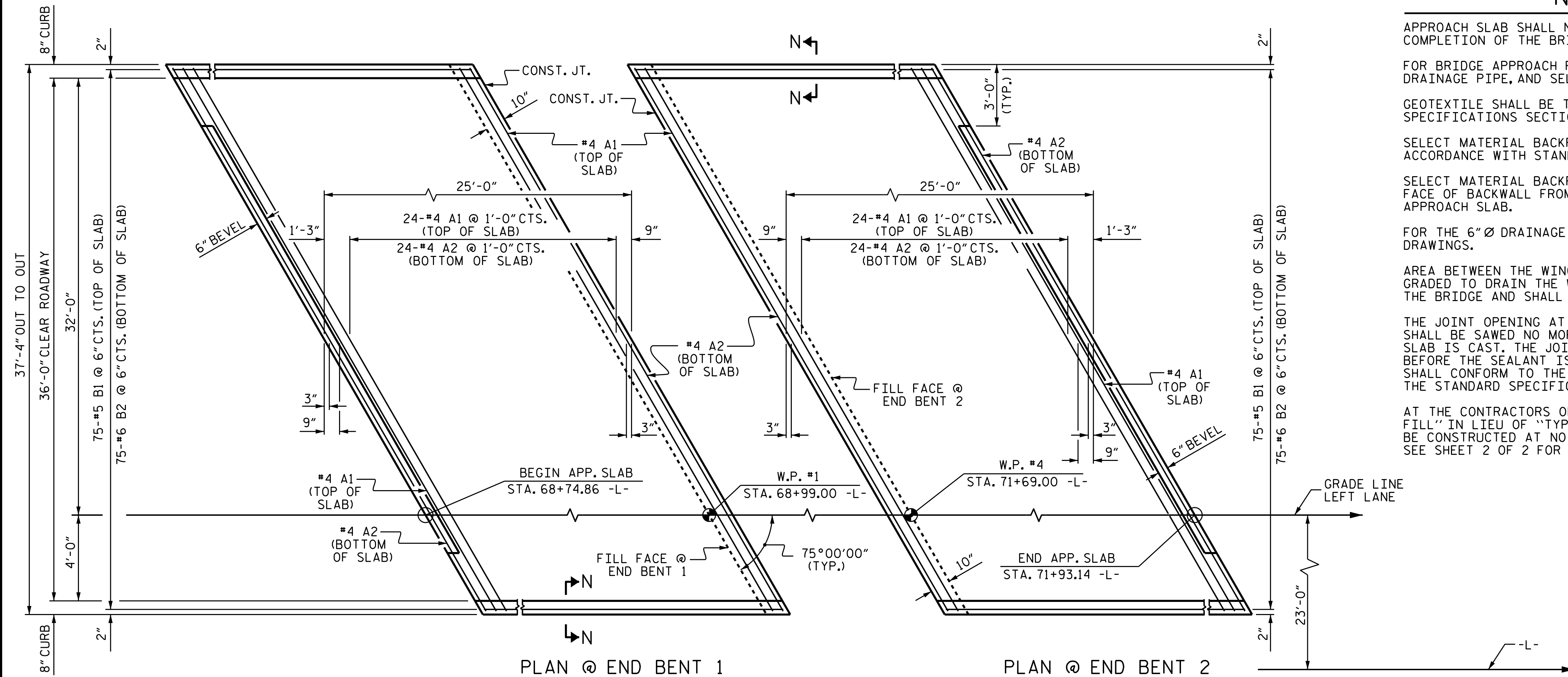
DESIGN ENGINEER OF RECORD:	DATE:
ASSEMBLED BY: A. K. ALLANK	DATE: 08/28/20
CHECKED BY: R. C. LARSON	DATE: 11/14/20
DRAWN BY: REK 1/84	REV. 10/1/11
CHECKED BY: RDU 1/84	REV. 12/21/11
	REV. 12/17
	MAA/GM
	MAA/GM
	MAA/THC

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ENGINEERS PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone: 919-783-9241

REVISIONS						SHEET NO. S3-28	TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLOTDRYS\$ \$PENTBL\$ \$PROJECT NO. 241704391.04



NOTES

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

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

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

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

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

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

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

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

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

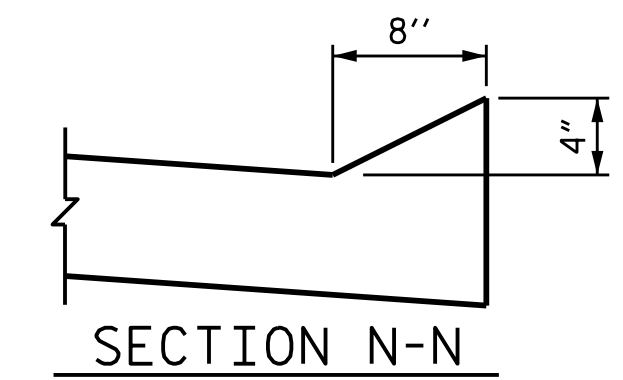
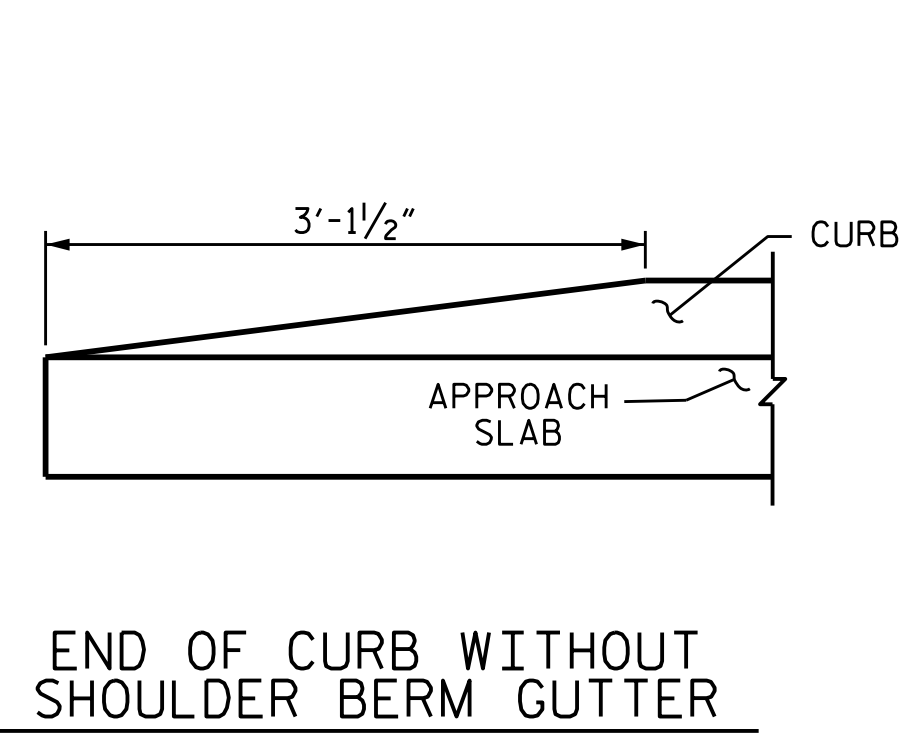
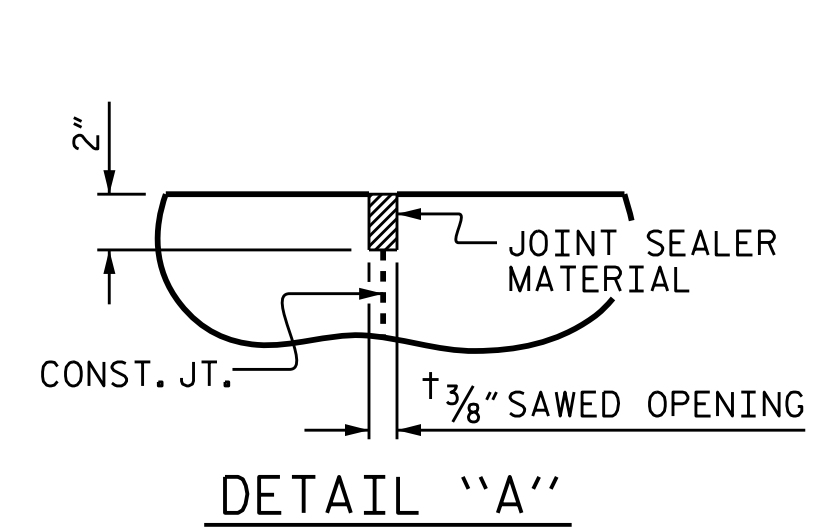
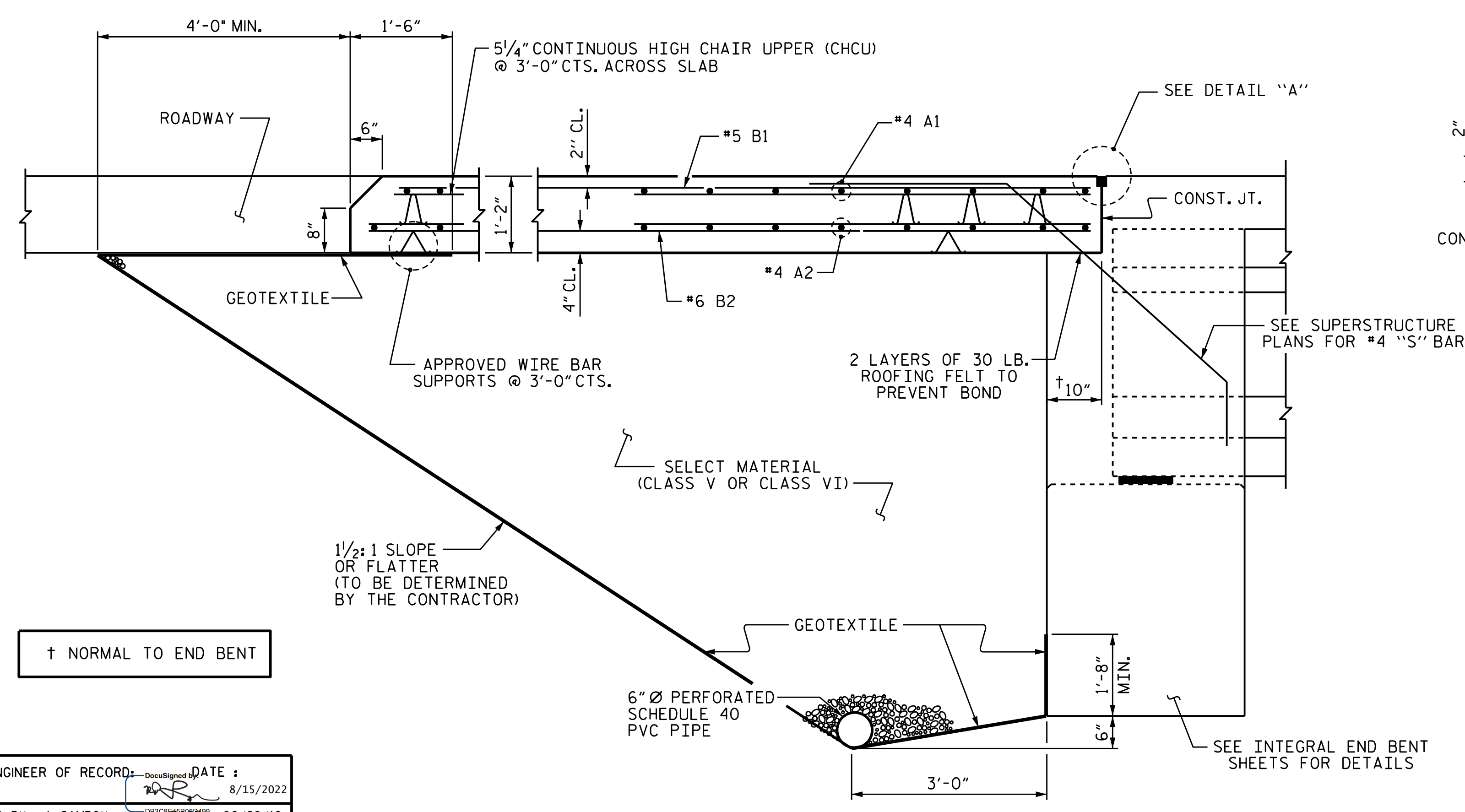
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	38'-4"	666
A2	26	#4	STR	38'-4"	666
* B1	75	#5	STR	24'-0"	1877
B2	75	#6	STR	24'-6"	2760
REINFORCING STEEL				3426	LBS.
* EPOXY COATED REINFORCING STEEL				2543	LBS.
CLASS AA CONCRETE				40.3	C. Y.

SPLICE LENGTHS

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



PROJECT NO. R-2561CA

COLUMBUS COUNTY

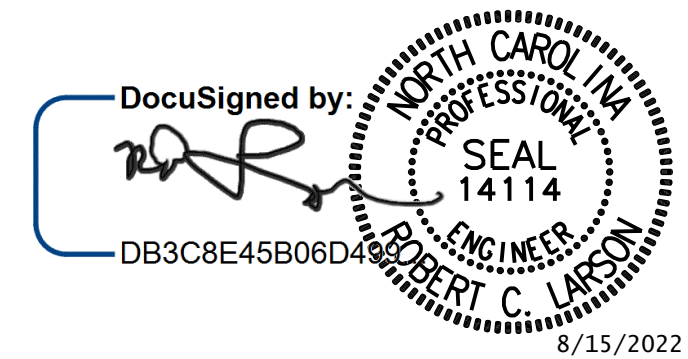
STATION: 70+34.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB
FOR INTEGRAL ABUTMENT
WITH FLEXIBLE PAVEMENT
LEFT LANE



DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022

ASSEMBLED BY: A. SAMBOY DATE: 06/28/19

CHECKED BY: R.F. DECOLA DATE: 06/16/20

DRAWN BY: TLA 10/05 REV. 6/13 MAA/GM

CHECKED BY: GM 5/06 REV. 12/17 MAA/THC

REV. 06/19 BNB/THC

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0784

KCI Associates
of North Carolina, P.A.

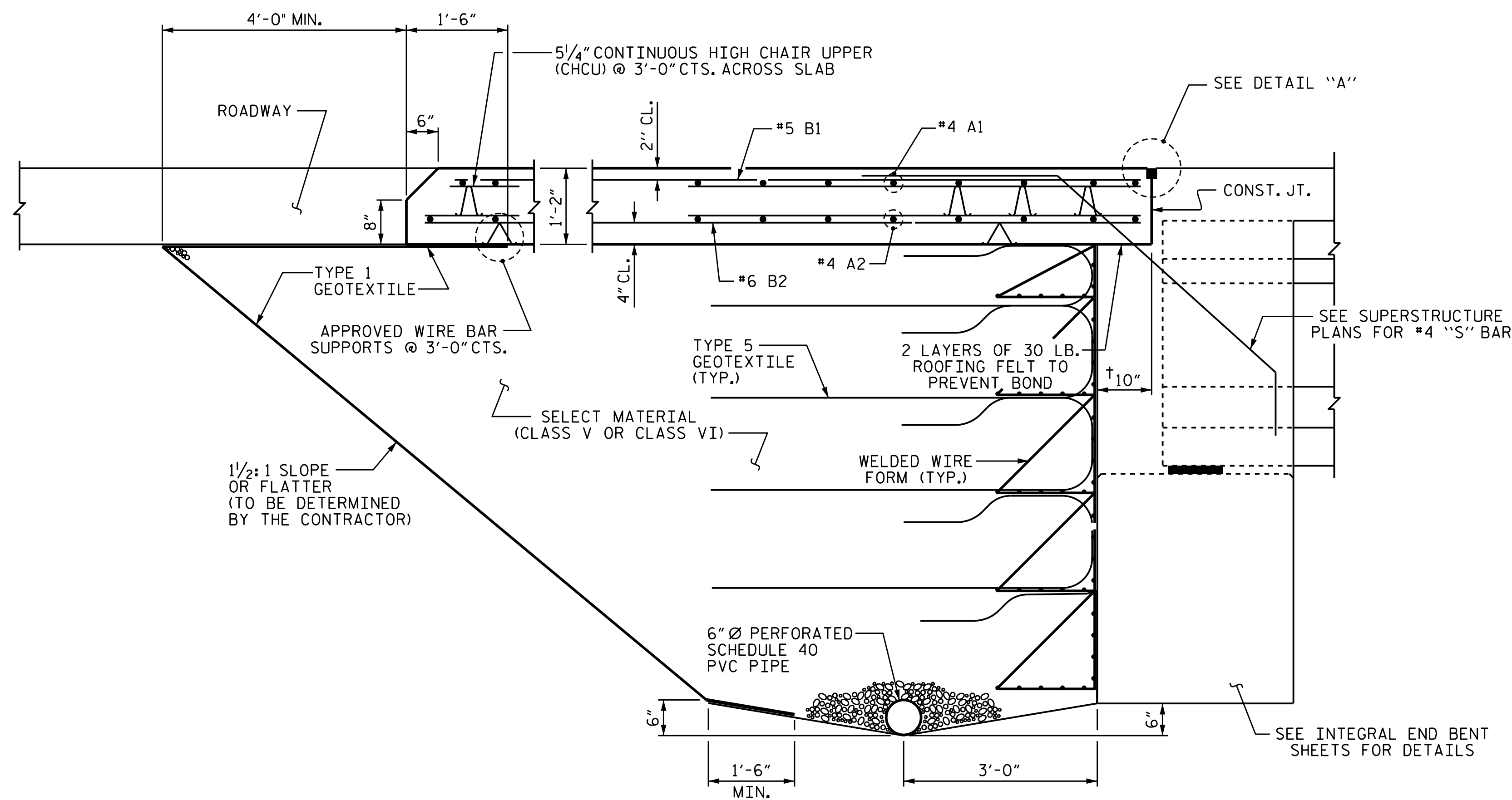
4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone 919-783-9241

REVISIONS

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

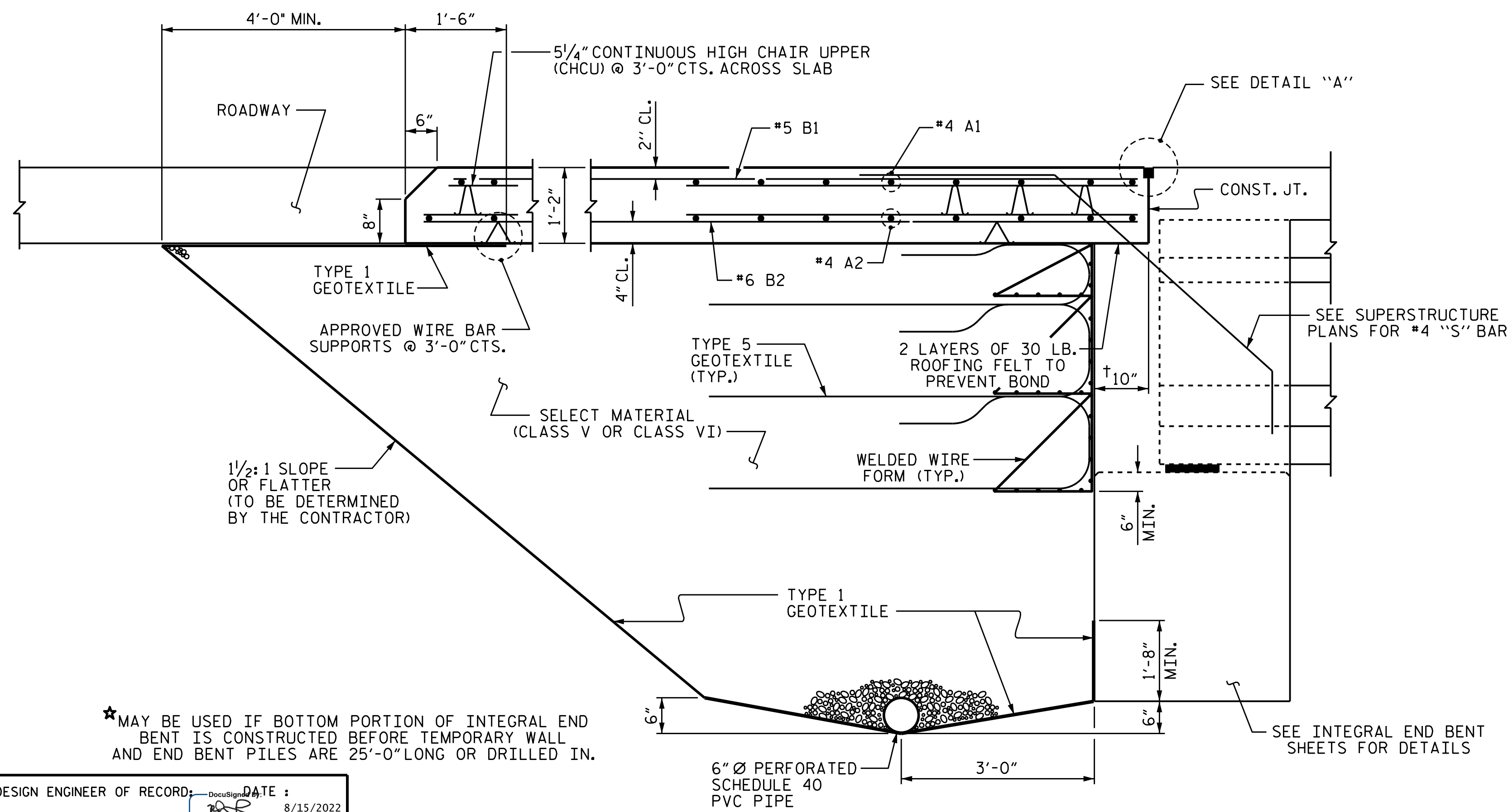
SHEET NO. S3-29

TOTAL SHEETS 30



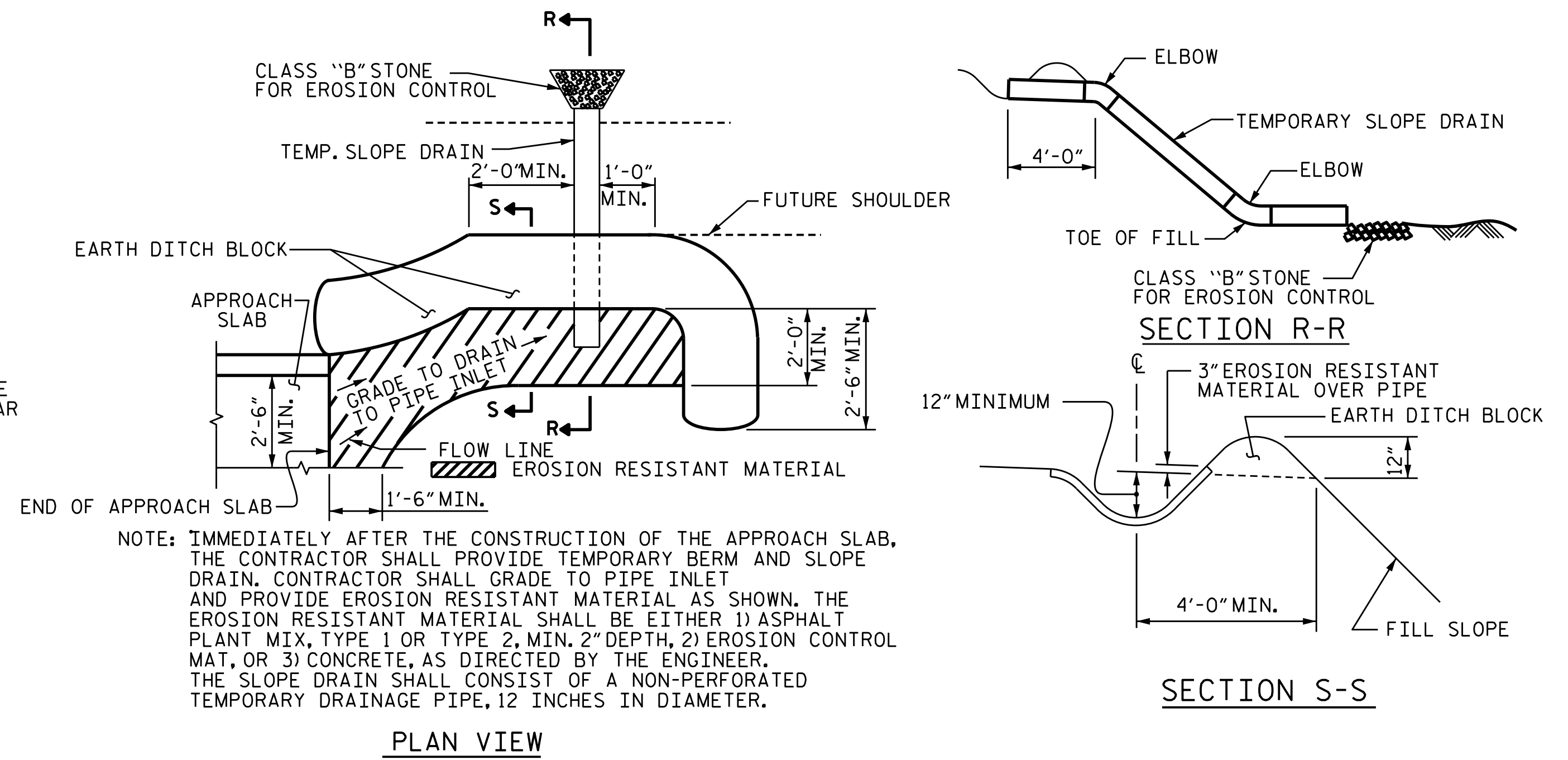
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



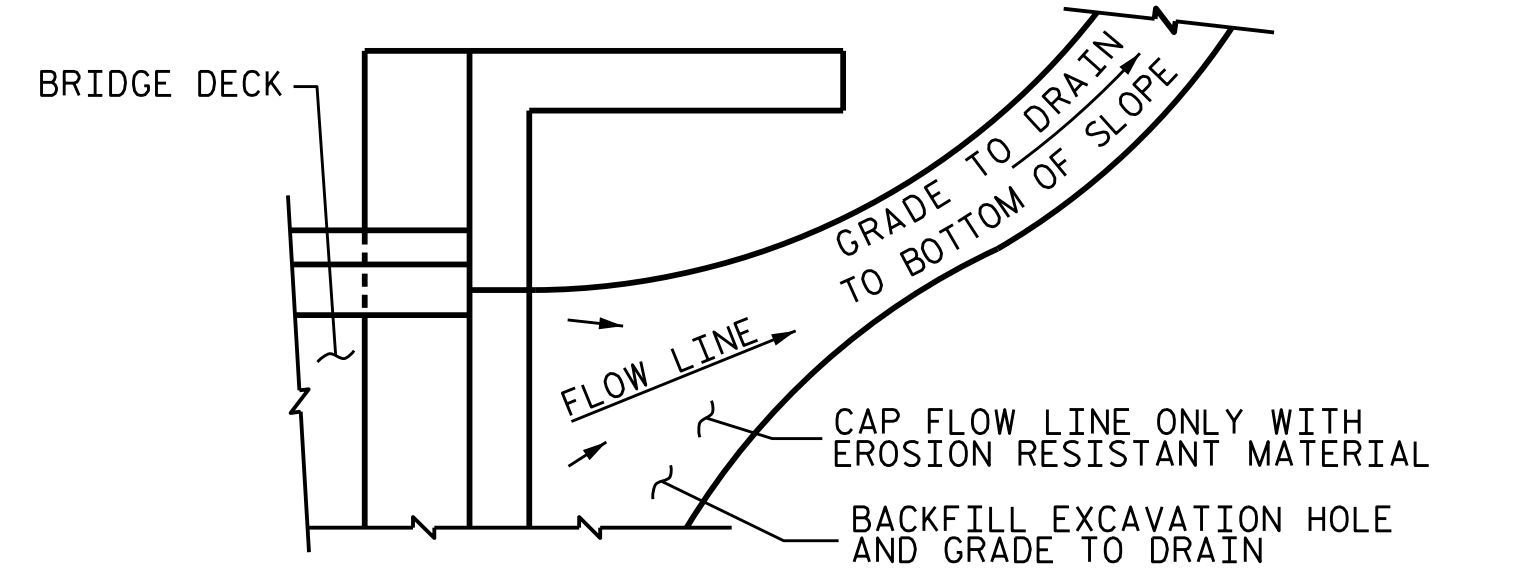
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

NOTES

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

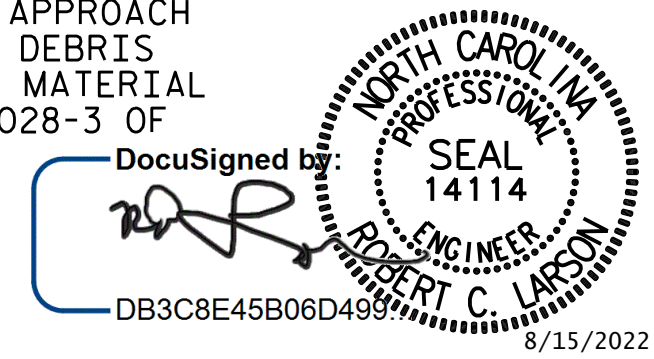
PROJECT NO. R-2561CA

COLUMBUS COUNTY

STATION: 70+34.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH
SLAB DETAILS
LEFT LANE



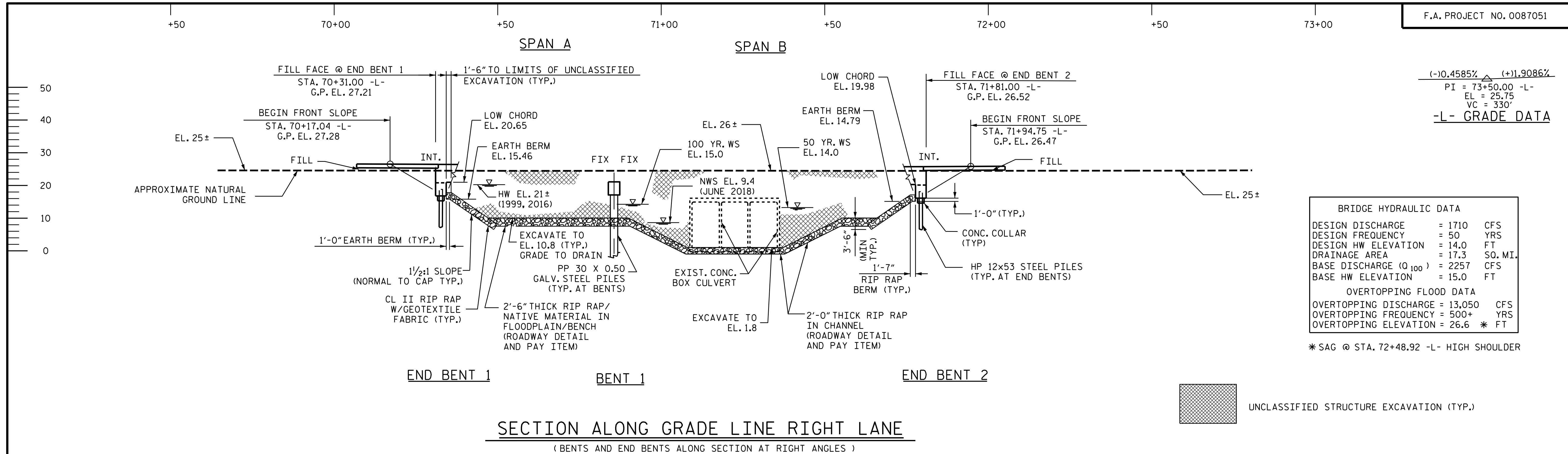
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-30	
1			3			TOTAL SHEETS	
2			4			30	

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2505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-1270 Phone 919-783-9241

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTORVYS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04

DESIGN ENGINEER OF RECORD:	DATE:
ASSEMBLED BY: R. C. LARSON	DATE: 06/14/20
CHECKED BY: R. F. DECOLA	DATE: 06/16/20
DRAWN BY: TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC



(-0.4585% (+)1.9086%
PI = 73+50.00 -L-
EL = 25.75
VC = 330'
-L- GRADE DATA

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1710	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 14.0	FT
DRAINAGE AREA	= 17.3	SQ. MI.
BASE DISCHARGE (Q ₁₀₀)	= 2257	CFS
BASE HW ELEVATION	= 15.0	FT

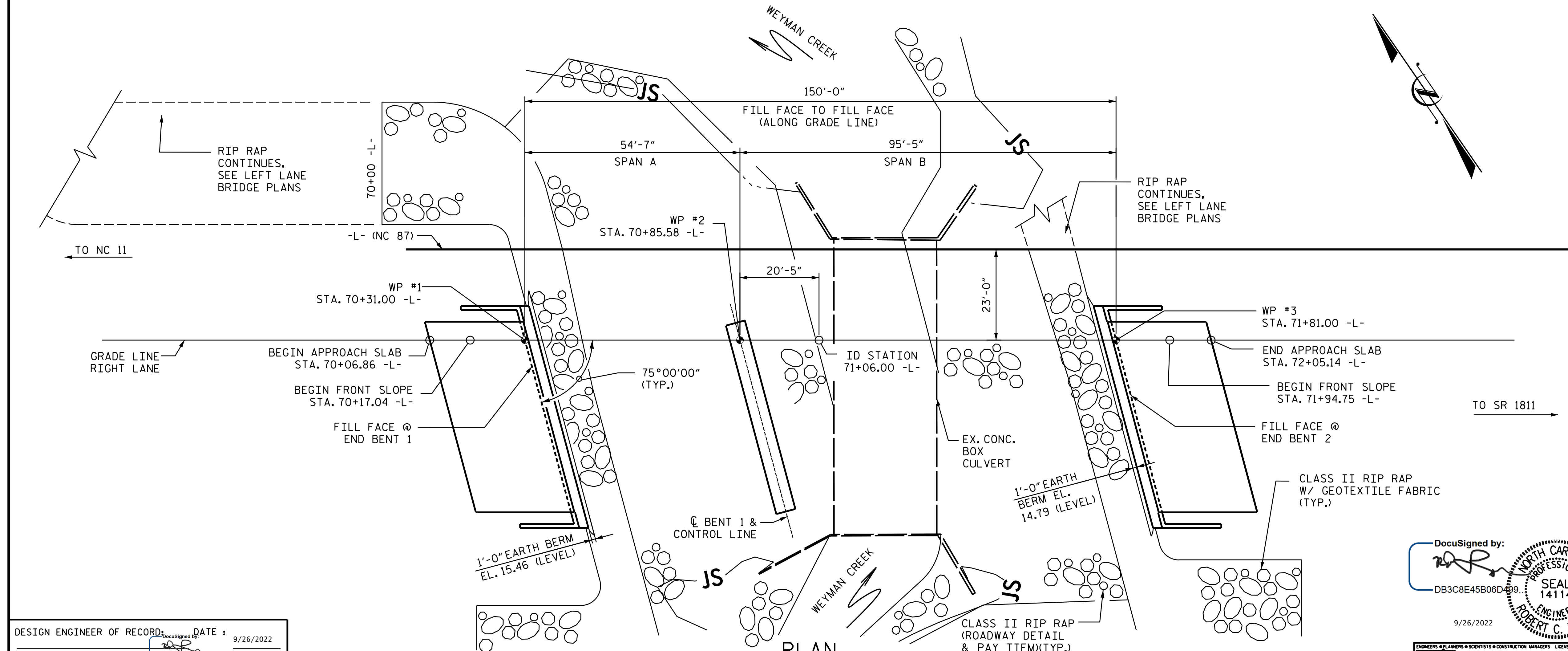
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 13,050	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 26.6	* FT

* SAG @ STA. 72+48.92 -L- HIGH SHOULDER

UNCLASSIFIED STRUCTURE EXCAVATION (TYP.)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



PROJECT NO. R-256ICA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 230372

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE ON NC 87
OVER WEYMAN CREEK
BETWEEN NC 11 AND
SR 1811 (NARROW GAP RD.)
RIGHT LANE

DocuSigned by:

DB3C8E45B06D499
9/26/2022

KCI Associates
of North Carolina, P.A.
2505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-9241

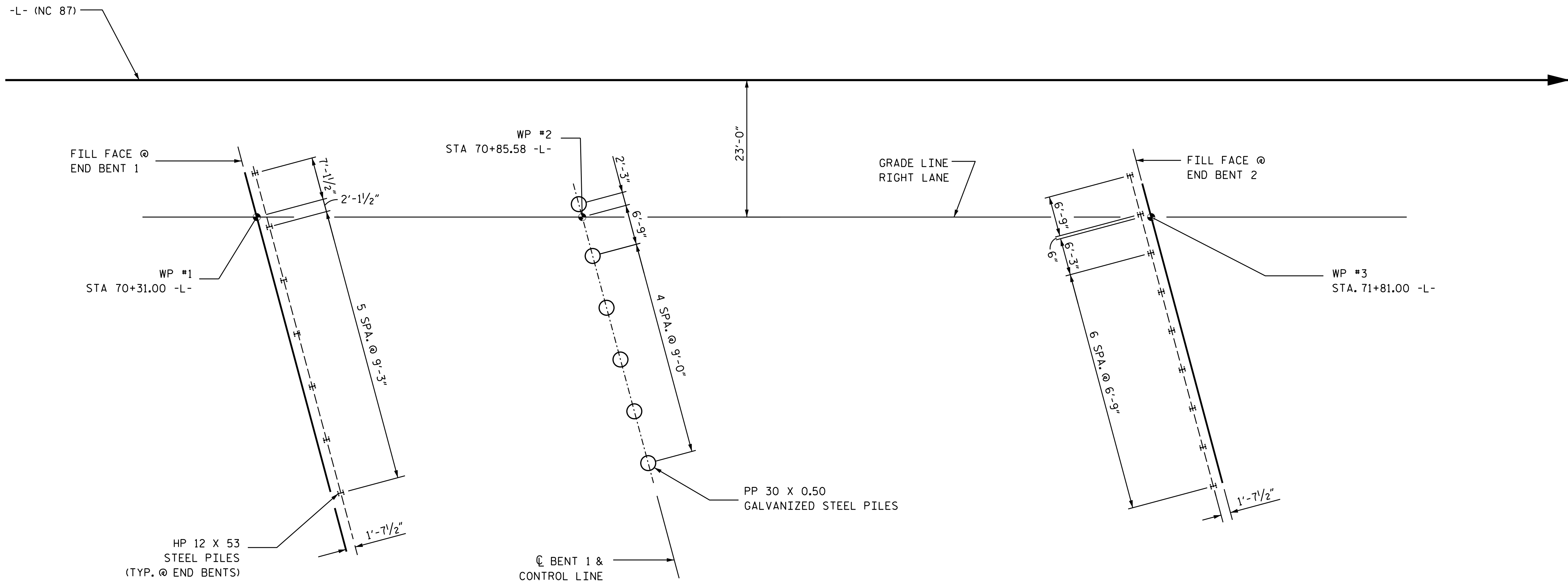
DESIGN ENGINEER OF RECORD: DATE: 9/26/2022
DRAWN BY: A. SAMBOY DATE: 06/12/19
CHECKED BY: R.C. LARSON DATE: 04/21/20

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UNLESS ALL SIGNATURES COMPLETED**

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

TOTAL SHEETS: 29

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTDRVS\$ \$PLTDVRS\$
 KCI PROJECT NO. 241704391.04



FOUNDATION LAYOUT

ALL PILES ARE VERTICAL.
 DIMENSIONS LOCATING PILES ARE TO CL PILE.

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
 PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.
 PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.
 PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 200 TONS PER PILE.
 DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.
 DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 155 TONS PER PILE.
 DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 340 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.
 INSTALL PILES AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN -29.0 FT.
 THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION -12.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
 IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 65,700 TO 122,200 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.
 TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT 1 AND END BENT 1 OR END BENT 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 1 OF 2 BRIDGE NO. 418

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON NC 87
 OVER WEYMAN CREEK
 BETWEEN NC 11 AND
 SR 1811 (NARROW GAP RD.)
 RIGHT LANE

DocuSigned by:

 DB3C8E45B06D499
 8/15/2022
 NORTH CAROLINA PROFESSIONAL SEAL 14114
 ENGINEER ROBERT C. LARSON

DESIGN ENGINEER OF RECORD:		DATE:	8/15/2022
DRAWN BY:	R.J. FLORY	DATE:	11/11/20
CHECKED BY:	R.C. LARSON	DATE:	11/17/20

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

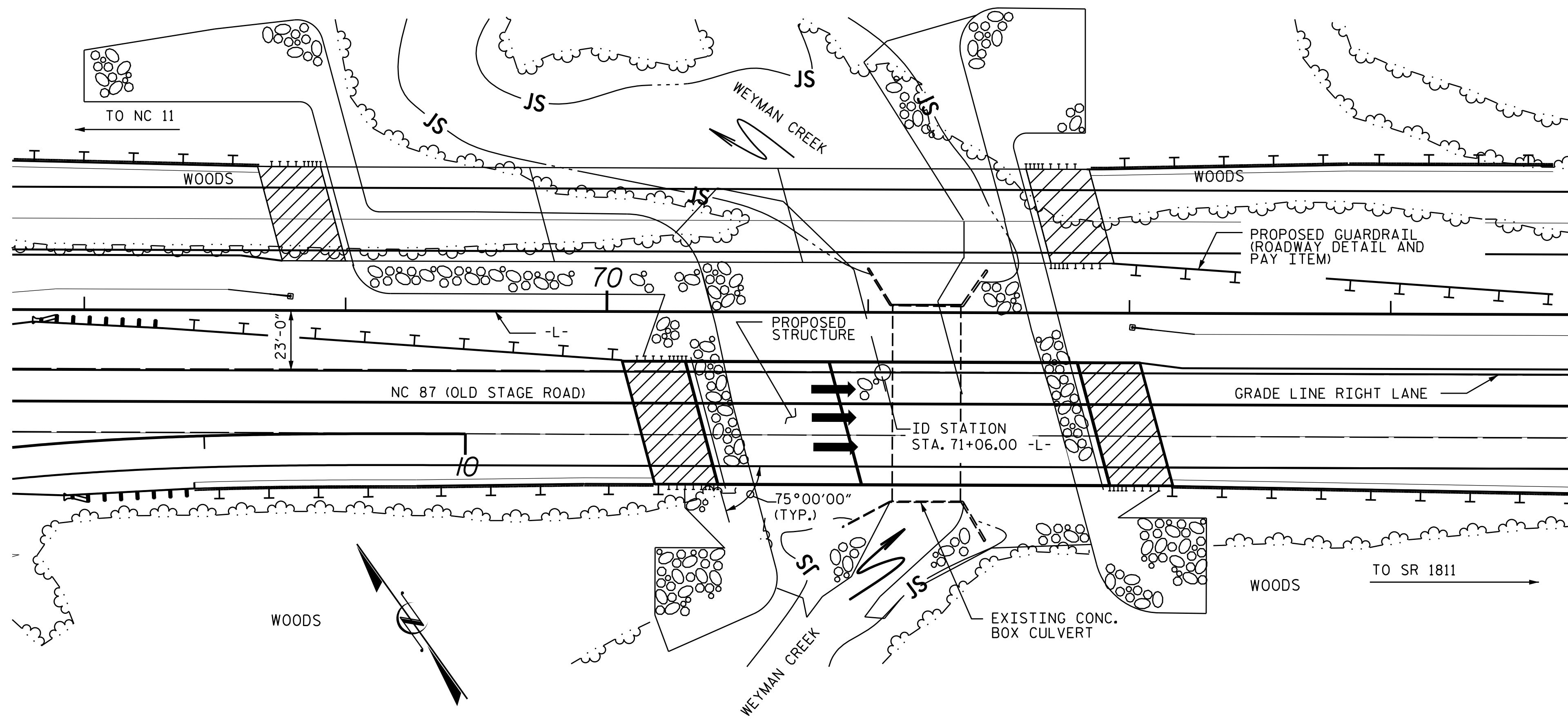
ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 400 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone: 919-785-9241

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

TOTAL SHEETS: 29

\$FILEL\$ \$DATE\$ \$TIME\$ \$USER\$ \$PLTDVRS\$ \$PENTBLS\$ \$PLTDVRS\$
 KCI PROJECT NO. 241704391.04

BENCHMARK: BM 3 BENCH TIE SET IN 14" OAK 65.32' RT. -L- STA 73+46.04 EL. 22.44 NAVD 88



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET 1 OF 3 SHALL BE EXCAVATED FOR A DISTANCE OF 80 FT TO THE RIGHT SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF 76 LF TRIPLE BARREL 8'X14' REINFORCED CONCRETE BOX CULVERT AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING CULVERT IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE CULVERT DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 71+06.00 -L-	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 71+06.00 -L	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS @ STA. 71+06.00 -L-	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR PP 30 X 0.50 GALVANIZED STEEL PILES	HP 12 X 53 STEEL PILES	PP 30 X 0.50 GALVANIZED STEEL PILES	PILE REDRIVES	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS			
	LUMP SUM	LUMP SUM	EACH	LUMP SUM	SO.FT.	SO.FT.	CU.YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	EA.	EA.	NO.	LIN.FT.	EA.	TON	SO. YDS	LUMP SUM			
SUPERSTRUCTURE					7451	8678		LUMP SUM		10	733.33					296.54			LUMP SUM			
END BENT 1							42.7		6169		7		7	420	4		475	530				
BENT 1							30.8		4734			6		480	3							
END BENT 2							43.2		6092		9		9	585	5		325	360				
TOTAL	LUMP SUM	LUMP SUM	2	LUMP SUM	7451	8678	116.7	LUMP SUM	16,995	10	733.33	16	6	16	1005	6	480	12	296.54	800	890	LUMP SUM

NOTES (CONT'D)

THE EXISTING CULVERT INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING STRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE. REMOVAL OF THE EXISTING CULVERT SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE CULVERT IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18- EVALUATING SCOUR AT BRIDGES."

FOR INTERIOR BENT 1, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEET(S) FOR REQUIRED GALVANIZED LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

SAMPLE BAR REPLACEMENT

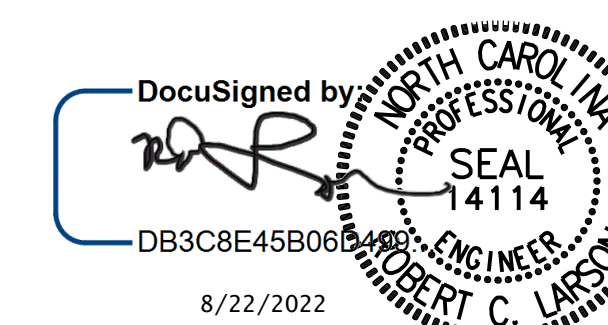
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND $f_y = 60$ ksi.

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON NC 87
 OVER WEYMAN CREEK
 BETWEEN NC 11 AND
 SR 1811 (NARROW GAP RD.)
 RIGHT LANE



DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/22/2022
 DRAWN BY: A. SAMBOY DATE: 06/13/19
 CHECKED BY: R. C. LARSON DATE: 04/21/20

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0184
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 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-9244

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

TOTAL SHEETS: 29

\$FILEL\$ \$DATES\$ \$TIME\$ \$USER\$ \$PENTBL\$ \$PLTDV\$ \$PROJECT NO. 241704391.04

LOAD FACTORS:

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.03		1.75	0.852	1.48	B	E	54.1	0.980	1.11	B	I	21.2	0.80	0.852	1.03	B	E	54.1		
	HL-93 (OPERATING)	N/A		1.49		1.35	0.852	1.91	B	E	54.1	0.980	1.49	B	I	21.2	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.46	52.56	1.75	0.852	2.10	B	E	54.1	0.980	1.53	B	I	21.2	0.80	0.852	1.46	B	E	54.1		
	HS-20 (OPERATING)	36.000		2.03	73.08	1.35	0.852	2.72	B	E	54.1	0.980	2.03	B	I	21.2	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SN5H	13.500		3.51	47.38	1.40	0.964	5.57	A	I	19.9	0.980	5.05	B	I	21.2	0.80	0.852	3.51	B	E	54.1	
		SNGARBS2	20.000		2.52	50.40	1.40	0.852	4.52	B	E	54.1	0.980	3.48	B	I	21.2	0.80	0.852	2.52	B	E	54.1	
		SNAGRIS2	22.000		2.35	51.70	1.40	0.852	4.23	B	E	54.1	0.980	3.21	B	I	21.2	0.80	0.852	2.35	B	E	54.1	
		SNCOTTS3	27.250		1.74	47.41	1.40	0.964	2.78	A	I	19.9	0.980	2.43	B	I	21.2	0.80	0.852	1.74	B	E	54.1	
		SNAGGRS4	34.925		1.42	49.59	1.40	0.964	2.49	A	I	19.9	0.980	1.95	B	I	21.2	0.80	0.852	1.42	B	E	54.1	
		SNS5A	35.550		1.39	49.41	1.40	0.964	2.43	A	I	19.9	0.980	1.96	B	I	21.2	0.80	0.852	1.39	B	E	54.1	
		SNS6A	39.950		1.26	50.33	1.40	0.852	2.27	B	E	54.1	0.980	1.76	B	I	21.2	0.80	0.852	1.26	B	E	54.1	
		SNS7B	42.000		1.20	50.40	1.40	0.852	2.16	B	E	54.1	0.980	1.71	B	I	21.2	0.80	0.852	1.20	B	E	54.1	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.54	50.82	1.40	0.852	2.76	B	E	54.1	0.980	2.14	B	I	21.2	0.80	0.852	1.54	B	E	54.1	
		TNT4A	33.075		1.54	50.93	1.40	0.852	2.76	B	E	54.1	0.980	2.08	B	I	21.2	0.80	0.852	1.54	B	E	54.1	
		TNT6A	41.600		1.25	52.00	1.40	0.852	2.24	B	E	54.1	0.980	1.80	B	I	21.2	0.80	0.852	1.25	B	E	54.1	
		TNT7A	42.000		1.24	52.08	1.40	0.852	2.24	B	E	54.1	0.980	1.77	B	I	21.2	0.80	0.852	1.24	B	E	54.1	
		TNT7B	42.000		1.27	53.34	1.40	0.852	2.28	B	E	54.1	0.980	1.68	B	I	21.2	0.80	0.852	1.27	B	E	54.1	
		TNAGRIT4	43.000		1.22	52.46	1.40	0.852	2.19	B	E	54.1	0.980	1.61	B	I	21.2	0.80	0.852	1.22	B	E	54.1	
		TNAGT5A	45.000		1.16	52.20	1.40	0.852	2.08	B	E	54.1	0.980	1.58	B	I	21.2	0.80	0.852	1.16	B	E	54.1	
TNAGT5B	45.000	③	1.15	51.75	1.40	0.852	2.06	B	E	54.1	0.980	1.54	B	I	21.2	0.80	0.852	1.15	B	E	54.1			

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)

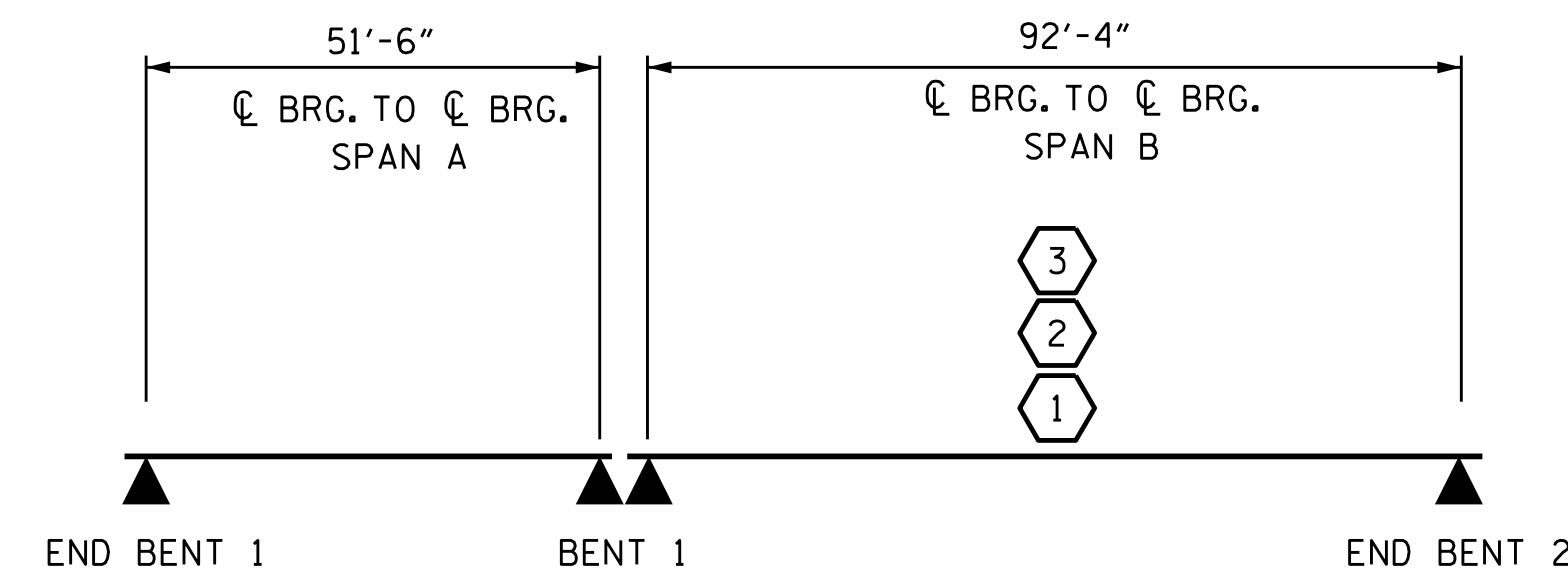
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
E - EXTERIOR



PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

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

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-4	
1			3			TOTAL SHEETS 29	
2			4				

DocuSigned by:
DB3C8E45B06D495
8/15/2022

Professional Engineer Seal for Robert C. Larson, License No. 14114.

