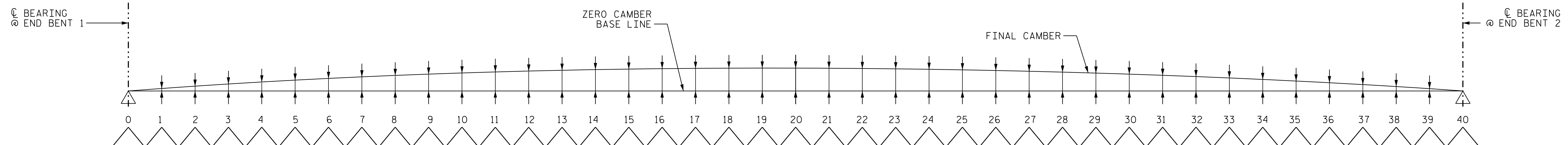


GIRDERS 1 & 4

FORTIETH PTS. BTWN BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000	
CAMBER (GIRDER ALONE IN PLACE)	↑ 0.000	0.022	0.043	0.064	0.085	0.104	0.124	0.142	0.159	0.176	0.192	0.206	0.219	0.230	0.241	0.249	0.256	0.262	0.266	0.268	0.269	0.268	0.266	0.261	0.256	0.249	0.241	0.230	0.219	0.206	0.192	0.176	0.160	0.142	0.124	0.104	0.085	0.064	0.043	0.022	0.000	
DEFL. DUE TO SUPERIMPOSED DL **	↓ 0.000	-0.013	-0.026	-0.039	-0.049	-0.063	-0.075	-0.086	-0.096	-0.107	-0.116	-0.125	-0.132	-0.140	-0.146	-0.151	-0.155	-0.159	-0.161	-0.163	-0.163	-0.161	-0.159	-0.155	-0.151	-0.146	-0.140	-0.132	-0.125	-0.116	-0.107	-0.096	-0.086	-0.075	-0.063	-0.049	-0.039	-0.026	-0.013	0.000		
FINAL CAMBER	↑ +0"	+0/8"	+03/16"	+05/16"	+07/16"	+01/2"	+09/16"	+011/16"	+03/4"	+013/16"	+015/16"	+1"	+11/16"	+11/16"	+11/8"	+13/16"	+13/16"	+11/4"	+11/4"	+11/4"	+11/4"	+11/4"	+11/4"	+11/4"	+11/4"	+13/16"	+13/16"	+11/8"	+11/16"	+11/16"	+1"	+015/16"	+013/16"	+03/4"	+011/16"	+09/16"	+01/2"	+07/16"	+05/16"	+03/16"	+01/8"	+0"

\*\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.



GIRDERS 2 & 3

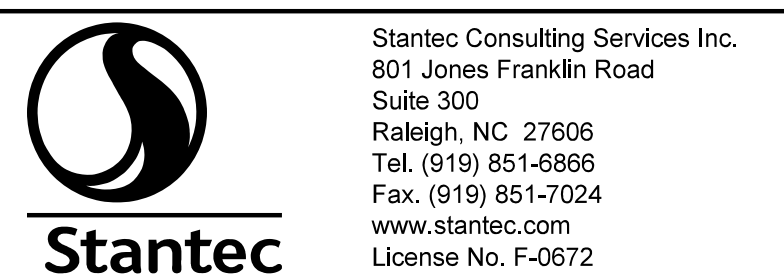
FORTIETH PTS. BTWN BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000		
CAMBER (GIRDER ALONE IN PLACE)	↑ 0.000	0.022	0.043	0.064	0.085	0.104	0.124	0.142	0.159	0.176	0.192	0.206	0.219	0.230	0.241	0.249	0.256	0.262	0.266	0.268	0.269	0.268	0.266	0.261	0.256	0.249	0.241	0.230	0.219	0.206	0.192	0.176	0.160	0.142	0.124	0.104	0.085	0.064	0.043	0.022	0.000		
DEFL. DUE TO SUPERIMPOSED DL **	↓ 0.000	-0.014	-0.029	-0.043	-0.054	-0.070	-0.083	-0.095	-0.105	-0.118	-0.128	-0.137	-0.145	-0.154	-0.160	-0.166	-0.171	-0.175	-0.177	-0.179	-0.180	-0.179	-0.177	-0.175	-0.171	-0.166	-0.160	-0.154	-0.145	-0.137	-0.128	-0.118	-0.105	-0.095	-0.083	-0.070	-0.054	-0.043	-0.029	-0.014	0.000		
FINAL CAMBER	↑ +0"	+0/16"	+03/16"	+01/4"	+03/8"	+07/16"	+01/2"	+09/16"	+05/8"	+011/16"	+03/4"	+013/16"	+07/8"	+015/16"	+015/16"	+1"	+1"	+11/16"	+11/16"	+11/16"	+11/16"	+11/16"	+11/16"	+11/16"	+11/16"	+1"	+1"	+015/16"	+015/16"	+07/8"	+013/16"	+03/4"	+011/16"	+011/16"	+011/16"	+09/16"	+01/2"	+07/16"	+03/8"	+01/4"	+03/16"	+01/16"	+0"

\*\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

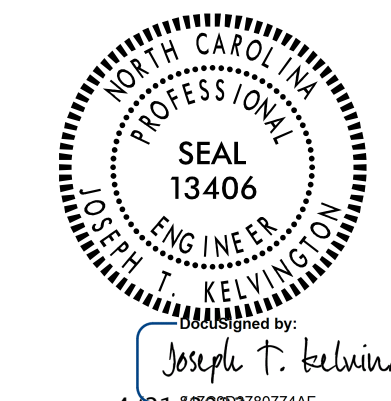
### SCHEMATIC CAMBER ORDINATES (SPAN A)

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT 'FINAL CAMBER (OR DEFLECTION)' WHICH IS SHOWN IN INCHES.  
 (+) FINAL CAMBER INDICATES NET UPWARD DISPLACEMENT.  
 (-) FINAL CAMBER INDICATES NET DOWNWARD DISPLACEMENT.

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-



DRAWN BY : N. D'AIUTO DATE : 05/01/18  
 CHECKED BY : J.T. KELVINGTON DATE : 12/30/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

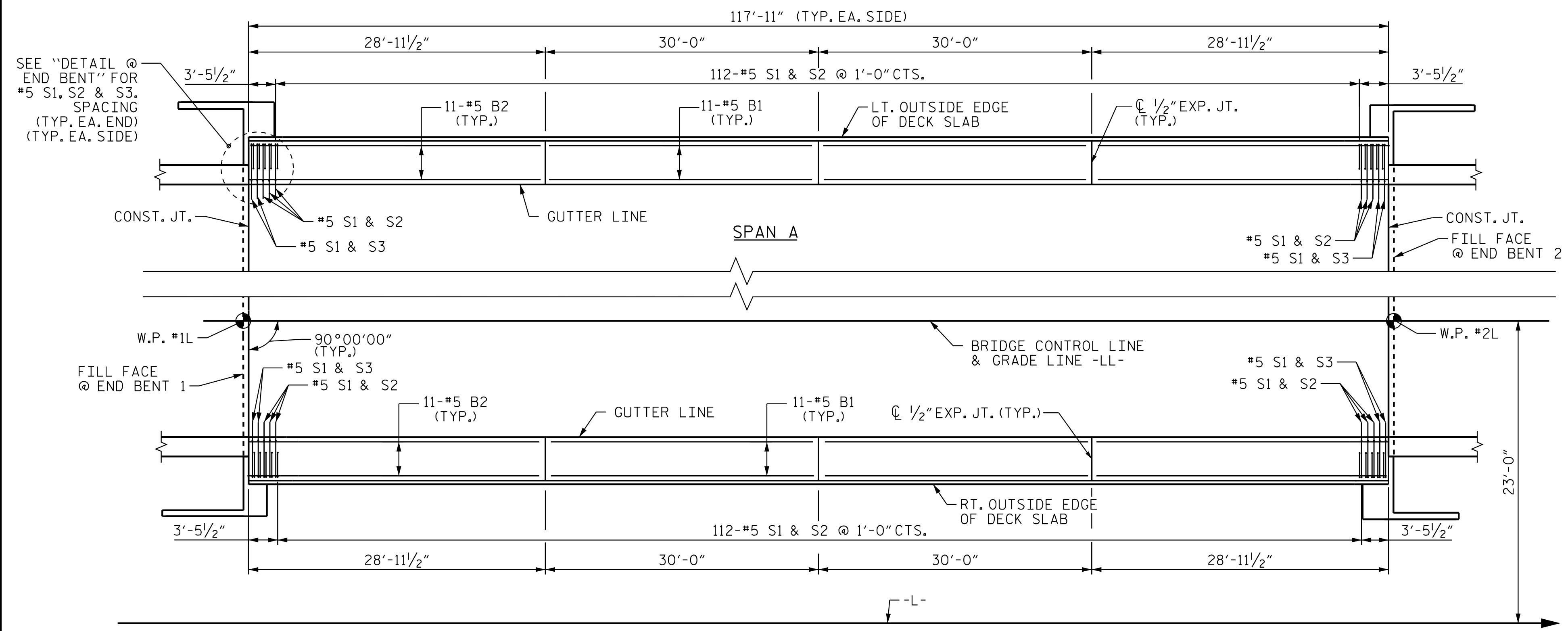


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 DEAD LOAD DEFLECTIONS  
 (LL)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	SB-16	
1			3			TOTAL SHEETS	
2			4			30	

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4/21/2023 jHogenbush



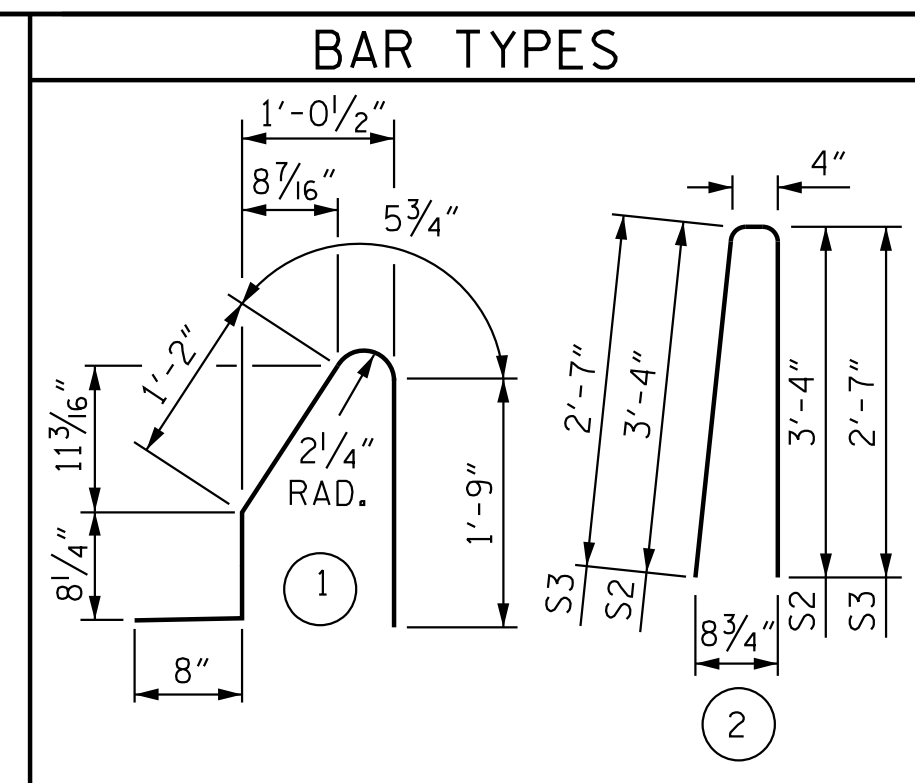
### NOTES

THE BARRIER RAIL IN THE 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.

THE JOINT IN THE DECK SLAB SHALL BE SAWED PRIOR TO CASTING OF THE BARRIER RAIL.

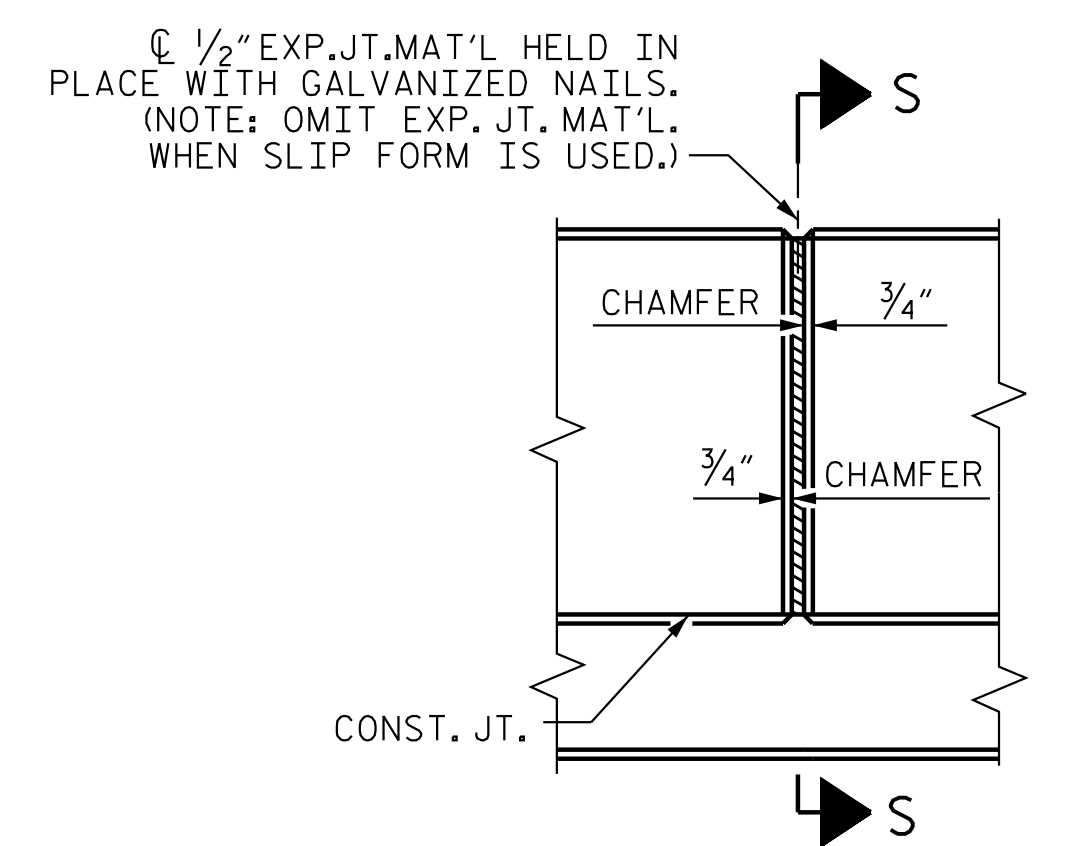


### BILL OF MATERIAL

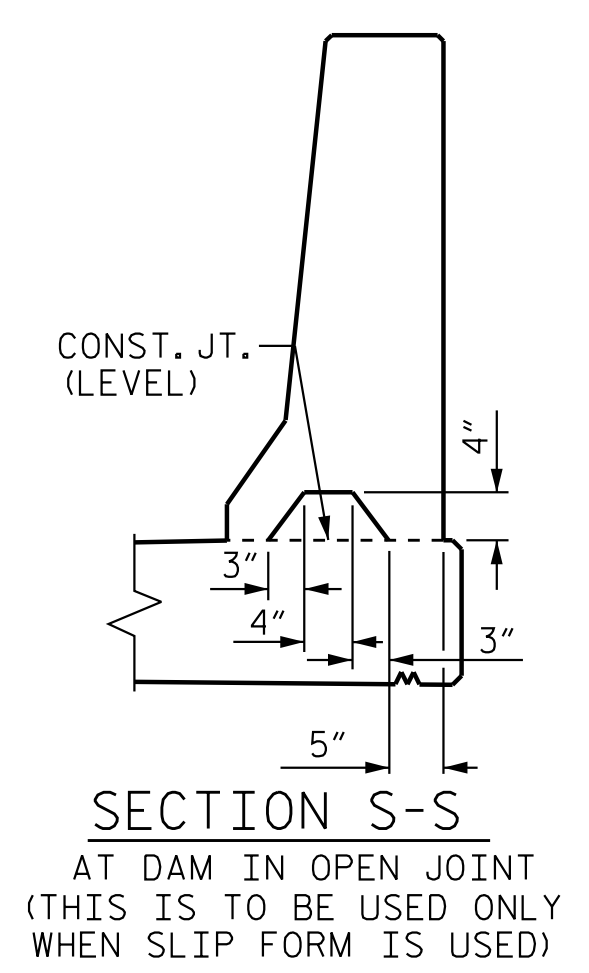
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	#5	STR	29'-7"	1358
* B2	44	#5	STR	28'-7"	1312
* S1	240	#5	1	4'-9"	1189
* S2	232	#5	2	7'-0"	1694
* S3	8	#5	2	5'-6"	46

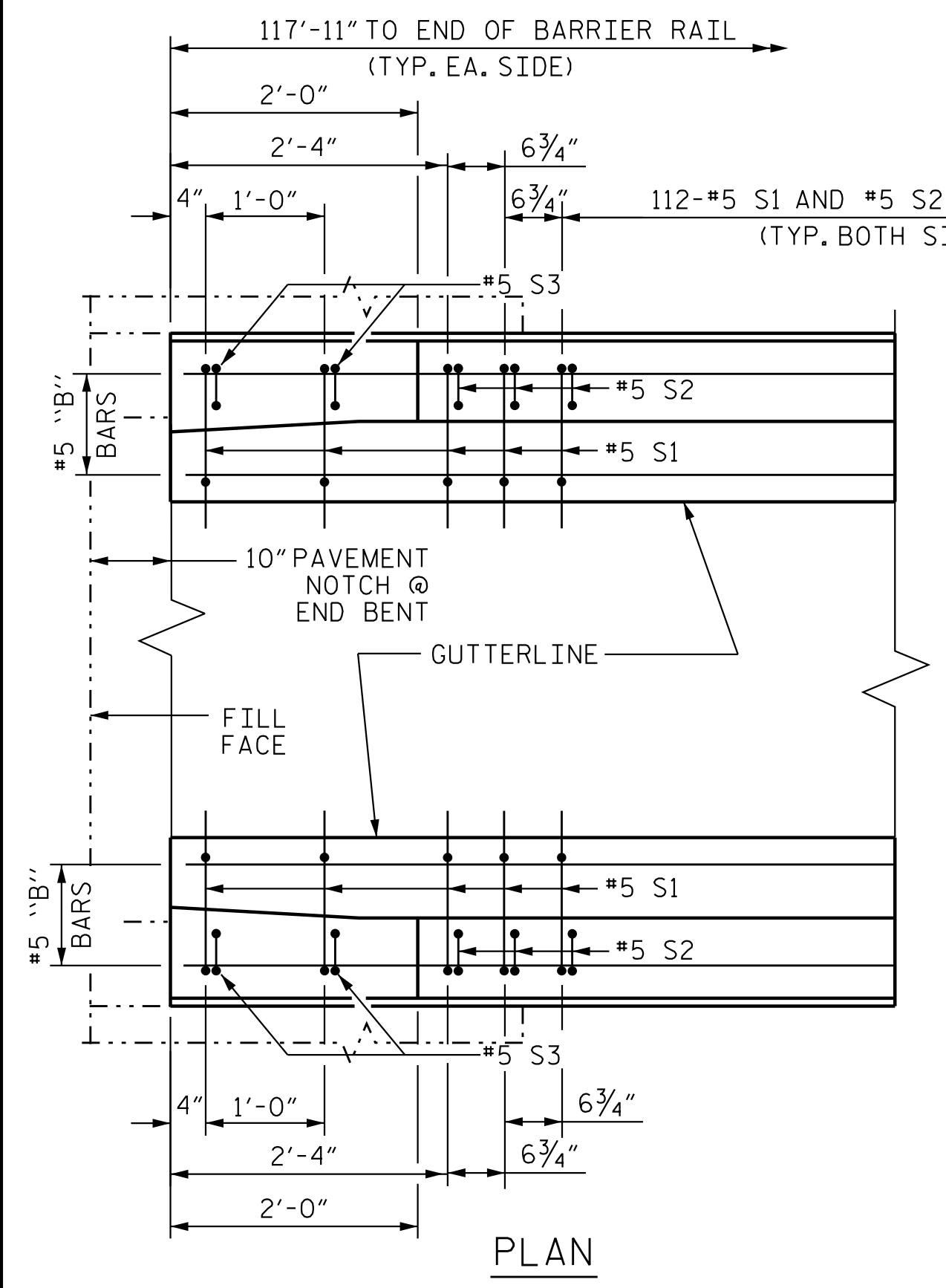
\* EPOXY COATED REINFORCING STEEL 5,599 LBS.  
 CLASS AA CONCRETE 32.0 CU. YDS.  
 CONCRETE BARRIER RAIL 235.83 LIN. FT.



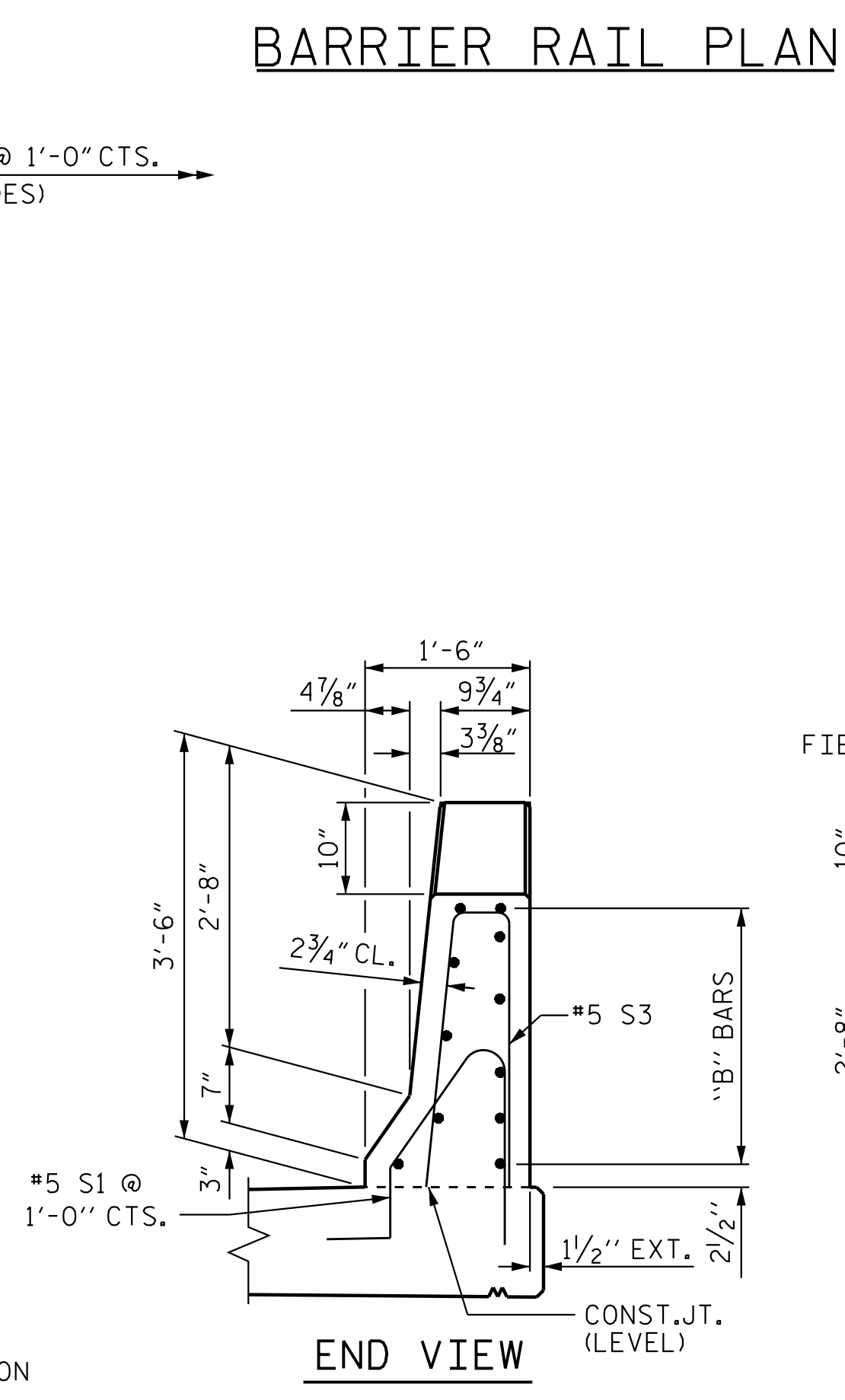
ELEVATION AT EXPANSION JOINTS  
BARRIER RAIL DETAILS



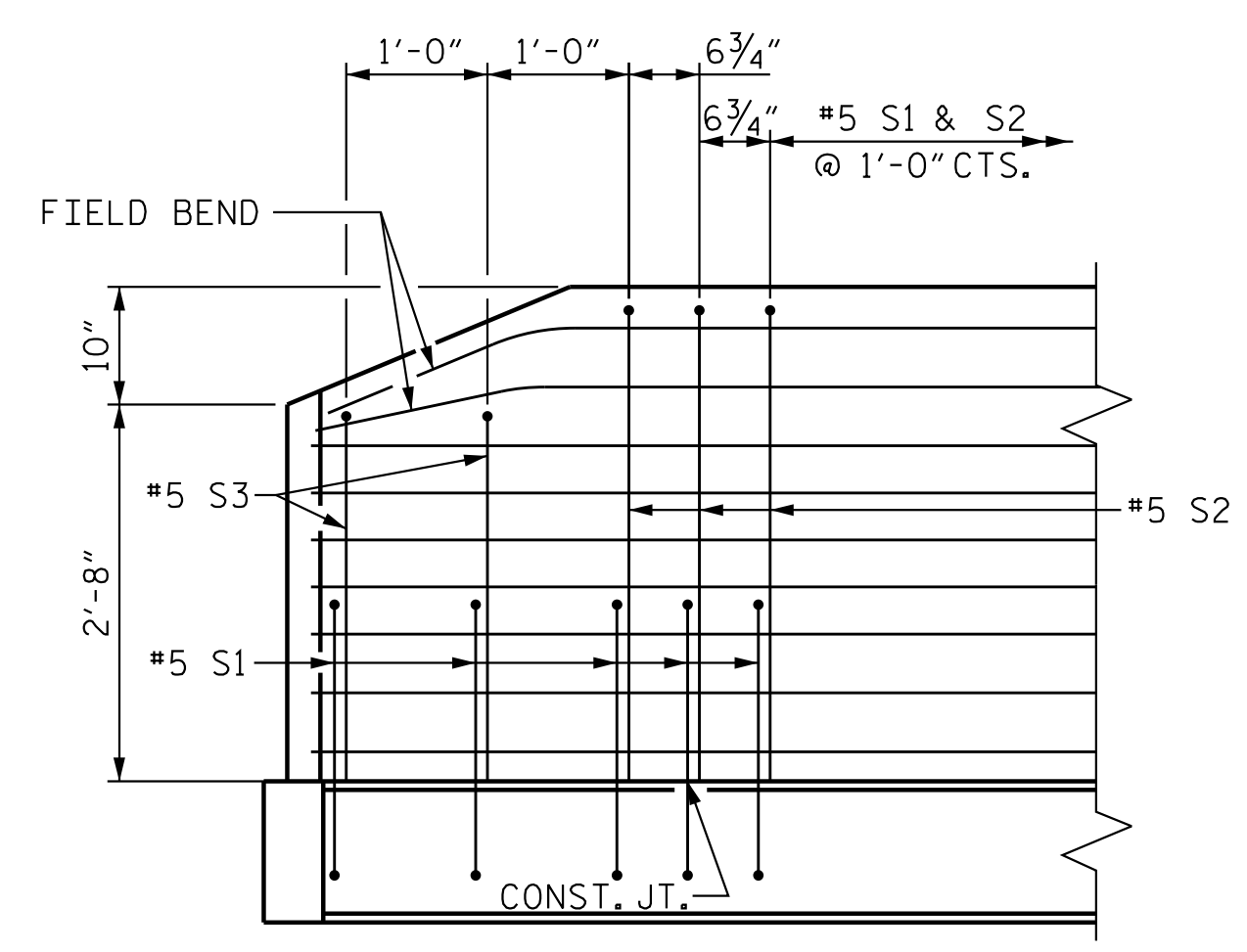
SECTION S-S  
AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



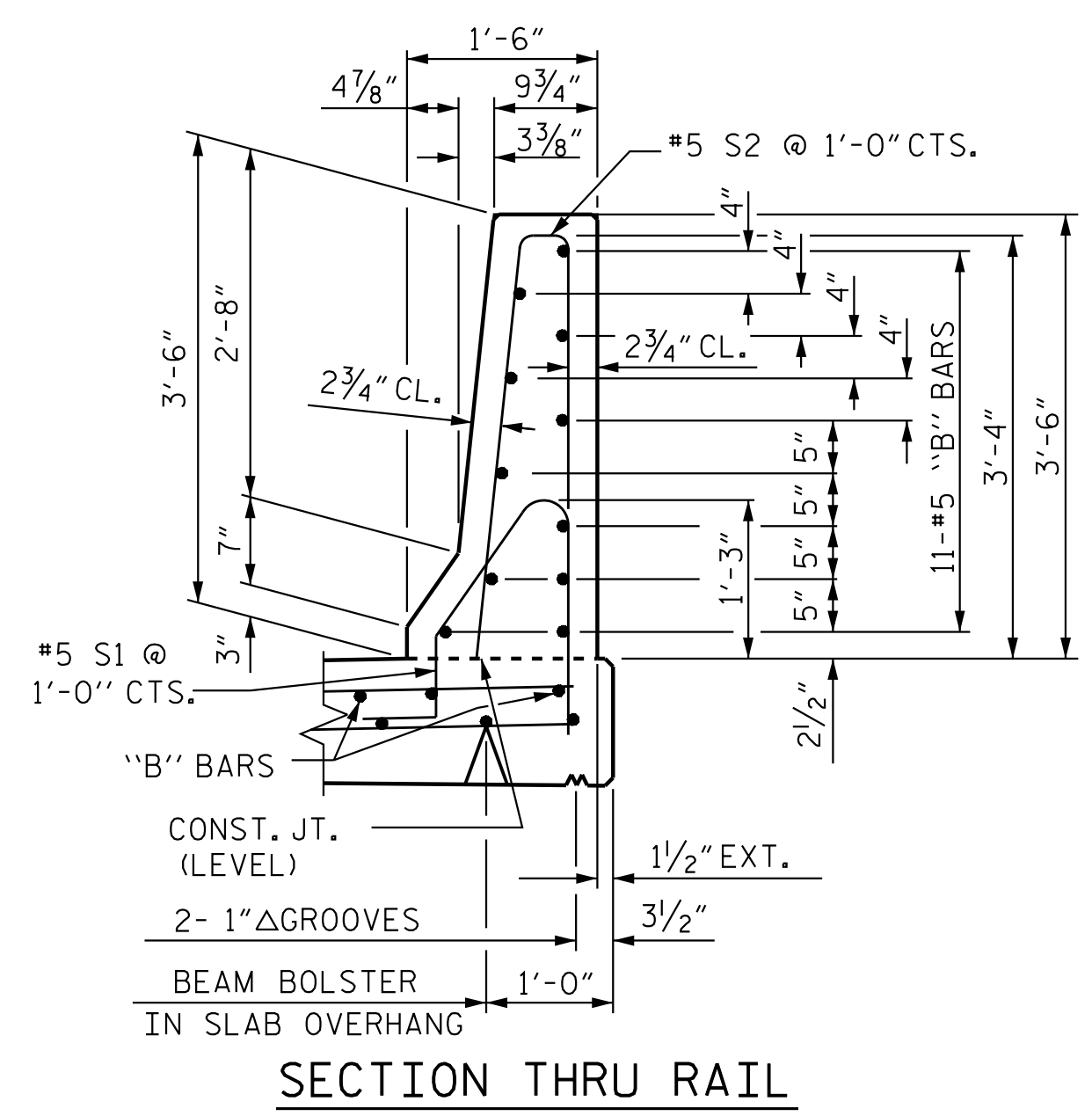
DETAIL @ END BENT  
END BENT 1 SHOWN END BENT 2 TYP. BY ROTATION



END VIEW



SIDE VIEW



SECTION THRU RAIL

### BARRIER RAIL PLAN

PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
 STATION: 810+00.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 CONCRETE  
 BARRIER RAIL  
 (LL)

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

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 801 Jones Franklin Road  
 Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

ASSEMBLED BY: N. D'AIUTO DATE: 05/01/18  
 CHECKED BY: J.T. KELVINGTON DATE: 12/05/22  
 DRAWN BY: ARB 5/87  
 CHECKED BY: SJD 9/87  
 REV. 7/12  
 REV. 6/13  
 REV. 12/17  
 MAA/GM  
 MAA/GM  
 MAA/GM  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

### END OF RAIL DETAILS

4/21/2023 jHogenbush 4/21/2023



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.)

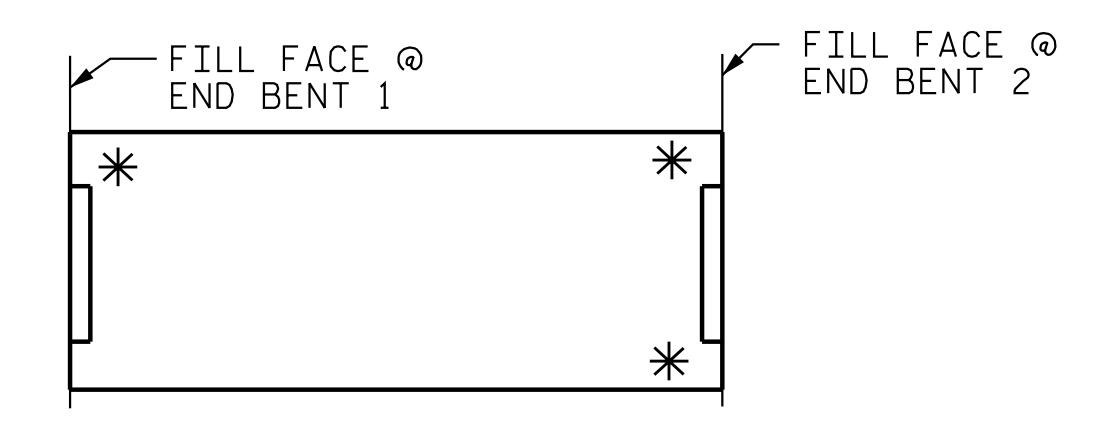
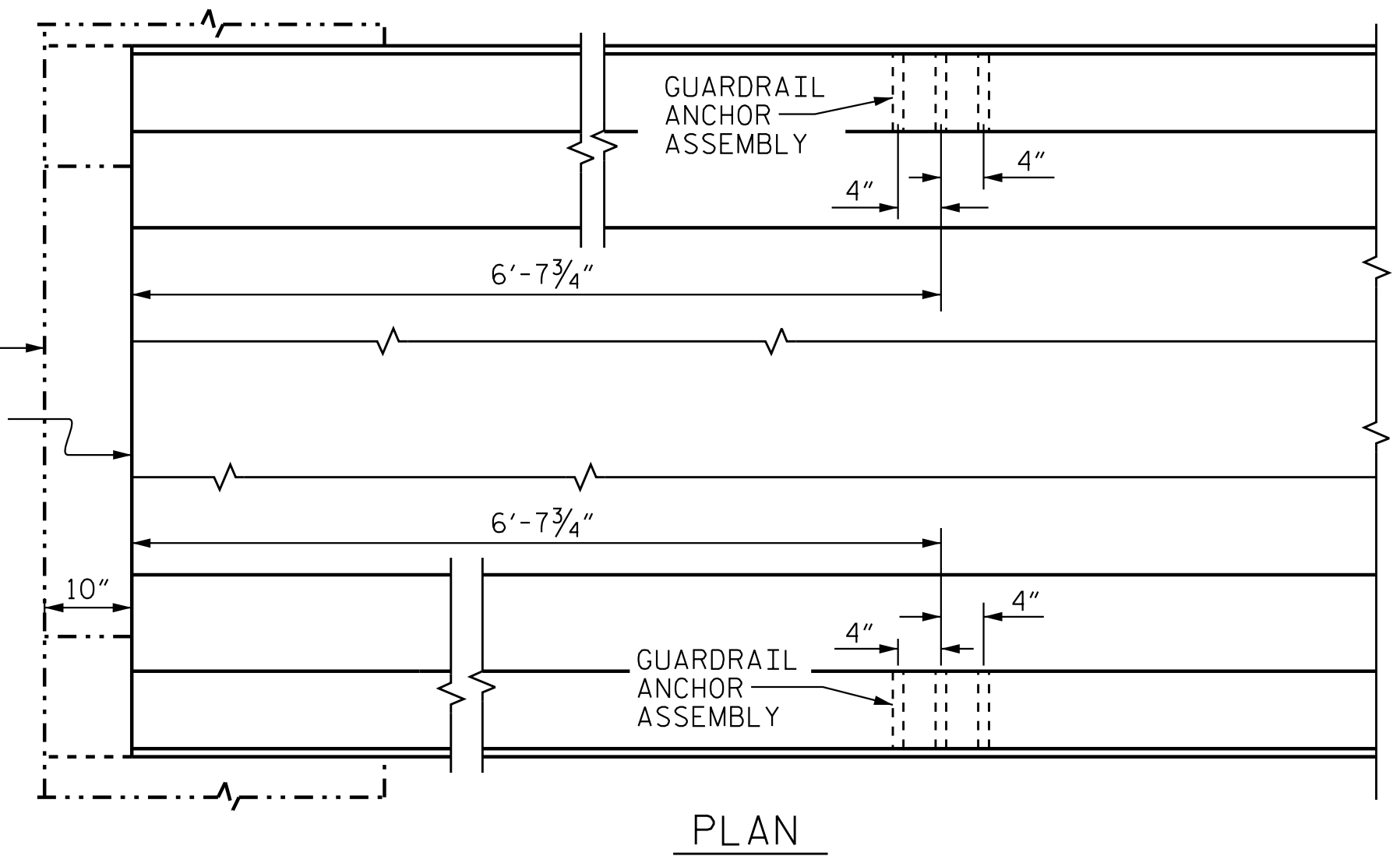
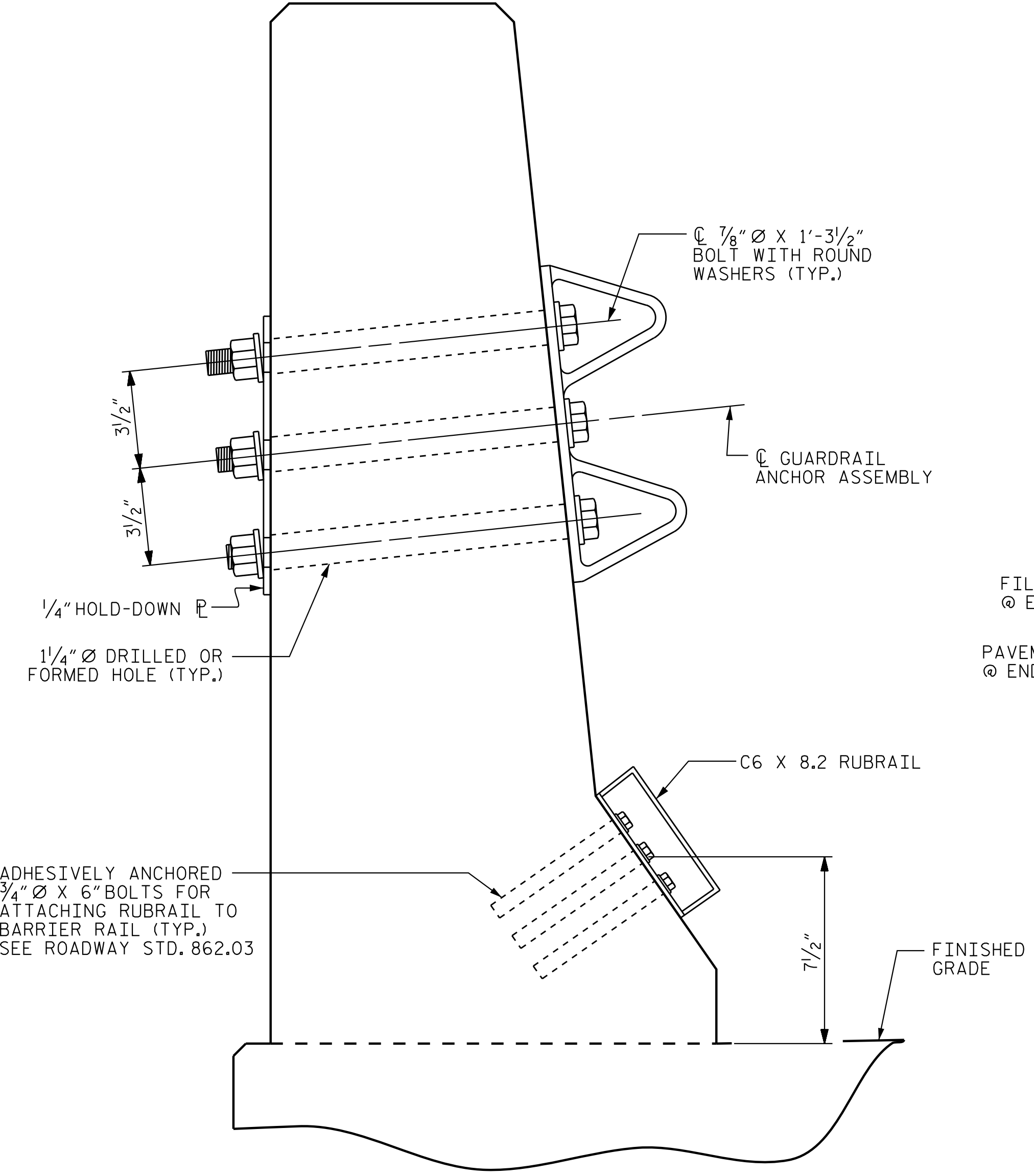
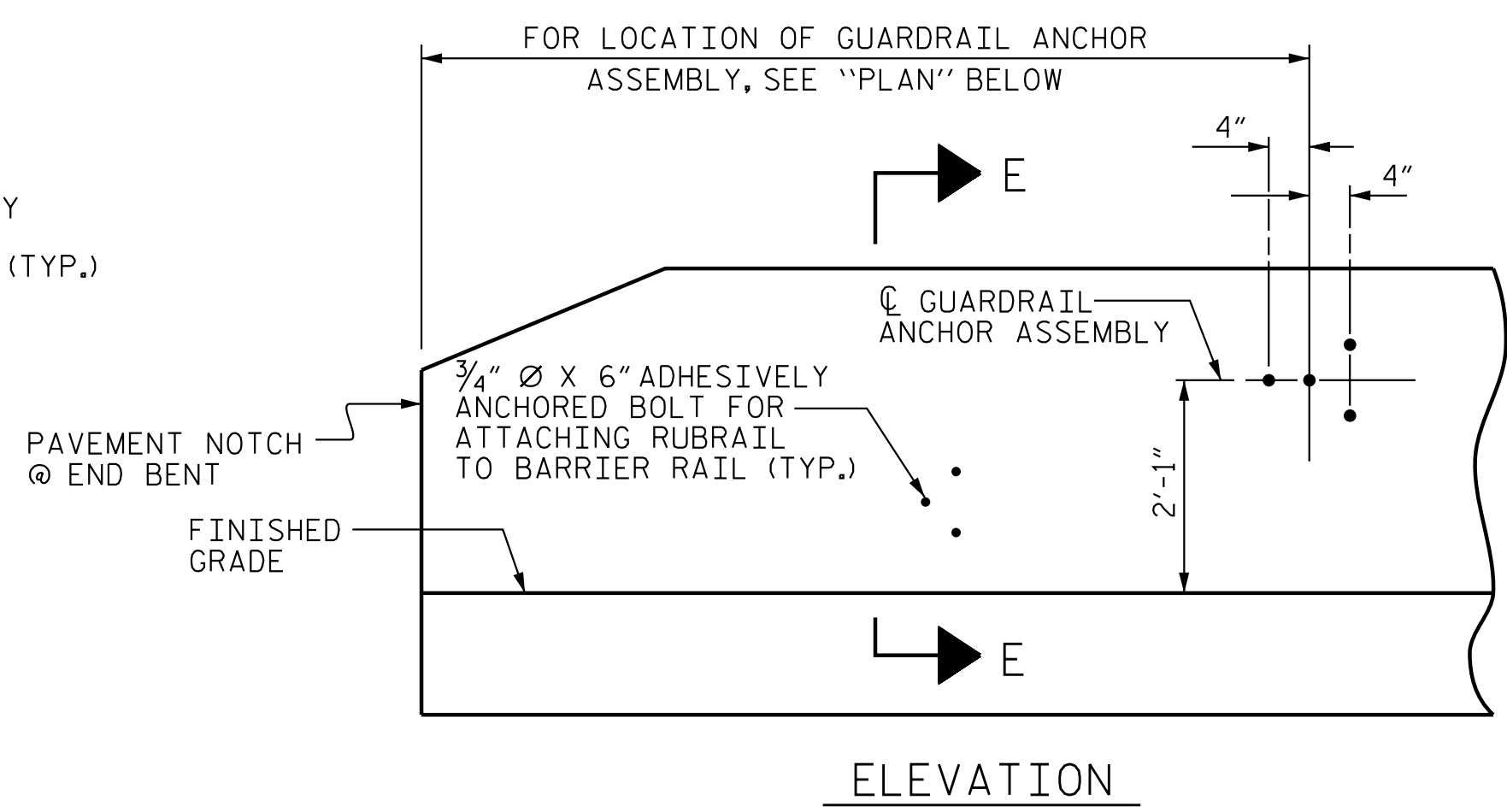
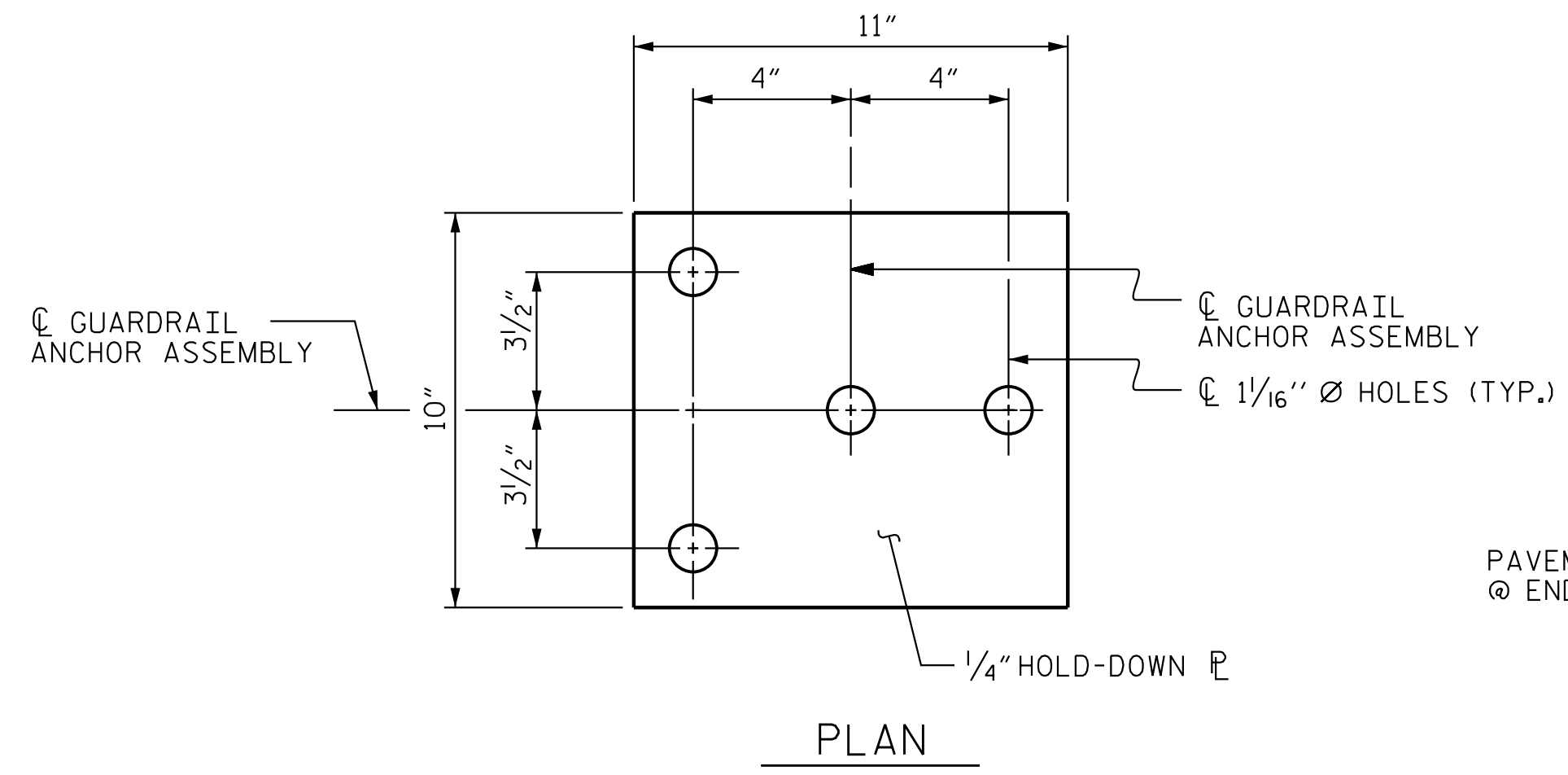
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

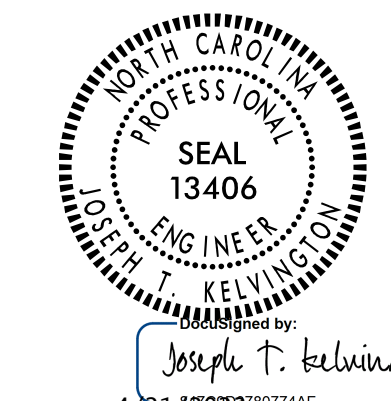
LOCATION OF ANCHORS FOR GUARDRAIL  
END BENT 1 SHOWN, END BENT 2 SIMILAR.

SECTION E-E  
GUARDRAIL ANCHOR ASSEMBLY DETAILS

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

Stantec Consulting Services Inc.  
801 Jones Franklin Road  
Suite 300  
Raleigh, NC 27606  
Tel. (919) 851-6866  
Fax. (919) 851-7024  
www.stantec.com  
License No. F-0672

DRAWN BY: N. D'AIUTO DATE: 05/01/18  
CHECKED BY: J.T. KELVINGTON DATE: 12/05/22  
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23



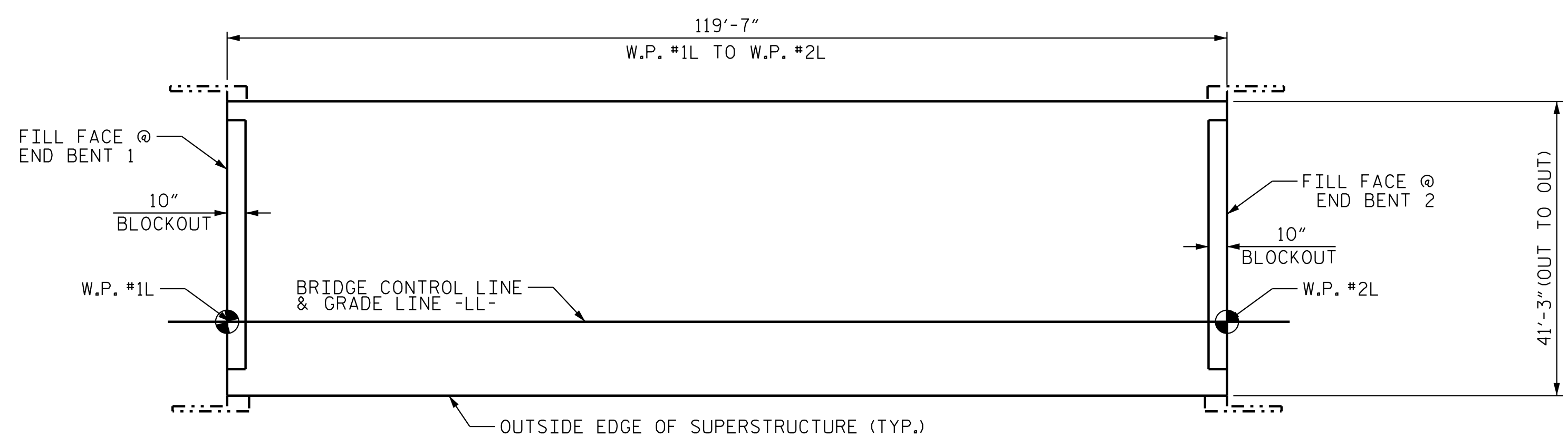
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RAI FTGH

STANDARD  
GUARDRAIL ANCHORAGE  
FOR BARRIER RAIL

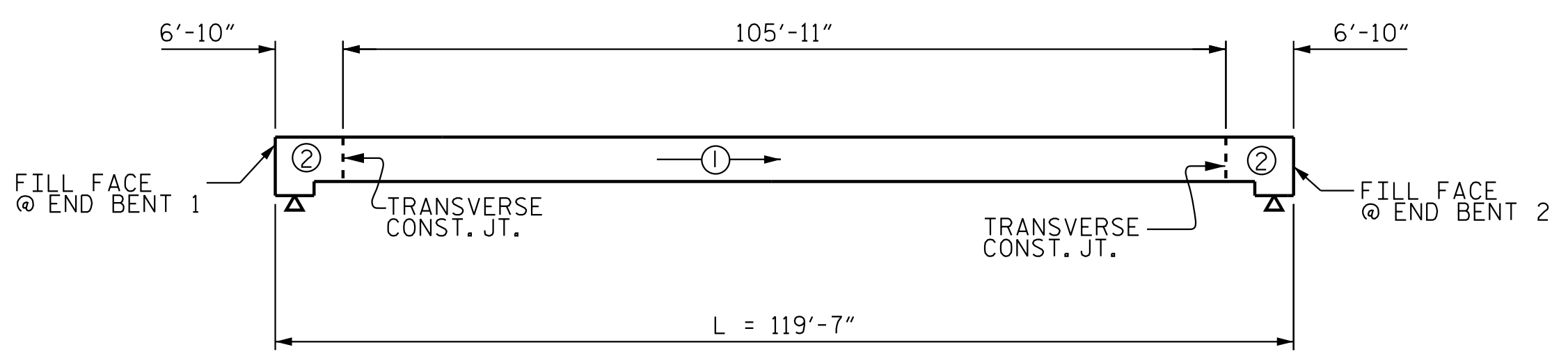
(LL)

REVISIONS						SHEET NO. S8-18
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			

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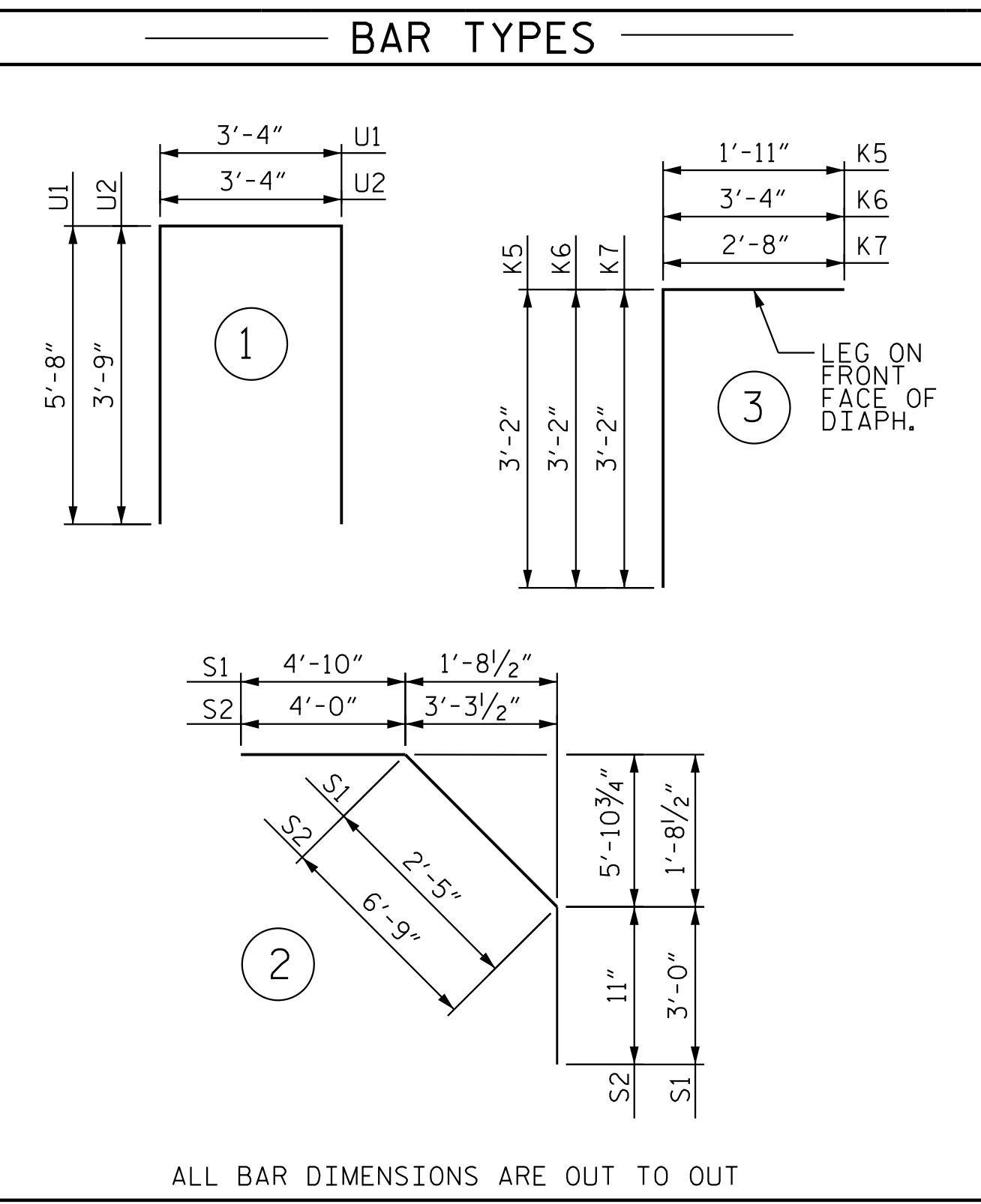


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 4,933)



POURING SEQUENCE ALONG GRADE LINE -LL-  
⊕ → = INDICATES POUR NUMBER AND DIRECTION OF POUR

REINFORCING BAR SCHEDULE					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	217	#5	STR	40'-9"	9223
A2	217	#5	STR	40'-9"	9223
*B1	58	#5	STR	60'-0"	3630
B2	82	#5	STR	59'-10"	5117
*B3	54	#6	STR	22'-11"	1859
*B4	54	#6	STR	25'-9"	2089
*G1	2	#5	STR	40'-9"	85
K1	28	#4	STR	21'-3"	397
K2	6	#4	STR	7'-0"	28
K3	30	#4	STR	9'-10"	197
K4	6	#4	STR	8'-6"	34
K5	4	#4	3	5'-1"	14
K6	20	#4	3	6'-6"	87
K7	4	#4	3	5'-10"	16
K8	12	#4	STR	6'-8"	53
*S1	60	#4	2	10'-3"	411
*S2	80	#4	2	11'-8"	623
U1	60	#4	1	14'-8"	588
U2	16	#4	1	10'-10"	116
REINFORCING STEEL				15,870 LBS.	
EPOXY COATED REINFORCING STEEL				17,920 LBS.	



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	140.2		
POUR #2	81.2		
TOTALS**	221.3	15,870	17,920

\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1692 SQ.FT.
BRIDGE DECK	4116 SQ.FT.
TOTAL	5808 SQ.FT.

