

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

COLUMBUS COUNTY

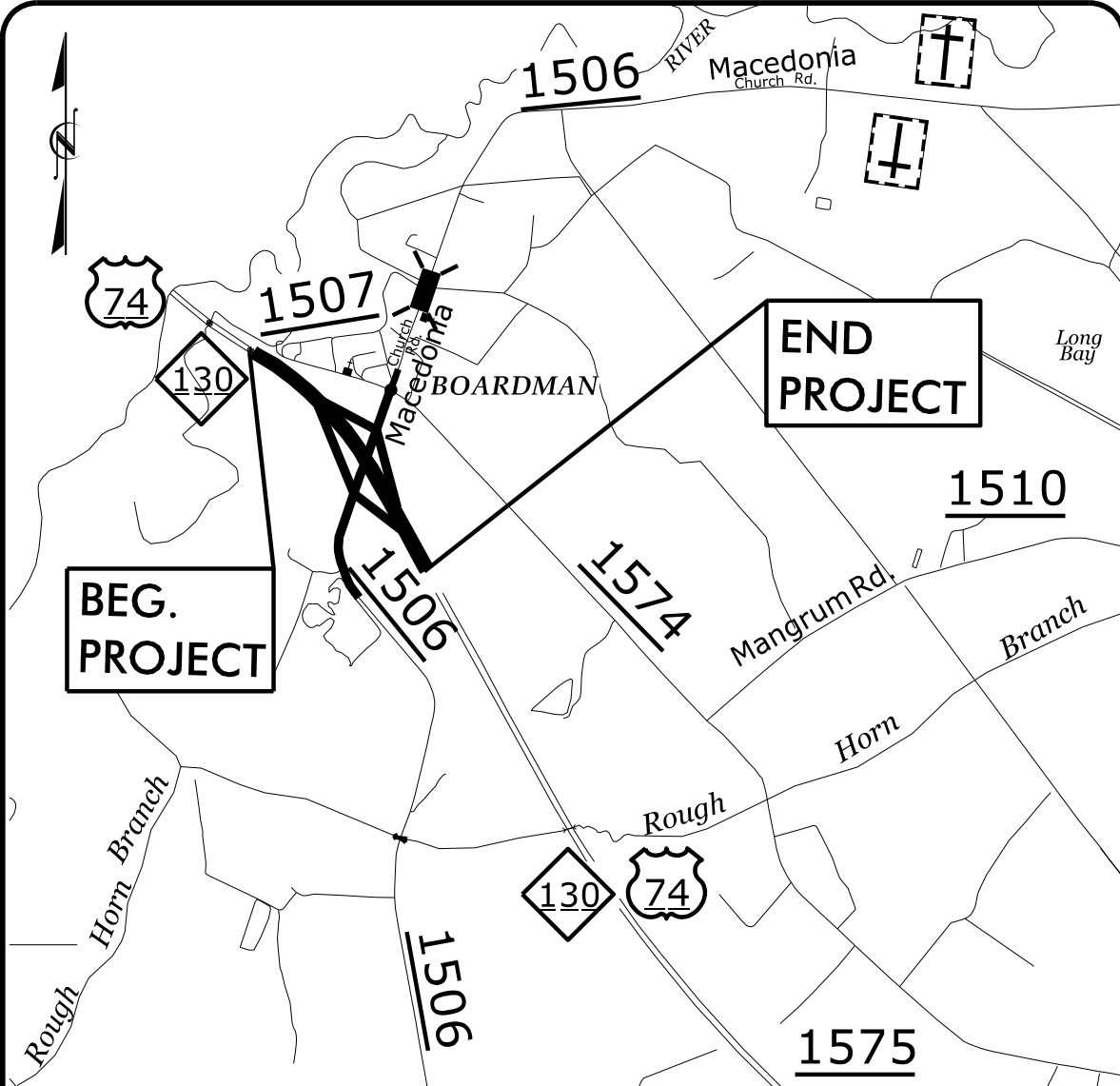
LOCATION: US 74 AT SR 1506 (OLD BOARDMAN RD/
MACEDONIA CHURCH RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5797		
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
44997.1.1		PE	
44997.2.1	NHPP-0074(215)	ROW/UTIL.	
44997.3.1		CONST.	

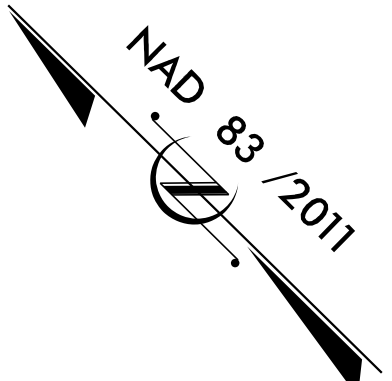
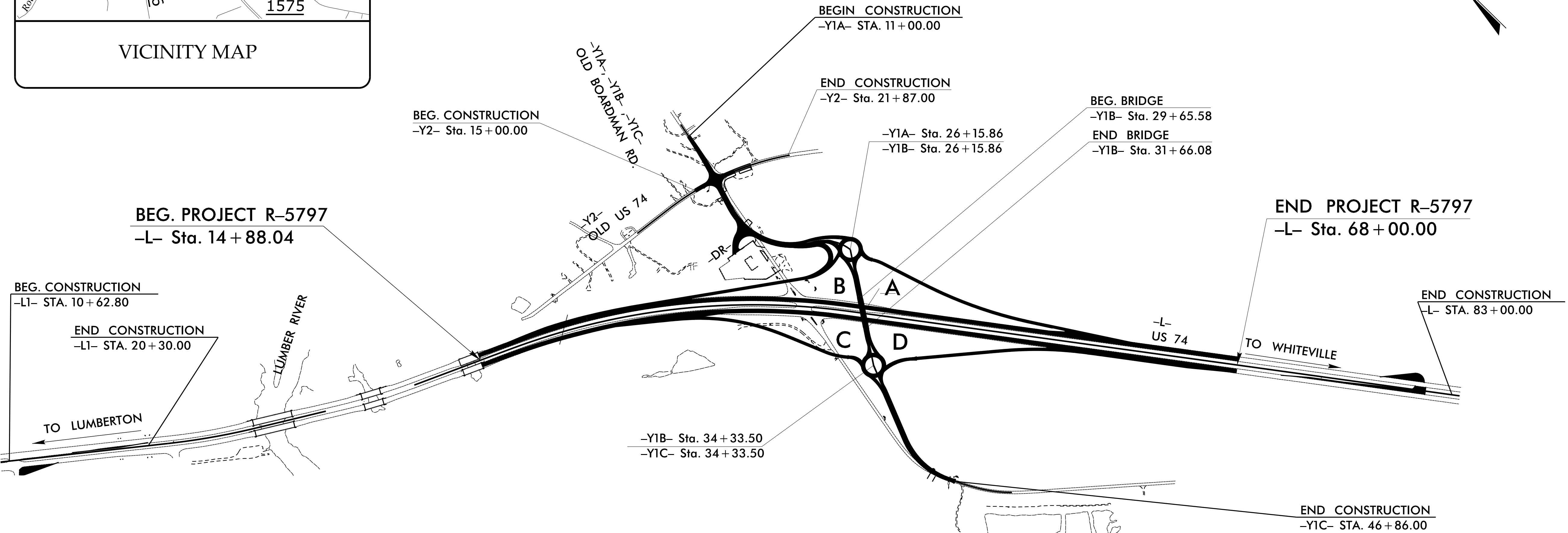
TIP PROJECT: R-5797

CONTRACT: C204571

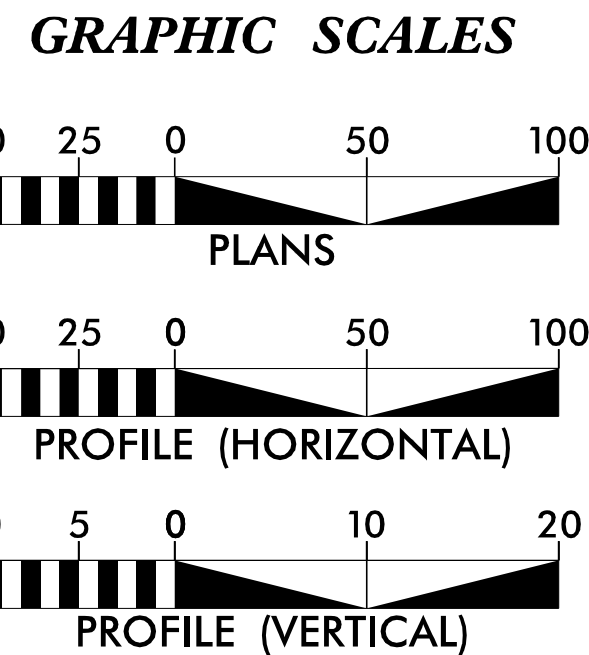


VICINITY MAP

STRUCTURE PLANS



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2020 =	13,700
ADT 2040 =	20,110
K =	9 %
D =	55 %
T =	19 % *
V =	70 MPH
* TTST =	15% DUAL = 4%
FUNC. CLASS =	FUTURE INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5797	=	1.006 MILES
TOTAL LENGTH TIP PROJECT R-5797	=	1.006 MILES

NCDOT CONTACT: DAVID STUTTS, PE
PROJECT ENGINEER - PEP/PROGRAM MGT.

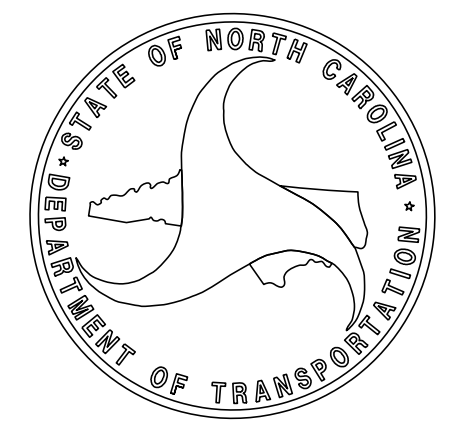
Prepared in the Office of:
WETHERILL ENGINEERING
1223 Jones Franklin Rd. Raleigh, N.C. 27606
License No. F-0377
Bus: 919.851.8077 Fax: 919.851.8107
2018 STANDARD SPECIFICATIONS

Prepared for:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.,
Raleigh NC, 27610

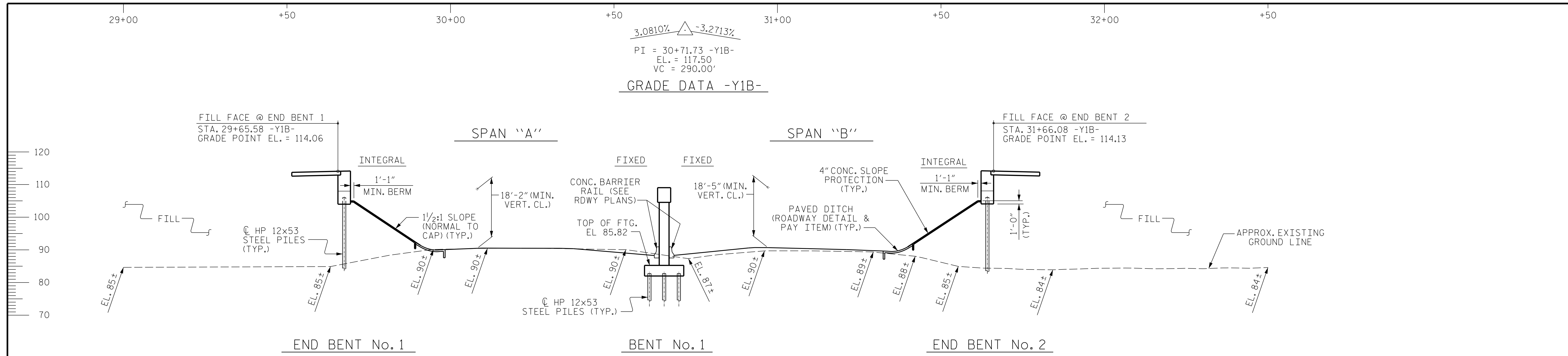
EDWARD G. WETHERILL, PE
PROJECT ENGINEER

LETTING DATE:
APRIL 20, 2021

JOHN, A. DILWORTH, PE
PROJECT DESIGN ENGINEER

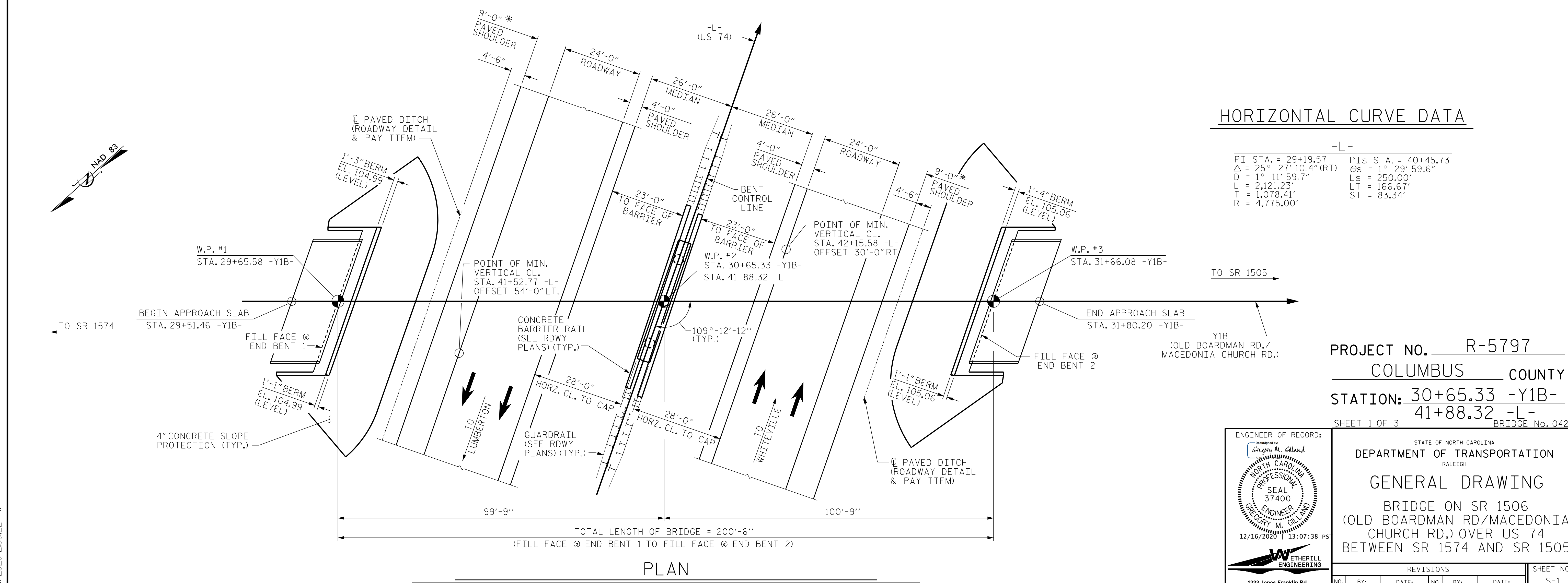


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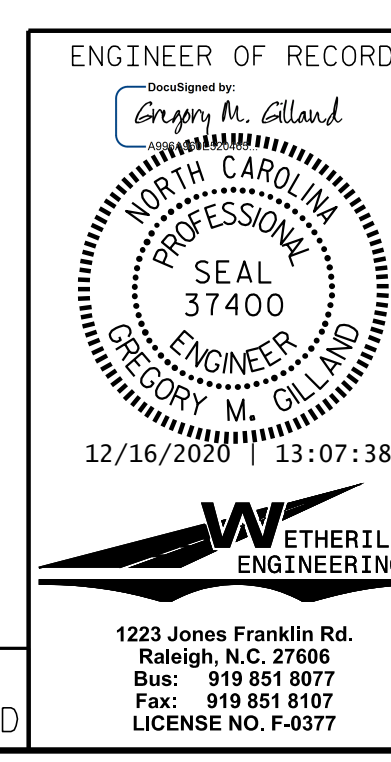


HORIZONTAL CURVE DATA

-L-	
PI STA. = 29+19.57	PIs STA. = 40+45.73
Δ = 25° 27' 10.4" (RT)	Θ s = 1° 29' 59.6"
D = 1° 11' 59.7"	Ls = 250.00'
L = 2,121.23'	LT = 166.67'
T = 1,078.41'	ST = 83.34'
R = 4,775.00'	



PROJECT NO. R-5797
 COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-
41+88.32 -L-
 SHEET 1 OF 3 BRIDGE No. 0420



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

BRIDGE ON SR 1506
 (OLD BOARDMAN RD./MACEDONIA CHURCH RD.) OVER US 74
 BETWEEN SR 1574 AND SR 1505

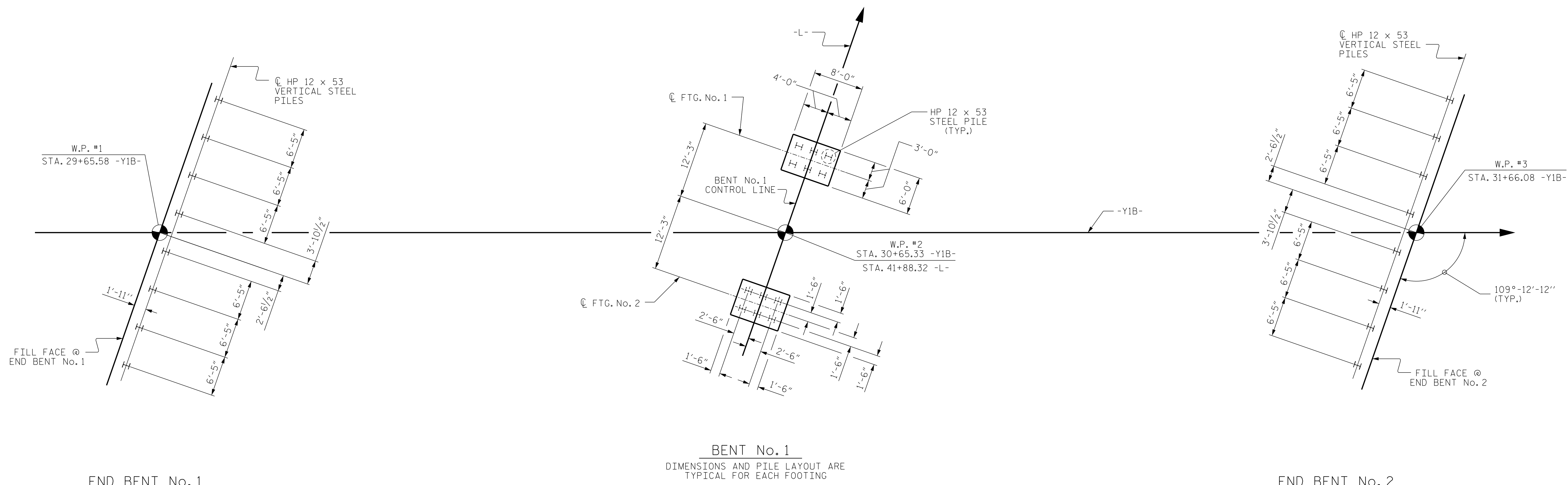
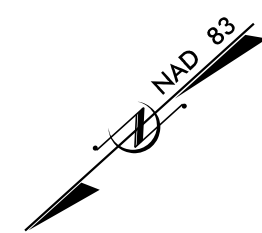
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			33

DRAWN BY: D. HODGE DATE: 4/19
 CHECKED BY: G.M. GILLILAND DATE: 4/19

* PAVED SHOULDER WIDTH AT BRIDGE
 (FOOTINGS AND PILES NOT SHOWN IN PLAN VIEW)

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

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BENT No. 1
DIMENSIONS AND PILE LAYOUT ARE
TYPICAL FOR EACH FOOTING

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THEIR CENTERLINE

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 105 TONS PER PILE.
- DRIVE PILES AT END BENT No.1 AND END BENT No.2 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.
- PILES AT BENT No.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 135 TONS PER PILE.
- DRIVE PILES AT BENT No.1 TO A REQUIRED DRIVING RESISTANCE OF 225 TONS PER PILE.
- TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 55,000 TO 75,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT No.1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.
- OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT No.1 AND END BENT No.2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

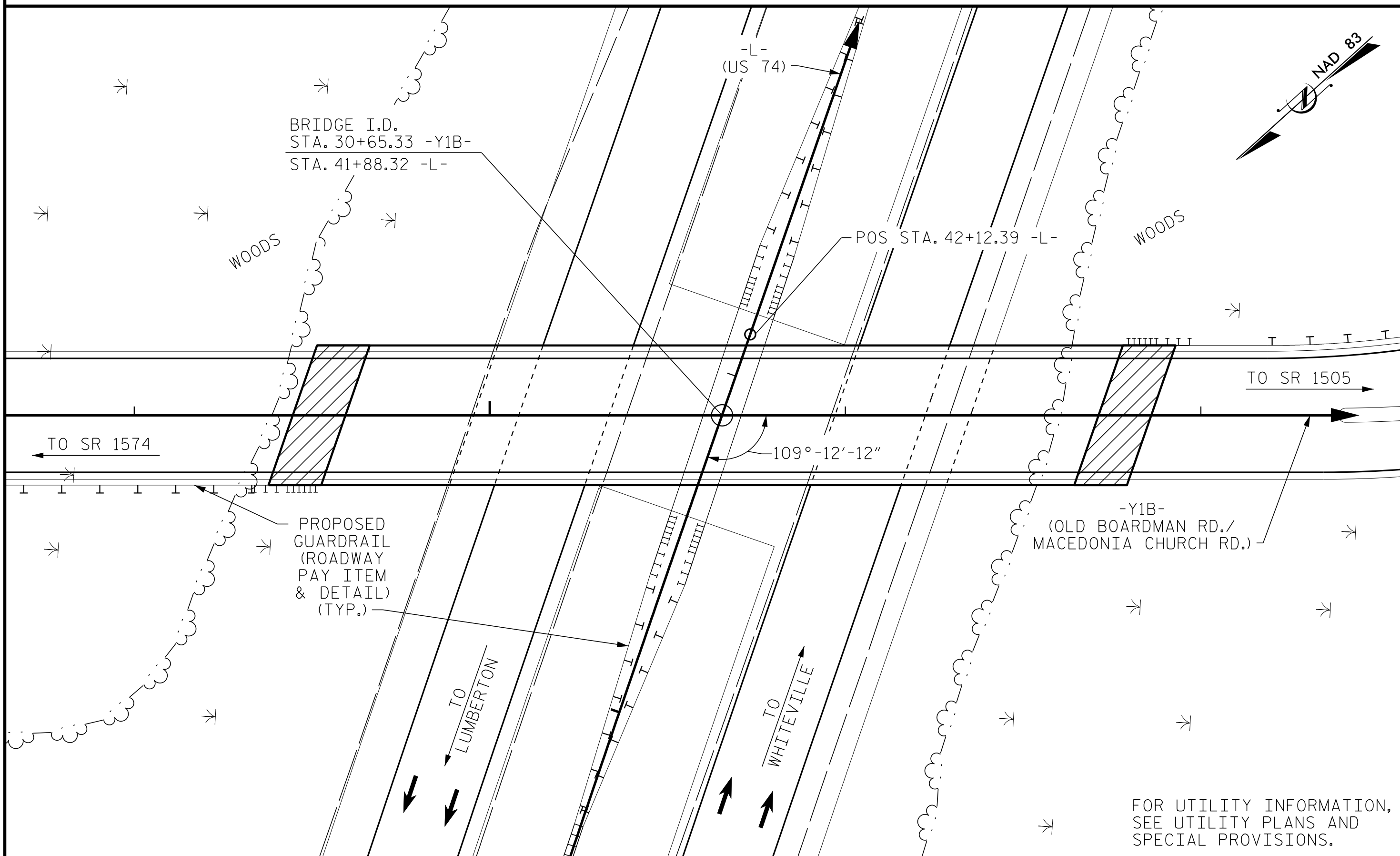
PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-
 SHEET 2 OF 3

ENGINEER OF RECORD: 8/22/2019 Gregory M. Gilliland WETHERILL ENGINEERING		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH GENERAL DRAWING BRIDGE ON SR 1506 (OLD BOARDMAN RD/MACEDONIA CHURCH RD.) OVER US 74 BETWEEN SR 1574 AND SR 1505																			
1223 Jones Franklin Rd. Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 LICENSE NO. F-0377		REVISIONS <table border="1"> <tr> <th>NO.</th> <th>BY:</th> <th>DATE:</th> <th>NO.</th> <th>BY:</th> <th>DATE:</th> </tr> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </table>		NO.	BY:	DATE:	NO.	BY:	DATE:	1			3			2			4		
NO.	BY:	DATE:	NO.	BY:	DATE:																
1			3																		
2			4																		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			SHEET NO. S-2 TOTAL SHEETS 33																		

DRAWN BY: D. HODGE DATE: 4/19
 CHECKED BY: G.M. GILLAND DATE: 4/19

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BM2 - BENCHTIE NAIL SET IN 48" PINE, STA. 28+80.51 -Y1B-, 81' RT., N 2495599 E 2015219, ELEV 88.56



LOCATION SKETCH

NOTES :

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 x 53 STEEL PILES	PILE REDRIVES	TWO BAR METAL RAIL	1'-2" x 2'-6" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS		
	LUMP SUM	EACH	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	LBS.	No.	LIN.FT.	EA.	NO.	LIN.FT.	EA.	LIN.FT.	SQ. YDS.	LUMP SUM	
SUPERSTRUCTURE			7,870	7,653					8	788.00			381.16	397.47				
END BENT 1					38.0		4,907				8	8	496	4		265		
BENT 1					51.2		8,239	1,325			12	12	849	6				
END BENT 2					38.0		4,907				8	8	496	4		270		
TOTAL	LUMP SUM	1	7,870	7,653	127.2	LUMP SUM	18,053	1,325	8	788.00	28	28	1,841	14	381.16	397.47	535	LUMP SUM

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-

SHEET 3 OF 3

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DRAWN BY : D. HODGE DATE : 4/19
CHECKED BY : G.M. GILLAND DATE : 4/19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:

 12/16/2020 13:07:38 PST
 WETHERILL ENGINEERING
 1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
 Bus: 919 851 8077
 Fax: 919 851 8107
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 BRIDGE ON SR 1506
 (OLD BOARDMAN RD./MACEDONIA CHURCH RD.) OVER US 74
 BETWEEN SR 1574 AND SR 1505

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			33

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	1.06	--	1.75	0.920	1.340	B	ER	48.790	1.070	1.190	B	I	88.390	0.80	0.790	1.060	B	I	48.790		
	HL-93 (OPERATING)	N/A		1.57	--	1.35	0.920	1.740	B	ER	48.790	1.070	1.570	B	I	88.390	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.47	52.920	1.75	0.920	1.870	B	ER	48.790	1.070	1.620	B	I	88.390	0.80	0.790	1.470	B	I	48.790		
	HS-20 (OPERATING)	36.000		2.12	76.320	1.35	0.920	2.420	B	ER	48.790	1.070	2.120	B	I	88.390	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.49	47.115	1.40	0.920	5.520	B	ER	48.790	1.070	5.160	B	I	88.390	0.80	0.790	3.490	B	I	48.790	
		SNGARBS2	20.000		2.53	50.600	1.40	0.920	4.000	B	ER	48.790	1.070	3.590	B	I	88.390	0.80	0.790	2.530	B	I	48.790	
		SNAGRIS2	22.000		2.36	51.920	1.40	0.920	3.750	B	ER	48.790	1.070	3.300	B	I	88.390	0.80	0.790	2.360	B	I	48.790	
		SNCOTTS3	27.250		1.73	47.143	1.40	0.920	2.740	B	ER	48.790	1.070	2.520	B	I	88.390	0.80	0.790	1.730	B	I	48.790	
		SNAGGRS4	34.925		1.42	49.594	1.40	0.920	2.250	B	ER	48.790	1.070	2.040	B	I	88.390	0.80	0.790	1.420	B	I	48.790	
		SNS5A	35.550		1.39	49.415	1.40	0.920	2.200	B	ER	48.790	1.070	2.050	B	I	88.390	0.80	0.790	1.390	B	I	48.790	
		SNS6A	39.950		1.26	50.337	1.40	0.920	2.000	B	ER	48.790	1.070	1.850	B	I	88.390	0.80	0.790	1.260	B	I	48.790	
		SNS7B	42.000		1.20	50.400	1.40	0.920	1.910	B	ER	48.790	1.070	1.780	B	I	88.390	0.80	0.790	1.200	B	I	48.790	
	TRUCK TRACTOR SEMI-TRAILER (TTS)	TNAGRIT3	33.000		1.54	50.820	1.40	0.920	2.440	B	ER	48.790	1.070	2.230	B	I	88.390	0.80	0.790	1.540	B	I	48.790	
		TNT4A	33.075		1.54	50.936	1.40	0.920	2.440	B	ER	48.790	1.070	2.180	B	I	88.390	0.80	0.790	1.540	B	I	48.790	
		TNT6A	41.600		1.25	52.000	1.40	0.920	1.980	B	ER	48.790	1.070	1.890	B	I	88.390	0.80	0.790	1.250	B	I	48.790	
		TNT7A	42.000		1.25	52.500	1.40	0.920	1.980	B	ER	48.790	1.070	1.850	B	I	88.390	0.80	0.790	1.250	B	I	48.790	
		TNT7B	42.000		1.28	53.760	1.40	0.920	2.030	B	ER	48.790	1.070	1.760	B	I	88.390	0.80	0.790	1.280	B	I	48.790	
		TNAGRIT4	43.000		1.23	52.890	1.40	0.920	1.950	B	ER	48.790	1.070	1.710	B	I	88.390	0.80	0.790	1.230	B	I	48.790	
TNAGT5A	45.000		1.16	52.200	1.40	0.920	1.840	B	ER	48.790	1.070	1.680	B	I	88.390	0.80	0.790	1.160	B	I	48.790			
TNAGT5B	45.000		③	1.15	51.750	1.40	0.920	1.830	B	ER	48.790	1.070	1.620	B	I	88.390	0.80	0.790	1.150	B	I	48.790		

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

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

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

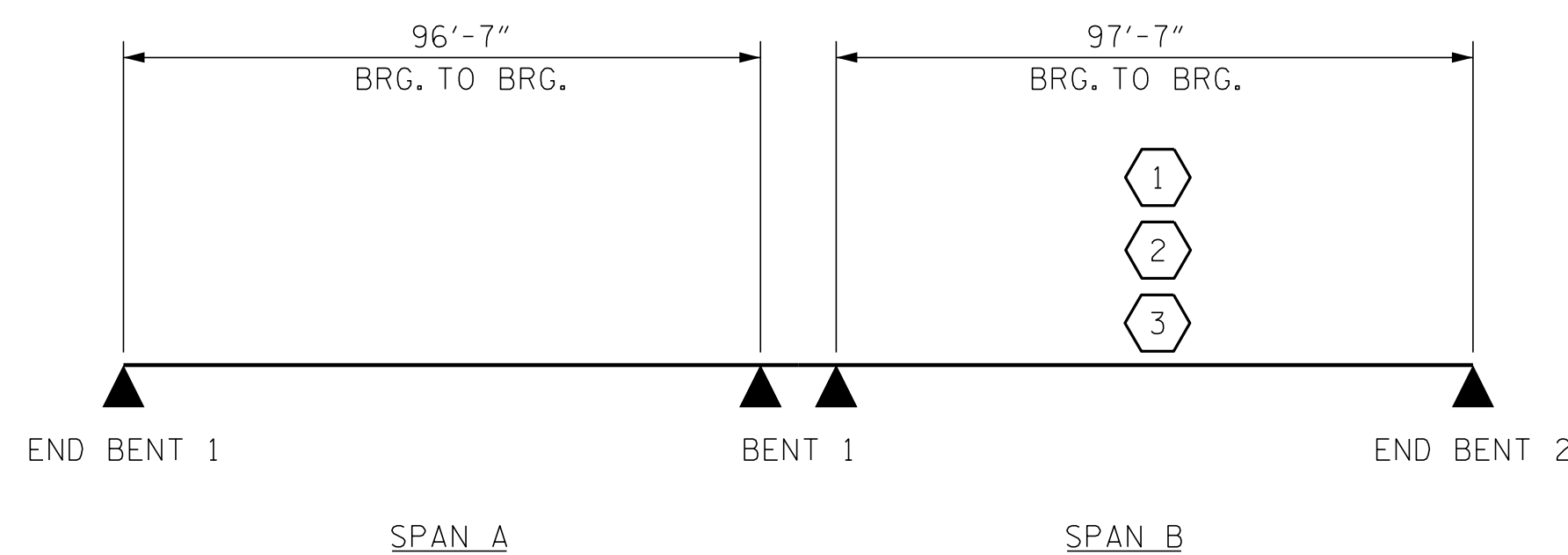
② DESIGN LOAD RATING (HS-20)

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-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

ASSEMBLED BY : D. HODGE	DATE : 4/19
CHECKED BY : G.M. GILLAND	DATE : 4/19
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

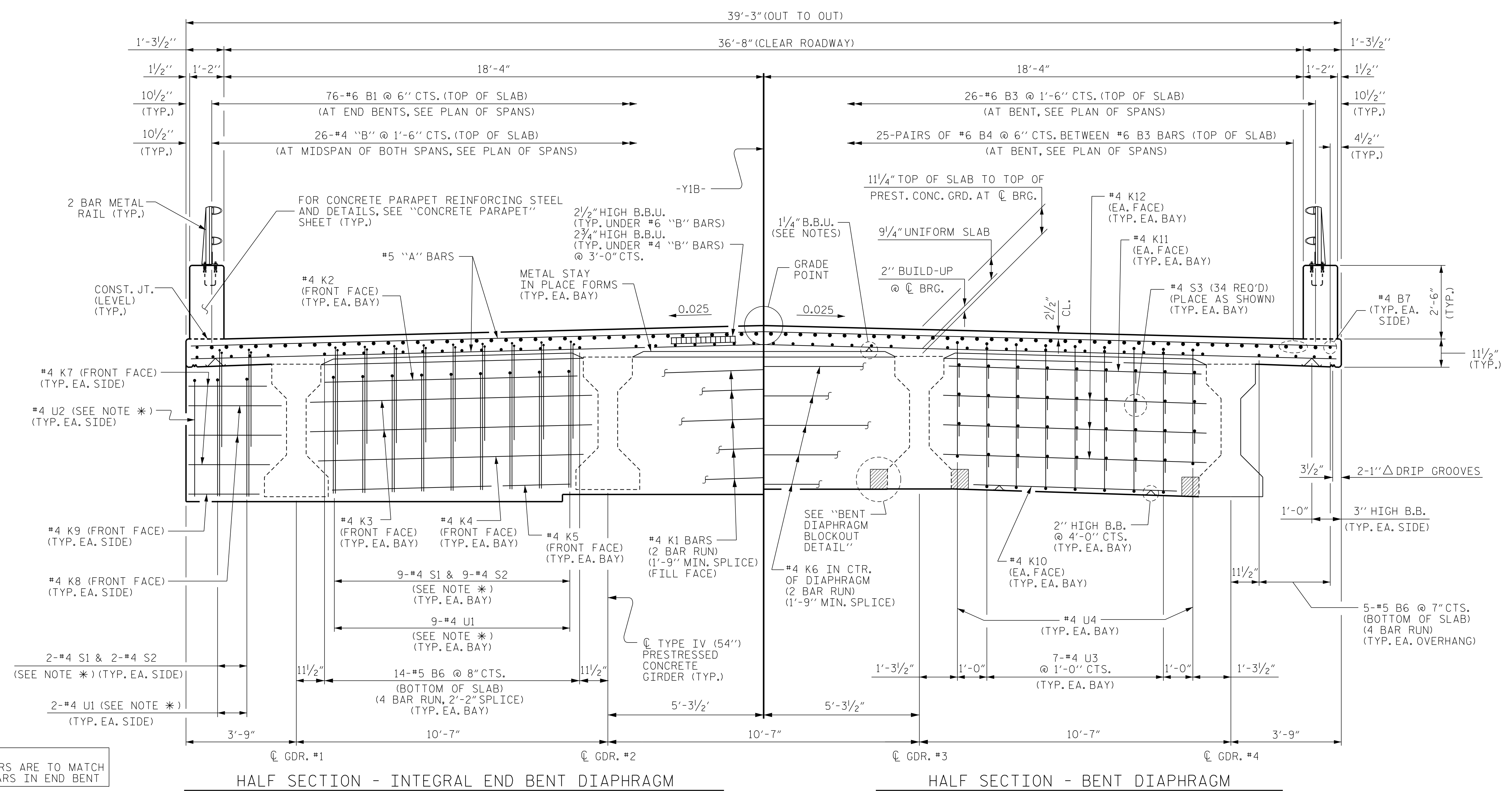
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:
8/22/2019

Gregory M. Gilland
ETHERILL ENGINEERING

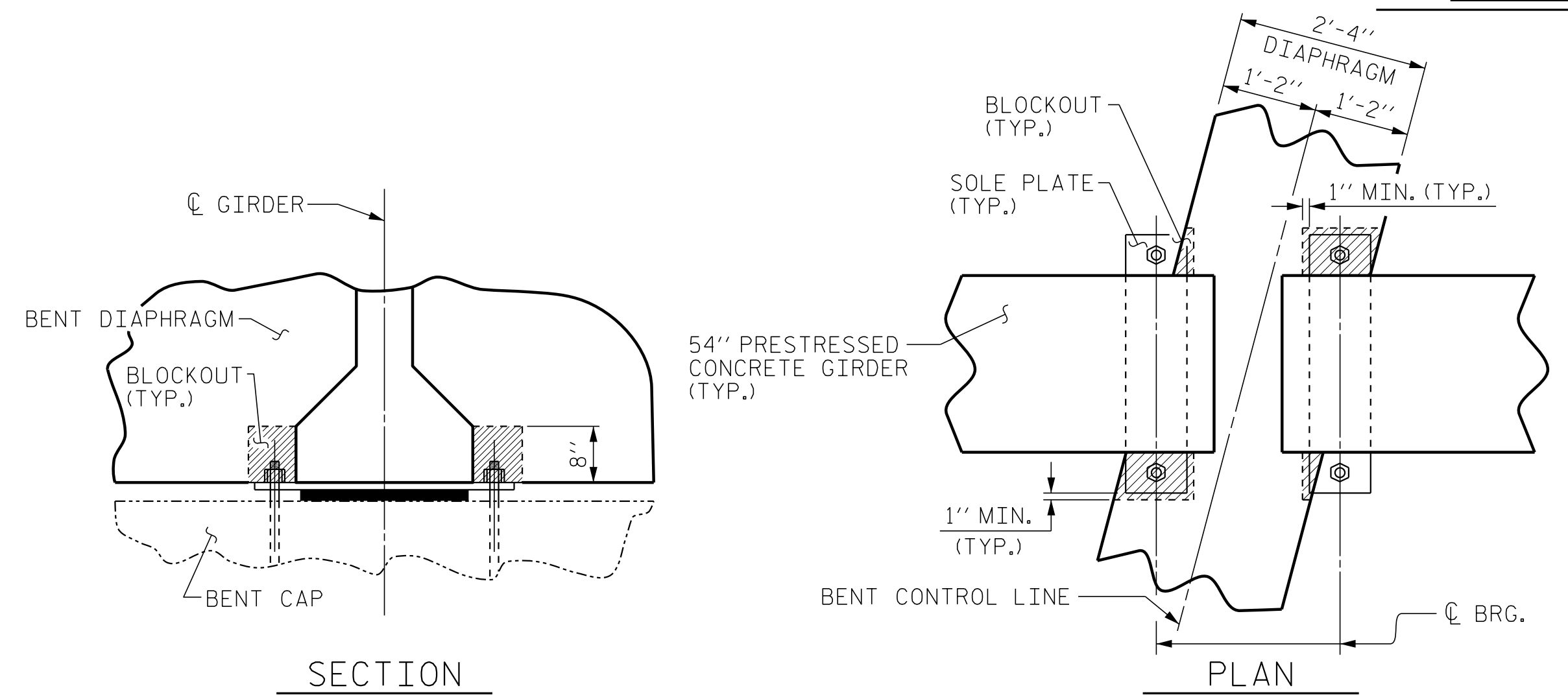
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-4
					TOTAL SHEETS 33

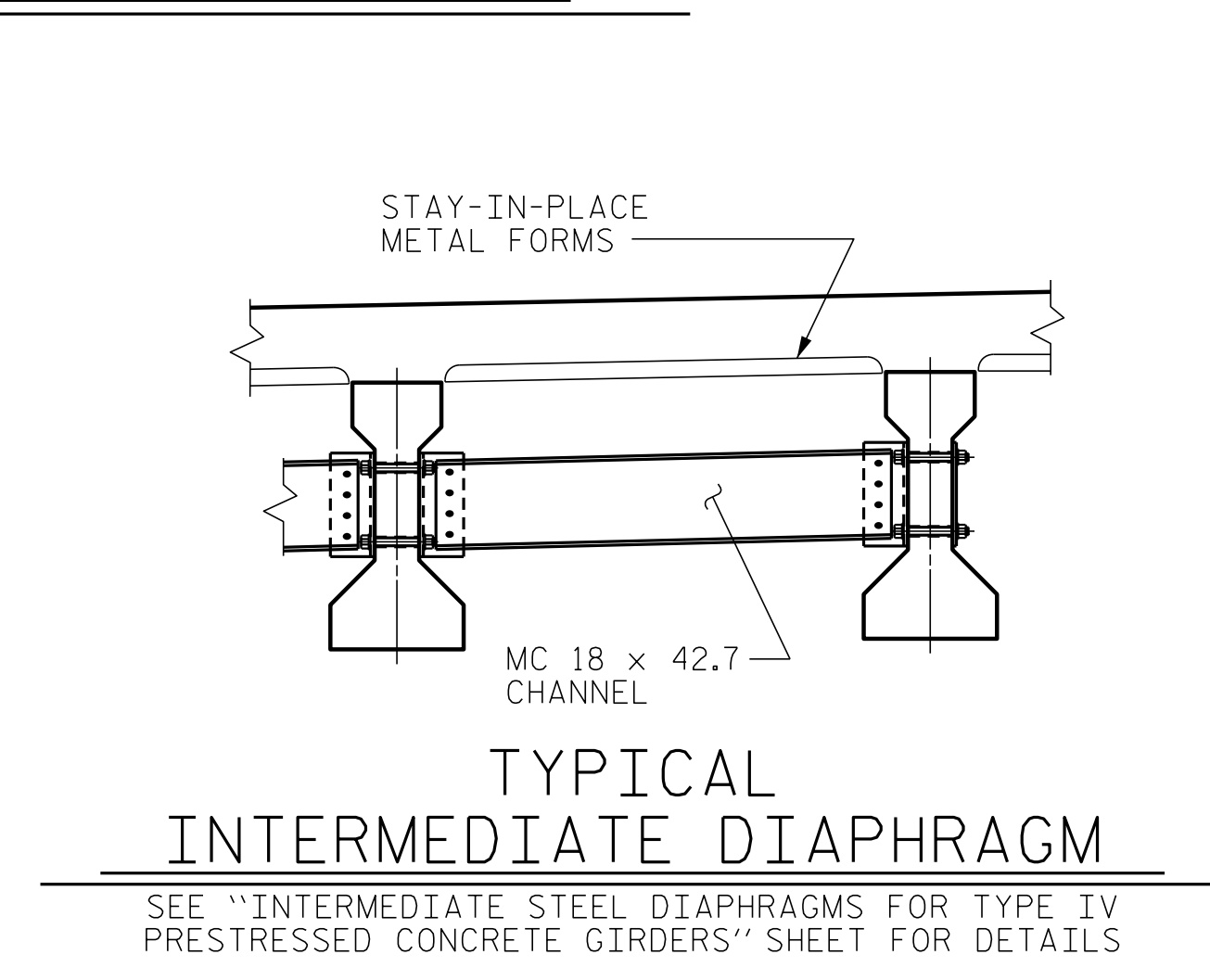


NOTE *
THESE BARS ARE TO MATCH
#4 "V" BARS IN END BENT

HALF SECTION - INTEGRAL END BENT DIAPHRAGM
HALF SECTION - BENT DIAPHRAGM
TYPICAL SECTION

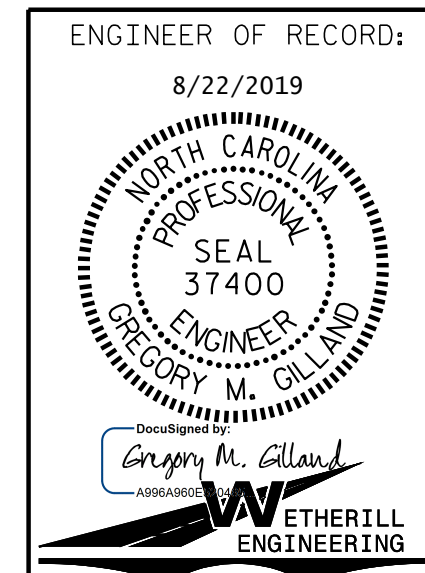


SECTION
BENT DIAPHRAGM BLOCK-OUT DETAIL



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

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-
SHEET 1 OF 2



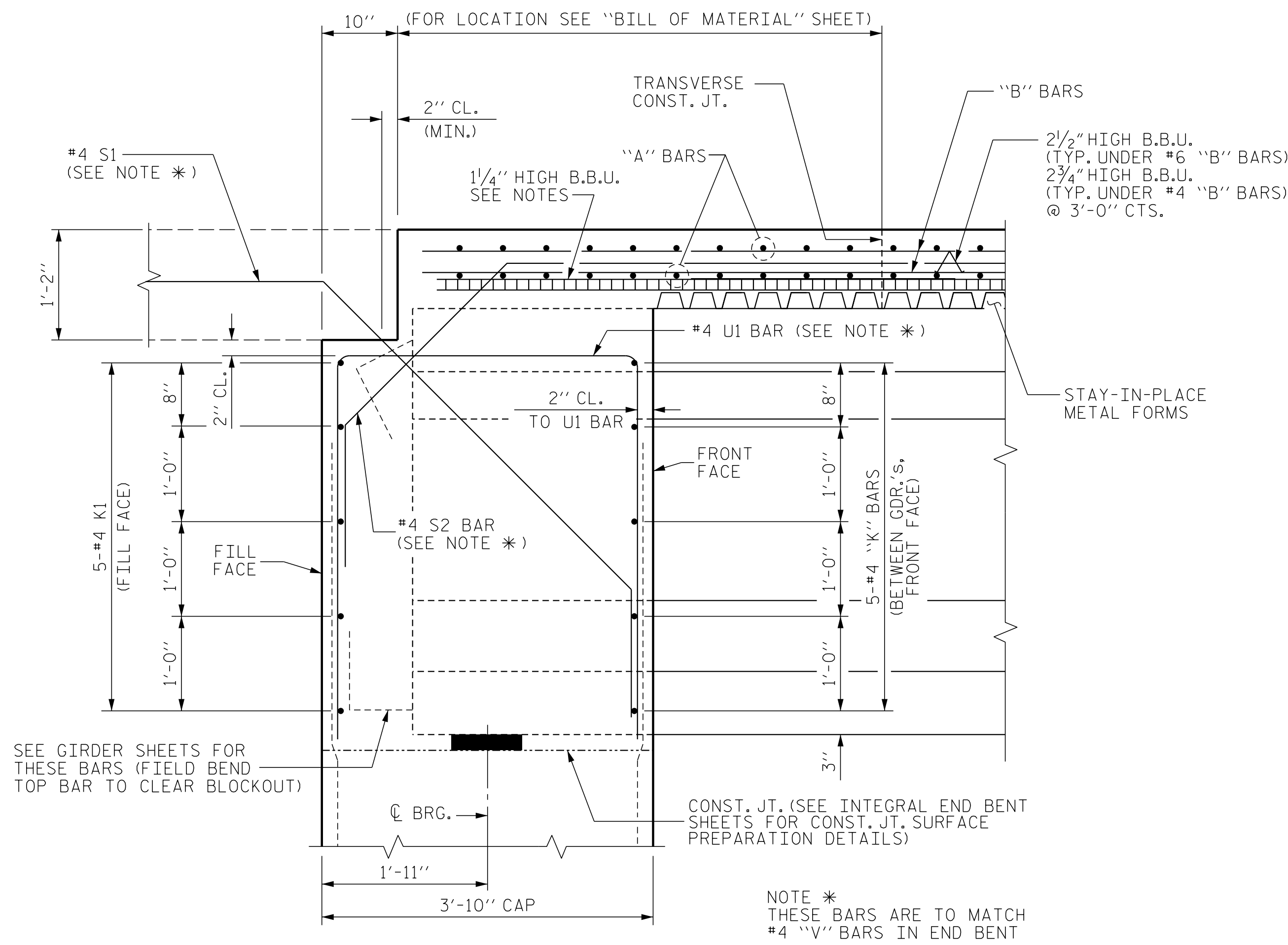
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION

DRAWN BY: D. HODGE DATE: 12/18
CHECKED BY: G.M. GILLAND DATE: 1/19

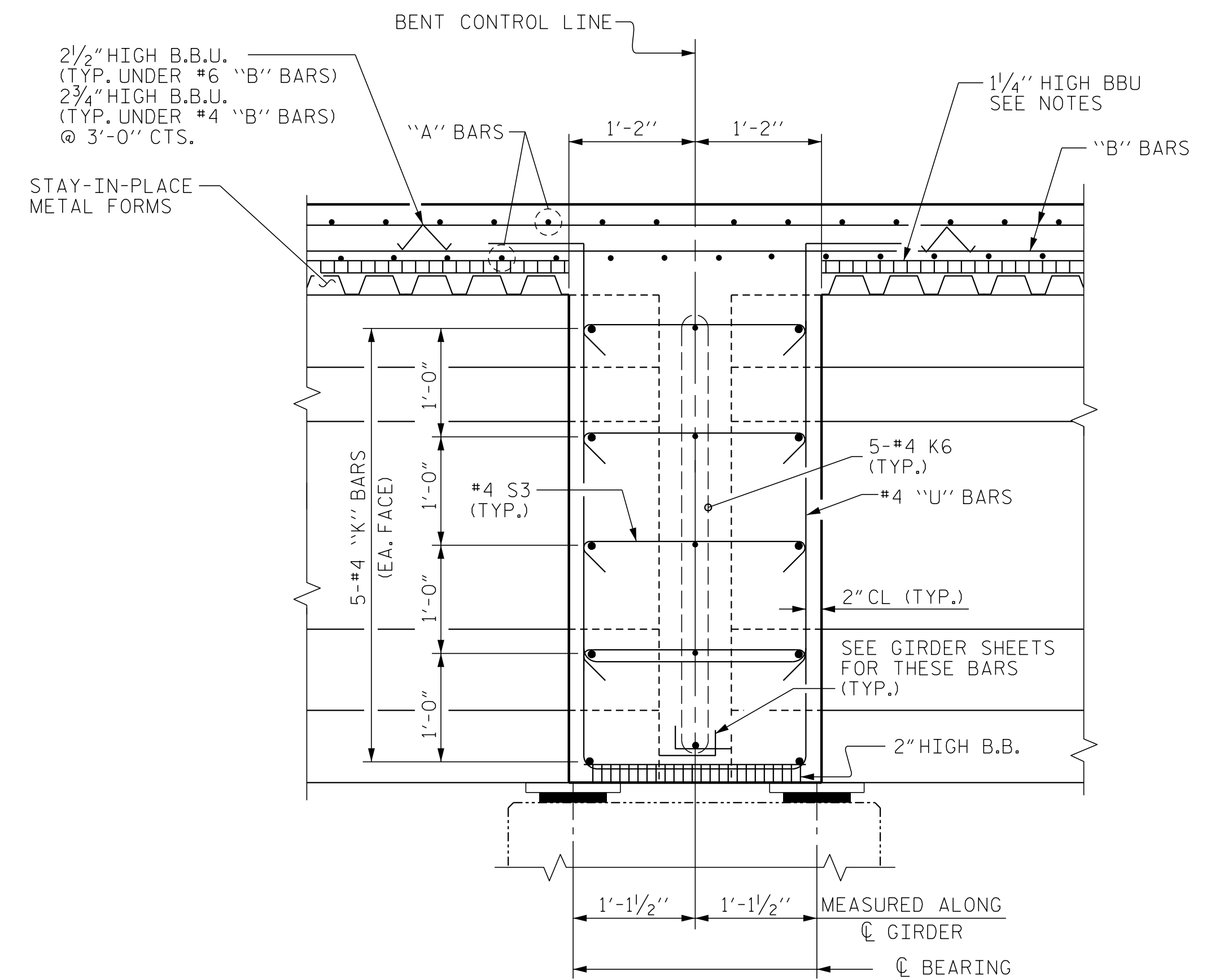
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UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			33

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SECTION THRU INTEGRAL END BENT
(SHOWN PERPENDICULAR TO FILL FACE)



SECTION THRU CONTINUOUS BENT DIAPHRAGM
(SHOWN PERPENDICULAR TO BENT CONTROL LINE)

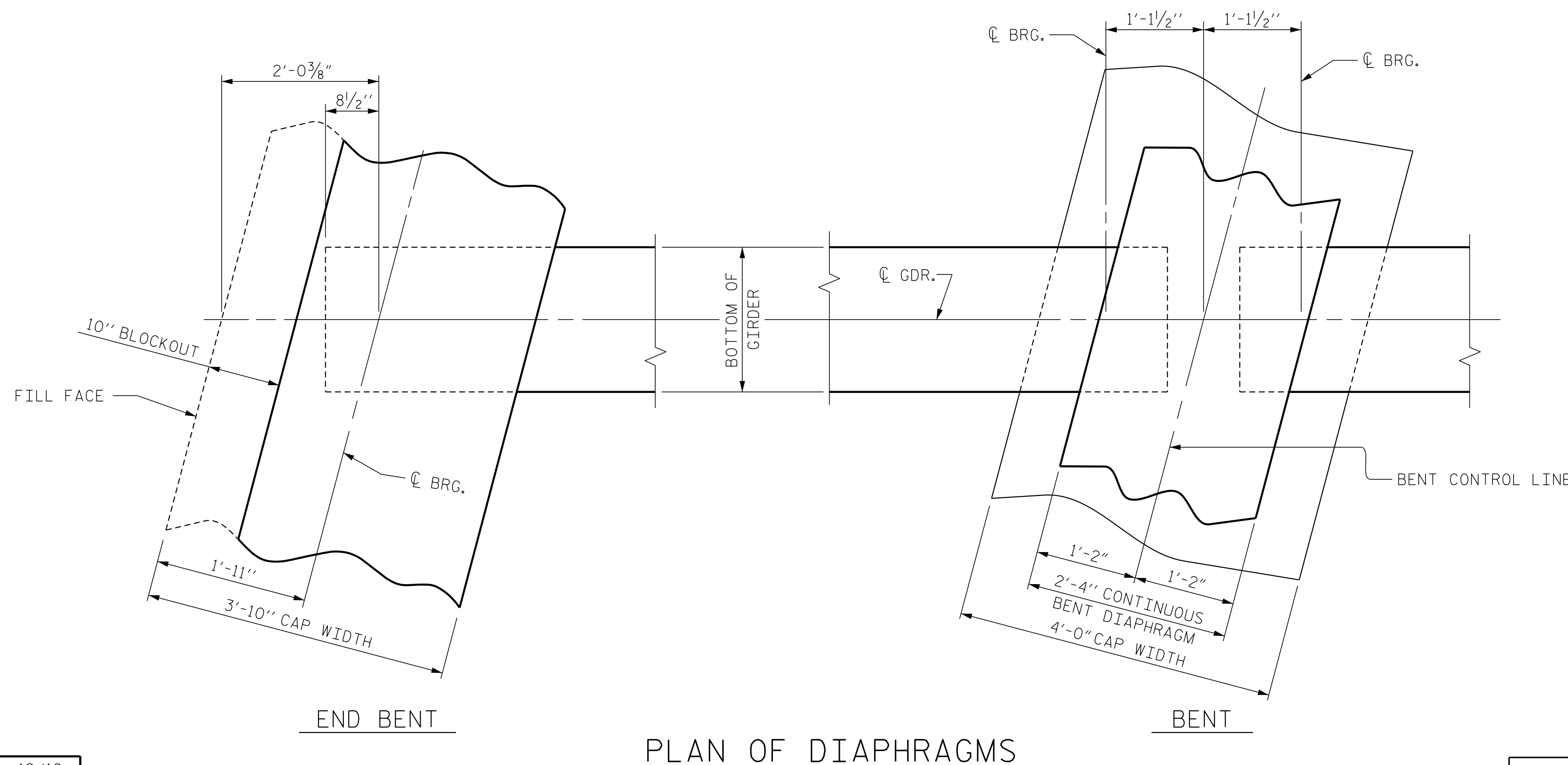
NOTES:

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.