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of North Carolina, P.A.
1505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-4270 Phone: (919) 783-9200

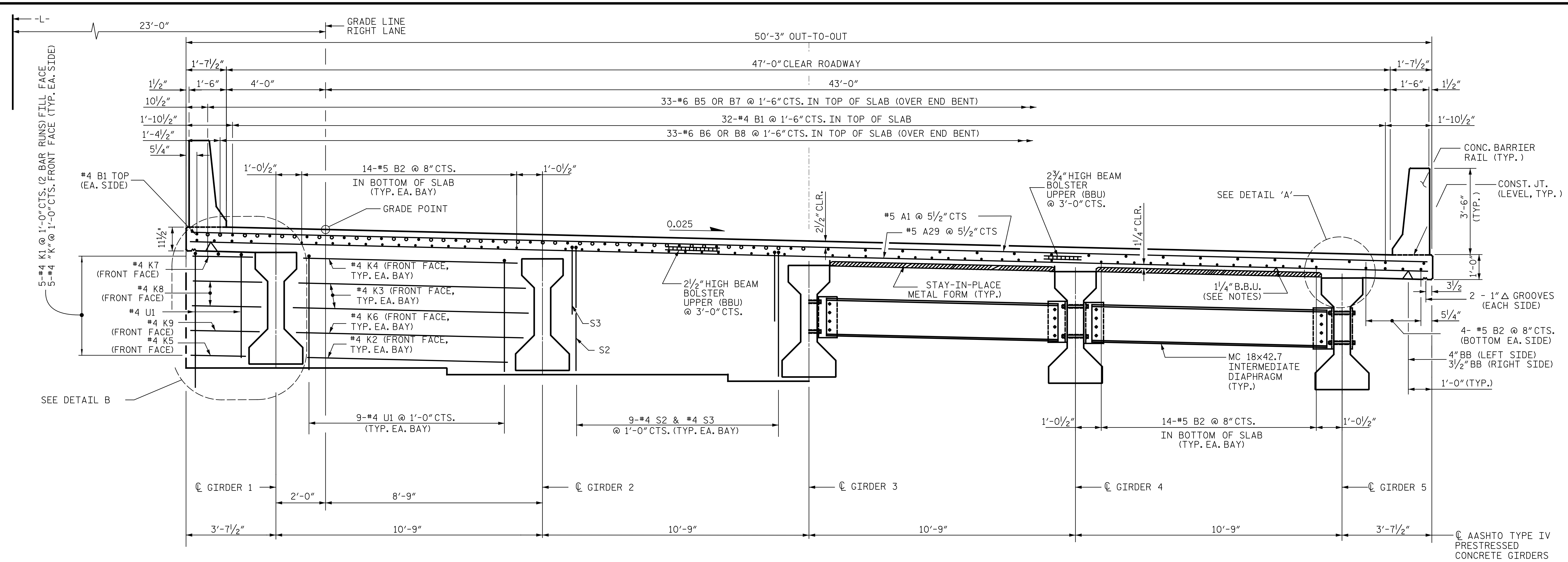
STD. NO. LRFR1

DESIGN ENGINEER OF RECORD: Robert C. Larson, DATE: 8/15/2022

ASSEMBLED BY: C. E. LARSON, DATE: 09/05/19
CHECKED BY: R. C. LARSON, DATE: 09/09/19

DRAWN BY: MAA 1/08, REV. 11/2/08RR, MAA/GM
CHECKED BY: GM/DI 2/08, REV. 10/1/11, MAA/GM
REV. 12/17, MAA/THC

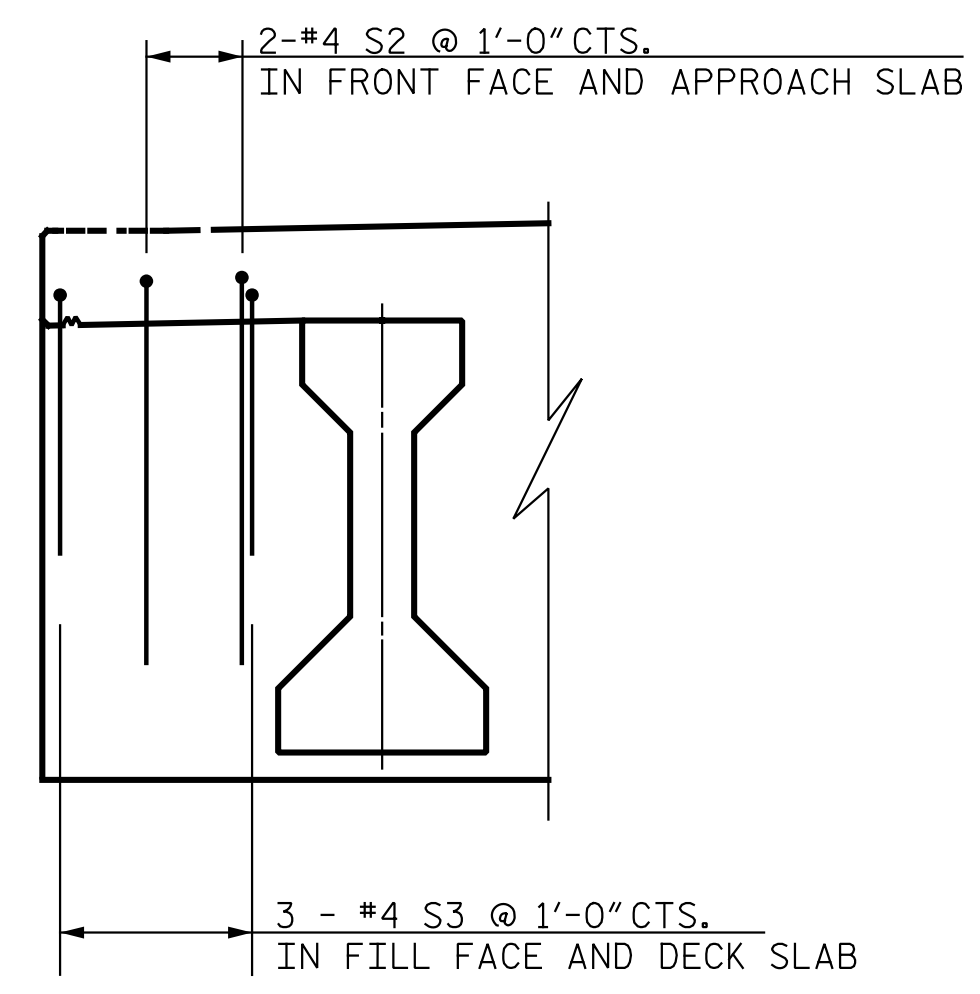
FILED \$ DATE \$ TIME \$ \$USERS \$ \$PLTDORVS \$ \$PENTBLS \$ \$PROJECT NO. 241704391.04



TYPICAL HALF SECTION AT INTEGRAL END BENT 1 AND 2 DIAPHRAGM

TYPICAL SECTION

TYPICAL HALF SECTION AT INTERMEDIATE DIAPHRAGM

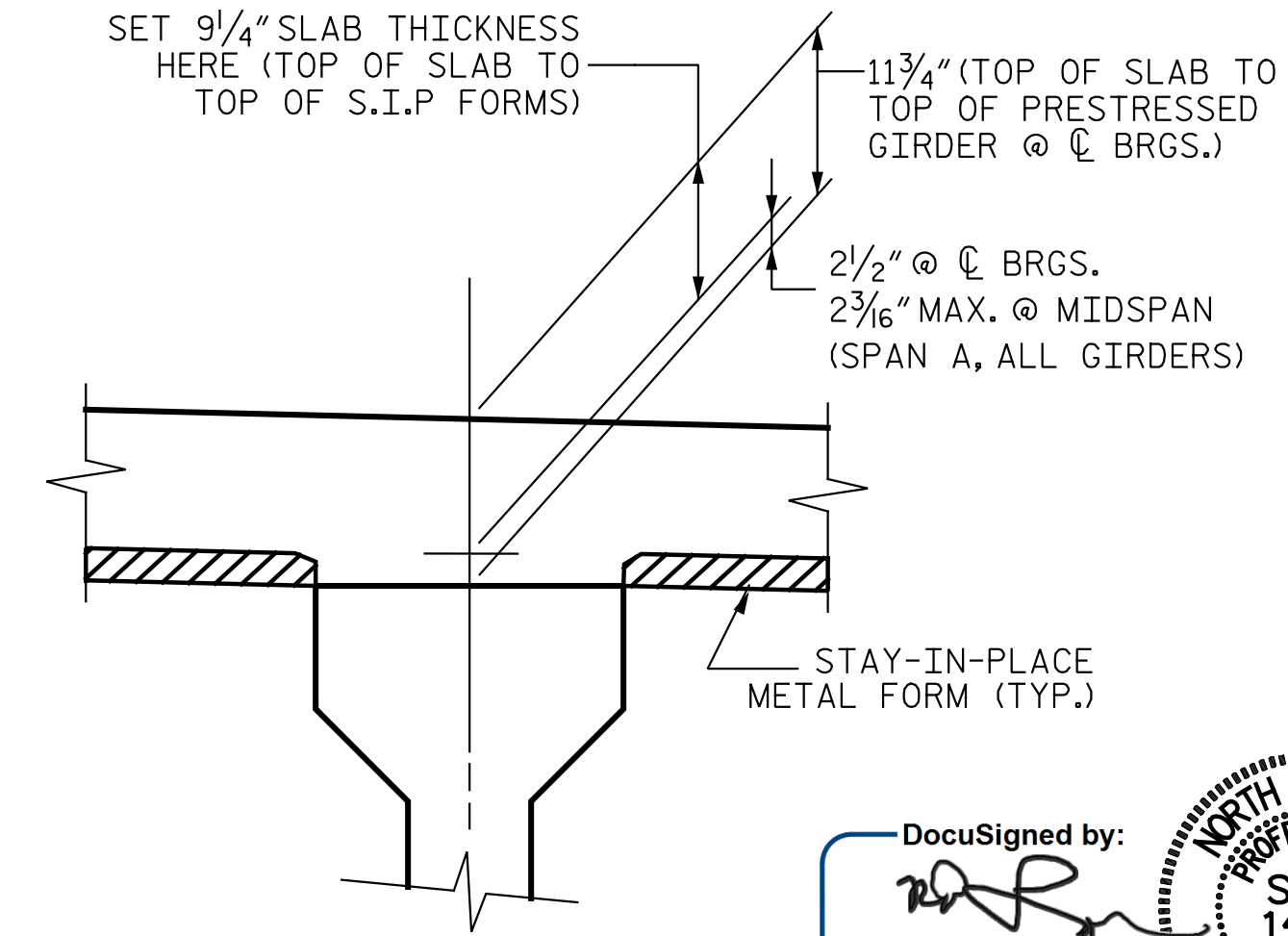


DETAIL B (TYP. EA. SIDE @ END BENTS)

NOTES

- PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.
- LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.
- PREVIOUSLY CAST CONCRETE SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE CONTINUOUS UNIT.
- BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI
- SEE BARRIER RAIL DRAWINGS FOR ADDITIONAL REINFORCING STEEL EMBEDDED IN DECK.

- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING OVER END BENT



DETAIL A

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION

RIGHT LANE

DocuSigned by:

 DB3C8E45B06D499
 8/15/2022
 NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14114
 ROBERT C. LARSON

DESIGN ENGINEER OF RECORD: DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 08/12/19
 CHECKED BY: R. C. LARSON DATE: 06/29/20

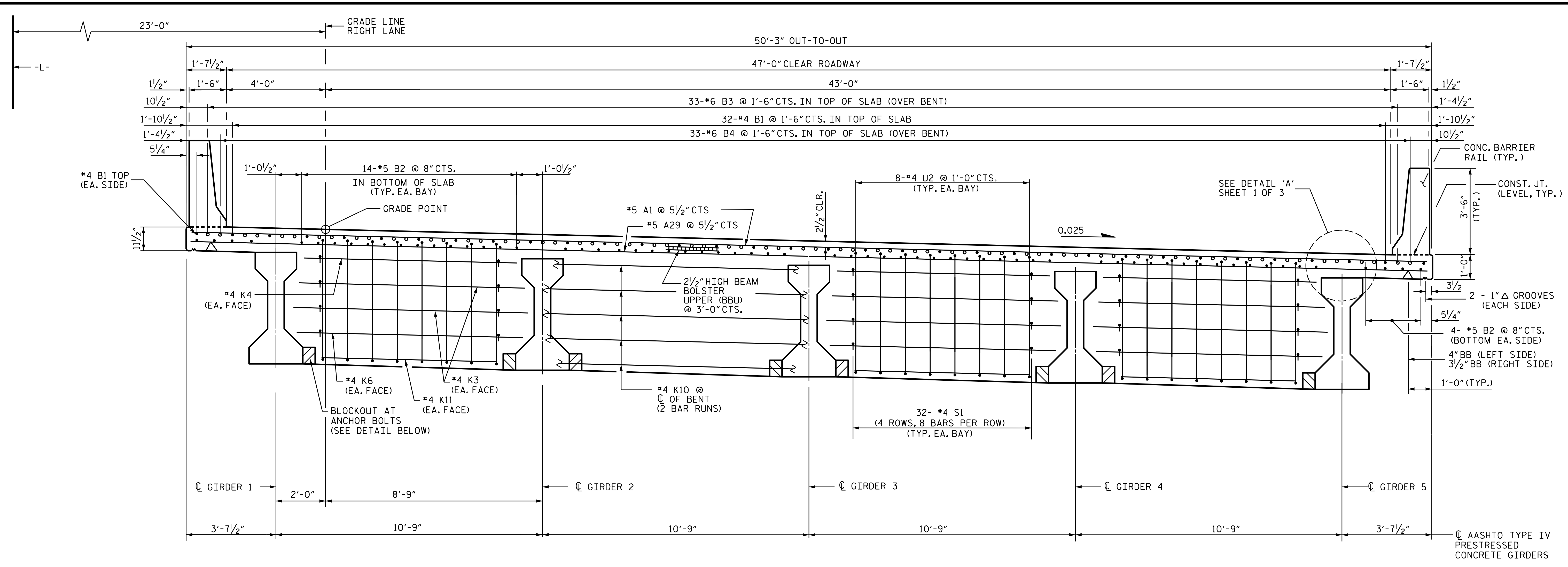
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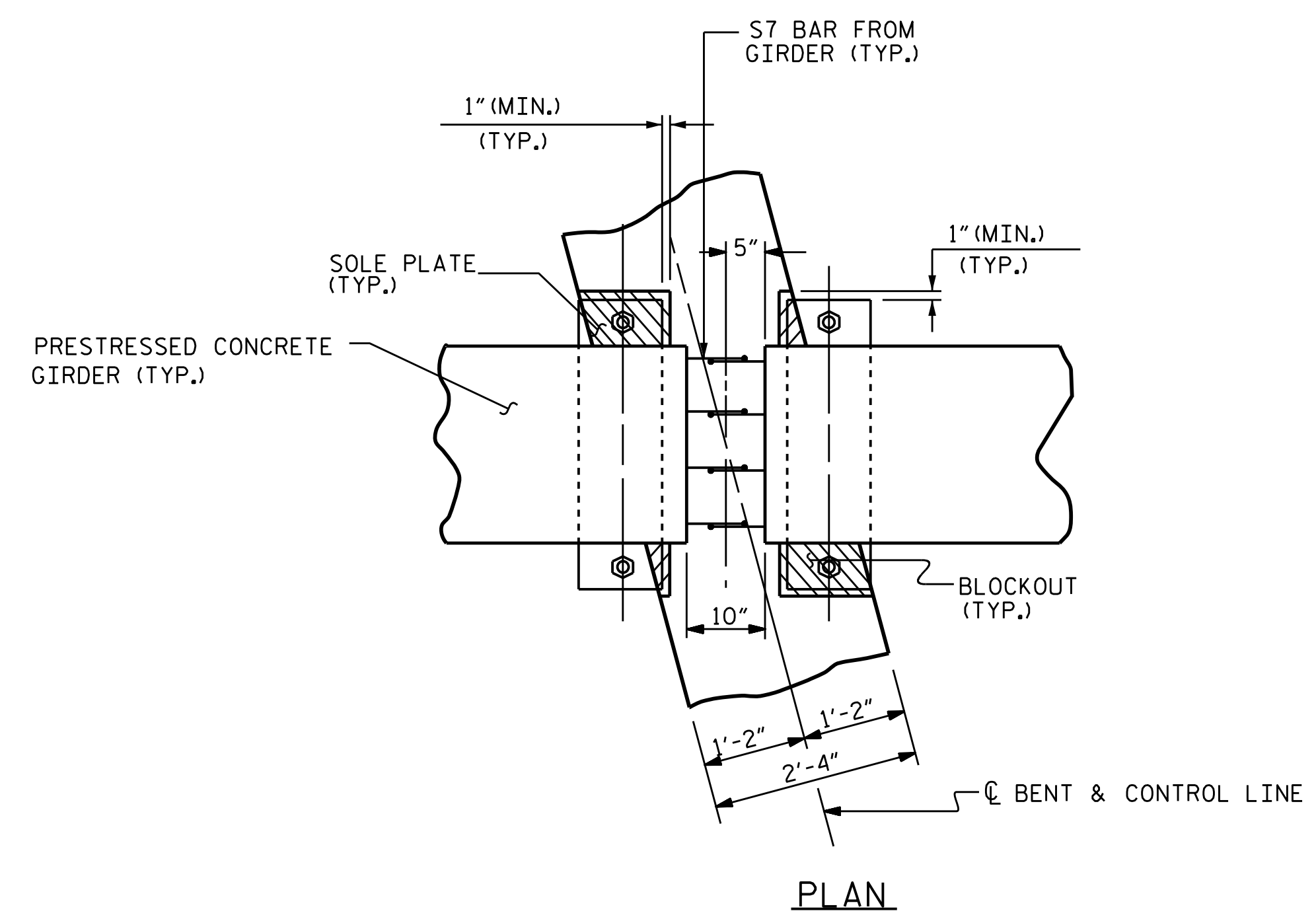
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NO.	DATE	NO.	DATE
1		3	
2		4	

TOTAL SHEETS: 29

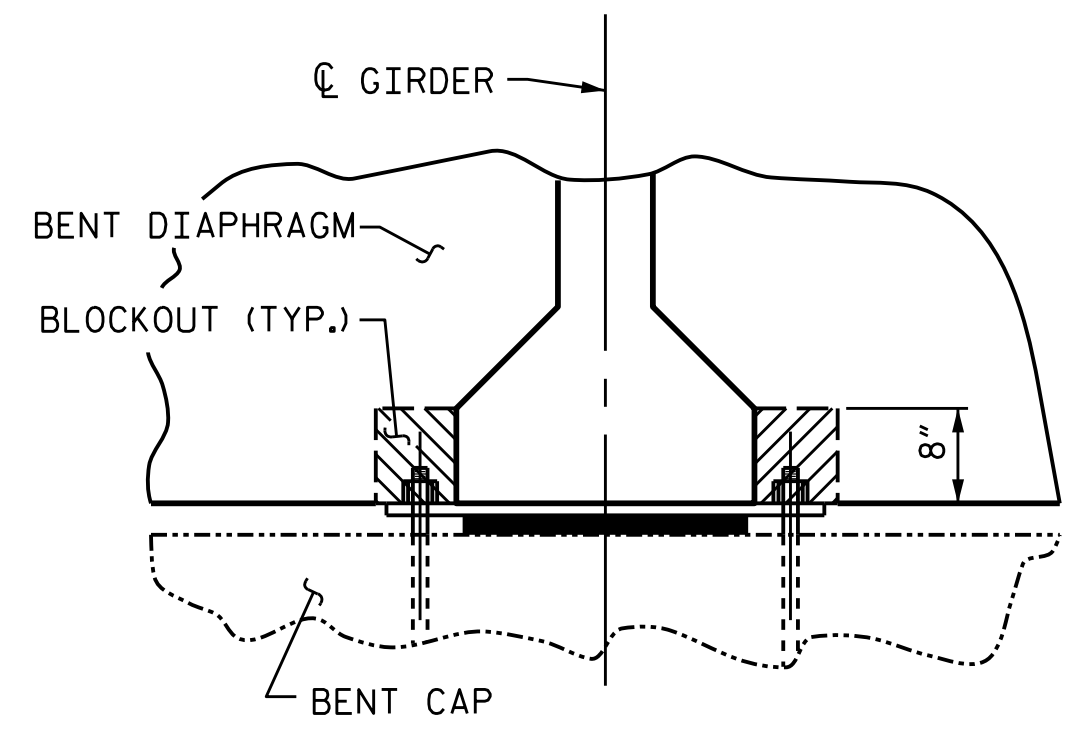
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 KCI PROJECT NO. 241704391.04



TYPICAL SECTION AT BENT DIAPHRAGM



BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION

- INDICATES CONTINUOUS REINFORCING
- INDICATES ADDITIONAL REINFORCING OVER BENT

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 TYPICAL SECTION**

RIGHT LANE

DocuSigned by:

 DB3CB8E45B06D
 8/15/2022

DESIGN ENGINEER OF RECORD:	DATE: 8/15/2022
DRAWN BY: A. K. ALLANKI	DATE: 08/13/19
CHECKED BY: R. C. LARSON	DATE: 06/29/20

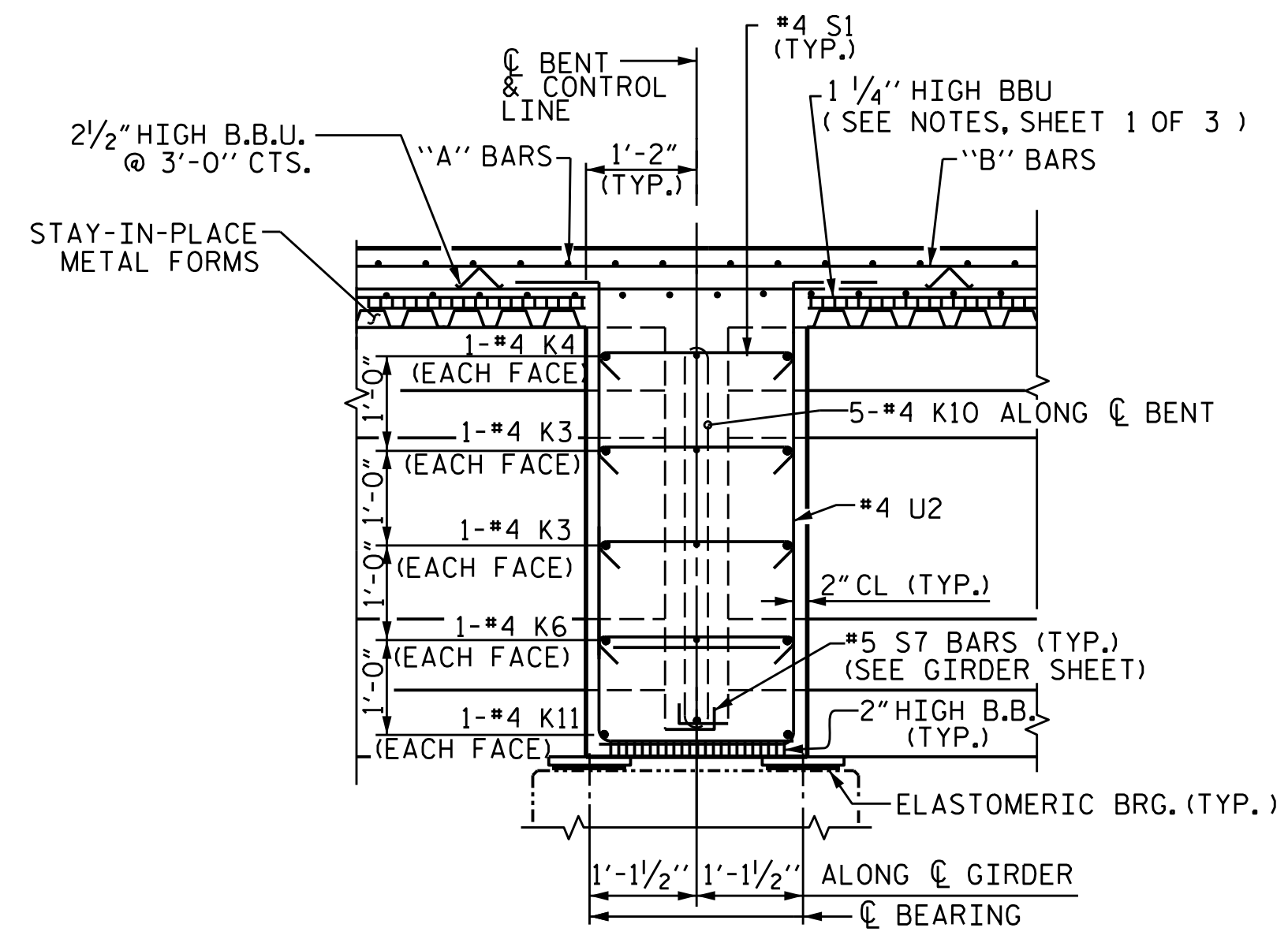
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 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone: (919) 785-9241

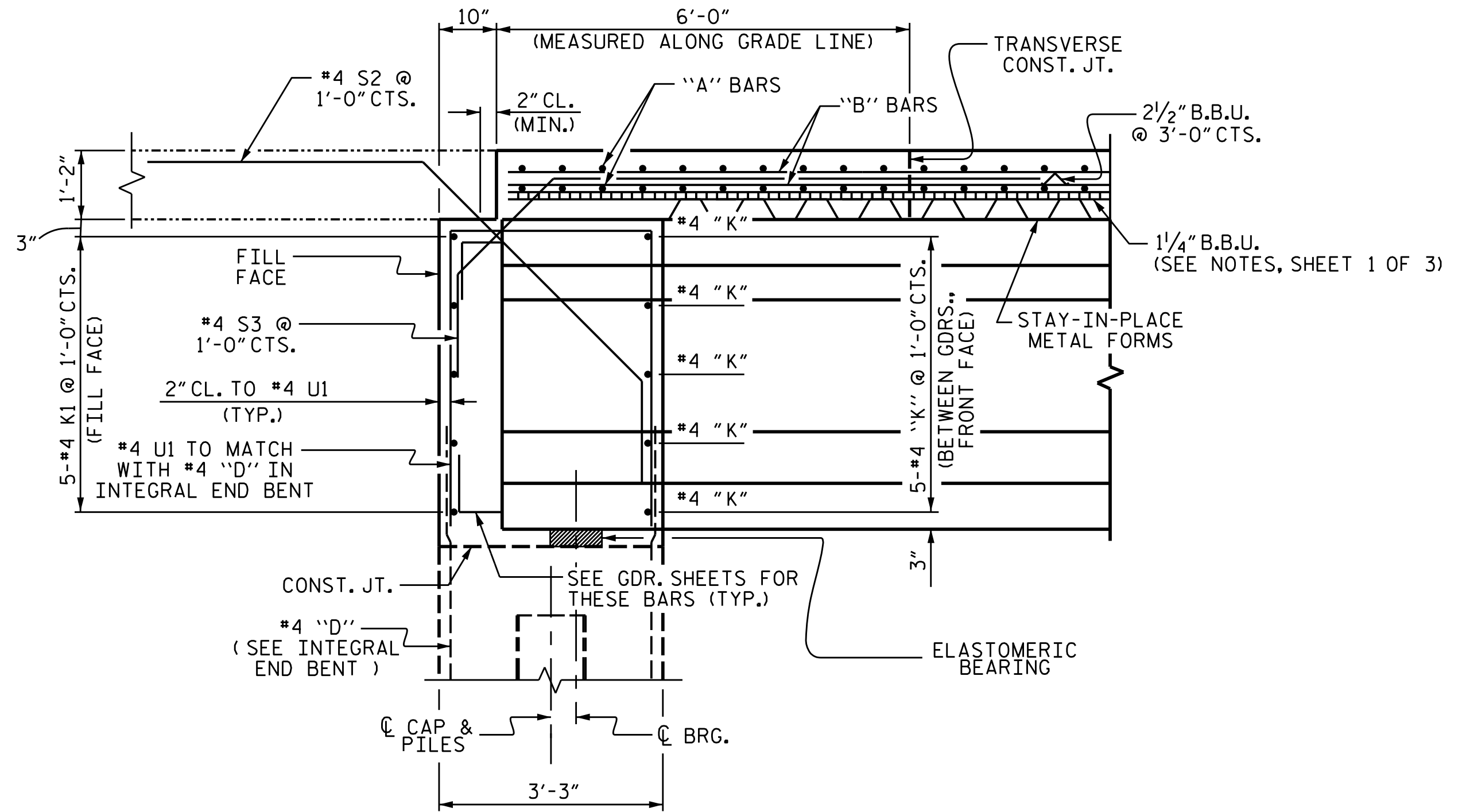
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NO.	DATE	NO.	DATE
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2		4	

TOTAL SHEETS: 29

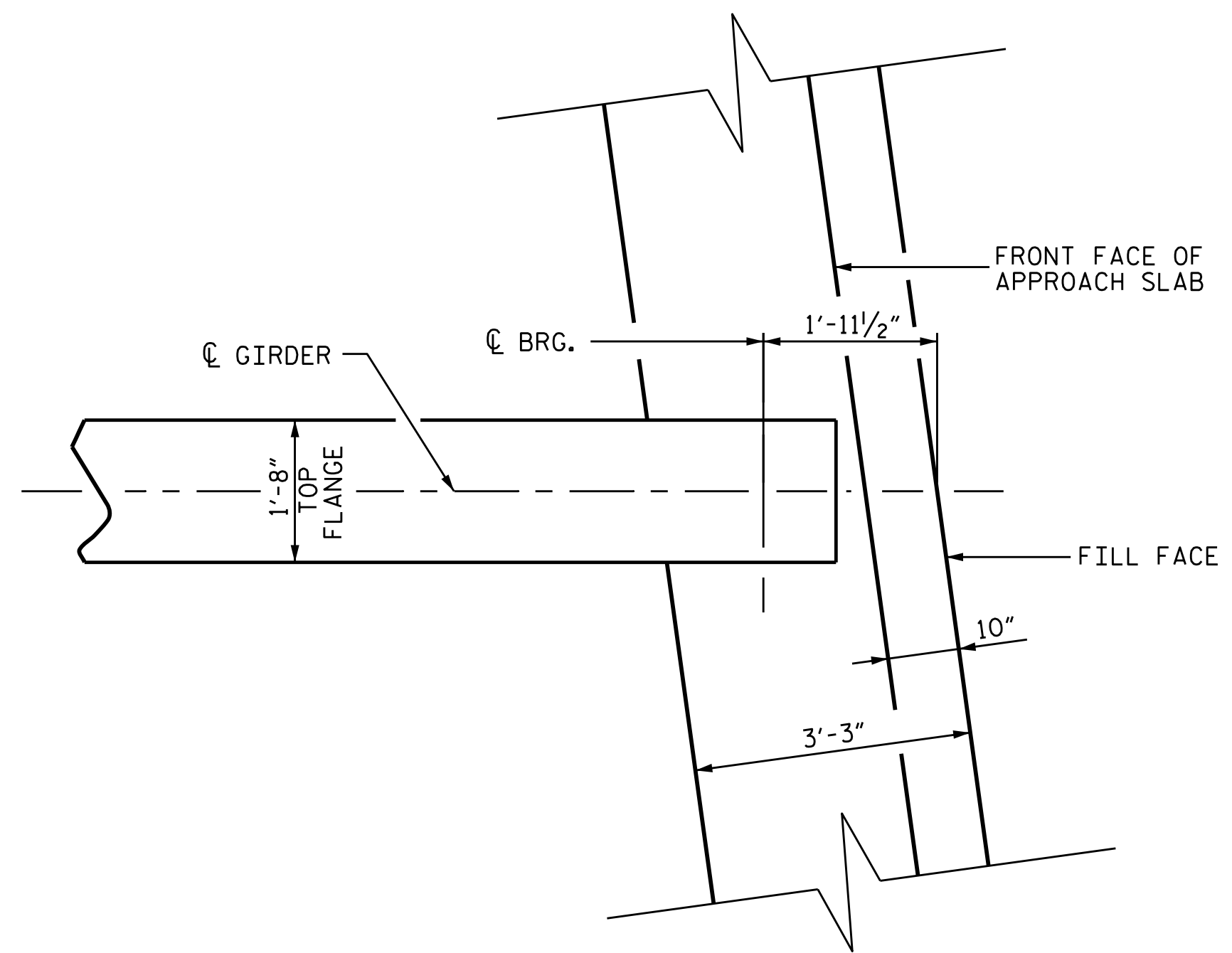
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 KCI PROJECT NO. 241704391.04



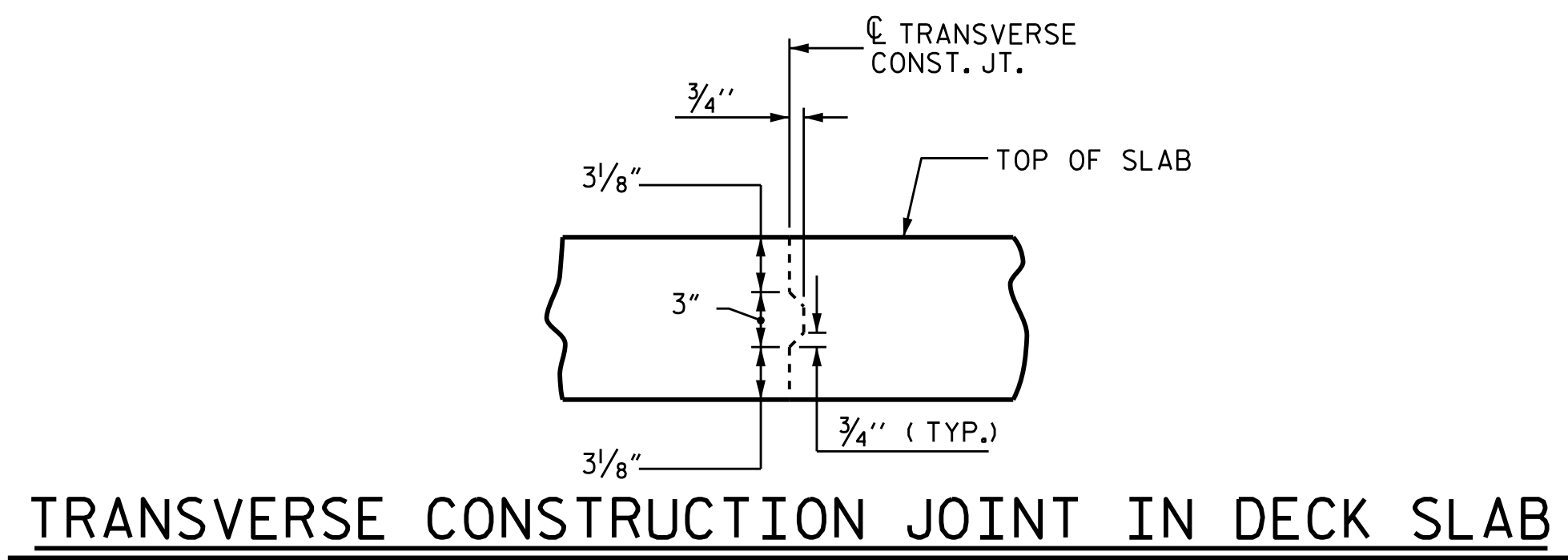
SECTION THRU BENT DIAPHRAGM



SECTION THRU INTEGRAL END BENT



PLAN OF GIRDER AT INTEGRAL END BENT



TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

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

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE TYPICAL SECTION

RIGHT LANE

DocuSigned by:

 DB3C8E45B06D490
 8/15/2022

DESIGN ENGINEER OF RECORD:	DATE:
	8/15/2022
DRAWN BY:	DATE:
A. K. ALLANKI	08/13/19
CHECKED BY:	DATE:
R. C. LARSON	06/29/20

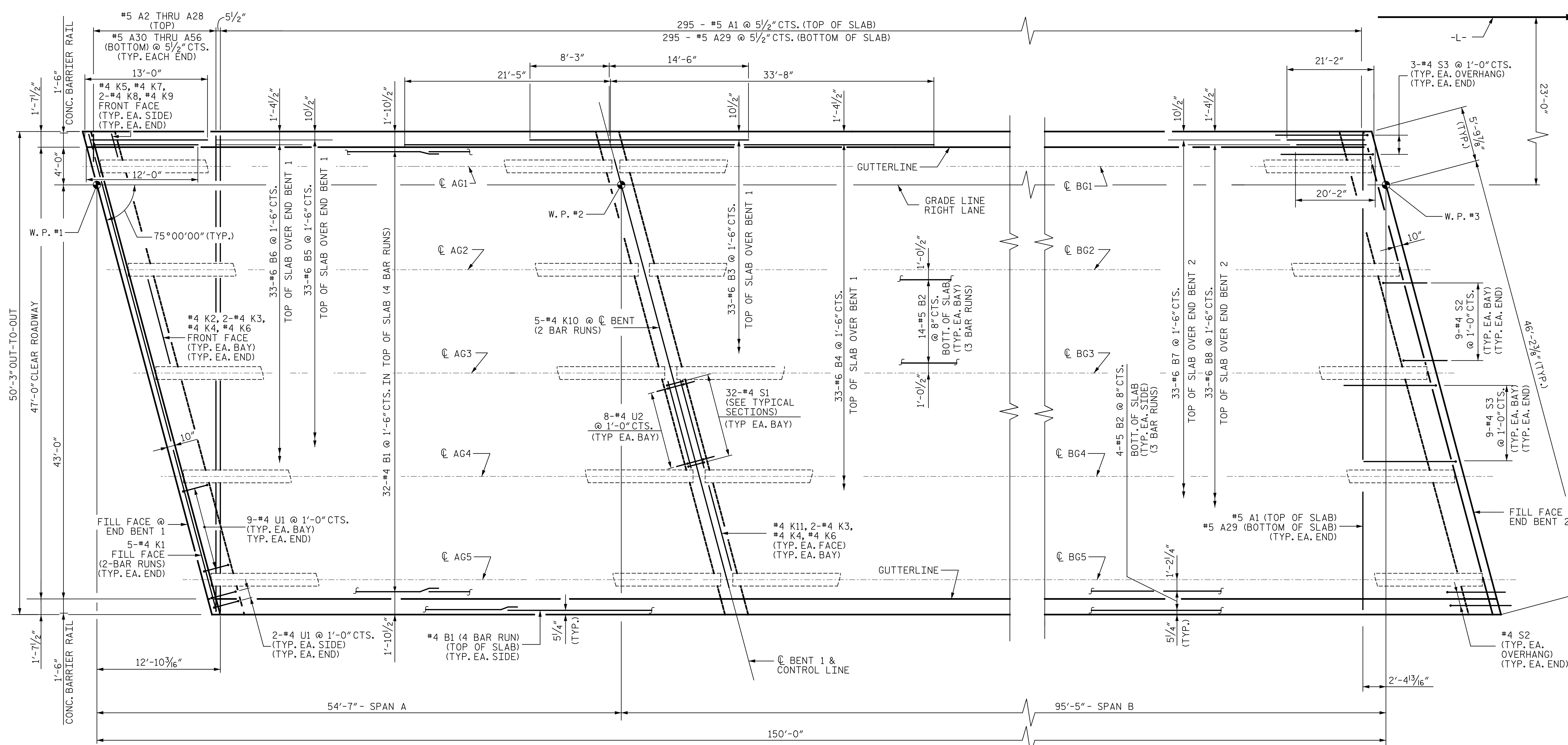
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1		3	
2		4	

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 KCI PROJECT NO. 241704391.04



PLAN - SPAN A & B

SEE SUPERSTRUCTURE BILL OF MATERIAL FOR REINFORCING SPLICE LENGTHS.
SEE GIRDER LAYOUT SHEET FOR INTERMEDIATE STEEL DIAPHRAGM LOCATIONS.

PROJECT NO. R-256ICA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
PLAN OF SPANS**

RIGHT LANE

DocuSigned by:
[Signature]
DB3C8E45B06D498
8/15/2022

PROFESSIONAL ENGINEER
SEAL 14114
ROBERT C. LARSON

DESIGN ENGINEER OF RECORD: *[Signature]* DATE: 8/15/2022

DRAWN BY: A. K. ALLANKI DATE: 08/13/19

CHECKED BY: R. C. LARSON DATE: 06/29/20

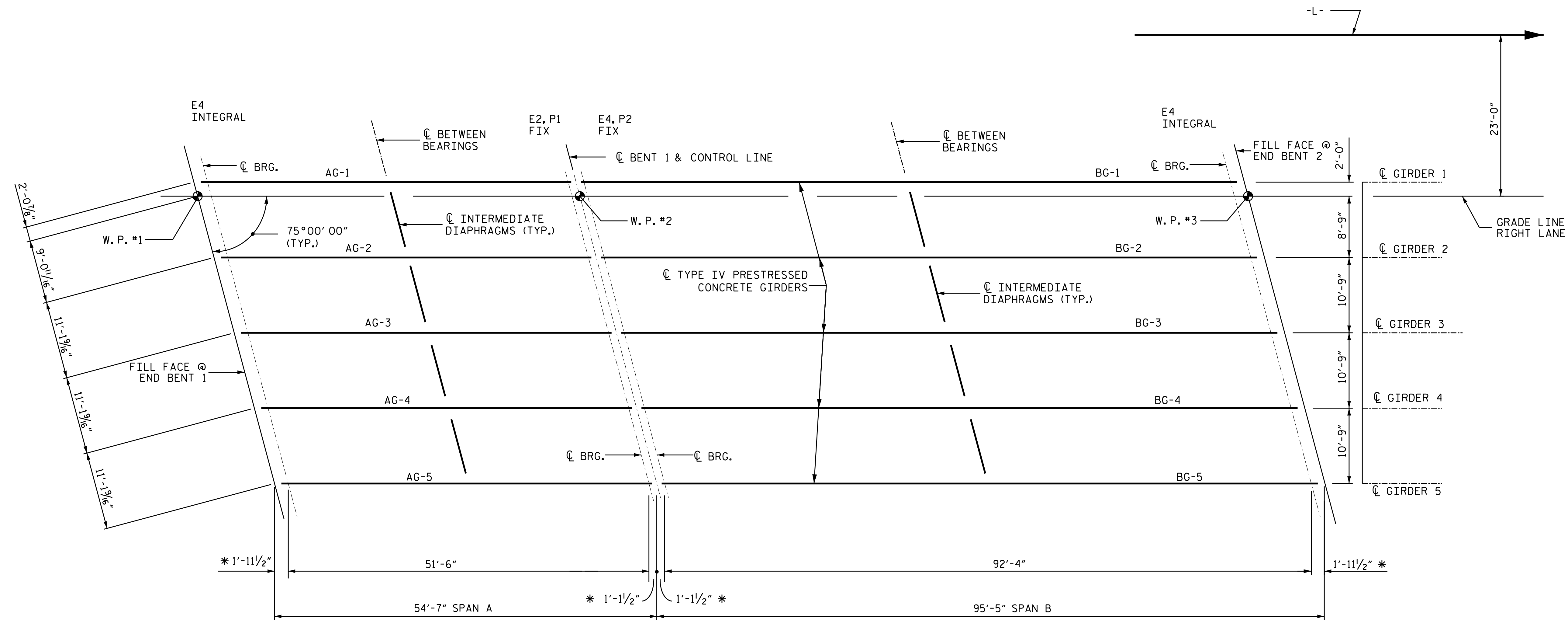
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1		3	
2		4	

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 KCI PROJECT NO. 241704391.04



* MEASURED ALONG C GIRDER

END BENT 1

BENT 1

END BENT 2

GIRDER LAYOUT

FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS,
SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE GIRDER LAYOUT

RIGHT LANE

DocuSigned by:

 DB3C8E45B06D499
 8/15/2022

DESIGN ENGINEER OF RECORD:		DATE:	8/15/2022
DRAWN BY:	A. K. ALLANKI	DATE:	08/14/19
CHECKED BY:	R. C. LARSON	DATE:	06/30/20

