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TIP PROJECT: U-5818

CONTRACT: C204341

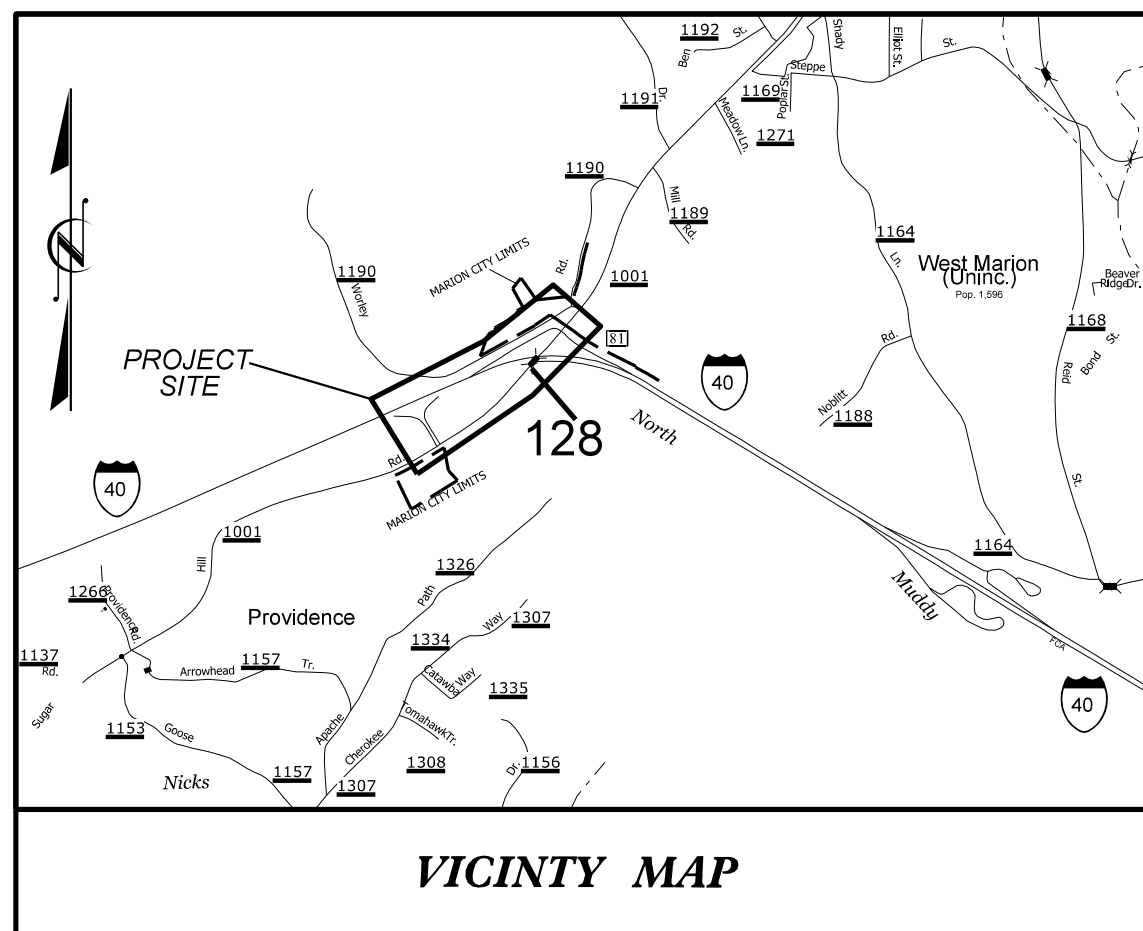
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

McDOWELL COUNTY

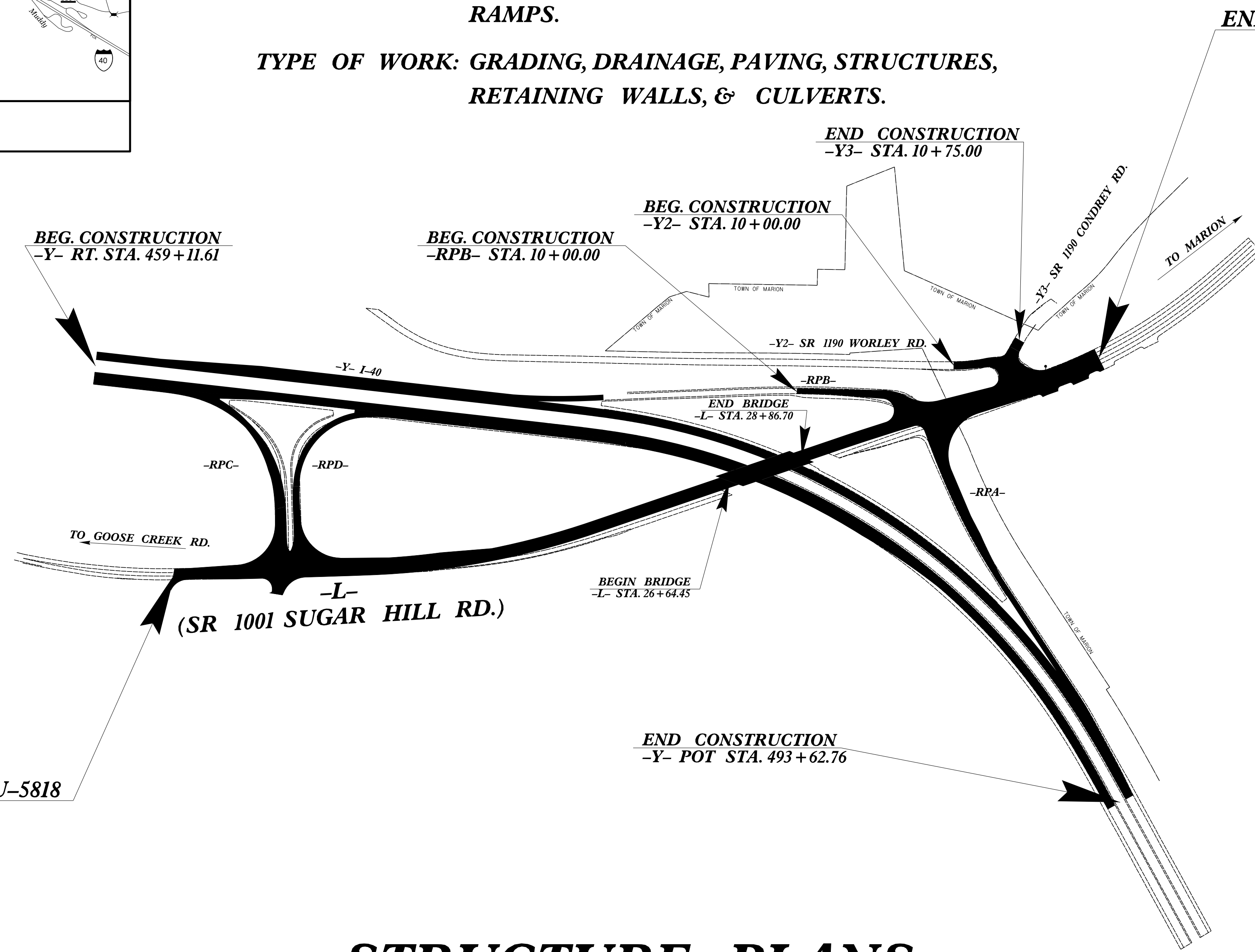
**LOCATION: SR 1001 (SUGAR HILL RD.) FROM I-40
WB RAMPS TO 0.3MI. WEST OF I-40 EB
RAMPS.**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES,
RETAINING WALLS, & CULVERTS.**

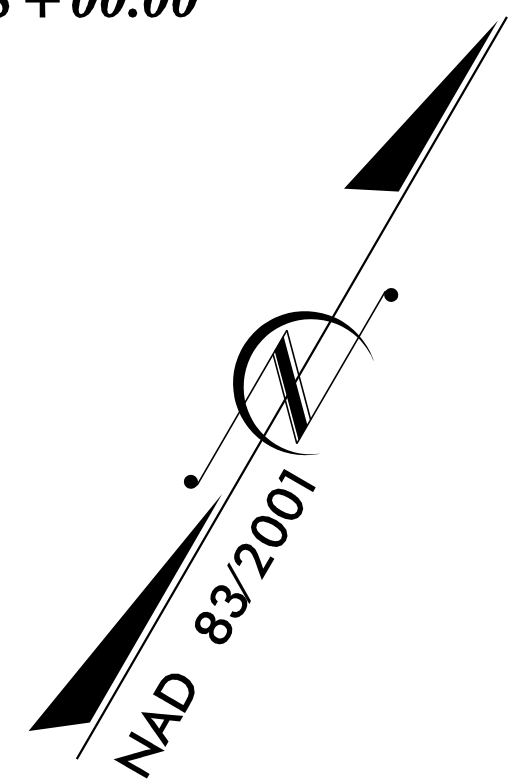
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5818		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
44390.1.1		PE	
44390.1.1		ROW /UTIL.	
44390.1.1		CONST.	



VICINITY MAP



**END TIP PROJECT U-5818
-L- STA. 38+00.00**



STRUCTURE PLANS

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2019 =	12,000
ADT 2040 =	15,600
K =	10 %
D =	55 %
T =	3 % *
V =	50 MPH
* TTST =	1% DUAL = 2%
FUNC. CLASS =	URBAN MINOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5818	=	0.488 MILES
LENGTH STRUCTURE TIP PROJECT U-5818	=	0.042 MILES
TOTAL LENGTH TIP PROJECT U-5818	=	0.530 MILES

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

LETTING DATE:
JUNE 18, 2019

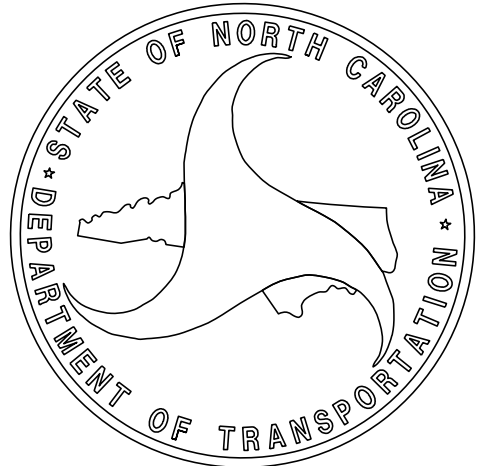
NCDOT CONTACT:

Prepared for:
**DIVISION OF HIGHWAYS
DIVISION 13**
55 Orange Street
Asheville NC, 28801

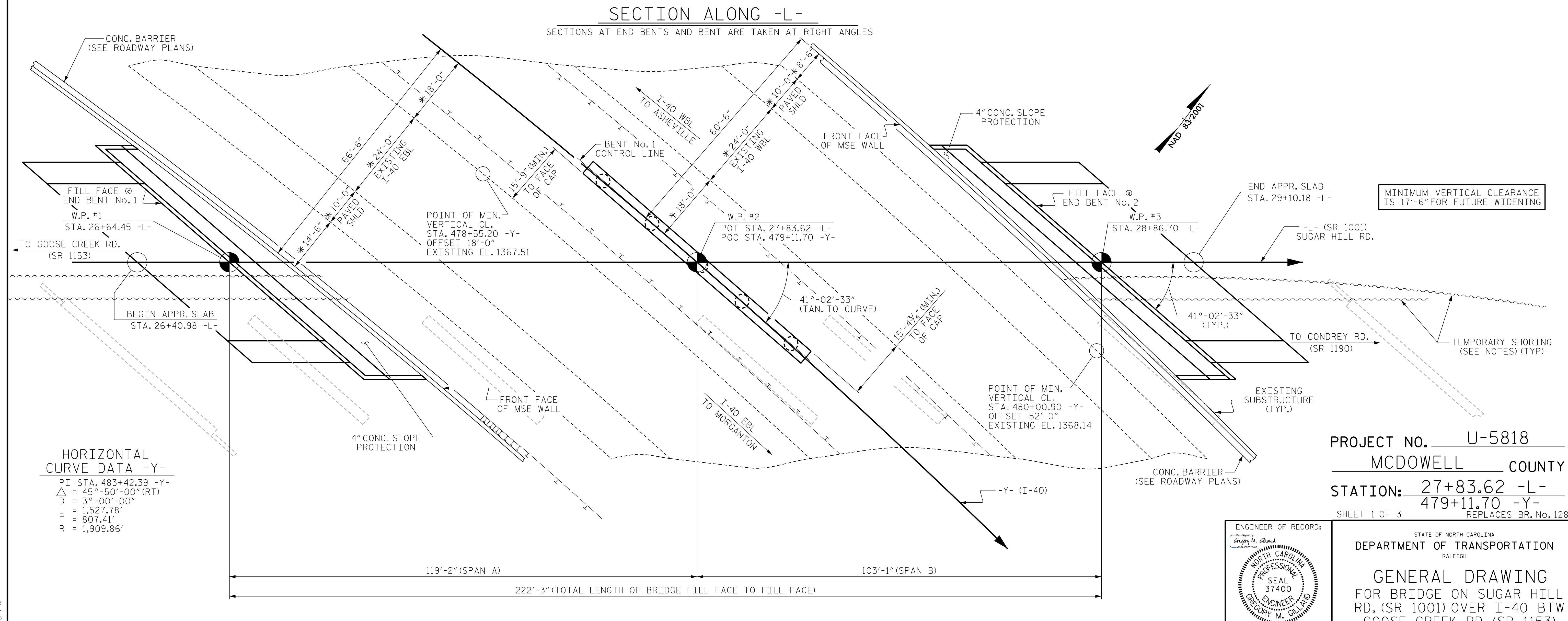
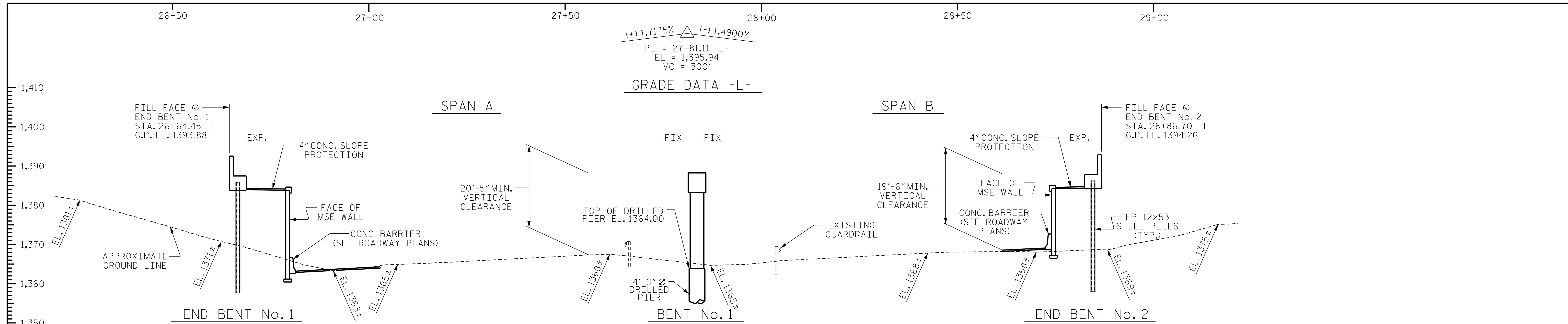
EDWARD WETHERILL, PE
PROJECT ENGINEER

GREG GILLAND, PE
PROJECT DESIGN ENGINEER

COLE HOOD, PE
DIVISION PROJECT DEVELOPMENT ENGINEER



5/7/2019 6:23:40 AM P:\2016\16162-01-U-5818\Structures\DMN\Bridges\U5818-SMU-TSH_5810128.dgn



PLAN
PILES NOT SHOWN IN PLAN VIEW FOR CLARITY
* RADIAL DIMENSION

DRAWN BY: B.C. HUNT DATE: 10-18
CHECKED BY: D. HODGE DATE: 10-18

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

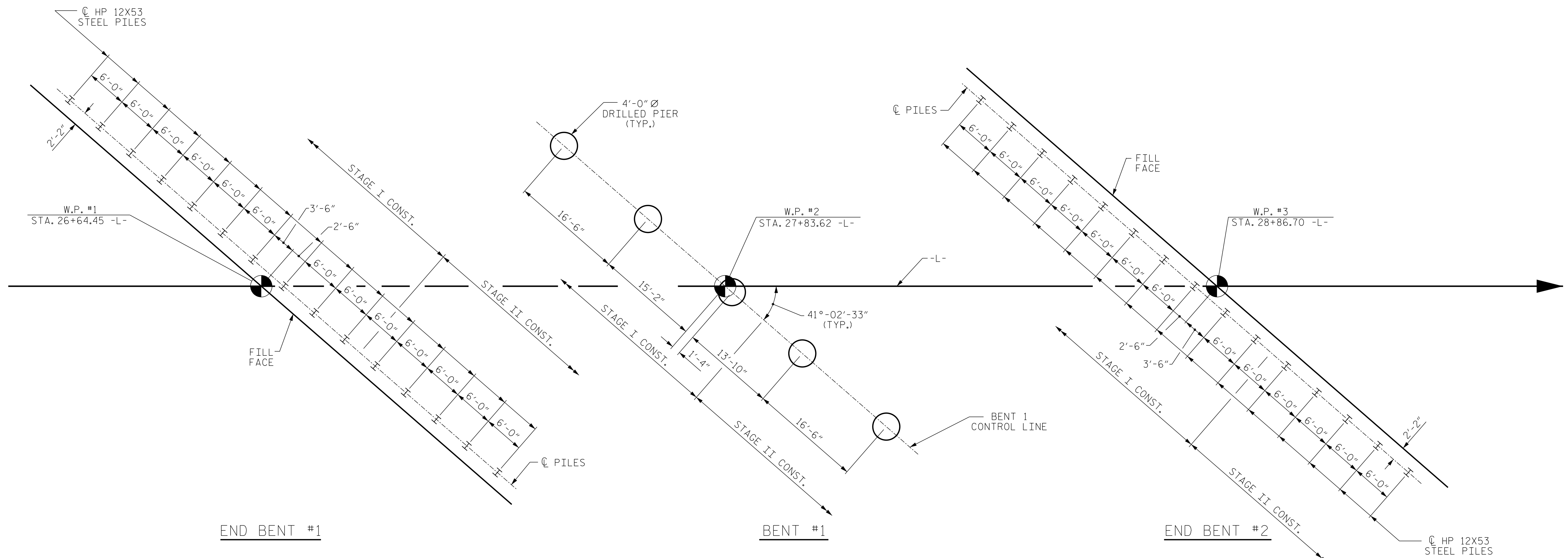
ENGINEER OF RECORD:
Gregory M. Giland
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 37400
GREGORY M. GILL AND
12/10/2018
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE ON SUGAR HILL
RD. (SR 1001) OVER I-40 BTW
GOOSE CREEK RD. (SR 1153)
AND CONDREY RD. (SR 1190)

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

SHEET NO. S1-1
TOTAL SHEETS 49

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FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES.
 DIMENSIONS LOCATING DRILLED PIERS ARE SHOWN TO CENTERLINE OF DRILLED PIERS.

NOTES:

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT No. 1 AND END BENT No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 91 TONS PER PILE.
- DRIVE PILES AT END BENT No. 1 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAW OR SCOUR.
- DRIVE PILES AT END BENT No. 2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAW OR SCOUR.
- DRILLED PIERS AT BENT No. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 418 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.
- INSTALL DRILLED PIERS AT BENT No. 1 TO A TIP ELEVATION NO HIGHER THAN 1328.0 (LEFT) AND 1336.0 (RIGHT) AND WITH THE REQUIRED TIP RESISTANCE.
- IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30,000 TO 50,000 FT-LBS. PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT No. 1 AND END BENT No. 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.
- TESTING 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.

- SPT IS REQUIRED FOR DRILLED PIERS AT BENT No. 1. FOR SPT TESTING, SEE 411 OF THE STANDARD SPECIFICATIONS.
- CSL TUBES AND TESTING ARE REQUIRED FOR DRILLED PIERS AT BENT No. 1. FOR CSL TESTING, SEE 411 OF THE STANDARD SPECIFICATIONS
- SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS FOR THE SETTLEMENT GAUGES REQUIRED AT END BENT No. 1 AND END BENT No. 2.
- OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL TO WITHIN 1 FOOT OF THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT 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. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

SHEET 2 OF 3

ENGINEER OF RECORD:
Gregory M. Giland

 12/10/2018

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

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SUGAR HILL
 RD. (SR 1001) OVER I-40 BTW
 GOOSE CREEK RD. (SR 1153)
 AND CONDREY RD. (SR 1190)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-2
1			3			TOTAL SHEETS
2			4			49

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : B.C. HUNT DATE : 9-18
 CHECKED BY : T.K. KOCH DATE : 9-18

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE						SERVICE III LIMIT STATE						COMMENT NUMBER						
						LIVE-LOAD FACTORS (γ _{LL})	MOMENT			SHEAR			LIVE-LOAD FACTORS (γ _{LL})	MOMENT										
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)		RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)							
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.08	---	1.75	0.790	1.400	B	E	48.820	1.050	1.080	B	E	78.540	0.80	0.790	1.080	B	E	48.820	1	
	HL-93 (OPERATING)	N/A		1.81	---	1.35	0.790	1.810	B	E	48.820	1.050	1.940	A	E	91.410	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.50	54.000	1.75	0.790	1.940	B	E	48.820	1.050	2.010	A	E	91.410	0.80	0.790	1.500	B	E	48.820		
	HS-20 (OPERATING)	36.000		2.52	90.720	1.35	0.790	2.520	B	E	48.820	1.050	2.660	A	E	91.410	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.55	47.925	1.40	0.790	5.740	B	E	48.820	1.050	6.550	B	E	78.540	0.80	0.790	3.550	B	E	48.820	
		SNGARBS2	20.000		2.58	51.600	1.40	0.790	4.160	B	E	48.820	1.050	4.540	A	E	91.410	0.80	0.790	2.580	B	E	48.820	
		SNAGRIS2	22.000		2.41	53.020	1.40	0.790	3.900	B	E	48.820	1.050	4.180	A	E	91.410	0.80	0.790	2.410	B	E	48.820	
		SNCOTTS3	27.250		1.77	48.233	1.40	0.790	2.850	B	E	48.820	1.050	3.180	A	E	91.410	0.80	0.790	1.770	B	E	48.820	
		SNAGGRS4	34.925		1.45	50.641	1.40	0.790	2.340	B	E	48.820	1.050	2.560	A	E	91.410	0.80	0.790	1.450	B	E	48.820	
		SNS5A	35.550		1.42	50.481	1.40	0.790	2.290	B	E	48.820	1.050	2.560	A	E	91.410	0.80	0.790	1.420	B	E	48.820	
		SNS6A	39.950		1.29	51.536	1.40	0.790	2.080	B	E	48.820	1.050	2.300	A	E	91.410	0.80	0.790	1.290	B	E	48.820	
		SNS7B	42.000		1.23	51.660	1.40	0.790	1.980	B	E	48.820	1.050	2.240	A	E	91.410	0.80	0.790	1.230	B	E	48.820	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.57	51.810	1.40	0.790	2.540	B	E	48.820	1.050	2.790	A	E	91.410	0.80	0.790	1.570	B	E	48.820	
		TNT4A	33.075		1.57	51.928	1.40	0.790	2.540	B	E	48.820	1.050	2.740	A	E	91.410	0.80	0.790	1.570	B	E	48.820	
		TNT6A	41.600		1.28	53.248	1.40	0.790	2.060	B	E	48.820	1.050	2.350	A	E	91.410	0.80	0.790	1.280	B	E	48.820	
		TNT7A	42.000		1.28	53.760	1.40	0.790	2.060	B	E	48.820	1.050	2.310	A	E	91.410	0.80	0.790	1.280	B	E	48.820	
		TNT7B	42.000		1.31	55.020	1.40	0.790	2.110	B	E	48.820	1.050	2.200	A	E	91.410	0.80	0.790	1.310	B	E	48.820	
		TNAGRIT4	43.000		1.25	53.750	1.40	0.790	2.030	B	E	48.820	1.050	2.130	A	E	91.410	0.80	0.790	1.250	B	E	48.820	
TNAGT5A	45.000		1.19	53.550	1.40	0.790	1.920	B	E	48.820	1.050	2.090	A	E	91.410	0.80	0.790	1.190	B	E	48.820			
TNAGT5B	45.000		③	1.18	53.100	1.40	0.790	1.900	B	E	48.820	1.050	2.020	A	E	91.410	0.80	0.790	1.180	B	E	48.820		

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:

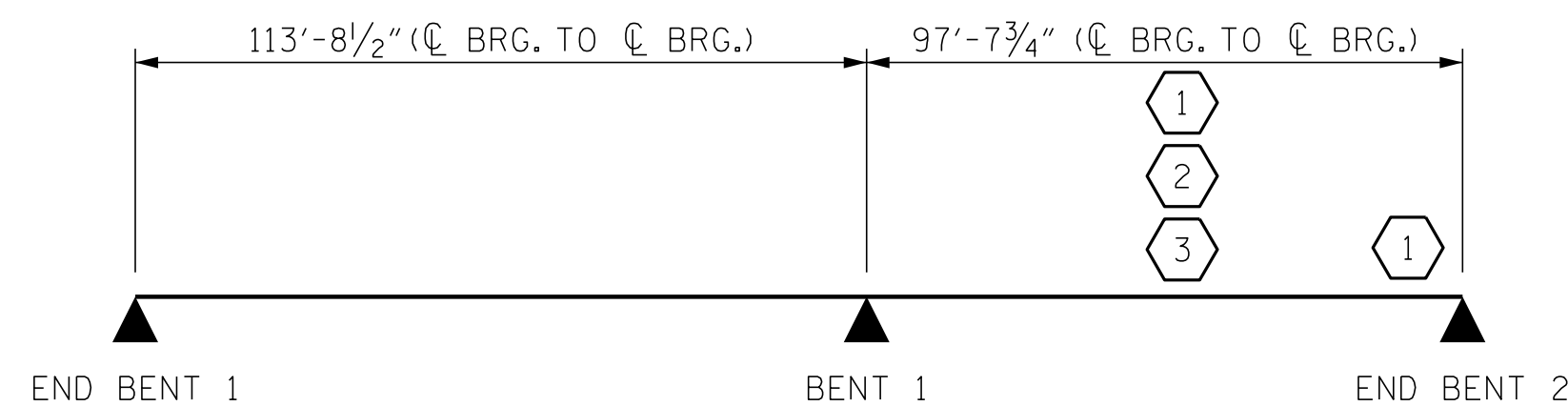
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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

COMMENTS:

1. CONTROLLING LOAD RATING FACTOR FOR HL-93 OCCURS AT TWO LOCATIONS.
- 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 E - EXTERIOR GIRDER



LRFR SUMMARY

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

ASSEMBLED BY : B.C. HUNT	DATE : 9-18
CHECKED BY : T.K. KOCH	DATE : 9-18
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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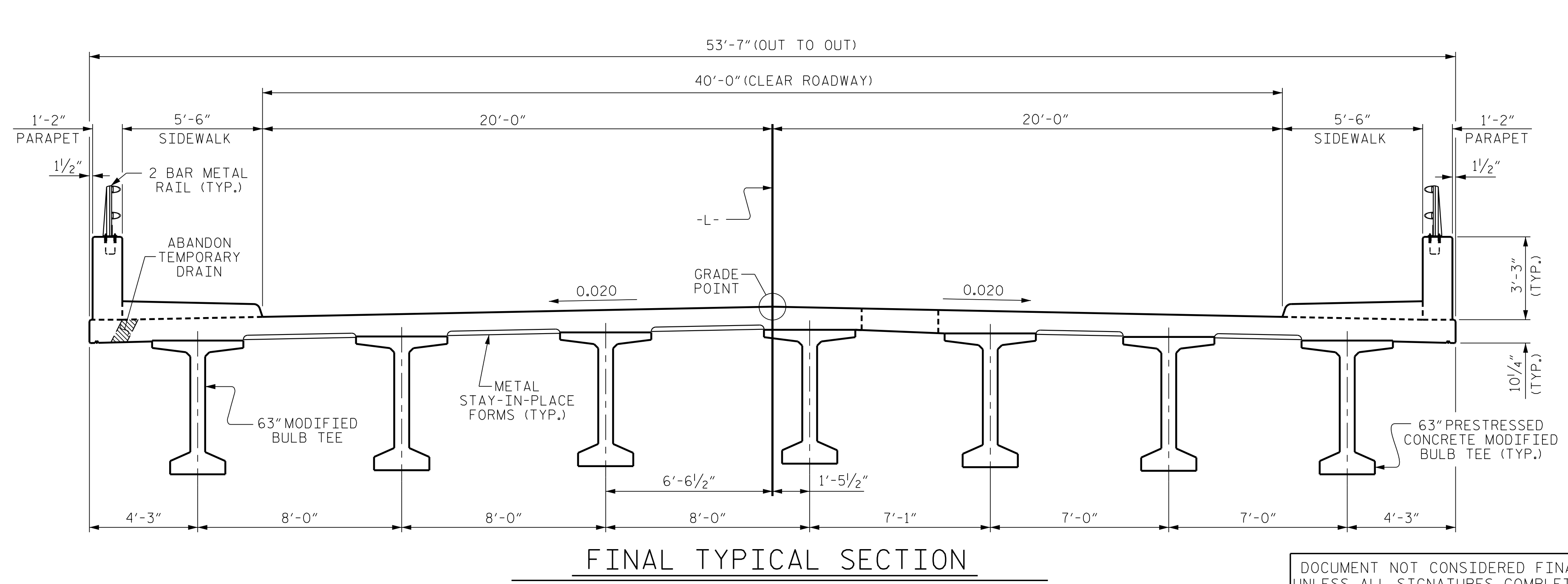
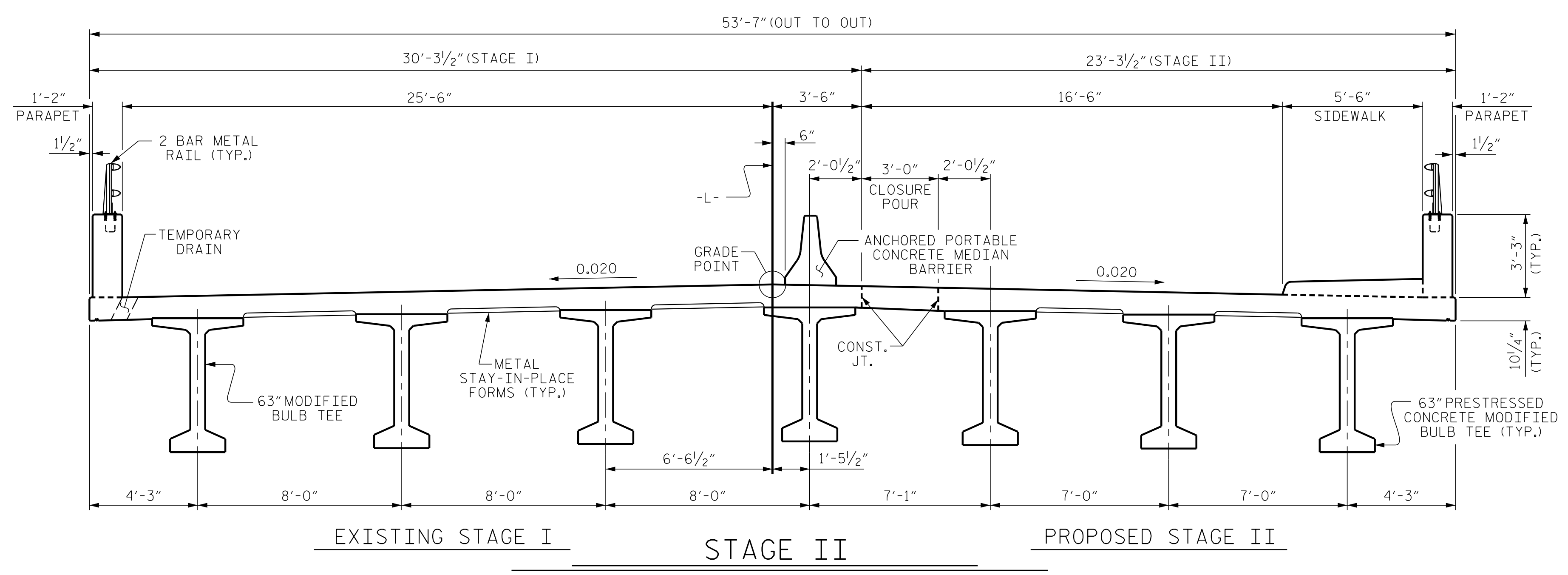
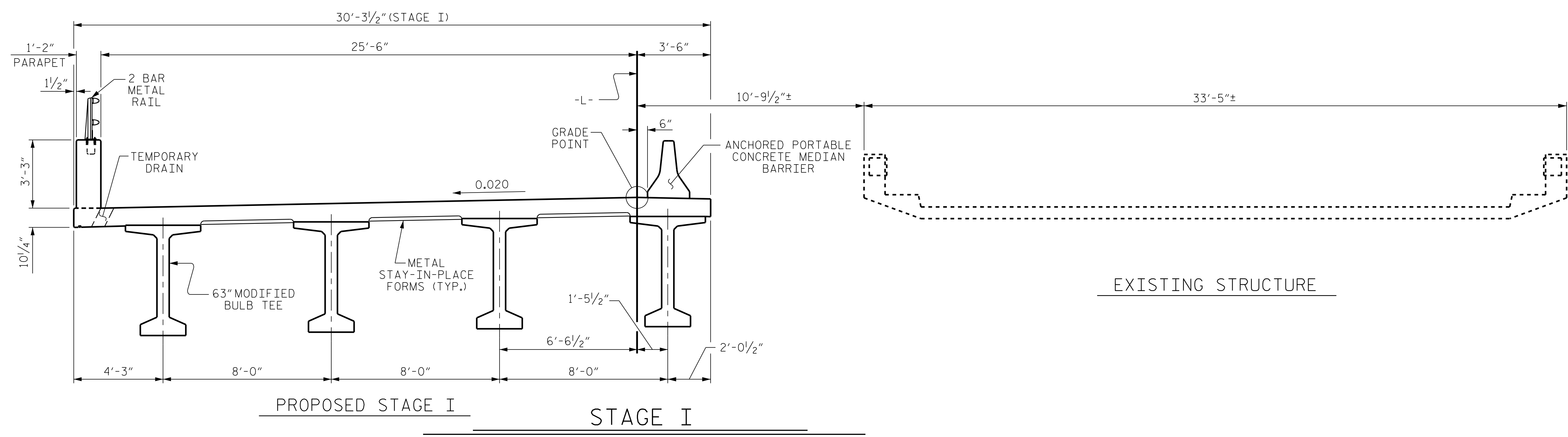
ENGINEER OF RECORD:

 12/10/2018

 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						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-4
1			3			TOTAL SHEETS
2			4			49



PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

ENGINEER OF RECORD:
Gregory M. Gilliland
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 37400
 ENGINEER
 GREGORY M. GILLILAND
 12/10/2018
 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

CONSTRUCTION
 SEQUENCE

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

SHEET NO. S1-5
 TOTAL SHEETS 49

DRAWN BY: D. HODGE DATE: 9/18
 CHECKED BY: B.C. HUNT DATE: 9/18

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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.

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

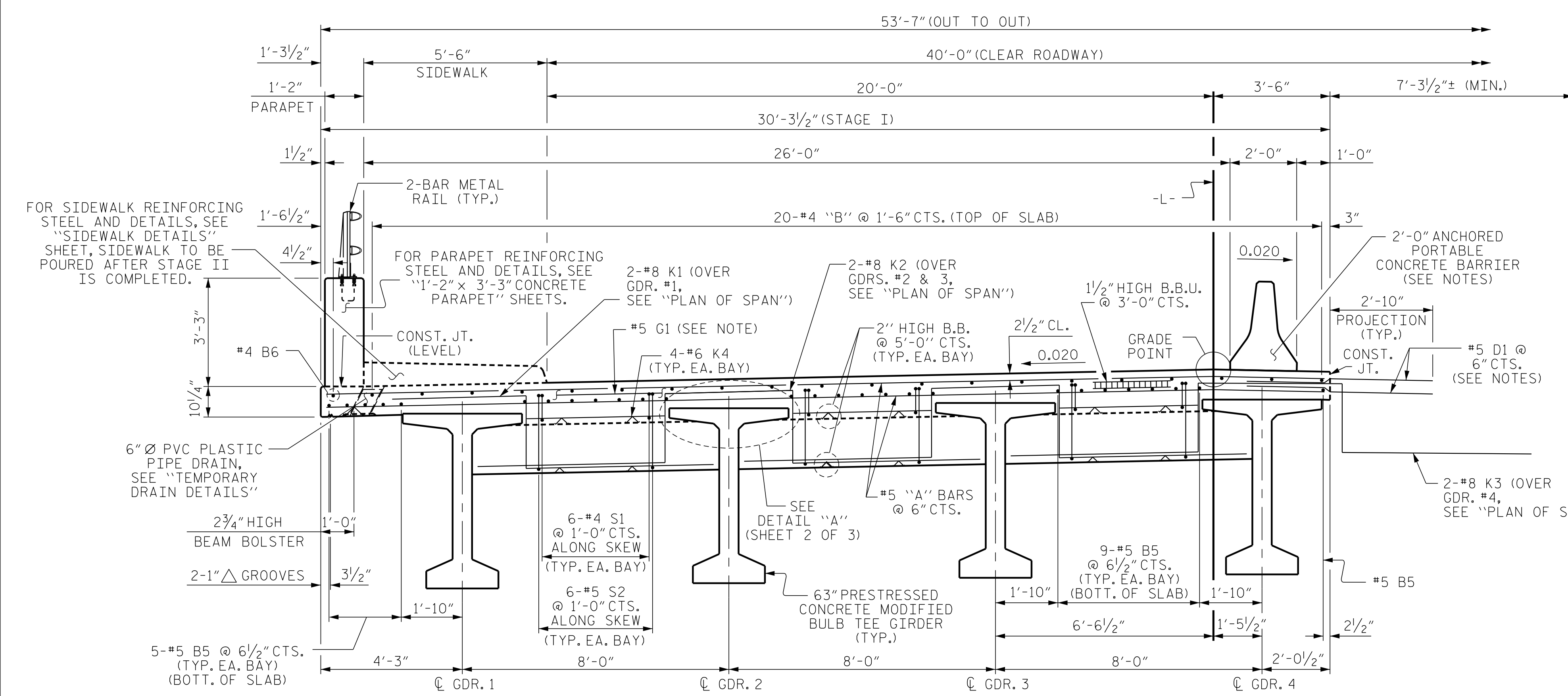
DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

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.

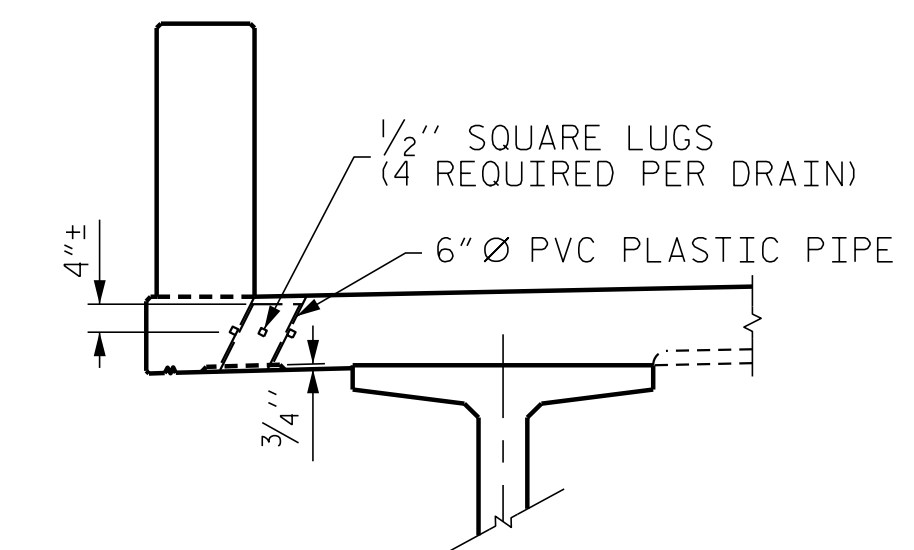
PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY ITEM OF ANCHORED PORTABLE CONCRETE BARRIER.



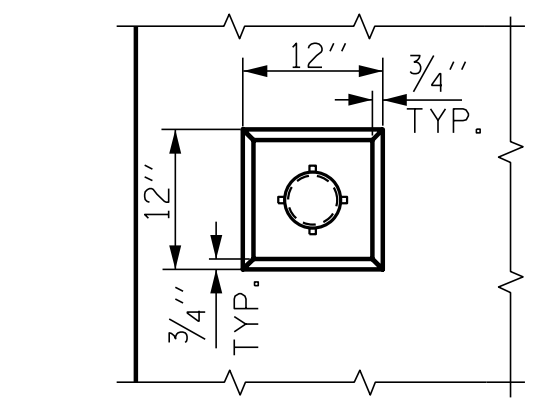
TYPICAL SECTION AT END BENT DIAPHRAGM



* TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (16 DRAINS REQUIRED)

ELEVATION

PIPE DETAIL



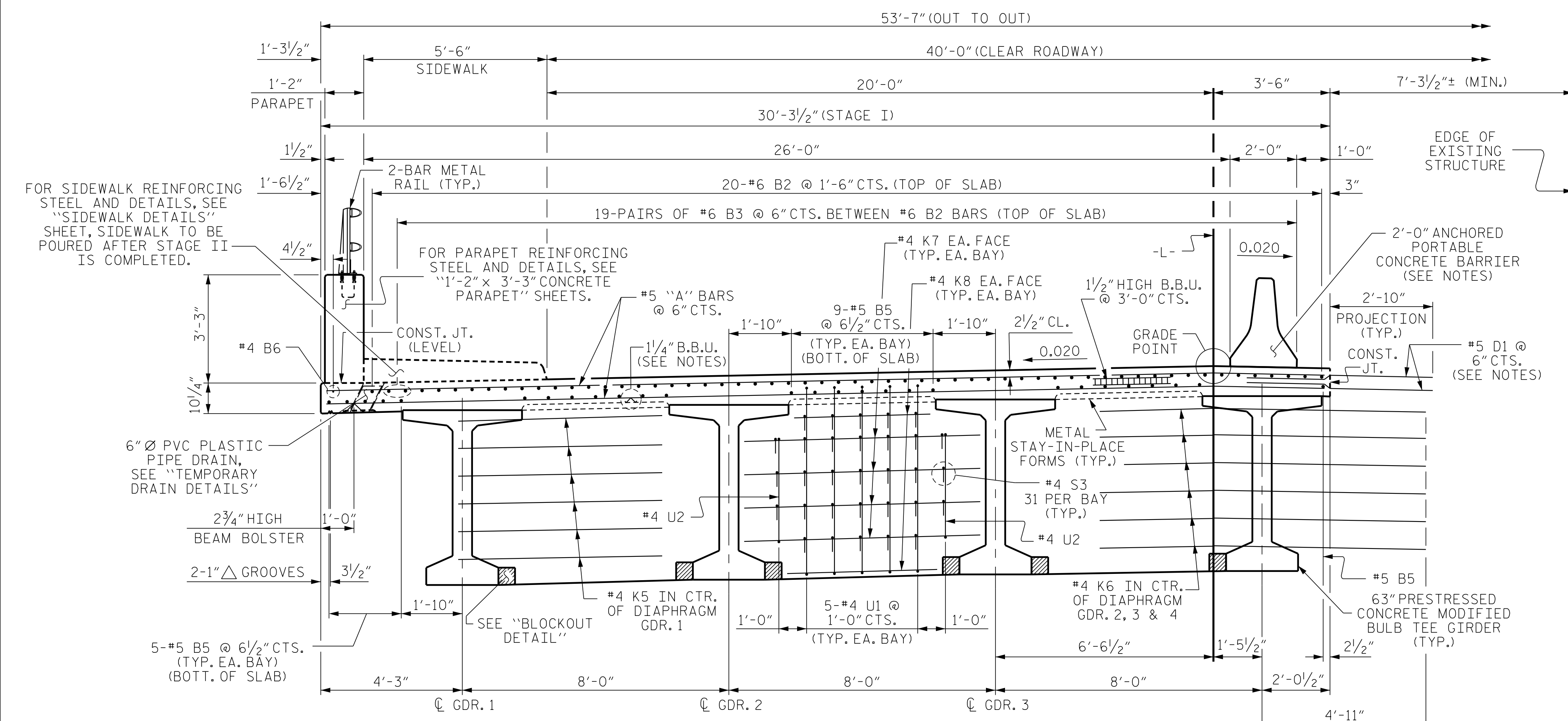
PLAN OF RECESS

TEMPORARY DRAIN DETAILS

TOP OF FLOOR DRAINS TO BE SET 3/8" BELOW SURFACE OF SLAB.

4 - 1/2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

THE 6" PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.



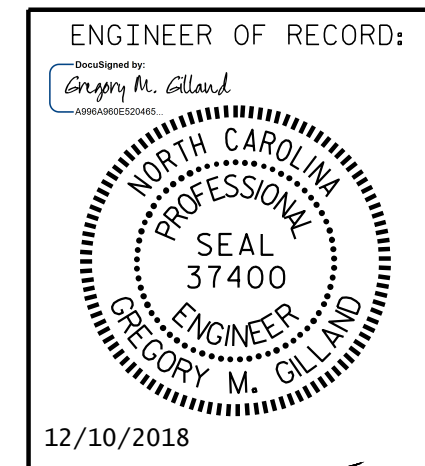
TYPICAL SECTION AT BENT DIAPHRAGM

PROJECT NO. U-5818

MCDOWELL COUNTY

STATION: 27+83.62 -L-

SHEET 1 OF 3



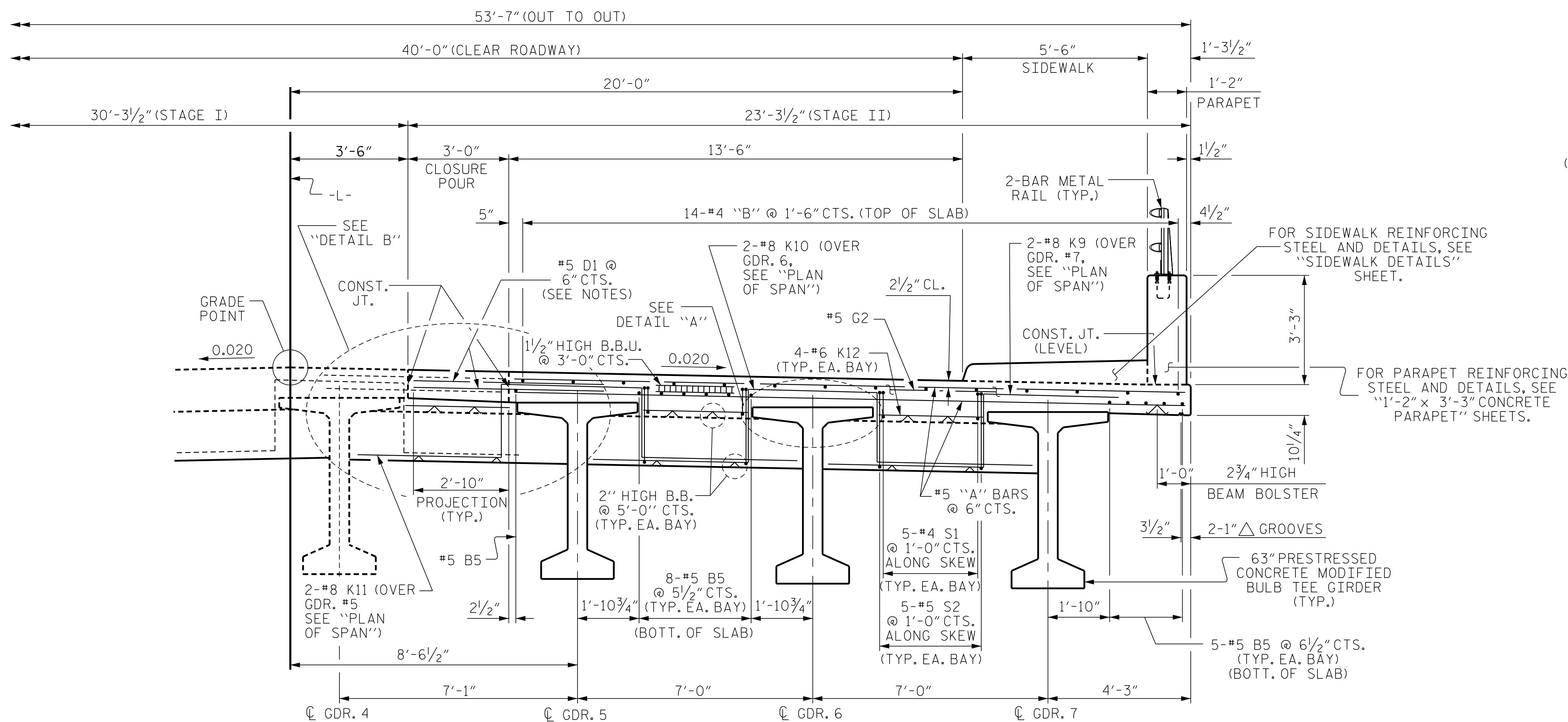
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-6
1			3			TOTAL SHEETS
2			4			49

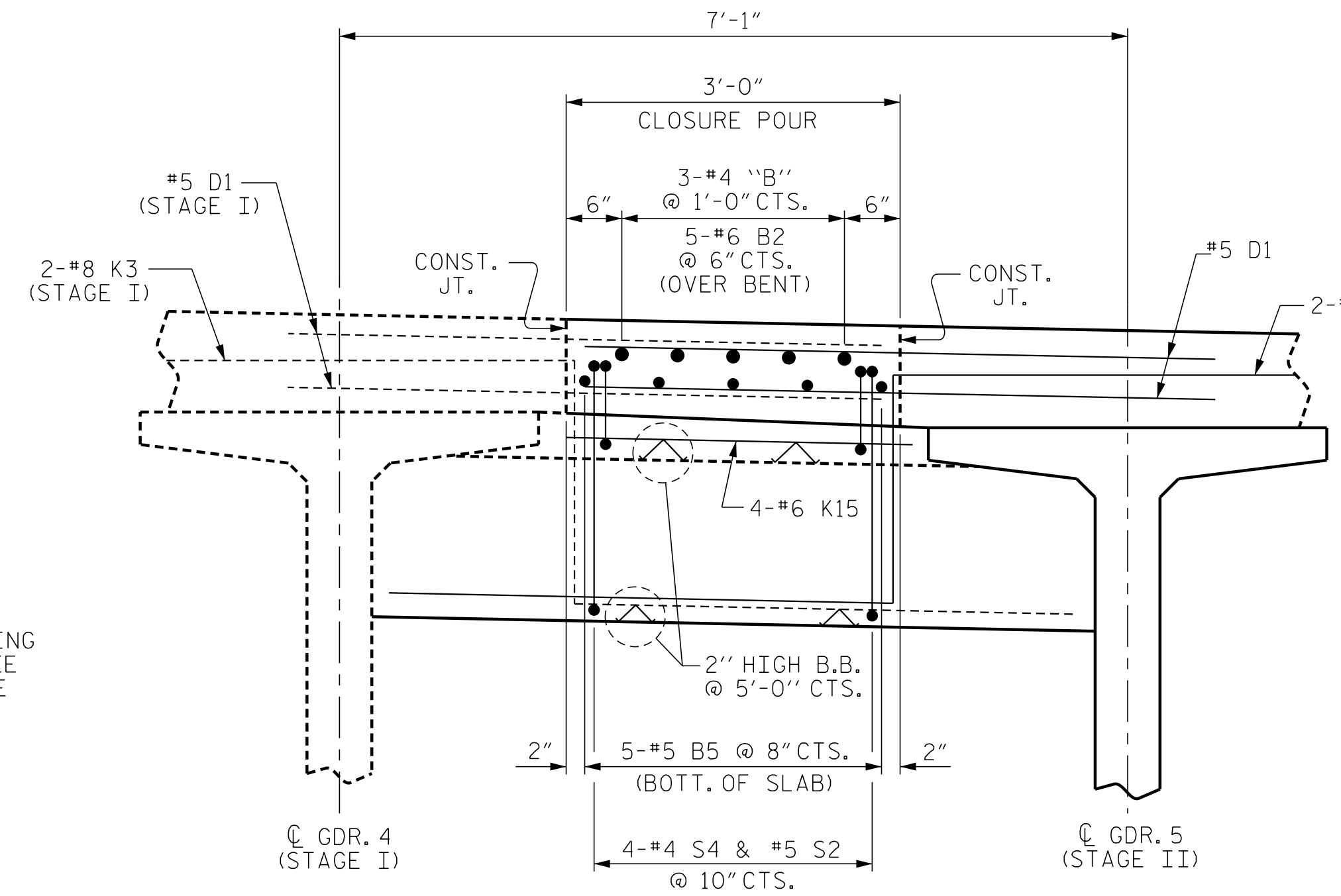
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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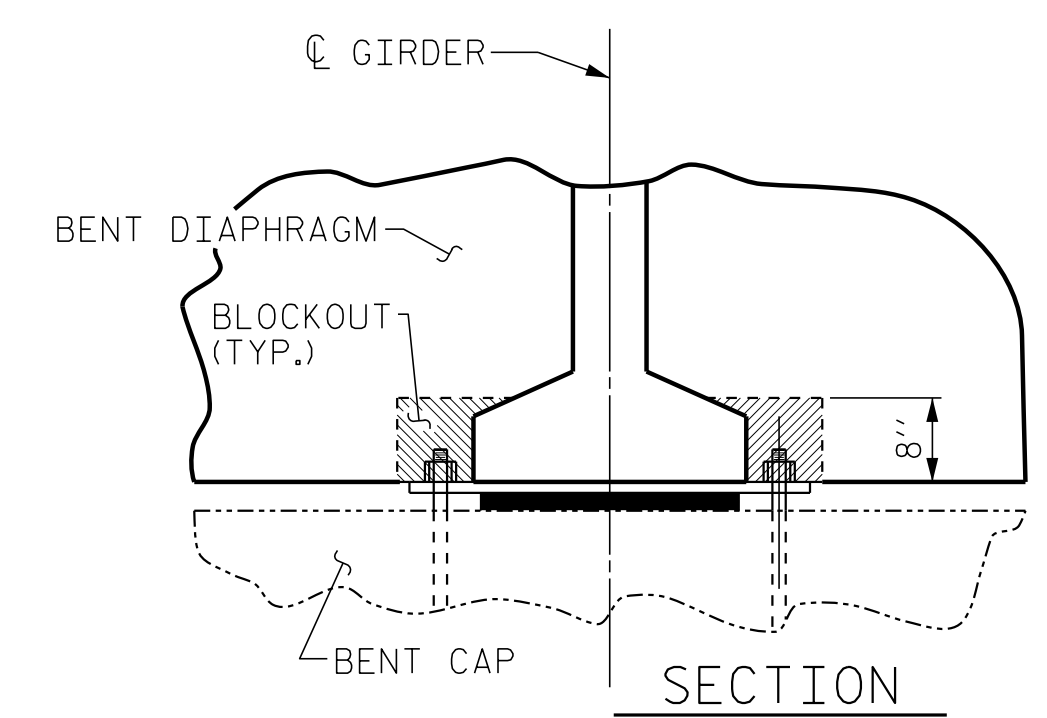
DRAWN BY: D. HODGE DATE: 6/18
 CHECKED BY: B.C. HUNT DATE: 9/18



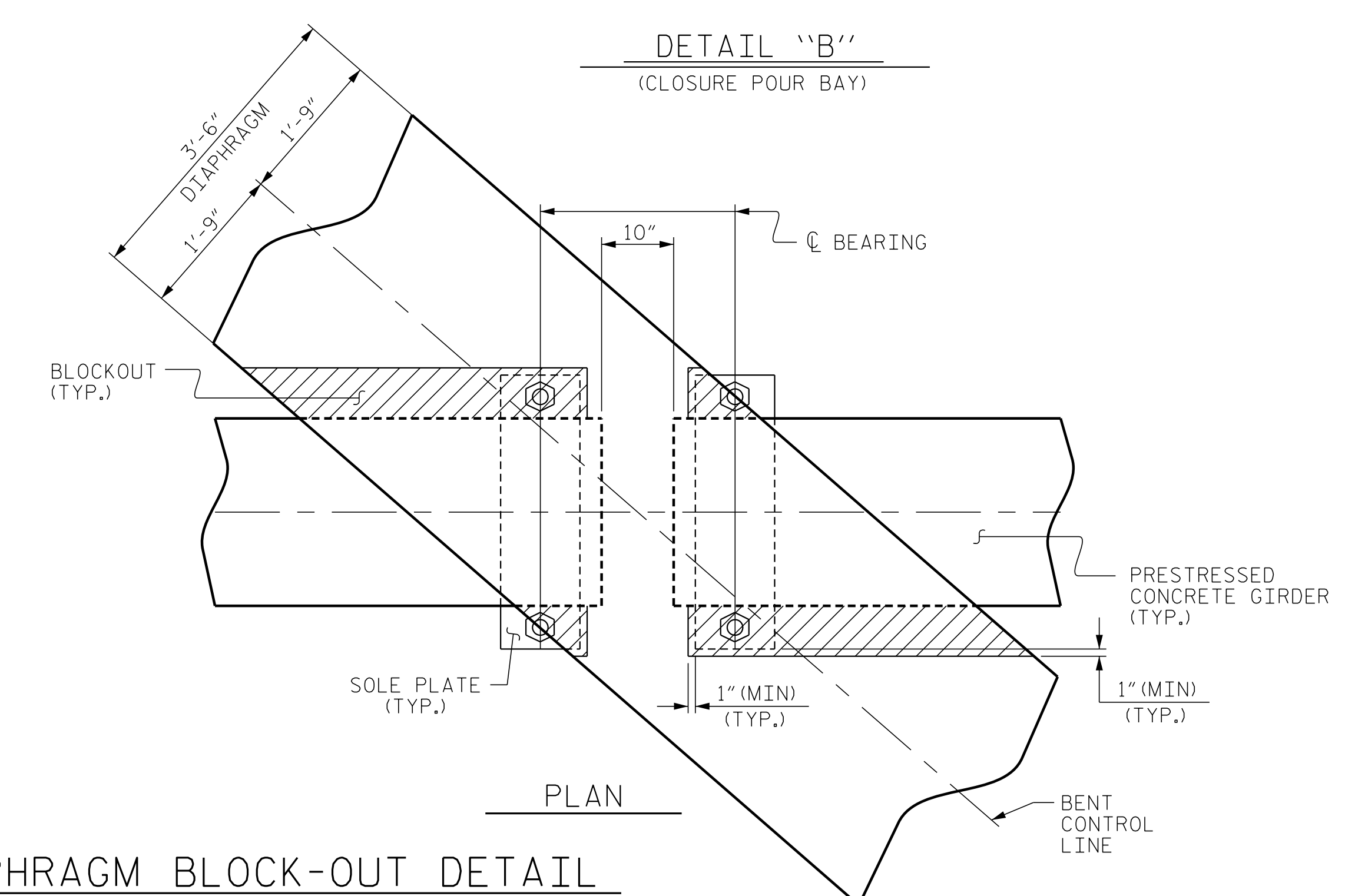
TYPICAL SECTION AT END BENT DIAPHRAGM



DETAIL "B"
(CLOSURE POUR BAY)

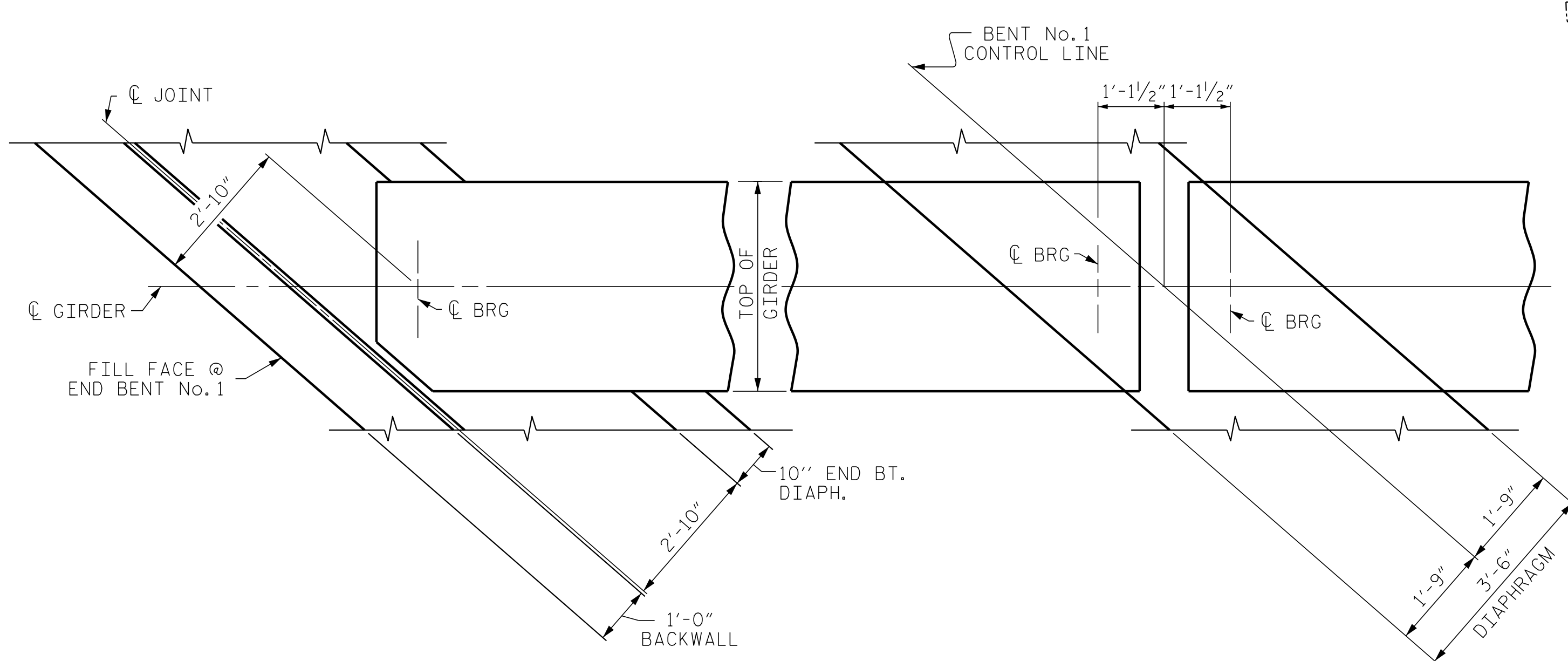


SECTION



PLAN

BENT DIAPHRAGM BLOCK-OUT DETAIL

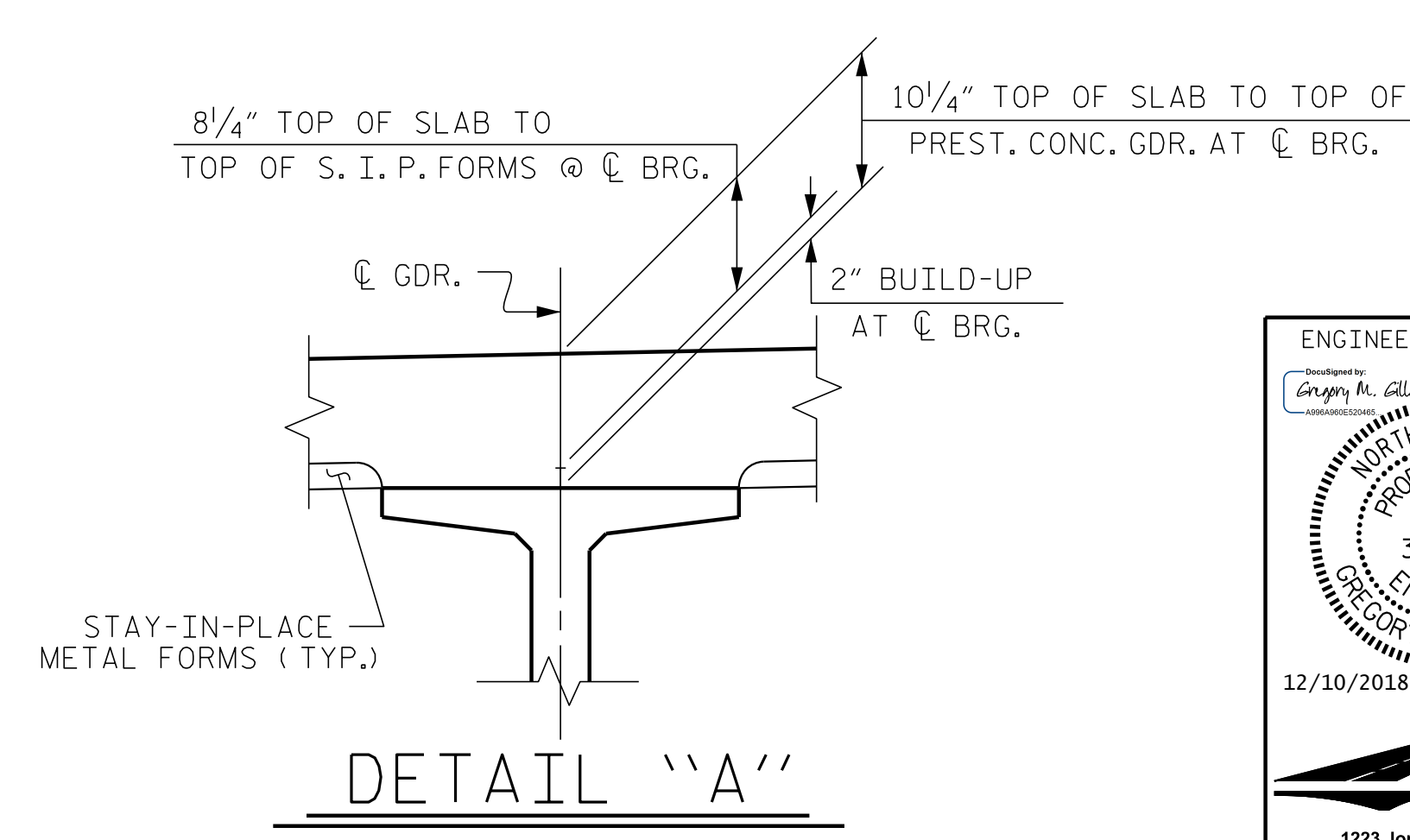


END BENT No. 1 DIAPHRAGM

PLAN

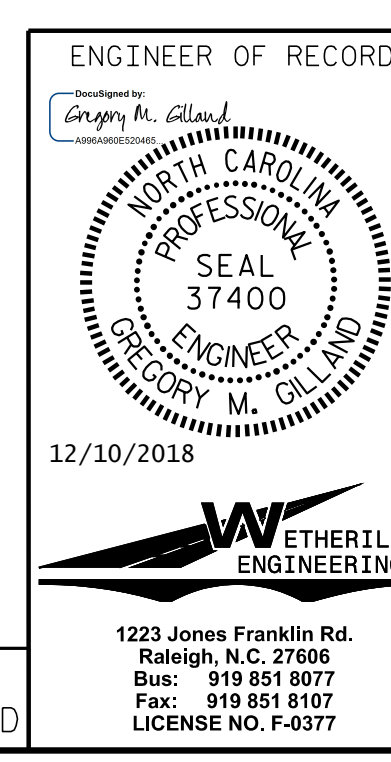
BENT No. 1 DIAPHRAGM

(END BENT No. 2 SIMILAR BY ROTATION)



DETAIL "A"

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 2 OF 3

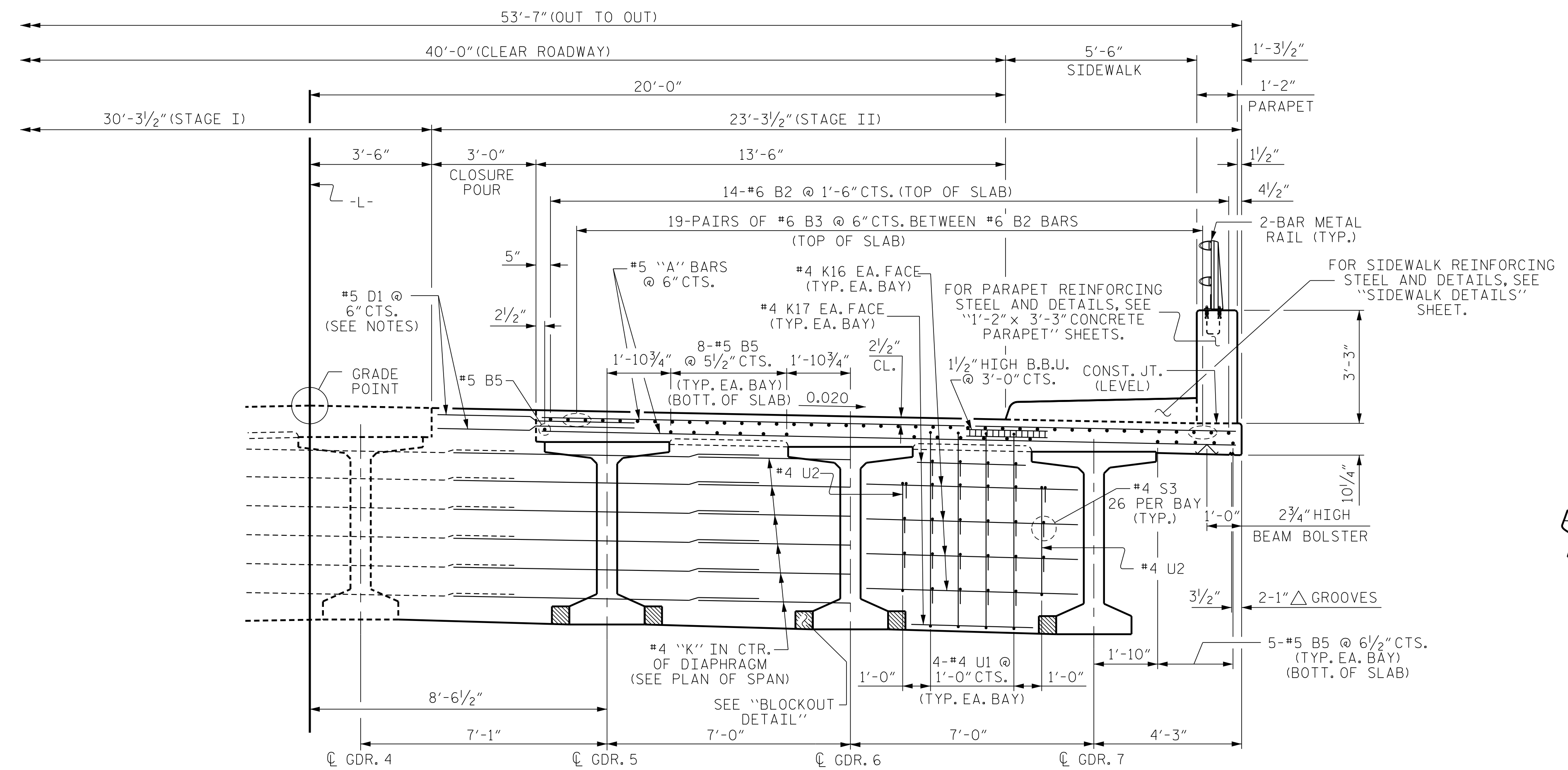


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION STAGE II					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-7 TOTAL SHEETS 49

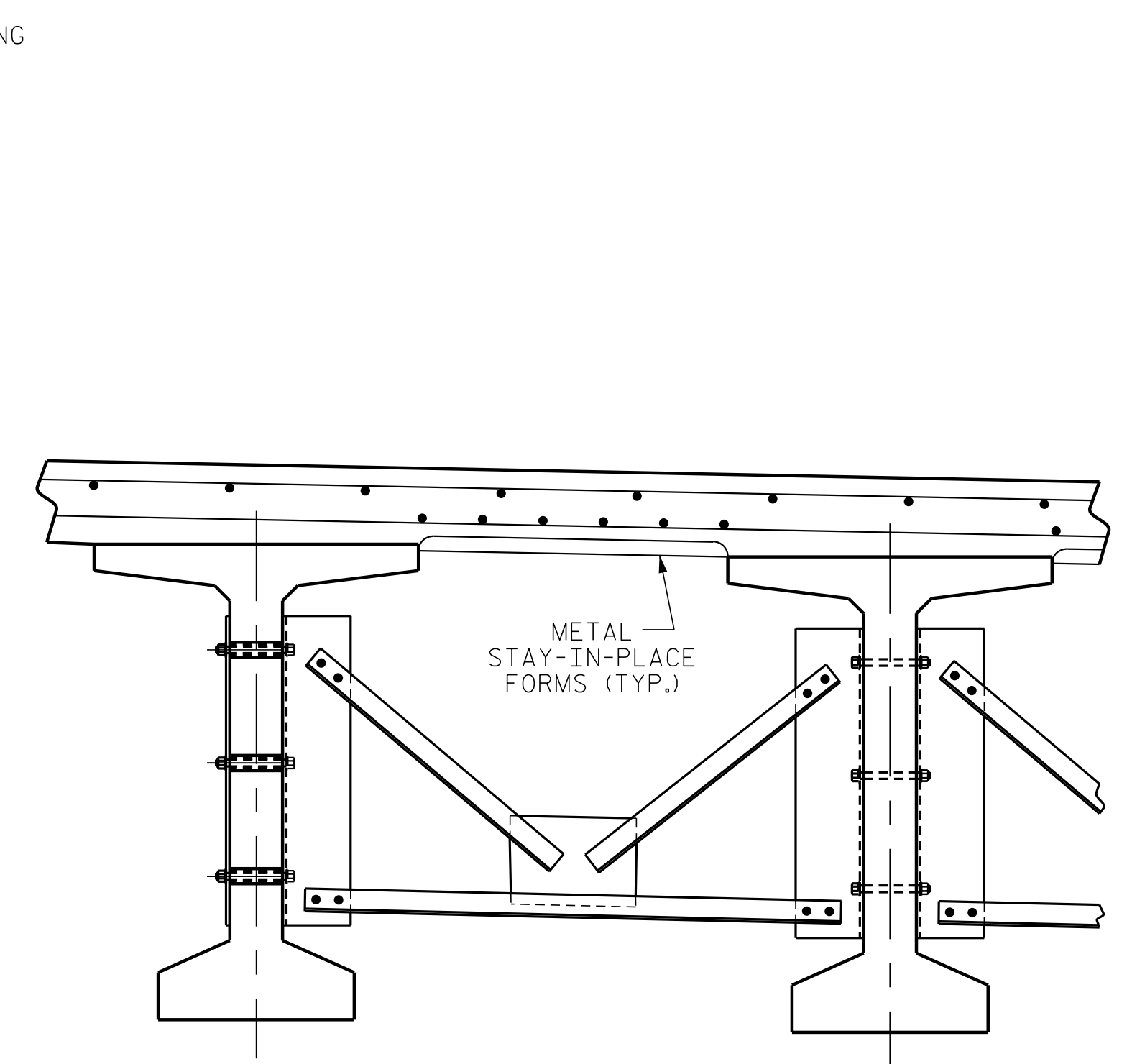
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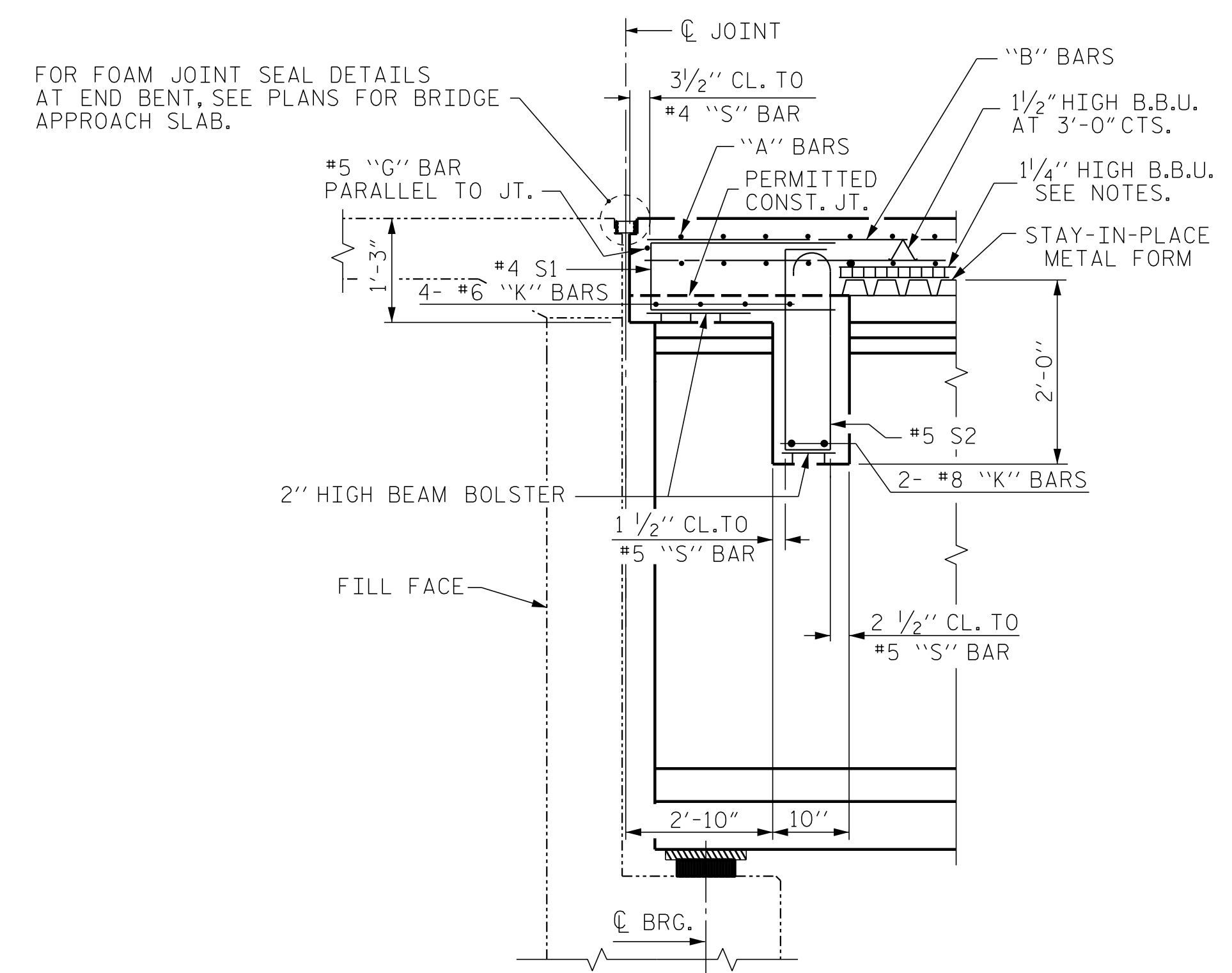


TYPICAL SECTION AT BENT DIAPHRAGM

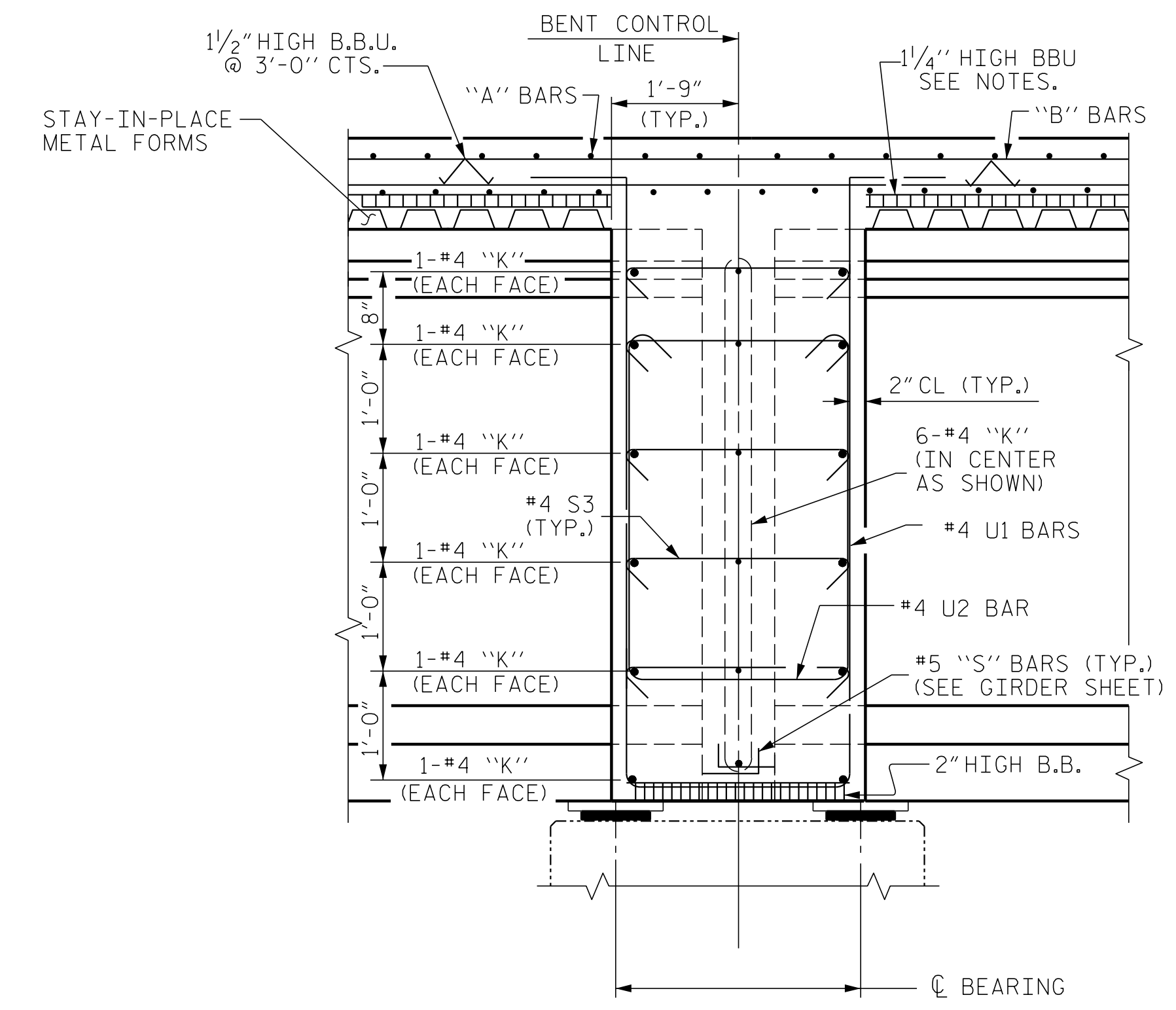


INTERMEDIATE DIAPHRAGM

(TYP. EA. BAY EXCEPT BETWEEN GIRDERS 4 AND 5)



SECTION THRU END BENT DIAPHRAGM



SECTION THRU BENT DIAPHRAGM

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 3 OF 3

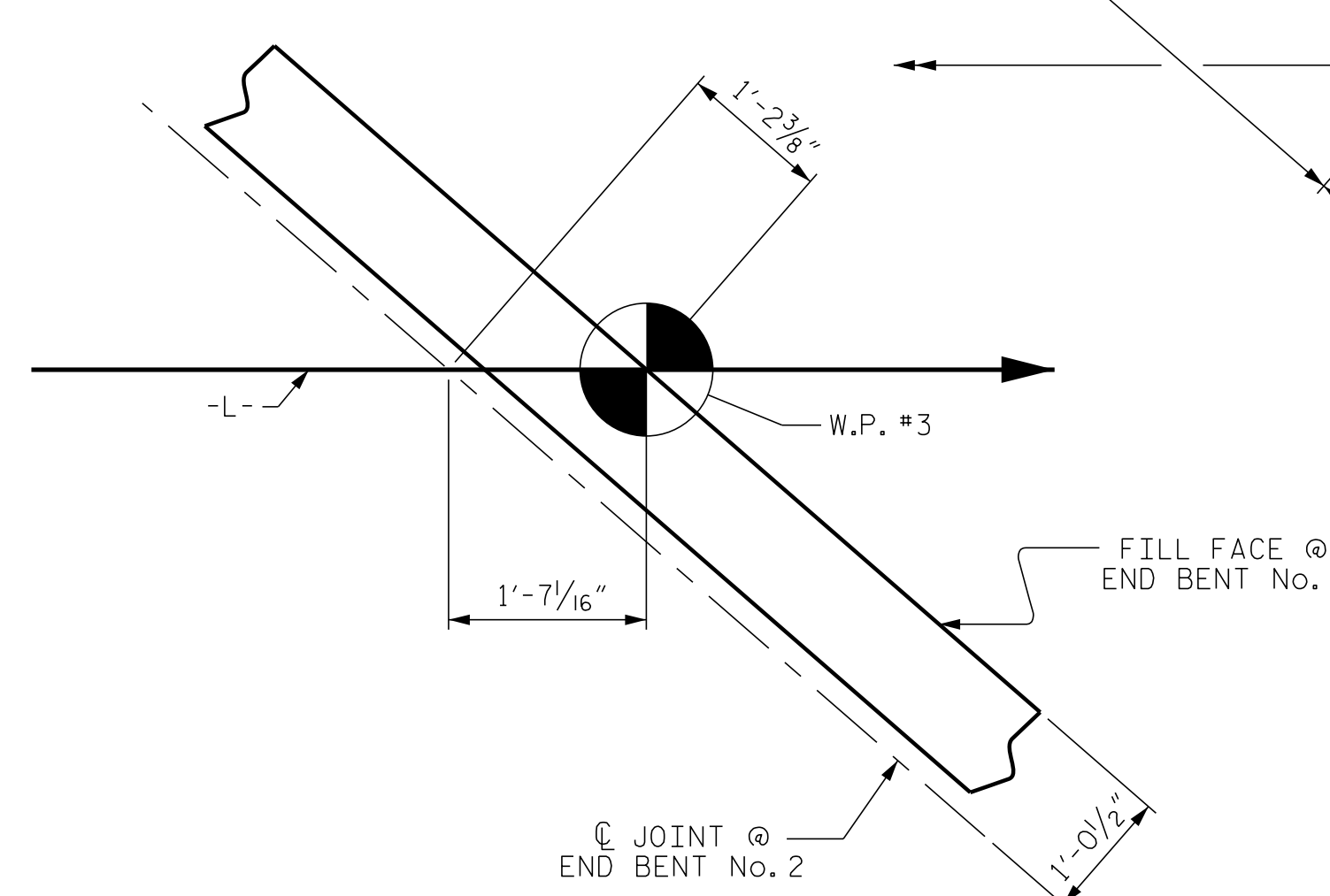
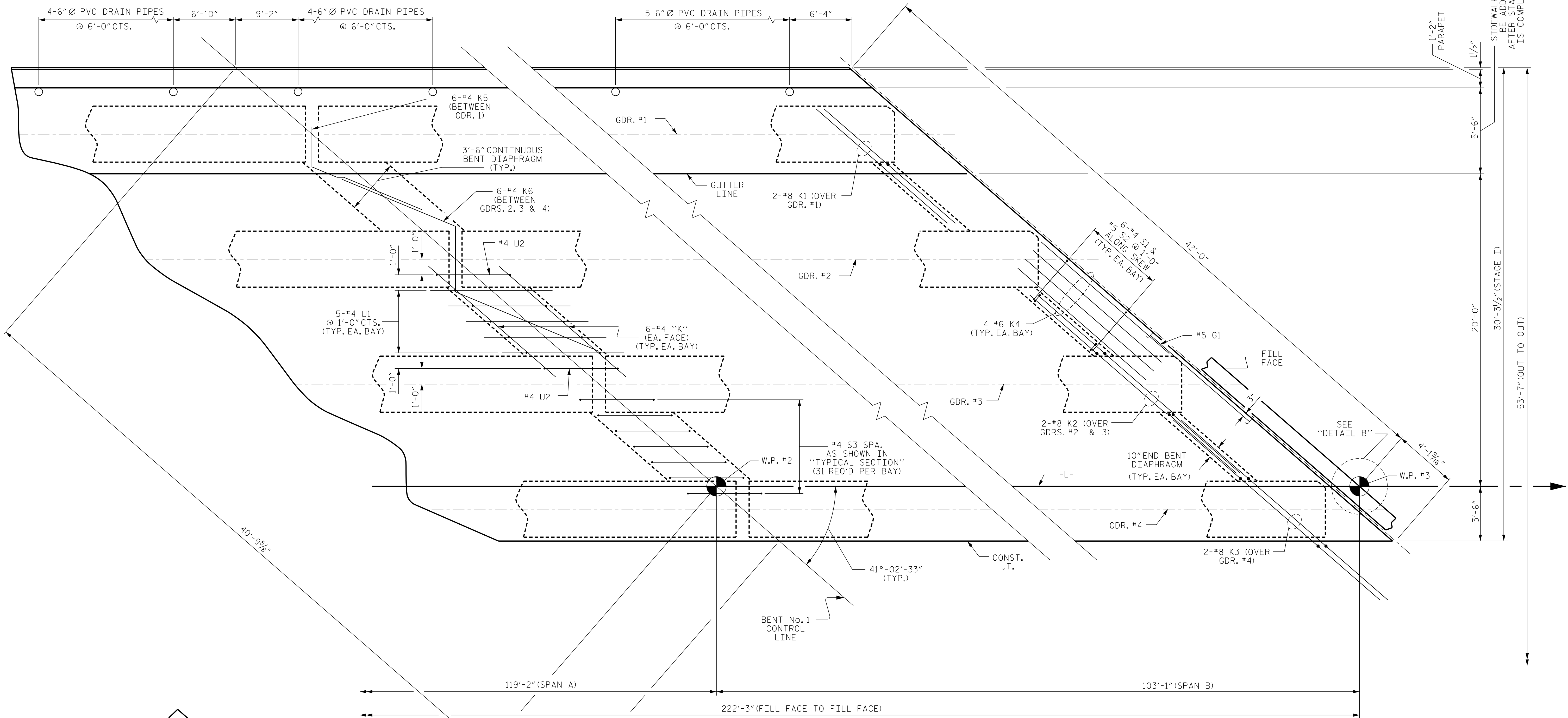
ENGINEER OF RECORD:
 Gregory M. Gilliland
 NORTH CAROLINA PROFESSIONAL SEAL 37400
 ENGINEER
 GREGORY M. GILLILAND
 12/10/2018
 WETHERILL ENGINEERING
 1223 Jones Franklin Rd.
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 Fax: 919 851 8107
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION STAGE II					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-8					TOTAL SHEETS 49

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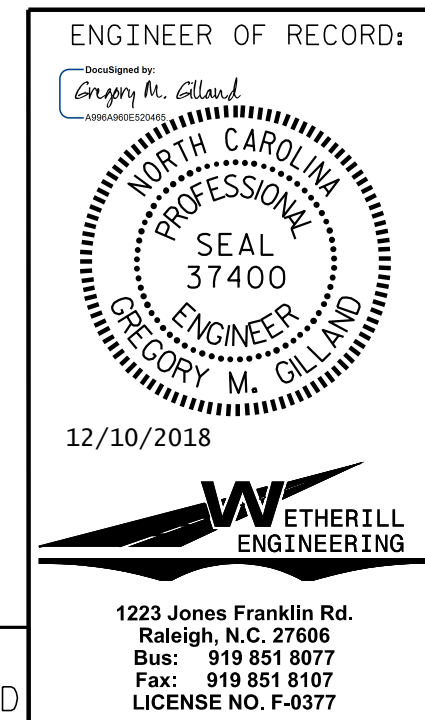
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PLAN OF SPAN B
(STAGE I)

NOTES:
 FOR "A" BAR AND DOWEL PLACEMENT, SEE "A" BAR PLACEMENT SHEETS.
 FOR "B" BAR PLACEMENT, SEE "B" BAR PLACEMENT SHEETS.
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 2 OF 10

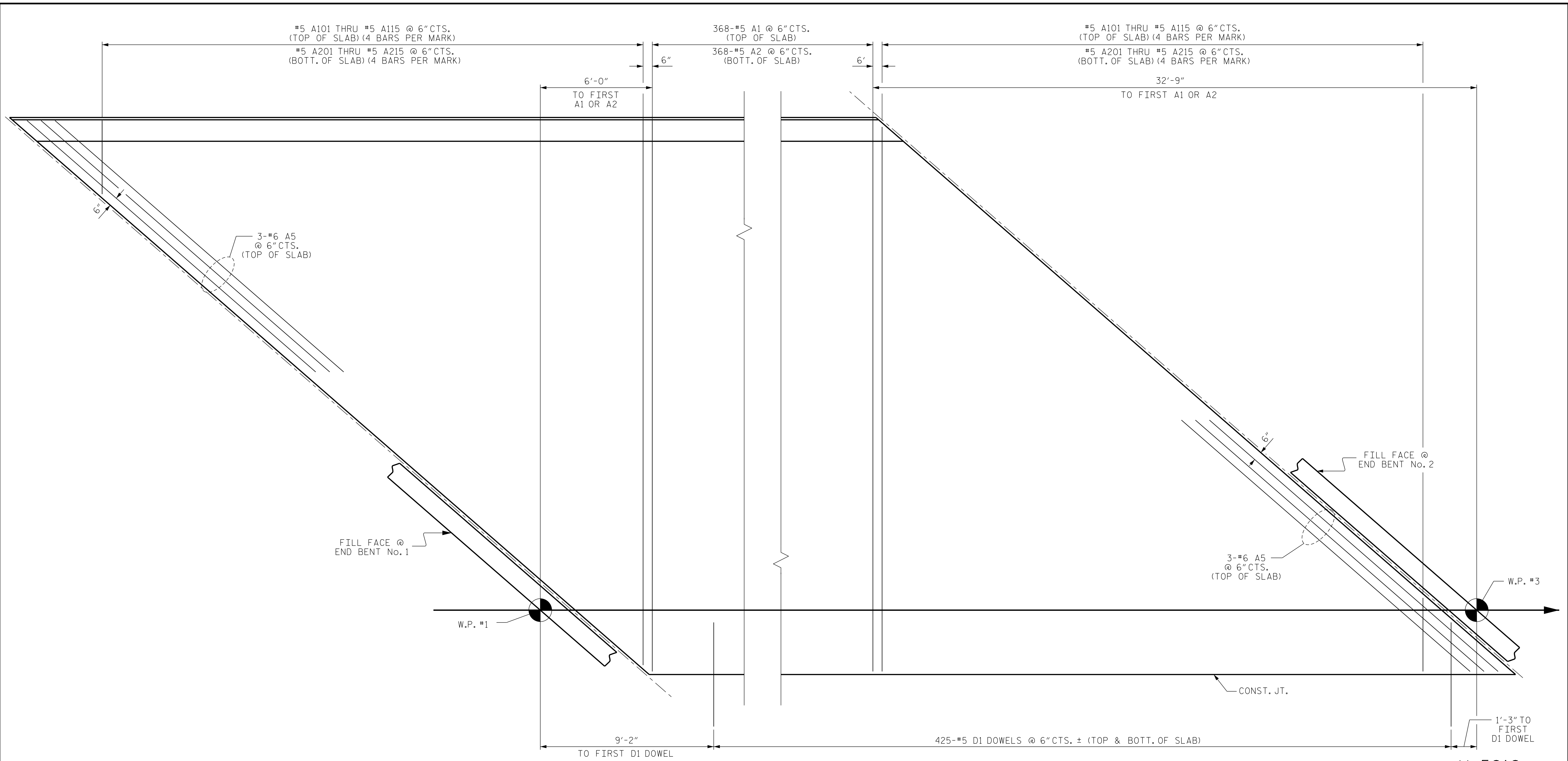


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPANS (STAGE I)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-10					TOTAL SHEETS 49

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#5 A101 THRU #5 A115 @ 6"CTS.
(TOP OF SLAB) (4 BARS PER MARK)
#5 A201 THRU #5 A215 @ 6"CTS.
(BOTT. OF SLAB) (4 BARS PER MARK)

368-#5 A1 @ 6"CTS.
(TOP OF SLAB)
368-#5 A2 @ 6"CTS.
(BOTT. OF SLAB)

#5 A101 THRU #5 A115 @ 6"CTS.
(TOP OF SLAB) (4 BARS PER MARK)
#5 A201 THRU #5 A215 @ 6"CTS.
(BOTT. OF SLAB) (4 BARS PER MARK)

3-#6 A5
@ 6"CTS.
(TOP OF SLAB)

FILL FACE @
END BENT No. 1

FILL FACE @
END BENT No. 2

3-#6 A5
@ 6"CTS.
(TOP OF SLAB)

W.P. #1

W.P. #3

CONST. JT.

9'-2"
TO FIRST D1 DOWEL

425-#5 D1 DOWELS @ 6"CTS. ± (TOP & BOTT. OF SLAB)

1'-3" TO
FIRST
D1 DOWEL

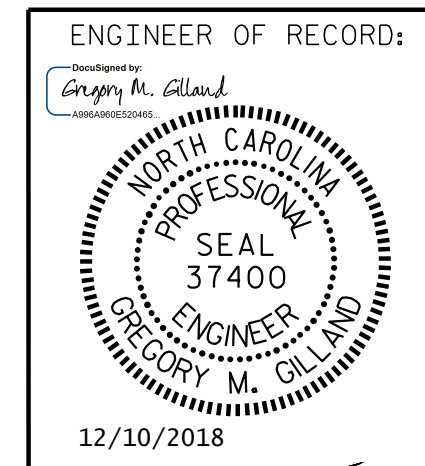
"A" BAR PLACEMENT

PROJECT NO. U-5818

MCDOWELL COUNTY

STATION: 27+83.62 -L-

SHEET 3 OF 10



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RALEIGH

"A" BAR PLACEMENT
STAGE I

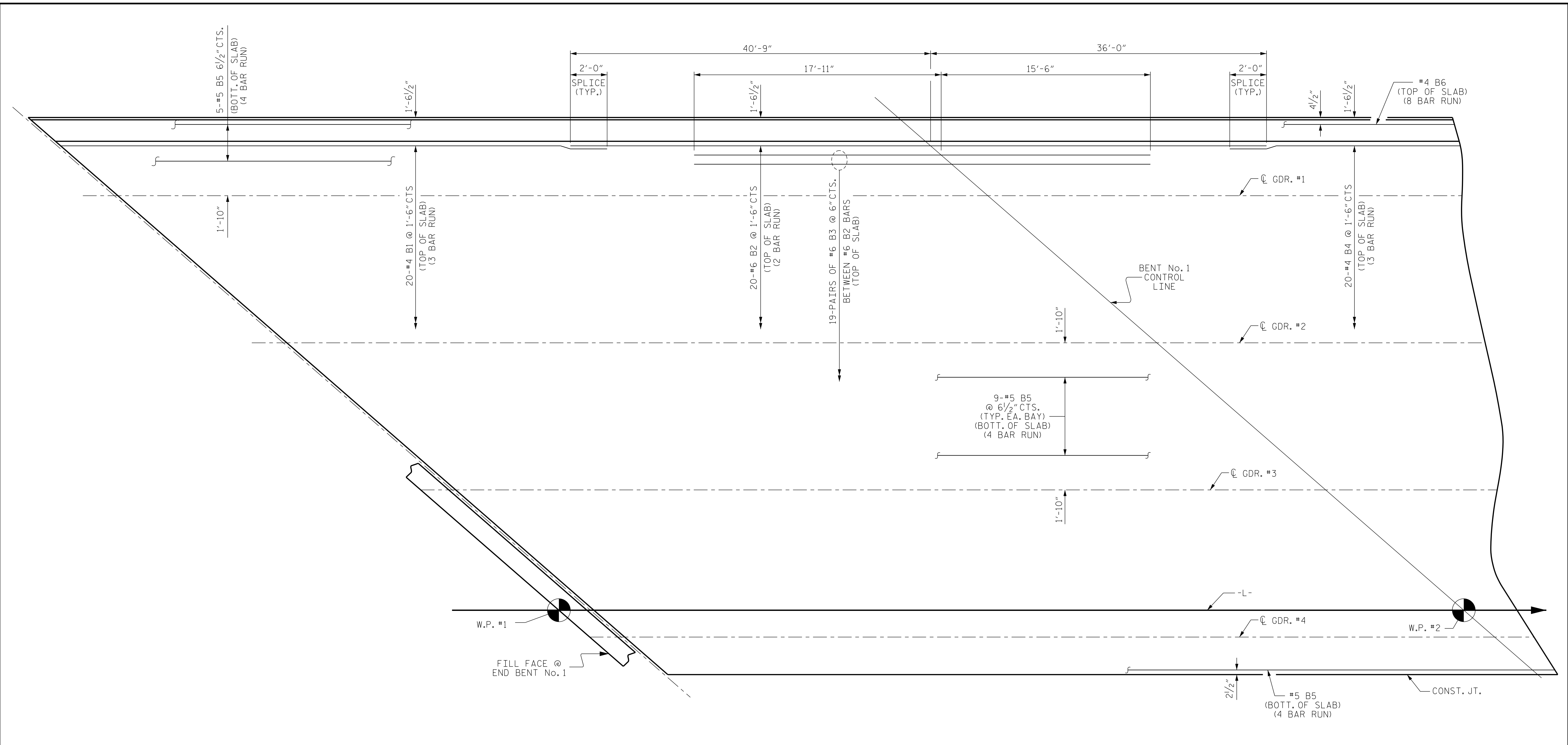
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NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS
2			4			49

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PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

SHEET 4 OF 10

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ENGINEER OF RECORD:

12/10/2018

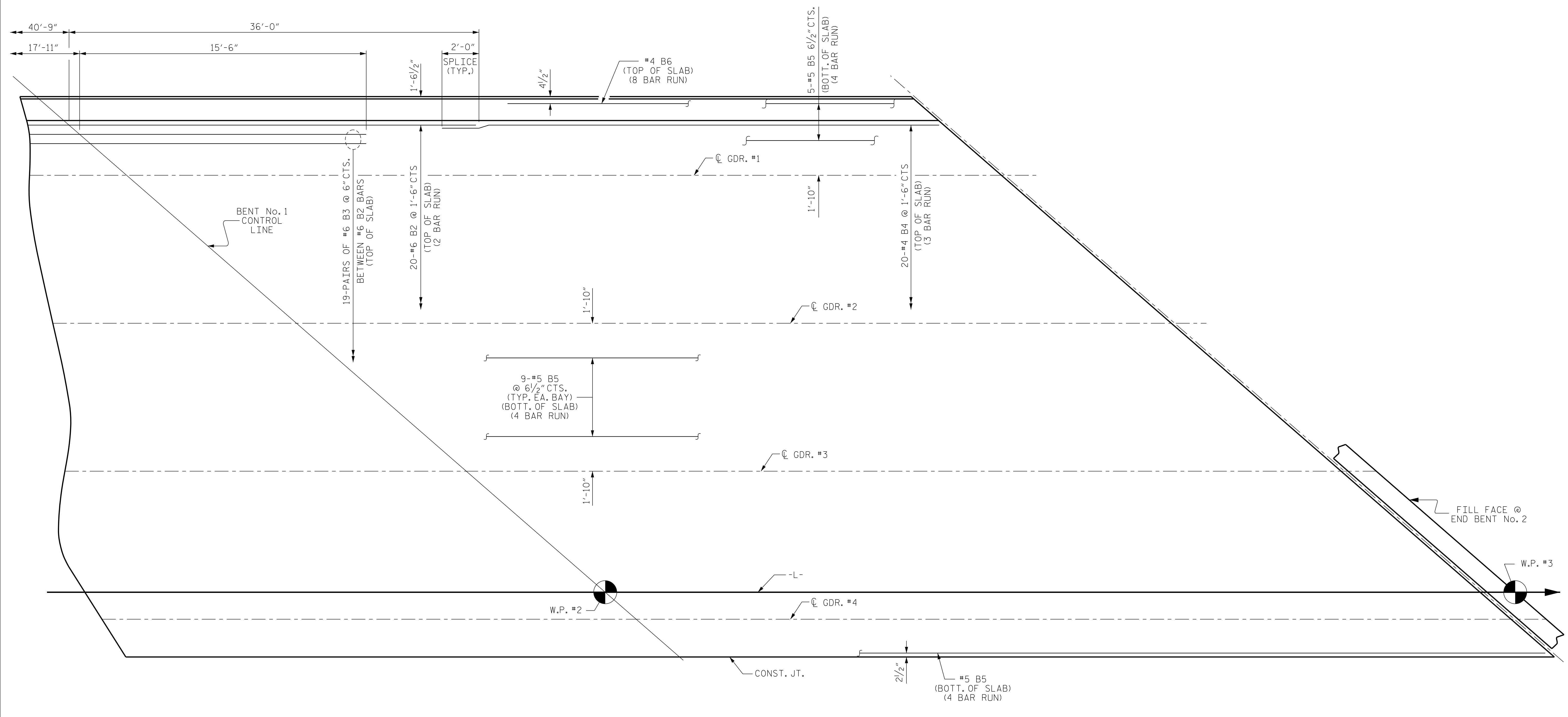
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**"B" BAR PLACEMENT
STAGE I**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-12
1			3			TOTAL SHEETS
2			4			49



"B" BAR PLACEMENT - SPAN B

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

SHEET 5 OF 10

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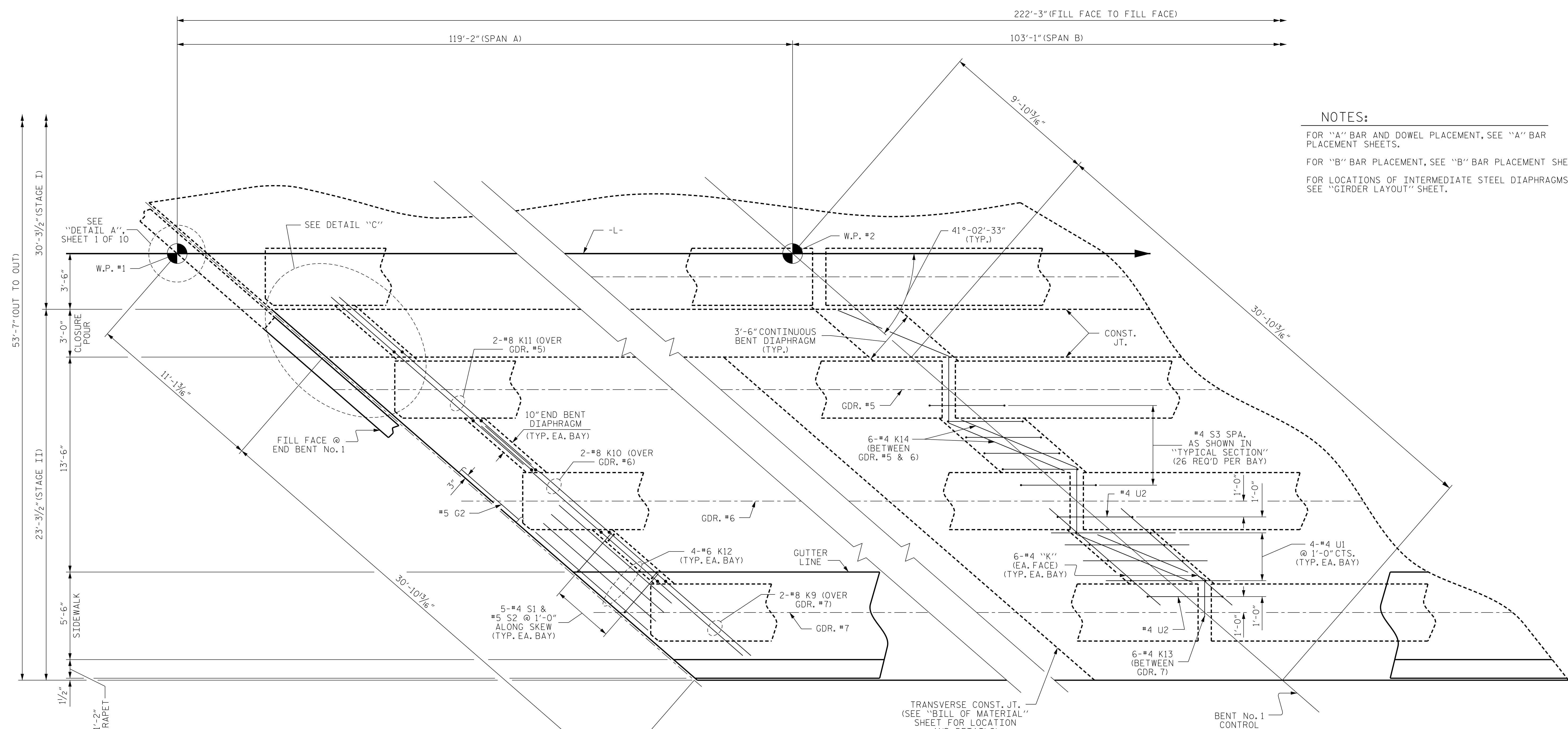
DOCUMENT NOT CONSIDERED FINAL
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ENGINEER OF RECORD:
Gregory M. Gilliland
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 37400
 ENGINEER
 GREGORY M. GILLILAND
 12/10/2018
 WETHERILL
 ENGINEERING
 1223 Jones Franklin Rd.
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 Fax: 919 851 8107
 LICENSE NO. F-0377

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 DEPARTMENT OF TRANSPORTATION
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"B" BAR PLACEMENT
 STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-13
1			3			TOTAL SHEETS
2			4			49



NOTES:

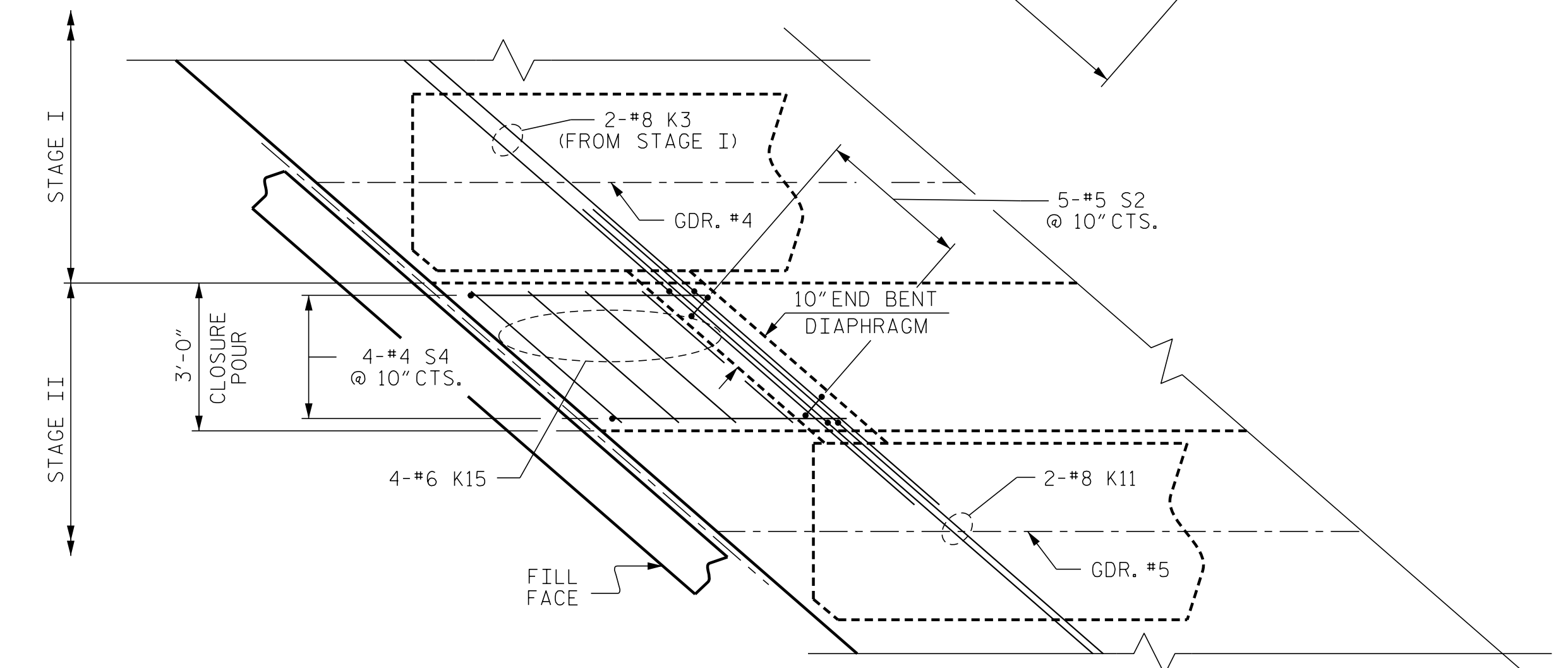
FOR "A" BAR AND DOWEL PLACEMENT, SEE "A" BAR PLACEMENT SHEETS.

FOR "B" BAR PLACEMENT, SEE "B" BAR PLACEMENT SHEETS.

FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.

PLAN OF SPAN A
(STAGE II)

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 6 OF 10



DETAIL "C"
END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR

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 Raleigh, N.C. 27606
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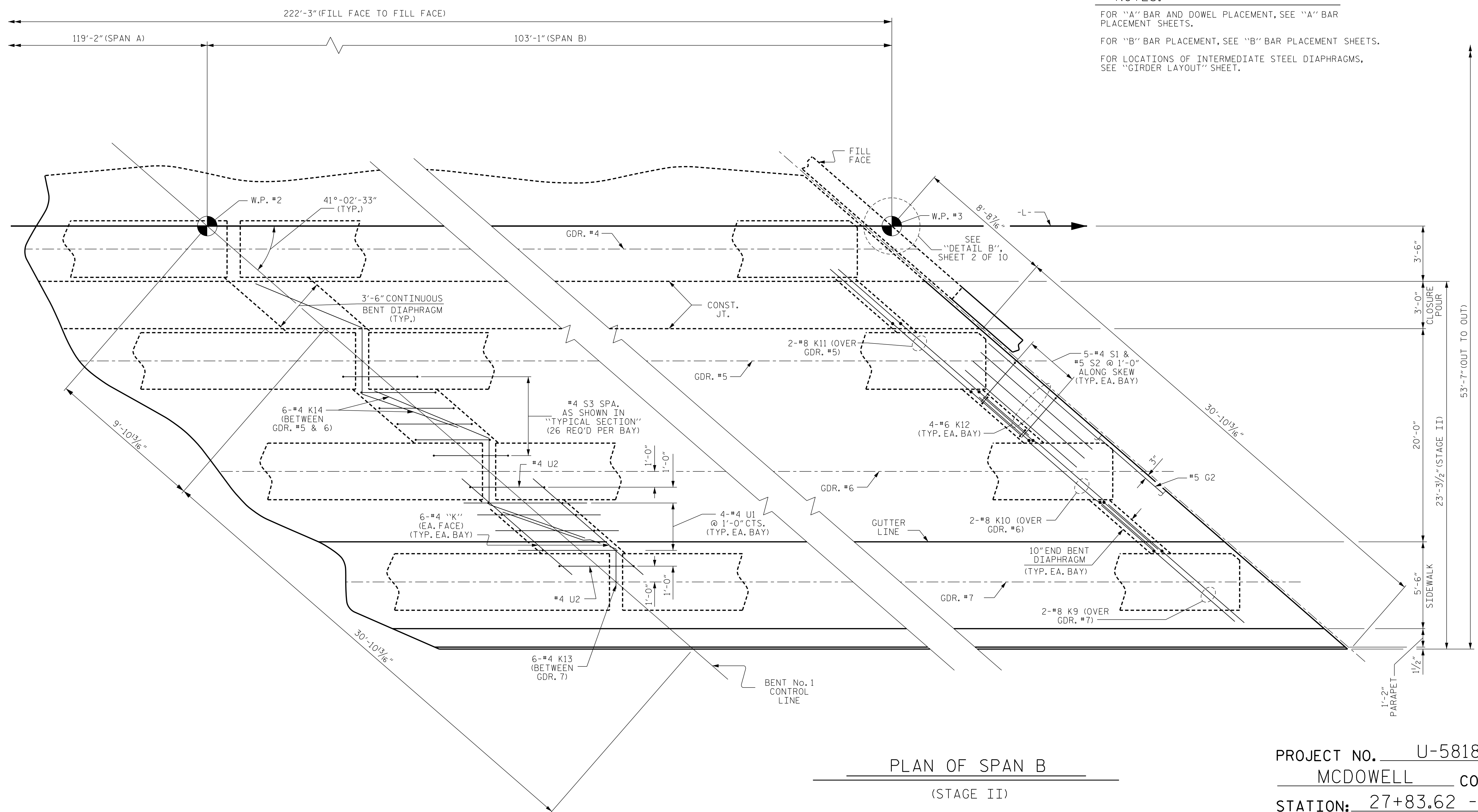
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPANS (STAGE II)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-14					TOTAL SHEETS 49

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NOTES:
 FOR "A" BAR AND DOWEL PLACEMENT, SEE "A" BAR PLACEMENT SHEETS.
 FOR "B" BAR PLACEMENT, SEE "B" BAR PLACEMENT SHEETS.
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.



PLAN OF SPAN B
(STAGE II)

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 7 OF 10

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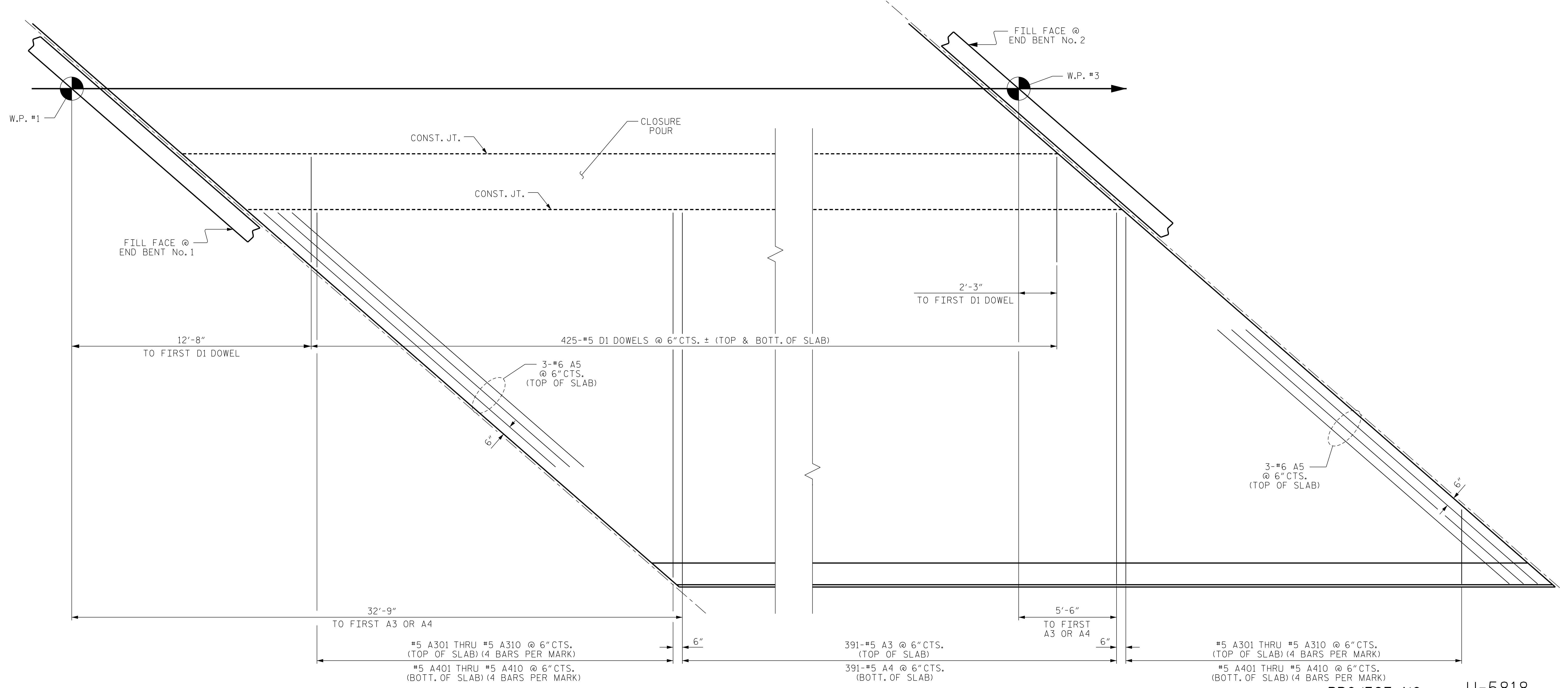
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ENGINEER OF RECORD:
Gregory M. Giland
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 Fax: 919 851 8107
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SUPERSTRUCTURE PLAN OF SPANS (STAGE II)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		
SHEET NO. S1-15					TOTAL SHEETS 49

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“A” BAR PLACEMENT

PROJECT NO. U-5818

MCDOWELL COUNTY

STATION: 27+83.62 -L-

SHEET 8 OF 10

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ENGINEER OF RECORD:

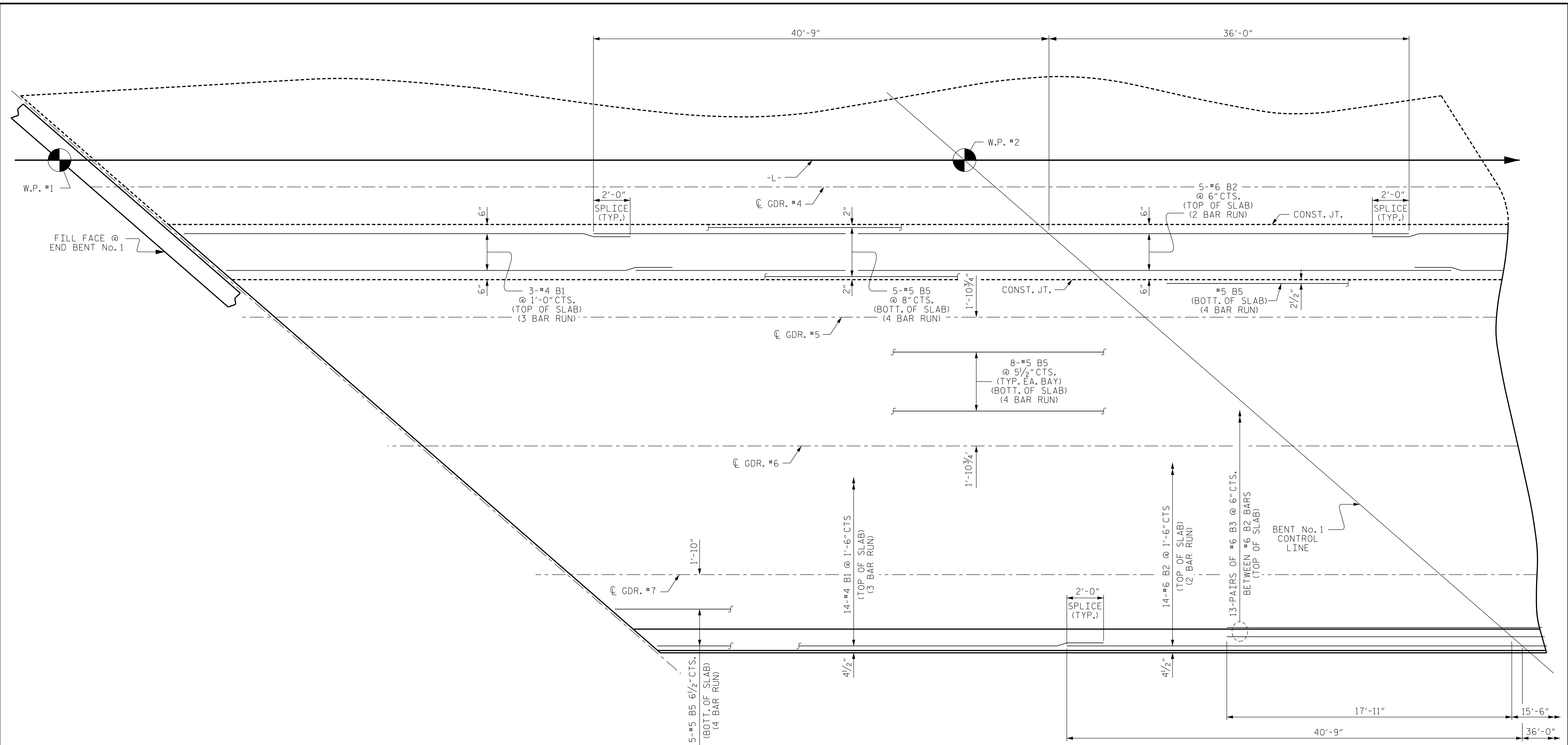
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 Fax: 919 851 8107
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**“A” BAR PLACEMENT
 STAGE II**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-16
1			3			TOTAL SHEETS
2			4			49

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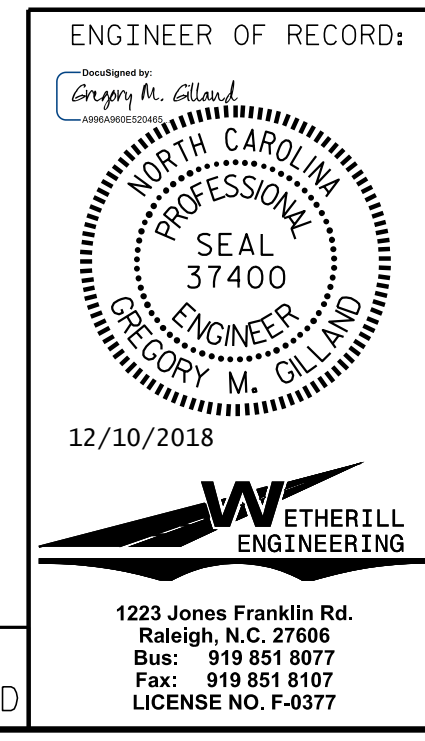
"B" BAR PLACEMENT - SPAN A

PROJECT NO. U-5818
MCDOWELL COUNTY
STATION: 27+83.62 -L-

SHEET 9 OF 10

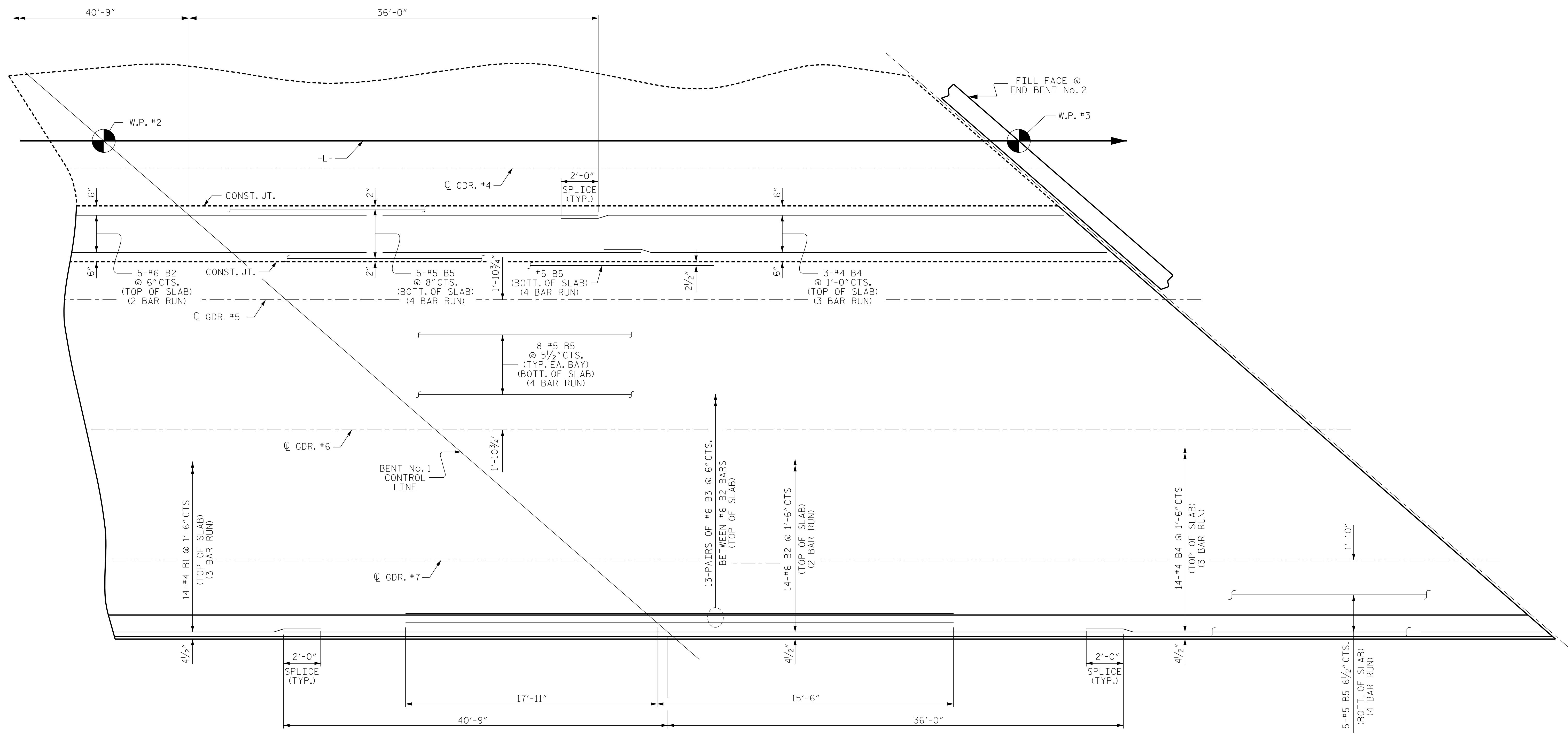
DRAWN BY: D. HODGE DATE: 8/18
CHECKED BY: B.C. HUNT DATE: 9/18

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
"B" BAR PLACEMENT STAGE II					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-17
					TOTAL SHEETS 49

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"B" BAR PLACEMENT - SPAN B

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

SHEET 10 OF 10

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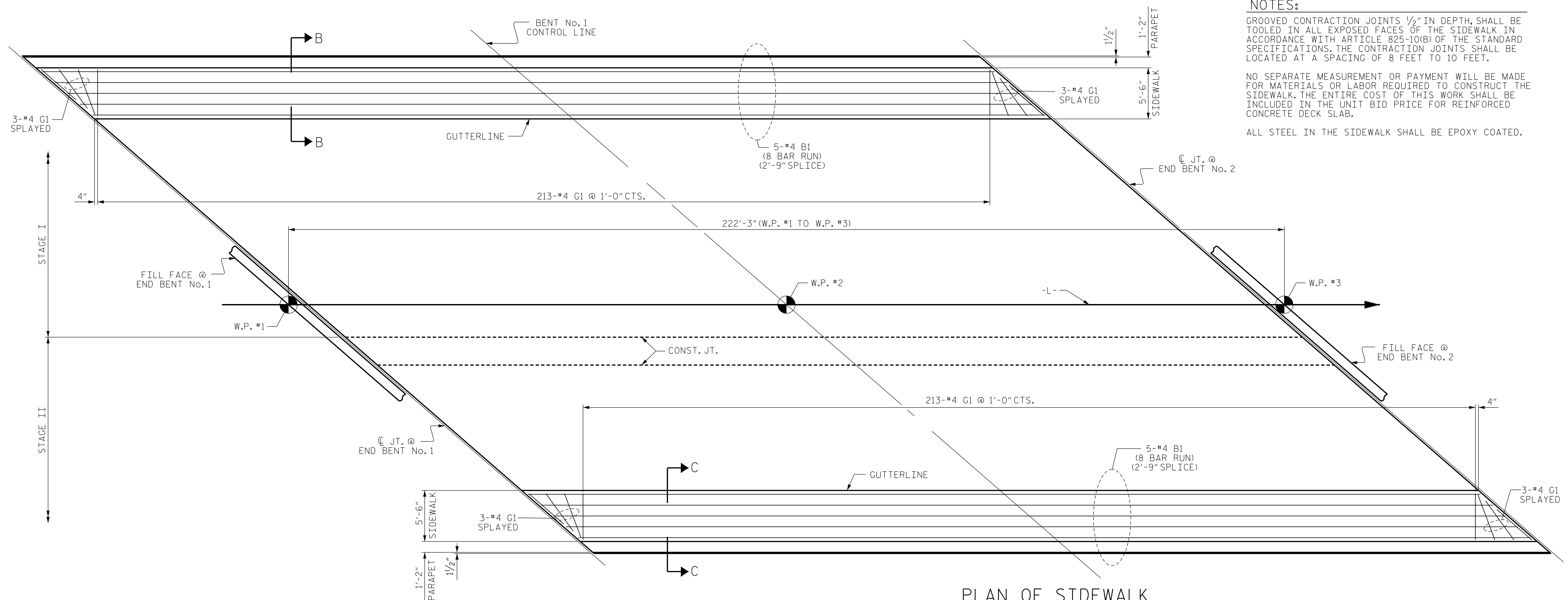
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ENGINEER OF RECORD:
Gregory M. Giland
 NORTH CAROLINA
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 ENGINEER
 GREGORY M. GILAND
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STATE OF NORTH CAROLINA
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 RALEIGH

"B" BAR PLACEMENT
STAGE II

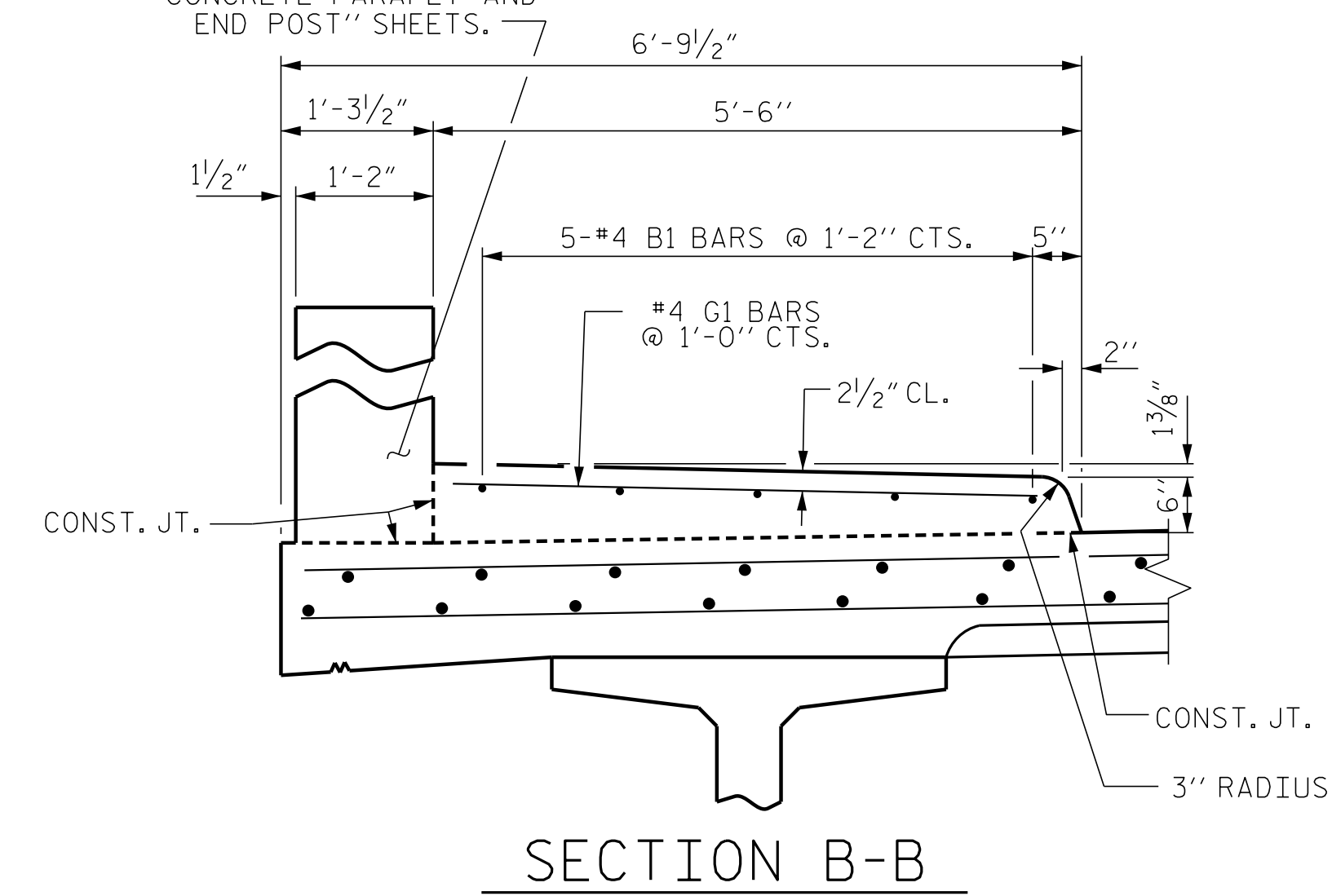
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NO.	BY:	DATE:	NO.	BY:	DATE:	S1-18
1			3			TOTAL SHEETS
2			4			49



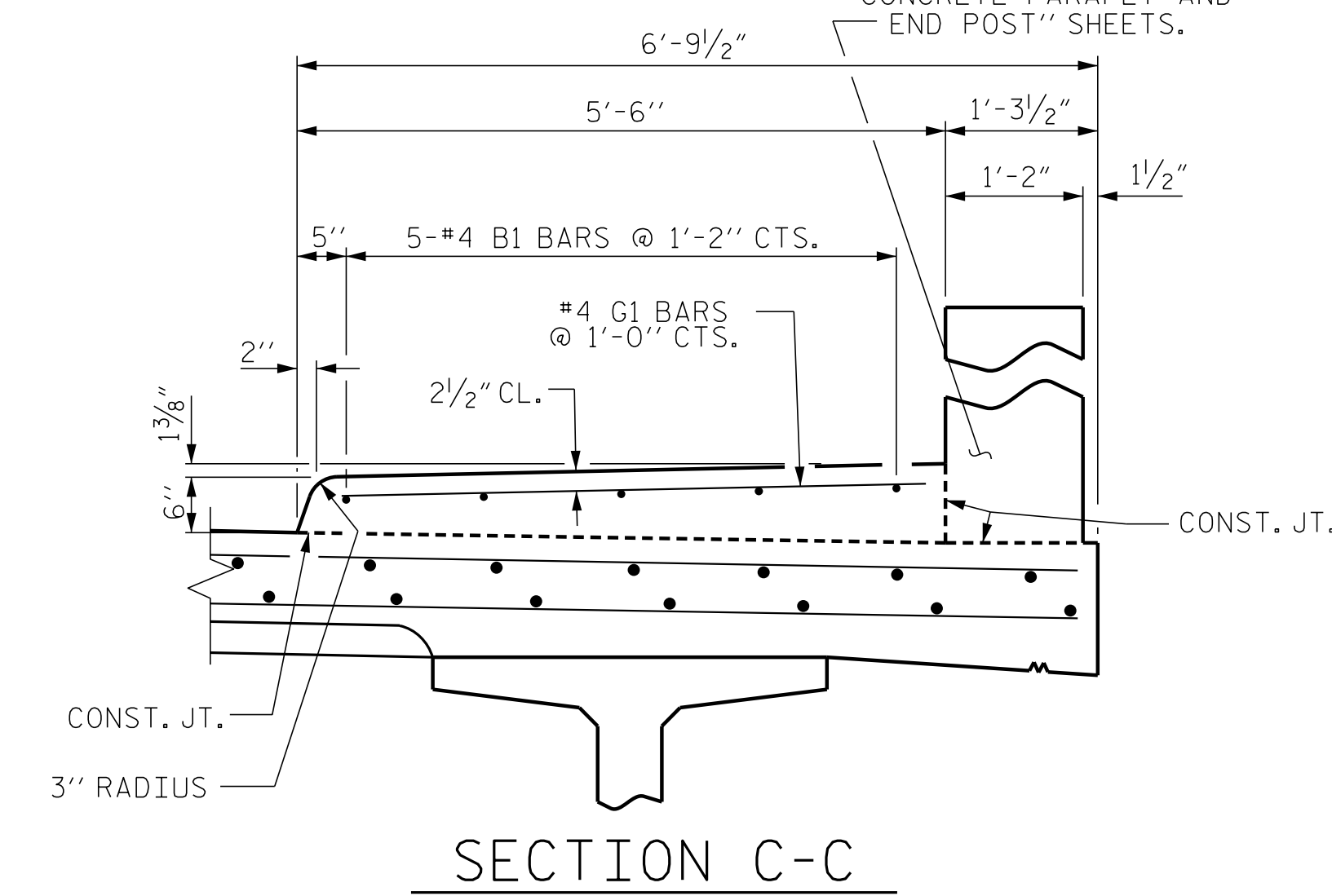
NOTES:
 GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET.
 NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT THE SIDEWALK. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT BID PRICE FOR REINFORCED CONCRETE DECK SLAB.
 ALL STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

FOR PARAPET REINFORCING STEEL AND DETAILS, SEE "CONCRETE PARAPET AND END POST" SHEETS.

FOR PARAPET REINFORCING STEEL AND DETAILS, SEE "CONCRETE PARAPET AND END POST" SHEETS.



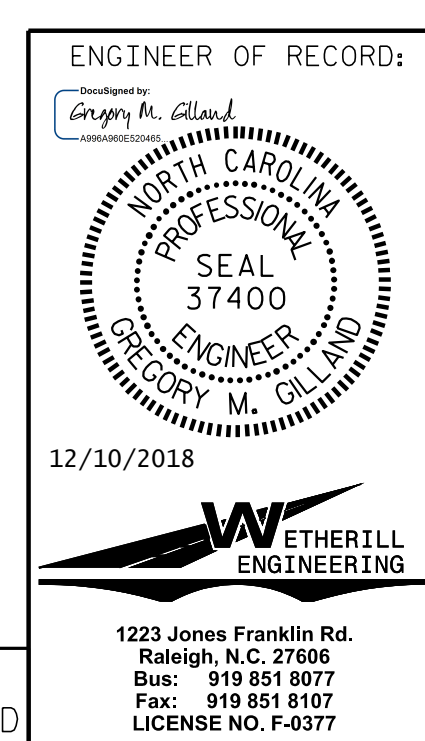
SECTION B-B



SECTION C-C

BILL OF MATERIAL FOR SIDEWALKS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	80	#4	STR	29'-9"	1590
* G1	438	#4	STR	5'-0"	1463
* EPOXY COATED REINFORCING STEEL					3,053 LBS.
CLASS "AA" CONCRETE					53.7 C.Y.

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-



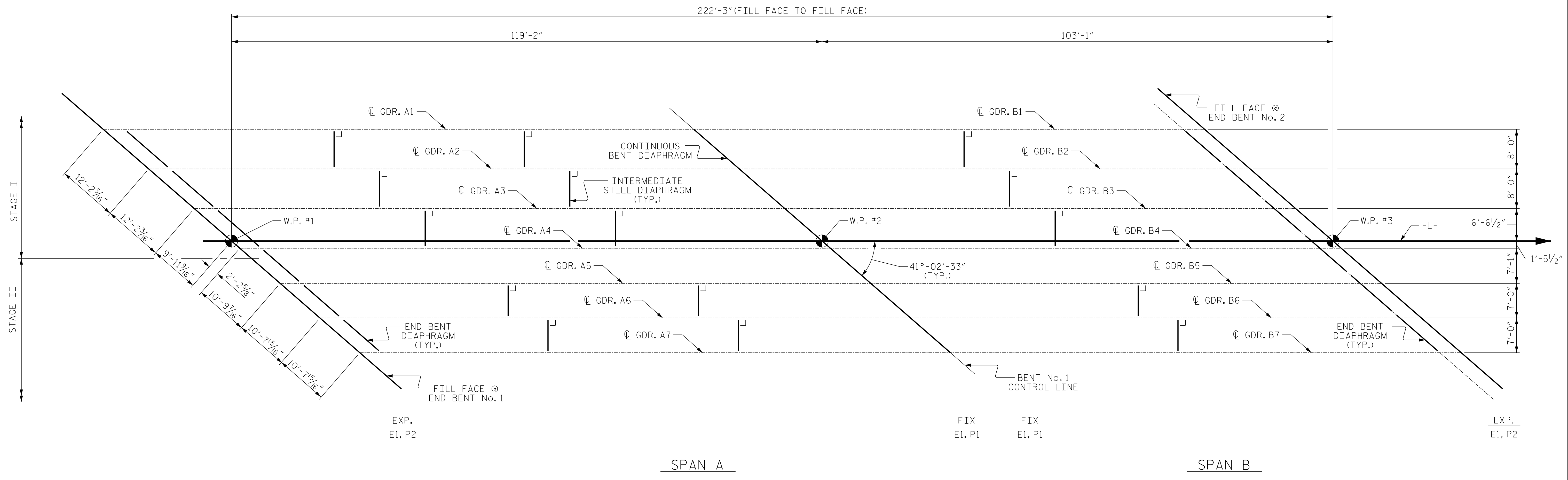
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-19
 TOTAL SHEETS 49

DRAWN BY: D. HODGE DATE: 8/18
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GIRDER LAYOUT

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

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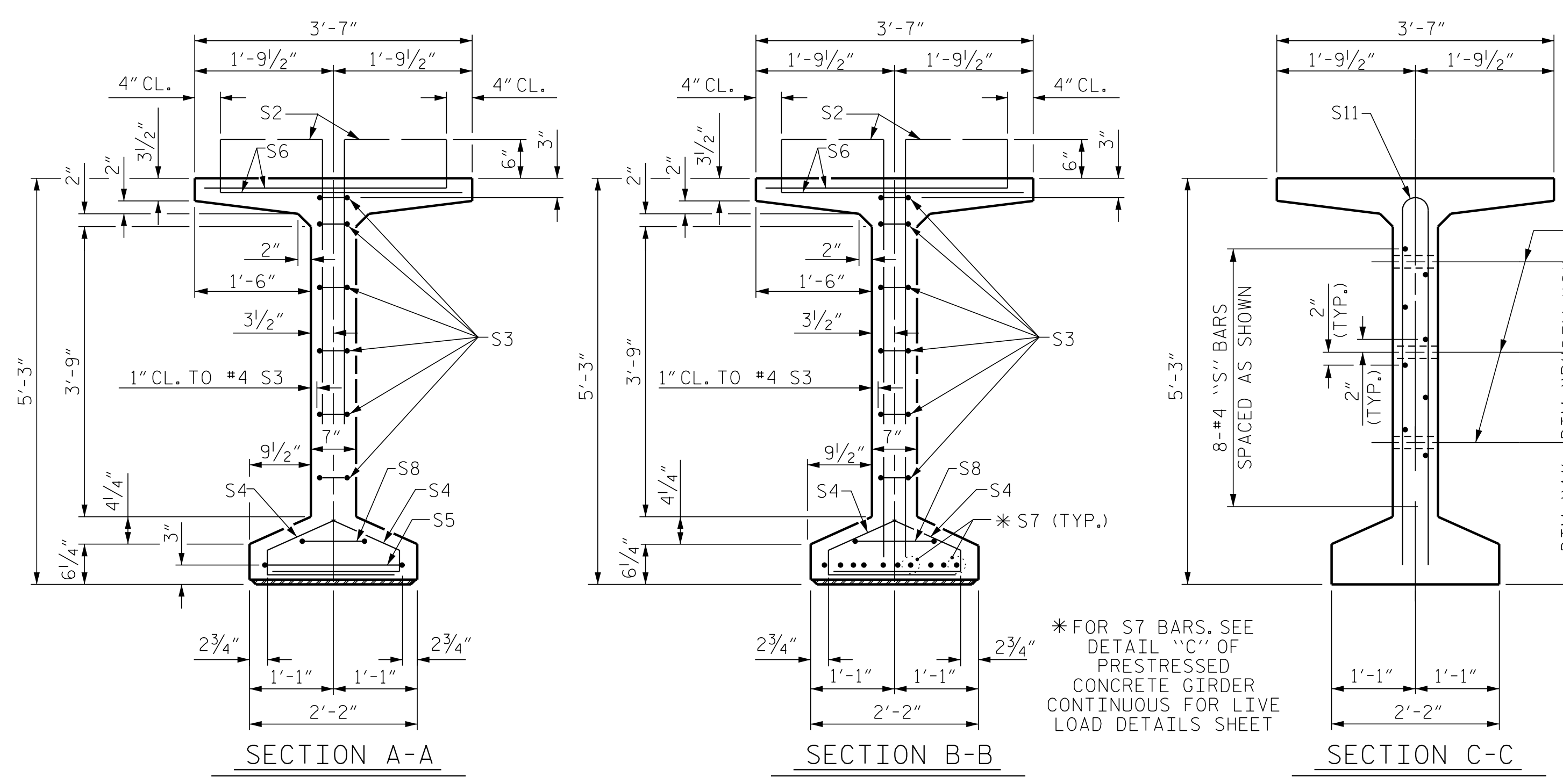
ENGINEER OF RECORD:
Gregory M. Gill
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 37400
 ENGINEER
 GREGORY M. GILL AND
 12/10/2018

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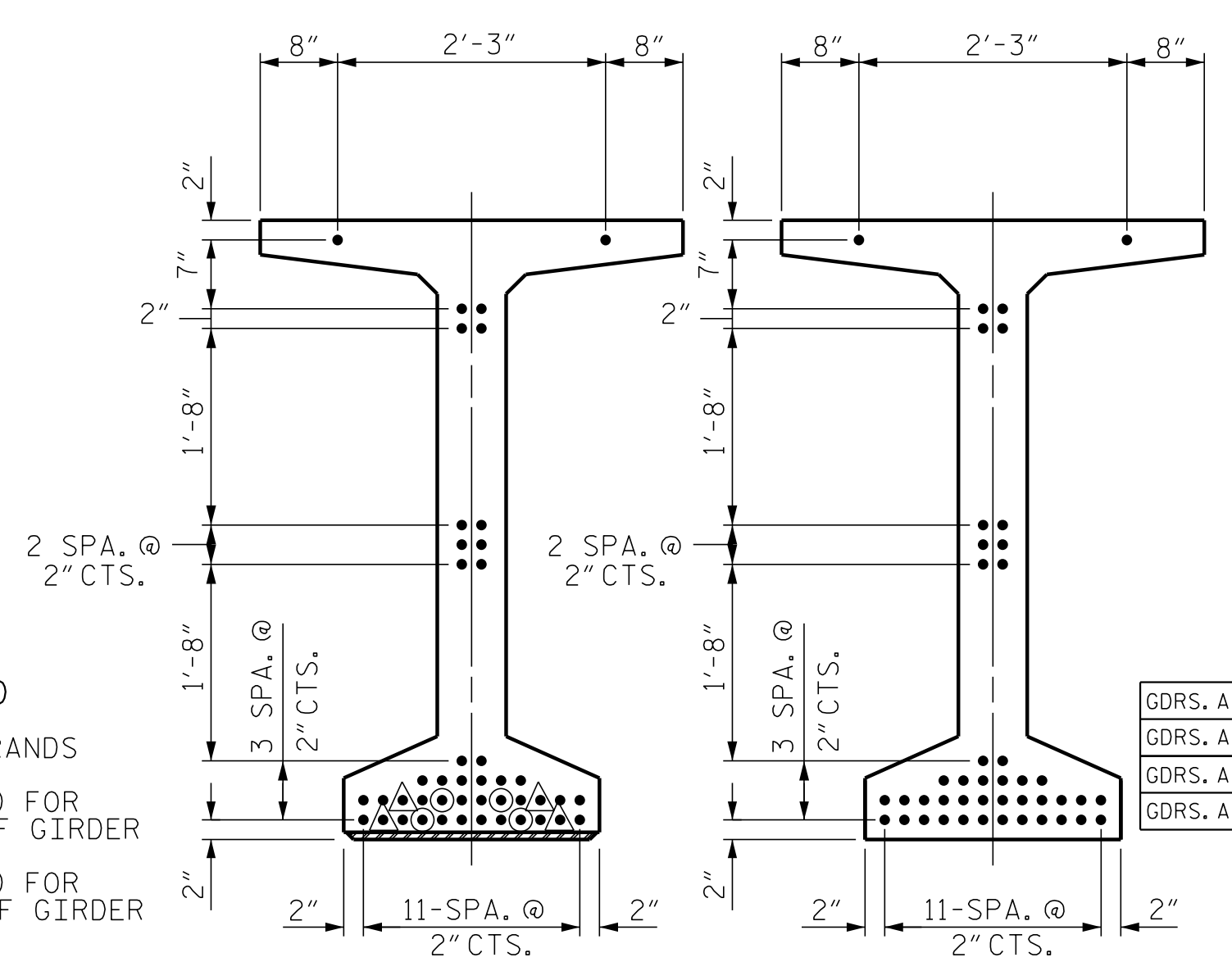
SUPERSTRUCTURE
 GIRDER LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-20
1			3			TOTAL SHEETS
2			4			49



1/2" Ø FORMED HOLE. SEE SHEET 4 OF 4 FOR LOCATION FOR DIM. "A", "B" & "C". SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET.)

- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - ▲ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 24'-0" FROM END OF GIRDER

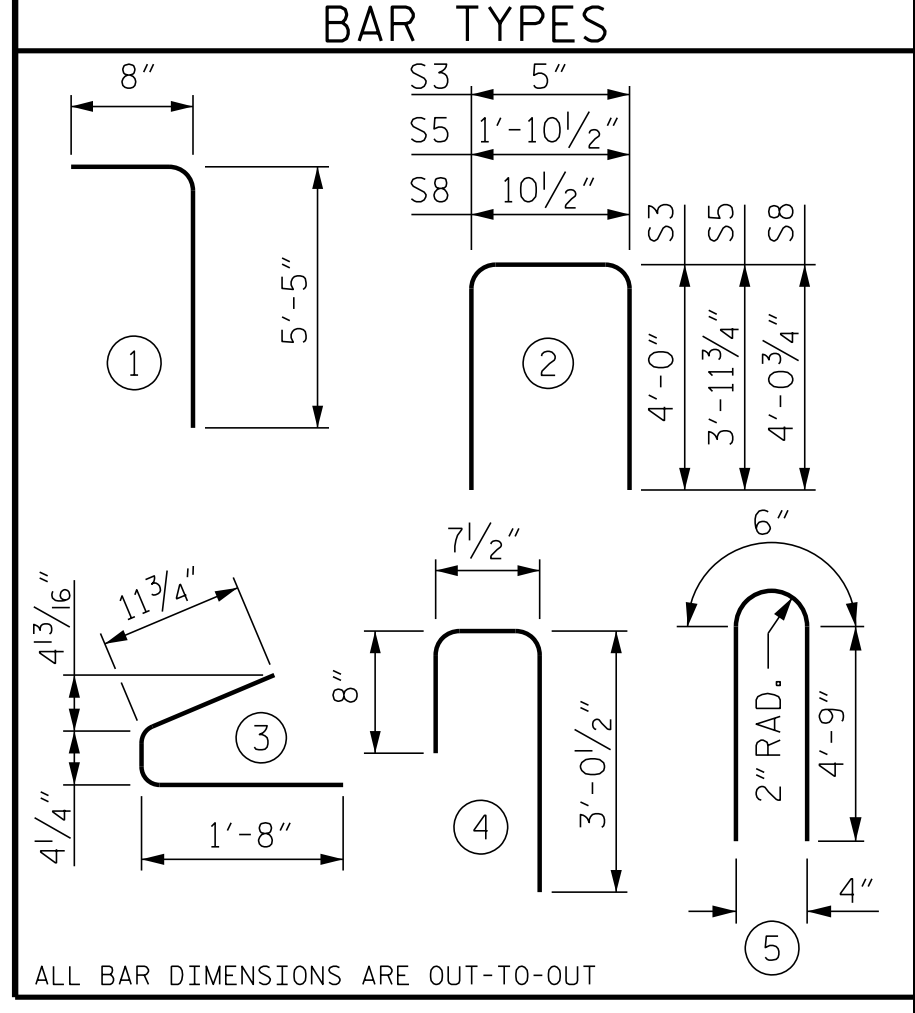


GDRS. A1, A4, A5 & A7
GDRS. A2, A3 & A6
GDRS. A1, A4, A5 & A7
GDRS. A2, A3 & A6

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

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	286	#4	1	6'-1"	1,162
S2	24	#6	1	6'-1"	219
S3	12	#4	2	8'-5"	67
S4	152	#4	3	3'-0"	305
S5	1	#5	2	9'-10"	10
S6	309	#5	4	4'-4"	1,397
*S7	10	#5	STR	3'-8"	38
S8	2	#5	2	9'-0"	19
S9	78	#5	STR	3'-3"	264
S10	1	#3	STR	1'-10"	1
S11	8	#5	5	10'-0"	83
S11	16	#5	5	10'-0"	167
S12	16	#4	STR	8'-0"	86
S13	16	#4	STR	17'-3"	184

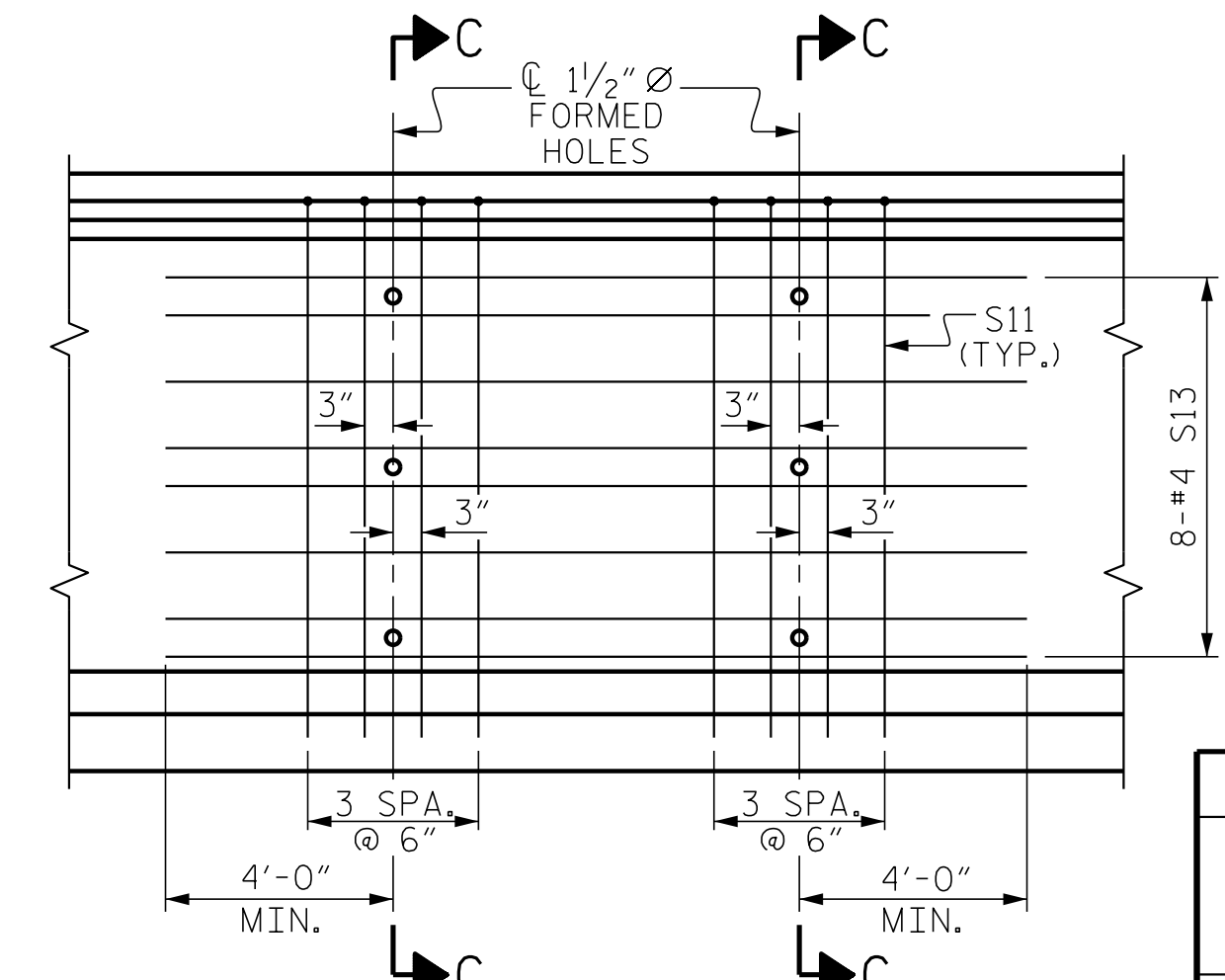
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



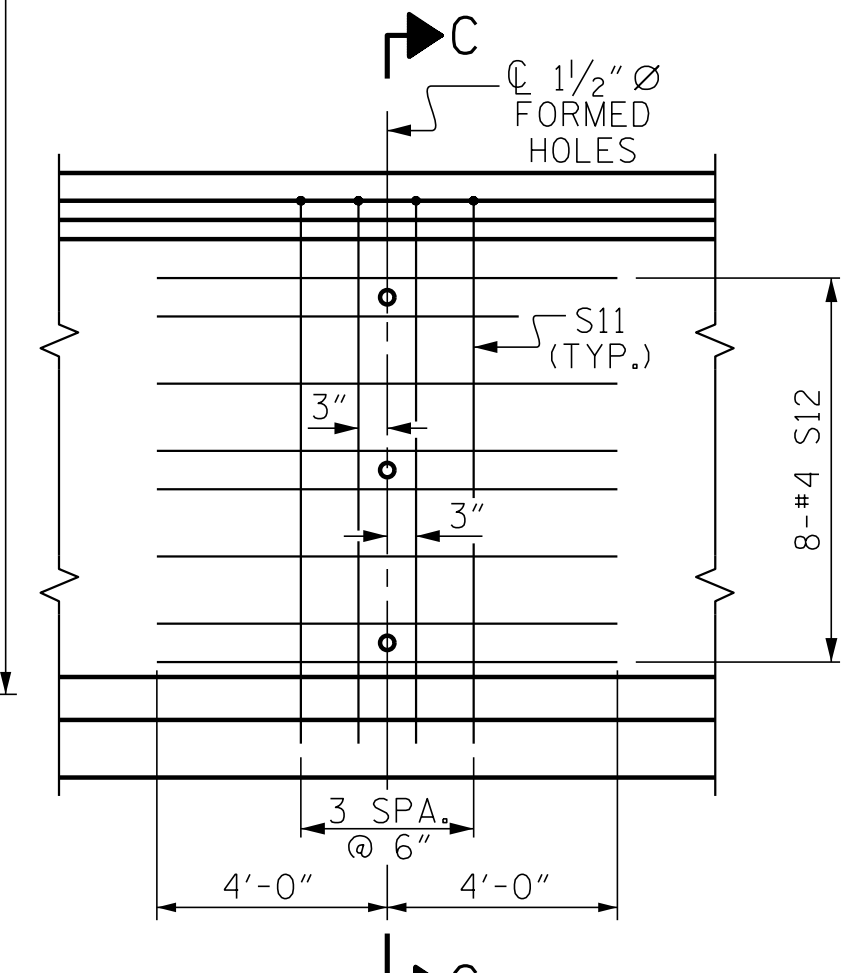
** NOTE: S6 ARE TYPICAL AT ALL S1 & S2 EXCEPT AT CORNER CLIP OF TOP FLANGE

(S1, S6 AND S9 BARS NOT SHOWN)

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



PARTIAL ELEVATION
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS A2, A3 & A6



PARTIAL ELEVATION
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS A1, A4, A5 & A7

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:
Gregory M. Gilliland
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 37400
GREGORY M. GILLILAND
12/10/2018
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GDRS. A1, A4, A5 & A7	3,651	22.8	44
GDRS. A2, A3 & A6	3,833	22.8	44

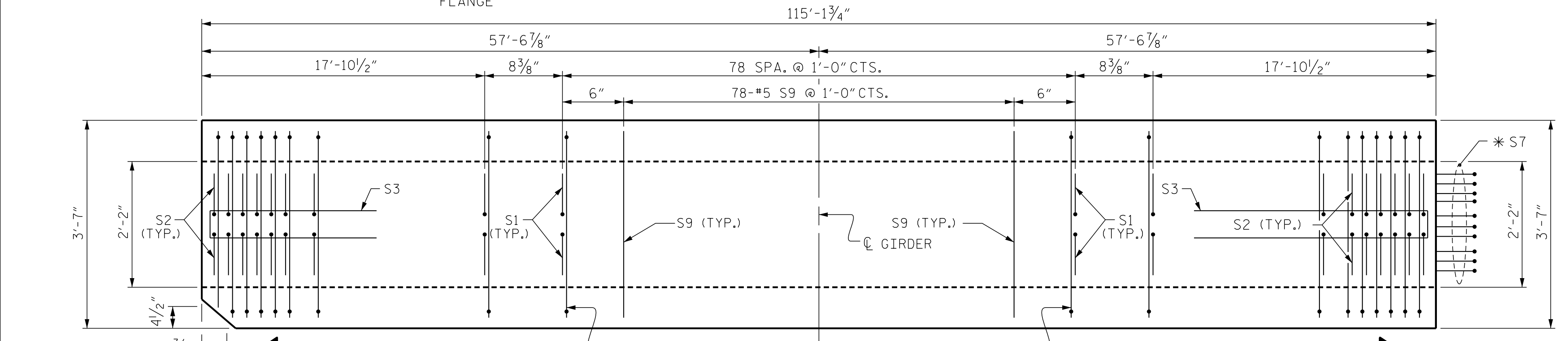
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
7	115'-1 3/4"	806.02

PROJECT NO. U-5818
MCDOWELL COUNTY
STATION: 27+83.62 -L-
SHEET 1 OF 4

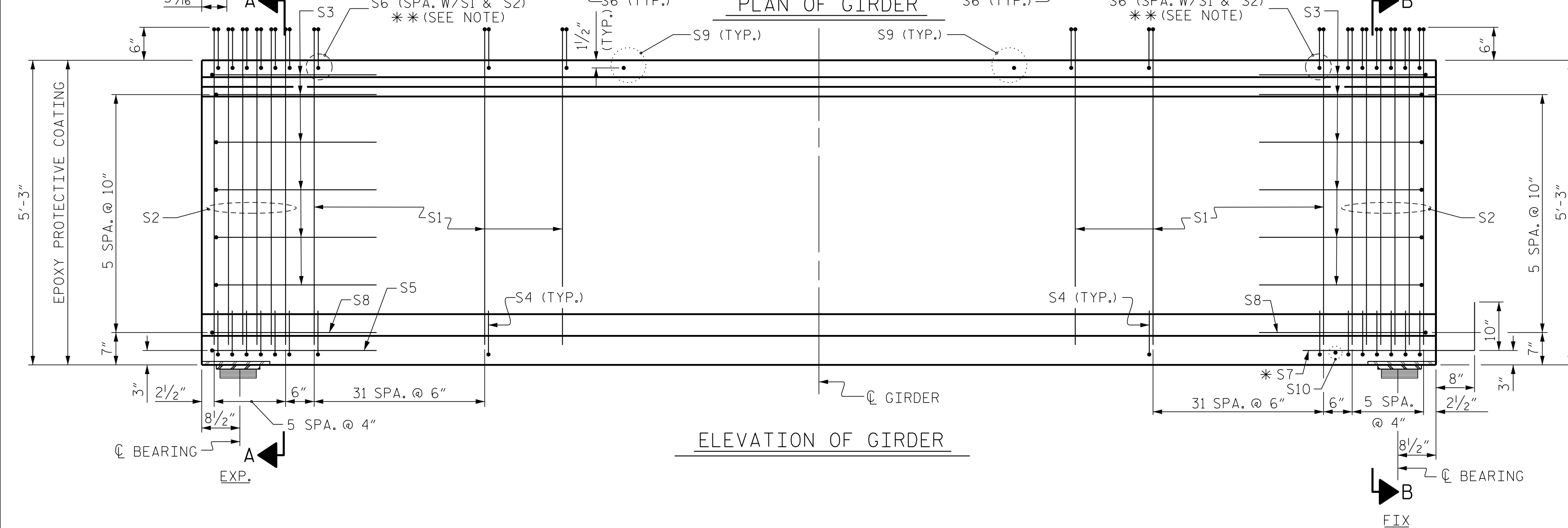
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
63" PRESTRESSED CONCRETE
MODIFIED BULB TEE
CONTINUOUS FOR LIVE LOAD
(SPAN A)

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

SHEET NO. S1-21
TOTAL SHEETS 49



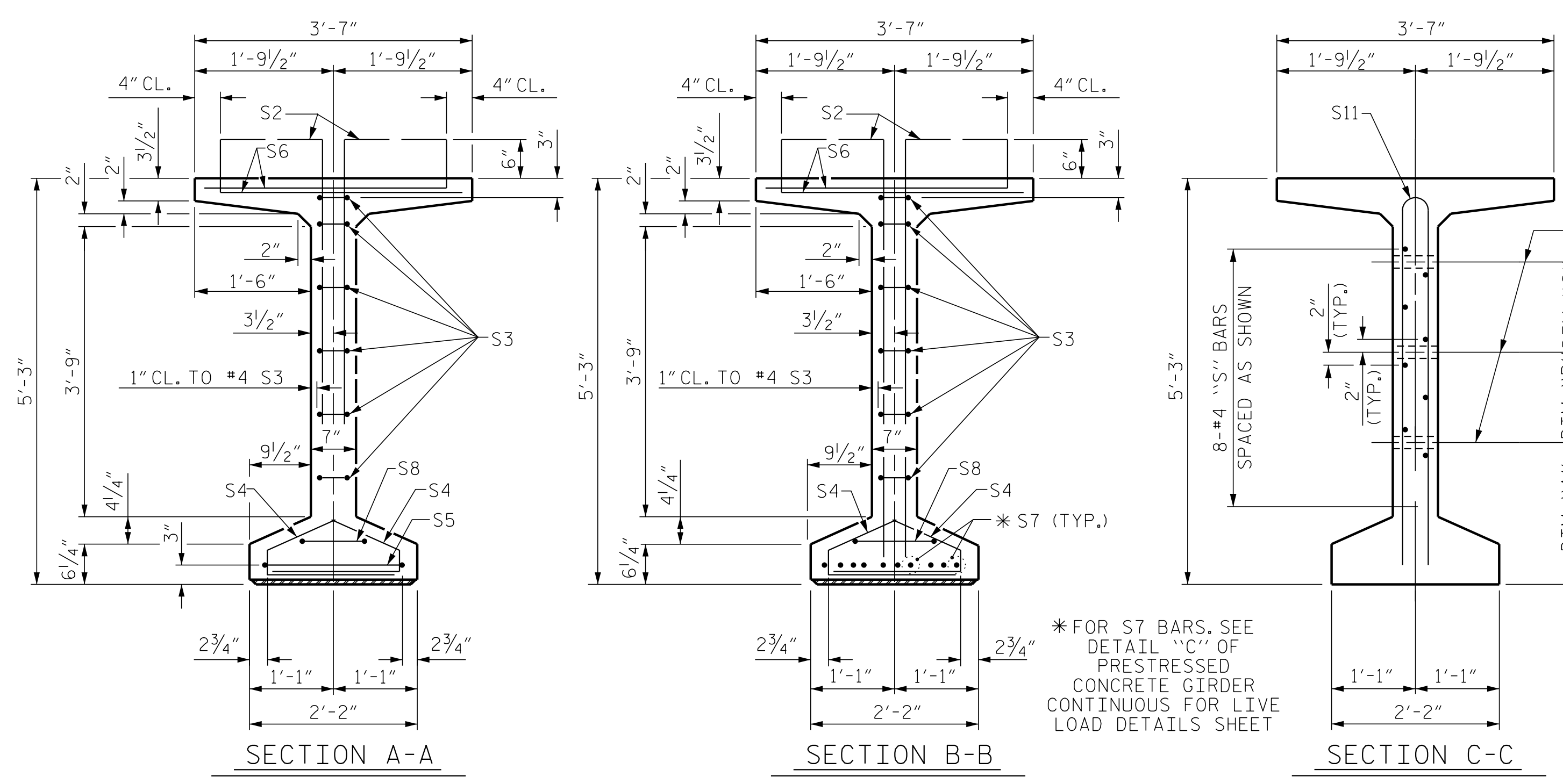
PLAN OF GIRDER



ELEVATION OF GIRDER

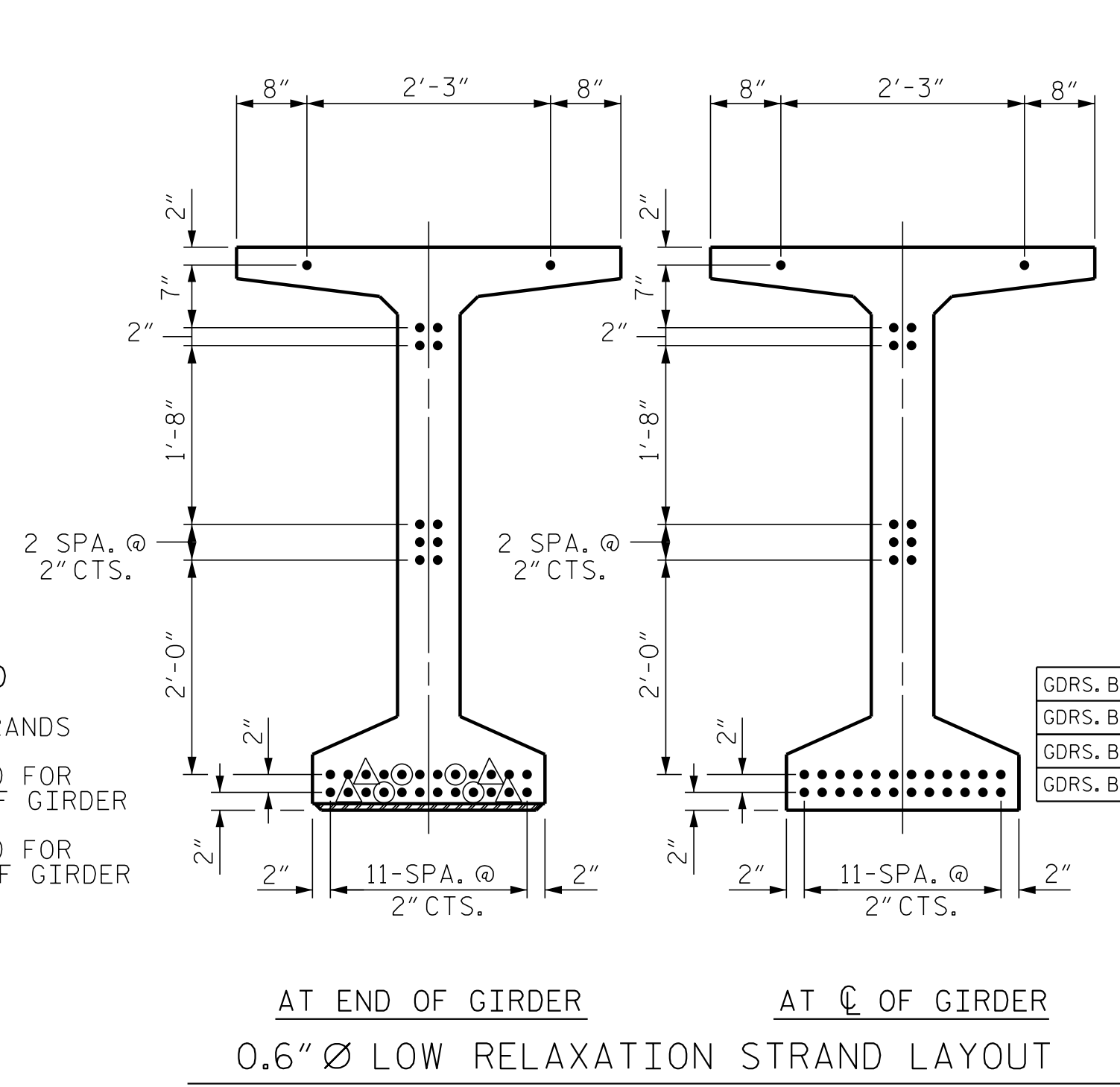
ASSEMBLED BY : D. HODGE	DATE : 9/18
CHECKED BY : B.C. HUNT	DATE : 9/18
DRAWN BY : EEM 2/6/97	REV. 6/13 MAA/GM
CHECKED BY : VAP 2/6/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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1/2" Ø FORMED HOLE. SEE SHEET 4 OF 4 FOR LOCATION FOR DIM. "A", "B" & "C". SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET.)

- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 24'-0" FROM END OF GIRDER

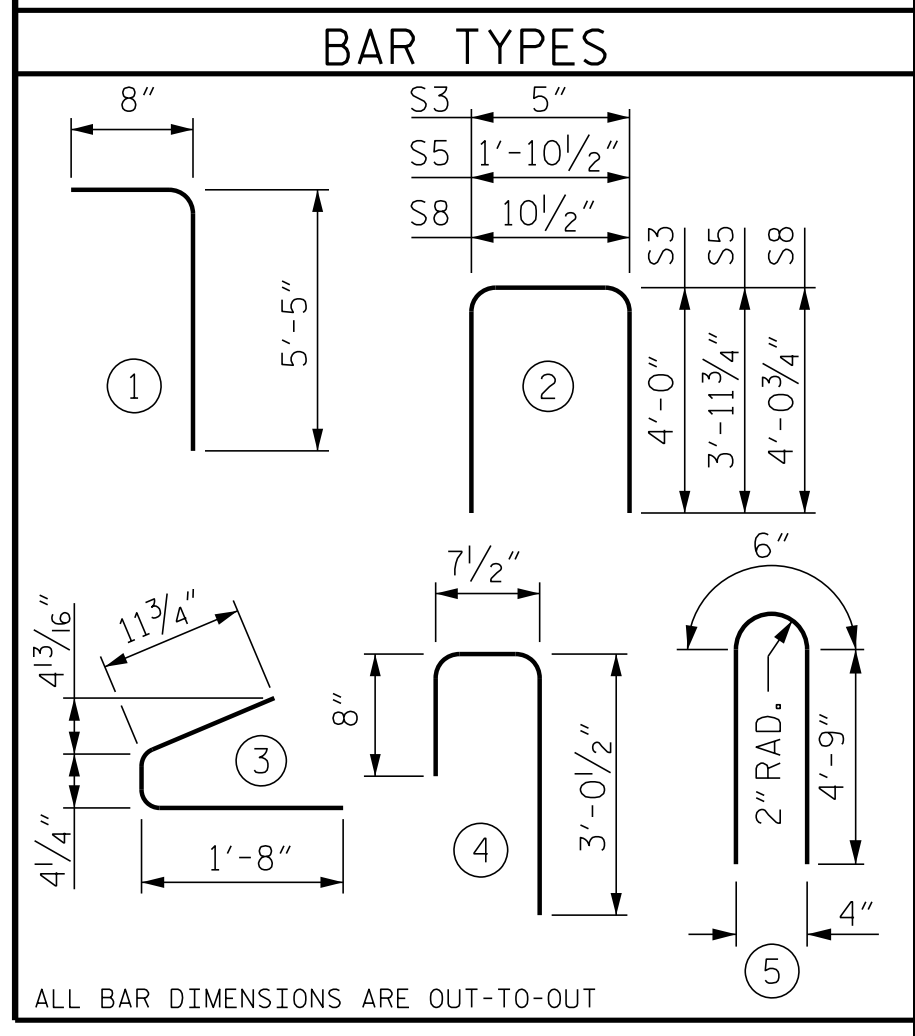


GDRS. B1, B4, B5 & B7
GDRS. B2, B3 & B6
GDRS. B1, B4, B5 & B7
GDRS. B2, B3 & B6

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

REINFORCING STEEL FOR ONE GDR					
BAR NUMBER	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	254	#4	1	6'-1"	1,032
S2	24	#5	1	6'-1"	152
S3	12	#4	2	8'-5"	67
S4	152	#4	3	3'-0"	305
S5	1	#5	2	9'-10"	10
S6	277	#5	4	4'-4"	1,252
*S7	10	#5	STR	3'-8"	38
S8	2	#5	2	9'-0"	19
S9	62	#5	STR	3'-3"	210
S10	1	#3	STR	1'-10"	1
S11	4	#5	5	10'-0"	42
S11	8	#5	5	10'-0"	83
S12	8	#4	STR	8'-0"	43
S13	8	#4	STR	17'-3"	92

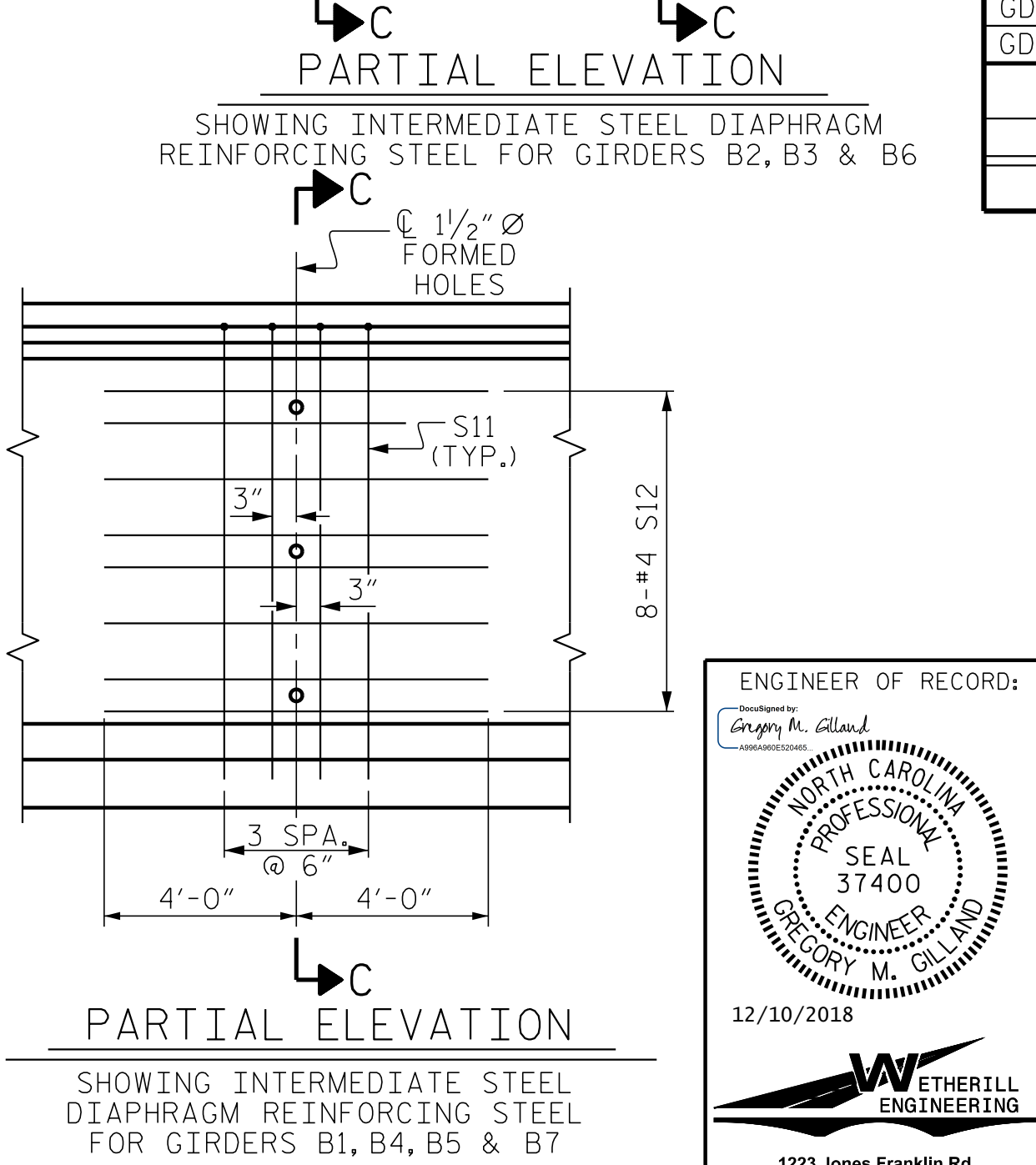
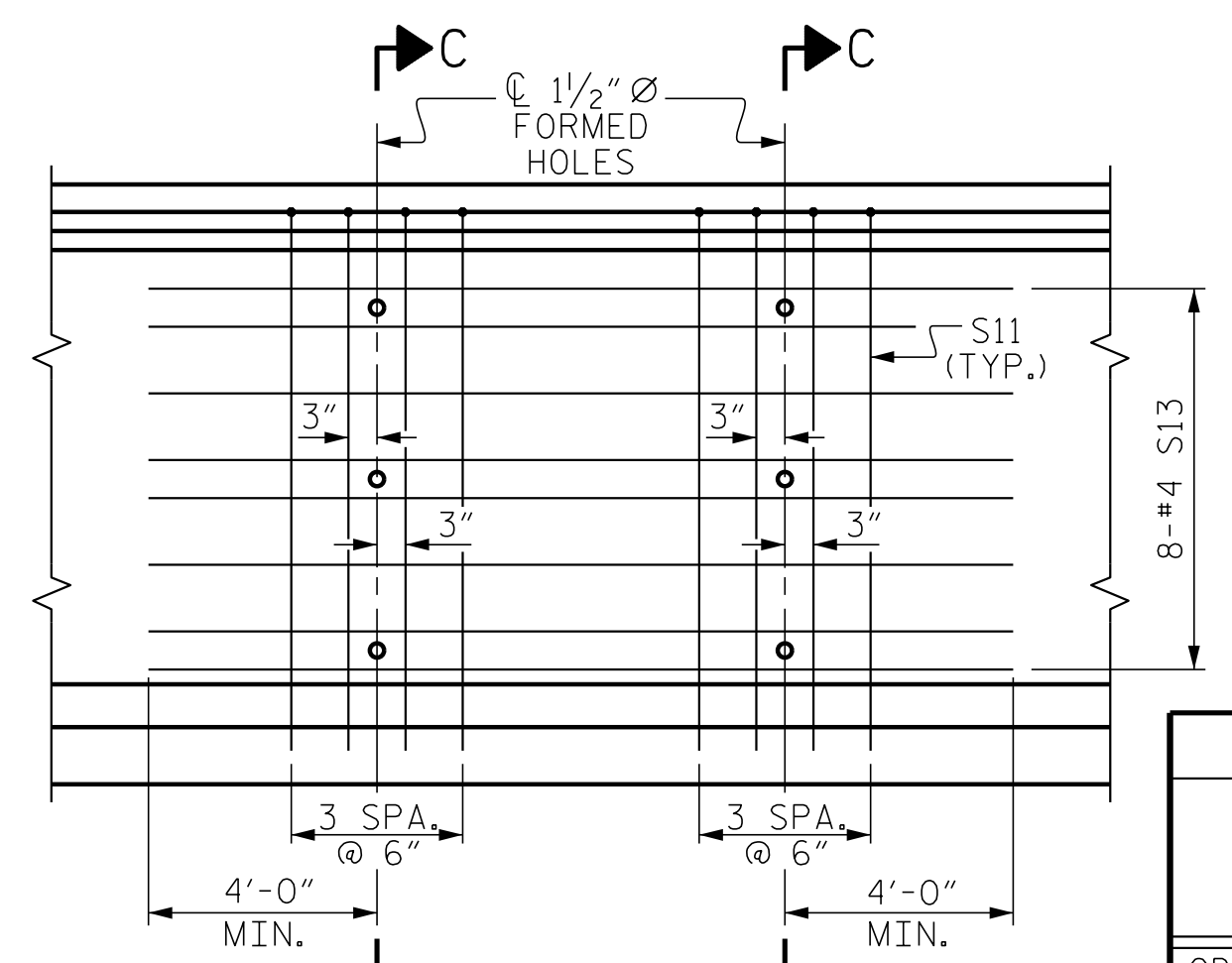
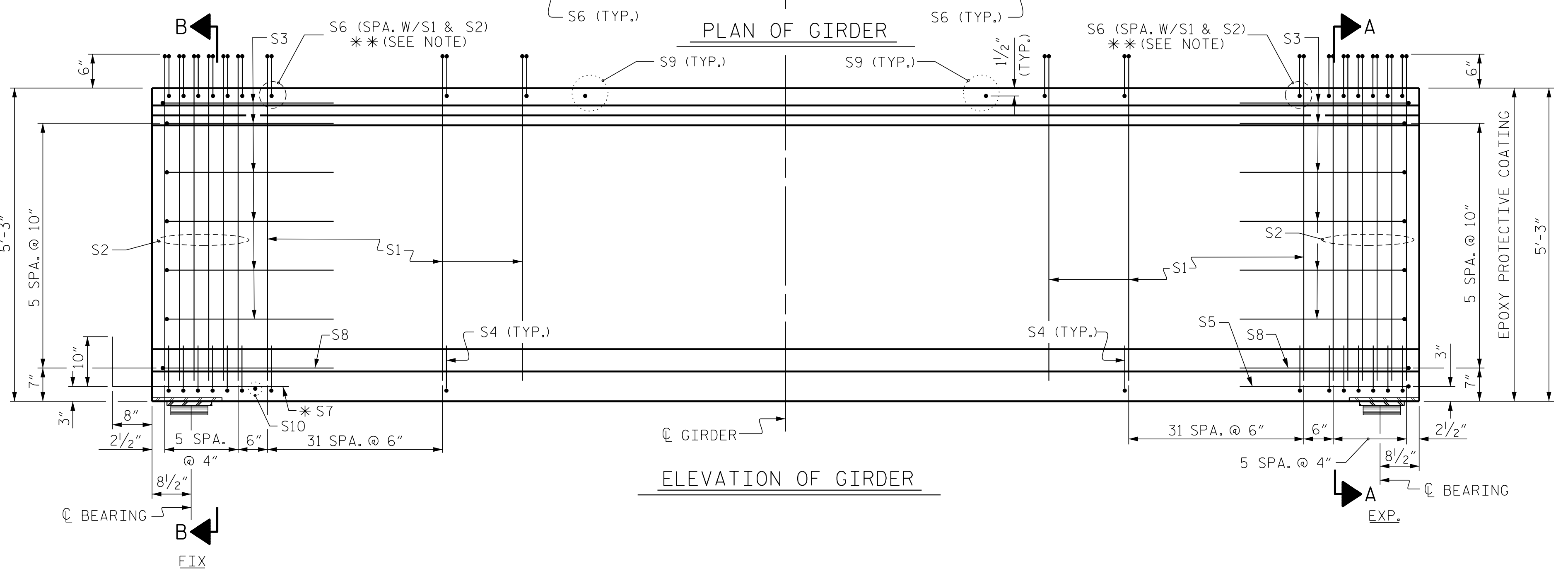
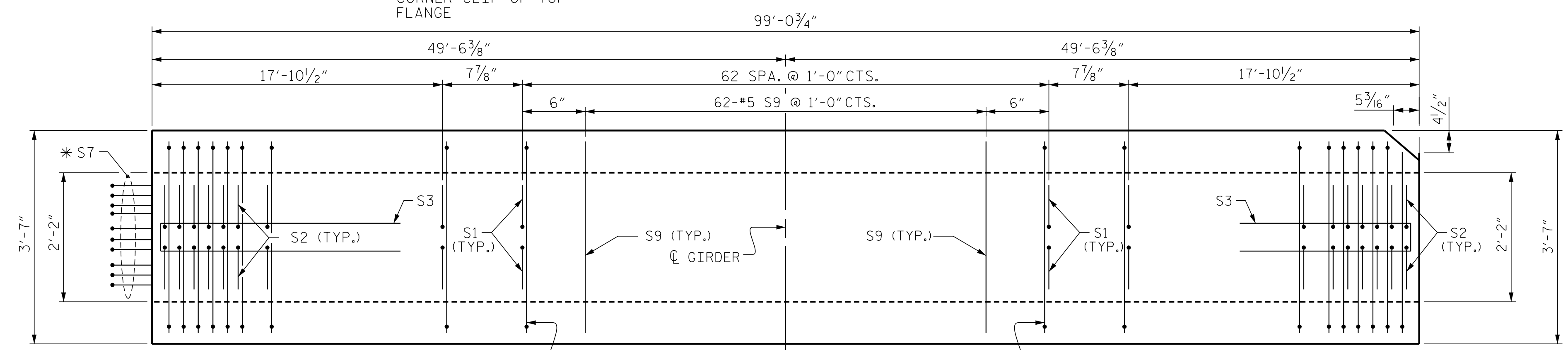
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



** NOTE: S6 ARE TYPICAL AT ALL S1 & S2 EXCEPT AT CORNER CLIP OF TOP FLANGE

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

(S1, S6 AND S9 BARS NOT SHOWN)



QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	7500 PSI CONCRETE	0.6" Ø L.R. STRANDS	
LB.	C.Y.	No.	
GDRS. B1, B4, B5 & B7	3,171	19.6	36
GDRS. B2, B3 & B6	3,261	19.6	36

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
7	99'-0 3/4"	693.44

PROJECT NO. U-5818
MCDOWELL COUNTY
STATION: 27+83.62 -L-
SHEET 2 OF 4



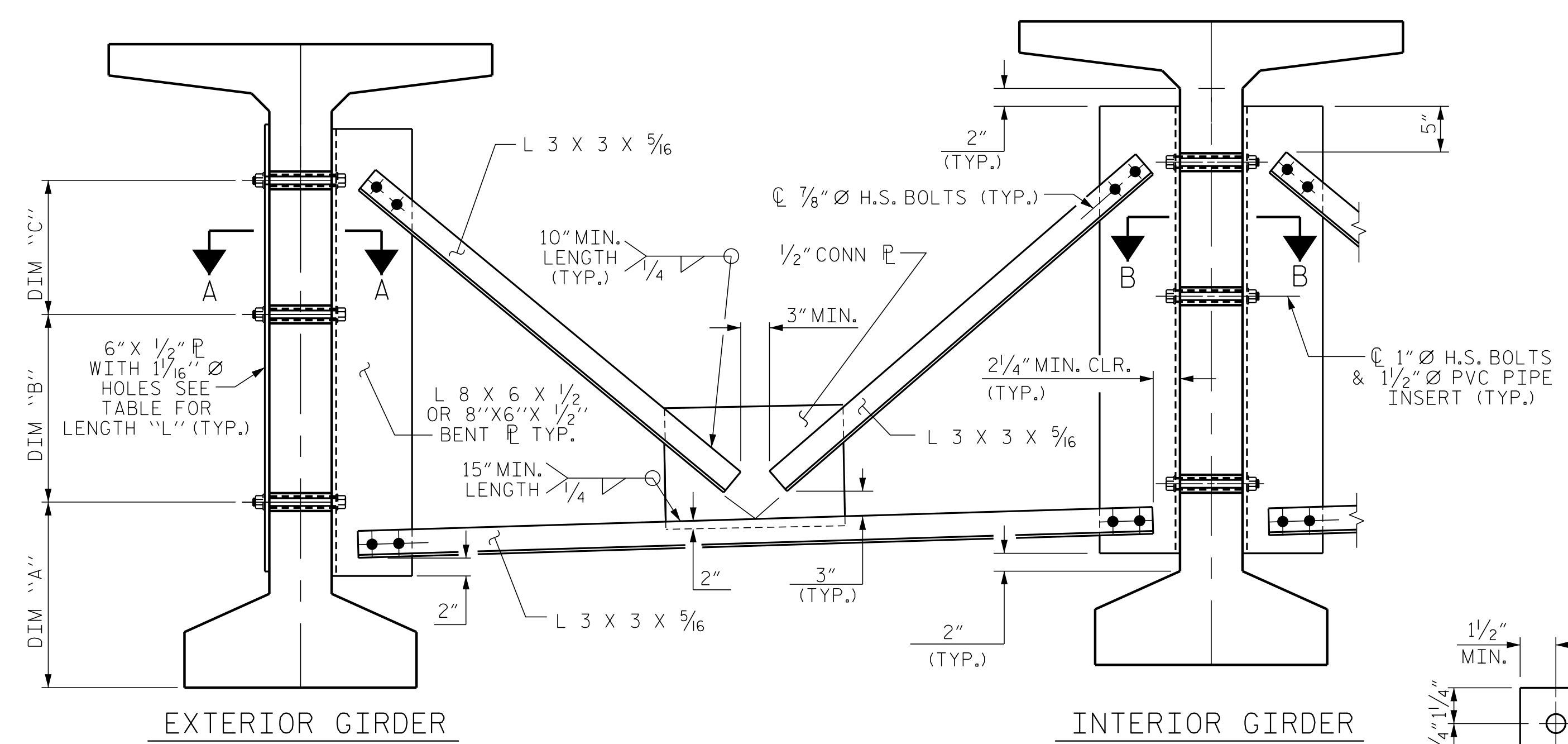
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
63" PRESTRESSED CONCRETE
MODIFIED BULB TEE
CONTINUOUS FOR LIVE LOAD
(SPAN B)

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

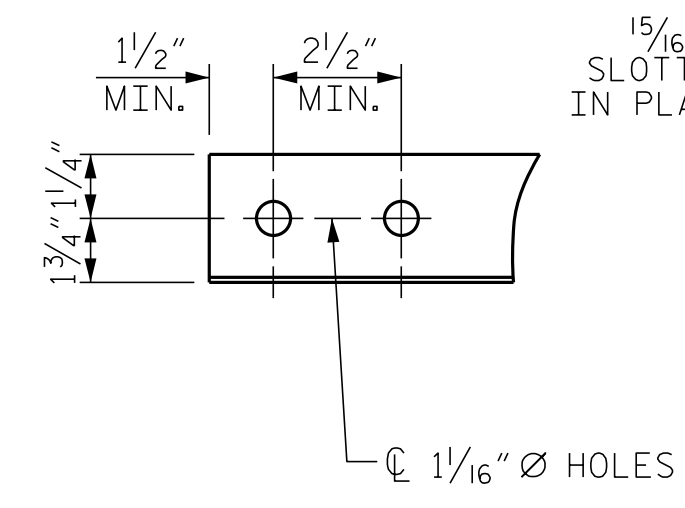
ASSEMBLED BY : D. HODGE	DATE : 9/18
CHECKED BY : B.C. HUNT	DATE : 9/18
DRAWN BY : EEM 2/6/97	REV. 6/13 MAA/GM
CHECKED BY : VAP 2/6/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

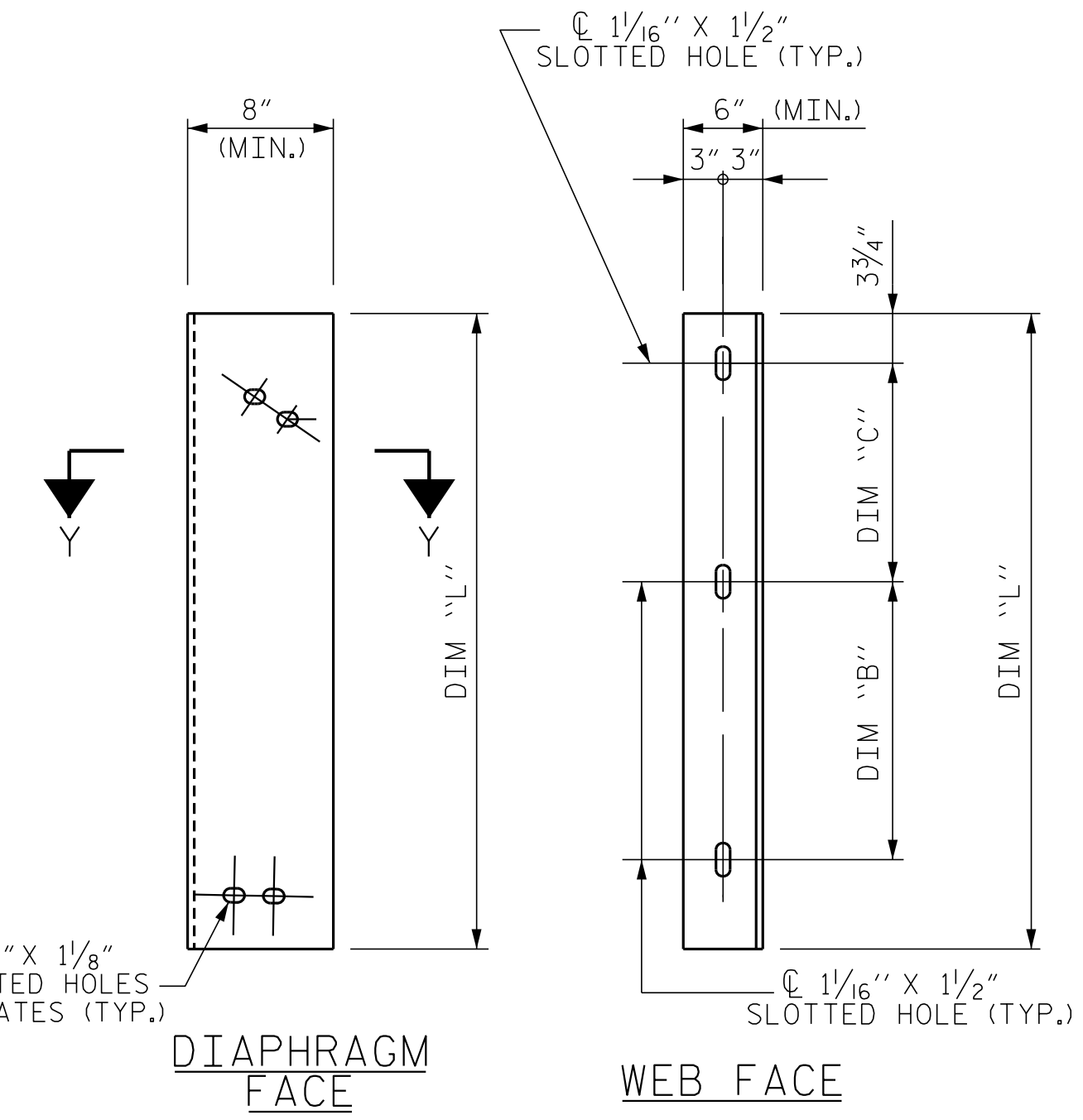
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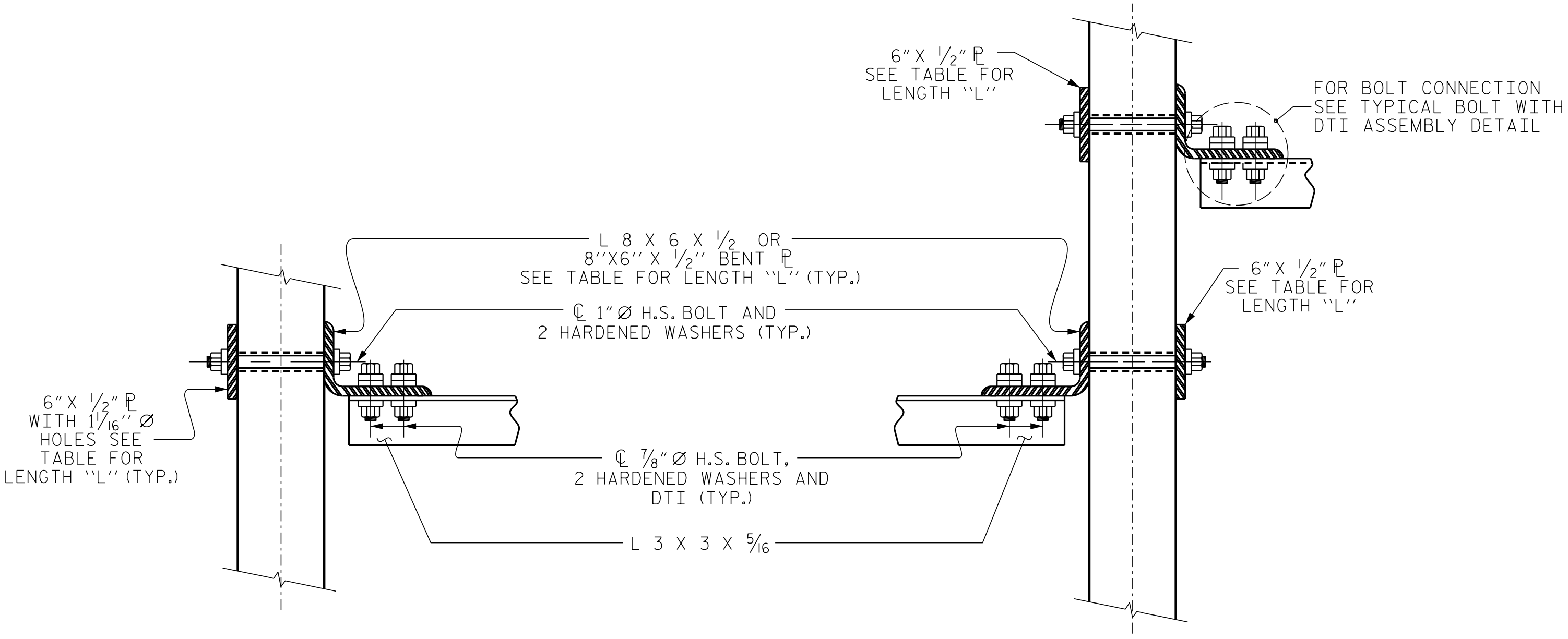
PART SECTION AT INTERMEDIATE DIAPHRAGM



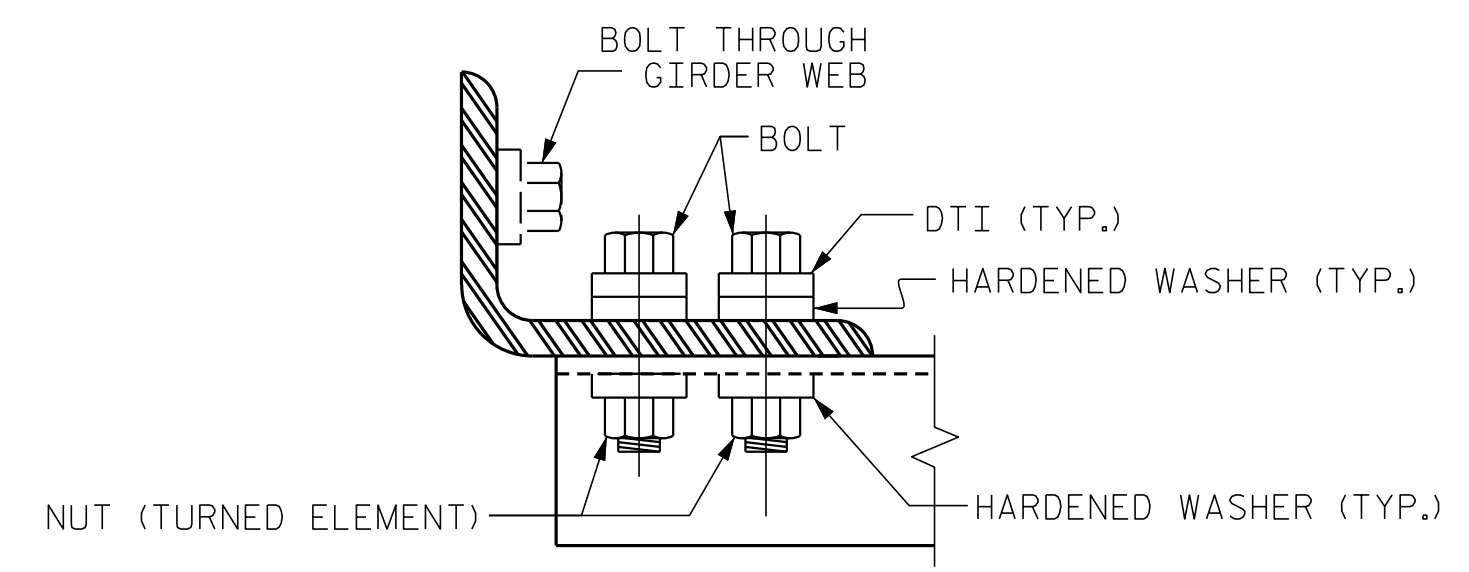
ANGLE END
(L 3 x 3 x 5/16)



CONNECTOR PLATE DETAIL



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

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

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

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

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63" BULB TEE	1'-10"	1'-2"	1'-2"	3'-5"

PROJECT NO. U-5818
MCDOWELL COUNTY
STATION: 27+83.62 -L-
SHEET 3 OF 4

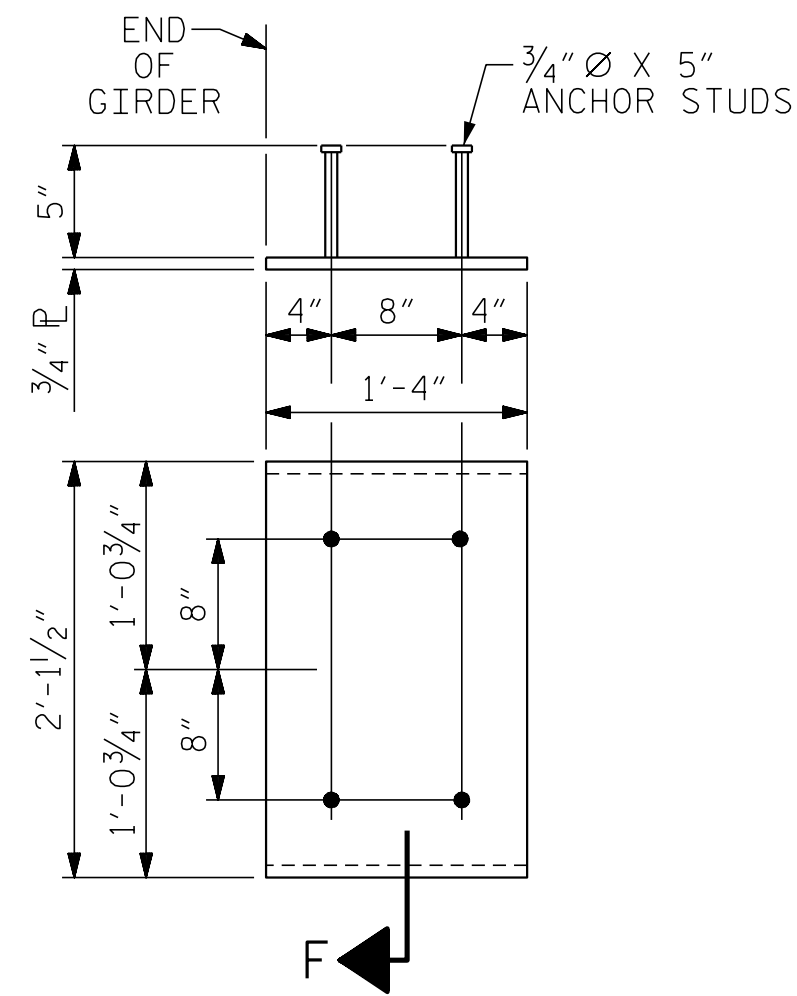
ENGINEER OF RECORD:
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NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 37400
GREGORY M. GILL AND
12/10/2018
ETHERILL ENGINEERING
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Raleigh, N.C. 27606
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Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

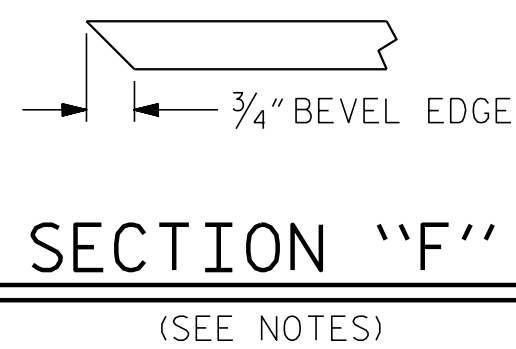
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-23
1			3			TOTAL SHEETS 49
2			4			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

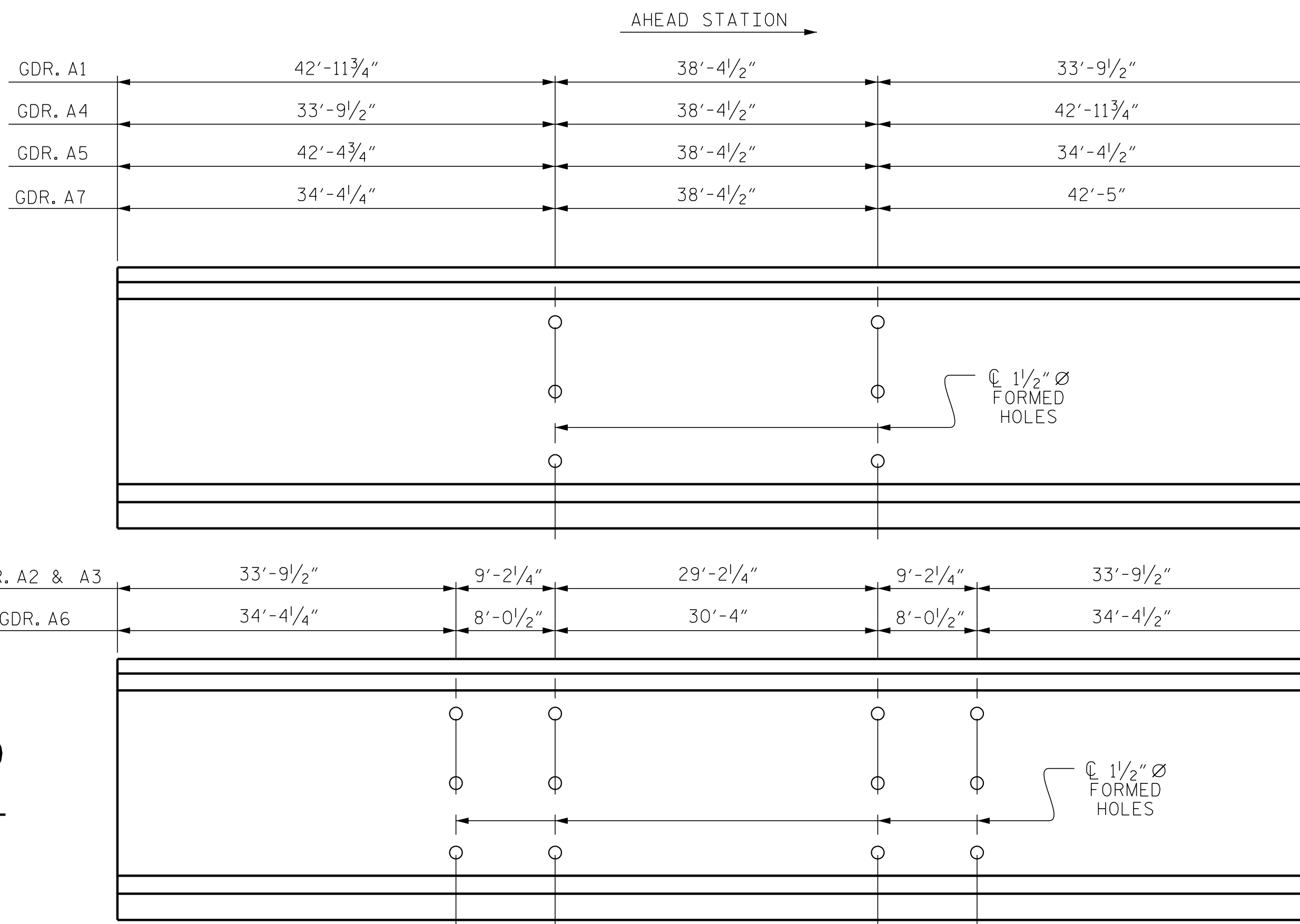
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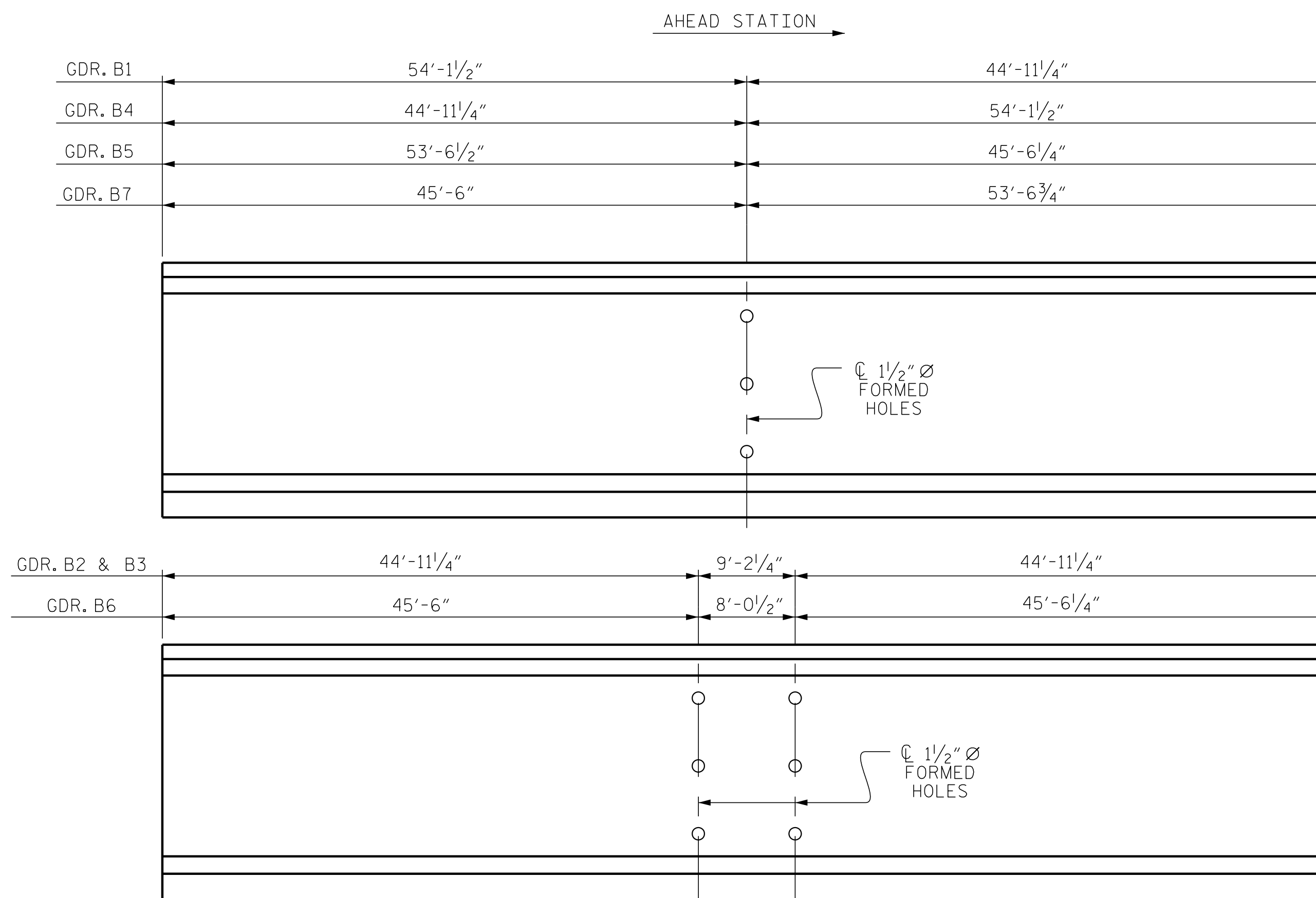
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER AND 63" MODIFIED BULB TEES
(2 REQ'D PER GIRDER)



SECTION "F"
(SEE NOTES)



LOCATION OF BOLT HOLES IN SPAN A GIRDERS



LOCATION OF BOLT HOLES IN SPAN B GIRDERS

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,700 PSI FOR SPAN A AND 5,200 FOR SPAN B.

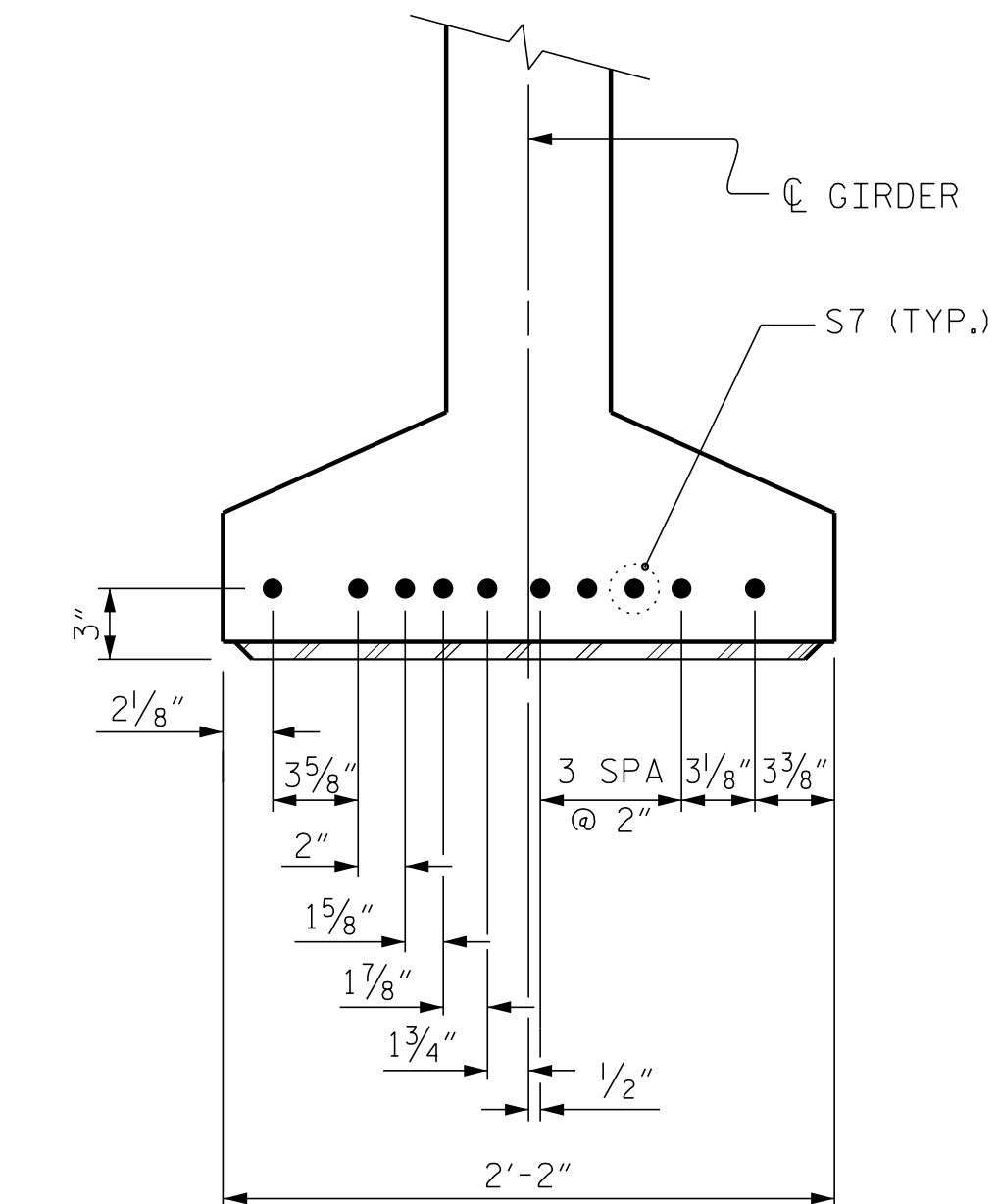
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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

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

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

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



DETAIL "C"
(FOR 63" MODIFIED BULB TEES)

PROJECT NO. U-5818
MCDOWELL COUNTY
STATION: 27+83.62 -L-

SHEET 4 OF 4

ASSEMBLED BY : D. HODGE	DATE : 9/18
CHECKED BY : B.C. HUNT	DATE : 9/18
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

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:
Gregory M. Gilland
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 37400
GREGORY M. GILLAND
12/10/2018
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 PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-24					TOTAL SHEETS 49

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN A																				
	GIRDERS A1 & A7																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.038	0.075	0.110	0.141	0.170	0.194	0.213	0.227	0.235	0.238	0.235	0.227	0.213	0.194	0.170	0.141	0.110	0.075	0.038	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.029	0.057	0.084	0.112	0.133	0.155	0.168	0.182	0.186	0.191	0.186	0.182	0.168	0.155	0.133	0.112	0.084	0.057	0.029	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	5/16"	3/8"	7/16"	7/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	7/16"	7/16"	3/8"	5/16"	3/16"	1/8"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN A																				
	GIRDERS A2 & A6																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.038	0.075	0.110	0.141	0.170	0.194	0.213	0.227	0.235	0.238	0.235	0.227	0.213	0.194	0.170	0.141	0.110	0.075	0.038	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.054	0.080	0.106	0.126	0.146	0.159	0.172	0.176	0.181	0.176	0.172	0.159	0.146	0.126	0.106	0.080	0.054	0.027	0.000
FINAL CAMBER ↑	0	1/8"	1/4"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	11/16"	11/16"	11/16"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	1/4"	1/8"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.6" Ø LOW RELAXATION	SPAN A																					
	GIRDERS A3 THRU A5																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0	
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.038	0.075	0.110	0.141	0.170	0.194	0.213	0.227	0.235	0.238	0.235	0.227	0.213	0.194	0.170	0.141	0.110	0.075	0.038	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.026	0.052	0.076	0.101	0.121	0.140	0.152	0.165	0.169	0.173	0.169	0.165	0.152	0.140	0.121	0.101	0.076	0.052	0.026	0.000	
FINAL CAMBER ↑	0	1/8"	1/4"	3/8"	1/2"	9/16"	5/8"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	5/8"	9/16"	1/2"	3/8"	1/4"	1/8"	0

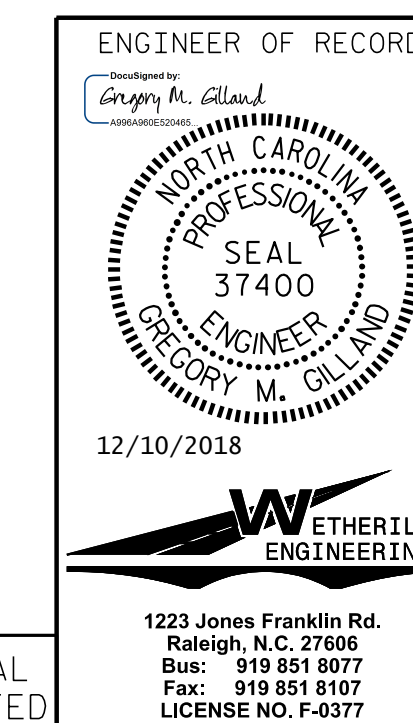
DEAD LOAD DEFLECTION TABLE FOR GIRDERS											
0.6" Ø LOW RELAXATION	SPAN B										
	GIRDERS B1 & B7										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.038	0.073	0.099	0.116	0.122	0.116	0.099	0.073	0.038	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.032	0.063	0.087	0.103	0.108	0.103	0.087	0.063	0.032	0.000
FINAL CAMBER ↑	0	1/16"	1/8"	1/8"	3/16"	3/16"	3/16"	1/8"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS											
0.6" Ø LOW RELAXATION	SPAN B										
	GIRDERS B2 & B6										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.038	0.073	0.099	0.116	0.122	0.116	0.099	0.073	0.038	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.030	0.060	0.083	0.097	0.102	0.097	0.083	0.060	0.030	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	3/16"	3/16"	1/8"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS											
0.6" Ø LOW RELAXATION	SPAN B										
	GIRDERS B3 THRU B5										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.038	0.073	0.099	0.116	0.122	0.116	0.099	0.073	0.038	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.029	0.057	0.079	0.093	0.098	0.093	0.079	0.057	0.029	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	1/4"	1/4"	5/16"	1/4"	1/4"	3/16"	1/8"	0

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

PROJECT NO. U-5818
MCDOWELL COUNTY
STATION: 27+83.62 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH	
SUPERSTRUCTURE DEAD LOAD DEFLECTIONS	
REVISIONS	
NO.	BY: DATE:
1	3
2	4
SHEET NO. S1-25 TOTAL SHEETS 49	

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DRAWN BY : D. HODGE DATE : 9/18
CHECKED BY : B.C. HUNT DATE : 9/18

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NOTES

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

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

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

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

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

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

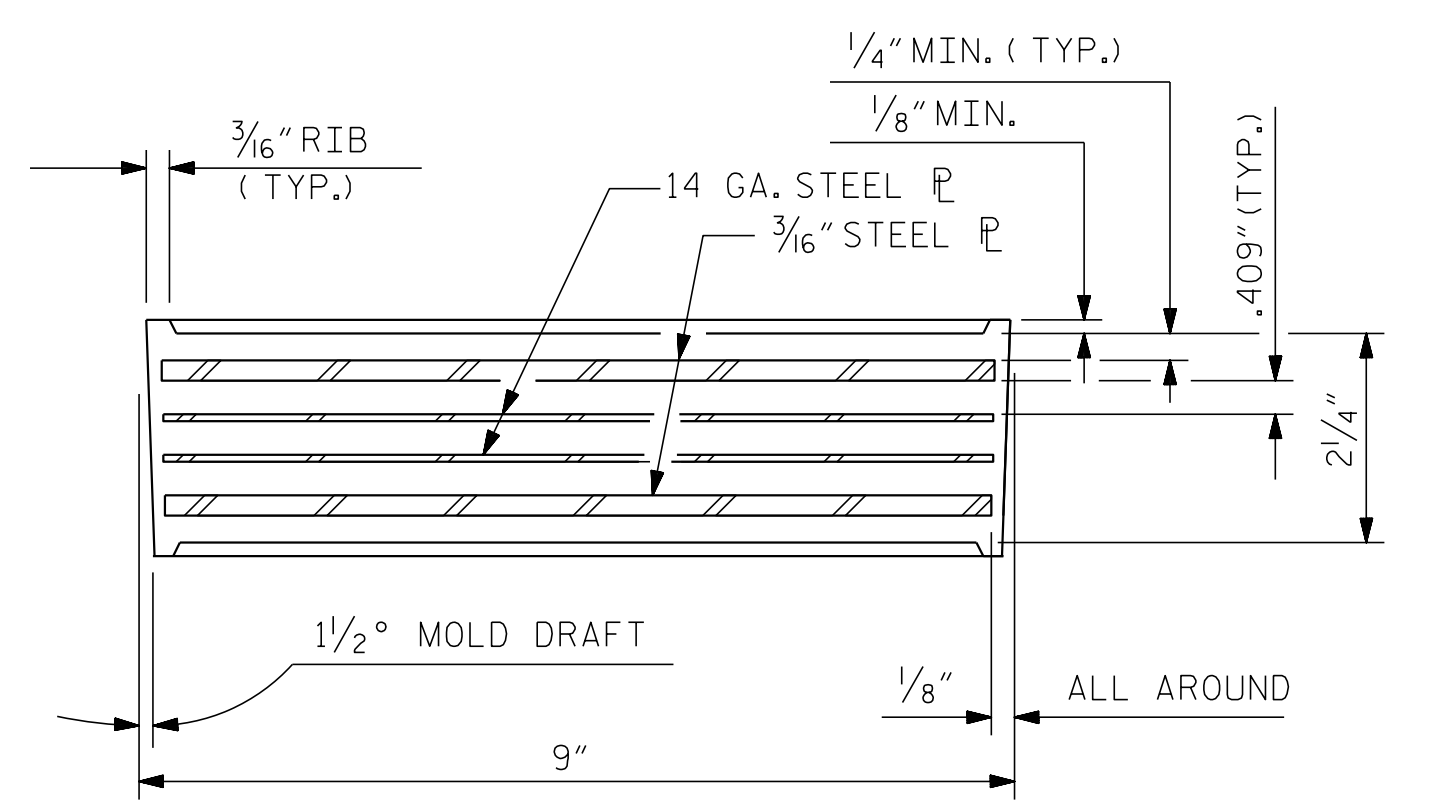
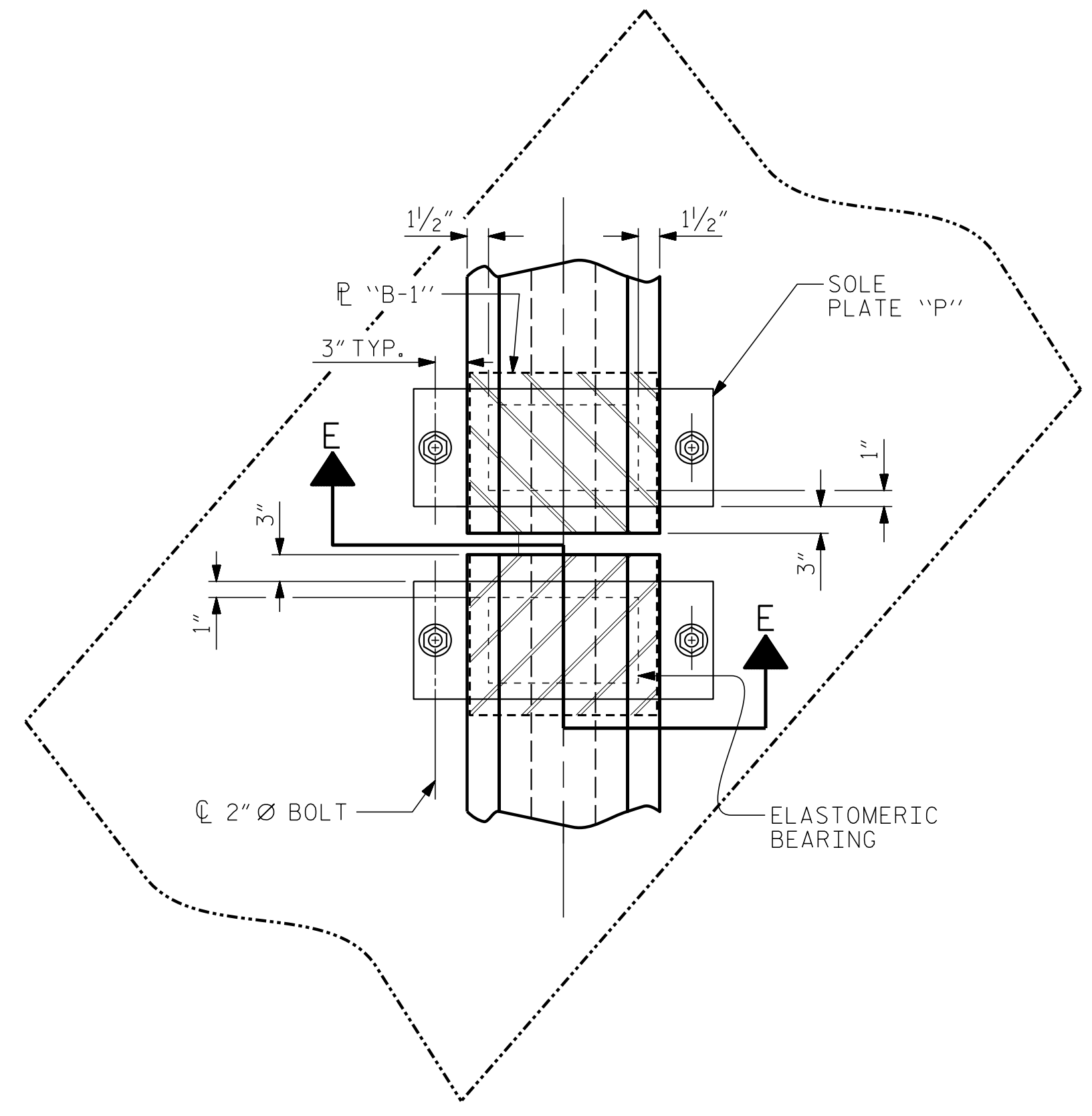
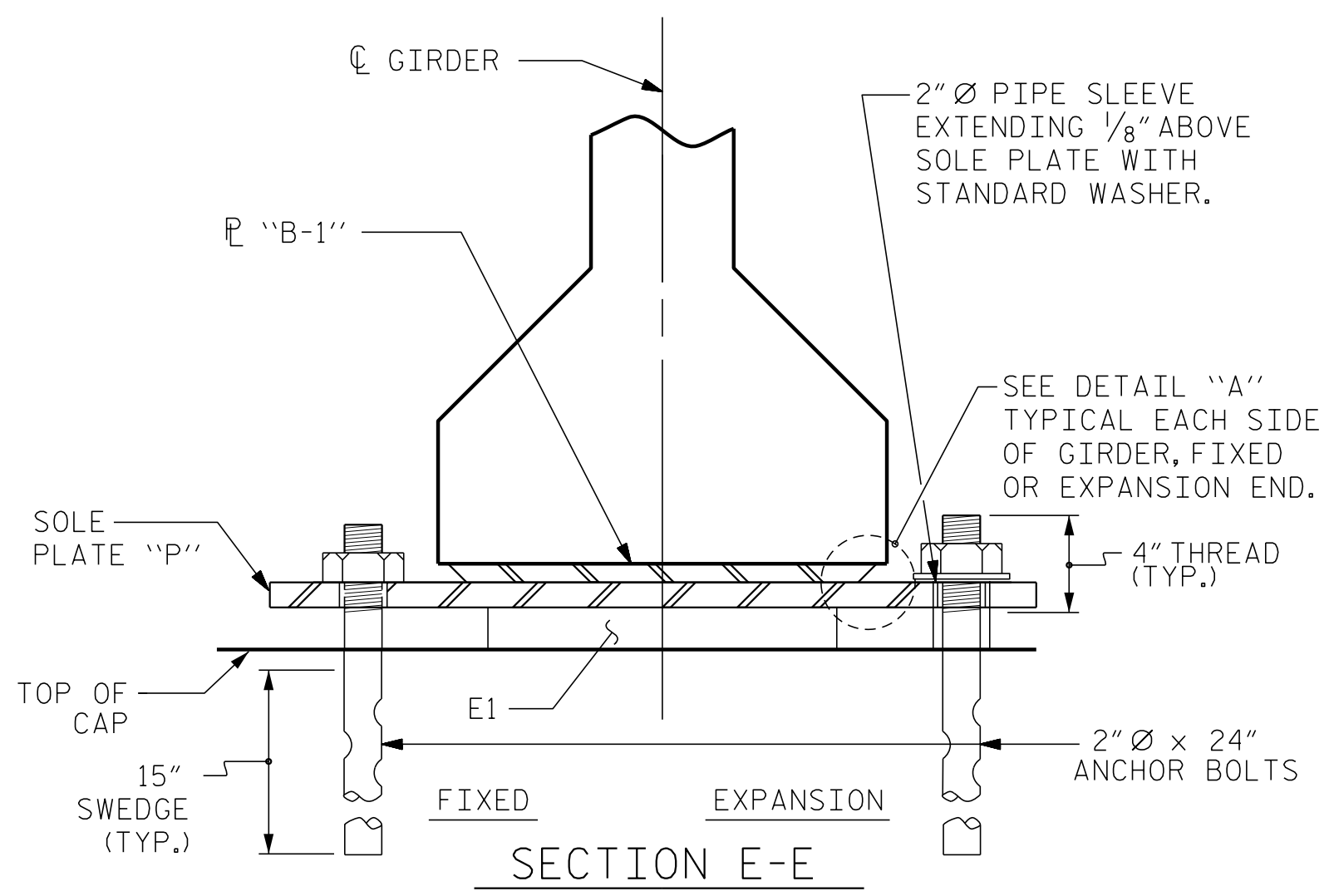
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

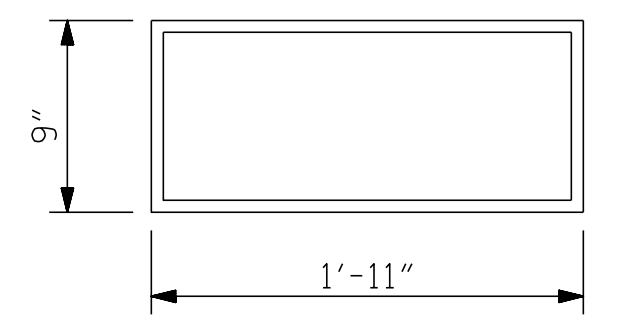
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

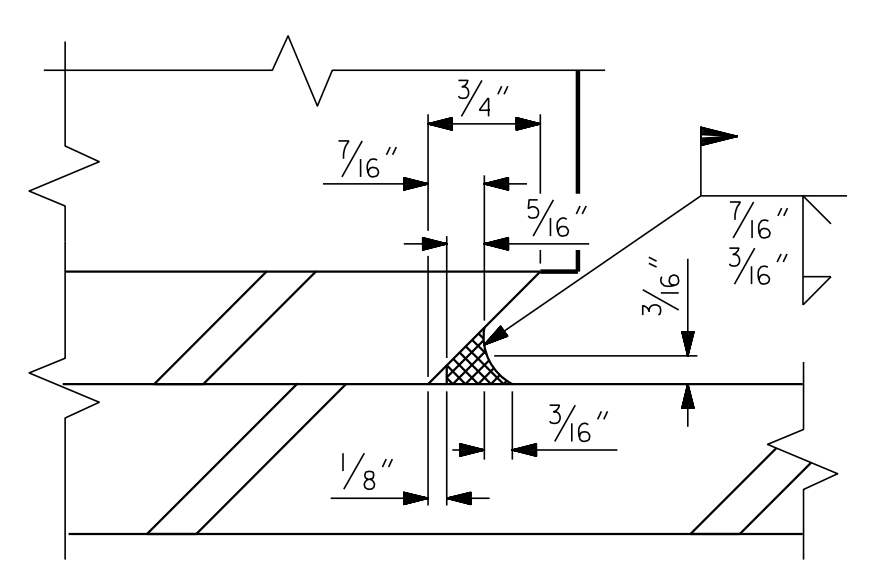
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



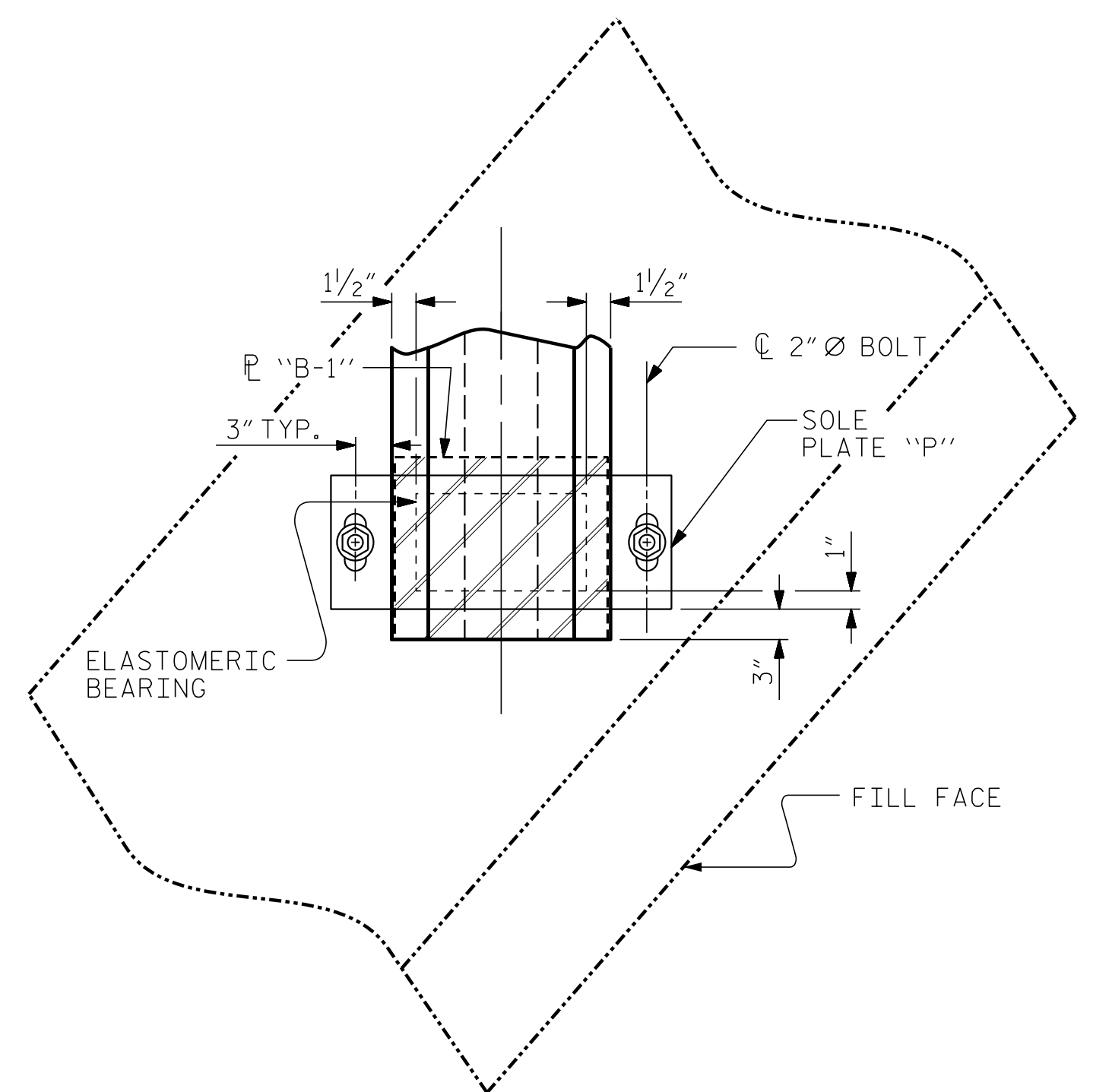
TYPICAL SECTION OF ELASTOMERIC BEARINGS



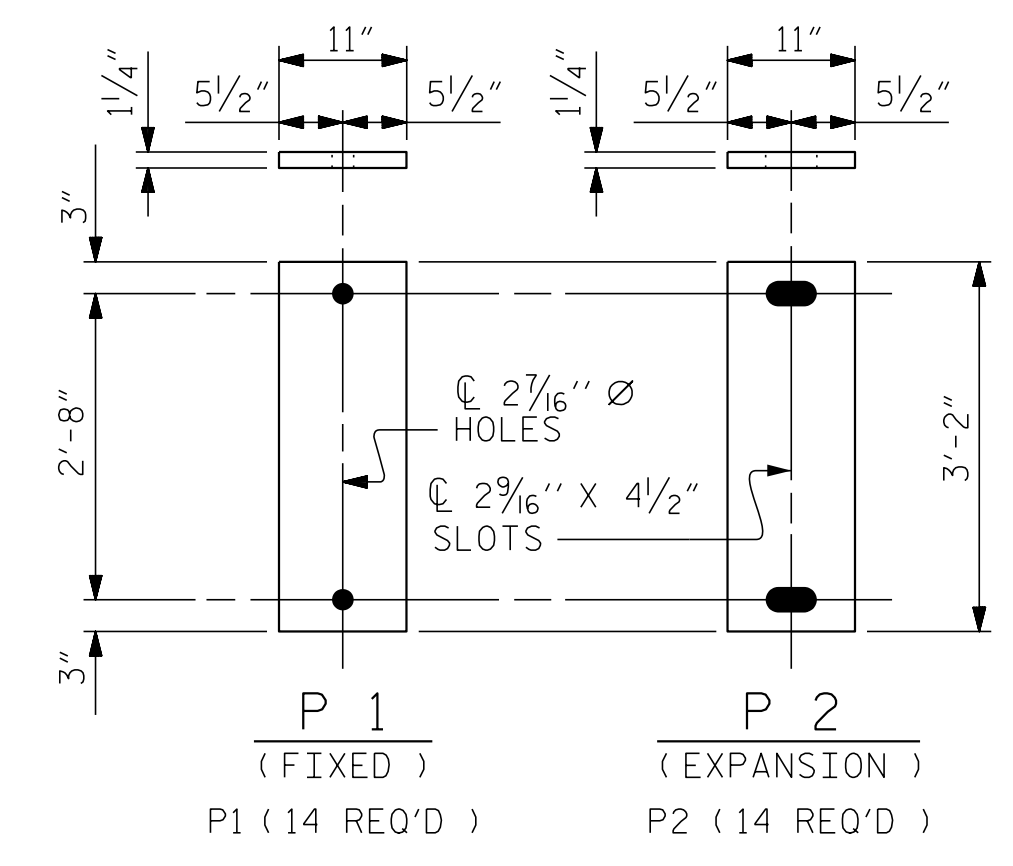
E1 (28 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE V



DETAIL "A"



TYPICAL PLAN
(SHOWING END BENT)



SOLE PLATE DETAILS ("P")

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

PROJECT NO. U-5818
MCDOWELL COUNTY
STATION: 27+83.62 -L-

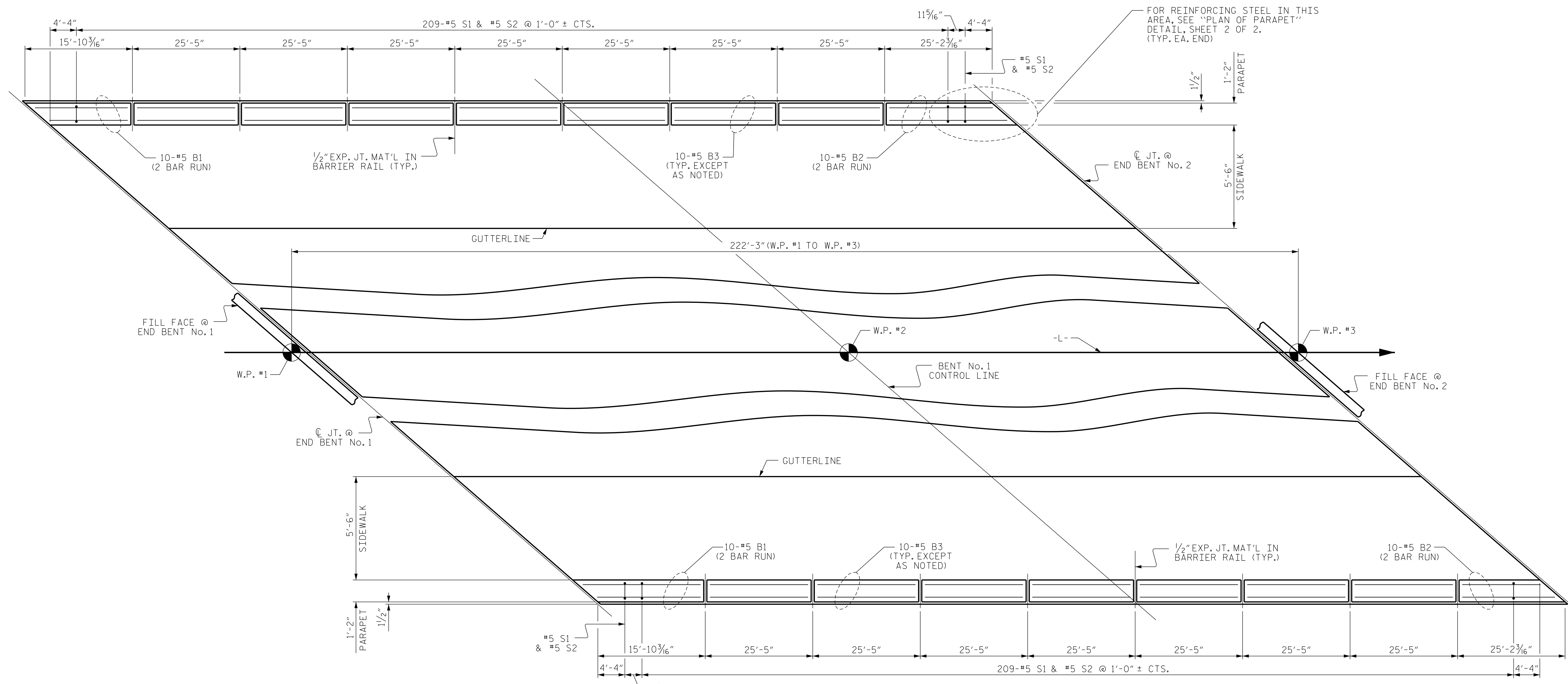
ENGINEER OF RECORD:
Gregory M. Gill
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 37400
GREGORY M. GILL AND
12/10/2018
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-26					TOTAL SHEETS 49

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ASSEMBLED BY : D. HODGE	DATE : 9/18
CHECKED BY : B.C. HUNT	DATE : 9/18
DRAWN BY : EEM 2/97	REV. 6/13 AAC/MAA
CHECKED BY : VAP 2/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC



PLAN OF CONCRETE PARAPET

#5 S1 & #5 S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN PARAPET.

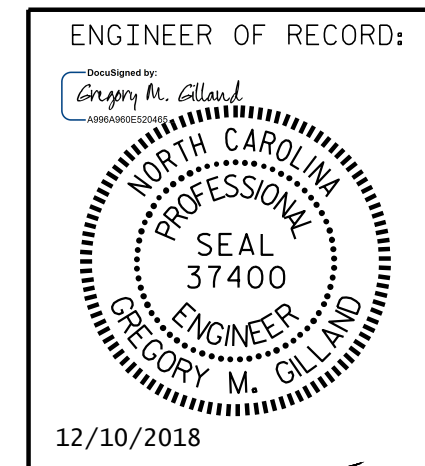
FOR REINFORCING STEEL IN SIDEWALK, SEE "SIDEWALK DETAILS" SHEET.

PROJECT NO. U-5818

MCDOWELL COUNTY

STATION: 27+83.62 -L-

SHEET 1 OF 2



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Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
1'-2" x 3'-3"
CONCRETE PARAPET

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-27
1			3			TOTAL SHEETS
2			4			49

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 12/4/2018 8:13:03 AM

DRAWN BY: D. HODGE DATE: 8/18
 CHECKED BY: B.C. HUNT DATE: 9/18

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NOTES

WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE PARAPET.

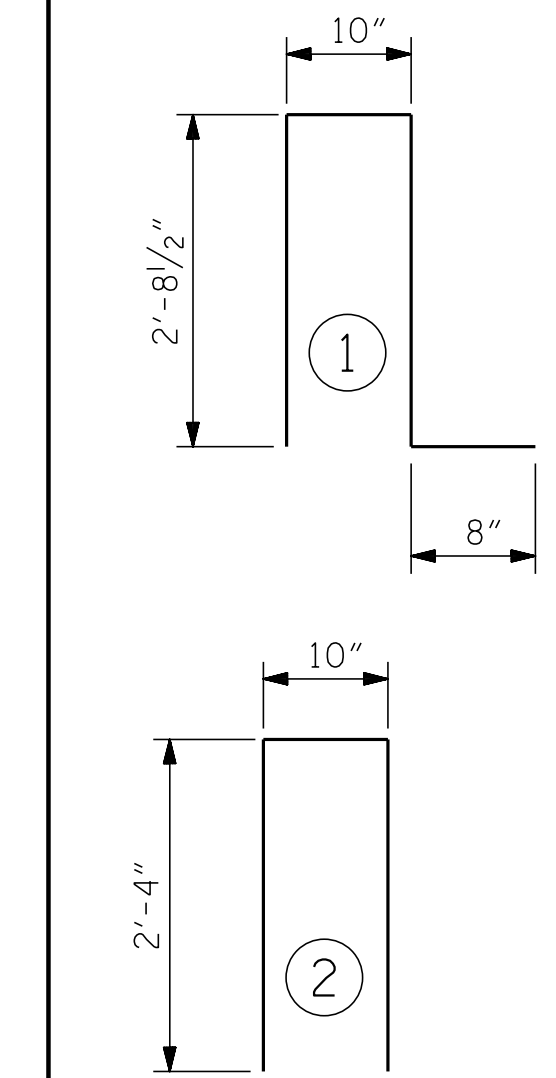
THE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.

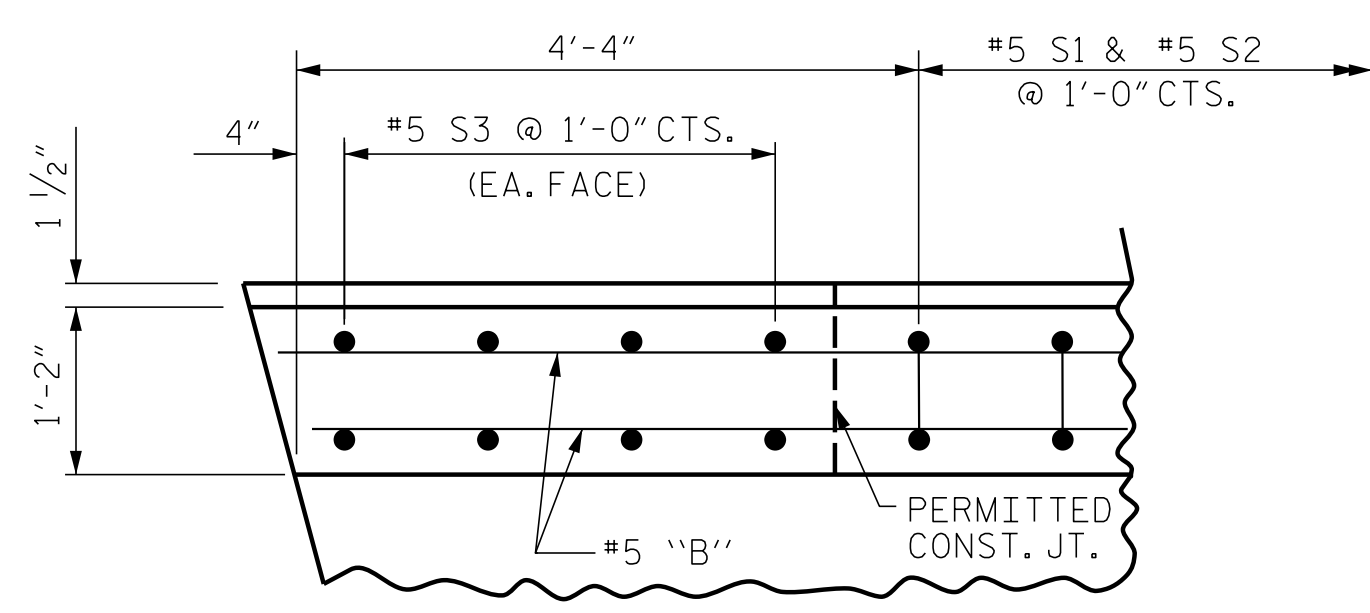
THE #5 S3 BAR SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 BAR IS 18.6 KIPS, FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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.

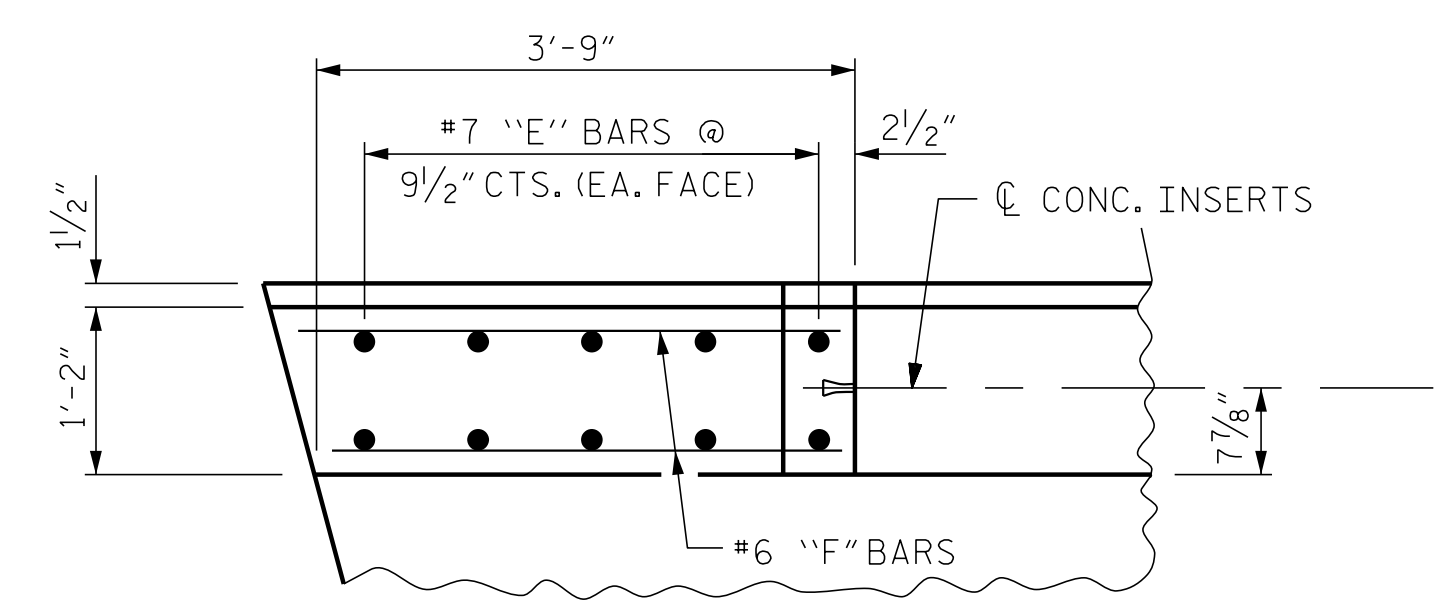
BAR TYPE		BILL OF MATERIAL FOR PARAPETS AND 4 END POSTS				
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* B1	40	#5	STR	9'-5"	393	
* B2	40	#5	STR	14'-2"	591	
* B3	140	#5	STR	25'-0"	3651	
* E1	8	#7	STR	3'-3"	53	
* E2	8	#7	STR	3'-9"	61	
* E3	8	#7	STR	4'-3"	69	
* E4	8	#7	STR	4'-9"	78	
* E5	8	#7	STR	5'-1"	83	
* F1	8	#6	STR	1'-10"	22	
* F2	4	#6	STR	4'-1"	25	
* F3	4	#6	STR	4'-10"	29	
* F4	4	#6	STR	3'-0"	18	
* F5	4	#6	STR	3'-8"	22	
* S1	420	#5	1	6'-11"	3030	
* S2	420	#5	2	5'-6"	2409	
* S3	32	#5	STR	3'-9"	125	
* EPOXY COATED REINFORCING STEEL					10,659 LBS.	
CLASS "AA" CONCRETE					62.4 C.Y.	
1'-2" x 3'-3" CONCRETE PARAPET					437.90 L.F.	



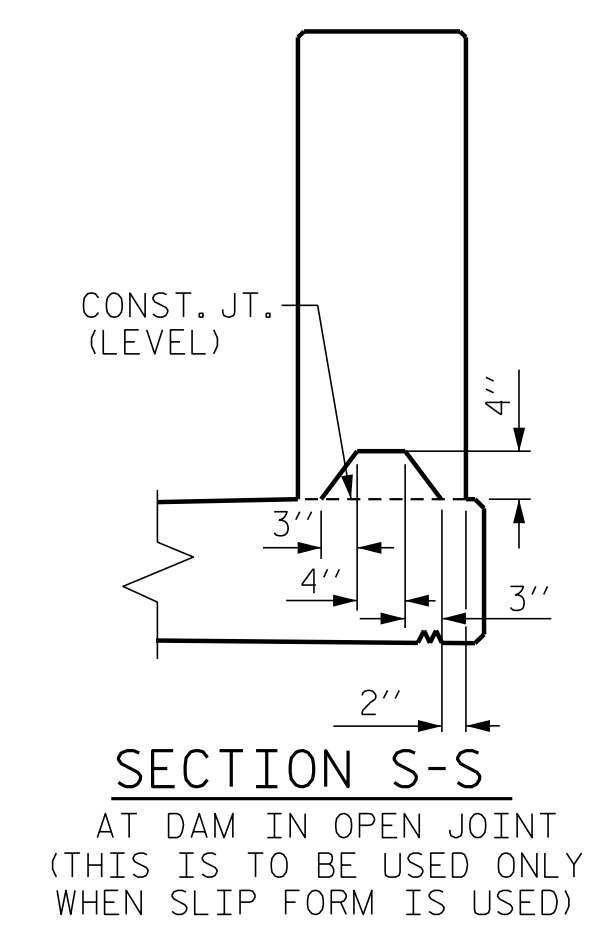
BAR DIMENSIONS ARE OUT TO OUT.



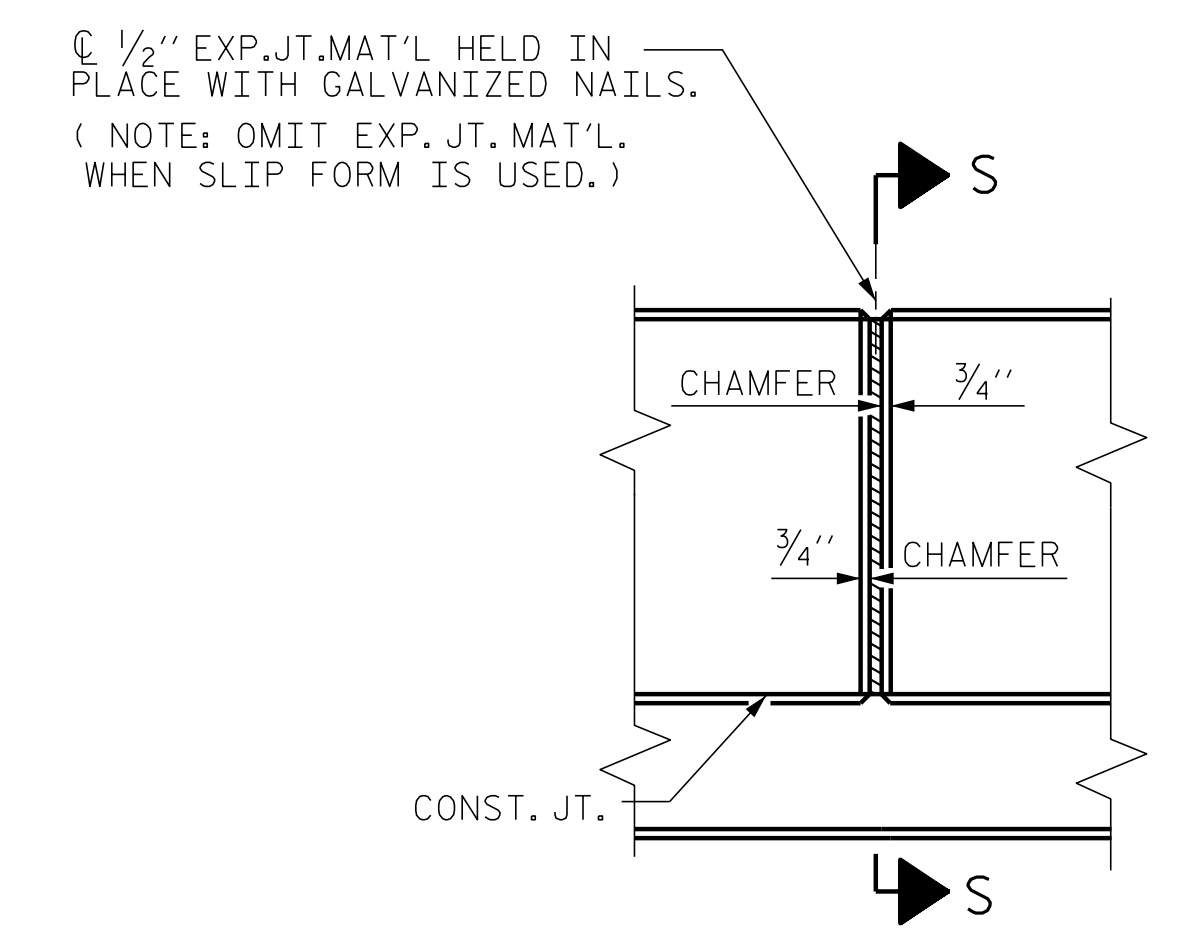
PLAN OF PARAPET



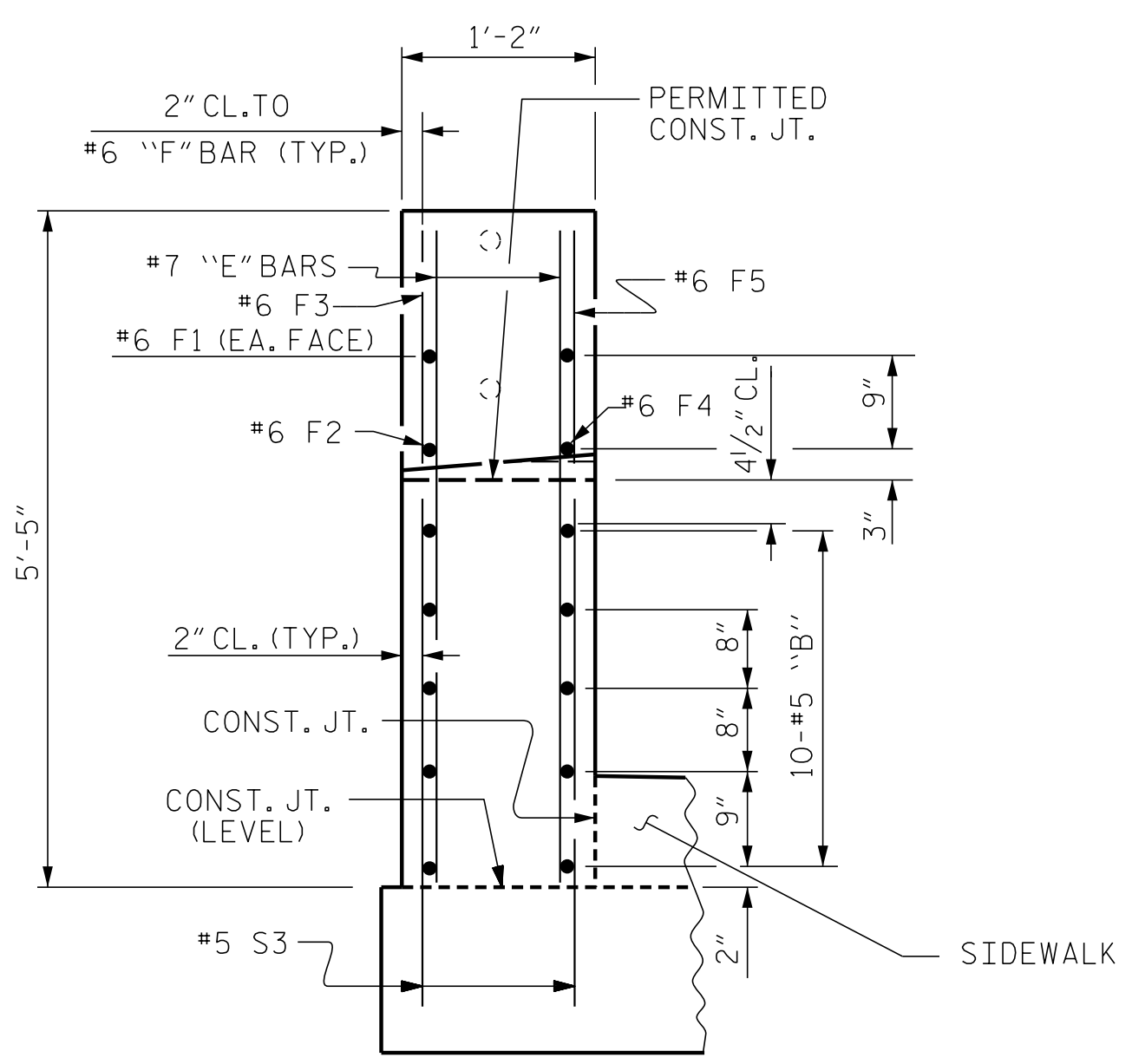
PLAN OF END POST



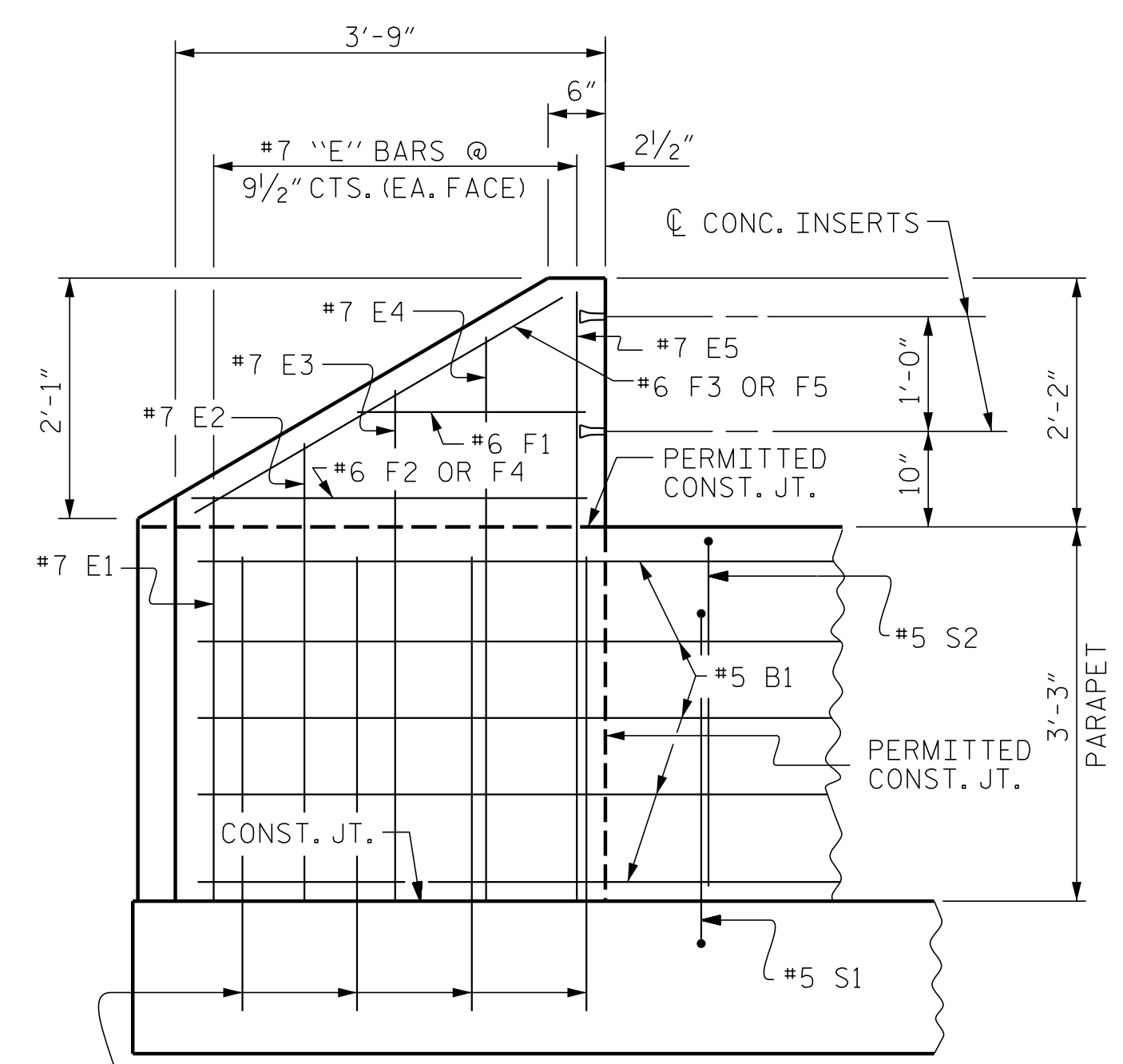
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)



ELEVATION AT JOINTS IN PARAPET



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.

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 2 OF 2

ENGINEER OF RECORD:
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 GREGORY M. GILLILAND
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 Fax: 919 851 8107
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 1'-2" x 3'-3"
 CONCRETE PARAPET
 FOR
 2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS 49
2			4			S1-28

DRAWN BY: D. HODGE DATE: 8/18
 CHECKED BY: B.C. HUNT DATE: 9/18

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NOTES

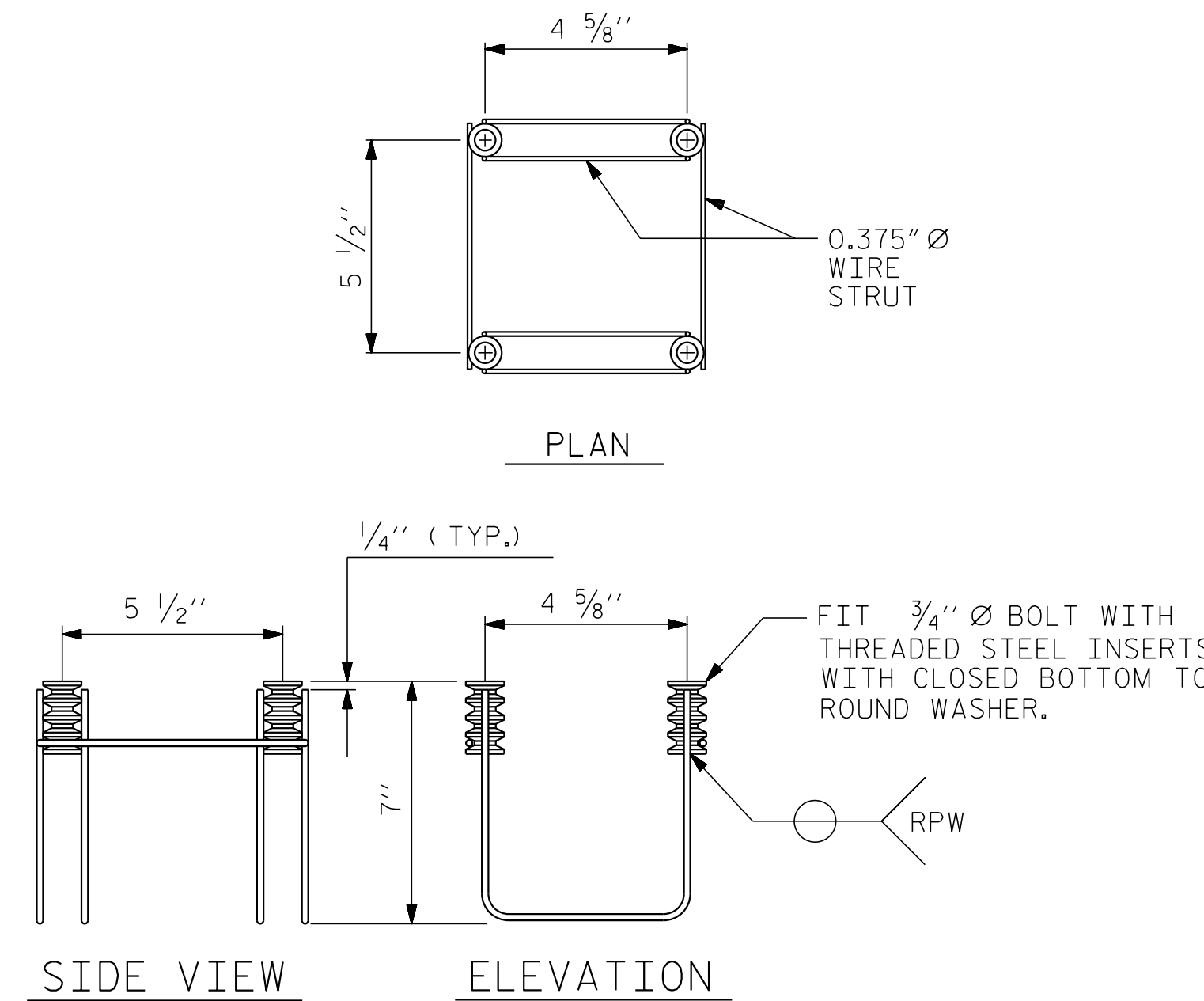
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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.

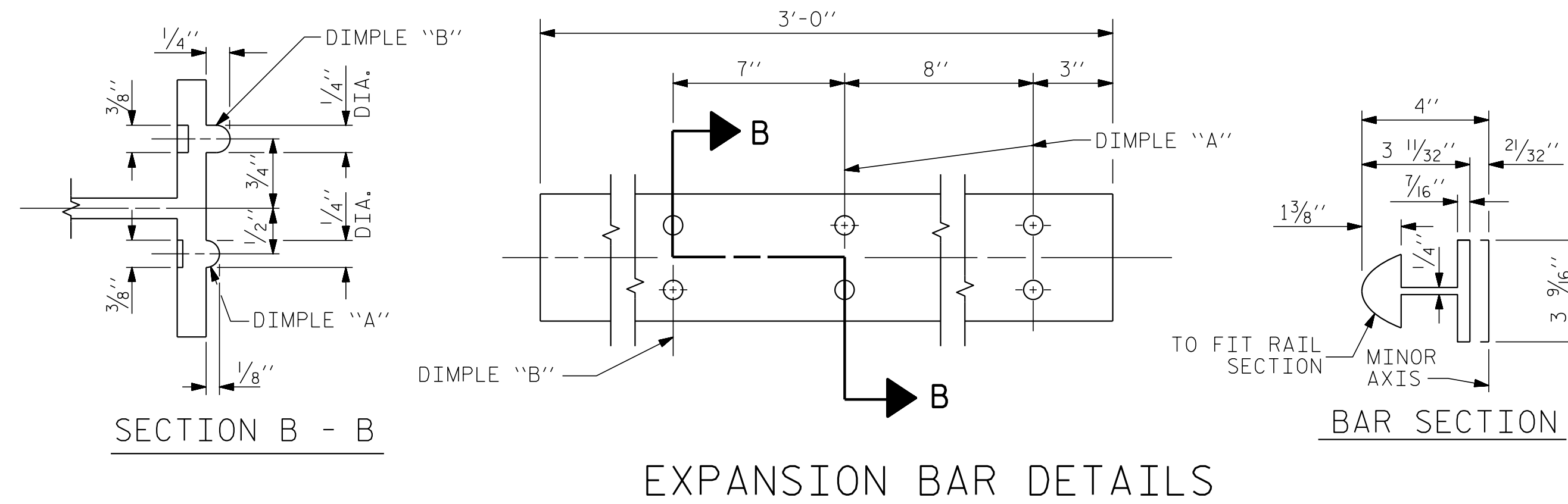
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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.

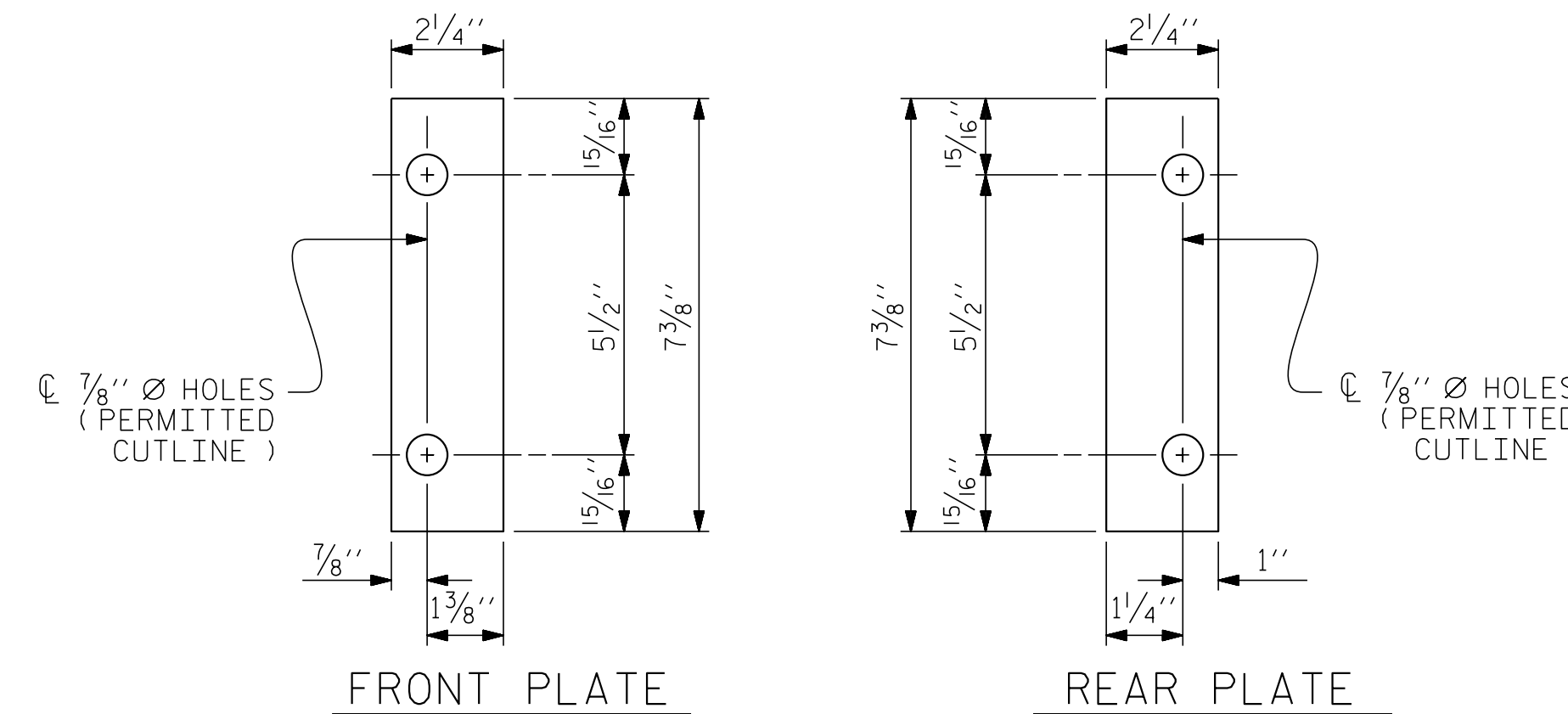


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(72 ASSEMBLIES REQUIRED)

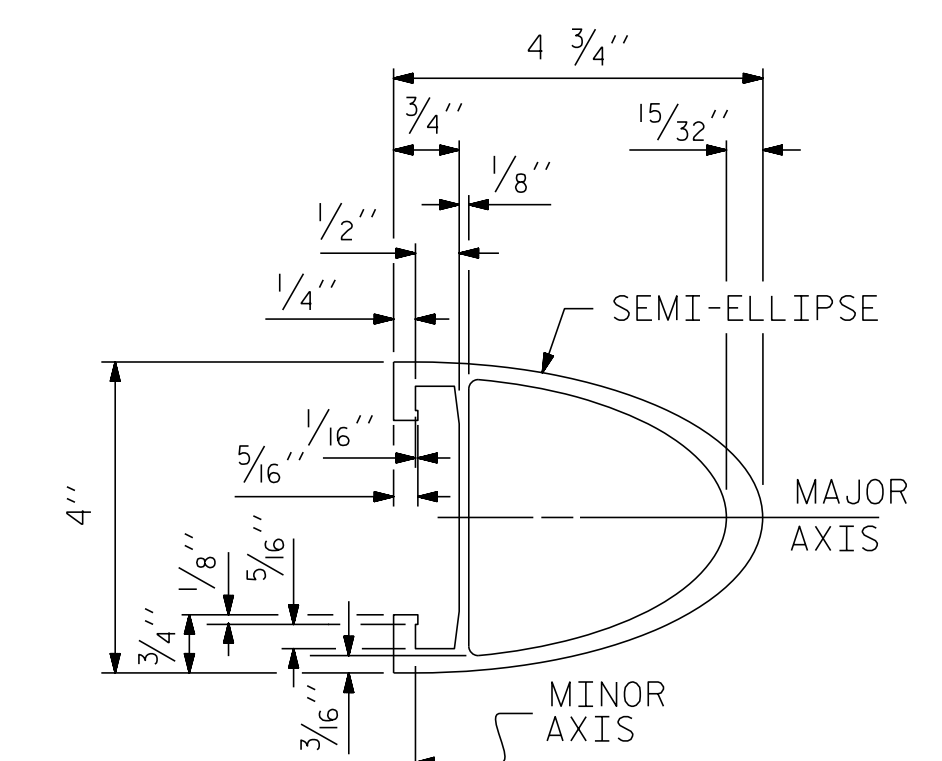


EXPANSION BAR DETAILS

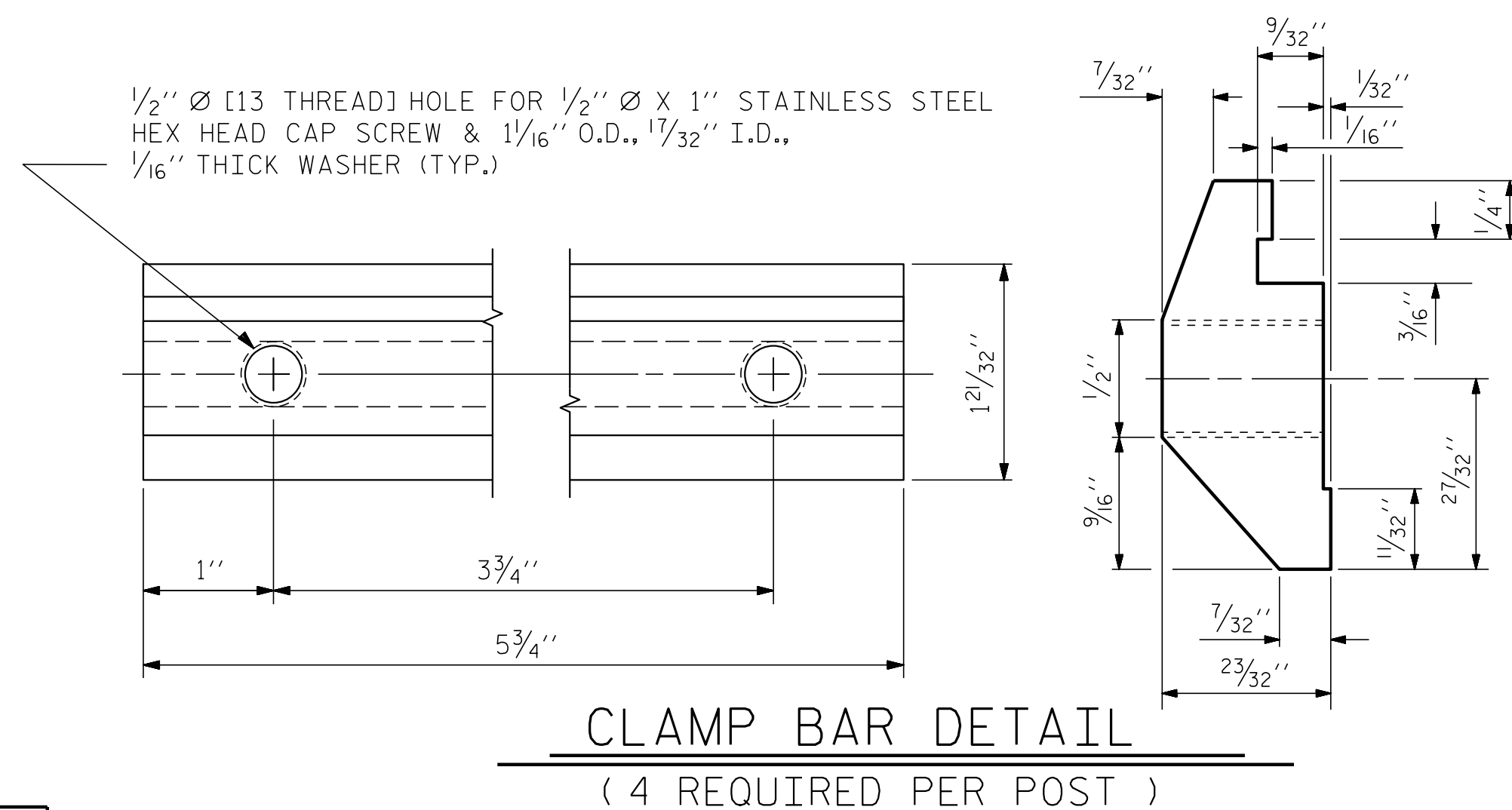


SHIM DETAILS

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

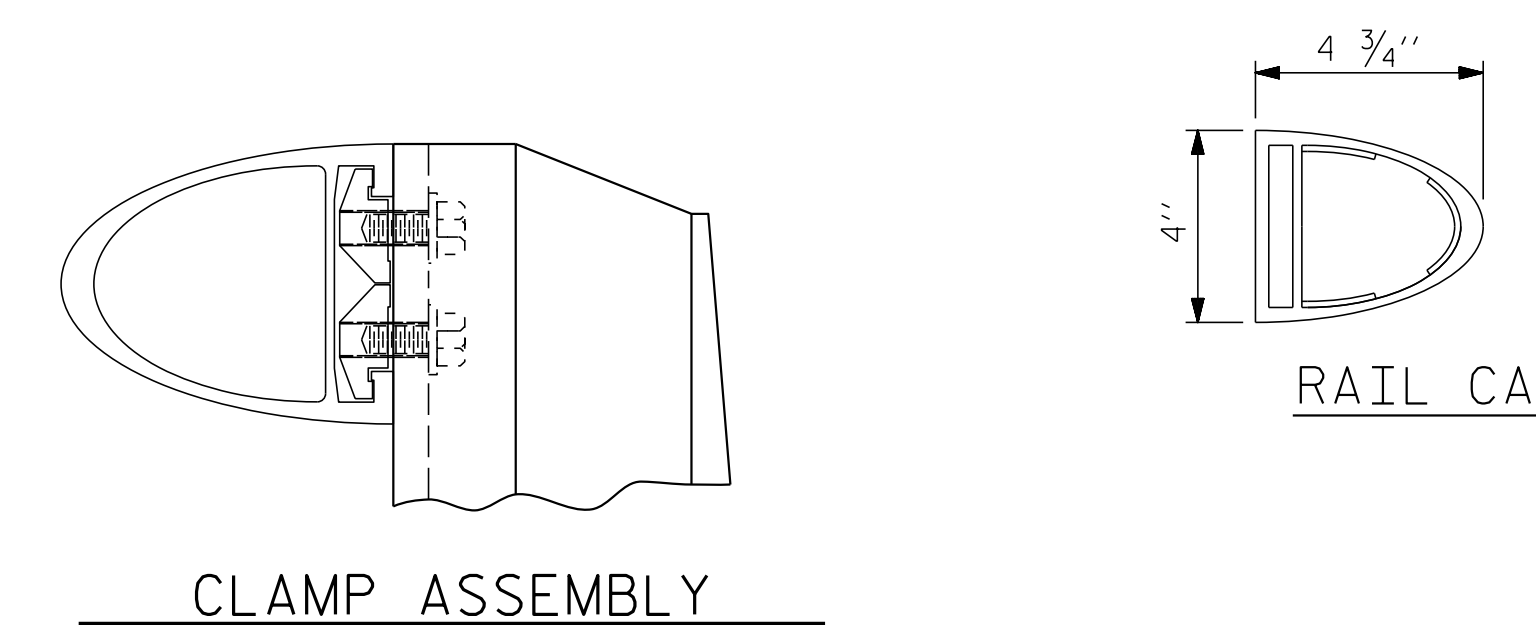


RAIL SECTION



CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

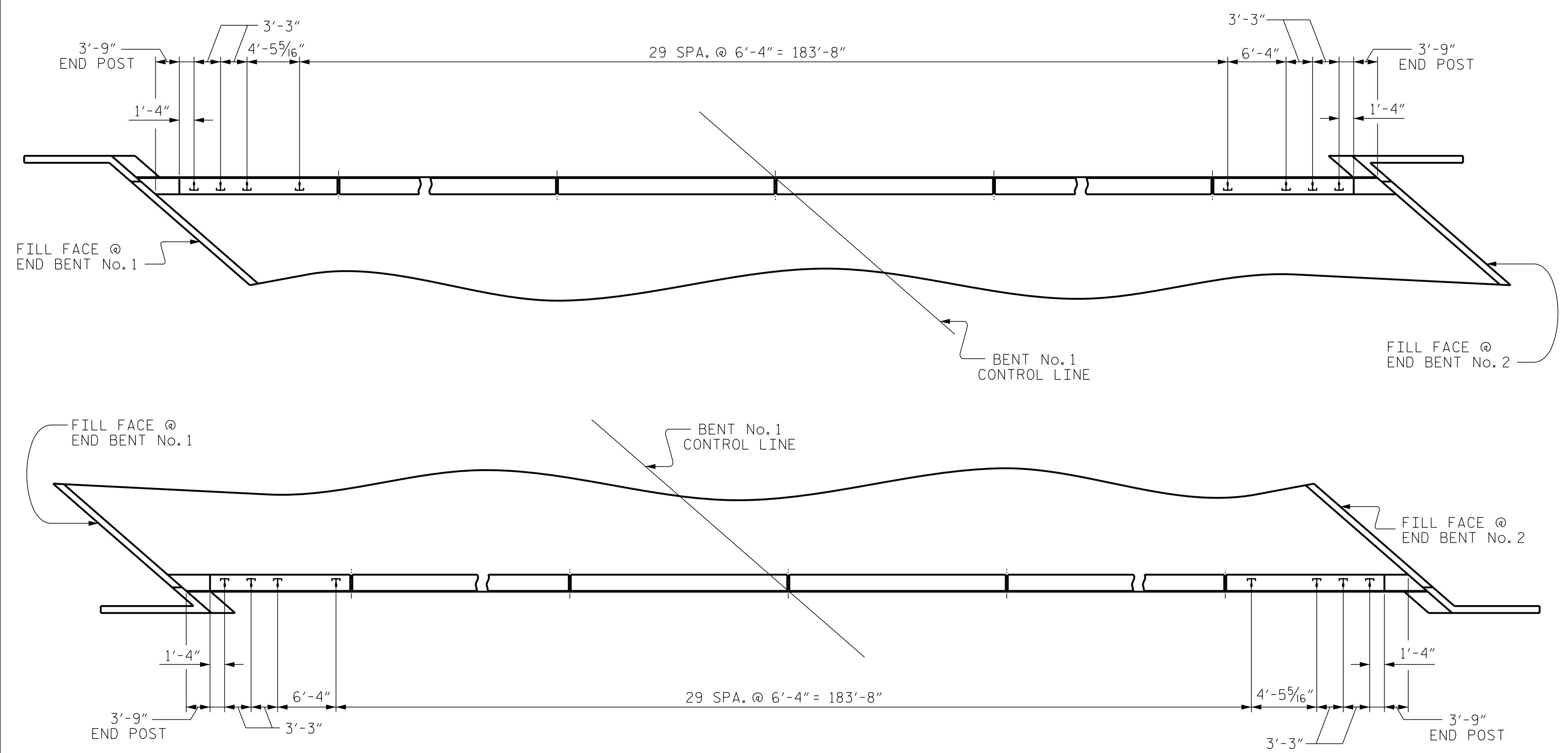
SHEET 2 OF 2

ENGINEER OF RECORD:
 Gregory M. Allard
 NORTH CAROLINA PROFESSIONAL SEAL 37400
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 LICENSE NO. F-0377

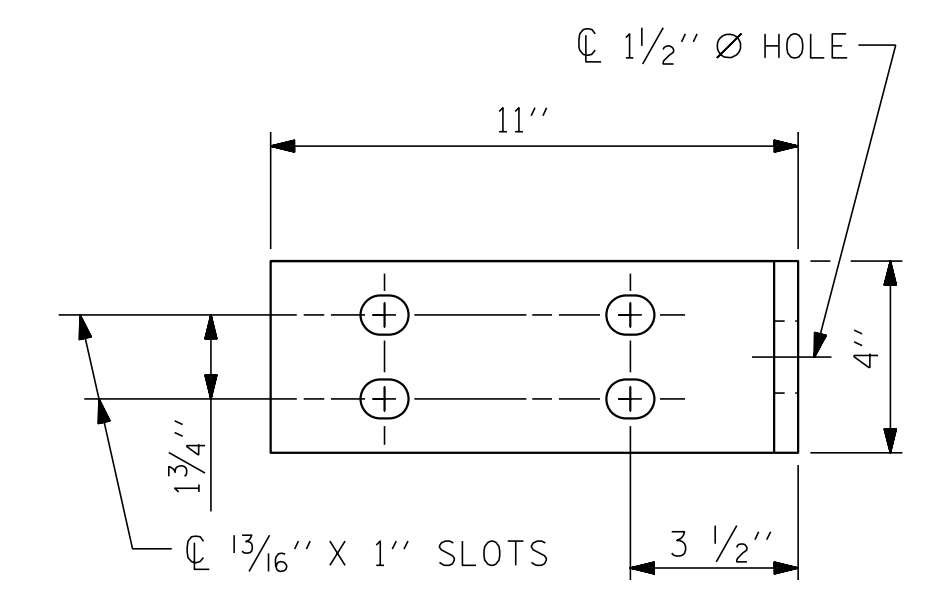
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD 2 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-30					TOTAL SHEETS 49

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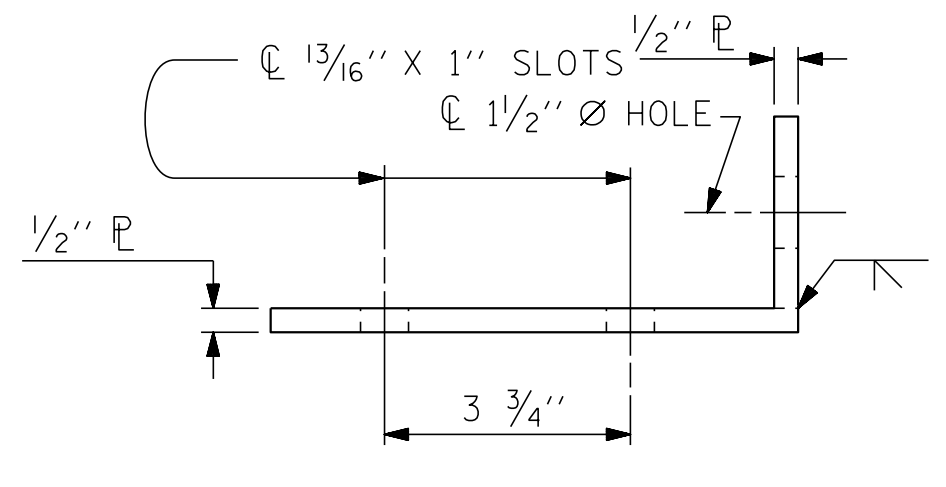
STD. NO. BMR4



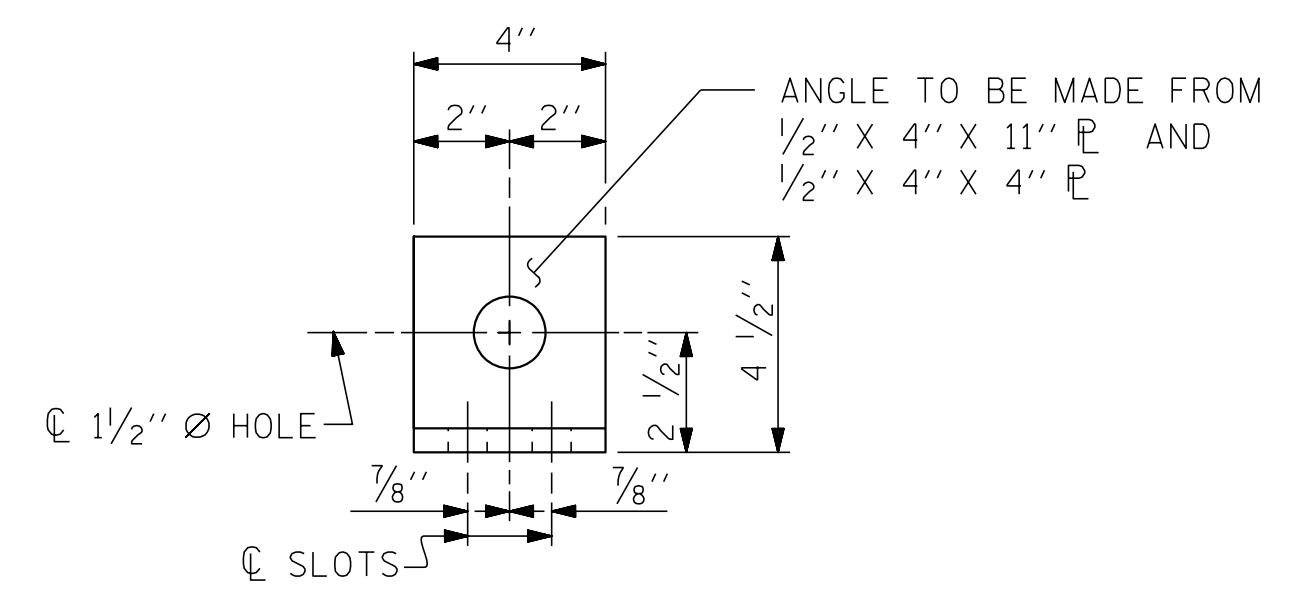
PLAN OF RAIL POST SPACINGS



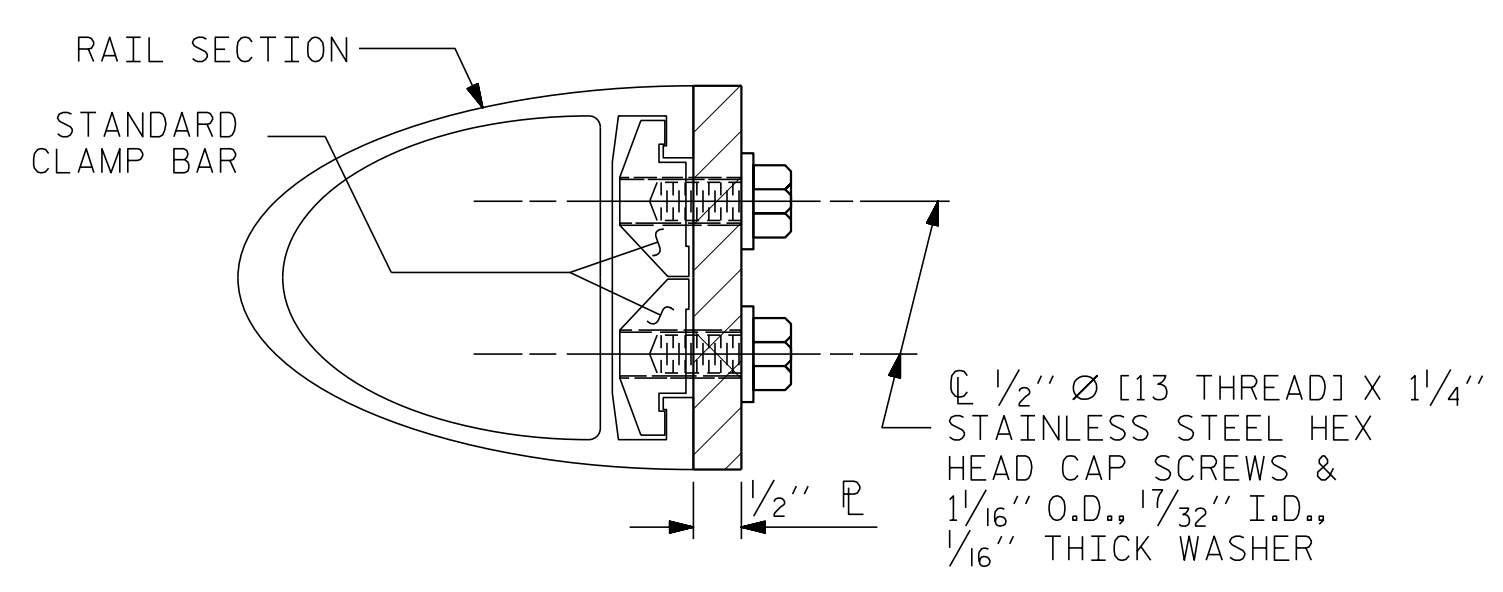
ELEVATION



TOP VIEW

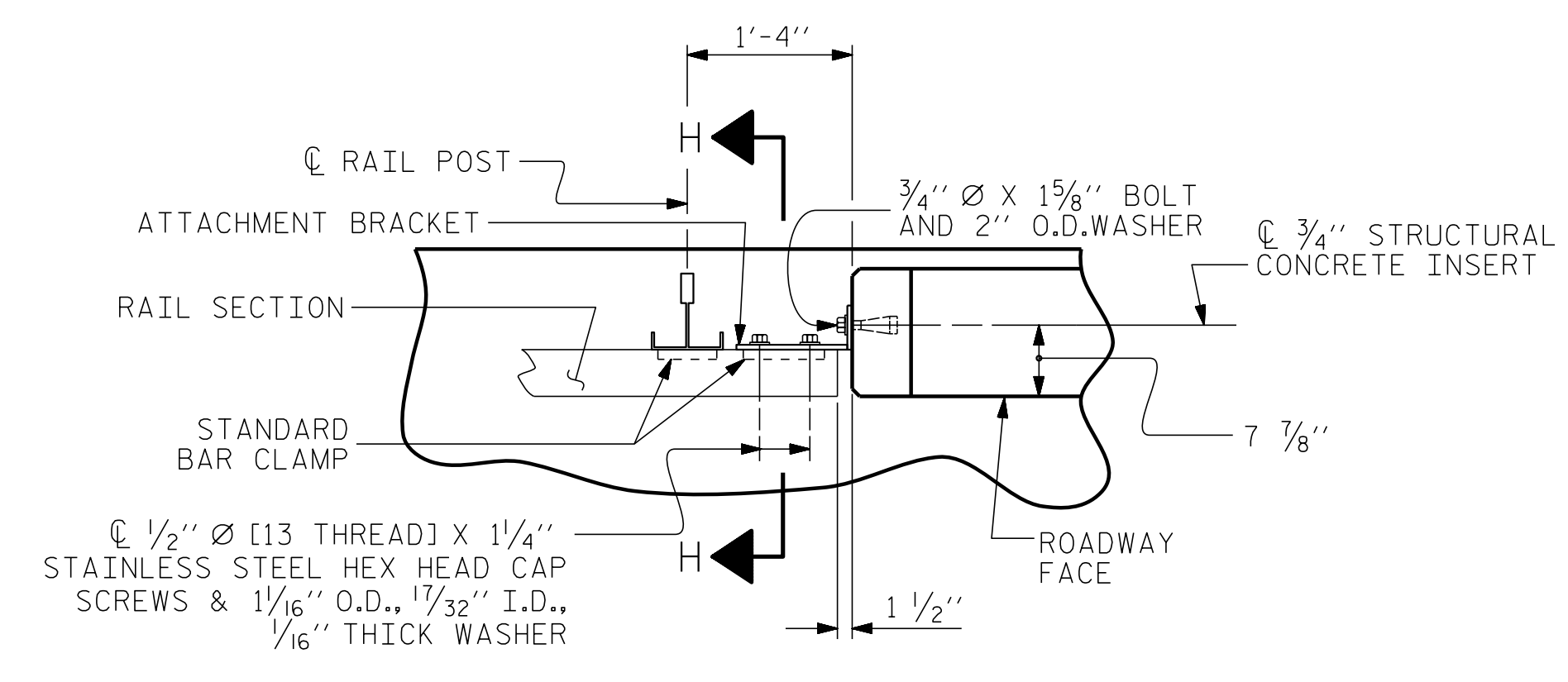


END VIEW (FIX AND EXP.)

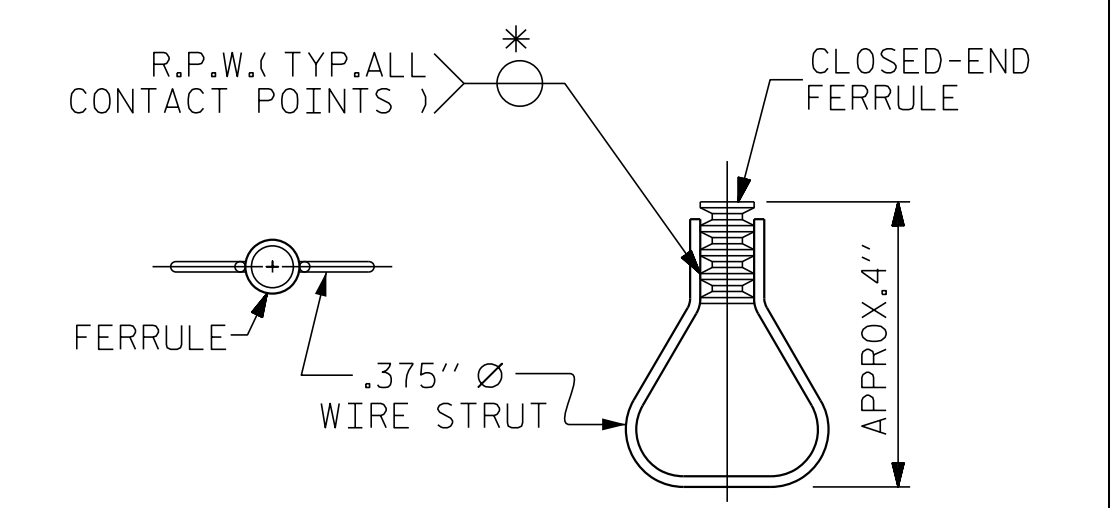


SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

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 1/2".
 - 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 1/16" 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.

ASSEMBLED BY : D. HODGE	DATE : 9/18
CHECKED BY : B.C. HUNT	DATE : 9/18
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

DETAILS FOR ATTACHING METAL RAIL TO END POST

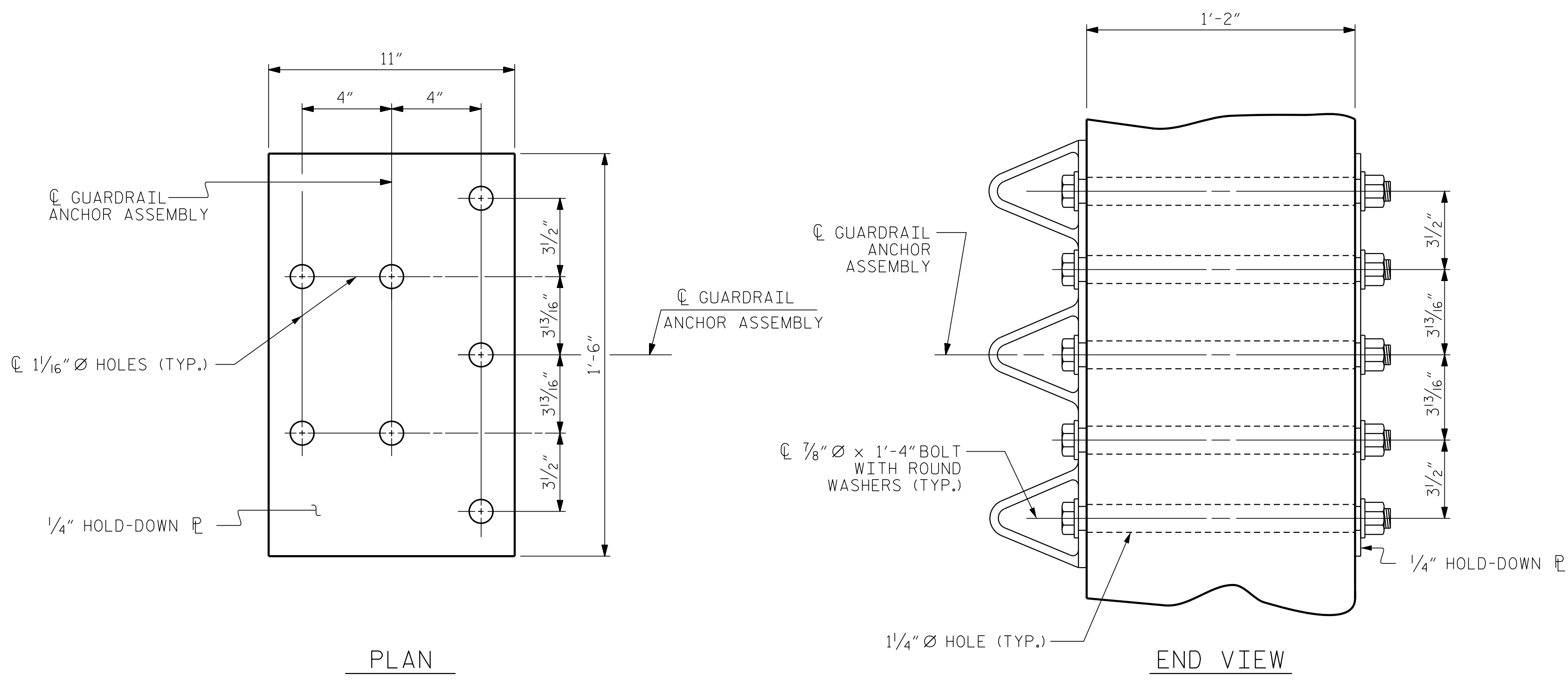
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:

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 WETHERILL ENGINEERING
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 LICENSE NO. F-0377

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. S1-31					TOTAL SHEETS 49

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GUARDRAIL ANCHOR ASSEMBLY DETAILS

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.

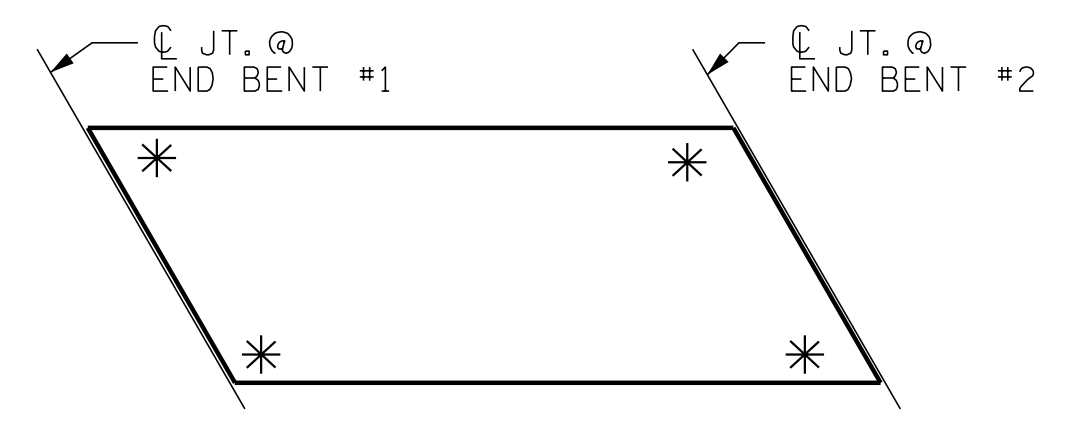
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

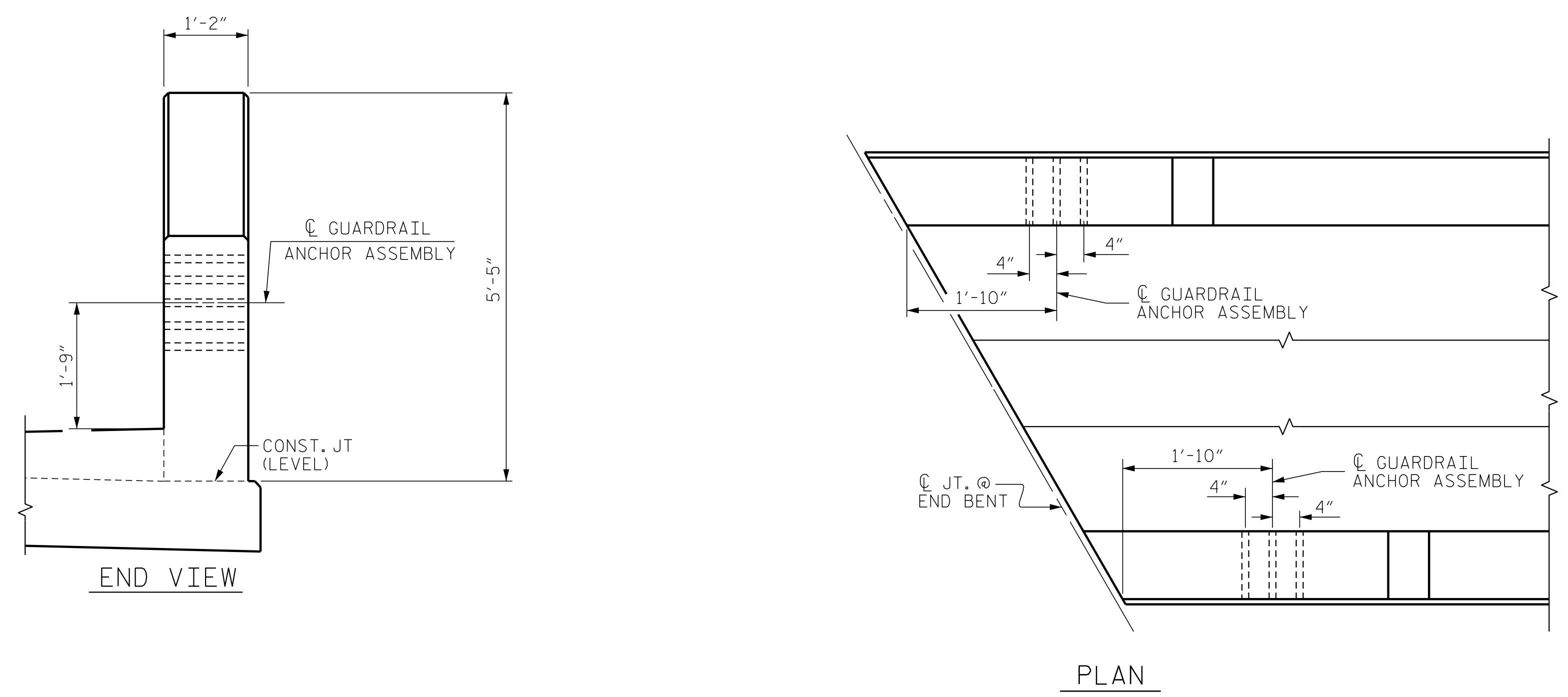
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

ENGINEER OF RECORD:
Gregory M. Giland
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 37400
 GREGORY M. GILAND
 12/10/2018
 WETHERILL 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
 GUARDRAIL ANCHORAGE
 DETAILS
 FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-32
1			3			TOTAL SHEETS 49
2			4			

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ASSEMBLED BY : D. HODGE	DATE : 9/18
CHECKED BY : B.C. HUNT	DATE : 9/18
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

NOTES

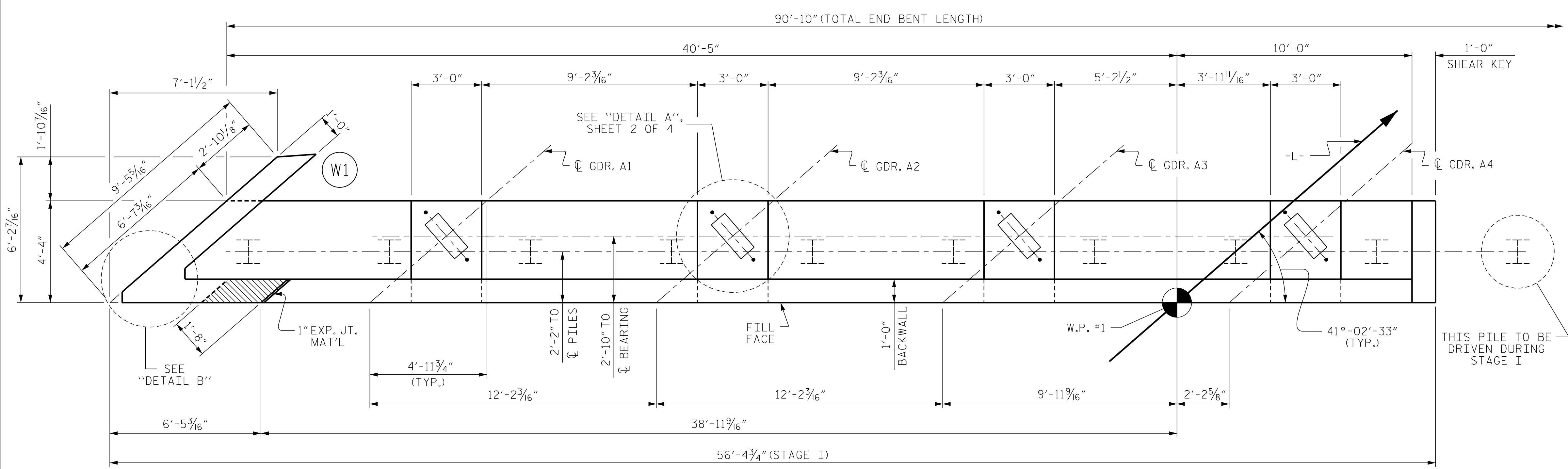
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

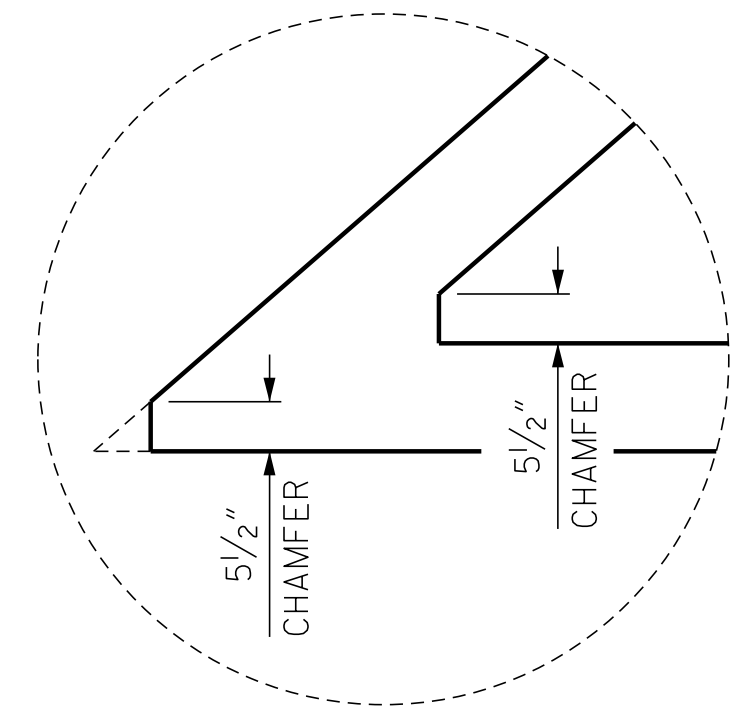
THE TOP SURFACE AREAS OF THE END BENT SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

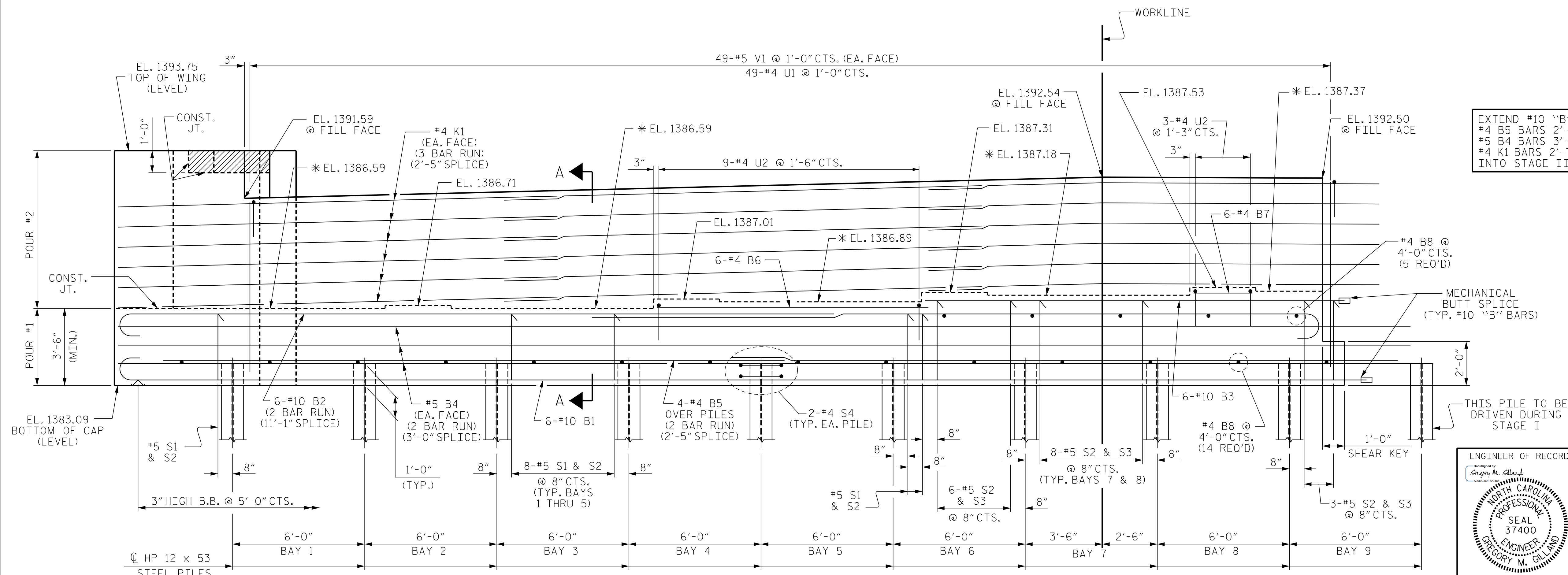
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE PARAPETS ARE CAST IN STAGE I OR PARAPET AND SIDEWALKS ARE CAST IN STAGE II IF SLIP FORMING IS USED.



PLAN



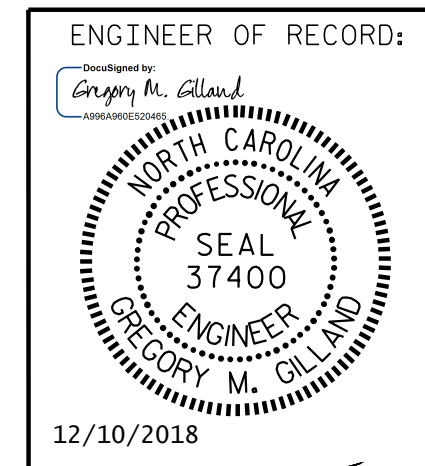
DETAIL "B"



ELEVATION

EXTEND #10 "B" BARS 1'-0" MIN.,
 #4 B5 BARS 2'-7",
 #5 B4 BARS 3'-2",
 #4 K1 BARS 2'-7",
 INTO STAGE II

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 1 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT No. 1
 STAGE I**

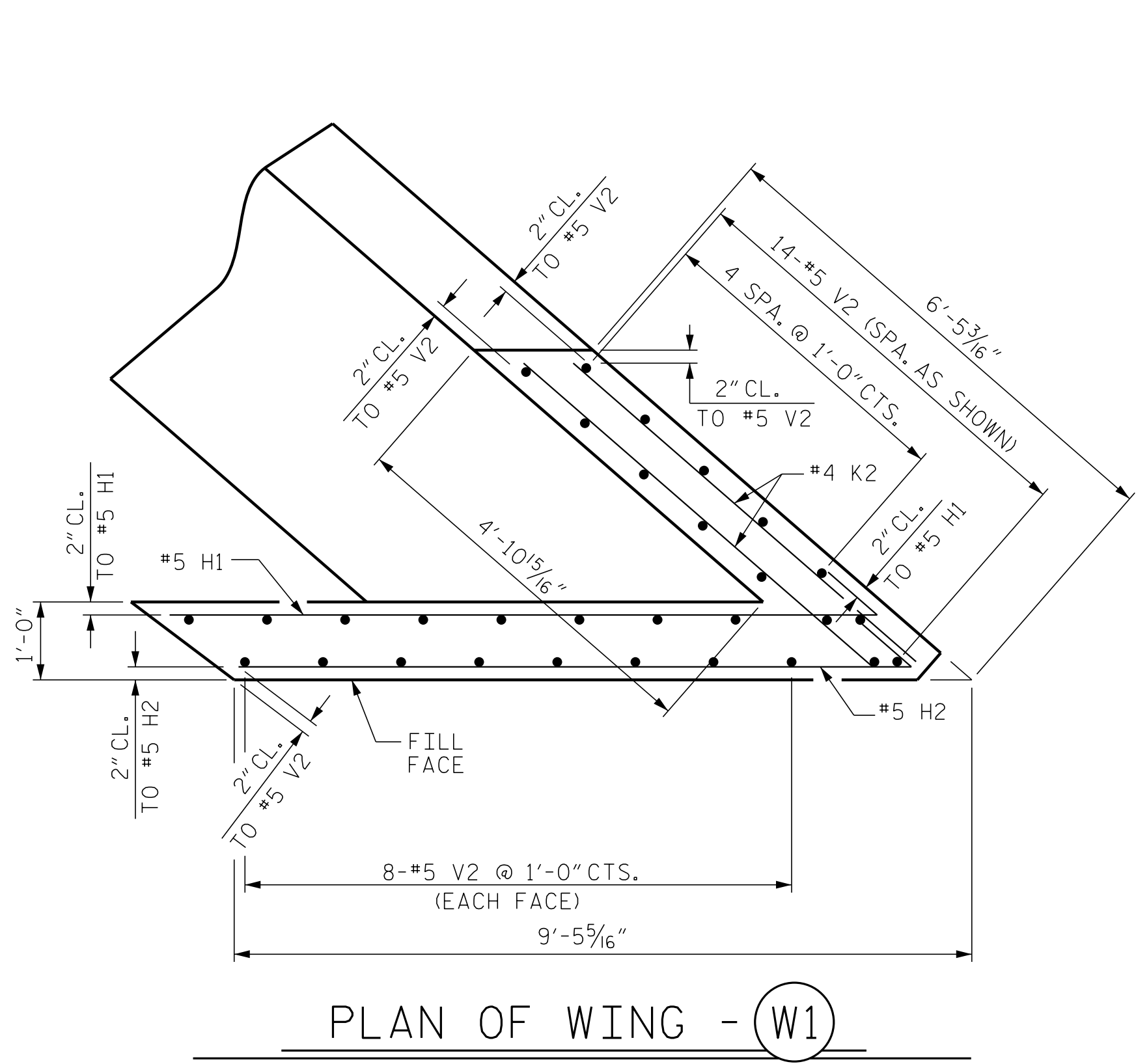
* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS. SEE SECTION A-A, SHEET 4 OF 4.

DRAWN BY: D. HODGE DATE: 9/18
 CHECKED BY: B.C. HUNT DATE: 9/18

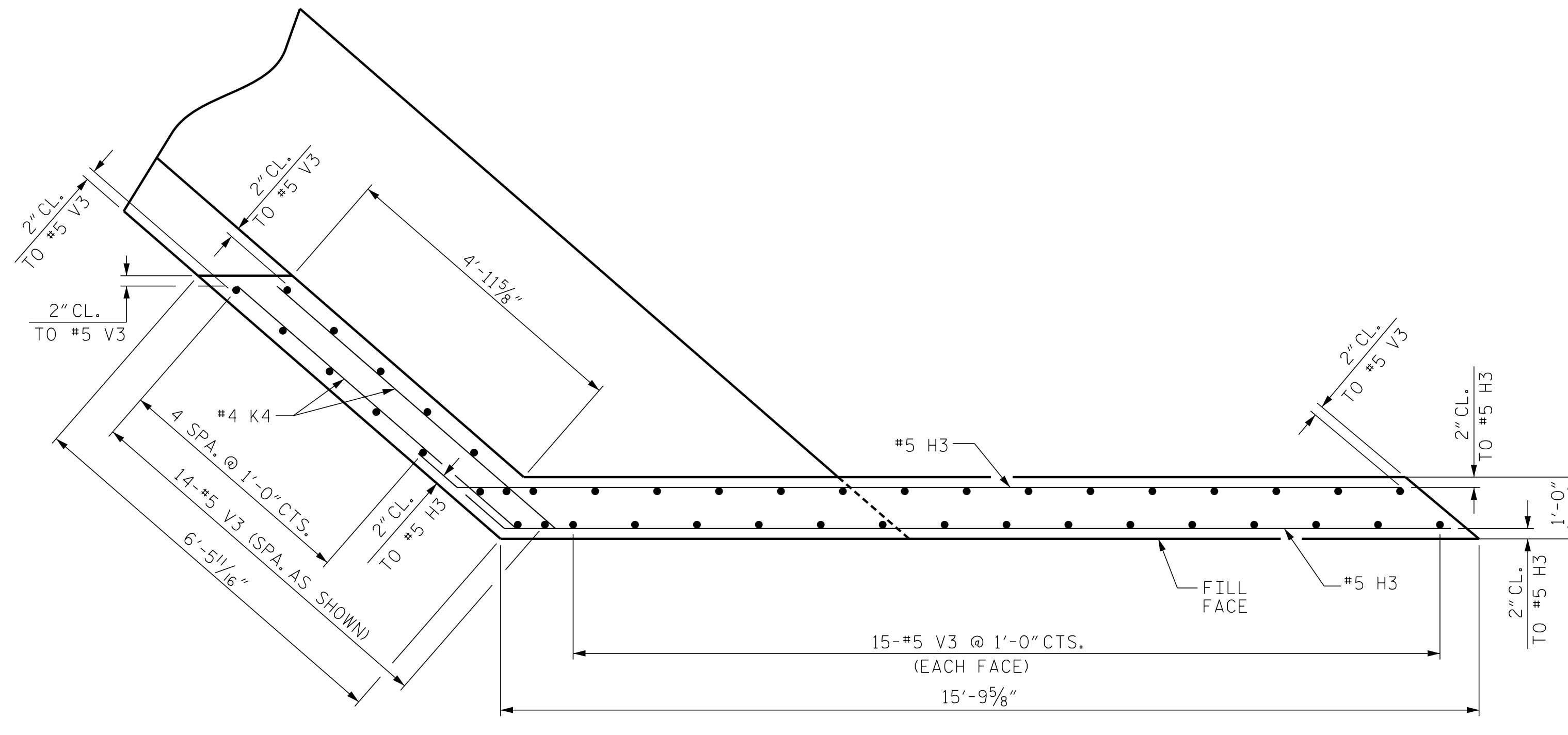
DOCUMENT NOT CONSIDERED FINAL
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-34
1			3			TOTAL SHEETS
2			4			49

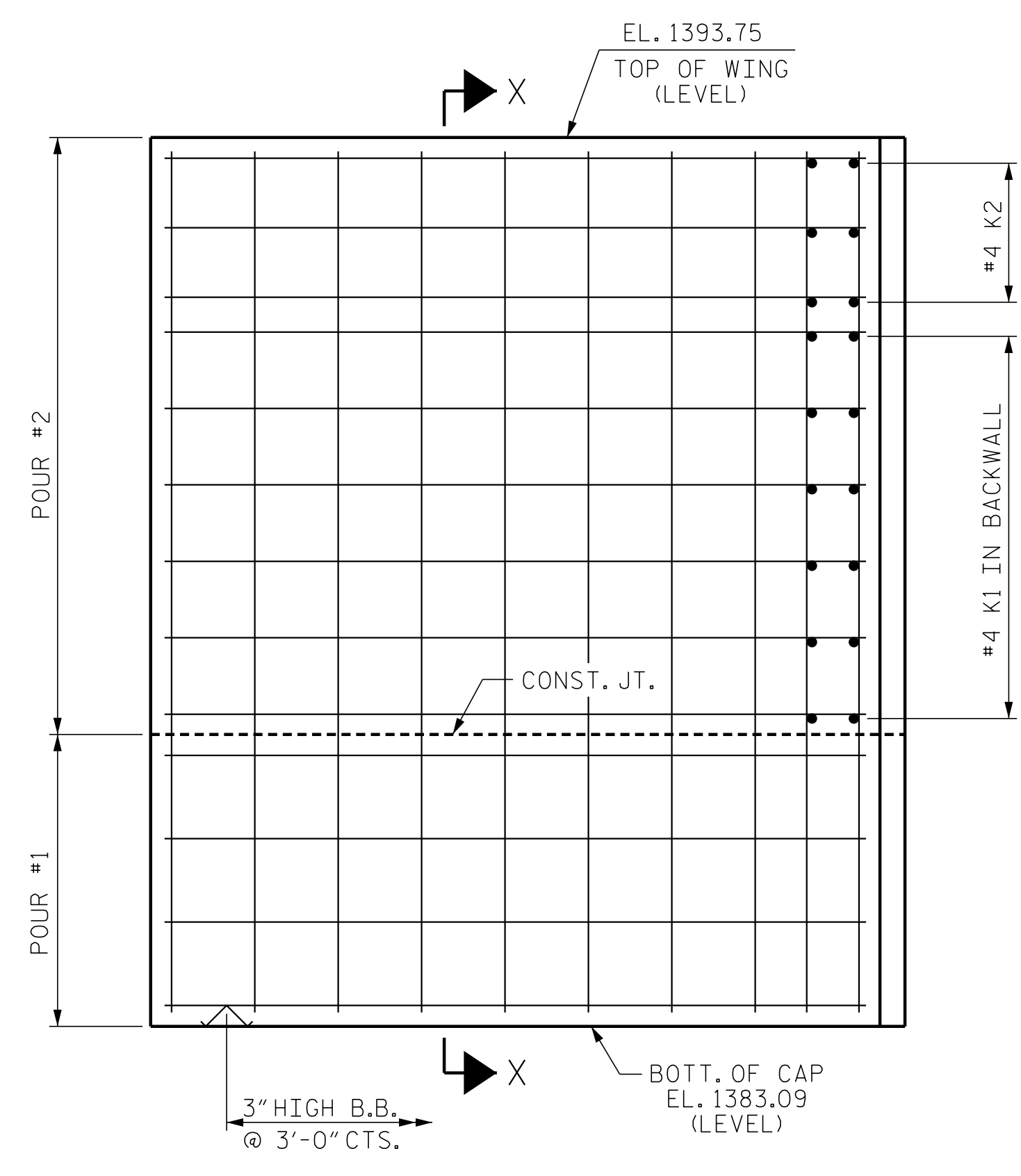
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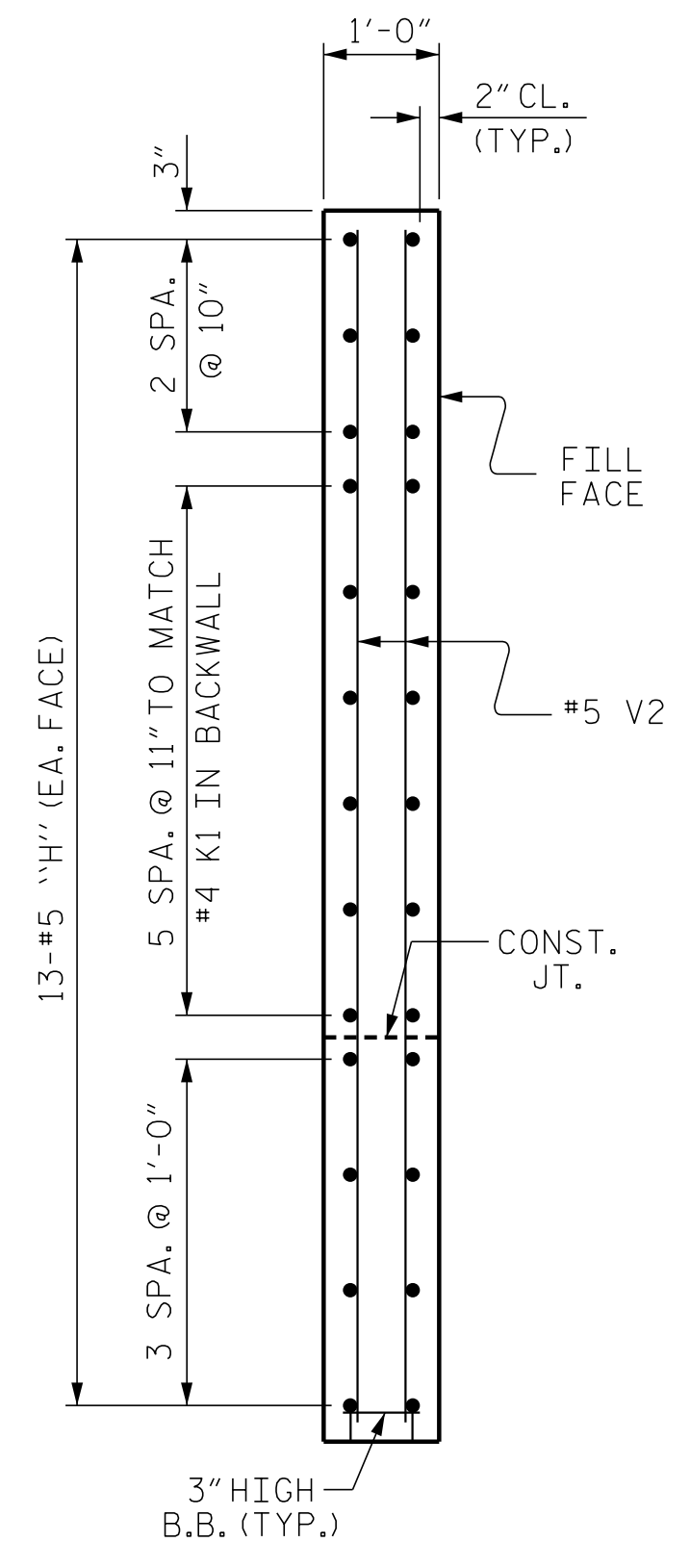
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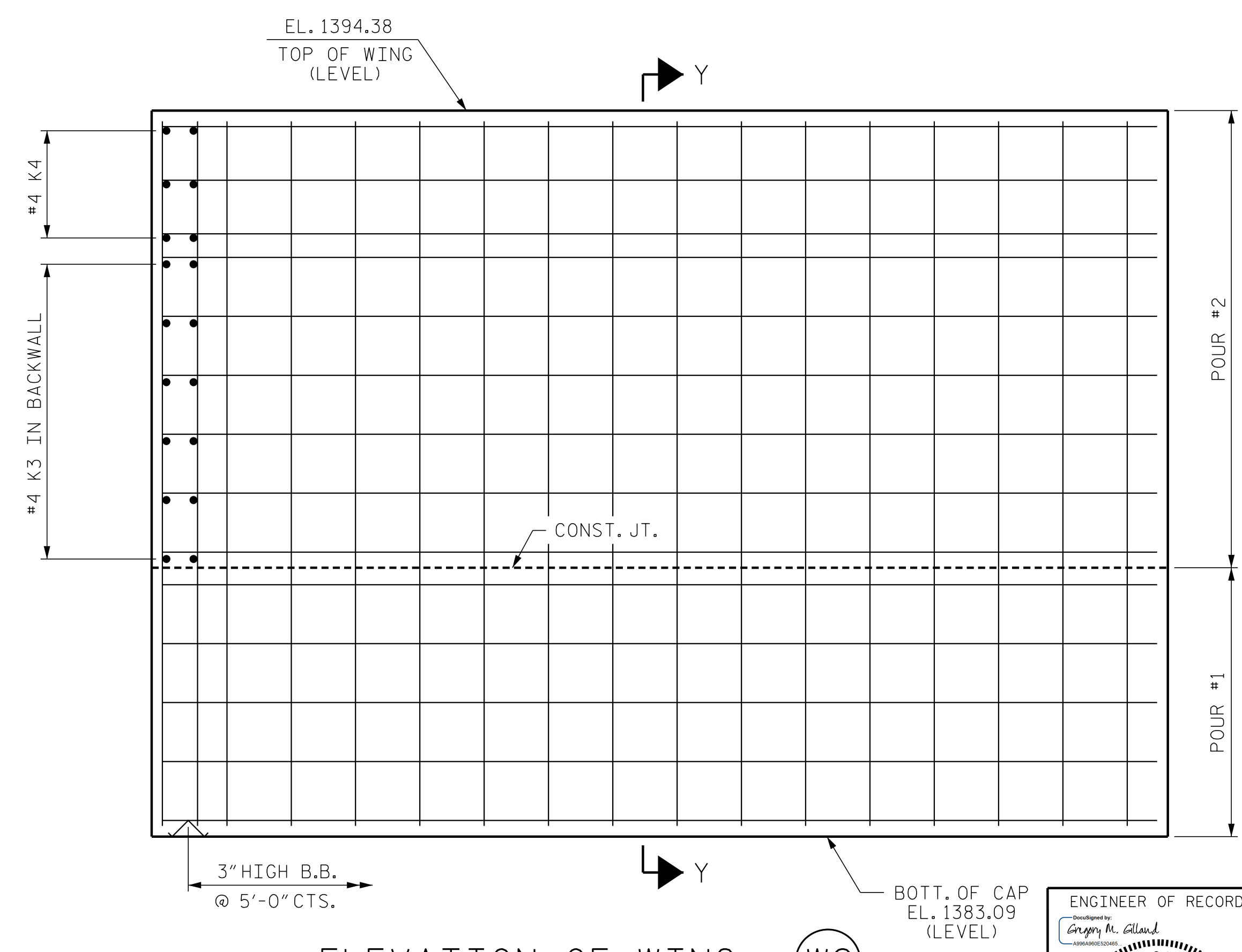
PLAN OF WING - (W2)



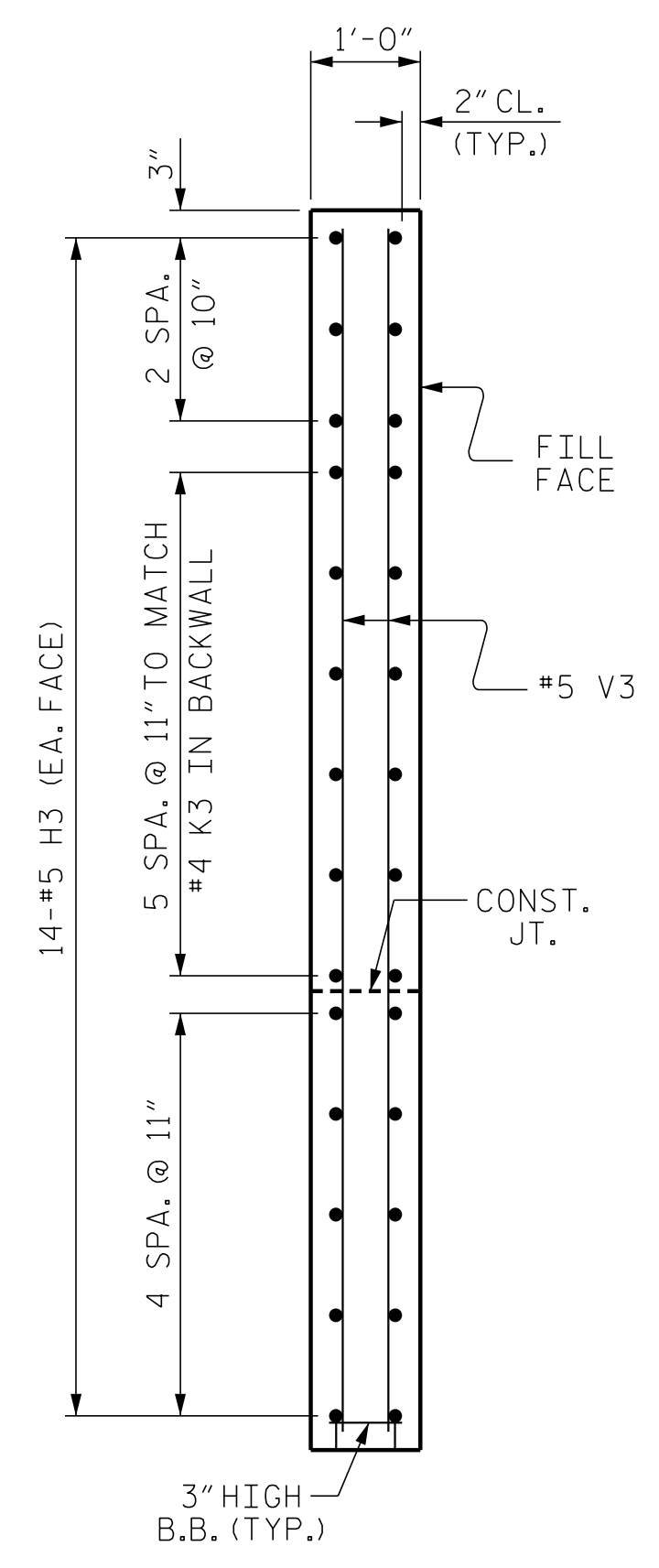
ELEVATION OF WING - (W1)



SECTION X-X



ELEVATION OF WING - (W2)



SECTION Y-Y

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 3 OF 4

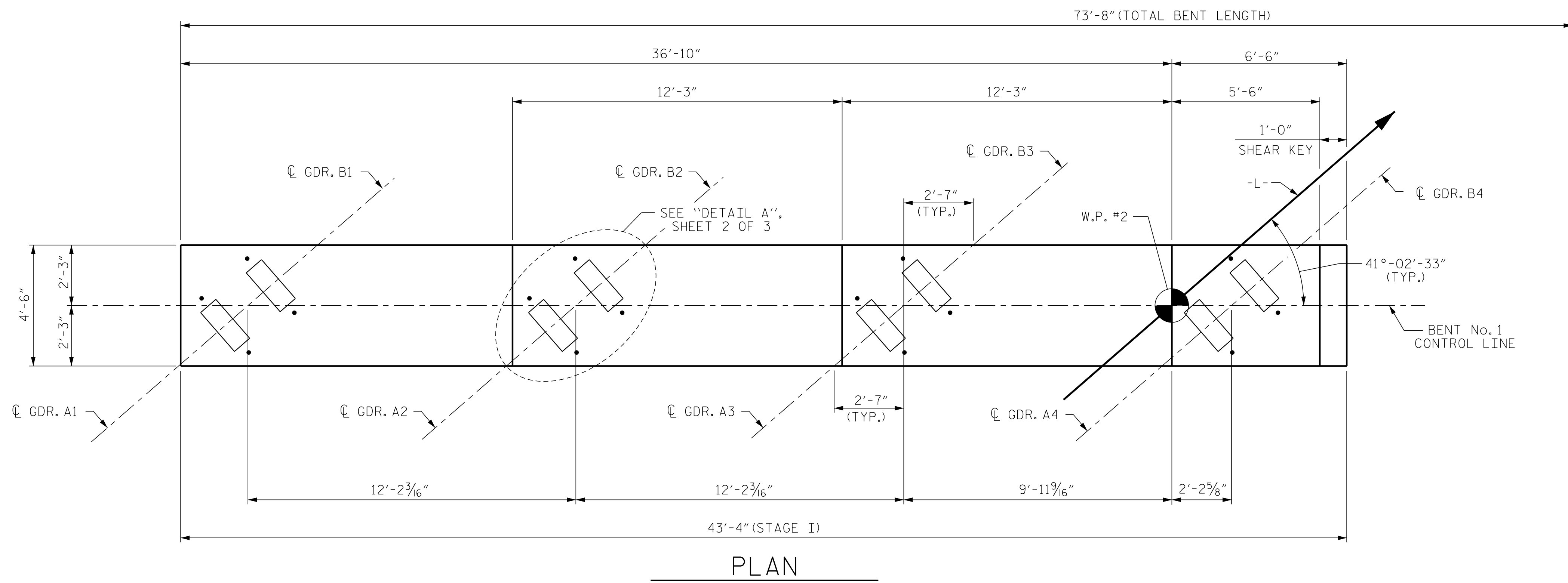
ENGINEER OF RECORD:
Gregory M. Gilliland
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 37400
 ENGINEER
 GREGORY M. GILLILAND
 12/10/2018
 WETHERILL
 ENGINEERING
 1223 Jones Franklin Rd.
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 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-36					TOTAL SHEETS 49

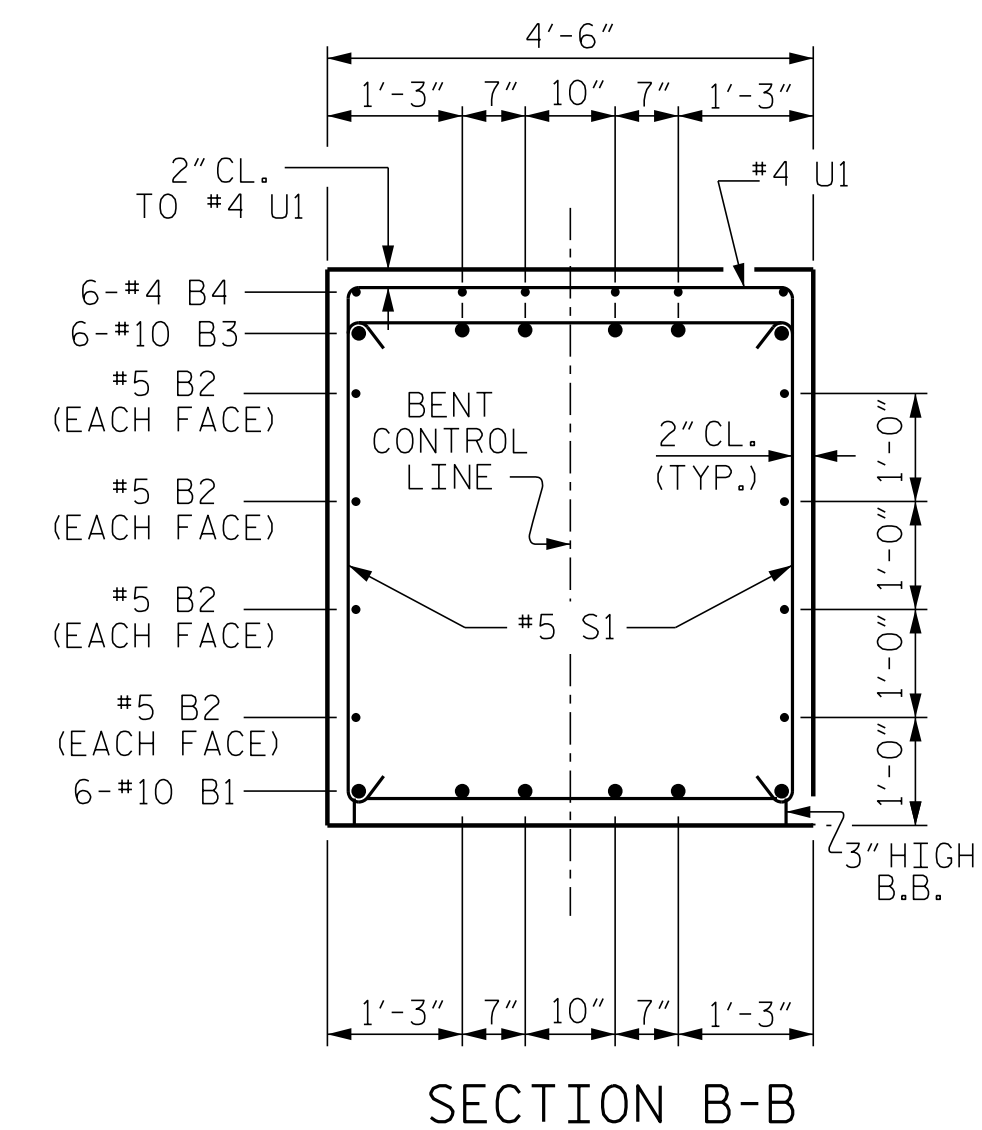
DRAWN BY: D. HODGE DATE: 9/18
 CHECKED BY: B.C. HUNT DATE: 9/18

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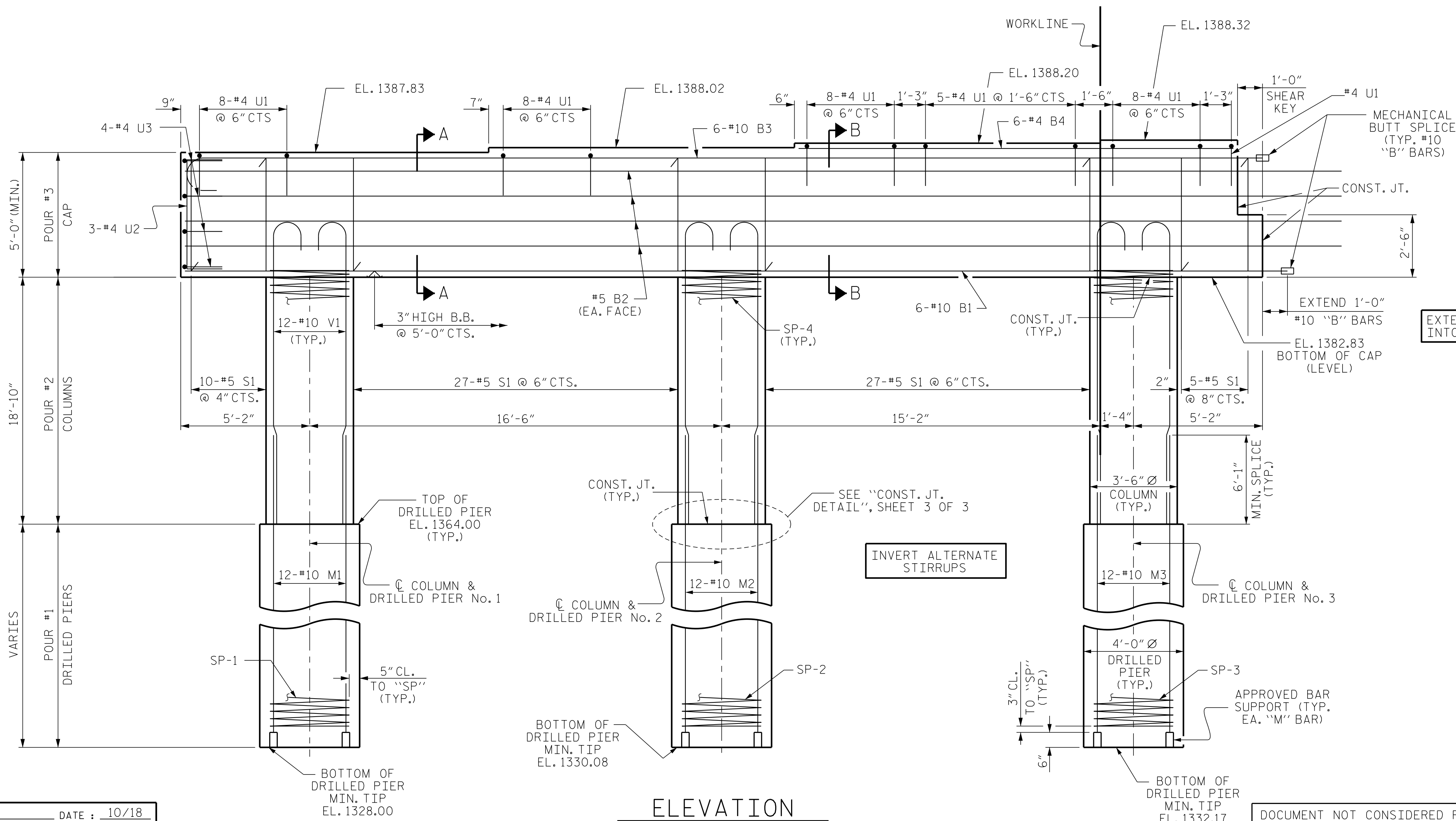
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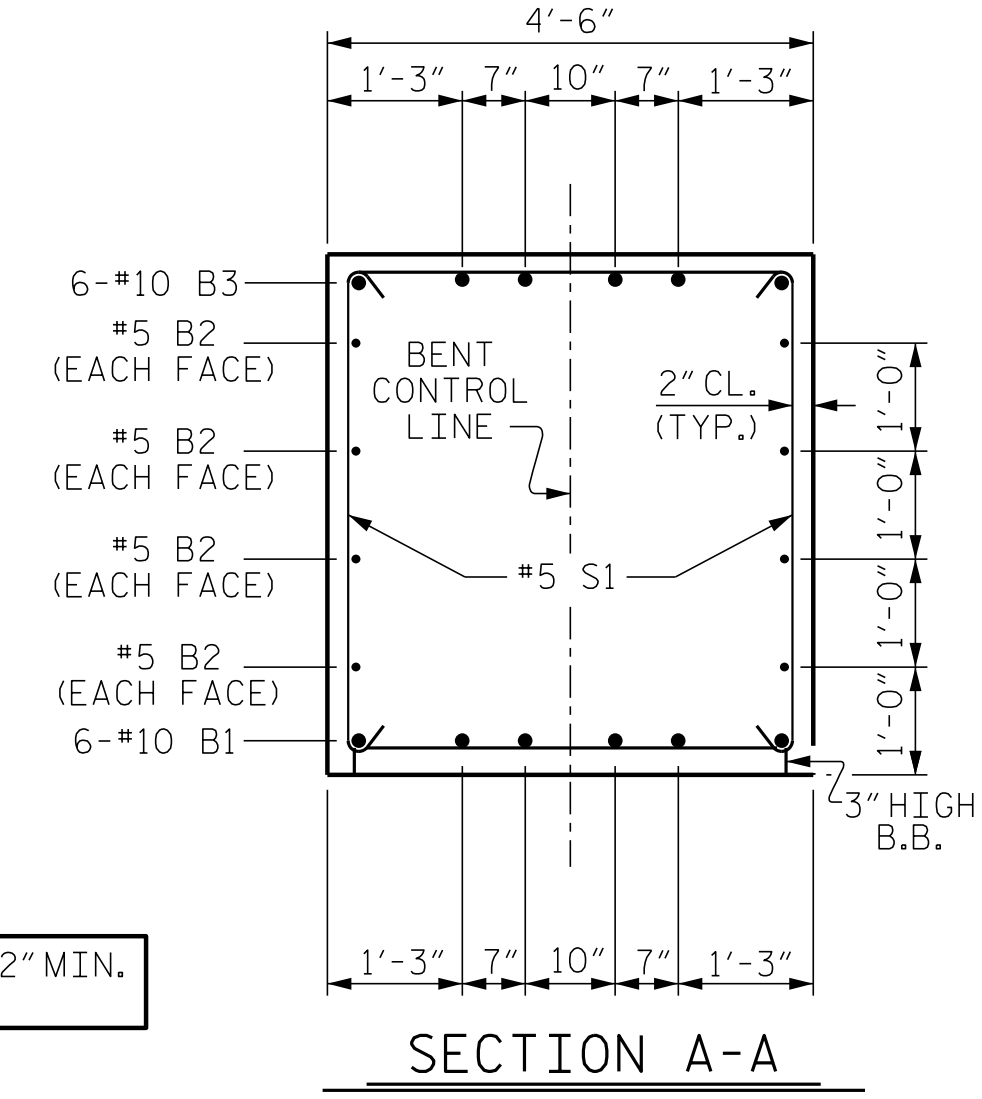
PLAN



SECTION B-B



ELEVATION



SECTION A-A

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 1 OF 3

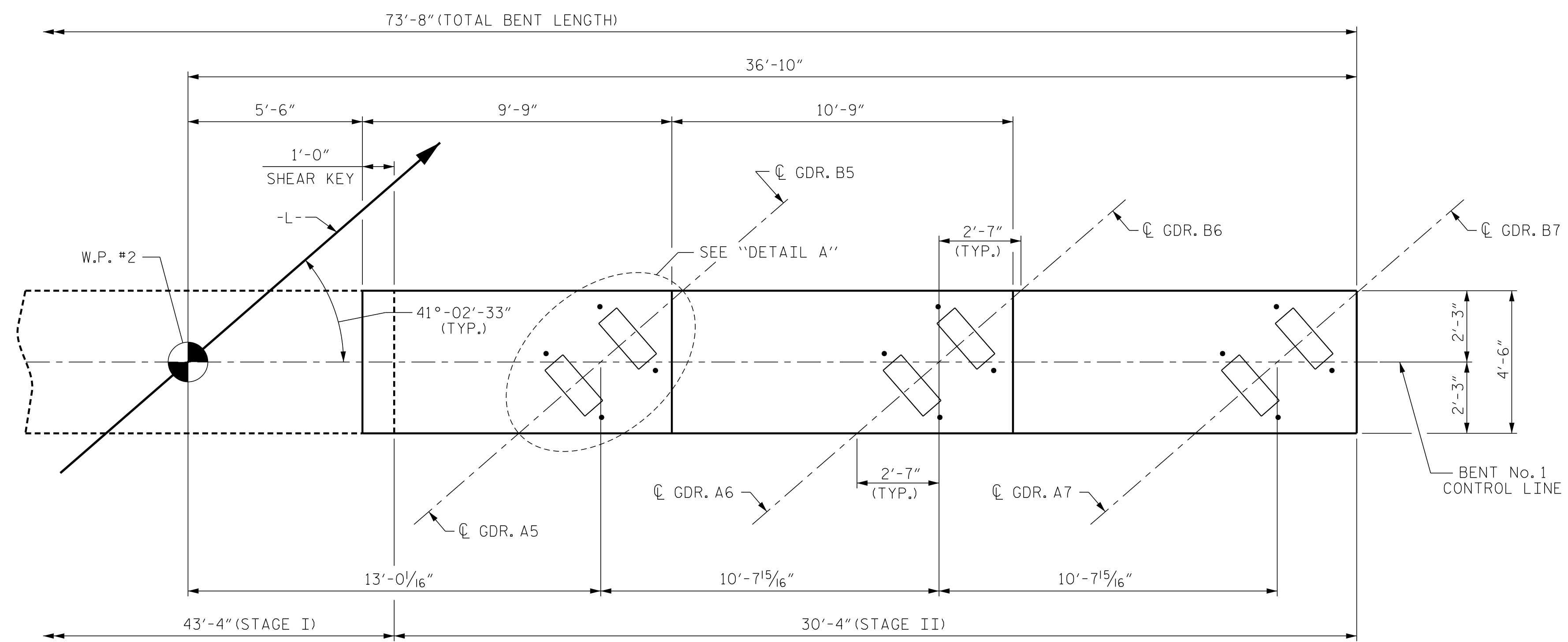


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 1 (STAGE I)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

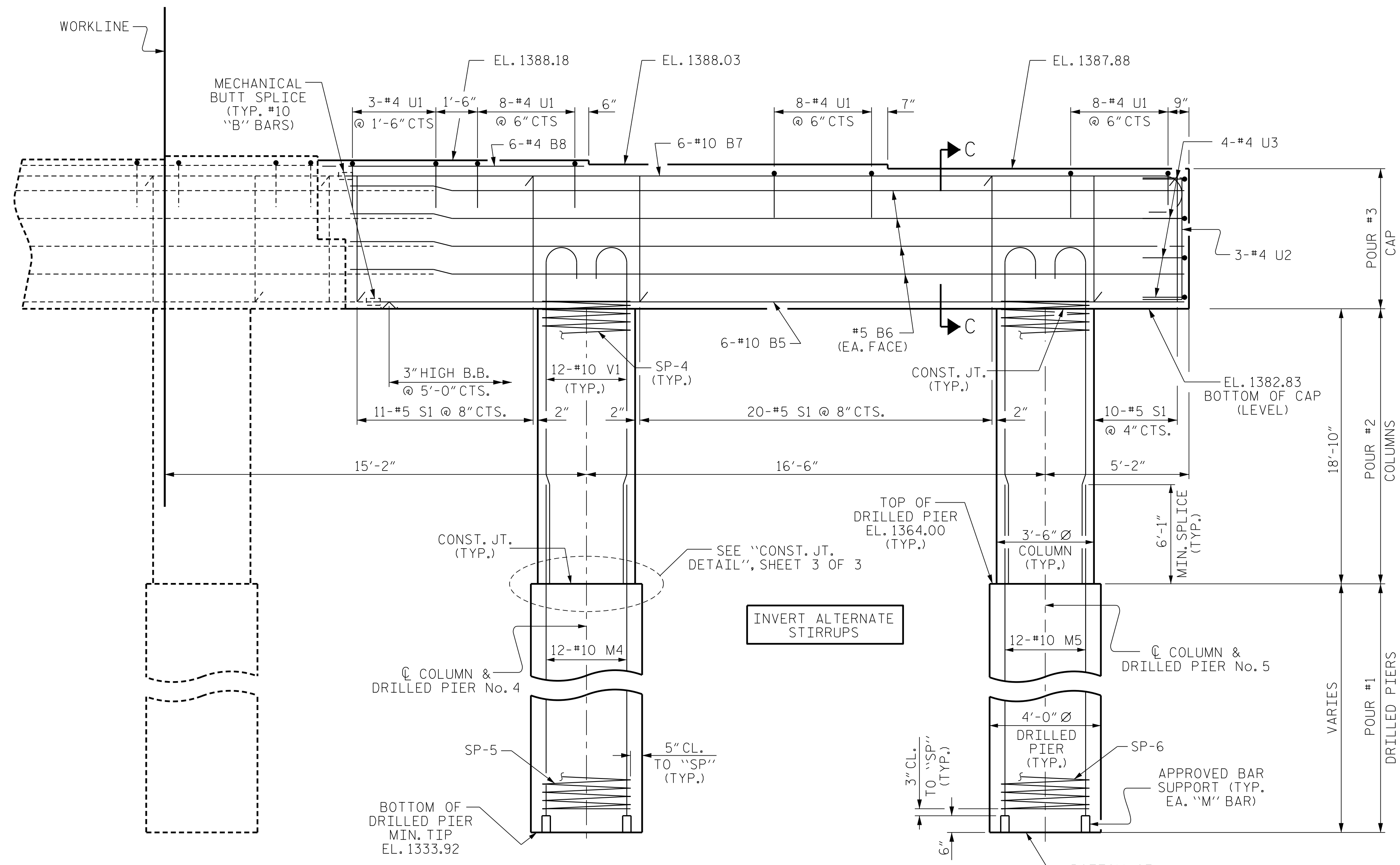
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 CHECKED BY: B.C. HUNT DATE: 10/18

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PLAN



ELEVATION

NOTES

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

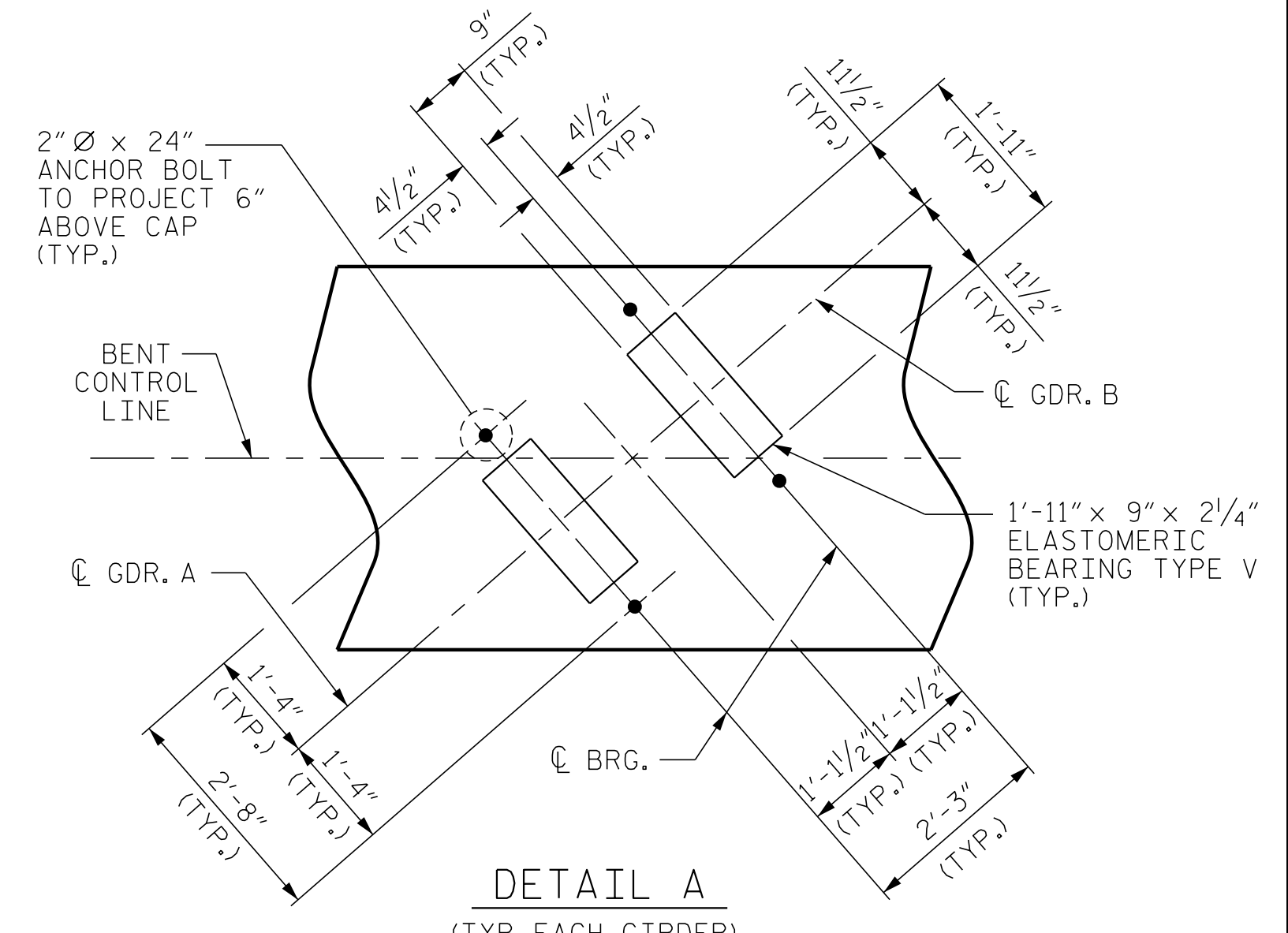
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

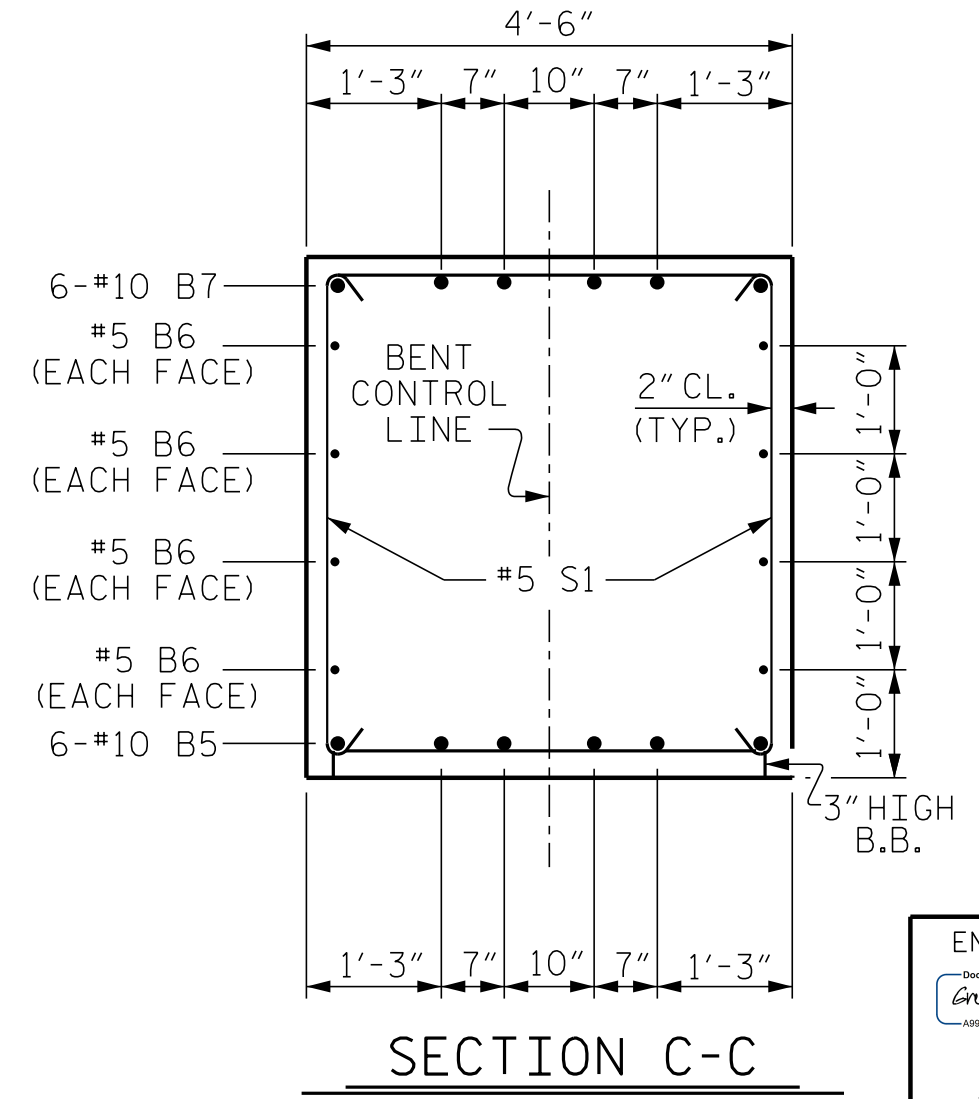
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIER WILL NOT BE PERMITTED.

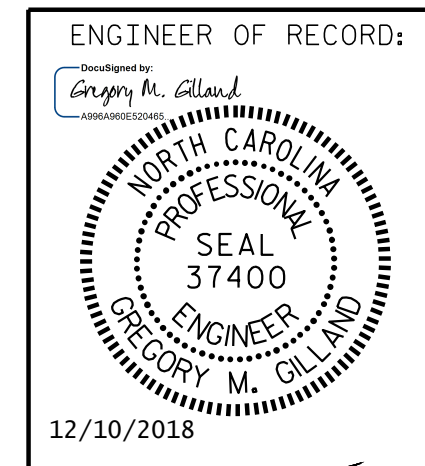


DETAIL A
(TYP. EACH GIRDER)



SECTION C-C

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 2 OF 3



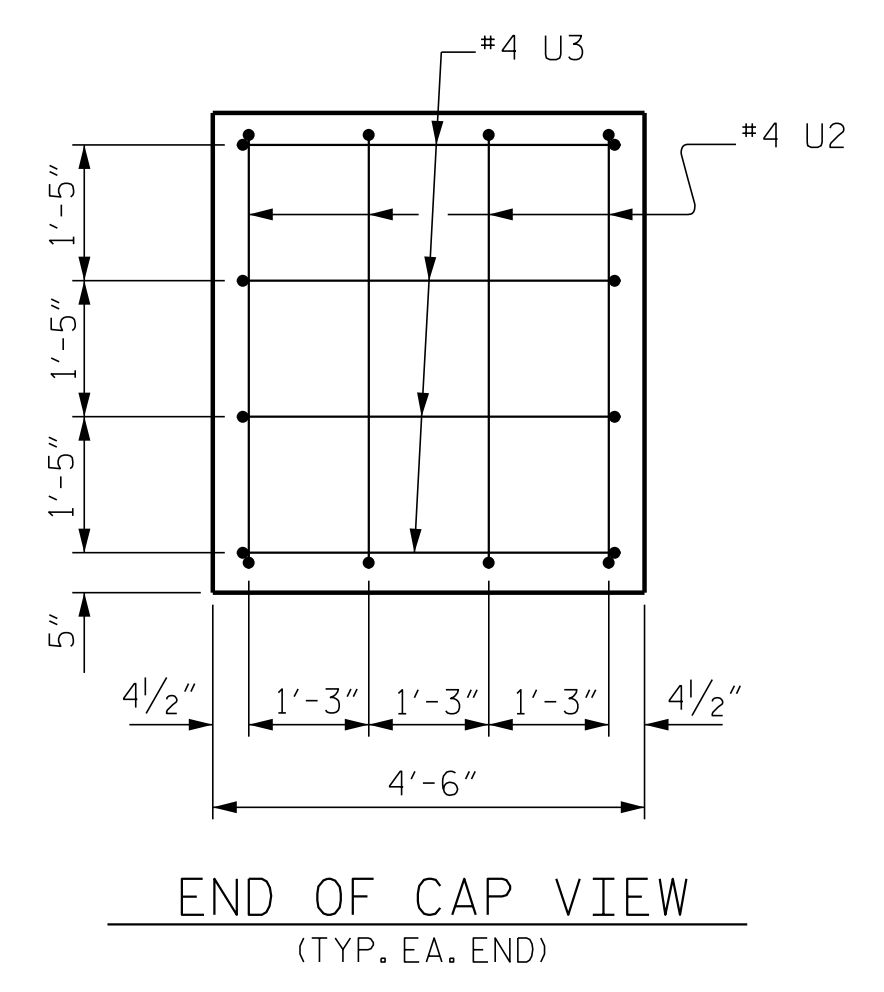
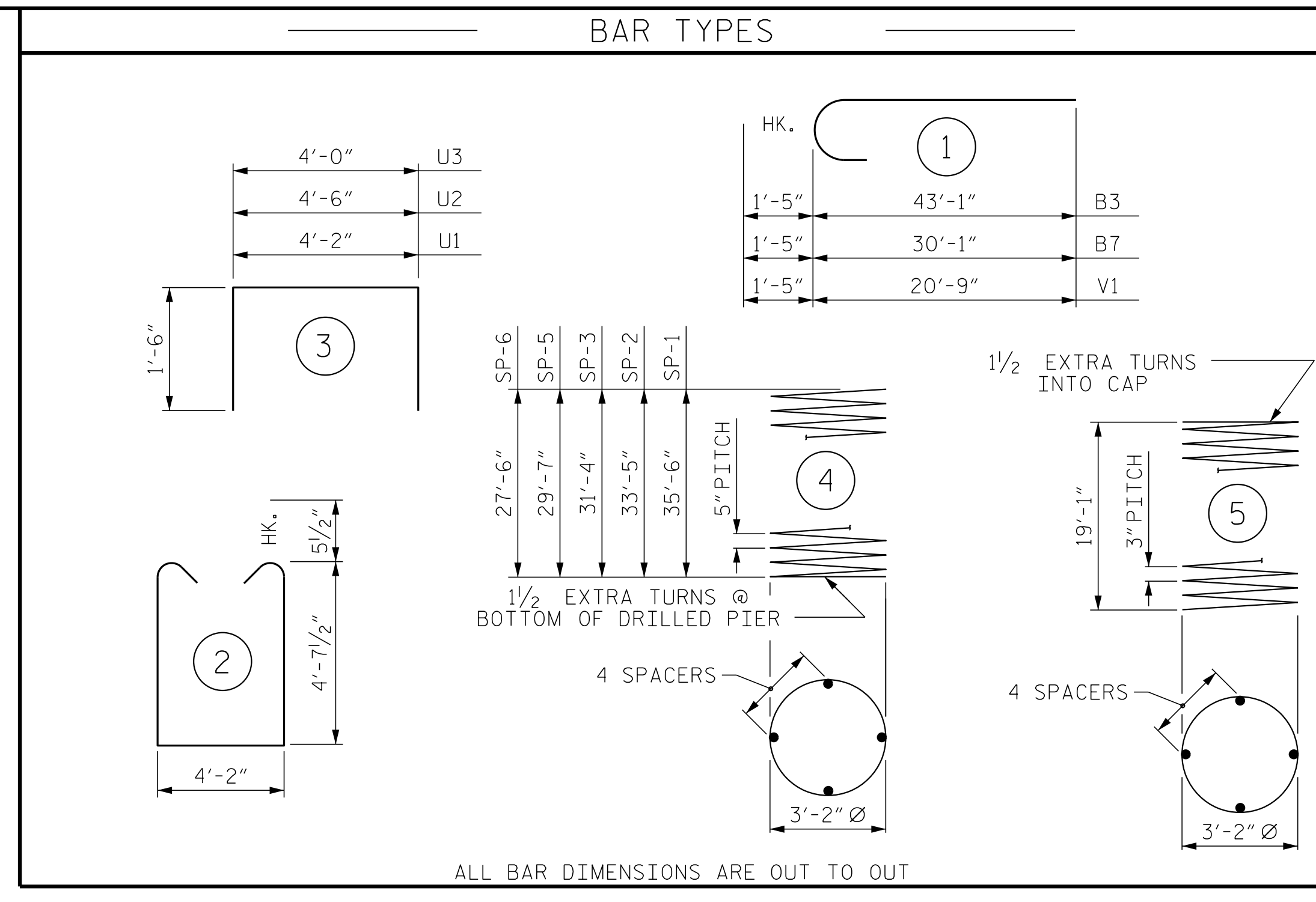
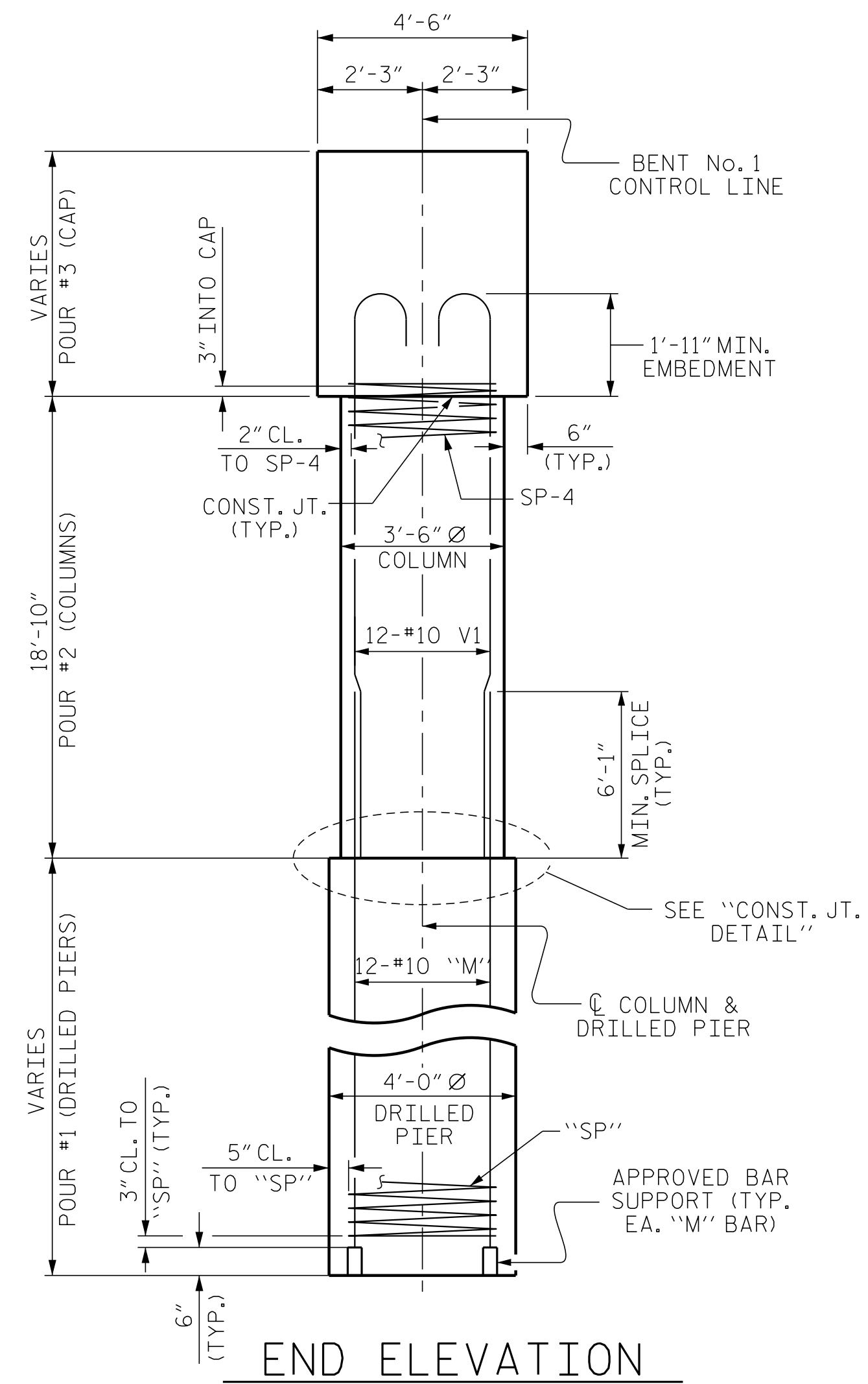
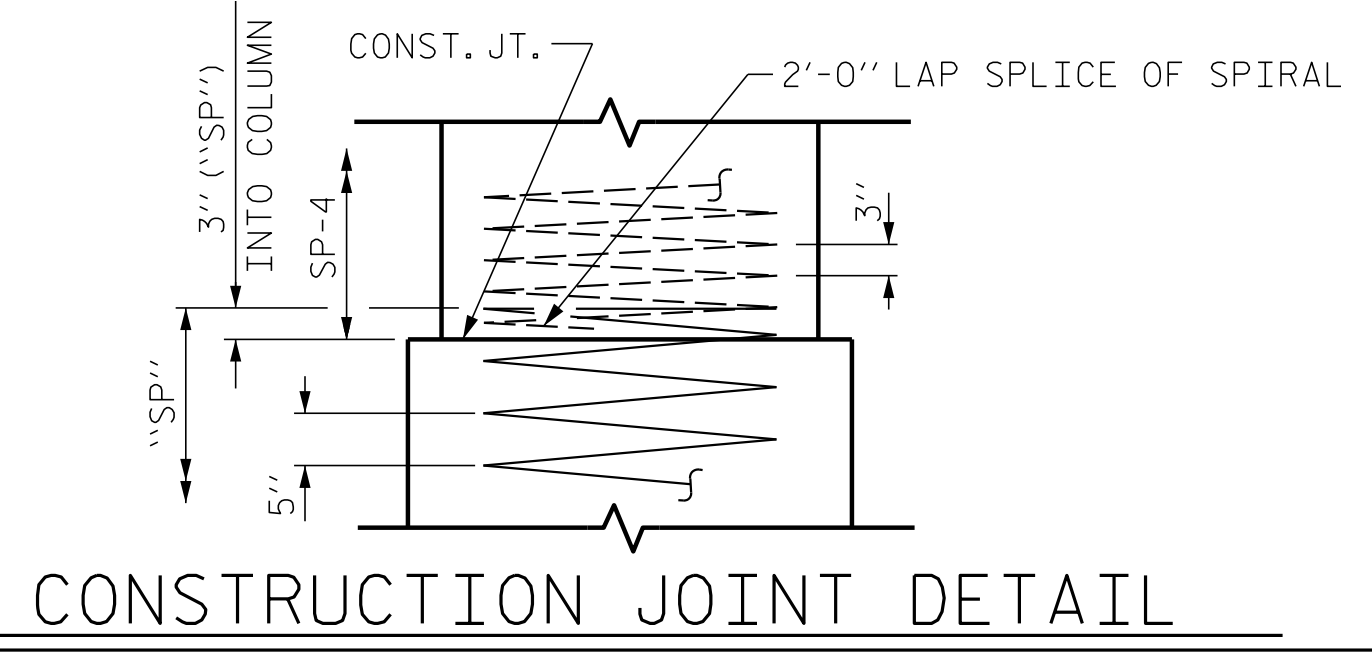
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 1 (STAGE II)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		
SHEET NO. S1-39					TOTAL SHEETS 49

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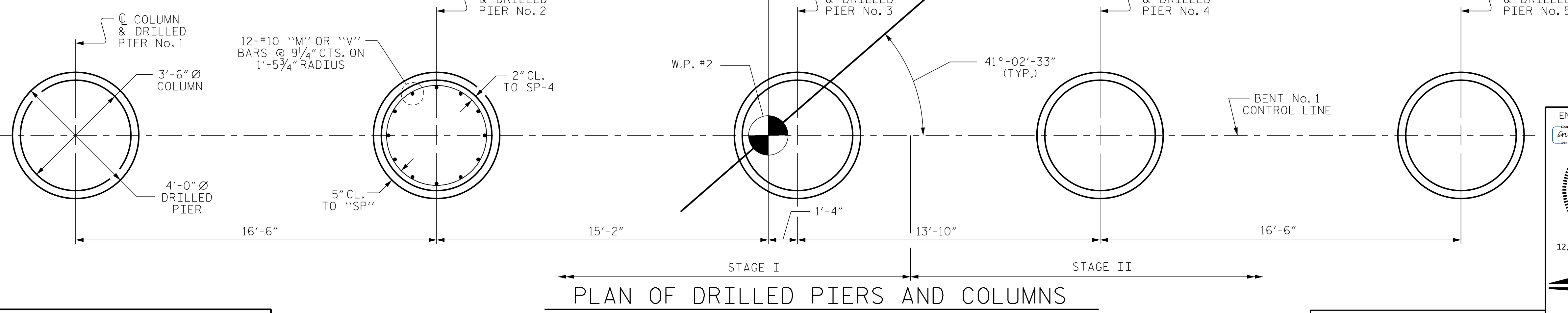
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 CHECKED BY: _____ DATE: _____

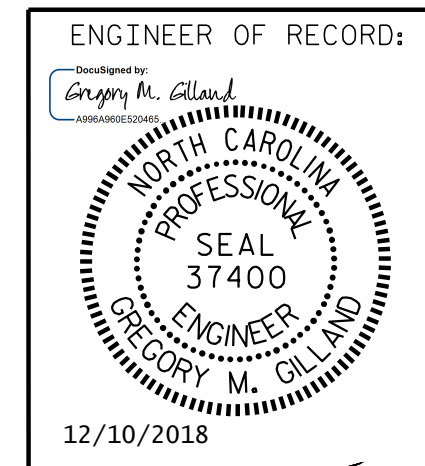


TOTAL QUANTITIES	
REINFORCING STEEL	22,827 LBS.
SPIRAL COLUMN REINFORCING STEEL	6,494 LBS.
CLASS "A" CONCRETE TOTAL	97.5 C.Y.
DRILLED PIERS:	
DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	74.4 C.Y.
4'-0" Ø DRILLED PIERS	159.83 LIN. FT.
CSL TUBES	669 LIN. FT.
CSL TESTING	1 EA.
SPT TESTING	5 EA.

BILL OF MATERIAL											
BENT No. 1											
STAGE I						STAGE II					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	STR	44'-2"	1140	B5	6	#10	STR	29'-2"	753
B2	8	#5	STR	46'-4"	387	B6	8	#5	STR	30'-0"	250
B3	6	#10	1	44'-6"	1149	B7	6	#10	1	31'-6"	813
B4	6	#4	STR	17'-5"	70	B8	6	#4	STR	9'-5"	38
M1	12	#10	STR	44'-7"	2302	M4	12	#10	STR	38'-8"	1997
M2	12	#10	STR	42'-6"	2195	M5	12	#10	STR	36'-7"	1889
M3	12	#10	STR	40'-5"	2087	S1	41	#5	2	14'-4"	613
S1	69	#5	2	14'-4"	1032	U1	27	#4	3	7'-2"	129
U1	38	#4	3	7'-2"	182	U2	4	#4	3	7'-6"	20
U2	4	#4	3	7'-6"	20	U3	4	#4	3	7'-0"	19
U3	4	#4	3	7'-0"	19	V1	24	#10	1	22'-2"	2289
V1	36	#10	1	22'-2"	3434						
REINFORCING STEEL					14,017 LBS.	REINFORCING STEEL					8,810 LBS.
SP-1	1	*	4	849'-8"	886	SP-5	1	*	4	710'-1"	741
SP-2	1	*	4	800'-8"	835	SP-6	1	*	4	661'-1"	690
SP-3	1	*	4	751'-8"	784	SP-4	2	**	5	766'-1"	1023
SP-4	3	**	5	766'-1"	1535	SPIRAL COLUMN REINFORCING STEEL					4,040 LBS.
SPIRAL COLUMN REINFORCING STEEL					4,040 LBS.	SPIRAL COLUMN REINFORCING STEEL					2,454 LBS.
* THE SP-1 THRU SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR						* THE SP-5 & SP-6 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-4 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR						** THE SP-4 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN						CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)					20.1 C.Y.	POUR #2 (COLUMNS)					13.4 C.Y.
POUR #3 (CAP)					37.3 C.Y.	POUR #3 (CAP)					26.7 C.Y.
TOTAL CLASS A CONCRETE					57.4 C.Y.	TOTAL CLASS A CONCRETE					40.1 C.Y.
DRILLED PIERS:						DRILLED PIERS:					
DRILLED PIER CONCRETE						DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)					47.4 C.Y.	POUR #1 (DRILLED PIERS)					27.0 C.Y.
4'-0" Ø DRILLED PIERS					101.75 LIN. FT.	4'-0" Ø DRILLED PIERS					58.08 LIN. FT.
CSL TUBES					425 LIN. FT.	CSL TUBES					244 LIN. FT.



PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 3 OF 3



12/10/2018
 WETHERILL ENGINEERING
 1223 Jones Franklin Rd.
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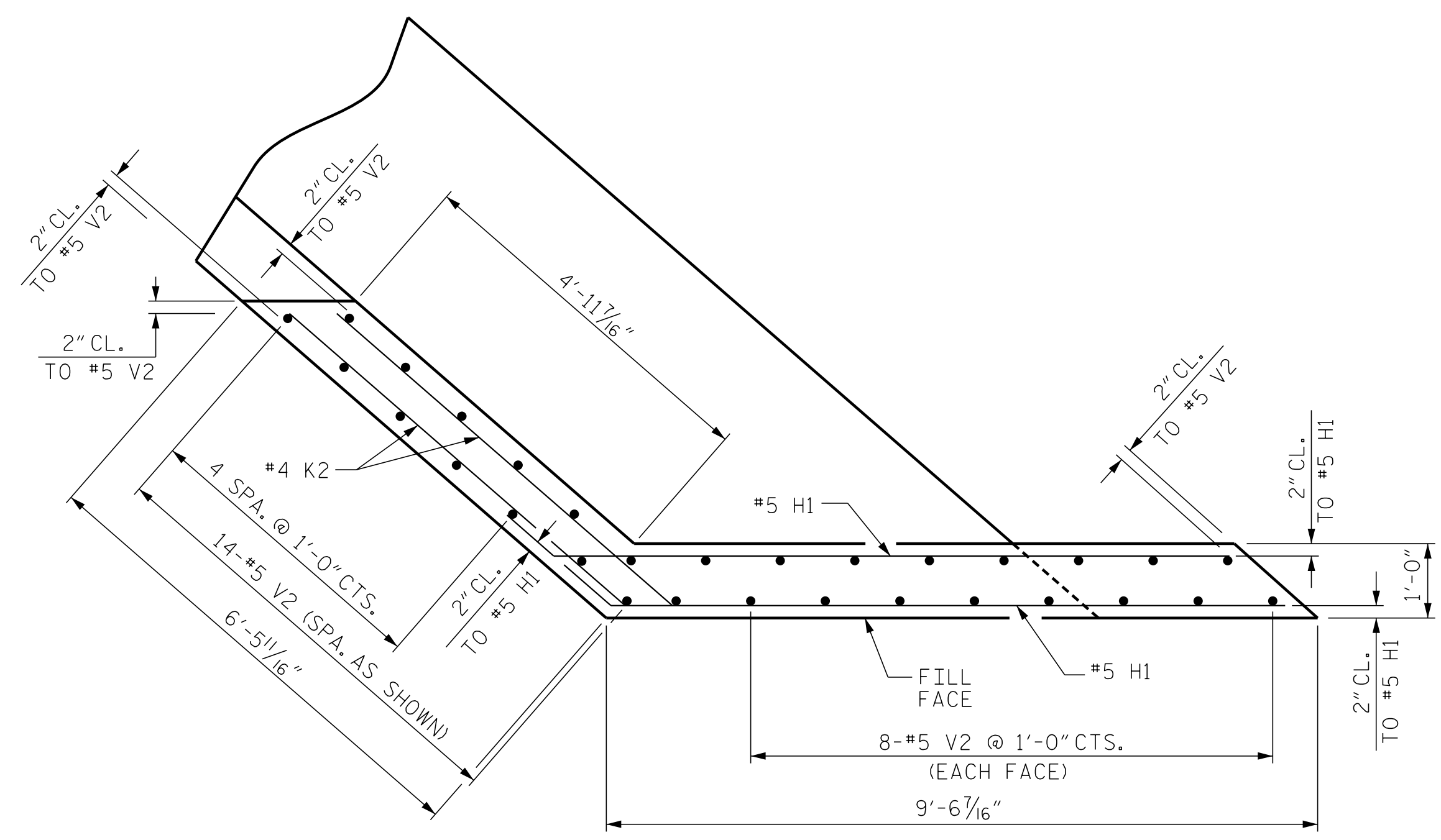
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NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

SHEET NO.		S1-40
TOTAL SHEETS		49

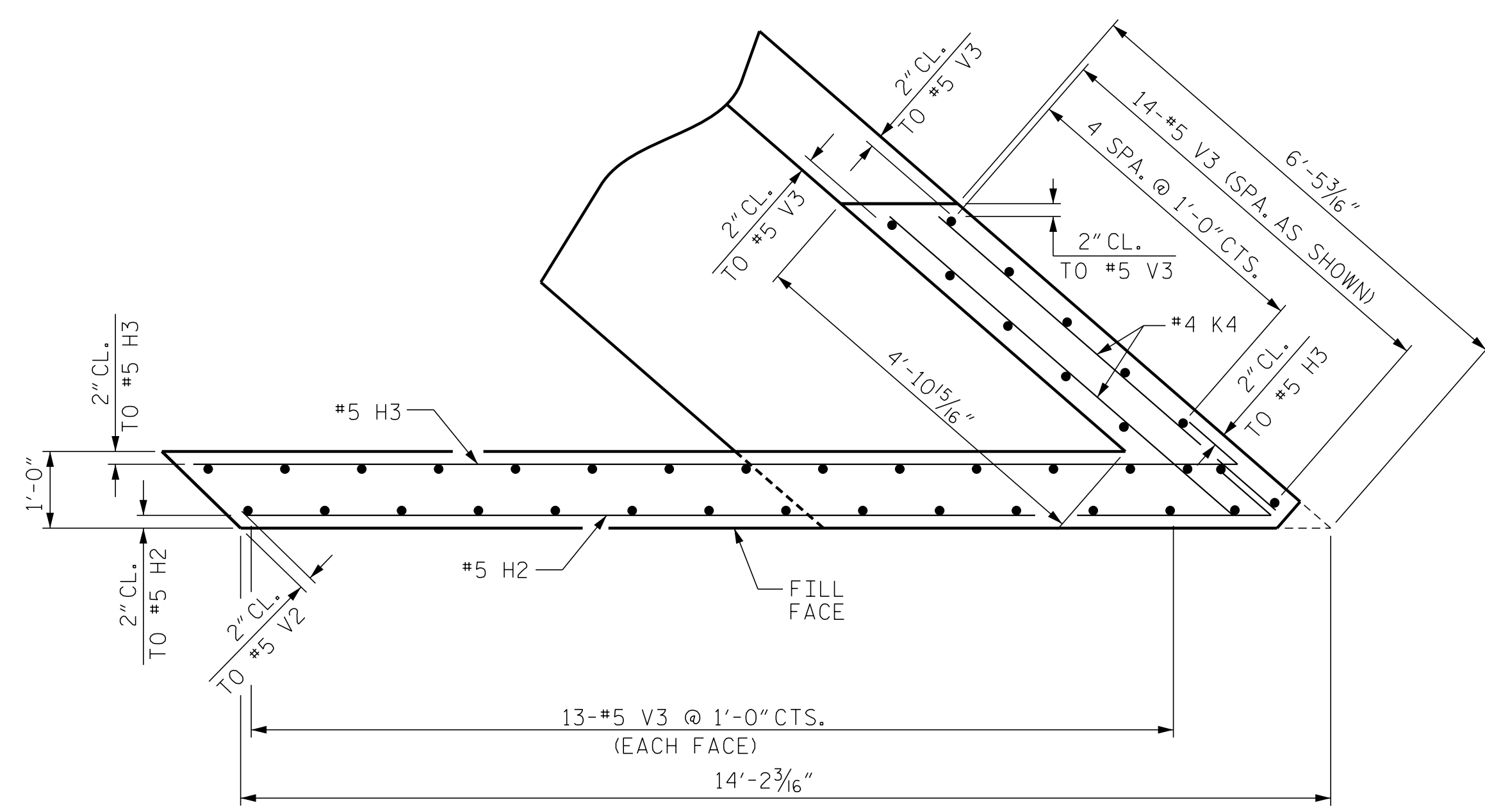
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 CHECKED BY: B.C. HUNT DATE: 10/18

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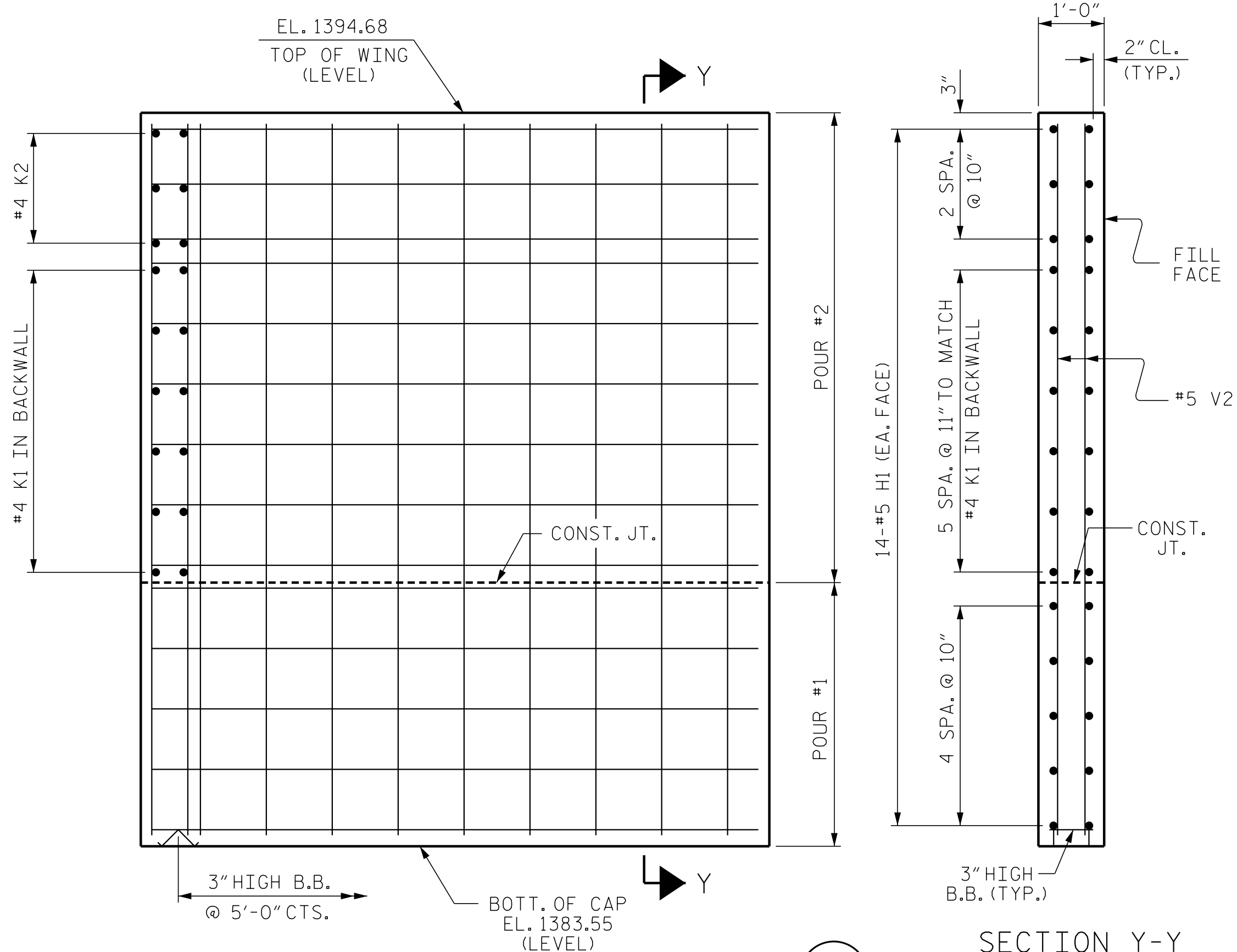
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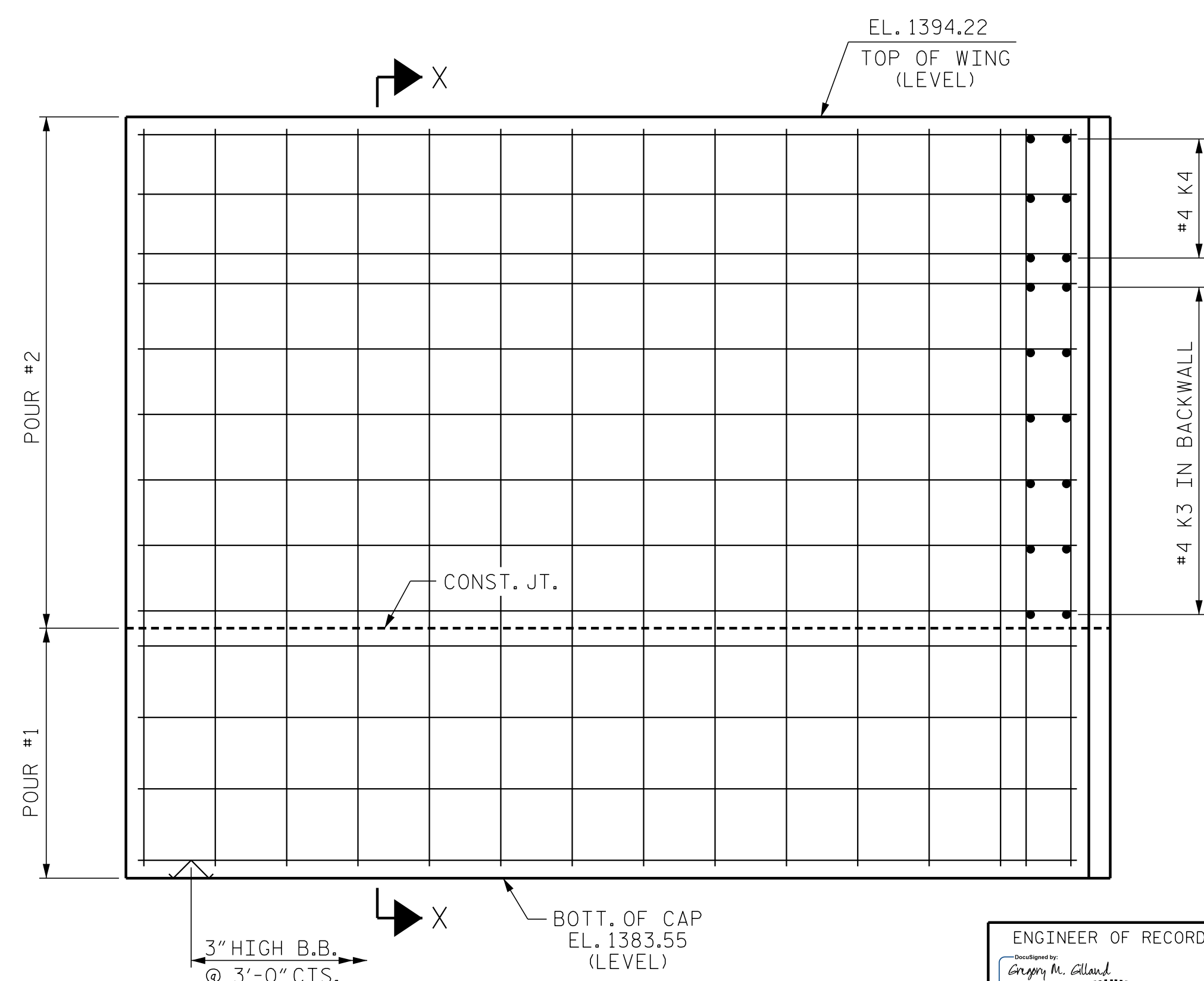
PLAN OF WING - (W1)



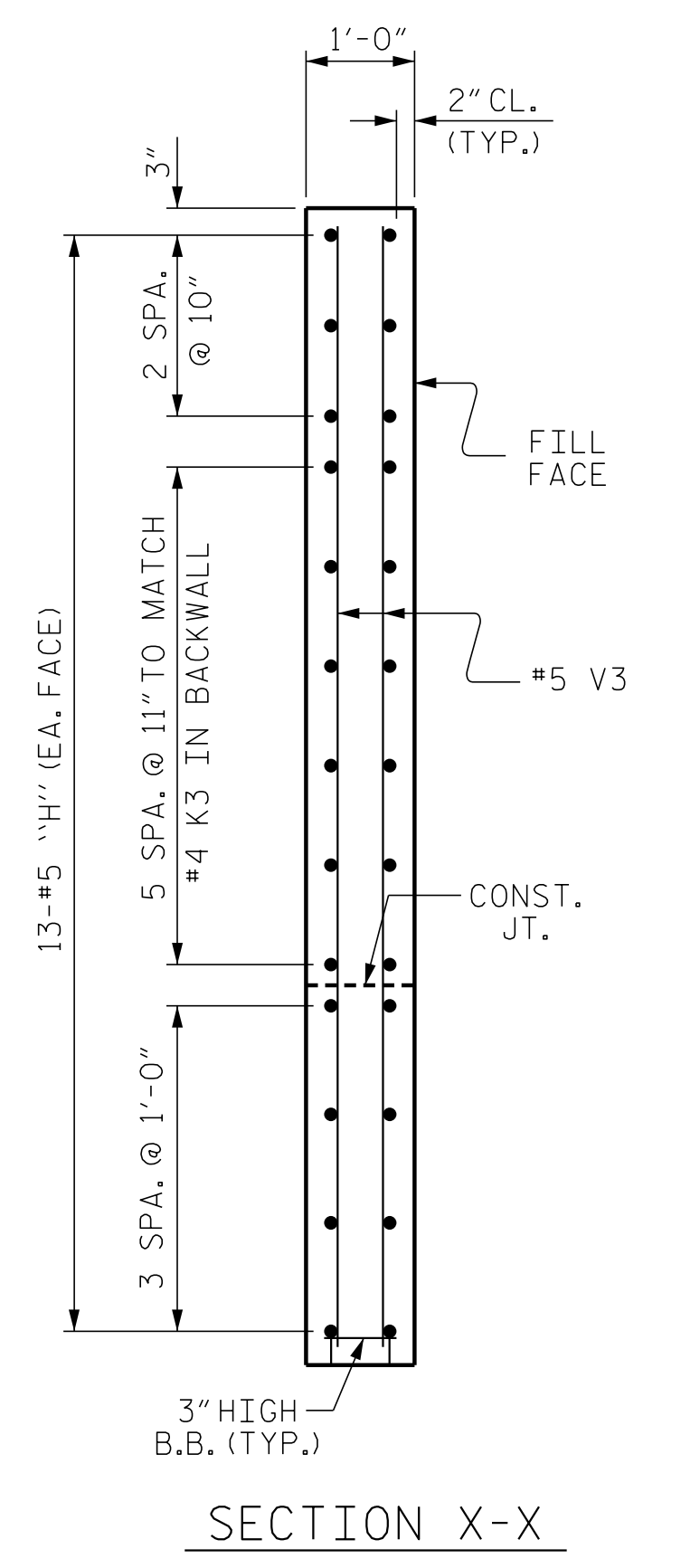
PLAN OF WING - (W2)



ELEVATION OF WING - (W1)

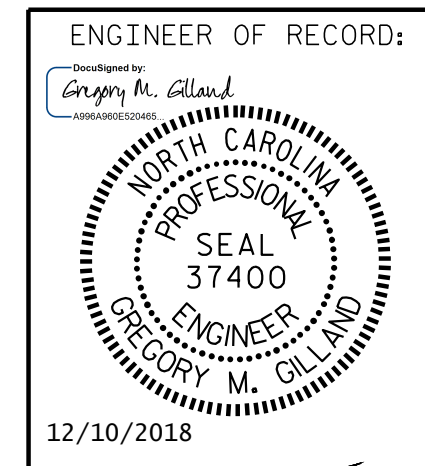


ELEVATION OF WING - (W2)



SECTION X-X

PROJECT NO. U-5818
 MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 3 OF 4



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

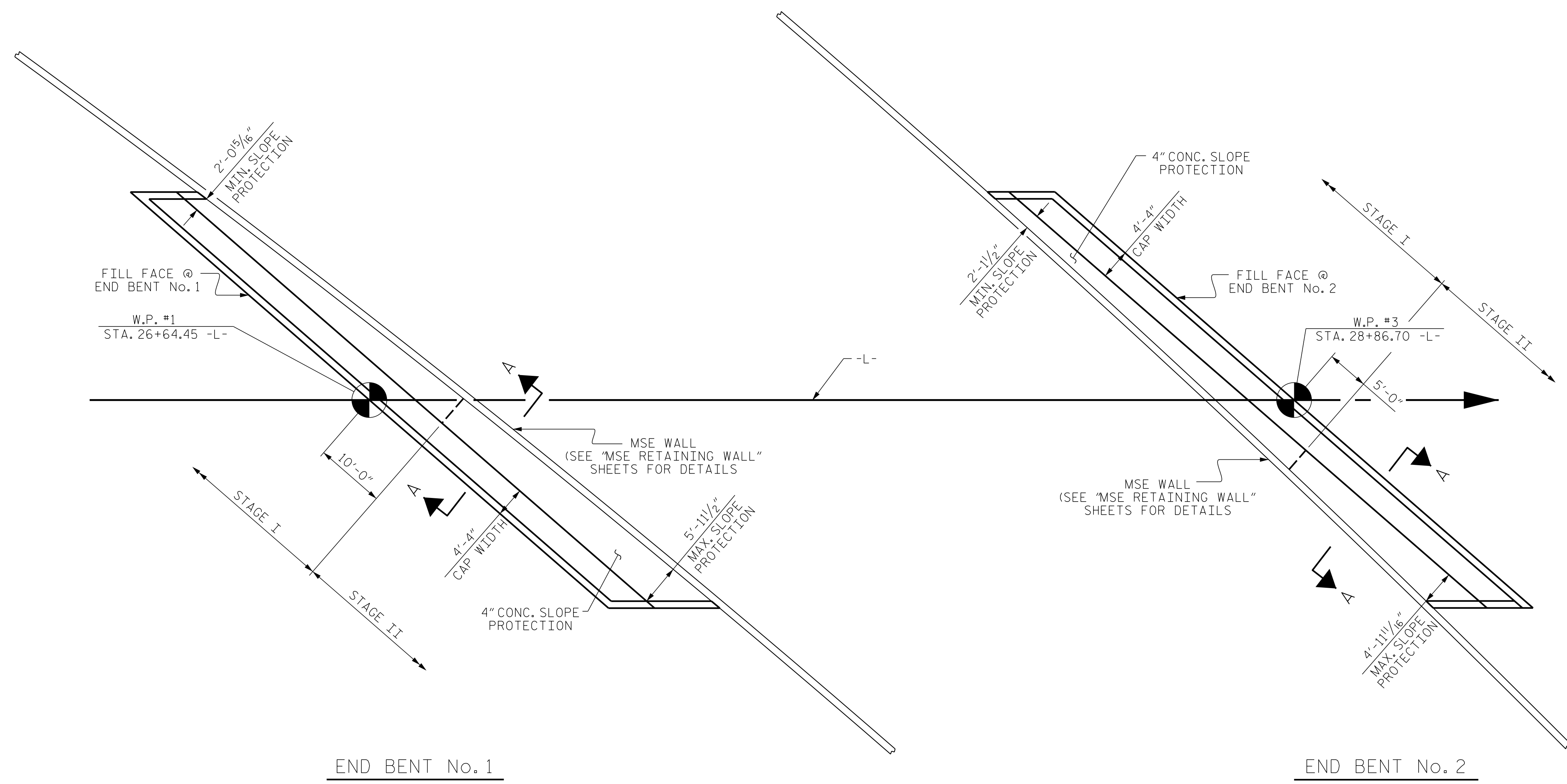
SUBSTRUCTURE
 END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-43
1			3			TOTAL SHEETS 49
2			4			

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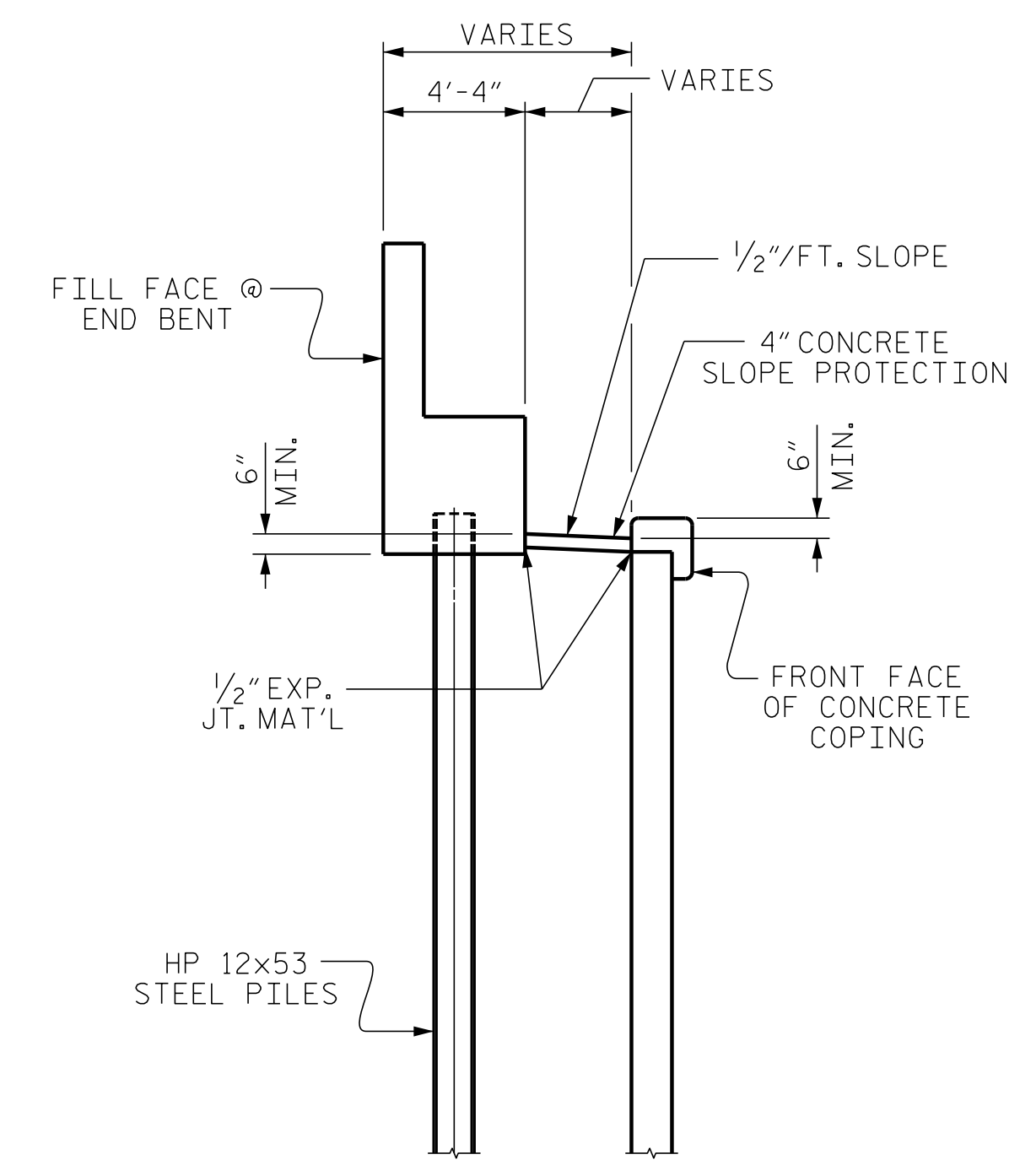
DRAWN BY: D. HODGE DATE: 9/18
 CHECKED BY: B.C. HUNT DATE: 10/18



END BENT No. 1

END BENT No. 2

PLAN



SECTION A-A

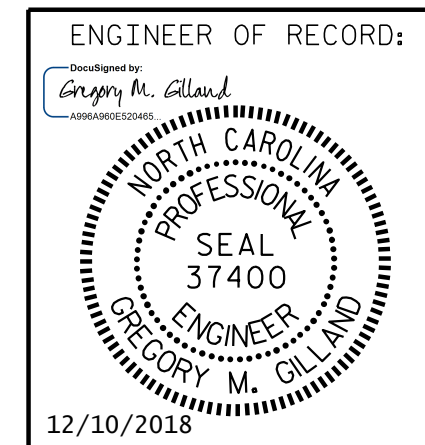
NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FINISHED TO THE SATISFACTION OF THE ENGINEER. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 20" WIDE AND PLACED IN THE MIDDLE OF THE 4" CONCRETE SLOPE PROTECTION. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 27+83.62 -L-	4" SLOPE PROTECTION		WELDED WIRE FABRIC 60 INCHES WIDE	
	SQUARE YARDS		APPROX. L.F.	
END BENT 1	STAGE I	STAGE II	STAGE I	STAGE II
	18	26	47	46
TOTAL	44		93	
END BENT 2	STAGE I	STAGE II	STAGE I	STAGE II
	17	14	57	27
TOTAL	31		84	

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-



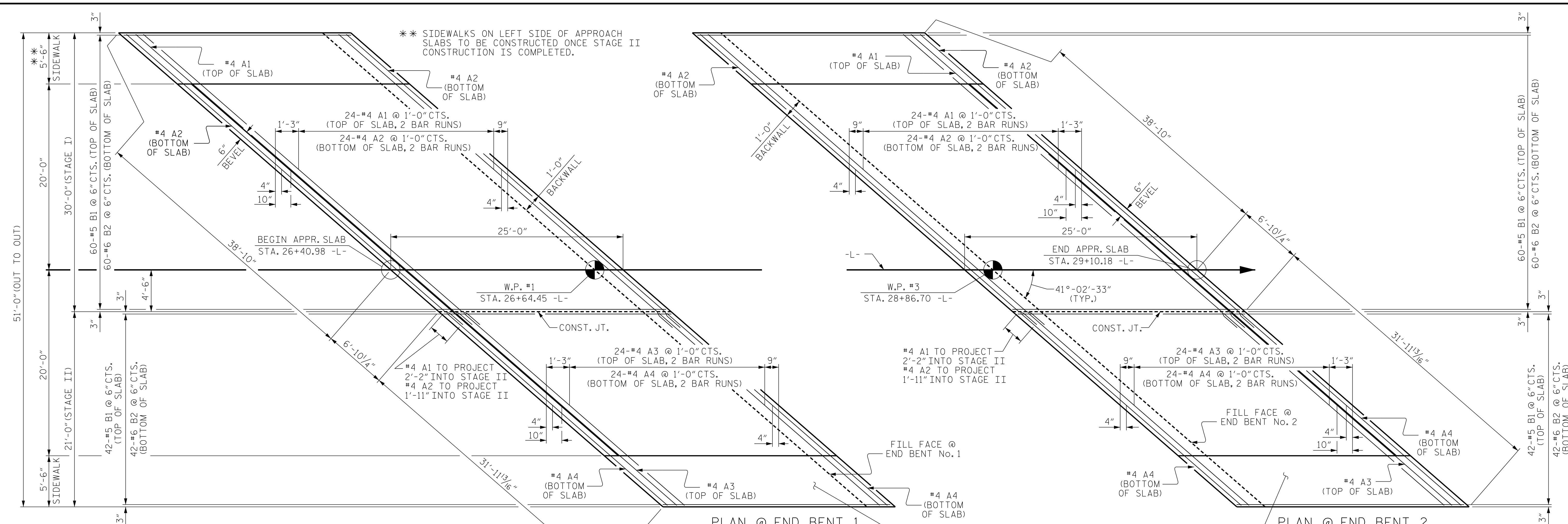
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS
2			4			49

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

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DRAWN BY : B.C. HUNT DATE : 9-18
 CHECKED BY : T.K. KOCH DATE : 9-18



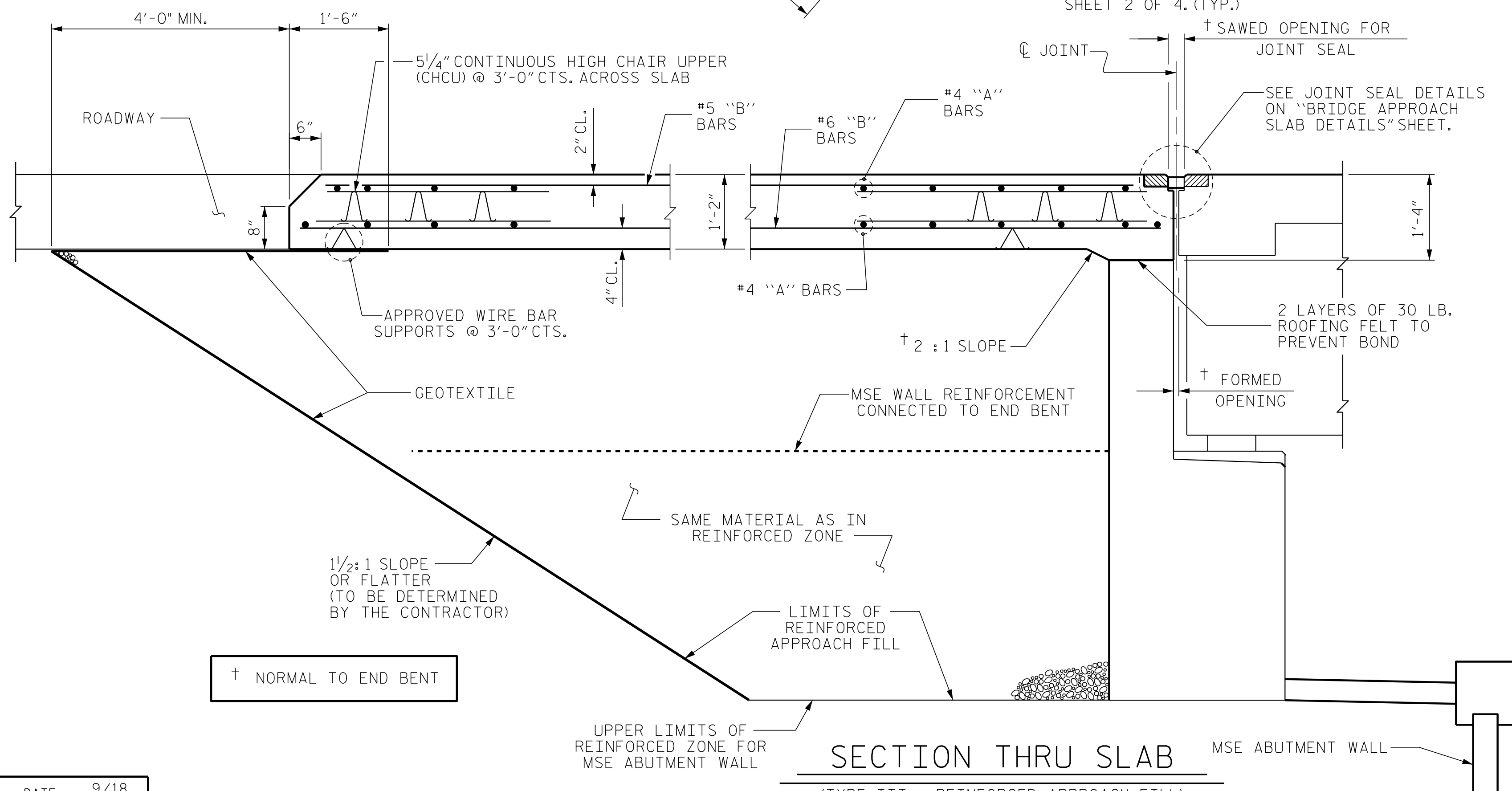
PLAN @ END BENT 1

PLAN @ END BENT 2

FOR REINFORCING STEEL IN SIDEWALKS, SEE "SIDEWALK DETAILS" SHEET 2 OF 4. (TYP.)

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

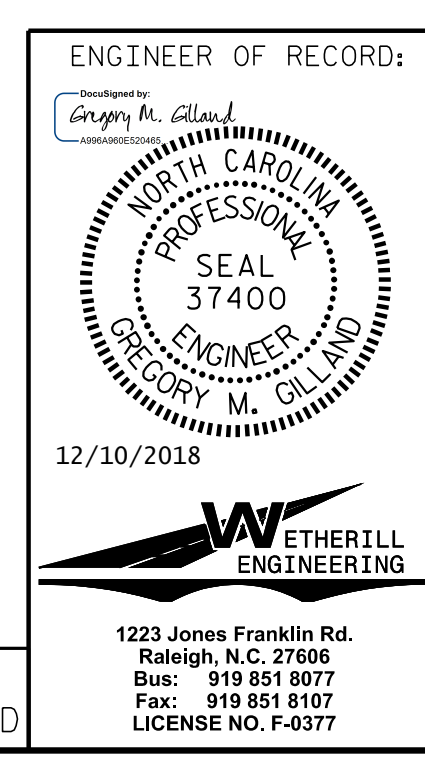
FOR REINFORCING STEEL IN SIDEWALKS, SEE "SIDEWALK DETAILS" SHEET 2 OF 4. (TYP.)



SECTION THRU SLAB

(TYPE III - REINFORCED APPROACH FILL)

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-
 SHEET 1 OF 4

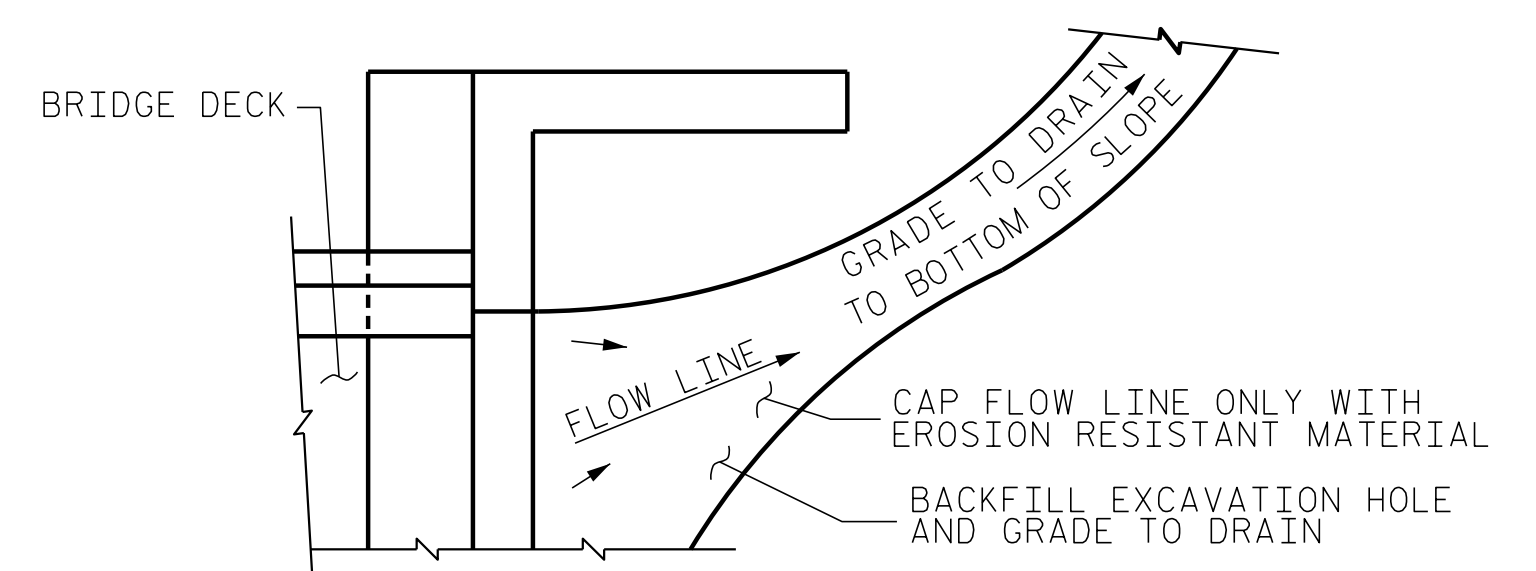


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-46					TOTAL SHEETS 49

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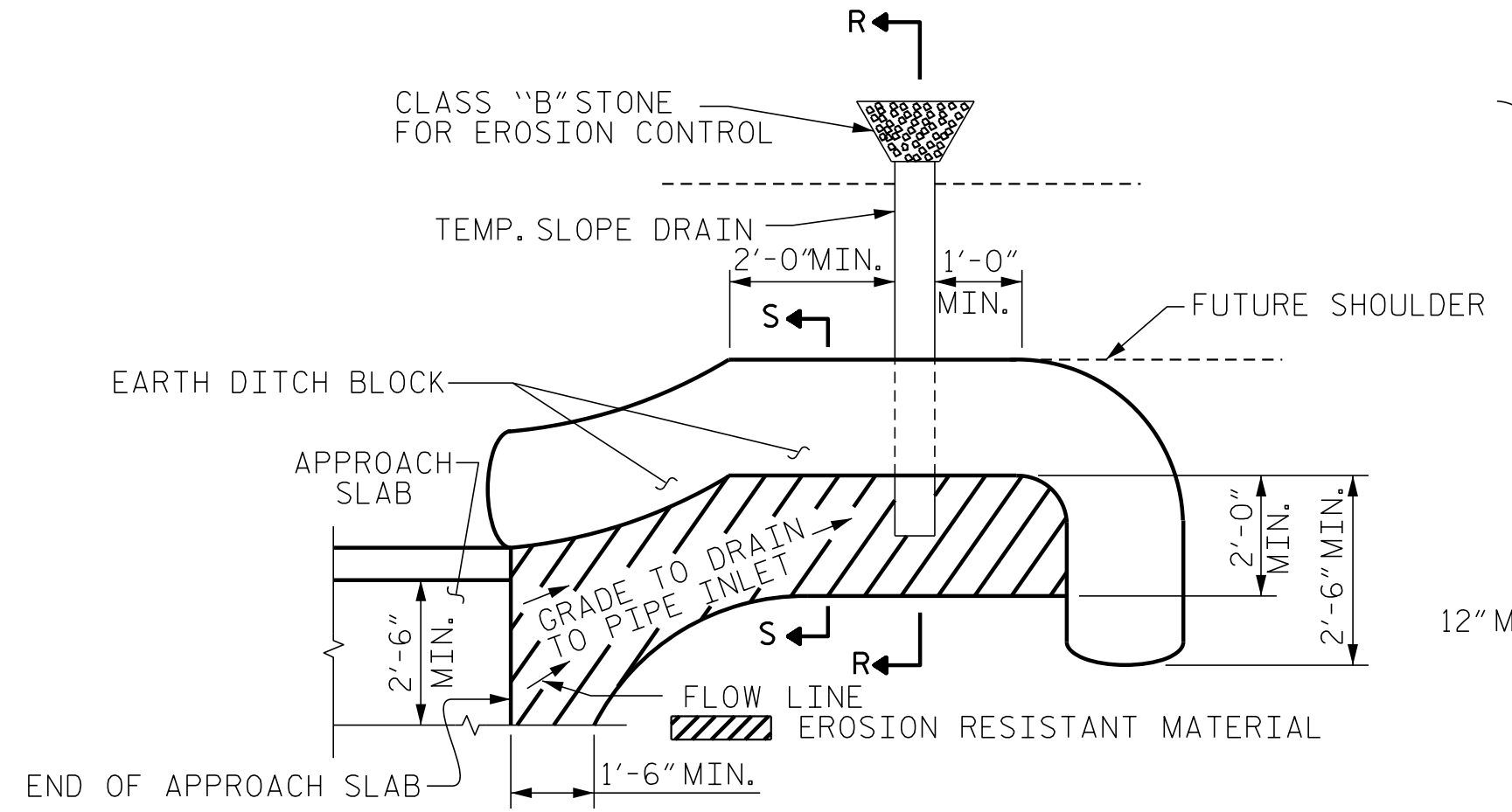
DRAWN BY: D. HODGE DATE: 9/18
 CHECKED BY: B.C. HUNT DATE: 9/18

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED



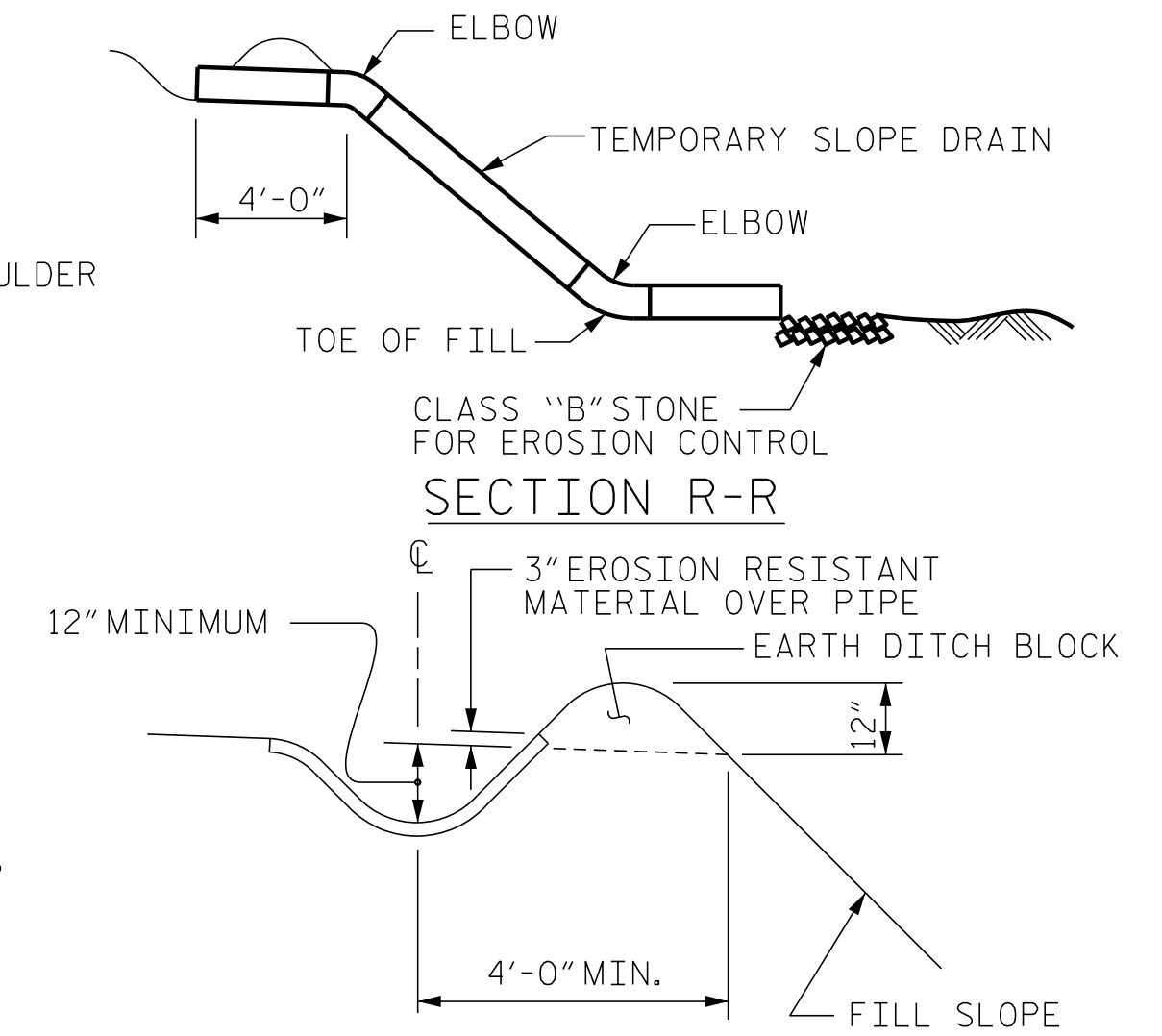
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

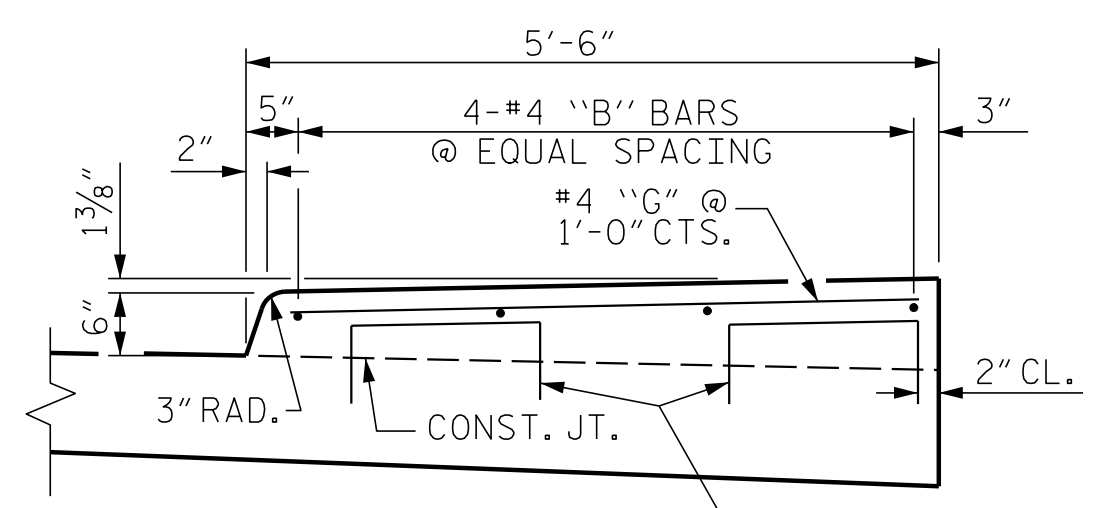


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



SECTION S-S



SECTION N-N
SIDEWALK DETAILS

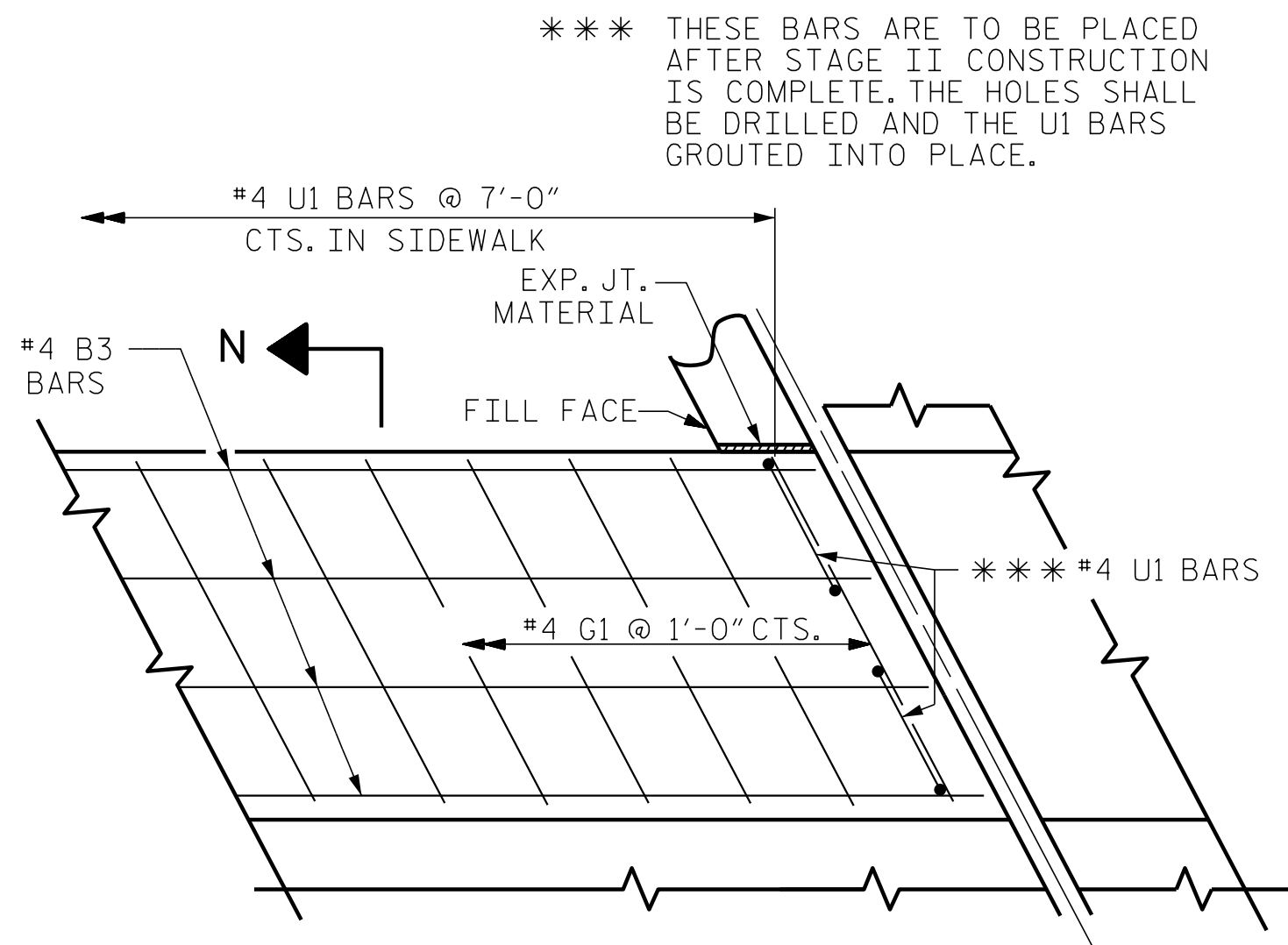
NOTE: U1 BARS IN LEFT SIDEWALK SHALL NOT BE PLACED UNTIL TRAFFIC IS SHIFTED TO STAGE II CONSTRUCTION.

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	11.9
2	11.9
TOTAL	23.8

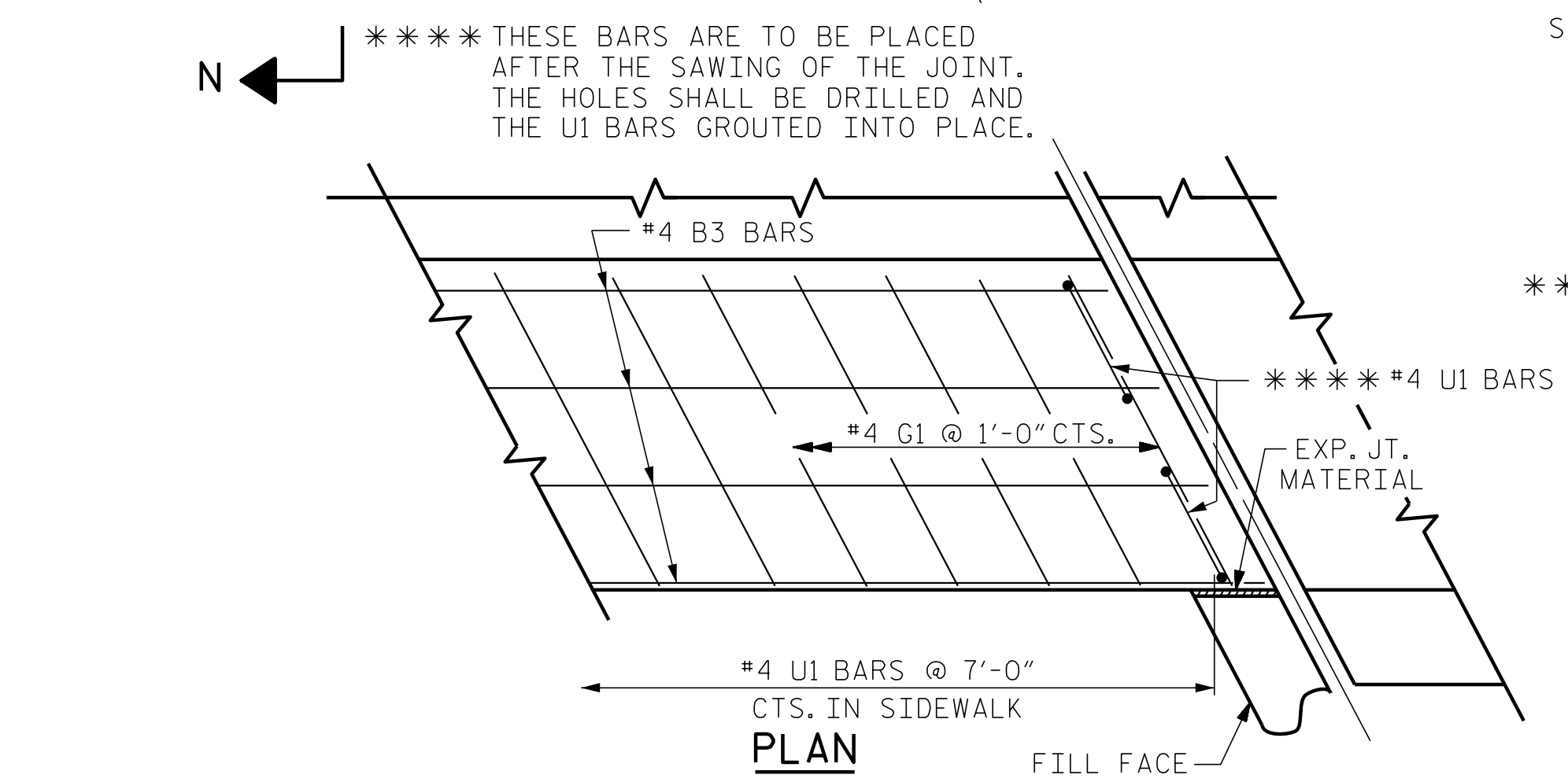
* BASED ON THE MINIMUM BLOCKOUT SHOWN.

TEMPORARY BERM AND SLOPE DRAIN DETAILS

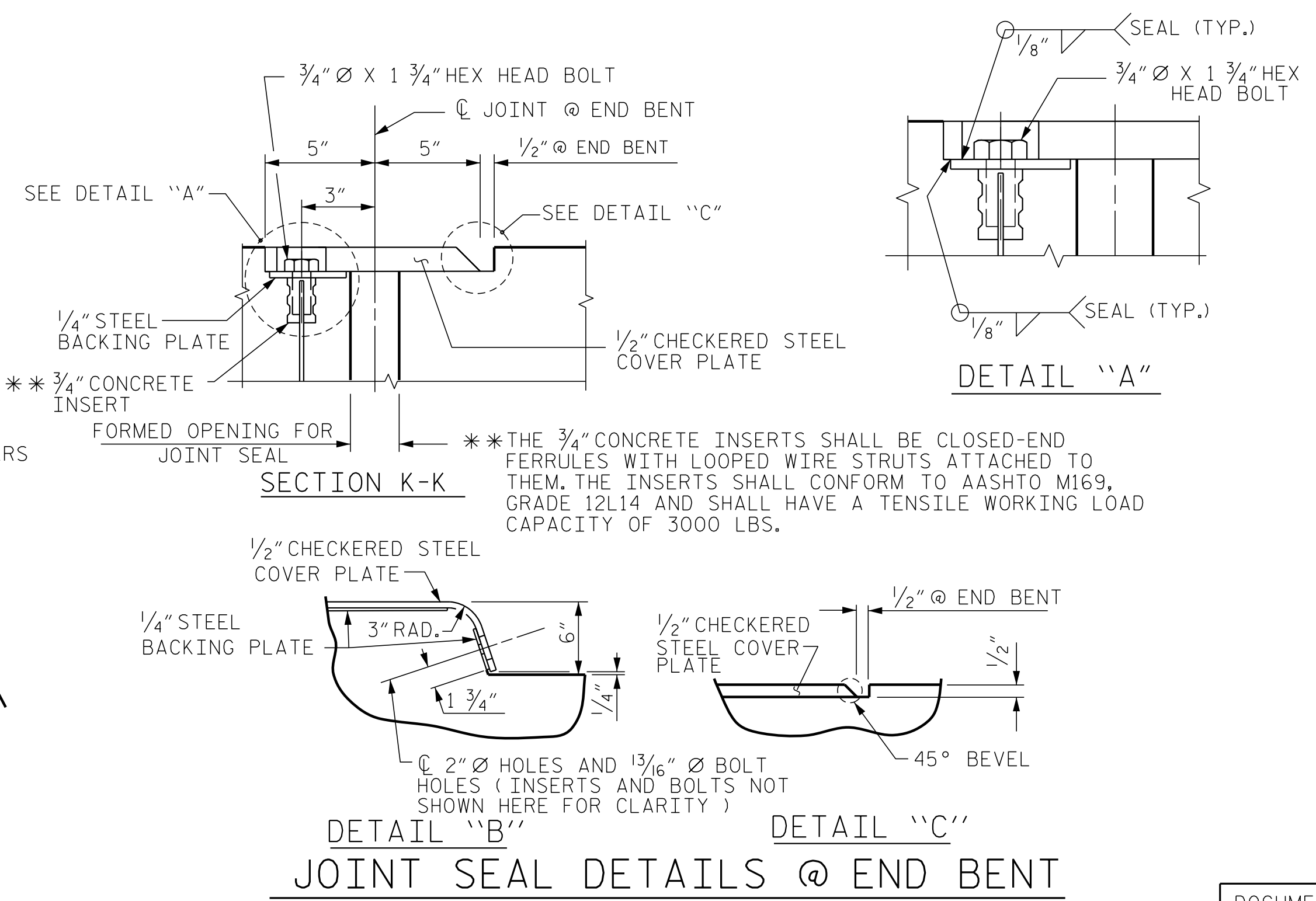
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



*** THESE BARS ARE TO BE PLACED AFTER STAGE II CONSTRUCTION IS COMPLETE. THE HOLES SHALL BE DRILLED AND THE U1 BARS GROUTED INTO PLACE.



*** THESE BARS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE U1 BARS GROUTED INTO PLACE.



DETAIL 'B'
JOINT SEAL DETAILS @ END BENT

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALY BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE 3/4" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "FOAM JOINT SEALS".

PROJECT NO. U-5818

MCDOWELL COUNTY

STATION: 27+83.62 -L-

SHEET 2 OF 4

ENGINEER OF RECORD:
Gregory H. Gillard
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 37400
GREGORY M. GILLARD
12/10/2018
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

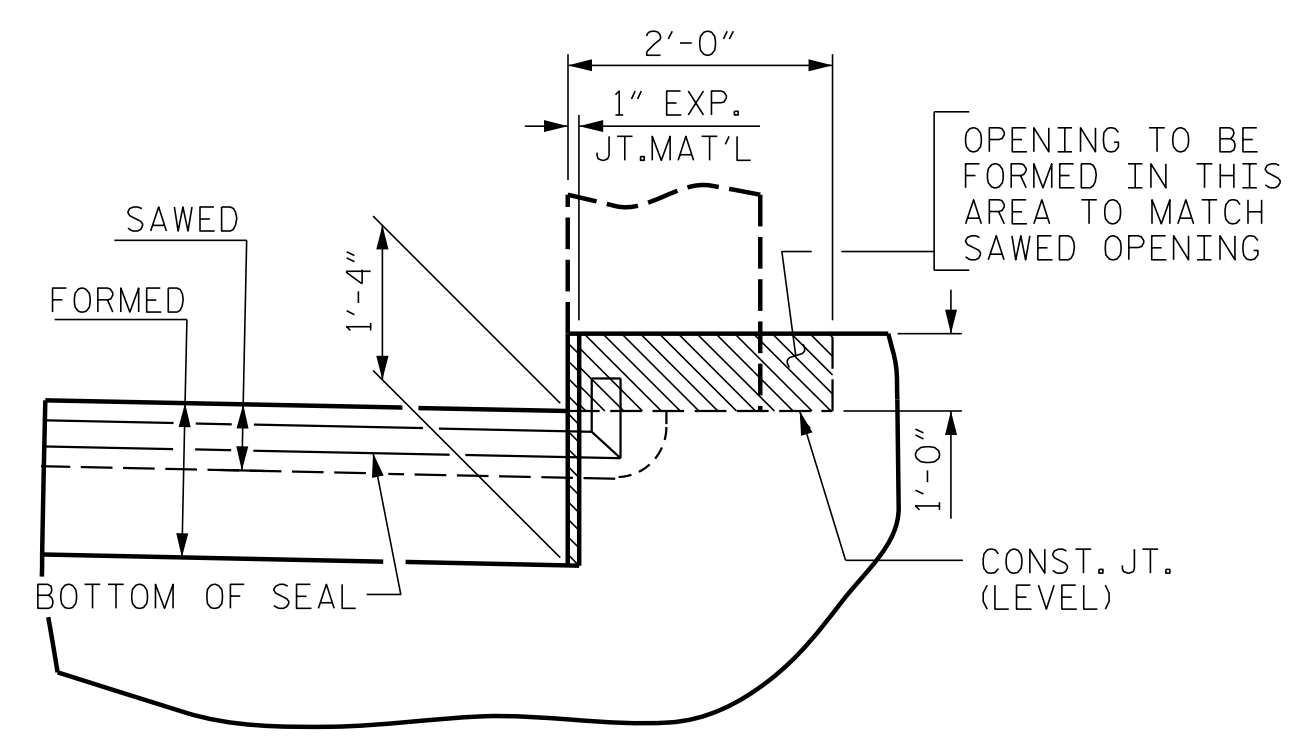
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-47
TOTAL SHEETS 49

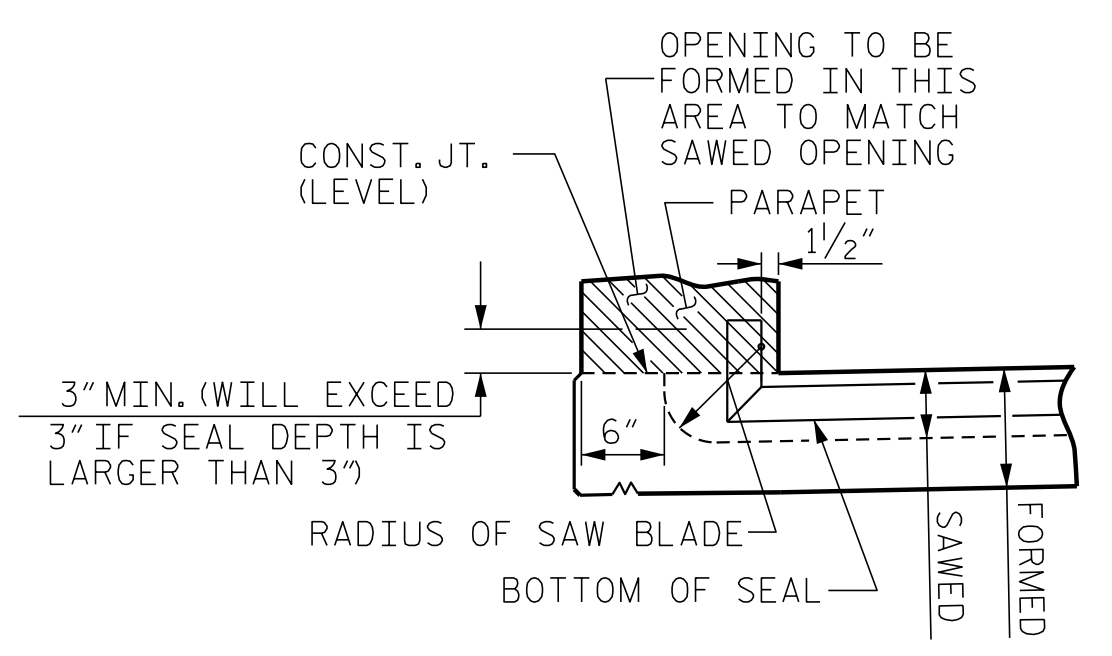
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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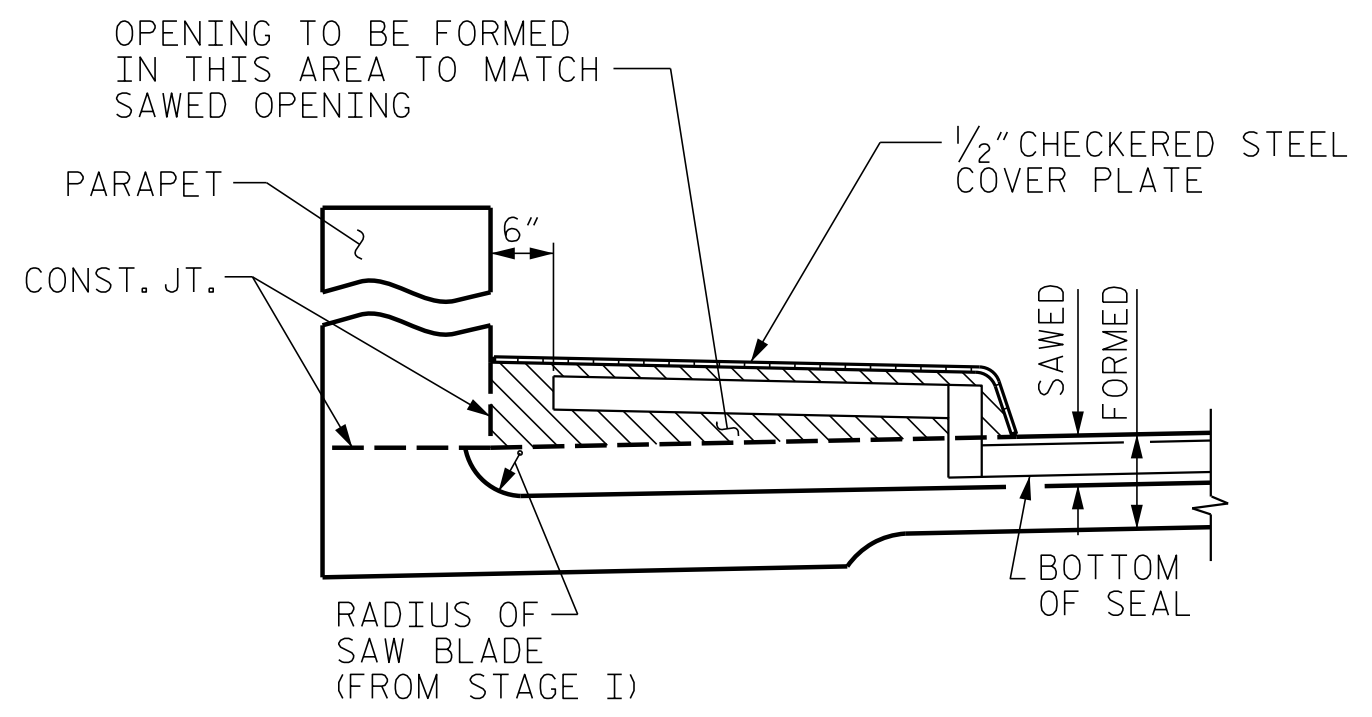
ASSEMBLED BY : D. HODGE	DATE : 9/18
CHECKED BY : B.C. HUNT	DATE : 9/18
DRAWN BY : FCJ 11/88	REV. 6/13 MAA/GM
CHECKED BY : ARB 11/88	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC



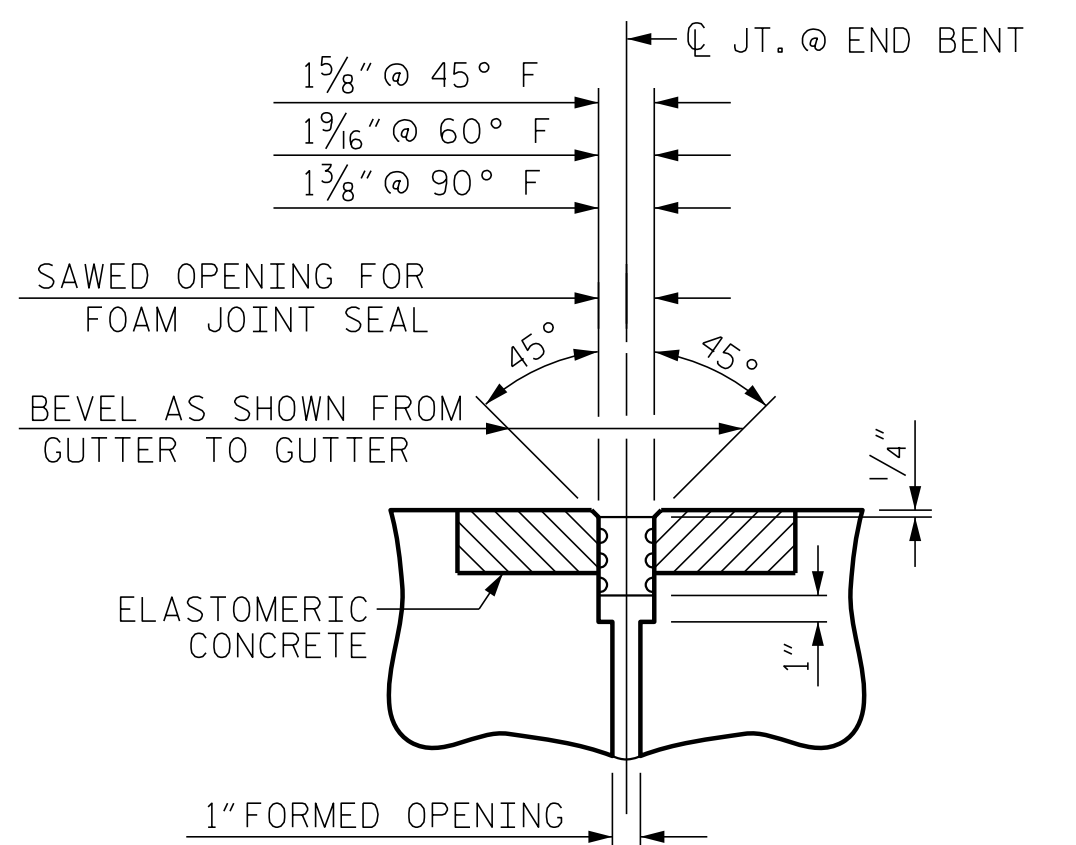
SECTION B-B



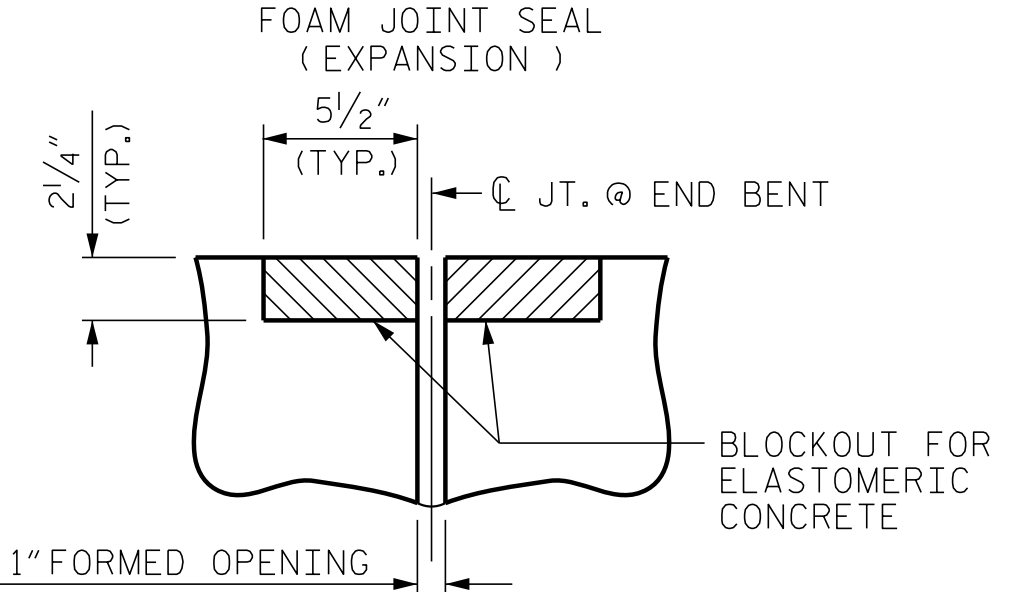
SECTION A-A



SECTION F-F



SECTION C-C
FOAM JOINT SEAL (EXPANSION)

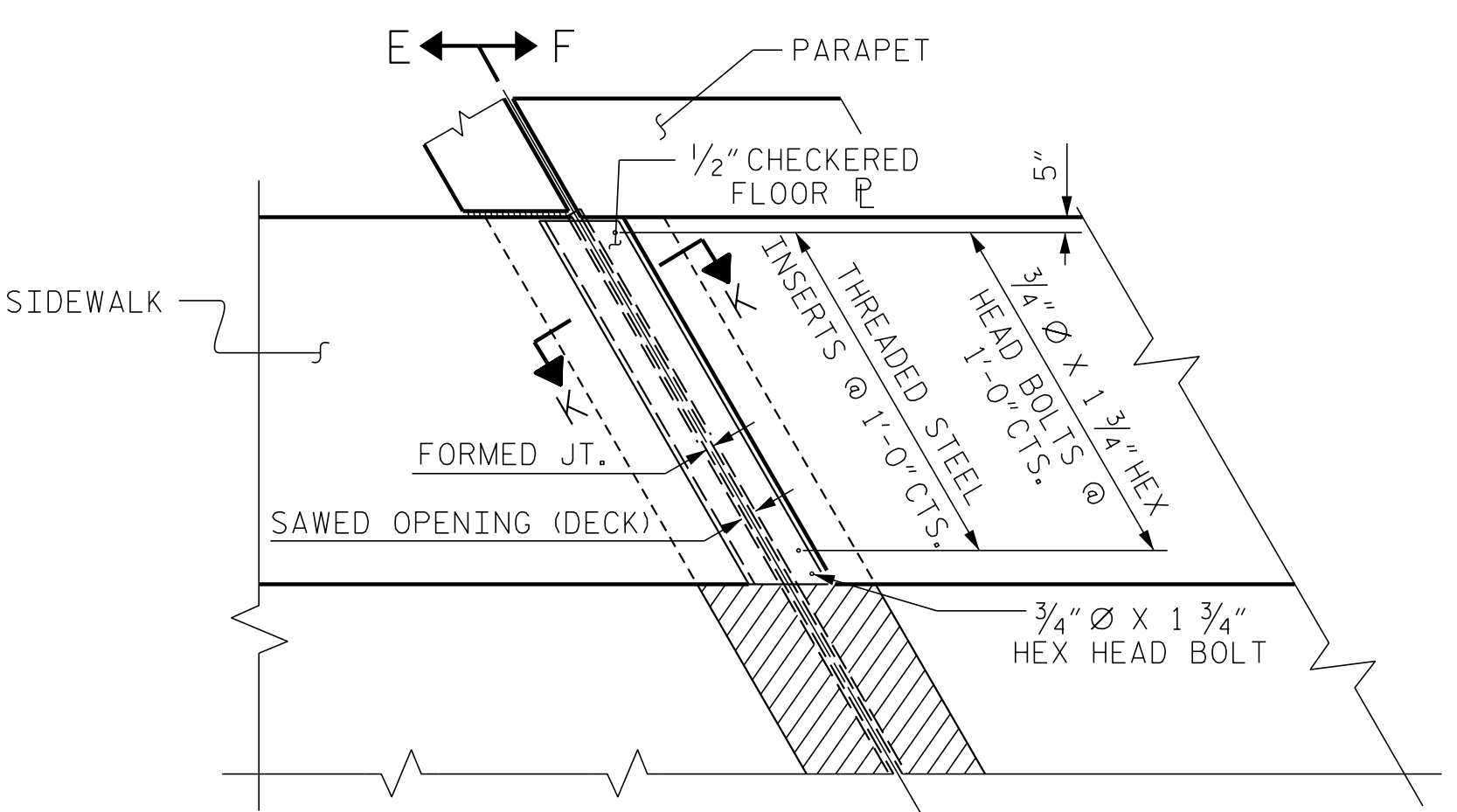
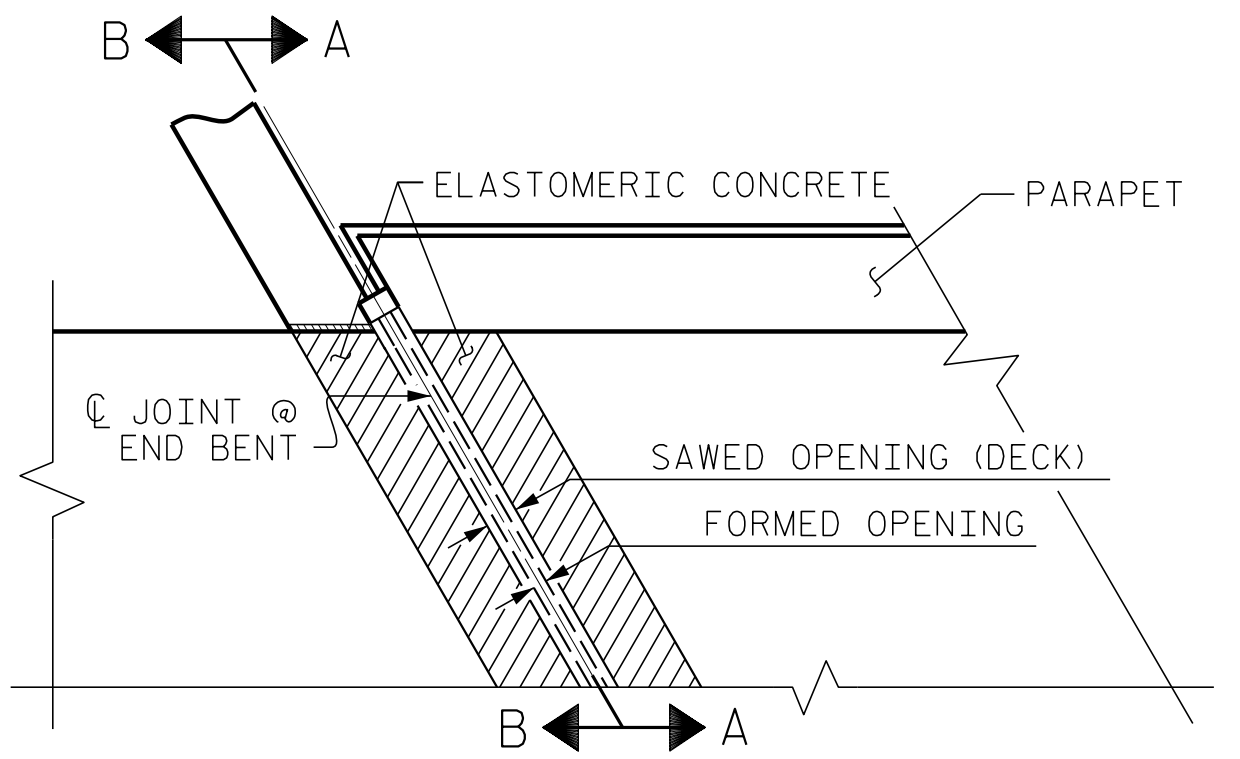


SECTION C-C
FOAM JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

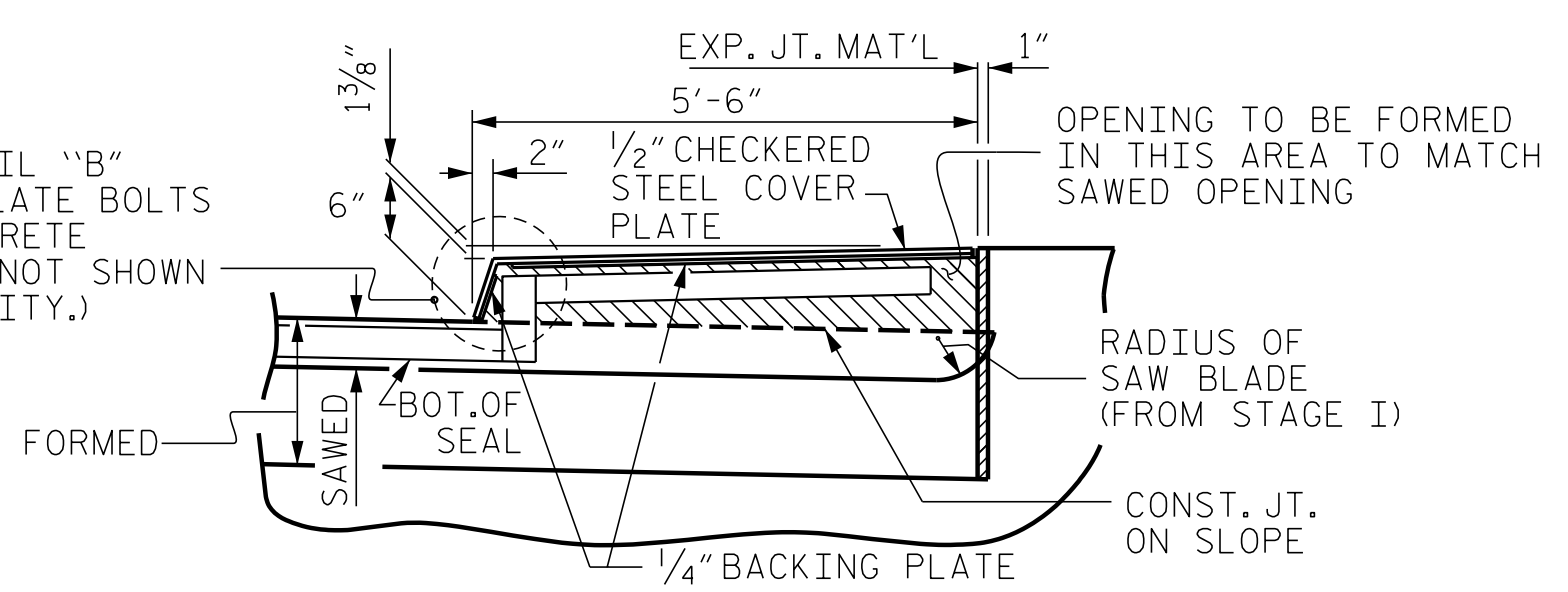
JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO THE FACE OF THE PARAPET.

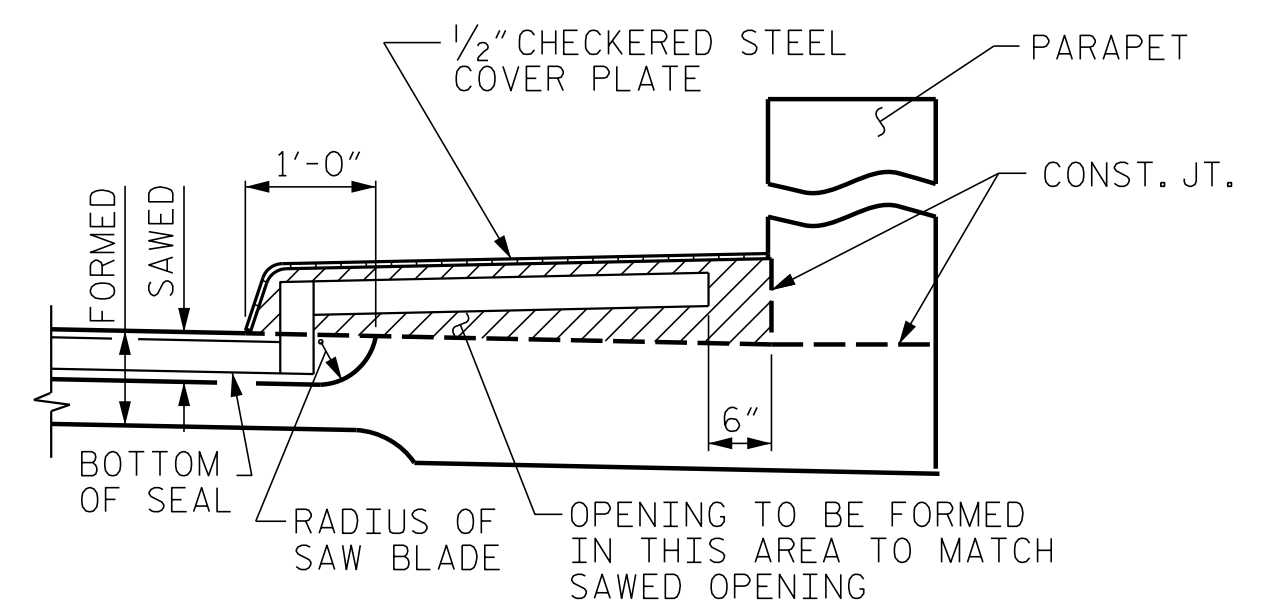
THE JOINT SHALL BE SAWS PRIOR TO THE CASTING OF THE PARAPET.



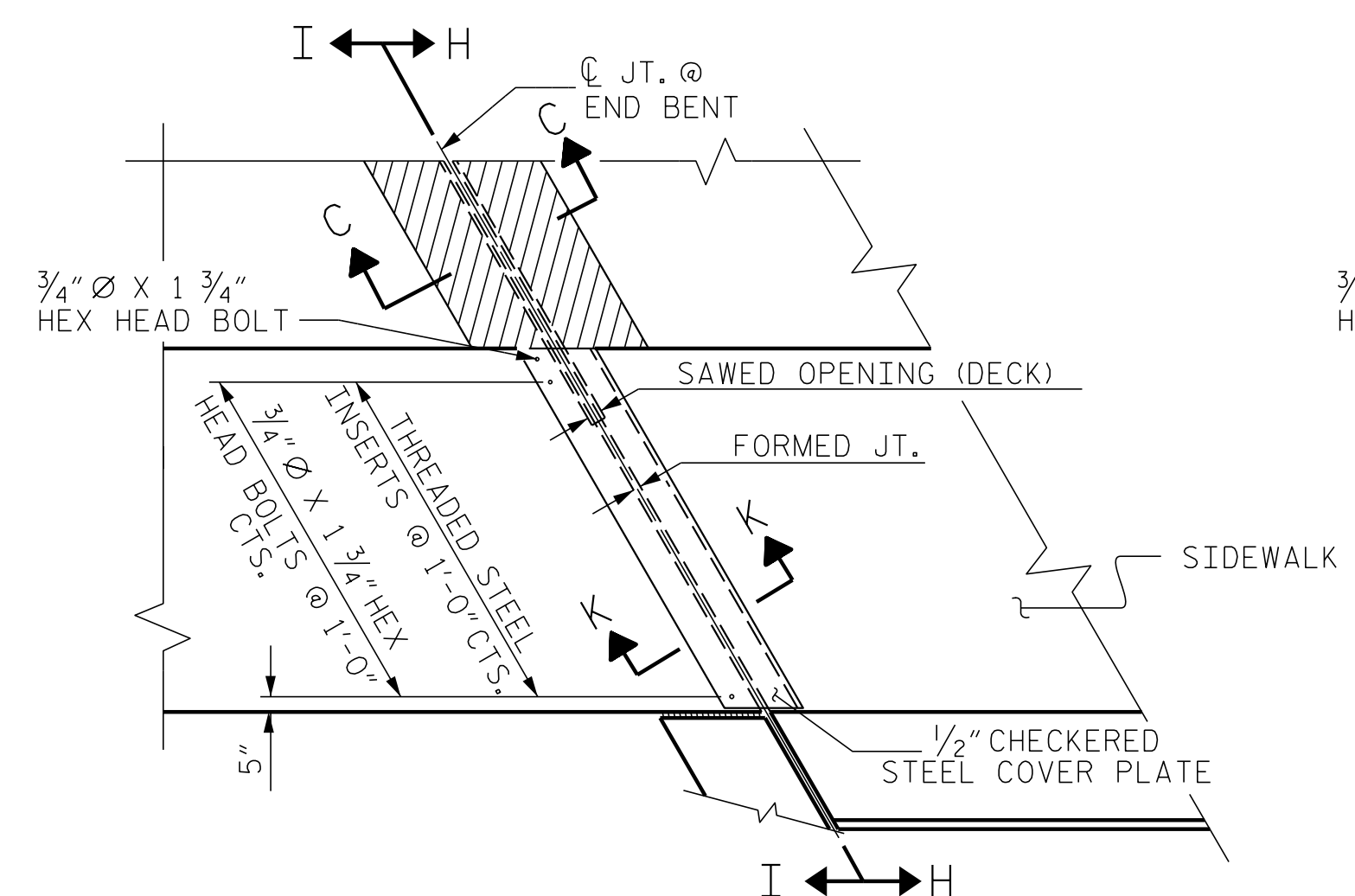
SEE SHEET 2 OF 4 FOR SECTION K-K



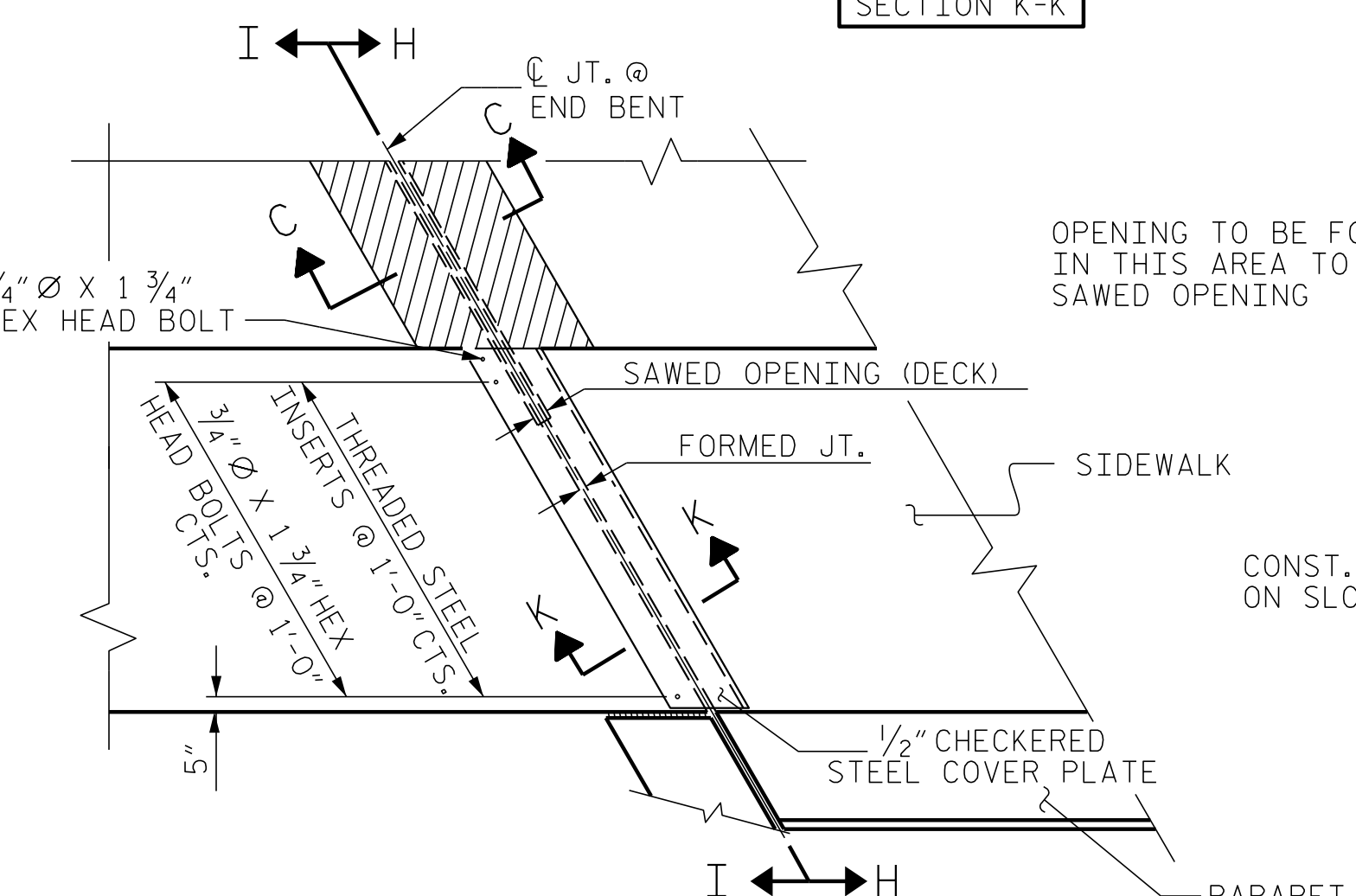
SECTION E-E



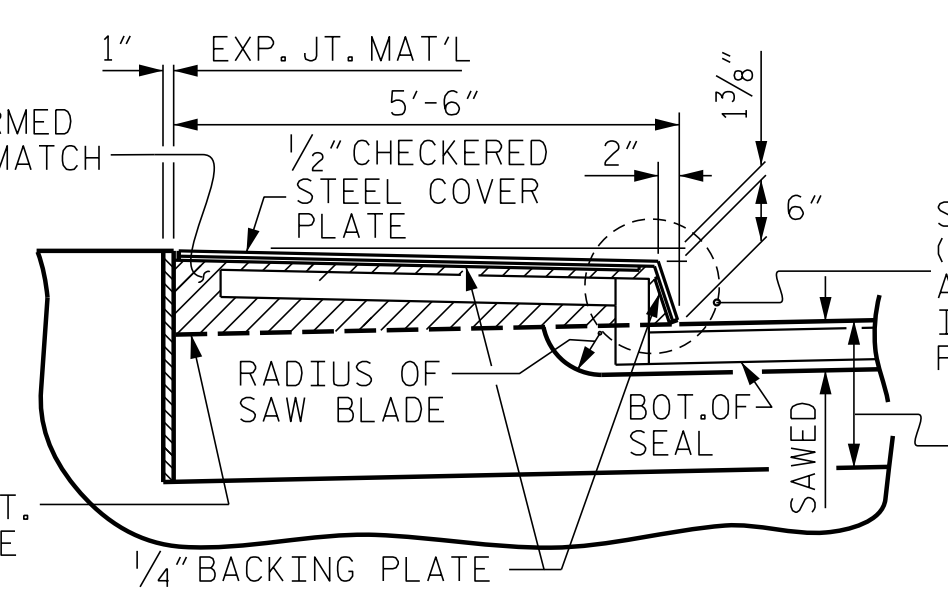
SECTION H-H



PLAN VIEW OF JOINT SEAL @ END BENT



PLAN VIEW OF JOINT SEAL @ END BENT



SECTION I-I

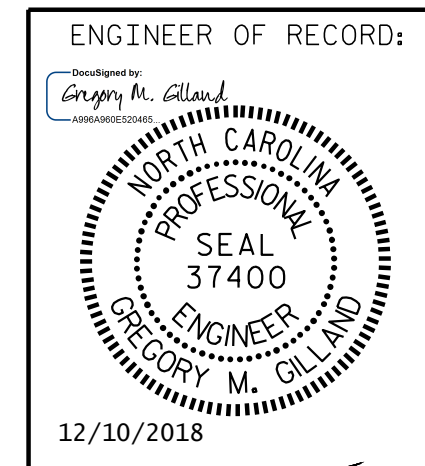
SEE DETAIL "B" (COVER PLATE BOLTS AND CONCRETE INSERTS NOT SHOWN FOR CLARITY.)

PROJECT NO. U-5818

MCDOWELL COUNTY

STATION: 27+83.62 -L-

SHEET 3 OF 4



12/10/2018
ETHERILL ENGINEERING

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH
SLAB DETAILS

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

SHEET NO. S1-48				
TOTAL SHEETS 49				

DRAWN BY: D. HODGE DATE: 9/18
CHECKED BY: B.C. HUNT DATE: 9/18

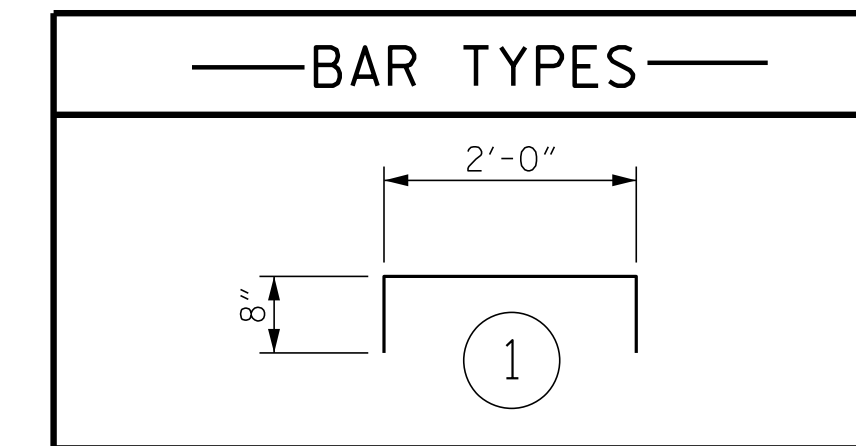
(DURING STAGE I & II CONSTRUCTION WITHOUT SIDEWALK ON LEFT SIDE)

(CONSTRUCTION COMPLETE WITH SIDEWALK ON LEFT SIDE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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BILL OF MATERIAL																											
APPROACH SLAB AT END BENT No. 1											APPROACH SLAB AT END BENT No. 2																
STAGE I					STAGE II						STAGE I					STAGE II											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT				
* A1	50	#4	STR	24'-10"	829	* A3	50	#4	STR	16'-9"	559	* A1	50	#4	STR	24'-10"	829	* A3	50	#4	STR	16'-9"	559				
A2	52	#4	STR	24'-7"	854	A4	52	#4	STR	16'-8"	579	A2	52	#4	STR	24'-7"	854	A4	52	#4	STR	16'-8"	579				
* B1	60	#5	STR	23'-0"	1,439	* B1	42	#5	STR	23'-0"	1,008	* B1	60	#5	STR	23'-0"	1,439	* B1	42	#5	STR	23'-0"	1,008				
B2	60	#6	STR	24'-5"	2,200	B2	42	#6	STR	24'-5"	1,540	B2	60	#6	STR	24'-5"	2,200	B2	42	#6	STR	24'-5"	1,540				
						* B3	8	#4	STR	24'-5"	130							* B3	8	#4	STR	24'-5"	130				
						* G1	50	#4	STR	7'-7"	253							* G1	50	#4	STR	7'-7"	253				
						* U1	16	#4	1	3'-4"	36							* U1	16	#4	1	3'-4"	36				
REINFORCING STEEL					LBS.	3,054	REINFORCING STEEL					LBS.	2,119	REINFORCING STEEL					LBS.	3,054	REINFORCING STEEL					LBS.	2,119
* EPOXY COATED REINFORCING STEEL					LBS.	2,268	* EPOXY COATED REINFORCING STEEL					LBS.	1,986	* EPOXY COATED REINFORCING STEEL					LBS.	2,268	* EPOXY COATED REINFORCING STEEL					LBS.	1,986
CLASS AA CONCRETE							CLASS AA CONCRETE							CLASS AA CONCRETE							CLASS AA CONCRETE						
TOTAL					C. Y.	32.4	POUR 1 (SLAB)					C. Y.	22.7	TOTAL					C. Y.	32.4	POUR 1 (SLAB)					C. Y.	22.7
							POUR 2 (SIDEWALKS)					C. Y.	6.1								POUR 2 (SIDEWALKS)					C. Y.	6.1
							TOTAL					C. Y.	28.8								TOTAL					C. Y.	28.8



ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES

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

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

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

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

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

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.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

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

PROJECT NO. U-5818
MCDOWELL COUNTY
 STATION: 27+83.62 -L-

SHEET 4 OF 4

<p>ENGINEER OF RECORD: 12/10/2018 1223 Jones Franklin Rd. Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 LICENSE NO. F-0377</p>	<p>STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH</p> <h2 style="margin: 0;">BRIDGE APPROACH SLAB</h2>																												
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="6">REVISIONS</th> <th>SHEET NO.</th> </tr> <tr> <th>NO.</th> <th>BY:</th> <th>DATE:</th> <th>NO.</th> <th>BY:</th> <th>DATE:</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> <td>TOTAL SHEETS</td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> <td>49</td> </tr> </tbody> </table>		REVISIONS						SHEET NO.	NO.	BY:	DATE:	NO.	BY:	DATE:		1			3			TOTAL SHEETS	2			4			49
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DRAWN BY: D. HODGE DATE: 9/18
 CHECKED BY: B.C. HUNT DATE: 9/18

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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $\frac{1}{2}$ " 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. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

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