

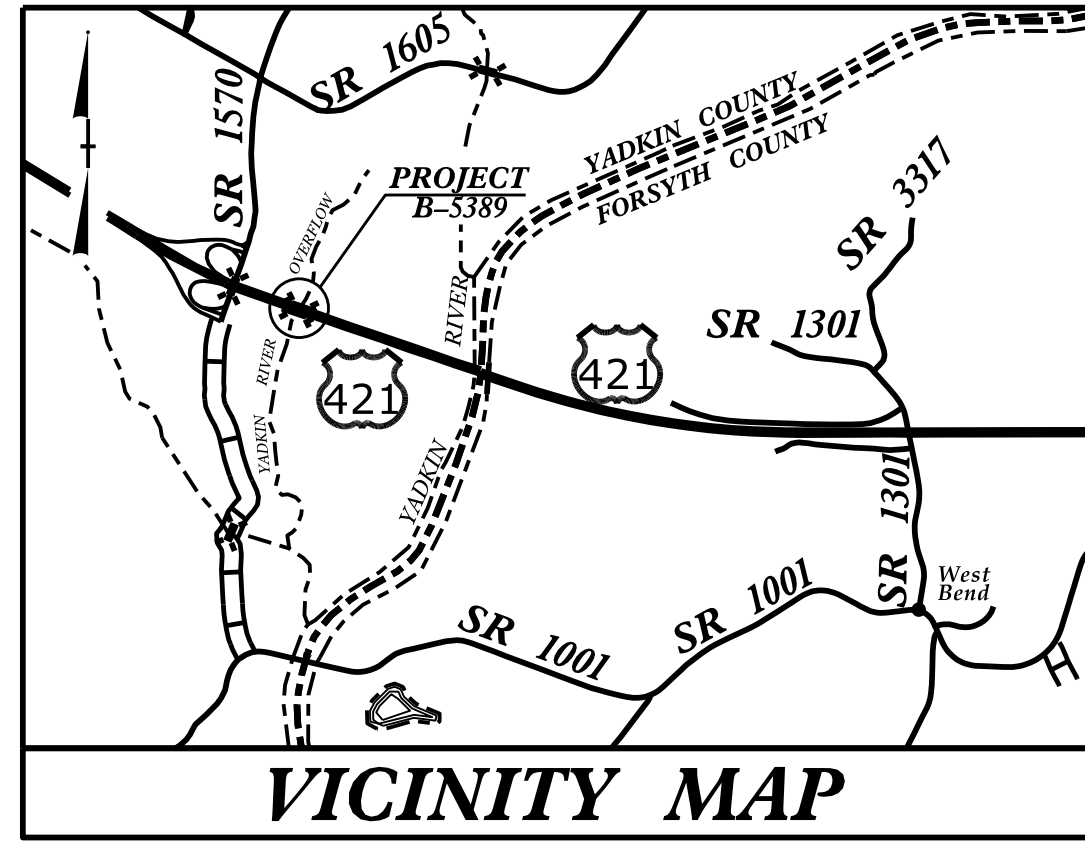
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and sealed by the individuals whose names and license  
numbers appear on each page, on the dates appearing  
with their signature on that page.**

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TIP PROJECT: B-5389

CONTRACT: C204220

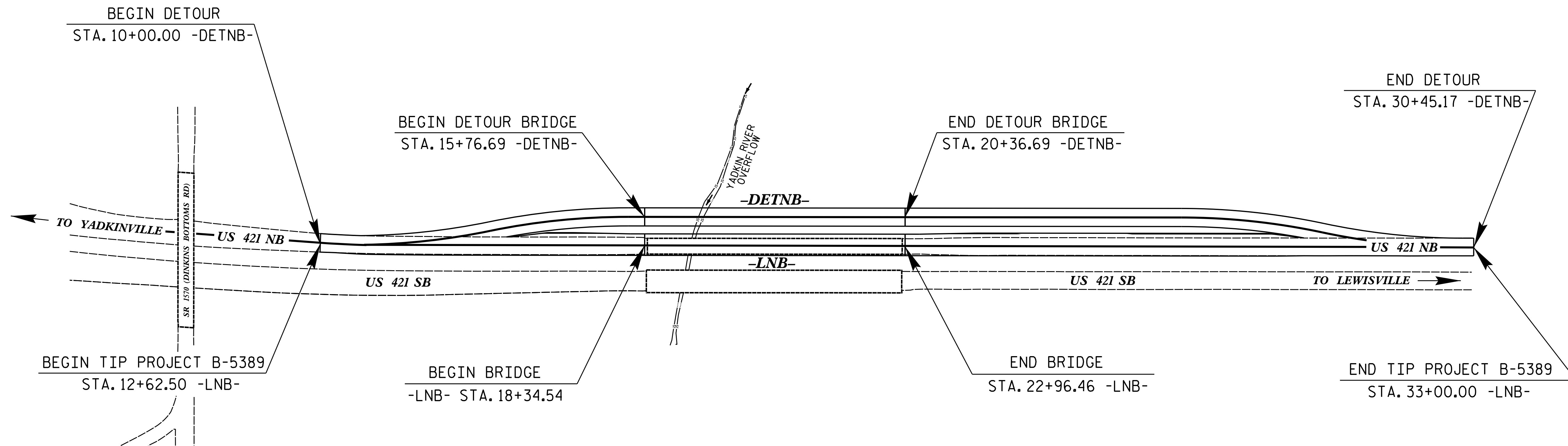
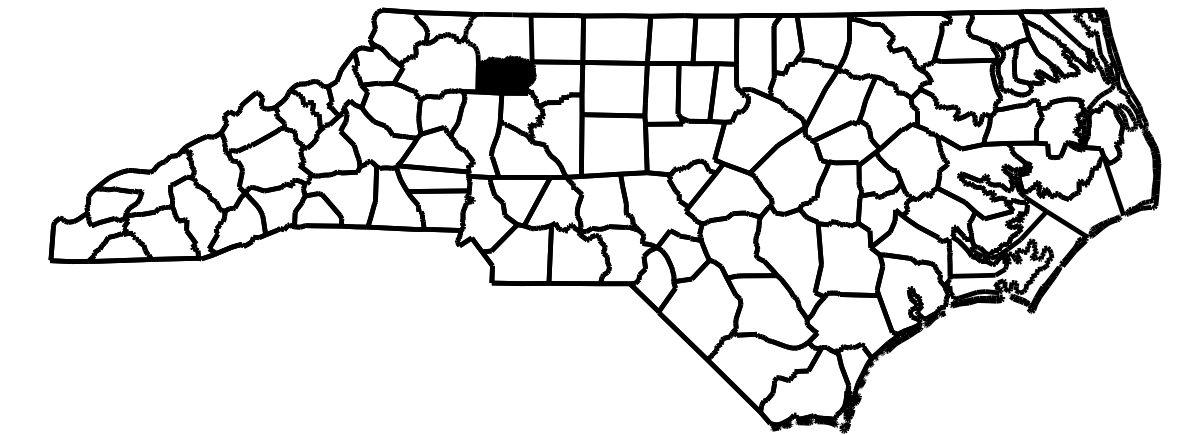


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**YADKIN COUNTY**

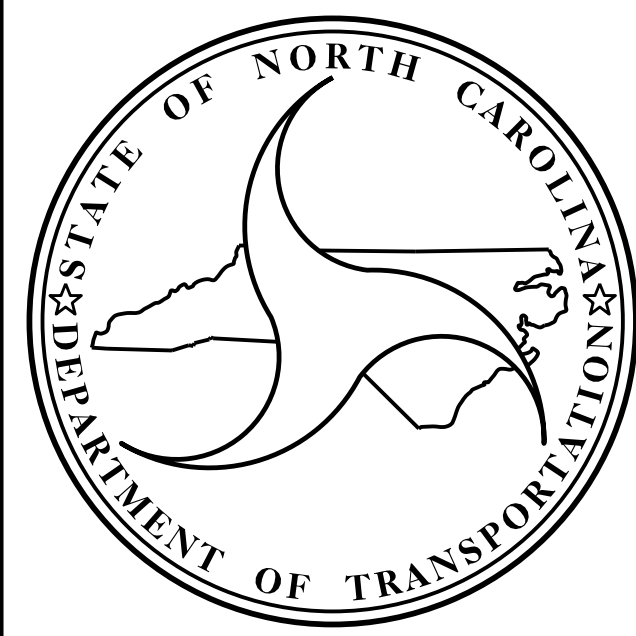
**LOCATION: BRIDGE NO. 105 OVER YADKIN RIVER OVERFLOW ON US 421 NORTHBOUND LANES**

**TYPE OF WORK: DRAINAGE, GRADING, PAVING, & STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5389	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46104.1.1	N/A	PE	
46104.2.1	N/A	ROWUTIL.	
46104.3.1	N/A	CONST.	



**STRUCTURE**



**DESIGN DATA**  
 ADT 2020 = 25,000  
 ADT 2040 = 30,300  
 K = 10 %  
 D = 65 %  
 T = 6 % \*  
 V = 70 MPH  
 Vdet = 55 MPH  
 \* (TTST = 3% + DUAL = 3%)  
 FUNC CLASS =  
 RURAL FREEWAY  
 REGIONAL TIER

**PROJECT LENGTH**  
 LENGTH ROADWAY TIP PROJECT B-5389 = 0.299 MI.  
 LENGTH STRUCTURE TIP PROJECT B-5389 = 0.087 MI.  
 TOTAL LENGTH TIP PROJECT B-5389 = 0.386 MI.

Prepared In the Office of:  
**DIVISION OF HIGHWAYS**  
 STRUCTURES MANAGEMENT UNIT  
 1000 BIRCH RIDGE DR.  
 RALEIGH, N.C. 27610

2018 STANDARD SPECIFICATIONS

**LETTING DATE :**  
 SEPTEMBER 17, 2019

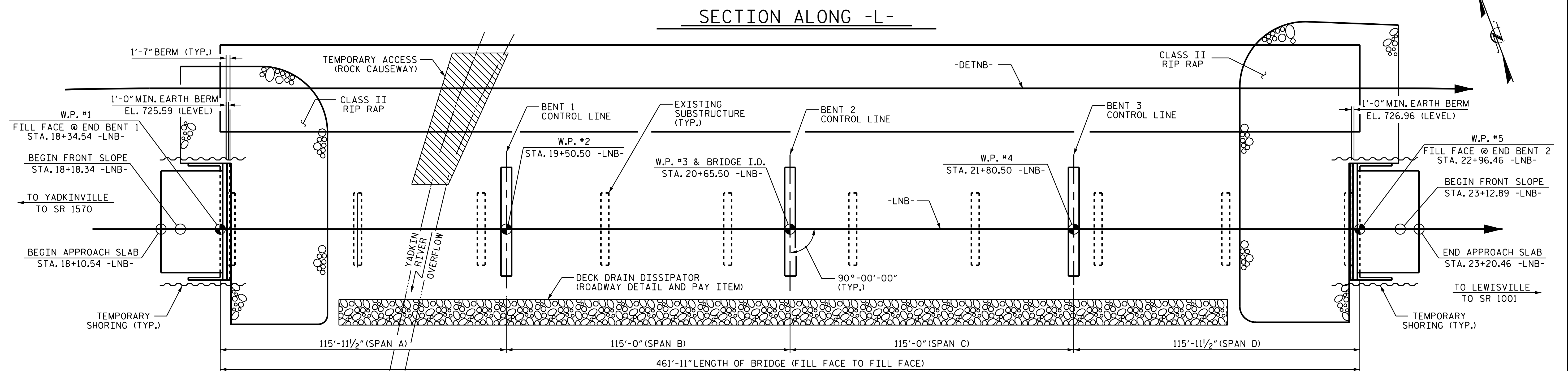
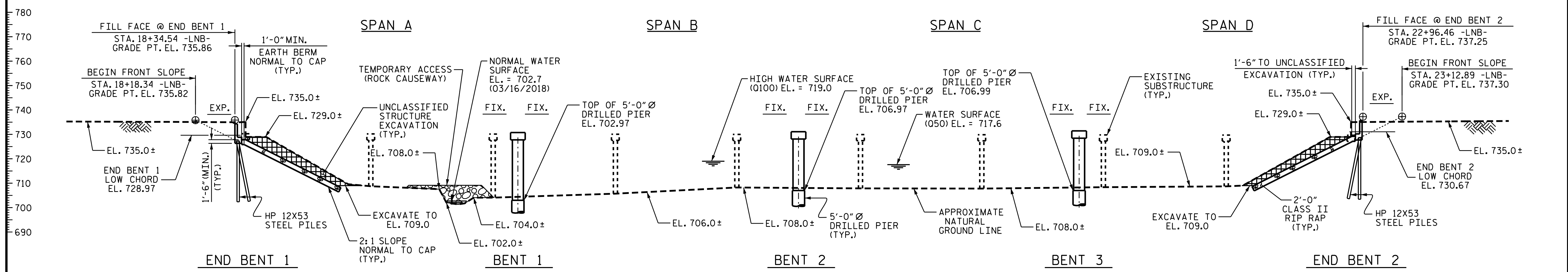
A. KEITH PASCHAL, P.E.  
 PROJECT ENGINEER

AMBER M. LEE, P.E.  
 PROJECT DESIGN ENGINEER

18+00 18+50 19+00 19+50 20+00 20+50 21+00 21+50 22+00 22+50 23+00 23+50

(-)-0.3000% (+)-0.3000%  
 P.I. STA. = 17+50.00 -LNB-  
 EL. = 735.61  
 V.C. = 140'  
**GRADE DATA**

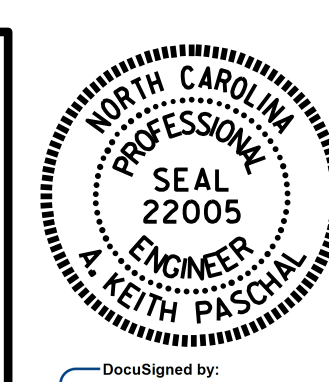
(+)-0.3000% (-)-0.3000%  
 P.I. STA. = 24+35.88 -LNB-  
 EL. = 737.67  
 V.C. = 240'  
**GRADE DATA**



PROJECT NO. B-5389  
 YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 1 OF 3 REPLACES BRIDGE NO. 105

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



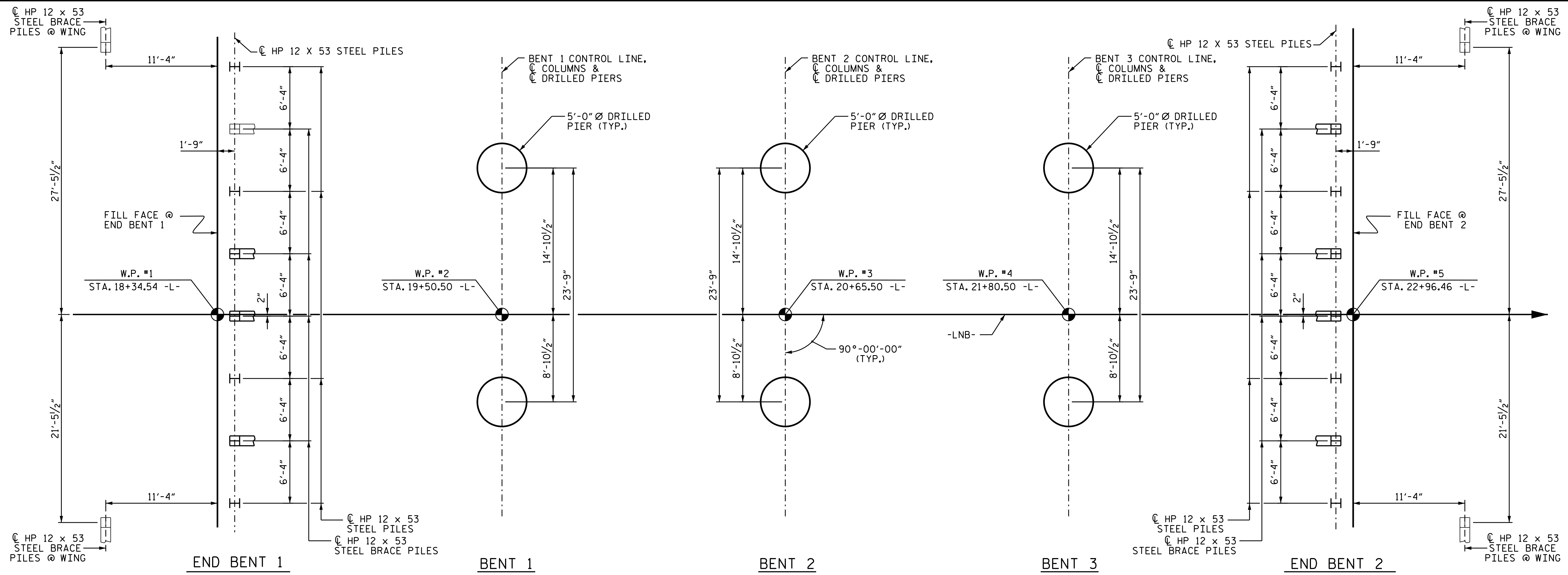
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE OVER  
 YADKIN RIVER OVERFLOW  
 ON US 421 BETWEEN  
 SR 1570 AND SR 1001

DRAWN BY: M. G. SHAIKH DATE: 10/2018  
 CHECKED BY: A. SORSENGINH DATE: 11/2018  
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE: 11/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	DATE:	S-1
1			3		TOTAL SHEETS
2			4		37





**FOUNDATION LAYOUT**  
 DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO CENTERLINE OF PILES AND DRILLED PIERS

**NOTES**

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS 1 & 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 112.5 TONS PER PILE.

DRIVE PILES AT END BENTS 1 & 2 TO A REQUIRED DRIVING RESISTANCE OF 188 TONS PER PILE.

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

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 850 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 830 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 3 ARE DESIGNED FOR A FACTORED RESISTANCE OF 850 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN EL. 662 FT. SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 18 FT. INTO ROCK OR WEATHERED ROCK.

INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN EL. 665 FT. (LT) AND 663 FT. (RT), SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 13 FT. INTO ROCK OR WEATHERED ROCK.

INSTALL DRILLED PIERS AT BENT 3 TO A TIP ELEVATION NO HIGHER THAN EL. 665 FT. (LT) AND 659 FT. (RT), SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 18 FT. (LT) AND 15 FT. (RT), INTO ROCK OR WEATHERED ROCK.

PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT 1. DO NOT EXTEND PERMANENT CASINGS BELOW EL. 685.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 2. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW EL. 688.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASING.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 3. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW EL. 690.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASING.

SID INSPECTIONS ARE REQUIRED FOR DRILLED PIERS AT BENT 1, 2, AND 3. 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.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION 685.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS ELEVATION 687.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

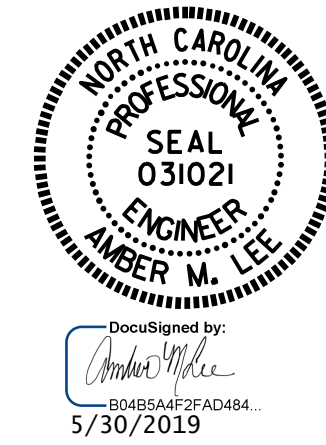
THE SCOUR CRITICAL ELEVATION FOR BENT 3 IS ELEVATION 689.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TO VERIFY BEARING STRATA, STANDARD PENETRATION TESTING (SPT) IS REQUIRED FOR DRILLED PIERS AT BENT 1. PERFORM SPTs AT ELEVATION 680.1 FT. (LT) AND 684.6 FT. (RT) TO VERIFY TOP OF PARTIALLY WEATHERED ROCK AND AGAIN AT THE FINAL TIP ELEVATION INDICATED. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

TO VERIFY BEARING STRATA, STANDARD PENETRATION TESTING (SPT) IS REQUIRED FOR DRILLED PIERS AT BENT 2. PERFORM SPTs AT ELEVATION 668.1 FT. (LT) AND 676.6 FT. (RT) TO VERIFY TOP OF PARTIALLY WEATHERED ROCK AND AGAIN AT THE FINAL TIP ELEVATION INDICATED. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

TO VERIFY BEARING STRATA, STANDARD PENETRATION TESTING (SPT) IS REQUIRED FOR DRILLED PIERS AT BENT 3. PERFORM SPTs AT ELEVATION 683.3 FT. (LT) AND 674.1 FT. (RT) TO VERIFY TOP OF PARTIALLY WEATHERED ROCK AND AGAIN AT THE FINAL TIP ELEVATION INDICATED. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRAWN BY : M. G. SHAIKH DATE : 11/2018  
 CHECKED BY : A. SORSENGINH DATE : 11/2018  
 DESIGN ENGINEER OF RECORD : A. SORSENGINH DATE : 11/2018



PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE OVER  
 YADKIN RIVER OVERFLOW  
 ON US 421 BETWEEN  
 SR 1571 AND SR 1001

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	DATE:	
1			3		S-2
2			4		TOTAL SHEETS 37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED







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

LOAD FACTORS:

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

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			
						LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.03	--	1.75	0.939	1.27	A	EL	56.38	1.012	1.67	A	I	78.93	0.80	0.939	1.03	A	EL	56.38		
	HL-93(Opr)	N/A	--	1.03	--	1.35	0.939	1.64	A	EL	56.38	1.012	2.16	A	I	78.93	N/A	--	--	--	--	--	--	
	HS-20(Inv)	36.000	2	1.48	53.375	1.75	0.939	1.82	A	EL	56.38	1.012	2.16	A	I	78.93	0.80	0.939	1.48	A	EL	56.38		
	HS-20(Opr)	36.000	--	1.48	53.375	1.35	0.939	2.36	A	EL	56.38	1.012	2.80	A	I	78.93	N/A	--	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.57	48.229	1.4	0.939	5.48	A	EL	56.38	1.012	6.57	A	I	78.93	0.80	0.939	3.57	A	EL	56.38	
		SNGARBS2	20.000	--	2.56	51.262	1.4	0.939	3.93	A	EL	56.38	1.012	4.63	A	I	78.93	0.80	0.939	2.56	A	EL	56.38	
		SNAGRIS2	22.000	--	2.39	52.534	1.4	0.939	3.67	A	EL	56.38	1.012	4.28	A	I	78.93	0.80	0.939	2.39	A	EL	56.38	
		SNCOTTS3	27.250	--	1.78	48.364	1.4	0.939	2.72	A	EL	56.38	1.012	3.27	A	I	78.93	0.80	0.939	1.78	A	EL	56.38	
		SNAGGRS4	34.925	--	1.45	50.463	1.4	0.939	2.22	A	EL	56.38	1.012	2.69	A	I	78.93	0.80	0.939	1.45	A	EL	56.38	
		SNS5A	35.550	--	1.42	50.321	1.4	0.939	2.17	A	EL	56.38	1.012	2.71	A	I	78.93	0.80	0.939	1.42	A	EL	56.38	
		SNS6A	39.950	--	1.28	51.266	1.4	0.939	1.97	A	EL	56.38	1.012	2.46	A	I	78.93	0.80	0.939	1.28	A	EL	56.38	
		SNS7B	42.000	--	1.22	51.302	1.4	0.939	1.88	A	EL	56.38	1.012	2.40	A	I	78.93	0.80	0.939	1.22	A	EL	56.38	
	TTST	TNAGRIT3	33.000	--	1.56	51.491	1.4	0.939	2.40	A	EL	56.38	1.012	2.93	A	I	78.93	0.80	0.939	1.56	A	EL	56.38	
		TNT4A	33.075	--	1.56	51.698	1.4	0.939	2.40	A	EL	56.38	1.012	2.87	A	I	78.93	0.80	0.939	1.56	A	EL	56.38	
		TNT6A	41.600	--	1.26	52.570	1.4	0.939	1.94	A	EL	56.38	1.012	2.53	A	I	78.93	0.80	0.939	1.26	A	EL	56.38	
		TNT7A	42.000	--	1.26	53.025	1.4	0.939	1.94	A	EL	56.38	1.012	2.48	A	I	78.93	0.80	0.939	1.26	A	EL	56.38	
		TNT7B	42.000	--	1.29	54.091	1.4	0.939	1.98	A	EL	56.38	1.012	2.35	A	I	78.93	0.80	0.939	1.29	A	EL	56.38	
		TNAGRIT4	43.000	--	1.24	53.262	1.4	0.939	1.90	A	EL	56.38	1.012	2.28	A	I	78.93	0.80	0.939	1.24	A	EL	56.38	
		TNACT5A	45.000	--	1.17	52.843	1.4	0.939	1.80	A	EL	56.38	1.012	2.25	A	I	78.93	0.80	0.939	1.17	A	EL	56.38	
		TNACT5B	45.000	3	1.17	52.463	1.4	0.939	1.79	A	EL	56.38	1.012	2.17	A	I	78.93	0.80	0.939	1.17	A	EL	56.38	

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:

- 
- 
- 
- 

# CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

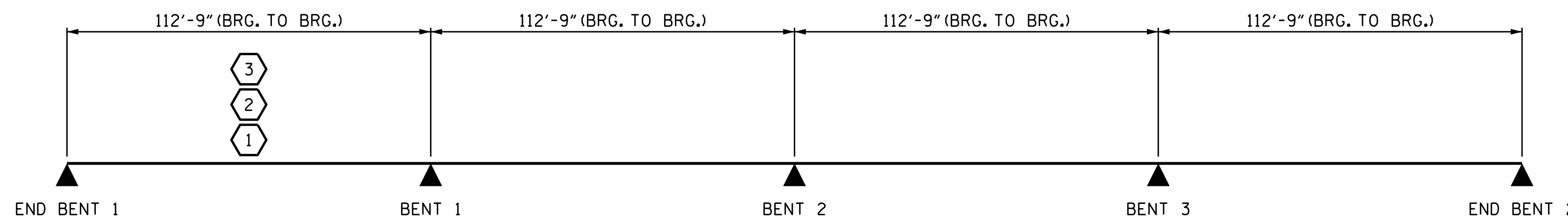
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

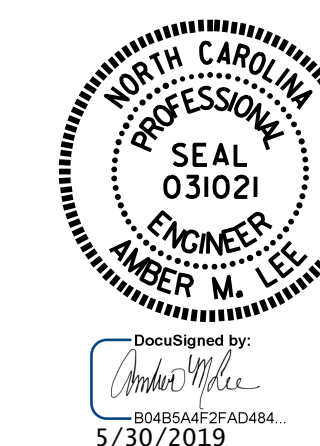
GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE GIRDERS  
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : A. SORSENGINH	DATE : 11/2018
CHECKED BY : M. G. SHAIKH	DATE : 1/2019
DRAWN BY : MAA	1/08
CHECKED BY : GM/DI	2/08
REV. 11/12/08RR	MAA/GM
REV. 10/11/11	MAA/GM

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

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

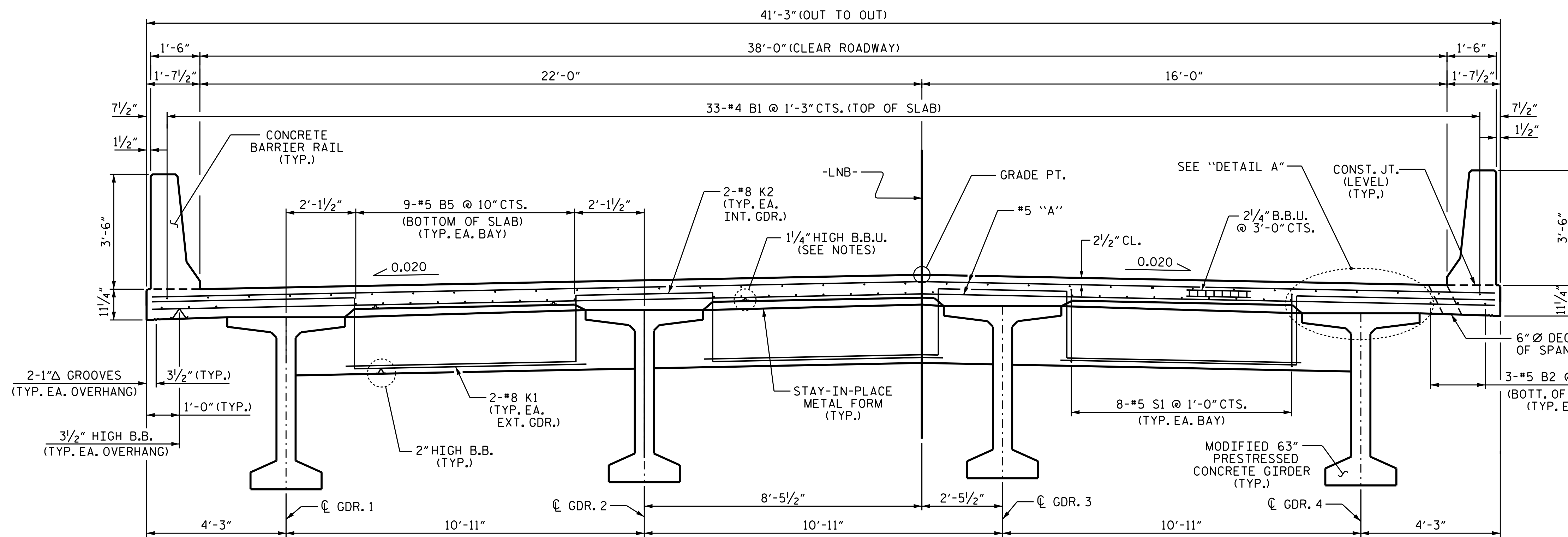
S-4  
TOTAL SHEETS 37

**NOTES**

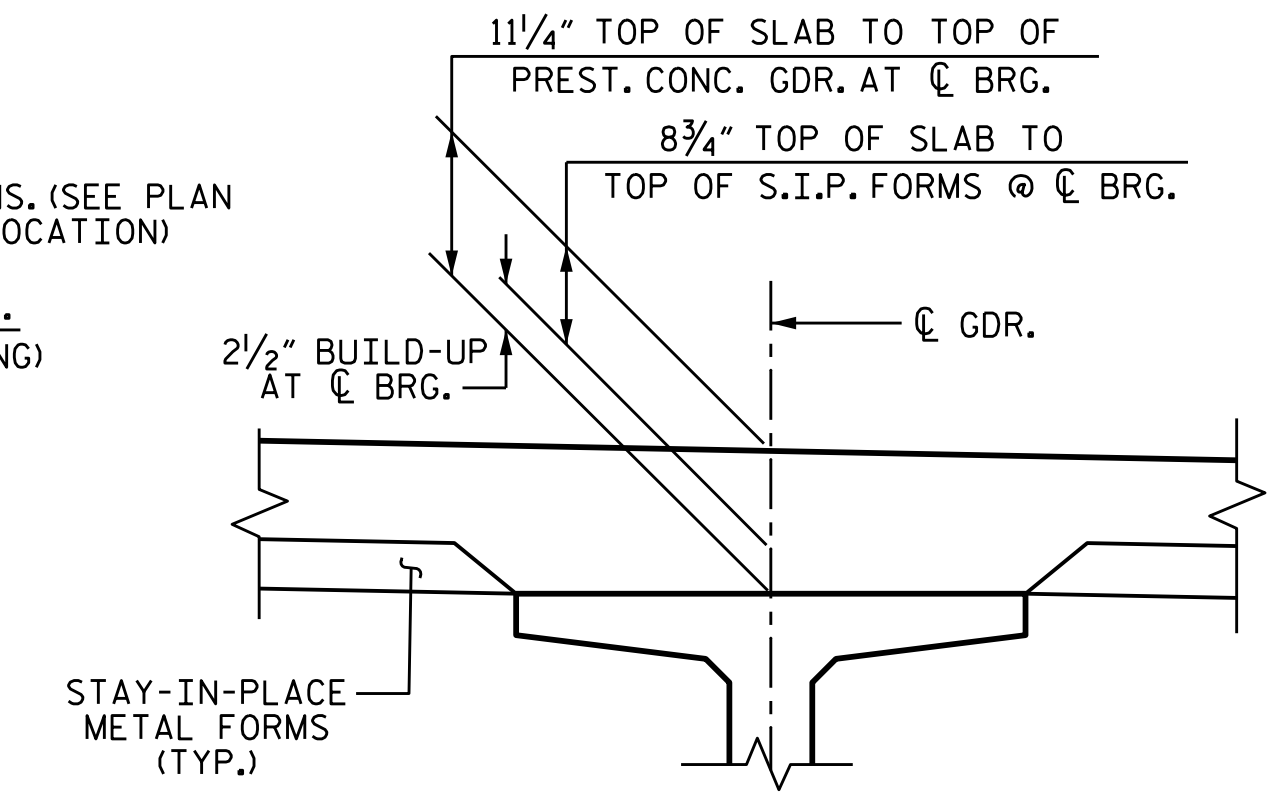
PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

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

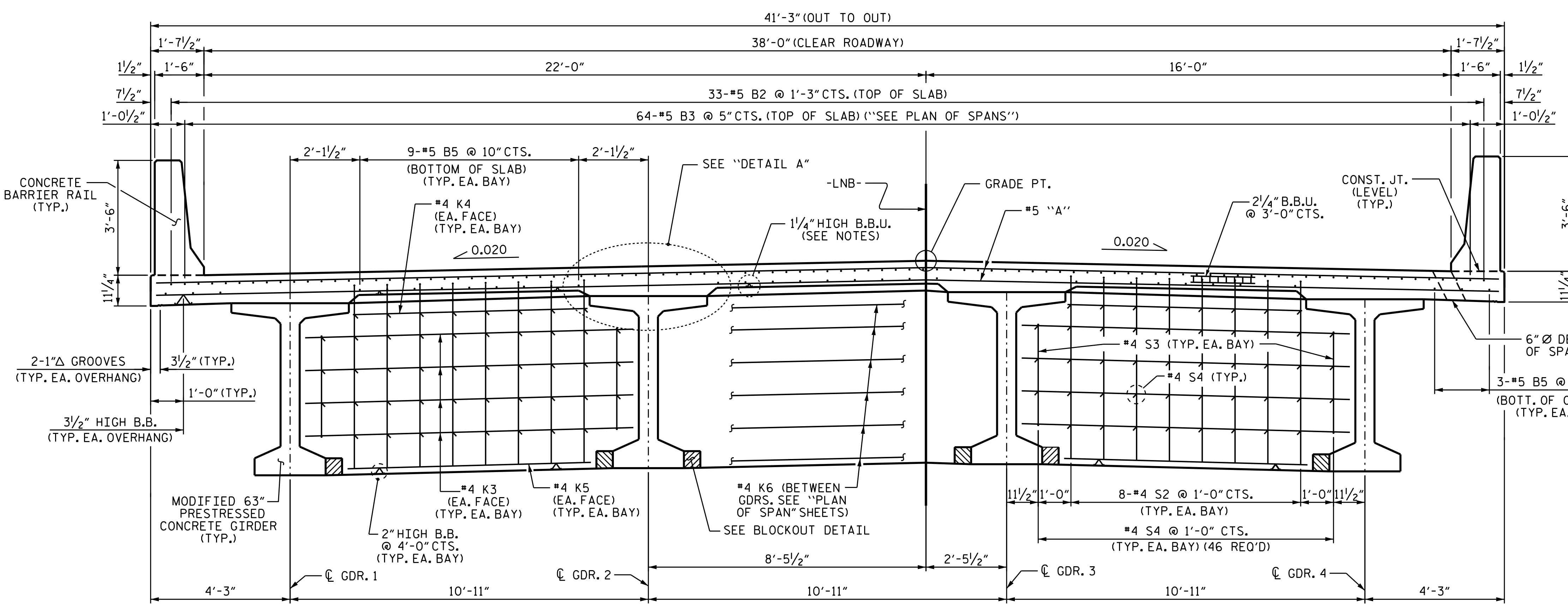
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.



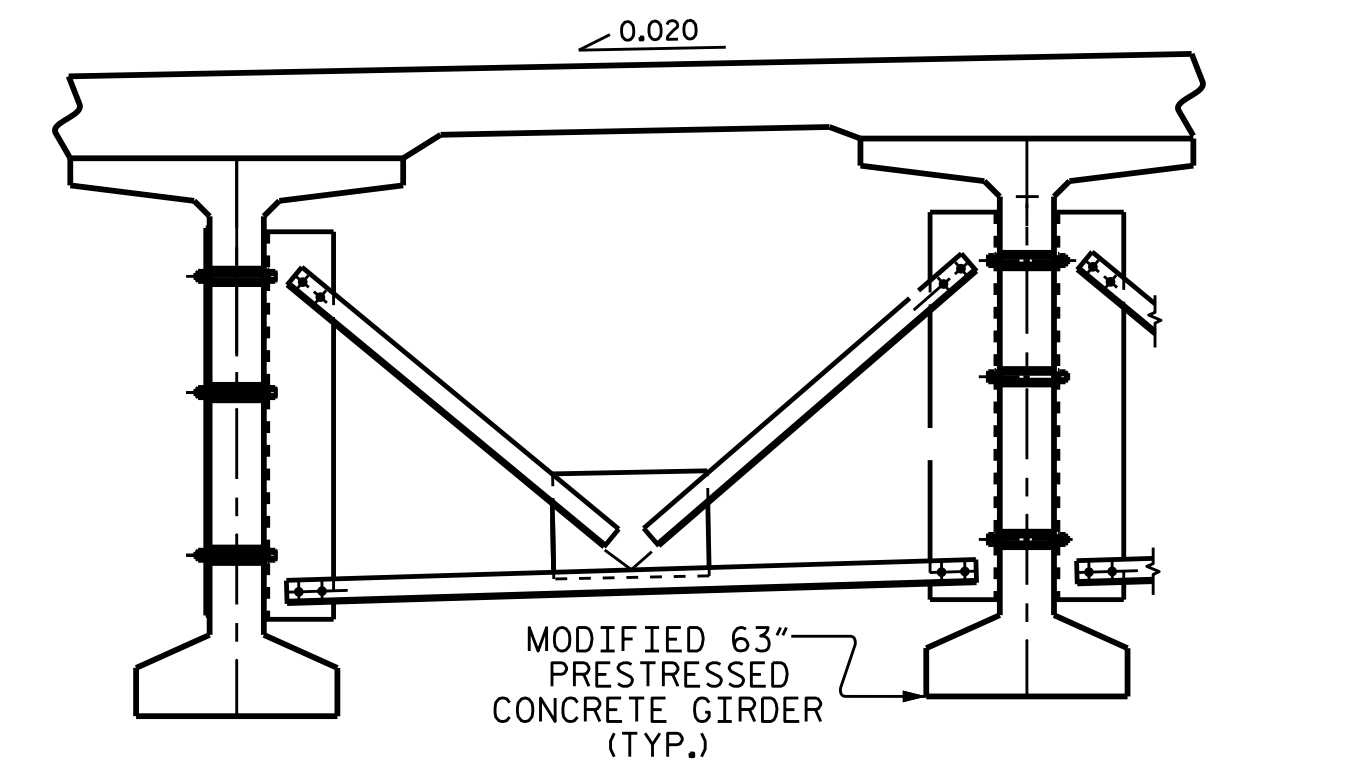
**TYPICAL SECTION @ END BENT DIAPHRAGMS**



**DETAIL A**



**TYPICAL SECTION @ BENT DIAPHRAGMS**

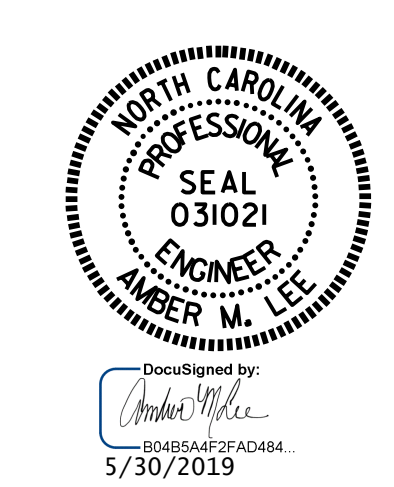


**PART SECTION AT INTERMEDIATE DIAPHRAGM**

SHOWING INTERMEDIATE DIAPHRAGM (FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS") (TYP. EA. BAY)

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 1 OF 2



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

DRAWN BY : M. G. SHAIKH DATE : 11/2018  
 CHECKED BY : A. SORSENGINH DATE : 11/2018  
 DESIGN ENGINEER OF RECORD : A. SORSENGINH DATE : 11/2018

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

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

S-5  
 TOTAL SHEETS  
 37





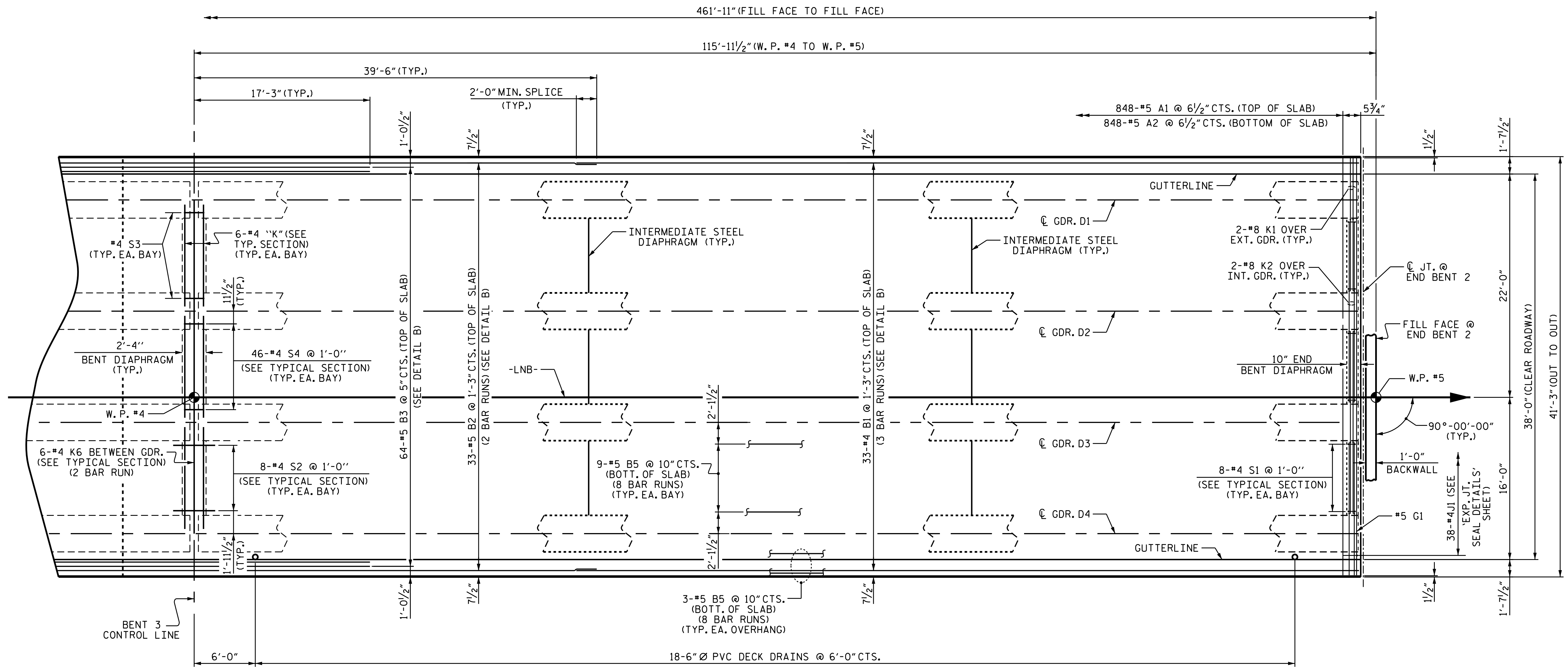






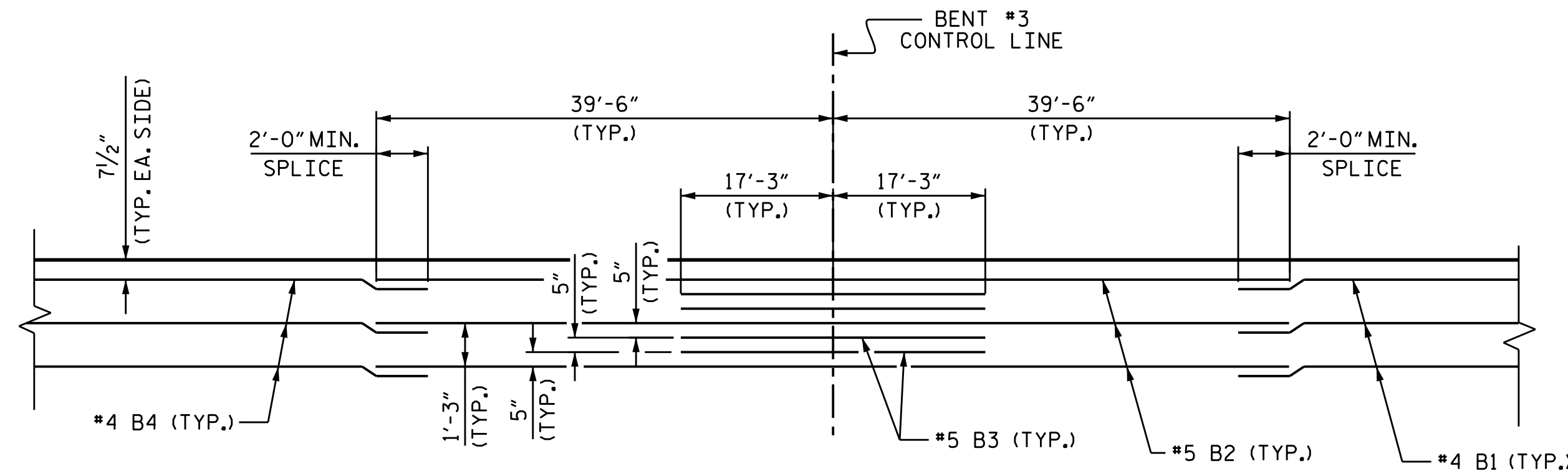






**PLAN OF SPAN D**

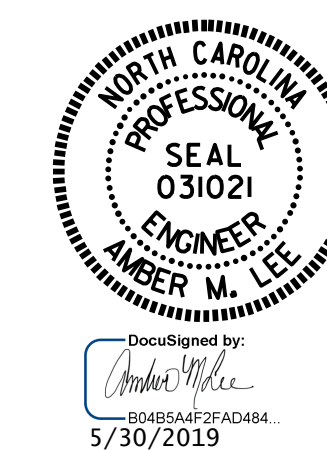
FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.



**DETAIL B AT BENT 3**

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 4 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

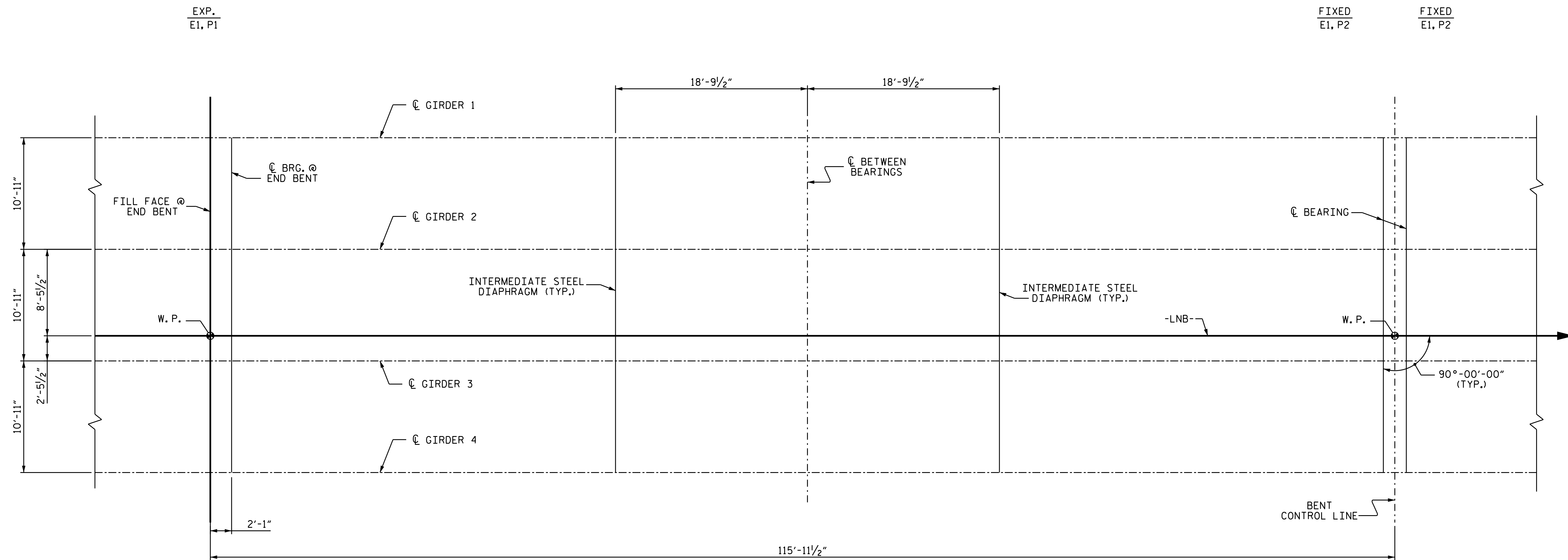
**PLAN OF SPAN D**

DRAWN BY: M. G. SHAIKH DATE: 11/2018  
 CHECKED BY: A. SORSENGINH DATE: 11/2018  
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE: 11/2018

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

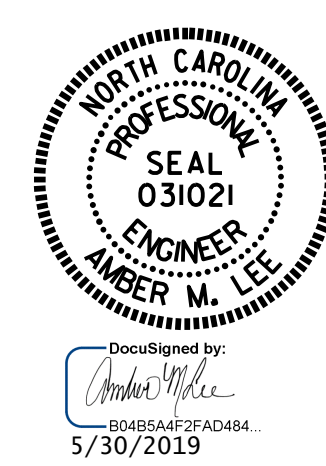
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			37





FRAMING PLAN

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-  
 SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

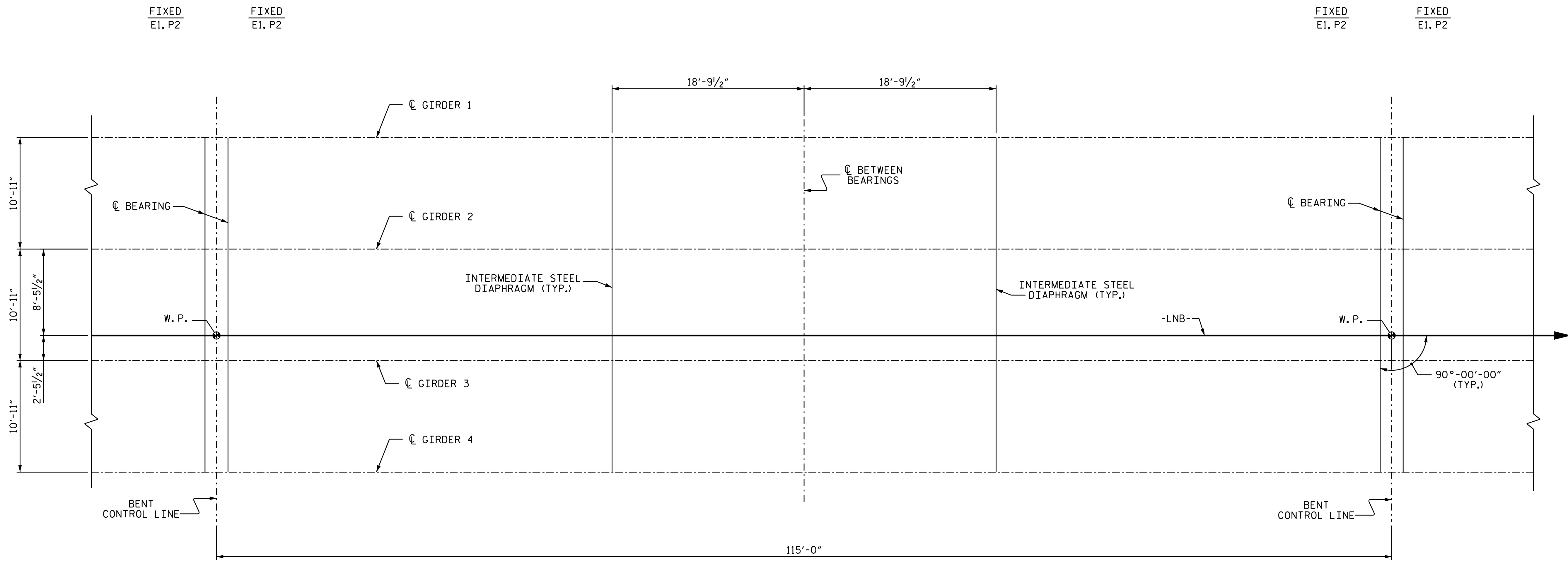
SUPERSTRUCTURE  
 FRAMING PLAN  
 SPANS A OR D

DRAWN BY : A. SORSENGINH DATE : 11/2018  
 CHECKED BY : M. G. SHAIKH DATE : 1/2019  
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 1/2019

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			37

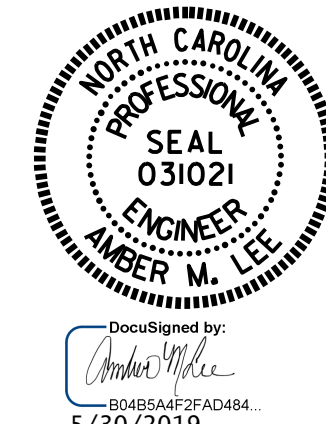
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 amlee



FRAMING PLAN

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 FRAMING PLAN  
 SPANS B OR C

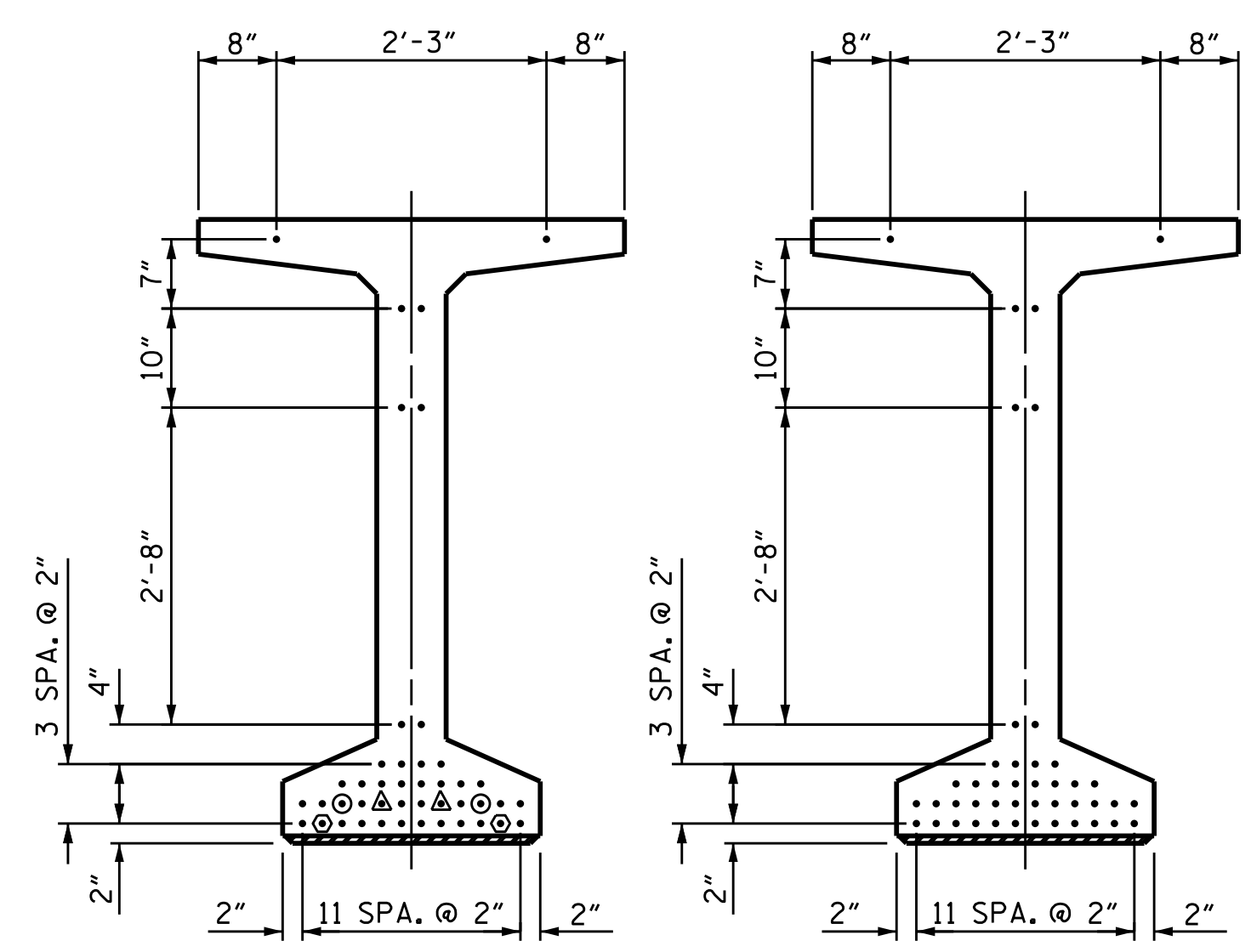
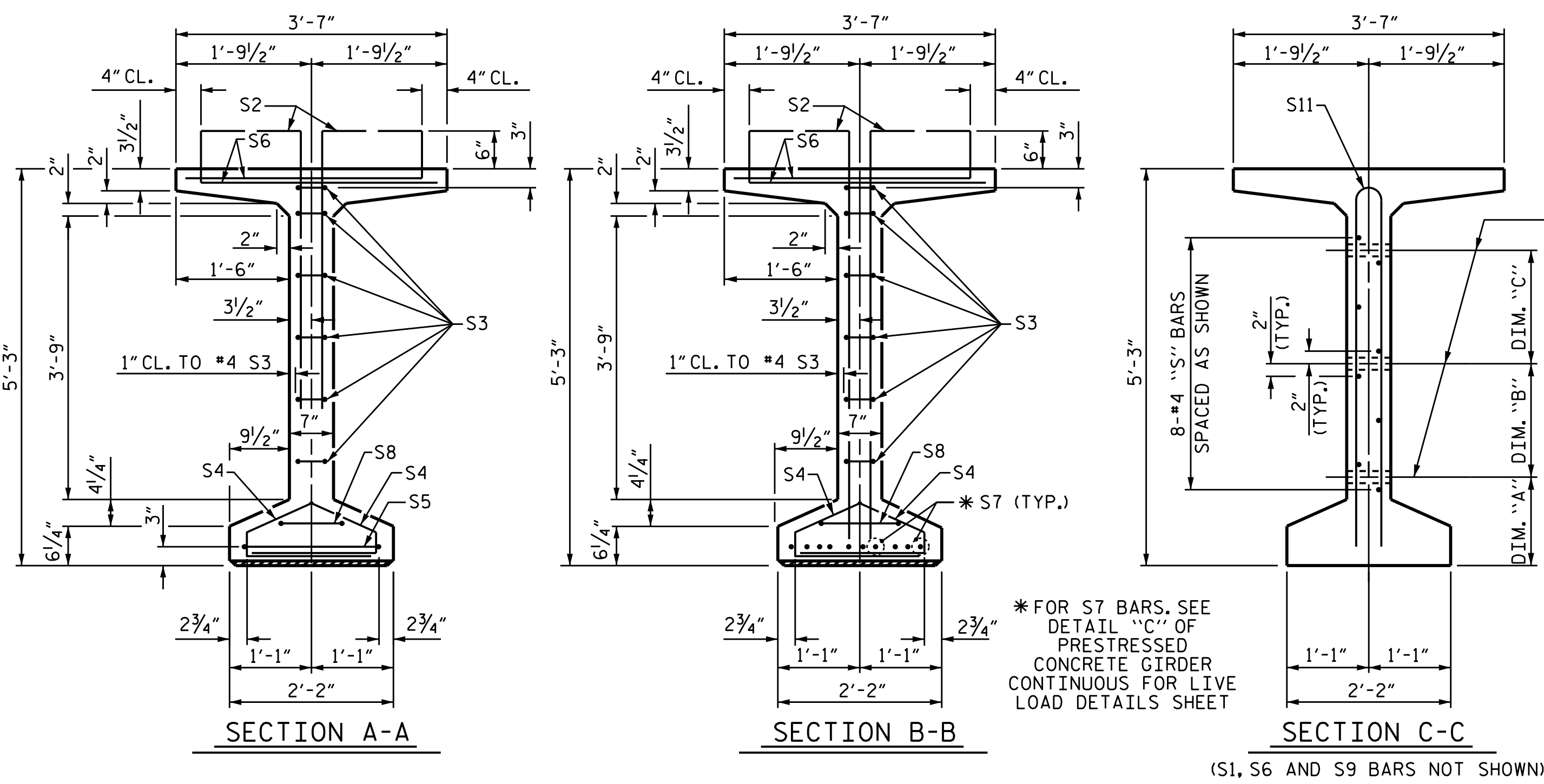
DRAWN BY: A. SORSENGINH      DATE: 11/2018  
 CHECKED BY: M. G. SHAIKH      DATE: 1/2019  
 DESIGN ENGINEER OF RECORD: A. SORSENGINH      DATE: 11/2018

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 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
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 amlee





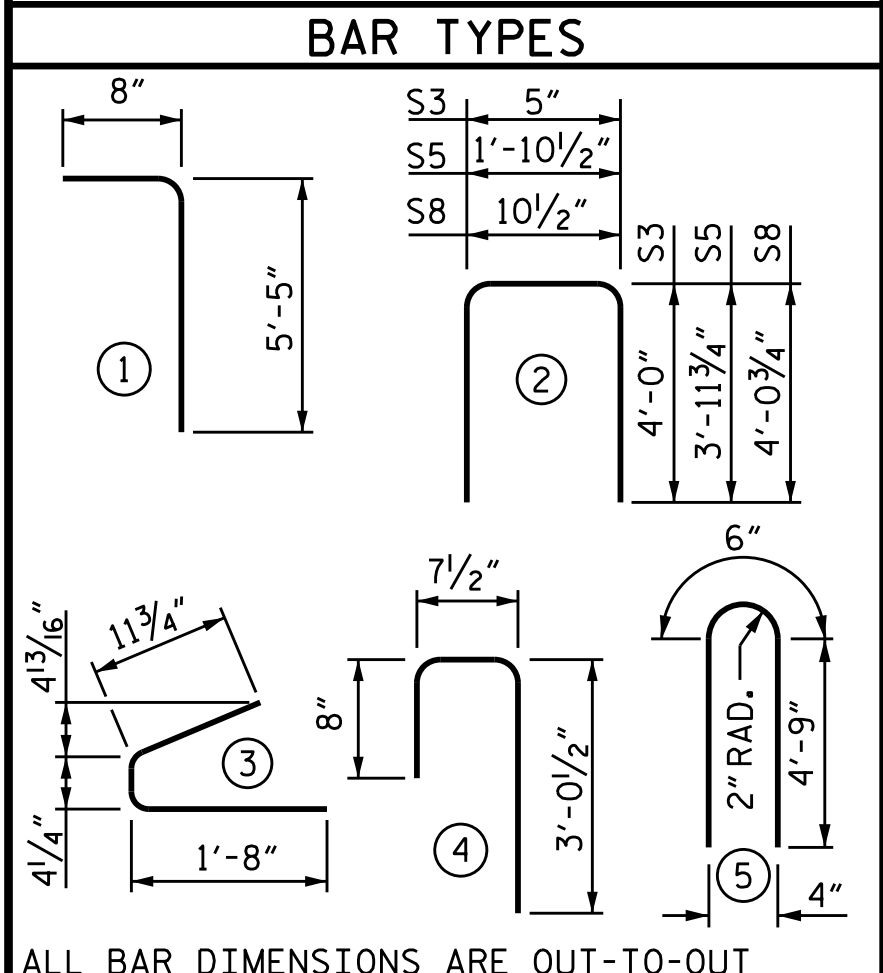
AT END OF GIRDER AT C OF GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

- DEBONDING LEGEND
- FULLY BONDED STRANDS
  - ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
  - ⊙ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
  - ⊕ STRANDS DEBONDED FOR 18'-0" FROM END OF GIRDER

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

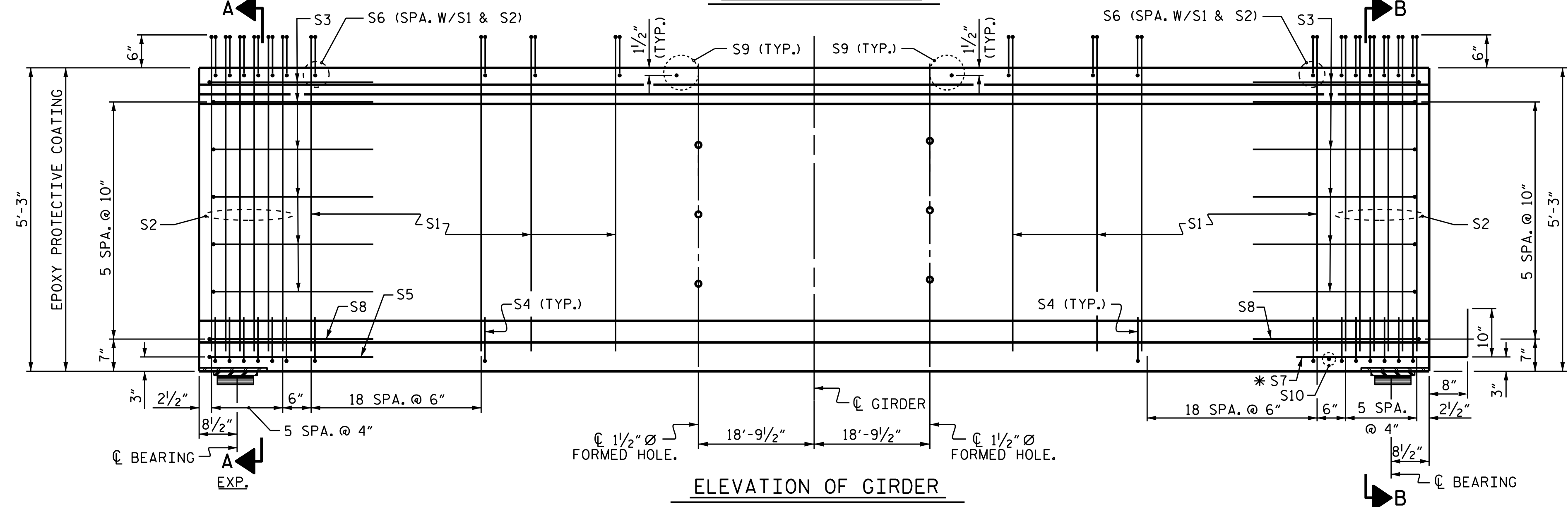
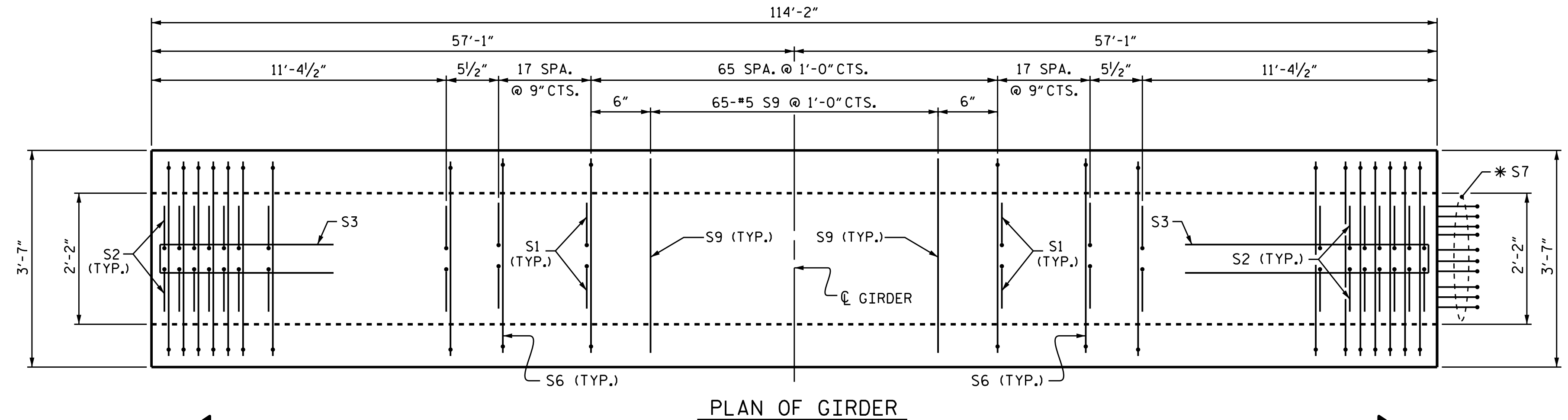
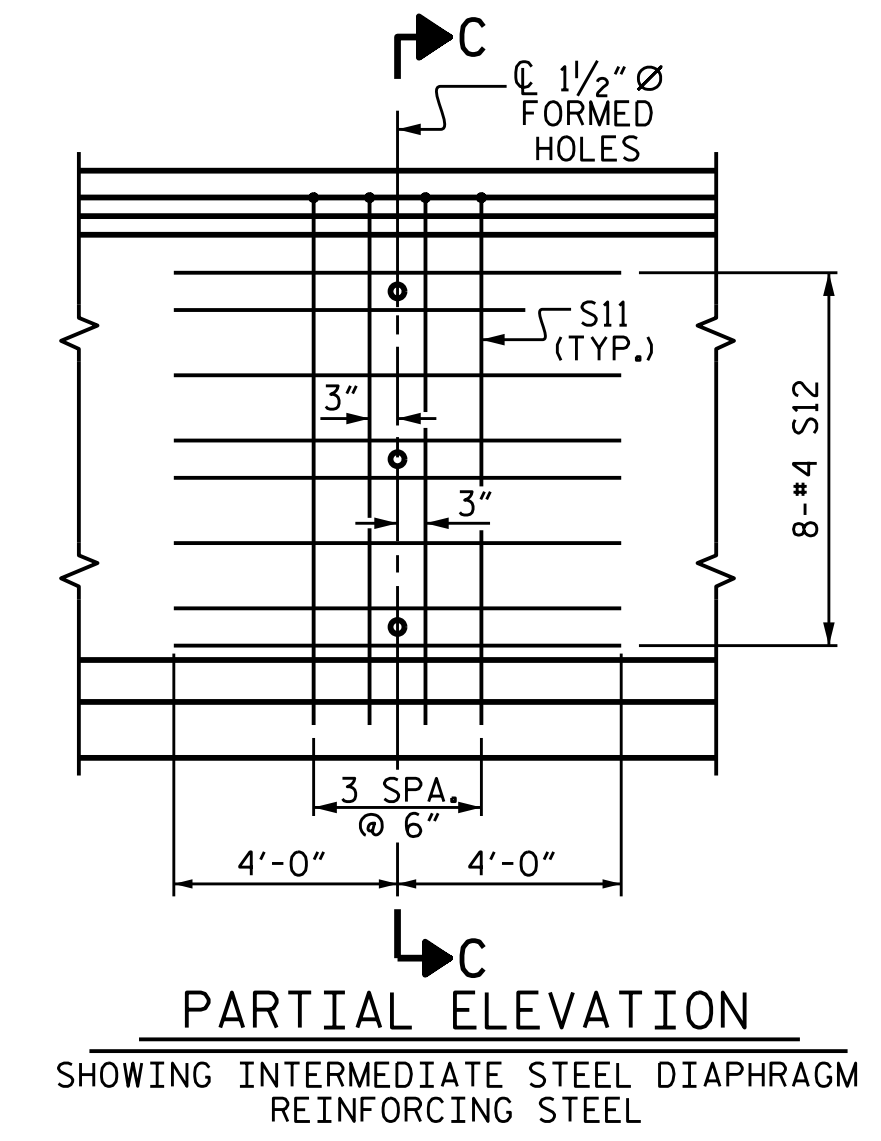
REINFORCING STEEL FOR ONE GDR						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	276	#4	1	6'-1"	1122	
S2	24	#5	1	6'-1"	152	
S3	12	#4	2	8'-5"	67	
S4	100	#4	3	3'-0"	200	
S5	1	#5	2	9'-10"	10	
S6	300	#5	4	4'-4"	1356	
*S7	10	#5	STR	3'-8"	38	
S8	2	#5	2	9'-0"	19	
S9	65	#5	STR	3'-3"	220	
S10	1	#3	STR	1'-10"	1	
S11	8	#5	5	10'-0"	83	
S12	16	#4	STR	8'-0"	86	

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



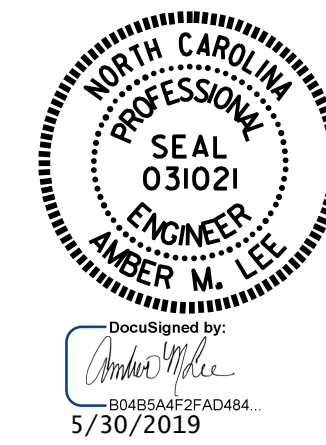
QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	9,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
3,354	22.5	44

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	114'-2"	456'-8"



PROJECT NO. B-5389  
YADKIN COUNTY  
STATION: 20+65.50 -LNB-

SHEET 1 OF 4



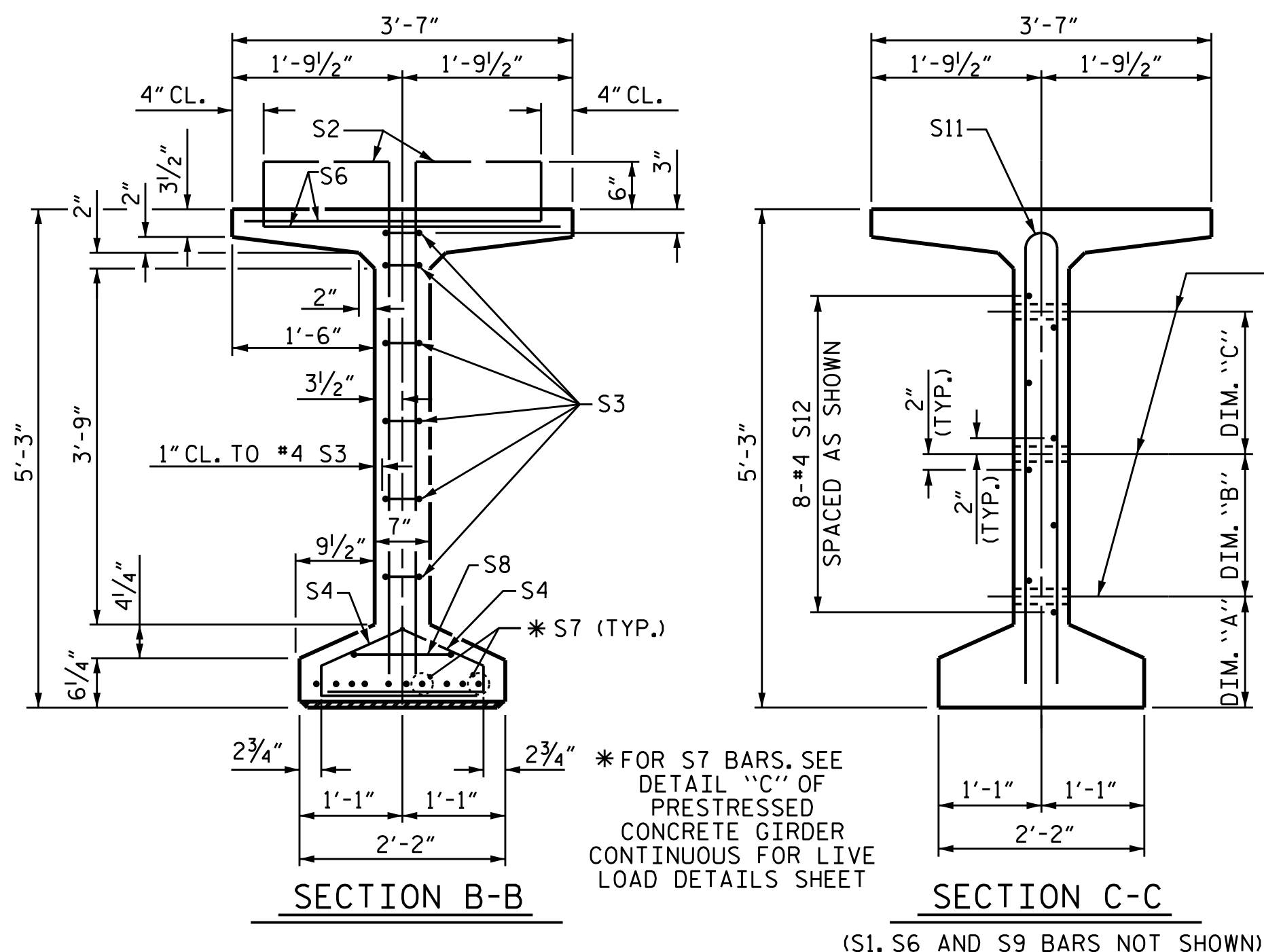
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

63" PRESTRESSED CONCRETE  
MODIFIED BULB TEE  
CONTINUOUS FOR LIVE LOAD  
(SPAN A OR D)

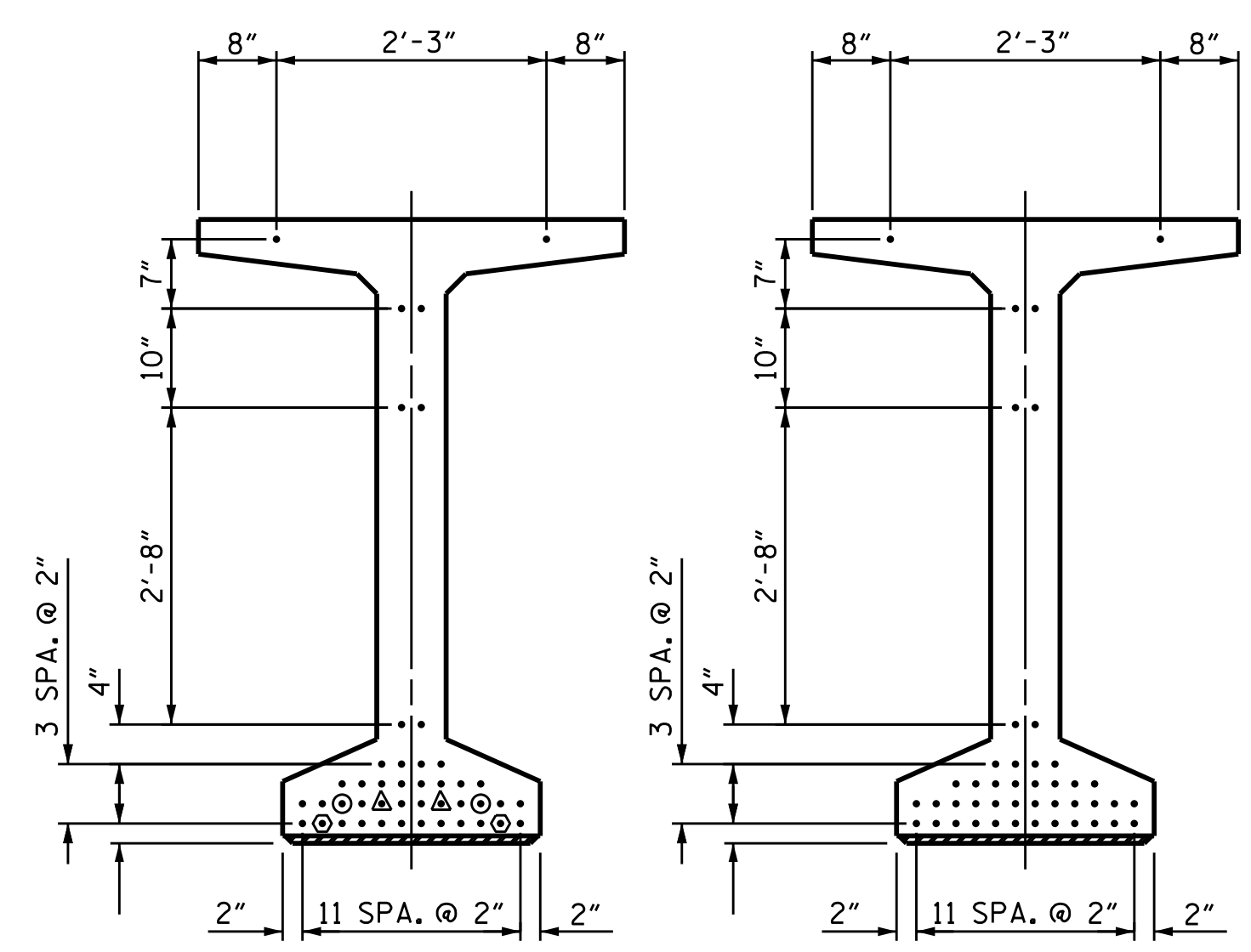
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CHECKED BY: M. G. SHAIKH	DATE: 1/2019
DRAWN BY: EEM 2/6/97	REV. 6/13 MAA/GM
CHECKED BY: VAP 2/6/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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1			3		TOTAL SHEETS
2			4		37



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



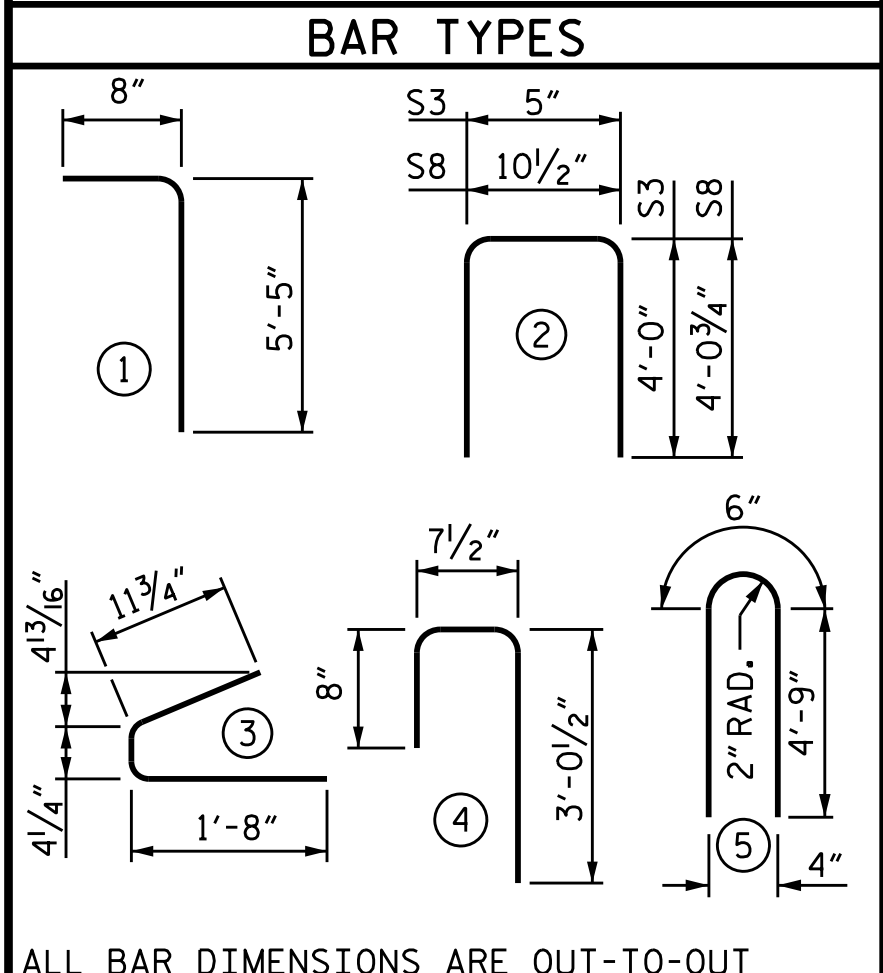
AT END OF GIRDER AT C OF GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

- DEBONDING LEGEND**
- FULLY BONDED STRANDS
  - STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
  - STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
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0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
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REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
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*S7	20	#5	STR	3'-8"	76
S8	2	#5	2	9'-0"	19
S9	65	#5	STR	3'-3"	220
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	10'-0"	83
S12	16	#4	STR	8'-0"	86

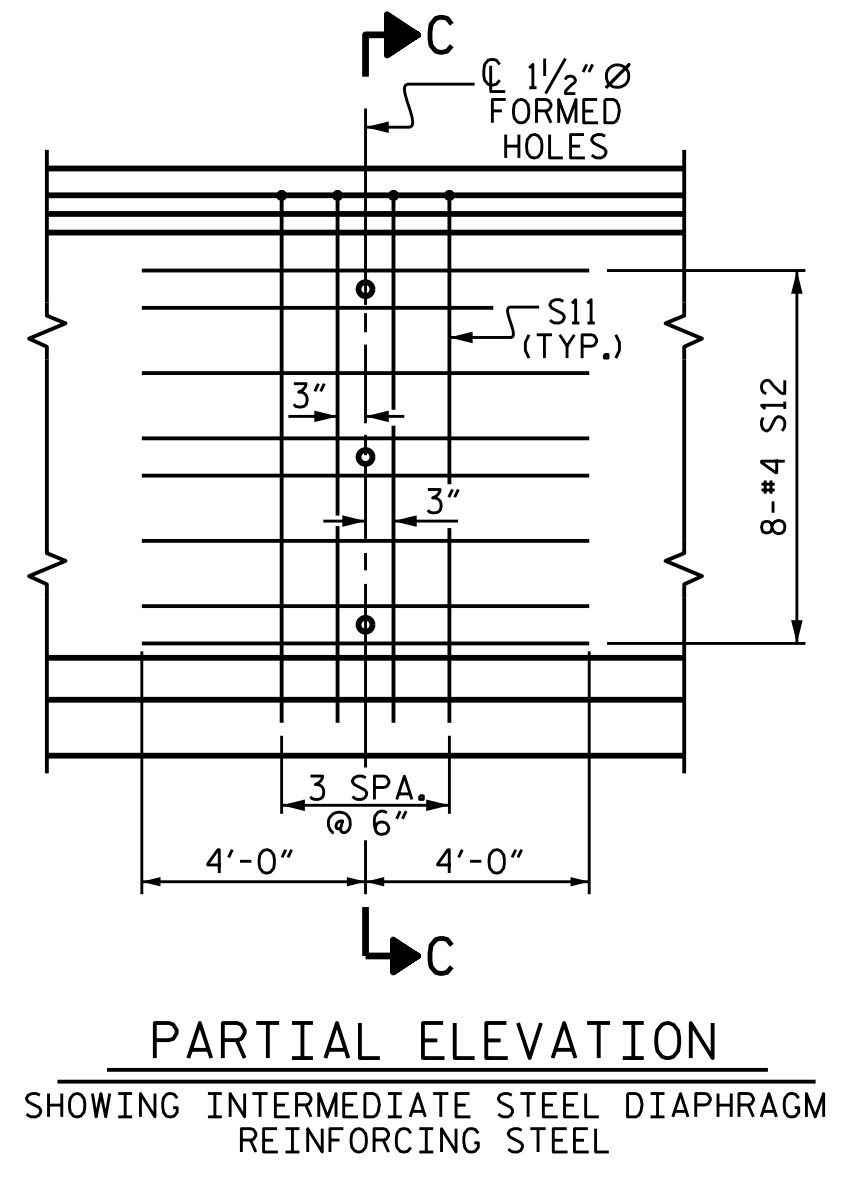
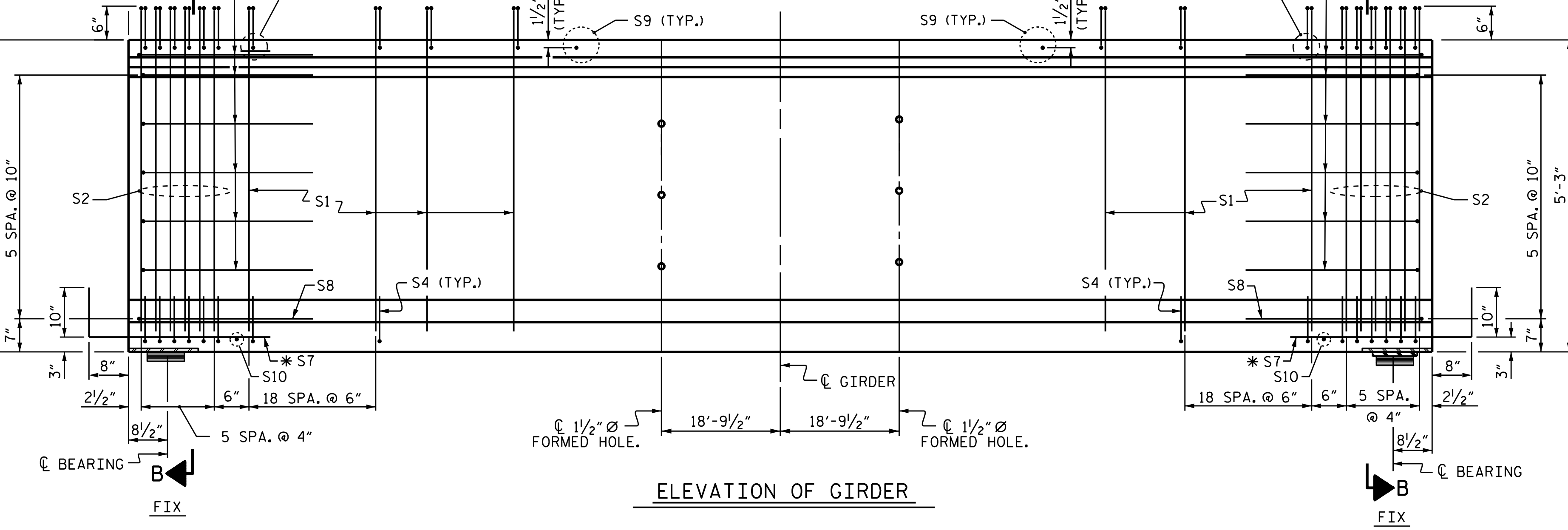
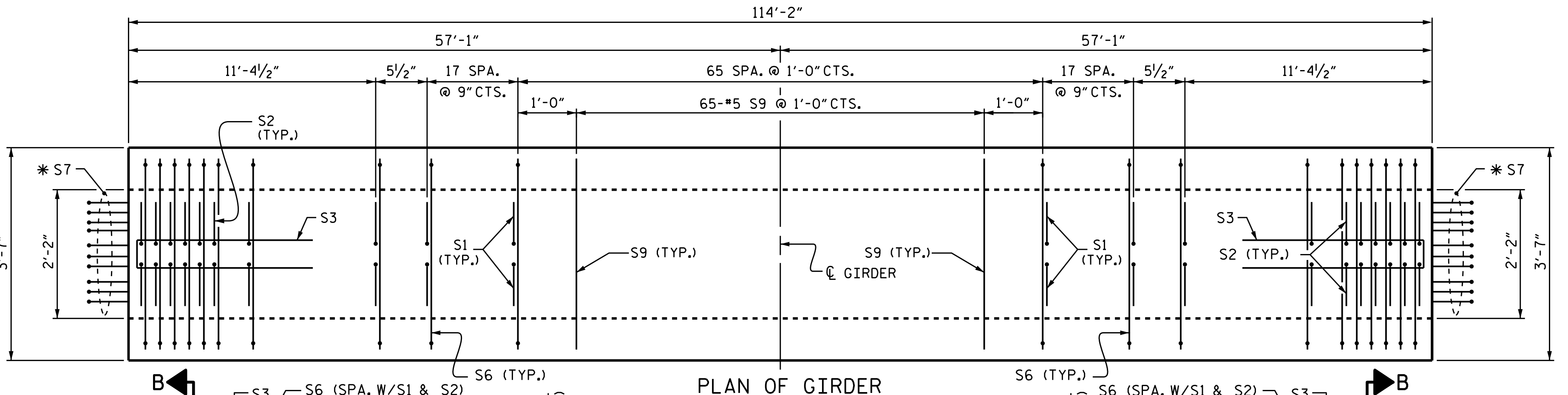
\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	9,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
3,382	22.5	44

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	114'-2"	456'-8"



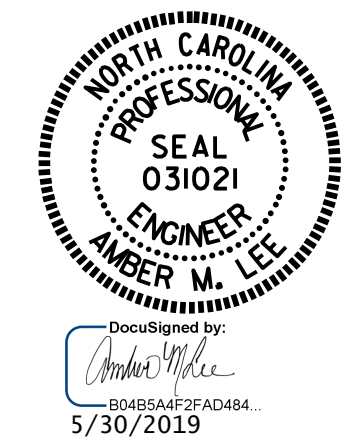
PARTIAL ELEVATION  
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL

PROJECT NO. B-5389  
YADKIN COUNTY  
STATION: 20+65.50 -LNB-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**63" PRESTRESSED CONCRETE  
MODIFIED BULB TEE  
CONTINUOUS FOR LIVE LOAD  
(SPAN B OR C)**



ASSEMBLED BY :	A. SORSENGINH	DATE :	11/2018
CHECKED BY :	M. G. SHAIKH	DATE :	1/2019
DRAWN BY :	EEM 2/6/97	REV. 6/13	MAA/GM
CHECKED BY :	VAP 2/6/97	REV. 1/15	MAA/TMG
		REV. 12/17	MAA/THC

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

S-14  
TOTAL SHEETS  
37

STD. NO. PCG7



NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

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

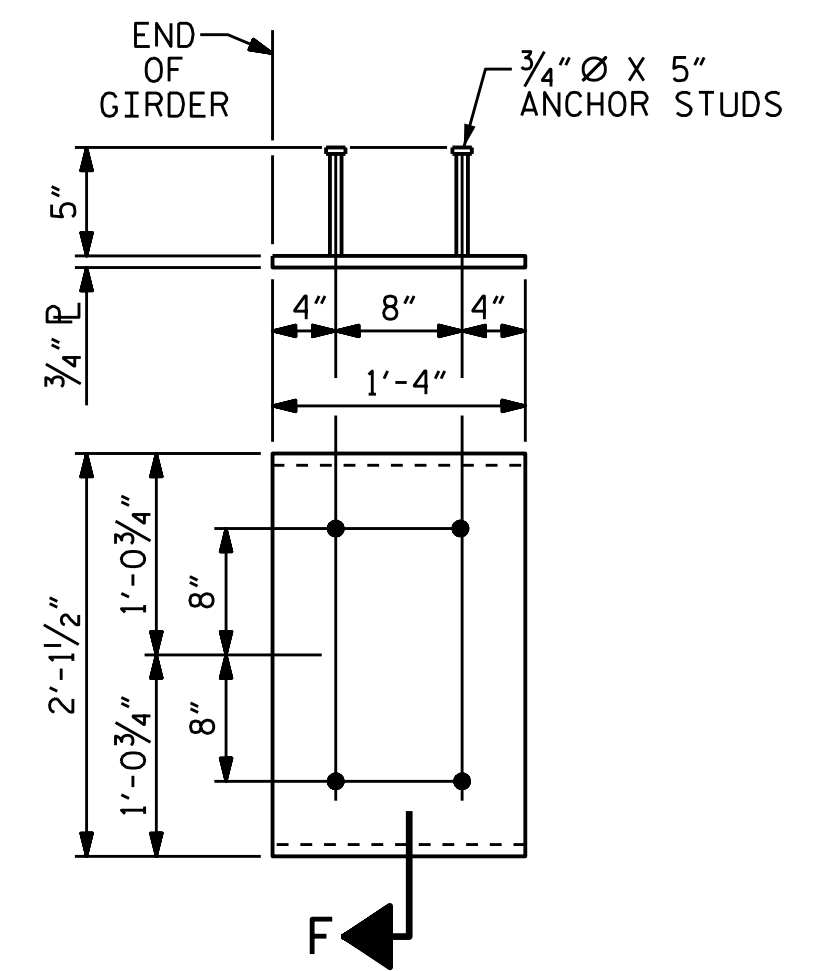
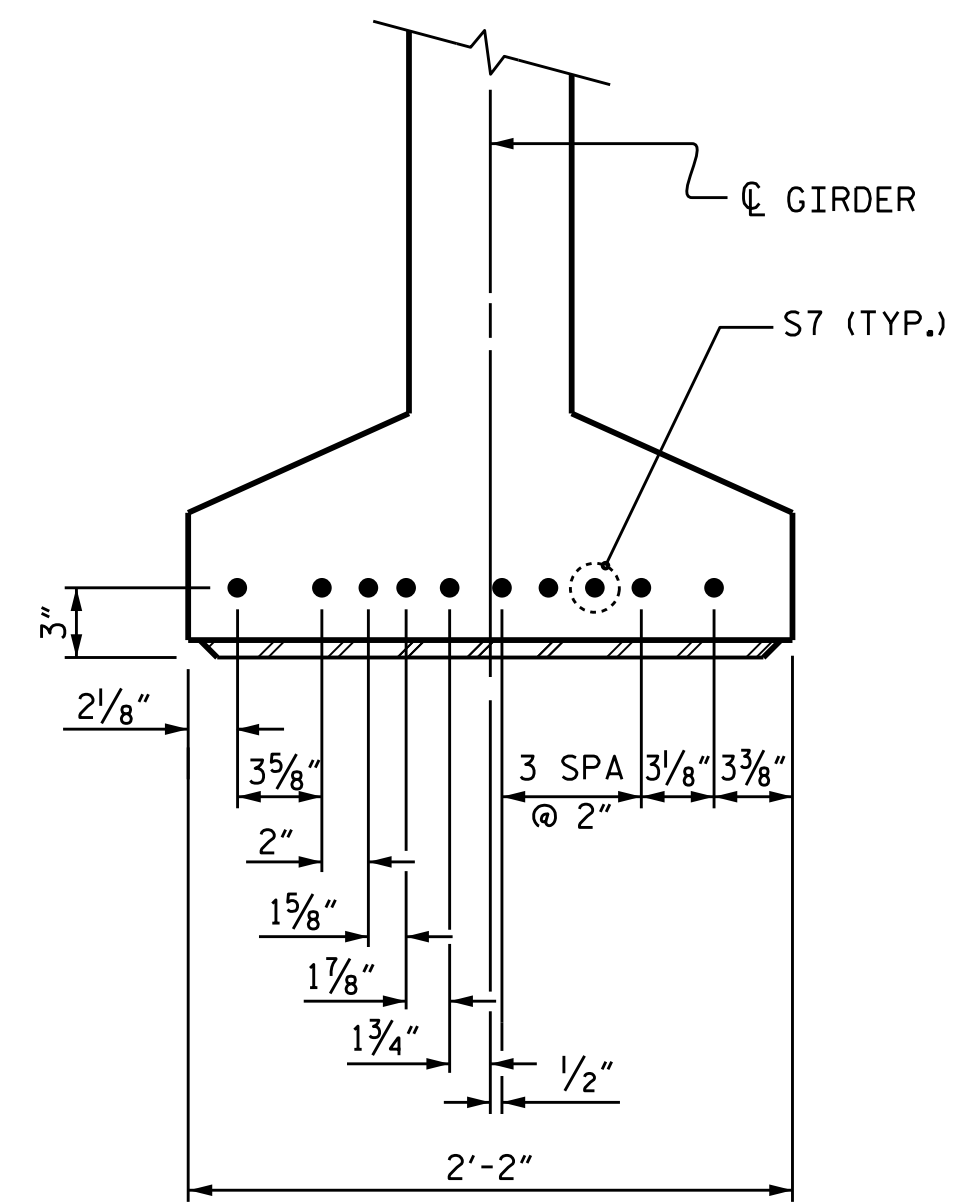
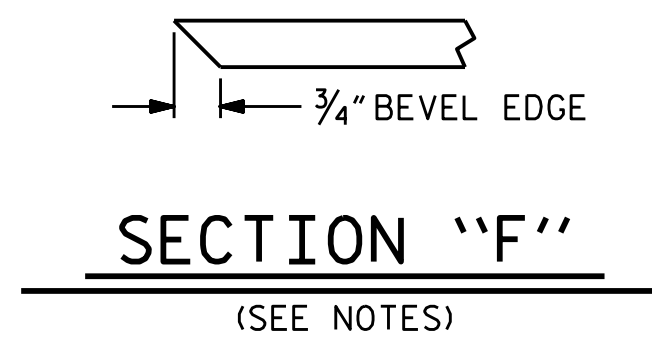
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,500 PSI.

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

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

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

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



**DEAD LOAD DEFLECTION TABLE FOR GIRDERS**

0.6" Ø LOW RELAXATION		GIRDERS 1 & 4																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.046	0.091	0.134	0.173	0.207	0.237	0.260	0.277	0.287	0.291	0.287	0.277	0.260	0.237	0.207	0.173	0.134	0.091	0.046	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.033	0.065	0.095	0.122	0.147	0.168	0.184	0.196	0.204	0.206	0.204	0.196	0.184	0.168	0.147	0.122	0.095	0.065	0.033	0.000
FINAL CAMBER	↑	0	3/16"	5/16"	7/16"	5/8"	3/4"	13/16"	15/16"	1"	1"	1"	1"	1"	15/16"	13/16"	3/4"	5/8"	7/16"	5/16"	3/16"	0

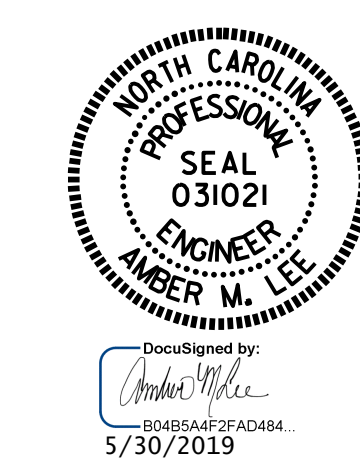
**DEAD LOAD DEFLECTION TABLE FOR GIRDERS**

0.6" Ø LOW RELAXATION		GIRDERS 2 & 3																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.045	0.089	0.131	0.169	0.203	0.231	0.254	0.271	0.281	0.284	0.281	0.271	0.254	0.231	0.203	0.169	0.131	0.089	0.045	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.036	0.071	0.104	0.135	0.162	0.185	0.203	0.216	0.224	0.227	0.224	0.216	0.203	0.185	0.162	0.135	0.104	0.071	0.036	0.000
FINAL CAMBER	↑	0	1/8"	3/16"	5/16"	7/16"	1/2"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	1/2"	7/16"	5/16"	3/16"	1/8"	0

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

PROJECT NO. B-5389  
YADKIN COUNTY  
STATION: 20+65.50 -LNB-

SHEET 3 OF 4



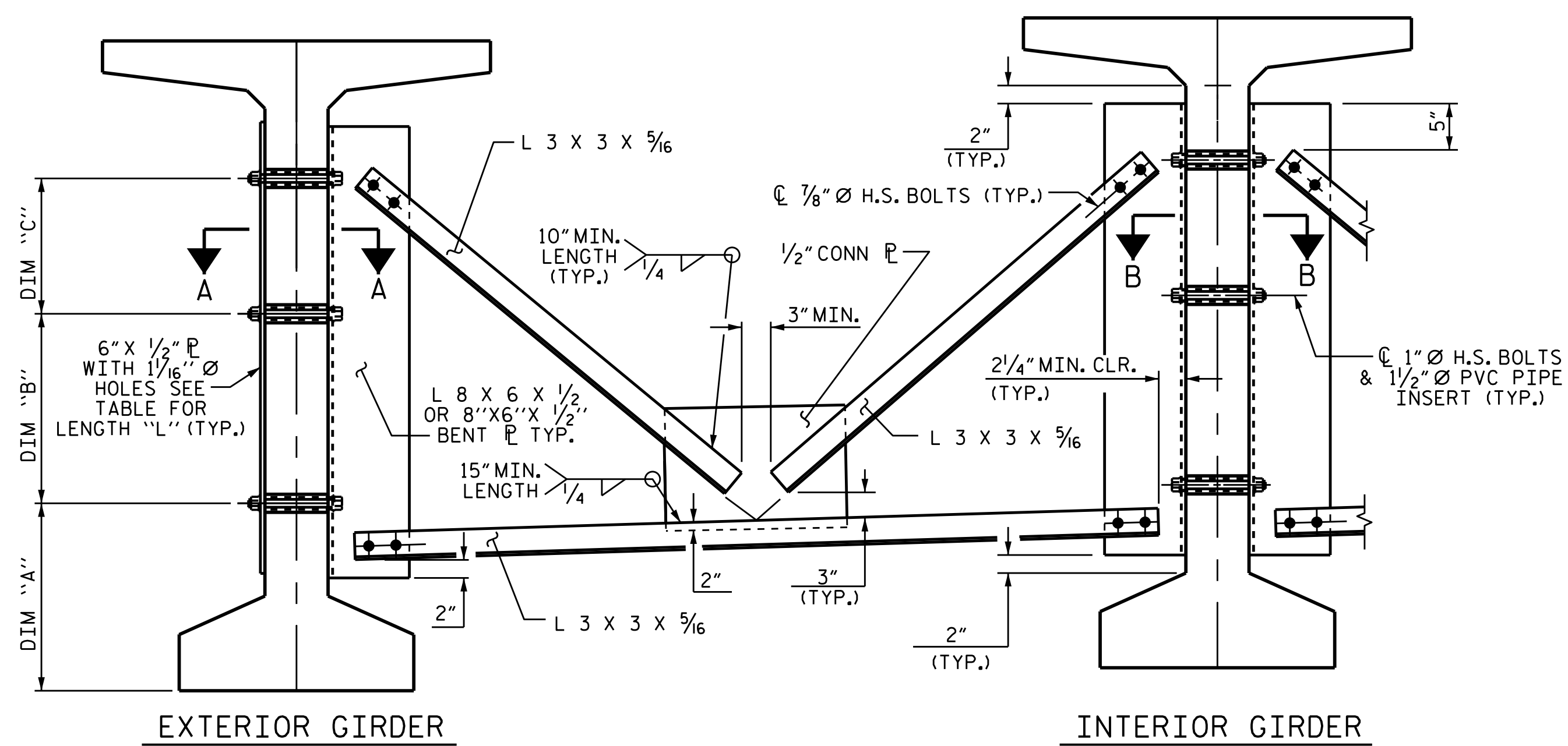
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
DETAILS**

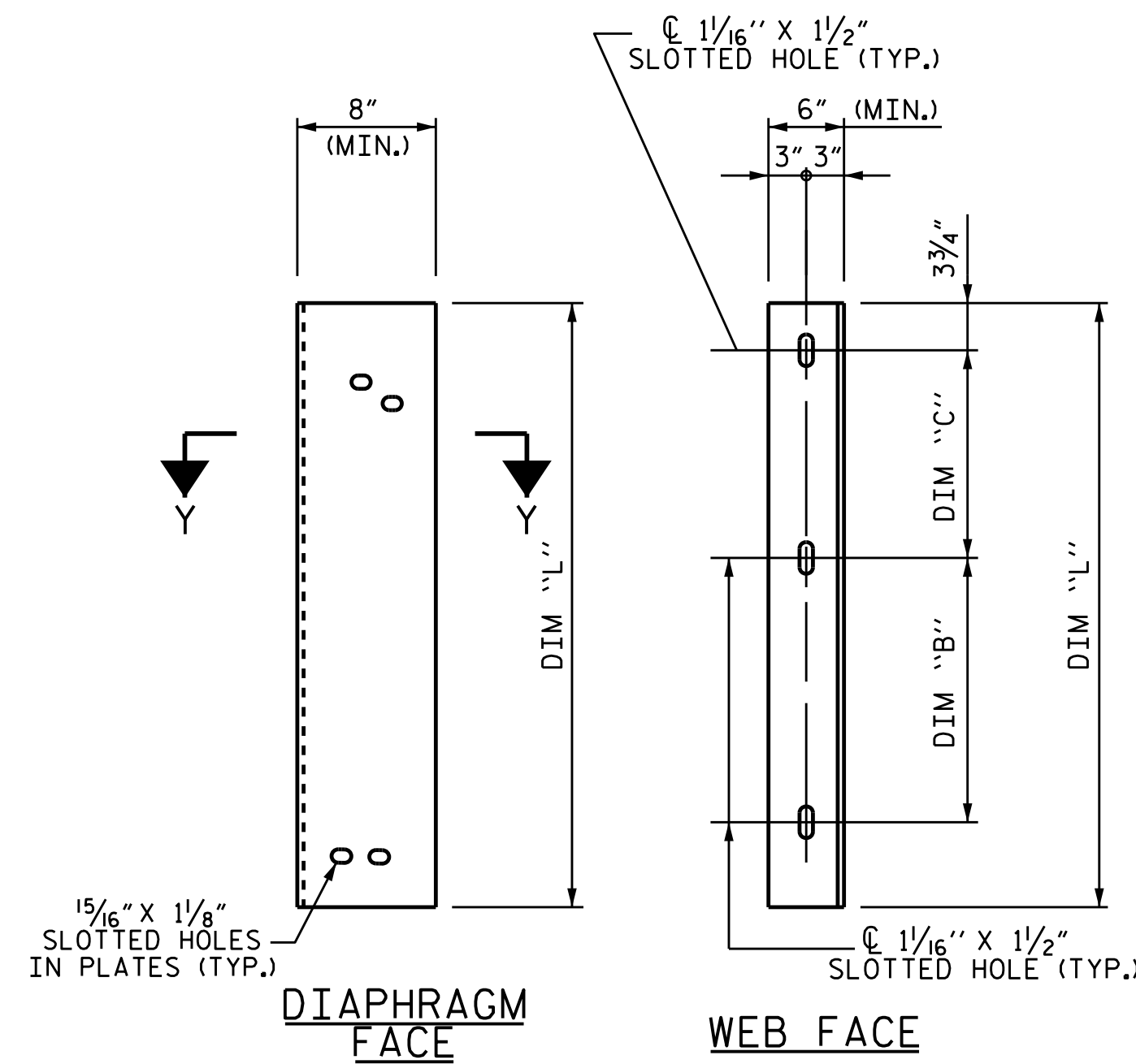
ASSEMBLED BY :	A. SORSENGINH	DATE :	11/2018
CHECKED BY :	M. G. SHAIKH	DATE :	1/2019
DRAWN BY :	ELR 11/91	REV. 1/15	MAA/TMG
CHECKED BY :	GRP 11/91	REV. 2/15	MAA/TMG
		REV. 12/17	MAA/THC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			37