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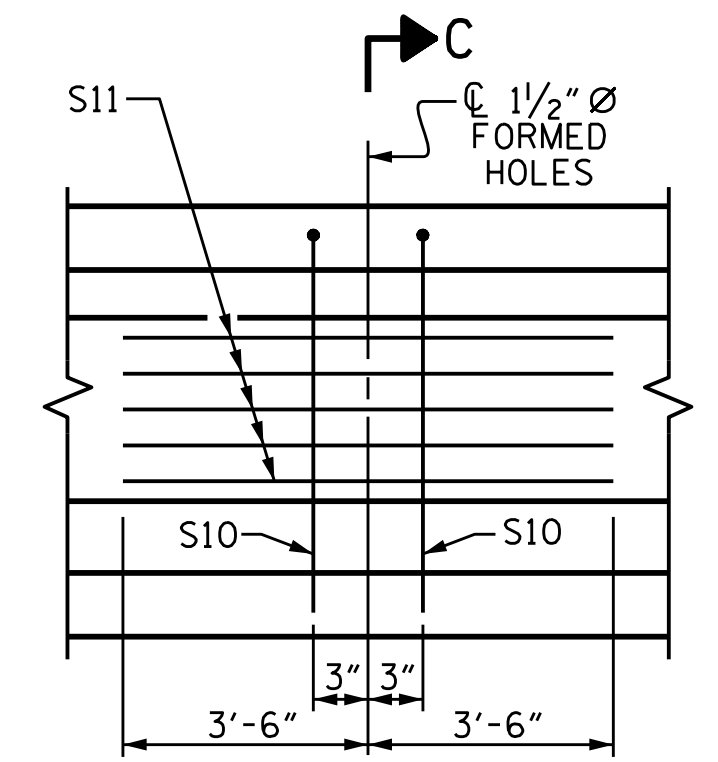
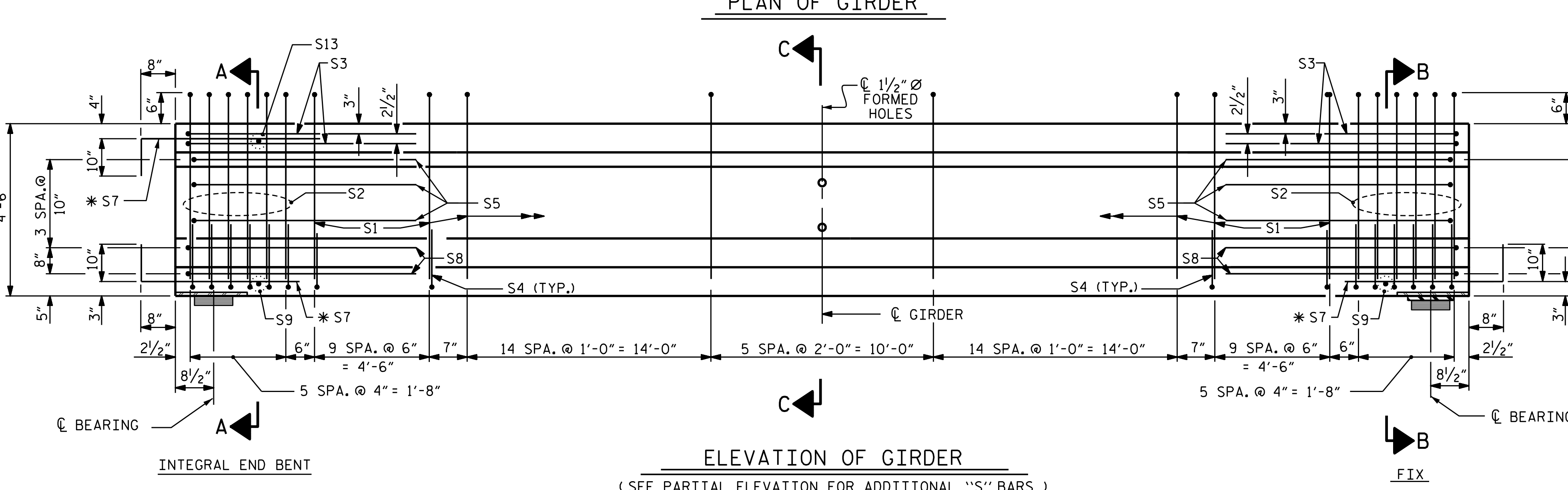
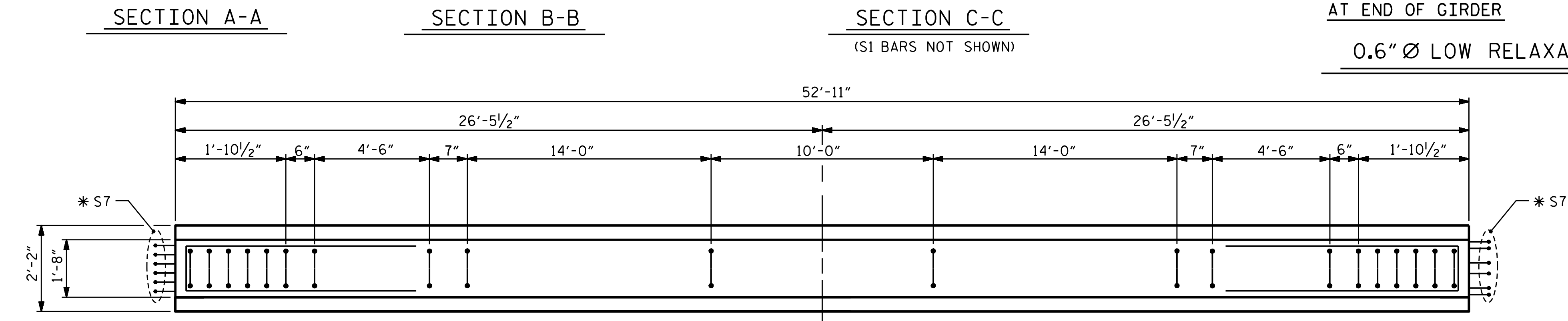
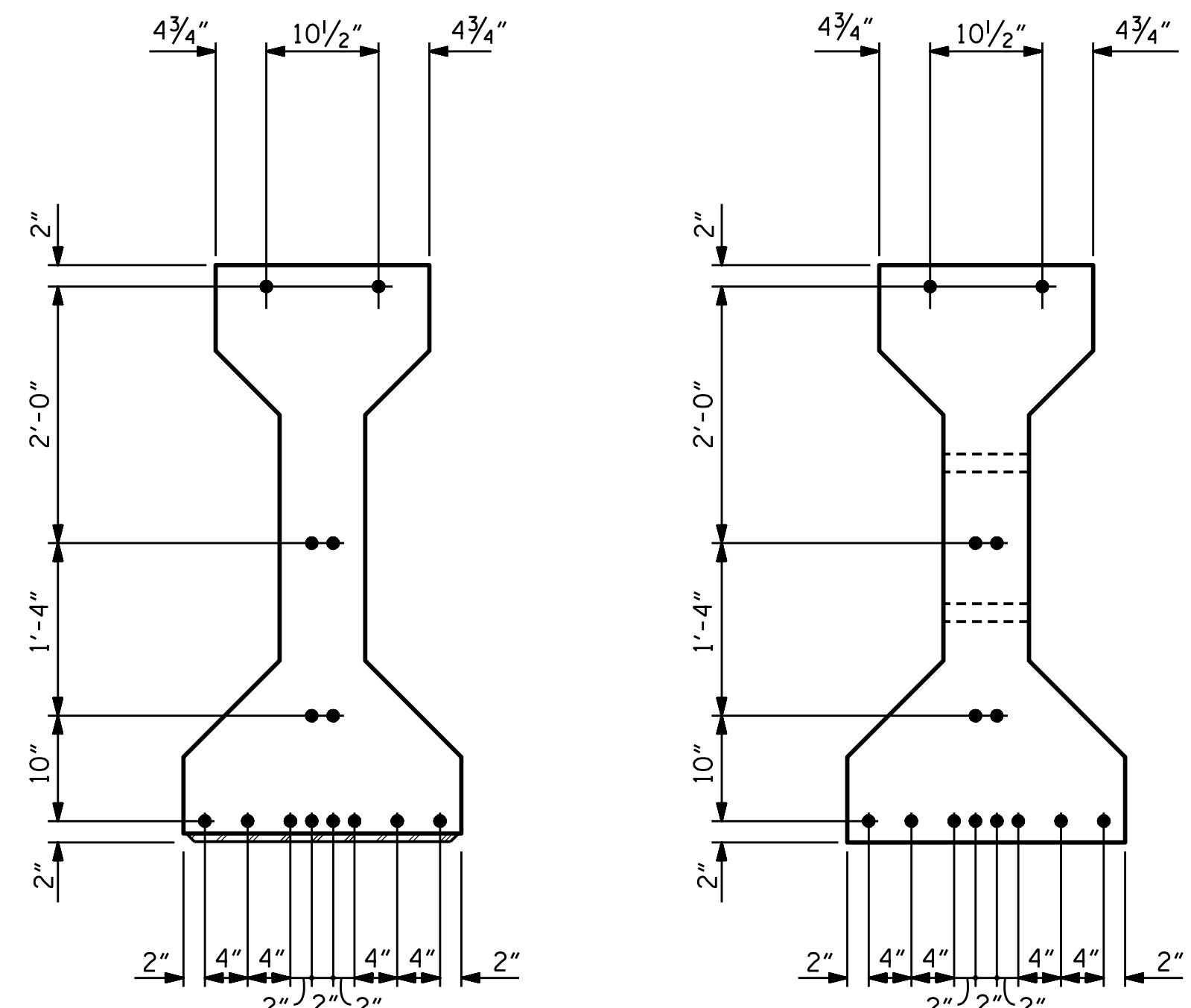
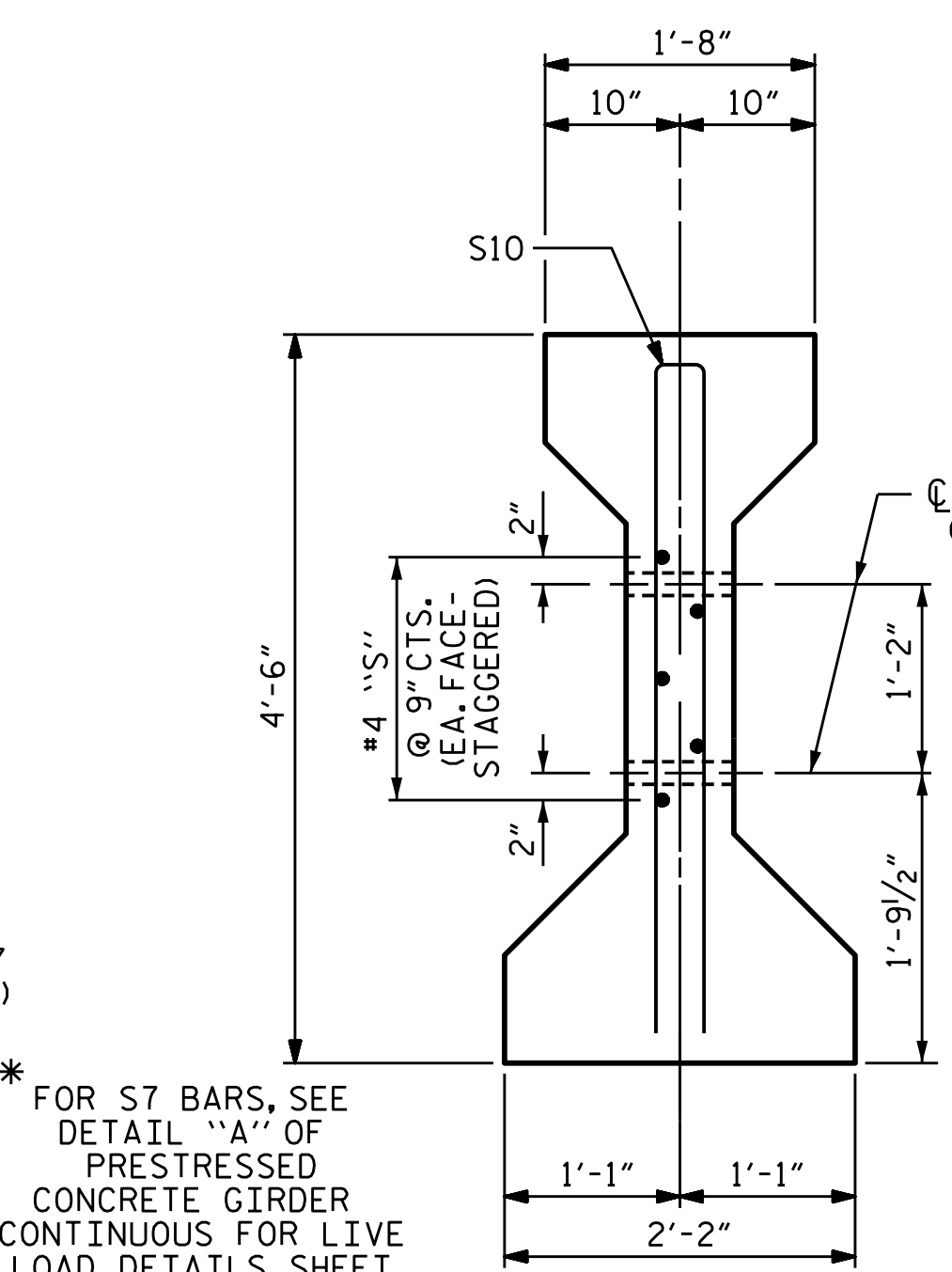
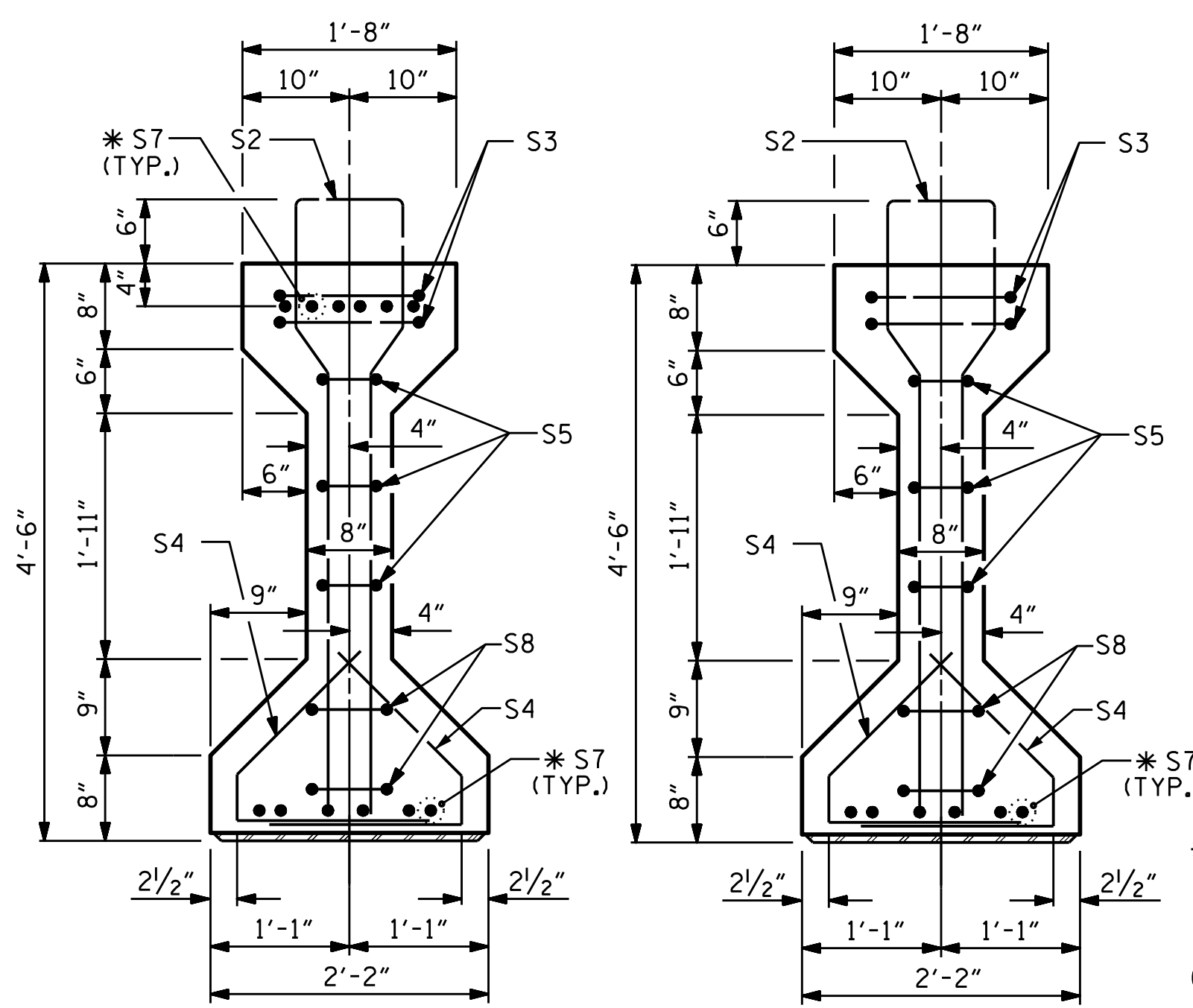
ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764

 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-5241

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

TOTAL SHEETS: 29

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 KCI PROJECT NO. 241704391.04

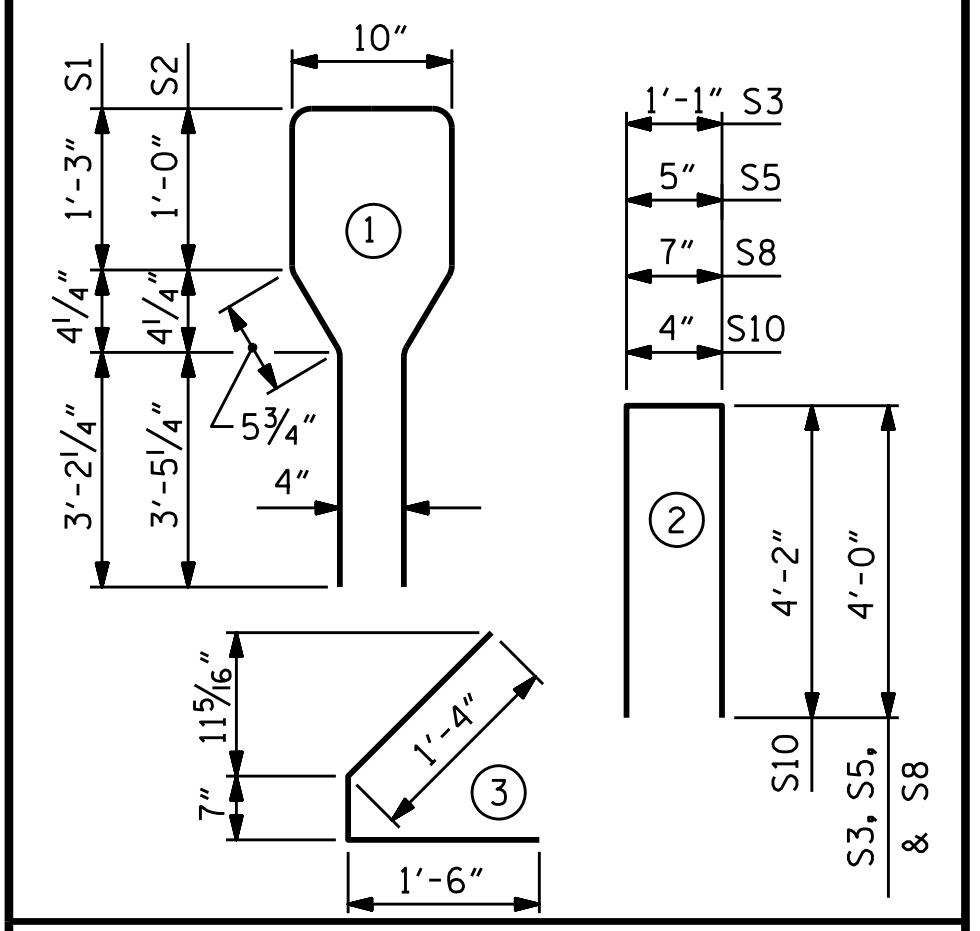


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	54	#4	1	10'-8"	385
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	STR	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

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

BAR TYPES
ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	5000 PSI CONCRETE		0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
	916	10.7	14

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	52'-11"	264'-7"

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 AASHTO TYPE IV
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 SPAN A
 RIGHT LANE

DocuSigned by:

 DB3C8E45B06D4999
 8/15/2022

SEAL
 14114
 ENGINEER
 ROBERT C. LARSON

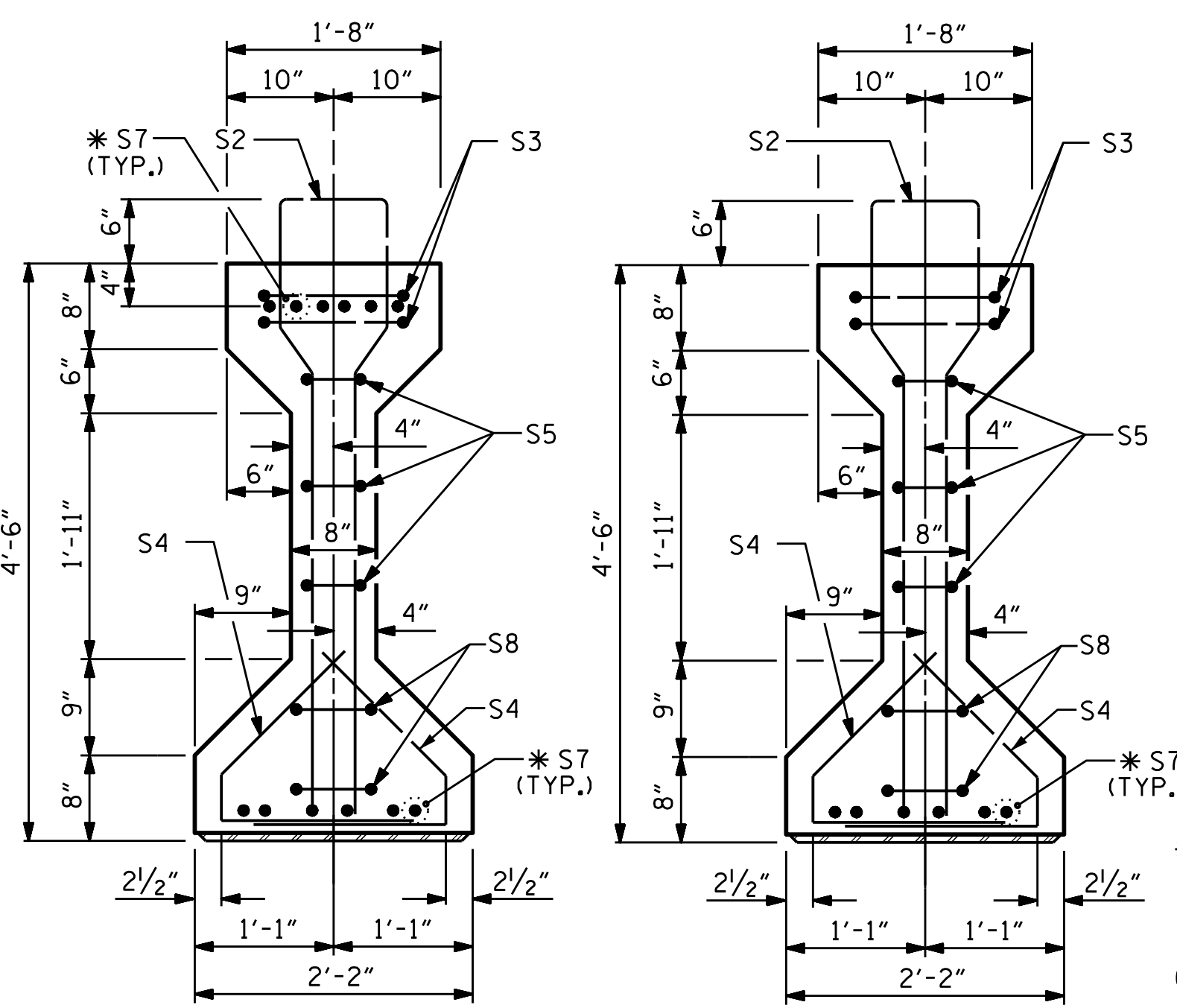
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 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone: 919-783-5204

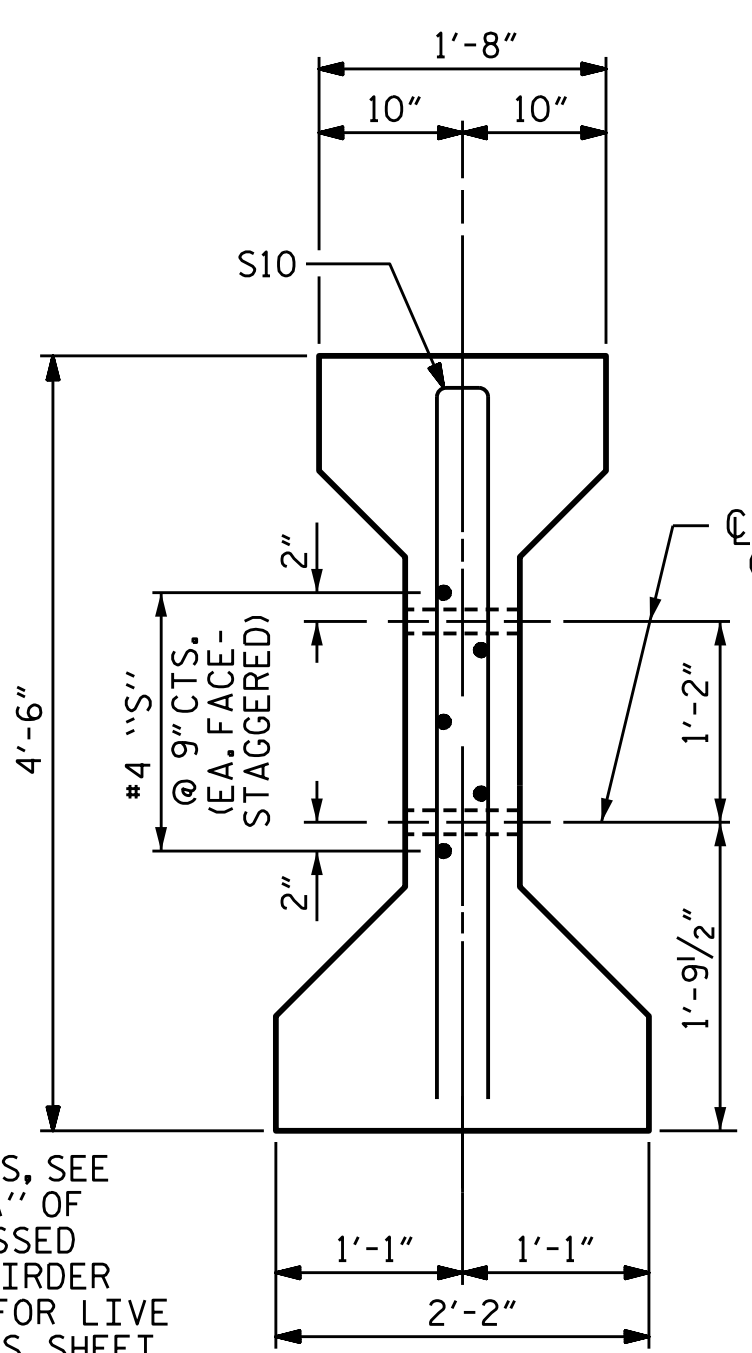
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 29
2			4			

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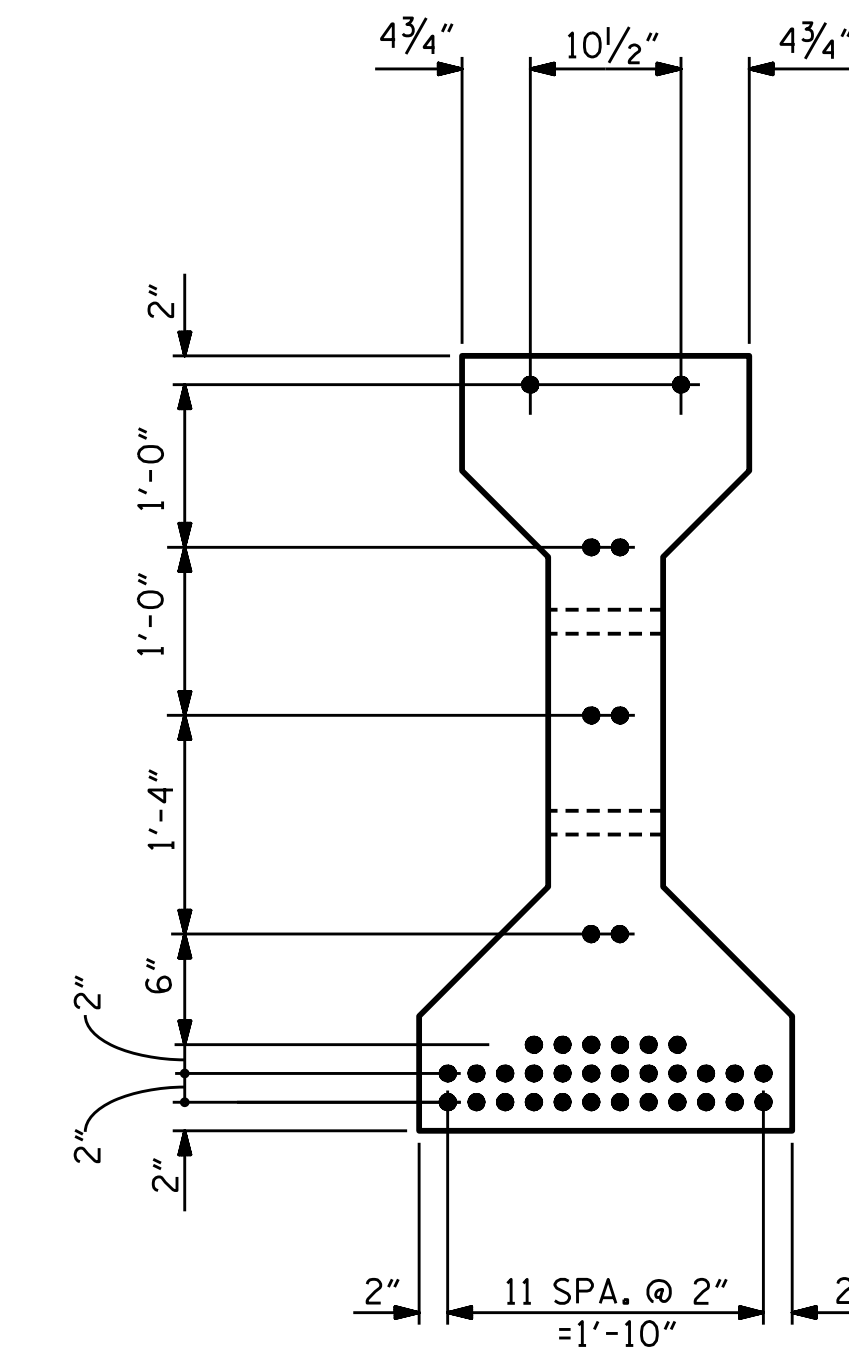
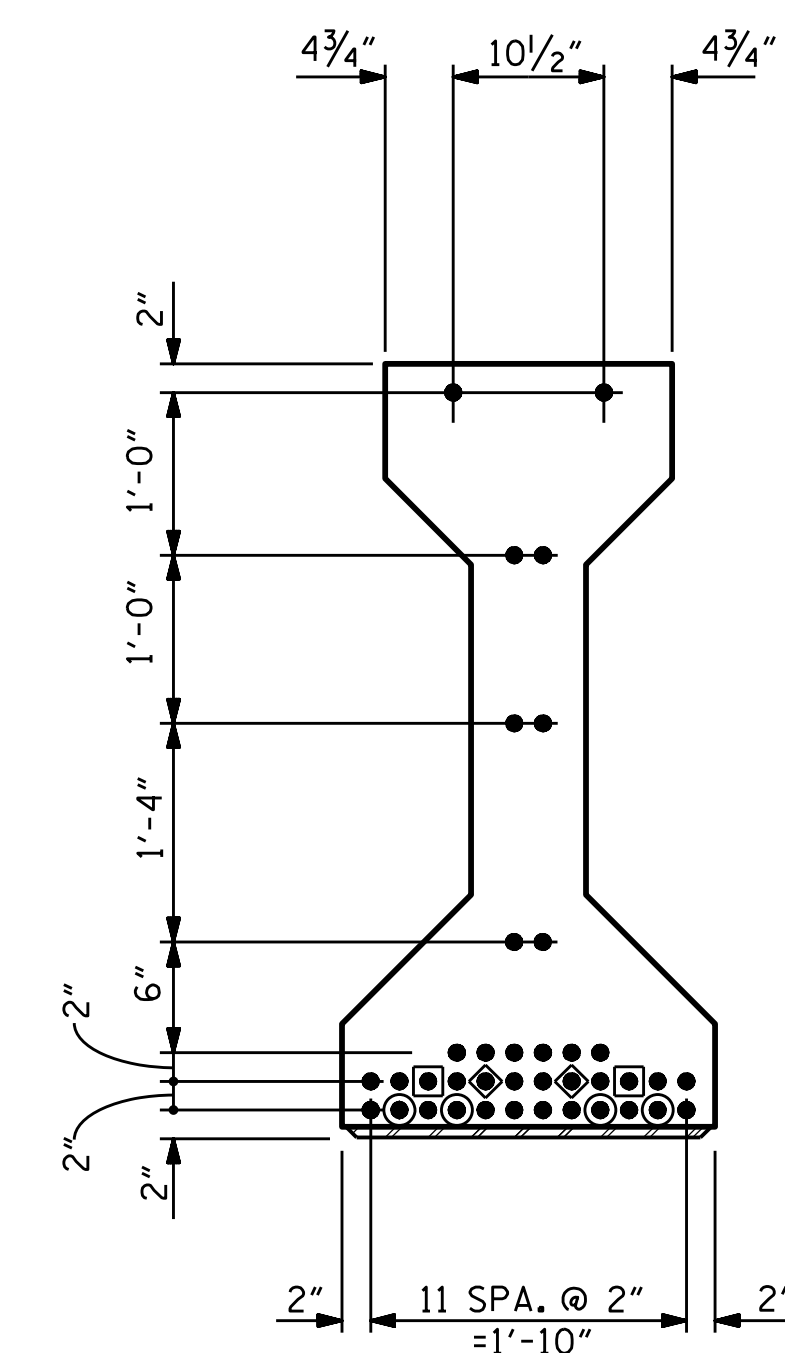
DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: A. K. ALLANKI	DATE:	08/15/19
CHECKED BY: R. C. LARSON	DATE:	04/23/20
DRAWN BY: ELR 8/91	MAA/GM	
CHECKED BY: GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC



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



1/2" Ø FORMED HOLE
(SEE FRAMING PLAN
FOR LOCATION)



AT END OF GIRDER
AT C OF GIRDER
0.6" Ø LOW RELAXATION STRAND LAYOUT

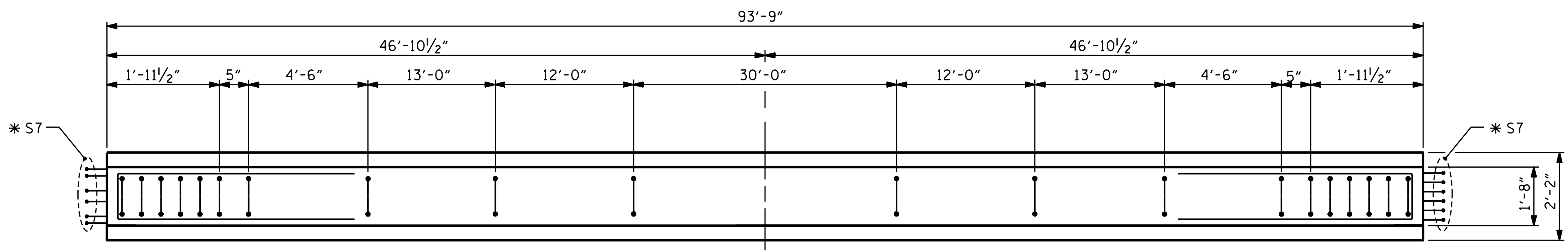
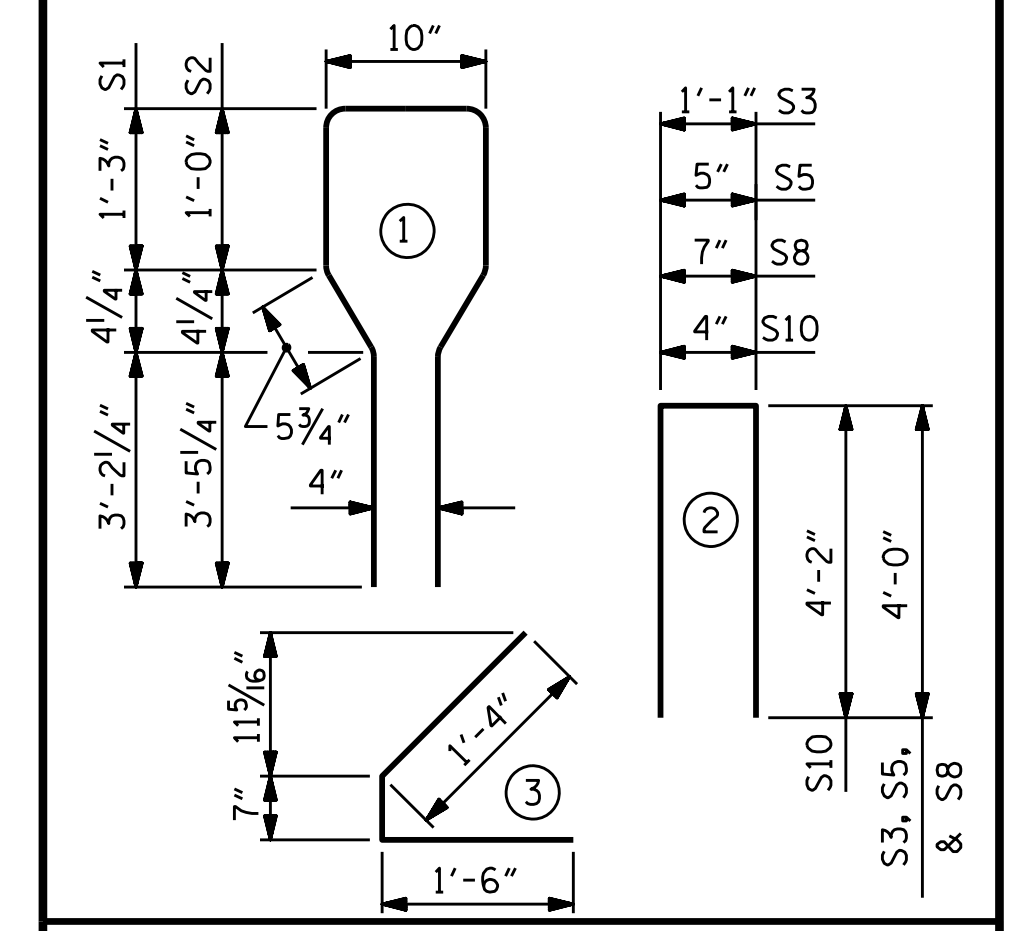
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	76	#4	1	10'-8"	542
S2	14	#6	1	10'-8"	224
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
*S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

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

BAR TYPES

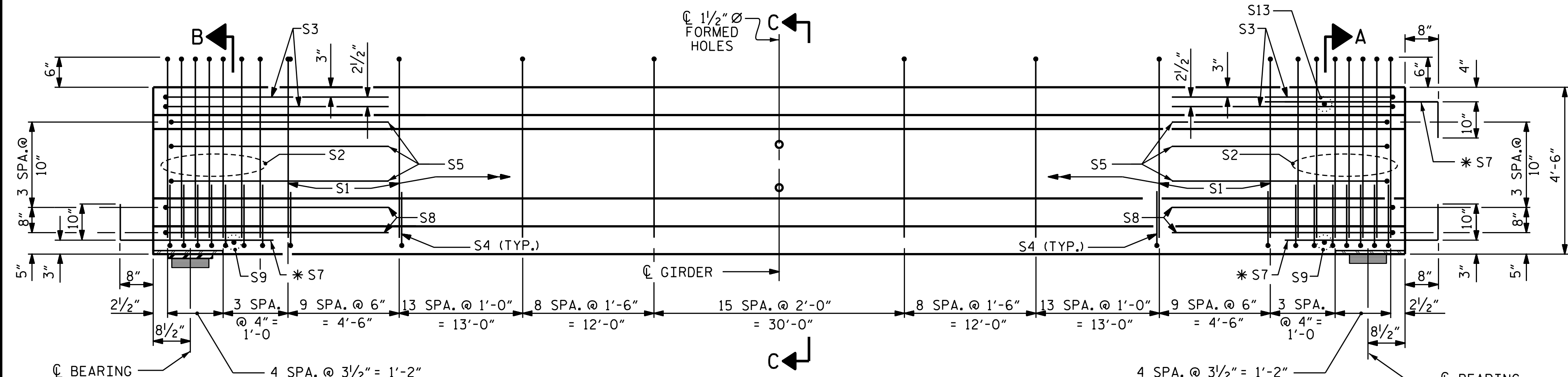
ALL BAR DIMENSIONS ARE OUT-TO-OUT



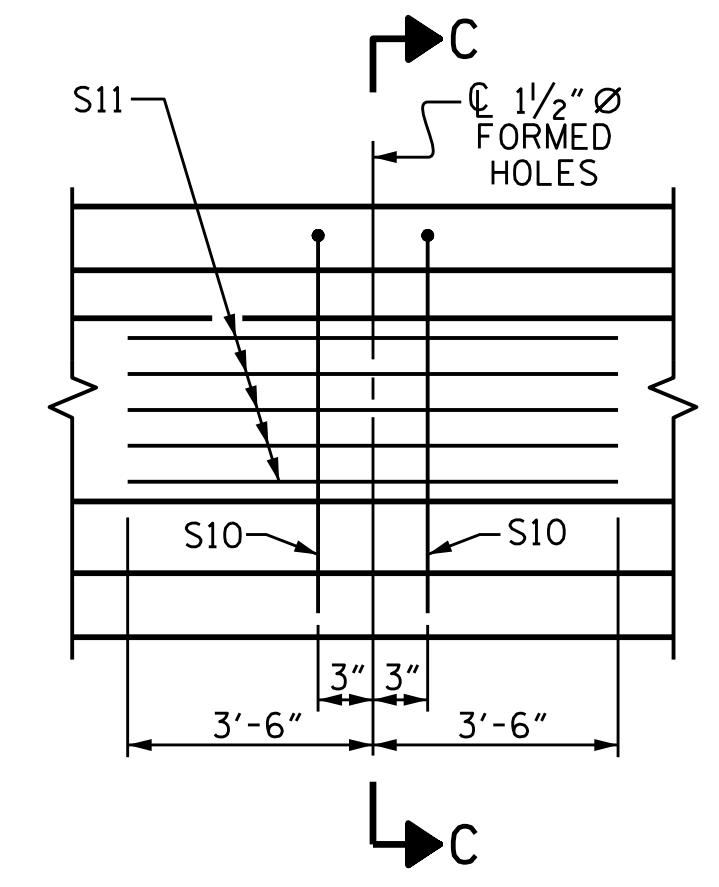
PLAN OF GIRDER

- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 10'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- ◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 18'-0" FROM END OF GIRDER. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	6500 PSI CONCRETE	0.6" Ø L. R. STRANDS	
LB.	C.Y.	No.	
1114	19.0	38	

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	93'-9"	468'-9"

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

DocuSigned by:
SEAL
14114
ENGINEER
ROBERT C. LARSON
8/15/2022

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

ENGINEERS & ARCHITECTS • SCIENTISTS • CONSTRUCTION MANAGERS LICENSE NUMBER: C-074
KCI Associates
of North Carolina, P.A.
450 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone 919-783-9241

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

TOTAL SHEETS: 29

\$FILEL\$ \$DATE\$ \$TIME\$ \$USERS\$ \$PLTDYVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04

DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: A. K. ALLANK	DATE:	08/22/19
CHECKED BY: R. C. LARSON	DATE:	04/23/20
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

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.

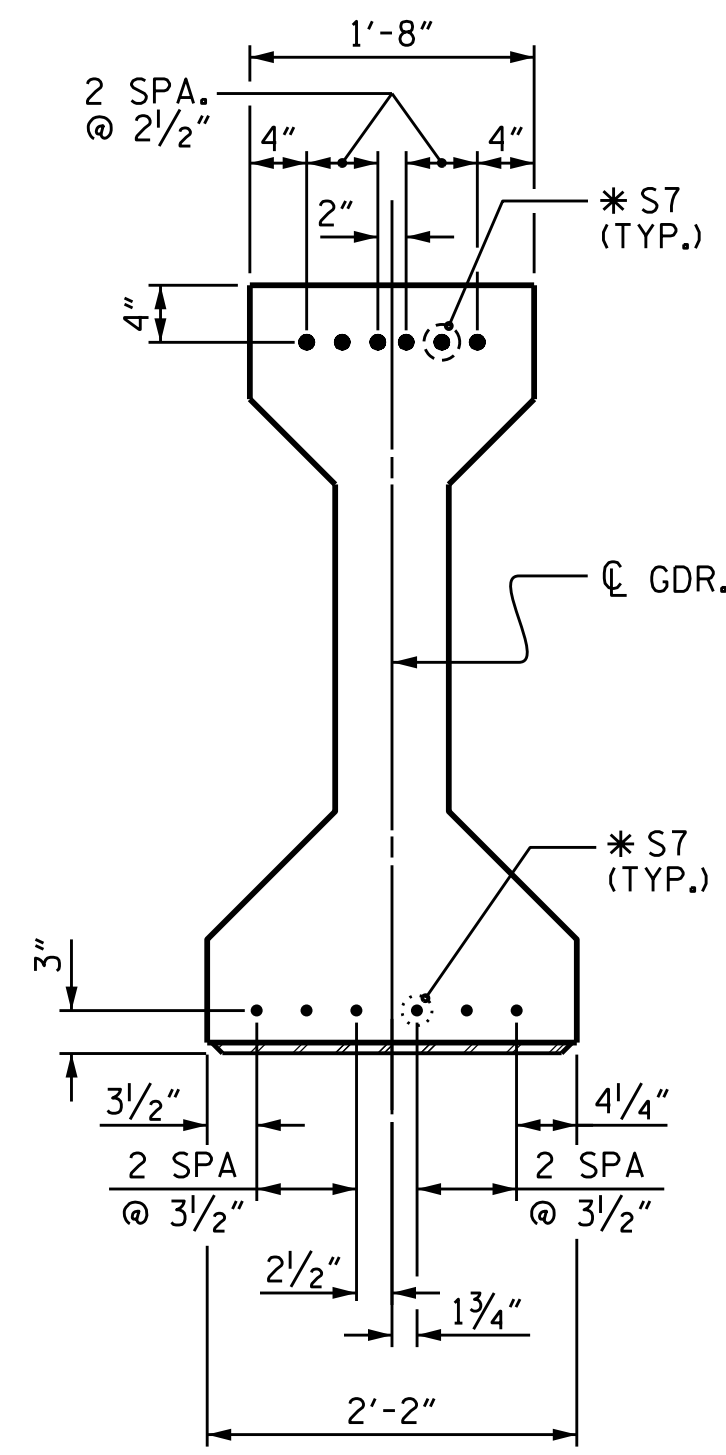
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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 4000 PSI FOR SPAN A AND 5200 PSI FOR SPANS B & C.

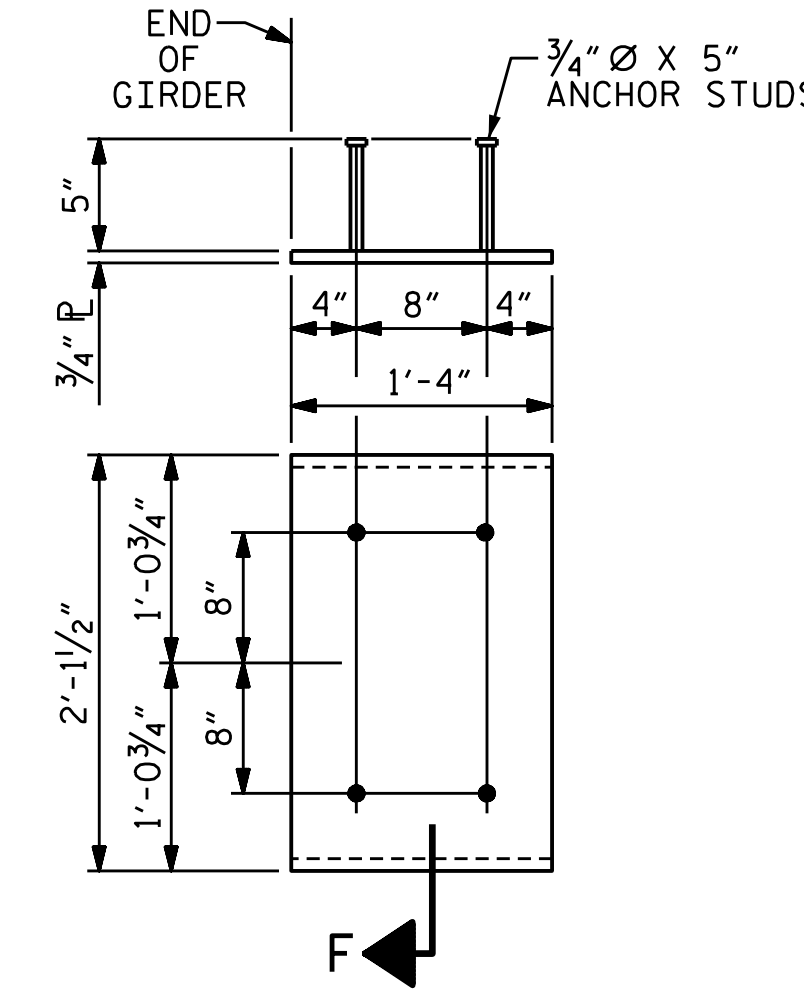
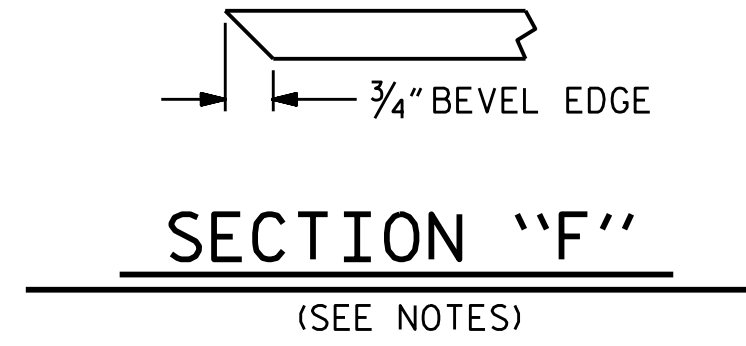
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER AND
(2 REQ'D PER GIRDER)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION		SPAN A (INTERIOR)																					
TWENTIETH POINTS		0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.007	0.014	0.020	0.026	0.031	0.036	0.039	0.042	0.043	0.044	0.043	0.042	0.039	0.036	0.031	0.026	0.020	0.014	0.007	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.003	0.005	0.008	0.010	0.013	0.014	0.016	0.017	0.018	0.018	0.018	0.017	0.016	0.014	0.013	0.010	0.008	0.005	0.003	0.000	
FINAL CAMBER	↑	0	1/16"	1/8"	1/8"	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0
0.6" Ø LOW RELAXATION		SPAN A (EXTERIOR)																					
TWENTIETH POINTS		0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.007	0.014	0.020	0.026	0.031	0.036	0.039	0.042	0.043	0.044	0.043	0.042	0.039	0.036	0.031	0.026	0.020	0.014	0.007	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.002	0.004	0.007	0.009	0.011	0.013	0.014	0.015	0.015	0.016	0.015	0.015	0.014	0.013	0.011	0.009	0.007	0.004	0.002	0.000	
FINAL CAMBER	↑	0	1/16"	1/8"	1/8"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0	
0.6" Ø LOW RELAXATION		SPAN B (INTERIOR)																					
TWENTIETH POINTS		0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.032	0.062	0.092	0.118	0.142	0.162	0.178	0.189	0.197	0.199	0.197	0.189	0.178	0.162	0.142	0.118	0.092	0.062	0.032	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.027	0.050	0.078	0.099	0.121	0.137	0.151	0.161	0.167	0.169	0.167	0.161	0.151	0.137	0.121	0.099	0.078	0.050	0.027	0.000	
FINAL CAMBER	↑	0	1/16"	1/8"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	1/8"	1/16"	0	
0.6" Ø LOW RELAXATION		SPAN B (EXTERIOR)																					
TWENTIETH POINTS		0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.032	0.062	0.092	0.118	0.142	0.162	0.178	0.189	0.197	0.199	0.197	0.189	0.178	0.162	0.142	0.118	0.092	0.062	0.032	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.024	0.044	0.068	0.087	0.106	0.120	0.133	0.141	0.147	0.149	0.147	0.141	0.133	0.120	0.106	0.087	0.068	0.044	0.024	0.000	
FINAL CAMBER	↑	0	1/8"	1/4"	1/4"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	1/4"	1/4"	1/8"	0	

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

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

SHEET 3 OF 3

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

DocuSigned by:
R. Larson
DB3C8E45B06498
8/15/2022
NORTH CAROLINA PROFESSIONAL SEAL
14114
ENGINEER
ROBERT C. LARSON

DESIGN ENGINEER OF RECORD	DATE :	8/15/2022
ASSEMBLED BY : R. C. LARSON	DATE :	06/24/20
CHECKED BY : R. F. DECOLA	DATE :	11/10/20
DRAWN BY : ELR 11/91	REV. 1/15	MAA/TMC
CHECKED BY : GRP 11/91	REV. 2/15	MAA/TMG
	REV. 12/17	MAA/THC

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KCI Associates
of North Carolina, P.A.
450 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-1270 Phone 919-783-9241

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-12
1			3			TOTAL SHEETS
2			4			29

STD. NO. PCG9 (Sht. 3a)

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTDRYS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04

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 DEPARTMENT'S 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.

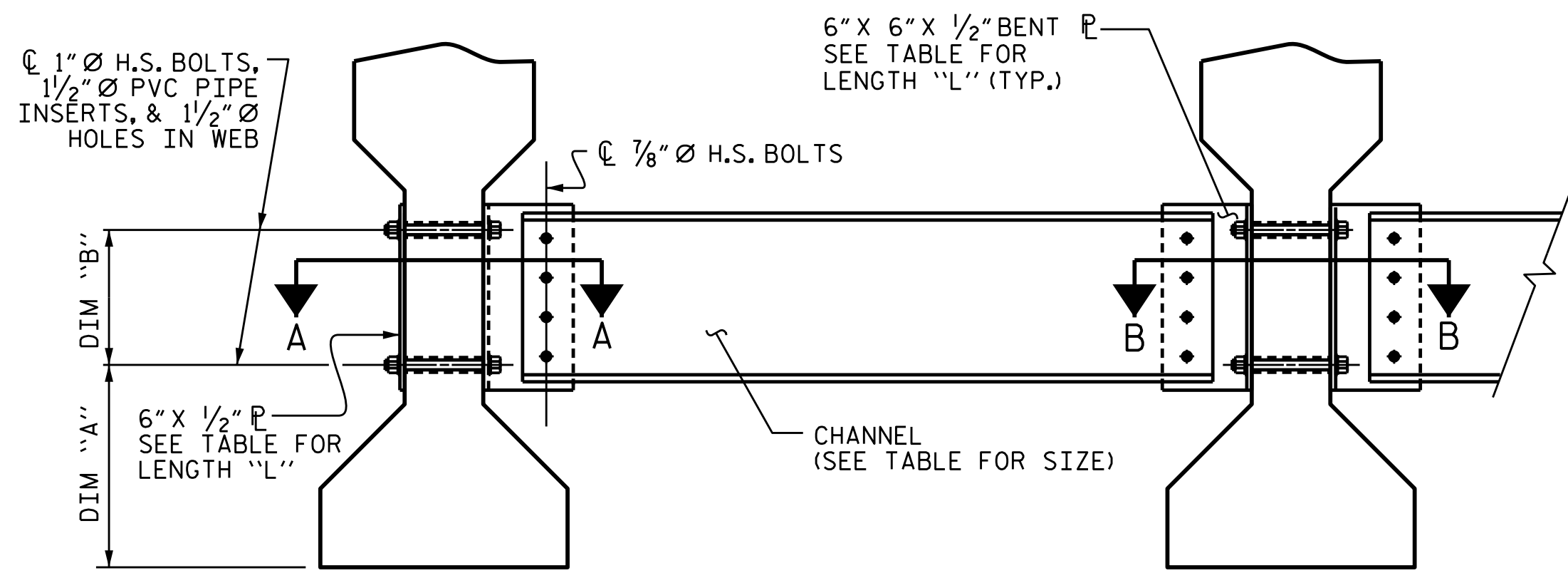
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

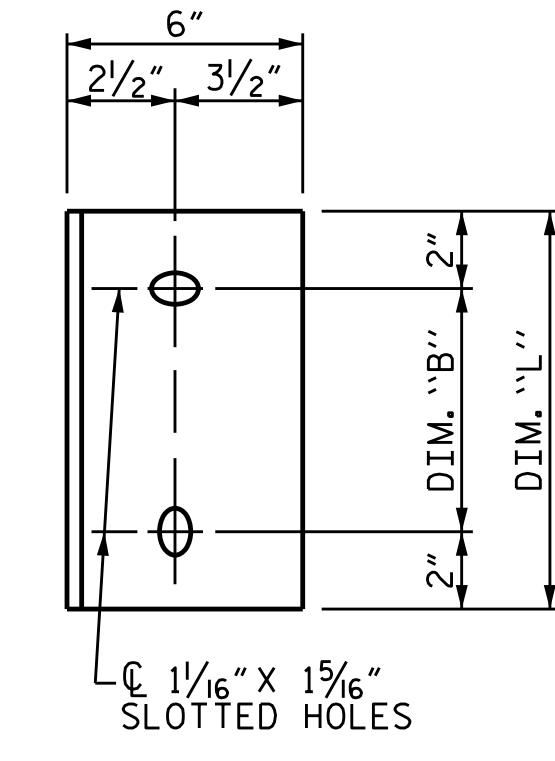
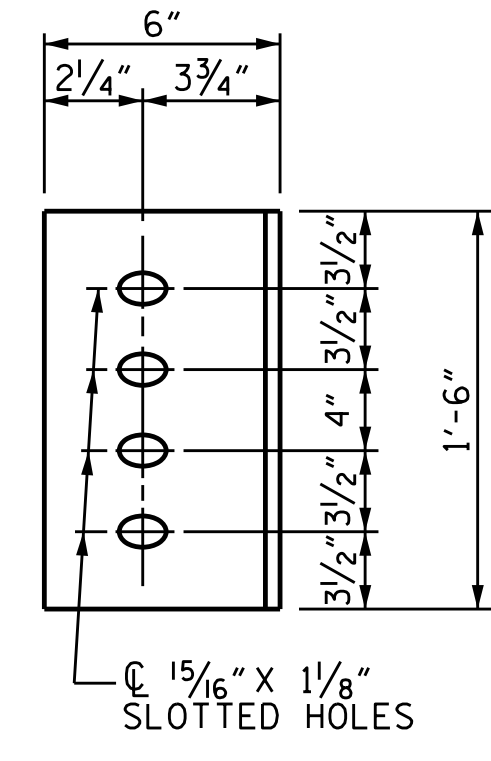
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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 **WEB FACE**
 (TYPE IV GDR.)