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"			

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

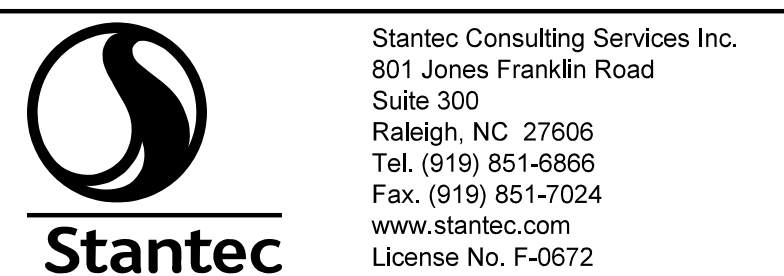


STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE BILL OF MATERIAL  
(LL)

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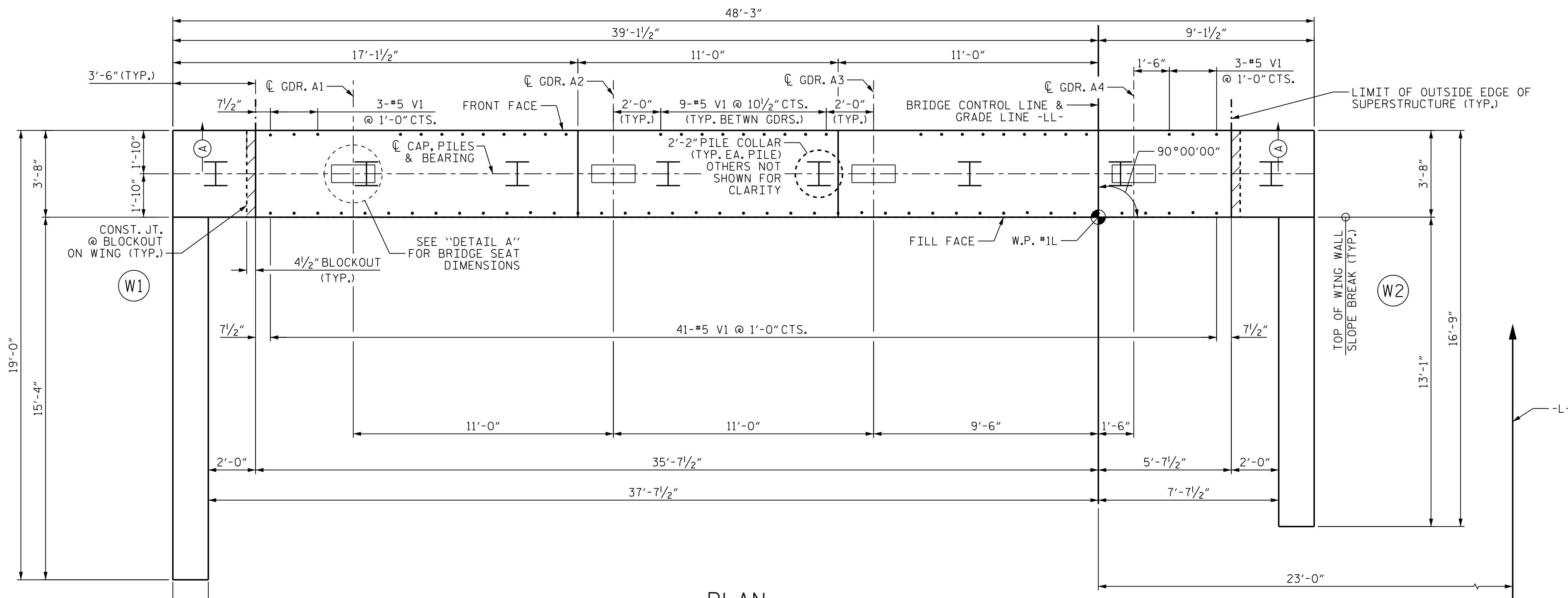
REVISIONS						SHEET NO. S8-19	TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				

6/22/2023  
jHogenbush  
6/22/2023  
c:\pvt\working\dmis6985\R2707D\_SMLL\_BM\_2200BB.dgn



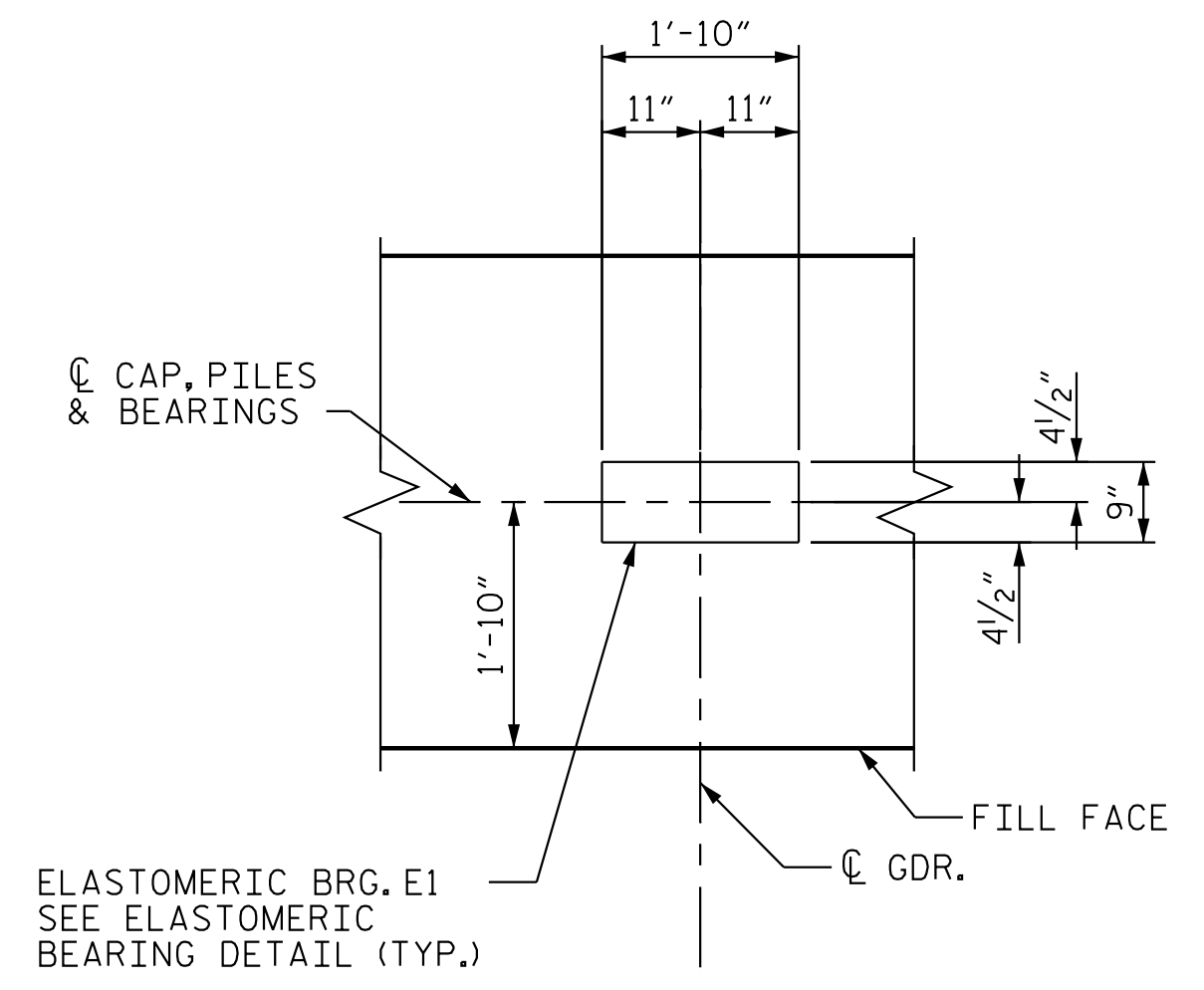
DRAWN BY: N. D'AIUTO DATE: 05/01/18  
CHECKED BY: J.T. KELVINGTON DATE: 12/05/22  
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 06/22/23



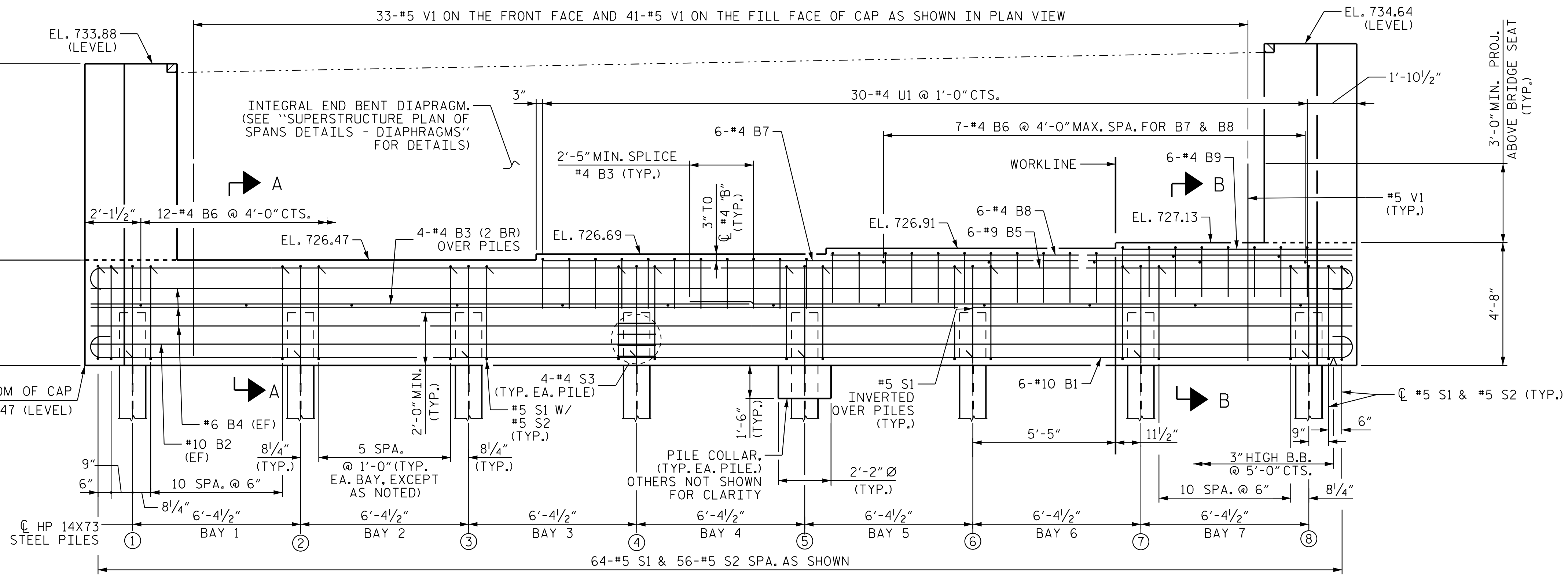


PLAN

- NOTES**
- (A) SLOPED TOP OF WING SURFACE BEYOND LIMIT OF INTEGRAL DIAPHR. SEE END BENT 1 WING WALL DETAILS, SHT. 2 OF 4.
  - (EF) - DENOTES EACH FACE
  - CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.
  - (2 BR) DENOTES 2 BAR RUN.
  - FOR SECTIONS A-A & B-B, SEE END BENT 1 DETAILS, SHT. 3 OF 4
  - FOR WING WALL DETAILS, SEE END BENT 1 DETAILS - WING WALLS, SHT. 2 OF 4



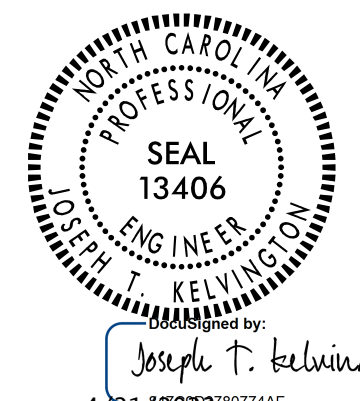
DETAIL A  
DIMENSIONS TYPICAL FOR EACH BEARING



ELEVATION

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 1 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 (LL)



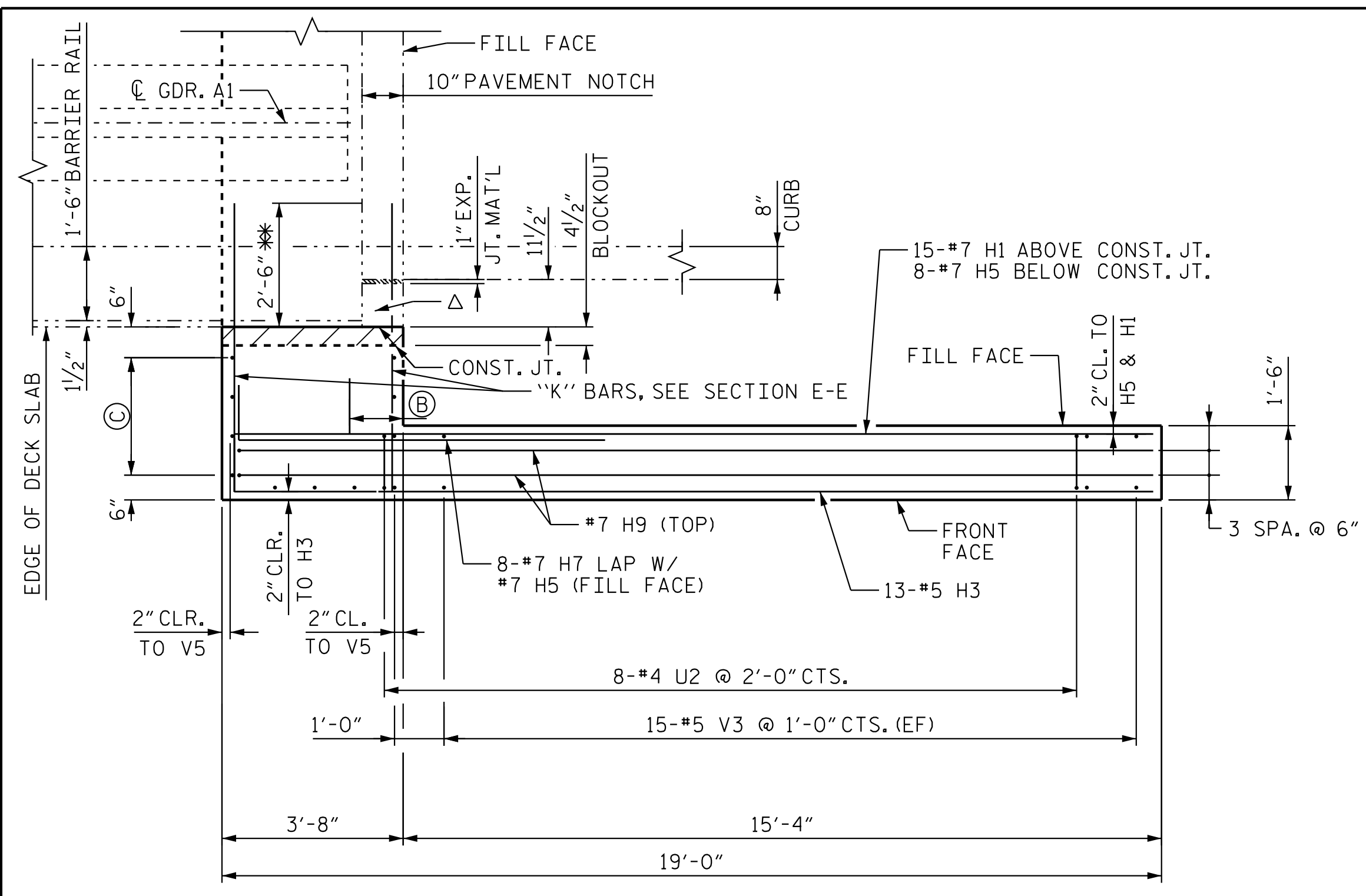
REVISIONS						SHEET NO. S8-20
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			

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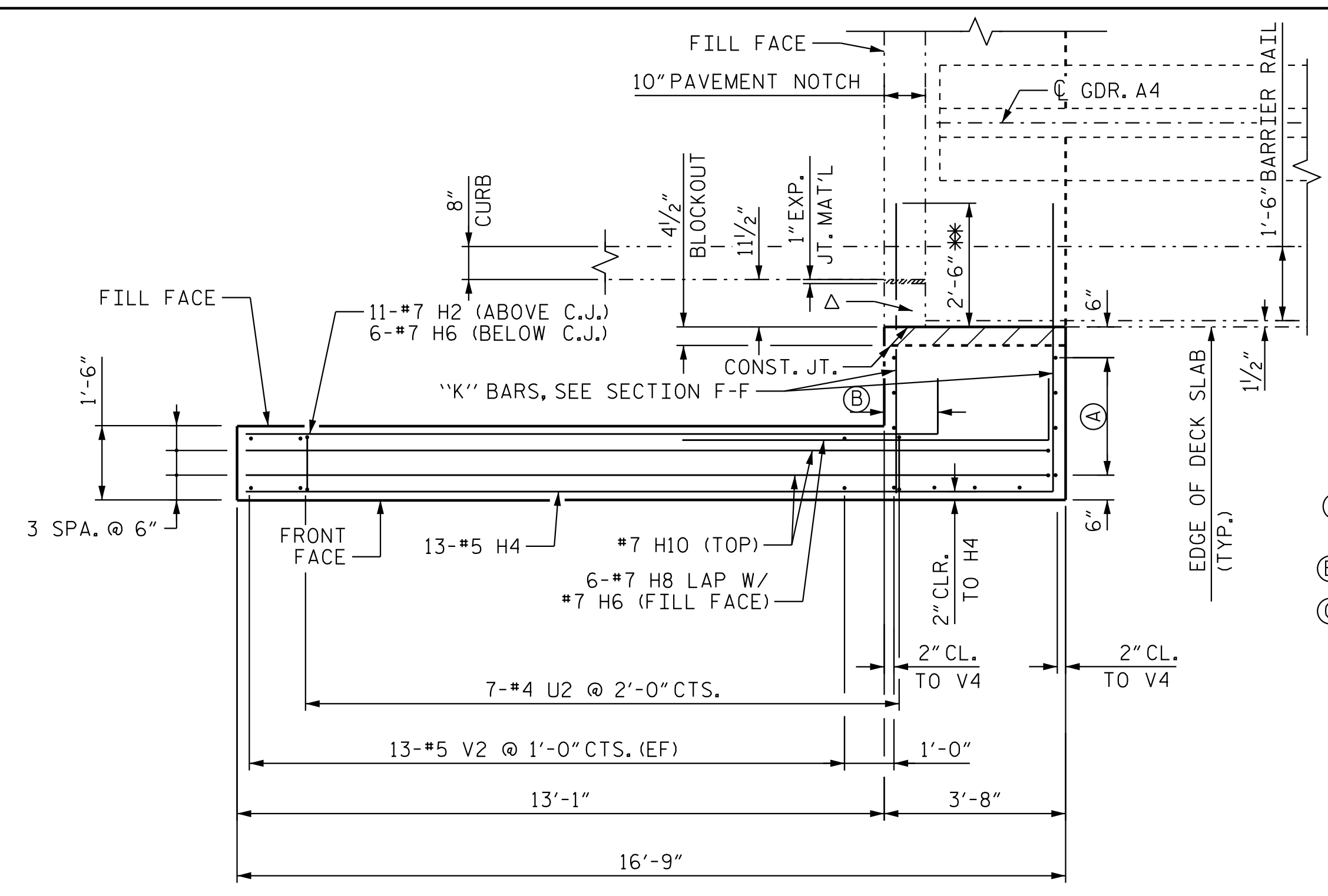
**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road  
 Suite 300  
 Raleigh, NC 27606  
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 Fax. (919) 851-7024  
 www.stantec.com  
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DRAWN BY: N. D'AIUTO DATE: 05/09/18  
 CHECKED BY: J.T. KELVINGTON DATE: 12/05/22  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

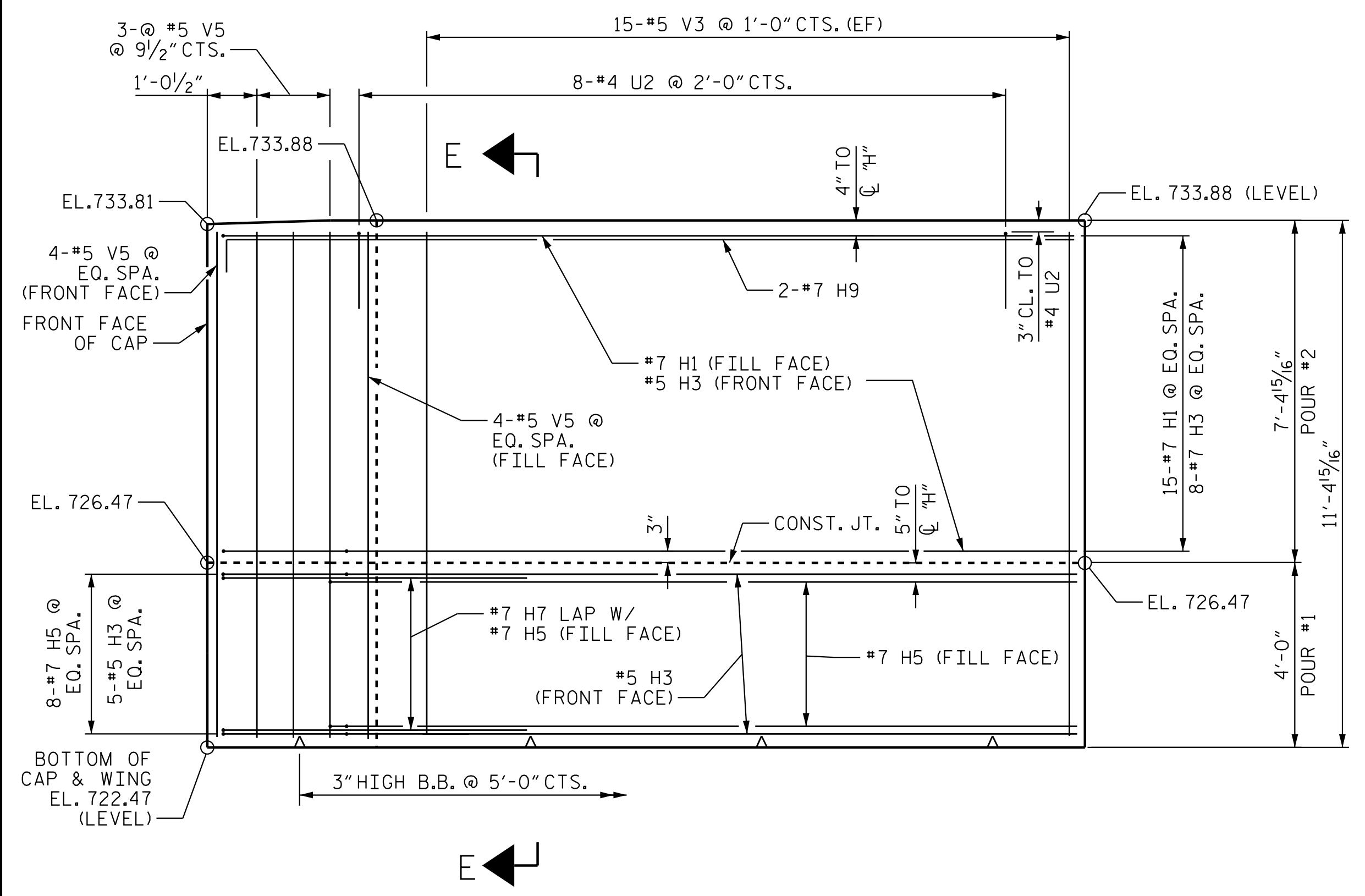
4/21/2023 4/21/2023 jHagenbush



PLAN OF LEFT WING (W1)

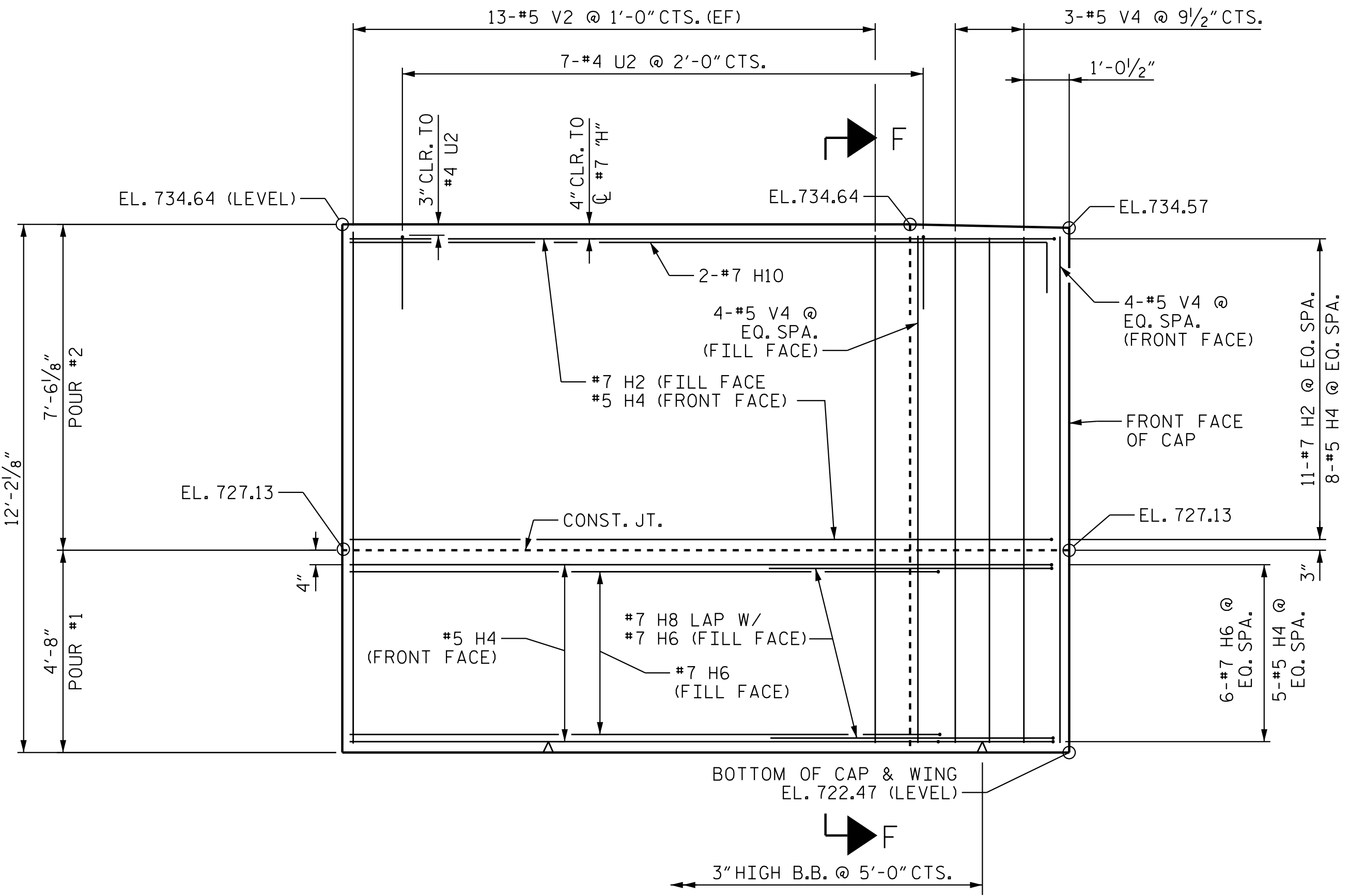


PLAN OF RIGHT WING (W2)



ELEVATION OF LEFT WING (W1)

NOTE: K1 & K2 BARS NOT SHOWN FOR CLARITY.



ELEVATION OF RIGHT WING (W2)

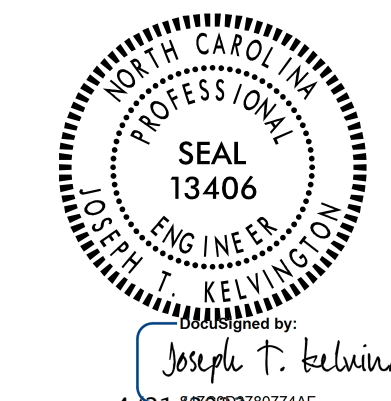
NOTE: K1 & K2 BARS NOT SHOWN FOR CLARITY.

NOTES:  
 Δ AREA BETWEEN APPROACH SLAB CURB AND BLOCKOUT SHALL MATCH THE FINISHED SURFACE OF THE BRIDGE DECK.  
 CONCRETE TO BE POURED IN THE HATCHED AREA TO MATCH THE TOP OF THE CURB AND THE INTEGRAL END BENT WING ELEVATION.  
 THE CONCRETE IN THE HATCHED AREA OF THE WING IS TO BE POURED AFTER THE JOINT BETWEEN THE BRIDGE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND IF SLIP FORMING IS USED, THE BARRIER HAS BEEN CAST.  
 #7 H7 AND #7 H8 BARS MAY BE REPOSITIONED SLIGHTLY VERTICALLY TO CLEAR CAP REINFORCEMENT AND HORIZONTALLY TO CLEAR THE PILE.  
 (A) 4-#5 V4 @ EQ. SPA. (FILL FACE & FRONT FACE)  
 (B) 1'-1" CLEAR FROM FILL FACE TO OUTSIDE OF "H".  
 (C) 4-#5 V5 @ EQ. SPA. (FILL FACE & FRONT FACE).  
 FOR SECTION E-E AND SECTION F-F, SEE END BENT 1 DETAILS, SHT. 3 OF 4.

PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1 -  
 WING WALLS  
 (LL)



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 www.stantec.com  
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DRAWN BY: E. M. MURR DATE: 05/09/18  
 CHECKED BY: J.T. KELVINGTON DATE: 12/05/22  
 DESIGN OF RECORD: J.T. KELVINGTON DATE: 04/21/23

NOTE: TOP SURFACE OF END BENT WING CAST ON TOP OF THE END BENT CAP SHALL BE SLOPED TRANSVERSELY FROM FILL FACE OF THE CAP TO FRONT FACE AT A RATE OF 1/4" / FT.  
 (EF) DENOTES EACH FACE.  
 \*\* #4 K2 2'-6" PROJECTION BEYOND CONST. JOINT.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

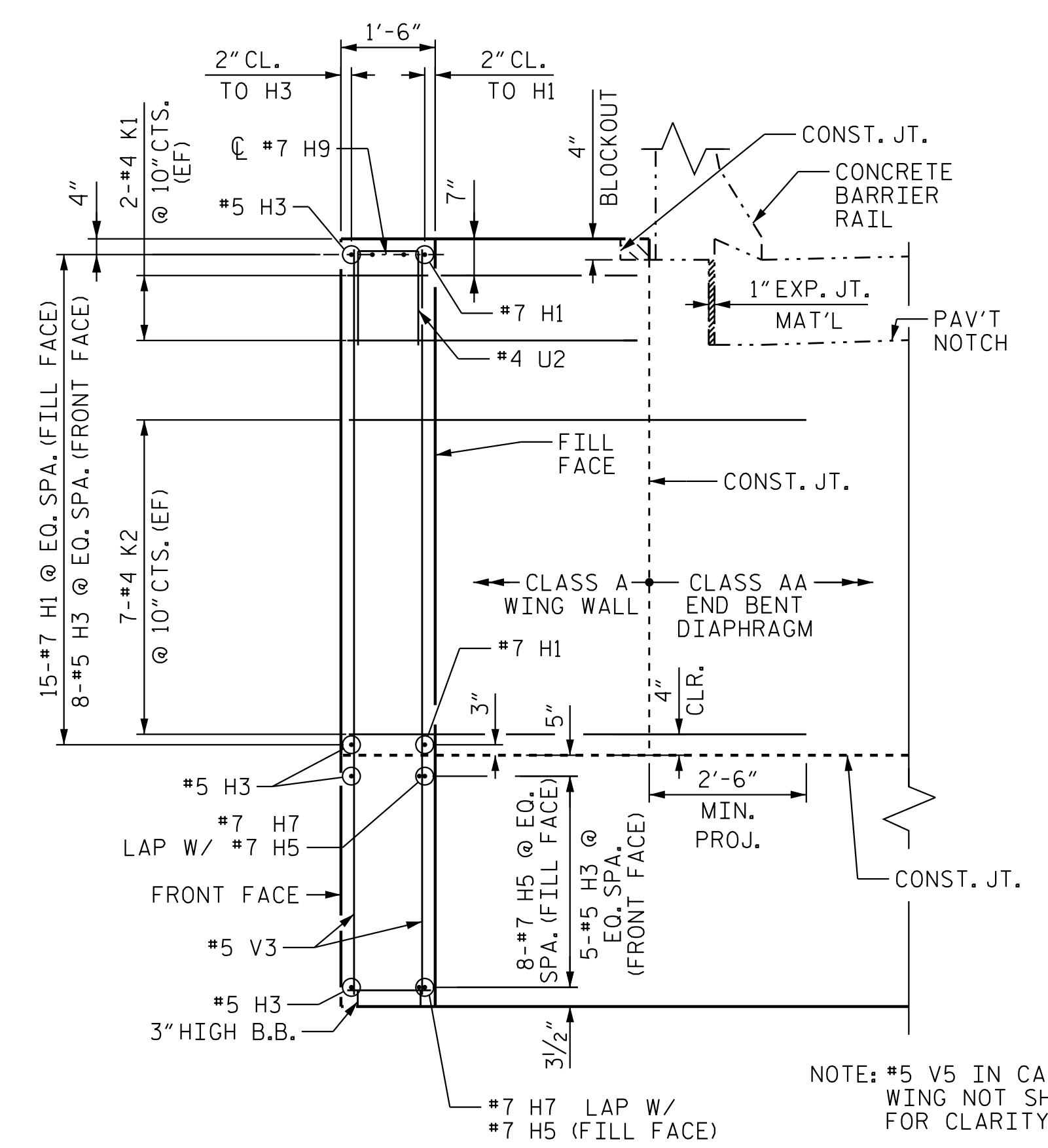
REVISIONS						SHEET NO. S8-21
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			



jHagenbush

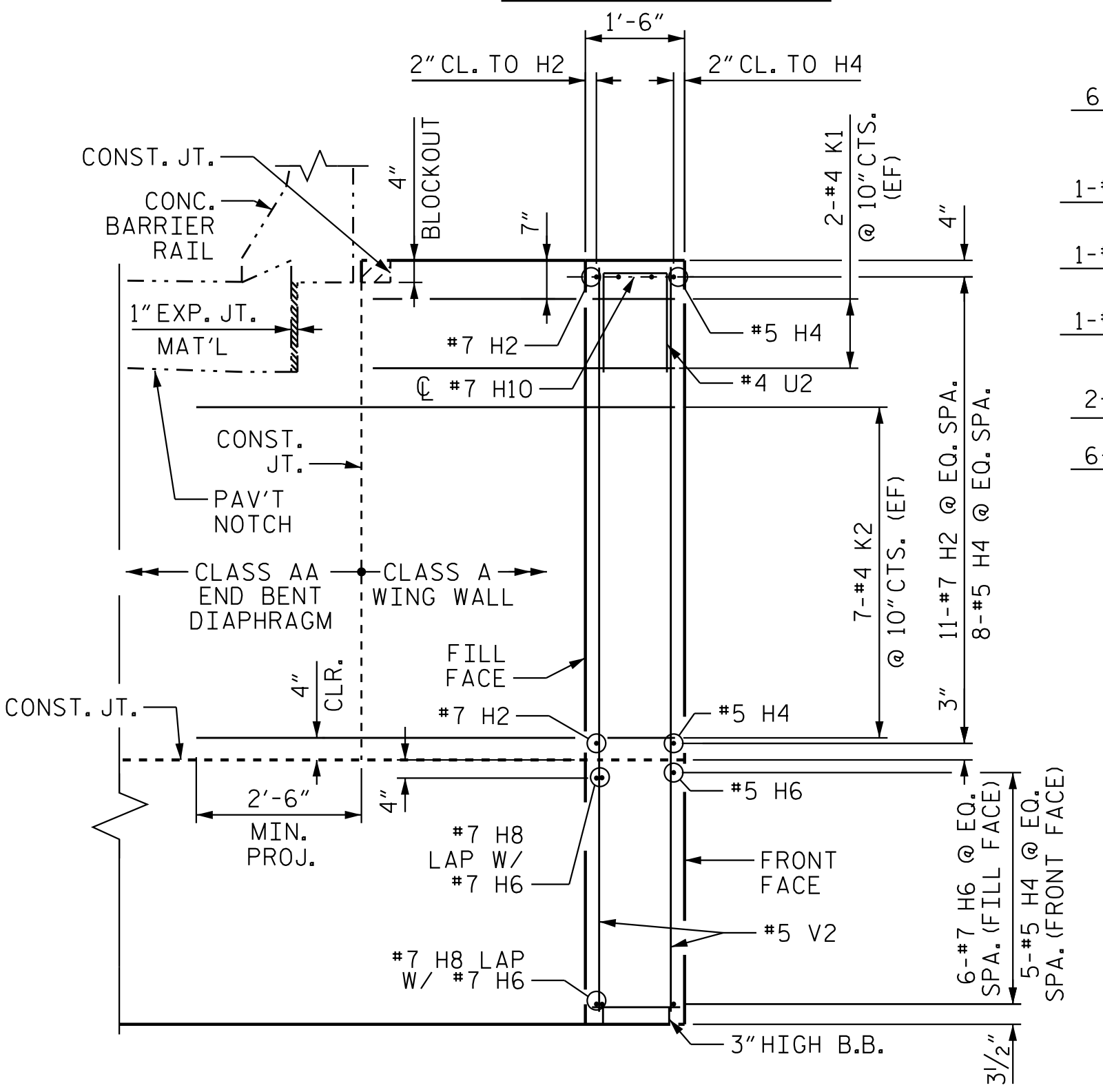
4/21/2023

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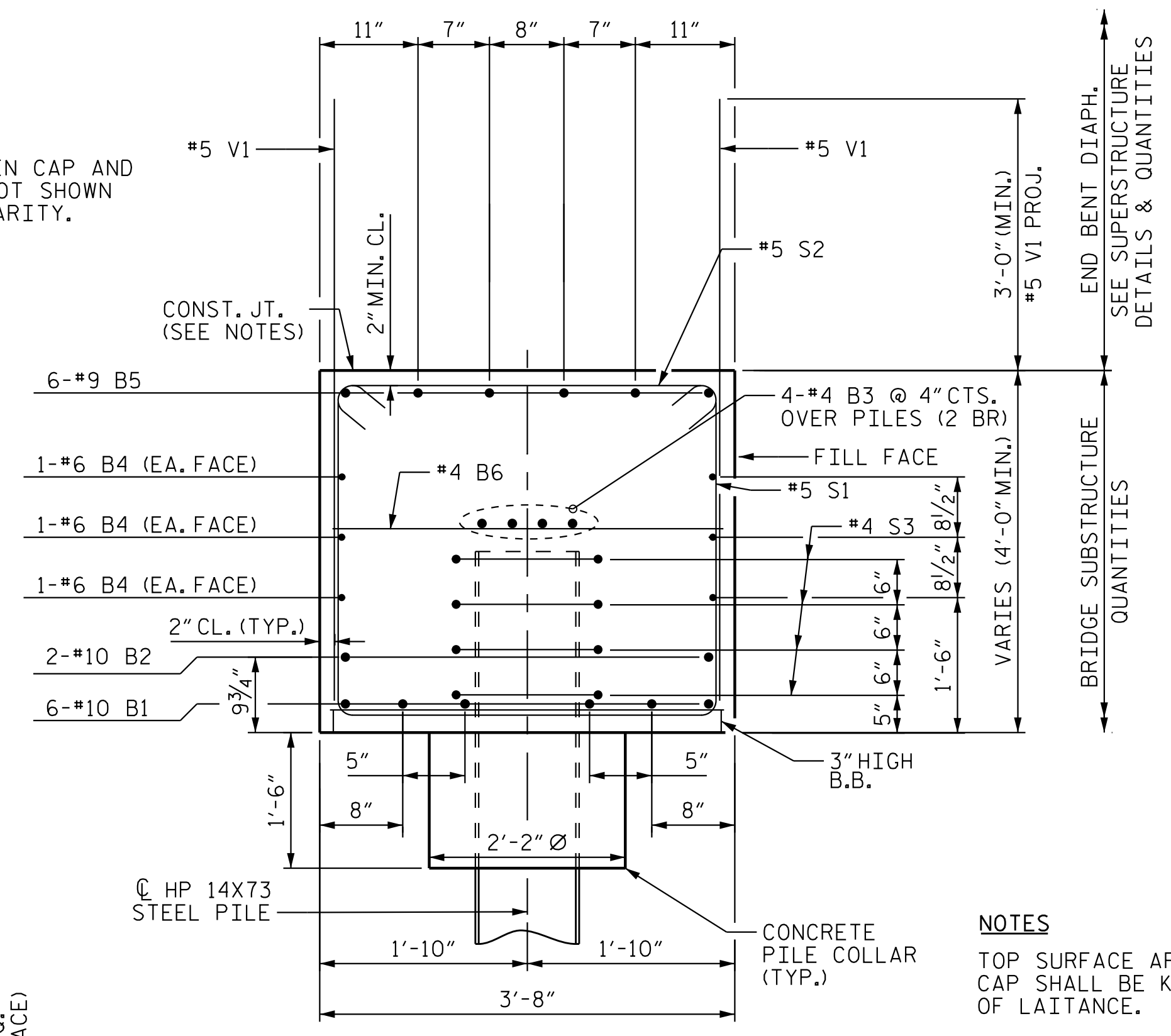
SECTION E-E

NOTE: #5 V5 IN CAP AND WING NOT SHOWN FOR CLARITY.



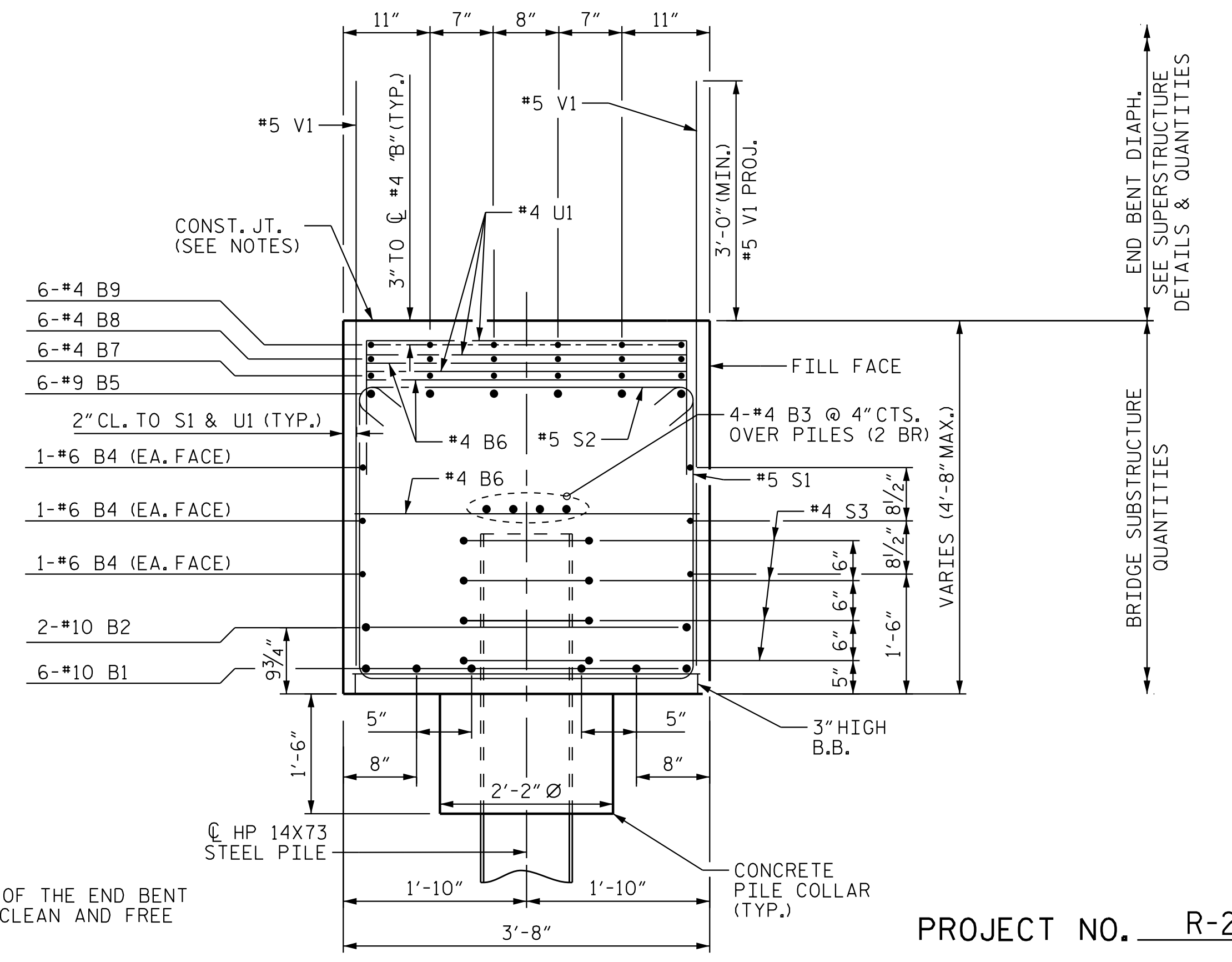
SECTION F-F

NOTE: #5 V4 IN CAP AND WING NOT SHOWN FOR CLARITY.



SECTION A-A

SEE "END BENT 1", SHEET 1 OF 4.



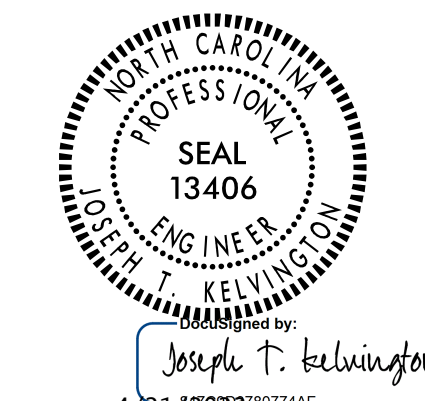
SECTION B-B

SEE "END BENT 1", SHEET 1 OF 4.

**NOTES**  
 TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.  
 ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP TO PROVIDE MIN. SURFACE AMPLITUDE OF 1/4", EXCEPT UNDER BEARING AREAS.  
 (2 BR) DENOTES 2 BAR RUN.  
 (EF) DENOTE EACH FACE.

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 License No. F-0672

DRAWN BY: N. D'AIUTO DATE: 05/09/18  
 CHECKED BY: J.T. KELVINGTON DATE: 01/15/23  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

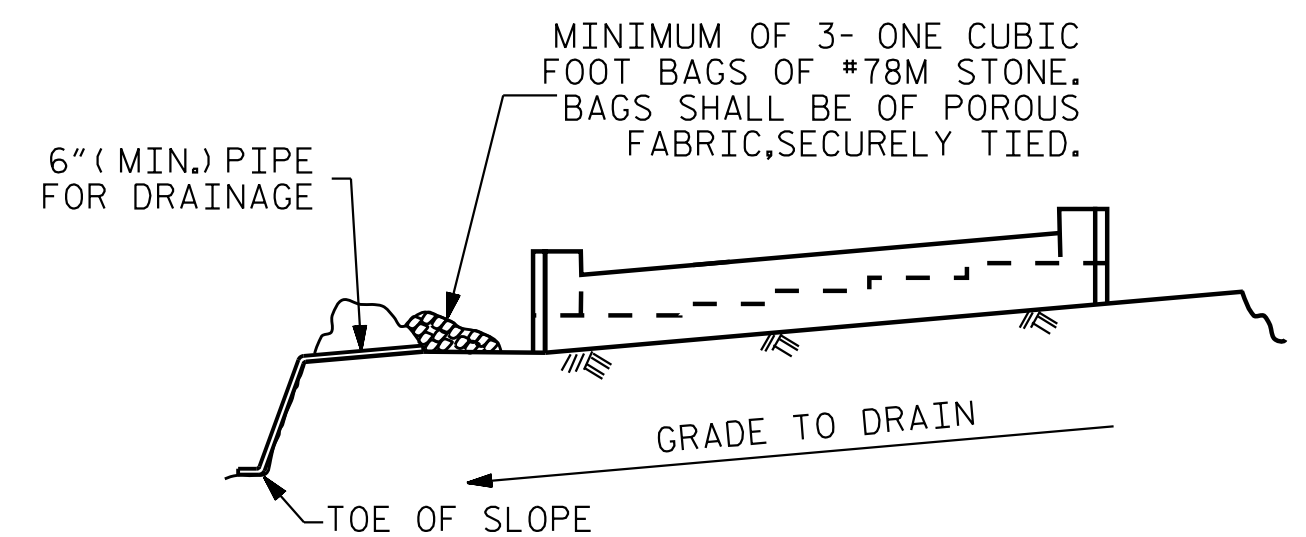


PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1 DETAILS  
 (LL)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S8-22	
1			3			TOTAL SHEETS 30	
2			4				

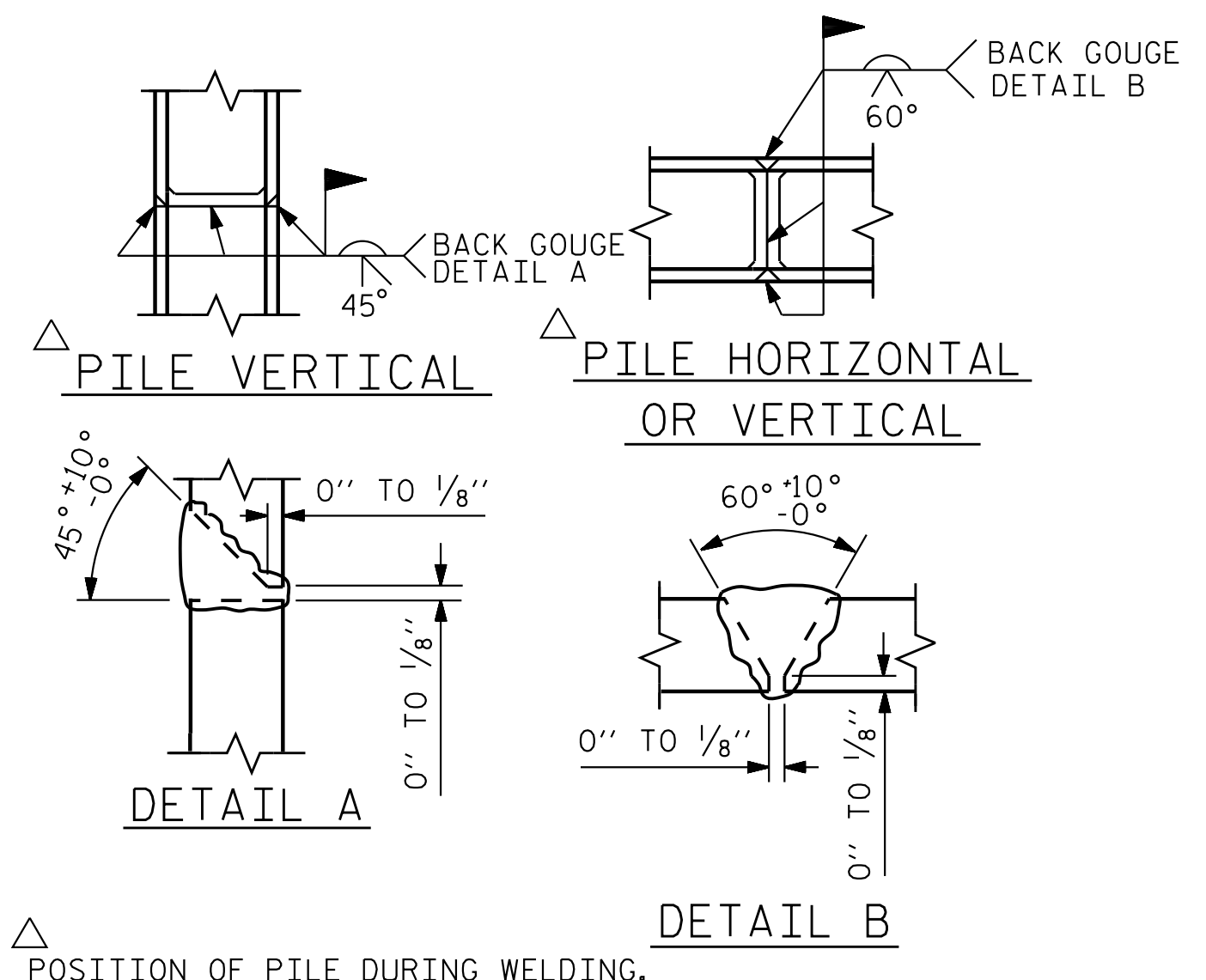


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

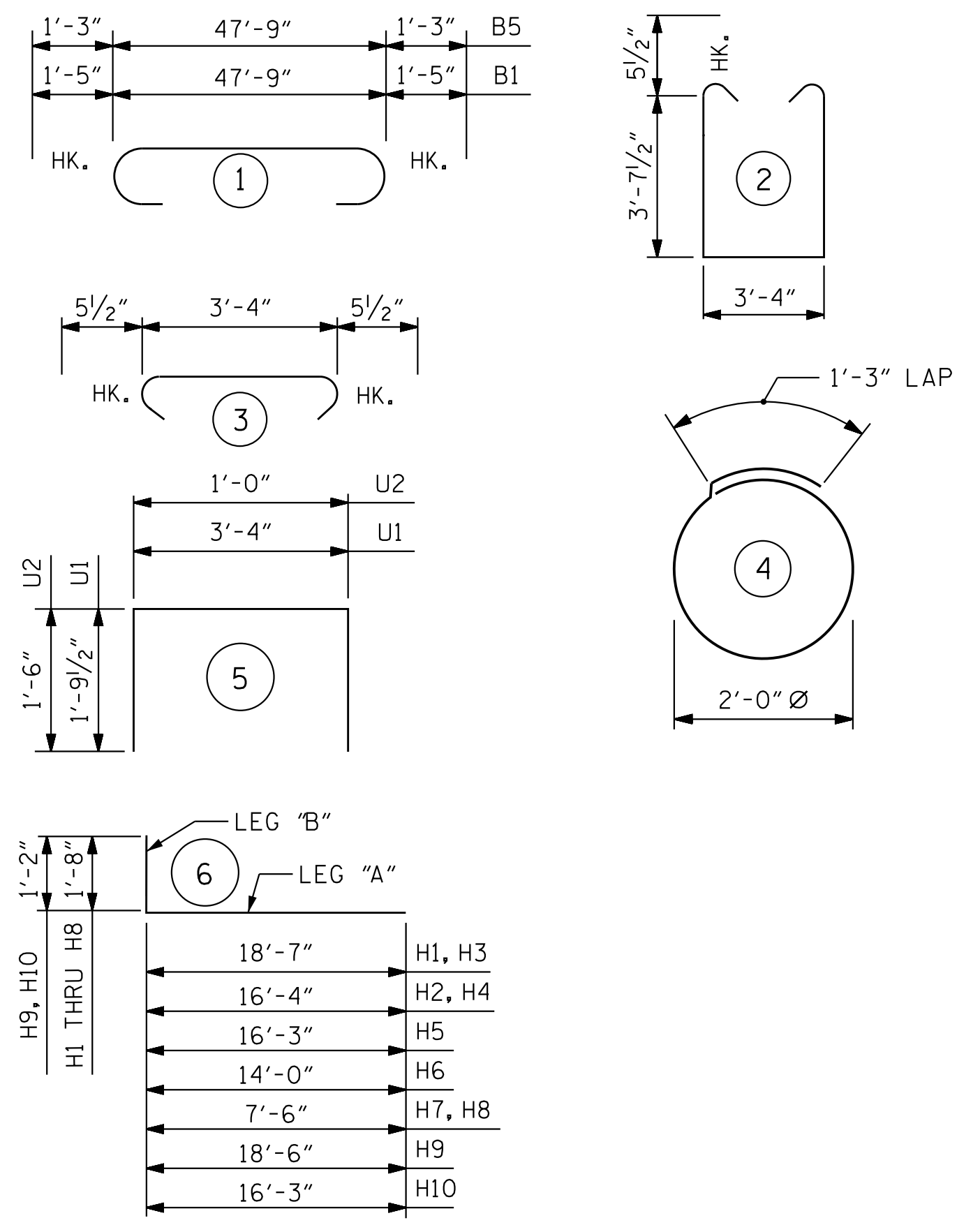
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



**PILE SPLICE DETAILS**

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT.

**BILL OF MATERIAL**

**END BENT 1**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	50'-7"	1306
B2	2	#10	STR	47'-3"	407
B3	8	#4	STR	24'-10"	133
B4	6	#6	STR	47'-9"	430
B5	6	#9	1	50'-3"	1025
B6	19	#4	STR	3'-4"	42
B7	6	#4	STR	30'-5"	122
B8	6	#4	STR	19'-5"	78
B9	6	#4	STR	8'-5"	34
H1	15	#7	6	20'-3"	621
H2	11	#7	6	18'-0"	405
H3	13	#5	6	20'-3"	275
H4	13	#5	6	18'-0"	244
H5	8	#7	6	17'-11"	293
H6	6	#7	6	15'-8"	192
H7	8	#7	6	9'-2"	150
H8	6	#7	6	9'-2"	112
H9	2	#7	6	19'-8"	80
H10	2	#7	6	17'-5"	71
K1	8	#4	STR	2'-9"	15
K2	28	#4	STR	5'-10"	109
S1	64	#5	2	11'-6"	768
S2	56	#5	3	4'-3"	248
S3	32	#4	4	7'-7"	162
U1	30	#4	5	6'-11"	139
U2	15	#4	5	4'-0"	40
V1	74	#5	STR	7'-5"	572
V2	26	#5	STR	11'-10"	321
V3	30	#5	STR	11'-1"	347
V4	11	#5	STR	11'-9"	135
V5	11	#5	STR	11'-0"	126
REINFORCING STEEL					LBS. 9,002
CLASS A CONCRETE BREAKDOWN:					
POUR#1: CAP, COLLARS, & WINGS					C.Y. 36.3
POUR#2: UPPER WINGS					C.Y. 18.8
CLASS A CONCRETE TOTAL					C.Y. 55.1

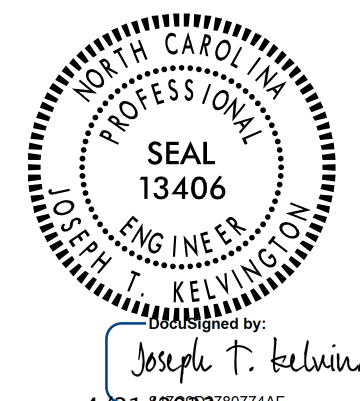
PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

SHEET 4 OF 4

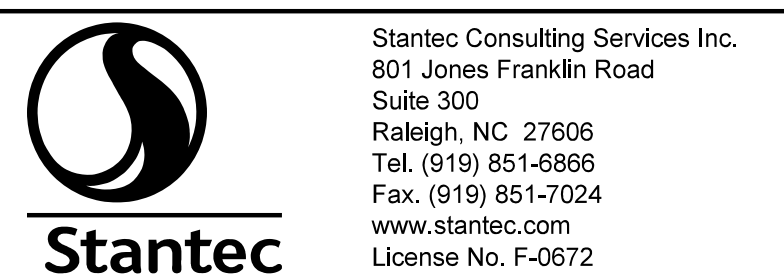
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
END BENT 1 DETAILS



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REVISIONS						SHEET NO. SB-23	TOTAL SHEETS 30
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1			3				
2			4				

STR. #8



DRAWN BY : N. D'AIUTO DATE : 05/09/18 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

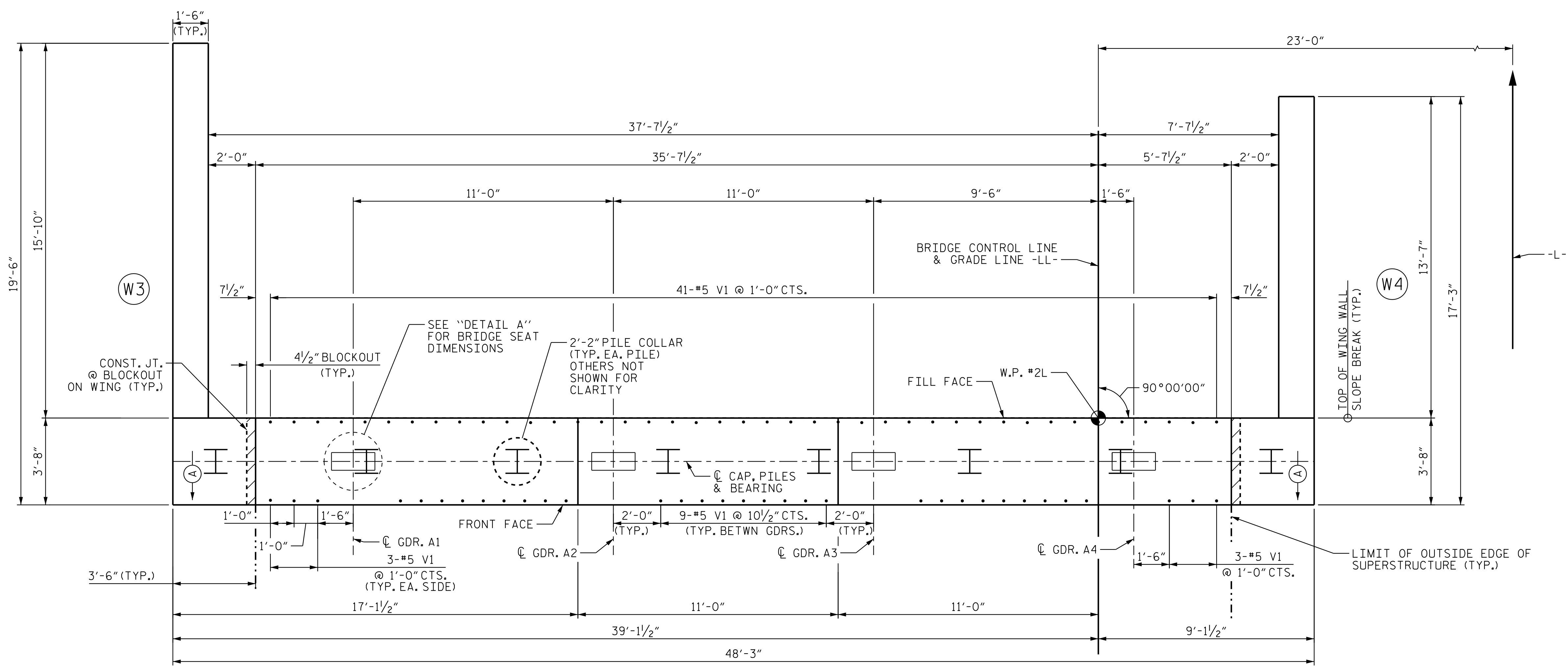
CHECKED BY : J.T. KELVINGTON DATE : 01/15/23

jhagenbush

4/21/2023

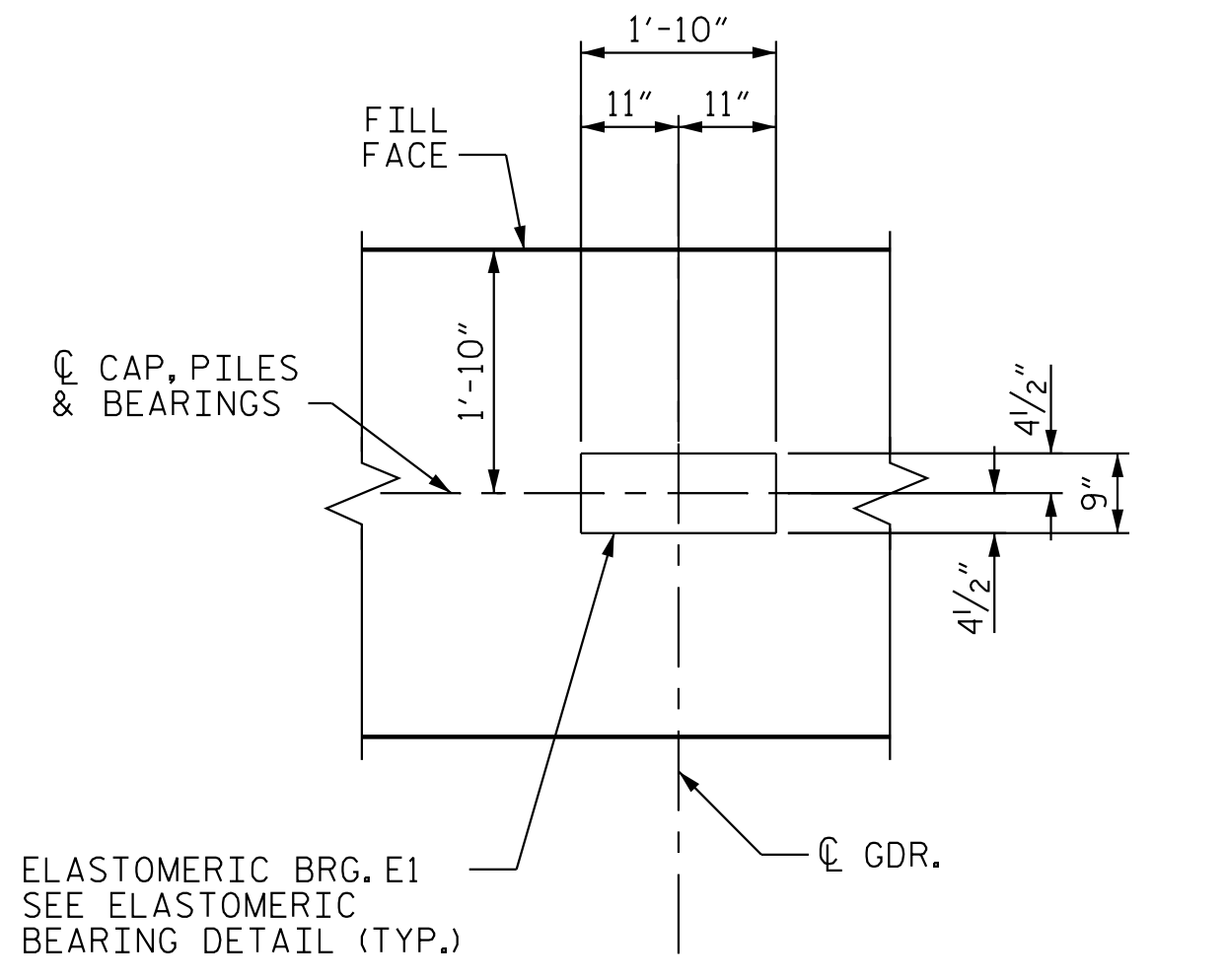
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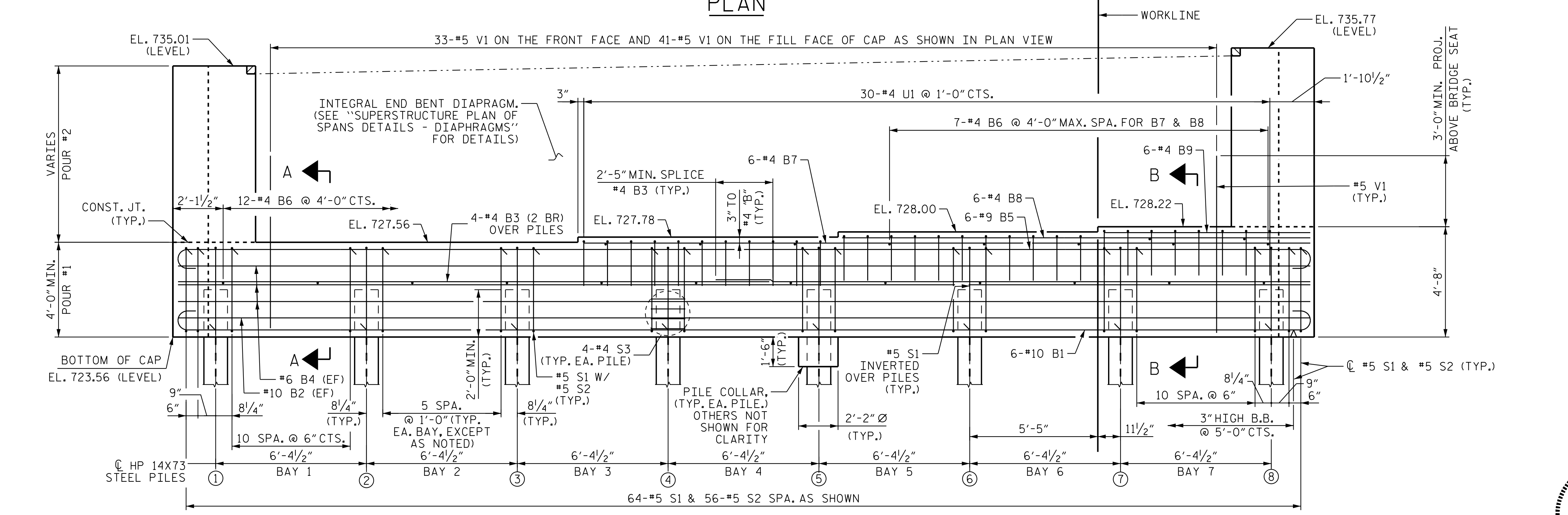


PLAN

- NOTES**
- (A) SLOPED TOP OF WING SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 2 WING WALL DETAILS, SHT. 2 OF 4.
  - (EF) - DENOTES EACH FACE
  - CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.
  - (2 BR) DENOTES 2 BAR RUN.
  - FOR SECTIONS A-A & B-B, SEE END BENT 2 DETAILS, SHT. 3 OF 4
  - FOR WING WALL DETAILS, SEE END BENT 2 DETAILS - WING WALLS, SHT. 2 OF 4



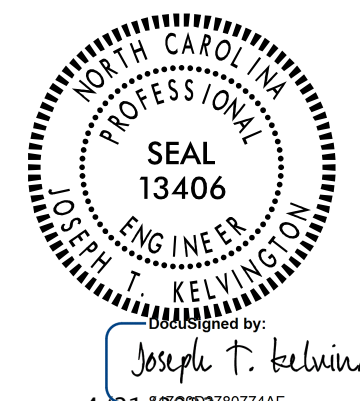
DETAIL A



ELEVATION

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 1 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUBSTRUCTURE**  
**END BENT 2**  
 (LL)

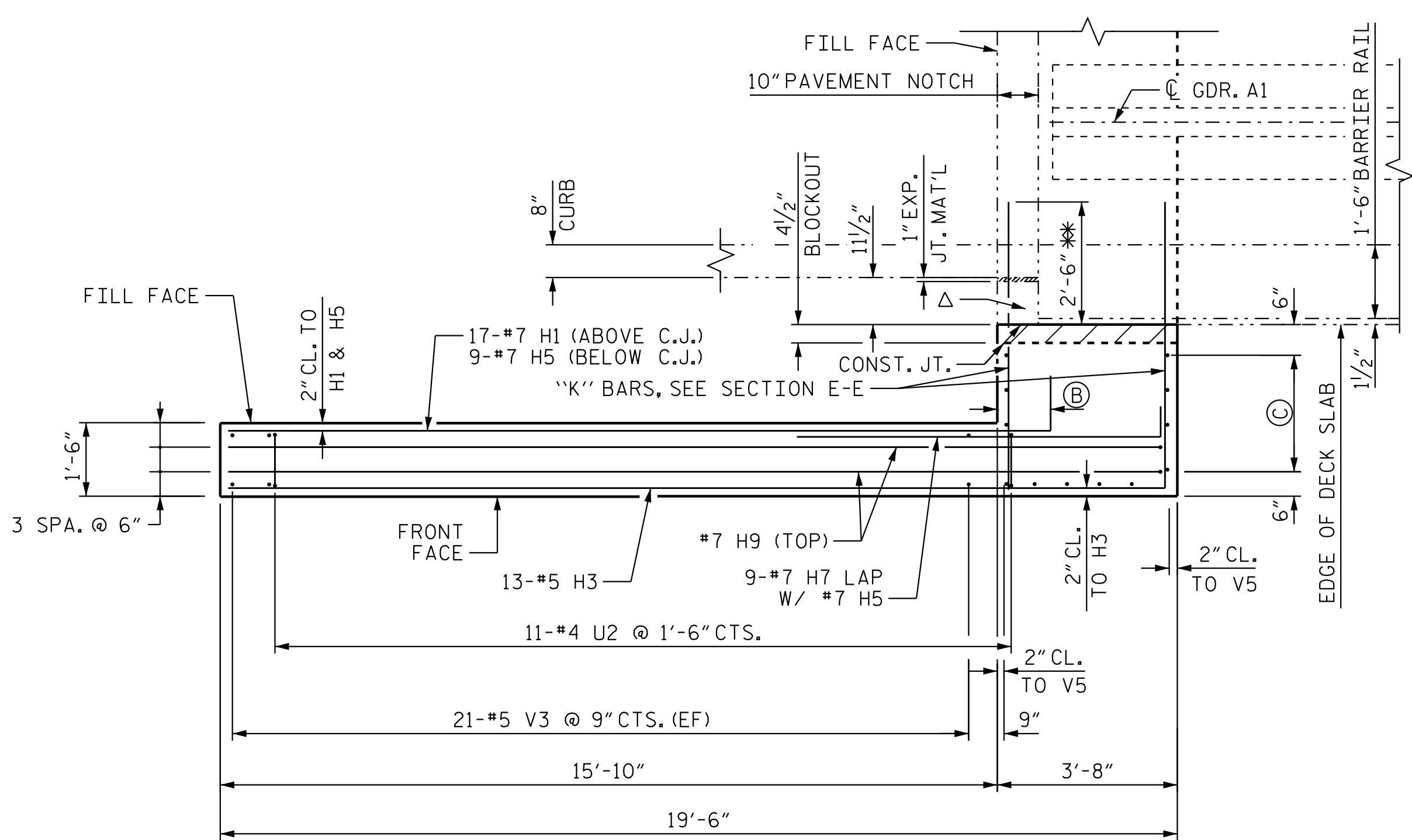


REVISIONS						SHEET NO. S8-24
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
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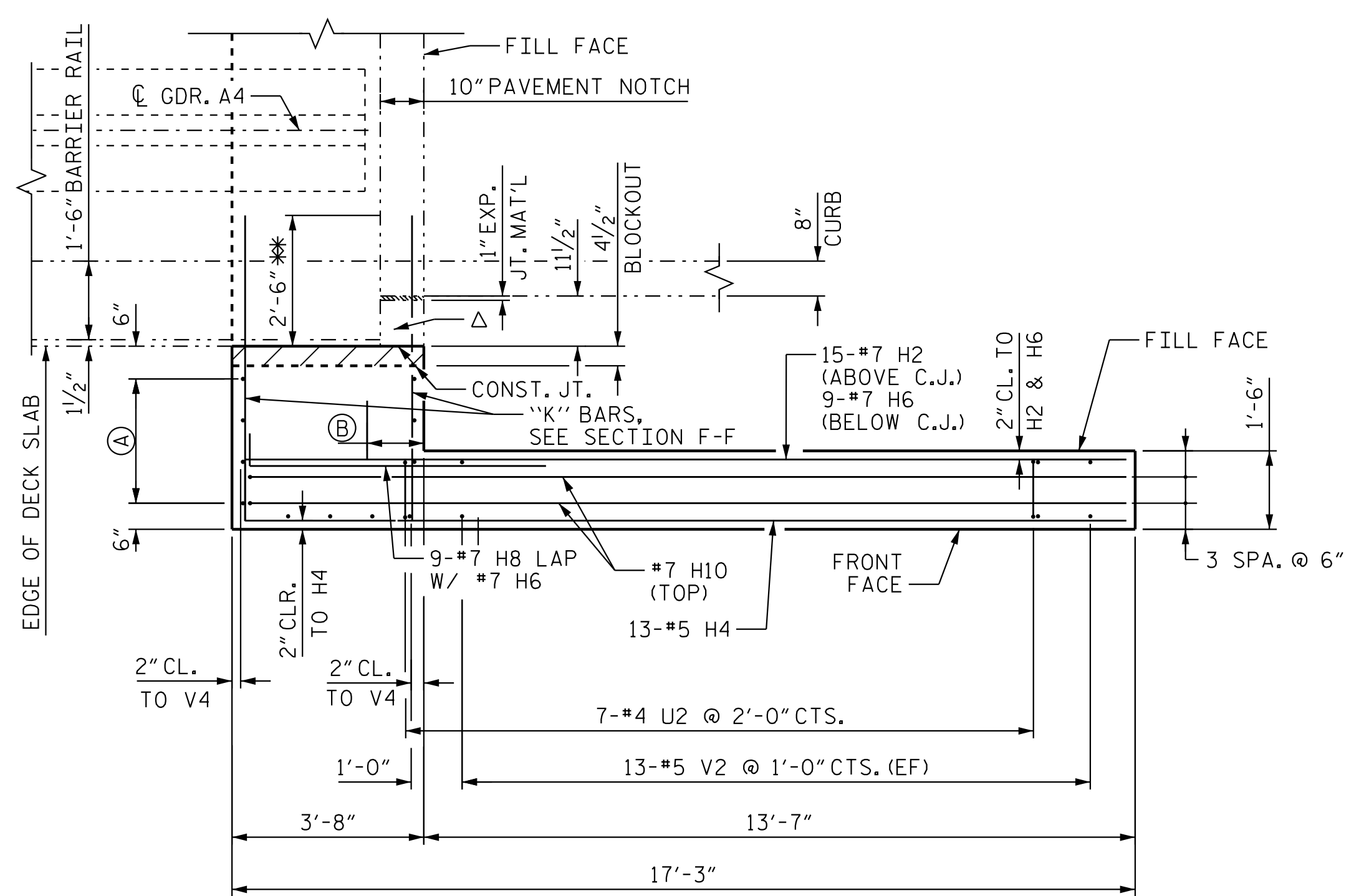
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DRAWN BY: N. D'AIUTO DATE: 05/09/18  
 CHECKED BY: J.T. KELVINGTON DATE: 12/05/22  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

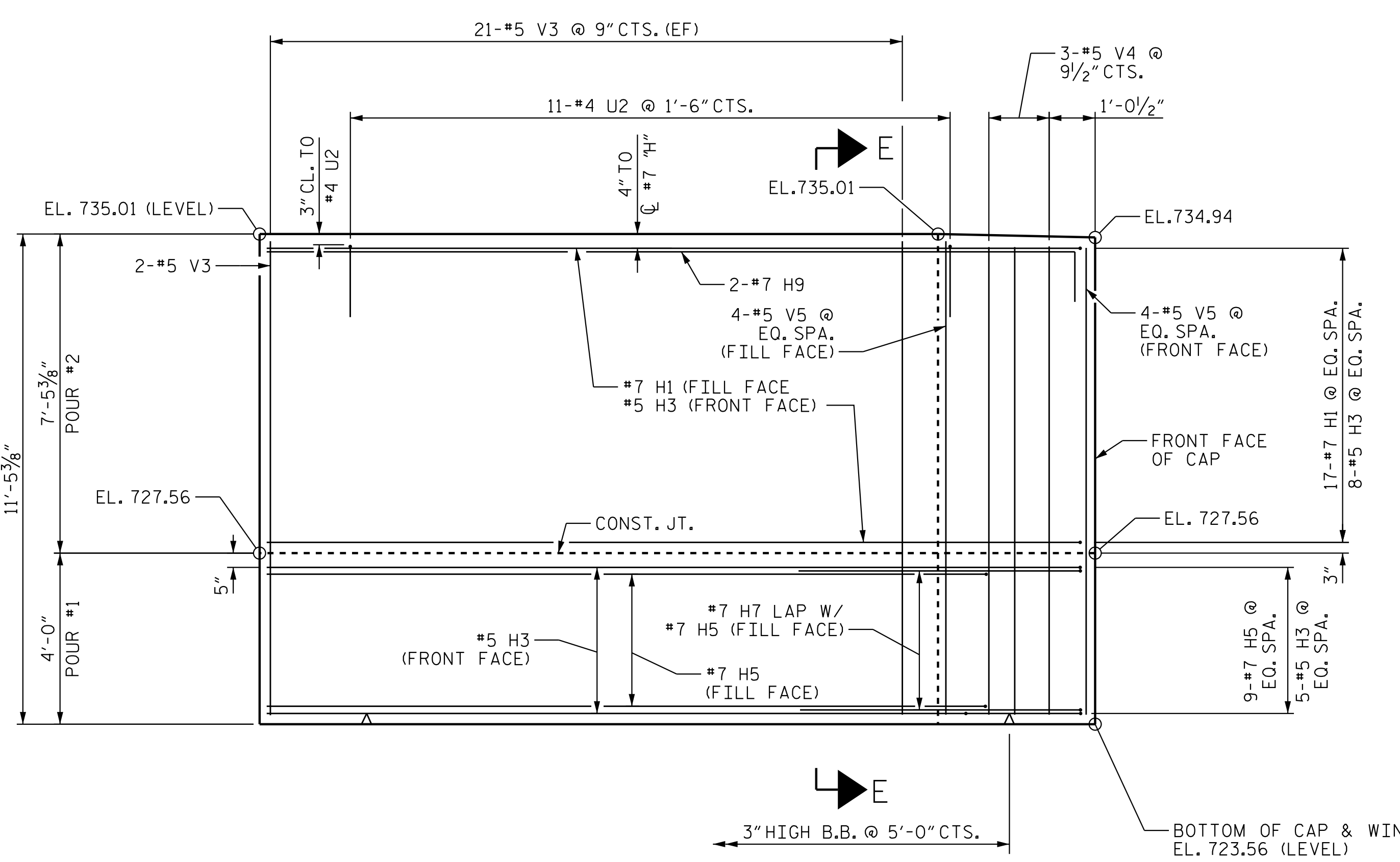


PLAN OF LEFT WING (W3)



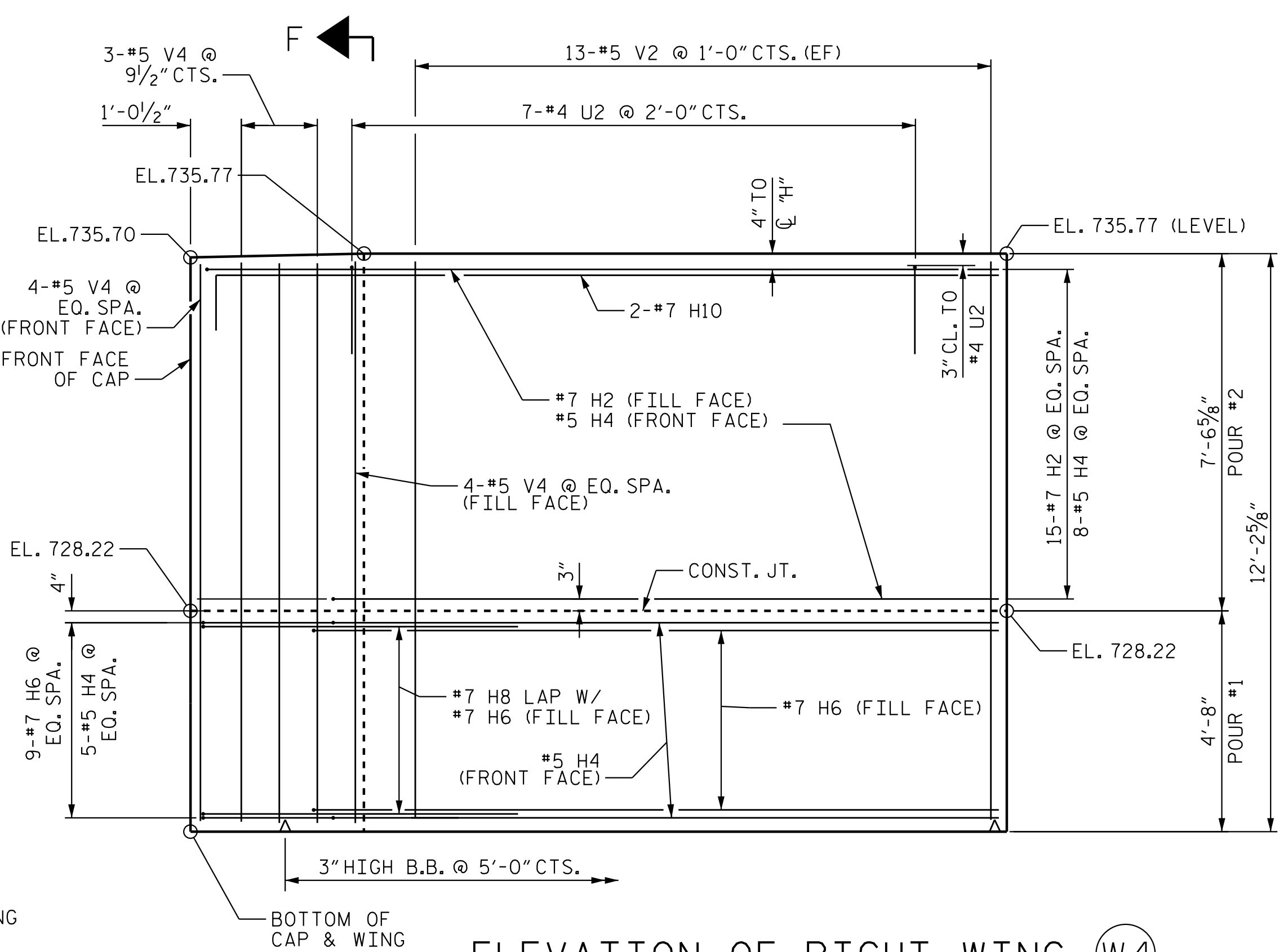
PLAN OF RIGHT WING (W4)

NOTES:  
 Δ AREA BETWEEN APPROACH SLAB CURB AND BLOCKOUT SHALL MATCH THE FINISHED SURFACE OF THE BRIDGE DECK.  
 CONCRETE TO BE POURED IN THE HATCHED AREA TO MATCH THE TOP OF THE CURB AND THE INTEGRAL END BENT WING ELEVATION.  
 THE CONCRETE IN THE HATCHED AREA OF THE WING IS TO BE POURED AFTER THE JOINT BETWEEN THE BRIDGE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND IF SLIP FORMING IS USED, THE BARRIER HAS BEEN CAST.  
 #7 H7 AND #7 H8 BARS MAY BE REPOSITIONED SLIGHTLY VERTICALLY TO CLEAR CAP REINFORCEMENT AND HORIZONTALLY TO CLEAR THE PILE.  
 (A) 4-#5 V4 @ EQ. SPA. (FILL FACE & FRONT FACE).  
 (B) 1'-1" CLEAR FROM FILL FACE TO OUTSIDE OF 'H'.  
 (C) 4-#5 V5 @ EQ. SPA. (FILL FACE & FRONT FACE).  
 FOR SECTION E-E AND SECTION F-F, SEE END BENT 2 DETAILS, SHT. 3 OF 4.



ELEVATION OF LEFT WING (W3)

NOTE: K1 & K2 BARS NOT SHOWN FOR CLARITY.  
 NOTE: TOP SURFACE OF END BENT WING CAST ON TOP OF THE END BENT CAP SHALL BE SLOPED TRANSVERSELY FROM FILL FACE OF THE CAP TO FRONT FACE AT A RATE OF 1/4" / FT.  
 (EF) DENOTES EACH FACE.  
 \*\* #4 K2 2'-6" PROJECTION BEYOND CONST. JOINT.



ELEVATION OF RIGHT WING (W4)

NOTE: K1 & K2 BARS NOT SHOWN FOR CLARITY.

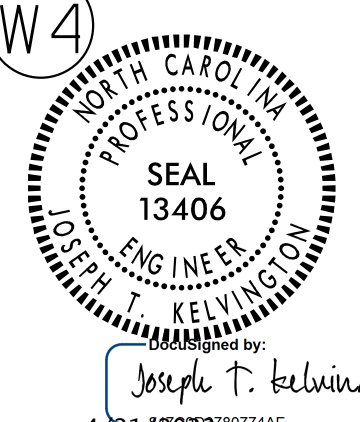
PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

END BENT 2 -  
 WING WALLS

(LL)



REVISIONS						SHEET NO. S8-25 TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

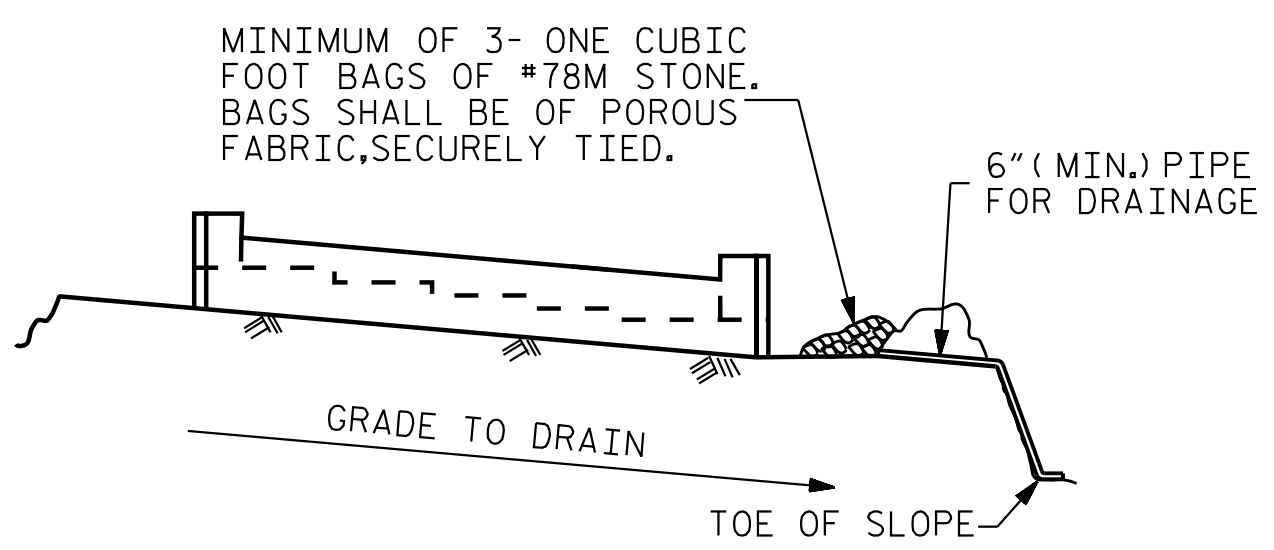
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DRAWN BY : E. M. MURR DATE : 05/08/18  
 CHECKED BY : J.T. KELVINGTON DATE : 12/05/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23





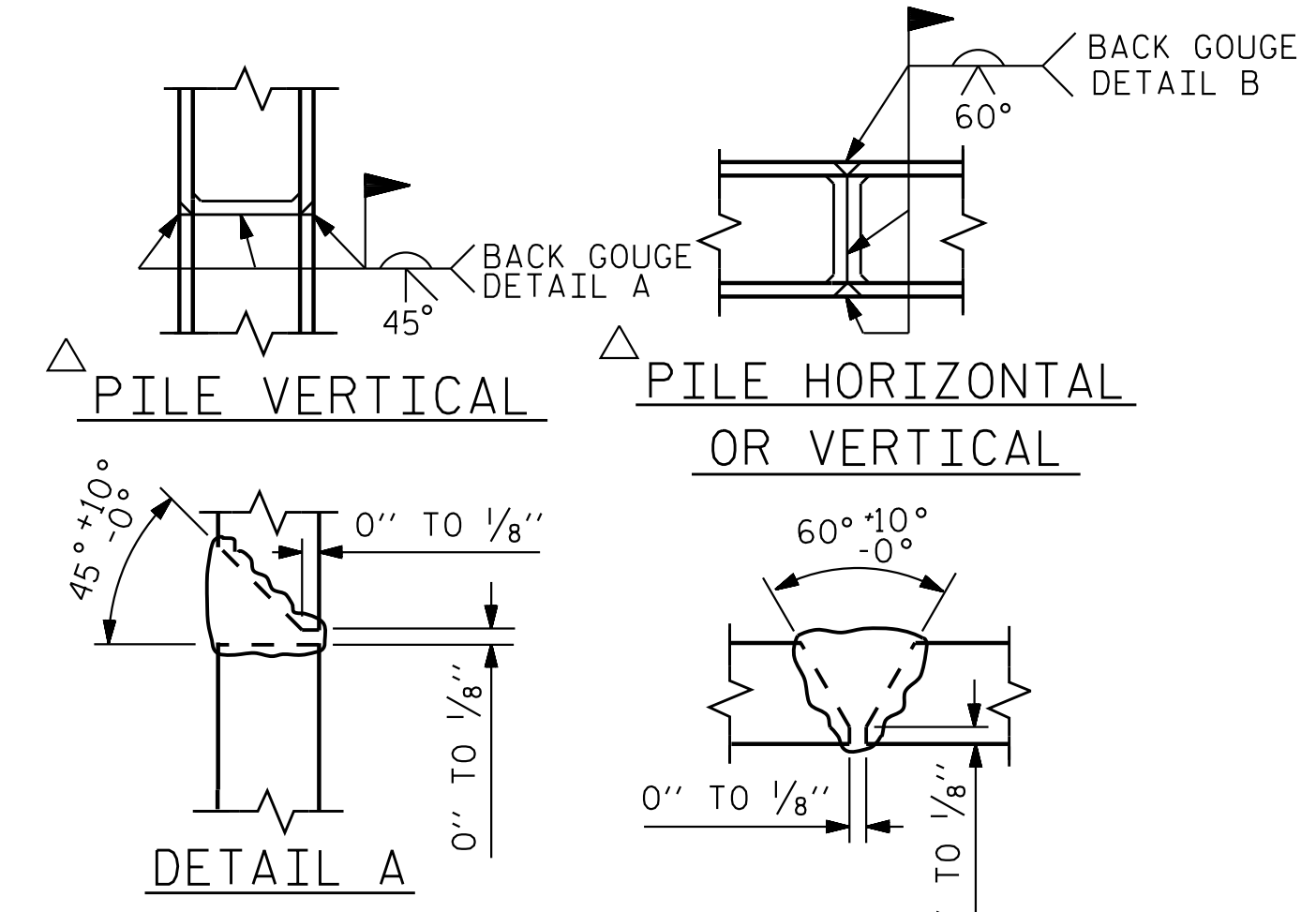


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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**TEMPORARY DRAINAGE AT END BENT**

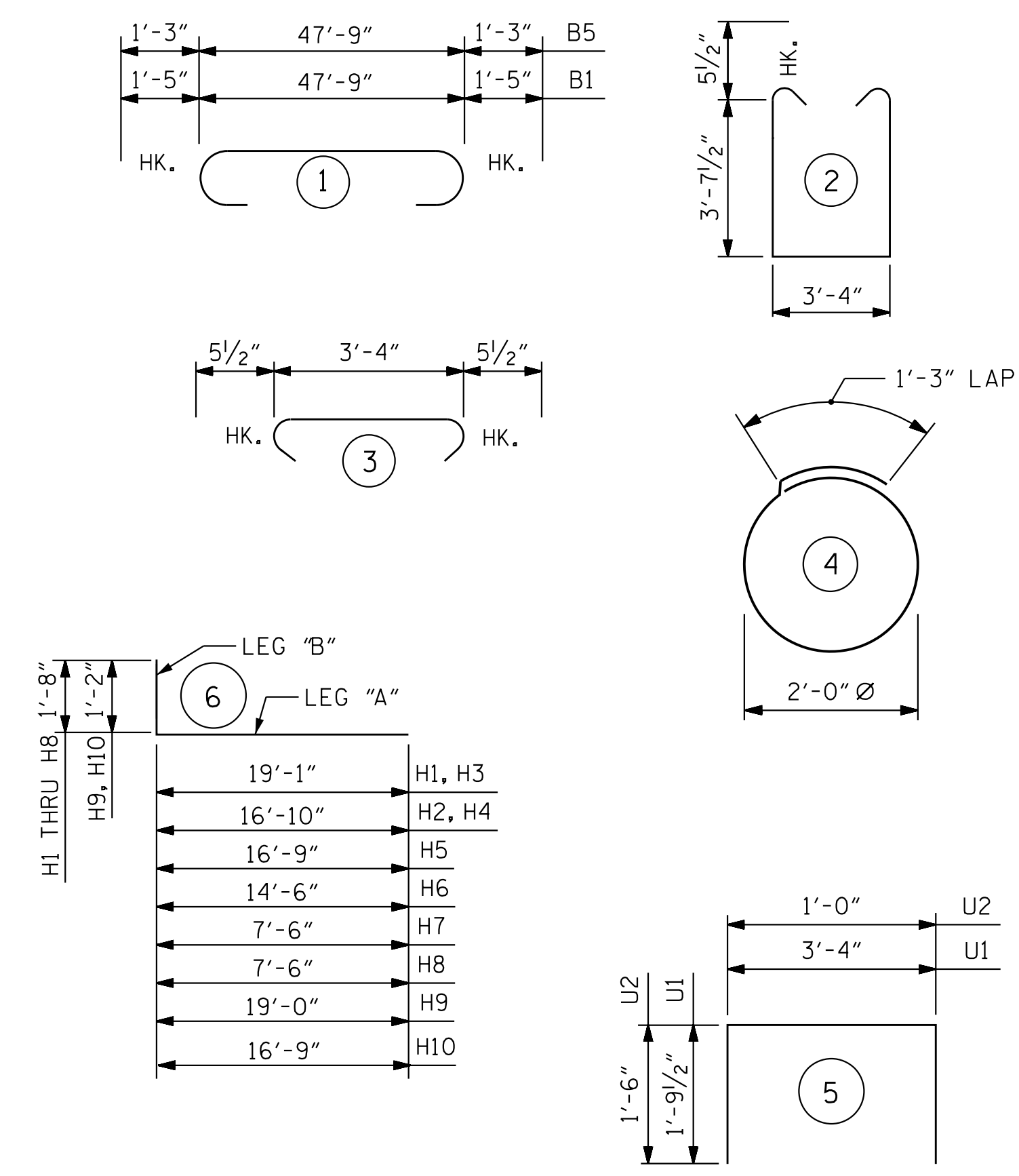


POSITION OF PILE DURING WELDING.

**PILE SPLICE DETAILS**

**BILL OF MATERIAL**

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT.

**END BENT 2**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	50'-7"	1306
B2	2	#10	STR	47'-3"	407
B3	8	#4	STR	24'-10"	133
B4	6	#6	STR	47'-9"	430
B5	6	#9	1	50'-3"	1025
B6	19	#4	STR	3'-4"	42
B7	6	#4	STR	30'-5"	122
B8	6	#4	STR	19'-5"	78
B9	6	#4	STR	8'-5"	34
H1	17	#7	6	20'-9"	721
H2	15	#7	6	18'-6"	567
H3	13	#5	6	20'-9"	281
H4	13	#5	6	18'-6"	251
H5	9	#7	6	18'-5"	339
H6	9	#5	6	16'-2"	152
H7	9	#7	6	9'-2"	169
H8	9	#7	6	9'-2"	169
H9	2	#7	6	20'-2"	82
H10	2	#7	6	17'-11"	73
K1	8	#4	STR	2'-9"	15
K2	28	#4	STR	5'-10"	109
S1	64	#5	2	11'-6"	768
S2	56	#5	3	4'-3"	248
S3	32	#4	4	7'-7"	162
U1	30	#4	5	6'-11"	142
U2	18	#4	5	4'-0"	142
V1	74	#5	STR	7'-5"	572
V2	26	#5	STR	11'-10"	321
V3	42	#5	STR	11'-1"	486
V4	11	#5	STR	11'-9"	135
V5	11	#5	STR	11'-0"	126
REINFORCING STEEL					LBS, 9,510
CLASS A CONCRETE BREAKDOWN:					
POUR#1: CAP, COLLARS, & WINGS				C.Y.	32.6
POUR#2: UPPER WINGS				C.Y.	21.1
CLASS A CONCRETE TOTAL					C.Y. 58.7

PROJECT NO. R-2707D

CLEVELAND COUNTY

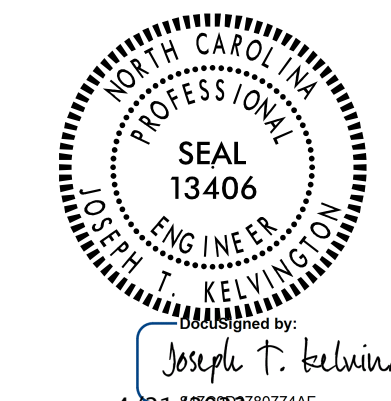
STATION: 810+00.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**END BENT 2 DETAILS**

(LL)

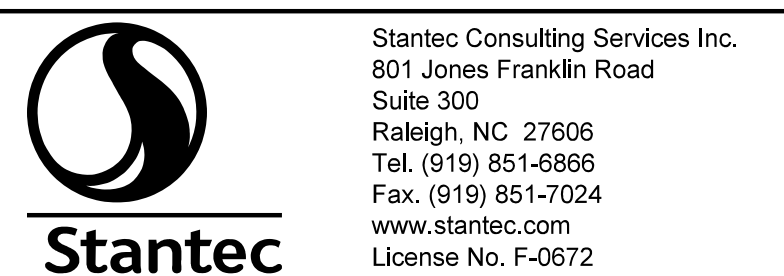


Joseph T. Kelvington  
4/21/2023

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

STR. #8



DRAWN BY : N. D'AIUTO DATE : 05/09/18 DESIGN ENGINEER

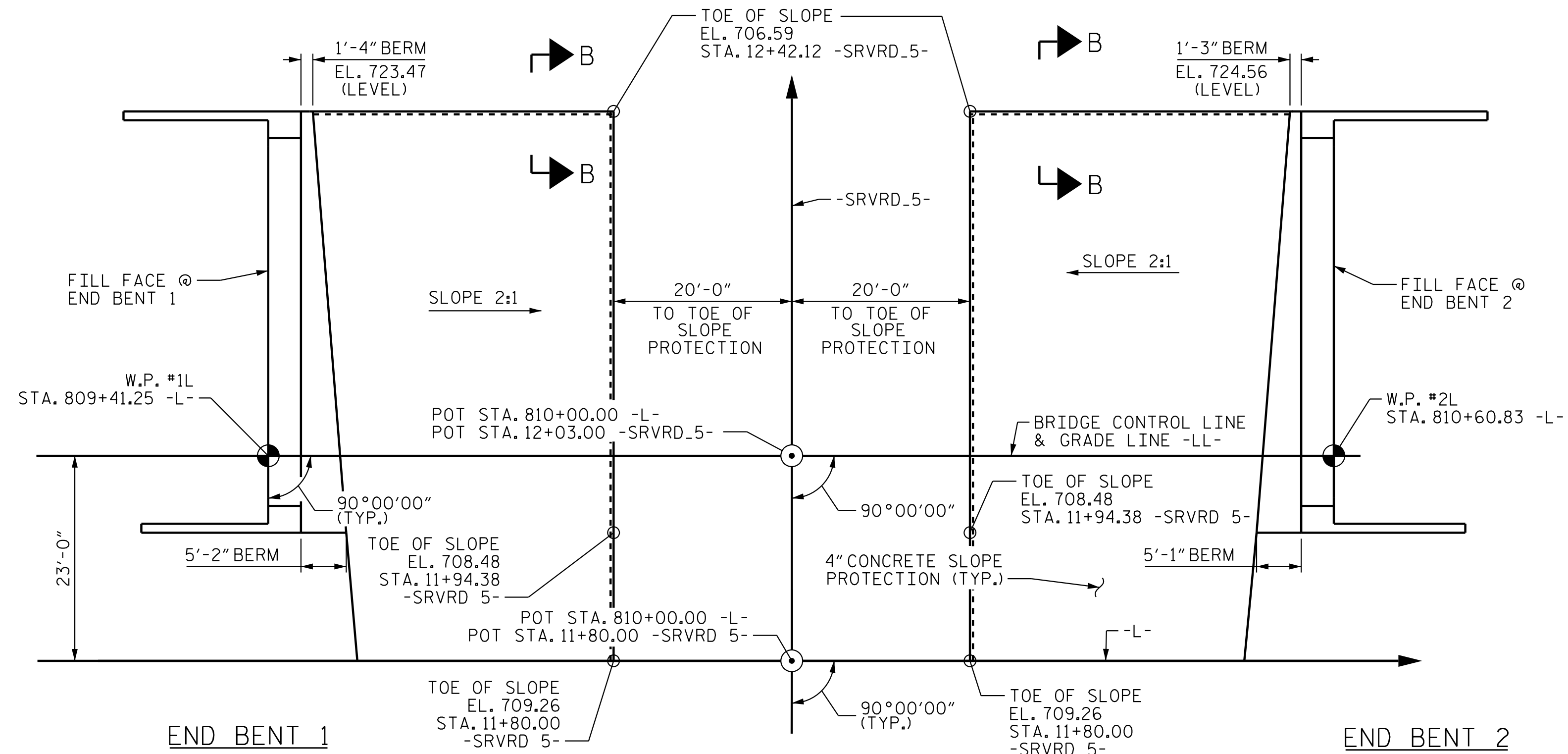
CHECKED BY : J.T. KELVINGTON DATE : 12/05/22 OF RECORD: J.T. KELVINGTON DATE : 04/21/23

jHagenbush

4/21/2023

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**GENERAL NOTES**

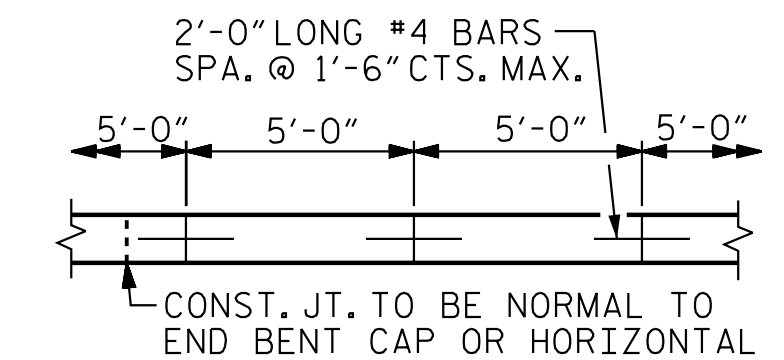
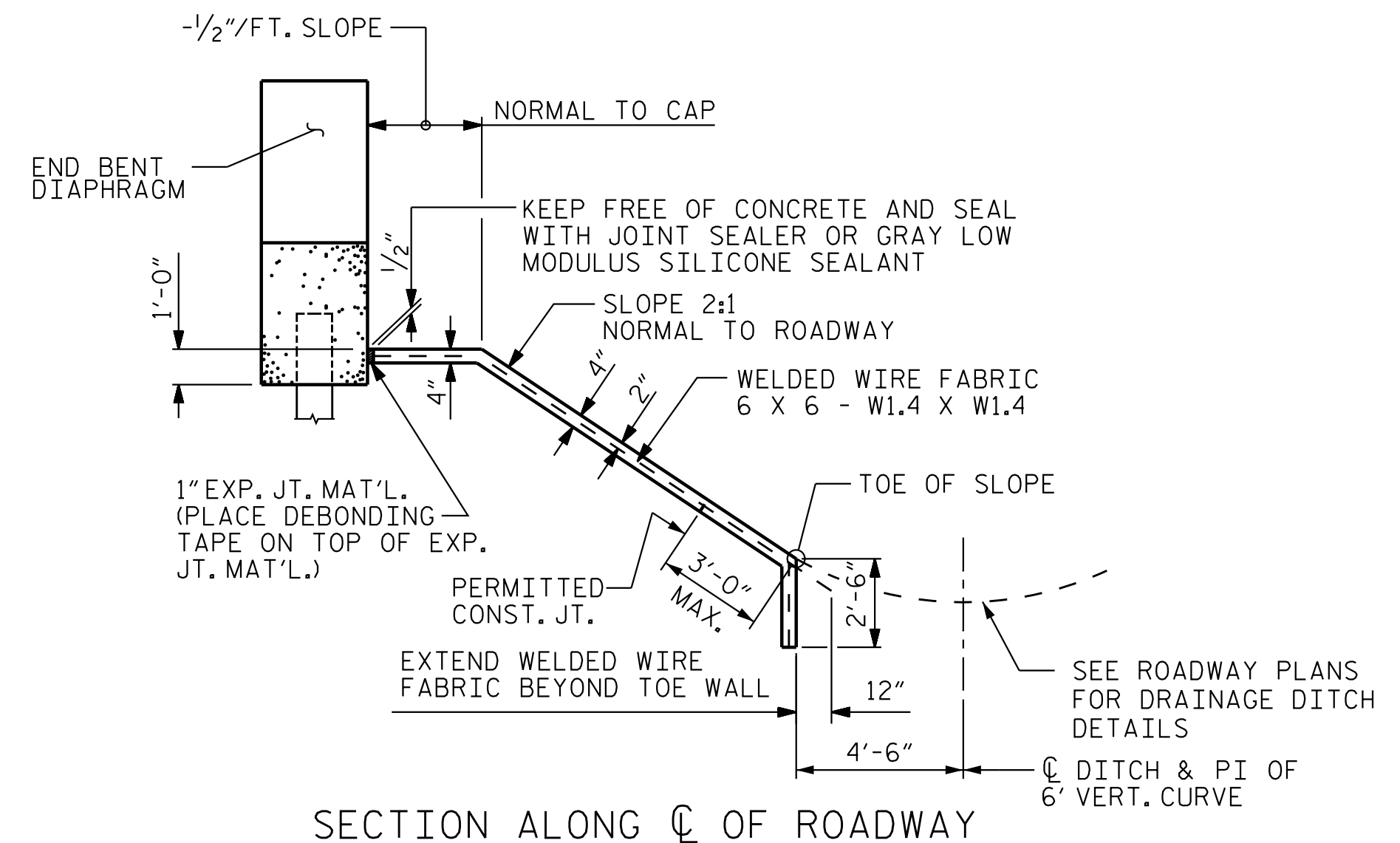
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION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

**ALTERNATE "A"**

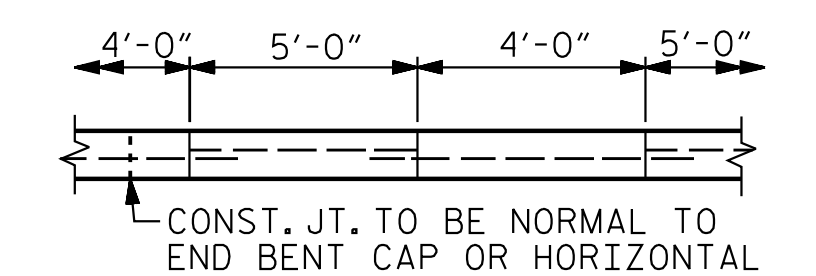
ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE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

BRIDGE @ STA. 810+00.00 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	259	467
END BENT 2	275	496

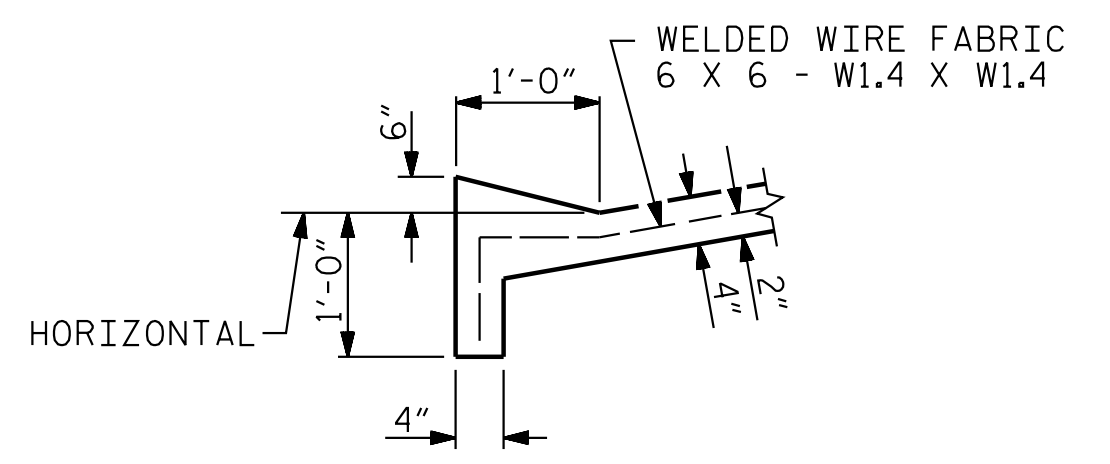
\* QUANTITY SHOWN IS BASED ON 5' POURS.



**POURING DETAIL**

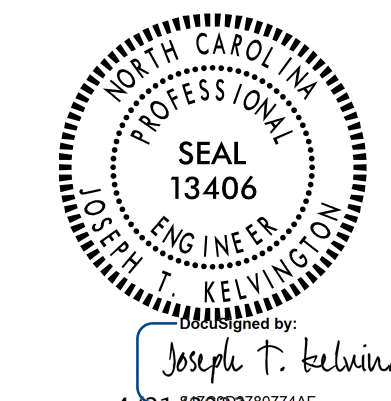


**OPTIONAL POURING DETAIL**



**SECTION B-B**  
**DETAILS FOR ALTERNATE "A"**

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SLOPE PROTECTION DETAILS**

(LL)

REVISIONS						SHEET NO. S8-28
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			

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 www.stantec.com  
 License No. F-0672

DRAWN BY : N. D'AIUTO DATE : 05/09/18  
 CHECKED BY : J.T. KELVINGTON DATE : 12/31/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

4/21/2023 4/21/2023 jHagenbush

### NOTES

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

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

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

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

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

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

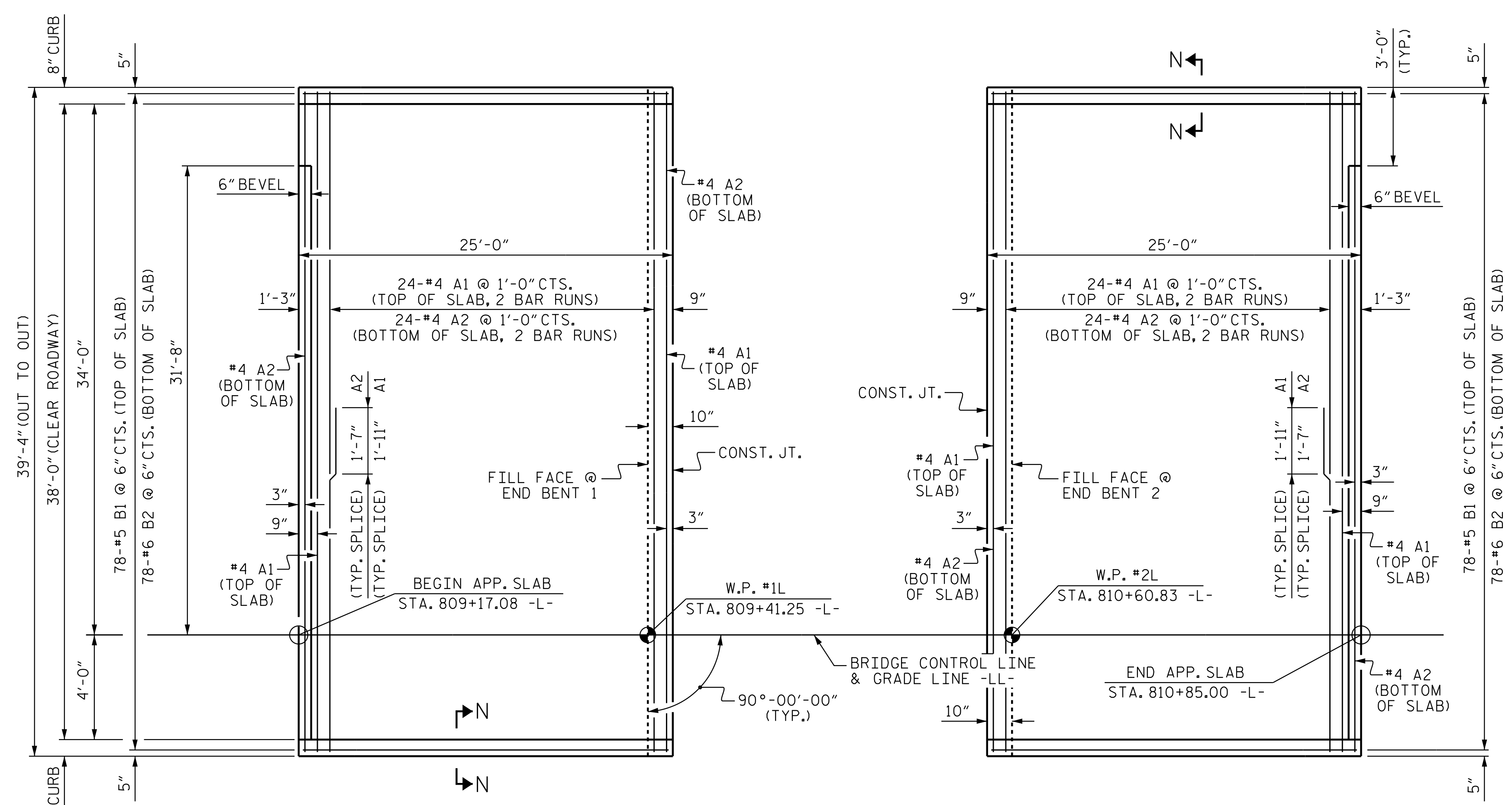
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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

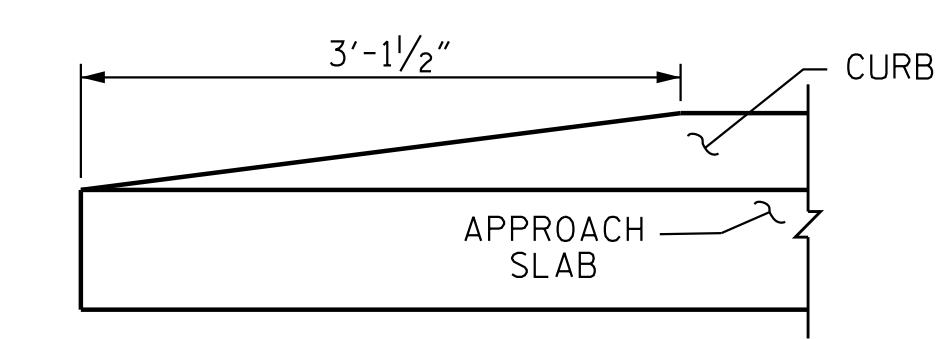
AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	20'-6"	712
A2	52	#4	STR	20'-5"	709
* B1	78	#5	STR	24'-2"	1966
B2	78	#6	STR	24'-8"	2890
REINFORCING STEEL				LBS.	3599
* EPOXY COATED REINFORCING STEEL				LBS.	2,678
CLASS AA CONCRETE				C. Y.	42.5

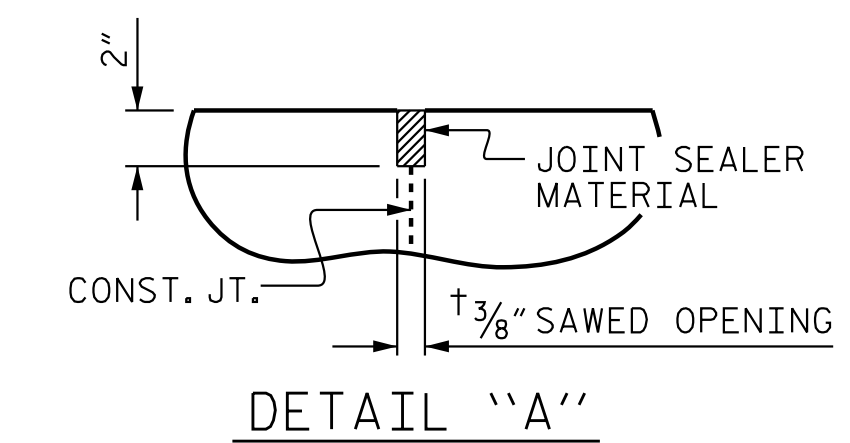
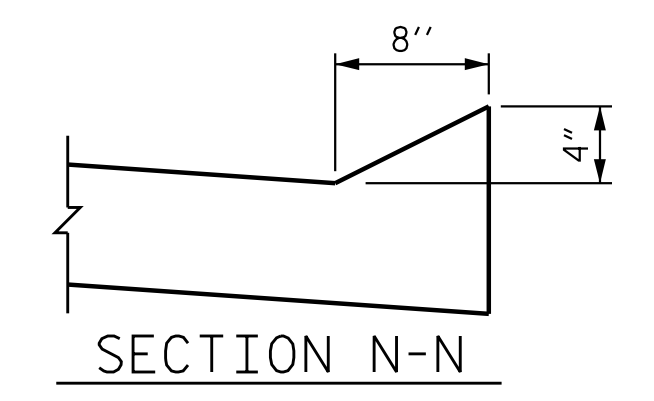
SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



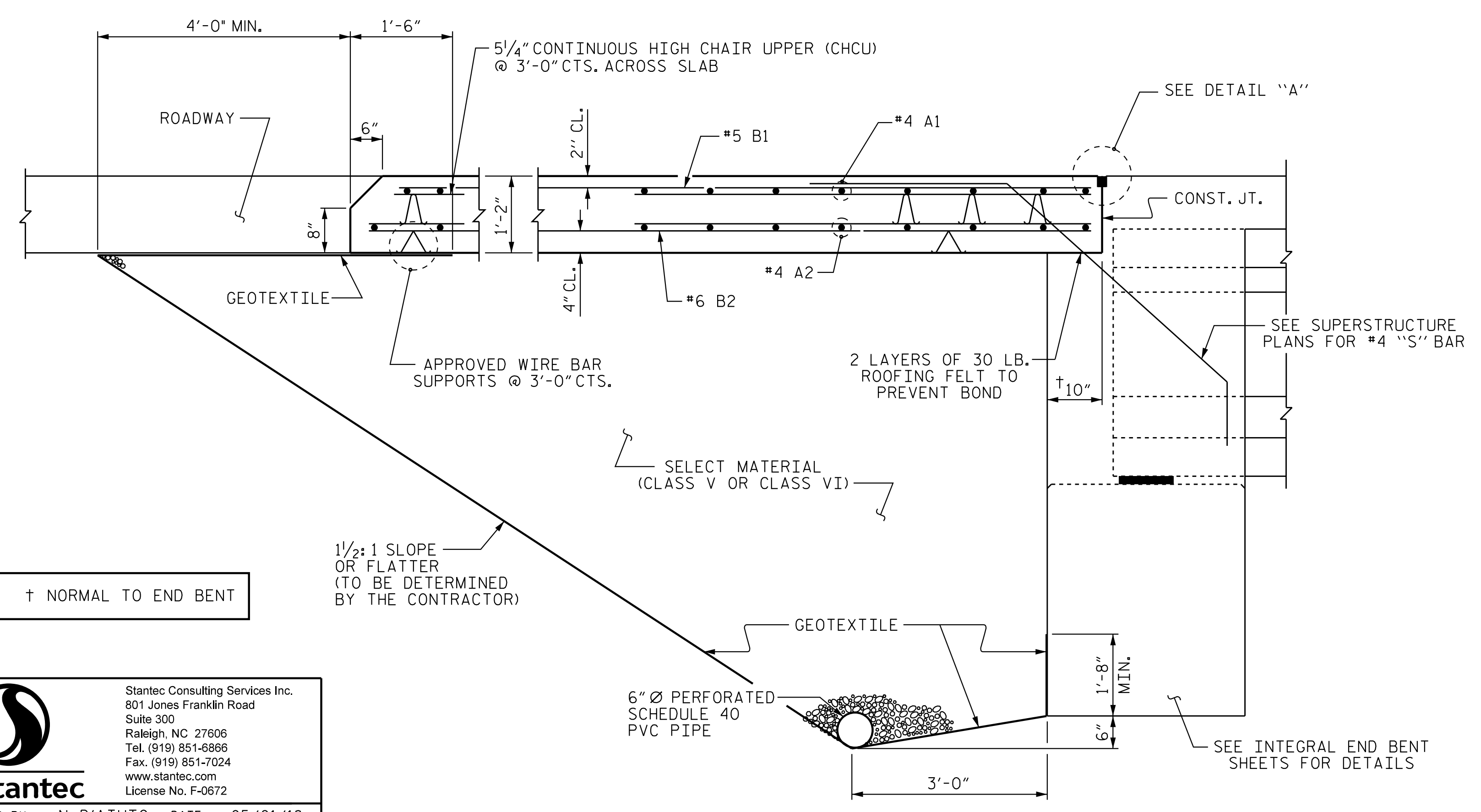
PLAN @ END BENT 1      PLAN @ END BENT 2  
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



END OF CURB WITHOUT SHOULDER BERM GUTTER



DETAIL "A"



SECTION THRU SLAB  
(TYPE I - STANDARD APPROACH FILL)

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

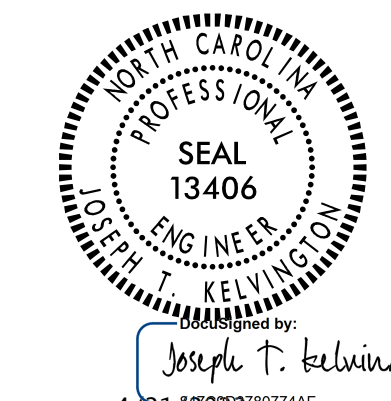
SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
BRIDGE APPROACH SLAB  
FOR INTEGRAL ABUTMENT  
WITH FLEXIBLE PAVEMENT

(LL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S8-29
1			3			TOTAL SHEETS 30
2			4			



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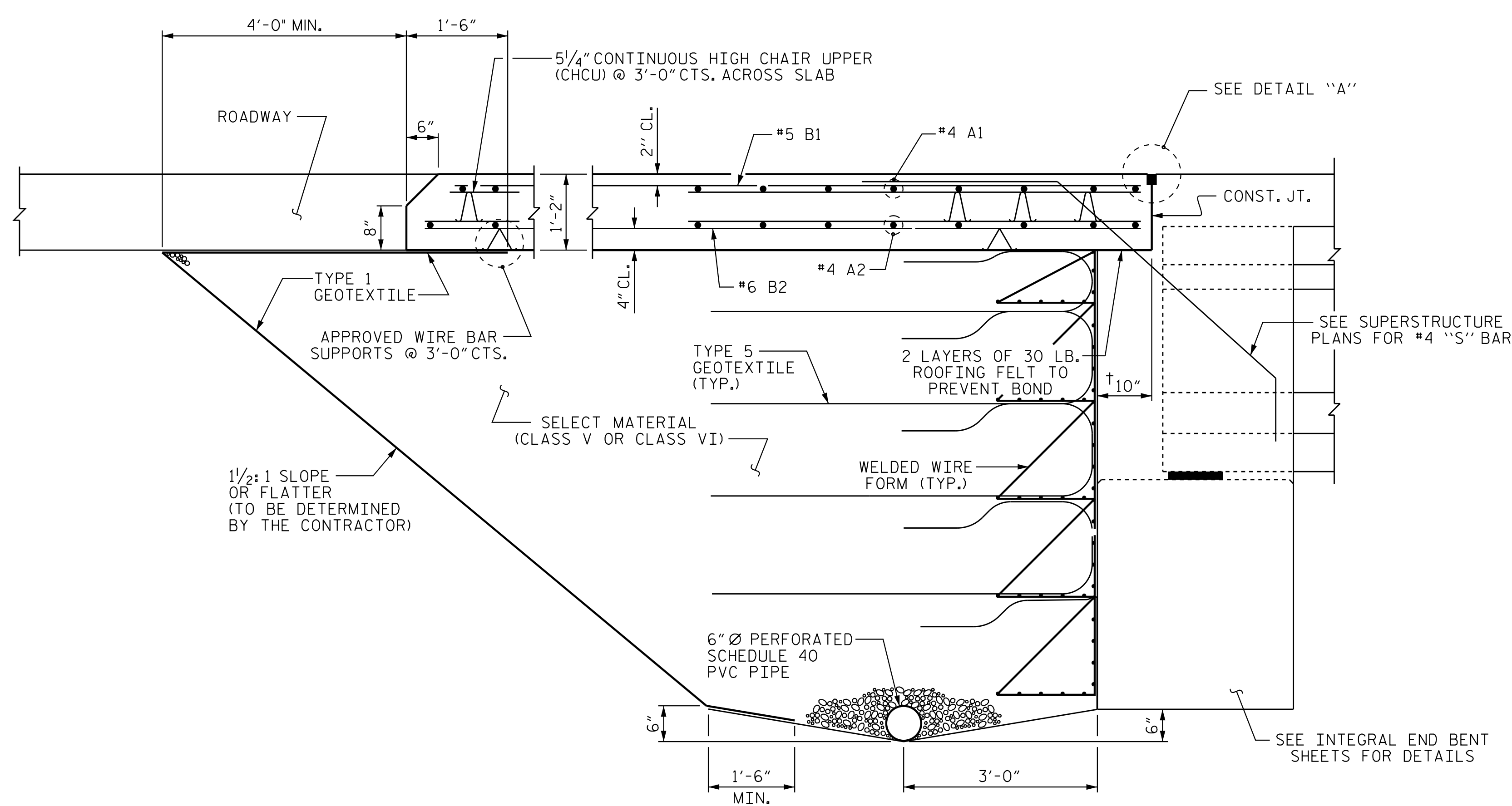
ASSEMBLED BY: N. D'AIUTO DATE: 05/01/18  
CHECKED BY: J.T. KELVINGTON DATE: 01/02/23

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

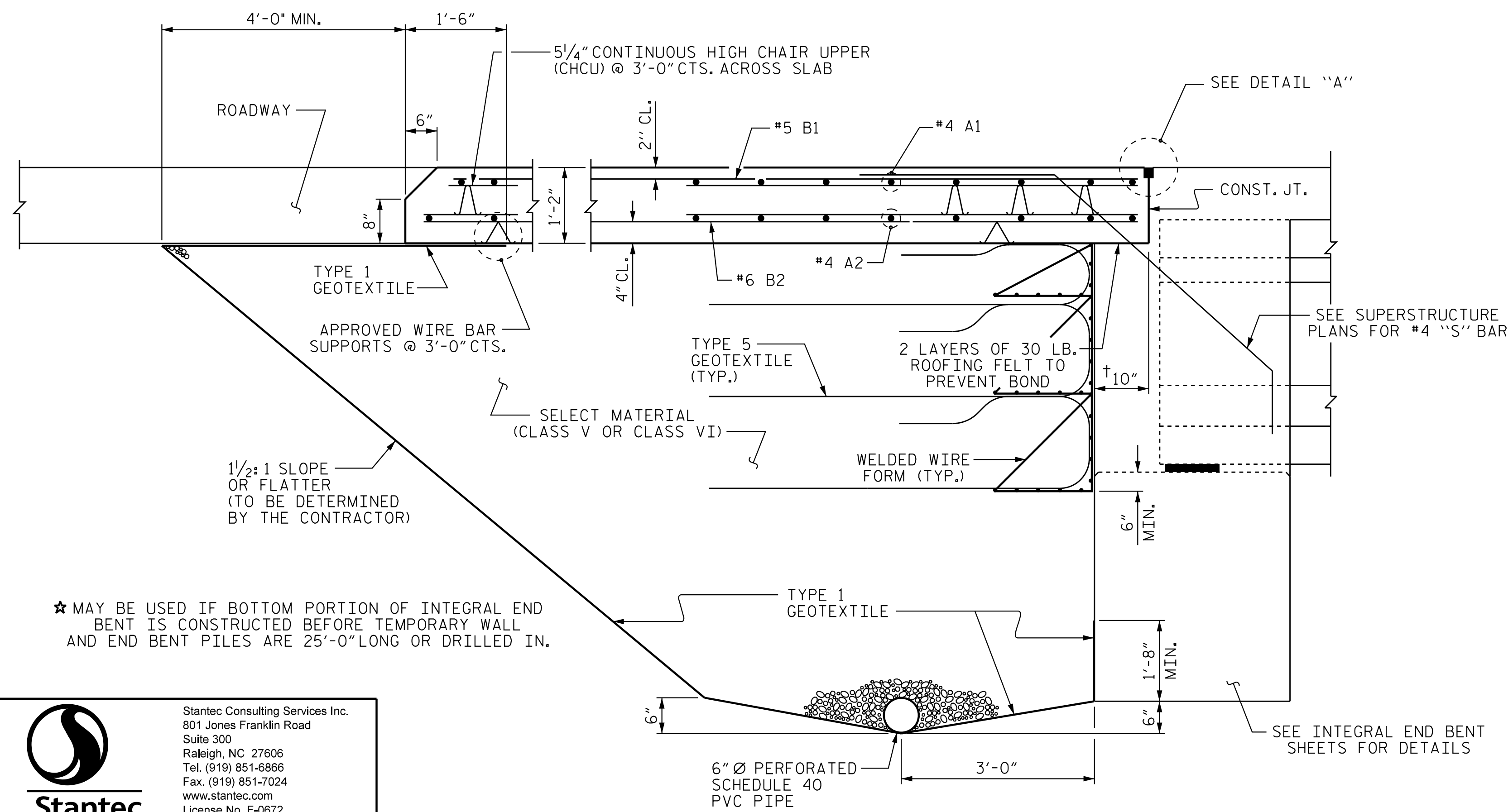
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

4/21/2023 jHagenbush

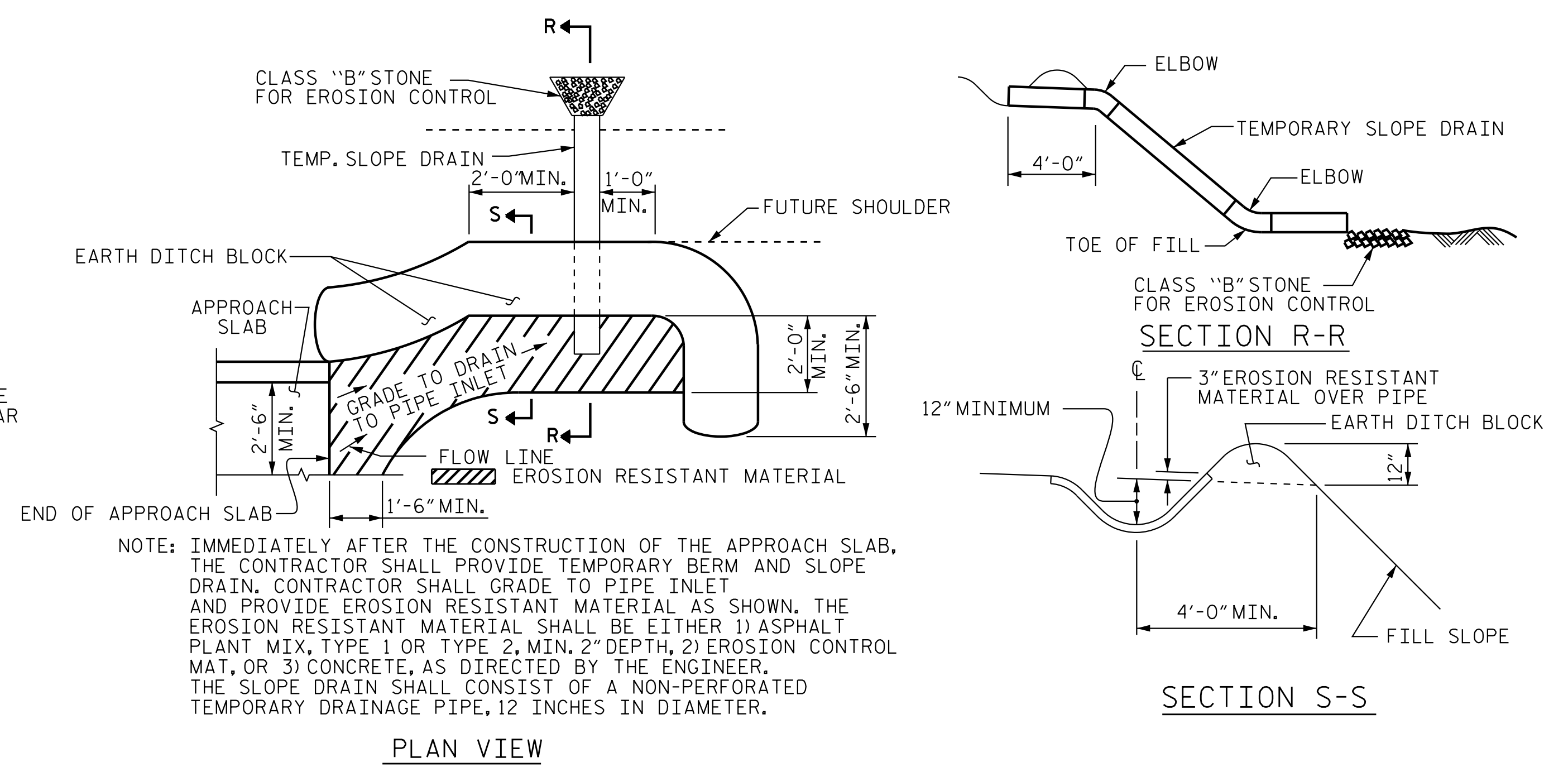




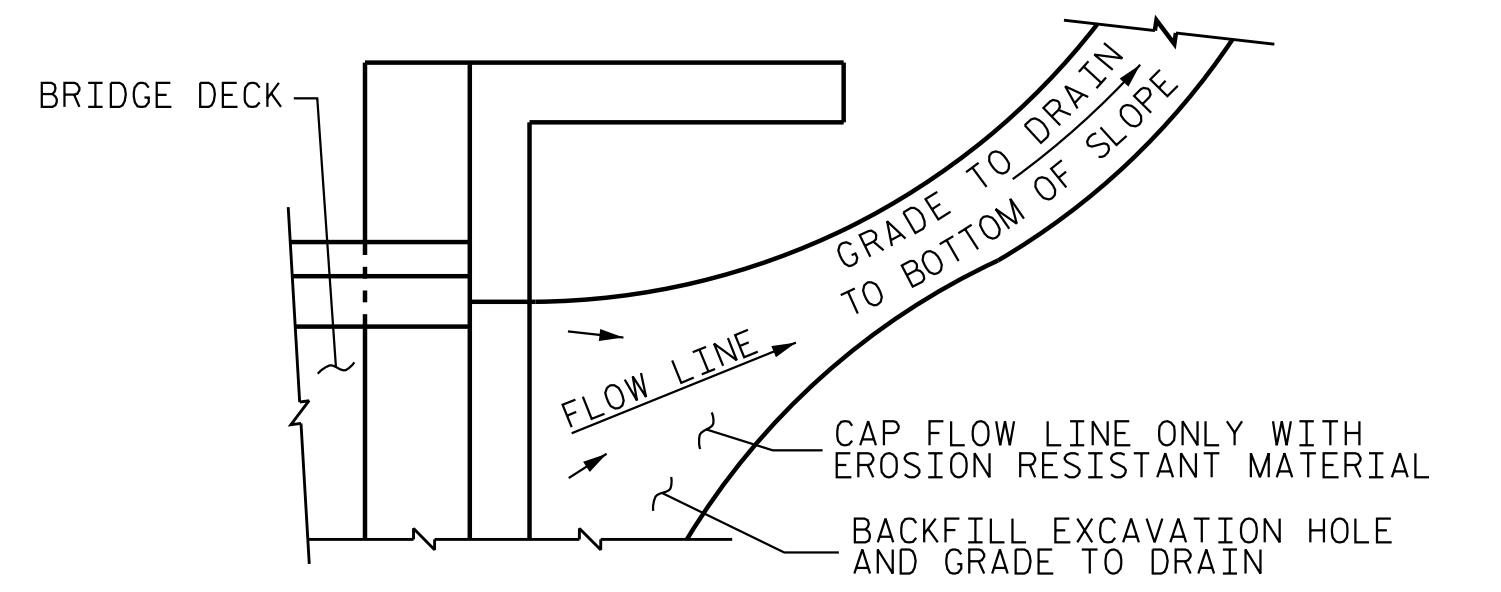
**SECTION THRU SLAB**  
(TYPE A - ALTERNATE APPROACH FILL)



**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.

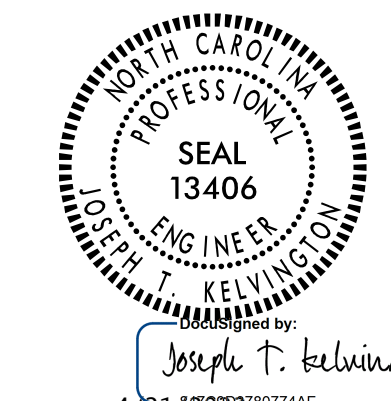
**TEMPORARY DRAINAGE DETAIL**

**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 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-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
(LL)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. SB-30
					TOTAL SHEETS 30

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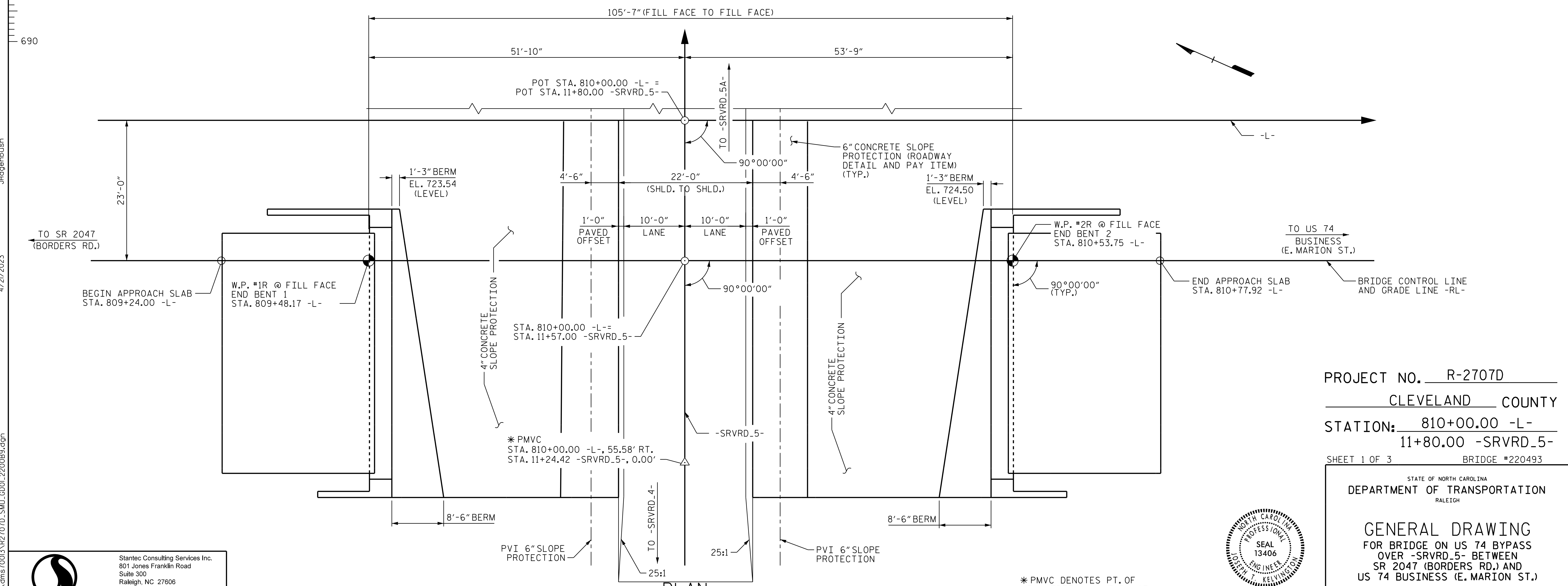
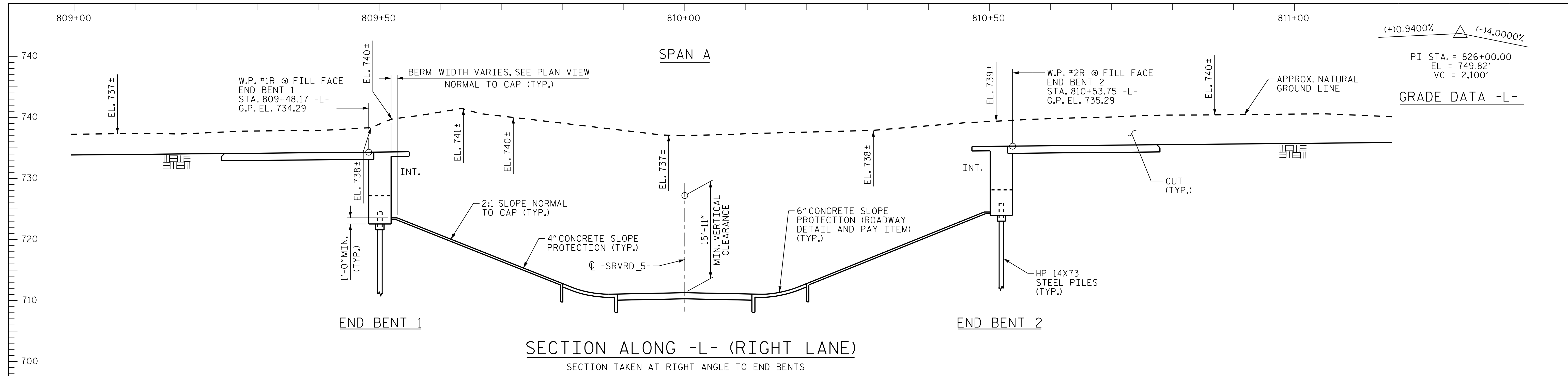
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CHECKED BY : J.T. KELVINGTON DATE : 01/02/23

DRAWN BY : TLA 10/05 REV. 12/21/11 MAA/GM  
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REV. 12/17 MAA/THC

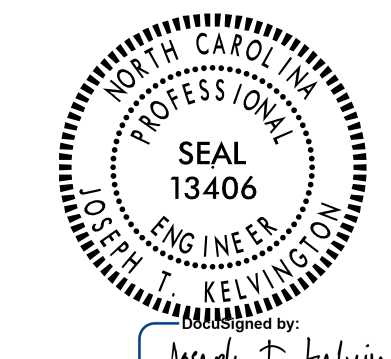
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE : 04/21/23



PROJECT NO. R-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-  
11+80.00 -SRVRD.5-  
SHEET 1 OF 3 BRIDGE #220493

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**  
FOR BRIDGE ON US 74 BYPASS  
OVER -SRVRD.5- BETWEEN  
SR 2047 (BORDERS RD.) AND  
US 74 BUSINESS (E. MARION ST.)  
(RL)



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-01	
1			3			TOTAL SHEETS	
2			4			30	

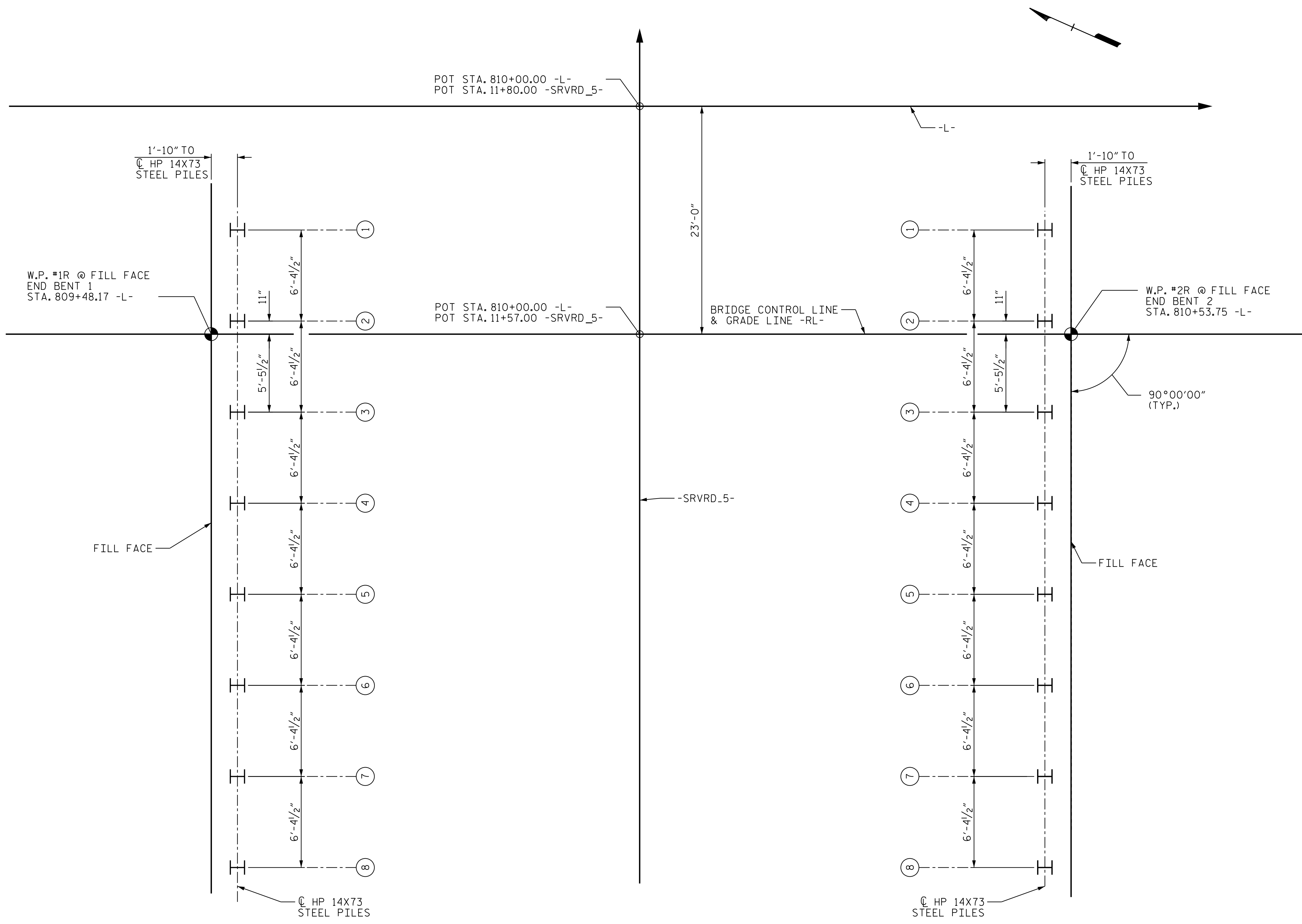
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DRAWN BY : J.E. HAGENBUSH DATE : 10/07/22  
CHECKED BY : J.T. KELVINGTON DATE : 12/05/22  
DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

\* PMVC DENOTES PT. OF  
MIN. VERTICAL CLEARANCE





END BENT 1

**FOUNDATION LAYOUT**

END BENT 2

ALL SUBSTRUCTURE WORK LINES PASS THROUGH WORK POINTS.

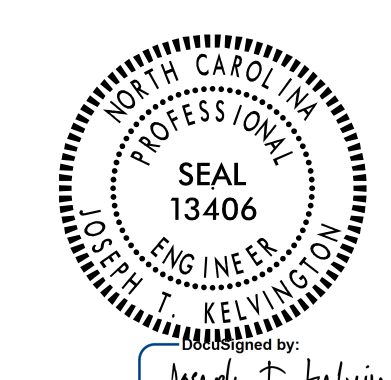
⊕ - DENOTES PILE NUMBER

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 11+80.00 -SRVRD\_5-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**FOUNDATION LAYOUT**  
 FOR BRIDGE ON US 74 BYPASS  
 OVER -SRVRD\_5- BETWEEN  
 SR 2047 (BORDERS RD.) AND  
 US 74 BUSINESS (E. MARION ST.)  
 (RL)



Designed by:  
 Joseph T. Kelvington  
 4/21/2023

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NO.	BY:	DATE:	NO.	BY:	DATE:	S9-02
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2			4			30

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DRAWN BY : N. D'AIUTO DATE : 04/23/18  
 CHECKED BY : J.T. KELVINGTON DATE : 12/05/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

jHagenbush

4/21/2023

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## SUMMARY OF PILE INFORMATION/ INSTALLATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (S) *-# (e.g., BENT 1, PILES 1-5')	FACTORED RESISTANCE PER PILE TONS	PILE CUT-OFF (TOP OF PILE) ELEVATION FT	ESTIMATED PILE LENGTH PER PILE FT	SCOUR CRITICAL ELEVATION FT	MIN. PILE TIP (TIP NO HIGHER THAN) ELEV FT	REQUIRED DRIVING RESISTANCE (RDR)** PER PILE TONS	TOTAL PILE REDRIVES QUANTITY EACH	PREDRILLING LENGTH PER PILE LIN FT	PREDRILLING ELEVATION (ELEV NOT TO PREDRILL BELOW) FT	MAXIMUM PREDRILLING DIA INCHES	PILE EXCAVATION (BOTTOM OF HOLE) ELEV FT	PILE EXC NOT IN SOIL PER PILE LIN FT	PILE EXC IN SOIL PER PILE LIN FT
END BENT 1, PILES 1-4	120	725.53	20			200					706.5	8.1	7.9
END BENT 1, PILES 5-8	120	725.53	20			200					707.5	8.2	6.8
END BENT 2, PILES 1-4	140	725.49	20			235					708.5	13.3	5.7
END BENT 2, PILES 5-8	140	725.49	15			235					709.5	10.0	4.0

\* PREDRILLING FOR PILES IS REQUIRED FOR END BENTS/ BENT WITH A PREDRILLING LENGTH AND AT THE CONTRACTOR'S OPTION FOR END BENTS/ BENTS WITH PREDRILLING INFORMATION BUT NO PREDRILLING LENGTH.

\*\* RDR =  $\frac{\text{FACTORED RESISTANCE} + \text{FACTORED DOWNDRAWY LOAD} + \text{FACTORED DEAD LOAD}}{\text{DYNAMIC RESISTANCE FACTOR}} + \text{NORMAL DOWNDRAWY RESISTANCE} + \frac{\text{NORMAL SCOUR RESISTANCE}}{\text{SCOUR RESISTANCE FACTOR}}$

## SUMMARY OF PDA/ PILE ORDER LENGTHS

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

PILE DRIVING ANALYZER (PDA)				PILE ORDER LENGTHS	
END BENT/ BENT NO.	PDA TESTING REQUIRED? YES OR MAYBE	PDA TEST PILE LENGTH FT	TOTAL PDA TESTING QUANTITY EACH	END BENT/ BENT NO(S)	PILE ORDER LENGTH BASIS* EST OR PDA

### FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

\* EST=PILE ORDER LENGTHS FROM ESTIMATED PILE LENGTHS; PDA=PILE ORDER LENGTHS BASED ON PDA TESTING. FOR GROUPS OF END BENTS/BENTS WITH PILE ORDER LENGTHS BASED ON PDA TESTING, THE FIRST END BENT/ BENT NO. LISTED FOR EACH GROUP IS THE REPRESENTATIVE END BENT/ BENT WITH THE PDA.

## PILE DESIGN INFORMATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (S) *-# (e.g., BENT 1, PILES 1-5')	FACTORED AXIAL LOAD PER PILE TONS	FACTORED DOWNDRAWY LOAD PER PILE FT	FACTORED DEAD LOAD* PER PILE TONS	DYNAMIC RESISTANCE FACTOR	NOMINAL DOWNDRAWY RESISTANCE PER PILE TONS	NOMINAL SCOUR RESISTANCE PER PILE TONS	SCOUR RESISTANCE FACTOR (DEFAULT=1.00)
END BENT 1, PILES 1-4	120			0.60			
END BENT 1, PILES 5-8	120			0.60			
END BENT 2, PILES 1-4	140			0.60			
END BENT 2, PILES 5-8	140			0.60			

\* FACTORED DEAD LOAD IS FACTORED WEIGHT OF PILE ABOVE THE GROUND LINE.

## SUMMARY OF PILE ACCESSORIES

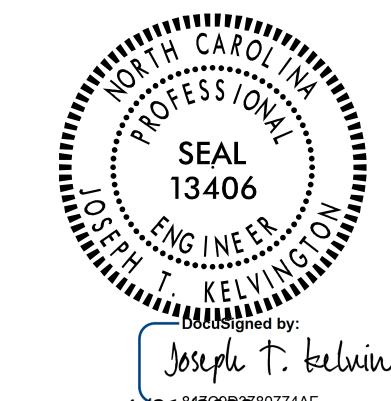
(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (S) *-# (e.g., BENT 1, PILES 1-5')	PIPE PILE PLATES REQUIRED YES OR MAYBE	STEEL PILE POINTS			STEEL PILE TIPS REQUIRED? YES
		PIPE PILE CUTTING SHOES REQUIRED? YES	PIPE PILE CONICAL POINTS REQUIRED? YES	H-PILE POINTS REQUIRED? YES	
-				-	
TOTAL QTY.				-	

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

### NOTES:

1. THE PILE FOUNDATION TABLES ARE BASED ON THE BRIDGE SUBSTRUCTURE DESIGN AND FOUNDATION RECOMMENDATIONS SEALED BY A NORTH CAROLINA PROFESSIONAL ENGINEER (STEPHEN C. CROCKETT, 048207) ON 01-04-2023.
2. TOTAL PILE DRIVING EQUIPMENT SETUP QUANTITY (NOT SHOWN IN PILE FOUNDATION TABLES) EQUALS THE NUMBER OF DRIVEN PILES, I.E., THE NUMBER OF PILES WITH A REQUIRED DRIVING RESISTANCE.
3. THE ENGINEER WILL DETERMINE NEED FOR PDA TESTING WHEN PDA'S MAY BE REQUIRED.



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**PRELIMINARY**  
 PILE FOUNDATION TABLES

(K.L.)

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DRAWN BY: J.E.HAGENBUSH DATE: 05/17/22 DESIGN ENGINEER  
 CHECKED BY: J.T.KELVINGTON DATE: 01/16/23 OF RECORD: J.T.KELVINGTON DATE: 04/21/23

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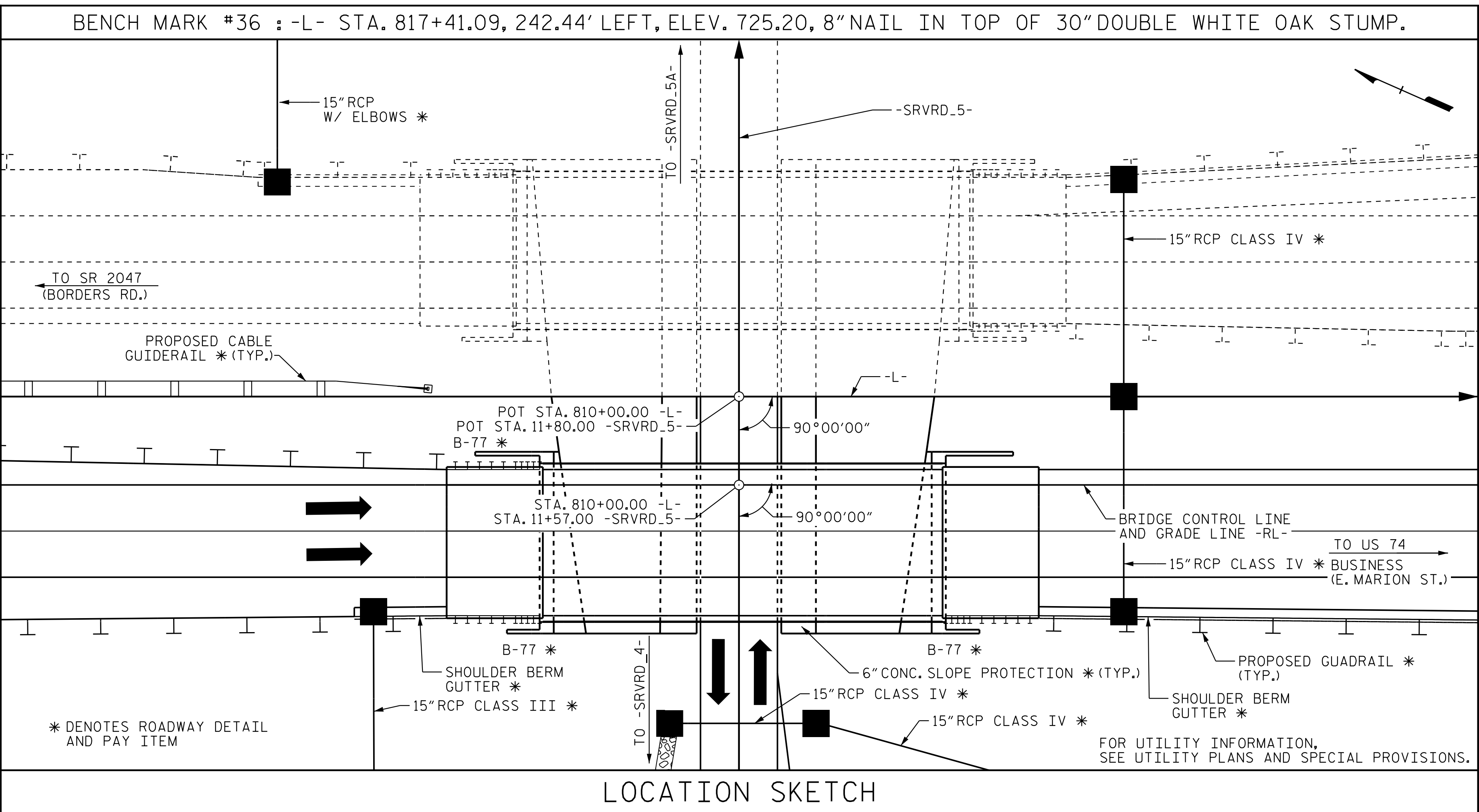
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-03
1			3			TOTAL SHEETS 30
2			4			

jHagenbush

4/21/2023

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**NOTES:**

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATION.
- 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 STRUCTURES, SEE SPECIAL PROVISIONS.
- 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 CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
- WORK SHALL NOT BE STARTED ON THIS BRIDGE UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.
- 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.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

LOCATION SKETCH

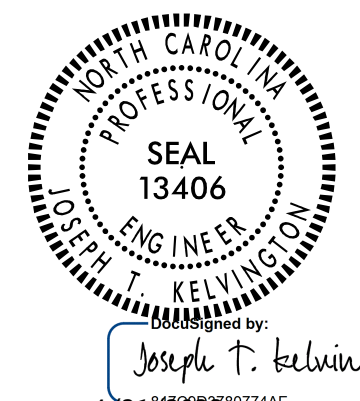
TOTAL BILL OF MATERIAL															
	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP 14X73 STEEL PILES		CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	LIN. FT.	LIN. FT.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE			4,356	5,318		LUMP SUM		4	413.33				207.83		LUMP SUM
END BENT 1	59.0	65.0			53.3		8,744			8	8	160		215	
END BENT 2	39.0	93.0			54.2		8,822			8	8	140		230	
TOTAL	98.0	158.0	4,356	5,318	107.5	LUMP SUM	17,566	4	413.33	16	16	300	207.83	445	LUMP SUM

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 3 OF 3

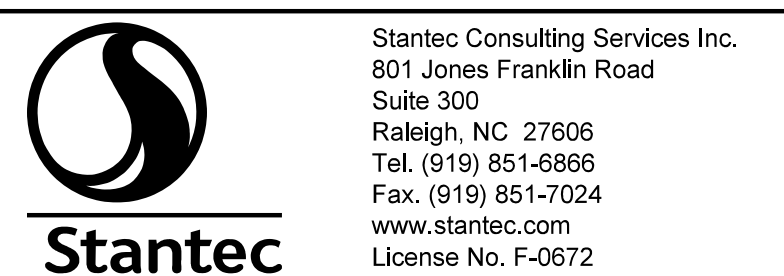
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE ON US 74 BYPASS  
 OVER -SRV RD 5- BETWEEN  
 SR 2047 (BORDERS RD.) AND  
 US 74 BUSINESS (E. MARION ST.)  
 (RL)



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-04
1			3			TOTAL SHEETS
2			4			30



DRAWN BY : J.E. HAGENBUSH DATE : 12/01/22  
 CHECKED BY : J.T. KELVINGTON DATE : 12/05/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	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 ( $\gamma_{LL}$ )	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 ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)		
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.08	--	1.75	0.936	1.26	A	EL	51.00	0.936	1.63	A	I	30.30	0.80	0.936	1.08	A	I	51.00		
	HL-93 (OPERATING)	N/A		1.63	--	1.35	0.936	1.63	A	EL	51.00	0.936	2.16	A	I	6.60	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.52	54.7	1.75	0.936	1.76	A	EL	51.00	0.936	2.26	A	I	6.60	0.80	0.936	1.52	A	I	51.00		
	HS-20 (OPERATING)	36.000		2.29	82.4	1.35	0.936	2.29	A	EL	51.00	0.936	2.96	A	I	6.60	N/A	--	--	--	--	51.00		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH				1.40	0.936	5.25	A	EL	51.00	0.936	7.19	A	I	6.60	0.80	0.936	3.62	A	I	51.00		
		SNGARBS2	20.000		1.47	29.4	1.40	0.936	2.13	A	EL	51.00	0.936	2.85	A	I	6.60	0.80	0.936	1.47	A	I	51.00	
		SNAGRIS2	22.000		1.31	28.8	1.40	0.936	1.90	A	EL	51.00	0.936	2.58	A	I	6.60	0.80	0.936	1.31	A	I	51.00	
		SNCOTTS3	27.250		1.44	39.2	1.40	0.936	2.09	A	EL	51.00	0.936	2.86	A	I	6.60	0.80	0.936	1.44	A	I	51.00	
		SNAGGRS4	34.925		1.25	43.7	1.40	0.936	1.81	A	EL	51.00	0.936	2.50	A	I	6.60	0.80	0.936	1.25	A	I	51.00	
		SNS5A	35.550		1.80	64.0	1.40	0.936	2.61	A	EL	51.00	0.936	3.53	A	I	6.60	0.80	0.936	1.80	A	I	51.00	
		SNS6A	39.950		2.44	97.5	1.40	0.936	3.54	A	EL	51.00	0.936	4.60	A	I	6.60	0.80	0.936	2.44	A	I	51.00	
	SNS7B	42.000		2.61	109.6	1.40	0.936	3.79	A	EL	51.00	0.936	5.00	A	I	6.60	0.80	0.936	2.61	A	I	51.00		
	TRUCK TRACTOR SEMI-TRAILER (TTS)	TNAGRIT3	33.000		1.59	52.5	1.40	0.936	2.31	A	EL	51.00	0.936	3.10	A	I	6.60	0.80	0.936	1.59	A	I	51.00	
		TNT4A	33.075		1.32	43.7	1.40	0.936	1.92	A	EL	51.00	0.936	2.46	A	I	6.60	0.80	0.936	1.32	A	I	51.00	
		TNT6A	41.600		1.27	52.8	1.40	0.936	1.84	A	EL	51.00	0.936	2.39	A	I	6.60	0.80	0.936	1.27	A	I	51.00	
		TNT7A	42.000		1.20	50.4	1.40	0.936	1.74	A	EL	51.00	0.936	2.34	A	I	6.60	0.80	0.936	1.20	A	I	51.00	
		TNT7B	42.000	③	1.19	50.0	1.40	0.936	1.73	A	EL	51.00	0.936	2.27	A	I	6.60	0.80	0.936	1.19	A	I	51.00	
		TNAGRIT4	43.000		1.59	68.4	1.40	0.936	2.31	A	EL	51.00	0.936	3.05	A	I	6.60	0.80	0.936	1.59	A	I	51.00	
TNAGT5A		45.000		1.29	58.1	1.40	0.936	1.88	A	EL	51.00	0.936	2.62	A	I	6.60	0.80	0.936	1.29	A	I	51.00		
TNAGT5B	45.000		1.29	58.1	1.40	0.936	1.88	A	EL	51.00	0.936	2.57	A	I	6.60	0.80	0.936	1.29	A	I	51.00			

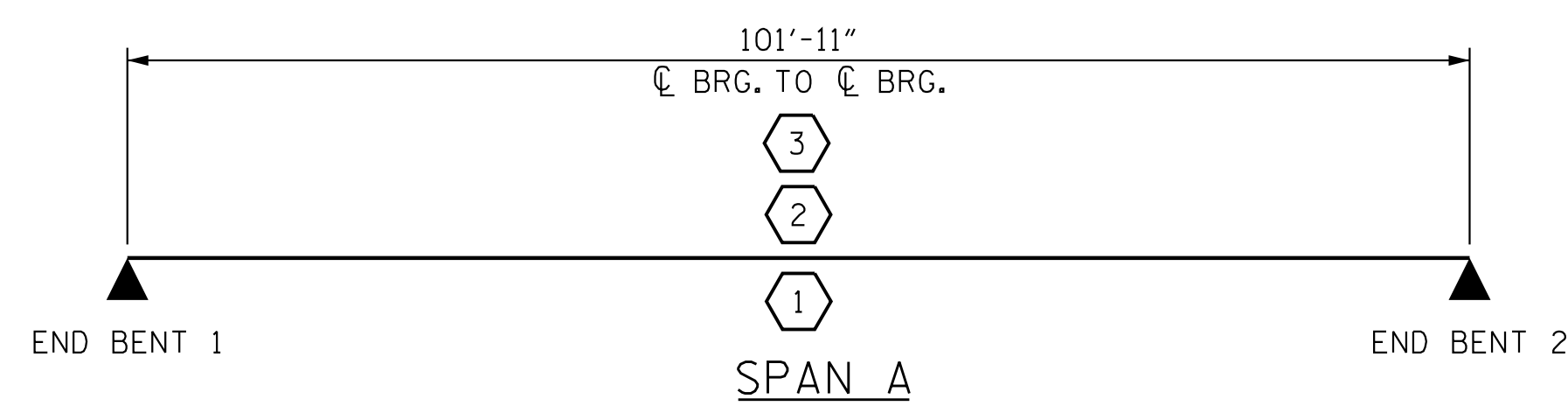
NOTES:

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.

SPAN LENGTH AND SUPPORT CONDITIONS SHOWN IN THE LRFR SKETCH CONFORMS TO THE ANALYSIS MODEL USED FOR ALL LOAD CONDITIONS.

#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	
GIRDER LOCATION	
I - INTERIOR GIRDER	
EL - EXTERIOR LEFT GIRDER	
ER - EXTERIOR RIGHT GIRDER	

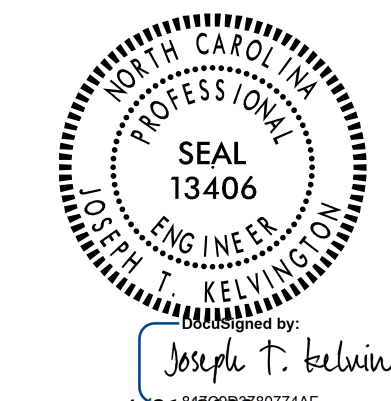


LRFR SUMMARY

PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

Stantec Consulting Services Inc.  
 801 Jones Franklin Road  
 Suite 300  
 Raleigh, NC 27606  
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 www.stantec.com  
 License No. F-0672

DRAWN BY: N. D'AIUTO DATE: 05/01/18  
 CHECKED BY: A. BOYKIN JR. DATE: 12/08/22  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23



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

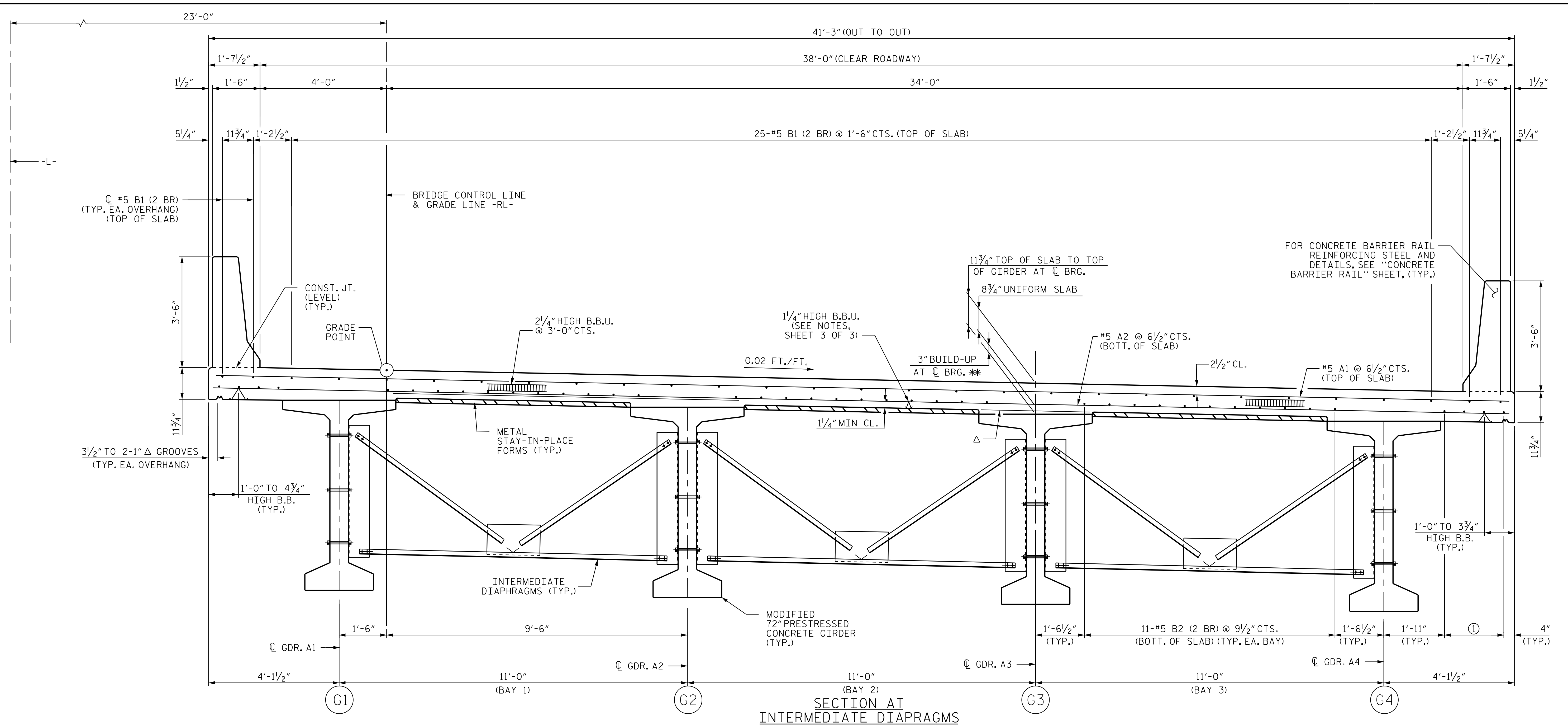
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	REVISIONS						SHEET NO. S9-05 TOTAL SHEETS 30
	NO.	BY:	DATE:	NO.	BY:	DATE:	
	1			3			
	2			4			



jHogenbush

4/21/2023

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**SECTION AT INTERMEDIATE DIAPHRAGMS**

\* BUILD UP IN SPAN @ ALL POINTS BETWEEN BEARINGS VARIES, 2 3/8" MAX. @ MID-SPAN, GIRDERS 2 & 3.

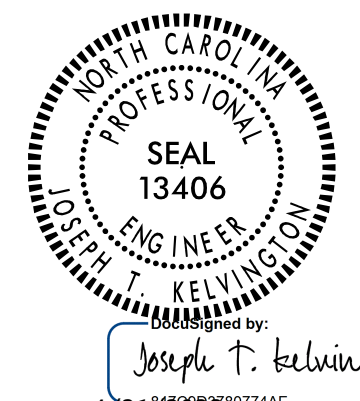
① 4-#5 B2 (2 BR) @ 7 1/2" CTS. (BOTTOM OF SLAB) (TYP. EA OVERHANG)

**TYPICAL SECTION**

SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR NOTES.  
 (2 BR) DENOTES 2 BAR RUN  
 Δ TOP OF METAL STAY IN PLACE FORM TO MATCH REQUIRED BOTTOM OF SLAB.  
 MAX. BUILD-UP BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 1 OF 3



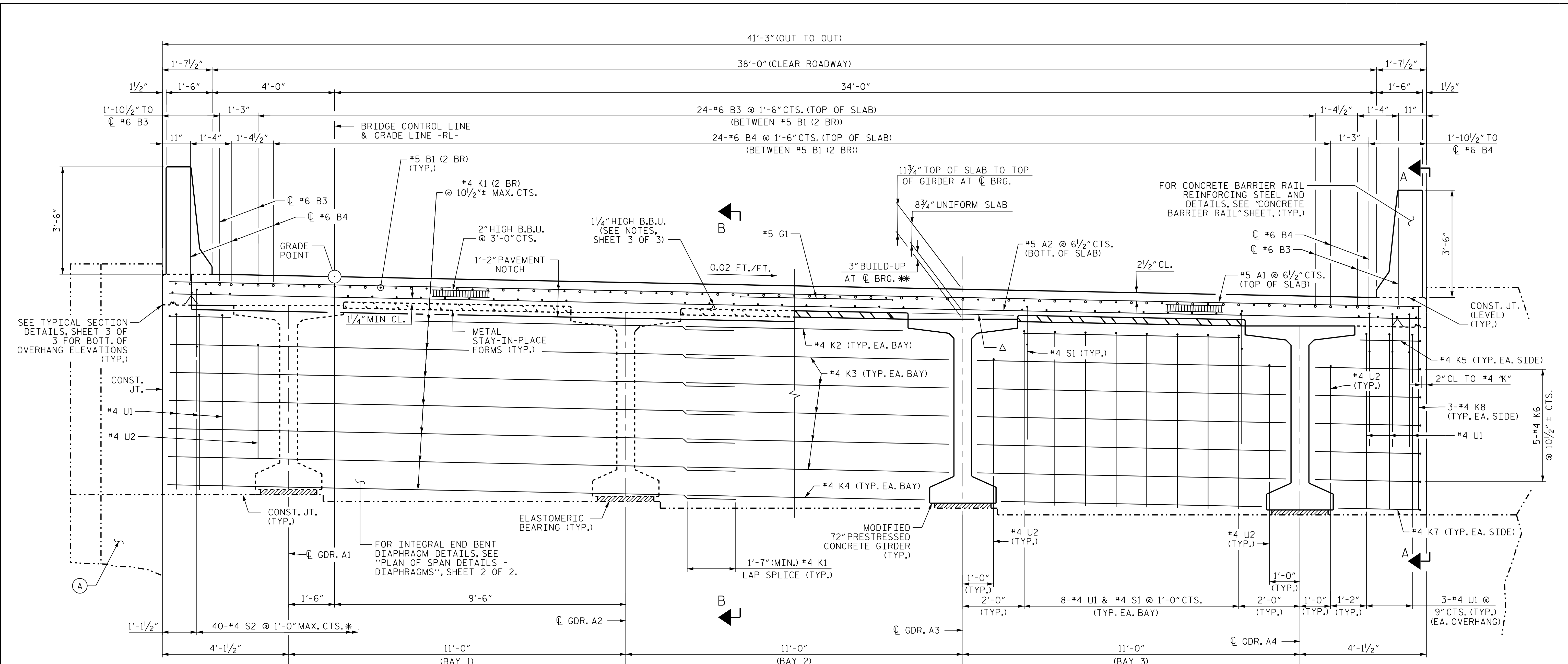
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION  
 (RL)

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DRAWN BY : N. D'AIUTO DATE : 04/2/18  
 CHECKED BY : J.T. KELVINGTON DATE : 12/07/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

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NO.	BY:	DATE:	NO.	BY:	DATE:	S9-06	
1			3			TOTAL SHEETS	
2			4			30	



\* NOTE: #4 S2 MAY BE REPOSITIONED AS NECESSARY TO CLEAR GIRDERS

**INTEGRAL DIAPHRAGM HALF-SECTION REINFORCEMENT AT FILL FACE**

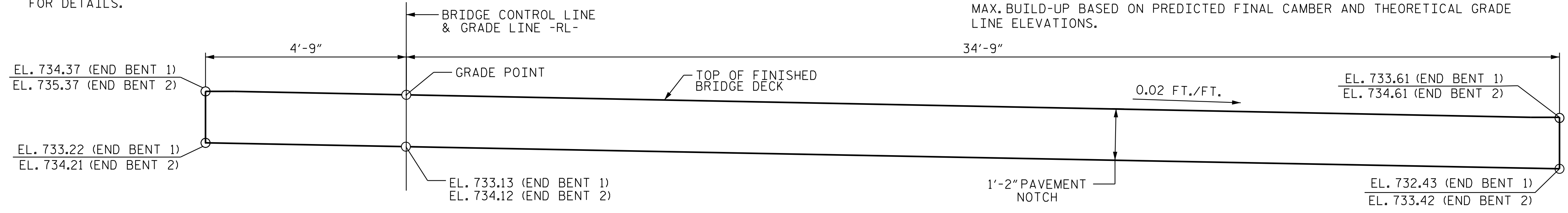
**TYPICAL SECTION**

**INTEGRAL DIAPHRAGM HALF-SECTION REINFORCEMENT AT FRONT FACE**

- DENOTES #5 B1 (2 BR) CONTINUOUS REINFORCEMENT. SEE "TYPICAL SECTION", SHT. 1 OF 3 FOR DETAILS
- = NEGATIVE MOMENT STEEL OVER END BENTS. SEE "TYPICAL SECTION", SHT. 3 OF 3 FOR DETAILS

SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR NOTES.  
 SEE SECTION B-B ON SHEET 3 OF 3 FOR SECTION THROUGH END BENT DIAPHRAGM  
 \*\* BUILD UP IN SPAN @ ALL POINTS BETWEEN BRGS. VARIES. 2 3/8" MAX. @ MID-SPAN, GIRDERS 2 & 3.  
 Δ TOP OF METAL STAY IN PLACE FORM TO MATCH REQUIRED BOTTOM OF SLAB. MAX. BUILD-UP BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

(A) INTEGRAL END BENT CAP AND WING WALL. SEE END BENT DRAWINGS FOR DETAILS.



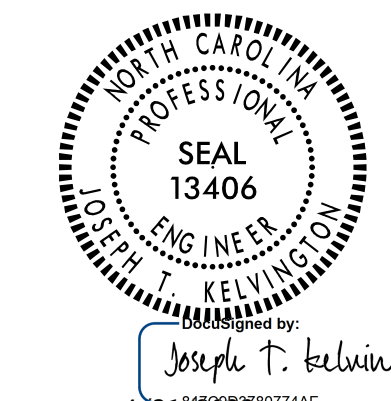
**APPROACH SLAB PAVEMENT NOTCH DETAIL**

ELEVATIONS ARE ALONG FILL FACE OF END BENT  
 DIMENSIONS ARE NORMAL TO BRIDGE CONTROL LINE -RL-

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION  
 (RL)



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2			4			

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 License No. F-0672

DRAWN BY: N.D'AIUTO DATE: 04/23/18  
 CHECKED BY: J.T. KELVINGTON DATE: 12/07/22  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23



**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 (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.

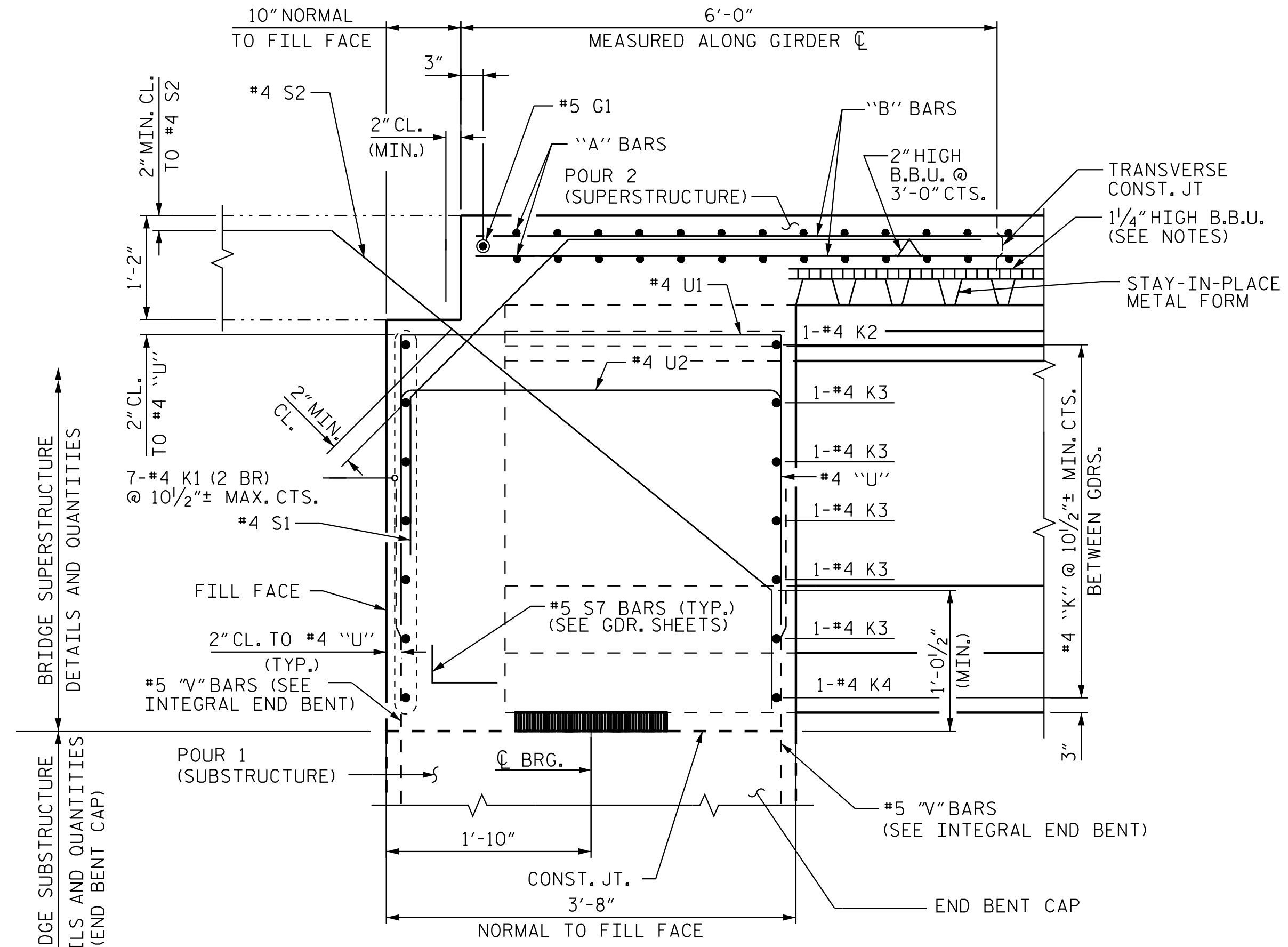
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

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

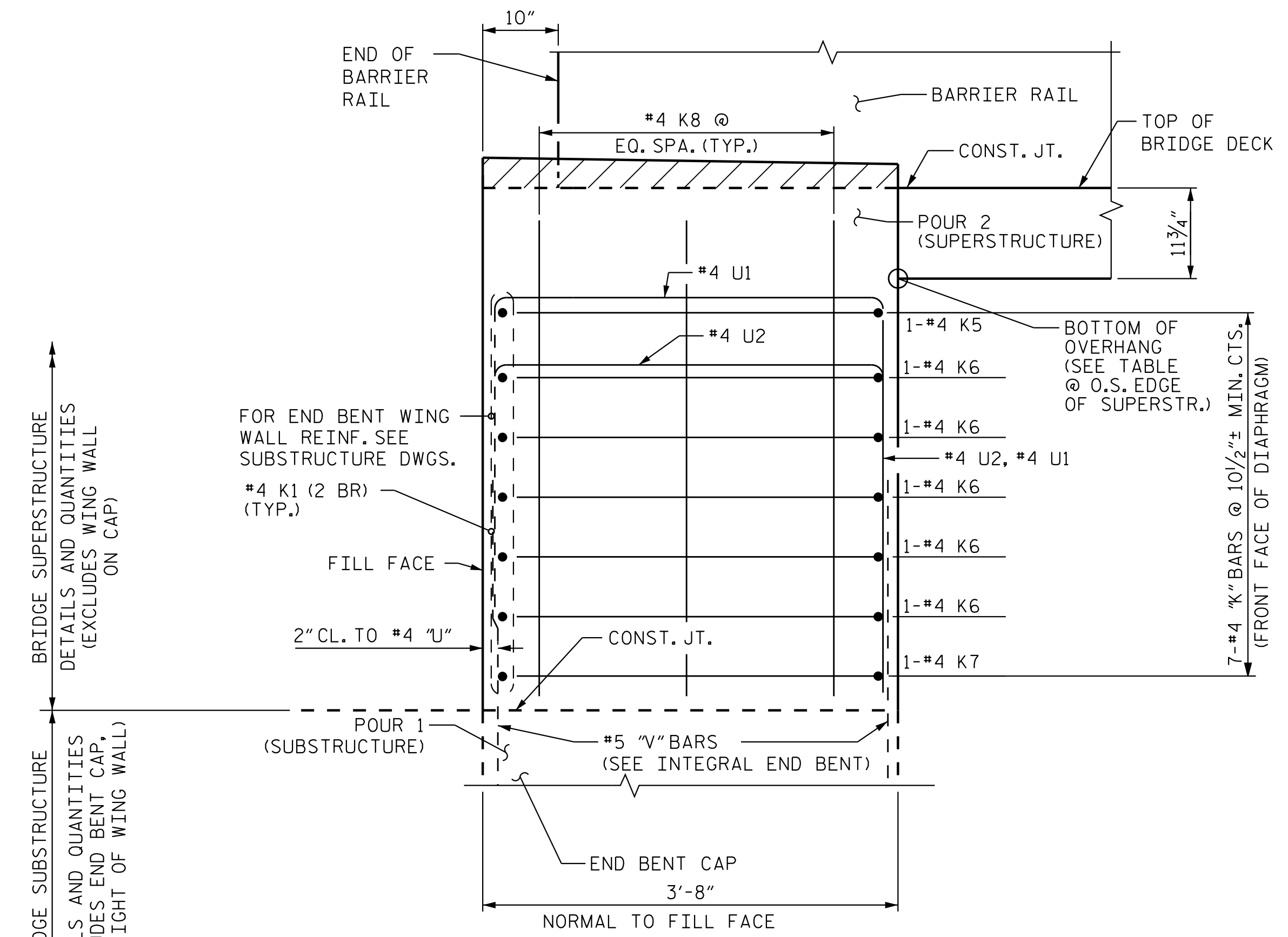
#5 G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

(2 BR) DENOTES 2 BAR RUN



**SECTION B-B**

SECTION THRU INTEGRAL END BENT DIAPHRAGM, SEE "PLAN OF SPANS DETAILS - DIAPHRAGMS", SHEET 3 OF 3

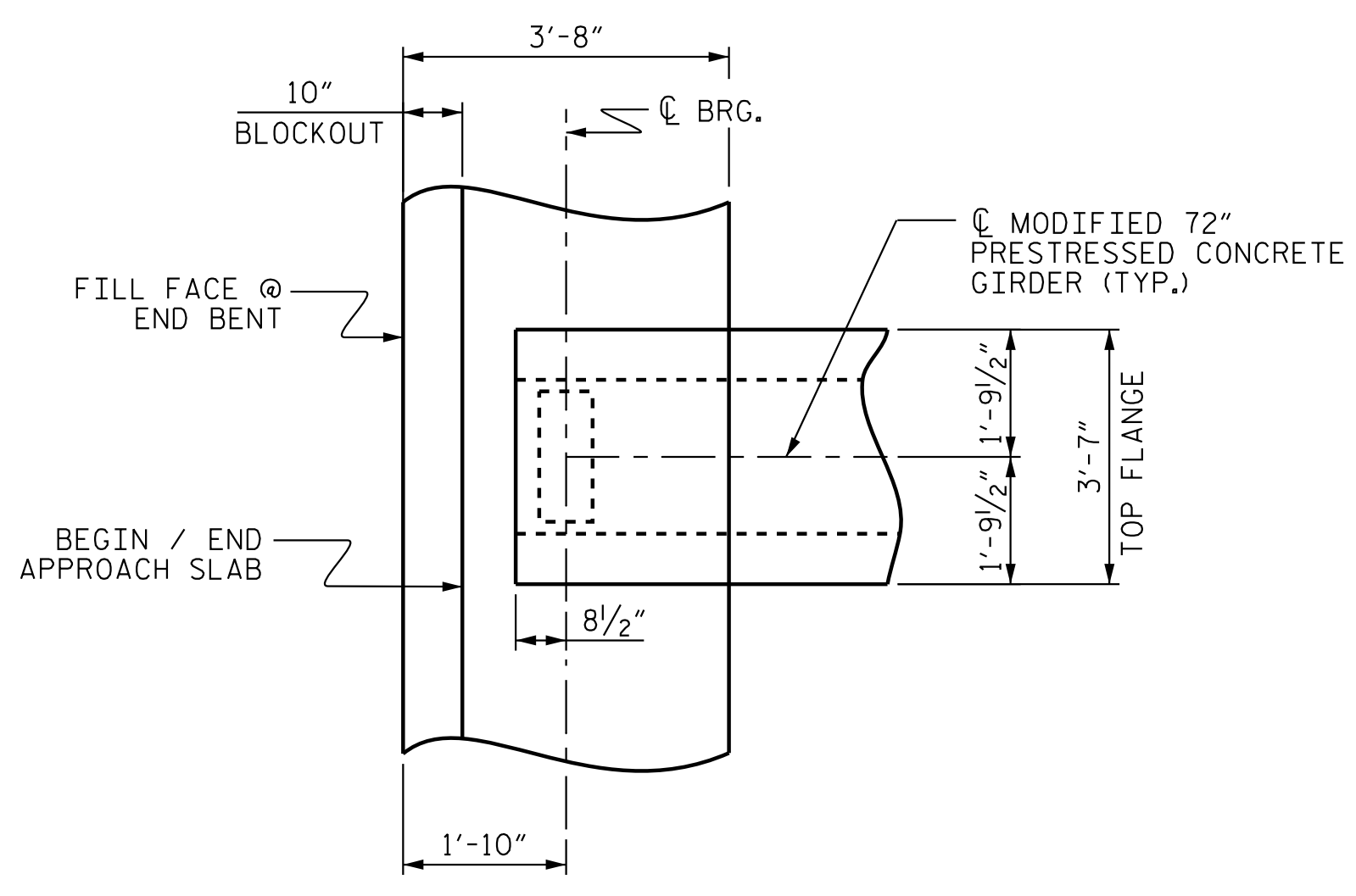


**ELEVATION A-A**

VIEW OF INTEGRAL END BENT DIAPHRAGM @ END BENT CONST. JT. SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS", SHEET 2 OF 2

**BOTTOM OF OVERHANG ELEV. @ OUTSIDE EDGE OF SUPERSTR.**

OVERHANG	END BENT	ELEV.
LEFT SIDE	1	733.43
RIGHT SIDE	1	732.67
LEFT SIDE	2	734.35
RIGHT SIDE	2	733.59



**PLAN OF INTEGRAL END BENT**

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 3 OF 3



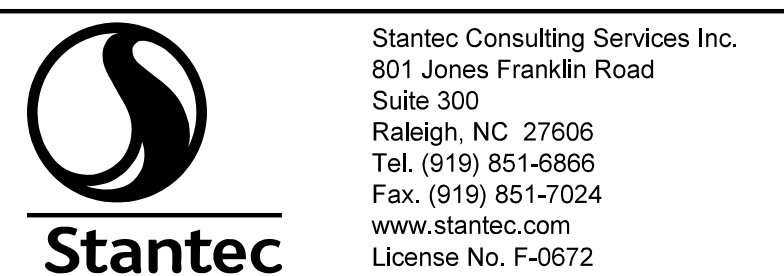
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION  
 DETAILS

(RL)

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			30

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STR. #9

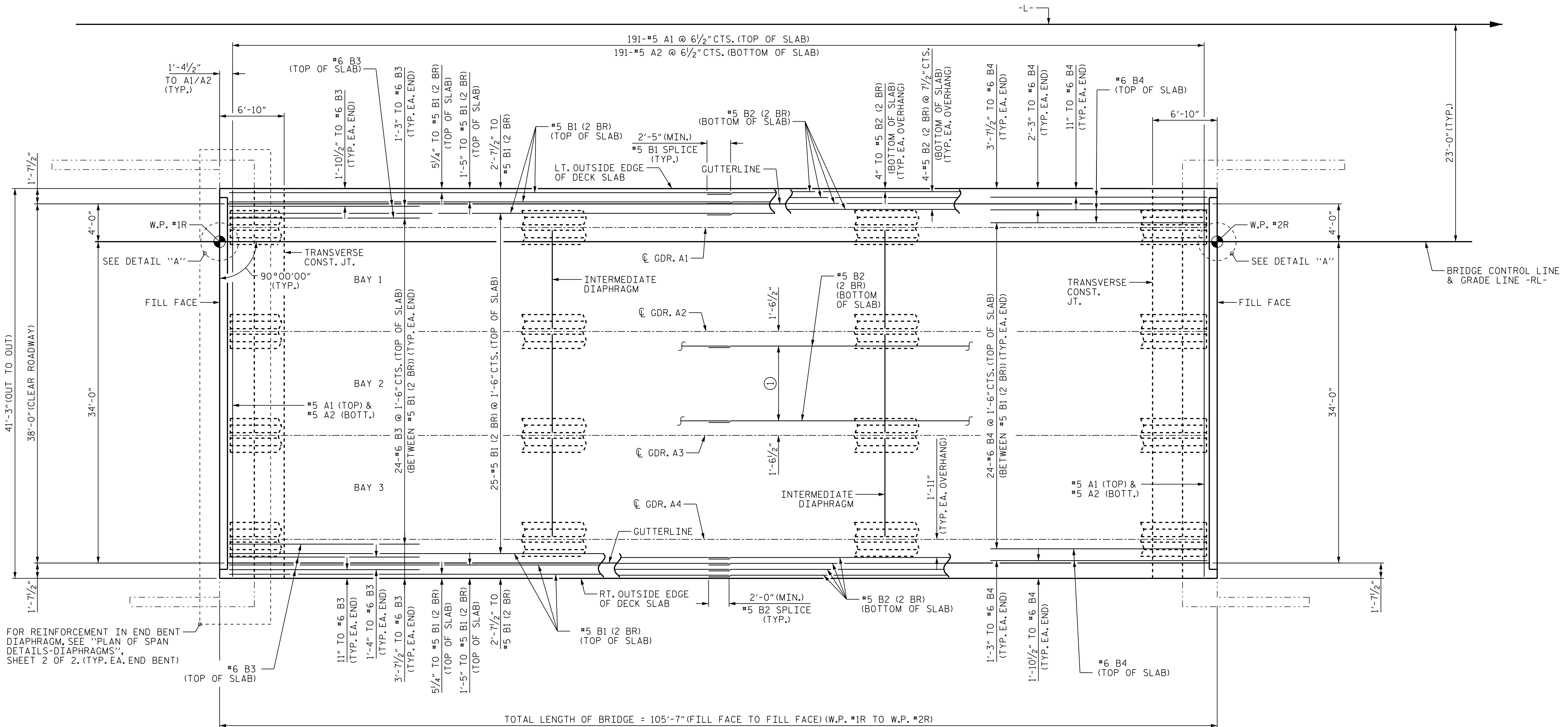


DRAWN BY: N. D'AIUTO DATE: 04/23/18  
 CHECKED BY: J.T. KELVINGTON DATE: 12/07/22  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

jHagenbush

4/21/2023

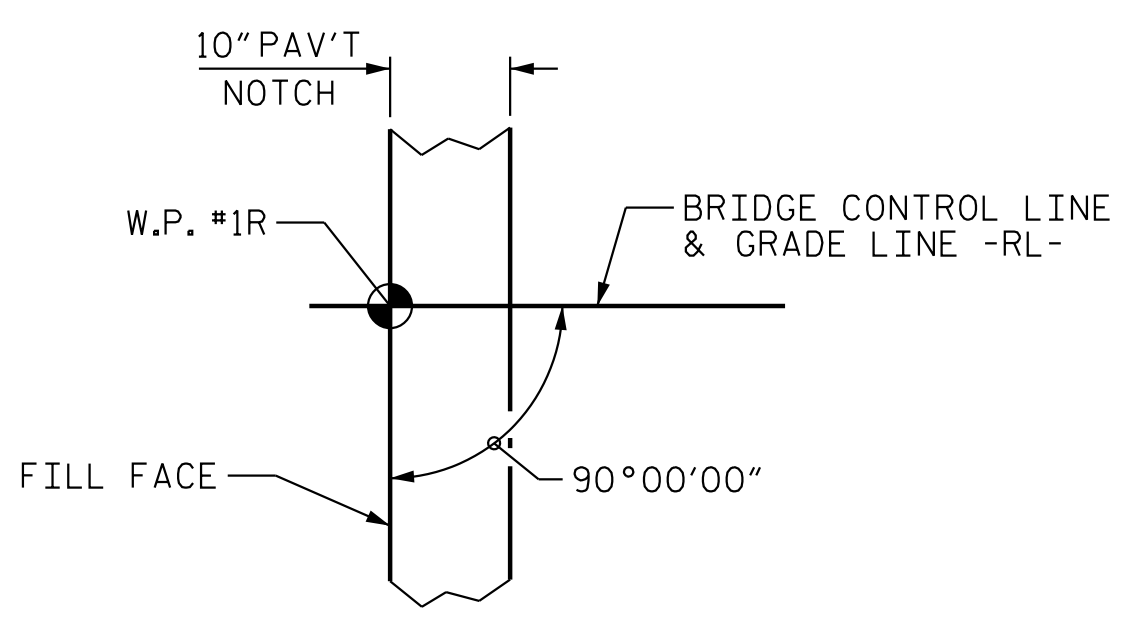
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PLAN OF SPAN A

① 11-#5 B2 (2 BR) @ 9 1/2" CTS. (BOTTOM OF SLAB) (TYP. EA. BAY)

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

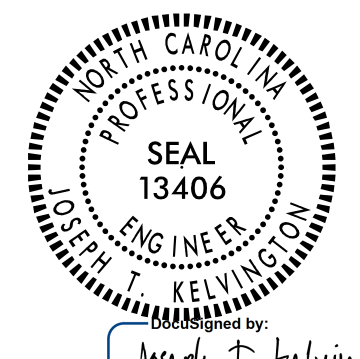


DETAIL "A"

W.P. #2R SIMILAR BY ROTATION

NOTES:

- (2 BR) DENOTES 2 BAR RUN
- FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.
- FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS", SHEET 2 OF 2.
- FOR POUR SEQUENCE, SEE "BILL OF MATERIALS" SHEET.
- FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGM FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.
- PLACE B3 AND B4 BARS 2" CLEAR OF THE 10" PAVEMENT NOTCH BLOCKOUT.



SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RAI FTGH  
SUPERSTRUCTURE  
PLAN OF SPANS  
(SPAN A)  
(RL)

REVISIONS						SHEET NO. S9-09
NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			

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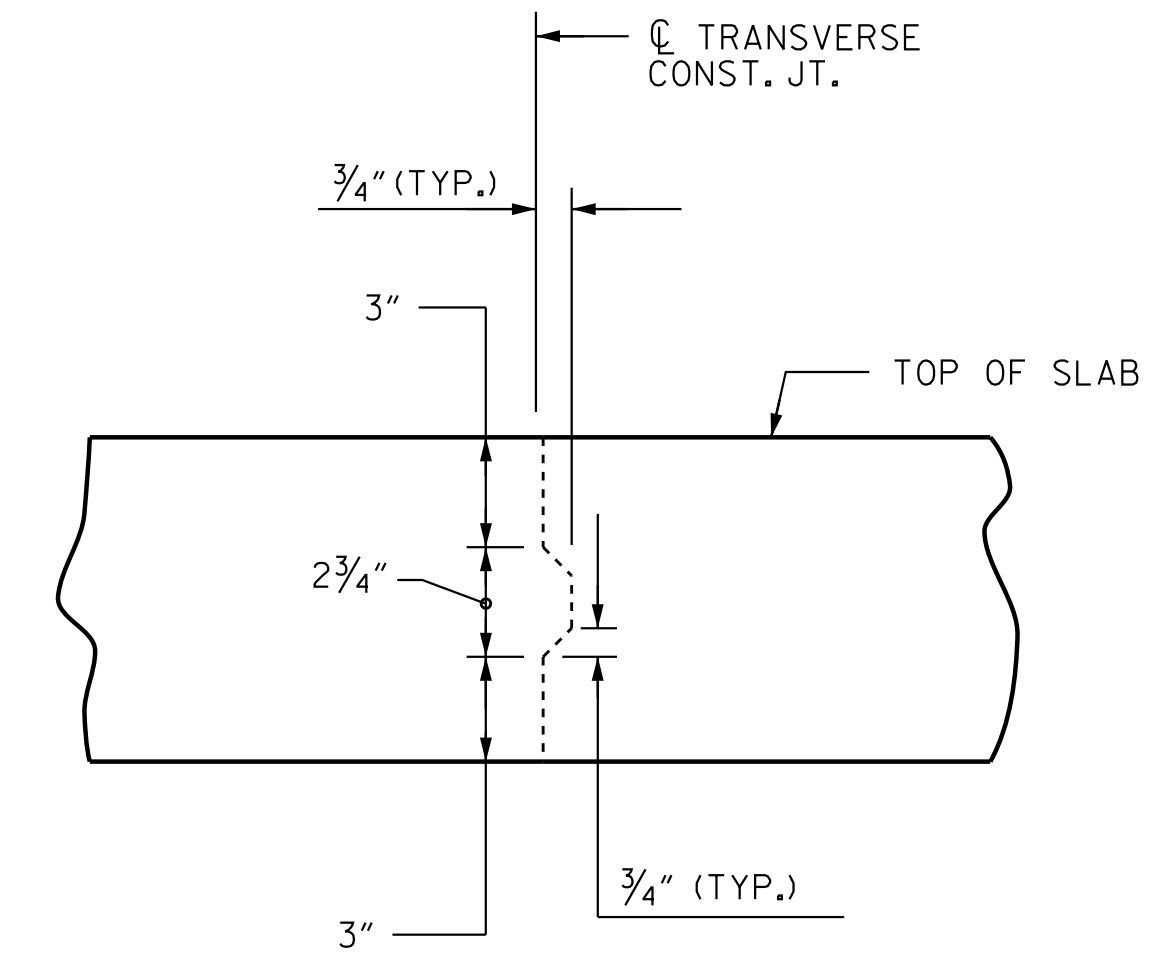
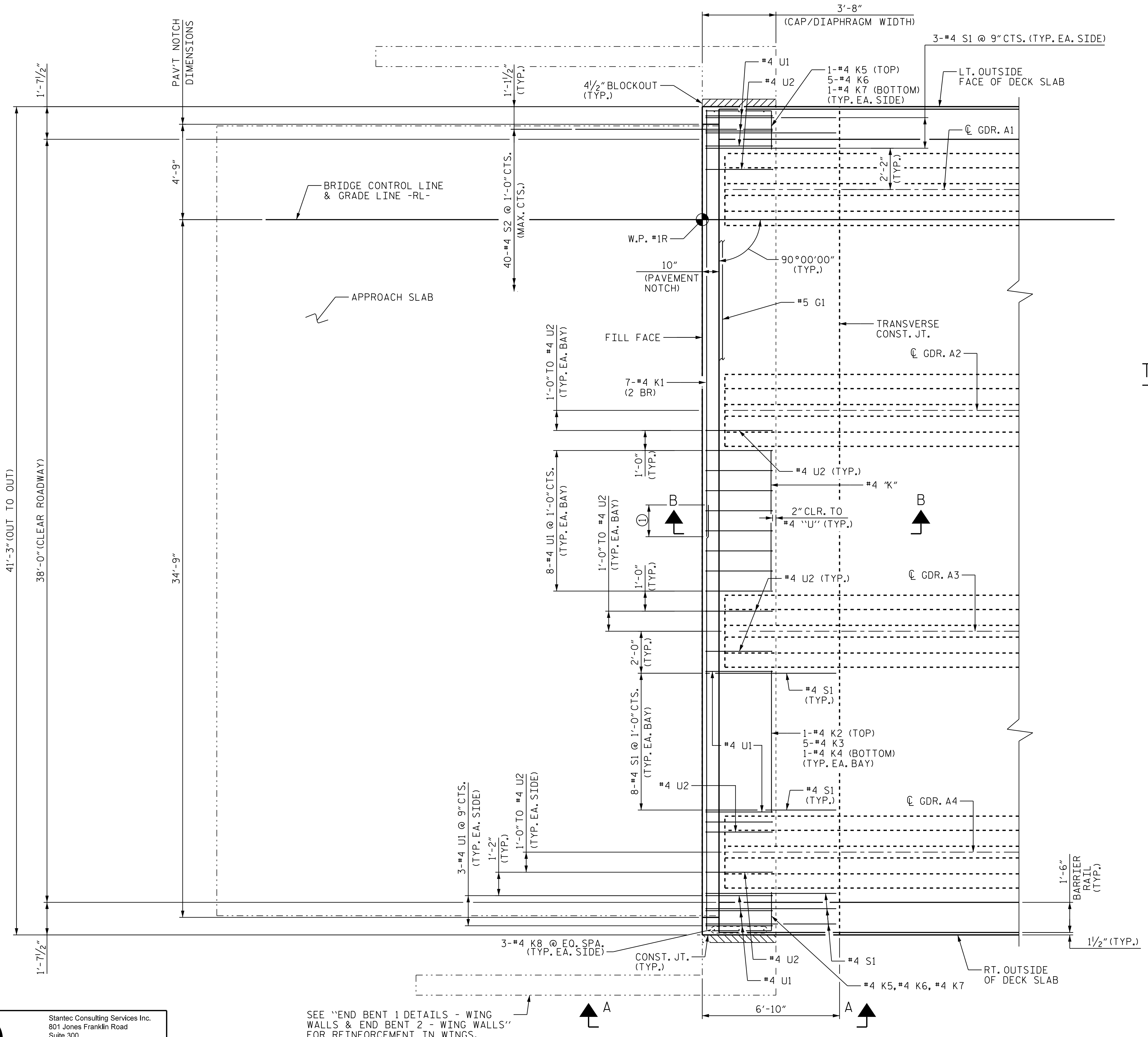
4/21/2023 jHogenbush



jHogenbush

4/21/2023

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### TRANSVERSE CONSTRUCTION JOINT DETAIL

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

### NOTES:

FOR SECTION B-B, & ELEVATION A-A, SEE TYPICAL SECTION DETAILS, SHEET 3 OF 3.

"A" BARS, "B" BARS & BARRIER RAIL REINFORCEMENT, ARE NOT SHOWN IN DECK SLAB FOR CLARITY.

(2 BR) DENOTES 2 BAR RUN.

#4 S2 BARS MAY BE REPOSITIONED AS FOUND NECESSARY TO CLEAR PRESTRESSED GIRDERS.

▨ DENOTES CONC. BLOCKOUT. SEE END BENT SHTS. AND SUPERSTRUCTURE TYPICAL SECTION DETAILS.

① 1'-7" MIN. SPLICE FOR #4 K1.

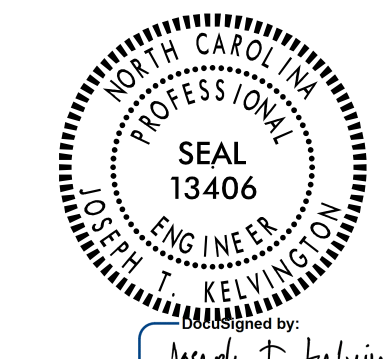
SEE "END BENT 1 DETAILS - WING WALLS & END BENT 2 - WING WALLS" FOR REINFORCEMENT IN WINGS.

### TYPICAL END BENT DIAPHRAGM REINFORCING DETAIL

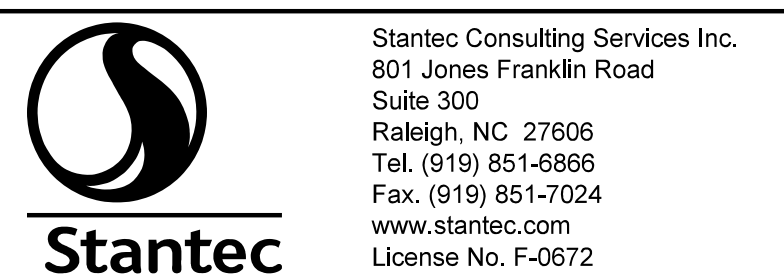
DETAIL AT END BENT 1 SHOWN. END BENT 2 SIMILAR BY ROTATION.

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

SHEET 2 OF 2



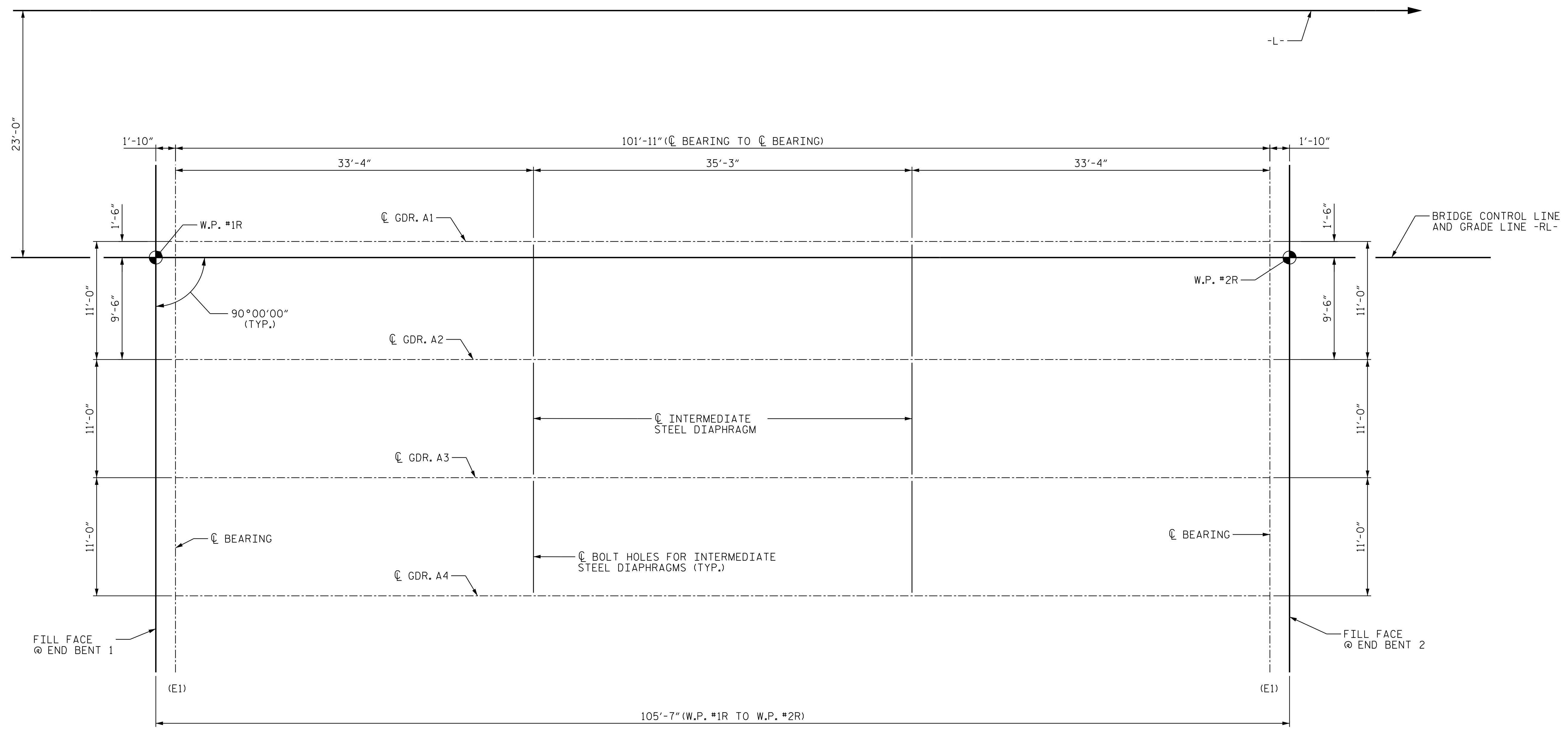
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RAIL FIGH  
SUPERSTRUCTURE  
PLAN OF SPANS  
DETAILS - DIAPHRAGMS  
(RL)



DRAWN BY : N. DAIUTO DATE : 04/23/18  
CHECKED BY : J.T. KELVINGTON DATE : 12/07/22  
DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

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2			4			



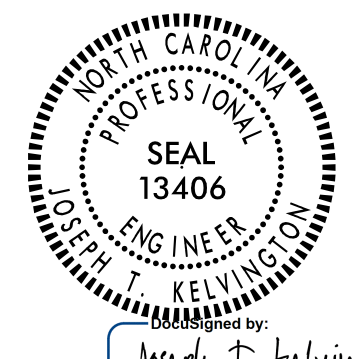
SPAN A  
FRAMING PLAN

NOTES:

- (E1) DENOTES ELASTOMERIC BEARING. SEE "ELASTOMERIC BEARING DETAILS".
- SEE TYPICAL SECTION FOR END BENT DIAPHRAGM DETAILS.
- REFER TO "PLAN OF SPAN DETAILS-DIAPHRAGMS" FOR END BENT DIAPHRAGM DETAILS.
- ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS NOTED.

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RAI FTGH  
SUPERSTRUCTURE  
FRAMING PLAN  
(RL)



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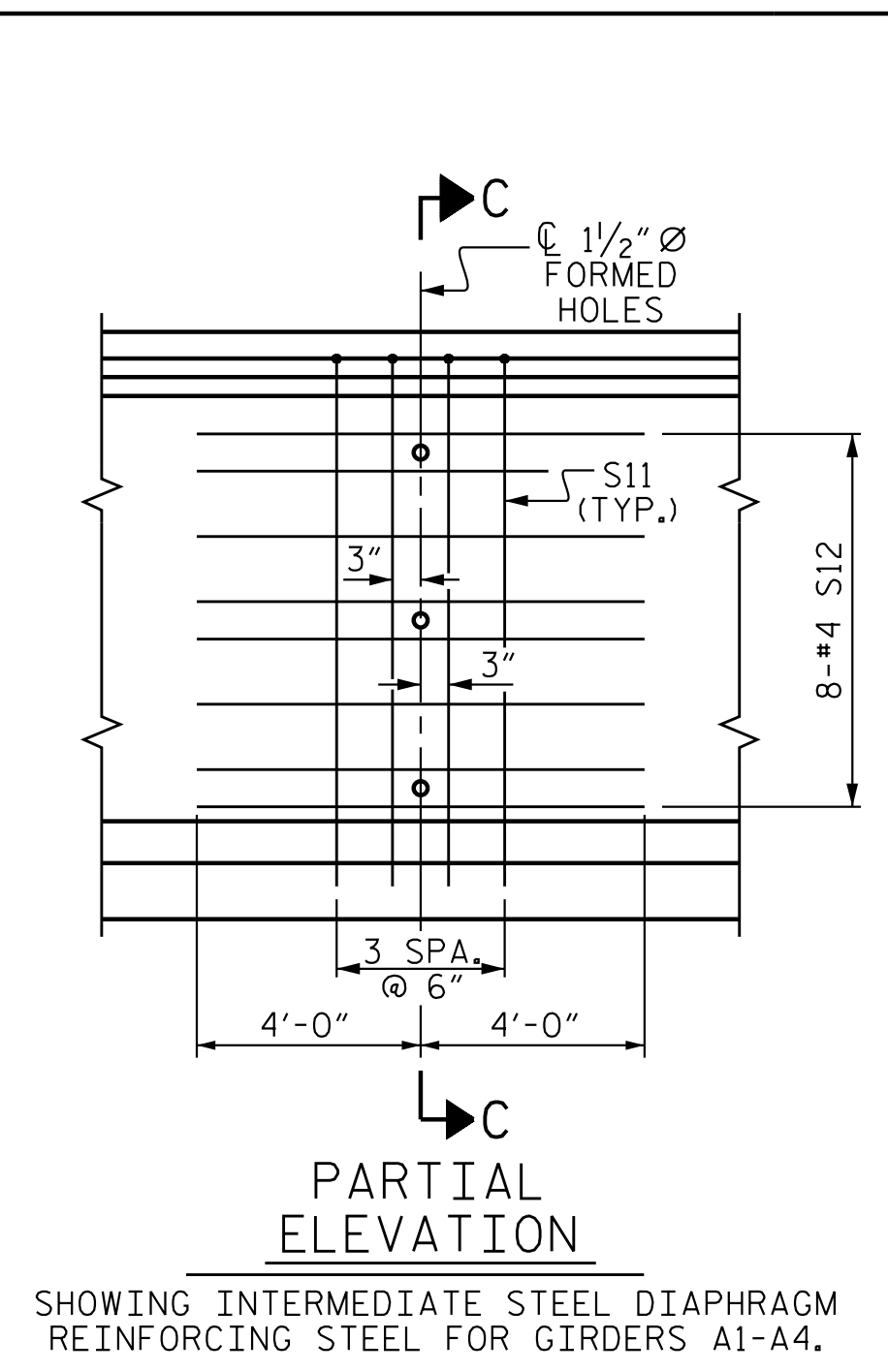
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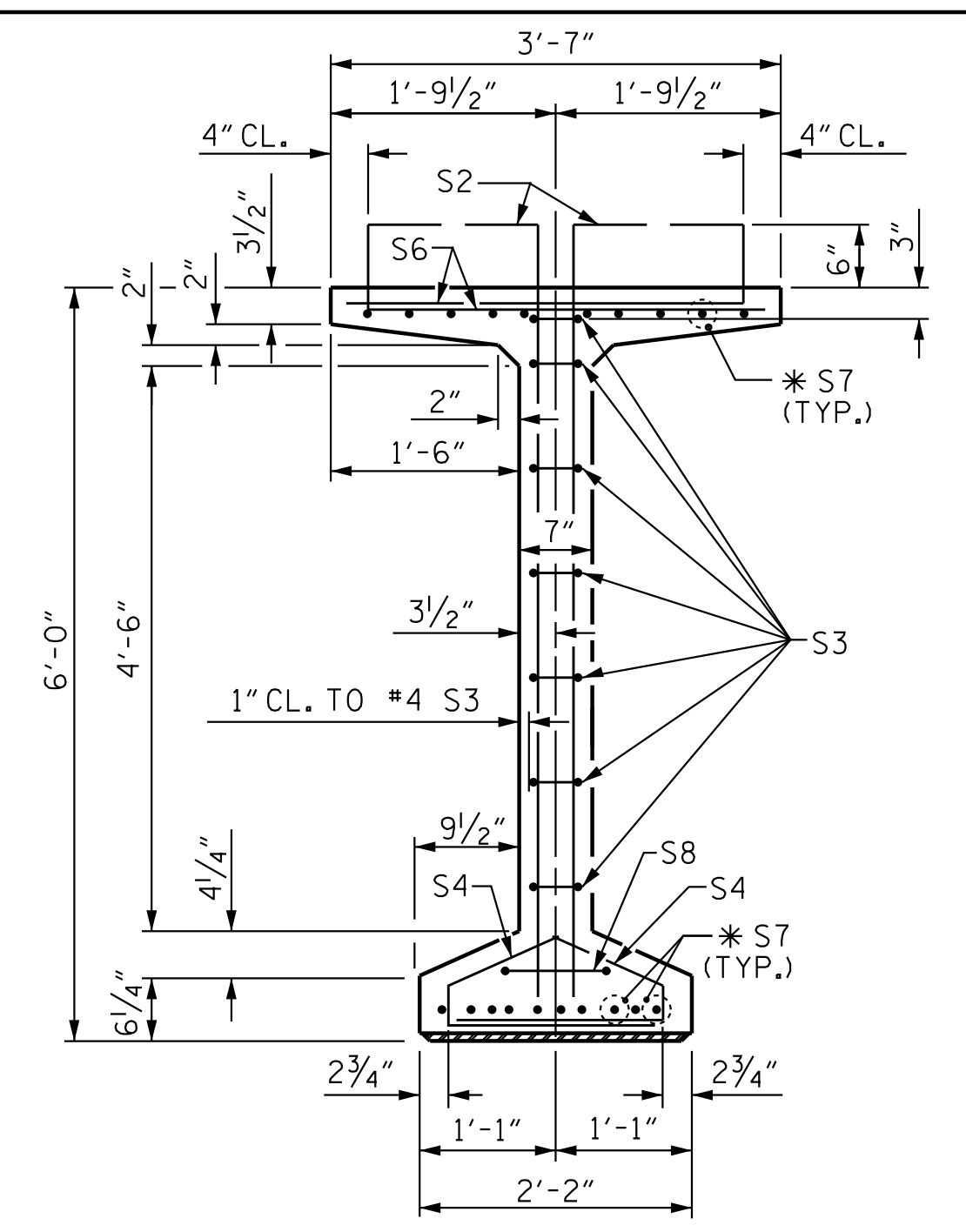
DRAWN BY: N. DAIUTO DATE: 04/23/18  
CHECKED BY: J.T. KELVINGTON DATE: 12/05/22  
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

4/21/2023 4/21/2023 jHagenbush

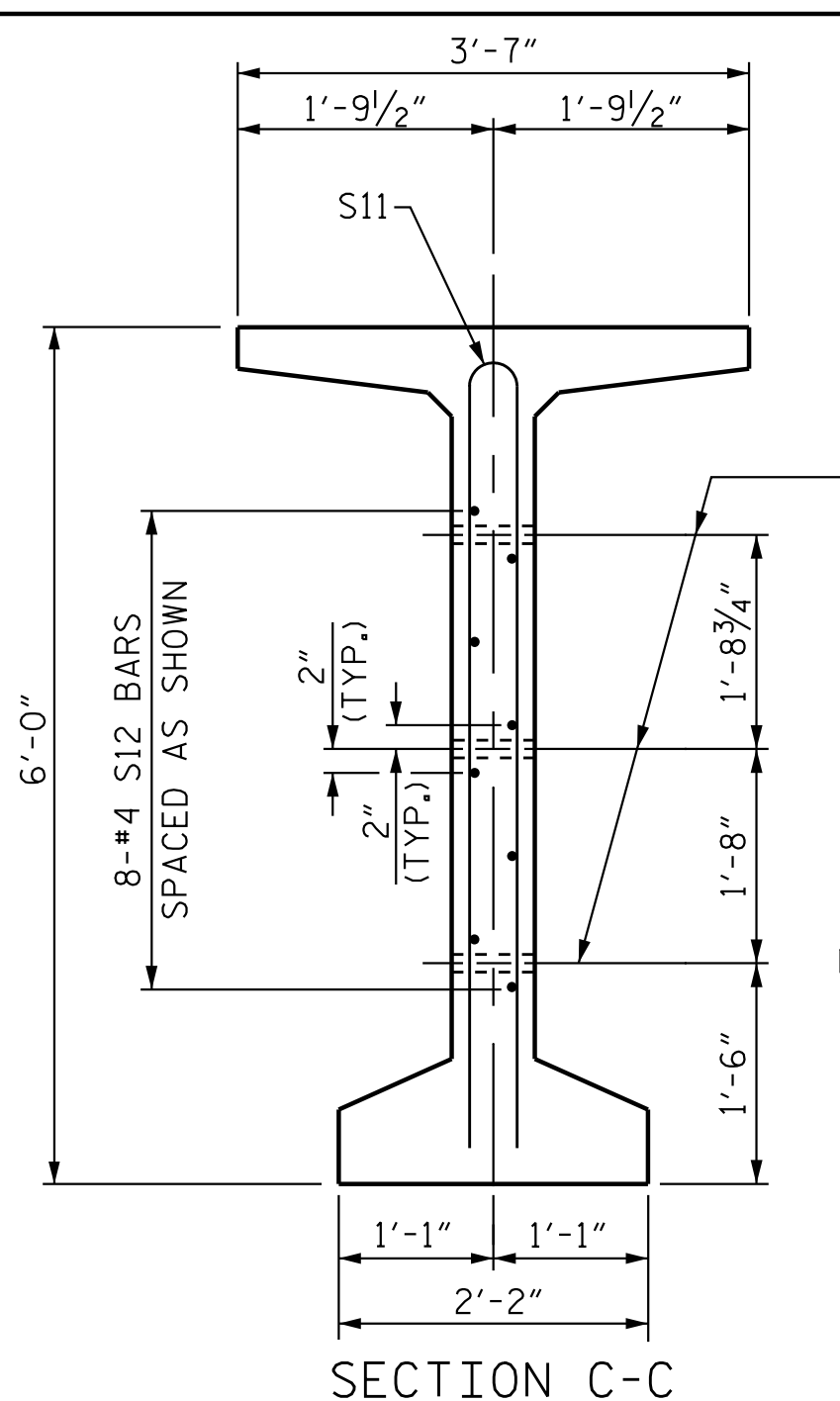




SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS A1-A4.

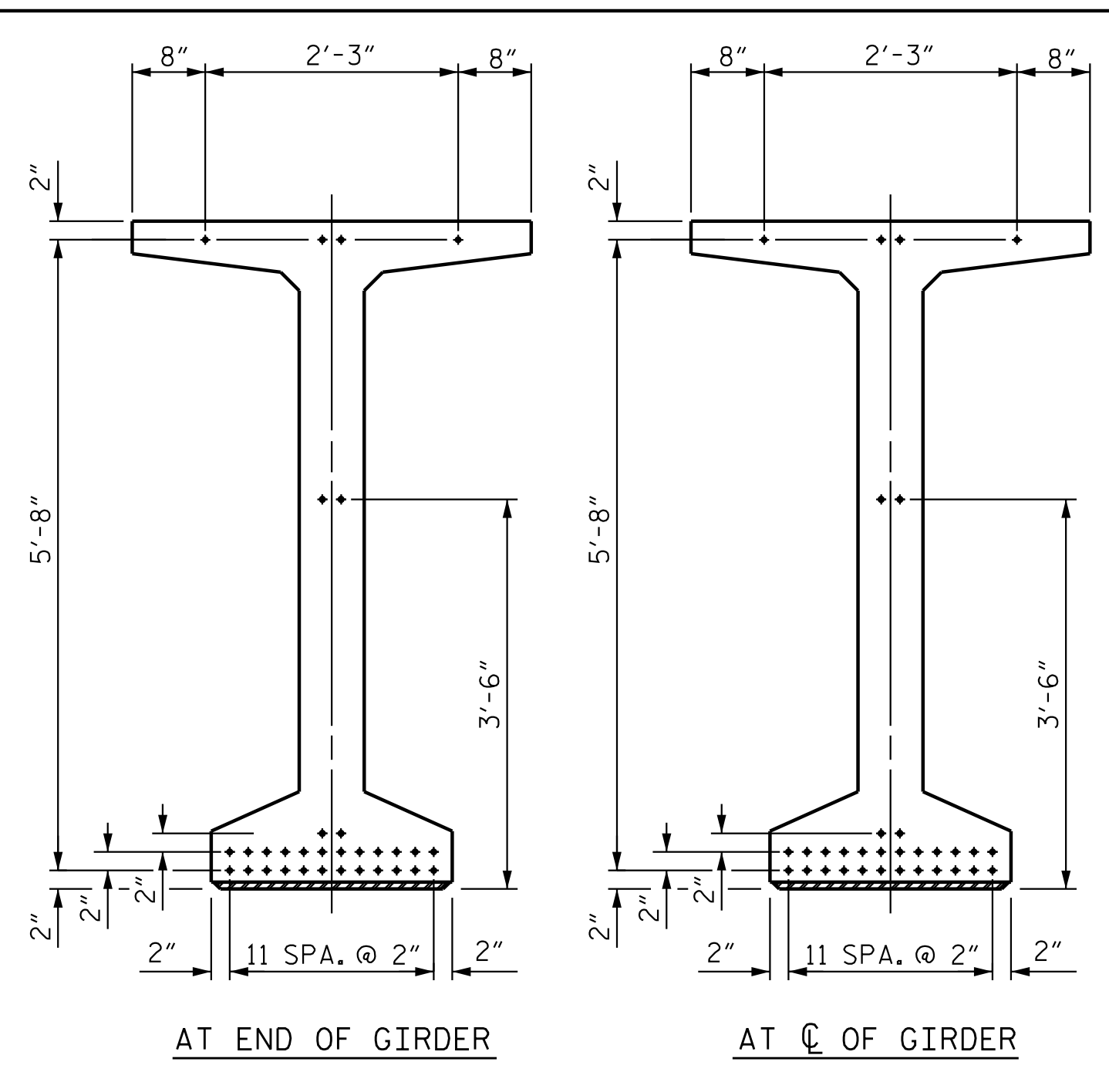


SECTION A-A

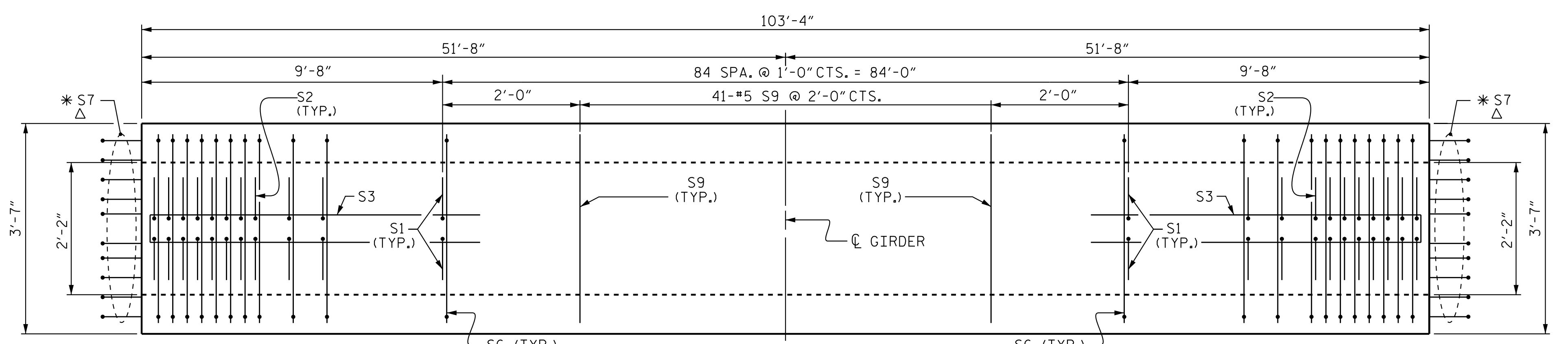


SECTION C-C  
(S1, S6 AND S9 BARS NOT SHOWN)

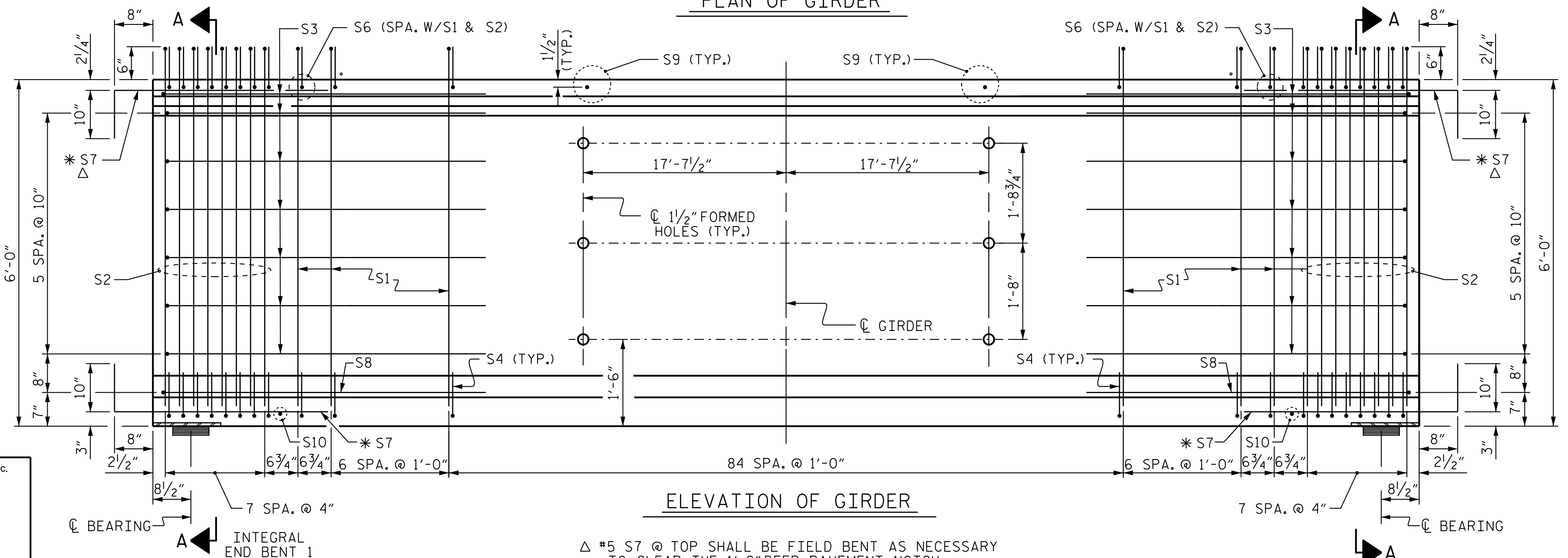
DEBONDING LEGEND  
 • FULLY BONDED STRANDS  
 \* FOR S7 BARS, SEE DETAIL "C" OF MODIFIED 72" PRESTRESSED CONCRETE GIRDER DETAILS SHEET



0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

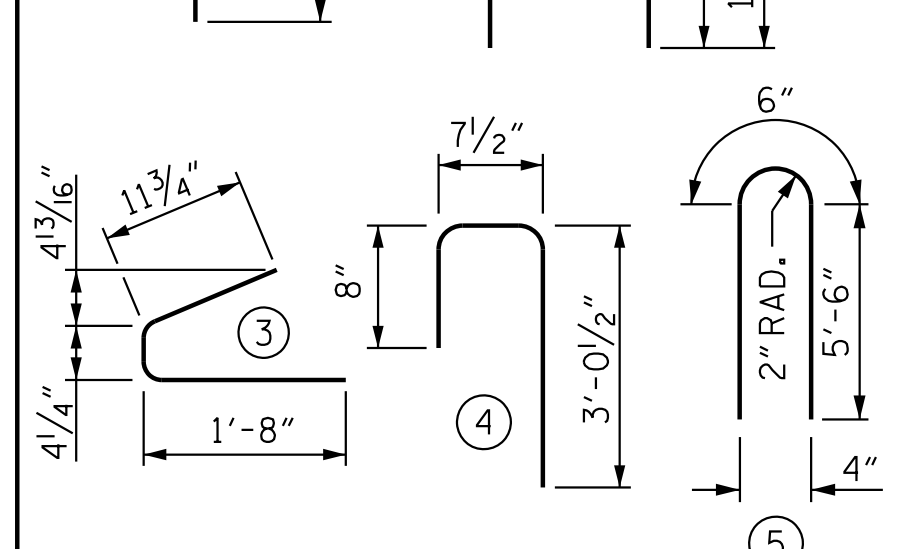
Δ #5 S7 @ TOP SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE 1'-2" DEEP PAVEMENT NOTCH.

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 GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	198	#4	1	6'-10"	904
S2	32	#6	1	6'-10"	328
S3	14	#4	2	20'-5"	191
S4	64	#4	3	3'-0"	128
S6	230	#4	4	4'-4"	666
*S7	40	#5	STR	3'-8"	153
S8	2	#5	2	21'-0"	44
S9	41	#5	STR	3'-3"	139
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	11'-6"	96
S12	16	#4	STR	8'-0"	86

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



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	8,000 PSI CONCRETE		0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	2,736	22.1	32

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	103'-4"	413'-4"

PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 MODIFIED  
 72" PRESTRESSED  
 CONCRETE GIRDER  
 (RL)



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 www.stantec.com  
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ASSEMBLED BY : N. DAIUTO	DATE : 05/01/18	MAA/GM	DESIGN
CHECKED BY : T.N. ENNIS	DATE : 08/24/18	MAA/TMG	ENGINEER
DRAWN BY : EEM 2/6/97	REV. 6/13	MAA/THC	OF RECORD
CHECKED BY : VAP 2/6/97	REV. 1/15		
	REV. 12/17		
			OF RECORD: J.T. KELVINGTON DATE : 04/21/23

jHagenbush

4/21/2023

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### NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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.

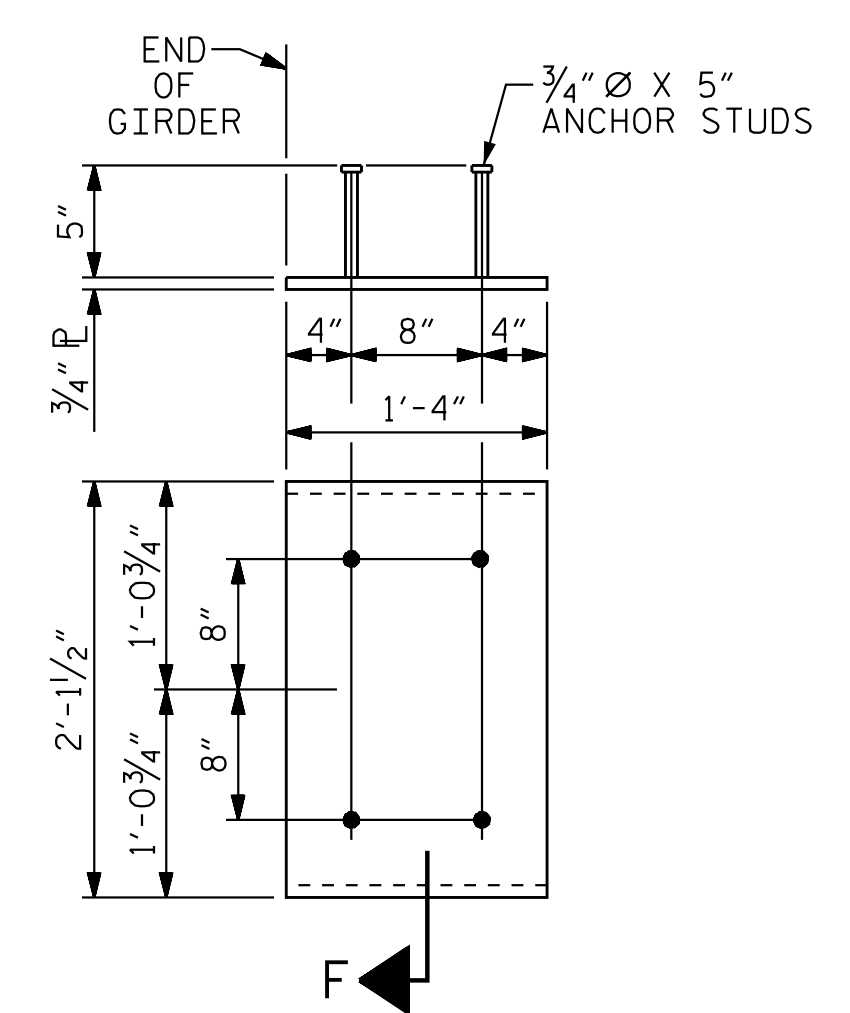
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,000 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".

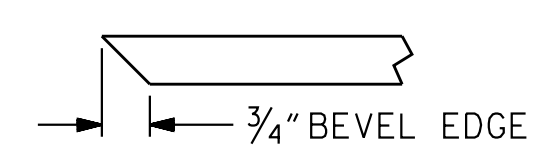
A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE.



### EMBEDDED PLATE "B-1" DETAILS

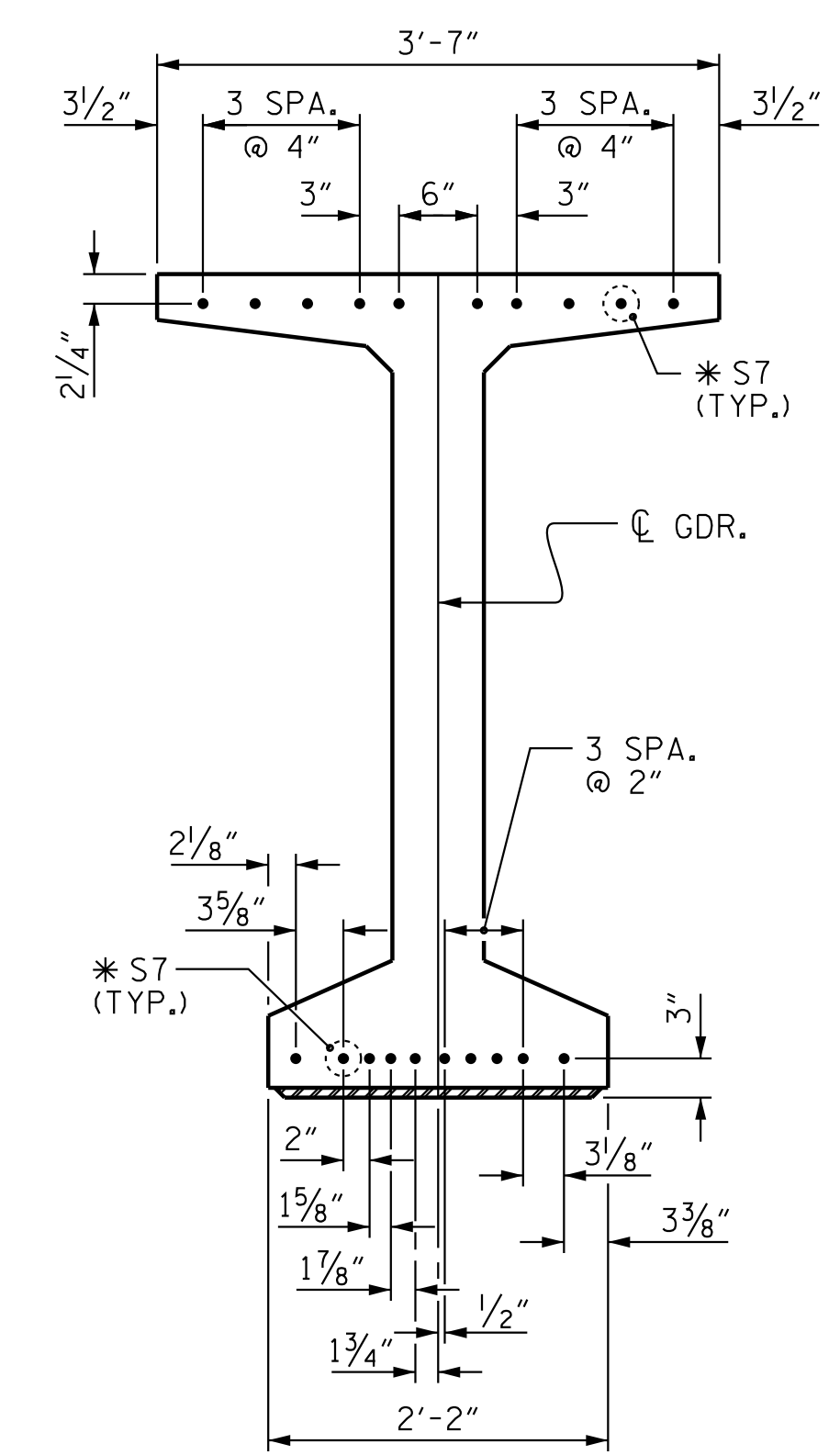
#### 72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)



### SECTION "F"

(SEE NOTES)



### DETAIL "C"

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

jHagenbush

4/21/2023

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DRAWN BY : J.E. HAGENBUSH DATE : 10/07/22  
 CHECKED BY : J.T. KELVINGTON DATE : 12/05/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23



PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
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SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

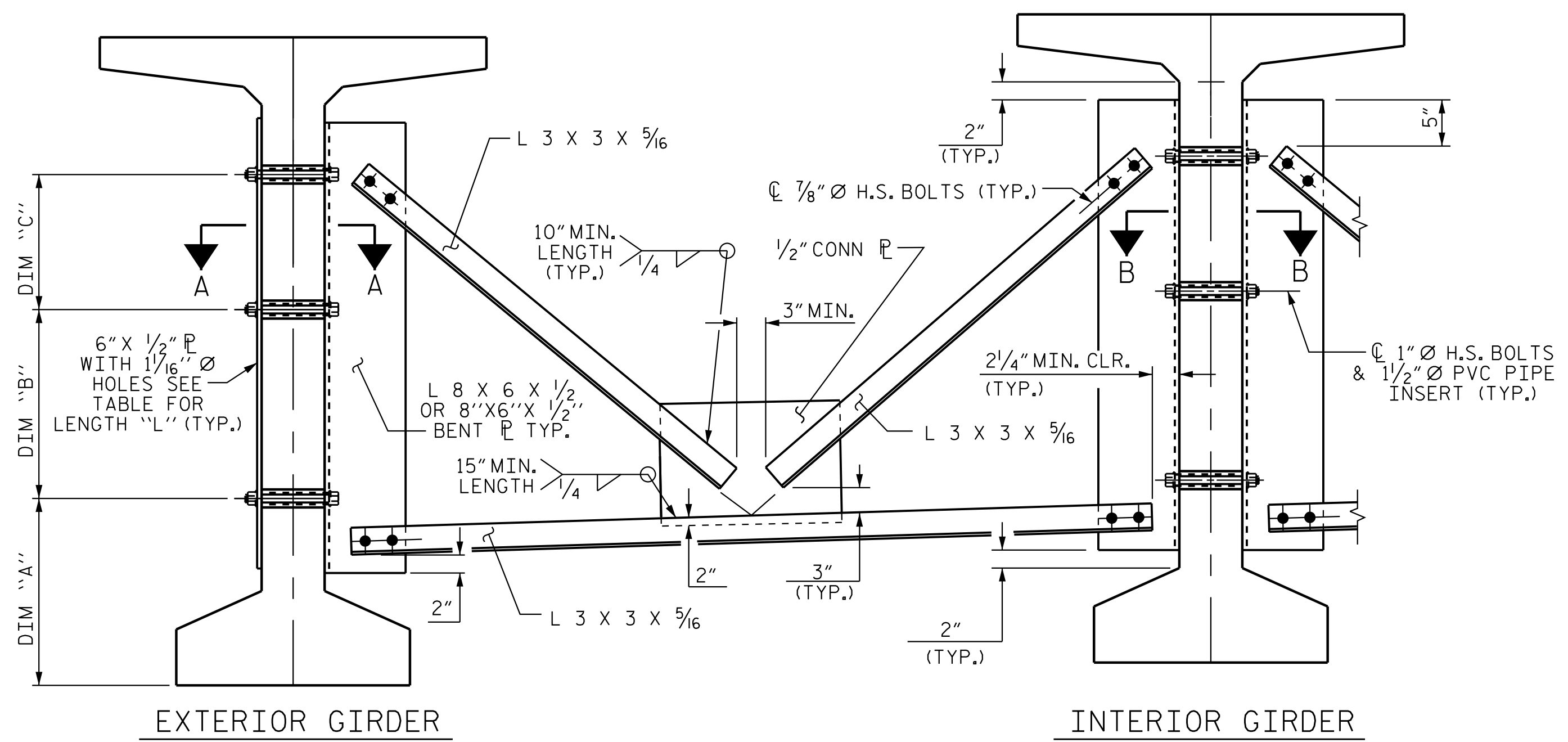
MODIFIED 72"  
 PRESTRESSED CONCRETE GIRDER  
 DETAILS

(RL)

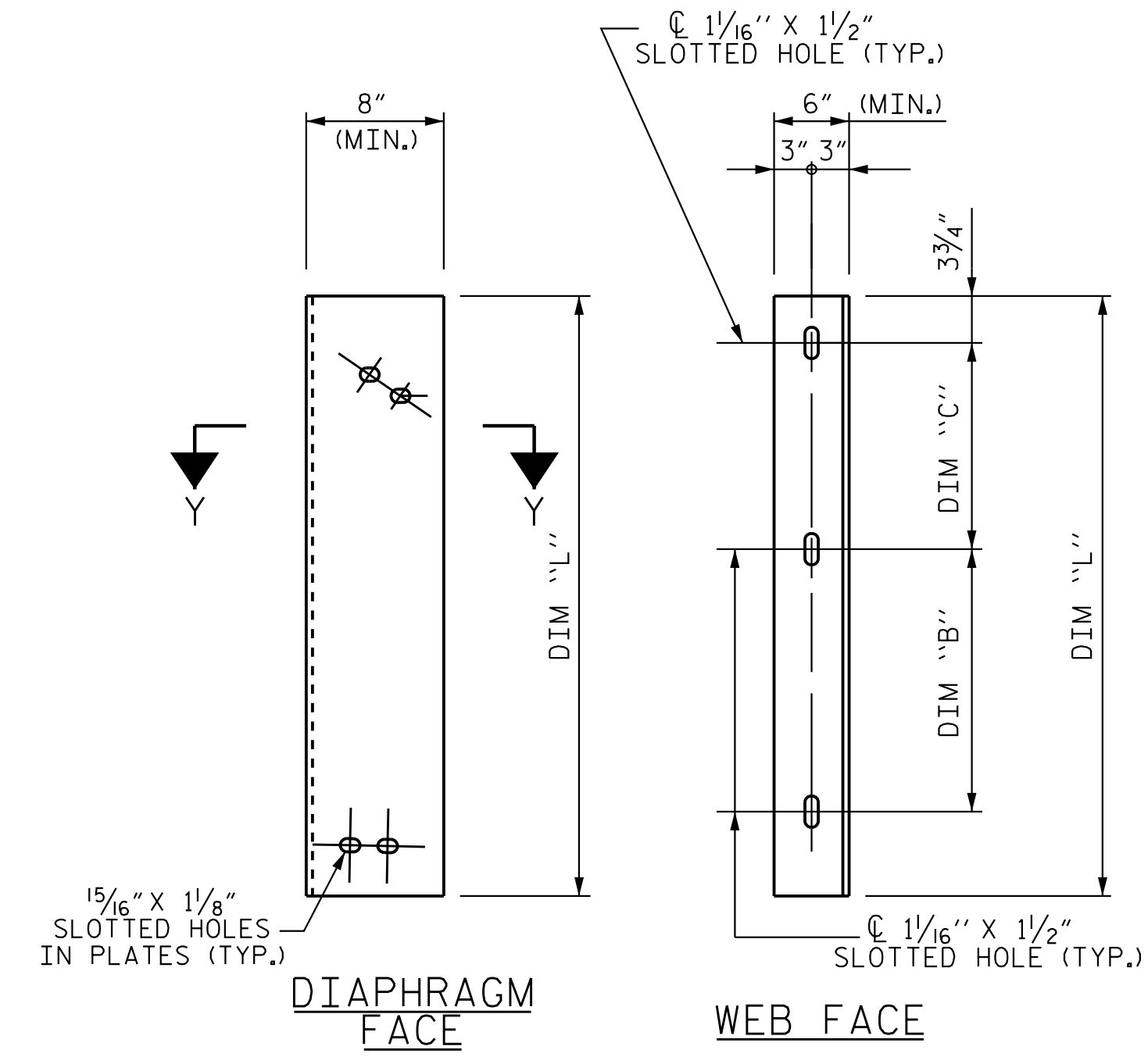
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**PART SECTION AT INTERMEDIATE DIAPHRAGM**  
(72'' BULB TEE GIRDER SHOWN)



**CONNECTOR PLATE DETAIL**

**STRUCTURAL STEEL NOTES**

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE 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, 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.

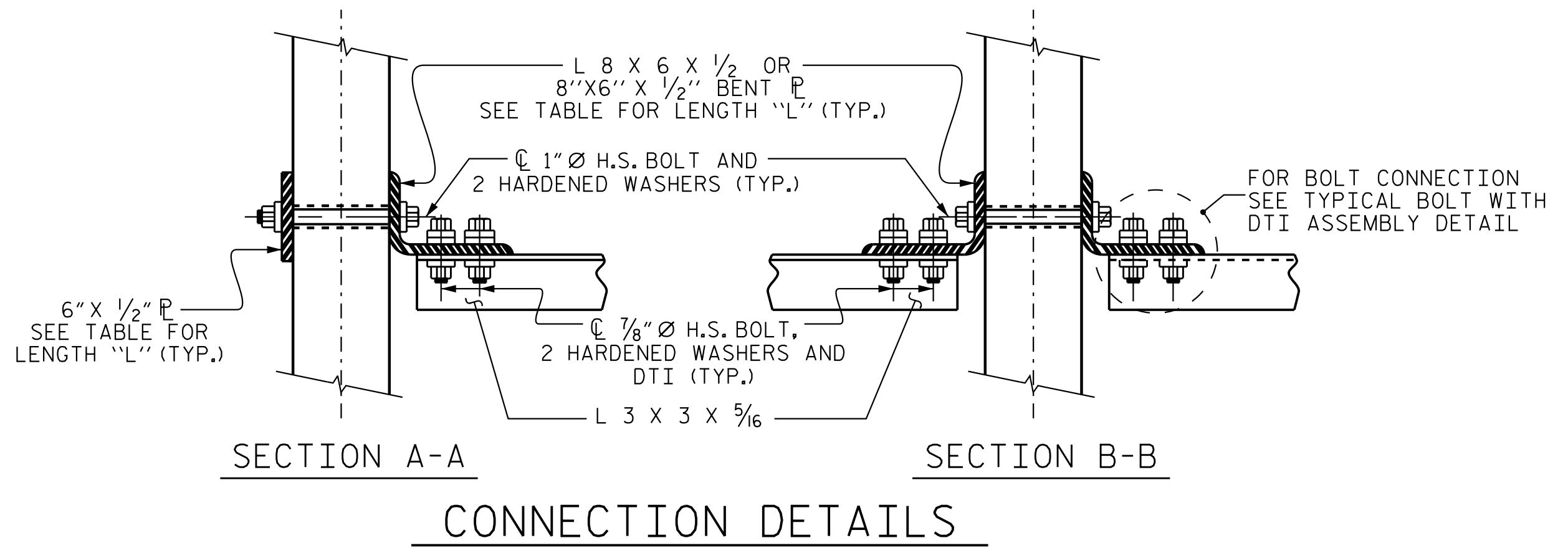
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

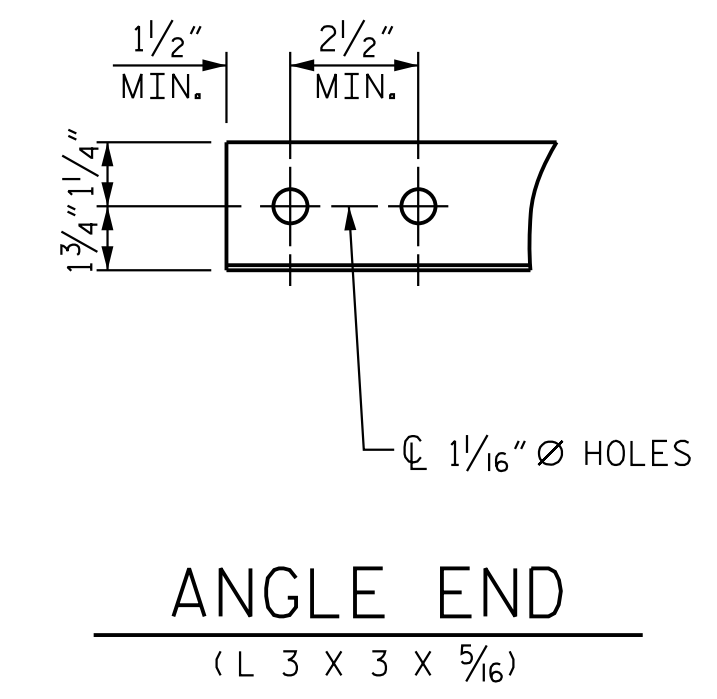
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

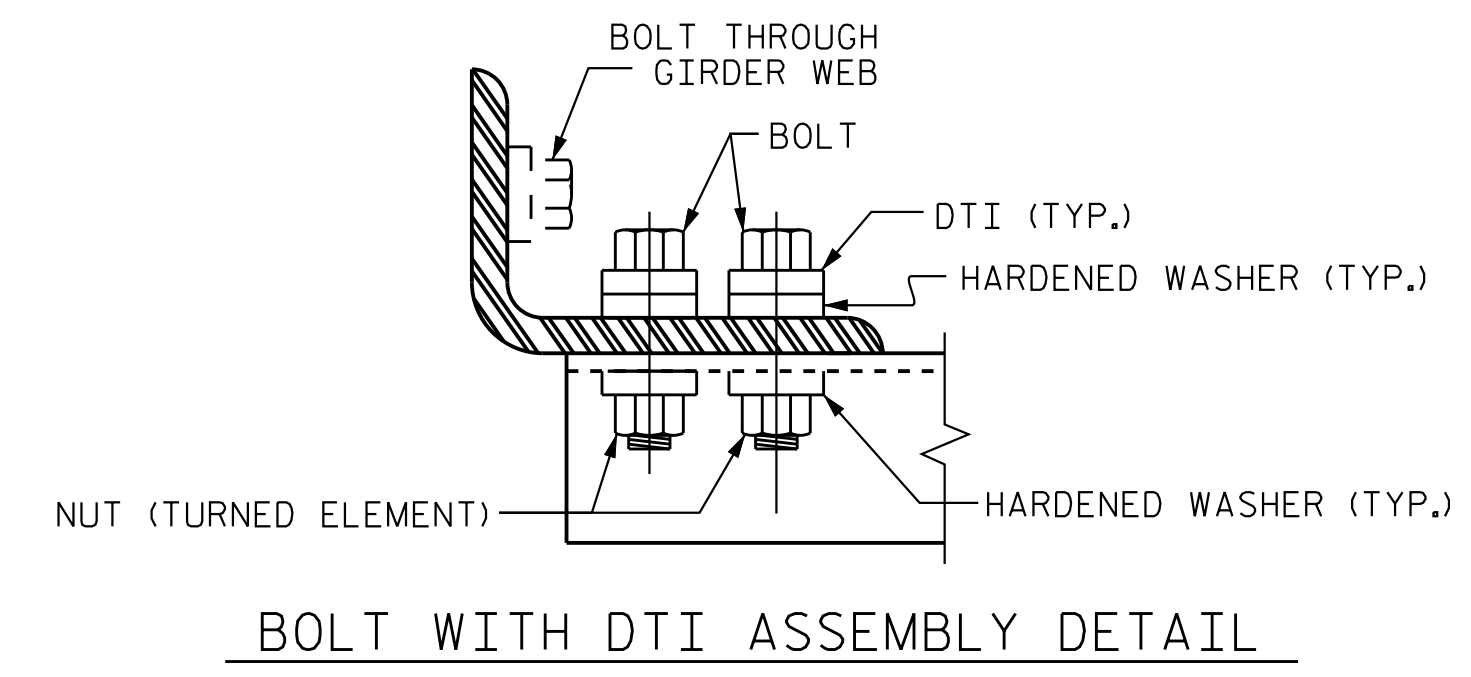
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



**CONNECTION DETAILS**



**ANGLE END**  
(L 3 x 3 x 5/16)



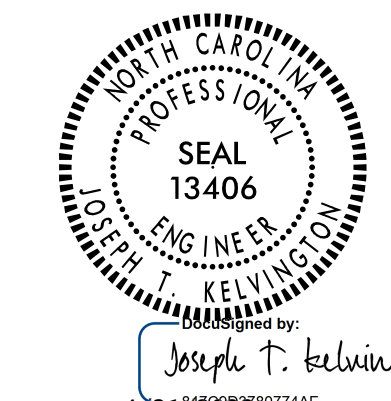
**BOLT WITH DTI ASSEMBLY DETAIL**

**TABLE**

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
MODIFIED 72" PRESTRESSED CONCRETE GIRDER	1'-6"	1'-8"	1'-8 3/4"	4'-2"

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS (RL)**

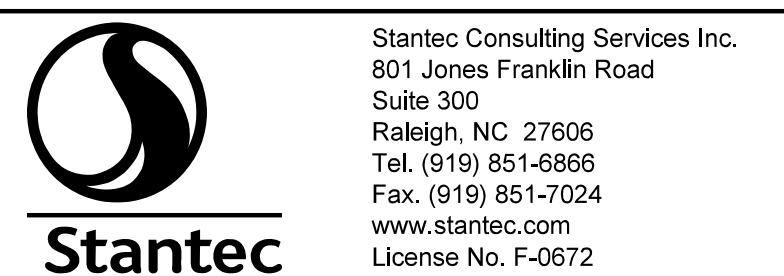
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4/21/2023

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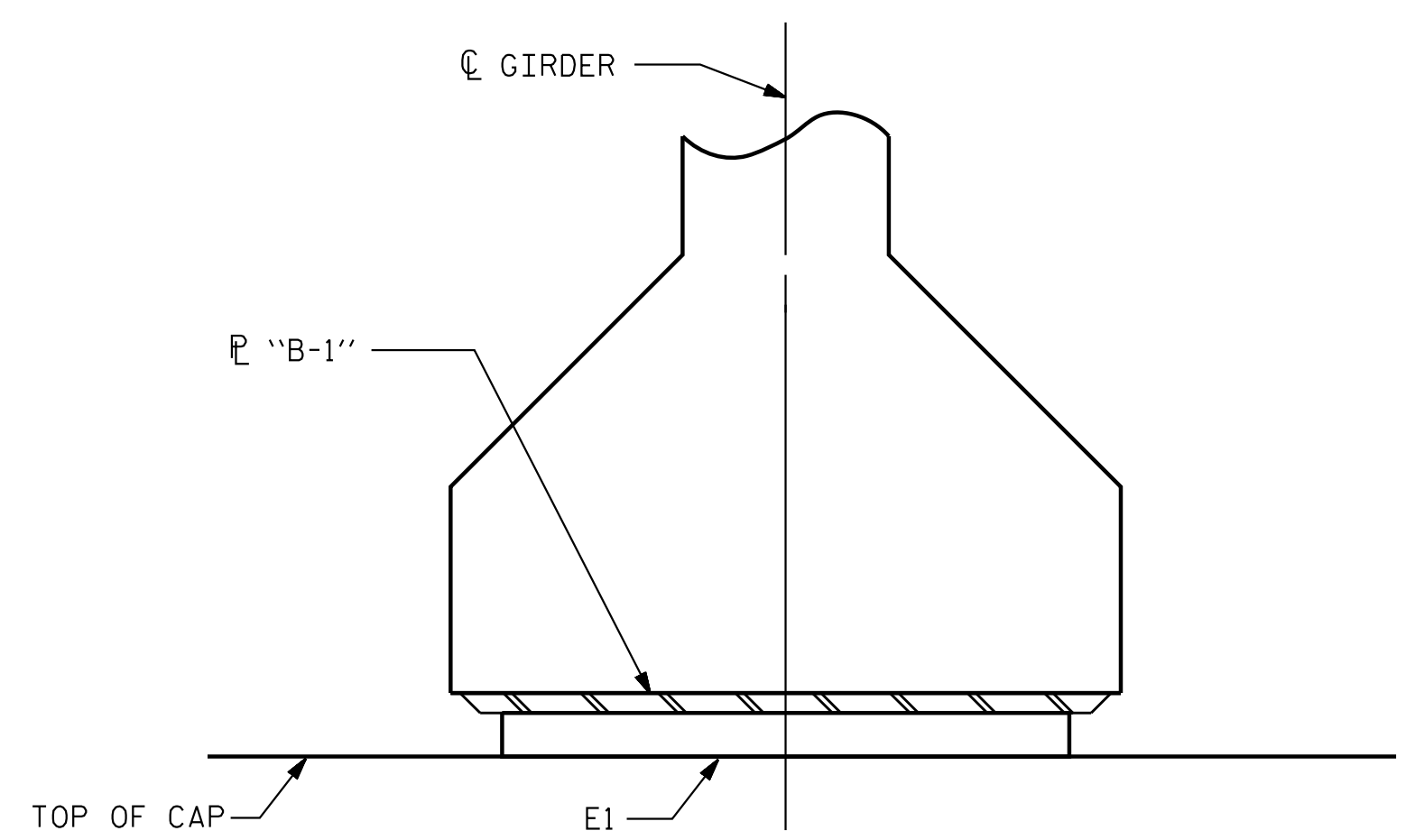


DRAWN BY : N. D'AIUTO DATE : 04/23/18  
 CHECKED BY : J.T. KELVINGTON DATE : 12/09/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

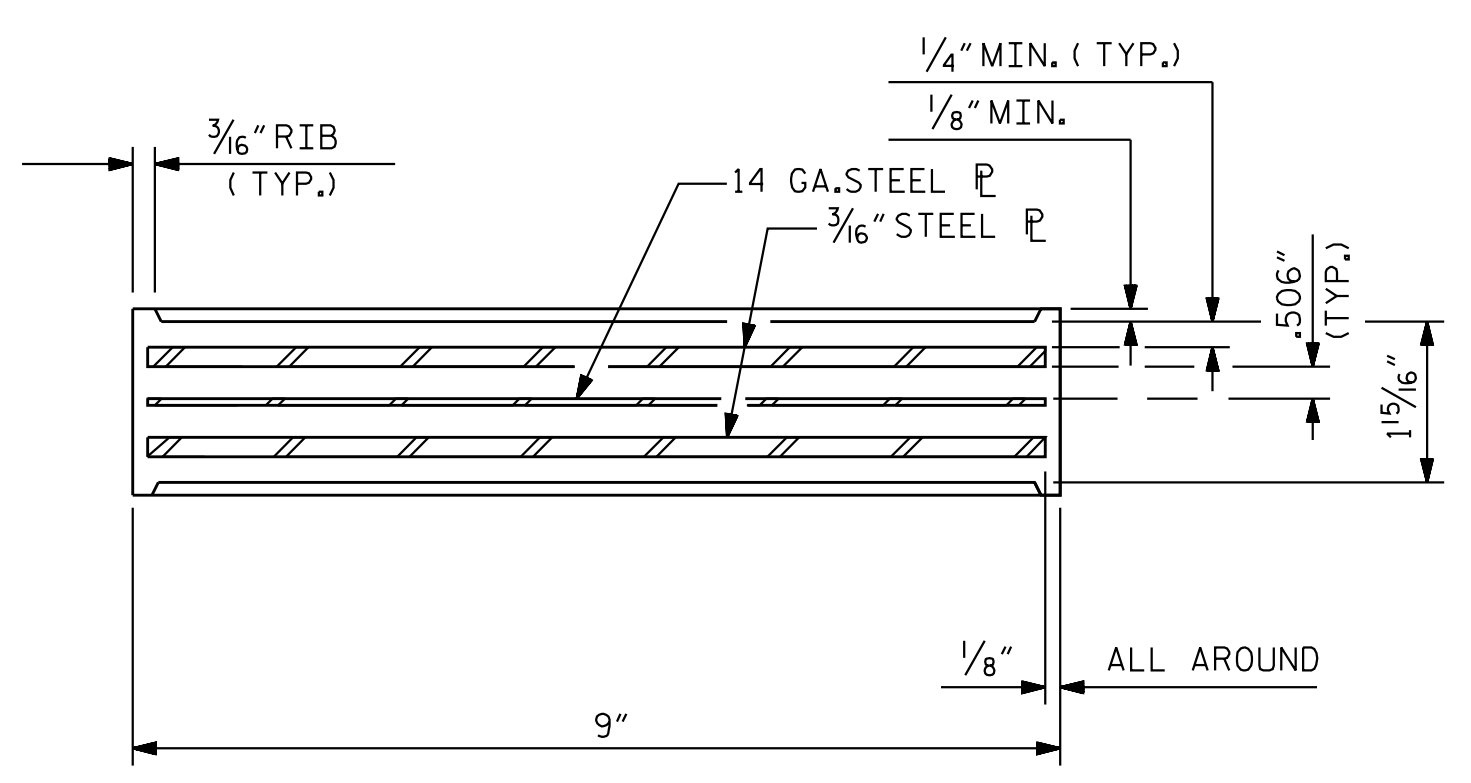
**NOTES**

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

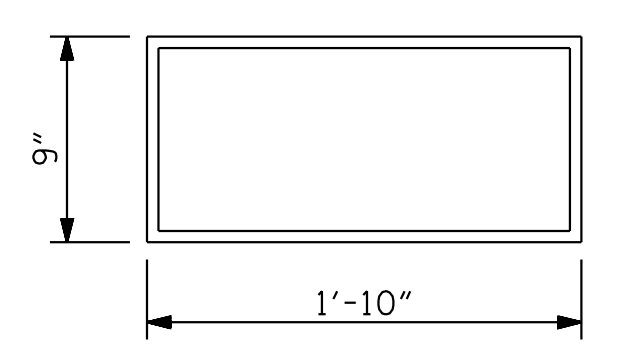
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



**SECTION E-E**



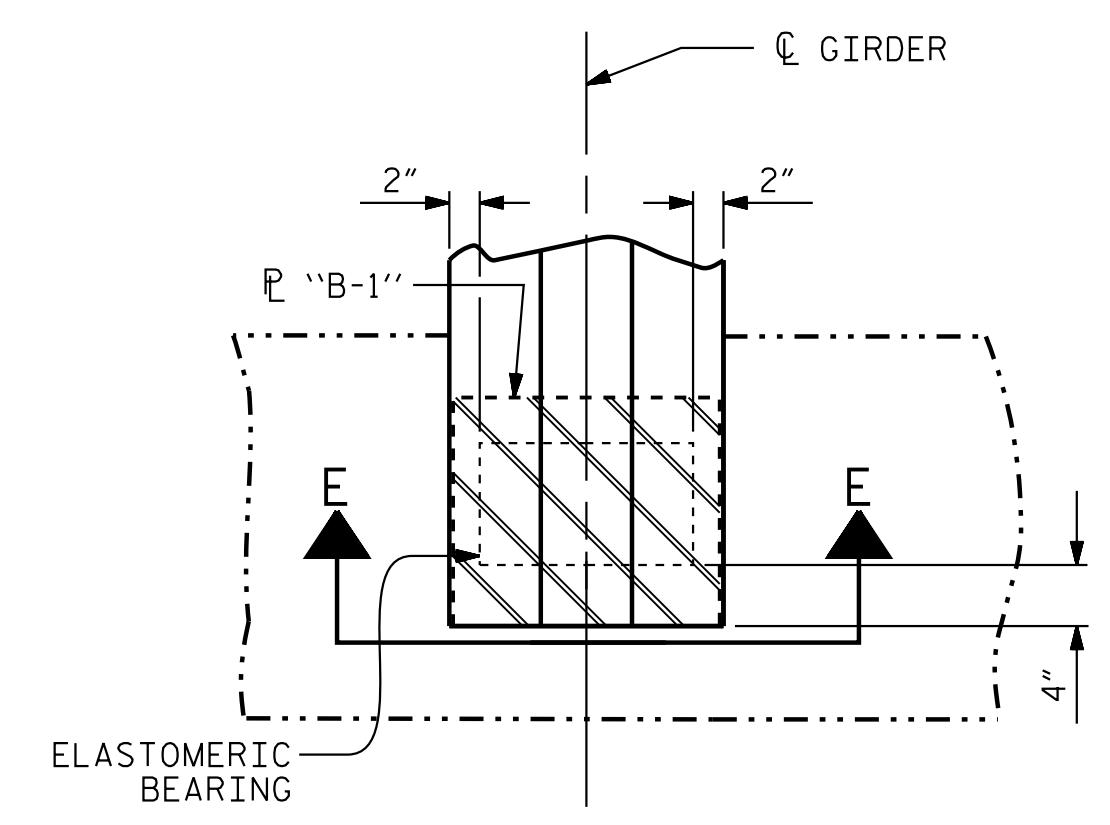
**TYPICAL SECTION OF ELASTOMERIC BEARINGS**



E1 (8 REQ'D)

**PLAN VIEW OF ELASTOMERIC BEARING**

**TYPE IV**



**TYPICAL PLAN**

SHOWING BOTTOM FLANGE @ INTEGRAL END BENT

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

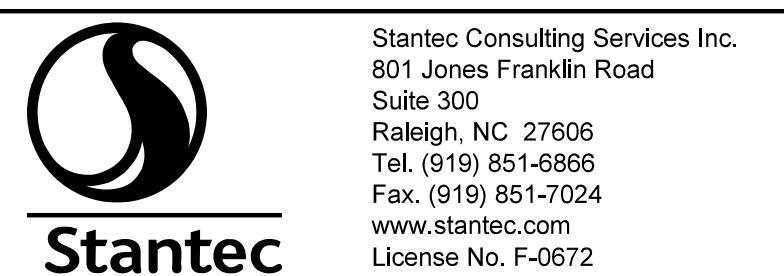
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**ELASTOMERIC BEARING DETAILS**  
 PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE  
 (RL)

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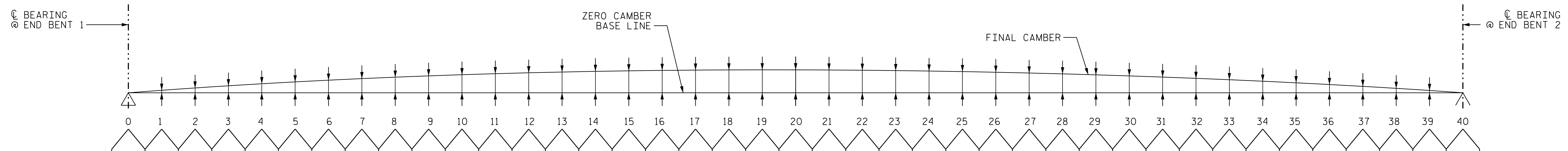
DRAWN BY : N. D'AIUTO DATE : 04/23/18 DESIGN ENGINEER  
 CHECKED BY : J.T. KELVINGTON DATE : 12/09/22 OF RECORD: J.T. KELVINGTON DATE : 04/21/23

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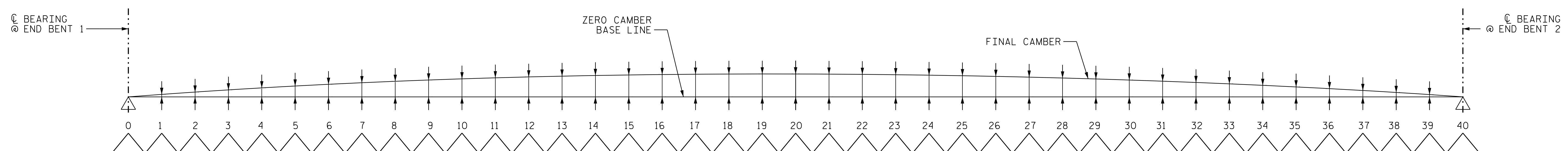




GIRDERS 1 & 4

FORTIETH PTS. BTWN BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE)	↑ 0.000	0.013	0.026	0.039	0.051	0.063	0.075	0.086	0.096	0.107	0.116	0.124	0.132	0.139	0.145	0.151	0.155	0.158	0.161	0.162	0.163	0.162	0.161	0.158	0.155	0.151	0.145	0.139	0.132	0.124	0.116	0.107	0.097	0.086	0.075	0.063	0.051	0.039	0.026	0.013	0.000
DEFL. DUE TO SUPERIMPOSED DL **	↓ 0.000	-0.008	-0.016	-0.024	-0.030	-0.039	-0.046	-0.053	-0.059	-0.066	-0.071	-0.077	-0.081	-0.086	-0.090	-0.093	-0.095	-0.098	-0.099	-0.100	-0.100	-0.100	-0.099	-0.098	-0.095	-0.093	-0.090	-0.086	-0.081	-0.077	-0.071	-0.066	-0.059	-0.053	-0.046	-0.039	-0.030	-0.024	-0.016	-0.008	0.000
FINAL CAMBER	↑ +0"	+0/16"	+0/8"	+0 3/16"	+0/4"	+0 5/16"	+0 3/8"	+0 3/8"	+0 7/16"	+0 1/2"	+0 9/16"	+0 5/8"	+0 5/8"	+0 11/16"	+0 11/16"	+0 3/4"	+0 3/4"	+0 3/4"	+0 3/4"	+0 3/4"	+0 3/4"	+0 3/4"	+0 3/4"	+0 3/4"	+0 11/16"	+0 11/16"	+0 5/8"	+0 5/8"	+0 9/16"	+0 9/16"	+0 1/2"	+0 7/16"	+0 7/16"	+0 3/8"	+0 3/8"	+0 5/16"	+0 1/4"	+0 3/16"	+0 1/8"	+0 1/16"	+0"

\*\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.



GIRDERS 2 & 3

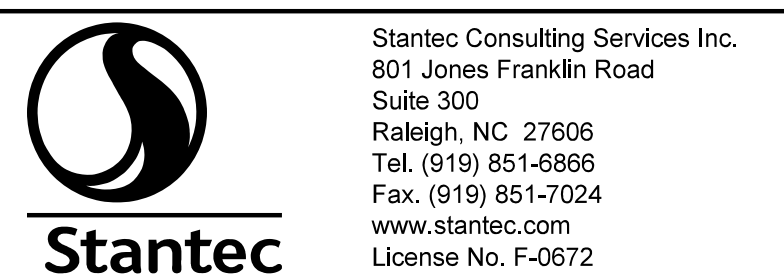
FORTIETH PTS. BTWN BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE)	↑ 0.000	0.013	0.026	0.039	0.051	0.063	0.075	0.086	0.096	0.107	0.116	0.124	0.132	0.139	0.145	0.151	0.155	0.158	0.161	0.162	0.163	0.162	0.161	0.158	0.155	0.151	0.145	0.139	0.132	0.124	0.116	0.107	0.097	0.086	0.075	0.063	0.051	0.039	0.026	0.013	0.000
DEFL. DUE TO SUPERIMPOSED DL **	↓ 0.000	-0.009	-0.017	-0.026	-0.032	-0.042	-0.050	-0.057	-0.063	-0.071	-0.077	-0.083	-0.088	-0.093	-0.097	-0.100	-0.103	-0.105	-0.107	-0.108	-0.108	-0.107	-0.105	-0.103	-0.100	-0.097	-0.093	-0.088	-0.083	-0.077	-0.071	-0.063	-0.057	-0.050	-0.042	-0.032	-0.026	-0.017	-0.009	0.000	
FINAL CAMBER	↑ +0"	+0/16"	+0/8"	+0/8"	+0/4"	+0/4"	+0 5/16"	+0 3/8"	+0 3/8"	+0 7/16"	+0 1/2"	+0 1/2"	+0 9/16"	+0 5/8"	+0 5/8"	+0 5/8"	+0 5/8"	+0 5/8"	+0 5/8"	+0 11/16"	+0 5/8"	+0 5/8"	+0 5/8"	+0 5/8"	+0 5/8"	+0 5/8"	+0 9/16"	+0 9/16"	+0 1/2"	+0 1/2"	+0 7/16"	+0 7/16"	+0 7/16"	+0 3/8"	+0 5/16"	+0 1/4"	+0 1/4"	+0 1/8"	+0 1/8"	+0 1/16"	+0"

\*\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

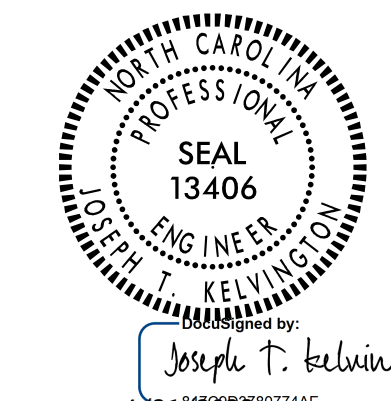
### SCHEMATIC CAMBER ORDINATES (SPAN A)

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT  
 'FINAL CAMBER (OR DEFLECTION)' WHICH IS SHOWN IN INCHES.  
 (+) FINAL CAMBER INDICATES NET UPWARD DISPLACEMENT.  
 (-) FINAL CAMBER INDICATES NET DOWNWARD DISPLACEMENT.

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-



DRAWN BY : N. D'AIUTO DATE : 04/23/18  
 CHECKED BY : J.T. KELVINGTON DATE : 12/09/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 DEAD LOAD DEFLECTIONS  
 (RL)

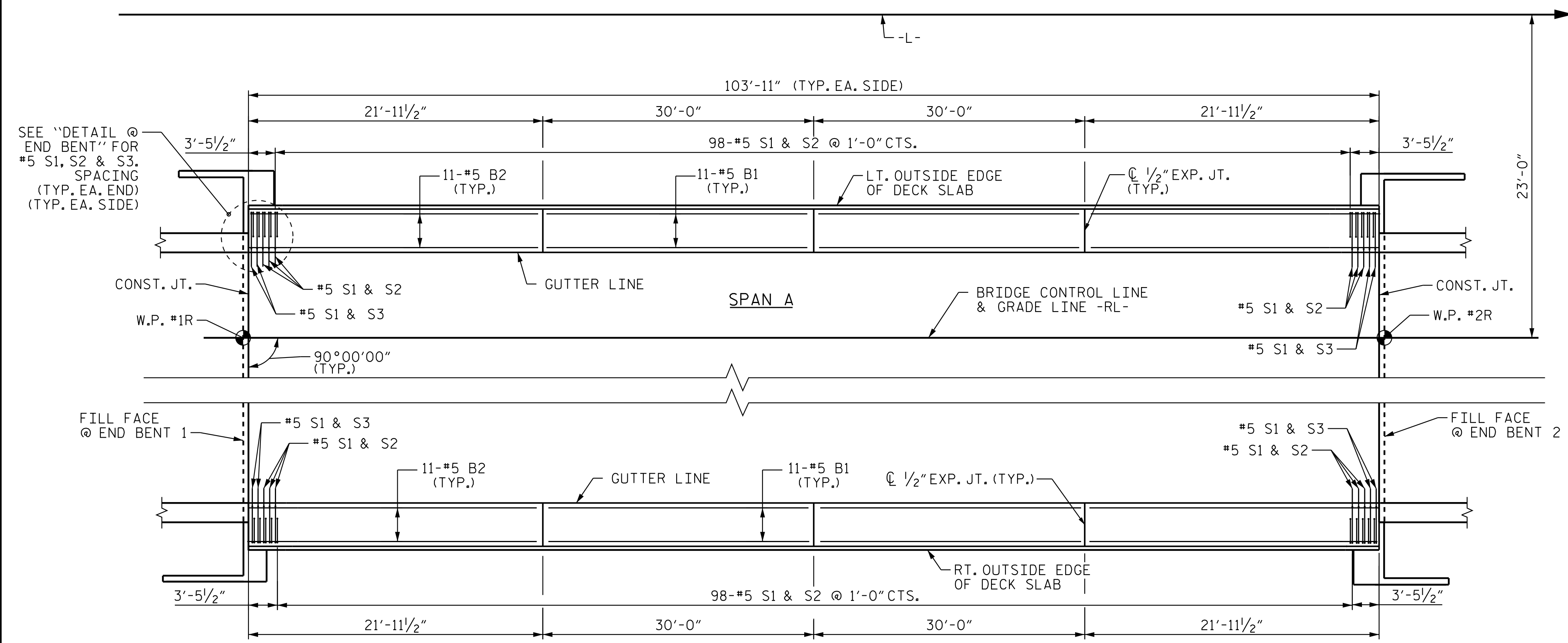
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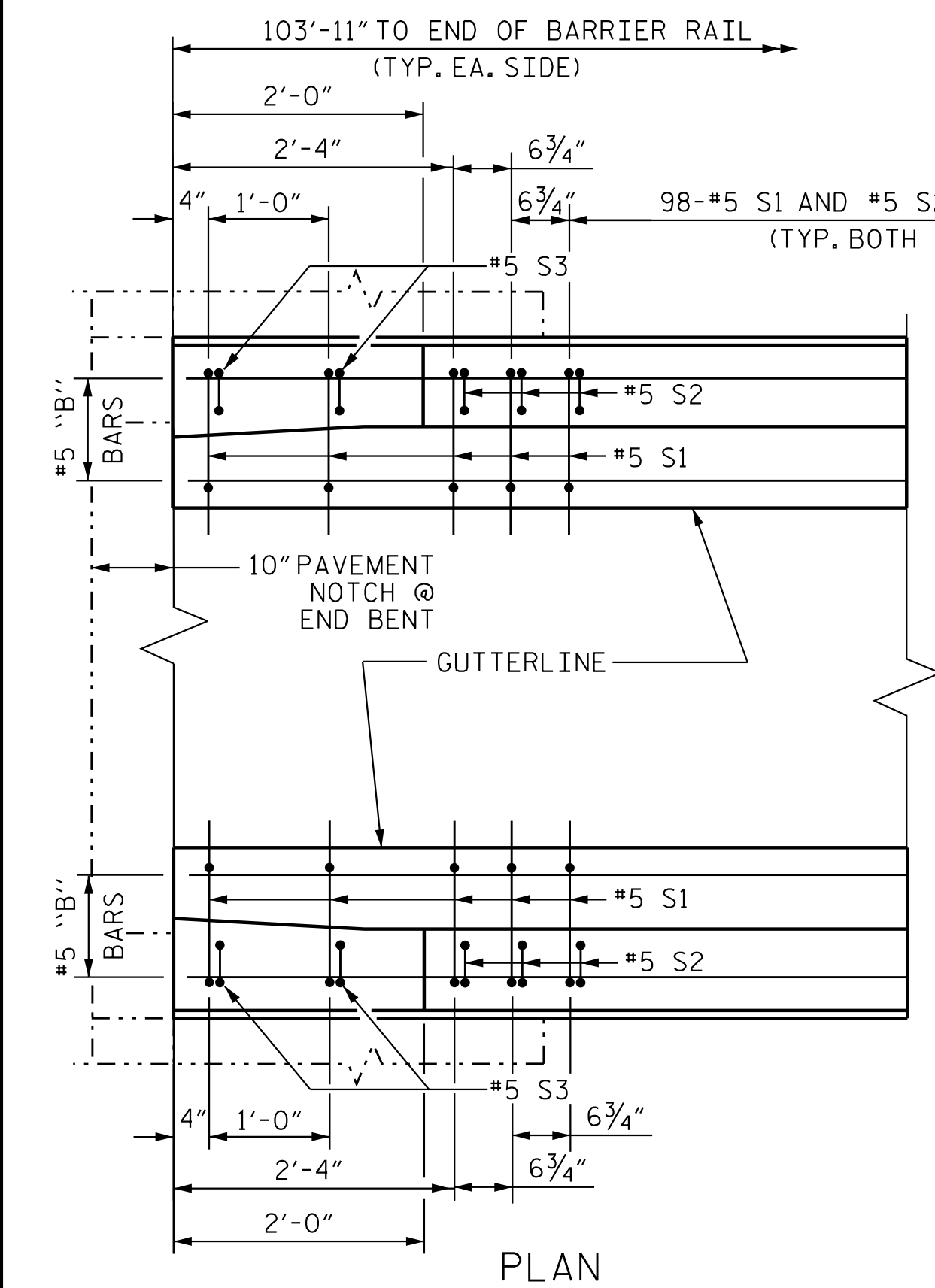
JHogenbush

4/21/2023

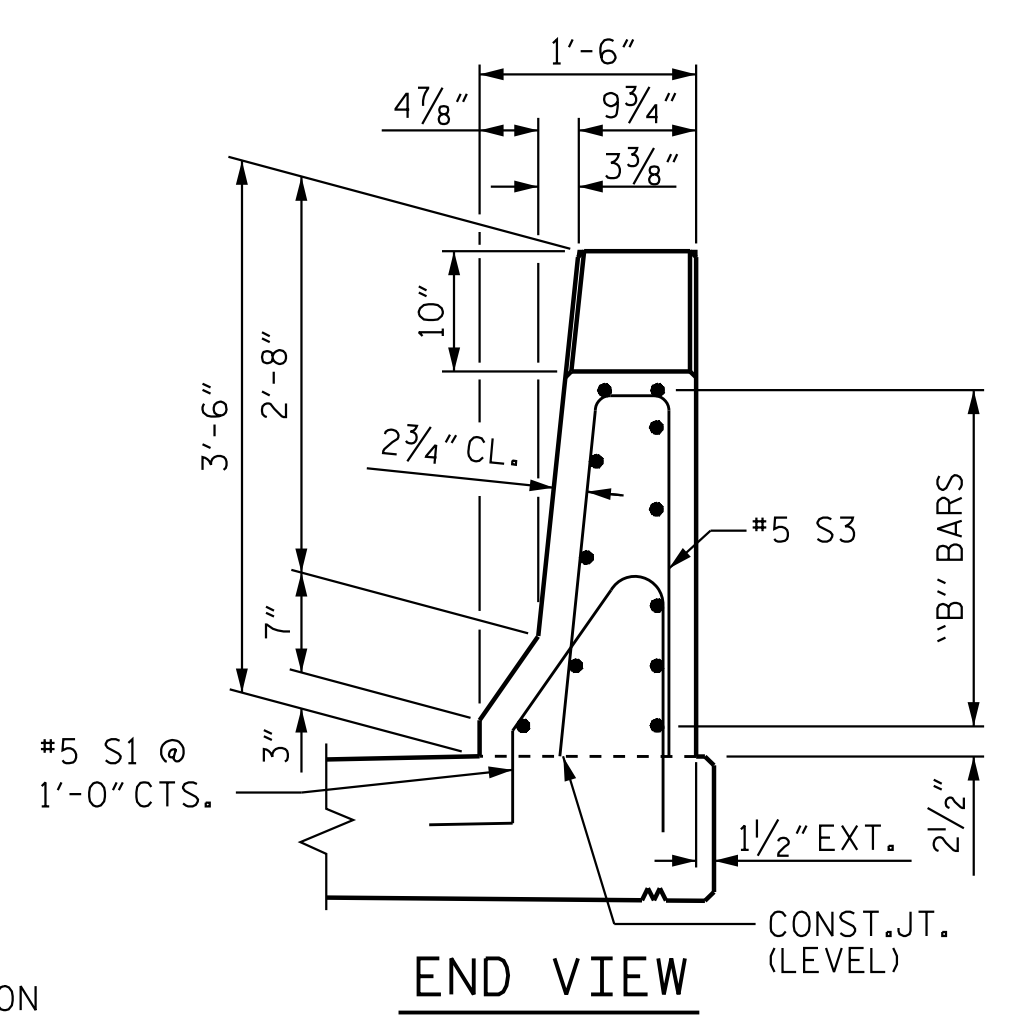
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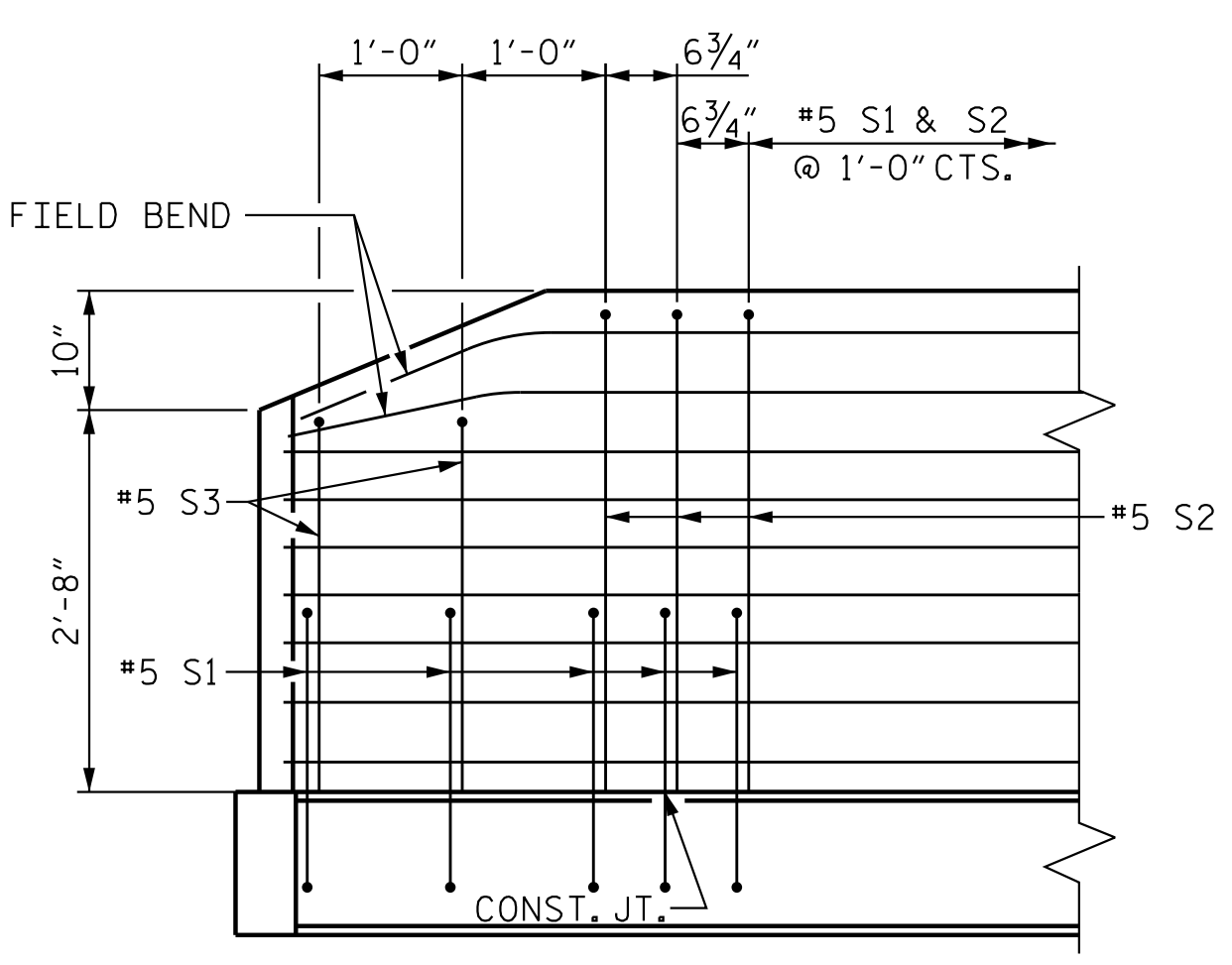
BARRIER RAIL PLAN



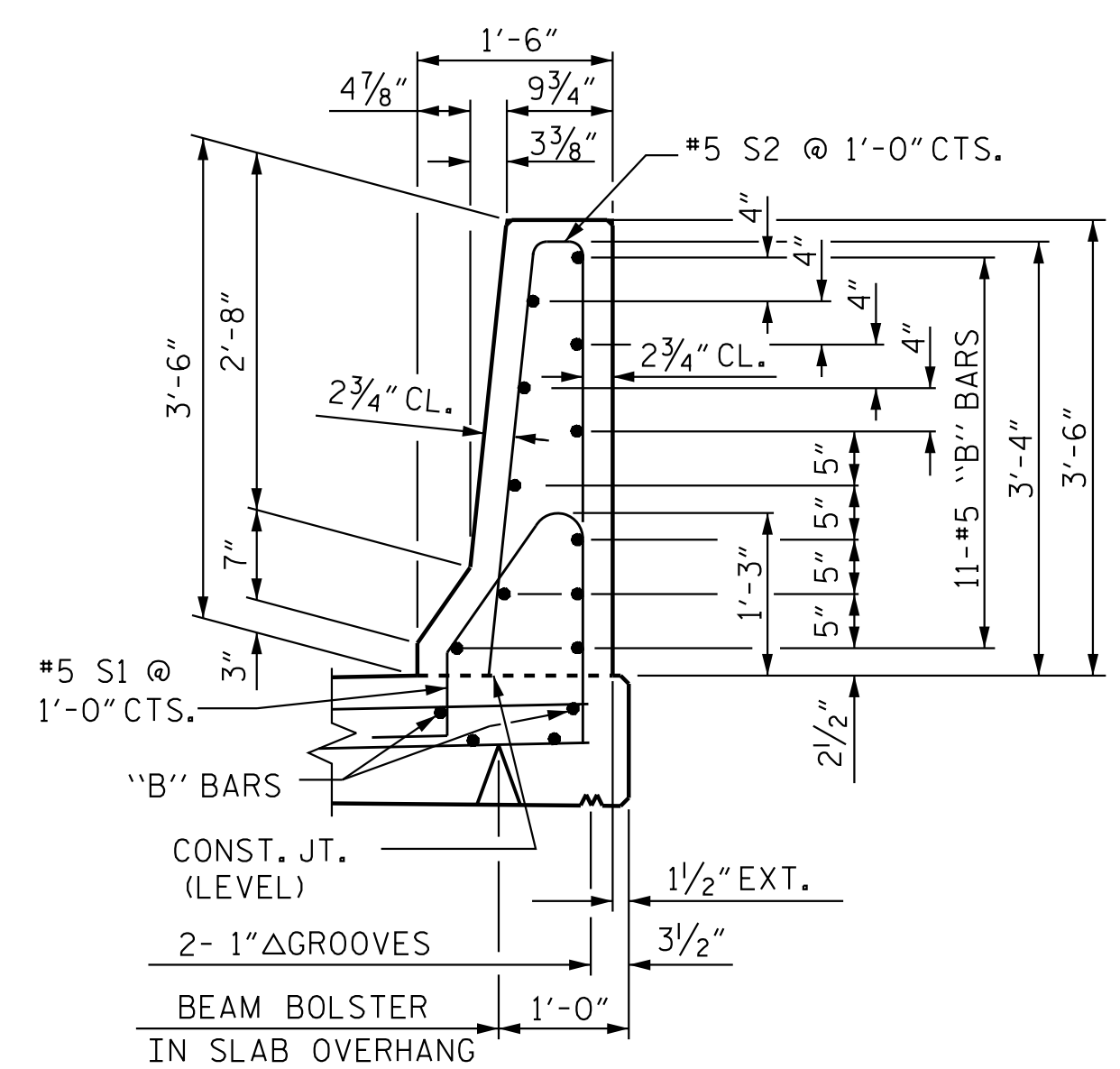
DETAIL @ END BENT



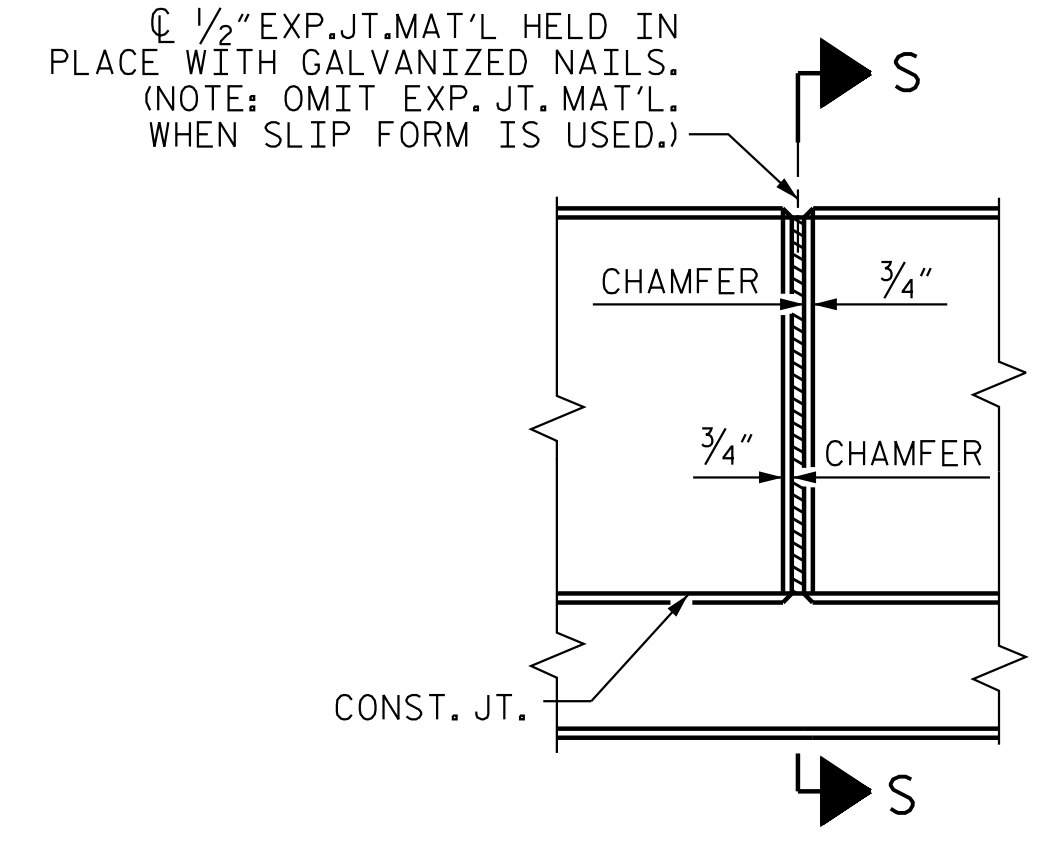
END VIEW



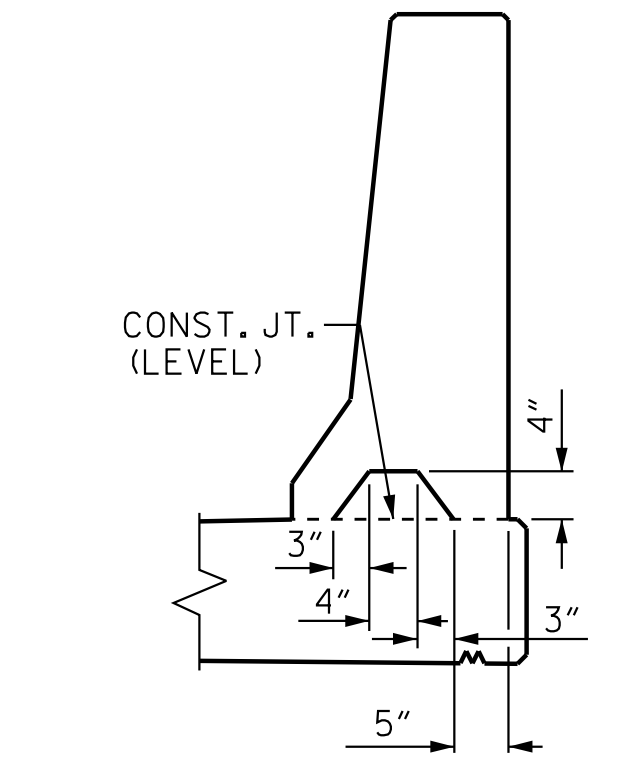
SIDE VIEW



SECTION THRU RAIL



ELEVATION AT EXPANSION JOINTS  
BARRIER RAIL DETAILS



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

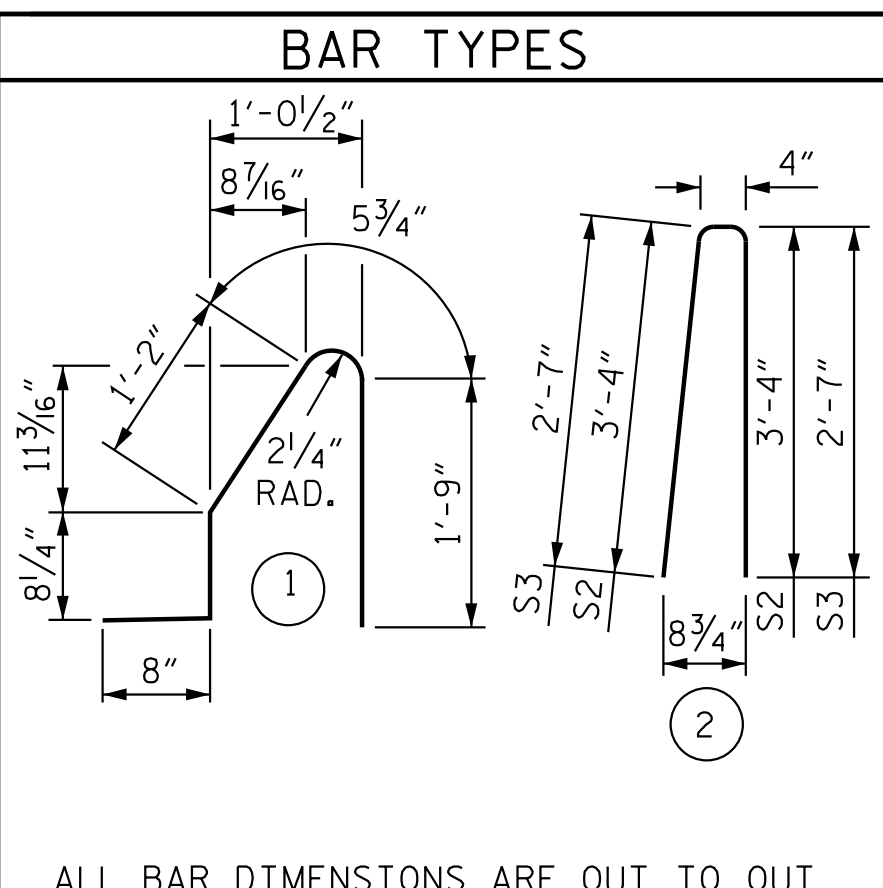
NOTES

THE BARRIER RAIL IN THE 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.

THE JOINT IN THE DECK SLAB SHALL BE SAWED PRIOR TO CASTING OF THE BARRIER RAIL.

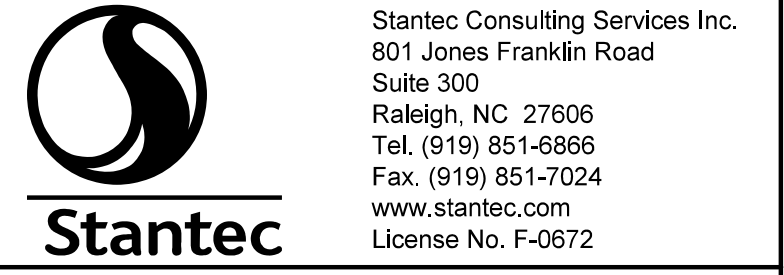


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL  
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	#5	STR	29'-7"	1358
* B2	44	#5	STR	21'-6"	987
* S1	212	#5	1	4'-9"	1050
* S2	204	#5	2	7'-0"	1489
* S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL					4,930 LBS.
CLASS AA CONCRETE					28.2 CU. YDS.
CONCRETE BARRIER RAIL					207.83 LIN. FT.

4/21/2023 jHagenbush 4/21/2023



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ASSEMBLED BY: J.E. HAGENBUSH DATE: 12/01/22  
CHECKED BY: J.T. KELVINGTON DATE: 12/05/22  
DRAWN BY: ARB 5/87  
CHECKED BY: SJD 9/87  
REV. 7/12  
REV. 6/13  
REV. 12/17  
MAA/GM  
MAA/GM  
MAA/GM  
DESIGN ENGINEER  
OF RECORD: J.T. KELVINGTON DATE: 04/21/23



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PROJECT NO. R-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
CONCRETE  
BARRIER RAIL

(RL)

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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.)

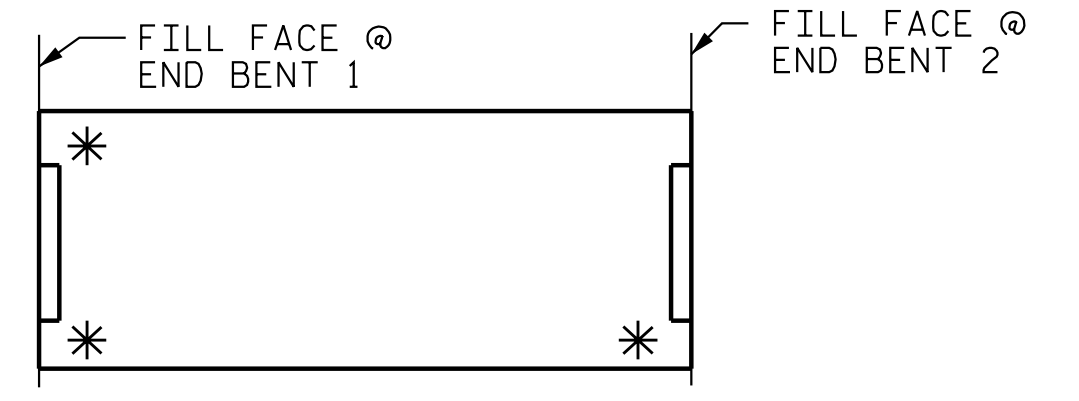
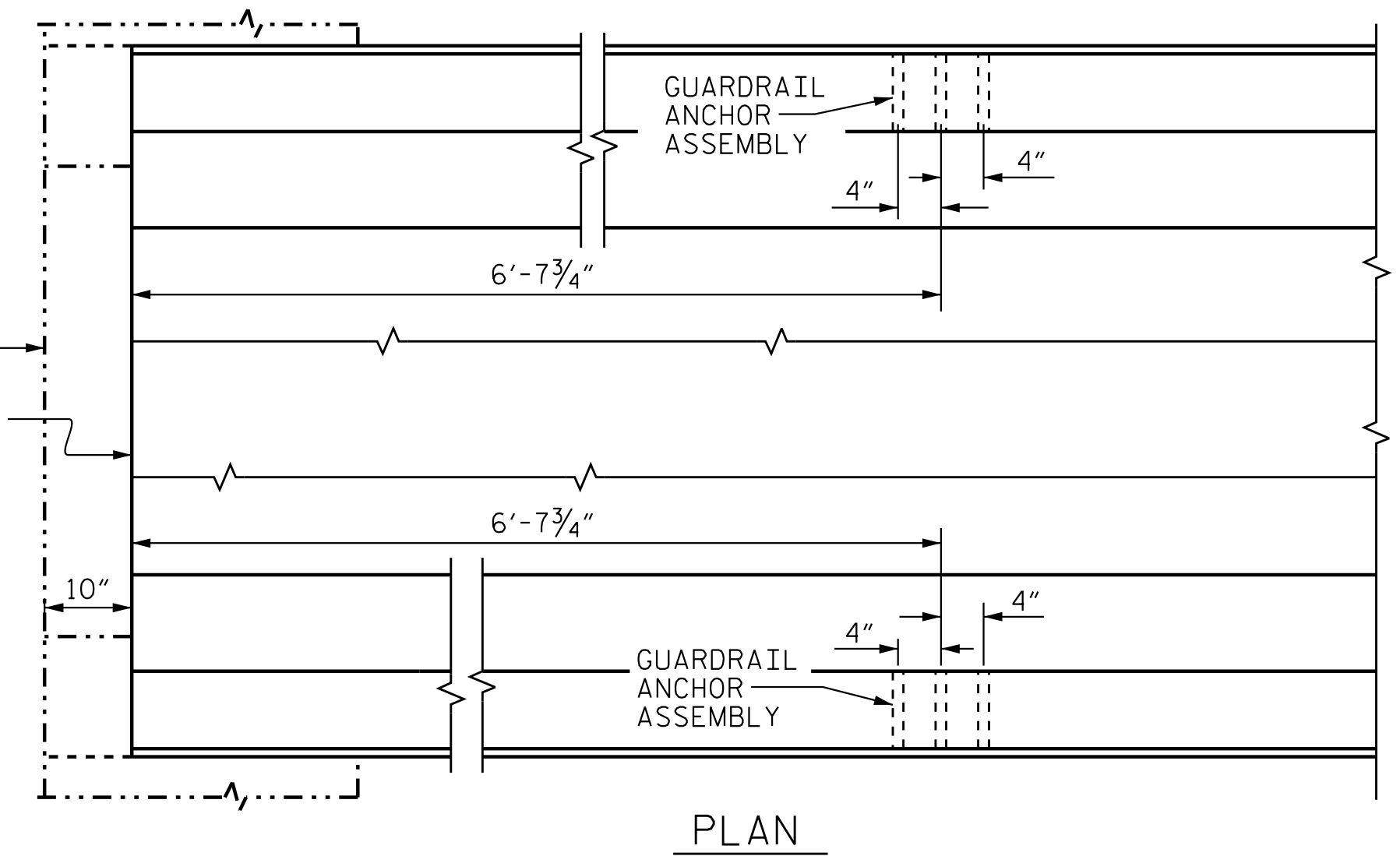
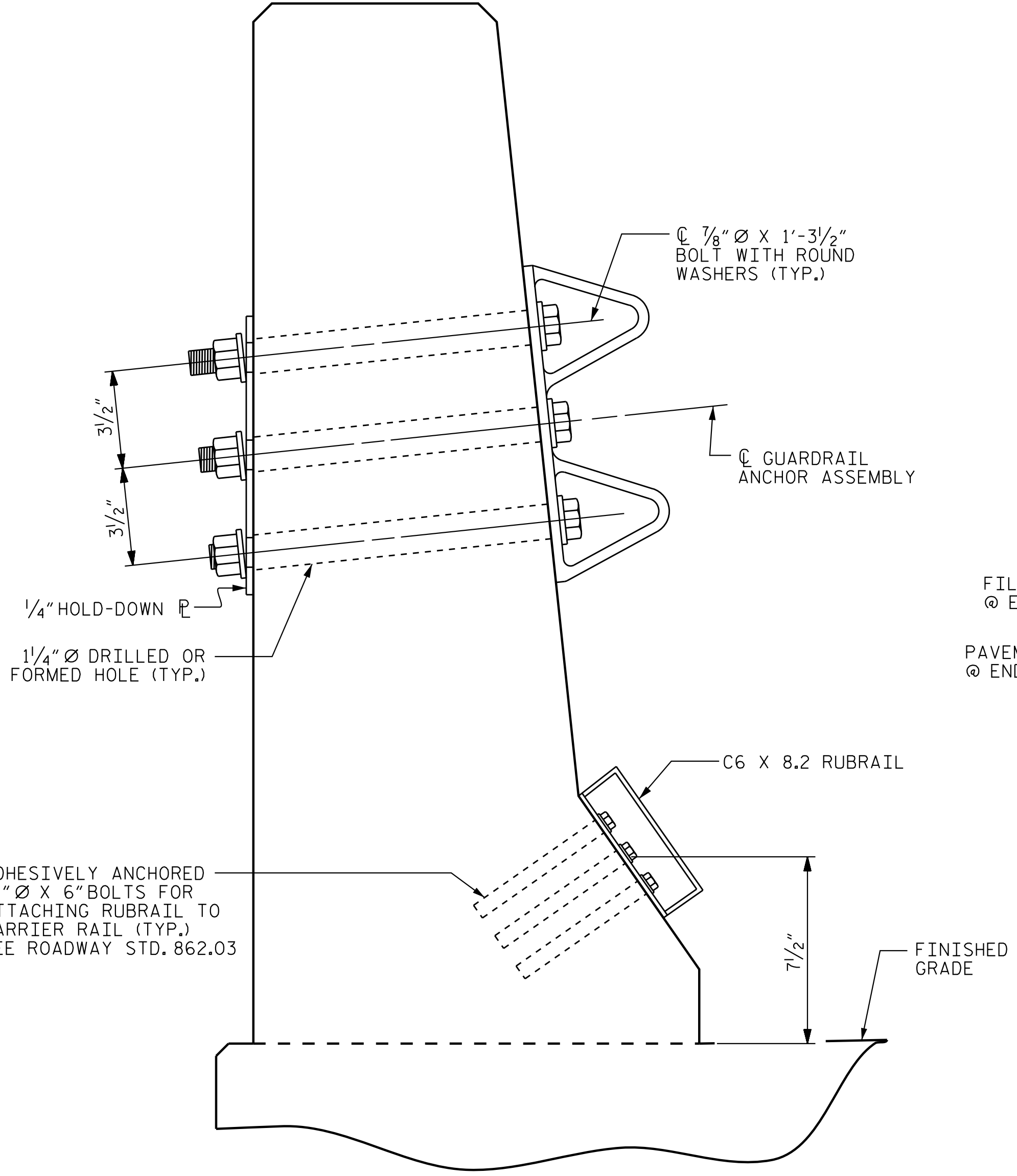
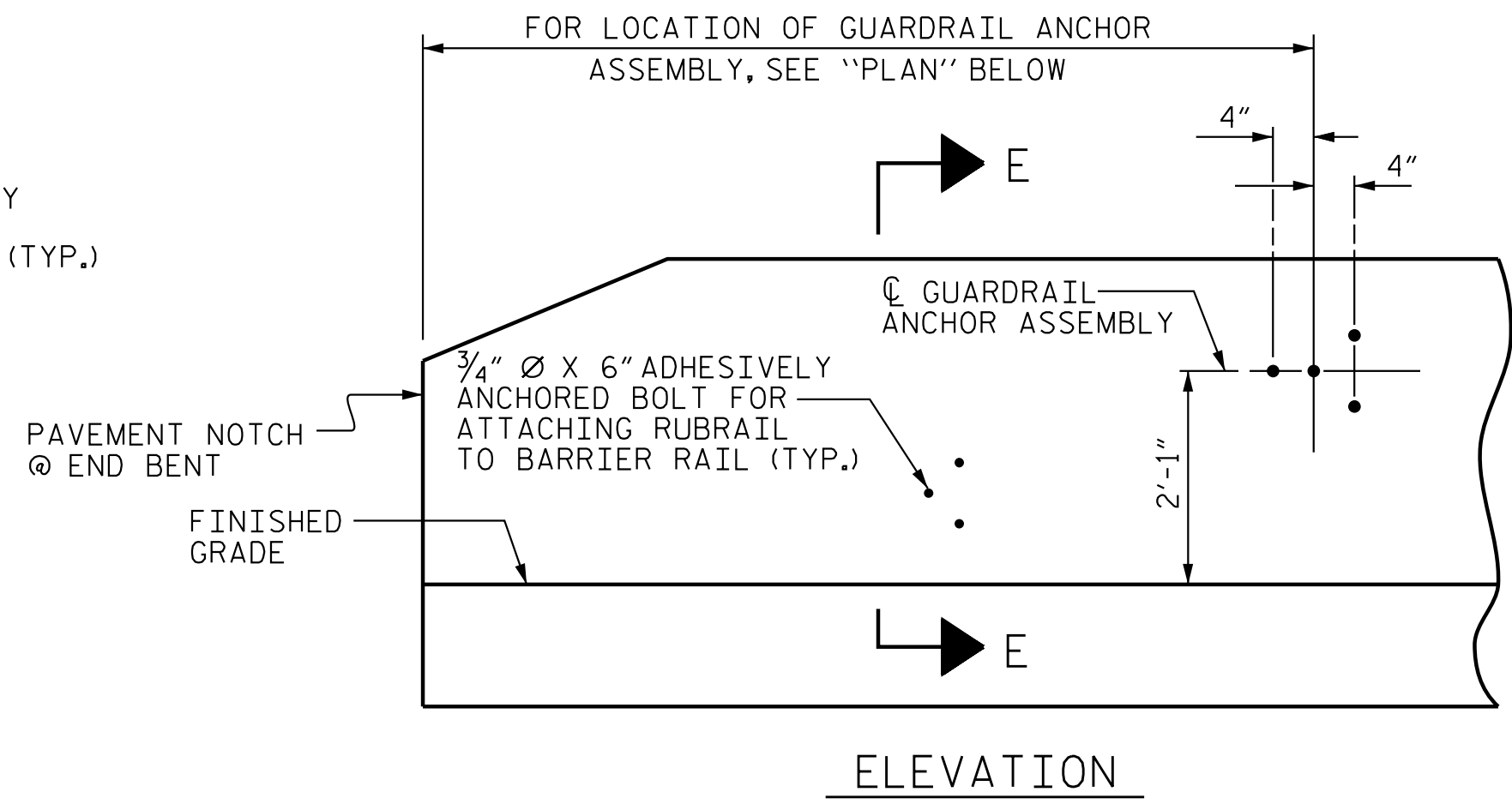
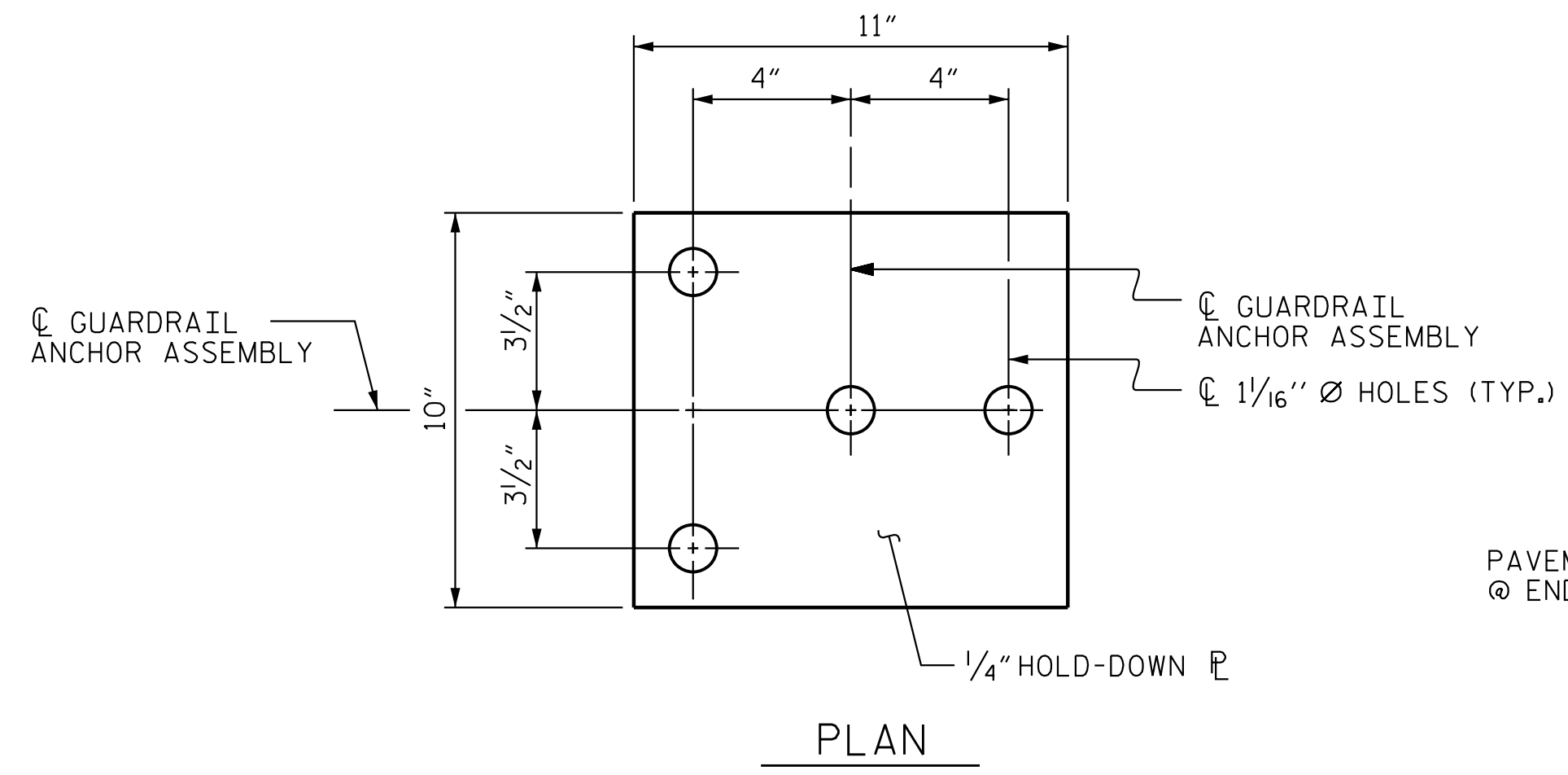
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

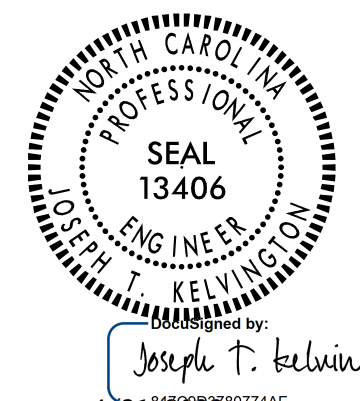


SKETCH SHOWING POINTS OF ATTACHMENTS  
\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

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

SECTION E-E  
GUARDRAIL ANCHOR ASSEMBLY DETAILS

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CLEVELAND COUNTY  
STATION: 810+00.00 -L-



STATE OF NORTH CAROLINA  
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STANDARD  
GUARDRAIL ANCHORAGE  
FOR BARRIER RAIL  
(RL)

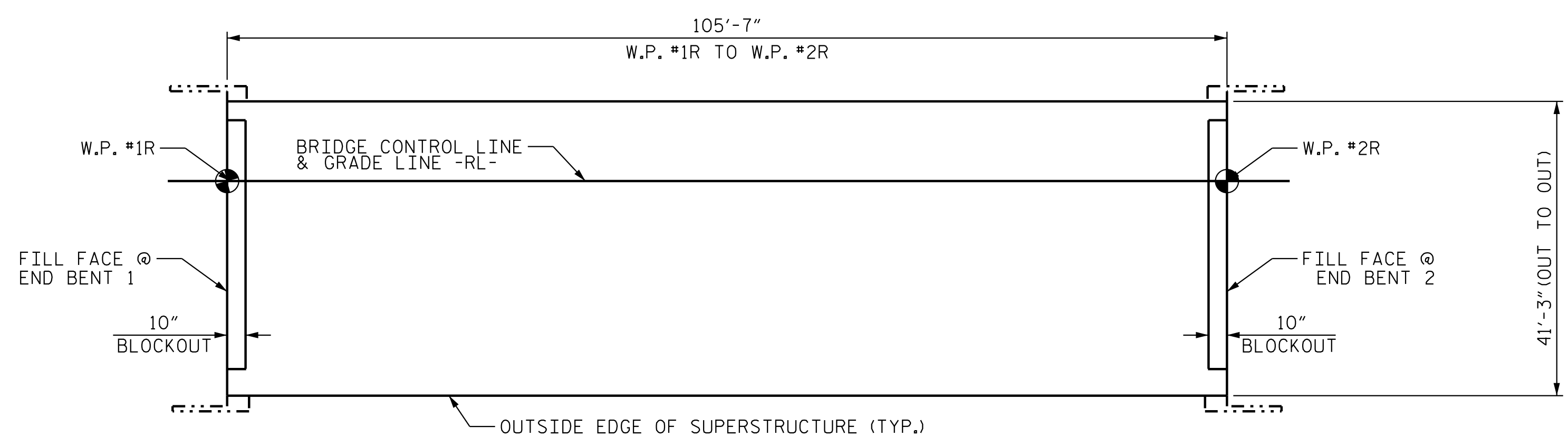
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CHECKED BY: J.T. KELVINGTON DATE: 01/18/23  
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

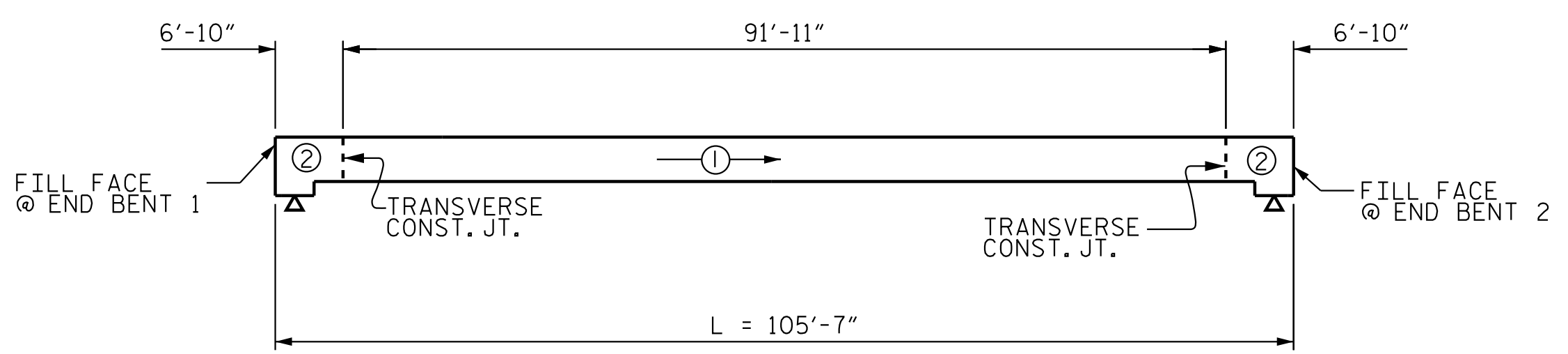
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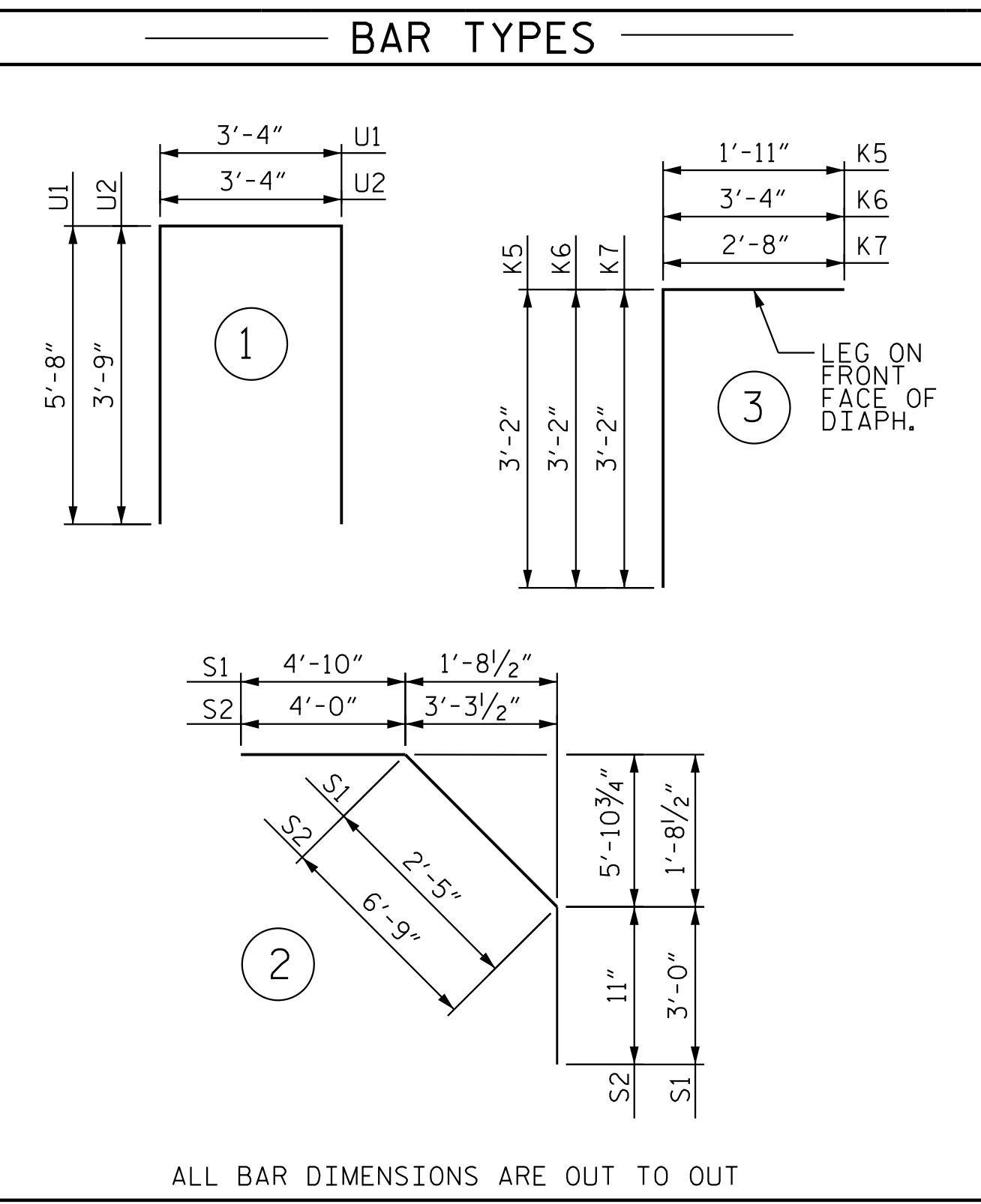


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 4,356)



POURING SEQUENCE ALONG GRADE LINE -RL-  
⊕ → = INDICATES POUR NUMBER AND DIRECTION OF POUR

REINFORCING BAR SCHEDULE						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	191	#5	STR	40'-9"	8118	
A2	191	#5	STR	40'-9"	8118	
*B1	58	#5	STR	53'-0"	3206	
B2	82	#5	STR	52'-10"	4519	
*B3	54	#6	STR	20'-2"	1636	
*B4	54	#6	STR	23'-0"	1865	
*G1	2	#5	STR	40'-9"	85	
K1	28	#4	STR	21'-3"	397	
K2	6	#4	STR	7'-0"	28	
K3	30	#4	STR	9'-10"	197	
K4	6	#4	STR	8'-6"	34	
K5	4	#4	3	5'-1"	14	
K6	20	#4	3	6'-6"	87	
K7	4	#4	3	5'-10"	16	
K8	12	#4	STR	6'-8"	53	
*S1	60	#4	2	10'-3"	411	
*S2	80	#4	2	11'-8"	623	
U1	60	#4	1	14'-8"	588	
U2	16	#4	1	10'-10"	116	
REINFORCING STEEL				14,167 LBS.		
EPOXY COATED REINFORCING STEEL				15,944 LBS.		



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	122.9		
POUR #2	81.2		
TOTALS**	204.1	14,167	15,944

\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,692 SQ.FT.
BRIDGE DECK	3,626 SQ.FT.
TOTAL	5,318 SQ.FT.

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"			

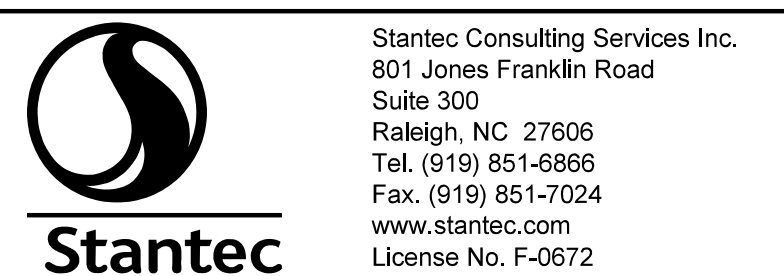
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CLEVELAND COUNTY  
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DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE BILL OF MATERIAL  
(RL)

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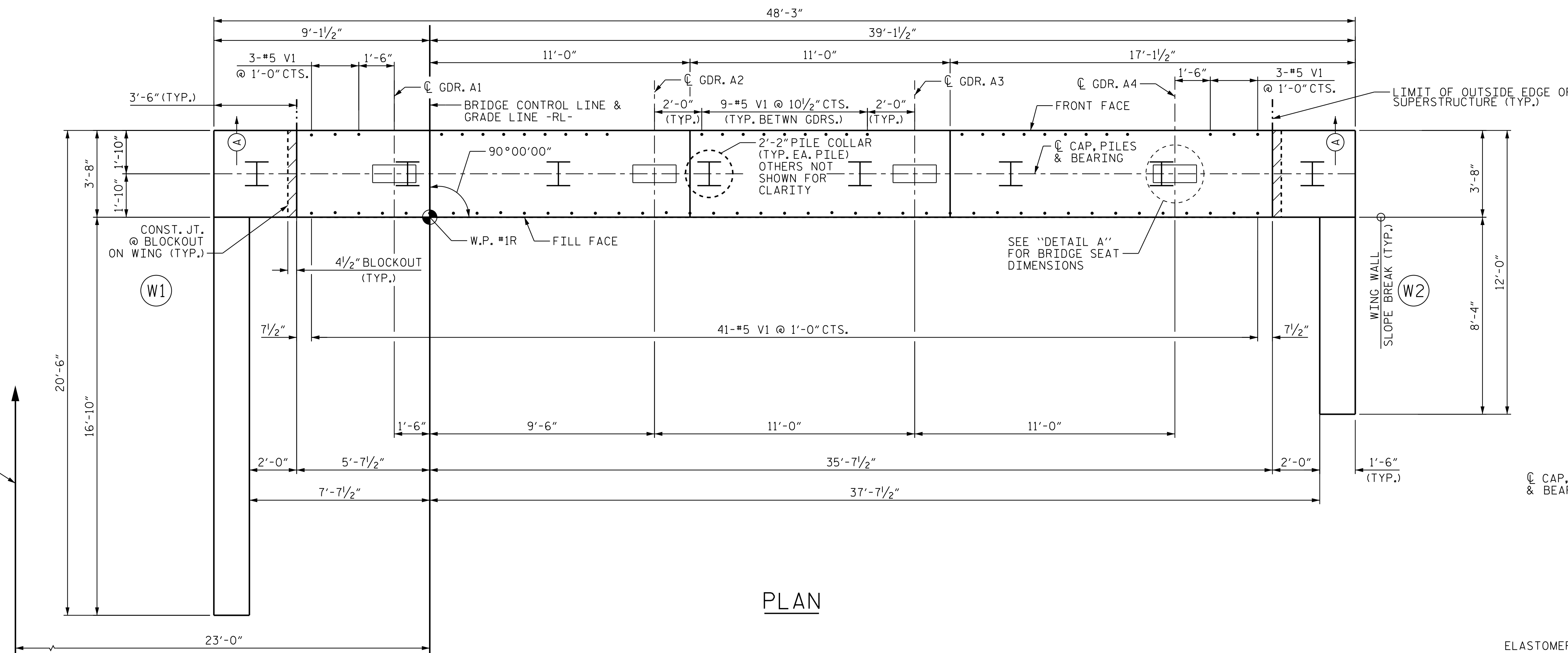
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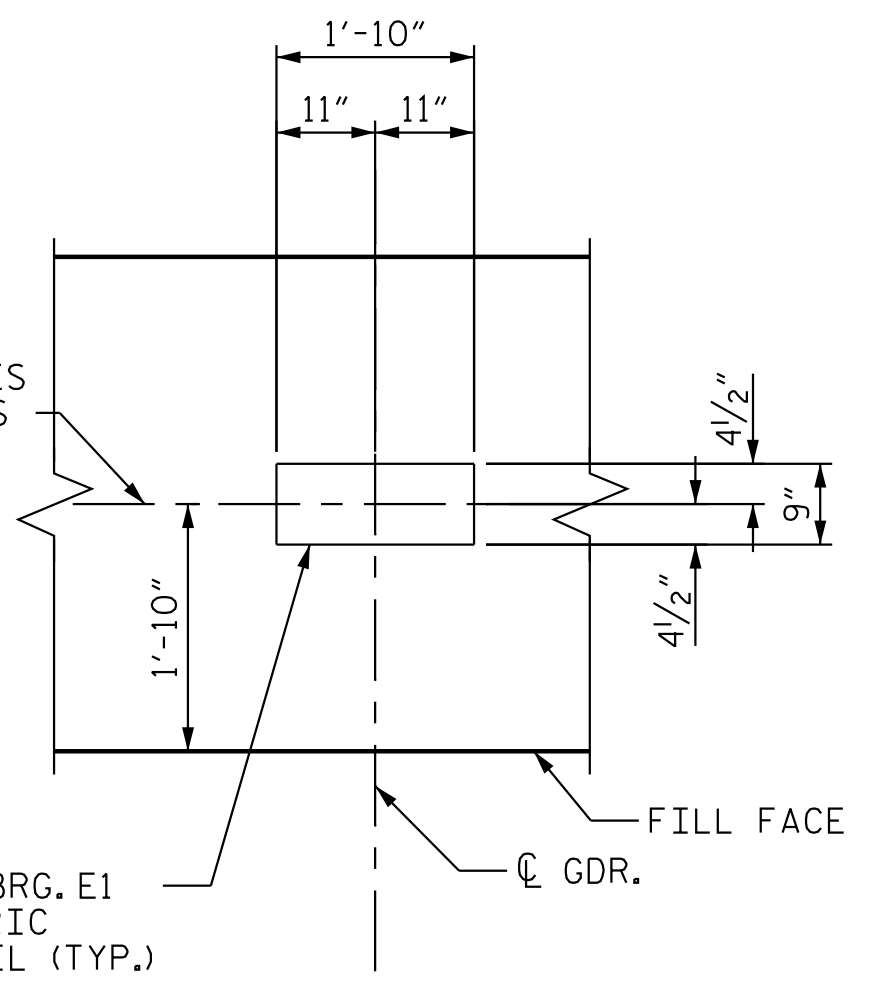
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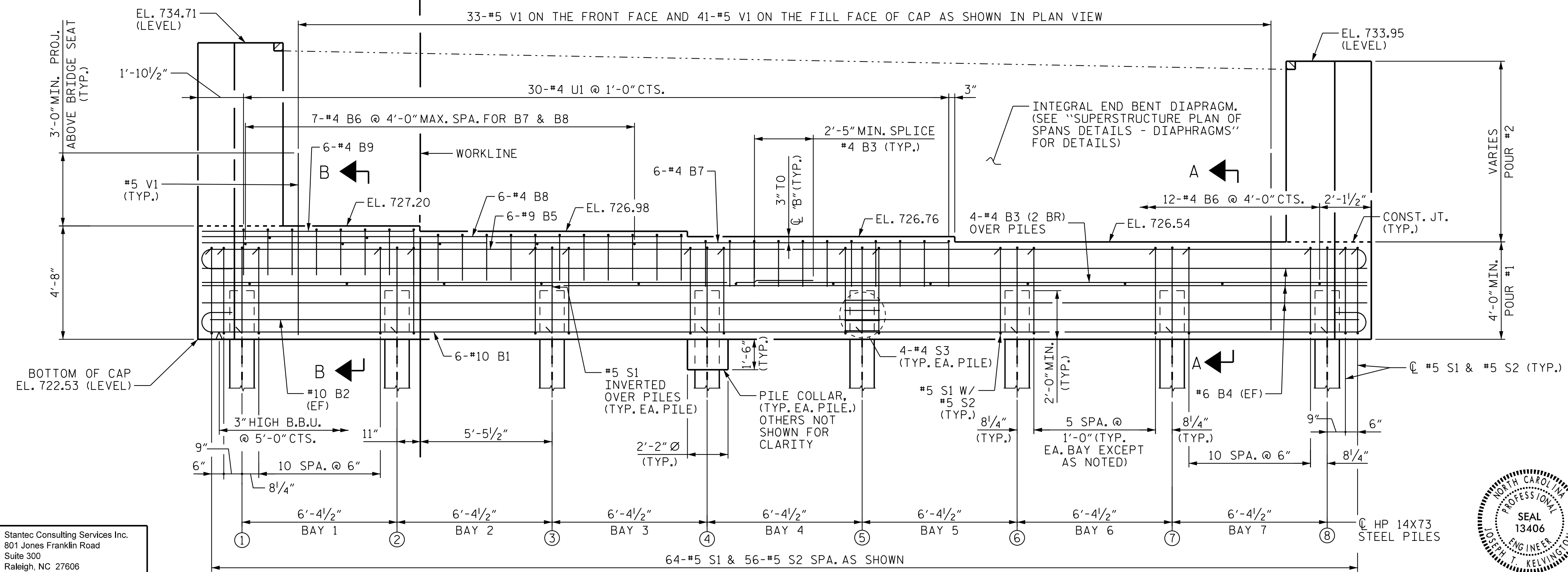


PLAN

- NOTES**
- (A) SLOPED TOP OF WING SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 2 WING WALL DETAILS, SHT. 2 OF 3.
  - (EF) - DENOTES EACH FACE
  - CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.
  - (2 BR) DENOTES 2 BAR RUN.
  - FOR SECTIONS A-A & B-B, SEE END BENT 1 DETAILS, SHT. 3 OF 4.
  - FOR WING WALL DETAILS, SEE END BENT 1 DETAILS - WING WALLS, SHT. 2 OF 4.



DETAIL A  
DIMENSIONS TYPICAL FOR EACH BEARING

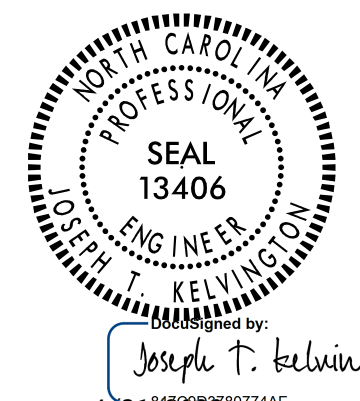


ELEVATION

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SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 (RL)

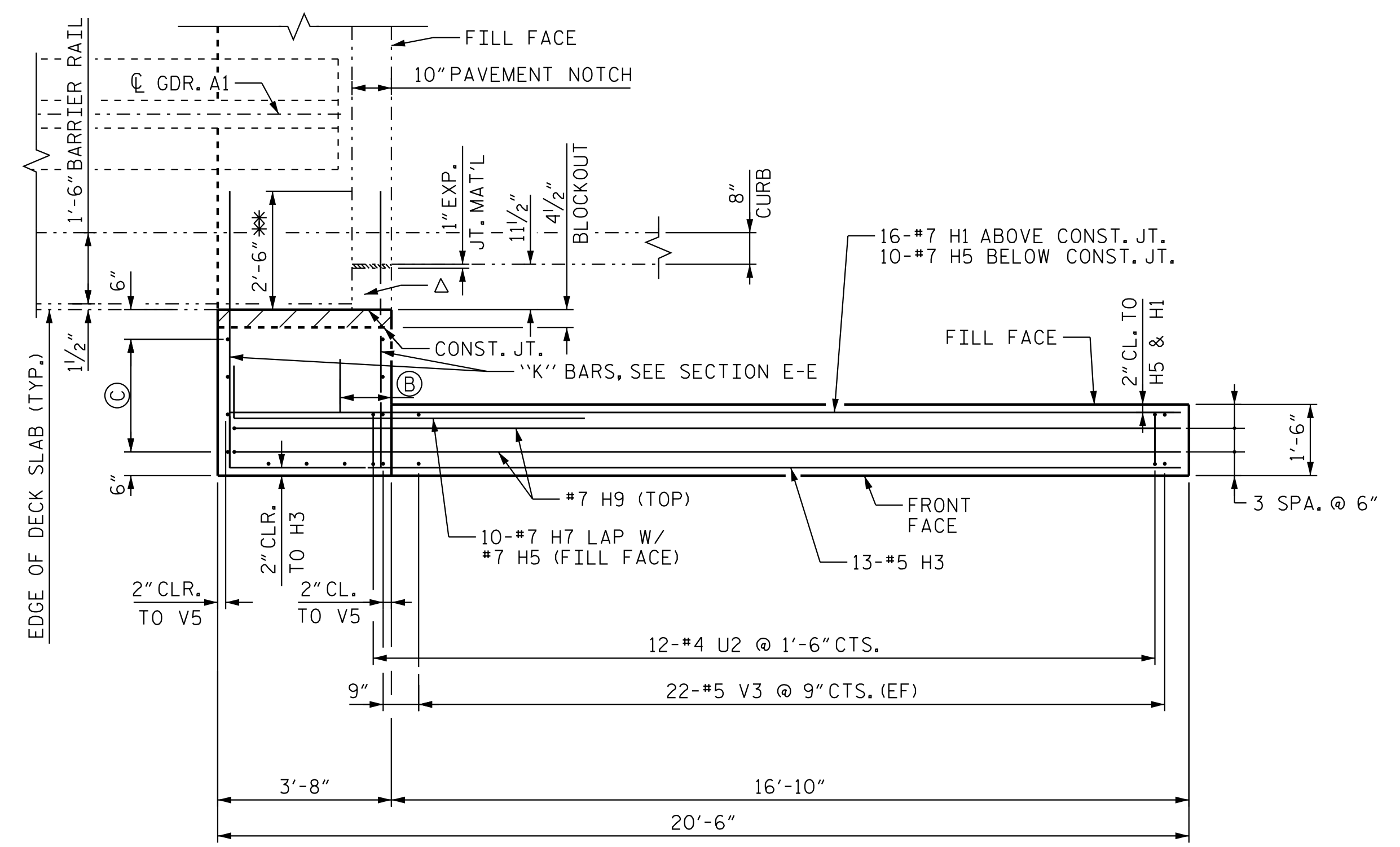


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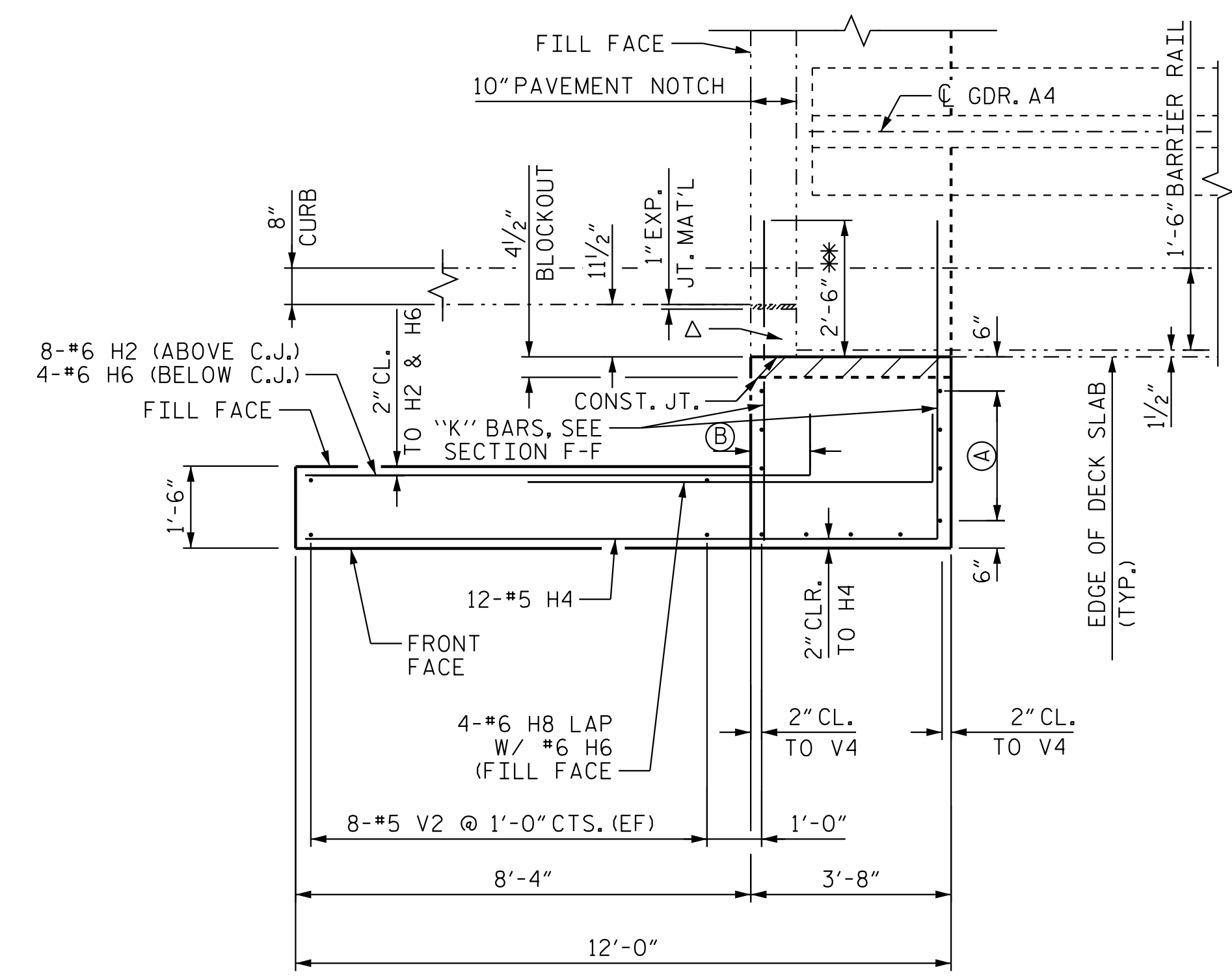
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 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

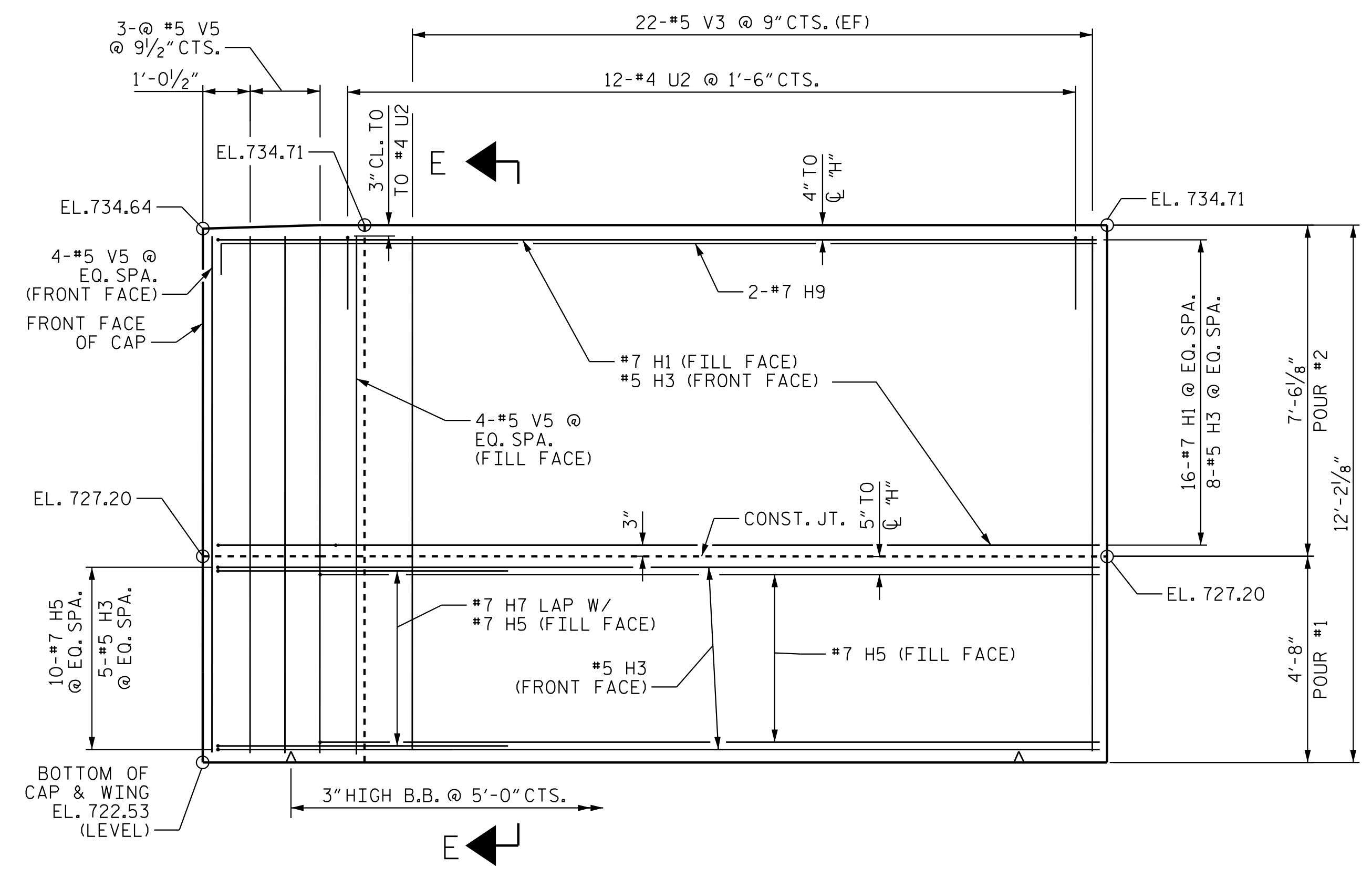


PLAN OF LEFT WING (W1)



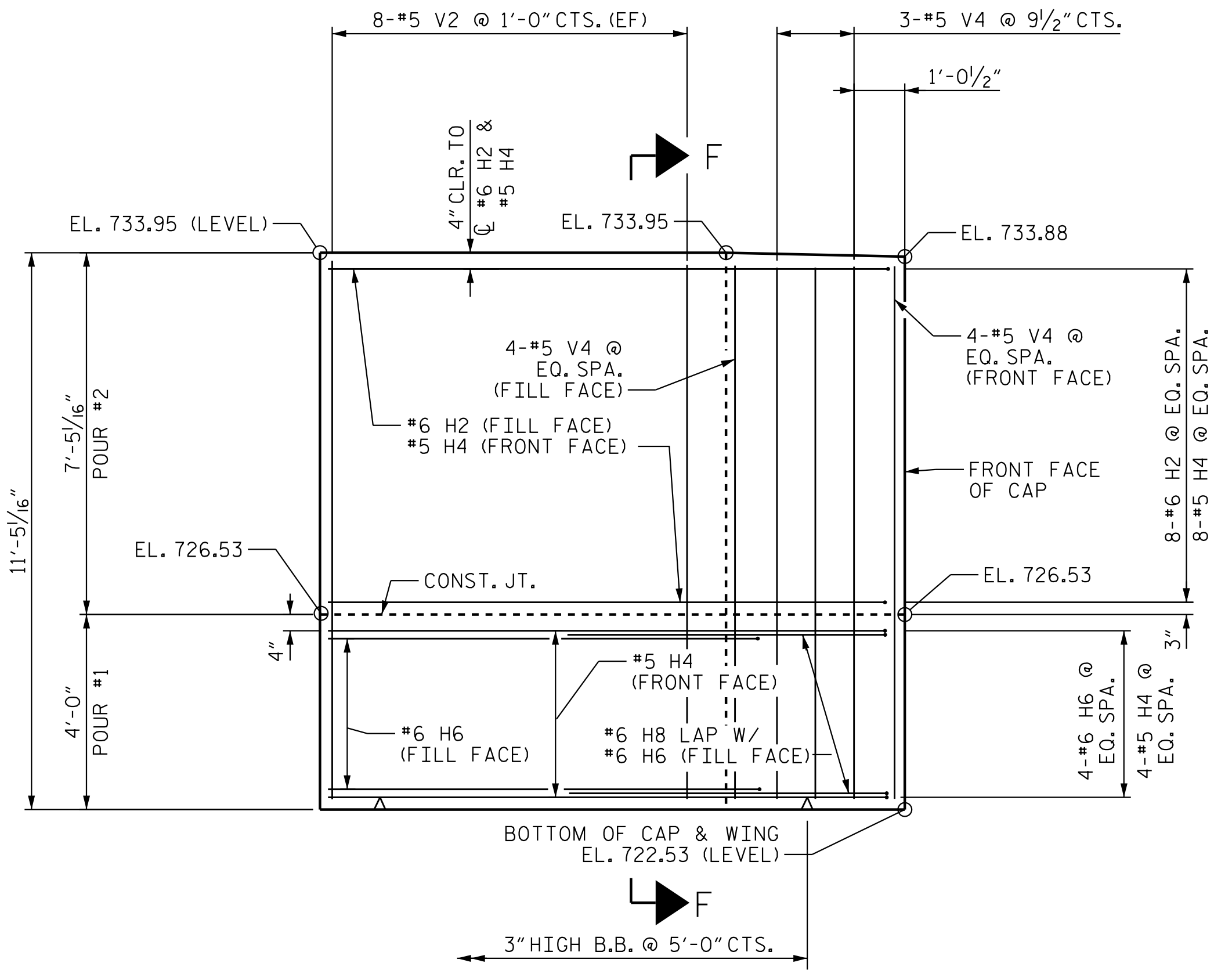
PLAN OF RIGHT WING (W2)

NOTES:  
 Δ AREA BETWEEN APPROACH SLAB CURB AND BLOCKOUT SHALL MATCH THE FINISHED SURFACE OF THE BRIDGE DECK.  
 CONCRETE TO BE POURED IN THE HATCHED AREA TO MATCH THE TOP OF THE CURB AND THE INTEGRAL END BENT WING ELEVATION.  
 THE CONCRETE IN THE HATCHED AREA OF THE WING IS TO BE POURED AFTER THE JOINT BETWEEN THE BRIDGE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND IF SLIP FORMING IS USED, THE BARRIER HAS BEEN CAST.  
 #7 H7 AND #6 H8 BARS MAY BE REPOSITIONED SLIGHTLY VERTICALLY TO CLEAR CAP REINFORCEMENT AND HORIZONTALLY TO CLEAR THE PILE.  
 (A) 4-#5 V4 @ EO. SPA. (FILL FACE & FRONT FACE)  
 (B) 1'-1" CLEAR FROM FILL FACE TO OUTSIDE OF "H".  
 (C) 4-#5 V5 @ EO. SPA. (FILL FACE & FRONT FACE).  
 FOR SECTION E-E AND SECTION F-F, SEE END BENT 1 DETAILS, SHT. 3 OF 4.



ELEVATION OF LEFT WING (W1)

NOTE: K1 & K2 BARS NOT SHOWN FOR CLARITY.



ELEVATION OF RIGHT WING (W2)

NOTE: K1 & K2 BARS NOT SHOWN FOR CLARITY.

PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1 - WING WALLS  
 (RL)



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4/21/2023  
 JHagenbush  
 4/21/2023  
 jtkelvington\dmst003\A2707D-SMU-EL02-2200B9.dgn

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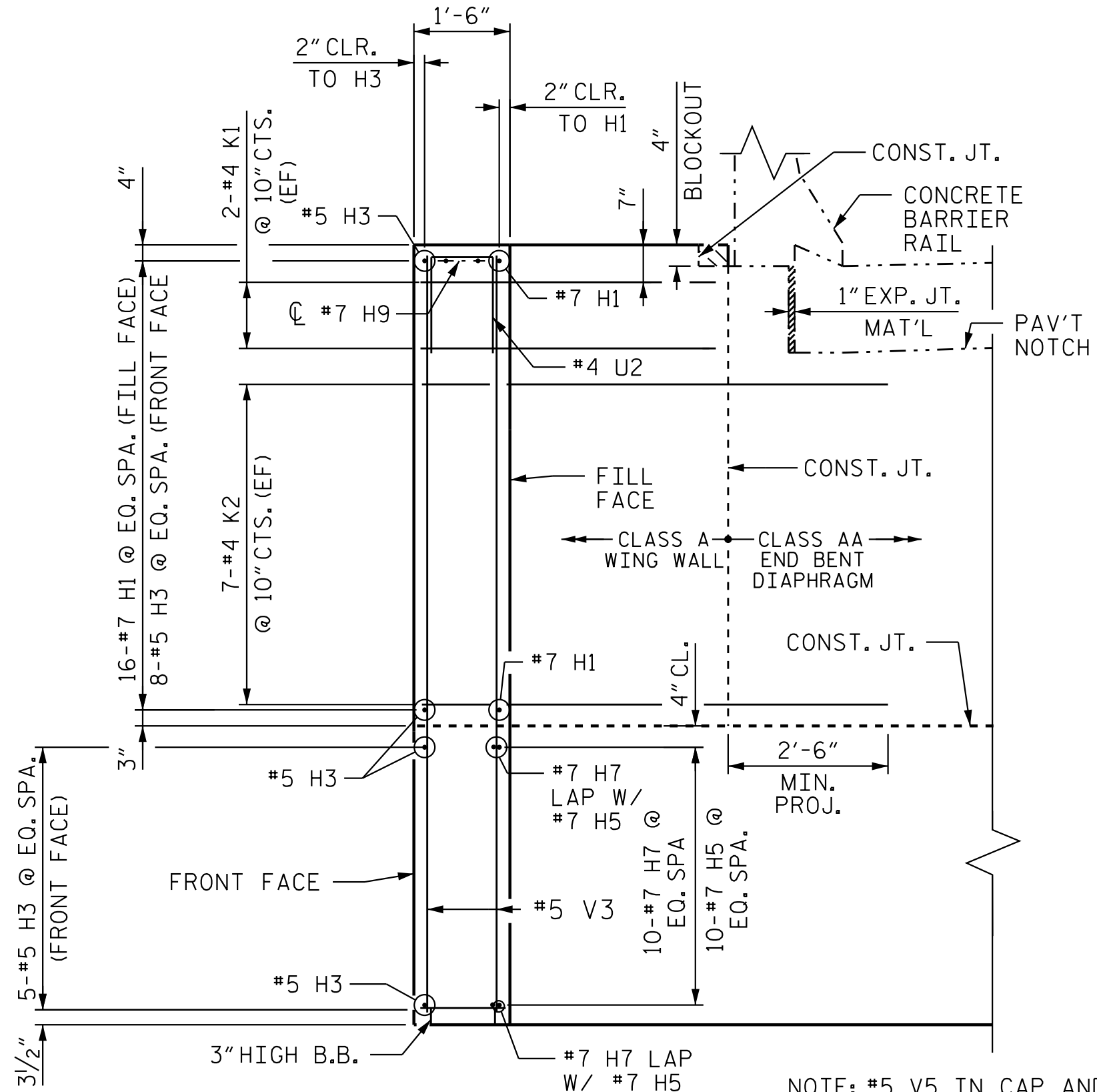
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 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

NOTE: TOP SURFACE OF END BENT WING CAST ON TOP OF THE END BENT CAP SHALL BE SLOPED TRANSVERSELY FROM FILL FACE OF THE CAP TO FRONT FACE AT A RATE OF 1/4" / FT.

(EF) DENOTES EACH FACE.

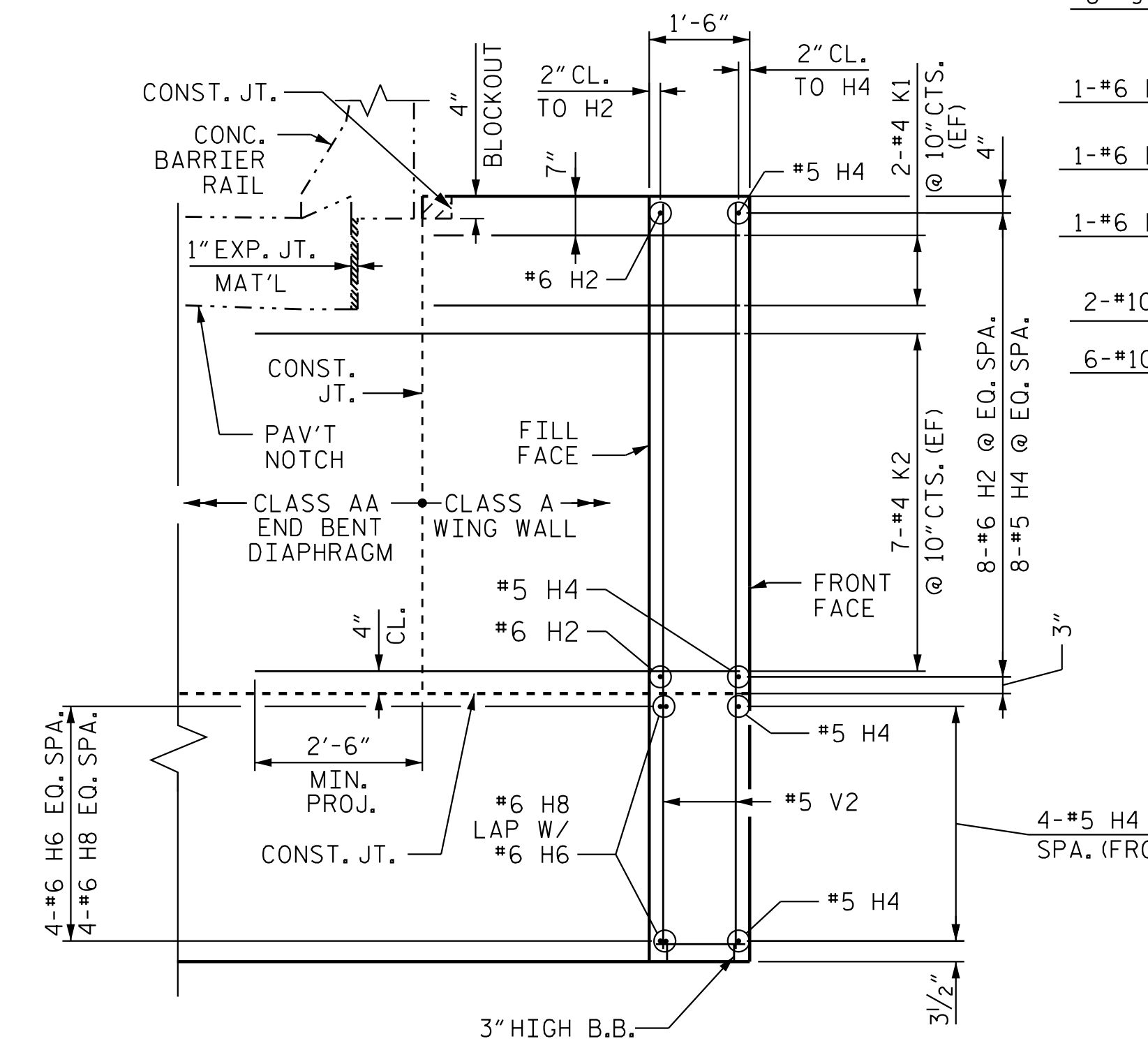
\* #4 K2 2'-6" PROJECTION BEYOND CONST. JOINT.





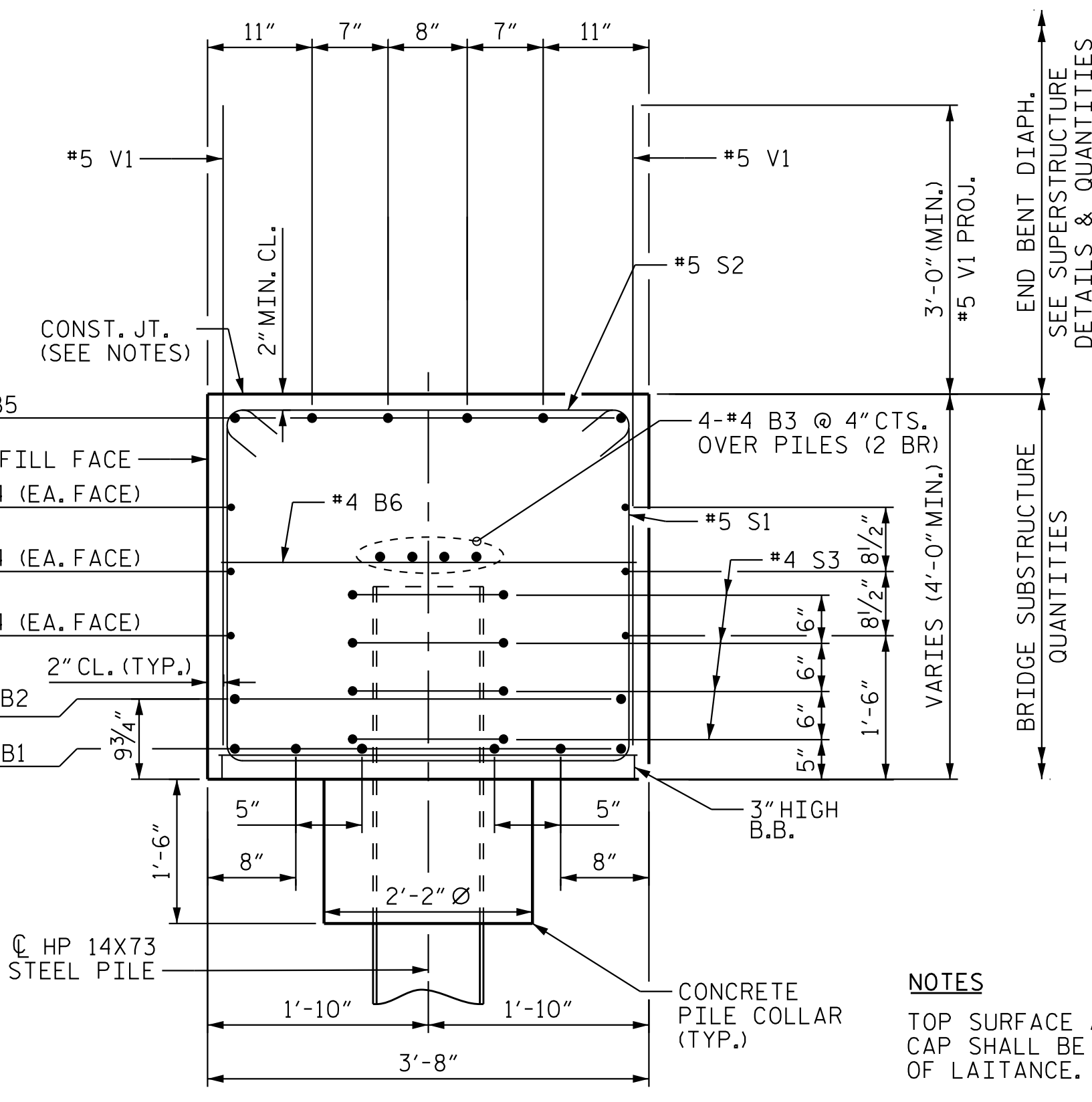
SECTION E-E

NOTE: #5 V5 IN CAP AND WING NOT SHOWN FOR CLARITY.



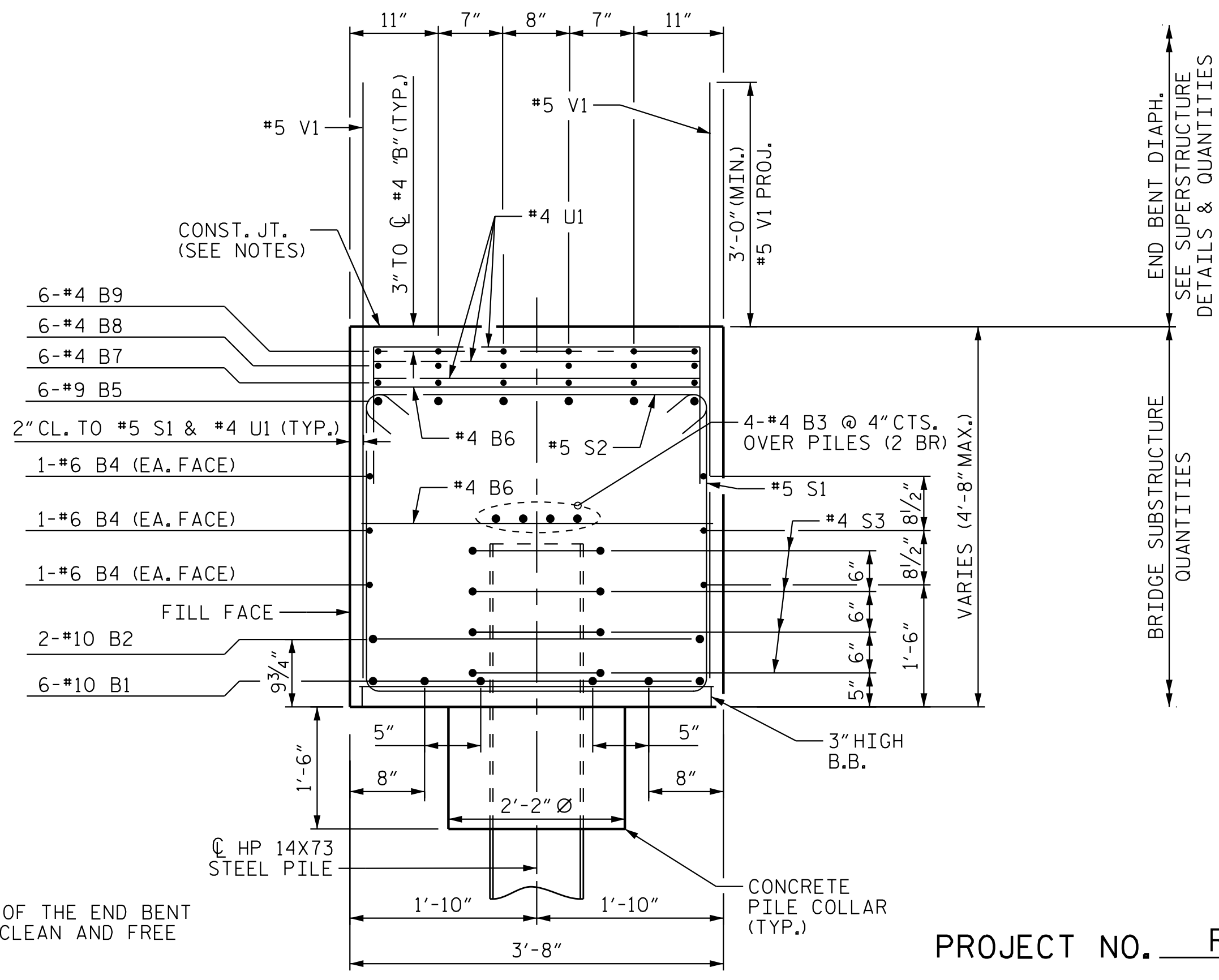
SECTION F-F

NOTE: #5 V4 IN CAP AND WING NOT SHOWN FOR CLARITY.



SECTION A-A

SEE "END BENT 1", SHEET 1 OF 4.



SECTION B-B

SEE "END BENT 1", SHEET 1 OF 4.

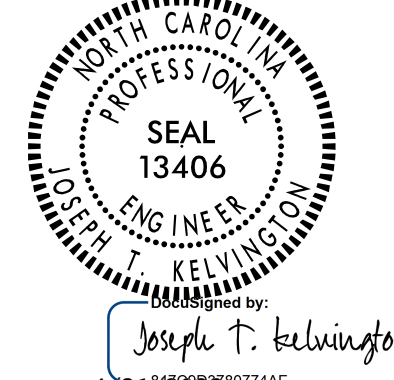
**NOTES**  
 TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.  
 ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP TO PROVIDE MIN. SURFACE AMPLITUDE OF 1/4", EXCEPT UNDER BEARING AREAS.  
 (2 BR) DENOTES 2 BAR RUN.

4/21/2023  
 JHagenbush  
 4/21/2023  
 JHagenbush



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 www.stantec.com  
 License No. F-0672

DRAWN BY: J.E. HAGENBUSH DATE: 12/09/22  
 CHECKED BY: J.T. KELVINGTON DATE: 12/12/22  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23



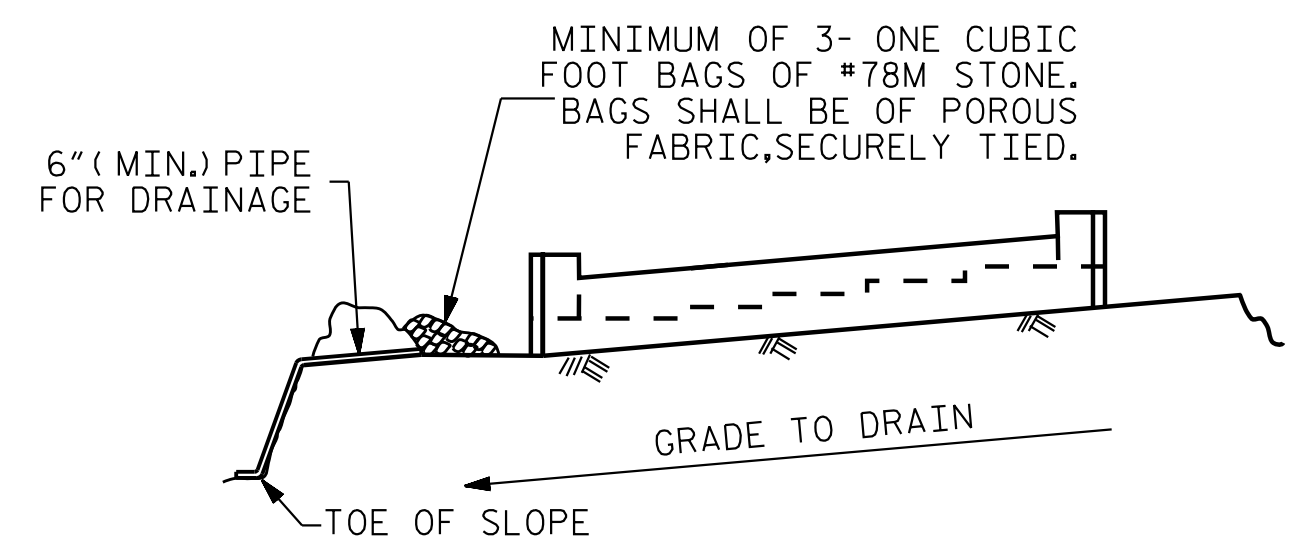
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. R-2707D  
 CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 3 OF 4

REVISIONS						SHEET NO. S9-22
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			

(RL)

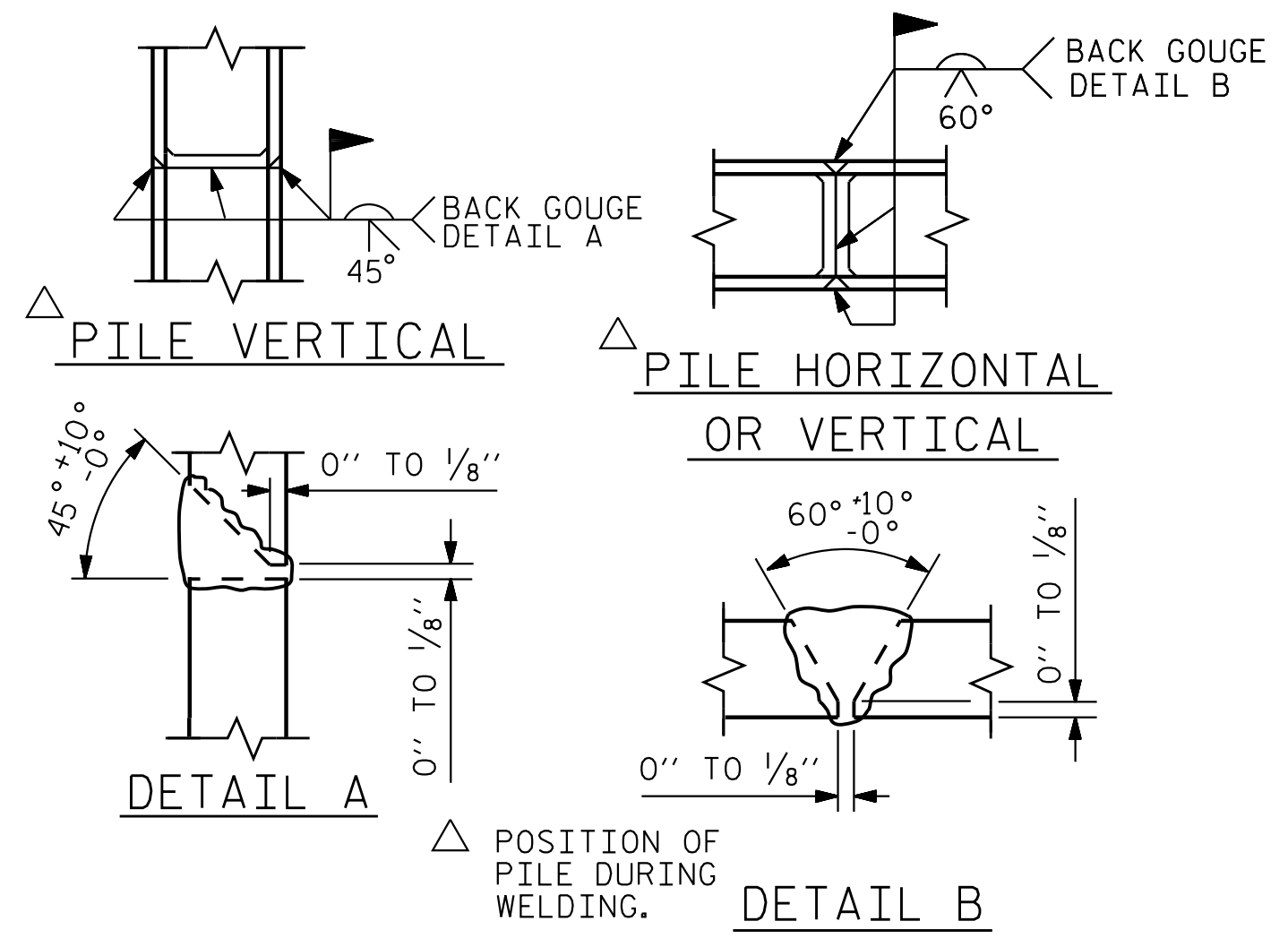


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

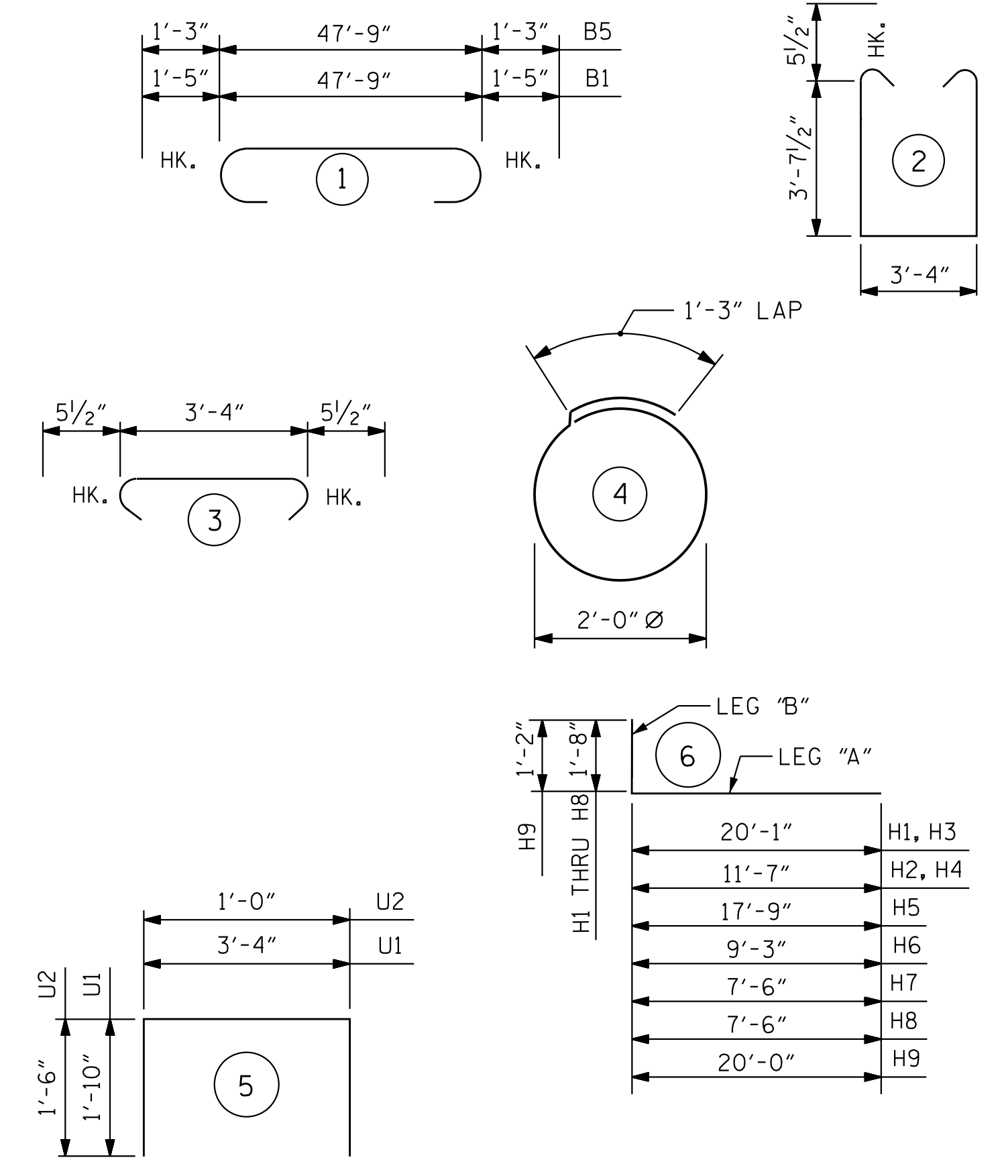
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



**PILE SPLICE DETAILS**

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT.

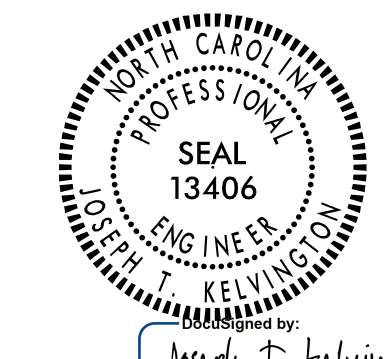
**BILL OF MATERIAL**

END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	50'-7"	1306
B2	2	#10	STR	47'-3"	407
B3	8	#4	STR	24'-10"	133
B4	6	#6	STR	47'-11"	432
B5	6	#9	1	50'-3"	1025
B6	19	#4	STR	3'-4"	42
B7	6	#4	STR	30'-5"	122
B8	6	#4	STR	19'-5"	78
B9	6	#4	STR	8'-5"	34
H1	16	#7	6	21'-9"	711
H2	8	#6	6	13'-3"	159
H3	13	#5	6	21'-9"	295
H4	12	#5	6	13'-3"	166
H5	10	#7	6	19'-5"	397
H6	4	#6	6	10'-11"	66
H7	10	#7	6	9'-2"	187
H8	4	#6	6	9'-2"	55
H9	2	#7	6	21'-2"	87
K1	8	#4	STR	2'-9"	15
K2	28	#4	STR	5'-10"	109
S1	64	#5	2	11'-6"	768
S2	56	#5	3	4'-3"	248
S3	32	#4	4	7'-7"	162
U1	30	#4	5	7'-0"	140
U2	12	#4	5	4'-0"	32
V1	74	#5	STR	7'-6"	579
V2	16	#5	STR	11'-1"	185
V3	44	#5	STR	11'-10"	543
V4	11	#5	STR	11'-0"	126
V5	11	#5	STR	11'-9"	135
REINFORCING STEEL					LBS. 8,744
CLASS A CONCRETE BREAKDOWN:					
POUR#1: CAP, COLLARS, WINGS				C.Y.	35.8
POUR#2: UPPER WINGS				C.Y.	17.5
CLASS A CONCRETE TOTAL				C.Y.	53.3

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

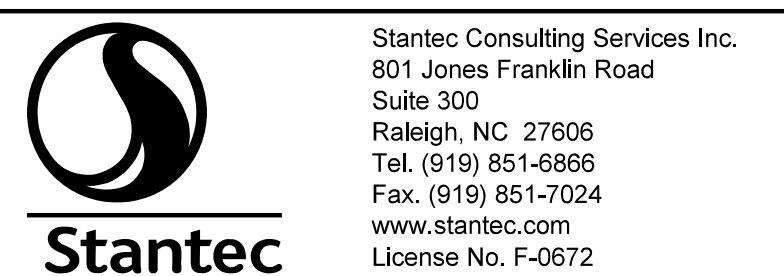
SHEET 4 OF 4

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



DESIGNED BY: Joseph T. Kelvington  
 4/21/2023  
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REVISIONS						SHEET NO. S9-23	TOTAL SHEETS 30
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1			3				
2			4				



DRAWN BY: J.E. HAGENBUSH DATE: 12/09/22 DESIGN ENGINEER  
 CHECKED BY: J.T. KELVINGTON DATE: 12/12/22 OF RECORD: J.T. KELVINGTON DATE: 04/21/23

jHagenbush

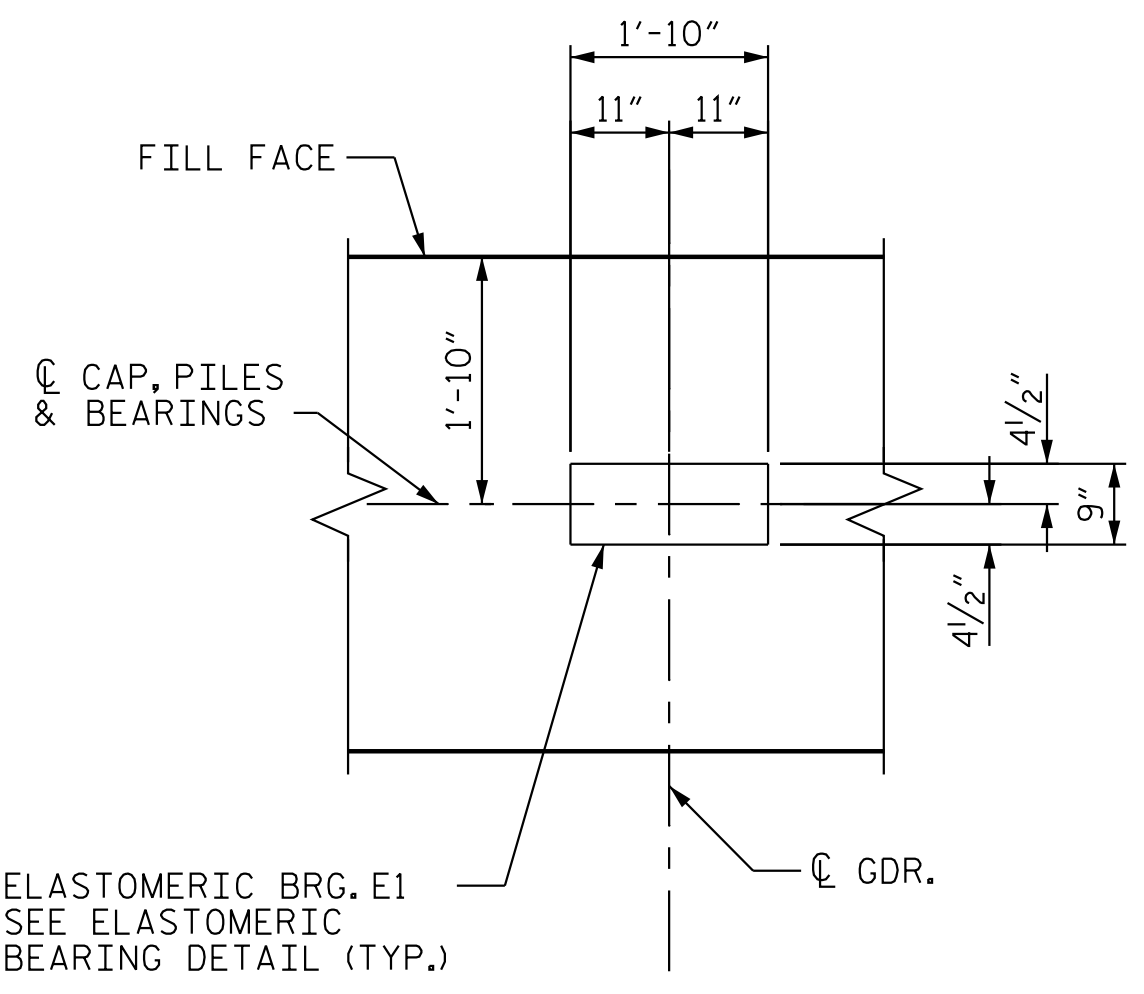
4/21/2023

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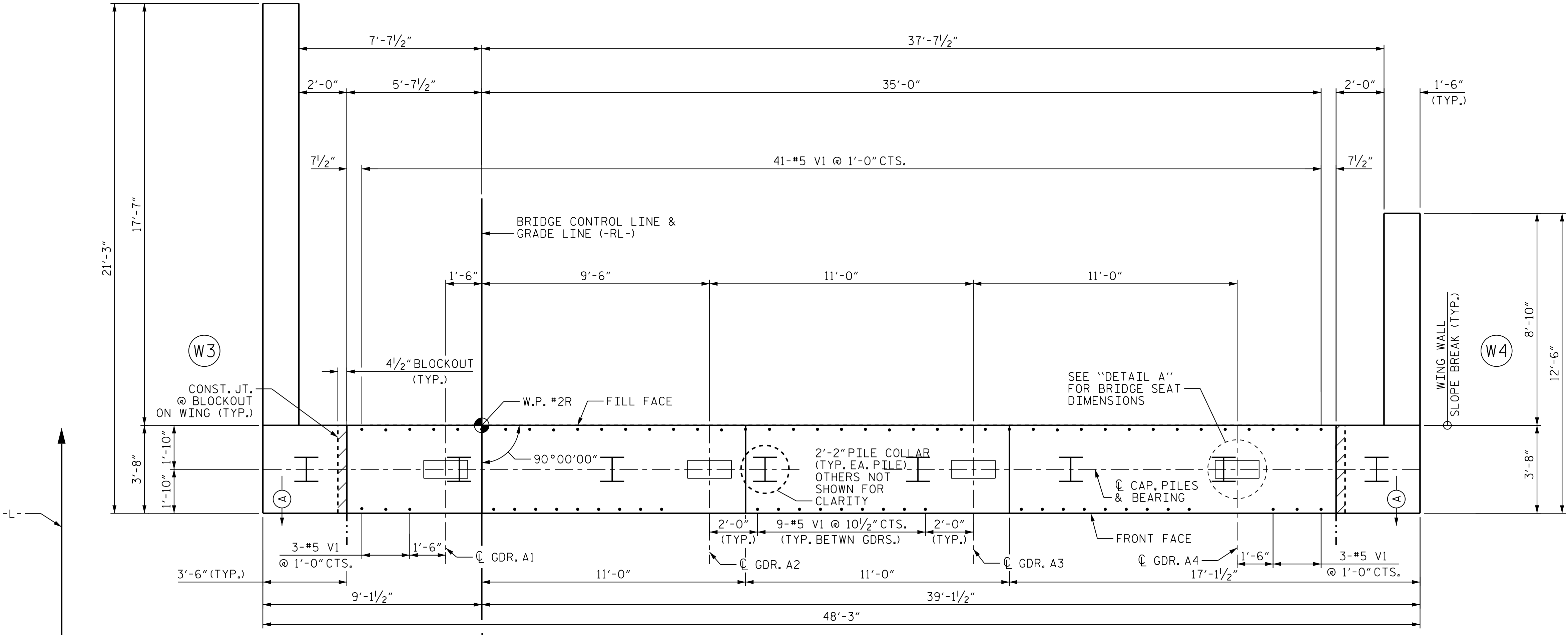
**NOTES**

- (A) SLOPED TOP OF WING SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 2 WING WALL DETAILS, SHT. 2 OF 3.
- (EF) - DENOTES EACH FACE
- CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.
- (2 BR) DENOTES 2 BAR RUN.
- FOR SECTIONS A-A & B-B, SEE END BENT 2 DETAILS, SHT. 3 OF 4.
- FOR WING WALL DETAILS, SEE END BENT 2 DETAILS - WING WALLS, SHT. 2 OF 4.

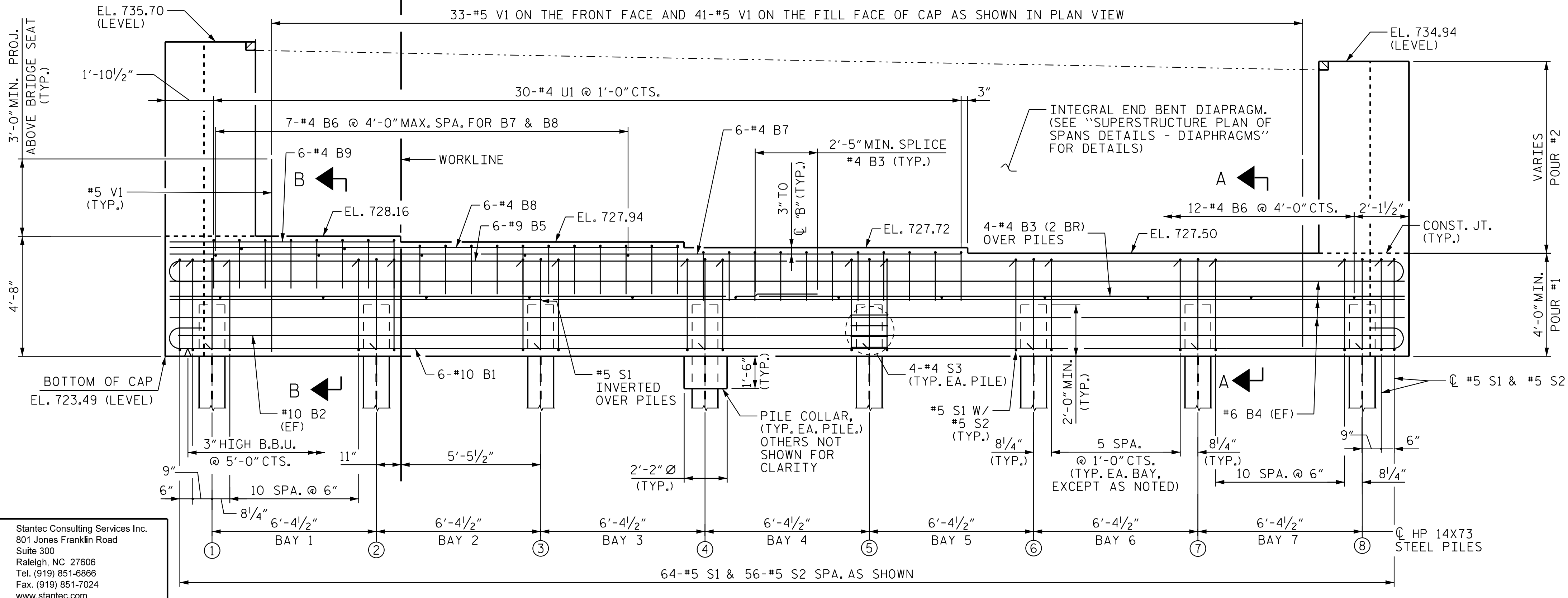


**DETAIL A**

DIMENSIONS TYPICAL FOR EACH BEARING



**PLAN**



**ELEVATION**

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 1 OF 4

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



REVISIONS				SHEET NO.	
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2			4		

SHEET NO. S9-24  
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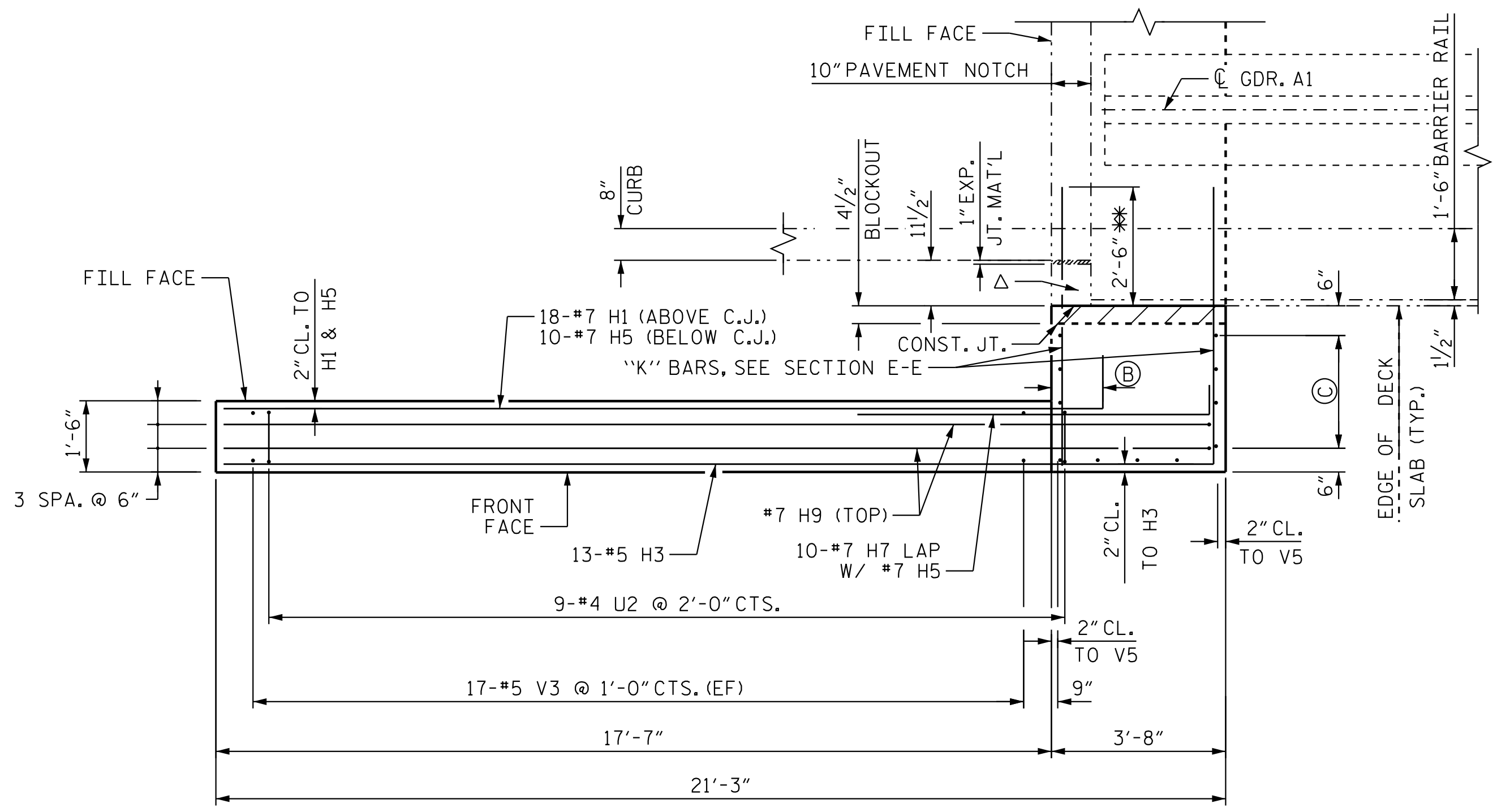
4/21/2023

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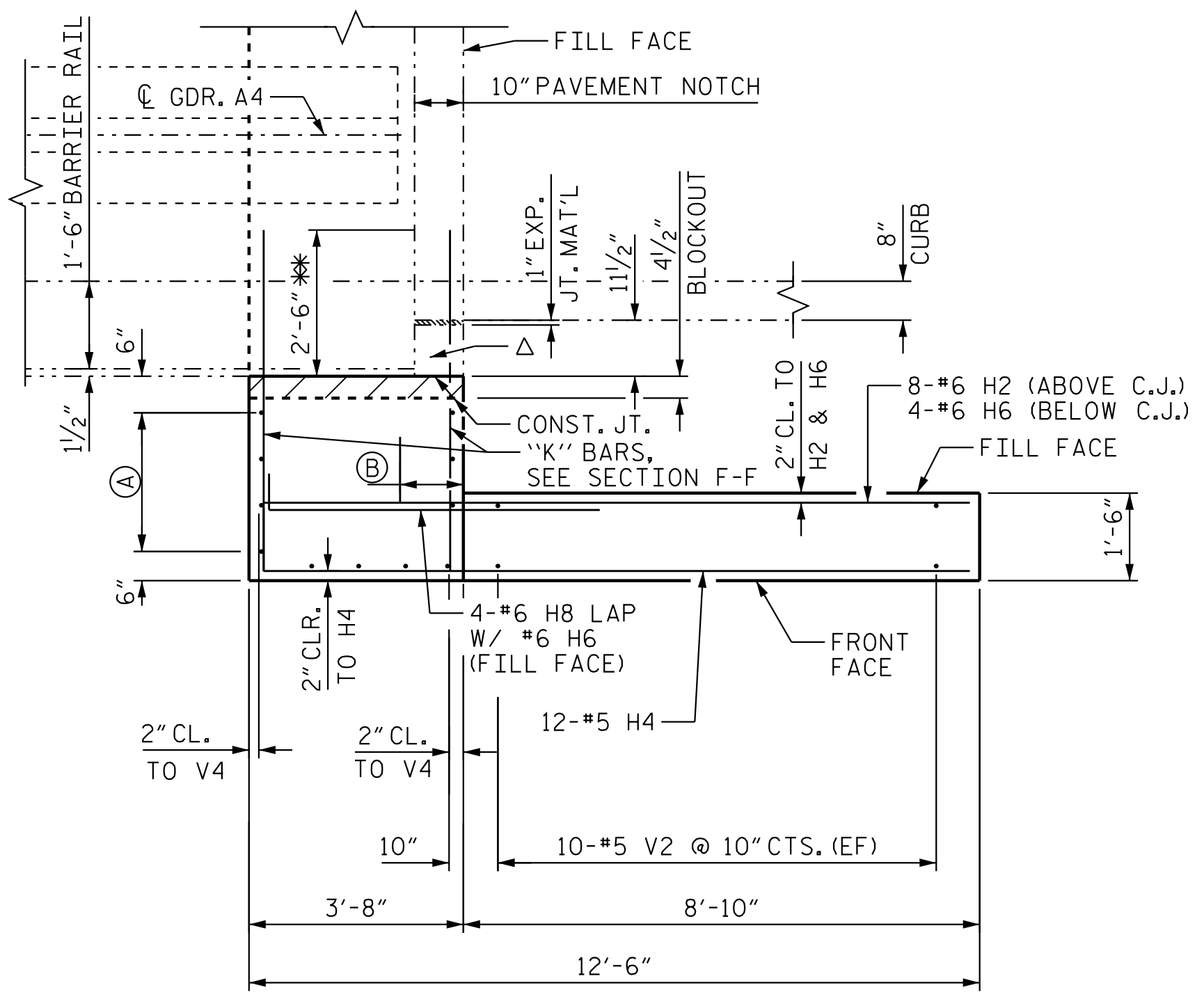
JHagenbush

4/21/2023

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PLAN OF LEFT WING (W3)

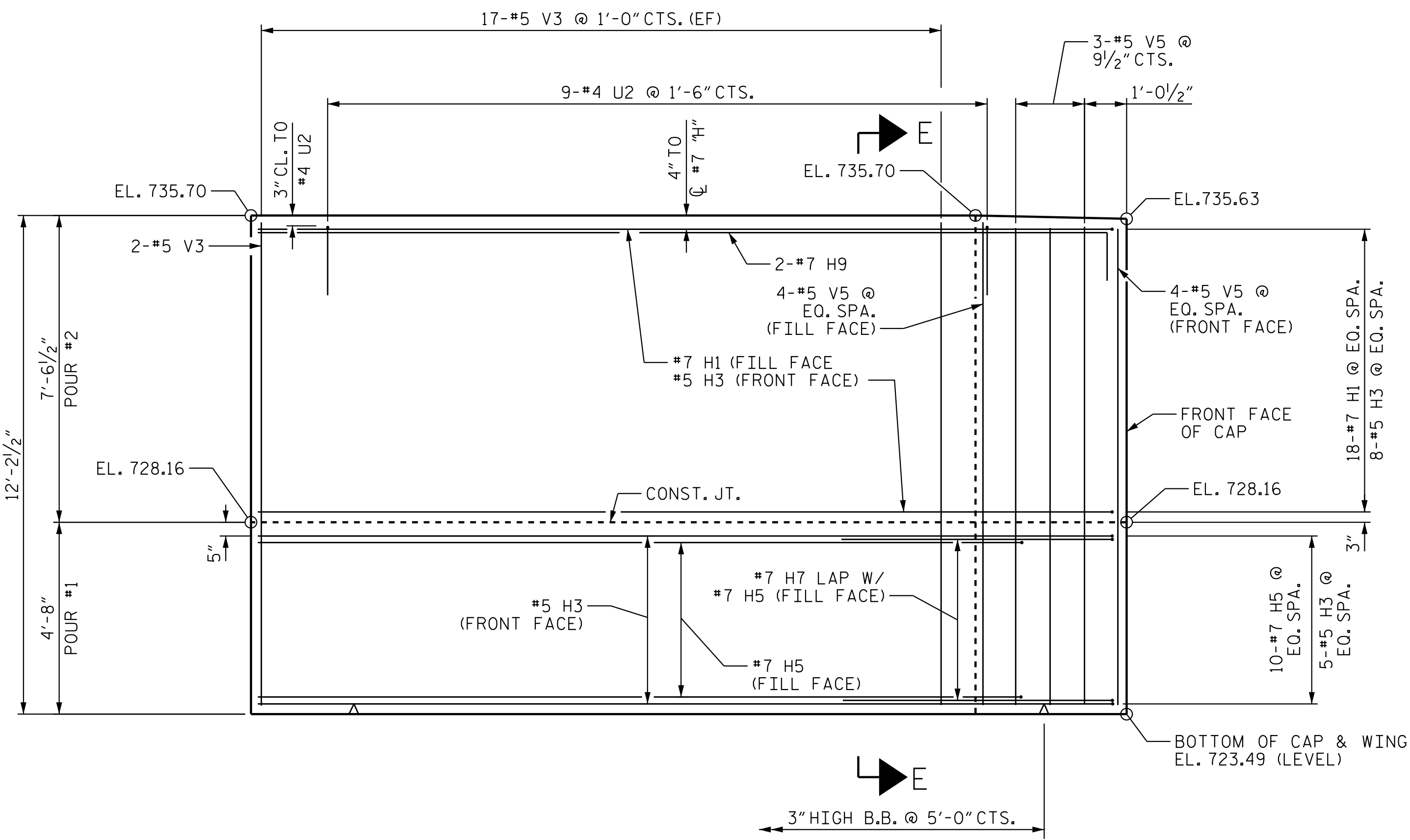


PLAN OF RIGHT WING (W4)

NOTES:
1. AREA BETWEEN APPROACH SLAB CURB AND BLOCKOUT SHALL MATCH THE FINISHED SURFACE OF THE BRIDGE DECK.
2. CONCRETE TO BE POURED IN THE HATCHED AREA TO MATCH THE TOP OF THE CURB AND THE INTEGRAL END BENT WING ELEVATION.
3. THE CONCRETE IN THE HATCHED AREA OF THE WING IS TO BE POURED AFTER THE JOINT BETWEEN THE BRIDGE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND IF SLIP FORMING IS USED, THE BARRIER HAS BEEN CAST.
4. #7 H7 & #6 H6 BARS MAY BE REPOSITIONED SLIGHTLY VERTICALLY TO CLEAR CAP REINFORCEMENT AND HORIZONTALLY TO CLEAR THE PILE.

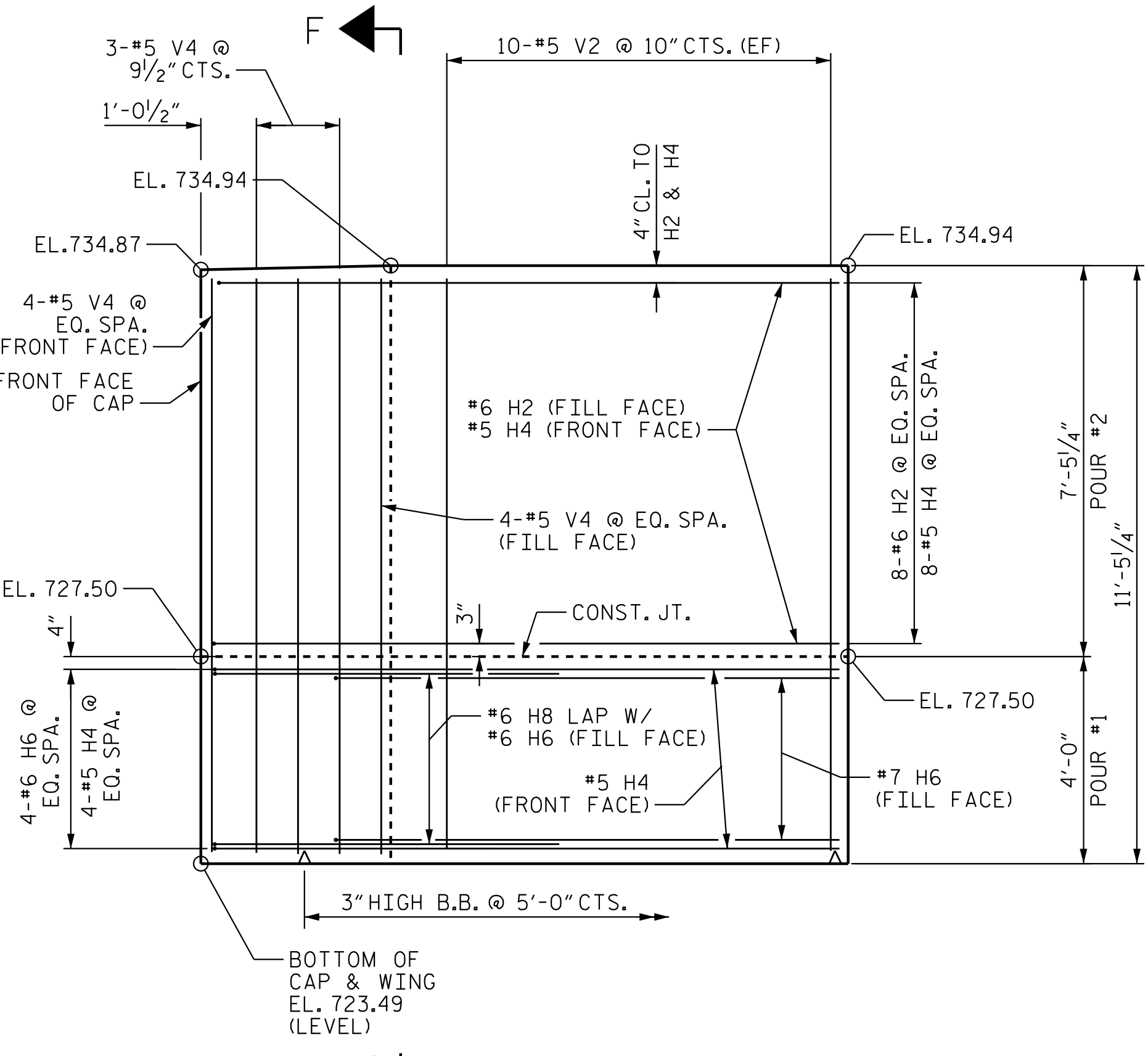
- (A) 3-#5 V4 @ EO. SPA. (FRONT FACE).
(B) 1'-1" CLEAR FROM FILL FACE.
(C) 4-#5 V5 @ EO. SPA. (EA. FACE).

FOR SECTION E-E & SECTION F-F, SEE END BENT 2 DETAIL, SHT. 3 OF 4.



ELEVATION OF RIGHT WING (W3)

NOTE: K1 & K2 BARS NOT SHOWN FOR CLARITY.



ELEVATION OF LEFT WING (W4)

NOTE: K1 & K2 BARS NOT SHOWN FOR CLARITY.

NOTE: TOP SURFACE OF END BENT WING CAST ON TOP OF THE END BENT CAP SHALL BE SLOPED TRANSVERSELY FROM FILL FACE OF THE CAP TO FRONT FACE AT A RATE OF 1/4" / FT.

(EF) DENOTES EACH FACE.

\* #4 K2 2'-6" PROJECTION BEYOND CONST. JOINT.

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 810+00.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 2 - WING WALLS
(RL)



Table with 4 columns: NO., BY:, DATE:, and REVISIONS. Includes sheet count: 30 TOTAL SHEETS.

Stantec logo and contact information: 801 Jones Franklin Road, Raleigh, NC 27606.

DRAWN BY: J.E. HAGENBUSH DATE: 12/09/22
CHECKED BY: J.T. KELVINGTON DATE: 12/12/22
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

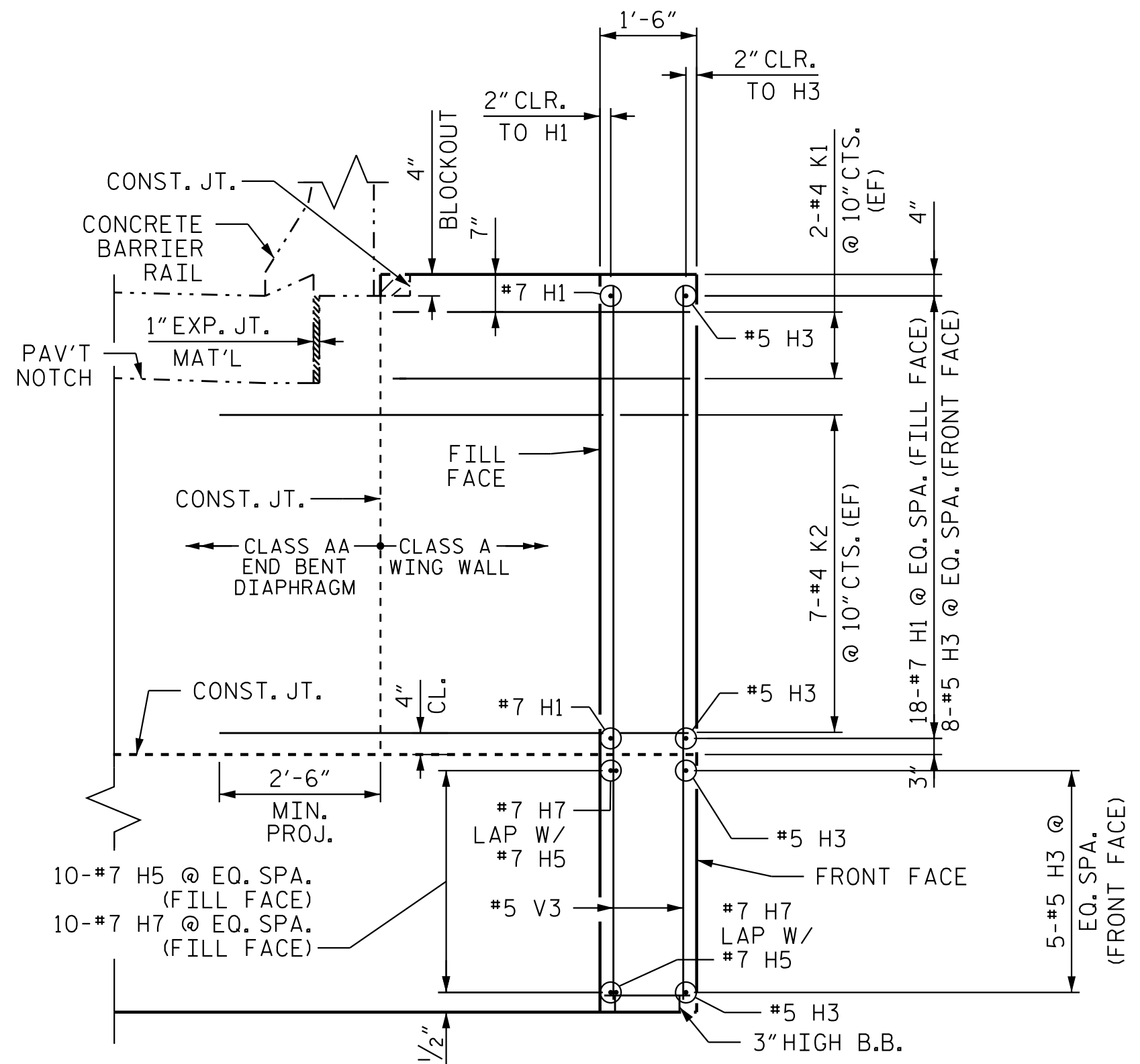
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JHagenbush

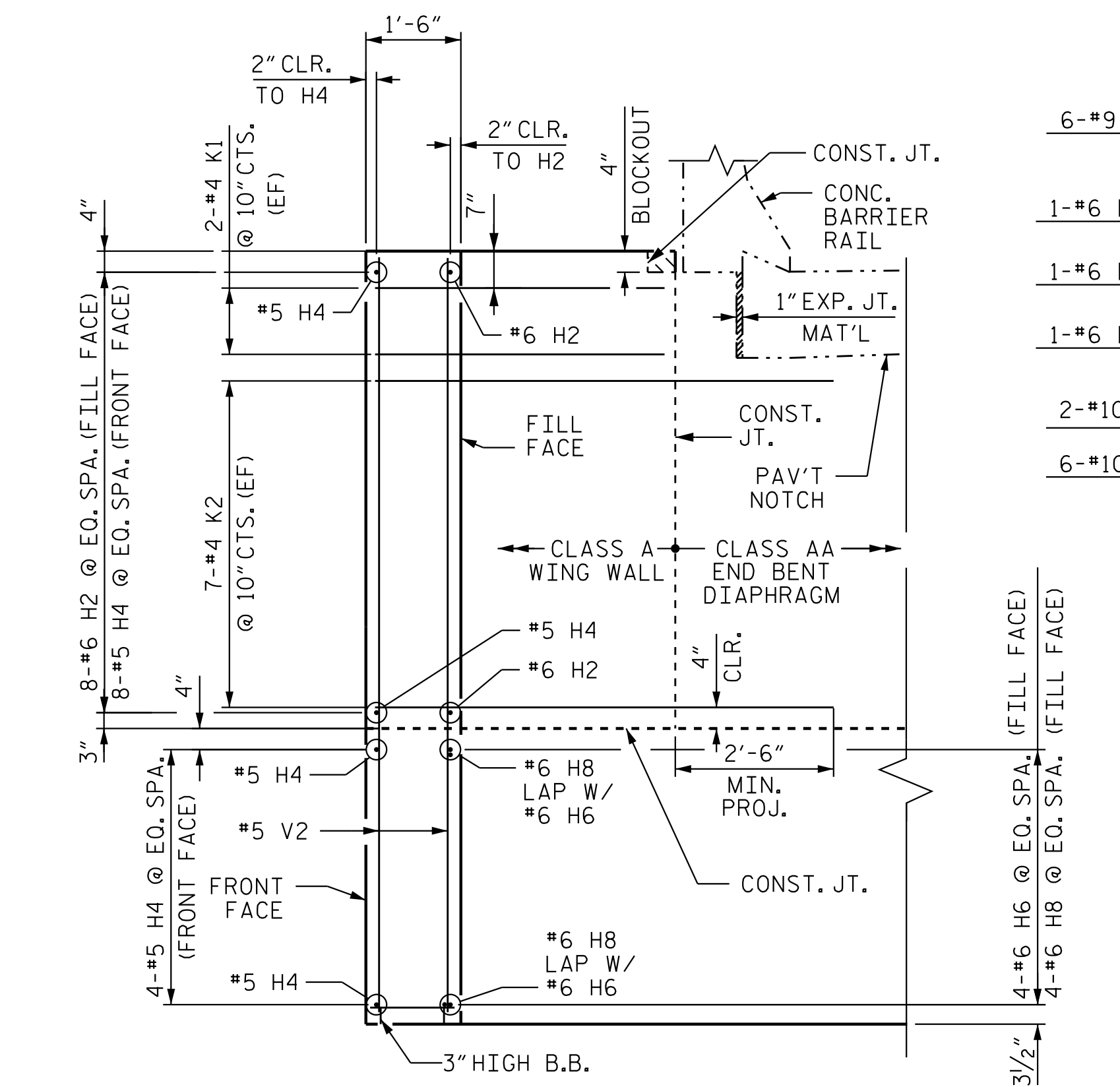
4/21/2023

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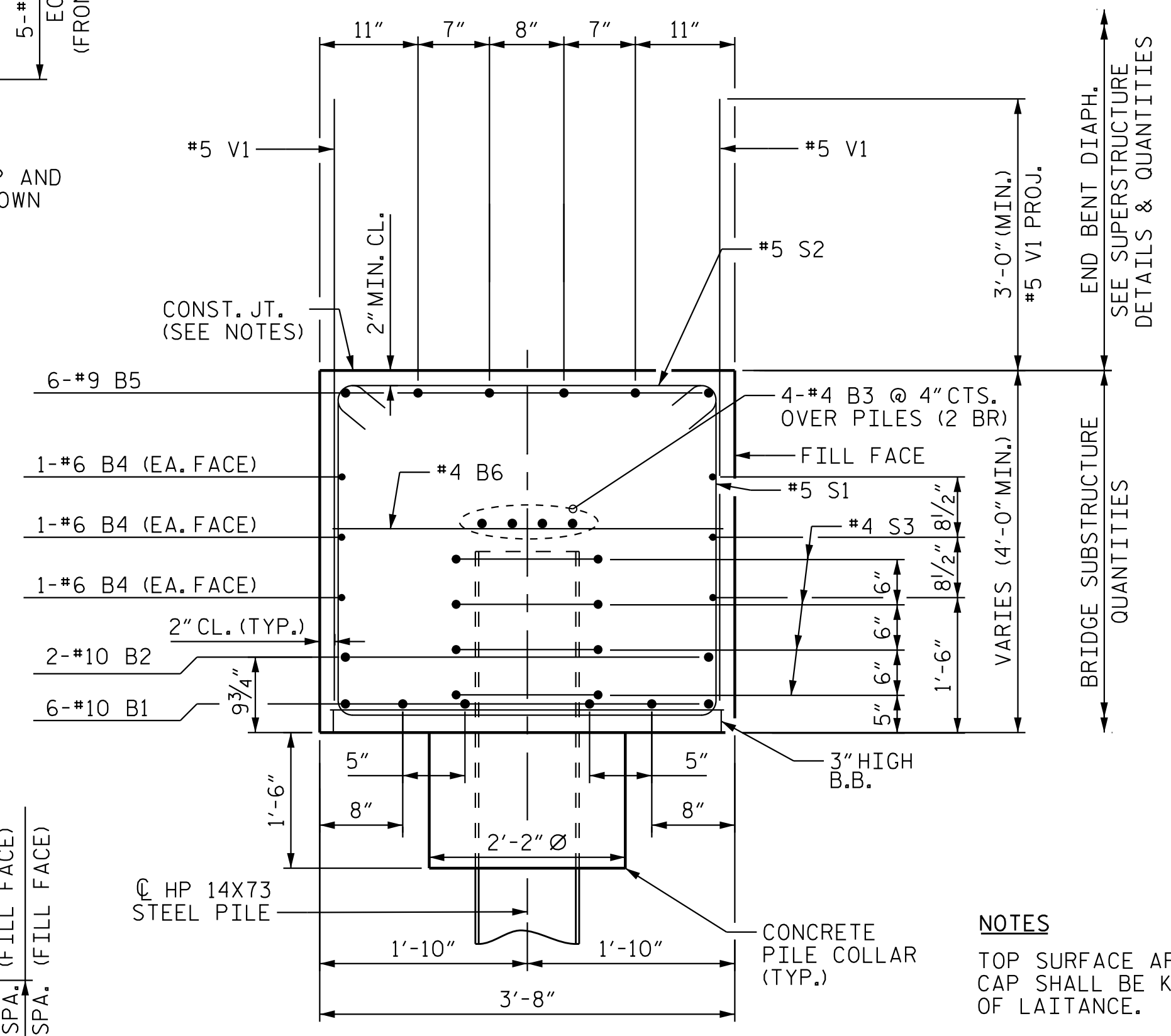
SECTION E-E

NOTE: #5 V5 IN CAP AND WING NOT SHOWN FOR CLARITY.



SECTION F-F

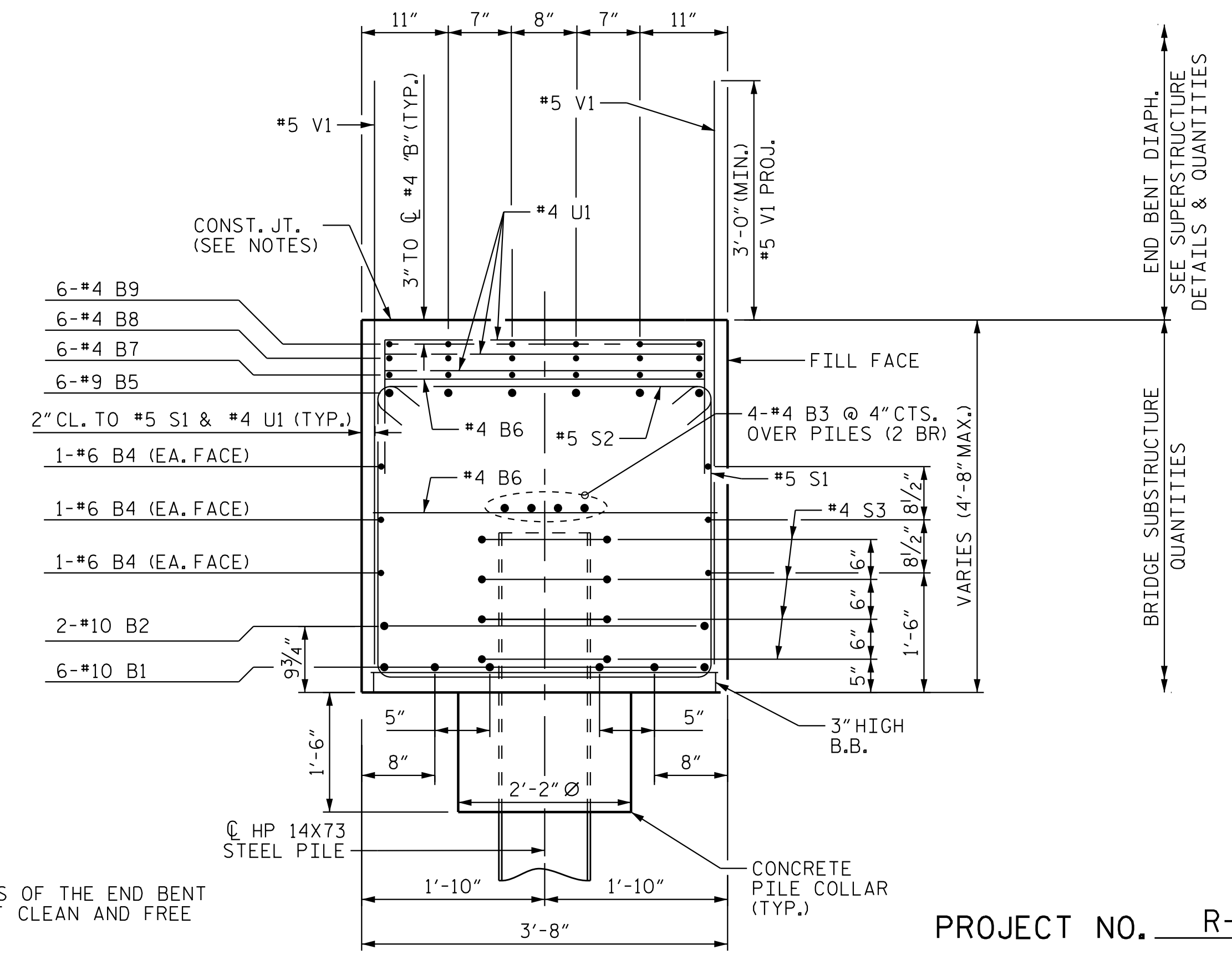
NOTE: #5 V4 IN CAP AND WING NOT SHOWN FOR CLARITY.



SECTION A-A

SEE "END BENT 2", SHEET 1 OF 4.

**NOTES**  
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 (2 BR) DENOTES 2 BAR RUN.



SECTION B-B

SEE "END BENT 2", SHEET 1 OF 4.

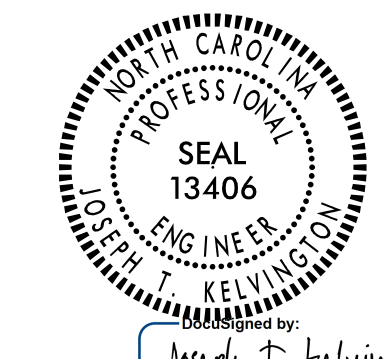
PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 3 OF 4



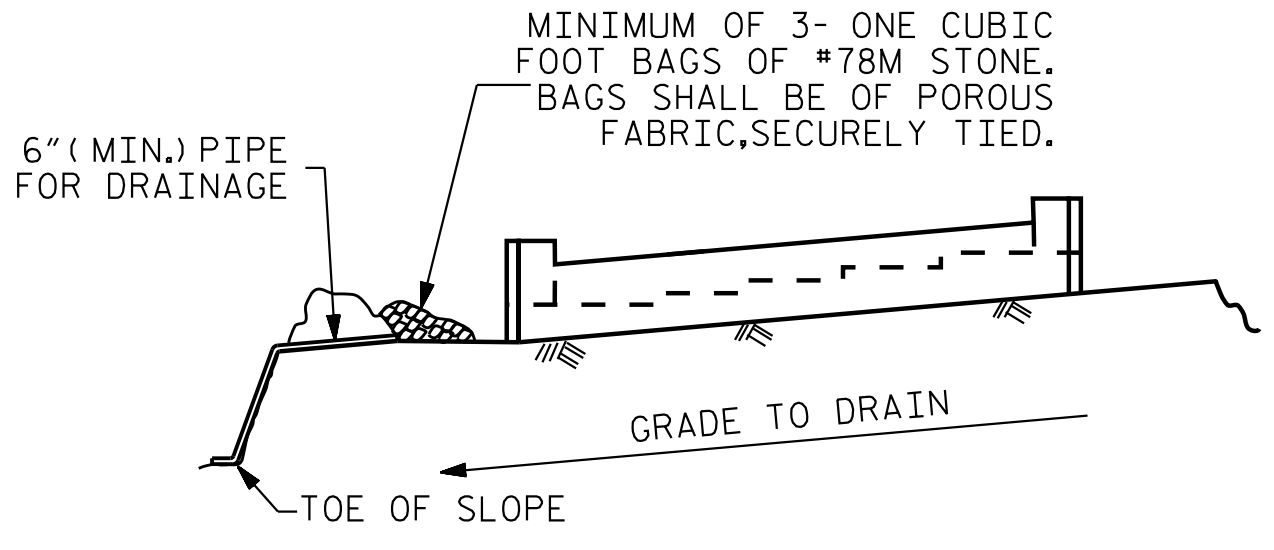
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DRAWN BY: J.E. HAGENBUSH DATE: 12/09/22  
 CHECKED BY: J.T. KELVINGTON DATE: 12/12/22  
 DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE END BENT 2 DETAILS (RL)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S9-26					TOTAL SHEETS 30

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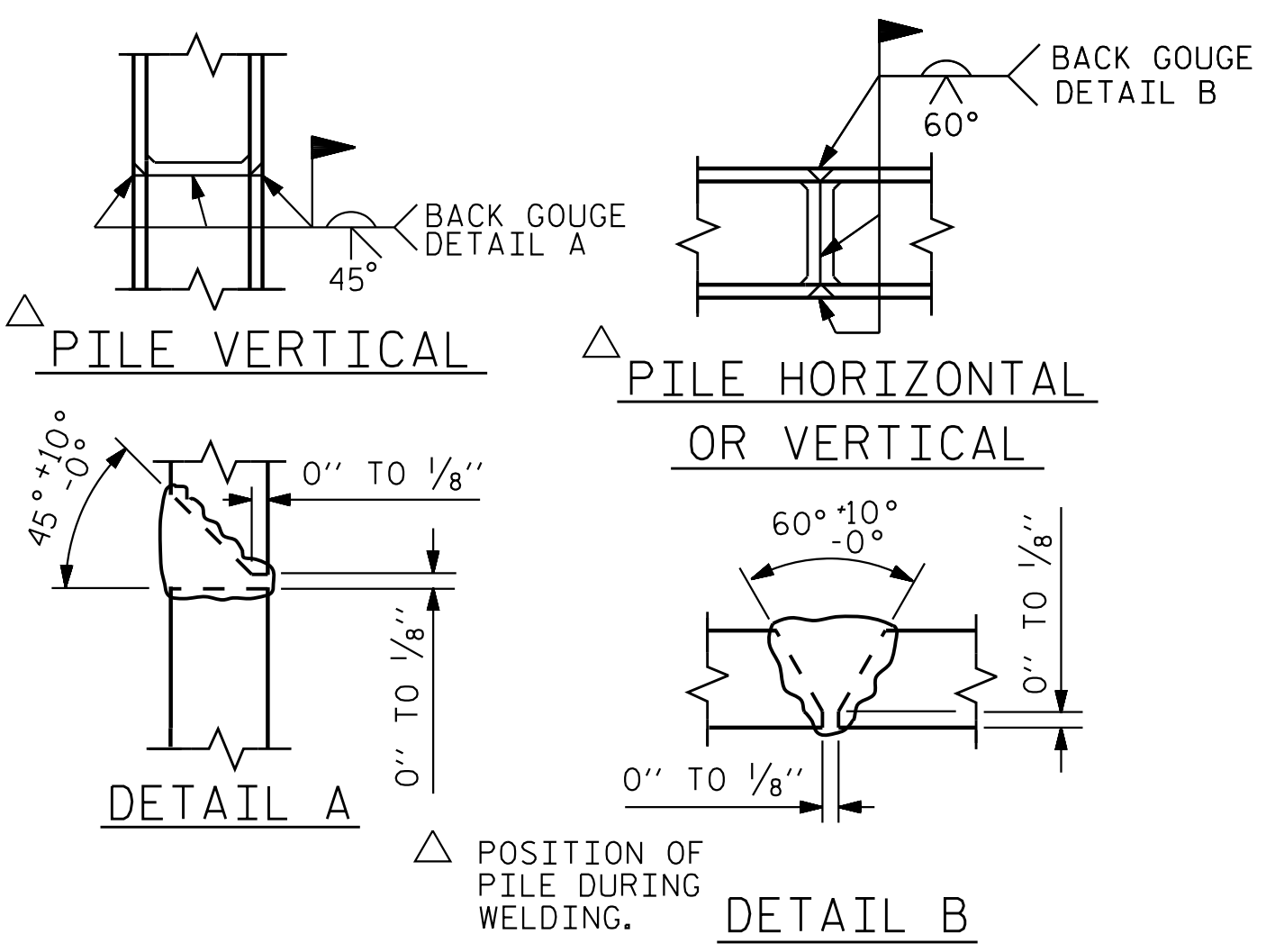


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

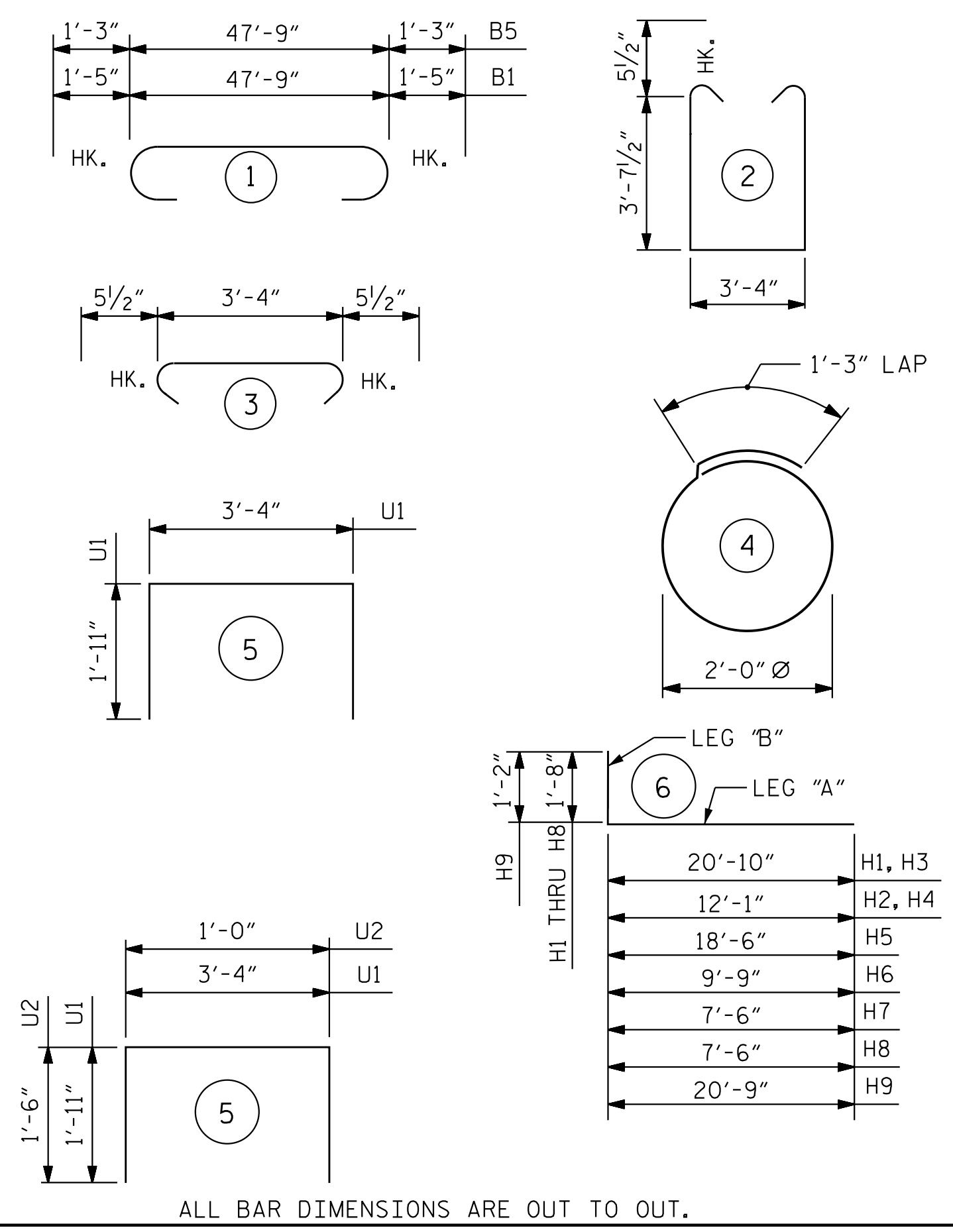
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



**PILE SPLICE DETAILS**

**BAR TYPES**



**BILL OF MATERIAL**

**END BENT 2**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	50'-7"	1306
B2	2	#10	STR	47'-3"	407
B3	8	#4	STR	24'-4"	133
B4	6	#6	STR	46'-11"	432
B5	6	#9	1	50'-3"	1025
B6	20	#4	STR	3'-4"	45
B7	6	#4	STR	29'-11"	122
B8	6	#4	STR	18'-11"	78
B9	6	#4	STR	7'-11"	34
H1	18	#7	6	22'-6"	828
H2	8	#6	6	13'-9"	165
H3	13	#5	6	22'-6"	305
H4	12	#5	6	13'-9"	172
H5	10	#7	6	20'-2"	412
H6	4	#6	6	11'-5"	69
H7	10	#7	6	9'-2"	187
H8	4	#6	6	9'-2"	55
H9	2	#7	6	21'-11"	90
K1	8	#4	STR	2'-9"	15
K2	28	#4	STR	5'-10"	109
S1	64	#5	2	11'-6"	768
S2	56	#5	3	4'-3"	248
S3	32	#4	4	7'-7"	162
U1	30	#4	5	7'-2"	144
U2	9	#4	5	4'-0"	24
V1	74	#5	STR	7'-6"	579
V2	20	#5	STR	11'-1"	231
V3	34	#5	STR	11'-10"	420
V4	11	#5	STR	11'-0"	126
V5	11	#5	STR	11'-9"	135

REINFORCING STEEL	LBS. 8,822
POUR#1: CAP, COLLARS, WINGS	C.Y. 36.1
POUR#2: UPPER WINGS	C.Y. 18.1
CLASS A CONCRETE TOTAL	C.Y. 54.2

PROJECT NO. R-2707D

CLEVELAND COUNTY

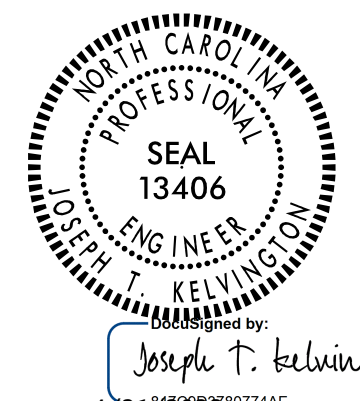
STATION: 810+00.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**END BENT 2 DETAILS**

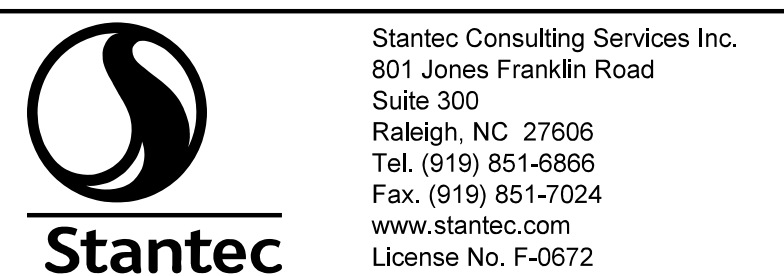
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REVISIONS						SHEET NO. S9-27	TOTAL SHEETS 30
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2			4				

STR. #9



DRAWN BY : N. D'AIUTO DATE : 05/09/18

CHECKED BY : T. N. ENNIS DATE : 08/27/18

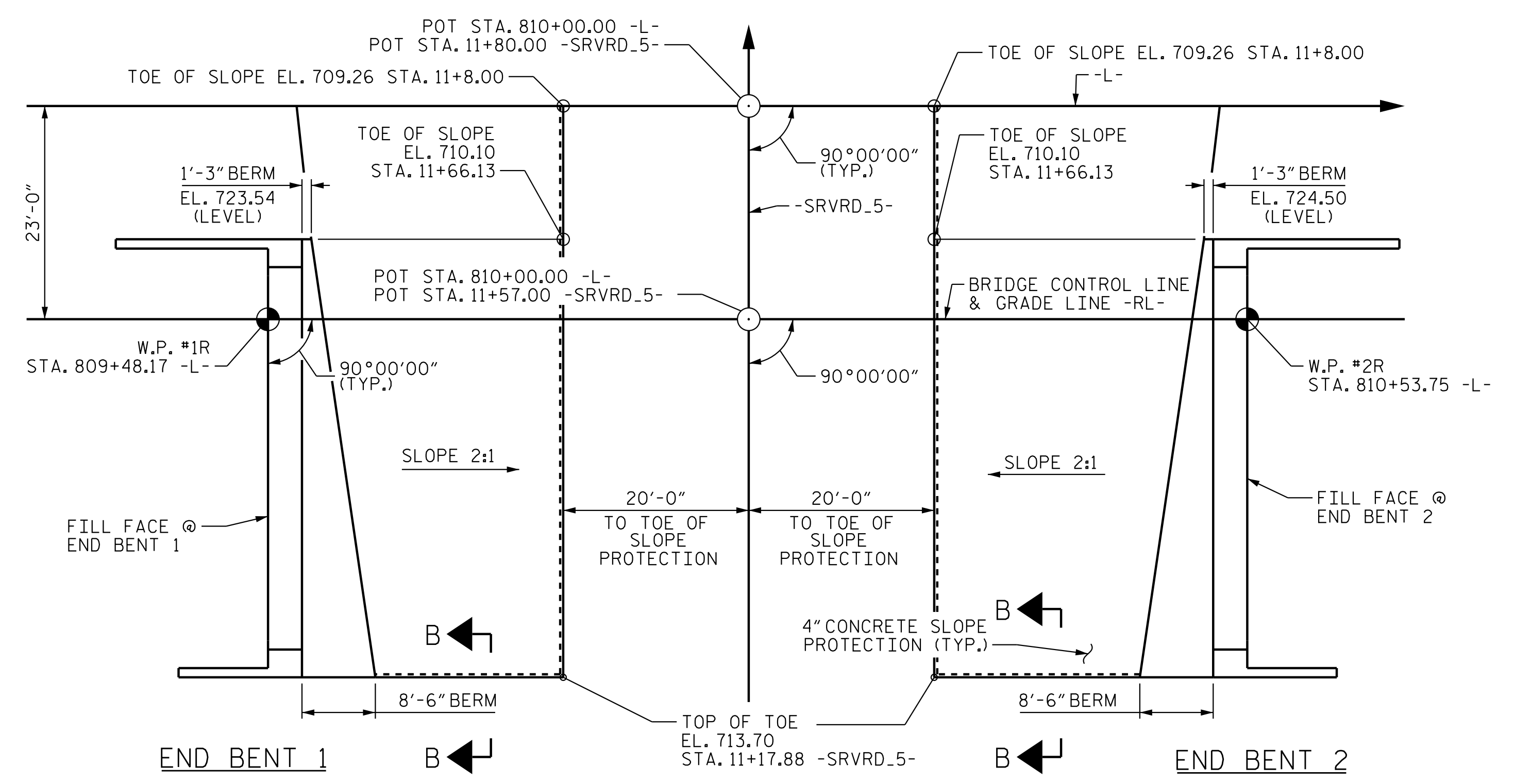
DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

jHogenbush

4/21/2023

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**GENERAL NOTES**

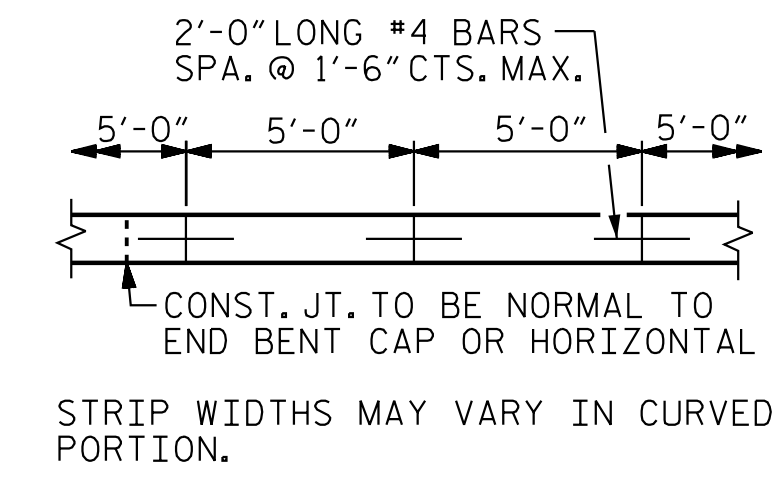
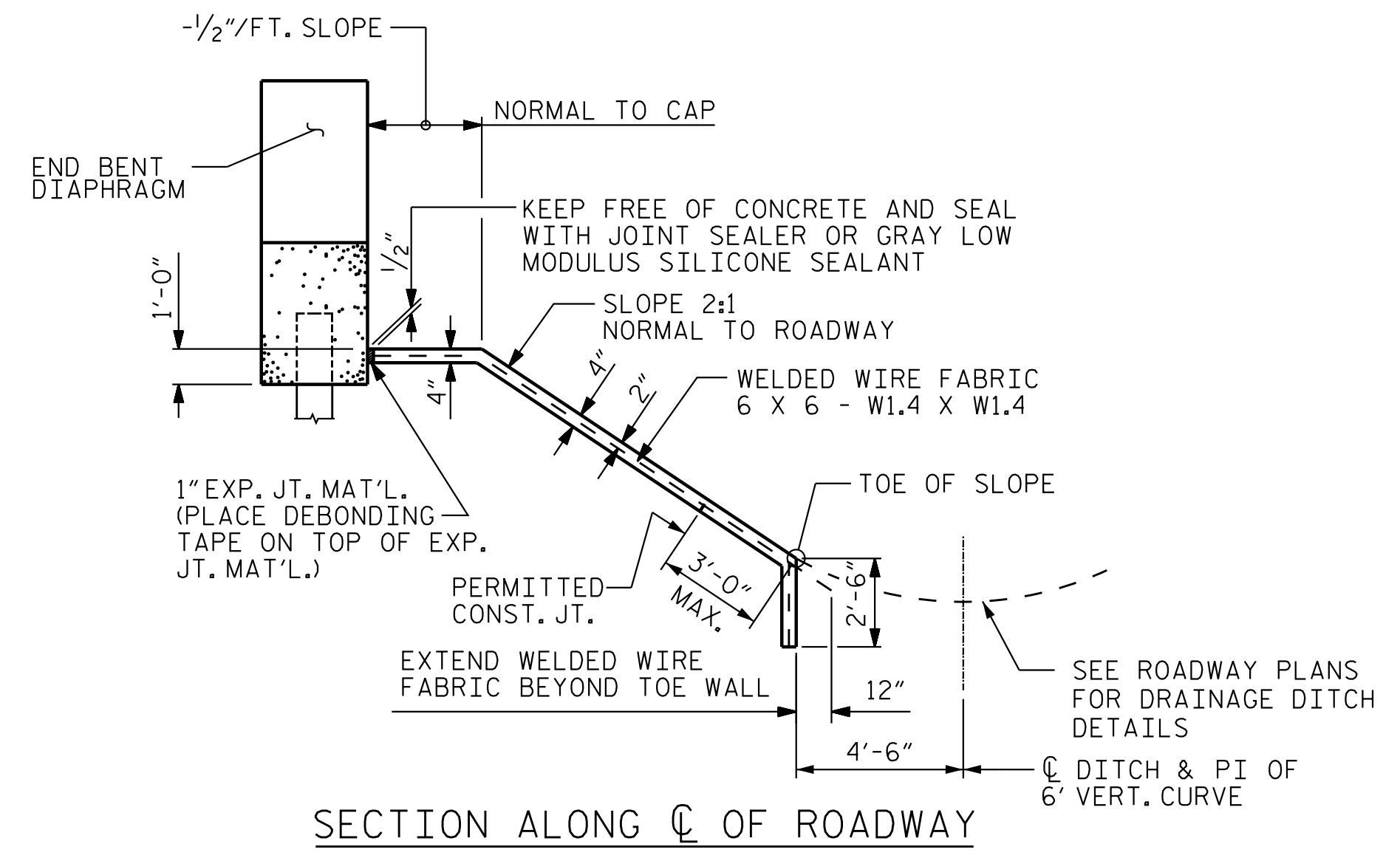
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION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

**ALTERNATE "A"**

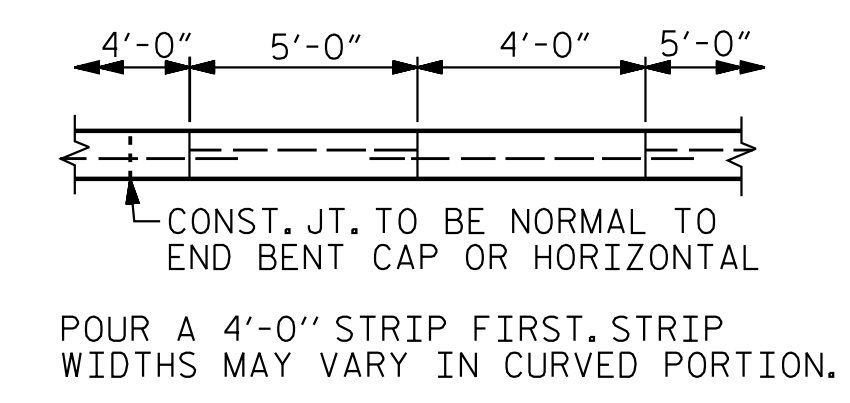
ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE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

BRIDGE @ STA. 810+00.00 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	215	388
END BENT 2	230	415

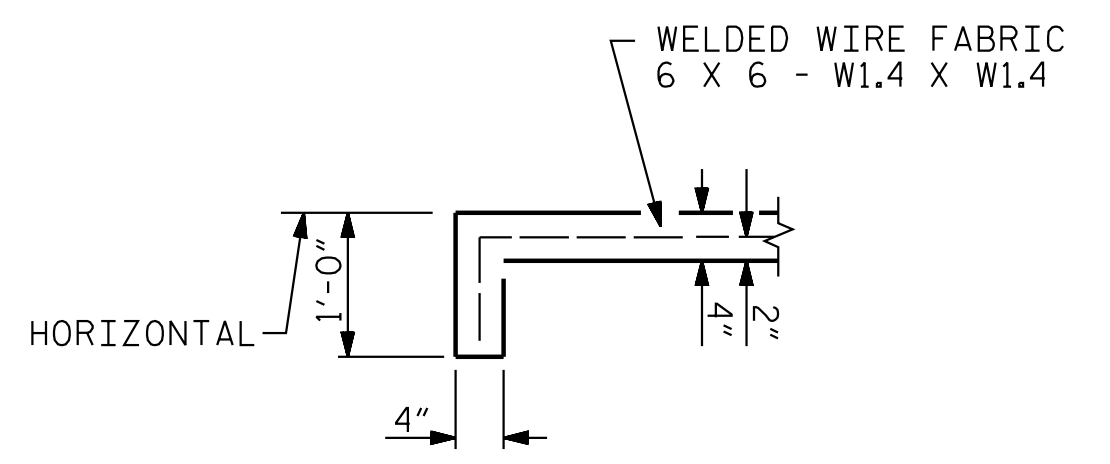
\* QUANTITY SHOWN IS BASED ON 5' POURS.



**POURING DETAIL**

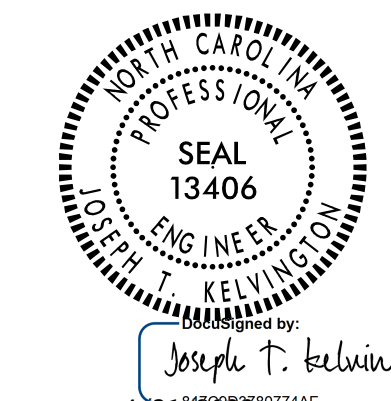


**OPTIONAL POURING DETAIL**



**SECTION B-B  
DETAILS FOR ALTERNATE "A"**

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SLOPE PROTECTION  
 DETAILS**

(RL)

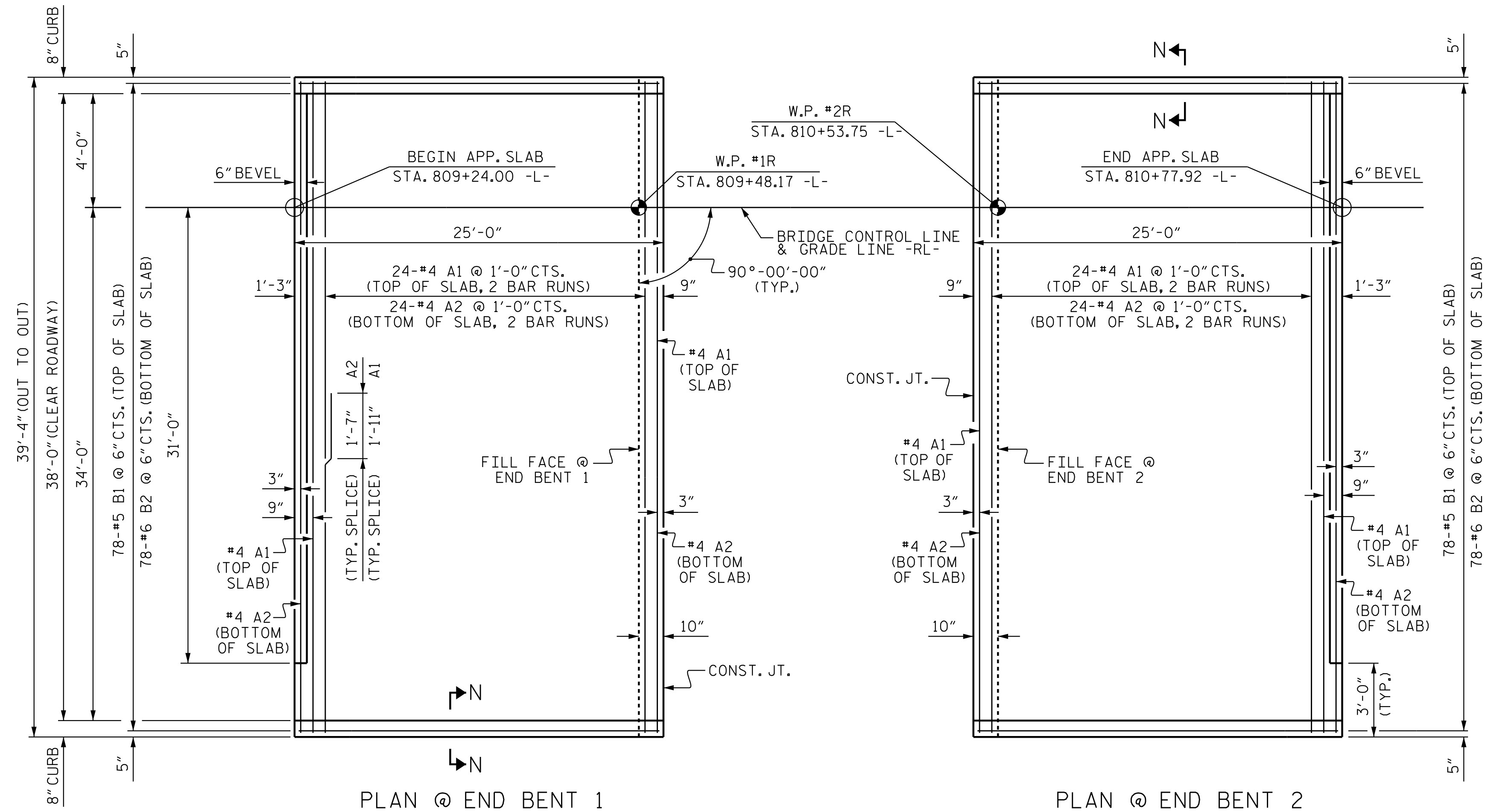
REVISIONS						SHEET NO. S9-28
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 30
2			4			

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

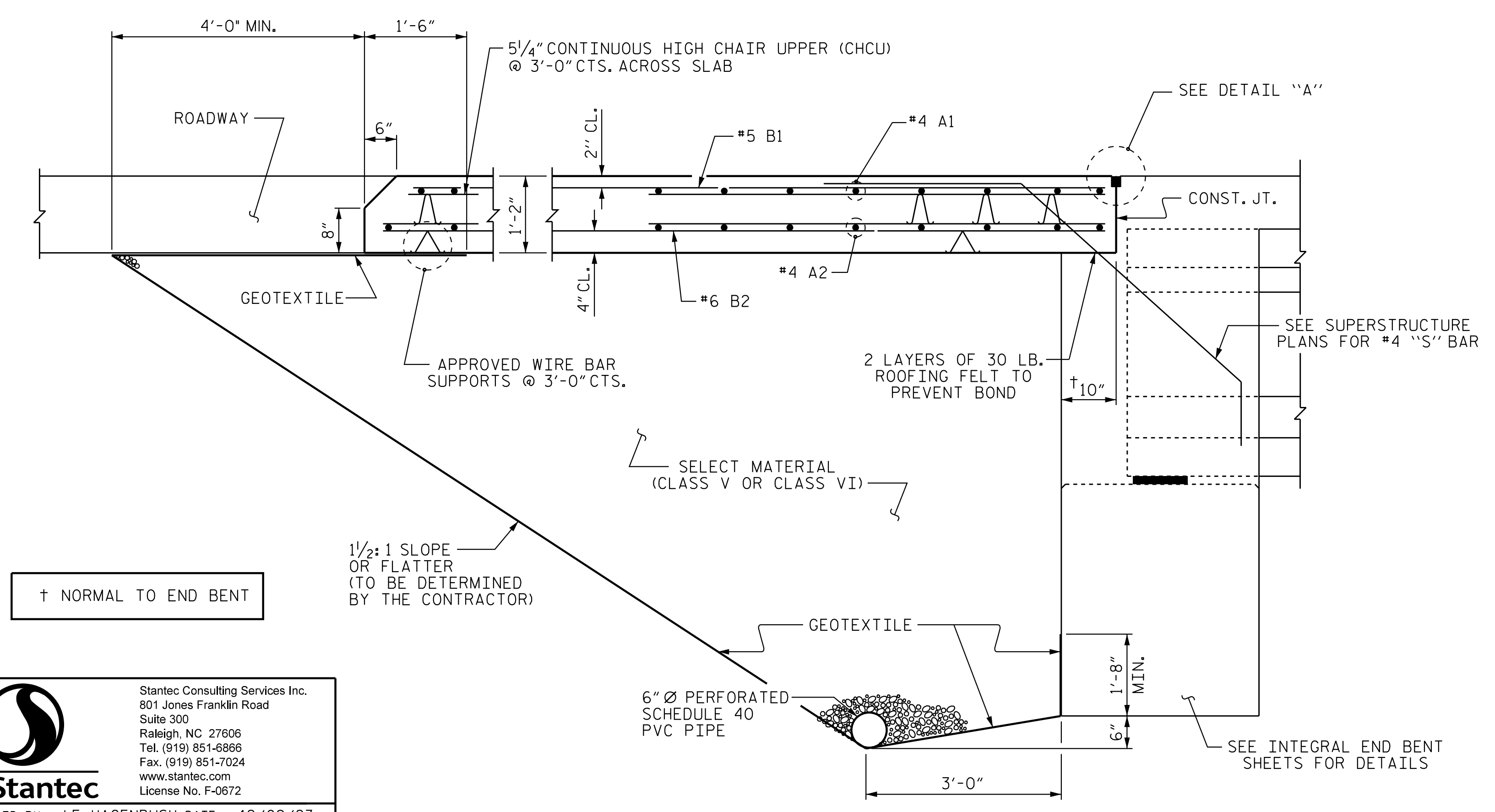
Stantec Consulting Services Inc.  
 801 Jones Franklin Road  
 Suite 300  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0672

DRAWN BY : N. D'AIUTO DATE : 05/09/18  
 CHECKED BY : J.T. KELVINGTON DATE : 12/31/22  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

4/21/2023 jHagenbush



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



SECTION THRU SLAB  
 (TYPE I - STANDARD APPROACH FILL)

**Stantec**  
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ASSEMBLED BY : J.E. HAGENBUSH DATE : 12/09/23  
 CHECKED BY : J.T. KELVINGTON DATE : 12/12/23  
 DRAWN BY : TLA 10/05  
 CHECKED BY : GM 5/06  
 REV. 12/21/11 MAA/GM  
 REV. 6/13 MAA/GM  
 REV. 12/17 MAA/THC  
 DESIGN ENGINEER OF RECORD : J.T. KELVINGTON DATE : 04/21/23

**NOTES**

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.
- AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

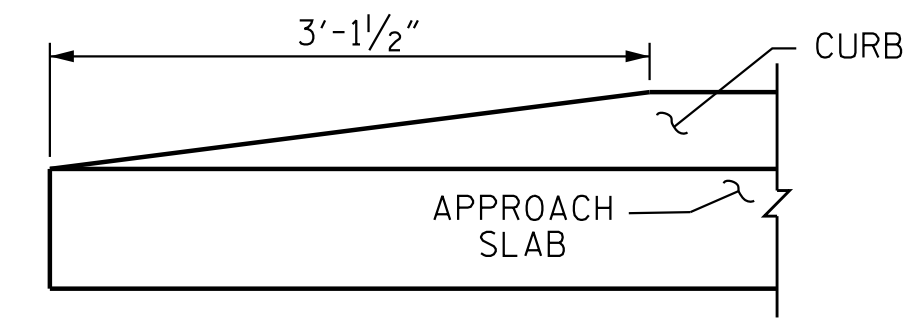
**BILL OF MATERIAL**

FOR ONE APPROACH SLAB (2 REQ'D)

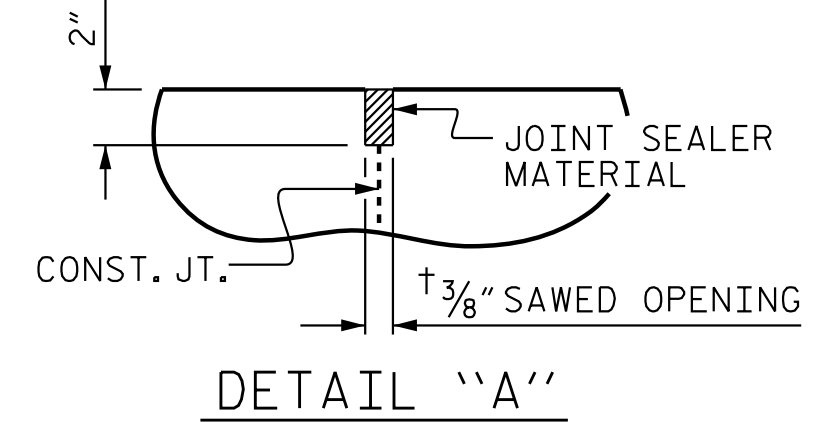
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	20'-6"	712
A2	52	#4	STR	20'-5"	709
* B1	78	#5	STR	24'-2"	1966
B2	78	#6	STR	24'-8"	2890
REINFORCING STEEL				LBS.	3,599
* EPOXY COATED REINFORCING STEEL				LBS.	2,678
CLASS AA CONCRETE				C. Y.	42.5

**SPLICE LENGTHS**

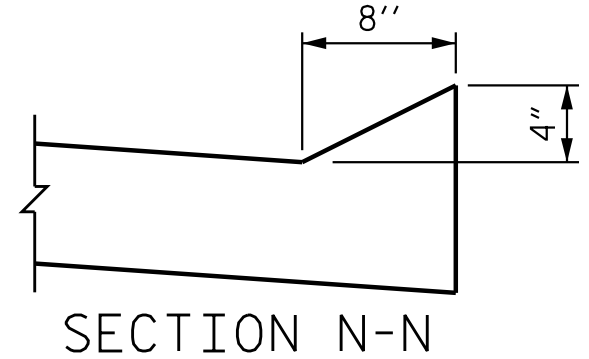
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



END OF CURB WITHOUT SHOULDER BERM GUTTER



DETAIL "A"

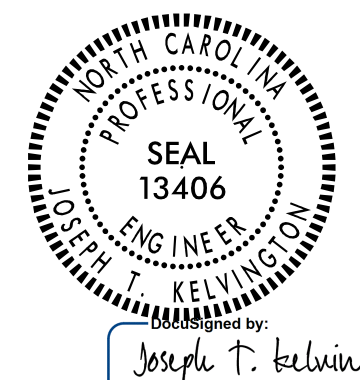


SECTION N-N

PROJECT NO. R-2707D  
CLEVELAND COUNTY  
 STATION: 810+00.00 -L-

SHEET 1 OF 2

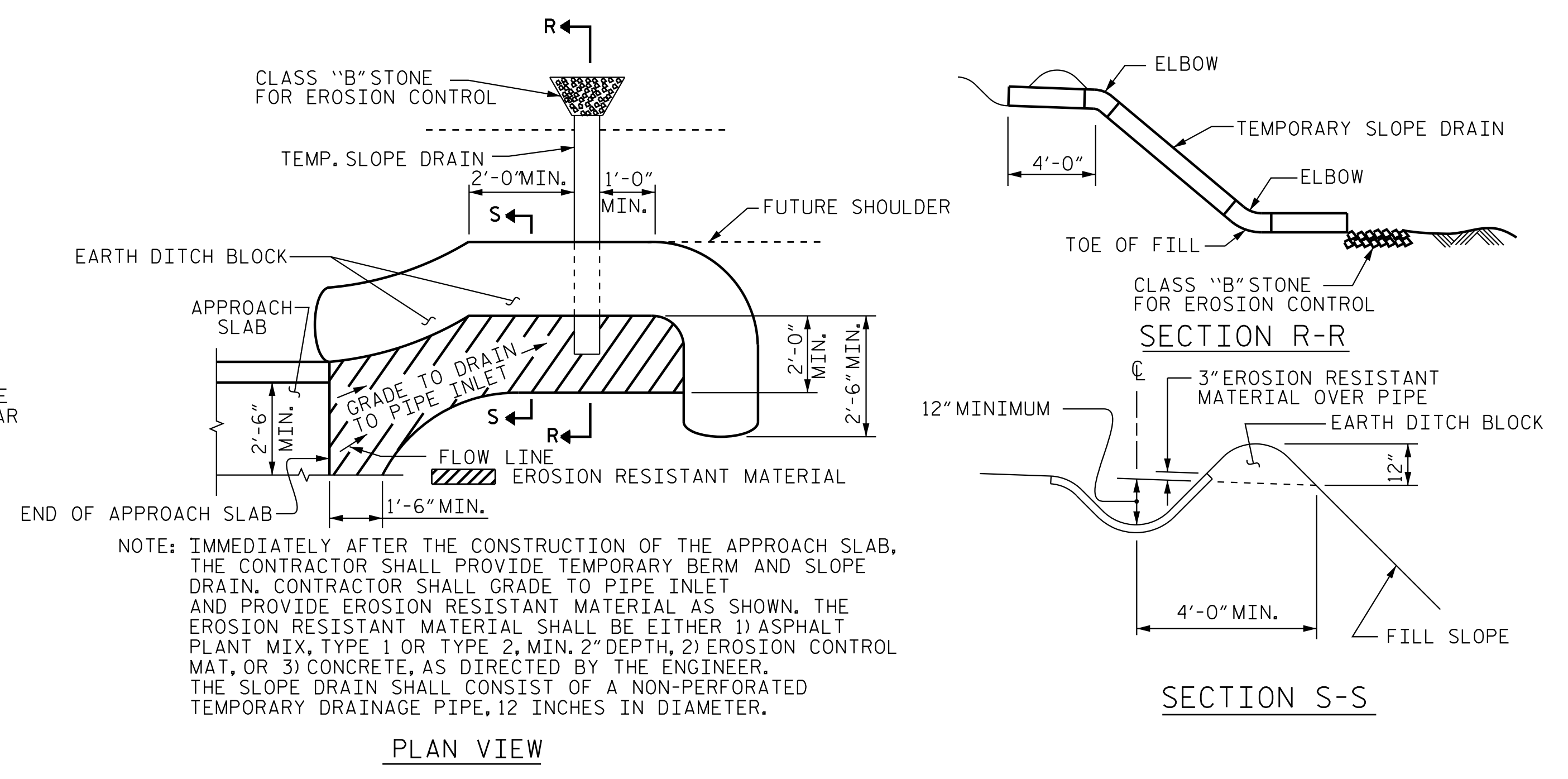
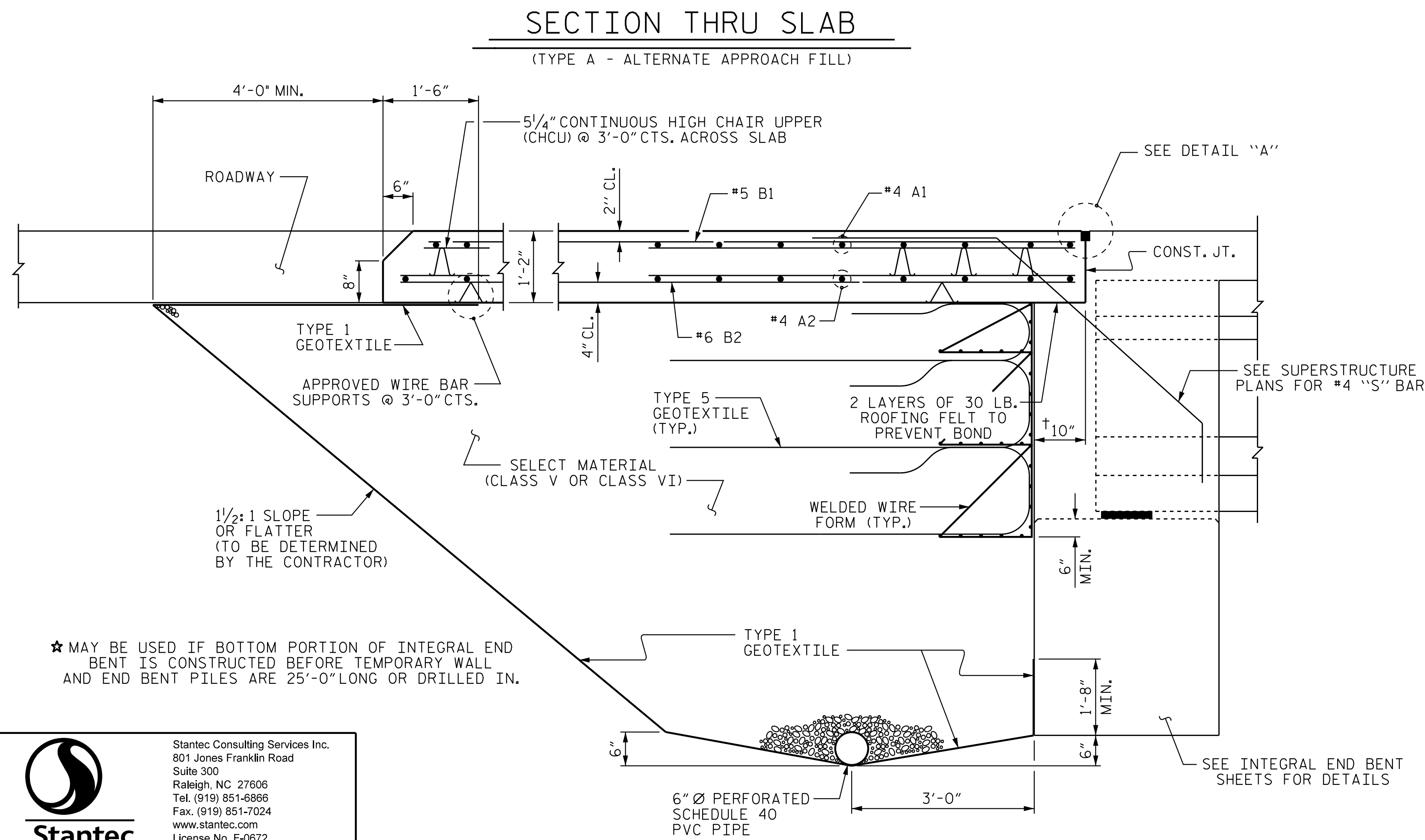
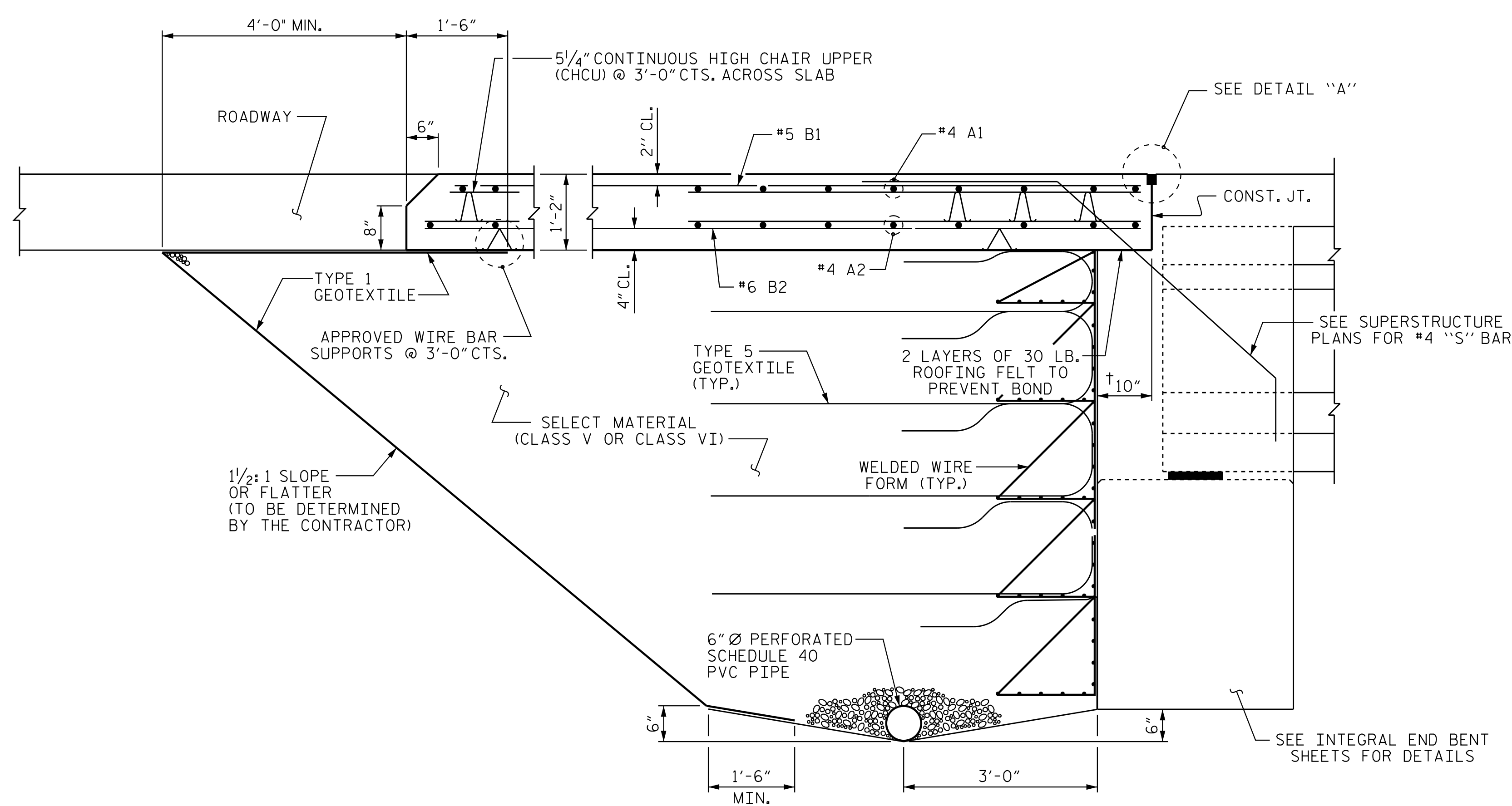
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT  
 WITH FLEXIBLE PAVEMENT



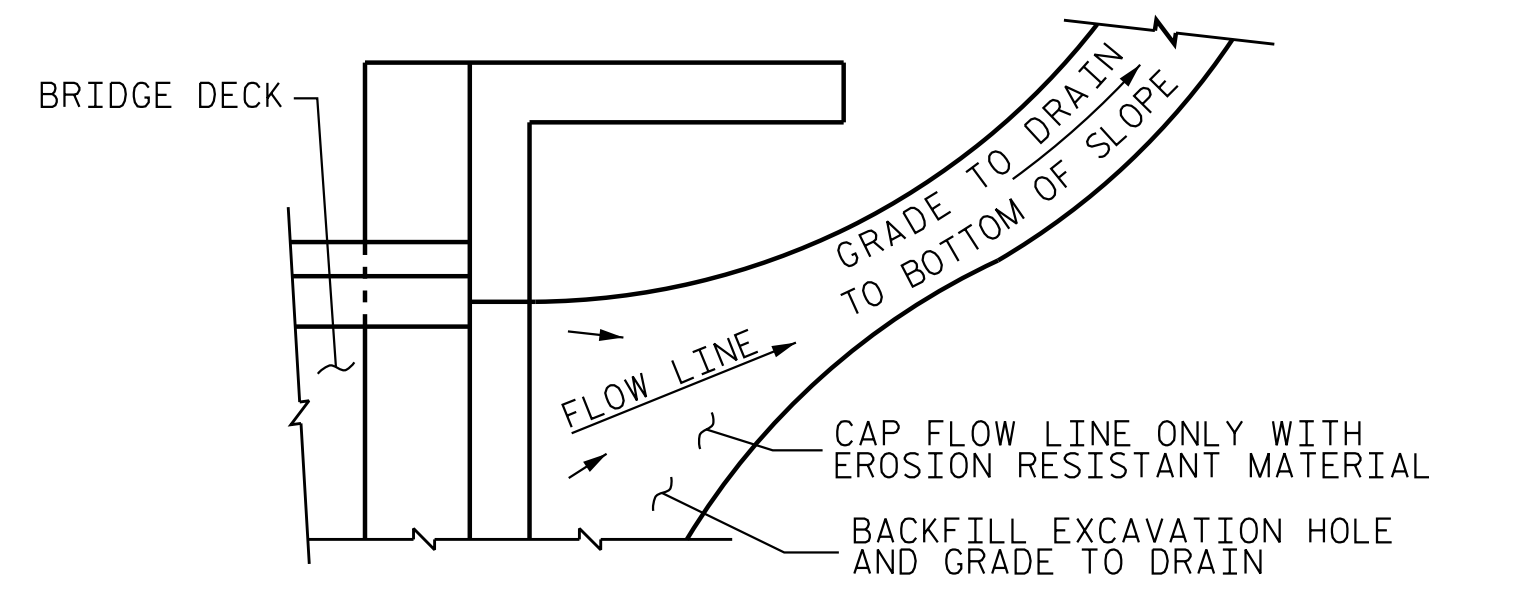
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1			3			TOTAL SHEETS 30
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TEMPORARY BERM AND SLOPE DRAIN DETAILS  
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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-2707D  
CLEVELAND COUNTY  
STATION: 810+00.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
BRIDGE APPROACH  
SLAB DETAILS  
(RL)



REVISIONS						SHEET NO. S9-30
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REV. 12/17 MAA/THC  
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE: 04/21/23

SECTION THRU SLAB  
(TYPE A - ALTERNATE APPROACH FILL)

# STANDARD NOTES

## DESIGN DATA:

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

## MATERIAL AND WORKMANSHIP:

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

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

## CONCRETE:

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

## CONCRETE CHAMFERS:

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

## DOWELS:

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

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

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

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

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

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

## REINFORCING STEEL:

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

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

## STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 1/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 1/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 1/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 1/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 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 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