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**PART SECTION AT INTERMEDIATE DIAPHRAGM**  
(63" BULB TEE BULB TEE GIRDER SHOWN)



**STRUCTURAL STEEL NOTES**

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.  
TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.  
THE PLATES, BENT PLATES, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

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

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

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

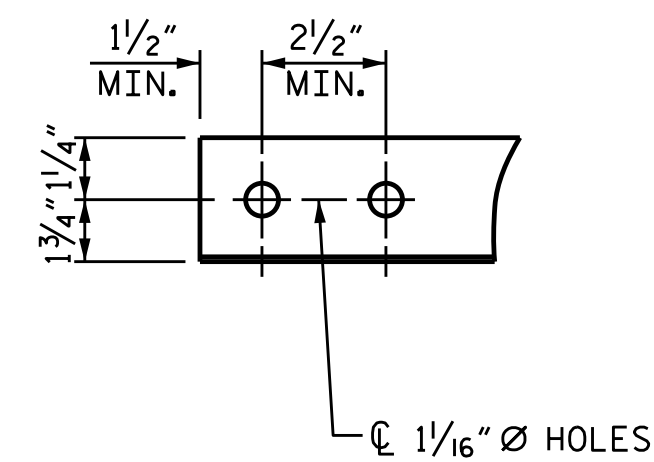
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

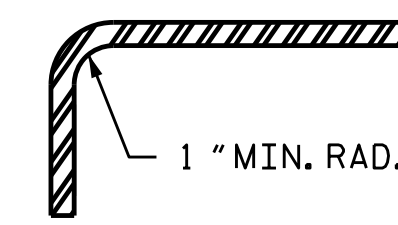
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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



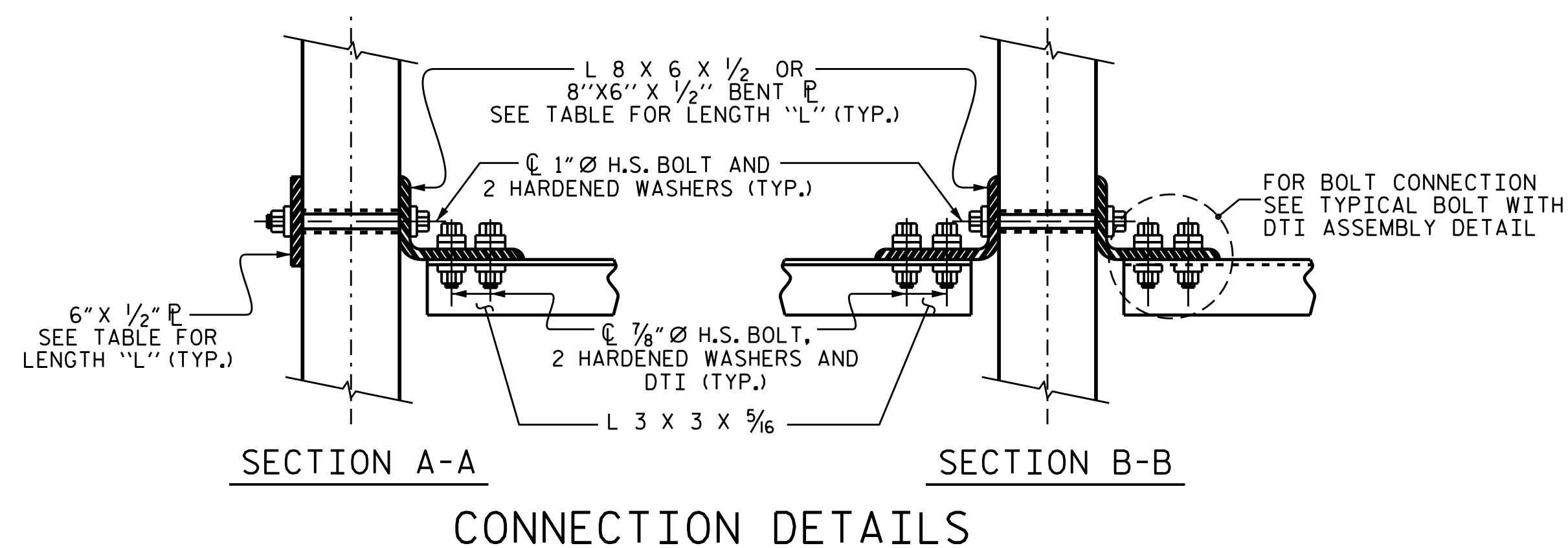
**ANGLE END**  
(L 3 x 3 x 5/16)



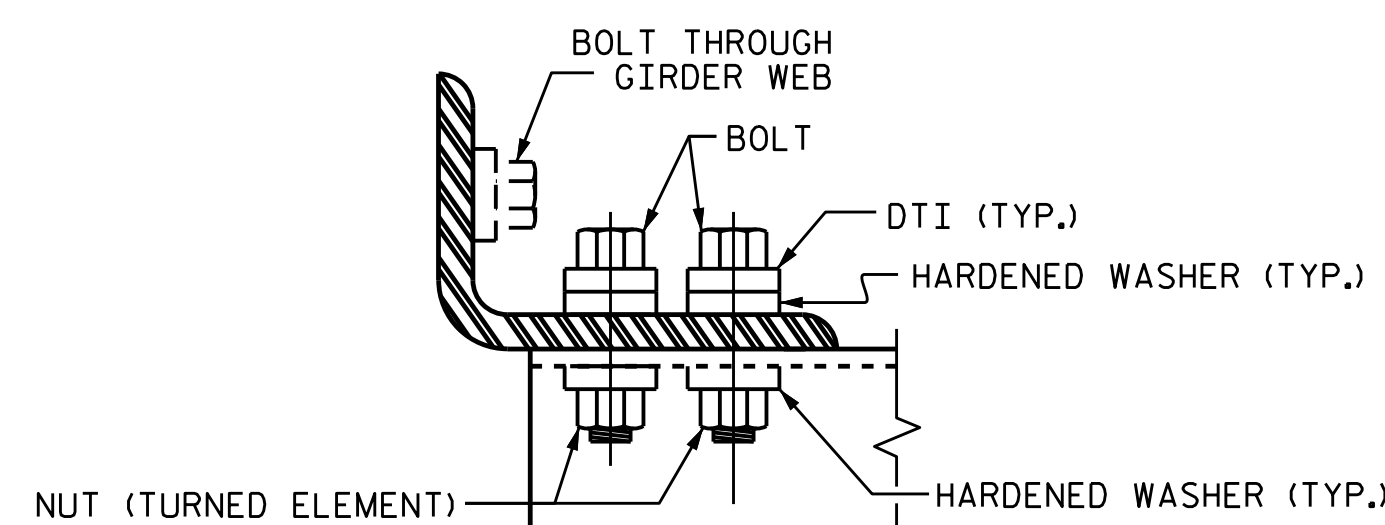
**CONNECTOR PLATE DETAIL**

**TABLE**

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63" BULB TEE	1'-4"	1'-5"	1'-4 3/4"	3'-5"



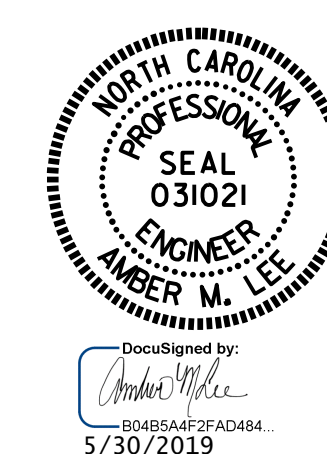
**CONNECTION DETAILS**



**BOLT WITH DTI ASSEMBLY DETAIL**

PROJECT NO. B-5389  
YADKIN COUNTY  
STATION: 20+65.50 -LNB-

SHEET 4 OF 4



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

ASSEMBLED BY : A. SORSENGIH DATE : 11/2018  
CHECKED BY : M. G. SHAIKH DATE : 1/2019  
DRAWN BY : RWW 11/09  
CHECKED BY : GM 11/09

REV. 10/1/11  
REV. 12/17

MAA/GM  
MAA/THC

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

S-16  
TOTAL SHEETS  
37



**NOTES**

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

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

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

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

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

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

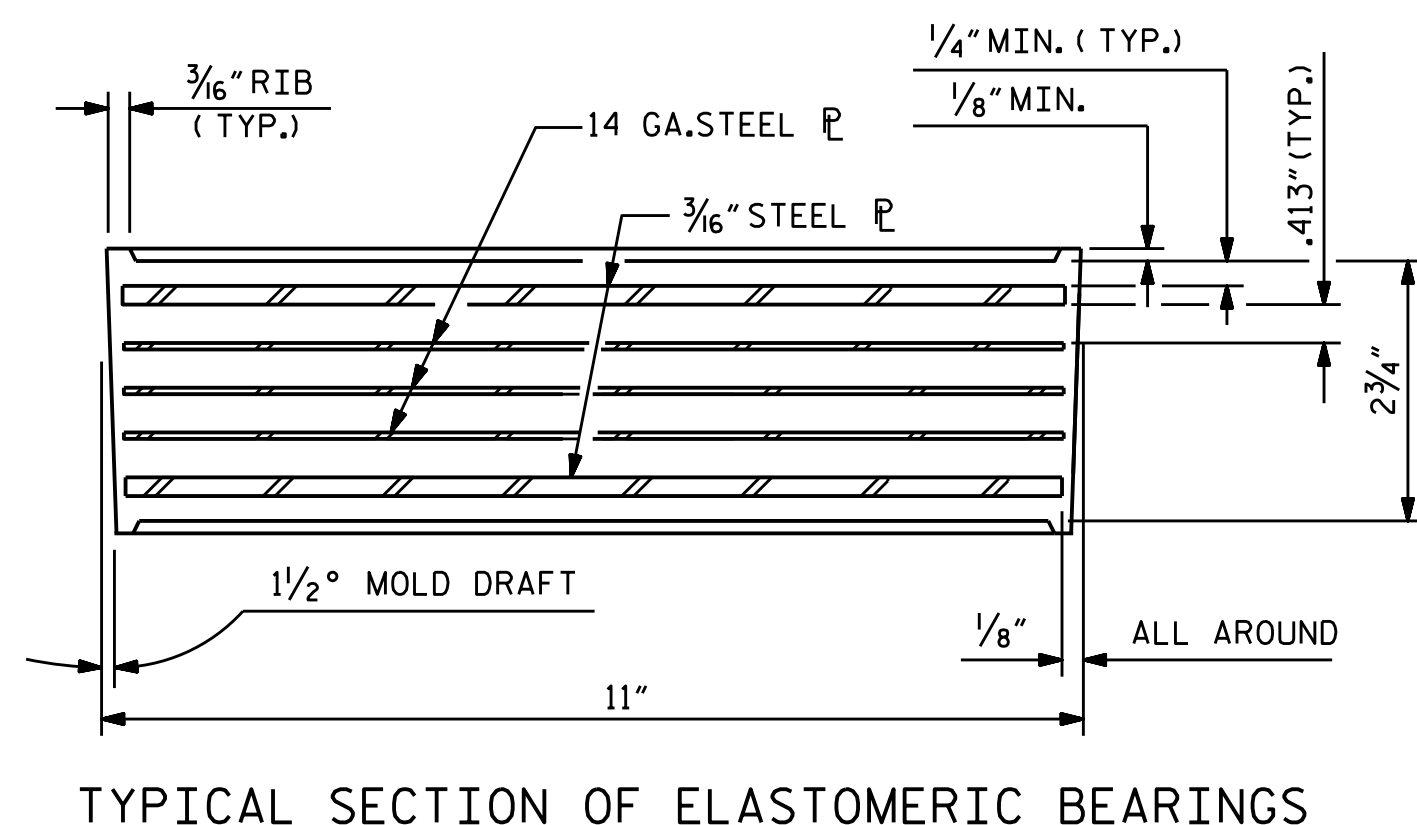
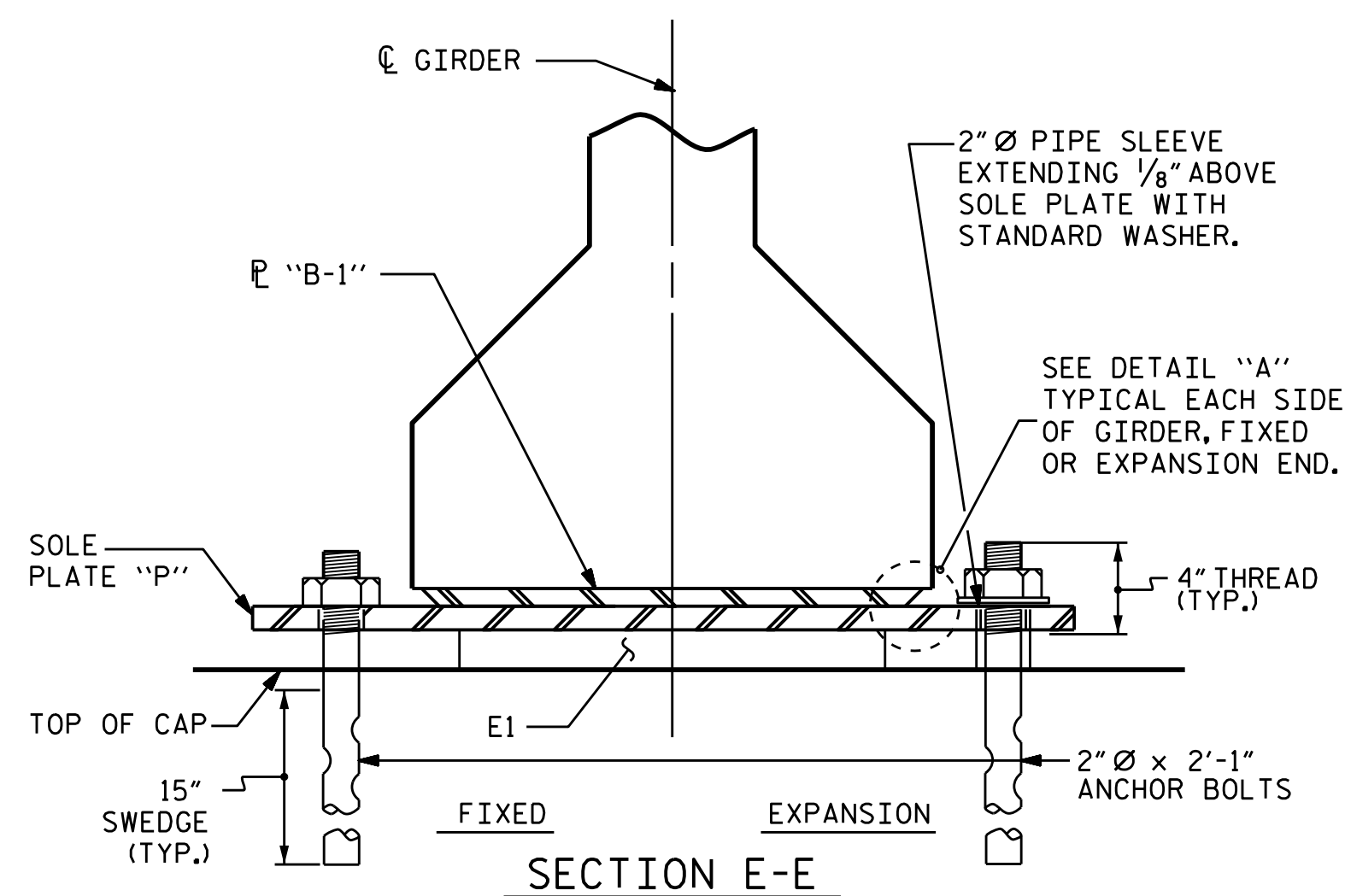
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

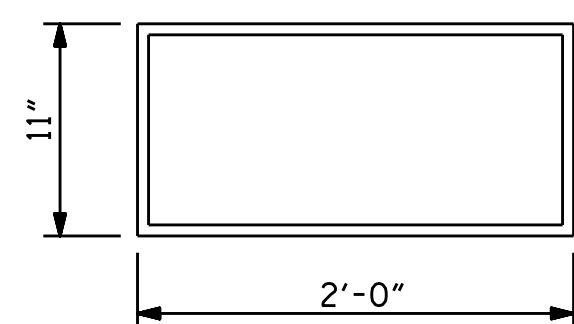
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



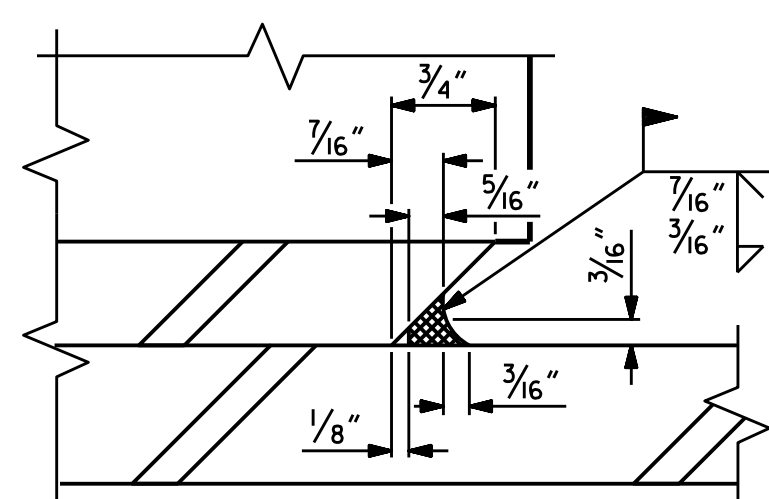
TYPICAL SECTION OF ELASTOMERIC BEARINGS



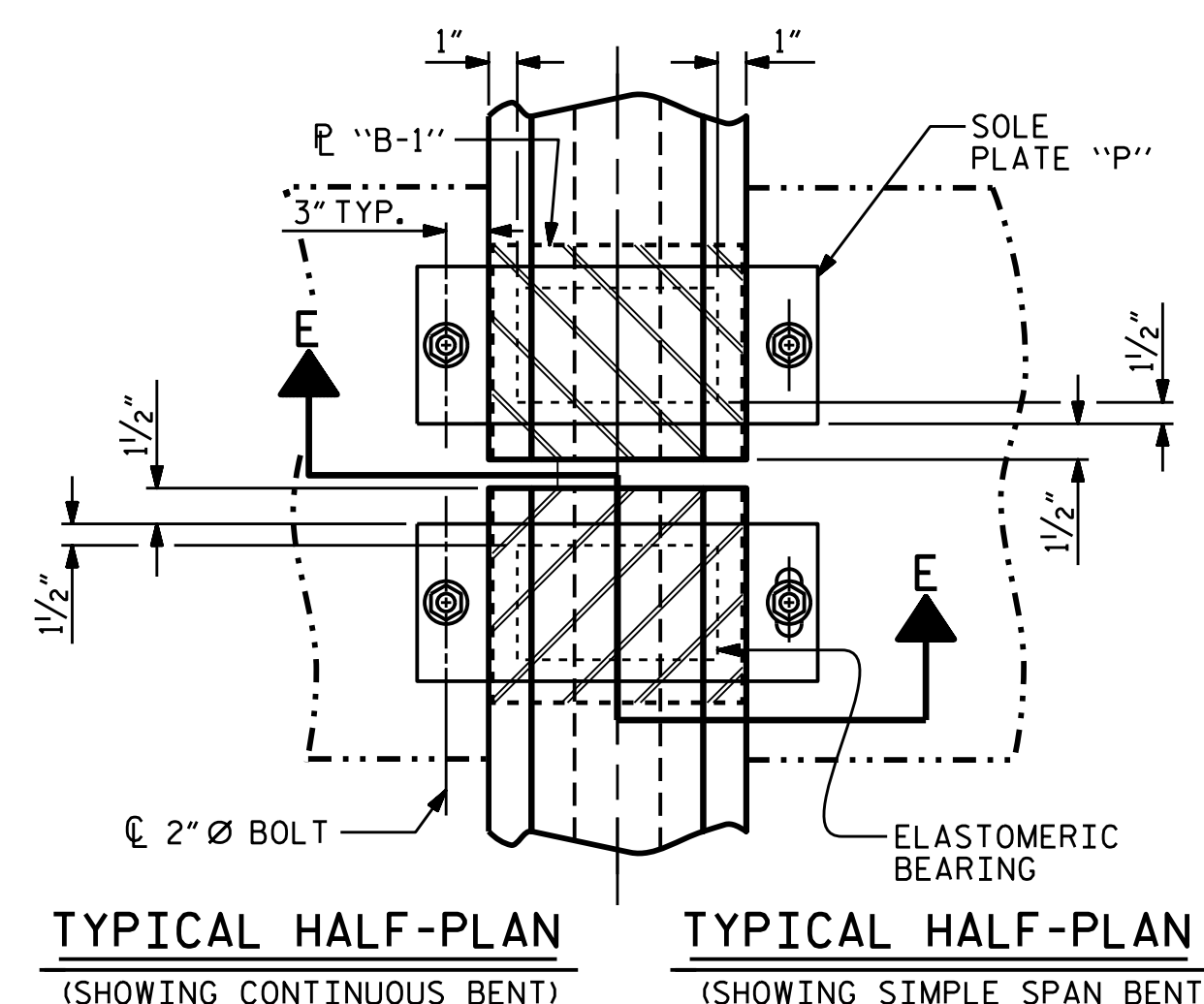
E1 (32 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

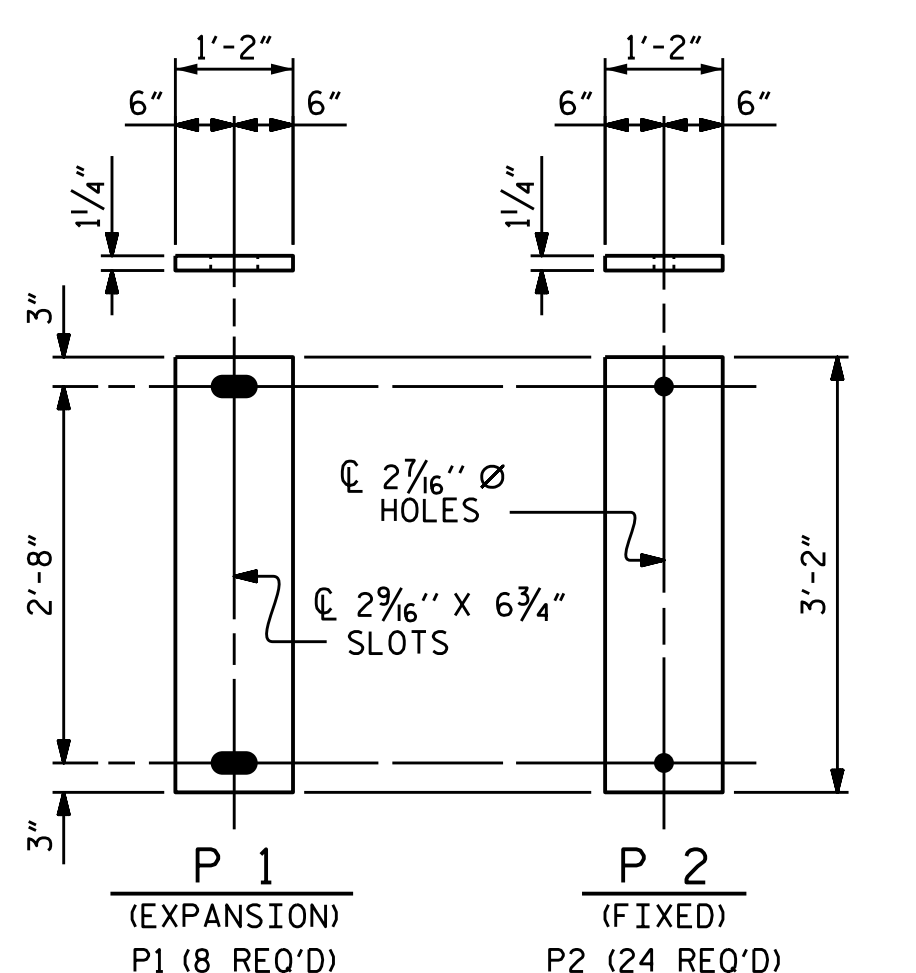
**TYPE VII**



DETAIL "A"



TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT) TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)



SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE VII	470 K



Designed by Amber M. Lee 5/30/2019

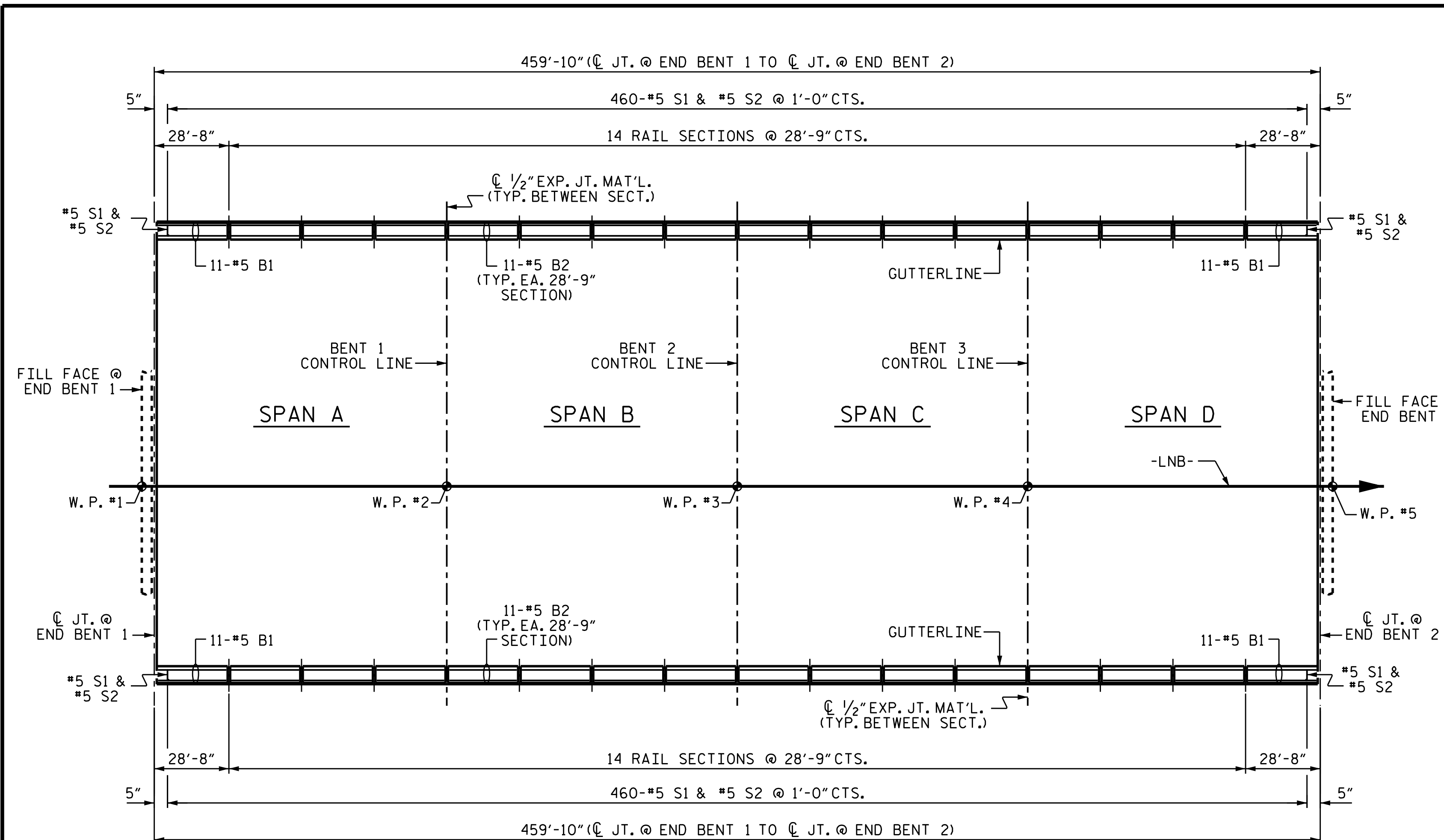
PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

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

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	
				TOTAL SHEETS
				37

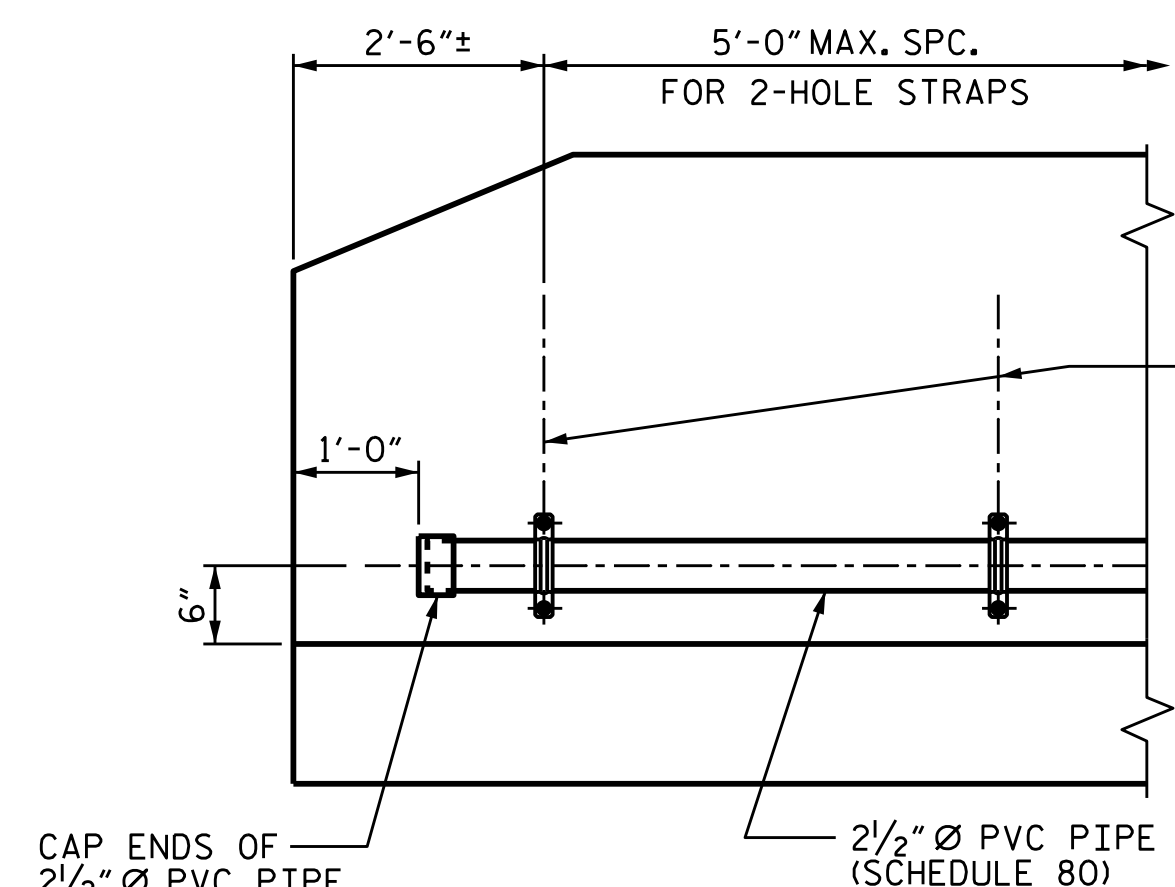
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ASSEMBLED BY : A. SORSENGINH	DATE : 11/2018
CHECKED BY : M. G. SHAIKH	DATE : 1/2019
DRAWN BY : EEM	2/97
CHECKED BY : VAP	2/97
REV. 6/13	AAC/MAA
REV. 1/15	MAA/TMG
REV. 12/17	MAA/THC



**PLAN**

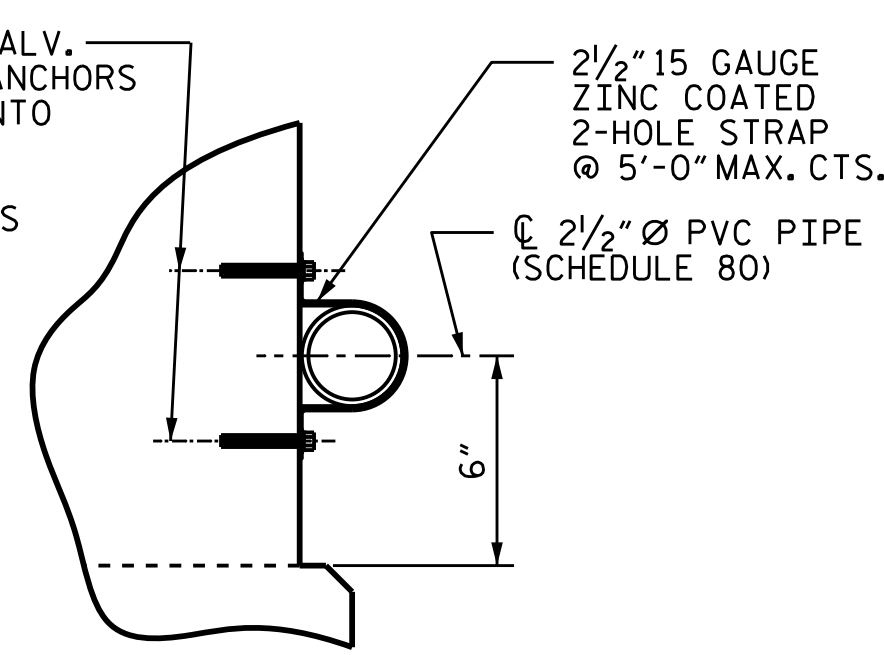
\*\* FOR REINFORCING STEEL IN THIS AREA, SEE "BARRIER RAIL - END OF RAIL DETAILS"



**ELEVATION**

**FIBER OPTIC CONDUIT SYSTEM DETAILS**

2 1/2" Ø SCHEDULE 80 PVC PIPE ATTACHED TO THE BACK OF BOTH RAILS FOR FUTURE FIBER OPTIC CABLE.



**SECTION**

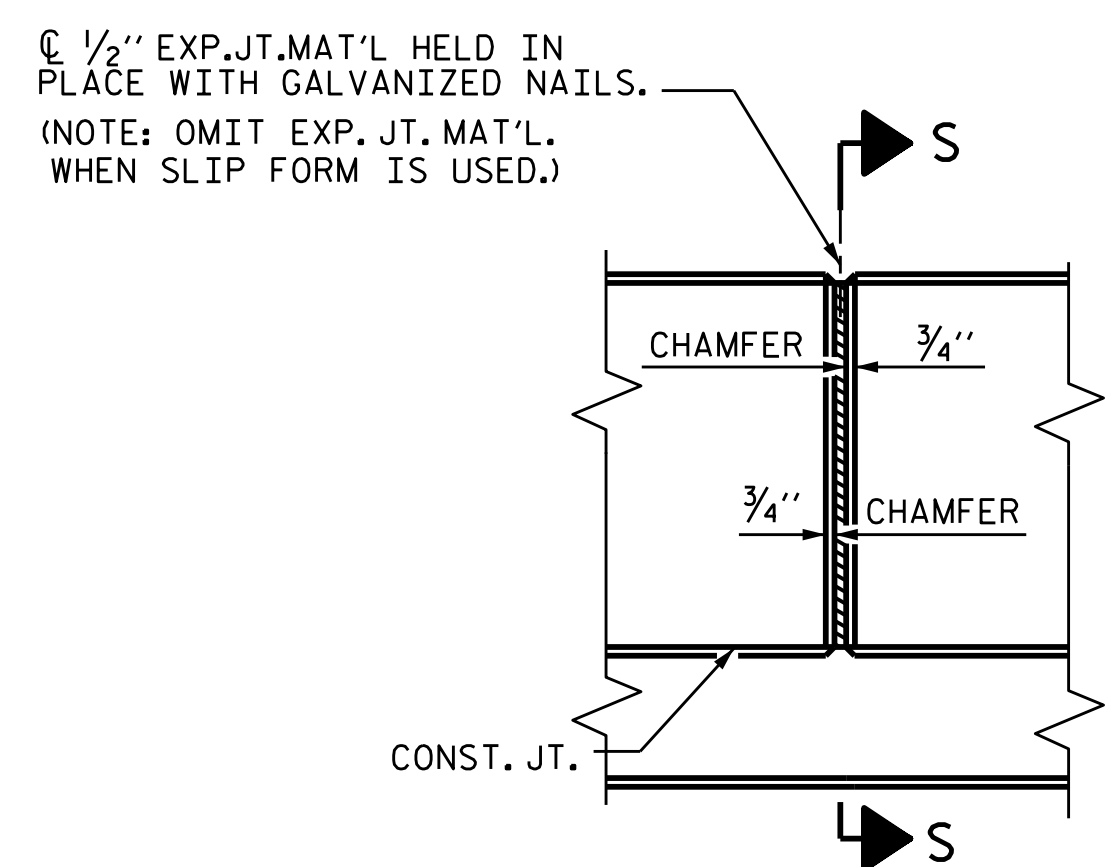
**NOTES**

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

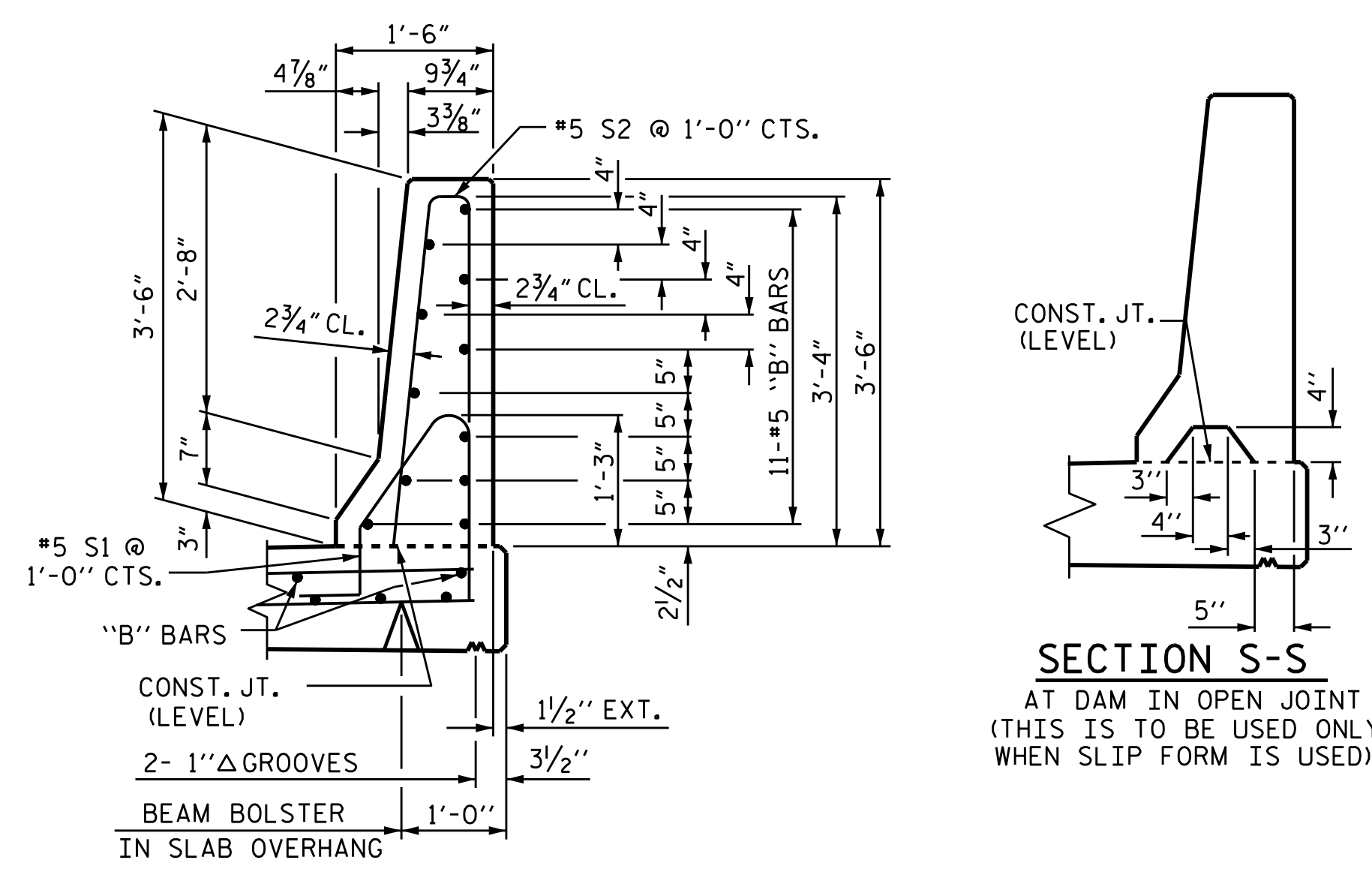
WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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.

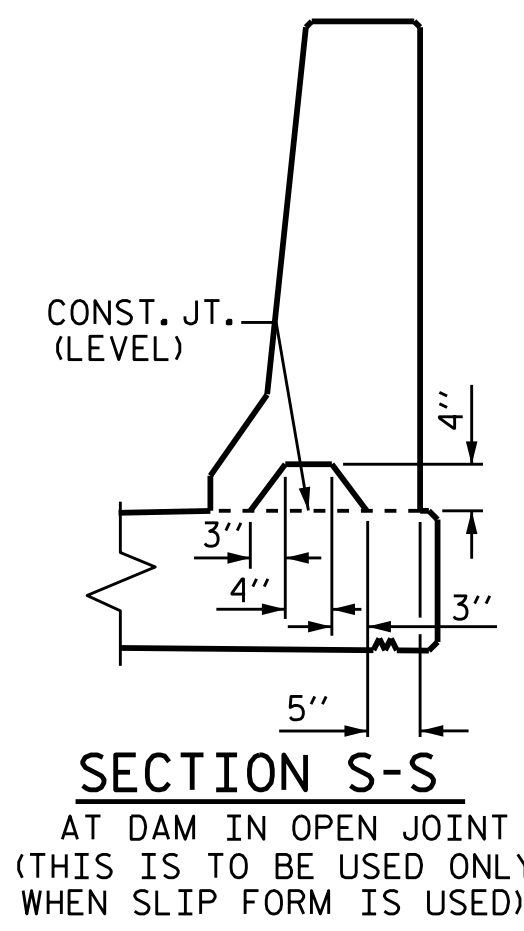


**ELEVATION AT EXPANSION JOINTS**



**SECTION THRU RAIL**

**BARRIER RAIL DETAILS**



**SECTION S-S**

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

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL**

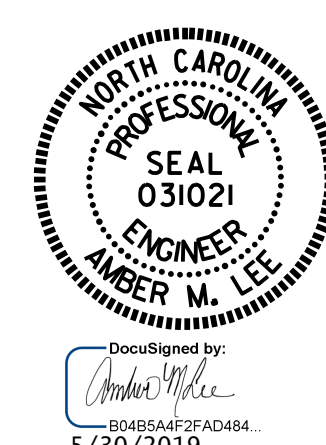
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	#5	STR	28'-3"	1296
* B2	308	#5	STR	28'-4"	9102
* S1	460	#5	1	4'-8"	2239
* S2	460	#5	2	7'-0"	3358

* EPOXY COATED REINFORCING STEEL	15,995 LBS.
CLASS AA CONCRETE	125.1 CU. YDS.
CONCRETE BARRIER RAIL	919'-6" LIN. FT.
FIBER OPTIC CONDUIT SYSTEM	919'-6" LIN. FT.

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 CONCRETE  
 BARRIER RAIL

ASSEMBLED BY :	A. SORSENGIH	DATE :	11/2018
CHECKED BY :	M. G. SHAIKH	DATE :	1/2019
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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1			3	
2			4	

S-18  
TOTAL SHEETS 37



**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.)

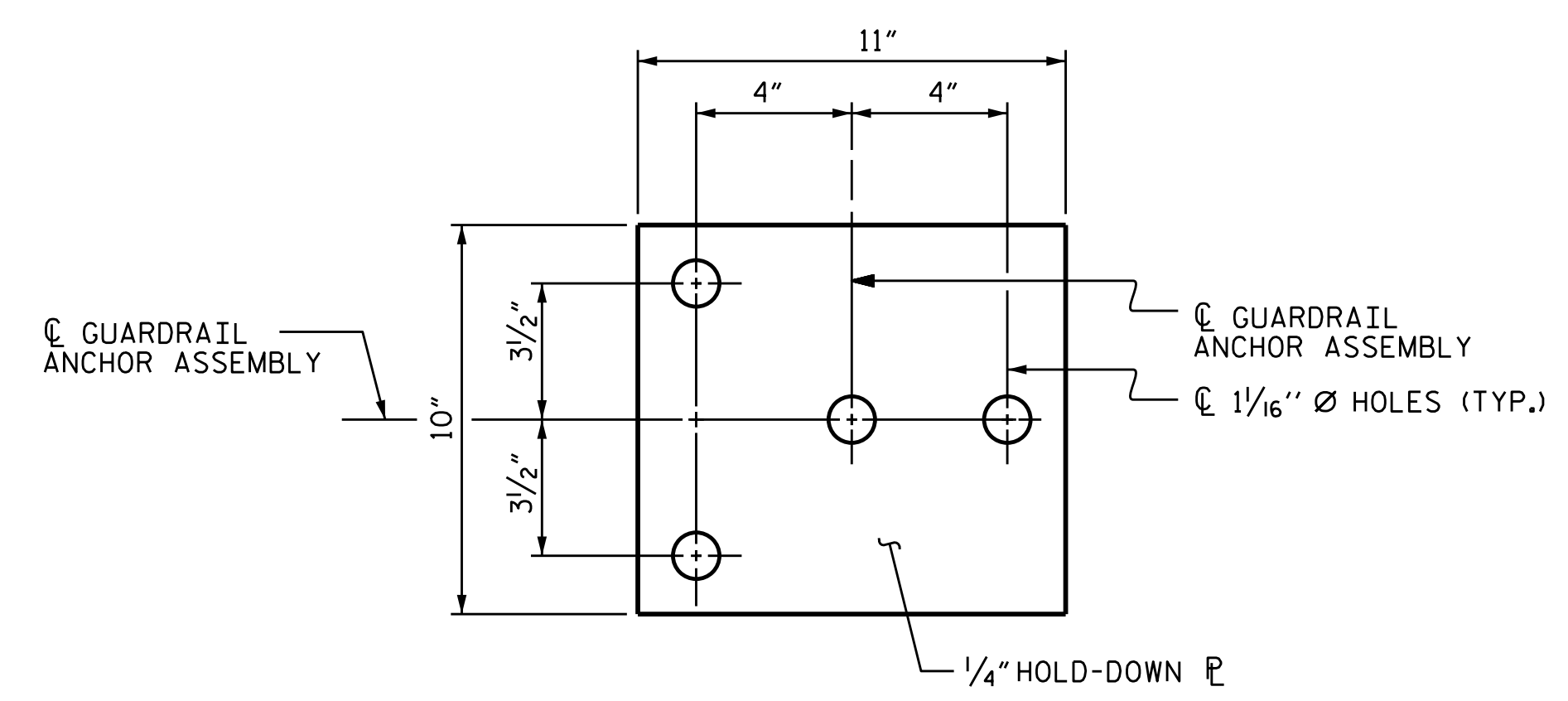
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

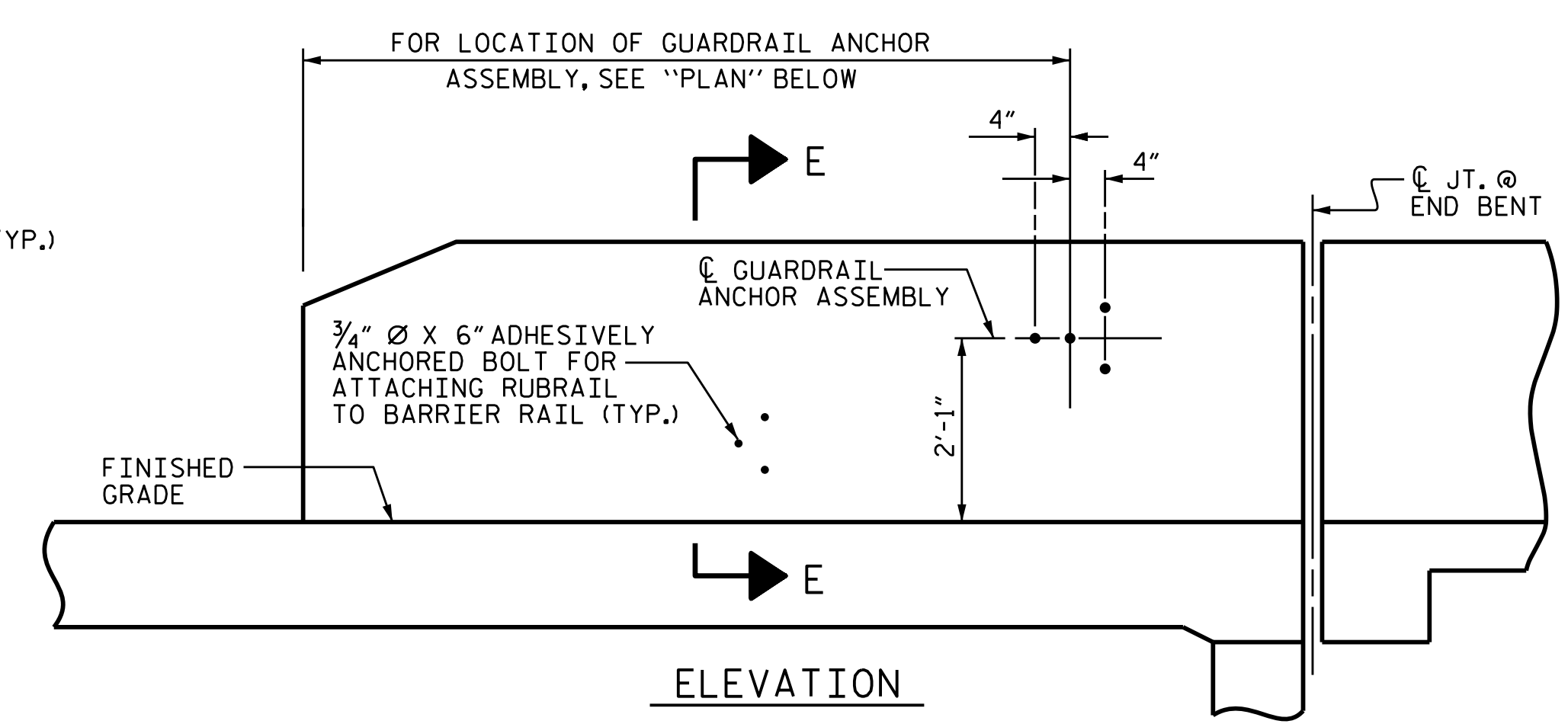
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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.

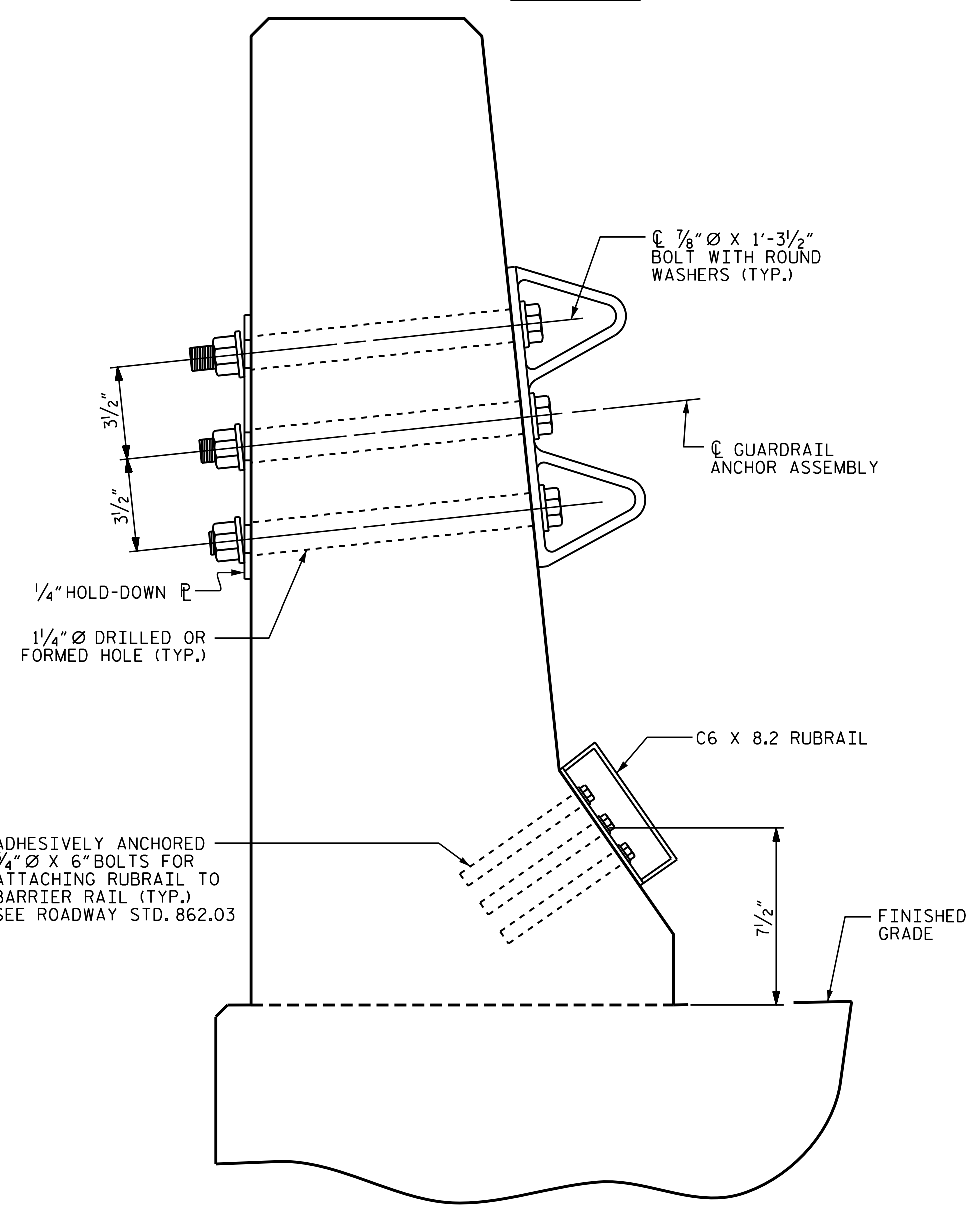
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR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



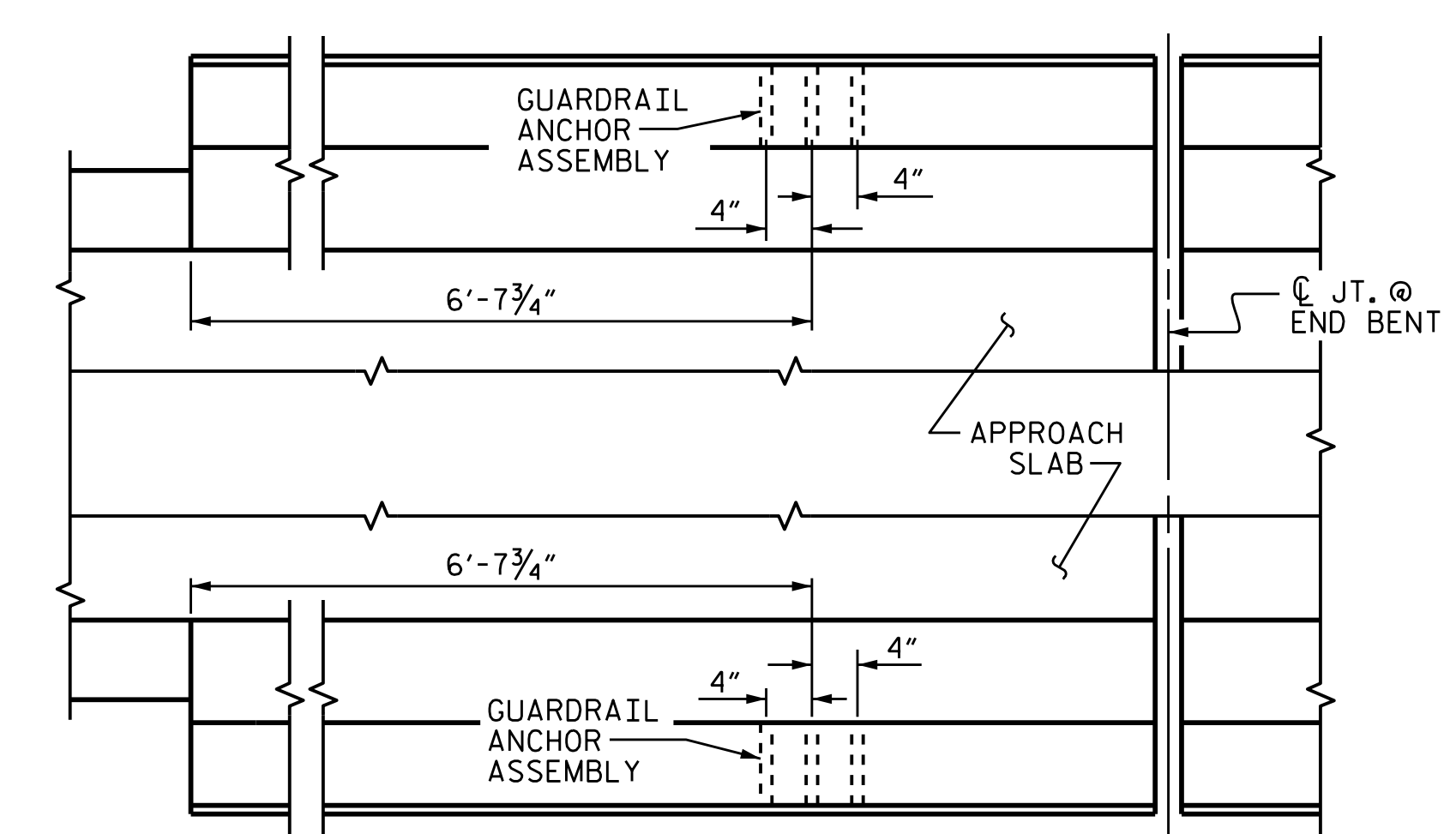
**PLAN**



**ELEVATION**



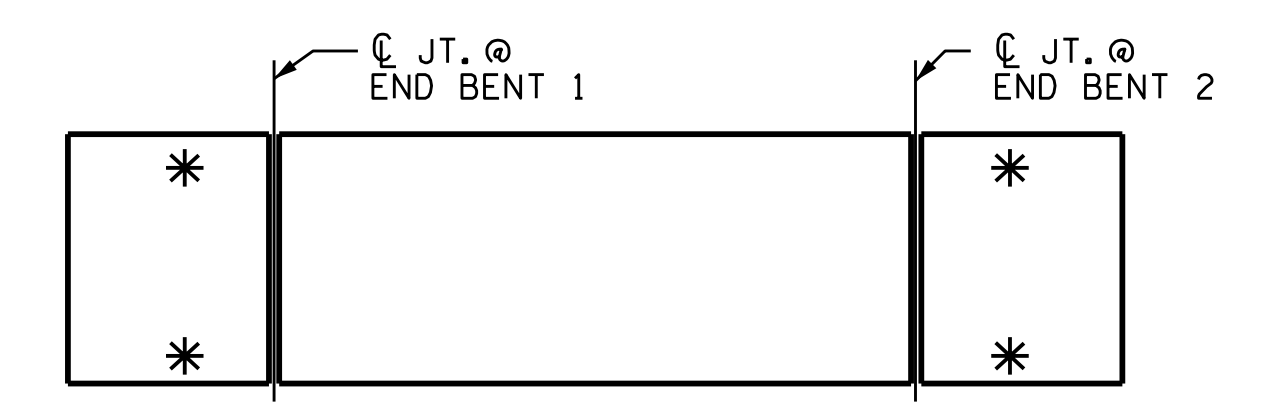
**SECTION E-E  
GUARDRAIL ANCHOR ASSEMBLY DETAILS**



**PLAN**

**LOCATION OF ANCHORS FOR GUARDRAIL**

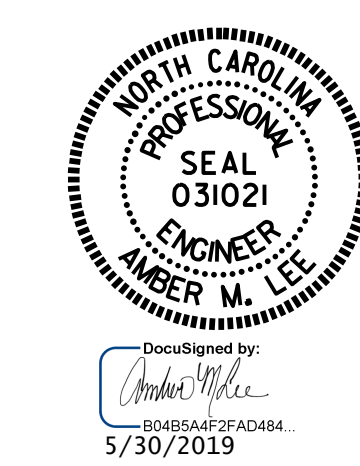
END BENT #1 SHOWN, END BENT #2 SIMILAR.



**SKETCH SHOWING POINTS OF ATTACHMENTS**

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**GUARDRAIL ANCHORAGE  
 FOR BARRIER RAIL**

ASSEMBLED BY :	A. SORSENGINH	DATE :	11/2018
CHECKED BY :	M. G. SHAIKH	DATE :	1/2019
DRAWN BY :	TLA	5/06	REV. 7/12
CHECKED BY :	GM	5/06	REV. 6/13
			REV. 12/17

30-MAY-2019 08:37  
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 amlee

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			37

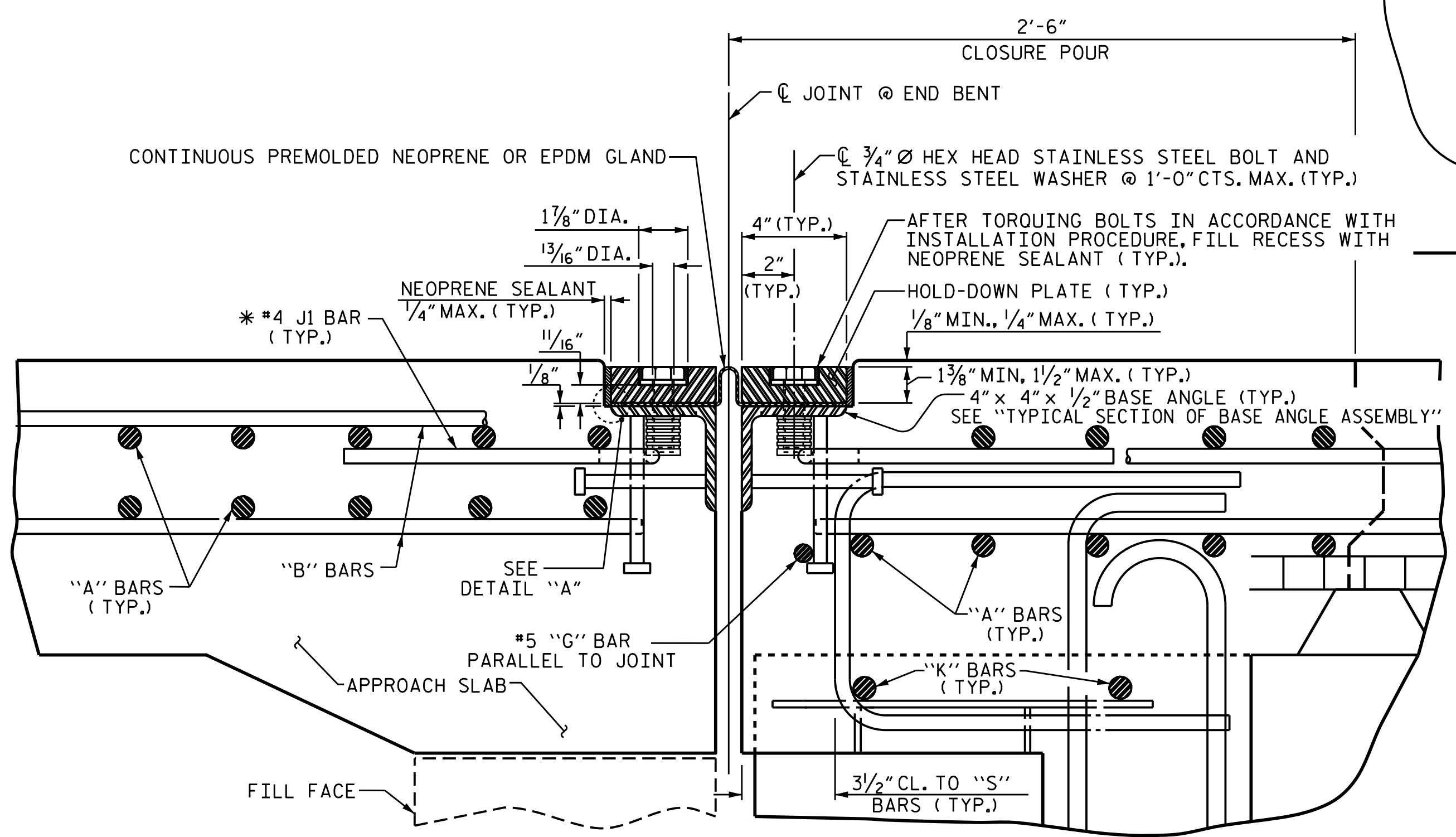
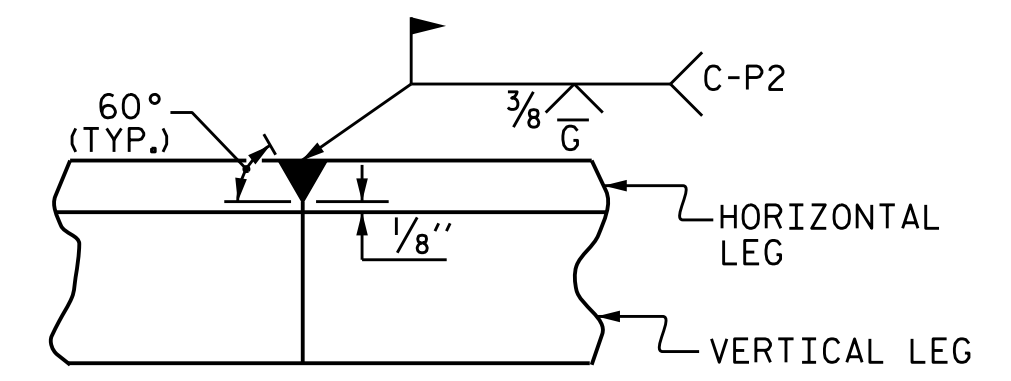
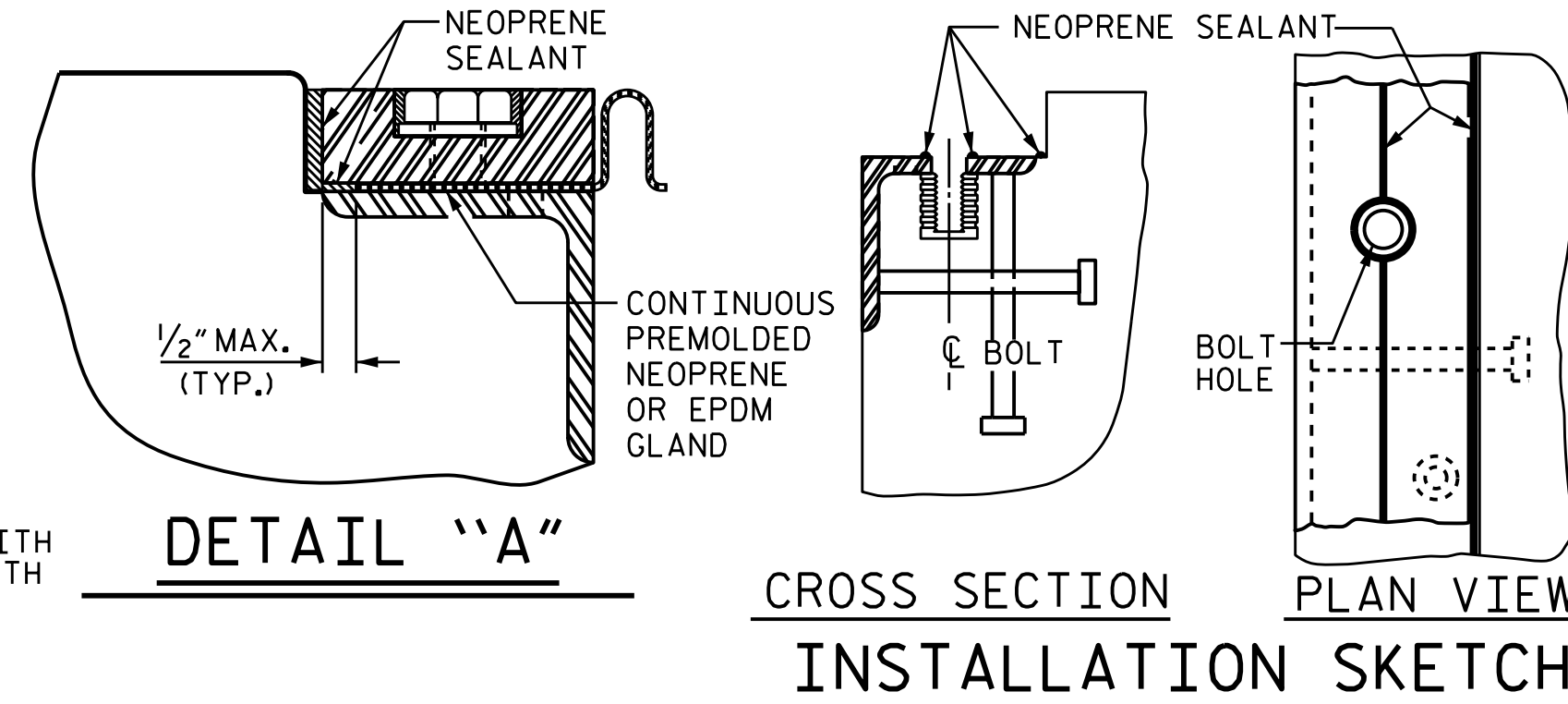


**INSTALLATION PROCEDURE**

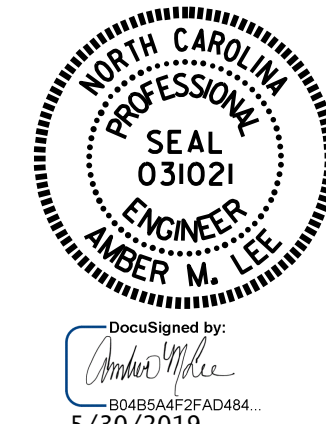
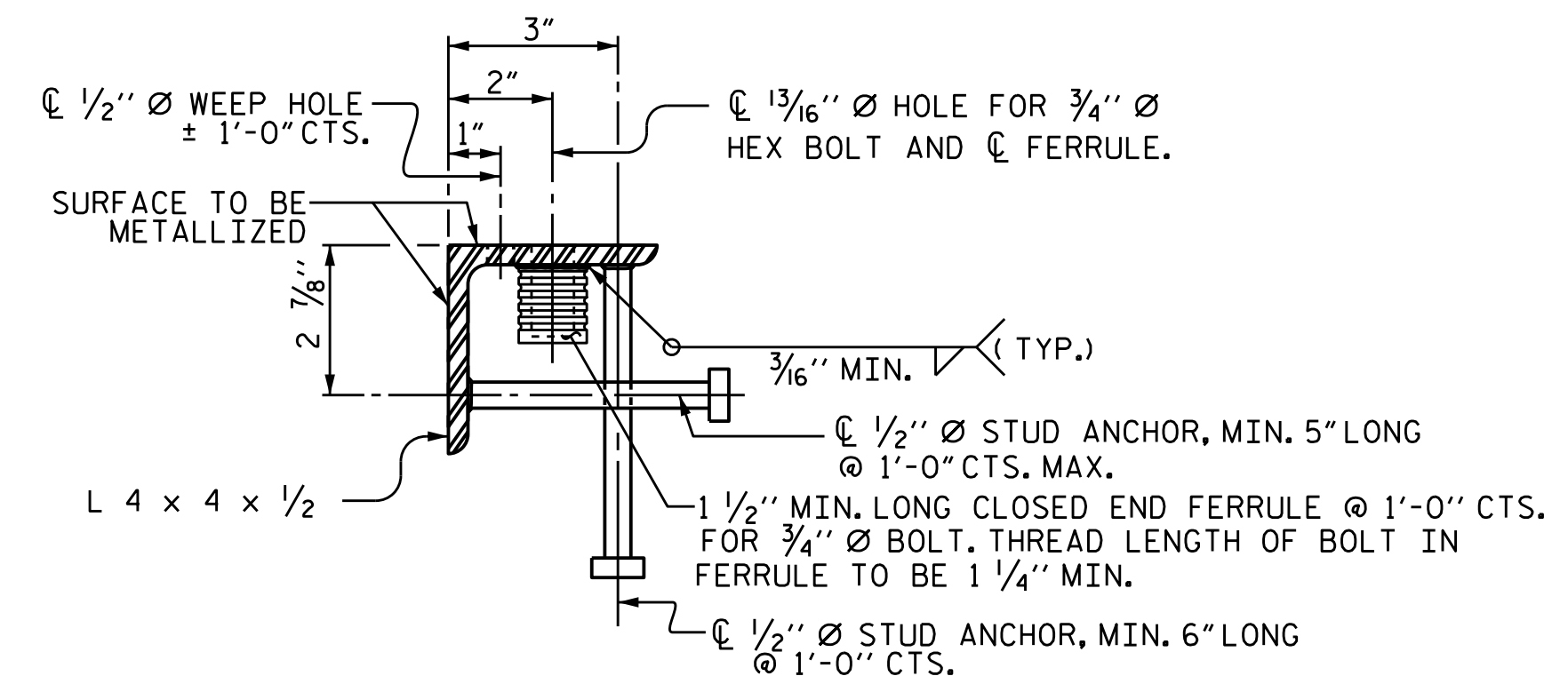
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED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

**GENERAL NOTES**

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



MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG CL RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	90	1 1/16"	2"	1 3/4"	1 1/4"
2	90	1 1/16"	2"	1 3/4"	1 1/4"



PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-  
 SHEET 1 OF 2

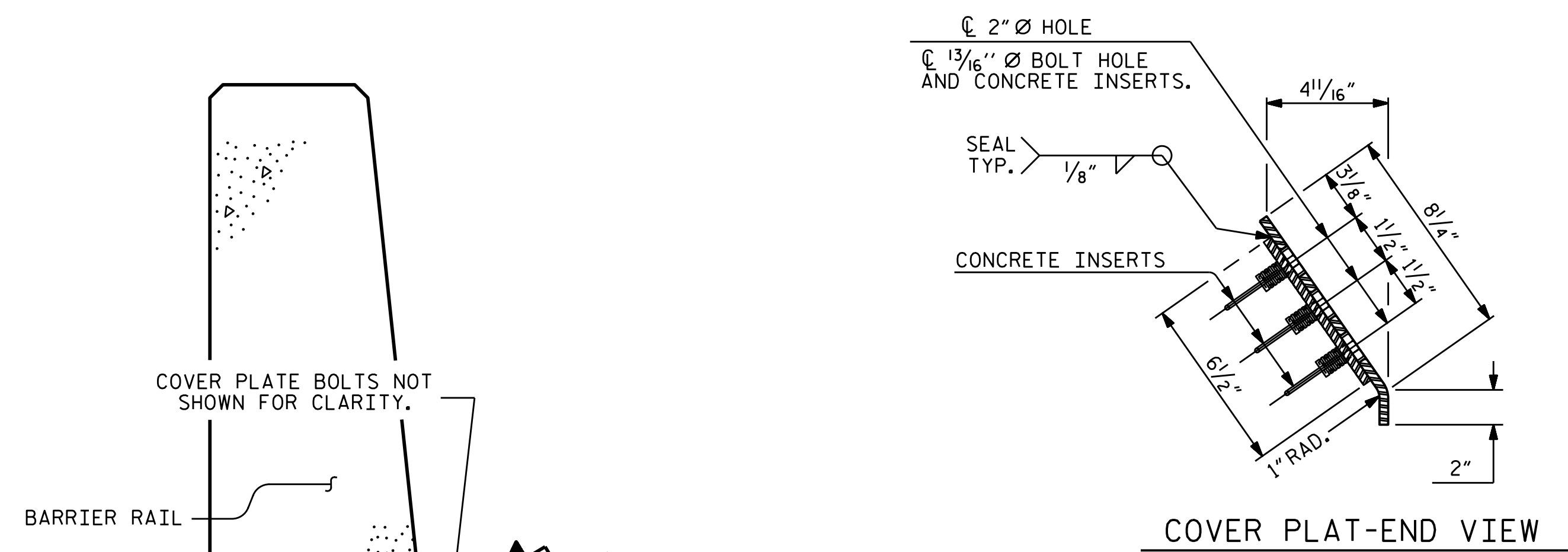
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 EXPANSION JOINT  
 SEAL DETAILS

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	S-20
1			3	TOTAL SHEETS
2			4	37

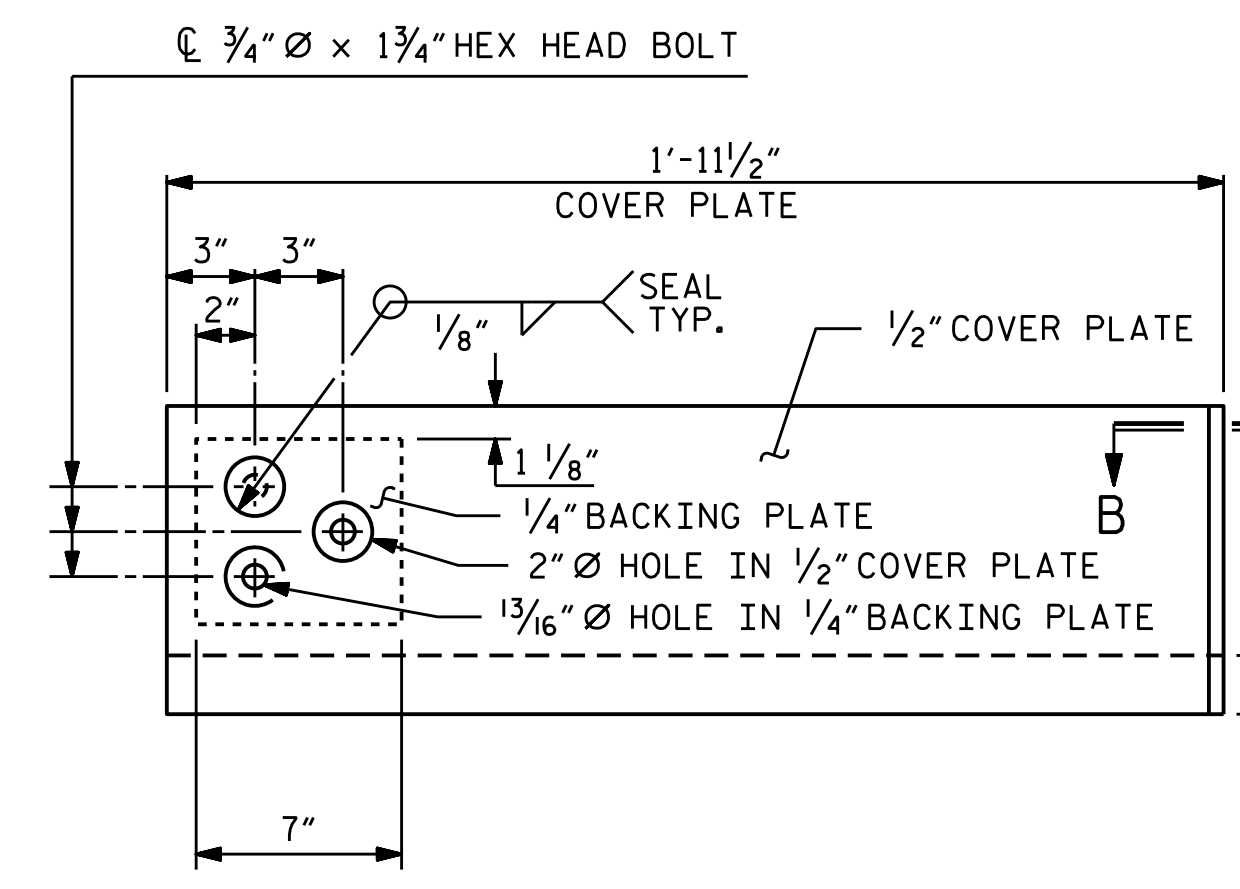
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : A. SORSENGINH	DATE : 11/2018
CHECKED BY : M. G. SHAIKH	DATE : 1/2019
DRAWN BY : REK 9/87	REV. 10/17/1 MAA/GM
CHECKED BY : CRK 10/87	REV. 10/17 MAA/THC
	REV. 6/18 MAA/THC

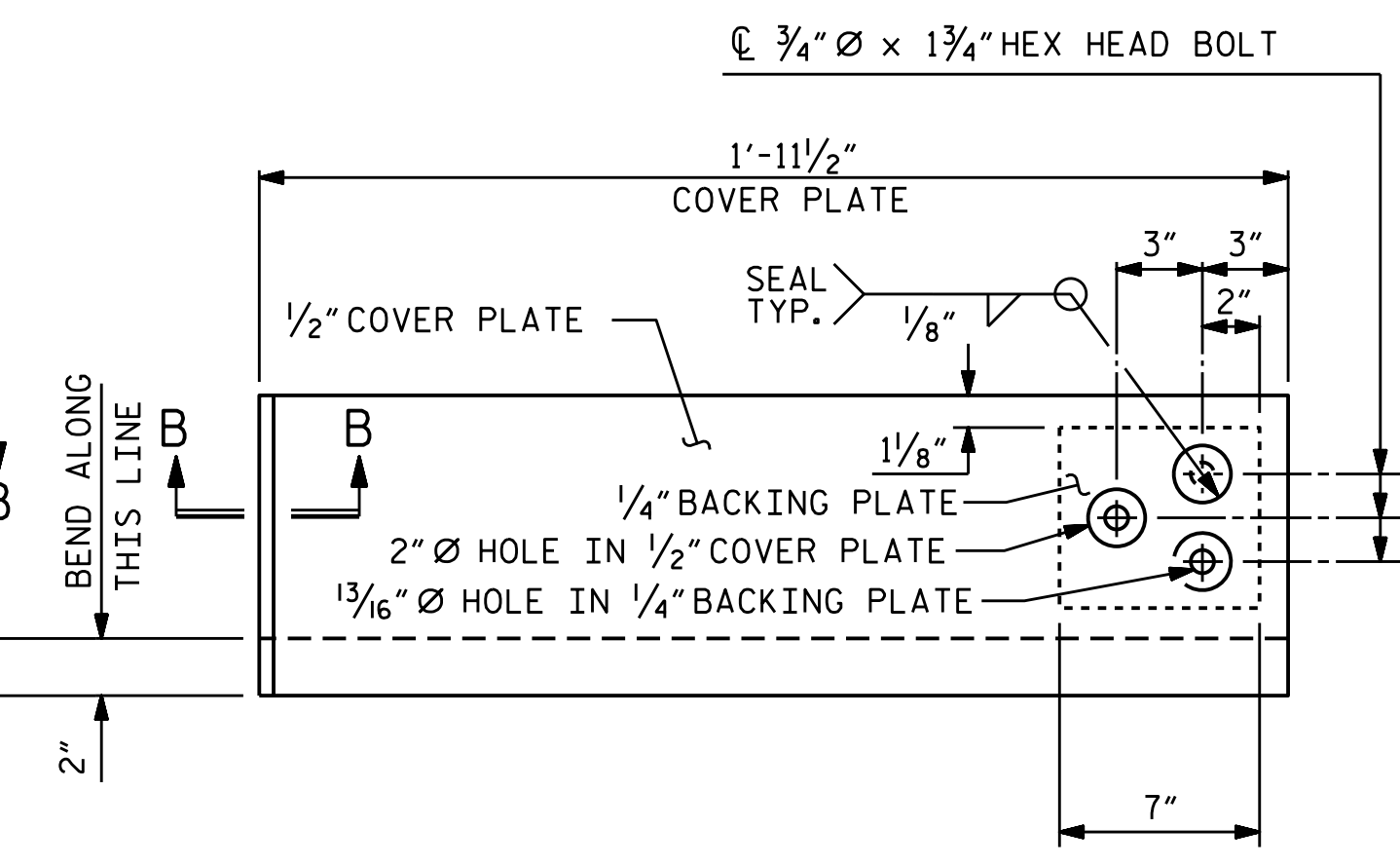




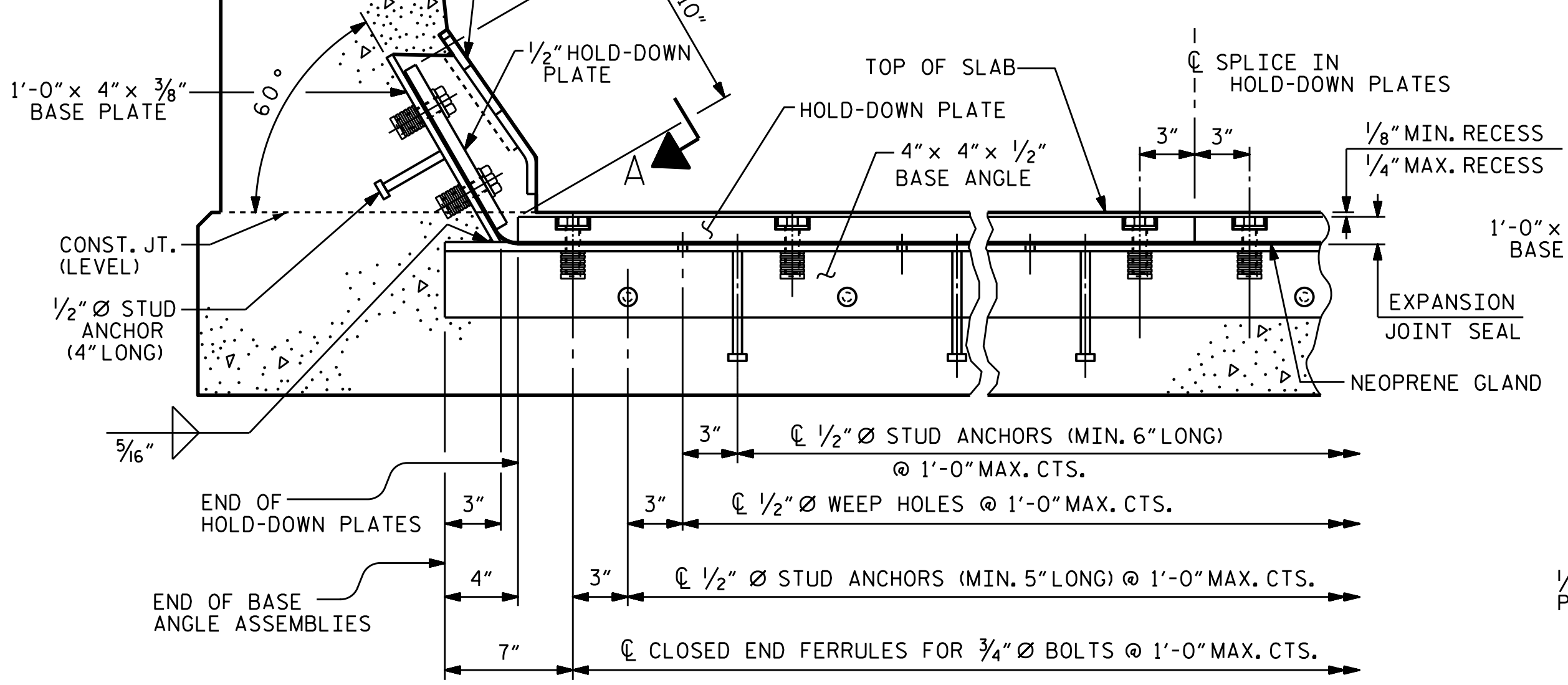
COVER PLAT-END VIEW



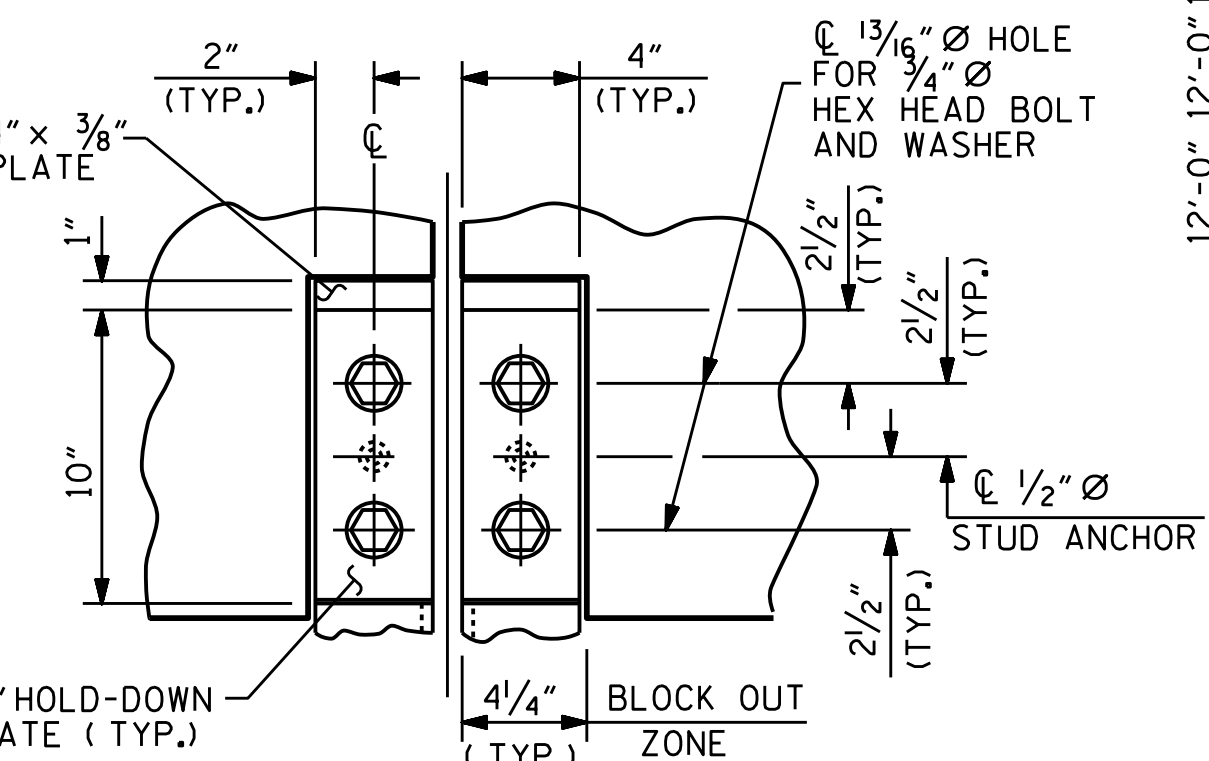
TYPE I - ELEVATION VIEW



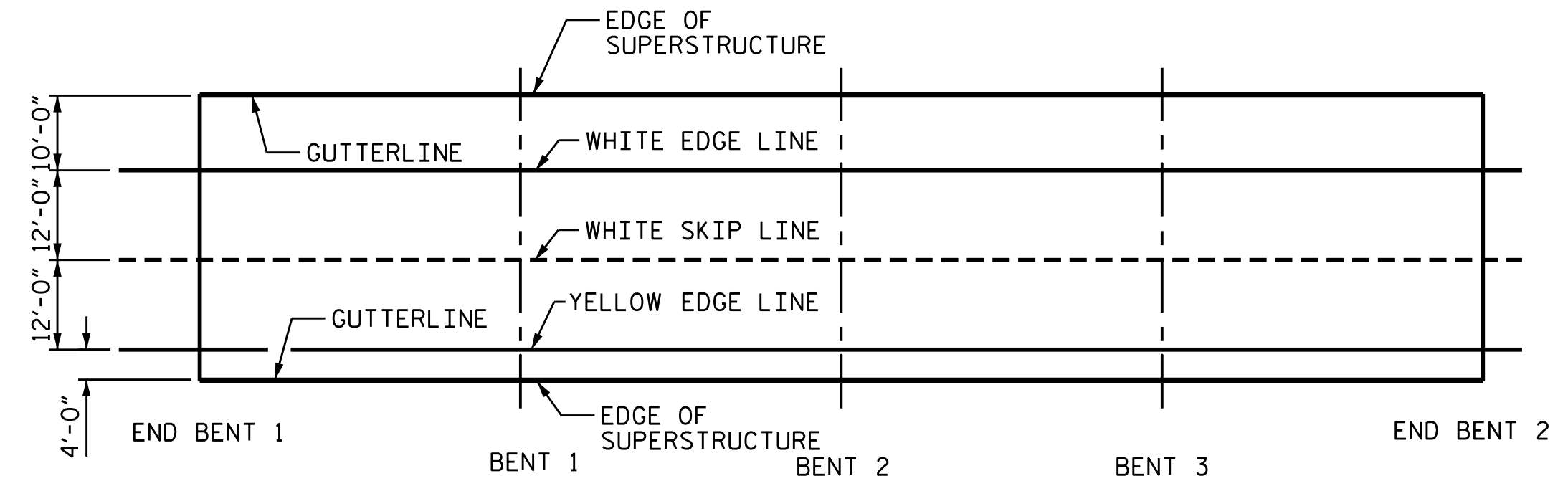
TYPE II - ELEVATION VIEW



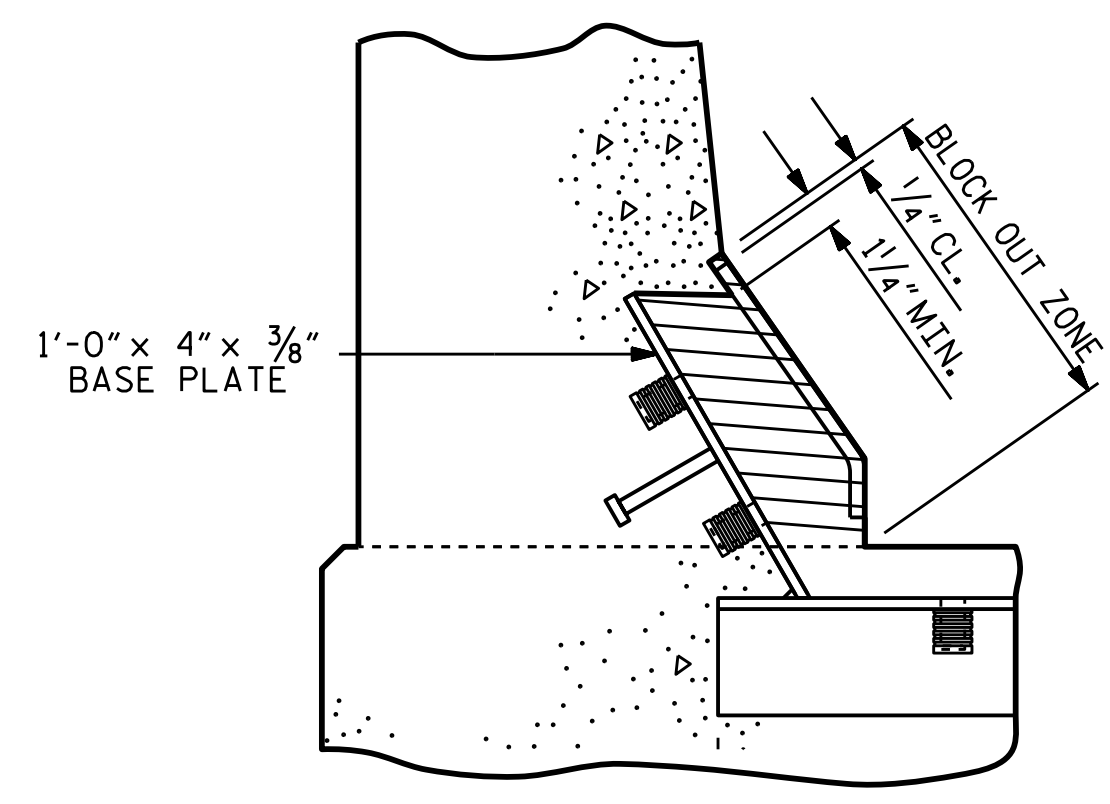
SECTION THRU RAIL NORMAL TO JOINT



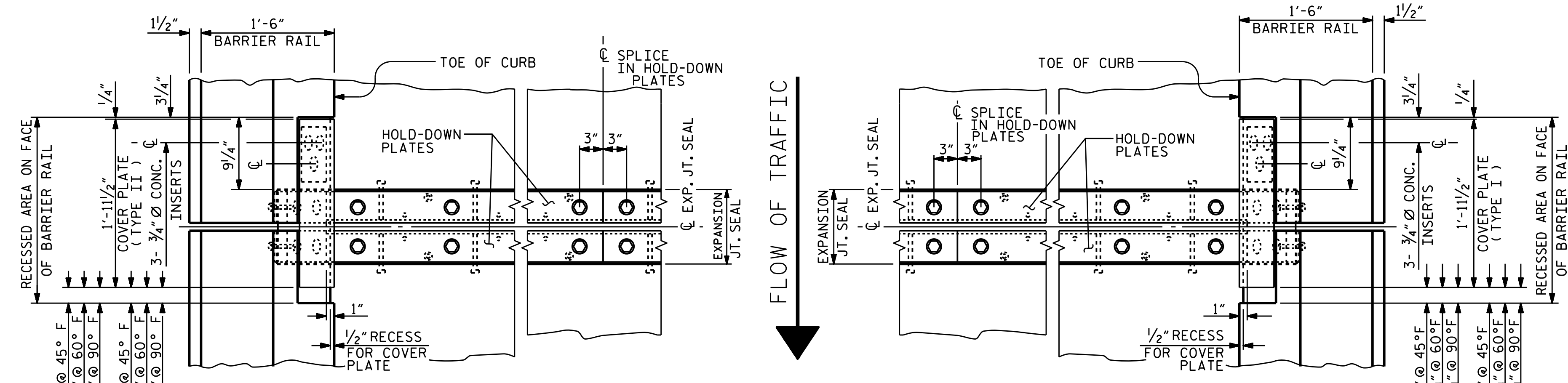
SECTION A - A



PAVEMENT MARKING ALIGNMENT

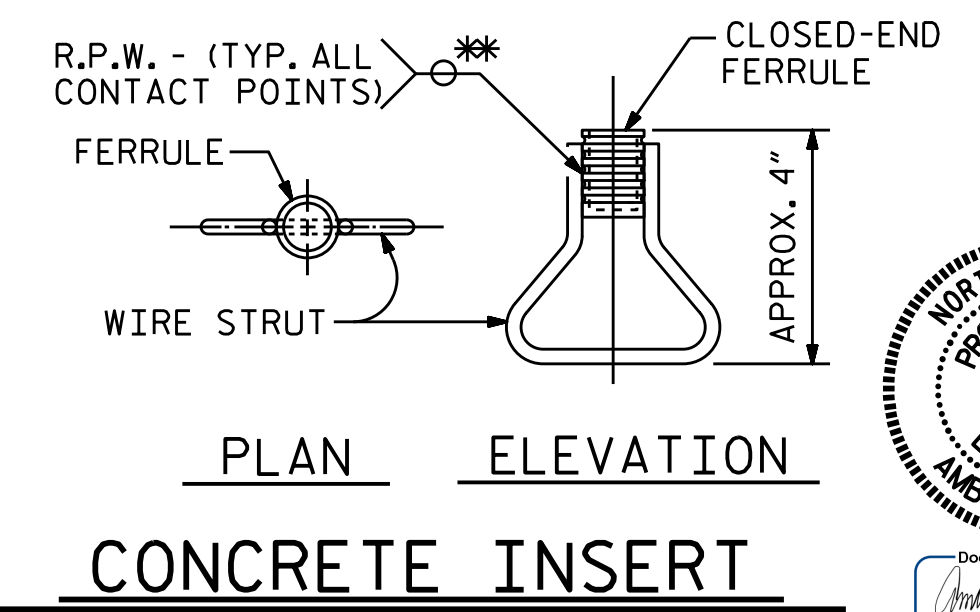


SECTION B - B



PLAN OF EXPANSION JOINT SEAL

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



CONCRETE INSERT

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



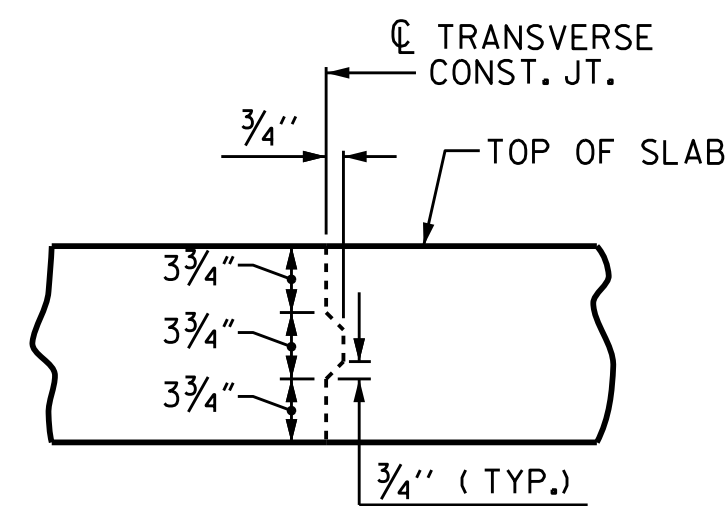
PROJECT NO. B-5389  
YADKIN COUNTY  
STATION: 20+65.50 -LNB-  
SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
EXPANSION JOINT  
SEAL DETAILS  
FOR BARRIER RAIL

ASSEMBLED BY :	A. SORSENGIH	DATE :	11/2018
CHECKED BY :	M. G. SHAIKH	DATE :	1/2019
DRAWN BY :	REK 9/87	REV. 7/12	MAA/GM
CHECKED BY :	CRK 10/87	REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC

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

SHEET NO. S-21			
TOTAL SHEETS 37			



**TRANSVERSE CONSTRUCTION JOINT DETAIL**

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

**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"			

**GROOVING BRIDGE FLOORS**

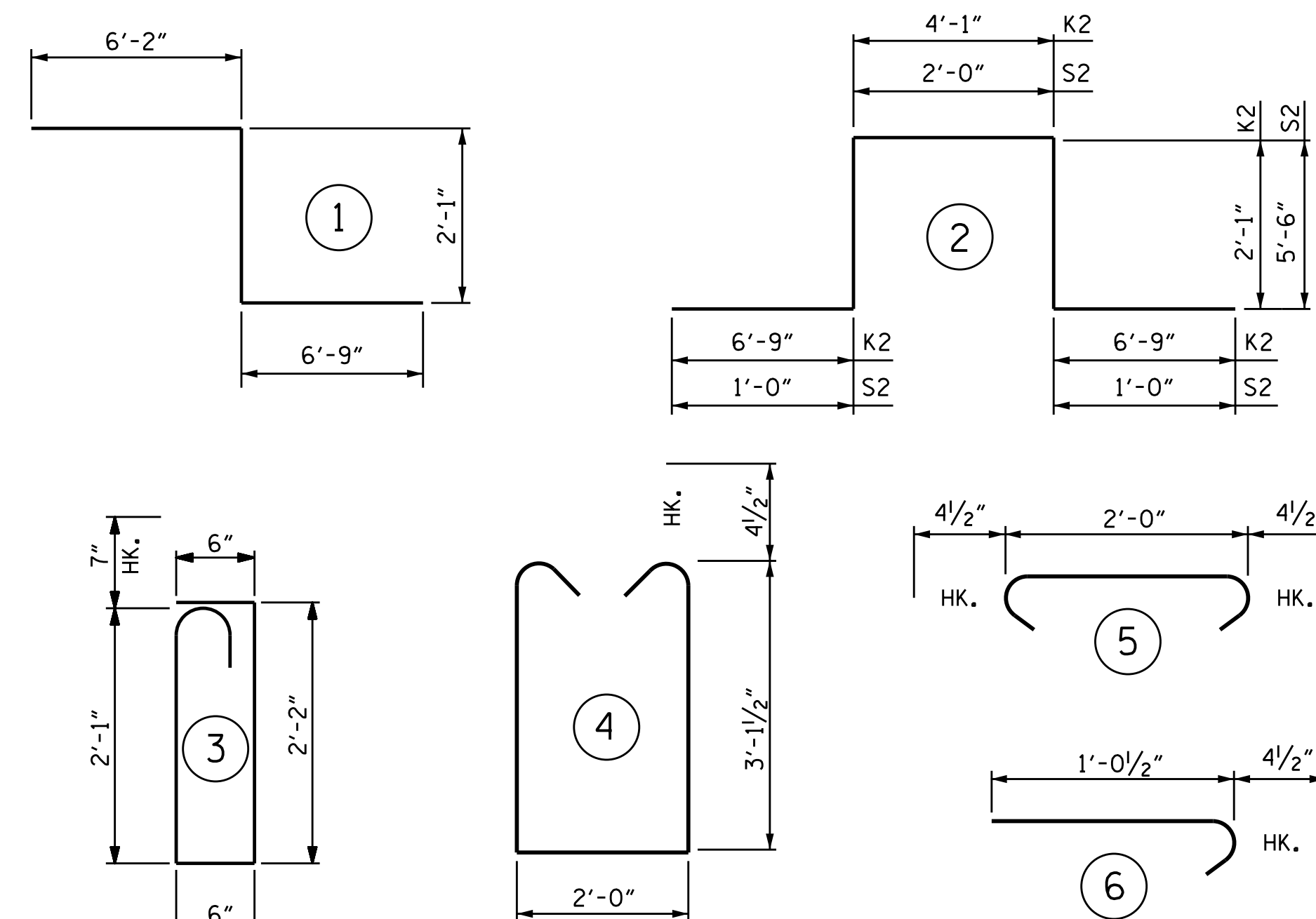
APPROACH SLABS	1663 SO.FT.
BRIDGE DECK	16,045 SO.FT.
<b>TOTAL</b>	<b>17,708 SO.FT.</b>

**REINFORCING BAR SCHEDULE SPANS A THRU D**

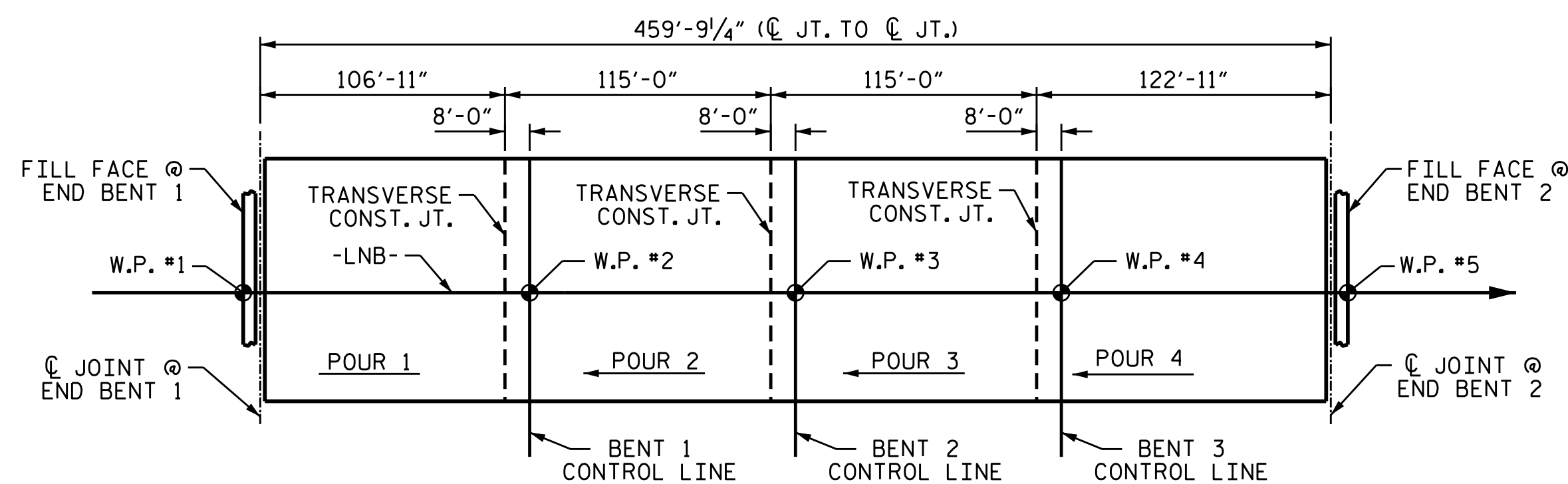
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	848	#5	STR	40'-11"	36,189
A2	848	#5	STR	40'-11"	36,189
* B1	198	#4	STR	27'-2"	3593
* B2	198	#5	STR	40'-9"	8415
* B3	192	#5	STR	34'-6"	6909
* B4	132	#4	STR	21'-0"	1852
B5	264	#5	STR	59'-4"	16,338
* G1	2	#5	STR	40'-11"	85
* J1	76	#4	6	1'-5"	72
* K1	8	#8	1	15'-0"	320
* K2	8	#8	2	21'-9"	465
K3	72	#4	STR	10'-0"	481
K4	18	#4	STR	7'-1"	85
K5	18	#4	STR	7'-5"	89
K6	36	#4	STR	17'-3"	415
* S1	48	#5	3	5'-10"	292
* S2	72	#4	2	15'-0"	721
S3	18	#4	4	9'-0"	108
S4	414	#4	5	2'-9"	761

REINFORCING STEEL = 54,466 LBS.  
\* EPOXY COATED REINF. STEEL = 58,913 LBS.

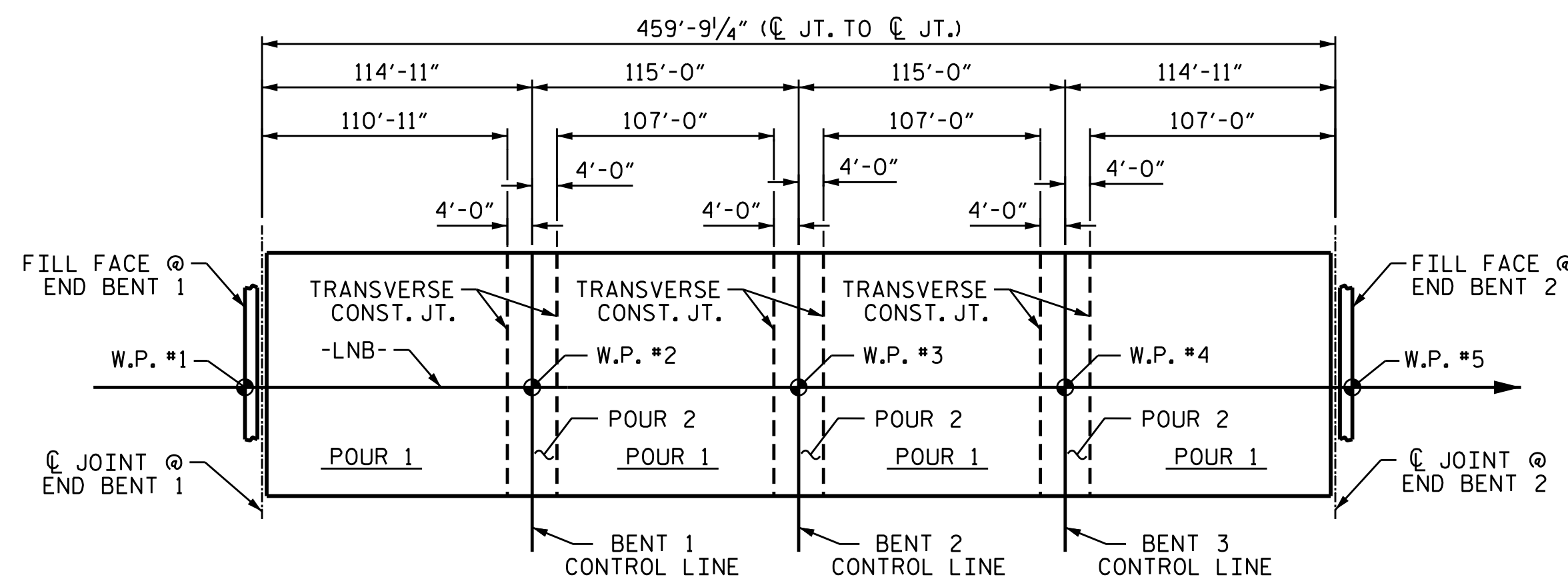
**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

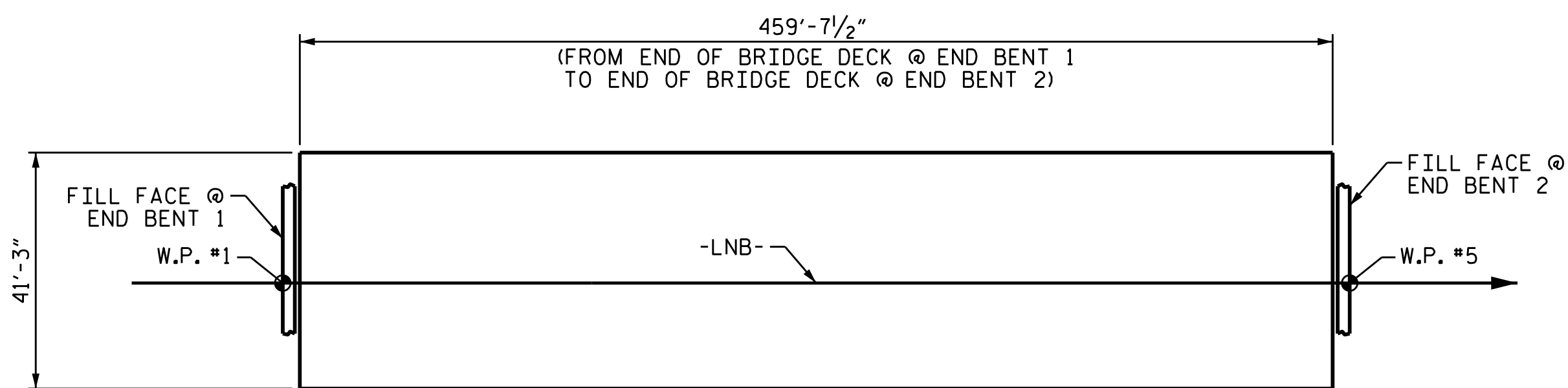


**POURING SEQUENCE**



**OPTIONAL POURING SEQUENCE**

POUR #2 CANNOT BE STARTED UNTIL BOTH ADJACENT #1 POURS REACH A MINIMUM OF 3000 PSI.



**LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB ( SQ. FT. = 18,960 )**

**SUPERSTRUCTURE BILL OF MATERIAL**

	CLASS AA CONCRETE	REINFORCING STEEL	
		(CU. YDS.)	(LBS.)
SPAN A, B, C AND D	POUR #1	145.7	54,466
	POUR #2	169.3	
	POUR #3	169.3	
	POUR #4	181.8	
<b>TOTALS **</b>	<b>666.1</b>	<b>54,466</b>	<b>58,913</b>

\*\* QUANTITIES FOR BARRIER RAIL IS NOT INCLUDED



PROJECT NO. B-5389  
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STATION: 20+65.50 -LNB-

STATE OF NORTH CAROLINA  
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RALEIGH

**SUPERSTRUCTURE BILL OF MATERIAL**

ASSEMBLED BY : M. G. SHAIKH	DATE : 11/2018
CHECKED BY : A. SORSENGINH	DATE : 12/2018
DRAWN BY : JMB 5/87	REV. 6/1/94 EEM/GRP
CHECKED BY : SJD 9/87	REV. 8/16/99 RWW/LES
	REV. 5/1/06 TLA/GM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

S-22  
TOTAL SHEETS  
37

STD. NO. BOM2



**NOTES**

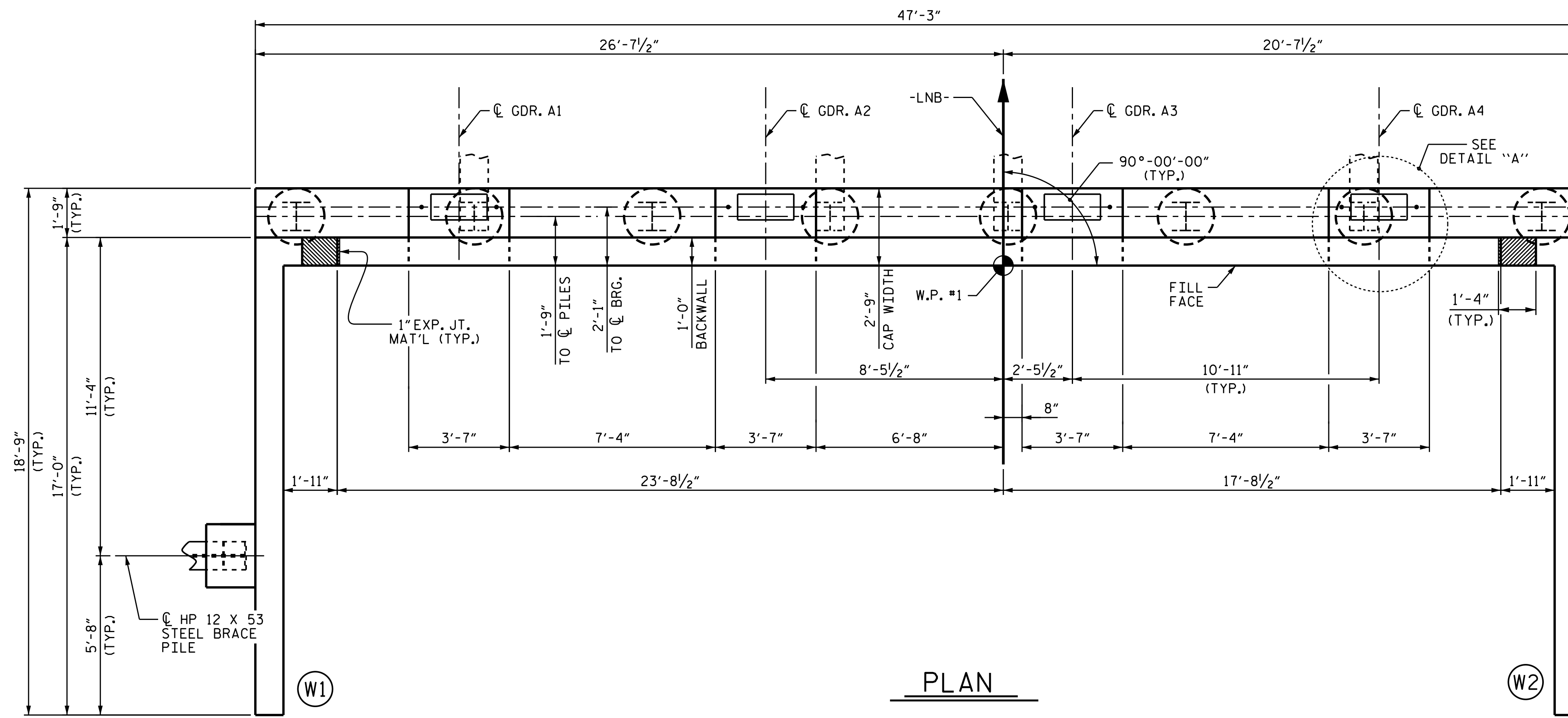
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

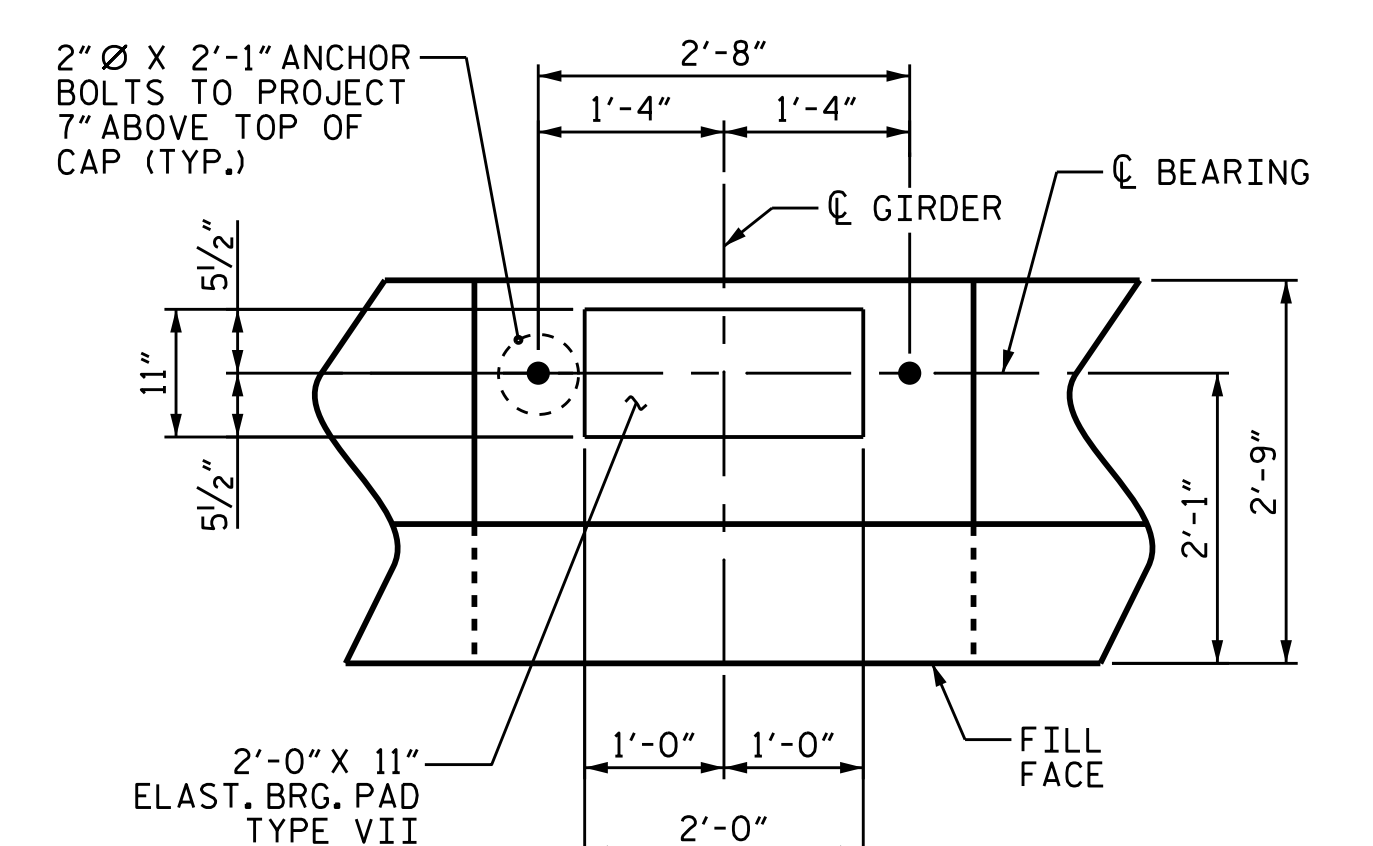
THE TOP SURFACE AREA OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

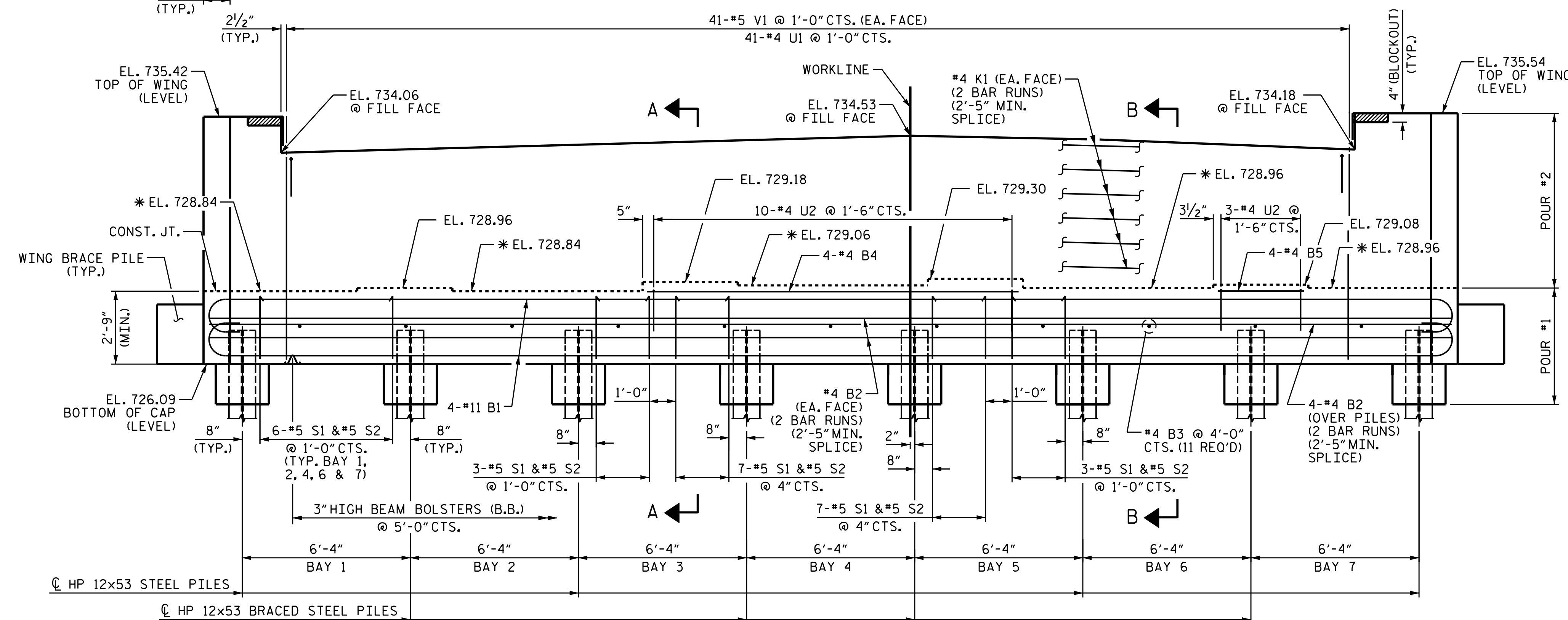
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.



**PLAN**



**DETAIL "A"**



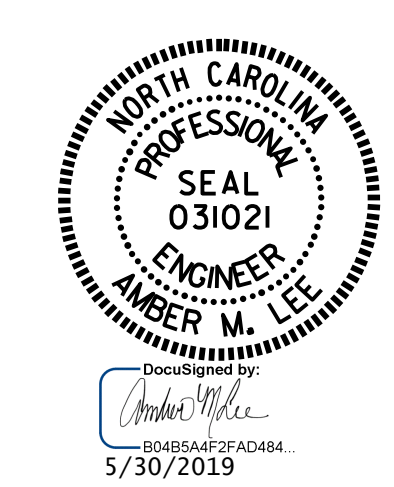
**ELEVATION**

(FOR CLARITY BRACE PILE IN WING NOT SHOWN)

\* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A & B-B, SHEET 3 OF 3.

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 1 OF 3



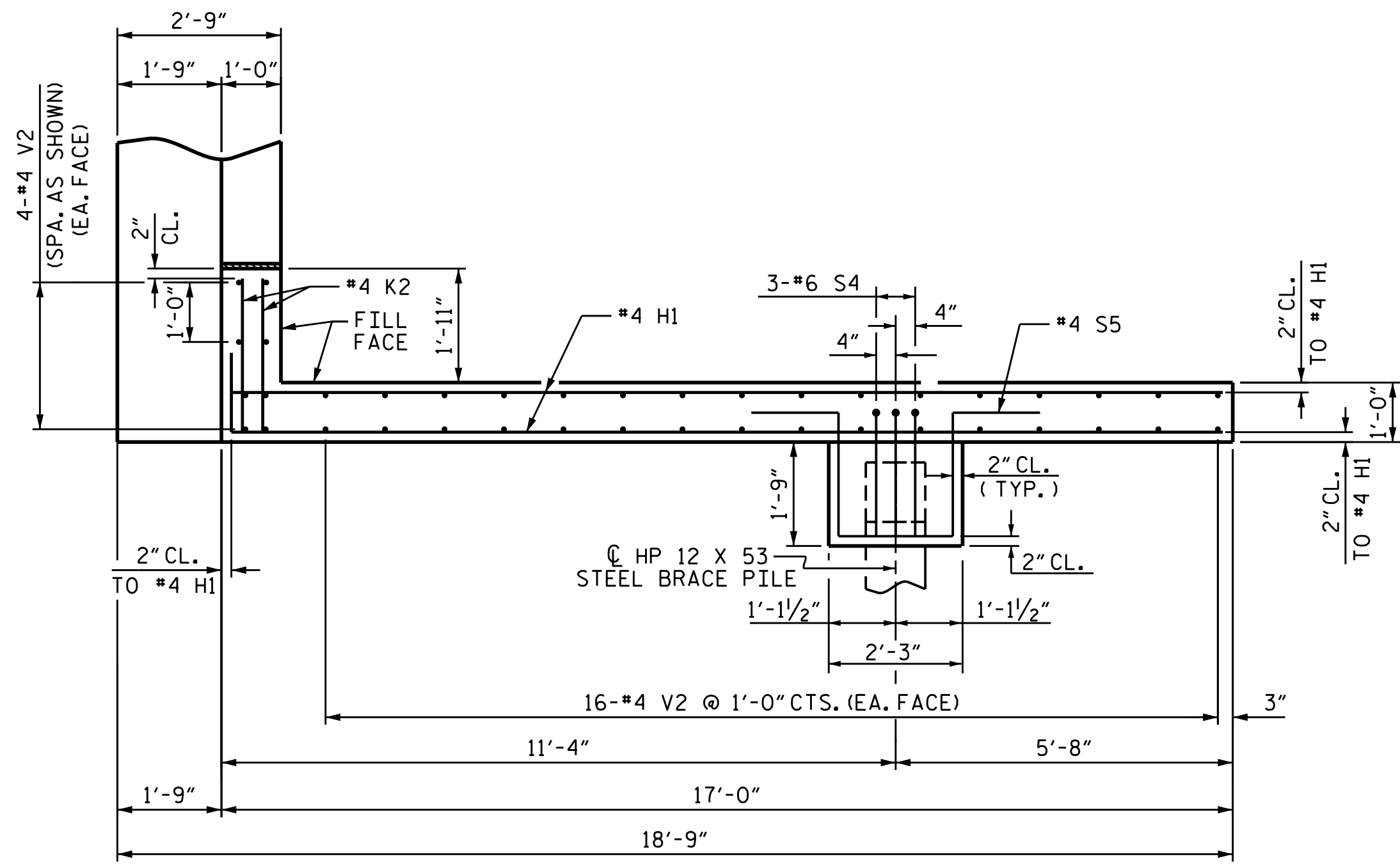
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**END BENT 1**

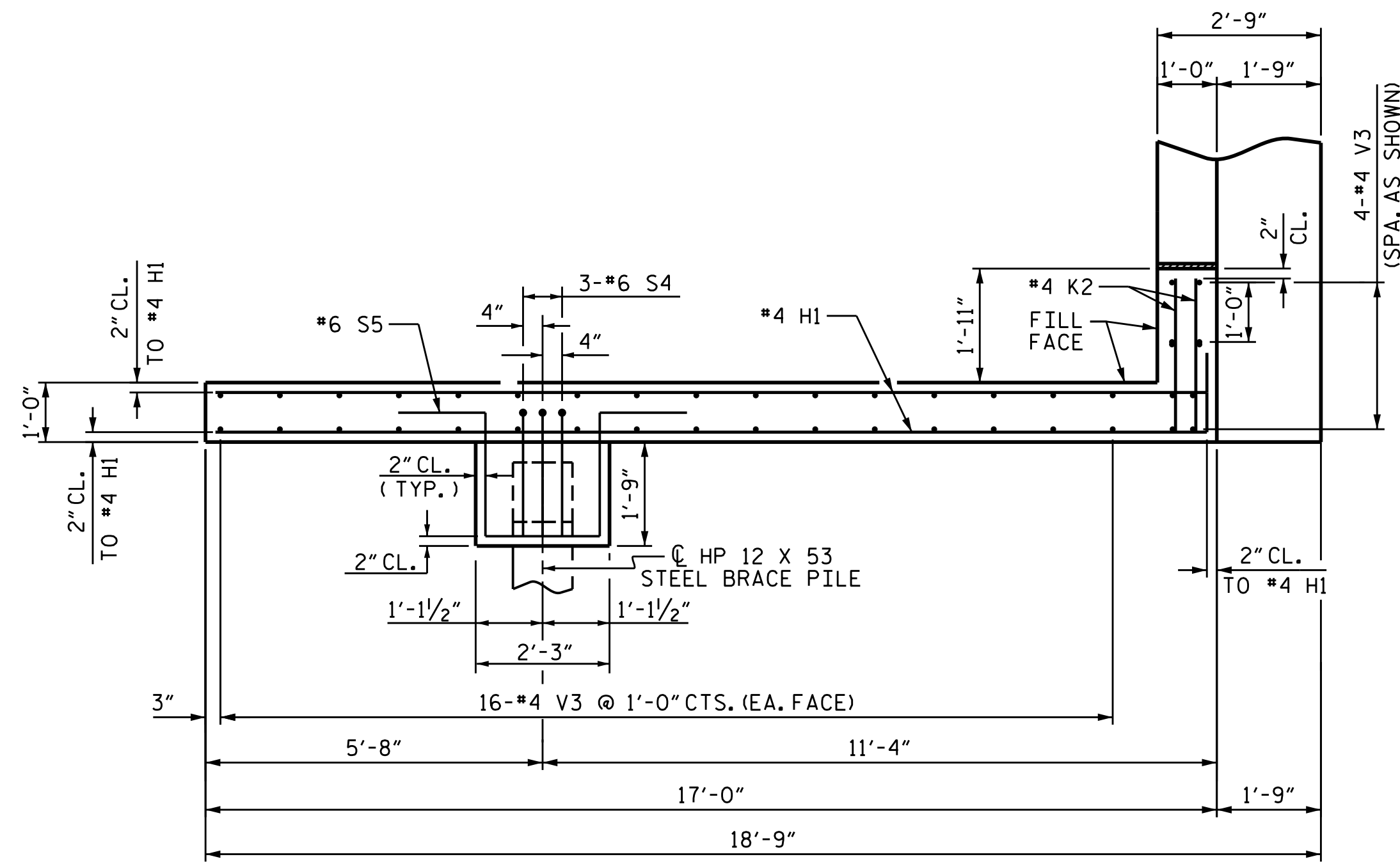
DRAWN BY: M.G. SHAIKH DATE: 01-2019  
 CHECKED BY: A. SORSENGINH DATE: 01-2019  
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 01-2019

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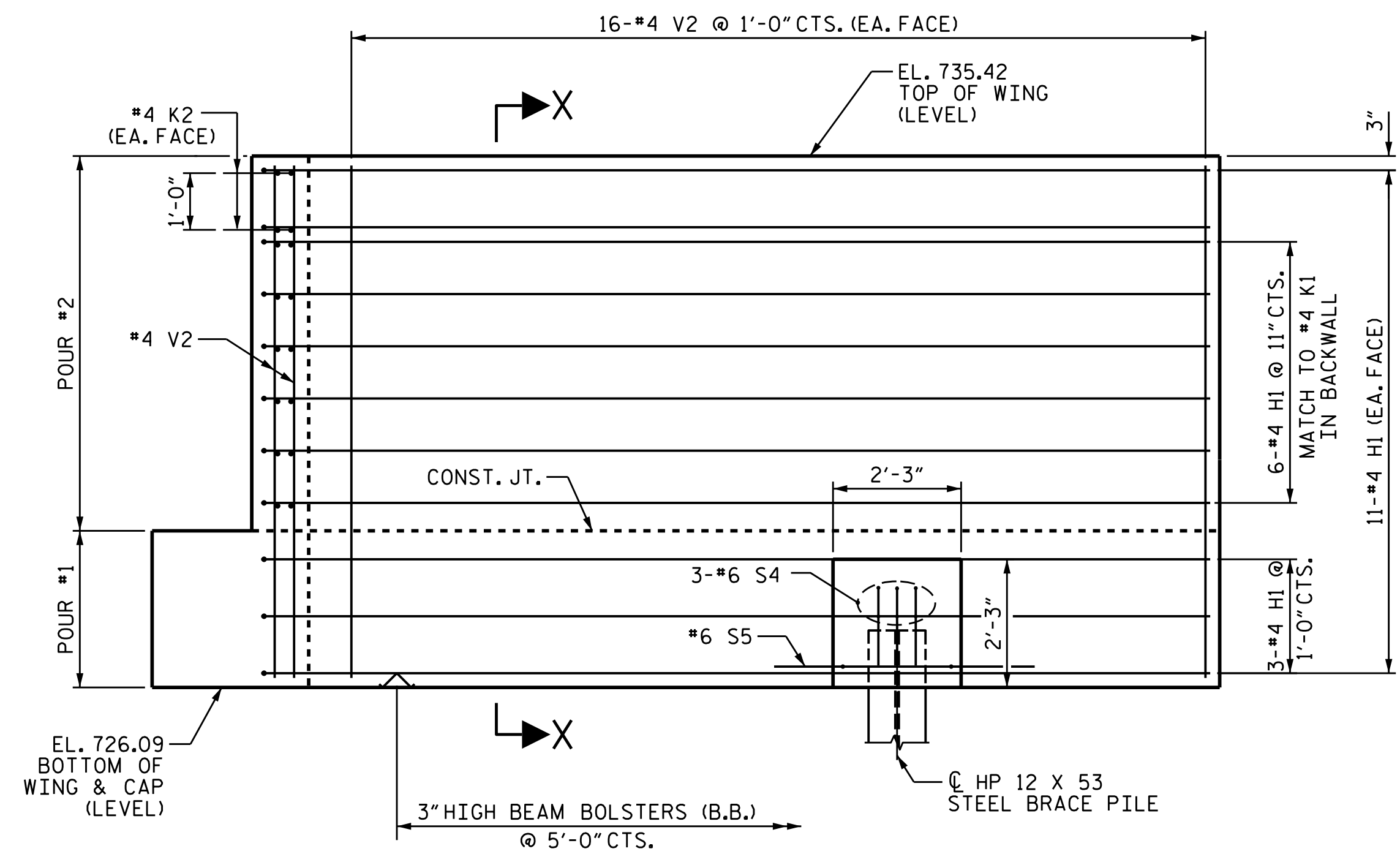
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			37



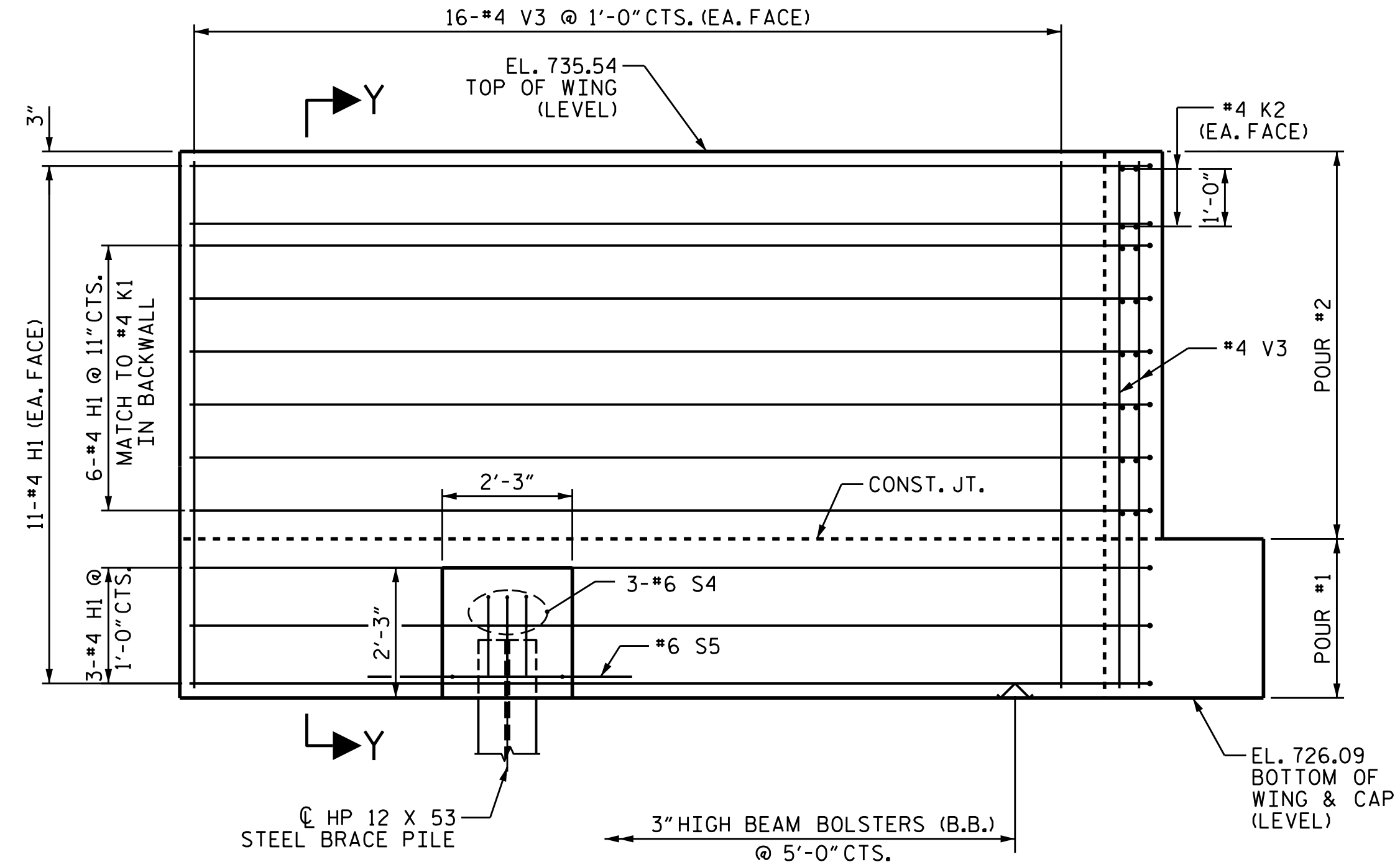
PLAN OF LEFT WING - W1



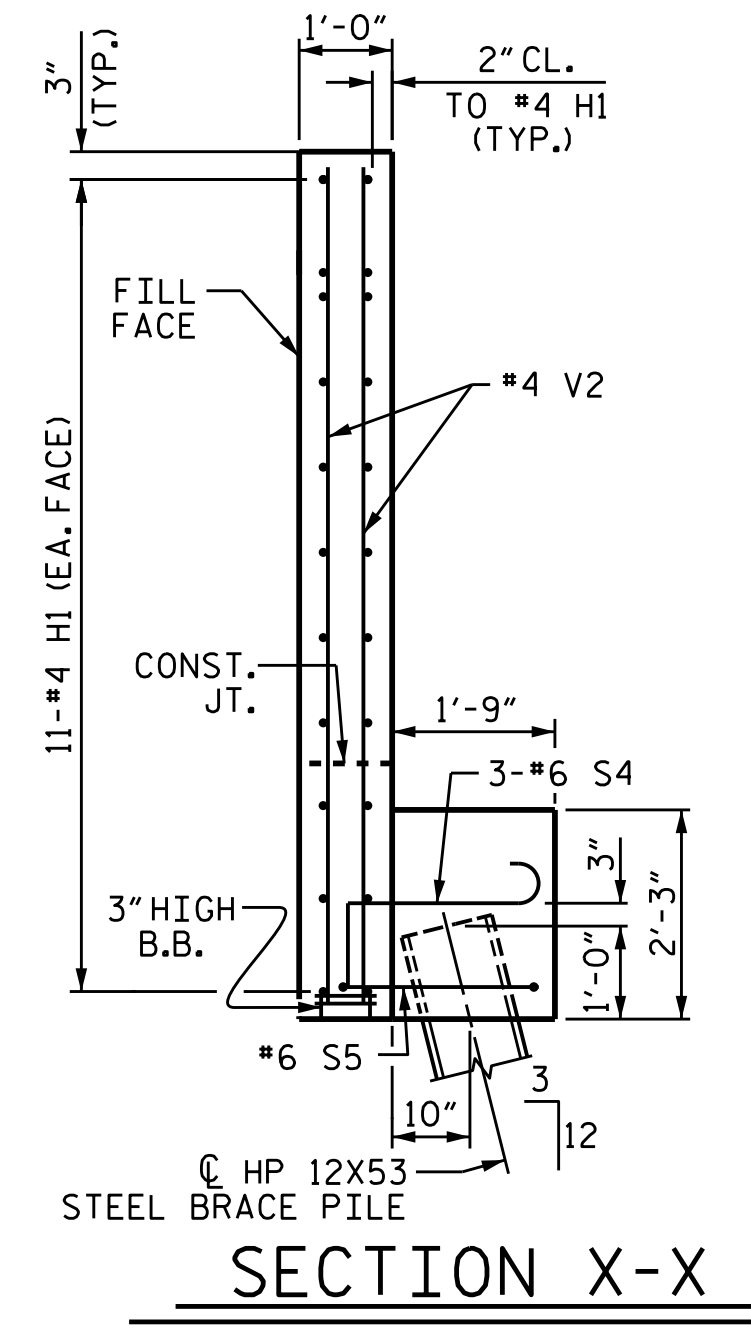
PLAN OF RIGHT WING - W2



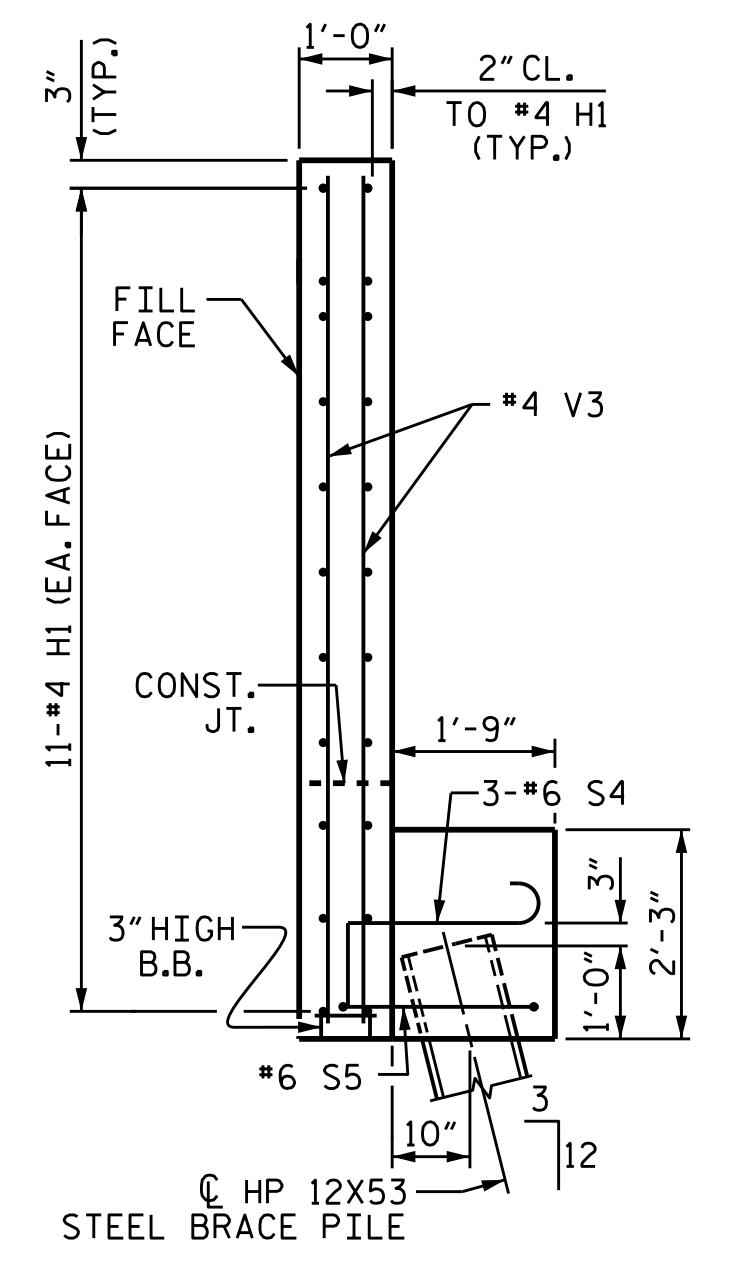
ELEVATION OF LEFT WING - W1



ELEVATION OF RIGHT WING - W2



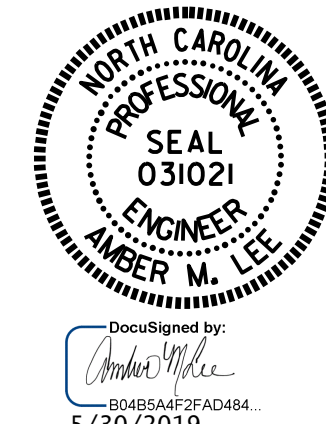
SECTION X-X



SECTION Y-Y

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
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END BENT 1

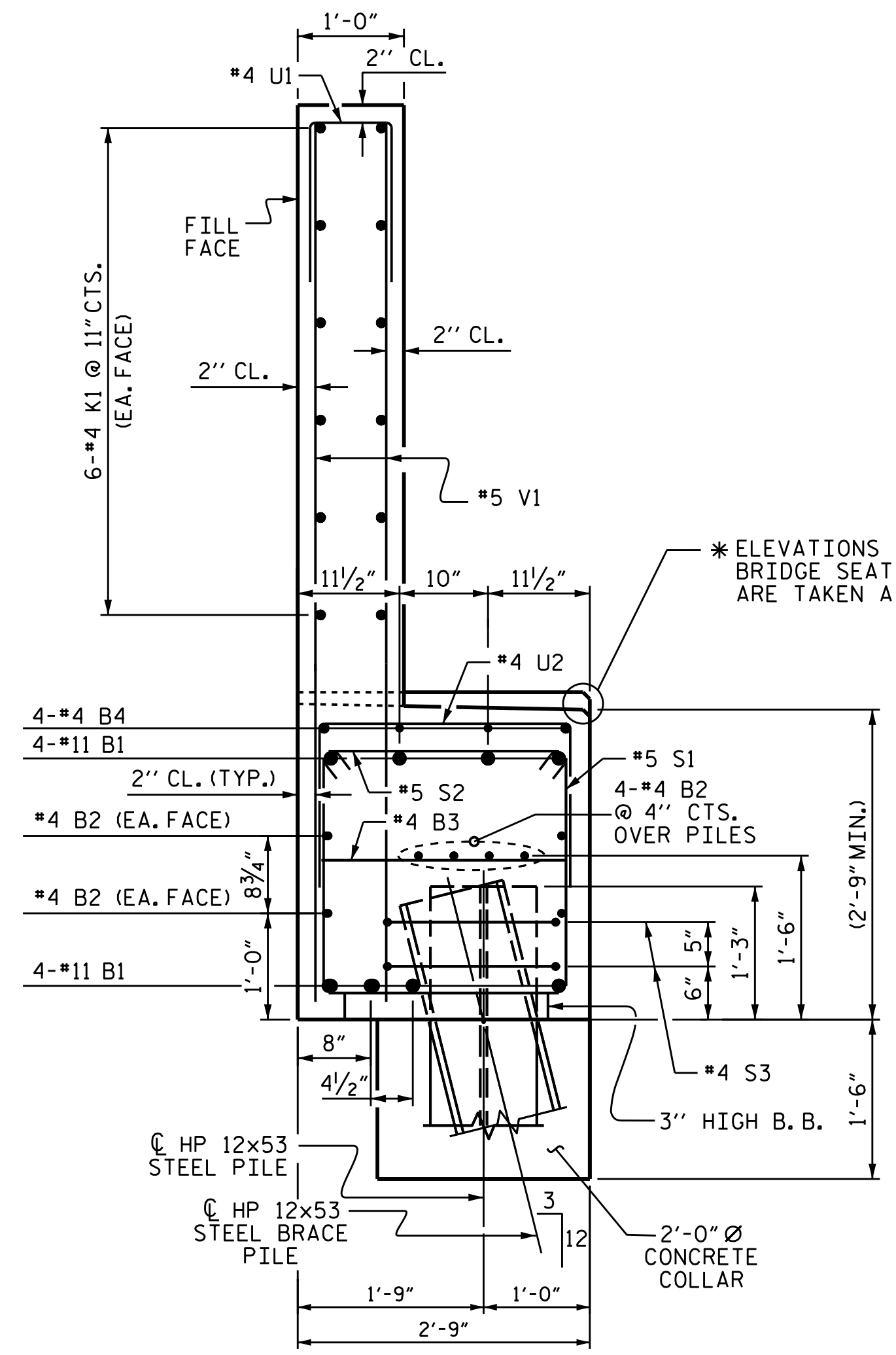
DRAWN BY : M.G. SHAIKH DATE : 01/2019  
 CHECKED BY : A. SORSENGINH DATE : 01/2019  
 DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR DATE : 01/2019

DOCUMENT NOT CONSIDERED  
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 SIGNATURES COMPLETED

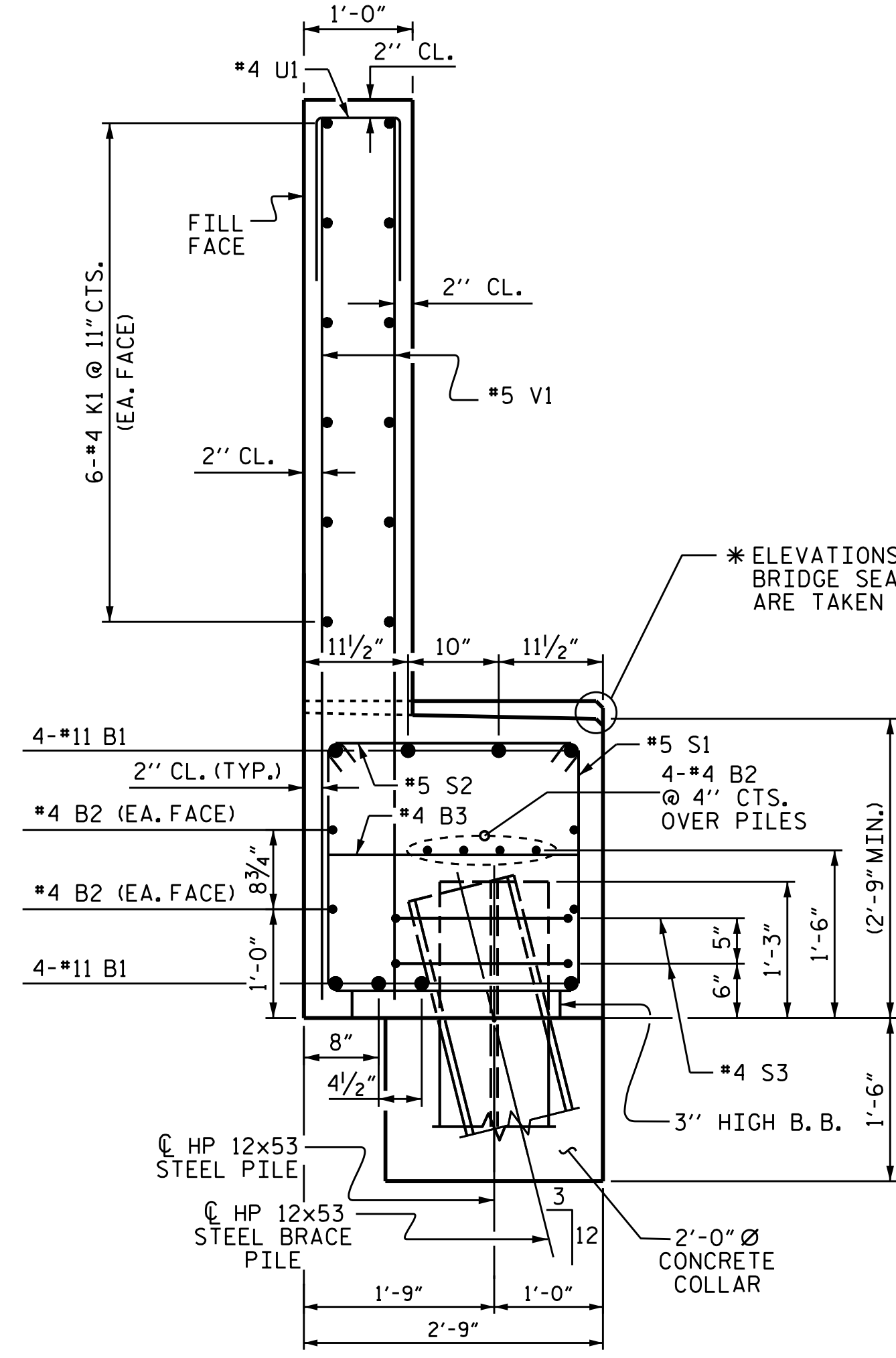
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NO.	BY:	DATE:	NO.	DATE:	
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2			4		TOTAL SHEETS 37

30-MAY-2019 08:37  
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 amlee

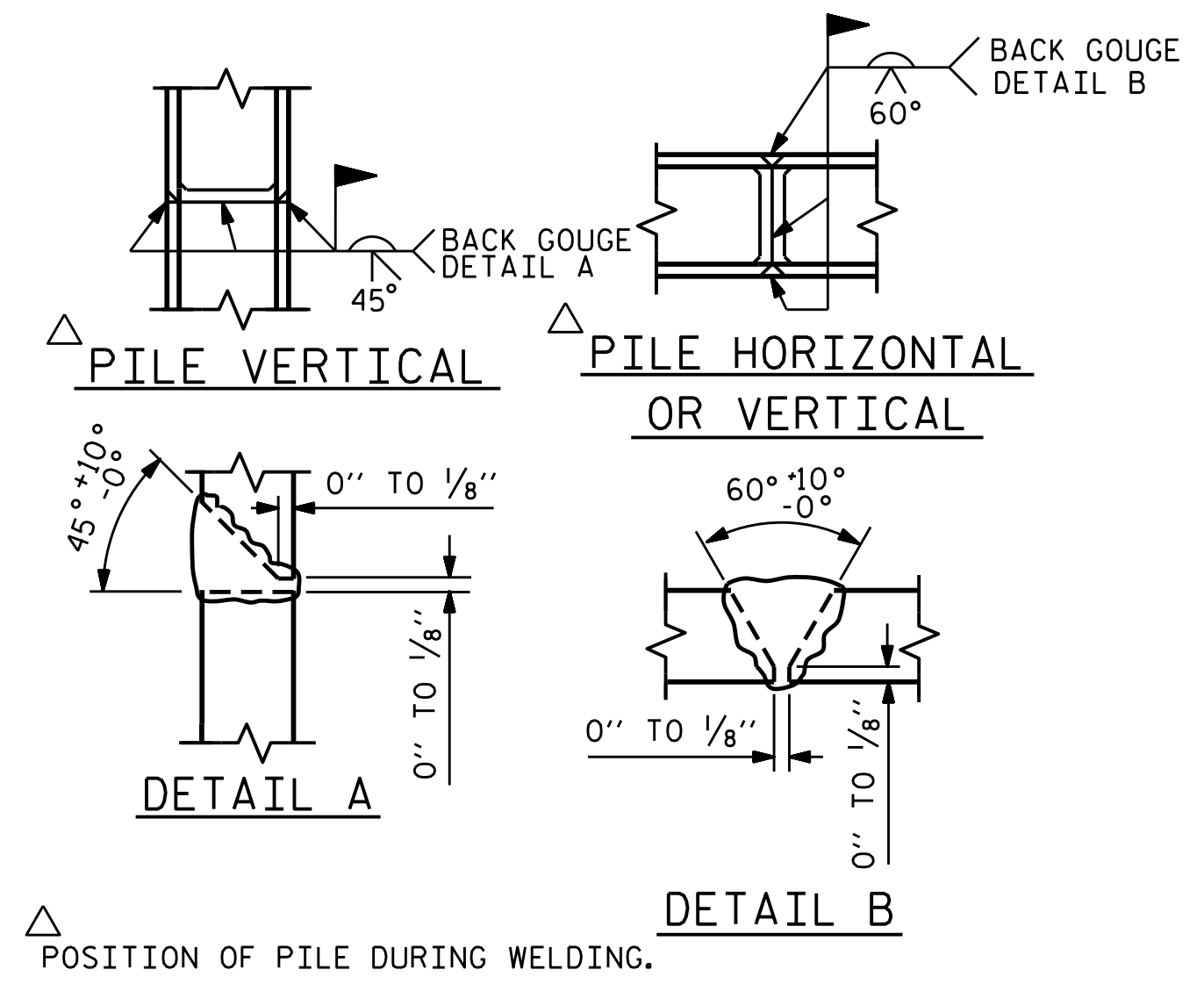




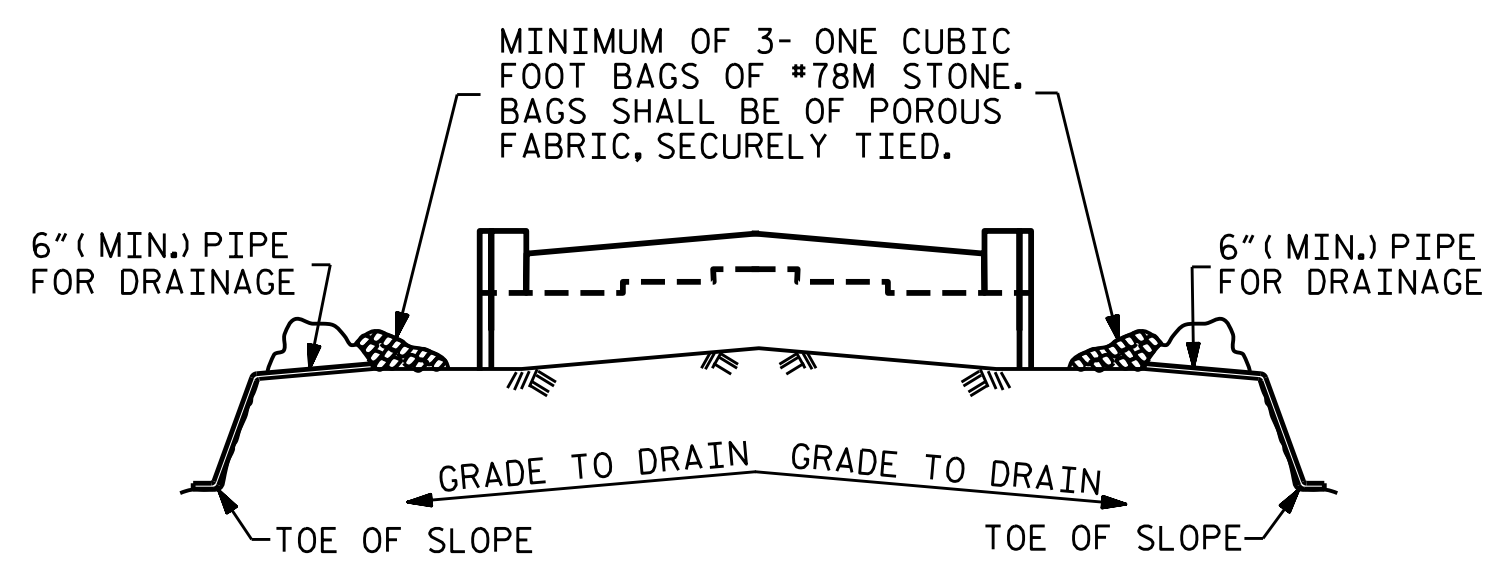
SECTION A-A



SECTION B-B



PILE SPLICE DETAILS



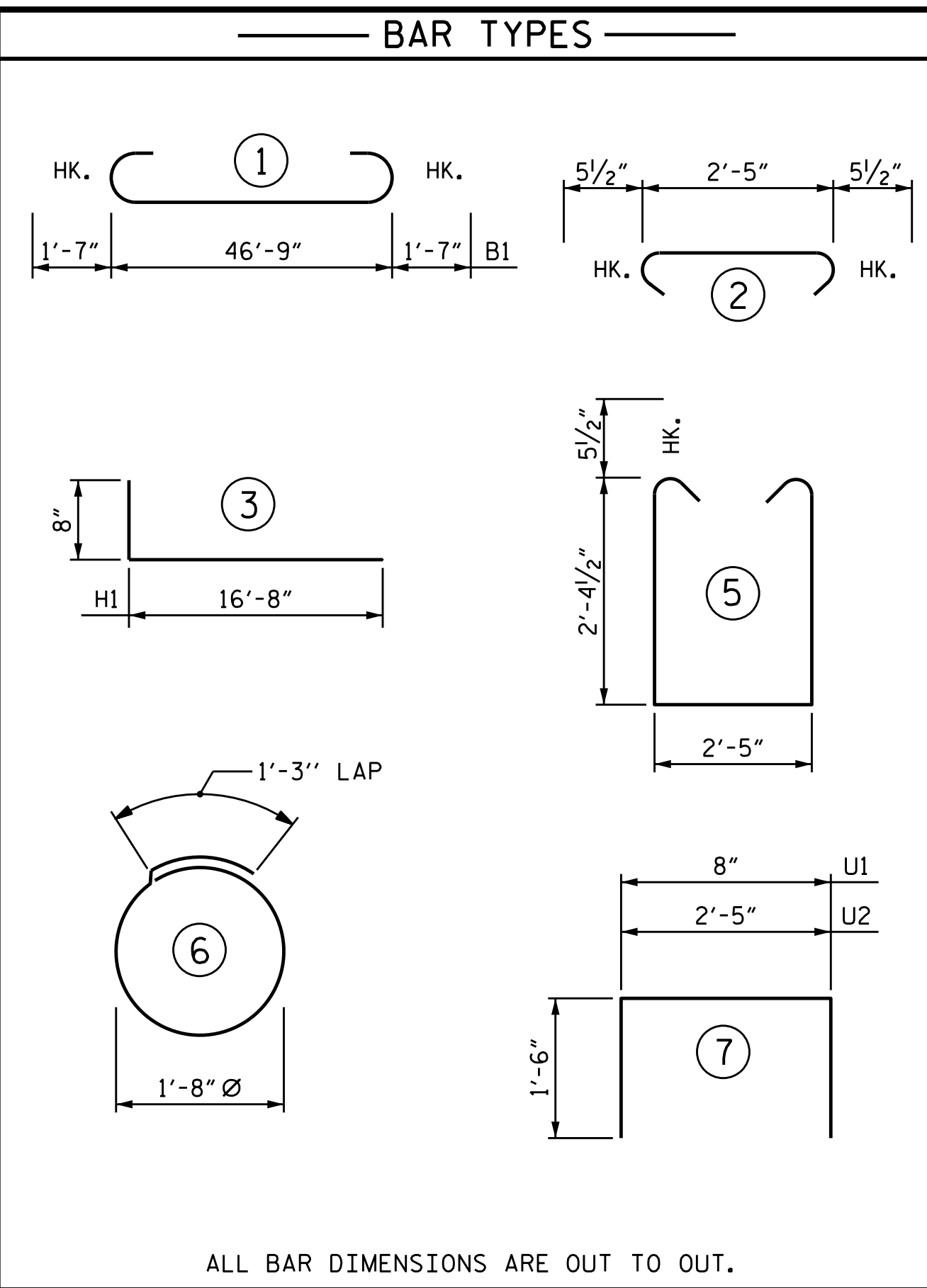
MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

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



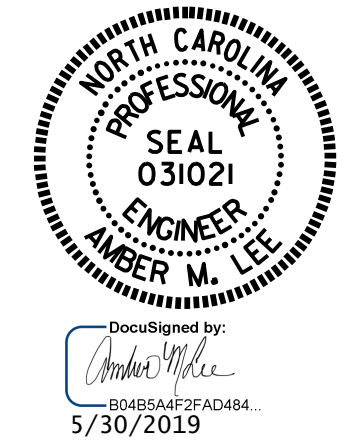
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	49'-11"	2122
B2	16	#4	STR	24'-8"	264
B3	11	#4	STR	2'-5"	18
B4	4	#4	STR	14'-0"	37
B5	4	#4	STR	3'-0"	8
H1	44	#4	3	17'-4"	509
K1	24	#4	STR	24'-8"	395
K2	8	#4	STR	2'-7"	14
S1	50	#5	5	8'-1"	422
S2	50	#5	2	3'-4"	174
S3	16	#4	6	6'-6"	69
U1	41	#4	7	3'-8"	100
U2	13	#4	7	5'-5"	47
V1	82	#5	STR	7'-7"	649
V2	40	#4	STR	9'-0"	240
V3	40	#4	STR	9'-1"	243
REINFORCING STEEL					5311 LBS.
CLASS A CONCRETE (CU. YDS.)					
POUR 1					
CAP, LOWER PART OF WING & COLLARS					19.4
POUR 2					
BACKWALL & UPPER PART OF WING					17.3
TOTAL					36.7
HP 12 X 53 STEEL PILES NO. 10					500 LIN. FT.

DRAWN BY: M.G. SHAIKH DATE: 01/2019  
 CHECKED BY: A. SORSENGINH DATE: 01/2019  
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 01/2019

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 amlee

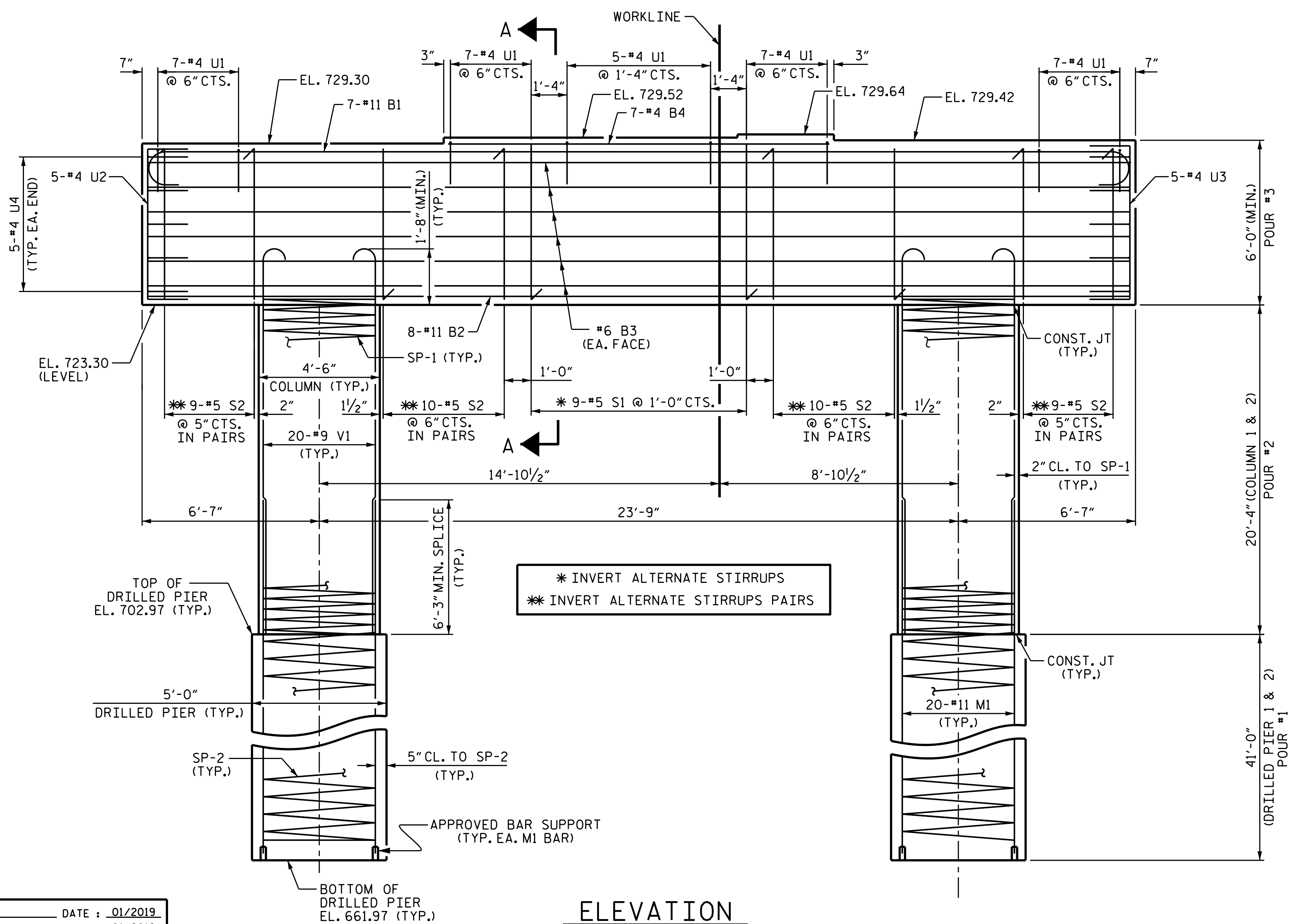
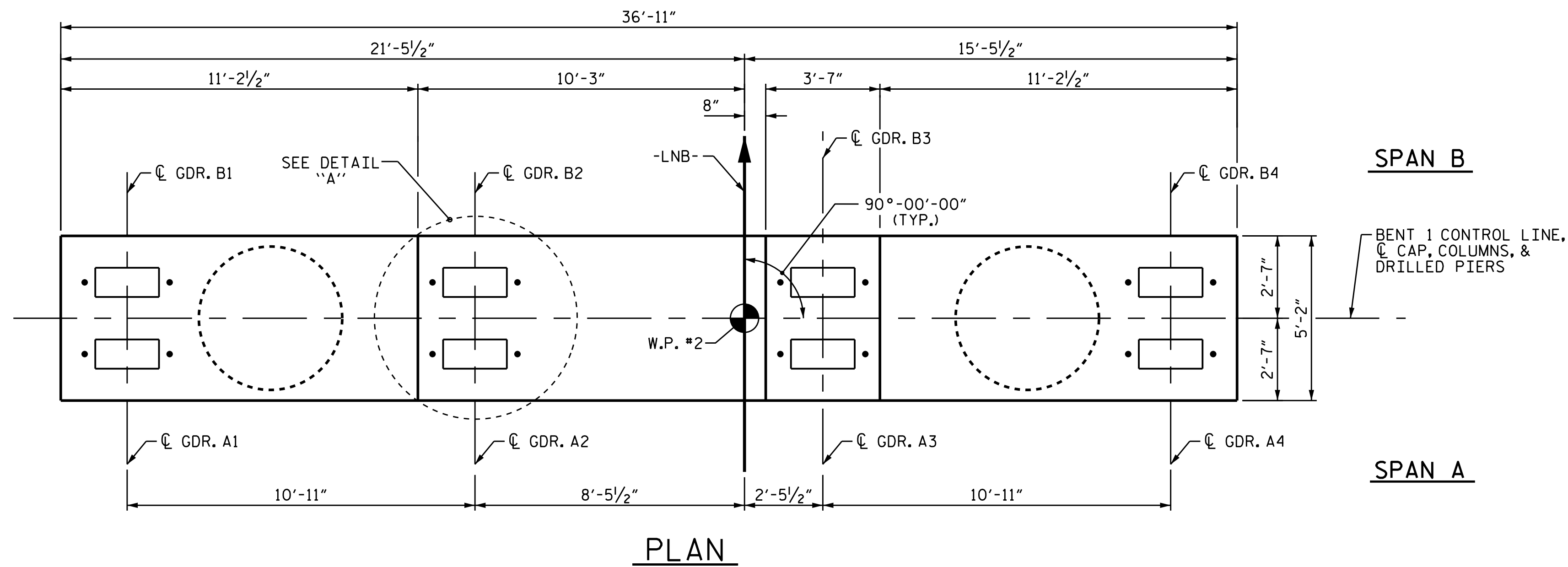
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PROJECT NO. B-5389  
 YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
END BENT 1					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-25
					TOTAL SHEETS 37



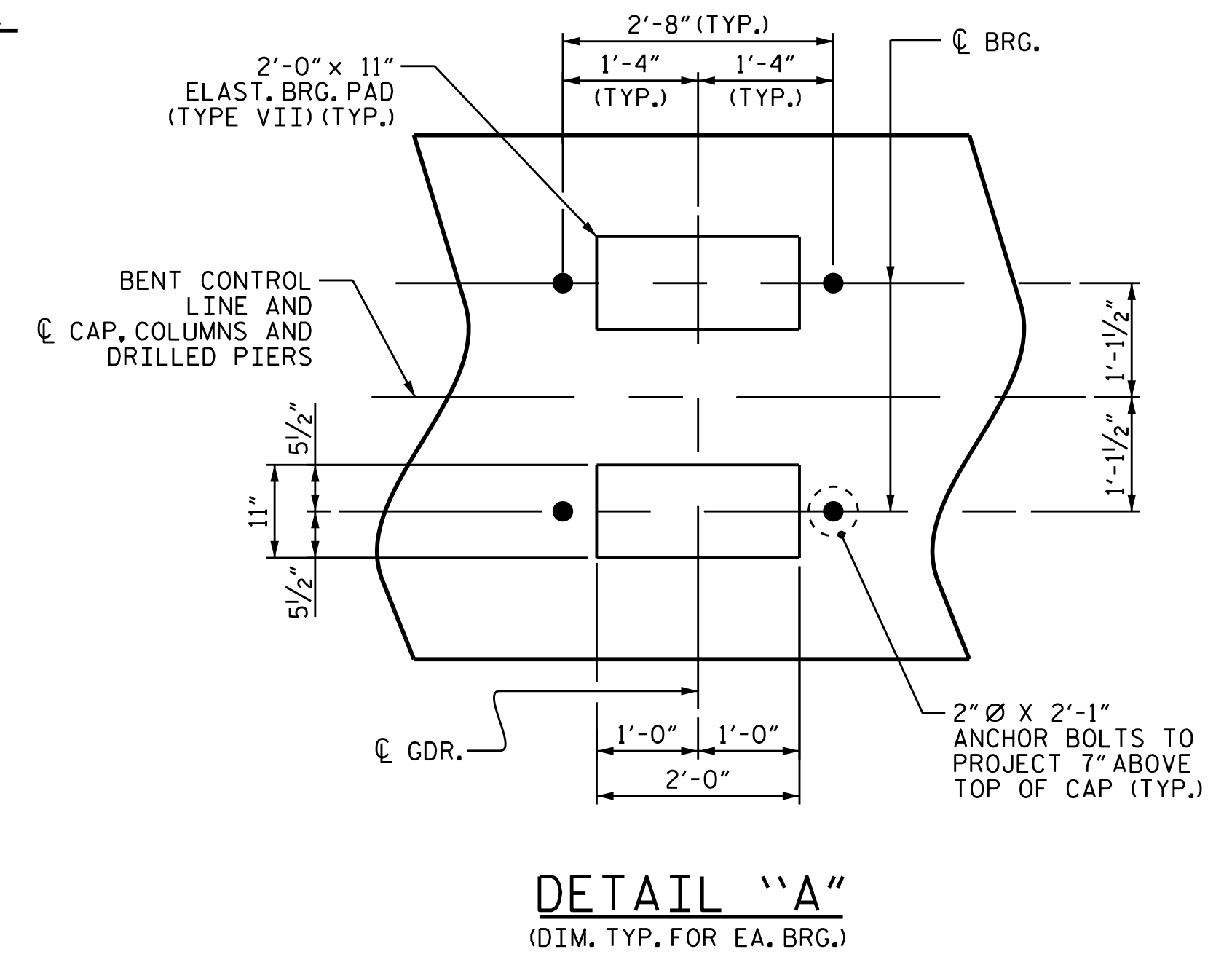
**NOTES**

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

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

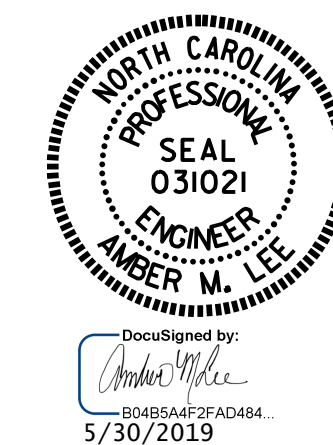
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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



PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

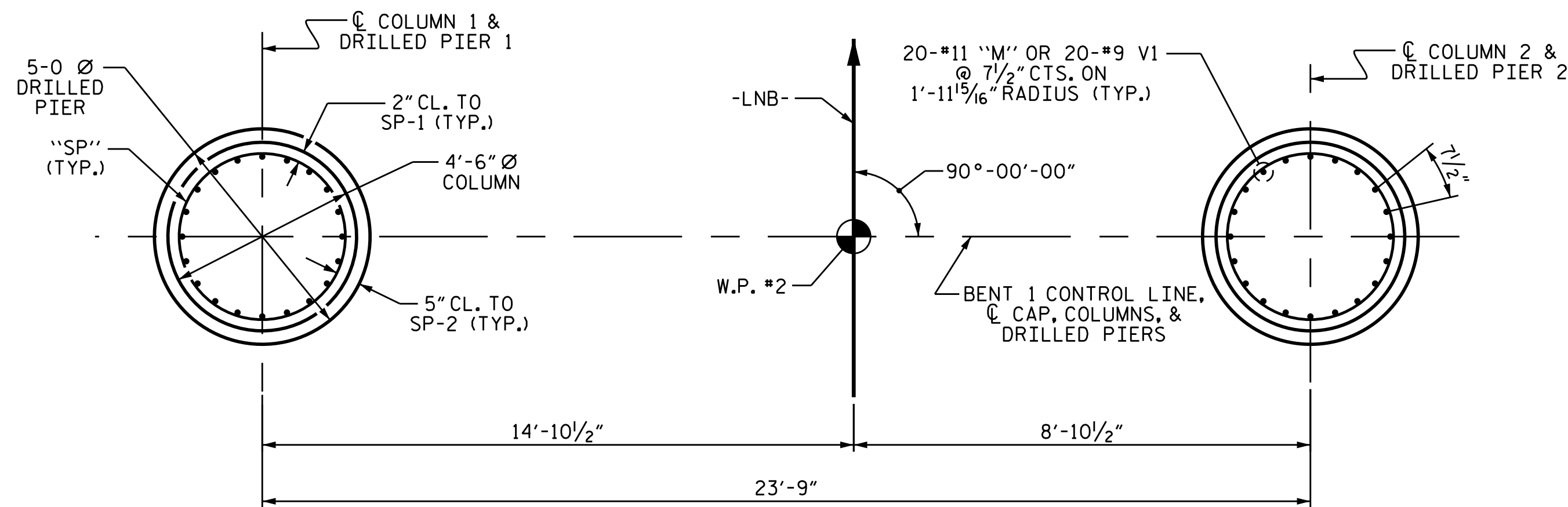
SHEET 1 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					S-26 TOTAL SHEETS 37

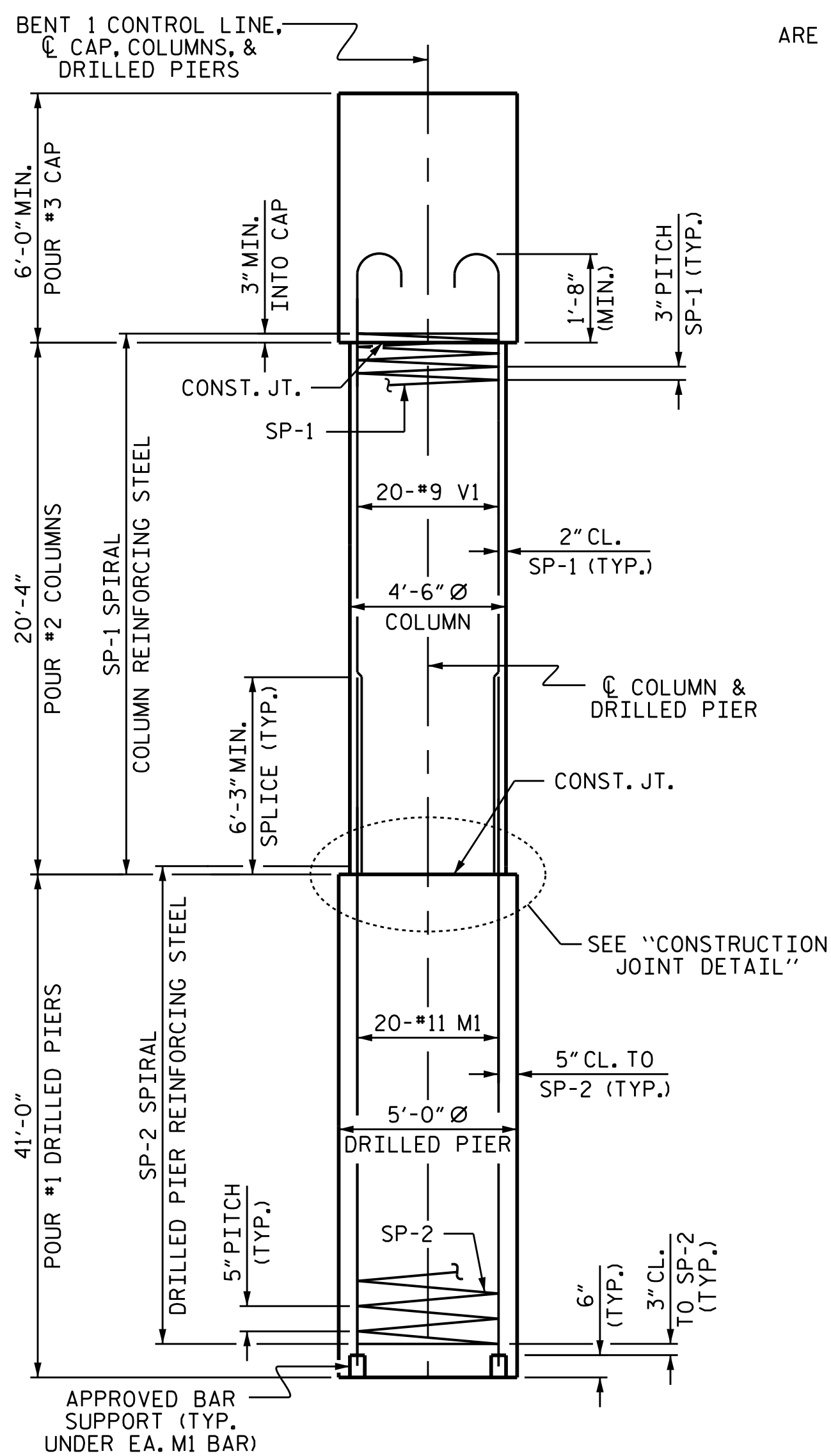
DRAWN BY: M.G. SHAIKH DATE: 01/2019  
 CHECKED BY: A. SORSENGINH DATE: 01/2019  
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 01/2019



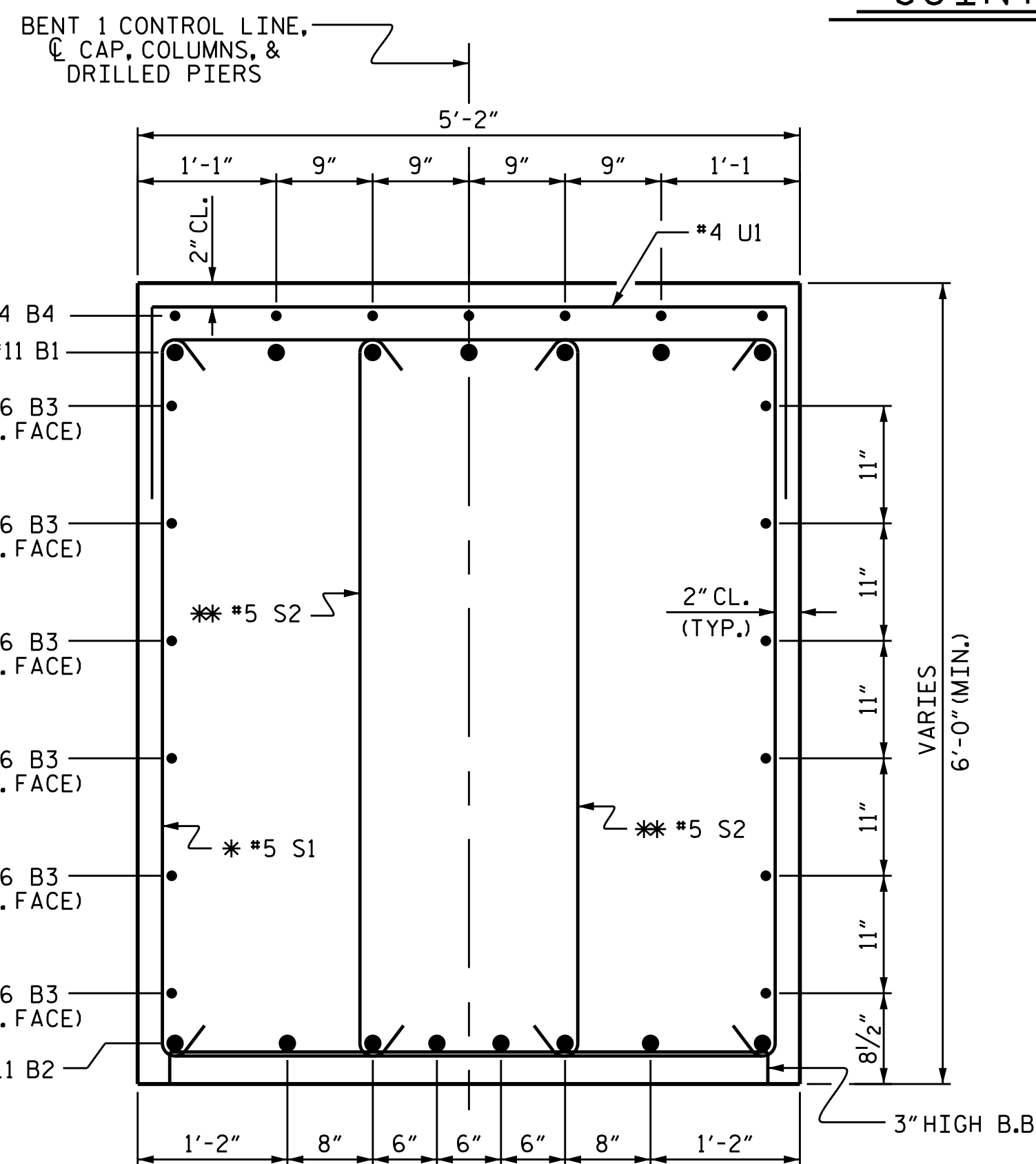


PLAN OF COLUMNS & DRILLED PIERS

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER

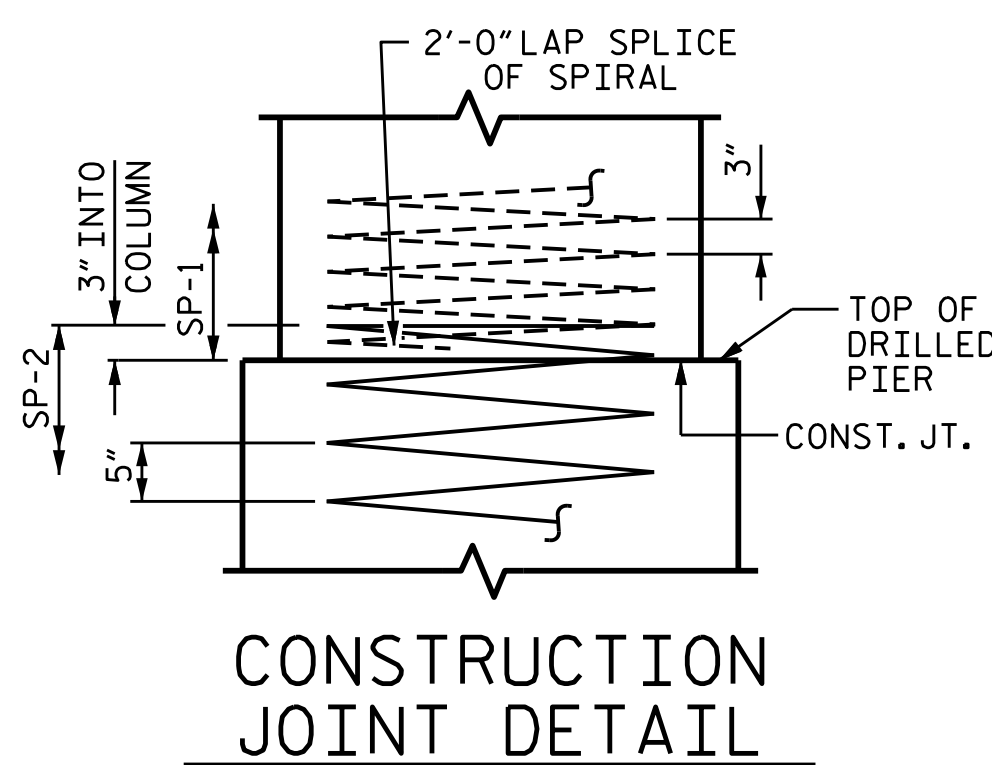


END ELEVATION



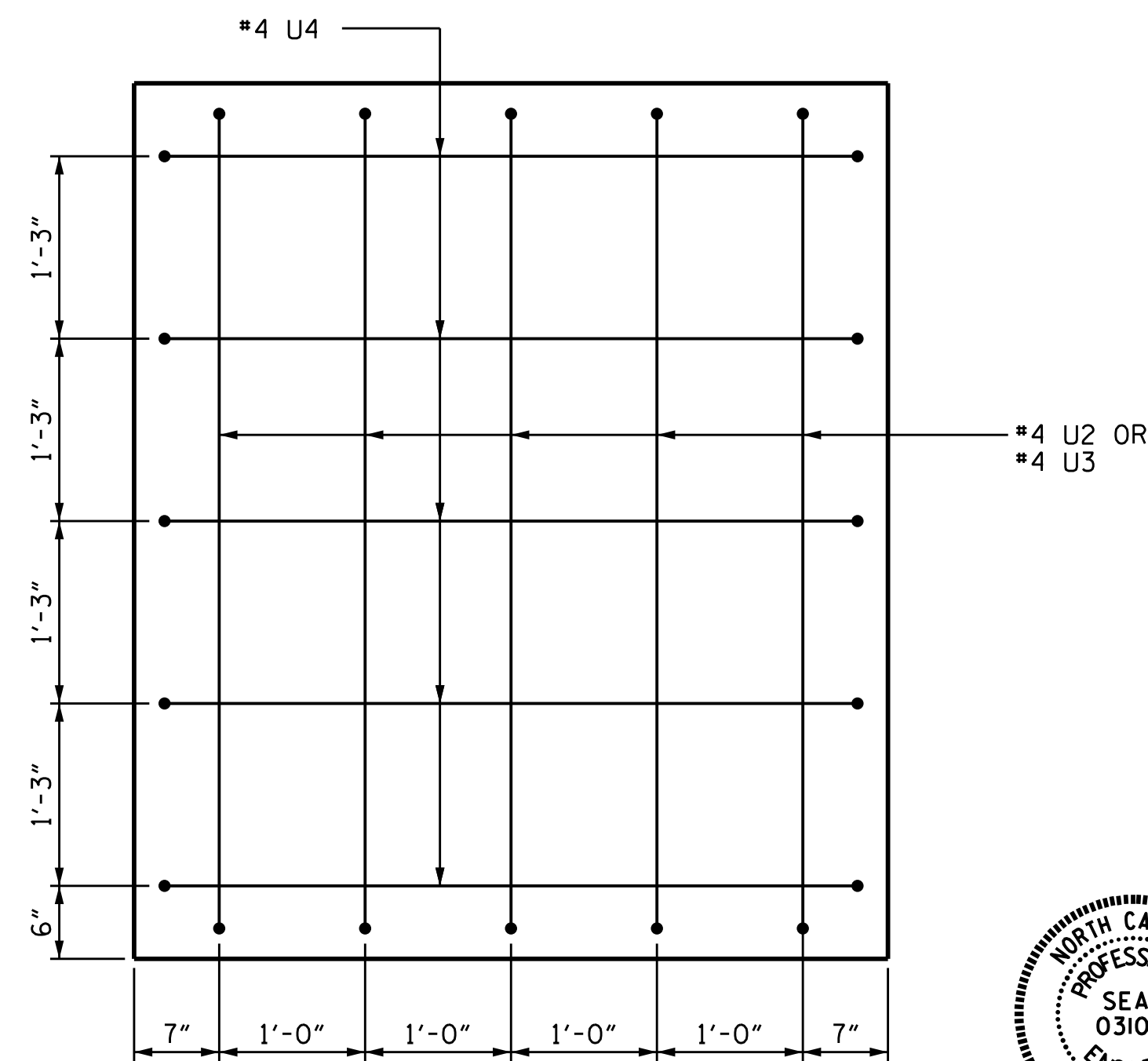
SECTION A-A

\* INVERT ALTERNATE STIRRUPS  
\*\* INVERT ALTERNATE STIRRUPS PAIRS



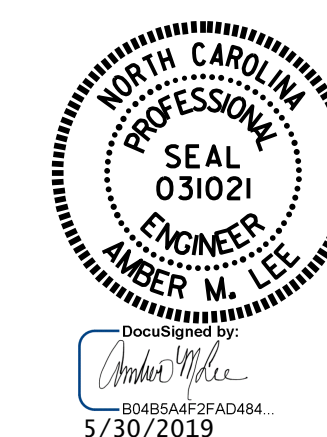
CONSTRUCTION JOINT DETAIL

BAR TYPES				BILL OF MATERIAL							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#11		39'-7"	1472	S1	9	#5	2	17'-0"	160
B2	8	#11	STR	36'-7"	1555	S2	76	#5	2	15'-5"	1222
B3	12	#6	STR	36'-7"	659	U1	33	#4	3	7'-10"	173
B4	7	#4	STR	14'-2"	66	U2	5	#4	3	8'-6"	28
						U3	5	#4	3	8'-7"	29
						U4	10	#4	3	7'-8"	51
						V1	40	#9	4	23'-3"	3162
						REINFORCING STEEL				LBS.	19203
						SP-1	2	*	5	1084'-2"	1448
						SP-2	2	**	6	1275'-7"	2661
						SPIRAL COLUMN REINFORCING STEEL				LBS.	4109
						* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
						** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
						CLASS A CONCRETE					
						POUR #3 (CAP)		C.Y.	43.3		
						POUR #2 (COLUMNS)		C.Y.	23.9		
						TOTAL CLASS A CONCRETE		C.Y.	67.2		
						DRILLED PIER QUANTITIES					
						DRILLED PIER CONCRETE					
						POUR #1 (DRILLED PIERS)		C.Y.	59.6		
						5'-0" Ø DRILLED PIERS IN SOIL		LIN. FT.	51.0		
						5'-0" Ø DRILLED PIERS NOT IN SOIL		LIN. FT.	31.0		
						PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIER		LIN. FT.	35.9		
						CSL TUBES		LIN. FT.	425.0		



END VIEW

(TYP. EACH END)



PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

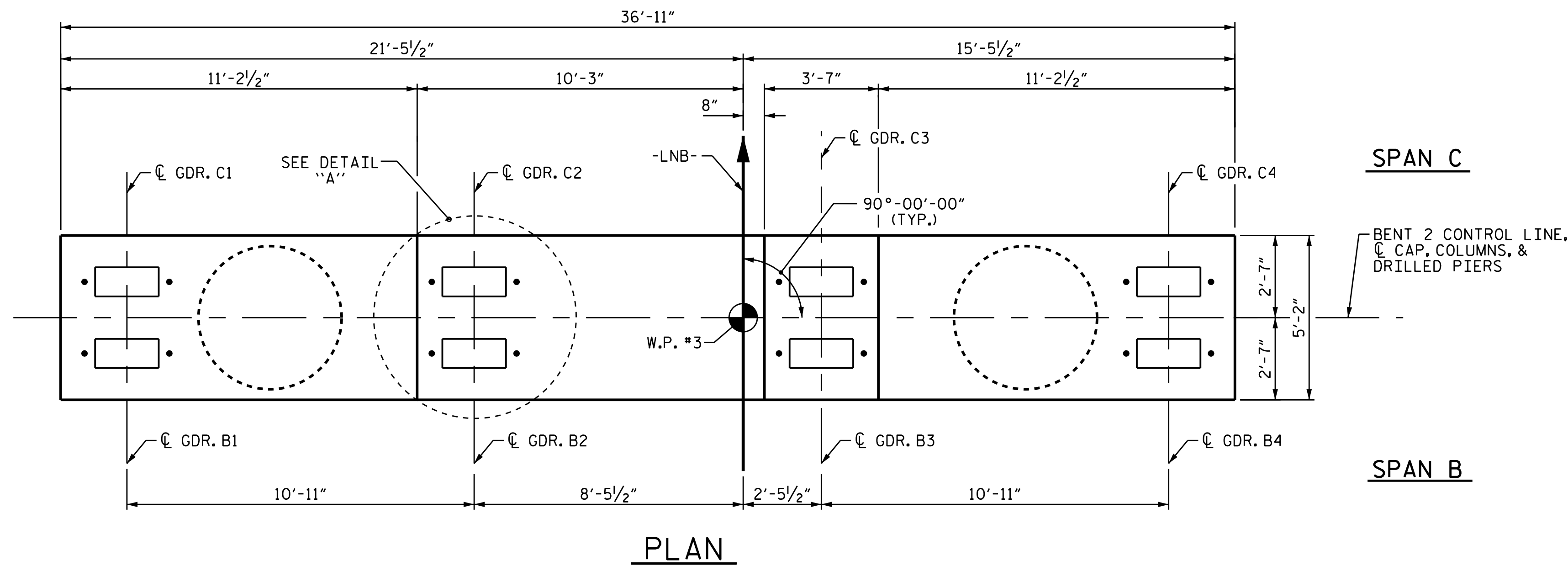
SUBSTRUCTURE  
 BENT 1

DRAWN BY: M. G. SHAIKH DATE: 01/2019  
 CHECKED BY: A. SORSENGINH DATE: 01/2019  
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE: 01/2019

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REVISIONS				SHEET NO.
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1			3	
2			4	

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 TOTAL SHEETS  
 37



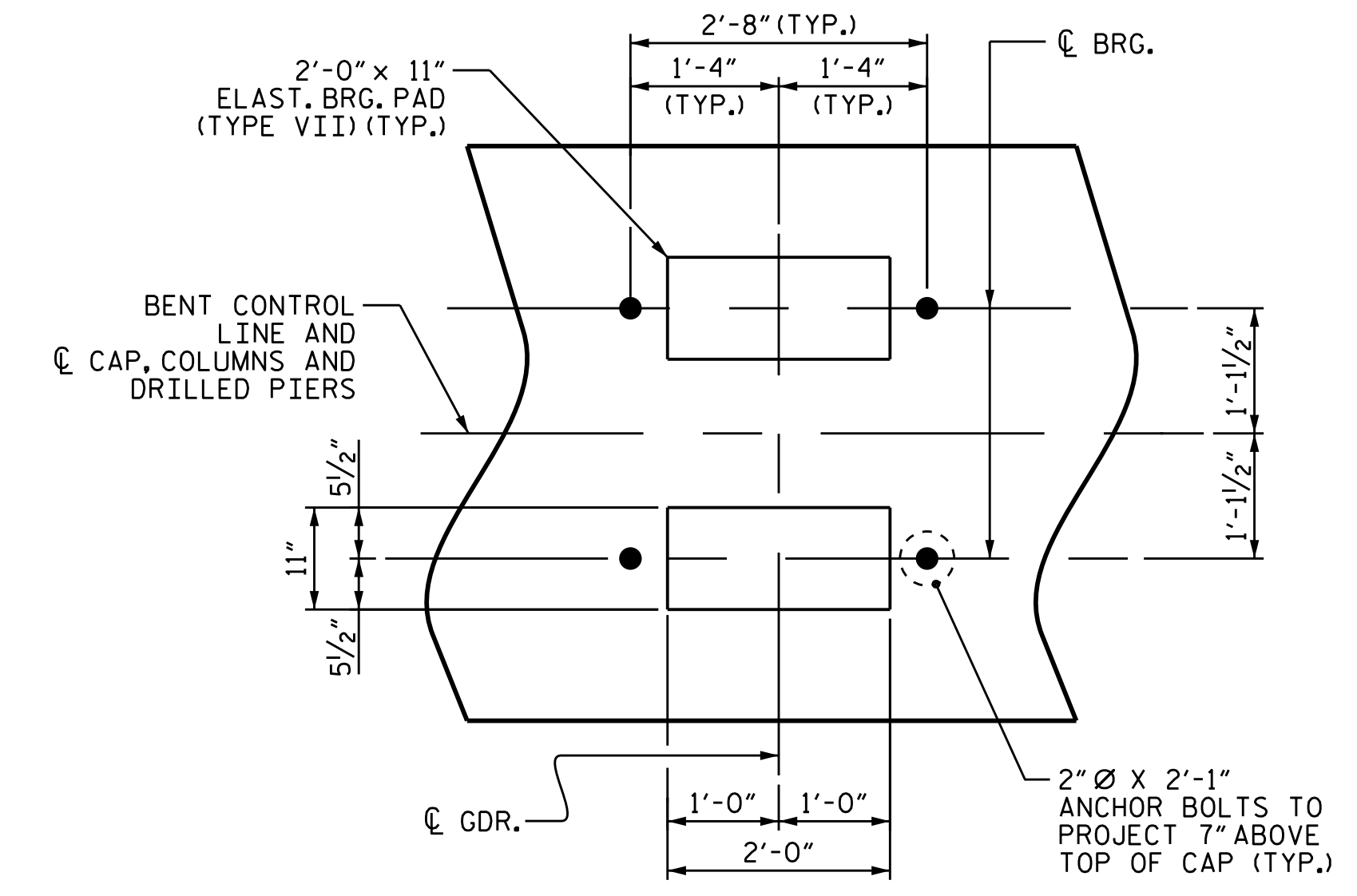
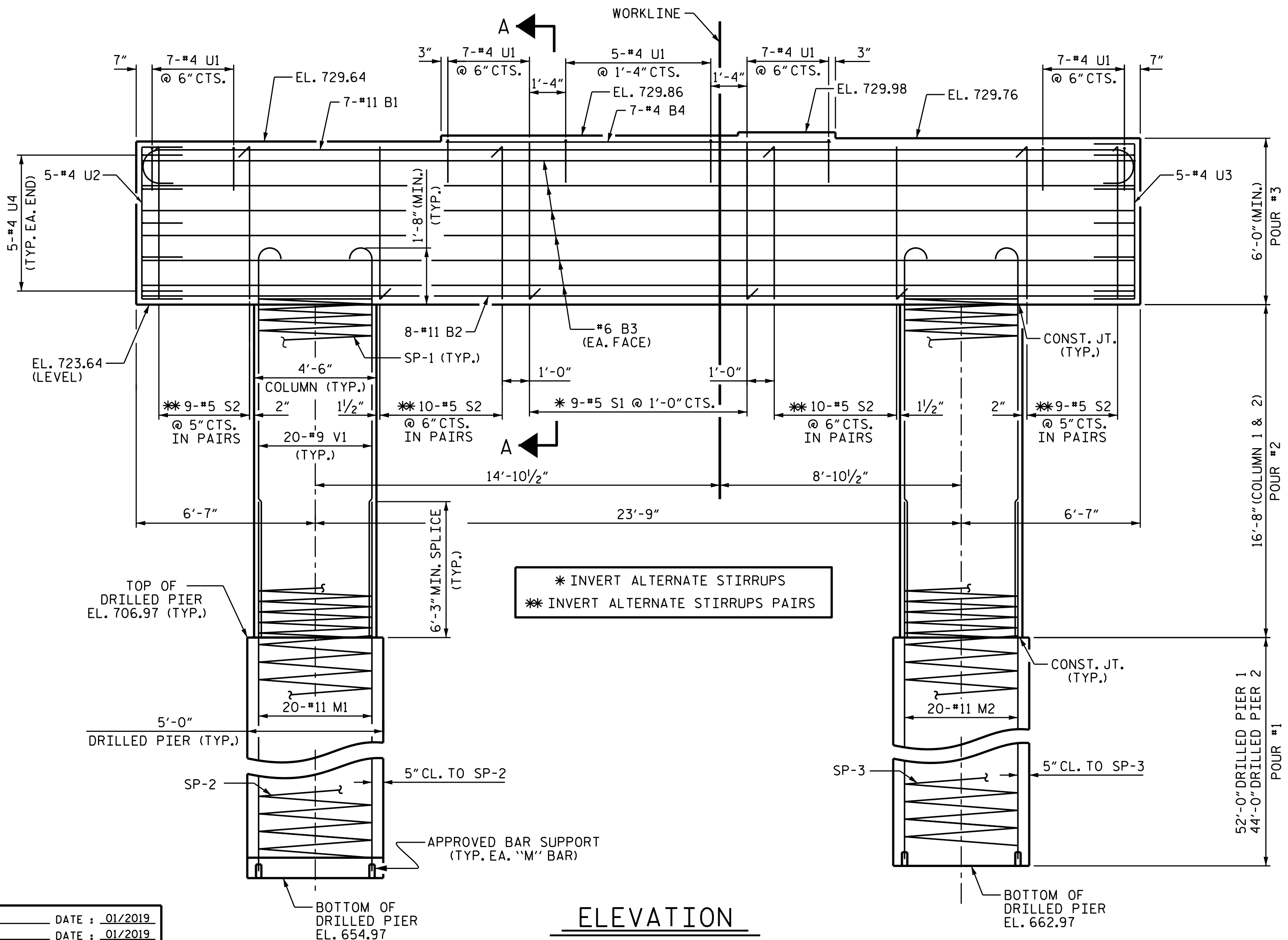
**NOTES**

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

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

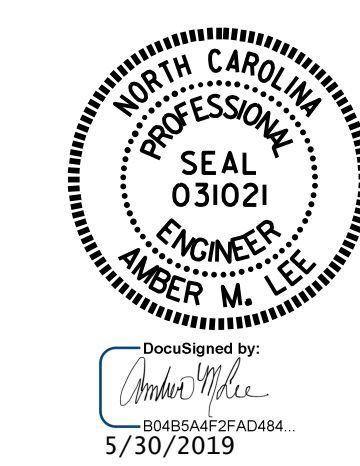
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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



**DETAIL "A"**  
(DIM. TYP. FOR EA. BRG.)

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-  
 SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

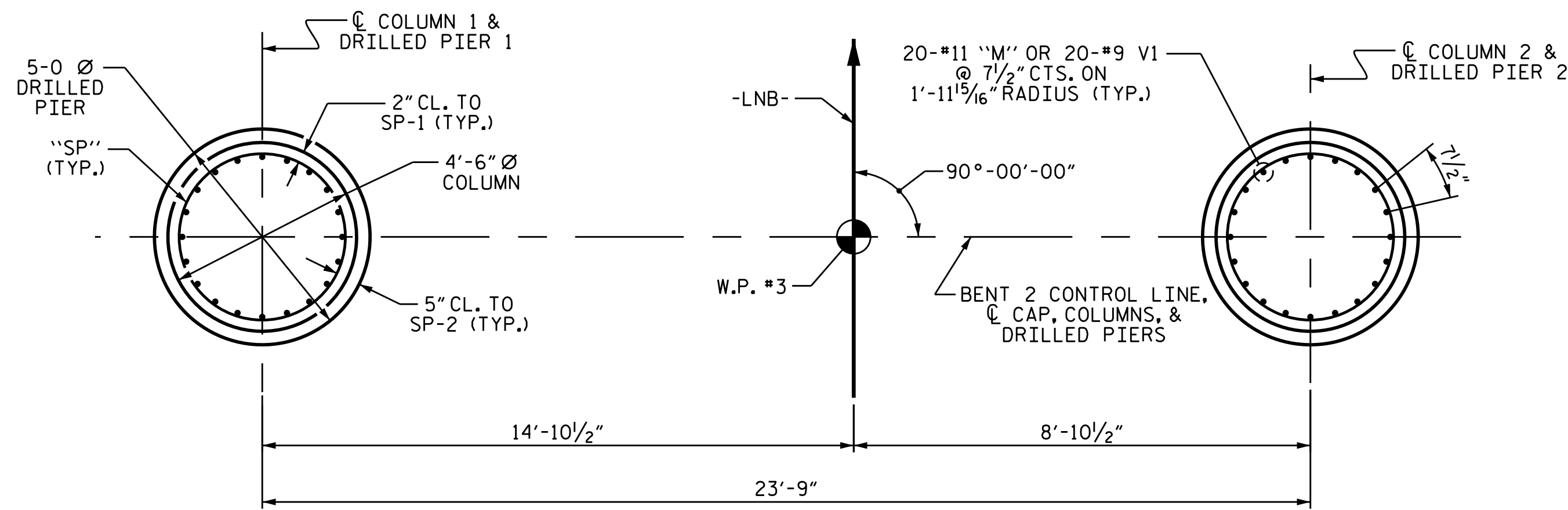
**SUBSTRUCTURE BENT 2**

NO.		BY:	DATE:	REVISIONS		SHEET NO.	
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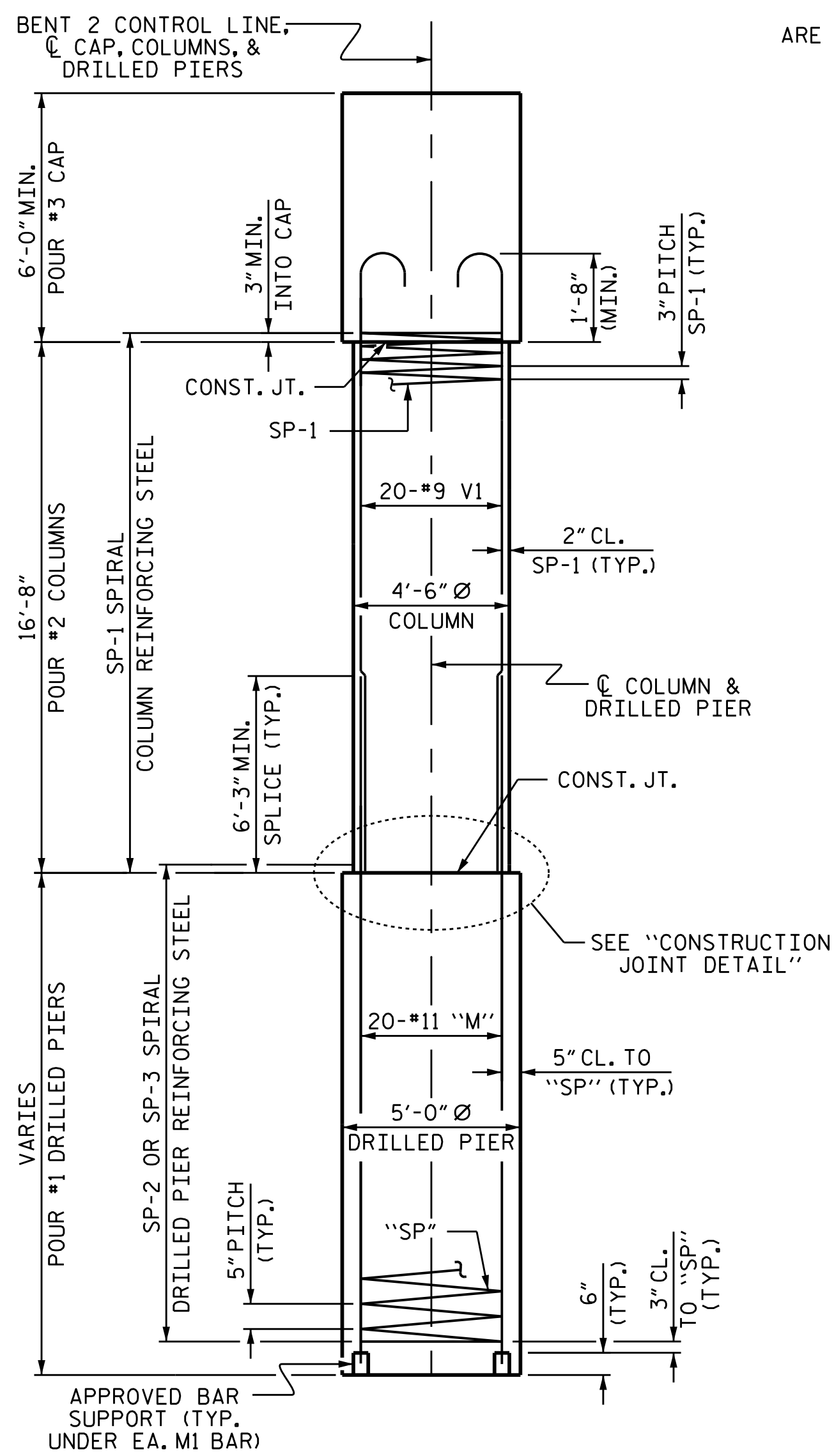
DRAWN BY: M.G. SHAIKH DATE: 01/2019  
 CHECKED BY: A. SORSENGINH DATE: 01/2019  
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 01/2019



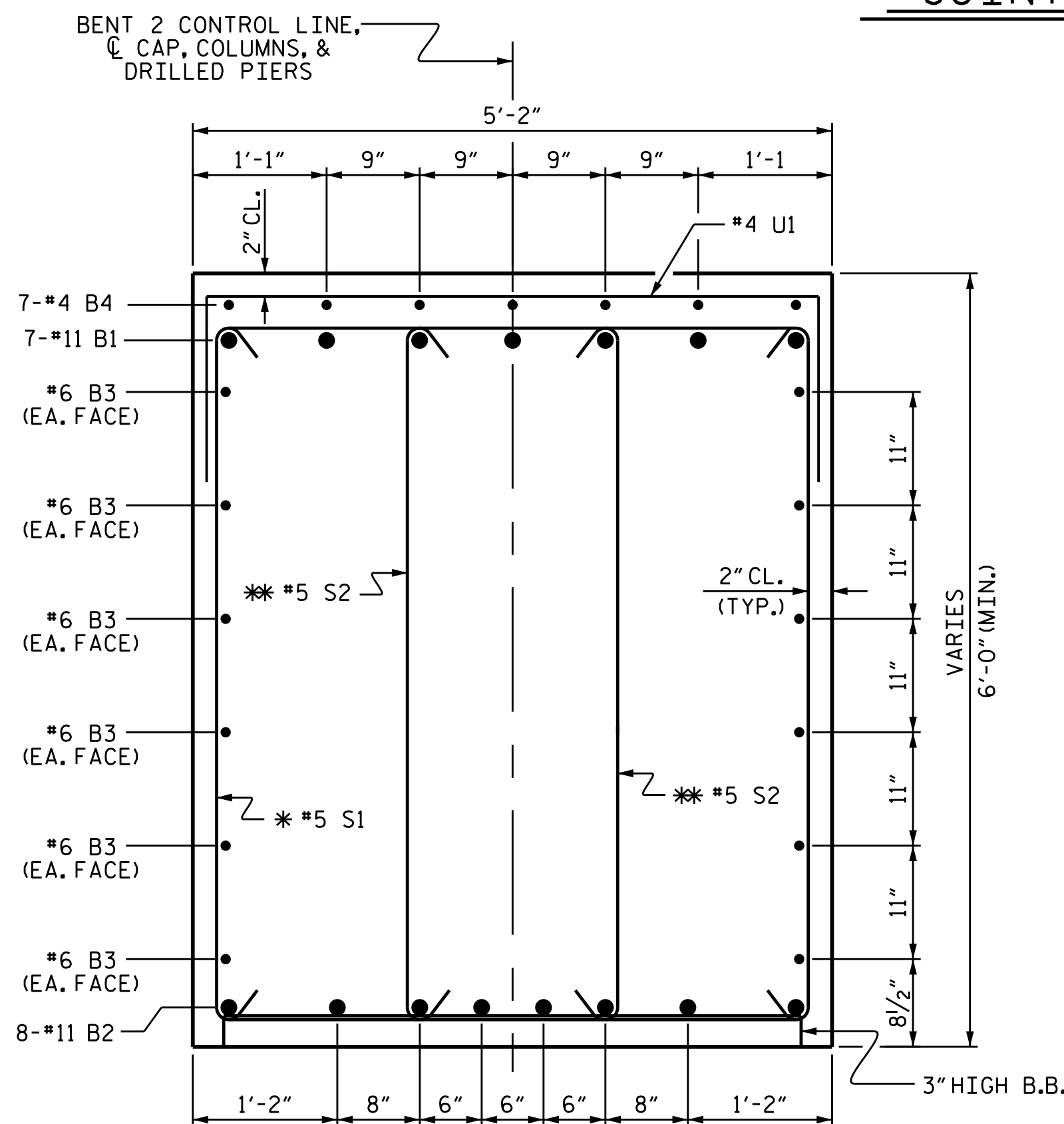


**PLAN OF COLUMNS & DRILLED PIERS**

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER

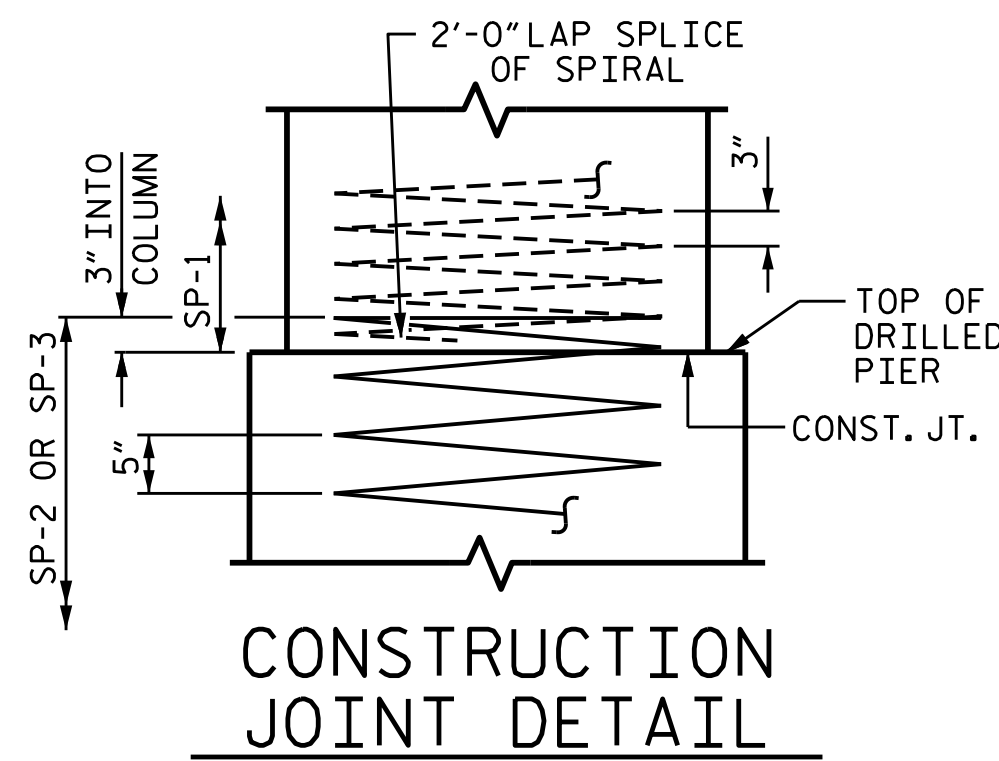


**END ELEVATION**

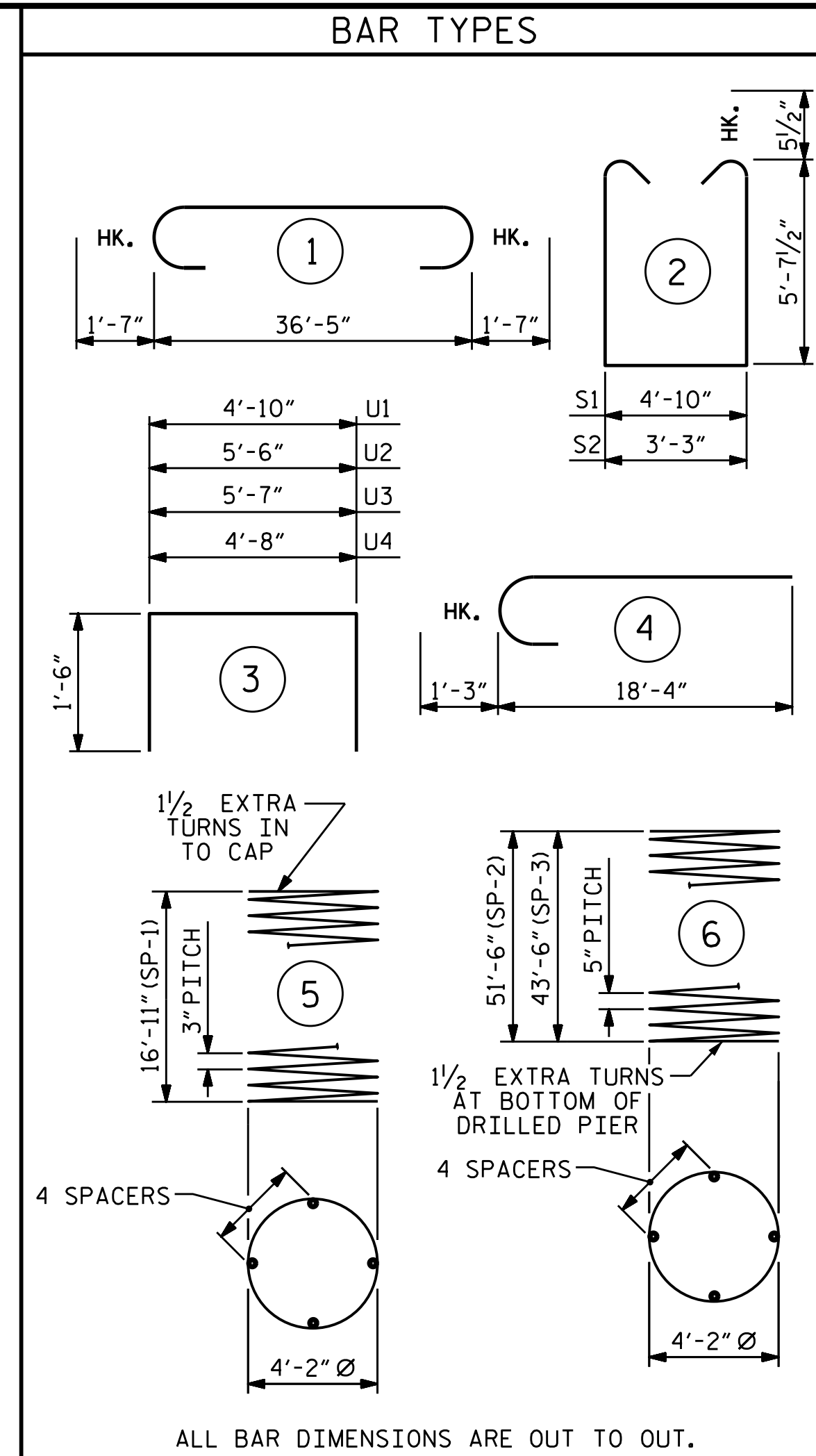


**SECTION A-A**

\* INVERT ALTERNATE STIRRUPS  
\*\* INVERT ALTERNATE STIRRUPS PAIRS



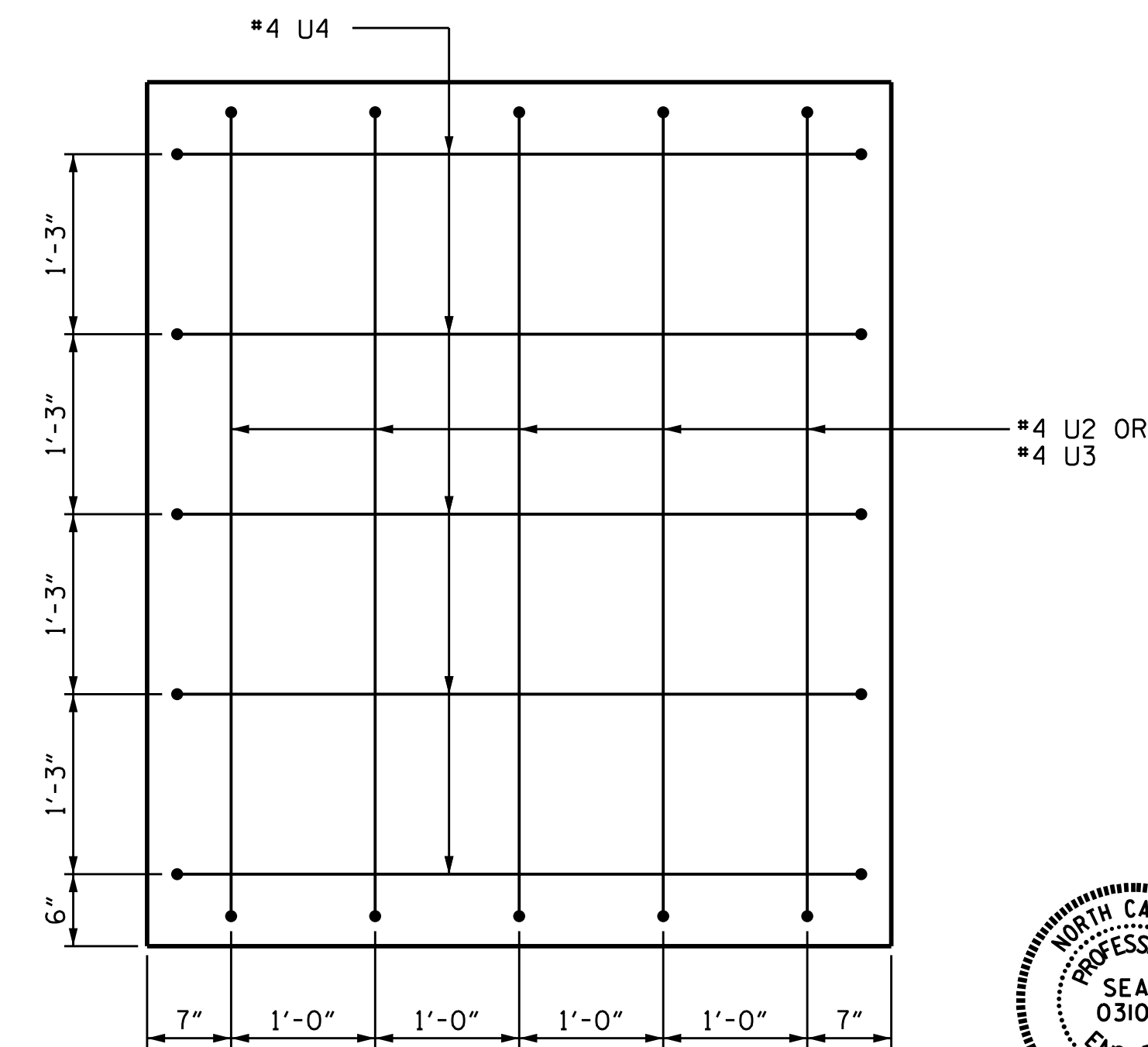
**CONSTRUCTION JOINT DETAIL**



ALL BAR DIMENSIONS ARE OUT TO OUT.

**BILL OF MATERIAL**

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#11		39'-7"	1472
B2	8	#11	STR	36'-7"	1555
B3	12	#6	STR	36'-7"	659
B4	7	#4	STR	14'-2"	66
M1	20	#11	STR	61'-0"	6482
M2	20	#11	STR	53'-0"	5632
S1	9	#5	2	17'-0"	160
S2	76	#5	2	15'-5"	1222
U1	33	#4	3	7'-10"	173
U2	5	#4	3	8'-6"	28
U3	5	#4	3	8'-7"	29
U4	10	#4	3	7'-8"	51
V1	40	#9	4	19'-7"	2663
REINFORCING STEEL				LBS.	20192
SP-1	2	*	5	896'-6"	1198
SP-2	1	**	6	1617'-10"	1687
SP-3	1	**	6	1369'-3"	1428
SPIRAL COLUMN REINFORCING STEEL				LBS.	4313
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
** THE SP-2 & SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE				C.Y.	43.3
POUR #3 (CAP)				C.Y.	19.6
TOTAL CLASS A CONCRETE				C.Y.	62.9
DRILLED PIER QUANTITIES					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				C.Y.	69.8
5'-0" DRILLED PIERS IN SOIL				LIN. FT.	72.0
5'-0" DRILLED PIERS NOT IN SOIL				LIN. FT.	24.0
PERMANENT STEEL CASING FOR 5'-0" DRILLED PIER				LIN. FT.	37.94
CSL TUBES				LIN. FT.	495.0

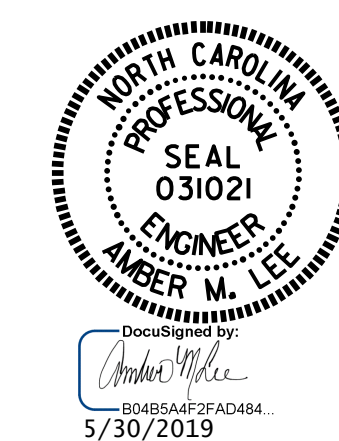


**END VIEW**

(TYP. EACH END)

PROJECT NO. B-5389  
YADKIN COUNTY  
STATION: 20+65.50 -LNB-

SHEET 2 OF 2



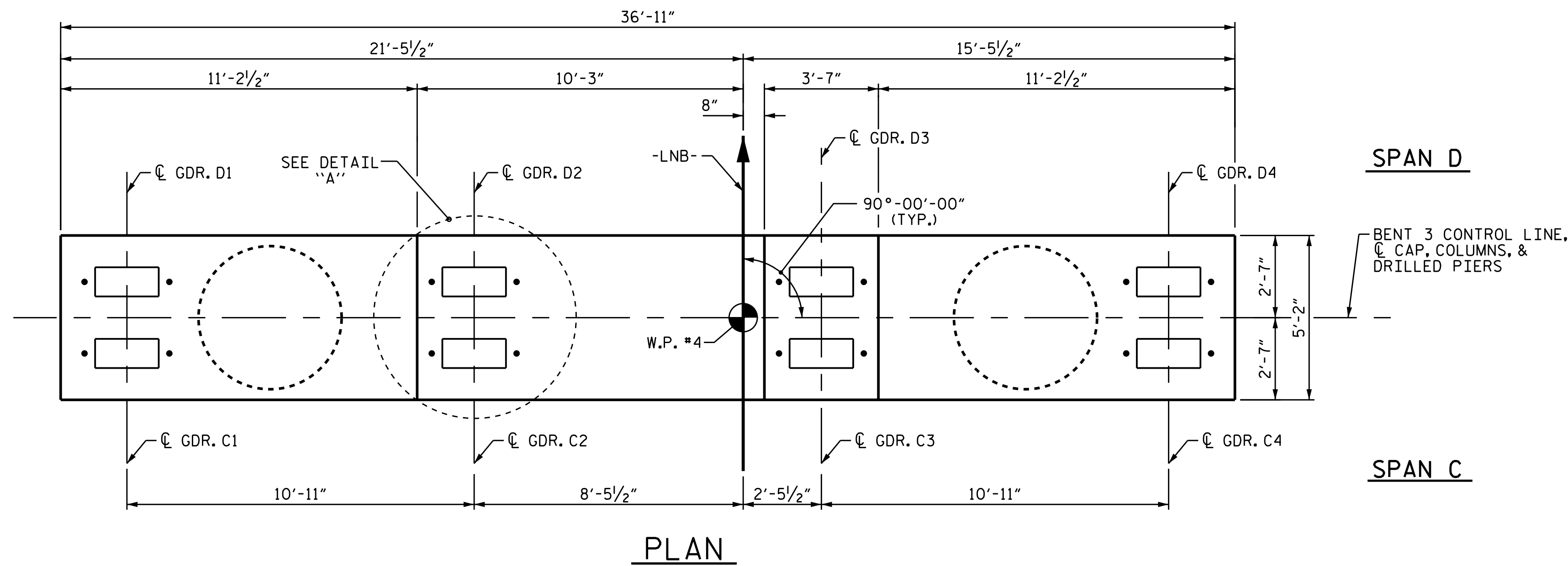
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT 2

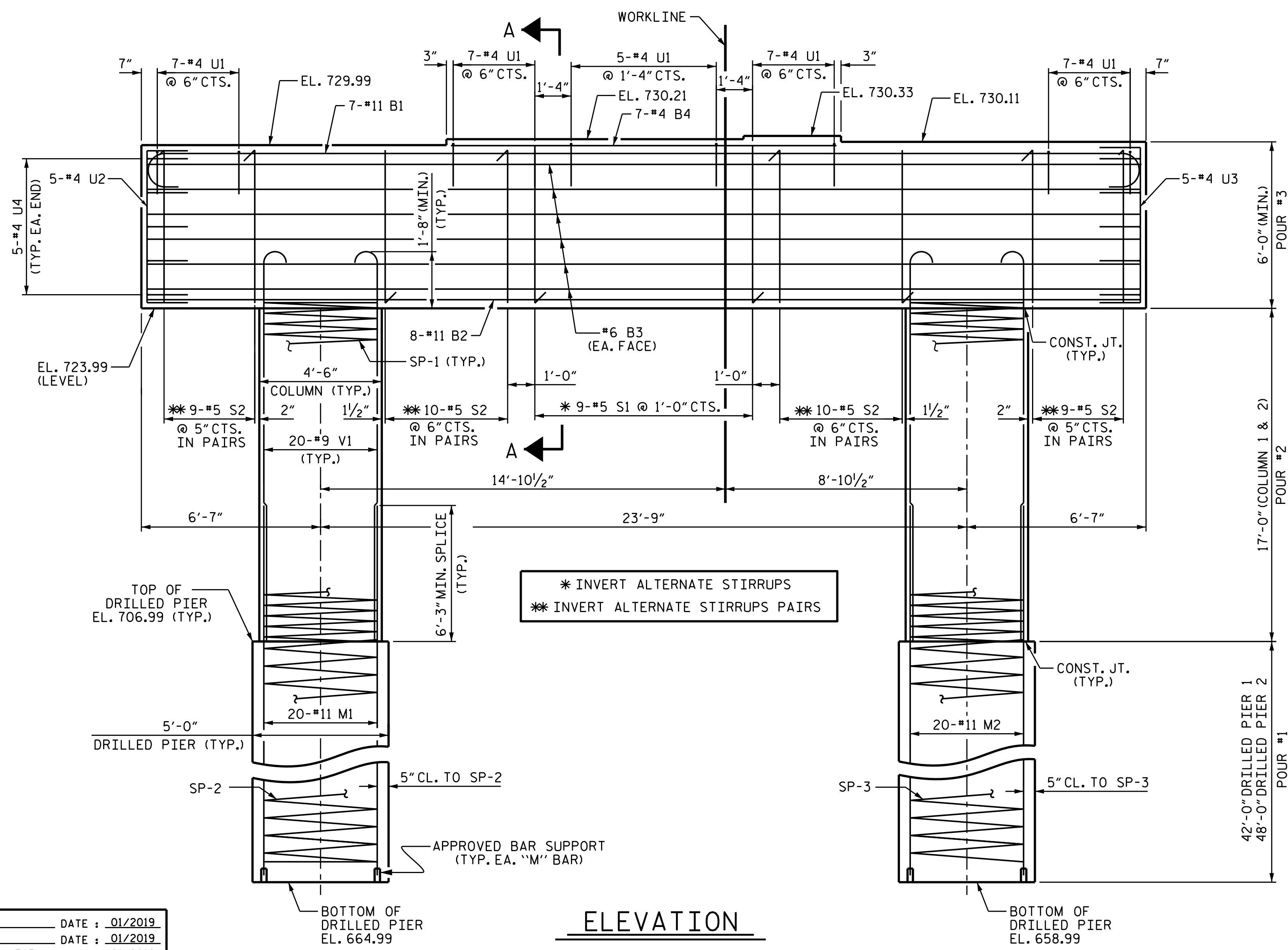
DRAWN BY: M. G. SHAIKH DATE: 01/2019  
CHECKED BY: A. SORSENGINH DATE: 01/2019  
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE: 01/2019

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	DATE:	S-29
1			3		TOTAL SHEETS
2			4		37



PLAN



ELEVATION

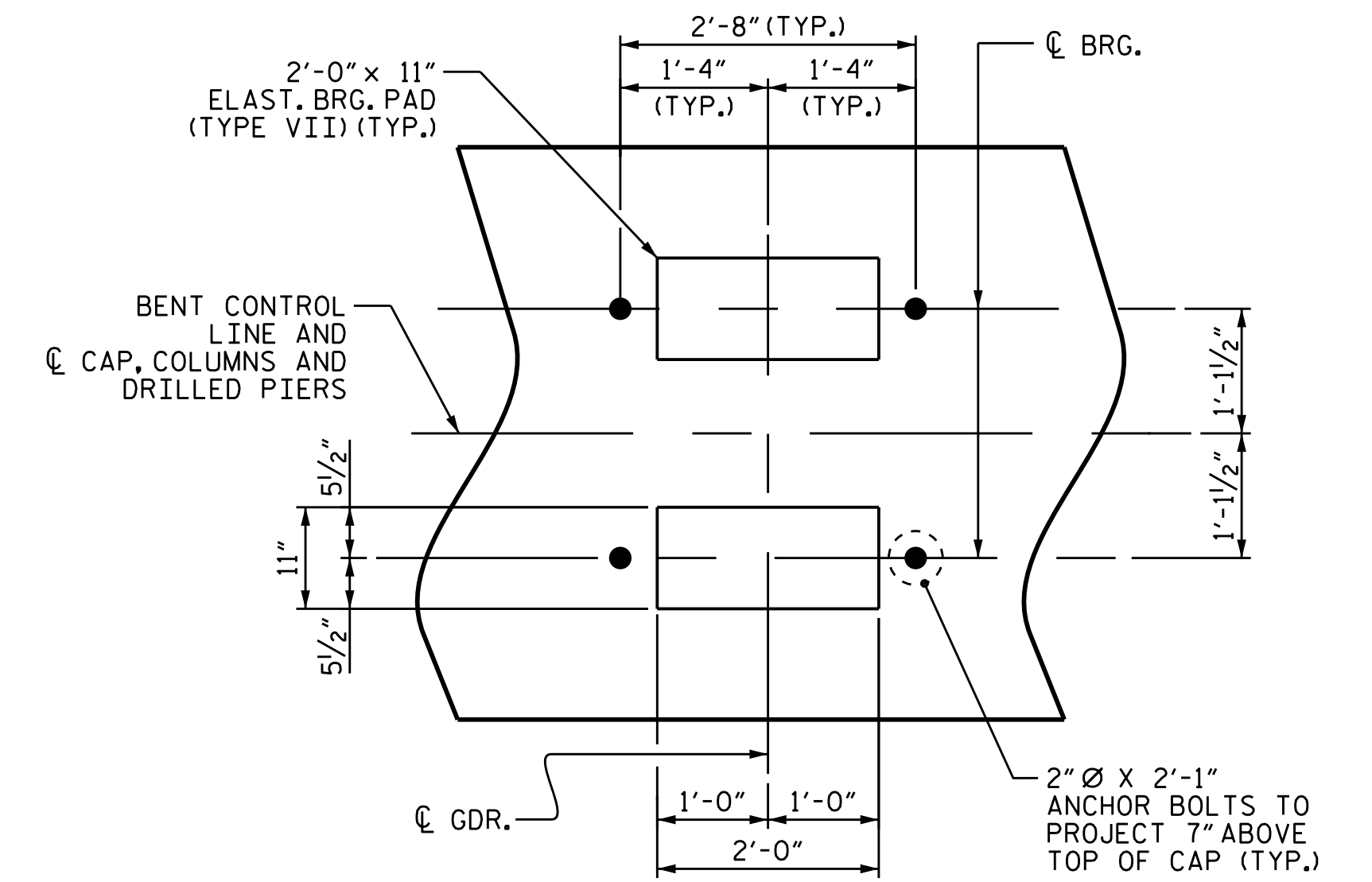
NOTES

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

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

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

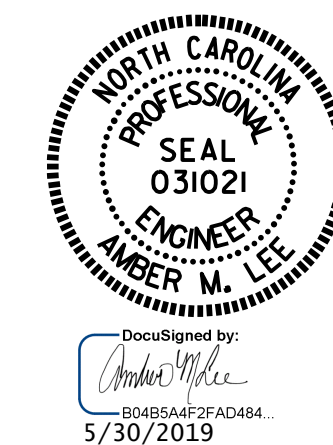
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.



DETAIL "A"  
(DIM. TYP. FOR EA. BRG.)

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

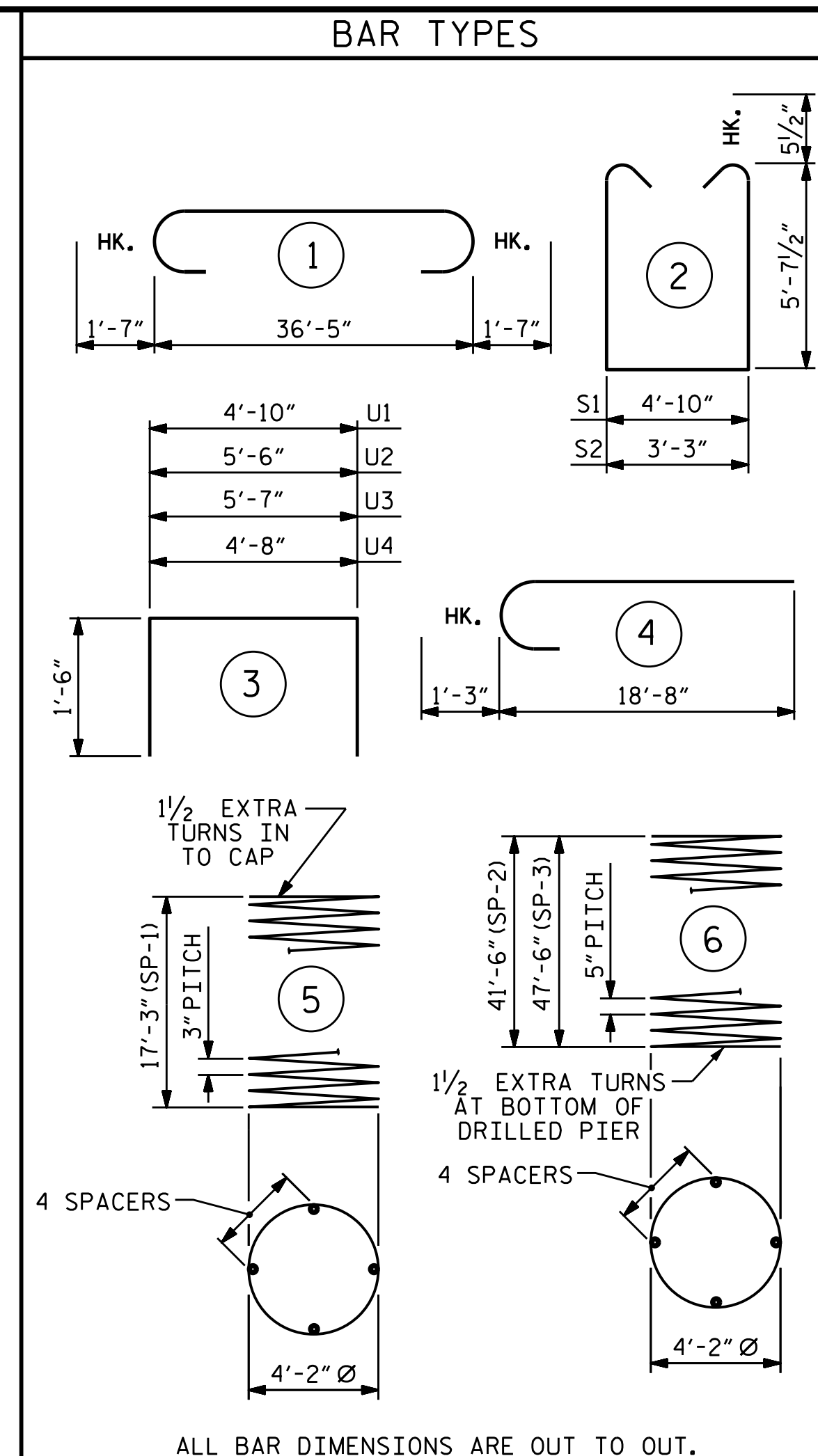
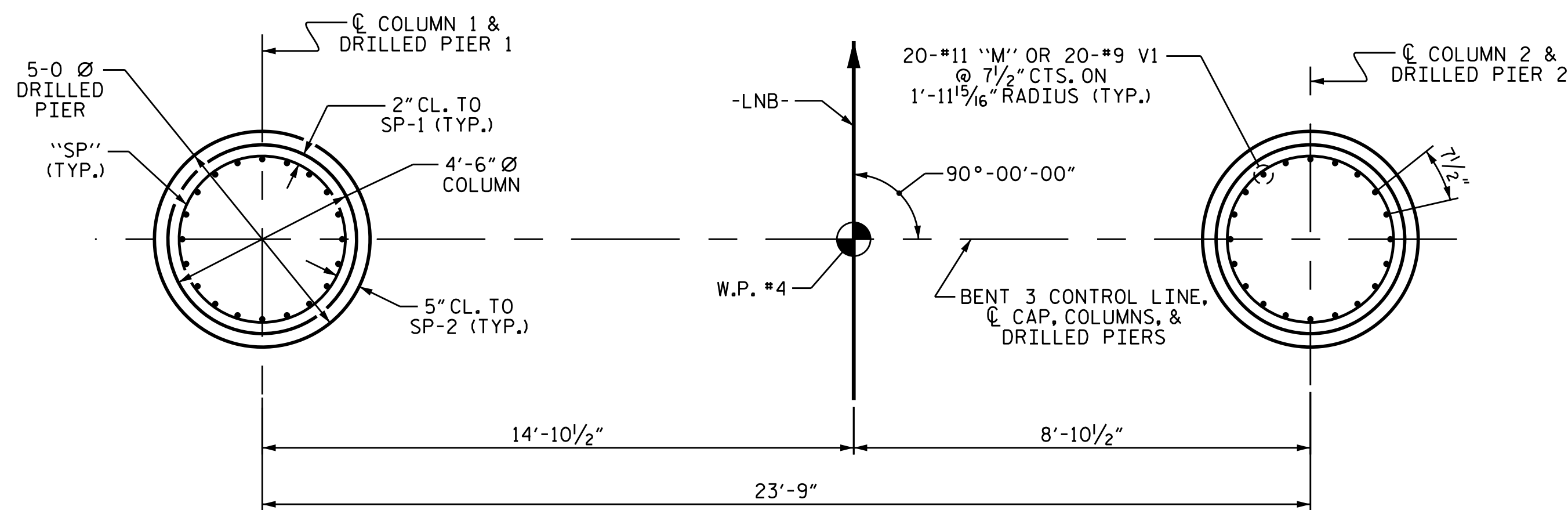
SHEET 1 OF 2



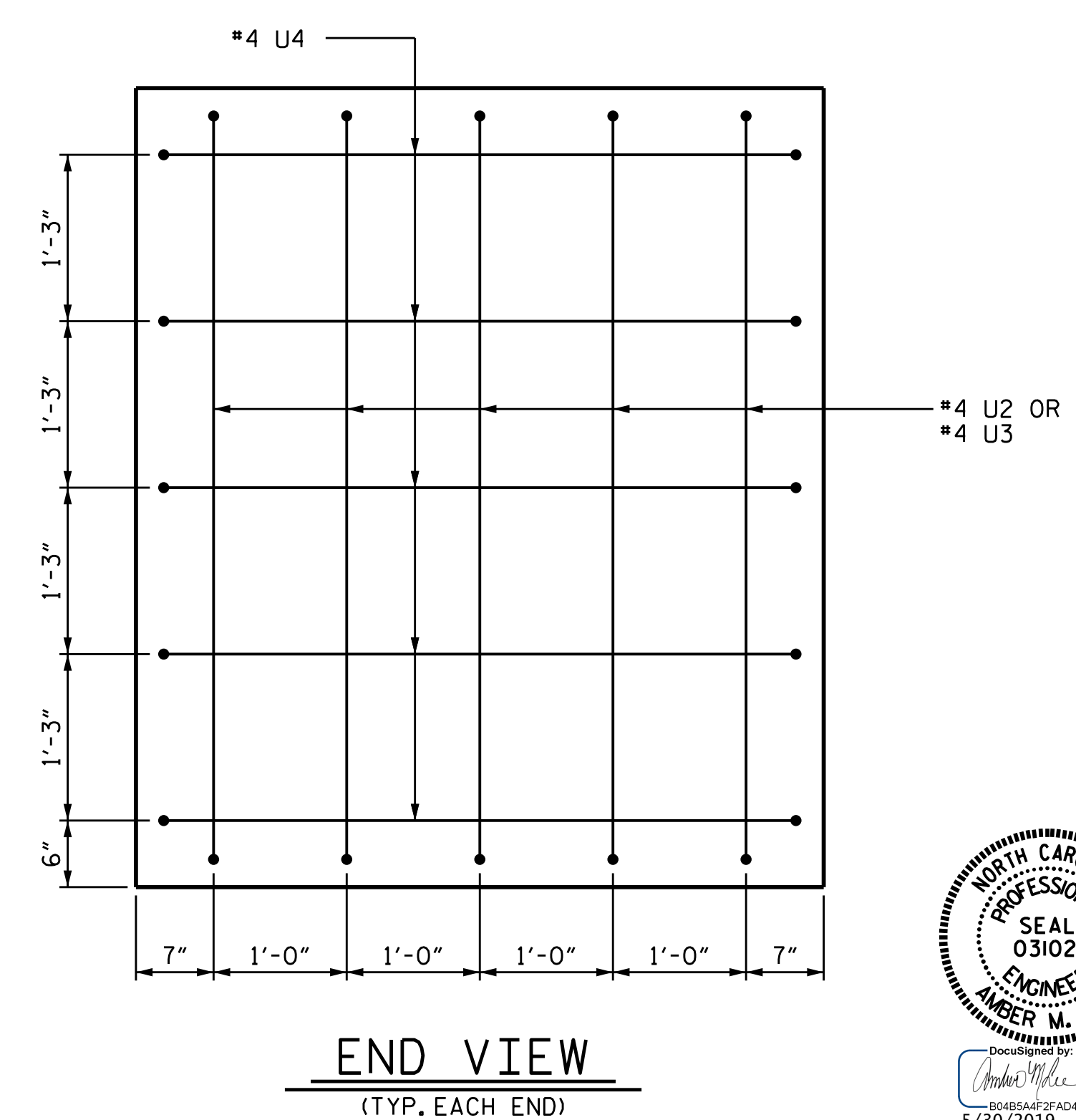
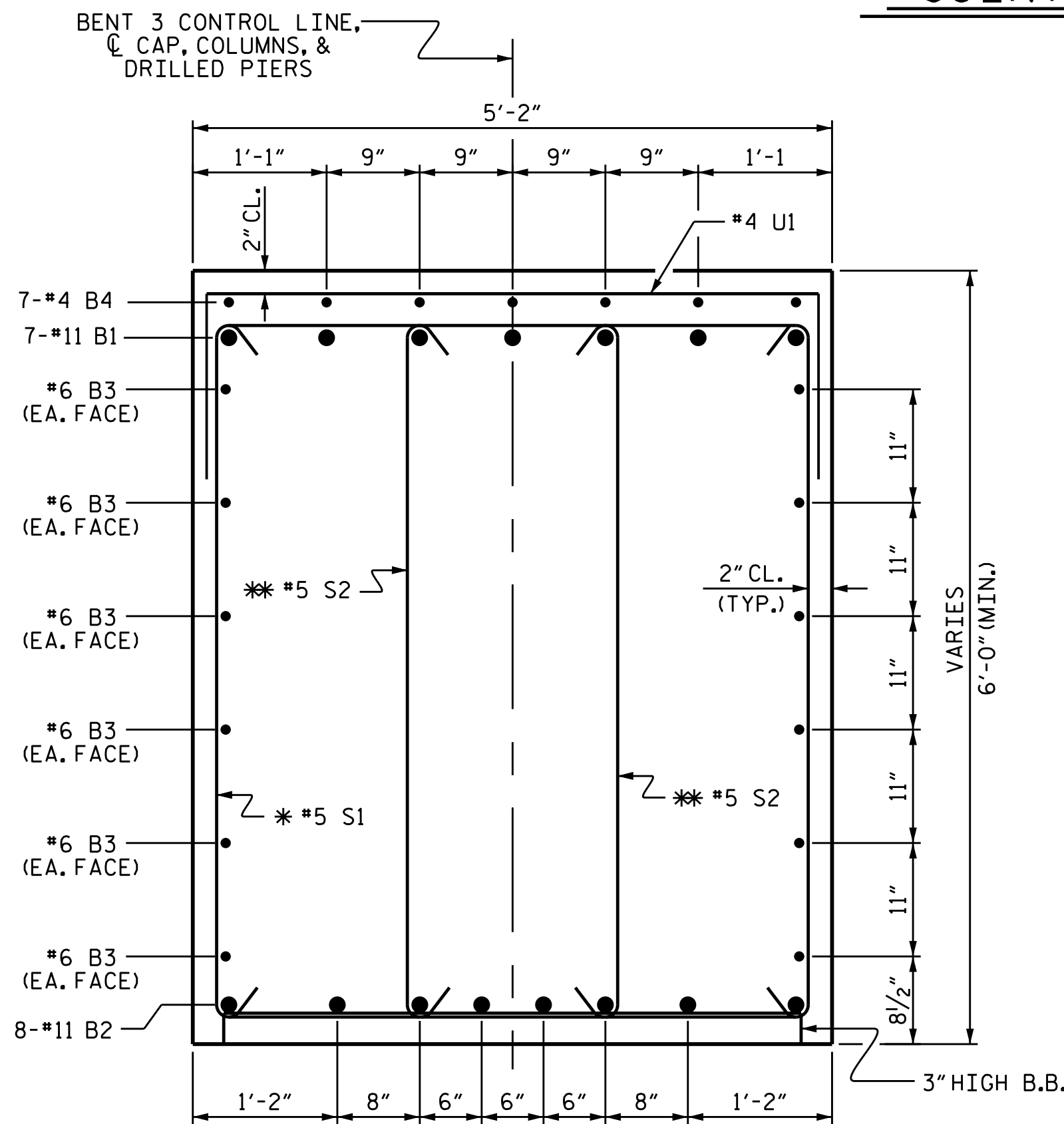
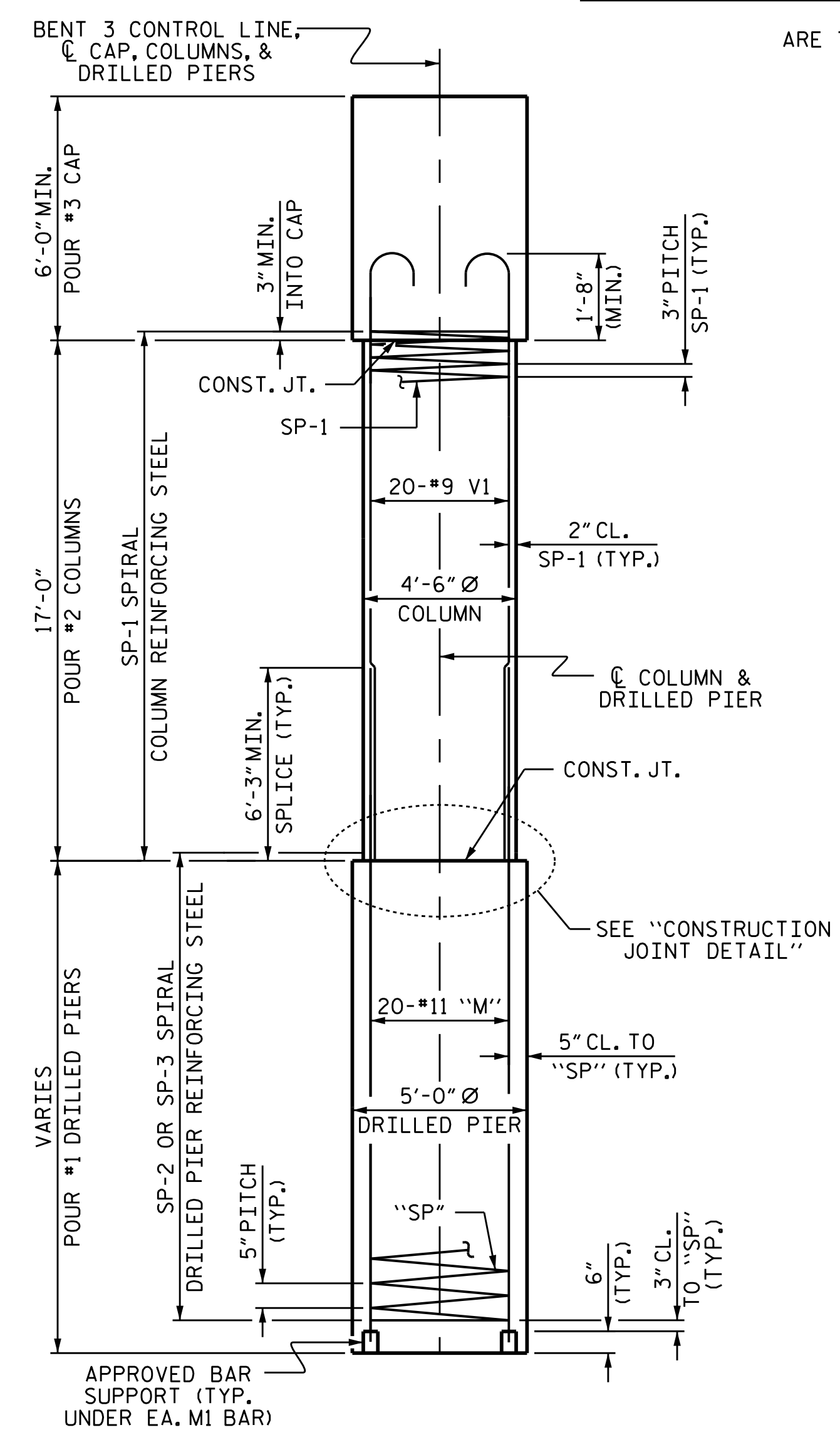
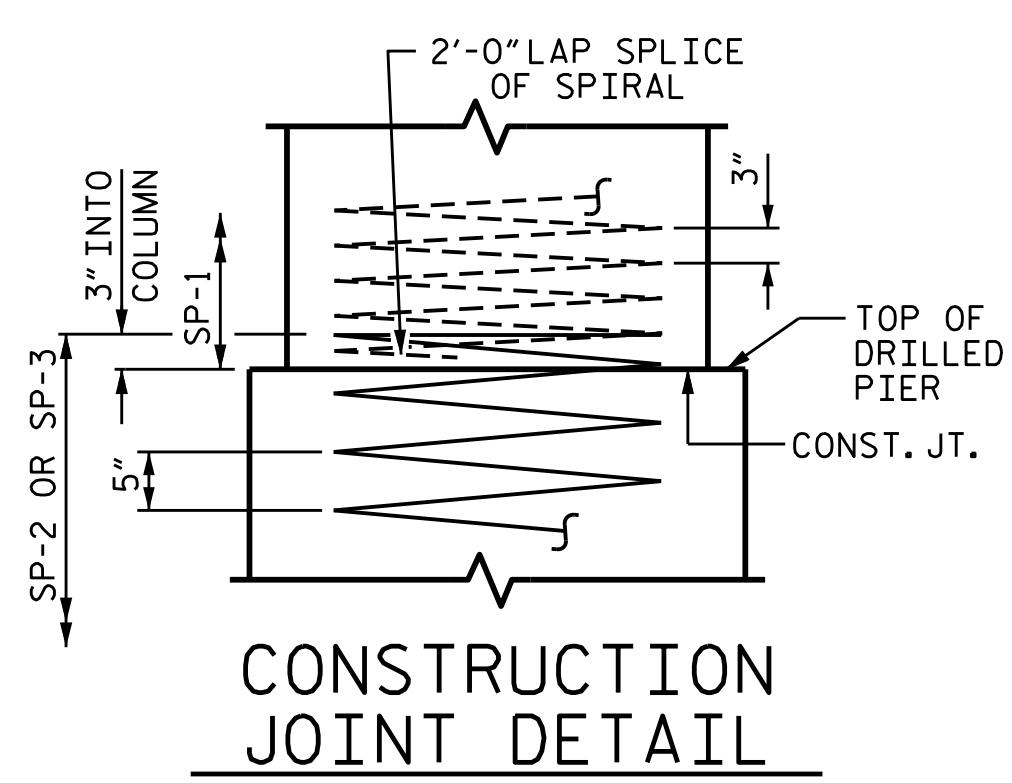
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 3					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					S-30 TOTAL SHEETS 37

DRAWN BY : M.G. SHAIKH DATE : 01/2019  
 CHECKED BY : A. SORSENGINH DATE : 01/2019  
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 01/2019

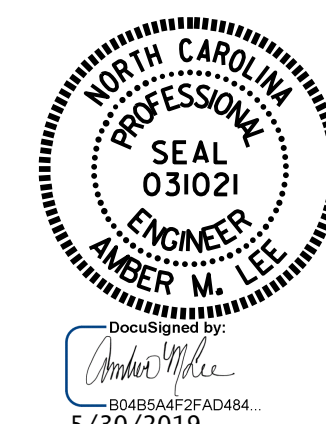




BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#11		39'-7"	1472
B2	8	#11	STR	36'-7"	1555
B3	12	#6	STR	36'-7"	659
B4	7	#4	STR	14'-2"	66
M1	20	#11	STR	51'-0"	5419
M2	20	#11	STR	57'-0"	6057
S1	9	#5	2	17'-0"	160
S2	76	#5	2	15'-5"	1222
U1	33	#4	3	7'-10"	173
U2	5	#4	3	8'-6"	28
U3	5	#4	3	8'-7"	29
U4	10	#4	3	7'-8"	51
V1	40	#9	4	19'-11"	2709
REINFORCING STEEL					LBS. 19600
SP-1	2	*	5	912'-8"	1219
SP-2	1	**	6	1307'-10"	1364
SP-3	1	**	6	1491'-11"	1556
SPIRAL COLUMN REINFORCING STEEL					LBS. 4139
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
** THE SP-2 & SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE					
POUR #3 (CAP)				C.Y.	43.3
POUR #2 (COLUMNS)				C.Y.	20.0
TOTAL CLASS A CONCRETE				C.Y.	63.3
DRILLED PIER QUANTITIES					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				C.Y.	65.4
5'-0" Ø DRILLED PIERS IN SOIL				LIN. FT.	65.0
5'-0" Ø DRILLED PIERS NOT IN SOIL				LIN. FT.	25.0
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIER				LIN. FT.	34.0
CSL TUBES				LIN. FT.	465.0



PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-  
 SHEET 2 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				
SUBSTRUCTURE BENT 3				
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	
				TOTAL SHEETS
				37

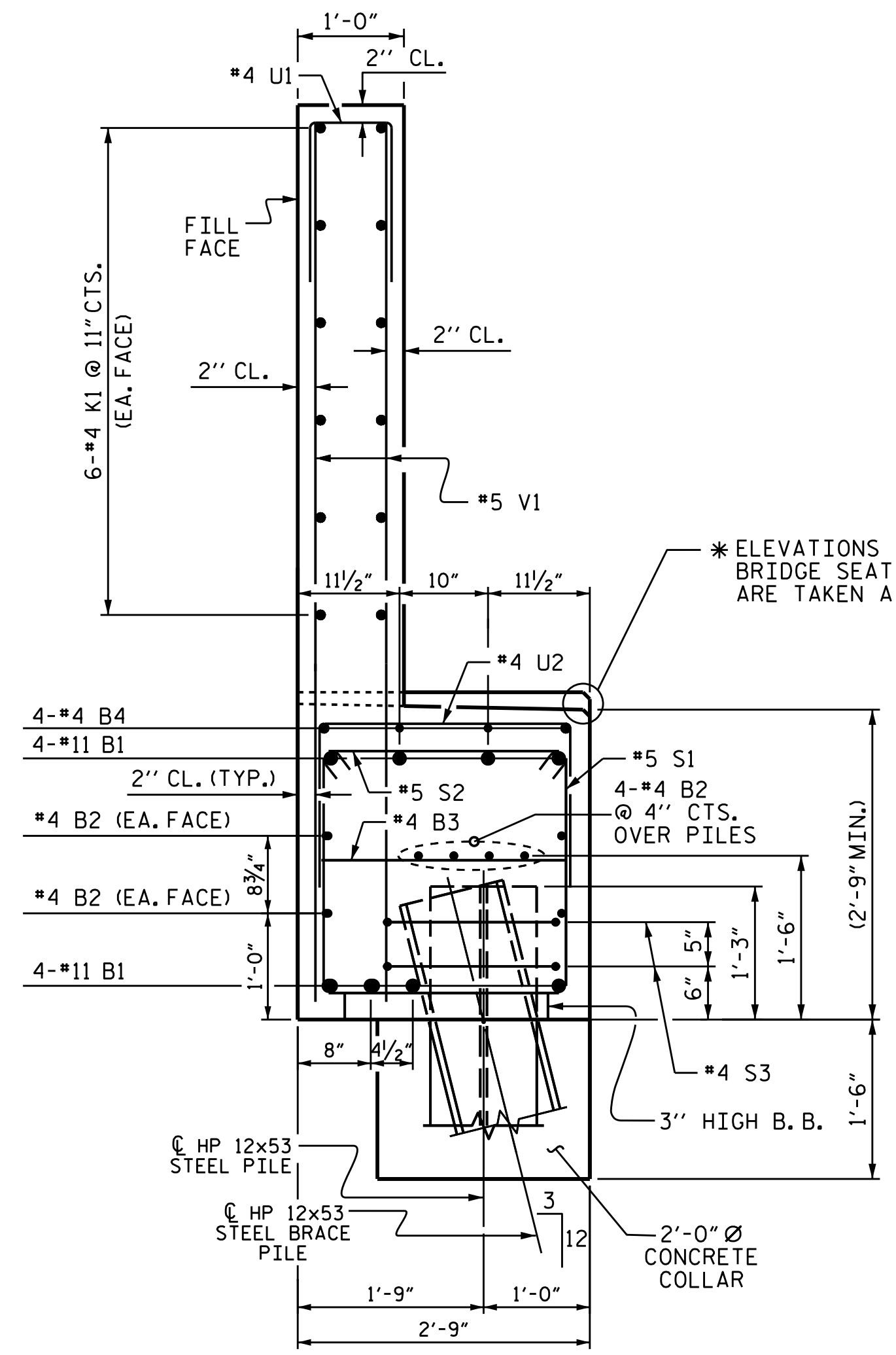
DRAWN BY: M. G. SHAIKH DATE: 01/2019  
 CHECKED BY: A. SORSENGINH DATE: 01/2019  
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE: 01/2019

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

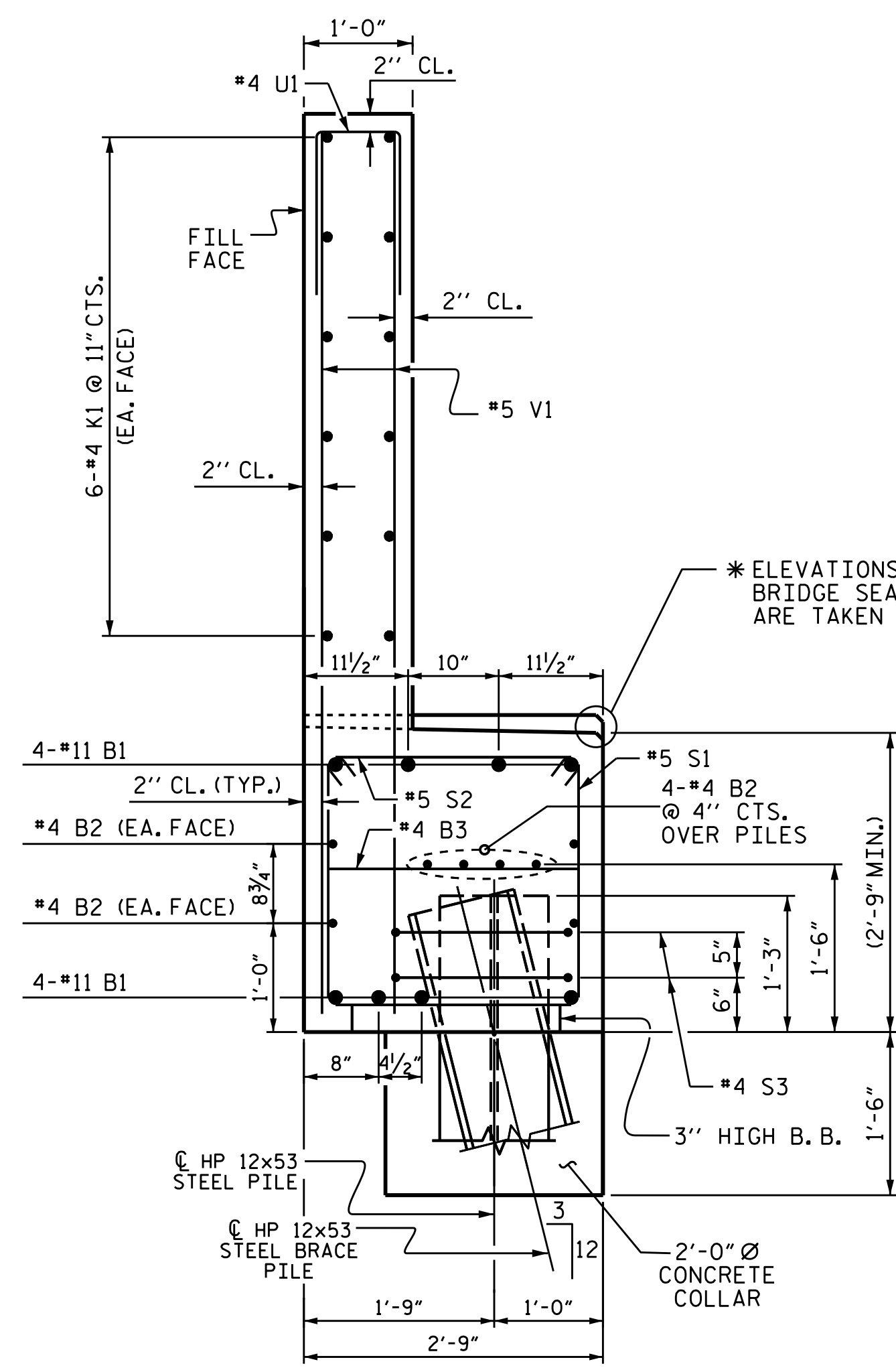




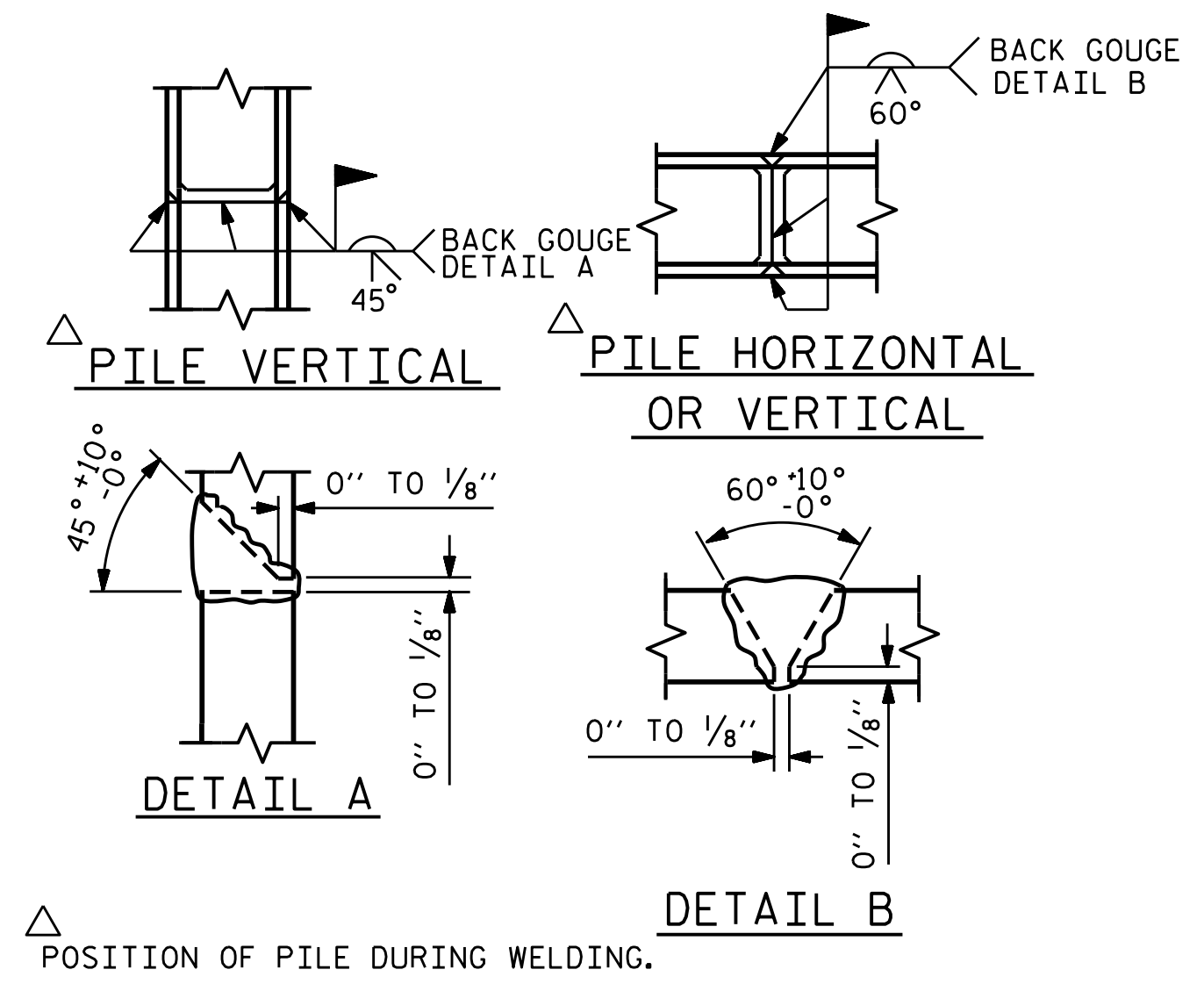




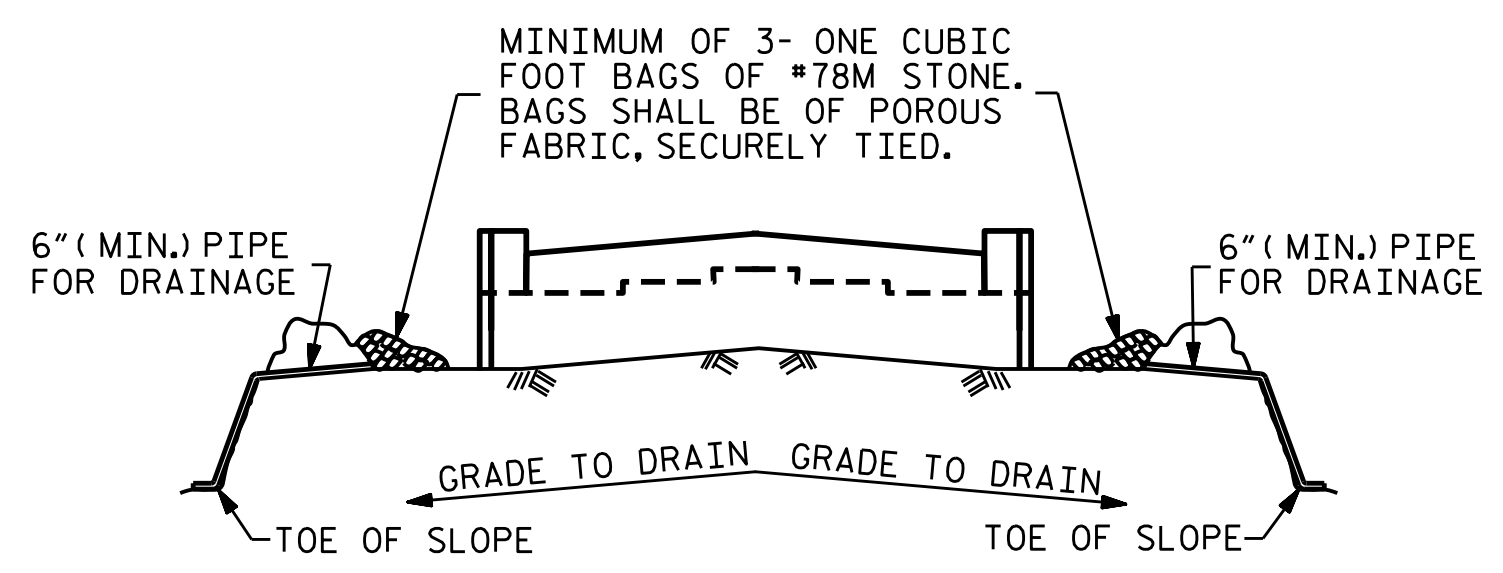
SECTION A-A



SECTION B-B



PILE SPLICE DETAILS

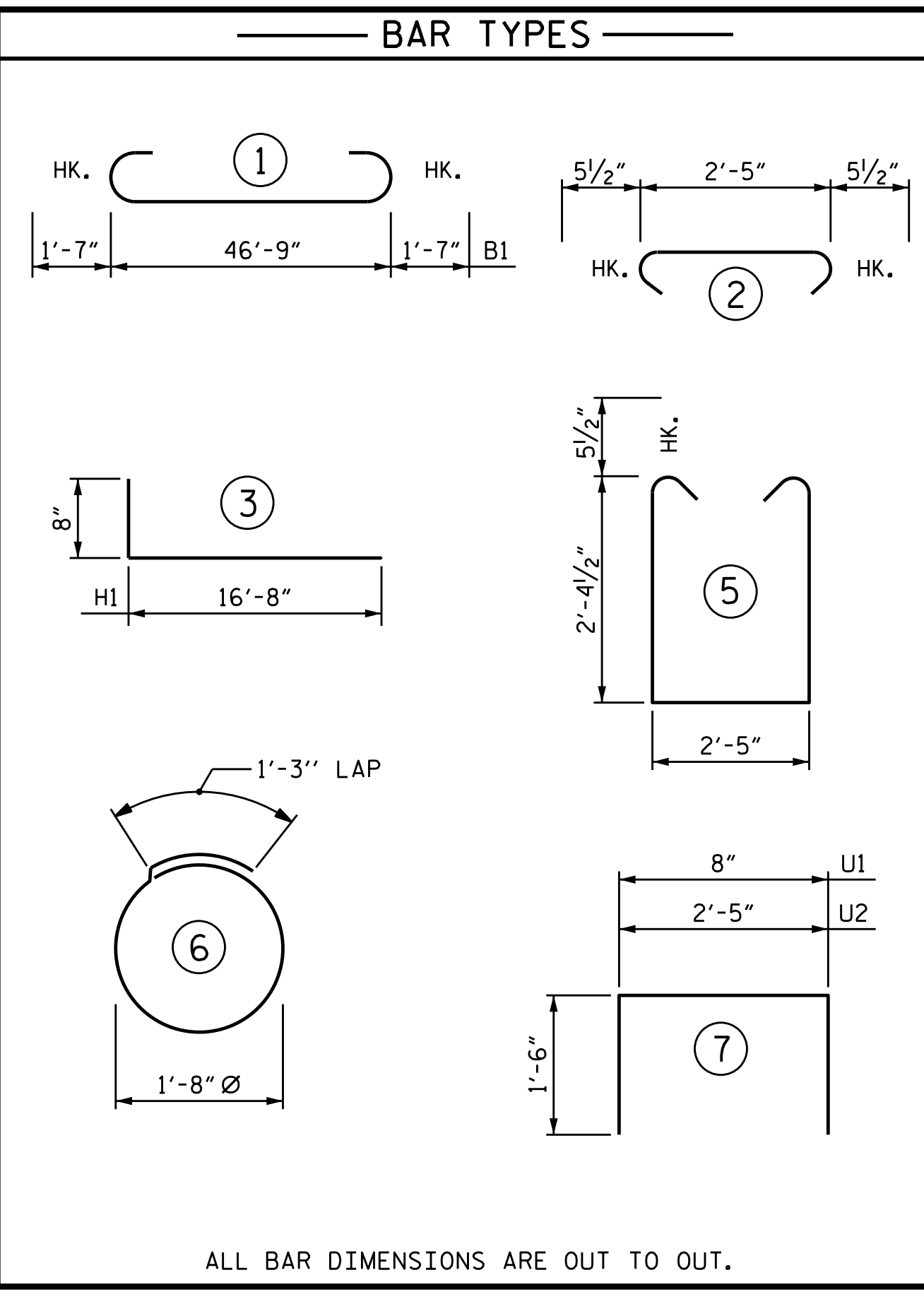


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

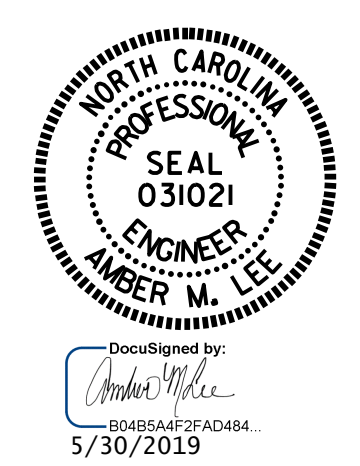


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	49'-11"	2122
B2	16	#4	STR	24'-8"	264
B3	11	#4	STR	2'-5"	18
B4	4	#4	STR	14'-0"	37
B5	4	#4	STR	3'-0"	8
H1	44	#4	3	17'-4"	509
K1	24	#4	STR	24'-8"	395
K2	8	#4	STR	2'-7"	14
S1	50	#5	5	8'-1"	422
S2	50	#5	2	3'-4"	174
S3	16	#4	6	6'-6"	69
U1	41	#4	7	3'-8"	100
U2	13	#4	7	5'-5"	47
V1	82	#5	STR	7'-7"	649
V2	40	#4	STR	9'-0"	240
V3	40	#4	STR	9'-1"	243
REINFORCING STEEL				5311 LBS.	
CLASS A CONCRETE (CU. YDS.)					
POUR 1					
CAP, LOWER PART OF WING & COLLARS				19.4	
POUR 2					
BACKWALL & UPPER PART OF WING				17.3	
TOTAL				36.7	
HP 12 X 53 STEEL PILES NO. 10				425 LIN. FT.	

PROJECT NO. B-5389  
YADKIN COUNTY  
STATION: 20+65.50 -LNB-

SHEET 3 OF 3

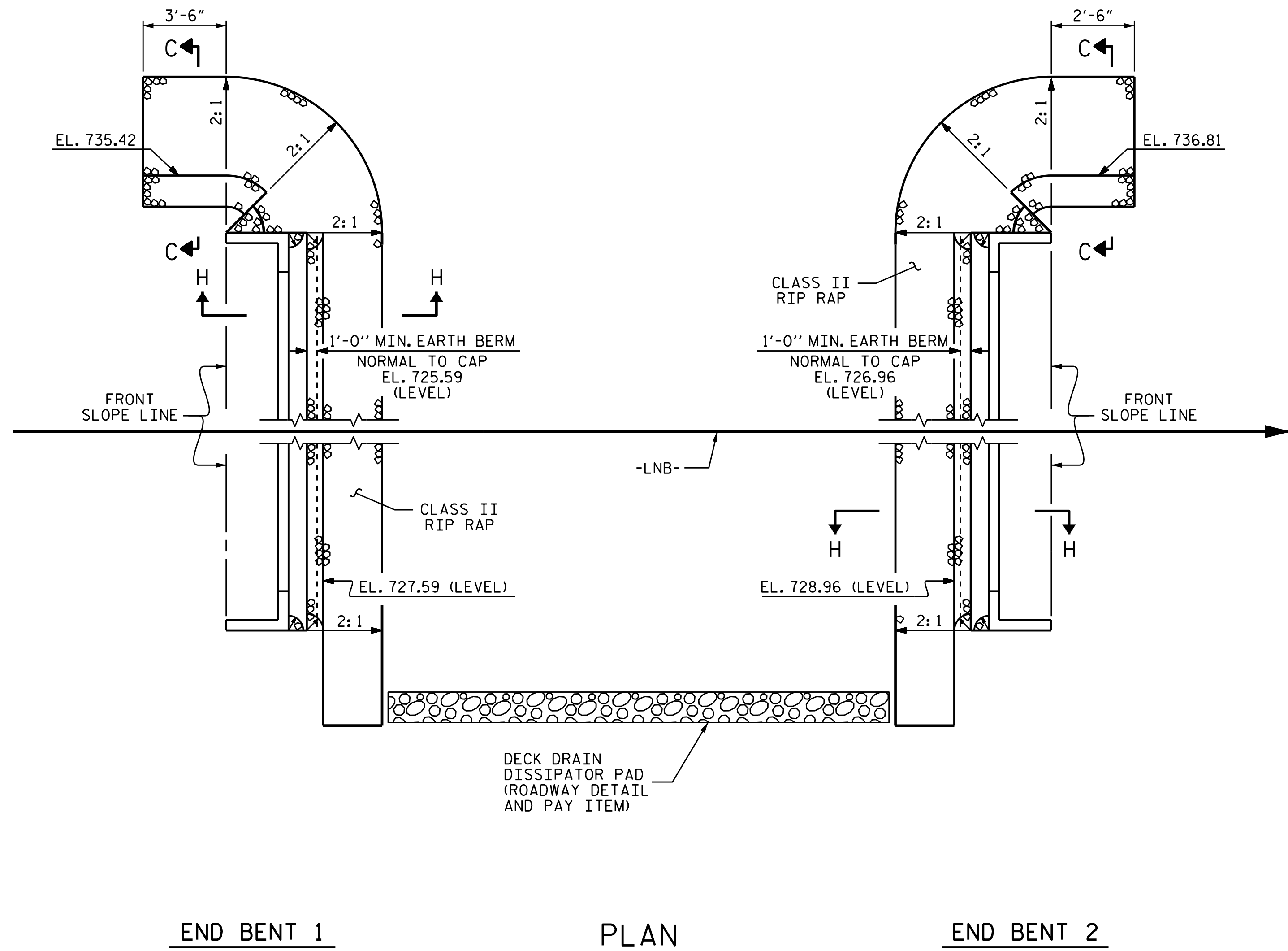


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
END BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

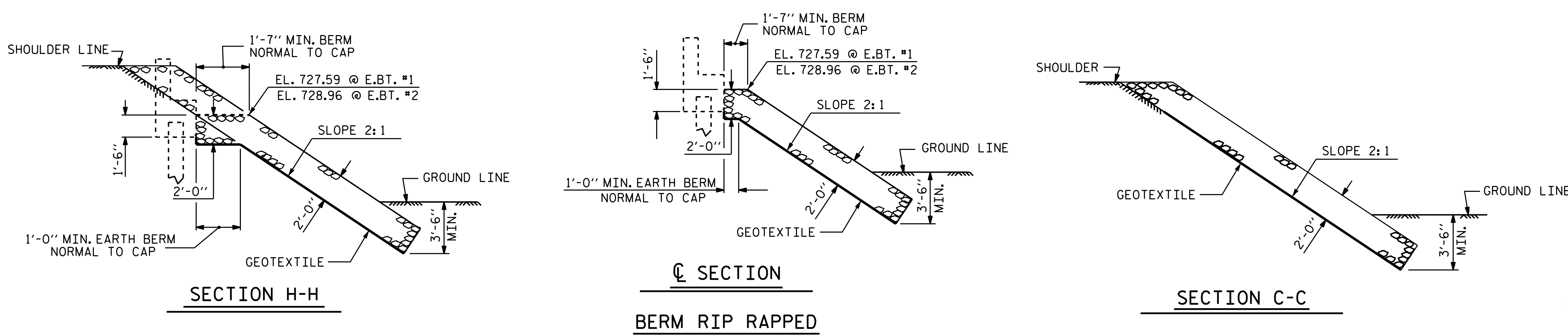
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY: M.G. SHAIKH DATE: 01/2019  
CHECKED BY: A. SORSENGINH DATE: 01/2019  
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 01/2019





ESTIMATED QUANTITIES		
BRIDGE @ STA. 20+65.50 -LNB-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	725	810
END BENT 2	725	810



PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

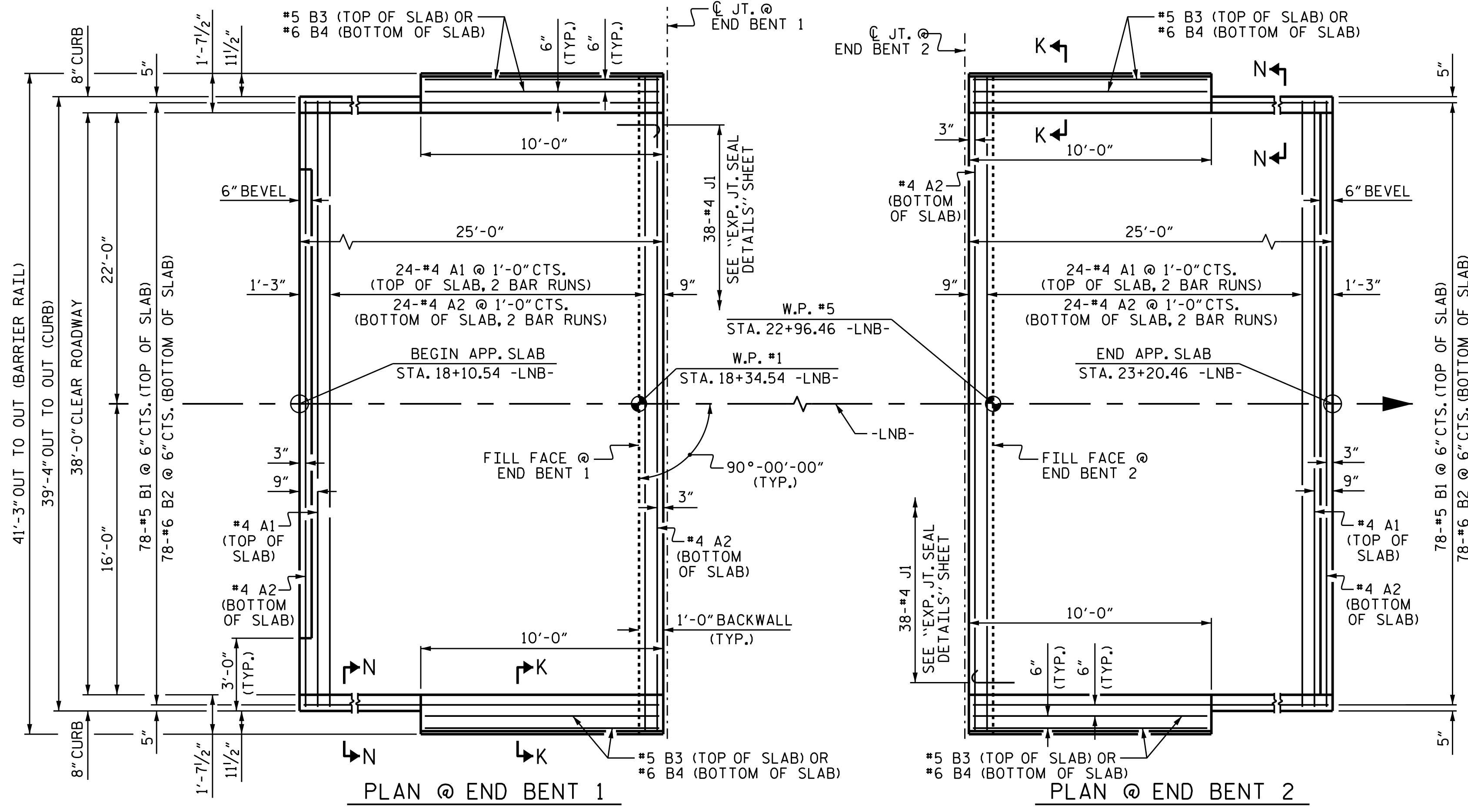


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 —RIP RAP DETAILS—

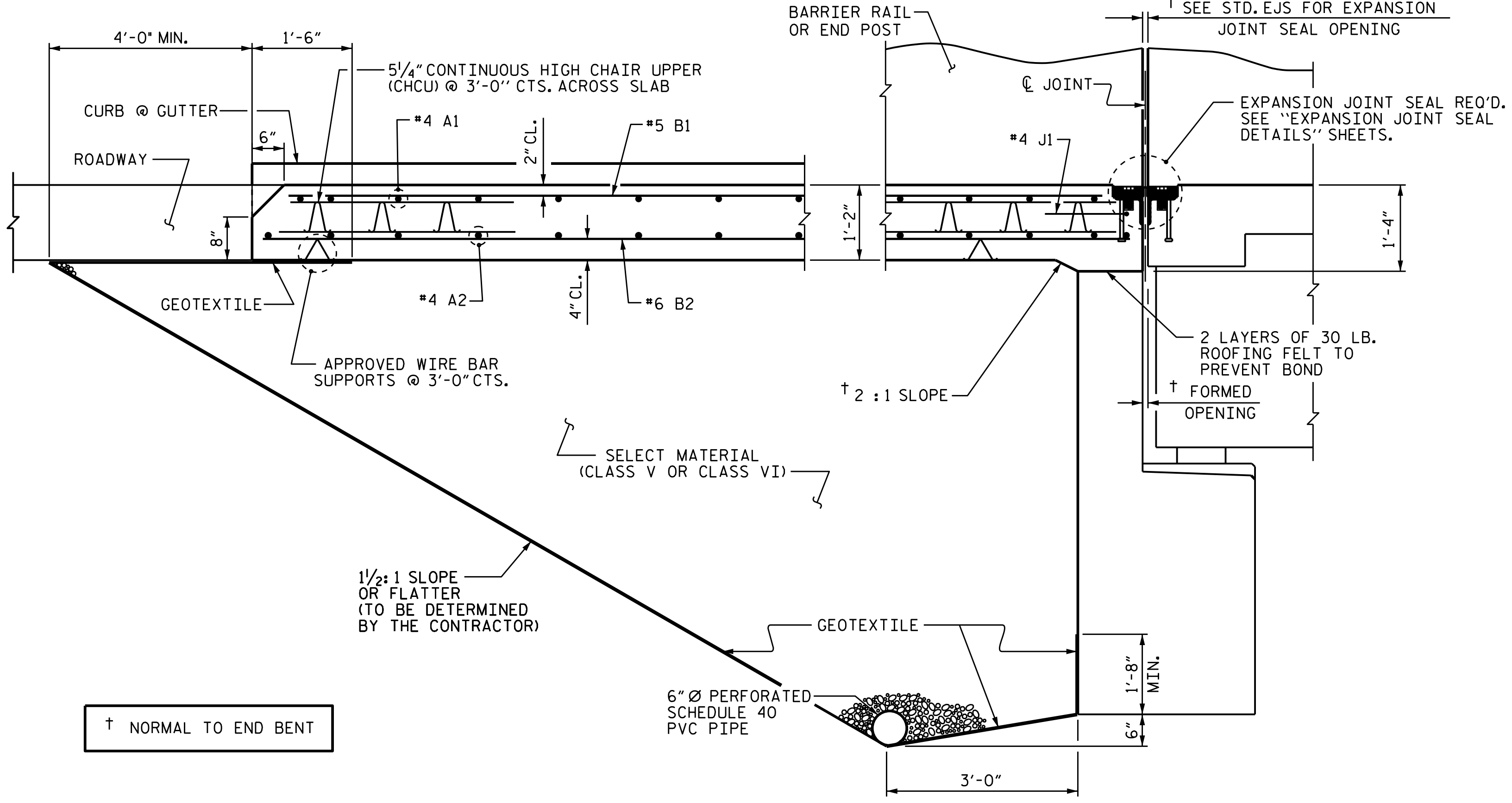
ASSEMBLED BY :	A. SORSENGIH	DATE :	11/2018
CHECKED BY :	M. G. SHAIKH	DATE :	1/2019
DRAWN BY :	REK 1/84	REV. 10/1/11	MAA/GM
CHECKED BY :	RDU 1/84	REV. 12/21/11	MAA/GM
		REV. 12/17	MAA/THC

NO.	BY:	DATE:	REVISIONS			SHEET NO.
			NO.	BY:	DATE:	
1			3			S-35
2			4			TOTAL SHEETS 37

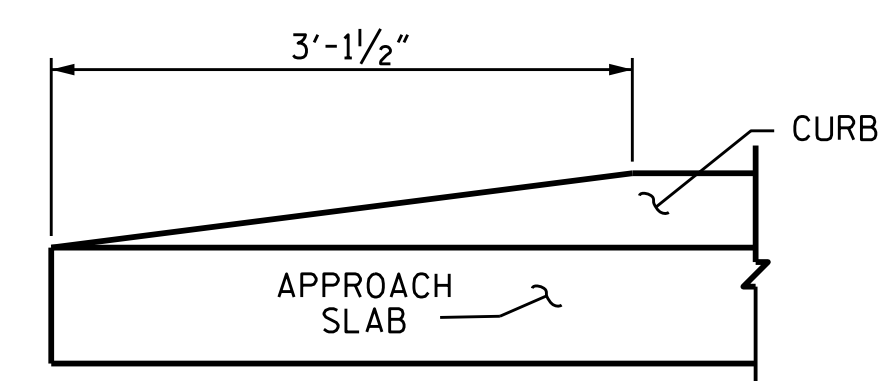
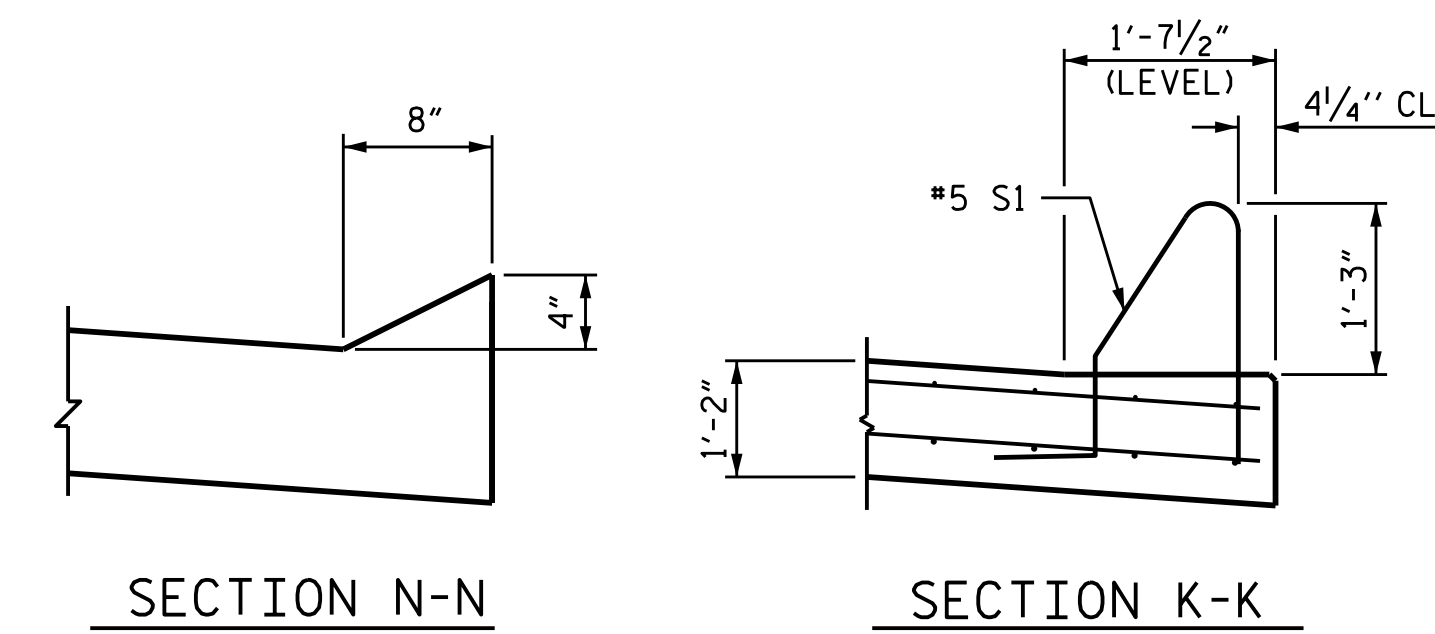
DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB  
(TYPE I - STANDARD APPROACH FILL)



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

- FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.
- GEOTEXTILE SHALL BE TYPE I 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.
- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- 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.
- FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

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

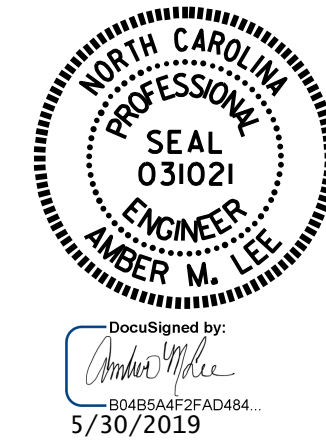
BILL OF MATERIAL						
<b>APPROACH SLAB AT E. BENT 1</b>						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	50	#4	STR	21'-6"	718	
A2	52	#4	STR	21'-4"	741	
*B1	78	#5	STR	24'-2"	1966	
B2	78	#6	STR	24'-8"	2890	
*B3	8	#5	STR	9'-8"	81	
B4	8	#6	STR	9'-8"	116	
*J1	38	#4	1	1'-5"	36	
REINFORCING STEEL **					LBS.	3747
*EPOXY COATED REINFORCING STEEL **					LBS.	2801
CLASS AA CONCRETE **					C. Y.	44.4
<b>APPROACH SLAB AT E. BENT 2</b>						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	50	#4	STR	21'-6"	718	
A2	52	#4	STR	21'-4"	741	
*B1	78	#5	STR	24'-2"	1966	
B2	78	#6	STR	24'-8"	2890	
*B3	8	#5	STR	9'-8"	81	
B4	8	#6	STR	9'-8"	116	
*J1	38	#4	1	1'-5"	36	
REINFORCING STEEL **					LBS.	3747
*EPOXY COATED REINFORCING STEEL **					LBS.	2801
CLASS AA CONCRETE **					C. Y.	44.4
BAR TYPE						
ALL BAR DIMENSIONS ARE OUT TO OUT						

\*\* QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.

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

PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-

SHEET 1 OF 2



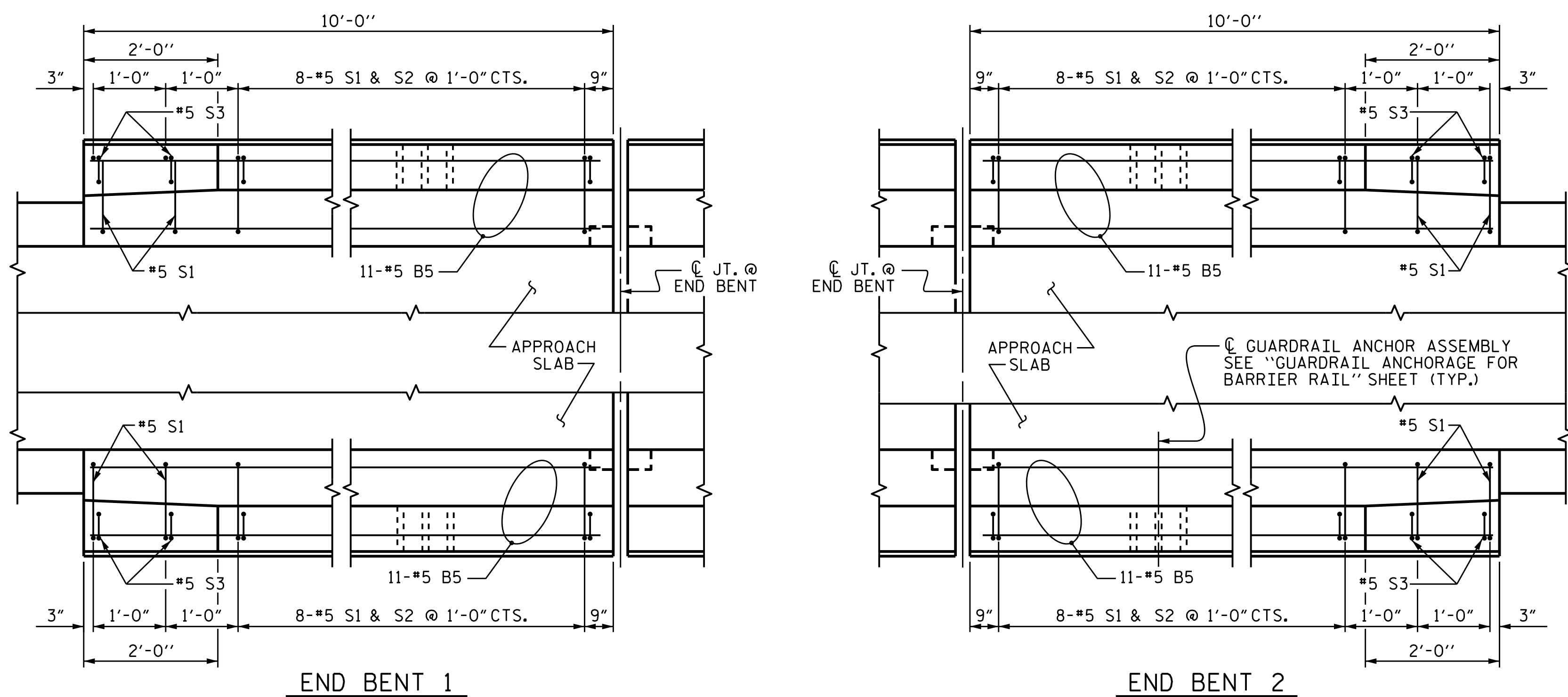
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				
STANDARD BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT				
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

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REVISIONS		SHEET NO.
NO.	DATE:	S-36
1		TOTAL SHEETS
2		37

ASSEMBLED BY :	A. SORSENGINH	DATE :	11/2018
CHECKED BY :	M. G. SHAIKH	DATE :	1/2019
DRAWN BY :	EEM	REV. 12/21/11	MAA/GM
CHECKED BY :	VAP	REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC





PLAN OF BARRIER RAIL

**NOTES**

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

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

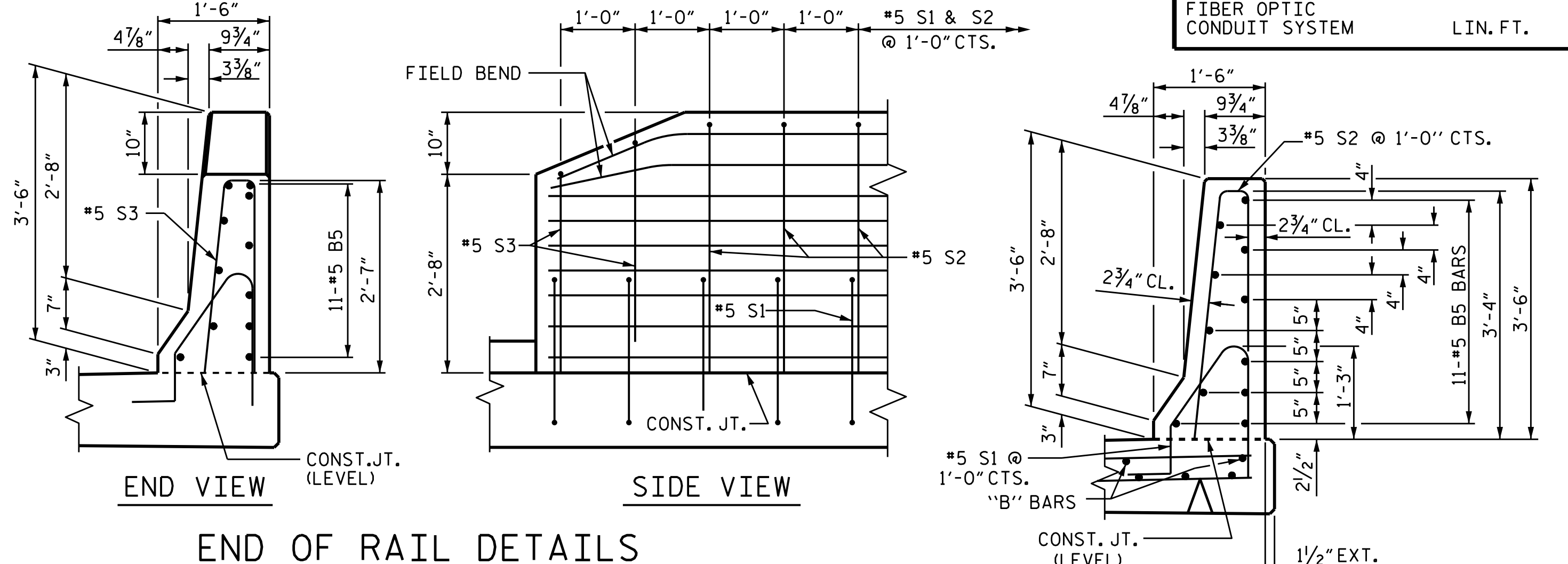
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT TO OUT

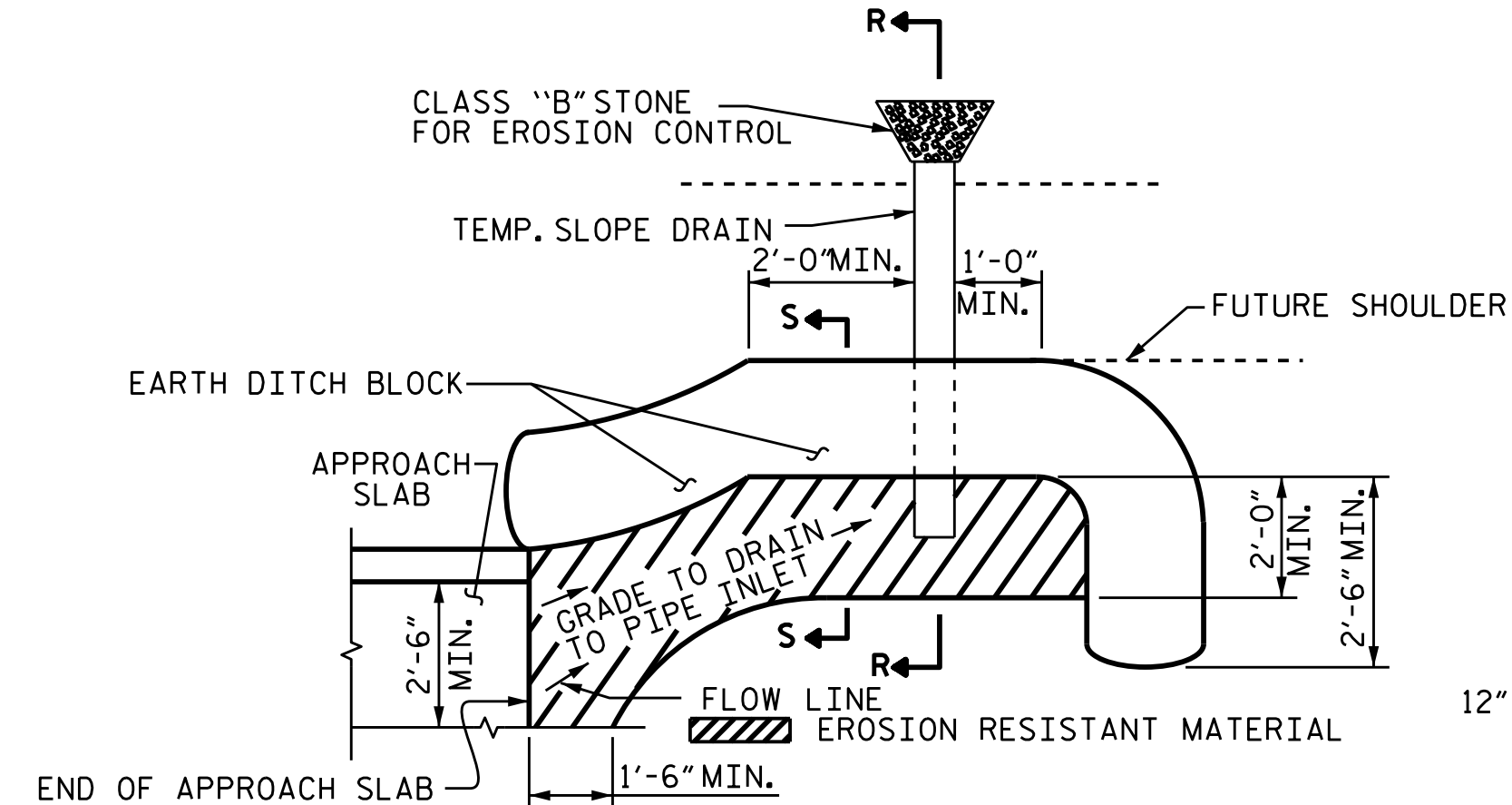
**BILL OF MATERIAL**

BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B5	44	#5	STR	9'-8"	444
* S1	40	#5	1	5'-1"	212
* S2	32	#5	2	7'-0"	234
* S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL				LBS.	936
CLASS AA CONCRETE				C. Y.	5.4
CONCRETE BARRIER RAIL				LIN. FT.	40.0
FIBER OPTIC CONDUIT SYSTEM				LIN. FT.	36.0

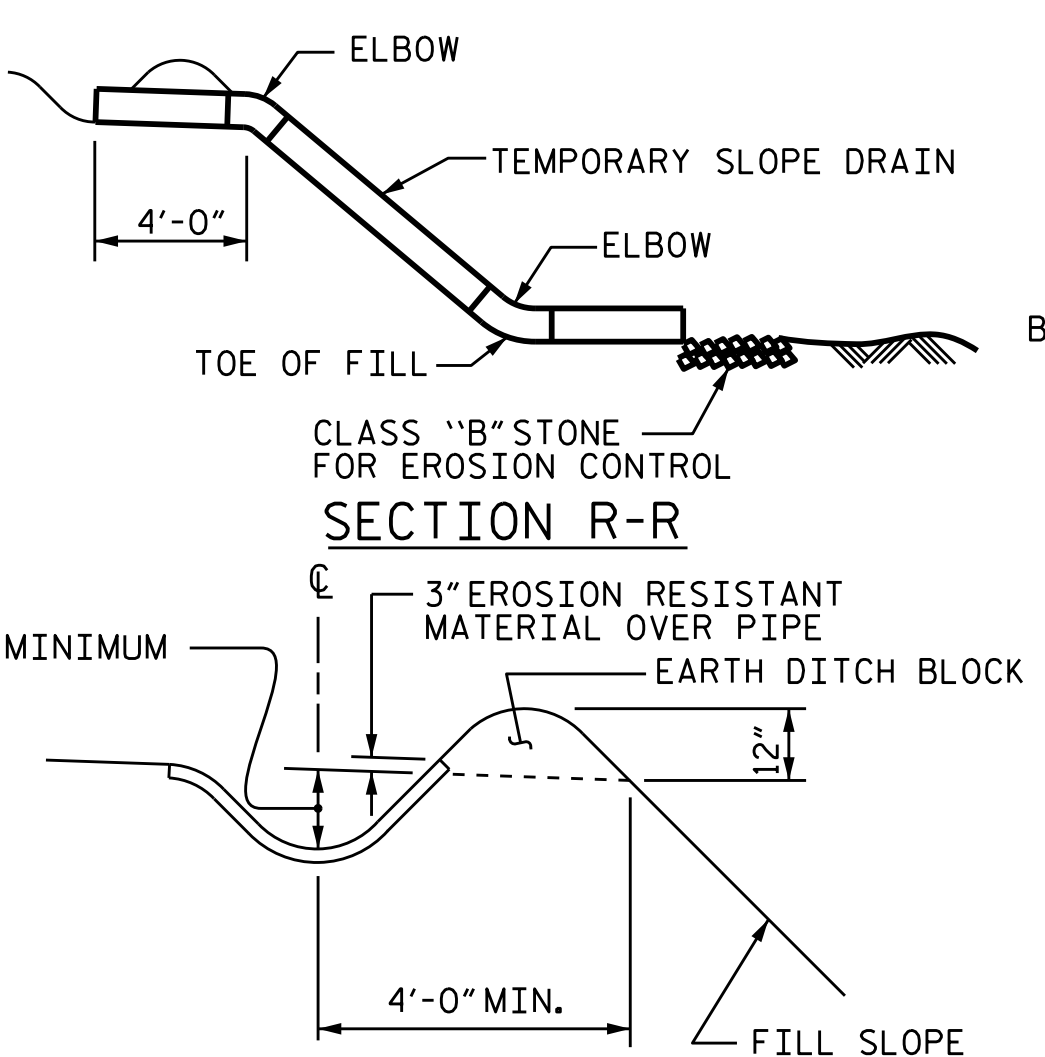


END OF RAIL DETAILS

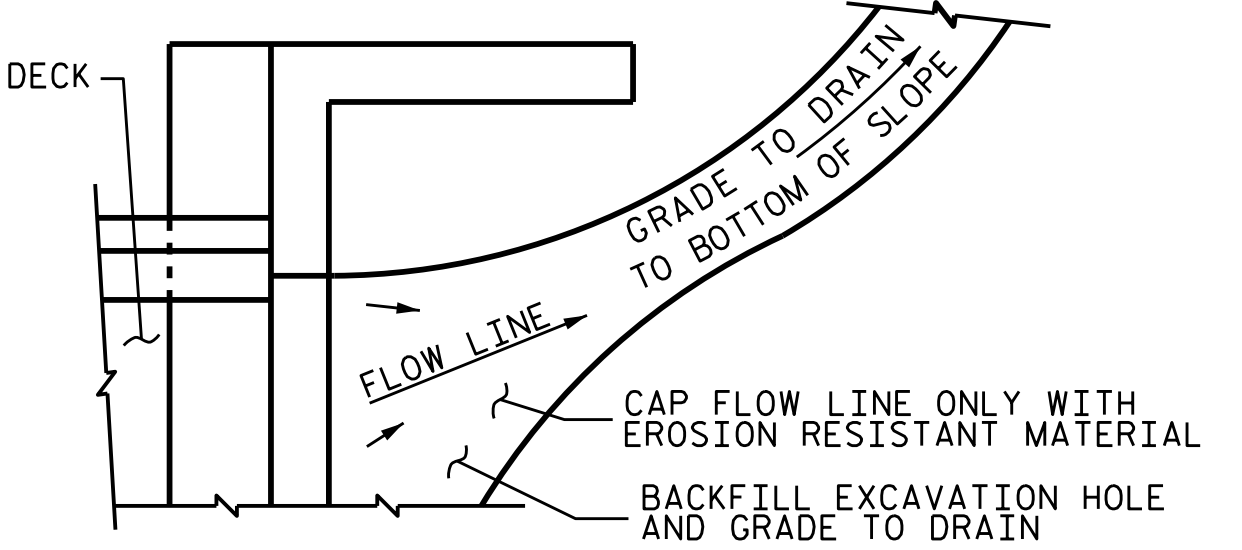
SECTION THRU RAIL



PLAN VIEW



SECTION S-S



TEMPORARY DRAINAGE DETAIL

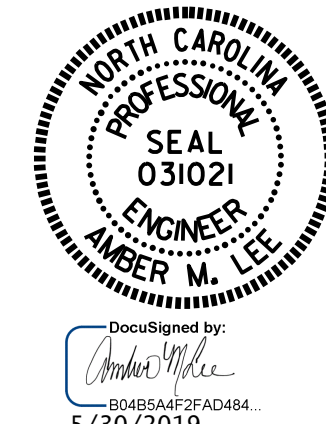
**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

ASSEMBLED BY :	A. SORSENGINH	DATE :	11/2018
CHECKED BY :	M. G. SHAIKH	DATE :	1/2019
DRAWN BY :	FCJ	REV. 6/13	MAA/GM
CHECKED BY :	ARB	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC

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PROJECT NO. B-5389  
YADKIN COUNTY  
 STATION: 20+65.50 -LNB-  
 SHEET 2 OF 2



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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. BAS4

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

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

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

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

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

### HANDRAILS AND POSTS:

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

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

### SPECIAL NOTES:

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

# ENGLISH

JANUARY, 1990