

HORIZONTAL CURVE DATA -I73-

P.I. STA. = 180+84.12
 $\Delta = 104^\circ-01'-52.6"$ (RT.)
 $D = 0^\circ-45'-00.0"$
 $L = 13,870.84'$
 $T = 9,783.54'$
 $R = 7,639.44'$
 $S.E. = 0.03$

GRADE DATA -I73-

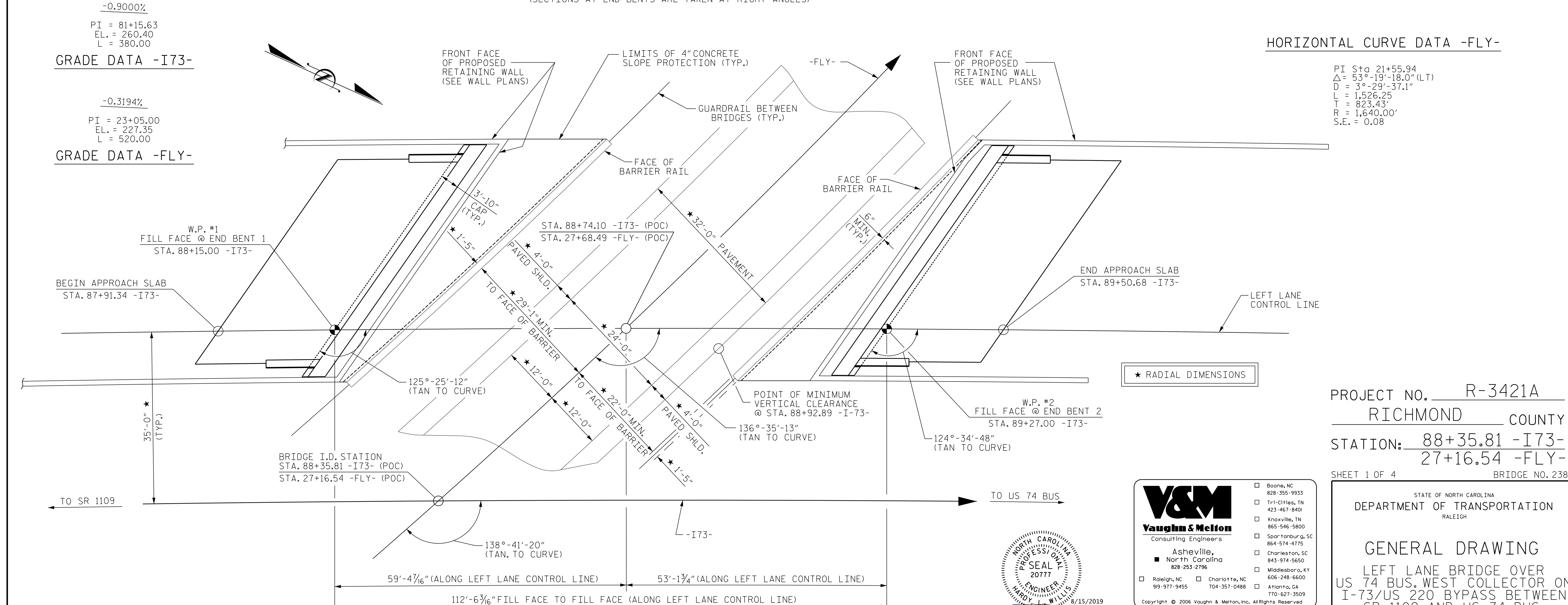
-0.9000%
 P.I. = 81+15.63
 EL. = 260.40
 L = 380.00

GRADE DATA -FLY-

-0.3194%
 P.I. = 23+05.00
 EL. = 227.35
 L = 520.00

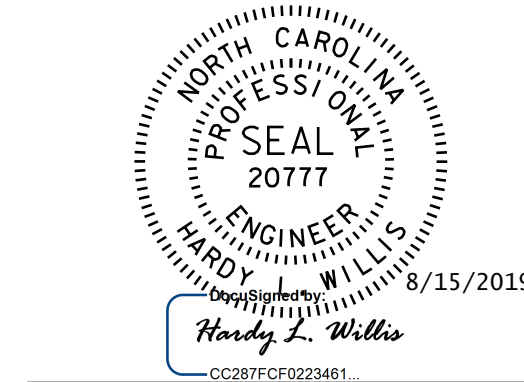
HORIZONTAL CURVE DATA -FLY-

P.I. Sta 21+55.94
 $\Delta = 53^\circ-19'-18.0"$ (LT)
 $D = 3^\circ-29'-37.1"$
 $L = 1,526.25'$
 $T = 823.43'$
 $R = 1,640.00'$
 $S.E. = 0.08$



NOTES:

END BENTS ARE PARALLEL.
 FOR CLARITY, PILES ARE NOT SHOWN IN PLAN VIEW.



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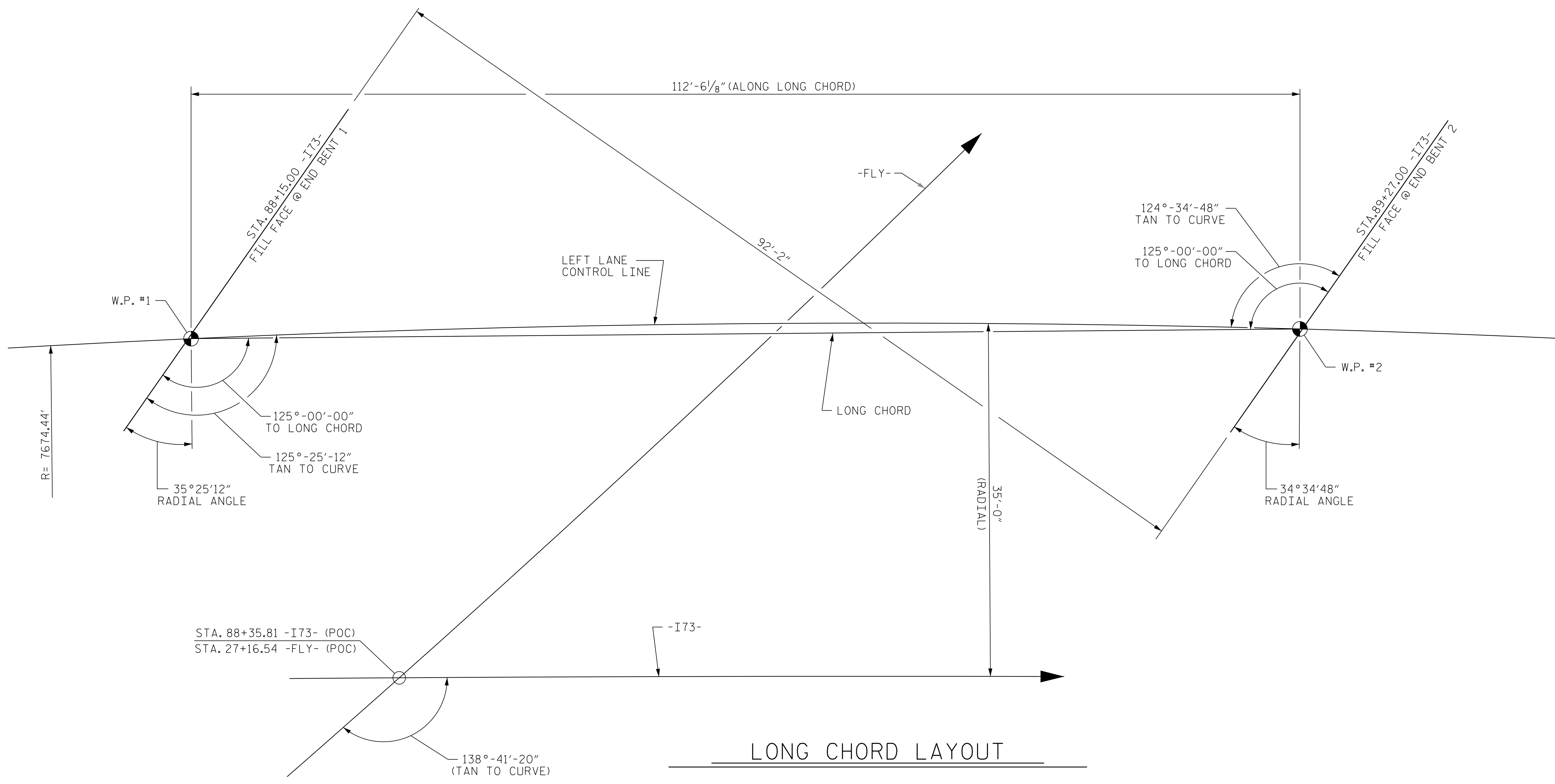
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PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 88+35.81 -I73-
27+16.54 -FLY-
 SHEET 1 OF 4 BRIDGE NO. 238

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 LEFT LANE BRIDGE OVER
 US 74 BUS. WEST COLLECTOR ON
 I-73/US 220 BYPASS BETWEEN
 SR 1109 AND US 74 BUS.

SHEET 1 OF 26		DWN. BY: MAF		DATE: 9/15		NO.		BY:		DATE:		SHEET NO.	
CHKD. BY: HLW		DATE: 9/15		DATE: 9/15		1		3				S01-1	
DES. EGR. OF RECORD: CBC		DATE: 9/15		DATE: 9/15		2		4				TOTAL SHEETS 26	



HORIZONTAL CURVE DATA -I73-

P.I. STA. = 180+84.12
 Δ = 104°-01'-52.6" (RT.)
 D = 0°-45'-00.0"
 L = 13,870.84'
 T = 9,783.54'
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 S.E. = 0.03

HORIZONTAL CURVE DATA -FLY-

P.I. STA. = 21+55.94
 Δ = 53°-19'-18.0" (LT)
 D = 3°-29'-37.1"
 L = 1,526.25'
 T = 823.43'
 R = 1,640.00'
 S.E. = 0.08

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 88+35.81 -I73-
27+16.54 -FLY-

SHEET 2 OF 4

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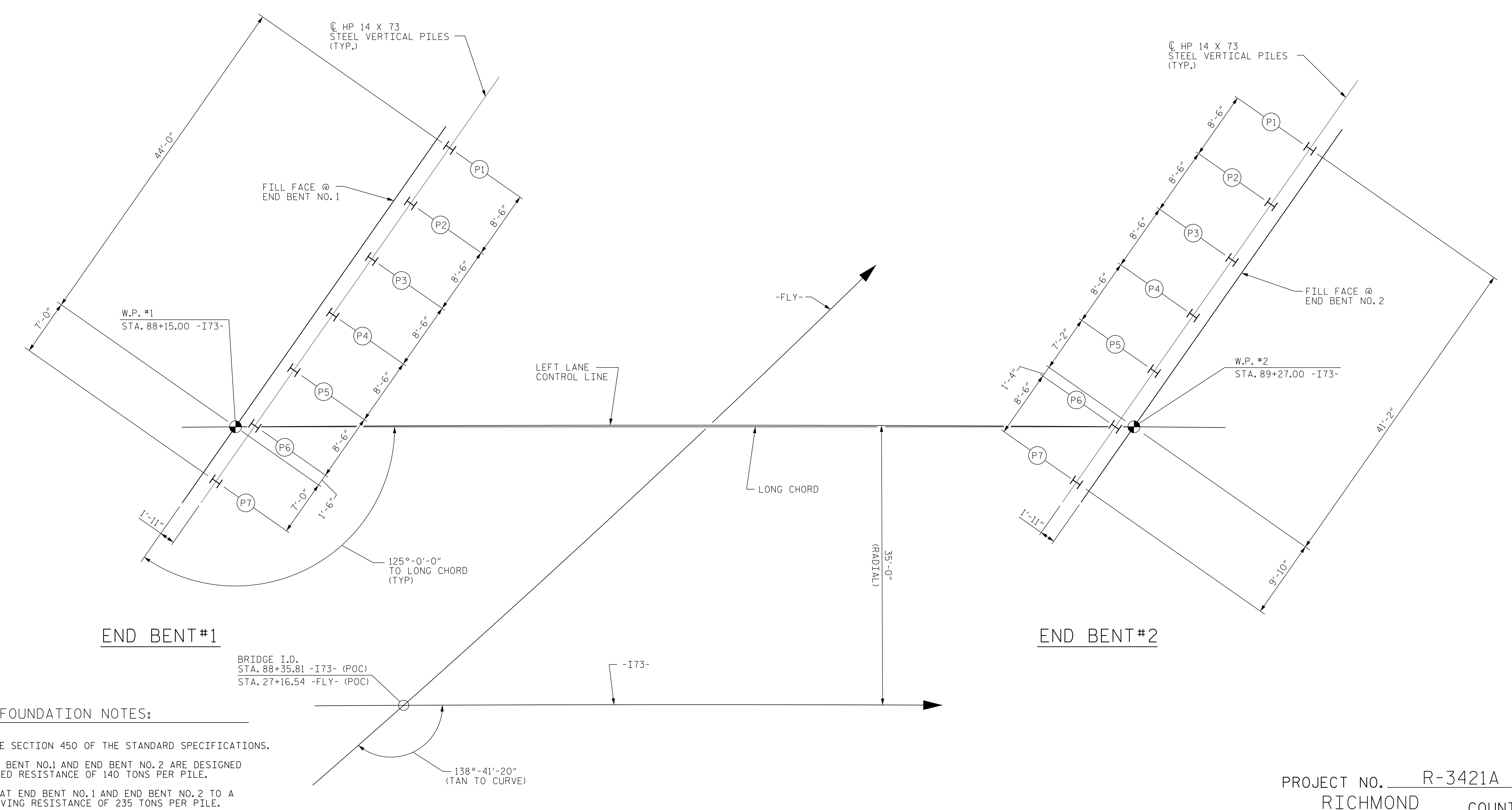
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SHEET 2 OF 26
 DWN. BY: MAF DATE: 9/15
 CHKD. BY: HLW DATE: 9/15
 DES. EGR. OF RECORD: CBC DATE: 9/15

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

LONG CHORD LAYOUT
 LEFT LANE BRIDGE OVER
 US 74 BUS. WEST COLLECTOR ON
 I-73/US 220 BYPASS BETWEEN
 SR 1109 AND US 74 BUS.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-2
1			3			TOTAL SHEETS
2			4			26



END BENT#1

END BENT#2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINES.

FOUNDATION NOTES:

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 140 TONS PER PILE.
- DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 235 TONS PER PILE.
- STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.1 AND END BENT NO.2, FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING, OR REDRIVING IS REQUIRED. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- DRILLED IN PILES ARE REQUIRED FOR END BENT NO. 2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 215 FEET. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 2

SPECIAL FOUNDATION NOTES:

INSTALL PILES AT END BENT NO.1 AND END BENT NO.2 PRIOR TO MSE WALL CONSTRUCTION.

PROJECT NO. R-3421A
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27+16.54 -FLY-

SHEET 3 OF 4

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STATE OF NORTH CAROLINA
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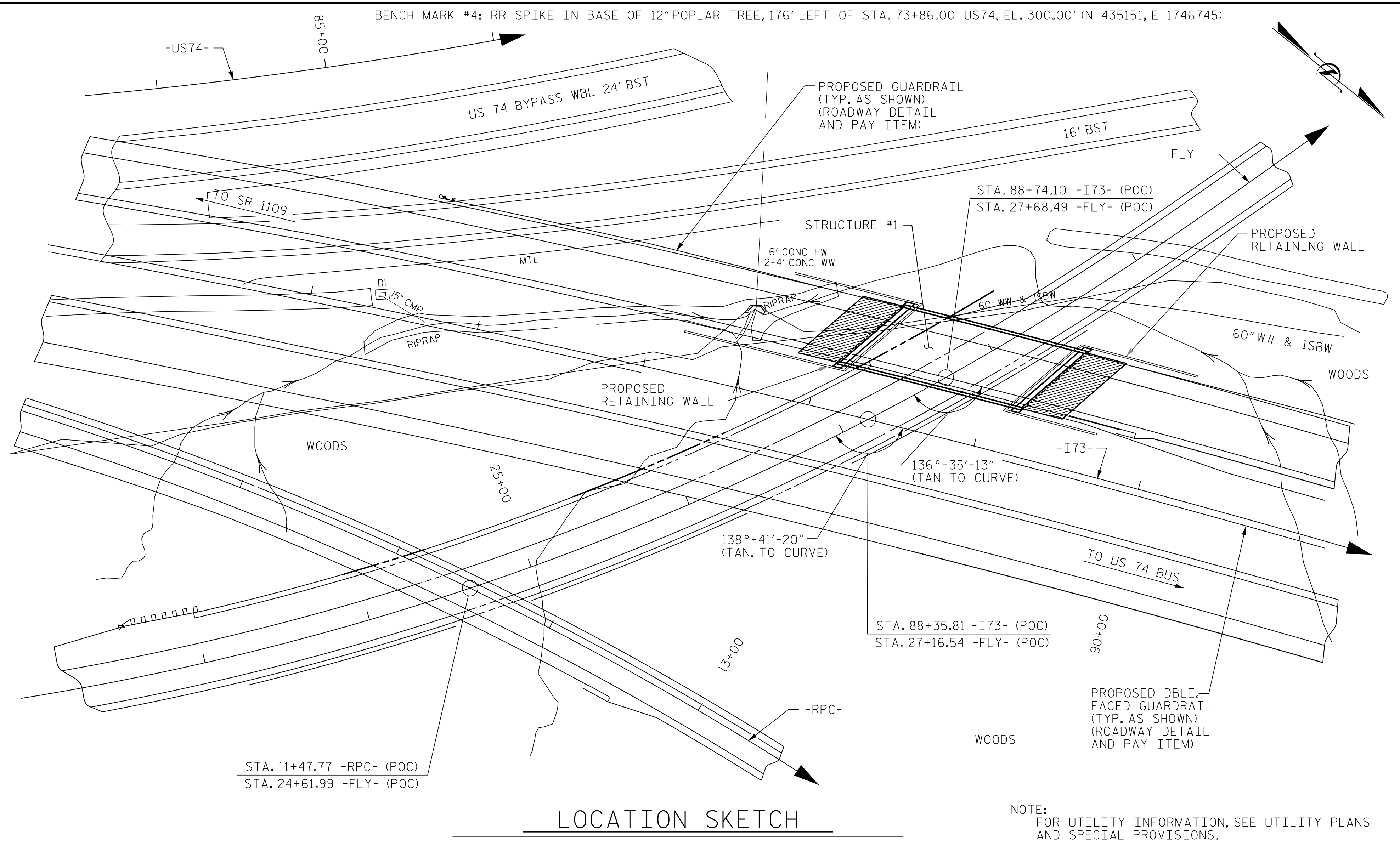
FOUNDATION LAYOUT
 LEFT LANE BRIDGE OVER
 US 74 BUS. WEST COLLECTOR ON
 I-73/US 220 BYPASS BETWEEN
 SR 1109 AND US 74 BUS.

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SHEET 3 OF 26
 DWN. BY: MAF
 CHKD. BY: HLW
 DES. EGR. OF RECORD: CBC

DATE: 9/15
 DATE: 9/15
 DATE: 9/15

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	
1			3			S01-3	
2			4			TOTAL SHEETS 26	



GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE ELEVATION AND CLEARANCE SHOWN ON THE PLANS AT THE POINT OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

WORK SHALL NOT BE STARTED ON THIS BRIDGE UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

TOTAL BILL OF MATERIAL																		
	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	PDA TESTING	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	STEEL PILE POINTS	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS		
	LIN. FT.	LIN. FT.	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	EACH	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM	
SUPERSTRUCTURE				4,746	5,850		LUMP SUM		5	538.59			261.4			LUMP SUM	LUMP SUM	
END BENT 1						49.9		6,635		7	7	280	7		66.2			
END BENT 2	5	65				48.9		6,575		7	7	210	7		43.1			
TOTAL	5	65	1	4,746	5,850	98.8	LUMP SUM	13,210	5	538.59	14	14	490	14	261.4	109.3	LUMP SUM	LUMP SUM

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 88+35.81 -I73-
27+16.54 -FLY-

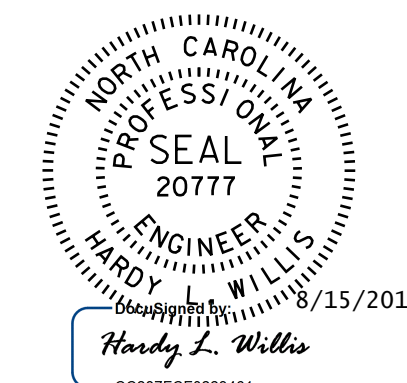
SHEET 4 OF 4

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SHEET 4 OF 26

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 DES. EGR. OF RECORD: CBC

DATE: 9/15
 DATE: 9/15
 DATE: 9/15

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 LEFT LANE BRIDGE OVER
 US 74 BUS. WEST COLLECTOR ON
 I-73/US 220 BYPASS BETWEEN
 SR 1109 AND US 74 BUS.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SO1-4
1			3			TOTAL SHEETS
2			4			26

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.11	--	1.75	0.751	1.21	A	E	53.2	0.964	1.96	A	I	5.2	0.80	0.751	1.11	A	E	53.2		
	HL-93 (OPERATING)	N/A		1.57	--	1.35	0.751	1.57	A	E	53.2	0.964	2.55	A	I	5.2	0.80	0.751	--	A	E	53.2		
	HS-20 (INVENTORY)	36.000	②	1.57	56.37	1.75	0.751	1.71	A	E	53.2	0.964	2.69	A	I	5.2	0.80	0.751	1.57	A	E	53.2		
	HS-20 (OPERATING)	36.000		2.22	79.98	1.35	0.751	2.22	A	E	53.2	0.964	3.49	A	I	5.2	0.80	0.751	--	A	E	53.2		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500		4.07	50.89	1.40	0.751	5.56	A	E	53.2	0.964	9.02	A	I	5.2	0.80	0.751	4.07	A	E	53.2	
		S3C	21.500		2.38	51.06	1.40	0.751	3.25	A	E	53.2	0.964	5.30	A	I	5.2	0.80	0.751	2.38	A	E	53.2	
		S3A	22.750		2.25	51.21	1.40	0.751	3.08	A	E	53.2	0.964	5.02	A	I	5.2	0.80	0.751	2.25	A	E	53.2	
		S4A	26.750		1.97	52.65	1.40	0.751	2.69	A	E	53.2	0.964	4.35	A	I	5.2	0.80	0.751	1.97	A	E	53.2	
		S5A	30.500		1.73	52.87	1.40	0.751	2.37	A	E	53.2	0.964	3.94	A	I	5.2	0.80	0.751	1.73	A	E	53.2	
		S6A	34.500		1.56	53.97	1.40	0.751	2.14	A	E	53.2	0.964	3.54	A	I	5.2	0.80	0.751	1.56	A	E	53.2	
		S7B	38.500		1.42	54.64	1.40	0.751	1.94	A	E	53.2	0.964	3.27	A	I	5.2	0.80	0.751	1.42	A	E	53.2	
	S7A	40.000	③	1.40	55.83	1.40	0.751	1.91	A	E	53.2	0.964	3.28	A	I	5.2	0.80	0.751	1.40	A	E	53.2		
	TRUCK-TRACTOR SEMI-TRAILER (TTST)	T4A	28.250		1.92	54.33	1.40	0.751	2.63	A	E	53.2	0.964	4.19	A	I	5.2	0.80	0.751	1.92	A	E	53.2	
		T5B	32.000		1.71	54.61	1.40	0.751	2.31	A	E	53.2	0.964	3.90	A	I	5.2	0.80	0.751	1.71	A	E	53.2	
T6A		36.000		1.54	55.46	1.40	0.751	2.11	A	E	53.2	0.964	3.55	A	I	5.2	0.80	0.751	1.54	A	E	53.2		
	T7A	40.000		1.42	56.77	1.40	0.751	1.94	A	E	53.2	0.964	3.28	A	I	5.2	0.80	0.751	1.42	A	E	53.2		
	T7B	40.000		1.49	59.67	1.40	0.751	2.04	A	E	53.2	0.964	3.14	A	I	5.2	0.80	0.751	1.49	A	E	53.2		

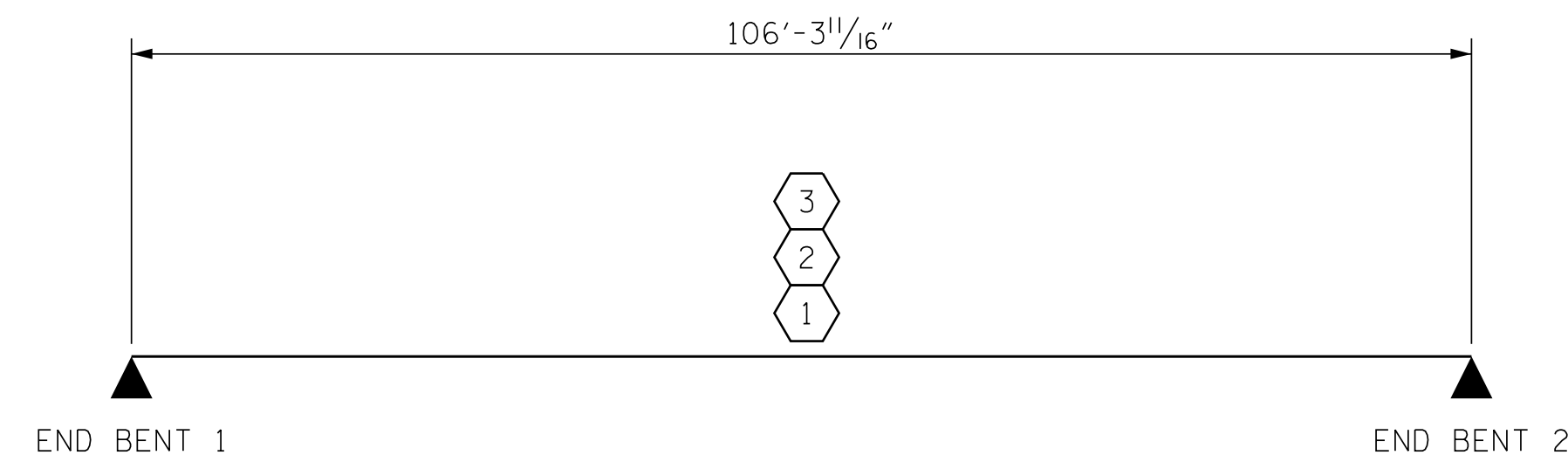
NOTES:

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.

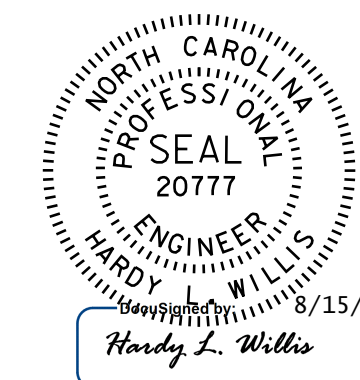
COMMENTS:

- 1.
- 2.
- 3.
- 4.

①	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



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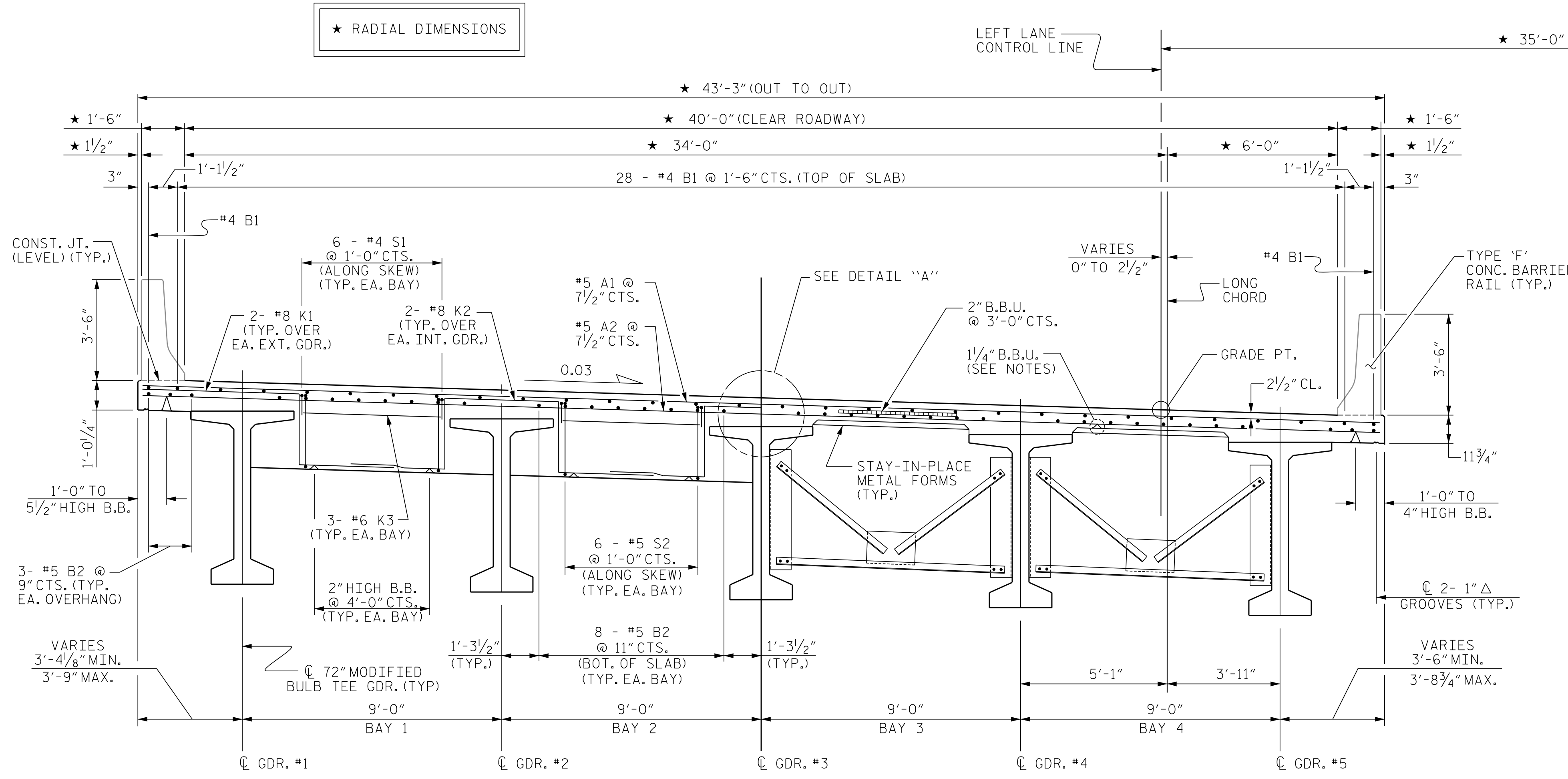
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RICHMOND COUNTY
 STATION: 88+35.81 -I73-
27+16.54 -FLY-

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

ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

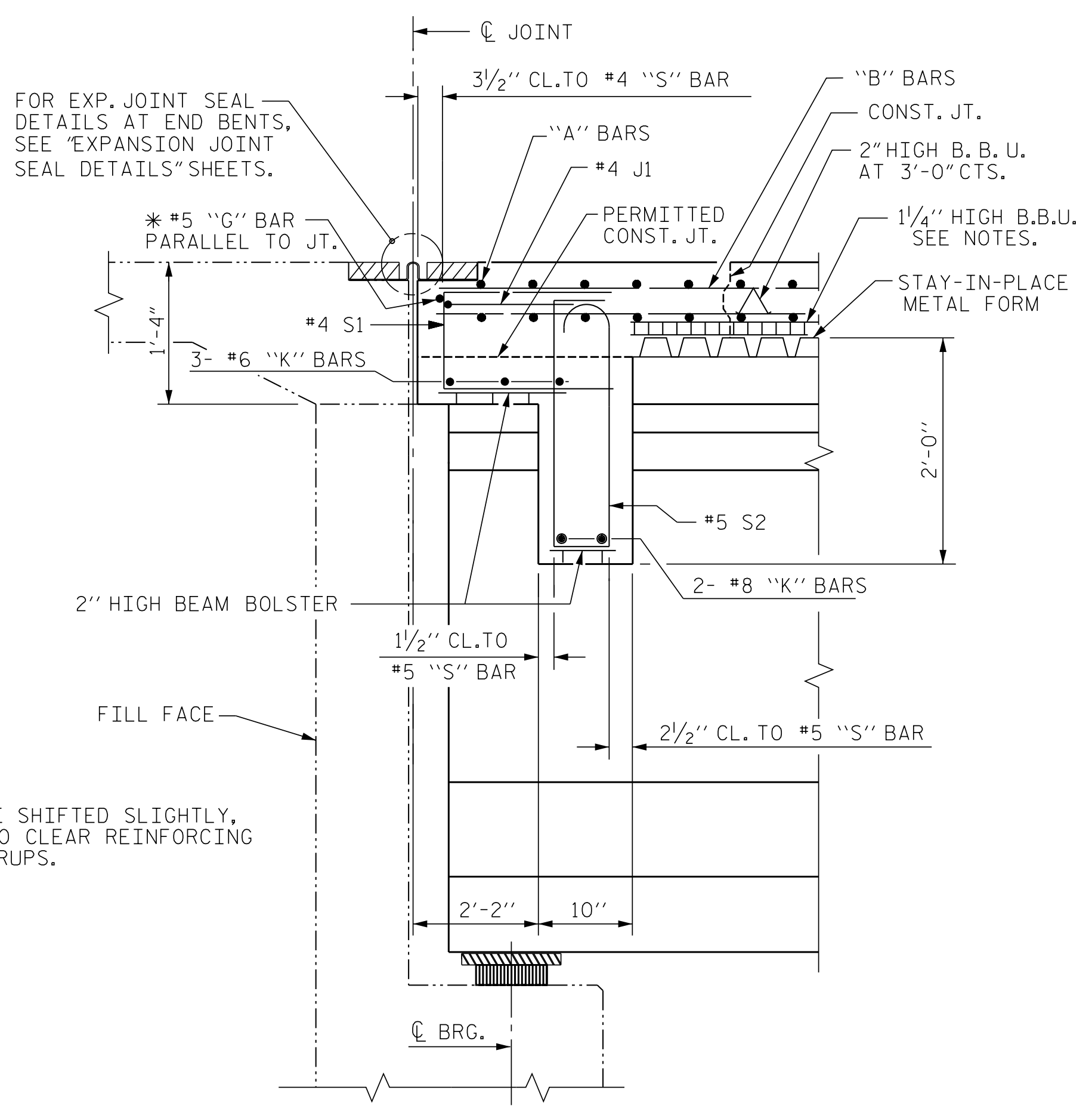
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NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S01-5
2			4			26



PART TYPICAL SECTION
SHOWING END BENT DIAPHRAGMS

PART TYPICAL SECTION
SHOWING INTERMEDIATE DIAPHRAGMS

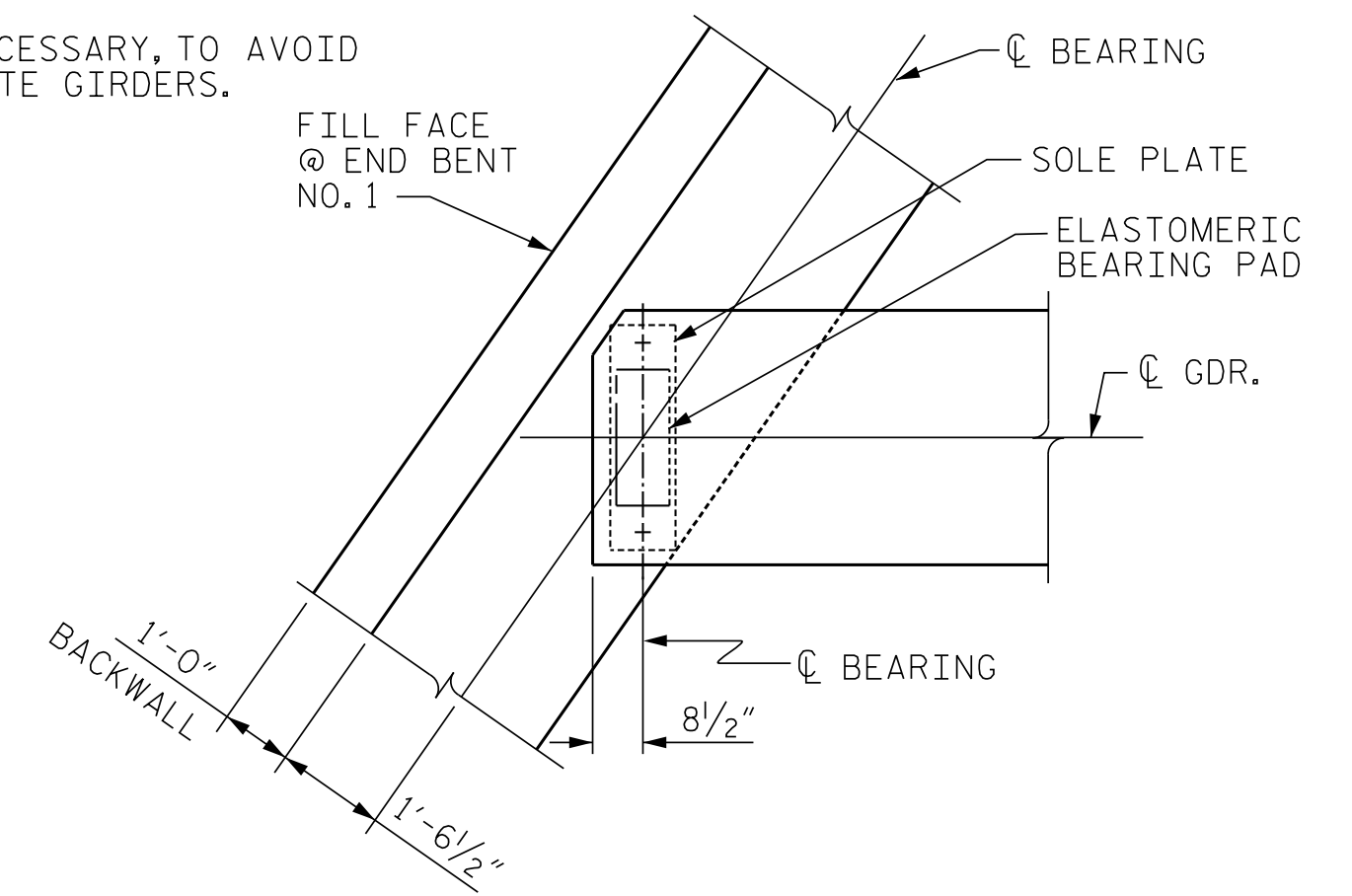
TYPICAL SECTION
SIMPLE SPAN COMPOSITE DECK ON 72" MBT PRESTRESSED CONCRETE GIRDERS.
GIRDERS ARE PARALLEL TO LONG CHORD.