CONNECTOR PLATE DETAILS

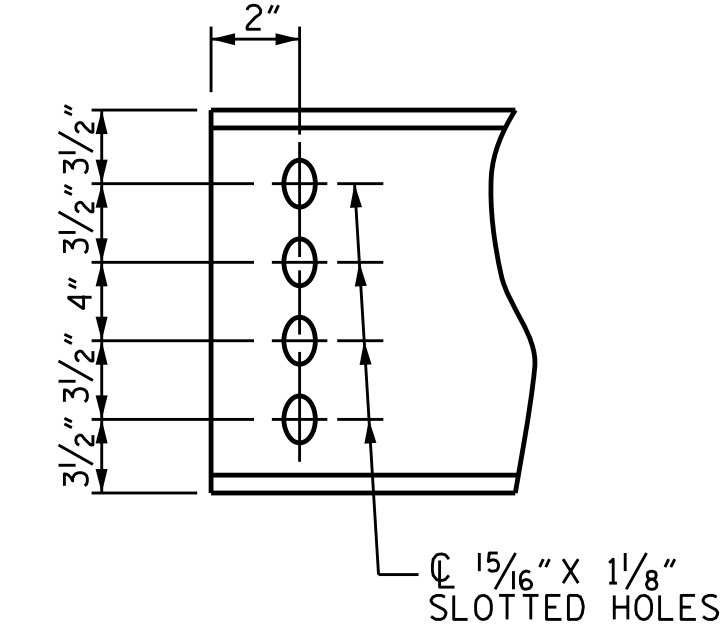
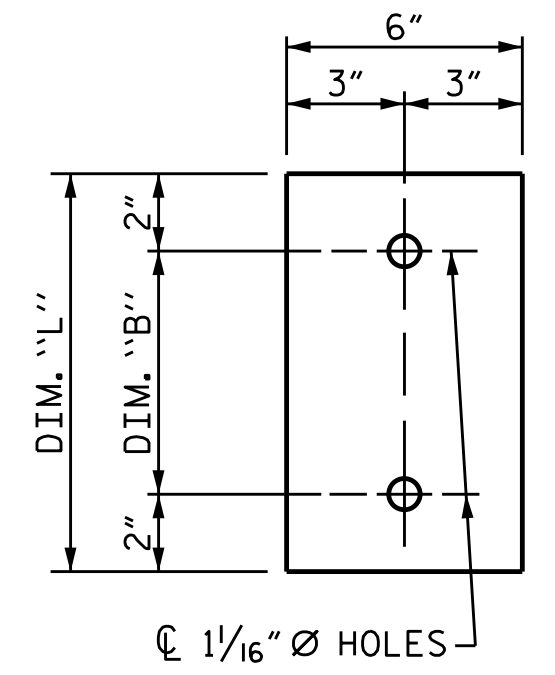
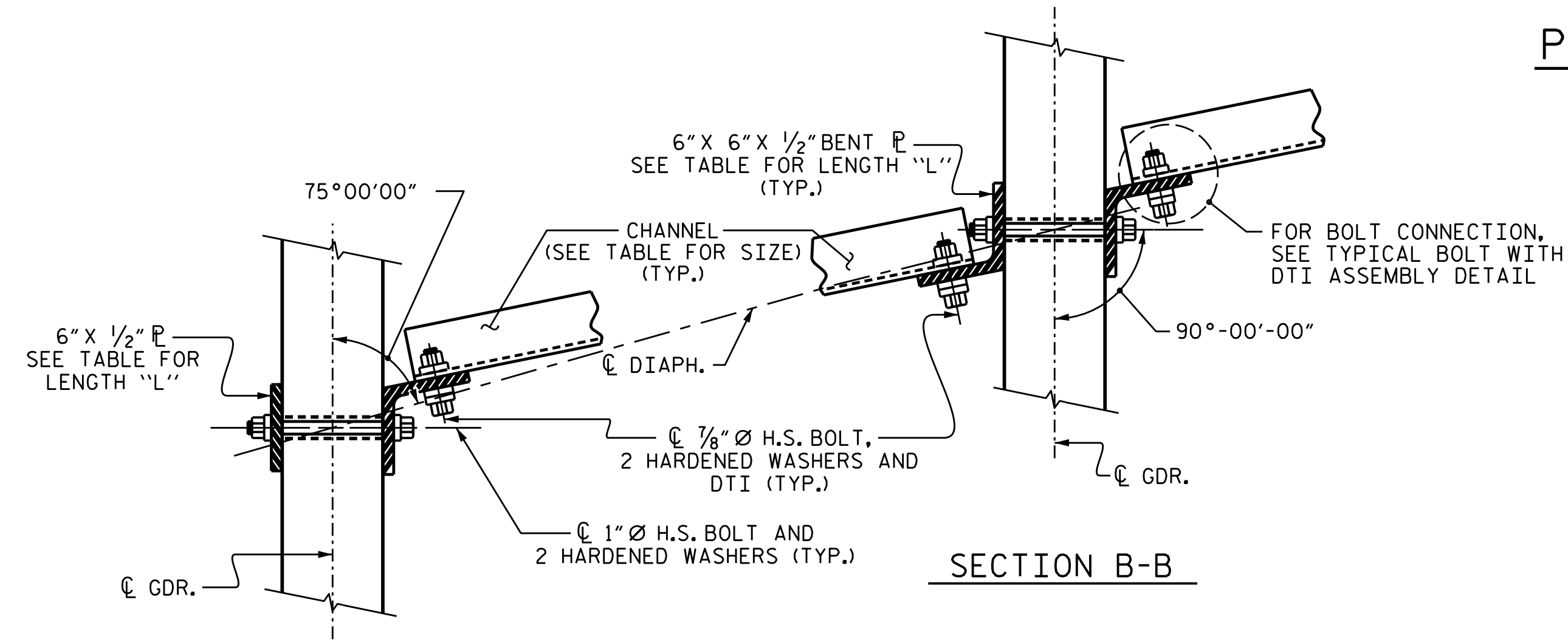
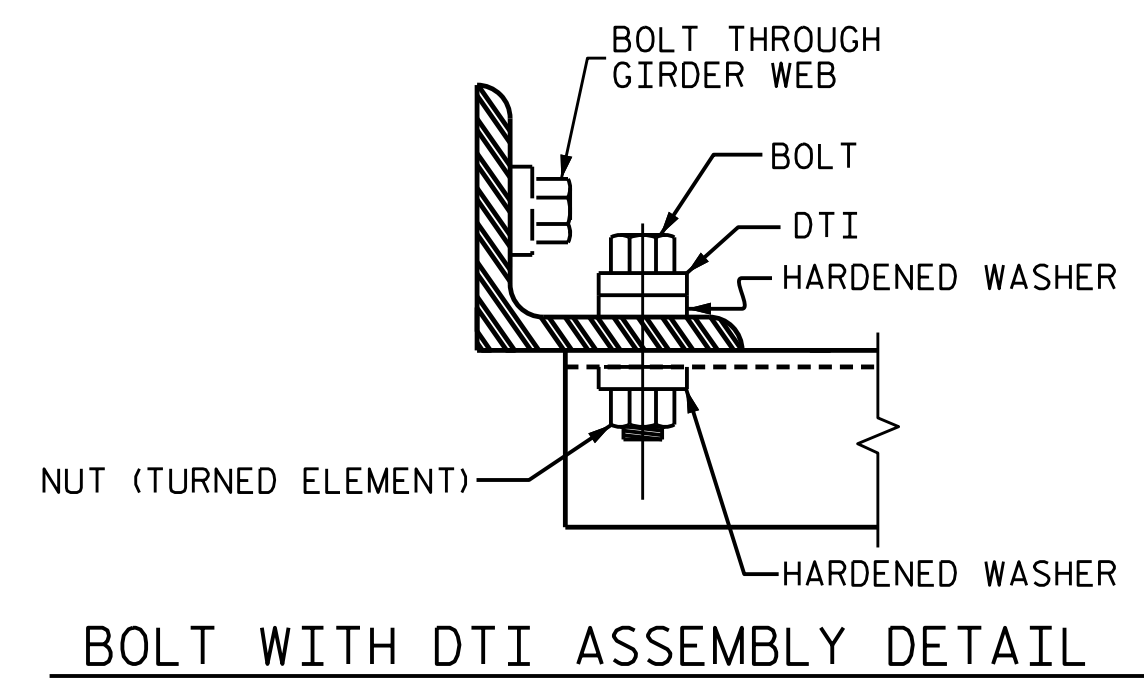


PLATE DETAILS **CHANNEL END**
 (TYPE IV GDR.)



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. R-2561CA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

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

DocuSigned by:

 DB3C8E45B06D499
 8/15/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-13
1			3			TOTAL SHEETS
2			4			29

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ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS LICENSE NUMBER: C-074
KCI Associates of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone: (919) 783-9200

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLOTDRYS\$ \$PENTBLS\$ \$PLTDORYS\$
 KCI PROJECT NO. 241704391.04

DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: R. C. LARSON	DATE:	06/19/20
CHECKED BY: R. F. DECOLA	DATE:	11/10/20
DRAWN BY: TLA 6/05	REV. 5/1/06RRR	KMM/GM
CHECKED BY: VC 6/05	REV. 10/1/18	MAA/GM
	REV. 12/17	MAA/THC

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

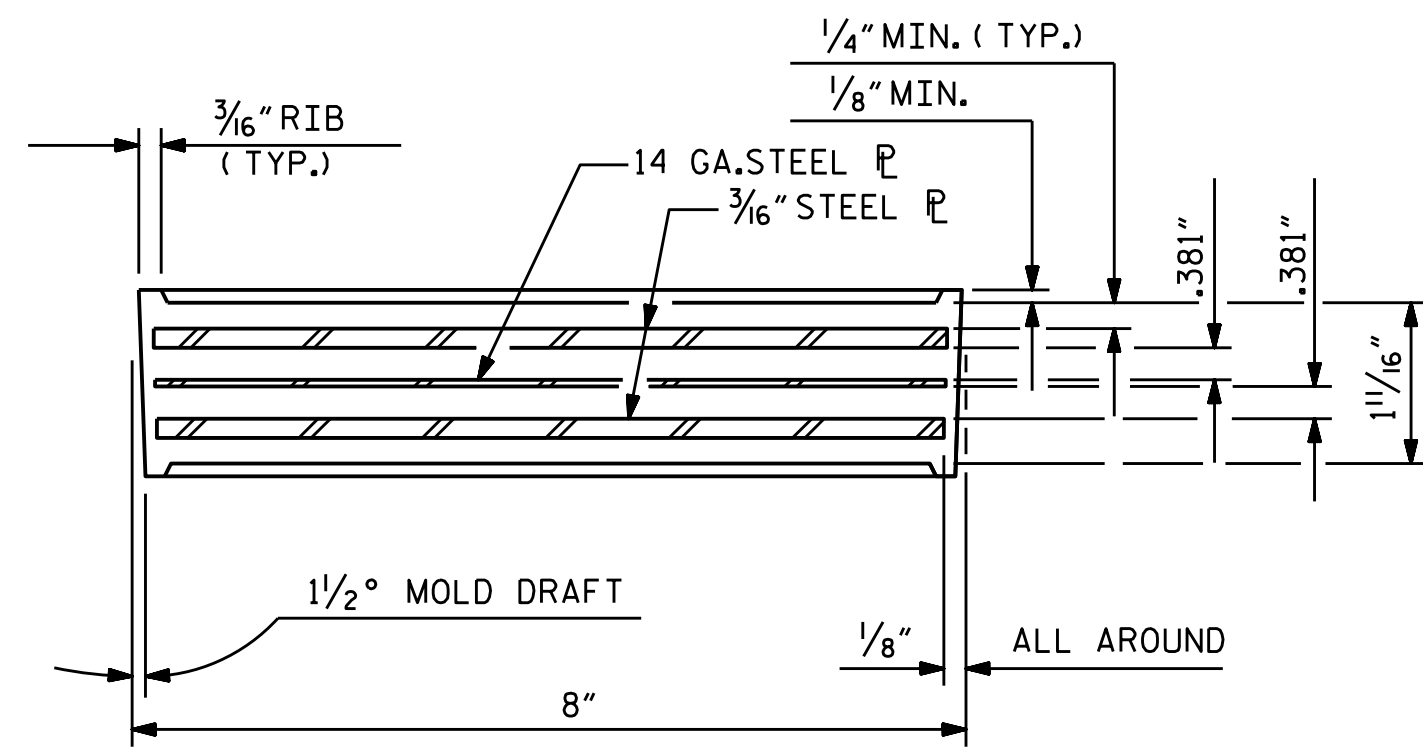
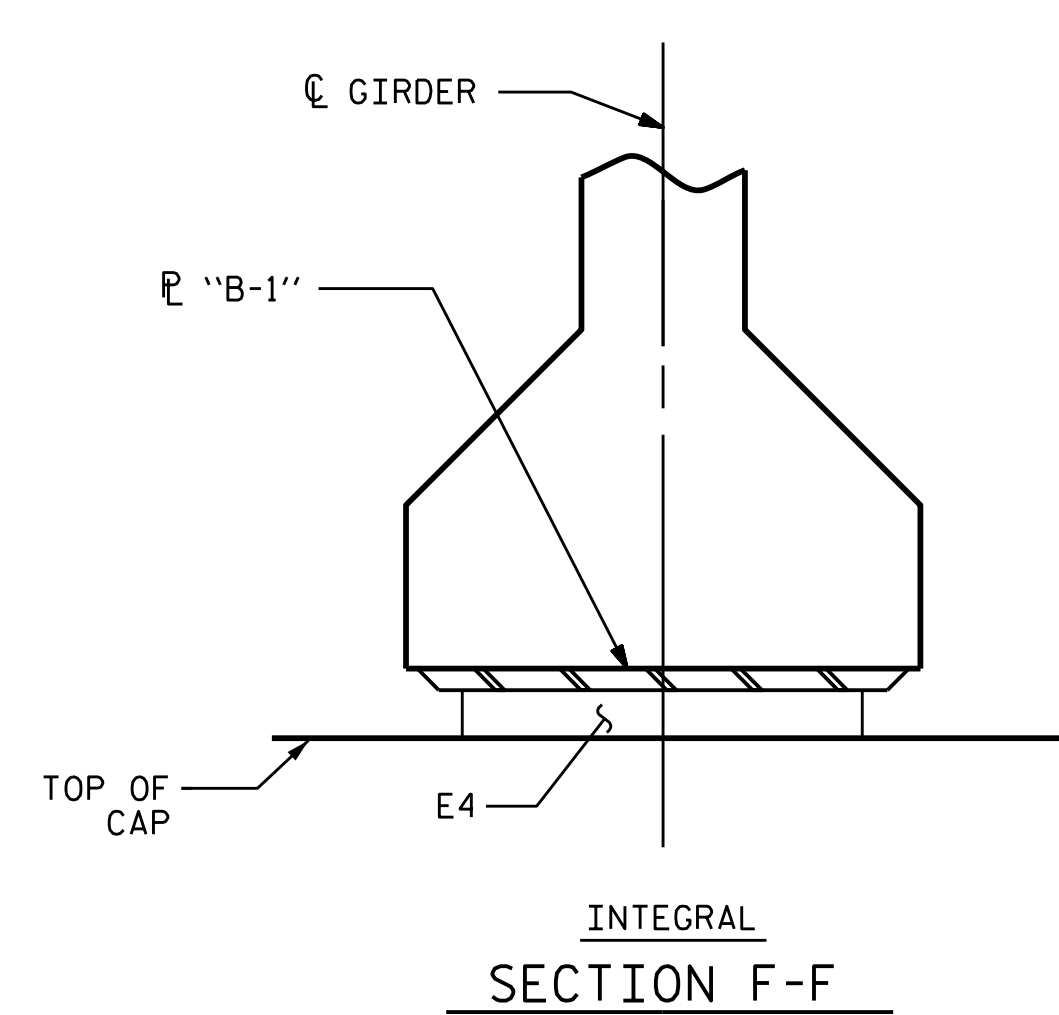
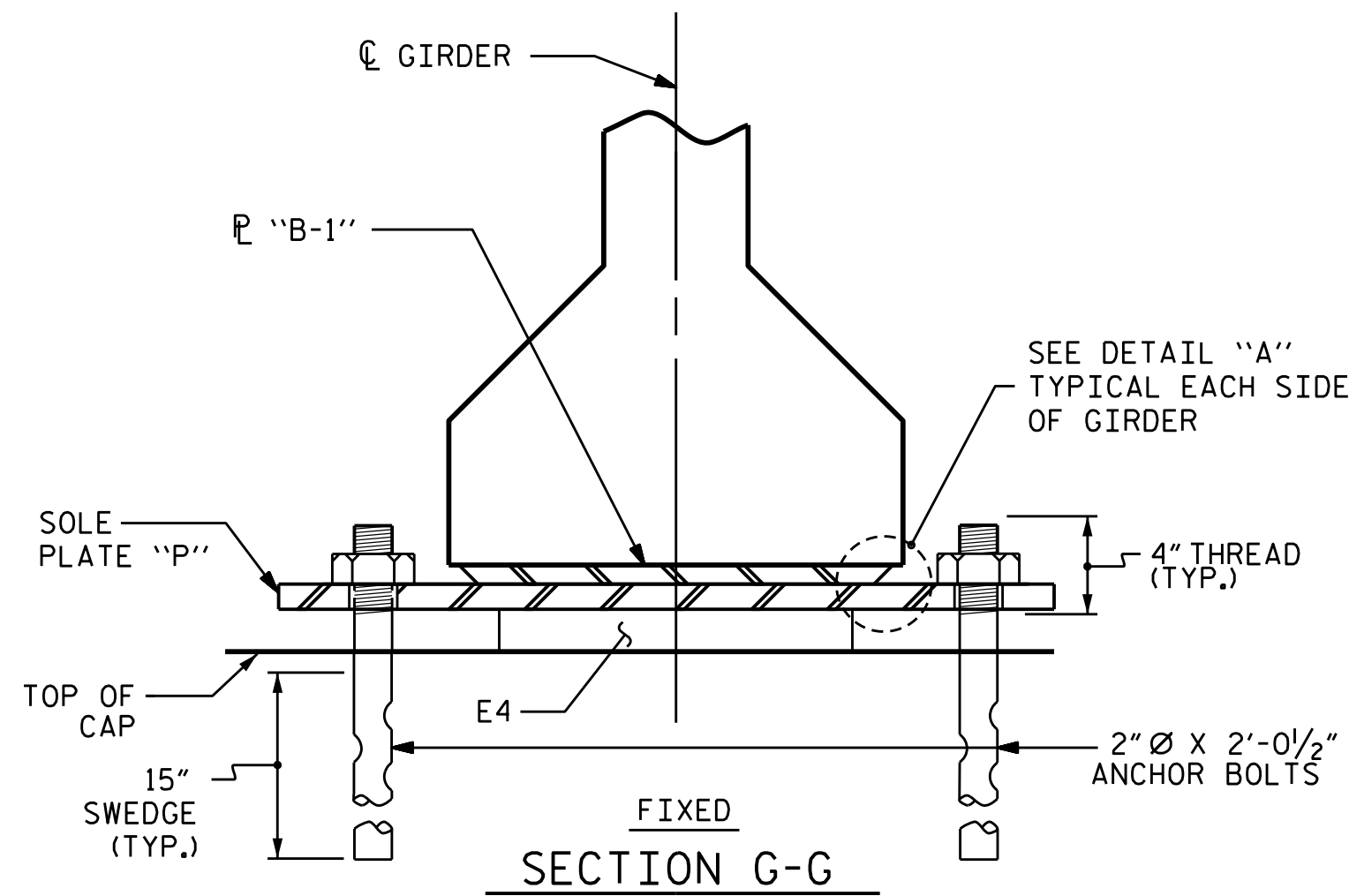
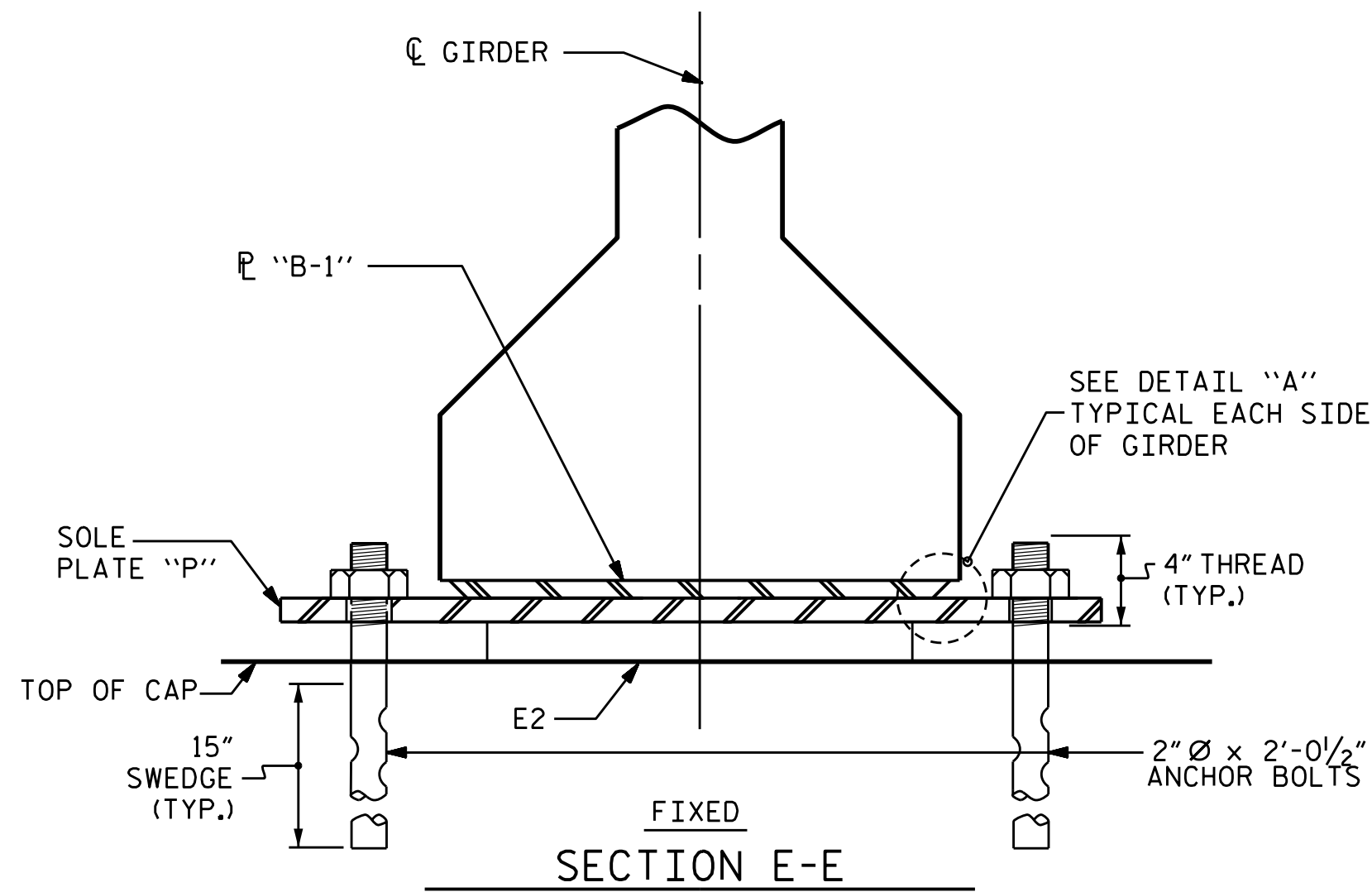
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

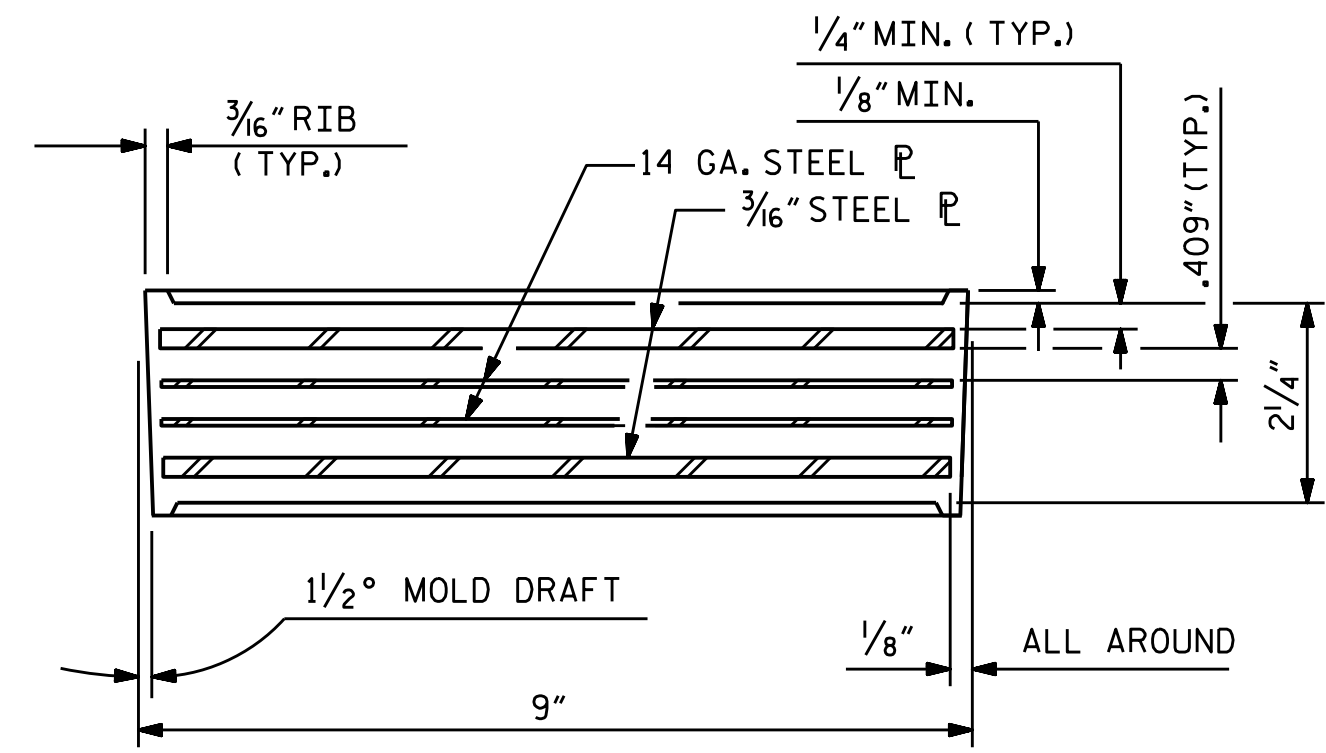
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

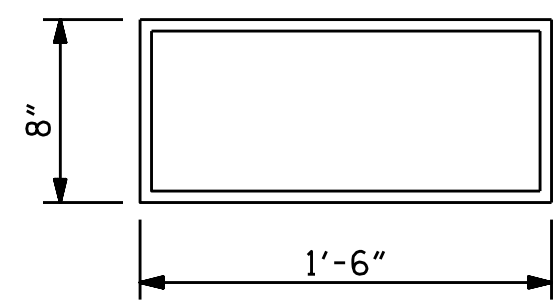
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



TYPICAL SECTION OF ELASTOMERIC BEARINGS



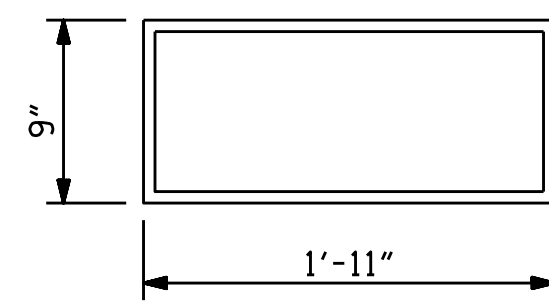
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (5 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

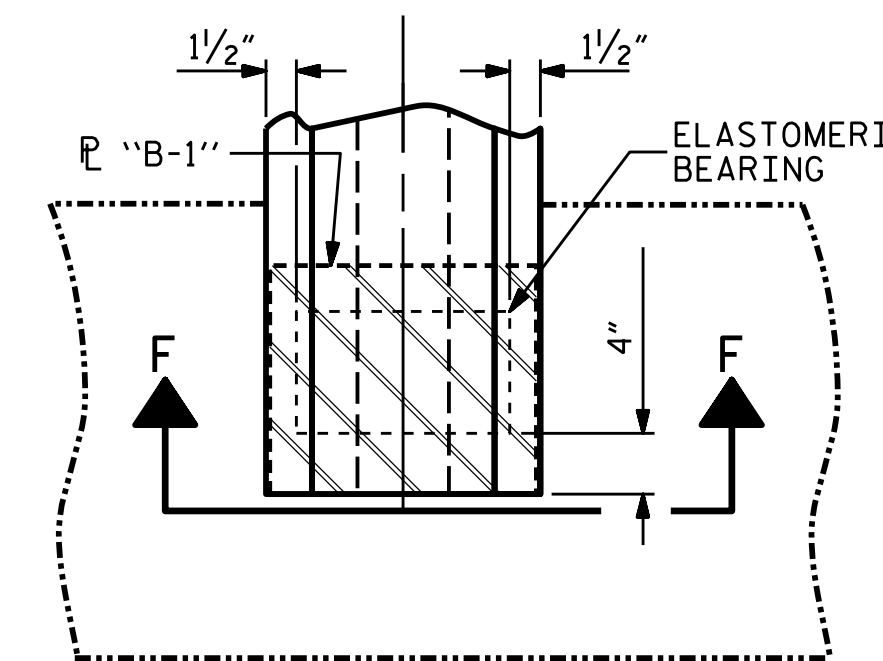
TYPE III



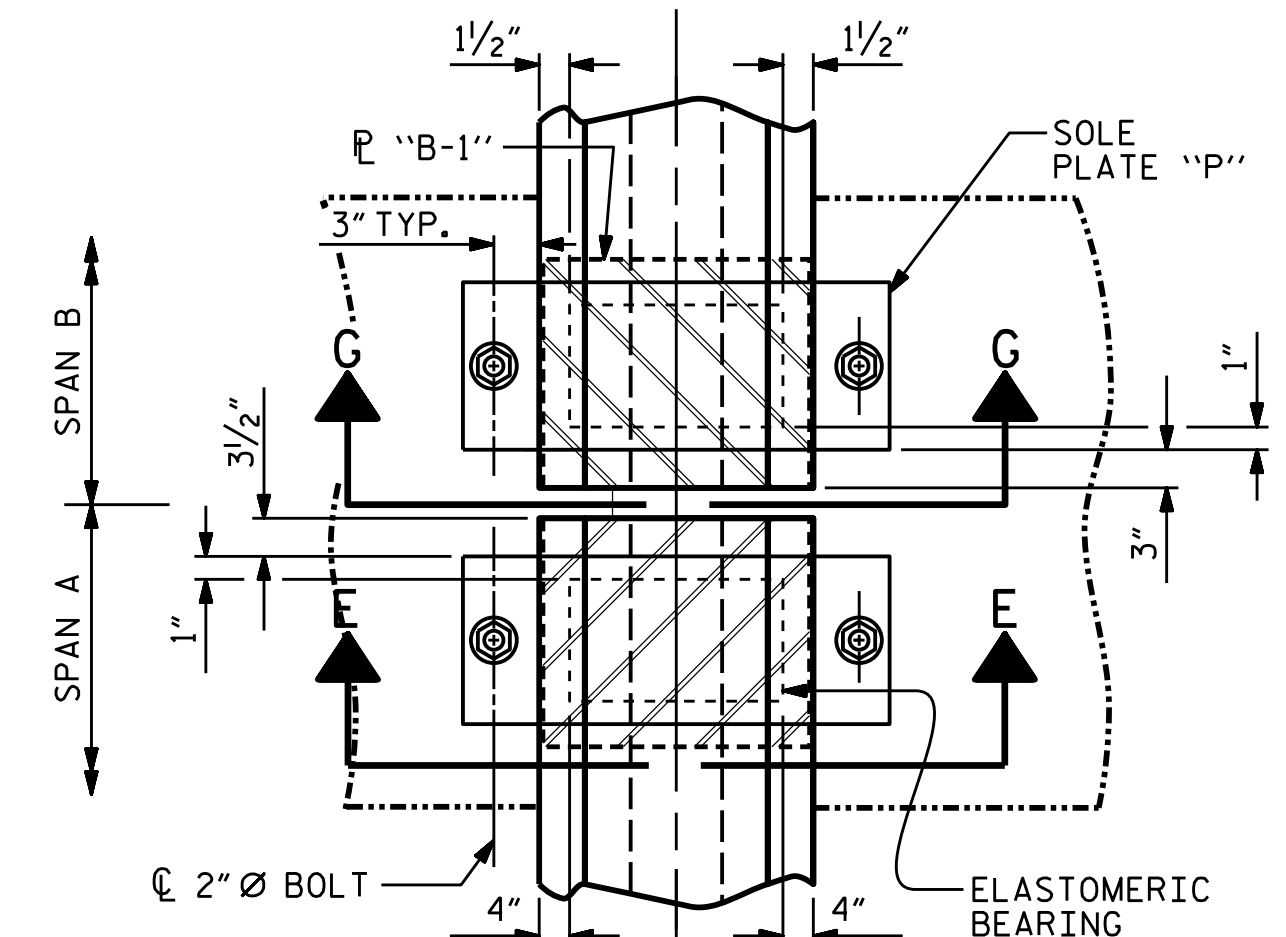
E4 (15 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

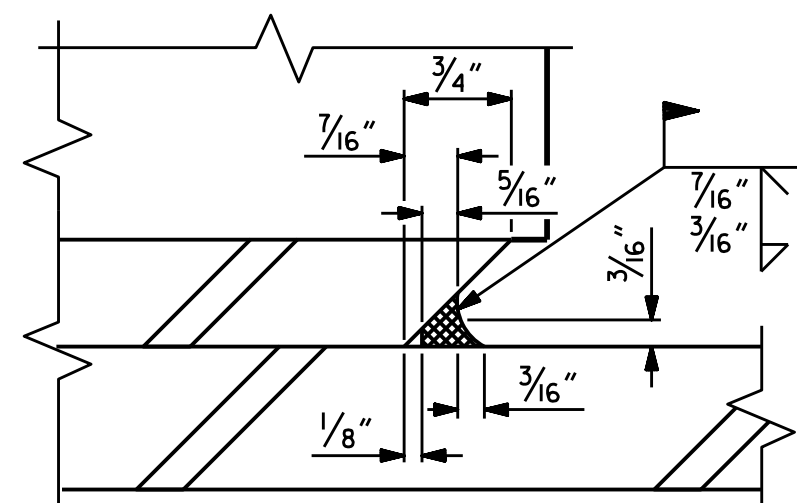
TYPE V



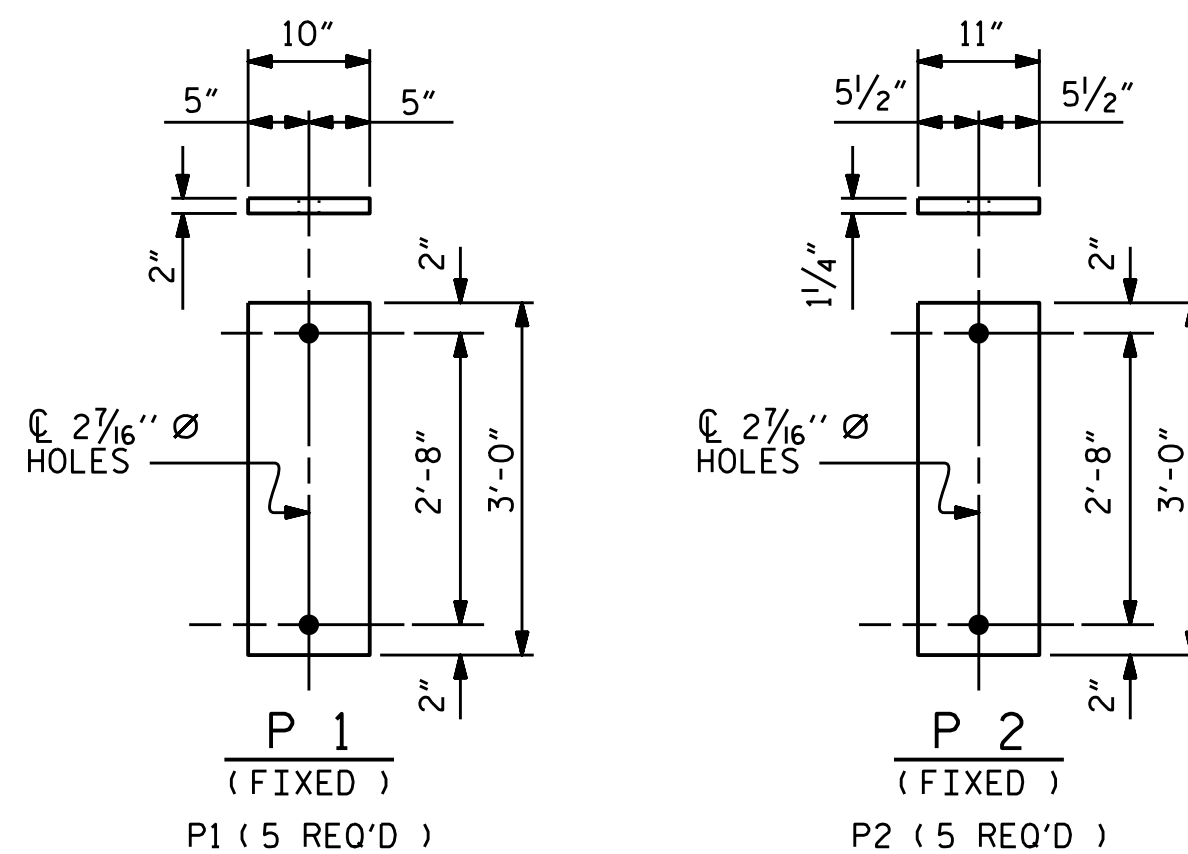
TYPICAL PLAN (SHOWING INTEGRAL END BENT)



TYPICAL PLAN (SHOWING CONTINUOUS BENT)



DETAIL "A"

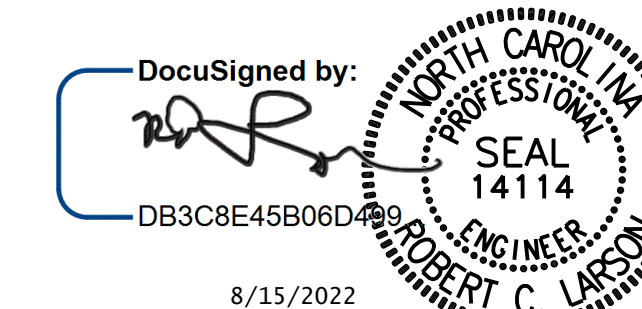


SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k
TYPE V	365 k

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

DESIGN ENGINEER OF RECORD:	DATE:	8/15/2022
ASSEMBLED BY: R. C. LARSON	DATE:	07/01/20
CHECKED BY: R. F. DECOLA	DATE:	11/10/20
DRAWN BY: EEM 2/97	REV. 6/13	AAC/MAA
CHECKED BY: VAP 2/97	REV. 1/15	MAA/TMC
	REV. 12/17	MAA/THC



8/15/2022

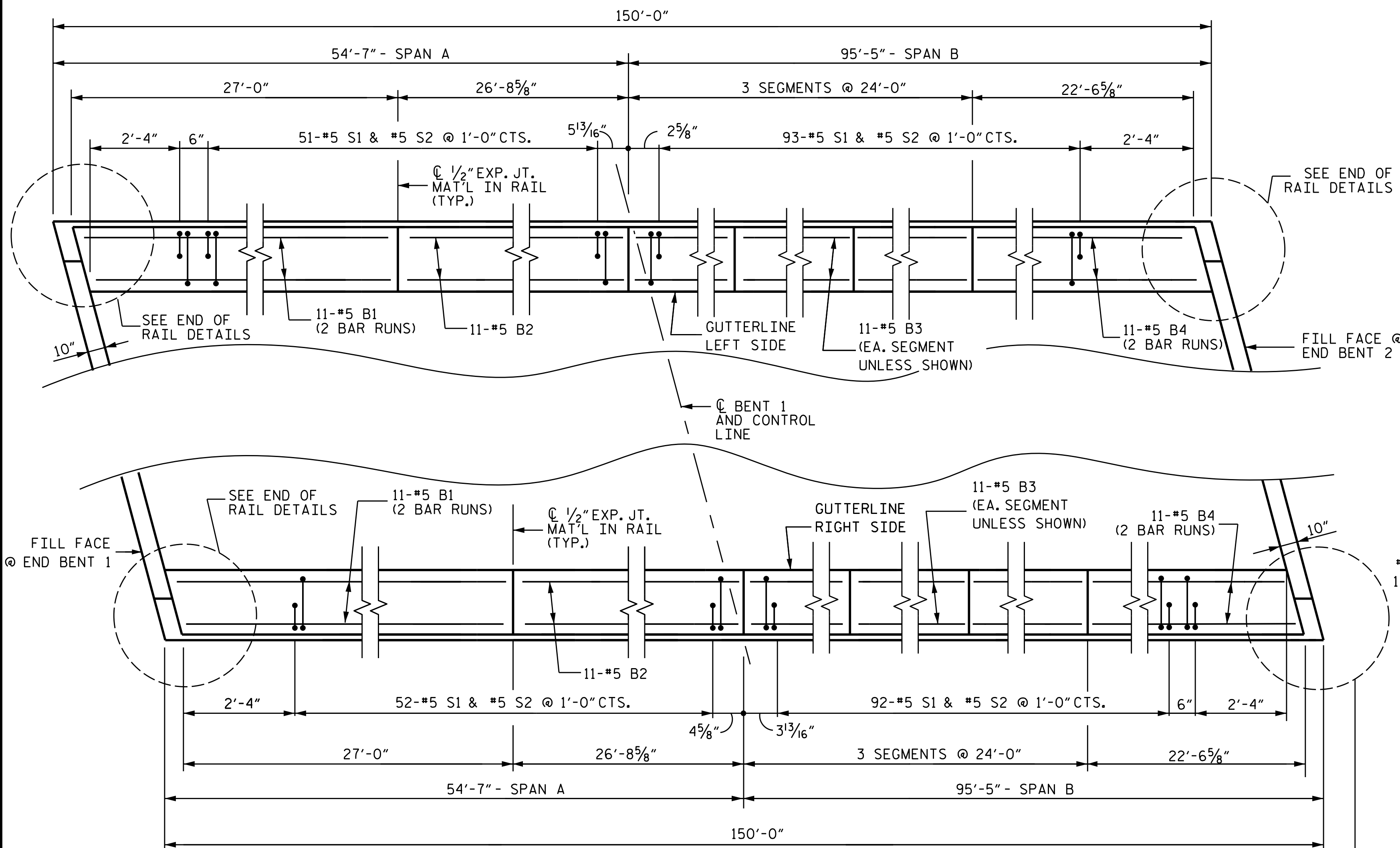
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ELASTOMERIC BEARING
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-14
1			3			TOTAL SHEETS
2			4			29

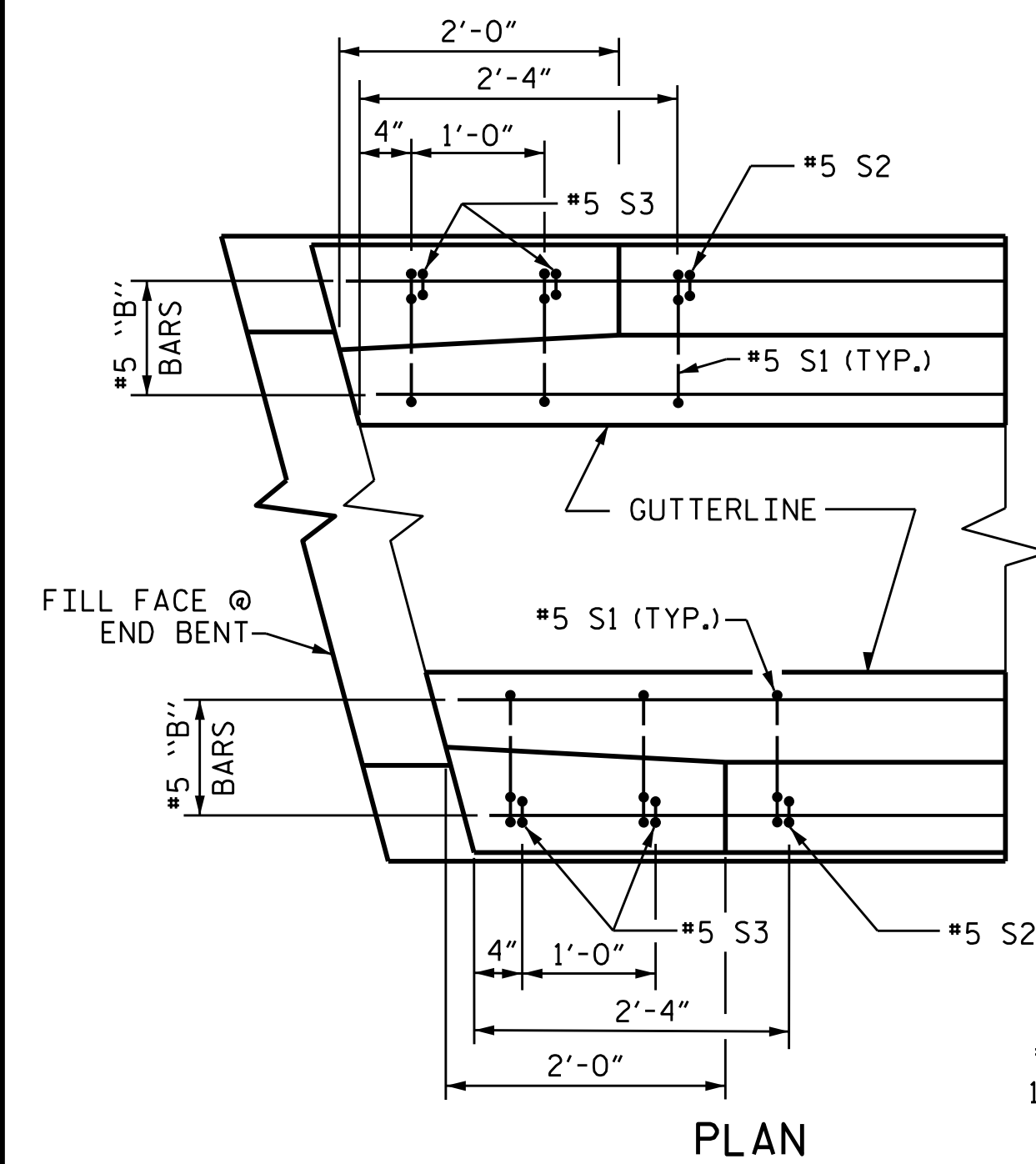
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KCI Associates of North Carolina, P.A.
2505 Fork of House Road, Suite 400, Raleigh, NC 27609-5270 Phone 919-783-8244

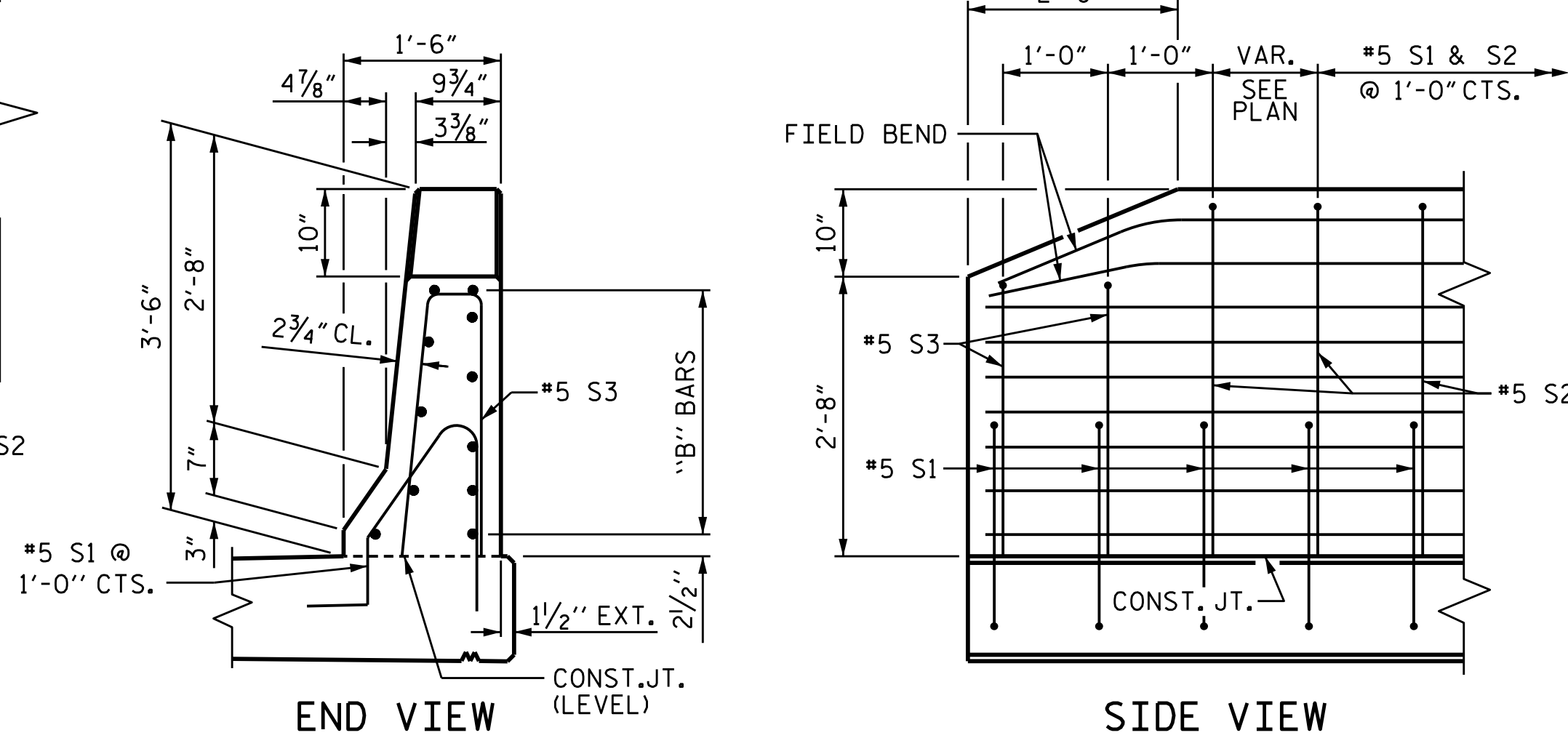
\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTBL\$ \$PLTDYV\$ \$KCI PROJECT NO. 241704391.04



PLAN



PLAN



END VIEW

SIDE VIEW

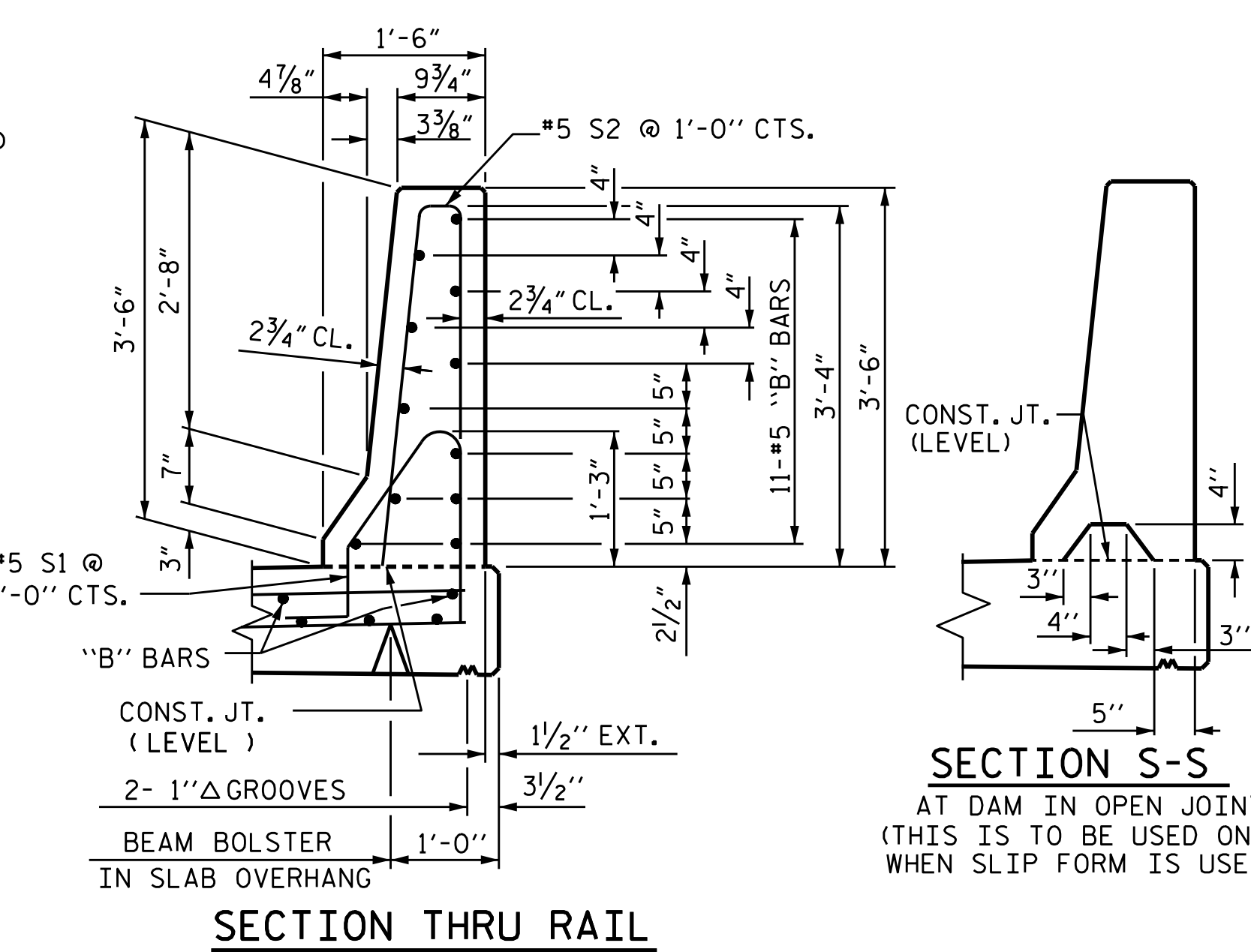
END OF RAIL DETAILS

NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

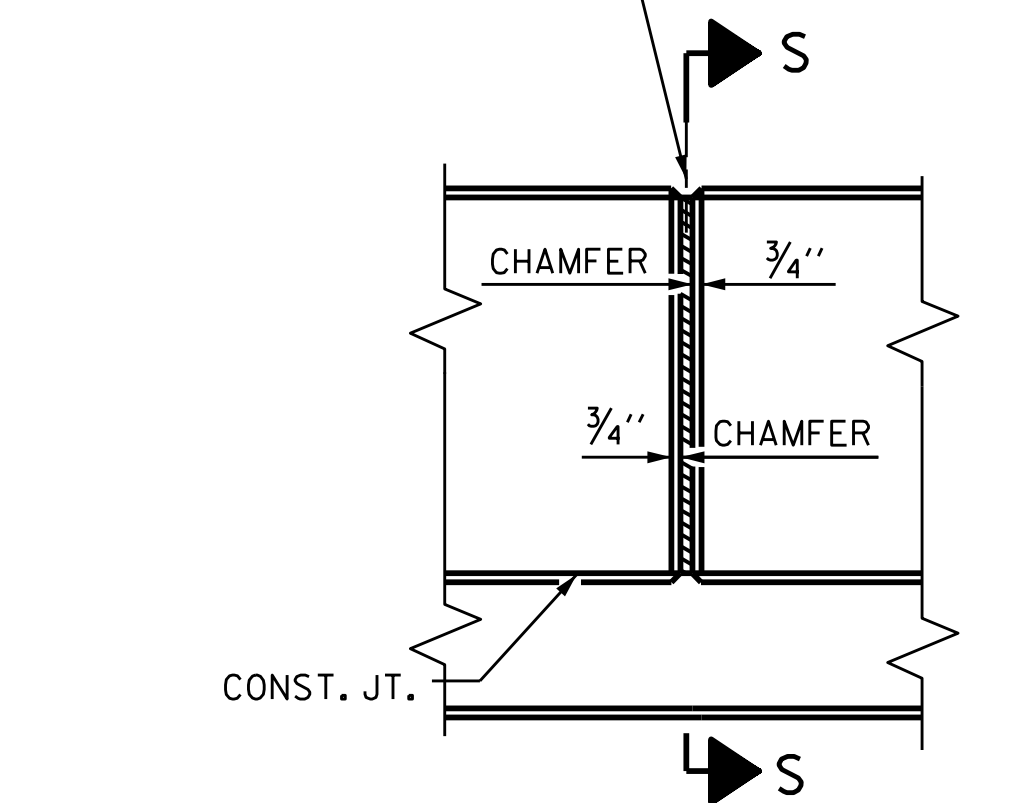
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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