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

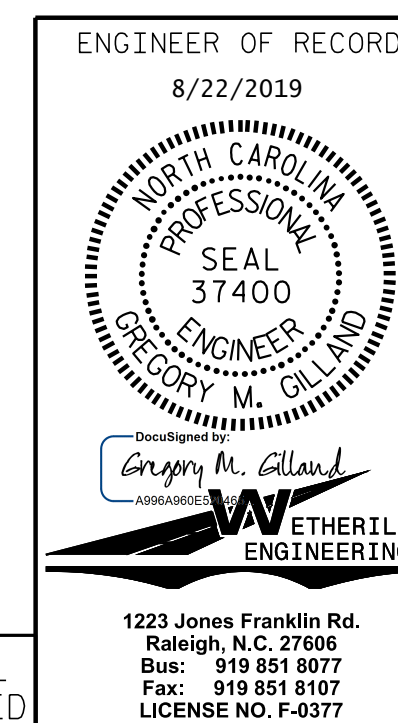
CONCRETE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.



PLAN OF DIAPHRAGMS

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION

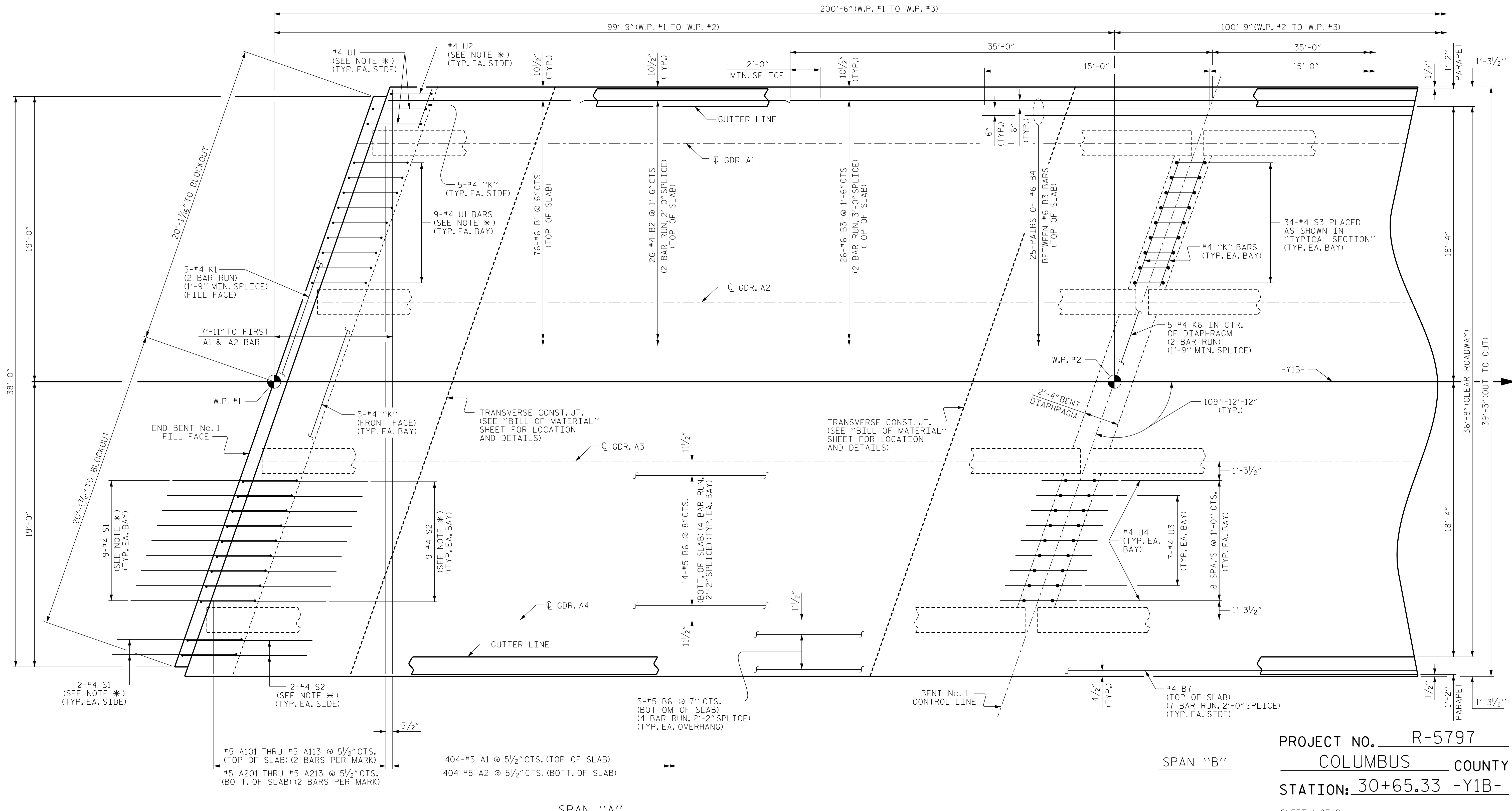
REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-6
2			4			TOTAL SHEETS 33

DRAWN BY: D. HODGE DATE: 12/18
 CHECKED BY: G.M. GILLILAND DATE: 1/19

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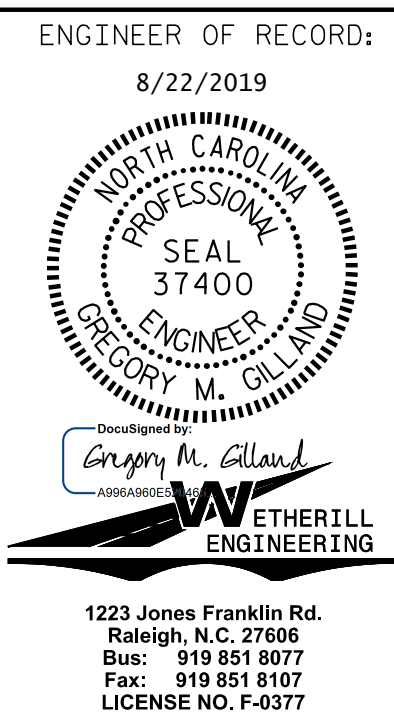
SPAN "A"

SPAN "B"

PARTIAL PLAN OF SPAN

NOTES :
 FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET" SHEETS.
 * THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-
 SHEET 1 OF 2



ENGINEER OF RECORD:
 8/22/2019
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN

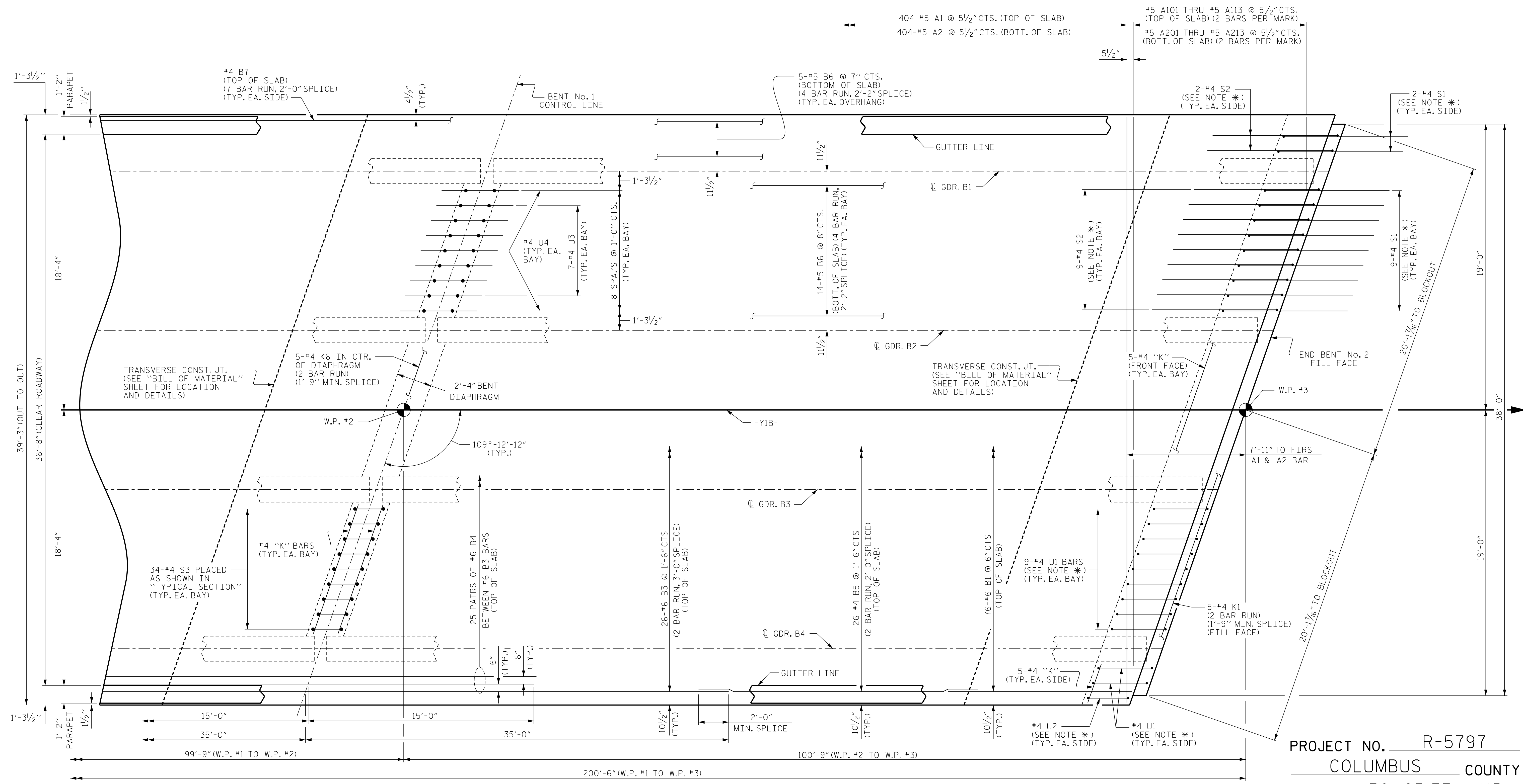
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			33

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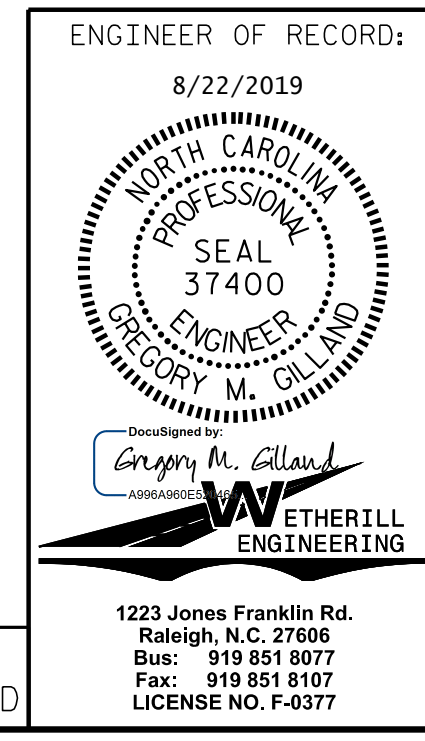


PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

SHEET 2 OF 2

PARTIAL PLAN OF SPAN

- NOTES :
- FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET" SHEETS.
 - * THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.
 - FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.

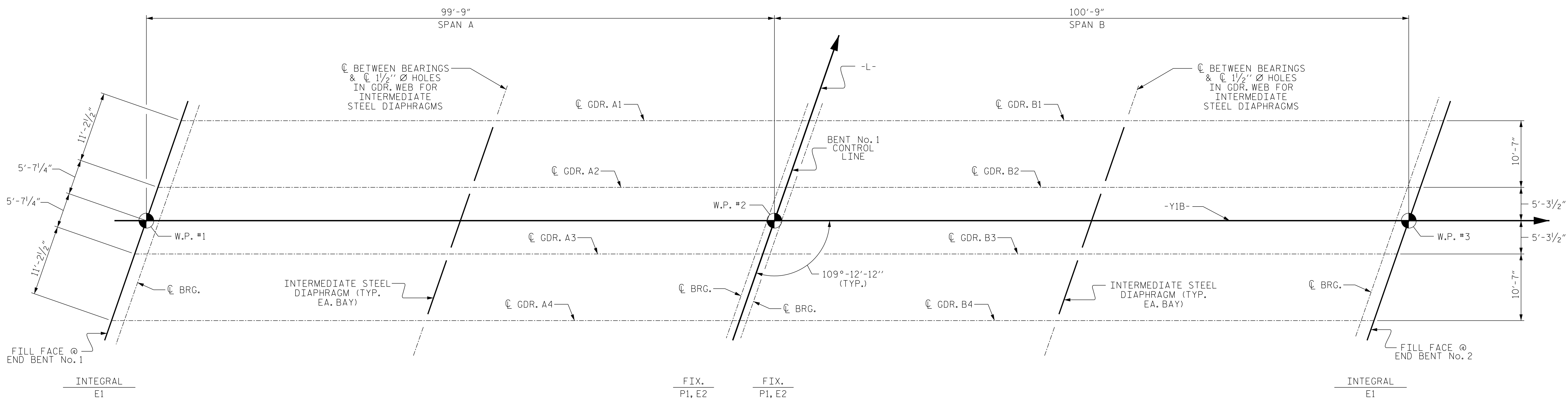


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPAN					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-8
TOTAL SHEETS					33

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GIRDER LAYOUT

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

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DRAWN BY : D. HODGE DATE : 1/19
 CHECKED BY : G.M. GILLAND DATE : 1/19

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ENGINEER OF RECORD:
 8/22/2019

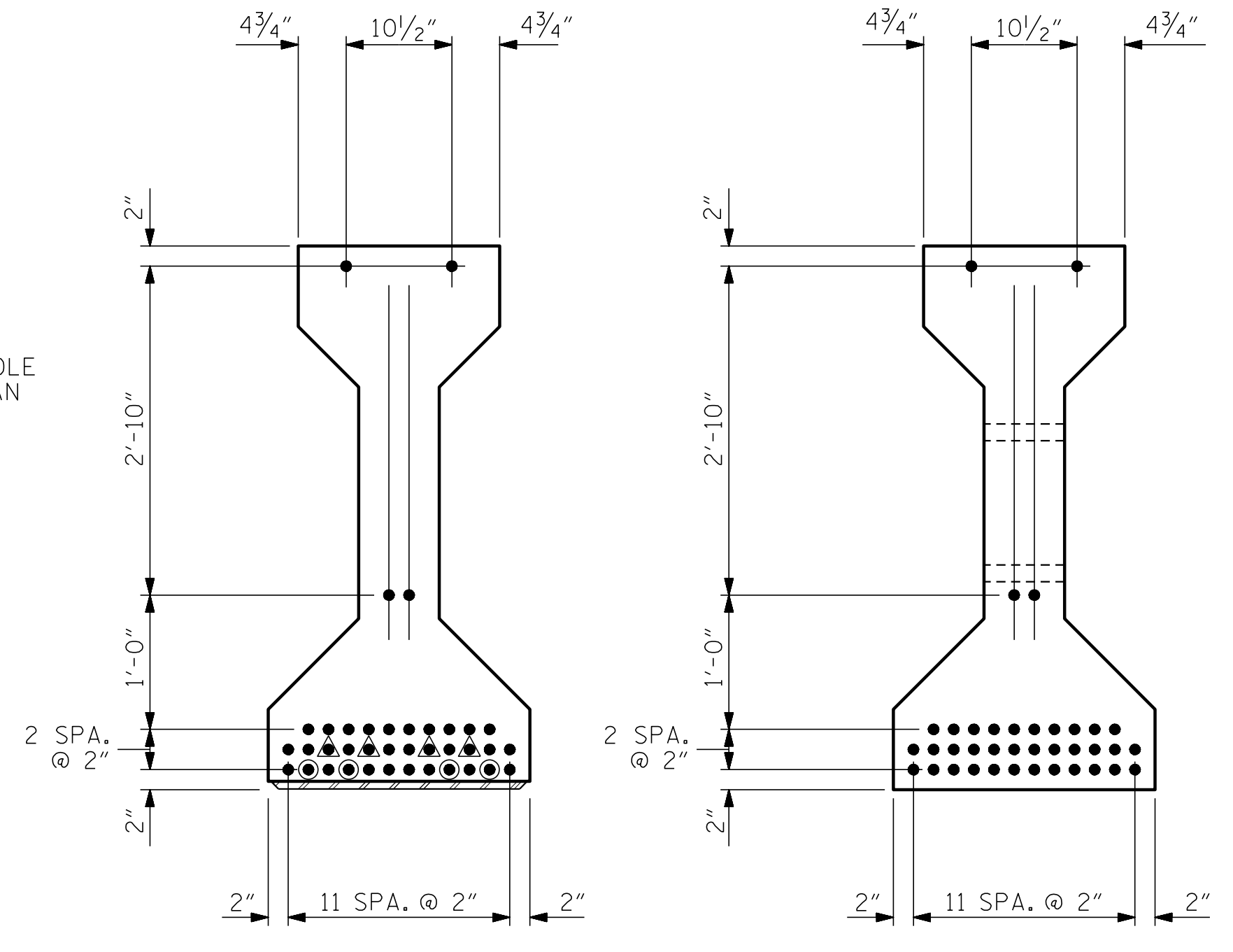
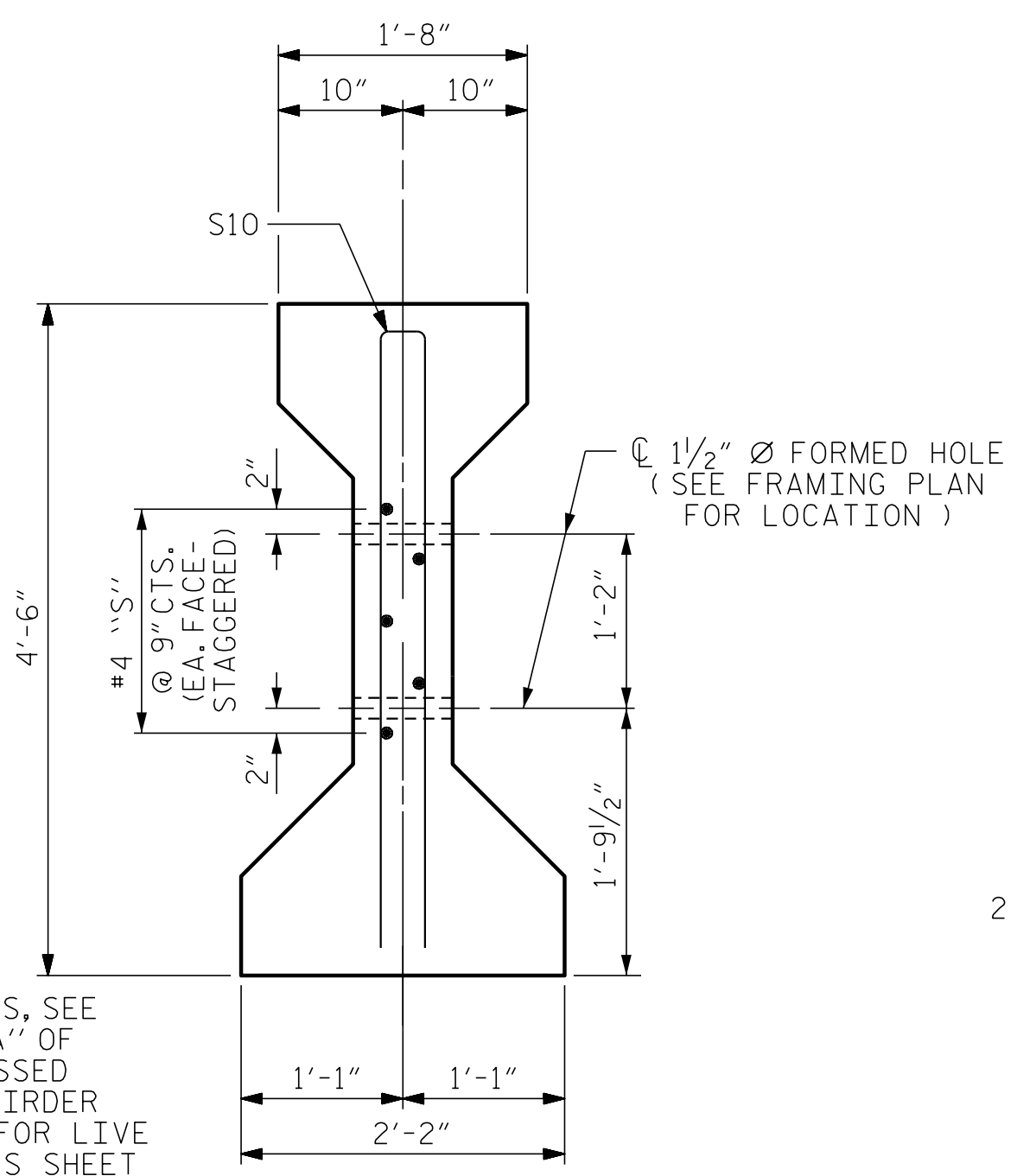
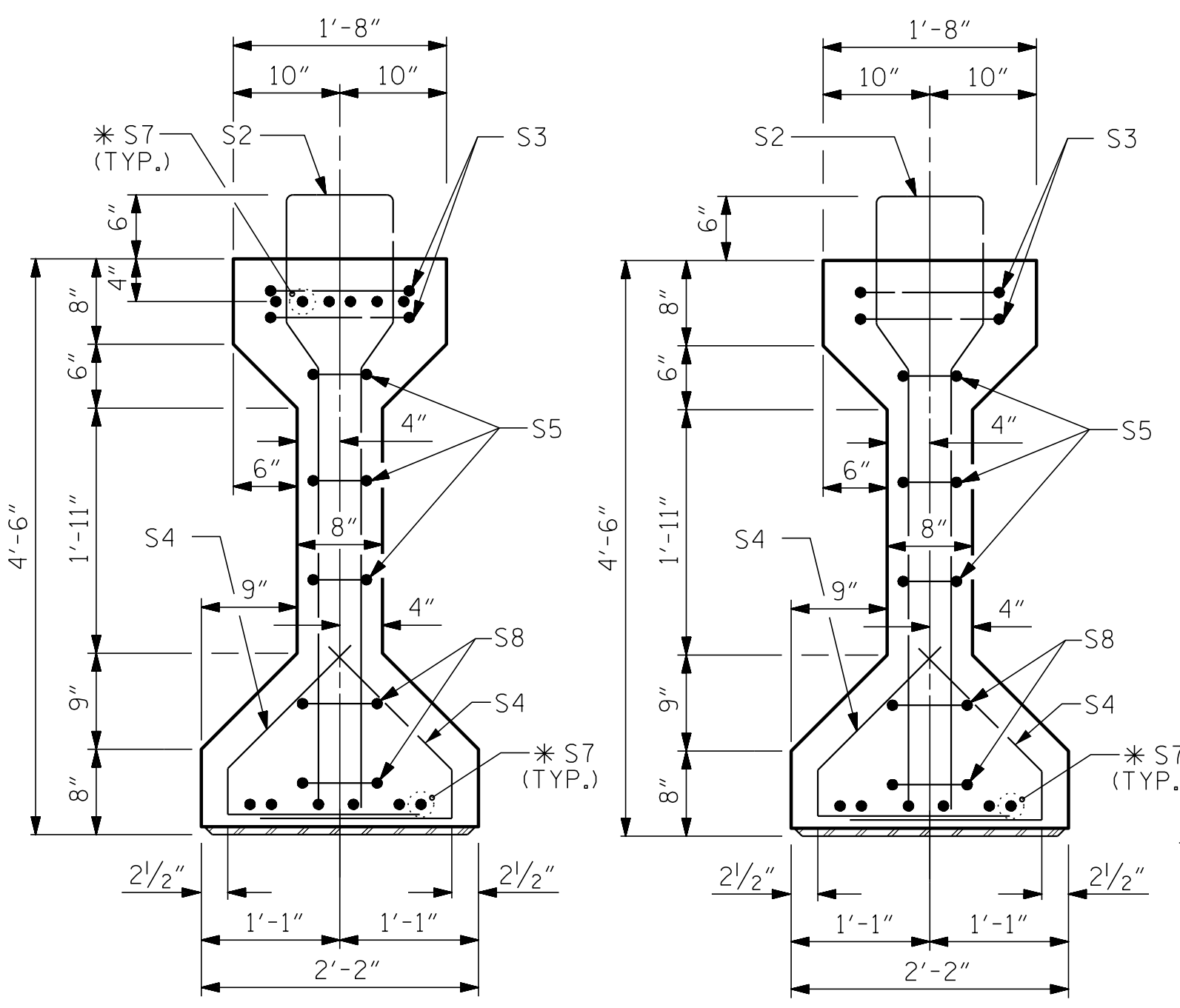
DocuSigned by:
Gregory M. Gilland
 WETHERILL ENGINEERING

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 Raleigh, N.C. 27606
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 GIRDER LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			33

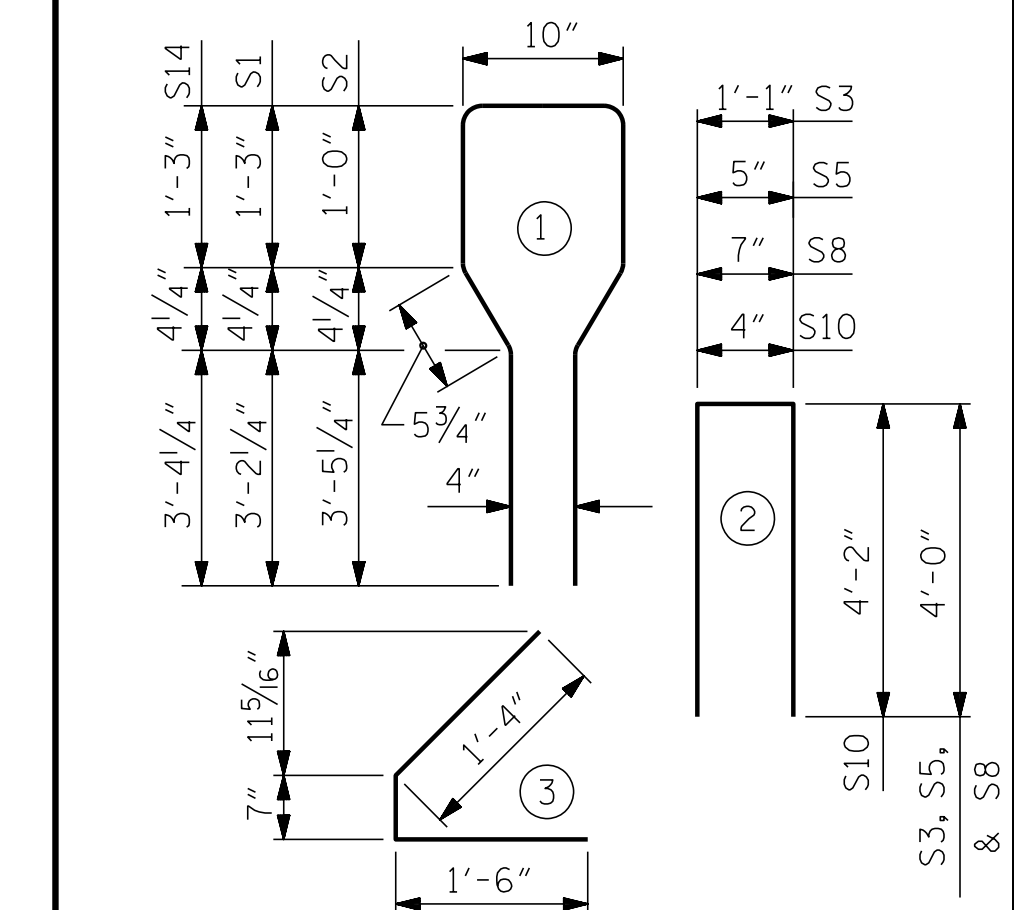


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	20	#4	1	10'-8"	143
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
*S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1
S14	84	#4	1	11'-0"	617

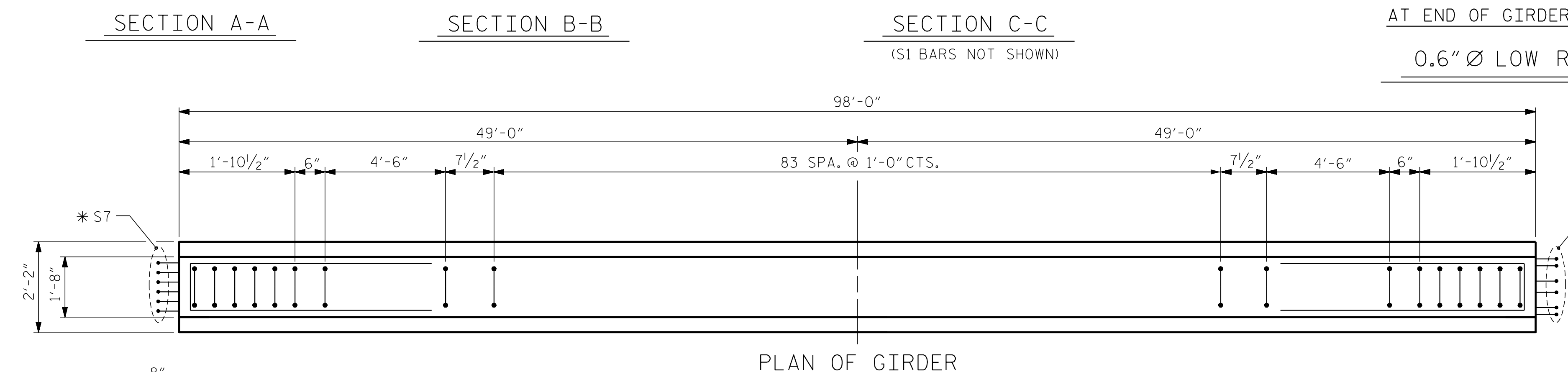
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES
ALL BAR DIMENSIONS ARE OUT-TO-OUT

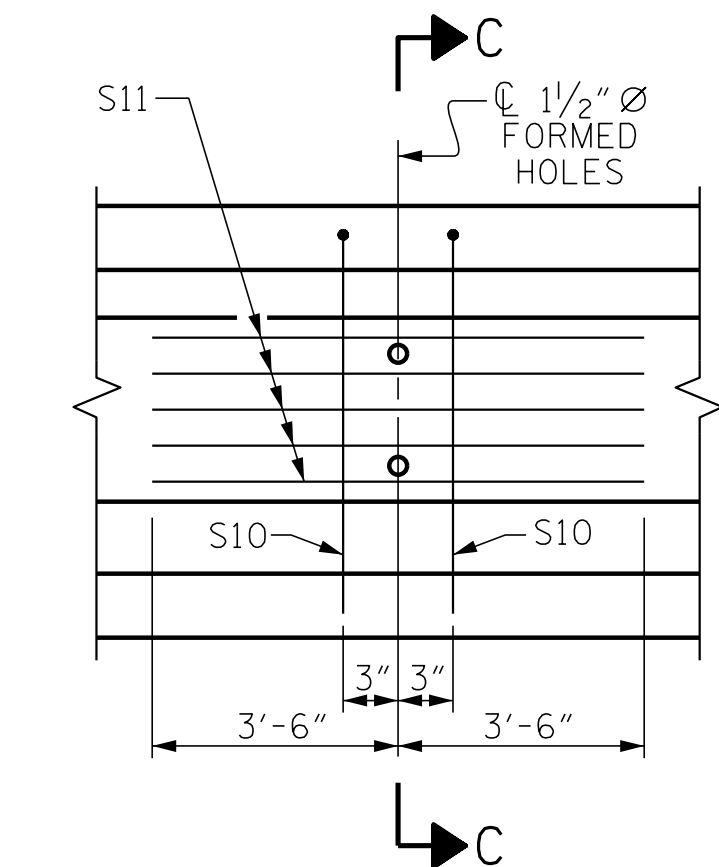
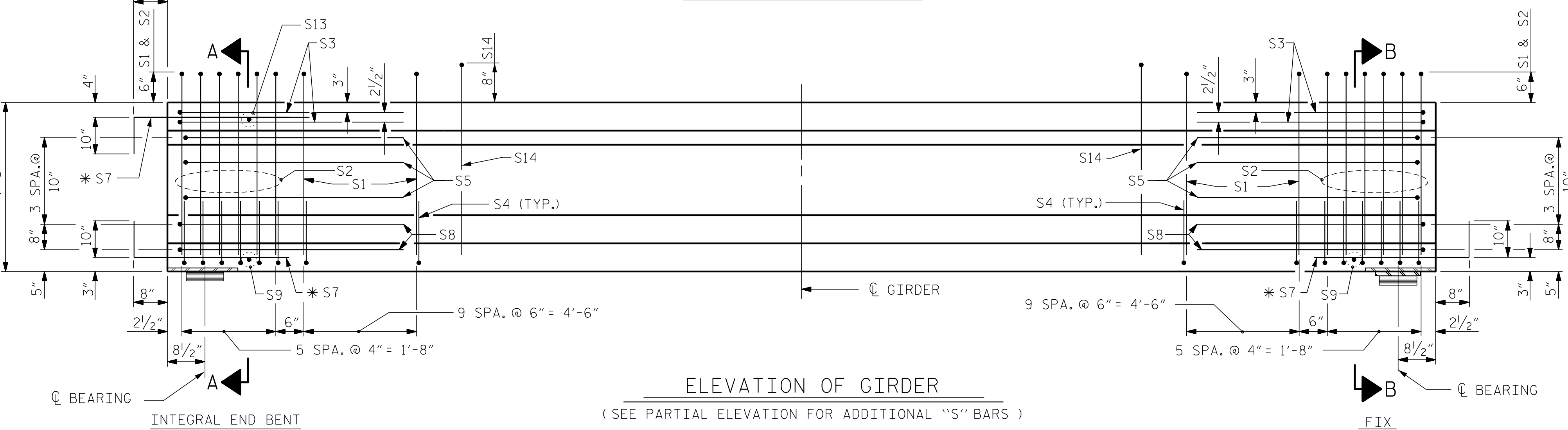


QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	8000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
	1,291	19.9	38

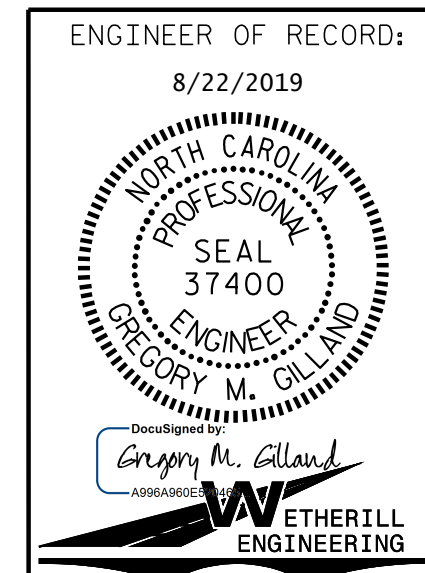
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	98'-0"	392'-0"



- ▲ DEBONDING LENGTH = 6'-0"
- DEBONDING LENGTH = 10'-0"



PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-



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

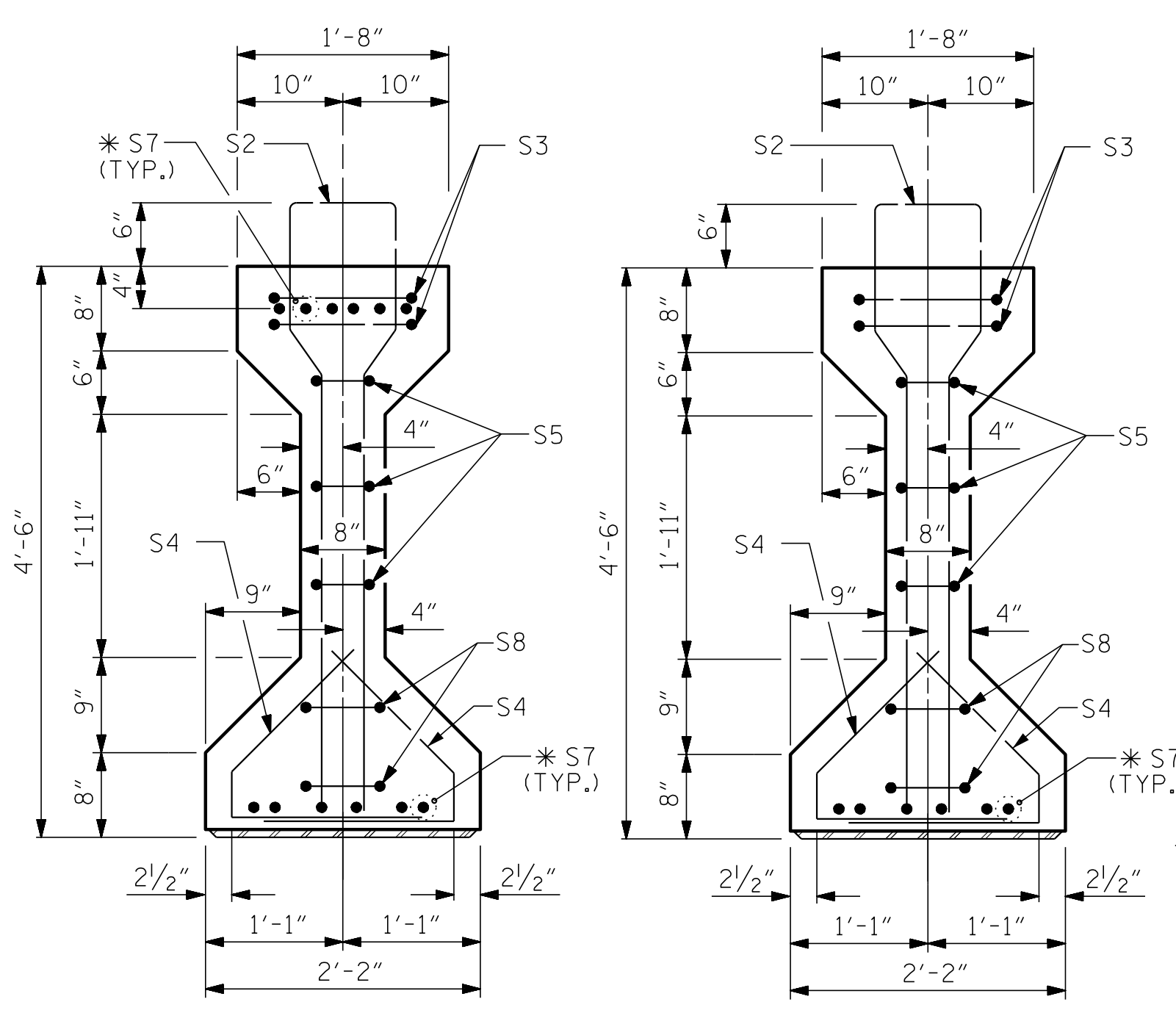
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

ASSEMBLED BY : D. HODGE	DATE : 1/19
CHECKED BY : G.M. GILLAND	DATE : 1/19
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/CM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

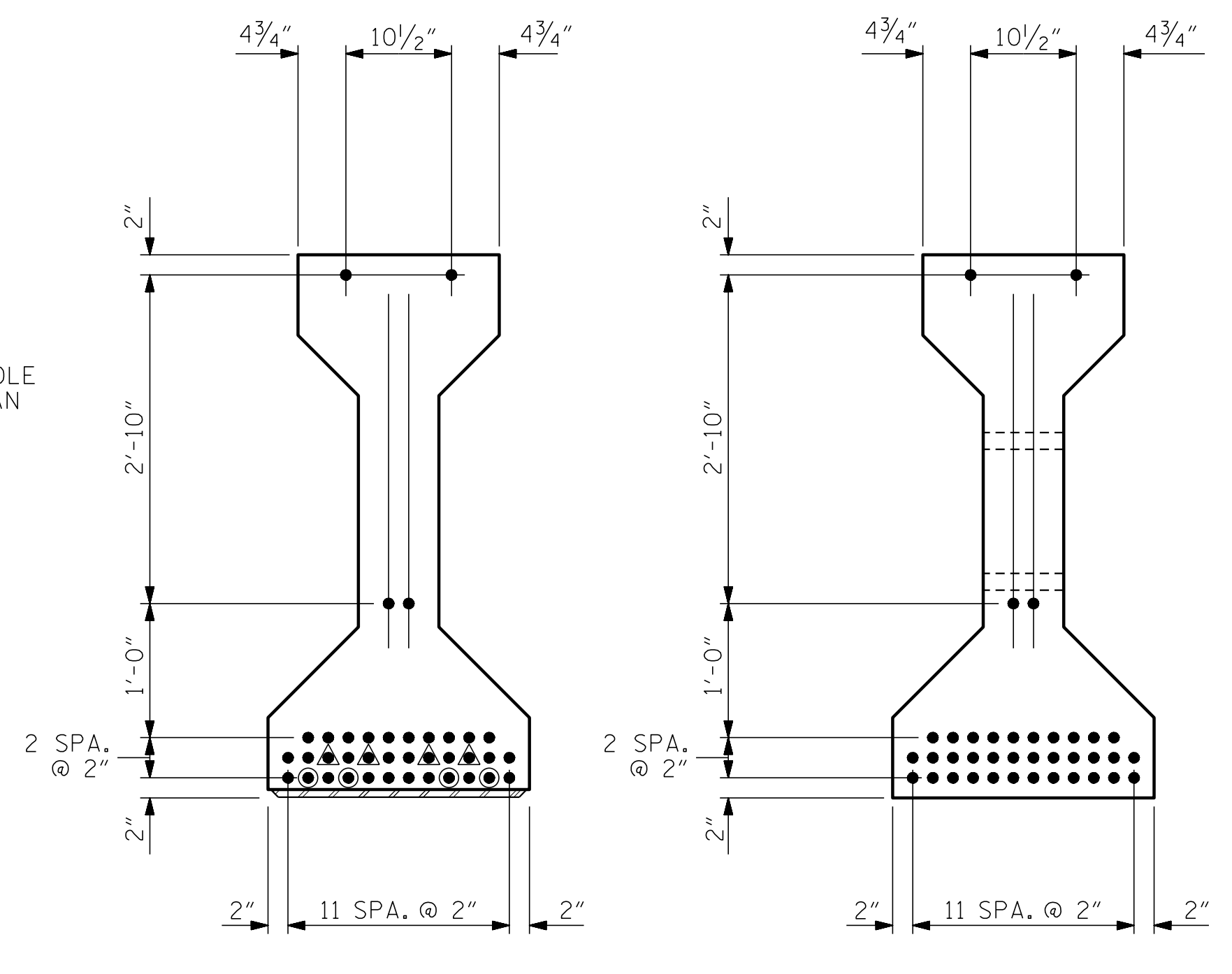
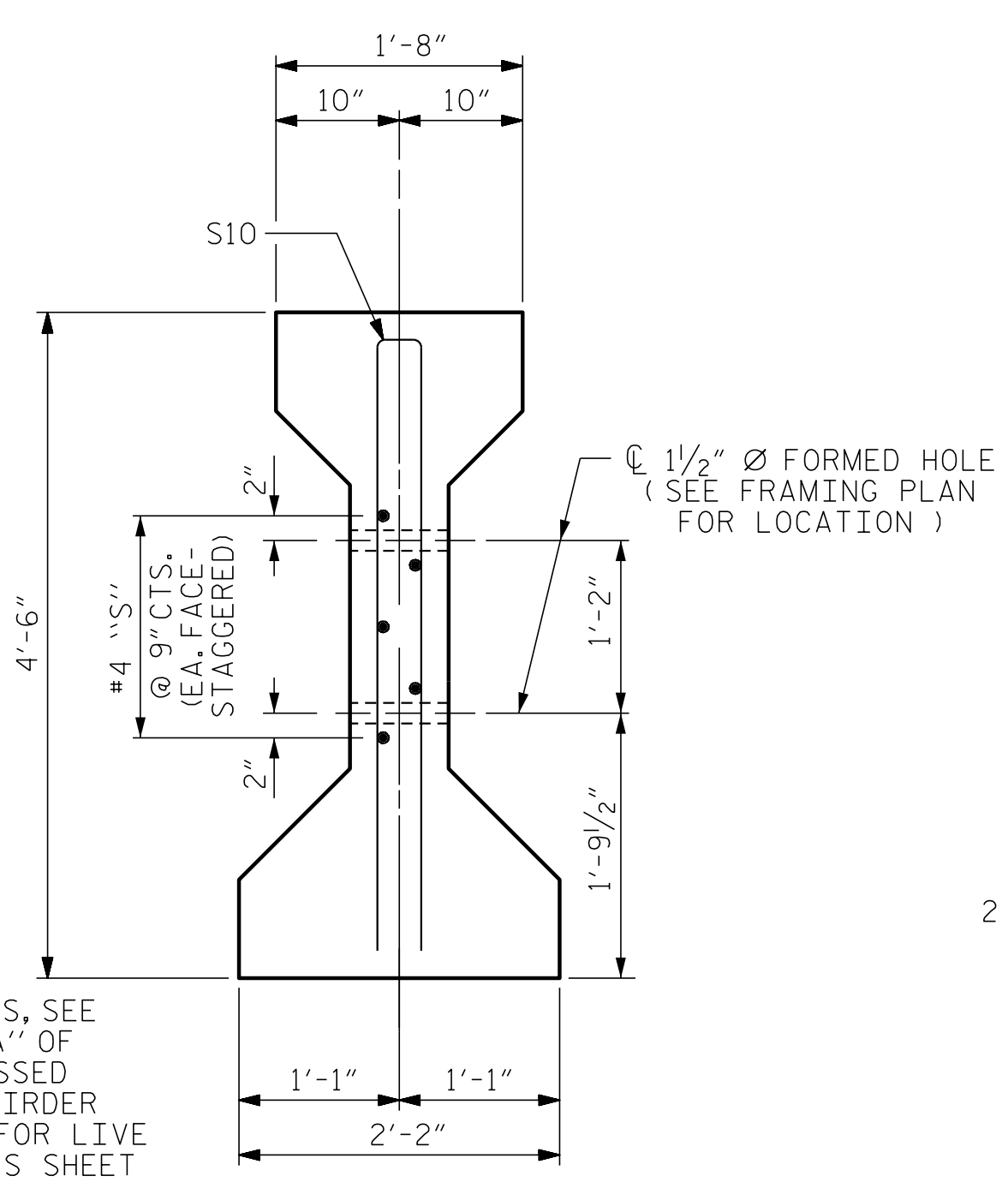
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* FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



AT END OF GIRDER
AT C OF GIRDER
0.6" Ø LOW RELAXATION STRAND LAYOUT

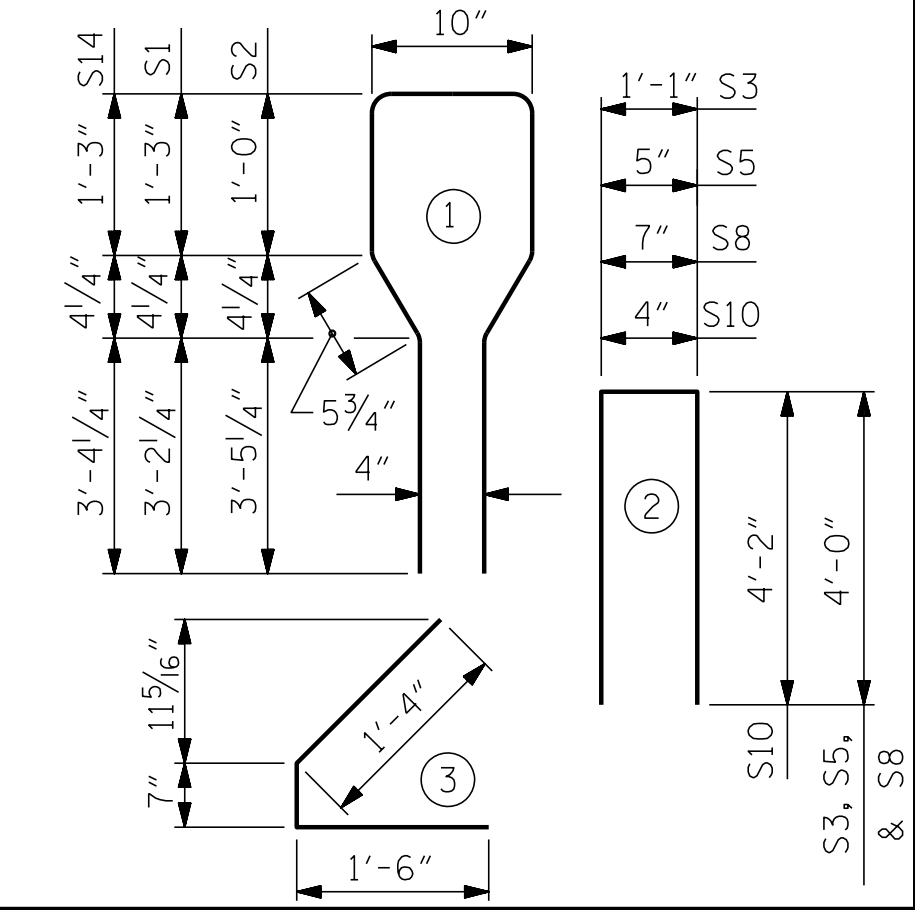
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
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*S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1
S14	85	#4	1	11'-0"	625

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

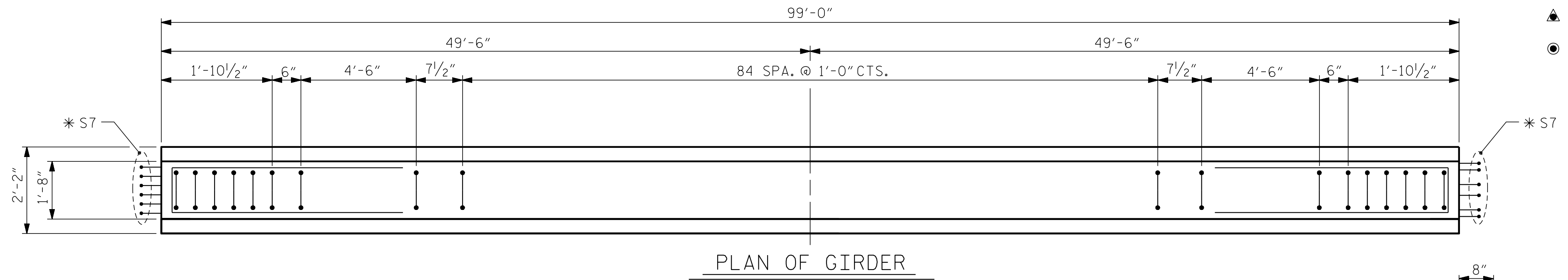
BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

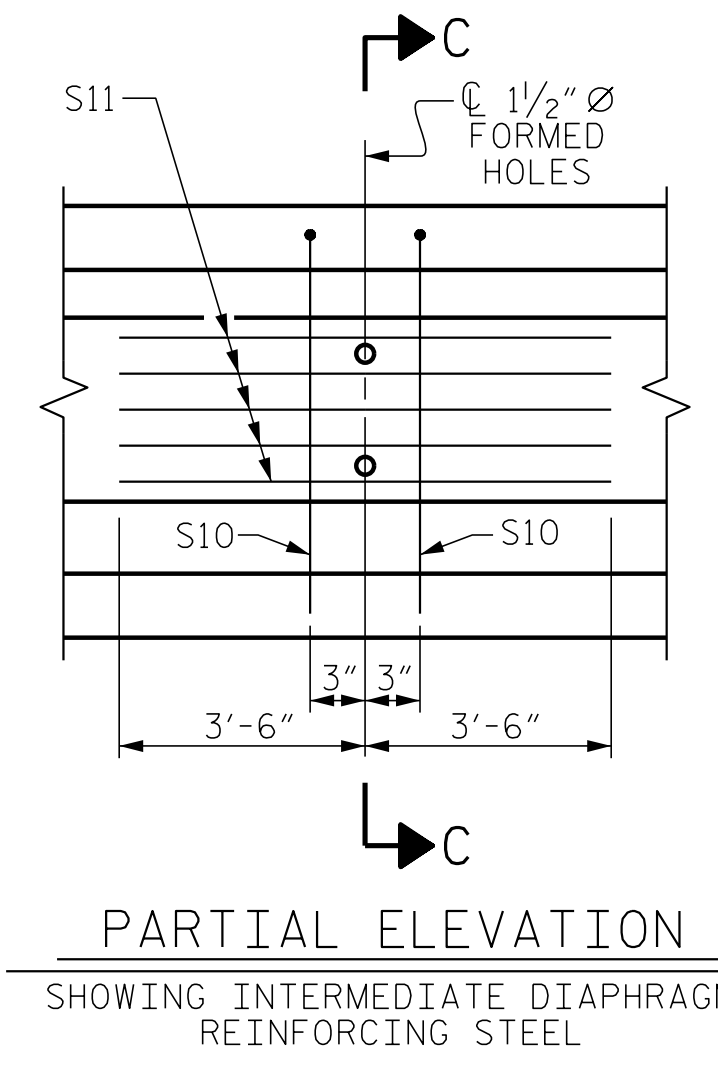
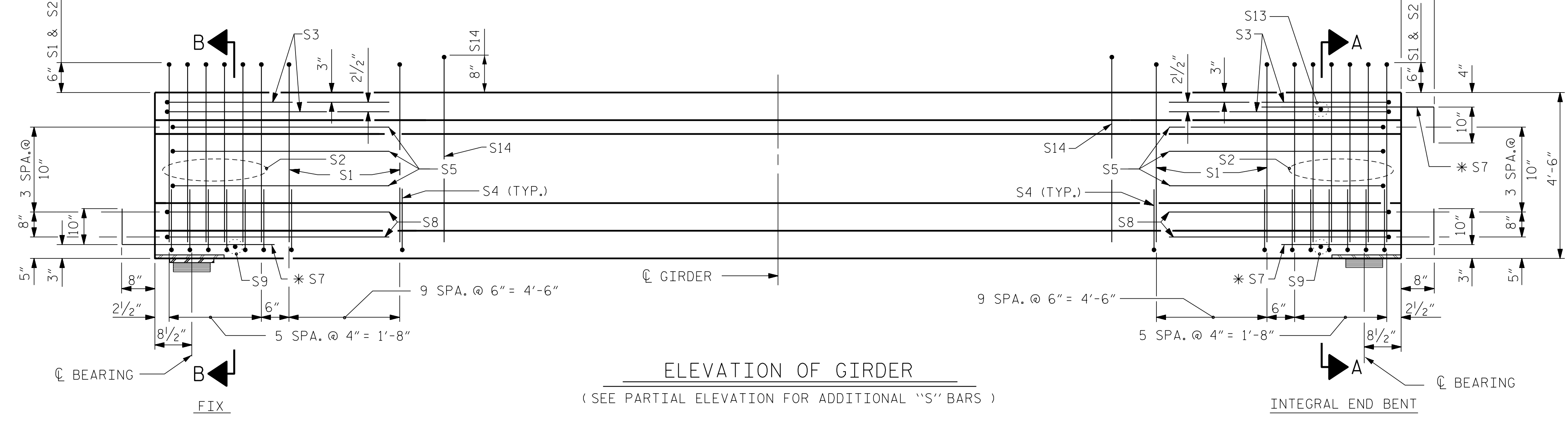


QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L. R. STRANDS	
LB.	C.Y.	No.	
1,299	20.1	38	

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	99'-0"	396'-0"

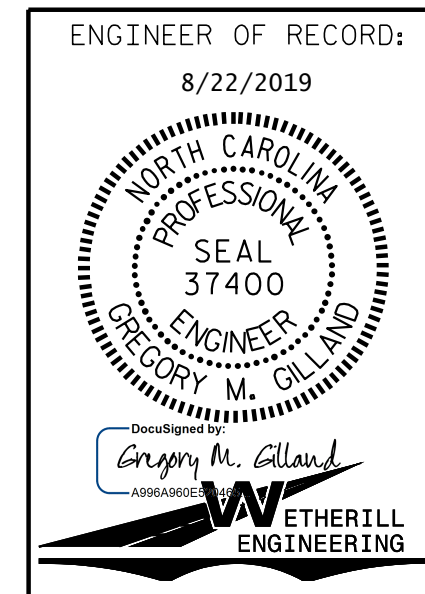


- ▲ DEBONDING LENGTH = 6'-0"
- DEBONDING LENGTH = 10'-0"



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-



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

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11	
1			3			TOTAL SHEETS	
2			4			33	

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ASSEMBLED BY : D. HODGE	DATE : 1/19
CHECKED BY : G.M. GILLAND	DATE : 1/19
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/CM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

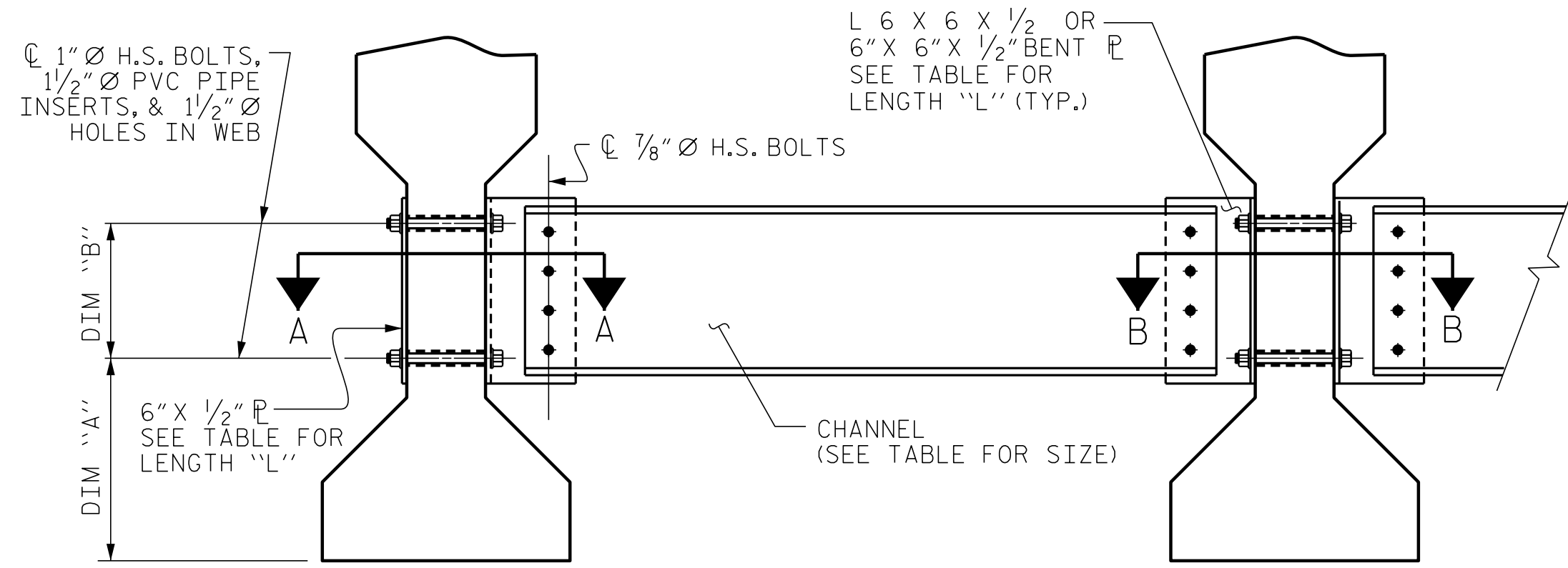
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

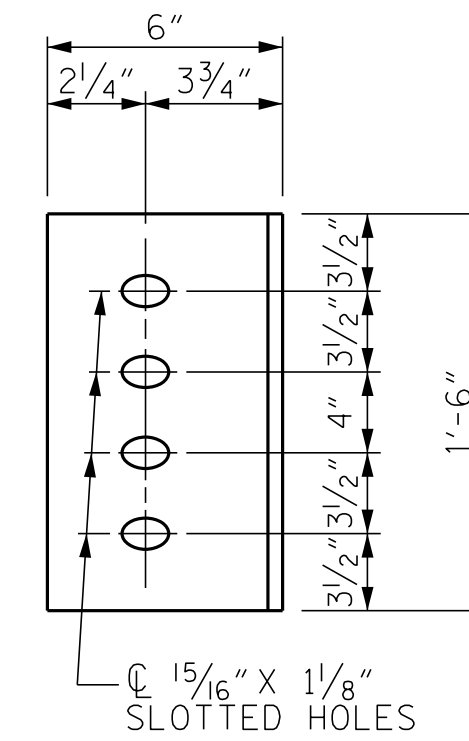
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

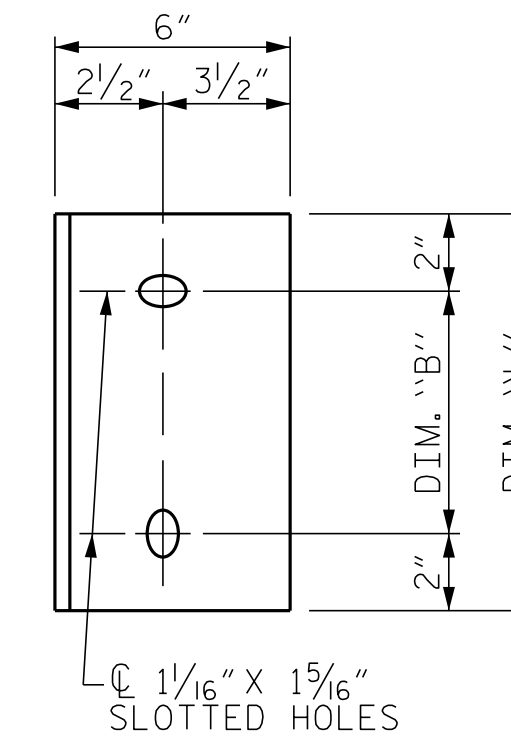
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



EXTERIOR GIRDER
INTERIOR GIRDER
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE



WEB FACE

CONNECTOR PLATE DETAILS

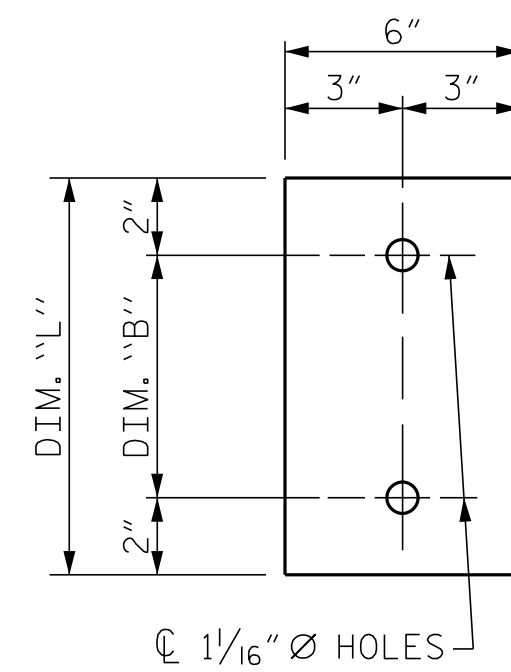
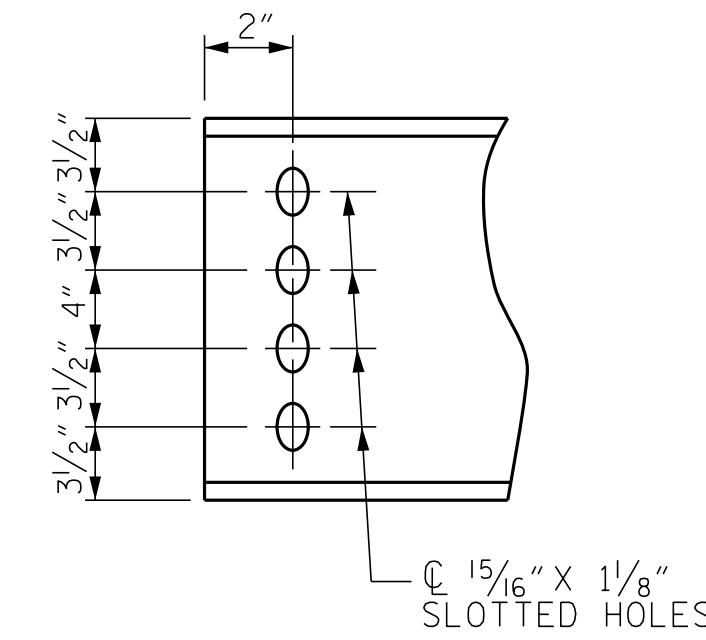


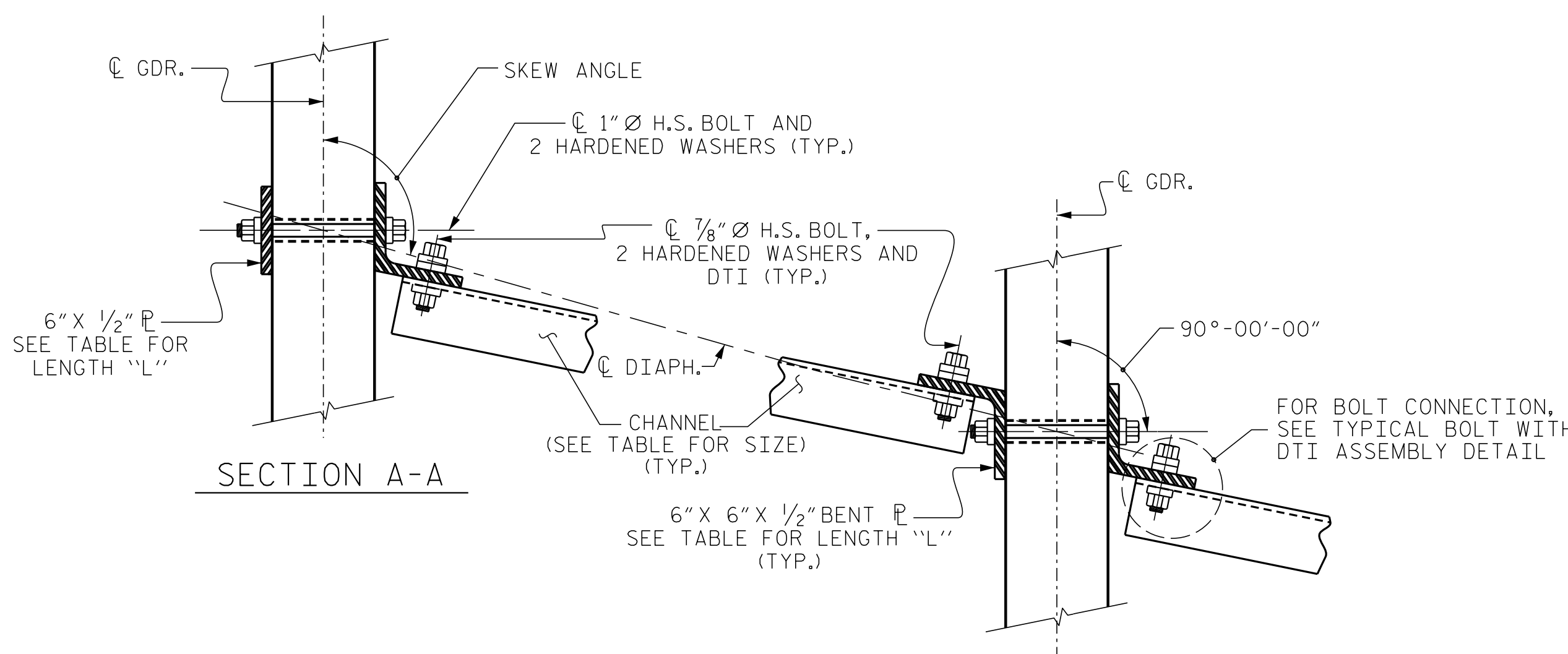
PLATE DETAILS



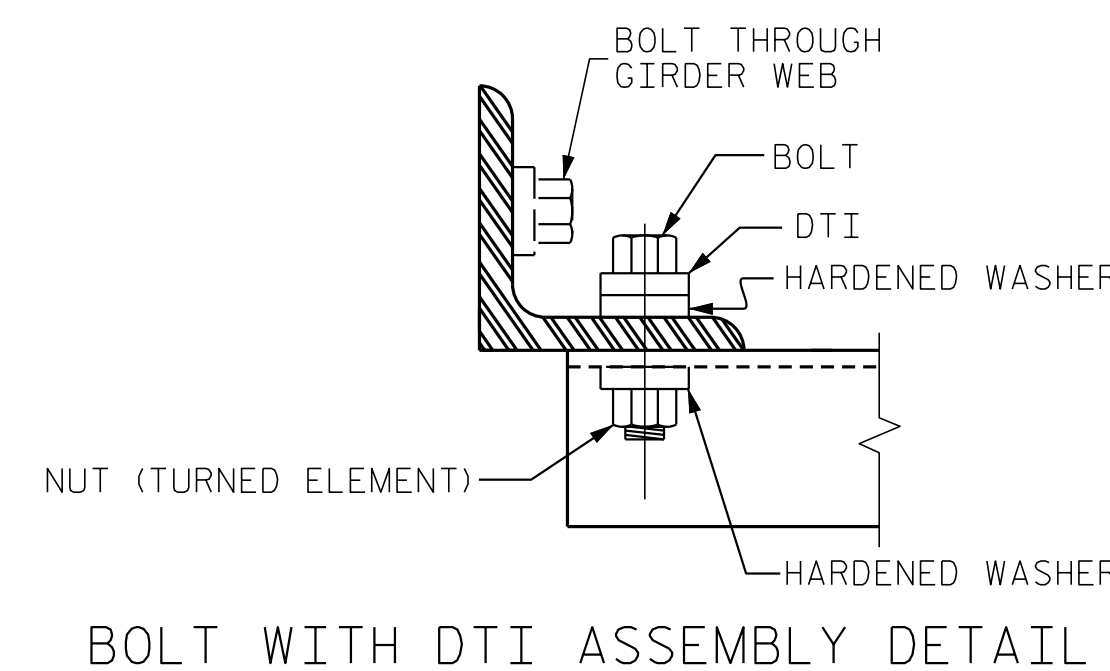
CHANNEL END

TABLE

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



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-

ENGINEER OF RECORD:
8/22/2019
NORTH CAROLINA PROFESSIONAL SEAL 37400
GREGORY M. GILLAND
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
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Fax: 919 851 8107
LICENSE NO. F-0377

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			33

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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.

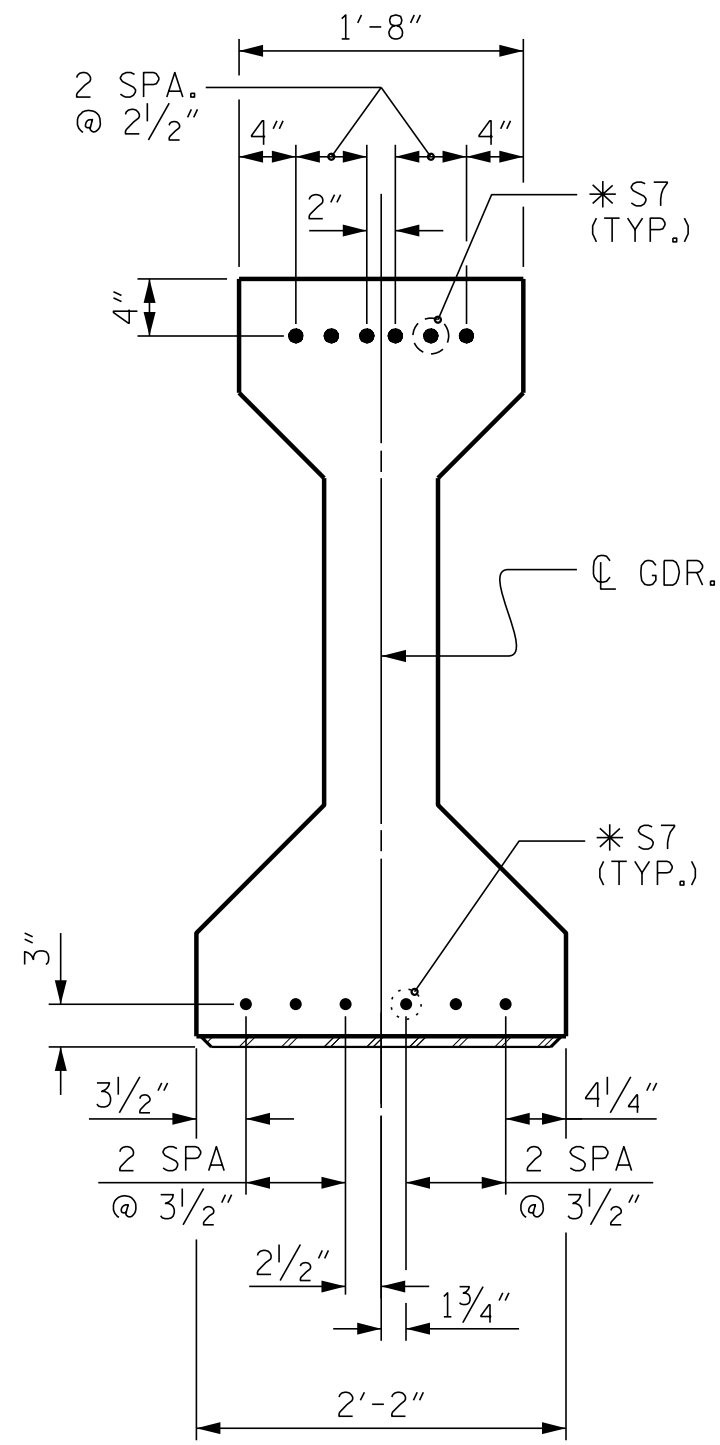
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6400 PSI.

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

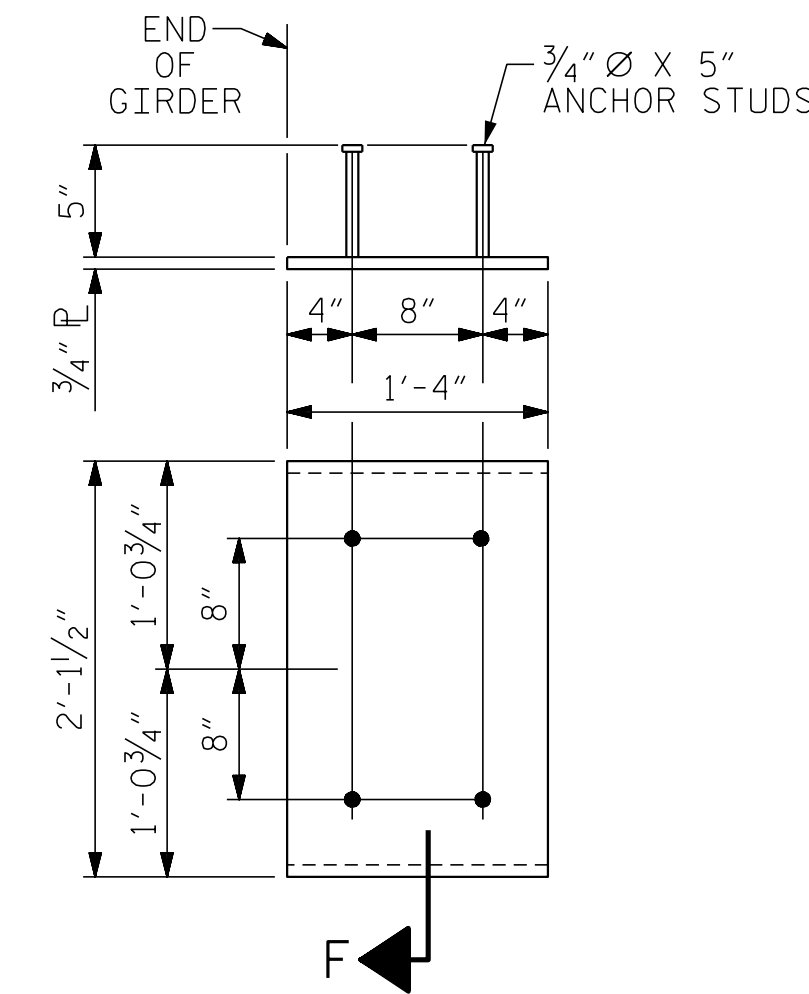
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

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.



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



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

(2 REQ'D PER GIRDER)

— DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPANS A & B —

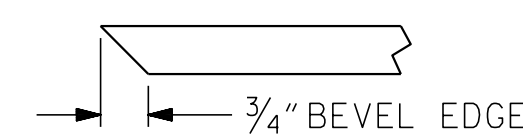
0.6" Ø LOW RELAXATION	GIRDERS 1 & 4											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.079	0.149	0.204	0.239	0.251	0.239	0.204	0.149	0.079	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.050	0.098	0.136	0.160	0.168	0.160	0.136	0.098	0.050	0
FINAL CAMBER	↑	0	3/8"	5/8"	13/16"	15/16"	1"	15/16"	13/16"	5/8"	3/8"	0

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

— DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPANS A & B —

0.6" Ø LOW RELAXATION	GIRDERS 2 & 3											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.079	0.149	0.204	0.239	0.251	0.239	0.204	0.149	0.079	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.057	0.112	0.155	0.182	0.192	0.182	0.155	0.112	0.057	0
FINAL CAMBER	↑	0	1/4"	7/16"	9/16"	11/16"	11/16"	11/16"	9/16"	7/16"	1/4"	0

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



SECTION "F"

(SEE NOTES)

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

ENGINEER OF RECORD:
 8/22/2019

 Disapproved by:

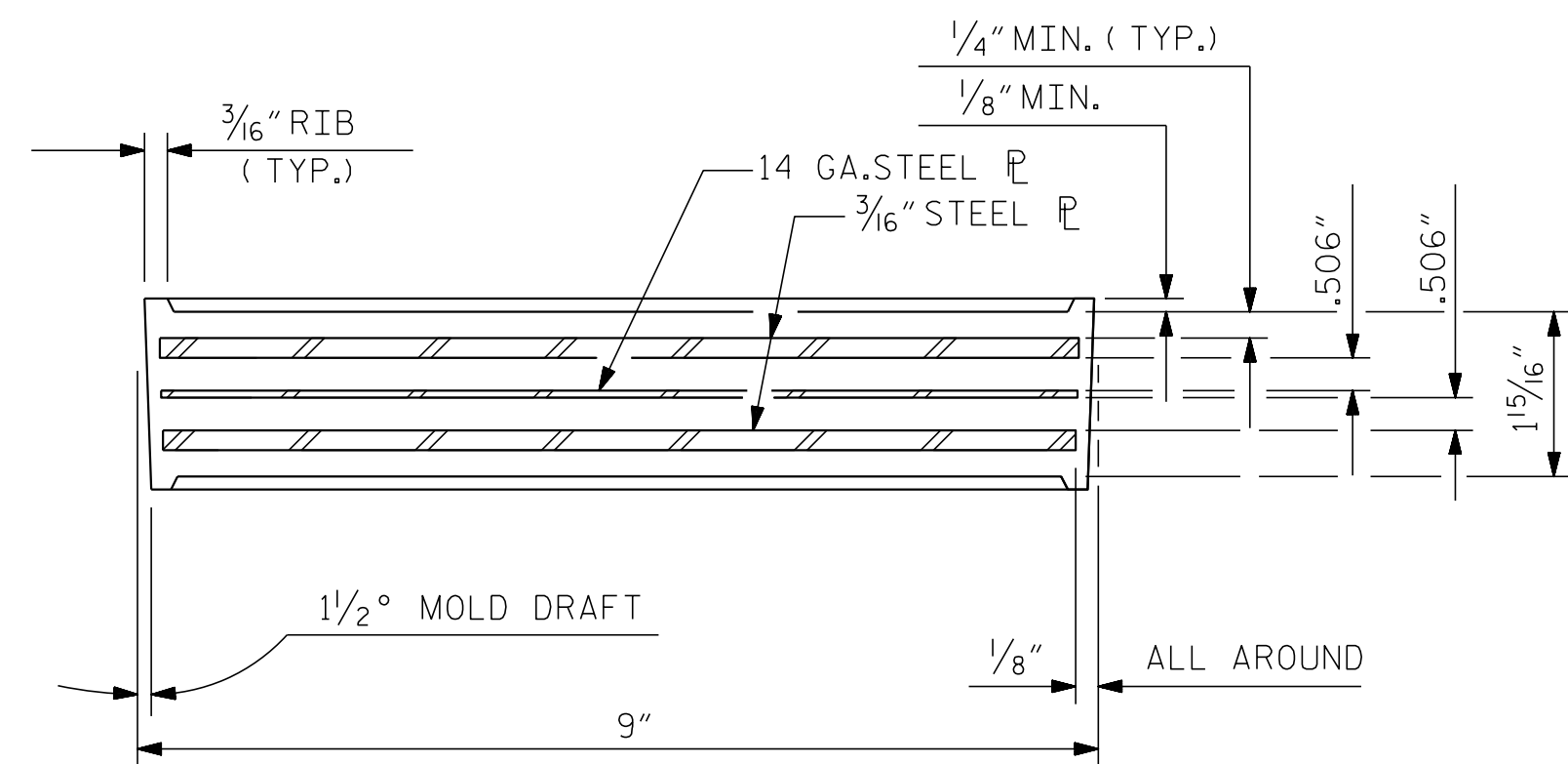
 WETHERILL ENGINEERING
 1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
 Bus: 919 851 8077
 Fax: 919 851 8107
 LICENSE NO. F-0377

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

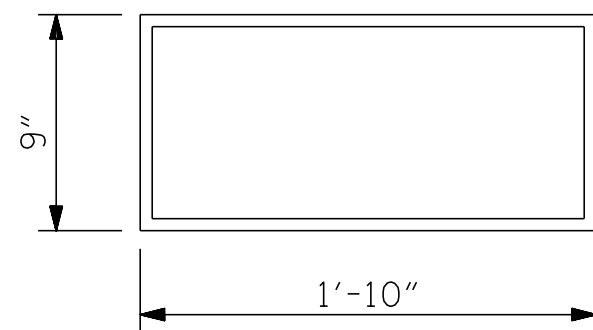
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			33

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ASSEMBLED BY : D. HODGE	DATE : 1/19
CHECKED BY : G.M. GILLAND	DATE : 1/19
DRAWN BY : ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC



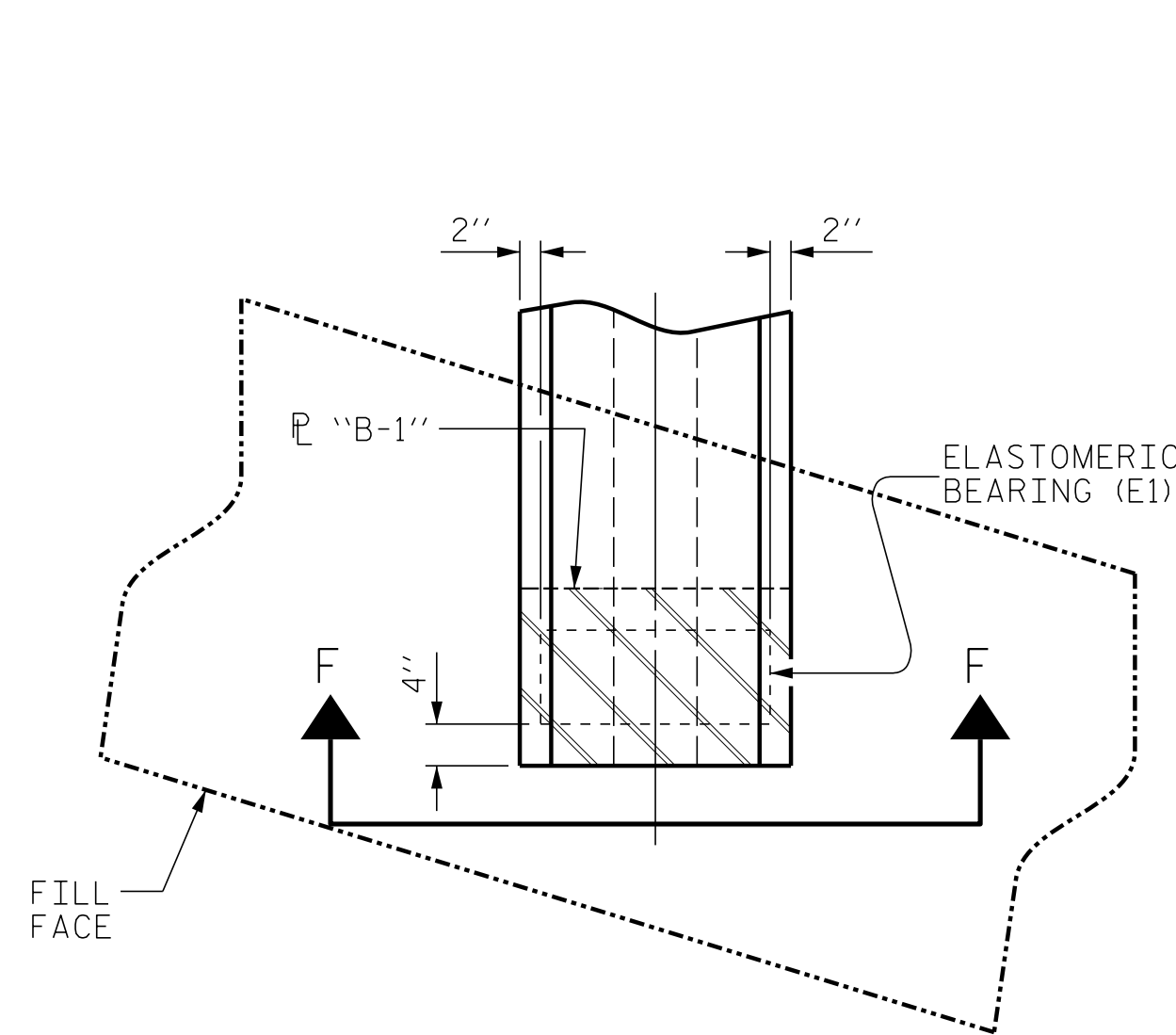
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (8 REQ'D)

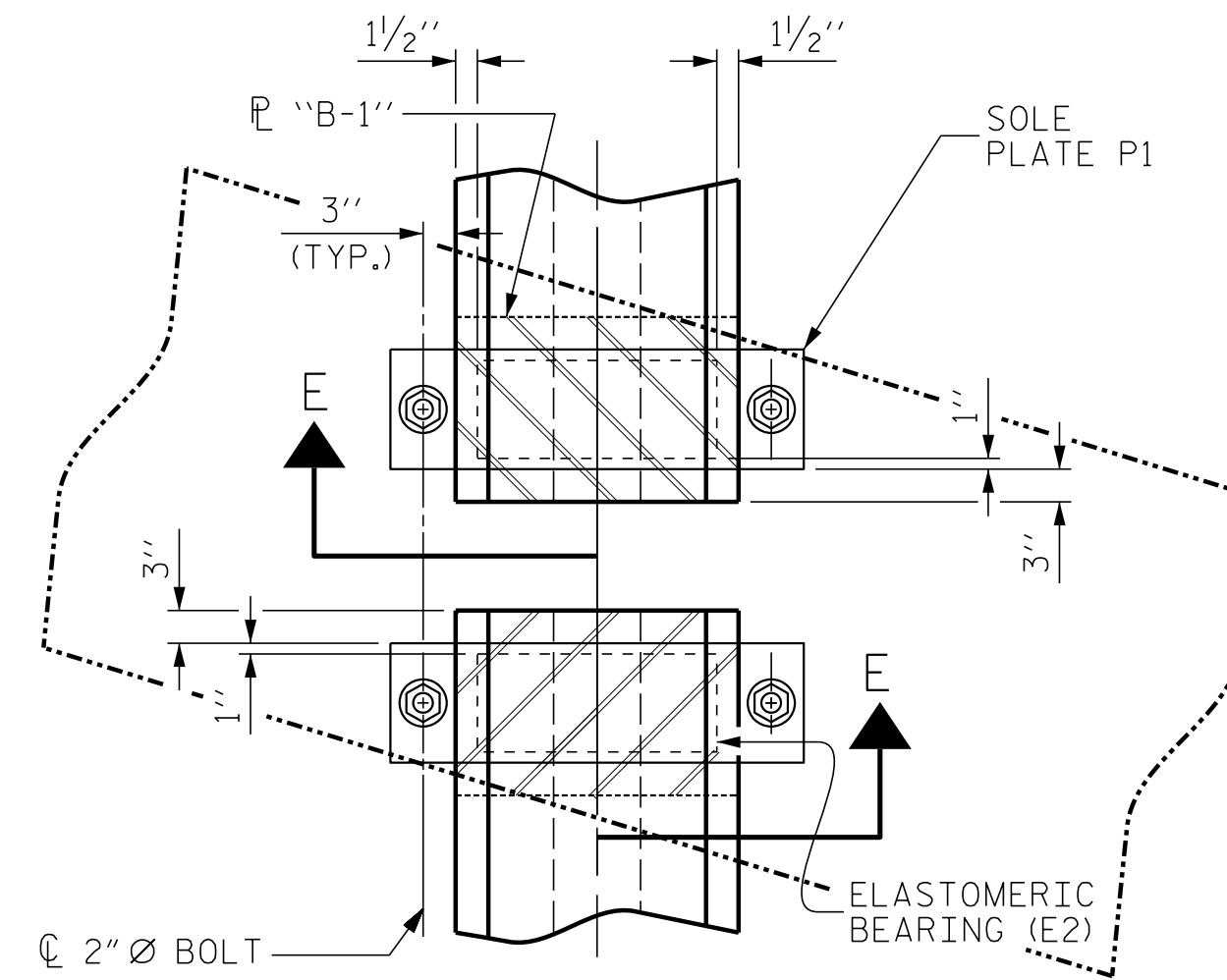
PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



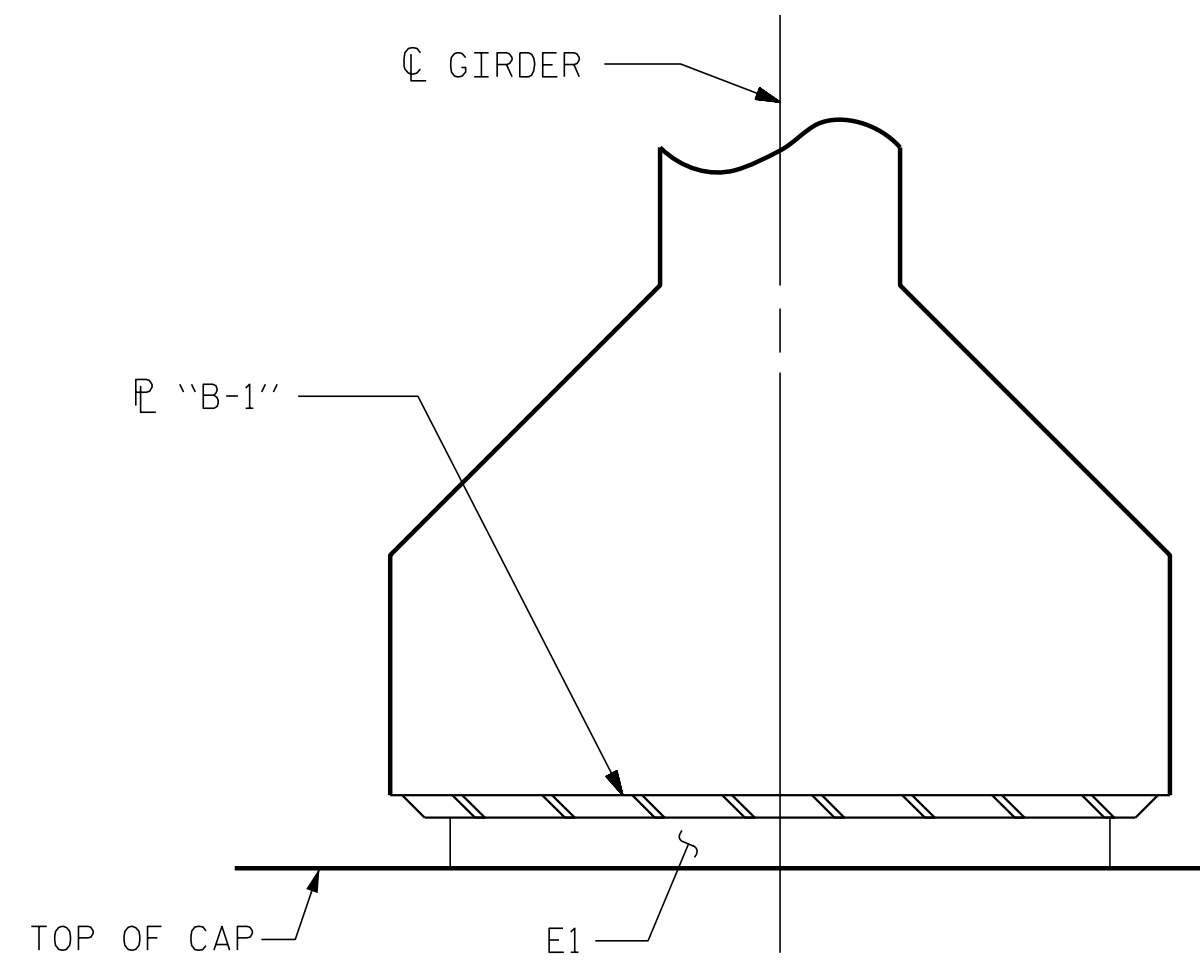
TYPICAL PLAN @ END BENT

(SHOWING INTEGRAL END BENT)

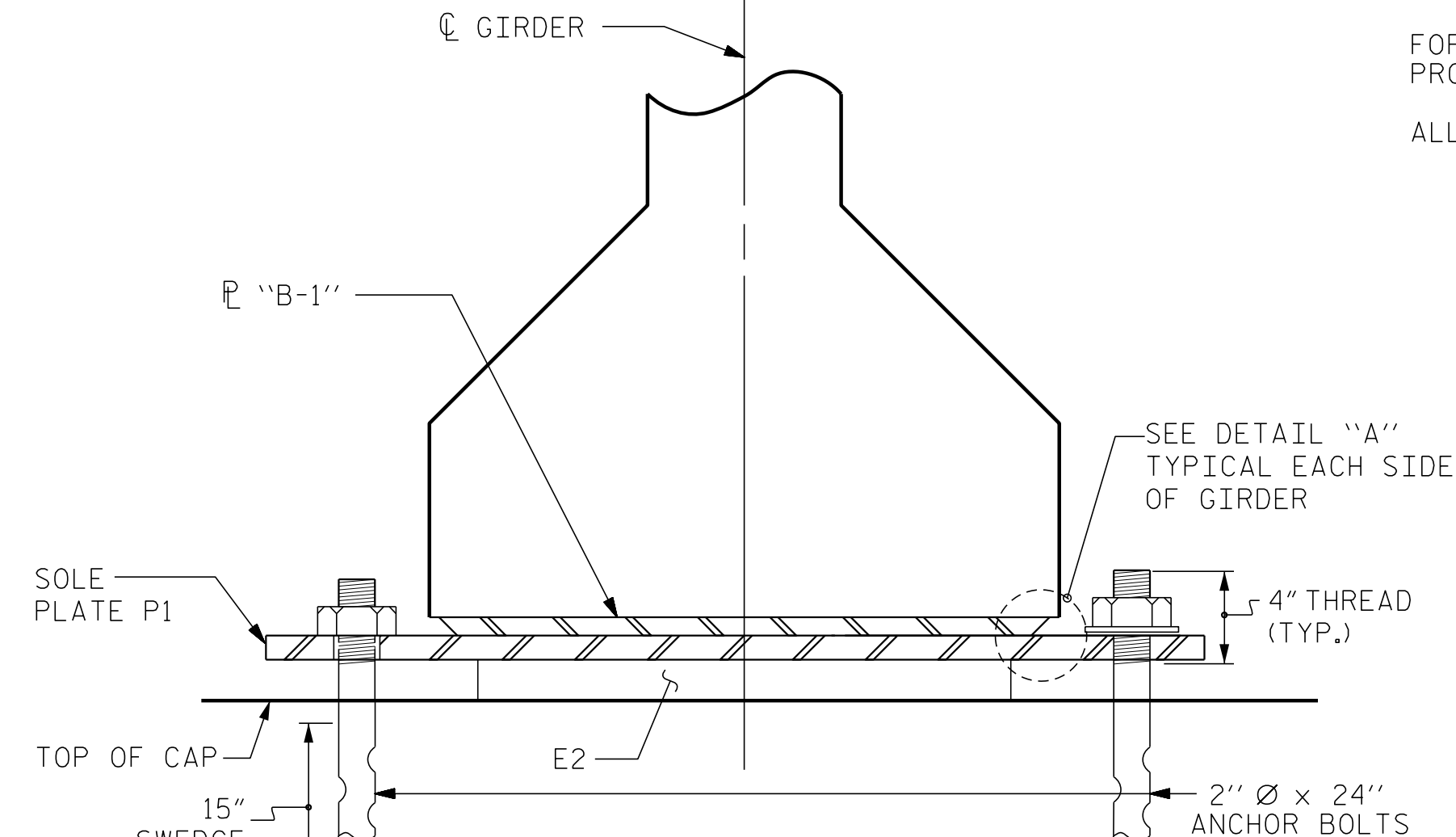


TYPICAL PLAN @ BENT

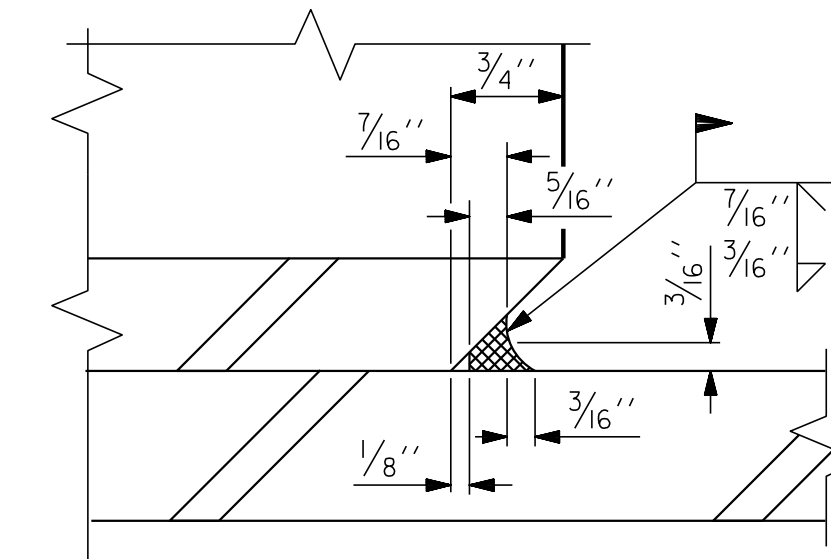
(SHOWING CONTINUOUS BENT)



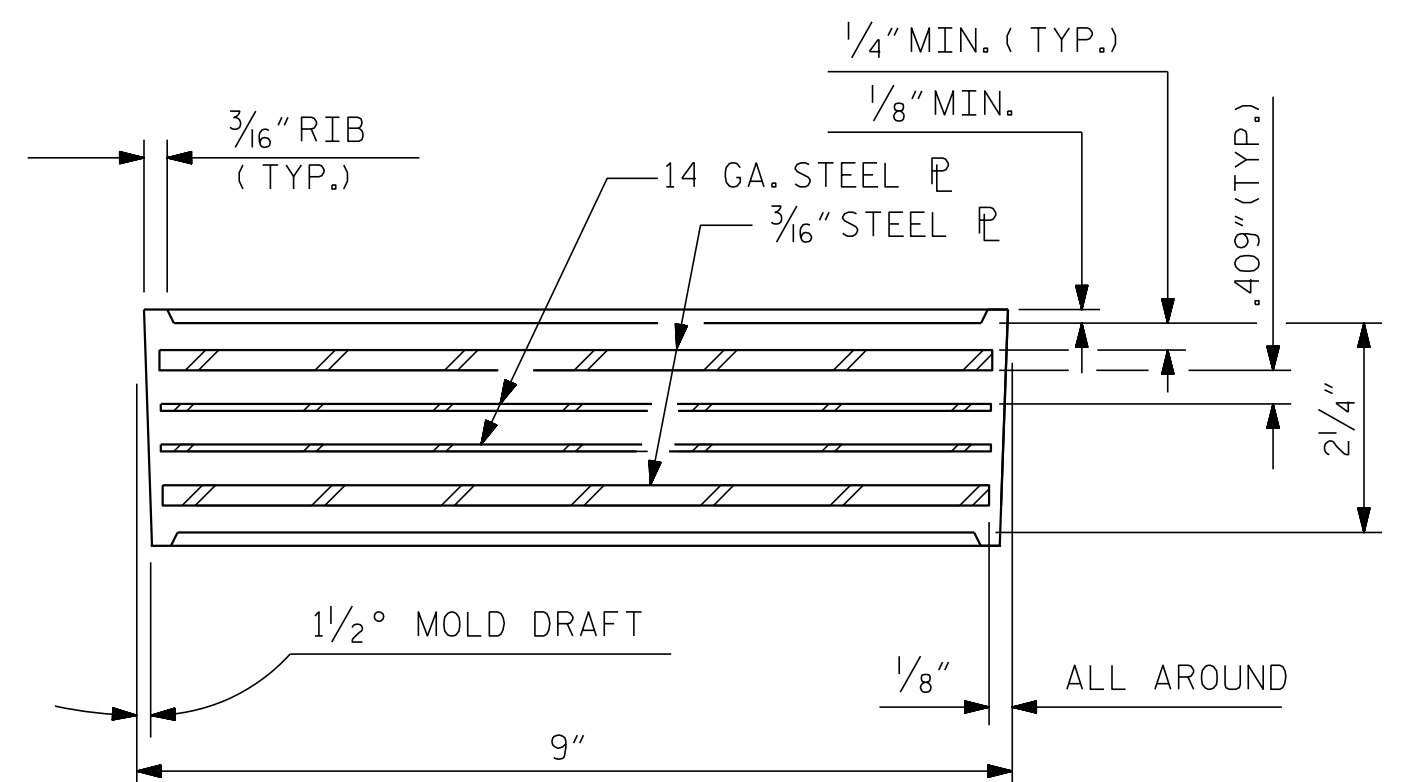
SECTION F-F



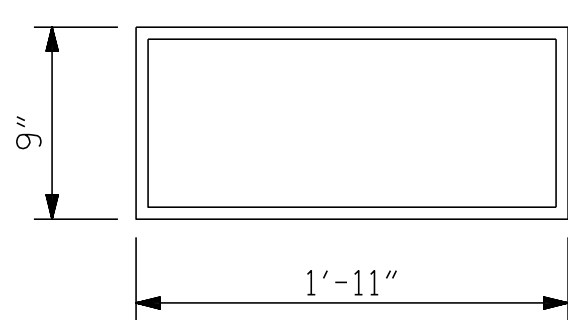
SECTION E-E



DETAIL "A"



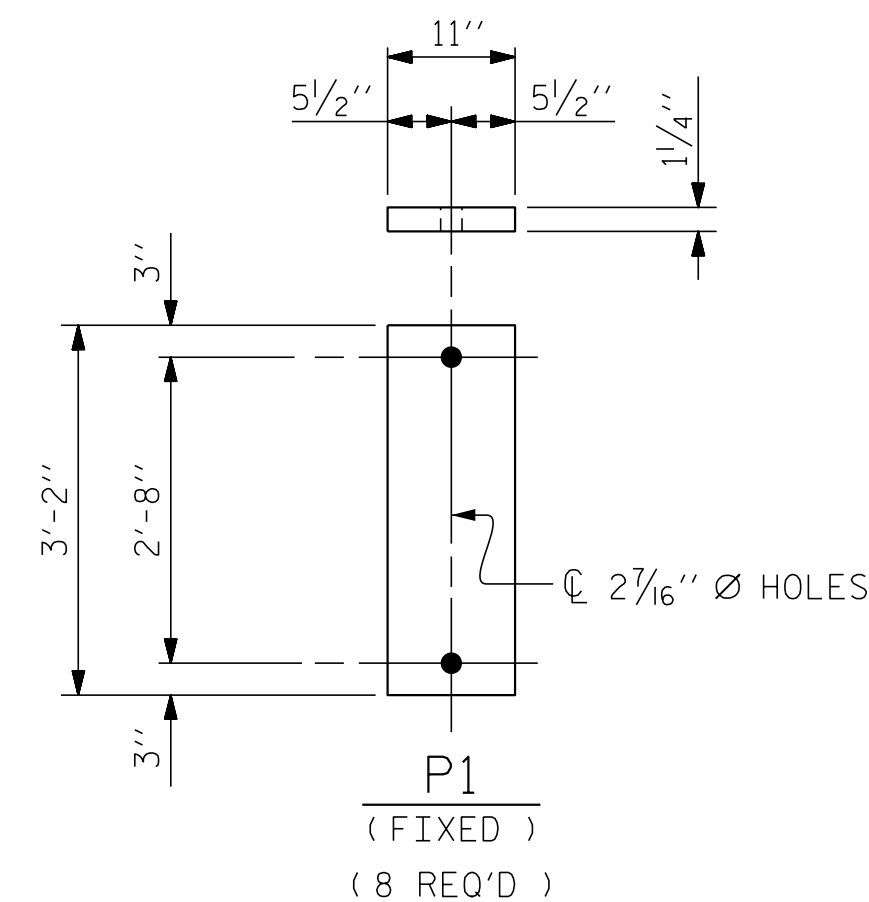
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



SOLE PLATE (P1) DETAIL

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k
TYPE V	365 k

NOTES

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

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

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

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

SOLE PLATE P1, 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.

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-

ENGINEER OF RECORD:
8/22/2019
NORTH CAROLINA PROFESSIONAL SEAL 37400
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LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
ELASTOMERIC
BEARING DETAILS

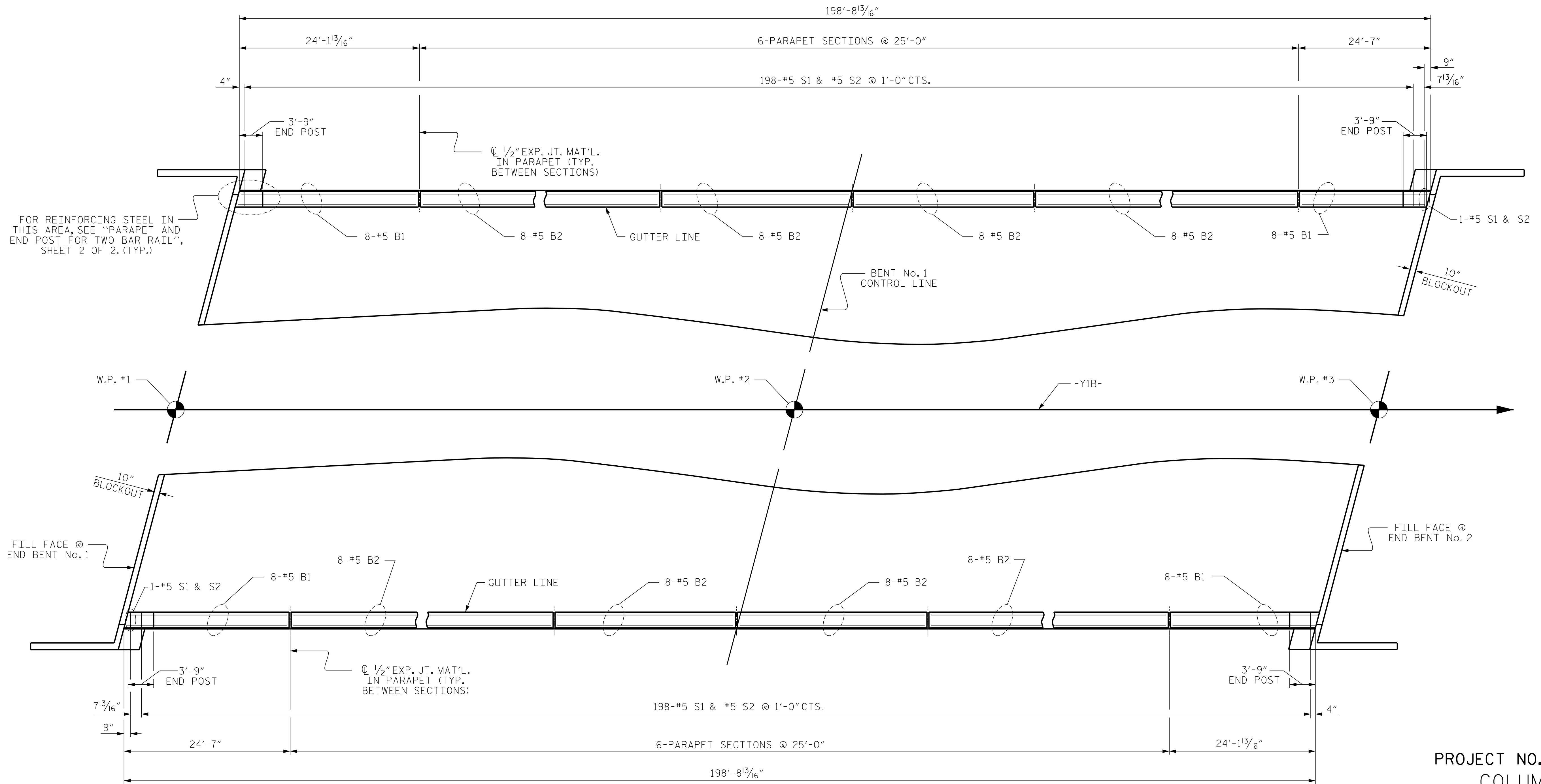
REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : D. HODGE DATE : 1/19
CHECKED BY : G.M. GILLAND DATE : 1/19

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PLAN OF CONCRETE PARAPET

ALL DIMENSIONS ARE ALONG OUTSIDE EDGE OF PARAPET.
 #5 S1 BAR MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN PARAPET.

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

SHEET 1 OF 2

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DRAWN BY: D. HODGE DATE: 1/19
 CHECKED BY: G.M. GILLAND DATE: 1/19

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ENGINEER OF RECORD:
 8/22/2019

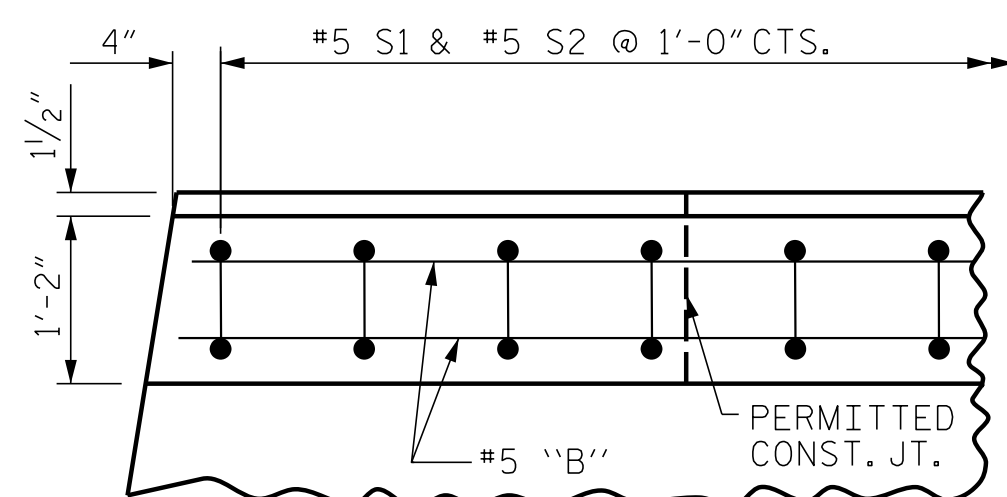
 Gregory M. Gilland
 WETHERILL ENGINEERING
 1223 Jones Franklin Rd.
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

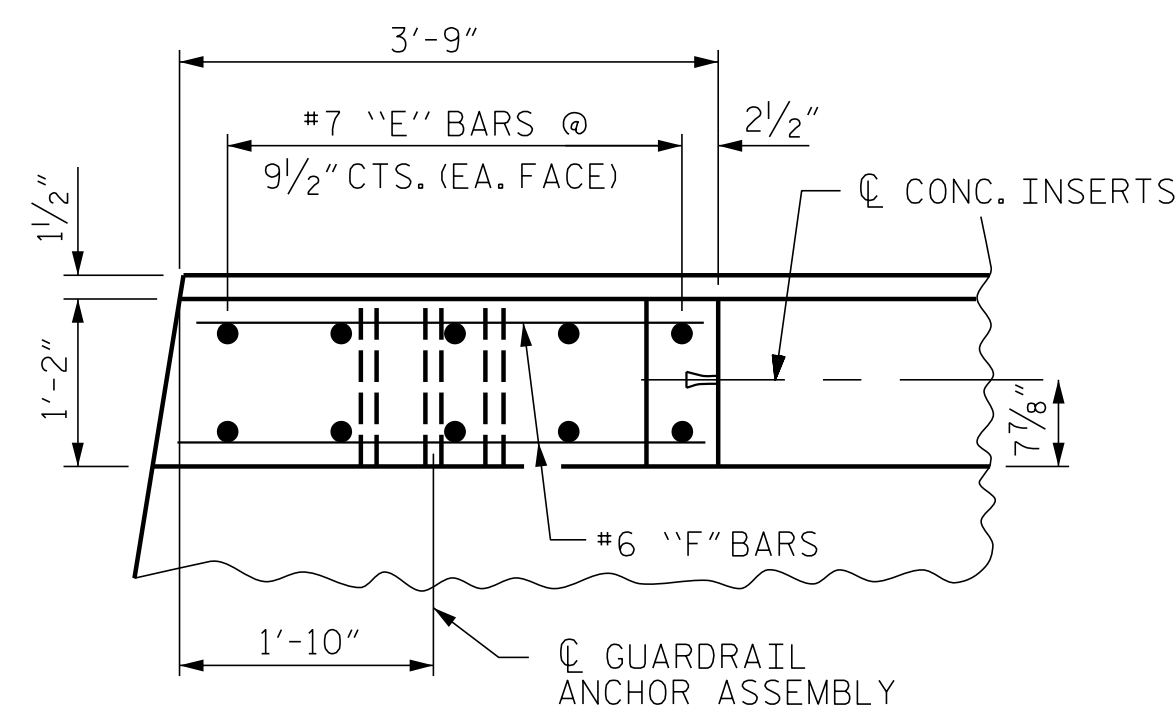
1'-2" x 2'-6"
 CONCRETE PARAPET
 FOR
 2 BAR METAL RAIL

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

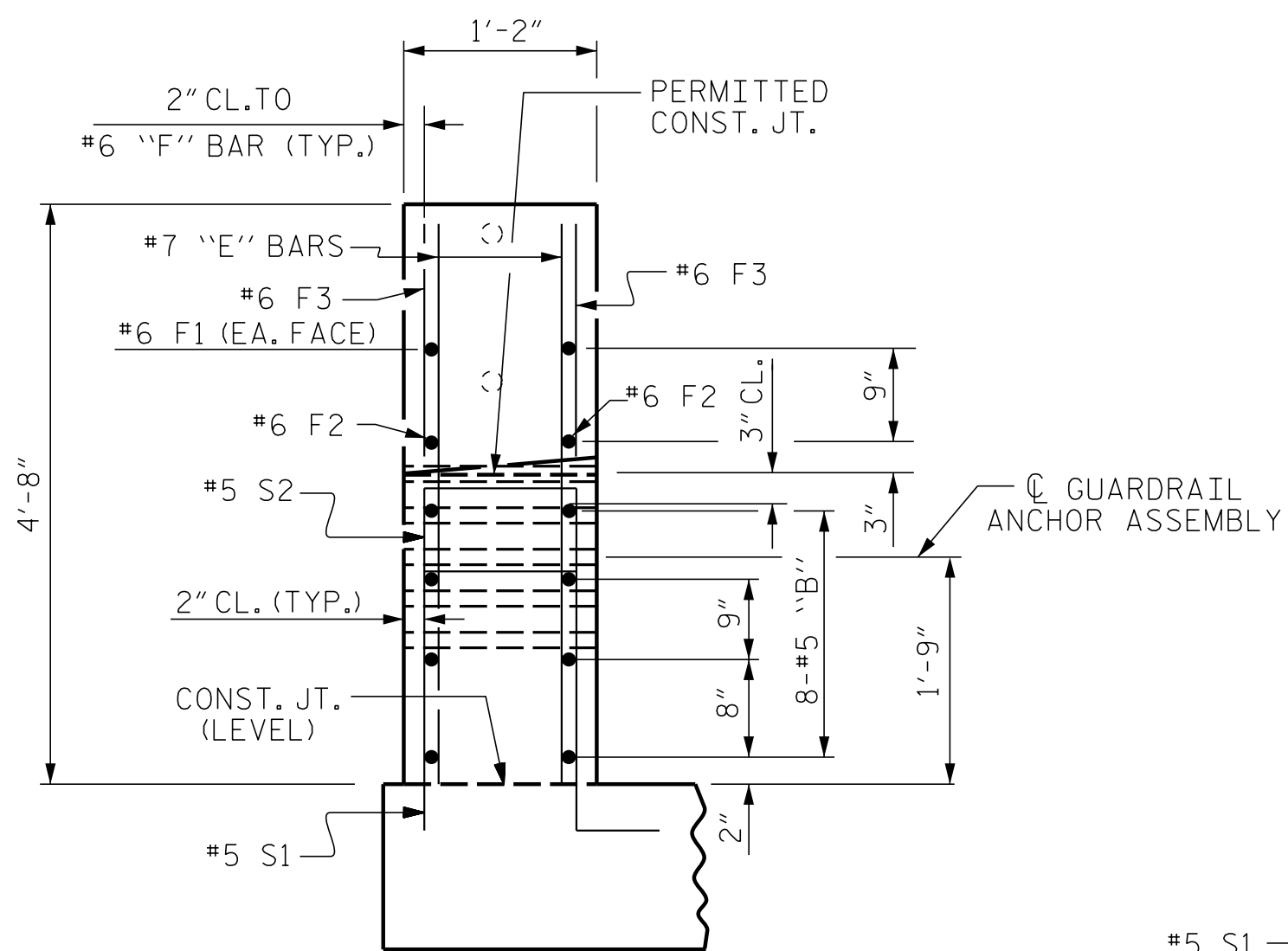
TOTAL SHEETS: 33



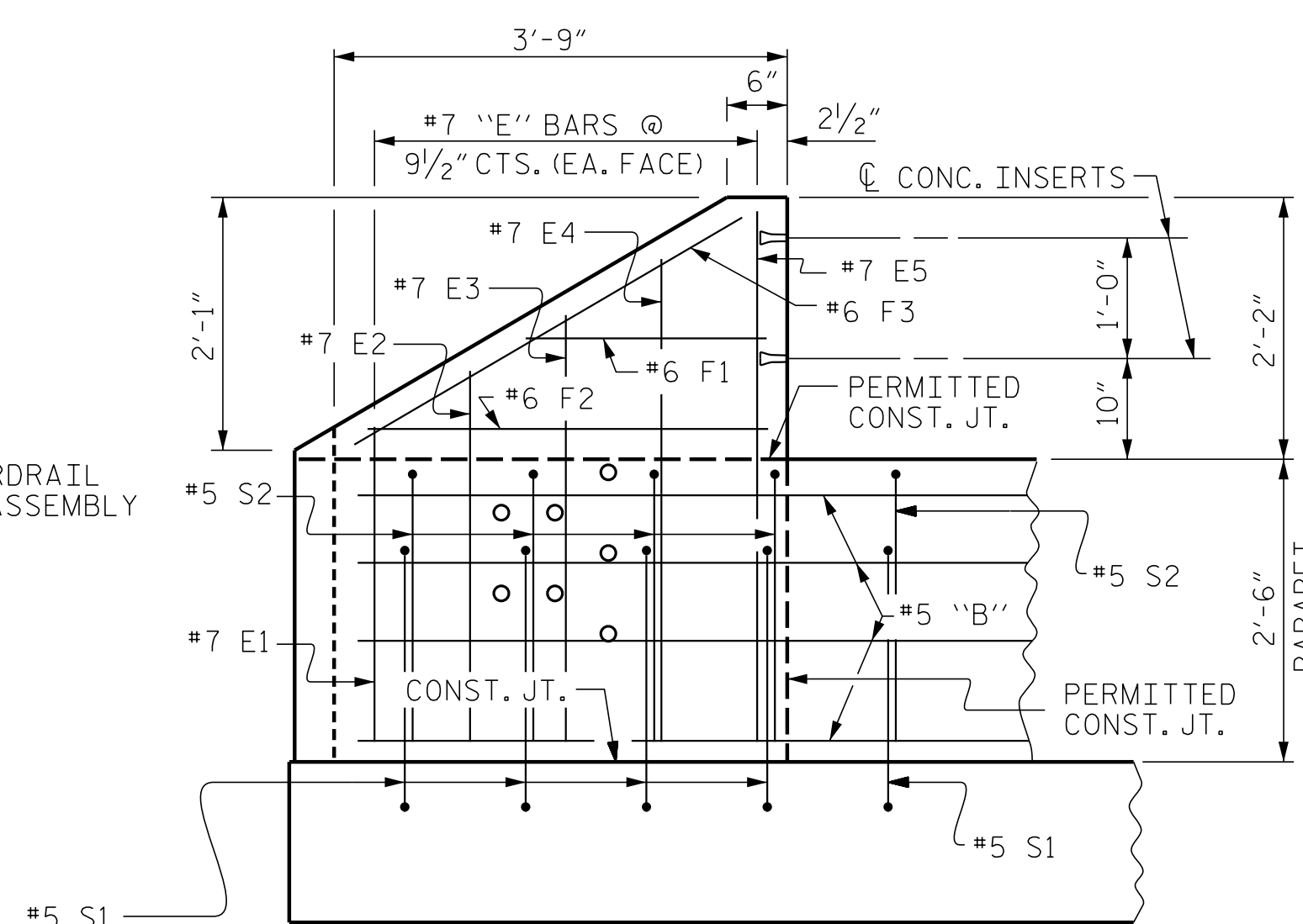
PLAN OF PARAPET



PLAN OF END POST



END VIEW

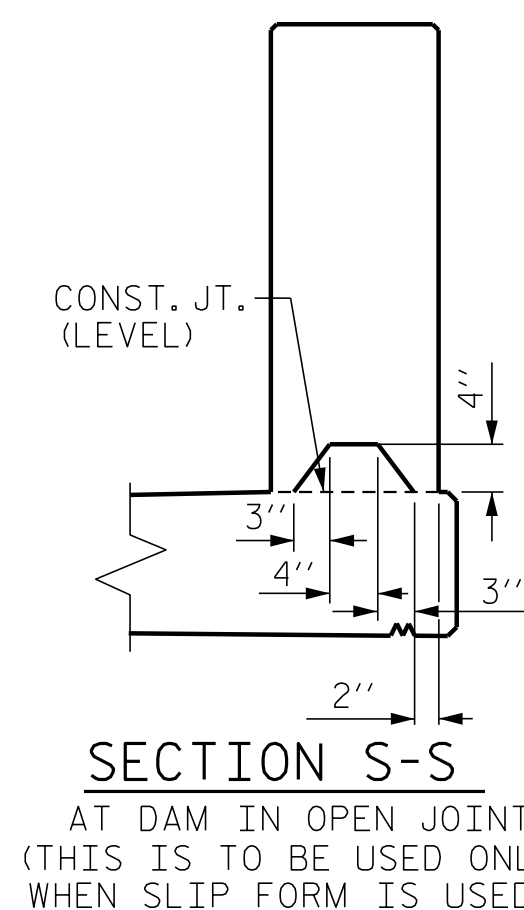


ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

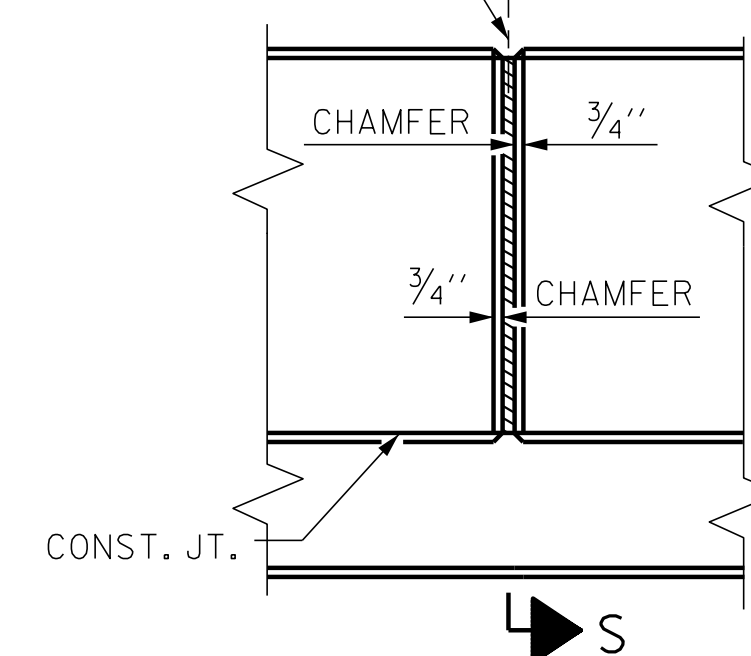
FOR GUARDRAIL ANCHORAGE DETAILS AND LOCATION, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.

BAR TYPE		BILL OF MATERIAL FOR PARAPETS AND 4 END POSTS					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT			
* B1	32	#5	STR	23'-10"	795		
* B2	96	#5	STR	24'-7"	2461		
* E1	8	#7	STR	2'-6"	41		
* E2	8	#7	STR	3'-0"	49		
* E3	8	#7	STR	3'-6"	57		
* E4	8	#7	STR	4'-0"	65		
* E5	8	#7	STR	4'-4"	71		
* F1	8	#6	STR	1'-10"	22		
* F2	8	#6	STR	3'-0"	36		
* F3	8	#6	STR	3'-4"	40		
* S1	398	#5	1	5'-5"	2249		
* S2	398	#5	2	5'-6"	2283		
					* EPOXY COATED REINFORCING STEEL	8,169 LBS.	
					CLASS "AA" CONCRETE	43.8 C.Y.	
					1'-2" x 2'-6" CONCRETE PARAPET	397.47 L.F.	



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

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



ELEVATION AT JOINTS IN PARAPET

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-
SHEET 2 OF 2

ENGINEER OF RECORD:
8/22/2019
NORTH CAROLINA PROFESSIONAL SEAL 37400
ENGINEER
GREGORY M. GILLAND
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1223 Jones Franklin Rd.
Raleigh, N.C. 27606
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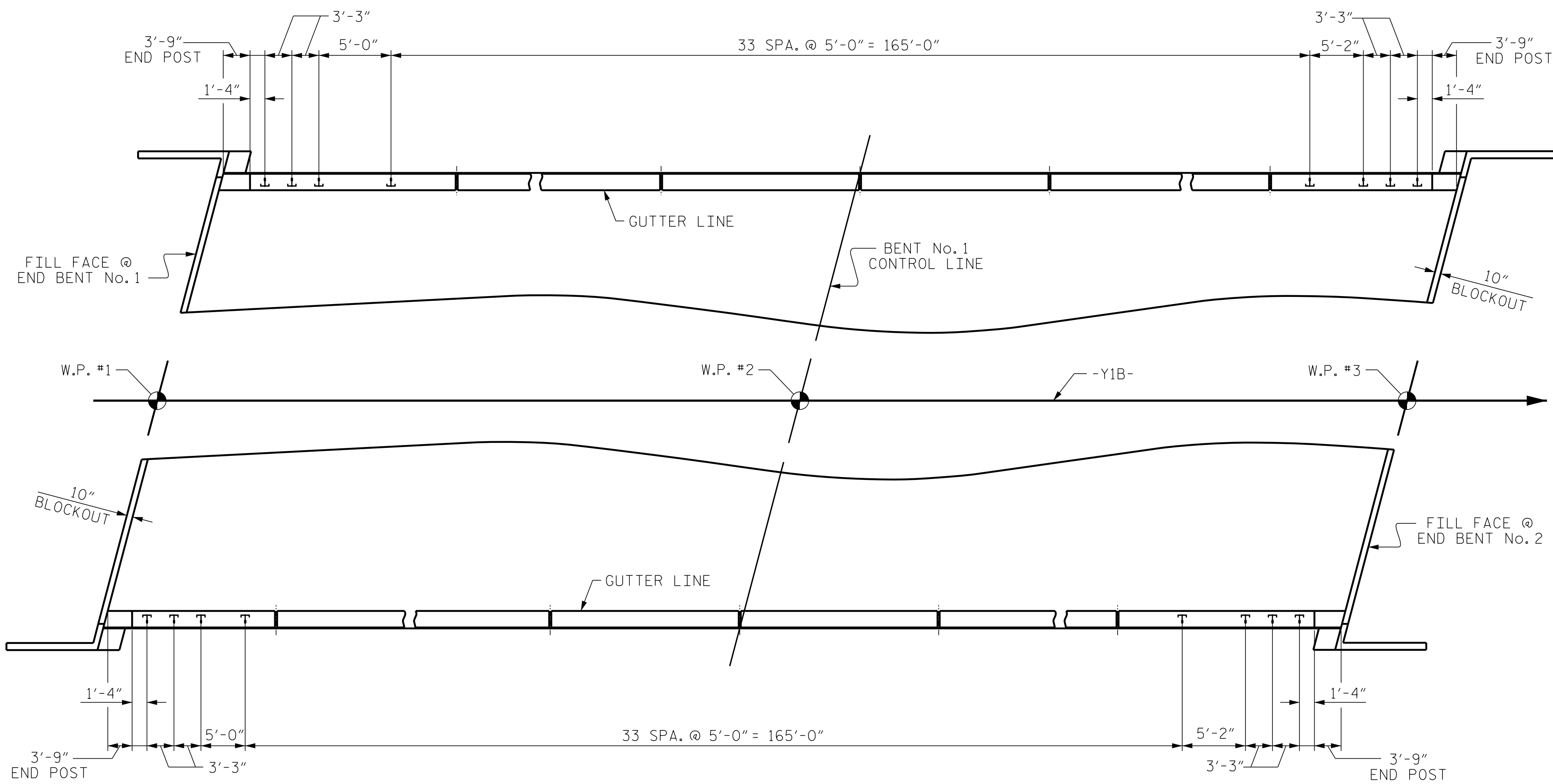
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
1'-2" x 2'-6"
CONCRETE PARAPET
FOR
2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			33

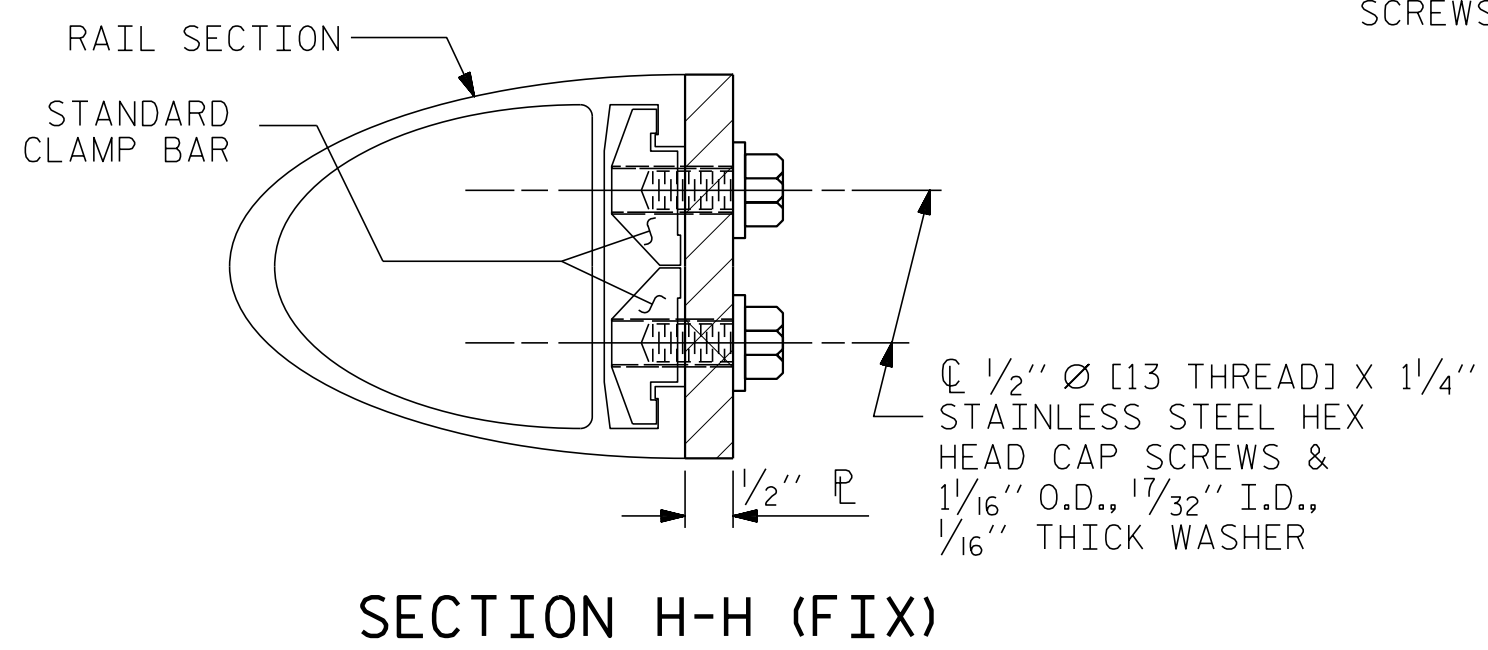
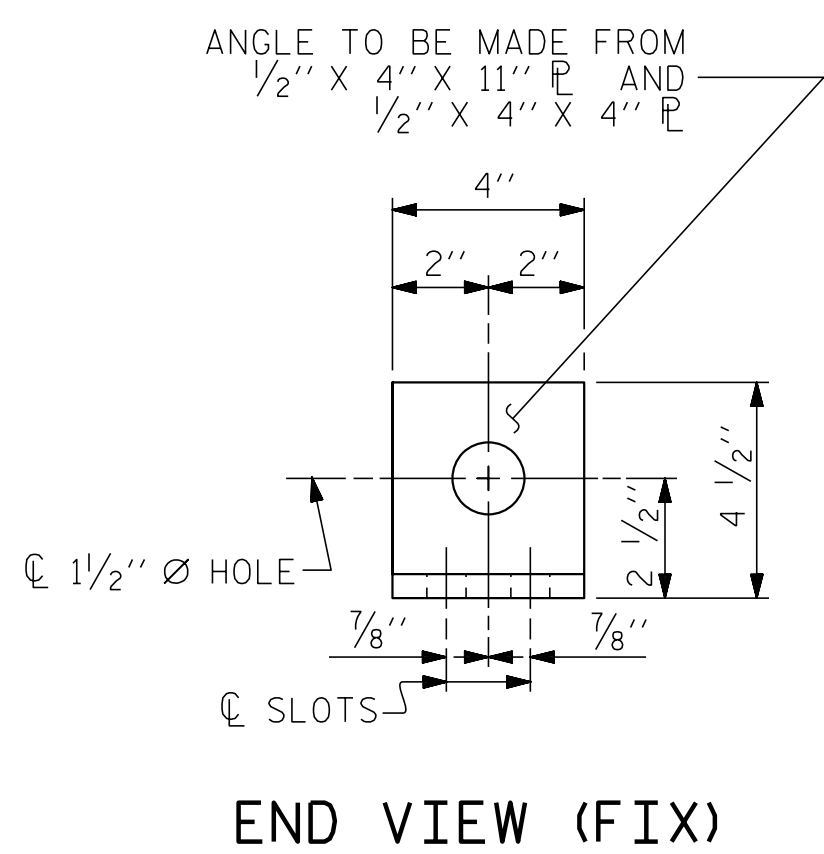
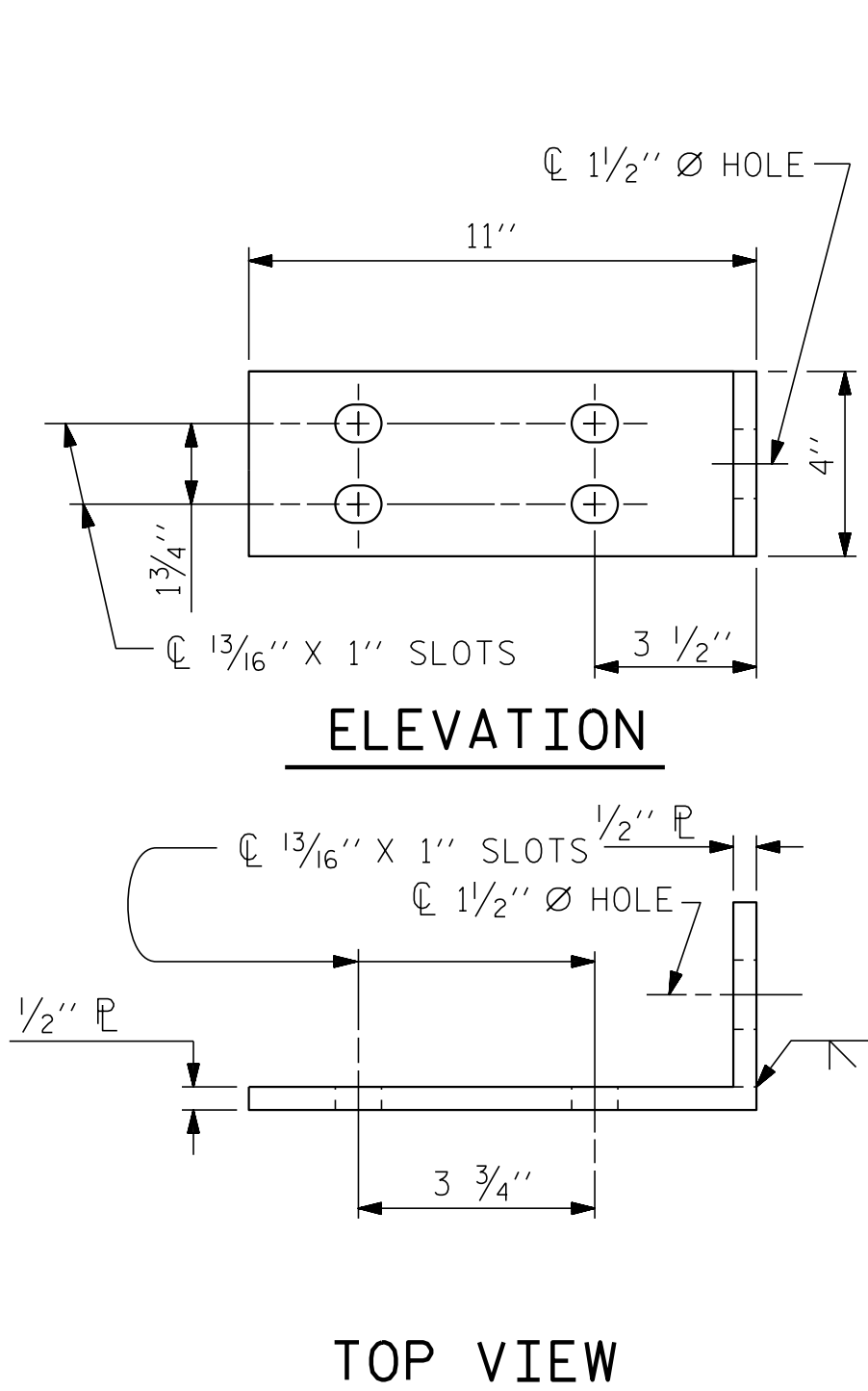
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CHECKED BY: G.M. GILLAND DATE: 1/19

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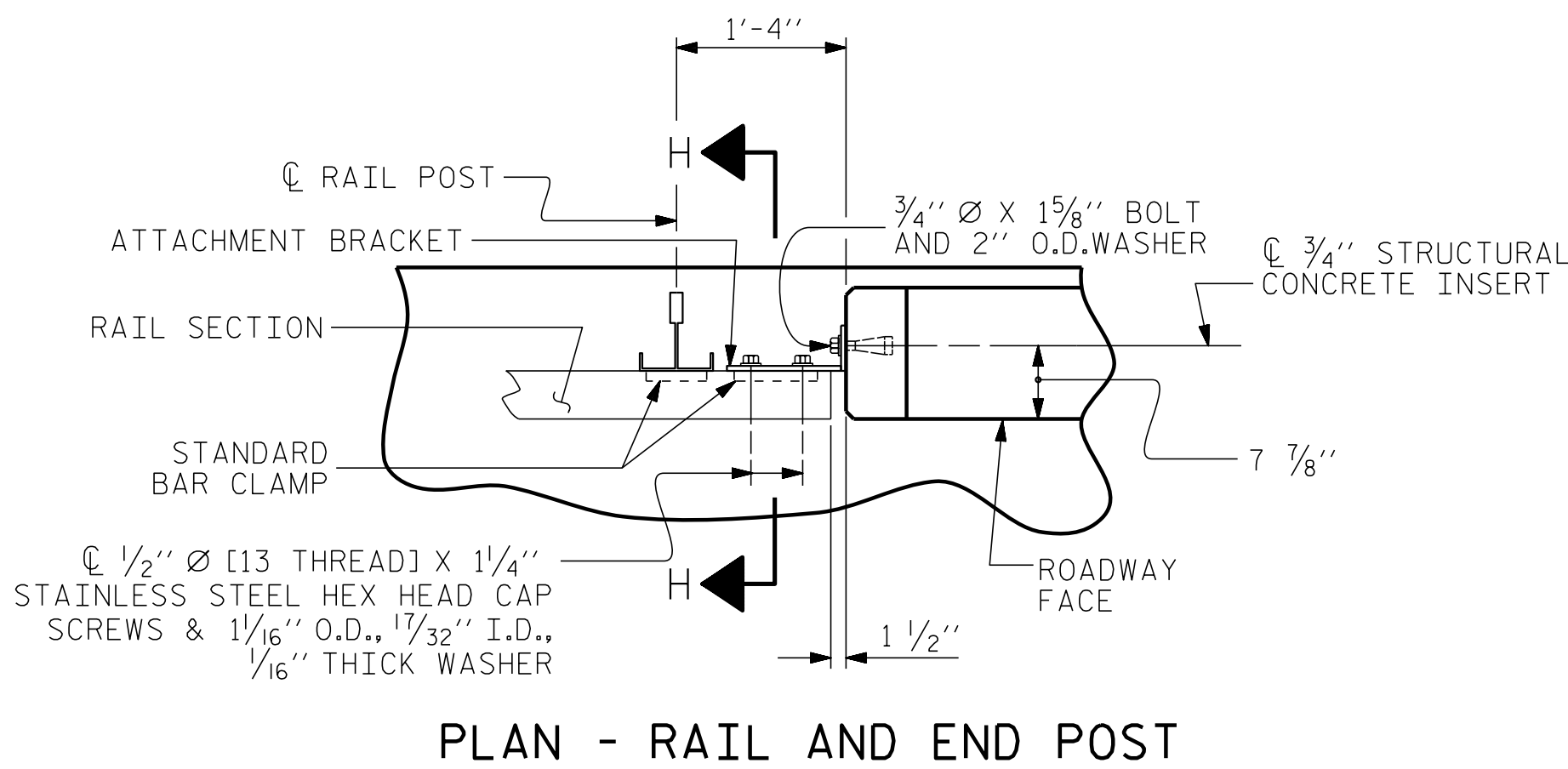
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PLAN OF RAIL POST SPACINGS



DETAILS FOR ATTACHING METAL RAIL TO END POST



NOTES

STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
 - B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER, BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER, THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

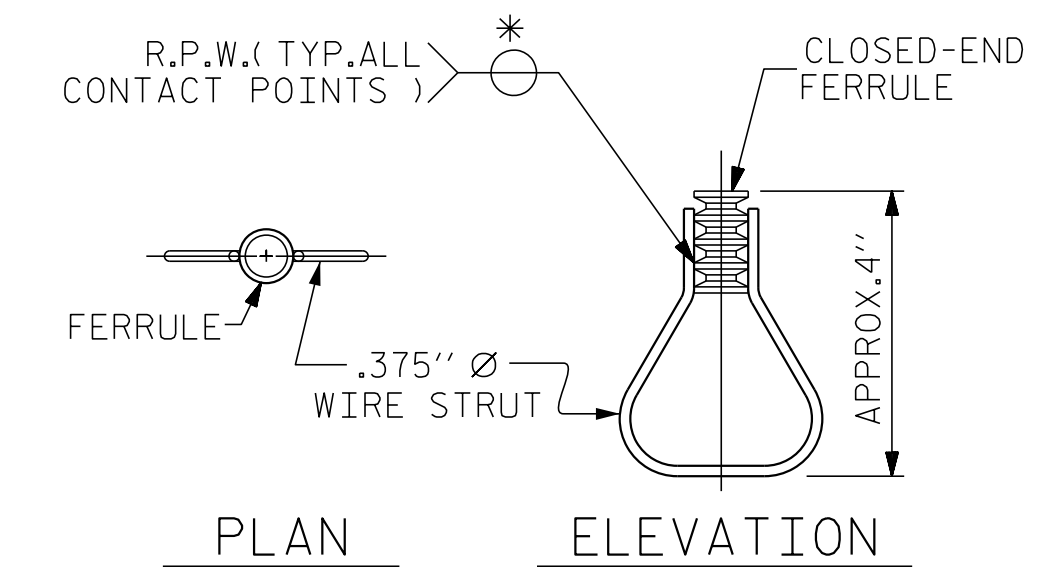
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
 - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60° F.
 - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 - E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

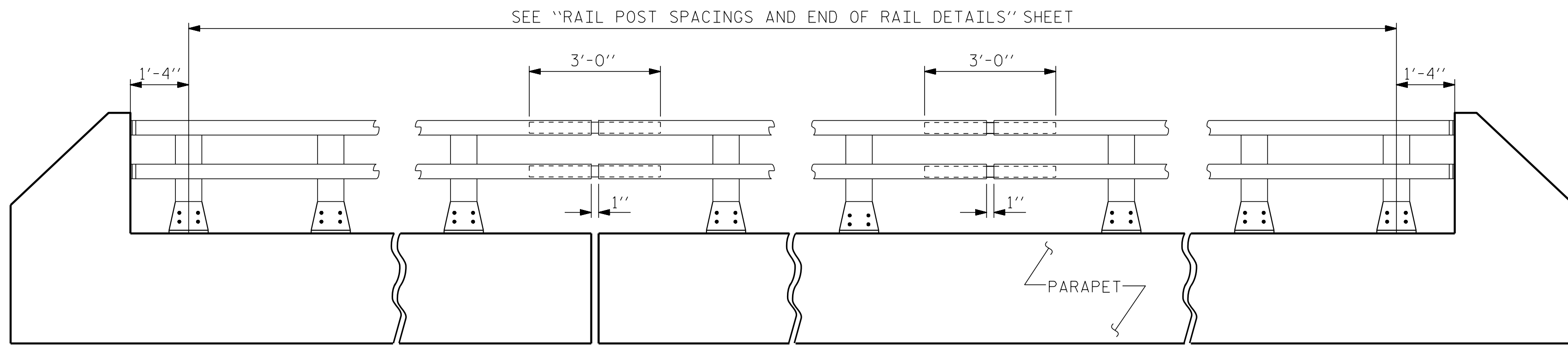
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DRAWN BY : FCJ 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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ENGINEER OF RECORD:
 8/22/2019

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD RAIL POST SPACINGS AND END OF RAIL DETAILS FOR TWO BAR METAL RAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-17					TOTAL SHEETS 33



ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STD NO. BMR2.

NOTES

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

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

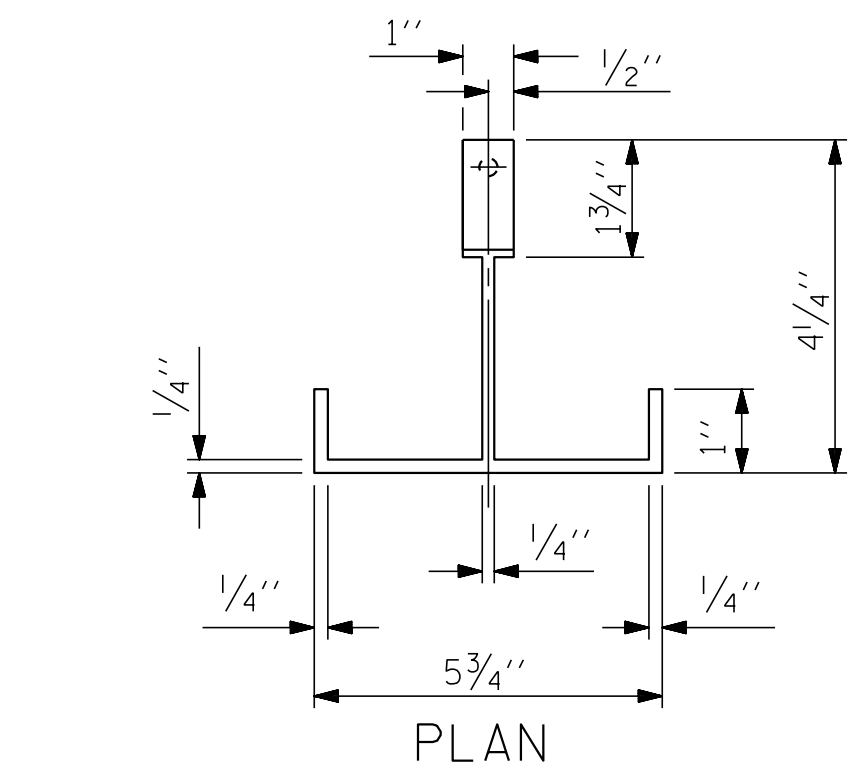
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

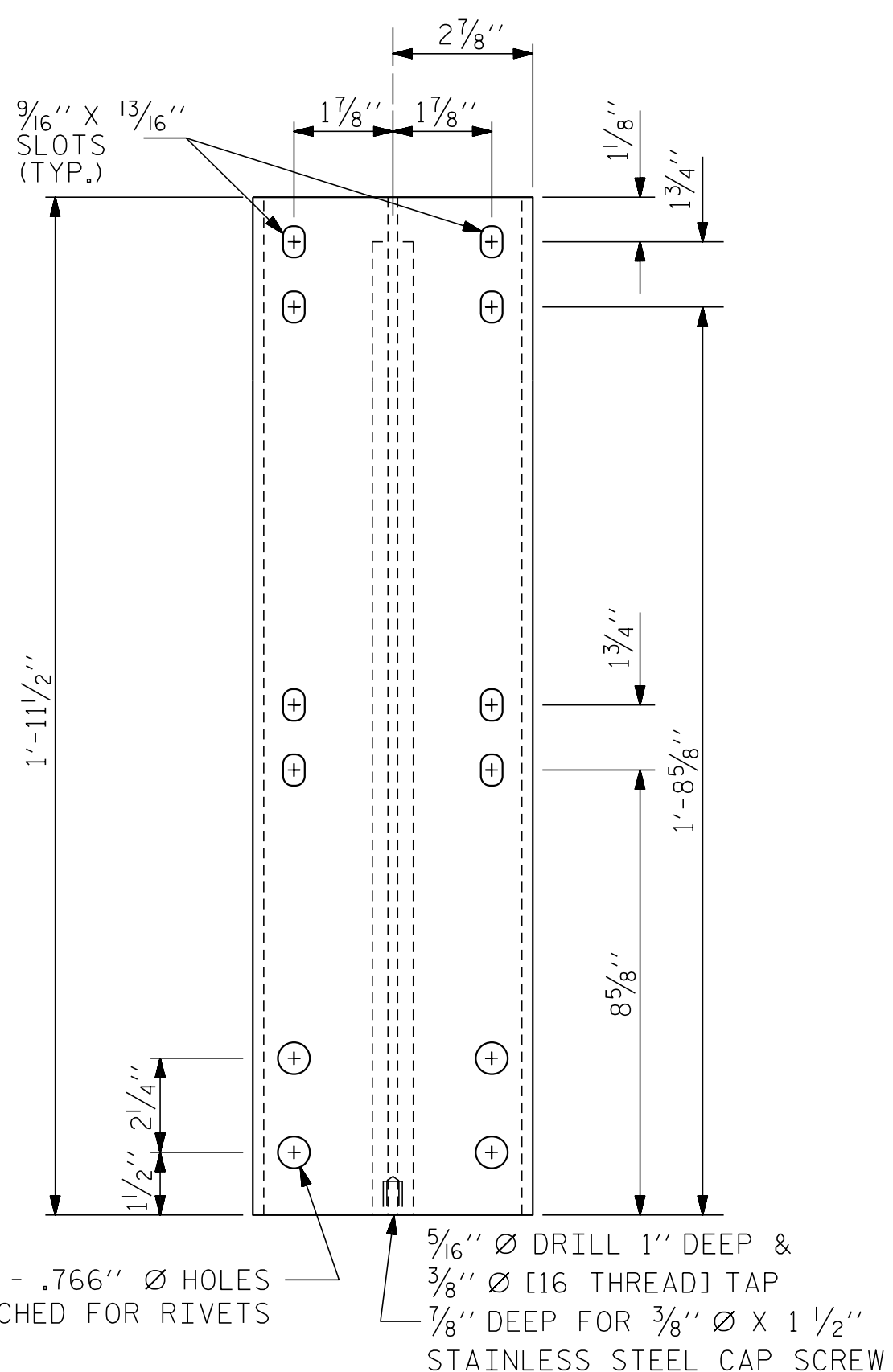
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

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

PAY LENGTH = 381.16 LIN. FT.



PLAN

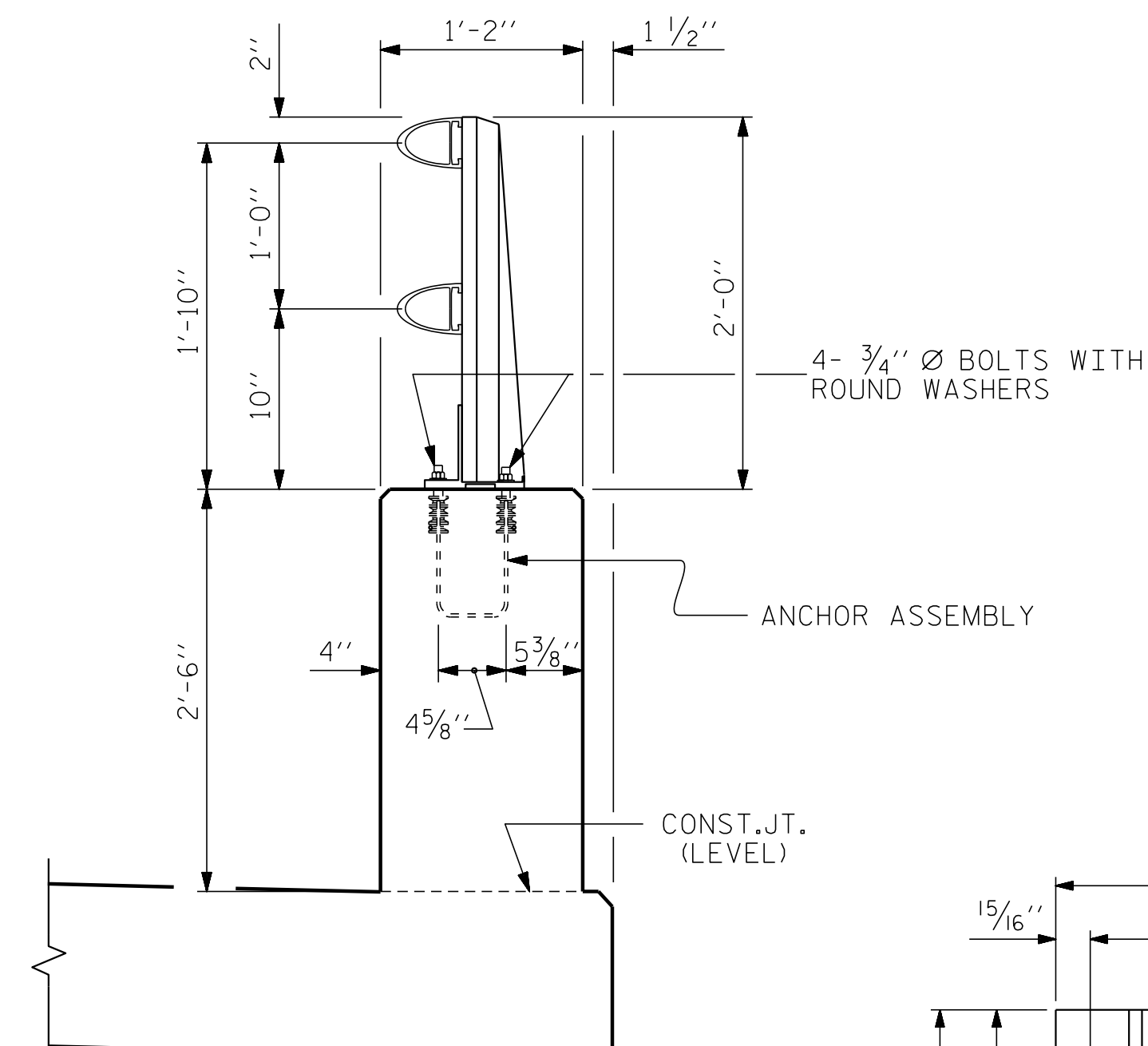


FRONT ELEVATION

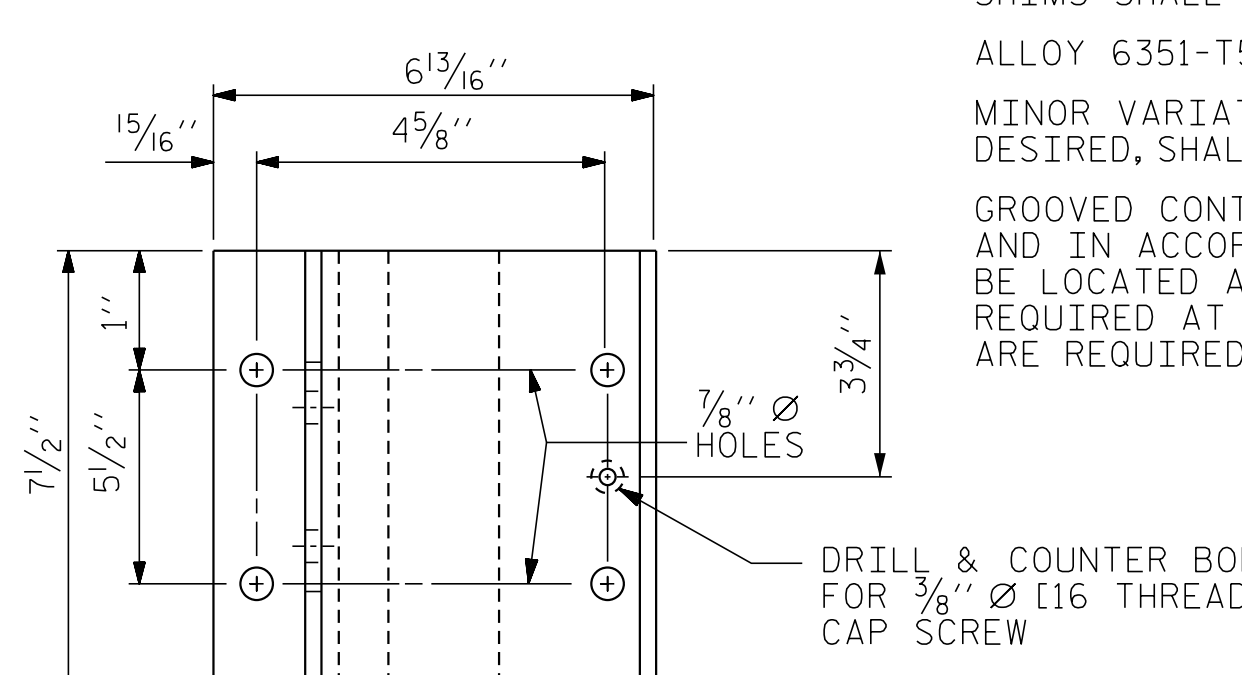
SIDE ELEVATION

DETAILS OF POST

4 - .766" Ø HOLES PUNCHED FOR RIVETS
 5/16" Ø DRILL 1" DEEP & 3/8" Ø [16 THREAD] TAP
 7/8" DEEP FOR 3/8" Ø X 1 1/2" STAINLESS STEEL CAP SCREW

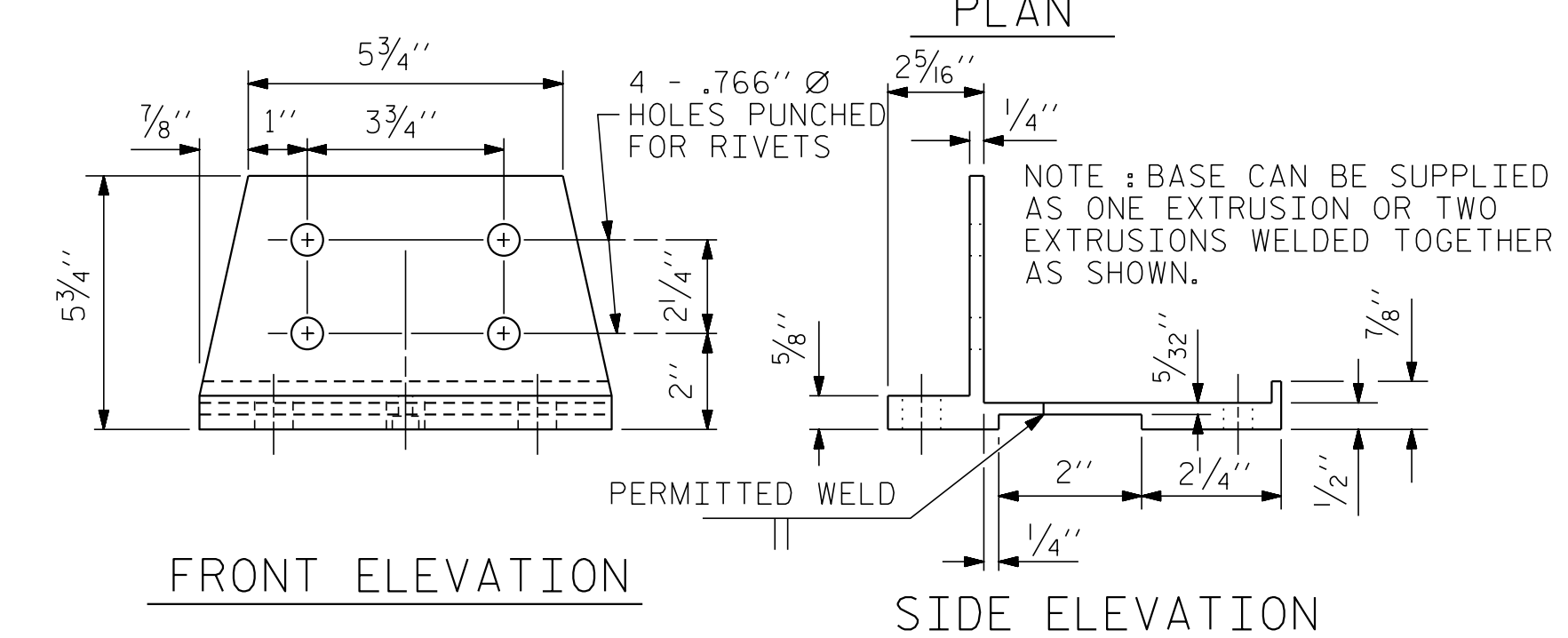


SECTION THRU PARAPET AND RAIL



PLAN

DRILL & COUNTER BORE FOR 3/8" Ø [16 THREAD] CAP SCREW

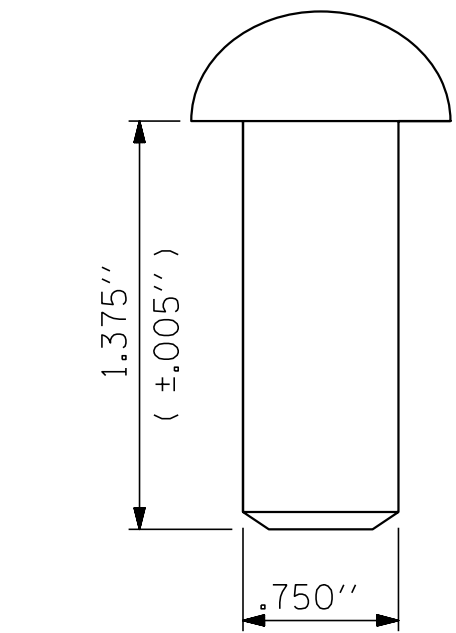


FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS

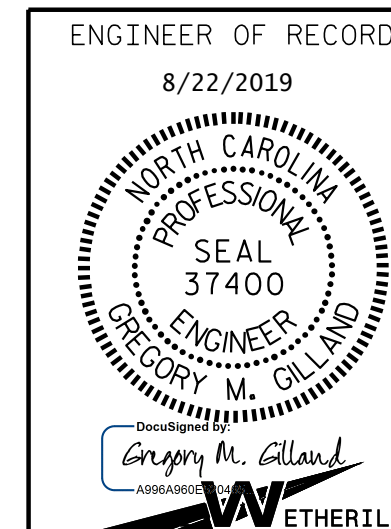
NOTE : BASE CAN BE SUPPLIED AS ONE EXTRUSION OR TWO EXTRUSIONS WELDED TOGETHER AS SHOWN.



RIVET DETAIL

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

SHEET 1 OF 2



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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			33

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ASSEMBLED BY : D. HODGE	DATE : 1/19
CHECKED BY : G.M. GILLAND	DATE : 1/19
DRAWN BY : EEM 6/94	REV. 10/1/11 MAA/GM
CHECKED BY : RGW 6/94	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NOTES

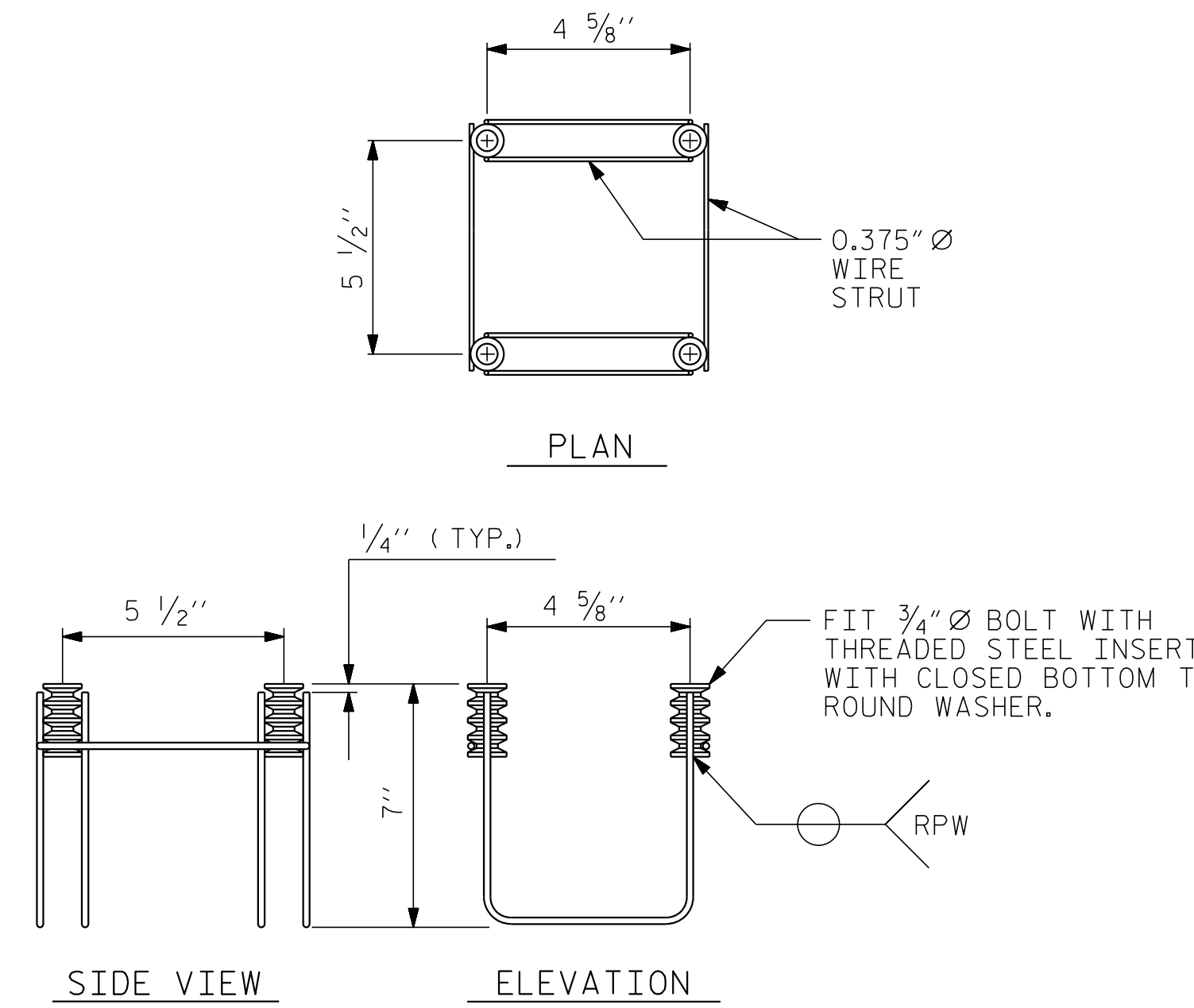
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

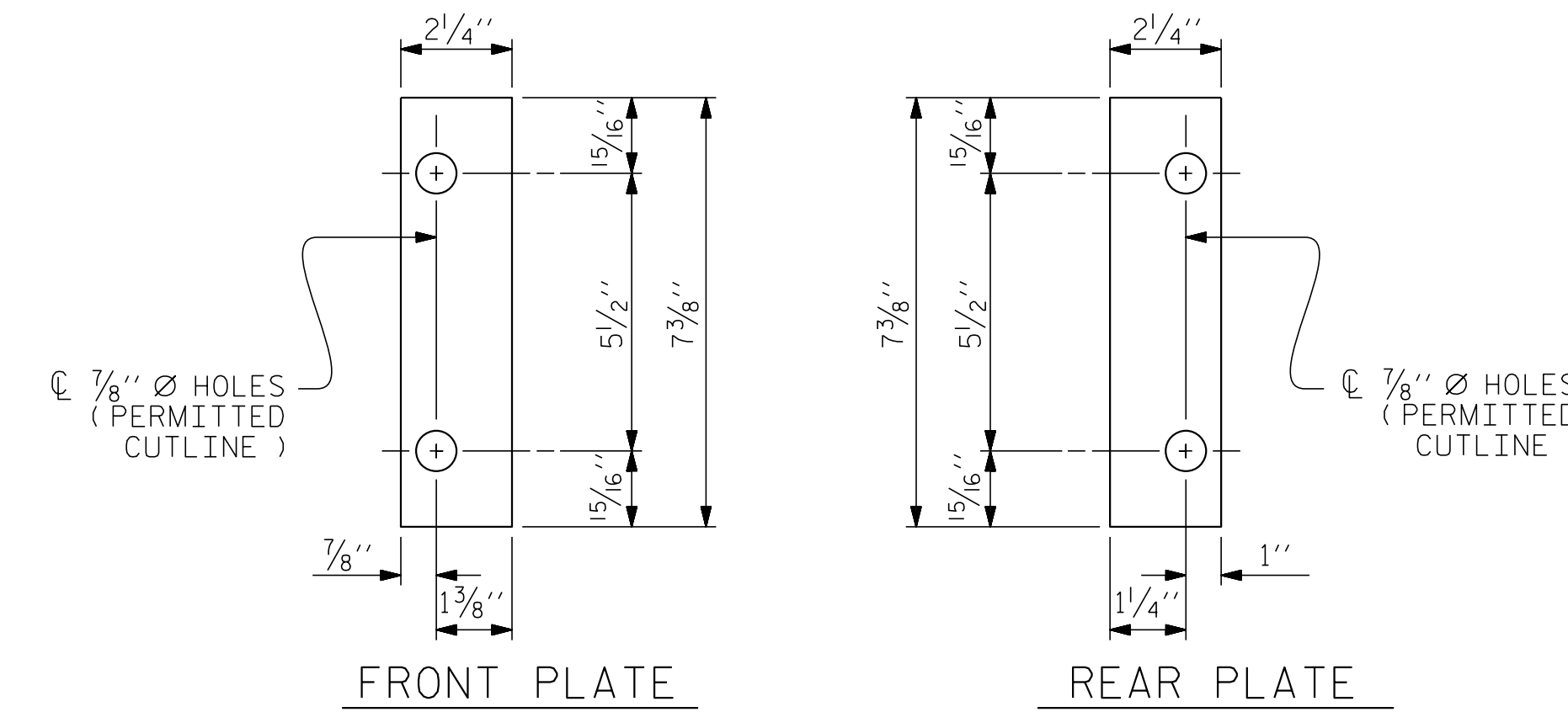
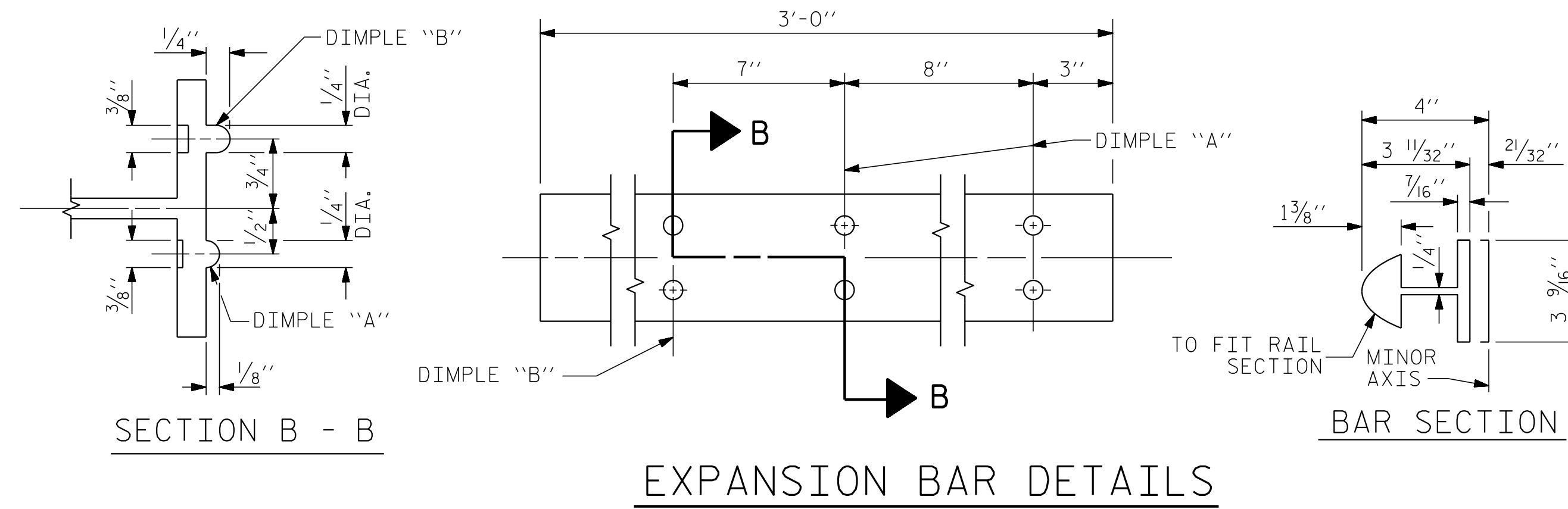
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



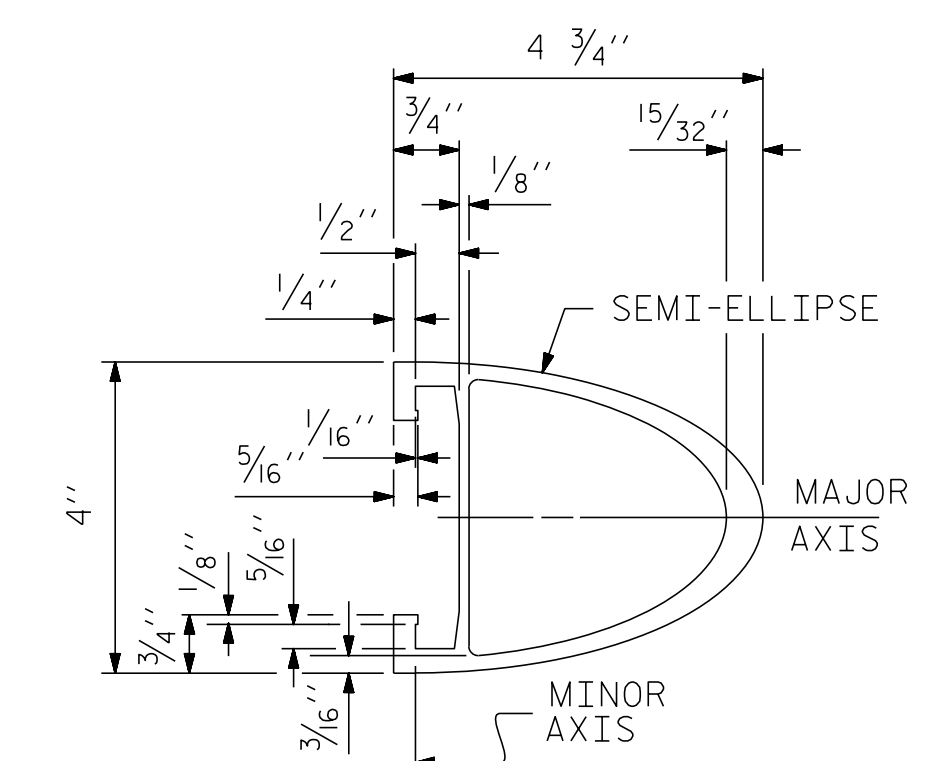
4-BOLT METAL RAIL ANCHOR ASSEMBLY

(80 ASSEMBLIES REQUIRED)

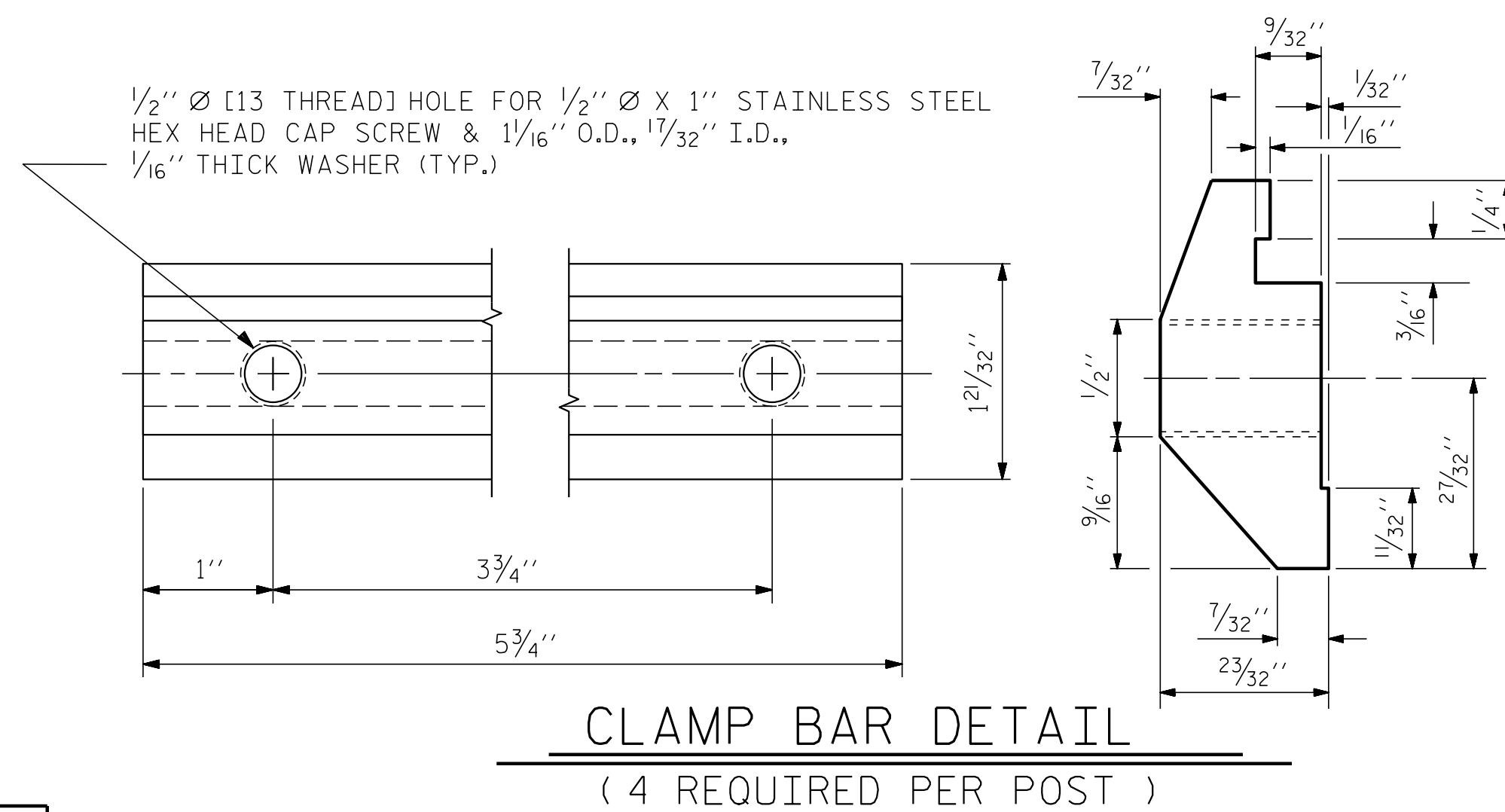


SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED OUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

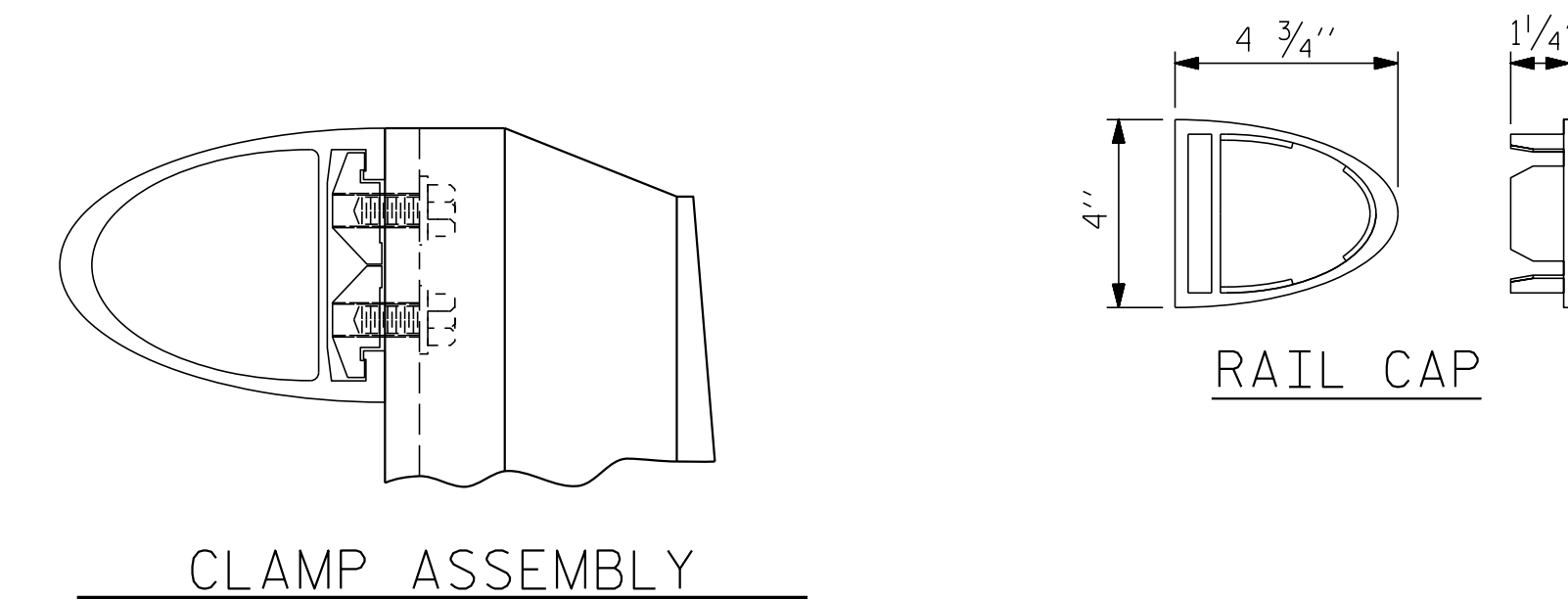


RAIL SECTION



CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

RAIL CAP

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-

SHEET 2 OF 2

ENGINEER OF RECORD:
8/22/2019
NORTH CAROLINA PROFESSIONAL SEAL 37400
GREGORY M. GILLAND
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

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

REVISIONS

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

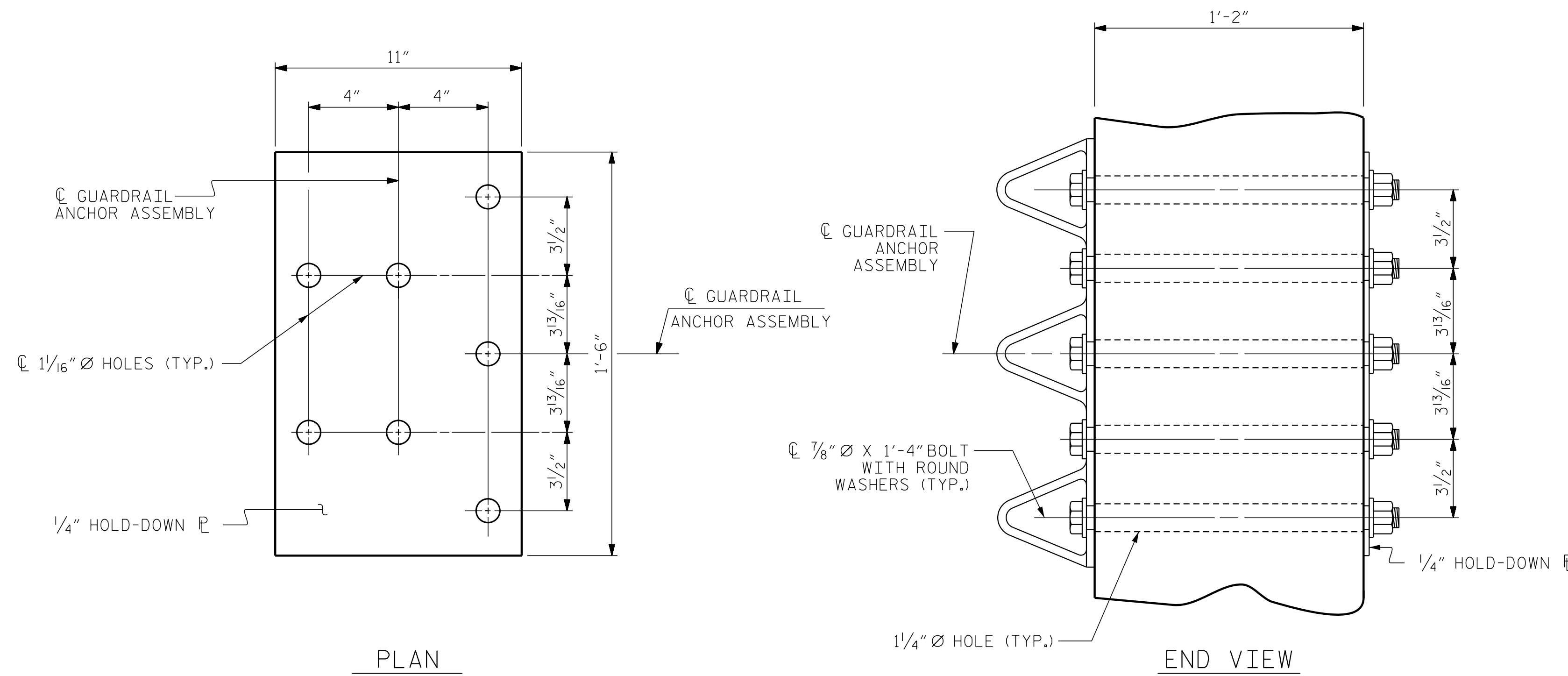
SHEET NO.
S-19
TOTAL SHEETS
33

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ASSEMBLED BY : D. HODGE	DATE : 1/19
CHECKED BY : G.M. GILLAND	DATE : 1/19
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

NOTES

- THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.
- THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.
- BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.
- AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.
- THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.
- THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.
- THE 1 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.

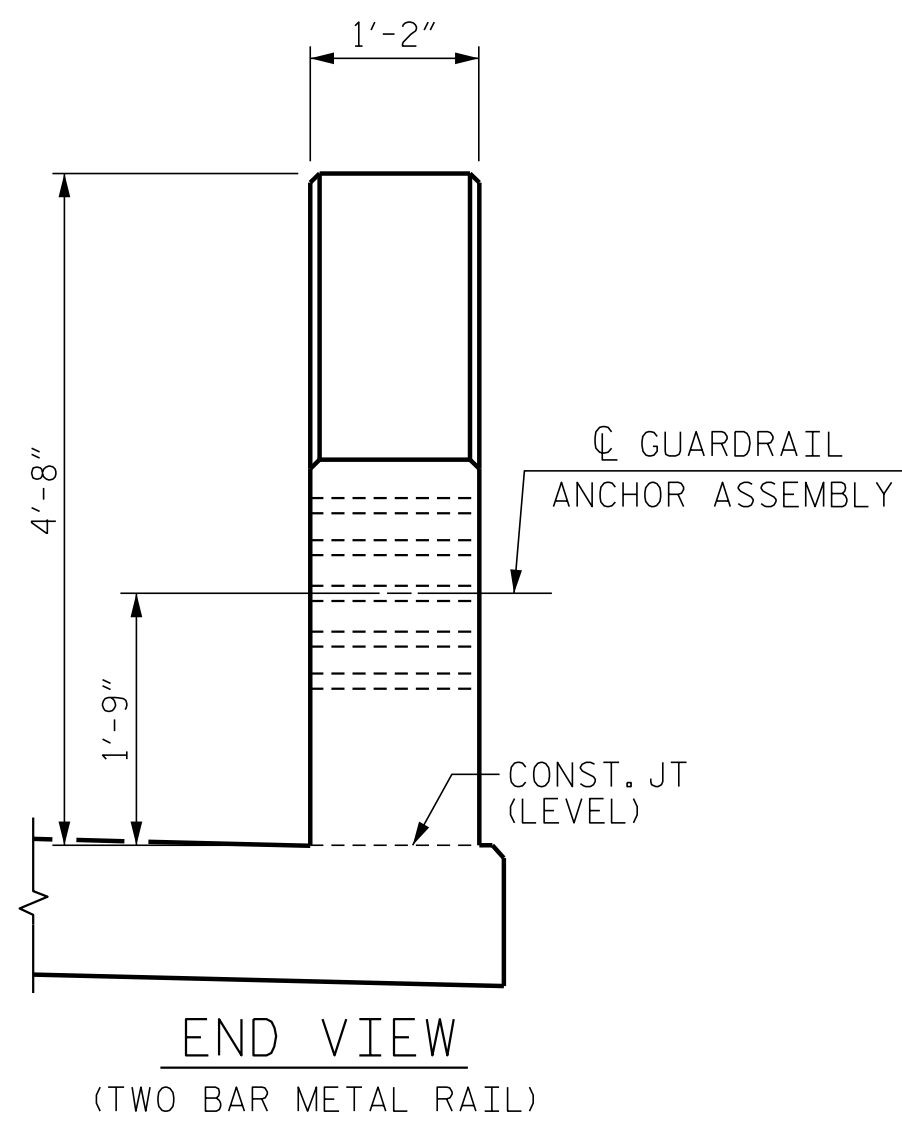


GUARDRAIL ANCHOR ASSEMBLY DETAILS

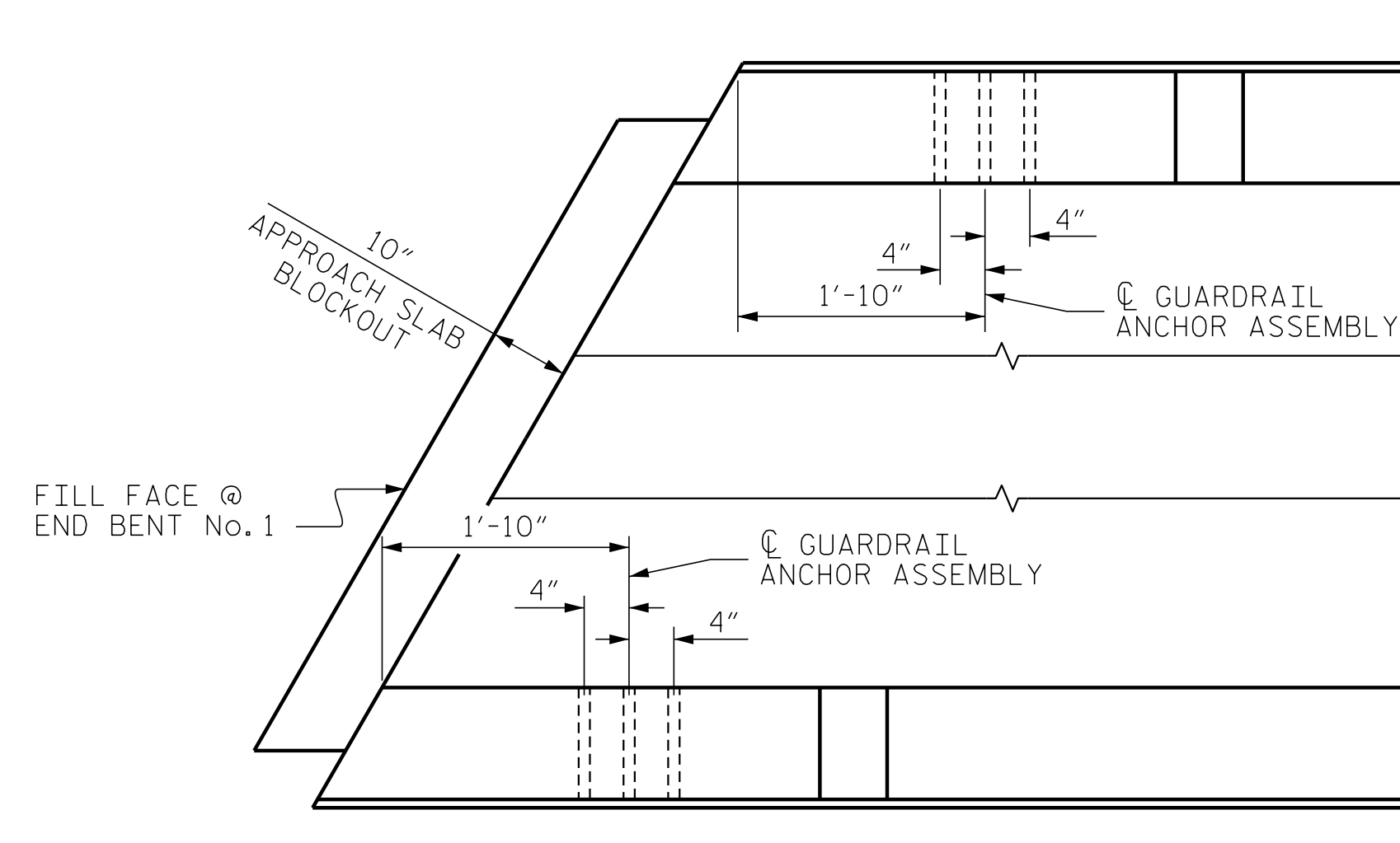


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW (TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-5797
 COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

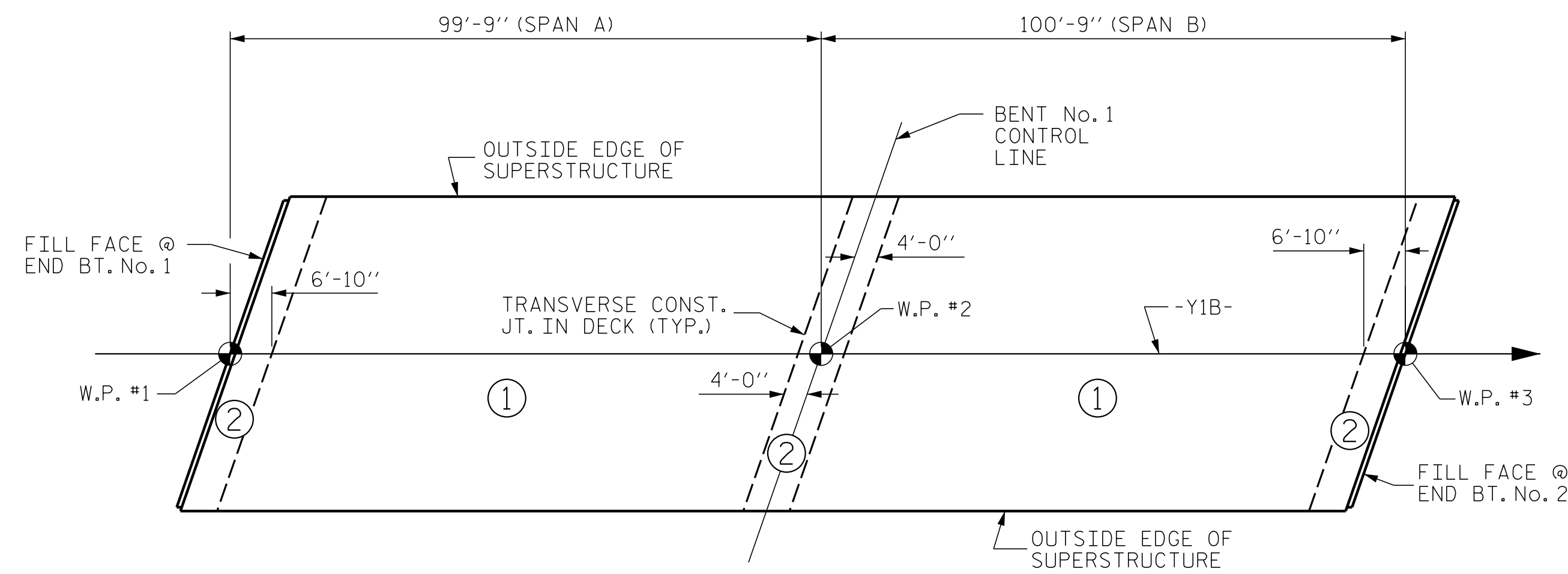
ENGINEER OF RECORD:
 Designed by
 Gregory M. Gilland
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 37400
 ENGINEER
 GREGORY M. GILLAND
 1/20/2020
 WETHERILL
 ENGINEERING
 1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
 Bus: 919 851 8077
 Fax: 919 851 8107
 LICENSE NO. F-0377

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			33

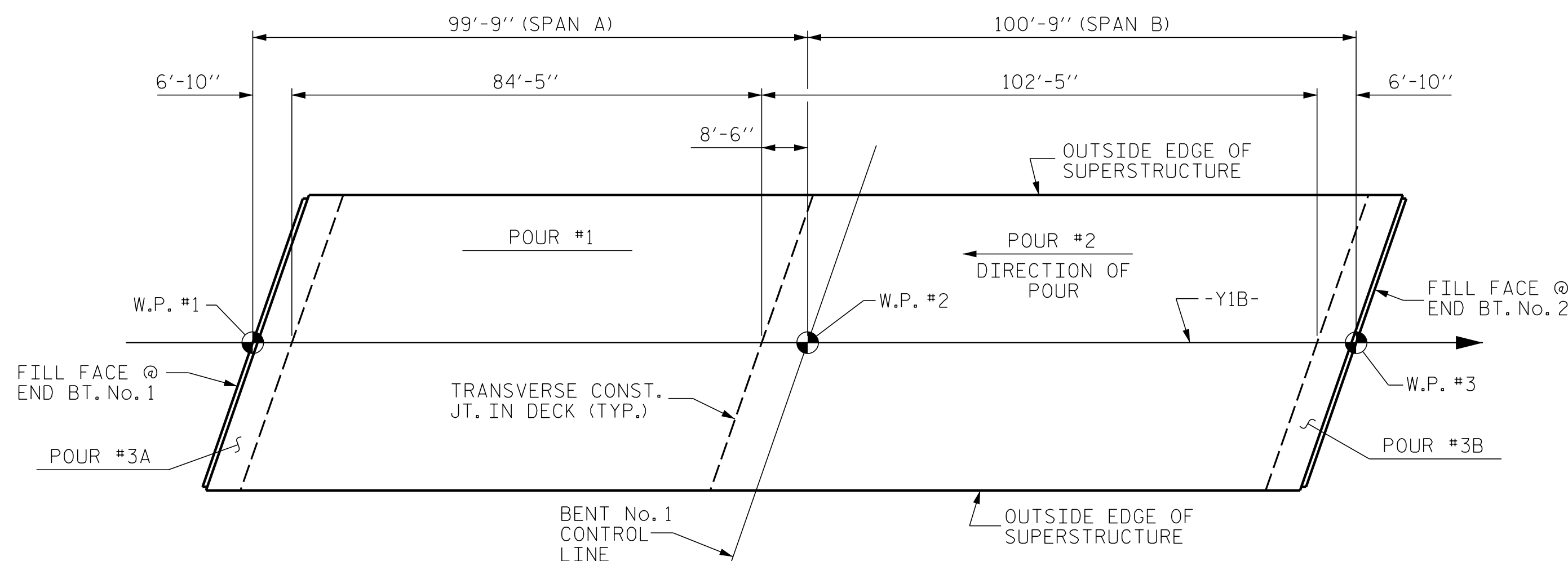
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ASSEMBLED BY : D. HODGE	DATE : 1/19
CHECKED BY : G.M. GILLAND	DATE : 1/19
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC



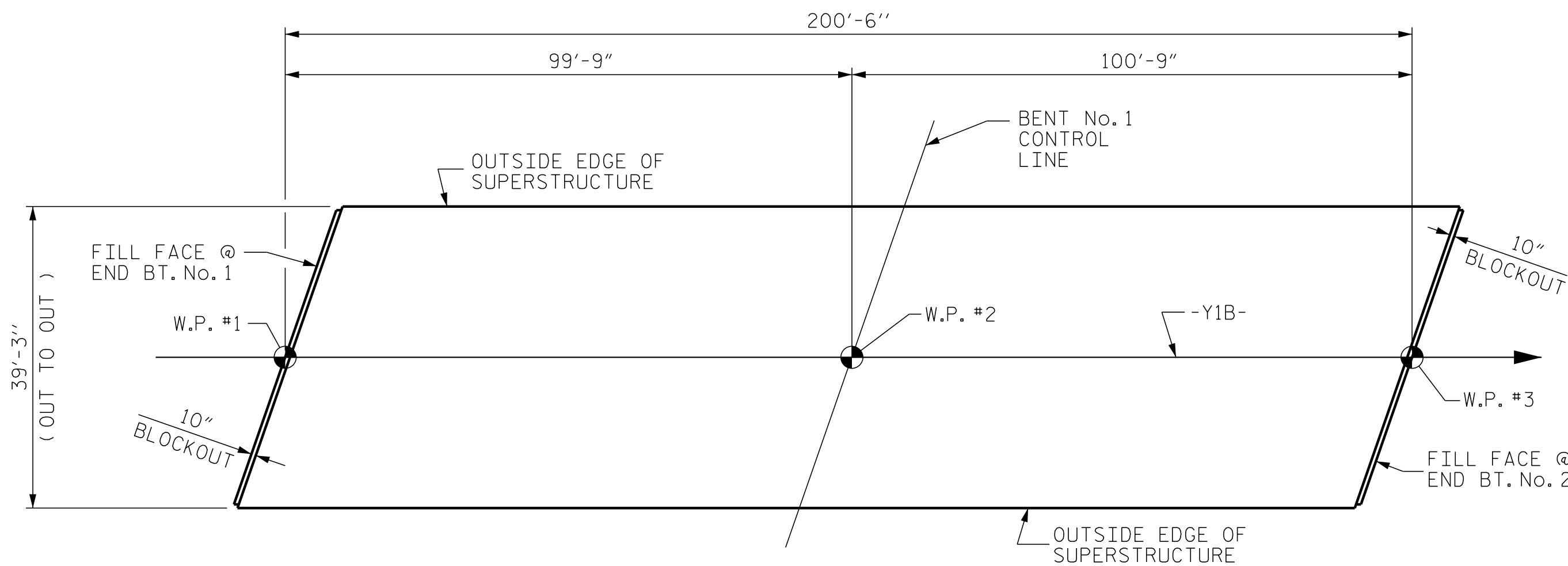
OPTIONAL DECK POUR DETAIL

POUR ② SHALL NOT BE STARTED UNTIL BOTH ADJACENT POUR ① REACH A MINIMUM OF 3,000 PSI



CONCRETE DECK POUR DETAIL

NOTE: EACH POUR #3 INCLUDES UPPER PART OF THE INTEGRAL END BENT.



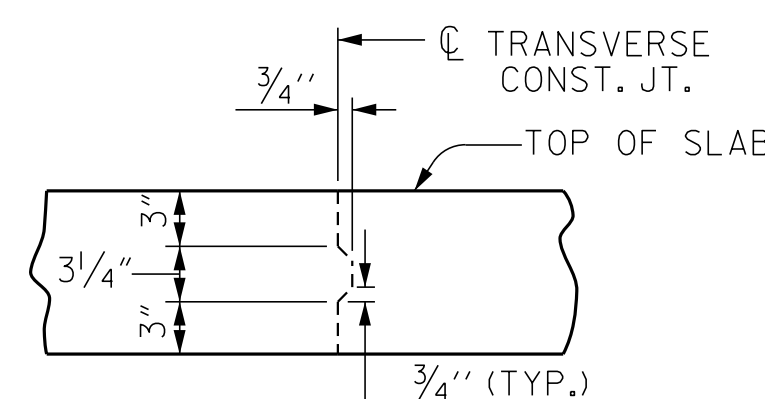
LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 7,870)

REINFORCING BAR SCHEDULE

SPAN "A-B"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	404	#5	STR	38'-11"	16,398
A2	404	#5	STR	38'-11"	16,398
* A101	4	#5	STR	36'-5"	152
* A102	4	#5	STR	33'-10"	141
* A103	4	#5	STR	31'-2"	130
* A104	4	#5	STR	28'-6"	119
* A105	4	#5	STR	25'-11"	108
* A106	4	#5	STR	23'-3"	97
* A107	4	#5	STR	20'-8"	86
* A108	4	#5	STR	18'-0"	75
* A109	4	#5	STR	15'-4"	64
* A110	4	#5	STR	12'-9"	53
* A111	4	#5	STR	10'-1"	42
* A112	4	#5	STR	7'-6"	31
* A113	4	#5	STR	4'-10"	20
A201	4	#5	STR	36'-5"	152
A202	4	#5	STR	33'-10"	141
A203	4	#5	STR	31'-2"	130
A204	4	#5	STR	28'-6"	119
A205	4	#5	STR	25'-11"	108
A206	4	#5	STR	23'-3"	97
A207	4	#5	STR	20'-8"	86
A208	4	#5	STR	18'-0"	75
A209	4	#5	STR	15'-4"	64
A210	4	#5	STR	12'-9"	53
A211	4	#5	STR	10'-1"	42
A212	4	#5	STR	7'-6"	31
A213	4	#5	STR	4'-10"	20
* B1	152	#6	STR	20'-0"	4,566
* B2	52	#4	STR	24'-11"	866
* B3	52	#6	STR	36'-6"	2,851
* B4	50	#6	STR	30'-0"	2,253
* B5	52	#4	STR	25'-5"	883
B6	208	#5	STR	51'-3"	11,118
* B7	14	#4	STR	30'-0"	281
K1	20	#4	STR	21'-6"	287
K2	6	#4	STR	9'-1"	36
K3	12	#4	STR	10'-2"	81
K4	6	#4	STR	9'-9"	39
K5	6	#4	STR	8'-8"	35
K6	10	#4	STR	17'-11"	120
K7	8	#4	STR	2'-9"	15
K8	8	#4	STR	3'-3"	17
K9	4	#4	STR	2'-6"	7
K10	6	#4	STR	8'-9"	35
K11	6	#4	STR	9'-2"	37
K12	18	#4	STR	9'-7"	115
* S1	62	#4	1	10'-7"	438
* S2	62	#4	1	11'-11"	494
S3	102	#4	4	2'-10"	193
U1	62	#4	2	11'-10"	490
U2	4	#4	2	11'-0"	29
U3	21	#4	3	14'-11"	209
U4	6	#4	3	12'-11"	52
REINFORCING STEEL				30,431	LBS.
* EPOXY COATED REINFORCING STEEL				30,148	LBS.

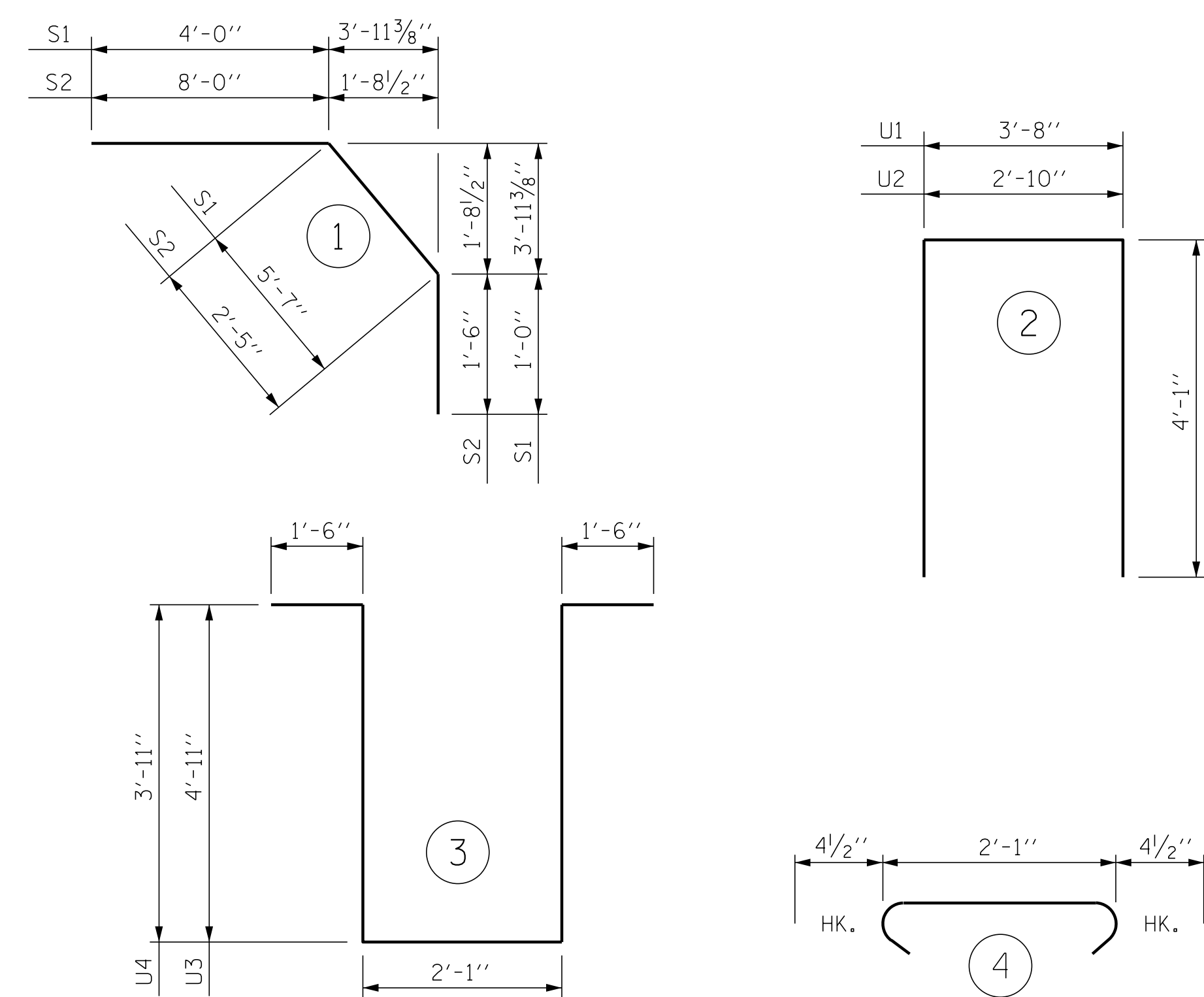
* THESE BARS ARE EPOXY COATED.



TRANSVERSE CONST. JOINT DETAIL

NOTE: SLAB REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	* EPOXY COATED REINFORCING STEEL (LBS.)
TOTALS **	320.5	30,431	30,148

** QUANTITIES FOR CONCRETE PARAPETS ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	962	SQ.FT.
BRIDGE DECK	6,691	SQ.FT.
TOTAL	7,653	SQ.FT.

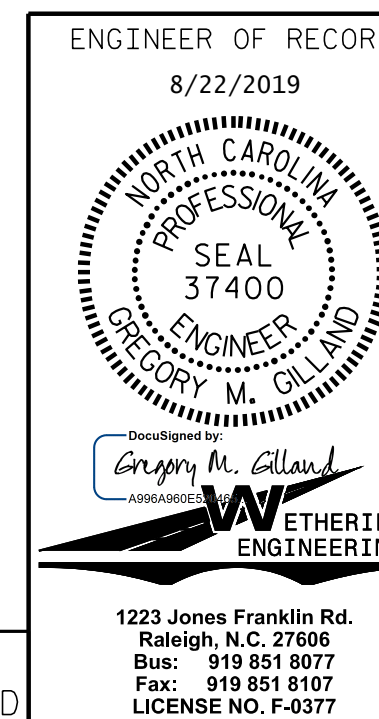
CLASS AA CONCRETE BREAKDOWN

POUR #1	109.7	CY
POUR #2	146.3	CY
POUR #3A	33.3	CY
POUR #3B	33.3	CY
CLASS AA CONCRETE BREAKDOWN TOTAL	322.6	CY

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"			

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

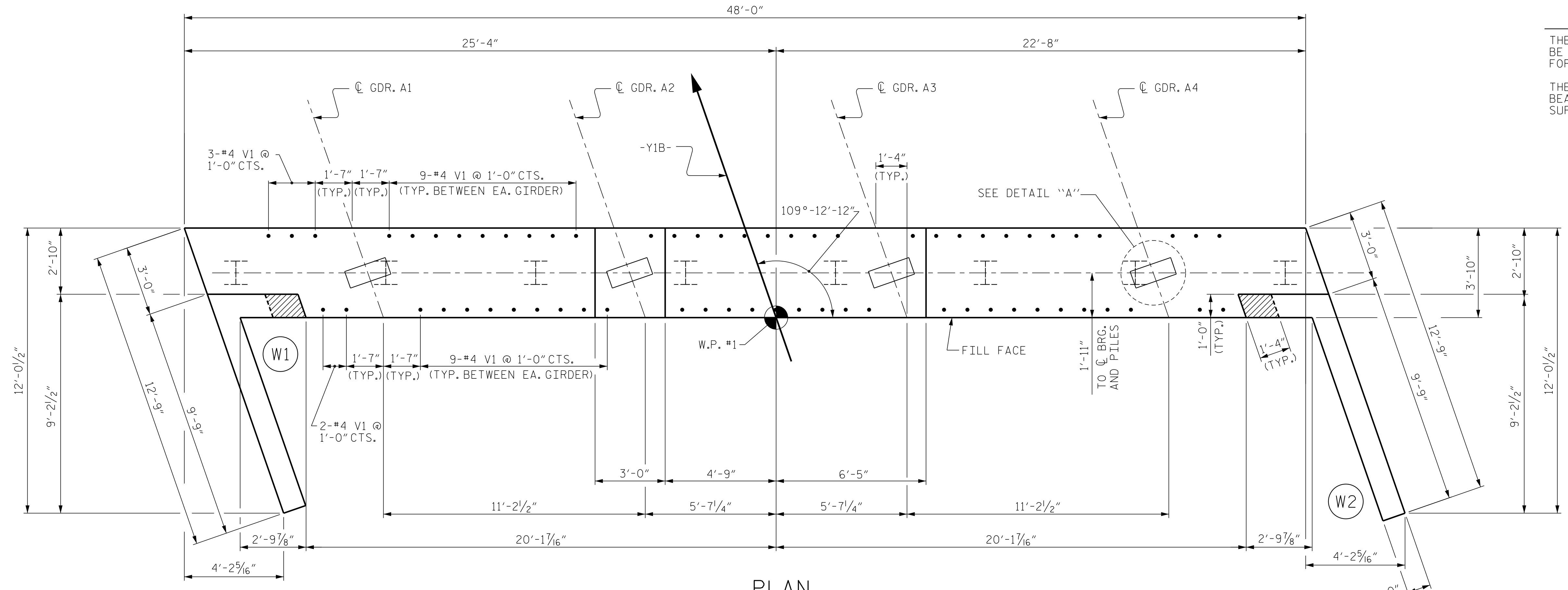
REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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SHEET NO. S-21
TOTAL SHEETS 33

DRAWN BY: D. HODGE DATE: 1/19
CHECKED BY: G.M. GILLILAND DATE: 1/19

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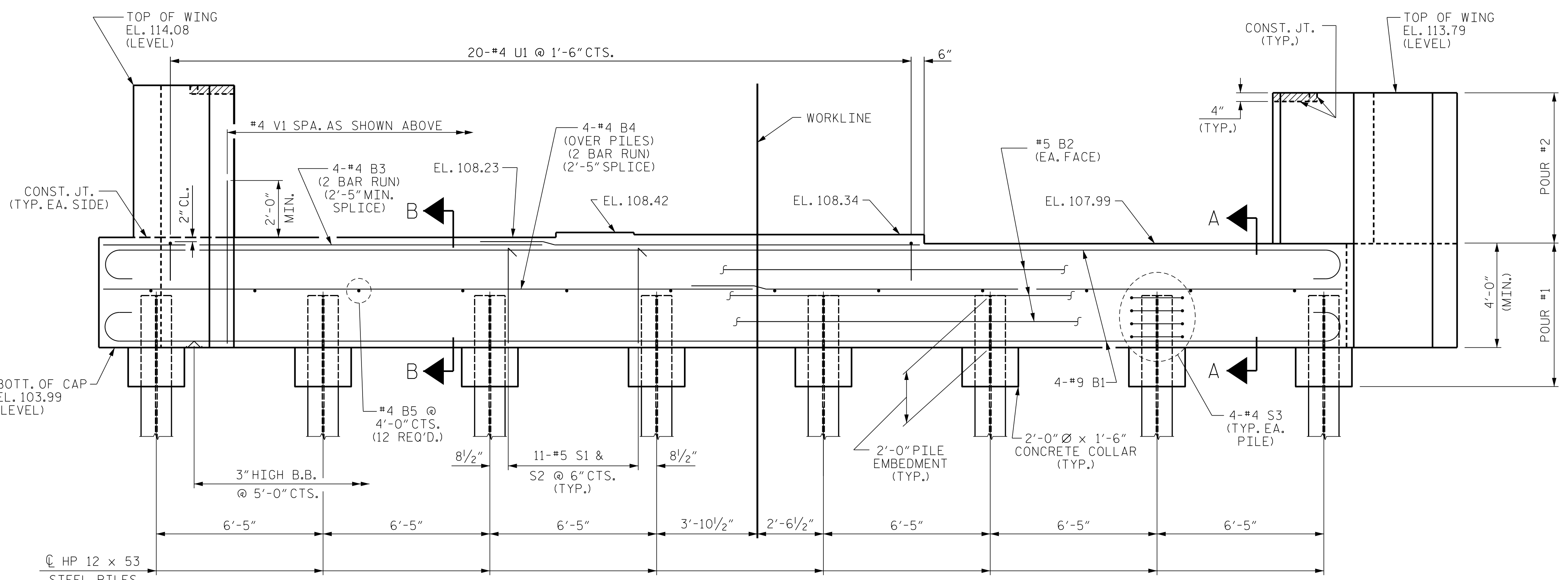


PLAN

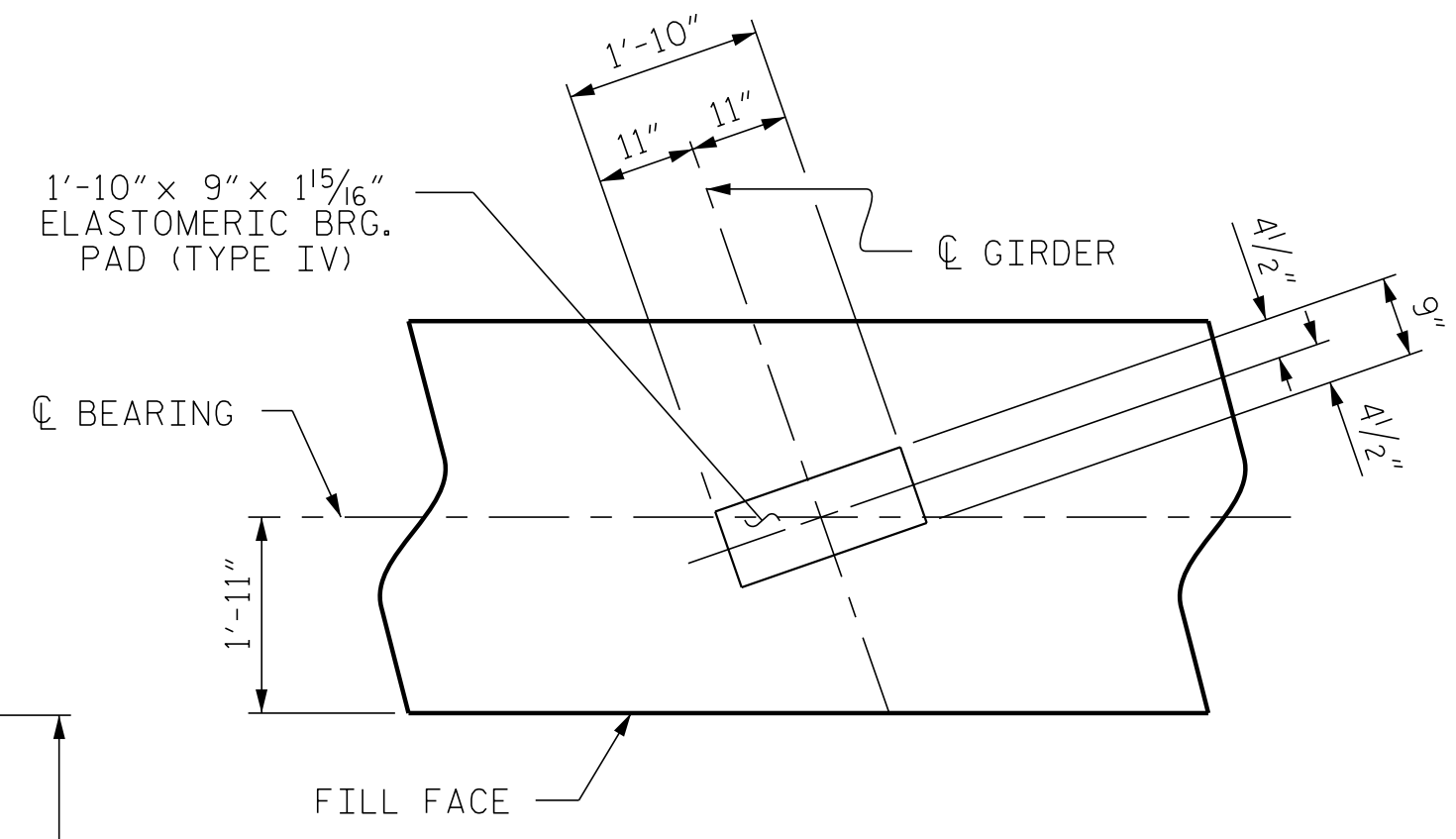
NOTES

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPETS ARE CAST IF SLIP FORMING IS USED.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE AREA OUTSIDE THE EDGE OF SUPERSTRUCTURE, SHALL BE RAKED TO A DEPTH OF 1/4".

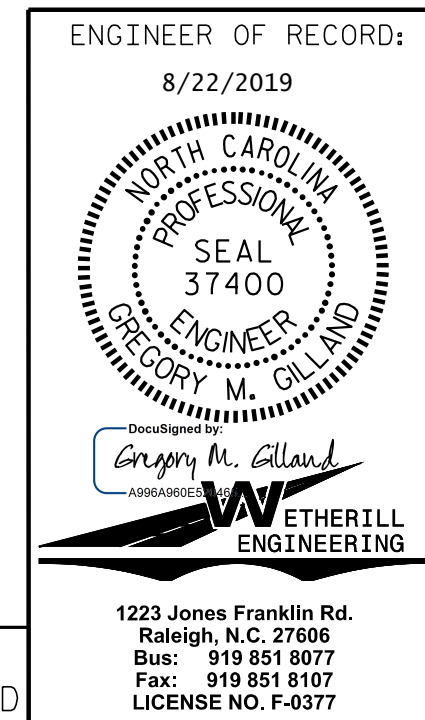


ELEVATION



DETAIL "A"

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-
 SHEET 1 OF 3



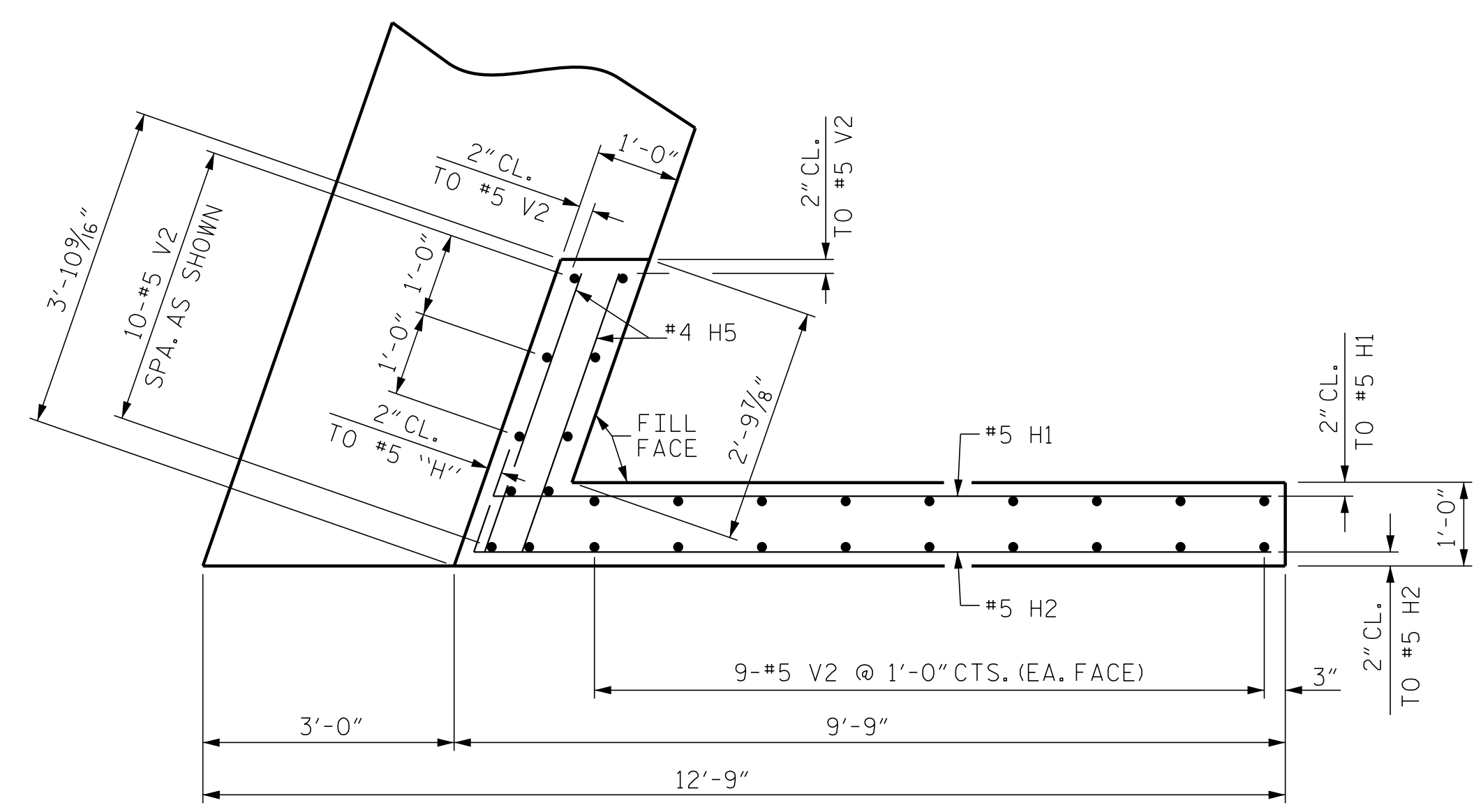
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE END BENT No. 1	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S-22
2			TOTAL SHEETS
			33

DRAWN BY: D. HODGE DATE: 1/19
 CHECKED BY: B.C. HUNT DATE: 2/19

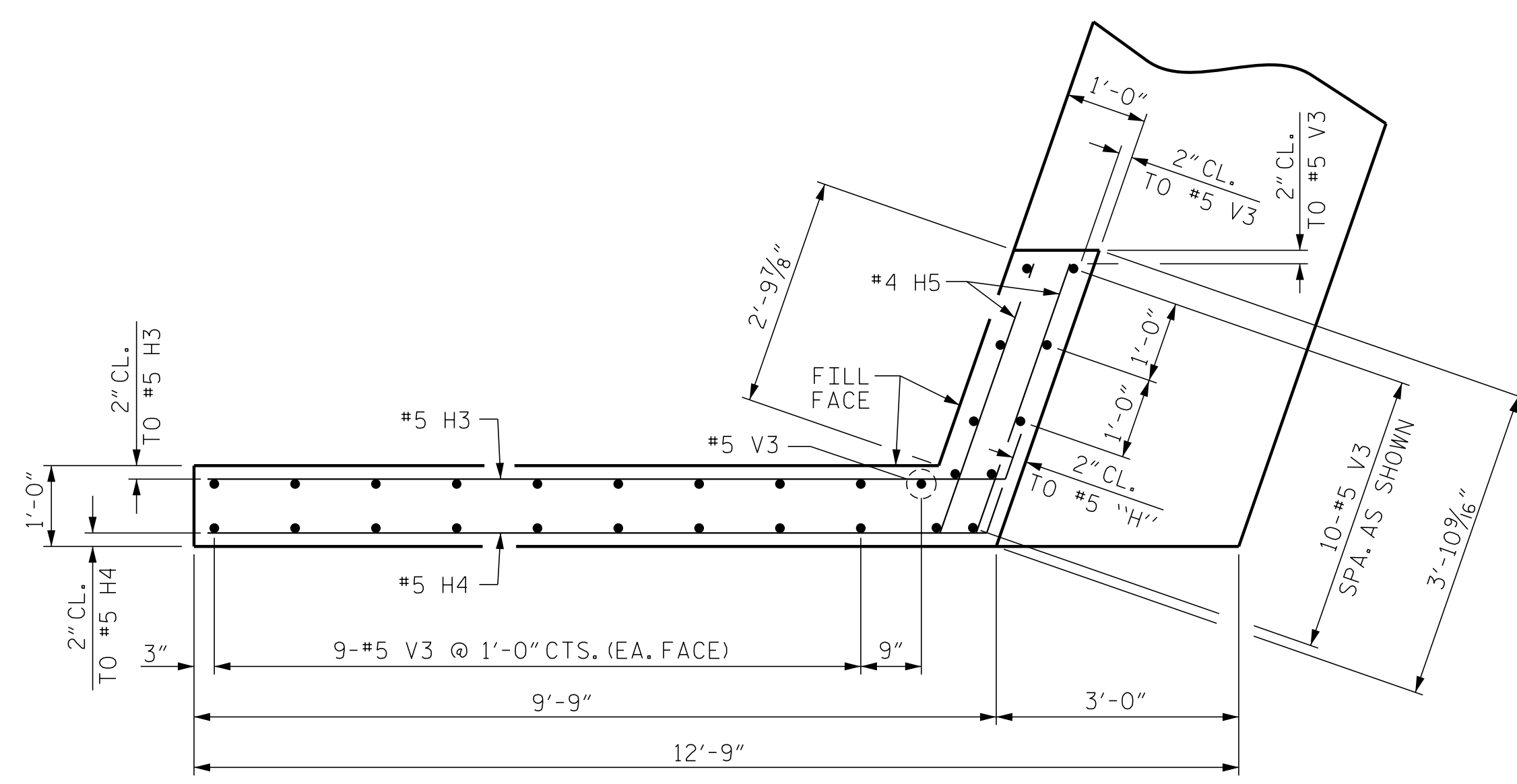
FOR SECTION A-A AND B-B, SEE SHEET 3 OF 3.

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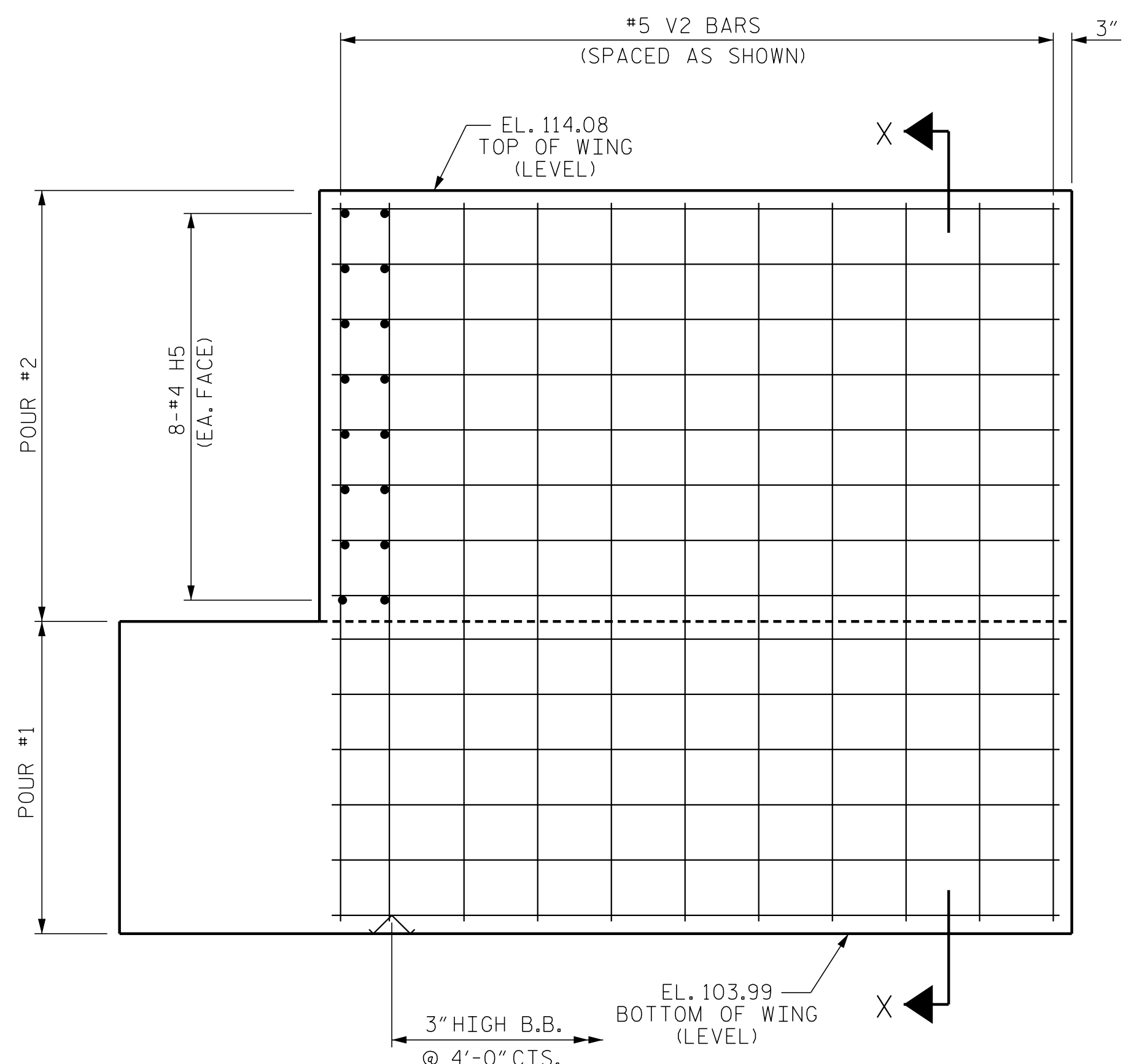
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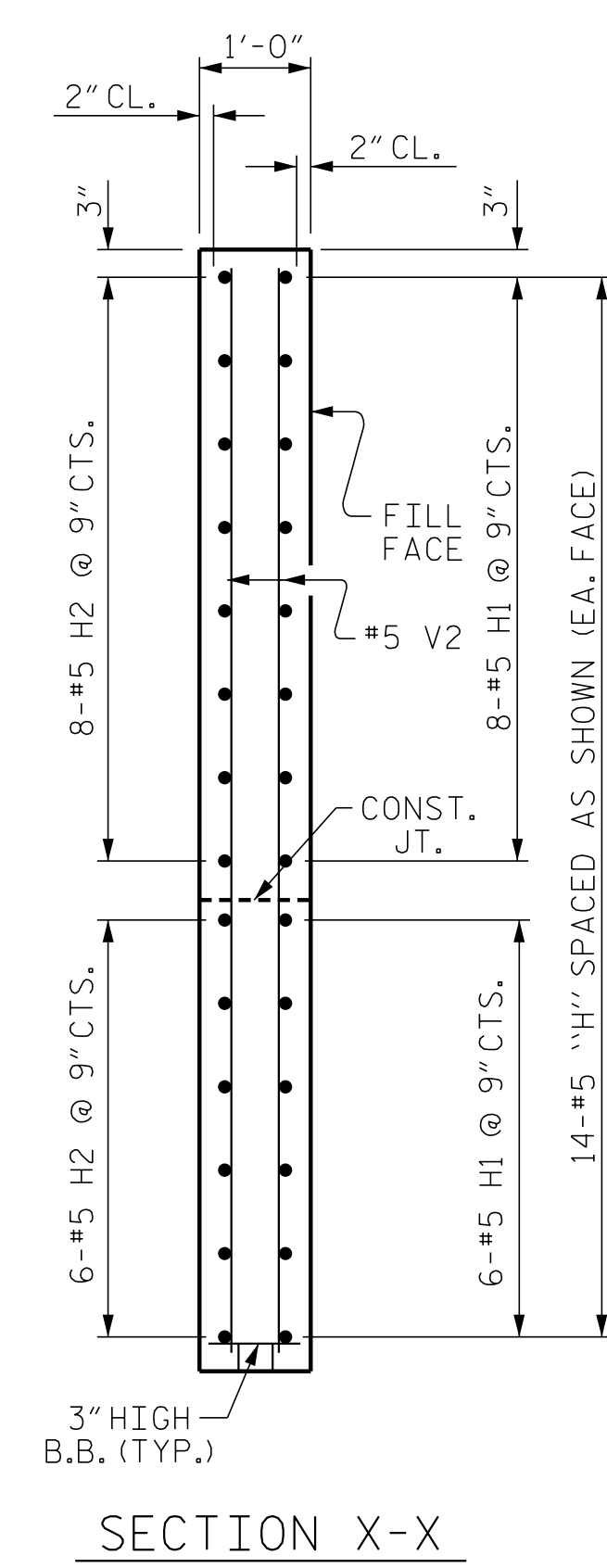
PLAN OF WING - (W1)



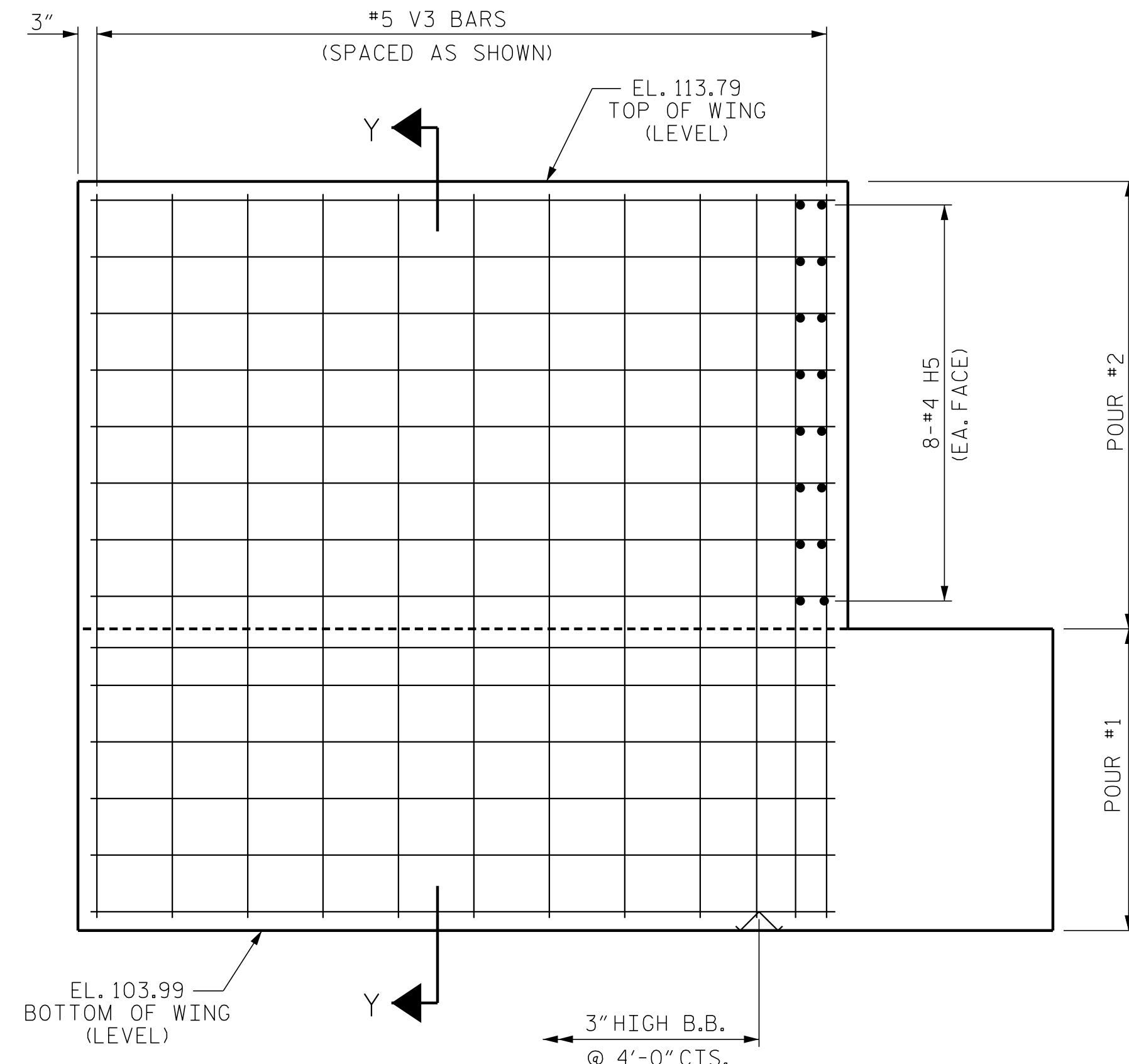
PLAN OF WING - (W2)



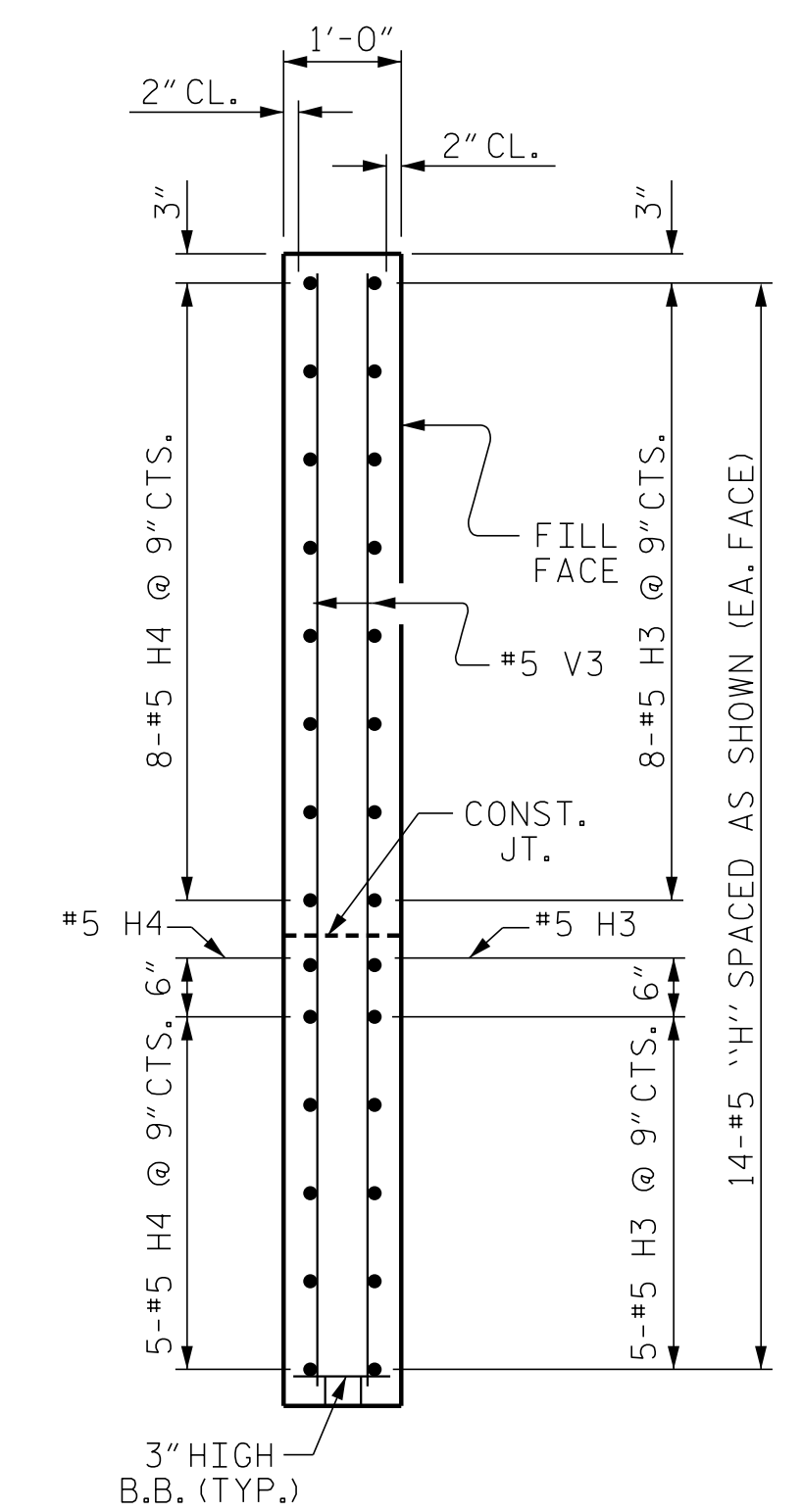
ELEVATION OF WING - (W1)



SECTION X-X

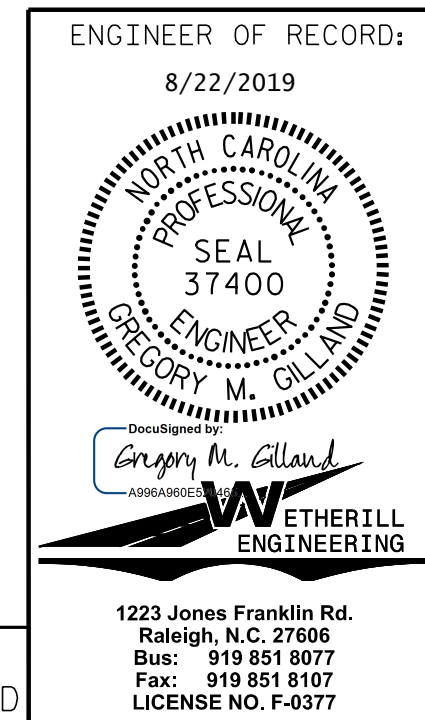


ELEVATION OF WING - (W2)



SECTION Y-Y

PROJECT NO. R-5797
 COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-
 SHEET 2 OF 3



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE END BENT No. 1	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S-23
2			TOTAL SHEETS 33

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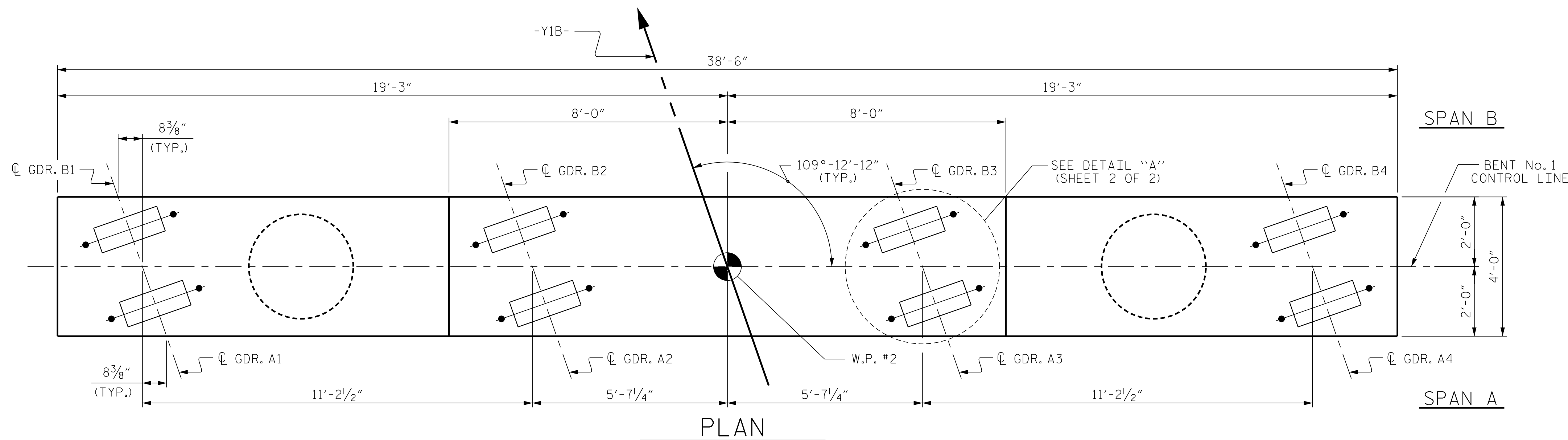
DRAWN BY: D. HODGE DATE: 2/19
 CHECKED BY: B.C. HUNT DATE: 2/19

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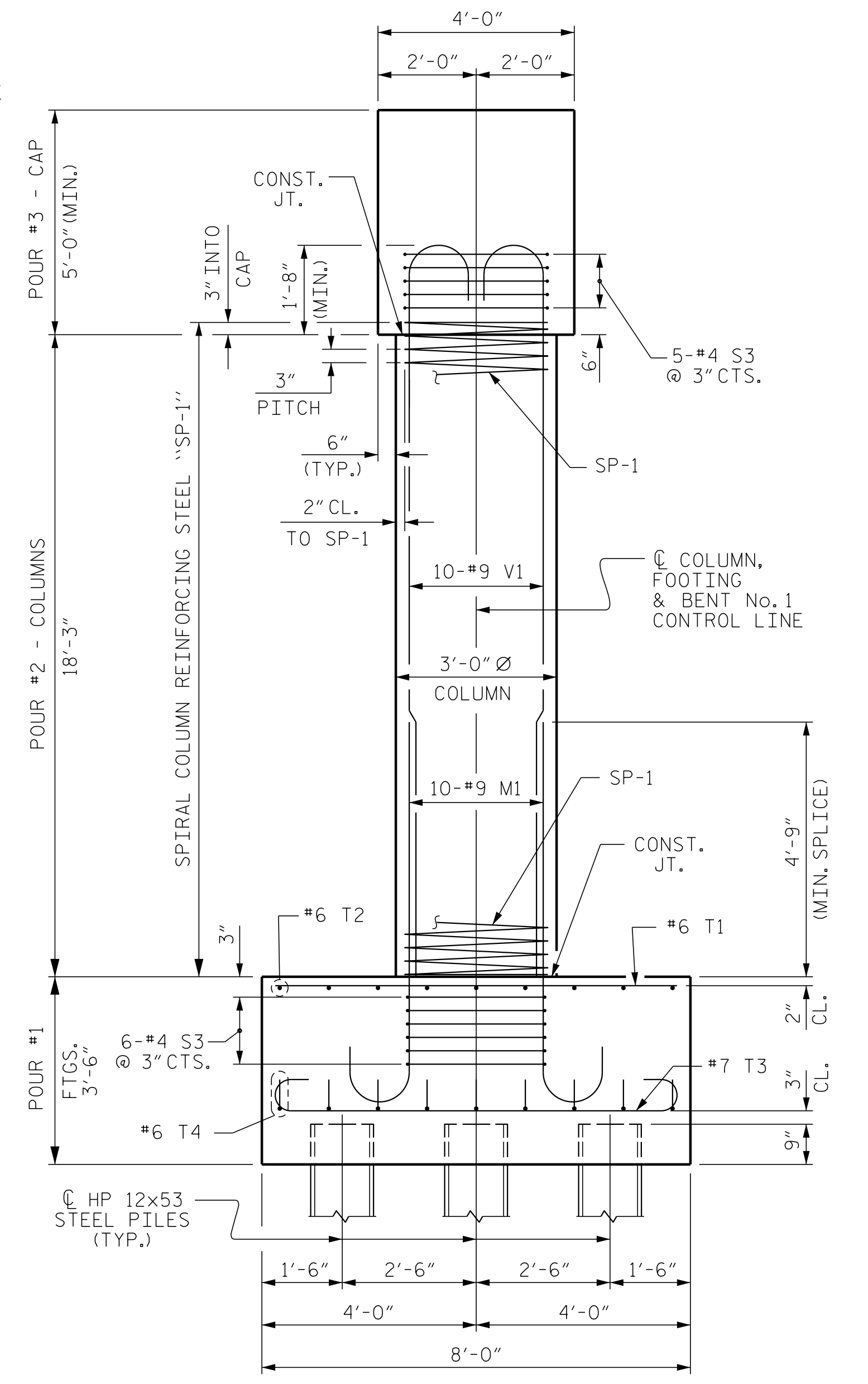
NOTES:

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

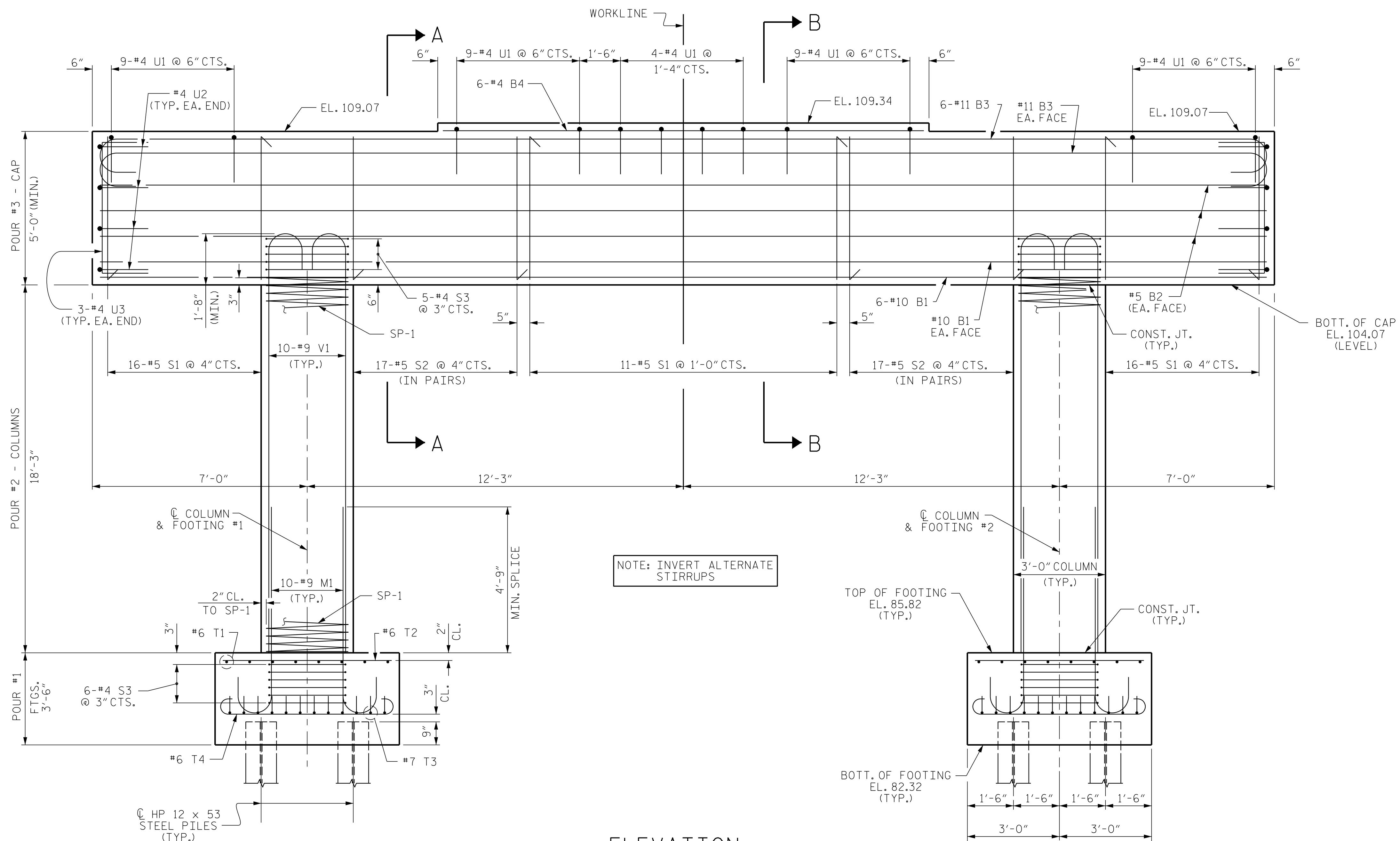
HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.



PLAN



END ELEVATION



NOTE: INVERT ALTERNATE STIRRUPS

ELEVATION

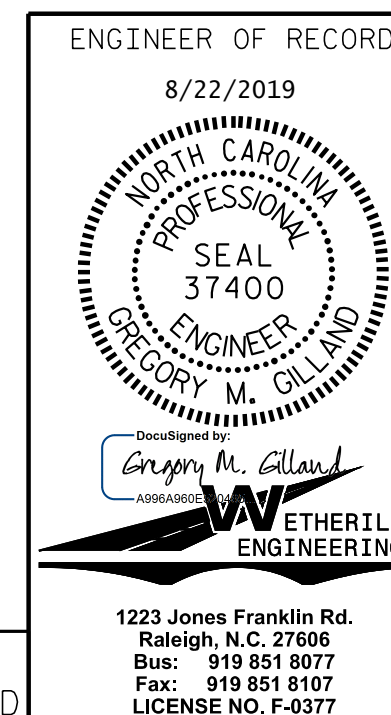
PILE PLACEMENT, REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING AND COLUMN.

PROJECT NO. R-5797

COLUMBUS COUNTY

STATION: 30+65.33 -Y1B-

SHEET 1 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 1

REVISIONS

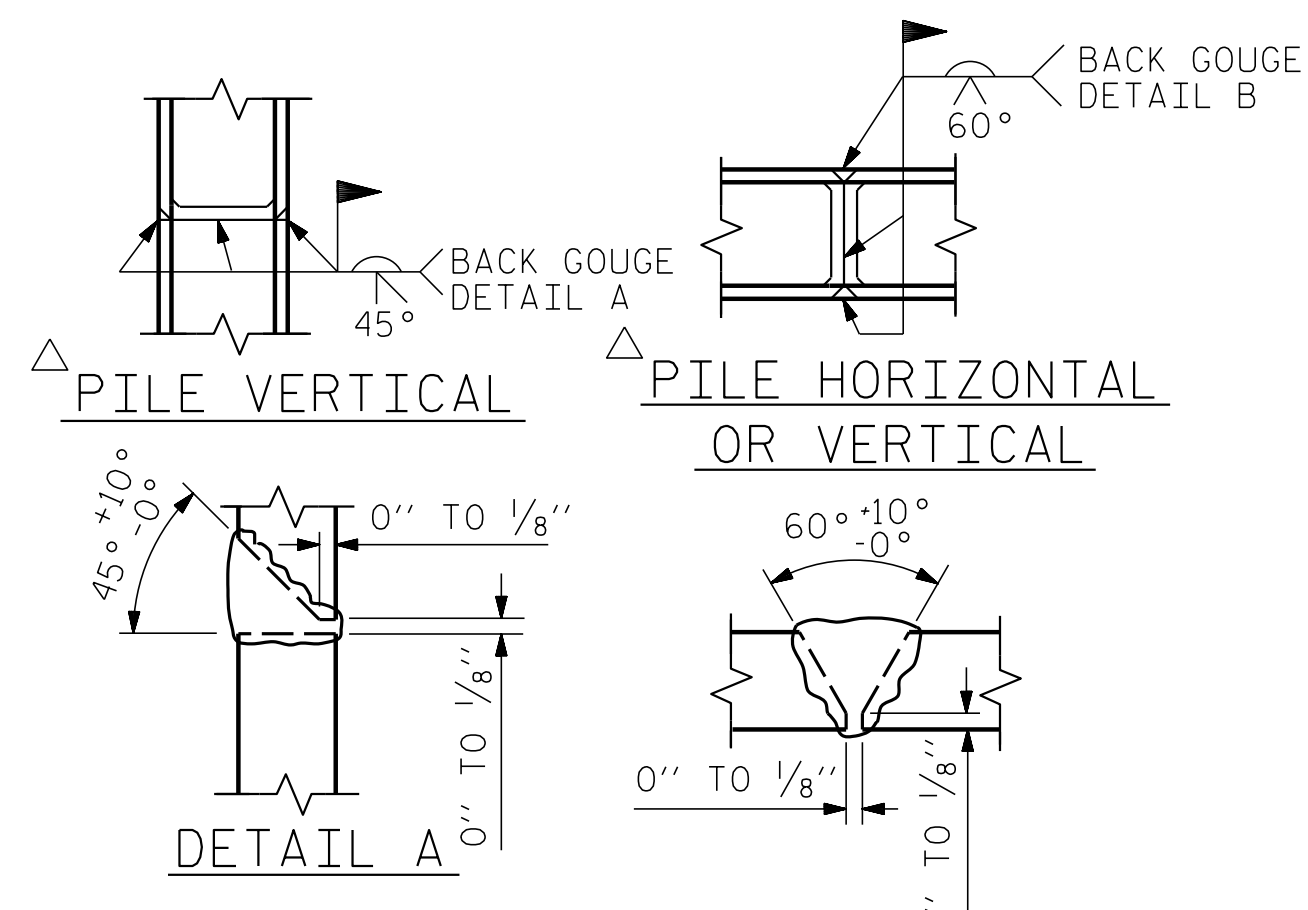
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.
S-25
TOTAL SHEETS
33

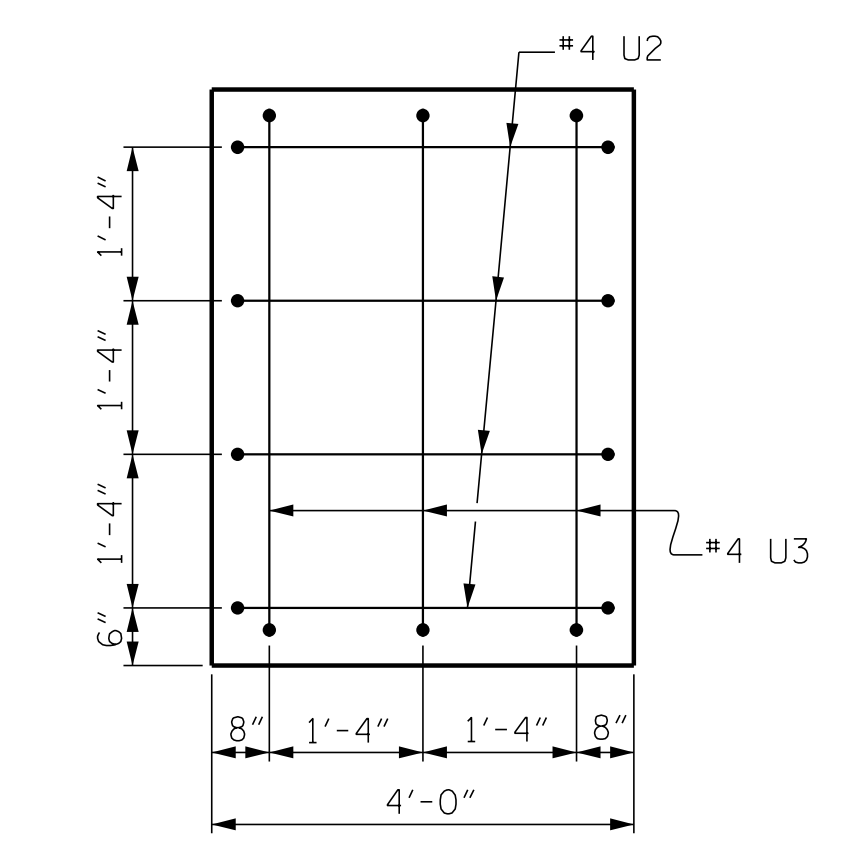
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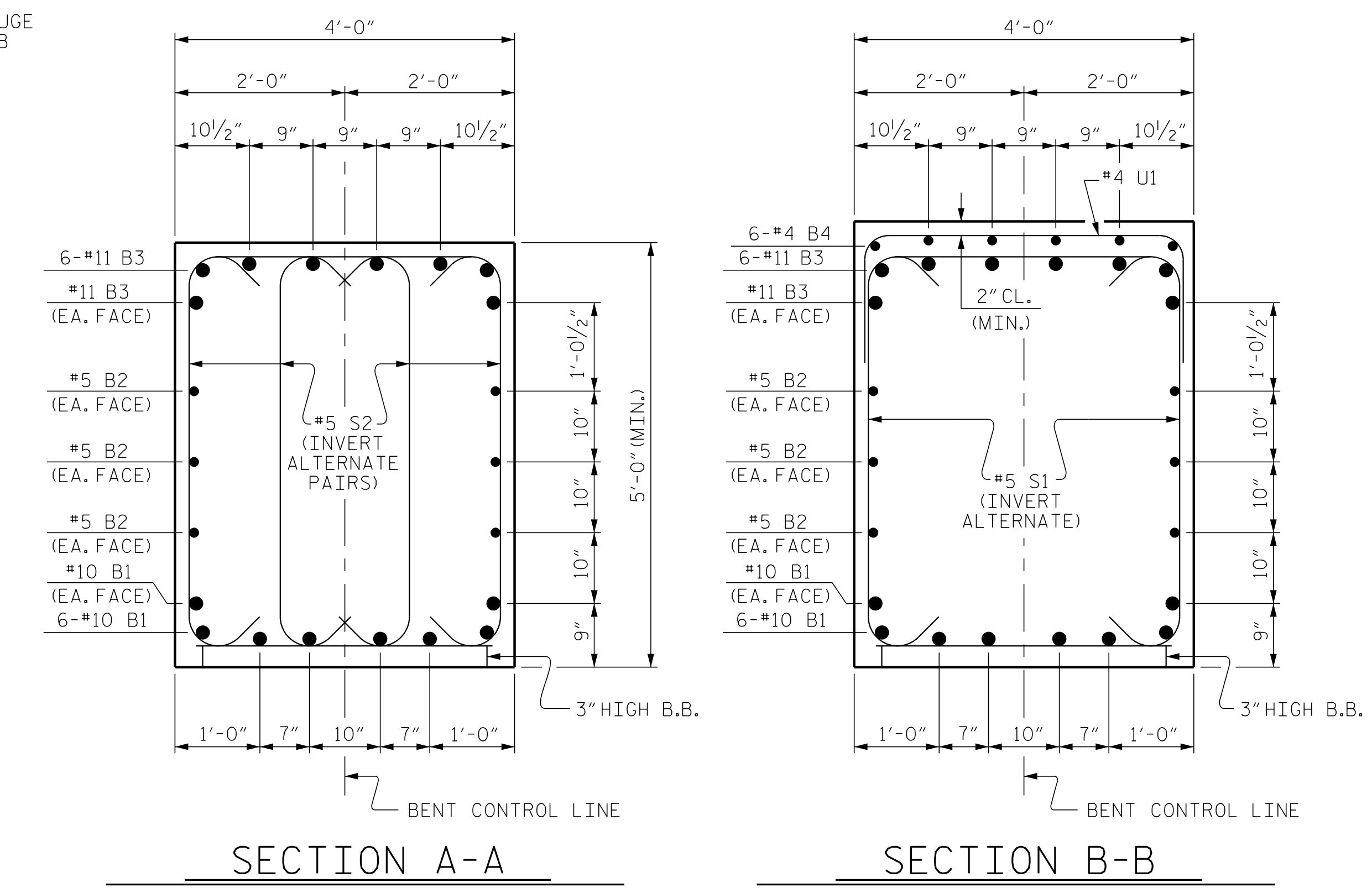
DRAWN BY: D. HODGE DATE: 3/19
 CHECKED BY: G.M. GILLAND DATE: 4/19



POSITION OF PILE DURING WELDING.
PILE SPlice DETAILS

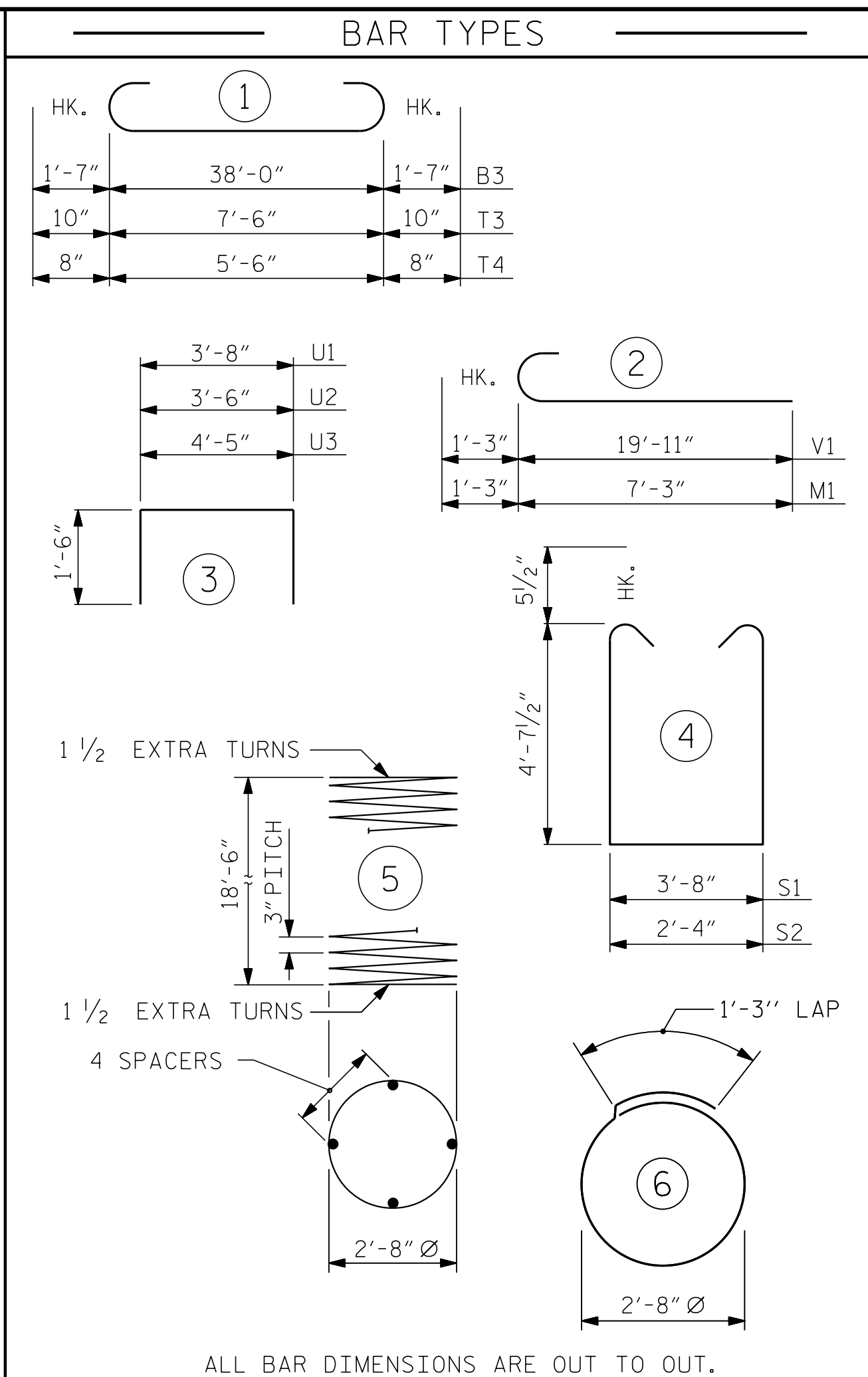


END OF CAP VIEW
(TYP. EA. END)



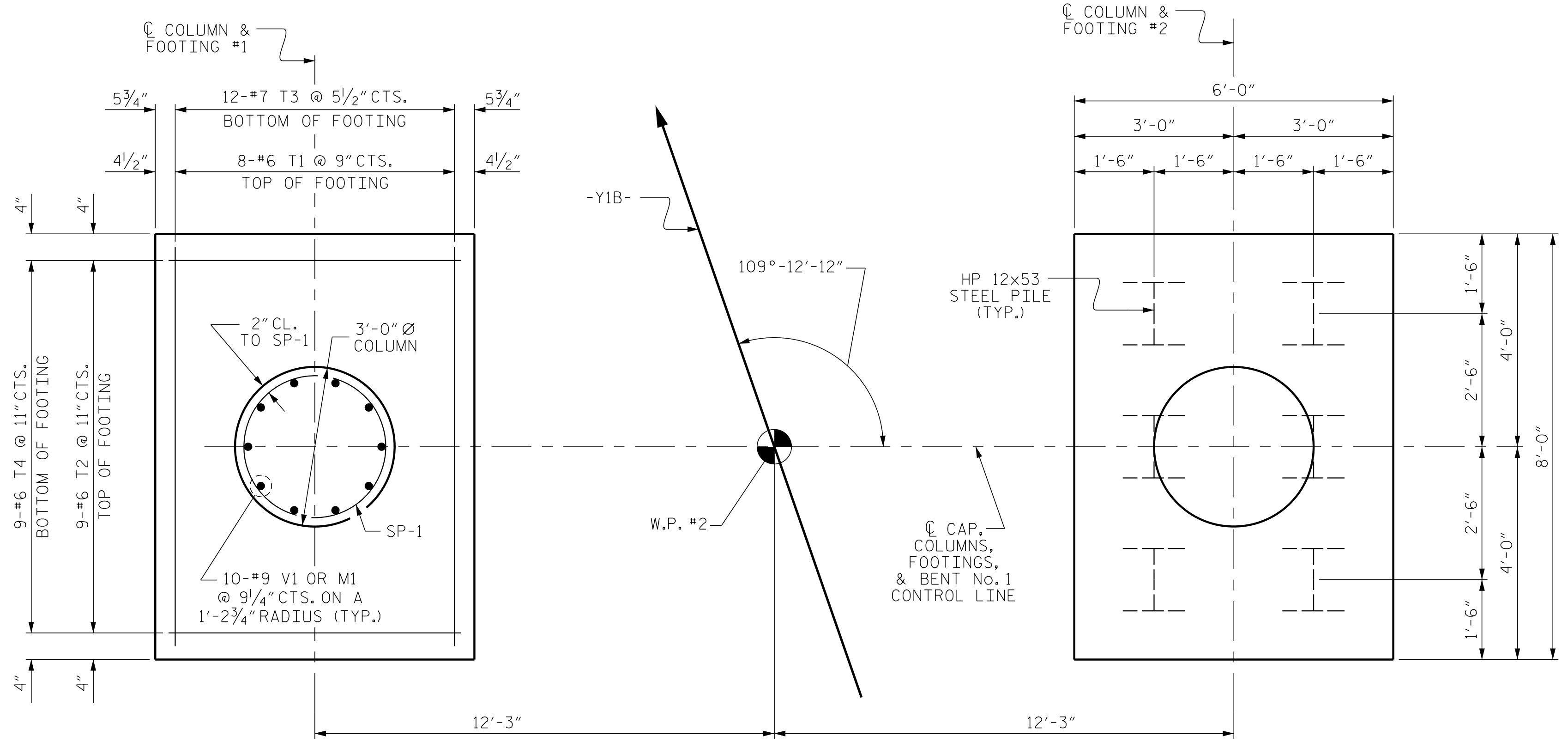
SECTION A-A

SECTION B-B



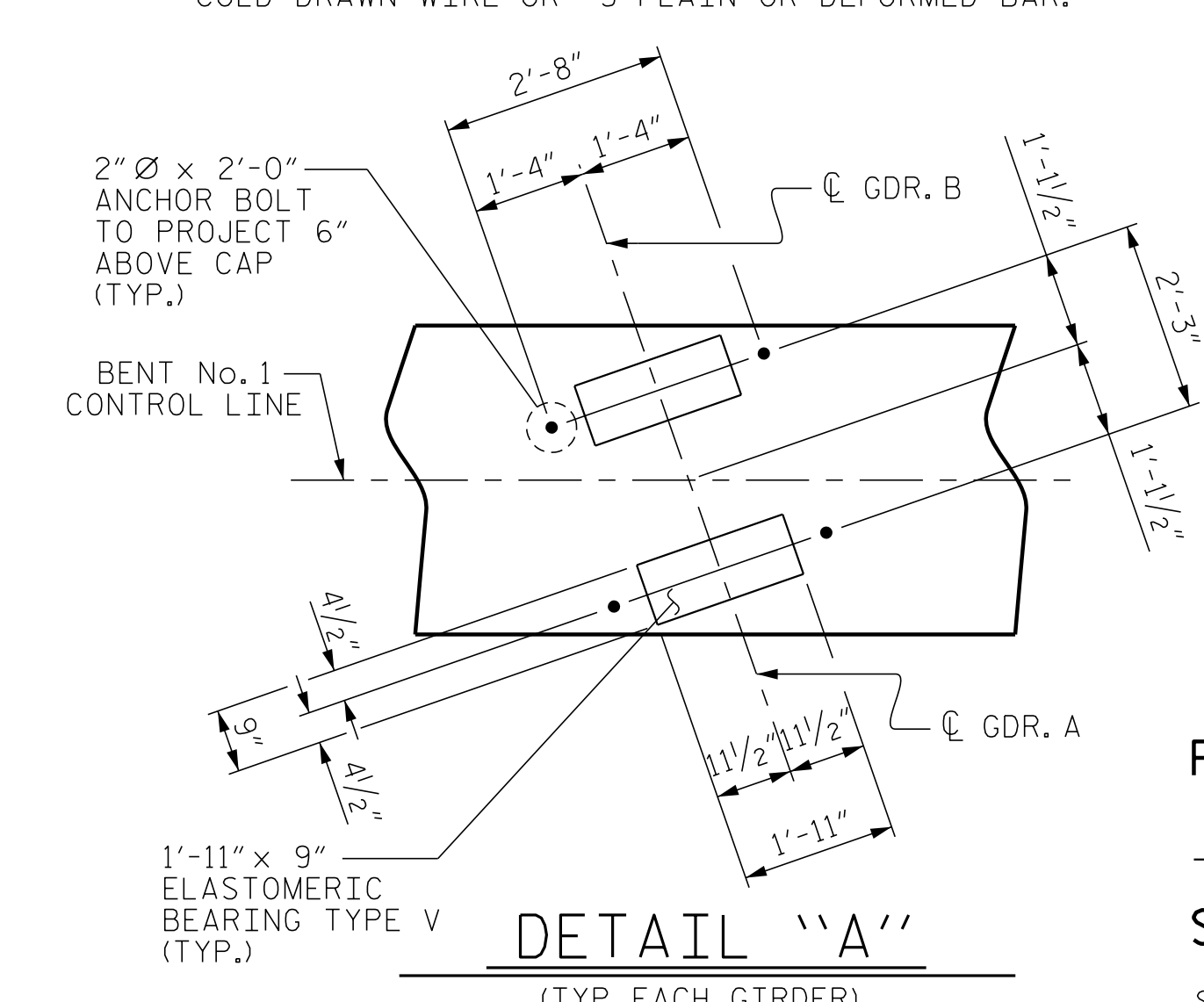
ALL BAR DIMENSIONS ARE OUT TO OUT.
** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL					
BENT No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	STR	38'-2"	1,314
B2	6	#5	STR	38'-2"	239
B3	8	#11	1	41'-2"	1,750
B4	6	#4	STR	15'-8"	63
M1	20	#9	2	8'-6"	578
S1	43	#5	4	13'-10"	620
S2	68	#5	4	12'-6"	887
S3	22	#4	6	9'-8"	142
T1	16	#6	STR	7'-6"	180
T2	18	#6	STR	5'-6"	149
T3	24	#7	1	9'-2"	450
T4	18	#6	1	6'-10"	185
U1	40	#4	3	6'-8"	178
U2	8	#4	3	6'-6"	35
U3	6	#4	3	7'-5"	30
V1	20	#9	2	21'-2"	1,439
REINFORCING STEEL					8,239 LBS.
SP-1	2	**	5	635'-4"	1,325
SPIRAL COLUMN REINFORCING STEEL					1,325 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 FOOTINGS					12.4 C.Y.
POUR #2 COLUMNS					9.6 C.Y.
POUR #3 CAP					29.2 C.Y.
TOTAL CLASS A CONCRETE					51.2 C.Y.
HP 12 X 53 STEEL PILES					
NO: 12					LIN. FT. = 849
PILE REDRIVES					6 EA.
FOUNDATION EXCAVATION					LUMP SUM
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					12 EA.



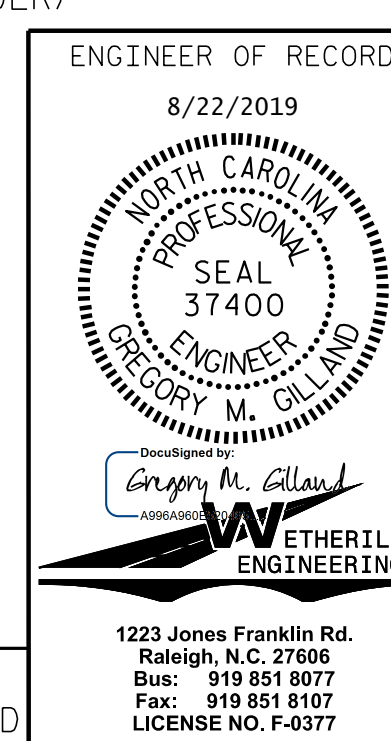
PLAN OF FOOTINGS AND COLUMNS

PILE PLACEMENT, REINFORCING STEEL, DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING.



DETAIL "A"
(TYP. EACH GIRDER)

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-
SHEET 2 OF 2



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

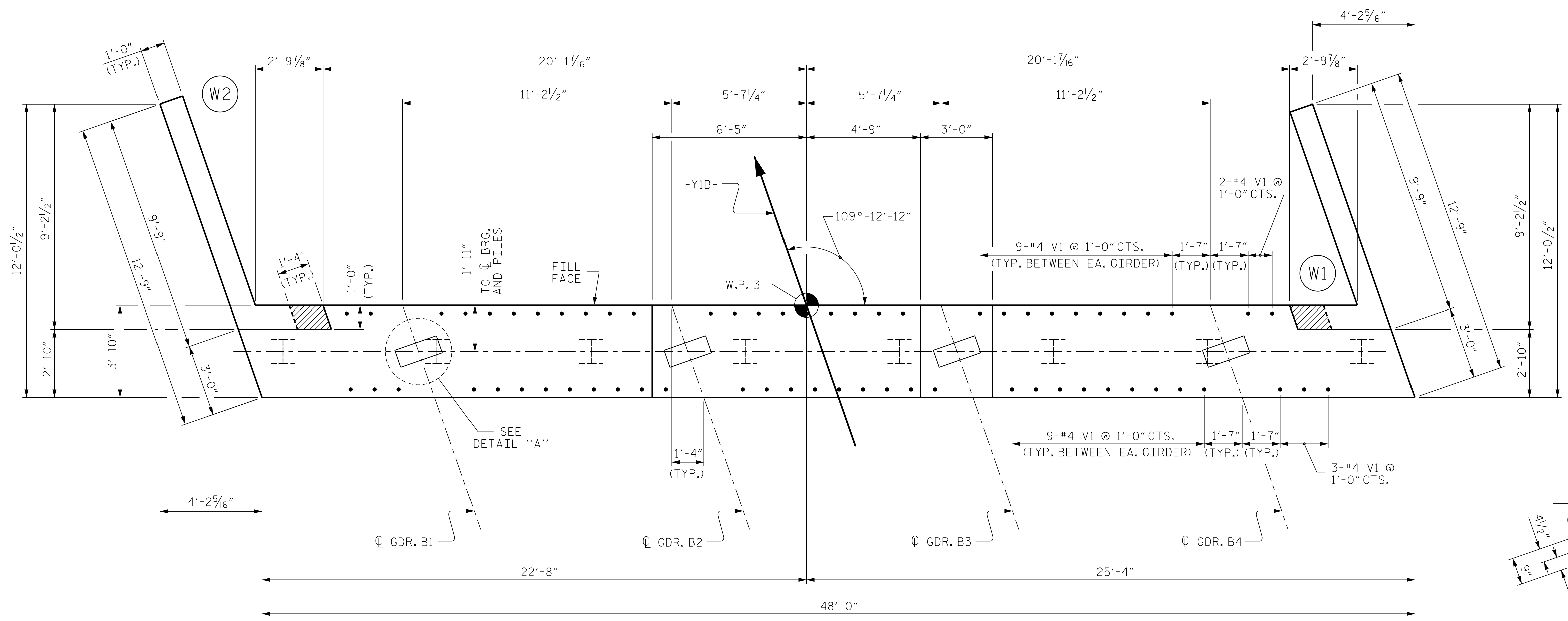
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

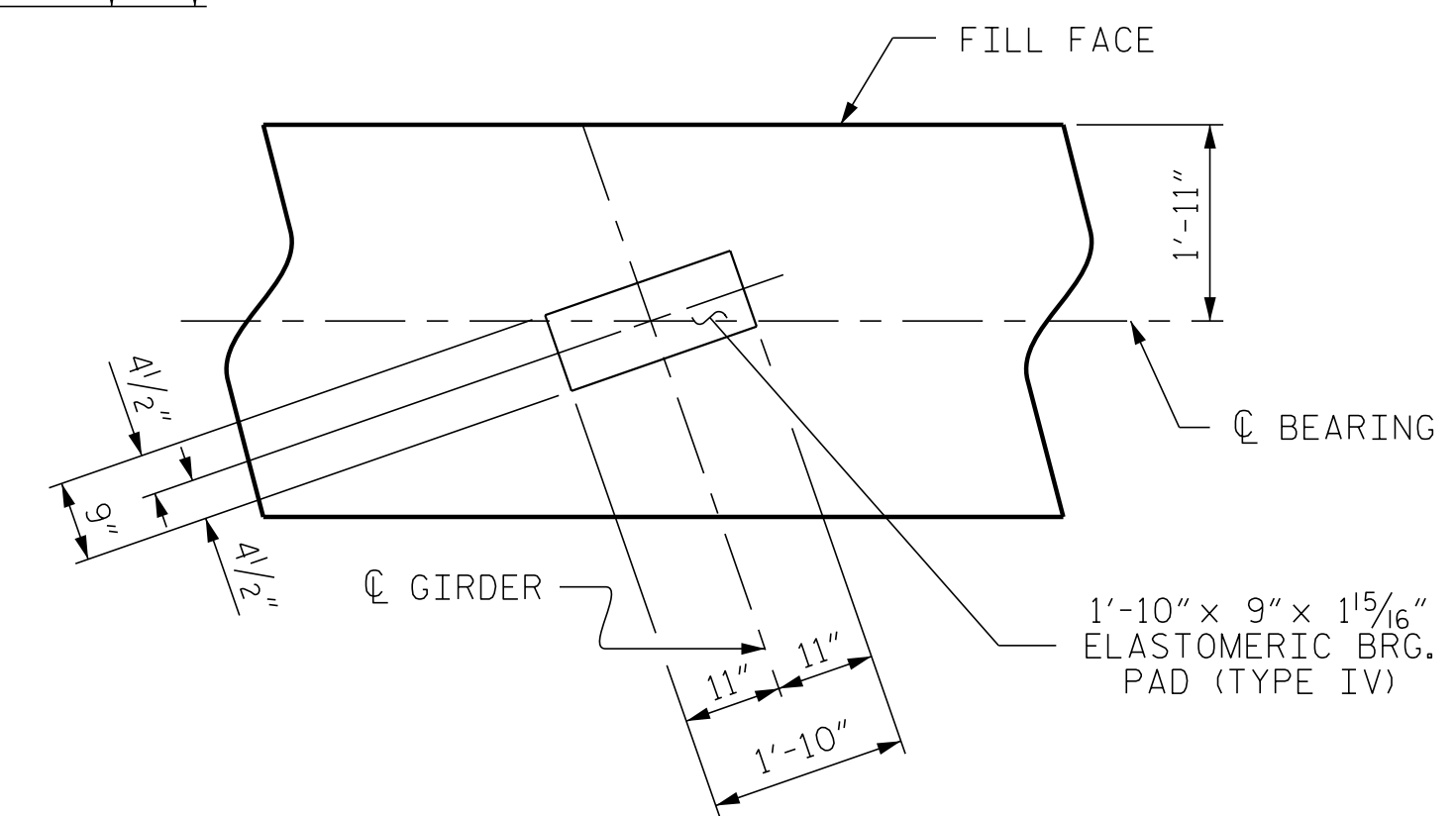
SHEET NO. S-26
TOTAL SHEETS 33

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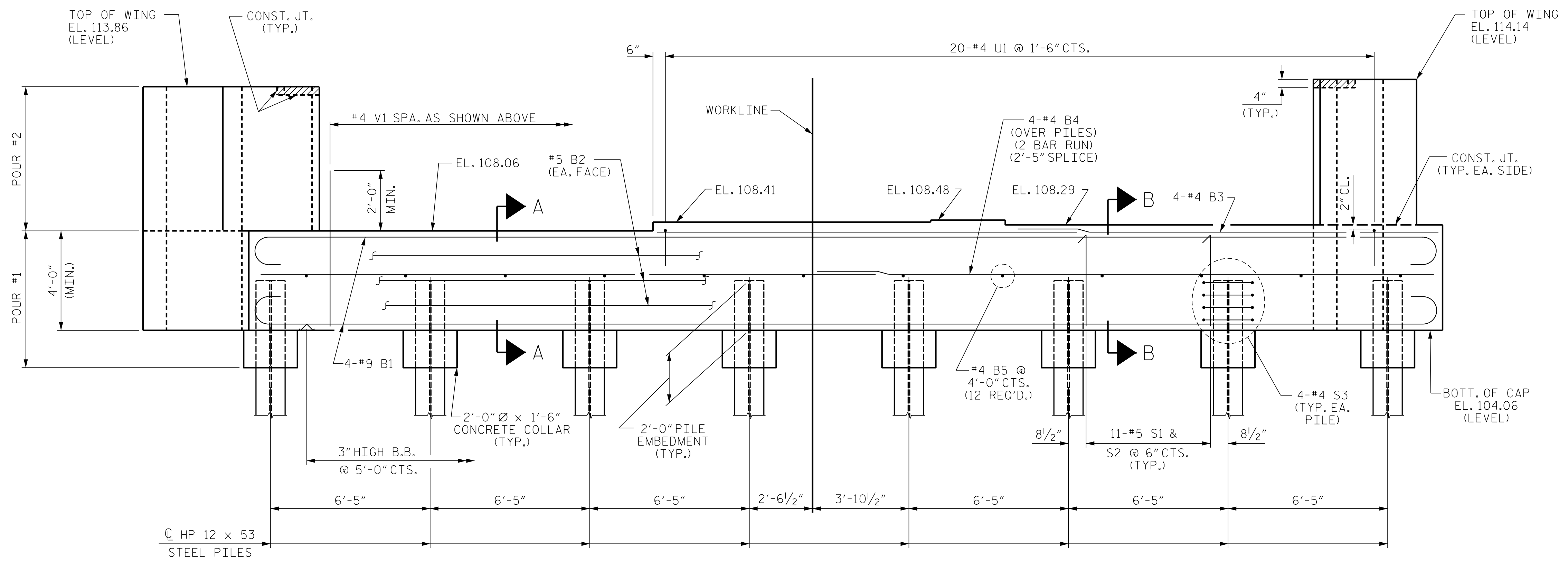
DRAWN BY: D. HODGE DATE: 4/19
CHECKED BY: G.M. GILLAND DATE: 4/19



PLAN



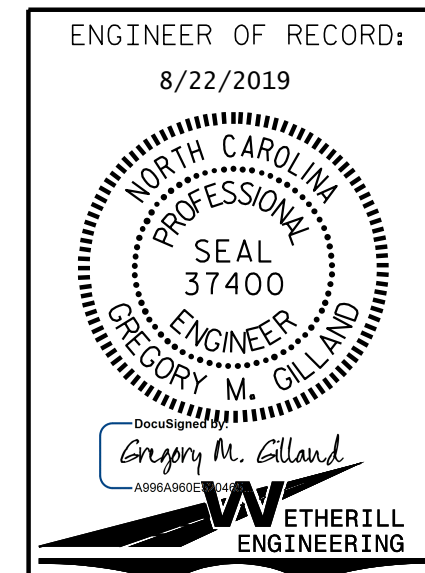
DETAIL "A"



ELEVATION

NOTES
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPETS ARE CAST IF SLIP FORMING IS USED.
 THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE AREA OUTSIDE THE EDGE OF SUPERSTRUCTURE, SHALL BE RAKED TO A DEPTH OF 1/4".

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-
 SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT No. 2

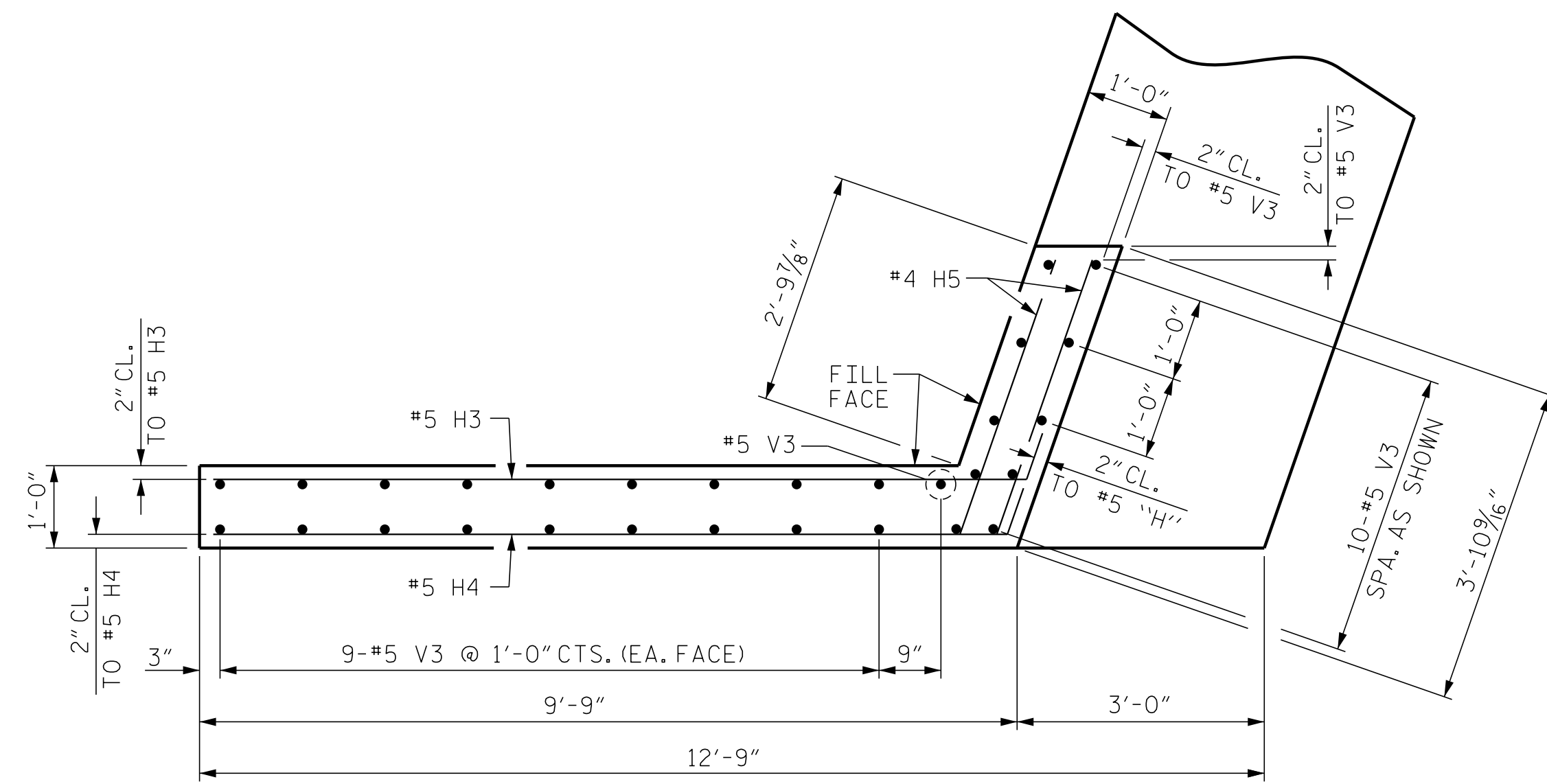
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			33

DRAWN BY: D. HODGE DATE: 1/19
 CHECKED BY: B.C. HUNT DATE: 2/19

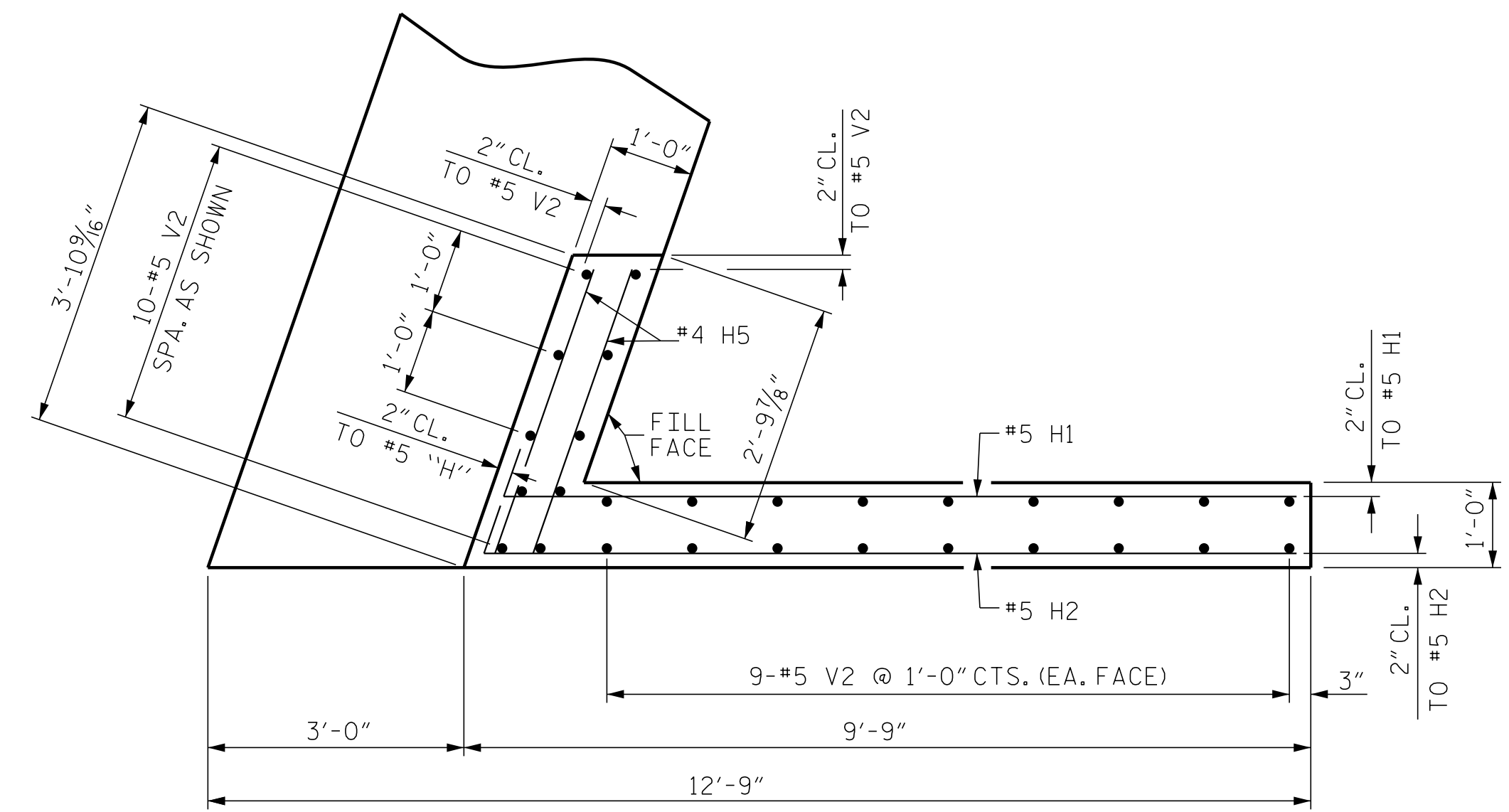
FOR SECTION A-A AND B-B, SEE SHEET 3 OF 3.

DOCUMENT NOT CONSIDERED FINAL
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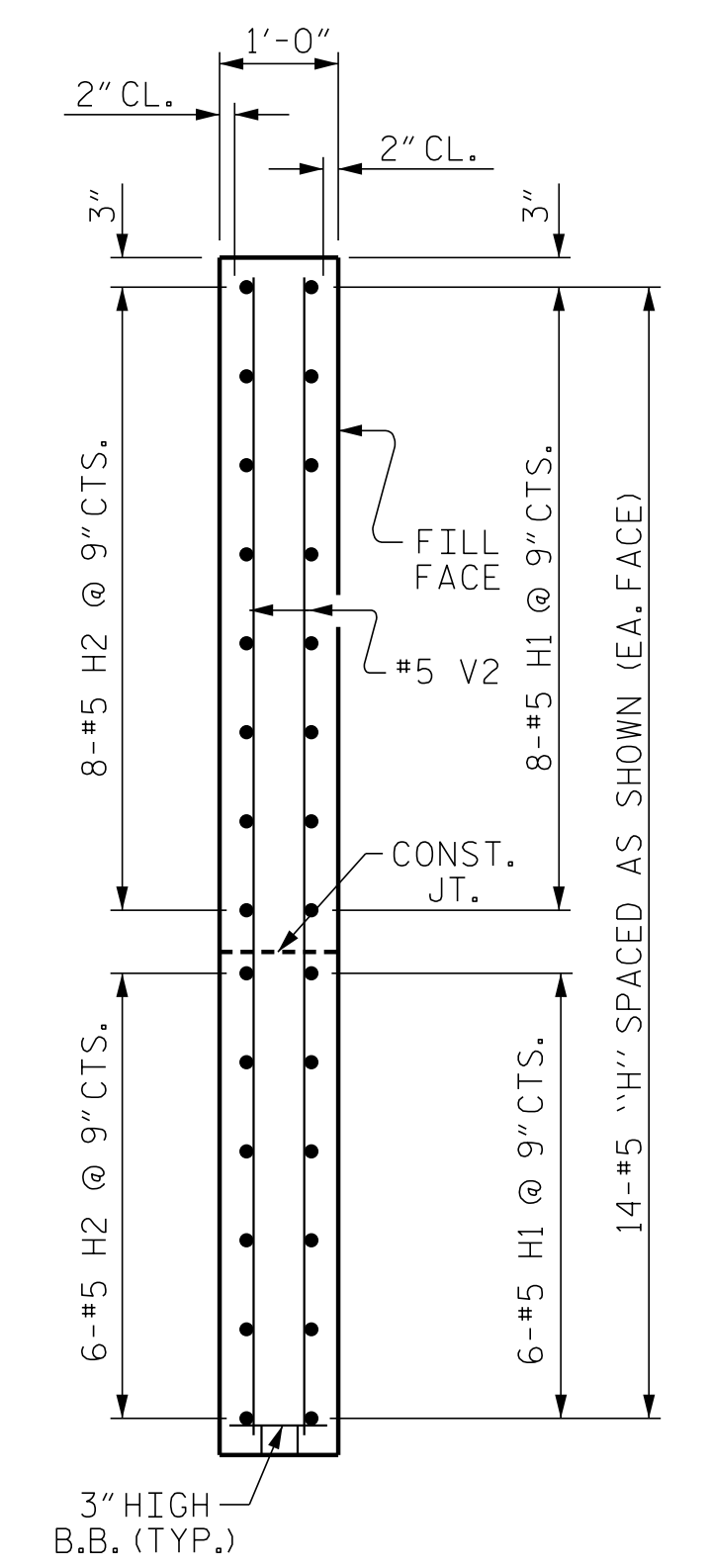
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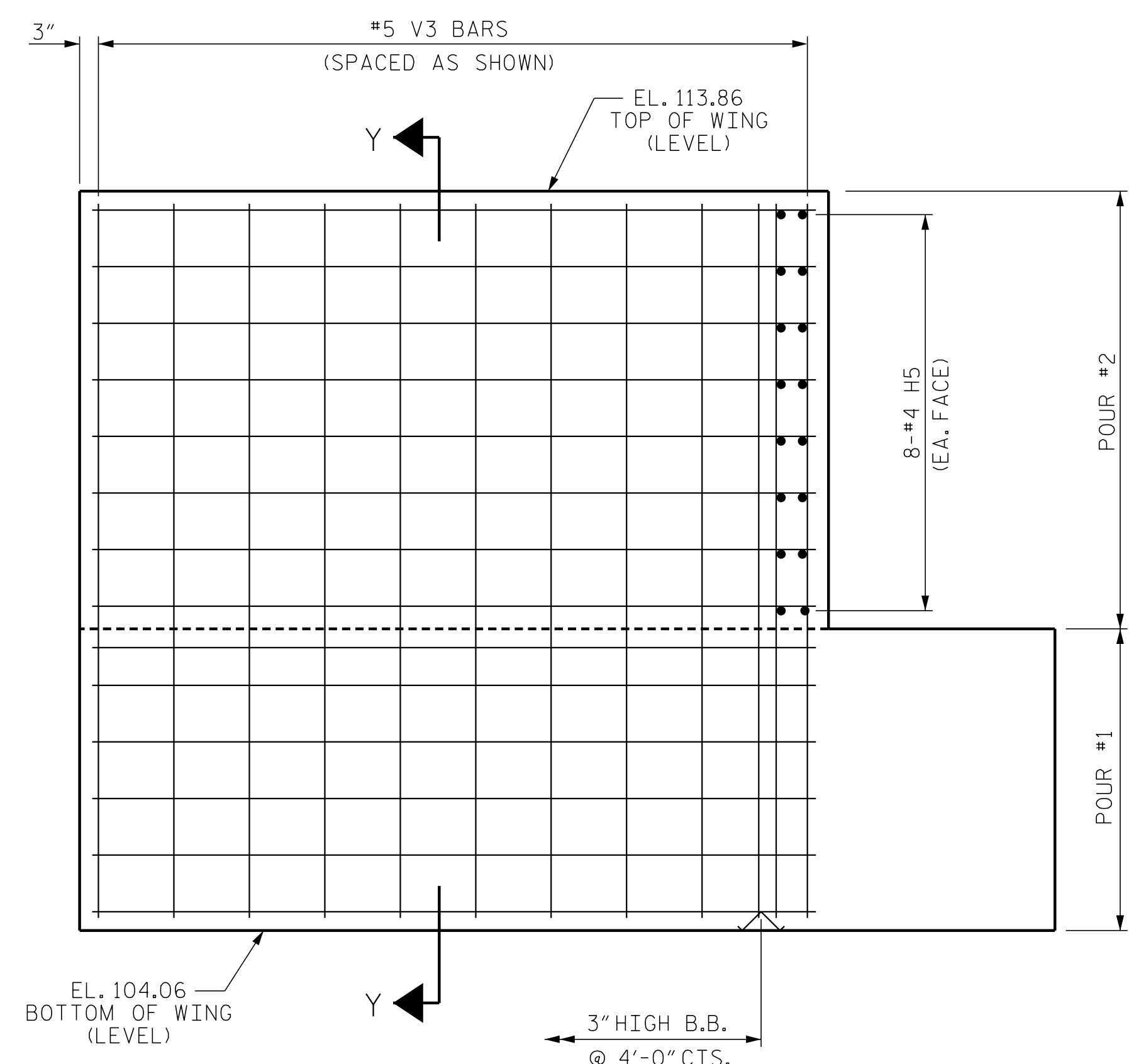
PLAN OF WING - (W2)



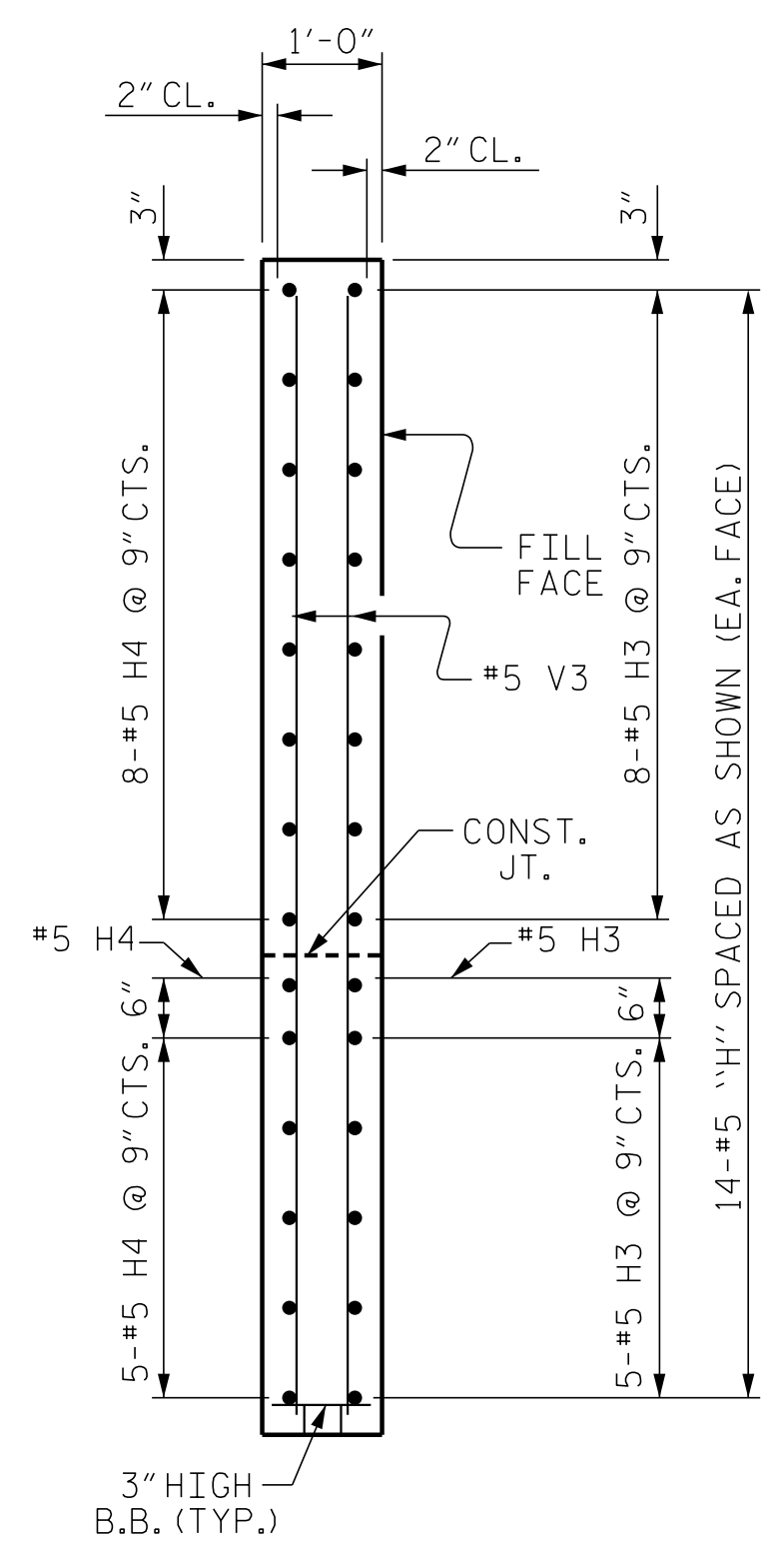
PLAN OF WING - (W1)



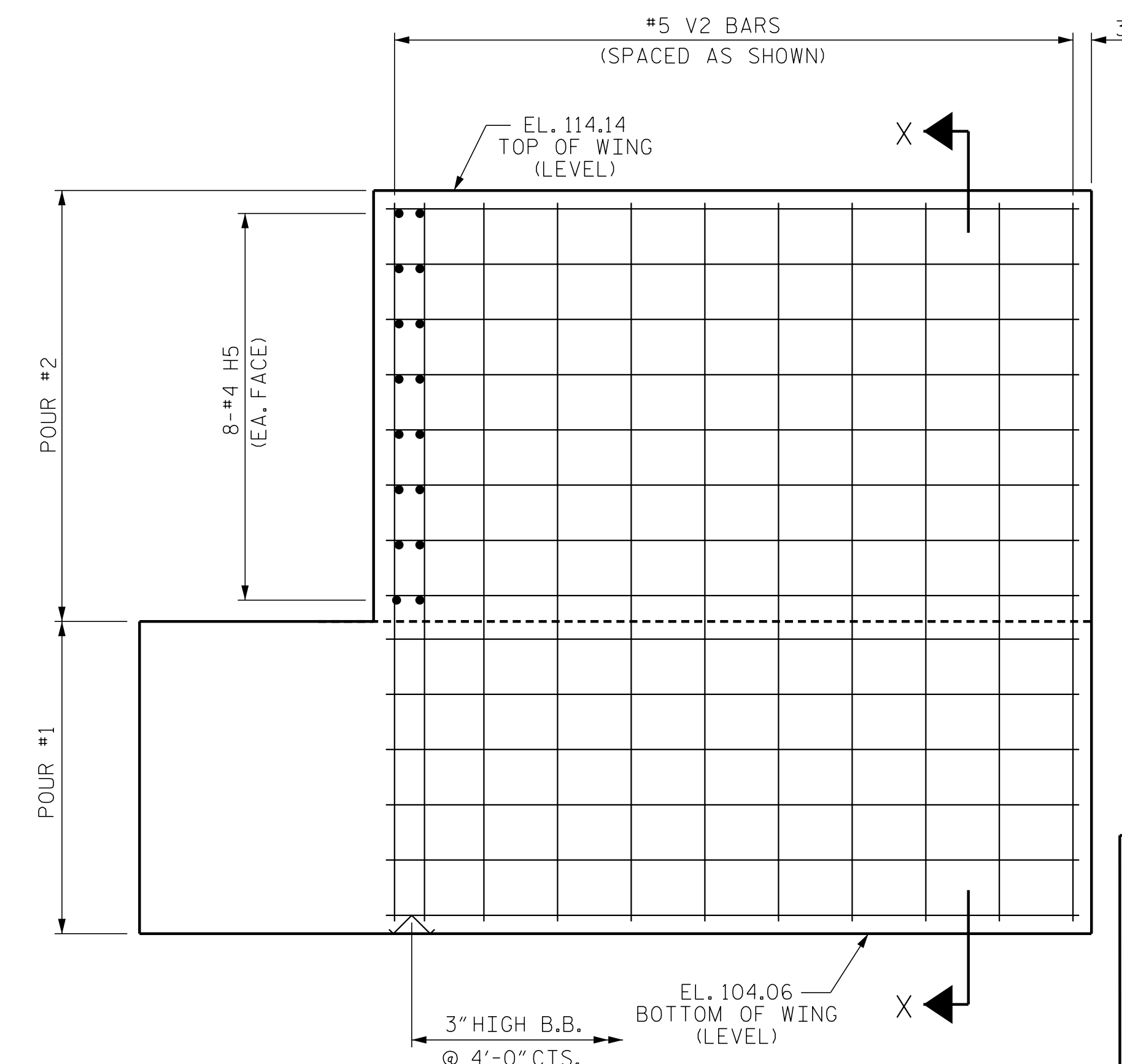
SECTION X-X



ELEVATION OF WING - (W2)

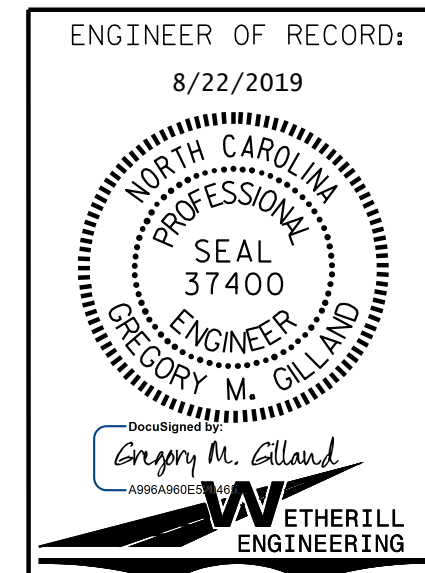


SECTION Y-Y



ELEVATION OF WING - (W1)

PROJECT NO. R-5797
 COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-
 SHEET 2 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 2

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

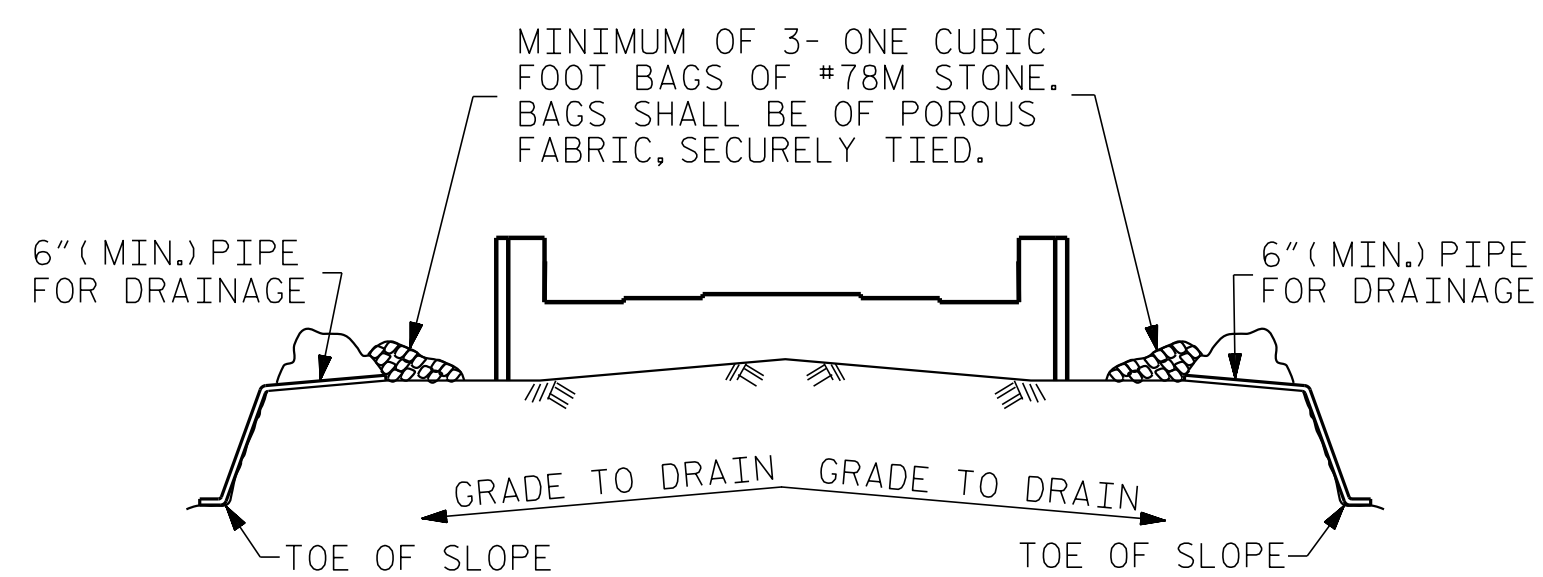
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DRAWN BY: D. HODGE DATE: 2/19
 CHECKED BY: B.C. HUNT DATE: 2/19

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ENGINEER OF RECORD:
 8/22/2019
 1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
 Bus: 919 851 8077
 Fax: 919 851 8107
 LICENSE NO. F-0377

SHEET NO.
 S-28
 TOTAL SHEETS
 33

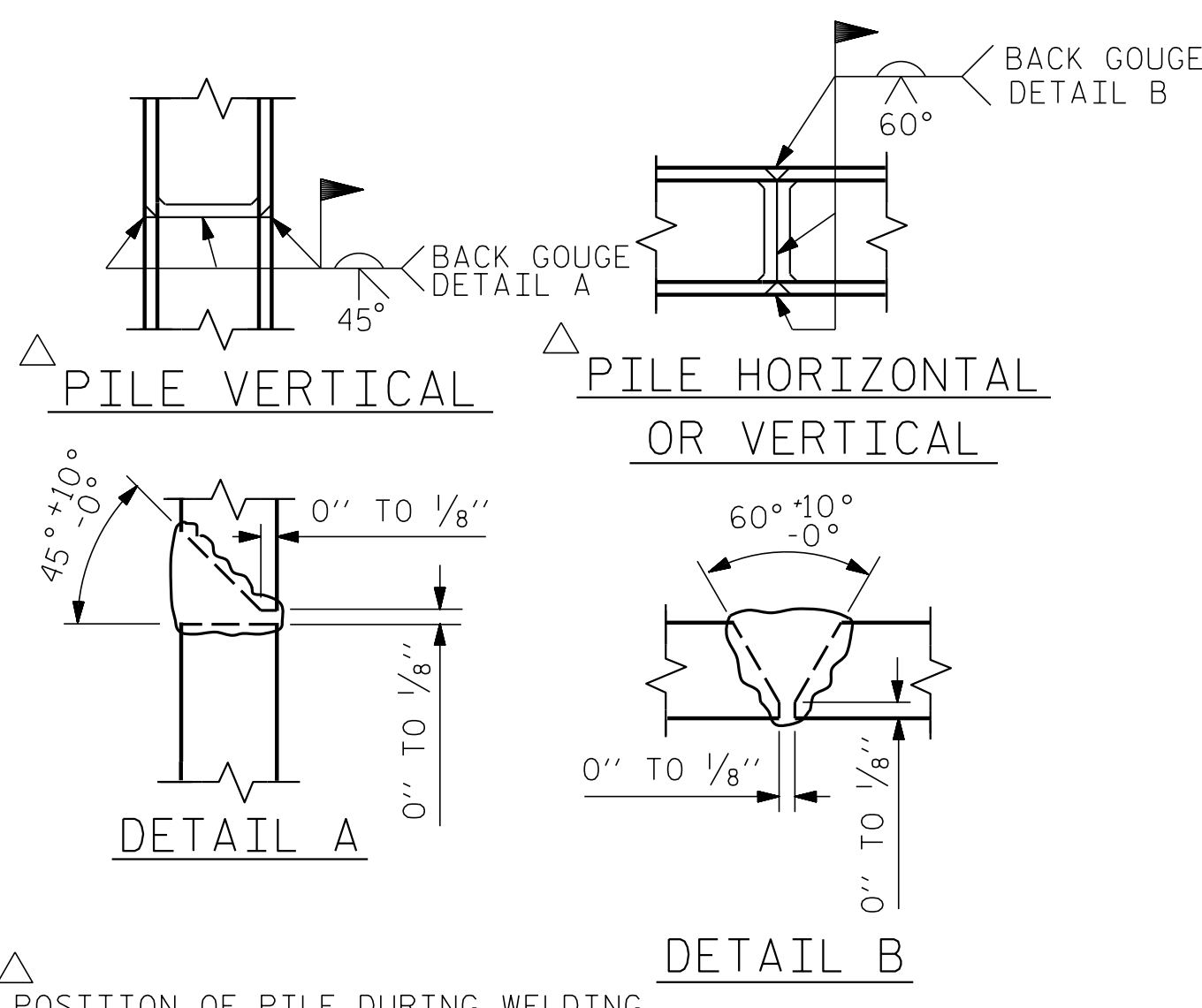


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

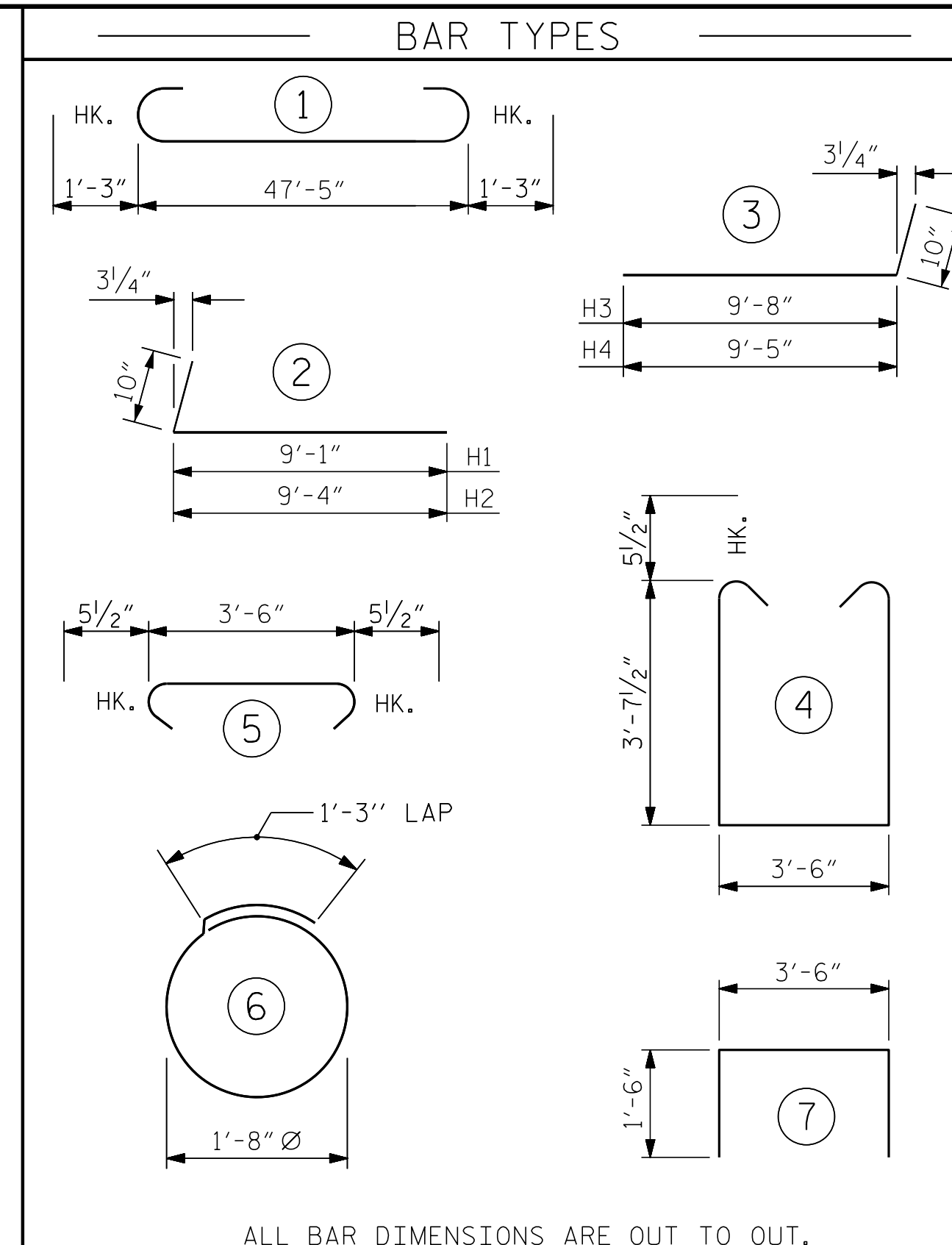
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS

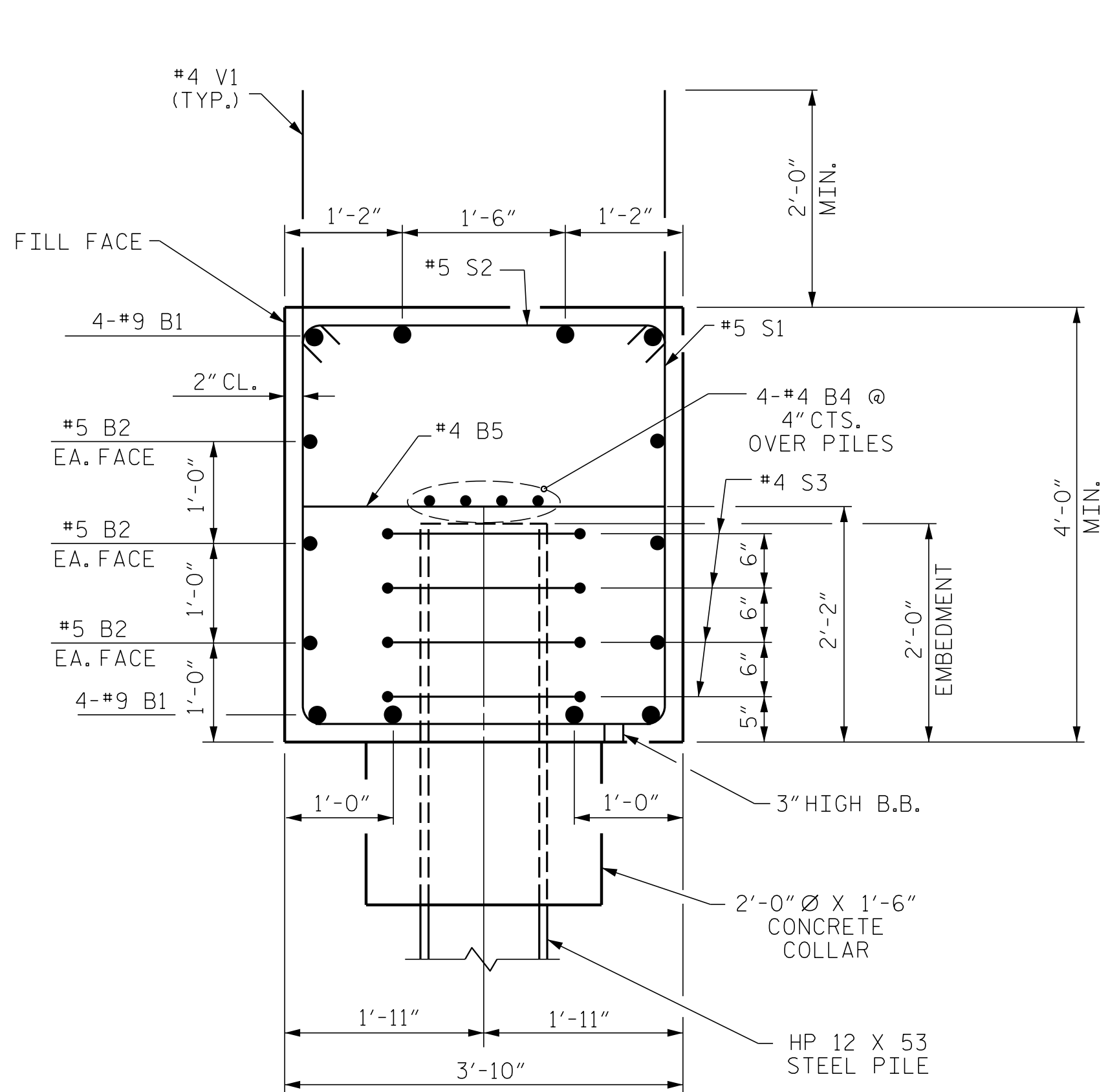


BILL OF MATERIAL

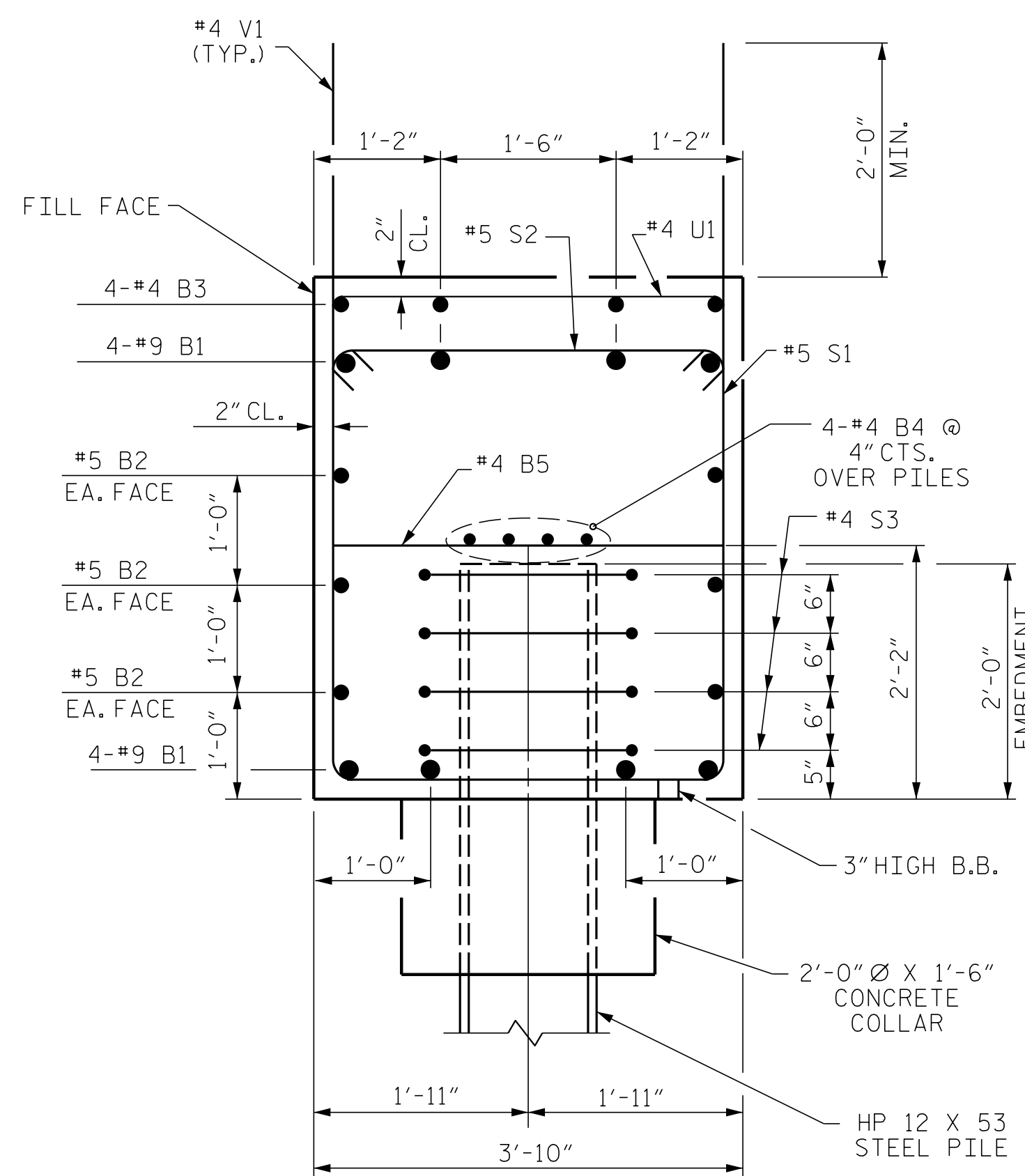
END BENT No. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		49'-11"	1358
B2	6	#5	STR	47'-7"	298
B3	8	#4	STR	16'-11"	90
B4	8	#4	STR	25'-1"	134
B5	12	#4	STR	3'-6"	28
H1	14	#5	2	9'-11"	145
H2	14	#5	2	10'-2"	148
H3	14	#5	3	10'-6"	153
H4	14	#5	3	10'-3"	150
H5	32	#4	STR	3'-6"	75
S1	77	#5	4	11'-8"	937
S2	77	#5	5	4'-5"	355
S3	32	#4	6	6'-6"	139
U1	20	#4	7	6'-6"	87
V1	64	#4	STR	5'-9"	246
V2	28	#5	STR	9'-8"	282
V3	29	#5	STR	9'-4"	282

REINFORCING STEEL	4,907 LBS.
CLASS A CONCRETE BREAKDOWN	
POUR #1 CAP, CONC. COLLARS & LOWER PART OF WINGS	32.6 C.Y.
POUR #2 UPPER PART OF WINGS	5.4 C.Y.
TOTAL CLASS A CONCRETE	38.0 C.Y.

HP 12 X 53 STEEL PILES	NO: 8	LIN. FT.= 496
PILE REDRIVES		4 EA.
PILE DRIVING EQUIPMENT SET UP FOR HP 12 X 53 STEEL PILES		8 EA.



SECTION A-A



SECTION B-B

PROJECT NO. R-5797

COLUMBUS COUNTY

STATION: 30+65.33 -Y1B-

SHEET 3 OF 3

ENGINEER OF RECORD:

8/22/2019

NORTH CAROLINA PROFESSIONAL SEAL 37400

GREGORY M. GILLAND

GREGORY M. GILLAND

ETHERILL ENGINEERING

1223 Jones Franklin Rd. Raleigh, N.C. 27606

Bus: 919 851 8077

Fax: 919 851 8107

LICENSE NO. F-0377

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

SUBSTRUCTURE END BENT No. 2

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

DRAWN BY: D. HODGE DATE: 2/19

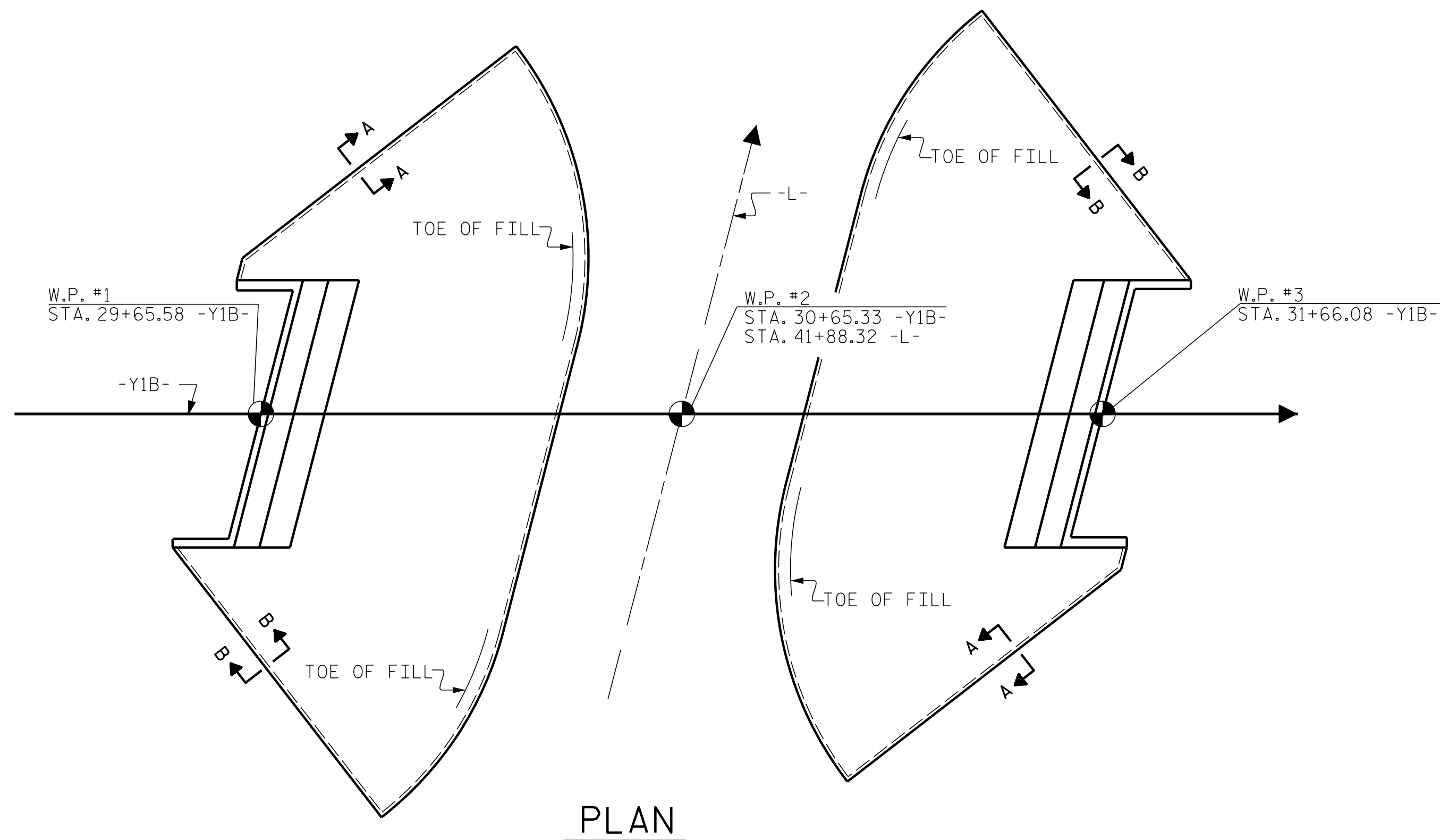
CHECKED BY: B.C. HUNT DATE: 2/19

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SHEET NO. S-29

TOTAL SHEETS 33

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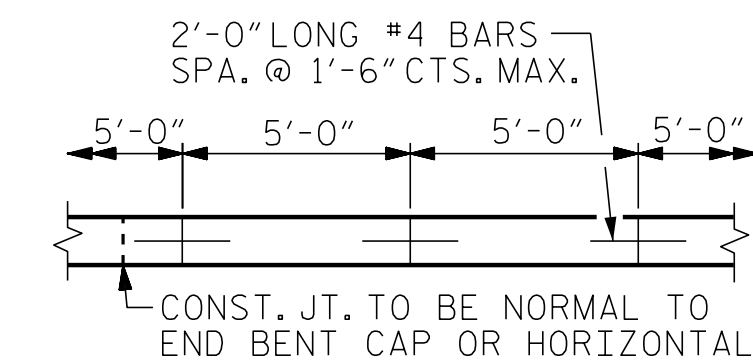


GENERAL NOTES

STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B", THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

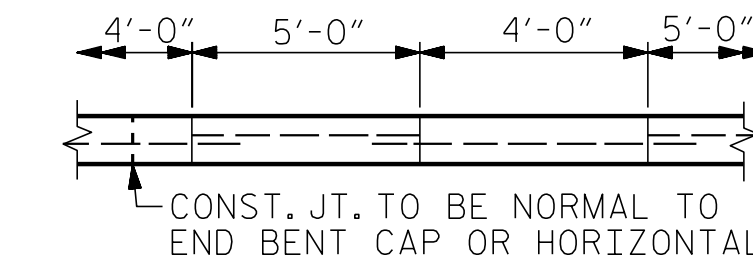
BRIDGE @ STA. 30+65.33 -Y1B-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	265	610
END BENT 2	270	675

* QUANTITY SHOWN IS BASED ON 5' POURS.



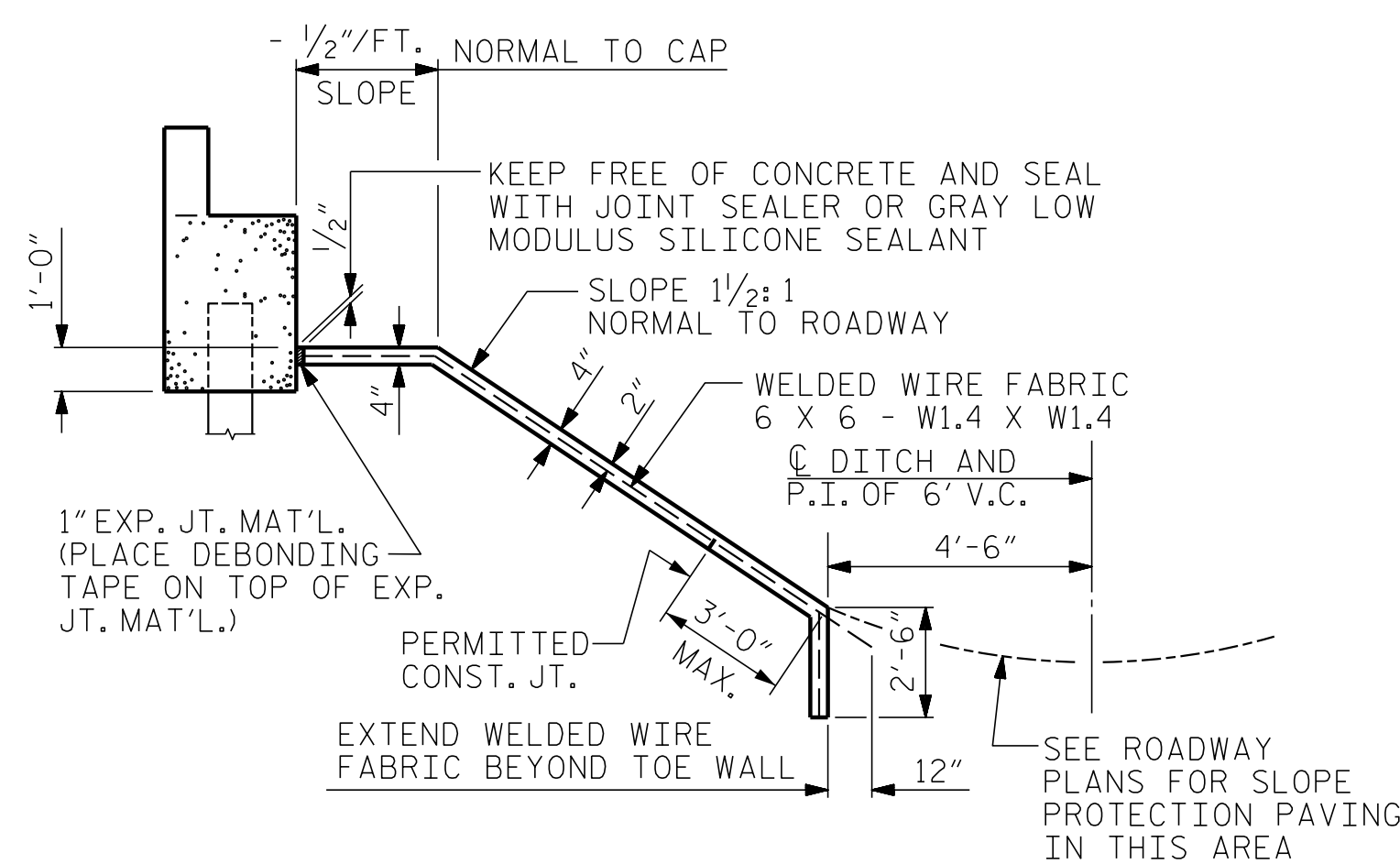
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL

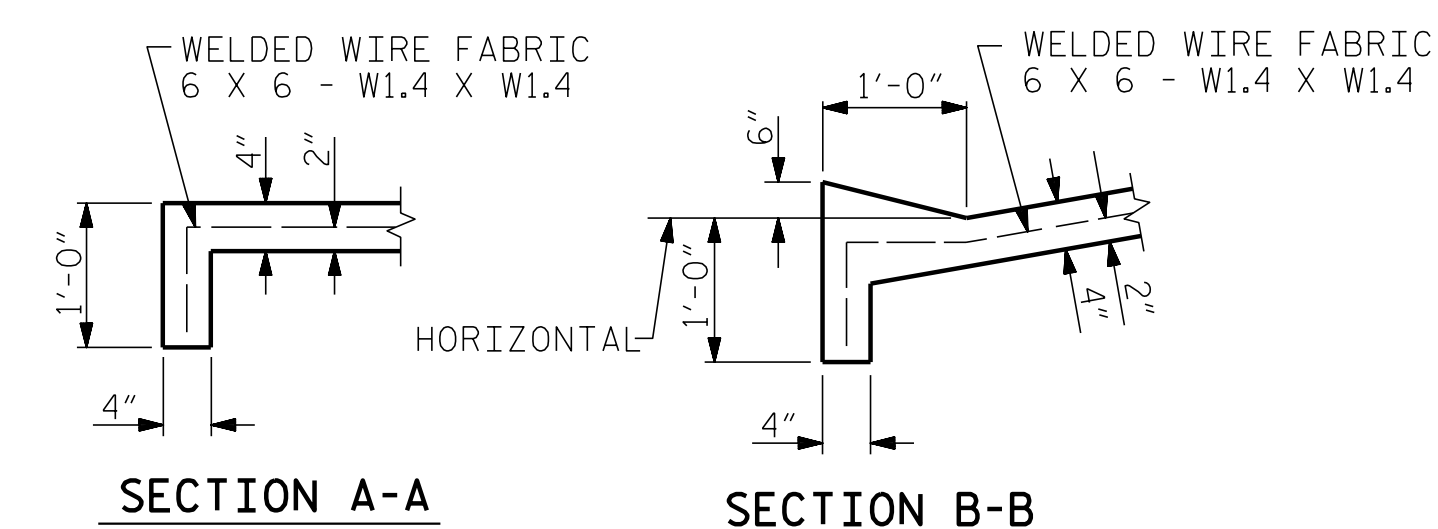


POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL



SECTION ALONG C SURVEY WHEN FILL CATCHES IN DITCH



SECTION A-A

SECTION B-B

PROJECT NO. R-5797
COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

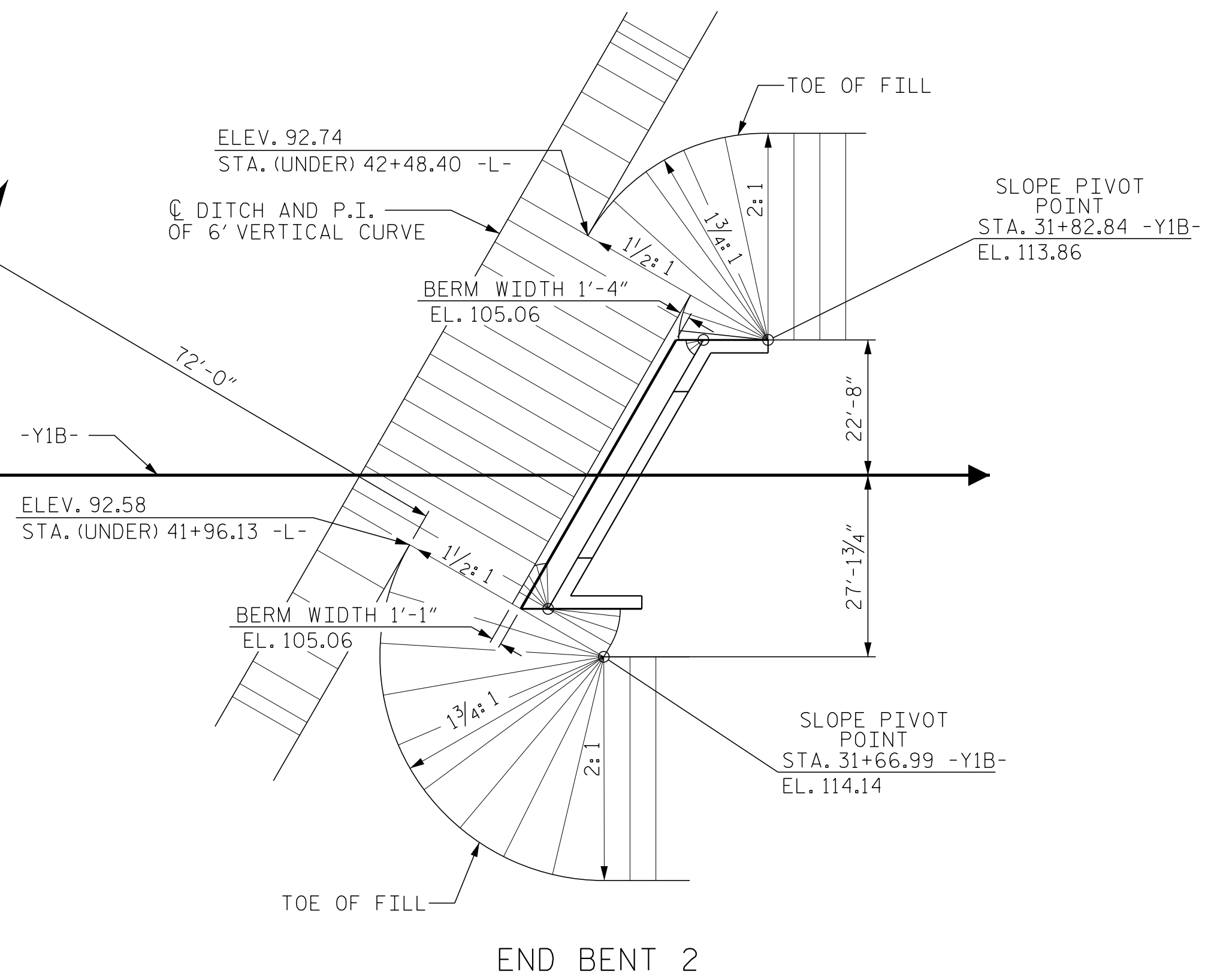
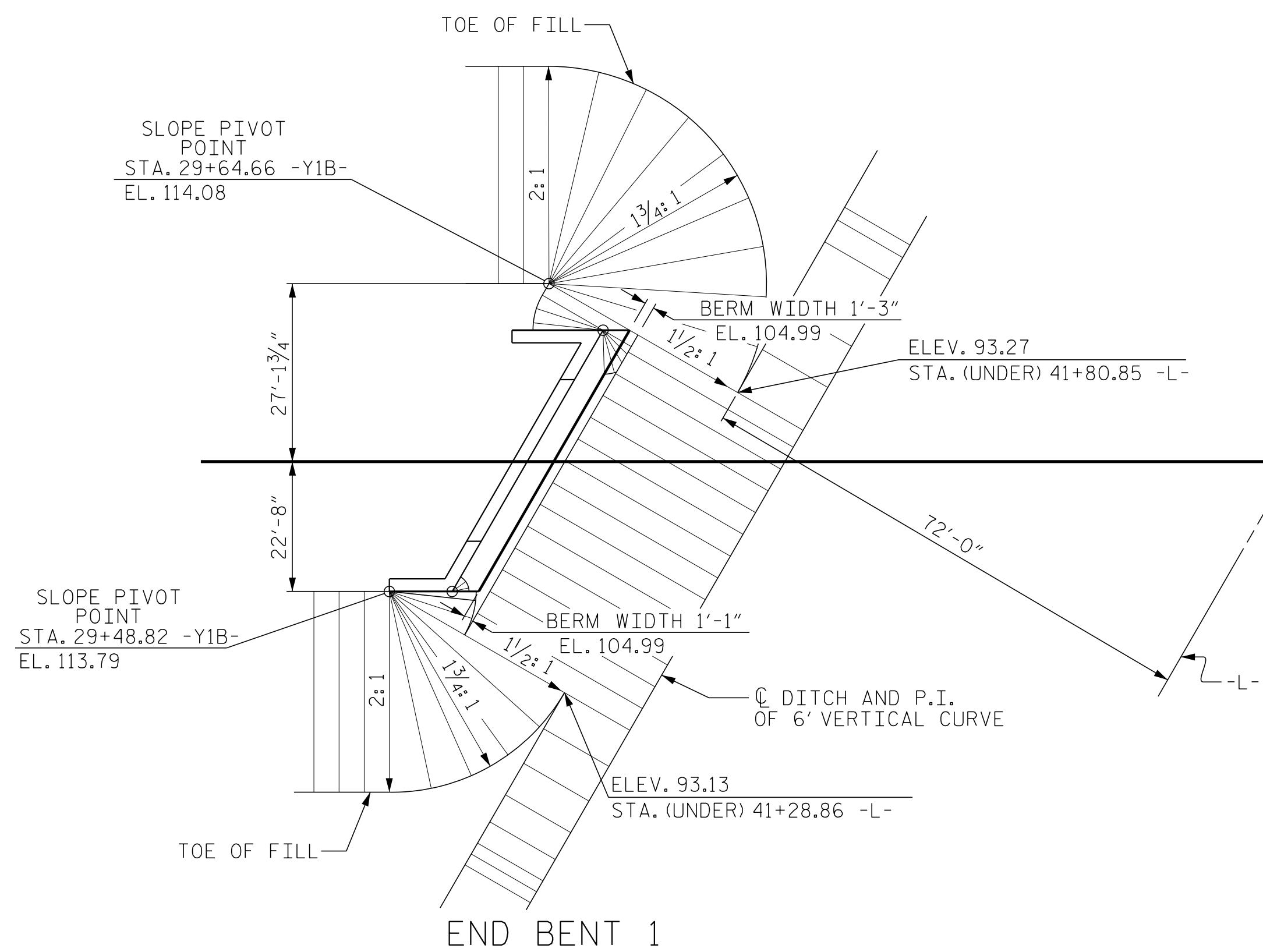
SHEET 1 OF 2

ENGINEER OF RECORD: 8/22/2019 GREGORY M. GILLILAND WETHERILL ENGINEERING		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD SLOPE PROTECTION DETAILS	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S-30
2			TOTAL SHEETS
			33

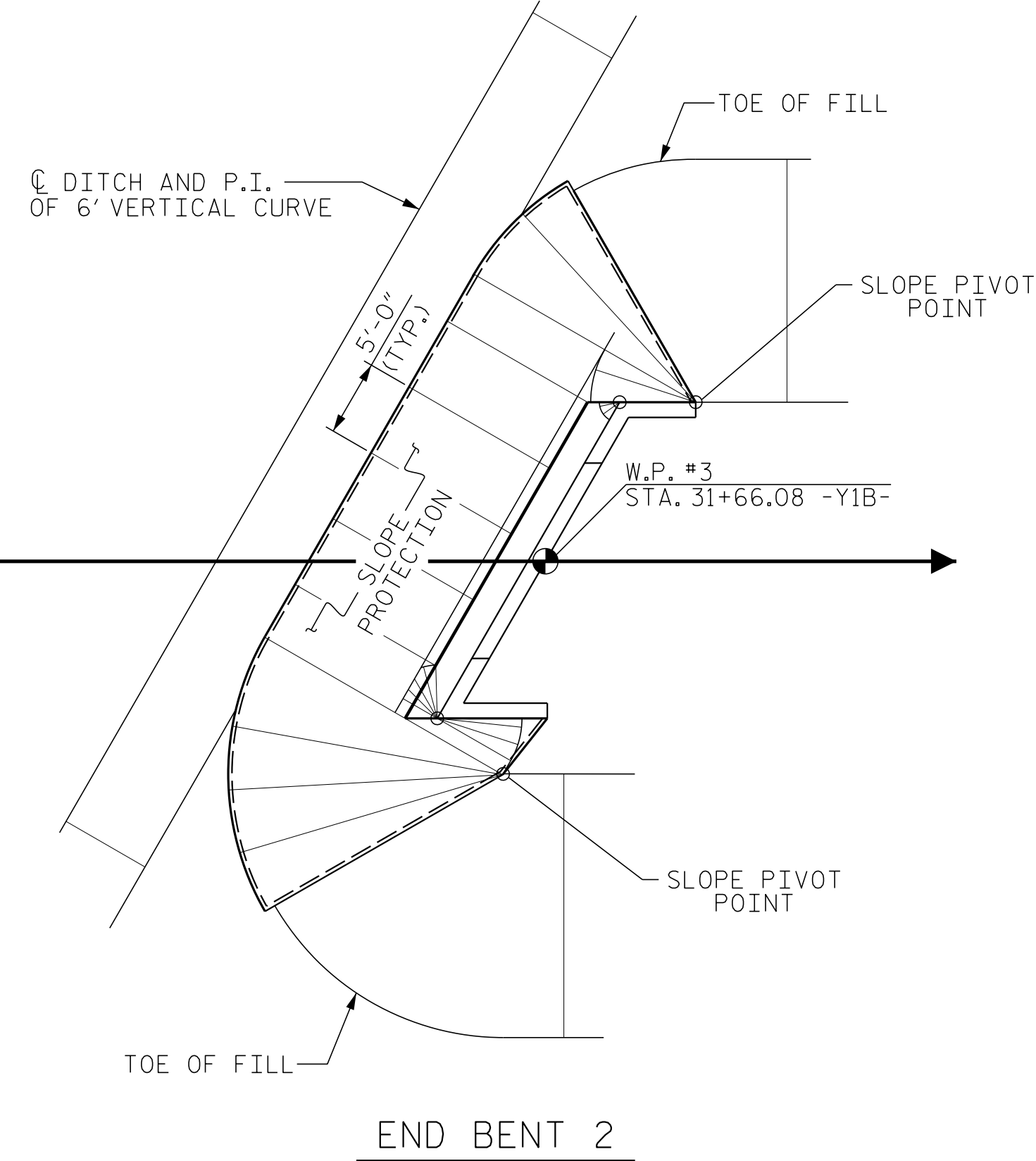
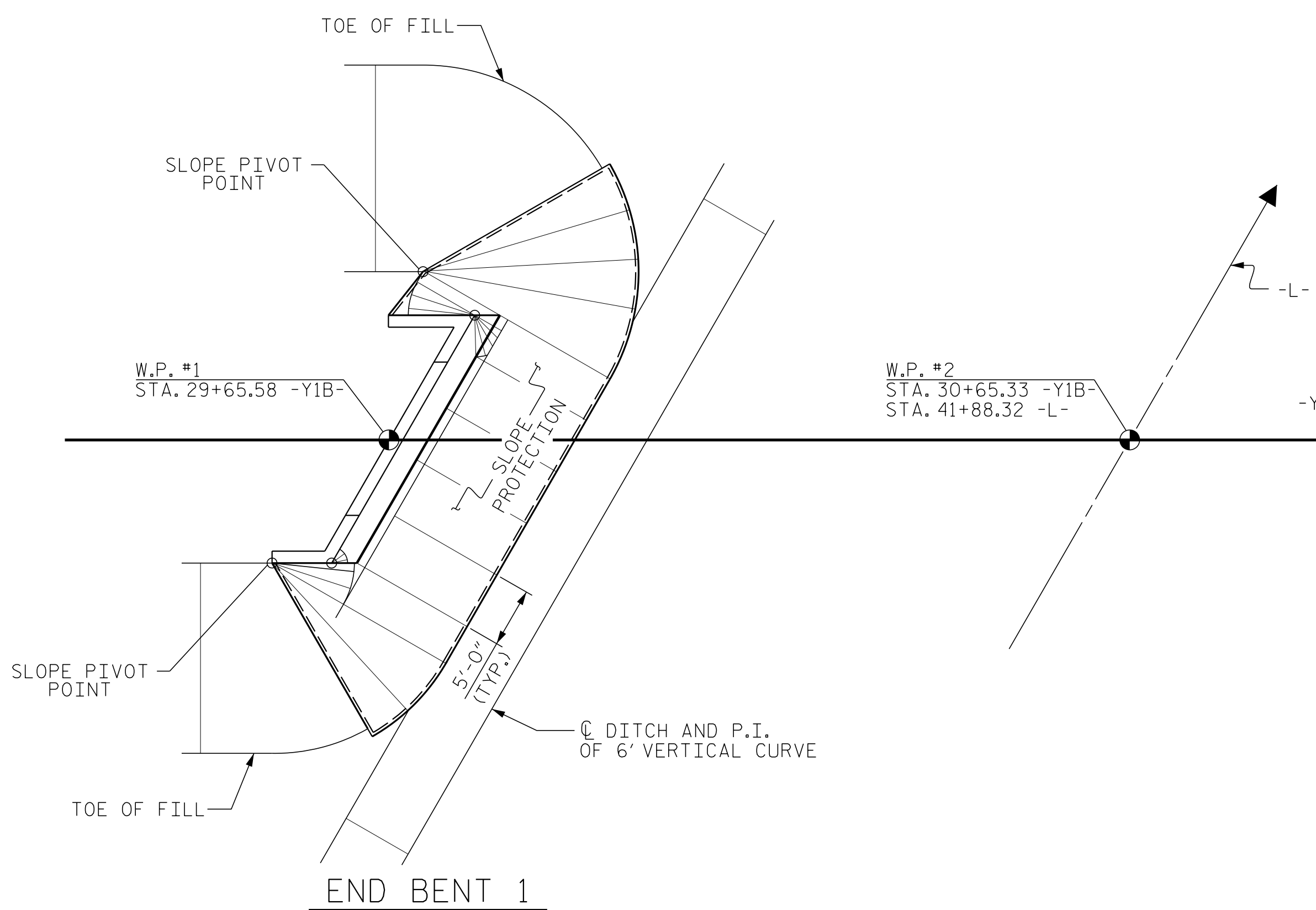
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ASSEMBLED BY : B.C. HUNT	DATE : 1-19
CHECKED BY : G.M. GILLILAND	DATE : 4-19
DRAWN BY : ELR 5/92	REV. 12/21/11 MAA/GM
CHECKED BY : GRP 6/92	REV. 1/16 MAA/TMG
	REV. 12/17 MAA/THC

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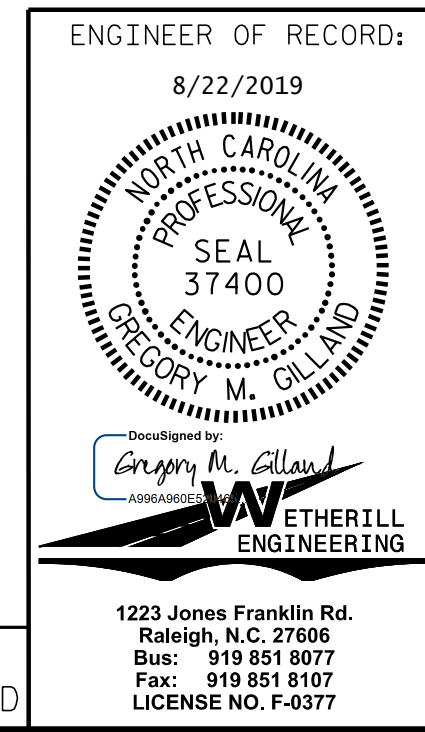
PLAN - GRADING



PLAN - CONCRETE PLACEMENT

PROJECT NO. R-5797
 COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-
 SHEET 2 OF 2

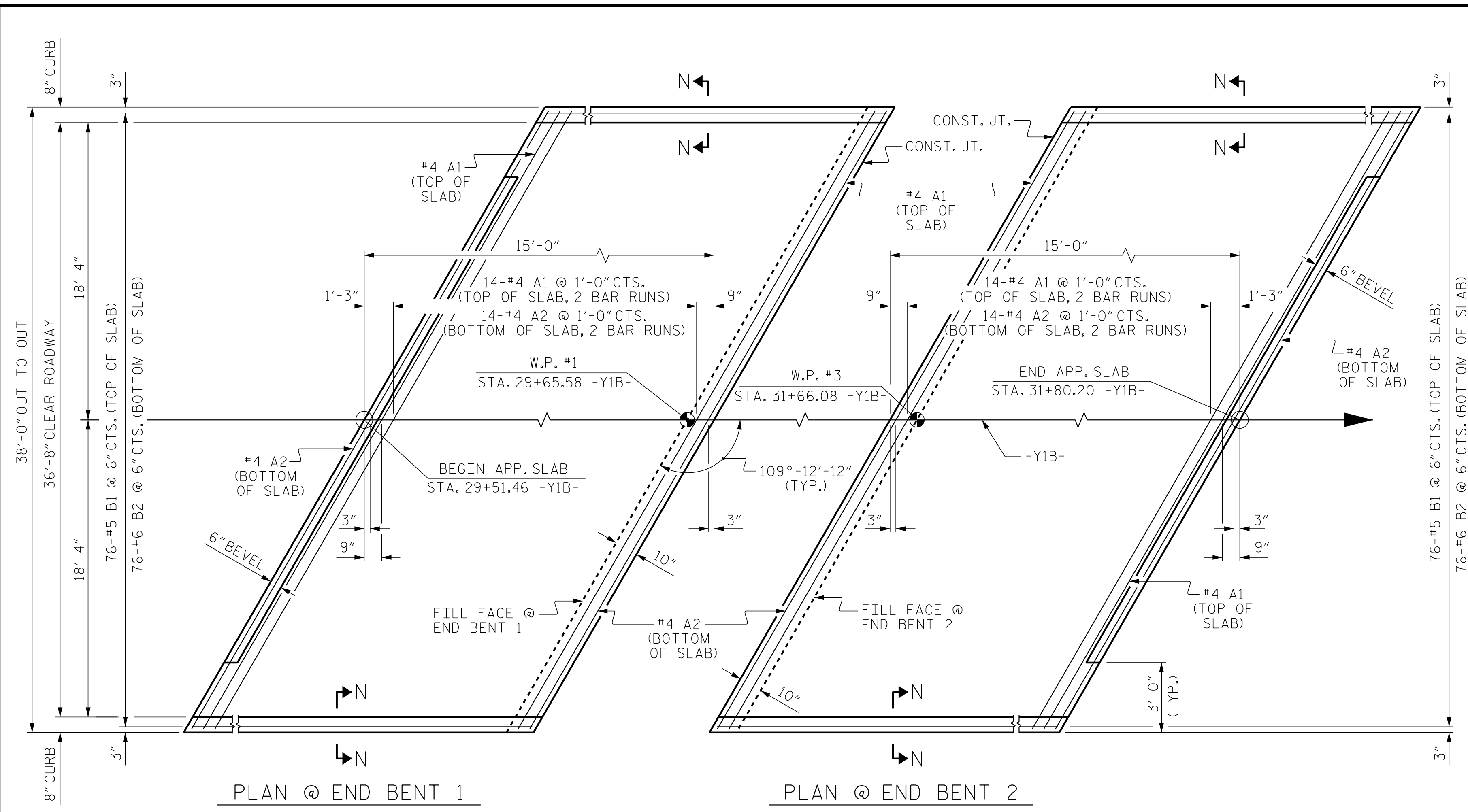
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DRAWN BY : WJH 10/88	REV. 10/11/11 MAA/GM
CHECKED BY : FCJ 10/88	REV. 1/16 MAA/TMG
	REV. 12/17 MAA/THC



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD SLOPE PROTECTION DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-31
TOTAL SHEETS					33

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PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

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

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

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

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

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

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

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

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

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

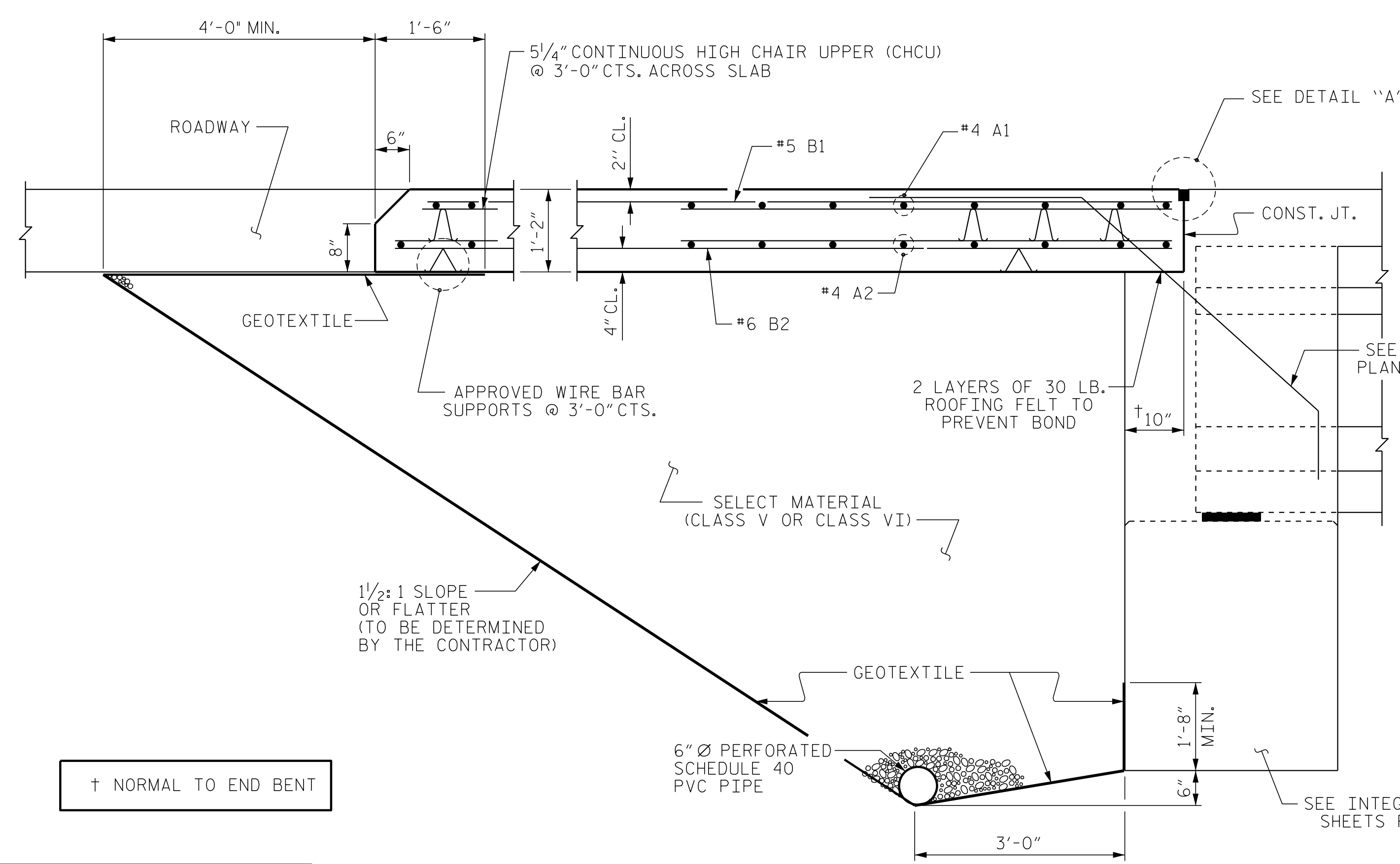
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	32	#4	STR	21'-0"	449
A2	32	#4	STR	20'-10"	445
* B1	76	#5	STR	14'-1"	1,116
B2	76	#6	STR	14'-7"	1,665
REINFORCING STEEL				LBS.	2,110
* EPOXY COATED REINFORCING STEEL				LBS.	1,565
CLASS AA CONCRETE				C. Y.	24.6

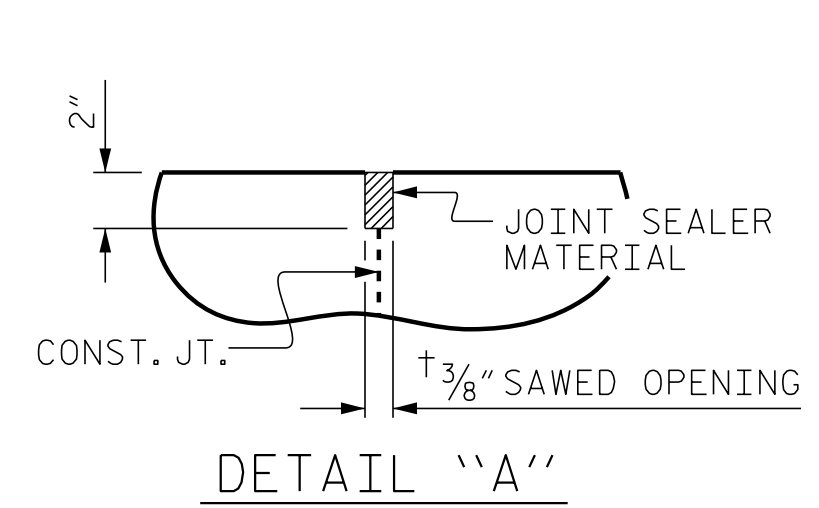
SPLICE LENGTHS

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

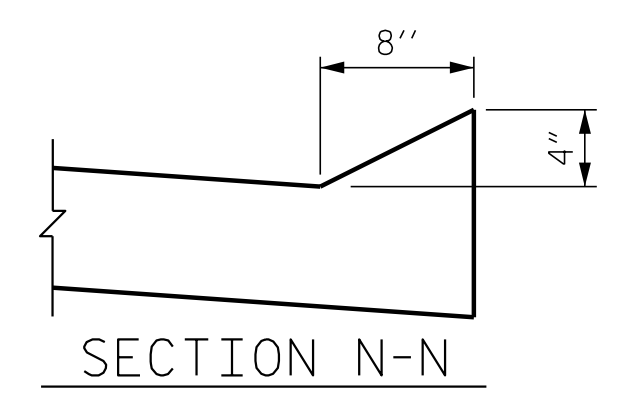


SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)



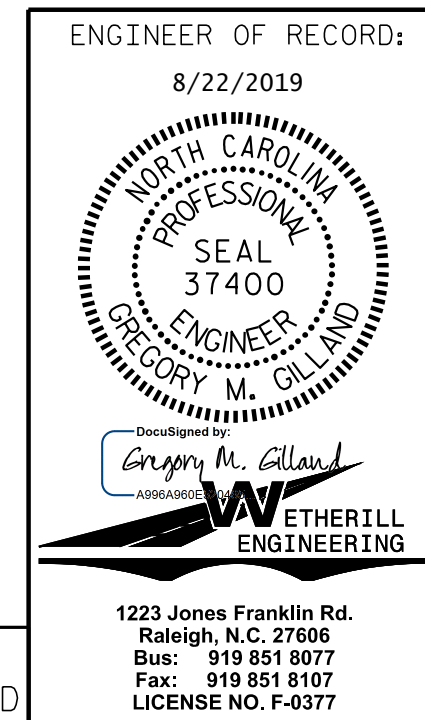
DETAIL "A"



SECTION N-N

PROJECT NO. R-5797
 COLUMBUS COUNTY
 STATION: 30+65.33 -Y1B-

SHEET 1 OF 2



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

REVISIONS

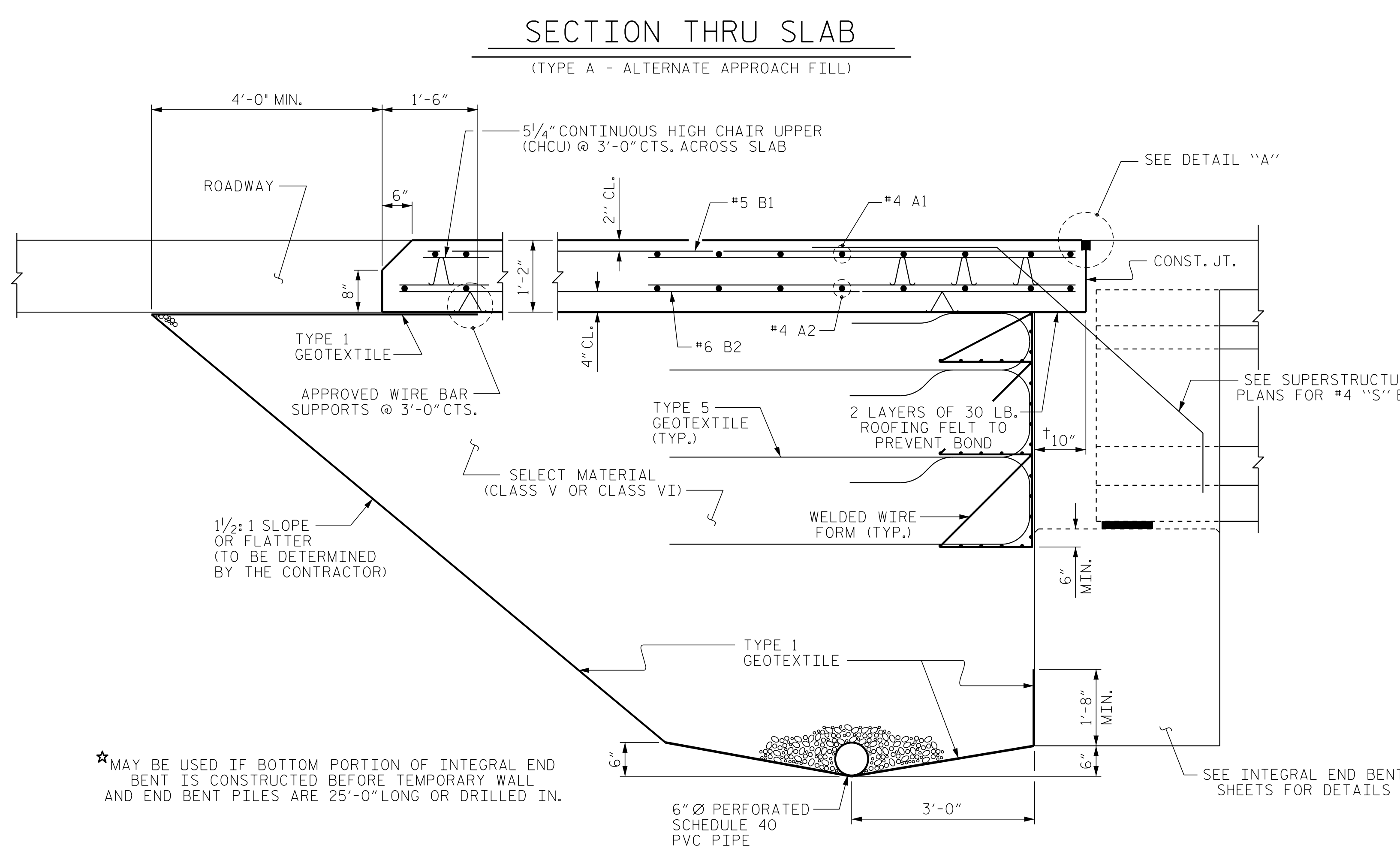
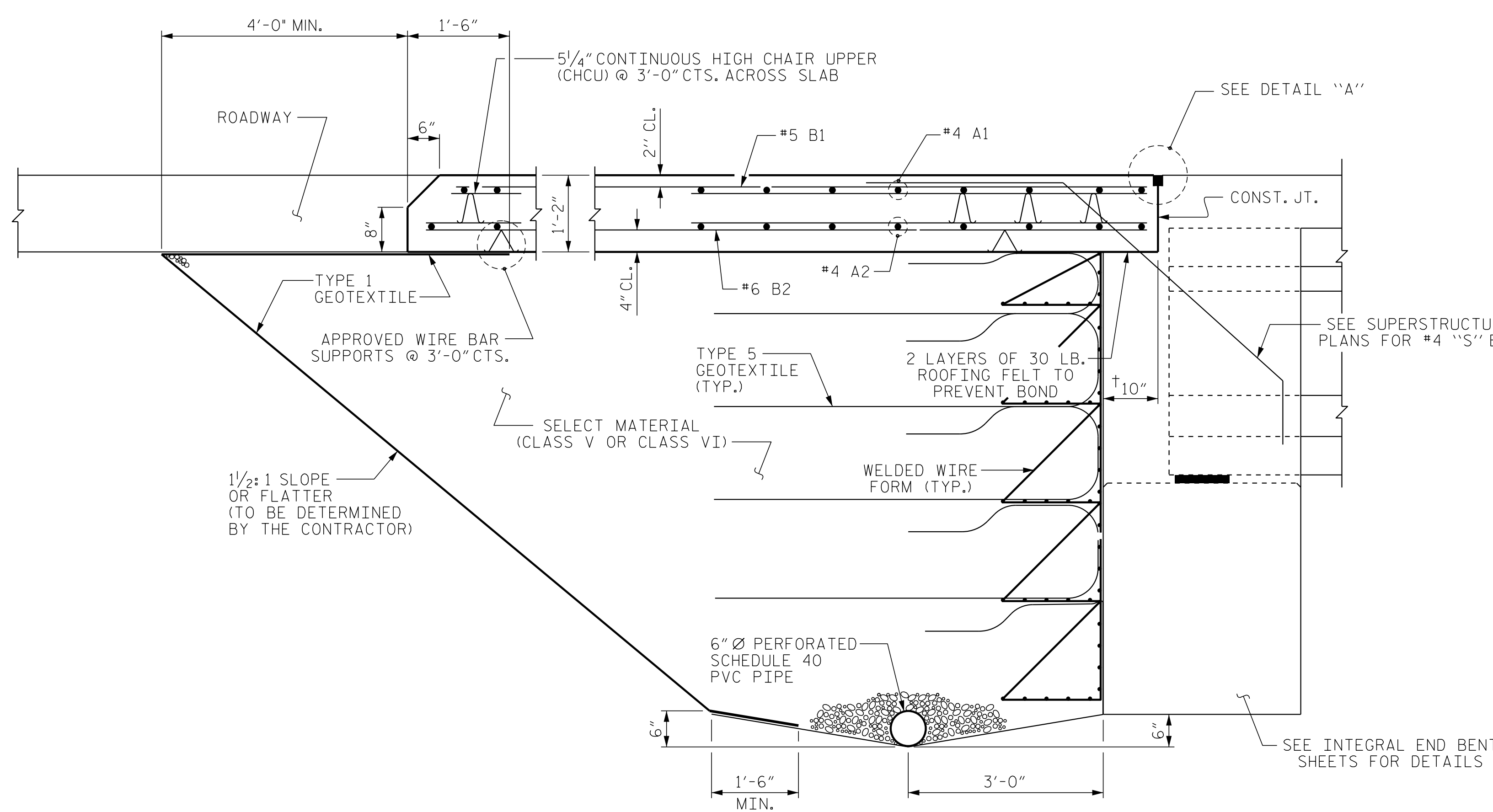
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SHEET NO. S-32
 TOTAL SHEETS 33

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

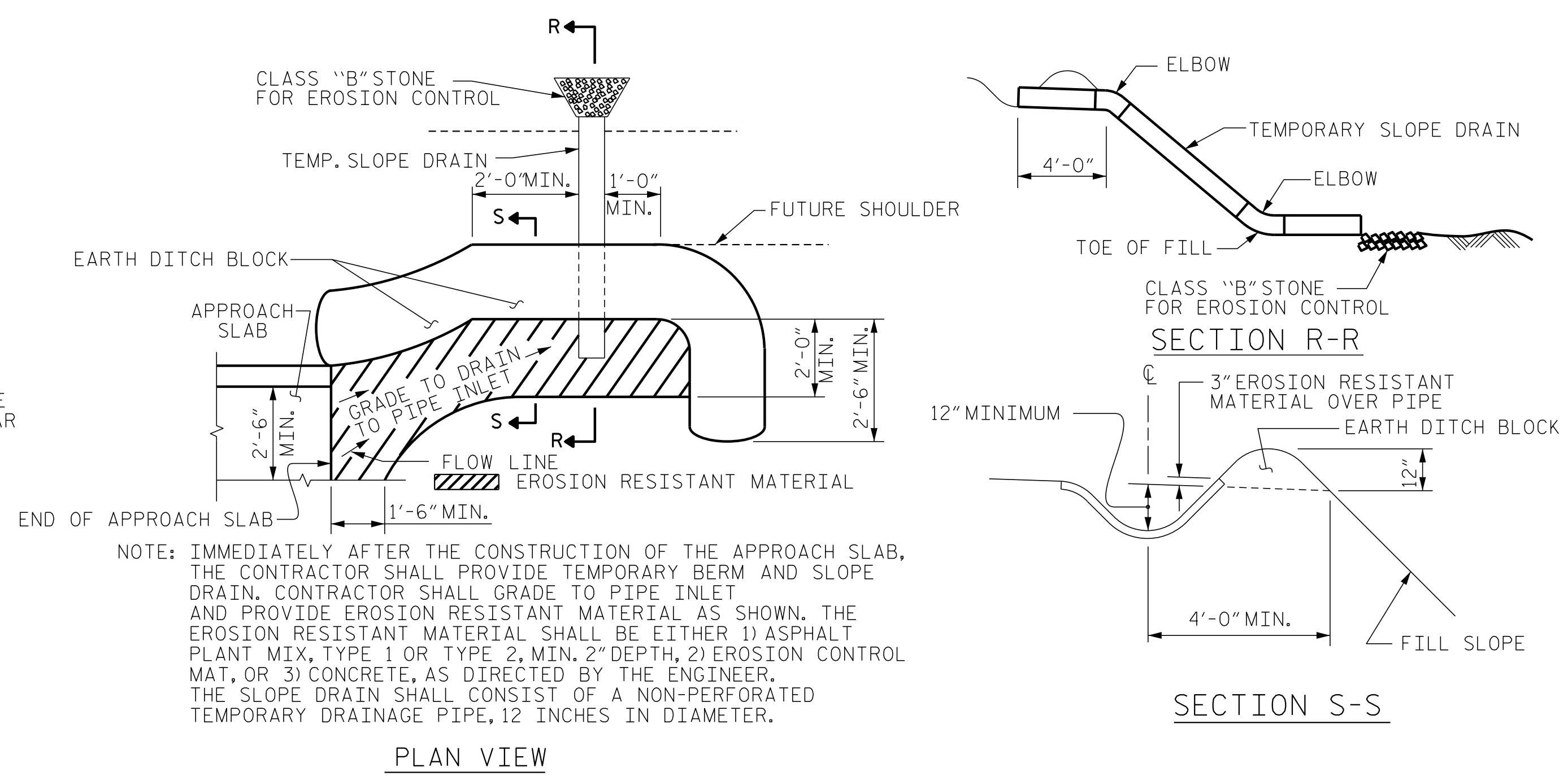
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ASSEMBLED BY : D. HODGE	DATE : 4/19
CHECKED BY : G.M. GILLAND	DATE : 4/19
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

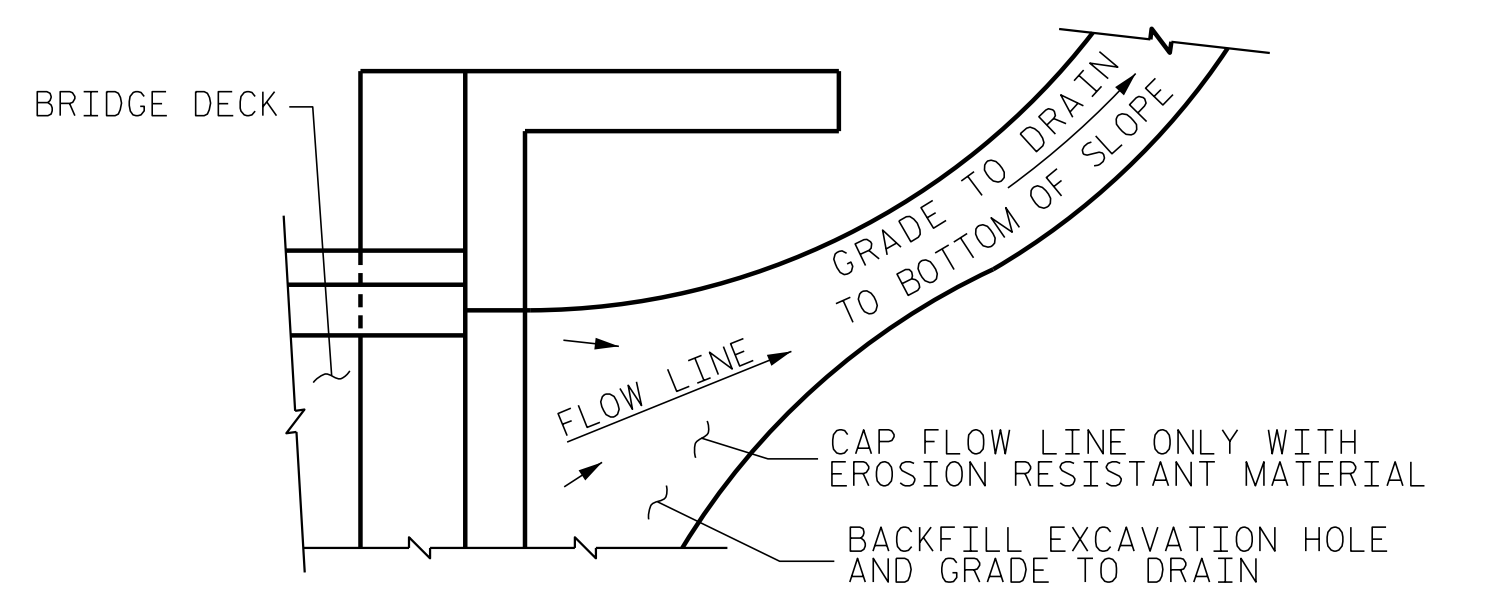


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SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)



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

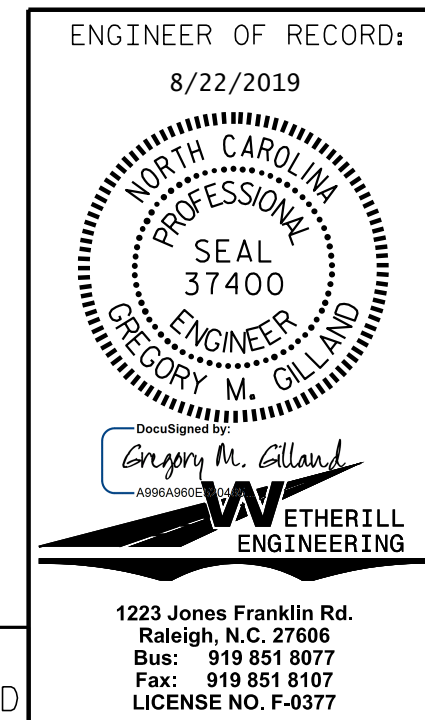


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

NOTES

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

PROJECT NO. R-5797
COLUMBUS COUNTY
STATION: 30+65.33 -Y1B-
SHEET 2 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-33					TOTAL SHEETS 33

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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