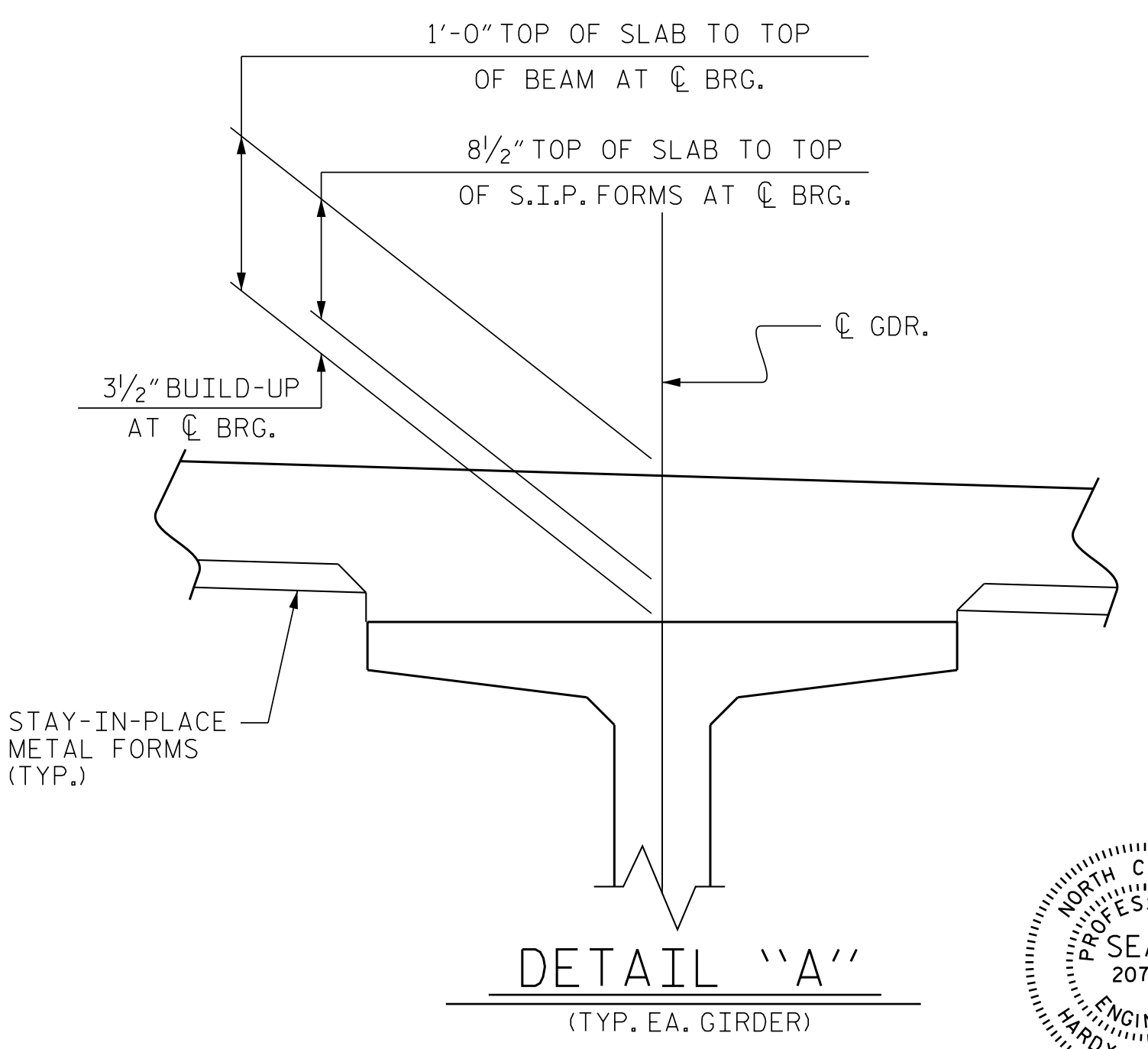
END OF GIRDER DETAIL AT END BENT

NOTES:

- PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER @ 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.
- BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000psi.
- PREVIOUSLY CAST CONCRETE SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3000psi BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.
- LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.



PLAN OF GIRDER
END BENT NO. 1 SHOWN,
END BENT NO. 2 SIMILAR.



DETAIL "A"
(TYP. EA. GIRDER)

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



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RALEIGH

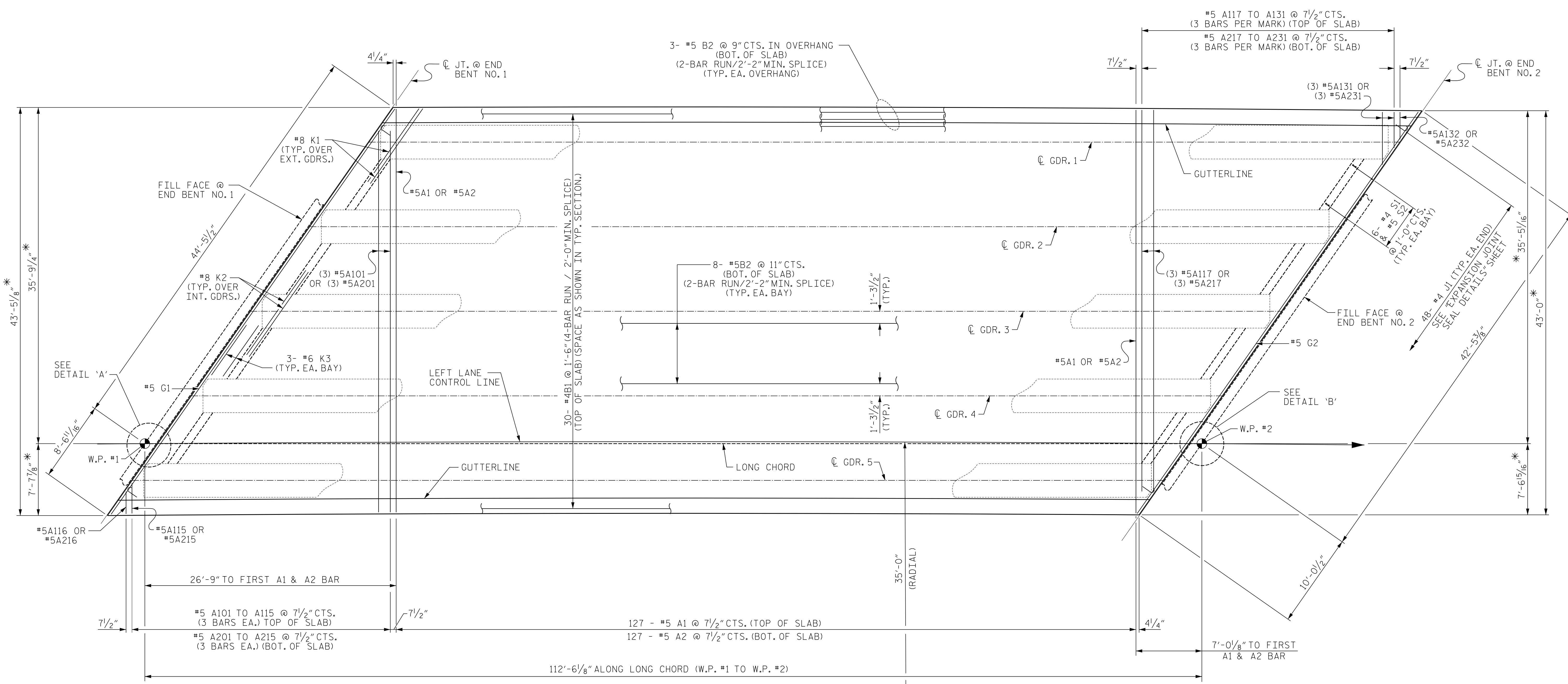
TYPICAL SECTION

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SHEET 6 OF 26
DWN. BY: MAF
CHKD. BY: HLW
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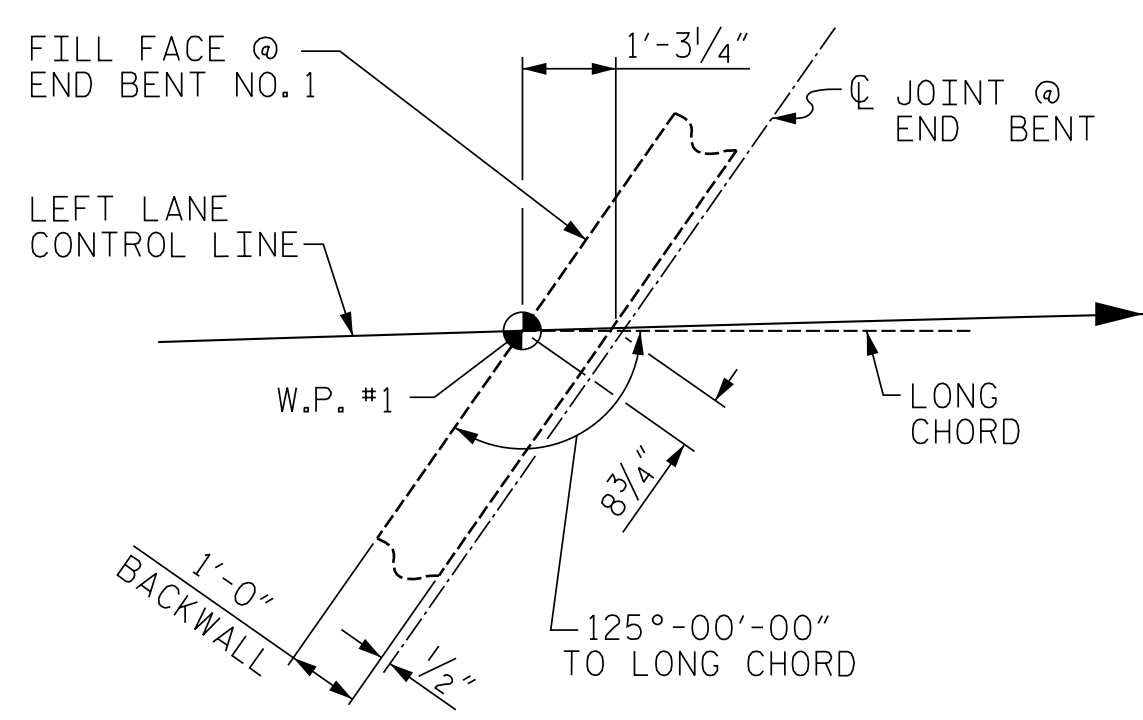
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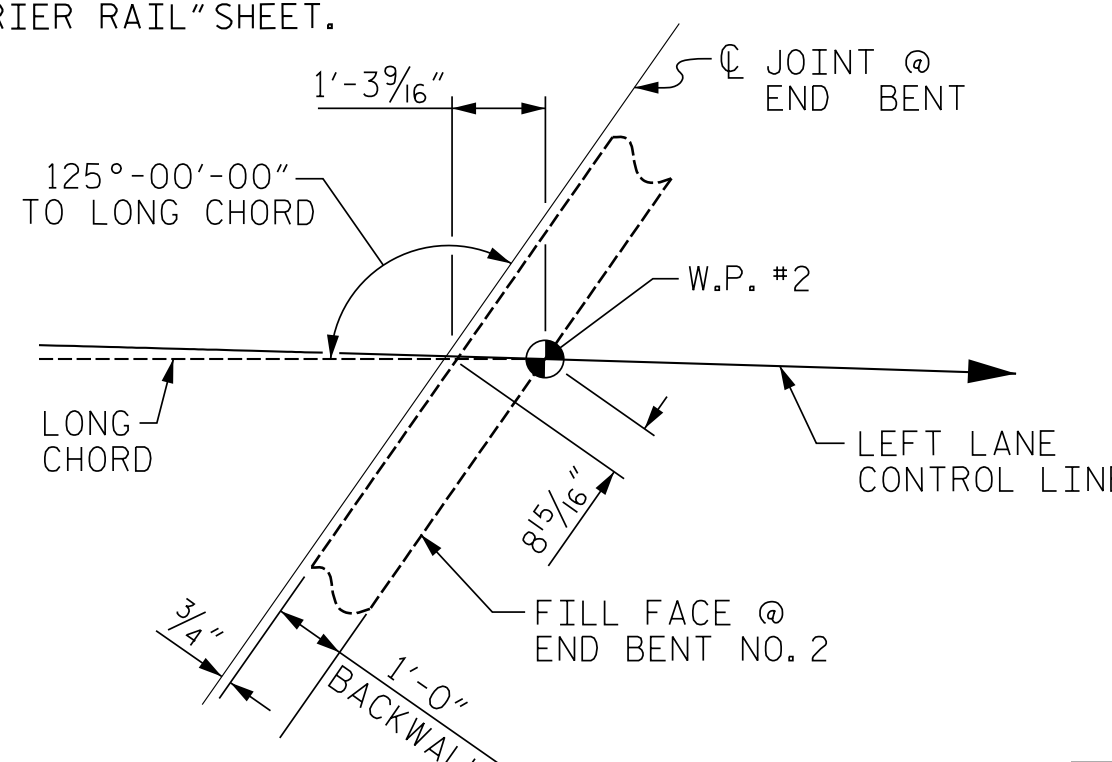
*THESE DIMENSIONS MEASURED PERPENDICULAR TO LONG CHORD.

PLAN OF SPAN

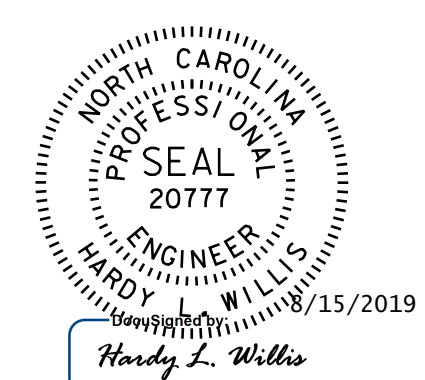
FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE 'FRAMING PLAN'.
FOR BARRIER RAIL REINFORCING STEEL AND DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET.



DETAIL 'A'



DETAIL 'B'



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RALEIGH

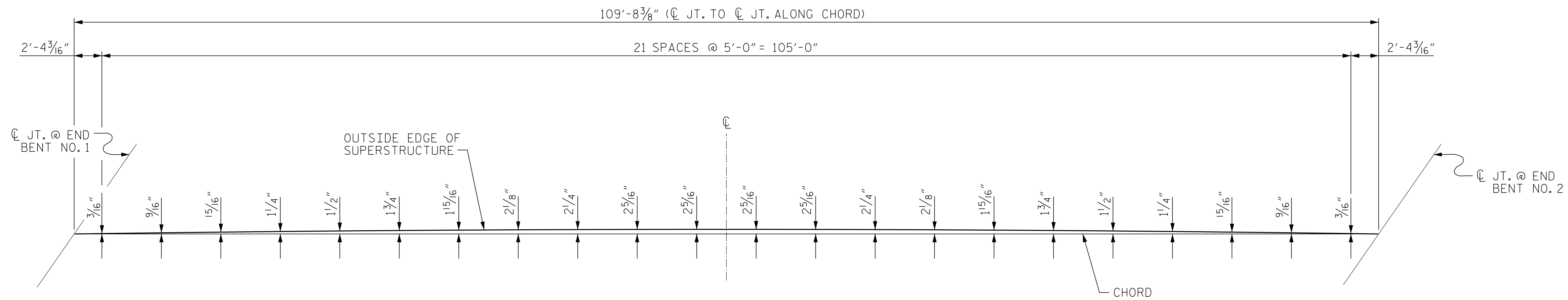
PLAN OF SPAN

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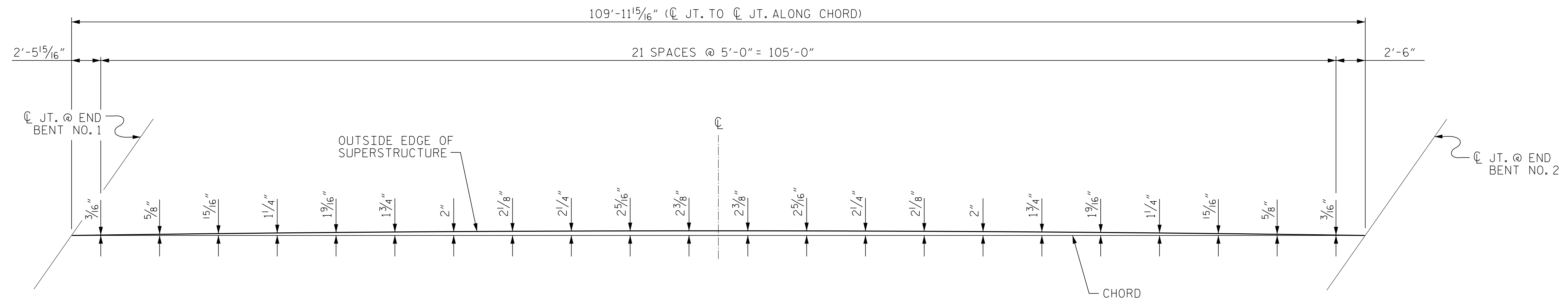
SHEET 7 OF 26
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CHKD. BY: HLW
DES. EGR. OF RECORD: CBC

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DATE: 9/15
DATE: 9/15

REVISIONS						SHEET NO.
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OUTSIDE LEFT OVERHANG ARC OFFSETS



OUTSIDE RIGHT OVERHANG ARC OFFSETS

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ARC OFFSETS

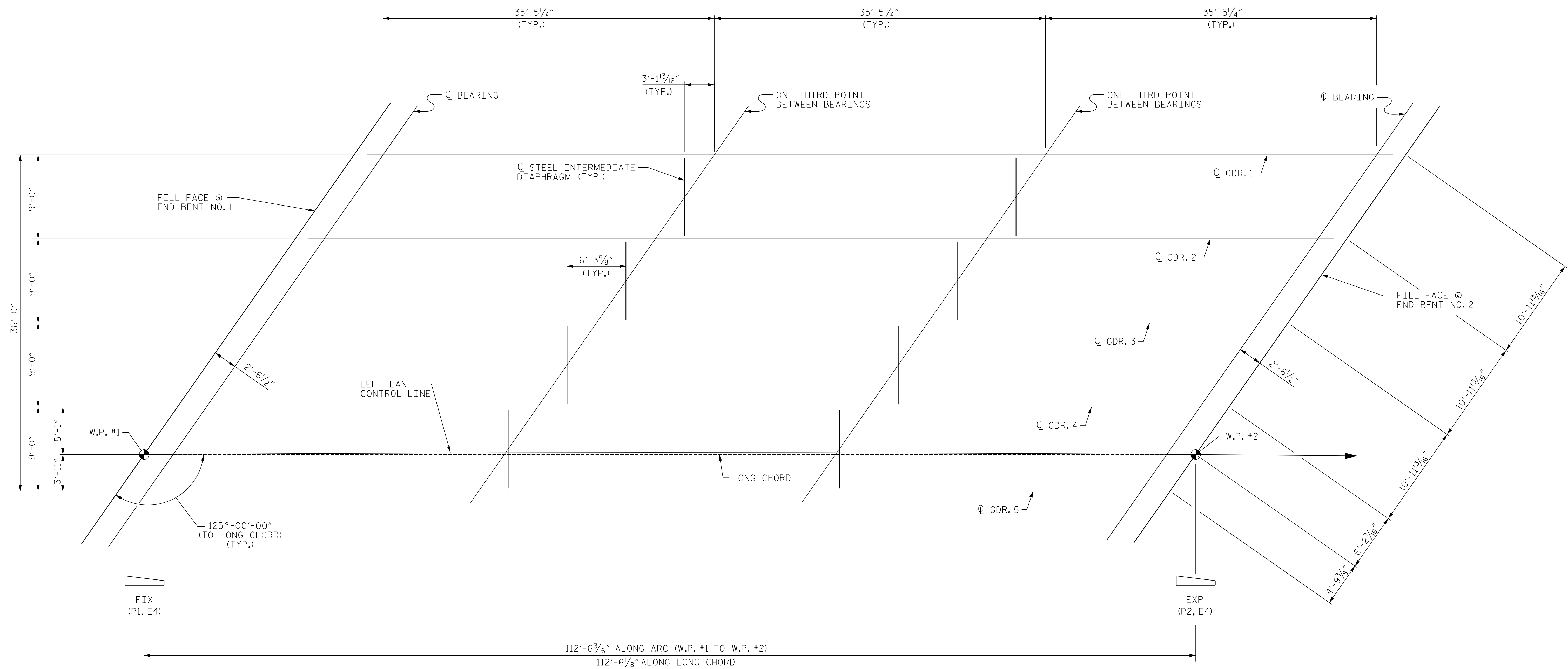


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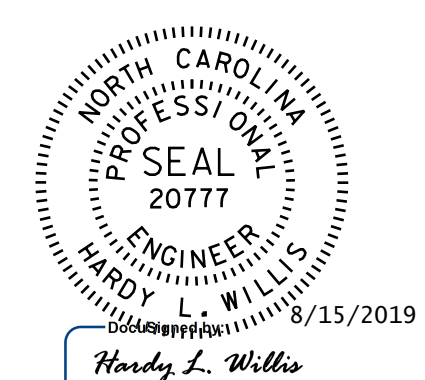
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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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SHEET NO.
 S01-8
 TOTAL SHEETS
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FRAMING PLAN
NOTE: GIRDERS ARE PARALLEL TO LONG CHORD.

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FRAMING PLAN

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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S01-9
2			4			TOTAL SHEETS 26

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.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

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 7000 PSI.

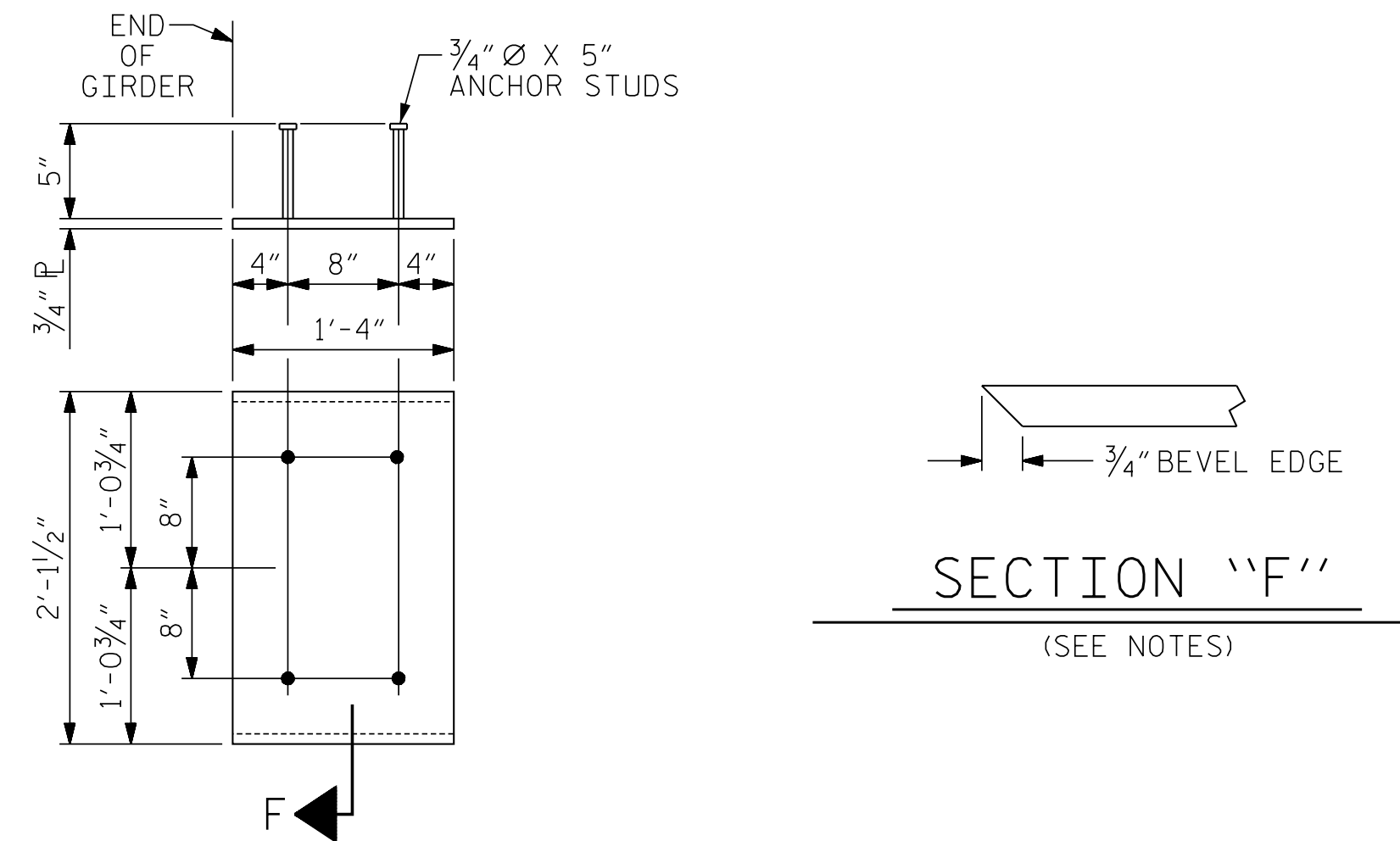
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

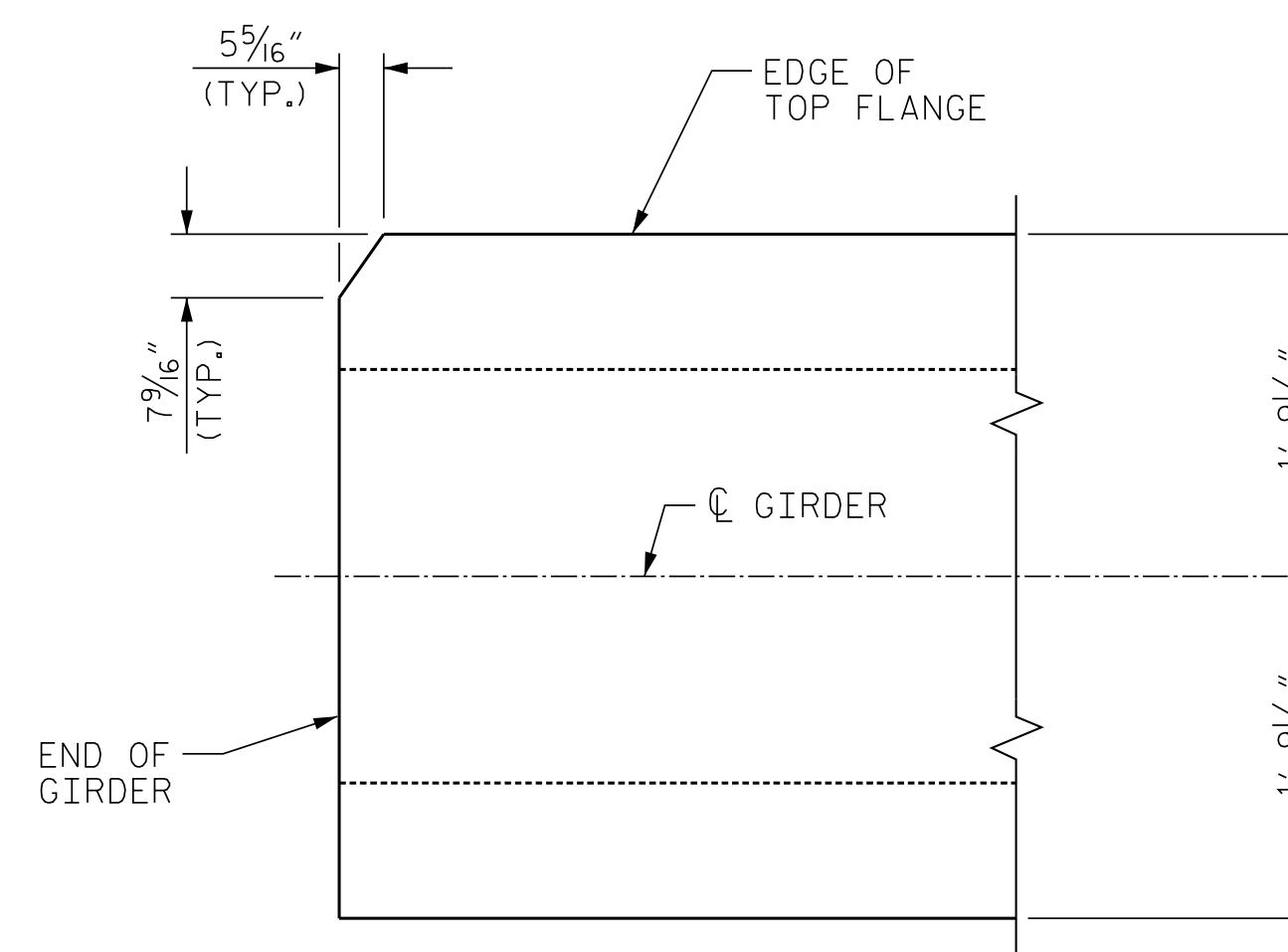
A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



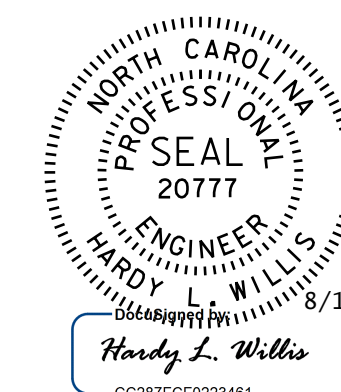
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER AND 72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)



FLANGE CLIP DETAIL

CHAMFER AT END BENT NO. 1 SHOWN. CHAMFER AT END BENT NO. 2 SIMILAR. CLIP OR SHIFT REINFORCEMENT AS NECESSARY TO ENSURE 2" CLEAR.