SECTION THRU RAIL

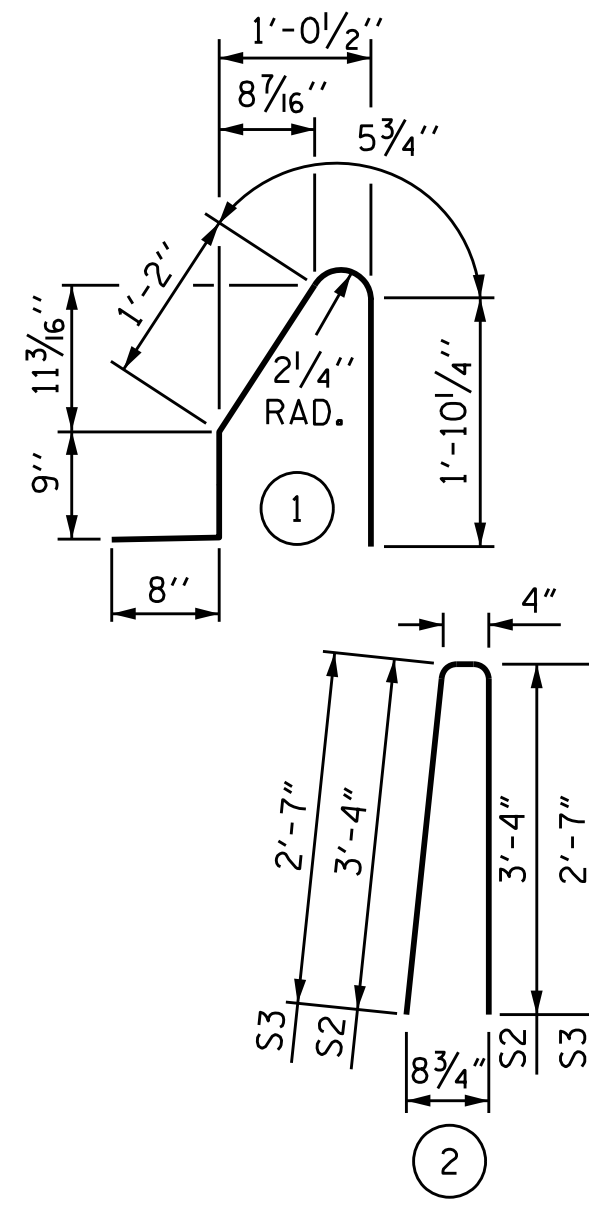
SECTION S-S

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



**ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS**

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

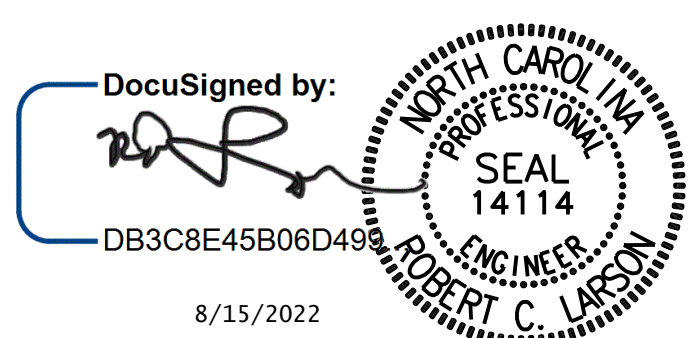
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	298	#5	1	4'-11"	1528
* S2	290	#5	2	7'-0"	2117
* S3	8	#5	2	5'-6"	46
* B1	44	#5	STR	15'-1"	692
* B2	22	#5	STR	26'-4"	604
* B3	66	#5	STR	23'-8"	1629
* B4	44	#5	STR	12'-11"	593

* EPOXY COATED REINFORCING STEEL 7209 LBS.
CLASS AA CONCRETE 40.3 CU. YDS.
CONCRETE BARRIER RAIL 296.54 LIN. FT.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE
BARRIER RAIL
RIGHT LANE



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-15
1			3			TOTAL SHEETS
2			4			29

DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022
ASSEMBLED BY: A. K. ALLANKOTTE DATE: 08/23/19
CHECKED BY: R. C. LARSON DATE: 07/01/20
DRAWN BY: ARB 5/87 MAA/GM
CHECKED BY: SJD 9/87 REV. 7/12 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

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

ENGINEERS & ARCHITECTS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-05414114
KCI Associates
of North Carolina, P.A.
4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone 919-783-8204

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

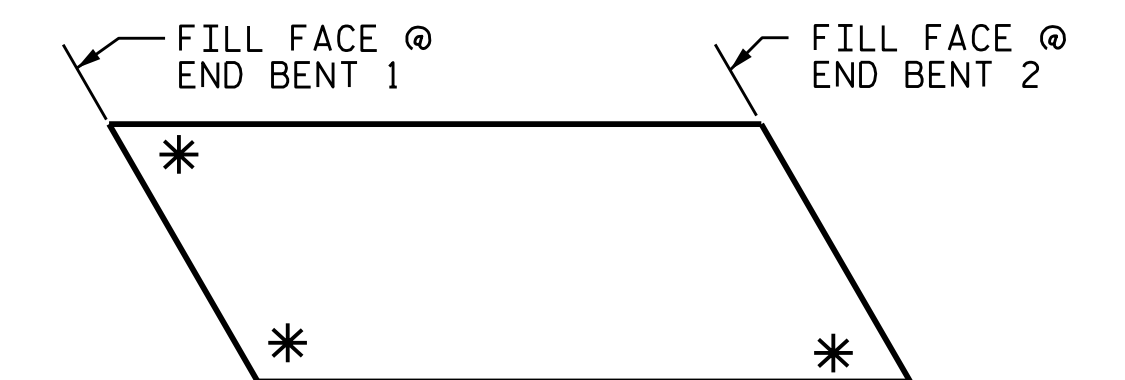
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

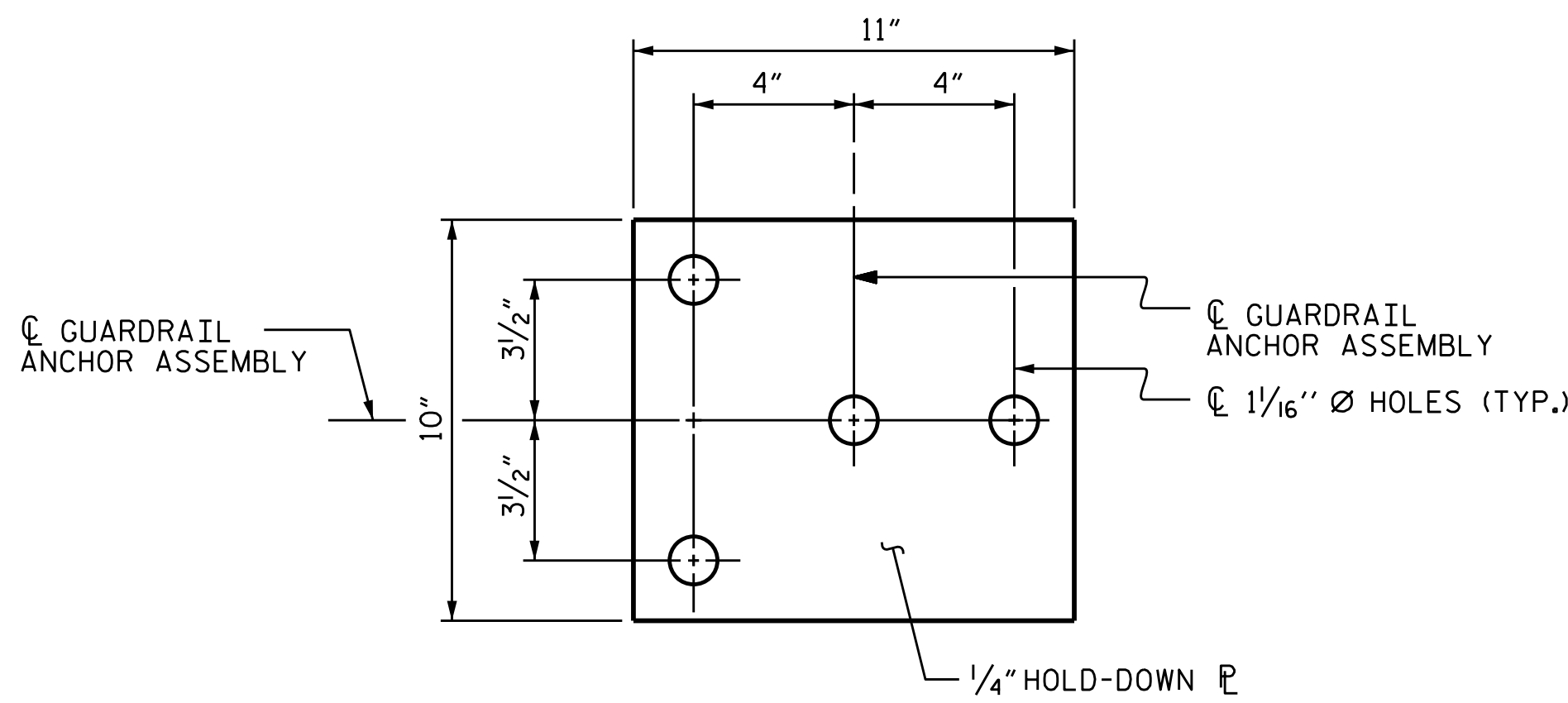
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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

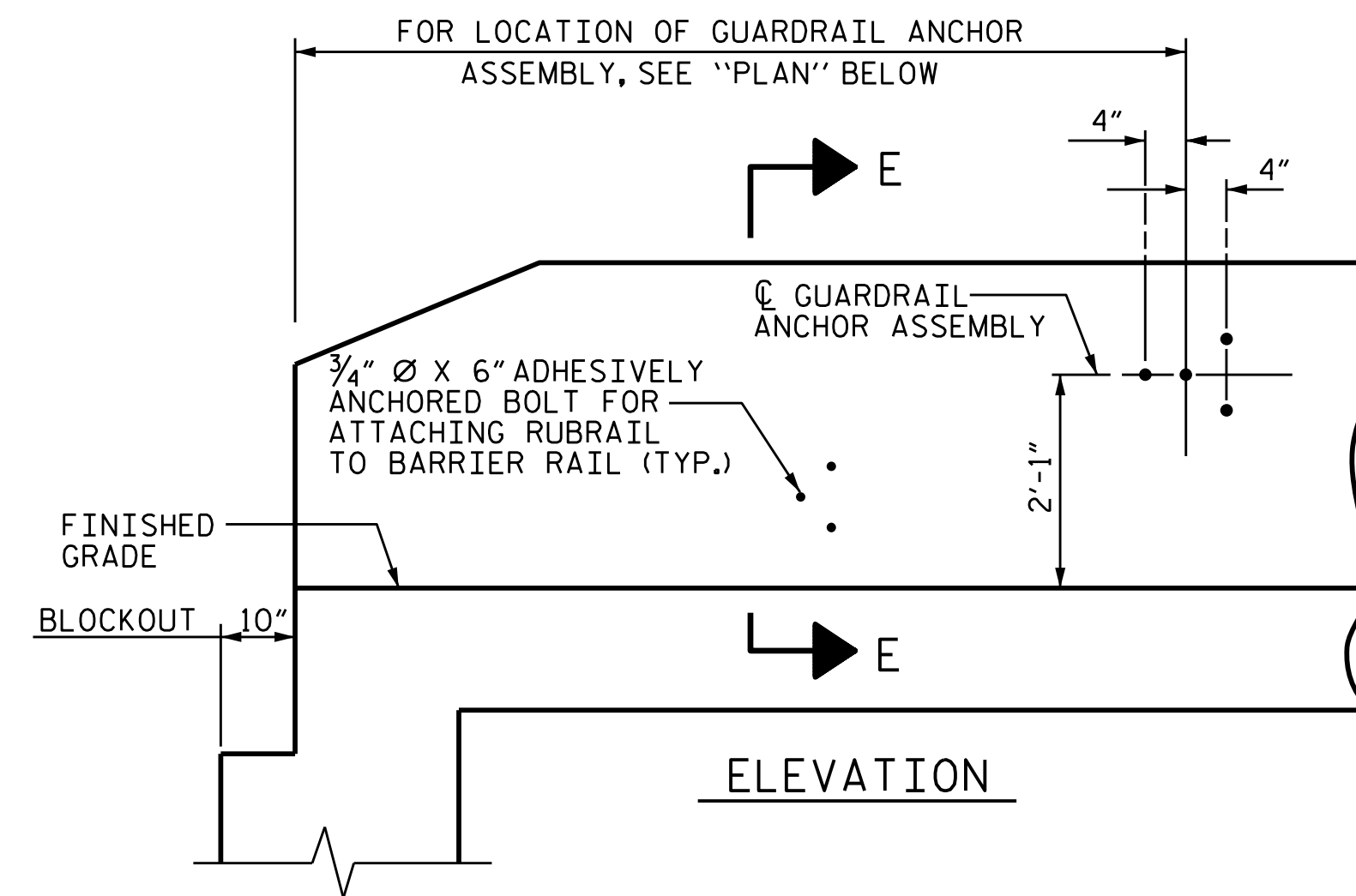


SKETCH SHOWING POINTS OF ATTACHMENTS

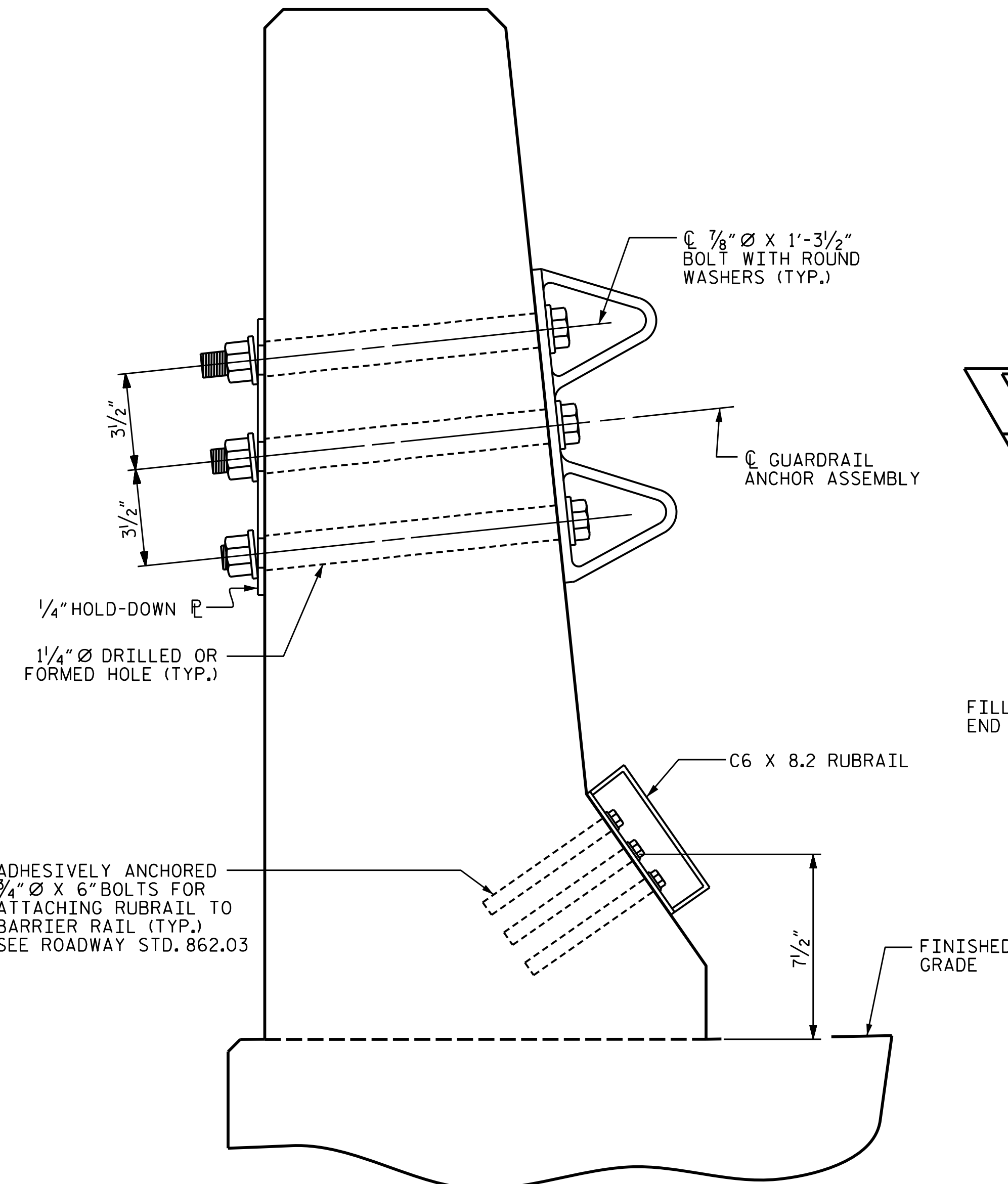
* DENOTES GUARDRAIL ANCHOR ASSEMBLY



PLAN

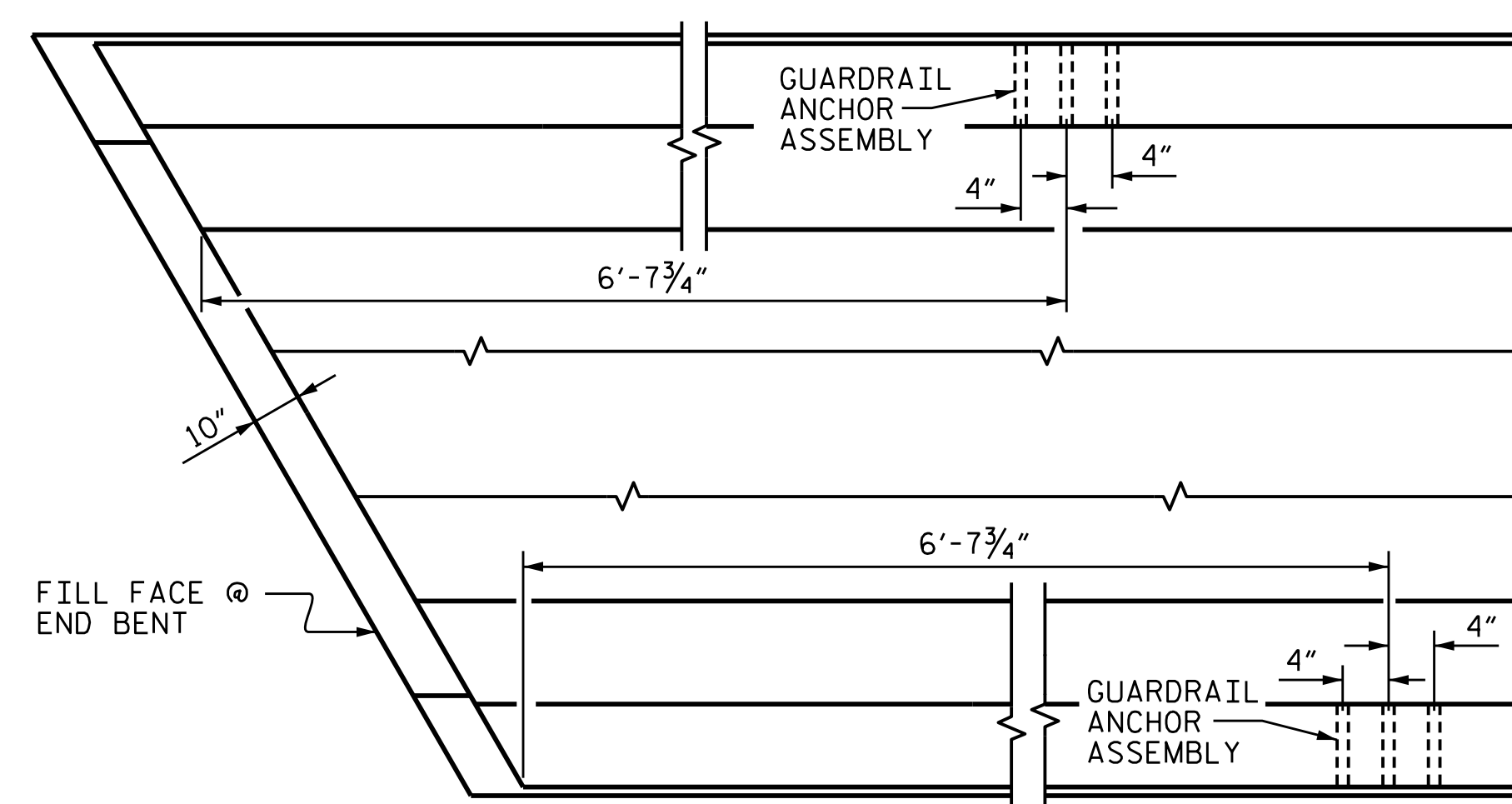


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE
FOR BARRIER RAIL

RIGHT LANE

DocuSigned by:
[Signature]
DB3C8E45B06D48...
8/15/2022
NORTH CAROLINA PROFESSIONAL SEAL 14114
ENGINEER
ROBERT C. LARSON

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S4- 16	
1			3			TOTAL SHEETS	
2			4			29	

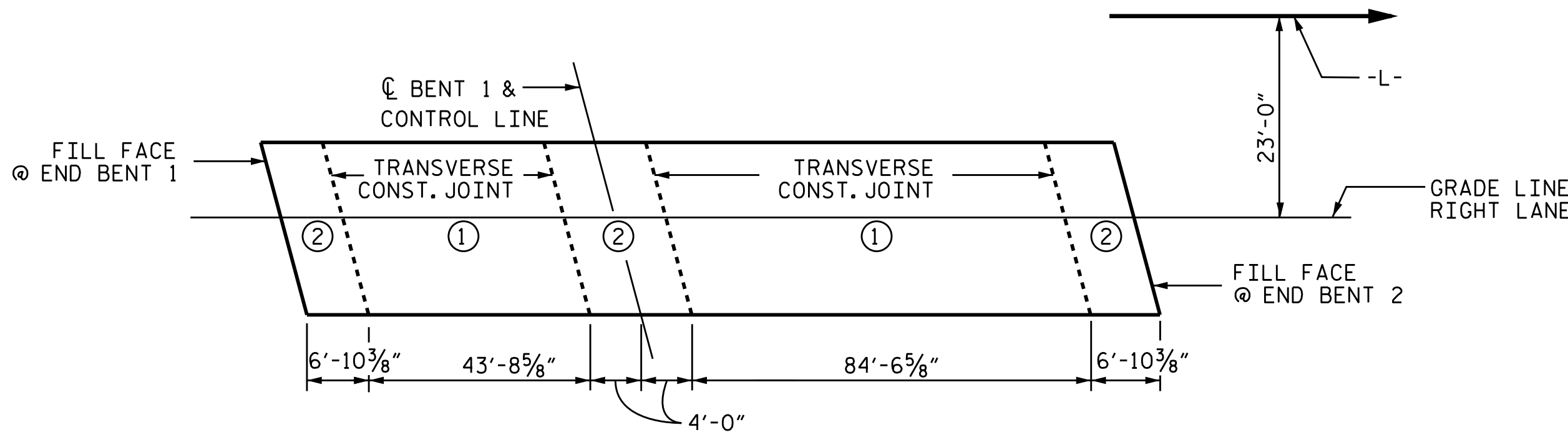
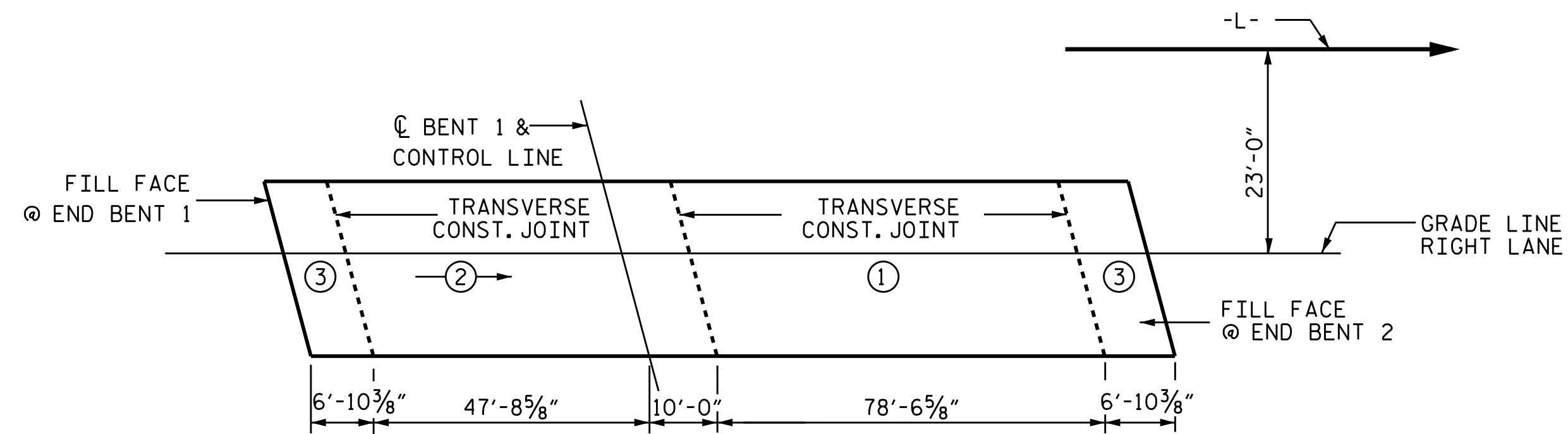
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of North Carolina, P.A.
1505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone 919-783-9241

(SHT 1a) STD. NO. GRA2

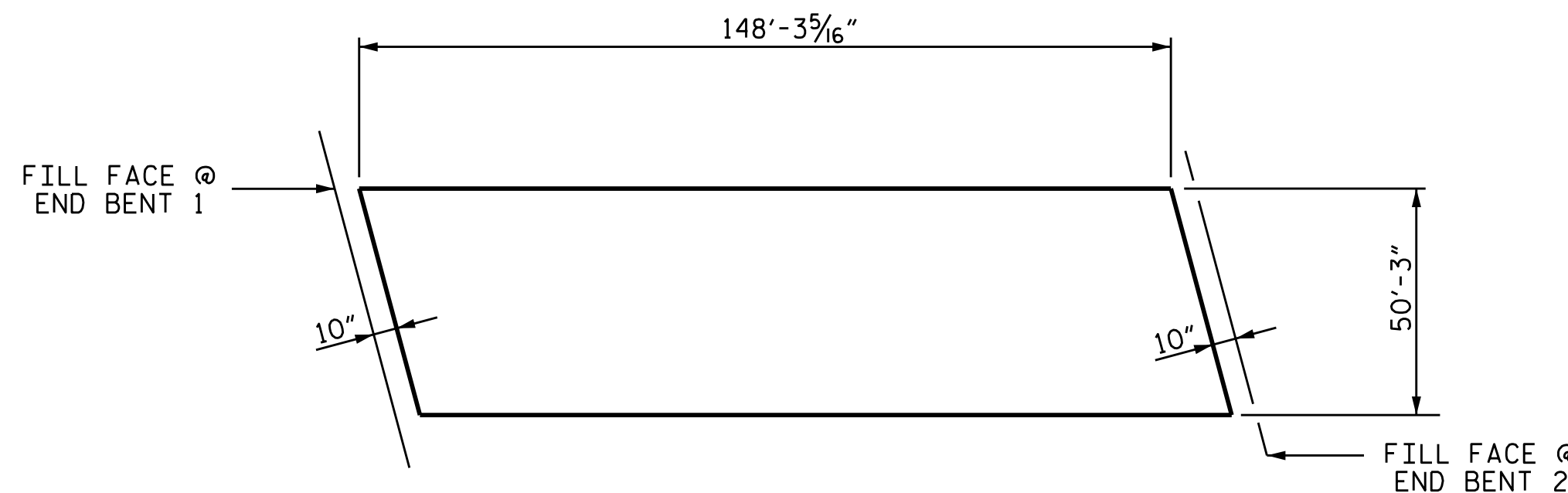
\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTDVYS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04

DESIGN ENGINEER OF RECORD	DATE:	8/15/2022
ASSEMBLED BY: A.K. ALLANK	DATE:	08/20/19
CHECKED BY: R.C. LARSON	DATE:	08/27/19
DRAWN BY: TLA 5/06	REV. 7/12	MAA/GM
CHECKED BY: GM 5/06	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC



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

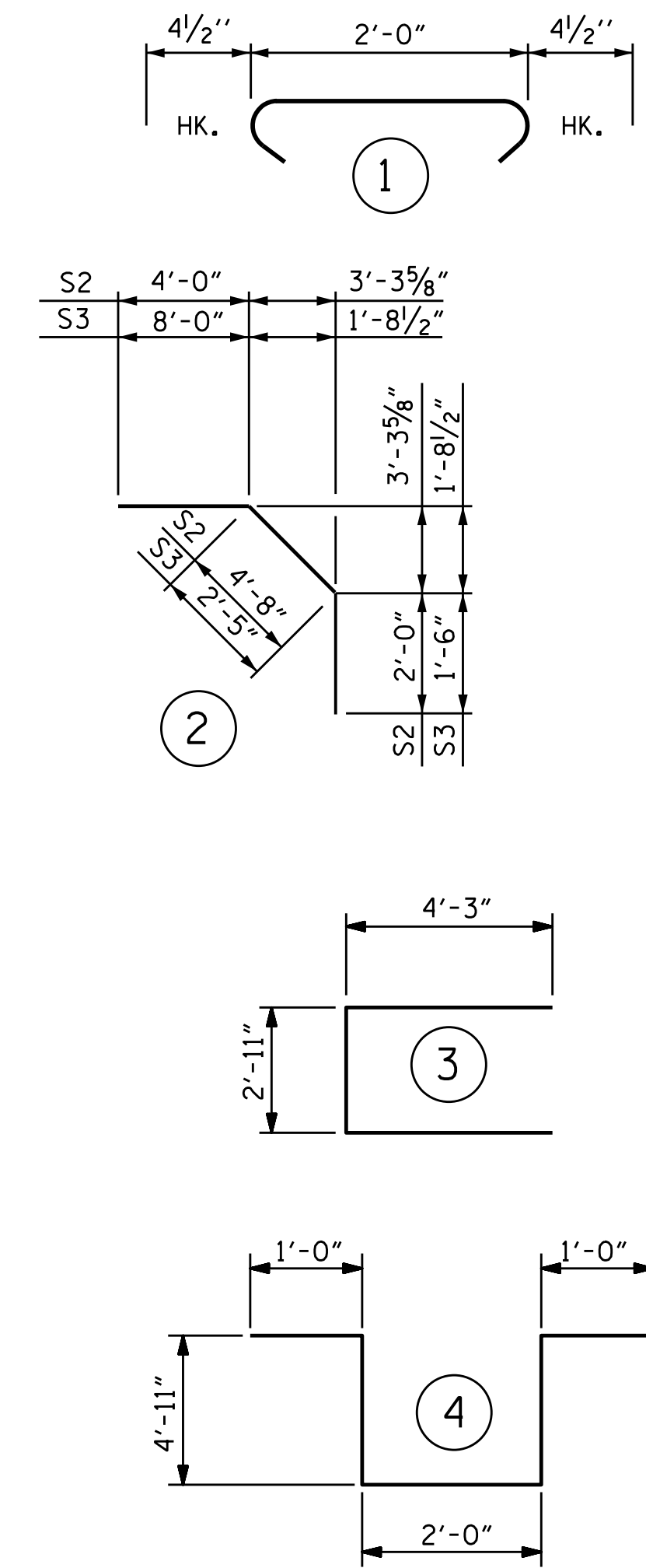
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			



BILL OF MATERIAL

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		
*A1	295	5	STR.	49'-11"	15359	A43	2	5	STR.	25'-7"	53
*A2	2	5	STR.	47'-10"	100	A44	2	5	STR.	23'-11"	50
*A3	2	5	STR.	46'-2"	96	A45	2	5	STR.	22'-2"	46
*A4	2	5	STR.	44'-5"	93	A46	2	5	STR.	20'-6"	43
*A5	2	5	STR.	42'-9"	89	A47	2	5	STR.	18'-9"	39
*A6	2	5	STR.	41'-0"	86	A48	2	5	STR.	17'-1"	36
*A7	2	5	STR.	39'-3"	82	A49	2	5	STR.	15'-4"	32
*A8	2	5	STR.	37'-7"	78	A50	2	5	STR.	13'-8"	29
*A9	2	5	STR.	35'-10"	75	A51	2	5	STR.	11'-11"	25
*A10	2	5	STR.	34'-2"	71	A52	2	5	STR.	10'-3"	21
*A11	2	5	STR.	32'-5"	68	A53	2	5	STR.	8'-6"	18
*A12	2	5	STR.	30'-9"	64	A54	2	5	STR.	6'-9"	14
*A13	2	5	STR.	29'-0"	60	A55	2	5	STR.	5'-1"	11
*A14	2	5	STR.	27'-4"	57	A56	2	5	STR.	3'-4"	7
*A15	2	5	STR.	25'-7"	53						
*A16	2	5	STR.	23'-11"	50	*B1	136	4	STR.	38'-6"	3498
*A17	2	5	STR.	22'-2"	46	B2	192	5	STR.	51'-3"	10263
*A18	2	5	STR.	20'-6"	43	*B3	33	6	STR.	22'-9"	1128
*A19	2	5	STR.	18'-9"	39	*B4	33	6	STR.	55'-1"	2730
*A20	2	5	STR.	17'-1"	36	*B5	33	6	STR.	11'-11"	590
*A21	2	5	STR.	15'-4"	32	*B6	33	6	STR.	10'-11"	541
*A22	2	5	STR.	13'-8"	29	*B7	33	6	STR.	20'-1"	995
*A23	2	5	STR.	11'-11"	25	*B8	33	6	STR.	19'-1"	946
*A24	2	5	STR.	10'-3"	21						
*A25	2	5	STR.	8'-6"	18	K1	20	4	STR.	26'-8"	356
*A26	2	5	STR.	6'-9"	14	K2	8	4	STR.	8'-6"	45
*A27	2	5	STR.	5'-1"	11	K3	32	4	STR.	10'-1"	216
*A28	2	5	STR.	3'-4"	7	K4	16	4	STR.	9'-1"	97
A29	295	5	STR.	49'-11"	15359	K5	4	4	STR.	2'-3"	6
A30	2	5	STR.	47'-10"	100	K6	16	4	STR.	9'-5"	101
A31	2	5	STR.	46'-2"	96	K7	4	4	STR.	2'-7"	7
A32	2	5	STR.	44'-5"	93	K8	8	4	STR.	3'-1"	16
A33	2	5	STR.	42'-9"	89	K9	4	4	STR.	2'-9"	7
A34	2	5	STR.	41'-0"	86	K10	10	4	STR.	24'-0"	160
A35	2	5	STR.	39'-3"	82	K11	8	4	STR.	7'-6"	40
A36	2	5	STR.	37'-7"	78						
A37	2	5	STR.	35'-10"	75	S1	128	4	1	2'-9"	235
A38	2	5	STR.	34'-2"	71	*S2	80	4	2	10'-8"	570
A39	2	5	STR.	32'-5"	68	*S3	84	4	2	11'-11"	669
A40	2	5	STR.	30'-9"	64						
A41	2	5	STR.	29'-0"	60	U1	80	4	3	11'-5"	610
A42	2	5	STR.	27'-4"	57	U2	32	4	4	13'-10"	296

BAR TYPES



—SUPERSTRUCTURE BILL OF MATERIAL—

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	129.9		
POUR 2	112.0		
POUR 3	76.3		
TOTALS**	318.2	29,237	28,469

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. R-256ICA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

GROOVING BRIDGE FLOORS

APPROACH SLABS	2154	SO.FT.
BRIDGE DECK	6524	SO.FT.
TOTAL	8678	SO.FT.

DocuSigned by:
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 14114
ROBERT C. LARSON
8/15/2022

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

DESIGN ENGINEER OF RECORD: DATE: 8/15/2022
DRAWN BY: A. K. ALLANKI DATE: 08/14/19
CHECKED BY: R. C. LARSON DATE: 06/29/20

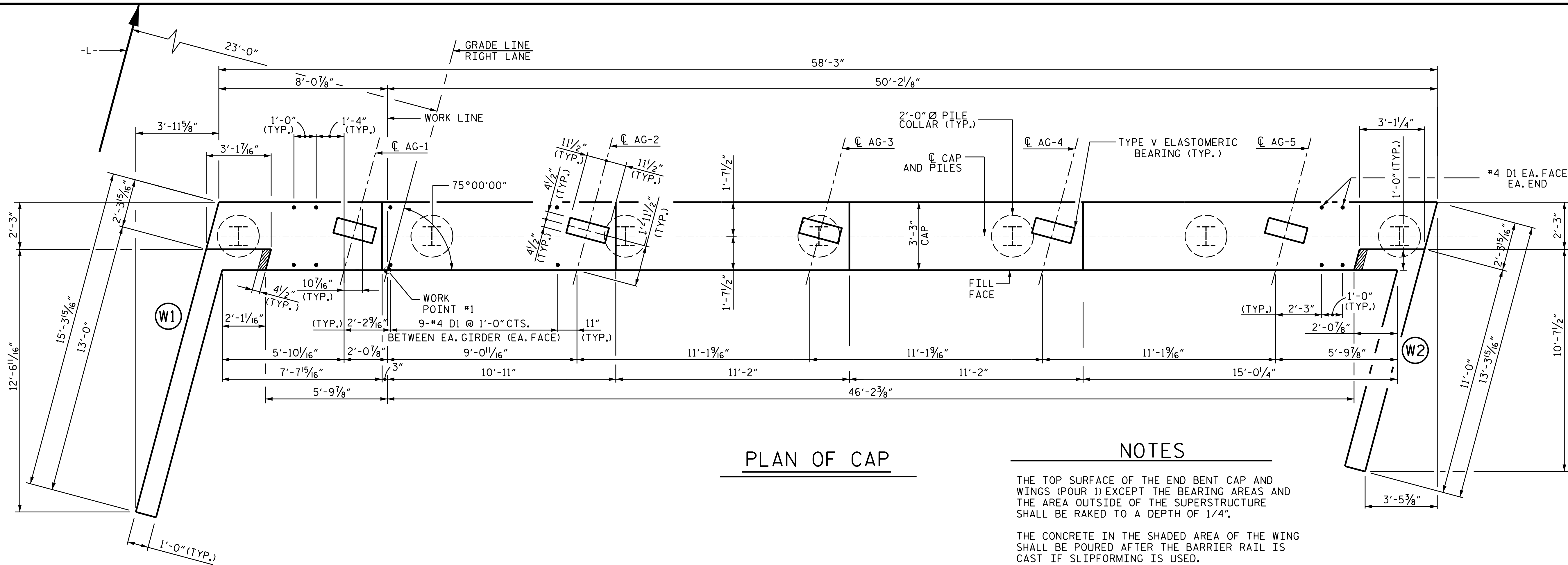
DOCUMENT NOT CONSIDERED FINAL
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KCI Associates
of North Carolina, P.A.
2505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5244

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

SHEET NO. S4-17
TOTAL SHEETS 29

\$FILEL\$ \$DATE\$ \$TIME\$ \$USER\$ \$PENTBL\$ \$PLTDV\$ \$KCI PROJECT NO. 241704391.04



PLAN OF CAP

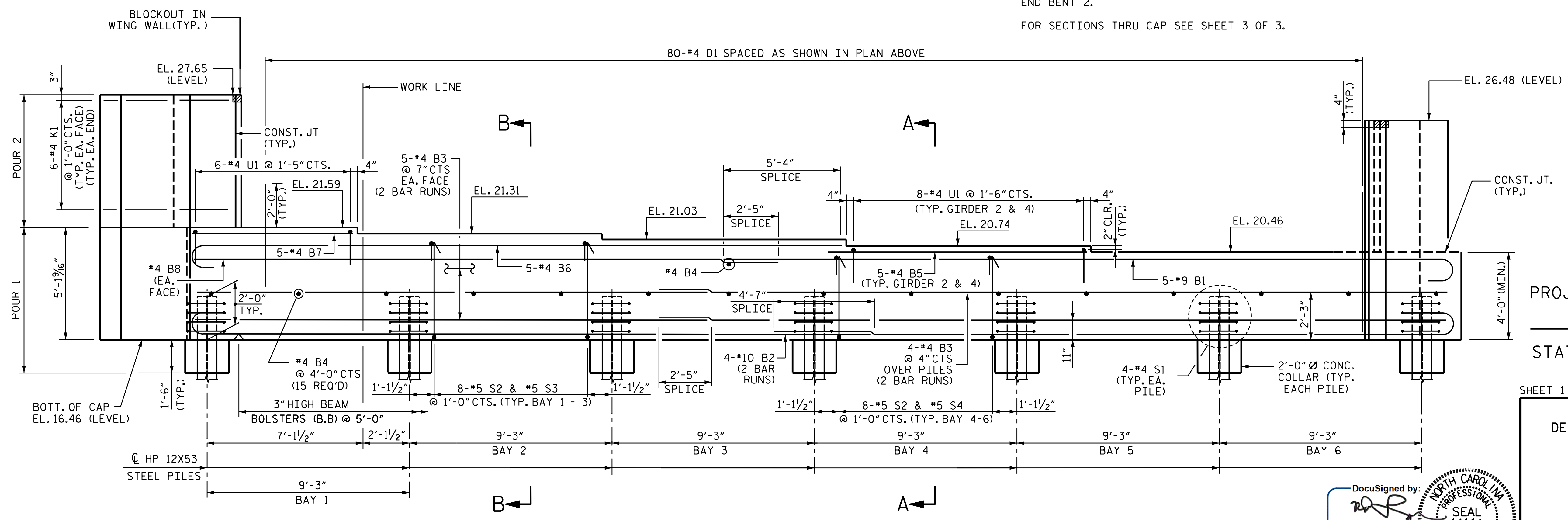
NOTES

THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1) EXCEPT THE BEARING AREAS AND THE AREA OUTSIDE OF THE SUPERSTRUCTURE SHALL BE RAKED TO A DEPTH OF 1/4".

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIPFORMING IS USED.

FOR "TEMPORARY DRAINAGE AT END BENT", SEE END BENT 2.

FOR SECTIONS THRU CAP SEE SHEET 3 OF 3.



ELEVATION

PROJECT NO. R-256ICA
 COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 1**

RIGHT LANE

DocuSigned by:

 DB3C8E45B06D800
 8/15/2022

DESIGN ENGINEER OF RECORD	DATE: 8/15/2022
DRAWN BY: A. K. ALLANKI	DATE: 08/04/20
CHECKED BY: R. C. LARSON	DATE: 08/12/20

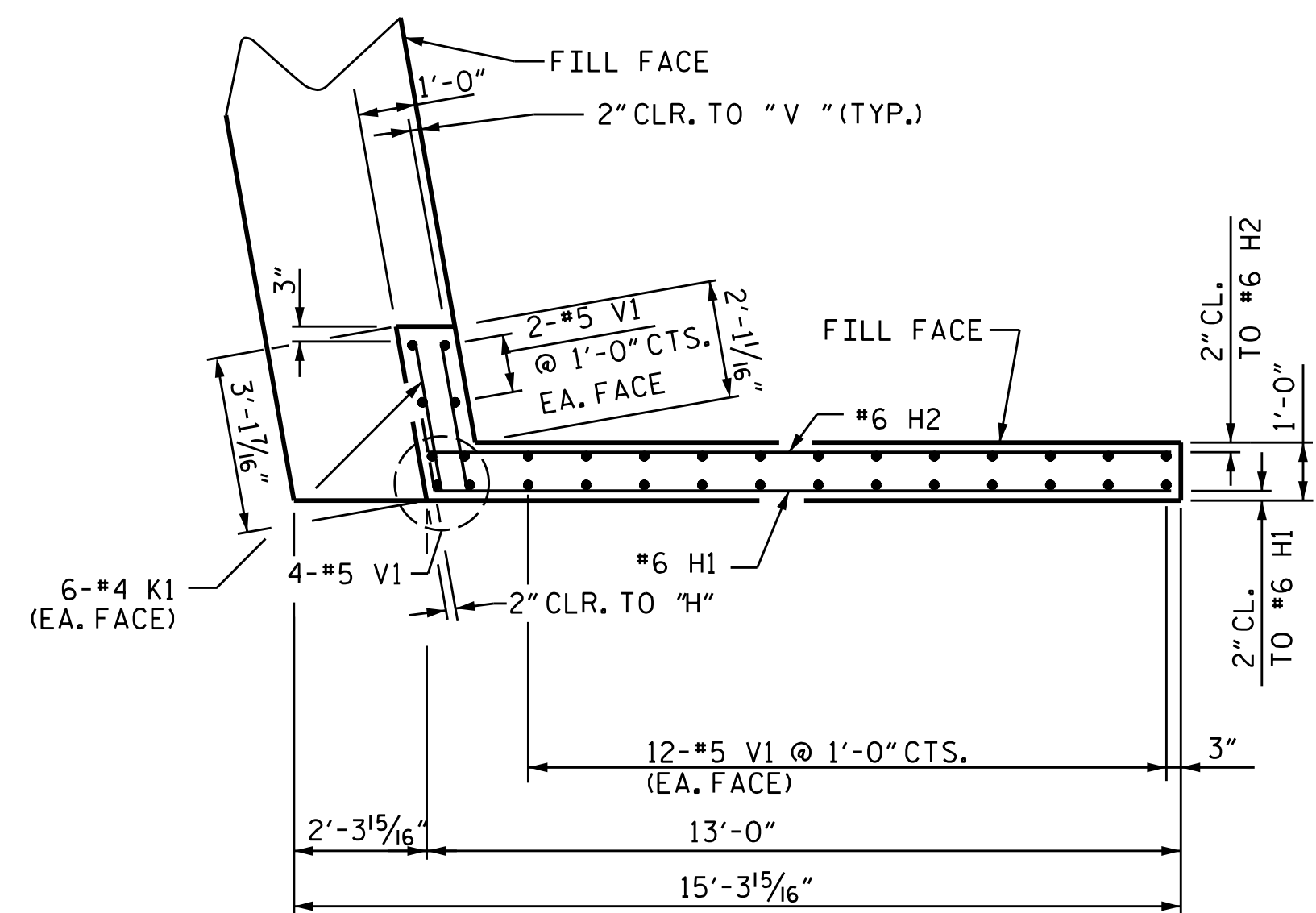
**DOCUMENT NOT CONSIDERED FINAL
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KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

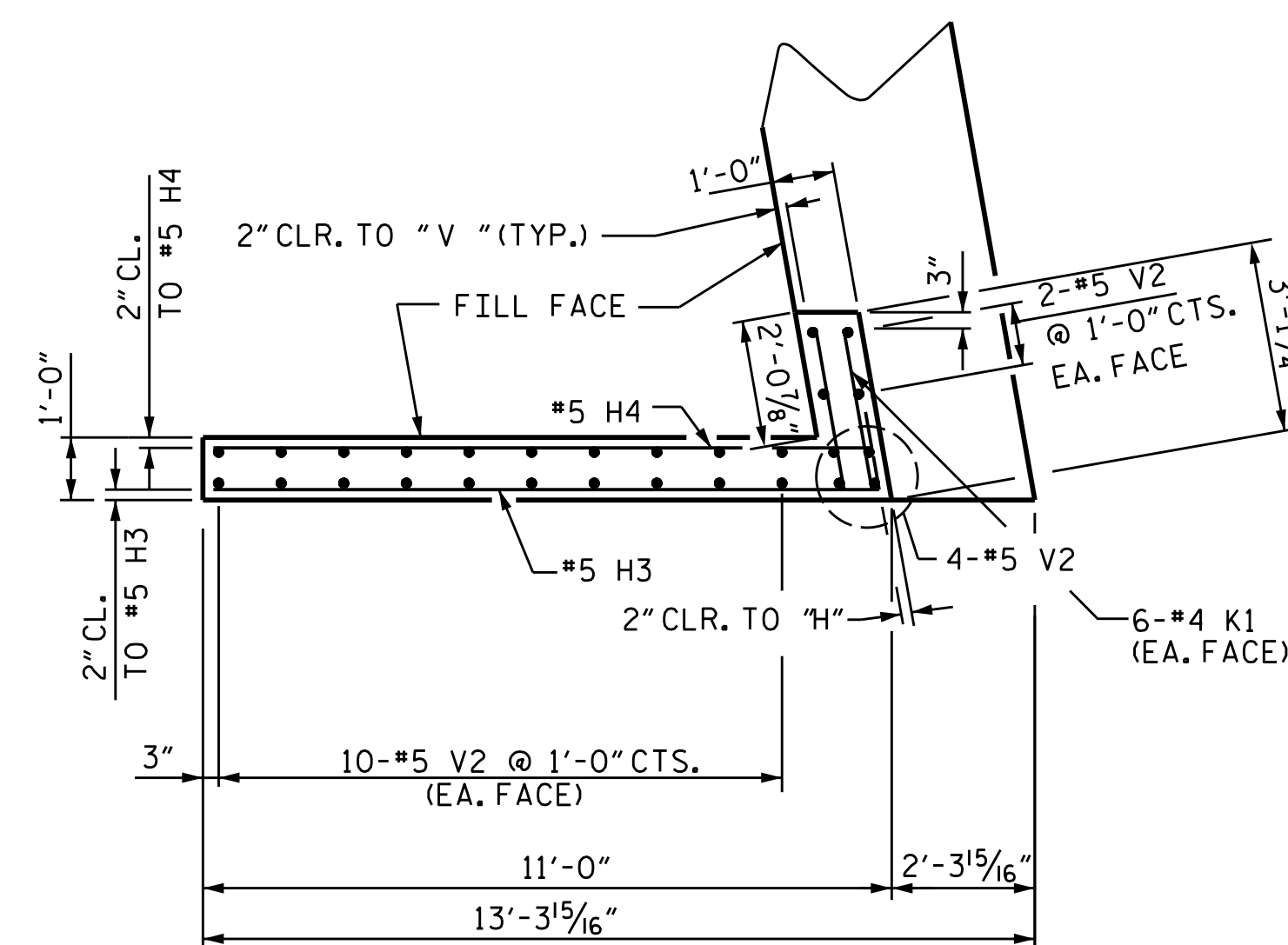
REVISIONS		SHEET NO.	
NO.	DATE	NO.	DATE
1		3	
2		4	

TOTAL SHEETS: 29

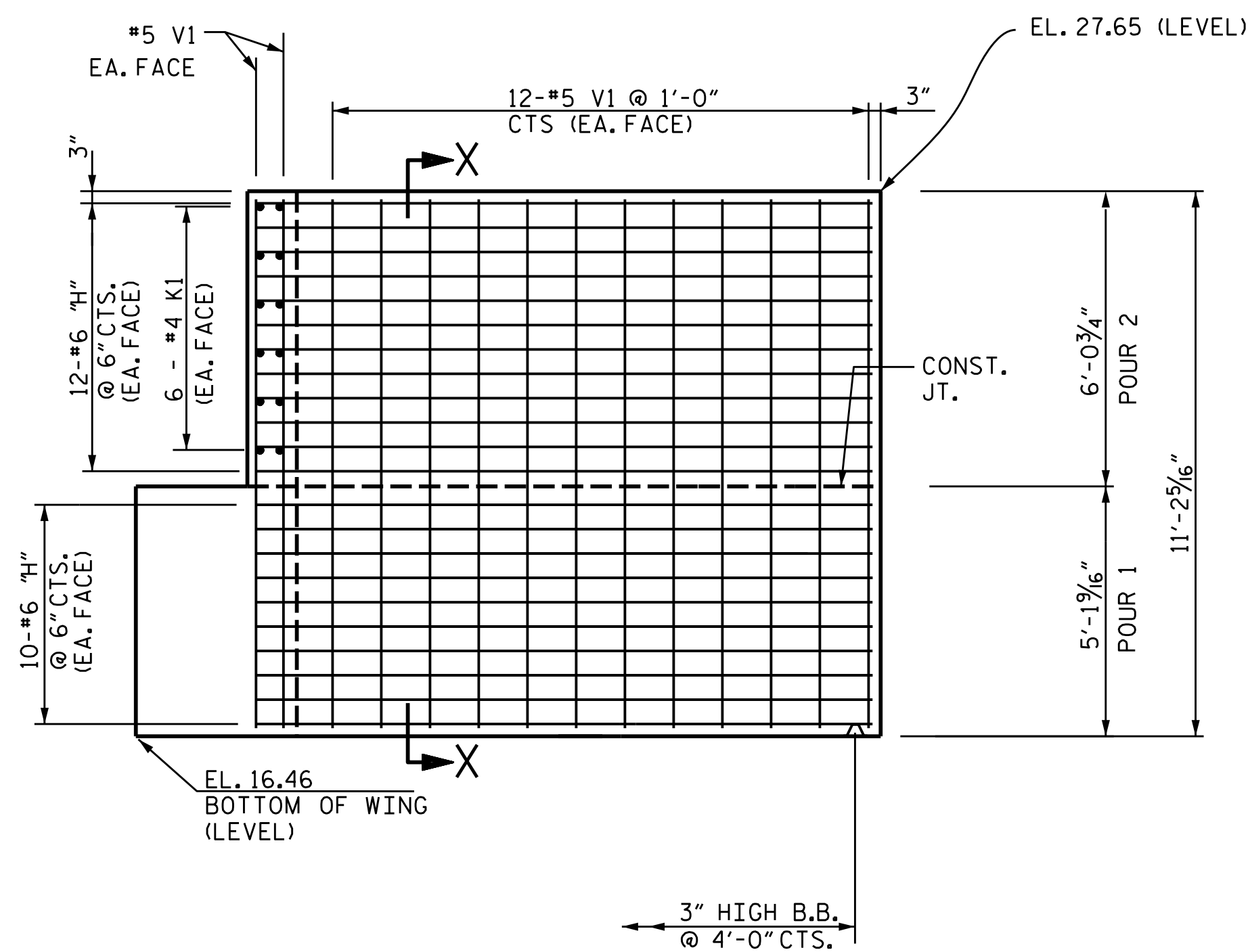
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 KCI PROJECT NO. 241704391.04



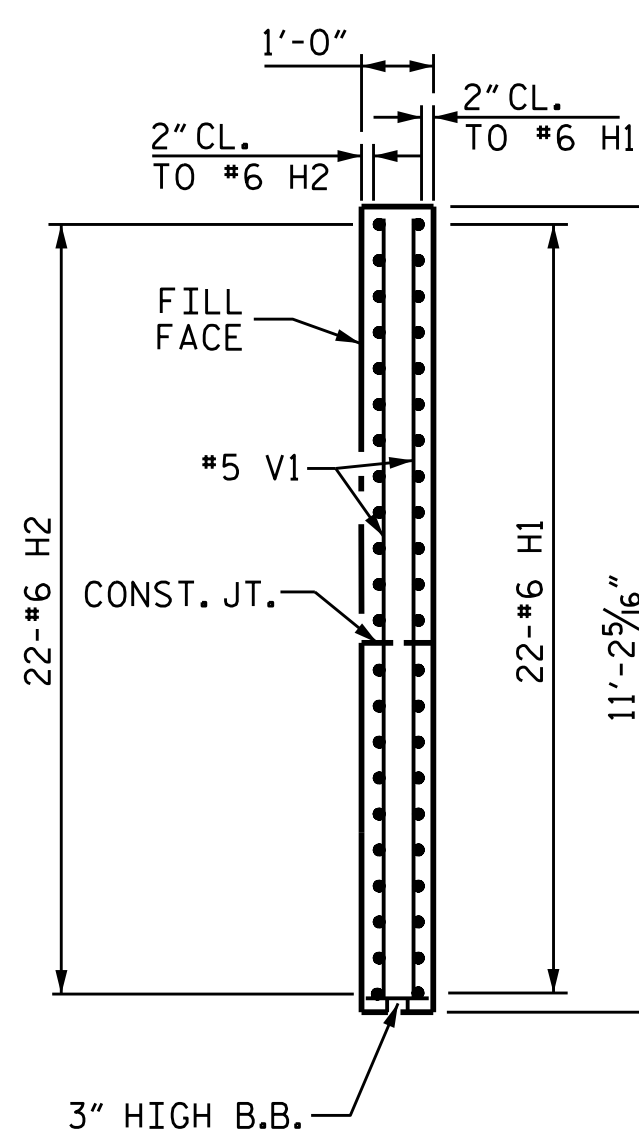
PLAN W1



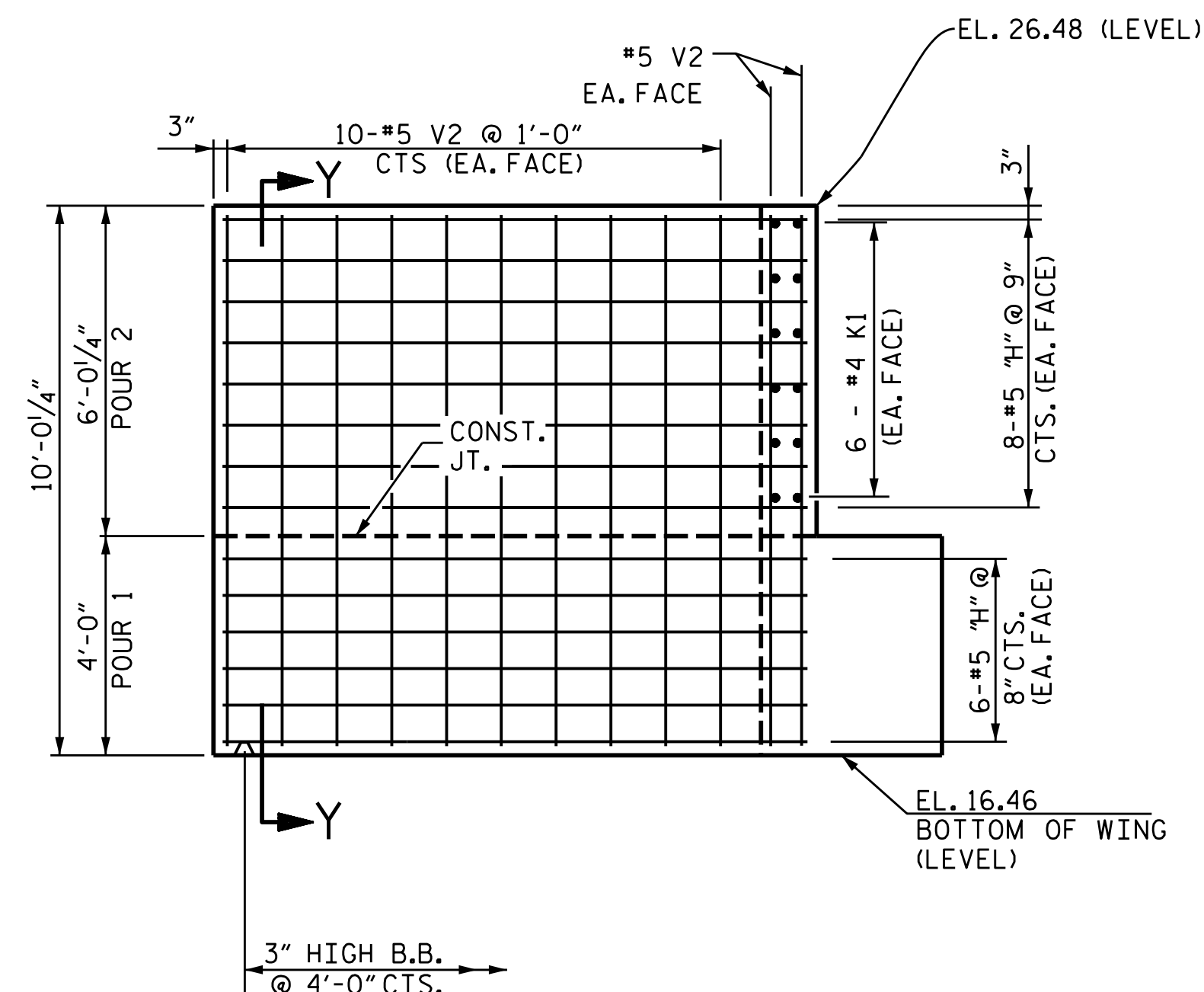
PLAN W2



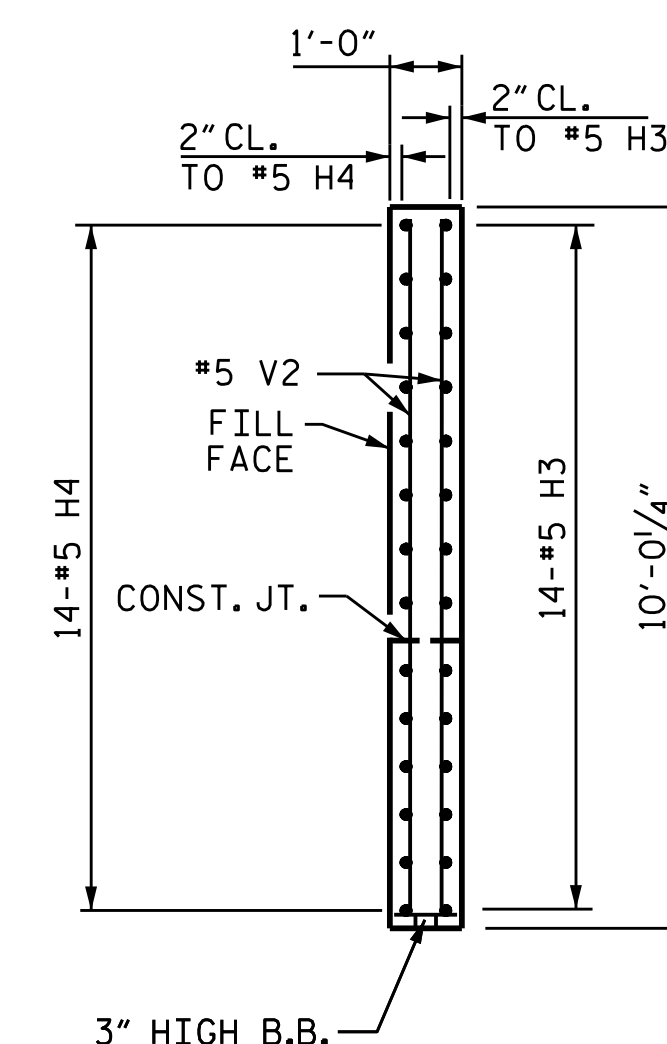
ELEVATION W1



SECTION X-X



ELEVATION W2



SECTION Y-Y

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1

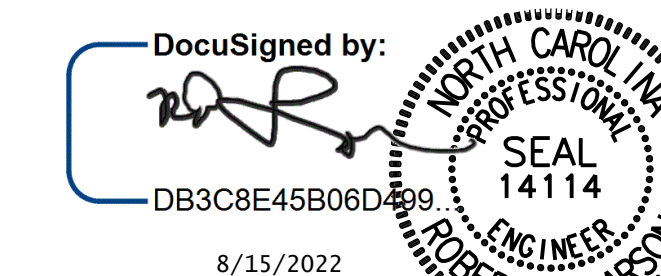
RIGHT LANE

REVISIONS

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

SHEET NO.
 S4- 19
 TOTAL SHEETS
 29

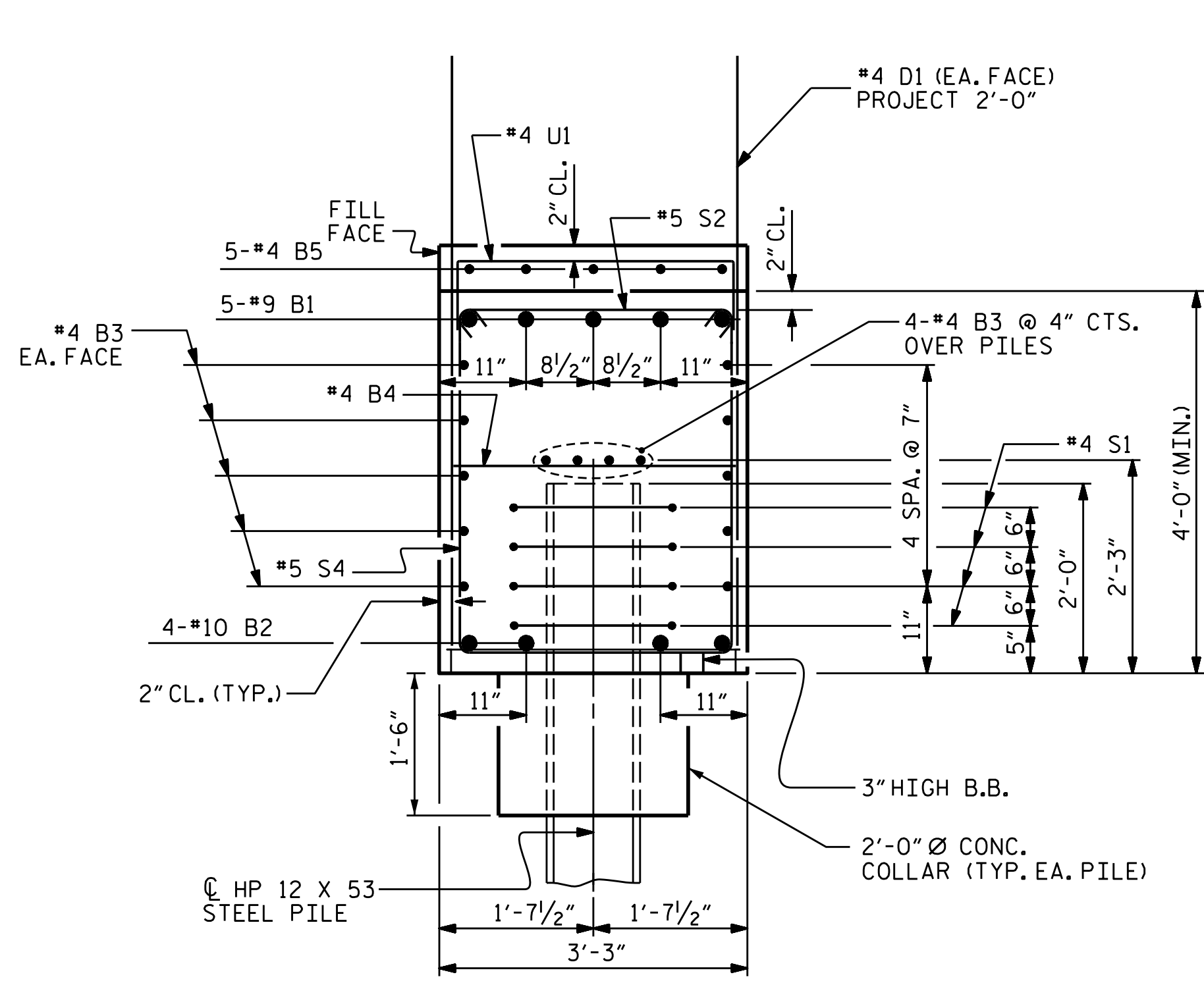
DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 08/06/20
 CHECKED BY: R. C. LARSON DATE: 08/14/20



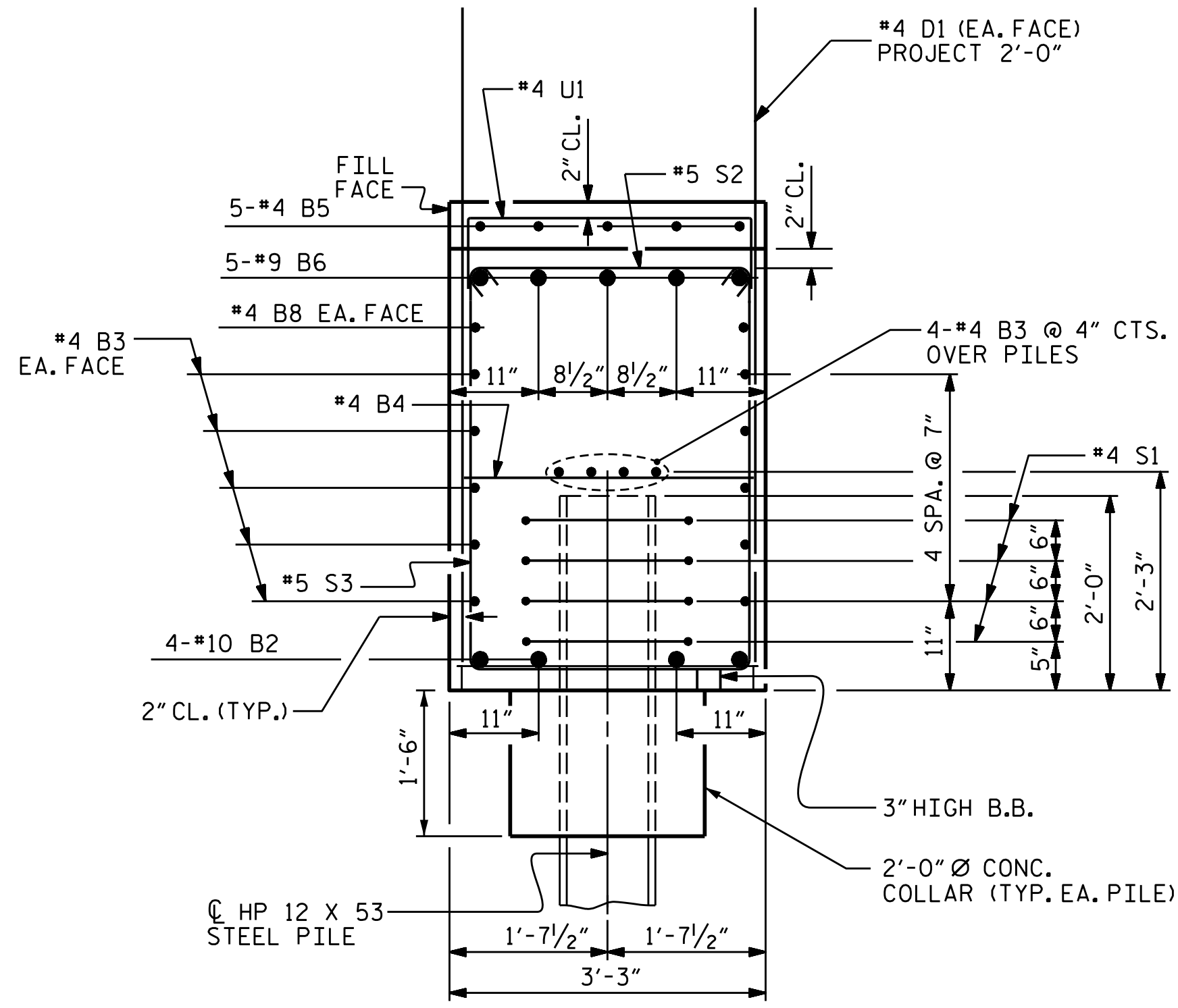
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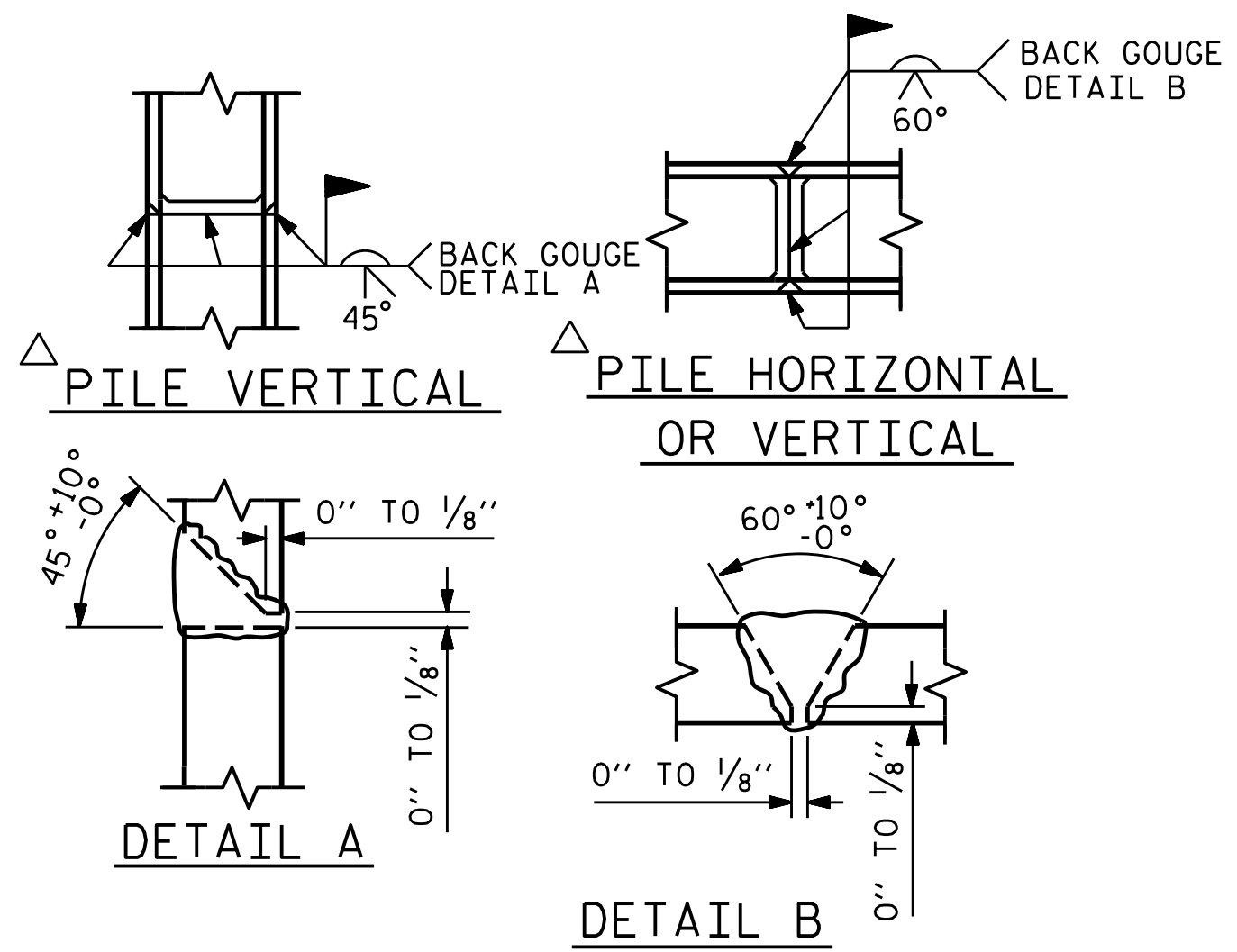
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 KCI PROJECT NO. 241704391.04



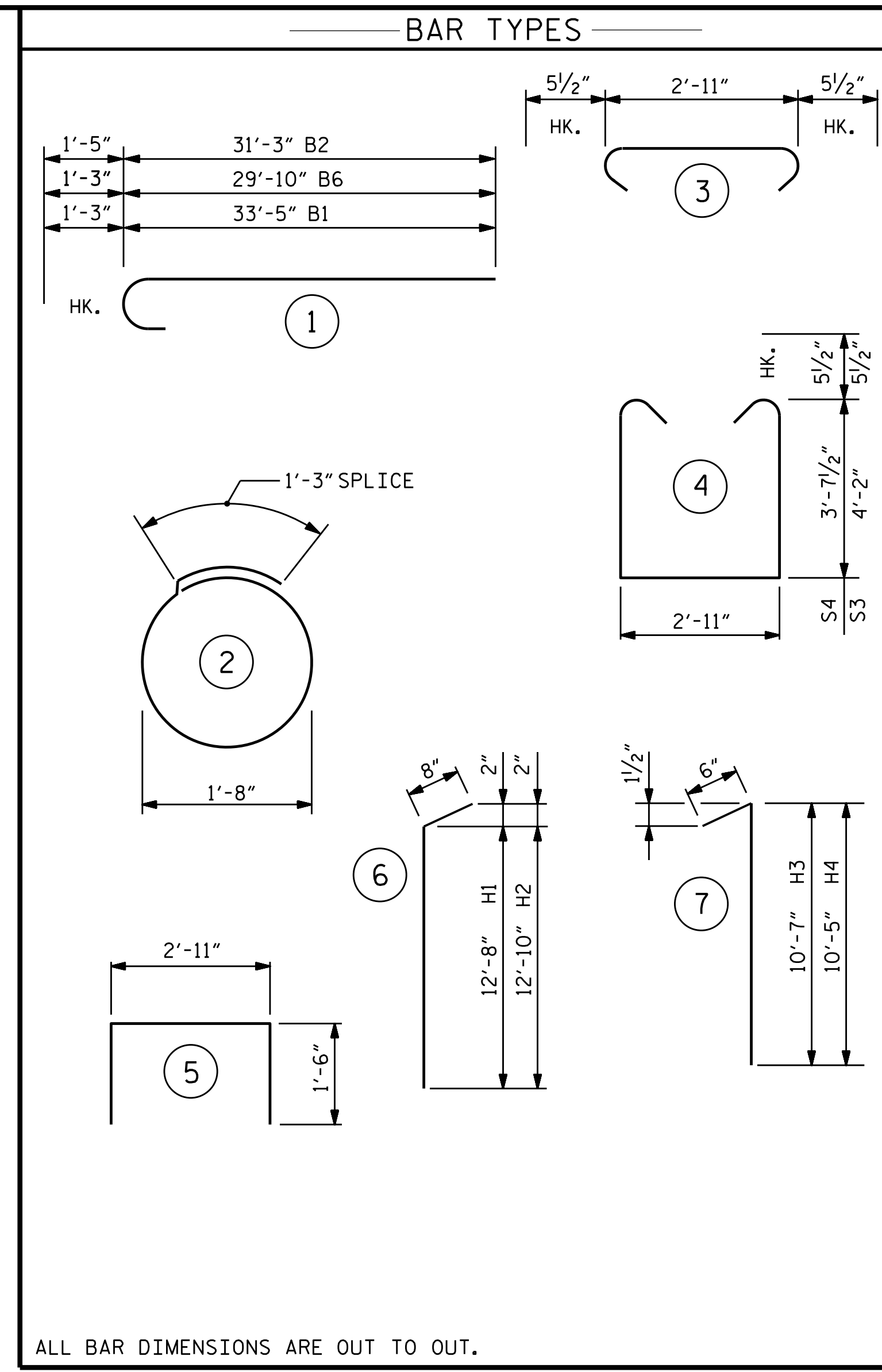
SECTION A-A



SECTION B-B



△ POSITION OF PILE DURING WELDING.
PILE SPLICE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	9	1	34'-8"	589
B2	8	10	1	32'-8"	1125
B3	28	4	STR.	30'-2"	564
B4	16	4	STR.	2'-11"	31
B5	10	4	STR.	12'-0"	80
B6	5	9	1	31'-1"	528
B7	5	4	STR.	7'-5"	25
B8	2	4	STR.	26'-11"	36
D1	80	4	STR.	5'-10"	312
H1	22	6	6	13'-4"	441
H2	22	6	6	13'-6"	446
H3	14	5	7	11'-1"	162
H4	14	5	7	10'-11"	159
K1	24	4	STR.	2'-9"	44
S1	28	4	2	6'-6"	122
S2	48	5	3	3'-10"	192
S3	24	5	4	12'-2"	305
S4	24	5	4	11'-1"	277
U1	22	4	5	5'-11"	87
V1	32	5	STR.	10'-10"	362
V2	28	5	STR.	9'-8"	282
REINFORCING STEEL, LBS.					6169
CLASS A CONCRETE, CY					
POUR 1 (CAP, LOWER PORTION OF WINGS AND COLLARS)					36.4
POUR 2 (UPPER PORTION OF WINGS)					6.3
TOTAL					42.7
HP 12X53 STEEL PILES					NO. 7
					L.F. 420
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES, EA.					7
PILE REDRIVES, EA.					4

PROJECT NO. R-256ICA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

SHEET 3 OF 3
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 1
RIGHT LANE

DocuSigned by:
ROBERT C. LARSON
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 14114
DB3C8E45B06D49B
8/15/2022

DESIGN ENGINEER OF RECORD: DATE: 8/15/2022
DRAWN BY: A. K. ALLANKI DATE: 08/13/20
CHECKED BY: R. C. LARSON DATE: 08/14/20

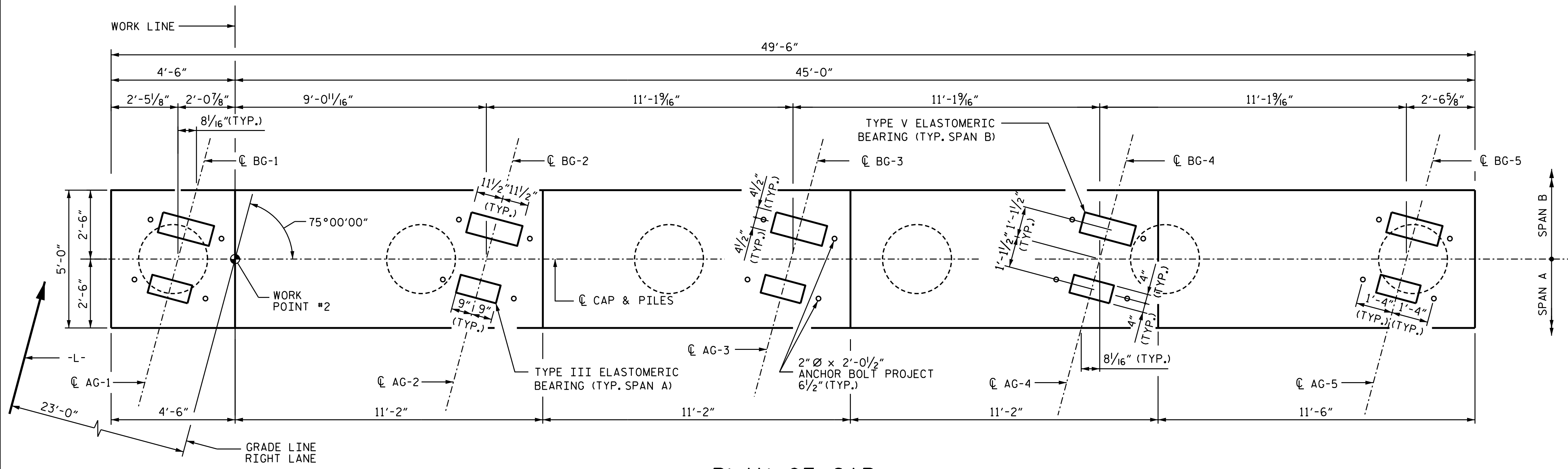
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KCI Associates
of North Carolina, P.A.
2505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

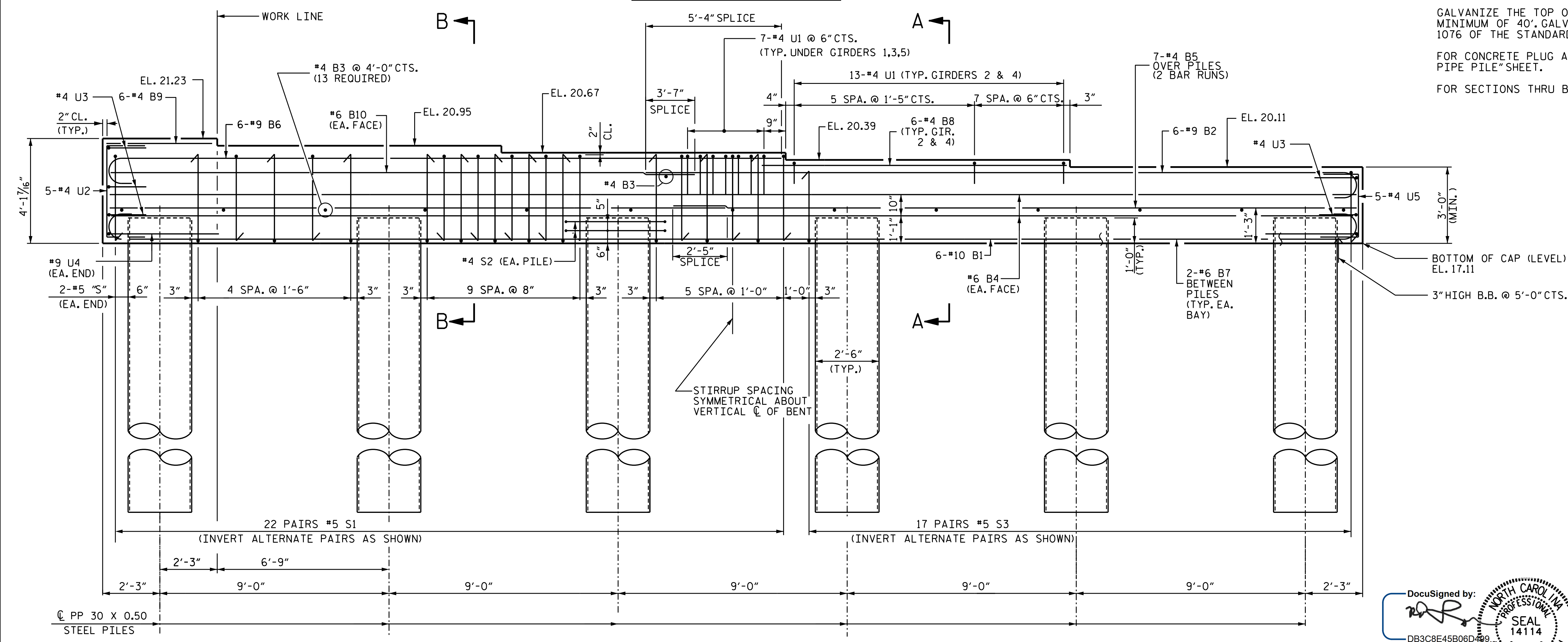
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SHEET NO. S4-20
TOTAL SHEETS 29

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PENTBLS\$ \$PLTDVRS\$ \$PROJECT NO. 241704391.04



PLAN OF CAP



ELEVATION

NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 40'. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.
- FOR CONCRETE PLUG AND REINFORCING IN PILES SEE "30" STEEL PIPE PILE" SHEET.
- FOR SECTIONS THRU BENT CAP SEE SHEET 2 OF 2

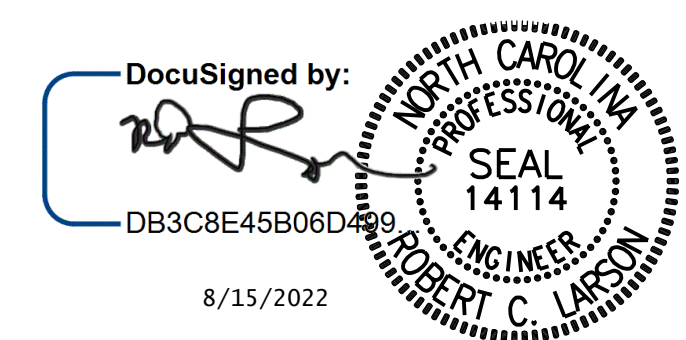
PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE BENT 1

RIGHT LANE



DESIGN ENGINEER OF RECORD:	DATE:
<i>(Signature)</i>	8/15/2022
DRAWN BY:	DATE:
A. K. ALLANKI	07/14/20
CHECKED BY:	DATE:
R. C. LARSON	07/17/20

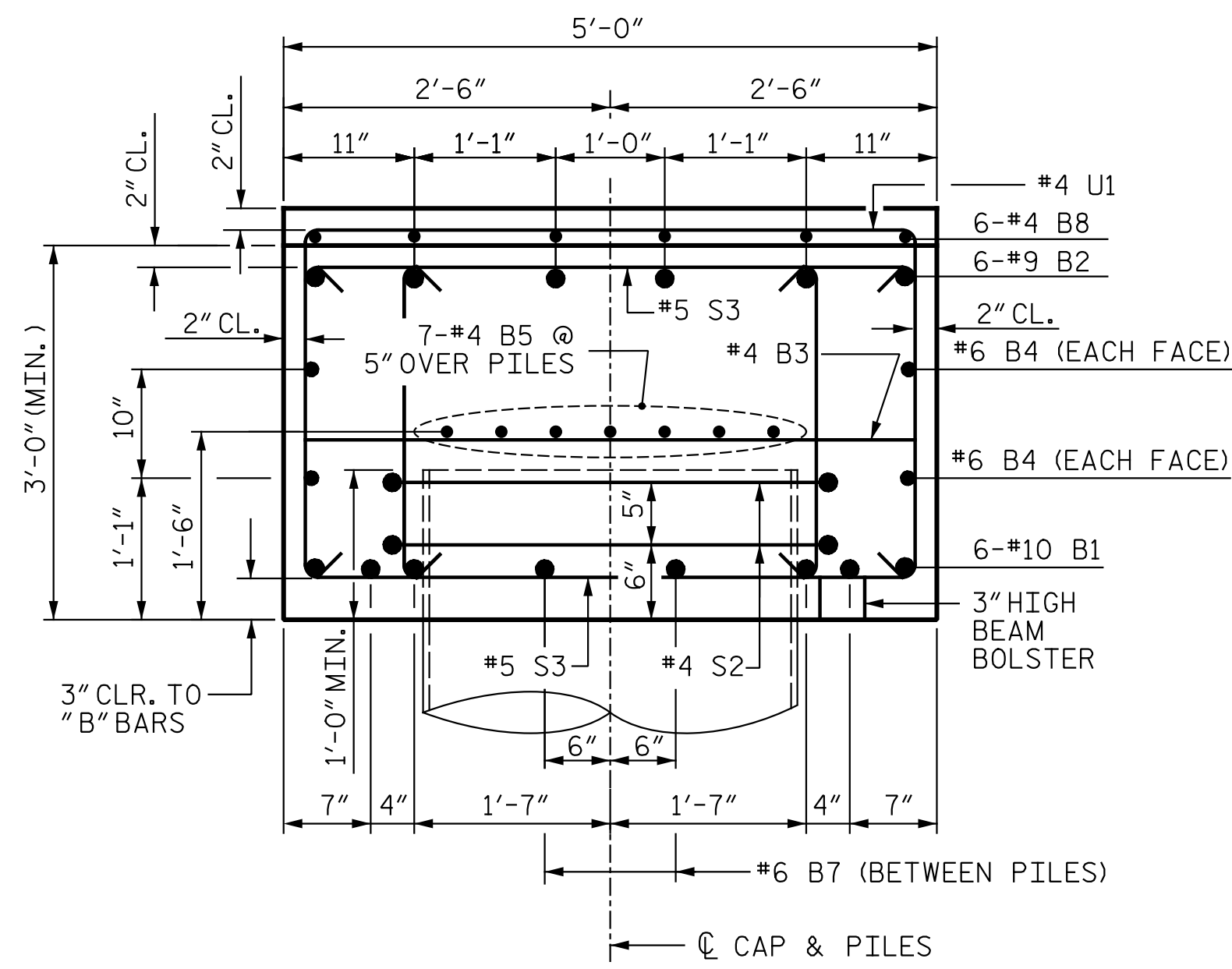
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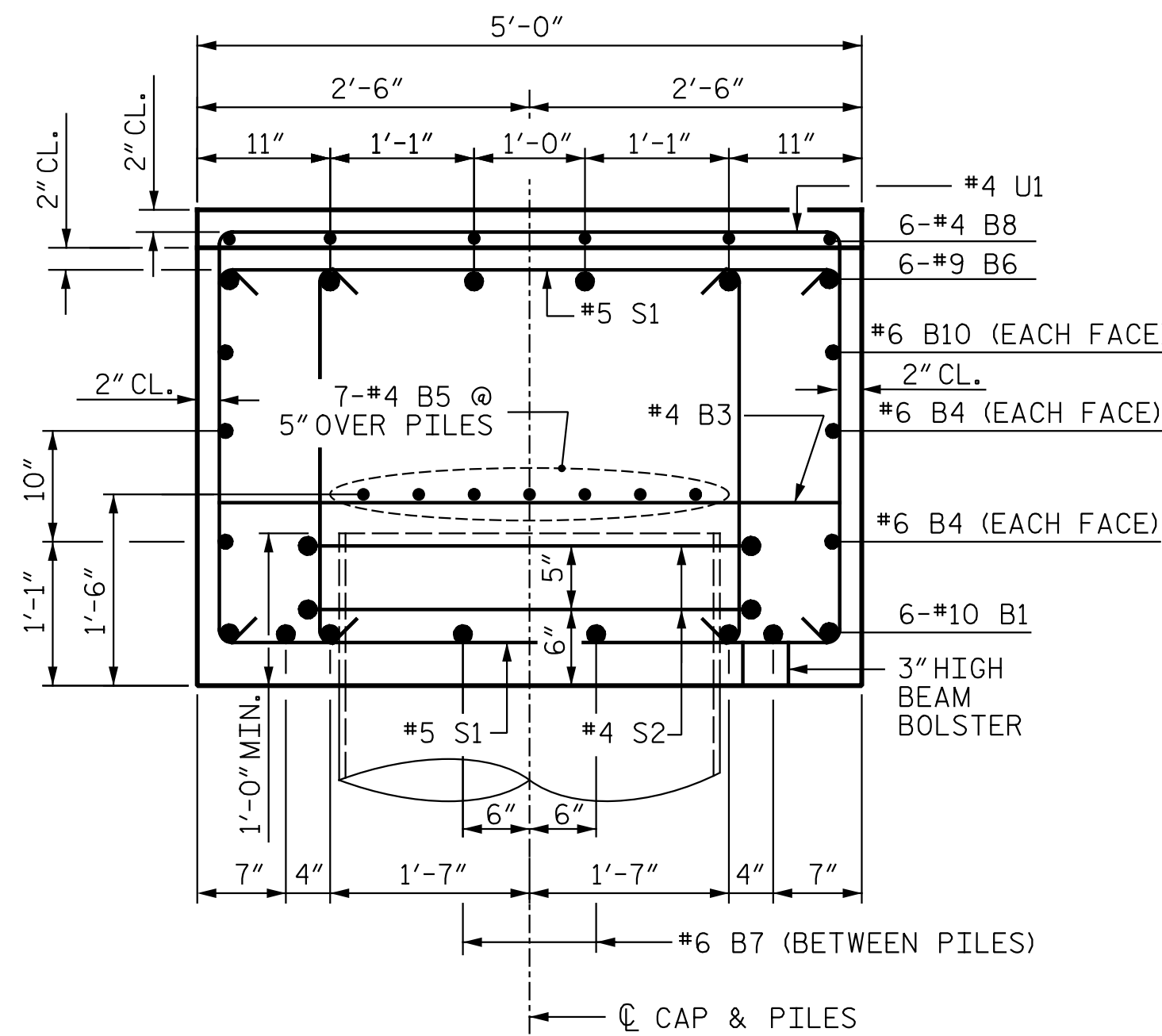
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NO.	DATE:	NO.	DATE:
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TOTAL SHEETS: 29

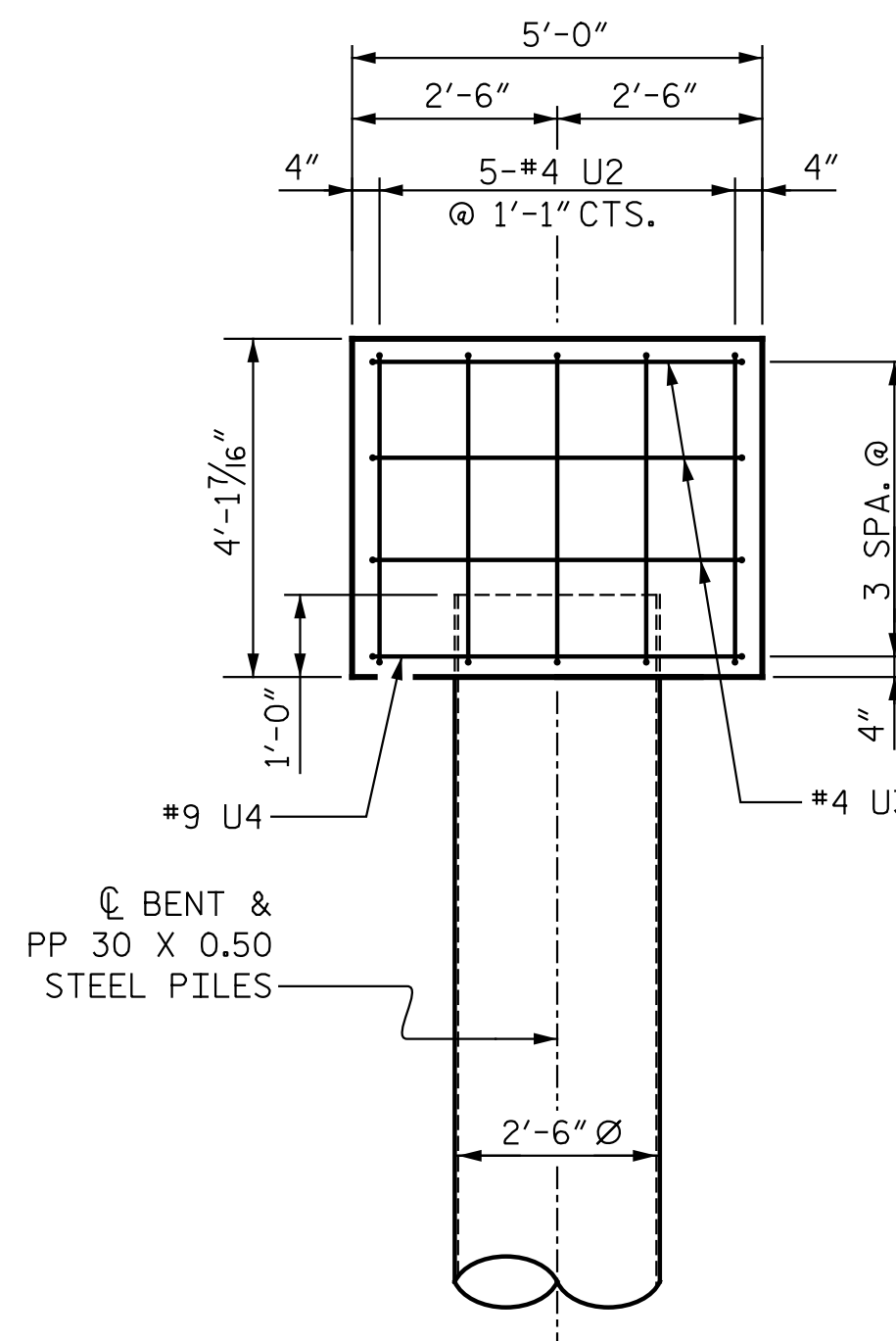
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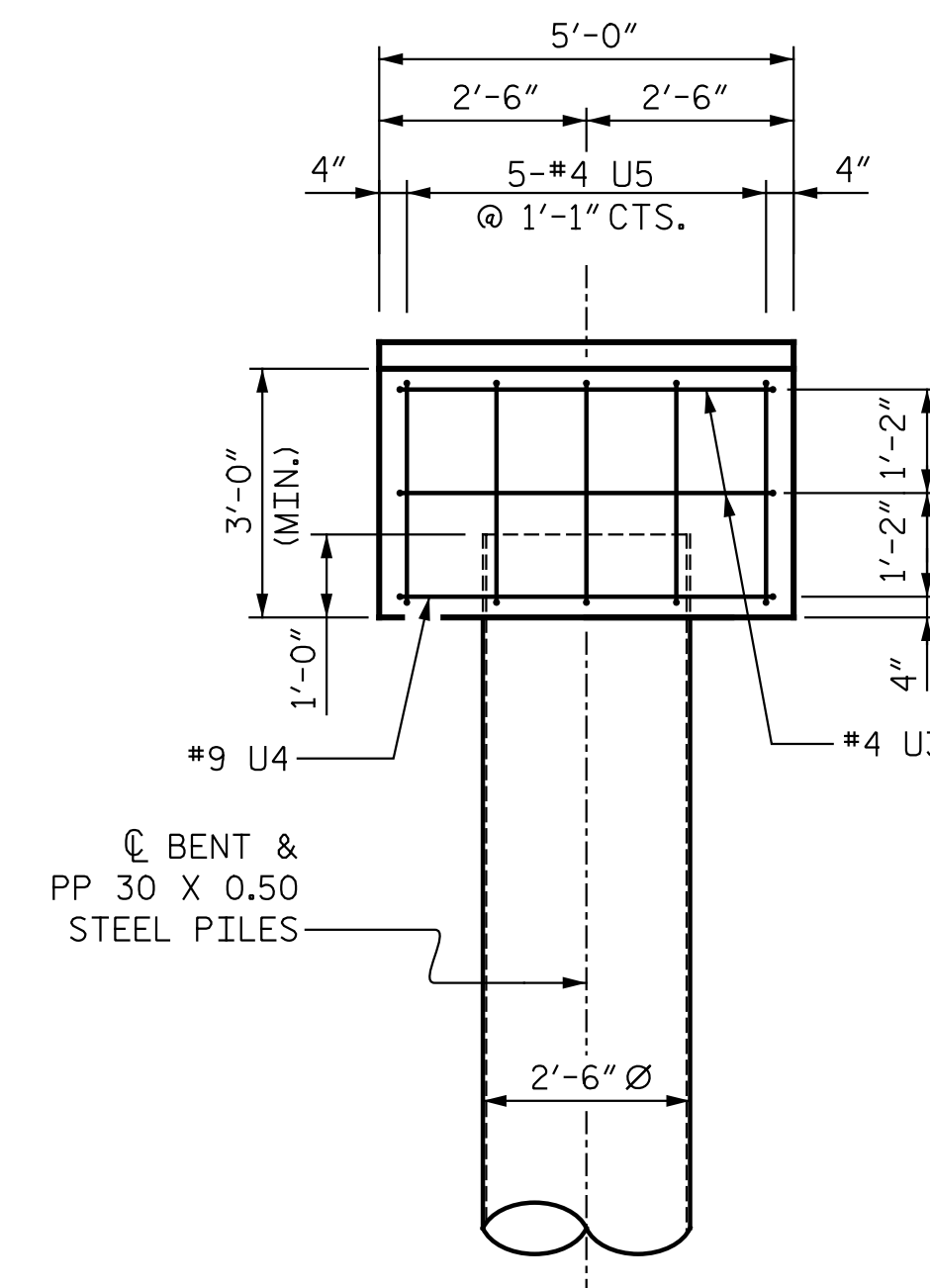
SECTION A-A



SECTION B-B

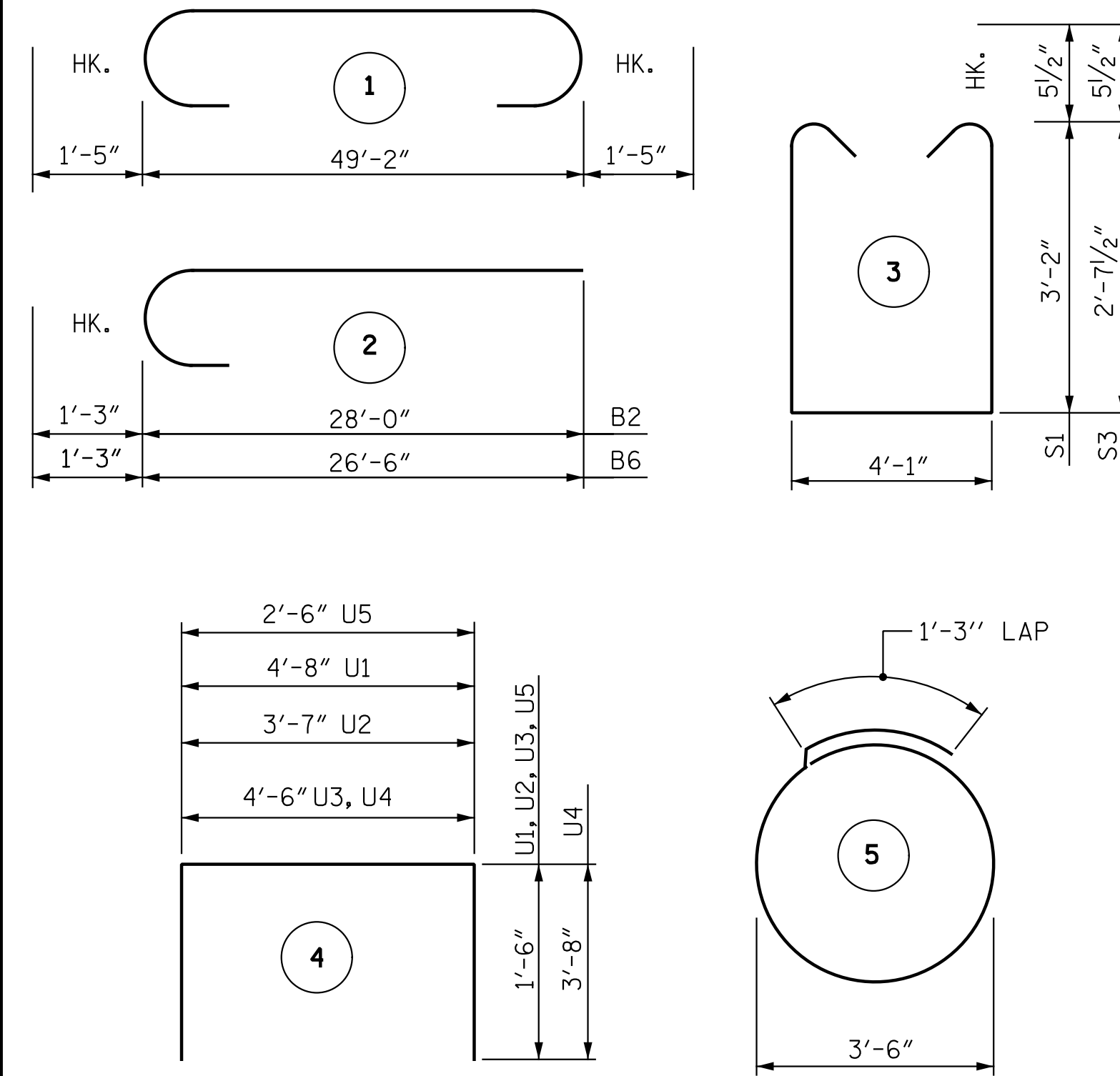


LEFT END ELEVATION



RIGHT END ELEVATION

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	10	1	52'-0"	1343
B2	6	9	2	29'-3"	597
B3	14	4	STR.	4'-8"	44
B4	4	6	STR.	49'-2"	295
B5	14	4	STR.	25'-10"	242
B6	6	9	2	27'-9"	566
B7	10	6	STR.	6'-2"	93
B8	12	4	STR.	12'-0"	96
B9	6	4	STR.	4'-2"	17
B10	2	6	STR.	24'-9"	74
S1	44	5	3	11'-4"	520
S2	12	4	5	12'-3"	98
S3	34	5	3	10'-3"	363
U1	47	4	4	7'-8"	241
U2	5	4	4	6'-7"	22
U3	5	4	4	7'-6"	25
U4	2	9	4	11'-10"	80
U5	5	4	4	5'-6"	18

REINFORCING STEEL, LBS.	4734
CLASS A CONCRETE, CU. YD.	30.8
PP 30 X 0.50 GALVANIZED STEEL PILES	
NO.	6
LIN. FT.	480
PILE DRIVING EQUIPMENT SETUP FOR PP 30 X 0.50 GALVANIZED STEEL PILES, EA.	6
PILE REDRIVES, EA.	3

(NOTE: PILE HEADS HAVE BEEN DEDUCTED FROM CLASS A CONCRETE)

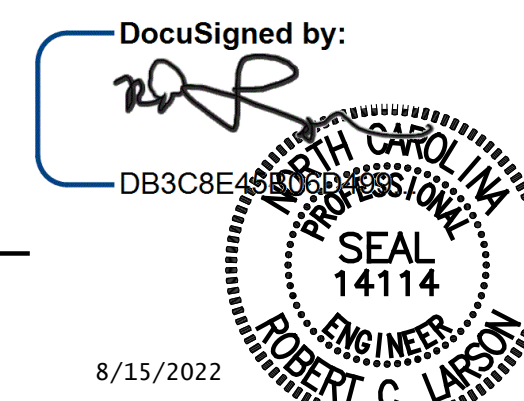
PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 1

RIGHT LANE



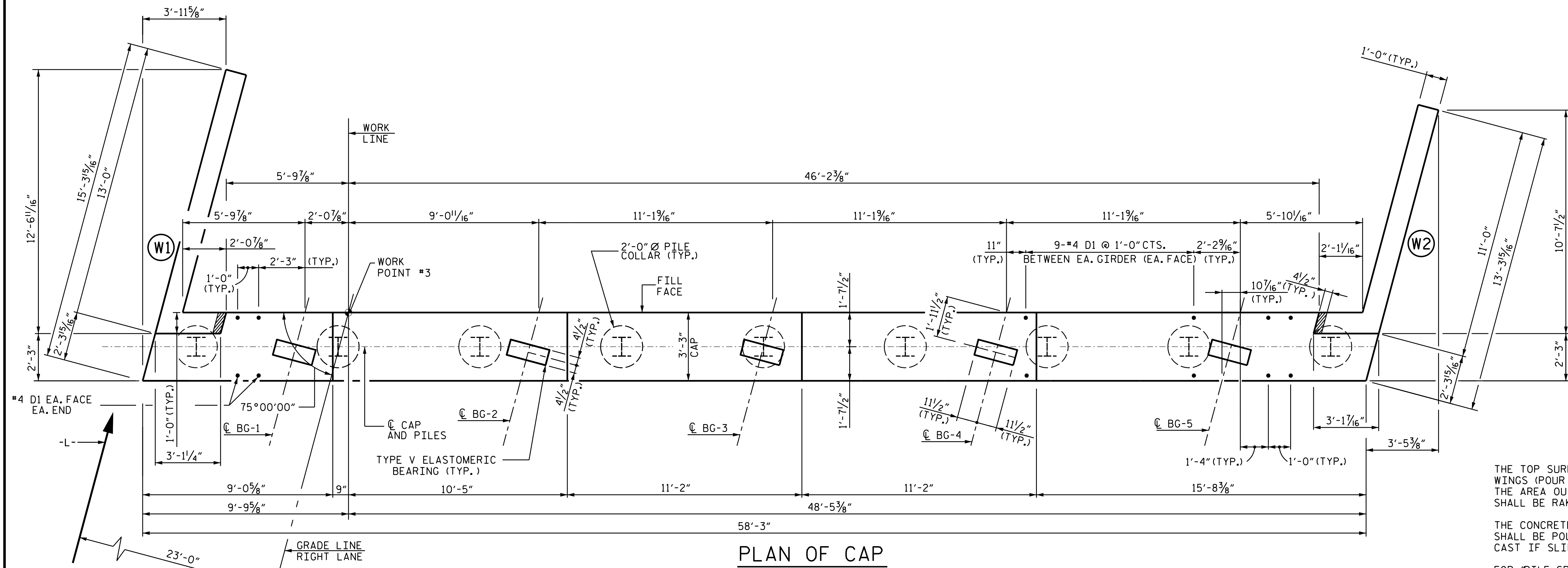
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DRAWN BY: A. K. ALLANKI	DATE	07/15/20
CHECKED BY: R. C. LARSON	DATE	07/17/20

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REVISIONS		SHEET NO.
NO.	DATE	S4-22
1		TOTAL SHEETS 29
2		

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PLAN OF CAP

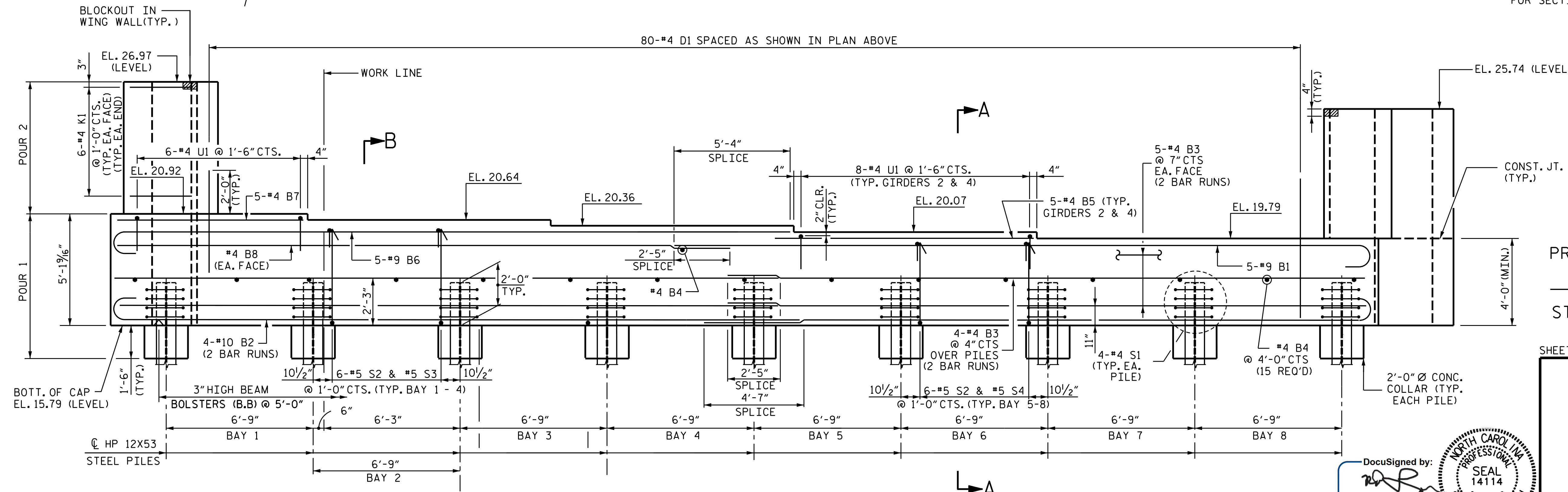
NOTES

THE TOP SURFACE OF THE END BENT CAP AND WINGS (POUR 1) EXCEPT THE BEARING AREAS AND THE AREA OUTSIDE OF THE SUPERSTRUCTURE SHALL BE RAKED TO A DEPTH OF 1/4".

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIPFORMING IS USED.

FOR "PILE SPLICE DETAILS", SEE END BENT 1.

FOR SECTIONS THRU CAP SEE SHEET 3 OF 3.

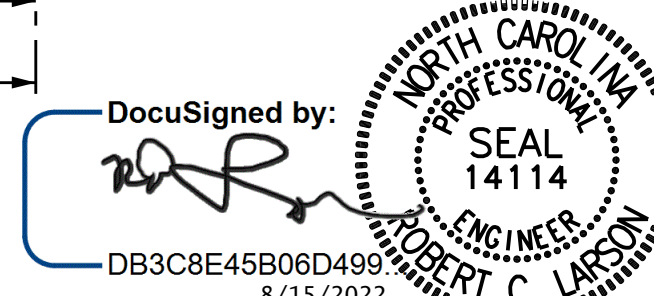


ELEVATION

PROJECT NO. R-256ICA
 COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 1 OF 3

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



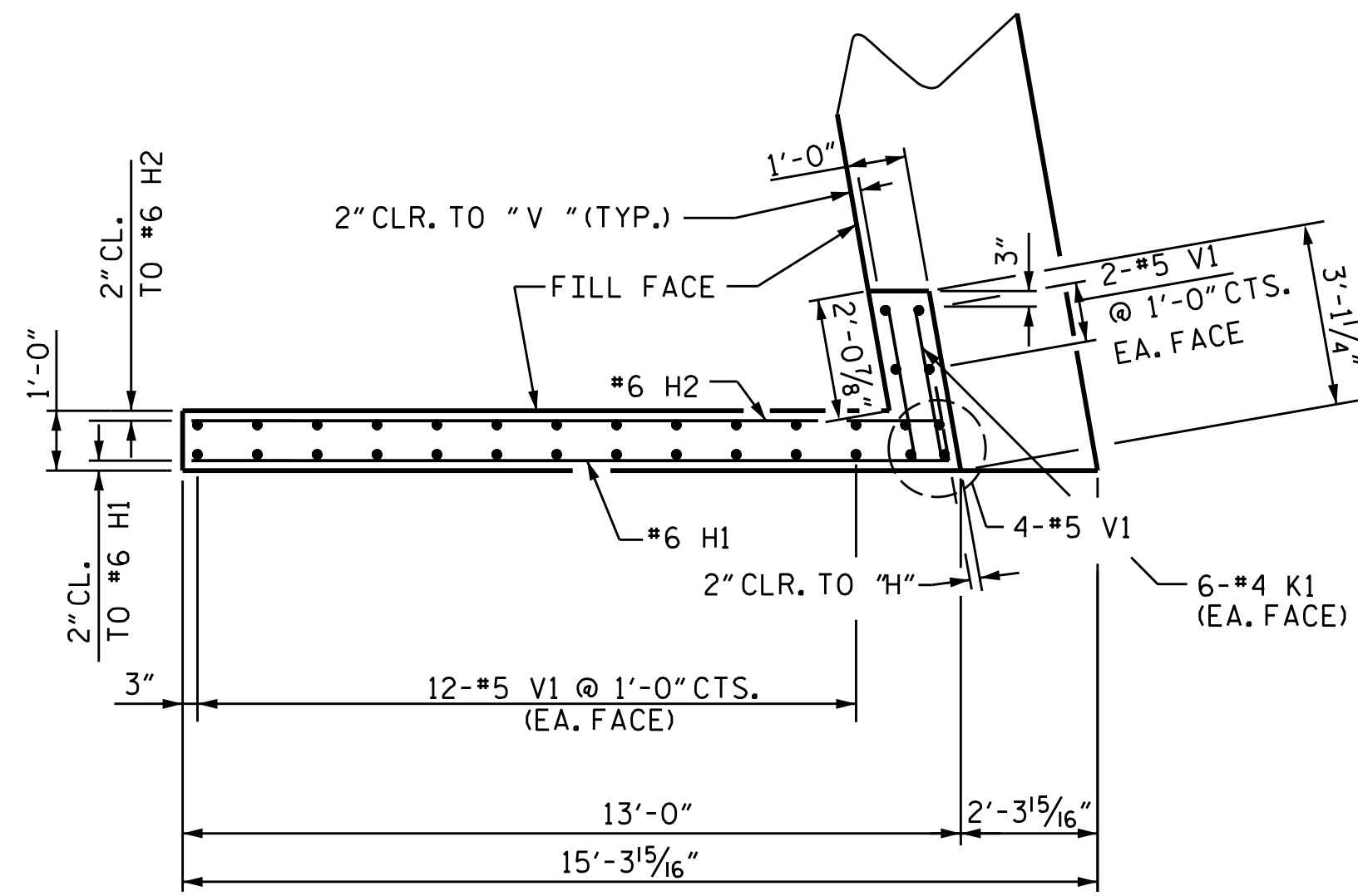
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 DRAWN BY: A. K. ALLANKI DATE: 08/17/20
 CHECKED BY: R. C. LARSON DATE: 08/20/20

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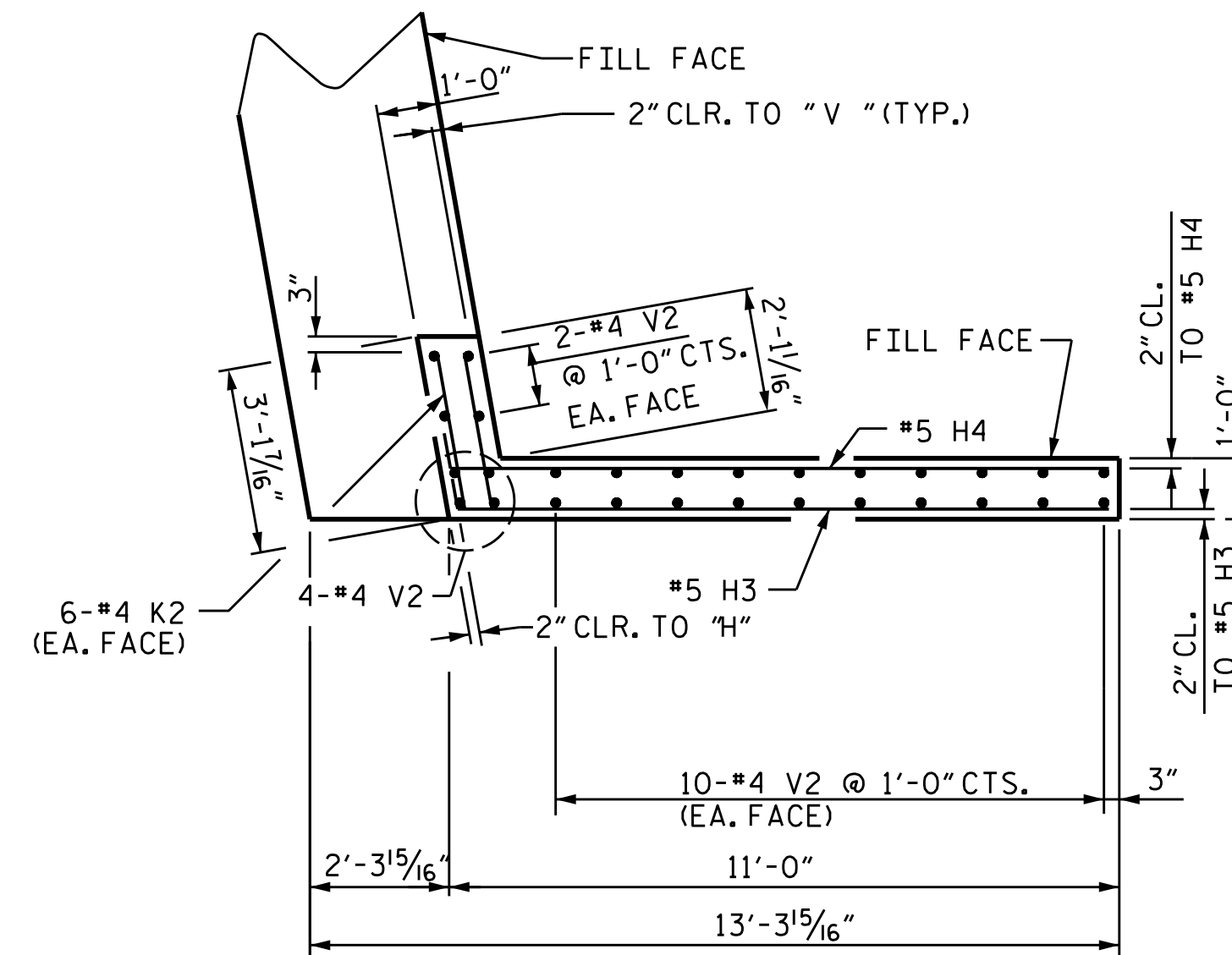
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TOTAL SHEETS: 29

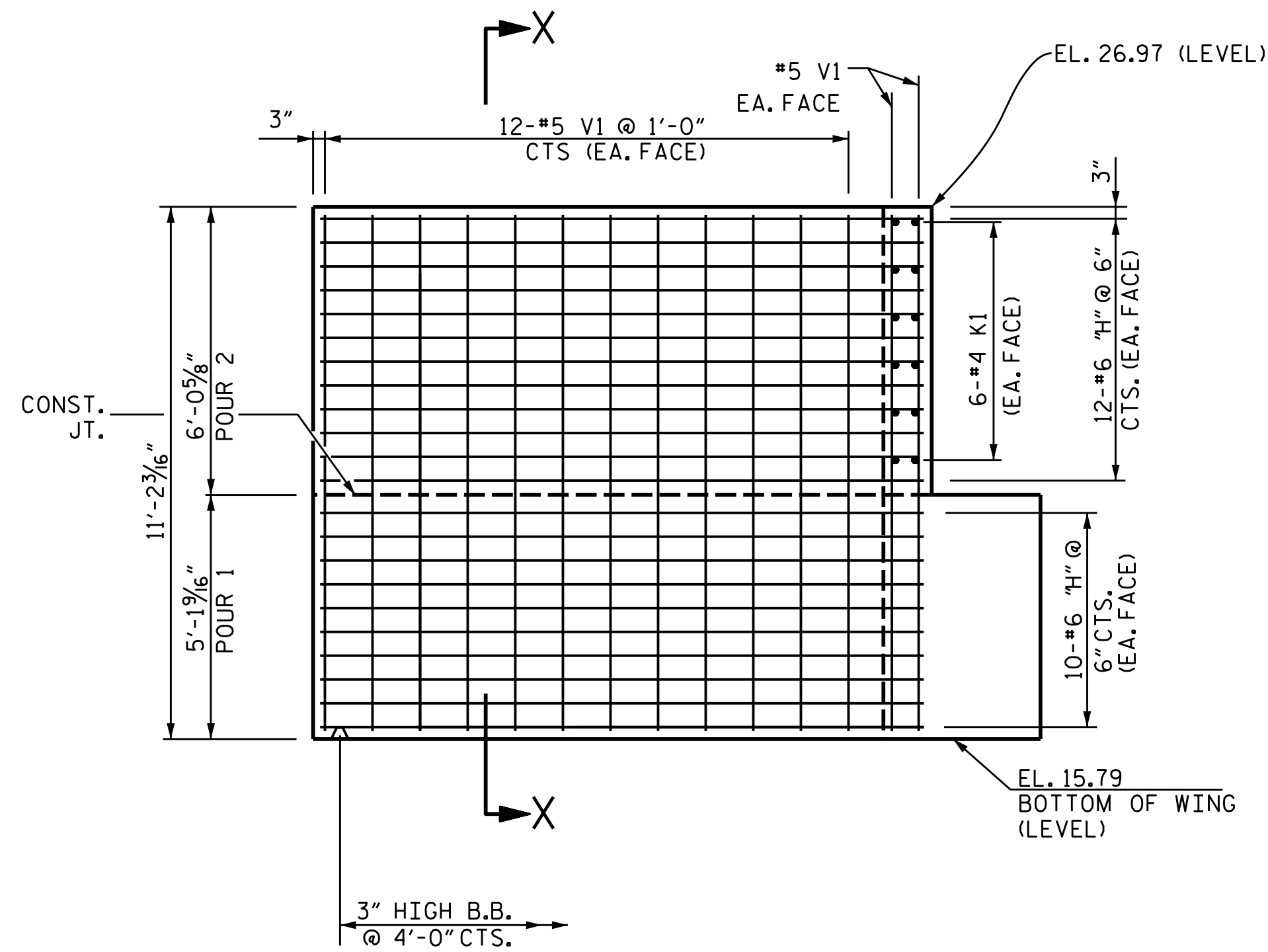
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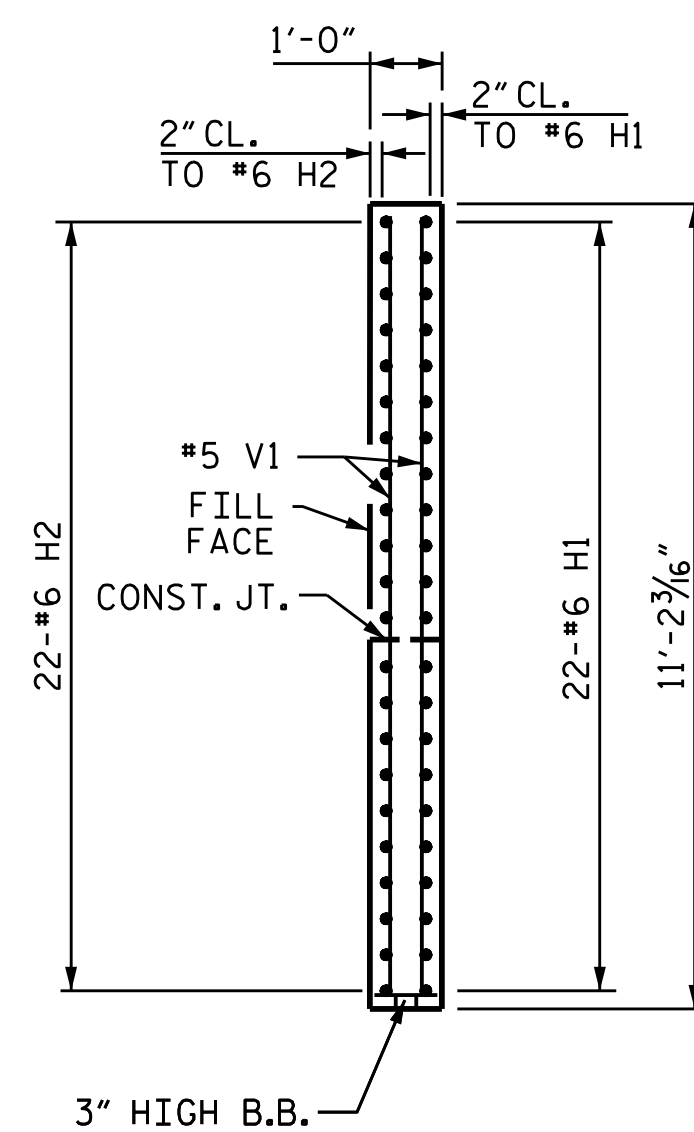
PLAN W1



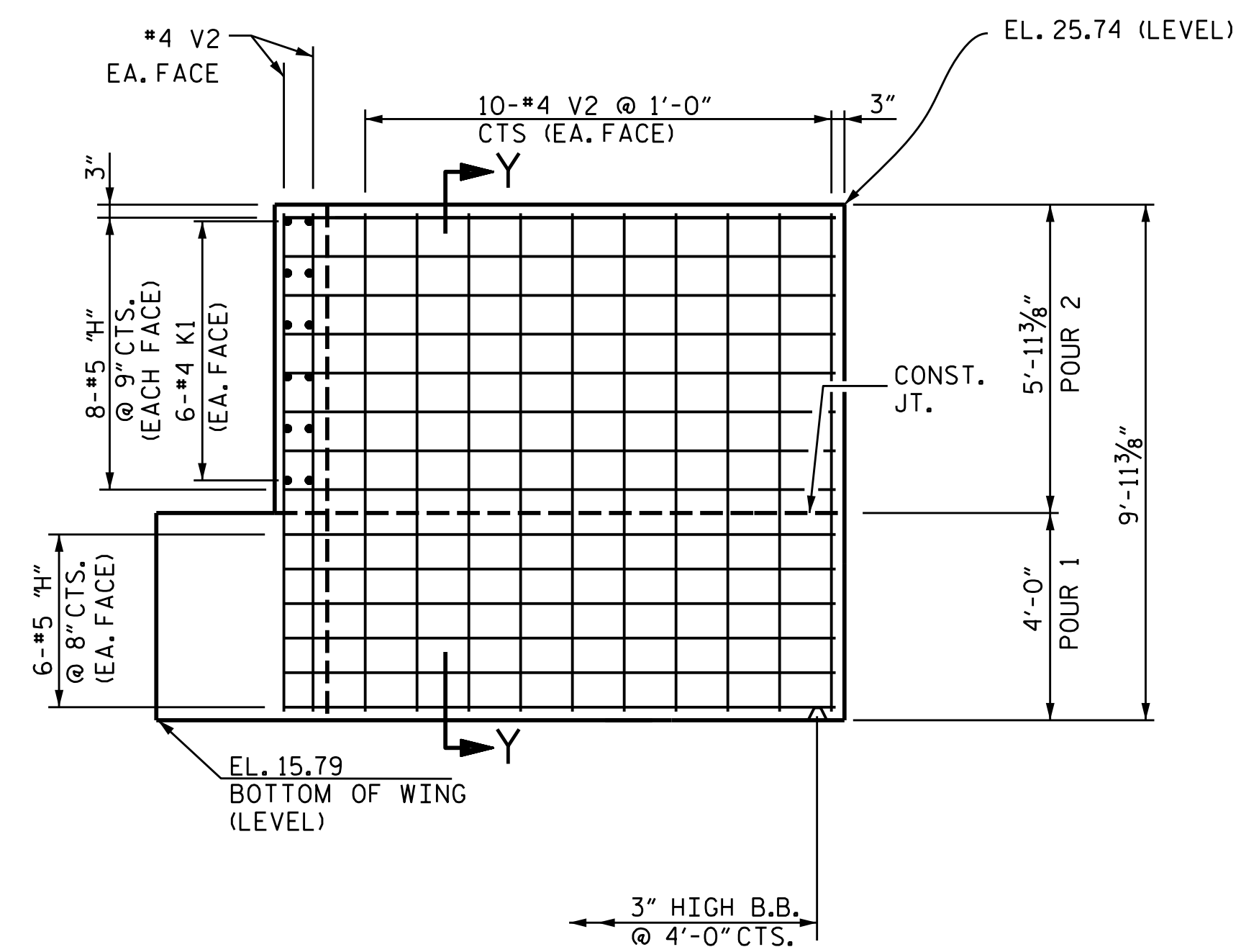
PLAN W2



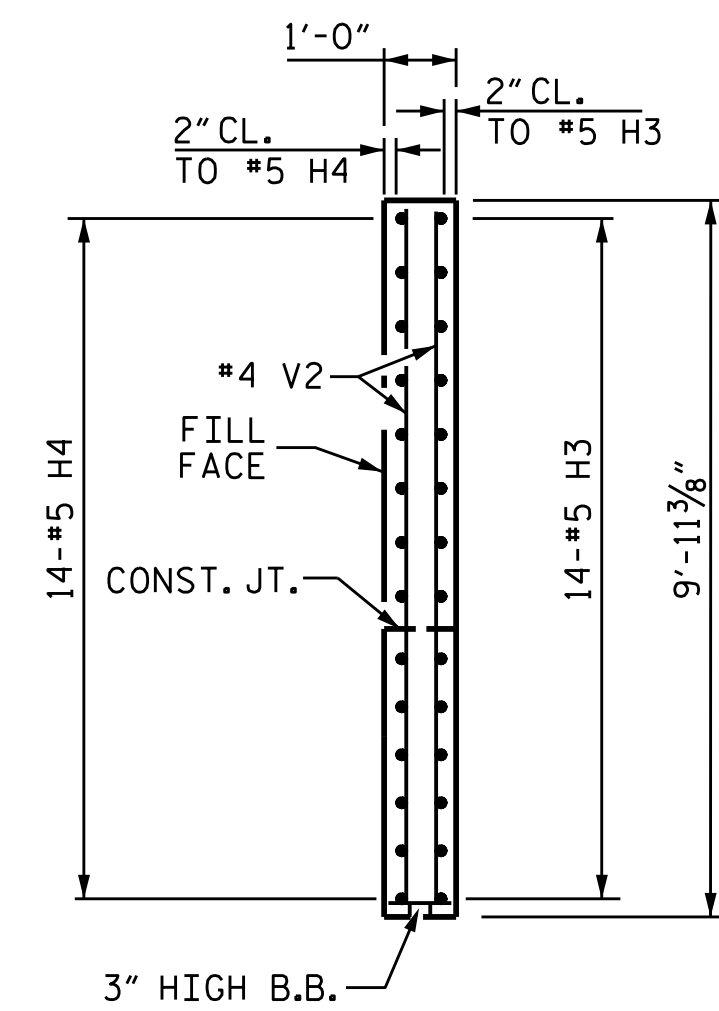
ELEVATION W1



SECTION X-X



ELEVATION W2



SECTION Y-Y

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2

RIGHT LANE

DocuSigned by:

 DB3C8E45B06D49
 8/15/2022
 NORTH CAROLINA PROFESSIONAL SEAL 14114 ENGINEER ROBERT C. LARSON

DESIGN ENGINEER OF RECORD DATE: 8/15/2022
 DRAWN BY: A. K. ALLANKI DATE: 08/18/20
 CHECKED BY: R. C. LARSON DATE: 08/20/20

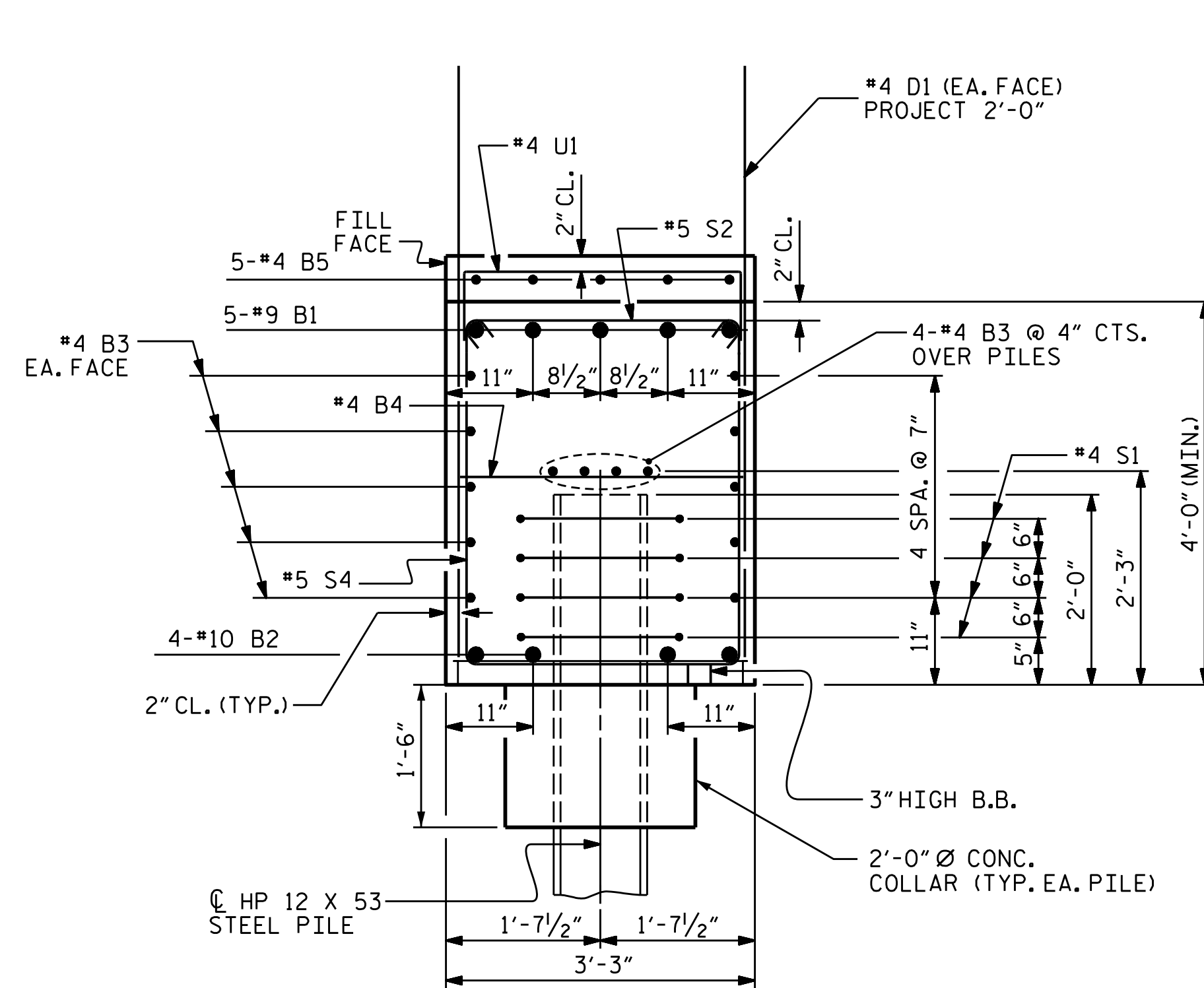
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KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone 919-785-5241

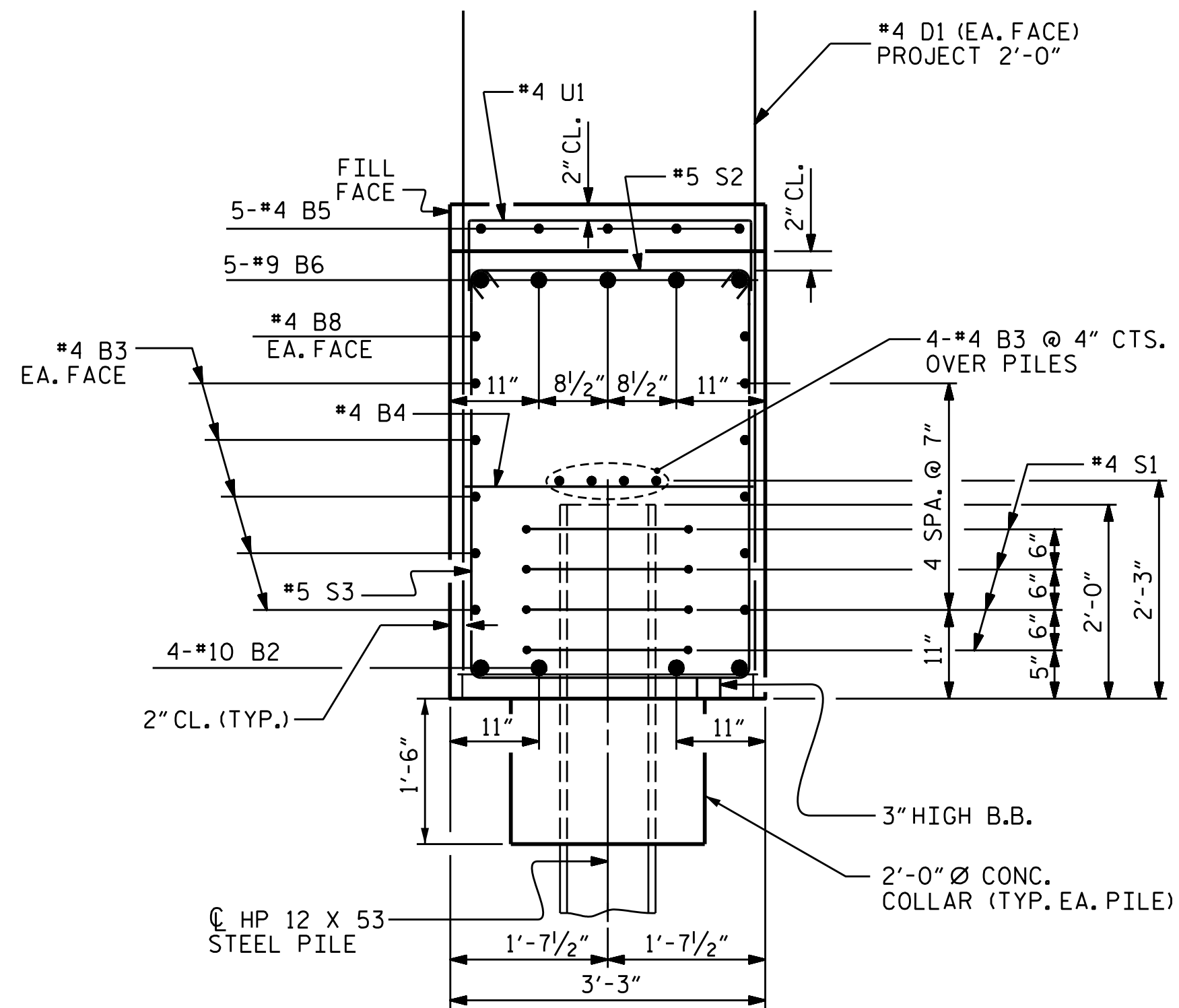
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TOTAL SHEETS: 29

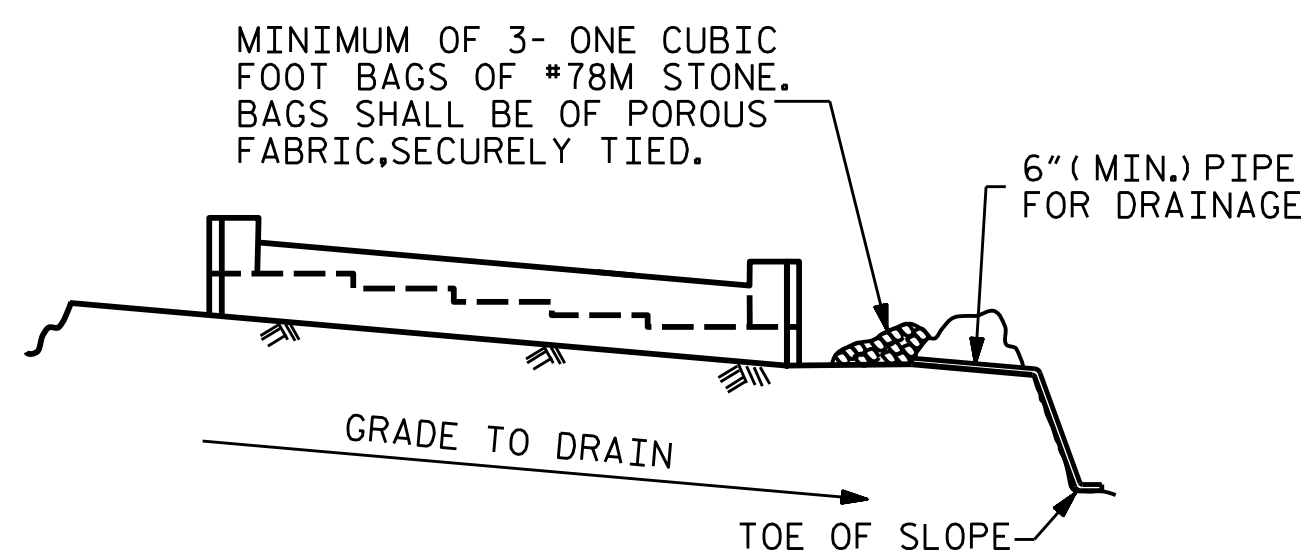
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 \$DATES\$ KCI PROJECT NO. 241704391.04



SECTION A-A



SECTION B-B

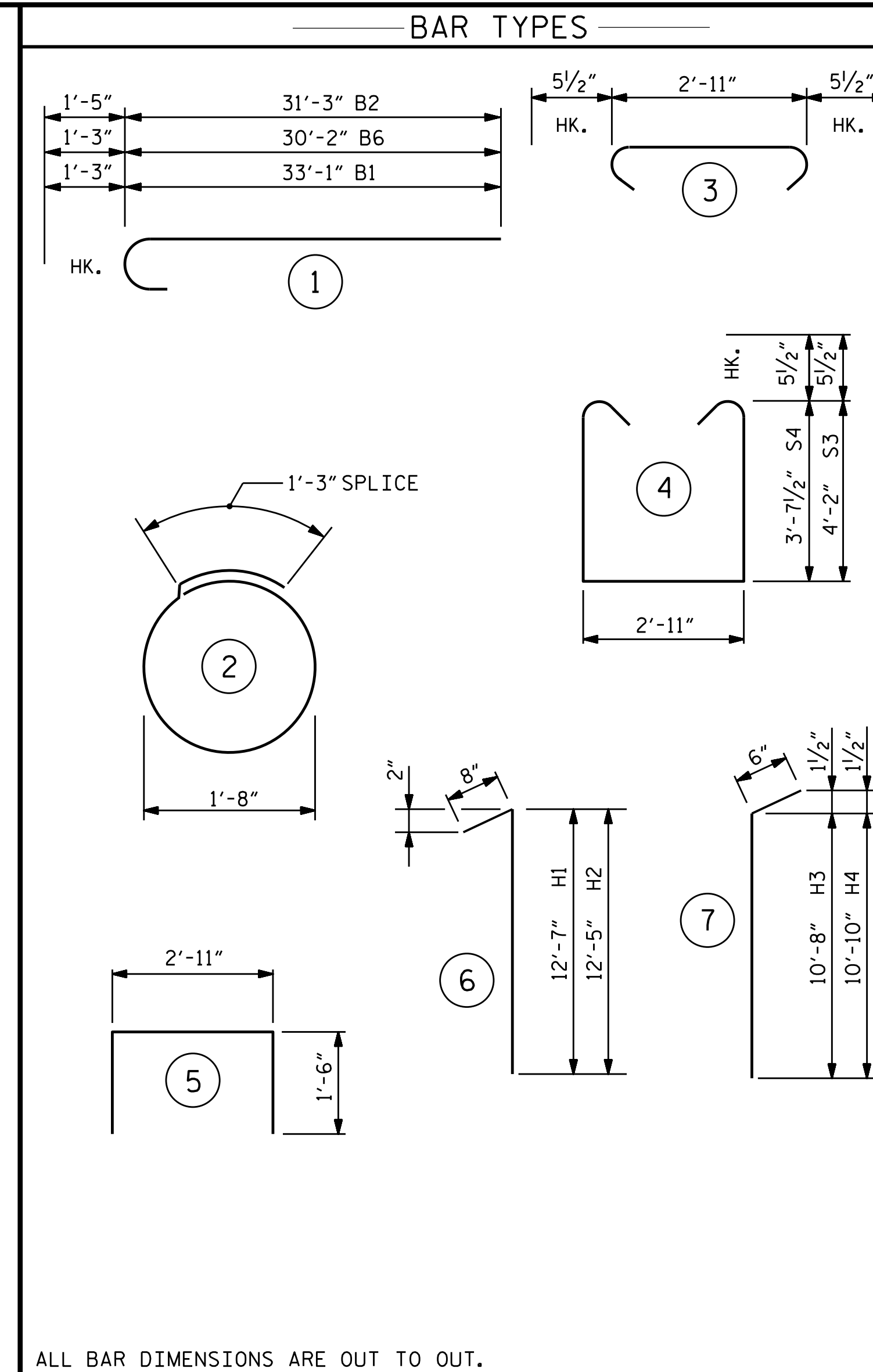


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	5	9	1	34'-4"	584
B2	8	10	1	32'-8"	1125
B3	28	4	STR.	30'-2"	564
B4	16	4	STR.	2'-11"	31
B5	10	4	STR.	12'-0"	80
B6	5	9	1	31'-5"	534
B7	5	4	STR.	7'-10"	26
B8	2	4	STR.	27'-3"	36
D1	80	4	STR.	5'-10"	312
H1	22	6	6	13'-3"	438
H2	22	6	6	13'-1"	432
H3	14	5	7	11'-2"	163
H4	14	5	7	11'-4"	165
K1	24	4	STR.	2'-9"	44
S1	36	4	2	6'-6"	156
S2	48	5	3	3'-10"	192
S3	24	5	4	12'-2"	305
S4	24	5	4	11'-1"	277
U1	22	4	5	5'-11"	87
V1	32	5	STR.	10'-10"	362
V2	28	4	STR.	9'-7"	179

REINFORCING STEEL, LBS.				6092
CLASS A CONCRETE, CY				
POUR 1 (CAP, LOWER PORTION OF WINGS AND COLLARS)				36.9
POUR 2 (UPPER PORTION OF WINGS)				6.3
TOTAL				43.2
HP 12X53 STEEL PILES				NO. 9
				L.F. 585
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES, EA.				9
PILE REDRIVES, EA.				5

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 2**

RIGHT LANE

DocuSigned by:

 DB3C8E45B06D999
 NORTH CAROLINA PROFESSIONAL SEAL 14114
 ENGINEER
 ROBERT C. LARSON
 8/15/2022

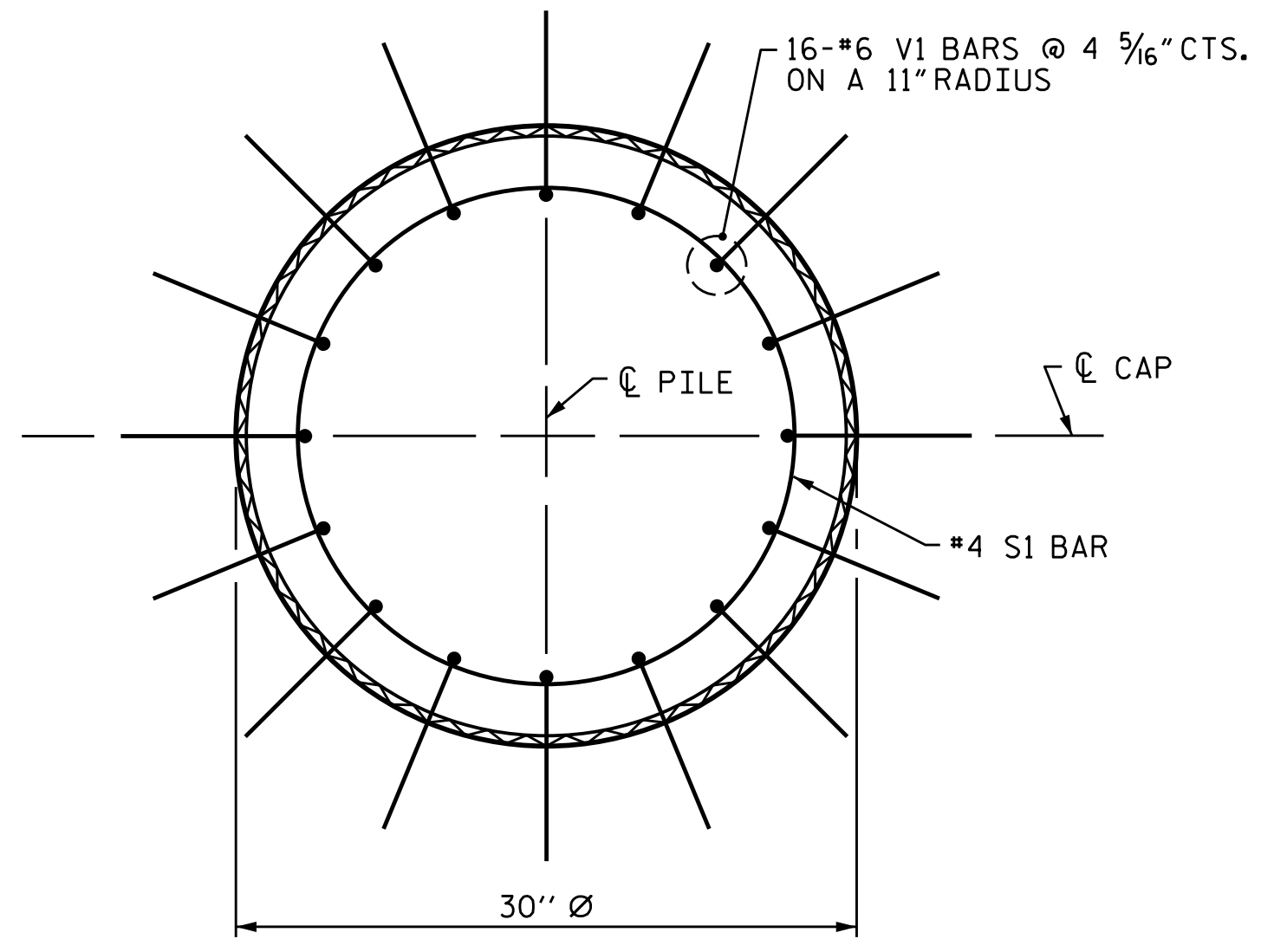
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 DRAWN BY: A. K. ALLANKI DATE: 08/19/20
 CHECKED BY: R. C. LARSON DATE: 08/20/20

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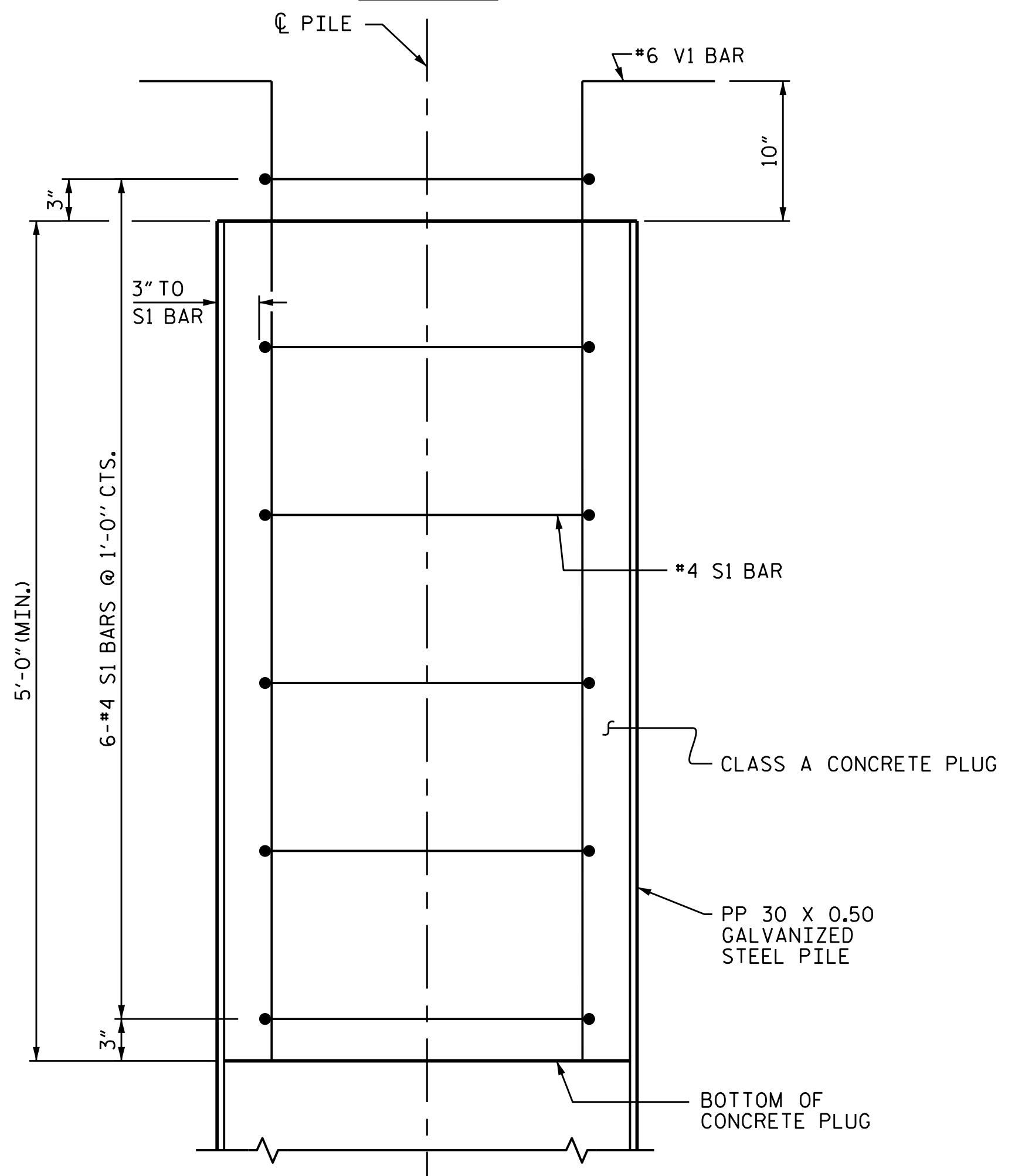
ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0164
KCI Associates
 of North Carolina, P.A.
 4505 Falls of House Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 785-9241

REVISIONS		SHEET NO.
NO.	DATE	S4- 25
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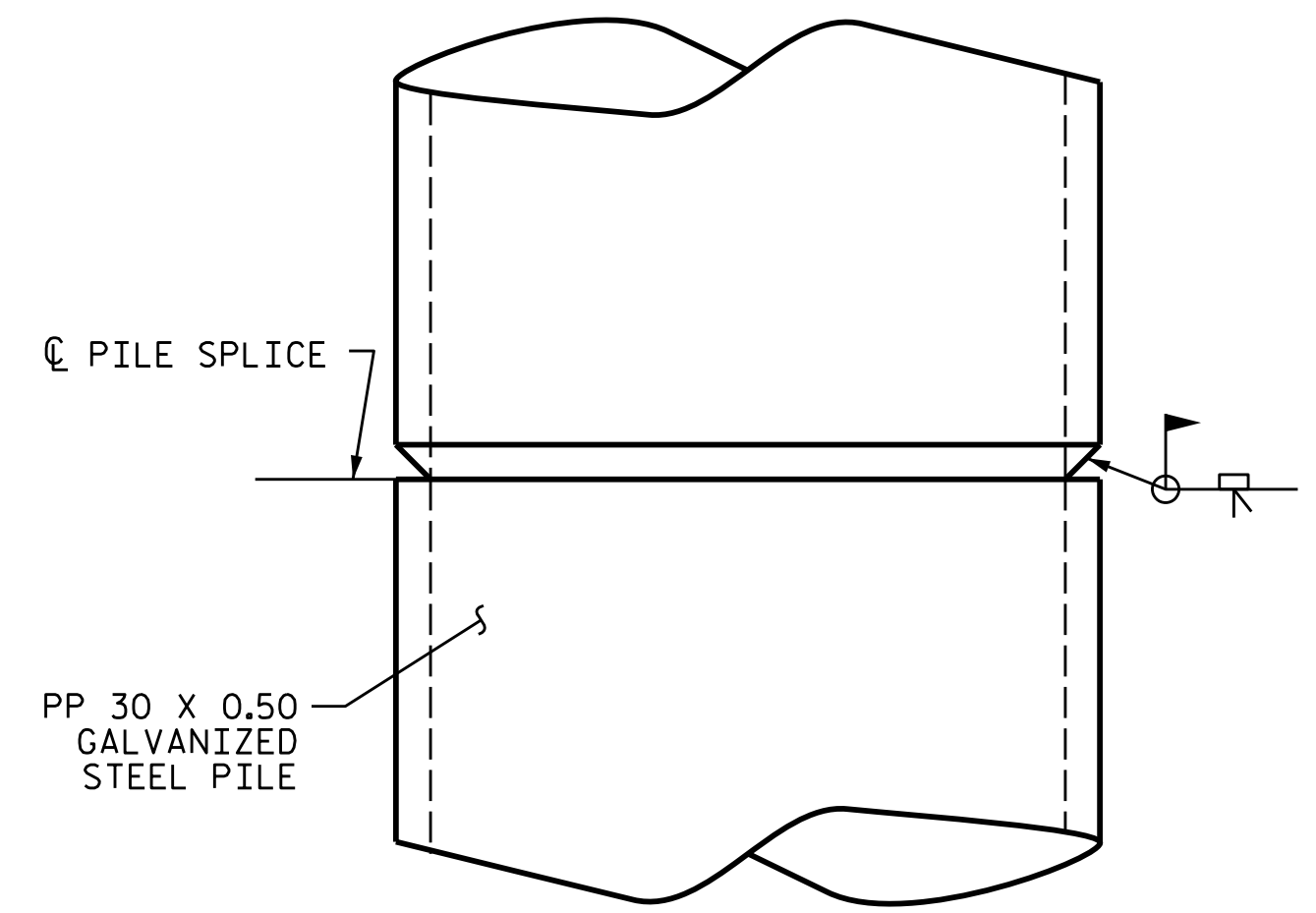


PLAN



ELEVATION

PP 30 X 0.50 GALVANIZED STEEL PILE
(OPEN END)



PIPE PILE SPLICE DETAIL

NOTES

PIPE PILES SHALL BE IN ACCORDANCE WITH SECTION 1084 OF THE STANDARD SPECIFICATIONS.

GALVANIZE STEEL PIPE PILES IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS UNLESS METALLIZING IS REQUIRED.

REMOVE AND REPLACE OR REPAIR TO THE SATISFACTION OF THE ENGINEER PILES THAT ARE DAMAGED, DEFORMED OR COLLAPSED DURING INSTALLATION OR DRIVING.

PILE SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

FOR OPEN END PIPE PILES, REMOVE ENOUGH SOIL AND WATER FROM INSIDE THE PILES TO CONSTRUCT THE CONCRETE PLUG WITHOUT FOULING THE CONCRETE.

FORM THE CONCRETE PLUG SUCH THAT THE REINFORCING STEEL OR CONCRETE DOES NOT MOVE AND THE CLEARANCE FROM THE REINFORCING STEEL TO THE INSIDE OF THE PILE IS MAINTAINED AFTER CONCRETE PLACEMENT. DO NOT PLACE CONCRETE IN THE BENT CAP UNTIL THE CONCRETE PLUG HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

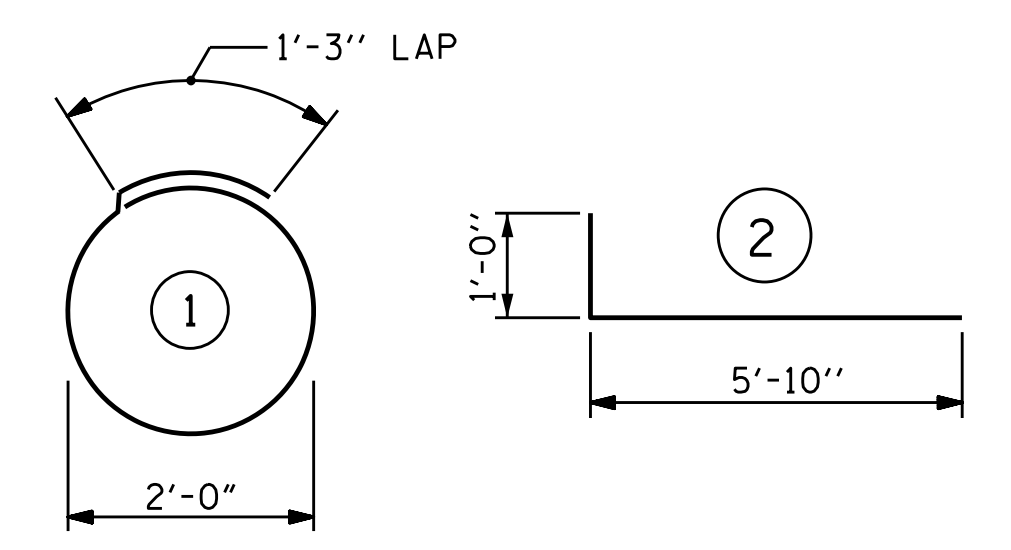
THE REINFORCING STEEL, CLASS A CONCRETE, AND GALVANIZING ARE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER LINEAR FOOT FOR PP 30 X 0.50 GALVANIZED STEEL PILES.

BILL OF MATERIAL FOR ONE
PP 30 X 0.50 GALVANIZED STEEL PILE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	6	#4	1	7'-7"	30
V1	16	#6	2	6'-10"	164
REINFORCING STEEL =				194	lbs

CLASS A CONCRETE	
5'-0" MINIMUM PLUG	0.8 CY

BAR TYPES

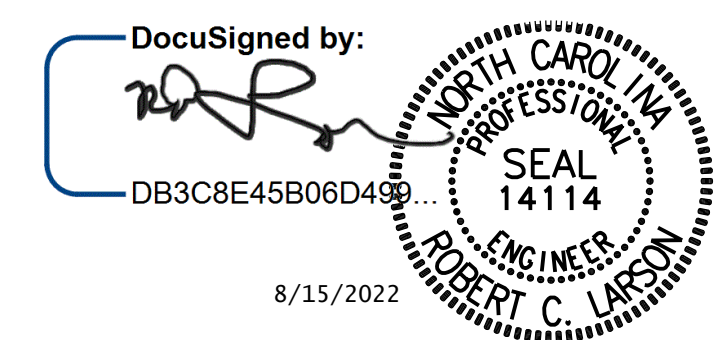


ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-256ICA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 30" STEEL PIPE PILE

RIGHT LANE



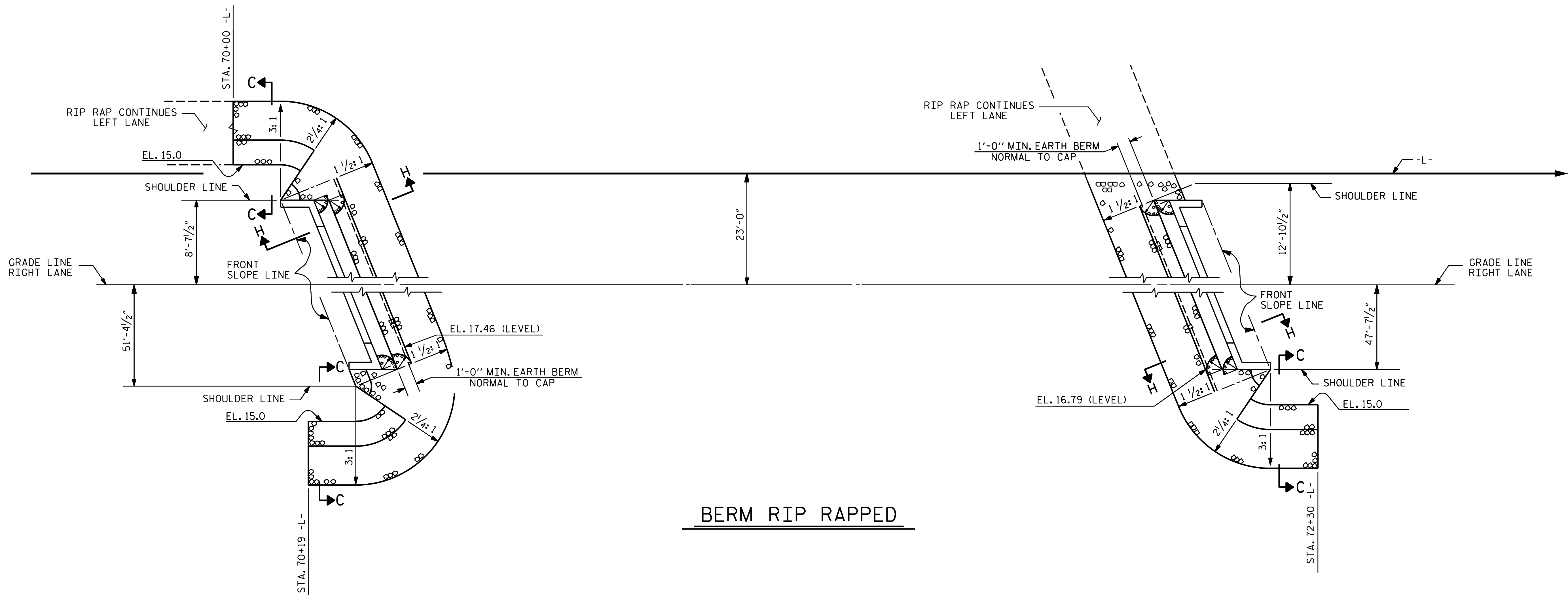
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ASSEMBLED BY : R. F. DECOLA	DATE :	06/26/20
CHECKED BY : R. C. LARSON	DATE :	06/26/20
DRAWN BY : TLA 8/05	REV. 5/1/06R	MAA/KMM
CHECKED BY : GM 9/05	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

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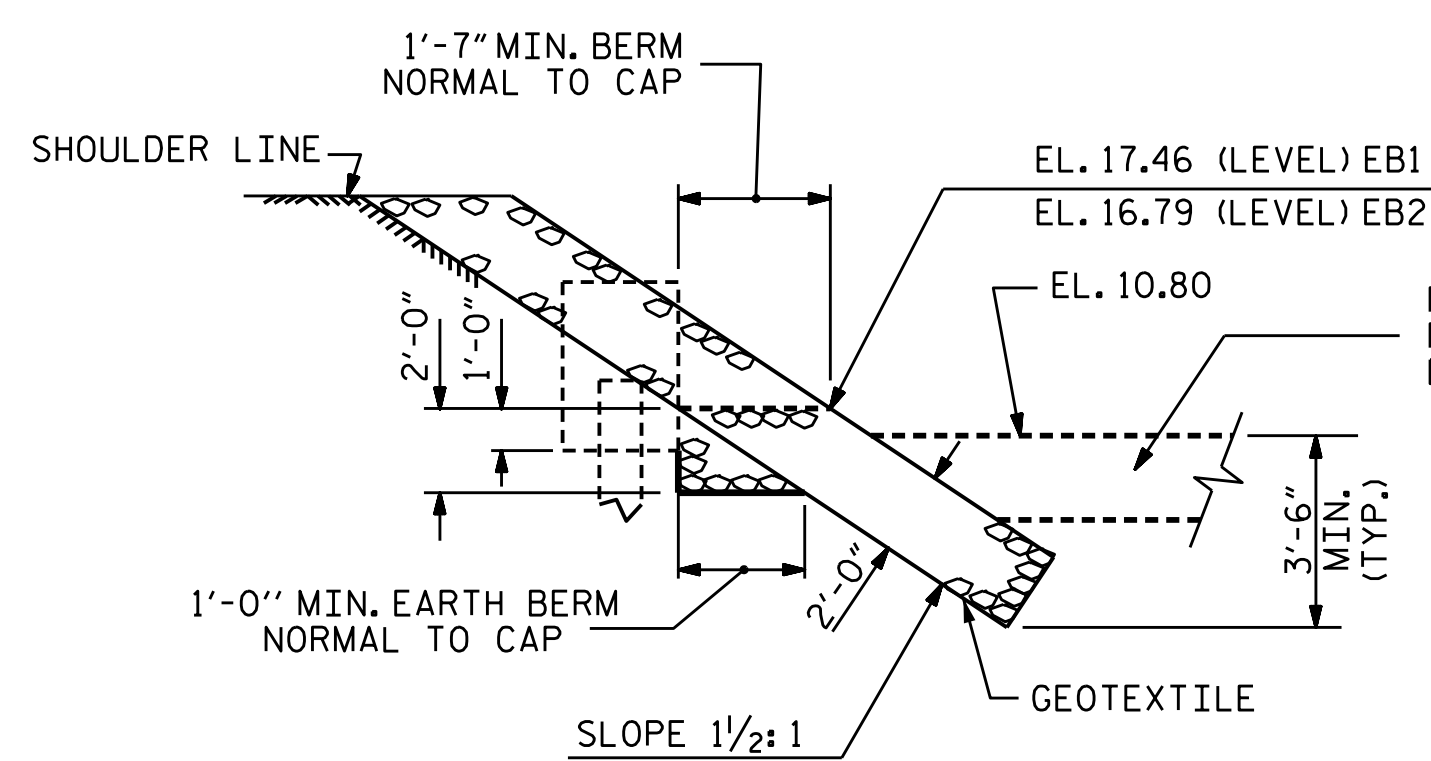
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 KCI PROJECT NO. 241704391.04

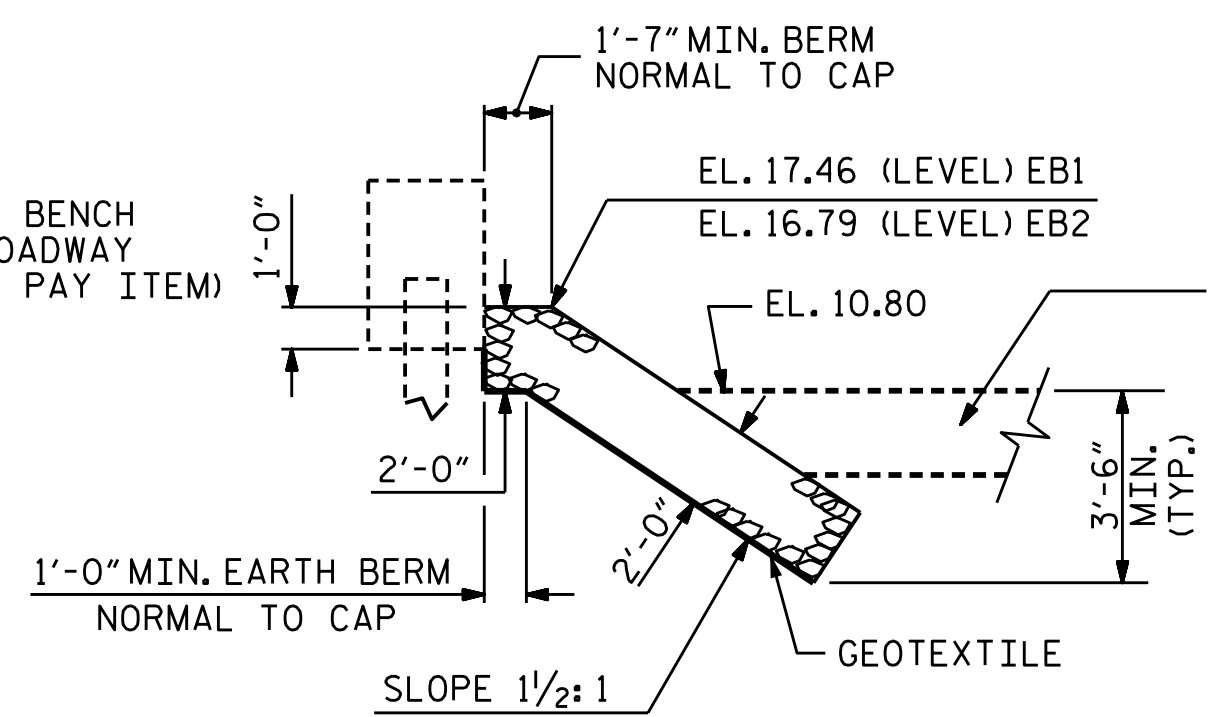


BERM RIP RAPPED

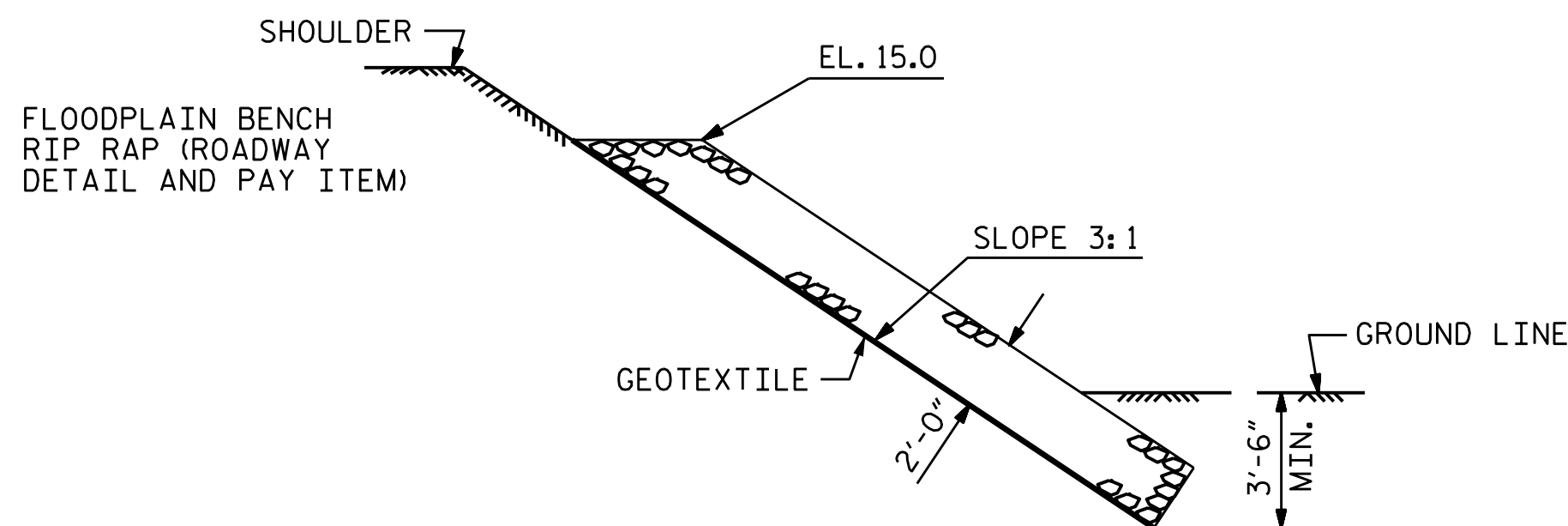
ESTIMATED QUANTITIES		
BRIDGE @ STA. 71+06.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	475	530
END BENT 2	325	360



SECTION H-H



SECTION C-C
BERM RIP RAPPED



SECTION C-C

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RIP RAP DETAILS
 RIGHT LANE

DocuSigned by:

 DB3C8E45B06D499
 8/15/2022
 NORTH CAROLINA PROFESSIONAL SEAL 14114
 ENGINEER
 ROBERT C. LARSON

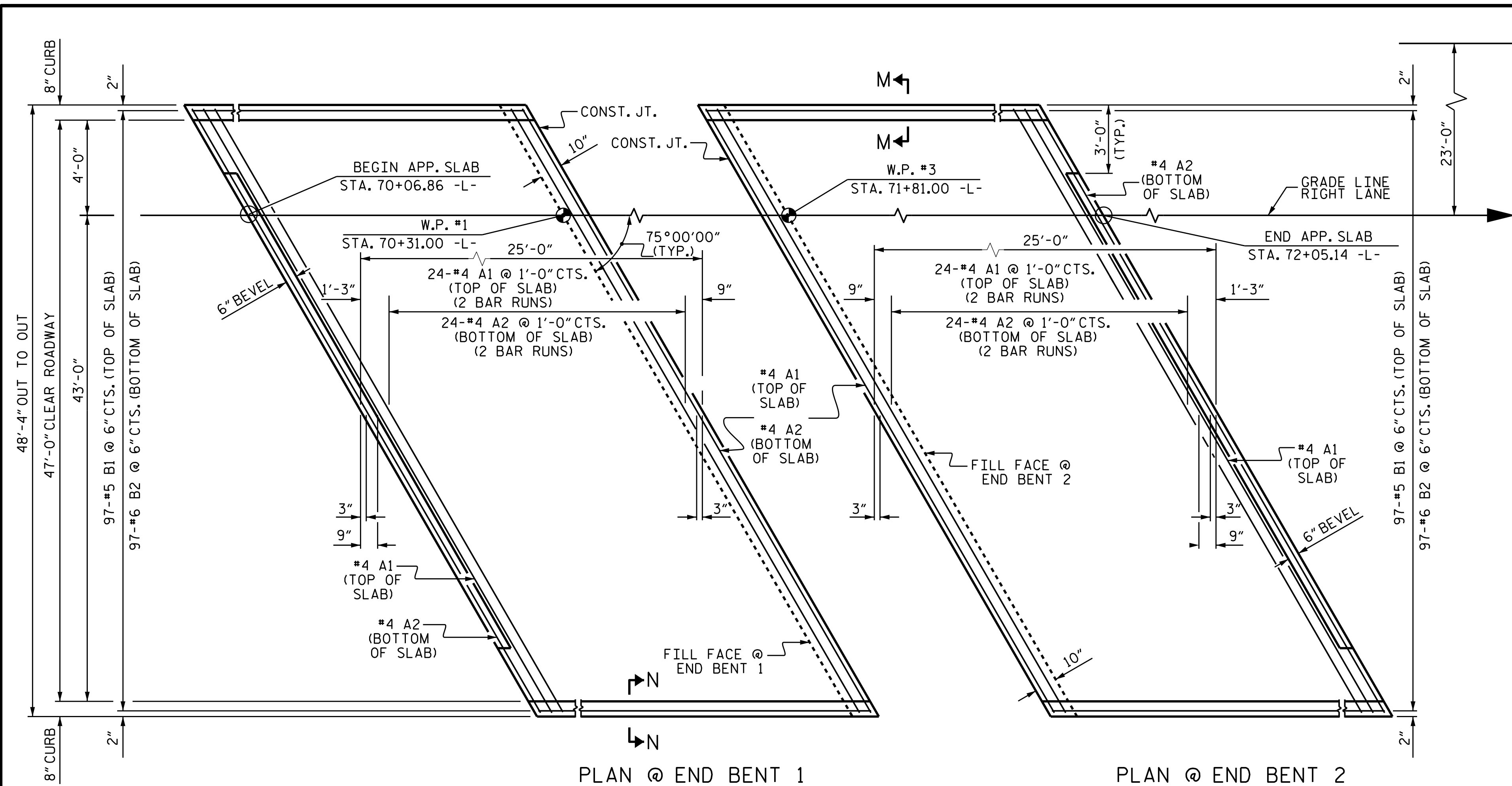
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ASSEMBLED BY: A. K. ALLANK	DATE: 08/28/20
CHECKED BY: R. C. LARSON	DATE: 11/17/20
DRAWN BY: REK 1/84	REV. 10/1/11
CHECKED BY: RDU 1/84	REV. 12/21/11
	REV. 12/17
	MAA/GM
	MAA/GM
	MAA/THC

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ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-4270 Phone 919-783-9241

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4- 27
1			3			TOTAL SHEETS
2			4			29

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTDYVS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04\$



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

NOTES

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

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

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

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

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

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

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

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

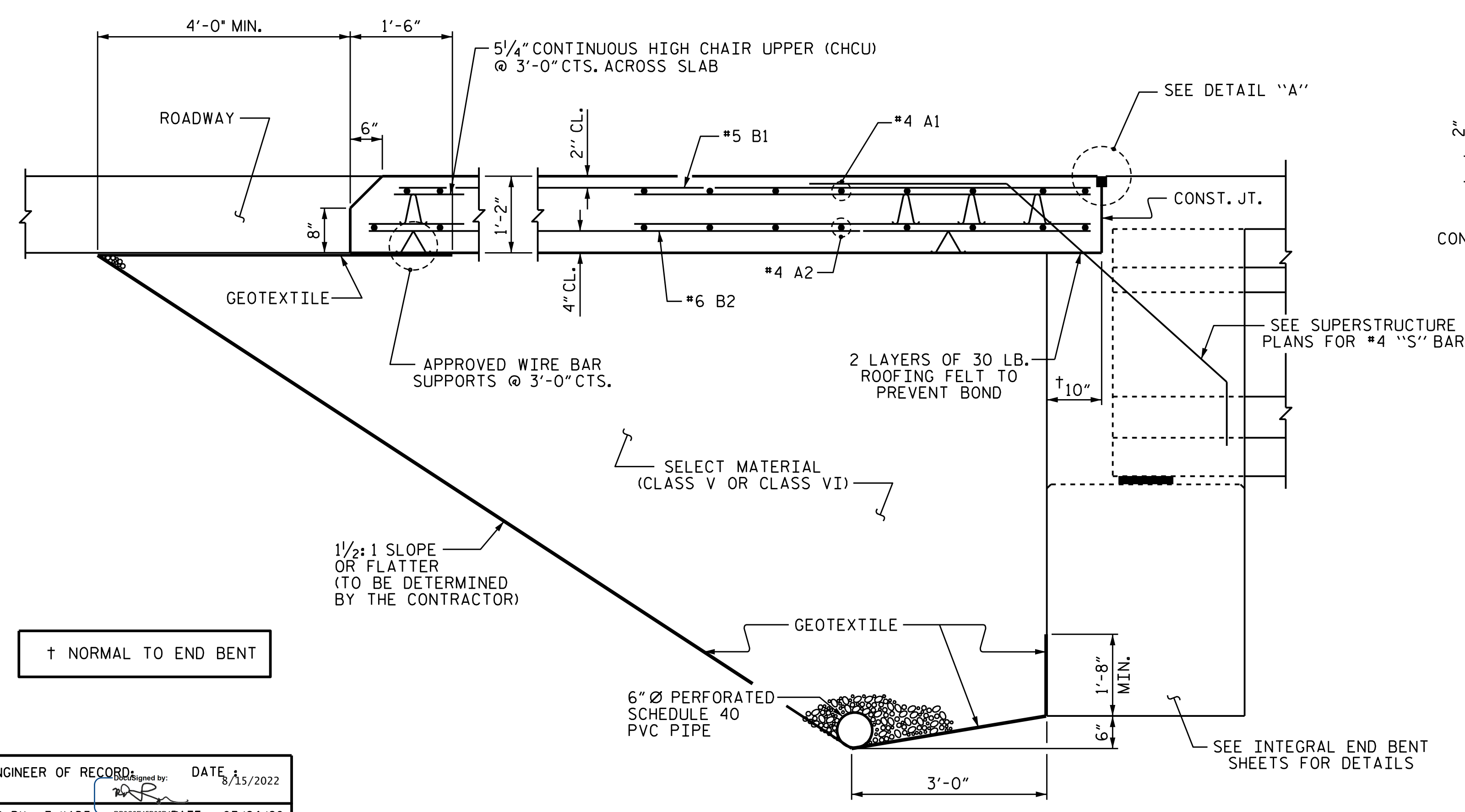
AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

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

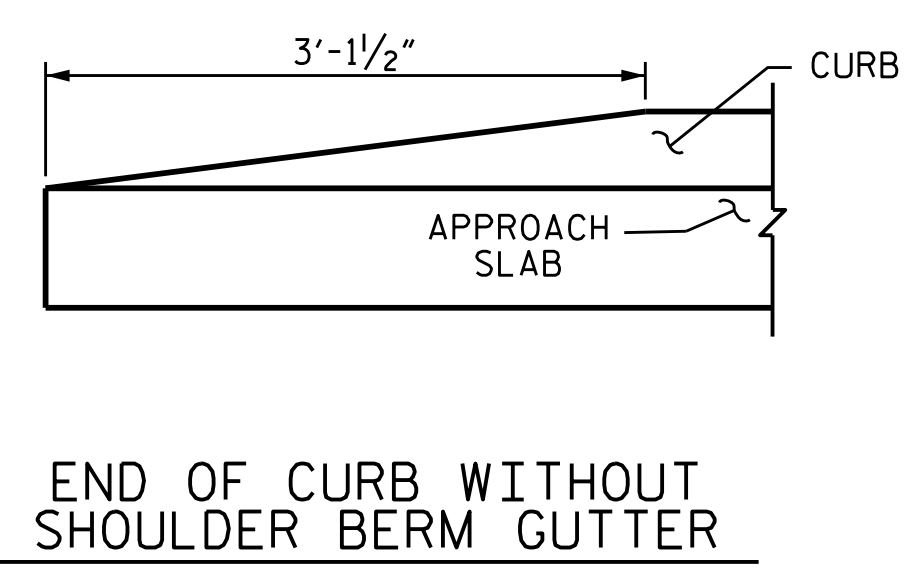
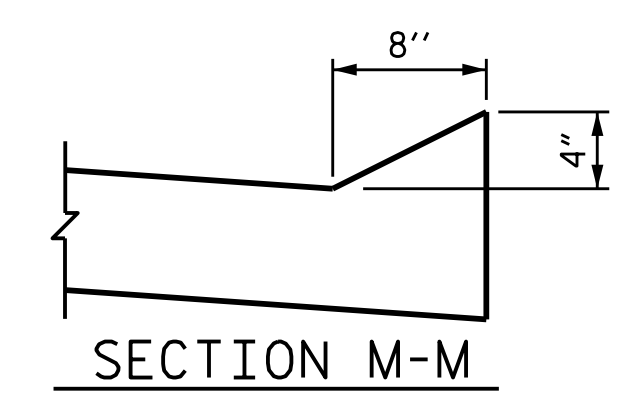
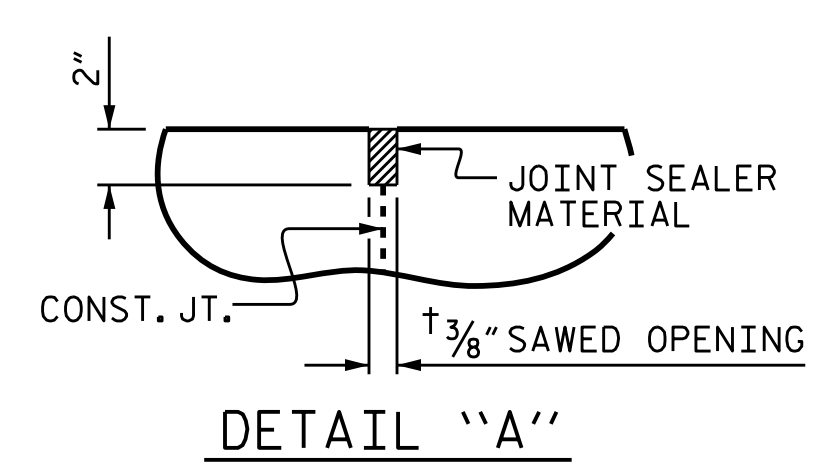
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	25'-10"	893
A2	52	#4	STR	25'-8"	892
* B1	97	#5	STR	24'-0"	2428
B2	97	#6	STR	24'-8"	3594
REINFORCING STEEL				4486	LBS.
* EPOXY COATED REINFORCING STEEL				3325	LBS.
CLASS AA CONCRETE				52.3	C. Y.

SPLICE LENGTHS

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



SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)



END OF CURB WITHOUT SHOULDER BERM GUTTER

PROJECT NO. R-2561CA
COLUMBUS COUNTY
STATION: 71+06.00 -L-

SHEET 1 OF 2
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB
FOR INTEGRAL ABUTMENT
WITH FLEXIBLE PAVEMENT
RIGHT LANE

DocuSigned by:
[Signature]
DB3C8E45B06D499
8/15/2022
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14114
ROBERT C. LARSON

DESIGN ENGINEER OF RECORD: [Signature] DATE: 8/15/2022

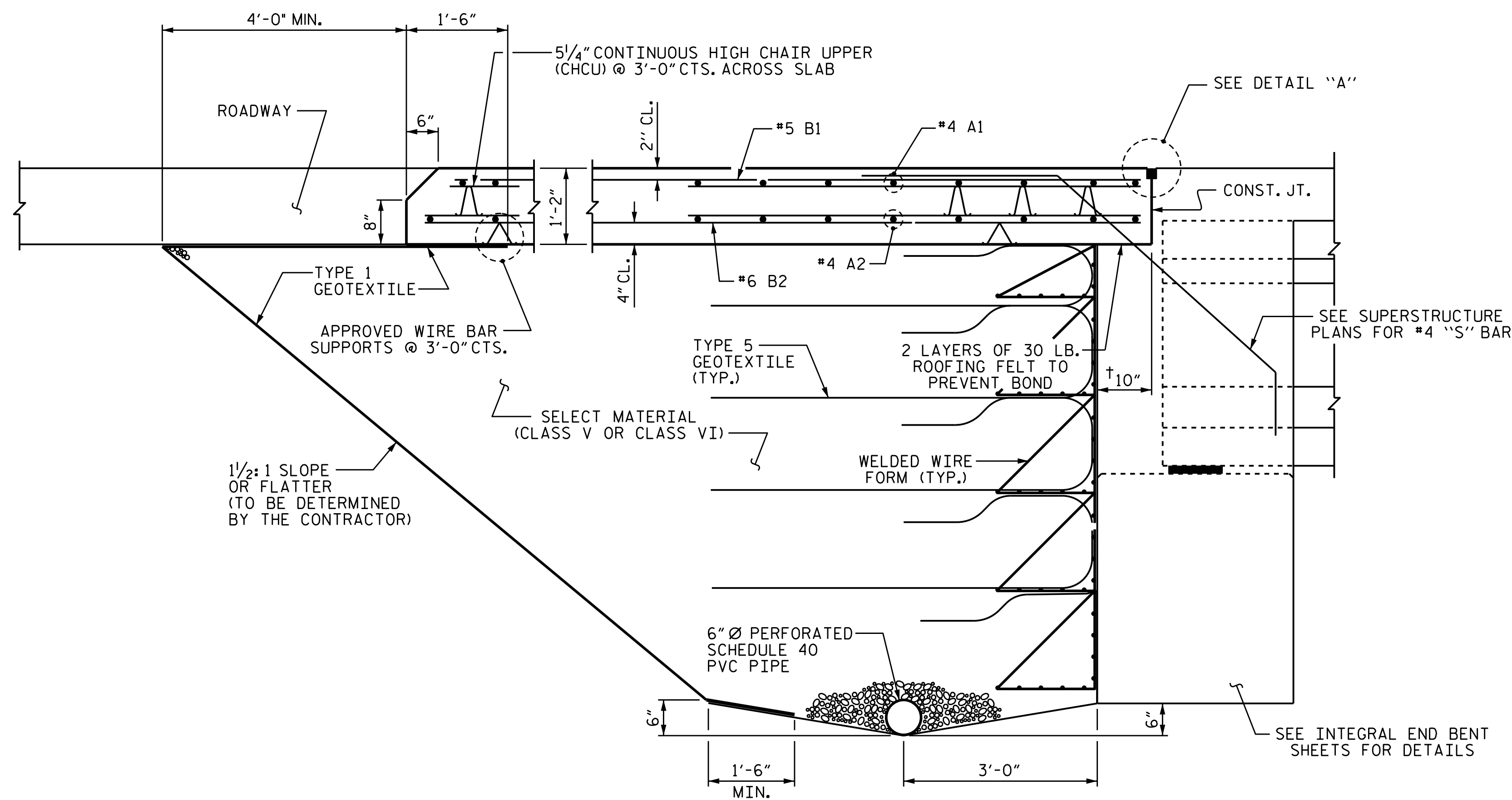
ASSEMBLED BY: Z. KADI DATE: 07/24/20
CHECKED BY: R.C. LARSON DATE: 07/28/20

DRAWN BY: TLA 10/05 REV. 6/13 MAA/GM
CHECKED BY: GM 5/06 REV. 12/17 MAA/THC
REV. 06/19 BNB/THC

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

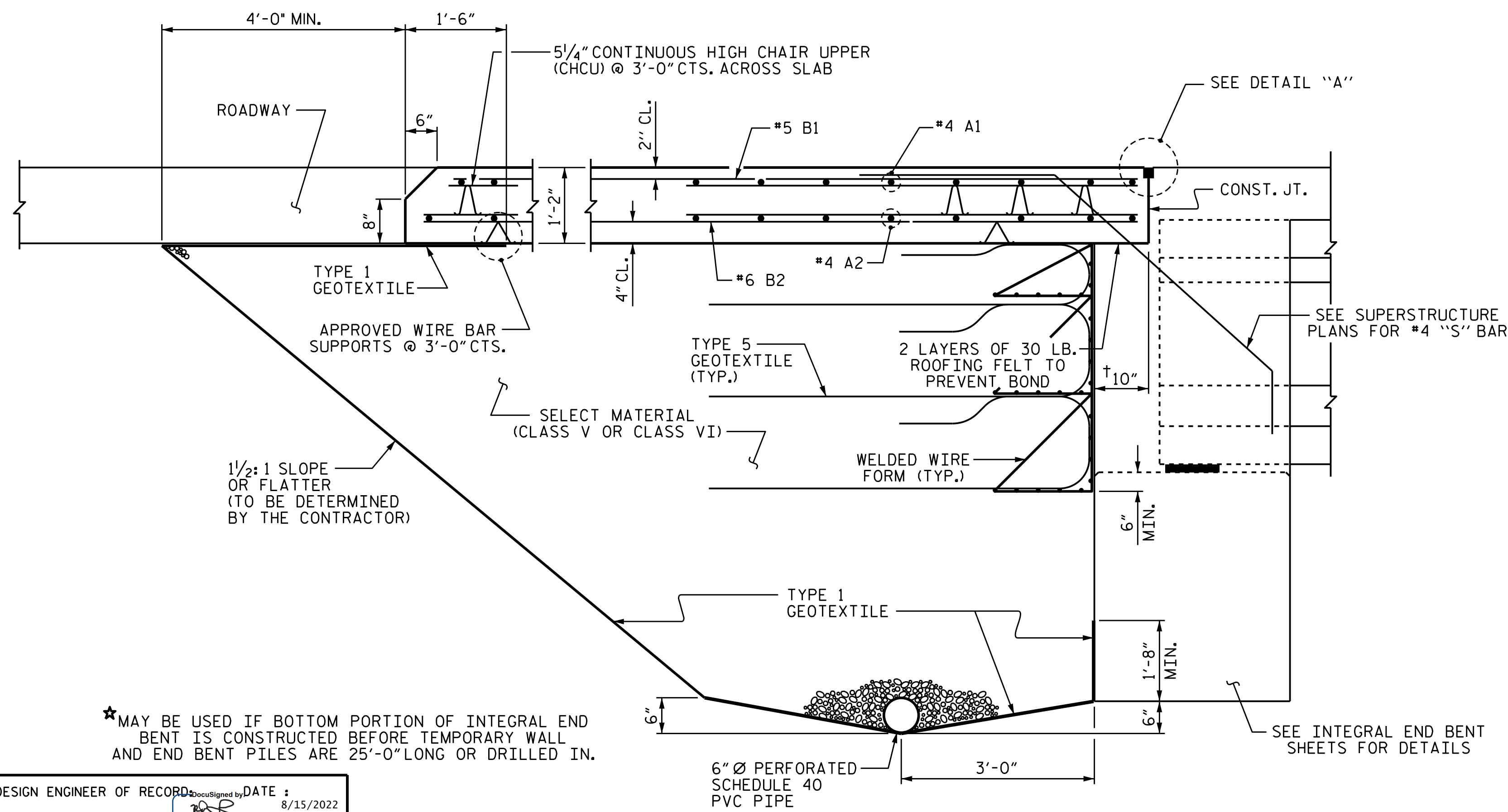
ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
of North Carolina, P.A.
4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-5270 Phone: 919-783-9241

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-28	
1			3			TOTAL SHEETS	
2			4			29	



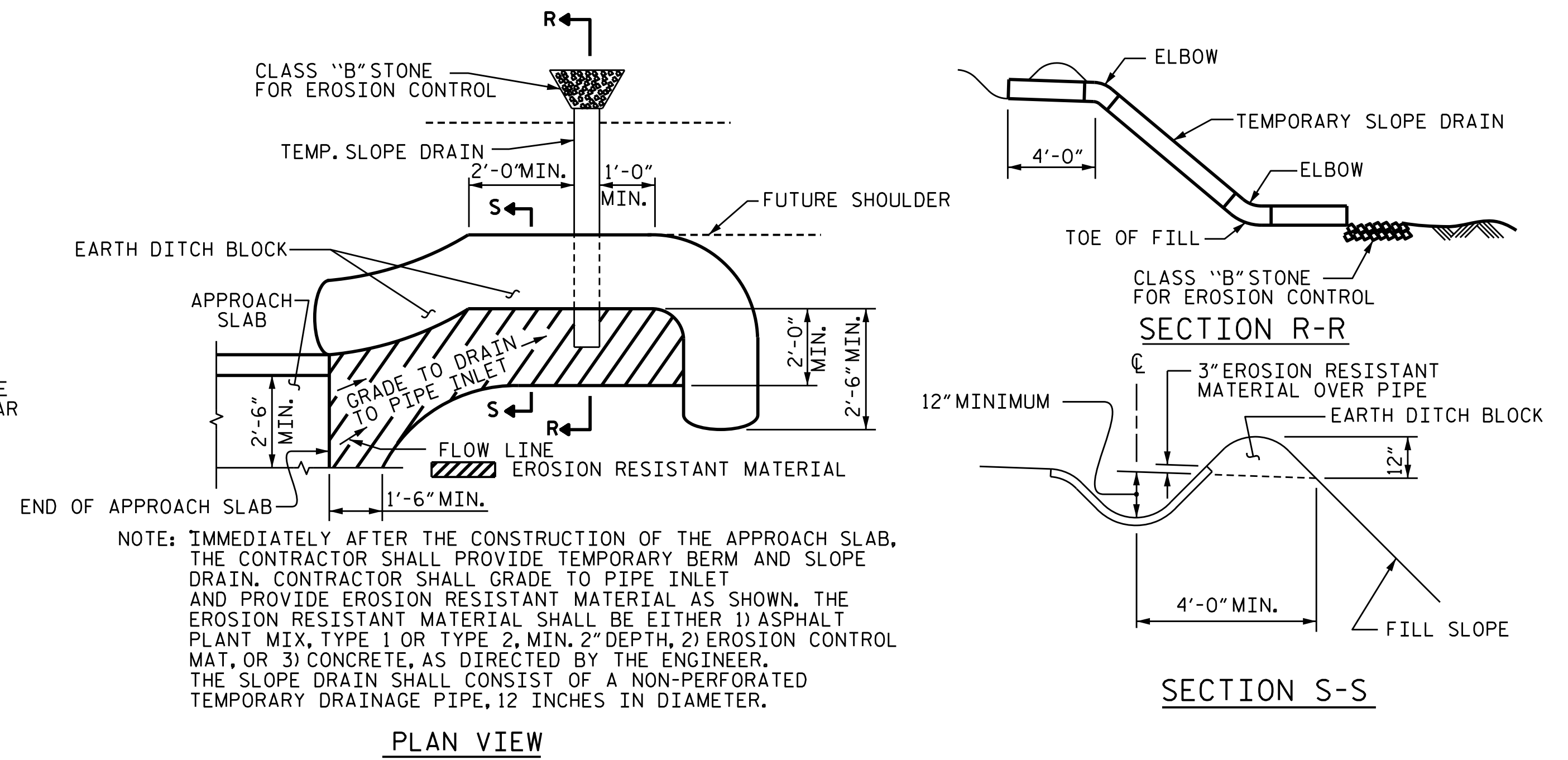
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



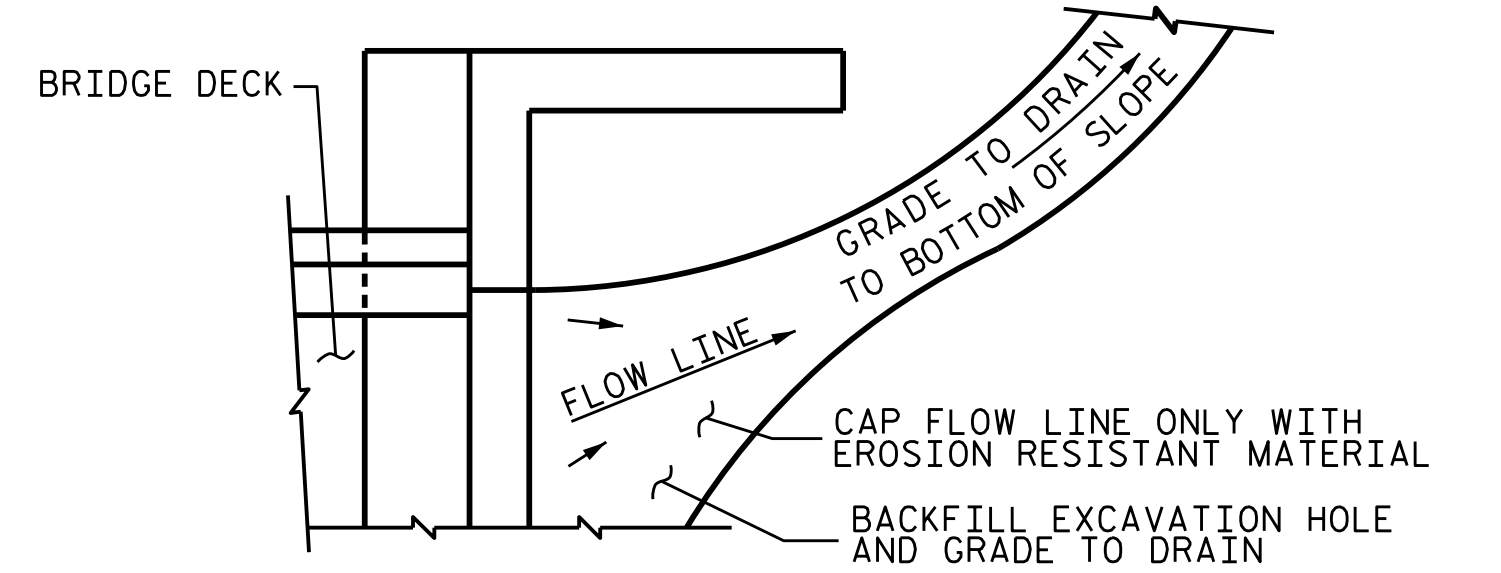
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



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

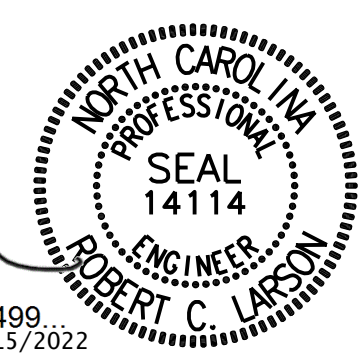
NOTES

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

PROJECT NO. R-2561CA
COLUMBUS COUNTY
 STATION: 71+06.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH
 SLAB DETAILS
 RIGHT LANE



DocuSigned by:
 DB3C8E45B06D499
 8/15/2022

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-29	
1			3			TOTAL SHEETS	
2			4			29	

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

ENGINEERS & PLANNERS & SCIENTISTS & CONSTRUCTION MANAGERS LICENSE NUMBER: C-0764
KCI Associates
 of North Carolina, P.A.
 4505 Falls of Neuse Road, Suite 400, Raleigh, NC 27609-1270 Phone 919-783-9241

\$FILEL\$ \$DATES\$ \$TIME\$ \$USERS\$ \$PLTORVYS\$ \$PENTBLS\$ \$PROJECT NO. 241704391.04

DESIGN ENGINEER OF RECORD	DATE: 8/15/2022
ASSEMBLED BY: R. C. LARSON	DATE: 06/14/20
CHECKED BY: R. F. DECOLA	DATE: 06/16/20
DRAWN BY: TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

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

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $\frac{1}{2}$ " 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 $\frac{1}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{1}{8}$ " \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 $\frac{1}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{1}{8}$ " \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. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN