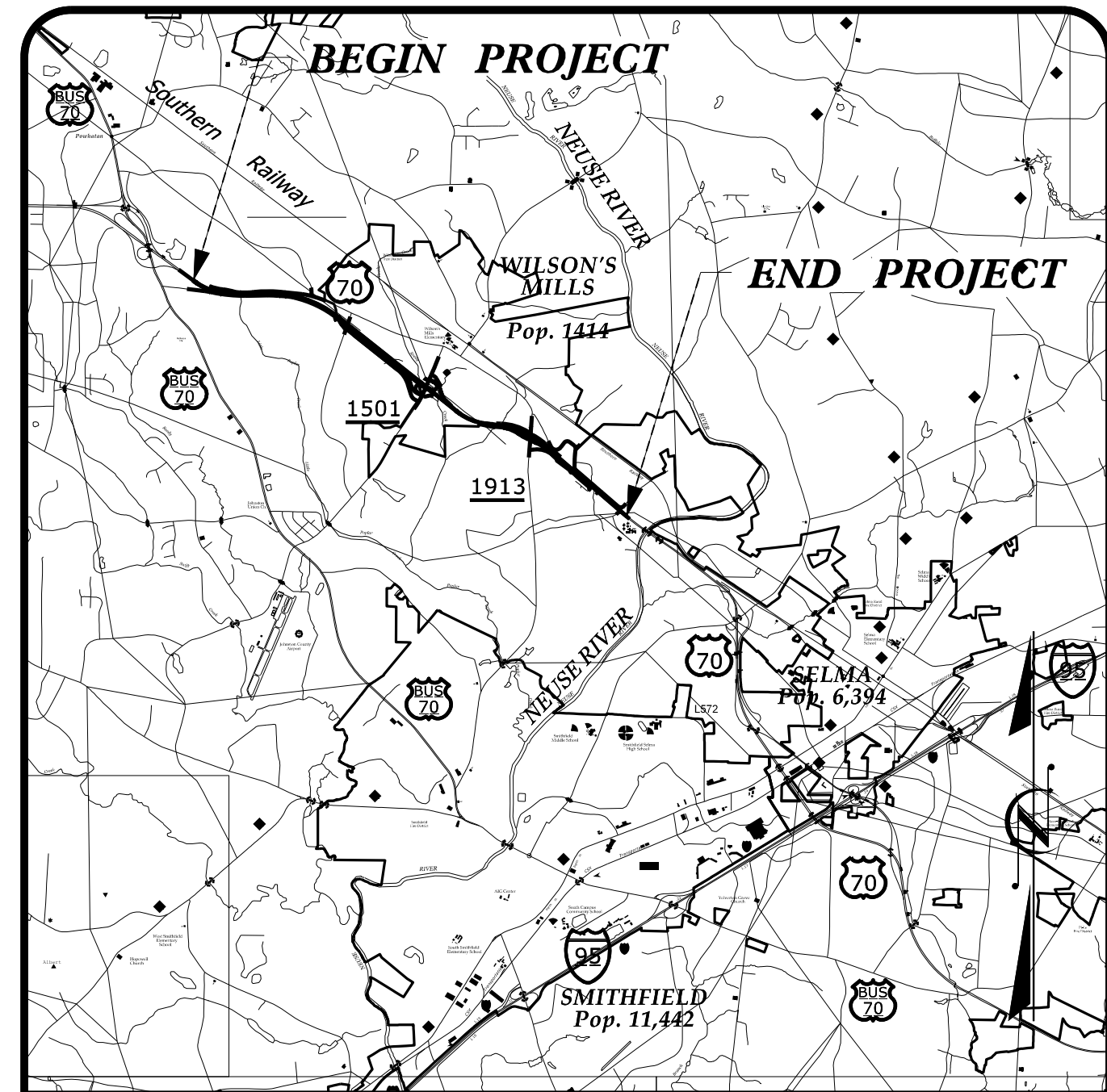


09\_08/2019

TIP PROJECT: W-5600

CONTRACT: C204359

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12:55 PM  
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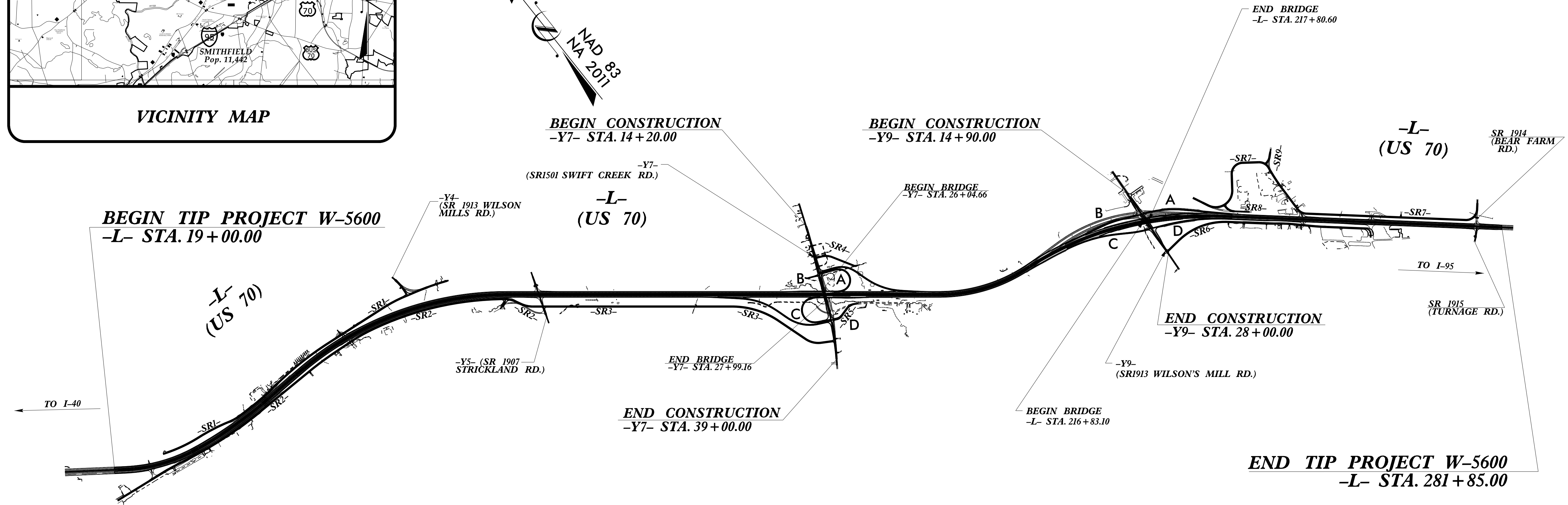
VICINITY MAP

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**JOHNSTON COUNTY**

LOCATION: US 70 FROM EAST OF US 70 BUSINESS TO WEST OF NEUSE RIVER.

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5600		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50056.1.1	HISP-0070(163)	PE	
50056.2.1	HISP-0070(163)	ROW	
50056.2.2	HISP-0070(163)	UTIL.	



# STRUCTURES

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**DESIGN DATA**

ADT 2020 =	30,700
ADT 2040 =	45,400
K =	8 %
D =	55 %
T =	14 % *
V =	70 MPH
* TTST =	8% DUAL = 6%
FUNC. CLASS =	INTERSTATE

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT W-5600	=	4.959 MILES
LENGTH STRUCTURE TIP PROJECT W-5600	=	0.019 MILES
TOTAL LENGTH TIP PROJECT W-5600	=	4.978 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

Prepared for:  
**DIVISION OF HIGHWAYS  
DIVISION 4**  
509 Ward Boulevard  
Wilson NC, 27895

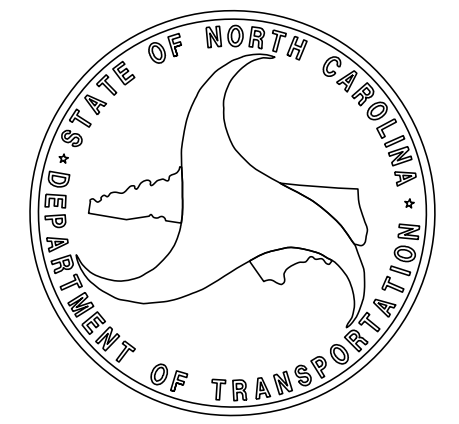
LETTING DATE:  
MARCH 16, 2021

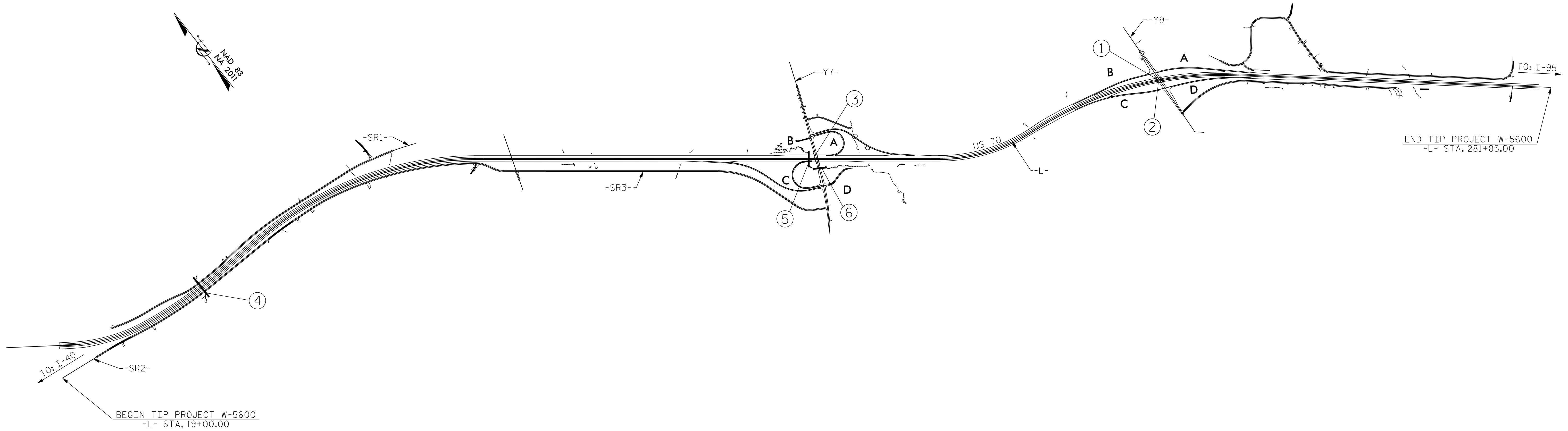
NCDOT CONTACT:

**EDWARD WETHERILL, PE**  
PROJECT ENGINEER

**G.M. GILLAND, P.E.**  
PROJECT DESIGN ENGINEER

**MATT CLARK, PE**  
DIVISION PROJECT MANAGER





INDEX			
STR. NO.	STATION	DESCRIPTION	SHEET NUMBERS
1	217+31.76 -L-	LEFT LANE BRIDGE ON US 70 OVER WILSON'S MILL RD. (SR 1913) BETWEEN SR 1501 AND SR 1915	S1-1 THRU S1-27
2	217+31.76 -L-	RIGHT LANE BRIDGE ON US 70 OVER WILSON'S MILL RD. (SR 1913) BETWEEN SR 1501 AND SR 1915	S2-1 THRU S2-18
3	27+01.91 -Y7-	BRIDGE ON SWIFT CREEK RD. (SR 1501) OVER US 70 BETWEEN SR 1913 AND SR 1907	S3-1 THRU S3-32
4	45+66.22 -L-	TRIPLE BARREL CULVERT EXTENSION (2 @ 6 FT. X 6 FT., 1 @ 5 FT. X 6 FT.) FOR LITTLE POPLAR CREEK UNDER -L- BETWEEN SR 2580 AND SR 2566	C1-1 THRU C1-10
5	155+03.40 -L-	DOUBLE BARREL CULVERT EXTENSION (2 @ 10 FT. X 6 FT.) FOR POPLAR CREEK UNDER -L- BETWEEN SR 1907 AND SR 1501	C2-1 THRU C2-7
6	28+84.00 -Y7-	DOUBLE BARREL CULVERT (2 @ 10 FT. X 7 FT.) FOR POPLAR CREEK UNDER -Y7- BETWEEN US 70 AND SR 1907	C3-1 THRU C3-8

PROJECT NO. W-5600  
JOHNSTON COUNTY

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STRUCTURE INDEX

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

DRAWN BY : B.C. HUNT DATE : 6-19  
 CHECKED BY : G.M. GILLAND DATE : 6-19

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 6/27/2019 9:23:03 AM



**NOTES:**

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

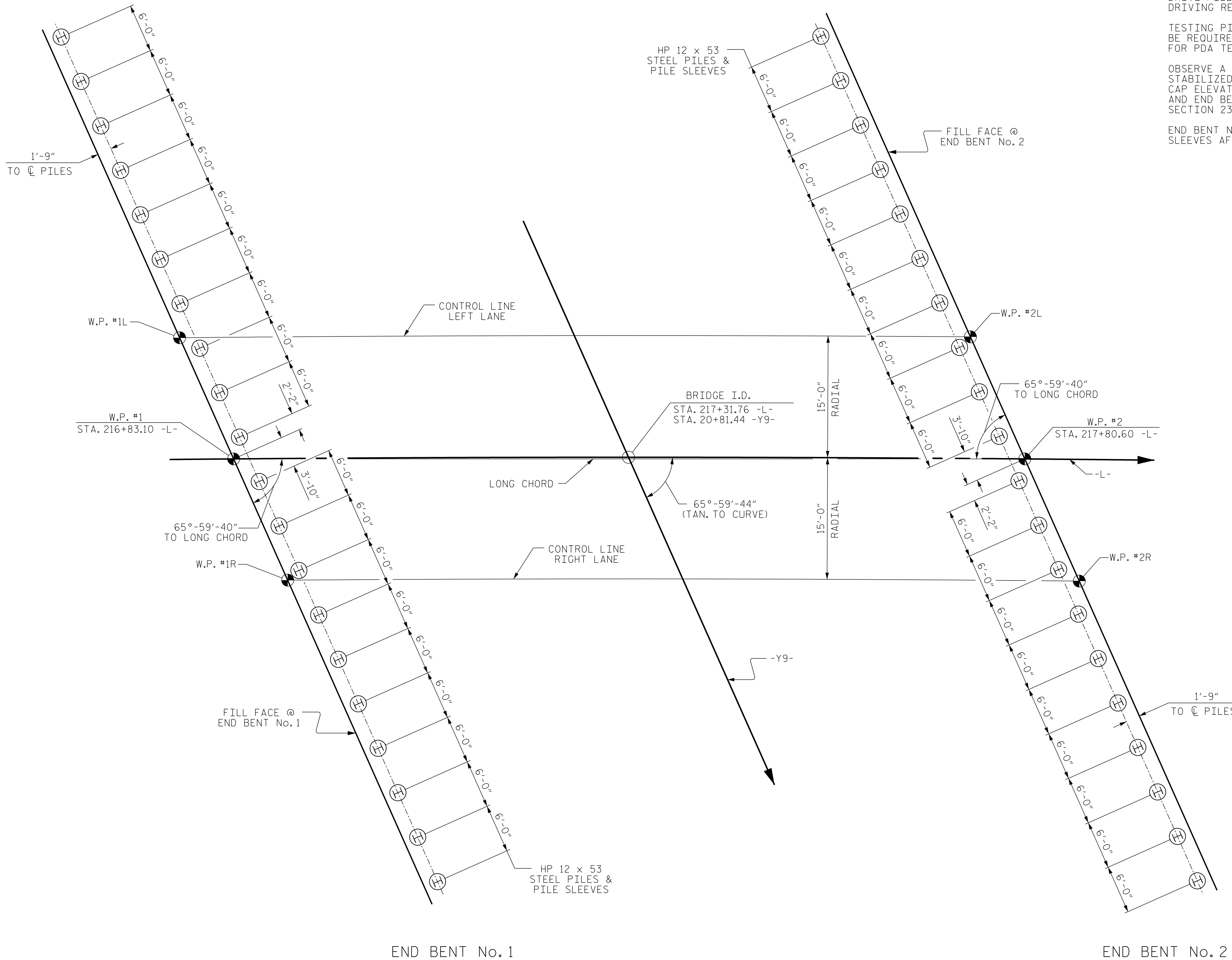
PILES AT END BENT No.1 AND END BENT No.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENT No.1 AND END BENT No.2 TO A REQUIRED DRIVING RESISTANCE OF 145 TONS PER PILE.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A TWO MONTH WAITING PERIOD AFTER CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL TO WITHIN 1 FT 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.

END BENT No.1 AND END BENT No.2 PILES WILL BE DRIVEN THROUGH PILE SLEEVES AFTER THE WAITING PERIOD.



END BENT No. 1

END BENT No. 2

**FOUNDATION LAYOUT**

PROJECT NO. W-5600

JOHNSTON COUNTY

STATION: 217+31.76 -L-

SHEET 2 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**GENERAL DRAWING**  
FOR BRIDGE  
ON US 70 OVER WILSON'S  
MILL RD. (SR 1913) BETWEEN  
SR 1501 AND SR 1915

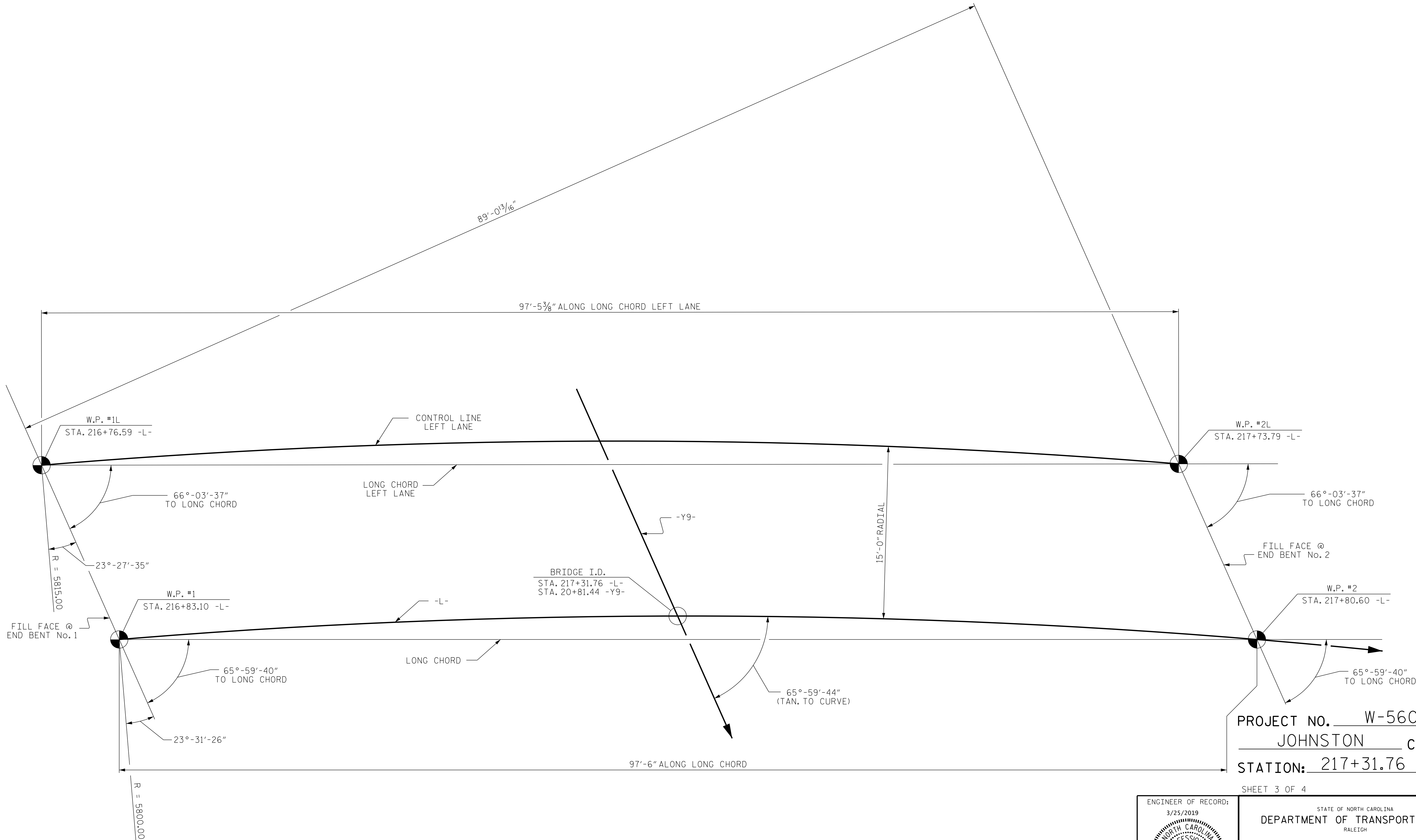
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-2
1			3			TOTAL SHEETS
2			4			27

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

DRAWN BY: D. HODGE DATE: 2/18  
CHECKED BY: B.C. HUNT DATE: 6/18

P:\2017\1712101\W-5600\USTO\Structures\DGM\L-over -Y9-DGN (LEFT LANE\NW-5600-Y9-FL (LEFT LANE)\_WE I.dgn  
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 3/20/2019 7:26:57 AM



**LONG CHORD LAYOUT**  
END BENTS ARE PARALLEL

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

SHEET 3 OF 4

DRAWN BY : D. HODGE DATE : 2/18  
 CHECKED BY : G.M. GILLAND DATE : 3/18

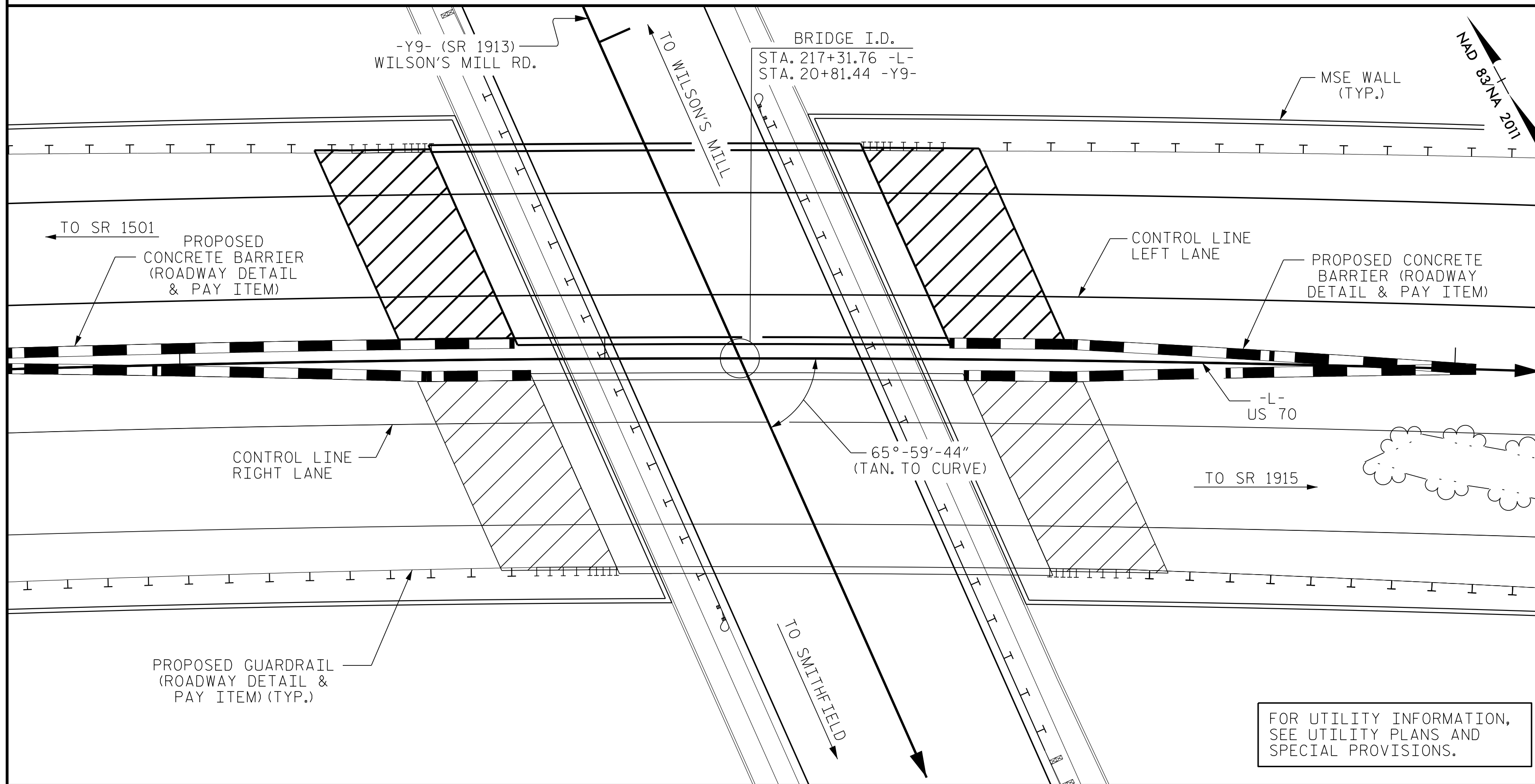
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gilland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR LEFT LANE BRIDGE  
 ON US 70 OVER WILSON'S  
 MILL RD. (SR 1913) BETWEEN  
 SR 1501 AND SR 1915

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

BM #14 - BENCH TIE NAIL SET IN 16" PINE, 205.18' LT OF -L- STA. 236+54.97, ELEV 196.34



LOCATION SKETCH

NOTES:

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

SAMPLE BAR REPLACEMENT

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

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

TOTAL BILL OF MATERIAL

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 x 53 STEEL PILES		CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	EACH	SO. FT.	SO. FT.	CU. YDS.	LUMP SUM	LBS.	No.	LIN. FT.	EACH	No.	LIN. FT.	LIN. FT.	SO. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		4,497	5,849		LUMP SUM		5	468.13				* 240.27		LUMP SUM	LUMP SUM
END BENT No. 1				76.7		11,041			20	20	1,245		15		
END BENT No. 2				76.5		11,041			20	20	1,145		15		
TOTAL	1	4,497	5,849	153.2	LUMP SUM	22,082	5	468.13	40	40	2,390	* 240.27	30	LUMP SUM	LUMP SUM

\* CONTAINS THE ADDITIONAL LINEAR FEET OF CONCRETE BARRIER RAIL ON APPROACH SLABS

END BENT PAY ITEMS: PDA TESTING, CLASS A CONCRETE, REINFORCING STEEL, PILE DRIVING EQUIPMENT SET UP FOR HP 12 x 53 STEEL PILES AND HP 12 x 53 STEEL PILES, INCLUDE BOTH LEFT LANE END BENT AND RIGHT LANE END BENT QUANTITIES.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 4 OF 4

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Olland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR LEFT LANE BRIDGE  
 ON US 70 OVER WILSON'S  
 MILL RD. (SR 1913) BETWEEN  
 SR 1501 AND SR 1915

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

DRAWN BY : D. HODGE DATE : 1/18  
 CHECKED BY : B.C. HUNT DATE : 6/18

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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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			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.14	--	1.75	0.840	1.46	A	EL	46.100	1.040	1.33	A	I	83.560	0.80	0.780	1.14	A	I	46.100		
	HL-93 (OPERATING)	N/A		1.75	--	1.35	0.840	1.89	A	EL	46.100	1.040	1.75	A	I	83.560	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.57	56.520	1.75	0.840	2.00	A	EL	46.100	1.040	1.78	A	I	83.560	0.80	0.780	1.57	A	I	46.100		
	HS-20 (OPERATING)	36.000		2.33	83.880	1.35	0.840	2.59	A	EL	46.100	1.040	2.33	A	I	83.560	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.68	49.680	1.40	0.840	5.88	A	EL	46.100	1.040	5.66	A	I	83.560	0.80	0.780	3.68	A	I	46.100	
		SNGARBS2	20.000		2.68	53.600	1.40	0.840	4.28	A	EL	46.100	1.040	3.95	A	I	83.560	0.80	0.780	2.68	A	I	46.100	
		SNAGRIS2	22.000		2.51	55.220	1.40	0.840	4.01	A	EL	46.100	1.040	3.64	A	I	83.560	0.80	0.780	2.51	A	I	46.100	
		SNCOTTS3	27.250		1.83	49.868	1.40	0.840	2.92	A	EL	46.100	1.040	2.77	A	I	83.560	0.80	0.780	1.83	A	I	46.100	
		SNAGGRS4	34.925		1.50	52.388	1.40	0.840	2.40	A	EL	46.100	1.040	2.25	A	I	83.560	0.80	0.780	1.50	A	I	46.100	
		SNS5A	35.550		1.47	52.259	1.40	0.840	2.35	A	EL	46.100	1.040	2.26	A	I	83.560	0.80	0.780	1.47	A	I	46.100	
		SNS6A	39.950		1.34	53.533	1.40	0.840	2.14	A	EL	46.100	1.040	2.04	A	I	83.560	0.80	0.780	1.34	A	I	46.100	
		SNS7B	42.000		1.28	53.760	1.40	0.840	2.04	A	EL	46.100	1.040	1.99	A	I	83.560	0.80	0.780	1.28	A	I	46.100	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.63	53.790	1.40	0.840	2.61	A	EL	46.100	1.040	2.46	A	I	83.560	0.80	0.780	1.63	A	I	46.100	
		TNT4A	33.075		1.64	54.243	1.40	0.840	2.62	A	EL	46.100	1.040	2.41	A	I	83.560	0.80	0.780	1.64	A	I	46.100	
		TNT6A	41.600		1.33	55.328	1.40	0.840	2.12	A	EL	46.100	1.040	2.09	A	I	83.560	0.80	0.780	1.33	A	I	46.100	
		TNT7A	42.000		1.33	55.860	1.40	0.840	2.13	A	EL	46.100	1.040	2.06	A	I	83.560	0.80	0.780	1.33	A	I	46.100	
		TNT7B	42.000		1.36	57.120	1.40	0.840	2.18	A	EL	46.100	1.040	1.95	A	I	83.560	0.80	0.780	1.36	A	I	46.100	
		TNAGRIT4	43.000		1.31	56.330	1.40	0.840	2.09	A	EL	46.100	1.040	1.89	A	I	83.560	0.80	0.780	1.31	A	I	46.100	
TNAGT5A	45.000		1.24	55.800	1.40	0.840	1.98	A	EL	46.100	1.040	1.86	A	I	83.560	0.80	0.780	1.24	A	I	46.100			
TNAGT5B	45.000		③	1.23	55.350	1.40	0.840	1.96	A	EL	46.100	1.040	1.79	A	I	83.560	0.80	0.780	1.23	A	I	46.100		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

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

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

COMMENTS:

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

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

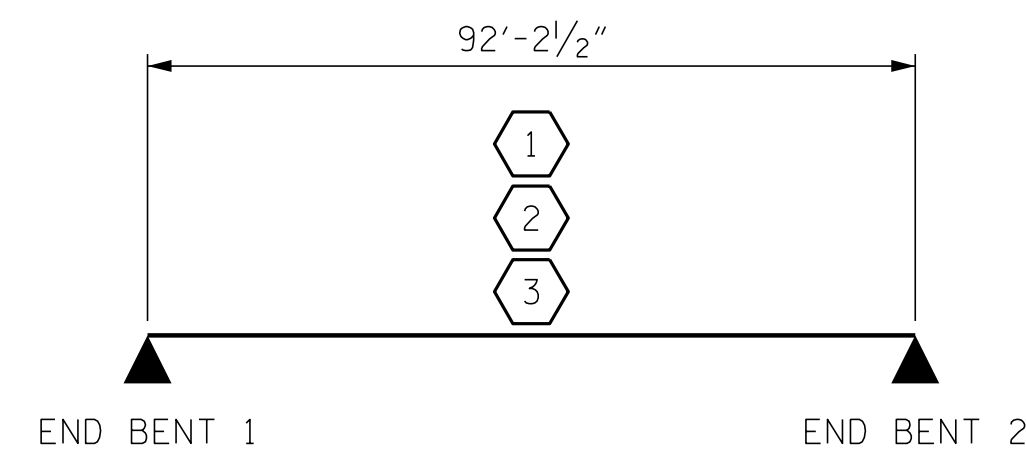
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

GIRDER LOCATION

I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

P:\2017\1712101\W-5600\USTO\Structures\DGN\L- over -Y9-DGN (LEFT LANE\W-5600\Y9\_LRFR (LEFT LANE)\_WE.Ldgn 3/20/2019 7:30:25 AM

ASSEMBLED BY : D. HODGE	DATE : 4/18
CHECKED BY : B.C. HUNT	DATE : 6/18
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

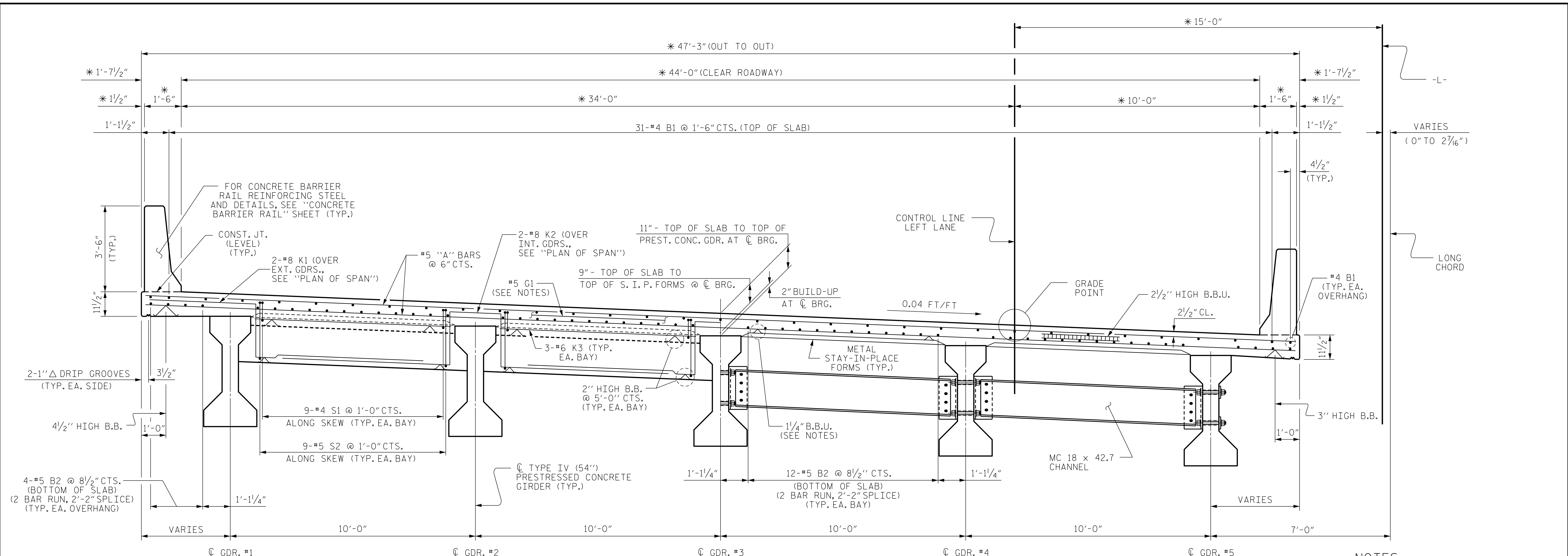
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UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
3/25/2019

Gregory M. Olland  
ETHERILL ENGINEERING

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

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC) (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-5
					TOTAL SHEETS 27



HALF SECTION - END BENT DIAPHRAGM

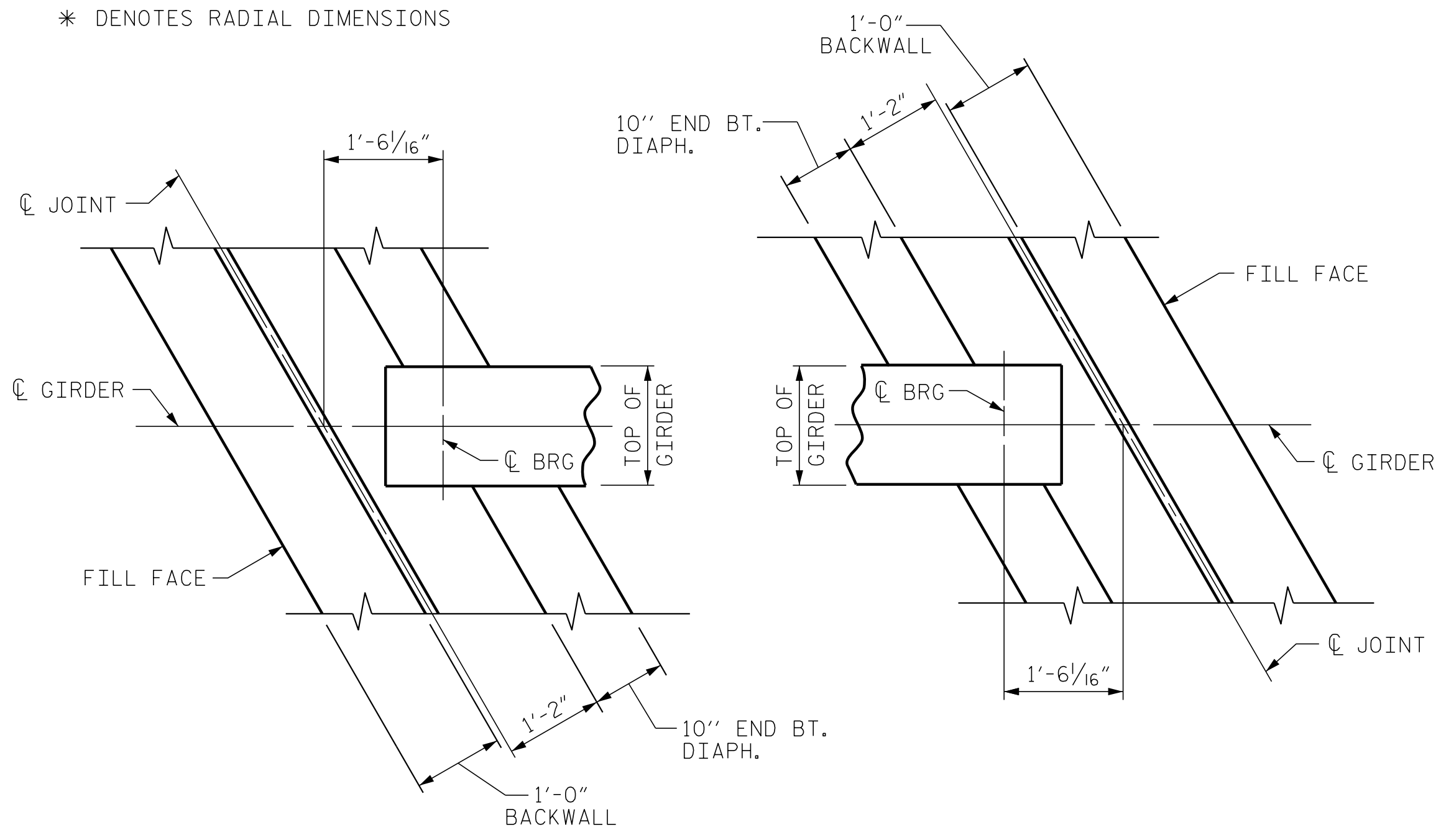
HALF SECTION - INTERMEDIATE DIAPHRAGM

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.
- BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- #5 G1 BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

TYPICAL SECTION

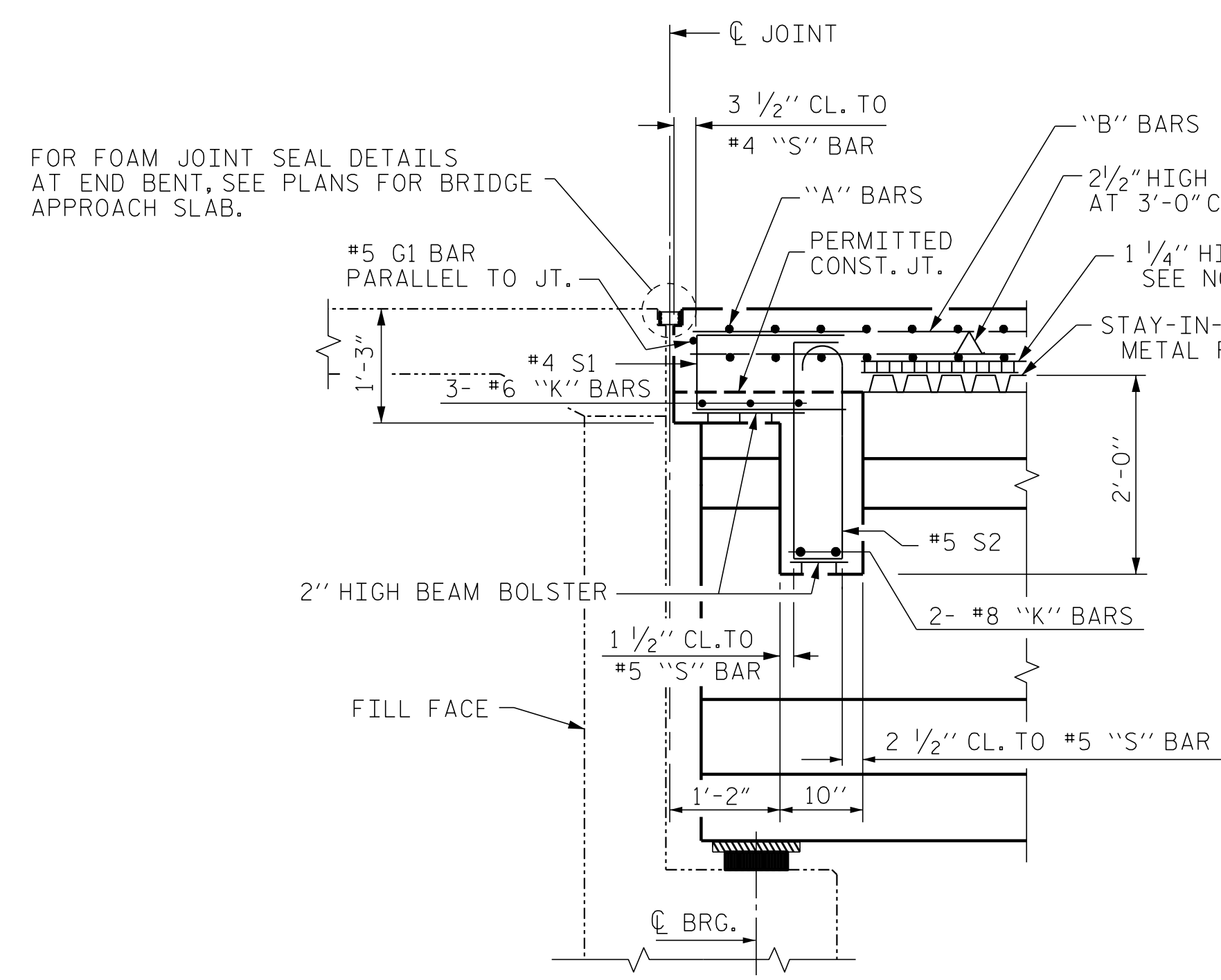
\* DENOTES RADIAL DIMENSIONS



END BENT No. 1 DIAPHRAGM

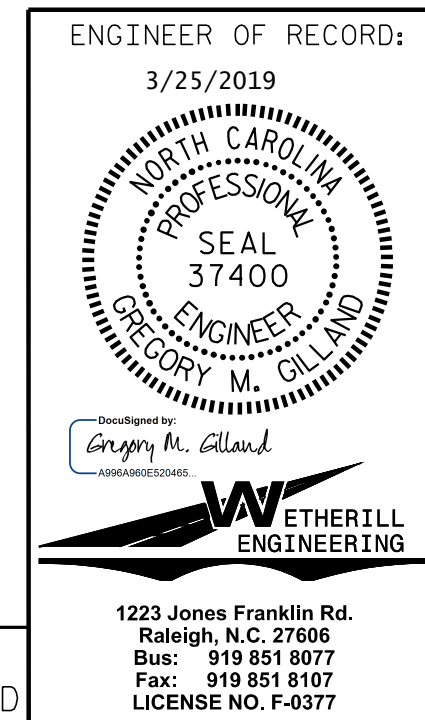
END BENT No. 2 DIAPHRAGM

PLAN



SECTION THRU END BENT DIAPHRAGM

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-



ENGINEER OF RECORD: 3/25/2019 GREGORY M. GILLAND 37400		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH	
SUPERSTRUCTURE TYPICAL SECTION (LEFT LANE)			
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S1-6
2			TOTAL SHEETS
			27

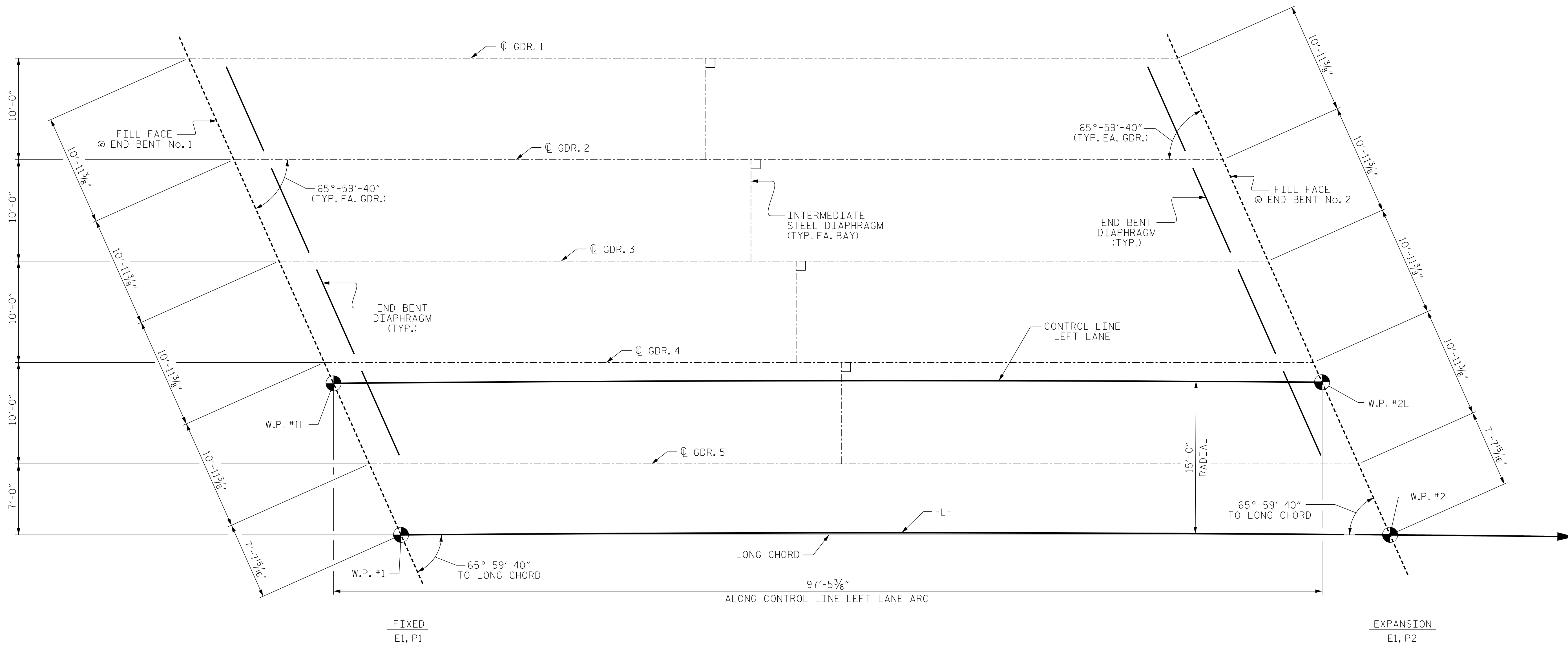
DRAWN BY: D. HODGE DATE: 12/17  
 CHECKED BY: G.M. GILLAND DATE: 2/18

DOCUMENT NOT CONSIDERED FINAL  
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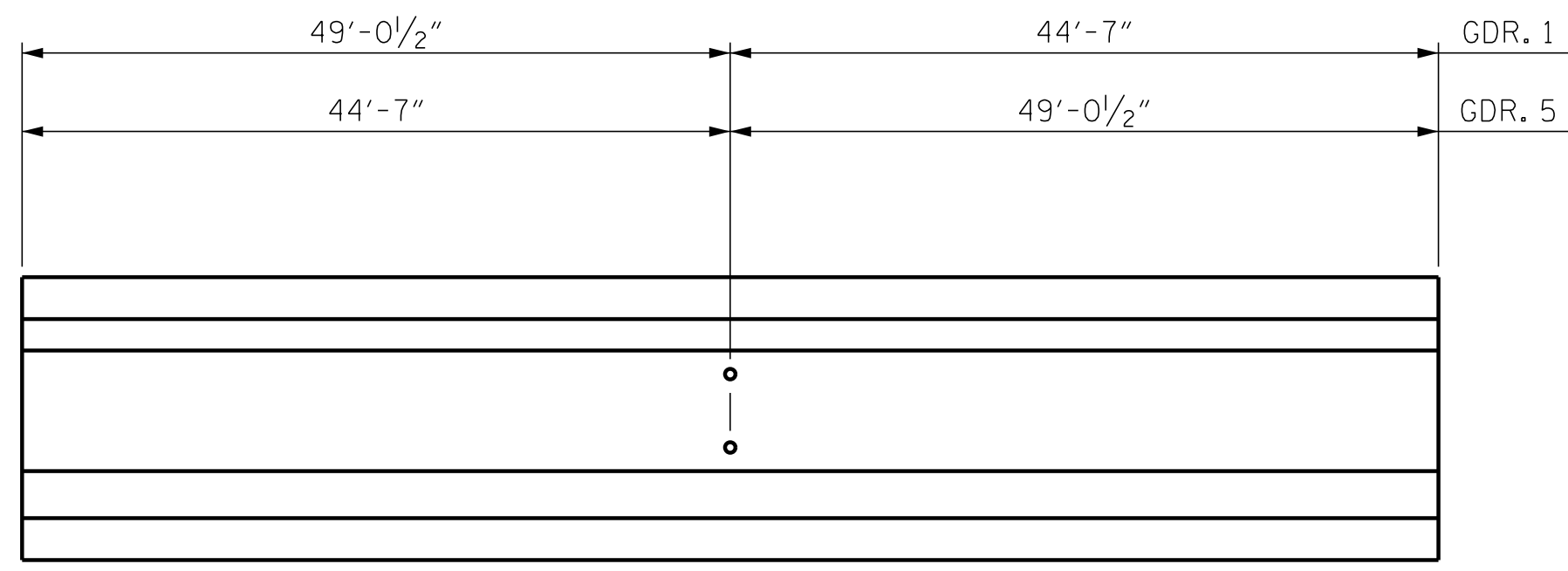






**GIRDER LAYOUT**

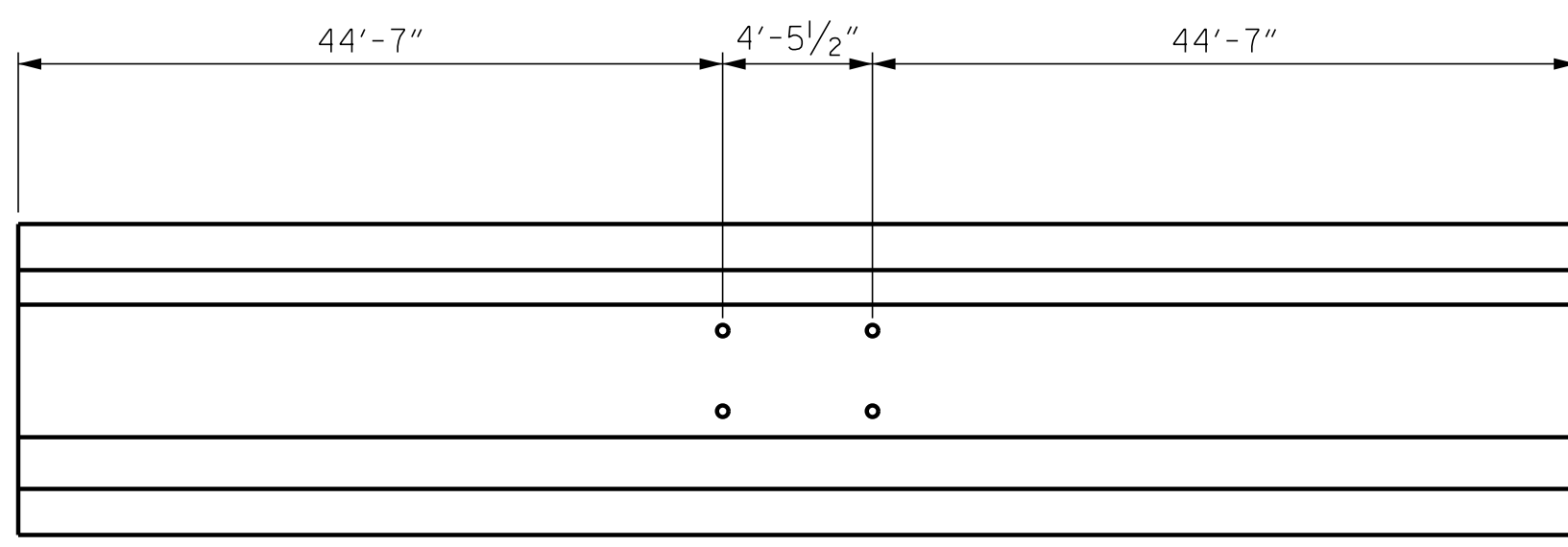
ALL GIRDERS ARE PARALLEL TO LONG CHORD.



**ELEVATION OF EXTERIOR GIRDERS**

SHOWING LOCATION OF 1/2" Ø HOLES IN WEB

UP STATION →



**ELEVATION OF INTERIOR GIRDERS**

SHOWING LOCATION OF 1/2" Ø HOLES IN WEB

UP STATION →

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-



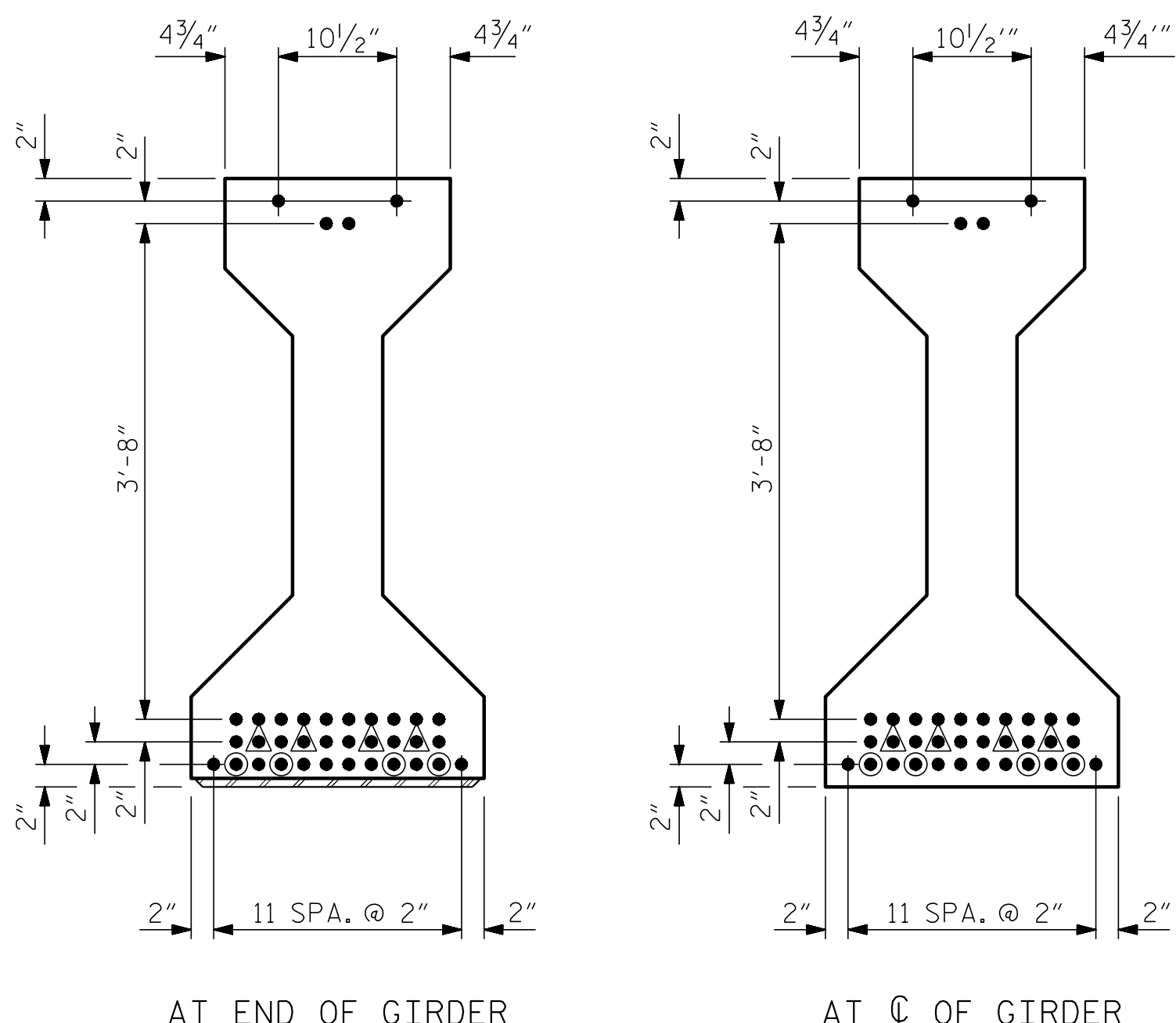
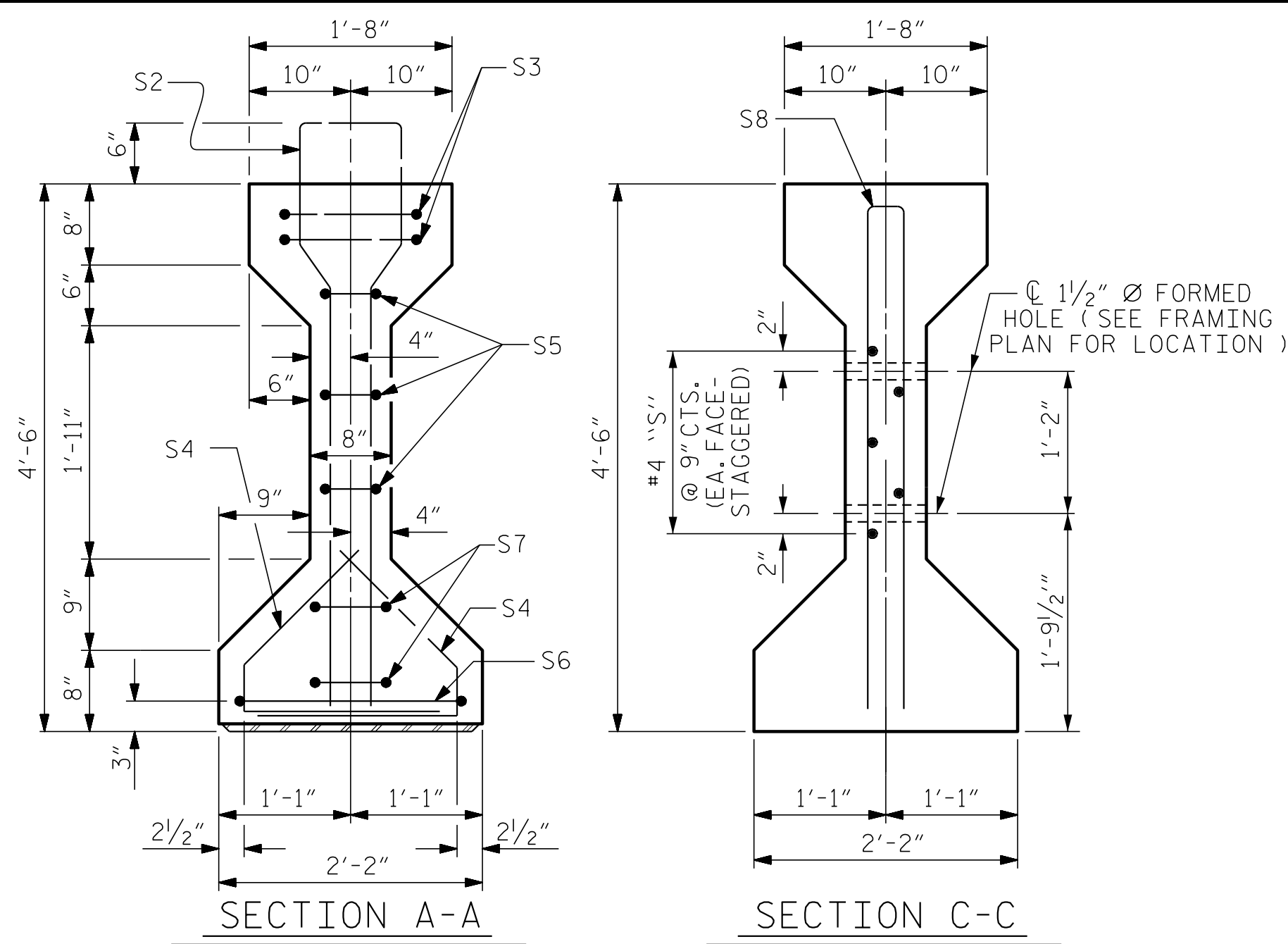
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 FRAMING PLAN  
 (LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-8
1			3			TOTAL SHEETS
2			4			27

DRAWN BY: D. HODGE DATE: 1/18  
 CHECKED BY: G.M. GILLAND DATE: 2/18

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 3/20/2019 7:44:32 AM



**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.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES.

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.

ALL PRESTRESSED 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 6000 PSI.

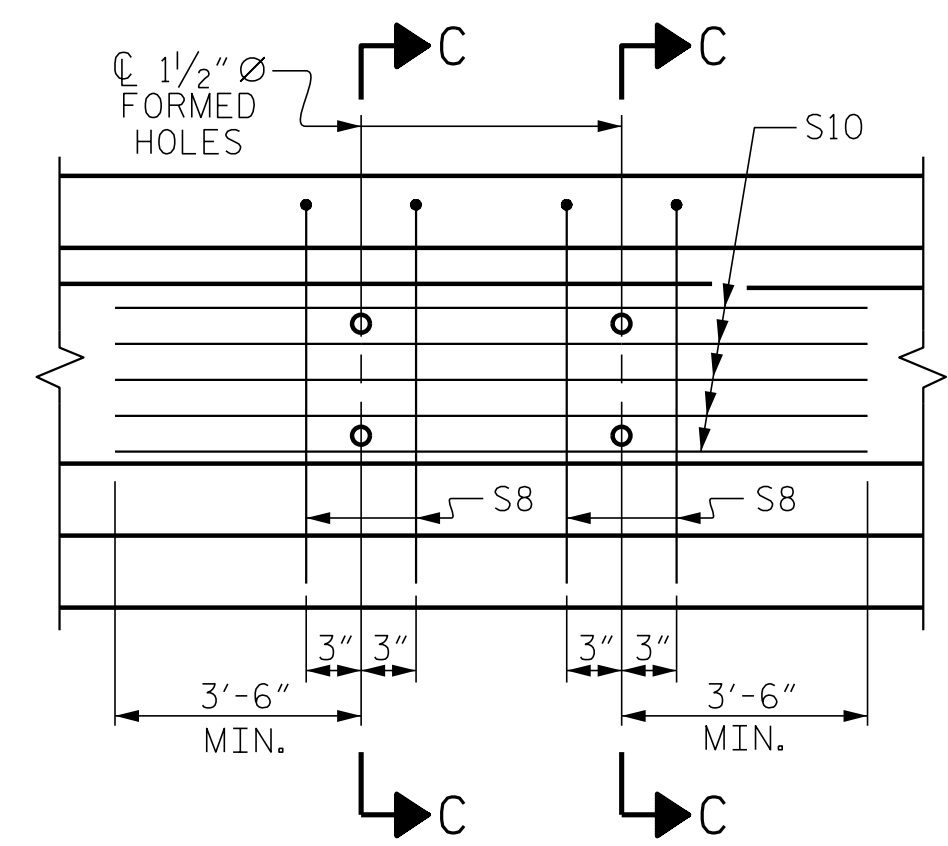
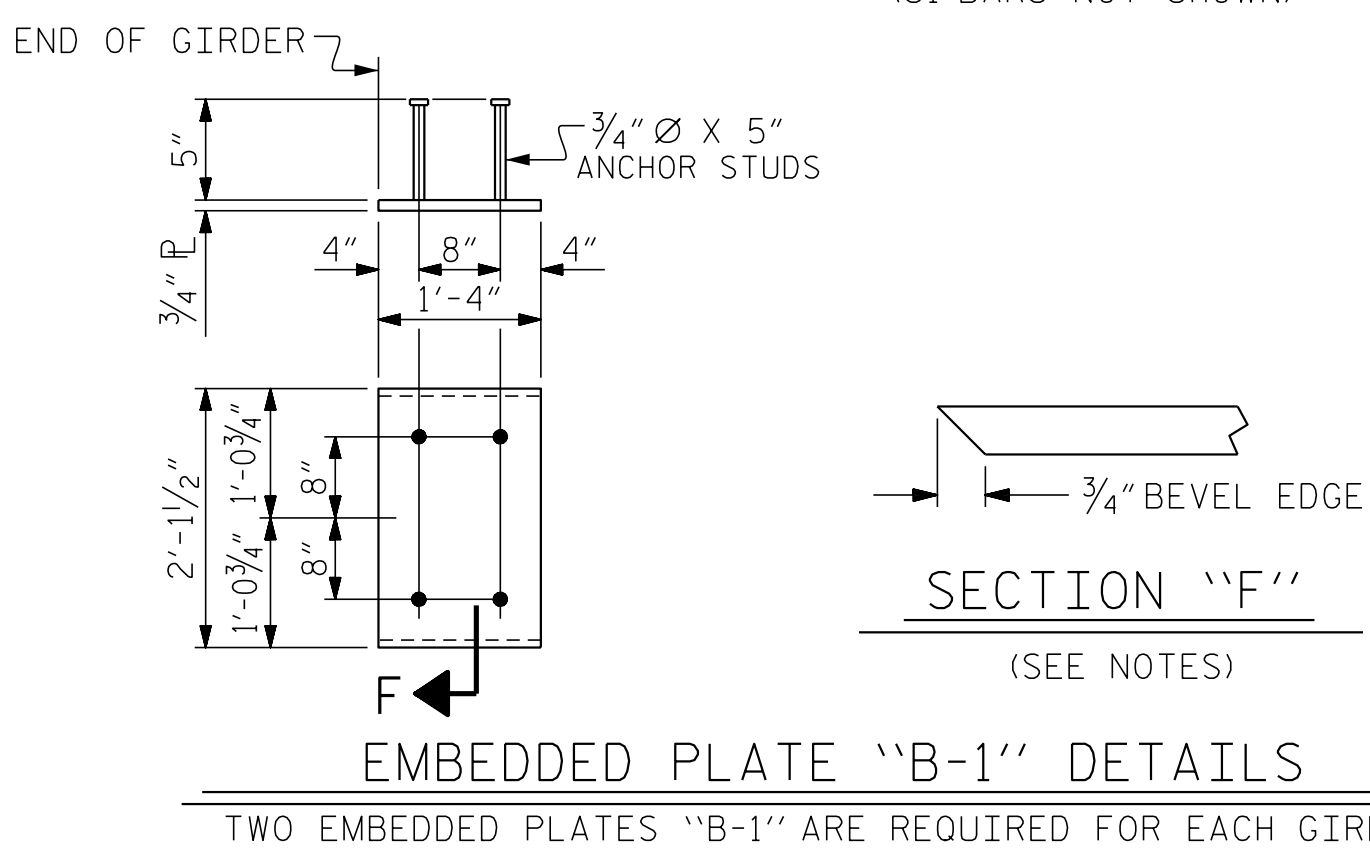
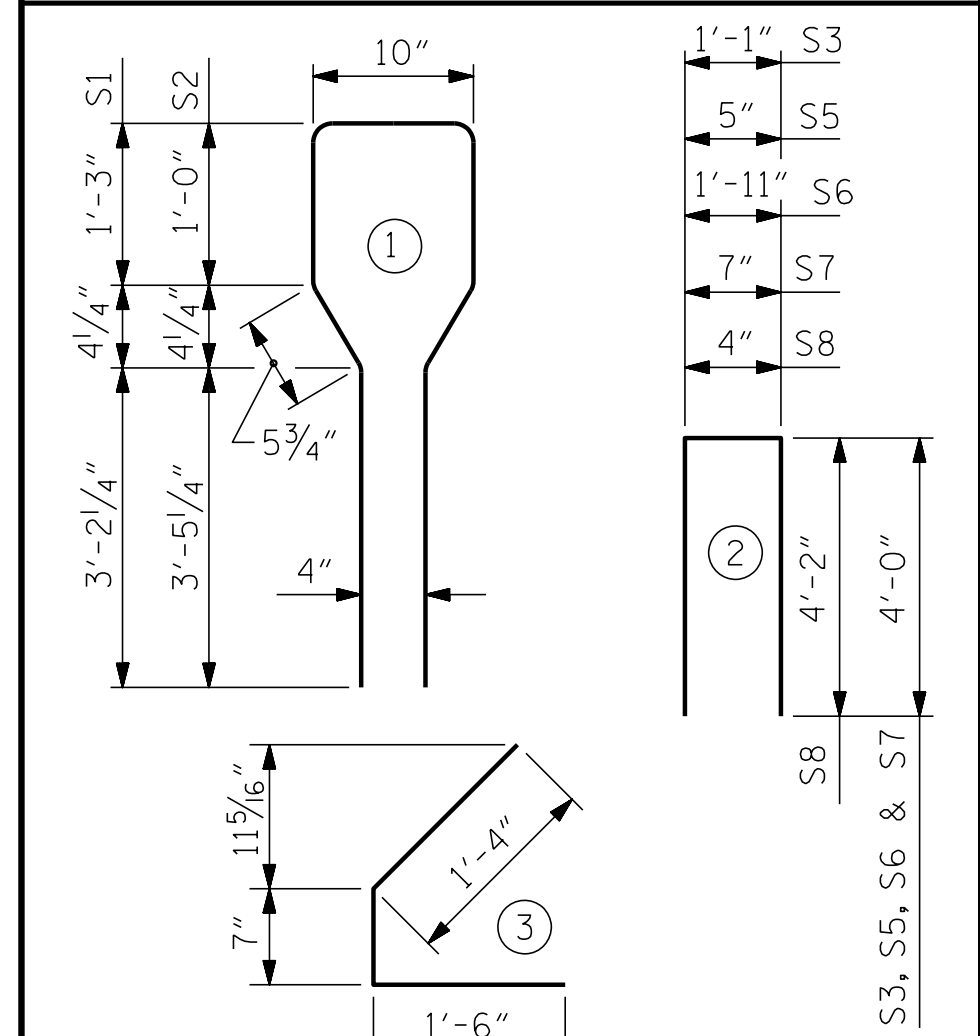
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER SHALL BE RAKED TO A DEPTH OF 1/4" EXCEPT IN THE AREA BETWEEN THE STIRRUP AND THE EDGE OF THE GIRDER.

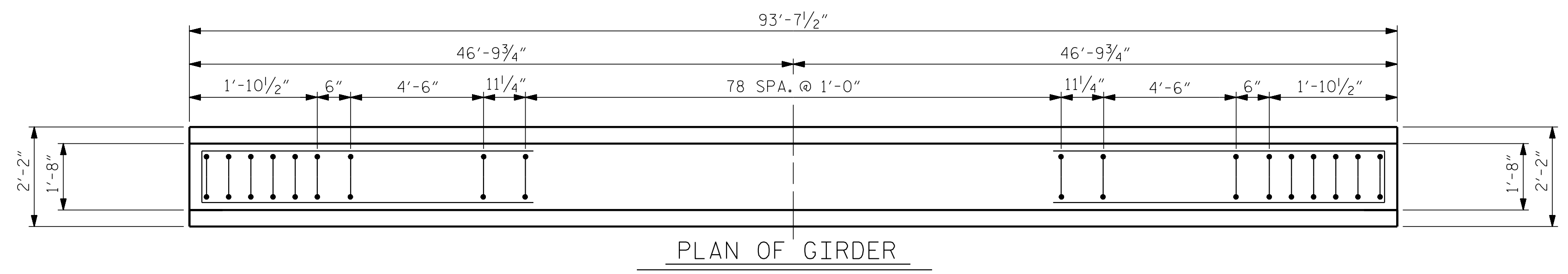
GDR.	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
GDR. 1 & 5	S8	#5	2	8'-8"	18
GDR. 2, 3 & 4	S8	#5	2	8'-8"	36
GDR. 1 & 5	S9	#4	STR	7'-0"	23
GDR. 2, 3 & 4	S10	#4	STR	11'-6"	38

**BAR TYPES**

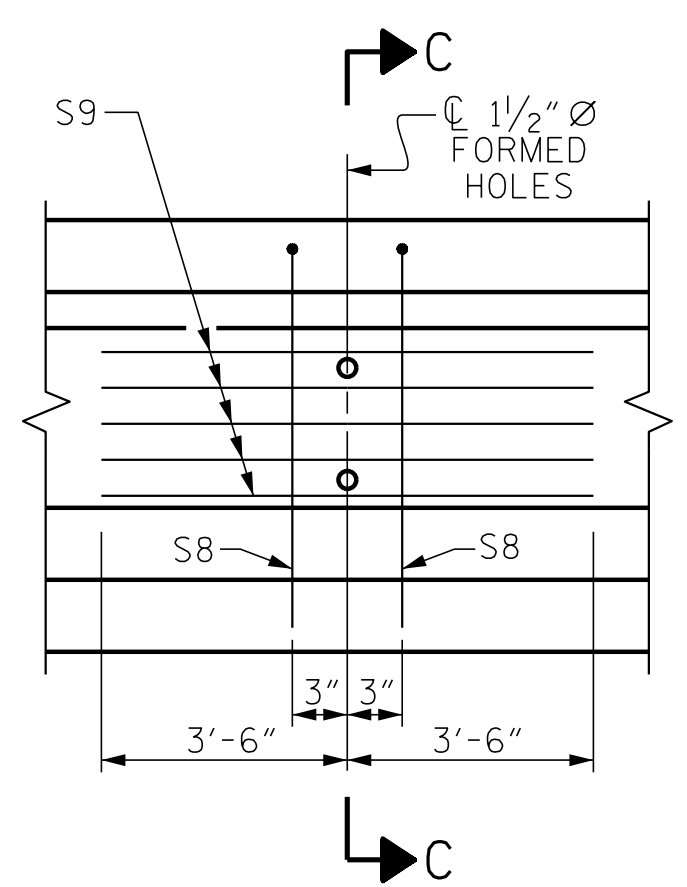
ALL BAR DIMENSIONS ARE OUT-TO-OUT



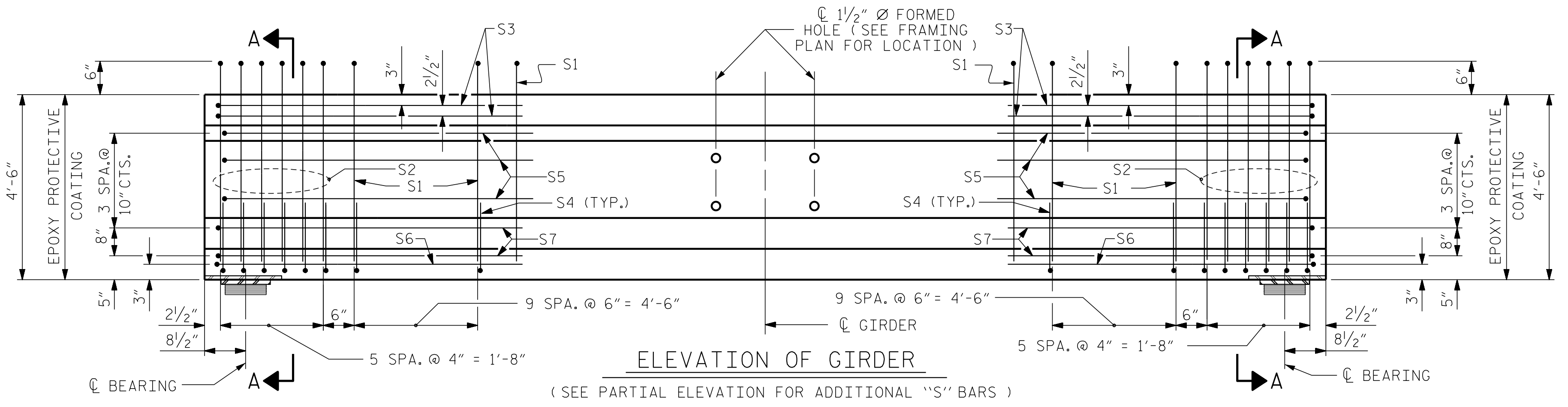
**PARTIAL ELEVATION**  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 2, 3 & 4



**PLAN OF GIRDER**



**PARTIAL ELEVATION**  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1 & 5



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

**0.6" Ø L. R. GRADE 270 STRANDS**

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

**REINFORCING STEEL FOR ONE GIRDER**

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	99	#4	1	10'-8"	705
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	2	#4	2	9'-11"	13
S7	4	#4	2	8'-7"	23
GDR. 1 & 5	S8	#5	2	8'-8"	18
GDR. 2, 3 & 4	S8	#5	2	8'-8"	36
GDR. 1 & 5	S9	#4	STR	7'-0"	23
GDR. 2, 3 & 4	S10	#4	STR	11'-6"	38

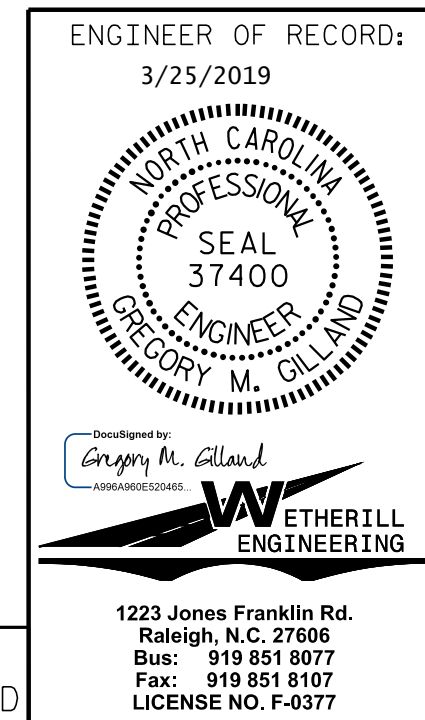
**QUANTITIES FOR ONE GIRDER**

	REINFORCING STEEL	7500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GDR. 1 & 5	1,178	19.0	36
GDR. 2, 3 & 4	1,211	19.0	36

**GIRDERS REQUIRED**

NUMBER	LENGTH	TOTAL LENGTH
5	93'-7 1/2"	468'-1 1/2"

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 AASHTO TYPE IV  
 PRESTRESSED CONCRETE GIRDER  
 (LEFT LANE)

**REVISIONS**

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

SHEET NO. S1-9  
TOTAL SHEETS 27

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PA-2017-17-12 1.01.W-5600\_USTO.Structures\DGN-L-Over-Y9-DGN (LEFT LANE)W-5600\_Y9\_PCG (LEFT LANE)\_WE Idgn 3/20/2019 7:46:59 AM

ASSEMBLED BY : D. HODGE DATE : 1/18  
 CHECKED BY : G.M. GILLAND DATE : 2/18  
 DRAWN BY : JMB 12/87 REV. 10/1/11 MAA/GM  
 CHECKED BY : ARB 12/87 REV. 1/15 MAA/TMG  
 REV. 12/17 MAA/THC

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

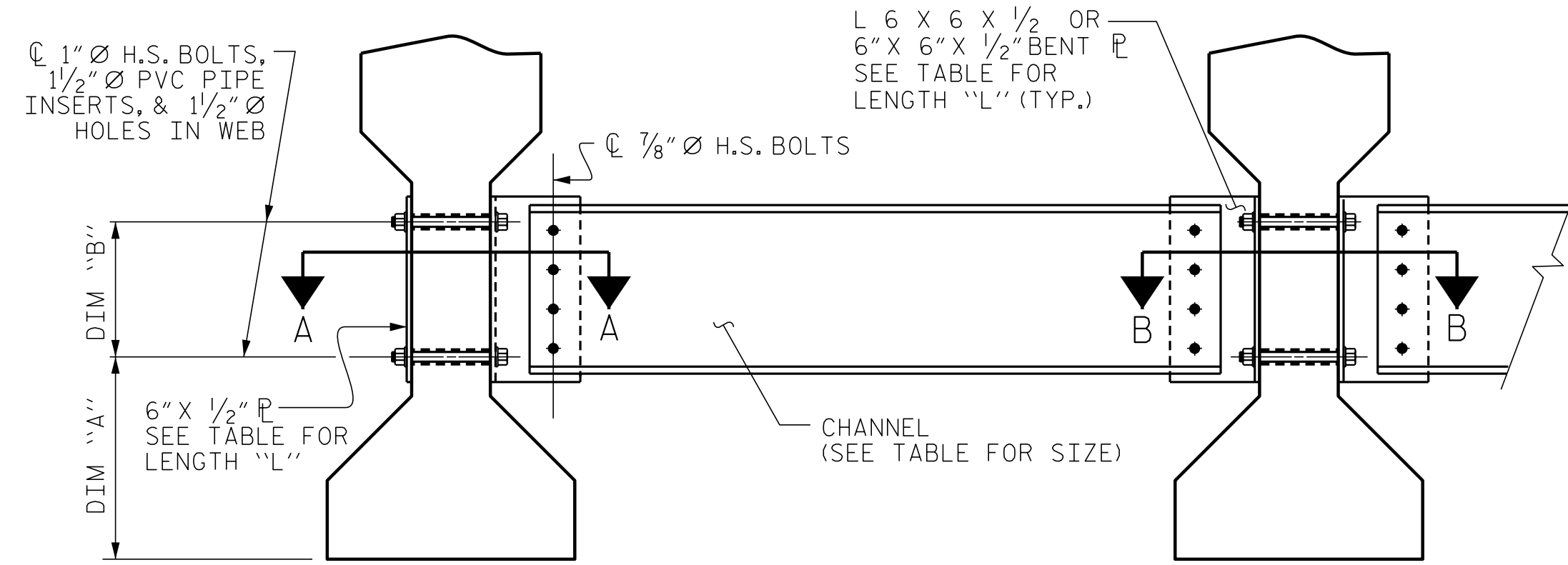
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

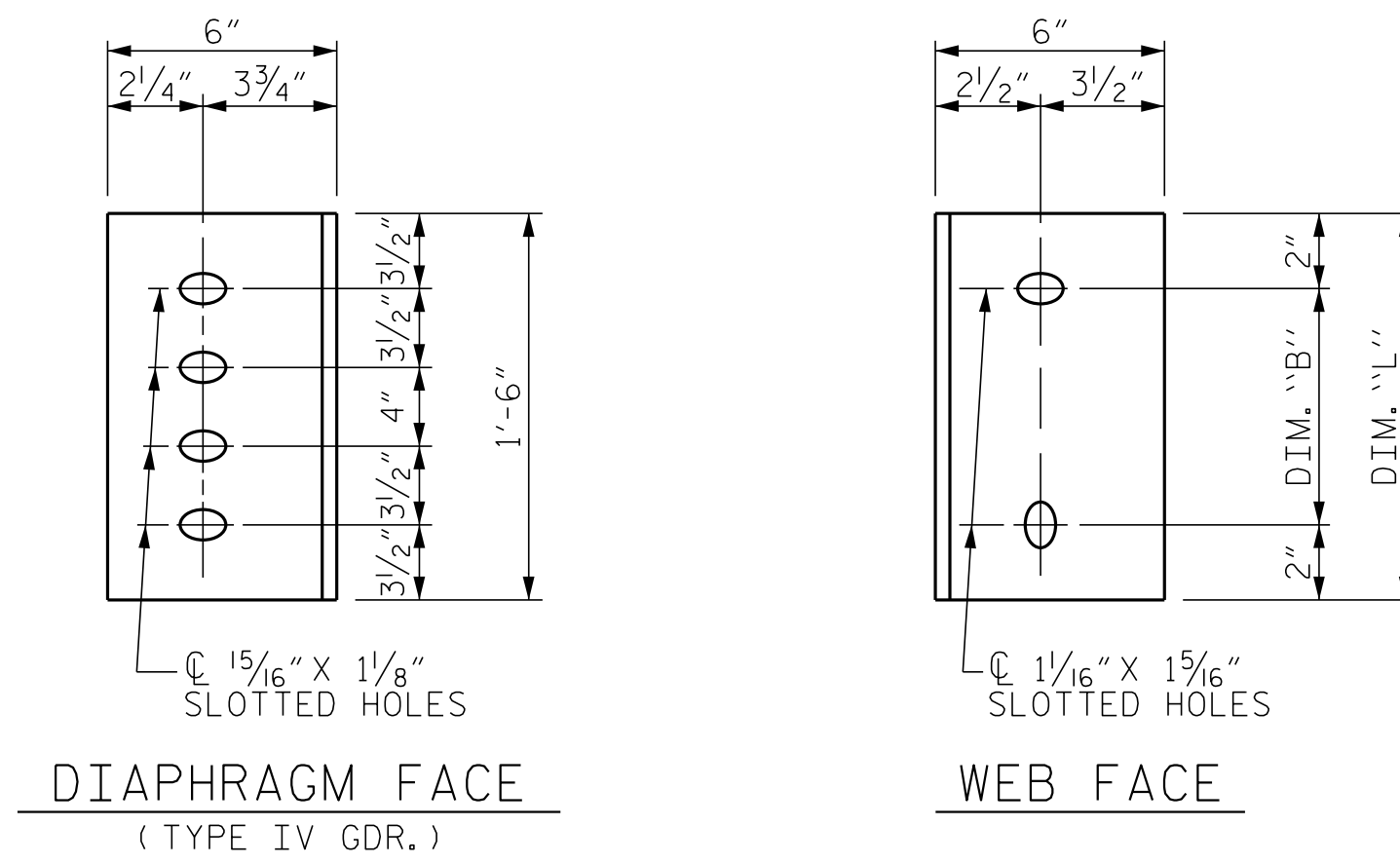
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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



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



DIAPHRAGM FACE (TYPE IV GDR.) WEB FACE

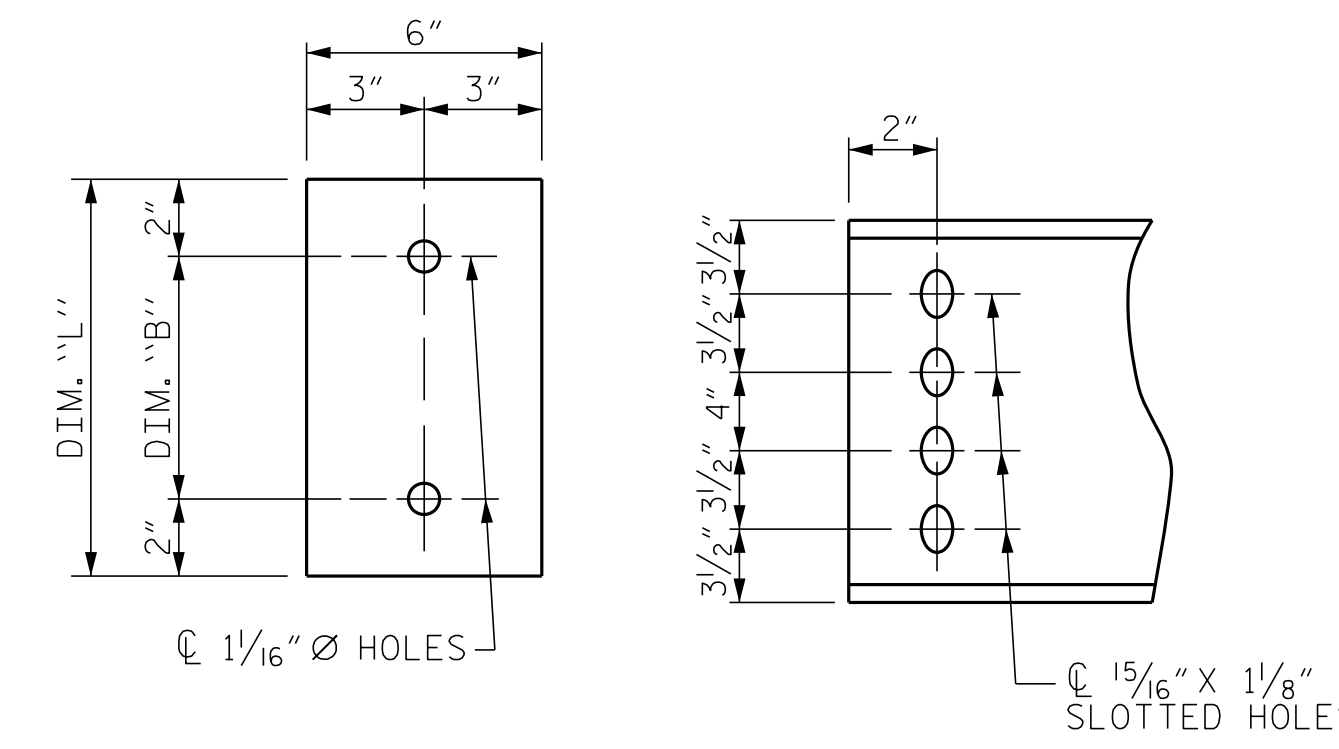
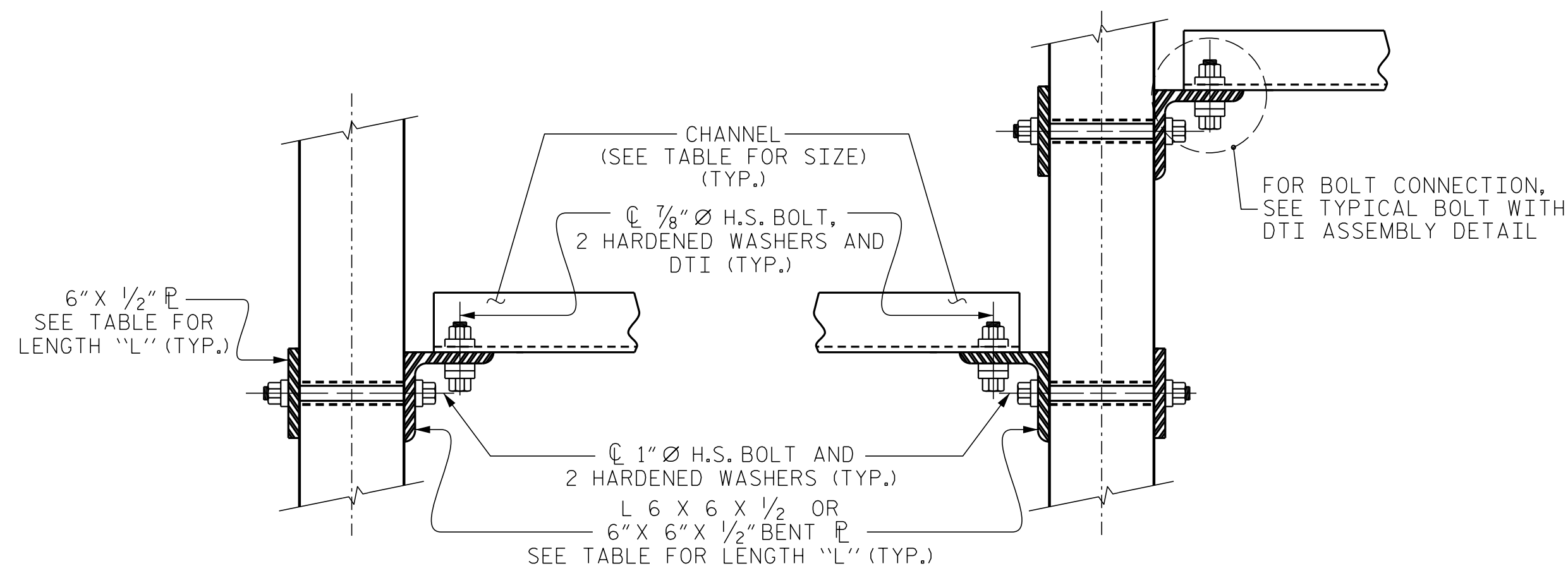


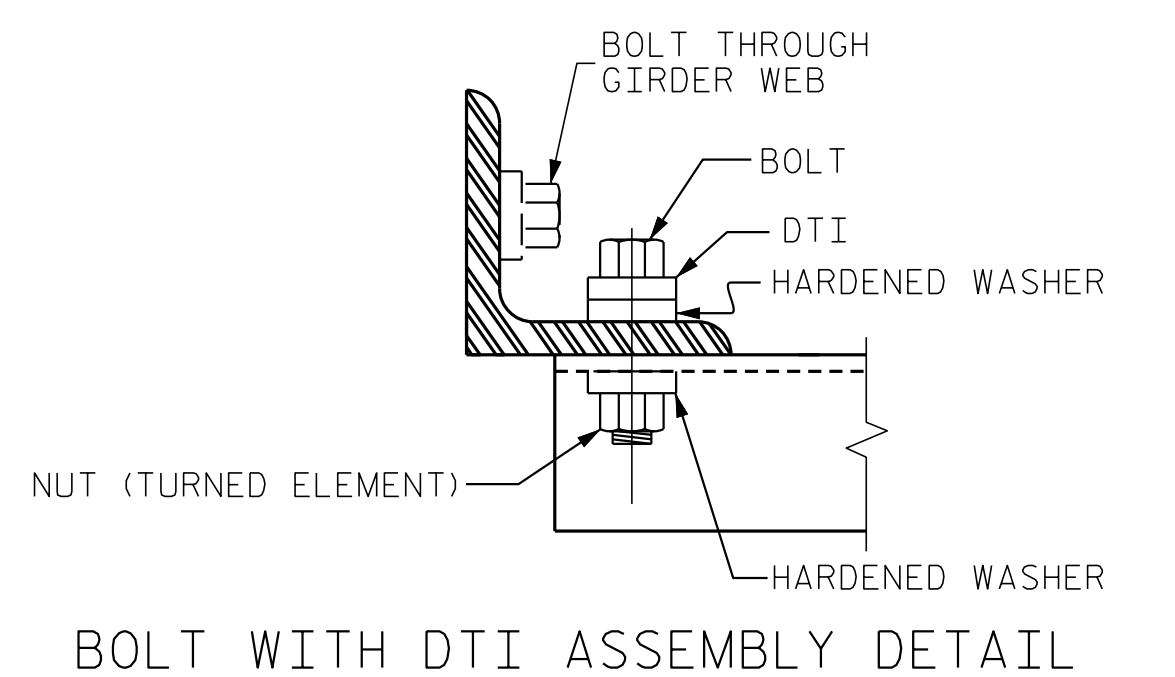
PLATE DETAILS CHANNEL END (TYPE IV GDR.)

TABLE

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



SECTION A-A SECTION B-B  
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN A

0.6" Ø LOW RELAXATION		GIRDERS 1 & 5										
TENTH POINTS		0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER ( GIRDER ALONE IN PLACE )	↑	0	0.059	0.112	0.154	0.180	0.189	0.180	0.154	0.112	0.059	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.041	0.080	0.111	0.131	0.138	0.131	0.111	0.080	0.041	0
FINAL CAMBER	↑	0	1/4"	3/8"	1/2"	5/8"	5/8"	9/16"	1/2"	3/8"	1/4"	0

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN A

0.6" Ø LOW RELAXATION		GIRDERS 2 THRU 4										
TENTH POINTS		0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER ( GIRDER ALONE IN PLACE )	↑	0	0.059	0.112	0.154	0.180	0.189	0.180	0.154	0.112	0.059	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.045	0.089	0.123	0.145	0.152	0.145	0.123	0.089	0.045	0
FINAL CAMBER	↑	0	3/16"	5/16"	3/8"	7/16"	7/16"	7/16"	3/8"	5/16"	3/16"	0

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 217+31.76 -L-

SHEET 2 OF 2

ASSEMBLED BY : D. HODGE DATE : 1/18  
CHECKED BY : G.M. GILLAND DATE : 2/18  
DRAWN BY : TLA 6/05 REV. 5/10/06RRR KMM/GM  
CHECKED BY : VC 6/05 REV. 10/11/11 MAA/GM  
REV. 12/17 MAA/THC

ENGINEER OF RECORD:  
3/25/2019  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 37400  
GREGORY M. OIL AND  
GREGORY M. OIL AND  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

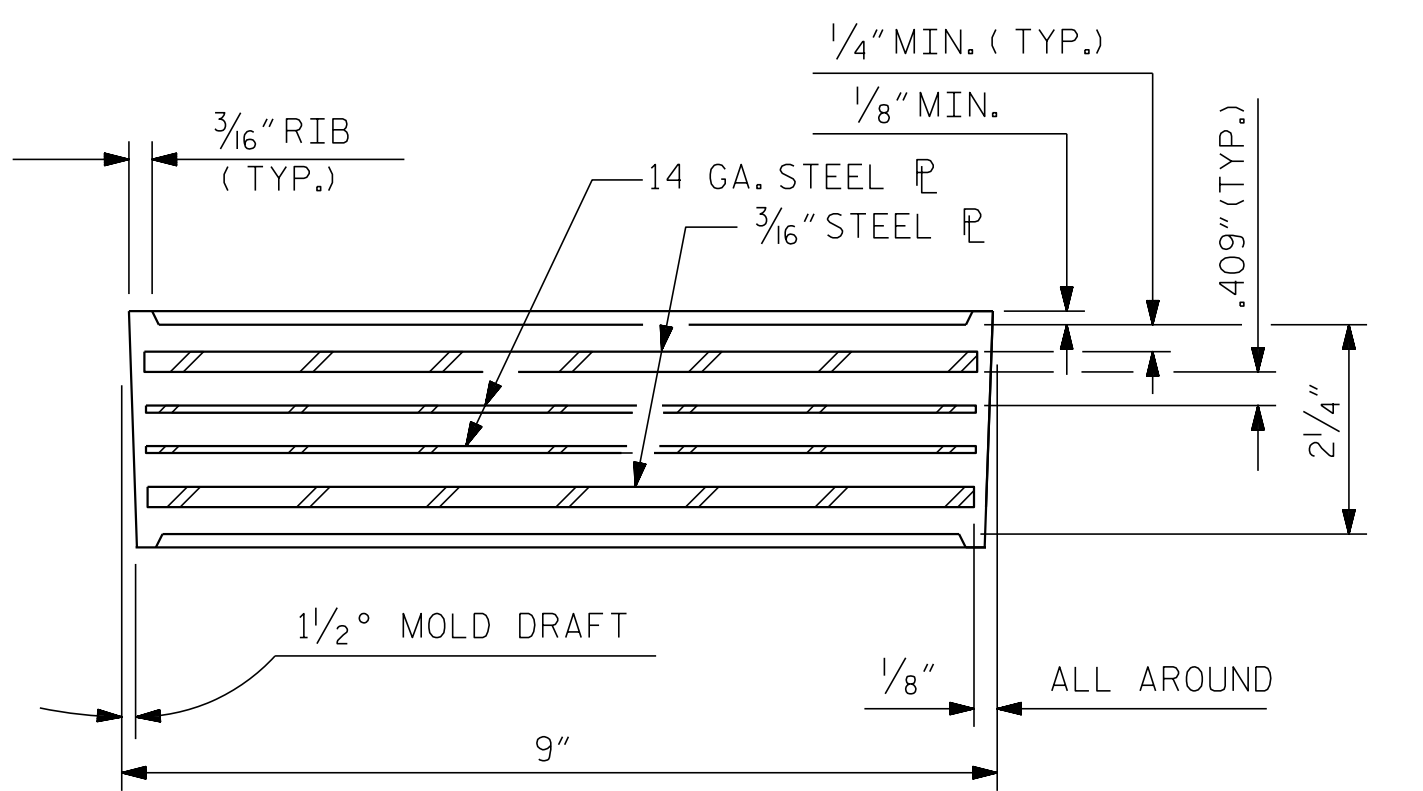
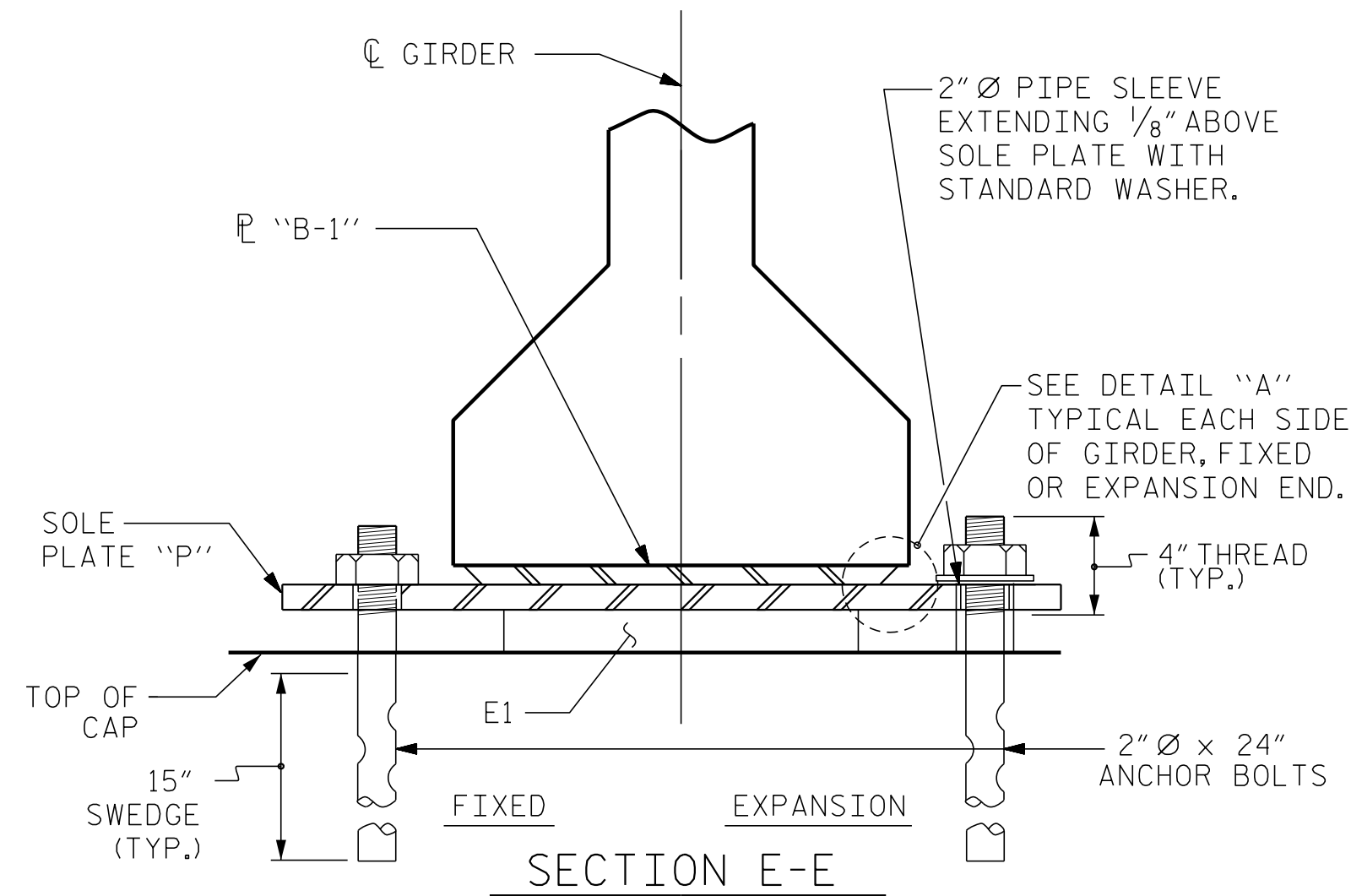
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS (LEFT LANE)

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

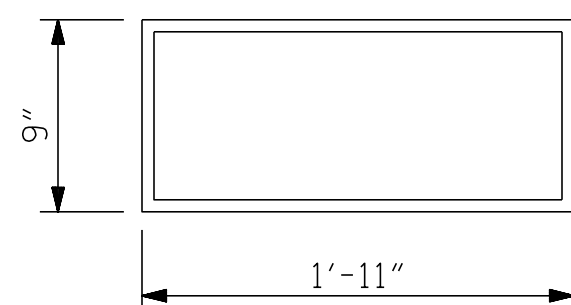
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TOTAL SHEETS 27

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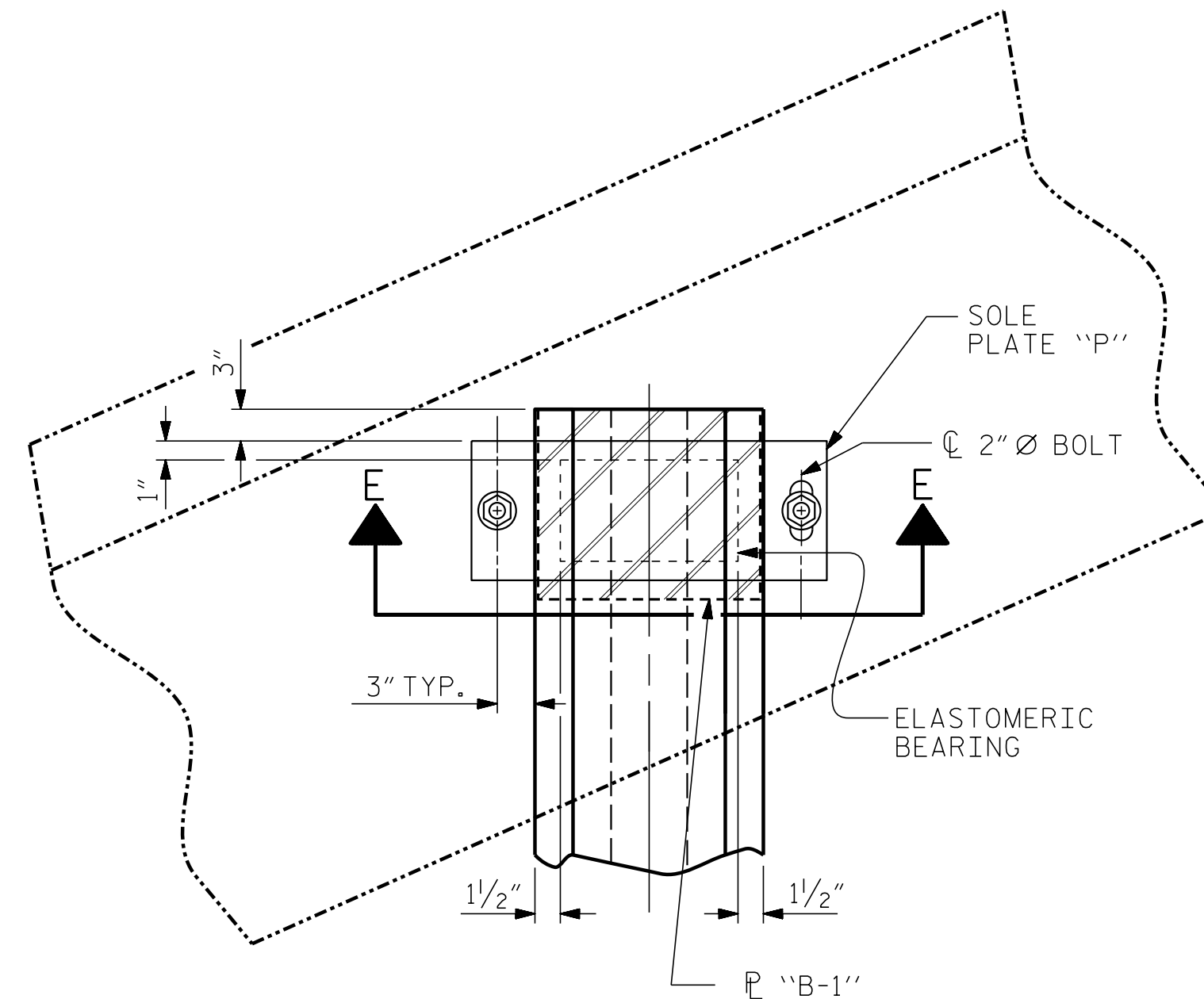
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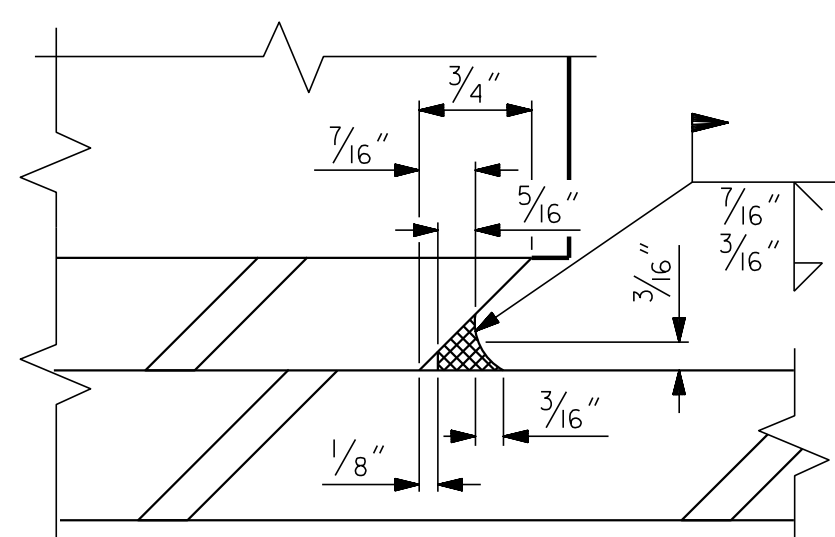
TYPICAL SECTION OF ELASTOMERIC BEARINGS



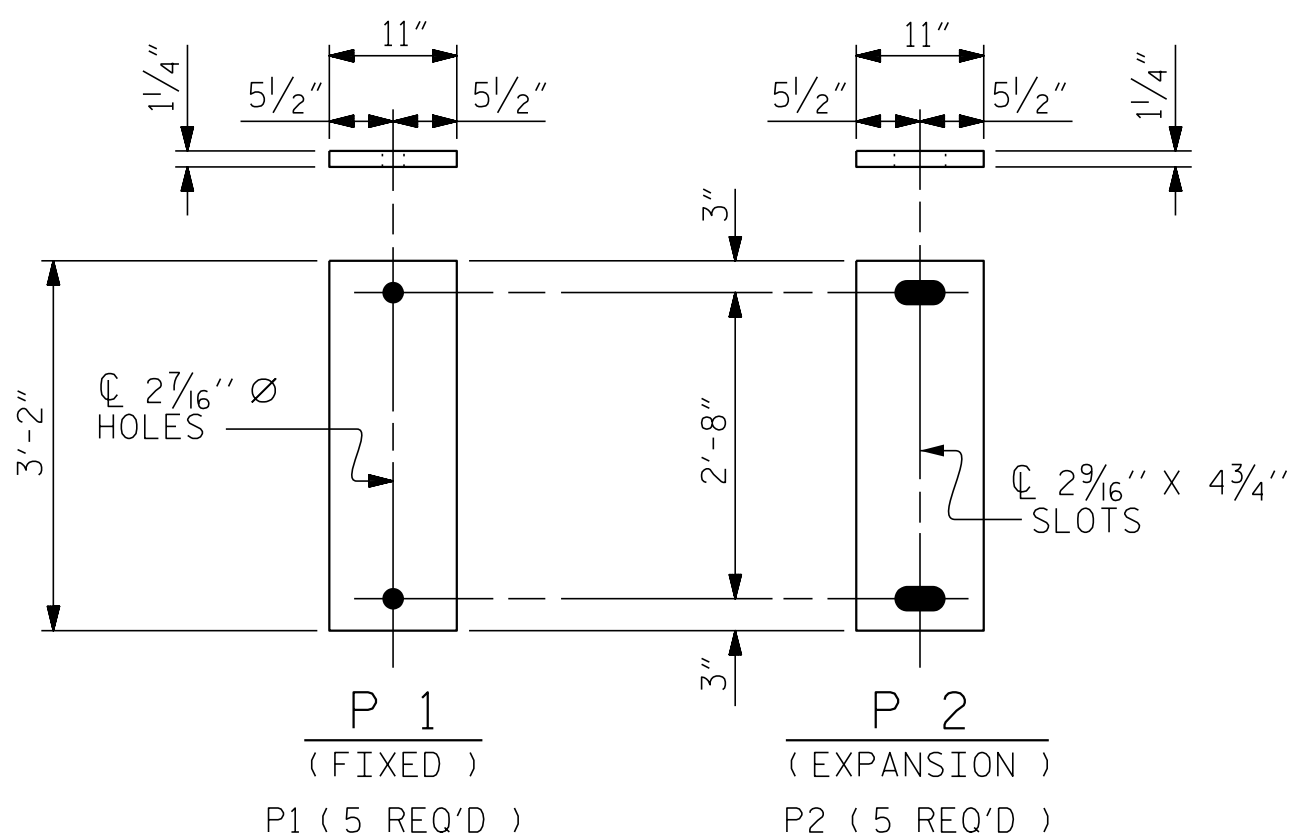
E1 (10 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
**TYPE V**



TYPICAL HALF-PLAN (AT END BENT No. 1)  
TYPICAL HALF-PLAN (AT END BENT No. 2)



DETAIL "A"



SOLE PLATE DETAILS ("P")

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

**NOTES**

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

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.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 217+31.76 -L-

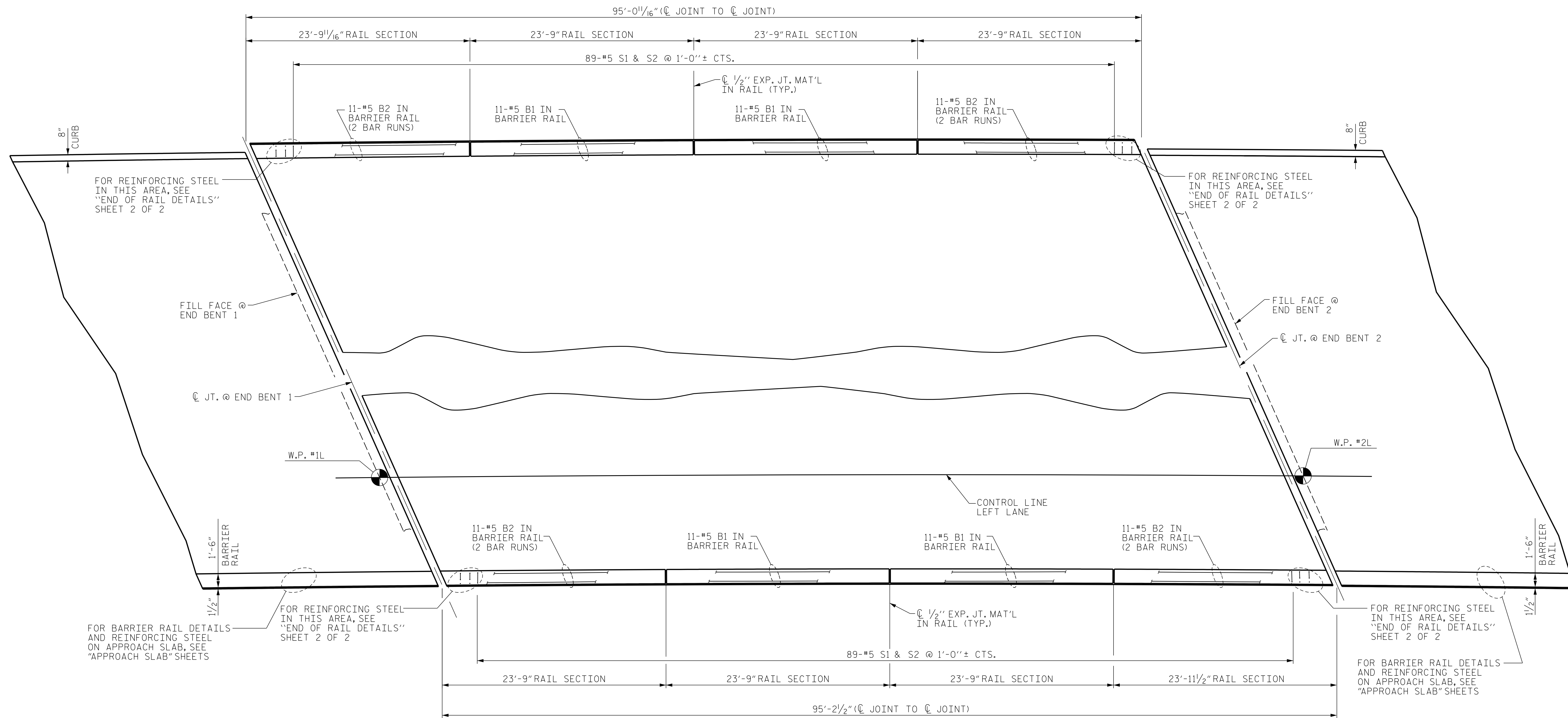
ENGINEER OF RECORD:  
3/25/2019  
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 37400  
GREGORY M. OIL AND  
GREGORY M. OIL AND  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
ELASTOMERIC BEARING  
DETAILS  
PRESTRESSED CONCRETE GIRDER  
SUPERSTRUCTURE (LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS
2			4			27

DOCUMENT NOT CONSIDERED FINAL  
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 3/20/2019 7:53:37 AM



**PLAN OF BARRIER RAIL - SPAN A**  
 ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL AND ARE RADIAL

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 1 OF 2

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Olland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

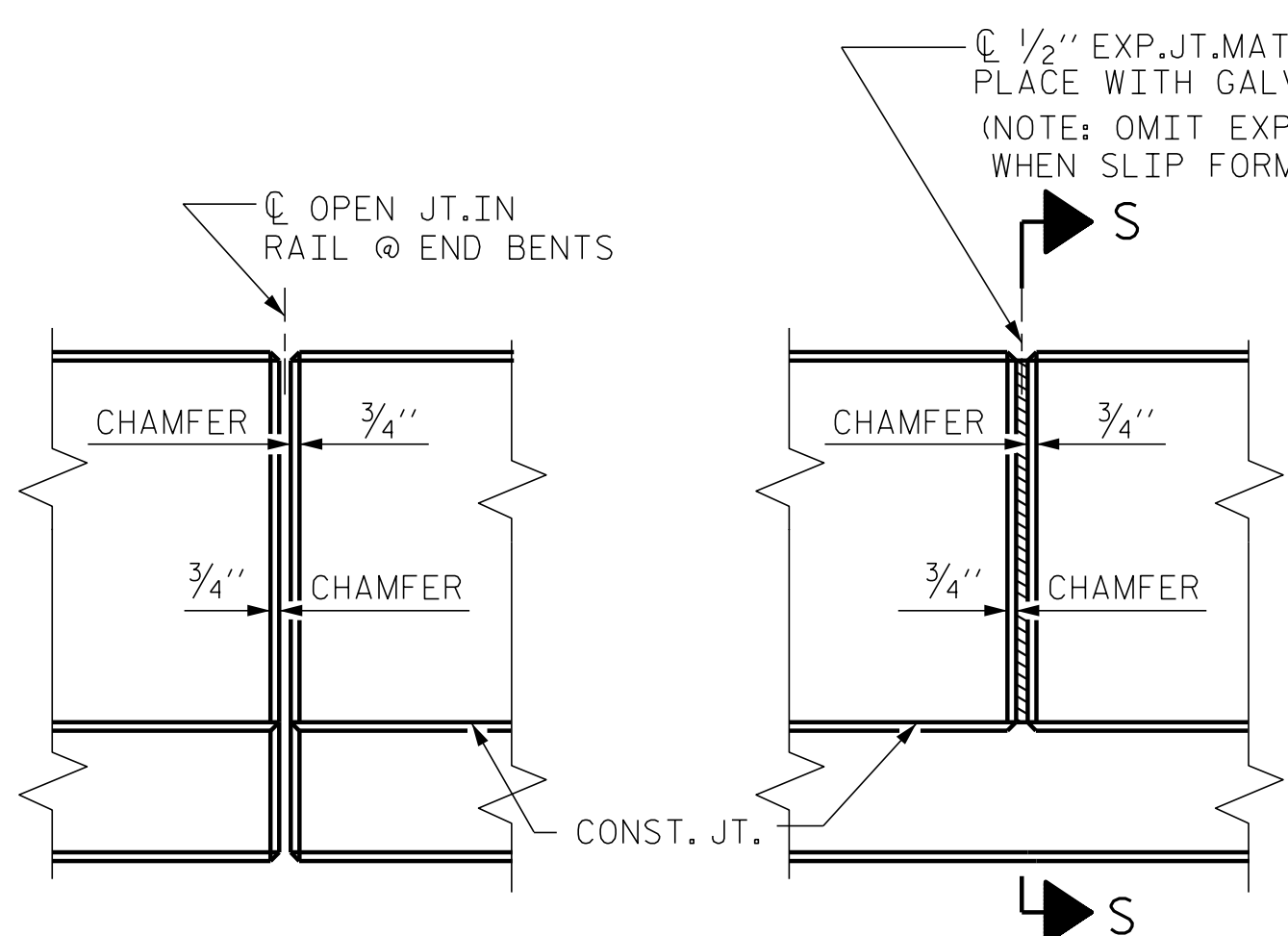
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 CONCRETE  
 BARRIER RAIL  
 (LEFT LANE)

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

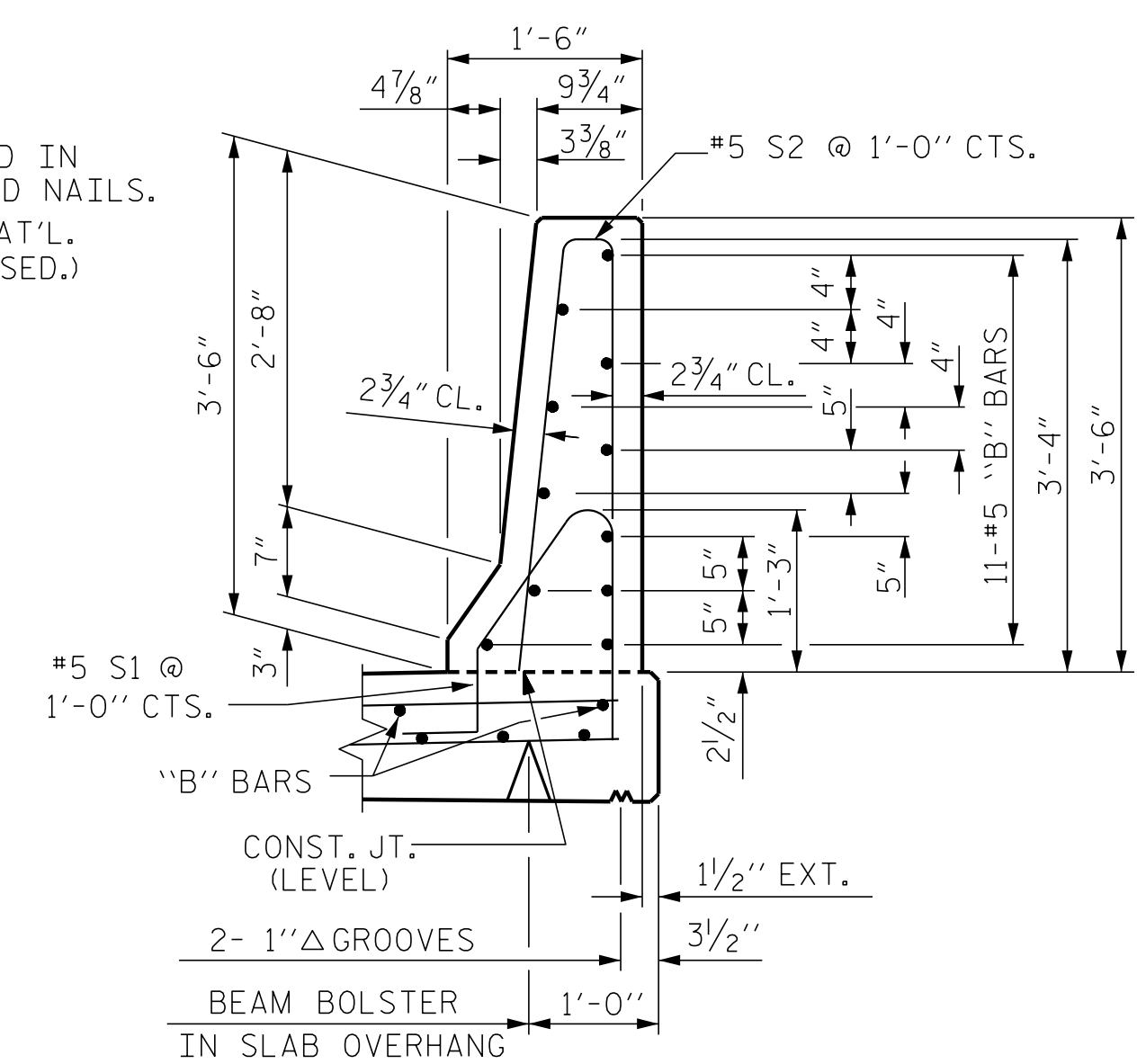
DRAWN BY : J. PENDERGRAFT DATE : 12-17  
 3/20/2019 8:02:14 AM  
 CHECKED BY : D. HODGE DATE : 1-18

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 UNLESS ALL SIGNATURES COMPLETED

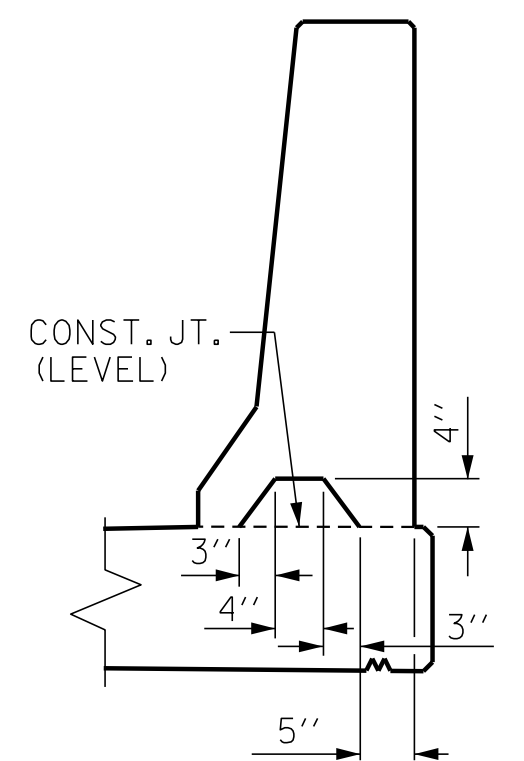
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 3/20/2019 8:02:14 AM



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL



SECTION S-S

NOTES

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

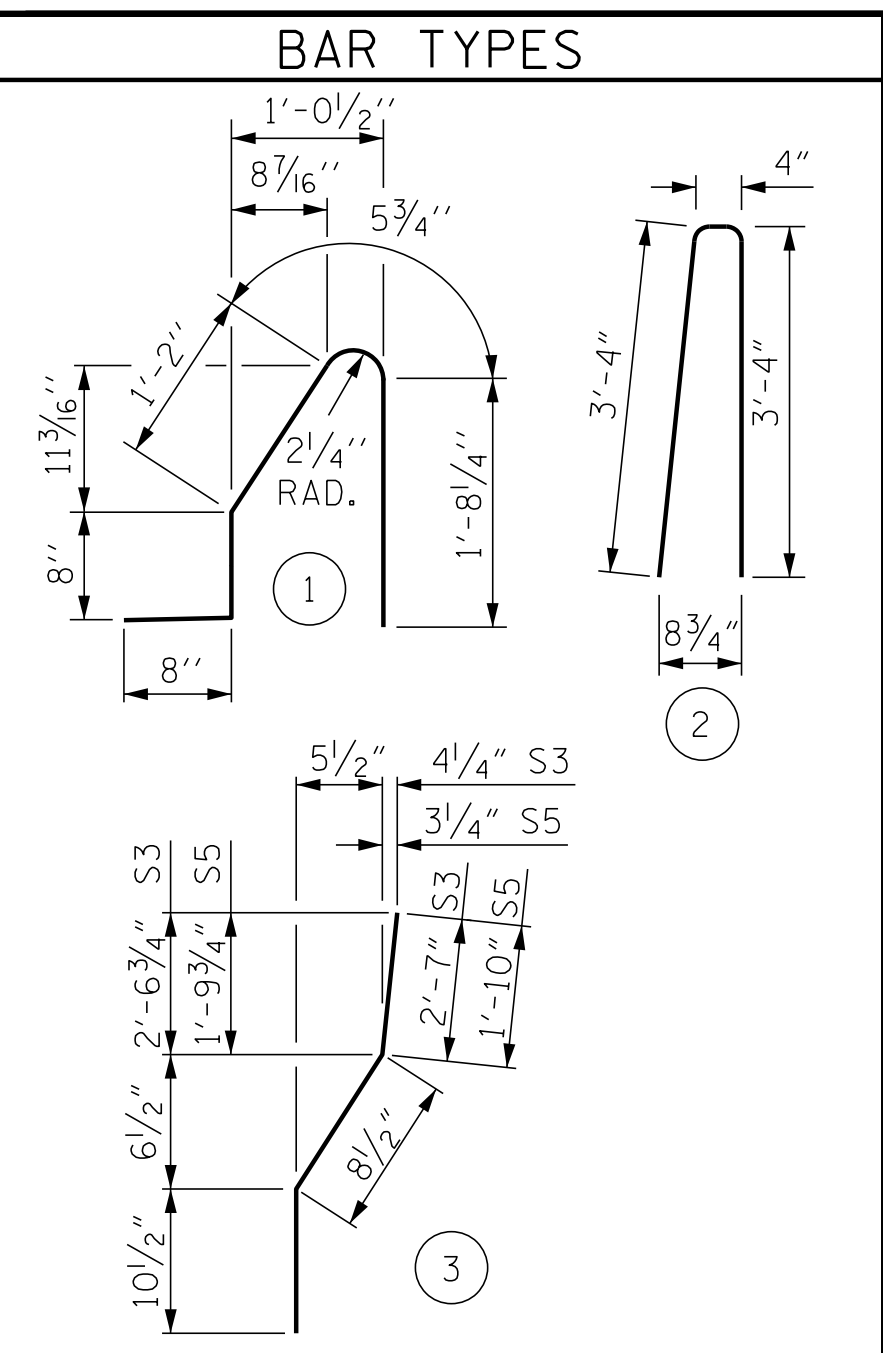
WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS 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 BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

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



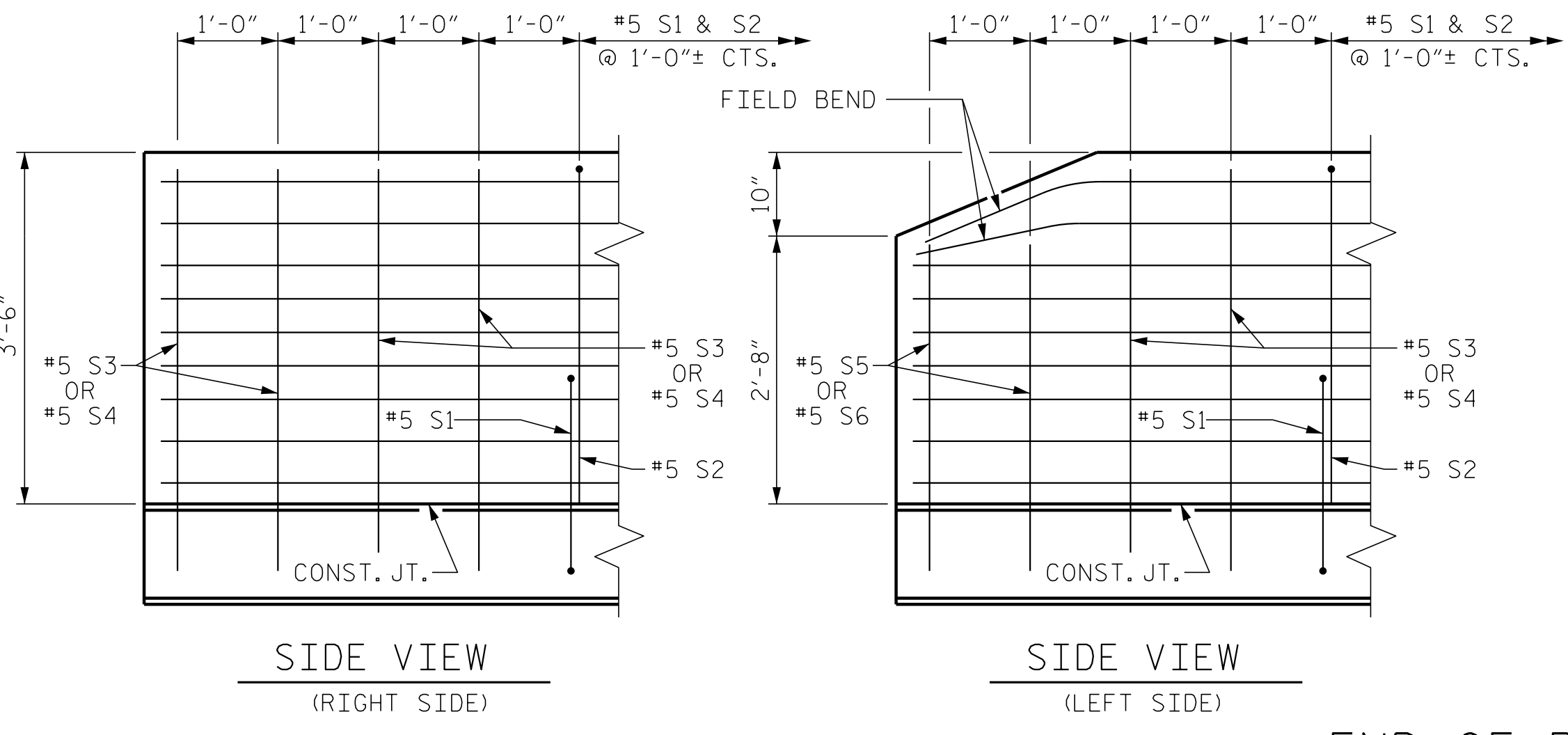
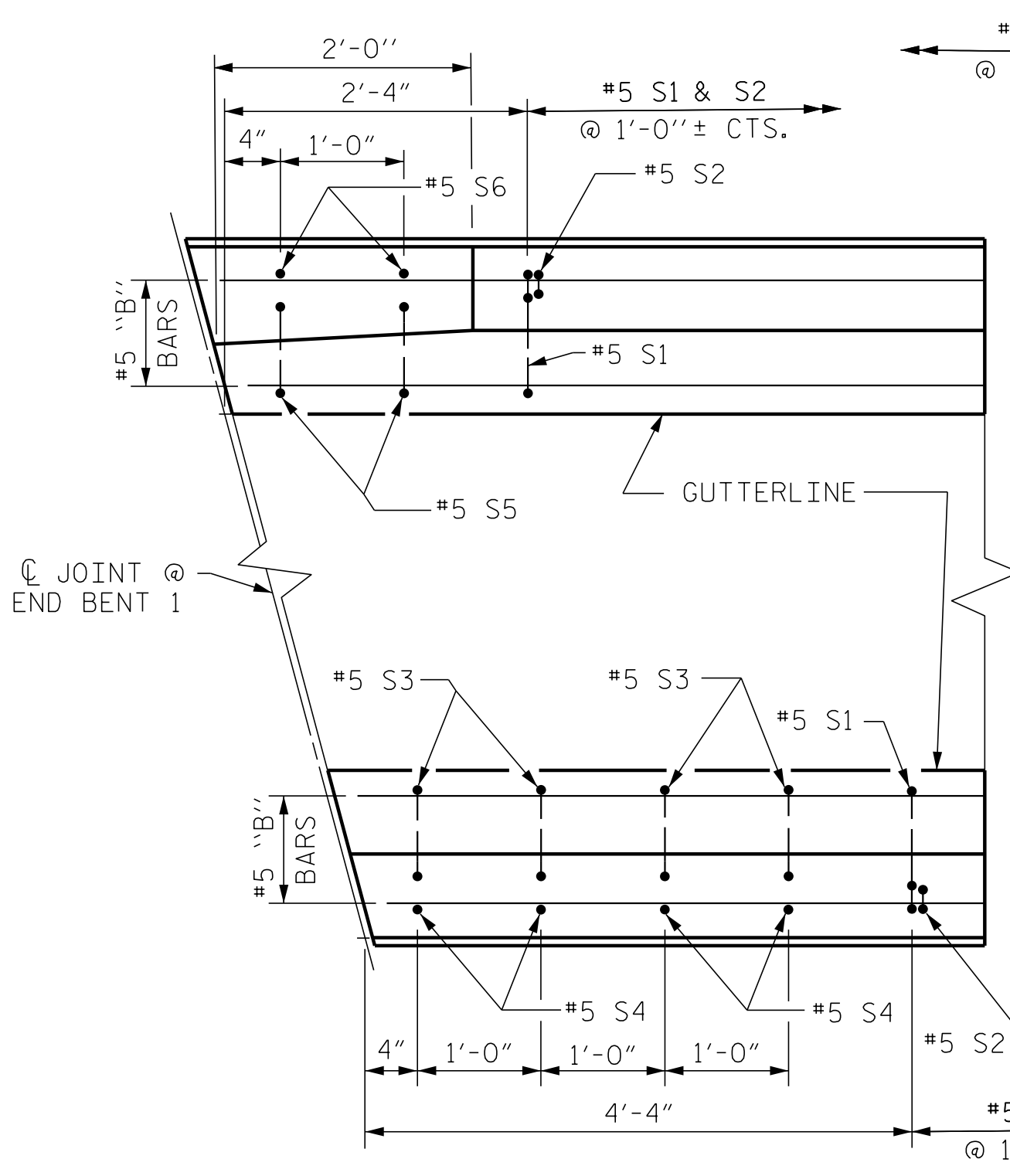
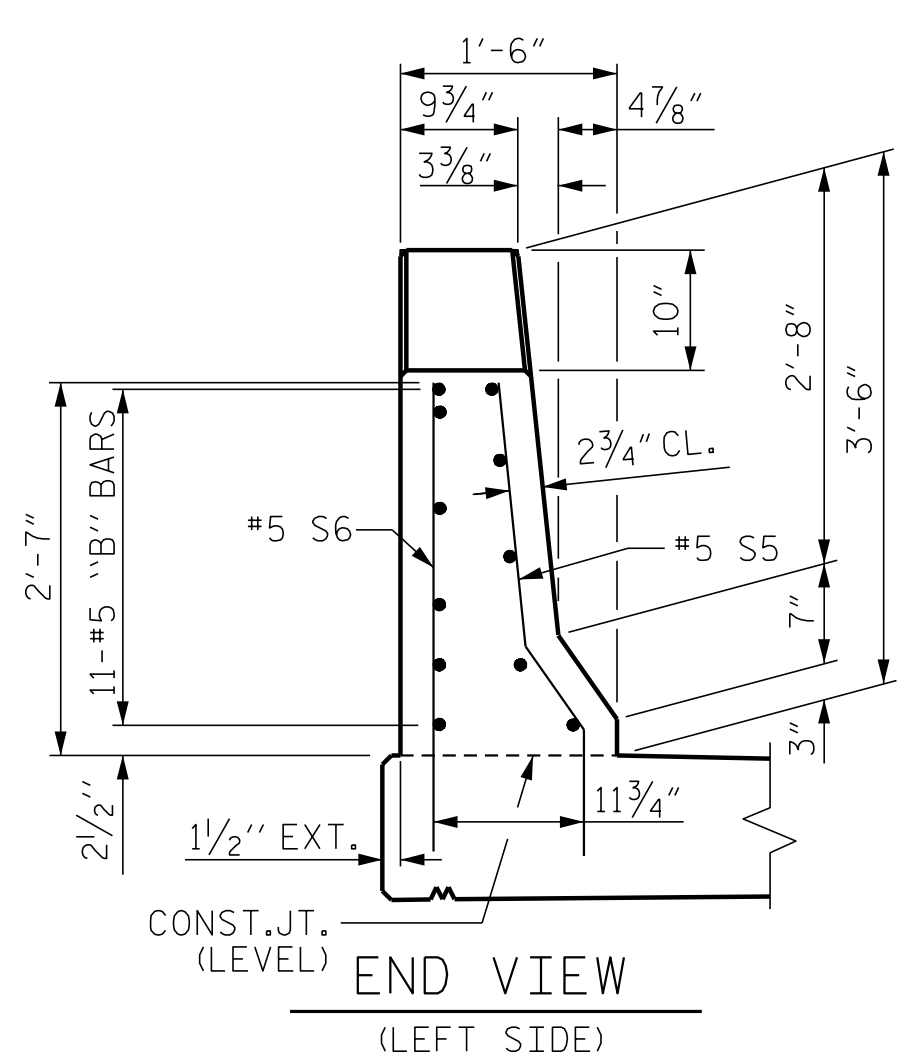
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* S1	178	#5	1	4'-8"	866
* S2	178	#5	2	7'-0"	1300
* S3	8	#5	3	4'-2"	35
* S4	8	#5	STR	4'-0"	33
* S5	4	#5	3	3'-5"	14
* S6	4	#5	STR	3'-3"	14
* B1	44	#5	STR	23'-4"	1071
* B2	88	#5	STR	13'-8"	1254
* EPOXY COATED REINFORCING STEEL					4587 LBS.
CLASS AA CONCRETE					25.9 CU. YDS.
CONCRETE BARRIER RAIL					190.27 LIN. FT.

BARRIER RAIL DETAILS



END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

PROJECT NO. W-5600  
 JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 2 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 CONCRETE  
 BARRIER RAIL  
 (LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-13
1			3			TOTAL SHEETS
2			4			27

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

P:\2017\1712101\W-5600\_USTOStructures\DGN\L-Over-Y9-DGN (LEFT LANE)W-5600\_Y9\_BR (LEFT LANE)\_WE I.dgn  
 3/20/2019 8:06:53 AM

ASSEMBLED BY : J. PENDERGRAFT	DATE : 12-17
CHECKED BY : D. HODGE	DATE : 1-18
DRAWN BY : ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NOTES

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

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

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

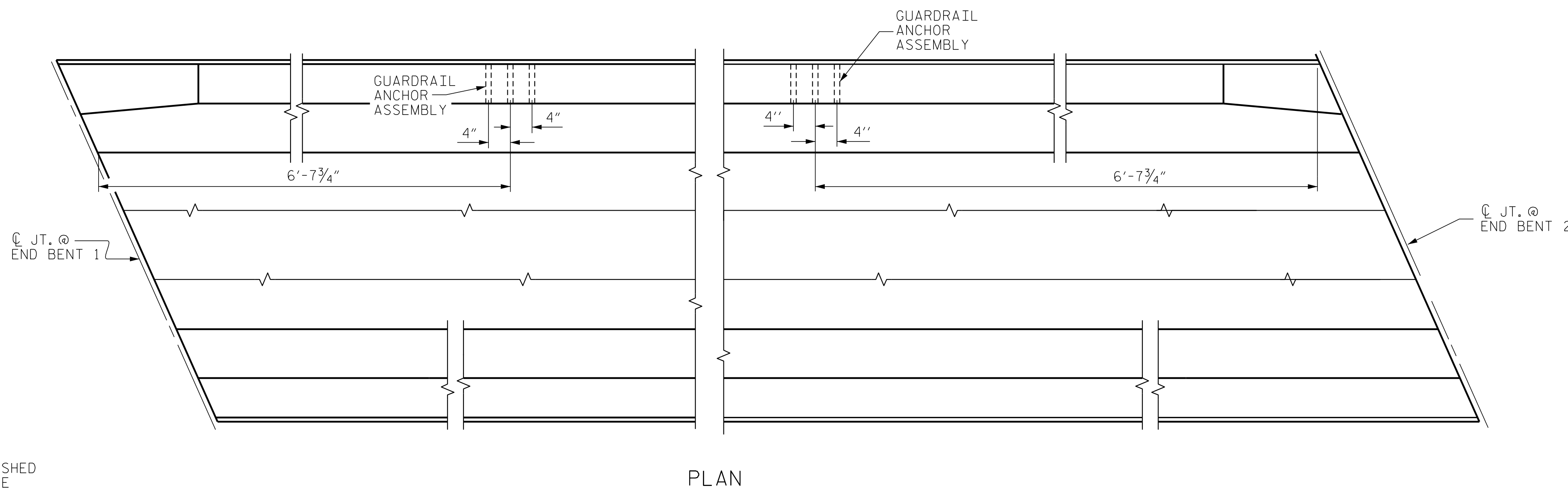
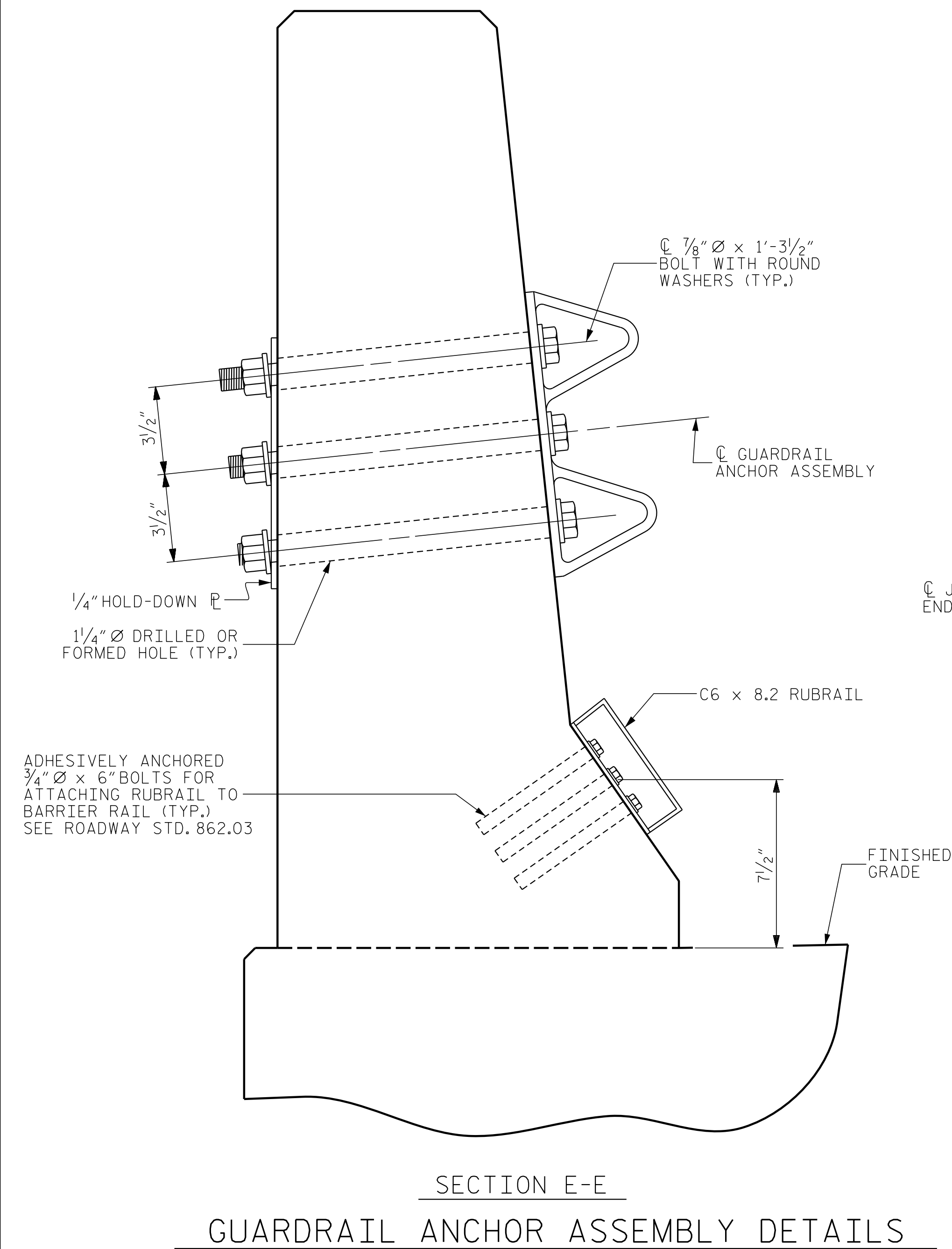
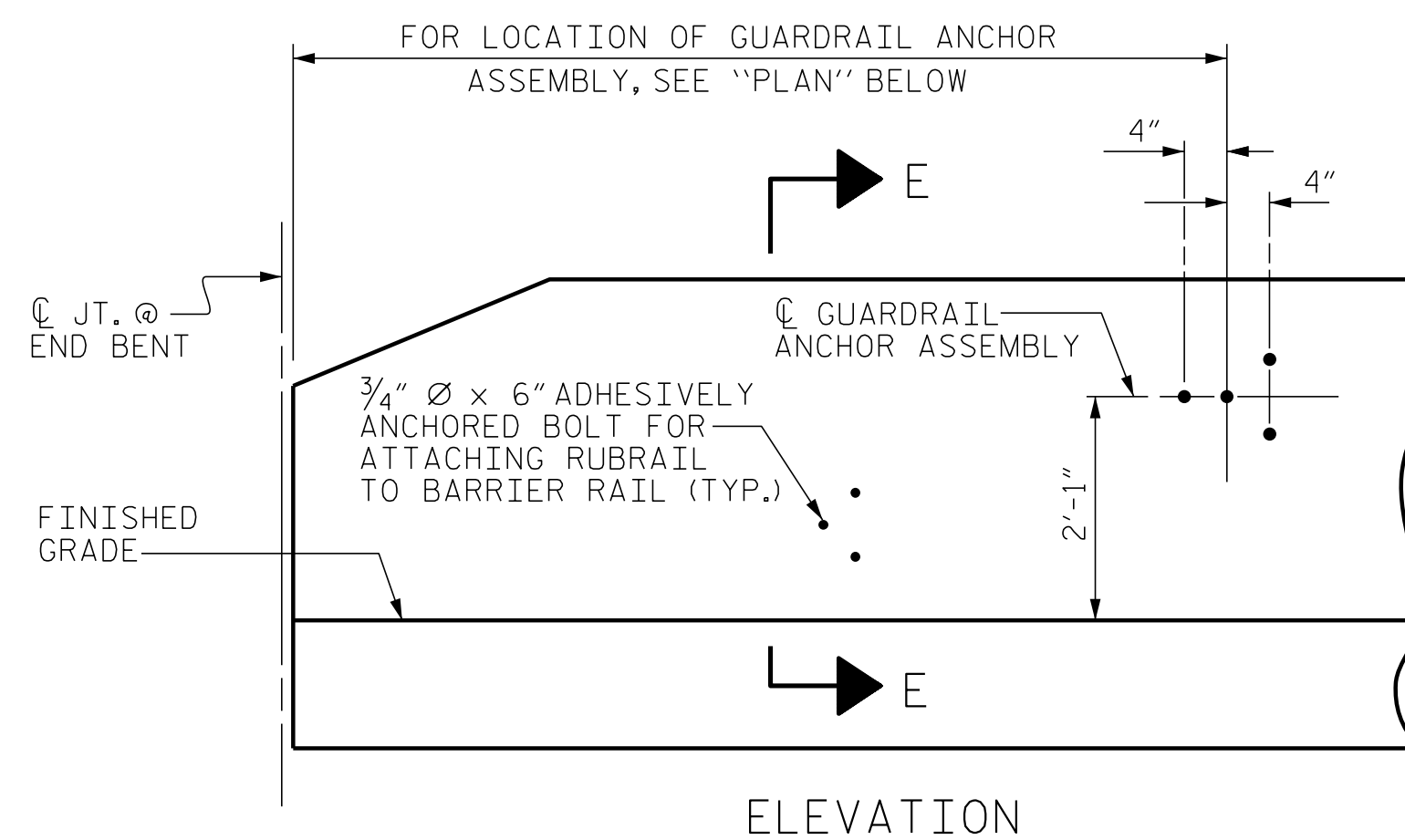
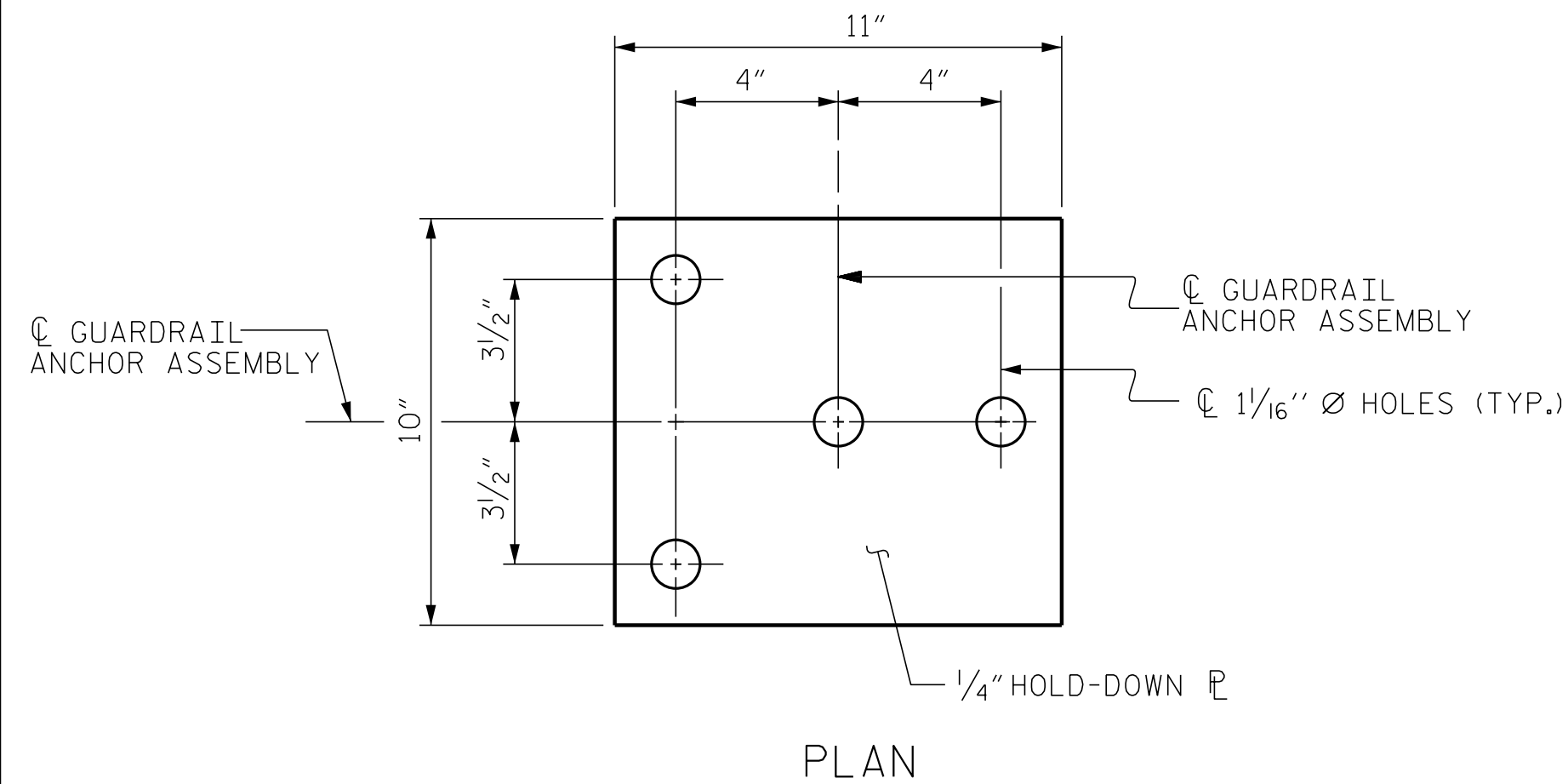
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

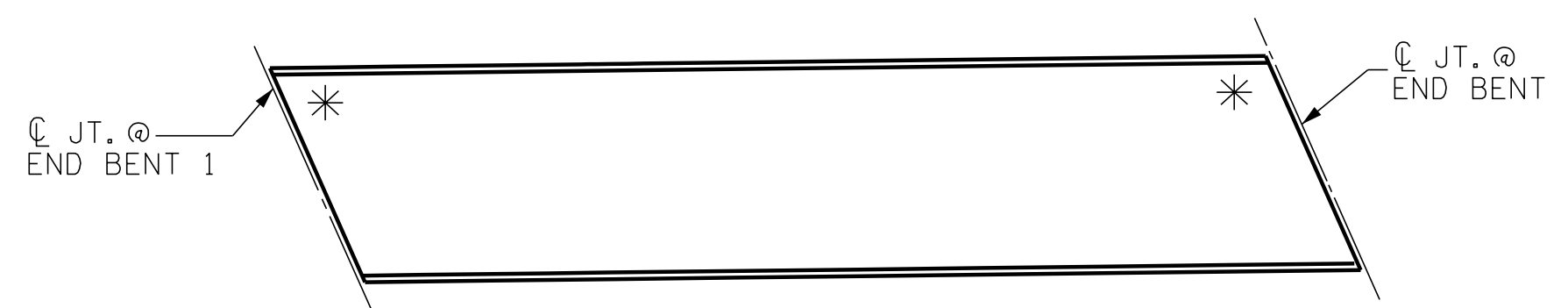
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

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



LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. W-5600  
 JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Olland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

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

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

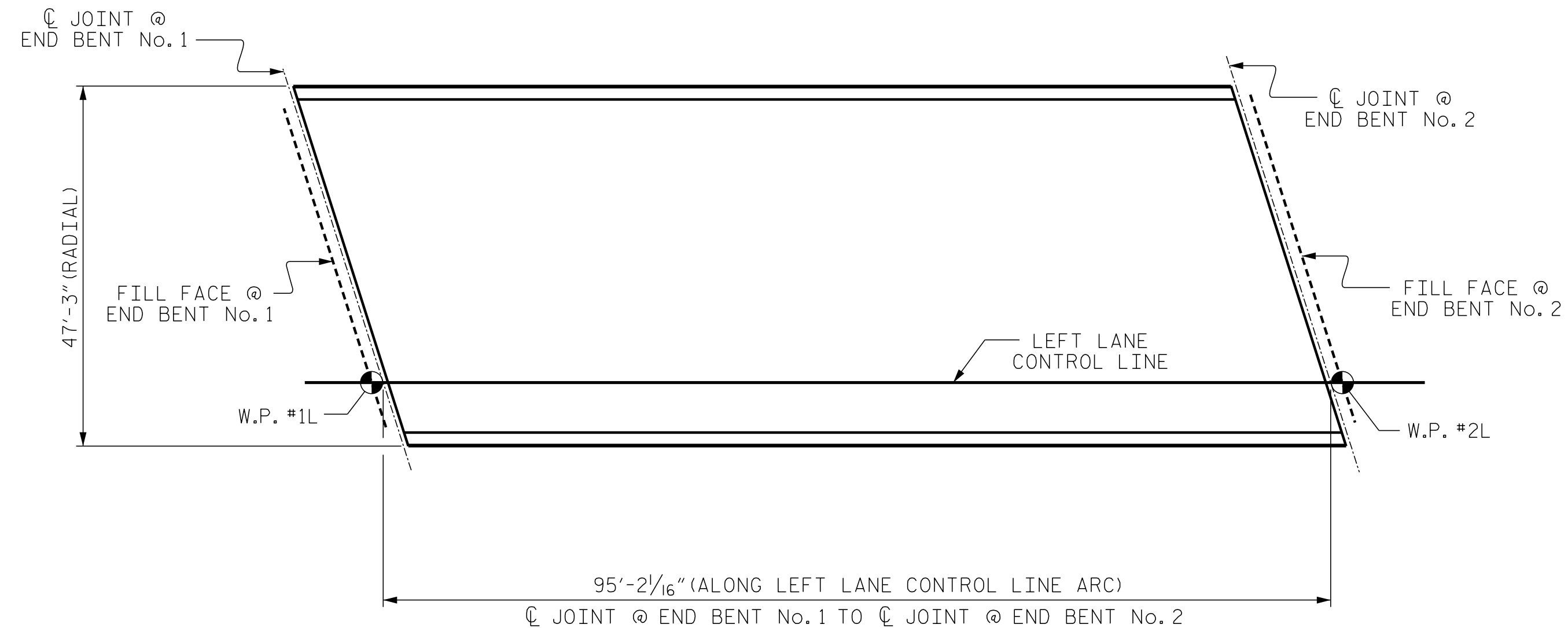
DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

(SHT 1a) STD. NO. GRA2

PA:2017.17.12.1.01.W-5600-USTO-Structures\DGN-L-over -Y9-DGN (LEFT LANE)W-5600\_Y9\_GRA (LEFT LANE)\_WE I.dgn  
 3/20/2019 8:09:52 AM

ASSEMBLED BY : J. PENDERGRAFT	DATE : 12-17
CHECKED BY : D. HODGE	DATE : 1-18
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC



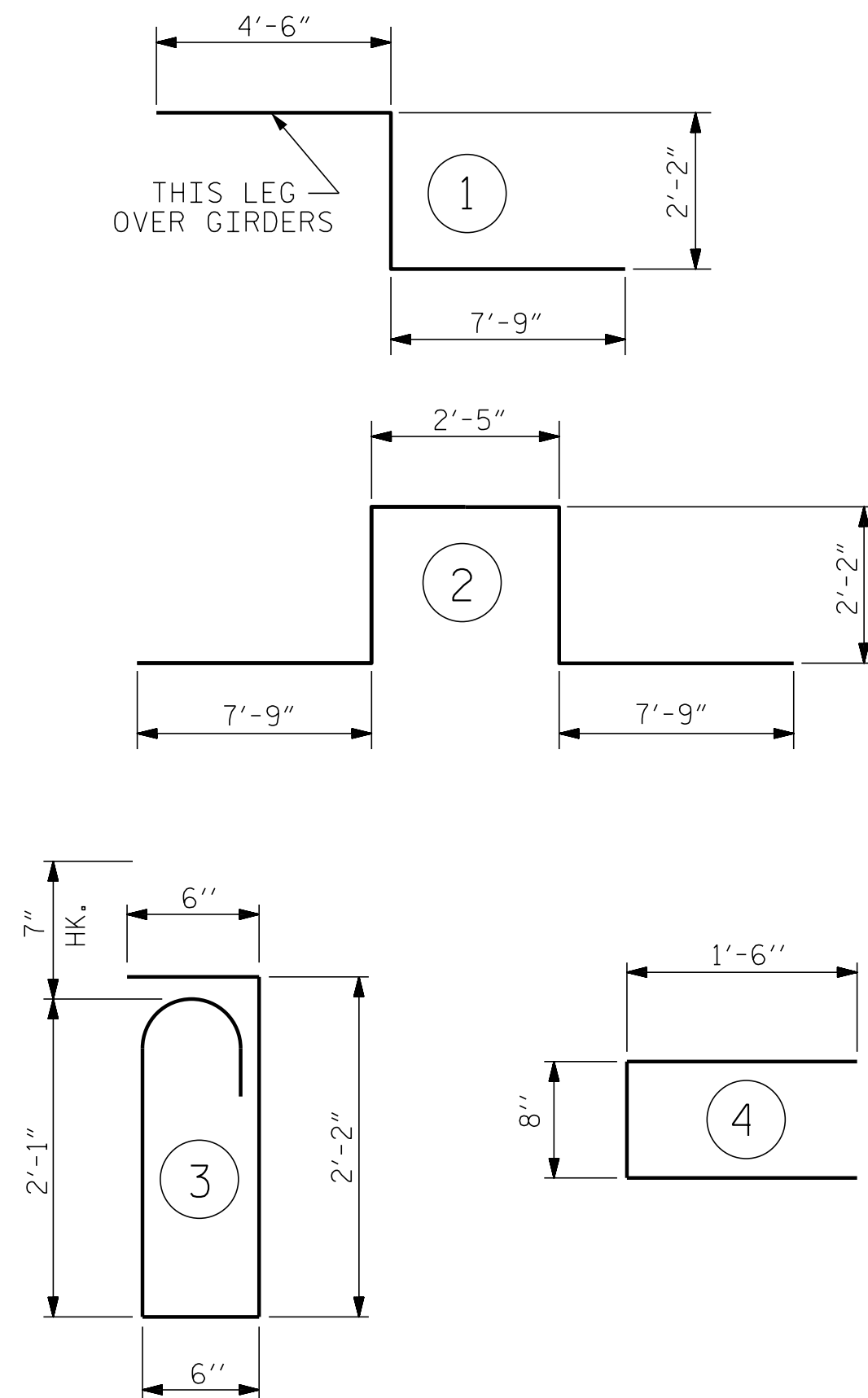


LAYOUT FOR COMPUTING AREA  
REINFORCED CONCRETE DECK SLAB  
(SQ. FT. = 4,497 )

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

DRAWN BY : D. HODGE DATE : 1/18  
3/20/2019 8:12:23 AM  
CHECKED BY : G.M. GILLAND DATE : 2/18

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	* EPOXY COATED REINFORCING STEEL (LBS.)
TOTALS**	150.0	15,240	13,218

\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,971 SQ.FT.
BRIDGE DECK	3,878 SQ.FT.
TOTAL	5,849 SQ.FT.

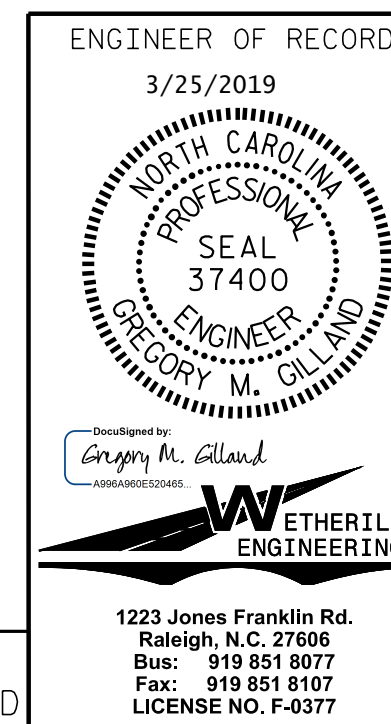
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	148	#5	STR	46'-11"	7242	A201	2	#5	STR	46'-1"	96
A2	148	#5	STR	46'-11"	7242	A202	2	#5	STR	45'-0"	94
						A203	2	#5	STR	43'-9"	91
* A101	2	#5	STR	46'-1"	96	A204	2	#5	STR	42'-9"	89
* A102	2	#5	STR	45'-0"	94	A205	2	#5	STR	41'-7"	87
* A103	2	#5	STR	43'-9"	91	A206	2	#5	STR	40'-6"	84
* A104	2	#5	STR	42'-9"	89	A207	2	#5	STR	39'-4"	82
* A105	2	#5	STR	41'-7"	87	A208	2	#5	STR	38'-3"	80
* A106	2	#5	STR	40'-6"	84	A209	2	#5	STR	37'-1"	77
* A107	2	#5	STR	39'-4"	82	A210	2	#5	STR	35'-11"	75
* A108	2	#5	STR	38'-3"	80	A211	2	#5	STR	34'-10"	73
* A109	2	#5	STR	37'-1"	77	A212	2	#5	STR	33'-8"	70
* A110	2	#5	STR	35'-11"	75	A213	2	#5	STR	32'-7"	68
* A111	2	#5	STR	34'-10"	73	A214	2	#5	STR	31'-5"	66
* A112	2	#5	STR	33'-8"	70	A215	2	#5	STR	30'-4"	63
* A113	2	#5	STR	32'-7"	68	A216	2	#5	STR	29'-2"	61
* A114	2	#5	STR	31'-5"	66	A217	2	#5	STR	28'-1"	59
* A115	2	#5	STR	30'-4"	63	A218	2	#5	STR	26'-11"	56
* A116	2	#5	STR	29'-2"	61	A219	2	#5	STR	25'-10"	54
* A117	2	#5	STR	28'-1"	59	A220	2	#5	STR	24'-8"	51
* A118	2	#5	STR	26'-11"	56	A221	2	#5	STR	23'-7"	49
* A119	2	#5	STR	25'-10"	54	A222	2	#5	STR	22'-5"	47
* A120	2	#5	STR	24'-8"	51	A223	2	#5	STR	21'-4"	45
* A121	2	#5	STR	23'-7"	49	A224	2	#5	STR	20'-2"	42
* A122	2	#5	STR	22'-5"	47	A225	2	#5	STR	19'-0"	40
* A123	2	#5	STR	21'-4"	45	A226	2	#5	STR	17'-11"	37
* A124	2	#5	STR	20'-2"	42	A227	2	#5	STR	16'-9"	35
* A125	2	#5	STR	19'-0"	40	A228	2	#5	STR	15'-8"	33
* A126	2	#5	STR	17'-11"	37	A229	2	#5	STR	14'-6"	30
* A127	2	#5	STR	16'-9"	35	A230	2	#5	STR	13'-5"	28
* A128	2	#5	STR	15'-8"	33	A231	2	#5	STR	12'-3"	26
* A129	2	#5	STR	14'-6"	30	A232	2	#5	STR	11'-2"	23
* A130	2	#5	STR	13'-5"	28	A233	2	#5	STR	10'-0"	21
* A131	2	#5	STR	12'-3"	26	A234	2	#5	STR	8'-11"	19
* A132	2	#5	STR	11'-2"	23	A235	2	#5	STR	7'-9"	16
* A133	2	#5	STR	10'-0"	21	A236	2	#5	STR	6'-8"	14
* A134	2	#5	STR	8'-11"	19	A237	2	#5	STR	5'-6"	11
* A135	2	#5	STR	7'-9"	16	A238	2	#5	STR	4'-4"	9
* A136	2	#5	STR	6'-8"	14	A239	2	#5	STR	3'-3"	7
* A137	2	#5	STR	5'-6"	11						
* A138	2	#5	STR	4'-4"	9	* B1	132	#4	STR	25'-3"	2226
* A139	2	#5	STR	3'-3"	7	B2	112	#5	STR	48'-7"	5675

* G1	2	#5	STR	51'-1"	107
* K1	8	#8	1	14'-5"	308
* K2	12	#8	2	22'-3"	713
K3	24	#6	STR	8'-9"	315
* S1	72	#4	4	3'-8"	176
* S2	72	#5	3	5'-10"	438

REINFORCING STEEL LBS. 15,240  
\* EPOXY COATED REINFORCING STEEL LBS. 13,218  
\* THESE BARS ARE EPOXY COATED.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 217+31.76 -L-

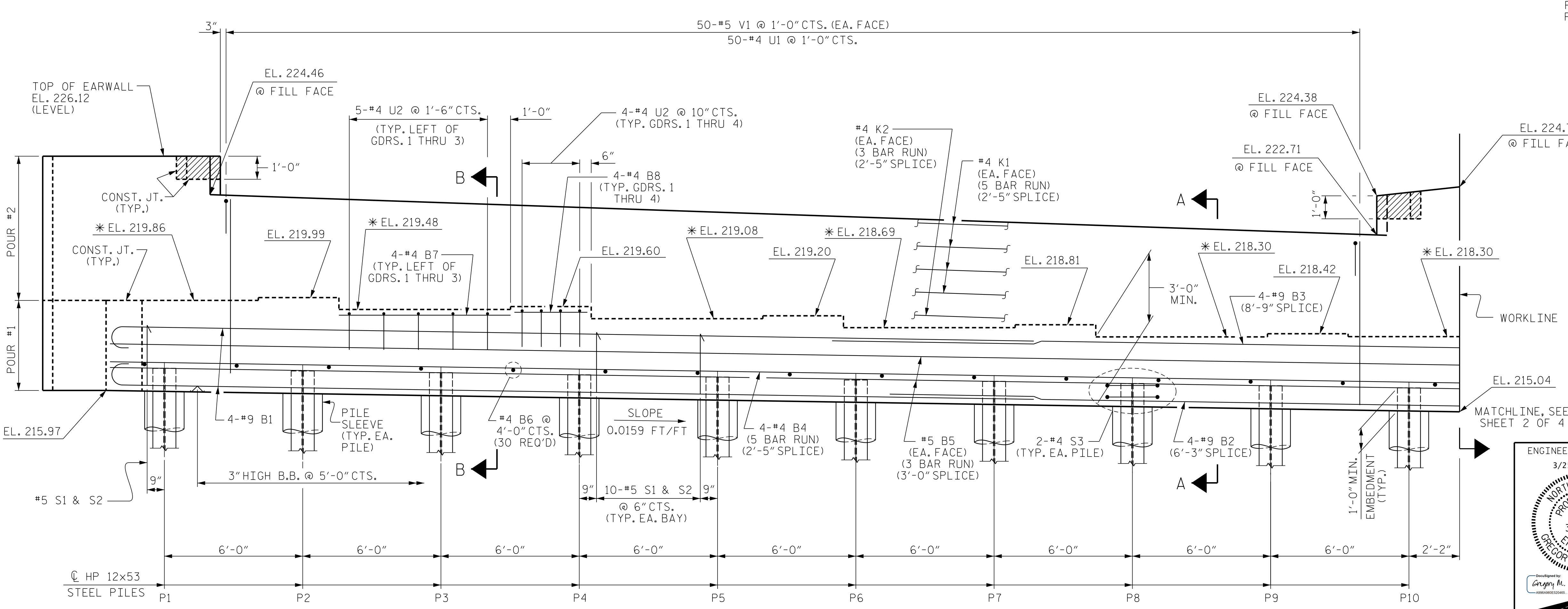
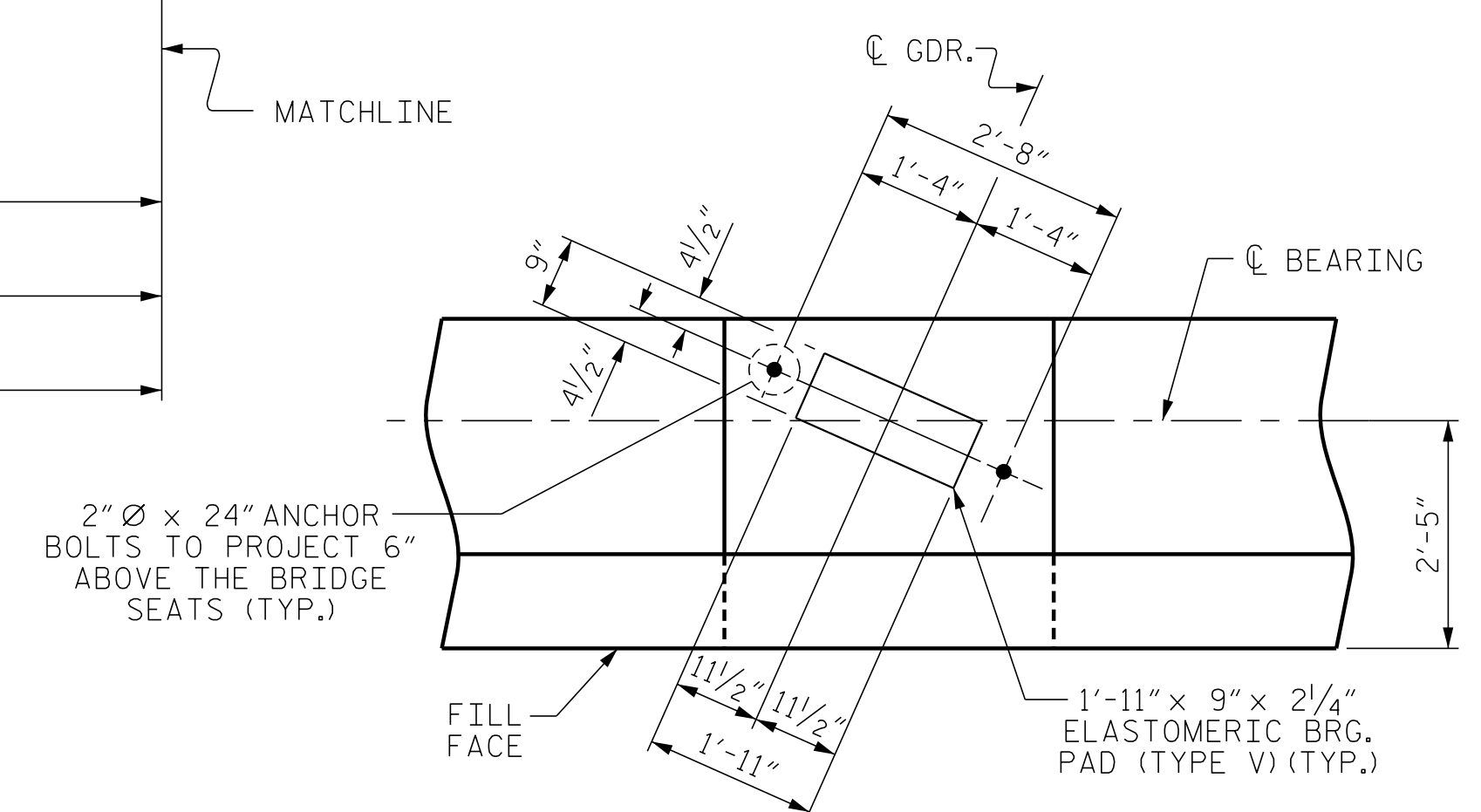
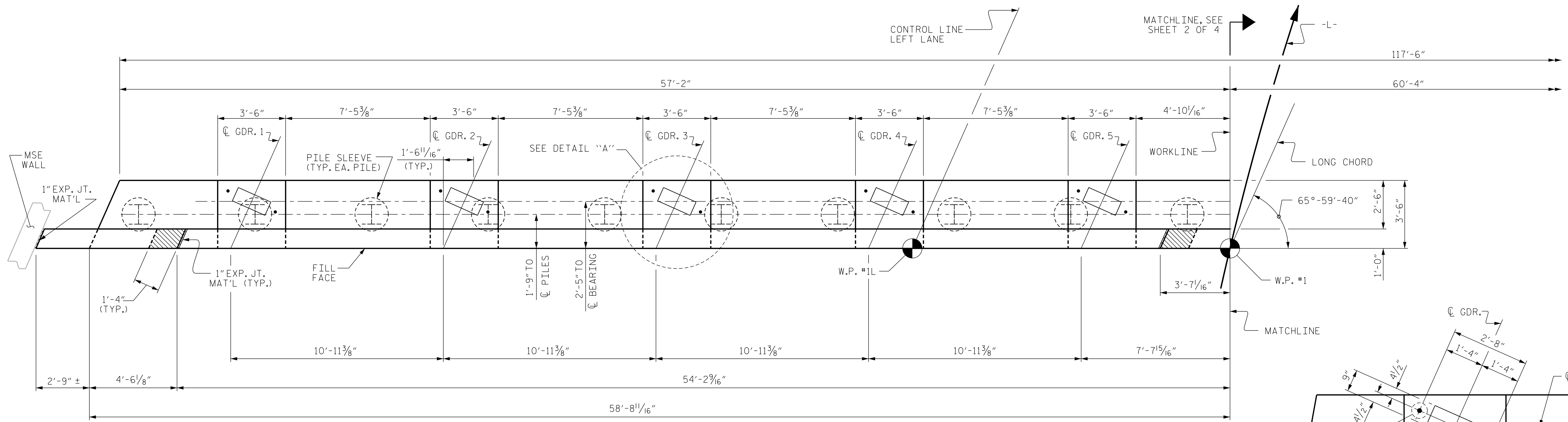


STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
BILL OF MATERIAL  
(LEFT LANE)

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

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. W-5600  
 JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 1 OF 4



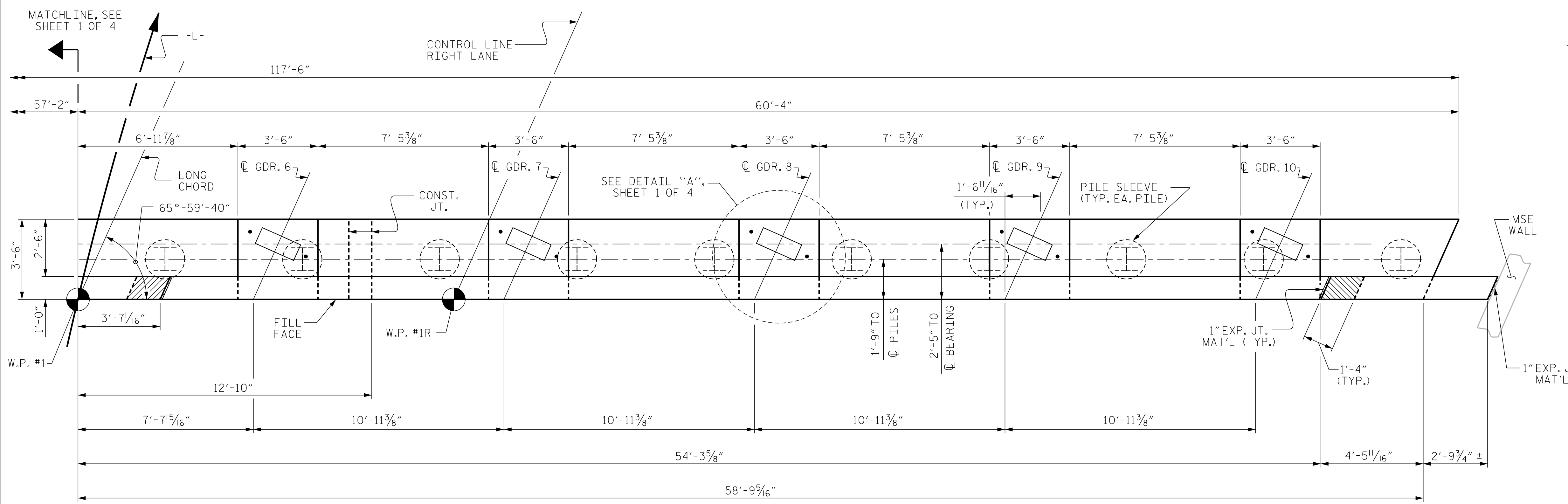
ENGINEER OF RECORD: 3/25/2019 NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 37400 GREGORY M. OLLAND		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH	
SUBSTRUCTURE END BENT No. 1			
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S1-16
2			TOTAL SHEETS 27

DRAWN BY: D. HODGE DATE: 2/18  
 CHECKED BY: B.C. HUNT DATE: 2/18

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A & B-B, SHEET 4 OF 4.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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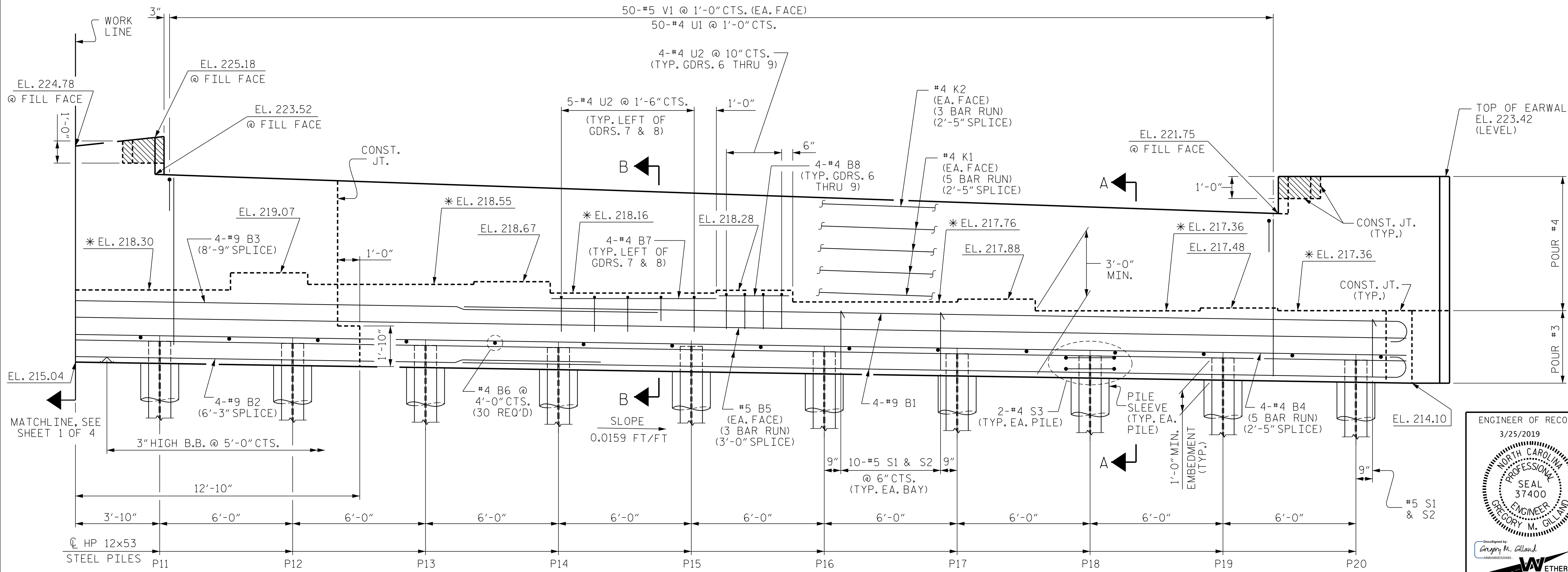


PLAN

NOTES:

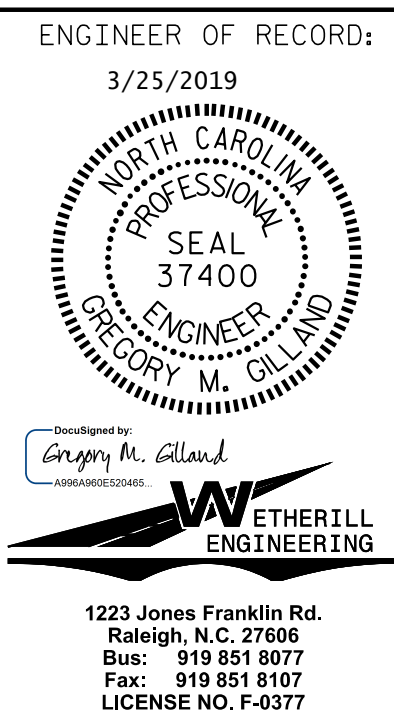
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- 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 BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

TOP OF PILE ELEVATION	
PILE	ELEVATION
P1	216.93
P2	216.84
P3	216.74
P4	216.65
P5	216.55
P6	216.45
P7	216.36
P8	216.27
P9	216.17
P10	216.07
P11	215.98
P12	215.88
P13	215.79
P14	215.69
P15	215.60
P16	215.50
P17	215.41
P18	215.31
P19	215.22
P20	215.12



ELEVATION

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 2 OF 4



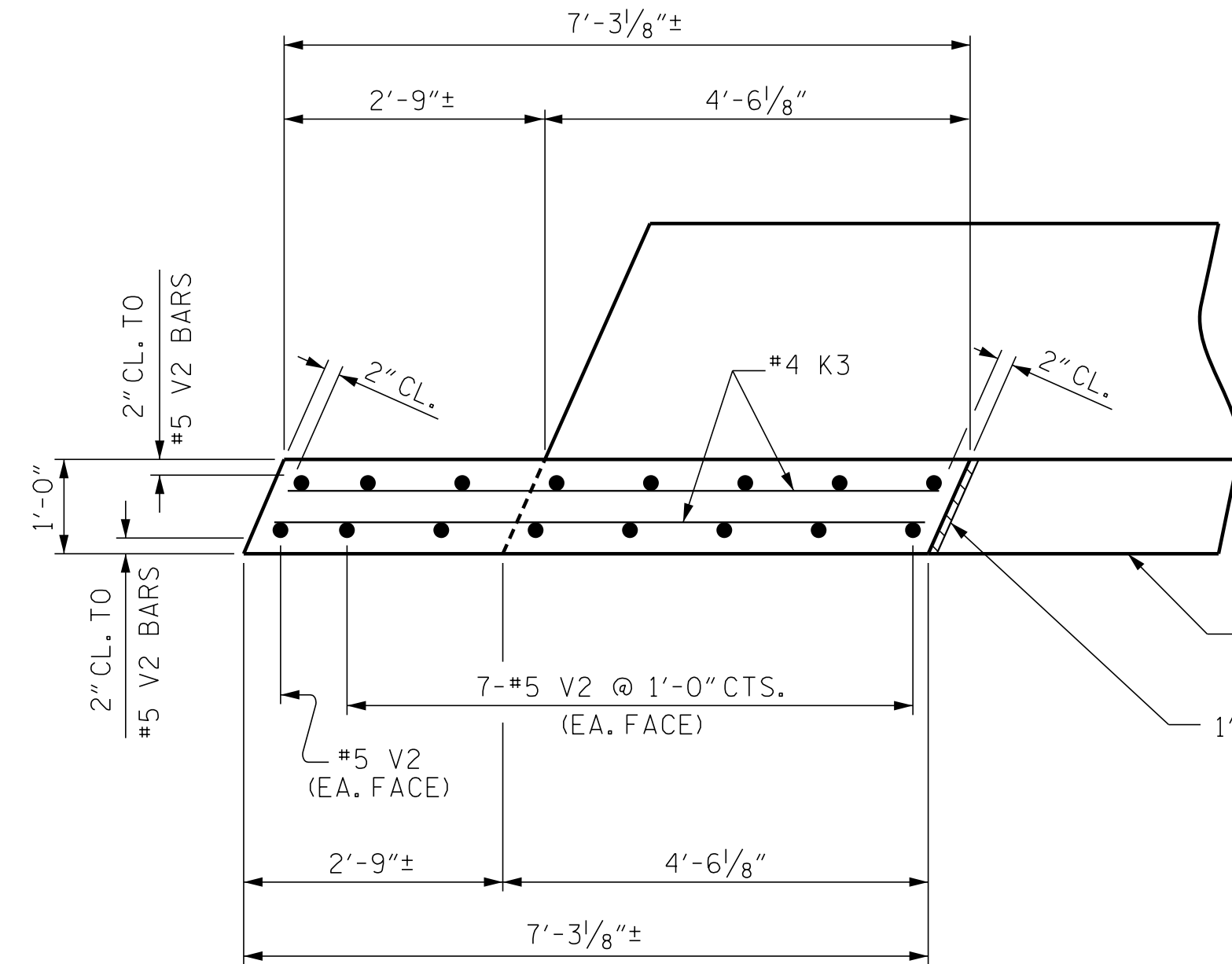
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-17
					TOTAL SHEETS 27

DRAWN BY: D. HODGE DATE: 2/18  
 CHECKED BY: B.C. HUNT DATE: 2/18

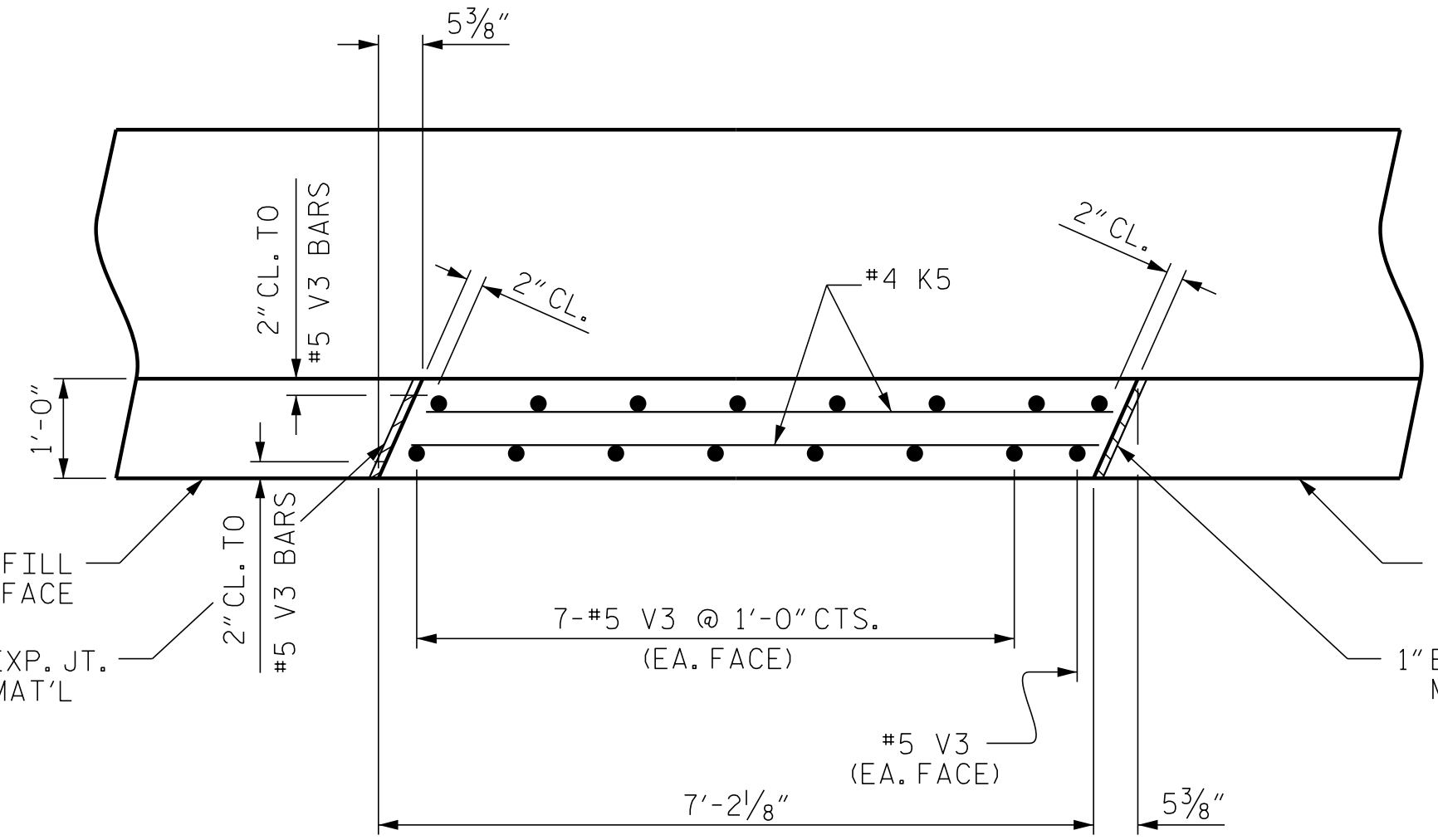
\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A & B-B, SHEET 4 OF 4.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

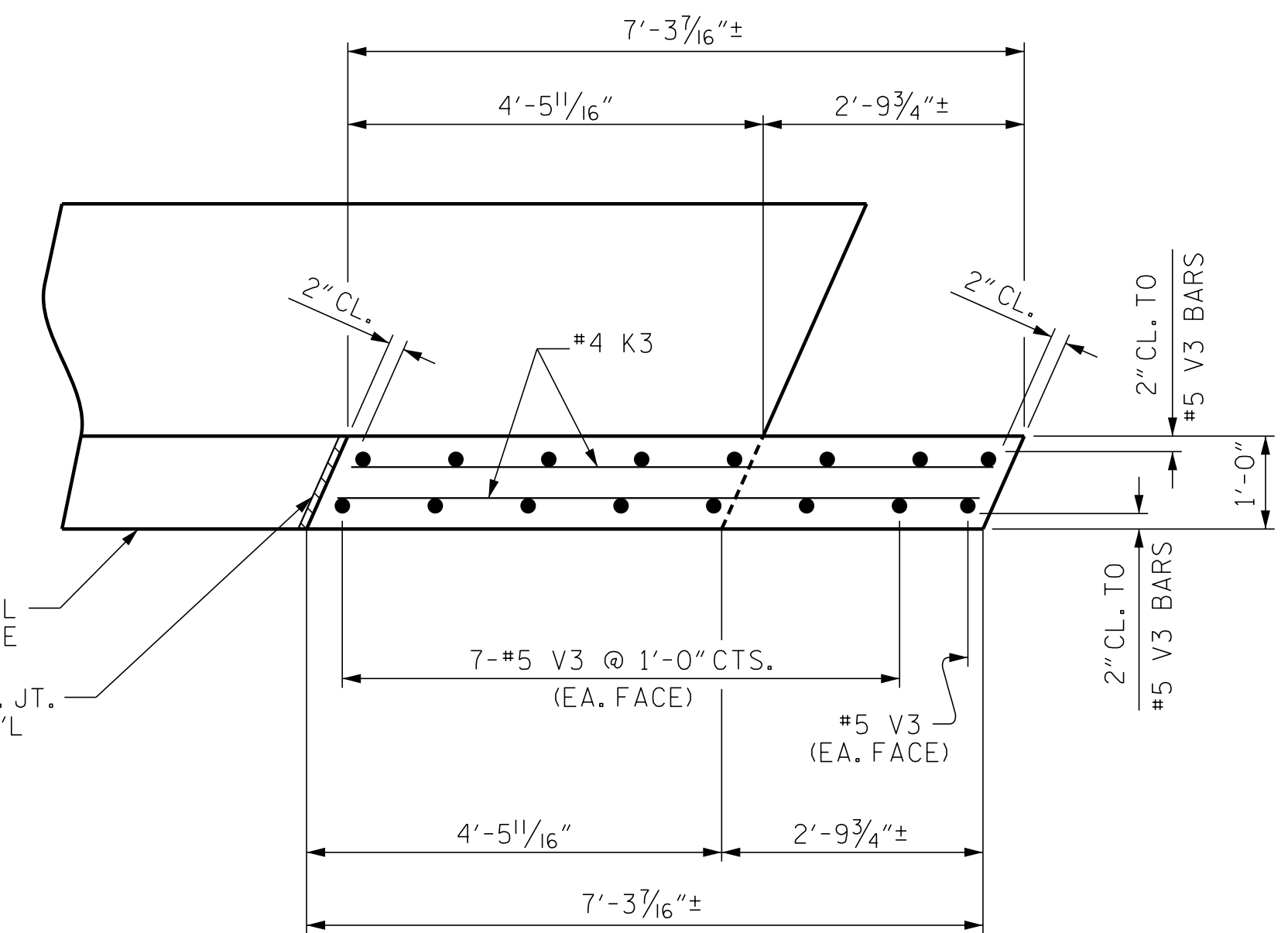
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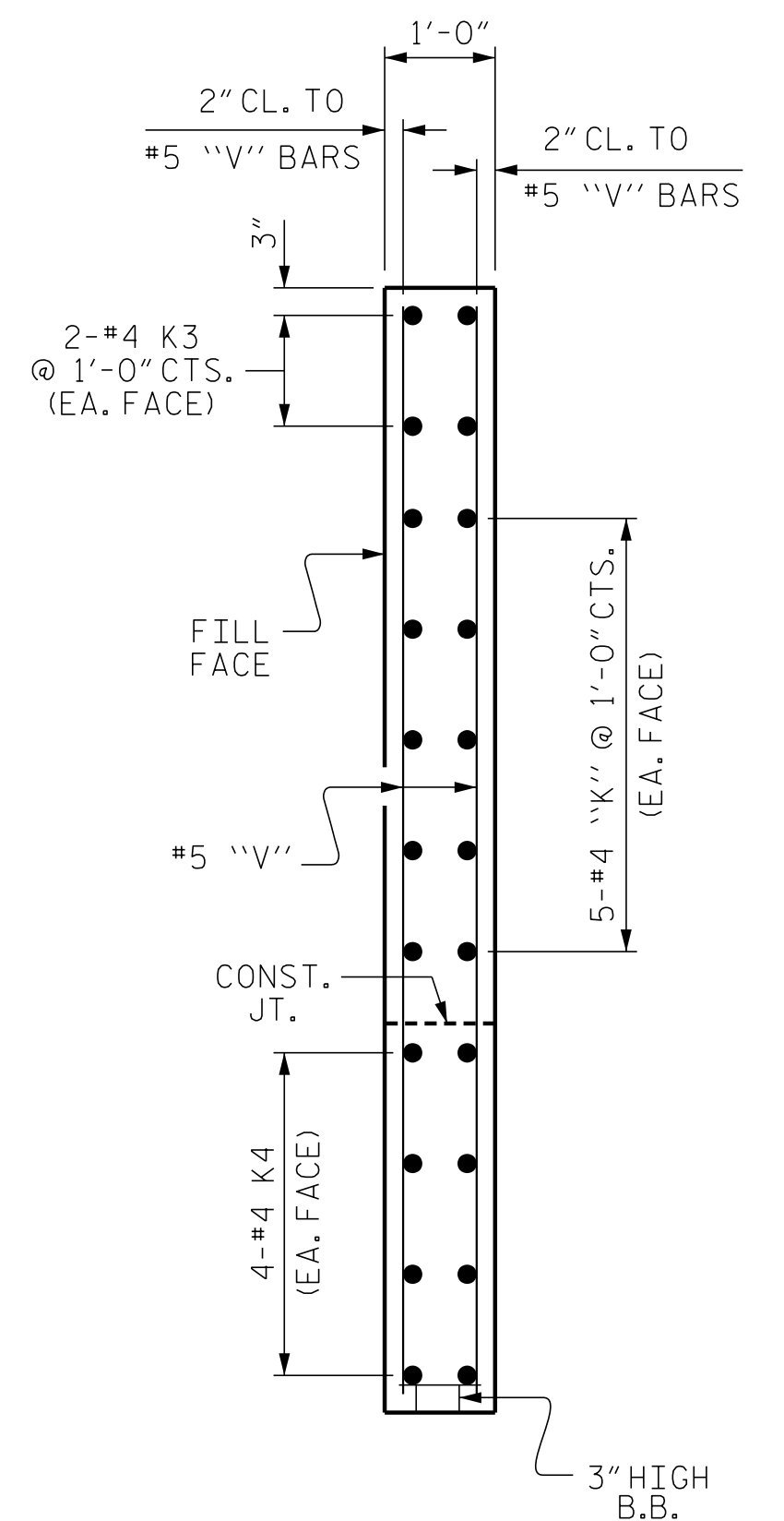
PLAN OF LEFT EARWALL



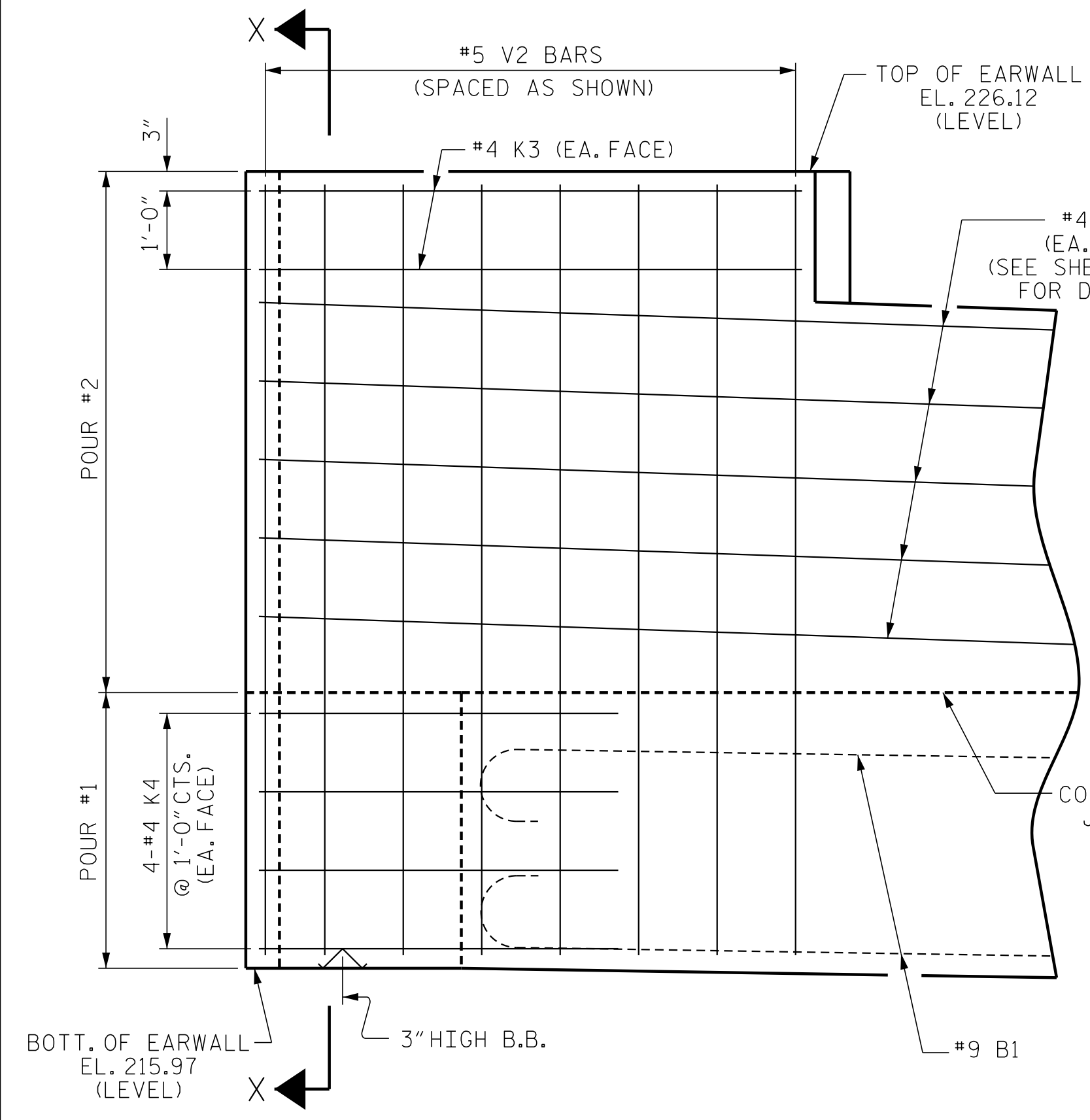
PLAN OF CENTER RAISED BACKWALL



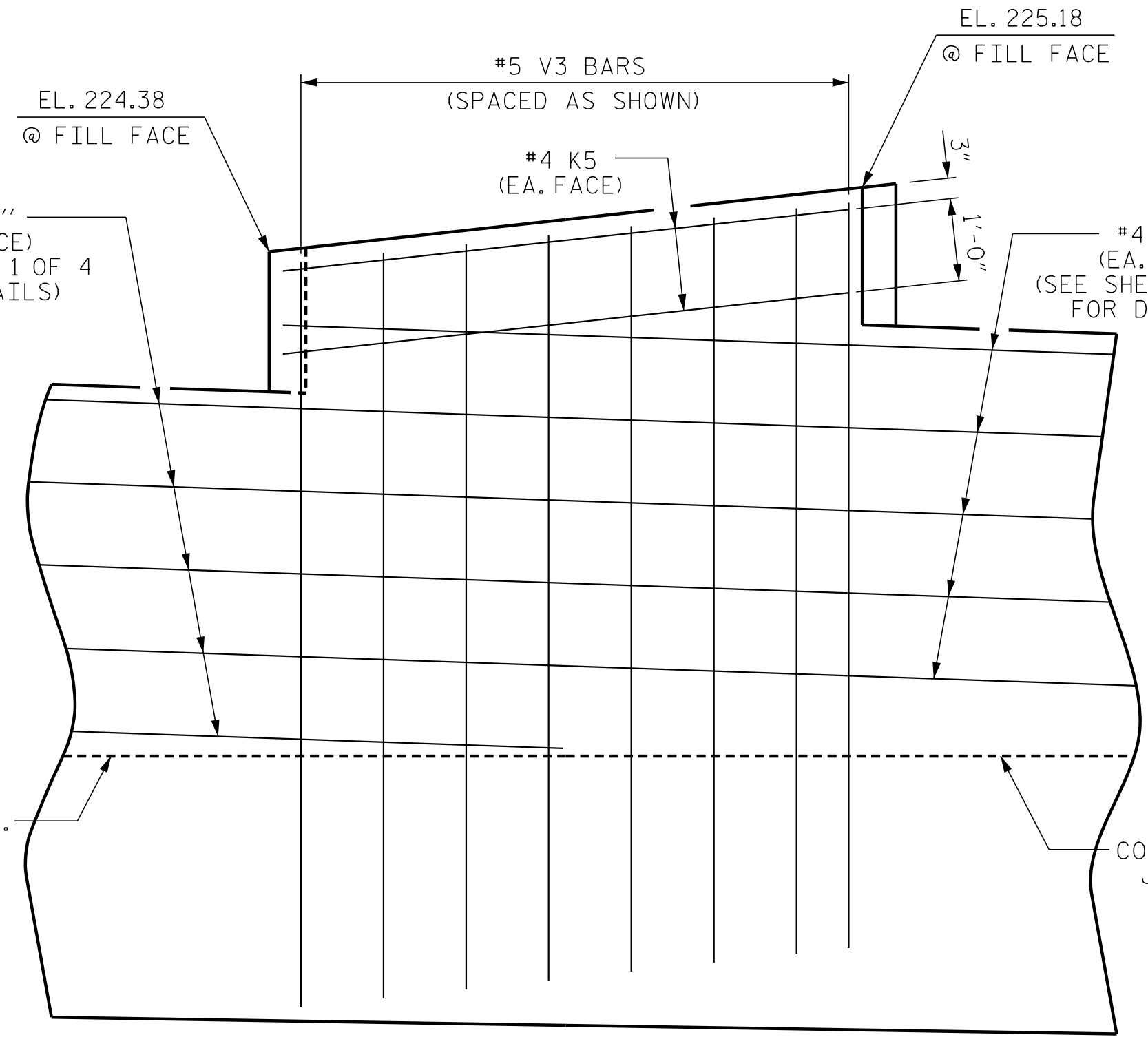
PLAN OF RIGHT EARWALL



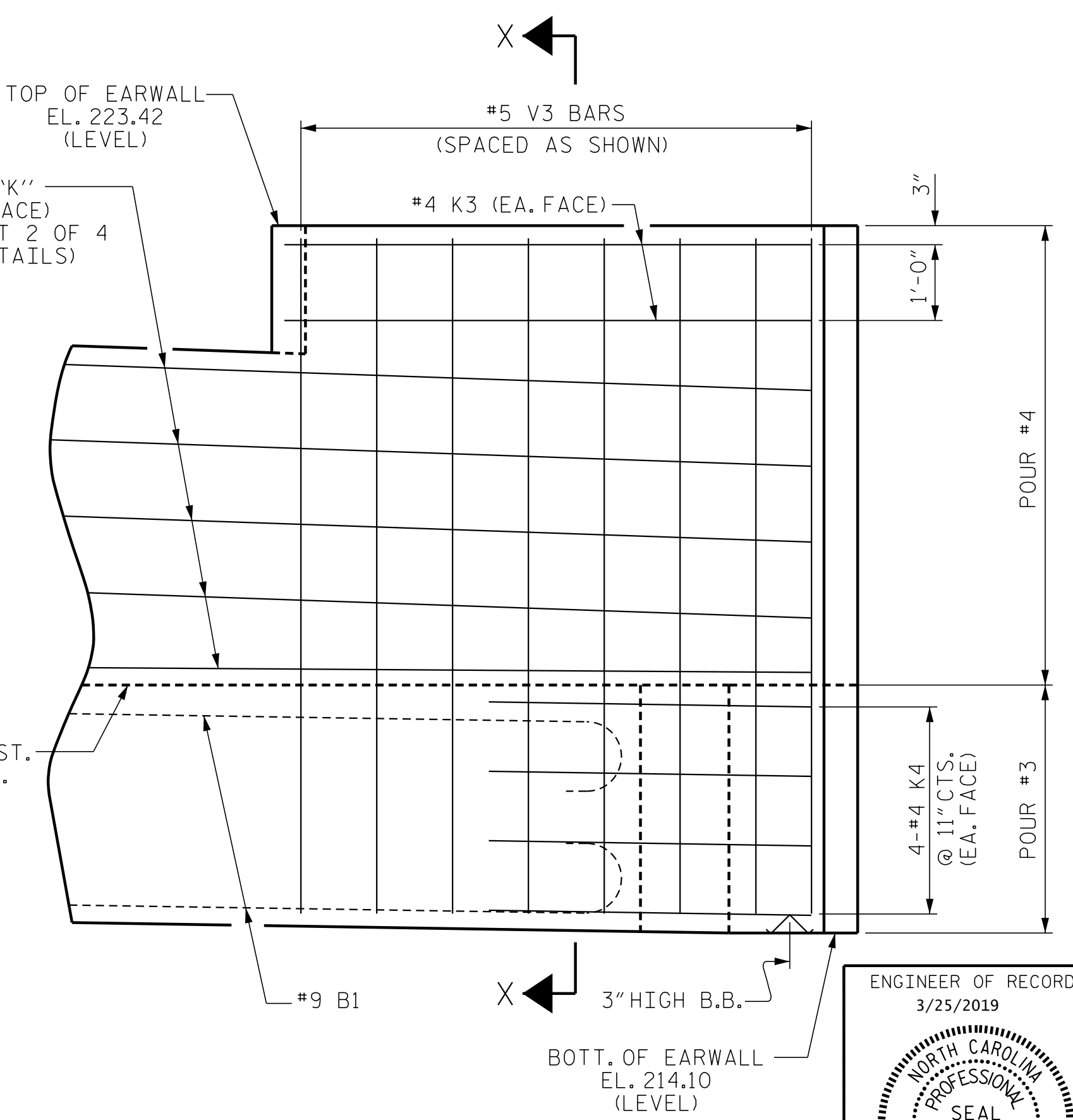
SECTION X-X



ELEVATION OF LEFT EARWALL



ELEVATION OF CENTER RAISED BACKWALL



ELEVATION OF RIGHT EARWALL

PROJECT NO. W-5600  
 JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 3 OF 4

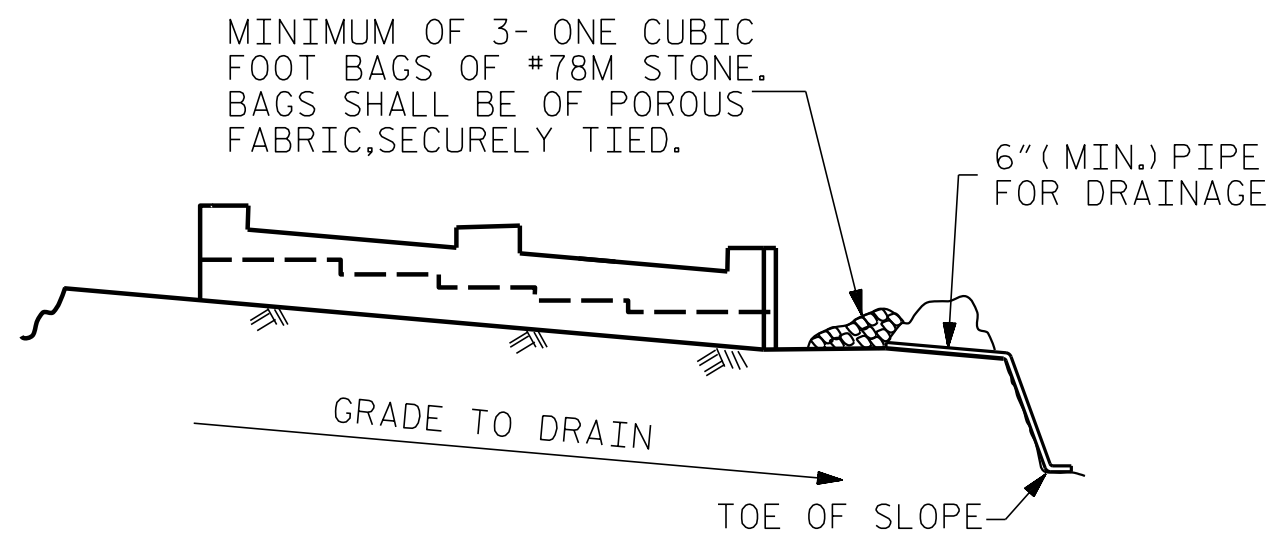
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DRAWN BY: D. HODGE DATE: 2/18  
 CHECKED BY: B.C. HUNT DATE: 2/18

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
 3/25/2019  
  
 Greg M. O'Neil  
 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					
SUBSTRUCTURE END BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-18 TOTAL SHEETS 27



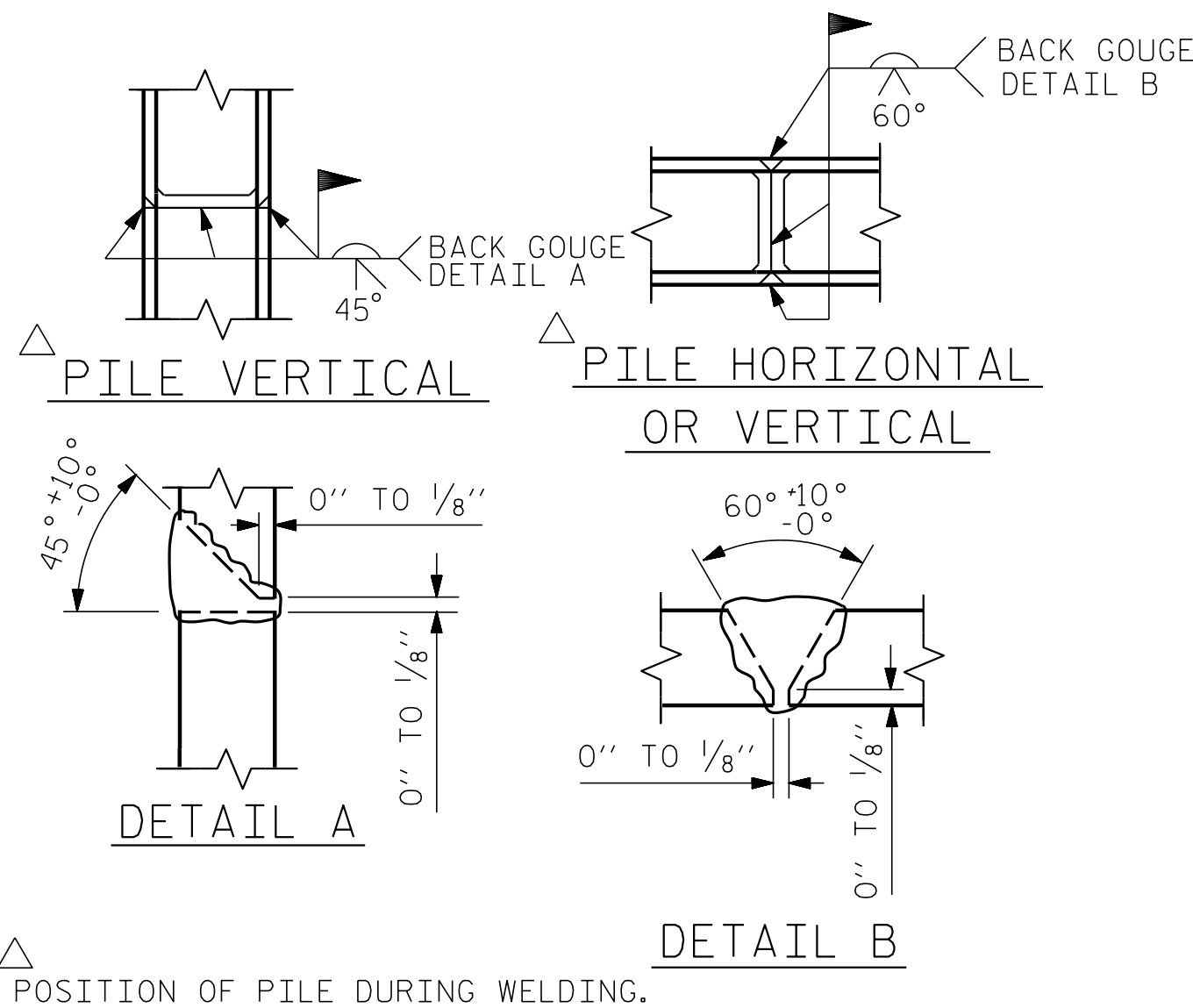
MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

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

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

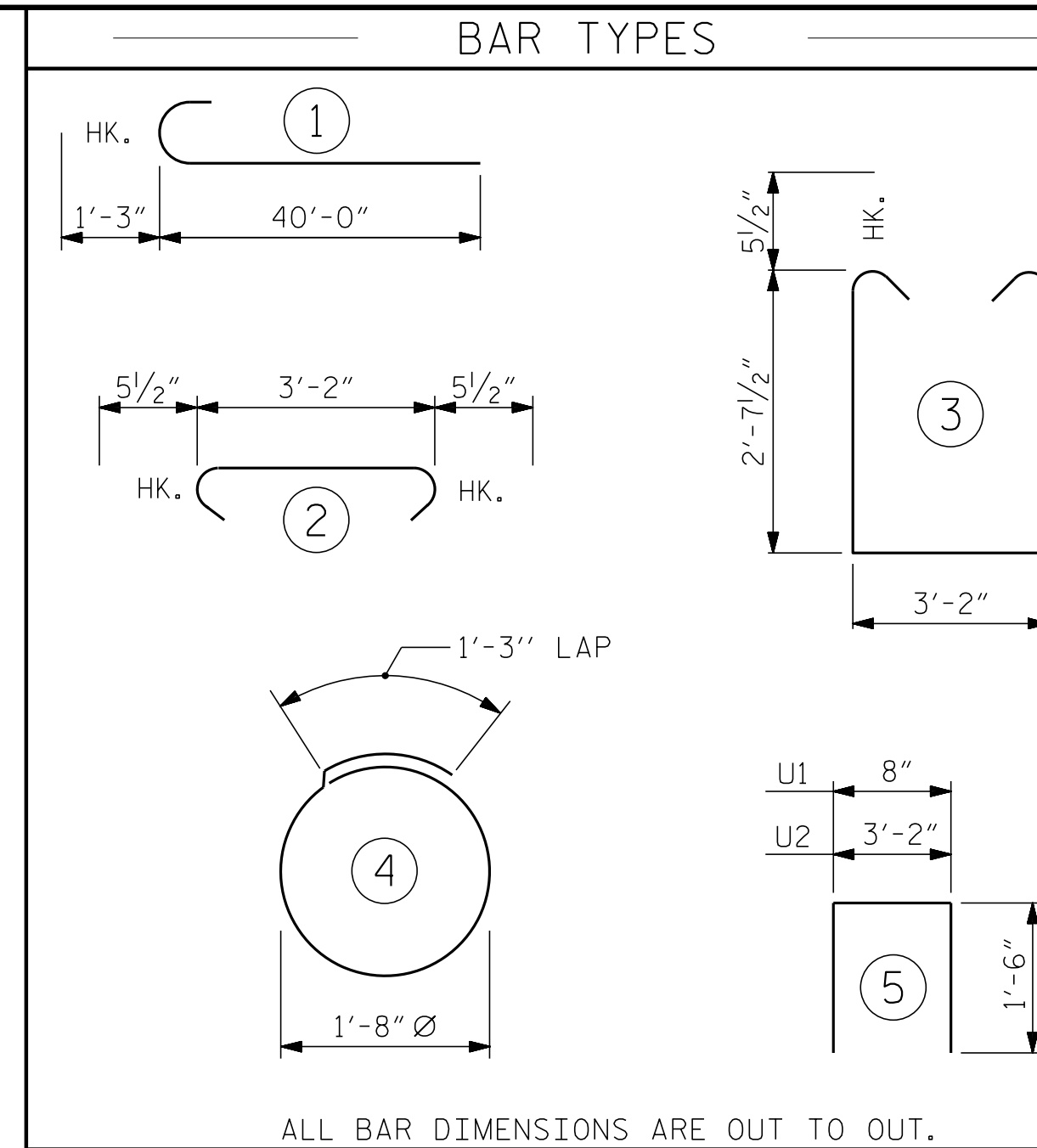
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL

#### END BENT No. 1

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9	1	41'-3"	2244
B2	4	#9	STR	49'-6"	673
B3	4	#9	STR	54'-6"	741
B4	20	#4	STR	25'-5"	340
B5	12	#5	STR	41'-1"	514
B6	30	#4	STR	3'-2"	63
B7	20	#4	STR	7'-6"	100
B8	32	#4	STR	3'-2"	68
K1	40	#4	STR	26'-6"	708
K2	12	#4	STR	23'-5"	188
K3	8	#4	STR	6'-10"	37
K4	16	#4	STR	5'-0"	53
K5	4	#4	STR	6'-10"	18
S1	192	#5	3	9'-4"	1869
S2	192	#5	2	4'-1"	818
S3	40	#4	4	6'-6"	174
U1	100	#4	5	3'-8"	245
U2	57	#4	5	6'-2"	235
V1	200	#5	STR	7'-2"	1495
V2	16	#5	STR	9'-9"	163
V3	32	#5	STR	8'-10"	295

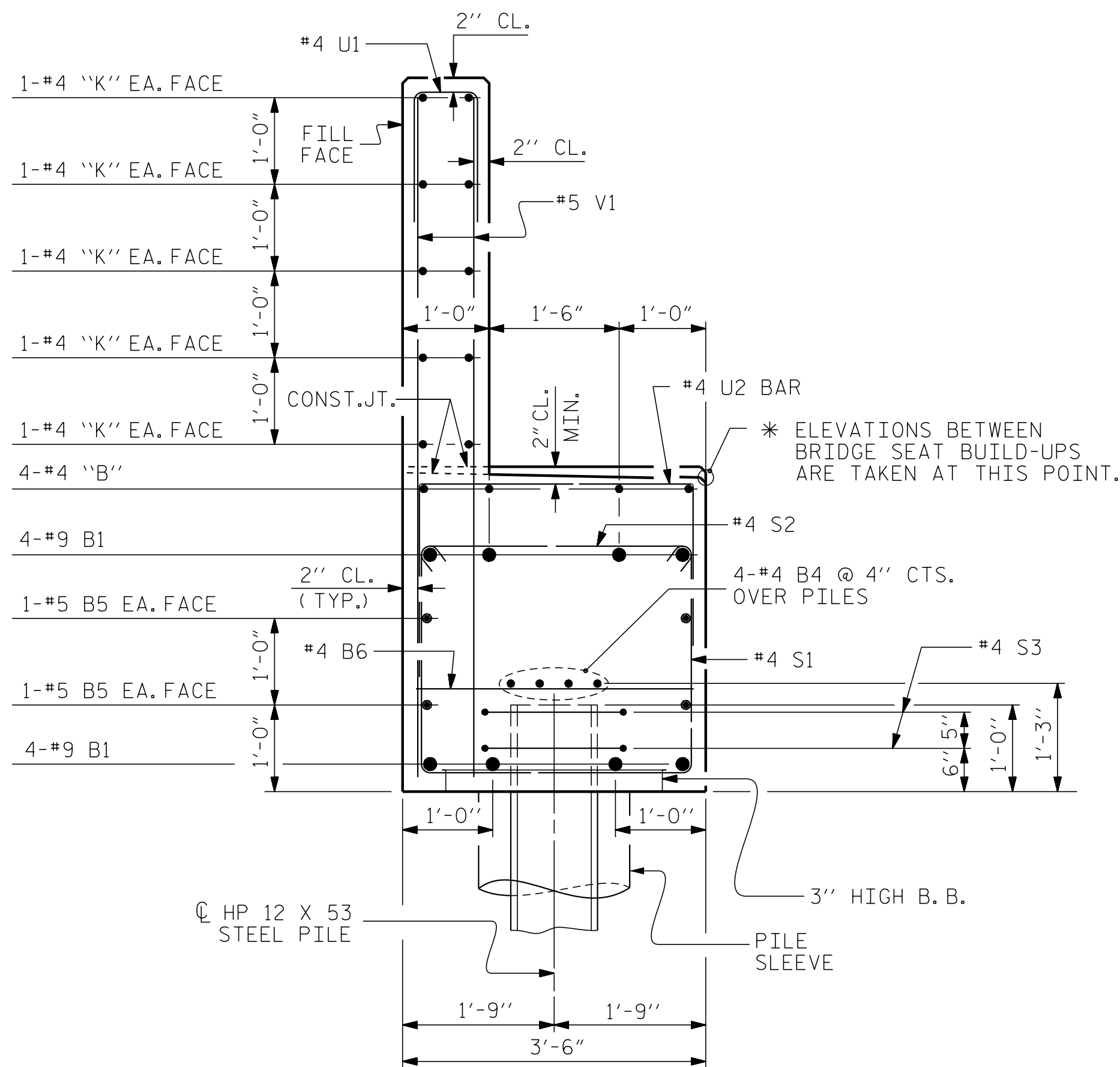
REINFORCING STEEL 11,041 LBS.

#### CLASS A CONCRETE BREAKDOWN

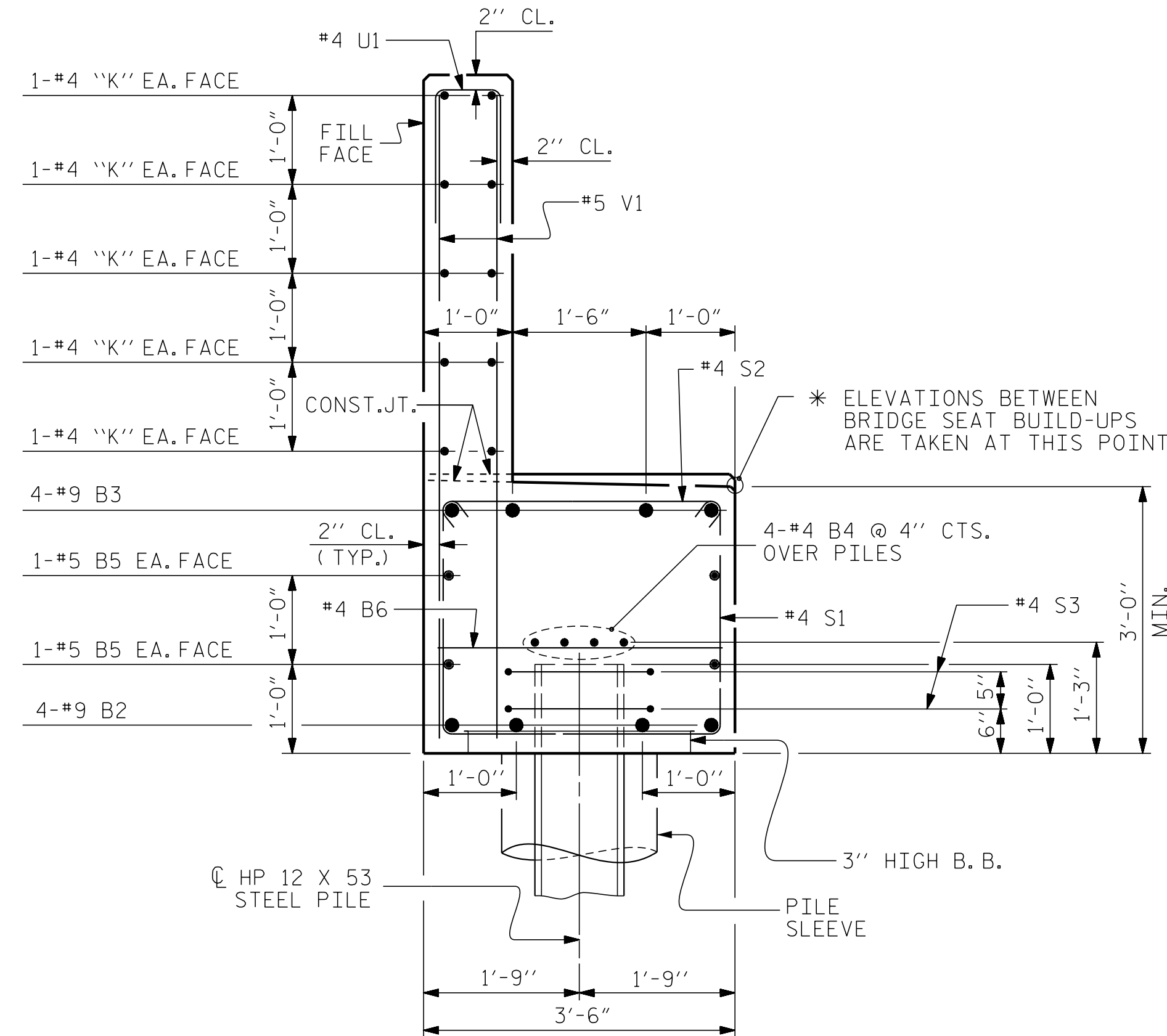
POUR #1	CAP AND LOWER PORTION OF EARWALL	33.0 C.Y.
POUR #2	UPPER PORTION OF EARWALL AND BACKWALL	13.7 C.Y.
POUR #3	CAP AND LOWER PORTION OF EARWALL	21.3 C.Y.
POUR #4	UPPER PORTION OF EARWALL AND BACKWALL	8.7 C.Y.
TOTAL CLASS A CONCRETE		76.7 C.Y.

HP 12 X 53 STEEL PILES  
NO: 20 LIN. FT. = 1,245

PILE DRIVING EQUIPMENT SET UP FOR HP 12 X 53 STEEL PILES 20 EA.



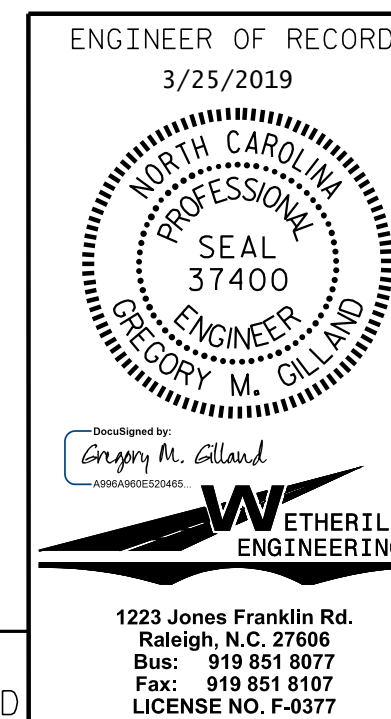
SECTION B-B



SECTION A-A

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 217+31.76 -L-

SHEET 4 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

### SUBSTRUCTURE END BENT No. 1

#### REVISIONS

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

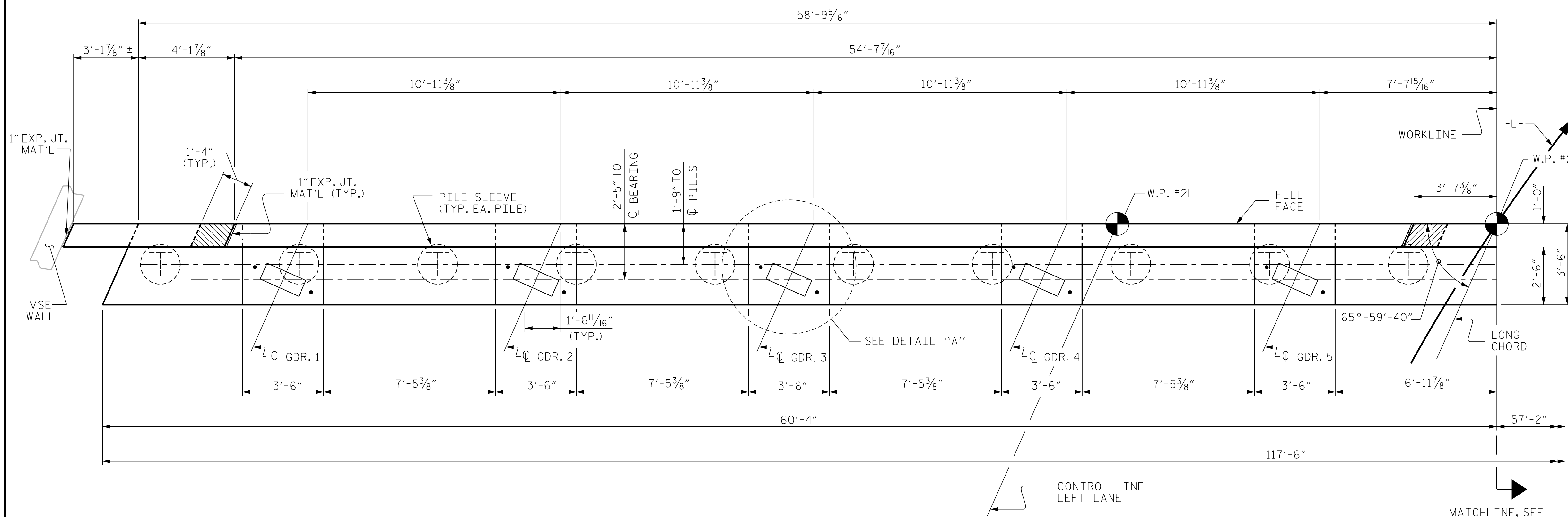
SHEET NO.

S1-19  
TOTAL SHEETS  
27

DRAWN BY: D. HODGE DATE: 2/18  
CHECKED BY: B.C. HUNT DATE: 2/18

DOCUMENT NOT CONSIDERED FINAL  
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Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377



**NOTES:**

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

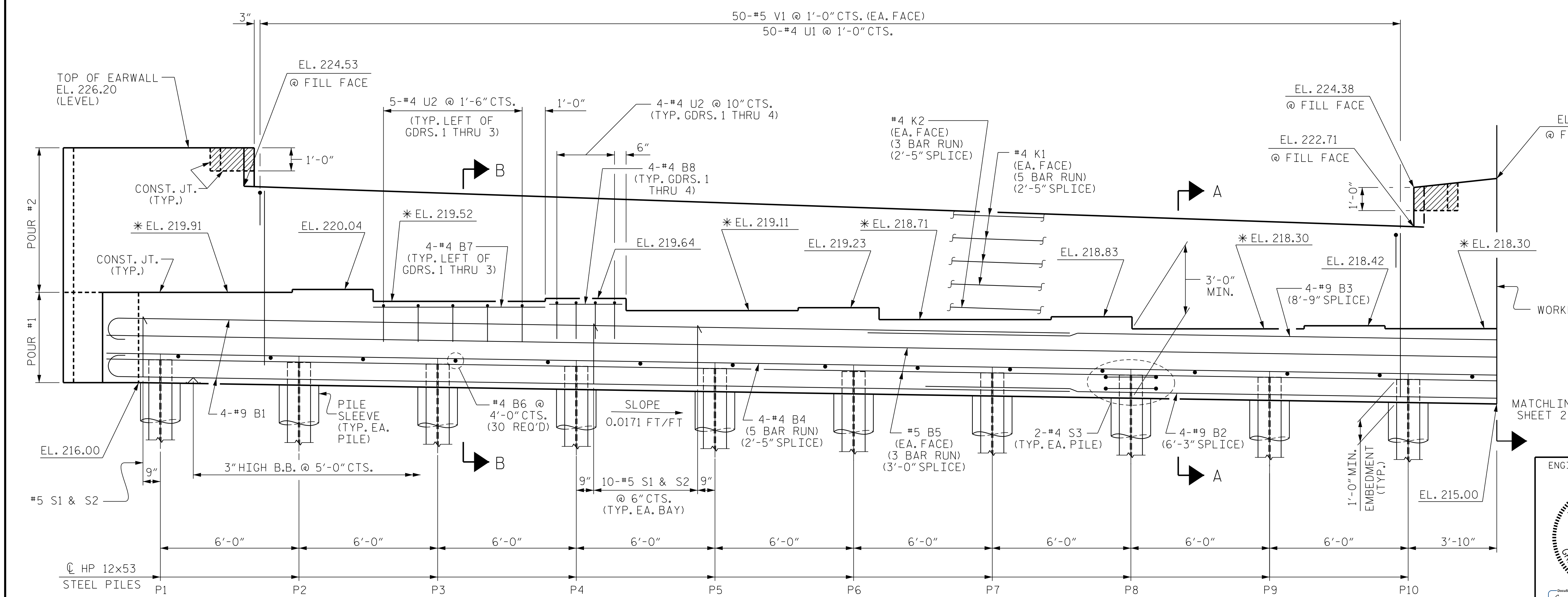
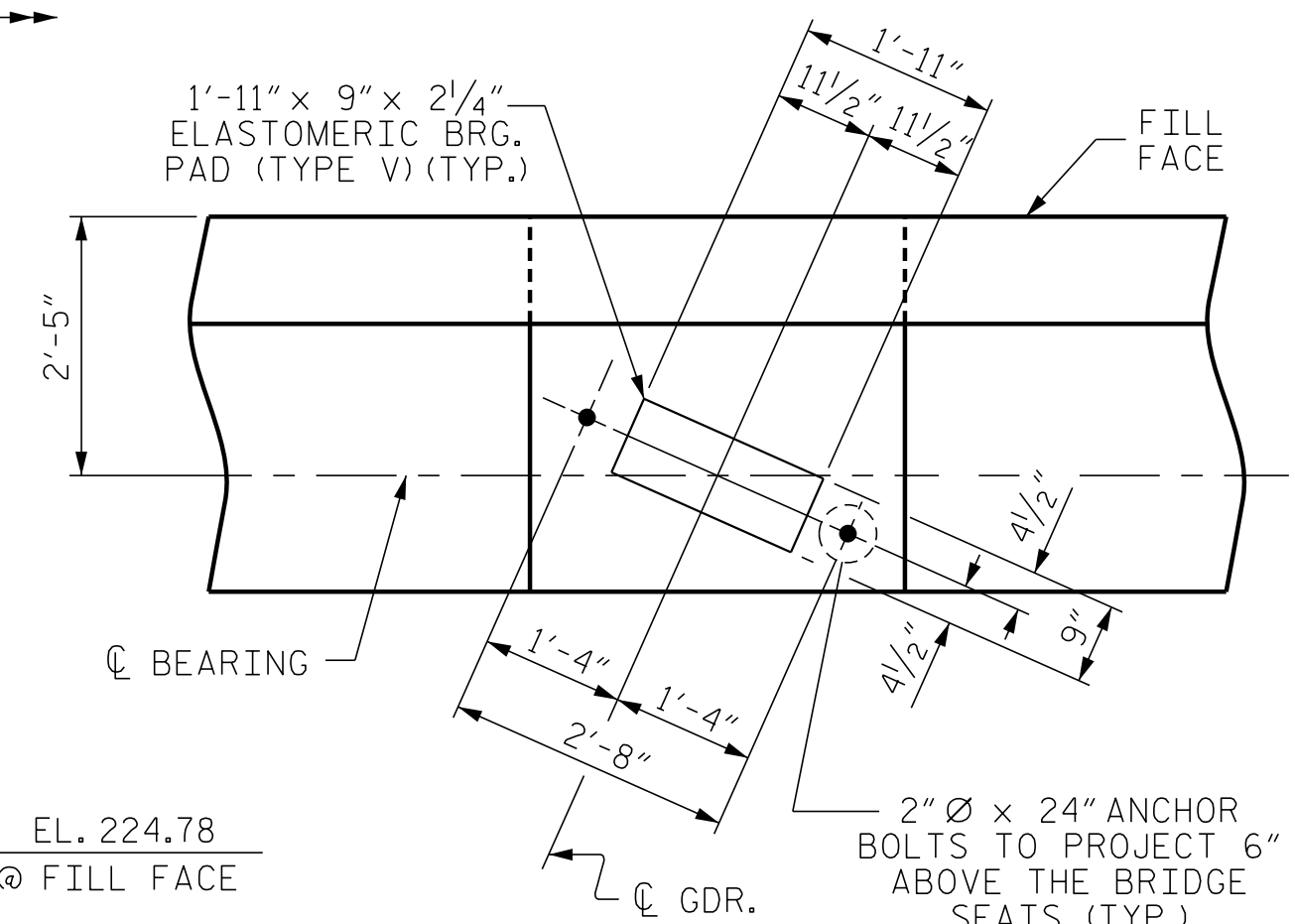
FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

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 BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.



**ELEVATION**

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A & B-B, SHEET 4 OF 4.

PROJECT NO. W-5600  
 JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 1 OF 4

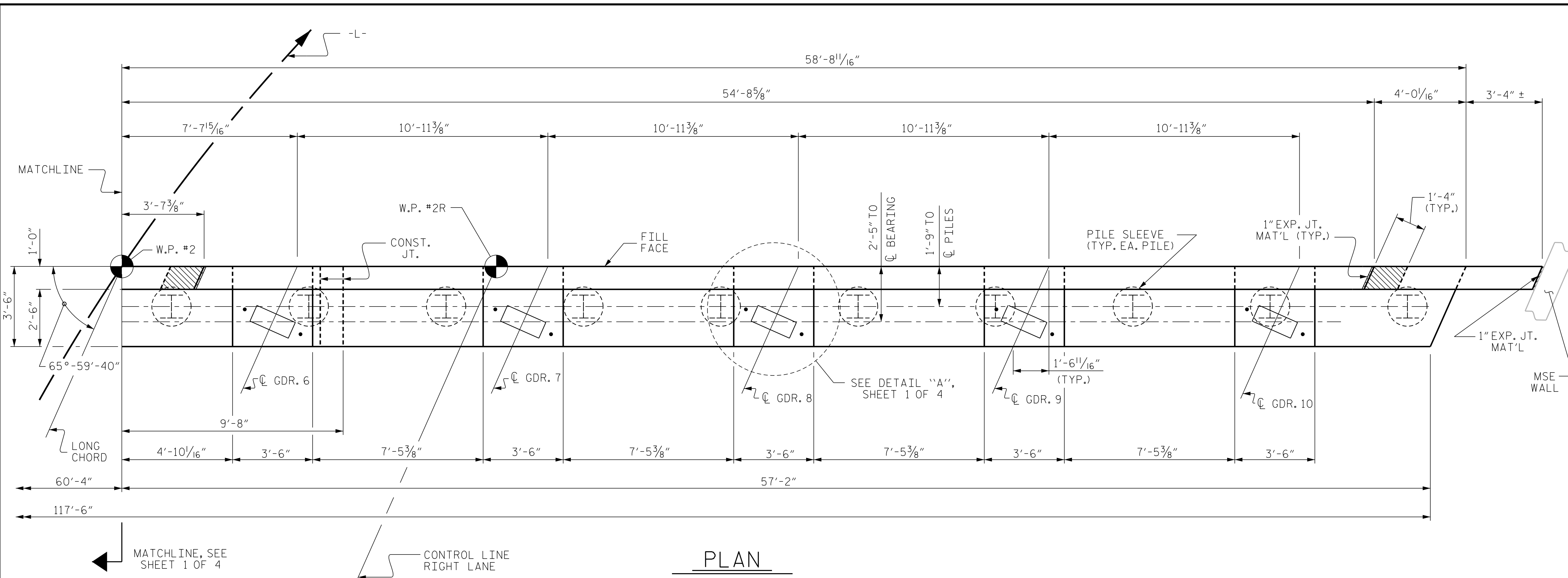


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-20 TOTAL SHEETS 27

DRAWN BY: D. HODGE DATE: 2/18  
 CHECKED BY: B.C. HUNT DATE: 2/18

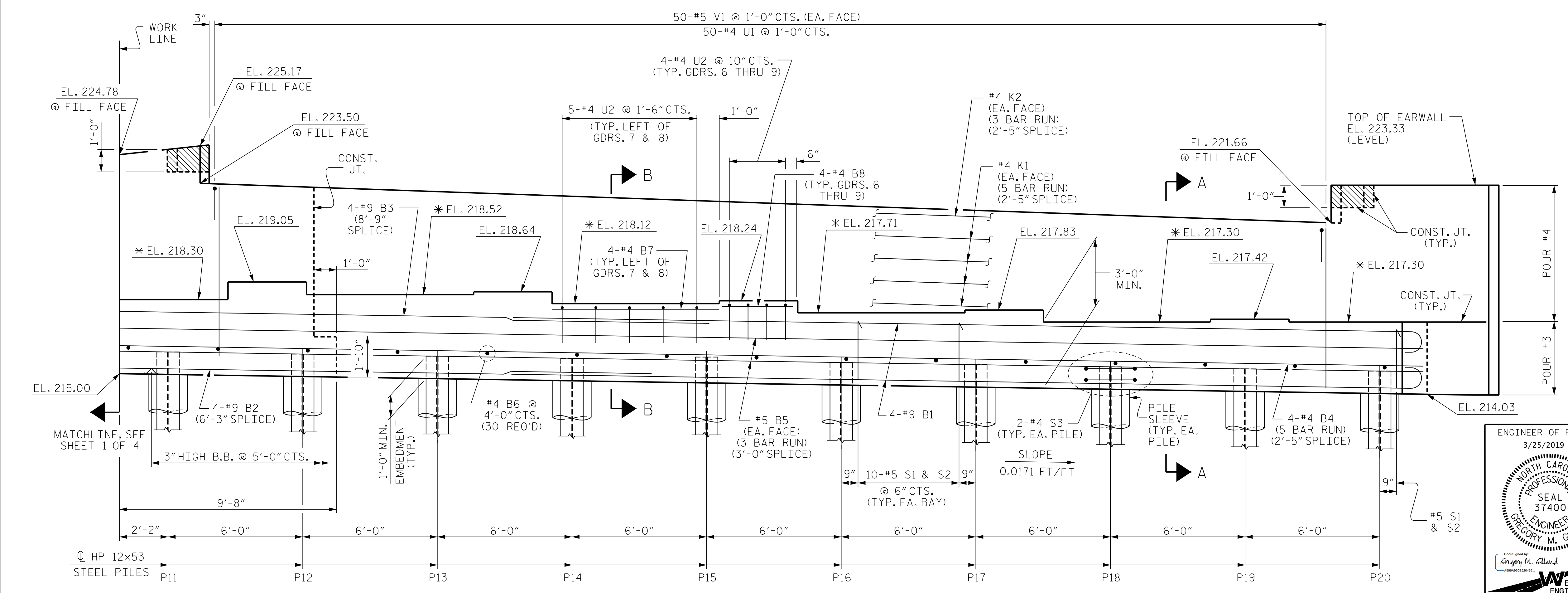
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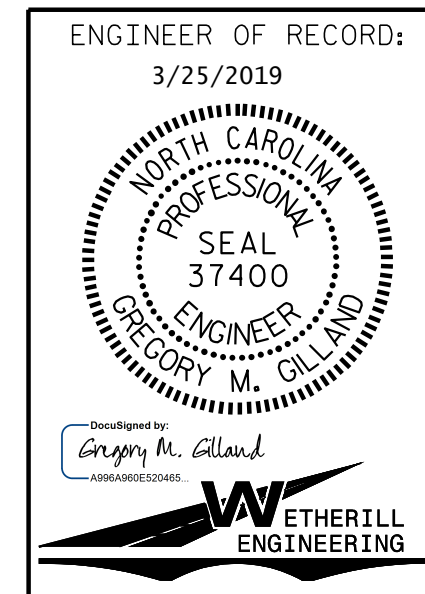
TOP OF PILE ELEVATION	
PILE	ELEVATION
P1	217.00
P2	216.90
P3	216.79
P4	216.69
P5	216.59
P6	216.49
P7	216.38
P8	216.28
P9	216.18
P10	216.08
P11	215.97
P12	215.87
P13	215.77
P14	215.67
P15	215.56
P16	215.46
P17	215.36
P18	215.26
P19	215.15
P20	215.05

PLAN



ELEVATION

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 2 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2

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

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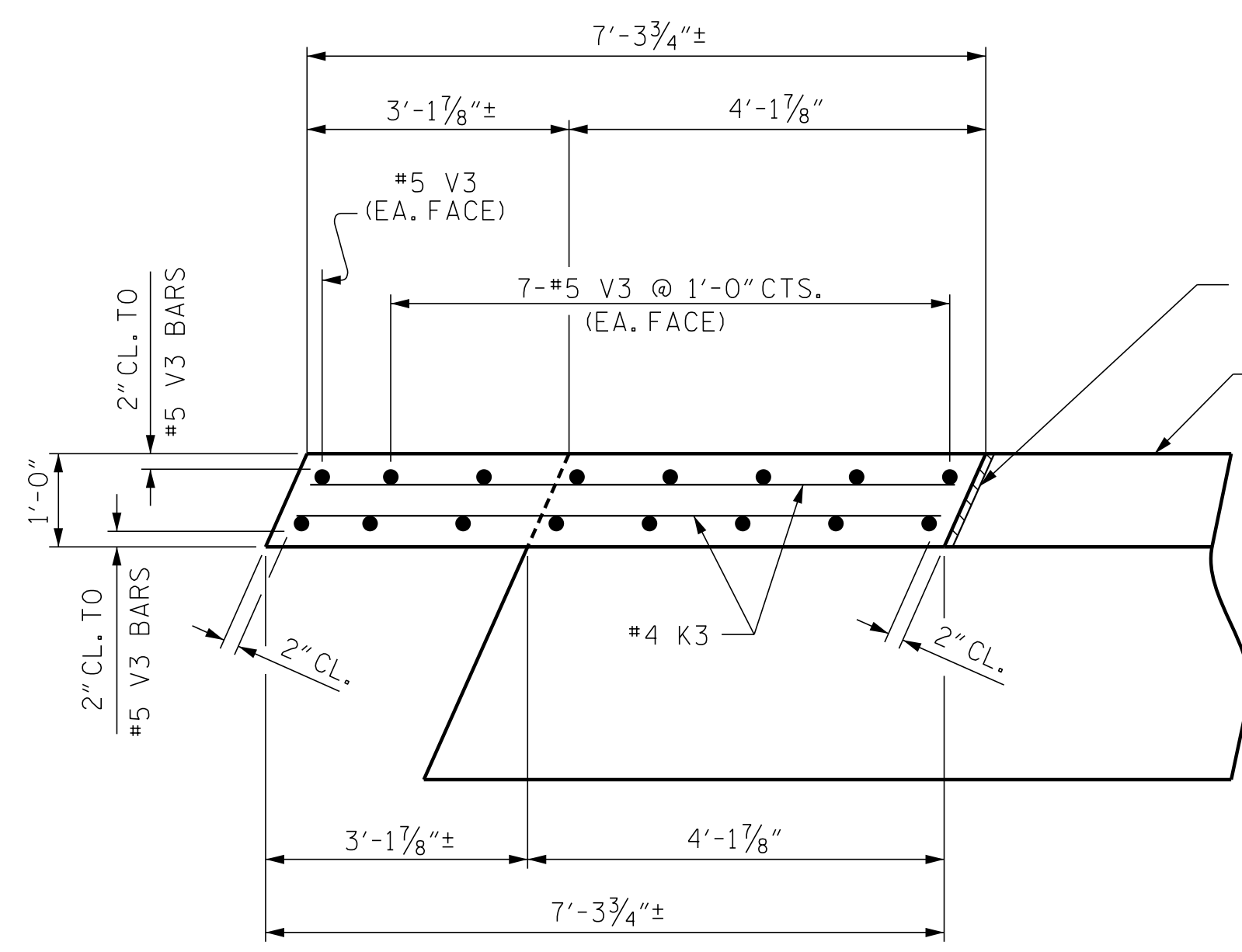
DRAWN BY: D. HODGE DATE: 2/18  
 CHECKED BY: B.C. HUNT DATE: 2/18

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A & B-B, SHEET 4 OF 4.

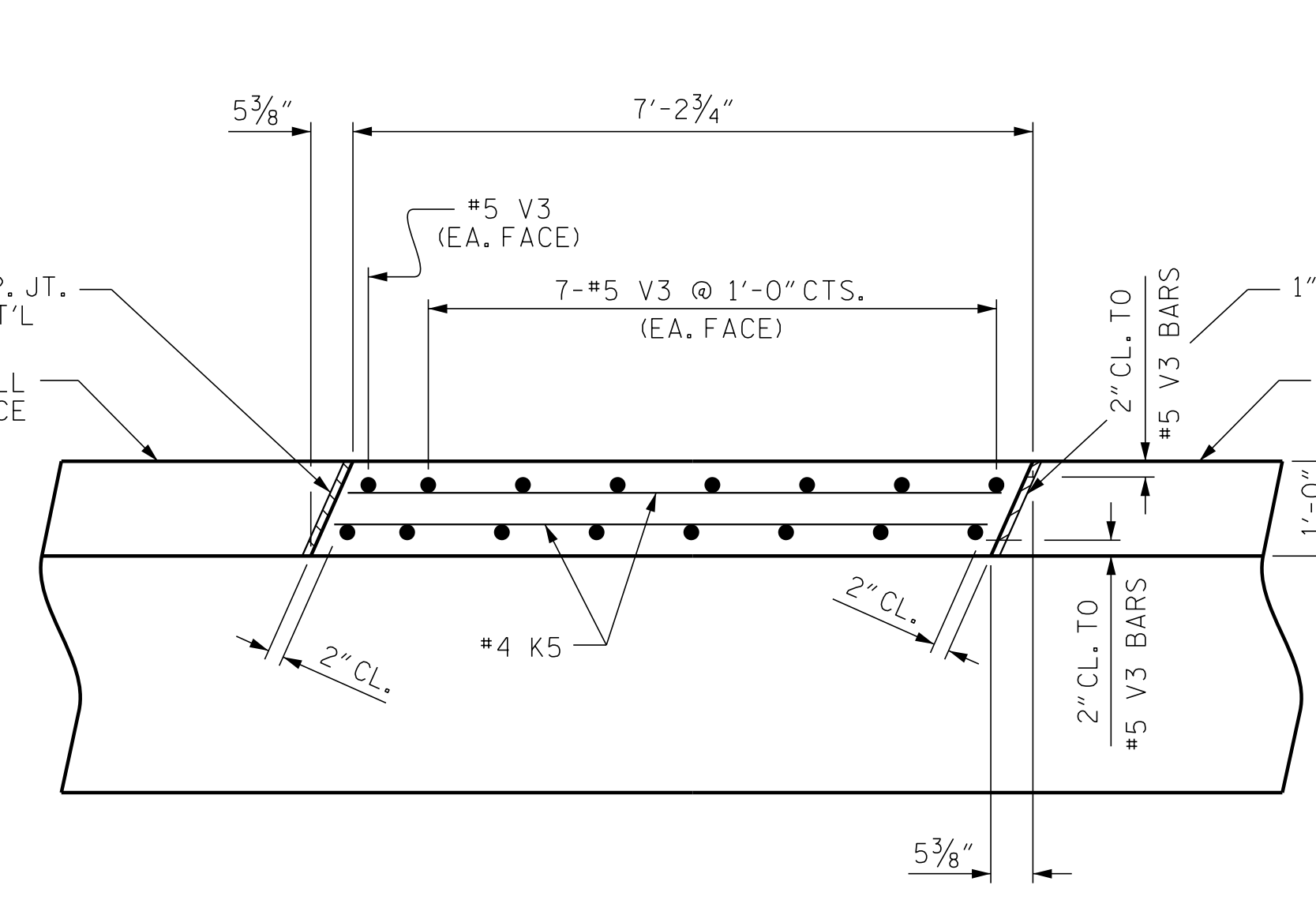
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

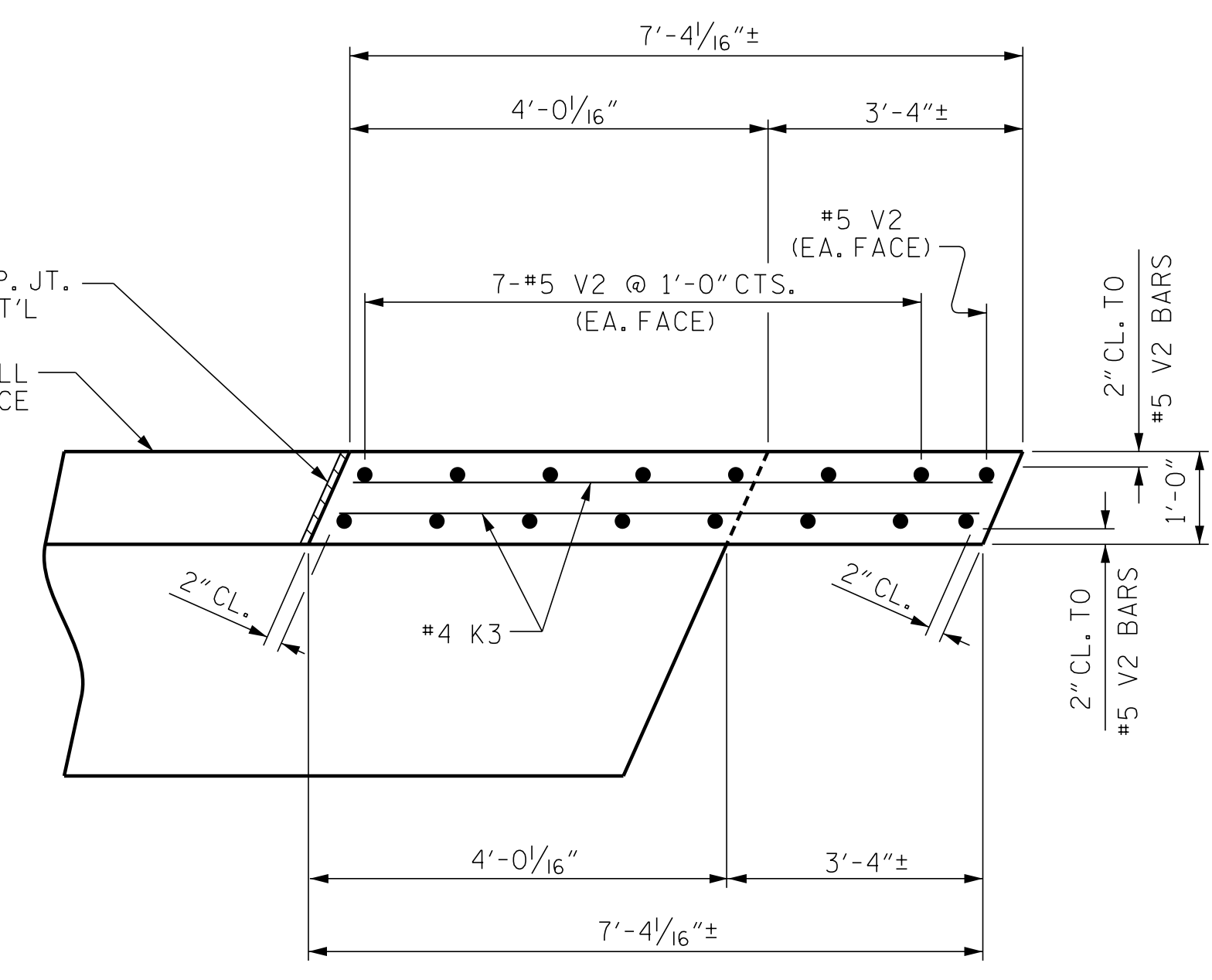
SHEET NO.  
 S1-21  
 TOTAL SHEETS  
 27



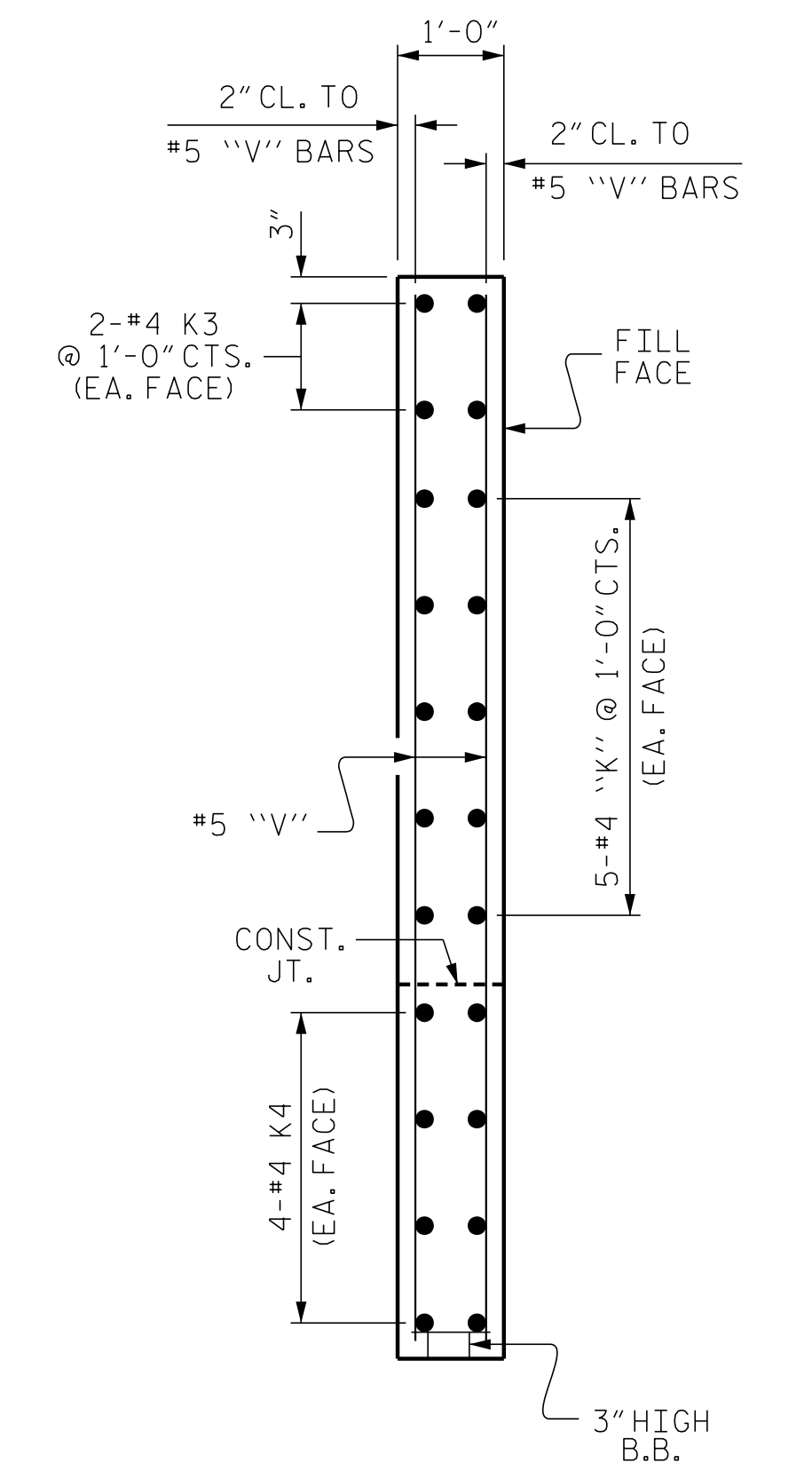
PLAN OF LEFT EARWALL



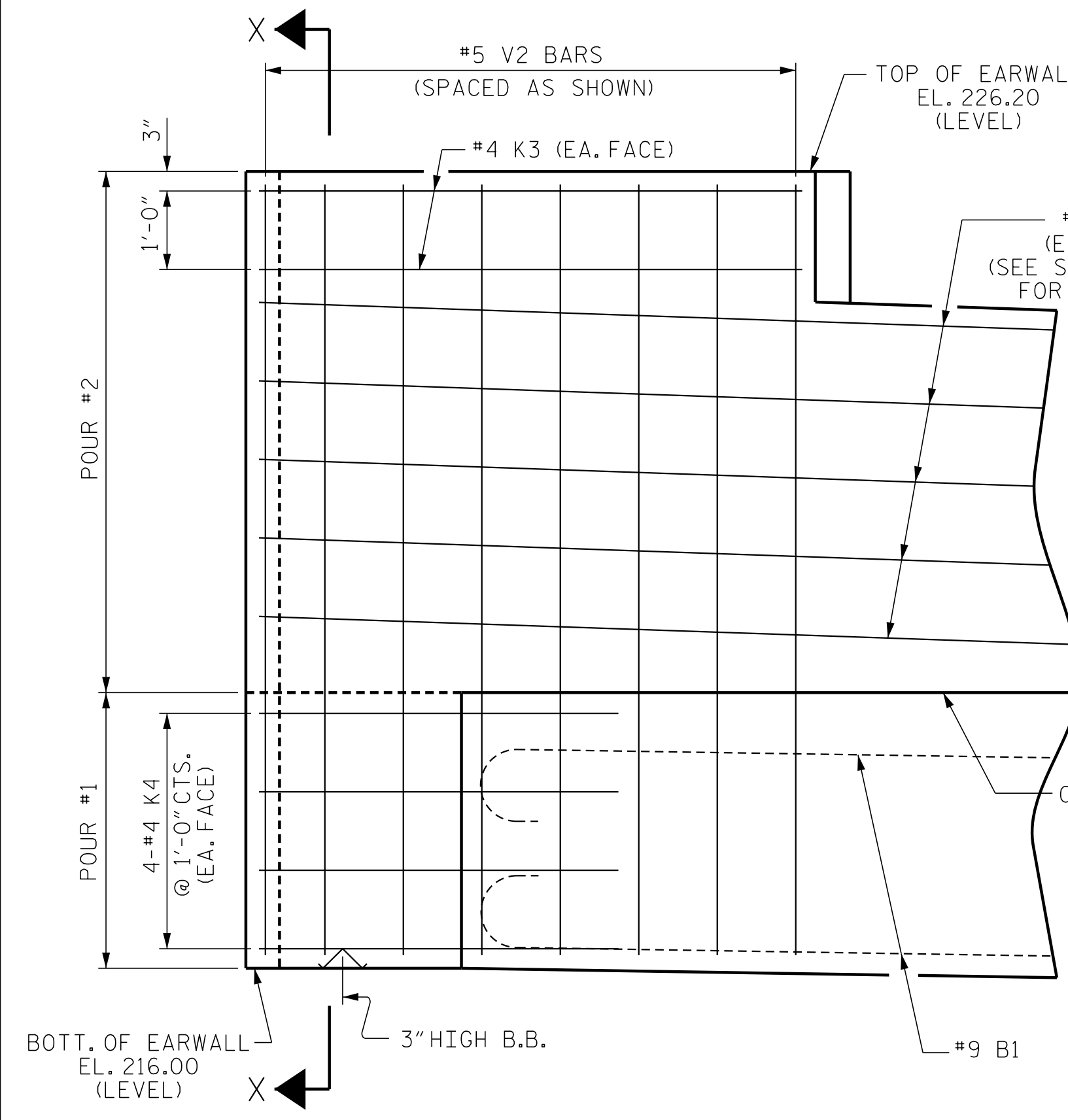
PLAN OF CENTER RAISED BACKWALL



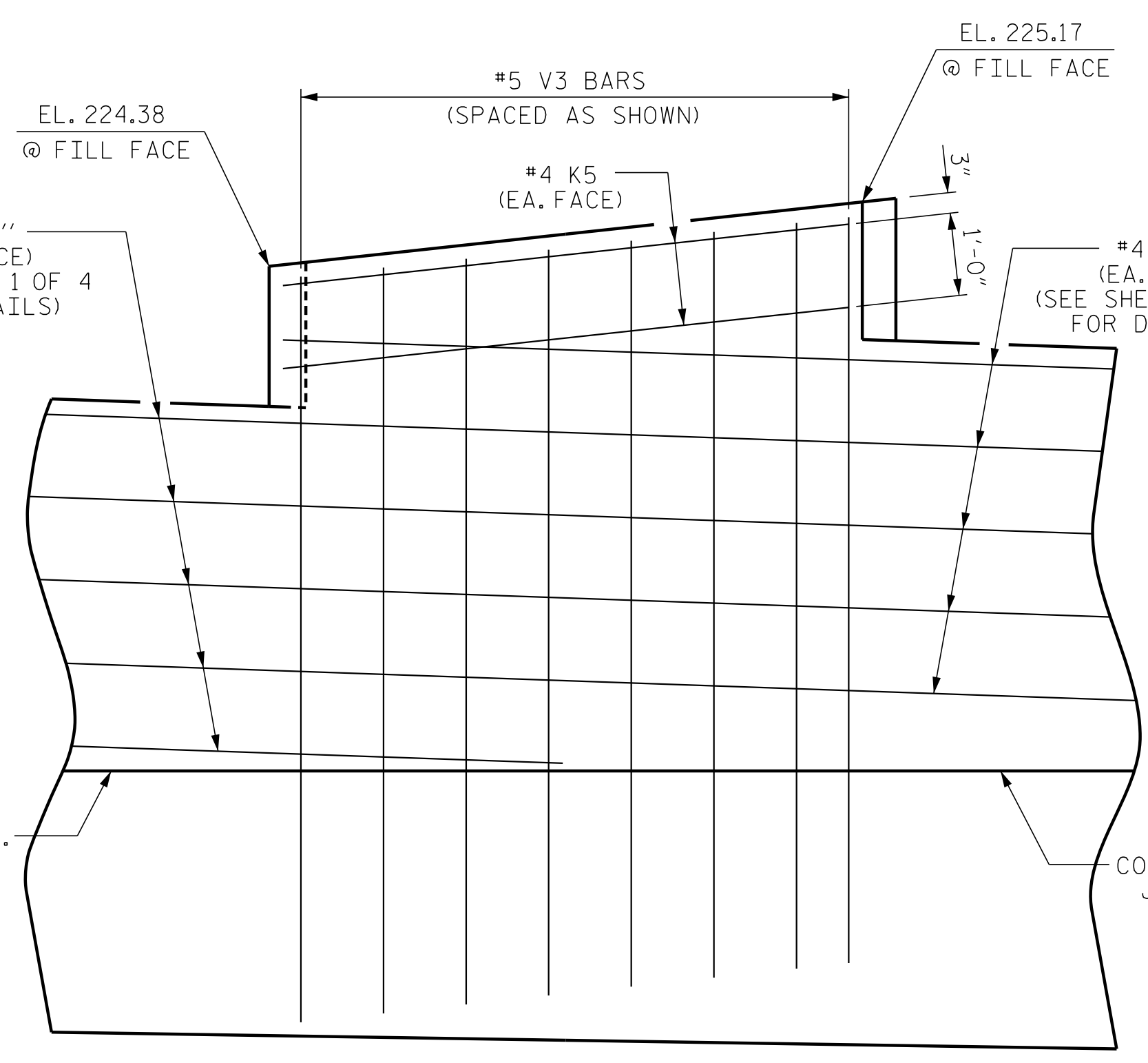
PLAN OF RIGHT EARWALL



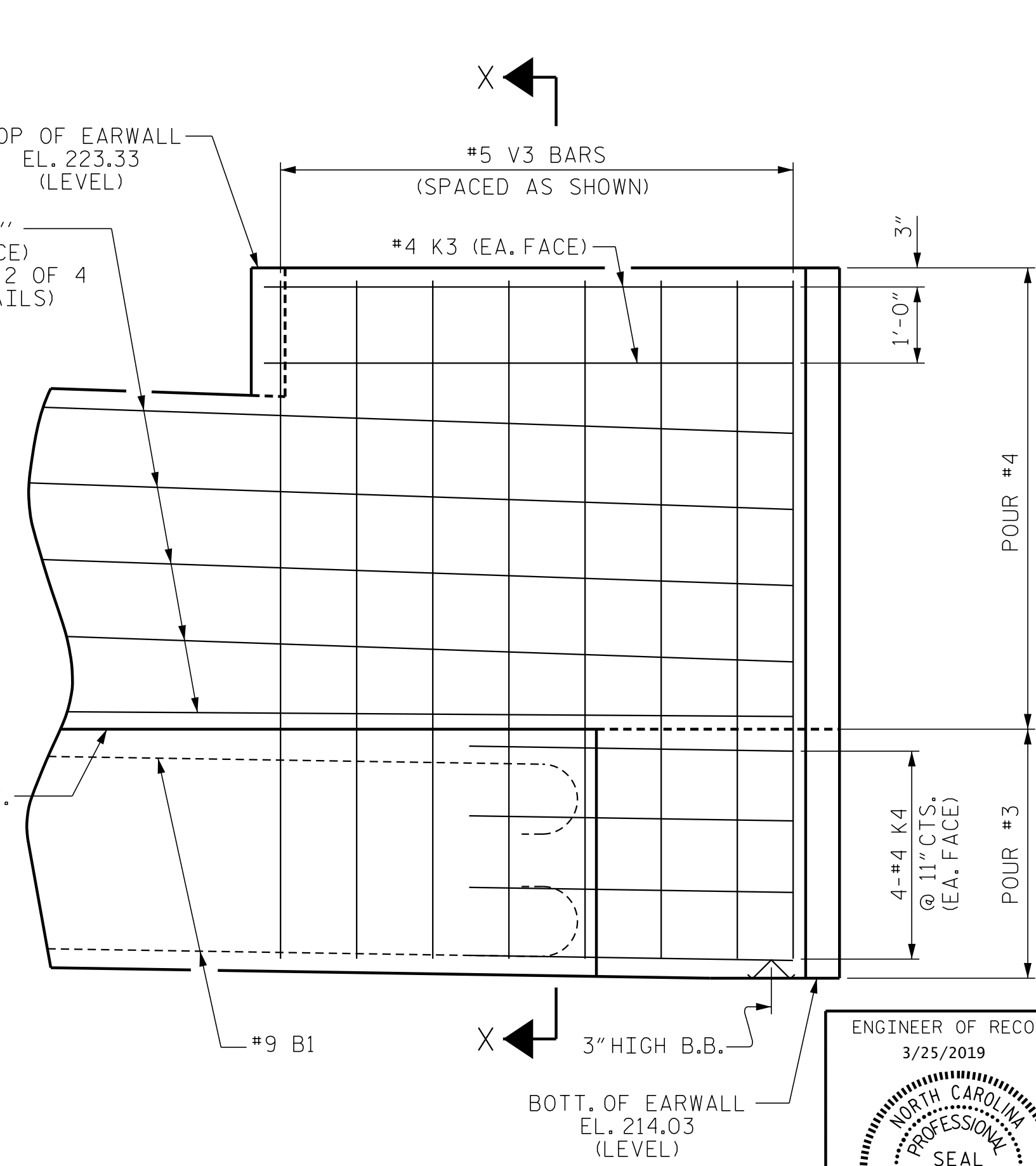
SECTION X-X



ELEVATION OF LEFT EARWALL



ELEVATION OF CENTER RAISED BACKWALL



ELEVATION OF RIGHT EARWALL

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

SHEET 3 OF 4

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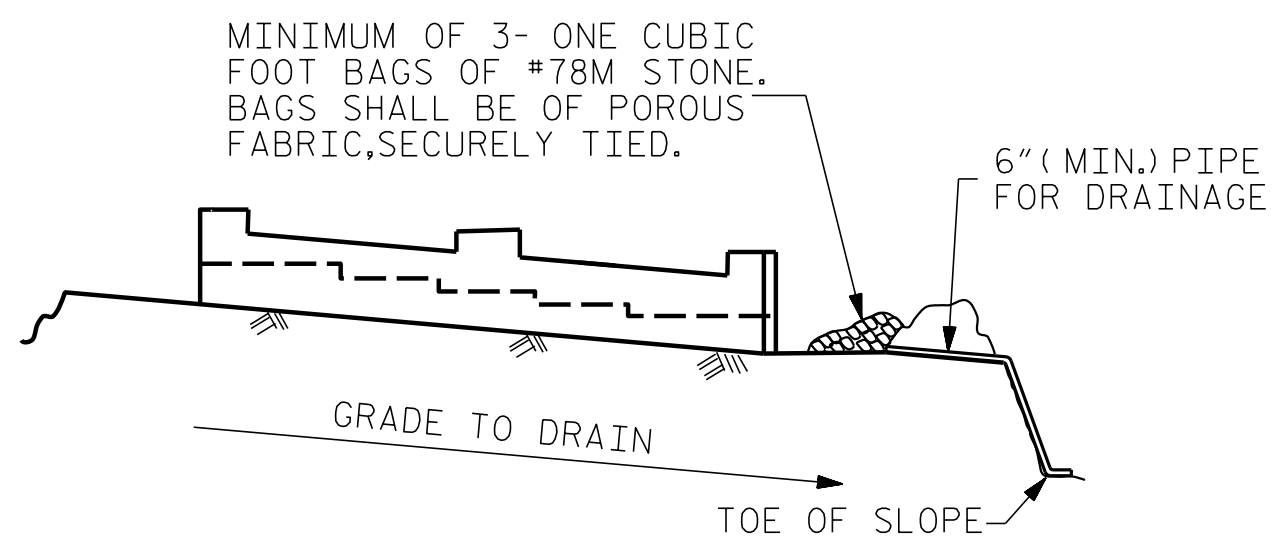
DRAWN BY : D. HODGE      DATE : 2/18  
 CHECKED BY : B.C. HUNT      DATE : 2/18

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Olland  
 ETHERILL ENGINEERING

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S1-22
					TOTAL SHEETS 27



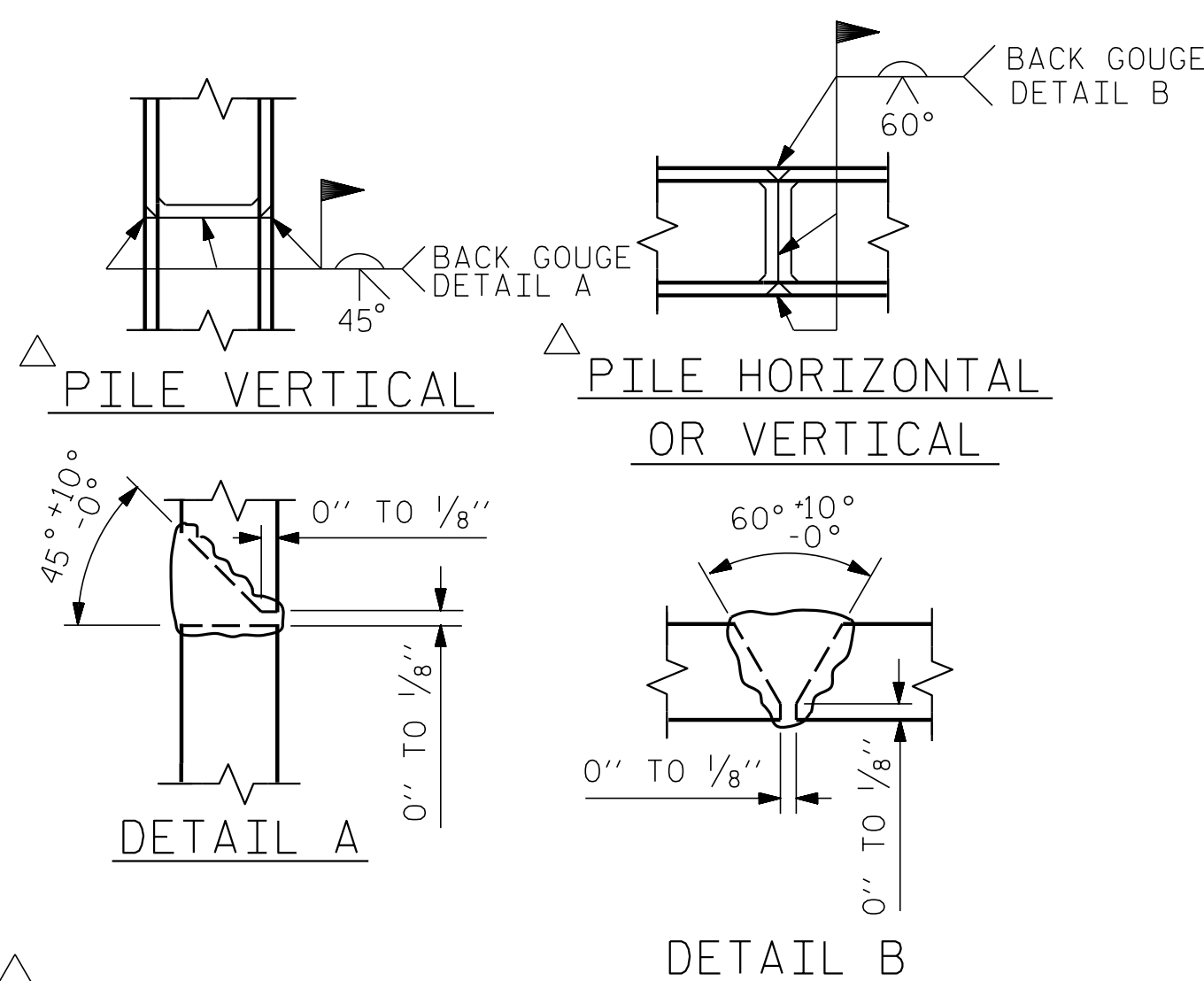


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

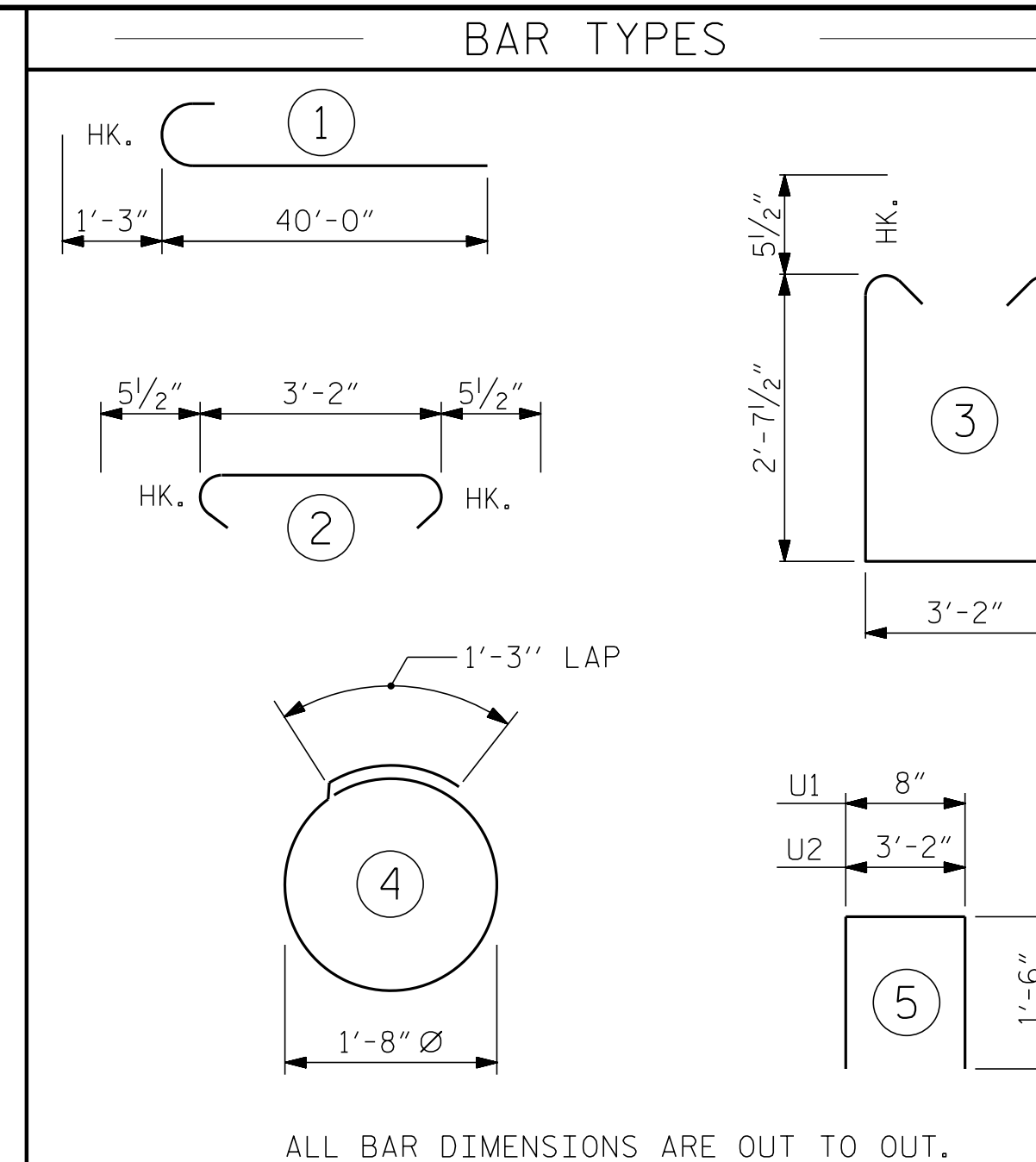
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL

#### END BENT No. 2

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9	1	41'-3"	2244
B2	4	#9	STR	49'-6"	673
B3	4	#9	STR	54'-6"	741
B4	20	#4	STR	25'-5"	340
B5	12	#5	STR	41'-1"	514
B6	30	#4	STR	3'-2"	63
B7	20	#4	STR	7'-6"	100
B8	32	#4	STR	3'-2"	68
K1	40	#4	STR	26'-6"	708
K2	12	#4	STR	23'-5"	188
K3	8	#4	STR	6'-10"	37
K4	16	#4	STR	5'-0"	53
K5	4	#4	STR	6'-10"	18
S1	192	#5	3	9'-4"	1869
S2	192	#5	2	4'-1"	818
S3	40	#4	4	6'-6"	174
U1	100	#4	5	3'-8"	245
U2	57	#4	5	6'-2"	235
V1	200	#5	STR	7'-2"	1495
V2	16	#5	STR	9'-9"	163
V3	32	#5	STR	8'-10"	295

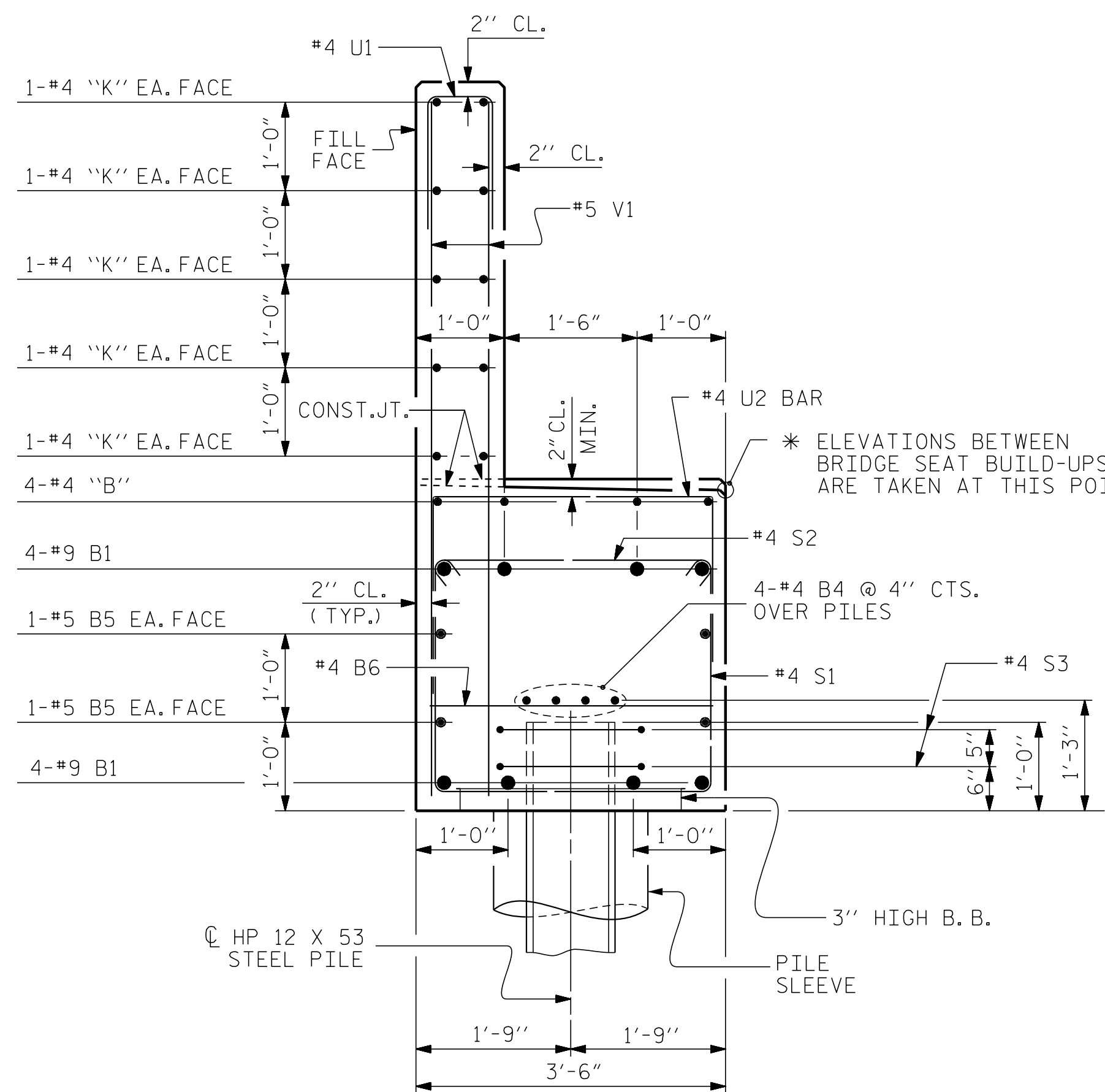
REINFORCING STEEL 11,041 LBS.

#### CLASS A CONCRETE BREAKDOWN

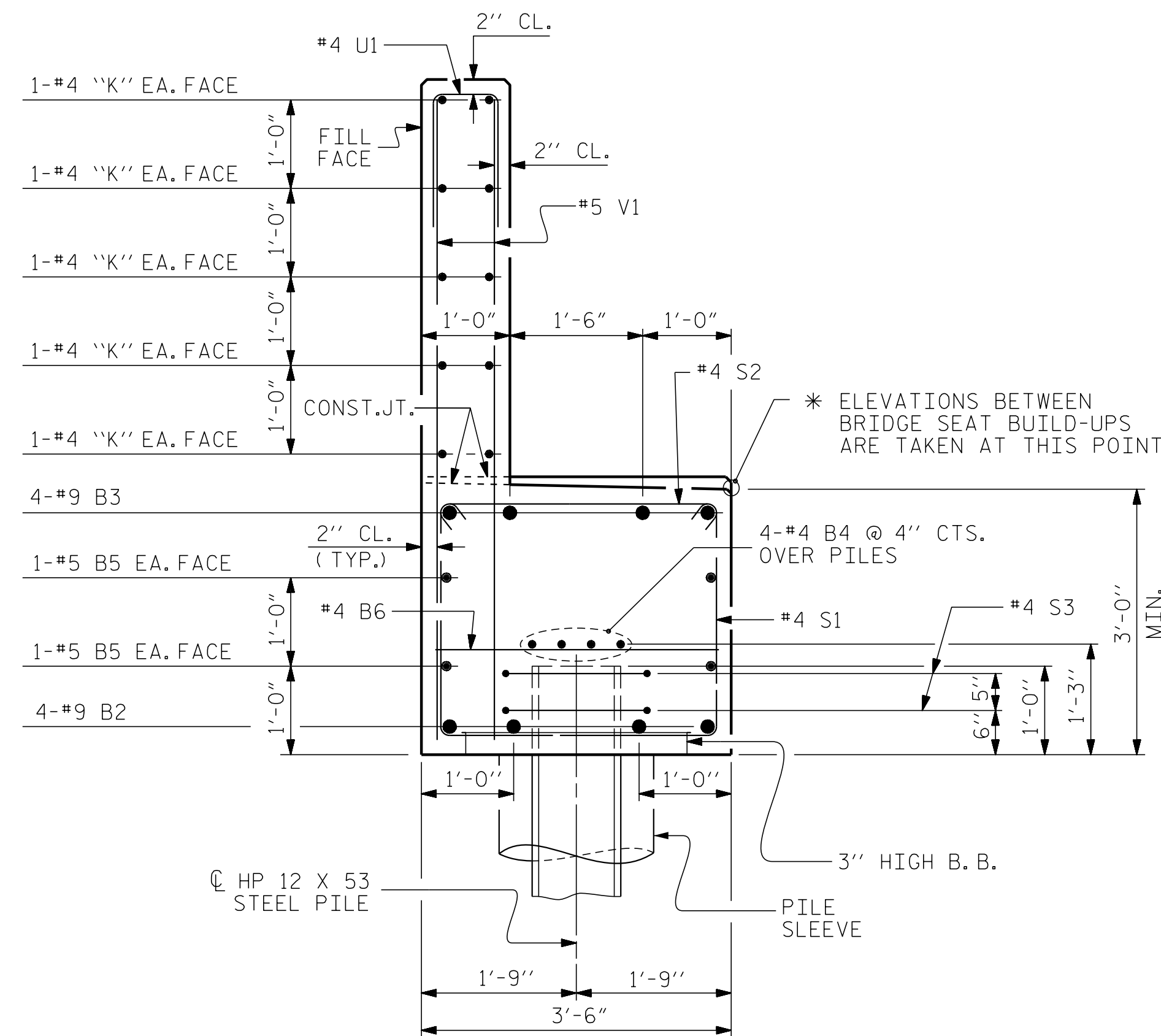
POUR #1	CAP AND LOWER PORTION OF EARWALL	32.1 C.Y.
POUR #2	UPPER PORTION OF EARWALL AND BACKWALL	13.5 C.Y.
POUR #3	CAP AND LOWER PORTION OF EARWALL	21.6 C.Y.
POUR #4	UPPER PORTION OF EARWALL AND BACKWALL	9.3 C.Y.
TOTAL CLASS A CONCRETE		76.5 C.Y.

HP 12 X 53 STEEL PILES  
NO: 20 LIN. FT. = 1,145

PILE DRIVING EQUIPMENT SET UP FOR HP 12 X 53 STEEL PILES 20 EA.



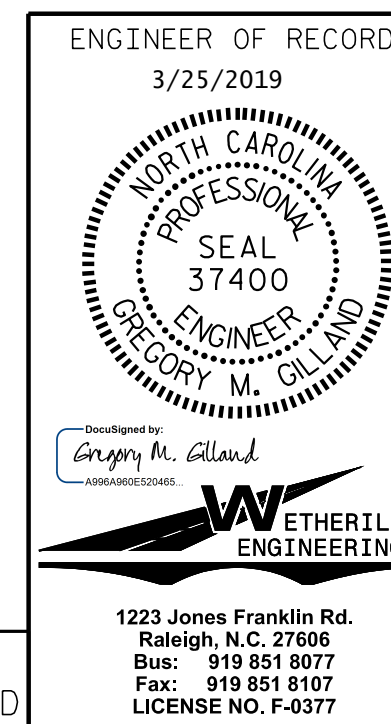
SECTION B-B



SECTION A-A

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 217+31.76 -L-

SHEET 4 OF 4



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

### SUBSTRUCTURE END BENT No. 2

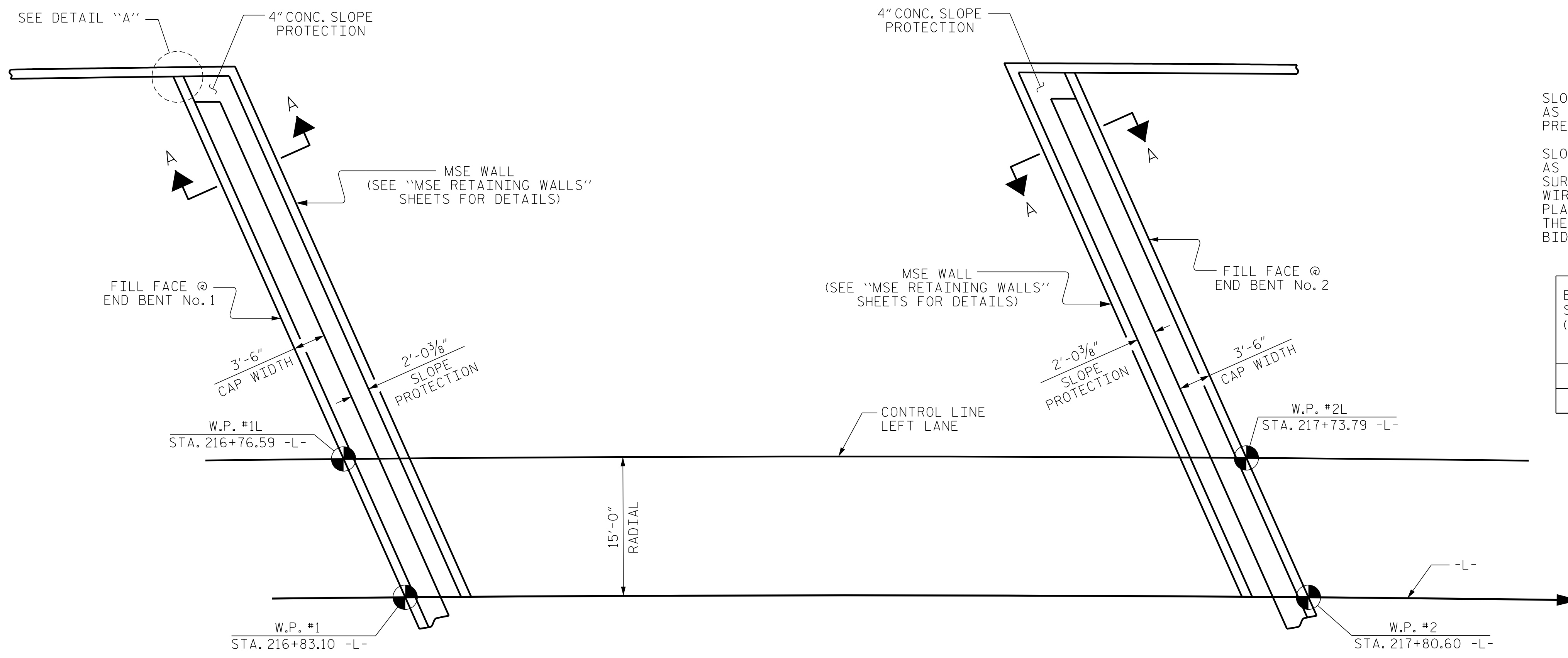
#### REVISIONS

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1			3			S1-23
2			4			TOTAL SHEETS 27

DRAWN BY: D. HODGE DATE: 2/18  
CHECKED BY: B.C. HUNT DATE: 2/18

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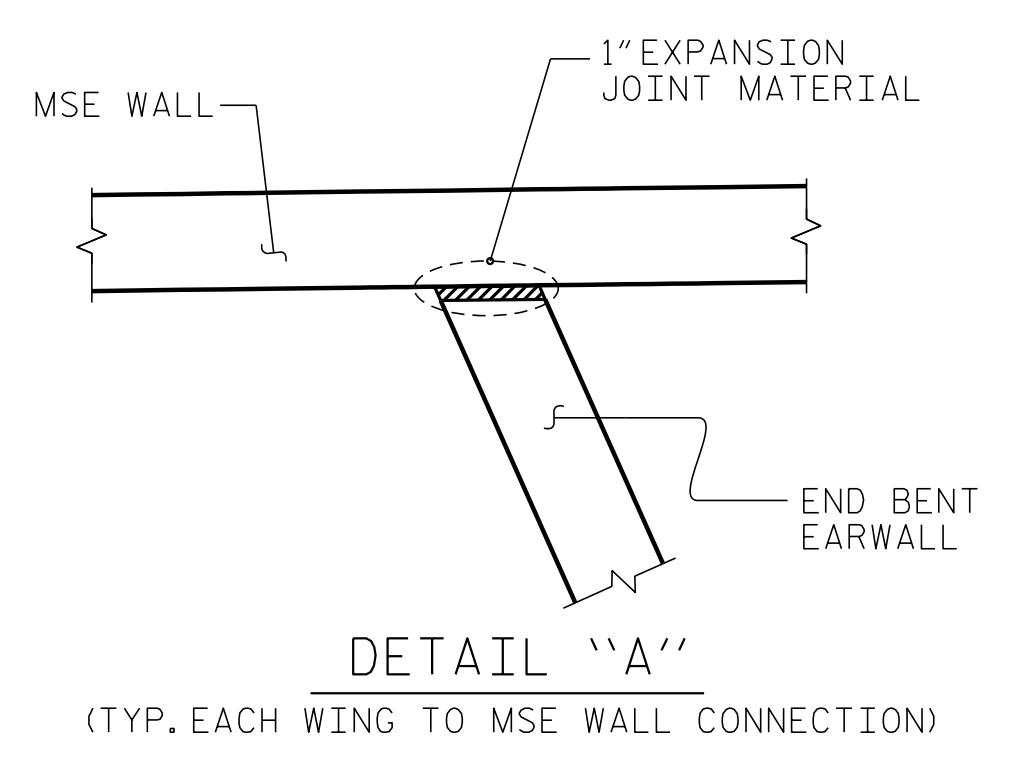
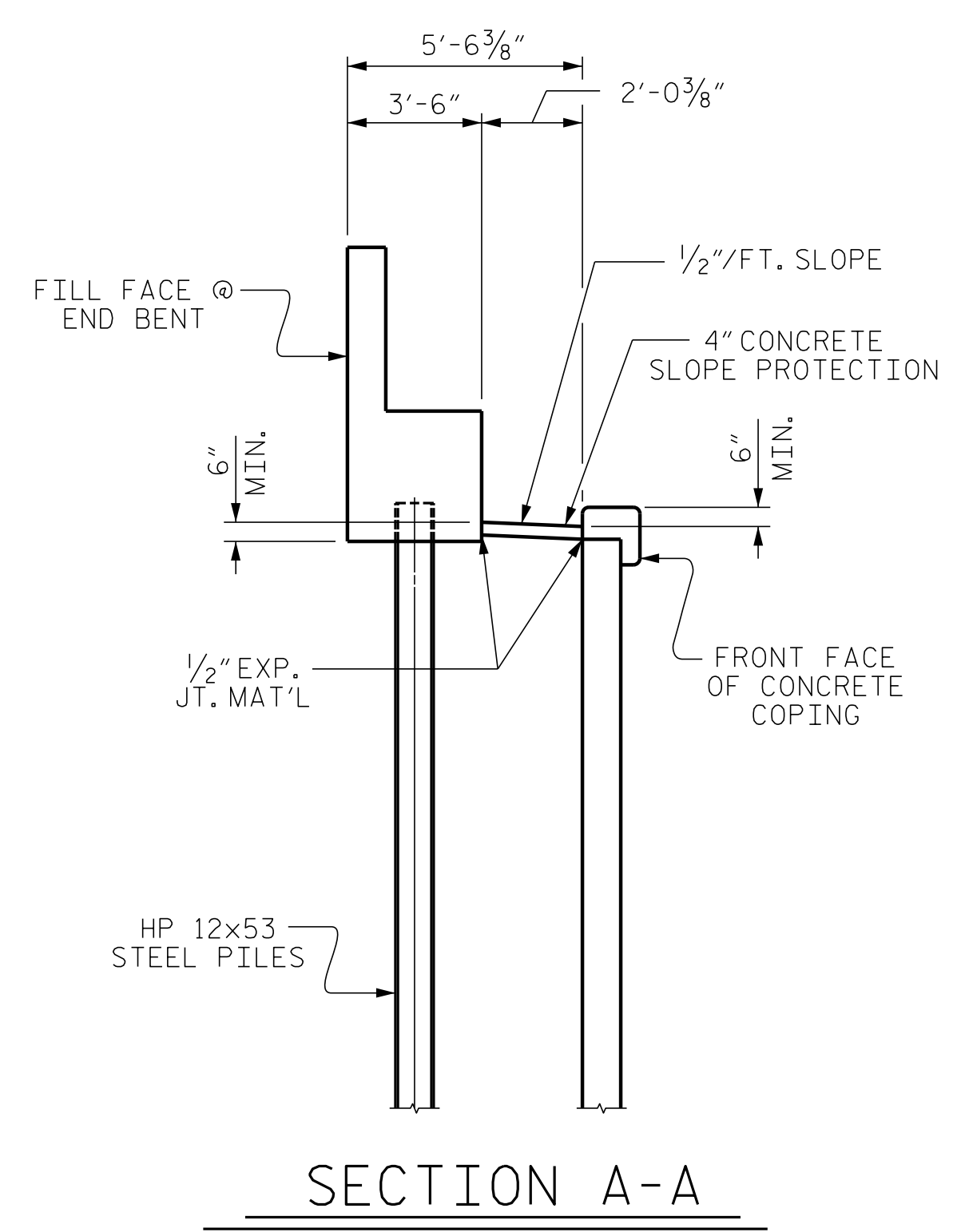
**NOTES**

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. 217+31.76 -L- (LEFT LANE)	4" SLOPE PROTECTION	WELDED WIRE FABRIC 20 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	15	65
END BENT 2	15	66

END BENT No. 1 PLAN END BENT No. 2



PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gilland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

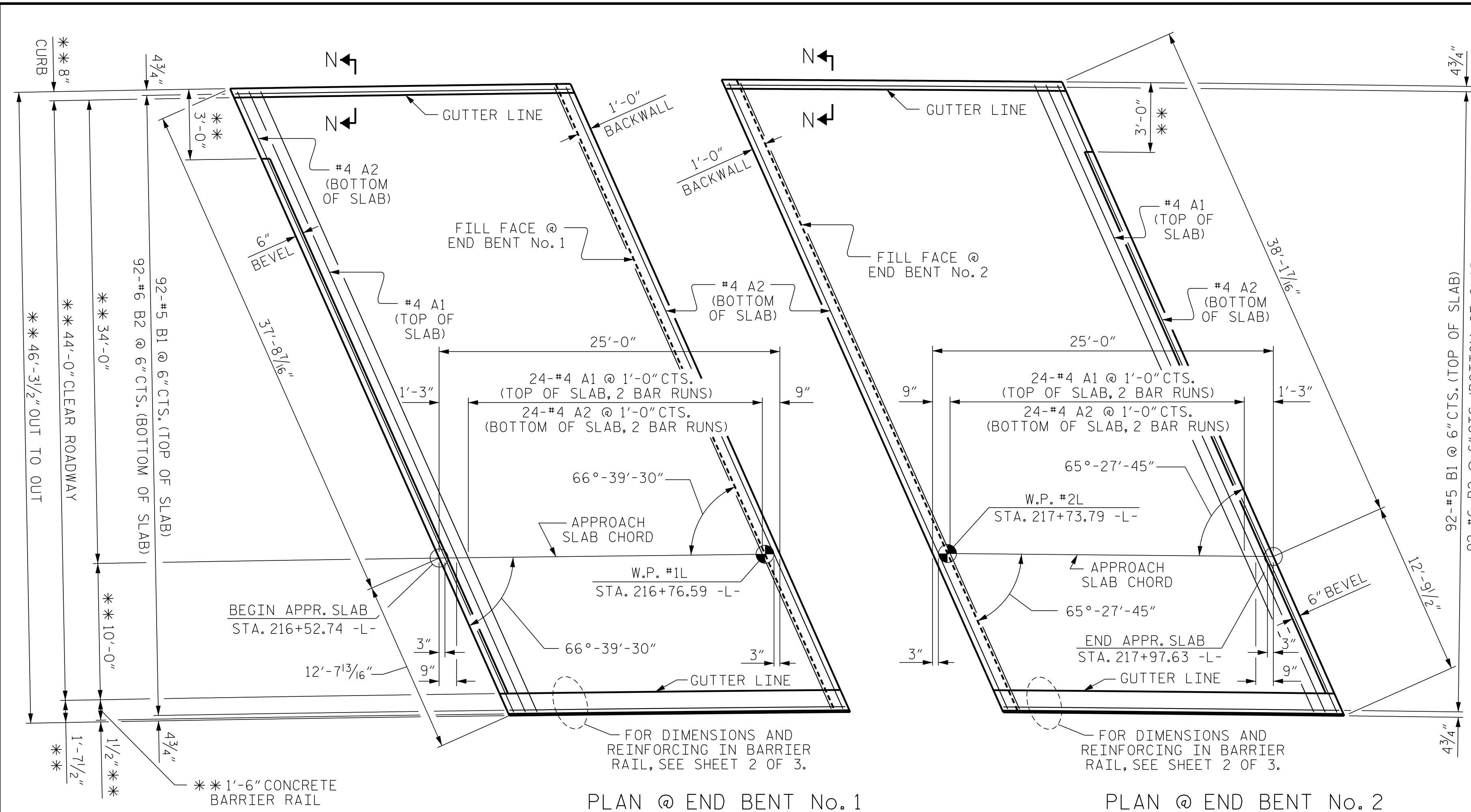
**SLOPE PROTECTION DETAILS (LEFT LANE)**

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

DRAWN BY : D. HODGE DATE : 2/18  
 CHECKED BY : G.M. GILLAND DATE : 2/18

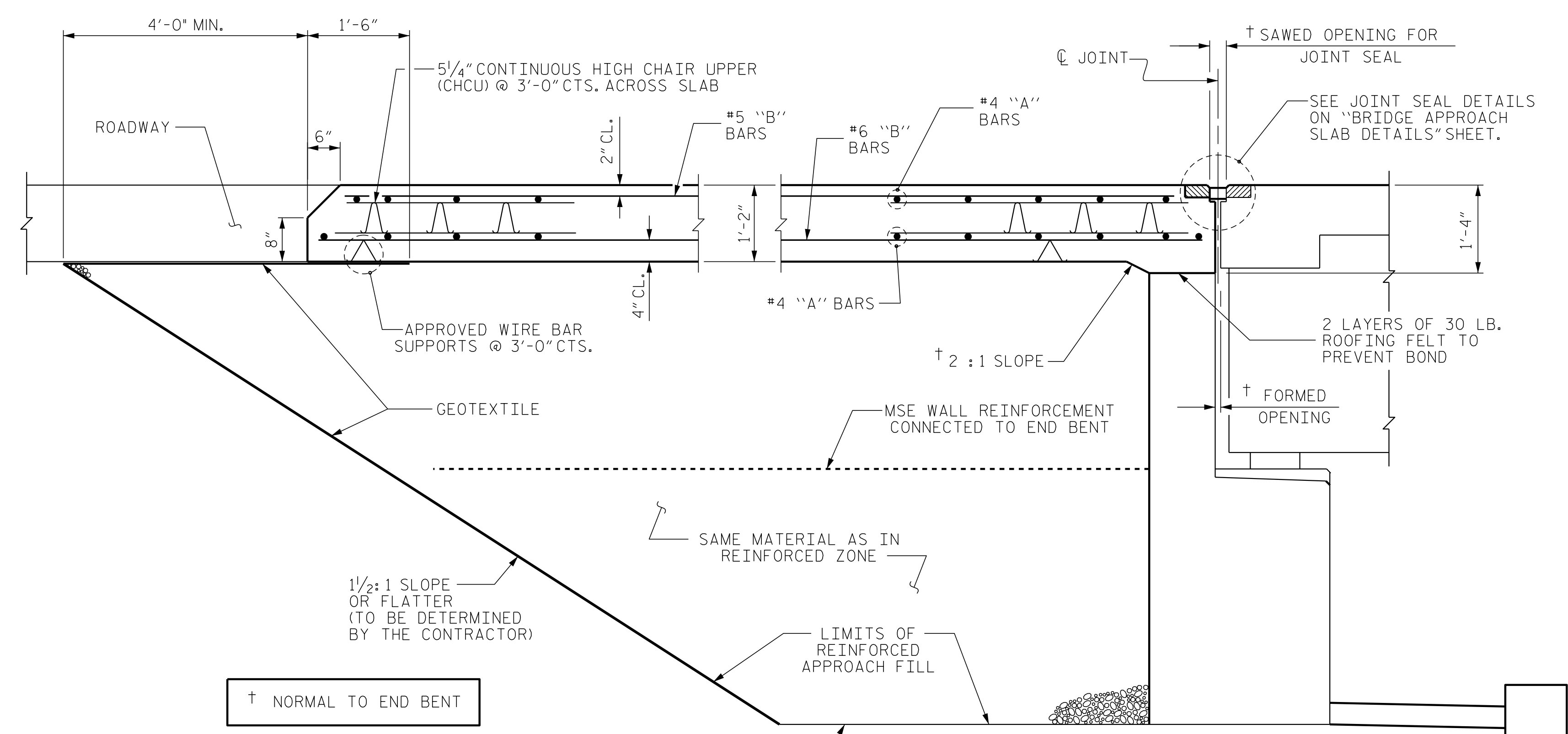
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 UNLESS ALL SIGNATURES COMPLETED

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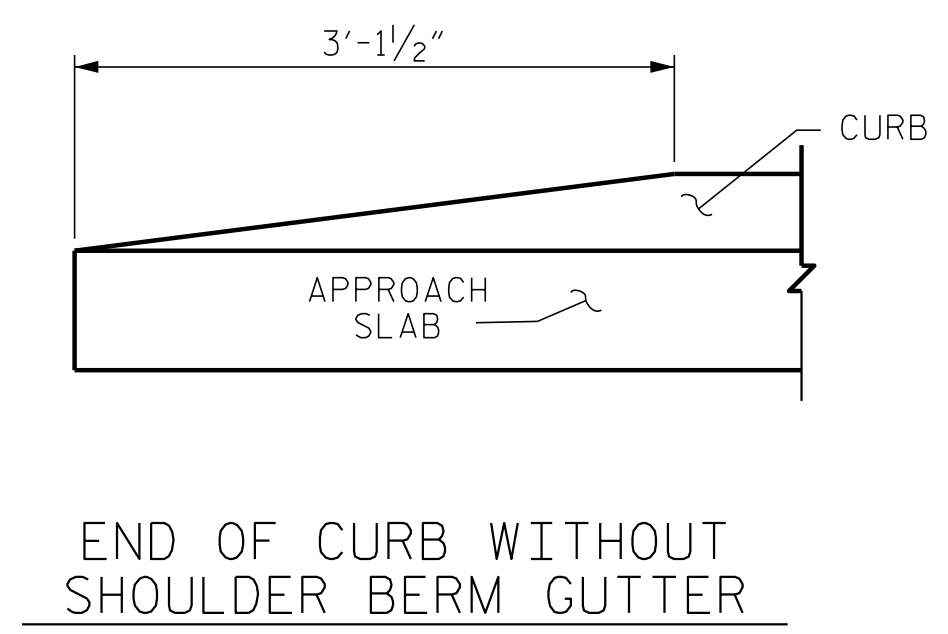
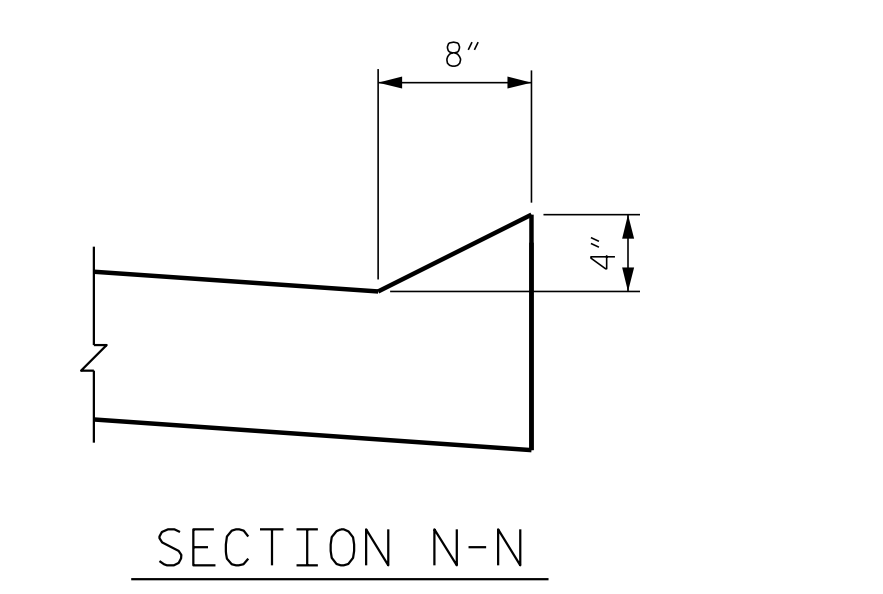


PLAN @ END BENT No. 1      PLAN @ END BENT No. 2  
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

\*\* DENOTES RADIAL DIMENSION      ARC OFFSETS TO OUTSIDE EDGE OF APPROACH SLABS ARE NEGLIGIBLE, THEREFORE NOT SHOWN



SECTION THRU SLAB  
(TYPE III - REINFORCED APPROACH FILL)



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 SAWS 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.

BILL OF MATERIAL					
APPROACH SLAB AT END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	26'-4"	880
A2	52	#4	STR	26'-2"	909
*B1	92	#5	STR	24'-0"	2303
B2	92	#6	STR	24'-7"	3397
REINFORCING STEEL					LBS. 4,306
*EPOXY COATED REINFORCING STEEL					LBS. 3,183
CLASS AA CONCRETE					C. Y. 50.0
APPROACH SLAB AT END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	26'-4"	880
A2	52	#4	STR	26'-2"	909
*B1	92	#5	STR	24'-0"	2303
B2	92	#6	STR	24'-7"	3397
REINFORCING STEEL					LBS. 4,306
*EPOXY COATED REINFORCING STEEL					LBS. 3,183
CLASS AA CONCRETE					C. Y. 50.0

FOR BARRIER RAIL QUANTITIES ON APPROACH SLAB, SEE SHEET 2 OF 3

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

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ASSEMBLED BY : D. HODGE	DATE : 1/18
CHECKED BY : B.C. HUNT	DATE : 2/18
DRAWN BY : EEM 3/95	REV. 12/21/11 MAA/GM
CHECKED BY : VAP 3/95	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

ENGINEER OF RECORD:  
3/25/2019  
  
 Gregory M. O'Neil  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-25				
TOTAL SHEETS 27				

### NOTES

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

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

WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE APPROACH SLAB SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

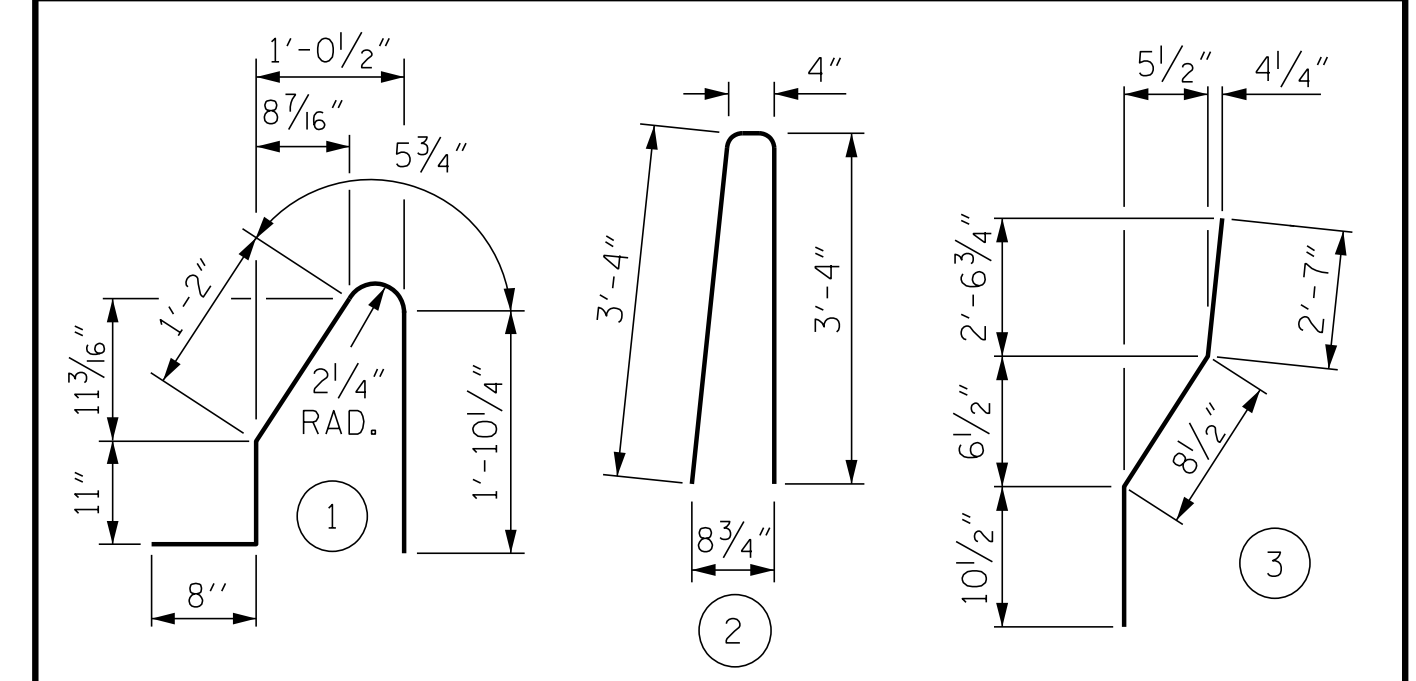
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 AND S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 AND S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

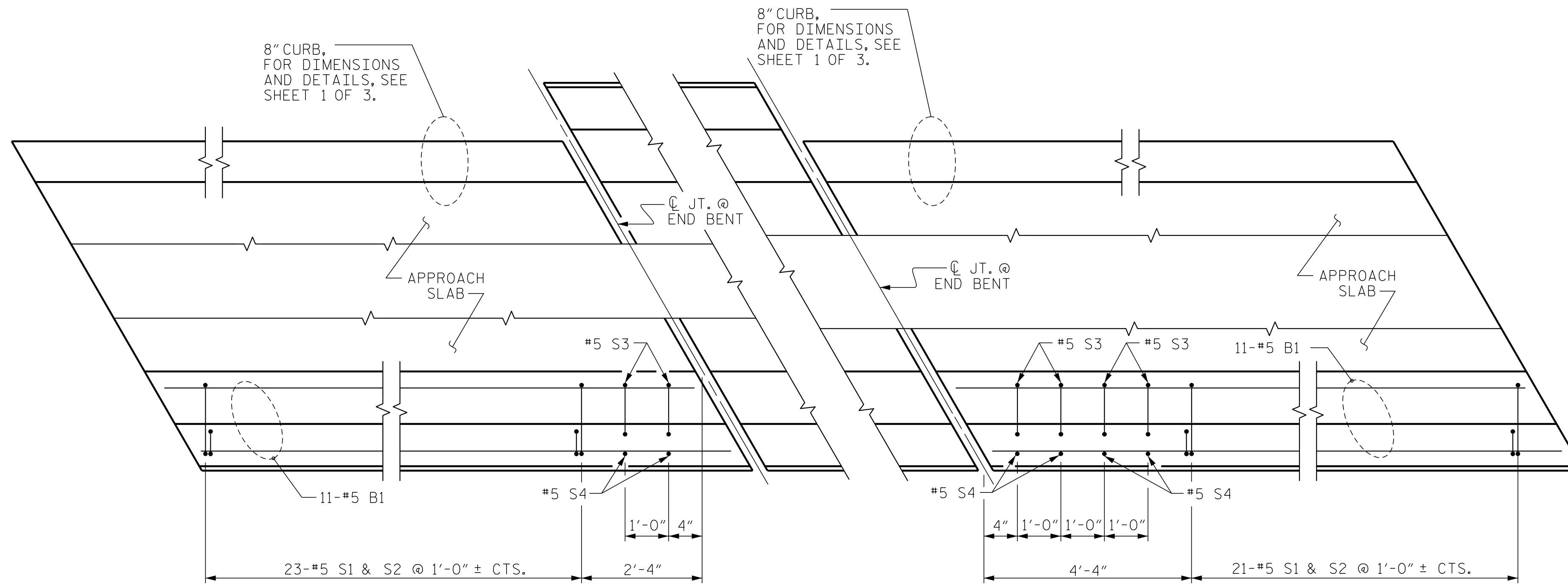
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT THIRD POINTS.

BILL OF MATERIAL					
BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	22	#5	STR	24'-7"	564
*S1	44	#5	1	5'-1"	233
*S2	44	#5	2	7'-0"	321
*S3	6	#5	3	4'-2"	26
*S4	6	#5	STR	4'-0"	25
* EPOXY COATED REINFORCING STEEL				LBS.	1,169
CLASS AA CONCRETE				C. Y.	6.8
CONCRETE BARRIER RAIL				50.00 LIN. FT.	

### BAR TYPES



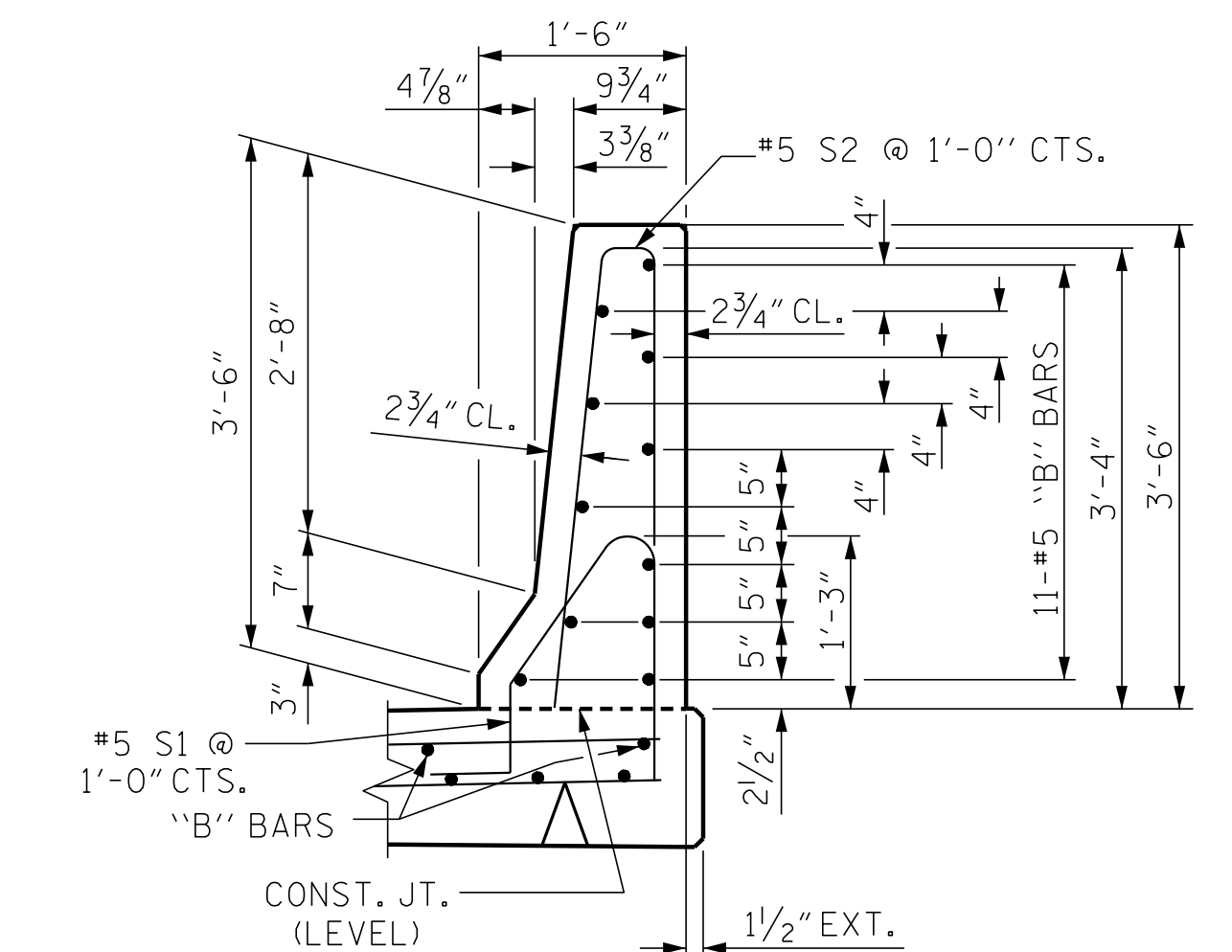
ALL BAR DIMENSIONS ARE OUT TO OUT



END BENT No. 1

END BENT No. 2

### PLAN OF BARRIER RAIL



### SECTION THRU RAIL

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

SHEET 2 OF 3

ASSEMBLED BY : D. HODGE	DATE : 1/18
CHECKED BY : B.C. HUNT	DATE : 2/18
DRAWN BY : FCJ 11/88	REV. 7/12 MAA/GM
CHECKED BY : ARB 11/88	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

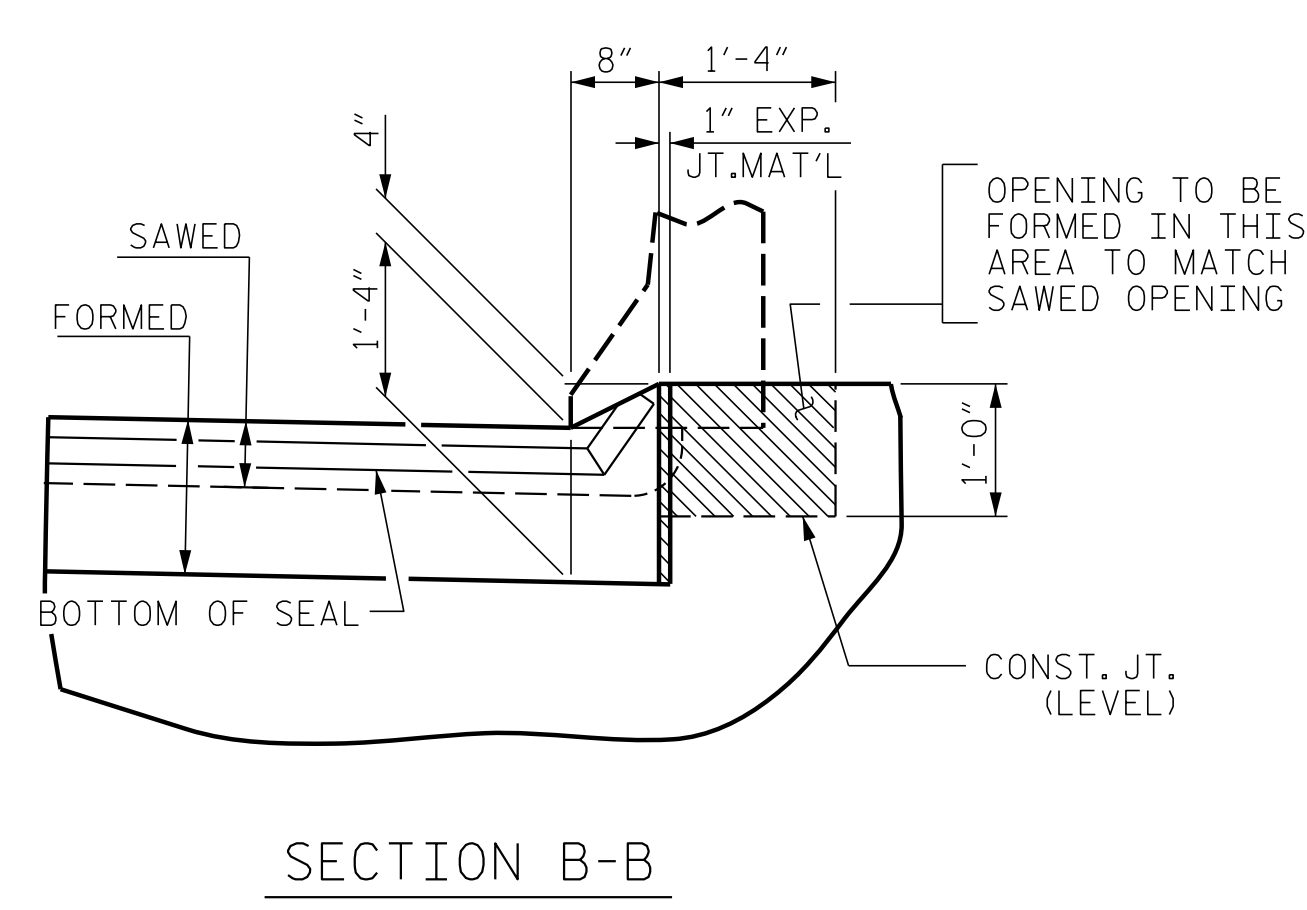
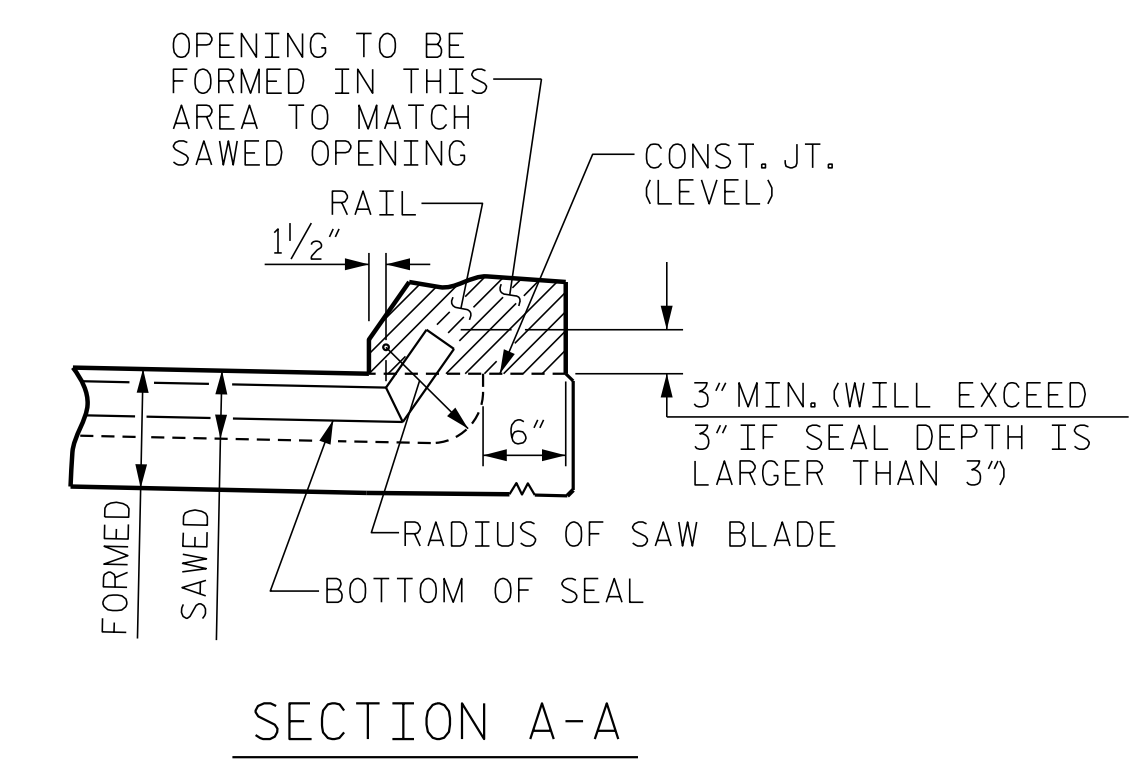
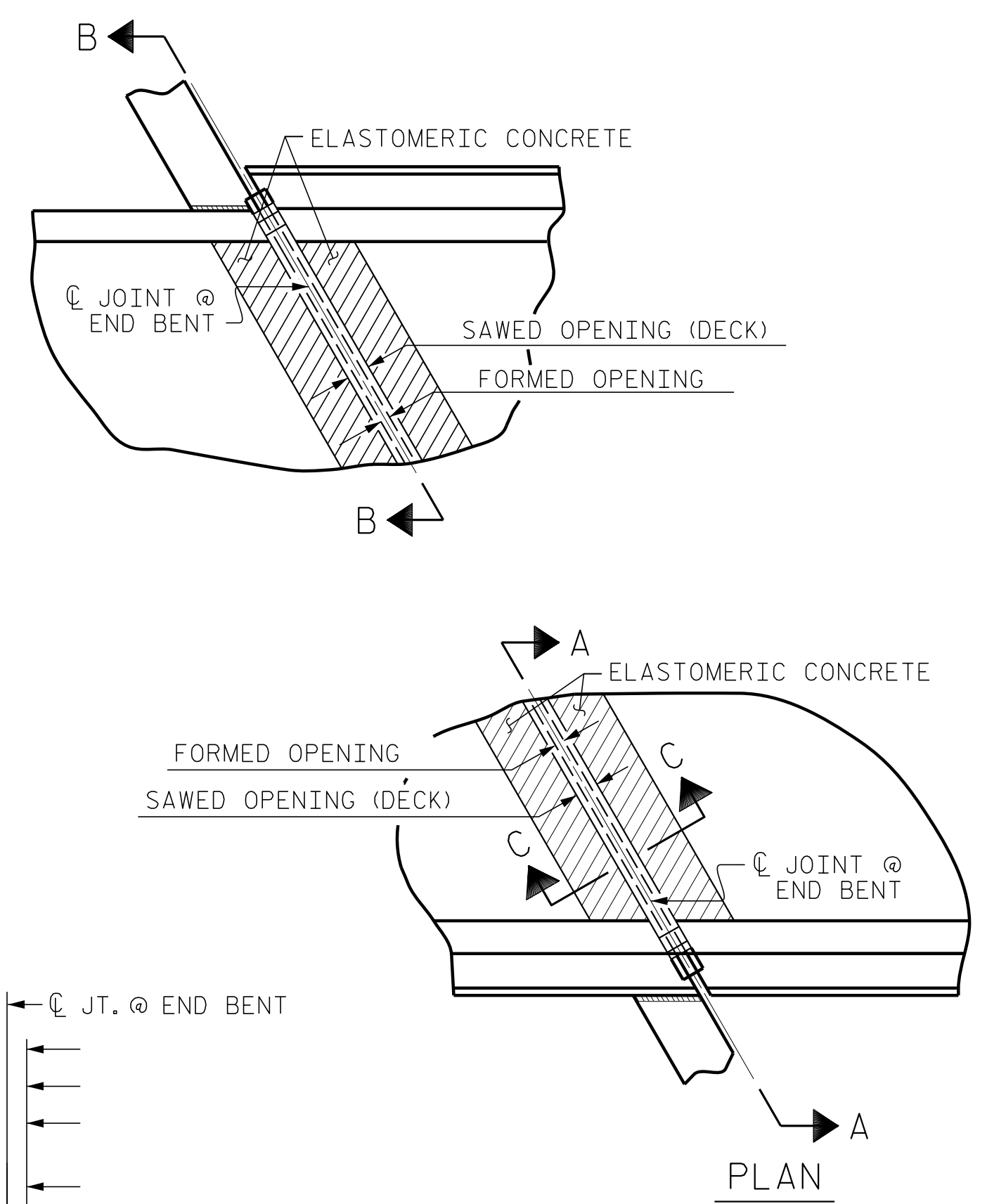
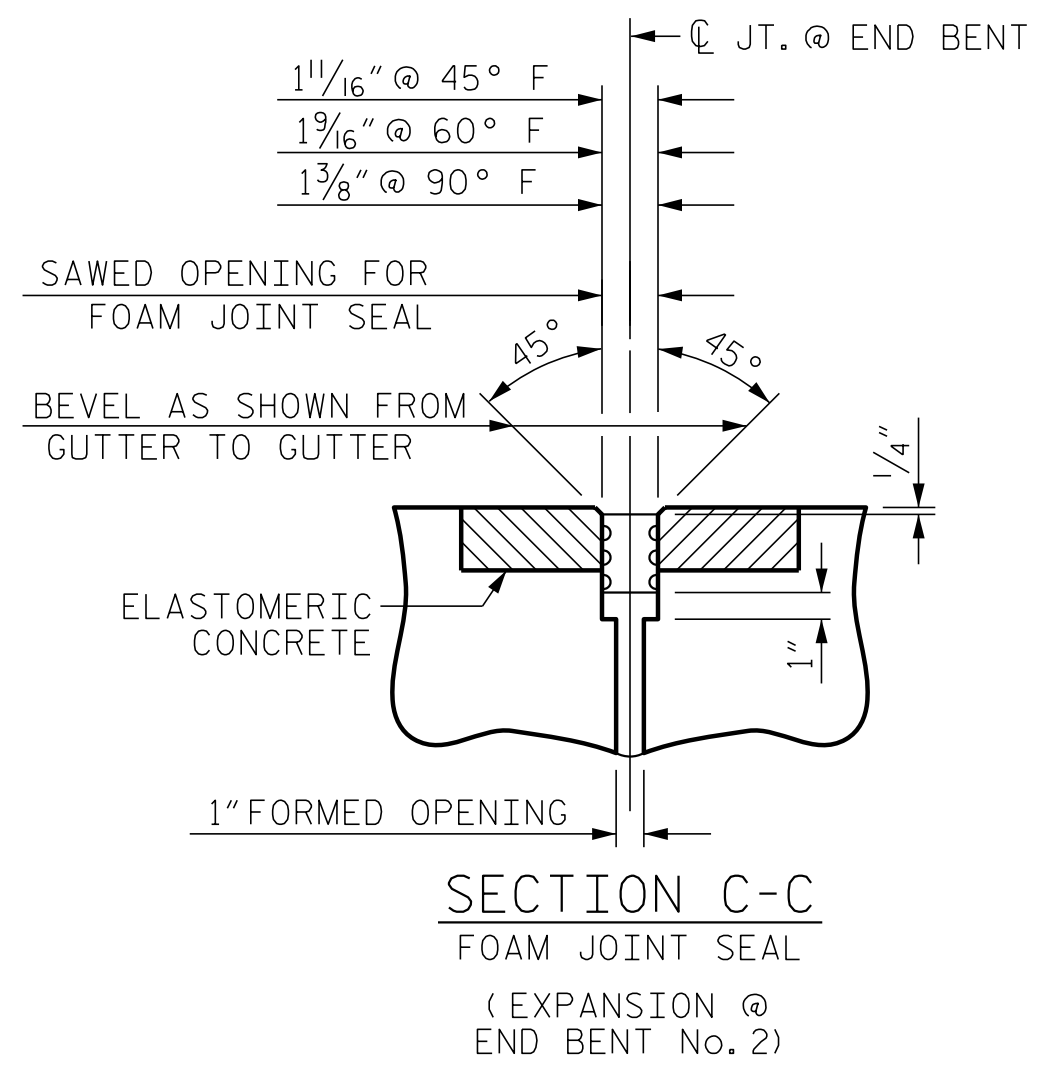
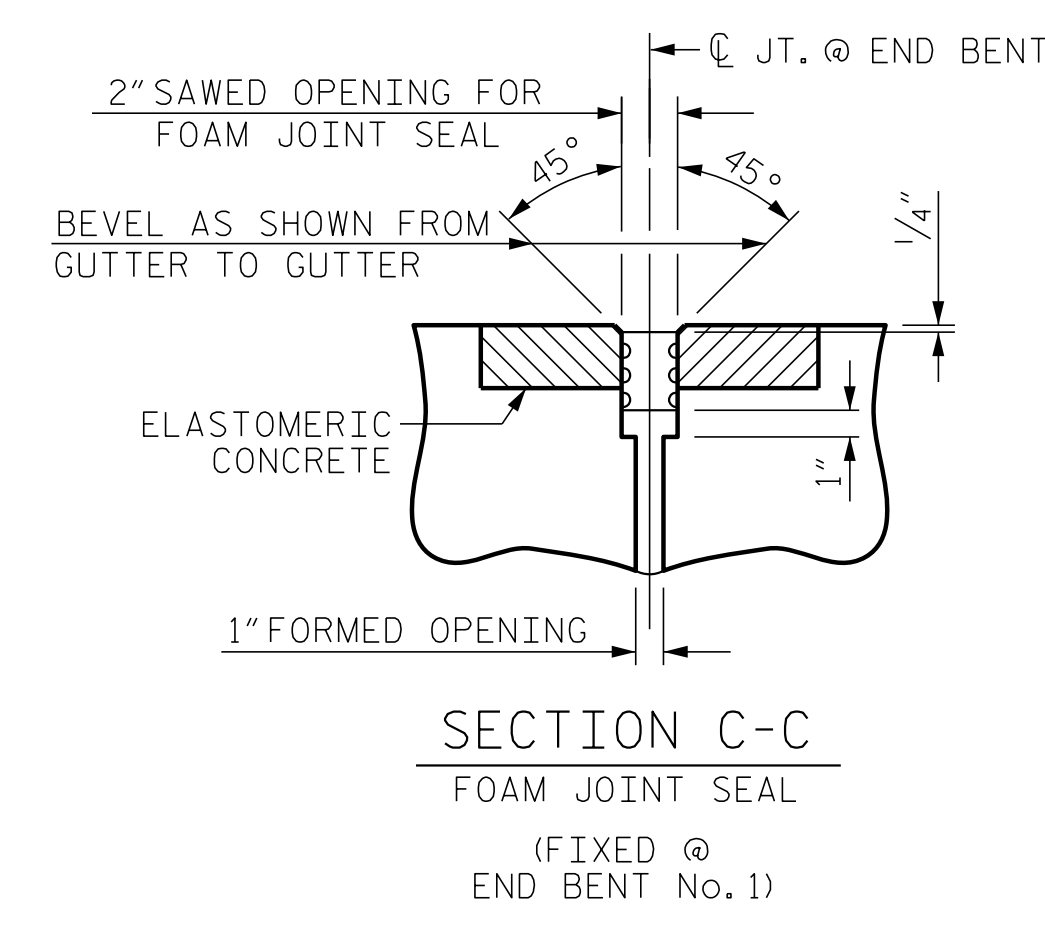
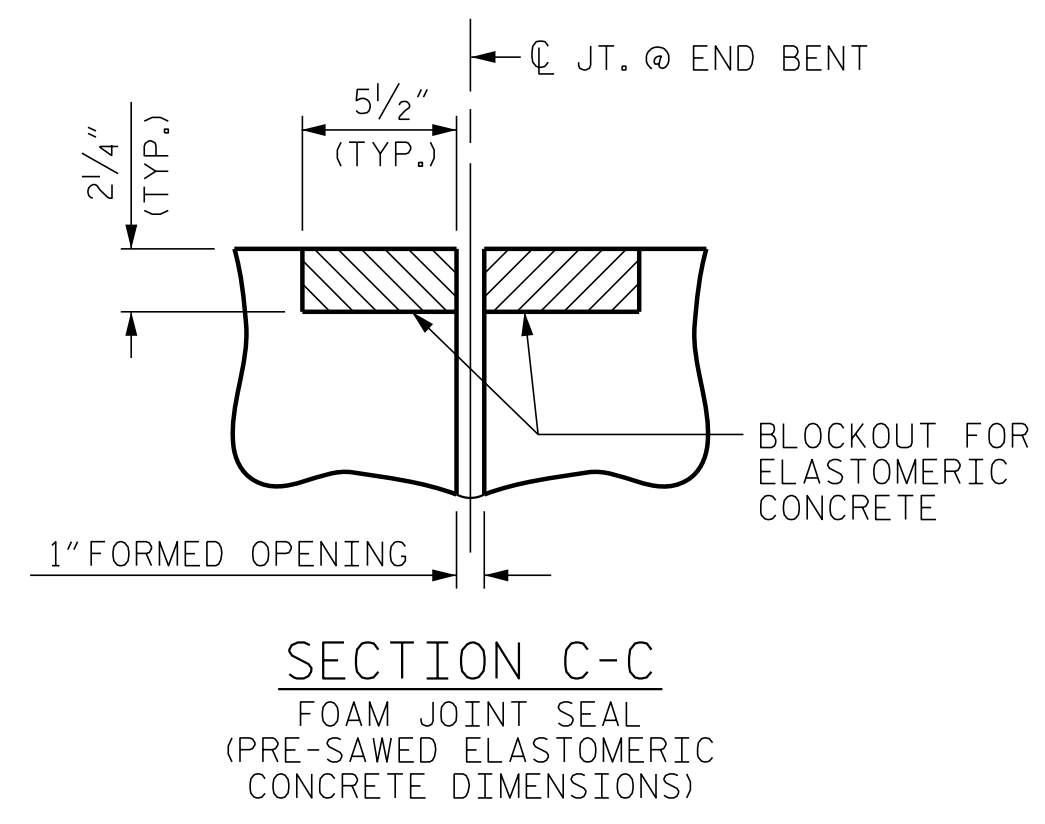
DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
 3/25/2019

Gregory M. Olland  
 ENGINEERING

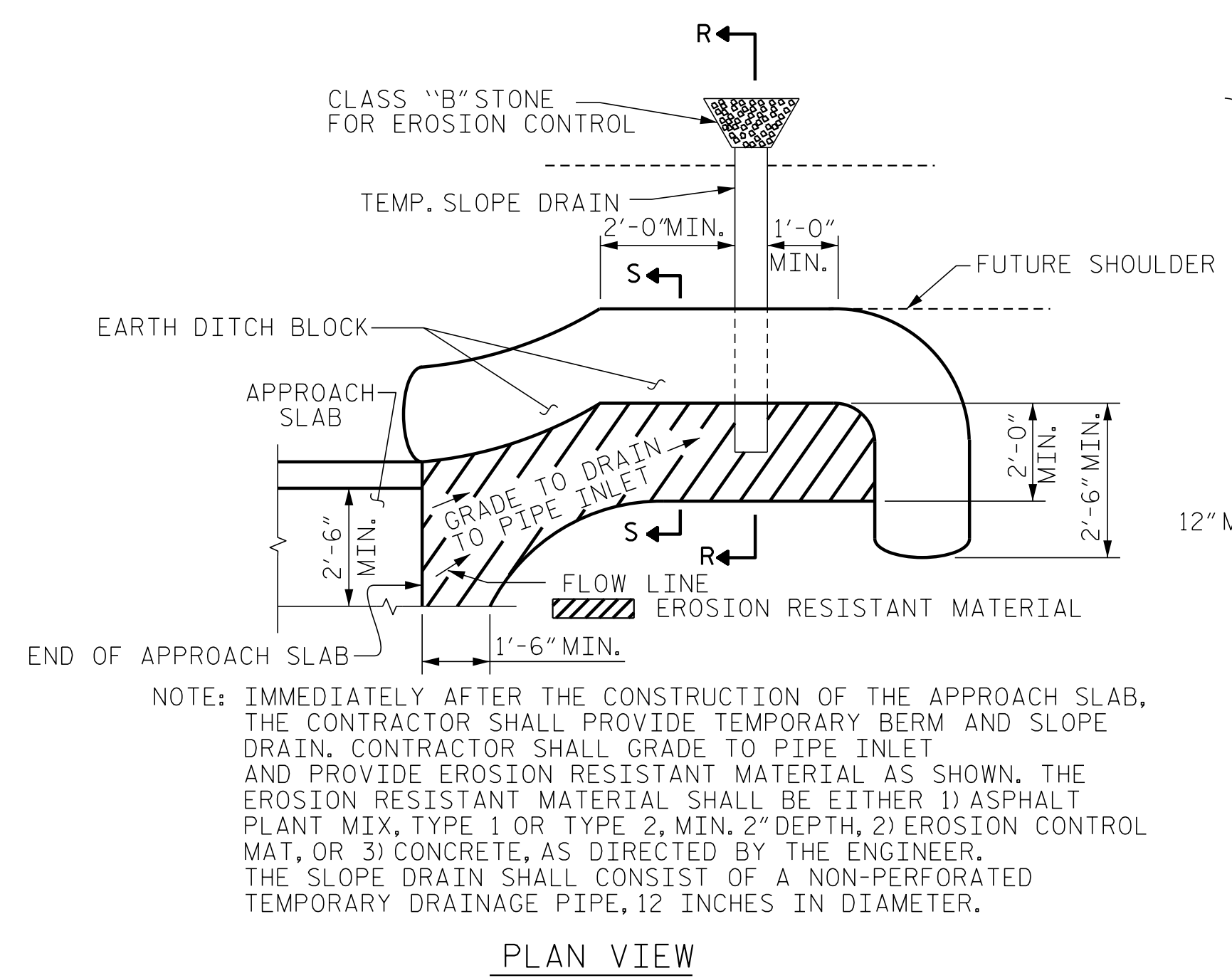
1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S1-26
TOTAL SHEETS					27



**JOINT SEAL DETAILS @ END BENT**

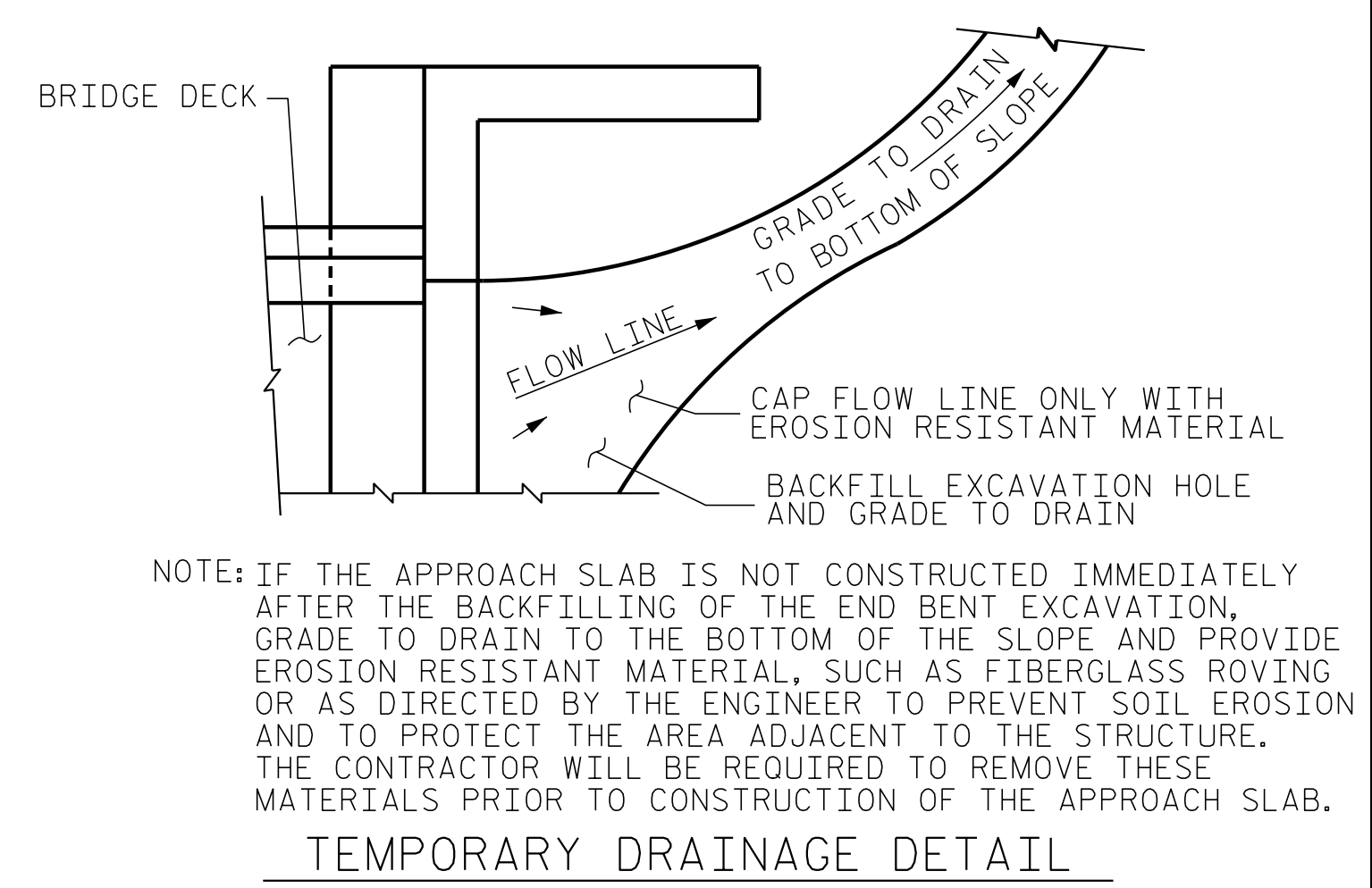
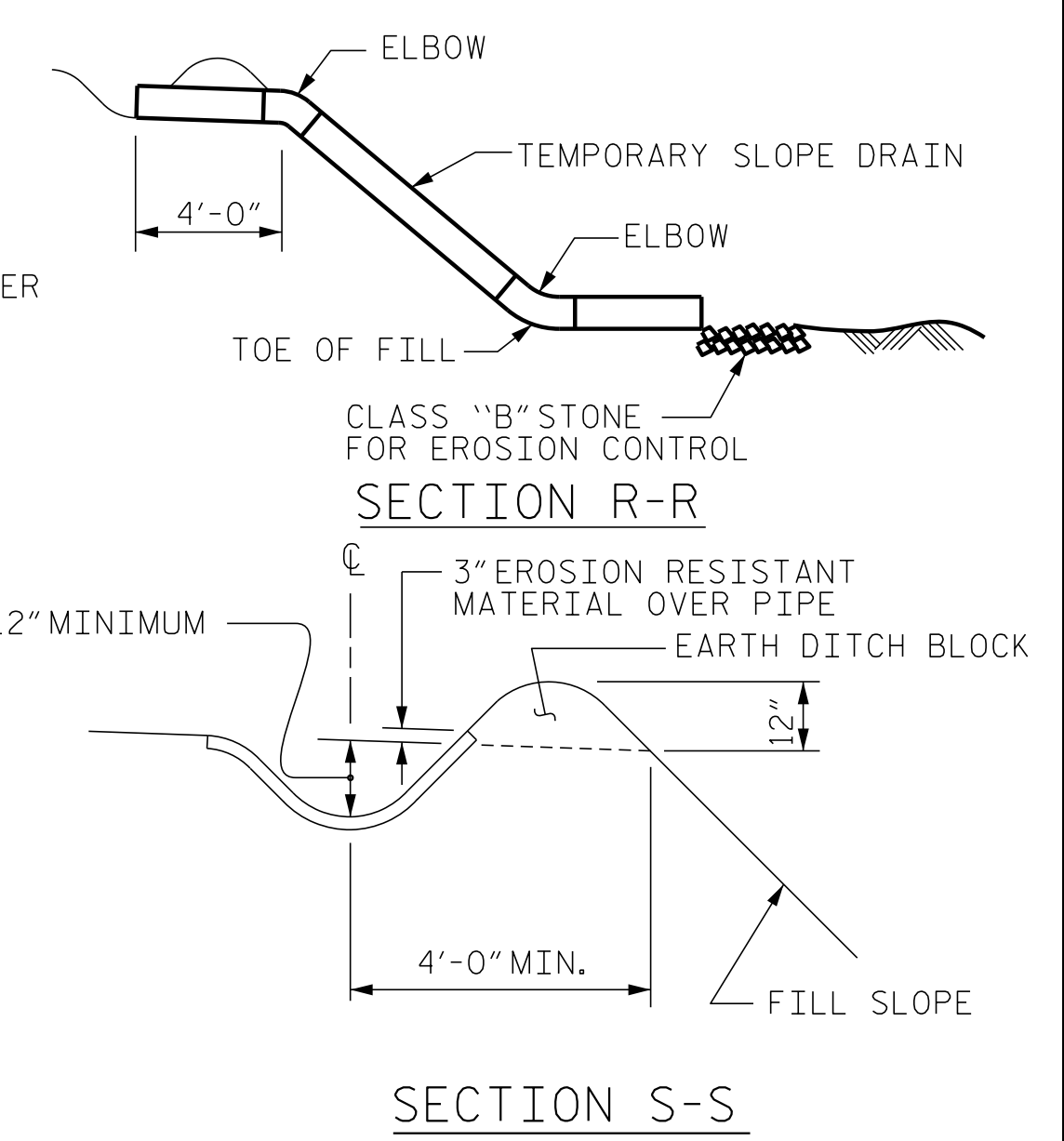
FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.  
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL PROVIDE 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.

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	8.2
2	8.3
TOTAL	16.5

\* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 3 OF 3

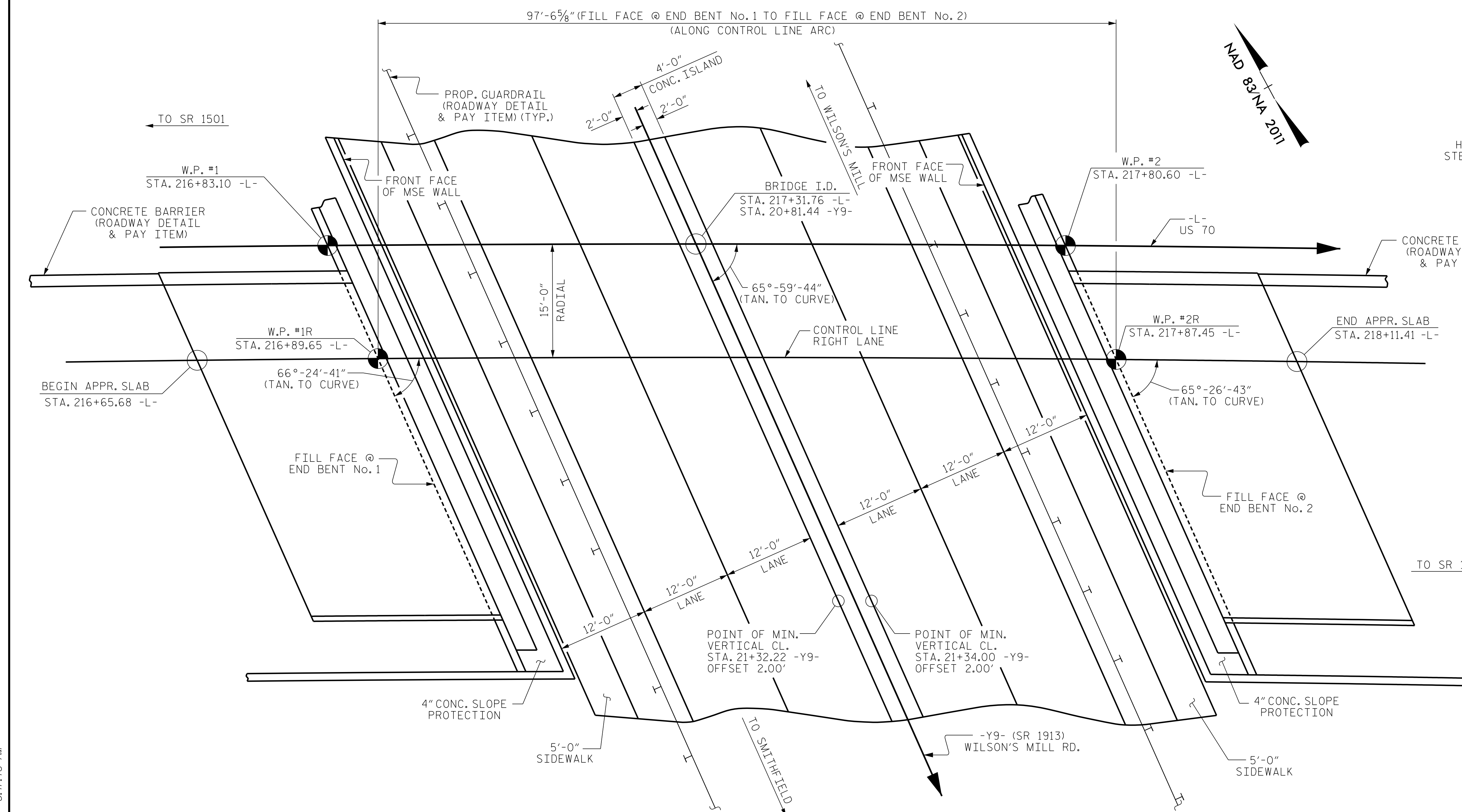
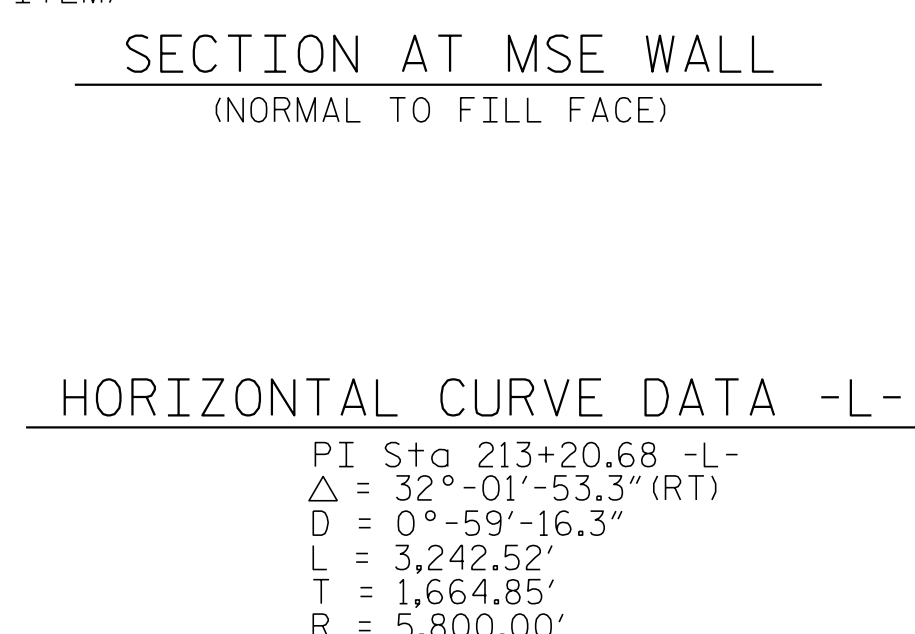
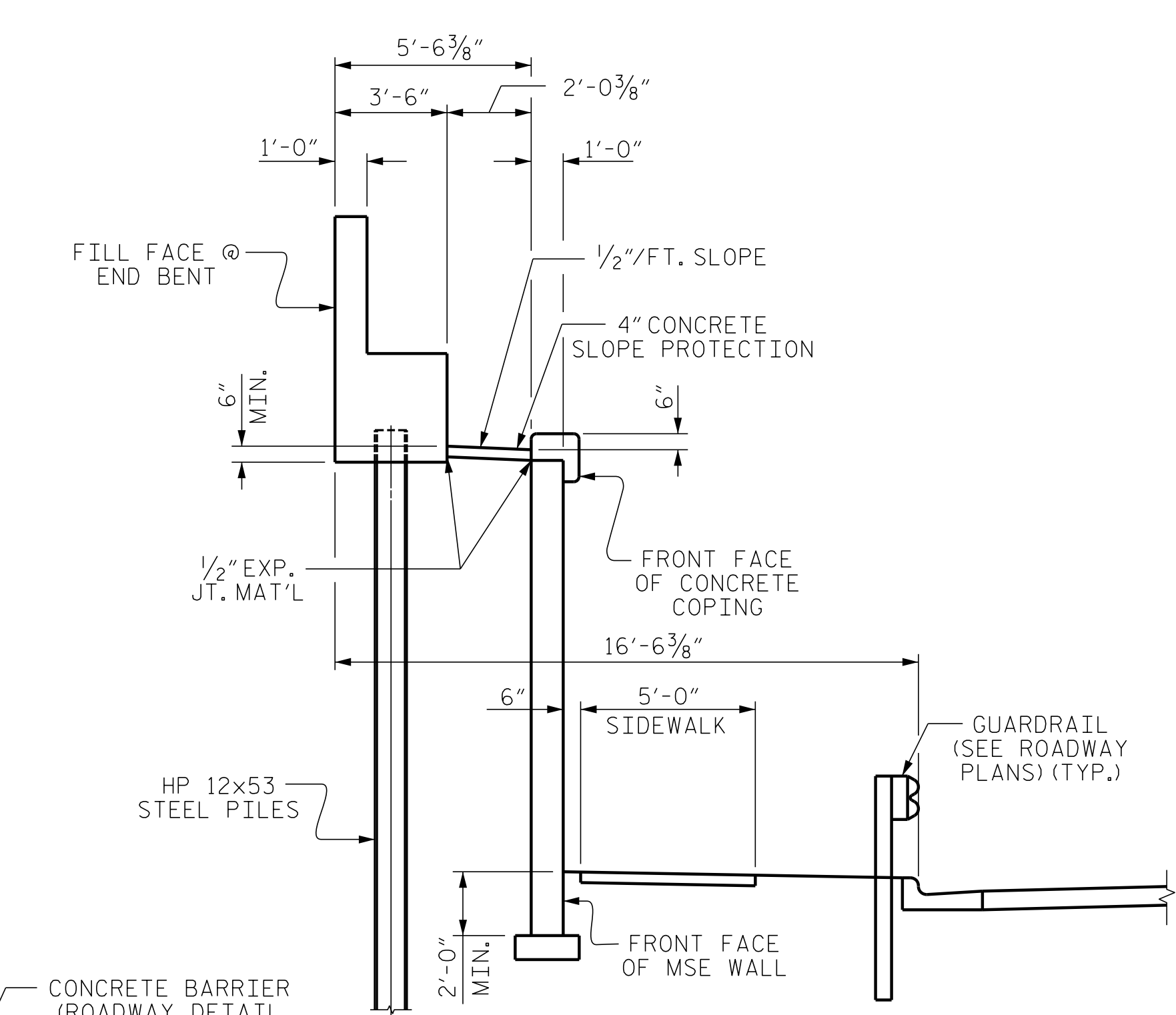
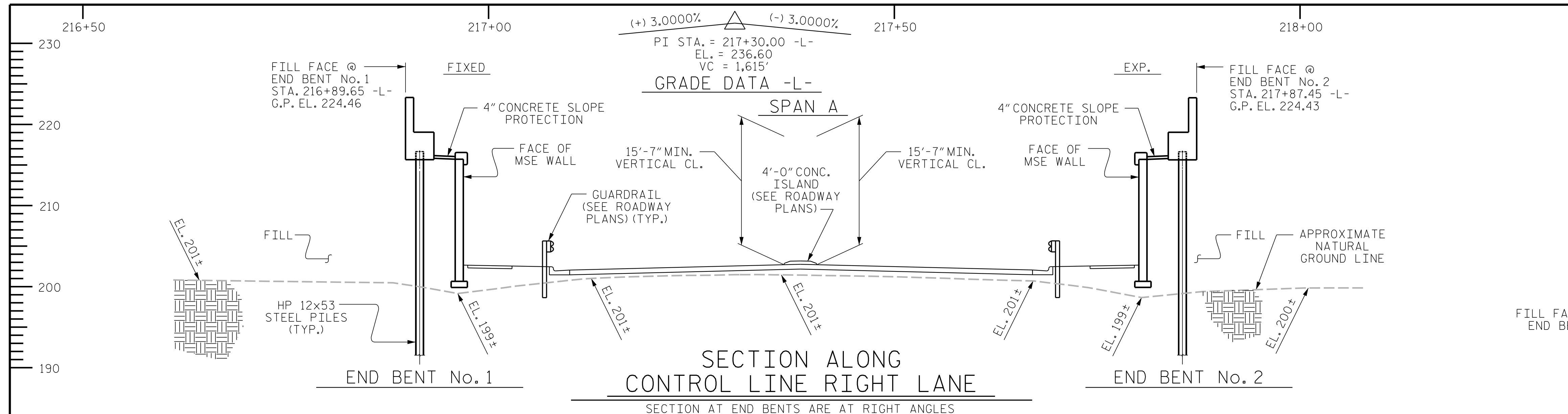
ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Allard  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

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

SHEET NO. S1-27				
TOTAL SHEETS 27				

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

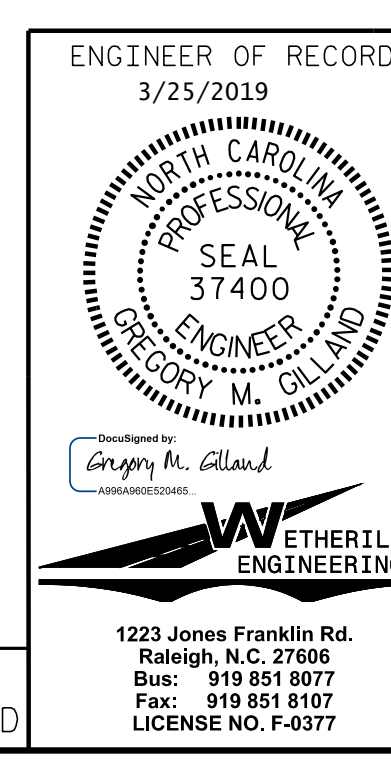
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 3/20/2019 8:43:01 AM



DRAWN BY : D. HODGE DATE : 1/18  
 CHECKED BY : B.C. HUNT DATE : 6/18

PILES NOT SHOWN IN PLAN VIEW FOR CLARITY

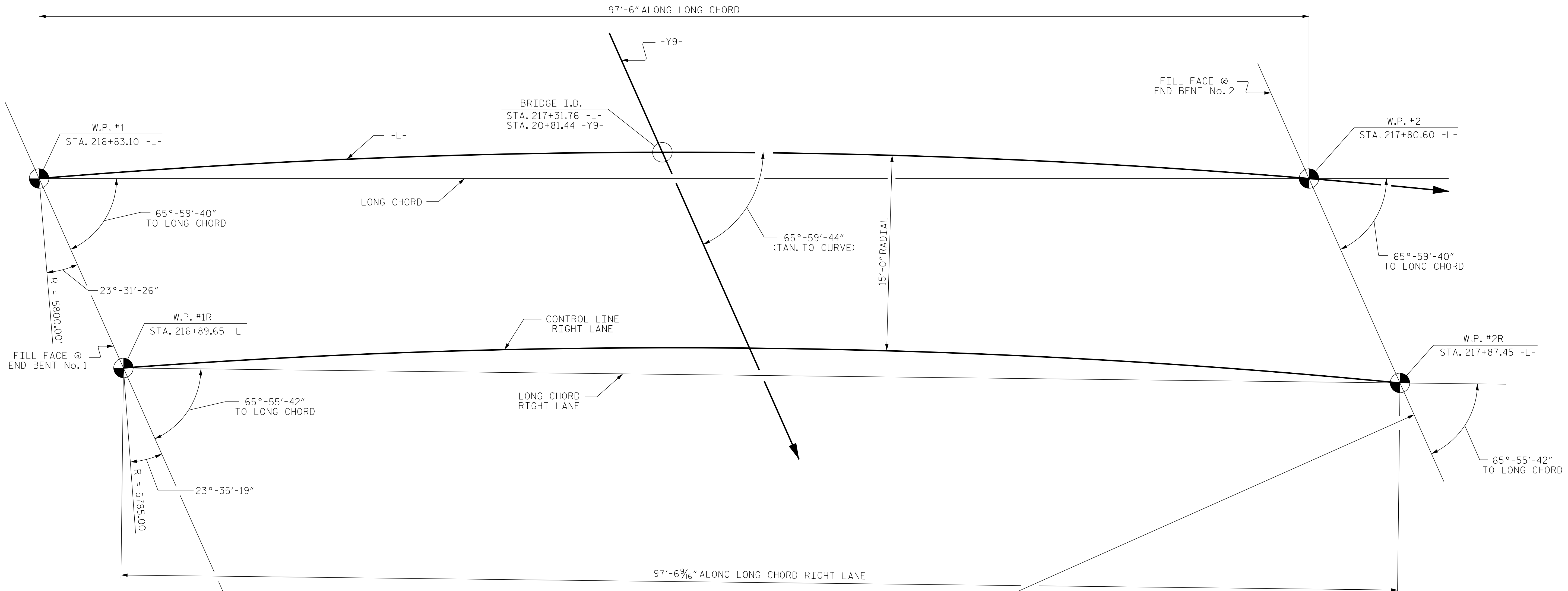
DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. W-5600  
 JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 20+81.44 -Y9-  
 SHEET 1 OF 3 BRIDGE No. 647

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR RIGHT LANE BRIDGE  
 ON US 70 OVER WILSON'S  
 MILL RD. (SR 1913) BETWEEN  
 SR 1501 AND SR 1915

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-1
1			3			TOTAL SHEETS 18
2			4			



**LONG CHORD LAYOUT**  
END BENTS ARE PARALLEL

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 2 OF 3

ENGINEER OF RECORD:  
3/25/2019

Gregory M. Gilliland  
 WETHERILL ENGINEERING

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
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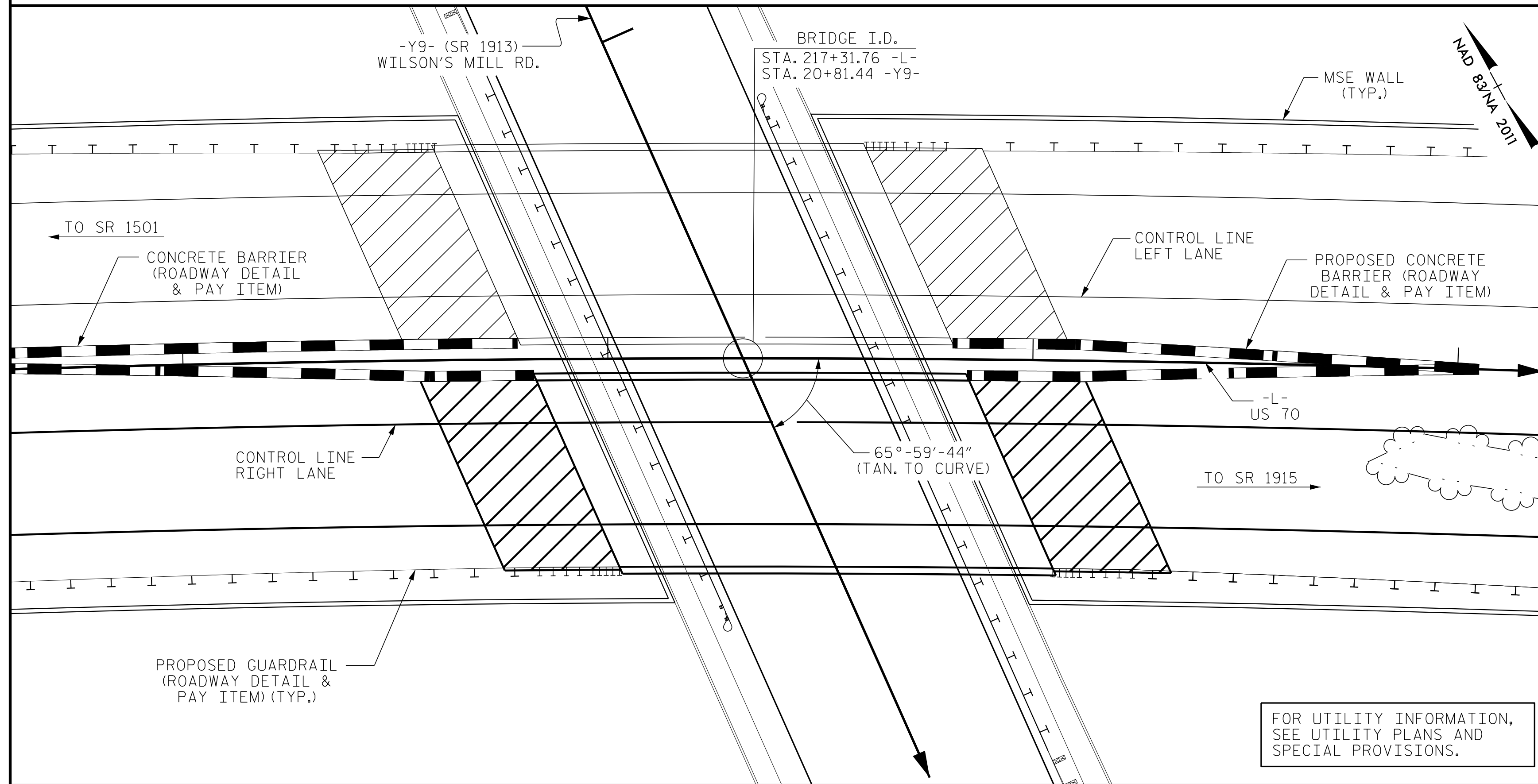
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR RIGHT LANE BRIDGE ON US 70 OVER WILSON'S MILL RD. (SR 1913) BETWEEN SR 1501 AND SR 1915					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S2-2
TOTAL SHEETS					18

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : D. HODGE DATE : 2/18  
 CHECKED BY : G.M. GILLAND DATE : 3/18

P:\2017\1712101\W-5600\USTO\Structures\DGM\L-over -Y9-DGN (RIGHT LANE)\WE.Ldgn  
 3/20/2019 8:54:20 AM

BM #14 - BENCH TIE NAIL SET IN 16" PINE, 205.18' LT OF -L- STA. 236+54.97, ELEV 196.34



LOCATION SKETCH

**NOTES:**

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR FOUNDATION LAYOUT SKETCH, SEE LEFT LANE STRUCTURE PLANS.

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

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

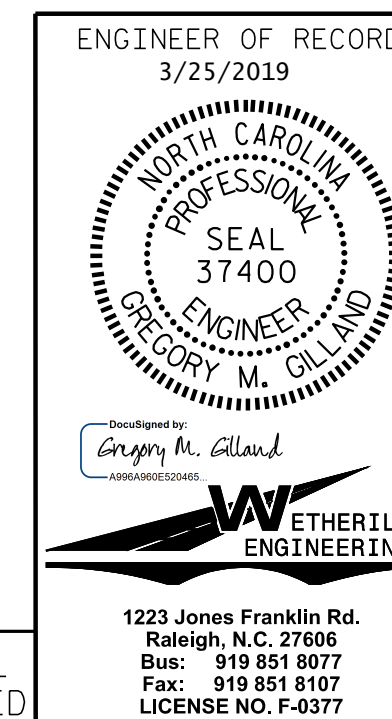
TOTAL BILL OF MATERIAL									
	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	BRIDGE APPROACH SLABS	54" PRESTRESSED CONCRETE GIRDERS		CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	SQ. FT.	SQ. FT.	LUMP SUM	No.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	4,502	5,857	LUMP SUM	5	468.13	* 240.62		LUMP SUM	LUMP SUM
END BENT No. 1							15		
END BENT No. 2							15		
TOTAL	4,502	5,857	LUMP SUM	5	468.13	* 240.62	30	LUMP SUM	LUMP SUM

\* CONTAINS THE ADDITIONAL LINEAR FEET OF CONCRETE BARRIER RAIL ON APPROACH SLABS

END BENT PAY ITEMS: PDA TESTING, CLASS A CONCRETE, REINFORCING STEEL, PILE DRIVING EQUIPMENT SET UP FOR HP 12 x 53 STEEL PILES AND HP 12 x 53 STEEL PILES, SEE GENERAL DRAWING (LEFT LANE) TOTAL BILL OF MATERIAL.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR RIGHT LANE BRIDGE  
 ON US 70 OVER WILSON'S  
 MILL RD. (SR 1913) BETWEEN  
 SR 1501 AND SR 1915

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-3
1			3			TOTAL SHEETS
2			4			18

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

P:\2017\1712101\W-5600\USTO\Structures\DGM\L-over -Y9\DGN (RIGHT LANE)\_WE I.dgn  
 3/20/2019 8:52:22 AM

DRAWN BY : D. HODGE DATE : 1/18  
 CHECKED BY : B.C. HUNT DATE : 6/18



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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.14	--	1.75	0.840	1.46	A	EL	46.100	1.040	1.33	A	I	83.560	0.80	0.780	1.14	A	I	46.100		
	HL-93 (OPERATING)	N/A		1.75	--	1.35	0.840	1.89	A	EL	46.100	1.040	1.75	A	I	83.560	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.57	56.520	1.75	0.840	2.00	A	EL	46.100	1.040	1.78	A	I	83.560	0.80	0.780	1.57	A	I	46.100		
	HS-20 (OPERATING)	36.000		2.33	83.880	1.35	0.840	2.59	A	EL	46.100	1.040	2.33	A	I	83.560	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.68	49.680	1.40	0.840	5.88	A	EL	46.100	1.040	5.66	A	I	83.560	0.80	0.780	3.68	A	I	46.100	
		SNGARBS2	20.000		2.68	53.600	1.40	0.840	4.28	A	EL	46.100	1.040	3.95	A	I	83.560	0.80	0.780	2.68	A	I	46.100	
		SNAGRIS2	22.000		2.51	55.220	1.40	0.840	4.01	A	EL	46.100	1.040	3.64	A	I	83.560	0.80	0.780	2.51	A	I	46.100	
		SNCOTTS3	27.250		1.83	49.868	1.40	0.840	2.92	A	EL	46.100	1.040	2.77	A	I	83.560	0.80	0.780	1.83	A	I	46.100	
		SNAGGRS4	34.925		1.50	52.388	1.40	0.840	2.40	A	EL	46.100	1.040	2.25	A	I	83.560	0.80	0.780	1.50	A	I	46.100	
		SNS5A	35.550		1.47	52.259	1.40	0.840	2.35	A	EL	46.100	1.040	2.26	A	I	83.560	0.80	0.780	1.47	A	I	46.100	
		SNS6A	39.950		1.34	53.533	1.40	0.840	2.14	A	EL	46.100	1.040	2.04	A	I	83.560	0.80	0.780	1.34	A	I	46.100	
		SNS7B	42.000		1.28	53.760	1.40	0.840	2.04	A	EL	46.100	1.040	1.99	A	I	83.560	0.80	0.780	1.28	A	I	46.100	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.63	53.790	1.40	0.840	2.61	A	EL	46.100	1.040	2.46	A	I	83.560	0.80	0.780	1.63	A	I	46.100	
		TNT4A	33.075		1.64	54.243	1.40	0.840	2.62	A	EL	46.100	1.040	2.41	A	I	83.560	0.80	0.780	1.64	A	I	46.100	
		TNT6A	41.600		1.33	55.328	1.40	0.840	2.12	A	EL	46.100	1.040	2.09	A	I	83.560	0.80	0.780	1.33	A	I	46.100	
		TNT7A	42.000		1.33	55.860	1.40	0.840	2.13	A	EL	46.100	1.040	2.06	A	I	83.560	0.80	0.780	1.33	A	I	46.100	
		TNT7B	42.000		1.36	57.120	1.40	0.840	2.18	A	EL	46.100	1.040	1.95	A	I	83.560	0.80	0.780	1.36	A	I	46.100	
		TNAGRIT4	43.000		1.31	56.330	1.40	0.840	2.09	A	EL	46.100	1.040	1.89	A	I	83.560	0.80	0.780	1.31	A	I	46.100	
TNAGT5A	45.000		1.24	55.800	1.40	0.840	1.98	A	EL	46.100	1.040	1.86	A	I	83.560	0.80	0.780	1.24	A	I	46.100			
TNAGT5B	45.000		③	1.23	55.350	1.40	0.840	1.96	A	EL	46.100	1.040	1.79	A	I	83.560	0.80	0.780	1.23	A	I	46.100		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

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

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

COMMENTS:

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

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

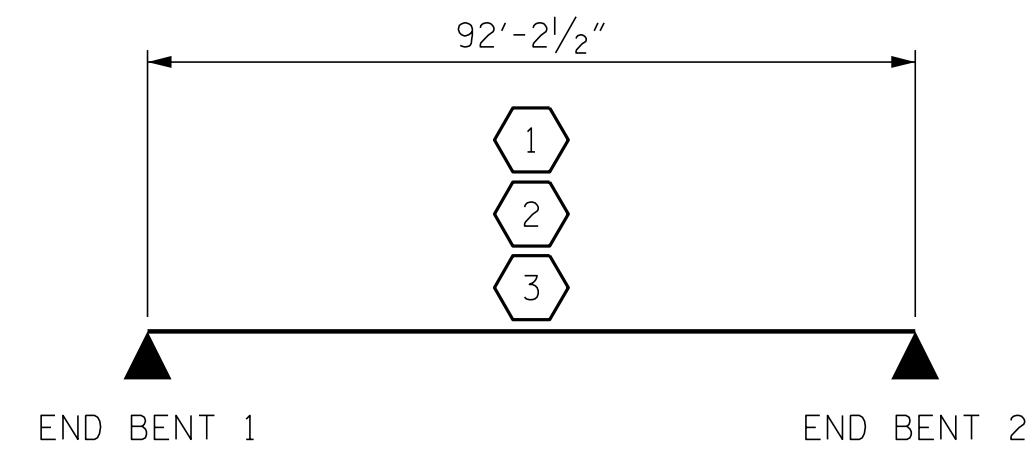
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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GIRDER LOCATION

I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

P:\2017\1712101\W-5600\USTO\Structures\DGN\L-over -Y9-DGN (RIGHT LANE)\_WE I.dgn  
 3/20/2019 8:56:22 AM

ASSEMBLED BY : D. HODGE	DATE : 4/18
CHECKED BY : B.C. HUNT	DATE : 6/18
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

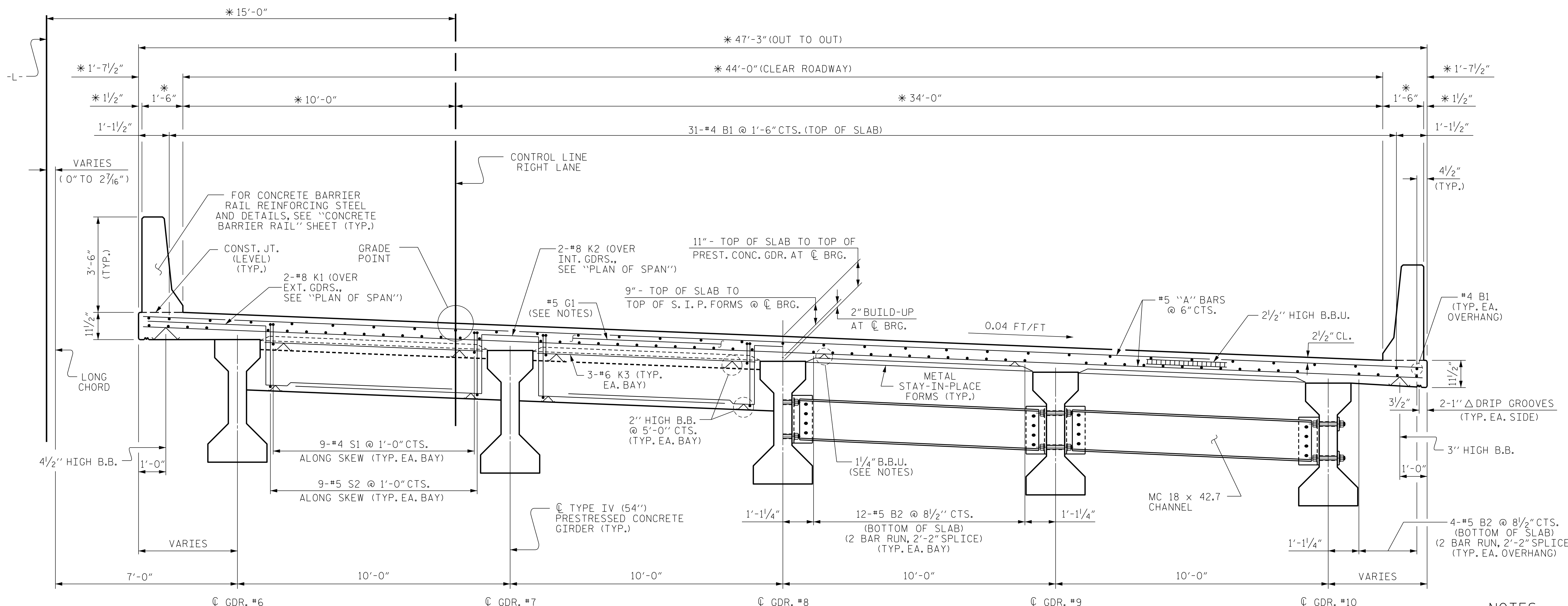
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ENGINEER OF RECORD:  
3/25/2019

Gregory M. Gulland  
ENGINEERING

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

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC) (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S2-4 TOTAL SHEETS 18



HALF SECTION - END BENT DIAPHRAGM

HALF SECTION - INTERMEDIATE DIAPHRAGM

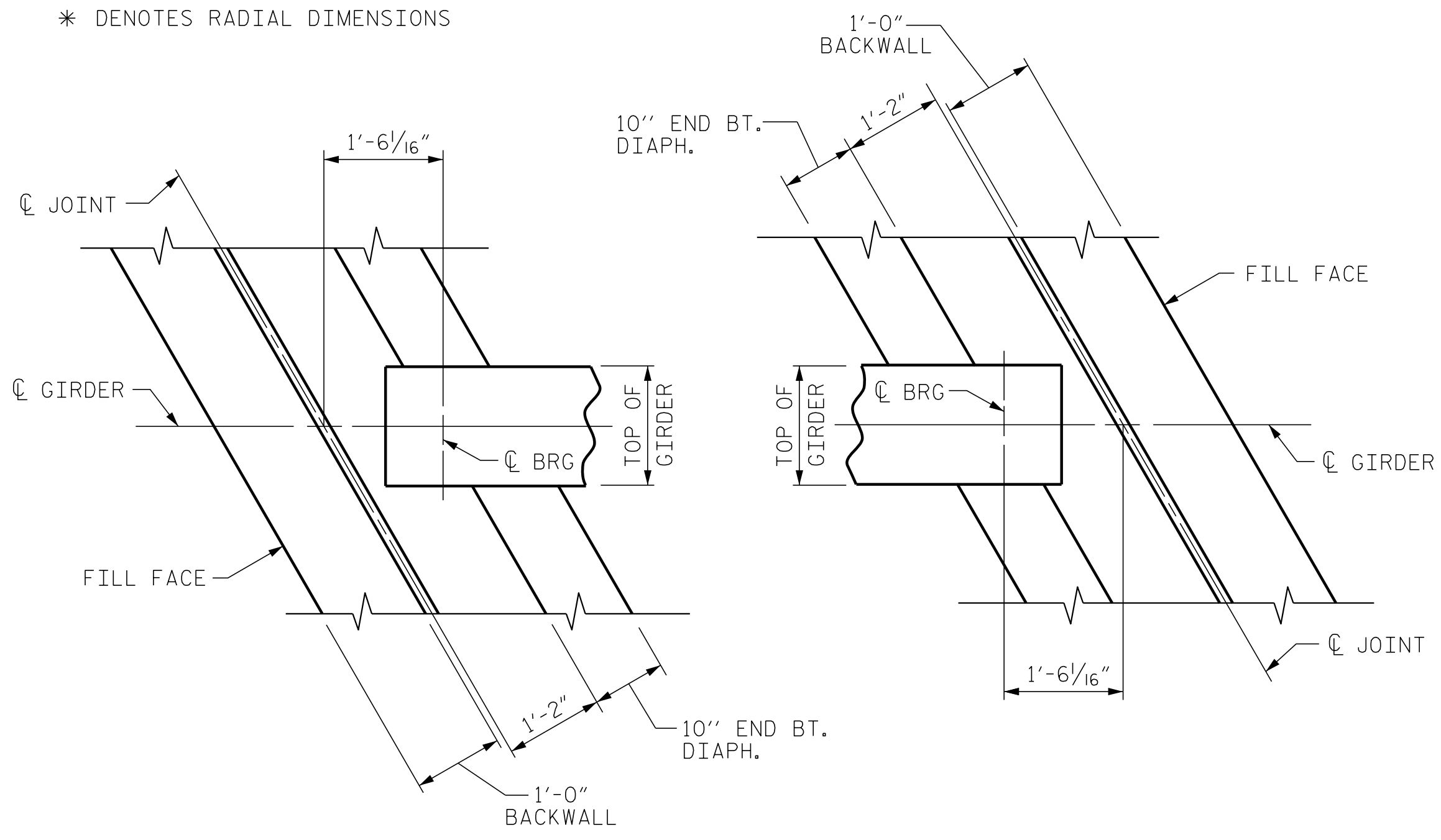
NOTES

- 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.
- BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- #5 G1 BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

TYPICAL SECTION

\* DENOTES RADIAL DIMENSIONS

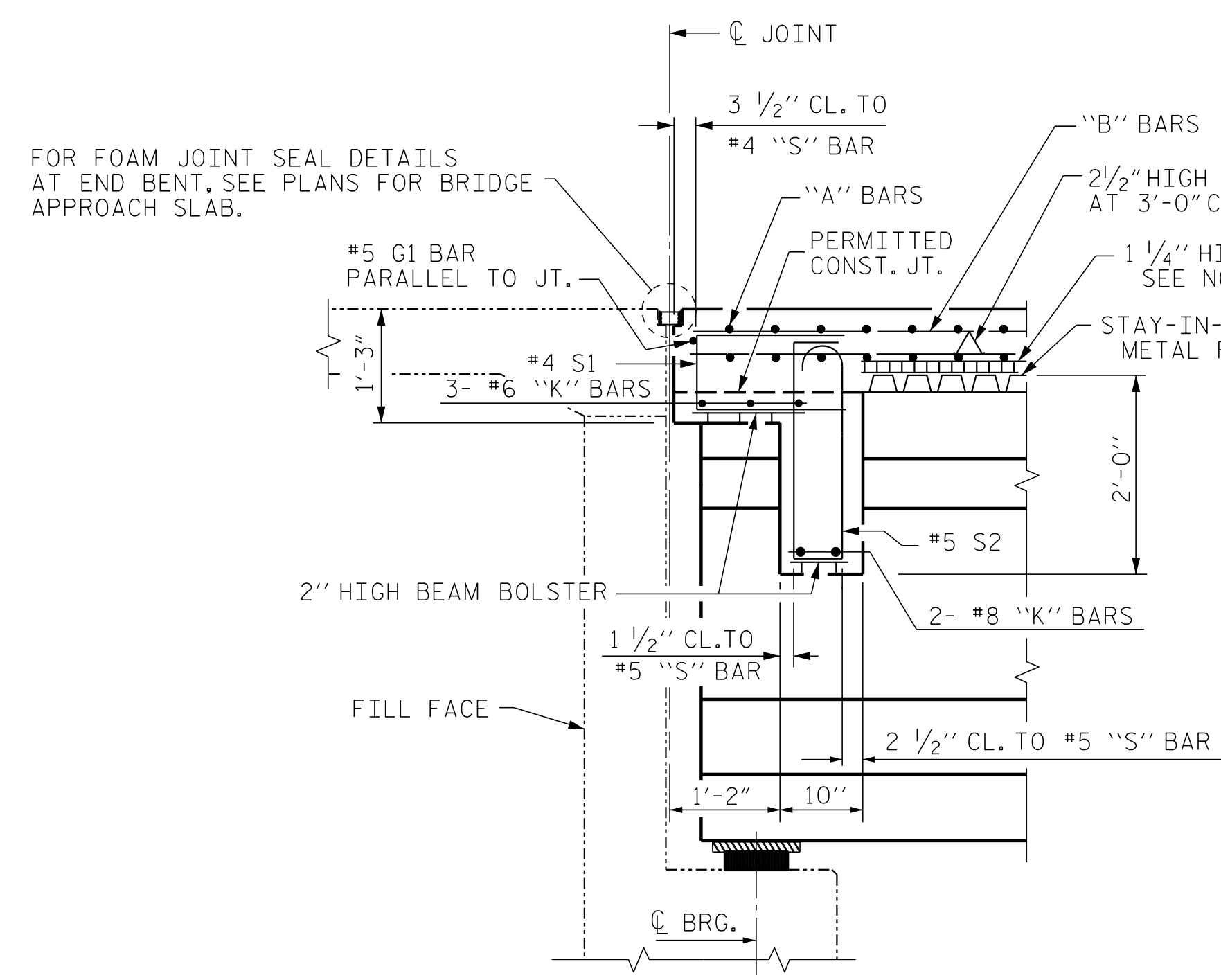


END BENT No. 1 DIAPHRAGM

END BENT No. 2 DIAPHRAGM

PLAN

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SECTION THRU END BENT DIAPHRAGM

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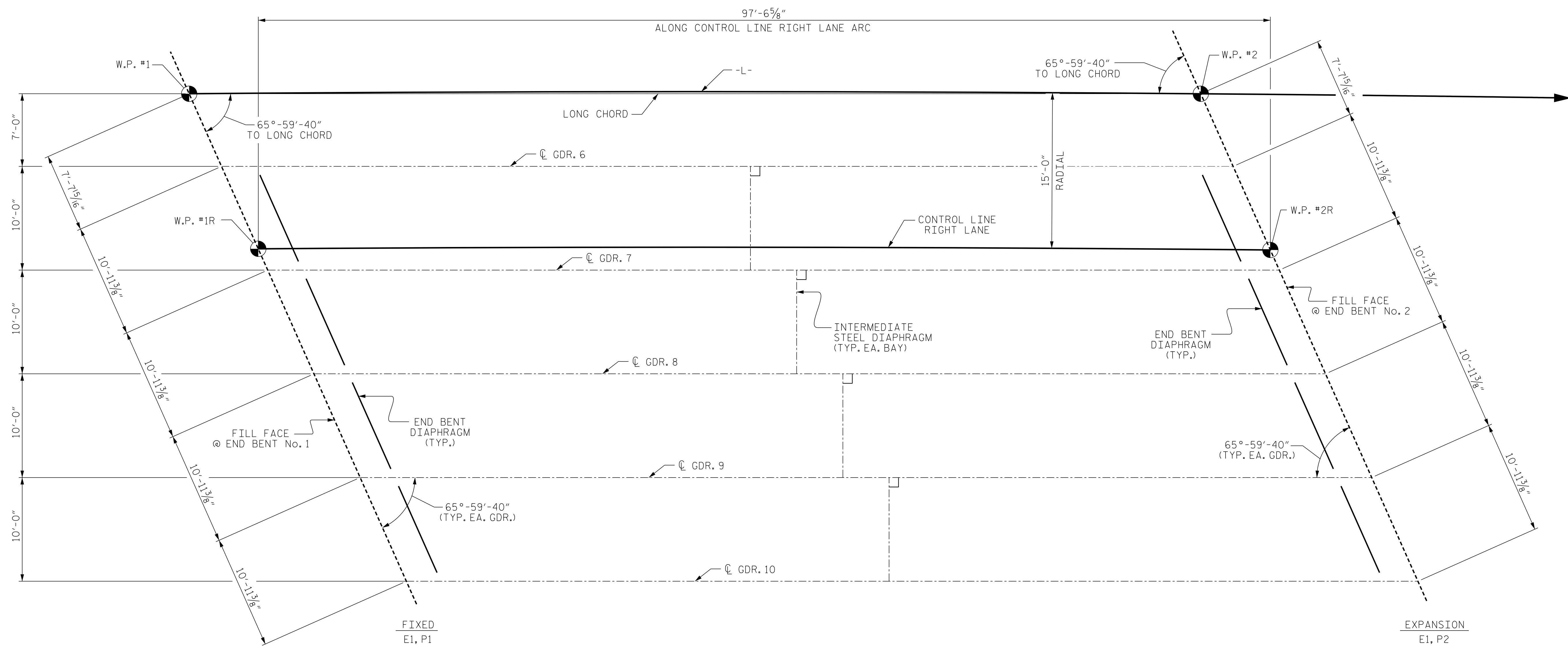
DRAWN BY: D. HODGE DATE: 12/17  
 CHECKED BY: G.M. GILLAND DATE: 2/18

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gilland  
 ETHERILL ENGINEERING

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S2-5					TOTAL SHEETS 18

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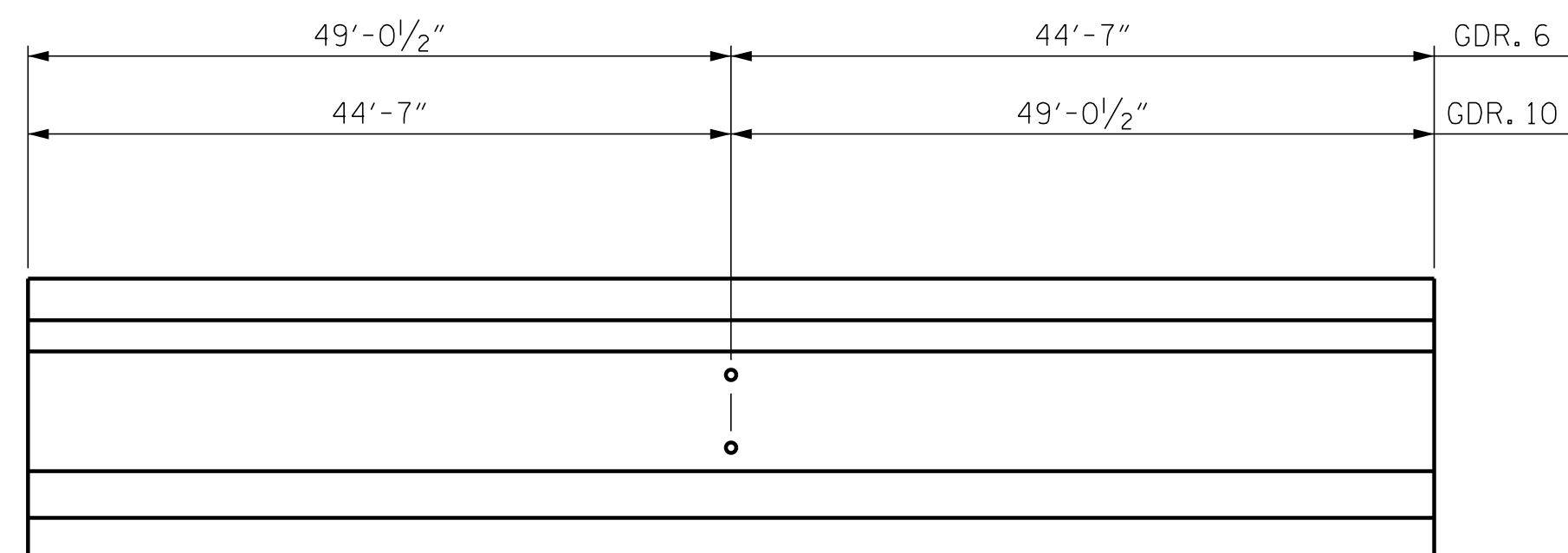




SPAN A

**GIRDER LAYOUT**

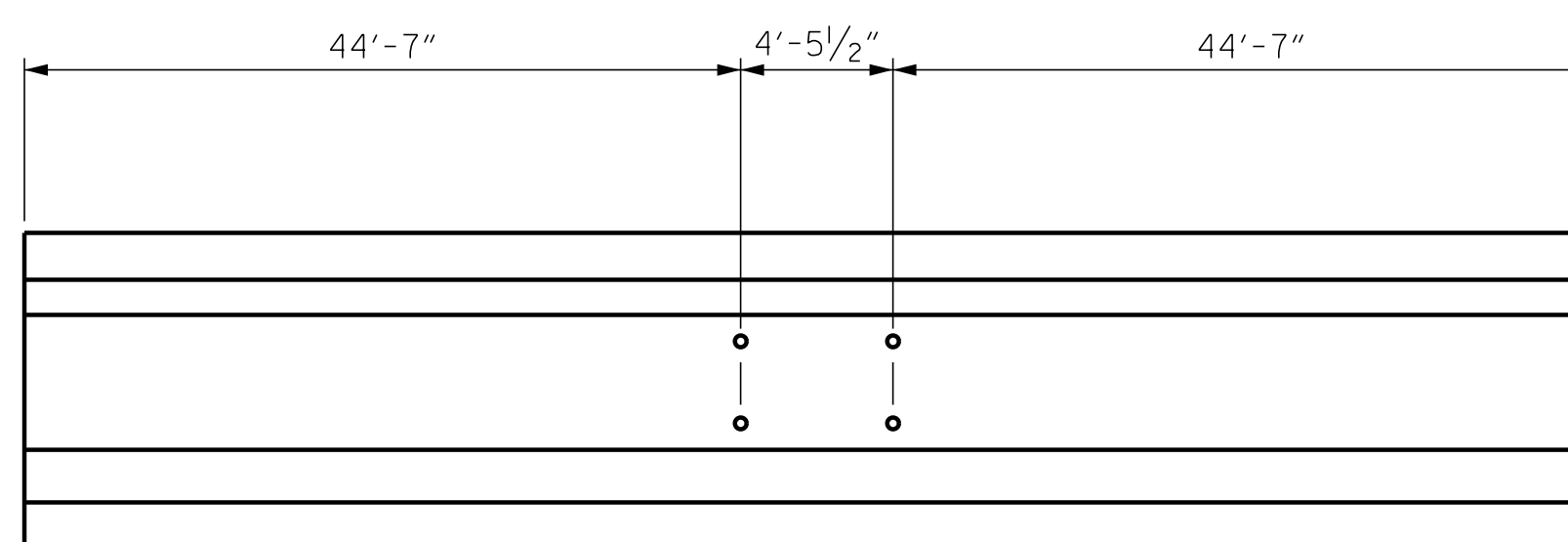
ALL GIRDERS ARE PARALLEL TO LONG CHORD.



**ELEVATION OF EXTERIOR GIRDS**

SHOWING LOCATION OF 1/2" Ø HOLES IN WEB

UP STATION →



**ELEVATION OF INTERIOR GIRDS**

SHOWING LOCATION OF 1/2" Ø HOLES IN WEB

UP STATION →

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

ENGINEER OF RECORD:  
3/25/2019

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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 FRAMING PLAN  
 (RIGHT LANE)**

REVISIONS

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

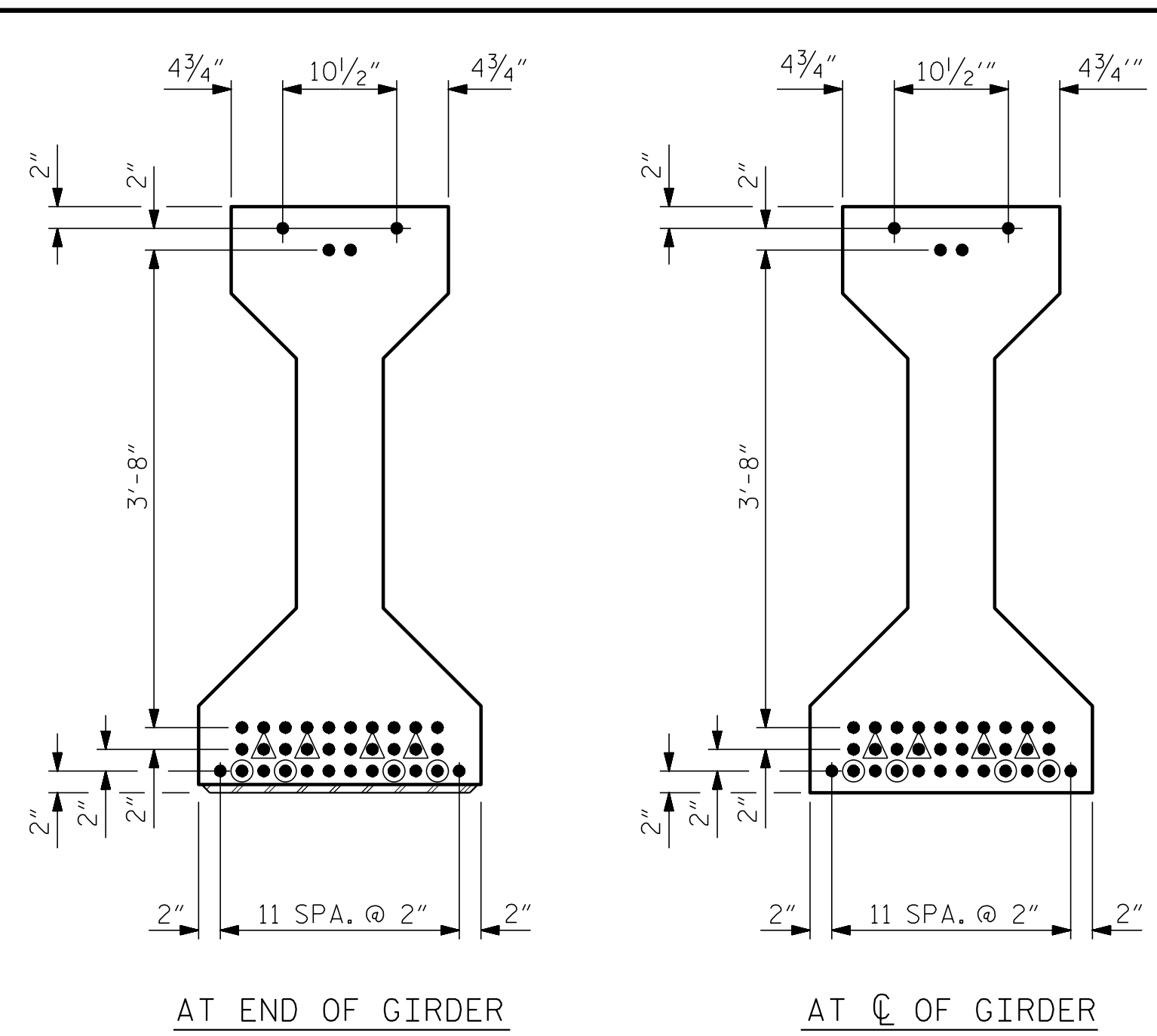
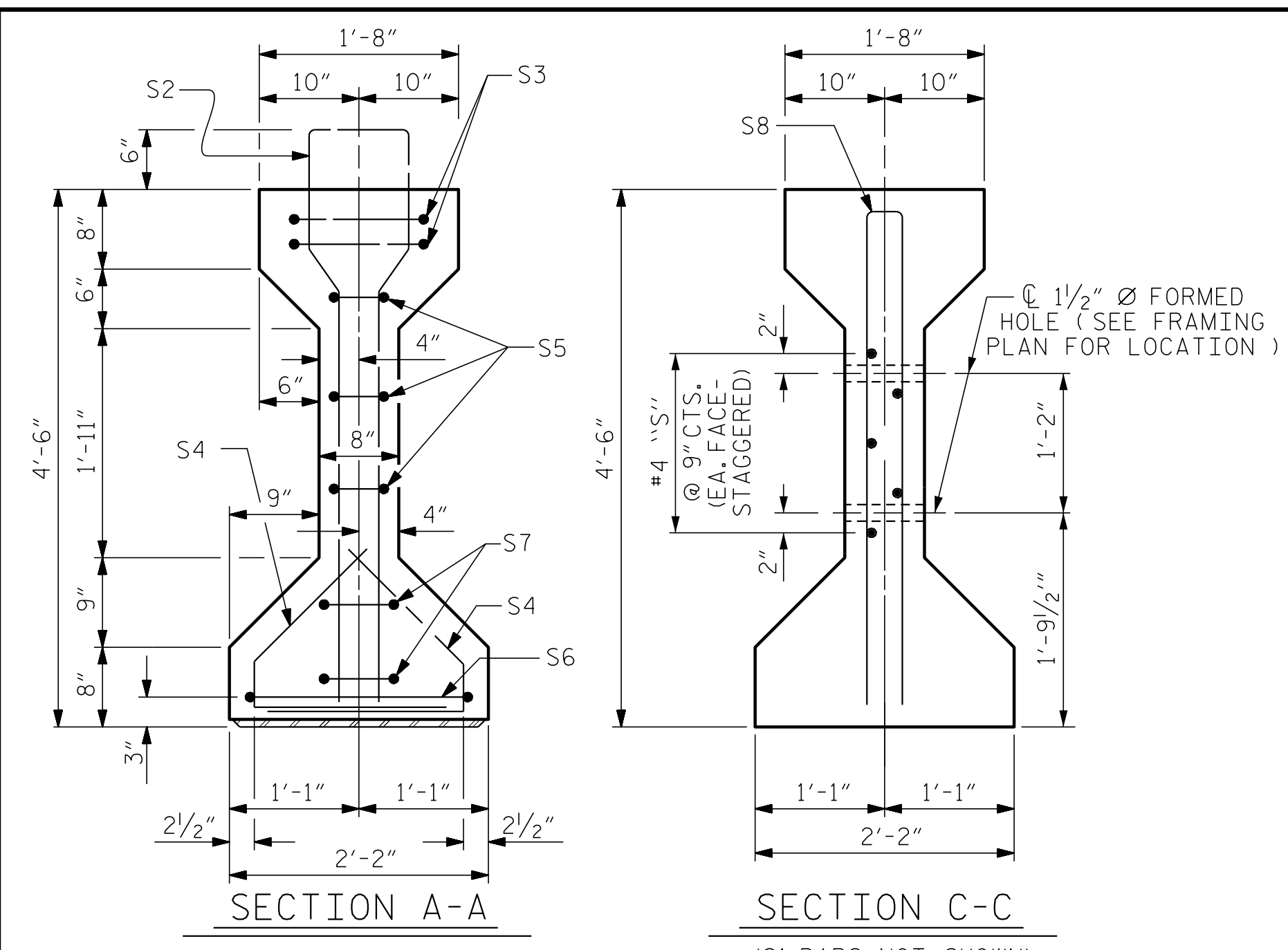
SHEET NO.  
S2-7  
 TOTAL SHEETS  
 18

DRAWN BY: D. HODGE DATE: 1/18  
 CHECKED BY: G.M. GILLAND DATE: 2/18

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P:\2017\1712101\W-5600\_USTO.Structures\DGN\L- over -Y9-DGN (R.IGHT LANE)\WE I.dgn  
 3/20/2019 9:05:07 AM



**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.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES.

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.

ALL PRESTRESSED STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

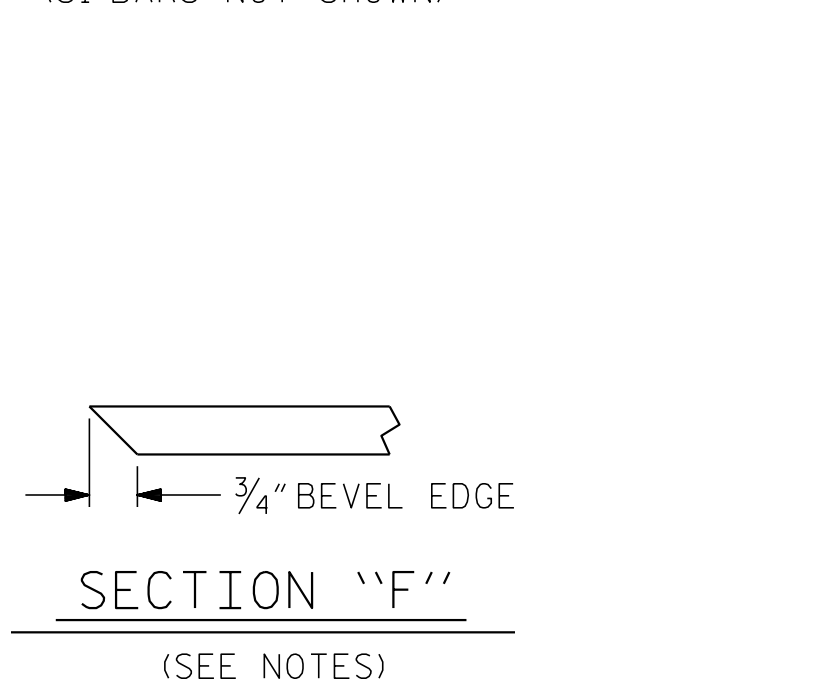
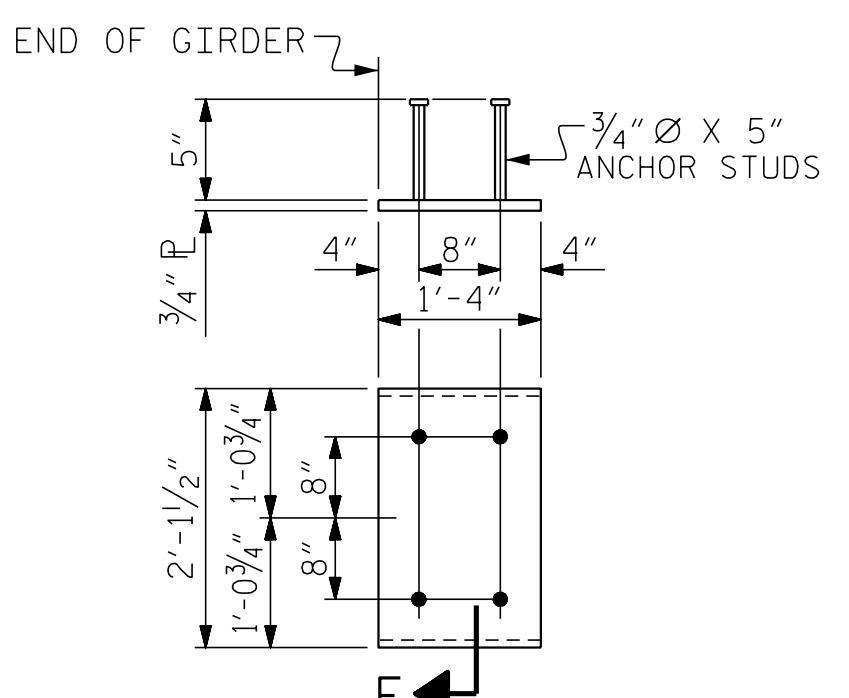
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

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

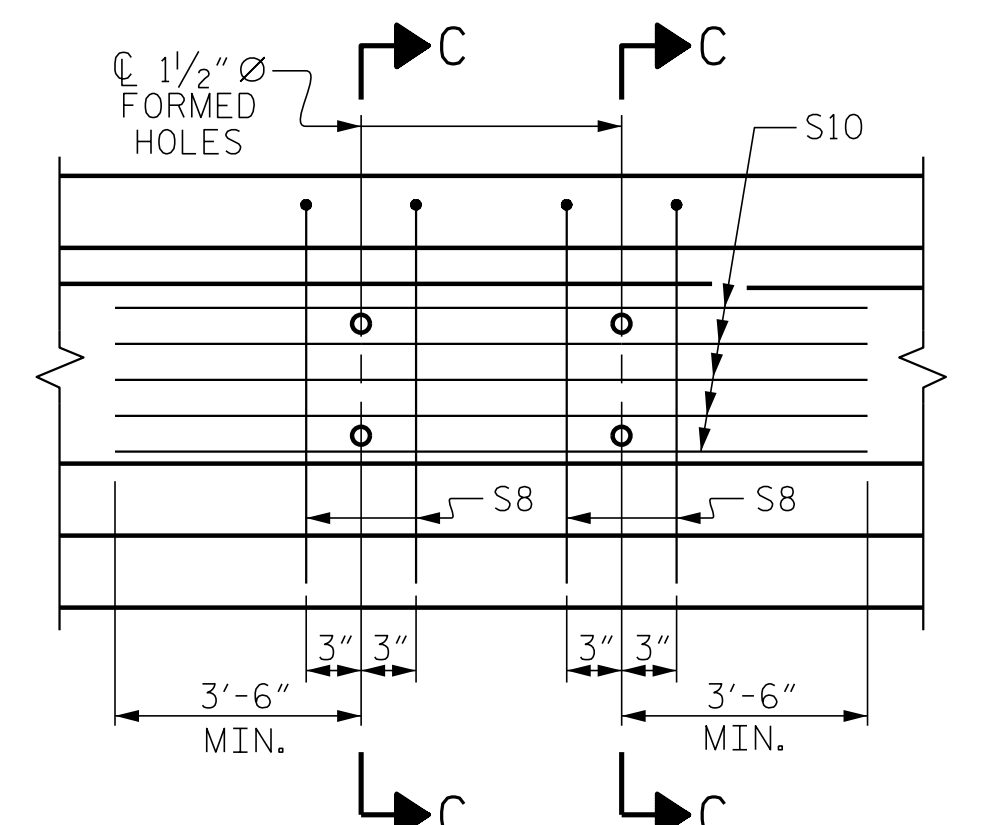
THE TOP SURFACE OF THE GIRDER SHALL BE RAKED TO A DEPTH OF 1/4" EXCEPT IN THE AREA BETWEEN THE STIRRUP AND THE EDGE OF THE GIRDER.

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

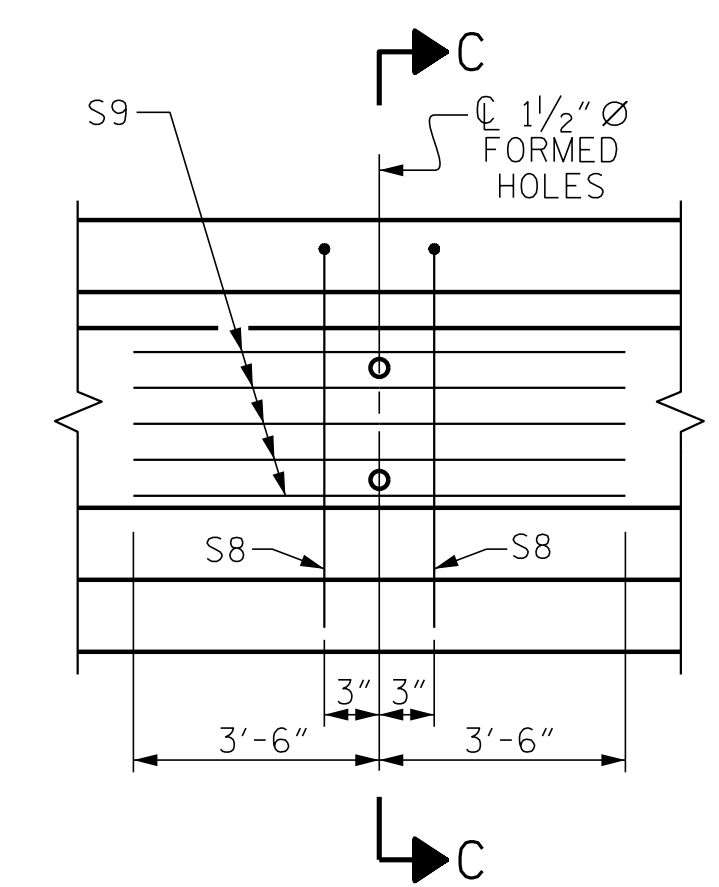
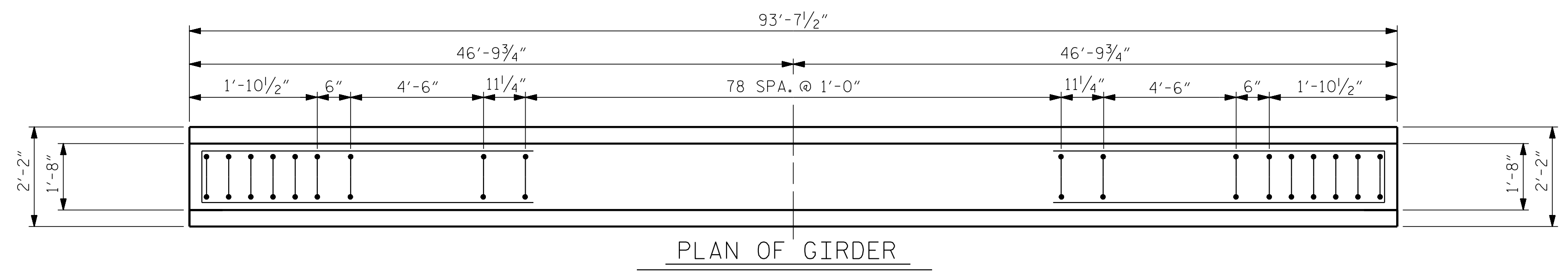
REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	99	#4	1	10'-8"	705
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	2	#4	2	9'-11"	13
S7	4	#4	2	8'-7"	23
S8	2	#5	2	8'-8"	18
S8	4	#5	2	8'-8"	36
S9	5	#4	STR	7'-0"	23
S10	5	#4	STR	11'-6"	38



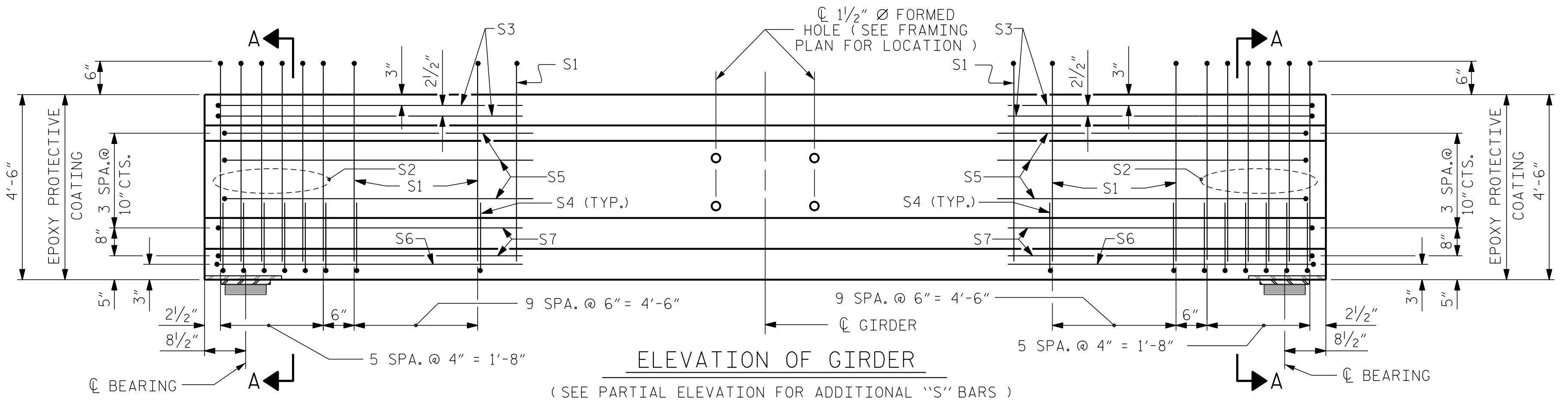
**EMBEDDED PLATE "B-1" DETAILS**  
TWO EMBEDDED PLATES "B-1" ARE REQUIRED FOR EACH GIRDER.



**PARTIAL ELEVATION**  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 7, 8 & 9



**PARTIAL ELEVATION**  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 6 & 10



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

	QUANTITIES FOR ONE GIRDER		
	REINFORCING STEEL (LB.)	7500 PSI CONCRETE (C.Y.)	0.6" Ø L. R. STRANDS (No.)
GDR. 6 & 10	1,178	19.0	36
GDR. 7, 8 & 9	1,211	19.0	36

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	93'-7 1/2"	468'-1 1/2"

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 1 OF 2

ENGINEER OF RECORD:  
3/25/2019

Gregory M. Gilland  
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 AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	
S2-8	TOTAL SHEETS 18

ASSEMBLED BY : D. HODGE	DATE : 1/18
CHECKED BY : G.M. GILLAND	DATE : 2/18
DRAWN BY : JMB 12/87	REV. 10/1/11 MAA/GM
CHECKED BY : ARB 12/87	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

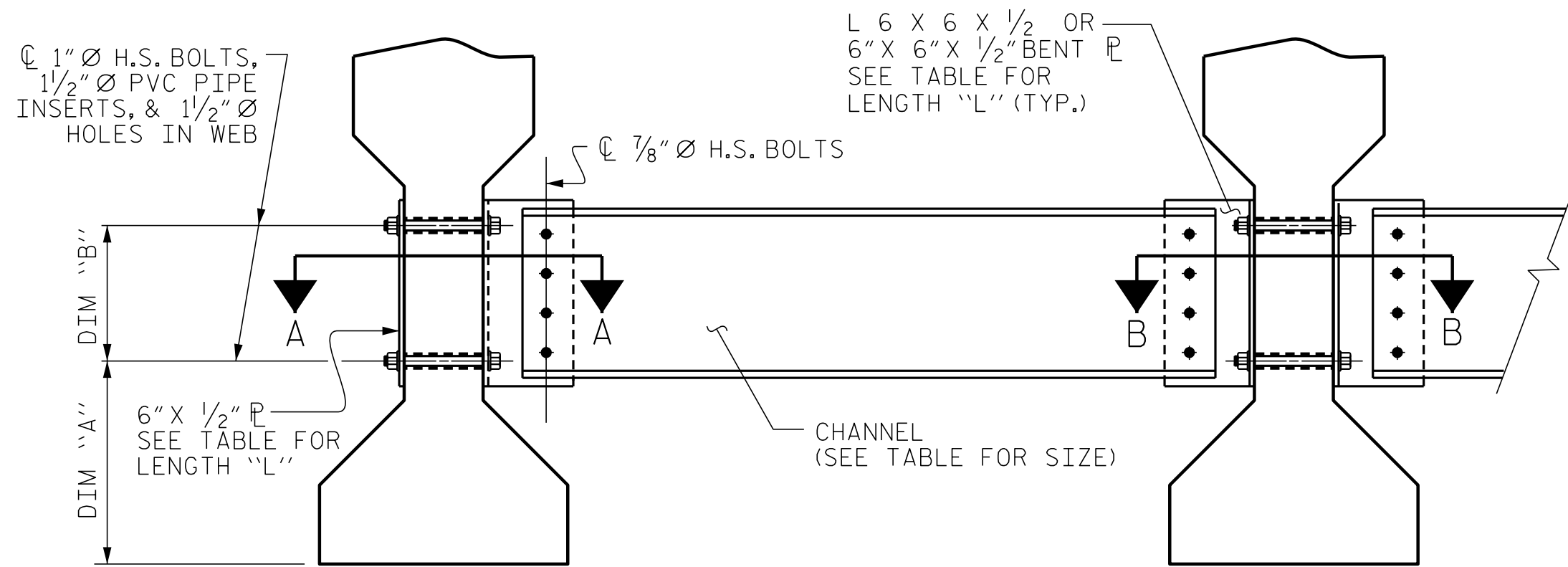
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

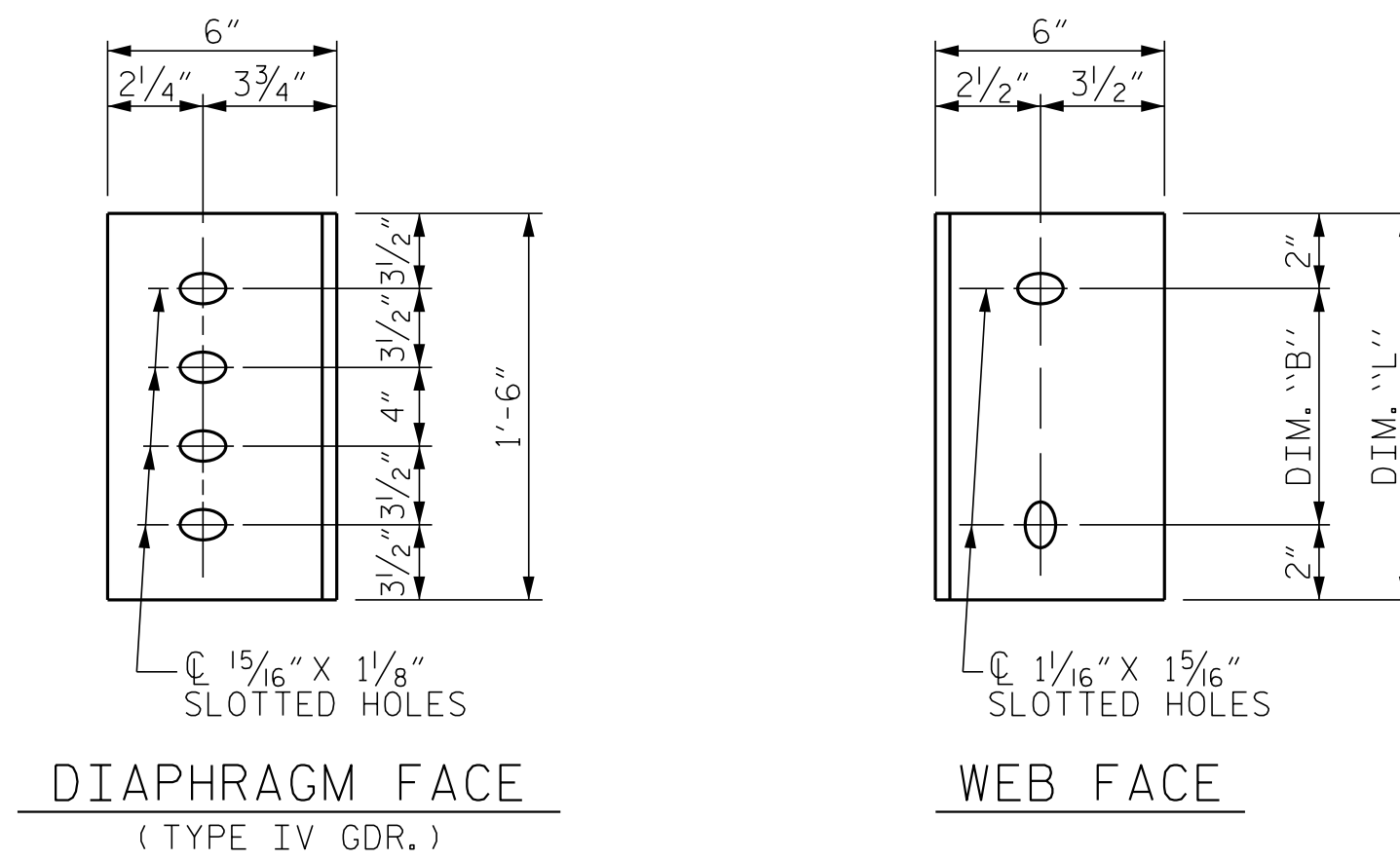
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

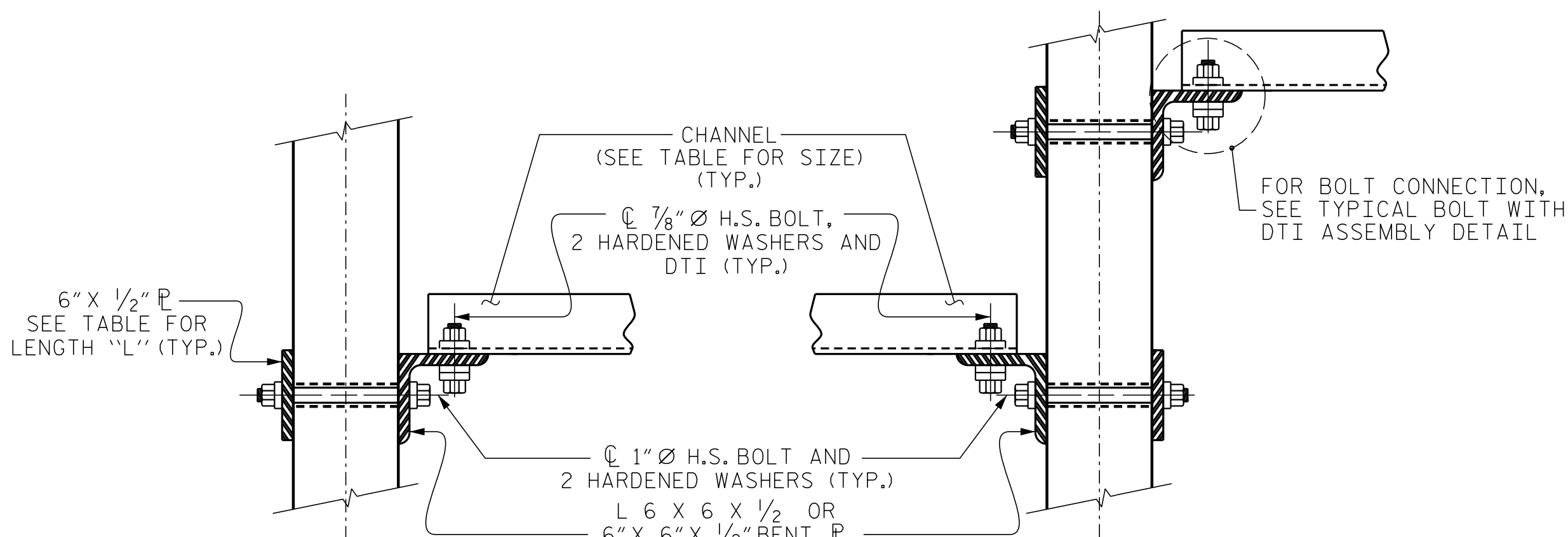
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



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



CONNECTOR PLATE DETAILS



SECTION A-A SECTION B-B  
CONNECTION DETAILS

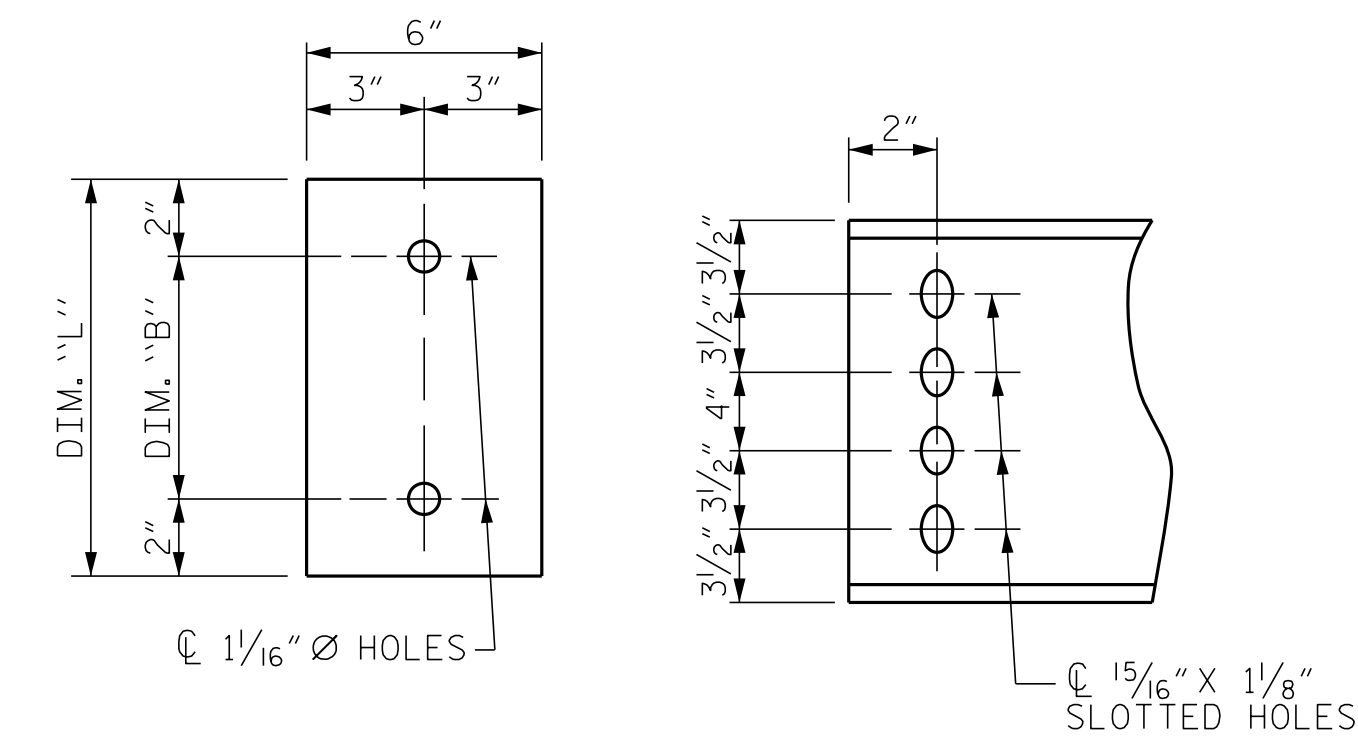
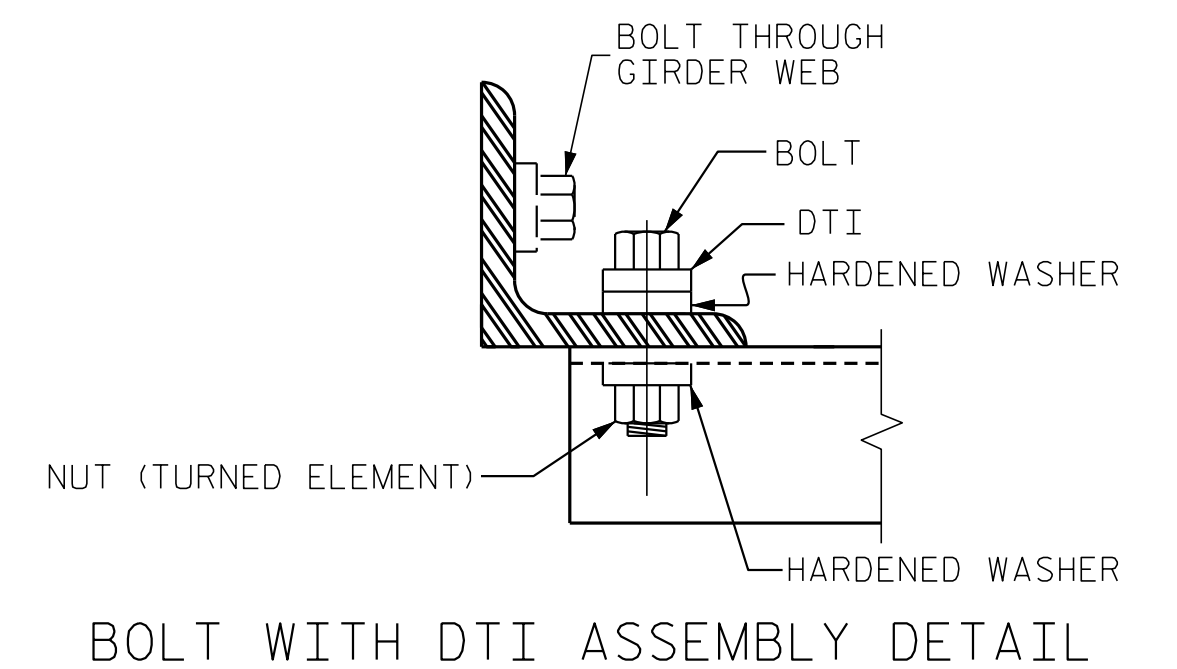


PLATE DETAILS CHANNEL END  
(TYPE IV GDR.)

TABLE

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



BOLT WITH DTI ASSEMBLY DETAIL

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN A

0.6" Ø LOW RELAXATION	GIRDERS 1 & 5											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER ( GIRDER ALONE IN PLACE )	↑	0	0.059	0.112	0.154	0.180	0.189	0.180	0.154	0.112	0.059	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.041	0.080	0.111	0.131	0.138	0.131	0.111	0.080	0.041	0
FINAL CAMBER	↑	0	1/4"	3/8"	1/2"	5/8"	5/8"	9/16"	1/2"	3/8"	1/4"	0

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPAN A

0.6" Ø LOW RELAXATION	GIRDERS 2 THRU 4											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER ( GIRDER ALONE IN PLACE )	↑	0	0.059	0.112	0.154	0.180	0.189	0.180	0.154	0.112	0.059	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.045	0.089	0.123	0.145	0.152	0.145	0.123	0.089	0.045	0
FINAL CAMBER	↑	0	3/16"	5/16"	3/8"	7/16"	7/16"	7/16"	3/8"	5/16"	3/16"	0

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 217+31.76 -L-

SHEET 2 OF 2

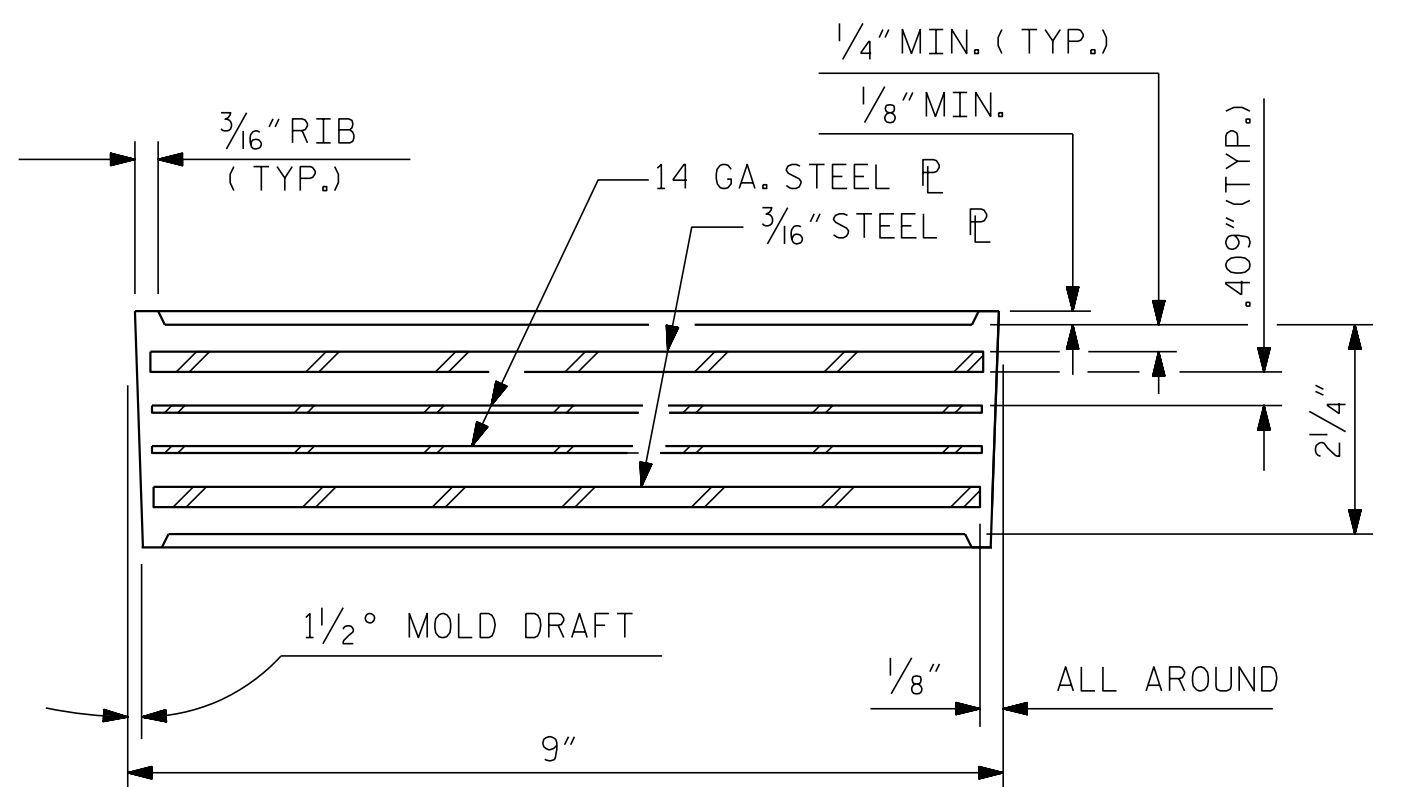
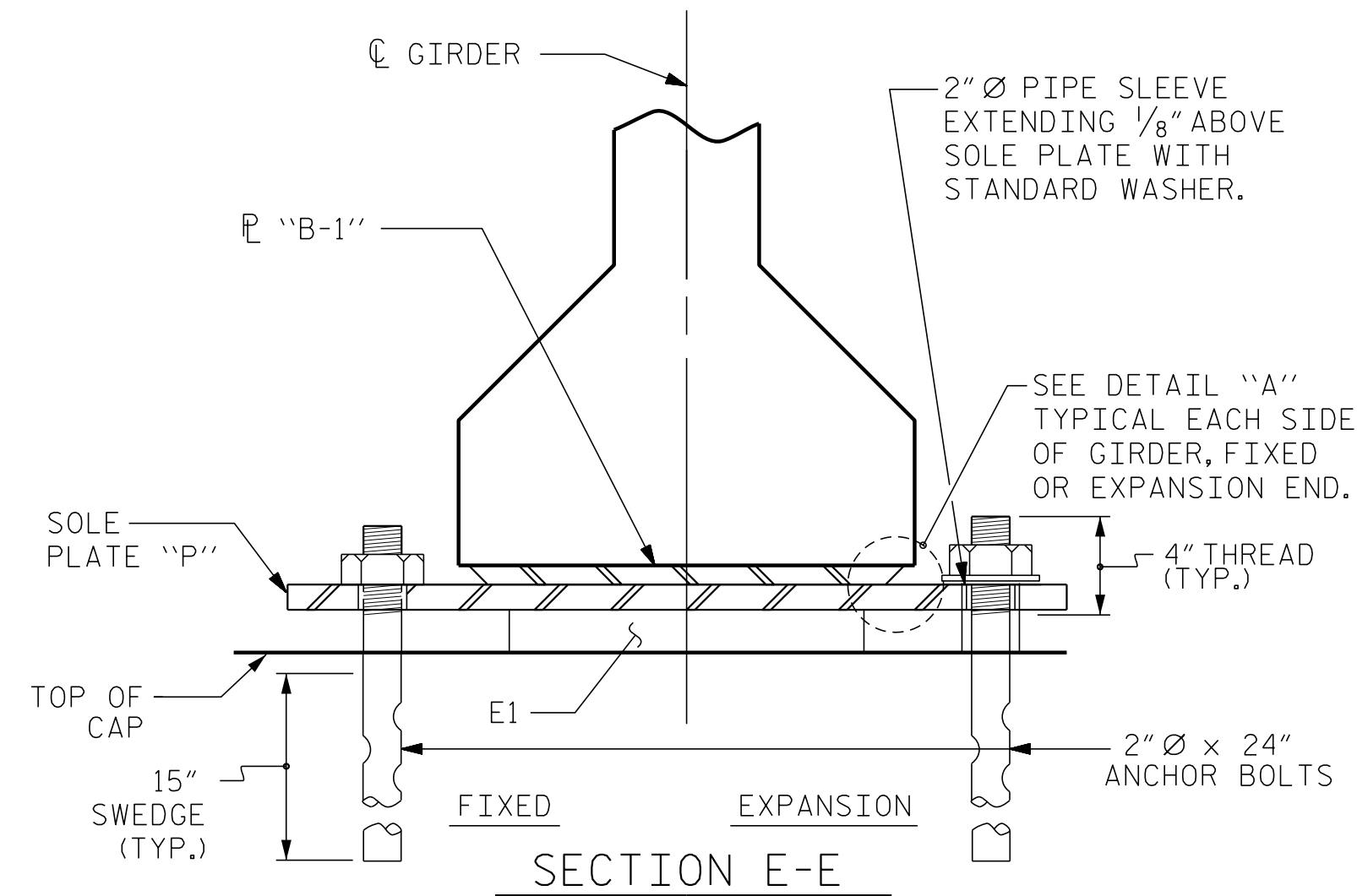
ASSEMBLED BY : D. HODGE DATE : 1/18  
CHECKED BY : G.M. GILLAND DATE : 2/18  
DRAWN BY : TLA 6/05 REV. 5/1/06RRR KMM/GM  
CHECKED BY : VC 6/05 REV. 10/1/11 MAA/GM  
REV. 12/17 MAA/THC

ENGINEER OF RECORD:  
3/25/2019  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 37400  
GREGORY M. GILLAND  
GREGORY M. GILLAND  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

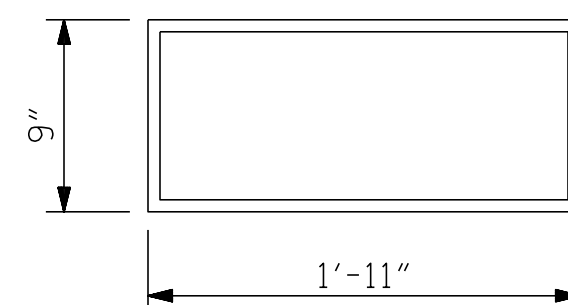
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS (RIGHT LANE)  
REVISIONS  
NO. BY: DATE: NO. BY: DATE:  
1 2 3 4  
SHEET NO. S2-9  
TOTAL SHEETS 18

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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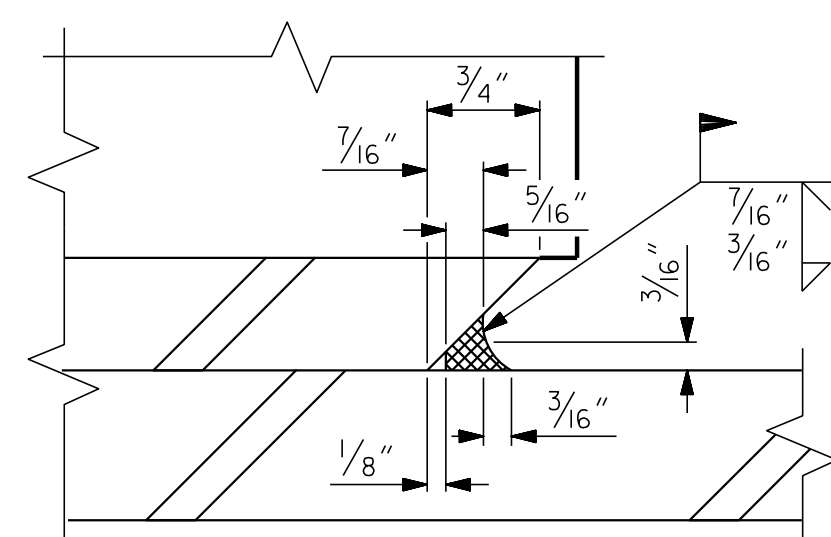


TYPICAL SECTION OF ELASTOMERIC BEARINGS

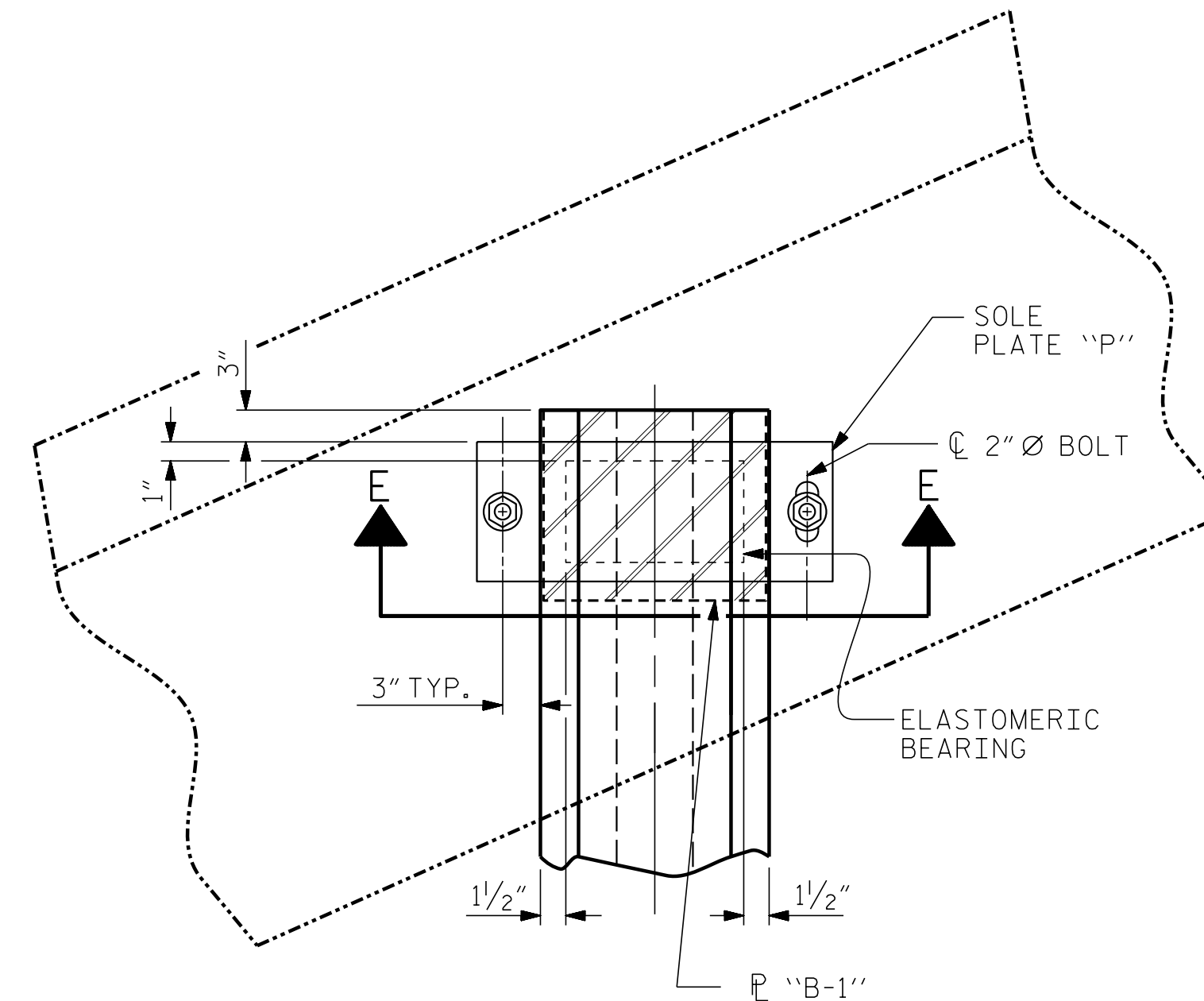


PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



DETAIL "A"



TYPICAL HALF-PLAN

(AT END BENT No. 1)

TYPICAL HALF-PLAN

(AT END BENT No. 2)

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

NOTES

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

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.

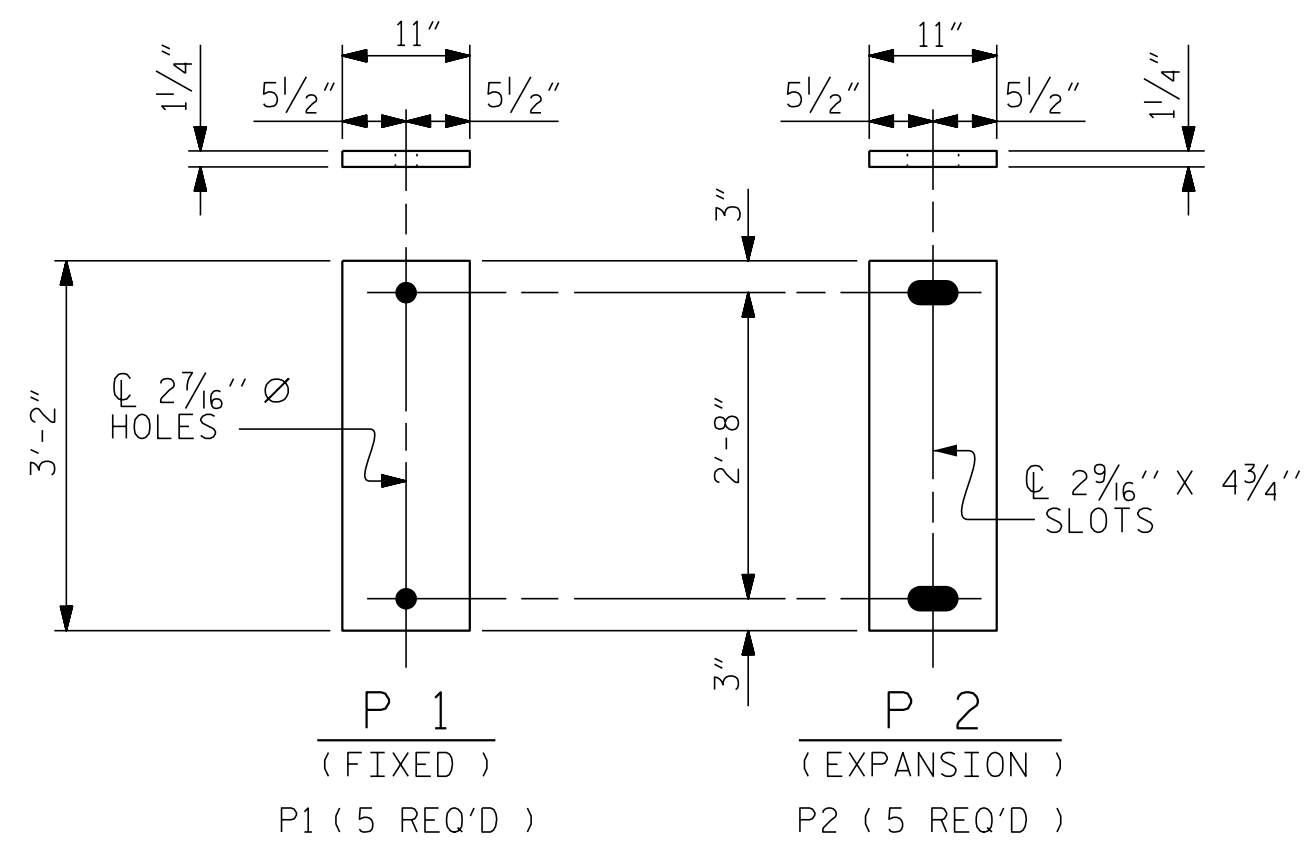
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 217+31.76 -L-



SOLE PLATE DETAILS ("P")

ASSEMBLED BY : D. HODGE	DATE : 1/18
CHECKED BY : G.M. GILLAND	DATE : 2/18
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

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ENGINEER OF RECORD:  
3/25/2019

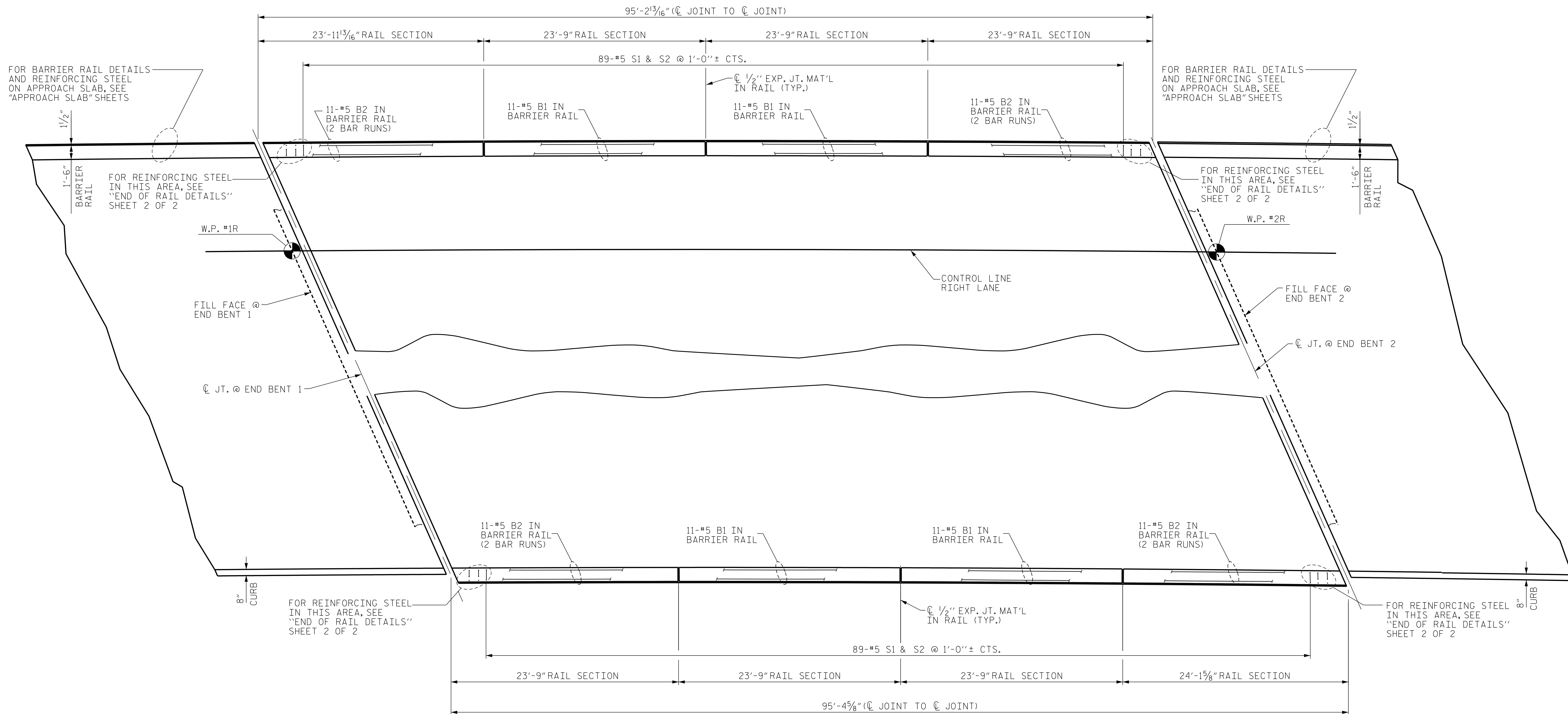
NORTH CAROLINA PROFESSIONAL SEAL 37400  
GREGORY M. GILLAND  
REGISTERED PROFESSIONAL ENGINEER

1223 Jones Franklin Rd.  
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
ELASTOMERIC BEARING  
DETAILS  
PRESTRESSED CONCRETE GIRDER  
SUPERSTRUCTURE (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-10
1			3			TOTAL SHEETS 18
2			4			

P:\2017\1712101\W-5600\USTO\Structures\DGN\L-over -Y9\DGN (R IGHT LANE\W-5600\_Y9\_BRG (R IGHT LANE)\_WE I.dgn  
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**PLAN OF BARRIER RAIL - SPAN A**  
 ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL AND ARE RADIAL

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

SHEET 1 OF 2

P:\2017\1712101\W-5600\_Structures\DGN\L-over -Y9-DGN (RIGHT LANE)\_WE I.dgn  
 3/20/2019 9:24:29 AM

DRAWN BY : J. PENDERGRAFT      DATE : 12-17  
 CHECKED BY : D. HODGE          DATE : 1-18

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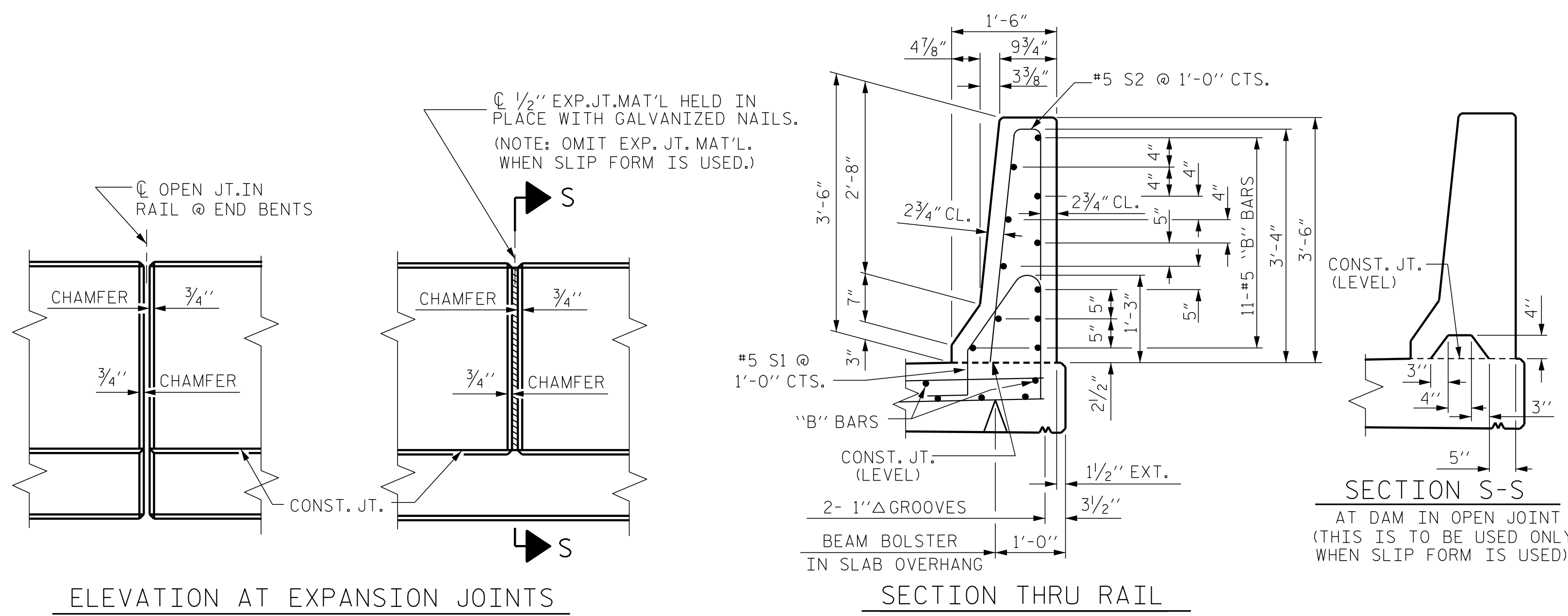
ENGINEER OF RECORD:  
 3/25/2019

Gregory M. Gulland  
 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					
SUPERSTRUCTURE CONCRETE BARRIER RAIL (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S2-11
TOTAL SHEETS					18





**NOTES**

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

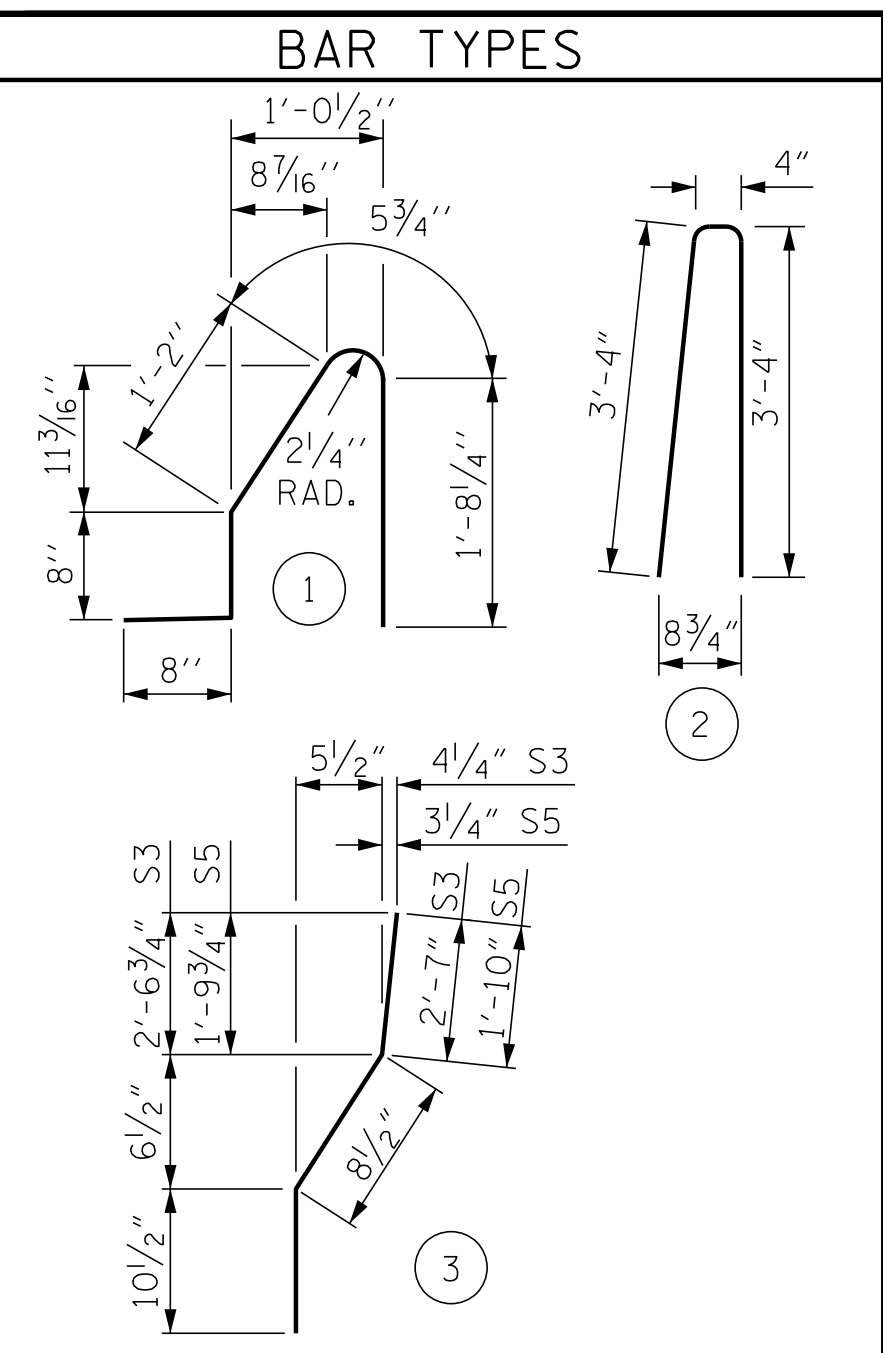
WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS 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 BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

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



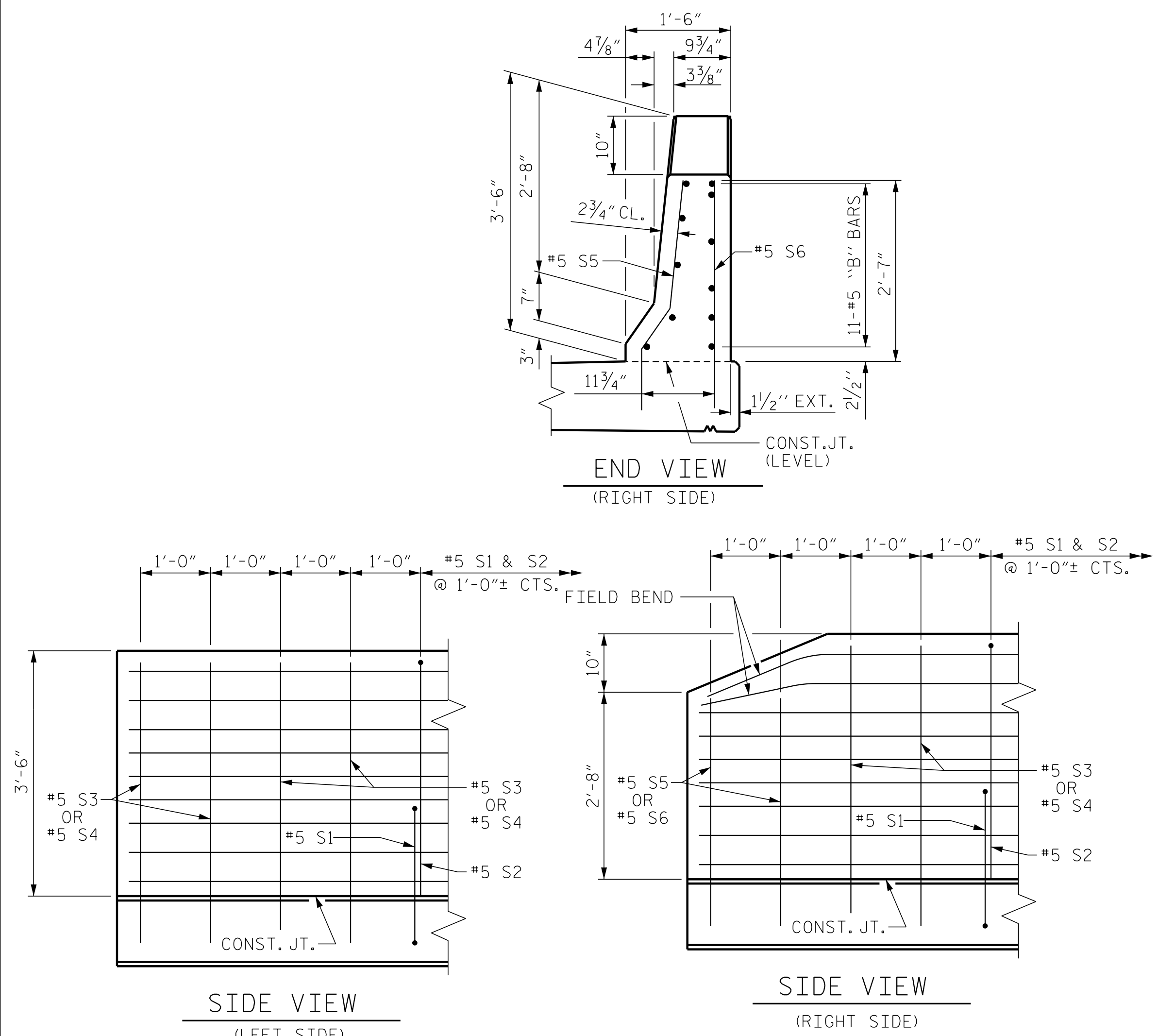
ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL**

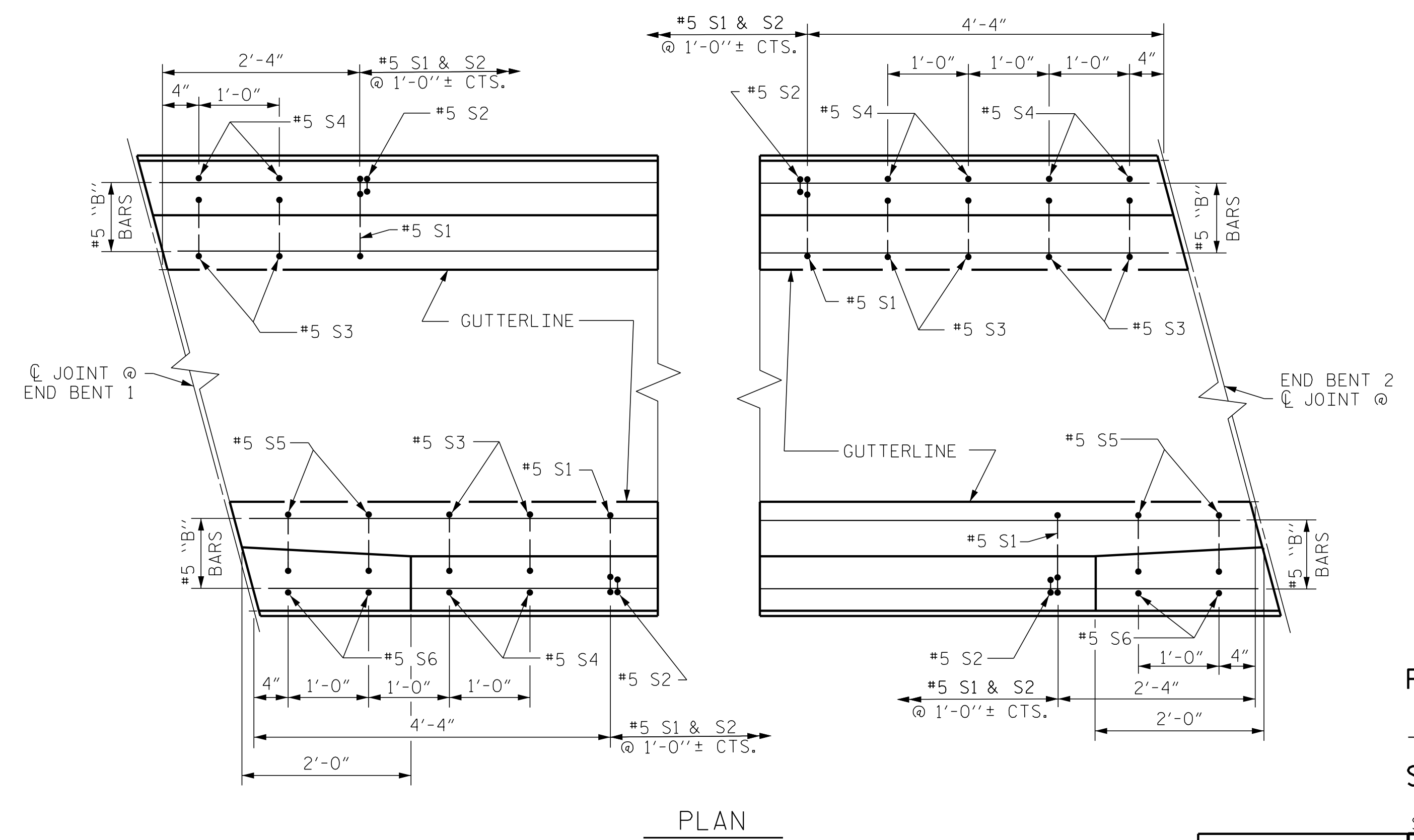
FOR CONCRETE BARRIER RAIL ONLY

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* S1	178	#5	1	4'-8"	866
* S2	178	#5	2	7'-0"	1300
* S3	8	#5	3	4'-2"	35
* S4	8	#5	STR	4'-0"	33
* S5	4	#5	3	3'-5"	14
* S6	4	#5	STR	3'-3"	14
* B1	44	#5	STR	23'-4"	1071
* B2	88	#5	STR	13'-8"	1254
* EPOXY COATED REINFORCING STEEL					4587 LBS.
CLASS AA CONCRETE					25.9 CU. YDS.
CONCRETE BARRIER RAIL					190.62 LIN. FT.

**BARRIER RAIL DETAILS**



**END OF RAIL DETAILS**  
 FOR ADHESIVE ANCHORING AT SAWED JOINTS



PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-  
 SHEET 2 OF 2

ENGINEER OF RECORD:  
 3/25/2019  
  
 GREGORY M. GULLAND  
 ENGINEER  
 GREGORY M. GULLAND  
 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  
 CONCRETE  
 BARRIER RAIL  
 (RIGHT LANE)

REVISIONS

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

SHEET NO. S2-12  
 TOTAL SHEETS 18

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 3/20/2019 9:26:57 AM

ASSEMBLED BY : J. PENDERGRAFT DATE : 12-17  
 CHECKED BY : D. HODGE DATE : 1-18

DRAWN BY : ARB 5/87 REV. 7/12 MAA/GM  
 3/20/2019 9:26:57 AM REV. 6/13 MAA/GM  
 CHECKED BY : SJD 9/87 REV. 12/17 MAA/THC

STD. NO. CBR1 (SHT 3)

NOTES

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

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

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

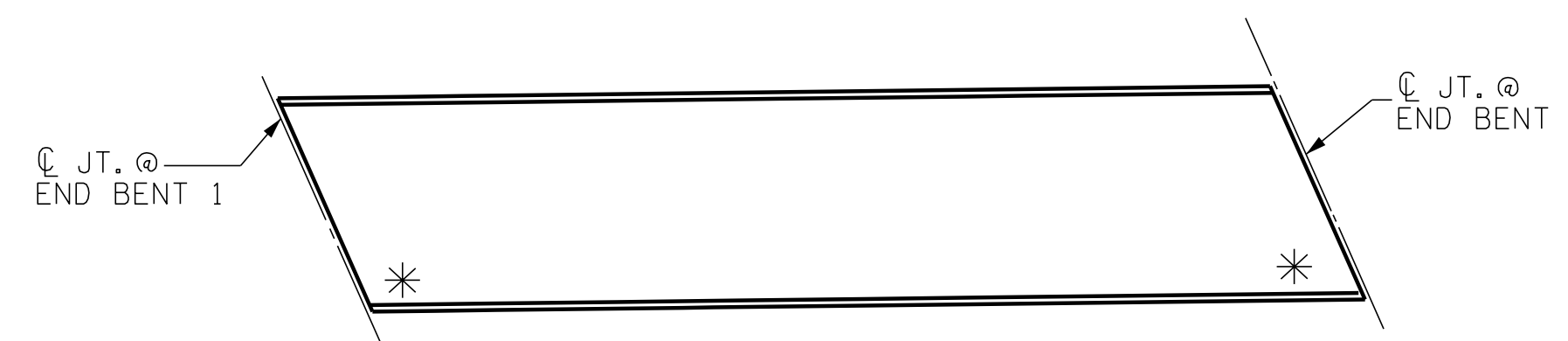
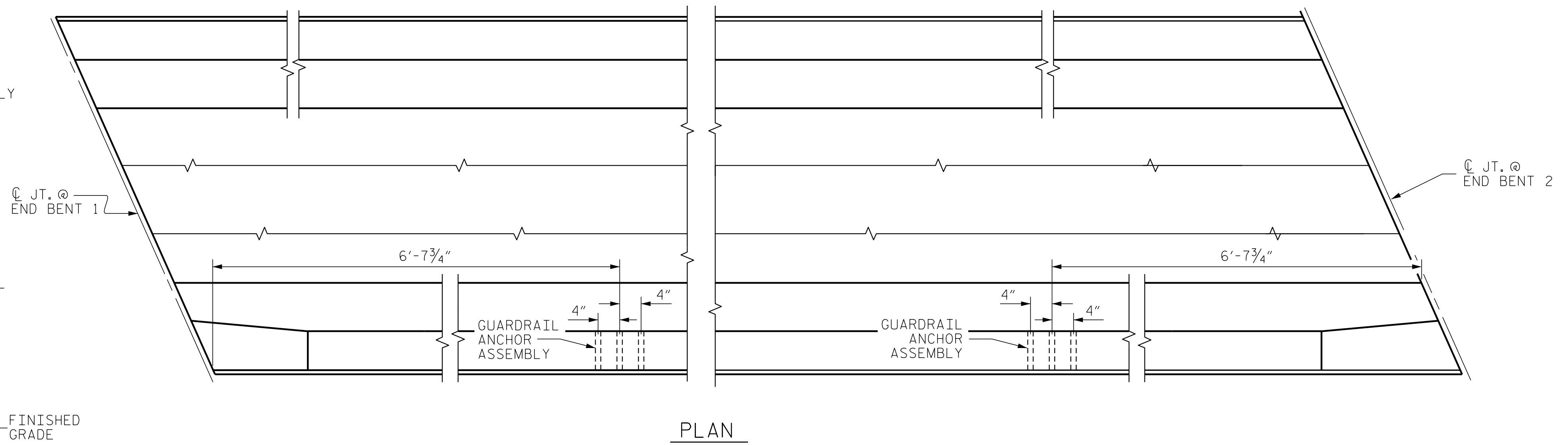
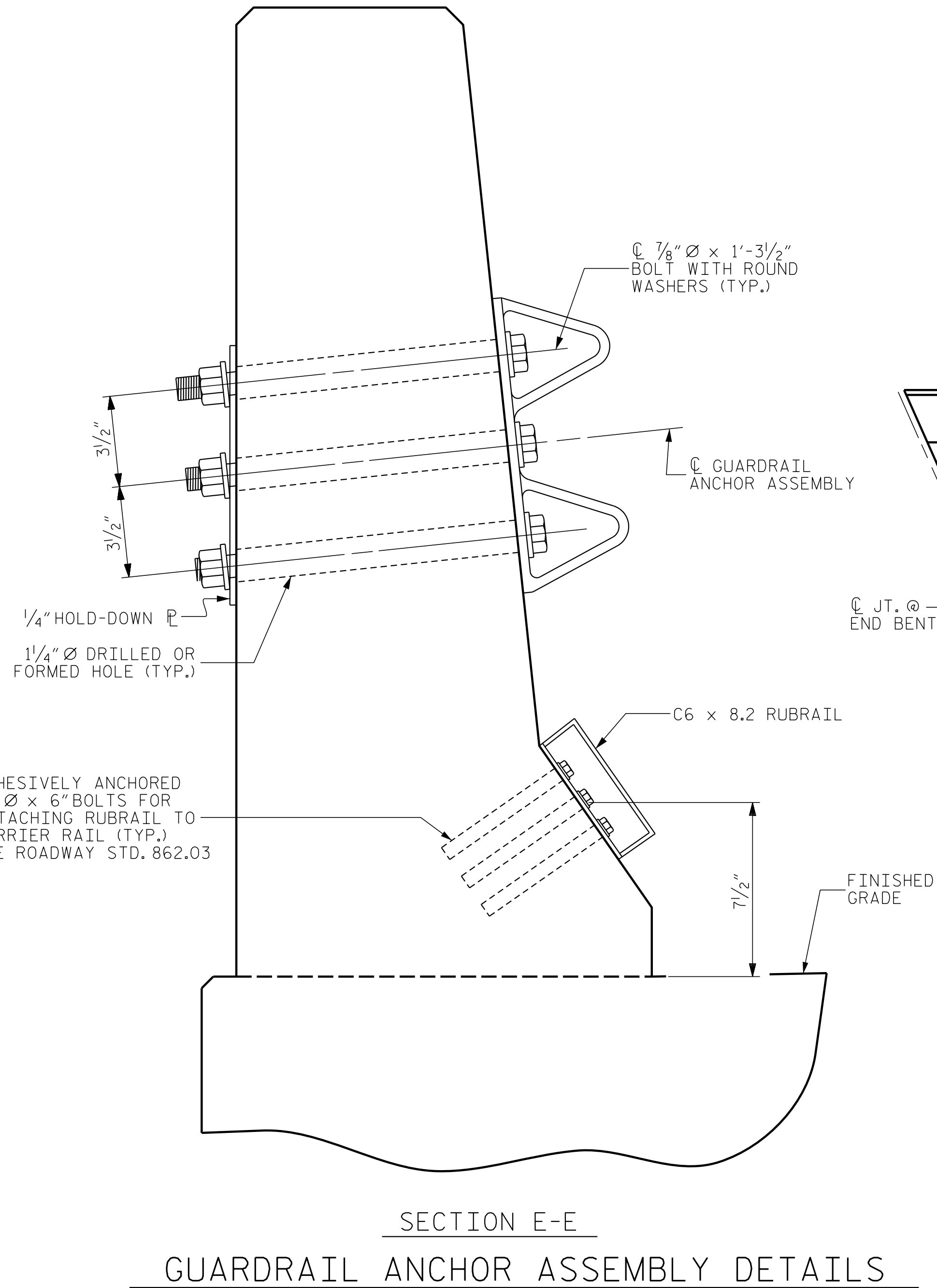
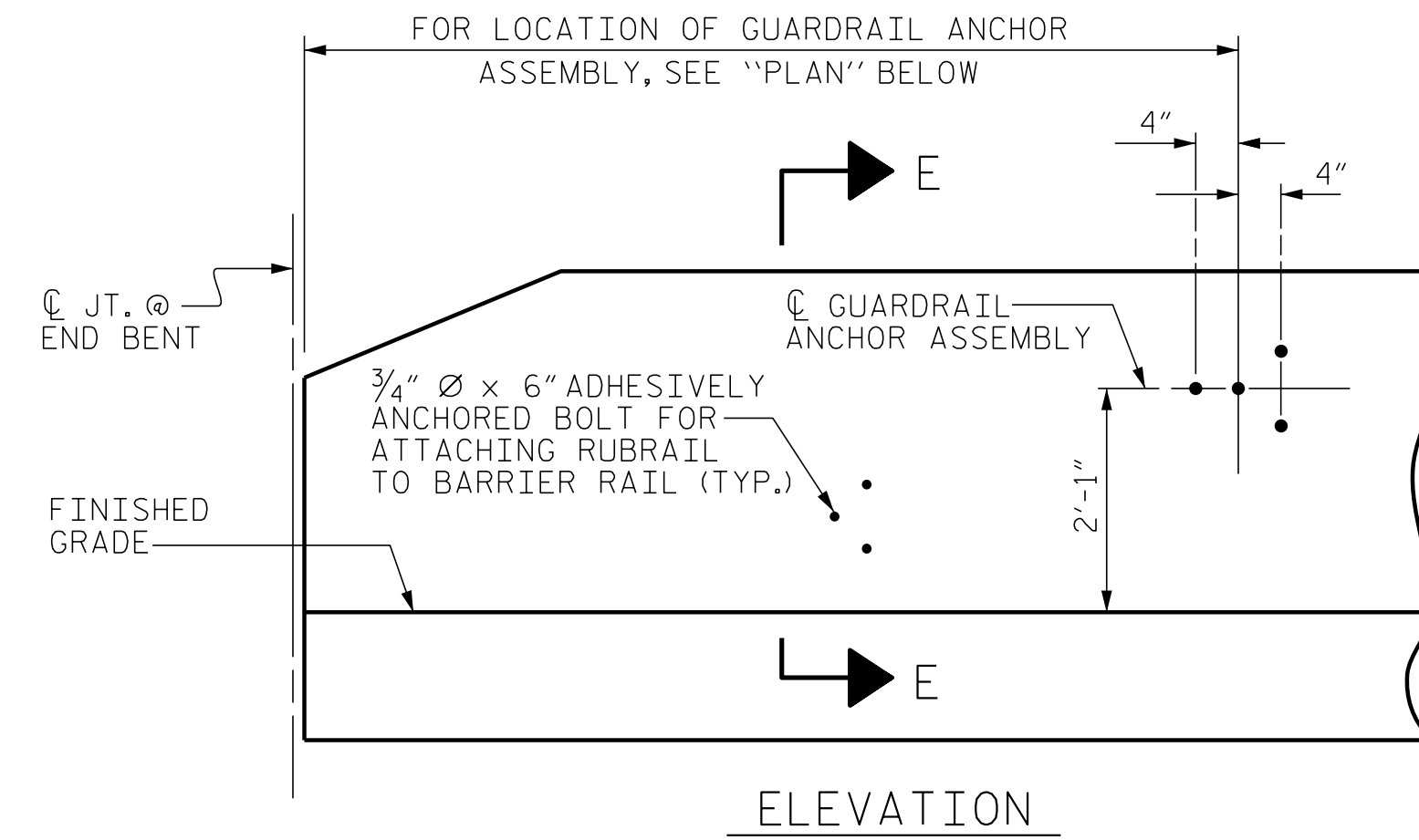
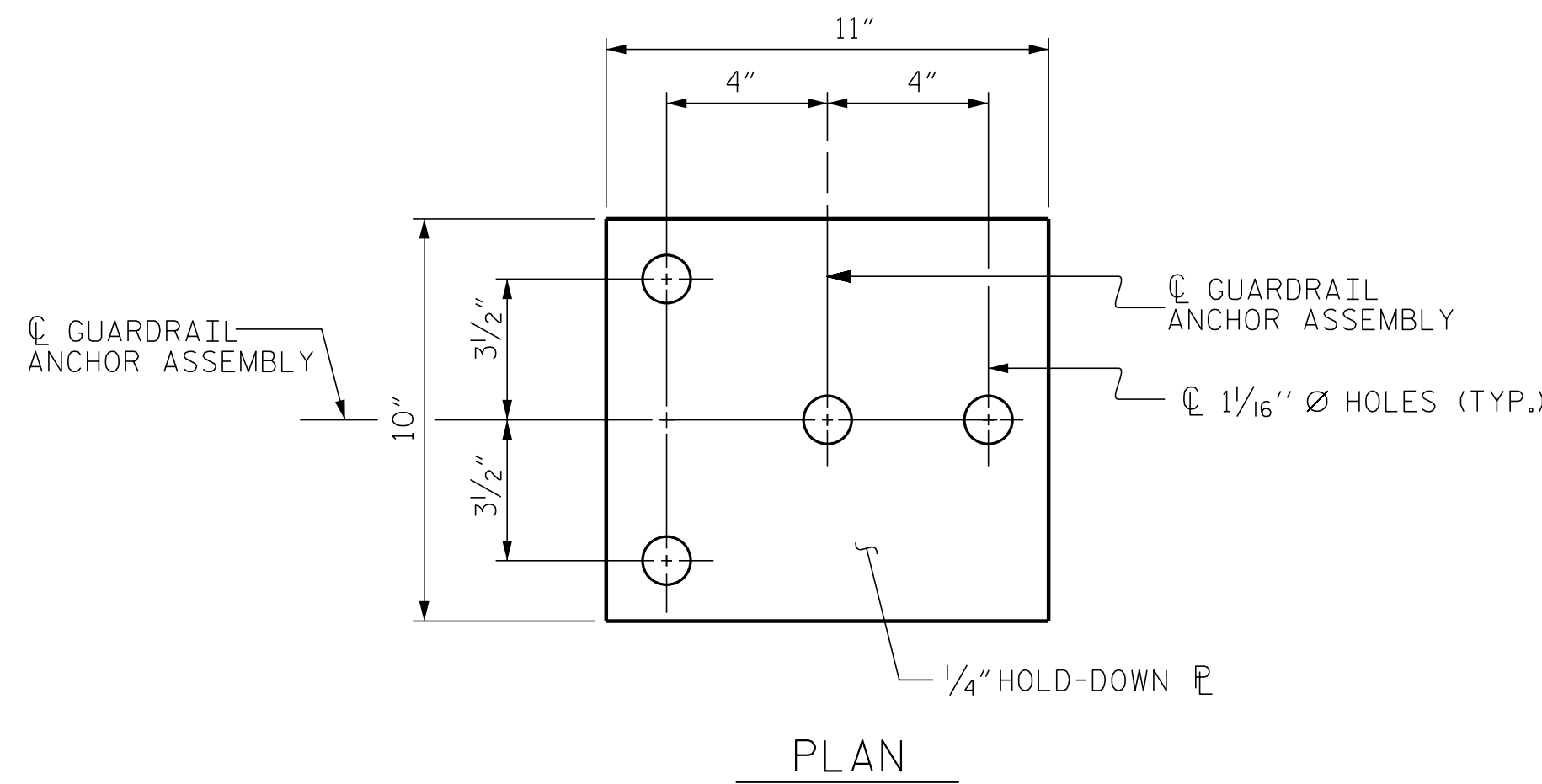
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



LOCATION OF ANCHORS FOR GUARDRAIL

SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gulland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

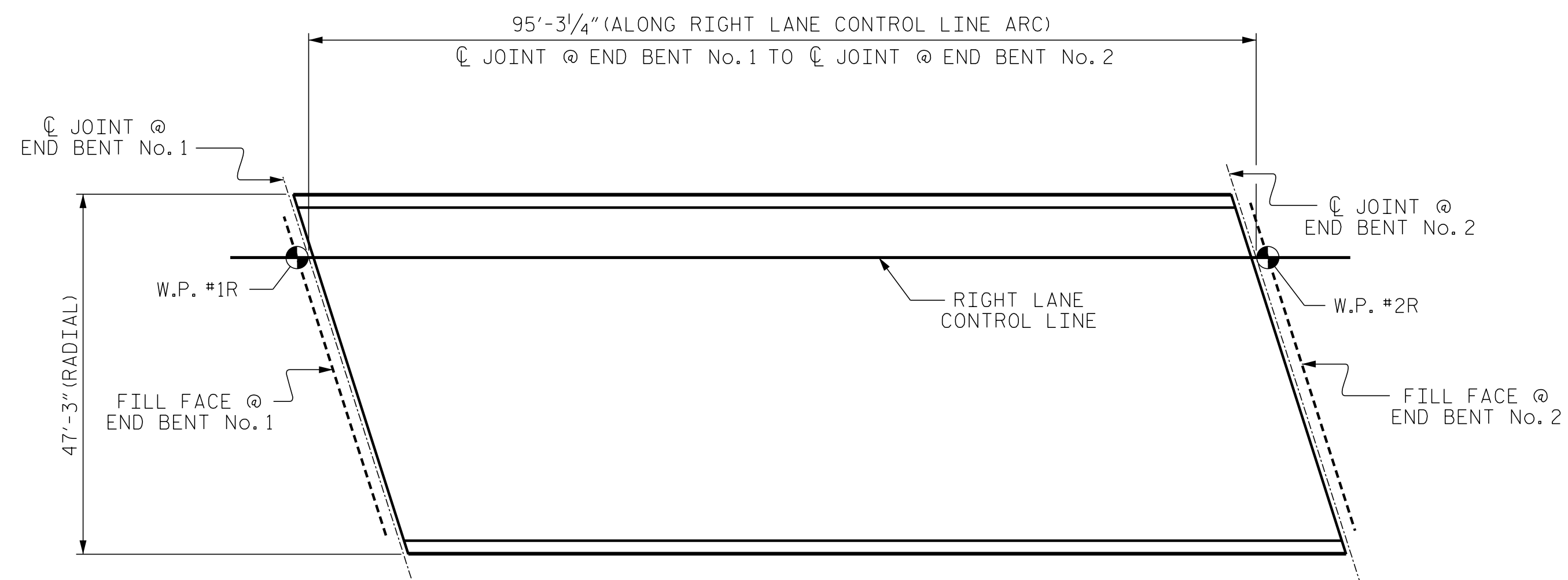
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD GUARDRAIL ANCHORAGE FOR BARRIER RAIL (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S2-13					TOTAL SHEETS 18

ASSEMBLED BY : J. PENDERGRAFT	DATE : 12-17
CHECKED BY : D. HODGE	DATE : 1-18
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

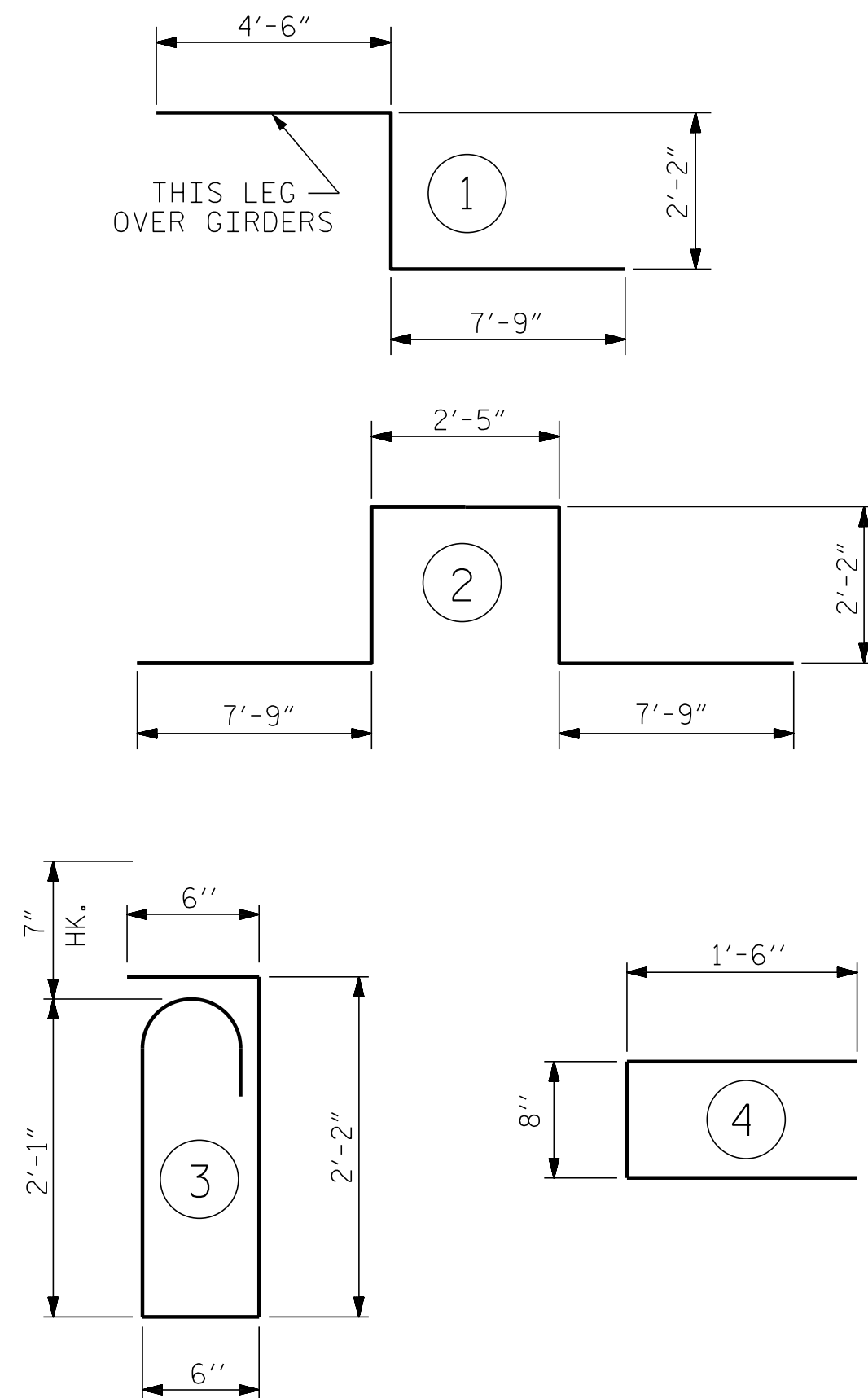
(SHT 1a) STD. NO. GRA2

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 3/20/2019 9:29:26 AM



LAYOUT FOR COMPUTING AREA  
REINFORCED CONCRETE DECK SLAB  
(SQ. FT. = 4,502)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	* EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
TOTALS**	150.3	15,240	13,218

\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,972 SQ.FT.
BRIDGE DECK	3,885 SQ.FT.
TOTAL	5,857 SQ.FT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	148	#5	STR	46'-11"	7242	A201	2	#5	STR	46'-1"	96
A2	148	#5	STR	46'-11"	7242	A202	2	#5	STR	45'-0"	94
						A203	2	#5	STR	43'-9"	91
* A101	2	#5	STR	46'-1"	96	A204	2	#5	STR	42'-9"	89
* A102	2	#5	STR	45'-0"	94	A205	2	#5	STR	41'-7"	87
* A103	2	#5	STR	43'-9"	91	A206	2	#5	STR	40'-6"	84
* A104	2	#5	STR	42'-9"	89	A207	2	#5	STR	39'-4"	82
* A105	2	#5	STR	41'-7"	87	A208	2	#5	STR	38'-3"	80
* A106	2	#5	STR	40'-6"	84	A209	2	#5	STR	37'-1"	77
* A107	2	#5	STR	39'-4"	82	A210	2	#5	STR	35'-11"	75
* A108	2	#5	STR	38'-3"	80	A211	2	#5	STR	34'-10"	73
* A109	2	#5	STR	37'-1"	77	A212	2	#5	STR	33'-8"	70
* A110	2	#5	STR	35'-11"	75	A213	2	#5	STR	32'-7"	68
* A111	2	#5	STR	34'-10"	73	A214	2	#5	STR	31'-5"	66
* A112	2	#5	STR	33'-8"	70	A215	2	#5	STR	30'-4"	63
* A113	2	#5	STR	32'-7"	68	A216	2	#5	STR	29'-2"	61
* A114	2	#5	STR	31'-5"	66	A217	2	#5	STR	28'-1"	59
* A115	2	#5	STR	30'-4"	63	A218	2	#5	STR	26'-11"	56
* A116	2	#5	STR	29'-2"	61	A219	2	#5	STR	25'-10"	54
* A117	2	#5	STR	28'-1"	59	A220	2	#5	STR	24'-8"	51
* A118	2	#5	STR	26'-11"	56	A221	2	#5	STR	23'-7"	49
* A119	2	#5	STR	25'-10"	54	A222	2	#5	STR	22'-5"	47
* A120	2	#5	STR	24'-8"	51	A223	2	#5	STR	21'-4"	45
* A121	2	#5	STR	23'-7"	49	A224	2	#5	STR	20'-2"	42
* A122	2	#5	STR	22'-5"	47	A225	2	#5	STR	19'-0"	40
* A123	2	#5	STR	21'-4"	45	A226	2	#5	STR	17'-11"	37
* A124	2	#5	STR	20'-2"	42	A227	2	#5	STR	16'-9"	35
* A125	2	#5	STR	19'-0"	40	A228	2	#5	STR	15'-8"	33
* A126	2	#5	STR	17'-11"	37	A229	2	#5	STR	14'-6"	30
* A127	2	#5	STR	16'-9"	35	A230	2	#5	STR	13'-5"	28
* A128	2	#5	STR	15'-8"	33	A231	2	#5	STR	12'-3"	26
* A129	2	#5	STR	14'-6"	30	A232	2	#5	STR	11'-2"	23
* A130	2	#5	STR	13'-5"	28	A233	2	#5	STR	10'-0"	21
* A131	2	#5	STR	12'-3"	26	A234	2	#5	STR	8'-11"	19
* A132	2	#5	STR	11'-2"	23	A235	2	#5	STR	7'-9"	16
* A133	2	#5	STR	10'-0"	21	A236	2	#5	STR	6'-8"	14
* A134	2	#5	STR	8'-11"	19	A237	2	#5	STR	5'-6"	11
* A135	2	#5	STR	7'-9"	16	A238	2	#5	STR	4'-4"	9
* A136	2	#5	STR	6'-8"	14	A239	2	#5	STR	3'-3"	7
* A137	2	#5	STR	5'-6"	11						
* A138	2	#5	STR	4'-4"	9	* B1	132	#4	STR	25'-3"	2226
* A139	2	#5	STR	3'-3"	7	B2	112	#5	STR	48'-7"	5675

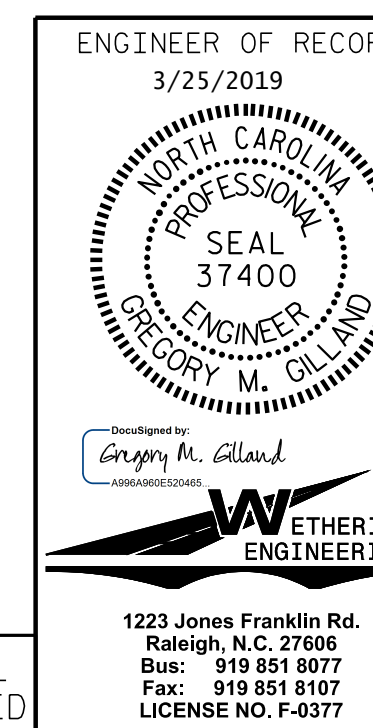
* G1	2	#5	STR	51'-1"	107
* K1	8	#8	1	14'-5"	308
* K2	12	#8	2	22'-3"	713
K3	24	#6	STR	8'-9"	315
* S1	72	#4	4	3'-8"	176
* S2	72	#5	3	5'-10"	438

REINFORCING STEEL LBS. 15,240  
\* EPOXY COATED REINFORCING STEEL LBS. 13,218  
\* THESE BARS ARE EPOXY COATED.

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

DRAWN BY: D. HODGE DATE: 1/18  
CHECKED BY: G.M. GILLAND DATE: 2/18

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



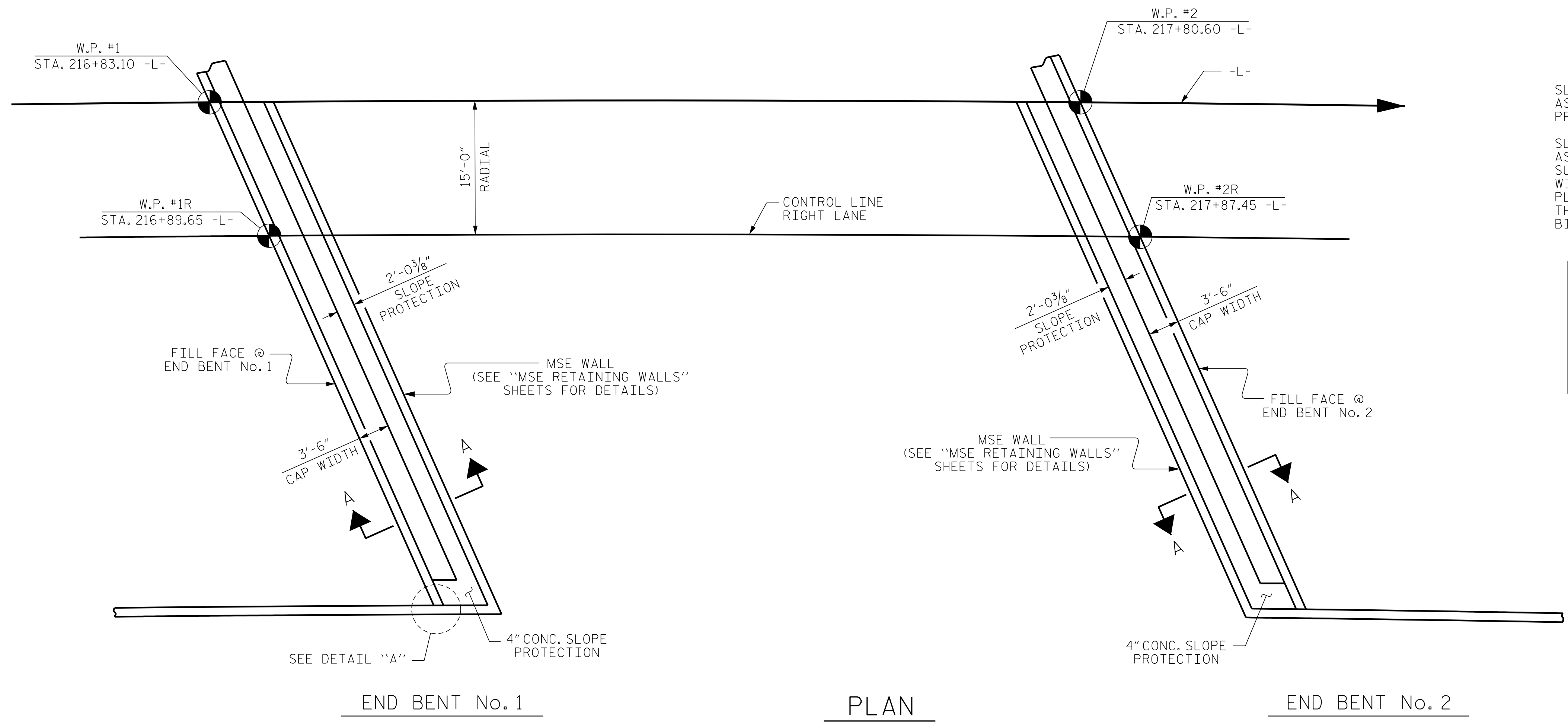
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
BILL OF MATERIAL  
(RIGHT LANE)

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S2-14
2			4			TOTAL SHEETS 18



END BENT No. 1

PLAN

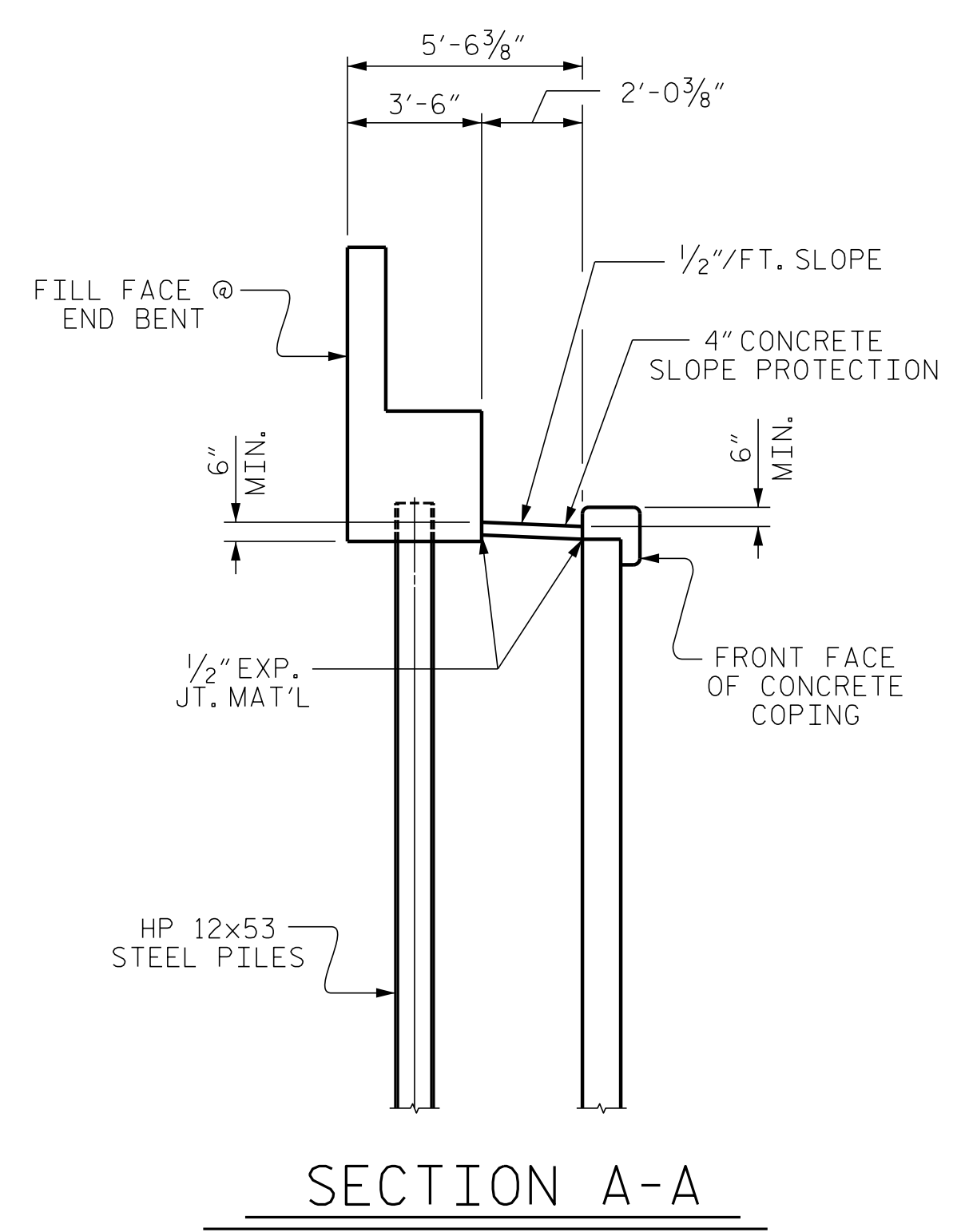
END BENT No. 2

**NOTES**

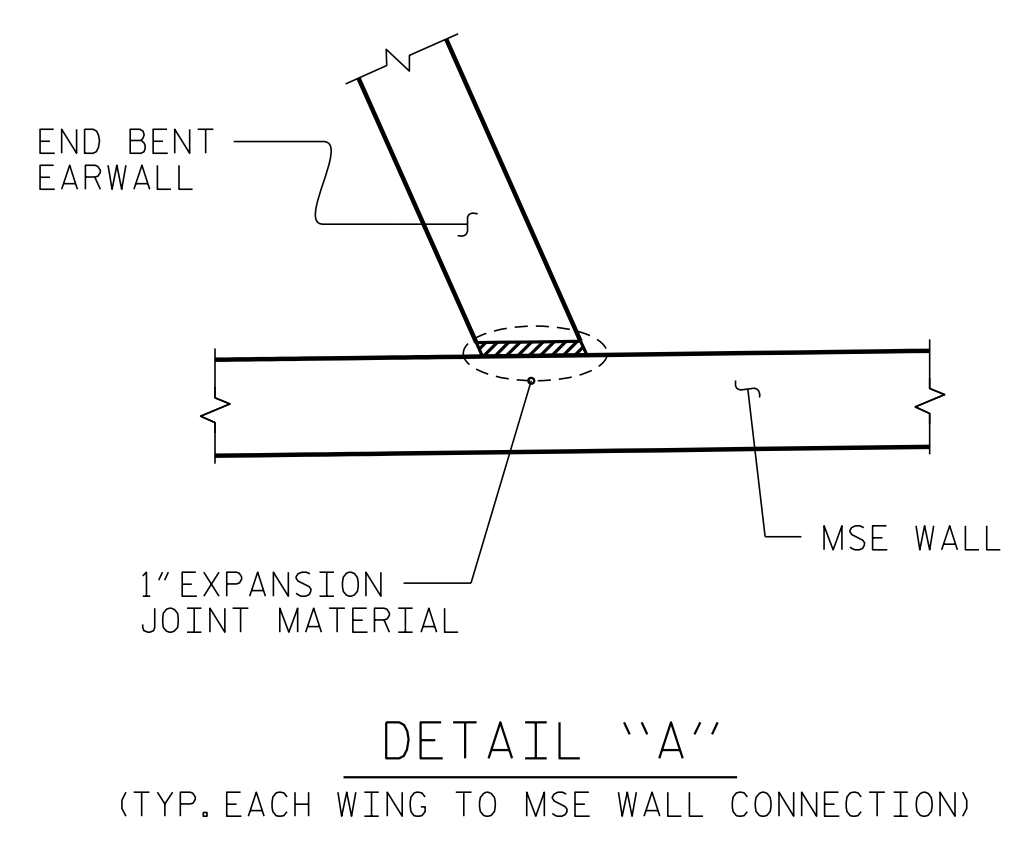
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

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. 217+31.76 -L- (RIGHT LANE)	4" SLOPE PROTECTION	WELDED WIRE FABRIC 20 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	15	66
END BENT 2	15	66



SECTION A-A



DETAIL "A"  
(TYP. EACH WING TO MSE WALL CONNECTION)

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

ENGINEER OF RECORD:  
3/25/2019

Gregory M. Gilland  
 WETHERILL ENGINEERING

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

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

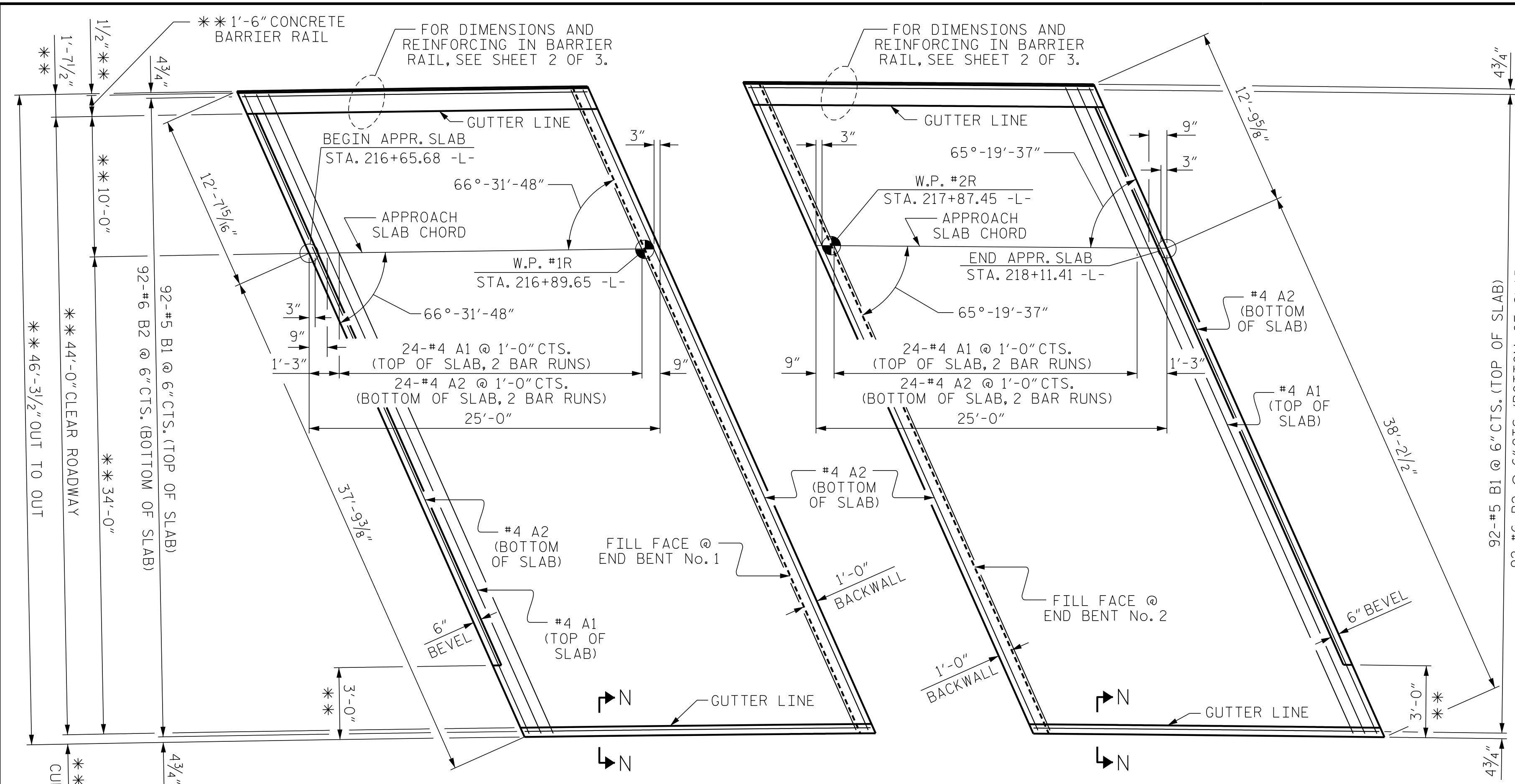
**SLOPE PROTECTION DETAILS (RIGHT LANE)**

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

DRAWN BY: D. HODGE DATE: 2/18  
 CHECKED BY: G.M. GILLAND DATE: 2/18

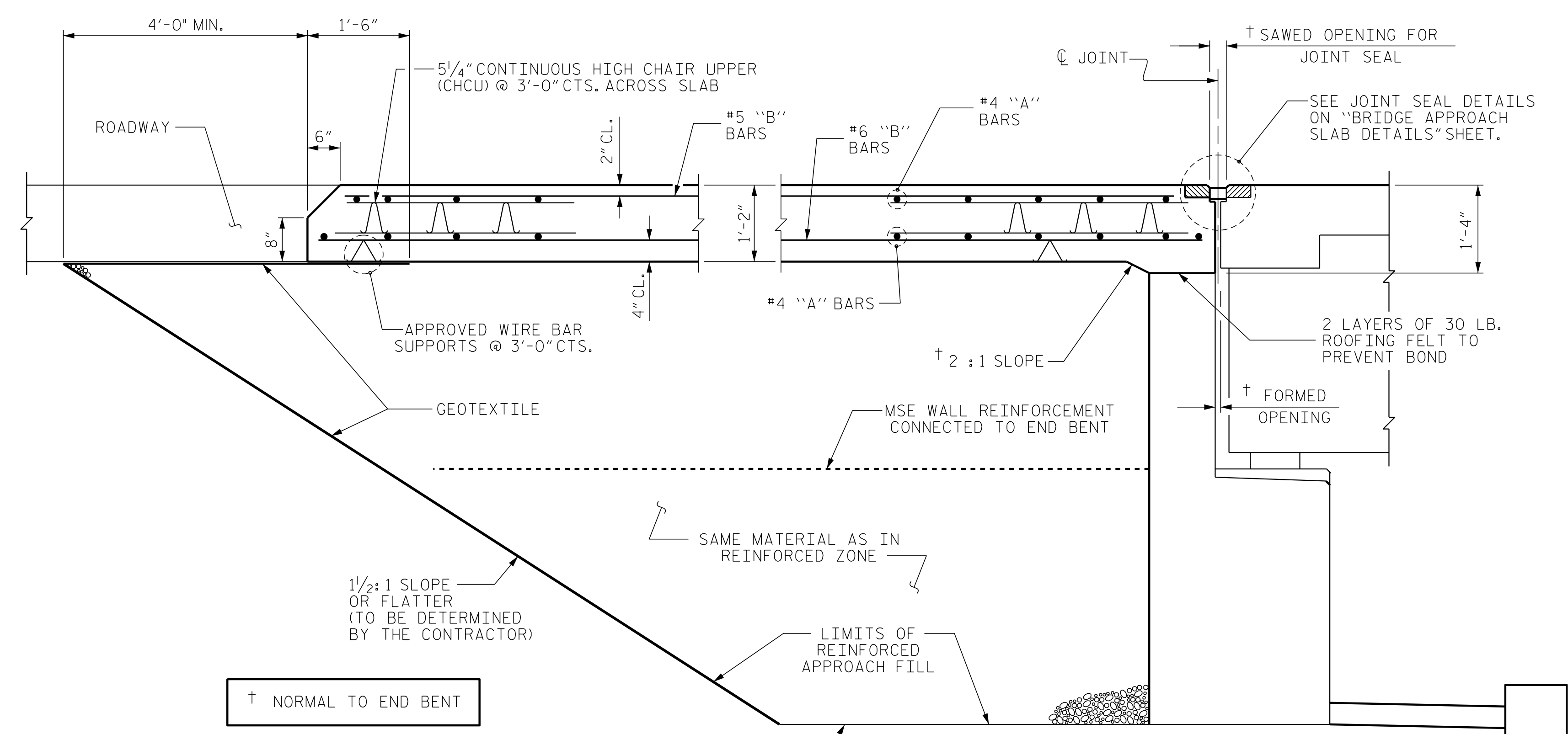
DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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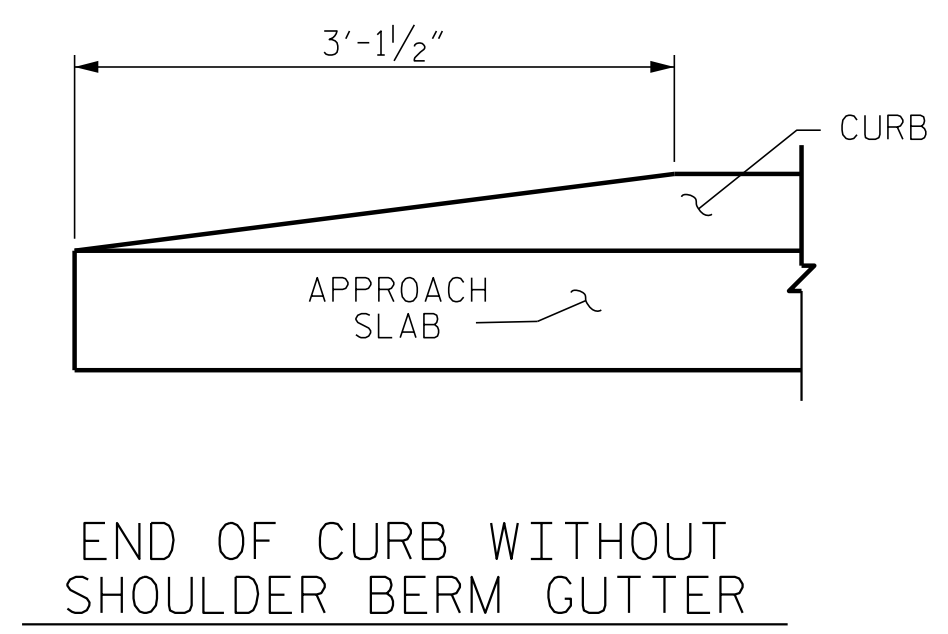
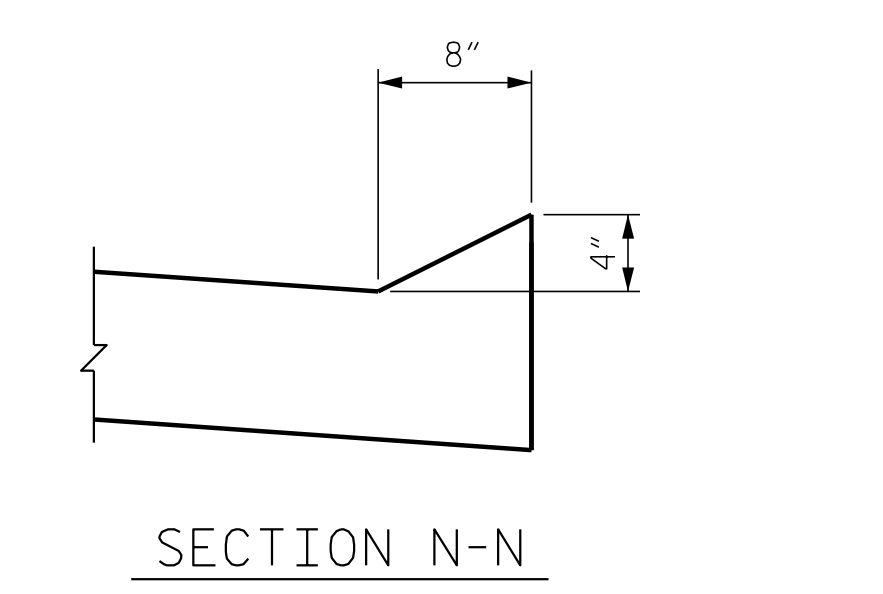


PLAN @ END BENT No. 1      PLAN @ END BENT No. 2  
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

\*\* DENOTES RADIAL DIMENSION      ARC OFFSETS TO OUTSIDE EDGE OF APPROACH SLABS ARE NEGLIGIBLE, THEREFORE NOT SHOWN



SECTION THRU SLAB  
(TYPE III - REINFORCED APPROACH FILL)



NOTES

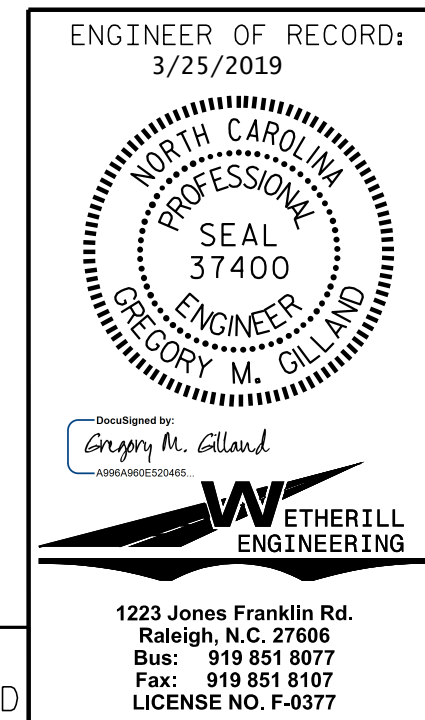
- FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT AND BACKFILL MATERIAL SEE ROADWAY PLANS.
- GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- BACKFILL MATERIAL SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.
- APPROACH SLAB SHALL 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.

BILL OF MATERIAL					
APPROACH SLAB AT END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	26'-4"	880
A2	52	#4	STR	26'-2"	909
*B1	92	#5	STR	24'-0"	2303
B2	92	#6	STR	24'-7"	3397
REINFORCING STEEL					LBS. 4,306
*EPOXY COATED REINFORCING STEEL					LBS. 3,183
CLASS AA CONCRETE					C. Y. 50.0
APPROACH SLAB AT END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	26'-4"	880
A2	52	#4	STR	26'-2"	909
*B1	92	#5	STR	24'-0"	2303
B2	92	#6	STR	24'-7"	3397
REINFORCING STEEL					LBS. 4,306
*EPOXY COATED REINFORCING STEEL					LBS. 3,183
CLASS AA CONCRETE					C. Y. 50.0

FOR BARRIER RAIL QUANTITIES ON APPROACH SLAB, SEE SHEET 2 OF 3

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 217+31.76 -L-  
SHEET 1 OF 3



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S2-16 TOTAL SHEETS 18

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

P:\2017\1712101\W-5600\_JUSTO Structures\DGN\L-over -Y9-DGN (RIGHT LANE)\W-5600\_Y9\_AS (RIGHT LANE)\_WE Idgn  
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### NOTES

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

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

WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE APPROACH SLAB SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

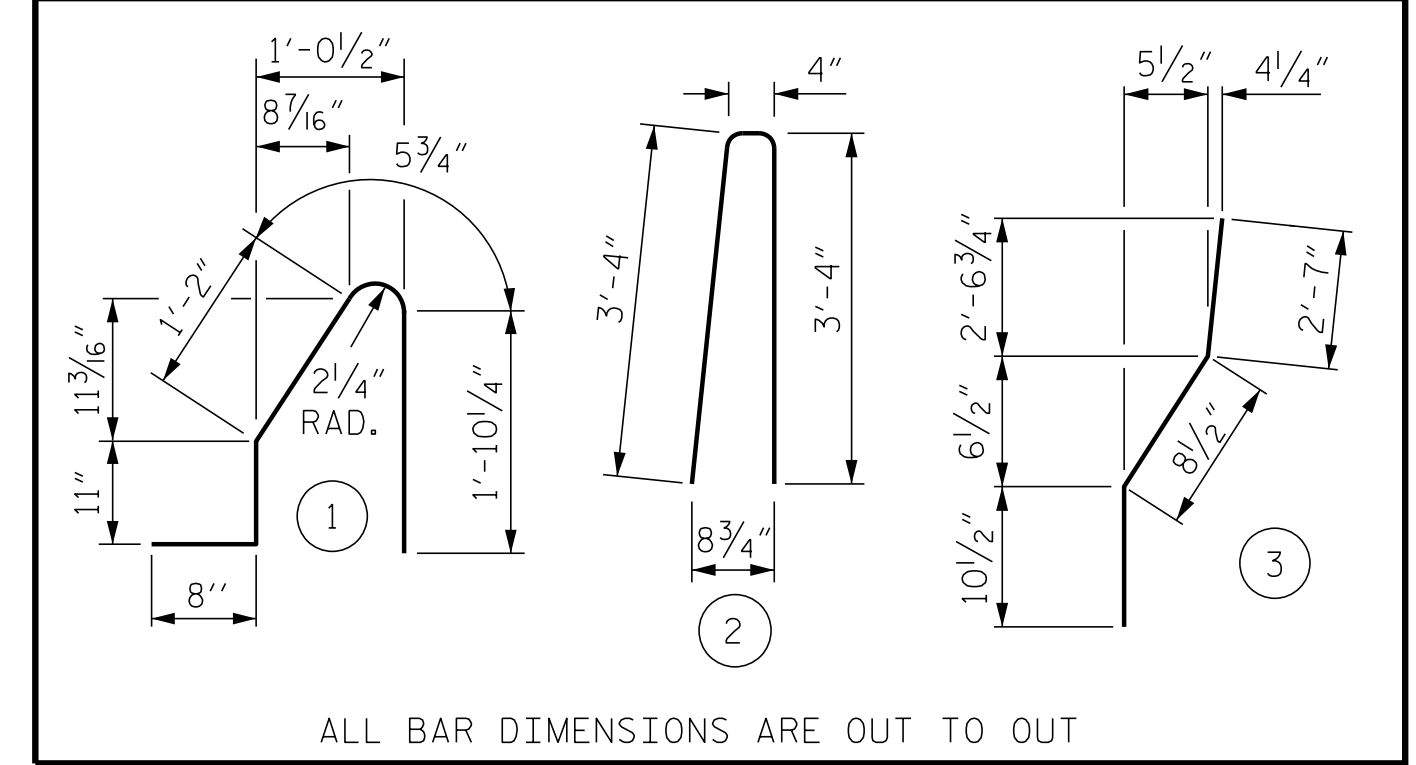
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 AND S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 AND S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

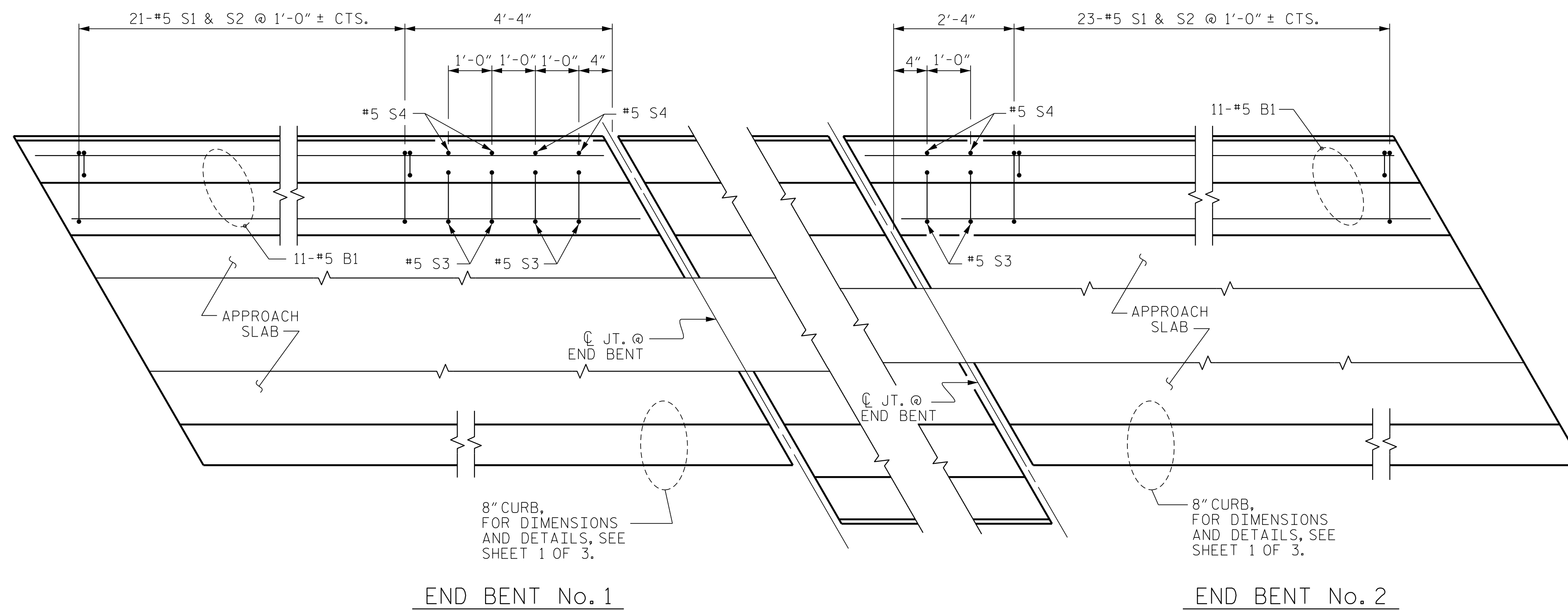
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT THIRD POINTS.

BILL OF MATERIAL					
BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	22	#5	STR	24'-7"	564
*S1	44	#5	1	5'-1"	233
*S2	44	#5	2	7'-0"	321
*S3	6	#5	3	4'-2"	26
*S4	6	#5	STR	4'-0"	25
* EPOXY COATED REINFORCING STEEL				LBS.	1,169
CLASS AA CONCRETE				C. Y.	6.8
CONCRETE BARRIER RAIL				50.00 LIN. FT.	

### BAR TYPES



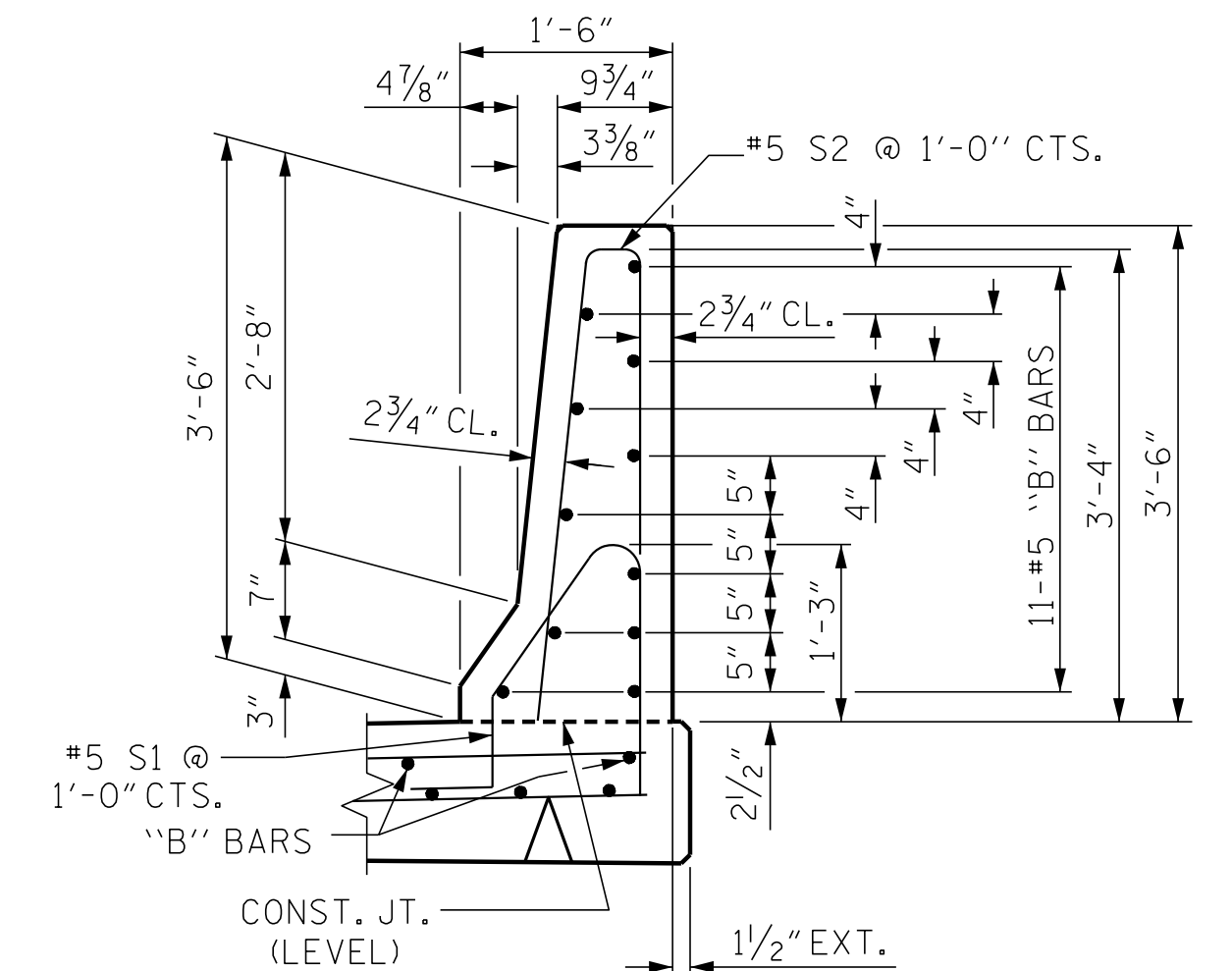
ALL BAR DIMENSIONS ARE OUT TO OUT



END BENT No. 1

END BENT No. 2

### PLAN OF BARRIER RAIL



### SECTION THRU RAIL

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 217+31.76 -L-

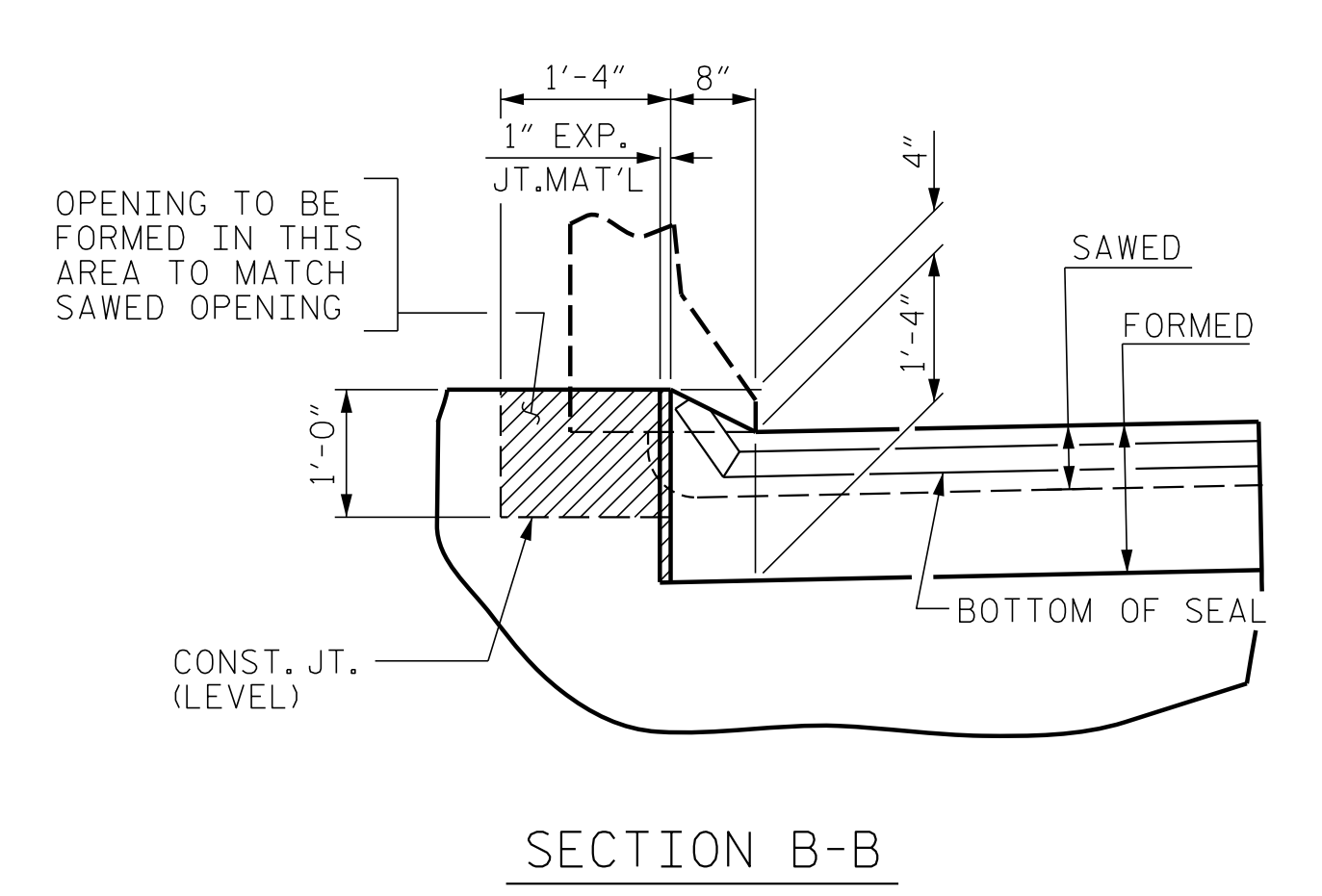
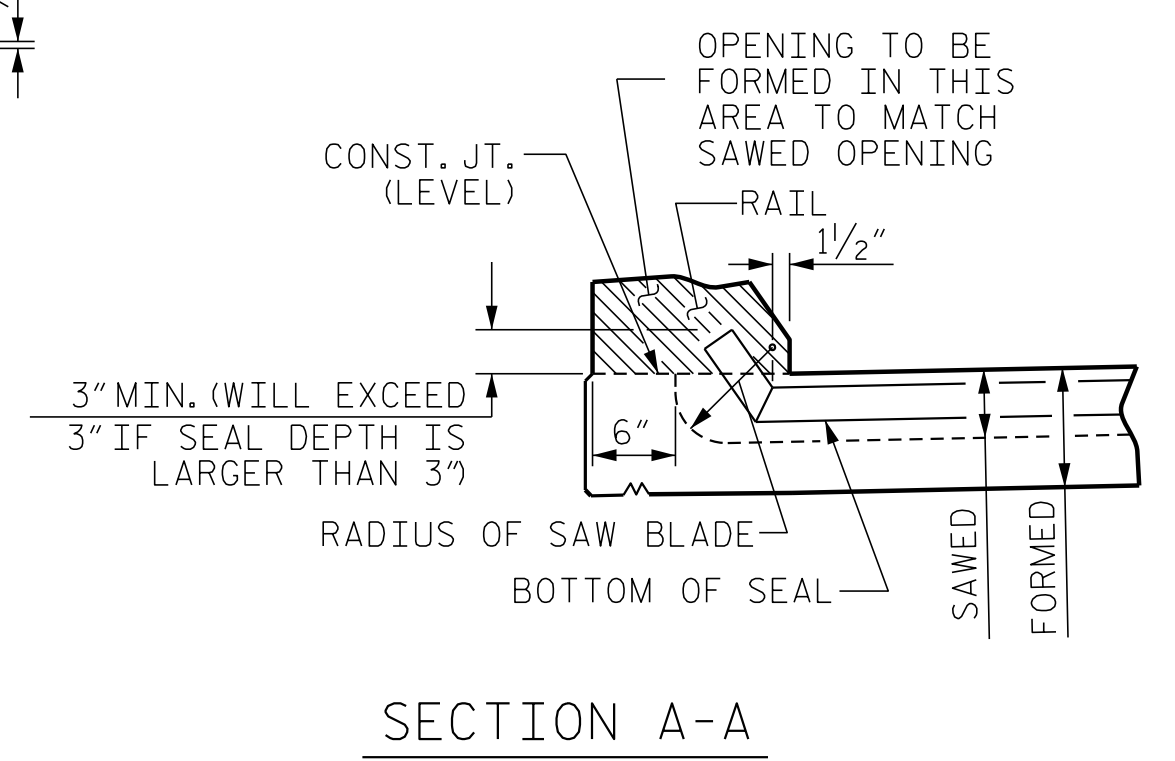
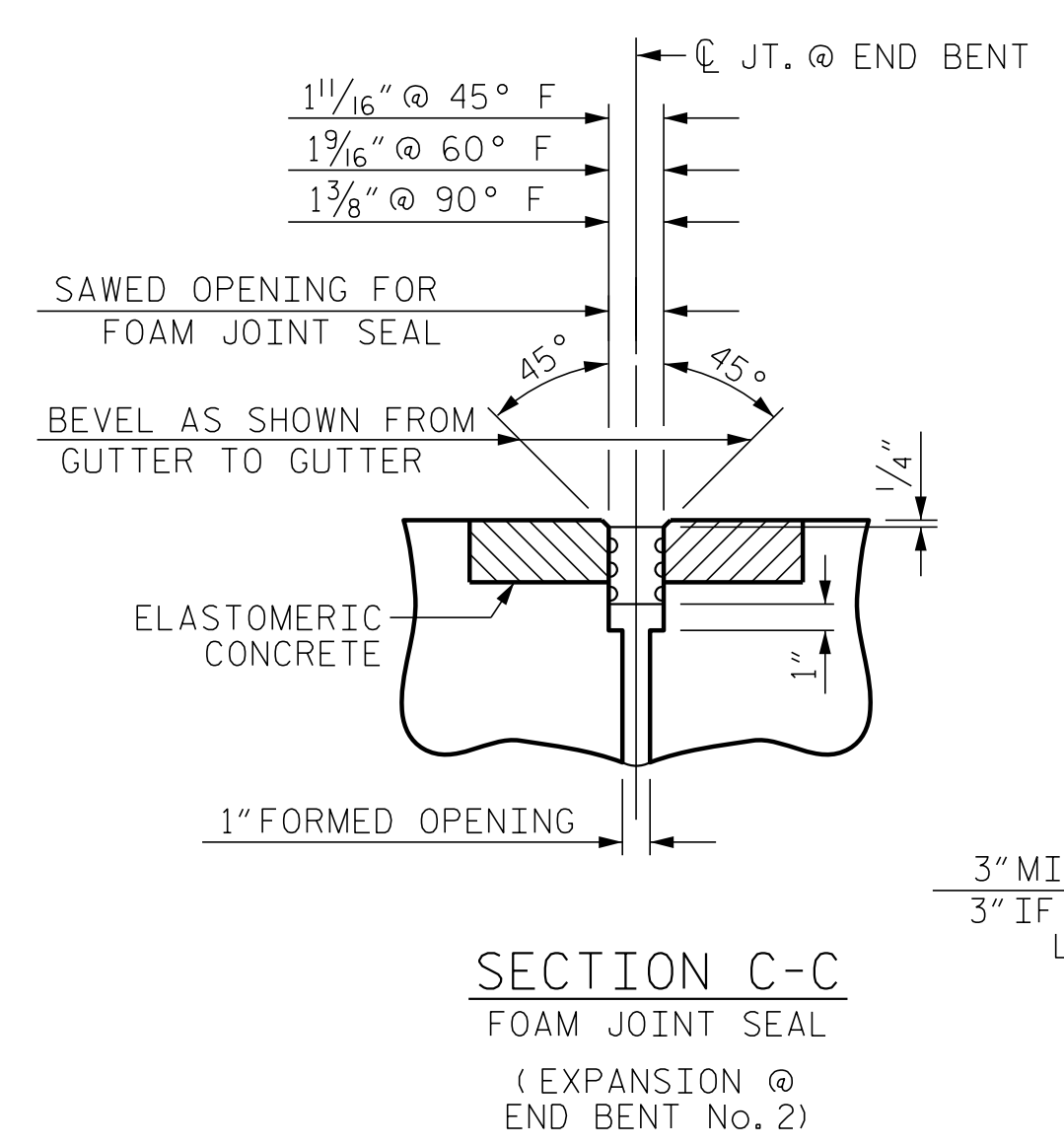
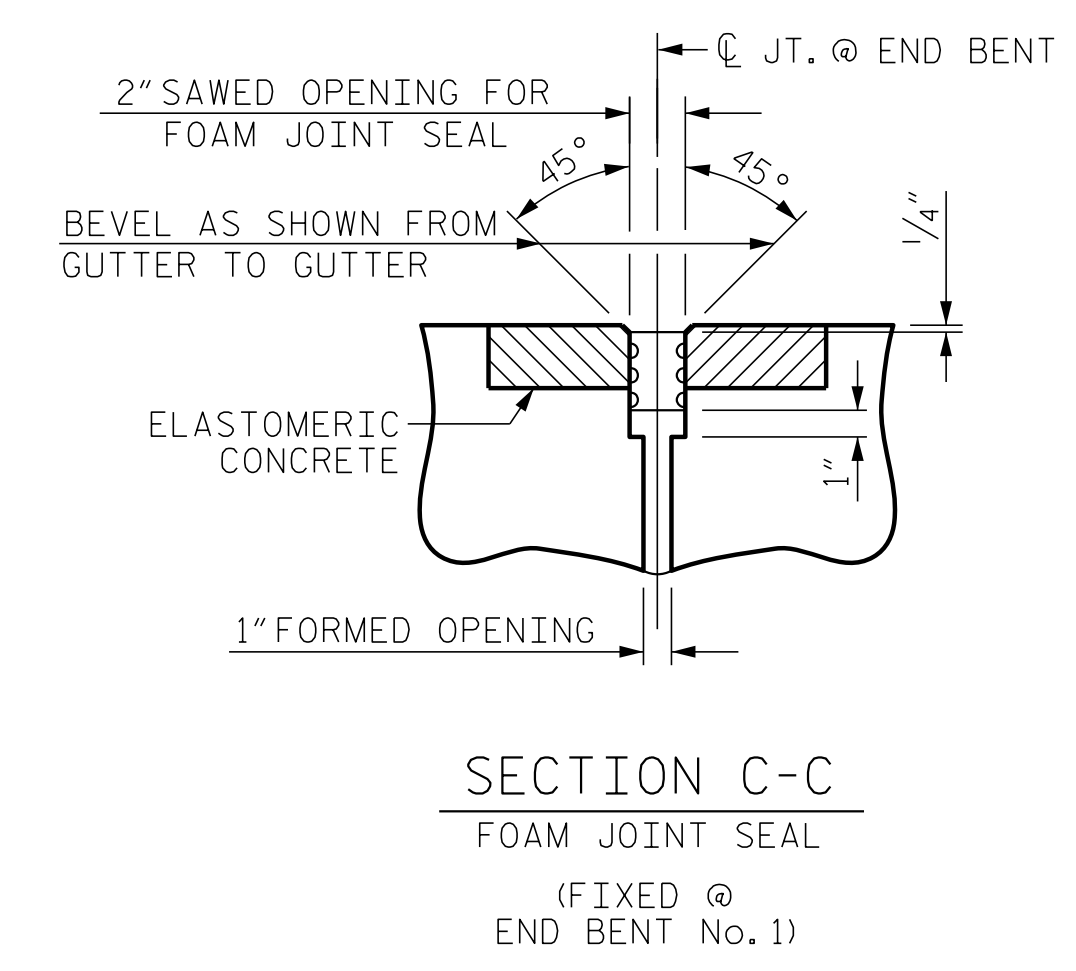
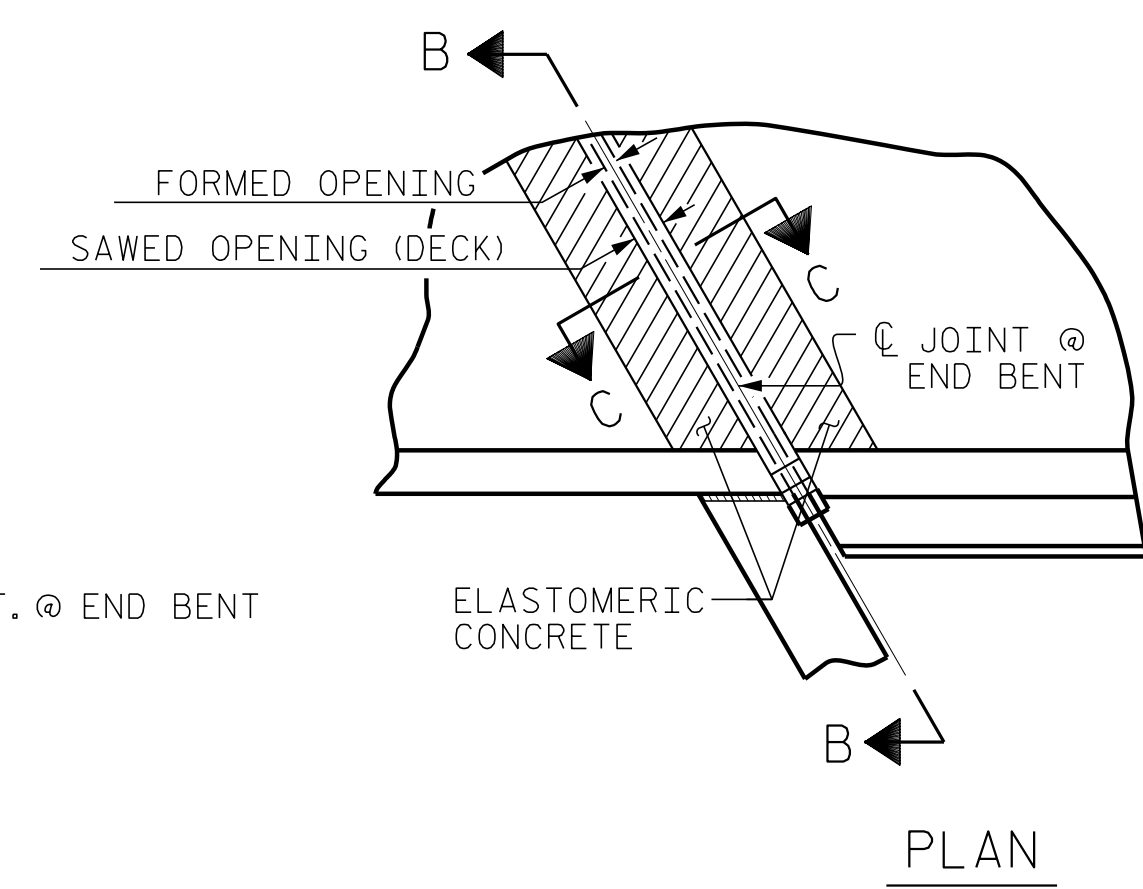
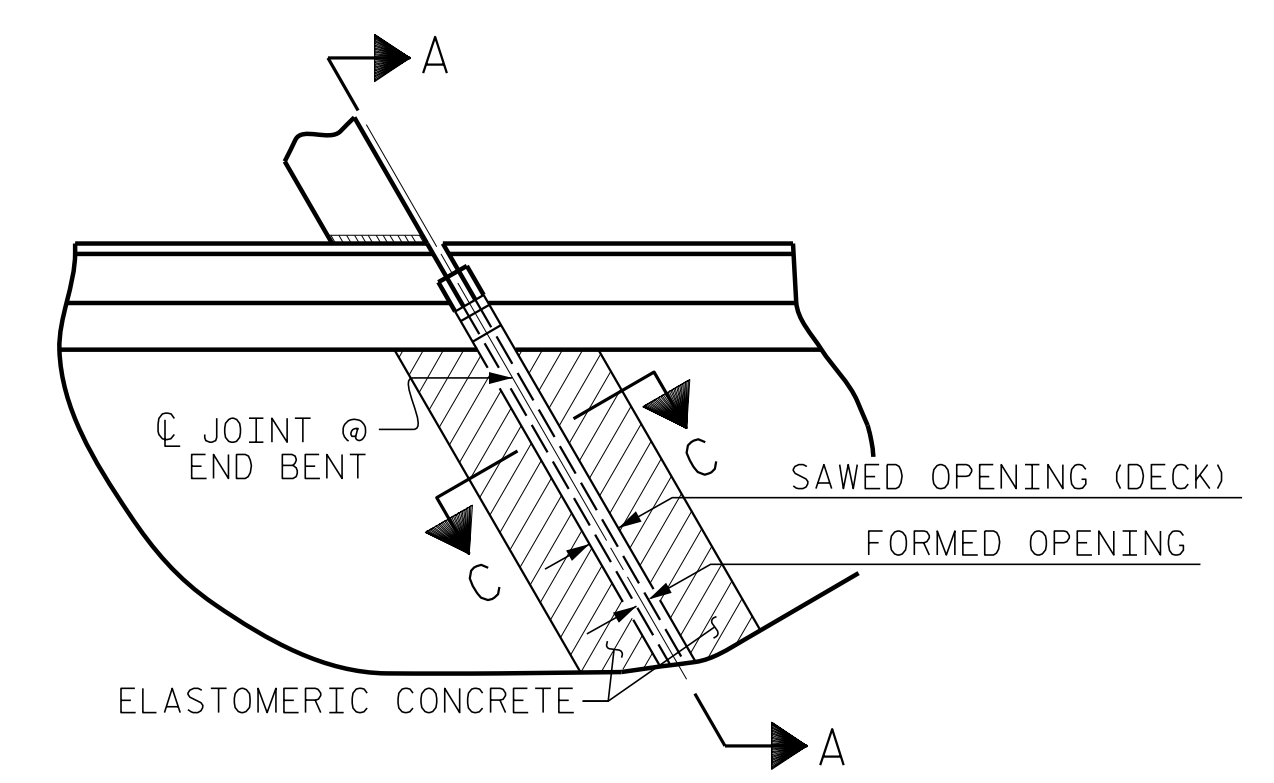
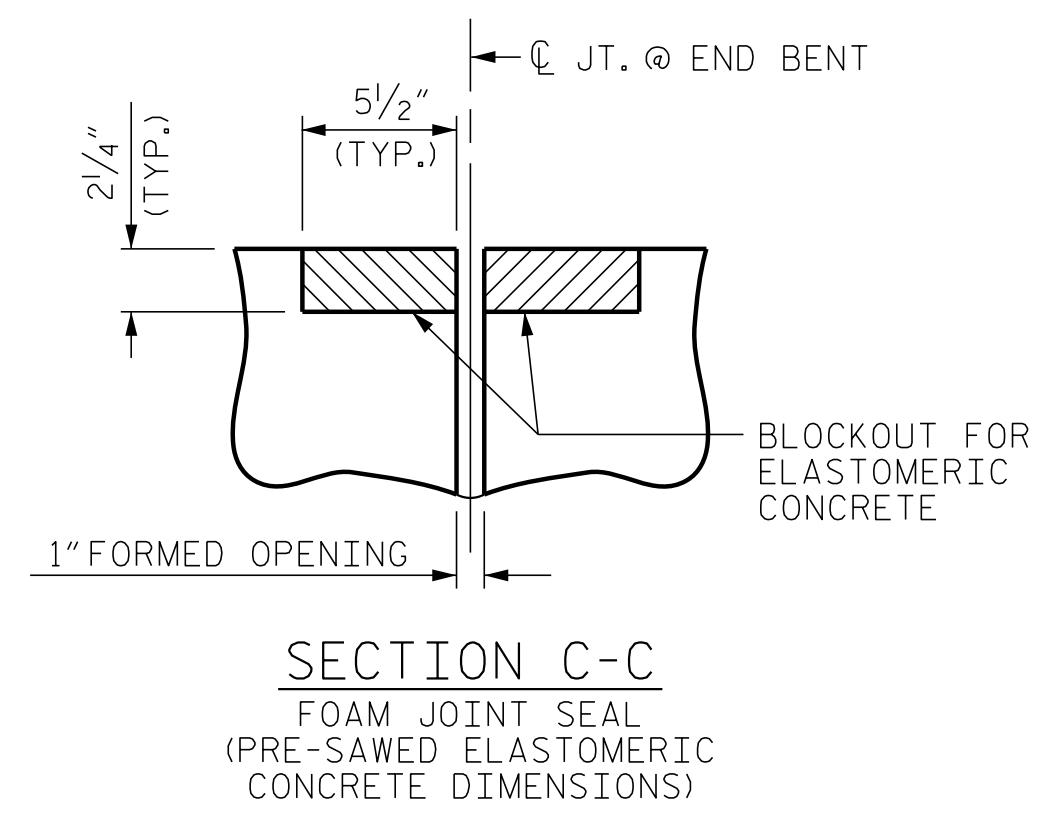
SHEET 2 OF 3

ASSEMBLED BY : D. HODGE	DATE : 1/18
CHECKED BY : B.C. HUNT	DATE : 2/18
DRAWN BY : FCJ 11/88	REV. 7/12 MAA/GM
CHECKED BY : ARB 11/88	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

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 UNLESS ALL SIGNATURES COMPLETED

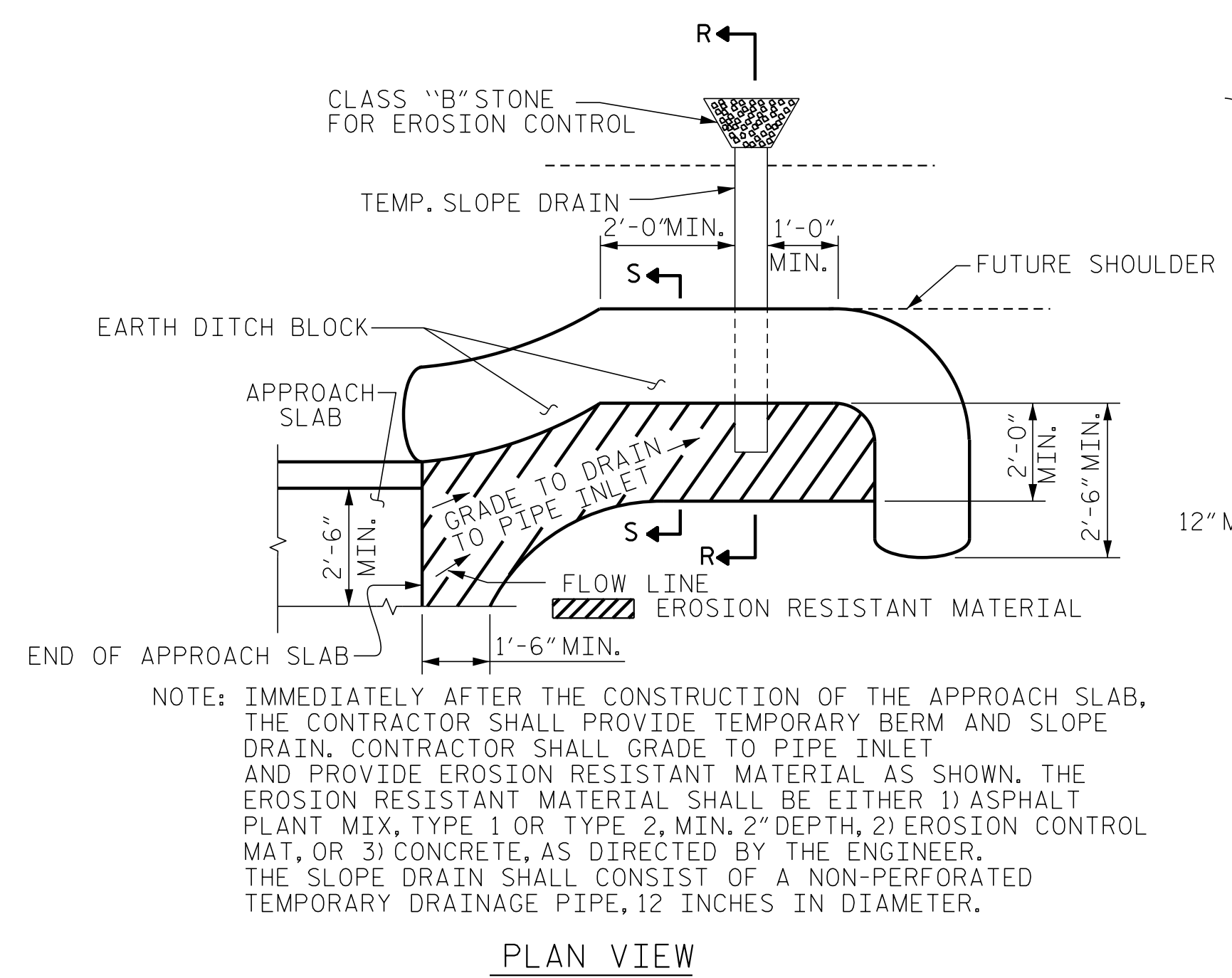
ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gulland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S2-17
TOTAL SHEETS					18



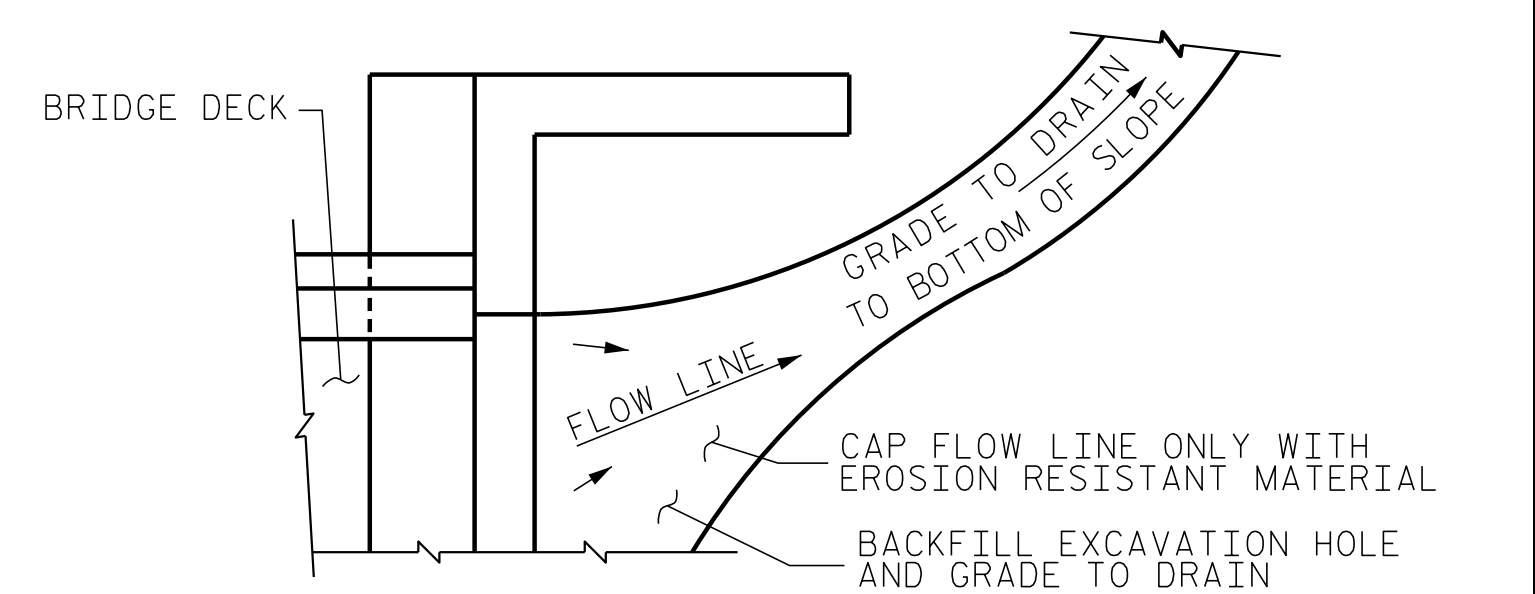
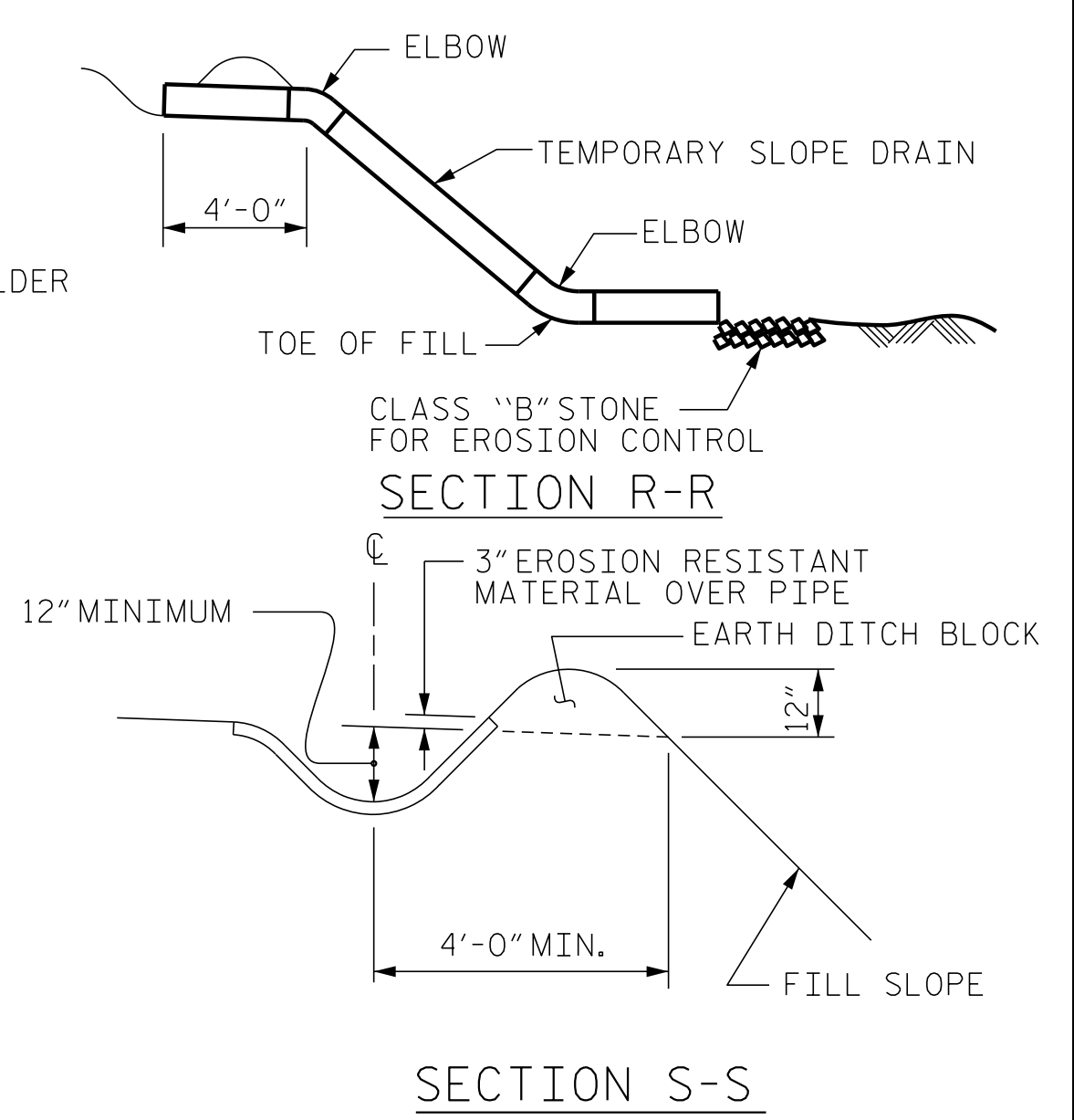
**JOINT SEAL DETAILS @ END BENT**

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.  
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.



**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

**TEMPORARY DRAINAGE DETAIL**

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	8.2
2	8.3
TOTAL	16.5

\* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. W-5600

JOHNSTON COUNTY

STATION: 217+31.76 -L-

SHEET 3 OF 3

ENGINEER OF RECORD:  
3/25/2019

Gregory M. Gulland  
REGISTERED ENGINEER

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  
(RIGHT LANE)

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

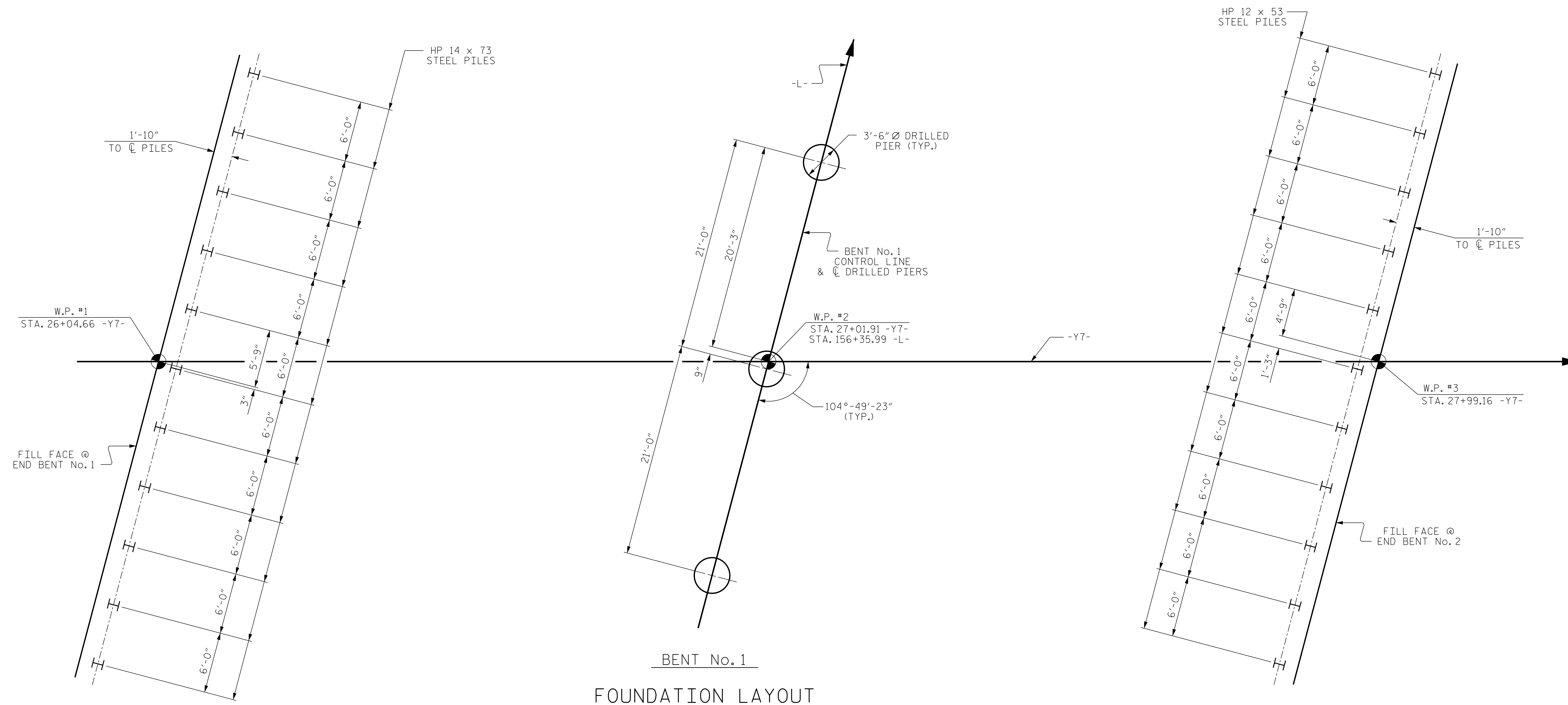
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TOTAL SHEETS 18

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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**FOUNDATION LAYOUT**

DIMENSIONS LOCATING DRILLED PIERS ARE SHOWN TO DRILLED PIER CENTERLINES

**NOTES:**

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT No. 1 AND END BENT No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

DRIVE PILES AT END BENT No. 1 TO A REQUIRED DRIVING RESISTANCE OF 300 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

DRIVE PILES AT END BENT No. 2 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 66,000 TO 74,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT No. 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT No. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRILLED-IN PILES ARE REQUIRED FOR INTEGRAL END BENT No. 2, RIGHT. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 166.0. FILL THE ENTIRE LENGTH OF THE HOLES WITH CLASS II OR III SELECT MATERIAL THAT MEETS SECTION 1016 OF THE STANDARD SPECIFICATIONS. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 2 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT No. 1 AND No. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT No. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 675 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 10 TSF.

INSTALL DRILLED PIERS AT BENT No. 1, LEFT, TO A TIP ELEVATION NO HIGHER THAN 161.0 WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 6.9 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

INSTALL DRILLED PIERS AT BENT No. 1, CENTER, TO A TIP ELEVATION NO HIGHER THAN 161.0 WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 7.0 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

INSTALL DRILLED PIERS AT BENT No. 1, RIGHT, TO A TIP ELEVATION NO HIGHER THAN 161.0 WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 6.9 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

SPT MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

SHEET 2 OF 3

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gilland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON SWIFT CREEK  
 RD. (SR 1501) OVER US 70  
 BETWEEN SR 1913  
 AND SR 1907

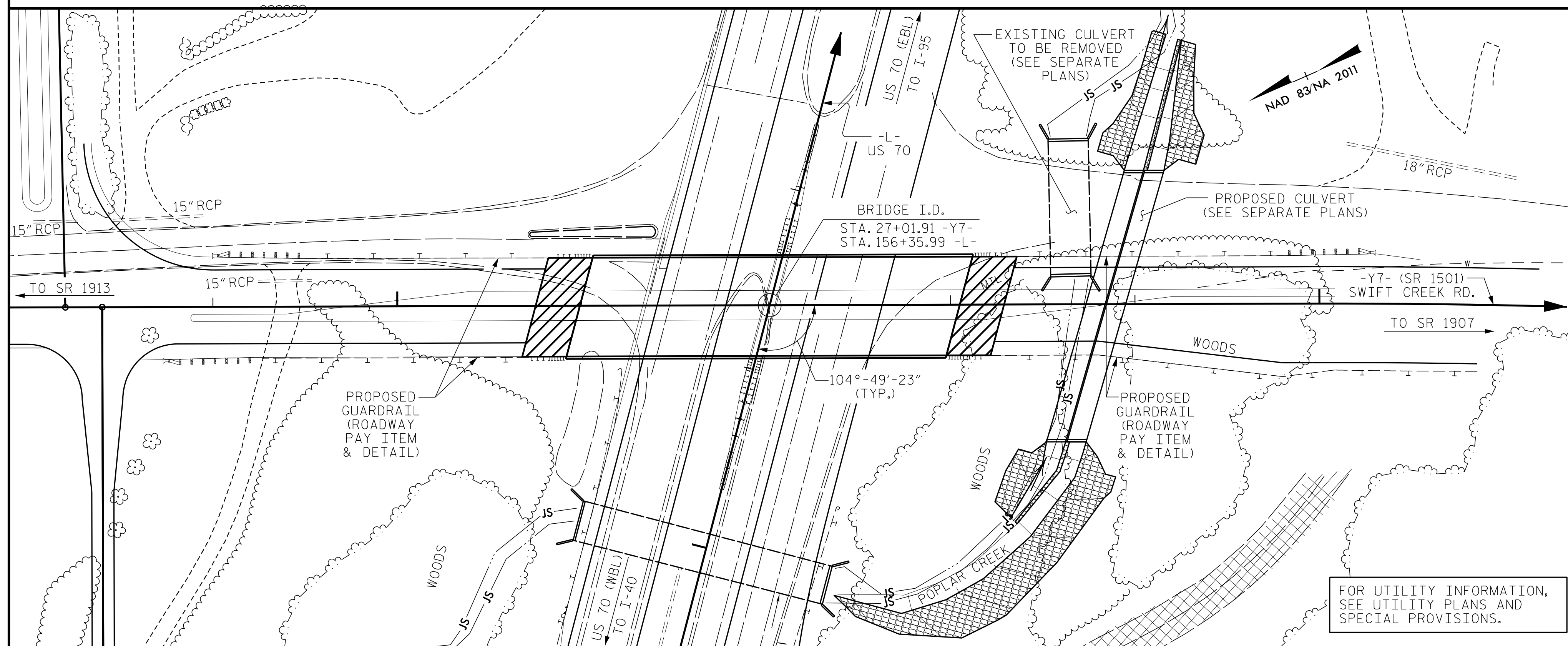
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-2
1			3			TOTAL SHEETS
2			4			32

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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DRAWN BY: D. HODGE DATE: 3/18  
 CHECKED BY: B.C. HUNT DATE: 1/19

BM #11 - BENCH TIE NAIL SET IN 18" PINE, 134.85' RT OF -Y7- STA. 39+10.93, ELEV 223.89



LOCATION SKETCH

**NOTES:**

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- THE EXISTING PAVEMENT WITHIN THE AREA OF THE END BENT PIERS SHALL BE REMOVED AND THE ROADBED SCARIFIED TO A MINIMUM DEPTH OF 2'-0".
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- 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 ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

**TOTAL BILL OF MATERIAL**

	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	SID INSPECTIONS	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL
	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE								10,908	11,180				
END BENT 1										47.8		5,962	
BENT 1			45.00	51.00	1	1	1			52.1		11,590	2,958
END BENT 2	201	31								47.6		5,930	
TOTAL	201	31	45.00	51.00	1	1	1	10,908	11,180	147.5	LUMP SUM	23,482	2,958

**SAMPLE BAR REPLACEMENT**

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

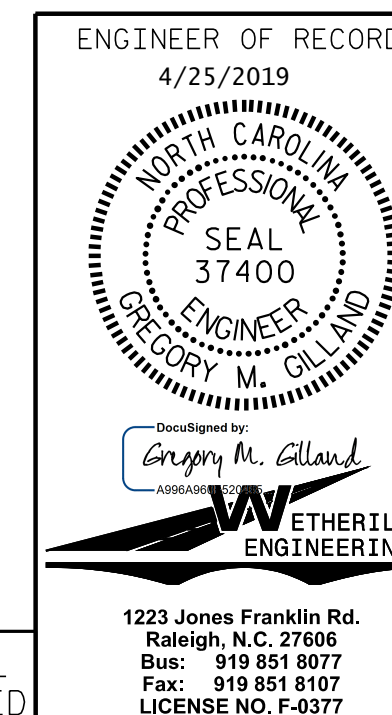
NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND  $f_y = 60\text{ksi}$ .

**TOTAL BILL OF MATERIAL**

	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES		PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES		HP 12 X 53 STEEL PILES		HP 14 X 73 STEEL PILES		STEEL PILE POINTS	TWO BAR METAL RAIL	1'-2" X 3'-3" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	No.	LIN.FT.	EA.	EA.	No.	LIN.FT.	No.	LIN.FT.	EA.	LIN.FT.	LIN.FT.	SQ. YDS.	LUMP SUM		
SUPERSTRUCTURE	12	1,147.75									369.44	385.55	LUMP SUM		
END BENT 1				11			11	632					350		
BENT 1															
END BENT 2			11		11	492			11				350		
TOTAL	12	1,147.75	11	11	11	492	11	632	11	369.44	385.55	700	LUMP SUM		

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON SWIFT CREEK RD. (SR 1501) OVER US 70 BETWEEN SR 1913 AND SR 1907

REVISIONS

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

SHEET NO.  
 S3-3  
 TOTAL SHEETS  
 32

DRAWN BY: D. HODGE DATE: 12/17  
 CHECKED BY: B.C. HUNT DATE: 1/19

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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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			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.03	--	1.75	0.880	1.35	A	EL	47.120	0.990	1.27	A	I	85.380	0.80	0.880	1.03	A	EL	47.120		
	HL-93 (OPERATING)	N/A		1.68	--	1.35	0.880	1.75	A	EL	47.120	0.990	1.68	A	I	85.380	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.42	51.120	1.75	0.880	1.86	A	EL	47.120	0.990	1.71	A	I	85.380	0.80	0.880	1.42	A	EL	47.120		
	HS-20 (OPERATING)	36.000		2.25	81.000	1.35	0.880	2.41	A	EL	47.120	0.990	2.25	A	I	85.380	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.34	45.090	1.40	0.880	5.48	A	EL	47.120	0.990	5.44	A	I	85.380	0.80	0.880	3.34	A	EL	47.120	
		SNGARBS2	20.000		2.43	48.600	1.40	0.880	3.98	A	EL	47.120	0.990	3.79	A	I	85.380	0.80	0.880	2.43	A	EL	47.120	
		SNAGRIS2	22.000		2.28	50.160	1.40	0.880	3.73	A	EL	47.120	0.990	3.49	A	I	85.380	0.80	0.880	2.28	A	EL	47.120	
		SNCOTTS3	27.250		1.66	45.235	1.40	0.880	2.72	A	EL	47.120	0.990	2.66	A	I	85.380	0.80	0.880	1.66	A	EL	47.120	
		SNAGGRS4	34.925		1.36	47.498	1.40	0.880	2.24	A	EL	47.120	0.990	2.16	A	I	85.380	0.80	0.880	1.36	A	EL	47.120	
		SNS5A	35.550		1.34	47.637	1.40	0.880	2.19	A	EL	47.120	0.990	2.17	A	I	85.380	0.80	0.880	1.34	A	EL	47.120	
		SNS6A	39.950		1.22	48.739	1.40	0.880	1.99	A	EL	47.120	0.990	1.96	A	I	85.380	0.80	0.880	1.22	A	EL	47.120	
	SNS7B	42.000		1.16	48.720	1.40	0.880	1.90	A	EL	47.120	0.990	1.90	A	I	85.380	0.80	0.880	1.16	A	EL	47.120		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.48	48.840	1.40	0.880	2.43	A	EL	47.120	0.990	2.36	A	I	85.380	0.80	0.880	1.48	A	EL	47.120	
		TNT4A	33.075		1.48	48.951	1.40	0.880	2.43	A	EL	47.120	0.990	2.31	A	I	85.380	0.80	0.880	1.48	A	EL	47.120	
		TNT6A	41.600		1.20	49.920	1.40	0.880	1.97	A	EL	47.120	0.990	2.00	A	I	85.380	0.80	0.880	1.20	A	EL	47.120	
		TNT7A	42.000		1.21	50.820	1.40	0.880	1.98	A	EL	47.120	0.990	1.97	A	I	85.380	0.80	0.880	1.21	A	EL	47.120	
		TNT7B	42.000		1.24	52.080	1.40	0.880	2.03	A	EL	47.120	0.990	1.87	A	I	85.380	0.80	0.880	1.24	A	EL	47.120	
		TNAGRIT4	43.000		1.18	50.740	1.40	0.880	1.94	A	EL	47.120	0.990	1.81	A	I	85.380	0.80	0.880	1.18	A	EL	47.120	
TNAGT5A		45.000		1.12	50.400	1.40	0.880	1.84	A	EL	47.120	0.990	1.78	A	I	85.380	0.80	0.880	1.12	A	EL	47.120		
TNAGT5B	45.000	③	1.11	49.950	1.40	0.880	1.82	A	EL	47.120	0.990	1.72	A	I	85.380	0.80	0.880	1.11	A	EL	47.120			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

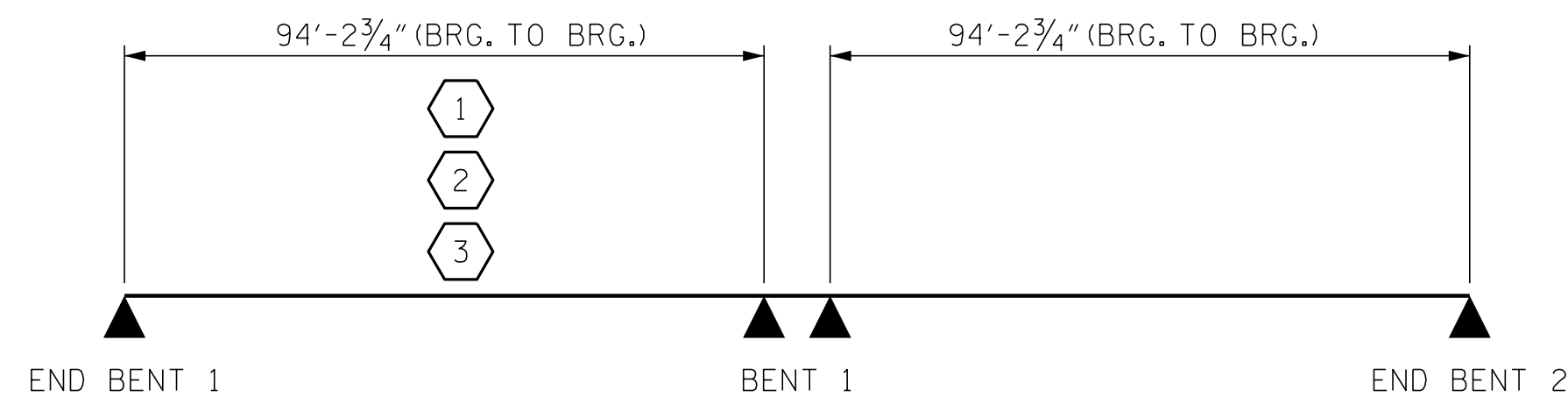
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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

COMMENTS:

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

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



LRFR SUMMARY

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

ASSEMBLED BY : D. HODGE	DATE : 12/17
CHECKED BY : G.M. GILLAND	DATE : 1/18
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

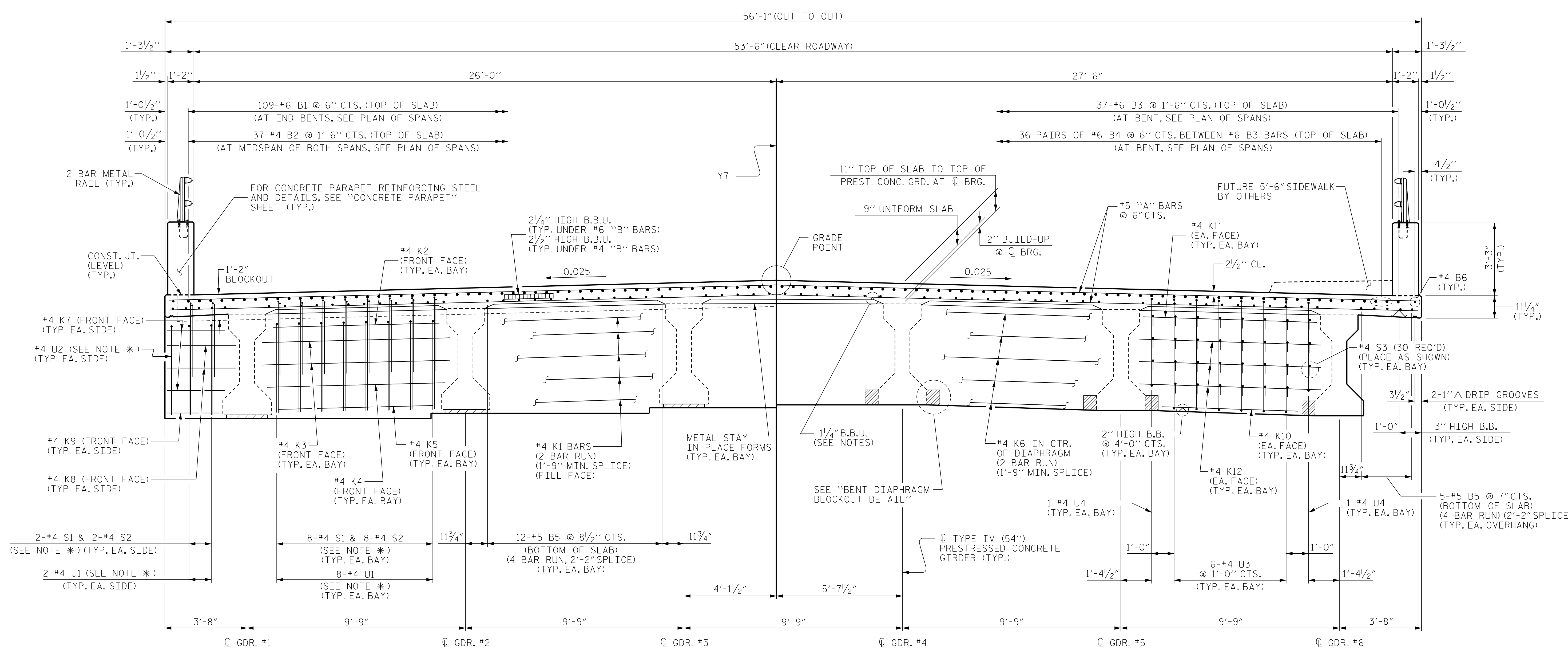
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UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
3/25/2019

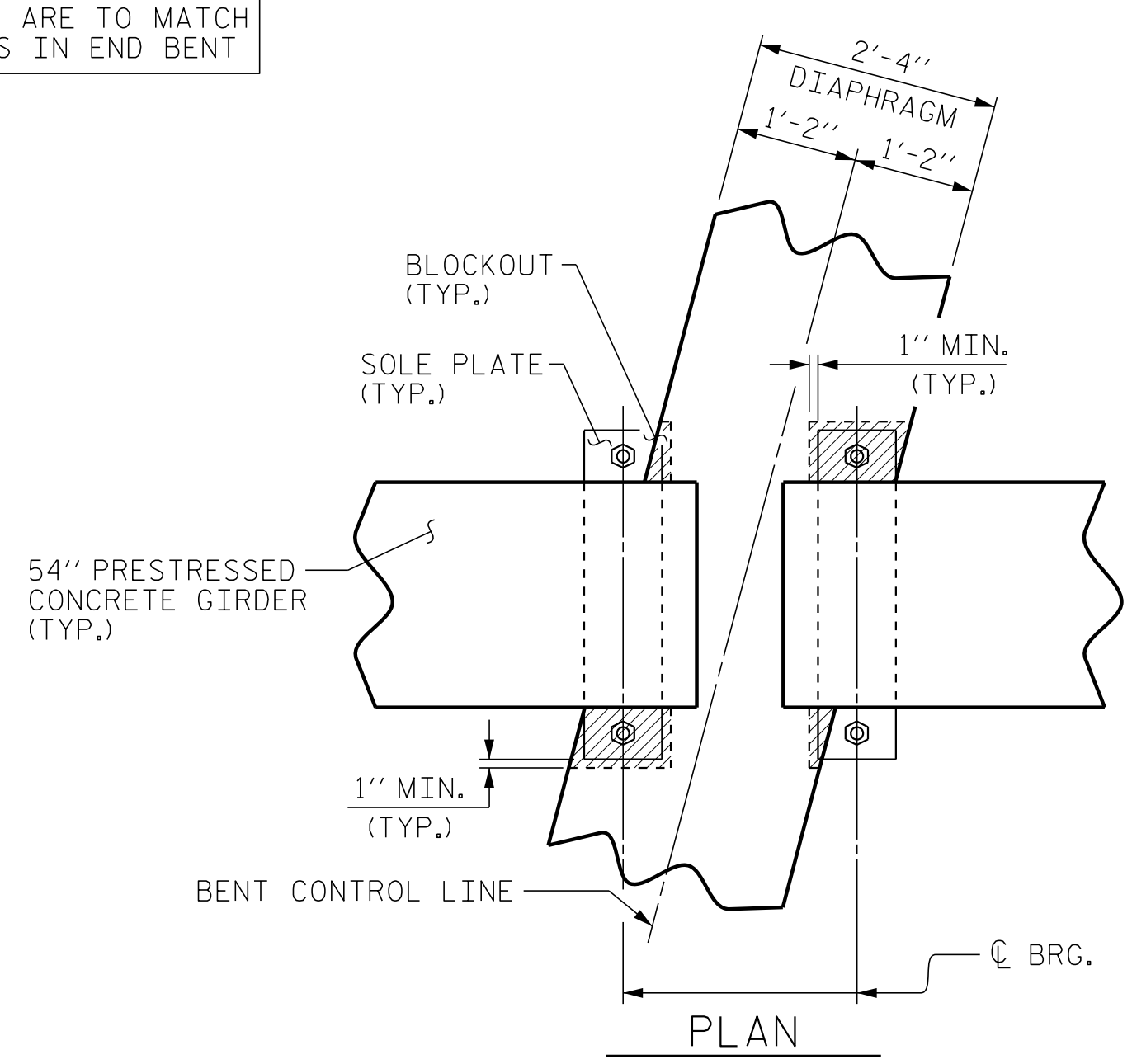
Gregory M. Gilland  
ENGINEERING

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

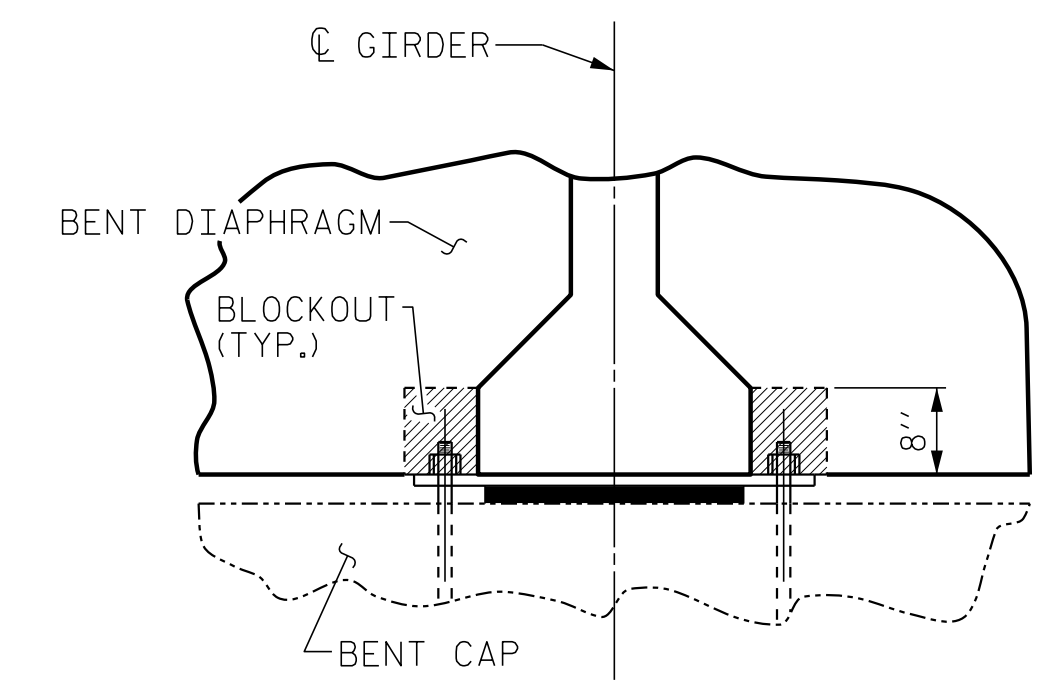
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STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S3-4
					TOTAL SHEETS 32



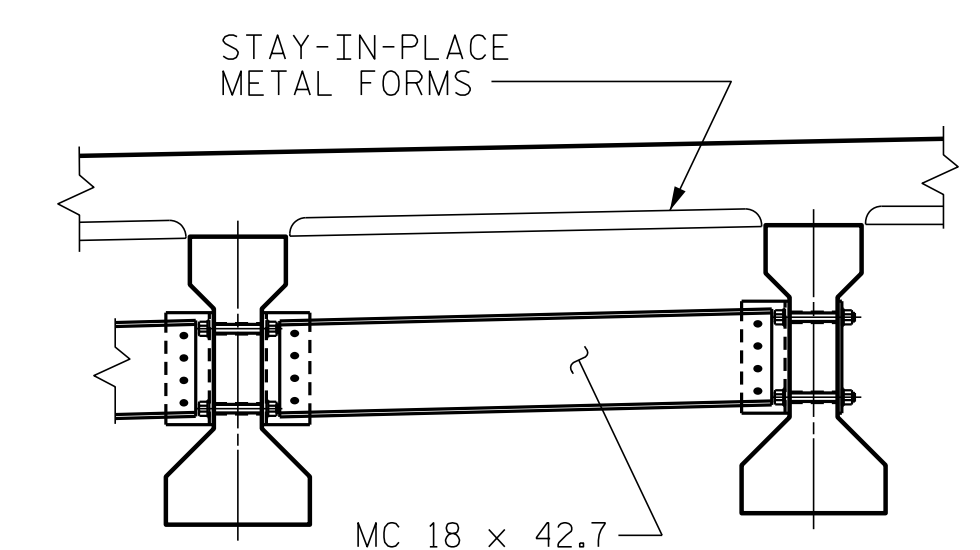
NOTE \*  
THESE BARS ARE TO MATCH  
#4 "V" BARS IN END BENT



BENT DIAPHRAGM BLOCK-OUT DETAIL



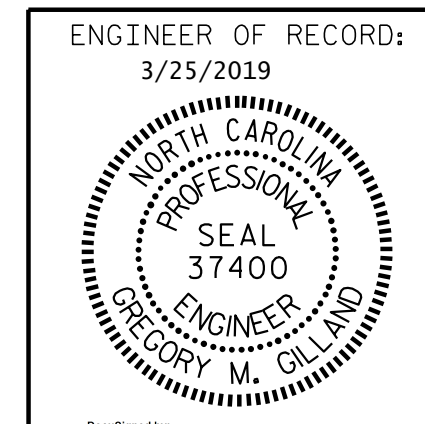
SECTION



TYPICAL INTERMEDIATE DIAPHRAGM

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 1 OF 2



Gregory M. Gilland  
 WETHERILL ENGINEERING

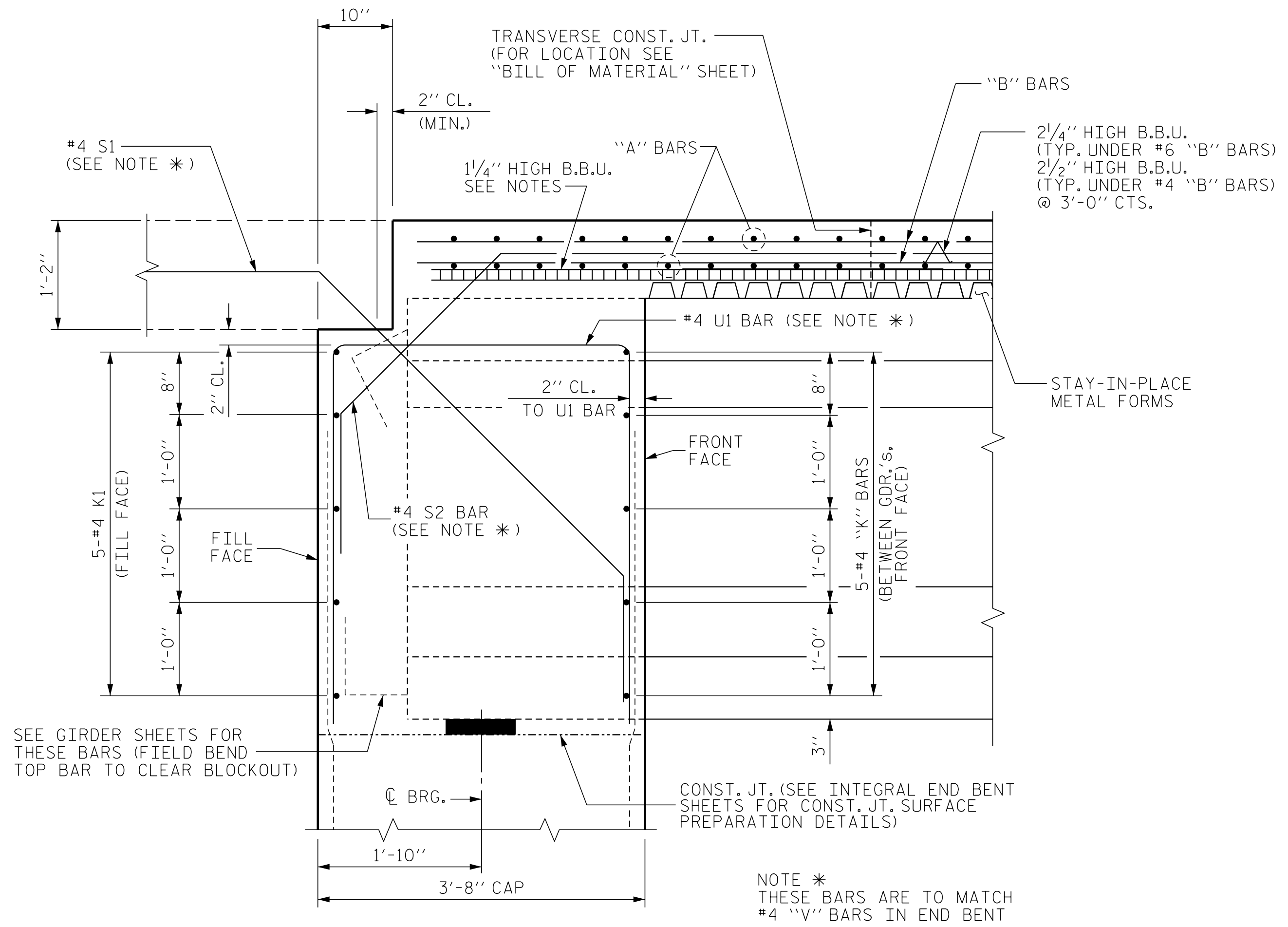
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

DRAWN BY : D. HODGE DATE : 11/17  
 CHECKED BY : G.M. GILLAND DATE : 1/18

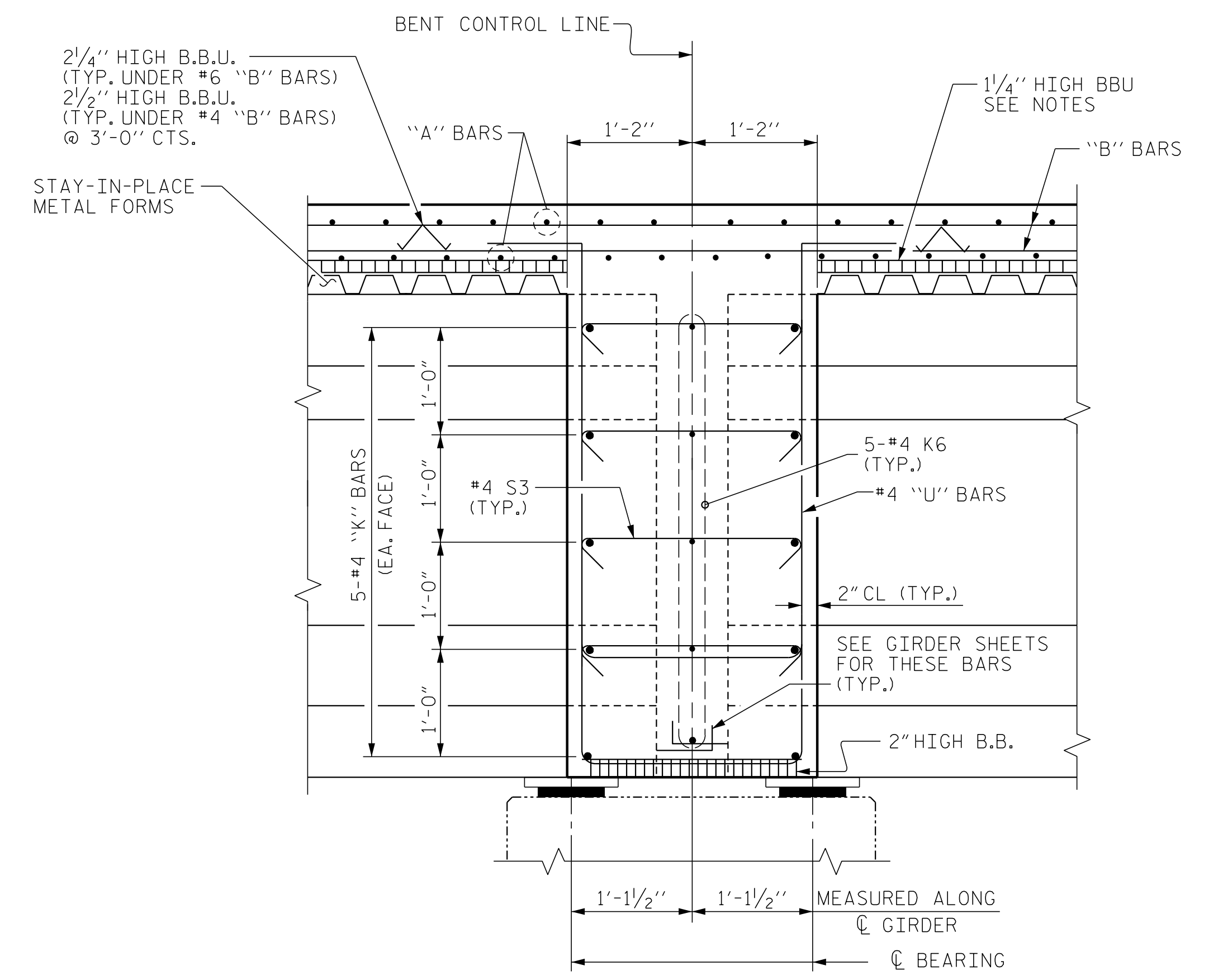
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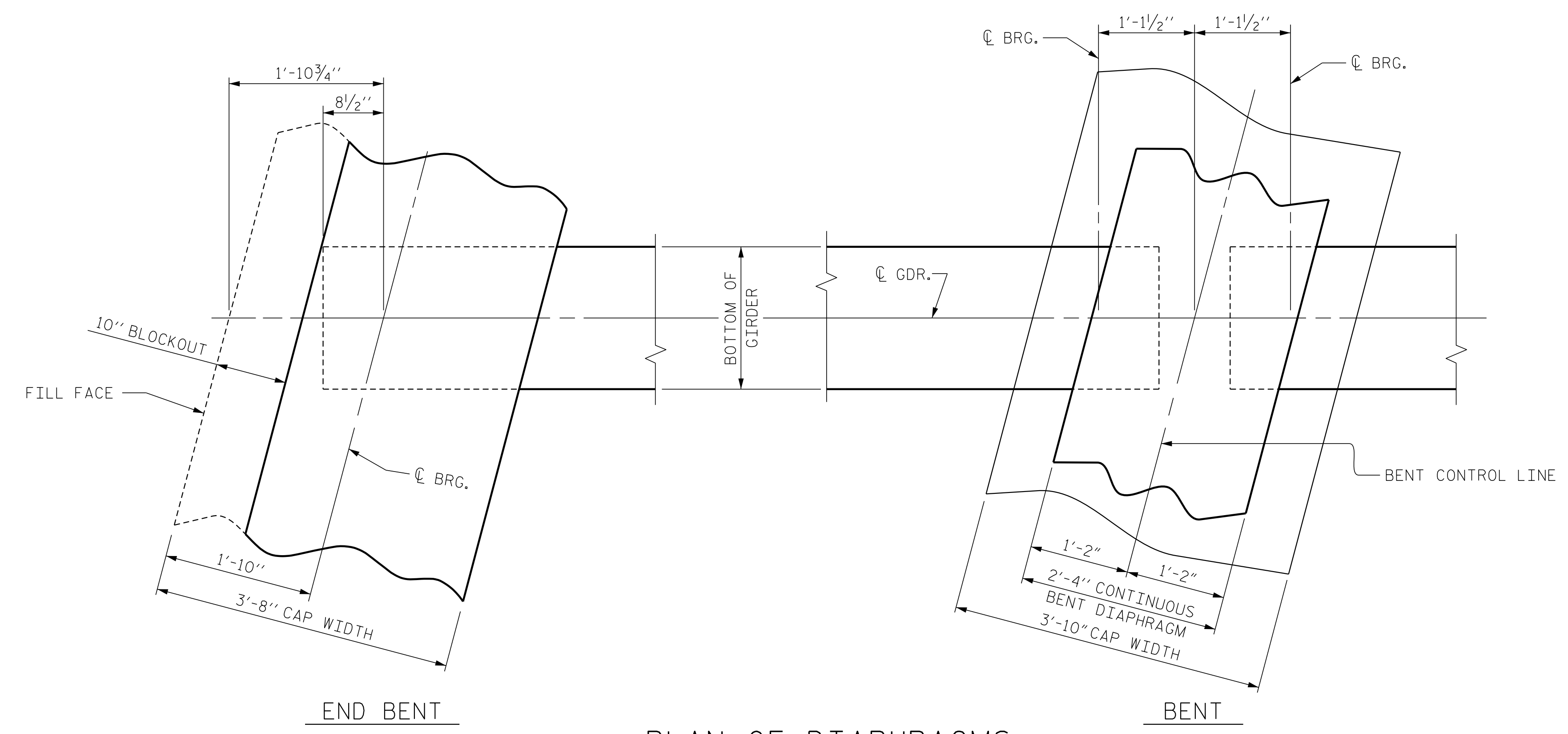
**SECTION THRU INTEGRAL END BENT**  
(SHOWN PERPENDICULAR TO FILL FACE)



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

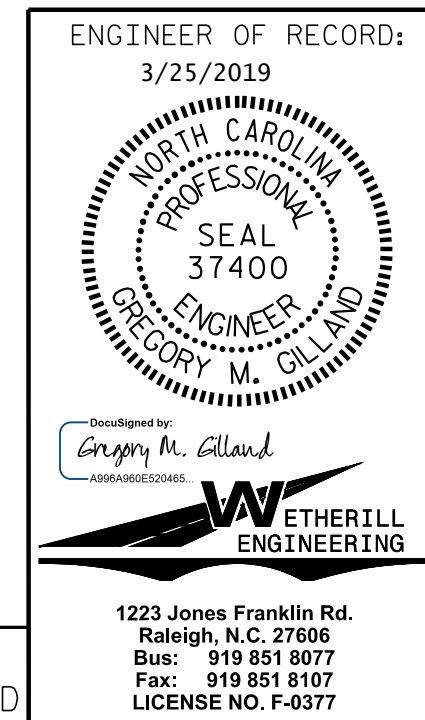
**NOTES:**

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



**PLAN OF DIAPHRAGMS**

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 2 OF 2



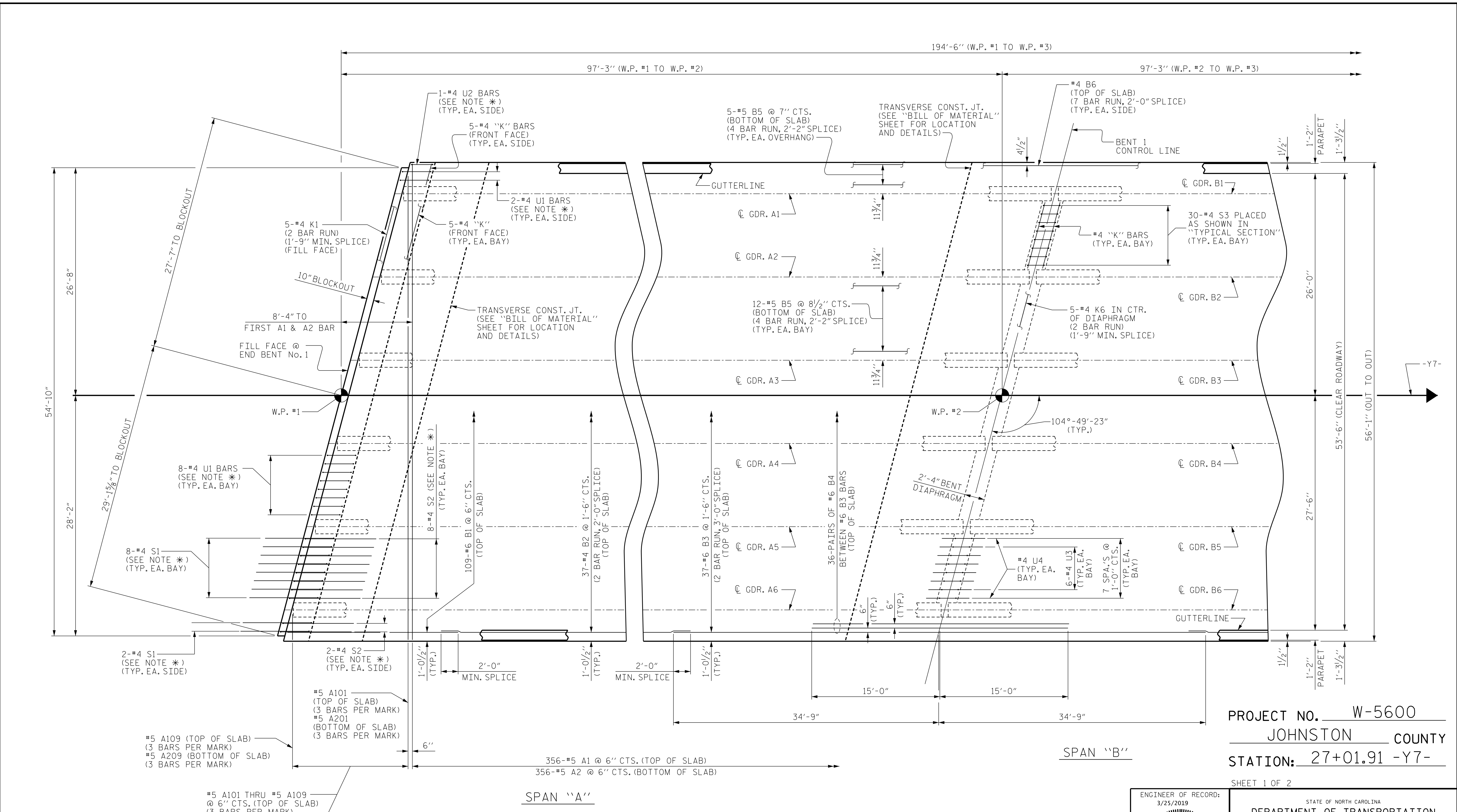
STATE OF NORTH CAROLINA		DEPARTMENT OF TRANSPORTATION		RALEIGH	
SUPERSTRUCTURE					
TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S3-6
TOTAL SHEETS					32

DRAWN BY: D. HODGE DATE: 11/17  
 CHECKED BY: G.M. GILLAND DATE: 1/18

DOCUMENT NOT CONSIDERED FINAL  
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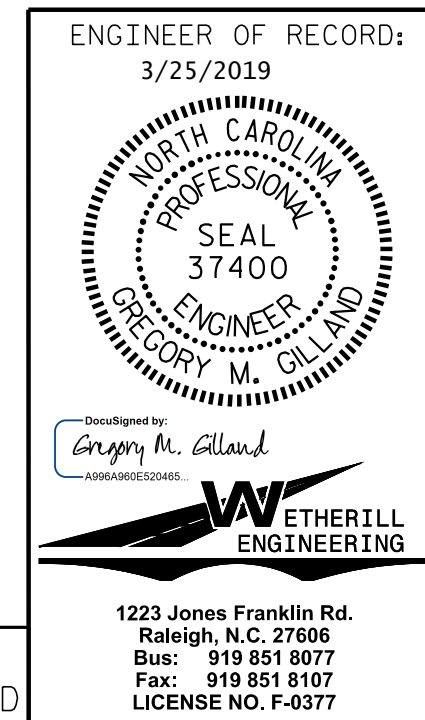
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**PARTIAL PLAN OF SPAN**

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

PROJECT NO. W-5600  
 JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 1 OF 2

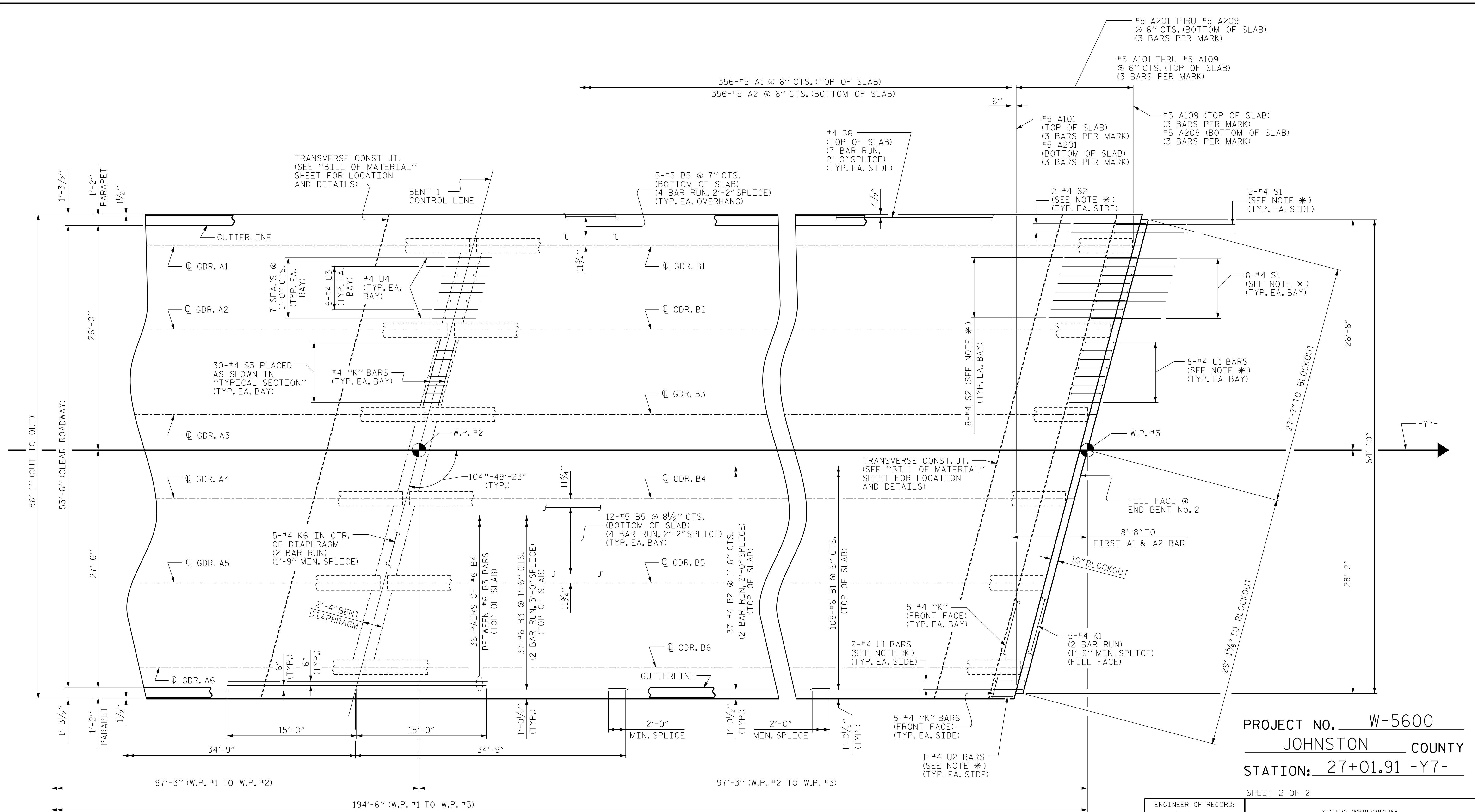


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPAN					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S3-7 TOTAL SHEETS 32

DRAWN BY: D. HODGE DATE: 11/17  
 CHECKED BY: G.M. GILLAND DATE: 1/18

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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SPAN "A"

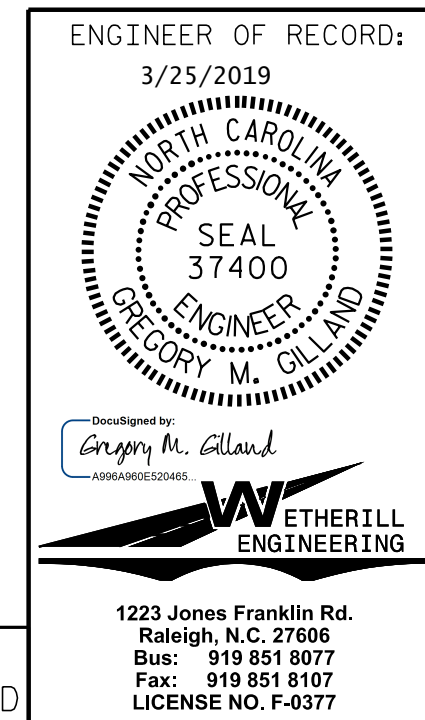
SPAN "B"  
PARTIAL PLAN OF SPAN

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 2 OF 2

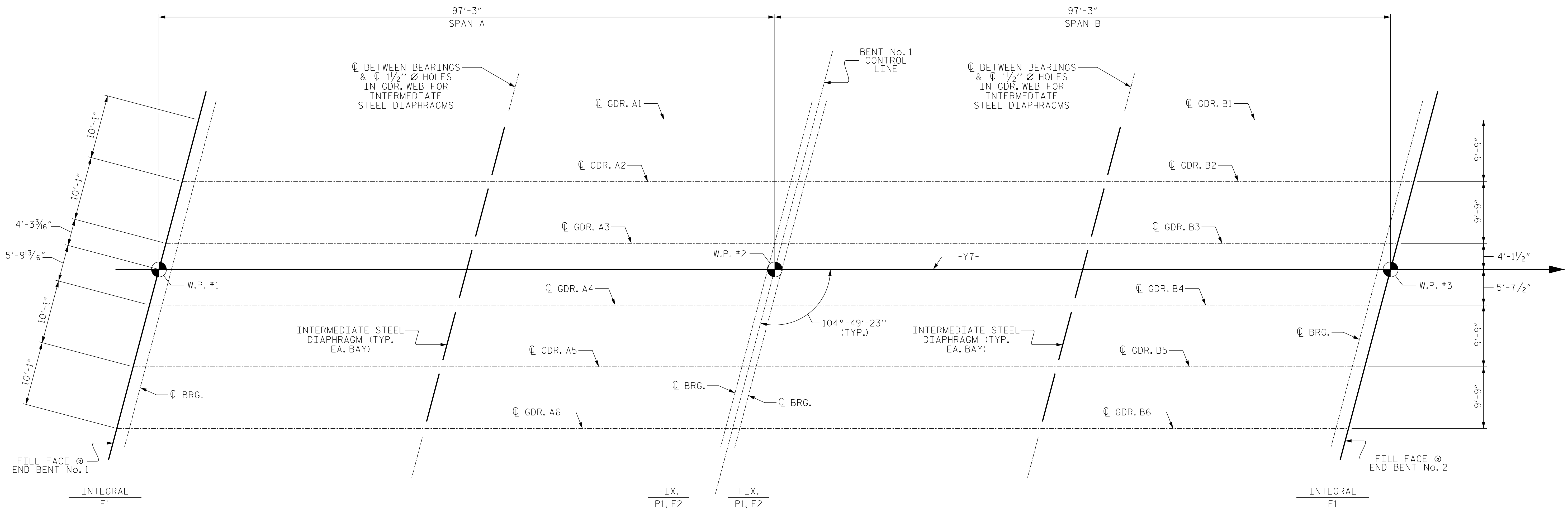
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 CHECKED BY: G.M. GILLAND DATE: 1/18

DOCUMENT NOT CONSIDERED FINAL  
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPAN					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S3-8
TOTAL SHEETS					32

1223 Jones Franklin Rd.  
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GIRDER LAYOUT

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

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DRAWN BY : D. HODGE DATE : 11/17  
 CHECKED BY : G.M. GILLAND DATE : 1/18

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
 3/25/2019

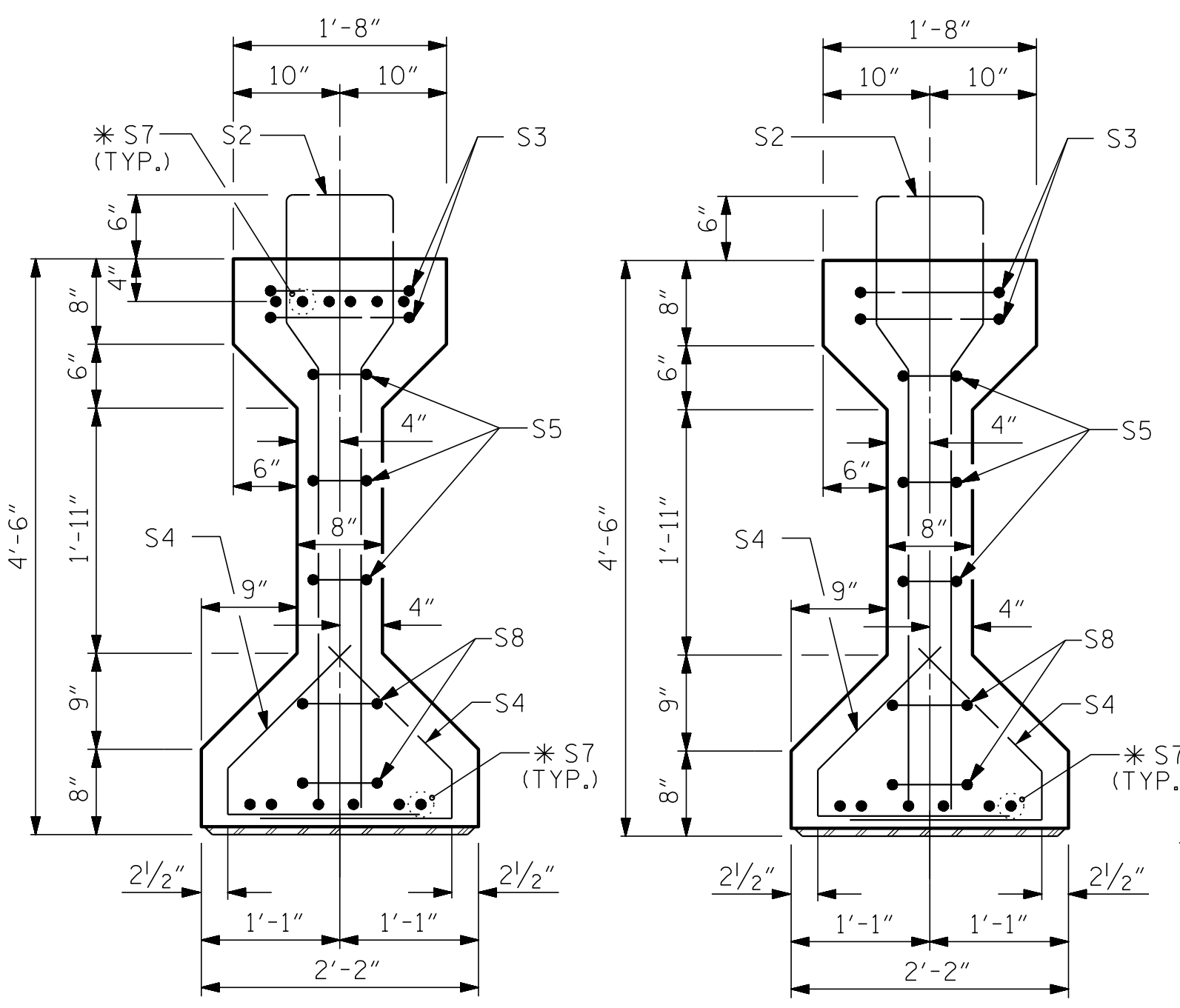
1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 GIRDER LAYOUT

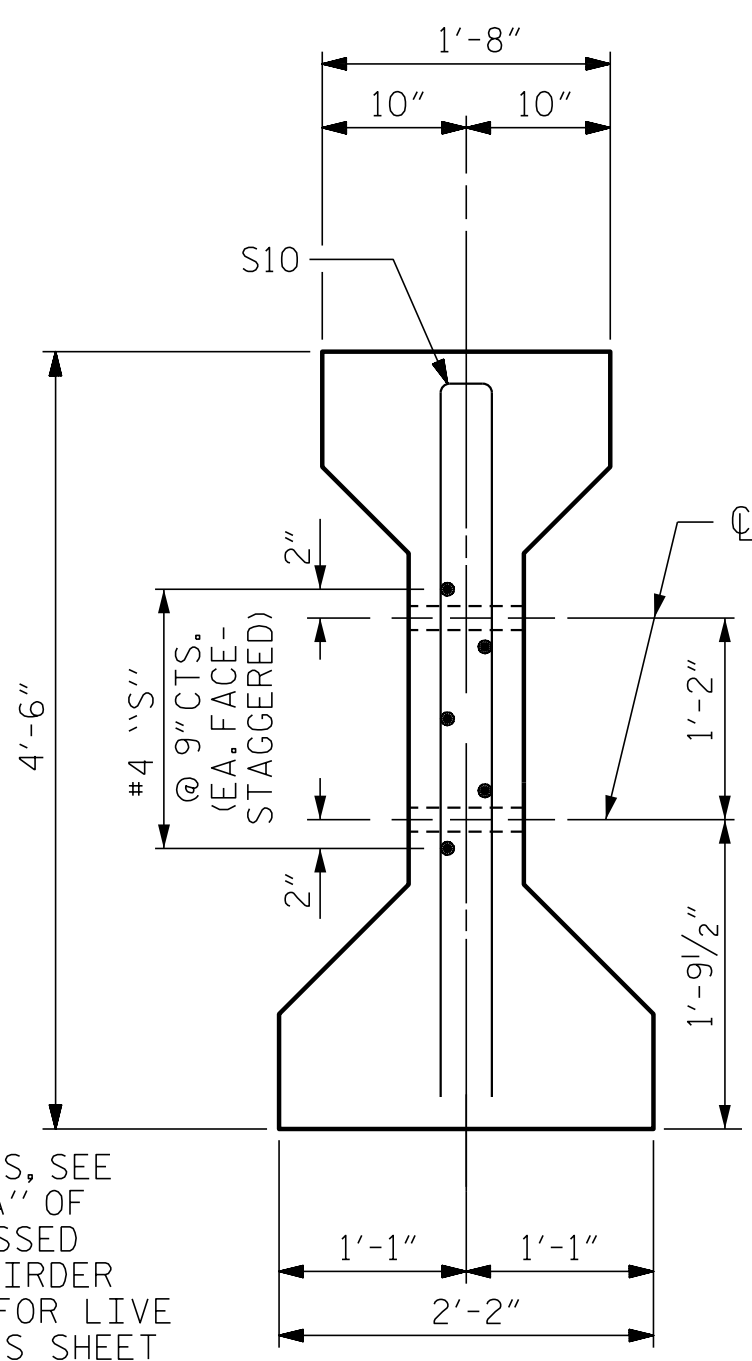
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NO.	BY:	DATE:	NO.	BY:	DATE:	S3-9
1			3			TOTAL SHEETS
2			4			32





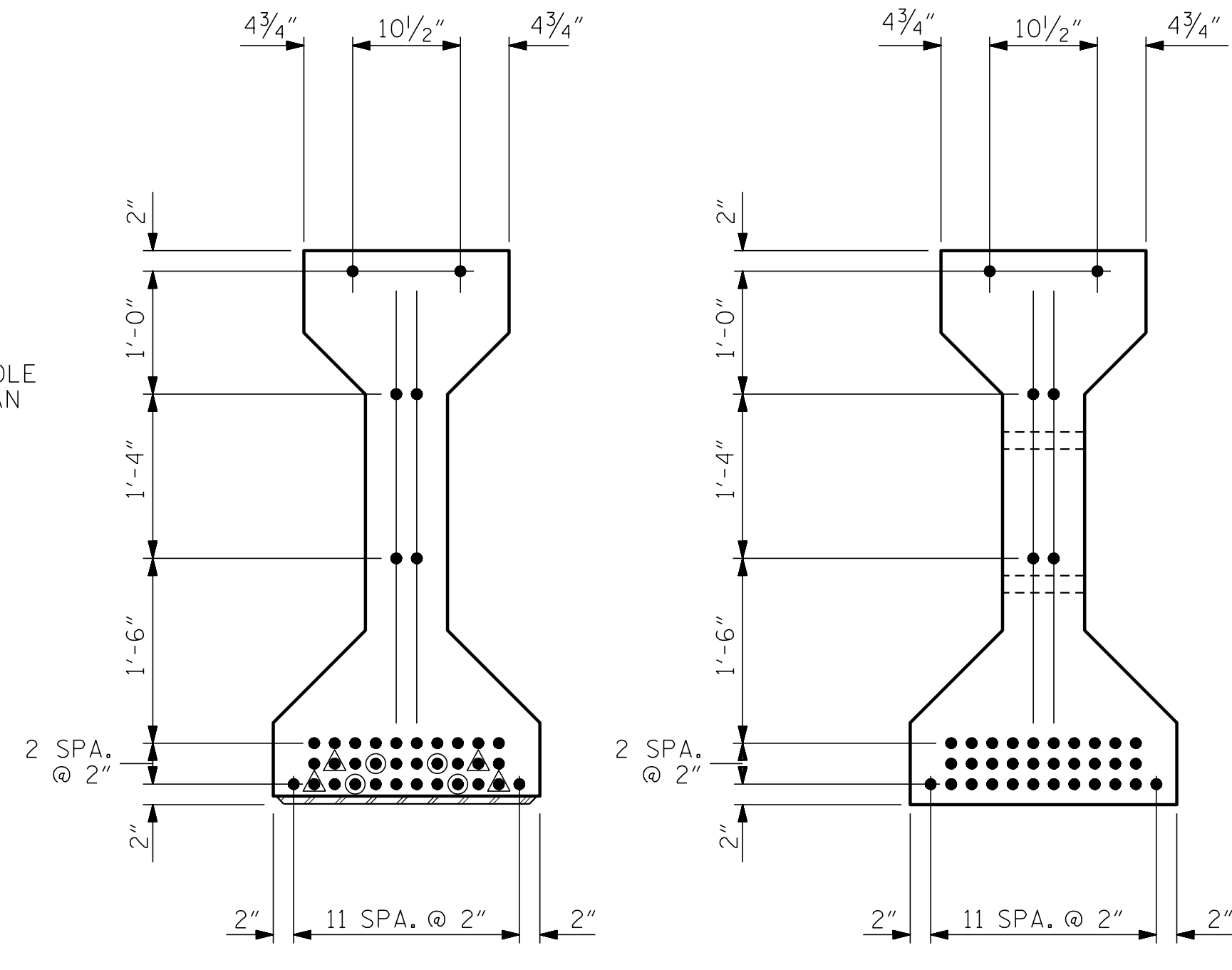
SECTION A-A

SECTION B-B



SECTION C-C  
(S1 BARS NOT SHOWN)

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

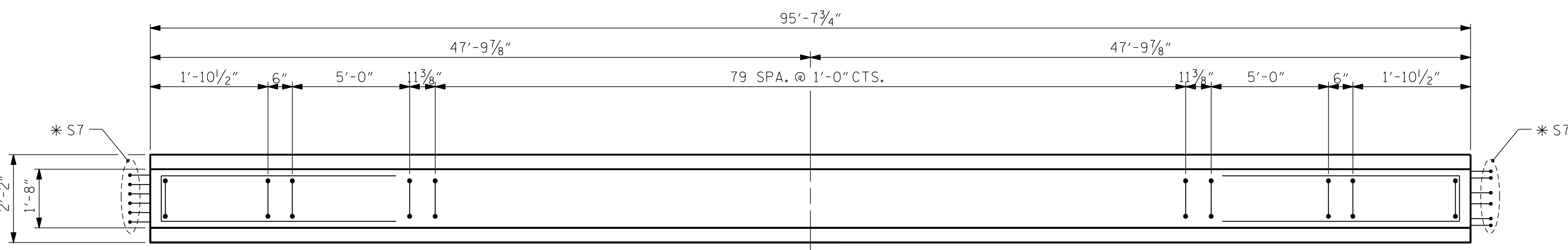


AT END OF GIRDER

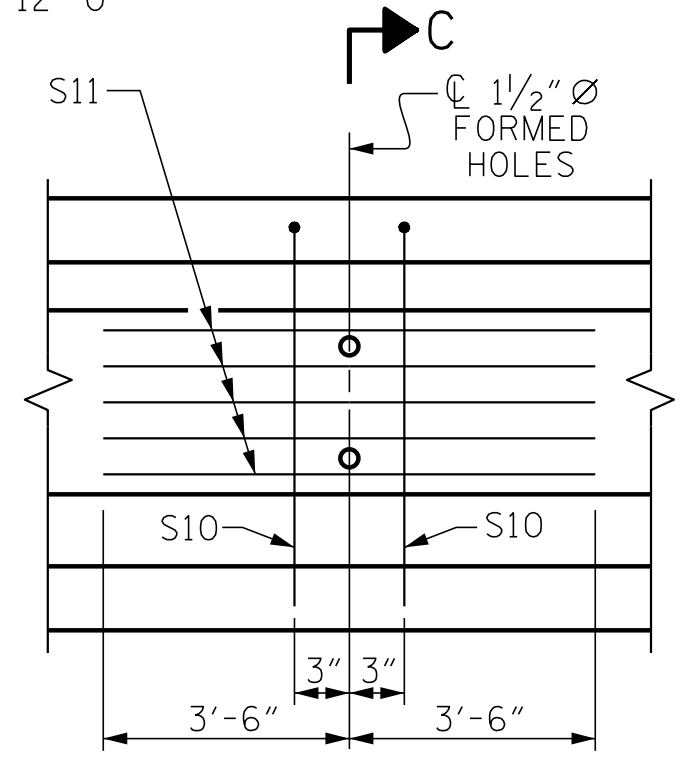
AT  $\bar{C}$  OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

- ▲ DEBONDING LENGTH = 8'-0"
- DEBONDING LENGTH = 12'-0"

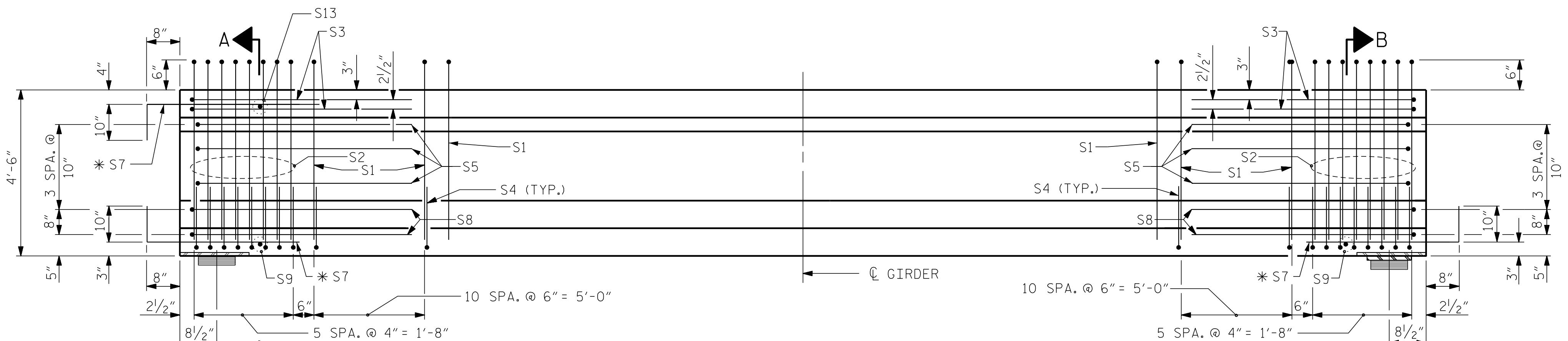


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM  
REINFORCING STEEL FOR GIRDERS



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

0.6" Ø L. R. GRADE 270 STRANDS

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

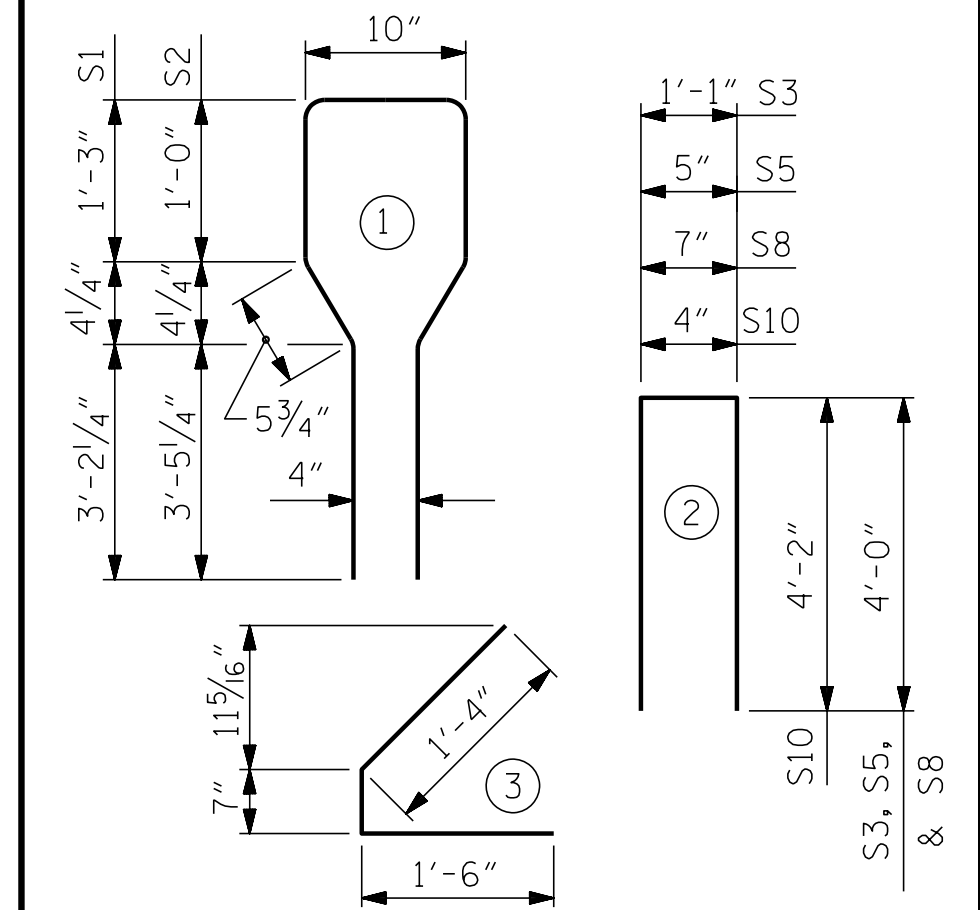
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	102	#4	1	10'-8"	727
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



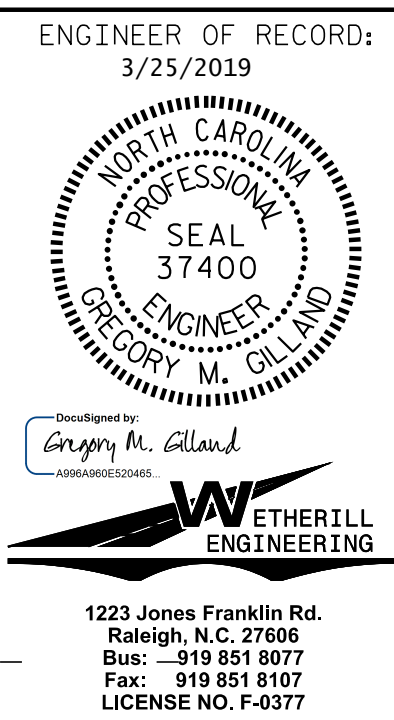
QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	7500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
	1,267	19.4	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
12	95'-7 3/4"	1147'-9"

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 27+01.91 -Y7-



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

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

ASSEMBLED BY : D. HODGE	DATE : 11/17
CHECKED BY : G.M. GILLAND	DATE : 1/18
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/CM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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UNLESS ALL SIGNATURES COMPLETED

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LICENSE NO. F-0377

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 3/20/2019 10:24:05 AM

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

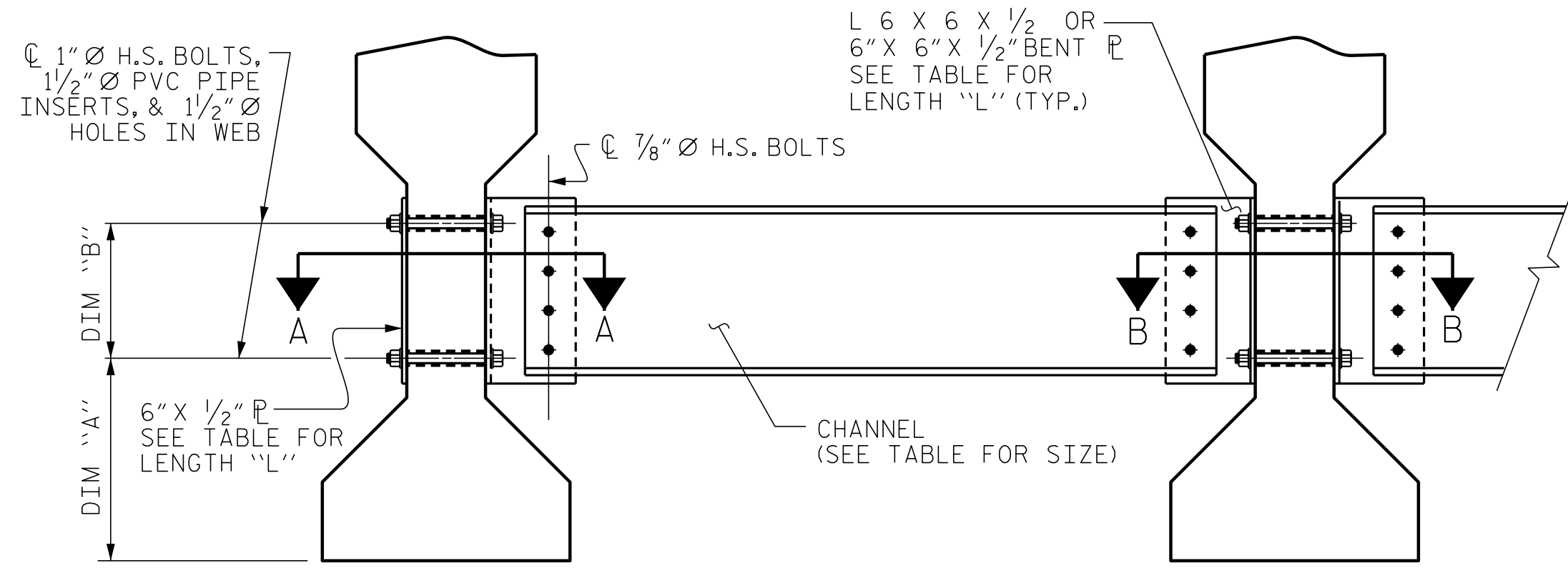
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

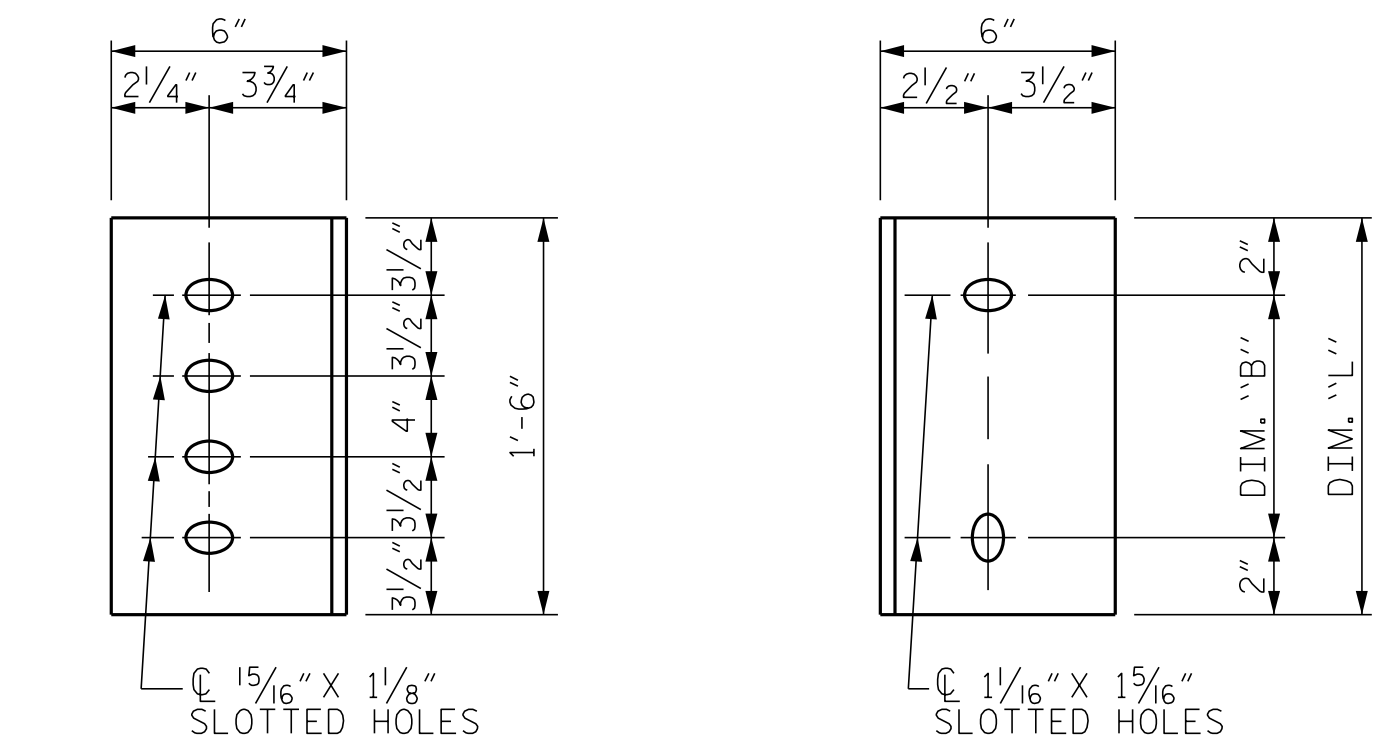
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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



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



DIAPHRAGM FACE  
(TYPE IV GDR.)  
WEB FACE

CONNECTOR PLATE DETAILS

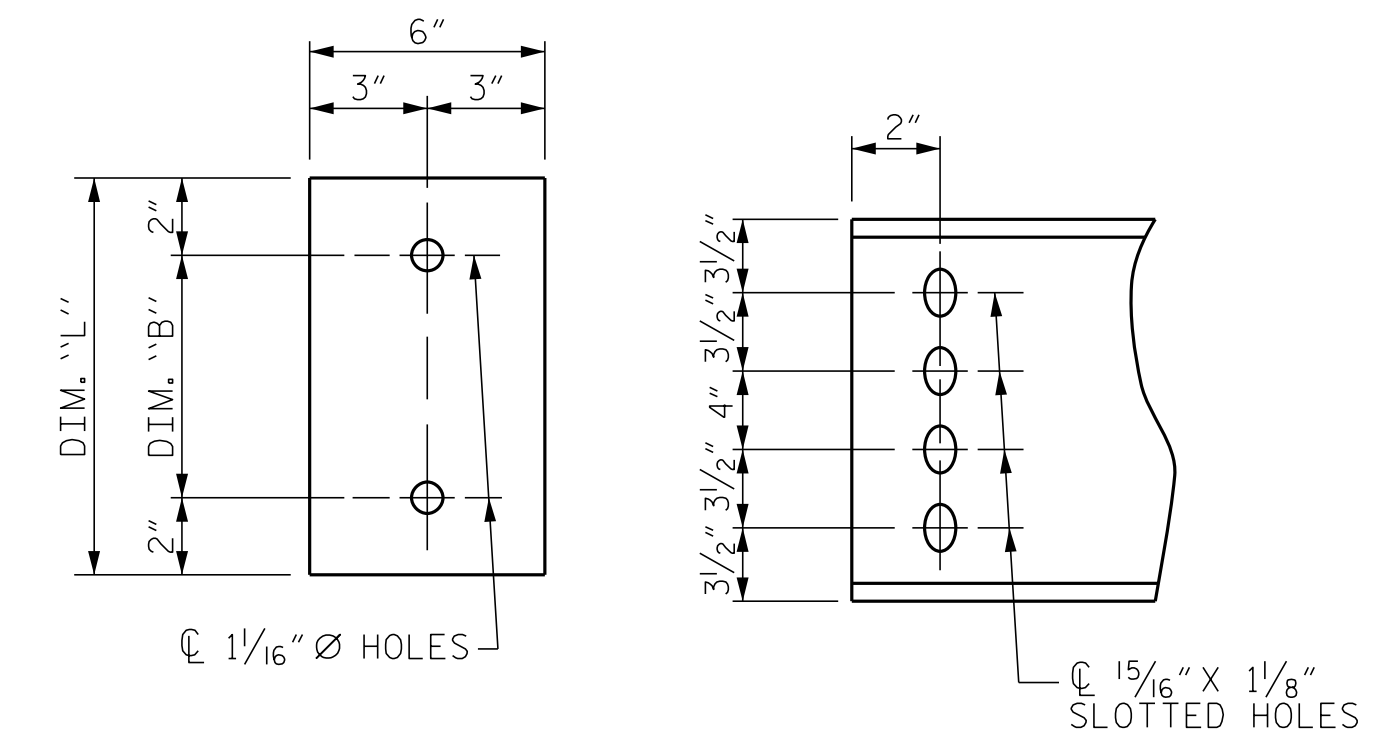
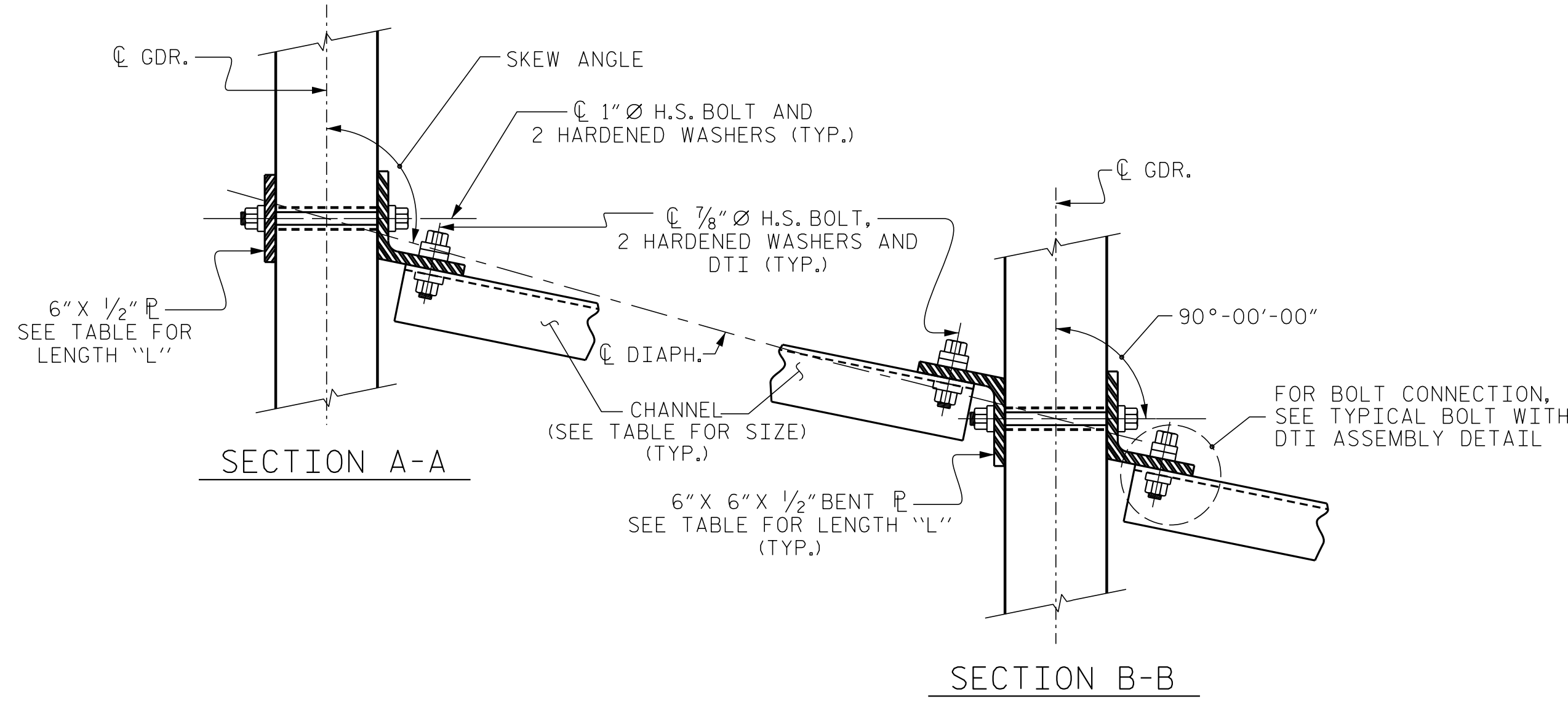


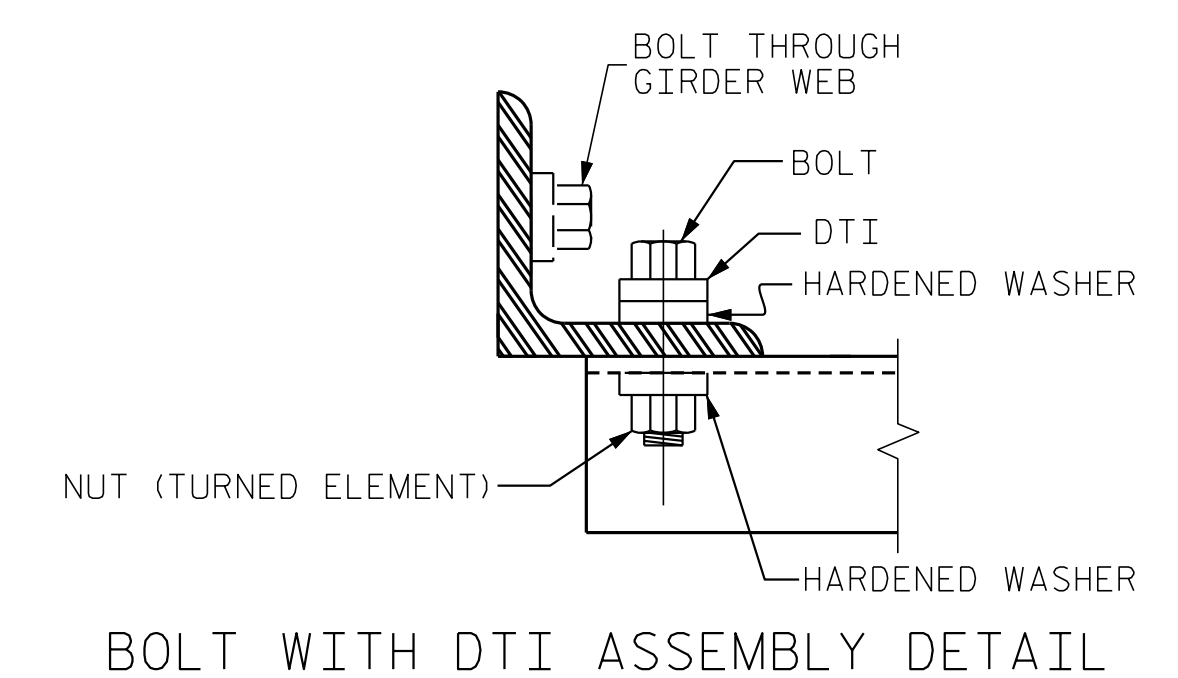
PLATE DETAILS  
CHANNEL END  
(TYPE IV GDR.)

TABLE

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



SECTION A-A  
SECTION B-B  
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 27+01.91 -Y7-

ENGINEER OF RECORD:  
3/25/2019  
NORTH CAROLINA PROFESSIONAL SEAL 37400  
ENGINEER  
GREGORY M. GILLAND  
GREGORY M. GILLAND  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

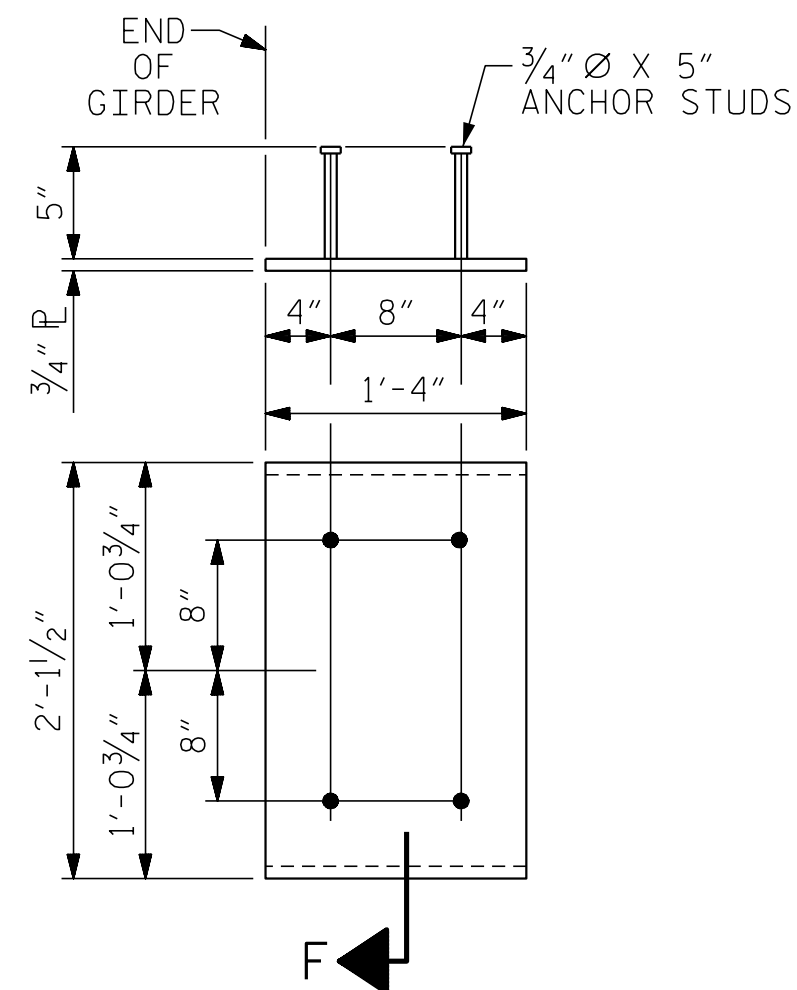
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
INTERMEDIATE  
STEEL DIAPHRAGMS  
FOR TYPE IV  
PRESTRESSED CONCRETE  
GIRDERS

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

ASSEMBLED BY : D. HODGE	DATE : 11/17
CHECKED BY : G.M. GILLAND	DATE : 1/18
DRAWN BY : TLA 6/05	REV. 5/10/6RRR KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

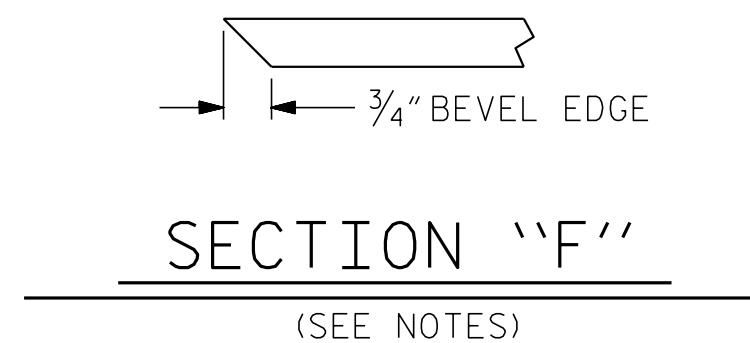
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UNLESS ALL SIGNATURES COMPLETED

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 3/20/2019 10:25:24 AM



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

(2 REQ'D PER GIRDER)



(SEE NOTES)

**NOTES**

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

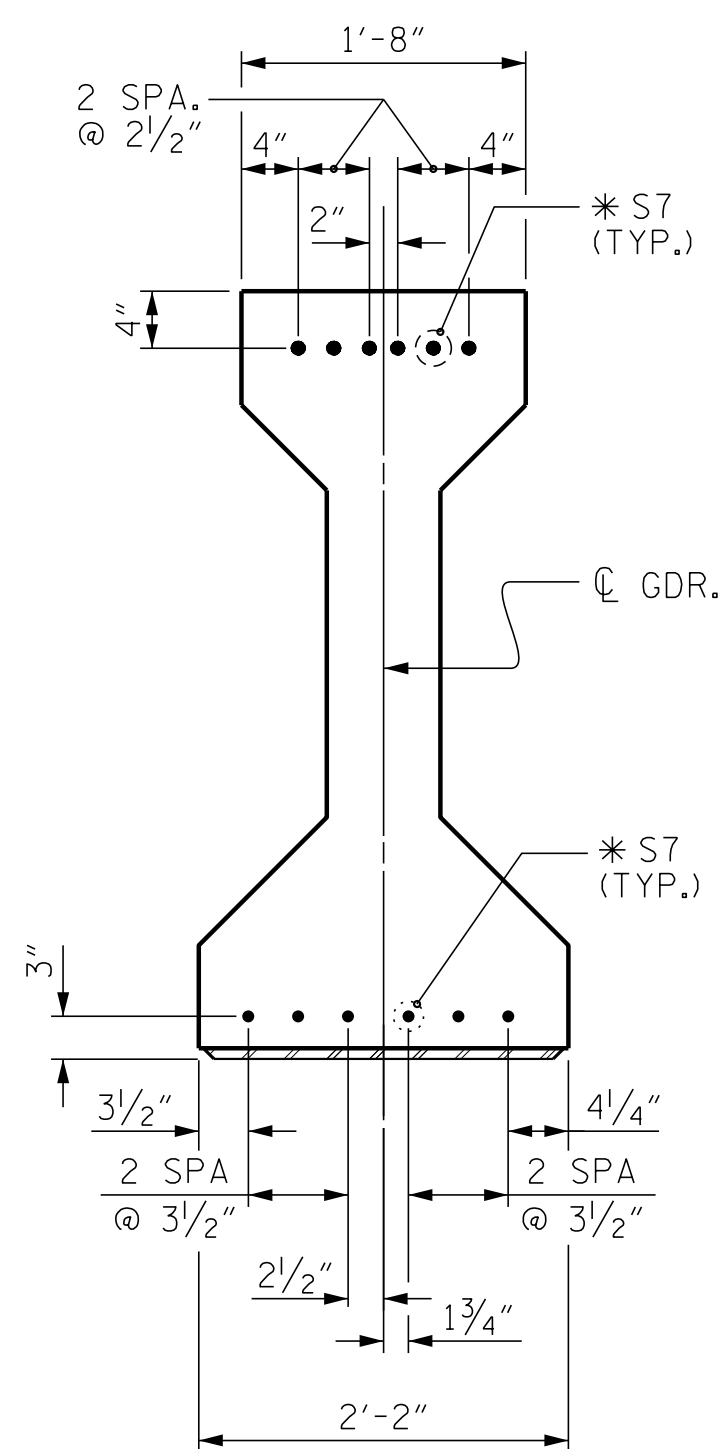
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

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

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

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



**DETAIL "A"**

(FOR AASHTO TYPE IV GIRDERS)

— DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPANS A & B —												
0.6" Ø LOW RELAXATION	GIRDERS 1 & 6											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	
CAMBER ( GIRDER ALONE IN PLACE )	↑	0	0.063	0.119	0.163	0.191	0.200	0.191	0.163	0.119	0.063	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.046	0.091	0.126	0.148	0.156	0.148	0.126	0.091	0.046	0
FINAL CAMBER	↑	0	3/16"	5/16"	7/16"	1/2"	9/16"	1/2"	7/16"	5/16"	3/16"	0

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

— DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPANS A & B —												
0.6" Ø LOW RELAXATION	GIRDERS 2 THRU 5											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	
CAMBER ( GIRDER ALONE IN PLACE )	↑	0	0.063	0.119	0.163	0.191	0.200	0.191	0.163	0.119	0.063	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.050	0.098	0.135	0.159	0.168	0.159	0.135	0.098	0.050	0
FINAL CAMBER	↑	0	3/16"	1/4"	5/16"	3/8"	3/8"	3/8"	5/16"	1/4"	3/16"	0

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

P:\2017\1712\1.01\W-5600\USTO\Structures\DGM\Y7-over-L\W-5600\_Y7\_PCG\_ME I.dgn  
 3/20/2019 10:28:04 AM

ASSEMBLED BY : D. HODGE	DATE : 11/17
CHECKED BY : G.M. GILLAND	DATE : 1/18
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

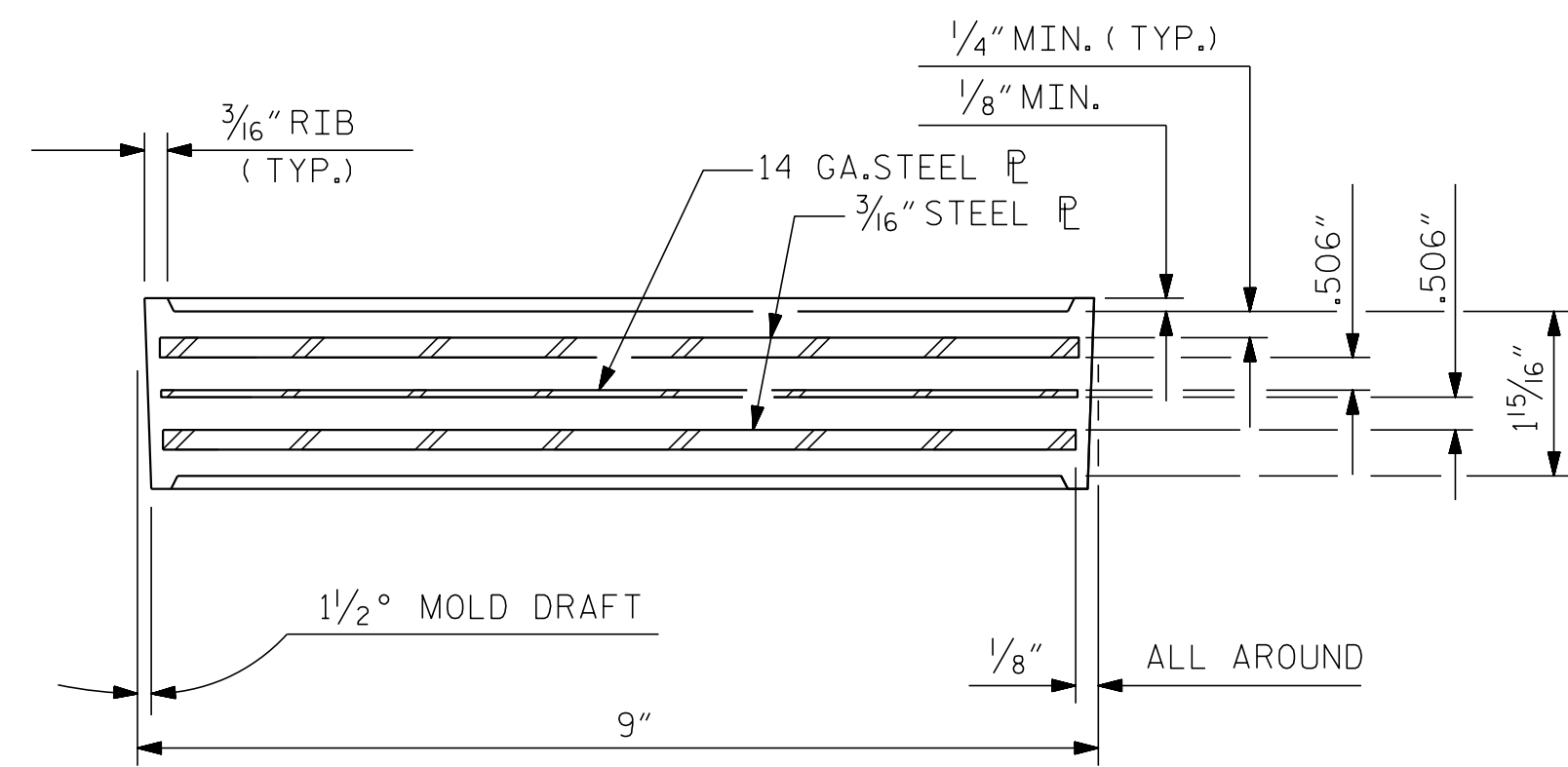
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gilland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

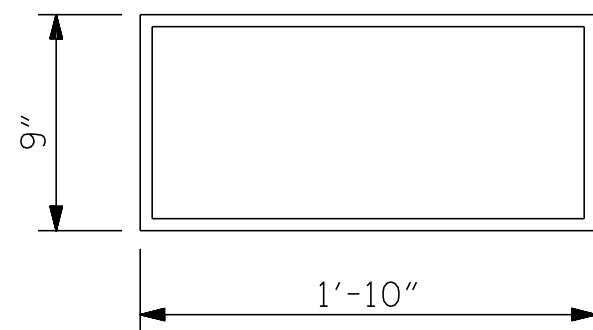
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 PRESTRESSED CONCRETE GIRDER  
 CONTINUOUS FOR LIVE LOAD  
 DETAILS

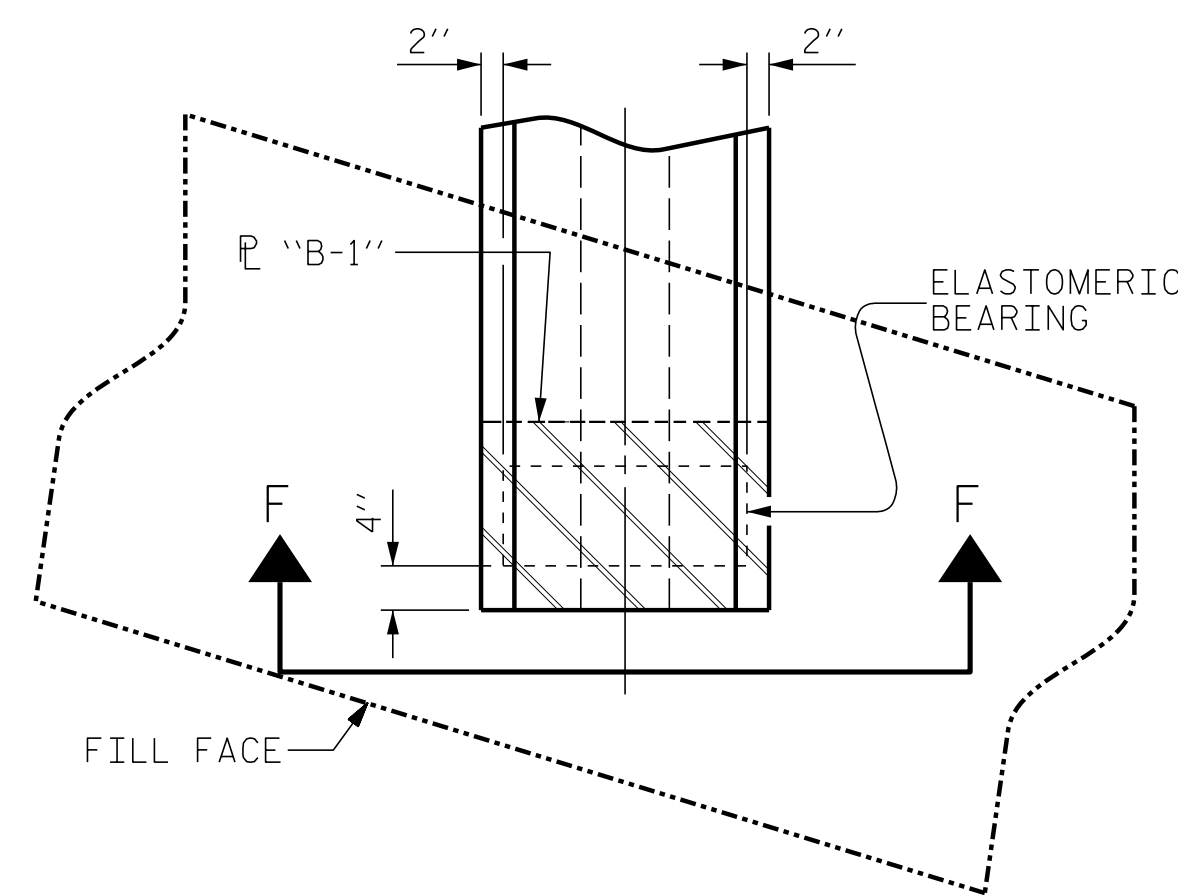
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NO.	BY:	DATE:	NO.	BY:	DATE:	S3-12
1			3			TOTAL SHEETS
2			4			32



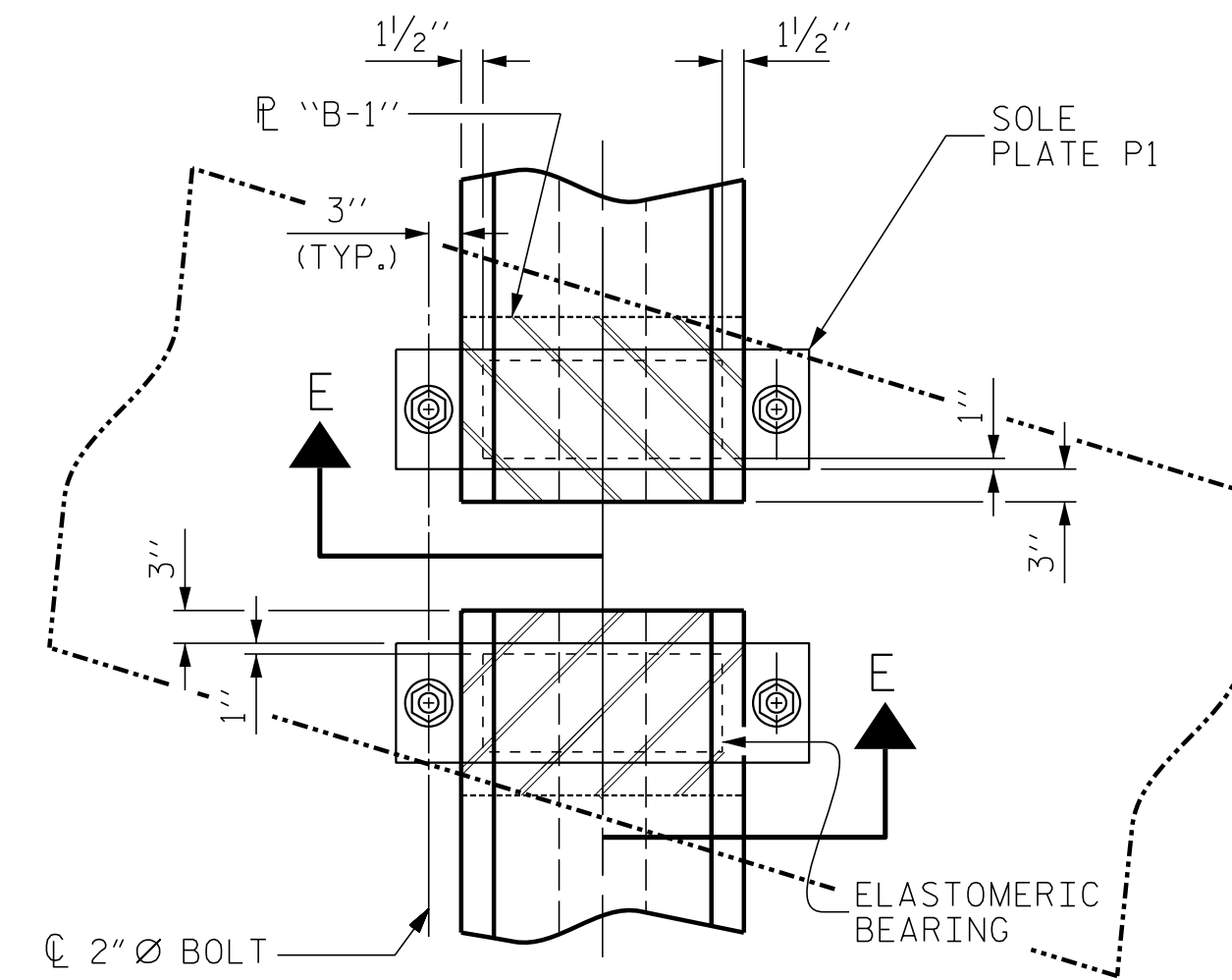
TYPICAL SECTION OF ELASTOMERIC BEARINGS



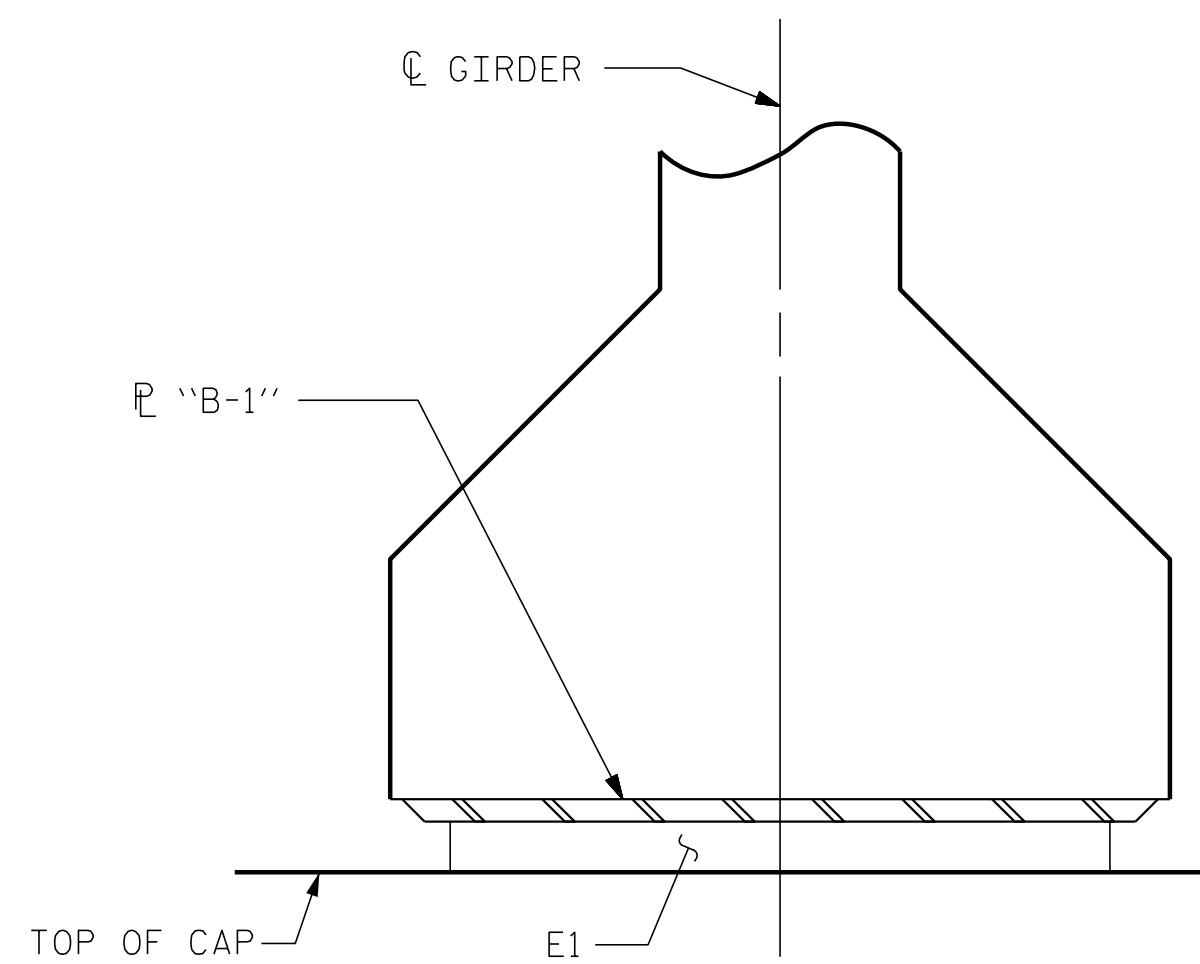
E1 (12 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE IV



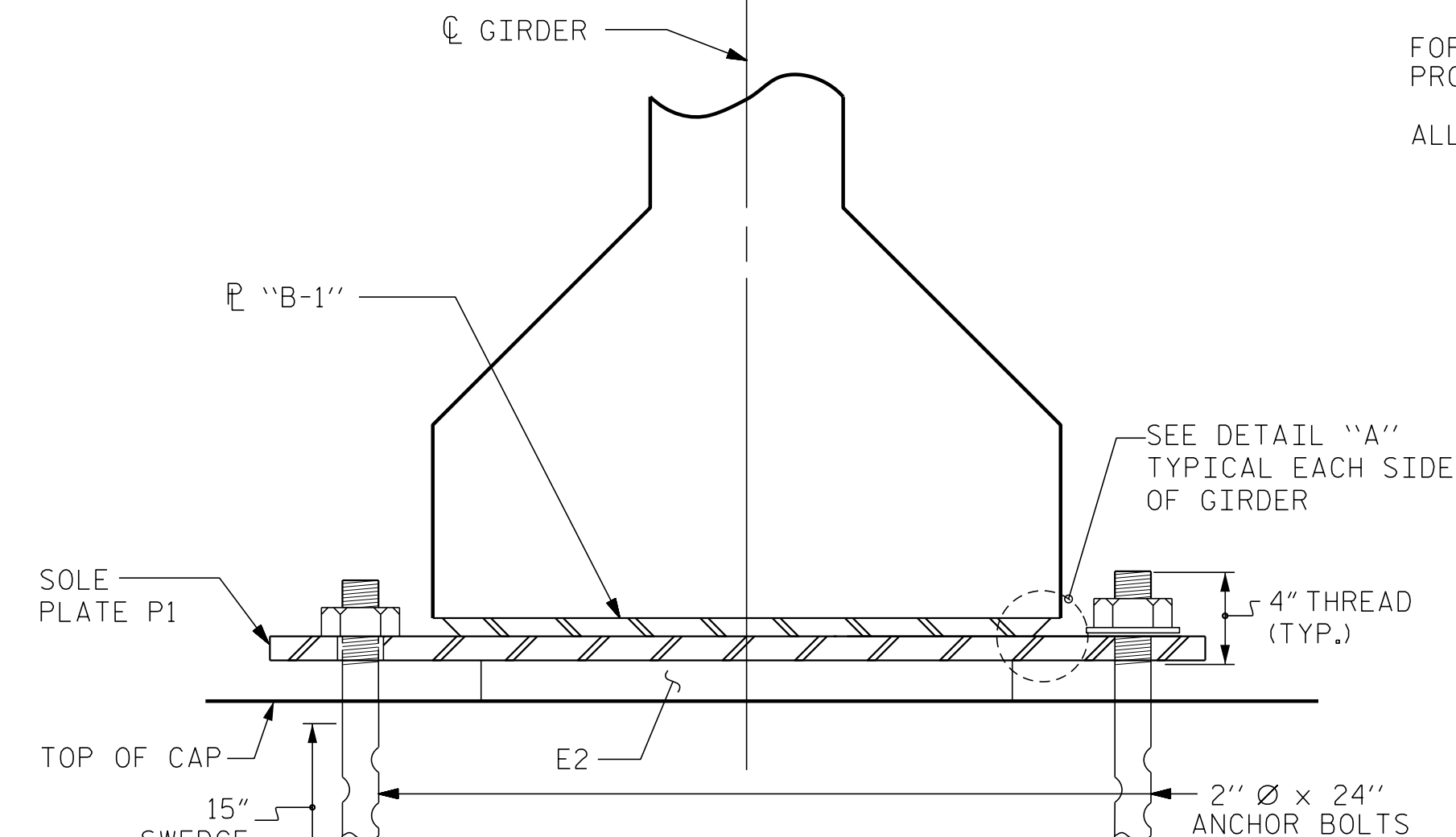
TYPICAL PLAN @ END BENT  
(SHOWING INTEGRAL END BENT)



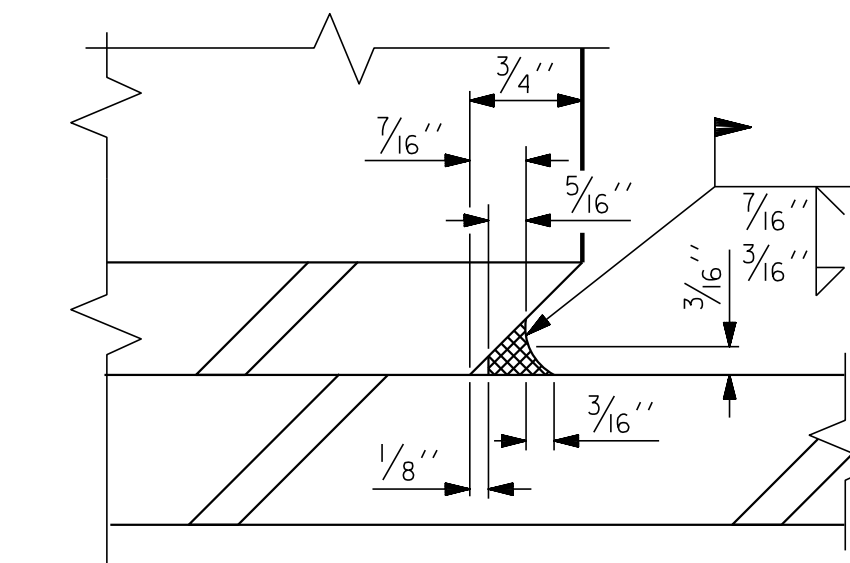
TYPICAL PLAN @ BENT  
(SHOWING CONTINUOUS BENT)



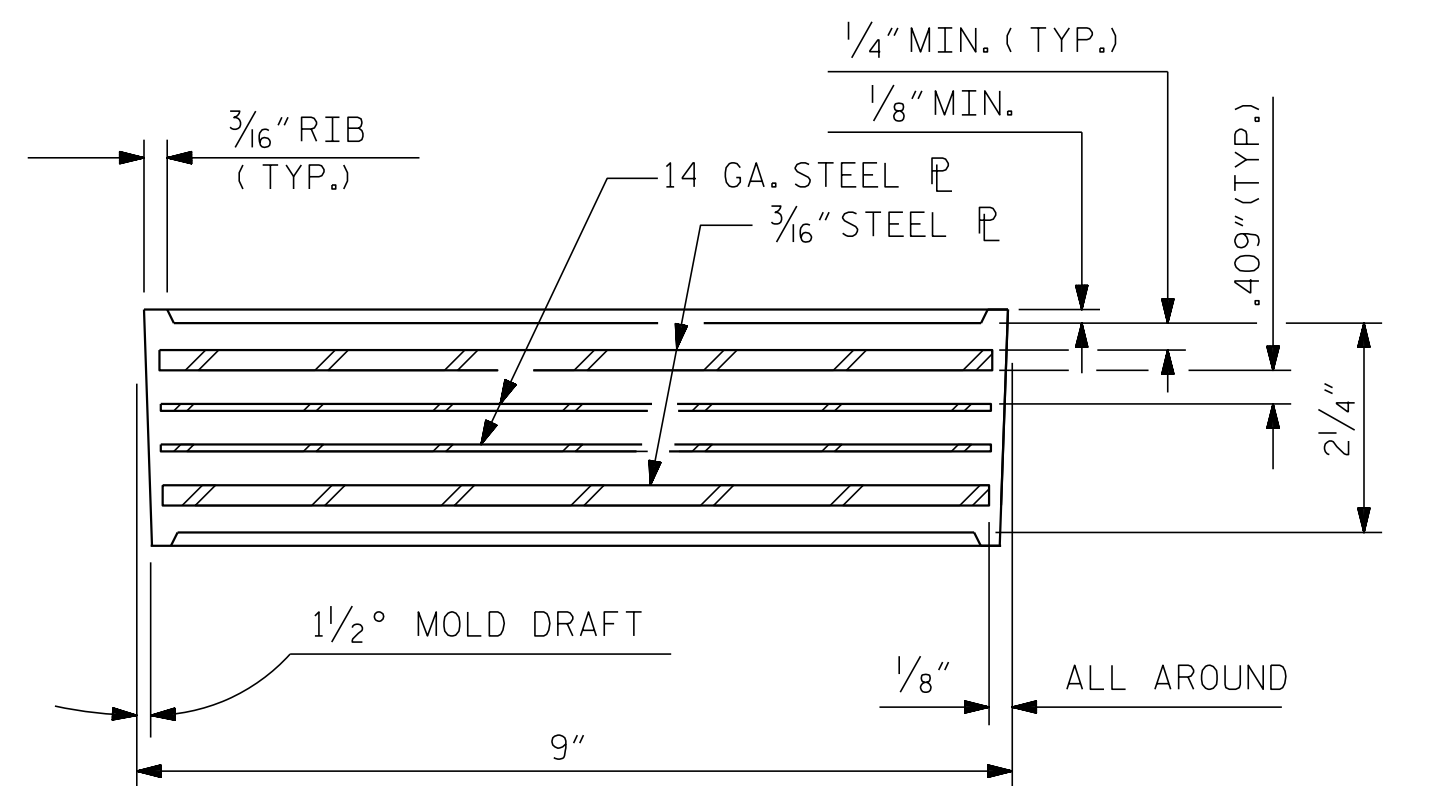
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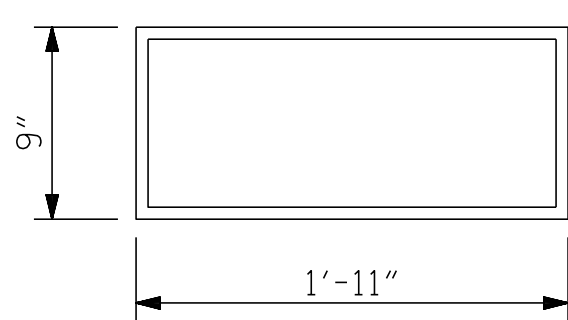
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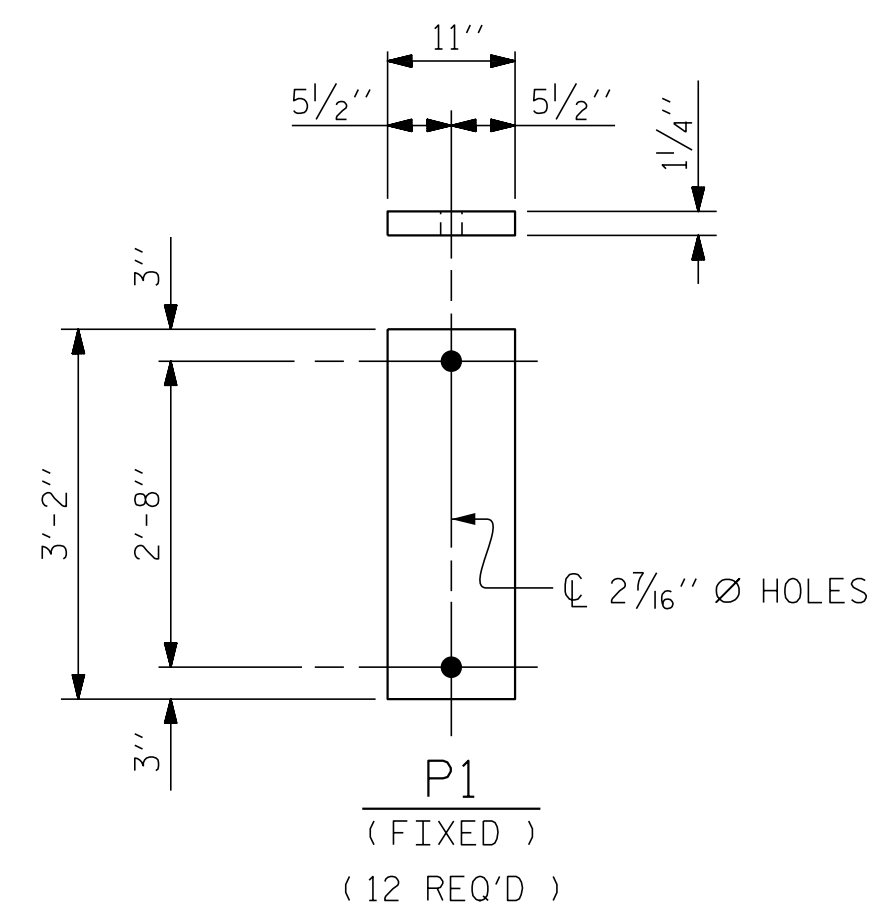
DETAIL "A"



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (12 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE V



SOLE PLATE (P1) DETAIL

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

ENGINEER OF RECORD:  
3/25/2019

Gregory M. Gilland  
ETHERILL ENGINEERING

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 27+01.91 -Y7-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
ELASTOMERIC  
BEARING DETAILS

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

SHEET NO. S3-13  
TOTAL SHEETS 32

**NOTES**

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

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

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

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

SOLE PLATE P1, BOLTS, NUTS AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

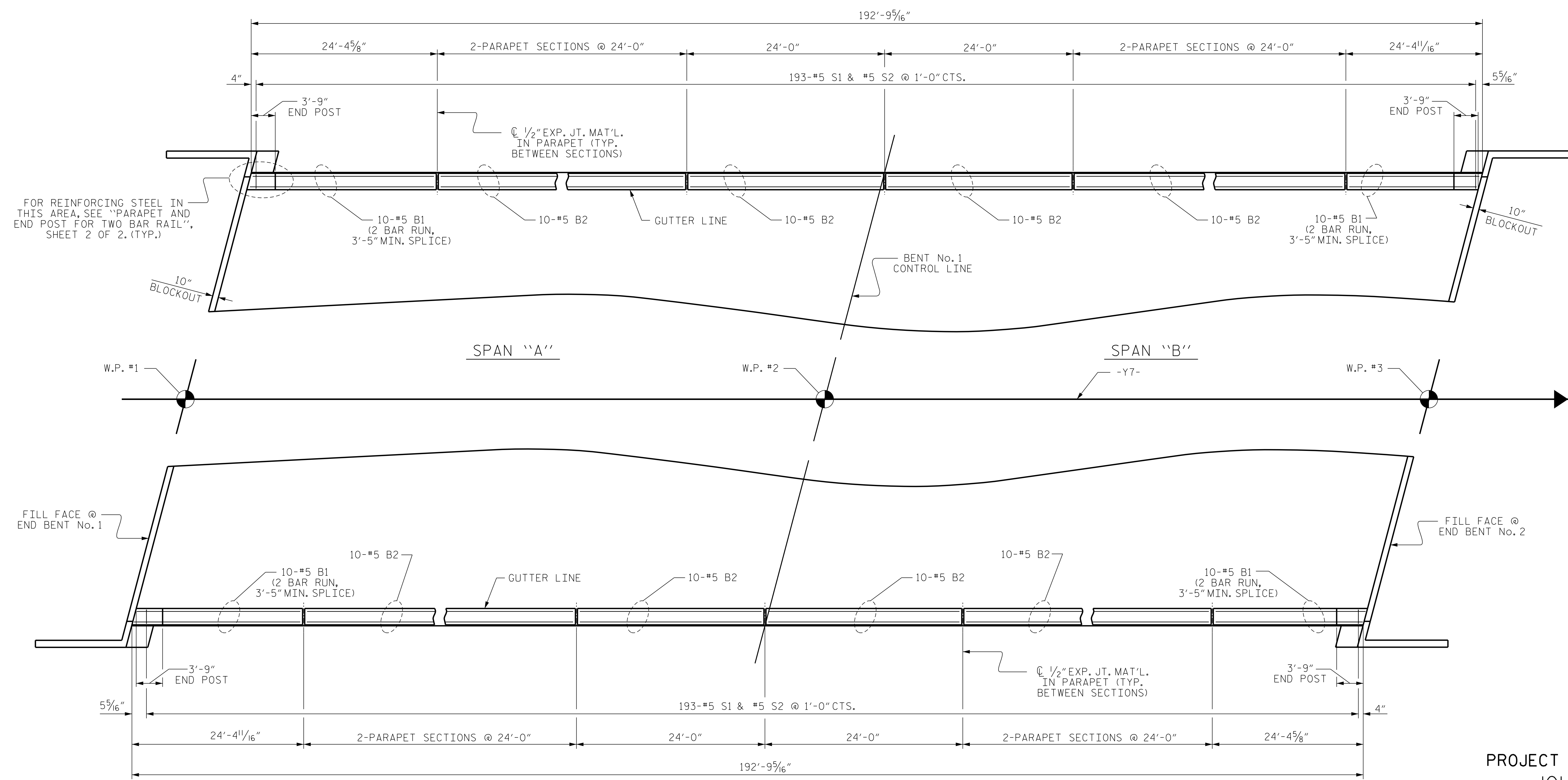
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

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 3/25/2019 9:10:59 AM

DRAWN BY: D. HODGE DATE: 12/17  
CHECKED BY: G.M. GILLAND DATE: 1/18

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### PLAN OF CONCRETE PARAPET

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

SHEET 1 OF 2

P:\2017\1712101\W-5600\_JSTO.Structures\DGMA-Y7-over-L-W-5600\_XT-PARA-WE I.dgn  
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DRAWN BY: D. HODGE DATE: 11/17  
 CHECKED BY: G.M. GILLAND DATE: 1/18

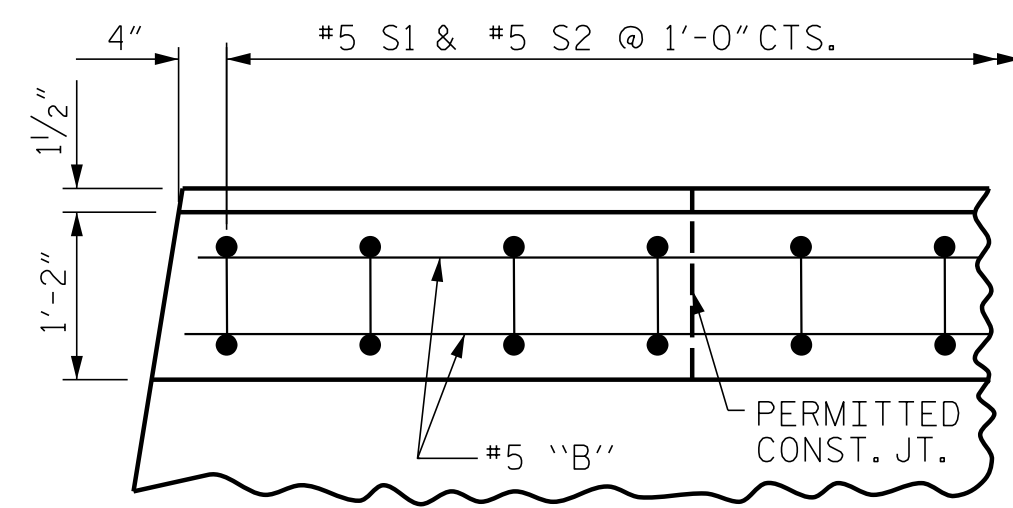
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ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gilland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
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 LICENSE NO. F-0377

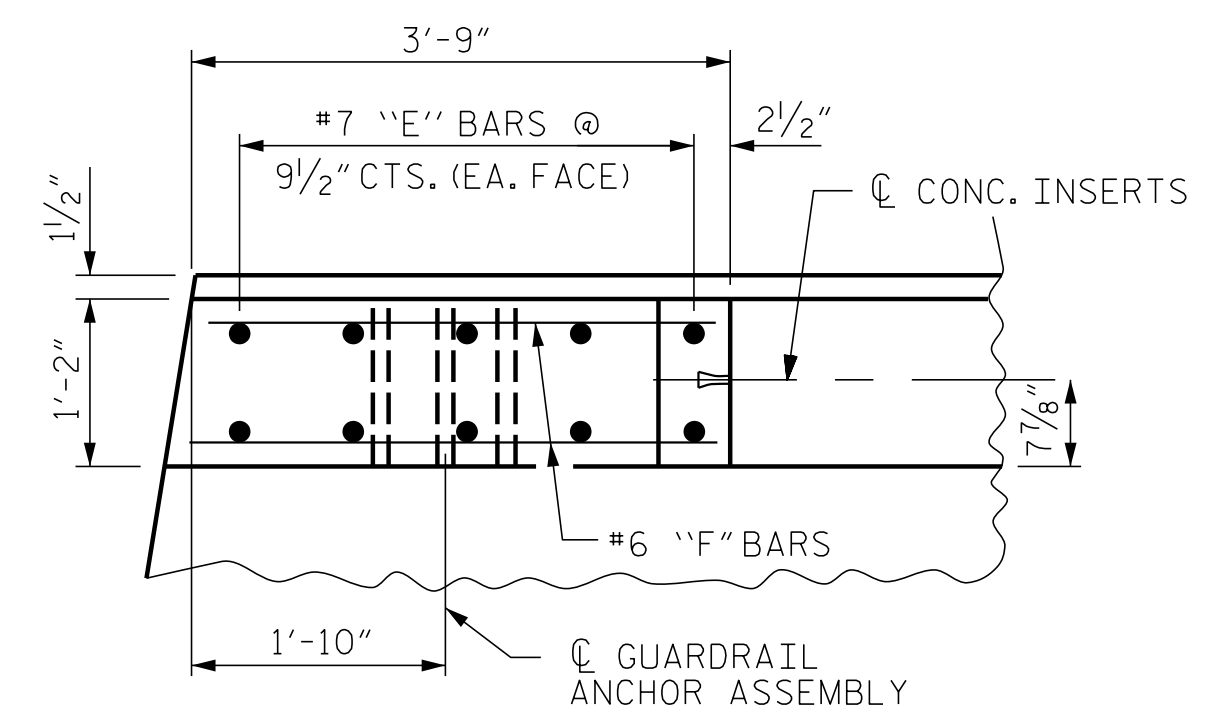
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

1'-2" x 3'-3"  
 CONCRETE PARAPET  
 FOR  
 2 BAR METAL RAIL

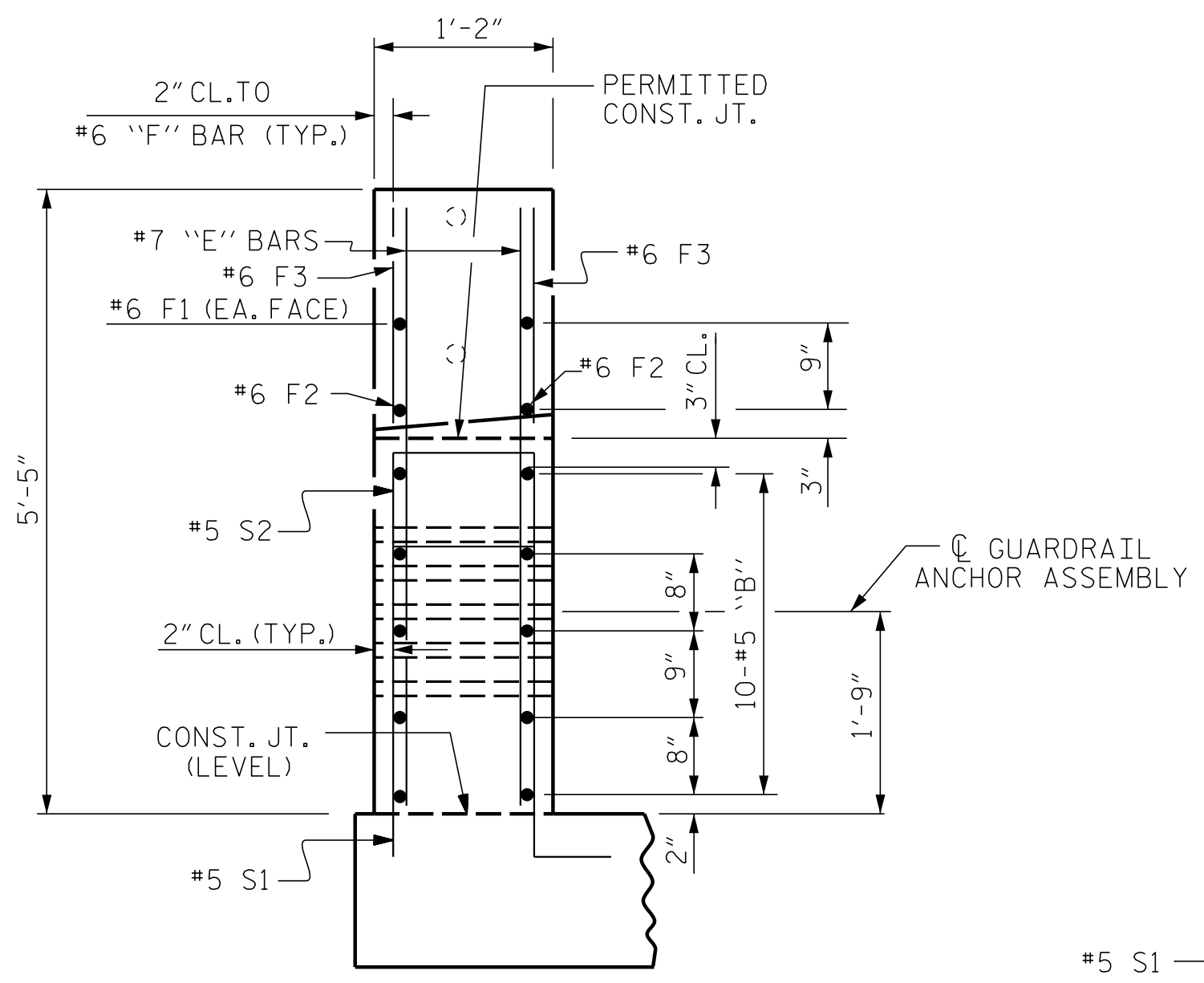
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-14
1			3			TOTAL SHEETS
2			4			32



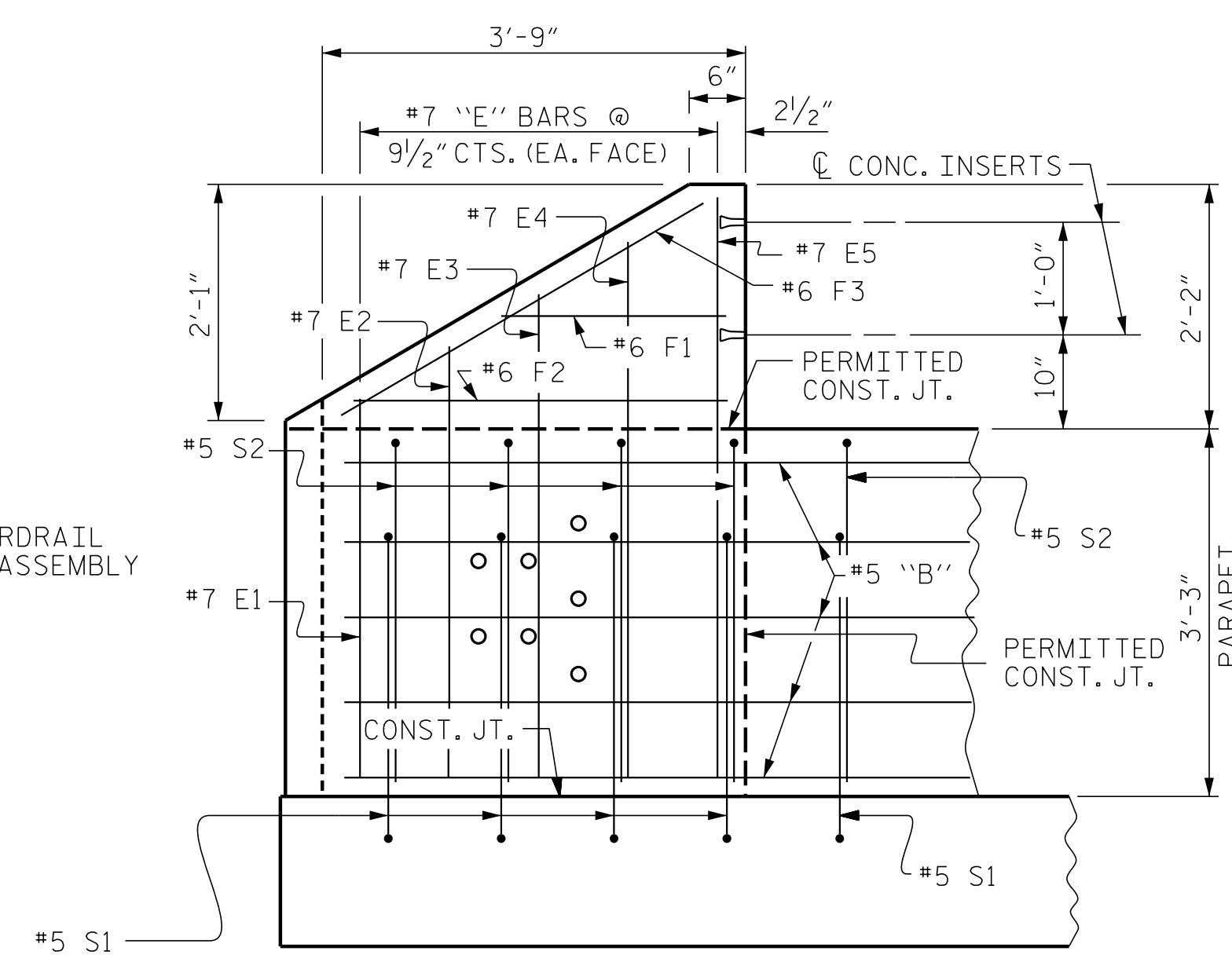
PLAN OF PARAPET



PLAN OF END POST



END VIEW

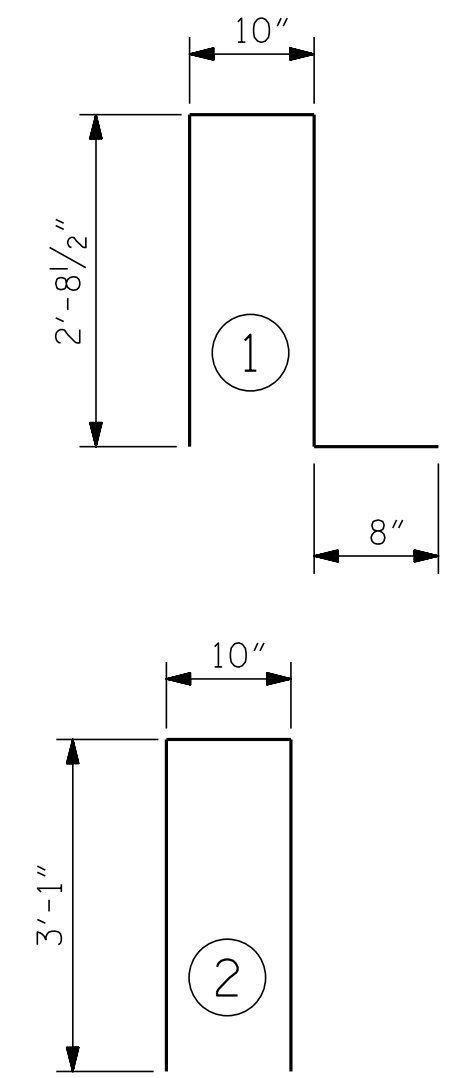


ELEVATION

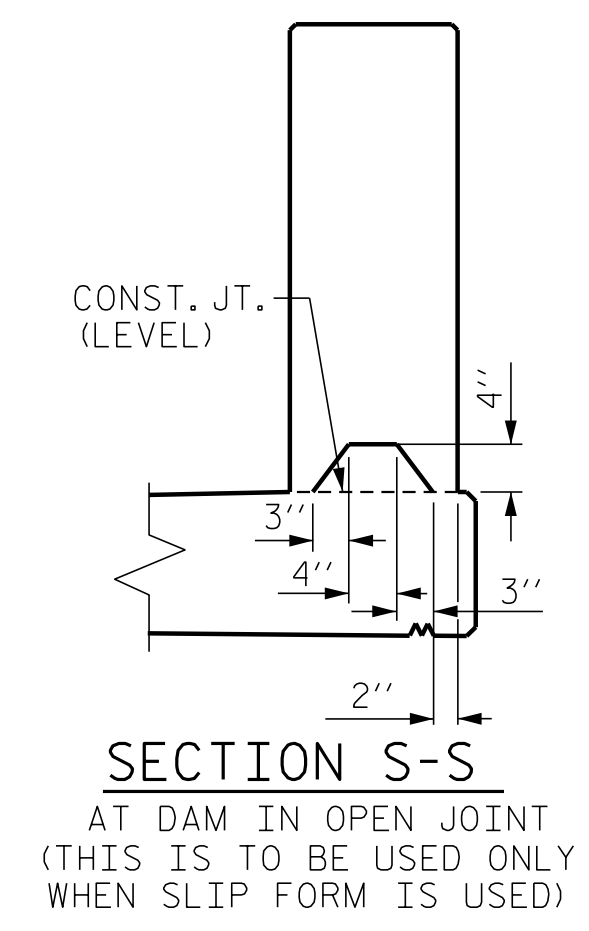
**PARAPET AND END POST FOR TWO BAR RAIL**

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

BAR TYPE		BILL OF MATERIAL FOR PARAPETS AND 4 END POSTS					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT			
* B1	80	#5	STR	13'-10"	1154		
* B2	120	#5	STR	23'-7"	2952		
* 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	8	#6	STR	3'-0"	36		
* F3	8	#6	STR	3'-4"	40		
* S1	386	#5	1	6'-11"	2785		
* S2	386	#5	2	7'-0"	2818		
					* EPOXY COATED REINFORCING STEEL	10,151 LBS.	
					CLASS "AA" CONCRETE	55.0 C.Y.	
					1'-2" x 3'-3" CONCRETE PARAPET	385.55 L.F.	

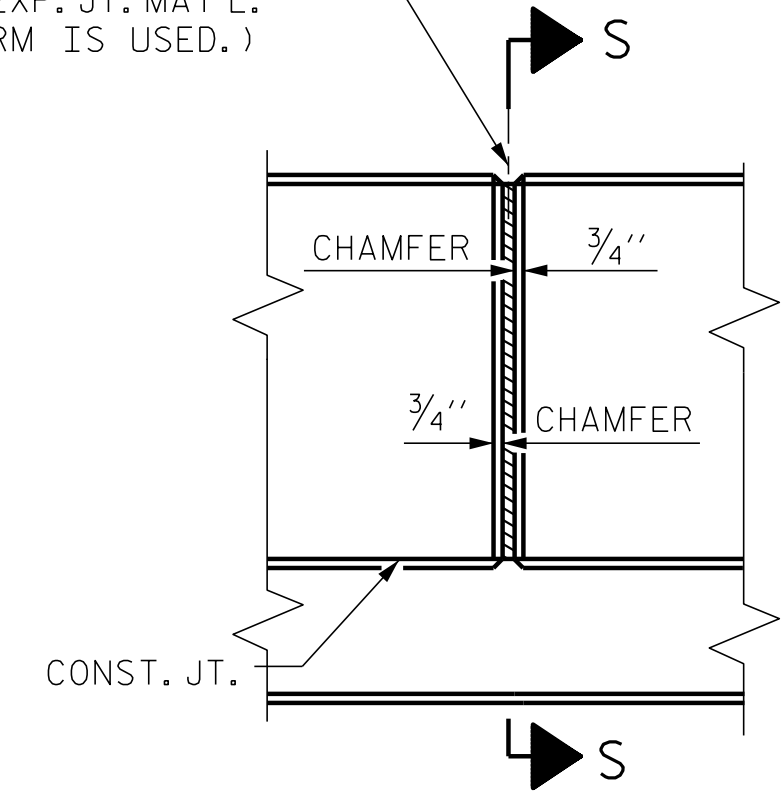


BAR DIMENSIONS ARE OUT TO OUT.



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

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



ELEVATION AT JOINTS IN PARAPET

PROJECT NO. W-5600

JOHNSTON COUNTY

STATION: 27+01.91 -Y7-

SHEET 2 OF 2

ENGINEER OF RECORD:  
3/25/2019

Gregory M. Gilland  
ETHERILL ENGINEERING

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

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

1'-2" x 3'-3"  
CONCRETE PARAPET  
FOR  
2 BAR METAL RAIL

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

TOTAL SHEETS: 32

DRAWN BY: D. HODGE DATE: 11/17  
CHECKED BY: G.M. GILLAND DATE: 1/18

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NOTES

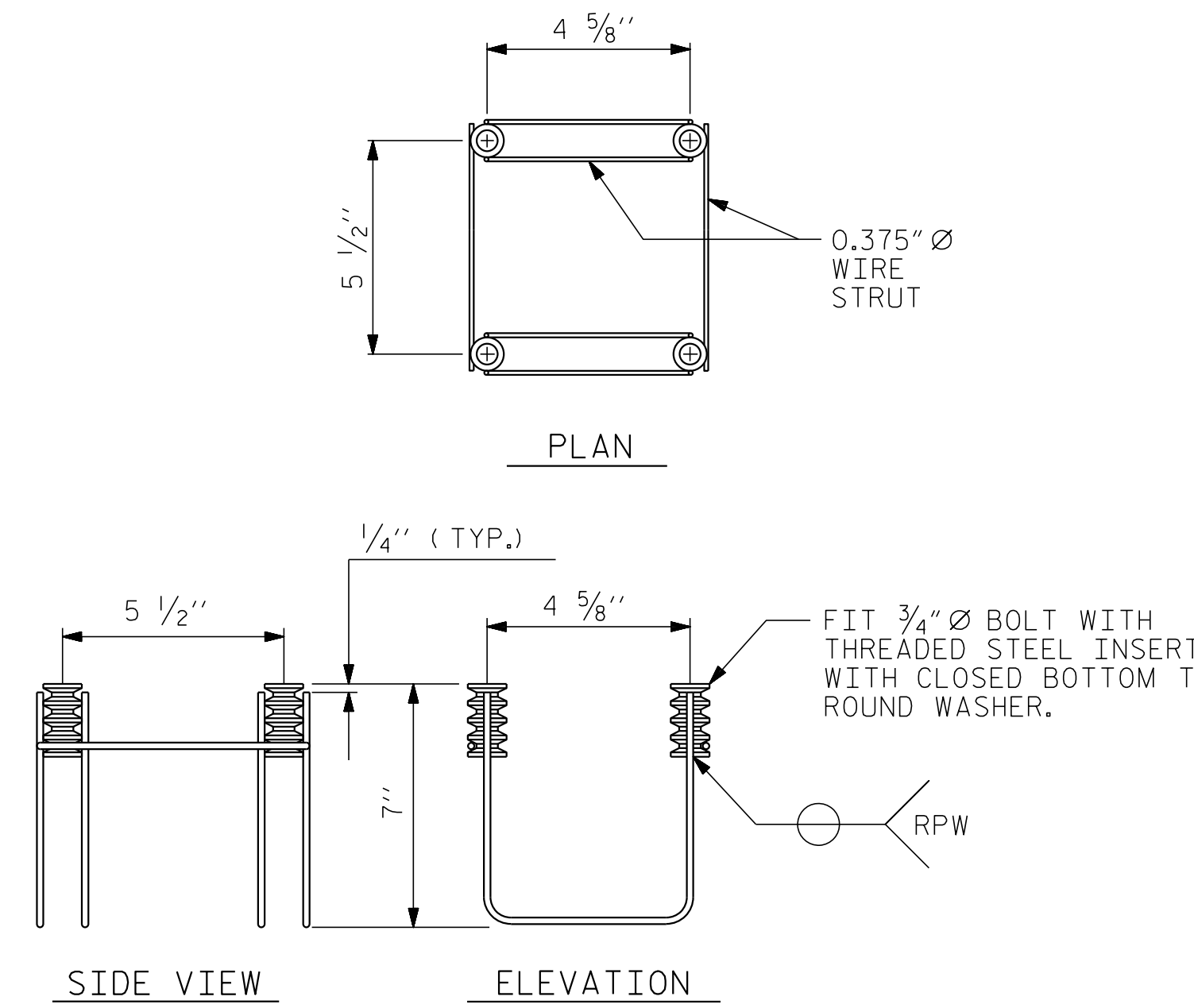
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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.

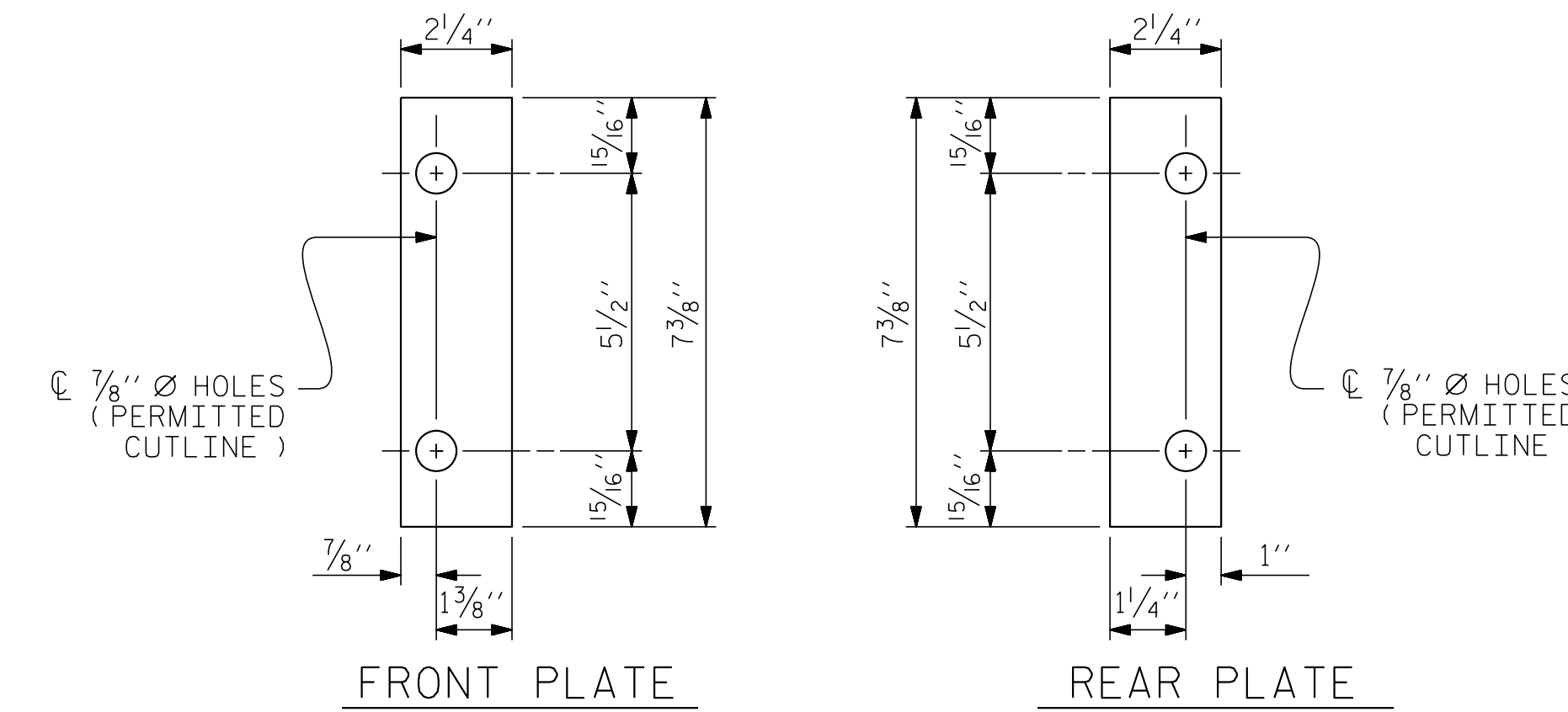
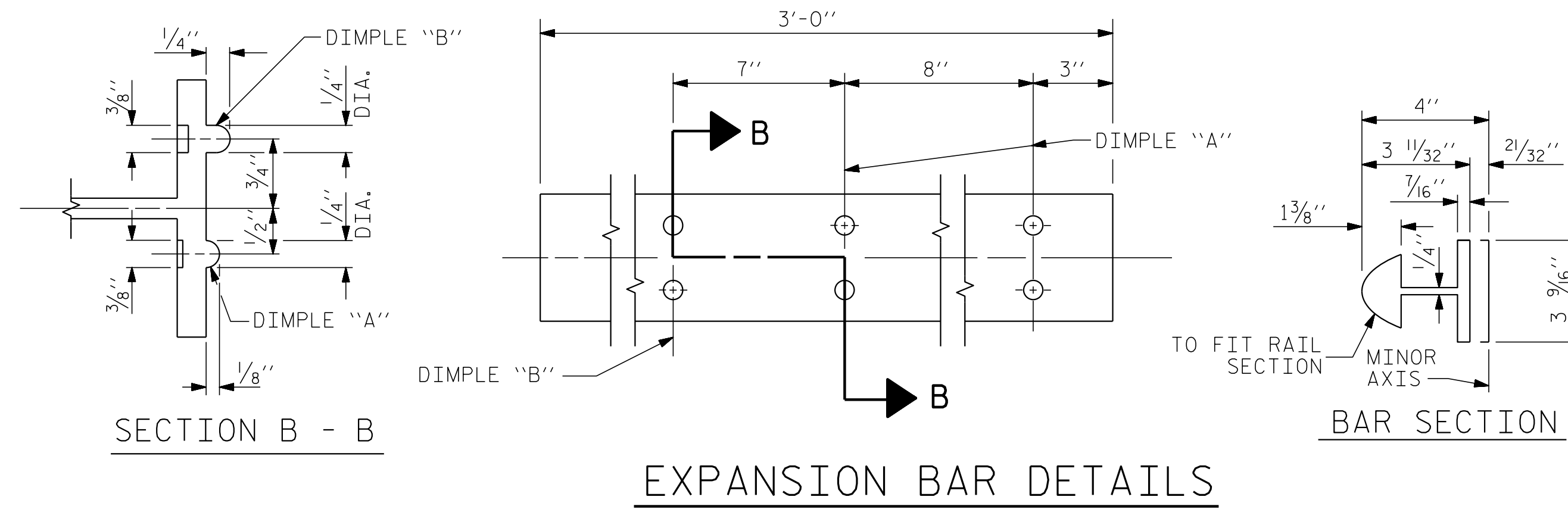
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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.



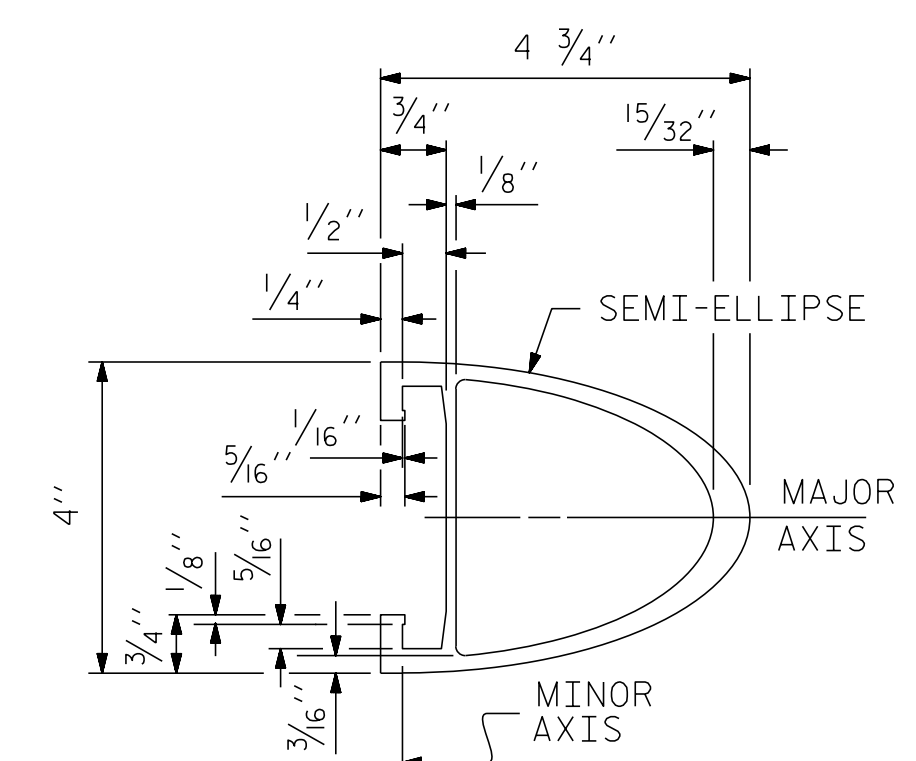
4-BOLT METAL RAIL ANCHOR ASSEMBLY

( 68 ASSEMBLIES REQUIRED )

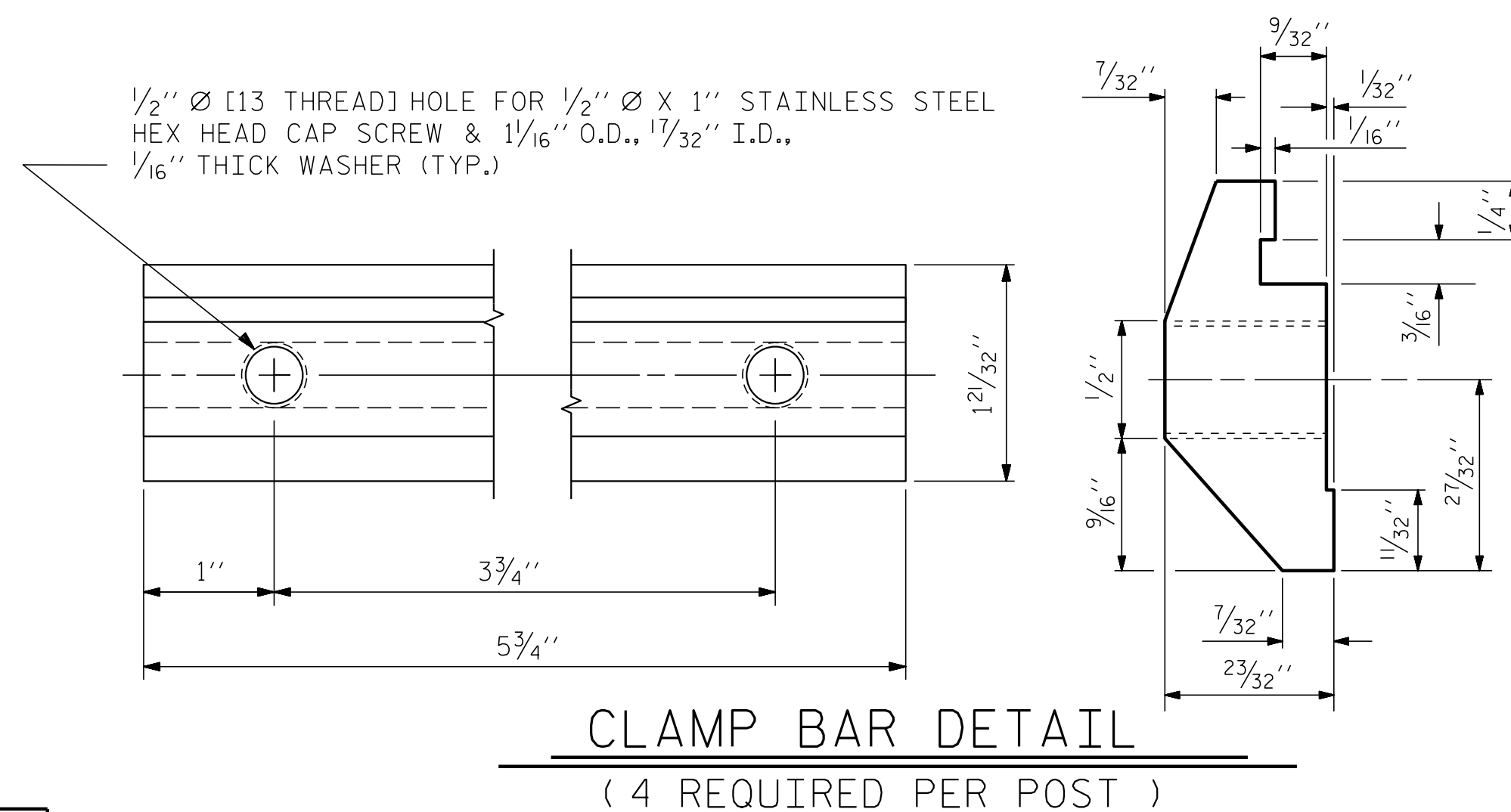


SHIM DETAILS

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

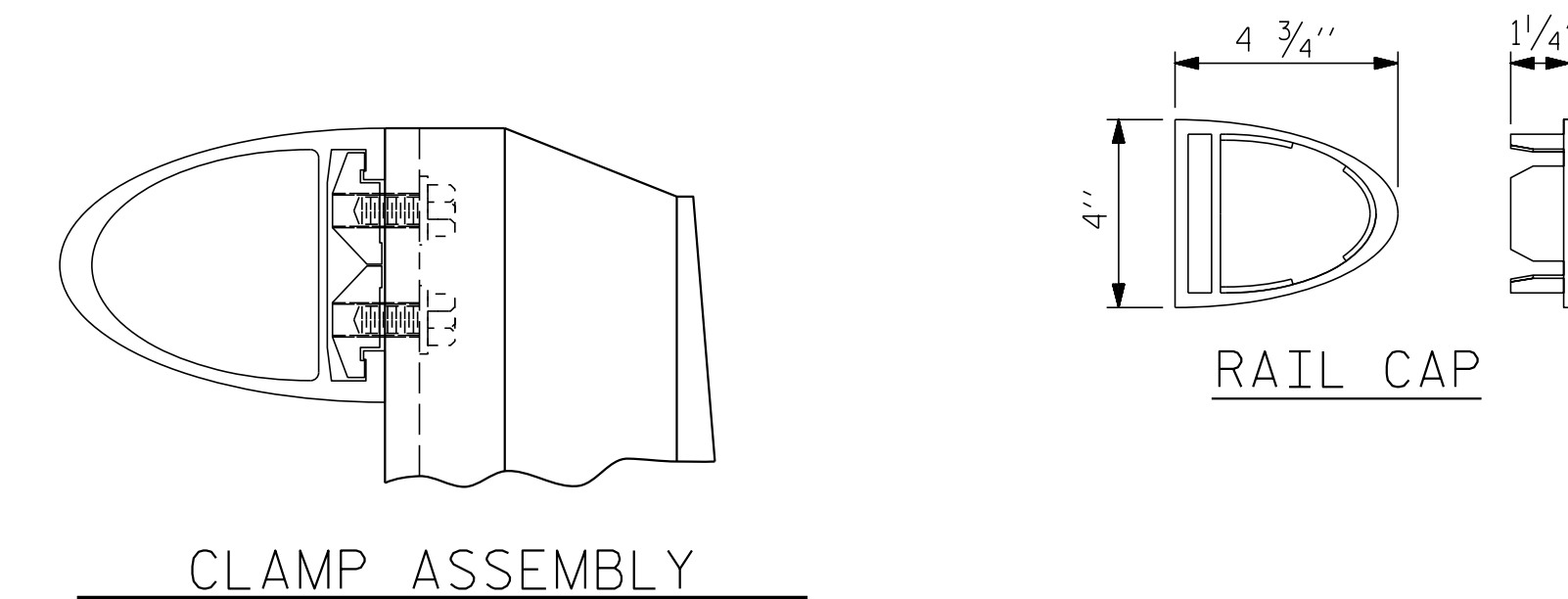


RAIL SECTION



CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY

RAIL CAP

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 27+01.91 -Y7-

SHEET 2 OF 2

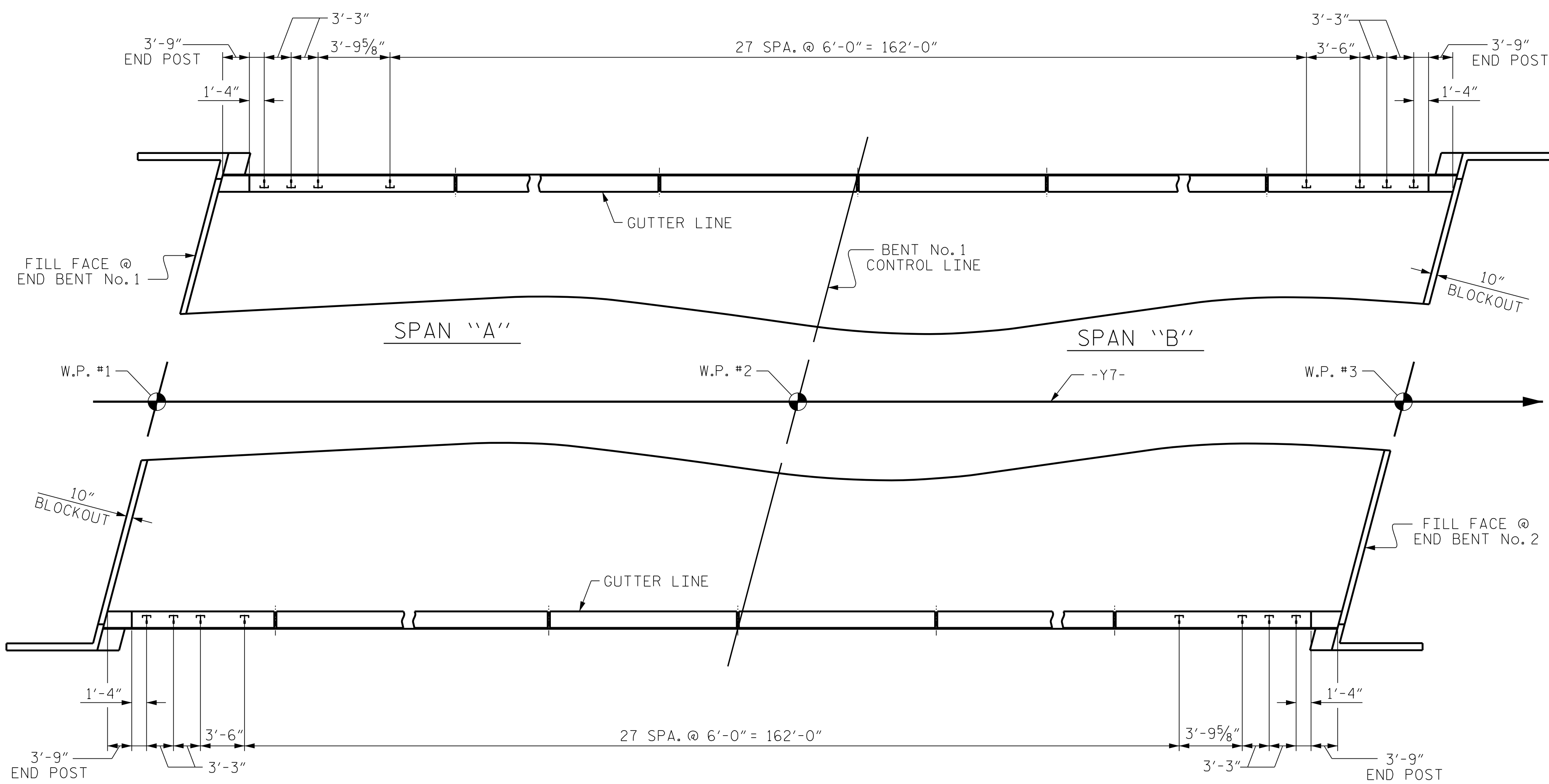
ENGINEER OF RECORD:  
3/25/2019  
NORTH CAROLINA PROFESSIONAL SEAL 37400  
ENGINEER  
GREGORY M. GILLAND  
Gregory M. Gilland  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		STANDARD 2 BAR METAL RAIL	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S3-17
2			TOTAL SHEETS 32

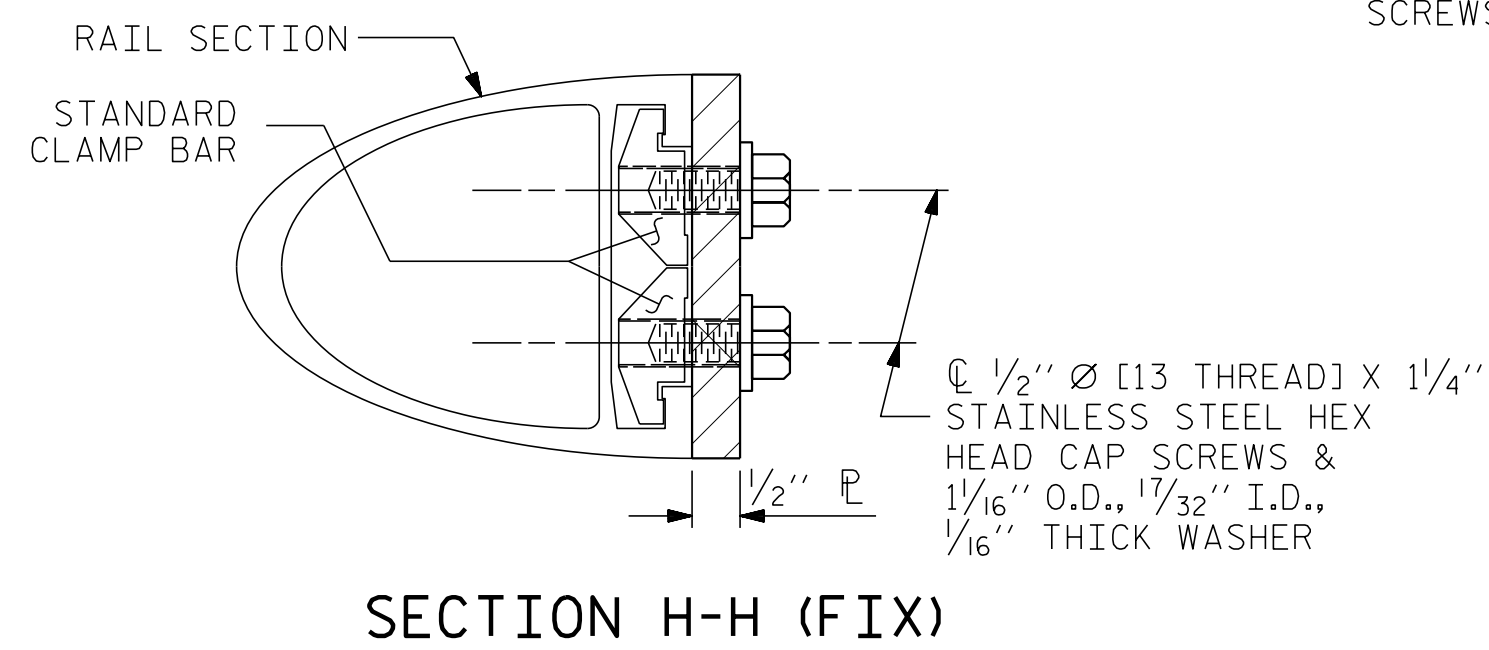
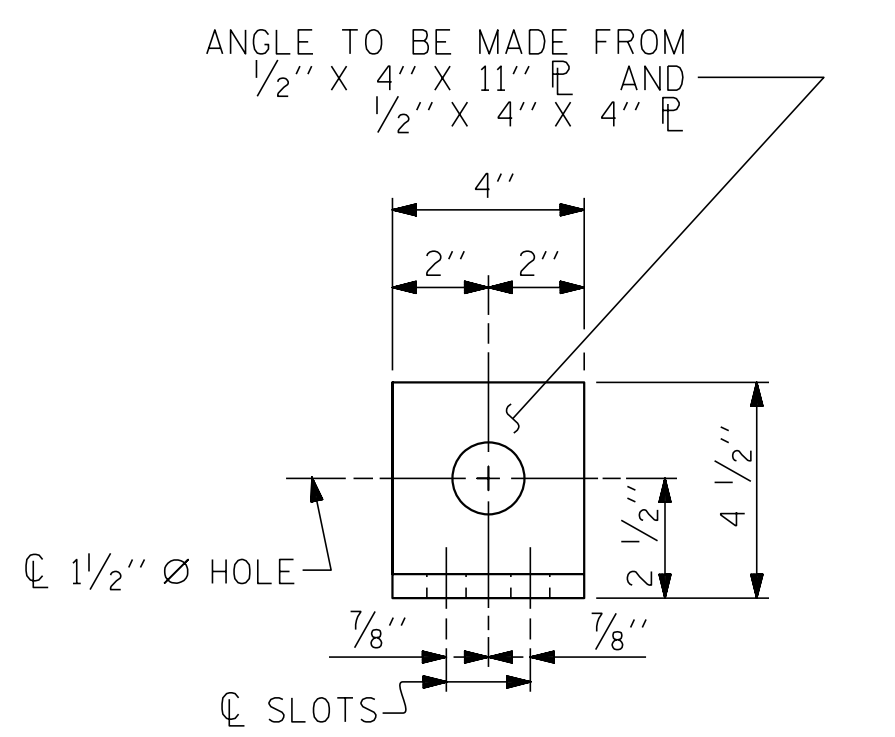
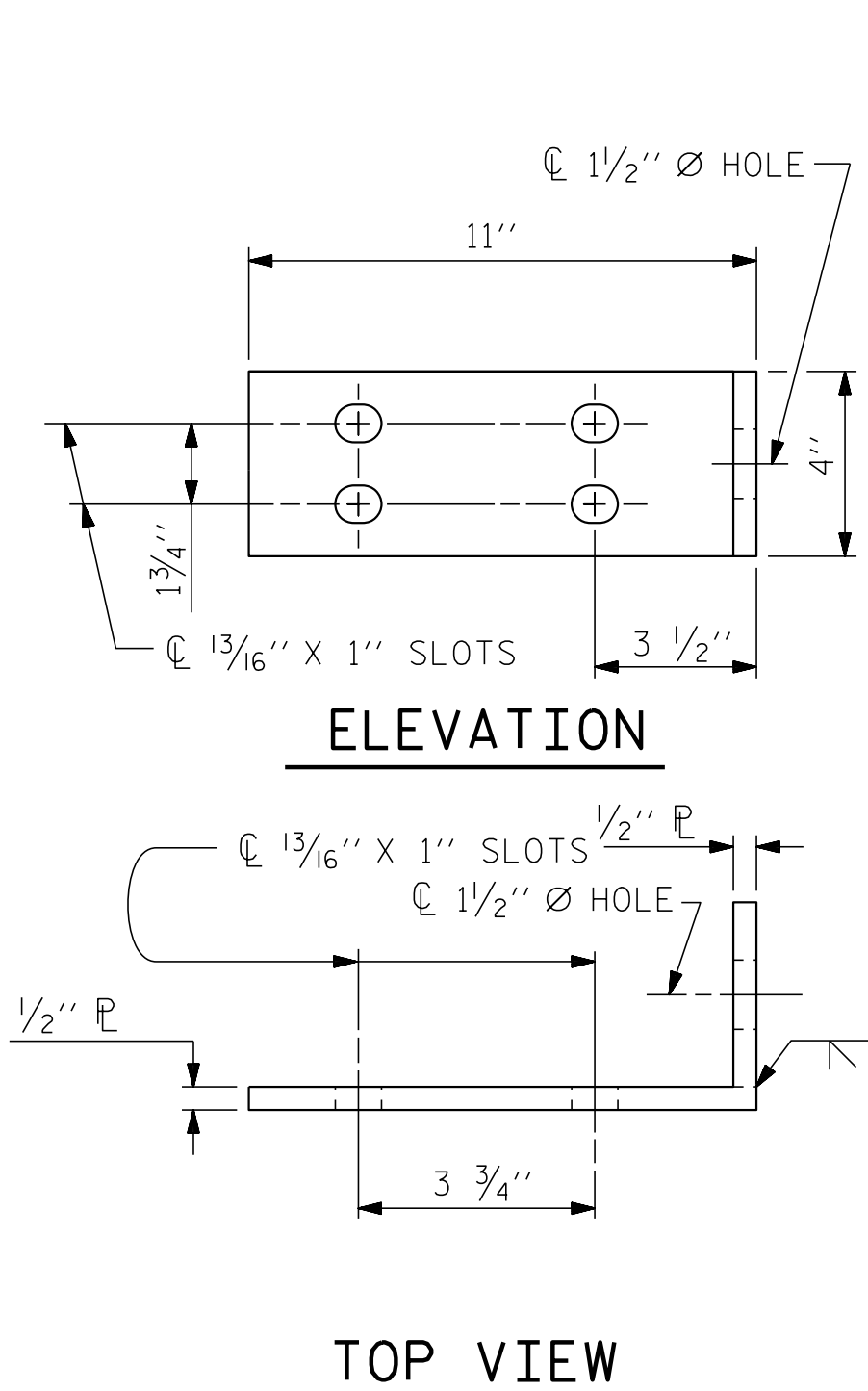
ASSEMBLED BY : D. HODGE	DATE : 11/17
CHECKED BY : G.M. GILLAND	DATE : 1/18
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

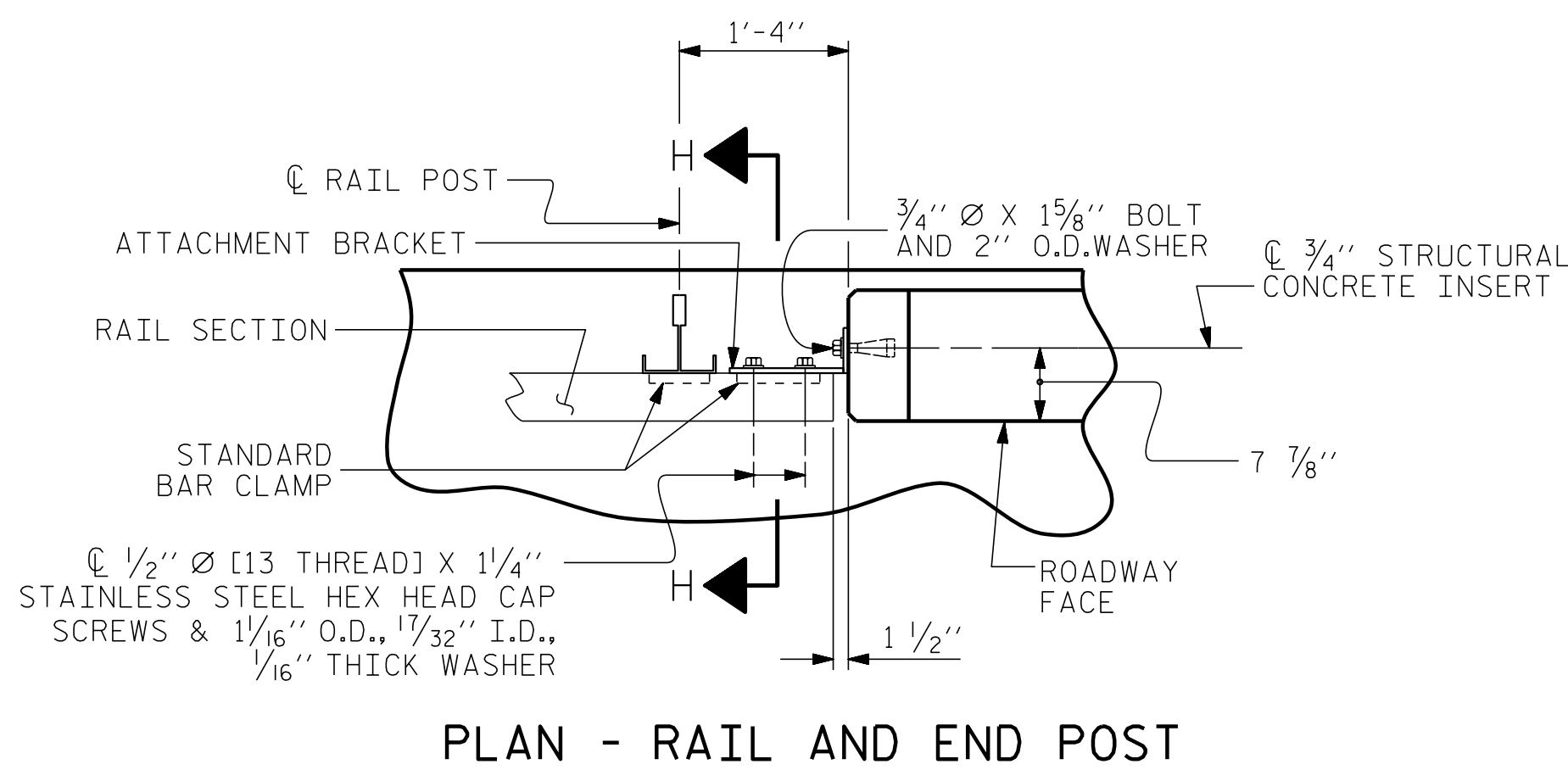




**PLAN OF RAIL POST SPACINGS**



**DETAILS FOR ATTACHING METAL RAIL TO END POST**



**NOTES**

**STRUCTURAL CONCRETE INSERT**

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

**NOTES**

**METAL RAIL TO END POST CONNECTION**

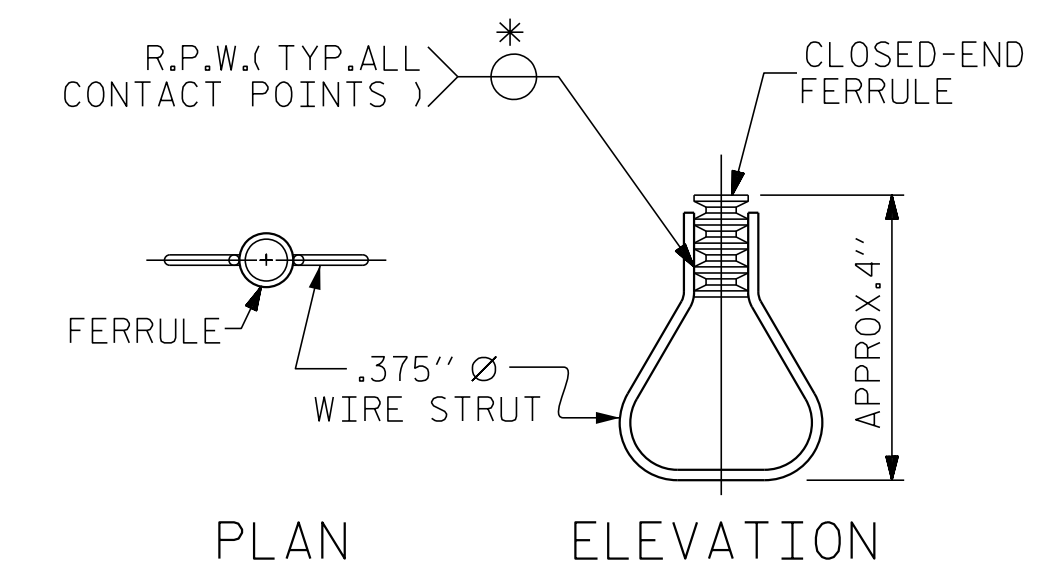
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A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

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

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

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

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



**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

ASSEMBLED BY : D. HODGE	DATE : 11/17
CHECKED BY : G.M. GILLAND	DATE : 1/18
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

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ENGINEER OF RECORD:  
3/25/2019

Gregory M. Gilland  
ETHERILL ENGINEERING

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

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD 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. S3-18					TOTAL SHEETS 32

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.

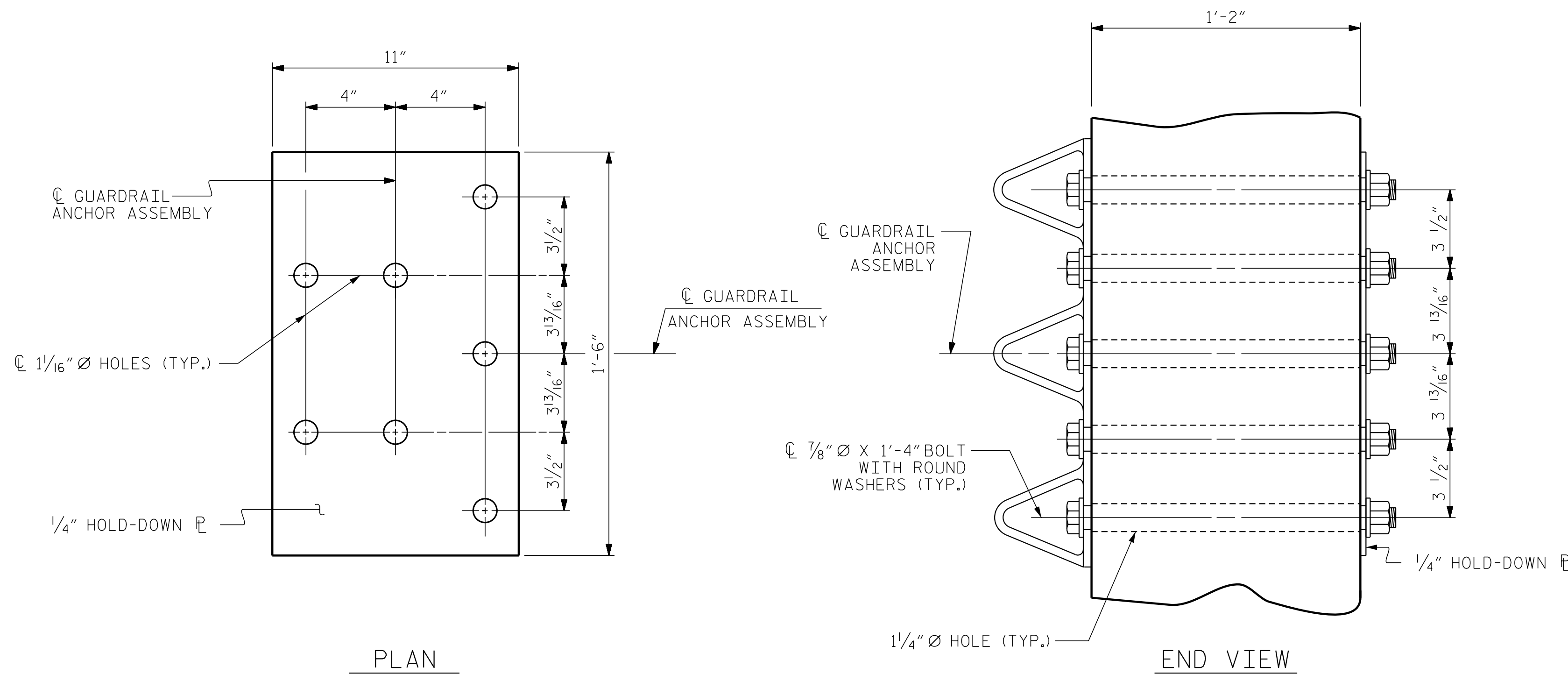
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.



PLAN

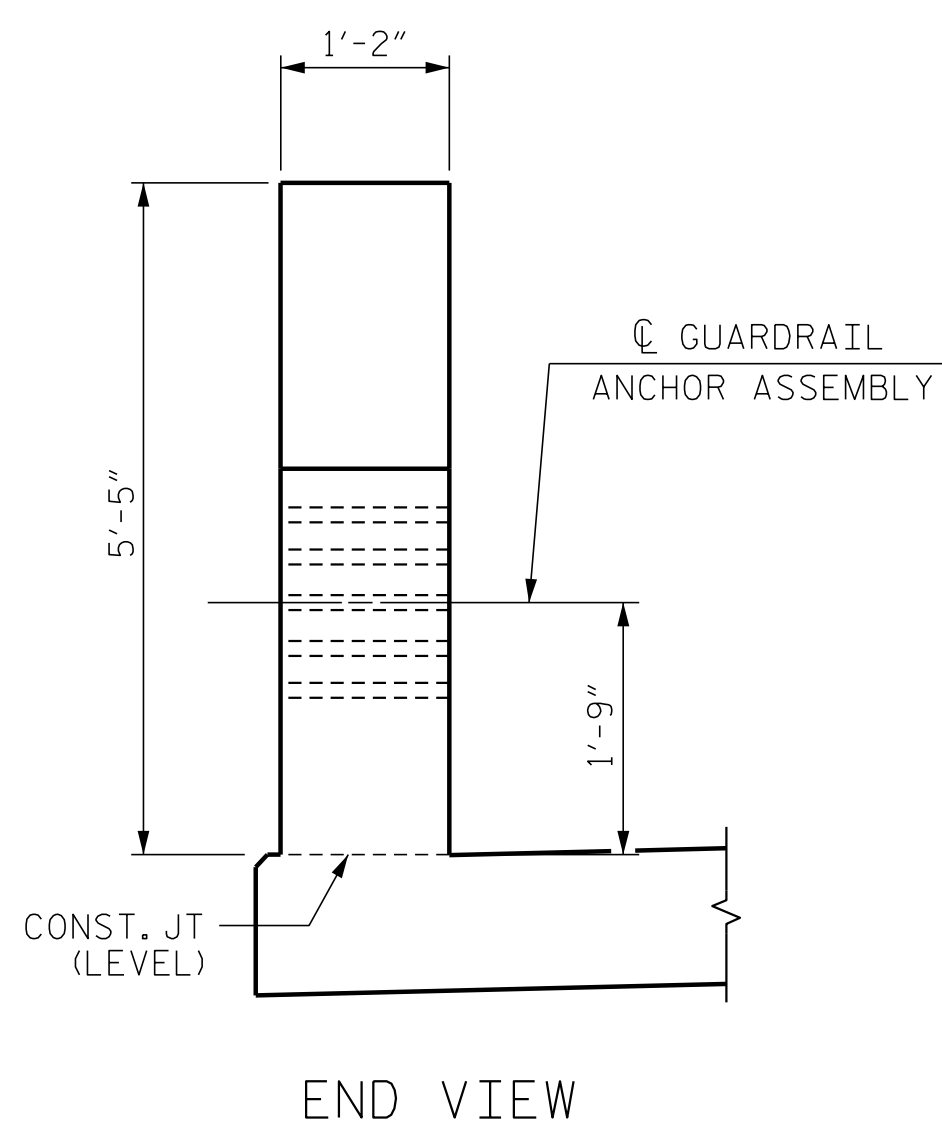
END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

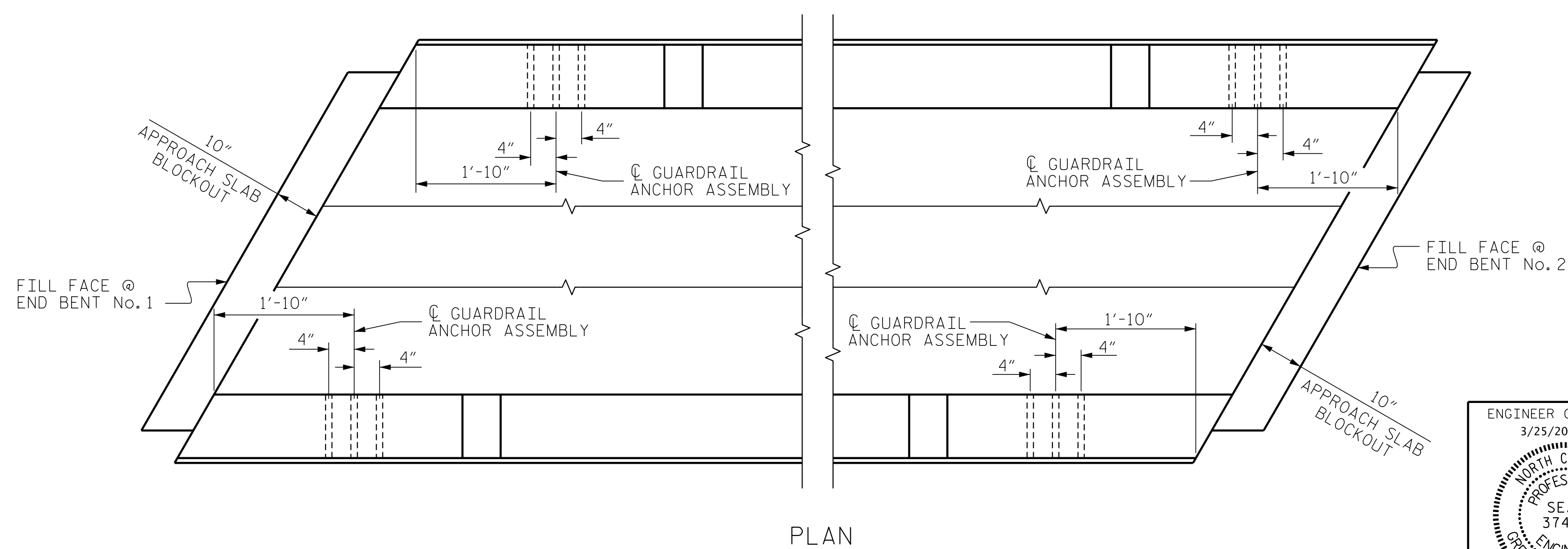


SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gilliland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

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

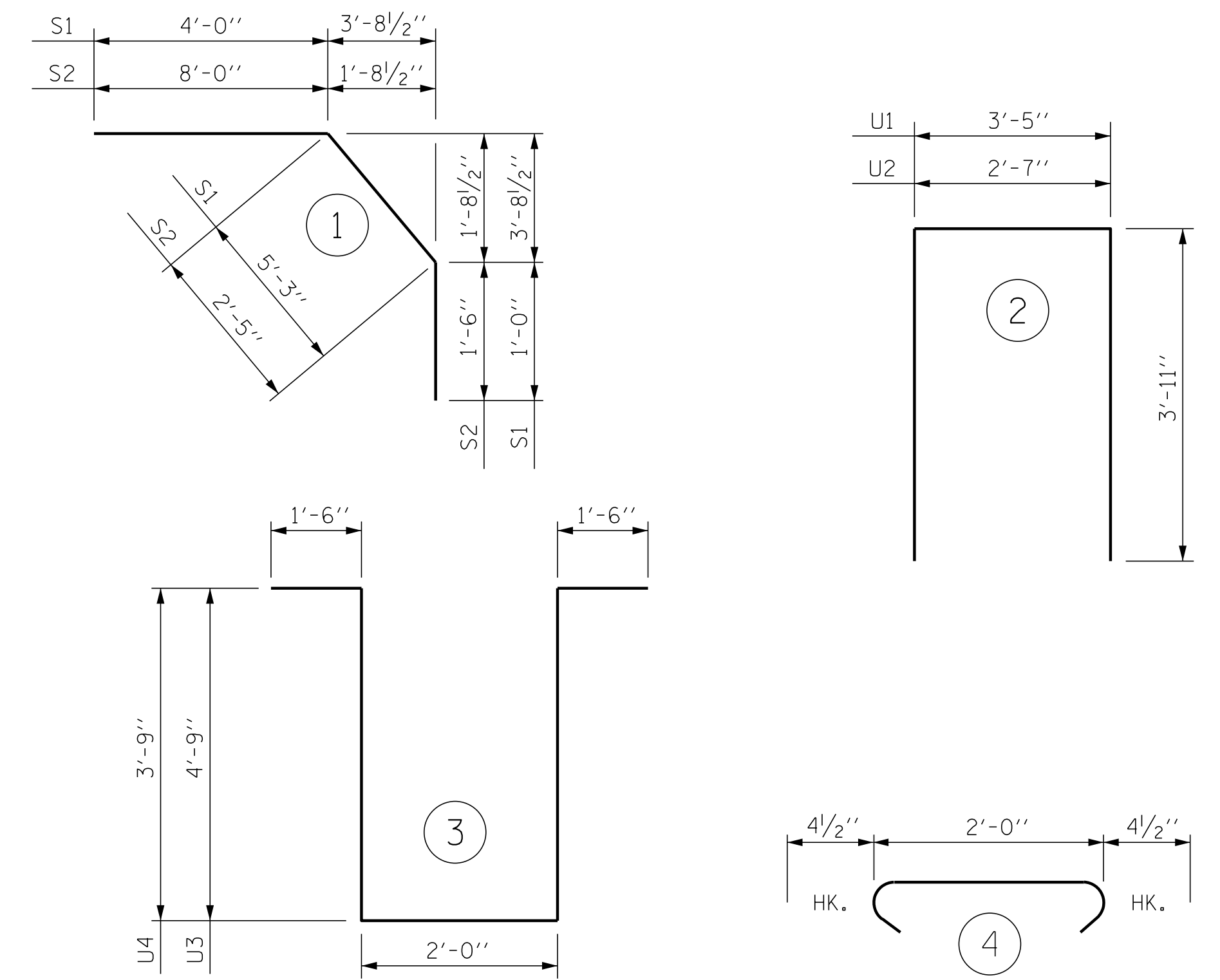
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-19
1			3			TOTAL SHEETS
2			4			32

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ASSEMBLED BY : D. HODGE	DATE : 11/17
CHECKED BY : G.M. GILLAND	DATE : 1/18
DRAWN BY : MAA 5/10	REV. 6/13 MAA/GM
CHECKED BY : GM 5/10	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	* EPOXY COATED REINFORCING STEEL (LBS.)
TOTALS **	433.3	39,284	40,012

\*\* QUANTITIES FOR CONCRETE PARAPETS ARE NOT INCLUDED

REINFORCING BAR SCHEDULE

SPAN "A-B"					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	356	#5	STR	55'-9"	20700
A2	356	#5	STR	55'-9"	20700
* A101	6	#5	STR	50'-5"	316
* A102	6	#5	STR	44'-9"	280
* A103	6	#5	STR	39'-1"	245
* A104	6	#5	STR	33'-5"	209
* A105	6	#5	STR	27'-9"	174
* A106	6	#5	STR	22'-1"	138
* A107	6	#5	STR	16'-5"	103
* A108	6	#5	STR	10'-9"	67
* A109	6	#5	STR	5'-1"	32
A201	6	#5	STR	50'-5"	316
A202	6	#5	STR	44'-9"	280
A203	6	#5	STR	39'-1"	245
A204	6	#5	STR	33'-5"	209
A205	6	#5	STR	27'-9"	174
A206	6	#5	STR	22'-1"	138
A207	6	#5	STR	16'-5"	103
A208	6	#5	STR	10'-9"	67
A209	6	#5	STR	5'-1"	32
* B1	218	#6	STR	20'-0"	6549
* B2	148	#4	STR	23'-9"	2348
* B3	74	#6	STR	36'-3"	4029
* B4	72	#6	STR	30'-0"	3244
B5	280	#5	STR	49'-9"	14529
* B6	14	#4	STR	29'-3"	274
K1	20	#4	STR	29'-9"	397
K2	10	#4	STR	8'-0"	53
K3	20	#4	STR	9'-0"	120
K4	10	#4	STR	8'-4"	56
K5	10	#4	STR	7'-6"	50
K6	10	#4	STR	26'-3"	175
K7	8	#4	STR	2'-7"	14
K8	8	#4	STR	3'-1"	16
K9	4	#4	STR	2'-4"	6
K10	10	#4	STR	6'-3"	42
K11	10	#4	STR	8'-0"	53
K12	30	#4	STR	8'-5"	169
* S1	88	#4	1	10'-3"	603
* S2	88	#4	1	11'-11"	701
S3	150	#4	4	2'-9"	276
U1	88	#4	2	11'-3"	661
U2	4	#4	2	10'-5"	28
U3	30	#4	3	14'-6"	291
U4	10	#4	3	12'-6"	84

REINFORCING STEEL 39,284 LBS.  
\* EPOXY COATED REINFORCING STEEL 40,012 LBS.

\* THESE BARS ARE EPOXY COATED.

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,445 SQ.FT.
BRIDGE DECK	9,735 SQ.FT.
TOTAL	11,180 SQ.FT.

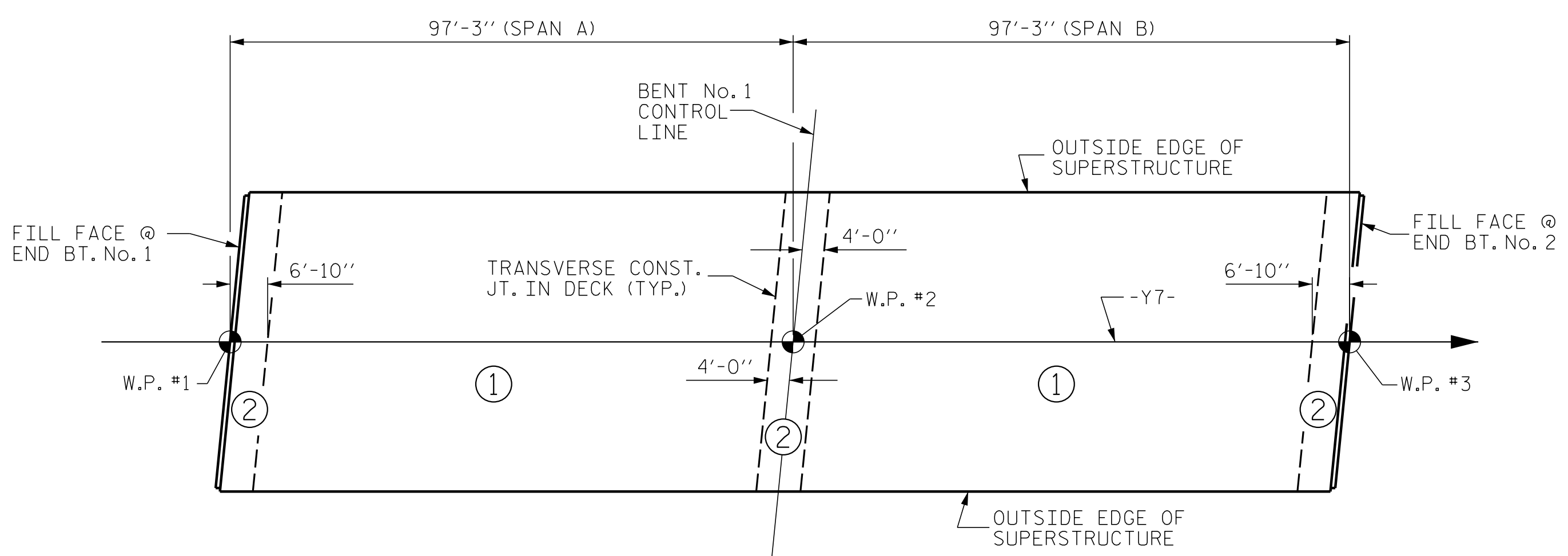
CLASS AA CONCRETE BREAKDOWN

POUR #1	147.7	CY
POUR #2	196.2	CY
POUR #3A	44.7	CY
POUR #3B	44.7	CY
CLASS AA CONCRETE BREAKDOWN TOTAL	433.3	CY

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

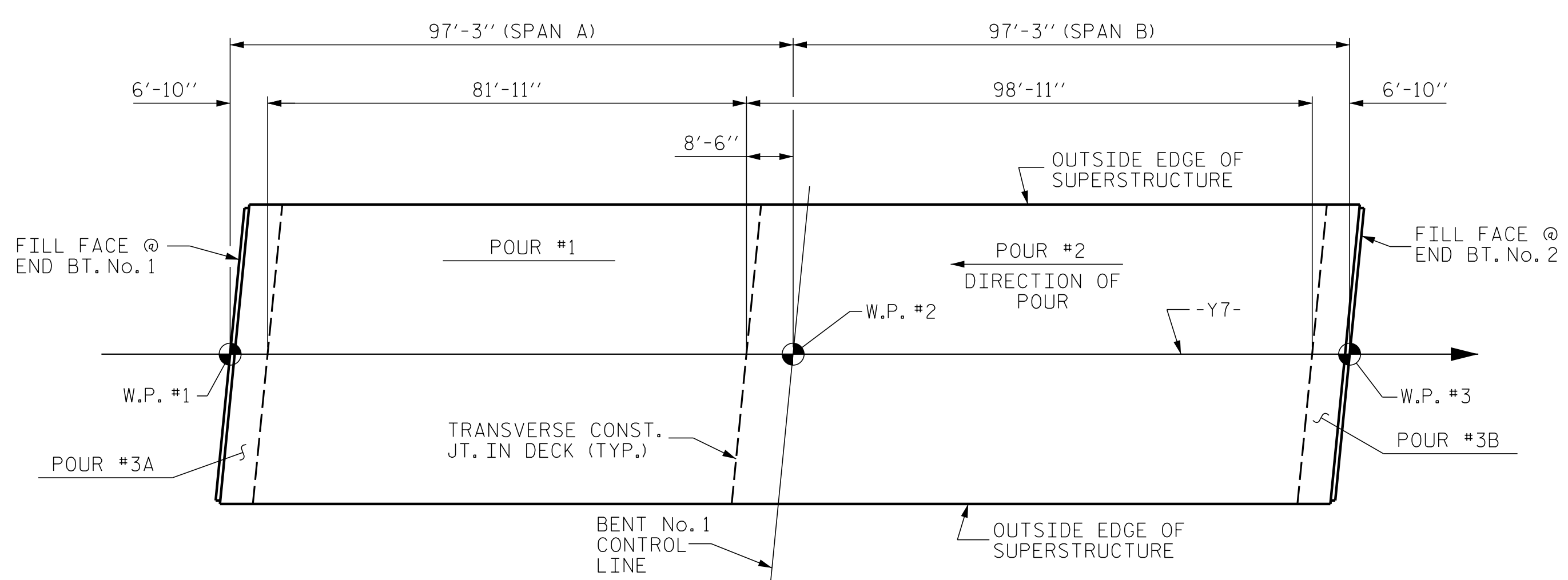
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 27+01.91 -Y7-



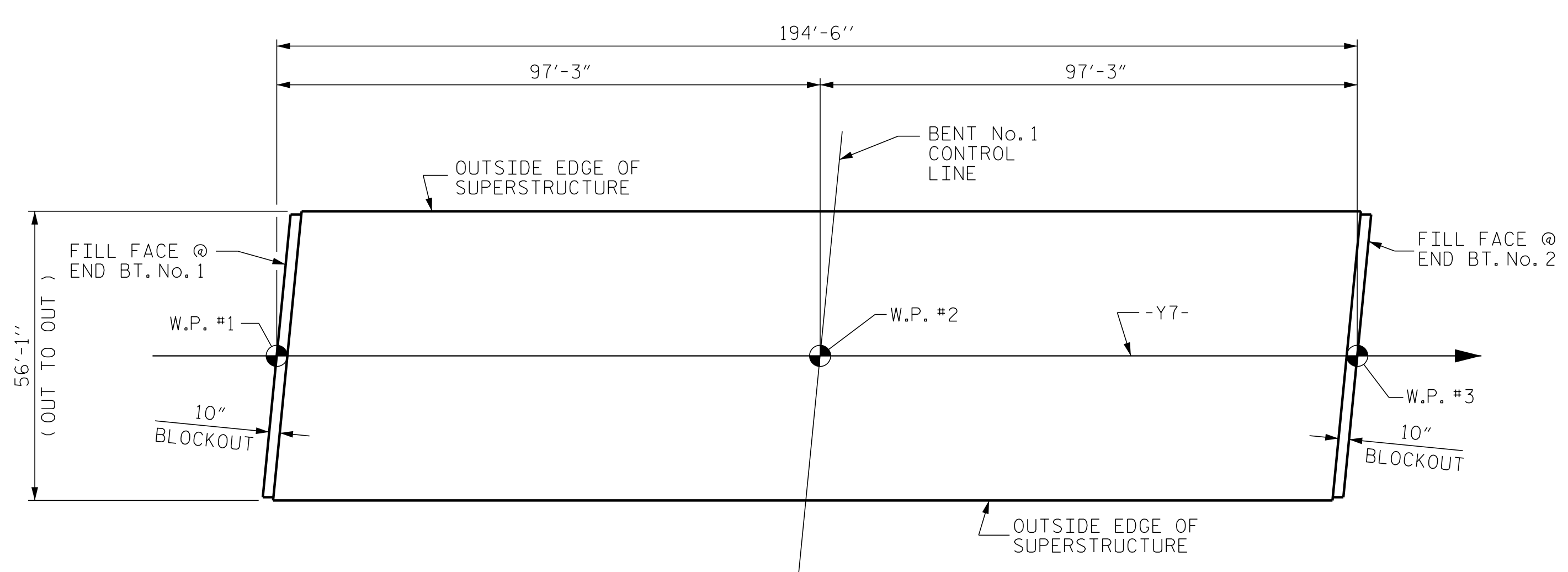
OPTIONAL DECK POUR DETAIL

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

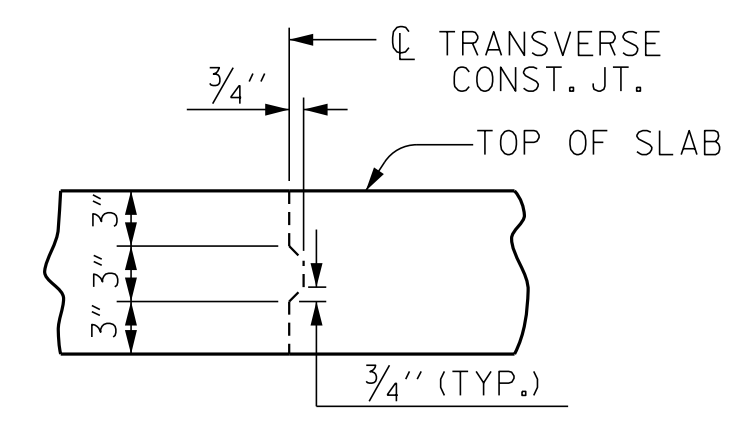


CONCRETE DECK POUR DETAIL

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



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10,908)



TRANSVERSE CONST. JOINT DETAIL

NOTE: SLAB REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

ENGINEER OF RECORD: 3/25/2019  
NORTH CAROLINA PROFESSIONAL SEAL 37400  
GREGORY M. GILLAND  
GREGORY M. GILLAND  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd. Raleigh, N.C. 27606  
Bus: 919 851 8077 Fax: 919 851 8107 LICENSE NO. F-0377

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-20
1			3			TOTAL SHEETS
2			4			32

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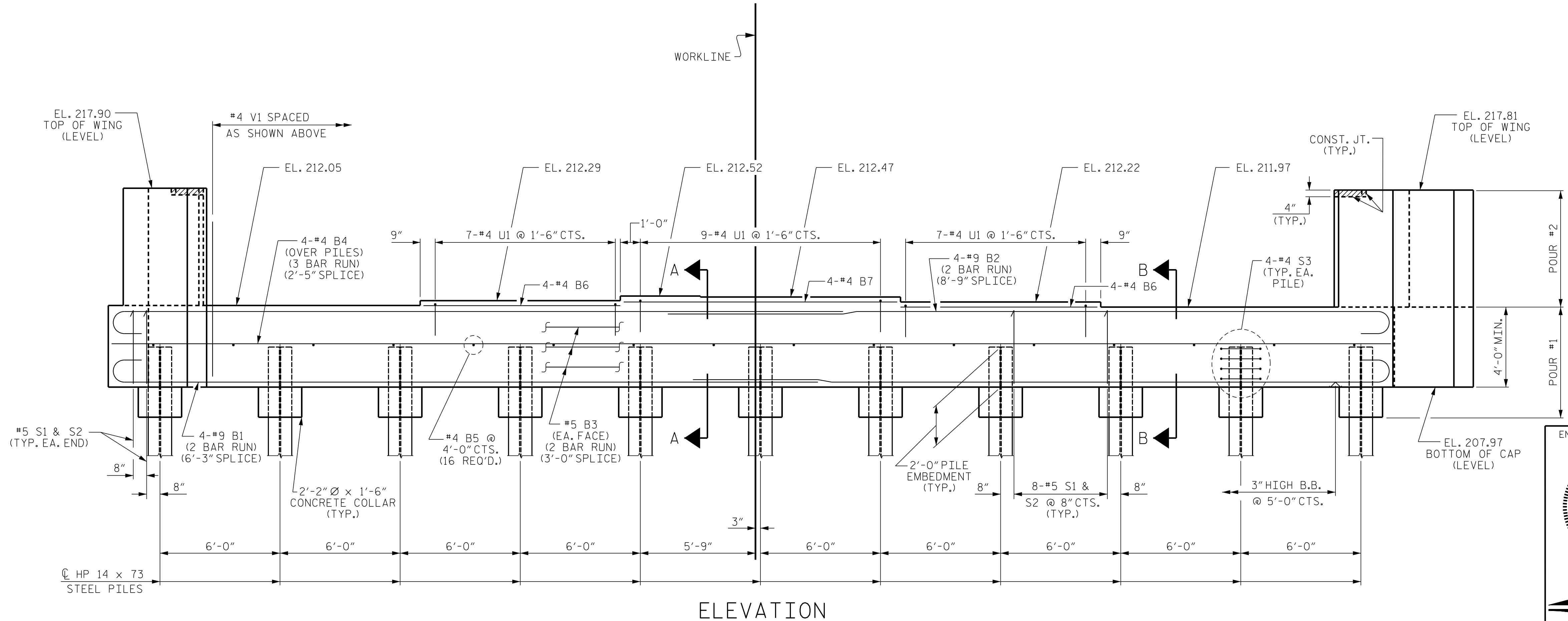
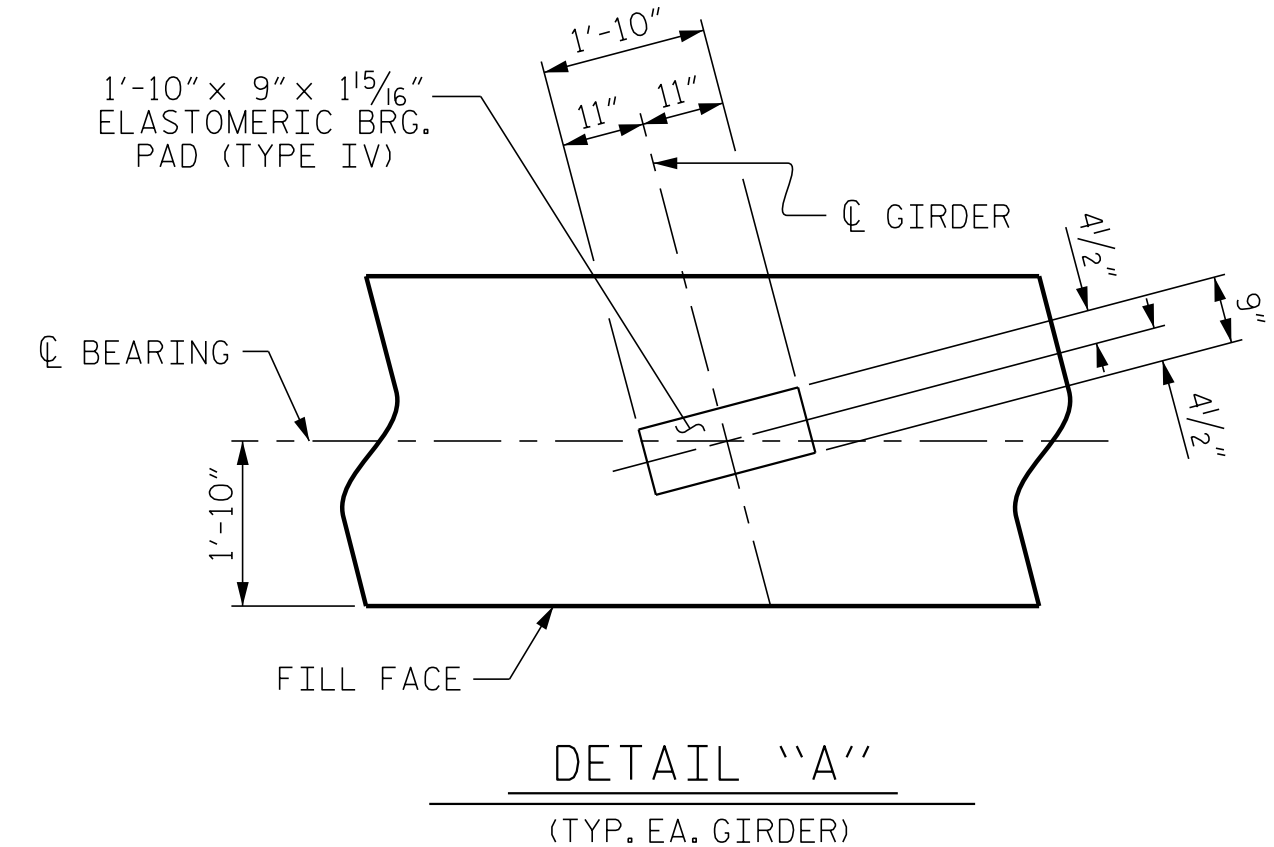
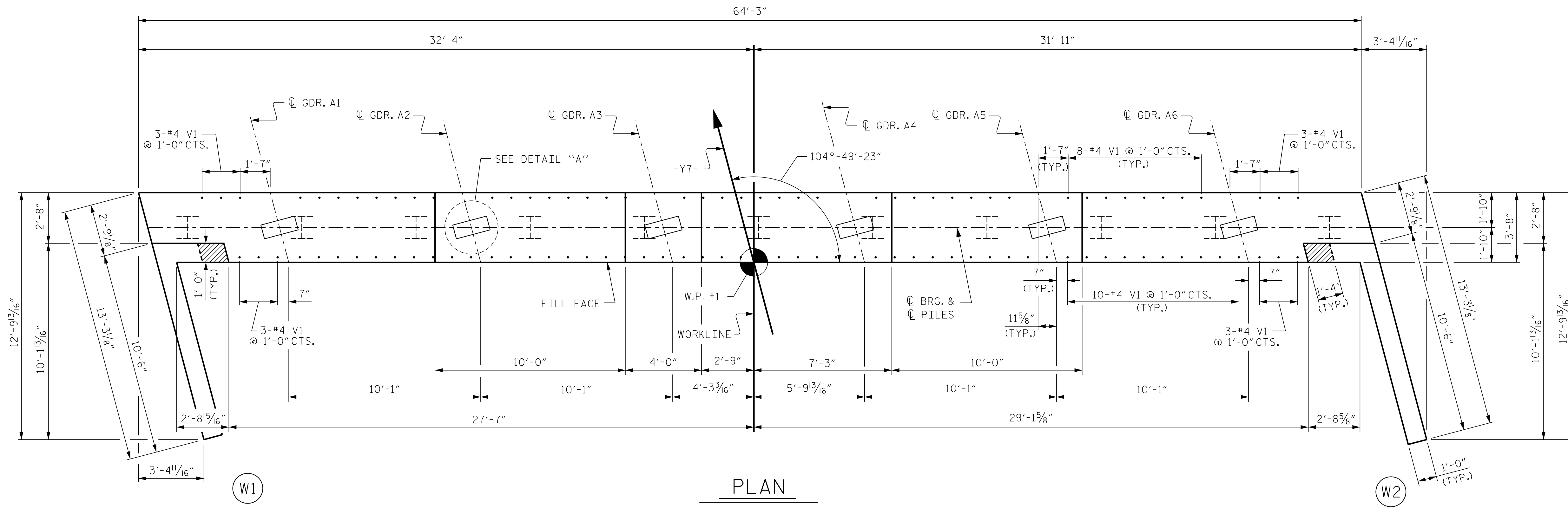
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CHECKED BY: G.M. GILLAND DATE: 1/18

NOTES

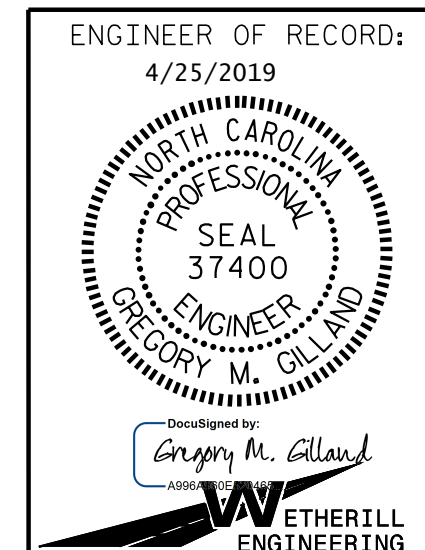
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPETS ARE CAST IF SLIP FORMING IS USED.

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

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO AVOID #4 V1 BARS IN CAP.



PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 27+01.91 -Y7-  
SHEET 1 OF 3



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

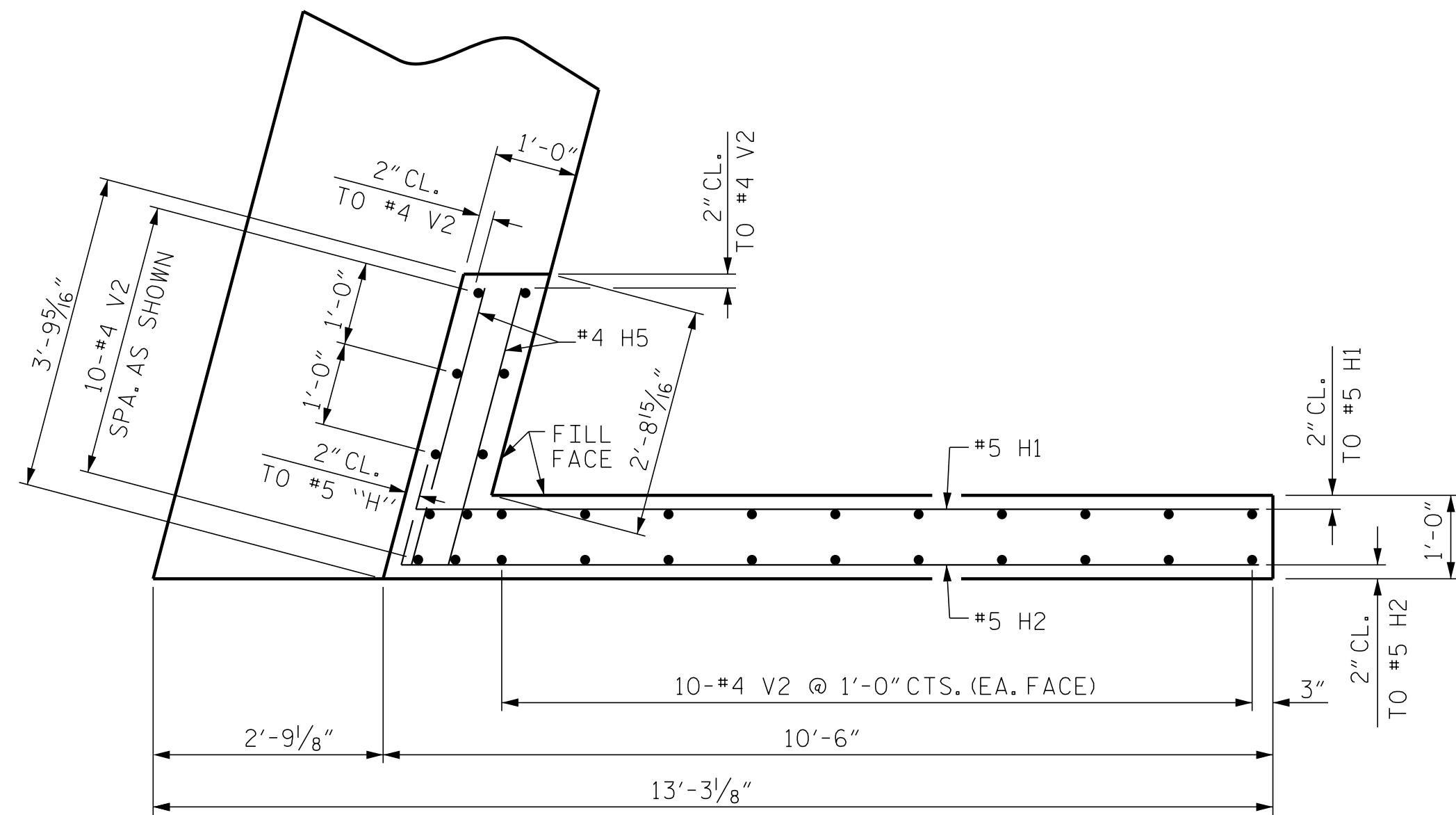
DRAWN BY: D. HODGE DATE: 1/18  
CHECKED BY: G.M. GILLAND DATE: 2/18

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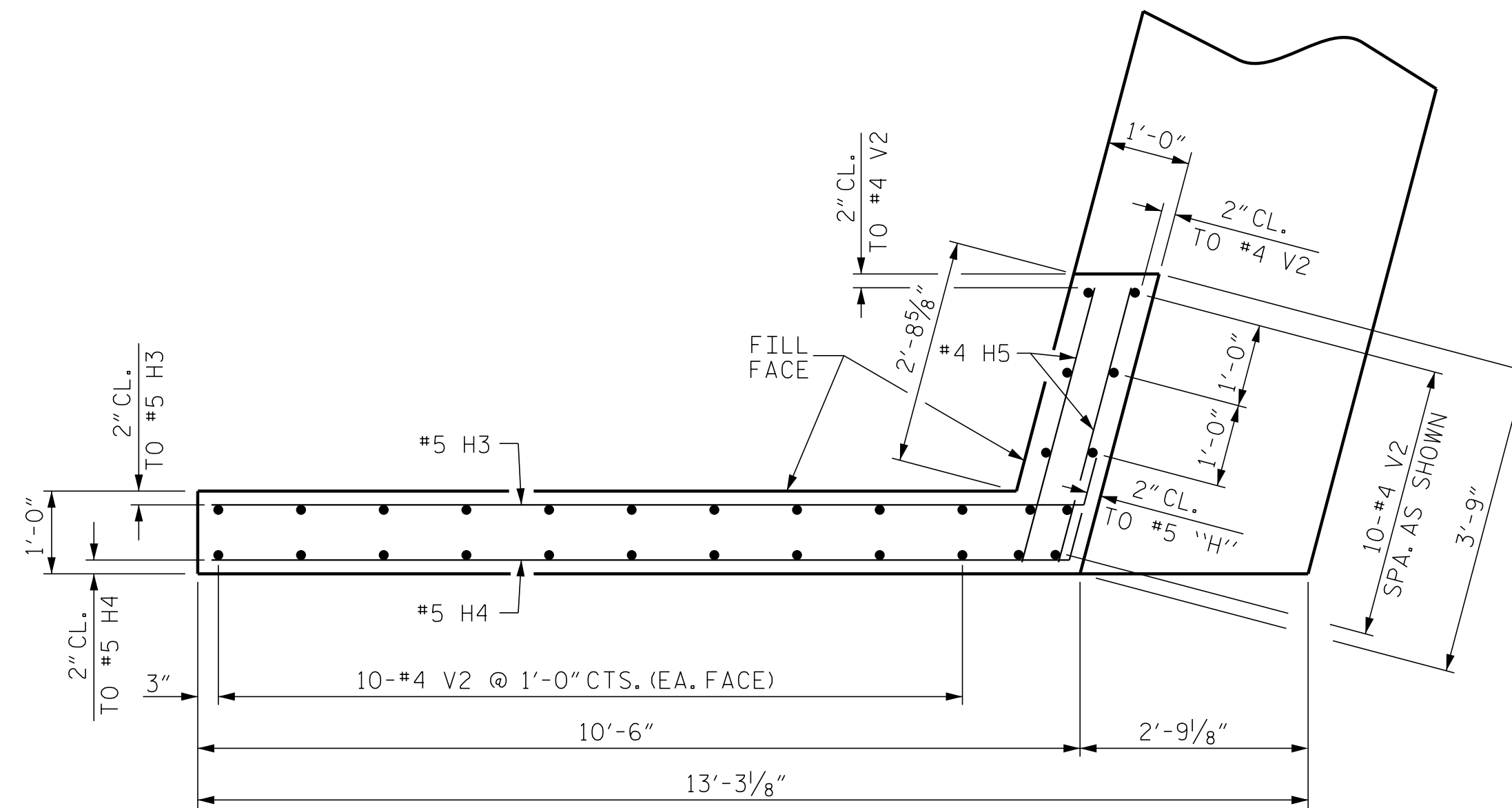
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

SHEET NO.  
S3-21  
TOTAL SHEETS  
32

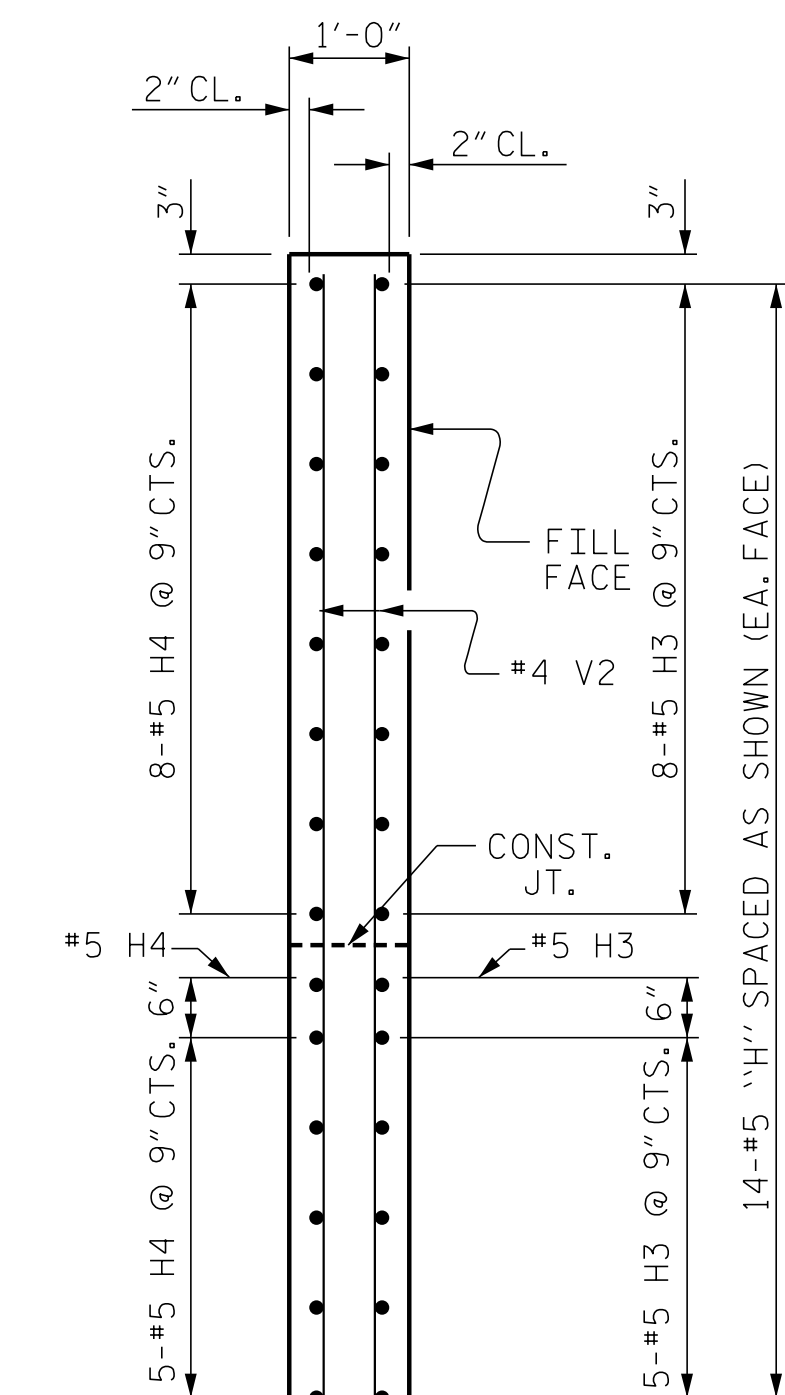
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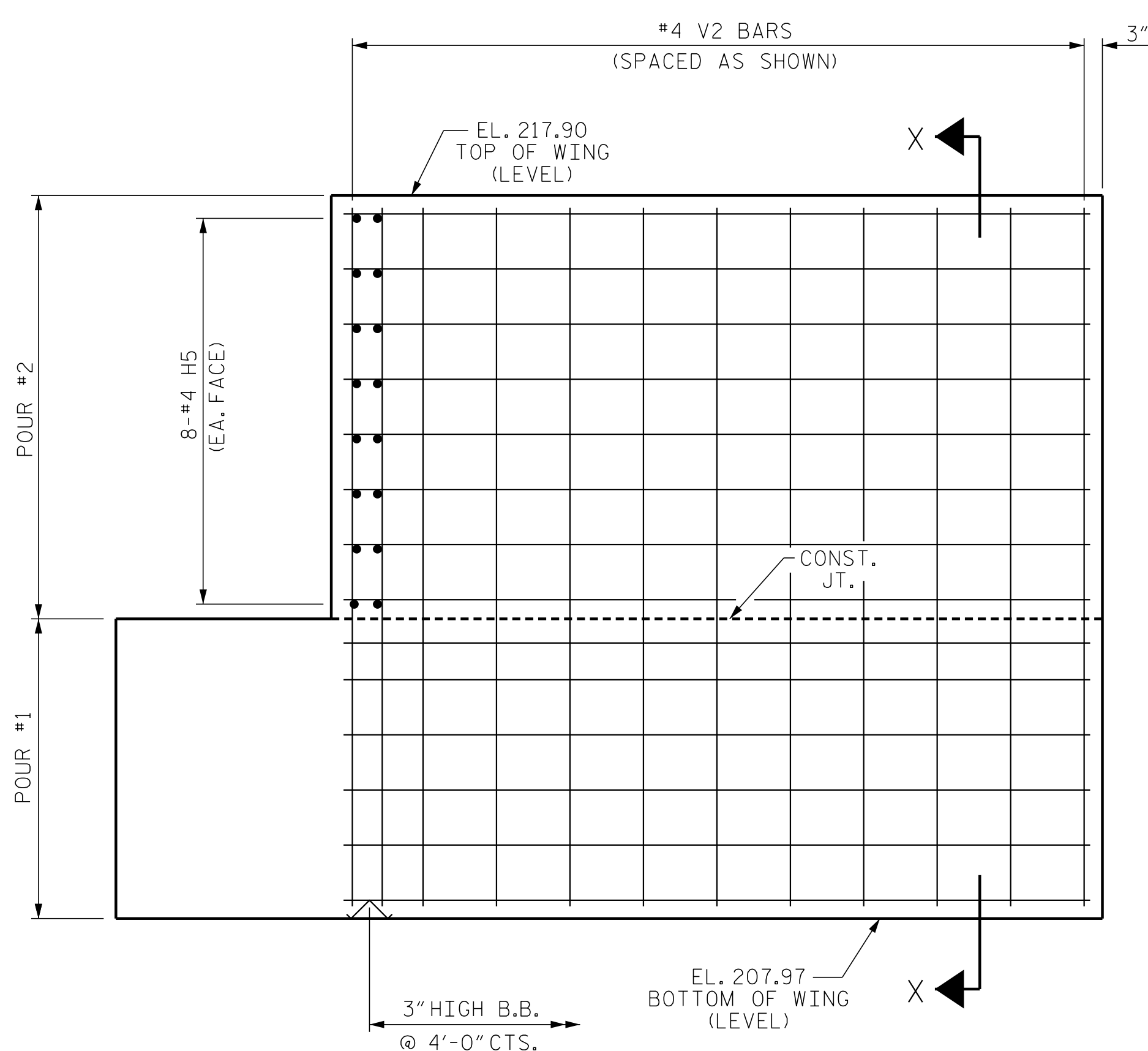
PLAN OF WING - (W1)



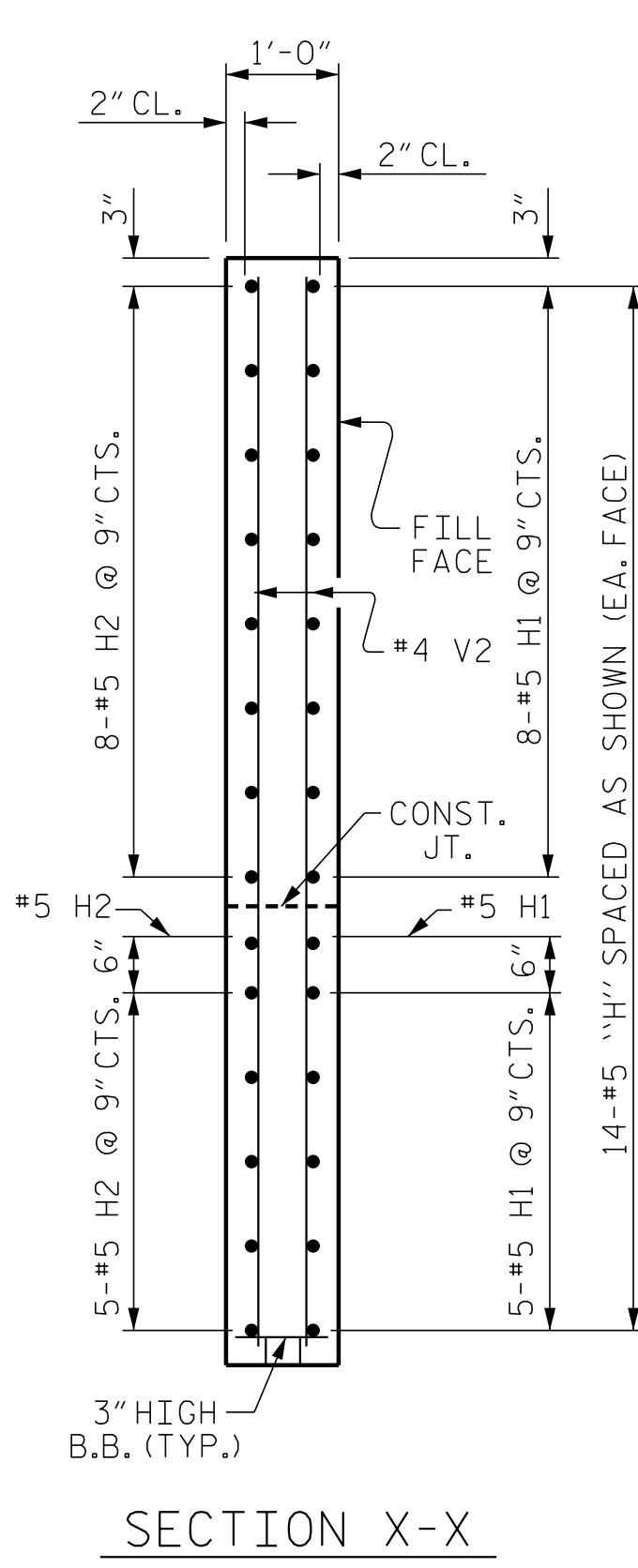
PLAN OF WING - (W2)



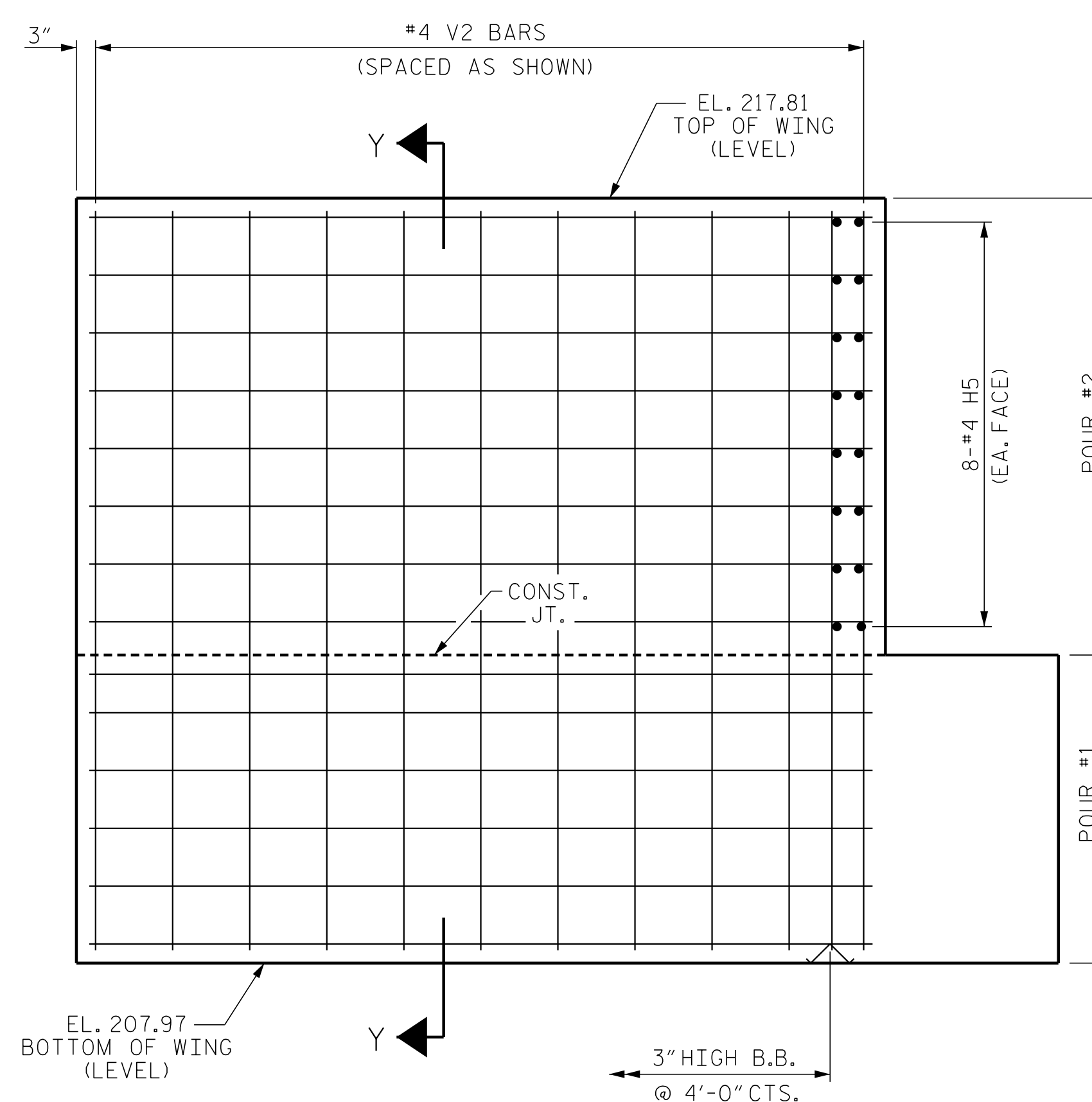
SECTION Y-Y



ELEVATION OF WING - (W1)

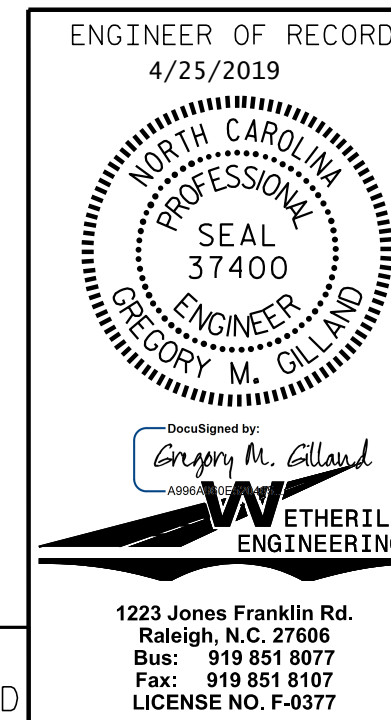


SECTION X-X



ELEVATION OF WING - (W2)

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 2 OF 3



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE END BENT No. 1	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S3-22
2			TOTAL SHEETS 32

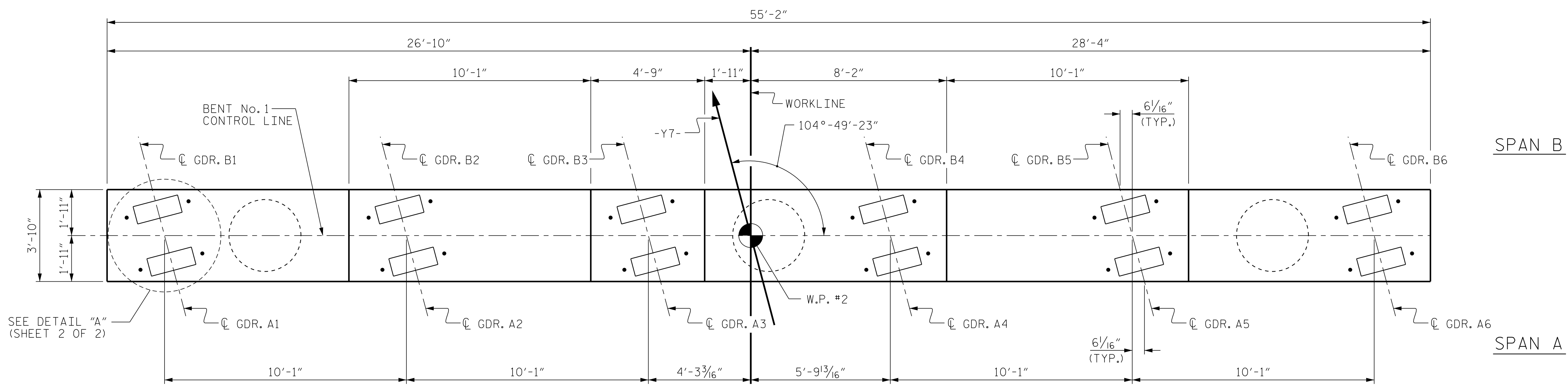
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 CHECKED BY: G.M. GILLAND DATE: 2/18

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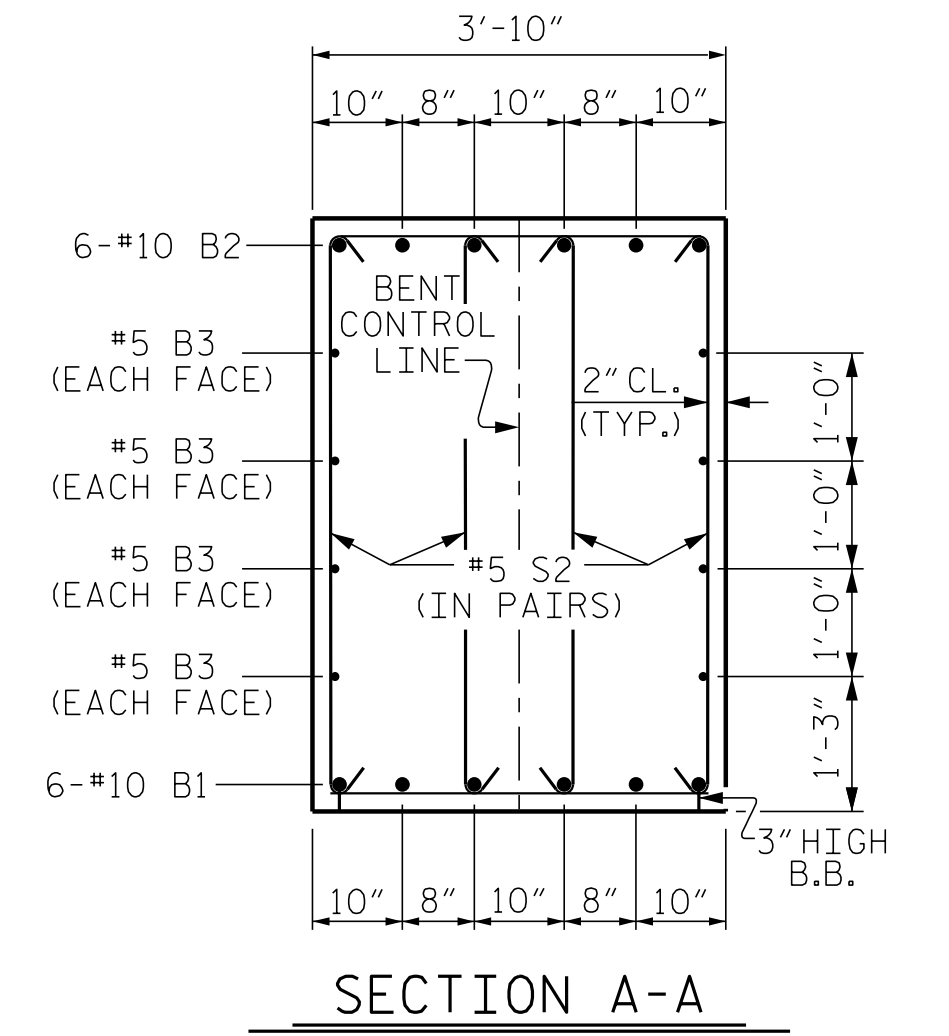
1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
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 LICENSE NO. F-0377

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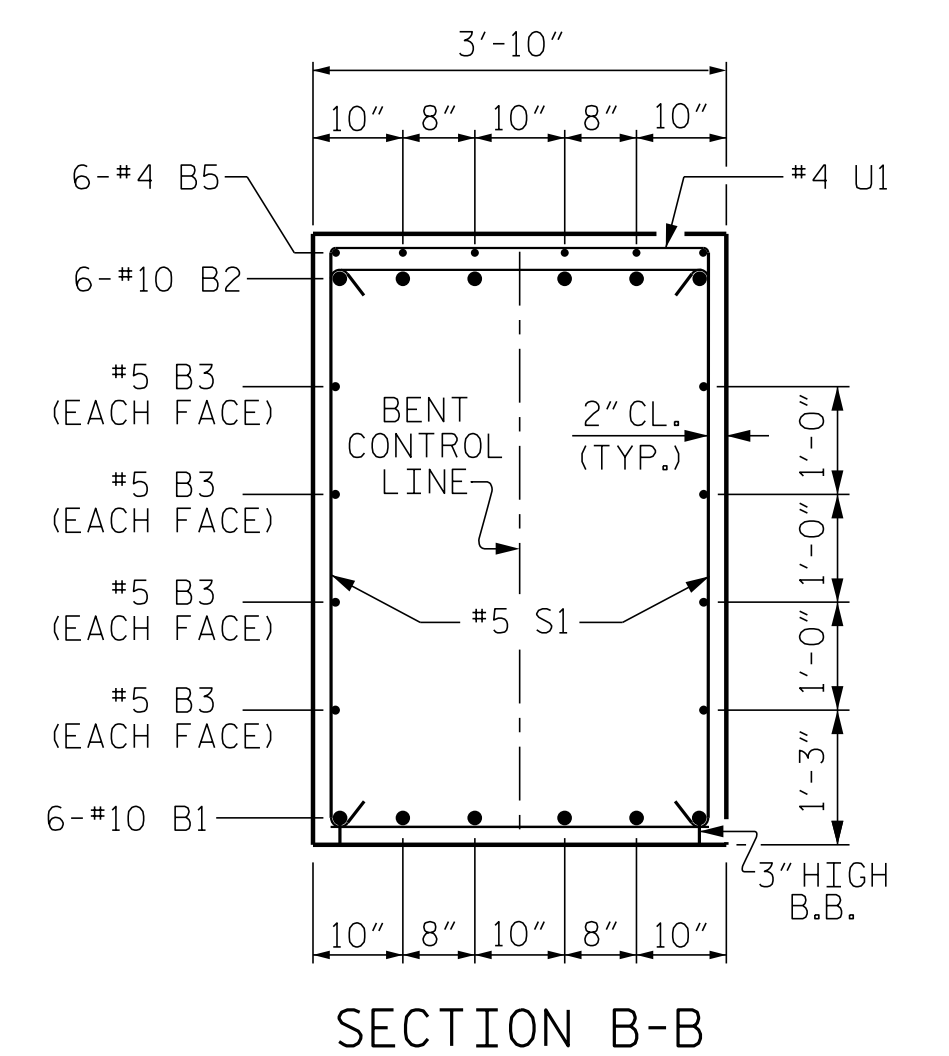




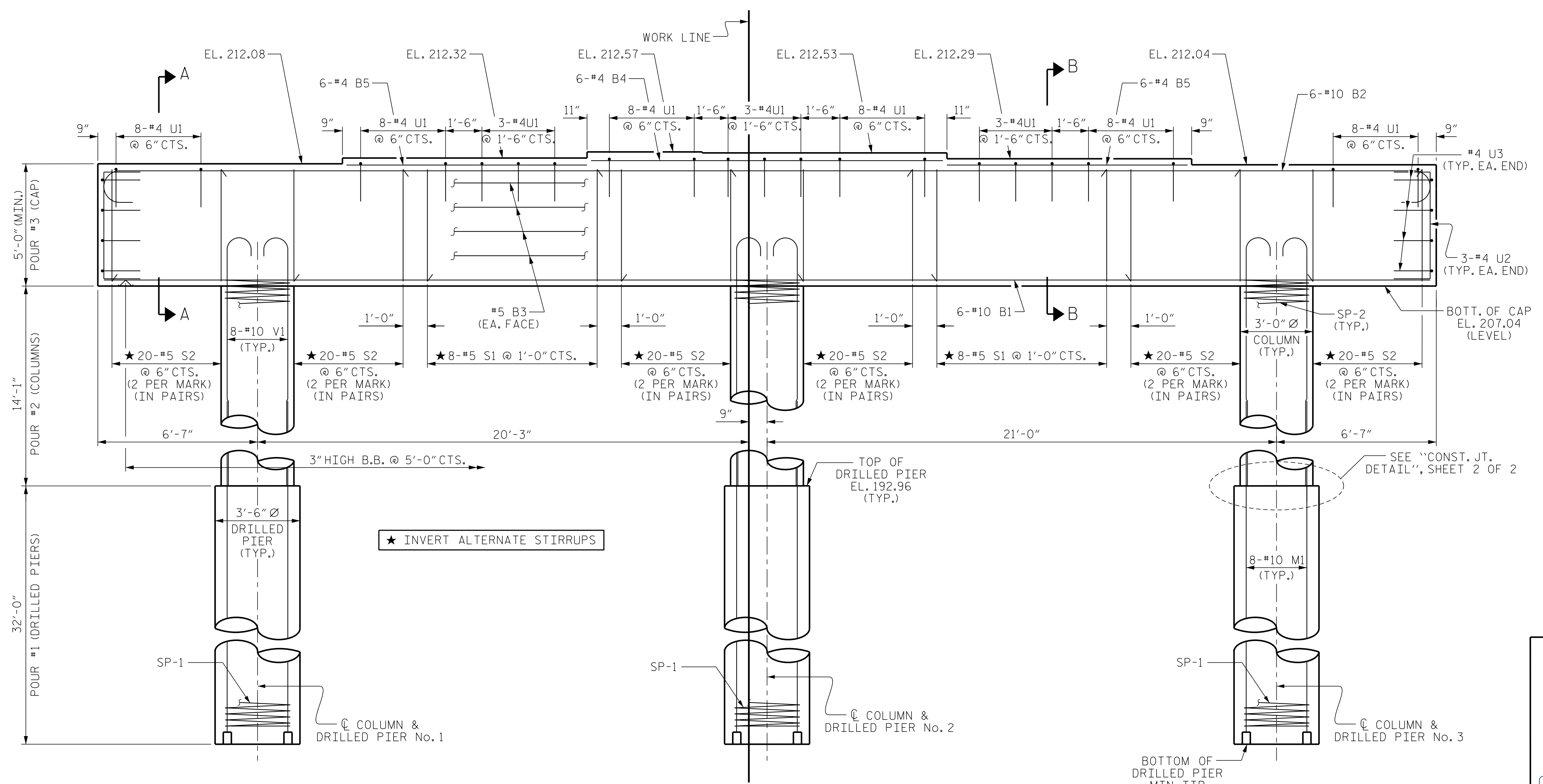
PLAN



SECTION A-A



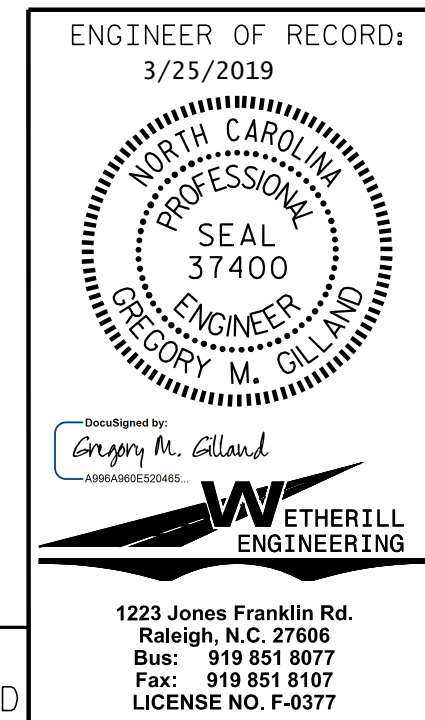
SECTION B-B



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER EXCEPT AS NOTED.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 1 OF 2

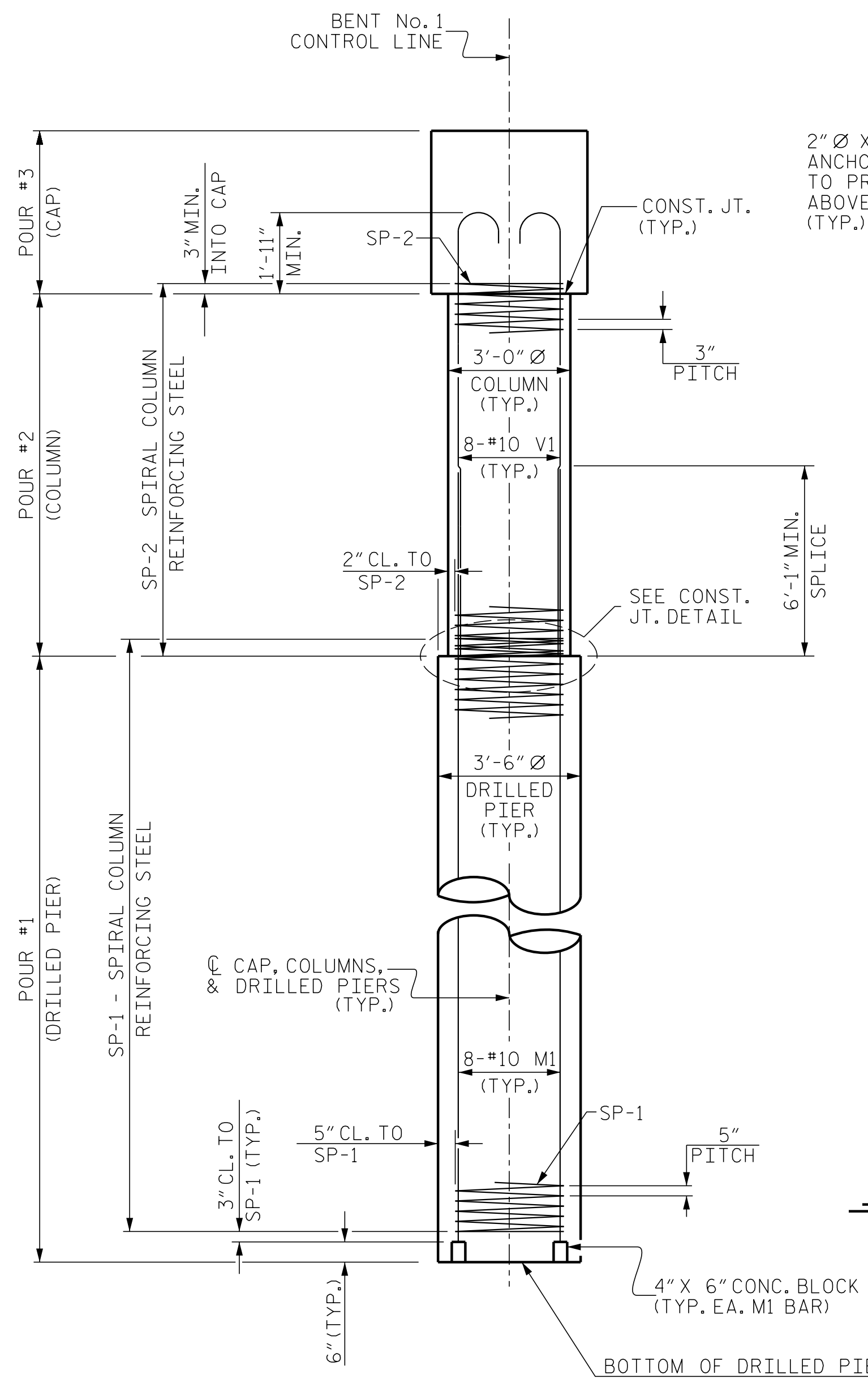


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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					SHEET NO. S3-24
					TOTAL SHEETS 32

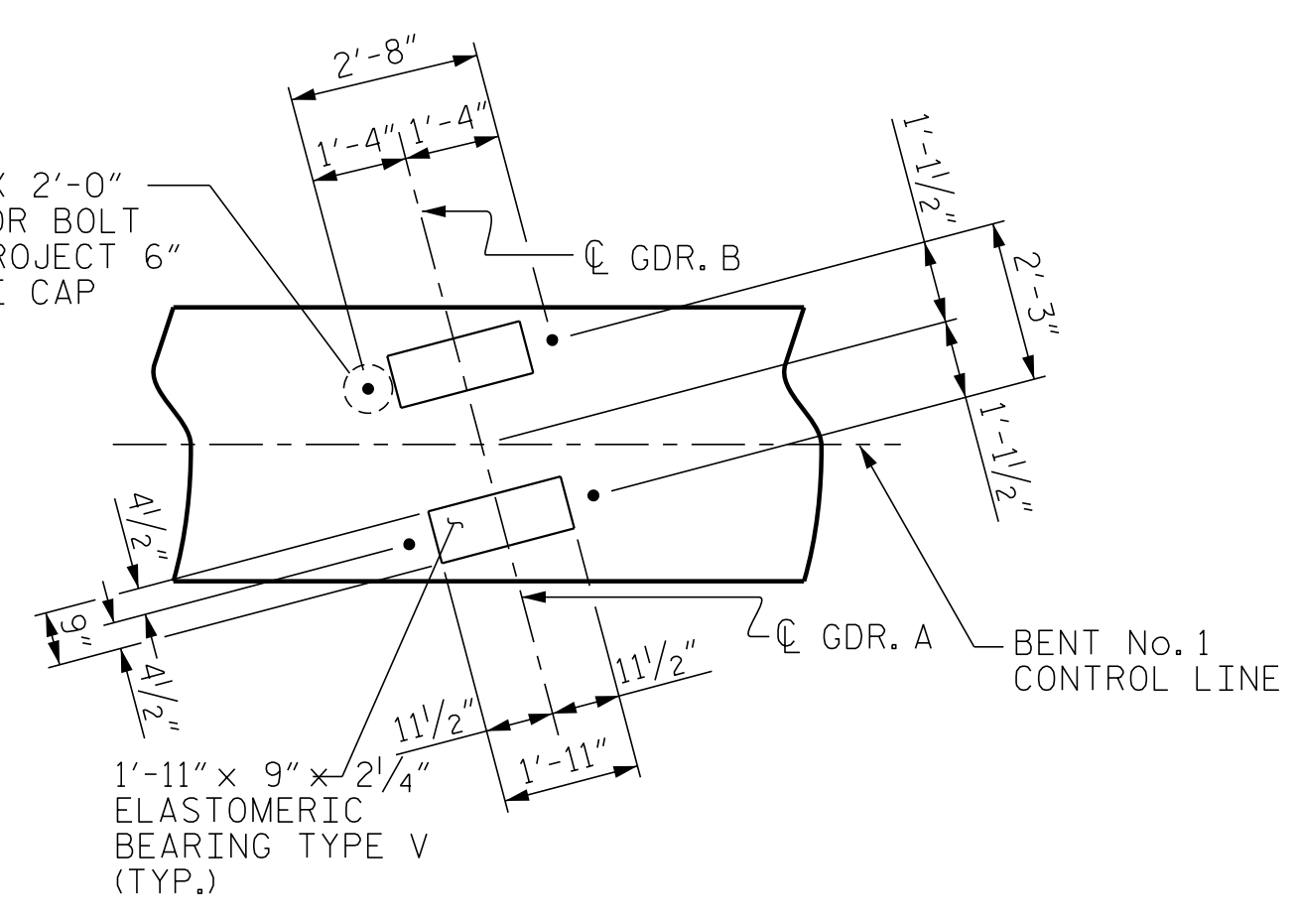
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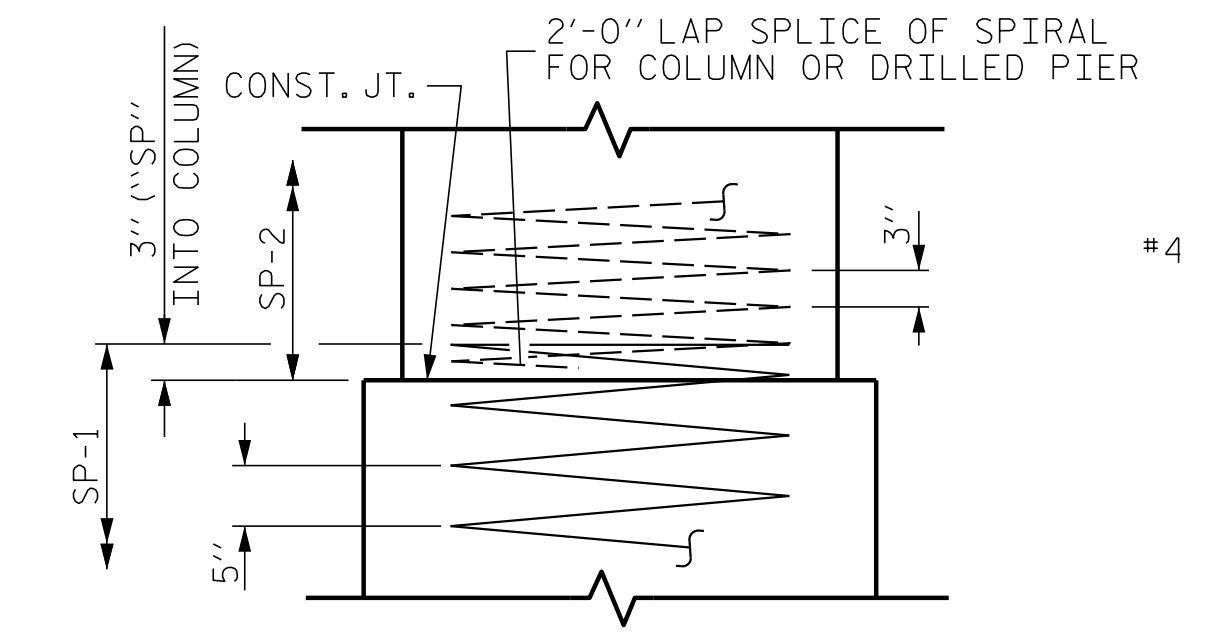
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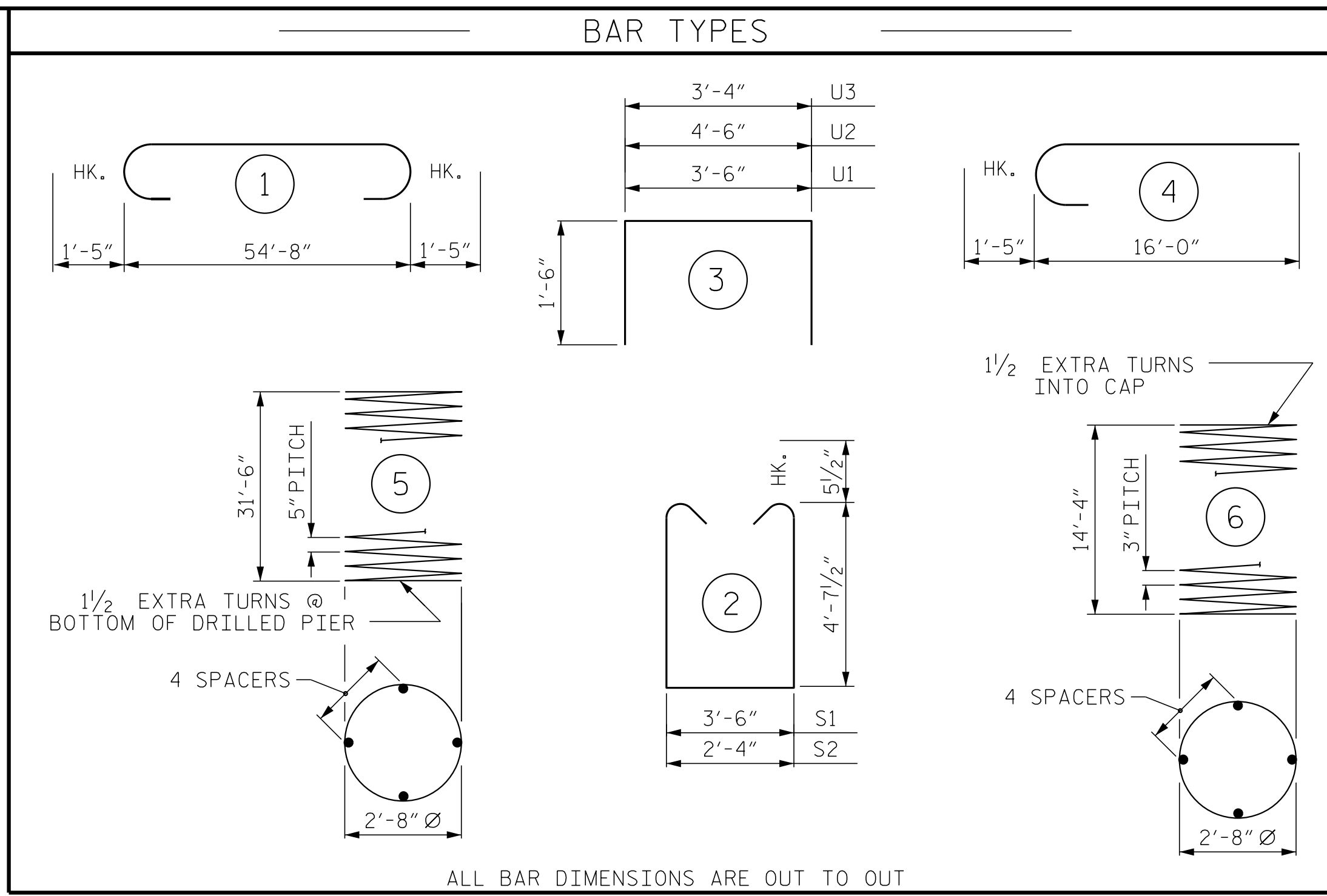
**END ELEVATION**



**DETAIL "A"**  
(TYP. EA. GIRDER)



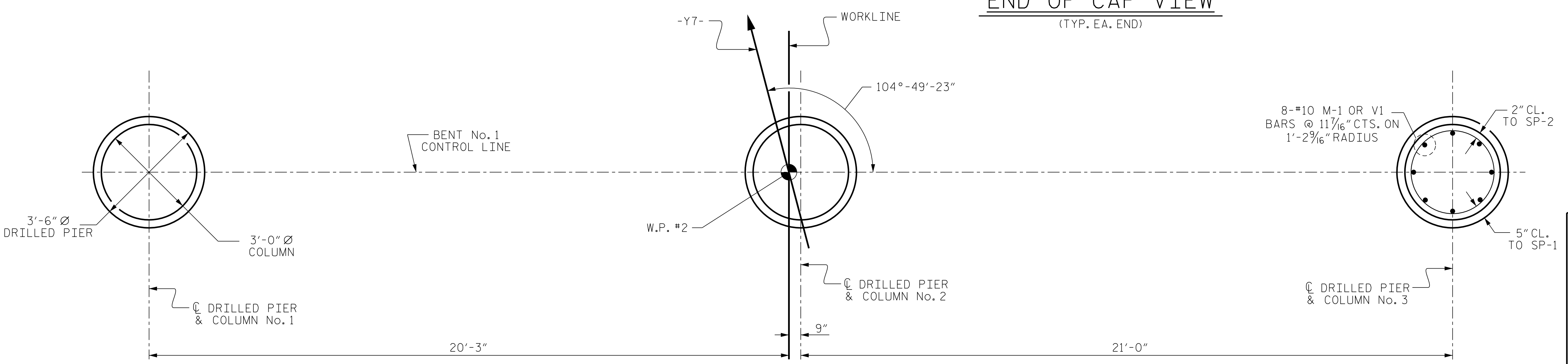
**CONSTRUCTION JOINT DETAIL**



ALL BAR DIMENSIONS ARE OUT TO OUT

- NOTES**
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
  - HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
  - FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
  - ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."
  - ★ INVERT ALTERNATE STIRRUPS.
  - 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.

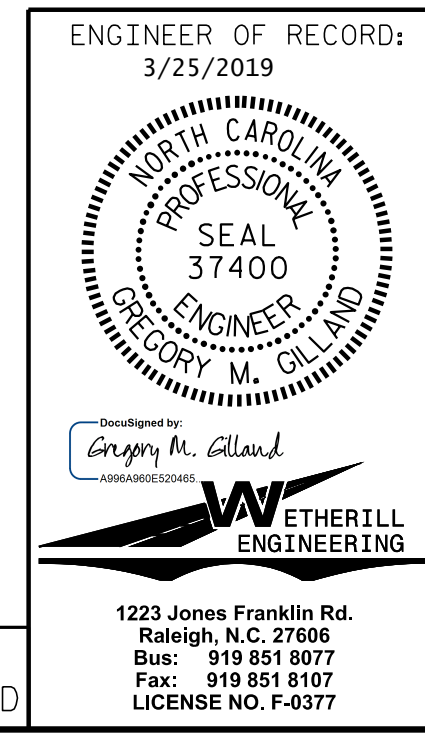
**END OF CAP VIEW**  
(TYP. EA. END)



**PLAN OF DRILLED PIERS AND COLUMNS**  
(REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH COLUMN & DRILLED PIER)

BILL OF MATERIAL					
BENT No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	STR	54'-10"	1416
B2	6	#10	1	57'-6"	1485
B3	8	#5	STR	54'-10"	458
B4	6	#4	STR	14'-6"	58
B5	12	#4	STR	9'-11"	79
M1	24	#10	STR	40'-7"	4191
S1	16	#5	2	13'-8"	228
S2	120	#5	2	12'-6"	1565
U1	57	#4	3	6'-6"	247
U2	6	#4	3	7'-6"	30
U3	8	#4	3	6'-4"	34
V1	24	#10	4	17'-5"	1799
REINFORCING STEEL					11,590 LBS.
SP-1	3	*	5	634'-1"	1984
SP-2	3	**	6	485'-10"	974
SPIRAL COLUMN REINFORCING STEEL					2,958 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)					11.1 C.Y.
POUR #3 (CAP)					41.0 C.Y.
TOTAL CLASS A CONCRETE					52.1 C.Y.
DRILLED PIERS:					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)					34.2 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL					51.0 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL					45.0 LIN. FT.
CSL TUBES					402.0 LIN. FT.

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 2 OF 2



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

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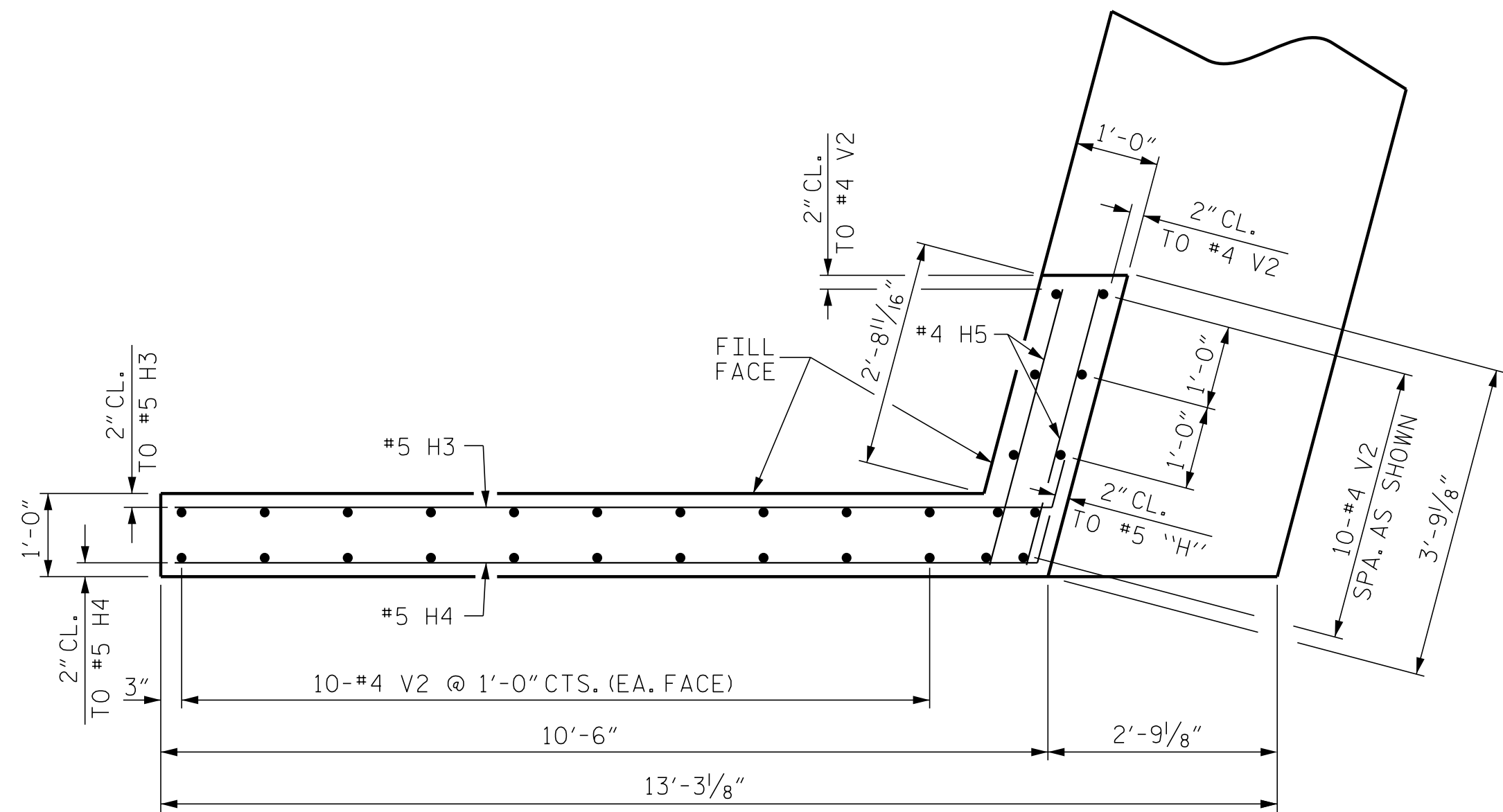
DRAWN BY: AMM/GMG DATE: 4-18  
 CHECKED BY: BCH DATE: 11-18

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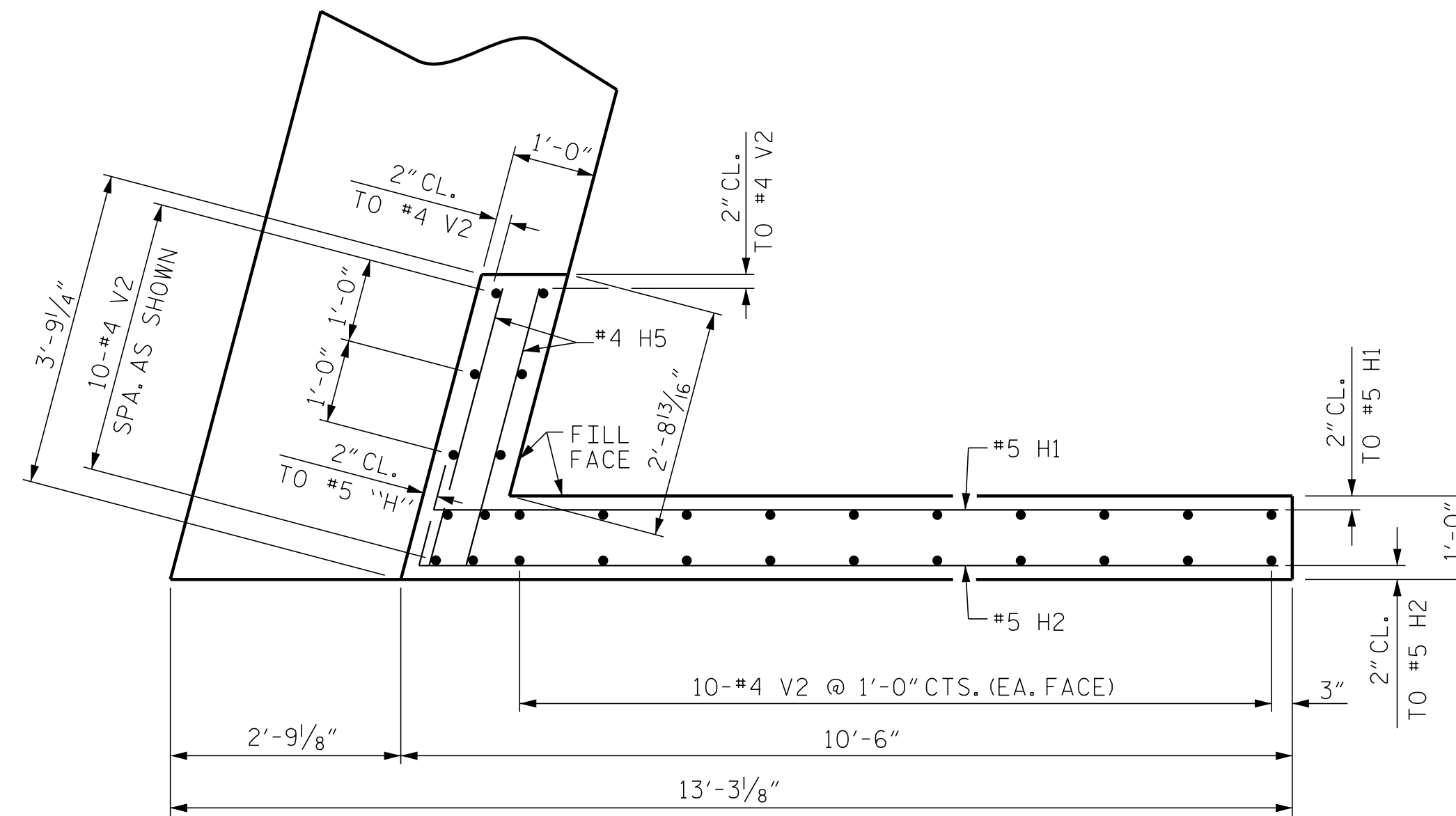
SHEET NO.  
S3-25  
 TOTAL SHEETS  
32



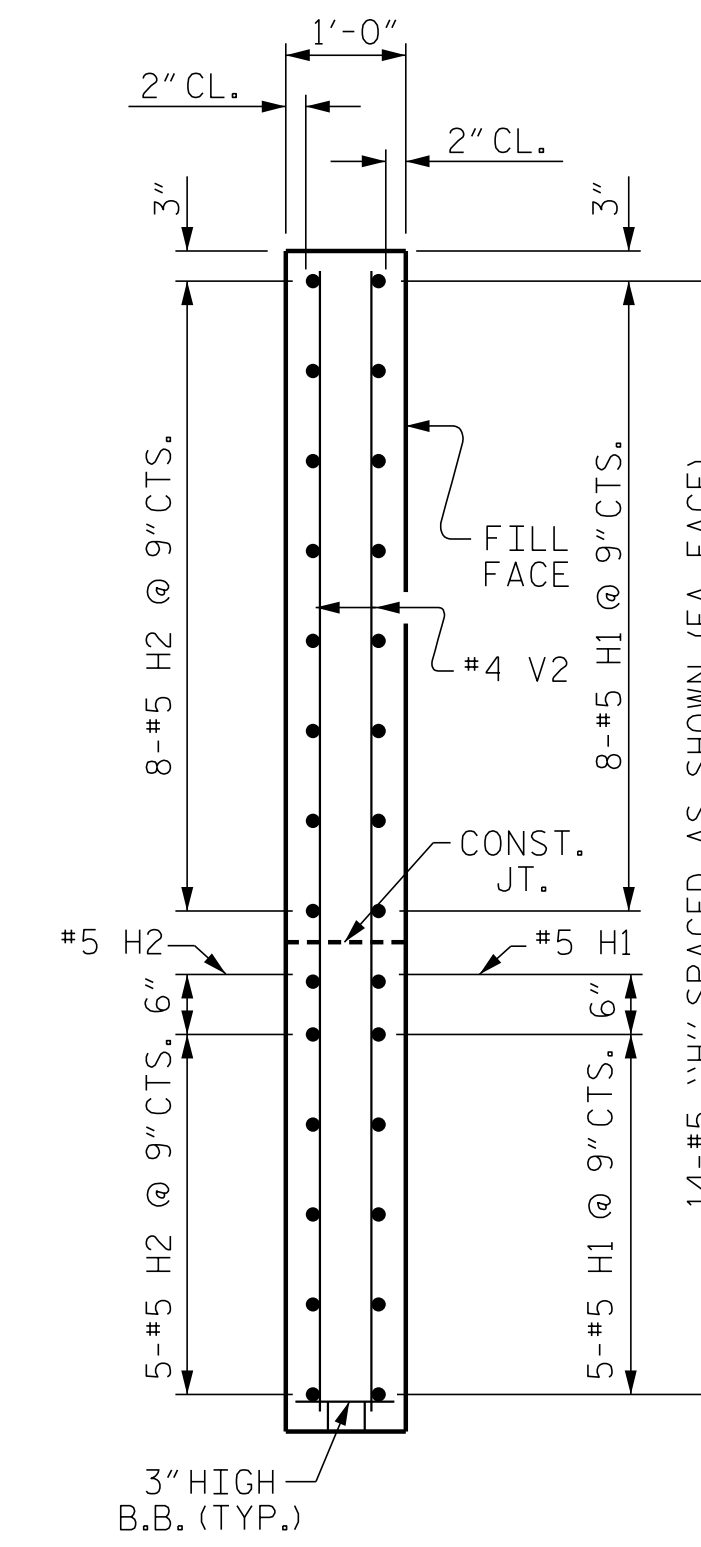




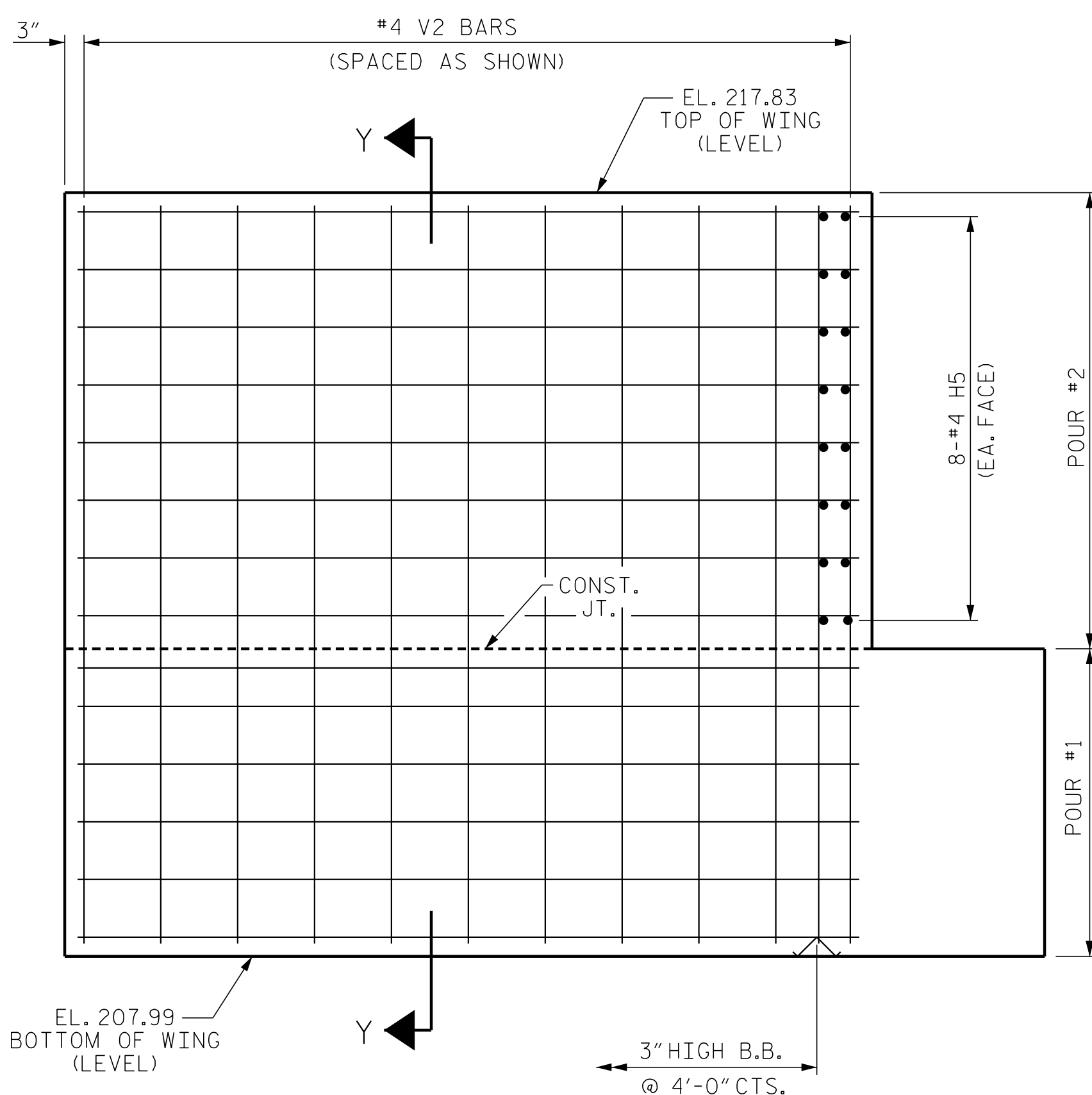
PLAN OF WING - (W2)



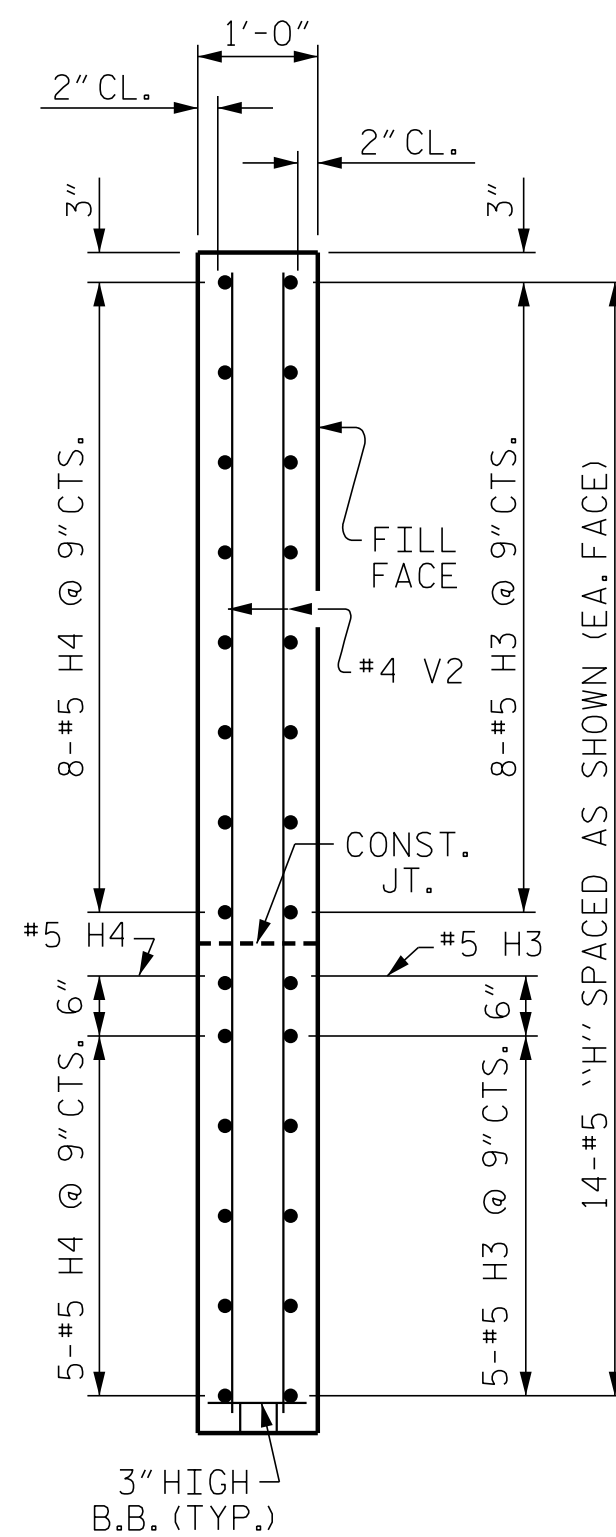
PLAN OF WING - (W1)



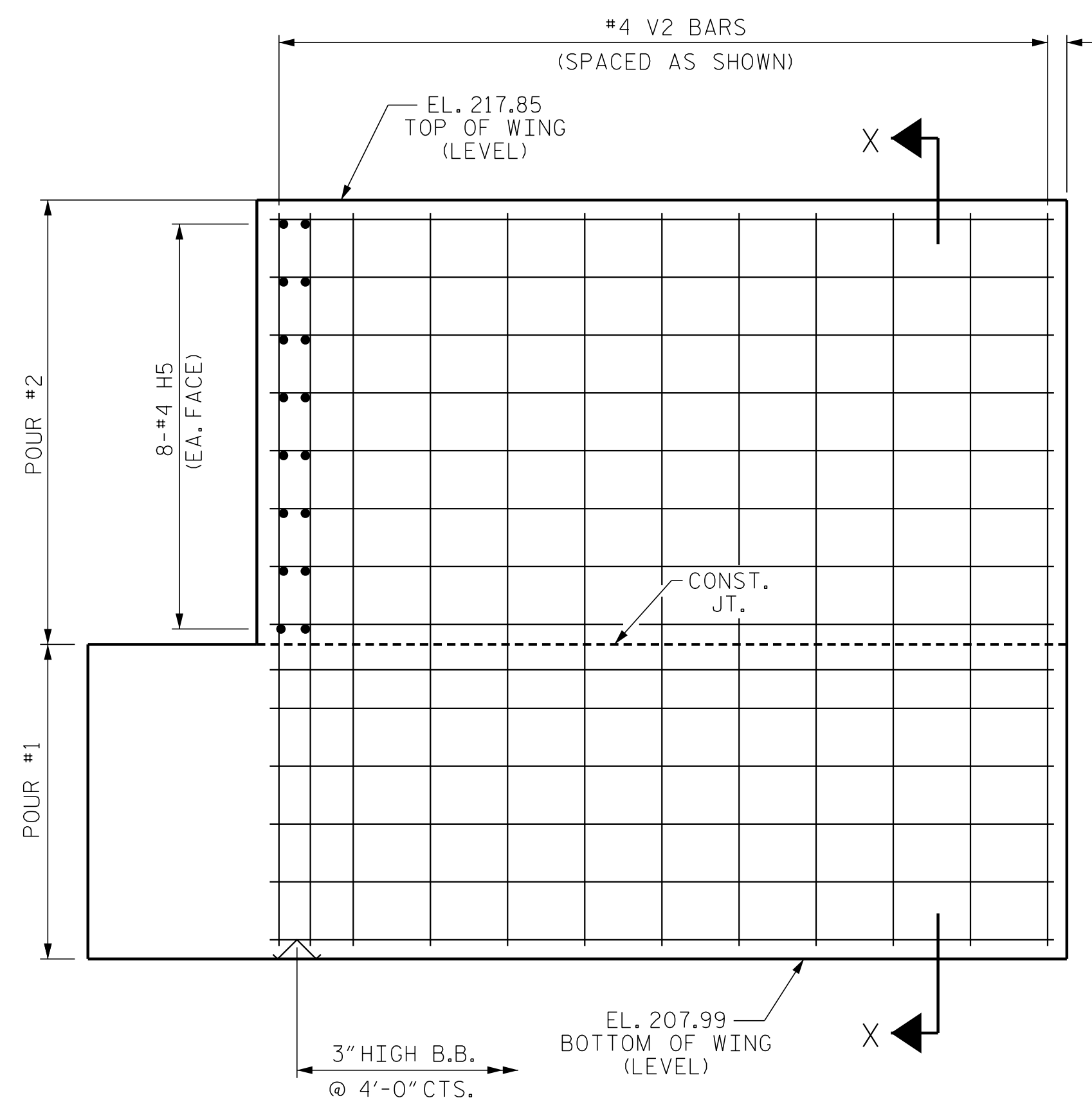
SECTION X-X



ELEVATION OF WING - (W2)



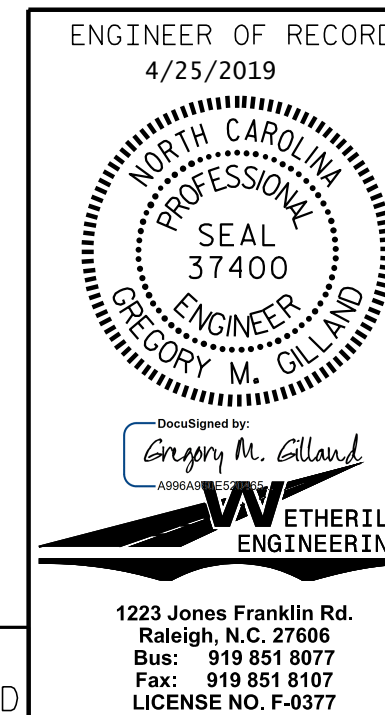
SECTION Y-Y



ELEVATION OF WING - (W1)

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2

REVISIONS

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

SHEET NO.  
 S3-27  
 TOTAL SHEETS  
 32

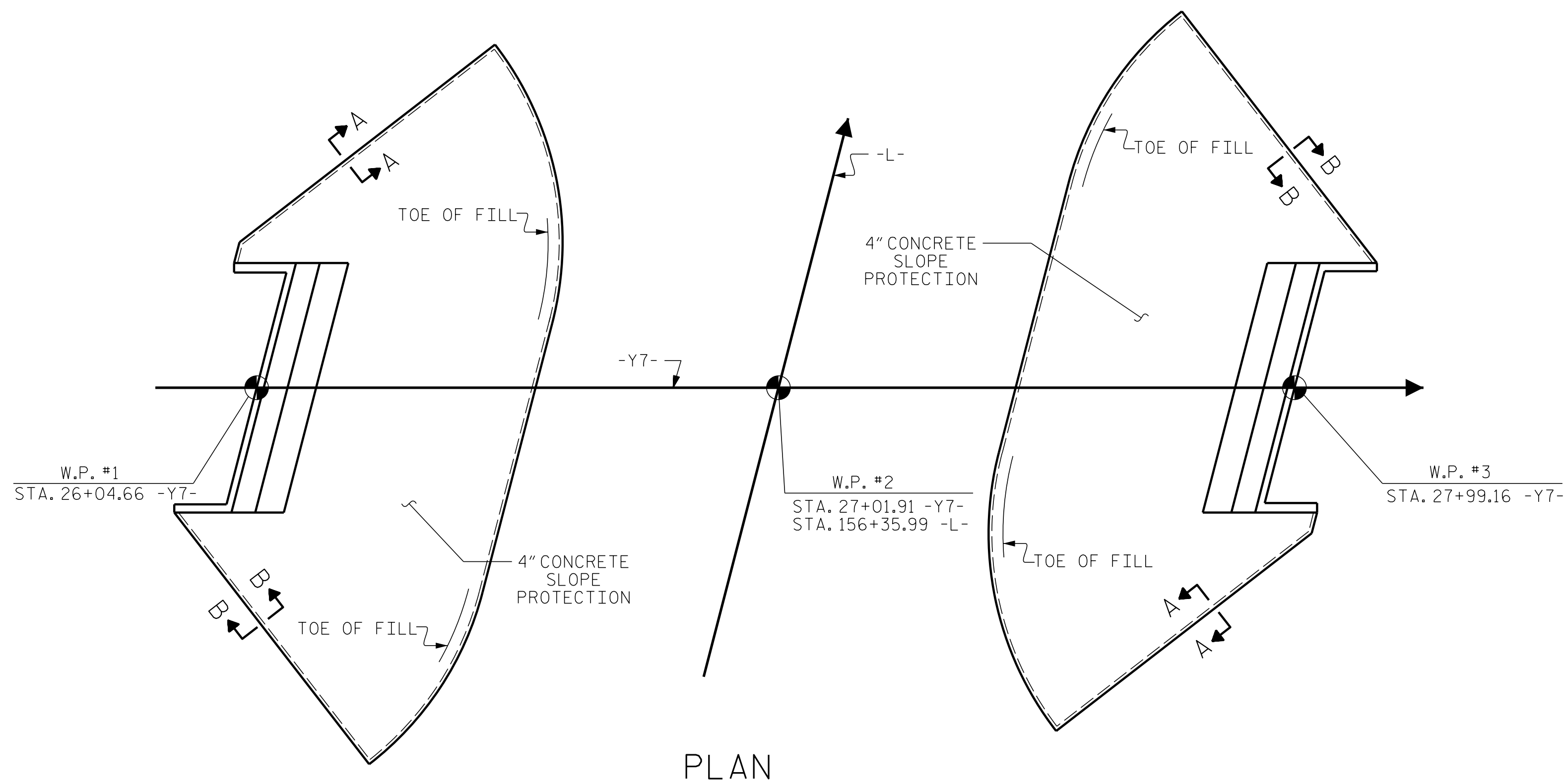
DRAWN BY: D. HODGE DATE: 1/18  
 CHECKED BY: G.M. GILLAND DATE: 2/18

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

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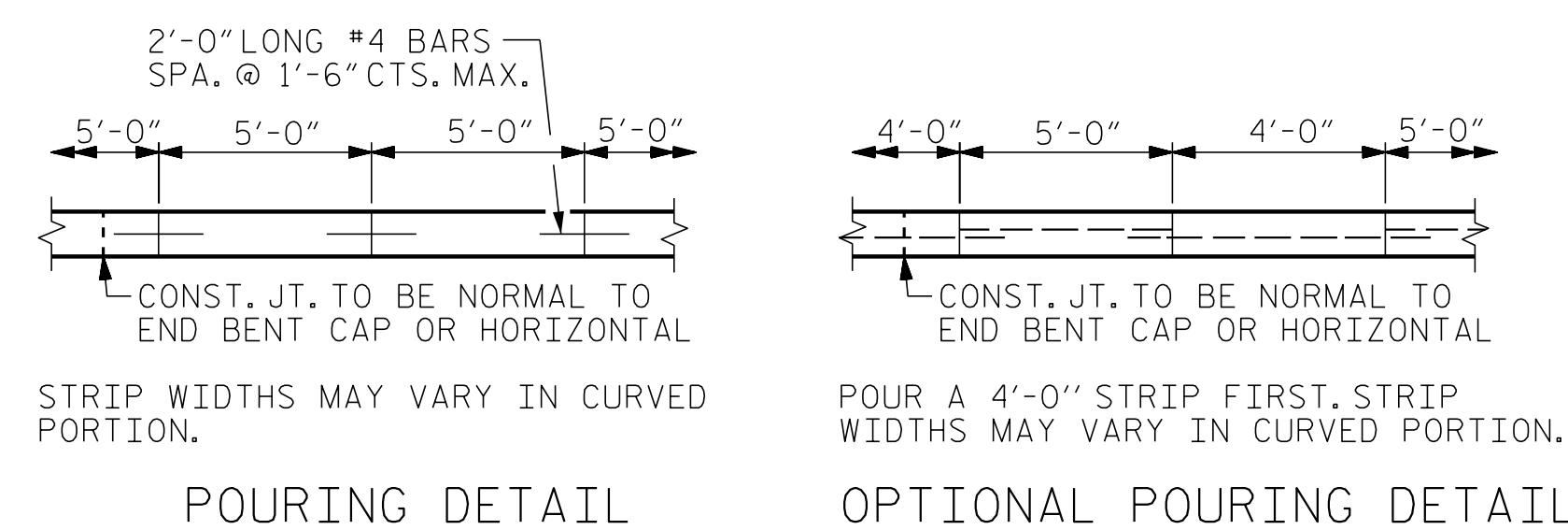
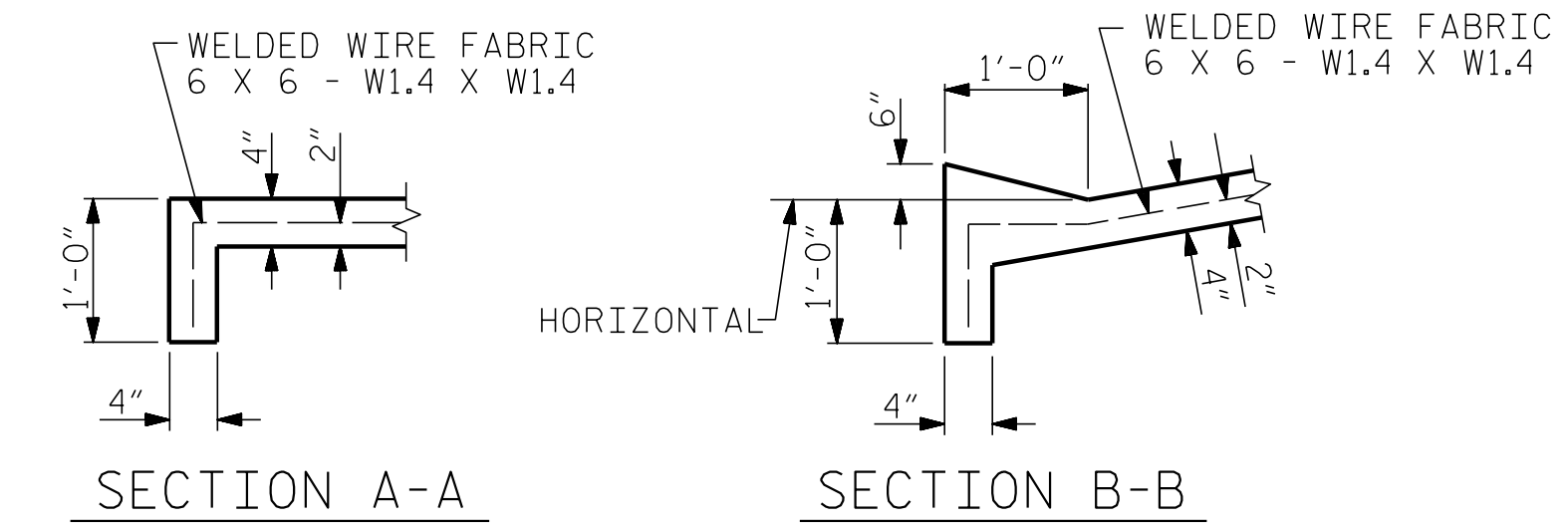
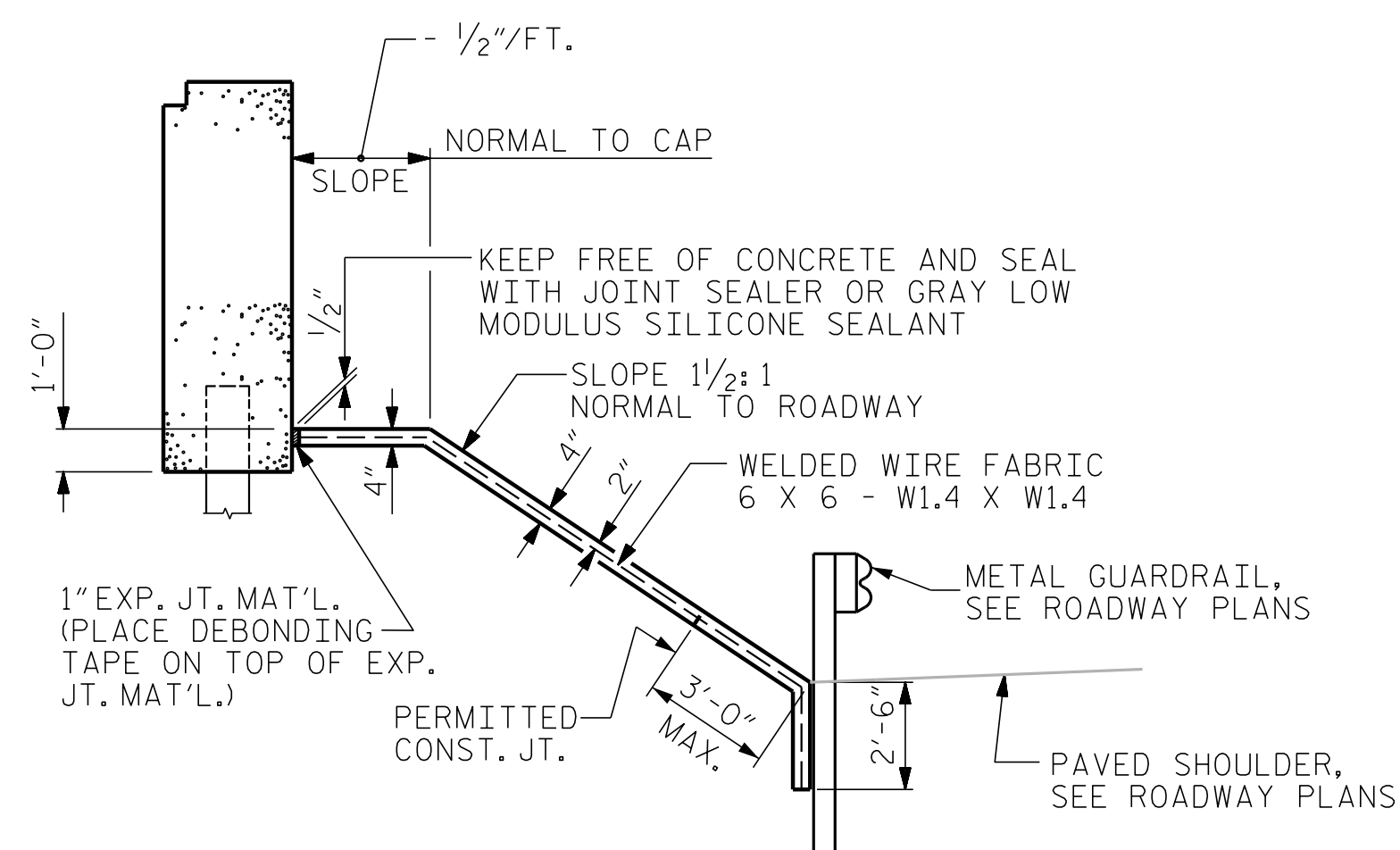


**GENERAL NOTES**

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

BRIDGE @ STA. 27+01.91 -Y7-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	350	700
END BENT 2	350	700
<b>TOTAL</b>	<b>700</b>	<b>1400</b>

\* QUANTITY SHOWN IS BASED ON 5' POURS.



PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-

SHEET 1 OF 2

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gulland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

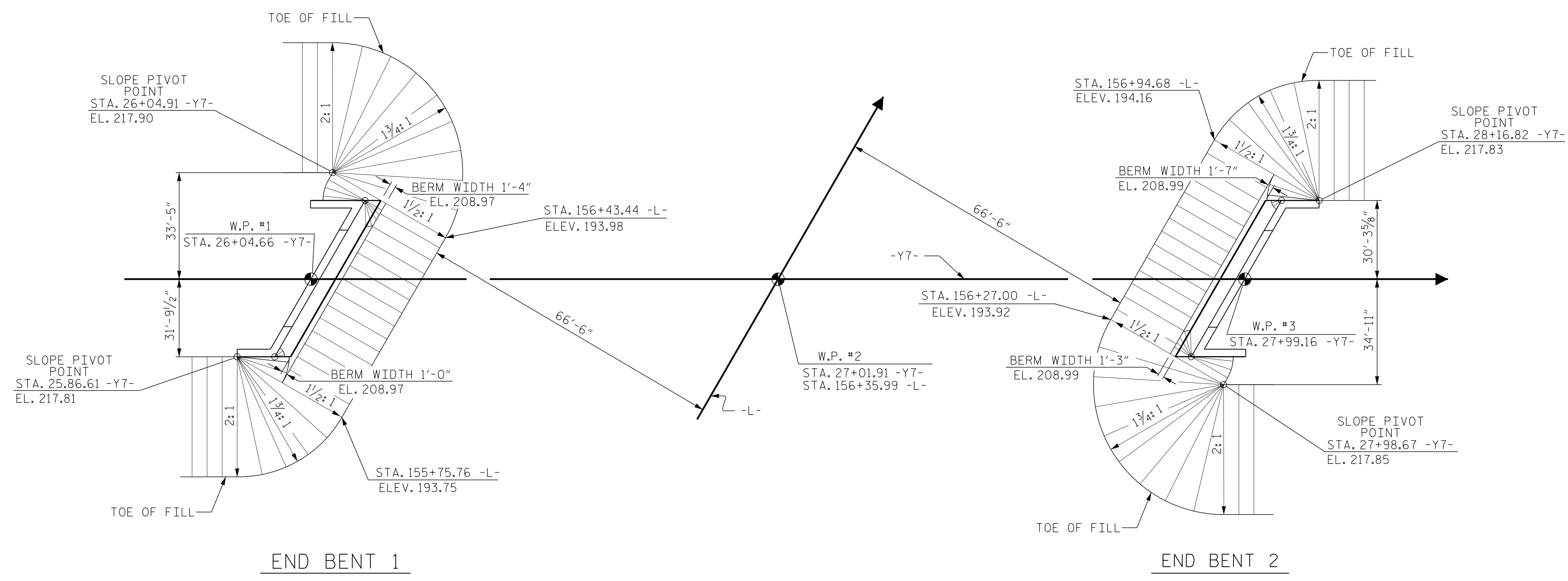
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 SLOPE PROTECTION  
 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-29
1			3			TOTAL SHEETS
2			4			32

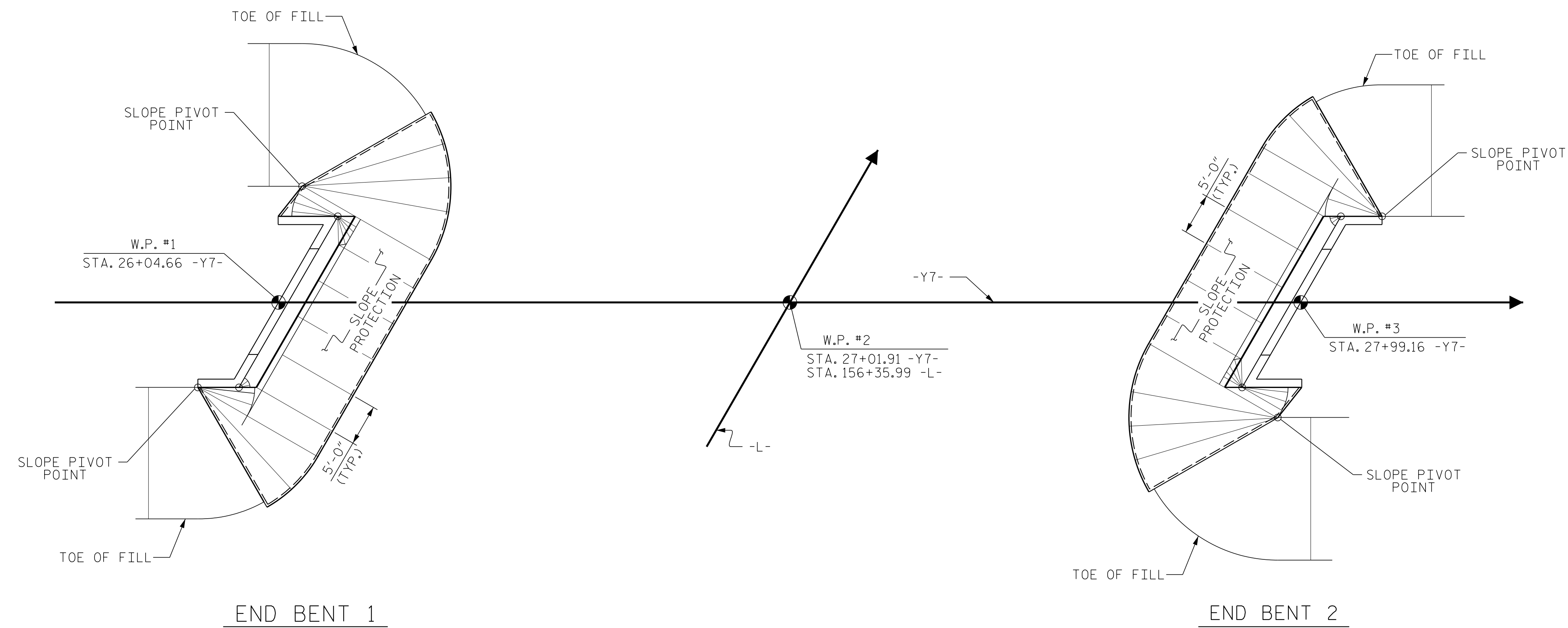
DOCUMENT NOT CONSIDERED FINAL  
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ASSEMBLED BY : D. HODGE	DATE : 11/17
CHECKED BY : B.C. HUNT	DATE : 3/18
DRAWN BY : ELR 5/92	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 6/92	REV. 12/21/11 MAA/GM
	REV. 1/16 MAA/TMG

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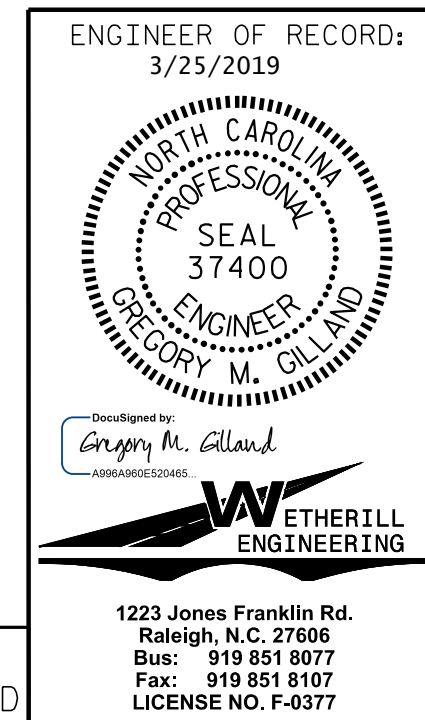


PLAN - GRADING



PLAN - CONCRETE PLACEMENT

PROJECT NO. W-5600  
JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 2 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD SLOPE PROTECTION DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S3-30
					TOTAL SHEETS 32

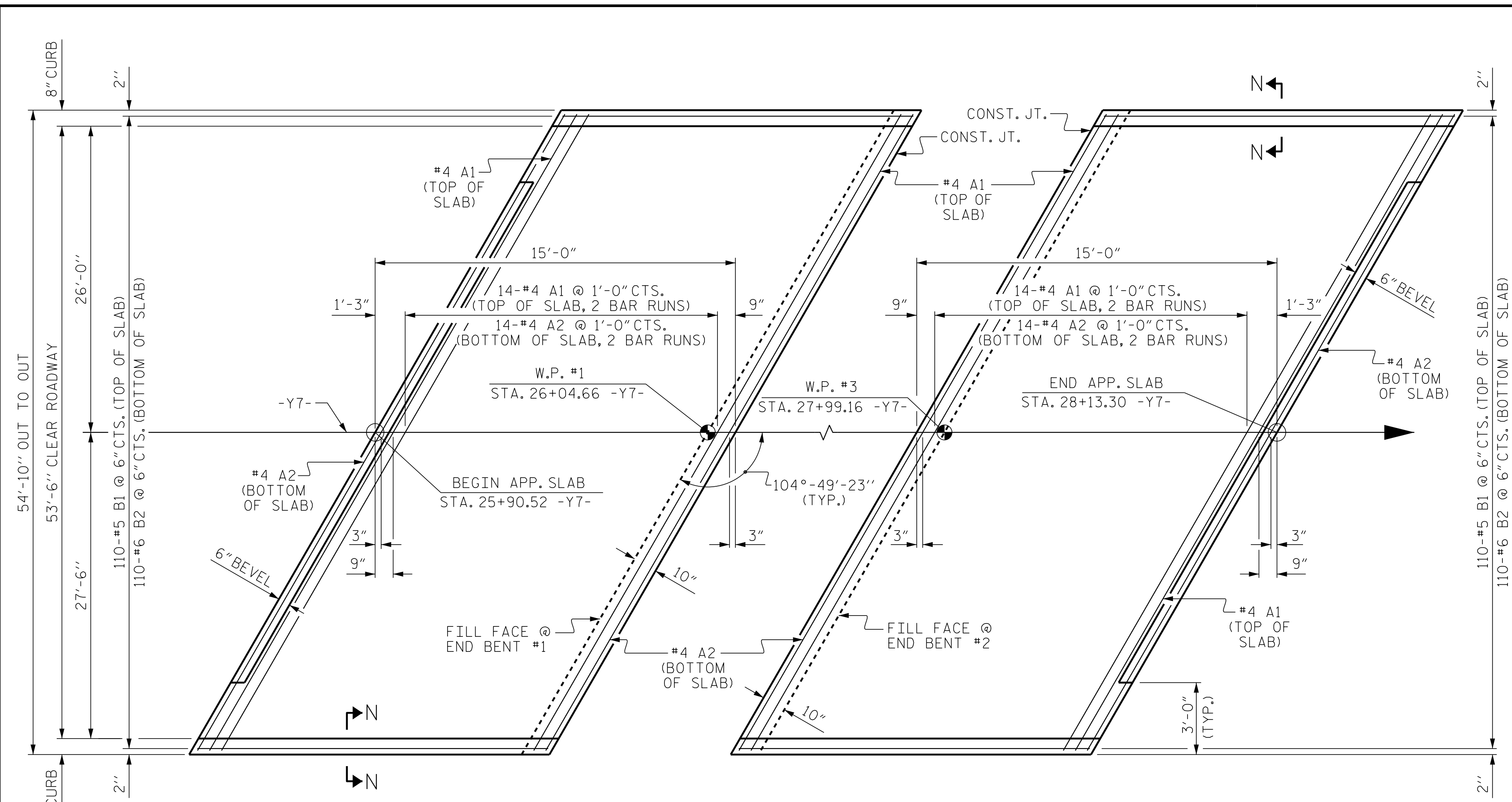
ASSEMBLED BY : D. HODGE	DATE : 3/18
CHECKED BY : B.C. HUNT	DATE : 3/18
DRAWN BY : WJH 10/88	REV. 10/11/11 MAA/GM
CHECKED BY : FCJ 10/88	REV. 1/16 MAA/TMG
	REV. 12/17 MAA/THC

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Fax: 919 851 8107  
LICENSE NO. F-0377

STD. NO. SP2

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PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

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

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

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

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

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

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

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

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

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

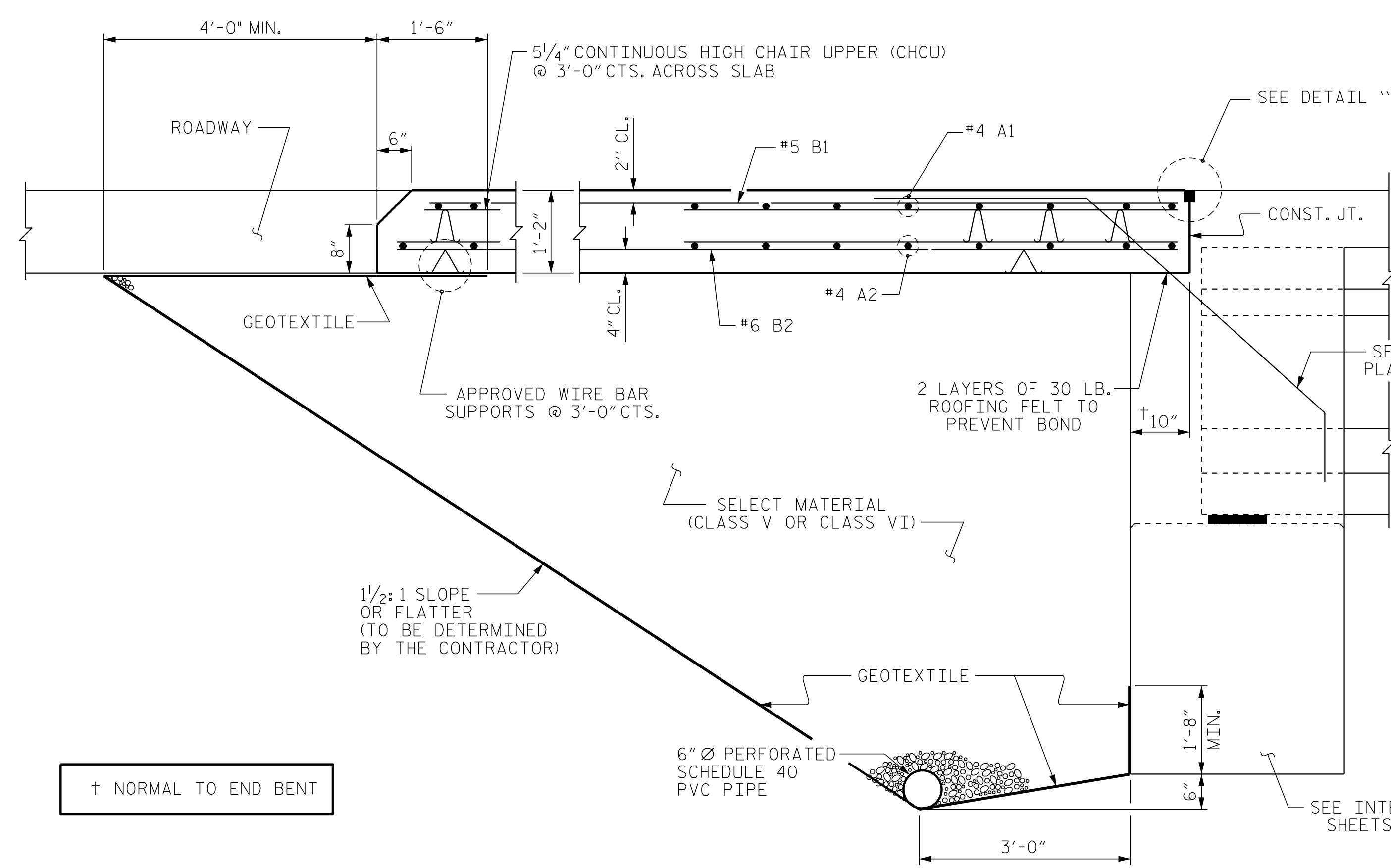
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	32	#4	STR	29'-3"	625
A2	32	#4	STR	29'-1"	622
* B1	110	#5	STR	14'-2"	1625
B2	110	#6	STR	14'-8"	2423
REINFORCING STEEL				LBS.	3045
* EPOXY COATED REINFORCING STEEL				LBS.	2250
CLASS AA CONCRETE				C. Y.	35.5

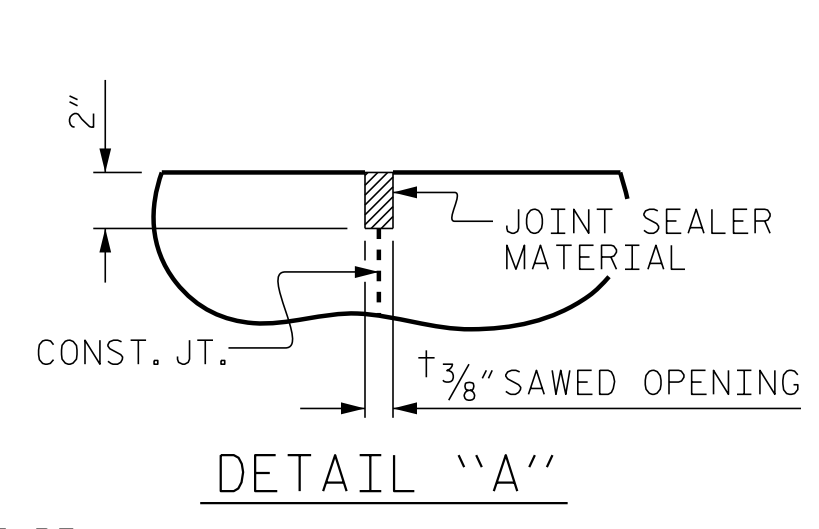
SPLICE LENGTHS

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

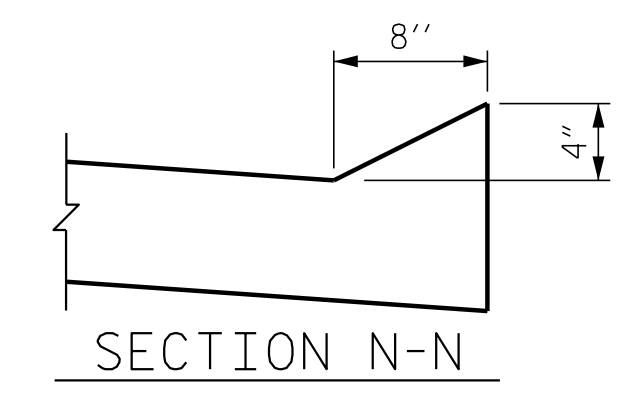


SECTION THRU SLAB

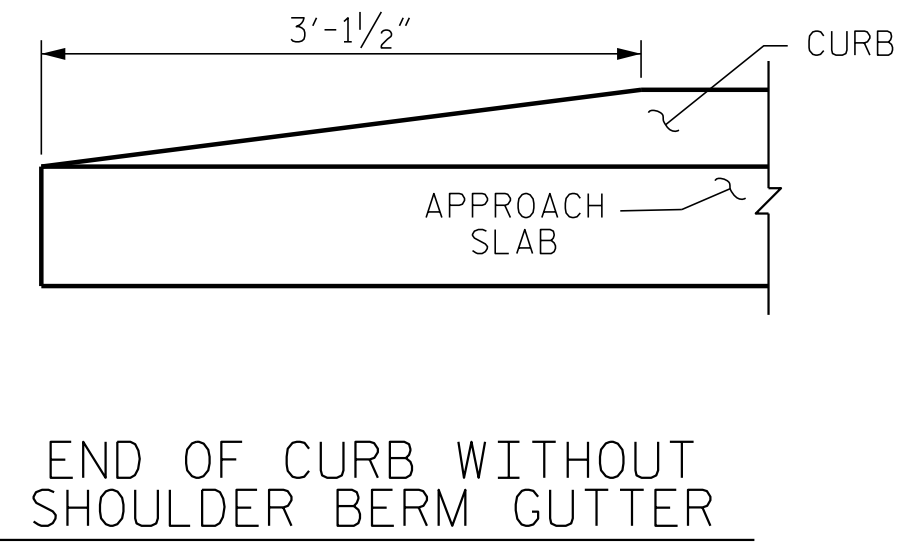
(TYPE I - STANDARD APPROACH FILL)



DETAIL "A"



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

PROJECT NO. W-5600  
 JOHNSTON COUNTY  
 STATION: 27+01.91 -Y7-  
 SHEET 1 OF 2

ENGINEER OF RECORD:  
 3/25/2019  
  
 Gregory M. Gulland  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

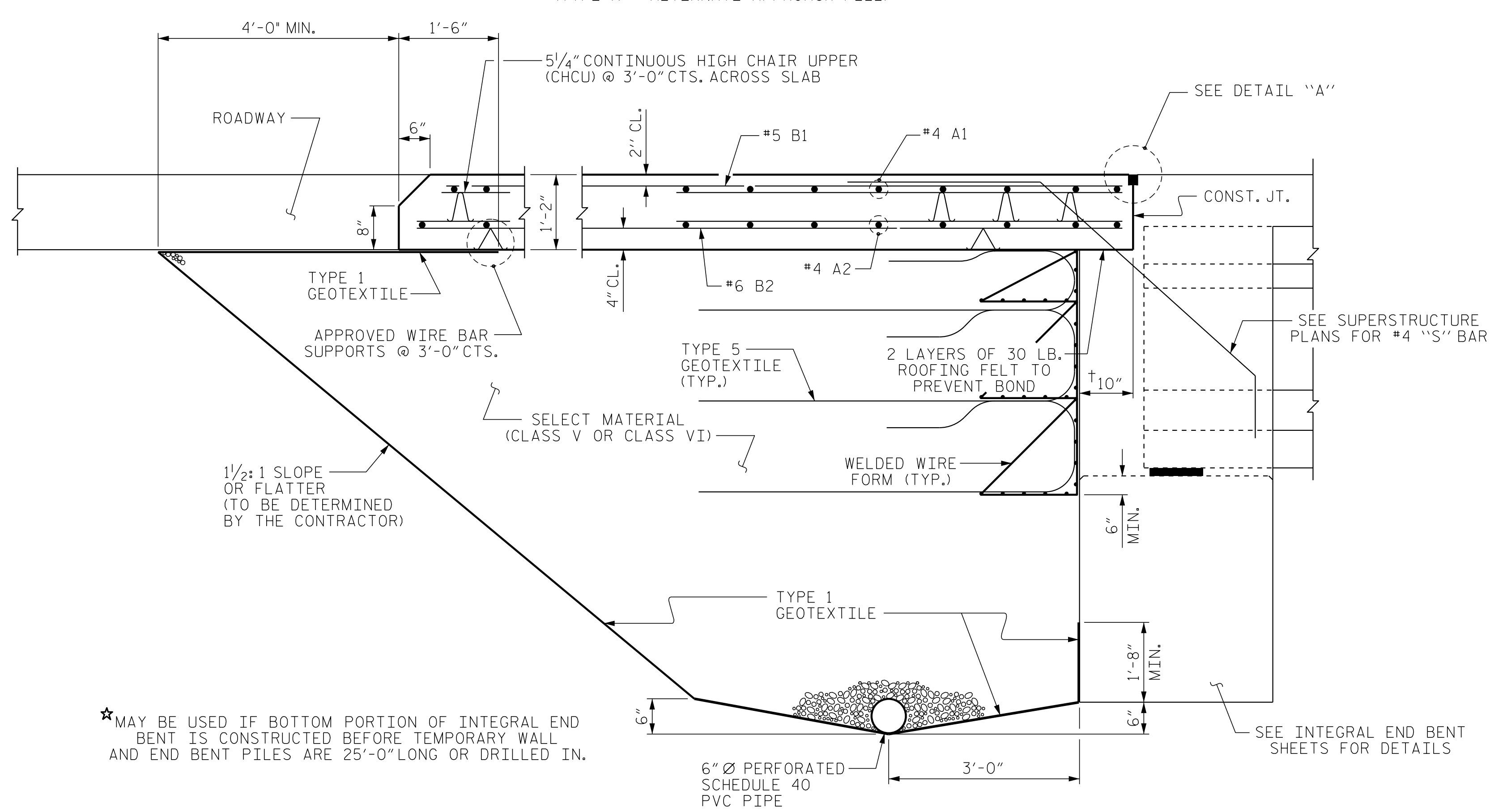
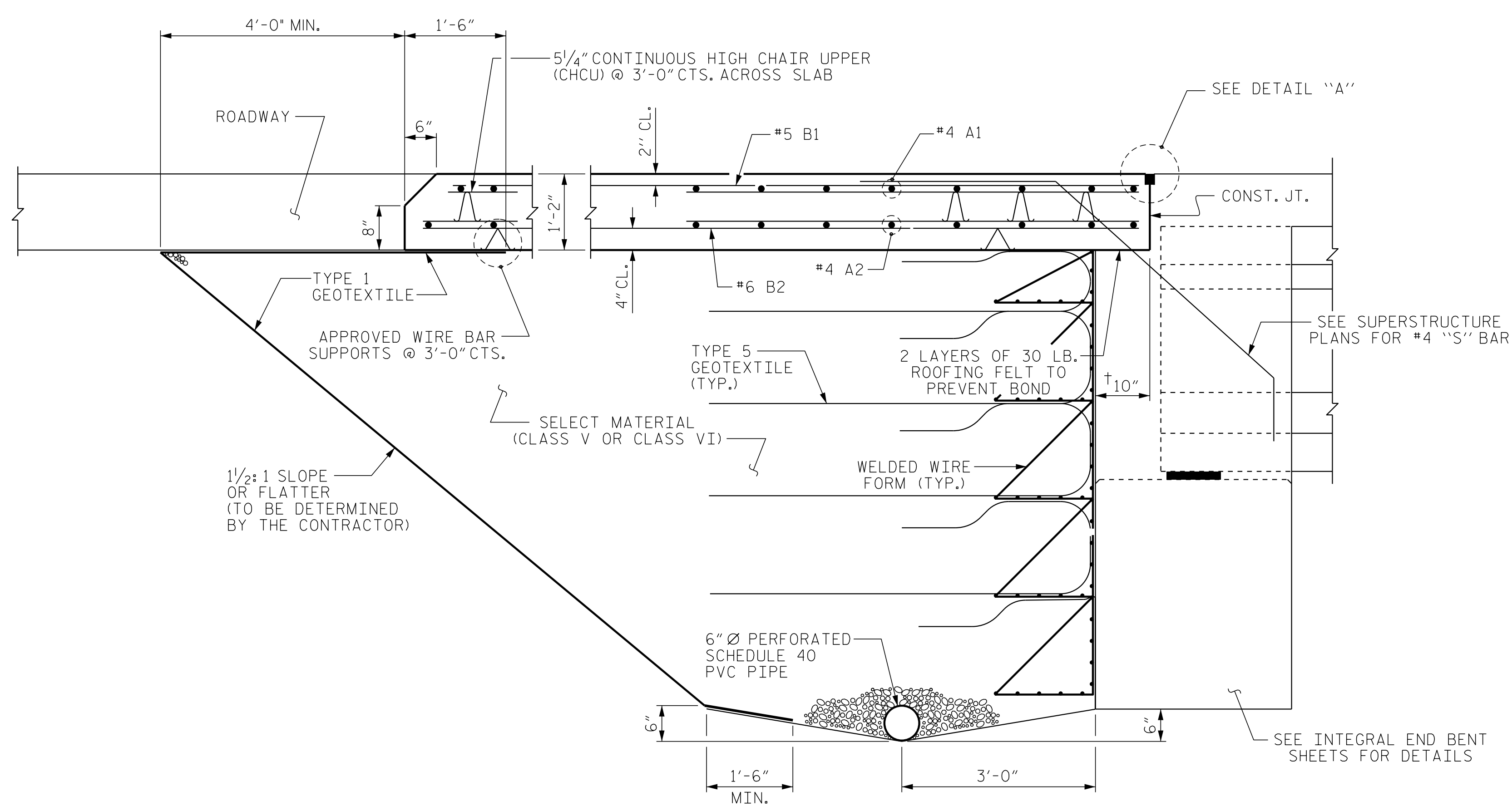
STANDARD  
 BRIDGE APPROACH  
 SLAB FOR  
 INTEGRAL ABUTMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-31
1			3			TOTAL SHEETS
2			4			32

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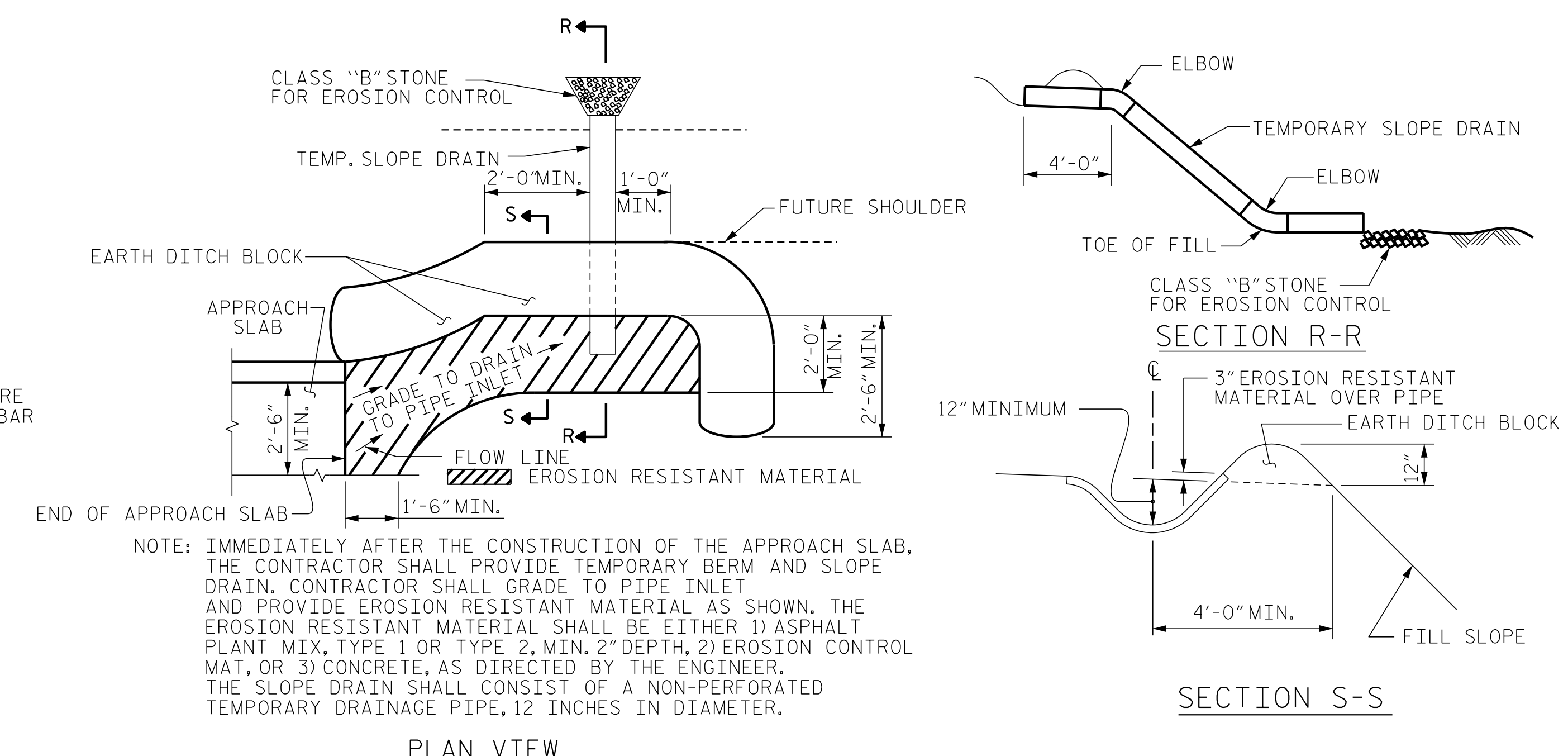
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ASSEMBLED BY : D. HODGE	DATE : 12/18
CHECKED BY : B.C. HUNT	DATE : 12/18
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

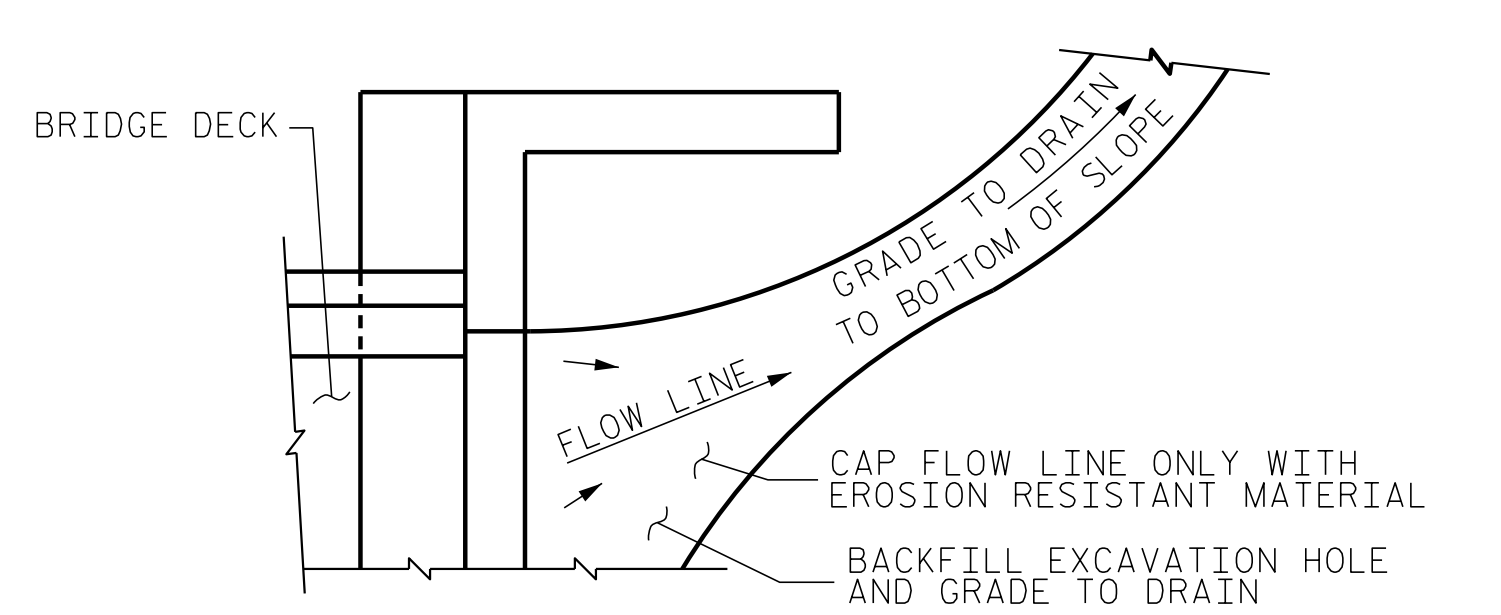


ASSEMBLED BY : D. HODGE	DATE : 12/18
CHECKED BY : B.C. HUNT	DATE : 12/18
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

SECTION THRU SLAB  
(TYPE A - ALTERNATE APPROACH FILL)



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



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

NOTES

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

FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

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

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

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

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

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

PROJECT NO. W-5600  
JOHNSTON COUNTY  
STATION: 27+01.91 -Y7-  
SHEET 2 OF 2

ENGINEER OF RECORD:  
3/25/2019  
NORTH CAROLINA PROFESSIONAL SEAL 37400  
GREGORY M. GILLAND  
Gregory M. Gilland  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		STANDARD BRIDGE APPROACH SLAB DETAILS	
REVISIONS			
NO.	BY:	DATE:	SHEET NO.
1			S3-32
2			TOTAL SHEETS 32

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