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SHEET 2 OF 2

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

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

SHEET 11 OF 26

STD. NO. PCG9

ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC

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NOTES

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

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

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

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

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

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

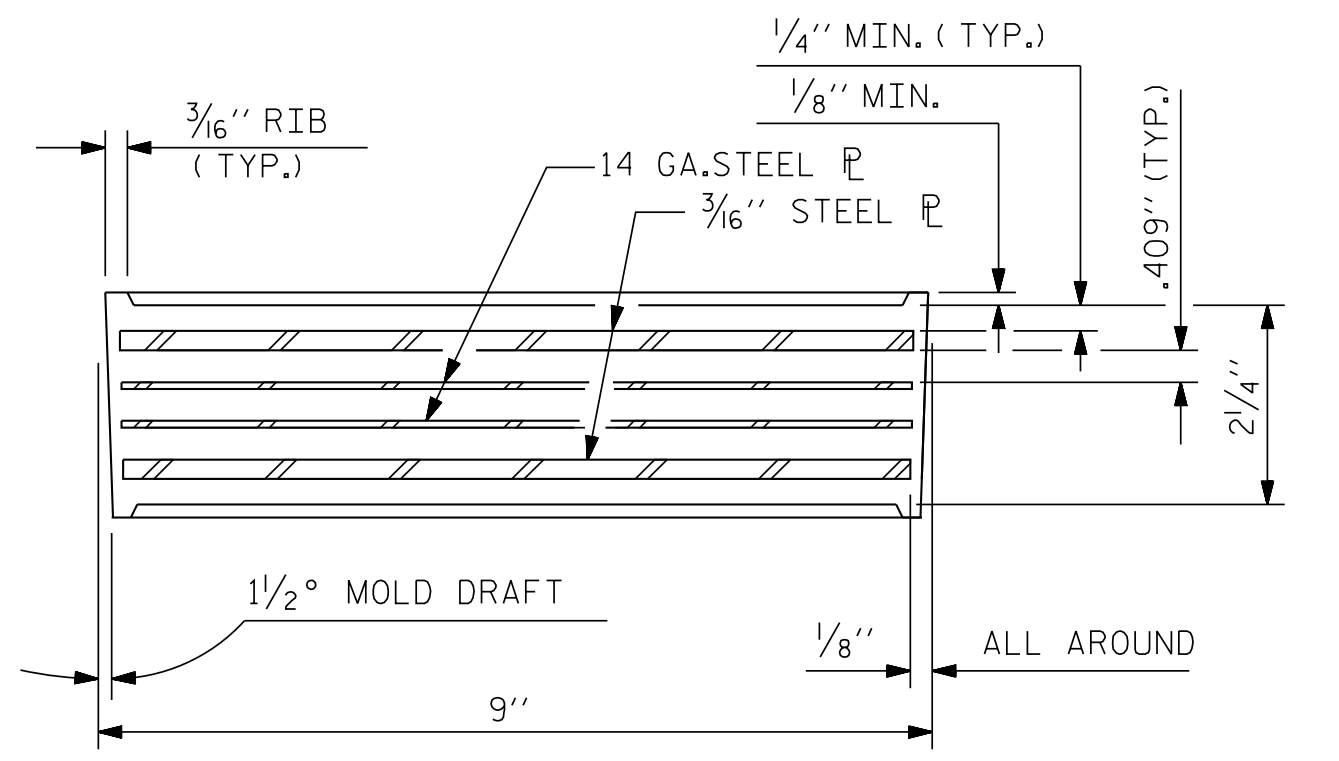
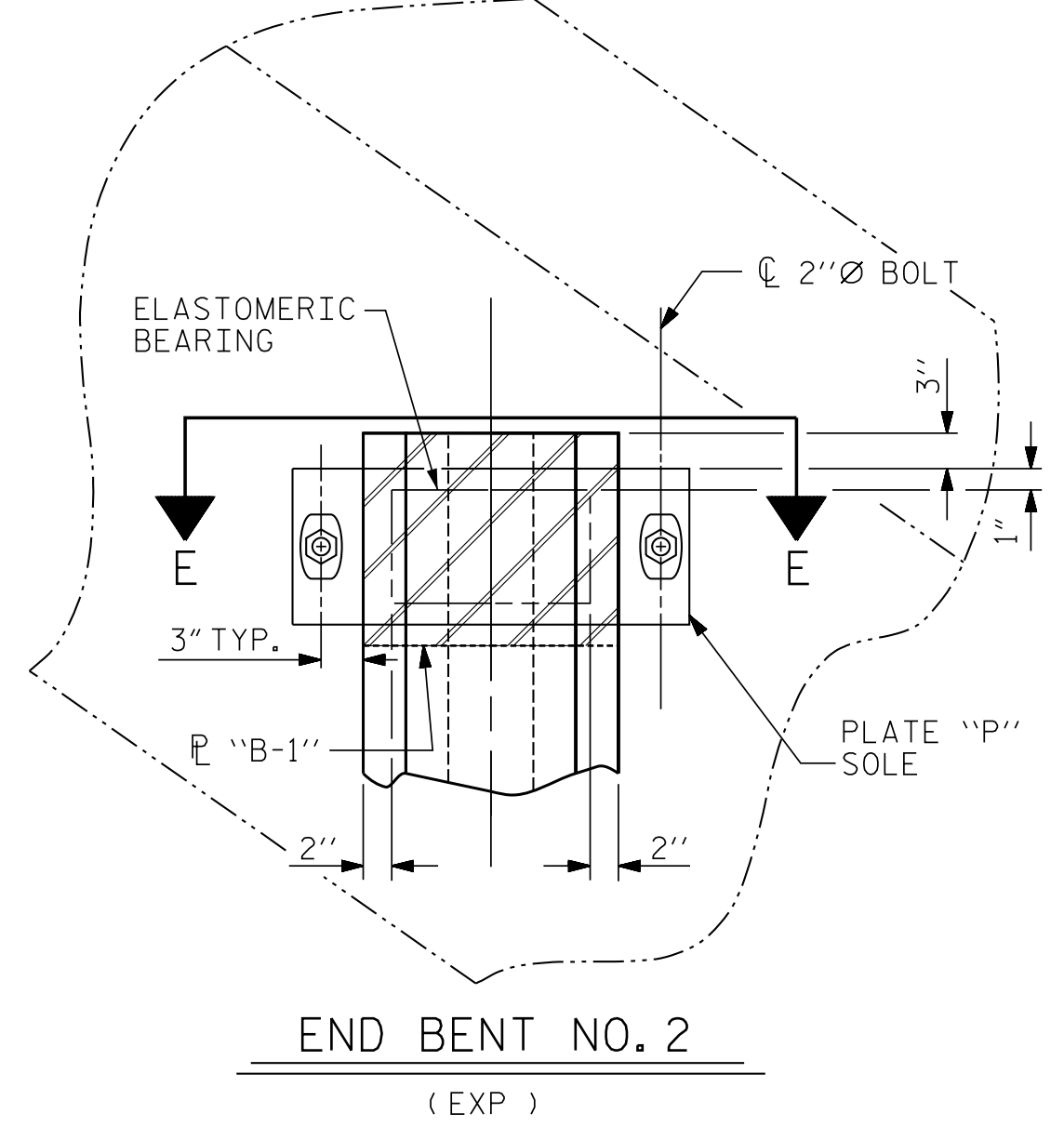
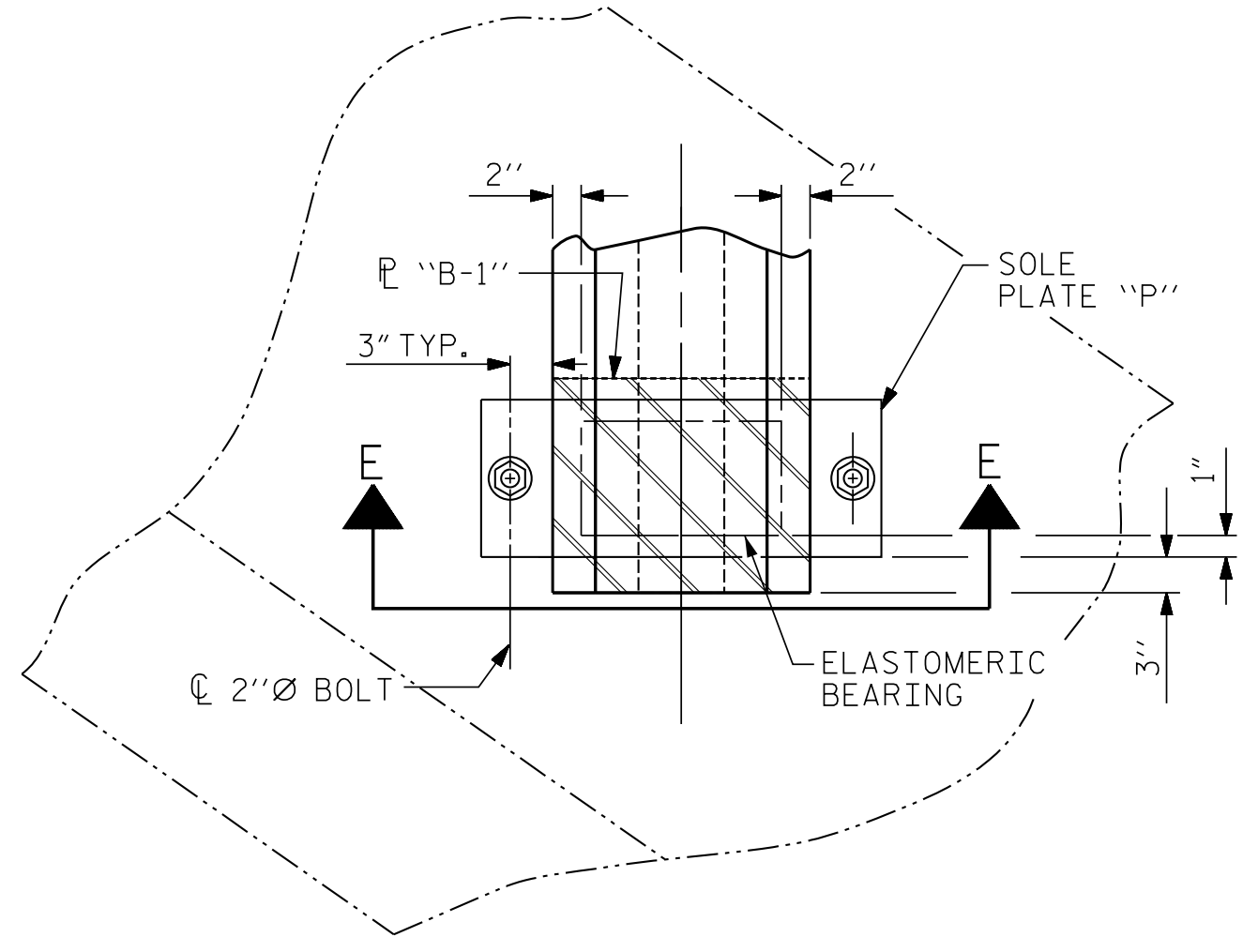
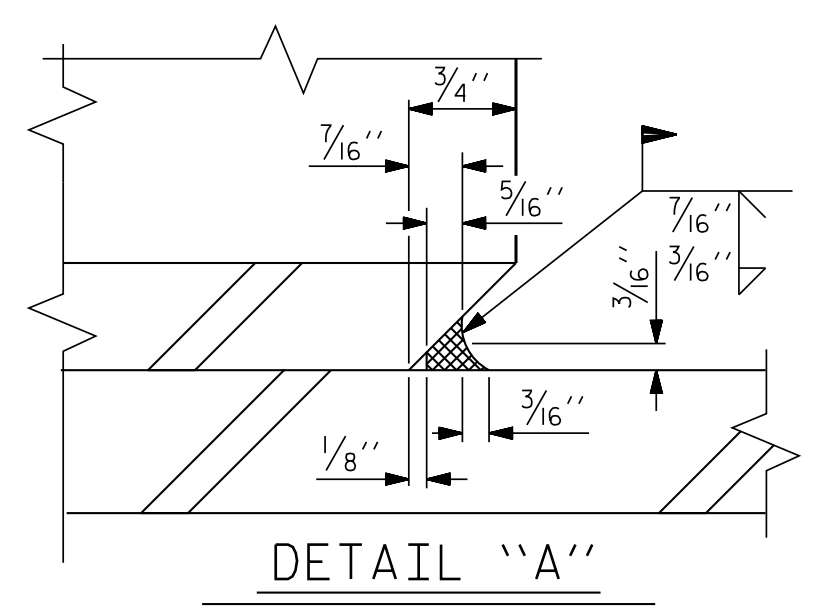
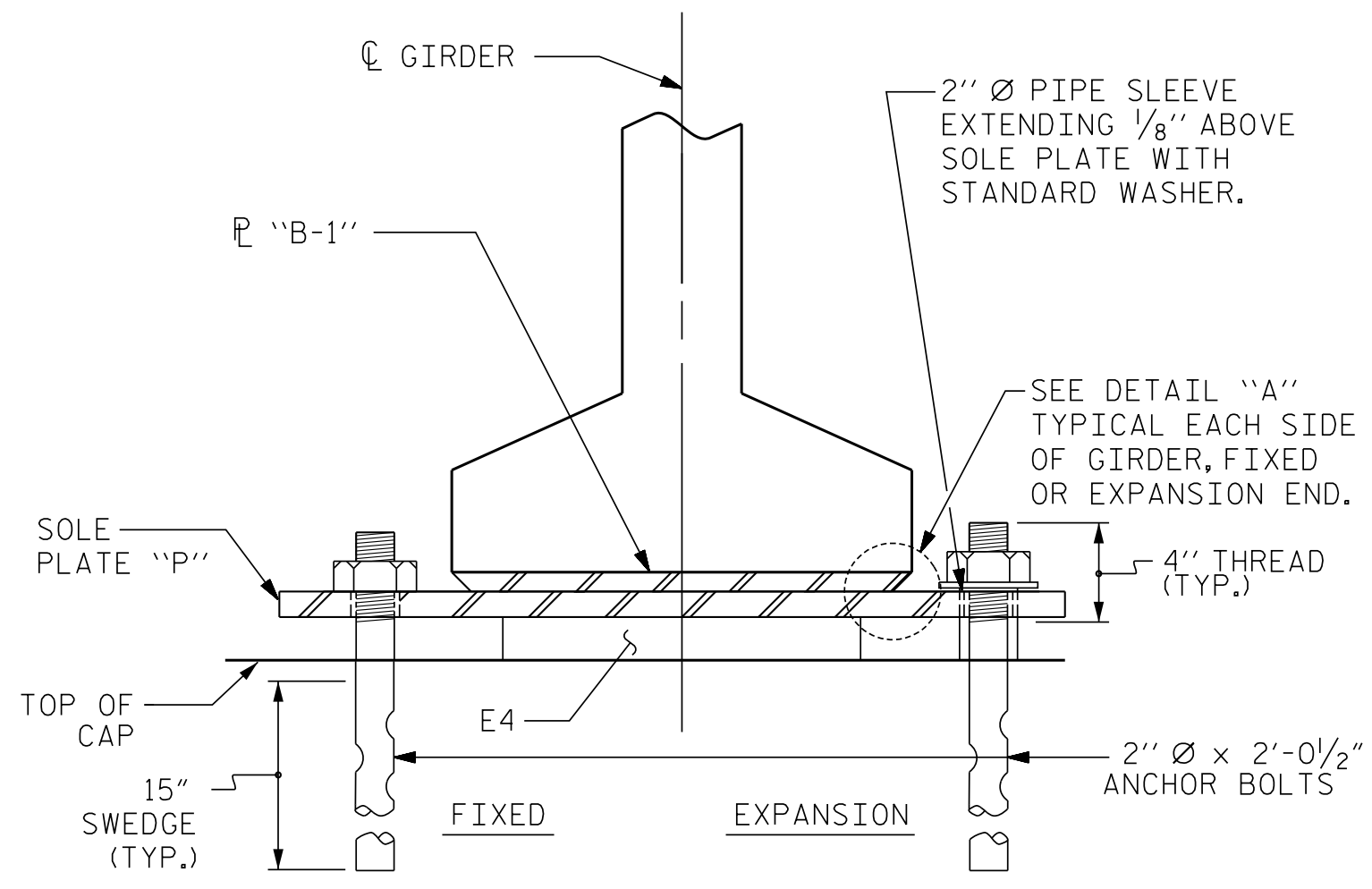
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

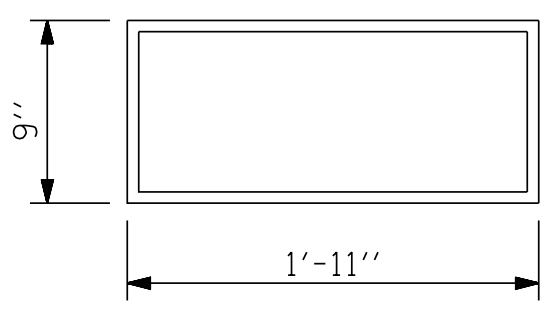
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

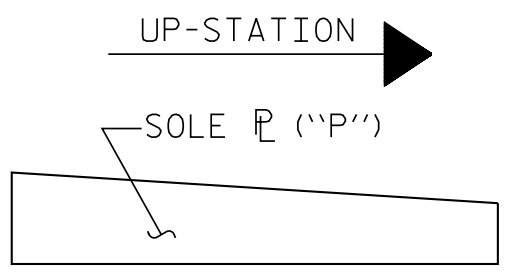
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



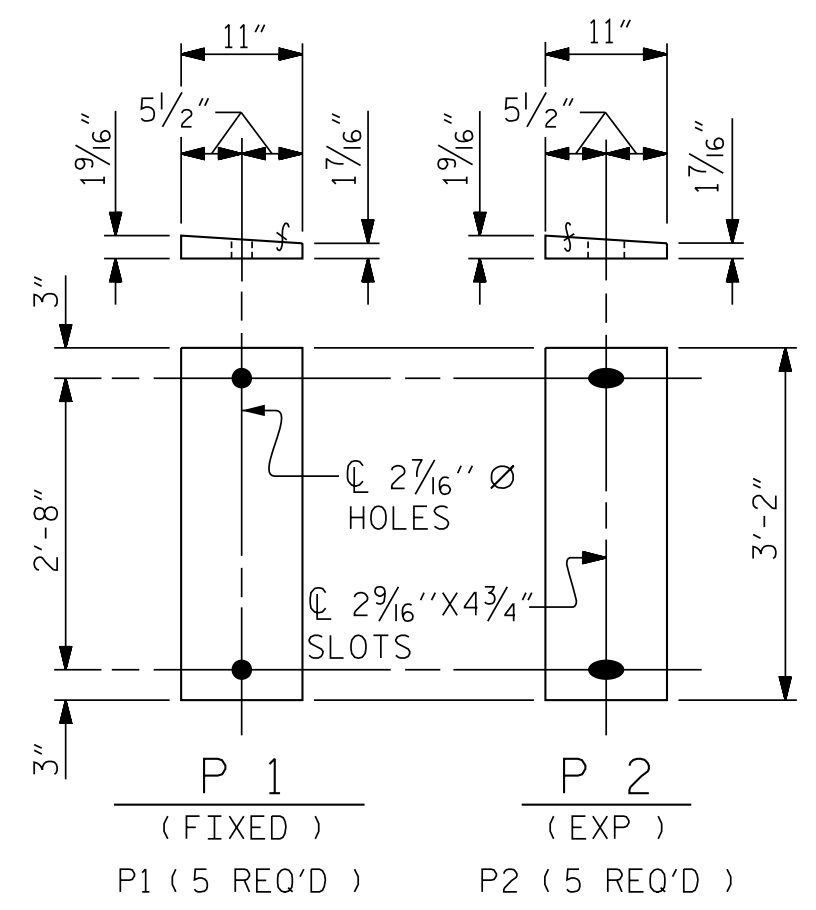
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (10 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE V



SOLE "P" PLACEMENT DETAIL



SOLE PLATE DETAILS ("P")

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



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

REVISIONS						SHEET NO. S01-13
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ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : EEM 2/97	REV. 6/13 AAC/MAA
CHECKED BY : VAP 2/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

GIRDERS NO. 1 & 5

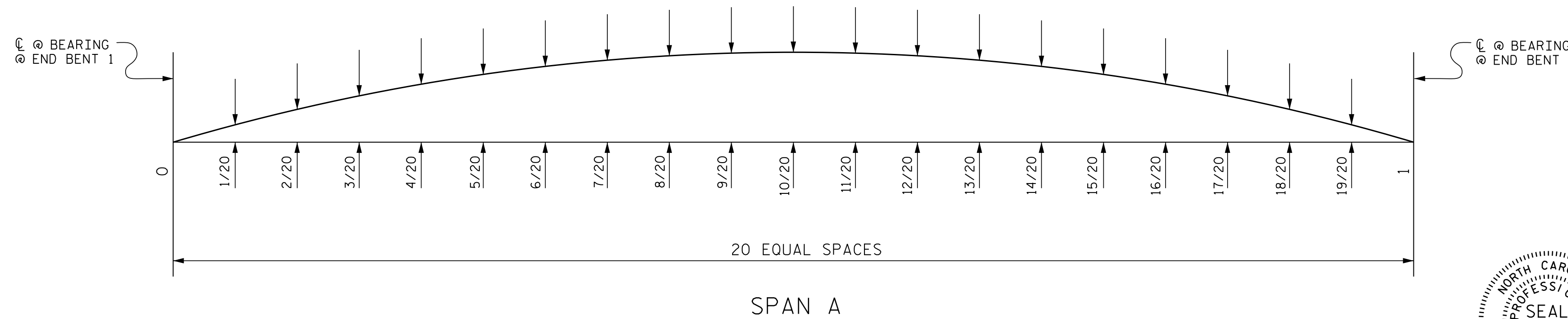
0.60" Ø LOW RELAXATION																					
TWENTIETH POINTS	0.0	0.05	0.10	0.15	.20	0.25	0.30	0.35	0.40	0.45	0.5	0.55	0.60	0.65	0.70	.075	0.80	.085	0.90	0.95	1.0
CAMBER (GIRDER ALONE IN PLACE) (FT.) ↑	0.000	0.023	0.045	0.066	0.085	0.102	0.116	0.128	0.136	0.141	0.143	0.141	0.136	0.128	0.116	0.102	0.085	0.066	0.045	0.023	0.000
* DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD (FT.) ↓	0.000	0.020	0.037	0.053	0.066	0.073	0.087	0.094	0.099	0.102	0.103	0.102	0.099	0.094	0.087	0.073	0.066	0.053	0.037	0.020	0.000
FINAL CAMBER (IN.) ↑	0"	1/16"	1/8"	1/8"	1/4"	3/8"	3/8"	7/16"	7/16"	7/16"	1/2"	7/16"	7/16"	7/16"	3/8"	3/8"	1/4"	1/8"	1/8"	1/16"	0"

* INCLUDES WEIGHT OF SLAB, BUILDUP, STAY-IN-PLACE FORMS, AND FUTURE WEARING SURFACE.

GIRDERS NO. 2 THRU 4

0.60" Ø LOW RELAXATION																					
TWENTIETH POINTS	0.0	0.05	0.10	0.15	.20	0.25	0.30	0.35	0.40	0.45	0.5	0.55	0.60	0.65	0.70	.075	0.80	.085	0.90	0.95	1.0
CAMBER (GIRDER ALONE IN PLACE) (FT.) ↑	0.000	0.023	0.045	0.066	0.085	0.102	0.116	0.128	0.136	0.141	0.143	0.141	0.136	0.128	0.116	0.102	0.085	0.066	0.045	0.023	0.000
* DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD (FT.) ↓	0.000	0.019	0.037	0.052	0.065	0.073	0.086	0.093	.098	0.101	0.103	0.101	0.098	0.093	0.086	0.073	0.065	0.052	0.037	0.019	0.000
FINAL CAMBER (IN.) ↑	0"	1/16"	1/8"	1/8"	1/4"	3/8"	3/8"	7/16"	7/16"	7/16"	1/2"	7/16"	7/16"	7/16"	3/8"	3/8"	1/4"	1/8"	1/8"	1/16"	0"

* INCLUDES WEIGHT OF SLAB, BUILDUP, STAY-IN-PLACE FORMS, AND FUTURE WEARING SURFACE.



SHEMATIC OF CAMBER ORDINATES

FOR CAMBER VALUES AT EACH GIRDER TWENTIETH POINTS, SEE TABLE ABOVE. SLOPE FOR ZERO CAMBER BASE LINE VALUES.

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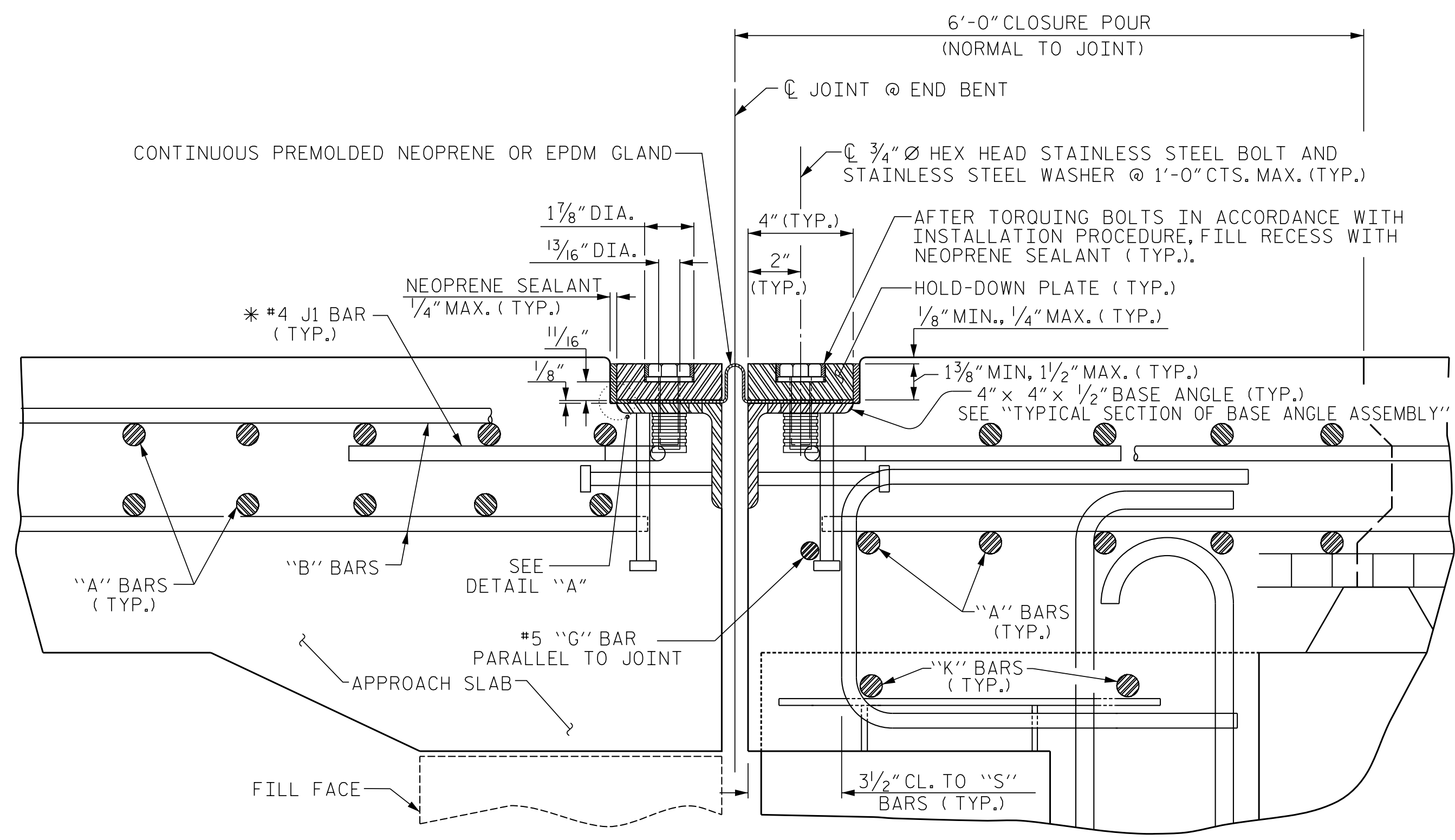
DEAD LOAD DEFLECTIONS

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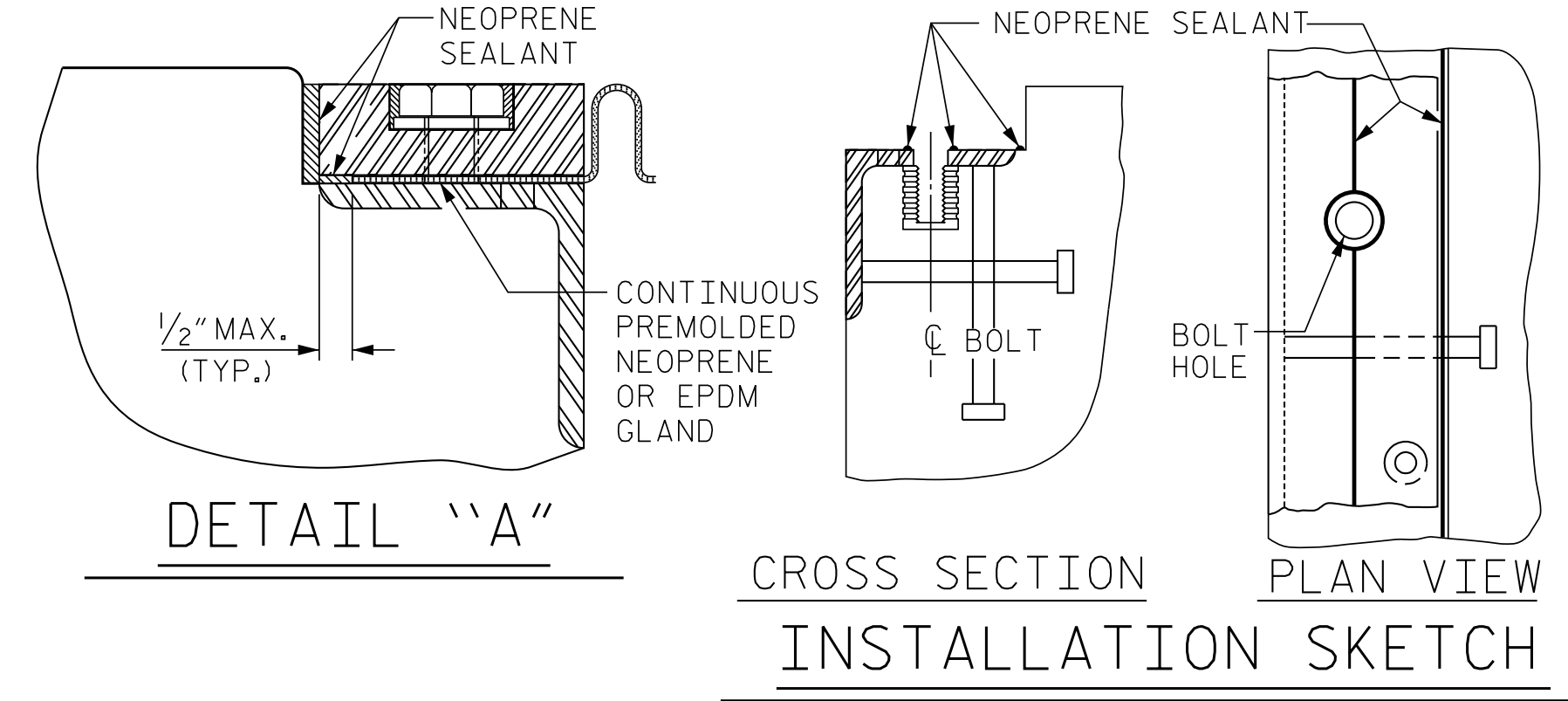


EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

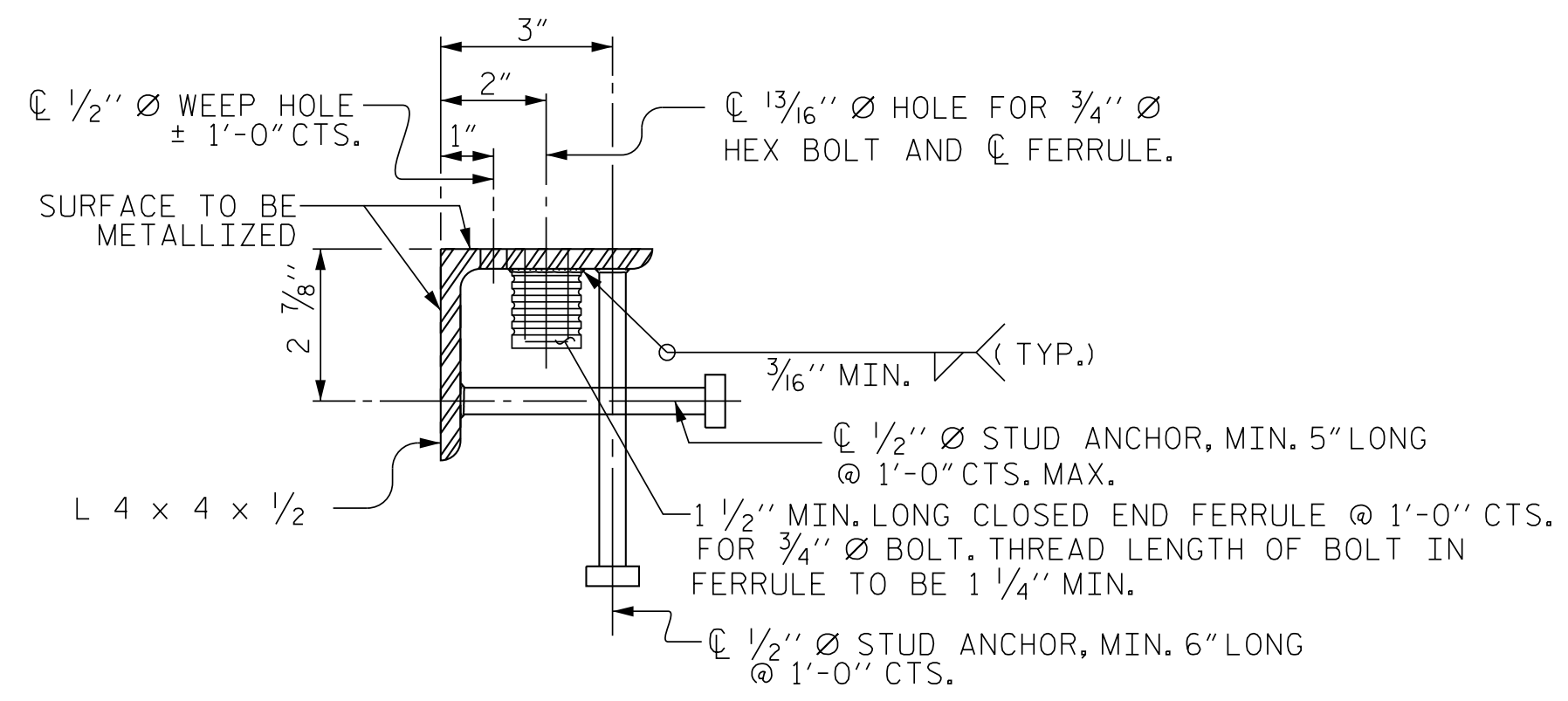
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG CL RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	125°-00'-00"	0"	1"	1"	1"
2	125°-00'-00"	1 1/16"	1 5/8"	1 1/2"	1 1/16"



DETAIL "A"

CROSS SECTION
PLAN VIEW
INSTALLATION SKETCH



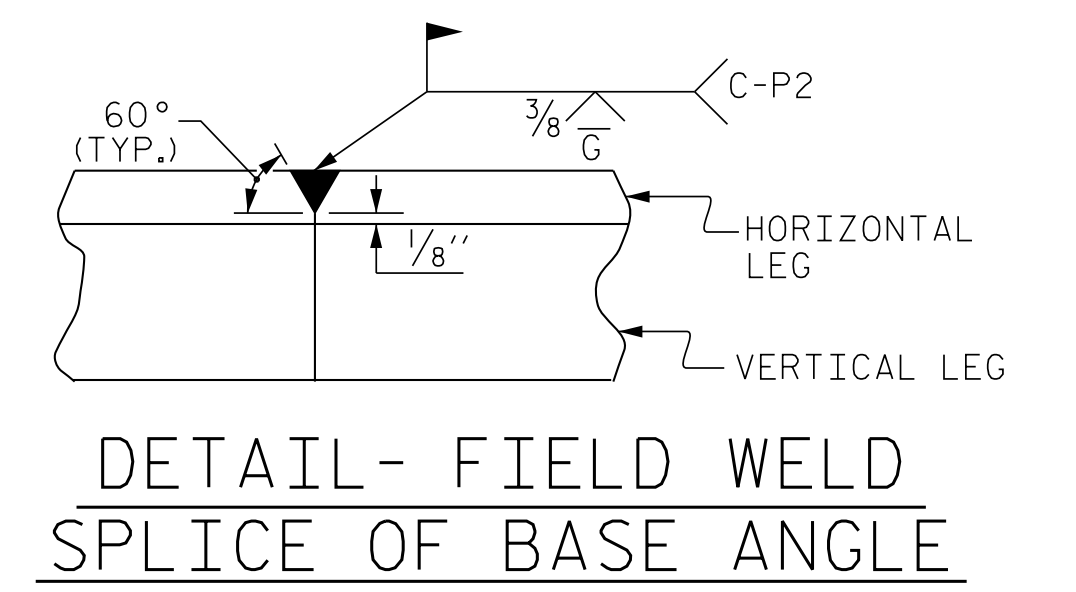
TYPICAL SECTION OF BASE ANGLE ASSEMBLY

INSTALLATION PROCEDURE

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

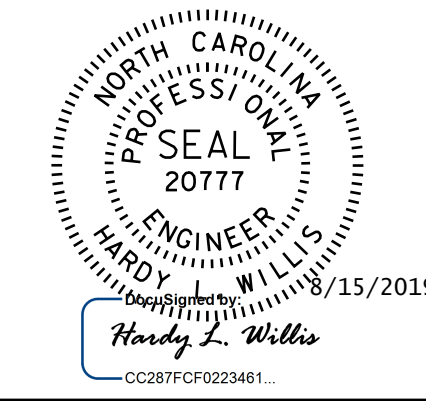
GENERAL NOTES

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



DETAIL - FIELD WELD
SPLICE OF BASE ANGLE

ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : REK 9/87	REV. 10/11 MAA/GM
CHECKED BY : CRK 10/87	REV. 10/11 MAA/THC
	REV. 6/18 MAA/THC



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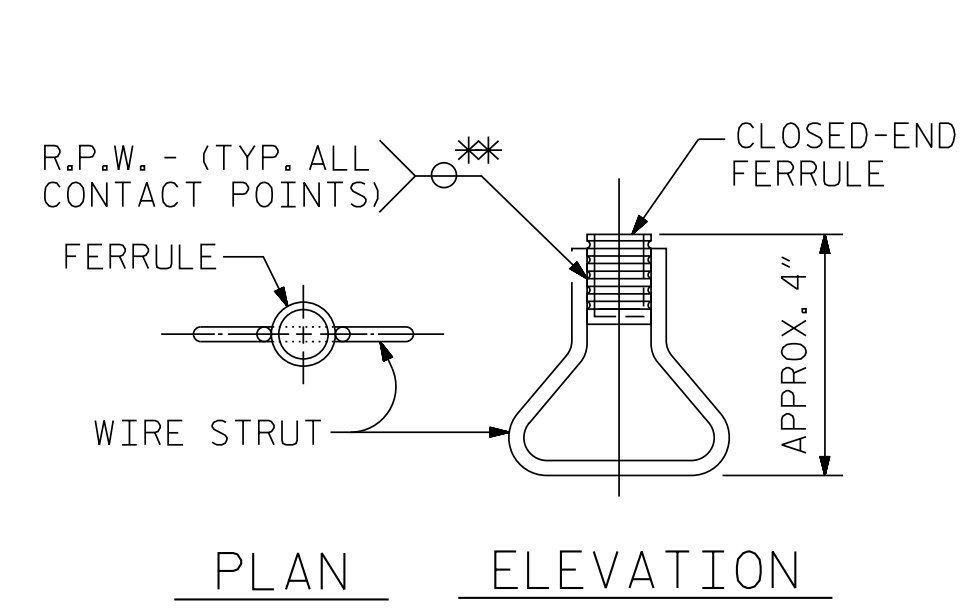
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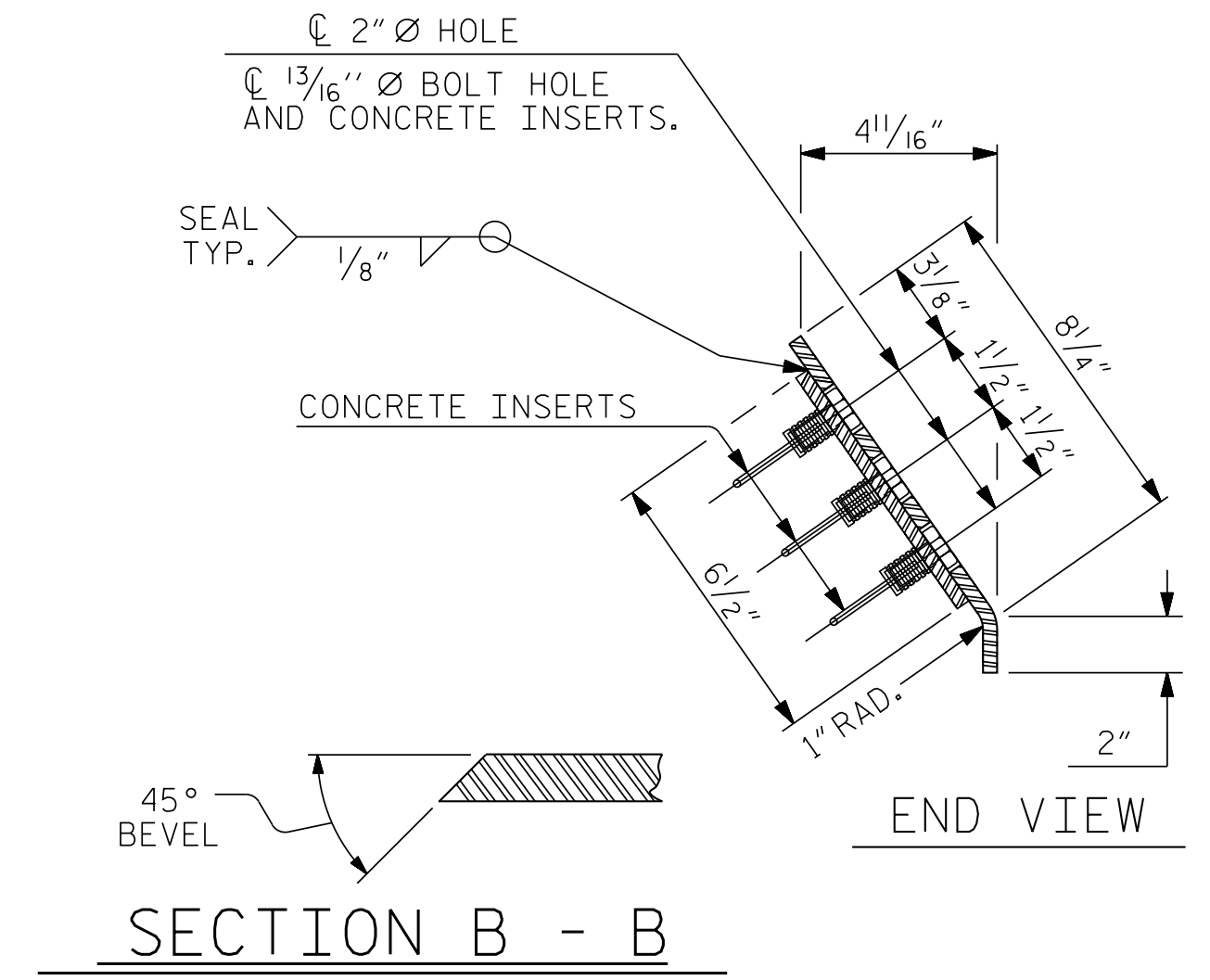
PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 88+35.81 -I73-
27+16.54 -FLY-
SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD EXPANSION JOINT SEAL DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S01-15
					TOTAL SHEETS 26

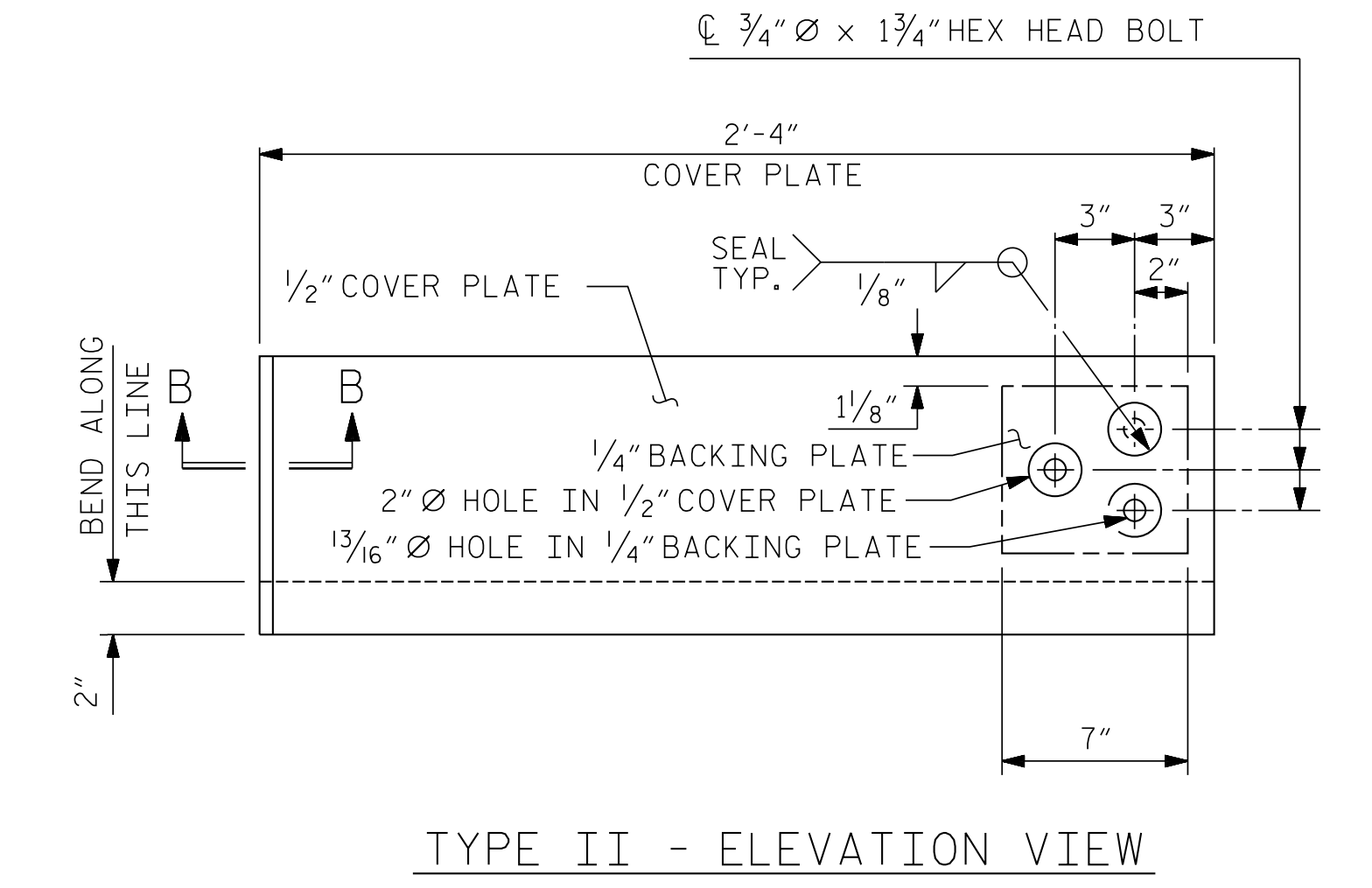


CONCRETE INSERT

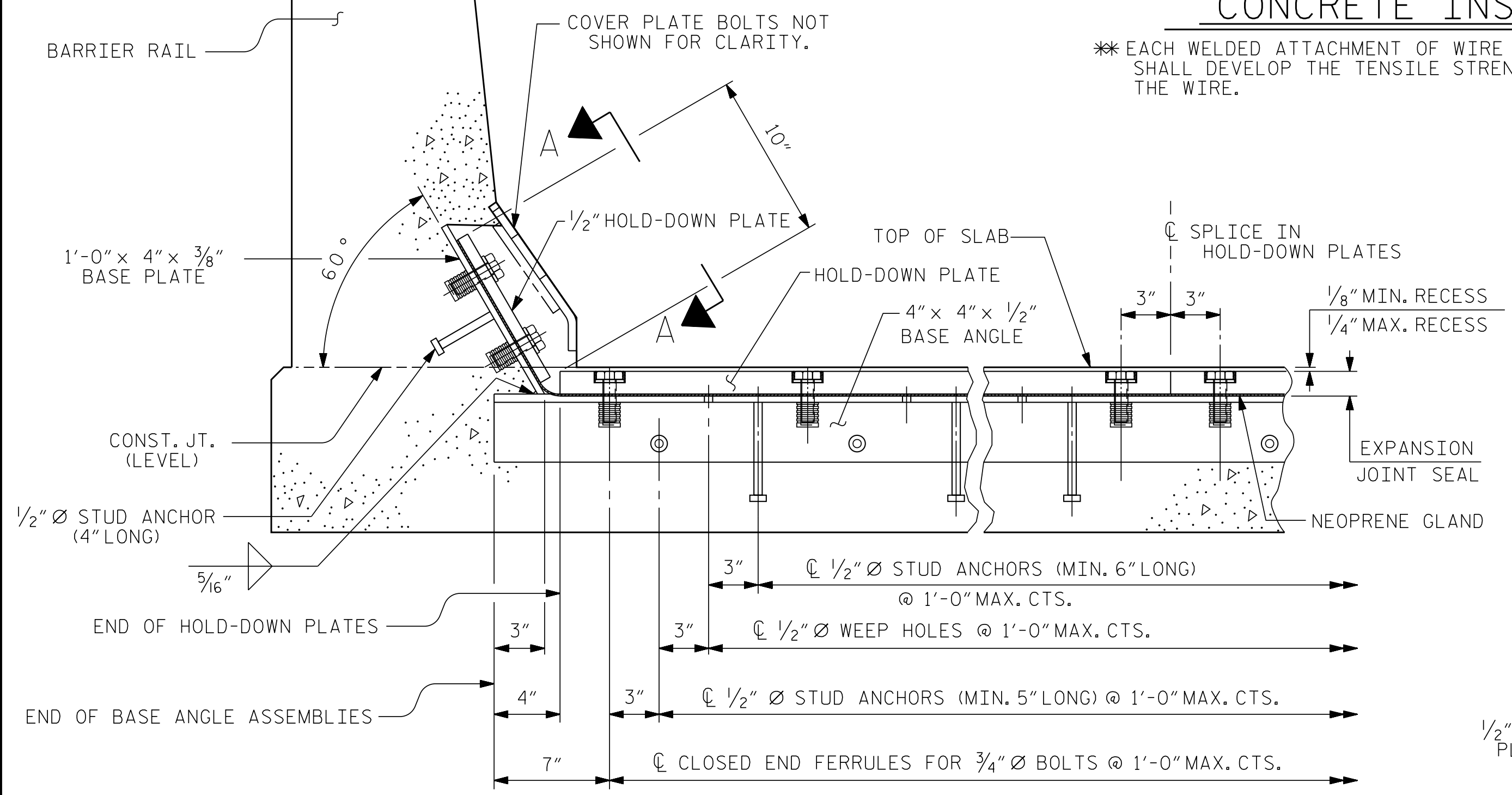
* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



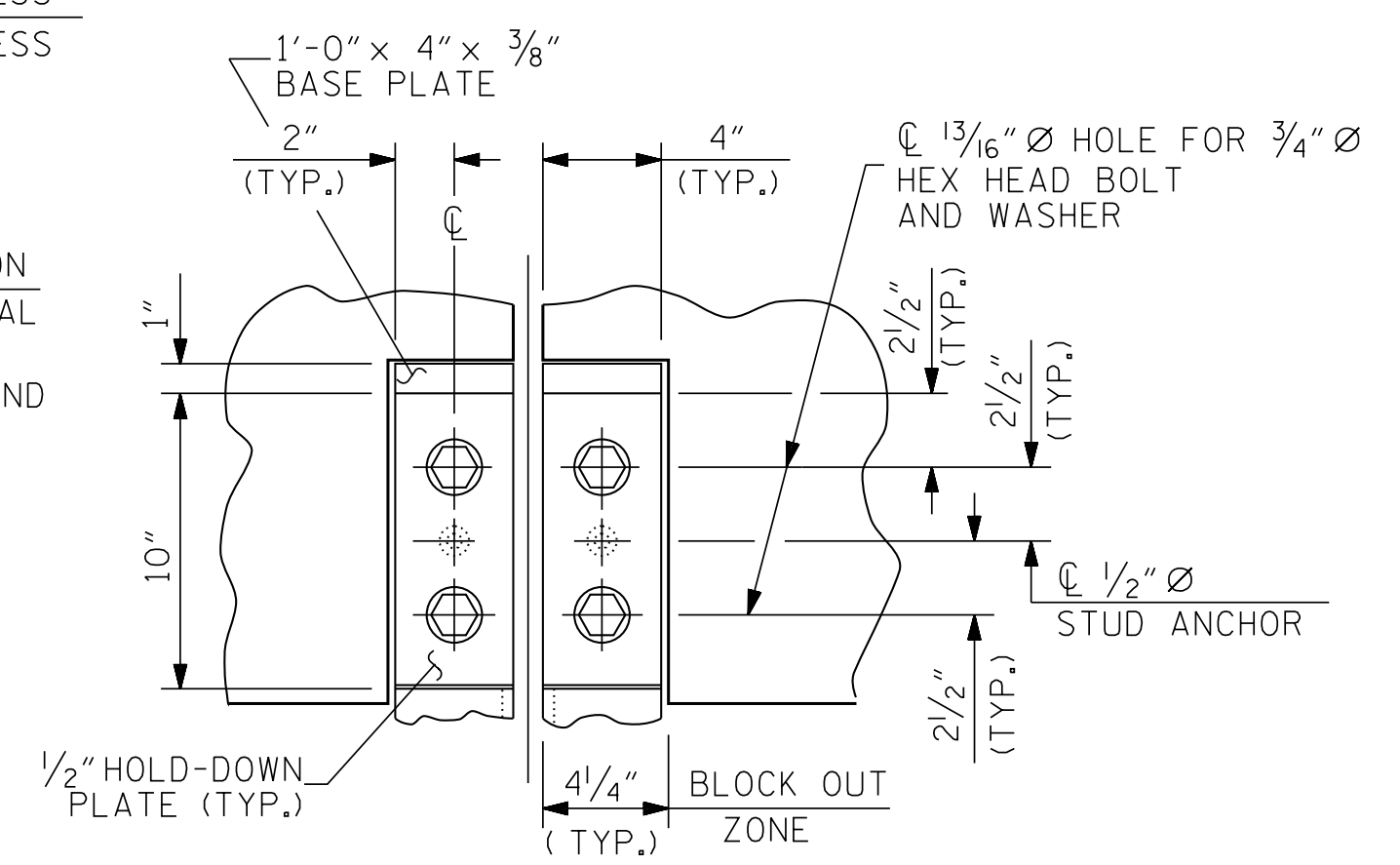
SECTION B - B



COVER PLATE DETAILS



SECTION THRU RAIL NORMAL TO JOINT



SECTION A - A

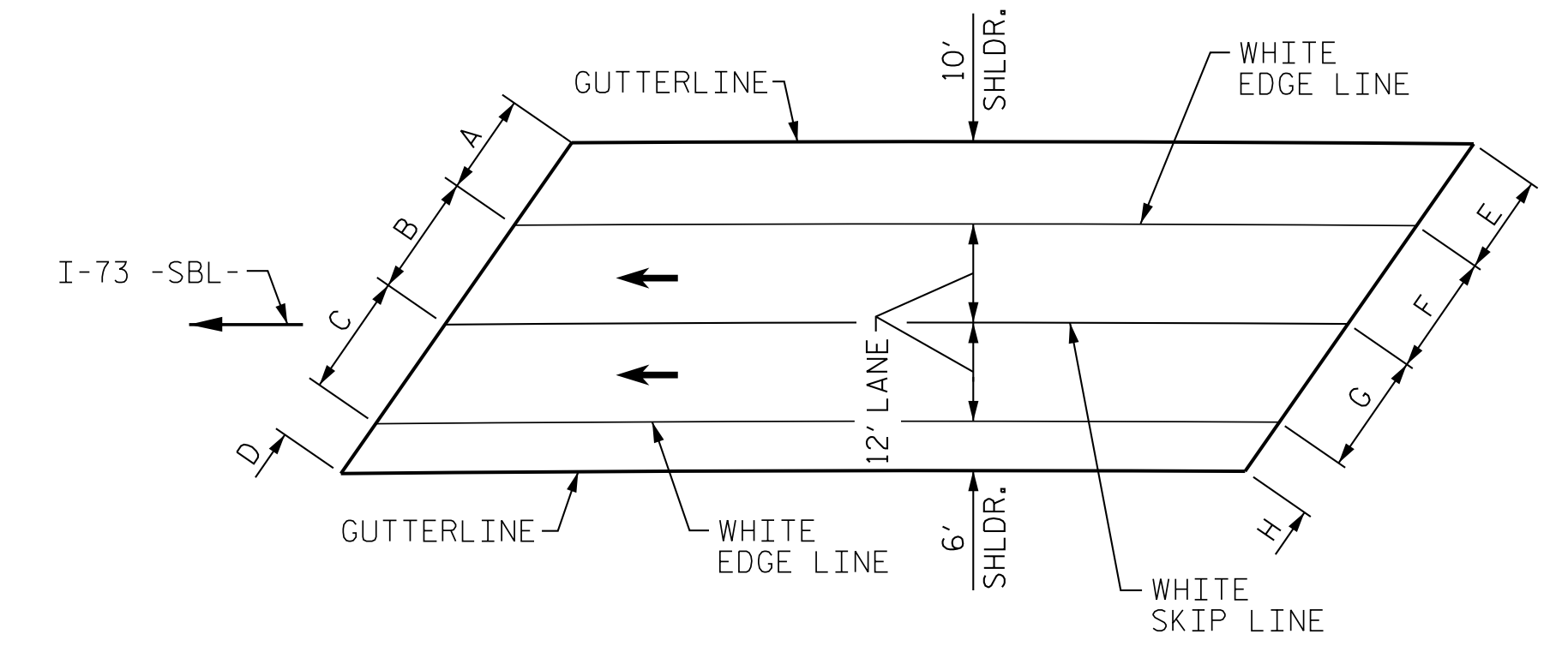
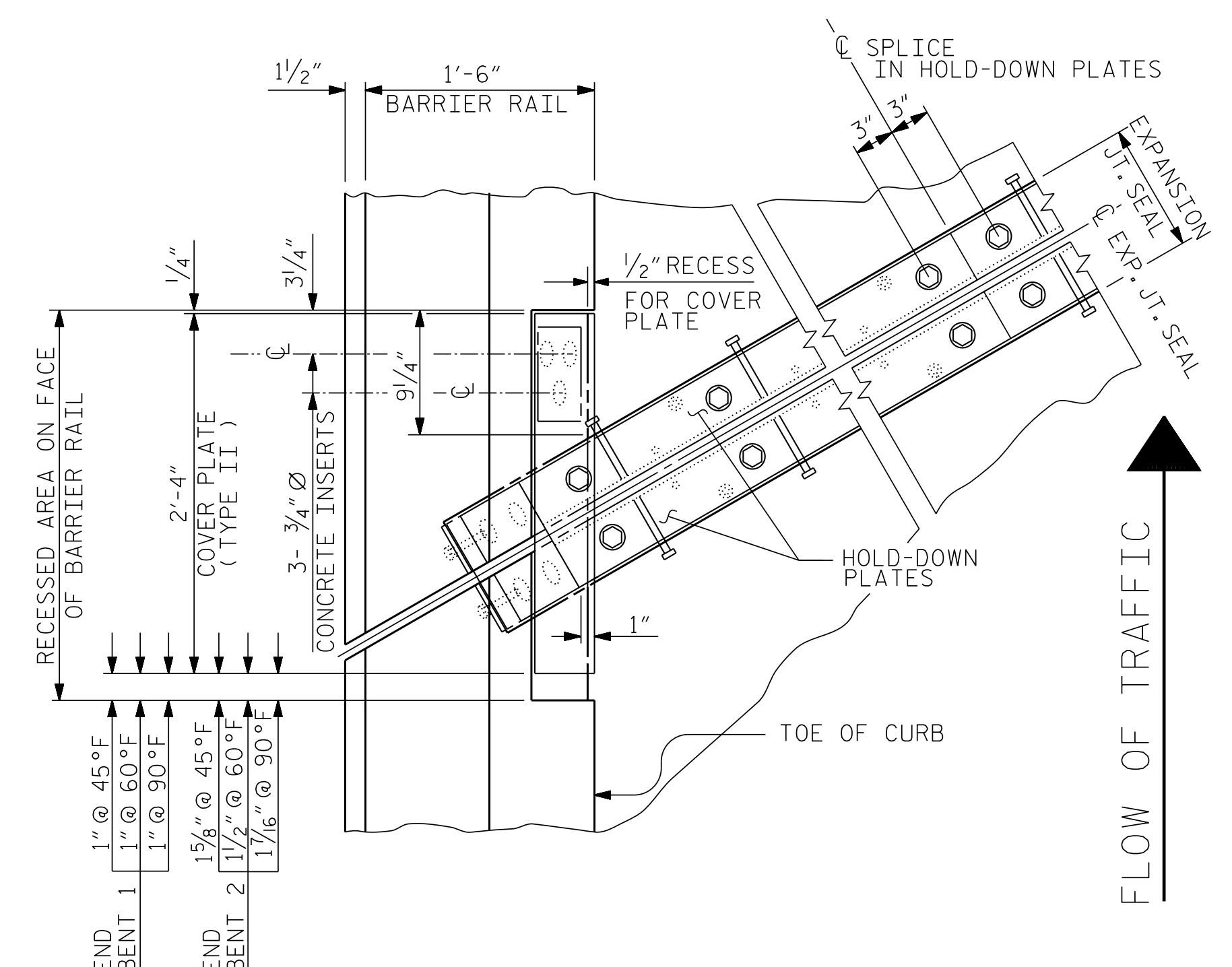
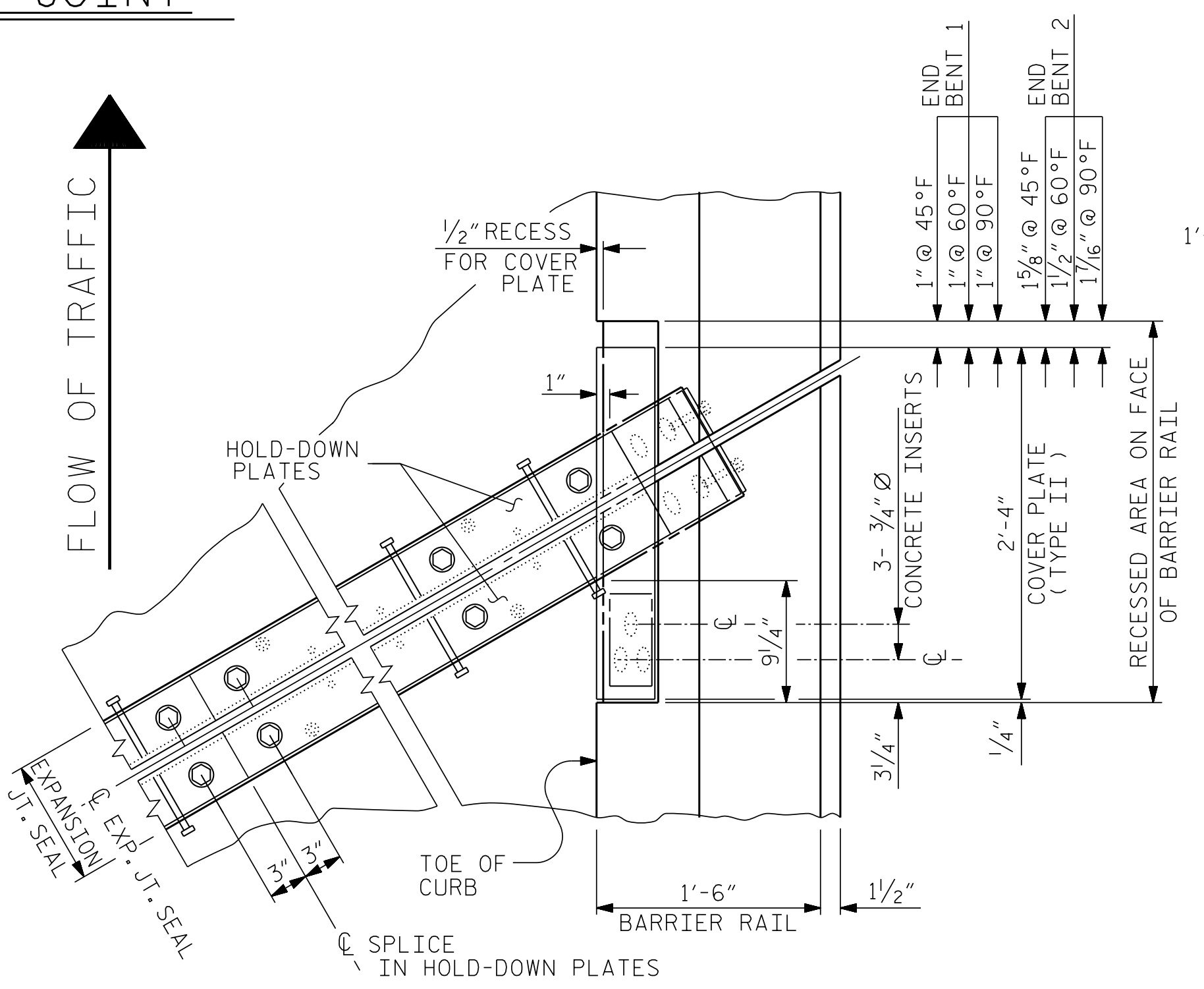


TABLE OF LETTERED DIMENSIONS							
A	B	C	D	E	F	G	H
12'-2 5/16"	14'-8 1/2"	14'-8 5/8"	7'-4 3/8"	12'-1 1/2"	14'-6 3/4"	14'-6 7/8"	7'-3 1/2"

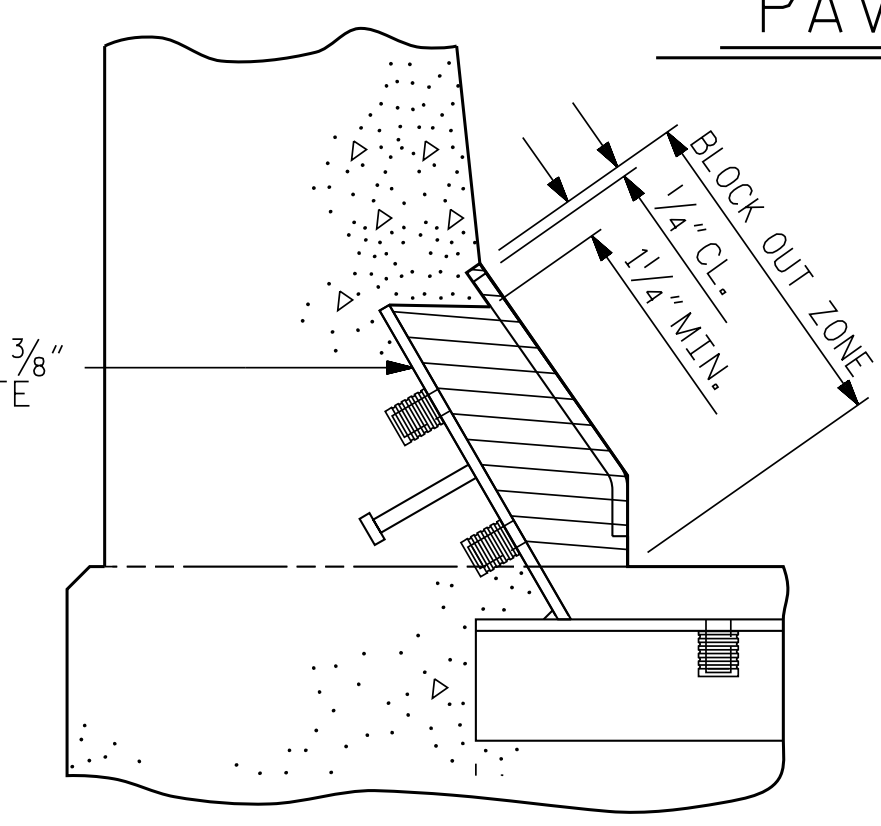
PAVEMENT MARKING ALIGNMENT



PLAN OF EXPANSION JOINT SEAL



BLOCK OUT DETAIL
SEE "SECTION A - A" FOR OTHER DETAILS.



ASSEMBLED BY : MAF
CHECKED BY : HLW
DATE : 9/2015

DRAWN BY : REK 9/87
CHECKED BY : CRK 10/87
REV. 7/12
REV. 6/13
REV. 12/17

MAA/GM
MAA/GM
MAA/THC

STATE OF NORTH CAROLINA
PROFESSIONAL SEAL
20777
ENGINEER
HARDY L. WILLIS
8/15/2019
Hardy L. Willis

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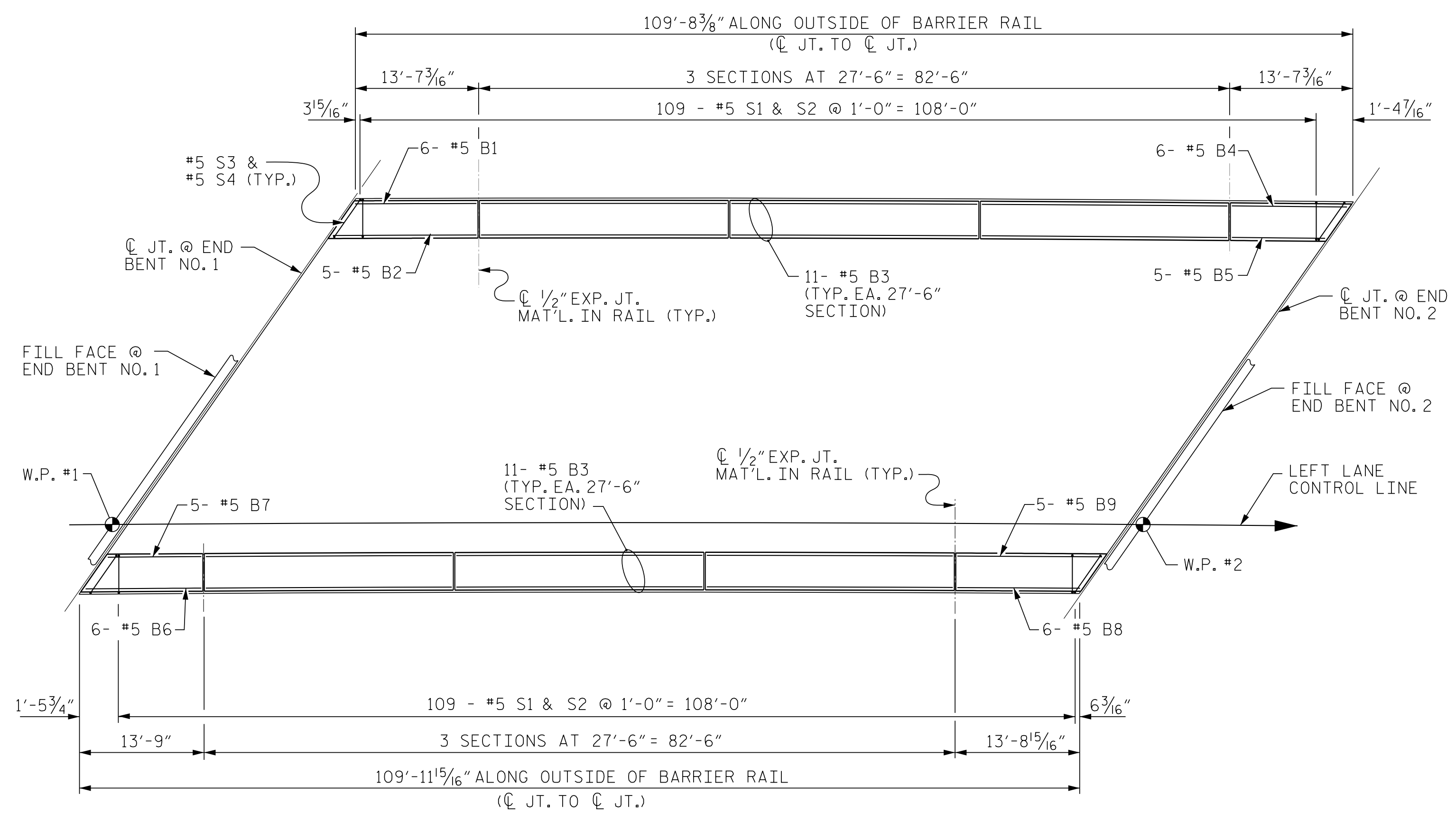
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PROJECT NO. R-3421A
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STATION: 88+35.81 -I73-
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SHEET 2 OF 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S01-16
2			4			TOTAL SHEETS 26



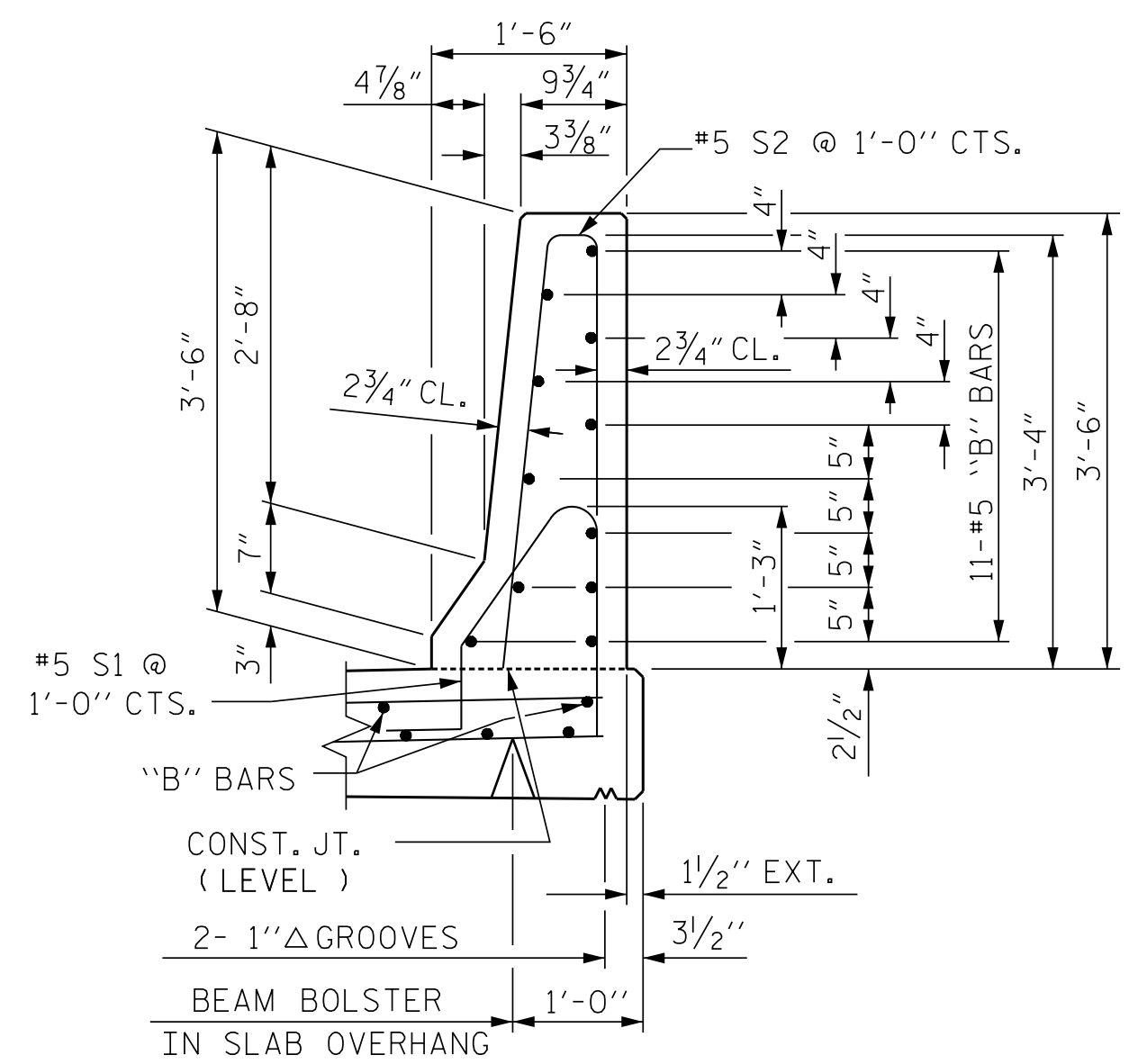
PLAN

NOTES

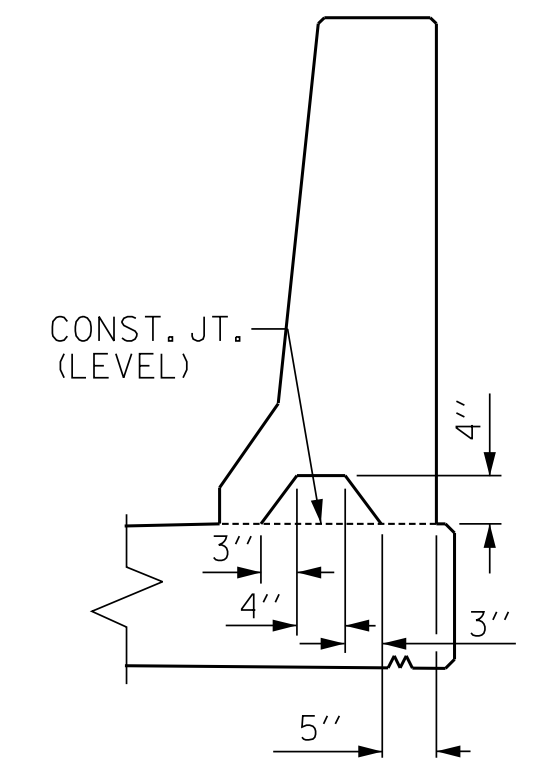
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

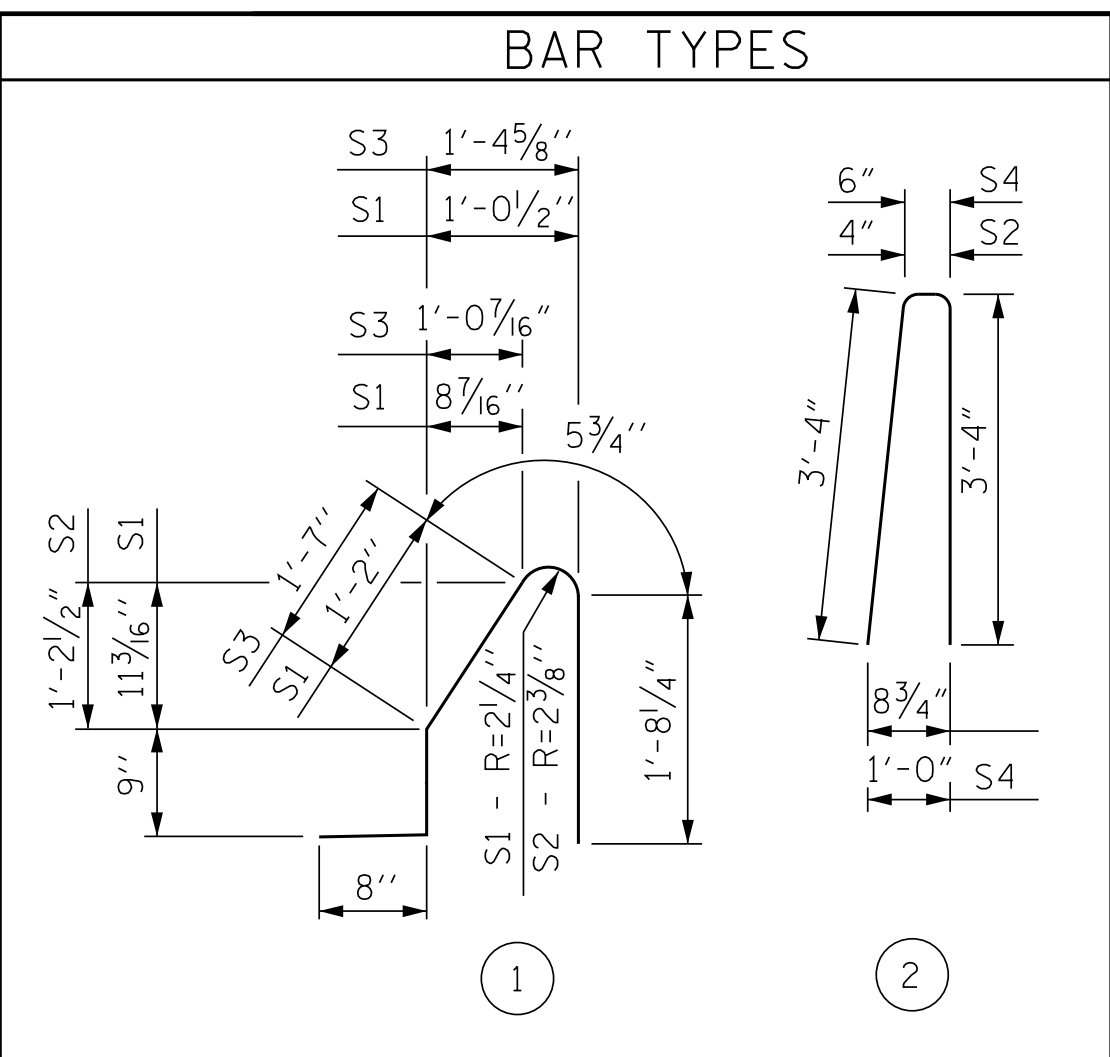
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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



SECTION THRU RAIL



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

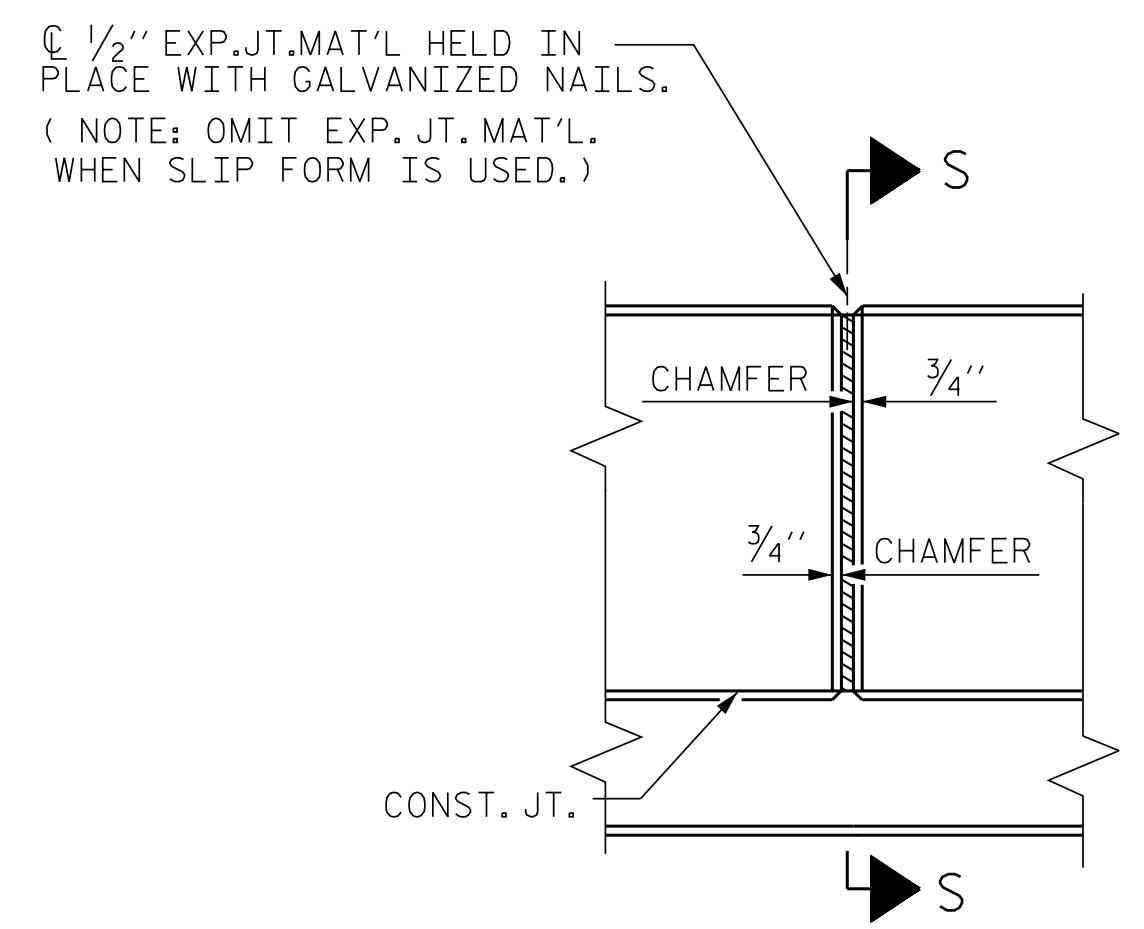


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
FOR CONCRETE BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	6	#5	STR	13'-2"	82
* B2	5	#5	STR	13'-11"	73
* B3	66	#5	STR	27'-1"	1864
* B4	6	#5	STR	13'-0"	80
* B5	5	#5	STR	12'-2"	63
* B6	6	#5	STR	13'-2"	82
* B7	5	#5	STR	12'-2"	63
* B8	6	#5	STR	13'-4"	83
* B9	5	#5	STR	14'-1"	73
* S1	218	#5	1	4'-9"	1080
* S2	218	#5	2	7'-0"	1592
* S3	4	#5	1	5'-2"	22
* S4	4	#5	2	7'-2"	30

* EPOXY COATED REINFORCING STEEL	5,187 LBS.
CLASS AA CONCRETE	29.9 CU. YDS.
CONCRETE BARRIER RAIL	
SUPERSTRUCTURE	219.44 LIN. FT.
● APPROACH SLABS	42.0 LIN. FT.
TOTAL	261.44 LIN. FT.

● FOR EPOXY COATED REINFORCING STEEL AND CLASS AA CONCRETE IN THE BARRIER RAIL ON APPROACH SLABS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.



ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS

ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : CBC	DATE : 9/2015
DRAWN BY : ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

PROFESSIONAL SEAL
2017
ENGINEER
HARDY L. WILLIS
8/15/2019
Hardy L. Willis
CC-281P01022481

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Asheville, North Carolina
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2			4		

SHEET NO.	S01-17
TOTAL SHEETS	26

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD-DOWN PLATE AND 4 - 7/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.
 THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

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

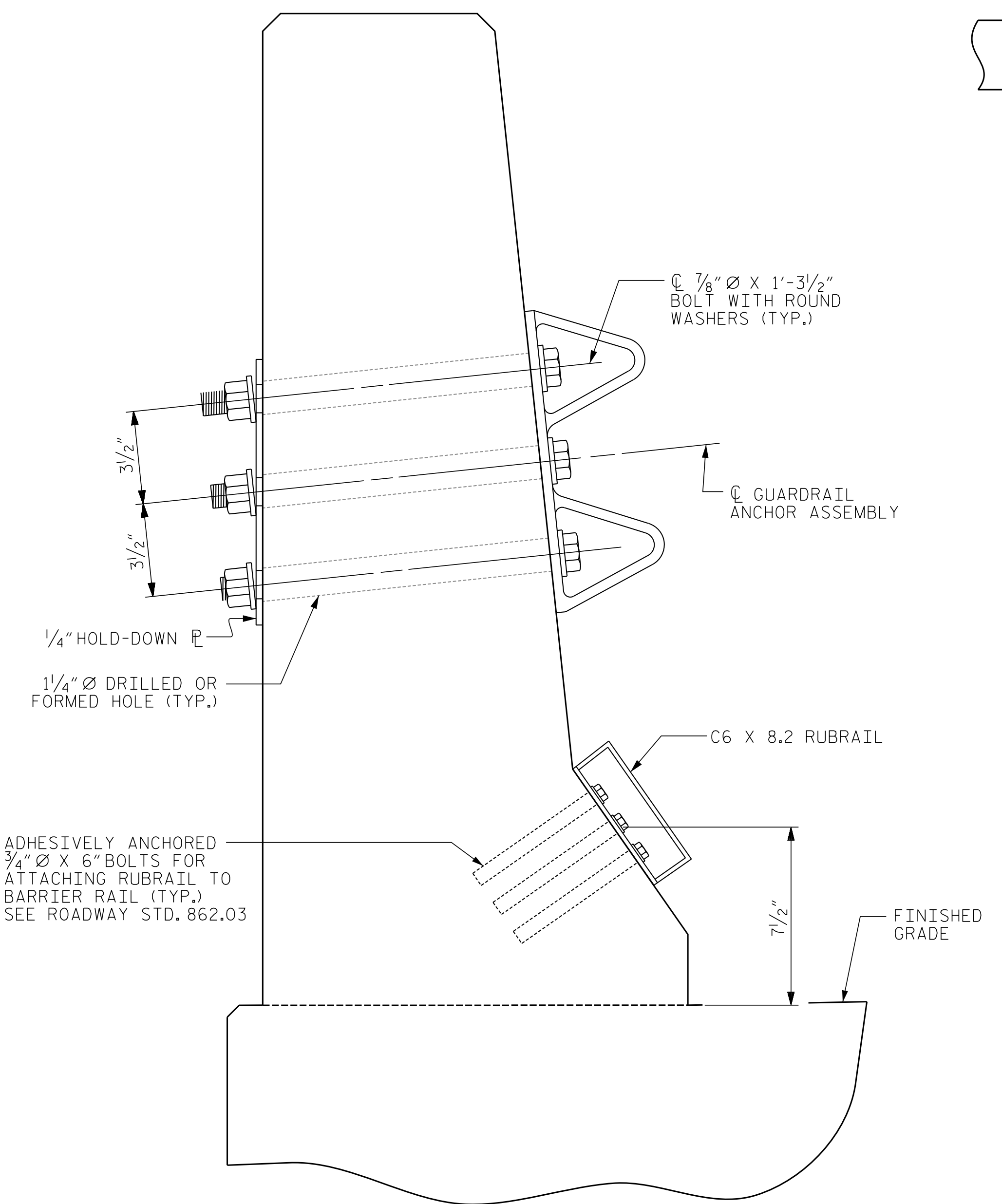
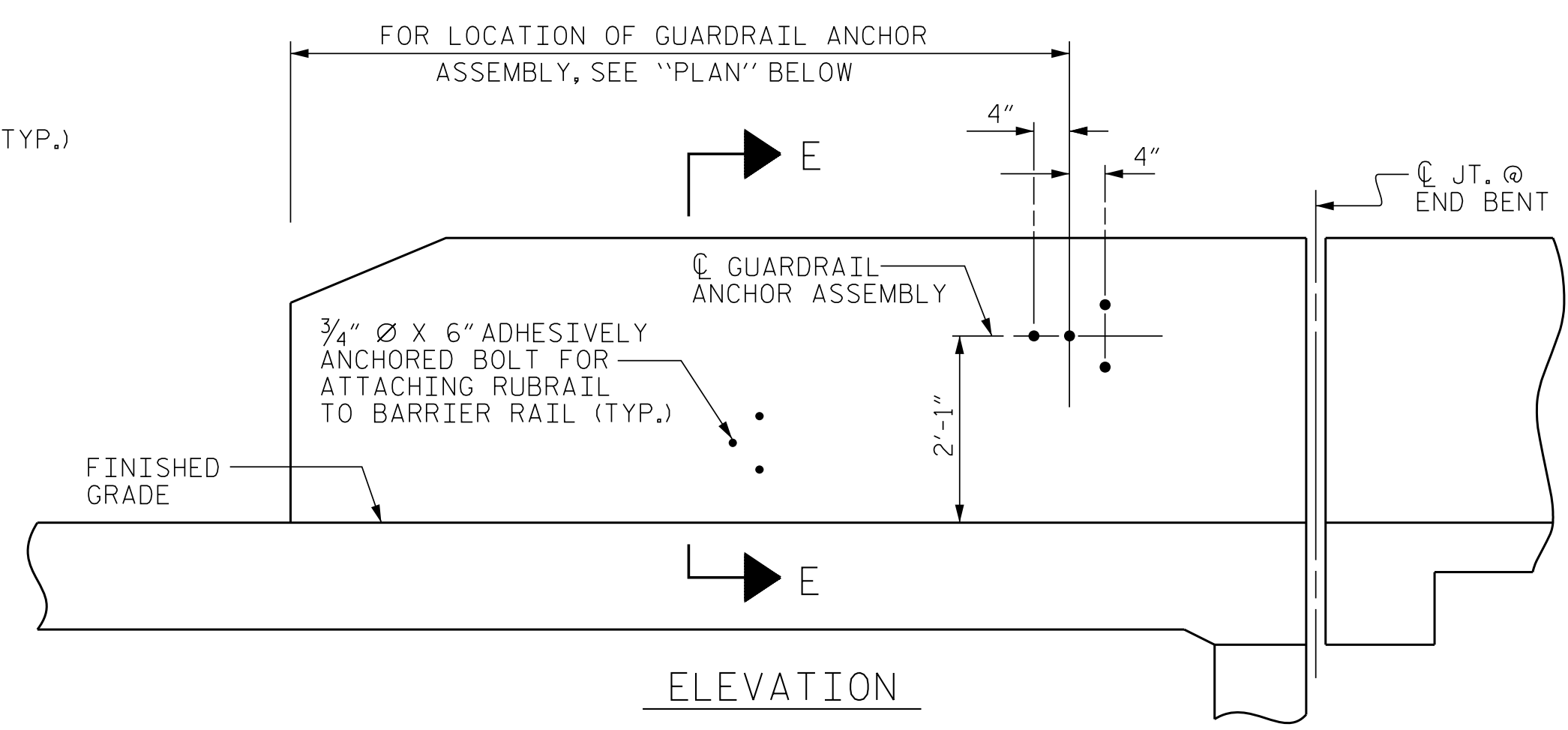
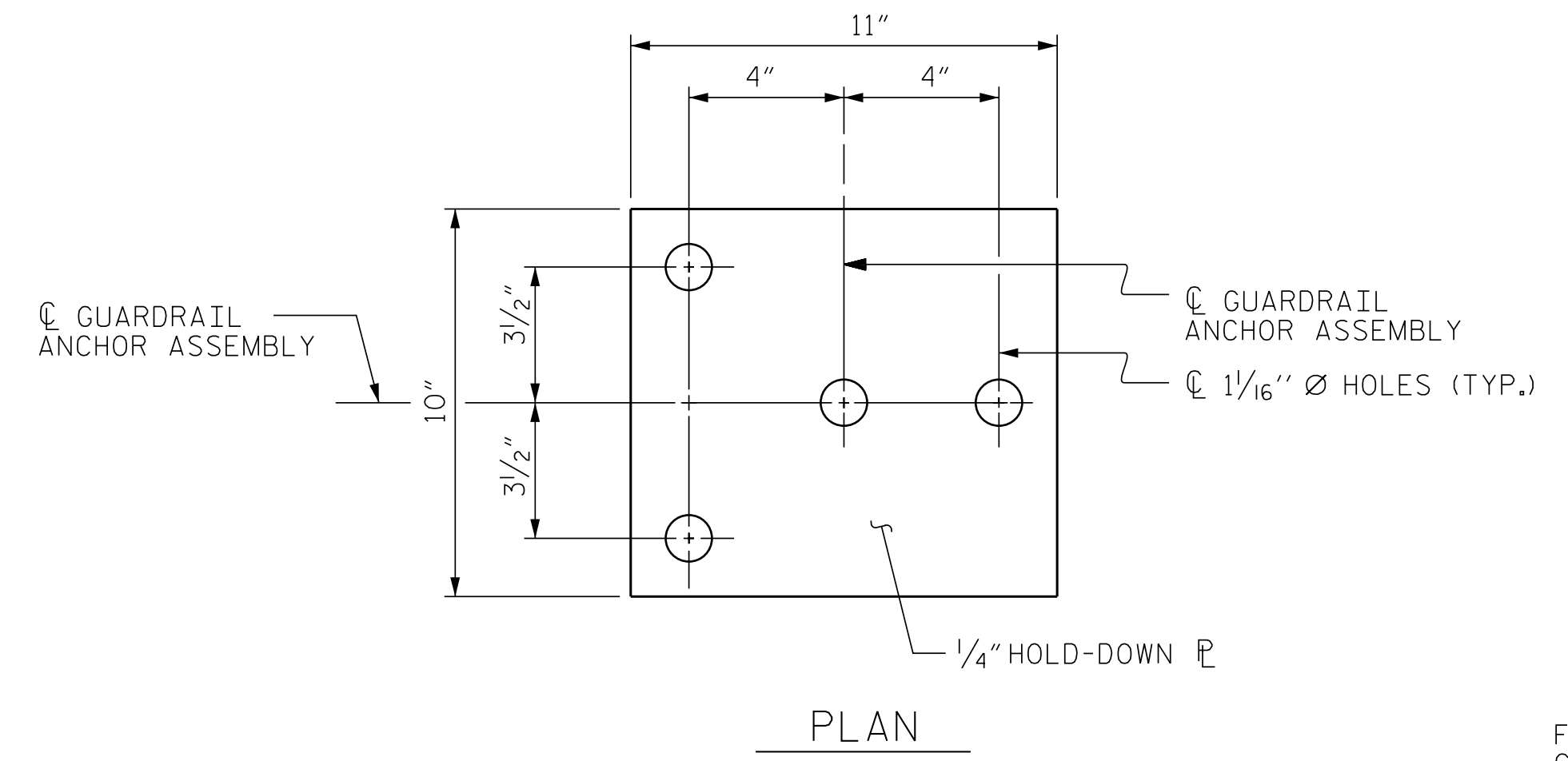
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

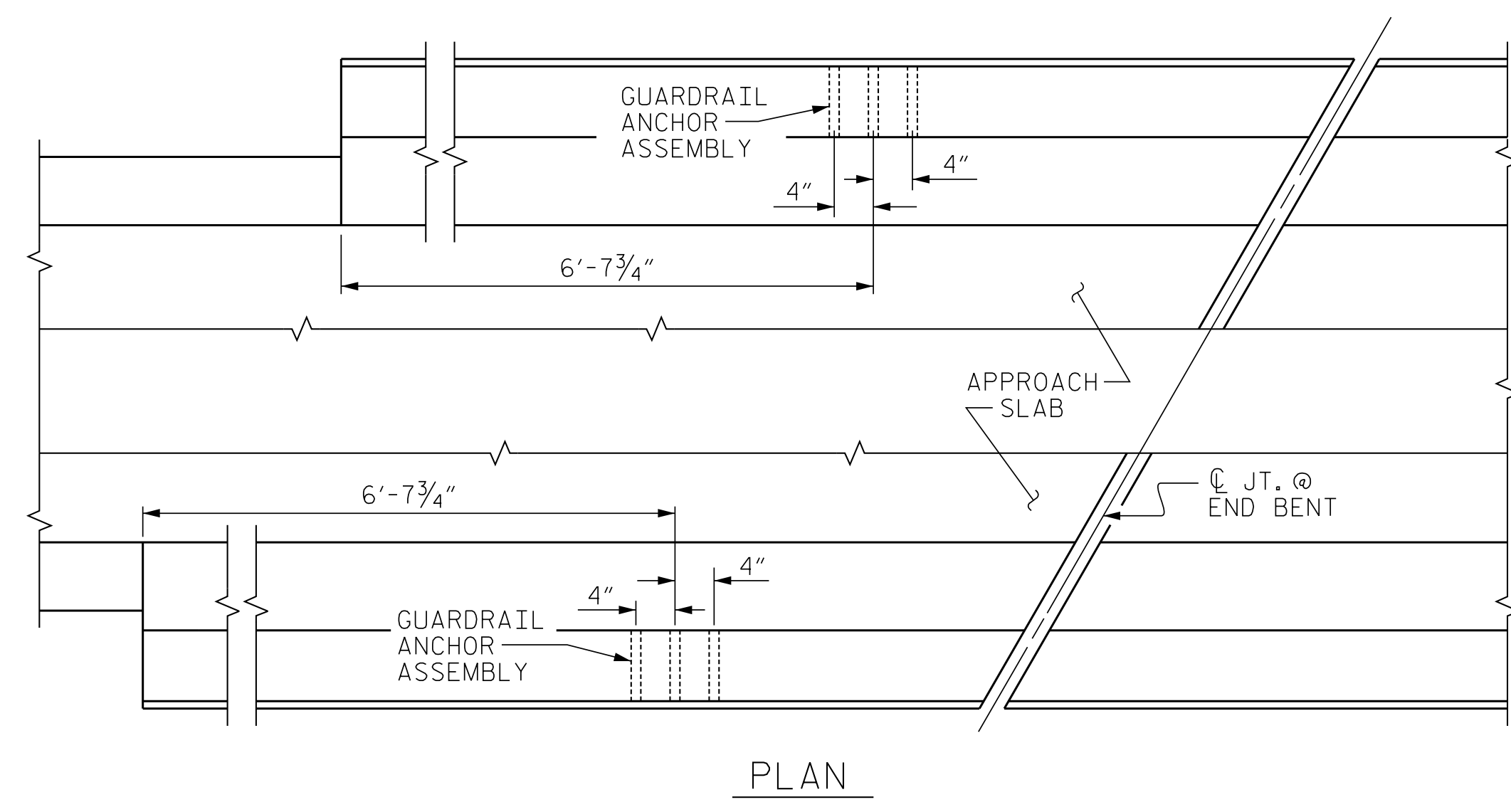
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 1/4" 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.

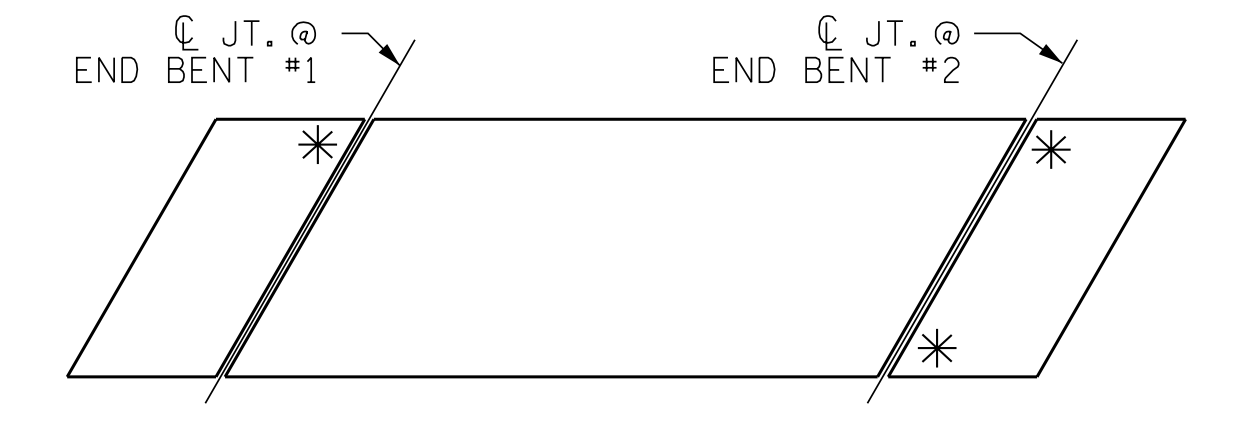


SECTION E-E
 GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 88+35.81 -I73-
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 GUARDRAIL ANCHORAGE
 FOR BARRIER RAIL

ASSEMBLED BY : MAF	DATE : 9/2015	MAA/GM
CHECKED BY : HLW	DATE : 9/2015	MAA/GM
DRAWN BY : TLA 5/06	REV. 7/12	MAA/THC
CHECKED BY : GM 5/06	REV. 6/13	
	REV. 12/17	

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Professional Engineer Seal for Hardy L. Willis, No. 20777, State of North Carolina, expires 8/15/2019.

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2			4			26

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	127	#5	STR	42'-11"	5685
A2	127	#5	STR	42'-11"	5685
* A101	3	#5	STR	40'-7"	127
* A102	3			37'-11"	119
* A103	3			35'-3"	110
* A104	3			32'-7"	102
* A105	3			29'-11"	94
* A106	3			27'-3"	85
* A107	3			24'-7"	77
* A108	3			21'-11"	69
* A109	3			19'-3"	60
* A110	3			16'-7"	52
* A111	3	#5	STR	13'-11"	44
* A112	3			11'-3"	35
* A113	3			8'-7"	27
* A114	3			5'-11"	19
* A115	3			3'-3"	10
* A116	1			2'-4"	2
* A117	3			40'-7"	127
* A118	3			37'-11"	119
* A119	3			35'-2"	110
* A120	3			32'-6"	102
* A121	3	#5	STR	29'-10"	93
* A122	3			27'-1"	85
* A123	3			24'-5"	76
* A124	3			21'-9"	68
* A125	3			19'-0"	60
* A126	3			16'-4"	51
* A127	3			13'-8"	43
* A128	3			10'-11"	34
* A129	3			8'-3"	26
* A130	3			5'-7"	17
* A131	3			2'-10"	9
* A132	1	#5	STR	2'-0"	2
A201	3	#5	STR	40'-7"	127
A202	3			37'-11"	119
A203	3			35'-3"	110
A204	3			32'-7"	102
A205	3			29'-11"	94
A206	3			27'-3"	85
A207	3			24'-7"	77
A208	3			21'-11"	69
A209	3			19'-3"	60
A210	3			16'-7"	52
A211	3	#5	STR	13'-11"	44
A212	3			11'-3"	35
A213	3			8'-7"	27
A214	3			5'-11"	19
A215	3			3'-3"	10
A216	1			2'-4"	2
A217	3			40'-7"	127
A218	3	#5	STR	37'-11"	119

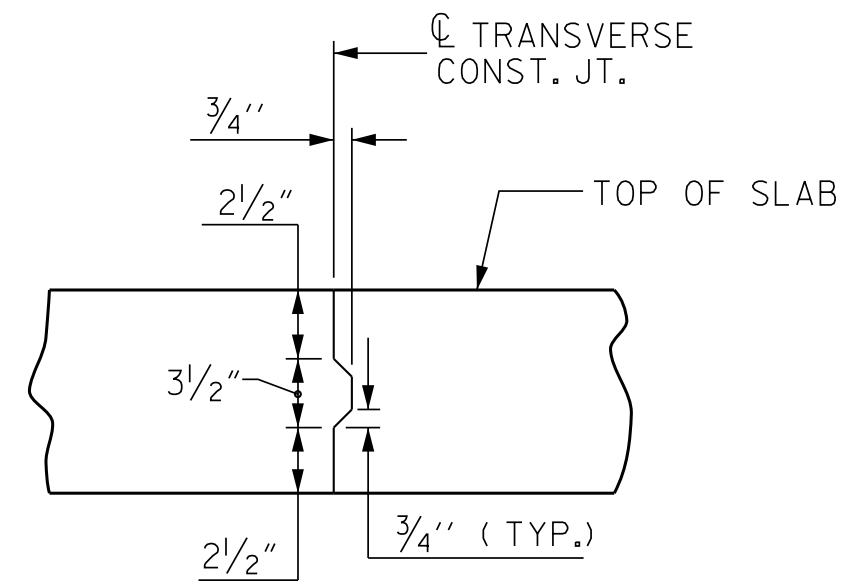
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A219	3	#5	STR	35'-2"	110
A220	3			32'-6"	102
A221	3			29'-10"	93
A222	3			27'-1"	85
A223	3			24'-5"	76
A224	3			21'-9"	68
A225	3			19'-0"	60
A226	3			16'-4"	51
A227	3			13'-8"	43
A228	3			10'-11"	34
A229	3			8'-3"	26
A230	3			5'-7"	17
A231	3			2'-10"	9
A232	1	#5	STR	2'-0"	2
* B1	120	#4	STR	28'-10"	2311
B2	76	#5	STR	55'-9"	4419
* G1	1	#5	STR	52'-7"	55
* G2	1	#5	STR	52'-1"	54
* J1	96	#4	5	1'-5"	91
* K1	8	#8	1	12'-10"	274
* K2	12	#8	2	18'-0"	577
* K3	24	#6	STR	6'-5"	231
* S1	48	#4	4	5'-8"	182
* S2	48	#5	3	5'-7"	280
REINFORCING STEEL					12,158 LBS.
* EPOXY COATED REINF. STEEL					11,794 LBS.

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,820	SQ.FT.
BRIDGE DECK	4,030	SQ.FT.
TOTAL	5,850	SQ.FT.

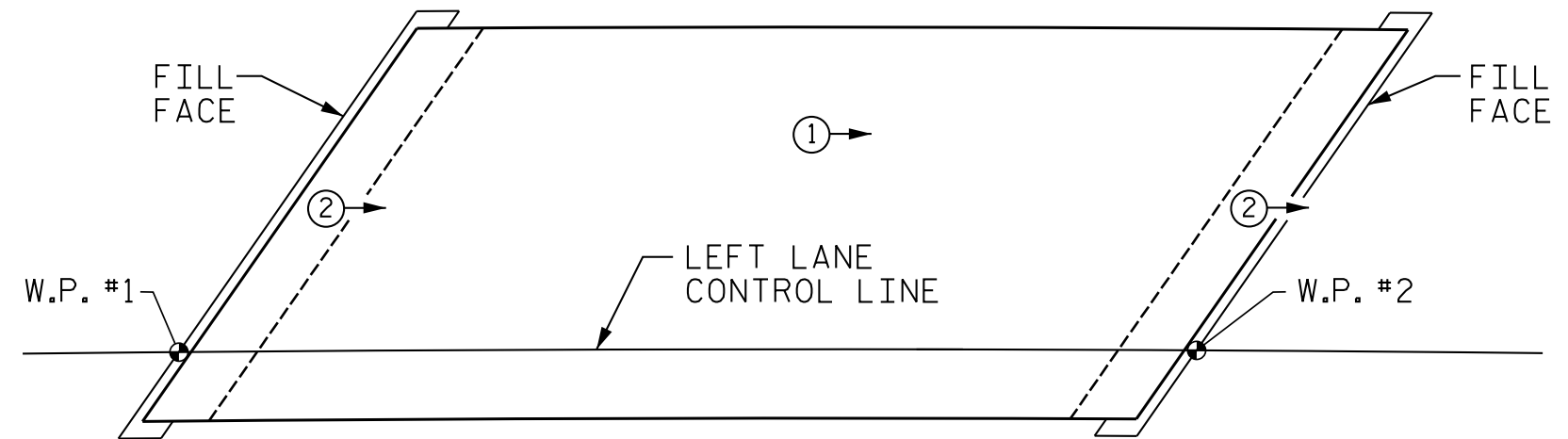
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

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

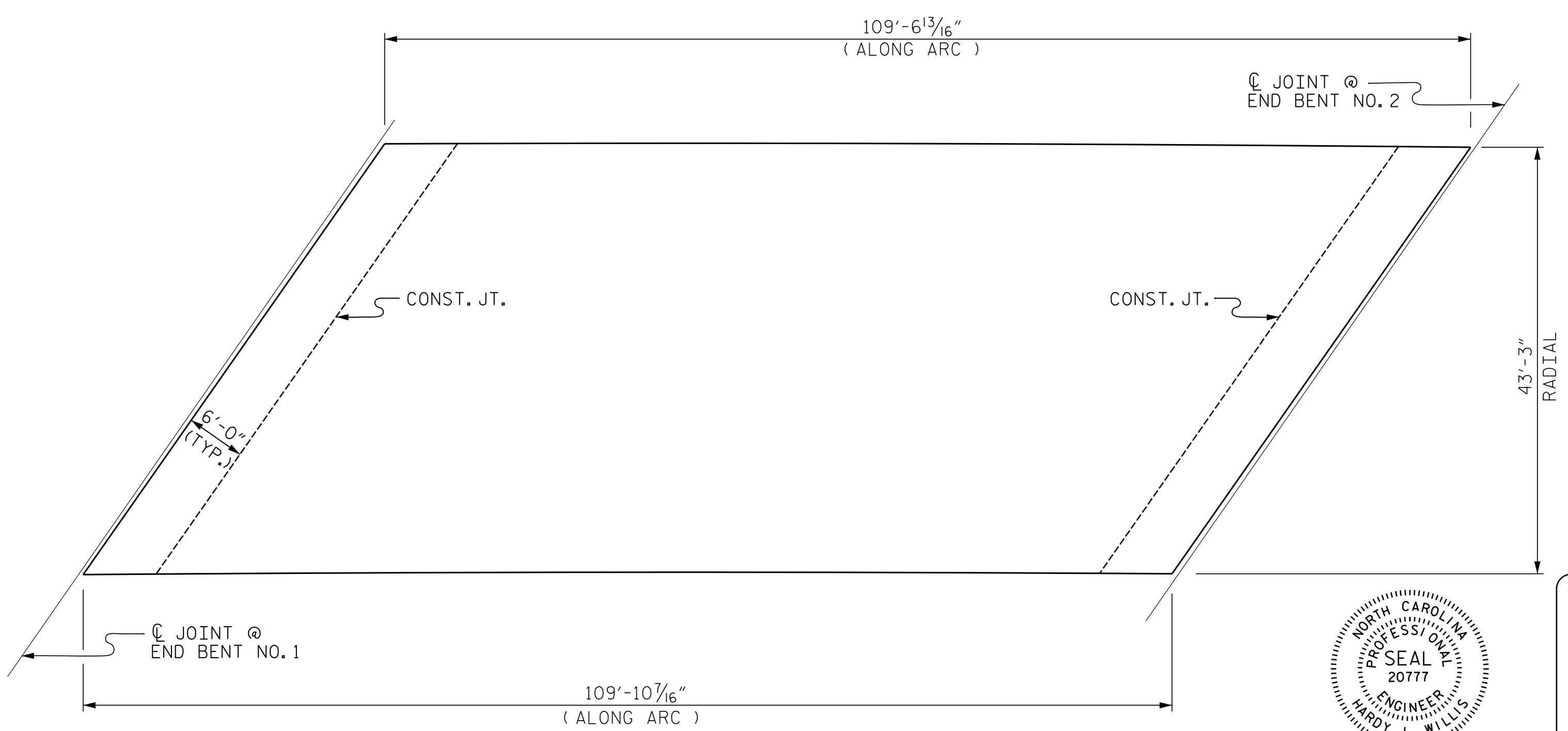


TRANSVERSE CONSTRUCTION JOINT DETAIL

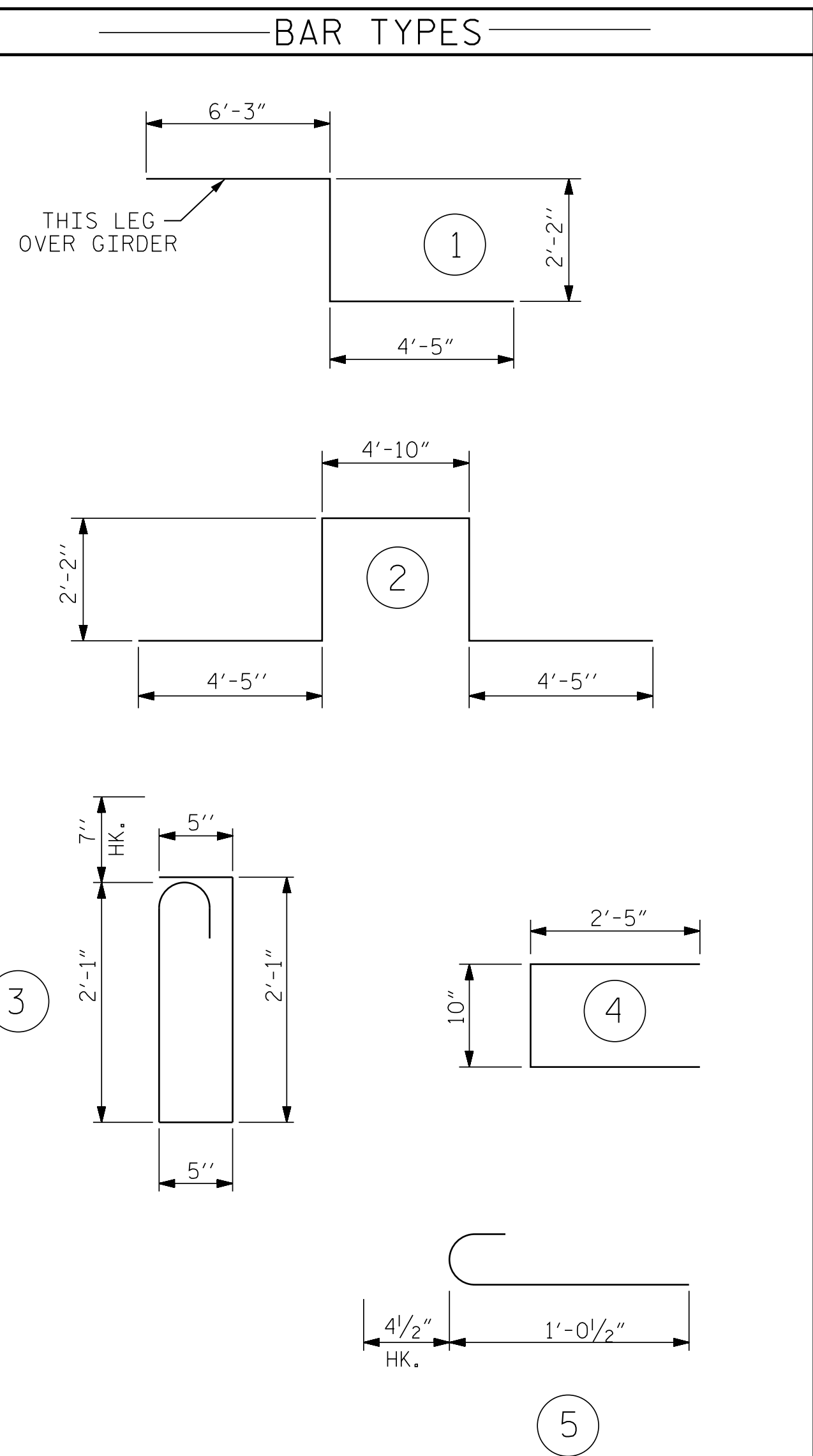
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT



POURING SEQUENCE



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 4,746)



ALL BAR DIMENSIONS ARE OUT TO OUT.

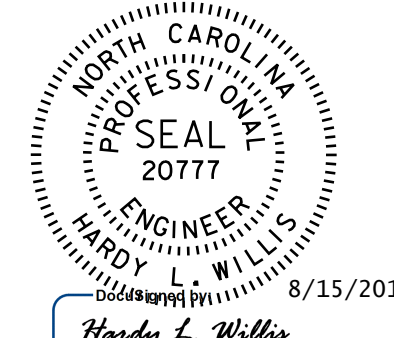
—SUPERSTRUCTURE BILL OF MATERIAL—

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
SPAN A	141.5	12,158	11,794
TOTALS**	141.5	12,158	11,794

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 88+35.81 -I73-
27+16.54 -FLY-

ASSEMBLED BY : MAF DATE : 9/2015
 CHECKED BY : HLW DATE : 9/2015
 DRAWN BY : JMB 5/87 REV. 8/16/99 RWW/LES
 CHECKED BY : SJD 9/87 REV. 5/1/06 TLA/GM
 REV. 10/1/11 MAA/GM



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Raleigh, NC 919-977-9455
 Charlotte, NC 704-357-0488
 Atlanta, GA 770-627-3509

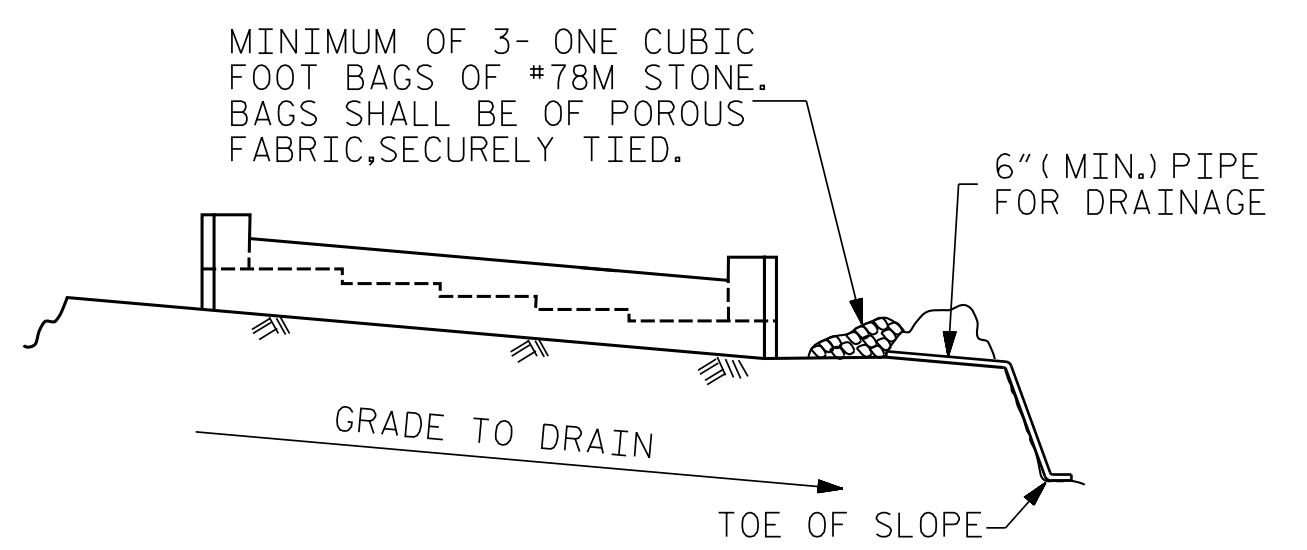
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 SUPERSTRUCTURE
 BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-19
1			3			TOTAL SHEETS 26
2			4			

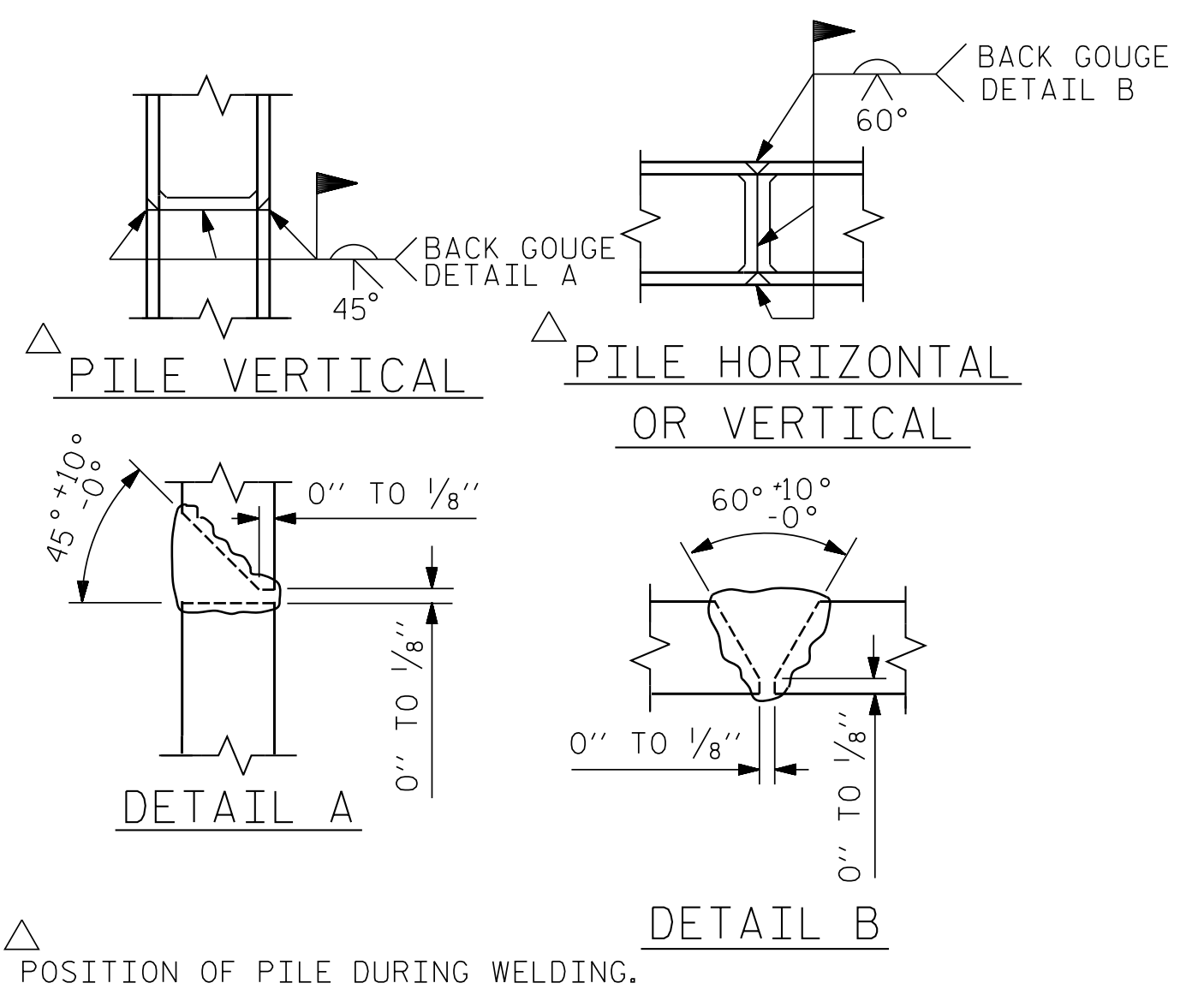


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

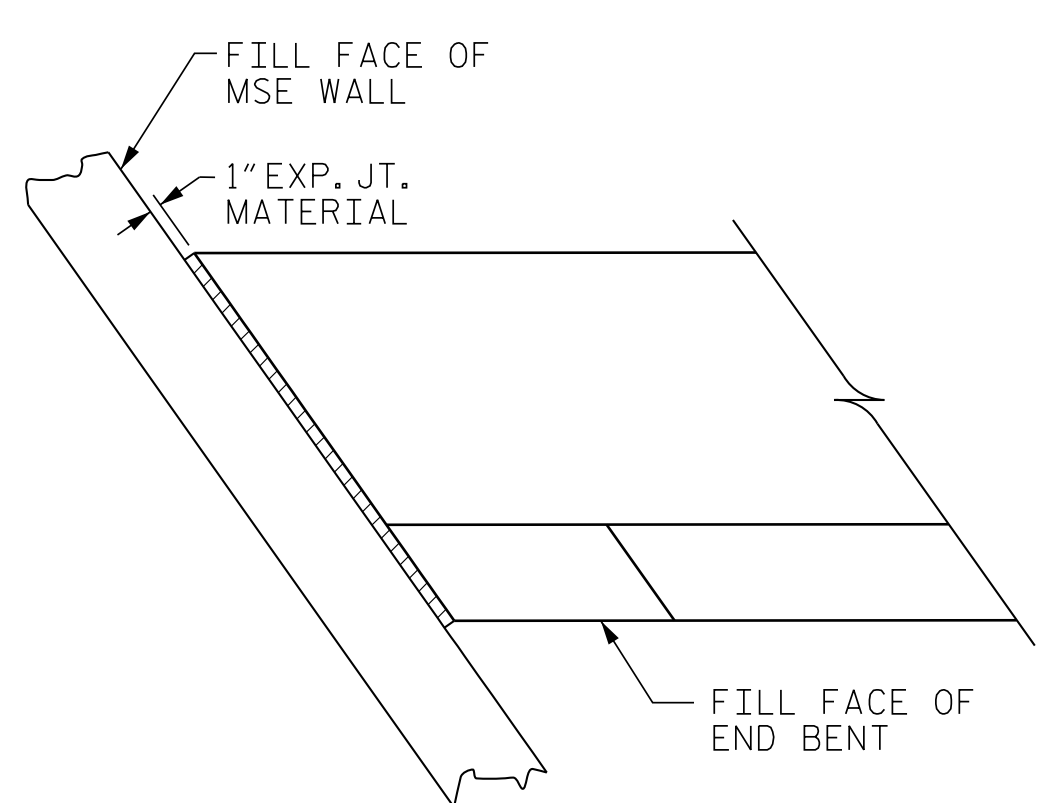
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

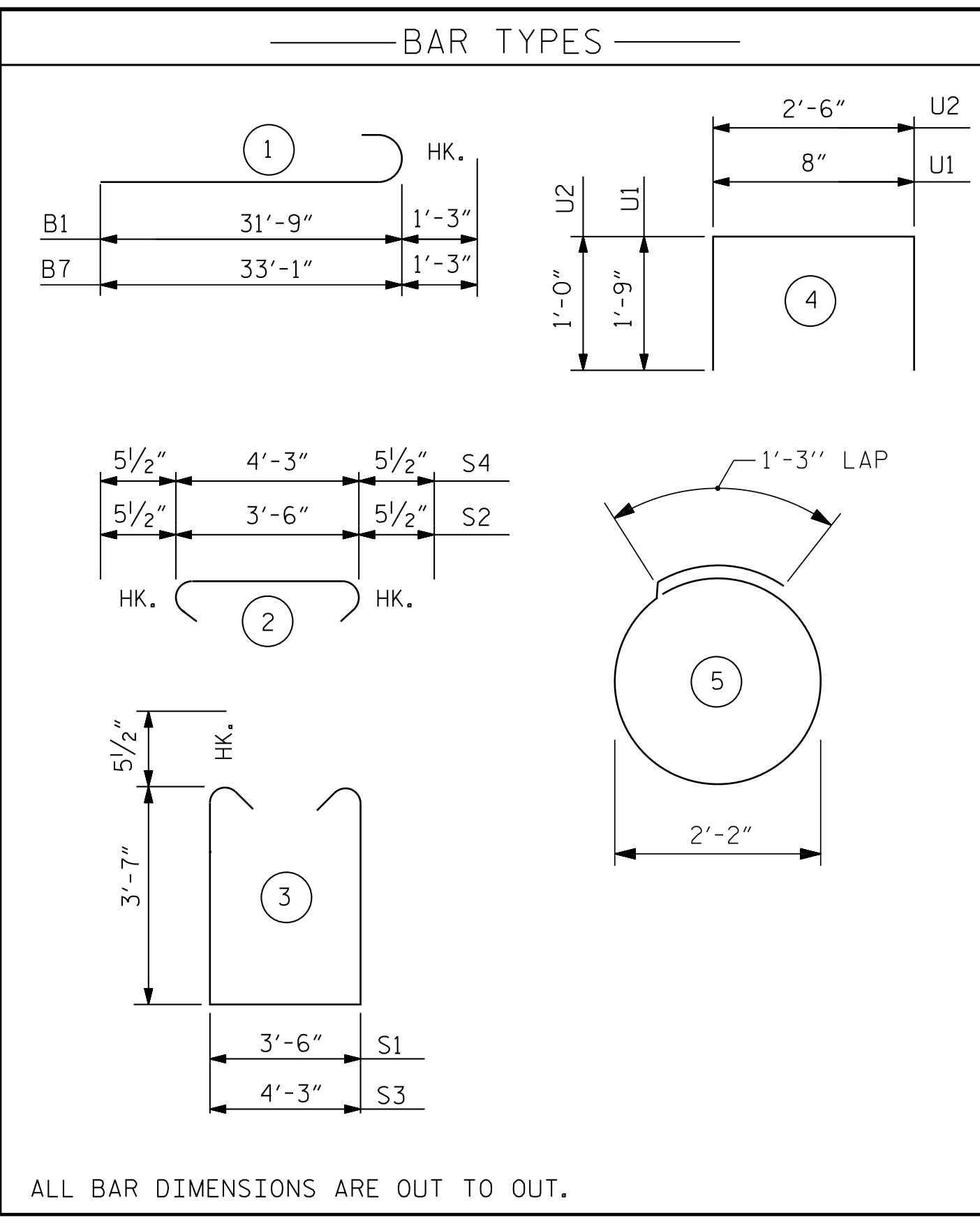


PILE SPLICE DETAILS



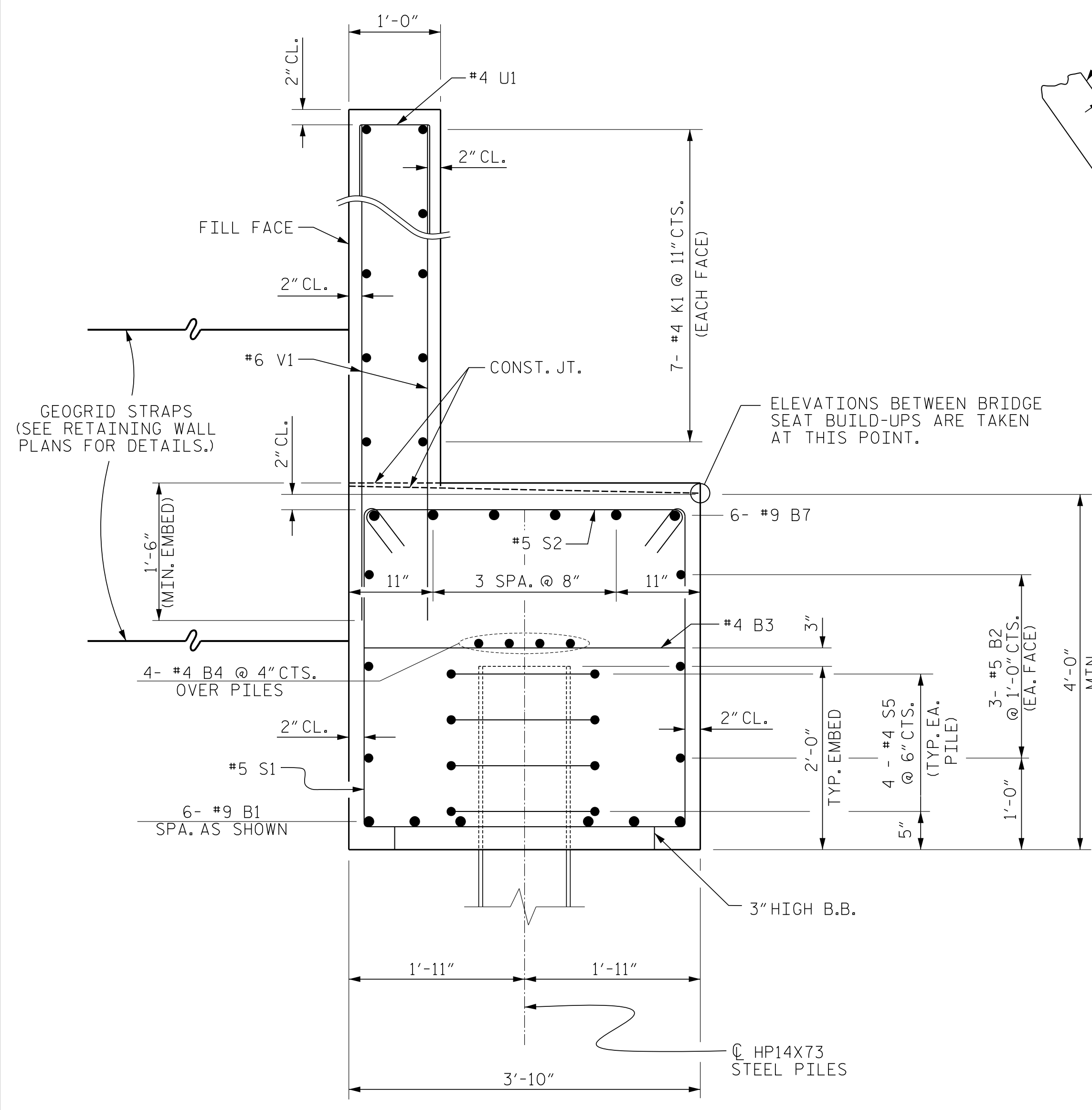
END OF CAP DETAIL

LEFT END SHOWN, RIGHT END SIMILAR.

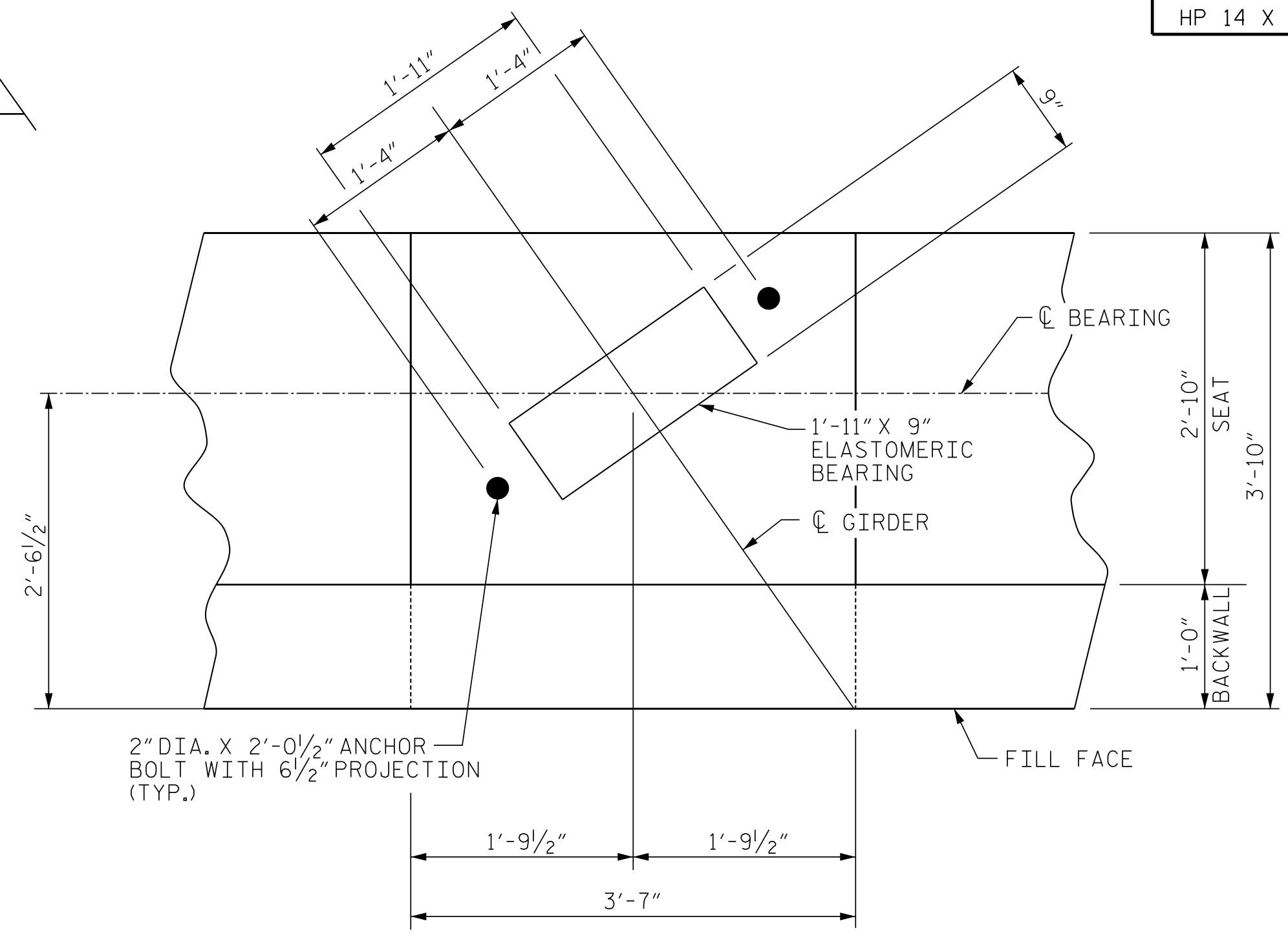


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL - END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	(1)	33'-0"	1346
B2	6	#5	STR	57'-3"	358
B3	14	#4	STR	3'-6"	33
B4	8	#4	STR	29'-10"	159
B5	2	#5	STR	31'-1"	64
B6	25	#4	STR	3'-3"	54
B7	12	#9	(1)	34'-4"	1401
K1	28	#4	STR	29'-10"	558
K2	4	#4	STR	1'-9"	5
S1	78	#5	(3)	11'-7"	942
S2	78	#5	(2)	4'-5"	359
S3	2	#5	(3)	12'-4"	26
S4	2	#5	(2)	5'-2"	11
S5	28	#4	(5)	8'-1"	151
U1	85	#4	(4)	4'-2"	237
U2	20	#4	(4)	4'-6"	60
V1	162	#4	STR	7'-7"	821
V2	8	#4	STR	9'-4"	50
REINFORCING STEEL					= 6,635 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1: CAP					= 36.5 C.Y.
POUR #2: BACKWALL					= 13.4 C.Y.
TOTAL CLASS A CONCRETE					= 49.9 C.Y.
PILE DRIVING EQUIPMENT SETUP NO: 7					
FOR HP 14 X 73 STEEL PILES					
STEEL PILE POINTS NO: 7					
HP 14 X 73 STEEL PILES NO: 7					LIN. FT. = 280

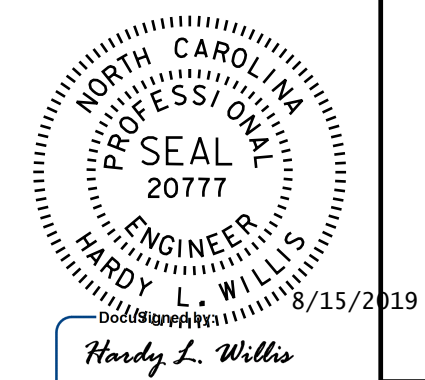


SECTION A-A



DETAIL 'A'

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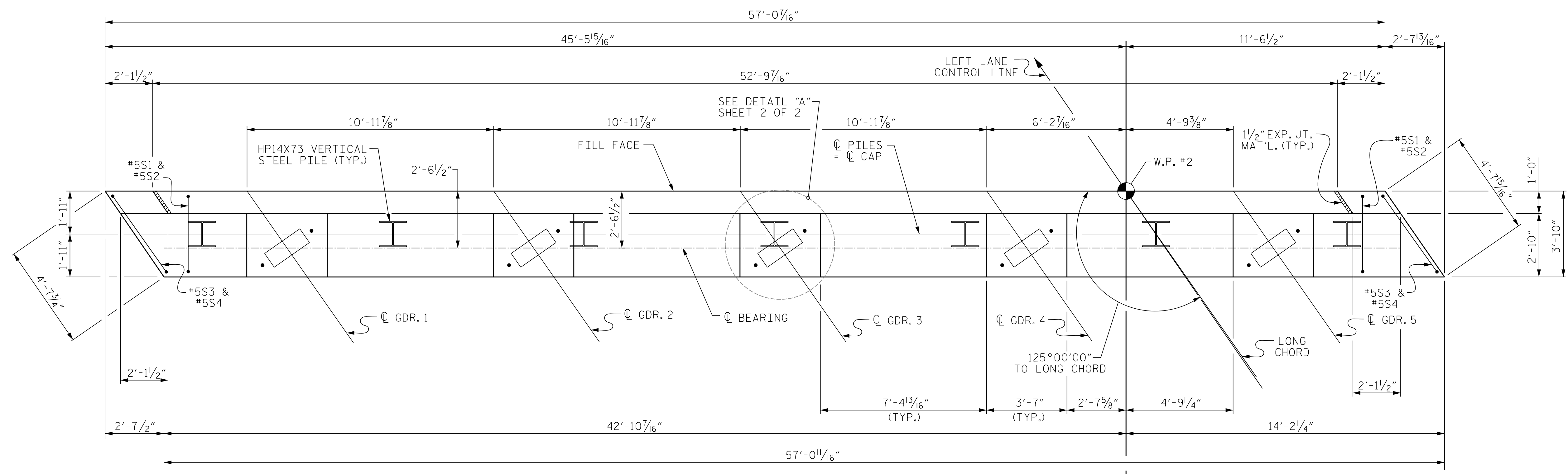
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PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 88+35.81 -I73-
27+16.54 -FLY-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT NO. 1

SHEET 21 OF 26		DATE: 9/15		NO. BY: DATE:		SHEET NO. S01-21	
DWN. BY: MAF		DATE: 9/15		NO. BY: DATE:		TOTAL SHEETS 26	
CHKD. BY: HLW		DATE: 9/15		NO. BY: DATE:			
DES. EGR. OF RECORD: CBC		DATE: 9/15		NO. BY: DATE:			



PLAN

NOTES:

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

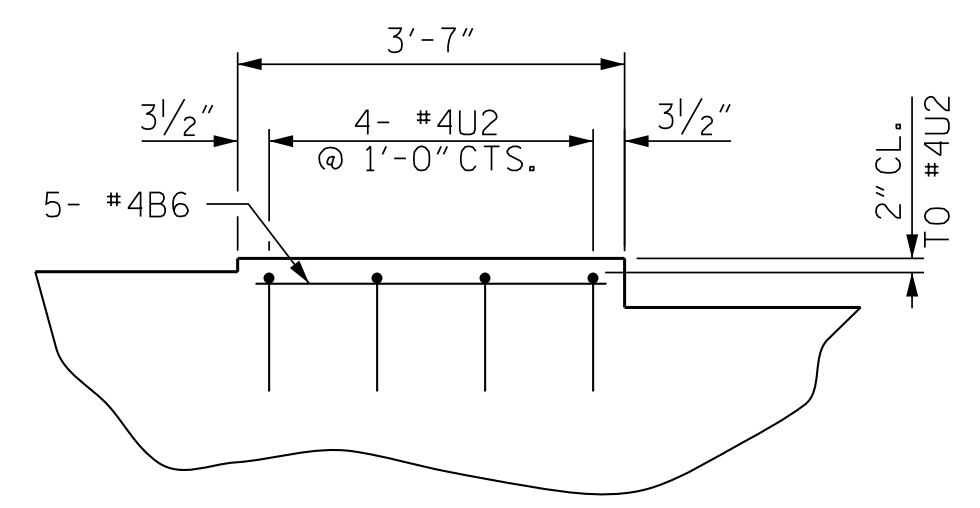
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

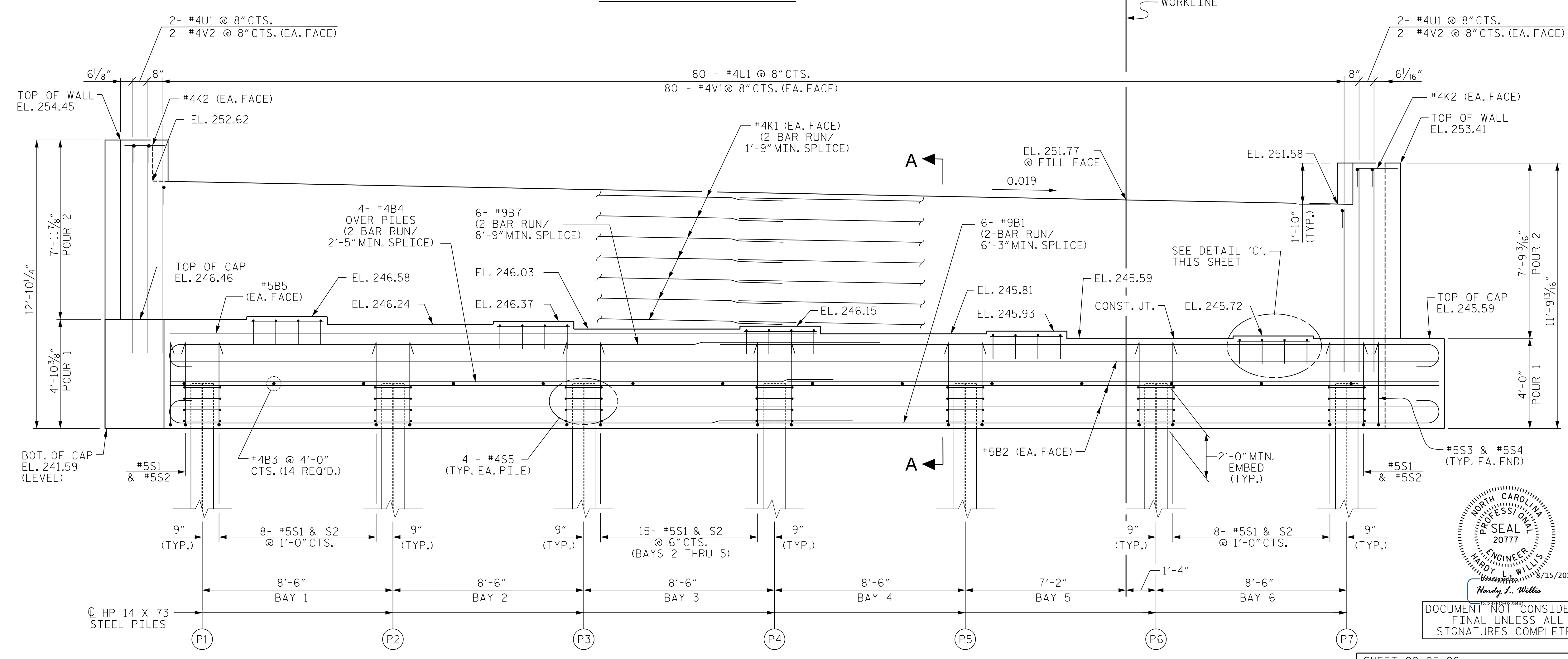
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

CONCRETE PILE COLLARS ARE NOT NECESSARY AT THIS END BENT, SINCE THE PILES ARE BEHIND AN MSE RETAINING WALL.

FOR MSE RETAINING WALLS, SEE SPECIAL PROVISIONS.



DETAIL 'C'



ELEVATION

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STATION: 88+35.81 -I73-
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SHEET 1 OF 2

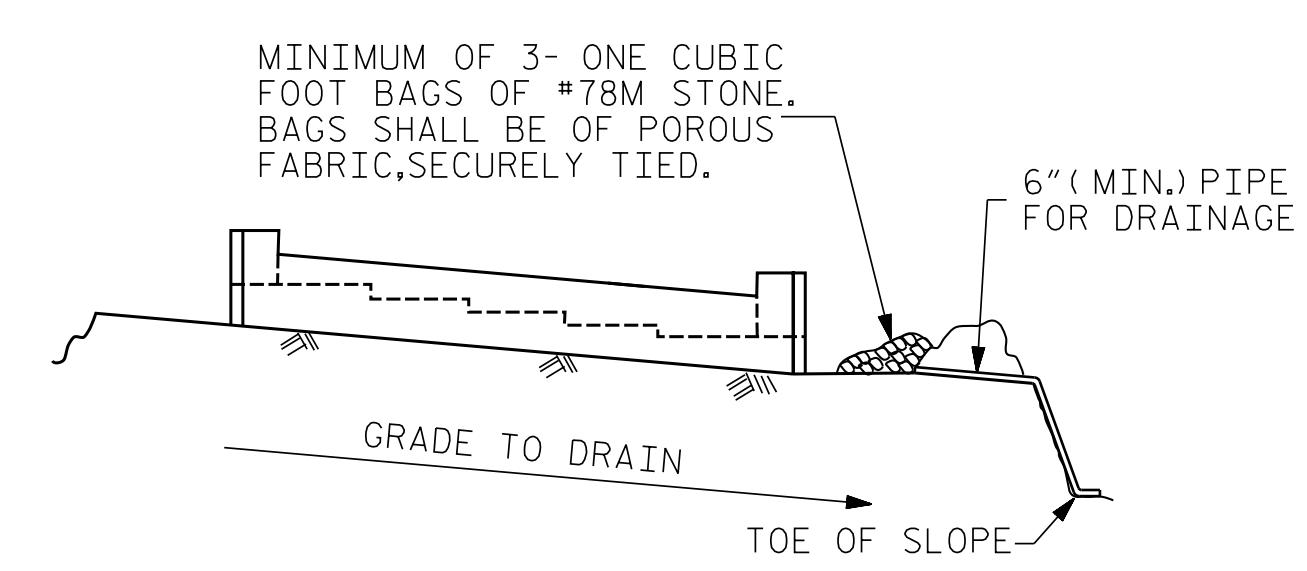
NORTH CAROLINA
PROFESSIONAL
SEAL
ENGINEER
HARDY L. WILKINS
11/15/2019
Hardy L. Wilkins

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT NO. 2

SHEET 22 OF 26		DATE: 9/15		NO. 1		SHEET NO. S01-22	
DWN. BY: MAF		DATE: 9/15		NO. 3		TOTAL SHEETS 26	
CHKD. BY: HLW		DATE: 9/15		NO. 4			
DES. EGR. OF RECORD: CBC		DATE: 9/15		NO. 2			

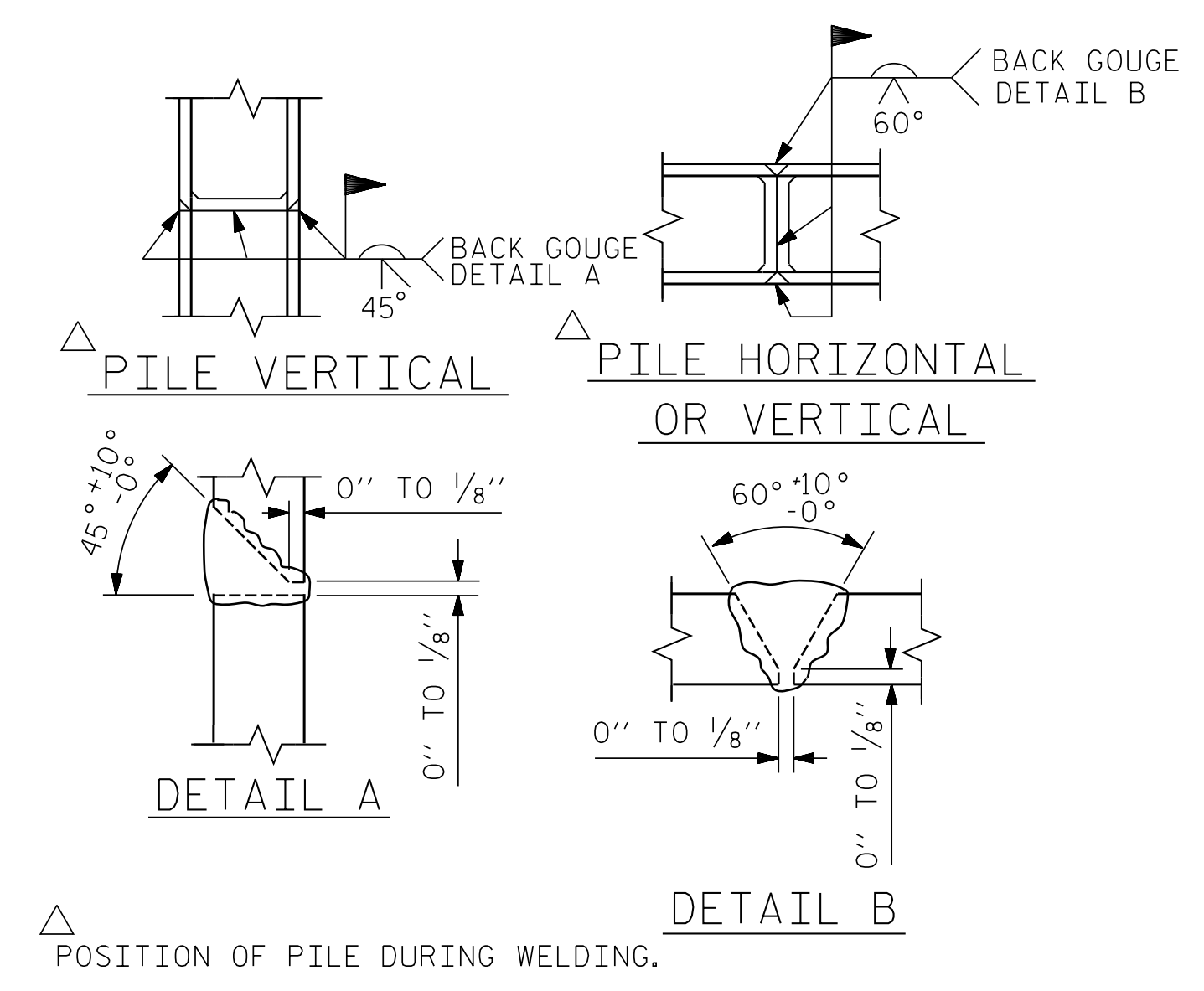


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

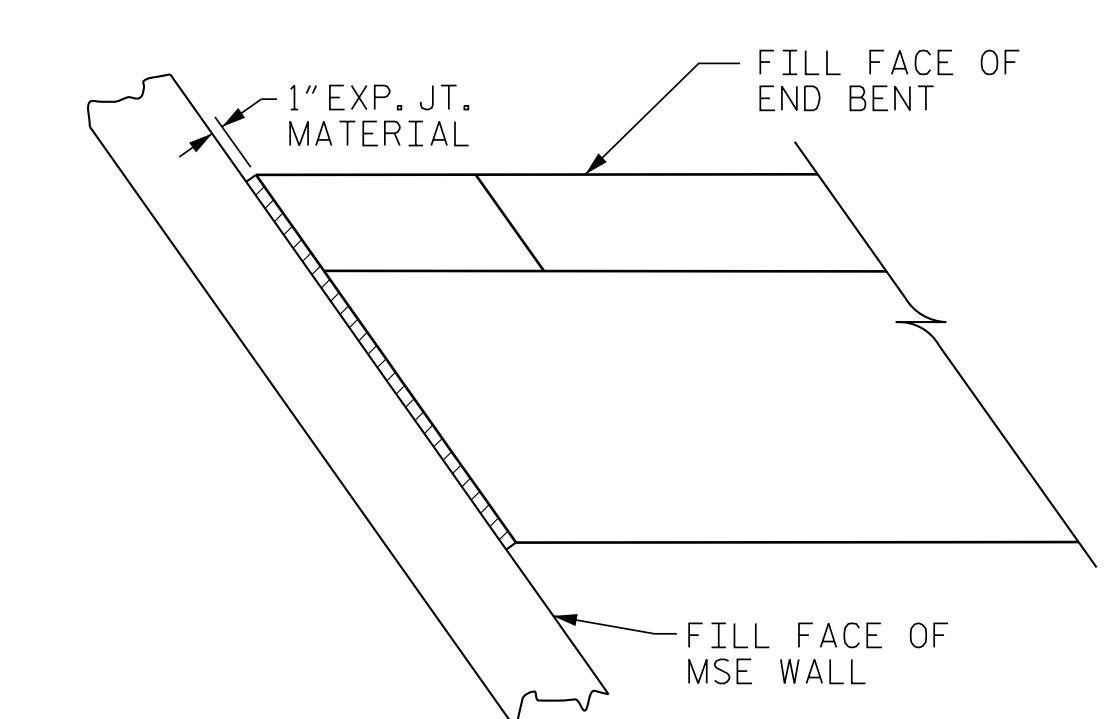
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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TEMPORARY DRAINAGE AT END BENT

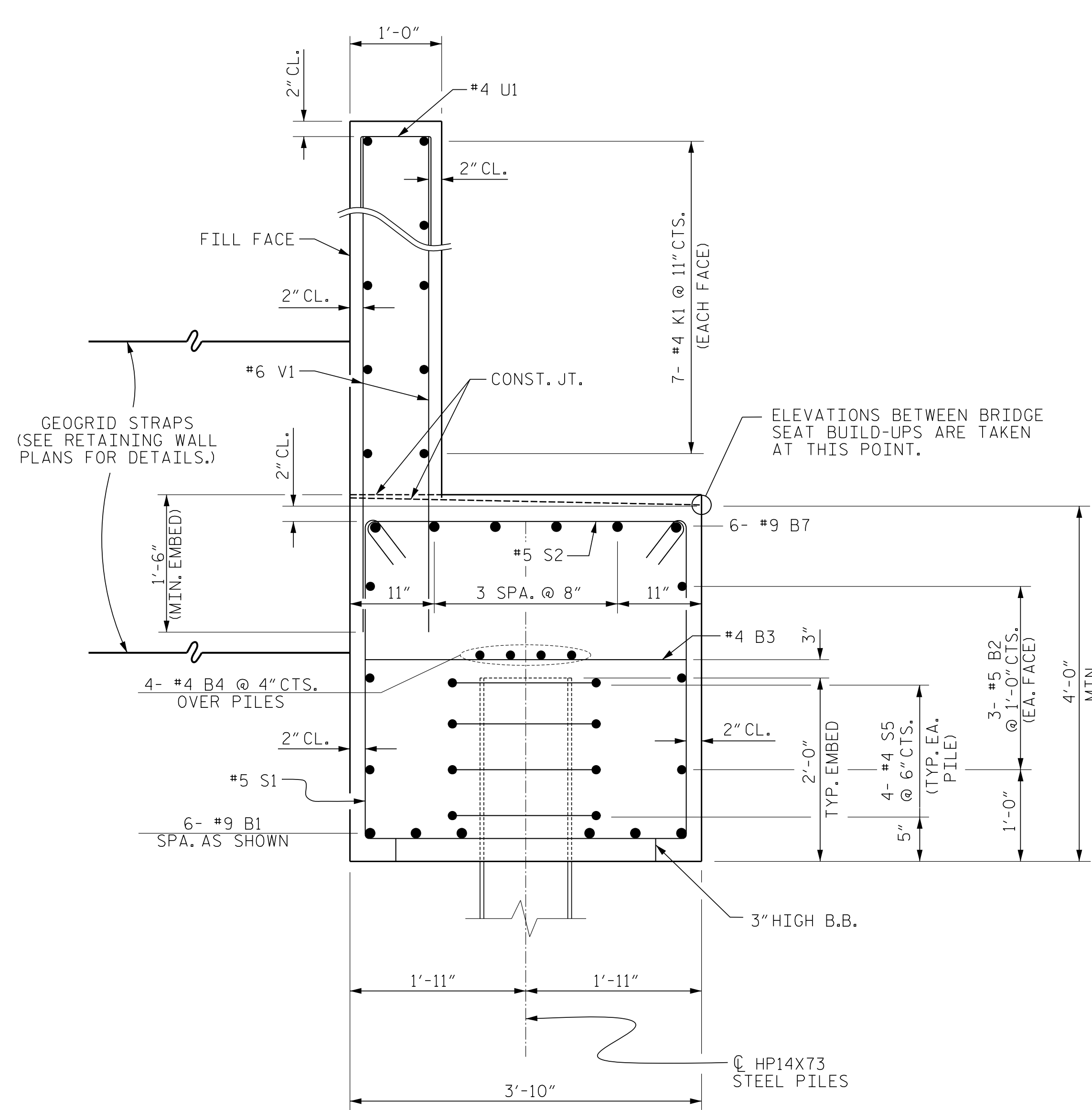


PILE SPLICE DETAILS

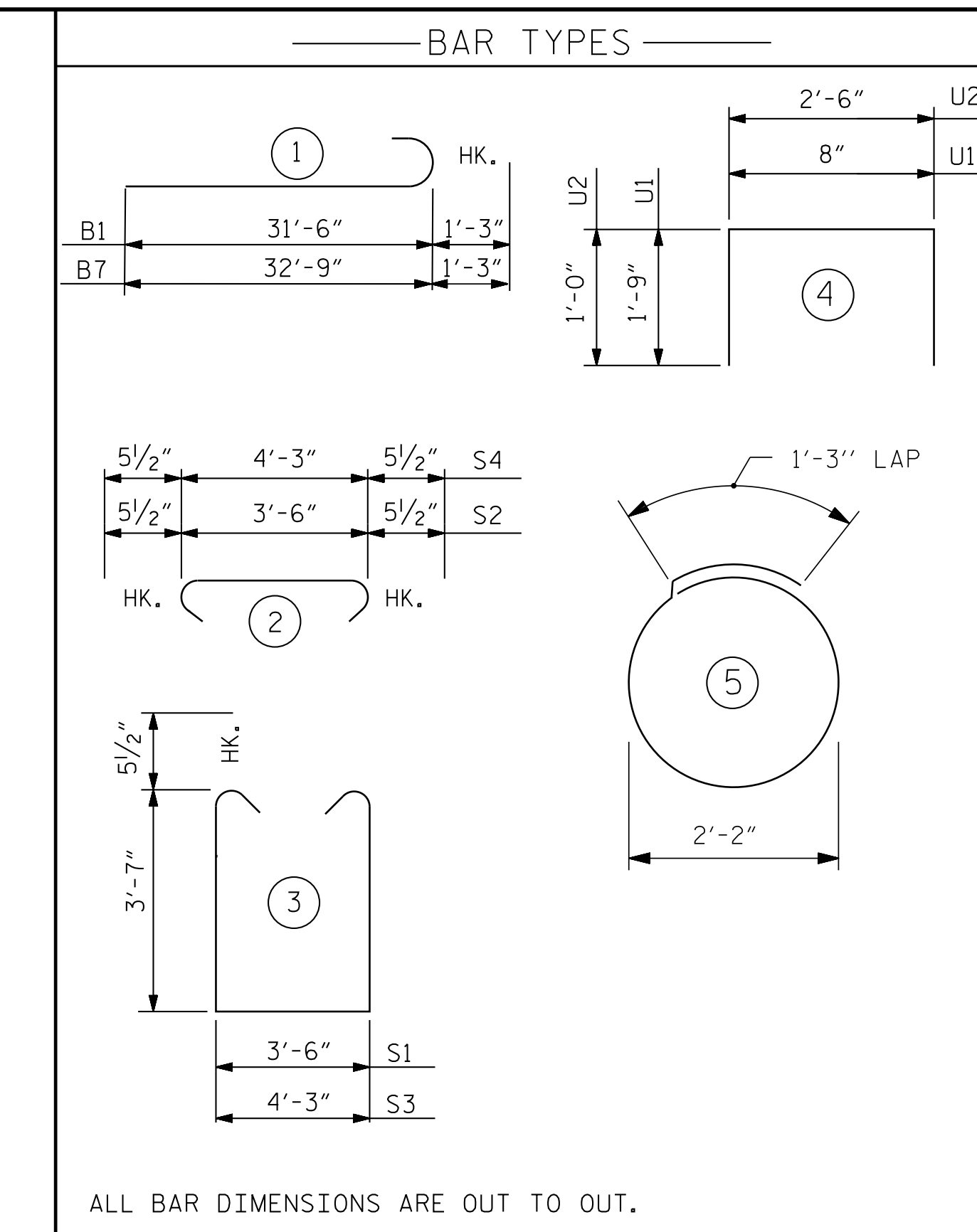


END OF CAP DETAIL

LEFT END SHOWN, RIGHT END SIMILAR.



SECTION A-A



BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL - END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	①	32'-9"	1336
B2	6	#5	STR	56'-8"	355
B3	14	#4	STR	3'-6"	33
B4	8	#4	STR	29'-7"	158
B5	2	#5	STR	31'-1"	65
B6	25	#4	STR	3'-3"	54
B7	12	#9	①	34'-0"	1387
K1	28	#4	STR	29'-3"	547
K2	4	#4	STR	1'-9"	5
S1	78	#5	③	11'-7"	942
S2	78	#5	②	4'-5"	359
S3	2	#5	③	12'-4"	26
S4	2	#5	②	5'-2"	11
S5	28	#4	⑤	8'-1"	151
U1	84	#4	④	4'-2"	234
U2	20	#4	④	4'-6"	60
V1	160	#4	STR	7'-6"	802
V2	8	#4	STR	9'-4"	50

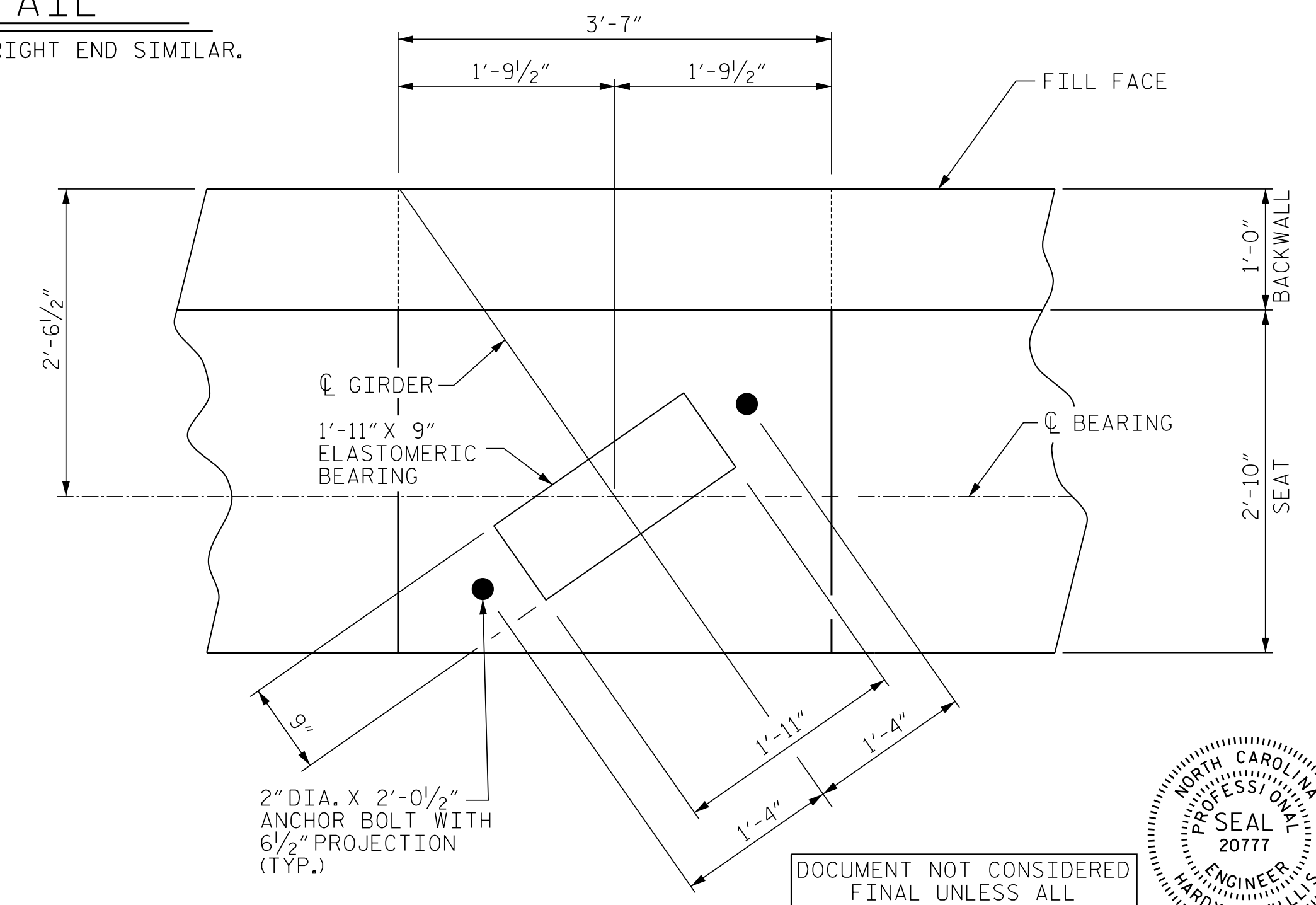
REINFORCING STEEL = 6,575 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1: CAP	= 35.8 C.Y.
POUR #2: BACKWALL	= 13.1 C.Y.
TOTAL CLASS A CONCRETE	= 48.9 C.Y.

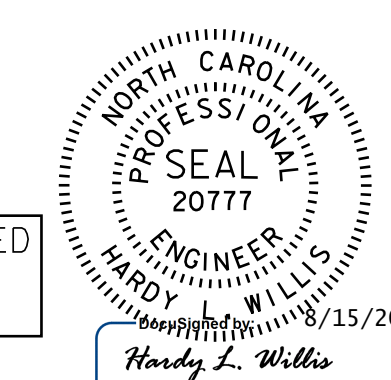
PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	NO: 7
STEEL PILE POINTS	NO: 7
HP 14 X 73 STEEL PILES	NO: 7 LIN. FT. = 210

PILE EXCAVATION IN SOIL	5 LIN. FT.
NOT IN SOIL	65 LIN. FT.



DETAIL 'A'

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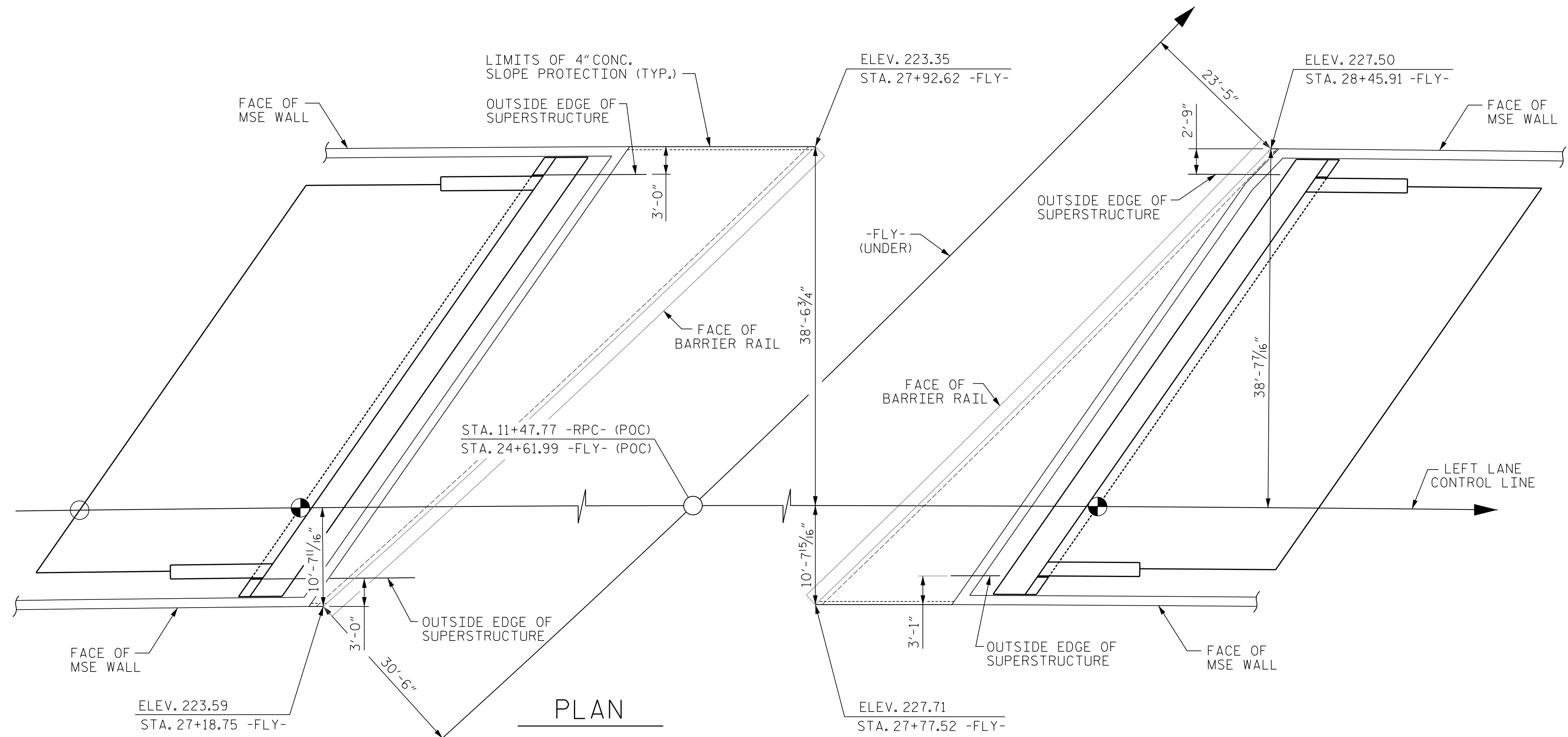
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PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 88+35.81 -I73-
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 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

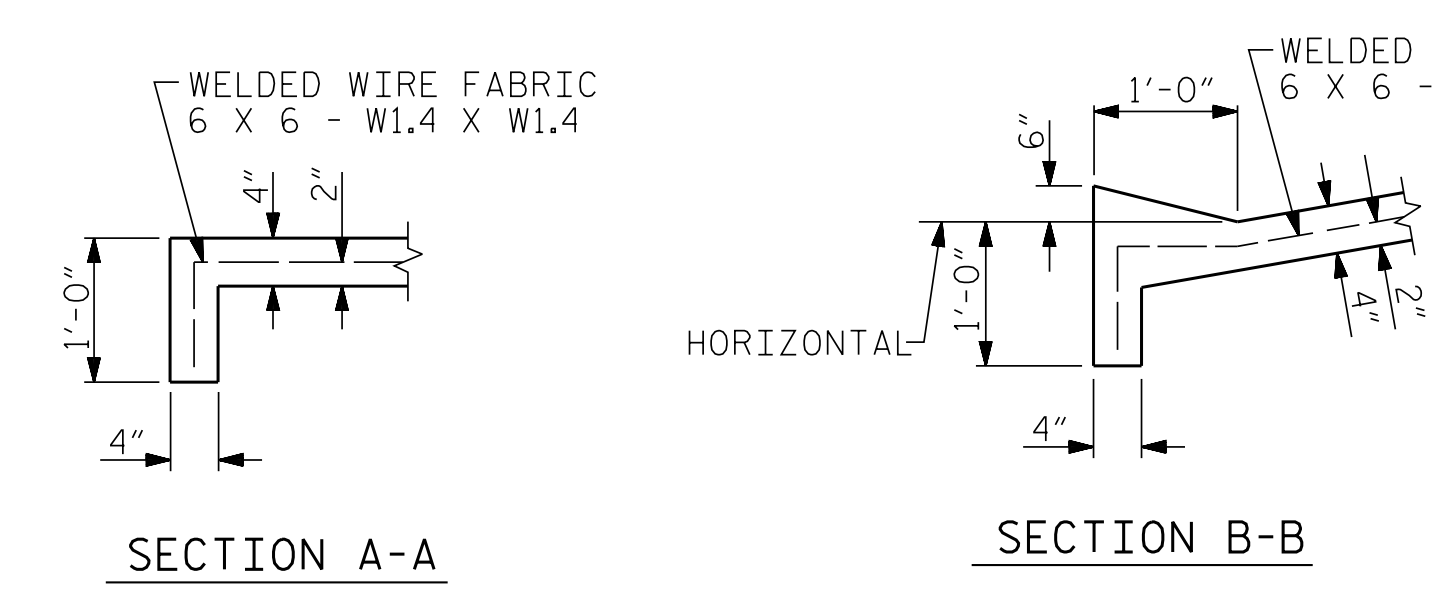
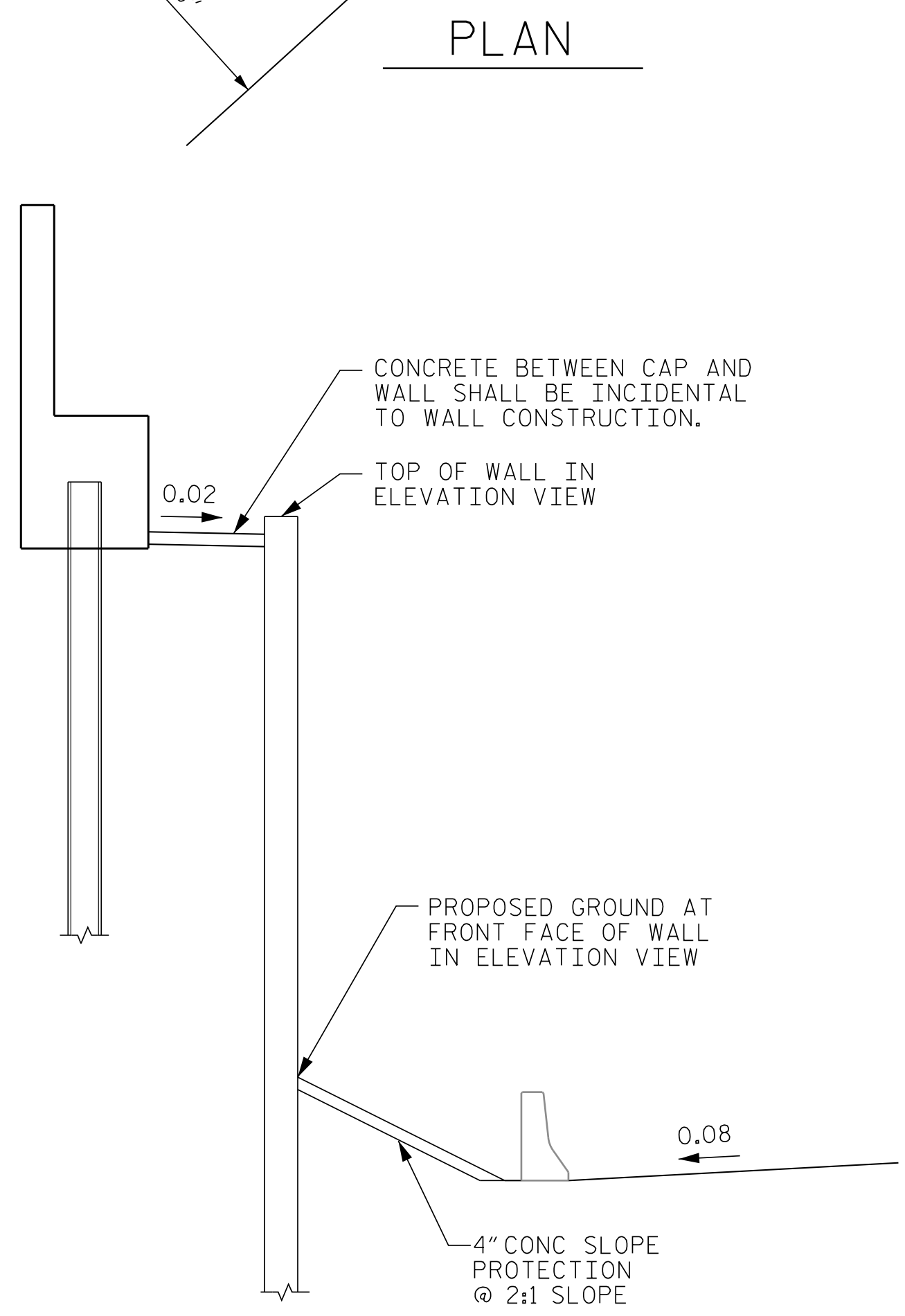
END BENT NO. 2

SHEET 23 OF 26		DATE: 9/15		NO. BY: DATE:		SHEET NO. S01-23	
DWN. BY: MAF	CHKD. BY: HLW	DES. EGR. OF RECORD: CBC	DATE: 9/15	NO. 1	BY: 3	DATE: 8/15/2019	TOTAL SHEETS 26
				NO. 2	BY: 4	DATE:	



GENERAL NOTES

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



BRIDGE @ STA. 88+35.81 -I73- STA. 27+16.54 -FLY-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	66.2	180
END BENT 2	43.1	100

* QUANTITY SHOWN IS BASED ON 5' POURS.



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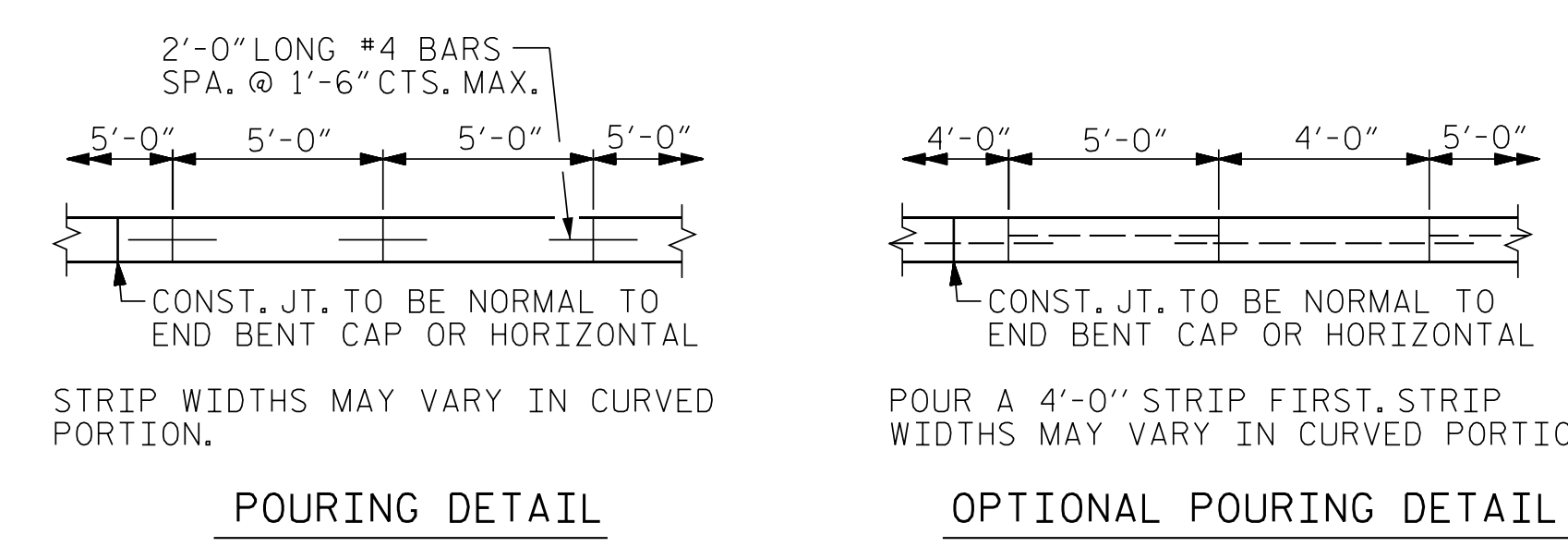
- Boone, NC 828-355-9933
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SLOPE PROTECTION
DETAILS



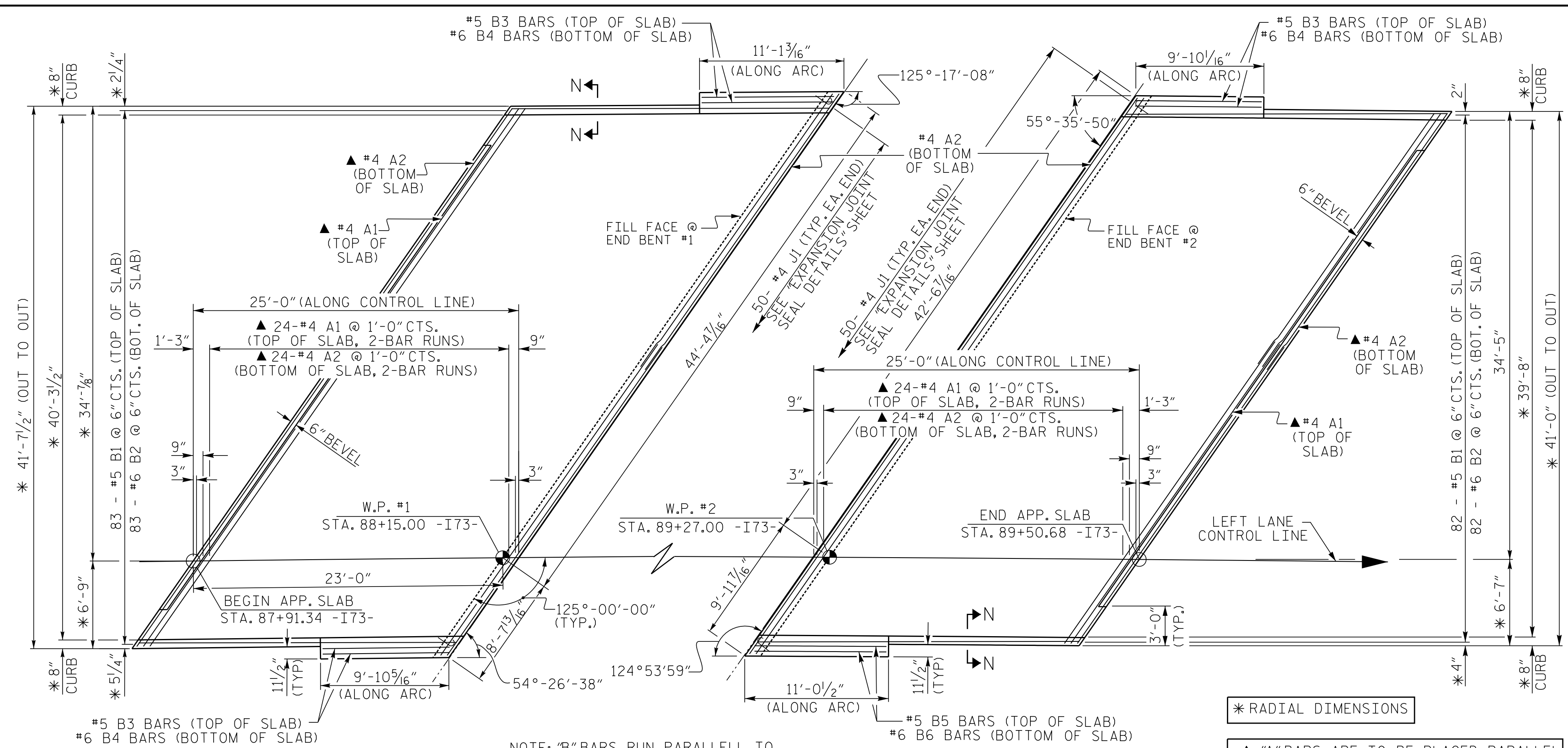
ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : ELR 5/92	REV. 12/21/11 MAA/GM
CHECKED BY : GRP 6/92	REV. 1/16 MAA/TMG
	REV. 12/17 MAA/THC

PARTIAL SECTION ALONG LEFT CONTROL LINE

POURING DETAIL

OPTIONAL POURING DETAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S01-24
2			4			TOTAL SHEETS 26



NOTES

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

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

BACKFILL MATERIAL SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.

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

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.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR	27'-5"	952
A2	54	#4	STR	27'-3"	983
*B1	83	#5	STR	23'-4"	2020
B2	83	#6	STR	24'-6"	3054
*B3	2	#5	STR	10'-0"	21
B4	2	#6	STR	10'-0"	31
*B5	2	#5	STR	9'-9"	20
B6	2	#6	STR	9'-9"	29
*J1	50	#4	1	1'-5"	47

REINFORCING STEEL LBS. 4097

* EPOXY COATED REINFORCING STEEL LBS. 3060

CLASS AA CONCRETE C. Y. 45.8

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR	27'-1"	941
A2	54	#4	STR	26'-11"	971
*B1	82	#5	STR	23'-8"	2024
B2	82	#6	STR	24'-8"	3038
*B3	2	#5	STR	9'-8"	20
B4	2	#6	STR	9'-8"	29
*B5	2	#5	STR	10'-1"	21
B6	2	#6	STR	10'-1"	30
*J1	50	#4	1	1'-5"	47

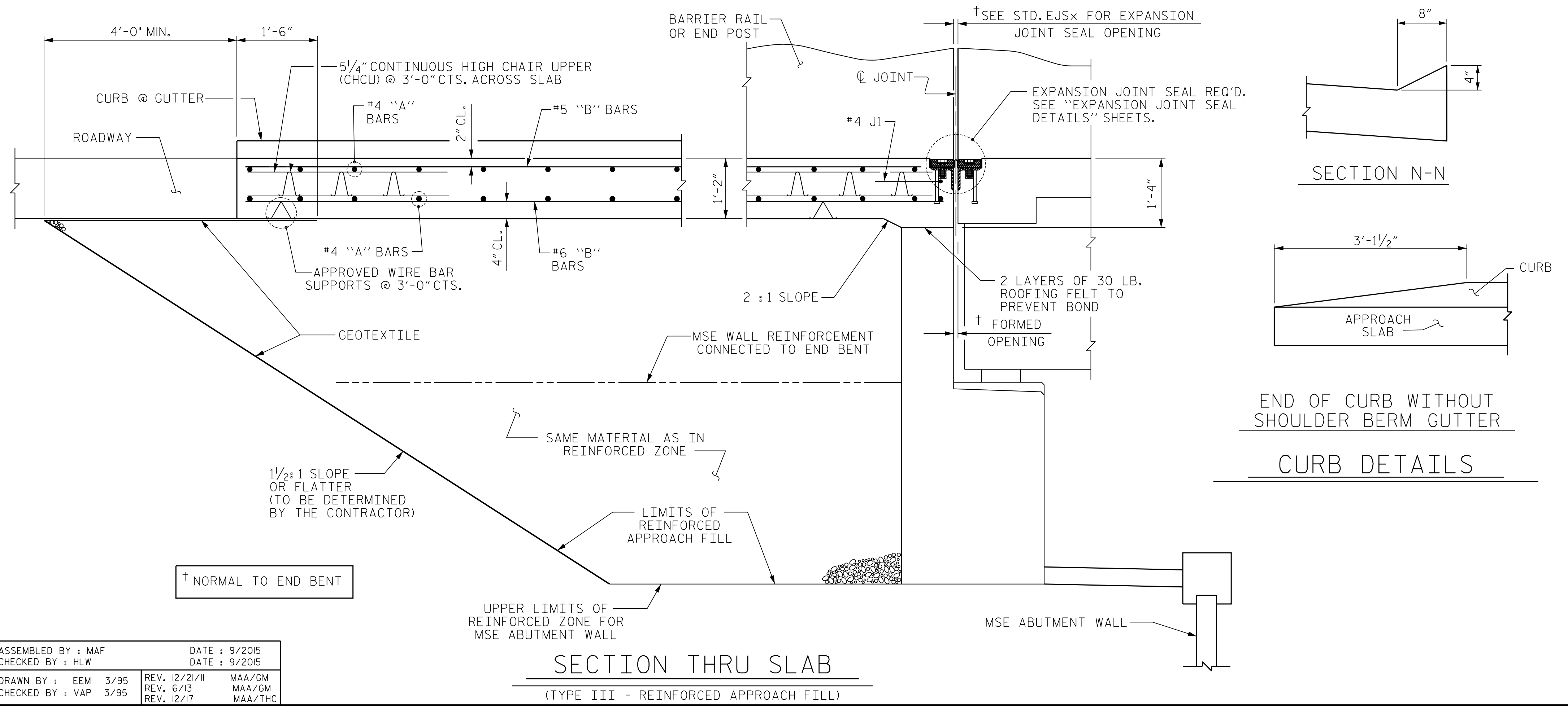
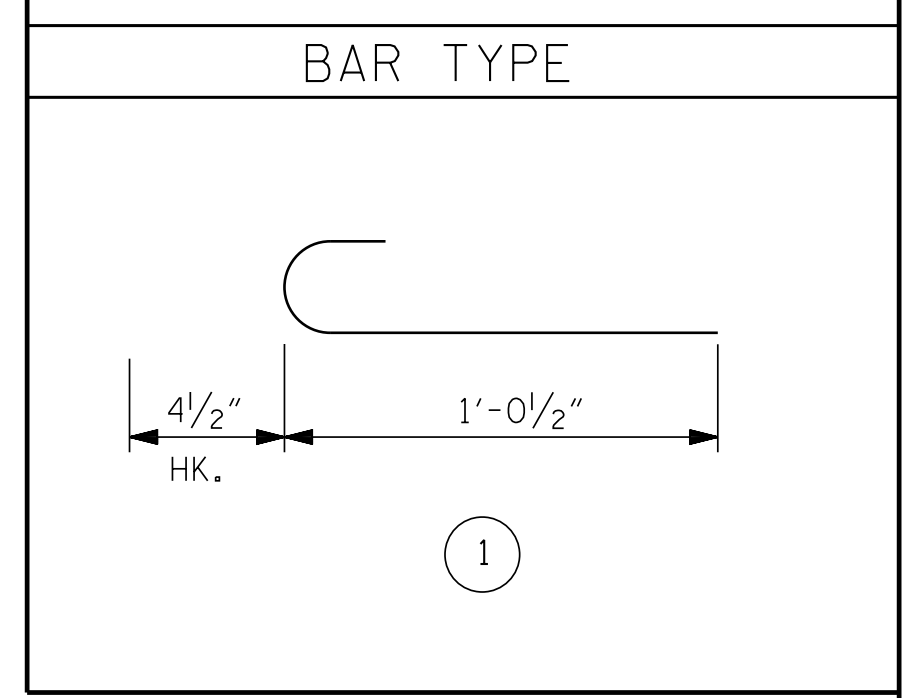
REINFORCING STEEL LBS. 4068

* EPOXY COATED REINFORCING STEEL LBS. 3053

CLASS AA CONCRETE C. Y. 45.8

SPLICE LENGTHS

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



PROFESSIONAL SEAL
 HARDY L. WILKINS
 ENGINEER
 8/15/2019
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PROJECT NO. R-3421A
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 STATION: 88+35.81 -I73-
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 SHEET 1 OF 2

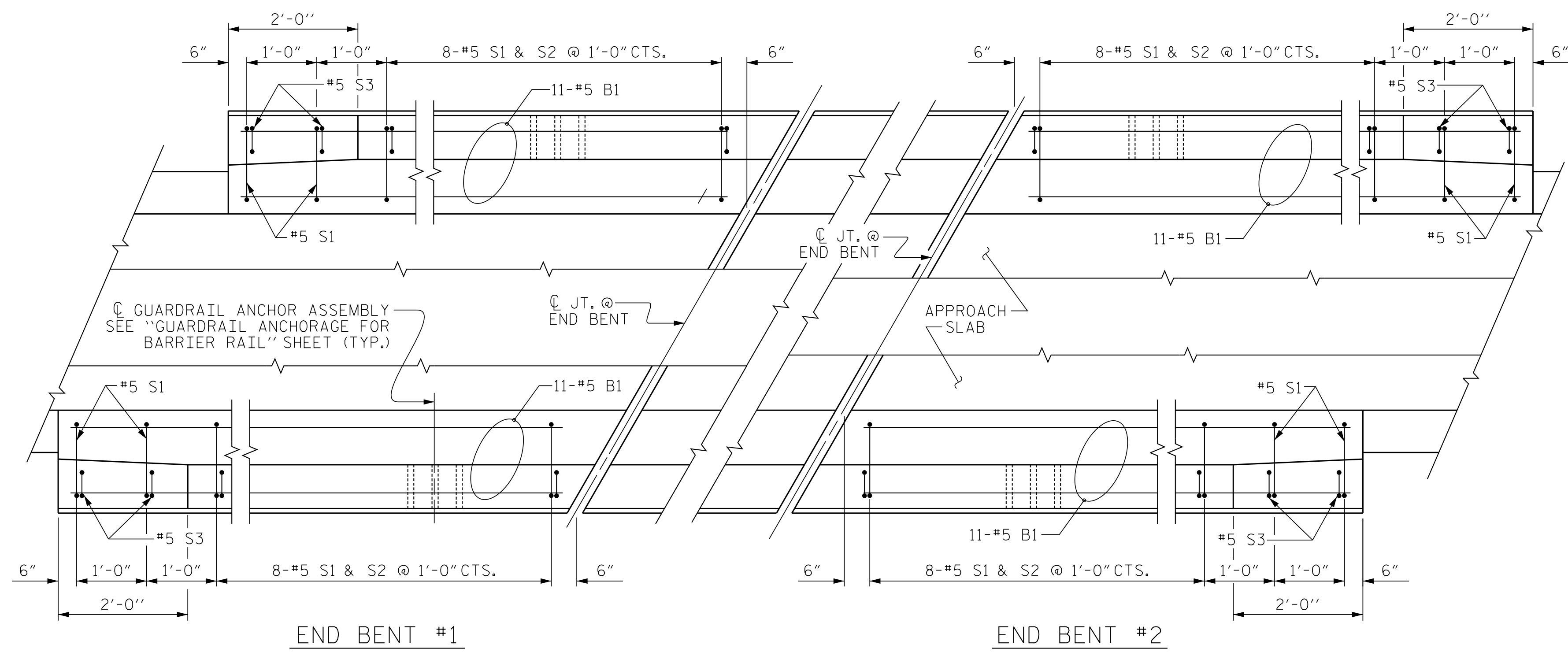
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-25	
1			3			TOTAL SHEETS	
2			4			26	

ASSEMBLED BY : MAF DATE : 9/2015
 CHECKED BY : HLW DATE : 9/2015

DRAWN BY : EEM 3/95 REV. 12/21/11 MAA/GM
 CHECKED BY : VAP 3/95 REV. 6/13 MAA/GM
 REV. 12/17 MAA/THC



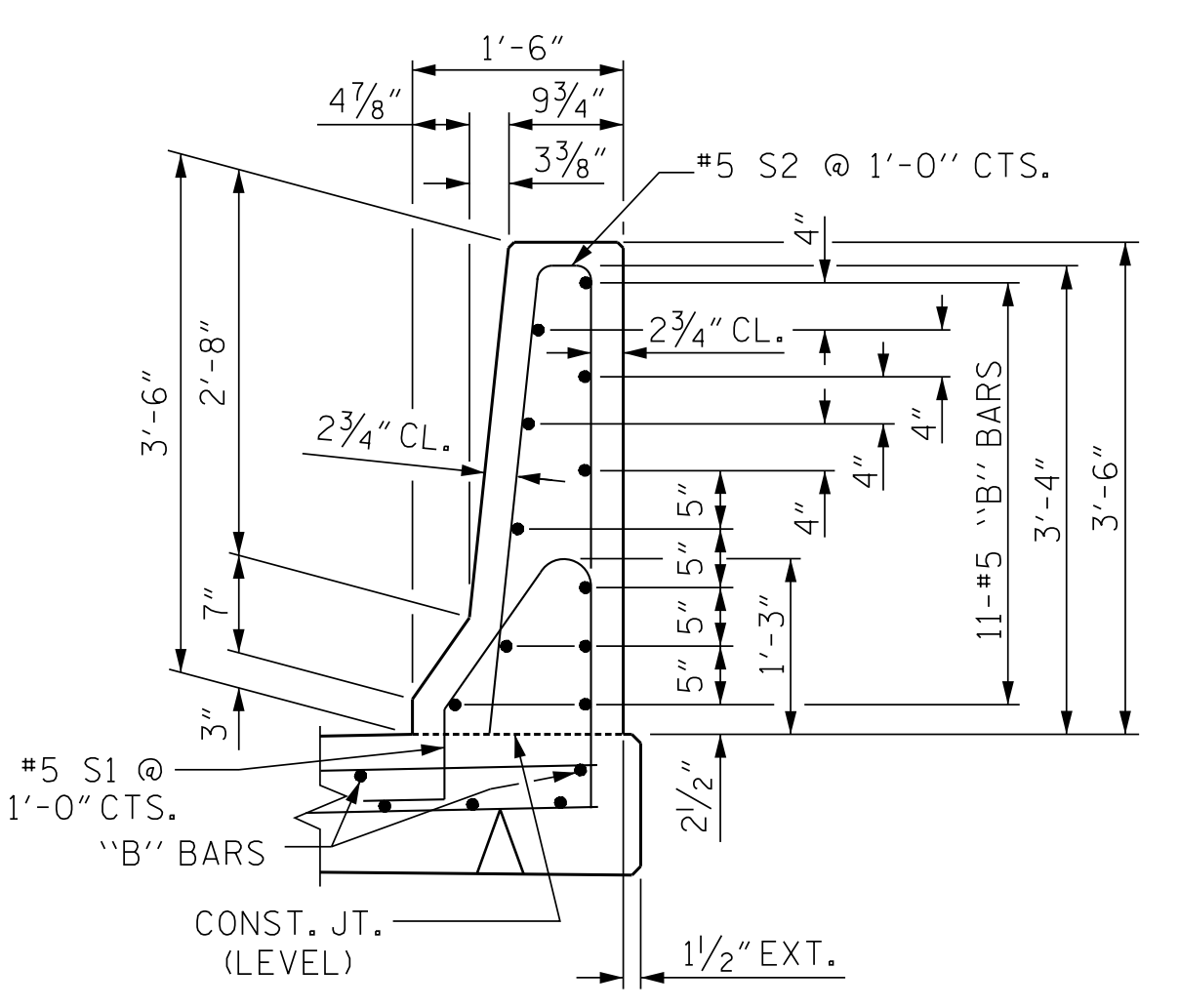
PLAN OF BARRIER RAIL

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

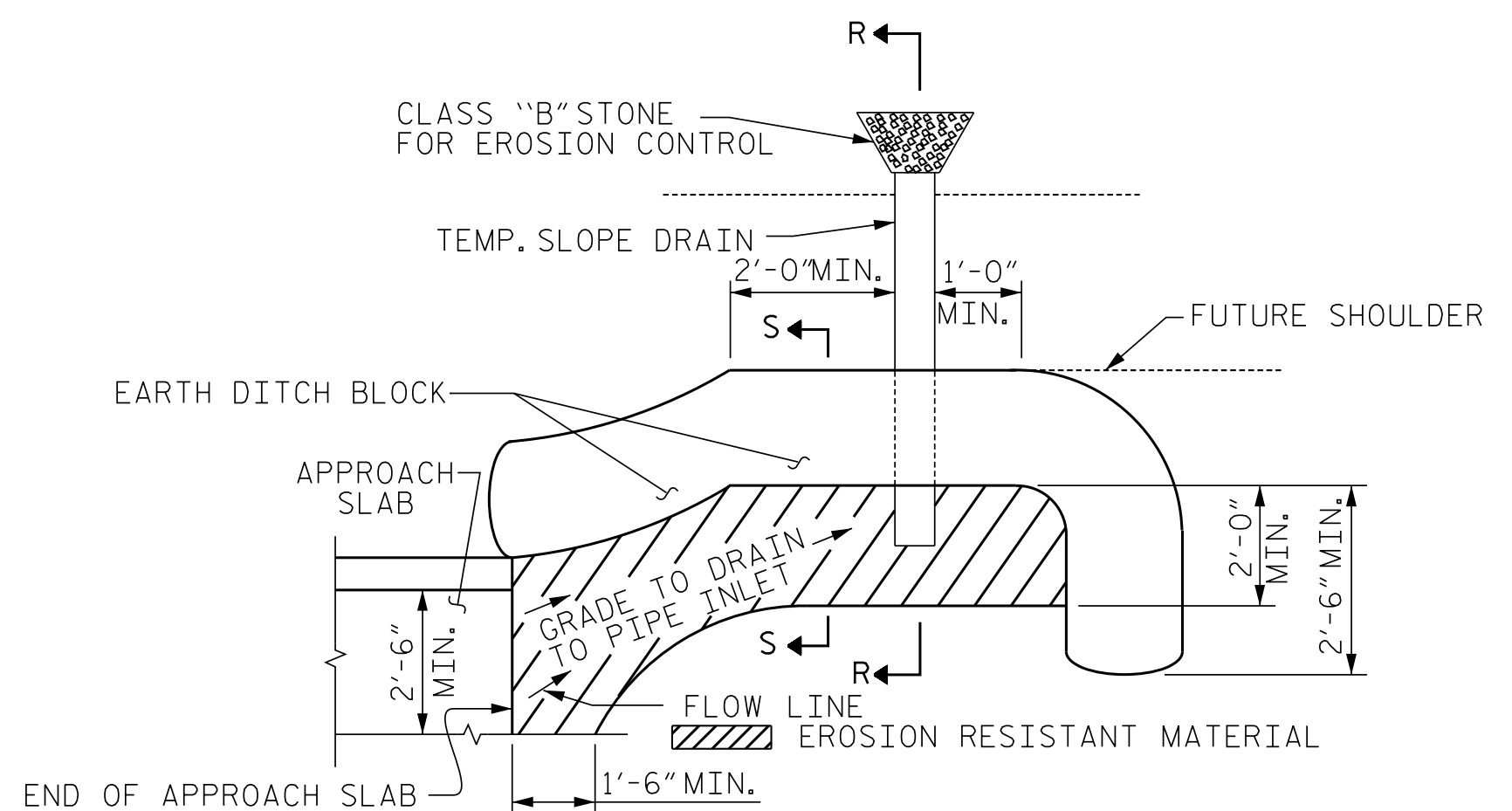
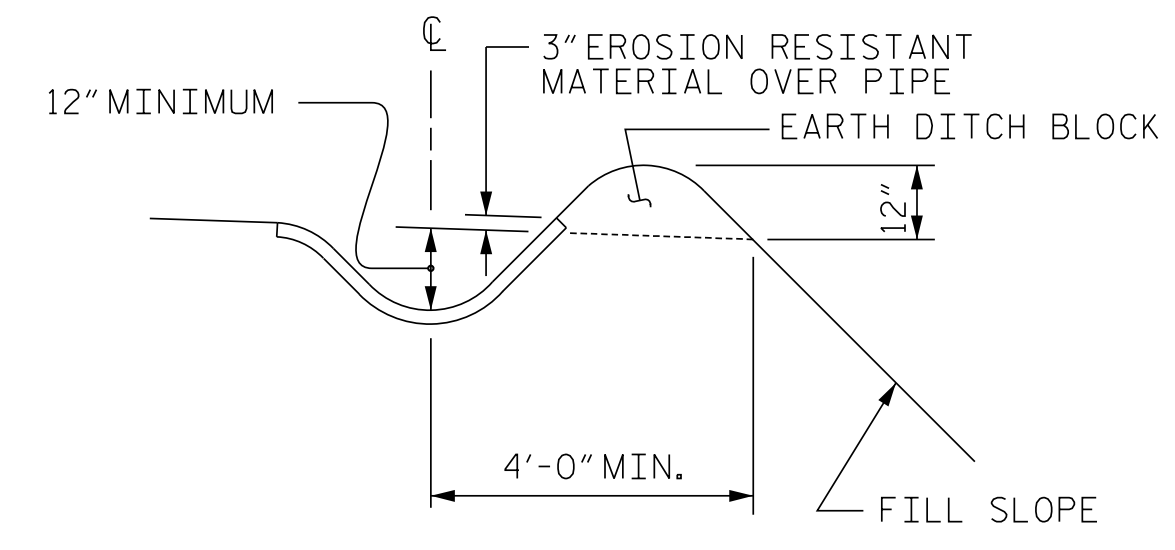
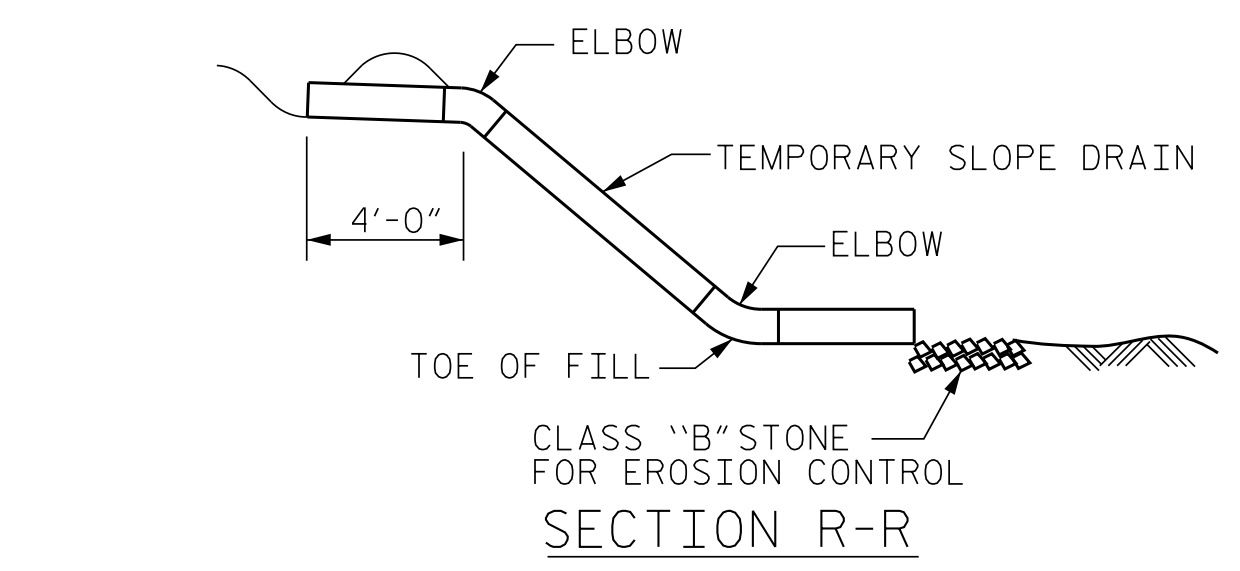


SECTION THRU RAIL

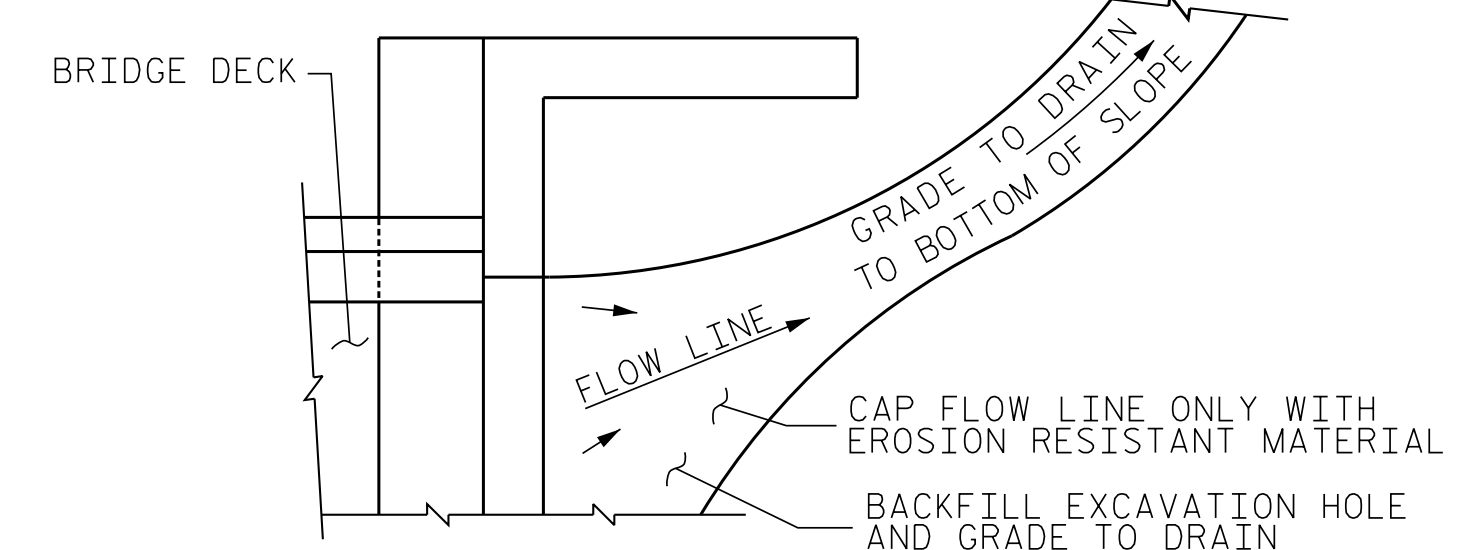
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT

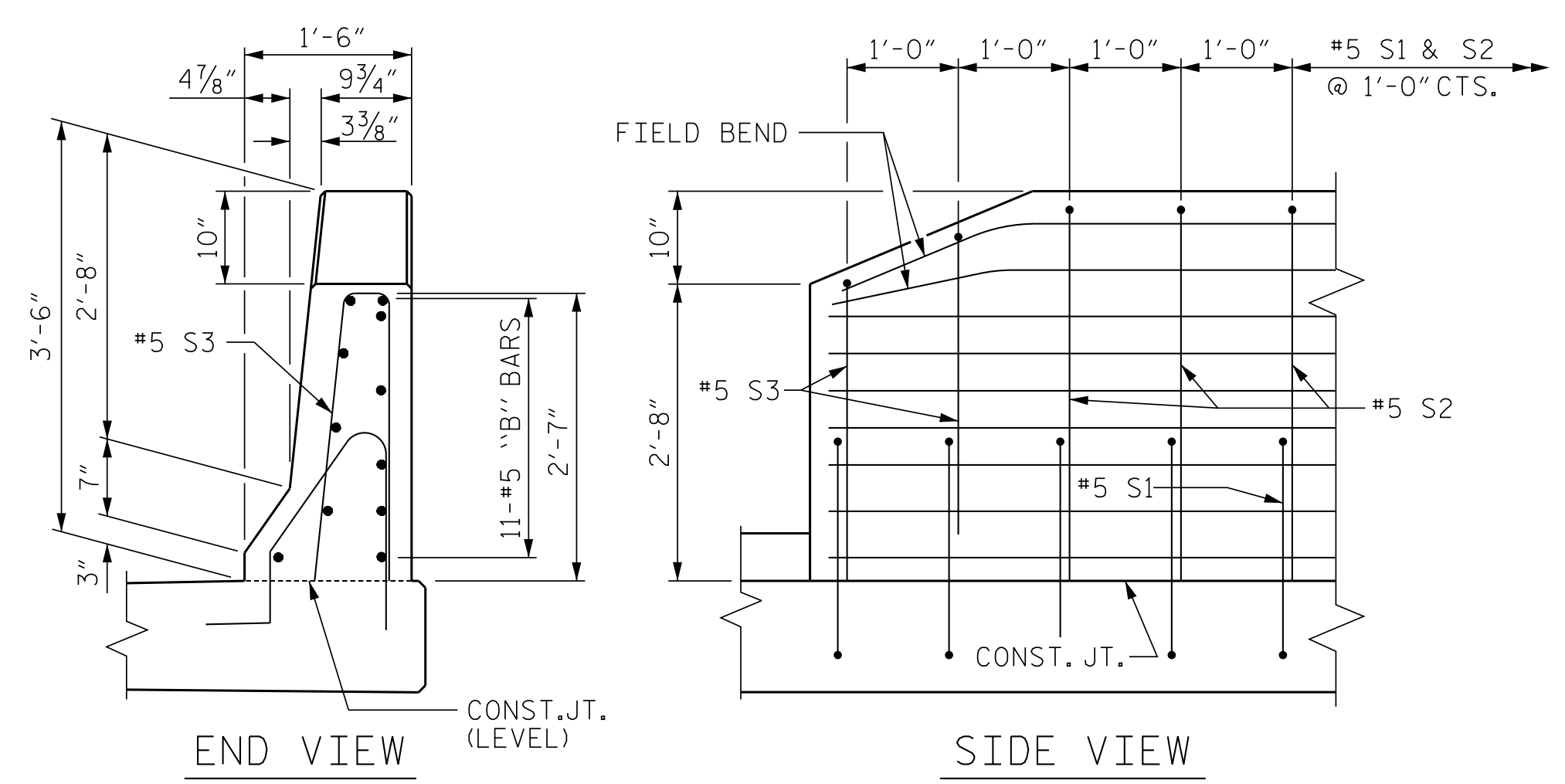
BILL OF MATERIAL					
BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	#5	STR	9'-7"	440
* S1	40	#5	1	5'-1"	212
* S2	32	#5	2	7'-0"	234
* S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL				932 LBS.	
CLASS AA CONCRETE				5.7 C. Y.	
CONCRETE BARRIER RAIL				42.0 LIN. FT.	



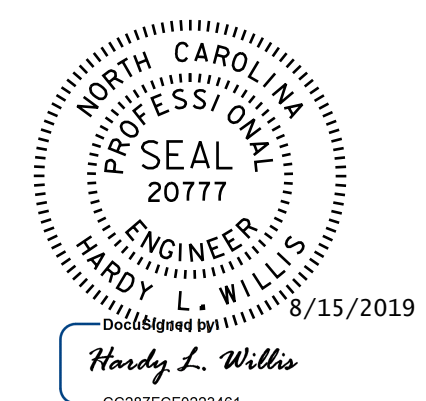
PLAN VIEW



TEMPORARY DRAINAGE DETAIL



END OF RAIL DETAILS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
828-253-2796

Boone, NC 828-355-9933
Tri-Cities, TN 423-467-8401
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650
Middlesboro, KY 606-248-6600
Raleigh, NC 919-977-9455
Charlotte, NC 704-357-0488
Atlanta, GA 770-627-3509

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PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 88+35.81 -I73-
27+16.54 -FLY-
SHEET 2 OF 2

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

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-26	
1			3			TOTAL SHEETS	26
2			4				

ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : FCJ 11/88	REV. 6/13 MAA/GM
CHECKED BY : ARB 11/88	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN