

**This electronic collection of documents is provided  
for the convenience of the user  
and is Not a Certified Document –**

**The documents contained herein were originally issued  
and sealed by the individuals whose names and license  
numbers appear on each page, on the dates appearing  
with their signature on that page.**

**This file or an individual page  
shall not be considered a certified document.**

22-DEC-2015 08:49  
 \$\$\$\$\$\$\$\$\$\$DGN\$\$\$\$\$\$\$\$\$  
 gcutcher

TIP PROJECT: W-5518

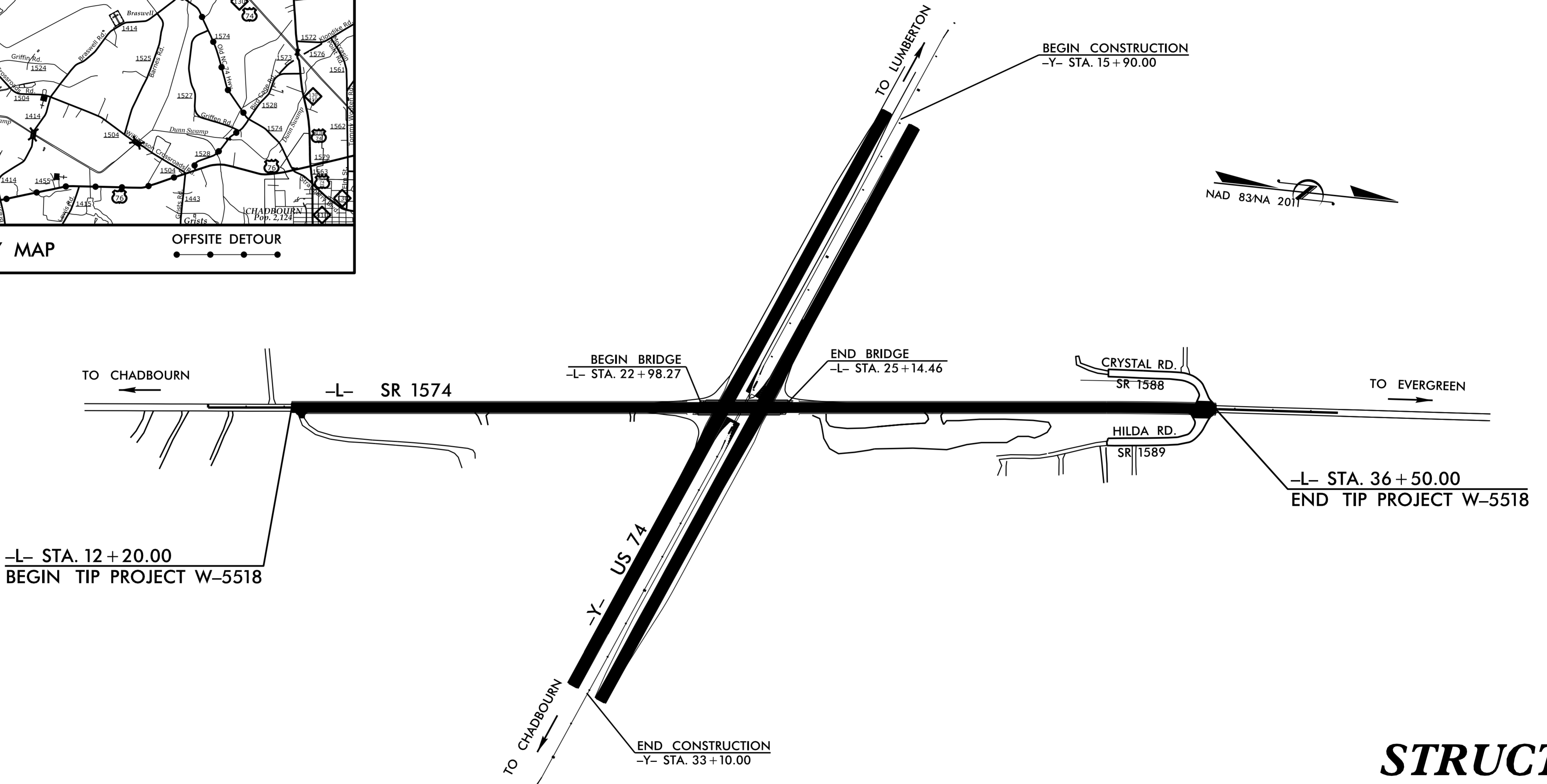
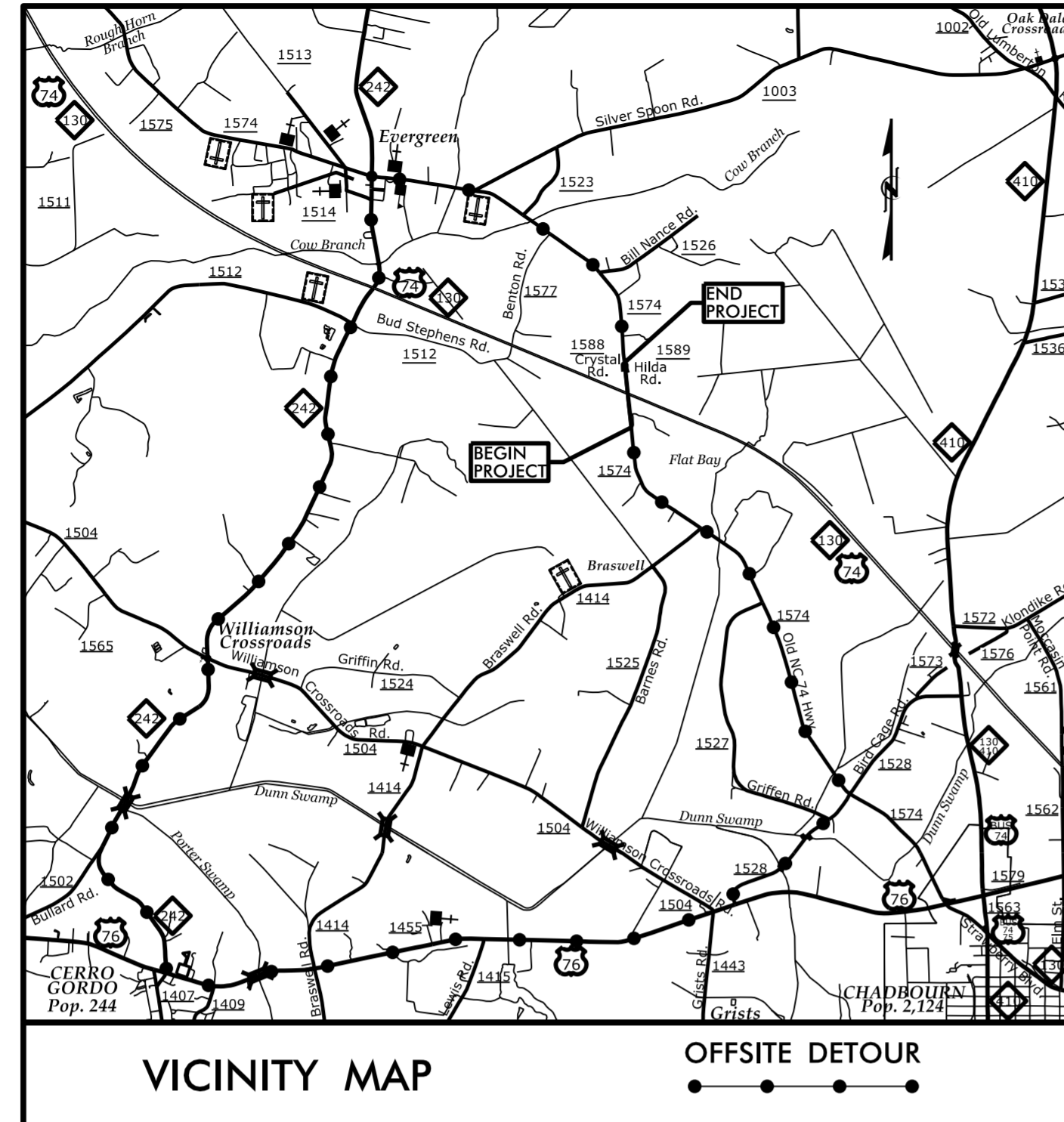
CONTRACT: C203781

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

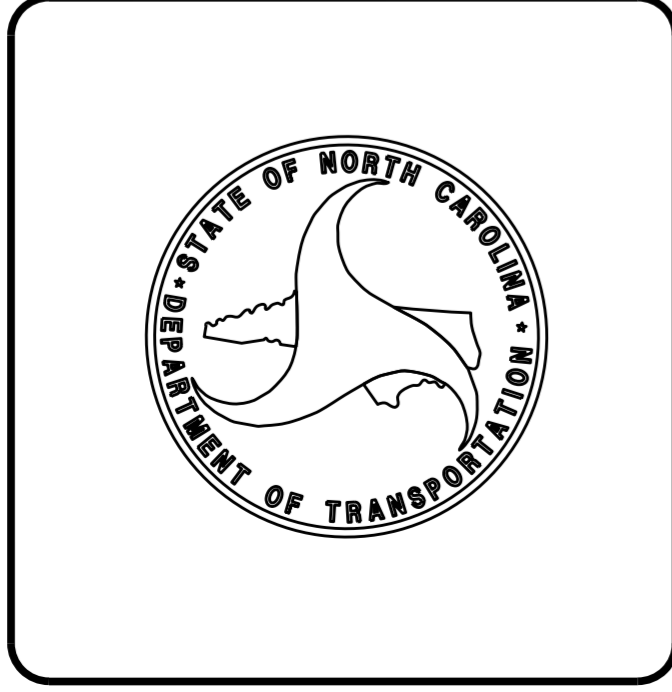
**COLUMBUS COUNTY**

LOCATION: CONSTRUCT OVERPASS OF SR 1574 (OLD US 74) OVER US 74  
 TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5518		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
43741.1.FS1	HSIP-0074(155)	PE	
43741.2.FS1	HSIP-0074(155)	ROW	
43741.3.FS1	HSIP-0074(155)	CONST	



**STRUCTURE**



**DESIGN DATA**

ADT 2014	=	1,100
ADT 2035	=	2,100
K	=	%
D	=	%
T	=	6 %*
V	=	60 MPH
*TTST	=	3% DUAL = 3%
FUNC CLASS	=	
MAJOR COLLECTOR	=	

**PROJECT LENGTH**

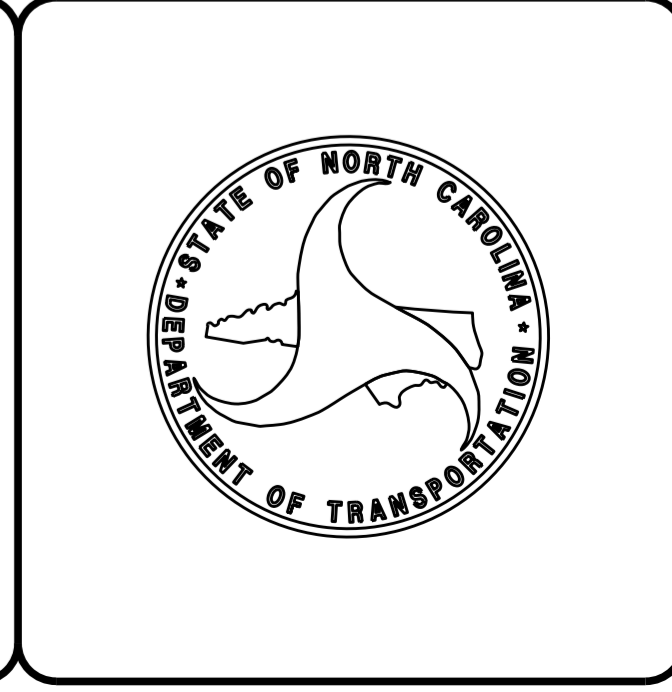
LENGTH ROADWAY TIP PROJECT W-5518	=	0.420 MILES
LENGTH STRUCTURE TIP PROJECT W-5518	=	0.040 MILES
TOTAL LENGTH TIP PROJECT W-5518	=	0.460 MILES

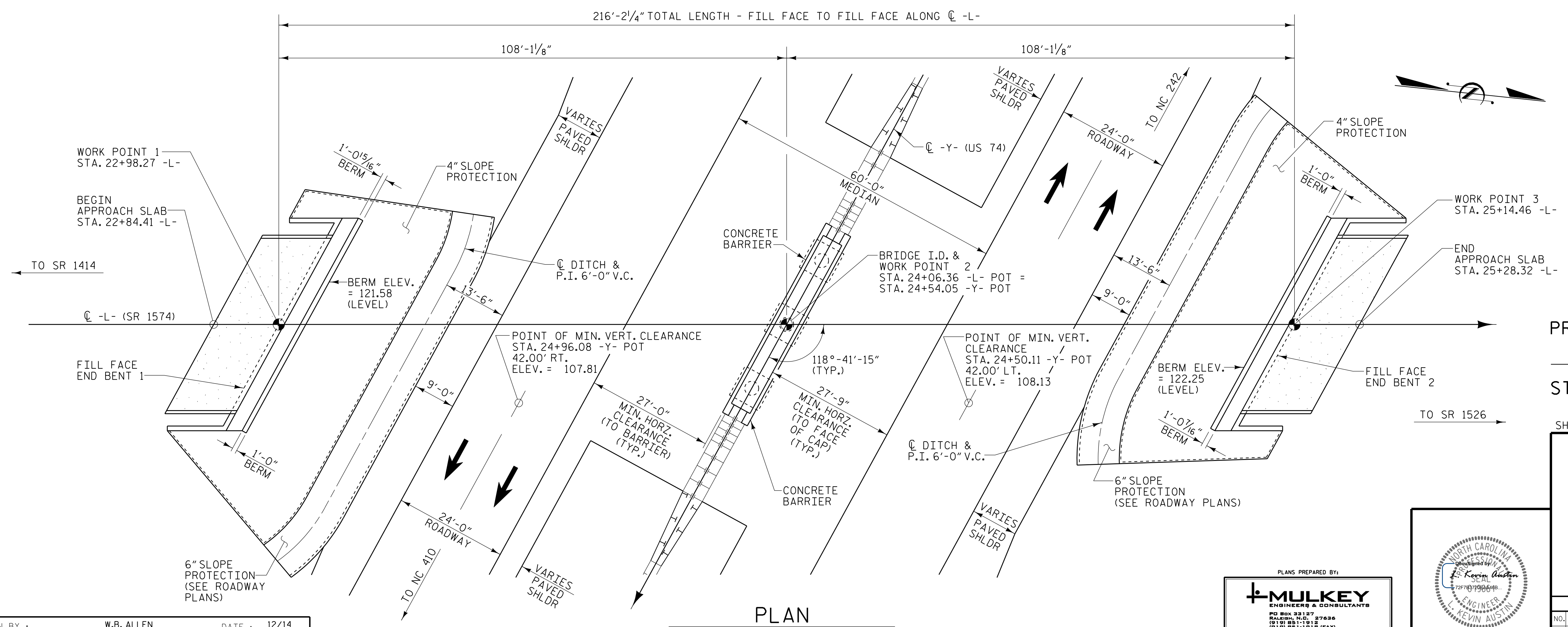
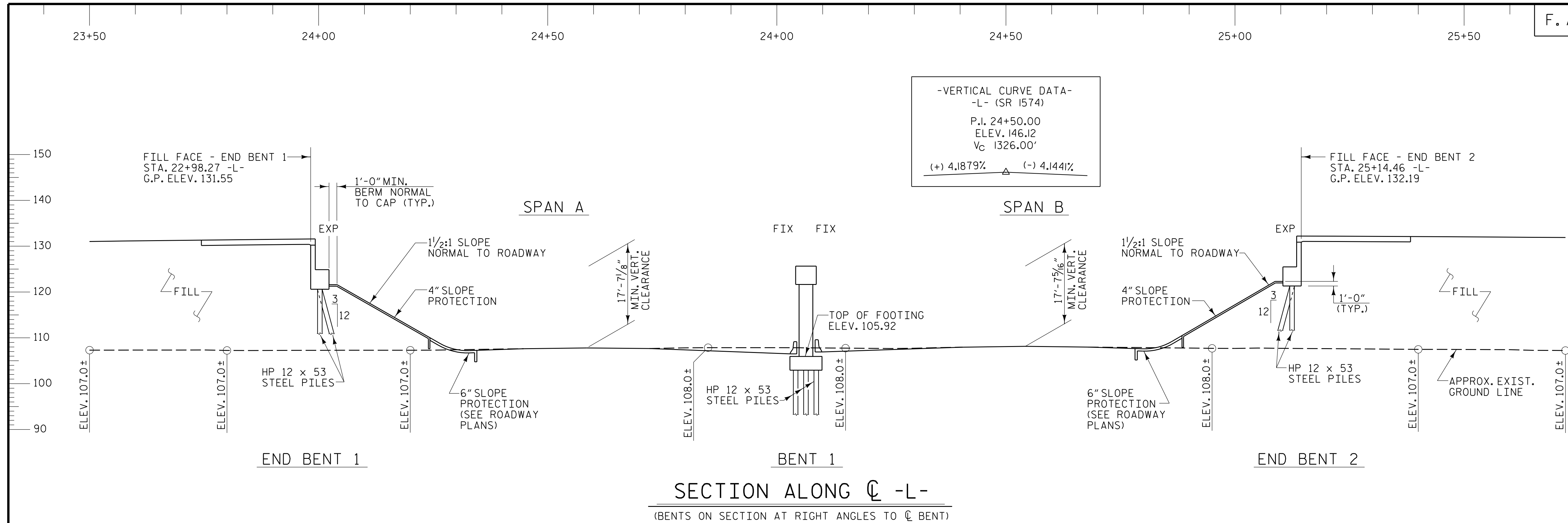
Prepared for:  
**HIGHWAY DIVISION 6**  
 558 Gillespie St.  
 Fayetteville, NC 28301

2012 STANDARD SPECIFICATIONS

LETTING DATE:  
 FEBRUARY 16, 2016

Prepared by:  
**MULKEY ENGINEERS & CONSULTANTS**  
 PO Box 33127  
 Raleigh, N.C. 27636  
 919.851.9118 FAX  
 WWW.MULKEYINC.COM  
 NC License No. 02031

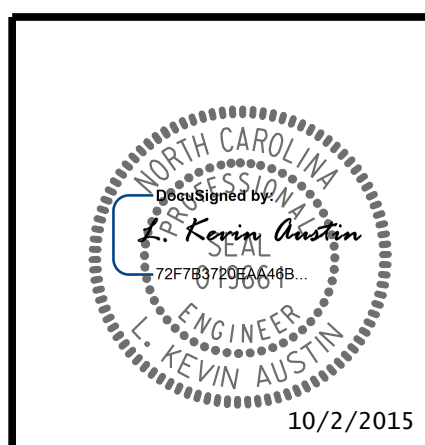




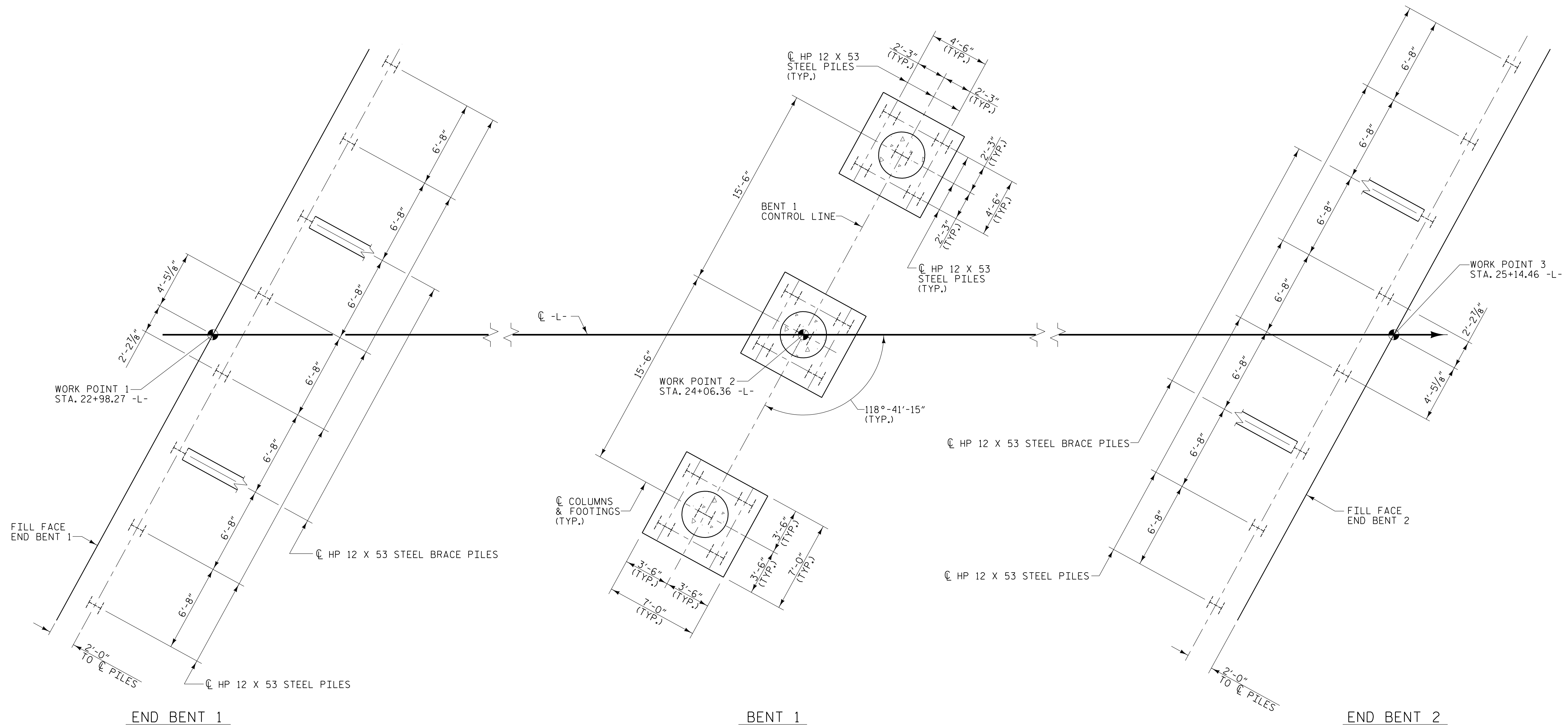
PROJECT NO. W-5518  
 COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT  
24+54.05 -Y- POT  
 SHEET 1 OF 4 BRIDGE NO. 412

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON -L- (SR 1574)  
 OVER -Y- (US 74) BETWEEN  
 SR 1414 AND SR 1526

DRAWN BY: W.B. ALLEN DATE: 12/14  
 CHECKED BY: L. K. AUSTIN DATE: 12/14  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15



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



### FONDATION LAYOUT

#### NOTES

- ALL PILES AT END BENT 1, BENT 1 AND END BENT 2 ARE HP 12 X 53.
- END BENT BRACE PILES ARE TO BE BATTERED AT 3:12.
- DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.
- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.
- DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.
- PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.
- DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 155 TONS PER PILE.
- PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.
- DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT WITH A SURCHARGE OF 2 FT. ABOVE FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1. FOR SURCHARGE, SEE EMBANKMENT SETTLEMENT GAUGES PROVISION.

OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO TO FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 2 FOR EMBANKMENT MONITORING, SEE EMBANKMENT SETTLEMENT GAUGES PROVISION.

TESTING THE FIRST PRODUCTION PILE AT END BENT NO. 2 AND BENT NO. 1 WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED. FOR PDA TESTING, SEE SECTION 450 OF THE STANADRD SPECIFICATIONS AND FOR PILE DRIVING CRITERIA, SEE PILES (LRFD) PROVISION.

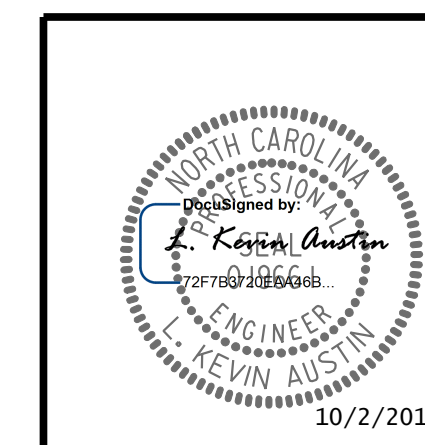
PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE ON -L- (SR 1574)  
 OVER -Y- (US 74) BETWEEN  
 SR 1414 AND SR 1526

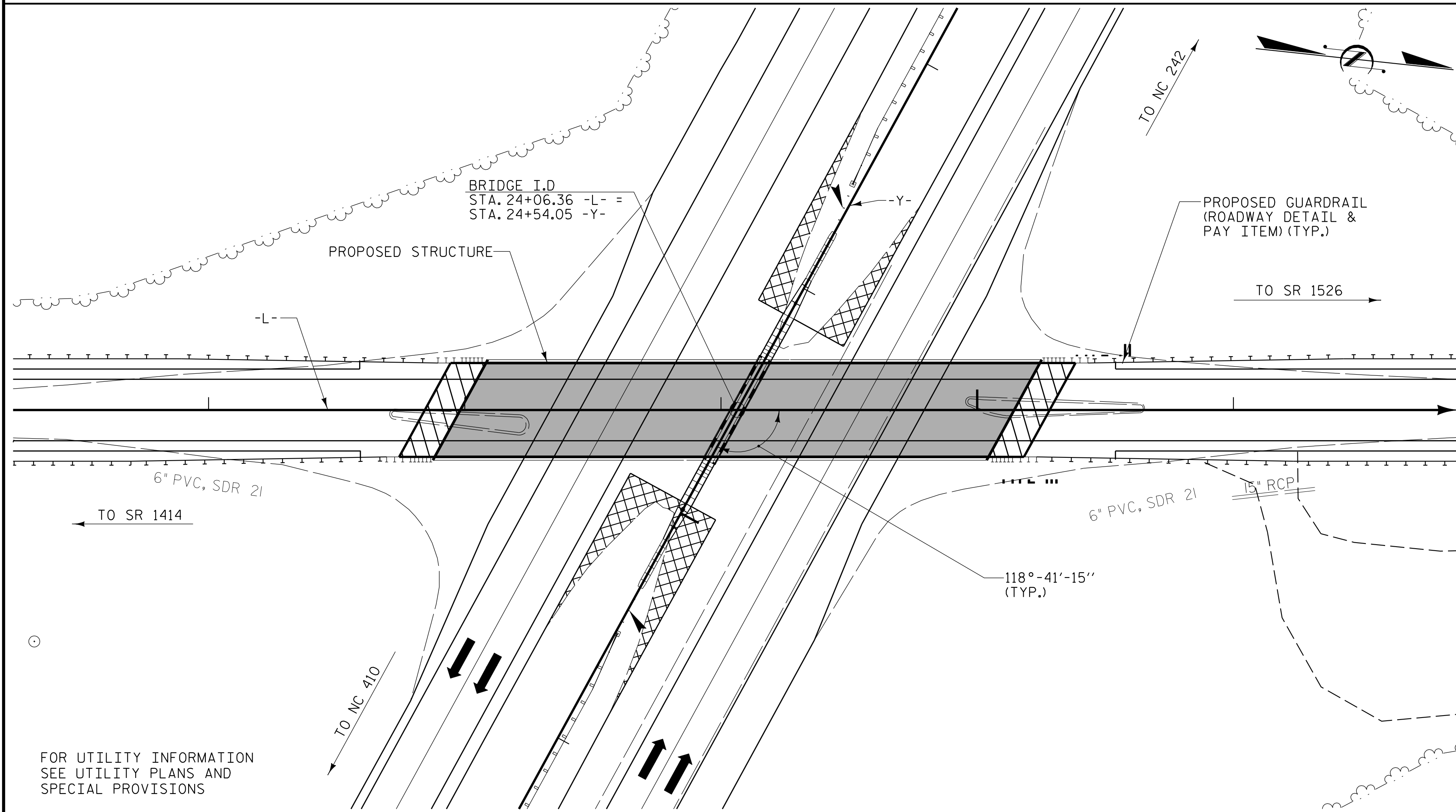
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			33
2			4			



DRAWN BY : W. B. ALLEN DATE : 6/15  
 CHECKED BY : Z. H. BROWN DATE : 6/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15

10/2/2015 1:46:16 PM R:\Structures\W5518\SMU\_FL\_01.dgn

BM #81: R/R SPIKE IN BASE OF 20" PINE; 166.22' RT STA. 21+16.49 -L- ELEV. 107.89



LOCATION SKETCH

NOTES

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENT OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATIONS ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

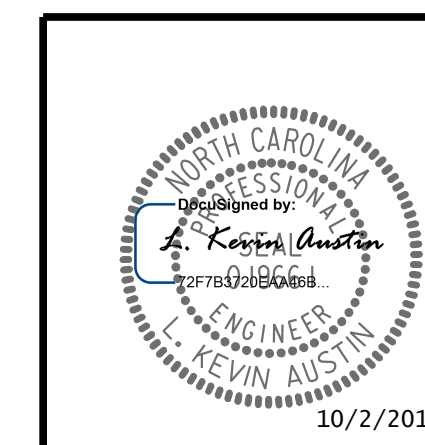
TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS	HP12X53 STEEL PILES	PILE REDRIVES	TWO BAR METAL RAIL	1'-2" x 2'-6" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO. FEET	NO. LIN. FT.	EACH	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			8390	8067		LUMP SUM			8 845.25			410.94	427.22		LUMP SUM	LUMP SUM
END BENT 1					52.2		6963			8 600	4			209		
BENT 1	LUMP SUM				60.7		9335	2022		15 1050	8					
END BENT 2					51.8		6864			8 600	4			209		
TOTAL	LUMP SUM	2	8390	8067	164.7	LUMP SUM	23162	2022	8 845.25	31 2250	16	410.94	427.22	418	LUMP SUM	LUMP SUM

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON -L- (SR 1574)  
 OVER -Y- (US 74) BETWEEN  
 SR 1414 AND SR 1526



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

DRAWN BY : W. B. ALLEN DATE : 11/14  
 CHECKED BY : Z. H. BROWN DATE : 6/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15

10/2/2015 4:48:51 PM R:\Structures\W5518\SWI\_GD\_02.dgn

LOAD FACTORS:

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT					SHEAR					LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.01	--	1.75	0.903	1.05	A	EL	52.12	1.077	1.09	A	I	31.27	0.80	0.903	1.01	A	EL	52.12		
	HL-93 (OPERATING)	N/A		1.36	--	1.35	0.903	1.36	A	EL	52.12	1.077	1.86	A	I	0.00	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.42	51.12	1.75	0.903	1.48	A	EL	52.12	1.077	1.87	A	I	31.27	0.80	0.903	1.42	A	EL	52.12		
	HS-20 (OPERATING)	36.000		1.92	69.12	1.35	0.903	1.92	A	EL	52.12	1.077	2.57	A	I	0.00	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.40	45.90	1.40	0.903	4.42	A	EL	52.12	1.077	6.17	A	I	0.00	0.80	0.903	3.40	A	EL	52.12	
		SNGARBS2	20.000		2.45	49.00	1.40	0.903	3.19	A	EL	52.12	1.077	4.30	A	I	0.00	0.80	0.903	2.45	A	EL	52.12	
		SNAGRIS2	22.000		2.29	50.38	1.40	0.903	2.98	A	EL	52.12	1.077	3.96	A	I	0.00	0.80	0.903	2.29	A	EL	52.12	
		SNCOTTS3	27.250		1.69	46.05	1.40	0.903	2.20	A	EL	52.12	1.077	3.07	A	I	0.00	0.80	0.903	1.69	A	EL	52.12	
		SNAGGRS4	34.925		1.38	48.20	1.40	0.903	1.80	A	EL	52.12	1.077	2.49	A	I	0.00	0.80	0.903	1.38	A	EL	52.12	
		SNS5A	35.550		1.35	47.99	1.40	0.903	1.76	A	EL	52.12	1.077	2.49	A	I	0.00	0.80	0.903	1.35	A	EL	52.12	
		SNS6A	39.950		1.23	49.14	1.40	0.903	1.60	A	EL	52.12	1.077	2.25	A	I	0.00	0.80	0.903	1.23	A	EL	52.12	
		SNS7B	42.000		1.17	49.14	1.40	0.903	1.52	A	EL	52.12	1.077	2.18	A	I	0.00	0.80	0.903	1.17	A	EL	52.12	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.49	49.17	1.40	0.903	1.94	A	EL	52.12	1.077	2.69	A	I	0.00	0.80	0.903	1.49	A	EL	52.12	
		TNT4A	33.075		1.50	49.61	1.40	0.903	1.95	A	EL	52.12	1.077	2.65	A	I	0.00	0.80	0.903	1.50	A	EL	52.12	
		TNT6A	41.600		1.21	50.34	1.40	0.903	1.58	A	EL	52.12	1.077	2.27	A	I	0.00	0.80	0.903	1.21	A	EL	52.12	
		TNT7A	42.000		1.21	50.82	1.40	0.903	1.58	A	EL	52.12	1.077	2.23	A	I	0.00	0.80	0.903	1.21	A	EL	52.12	
		TNT7B	42.000		1.24	52.08	1.40	0.903	1.61	A	EL	52.12	1.077	2.15	A	I	0.00	0.80	0.903	1.24	A	EL	52.12	
		TNAGRIT4	43.000		1.19	51.17	1.40	0.903	1.55	A	EL	52.12	1.077	2.09	A	I	0.00	0.80	0.903	1.19	A	EL	52.12	
TNAGT5A	45.000		1.13	50.85	1.40	0.903	1.47	A	EL	52.12	1.077	2.04	A	I	0.00	0.80	0.903	1.13	A	EL	52.12			
TNAGT5B	45.000		③	1.12	50.40	1.40	0.903	1.45	A	EL	52.12	1.077	1.89	A	I	31.27	0.80	0.903	1.12	A	EL	52.12		

NOTES:

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

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

COMMENTS:

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

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

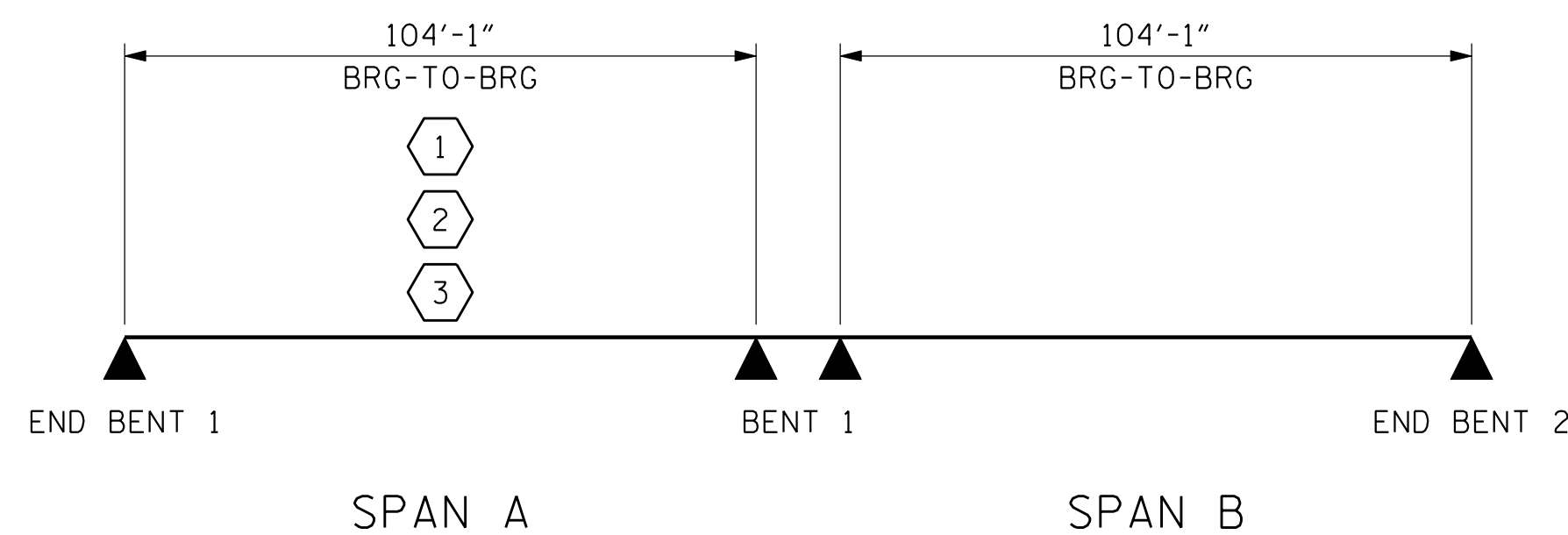
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. W-5518

COLUMBUS COUNTY

STATION: 24+06.36 -L- POT

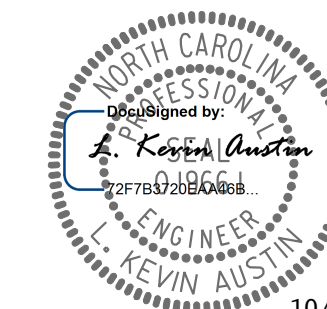
SHEET 4 OF 4

PLANS PREPARED BY:

**MULKEY**  
ENGINEERS & CONSULTANTS

PO BOX 23127  
RALEIGH, NC 27636  
(919) 851-1912  
(919) 851-1911 FAX  
WWW.MULKEYINC.COM  
NC LICENSE NO. 0-1031

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



10/2/2015

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

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

REVISIONS

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

SHEET NO.

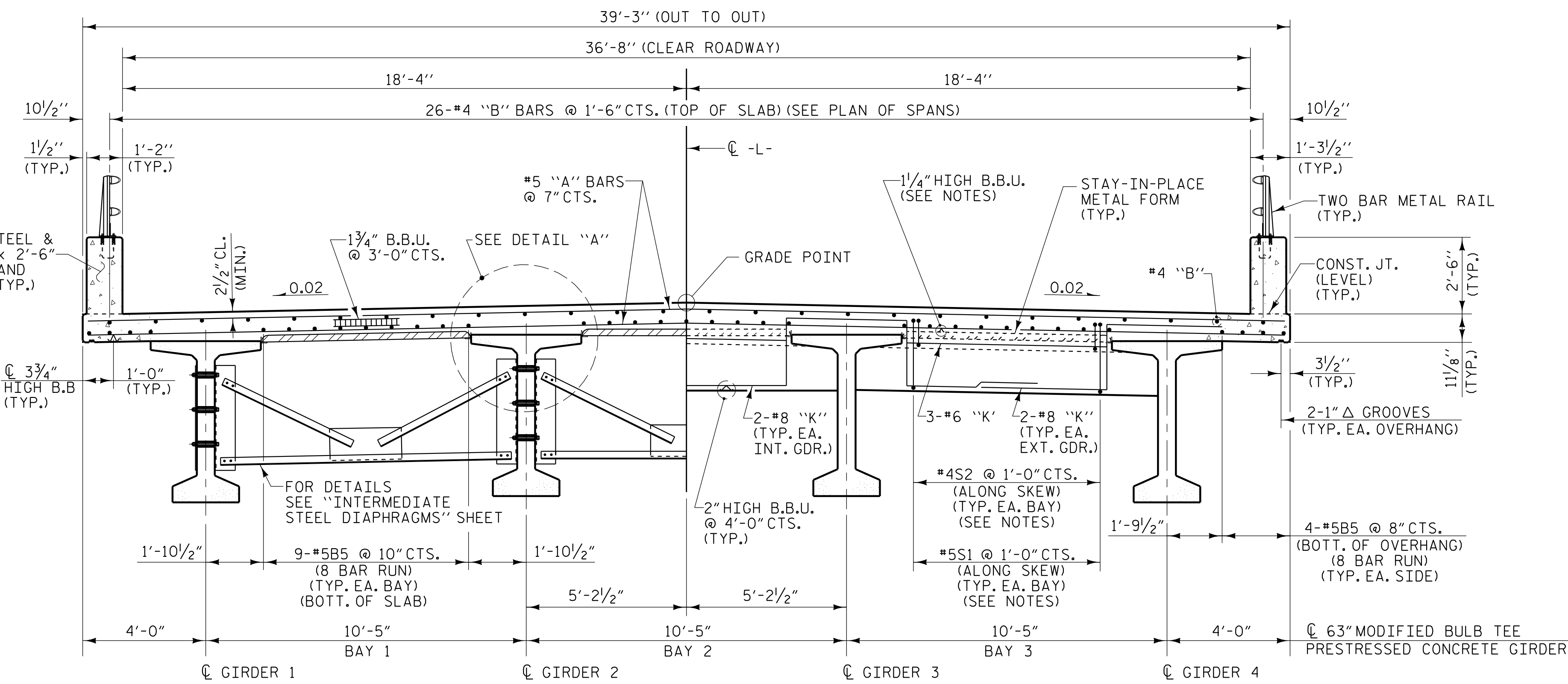
S-4

TOTAL SHEETS

33

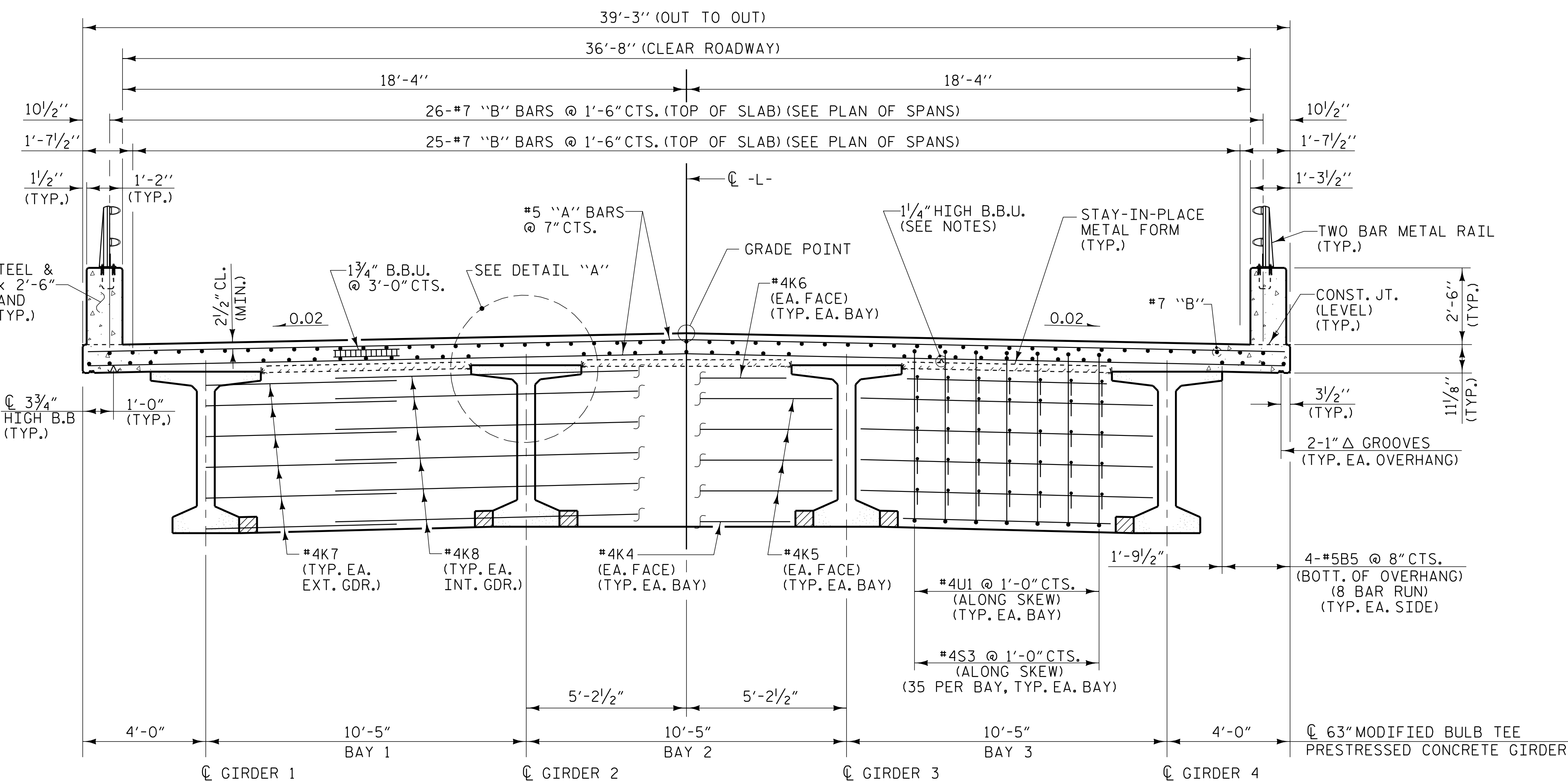
STD. NO. LRFR1

ASSEMBLED BY : Z. H. BROWN	DATE : 3/15
CHECKED BY : L. K. AUSTIN	DATE : 8/15
DRAWN BY : MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM



**HALF TYPICAL SECTION**  
SHOWING INTERMEDIATE DIAPHRAGM

**HALF TYPICAL SECTION**  
SHOWING END BENT DIAPHRAGM



**TYPICAL SECTION**  
SHOWING BENT DIAPHRAGM

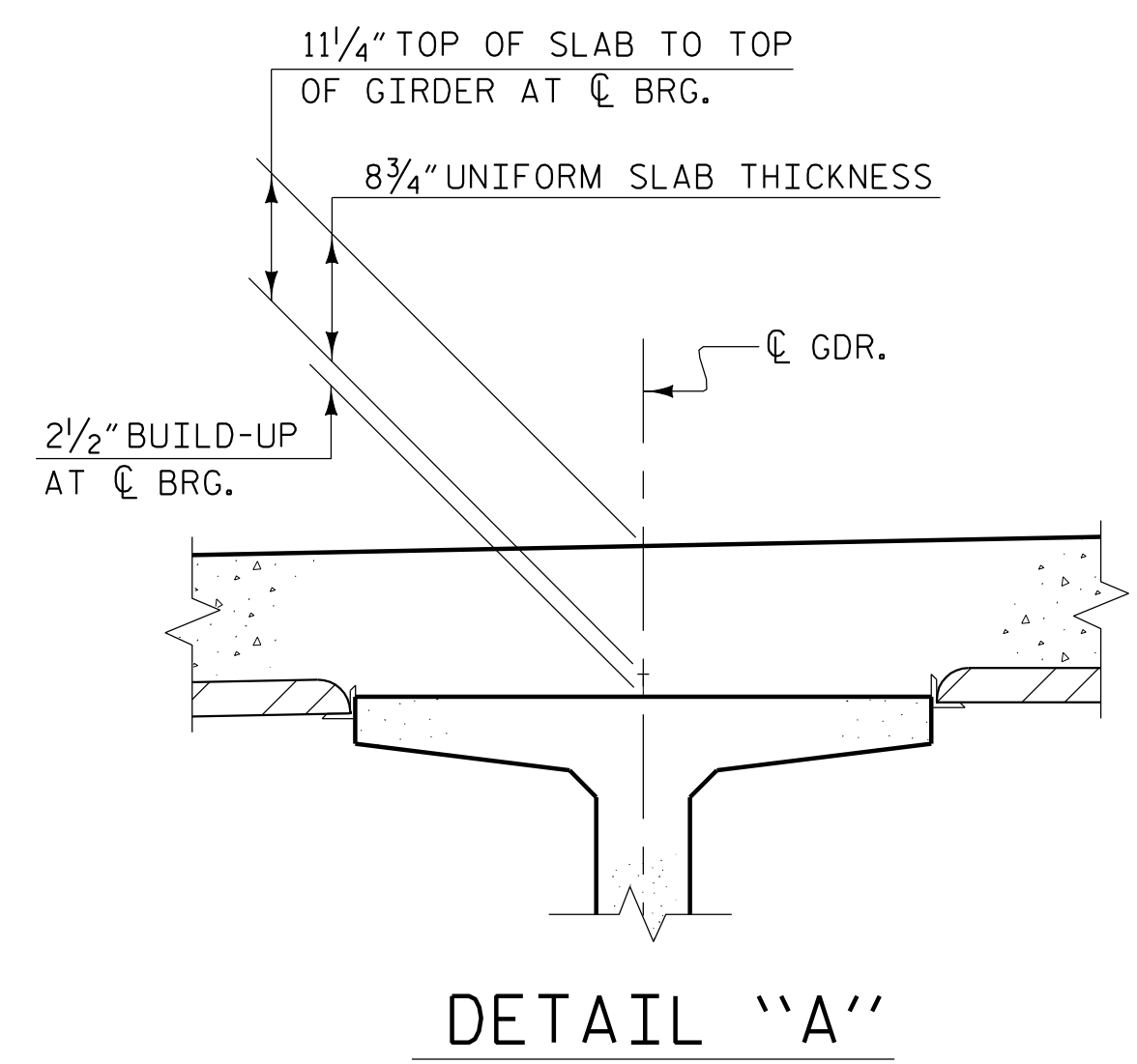
**NOTES**

PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER (BBU) AT 4'-0" CENTERS 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 AND DRAIN PIPES IN THE DECK.

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.

FOR NUMBER OF S1 & S2 BARS IN EACH BAY, SEE "PLAN OF SPANS" SHEETS.



**DETAIL "A"**

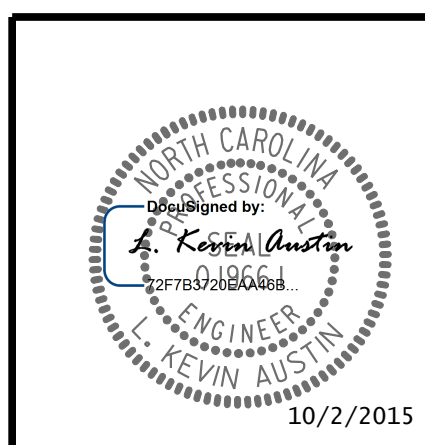
PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 1 OF 2

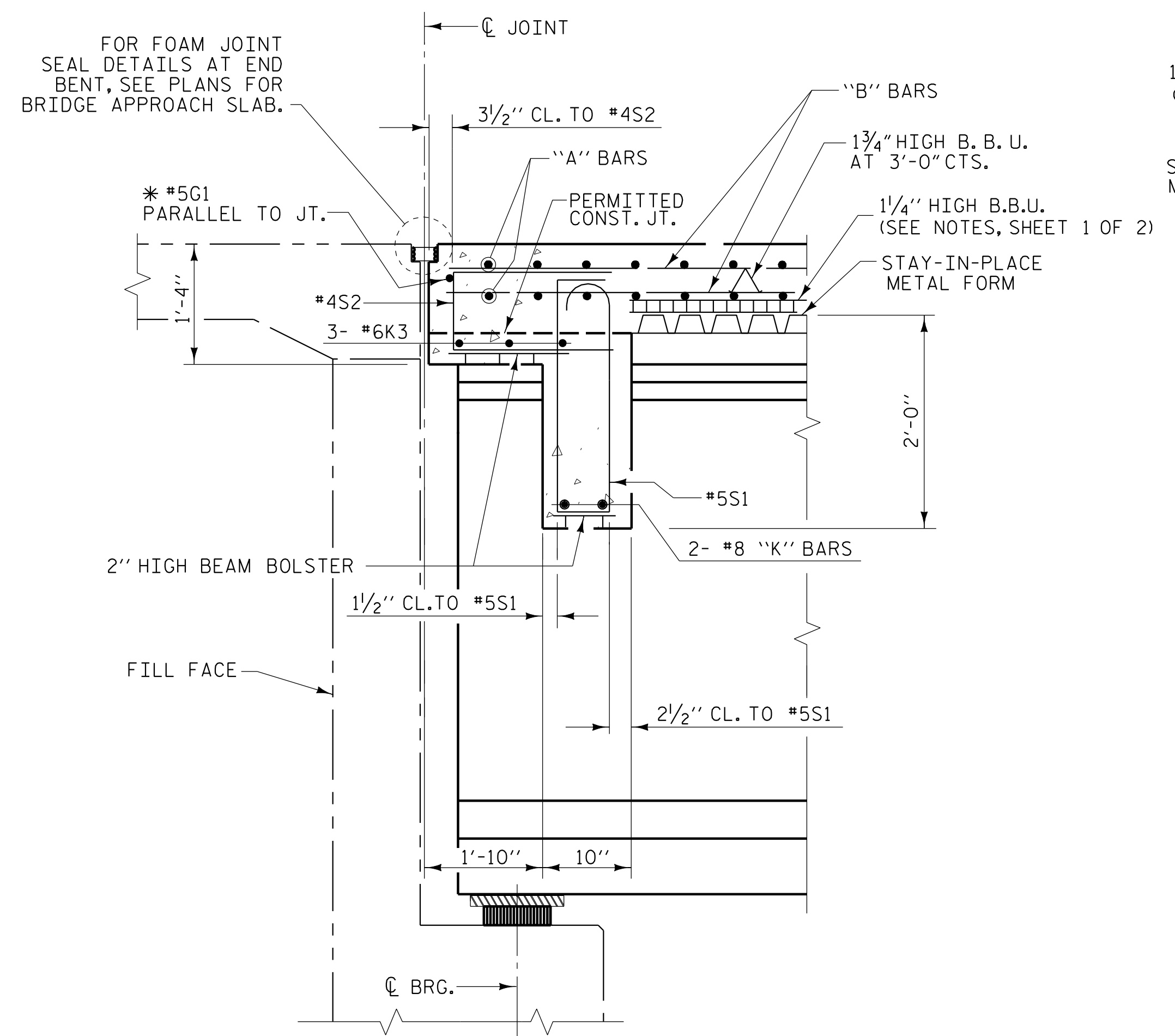
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

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

DRAWN BY : W. B. ALLEN DATE : 12/14  
 CHECKED BY : Z. H. BROWN DATE : 1/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15

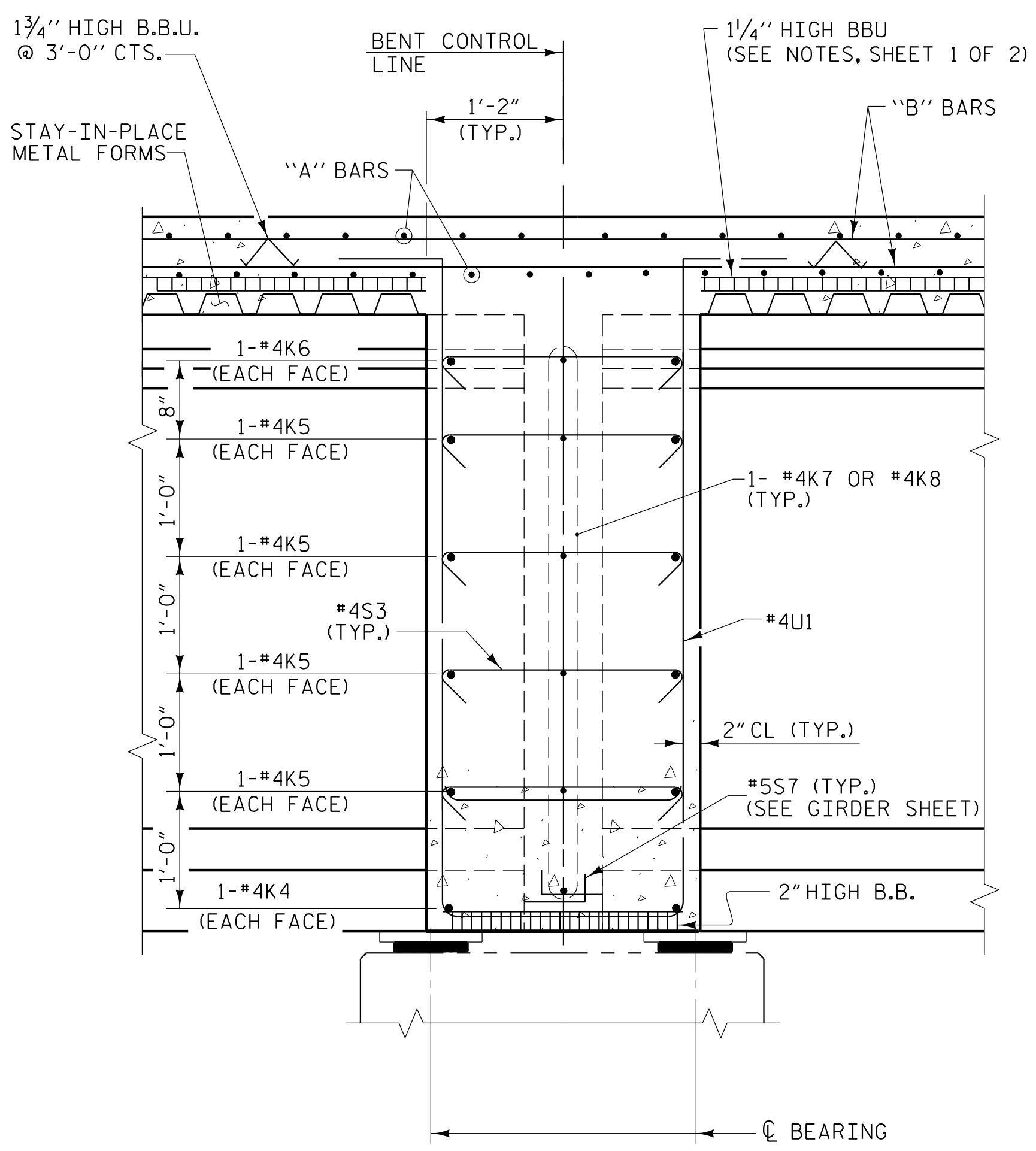


10/2/2005 4:52:44 PM R:\Structures\W5518\SMU\_15.dwg

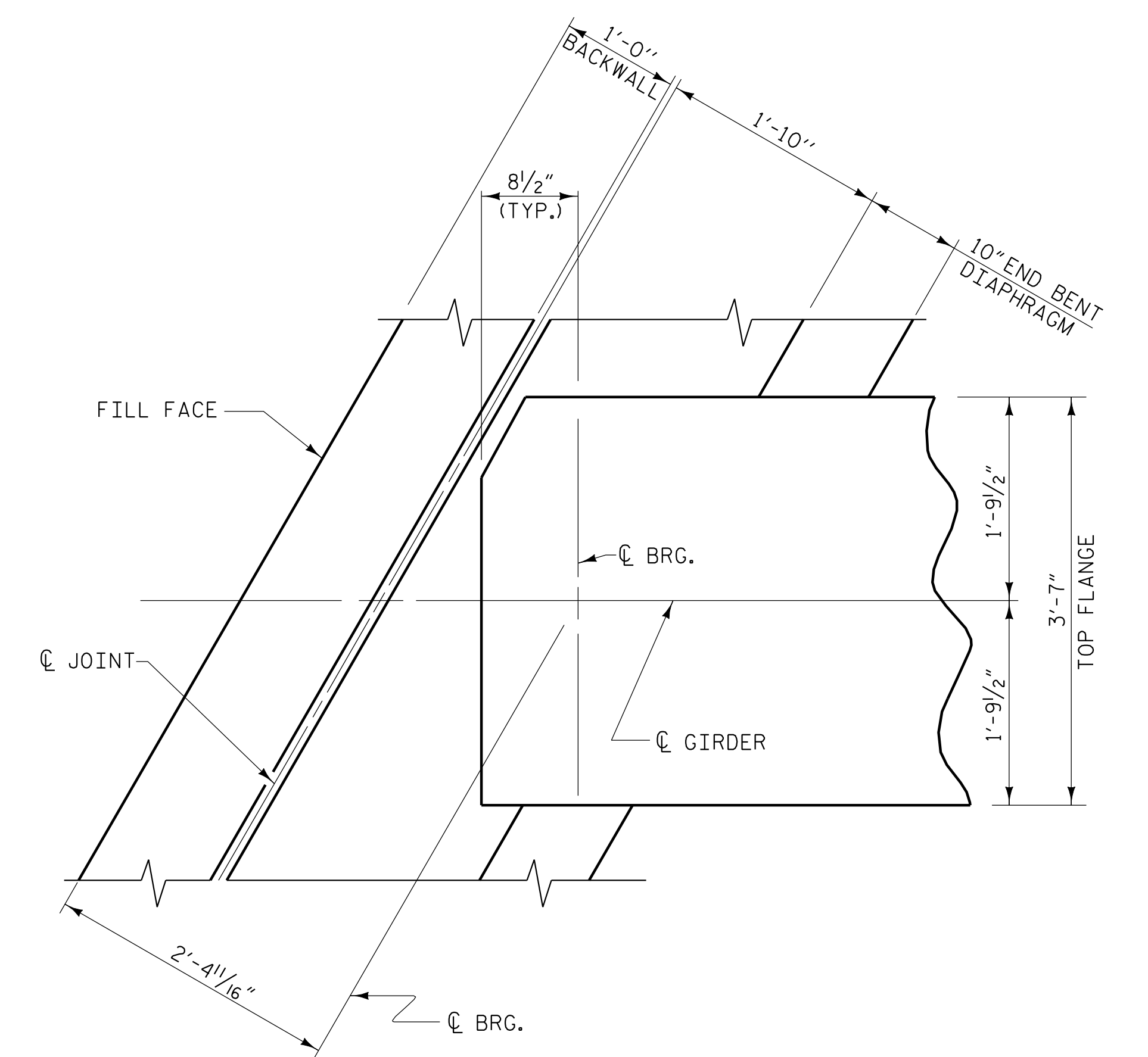


**SECTION THRU END BENT DIAPHRAGMS**

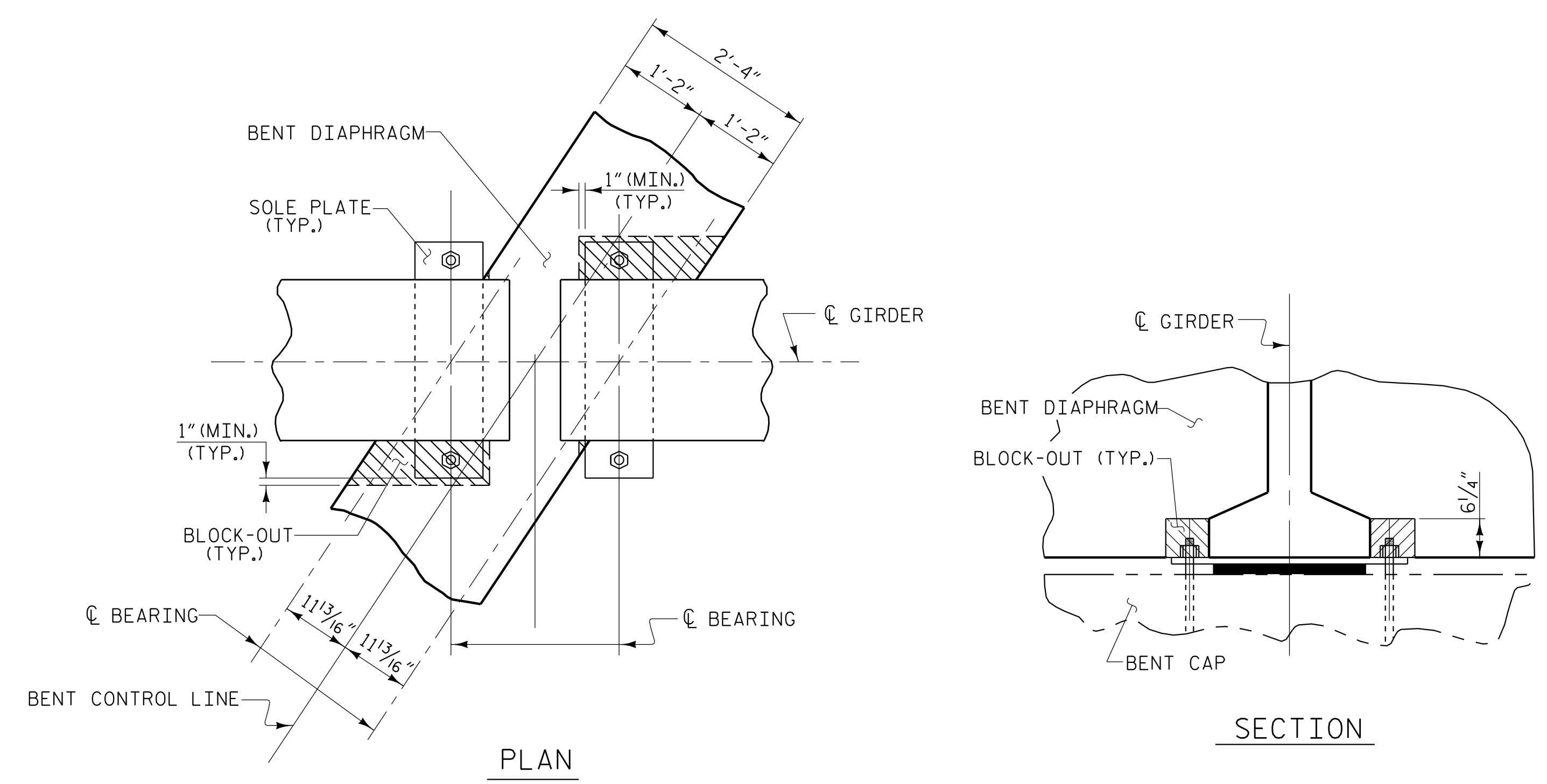
\* #5G1 BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.



**SECTION THRU BENT DIAPHRAGMS**



**PLAN VIEW OF END BENT DIAPHRAGM**



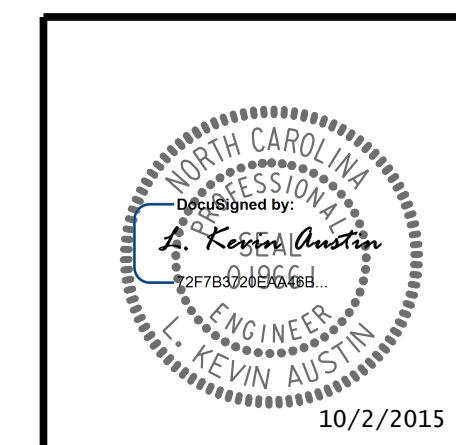
**BENT DIAPHRAGM BLOCK-OUT DETAIL**

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 2 OF 2

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

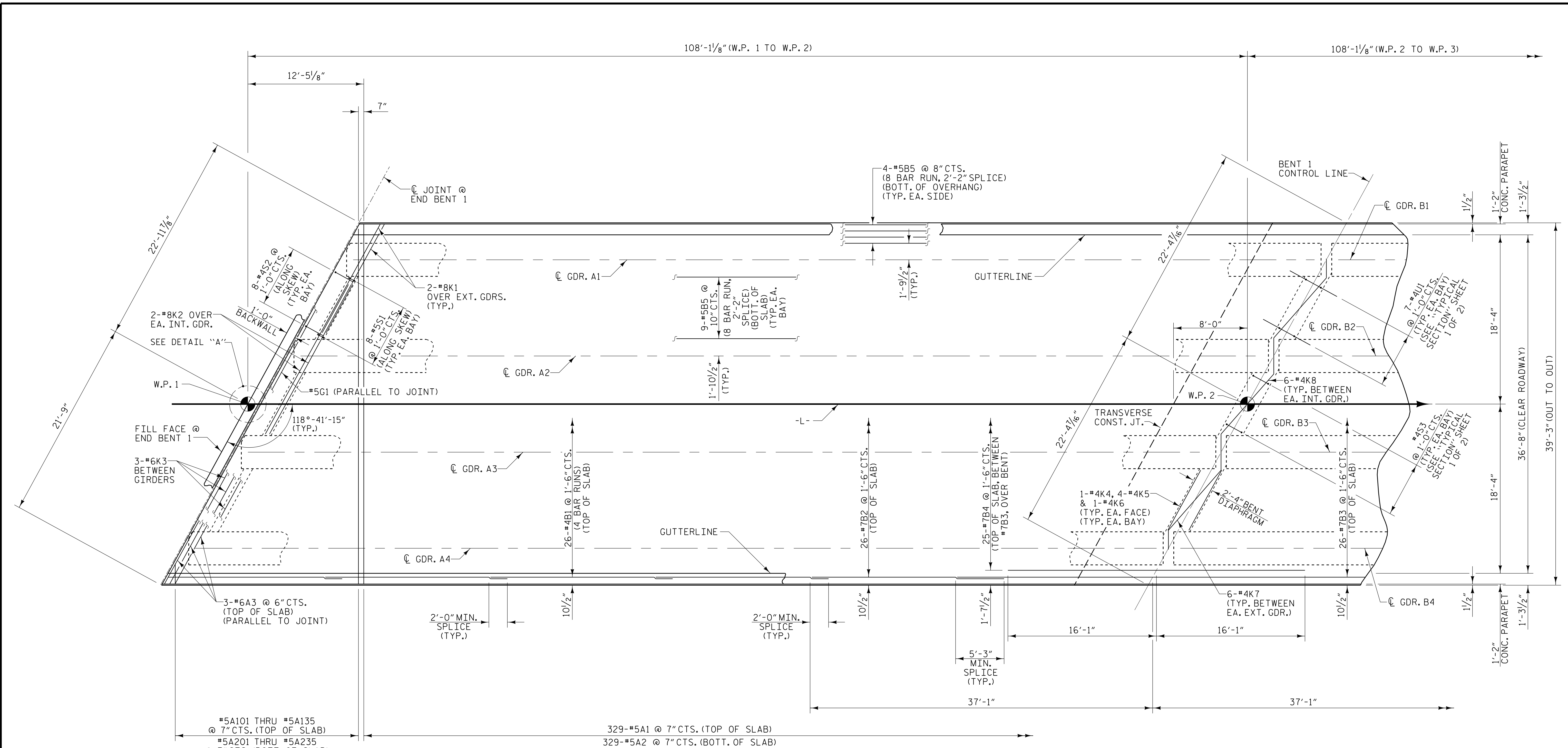
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			33



DRAWN BY : W. B. ALLEN DATE : 12/14  
 CHECKED BY : Z. H. BROWN DATE : 1/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15

10/2/2015 4:52:36 PM R:\Structures\W5518\SWU\_TS\_02.dgn

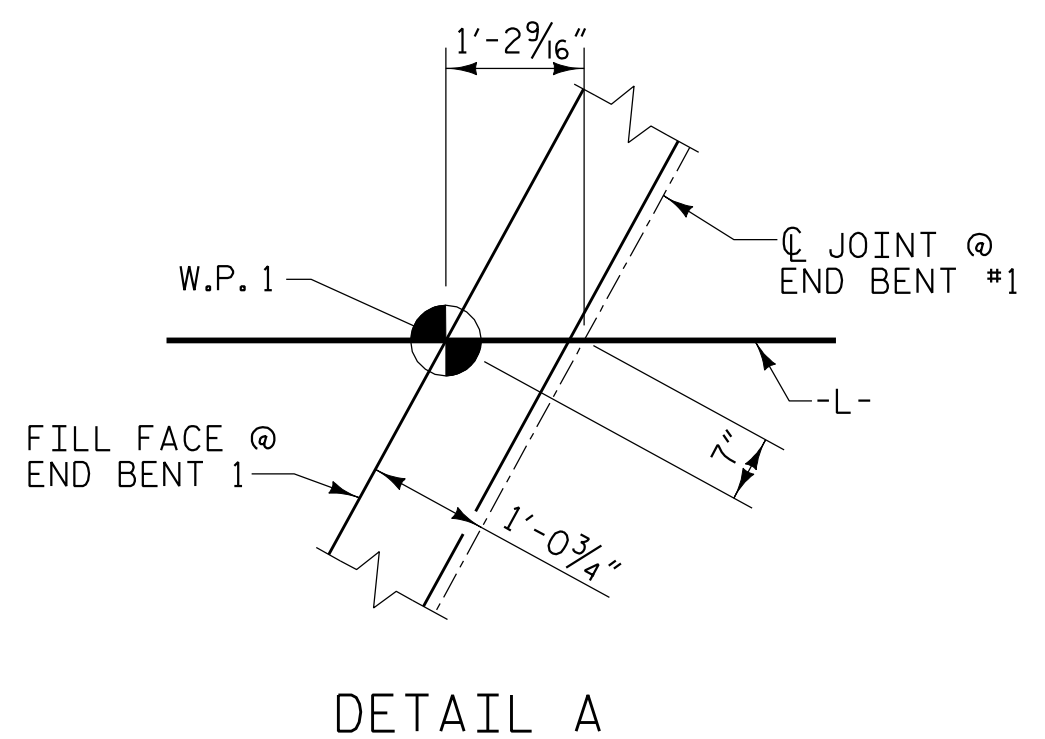




**SPAN A**

**NOTES**

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.  
 FOR POUR SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE BILL OF MATERIAL".



PROJECT NO. W-5518  
 COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 PLAN OF SPAN A**



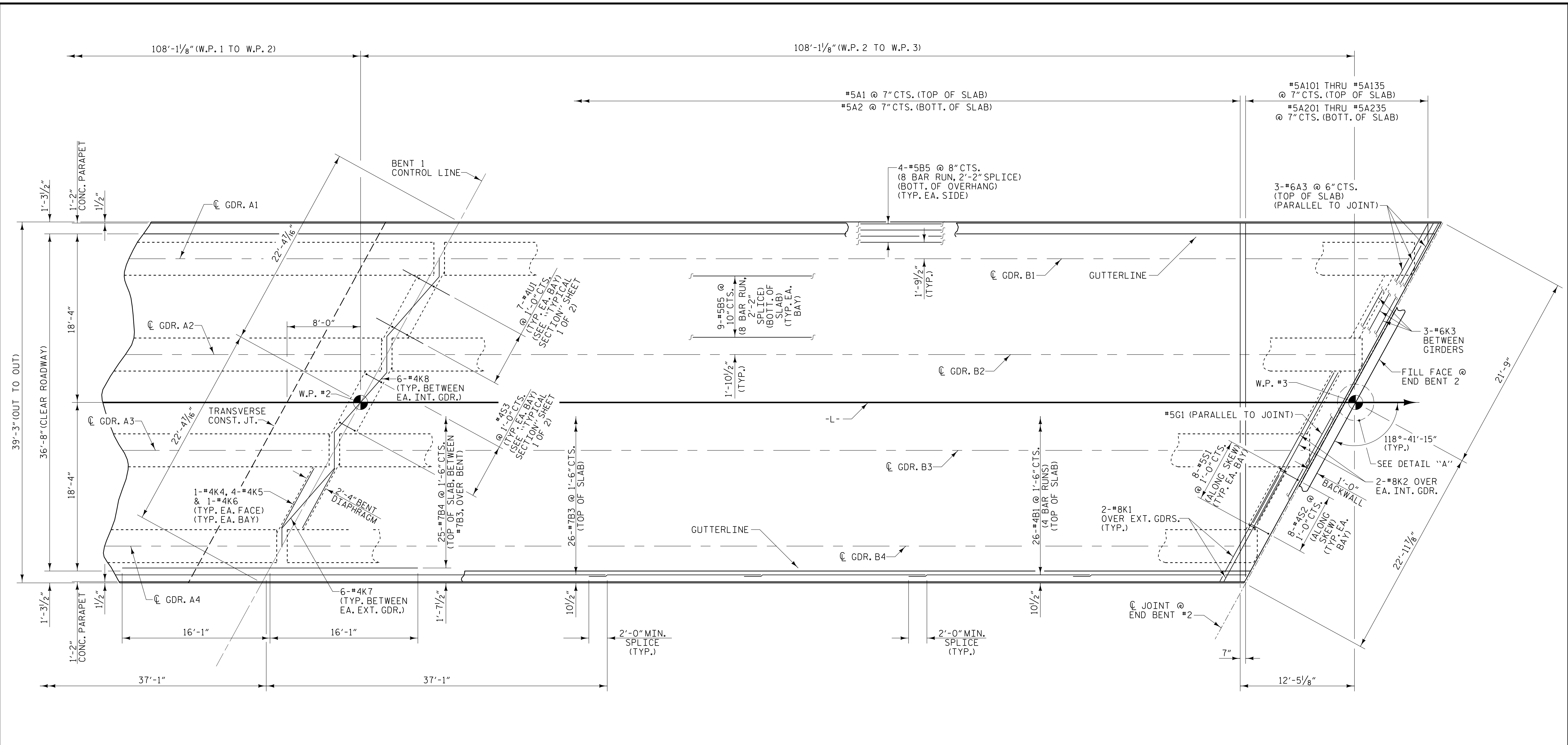
PLANS PREPARED BY:

**MULKEY**  
 ENGINEERS & CONSULTANTS  
 10118 RALEIGH, N.C. 27606  
 (919) 881-1818  
 (919) 881-1818 FAX  
 WWW.MULKEYINC.COM  
 NC LICENSE NO. 0-1021

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

DRAWN BY: W. B. ALLEN DATE: 12/14  
 CHECKED BY: Z. H. BROWN DATE: 1/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15

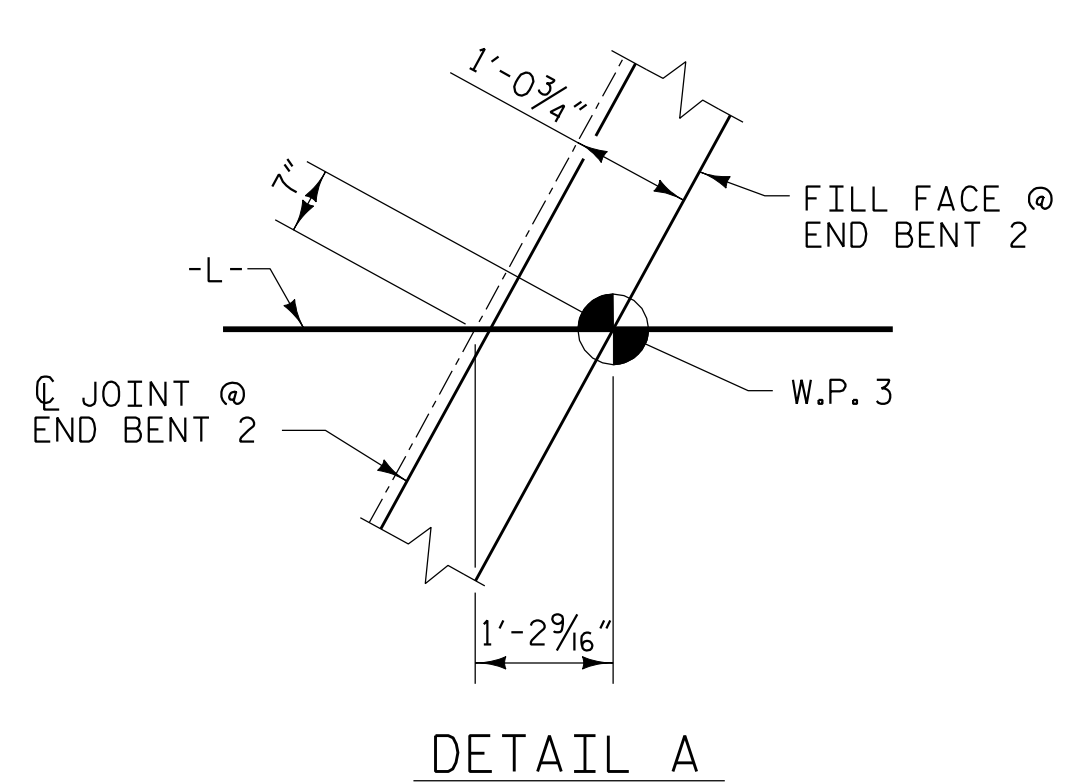
10/2/2015 4:50:38 PM RA:\Structures\W5518\SMU\_S1.dgn



**SPAN B**

**NOTES**

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.  
 FOR POUR SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE BILL OF MATERIAL".

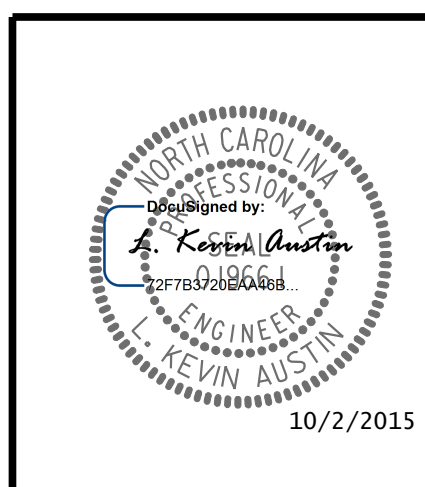


PROJECT NO. W-5518  
 COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

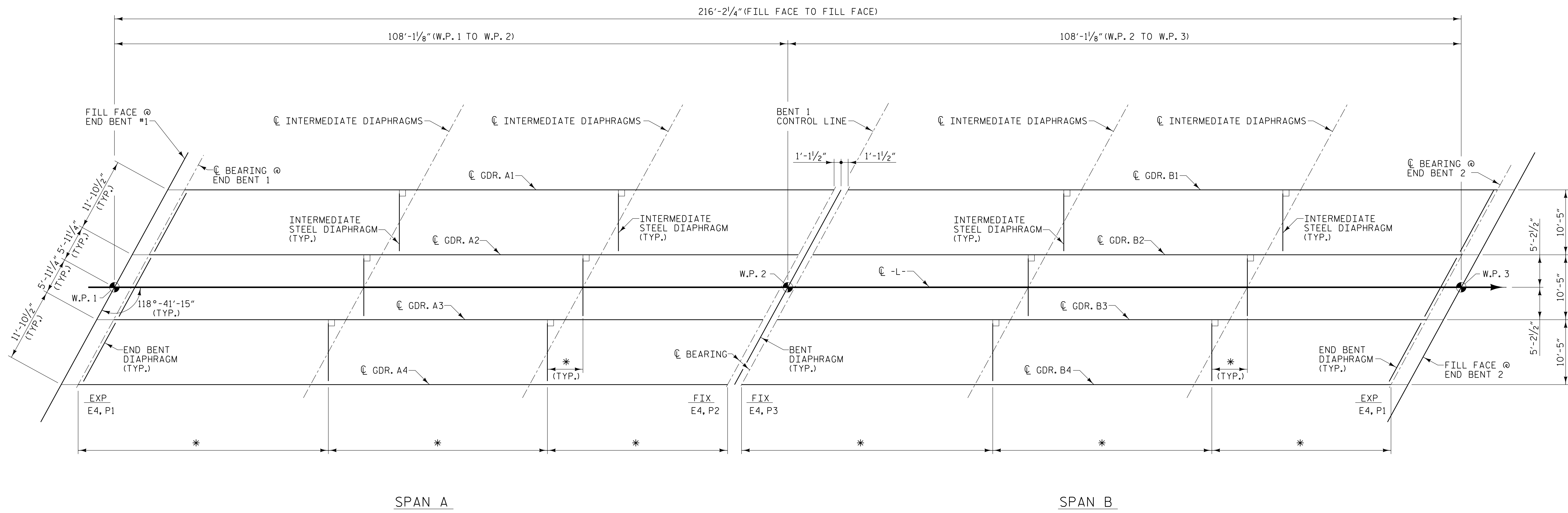
SHEET 2 OF 2  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPAN B

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

DRAWN BY: W. B. ALLEN DATE: 12/14  
 CHECKED BY: Z. H. BROWN DATE: 1/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15



10/2/2015 4:50:03 PM RA:\Structures\W5518\SMU\_S2.dgn



### FRAMING PLAN

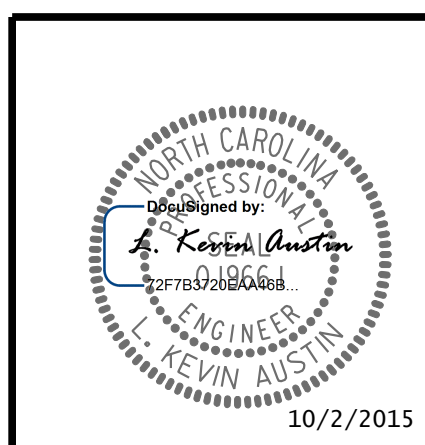
\* SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET 2 OF 4 FOR DIMENSIONS.

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

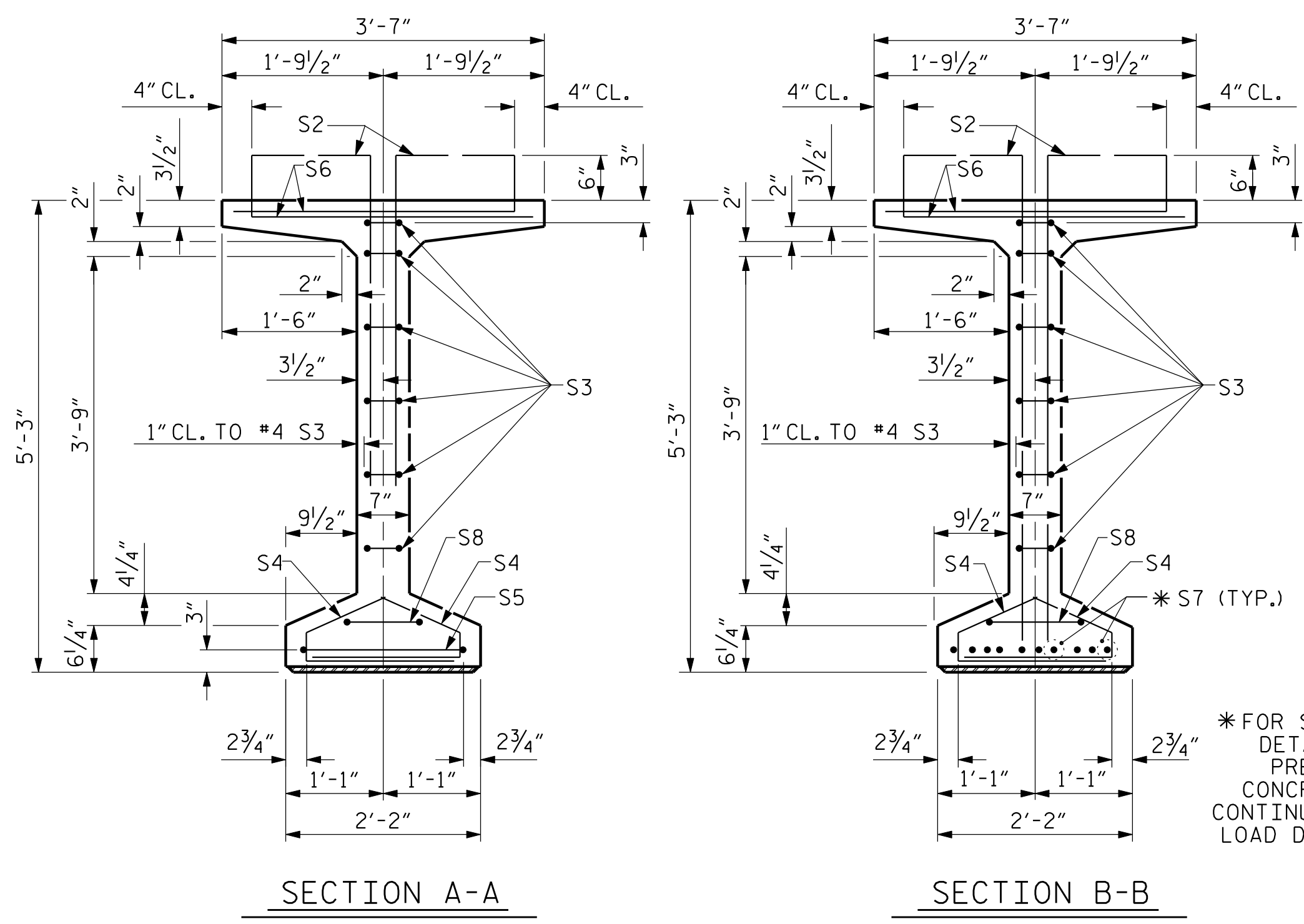
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 FRAMING PLAN

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

DRAWN BY : W. B. ALLEN DATE : 12/14  
 CHECKED BY : Z. H. BROWN DATE : 1/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15



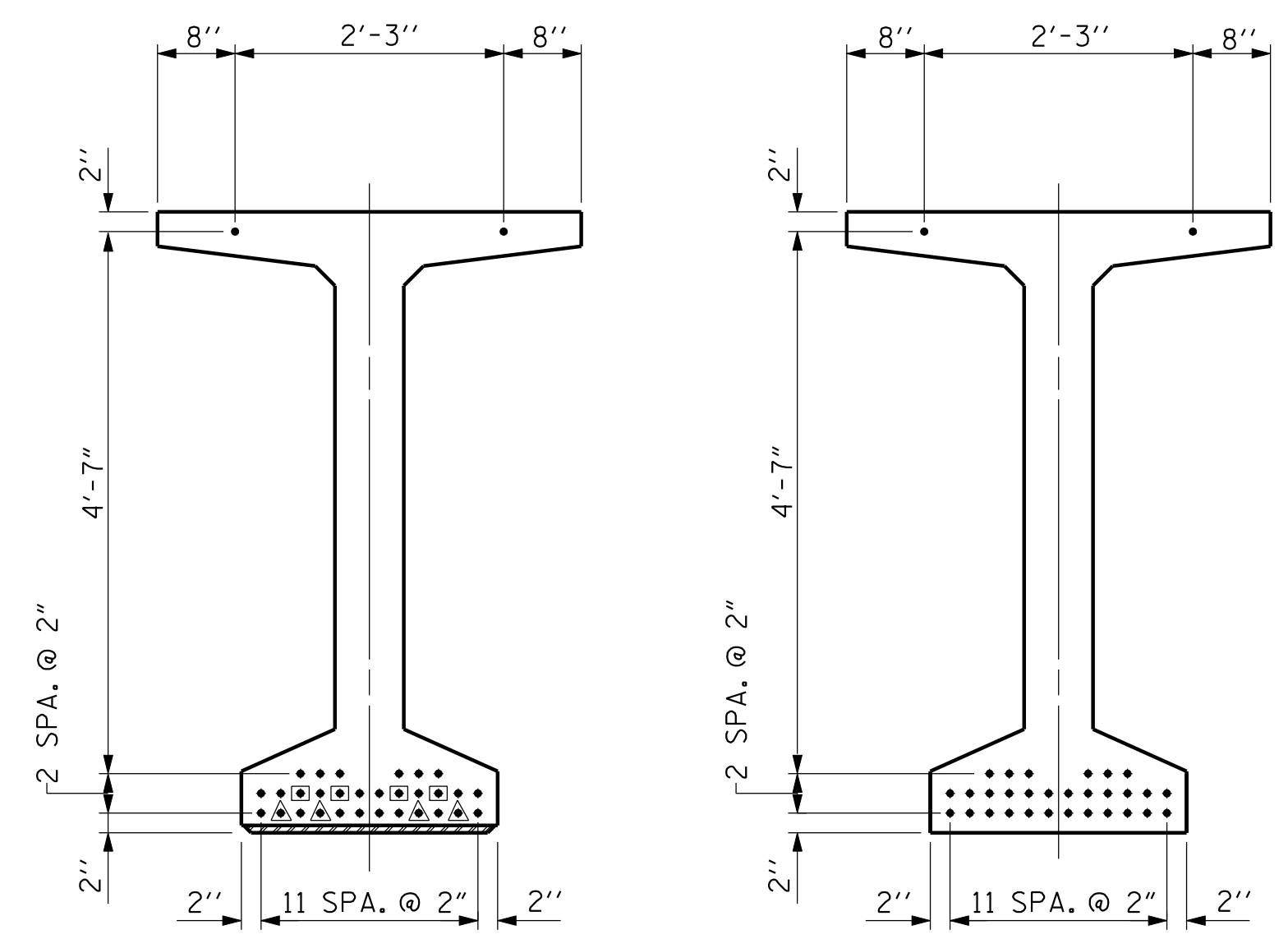
10/2/2015 1:46:42 PM RA:\Structures\W5518\SMU\_FP\_01.dgn



**DEBONDING LEGEND**

- FULLY BONDED STRANDS
- ◻ STRANDS DEBONDED FOR 2'-0" FROM END OF GIRDER
- ◼ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

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

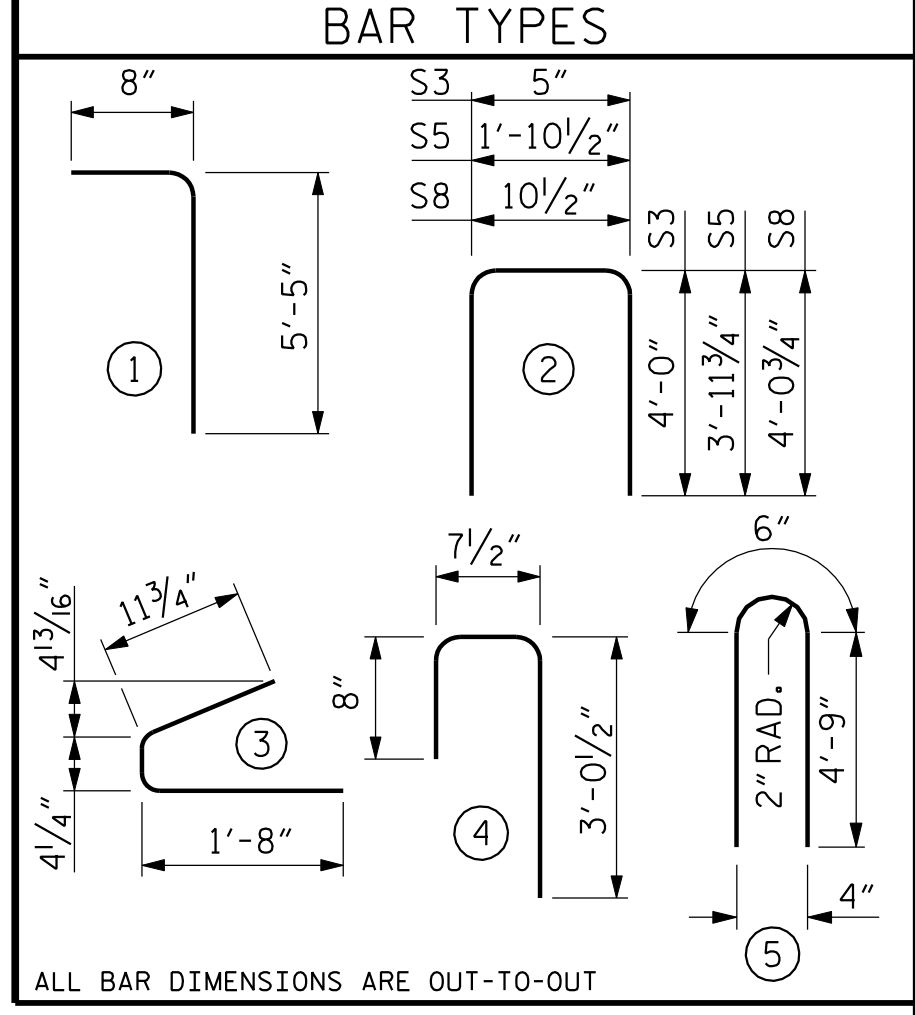


EXTERIOR GDR. S11 8 #5 5 10'-0" 83  
 INTERIOR GDR. S11 16 #5 5 10'-0" 167  
 EXTERIOR GDR. S12 16 #4 STR 3'-8" 86  
 INTERIOR GDR. S13 16 #4 STR 13'-9" 147

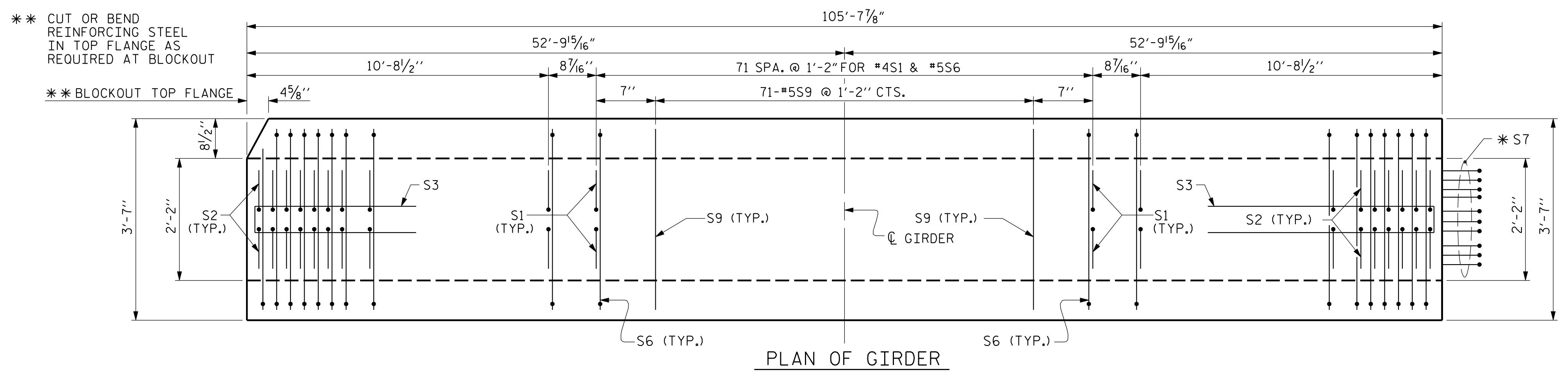
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	212	#4	1	6'-1"	862
S2	28	#5	1	6'-1"	178
S3	12	#4	2	8'-5"	67
S4	96	#4	3	3'-0"	192
S5	1	#5	2	9'-10"	10
S6	236	#5	4	4'-4"	1067
* S7	10	#5	STR	3'-8"	38
S8	2	#5	2	9'-0"	19
S9	71	#5	STR	3'-3"	241
S10	1	#3	STR	1'-10"	1
S11	8	#5	5	10'-0"	83
S12	16	#5	5	10'-0"	167
S13	16	#4	STR	8'-0"	86
S13	16	#4	STR	13'-9"	147

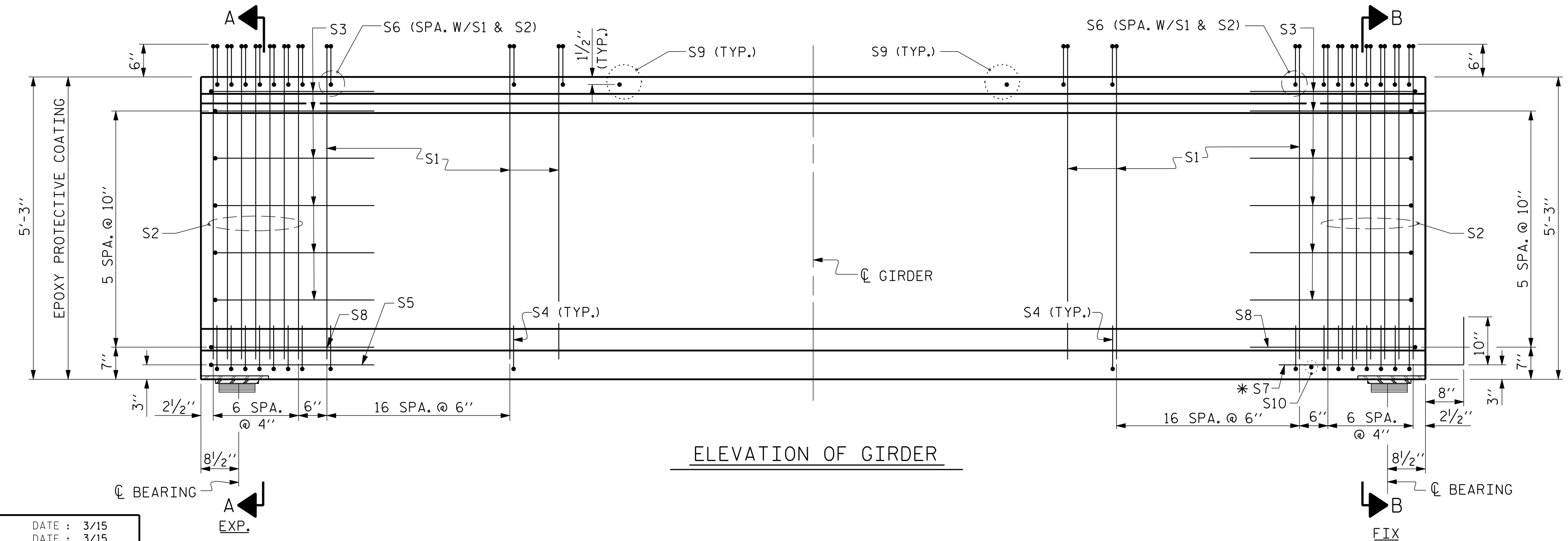
\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



ALL BAR DIMENSIONS ARE OUT-TO-OUT



PLAN OF GIRDER



ELEVATION OF GIRDER

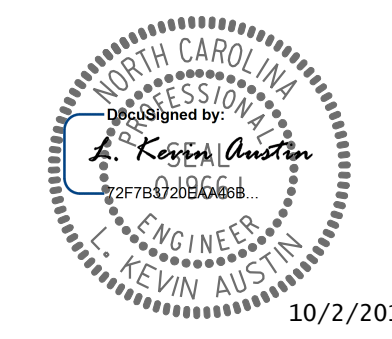
QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	10000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	2844	20.9	32
INTERIOR GIRDER	2989	20.9	32

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
8	105'-7 7/8"	845'-3"

PROJECT NO. W-5518  
 COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT  
 SHEET 1 OF 4



THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



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

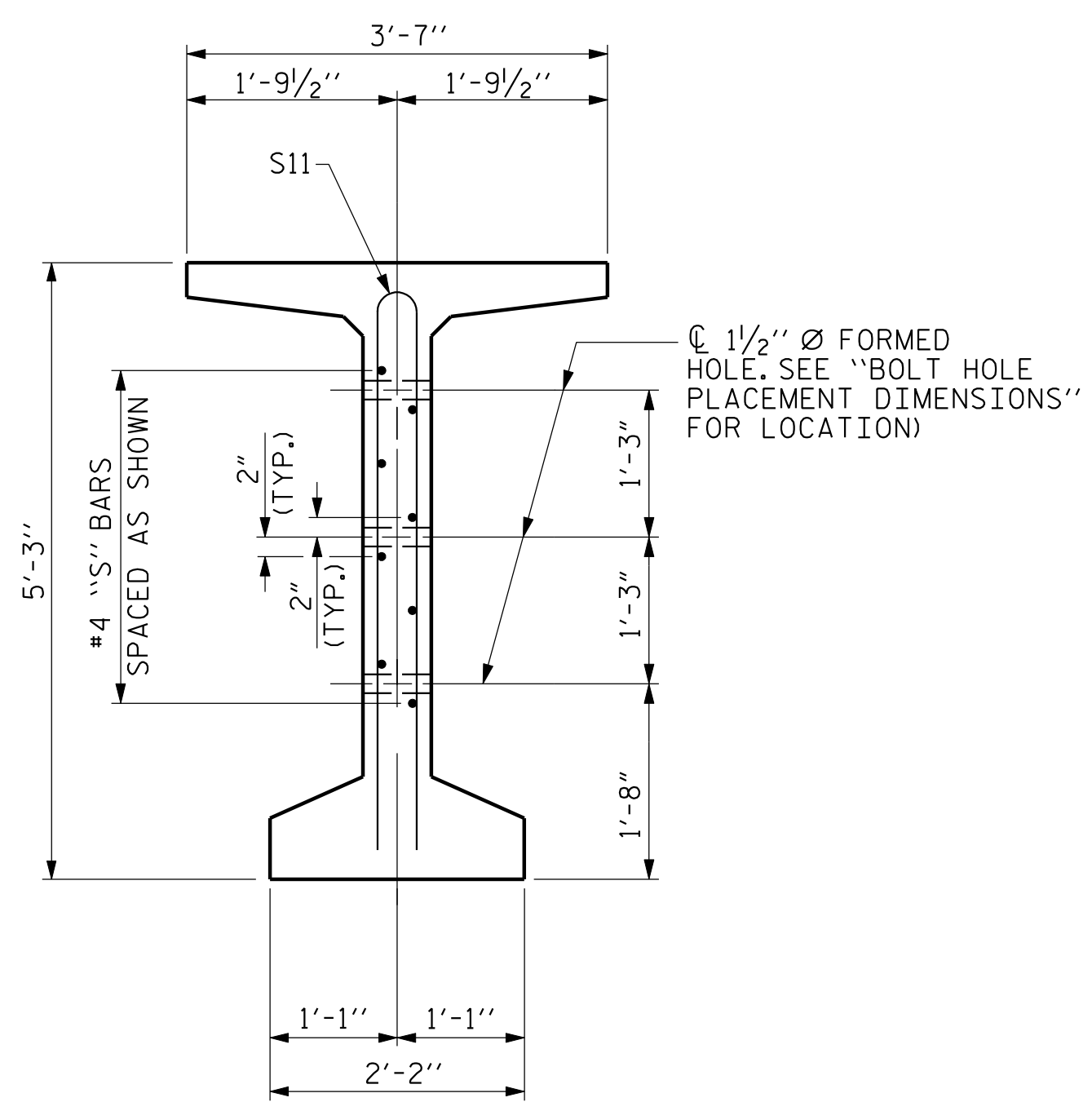
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S-10
TOTAL SHEETS	33

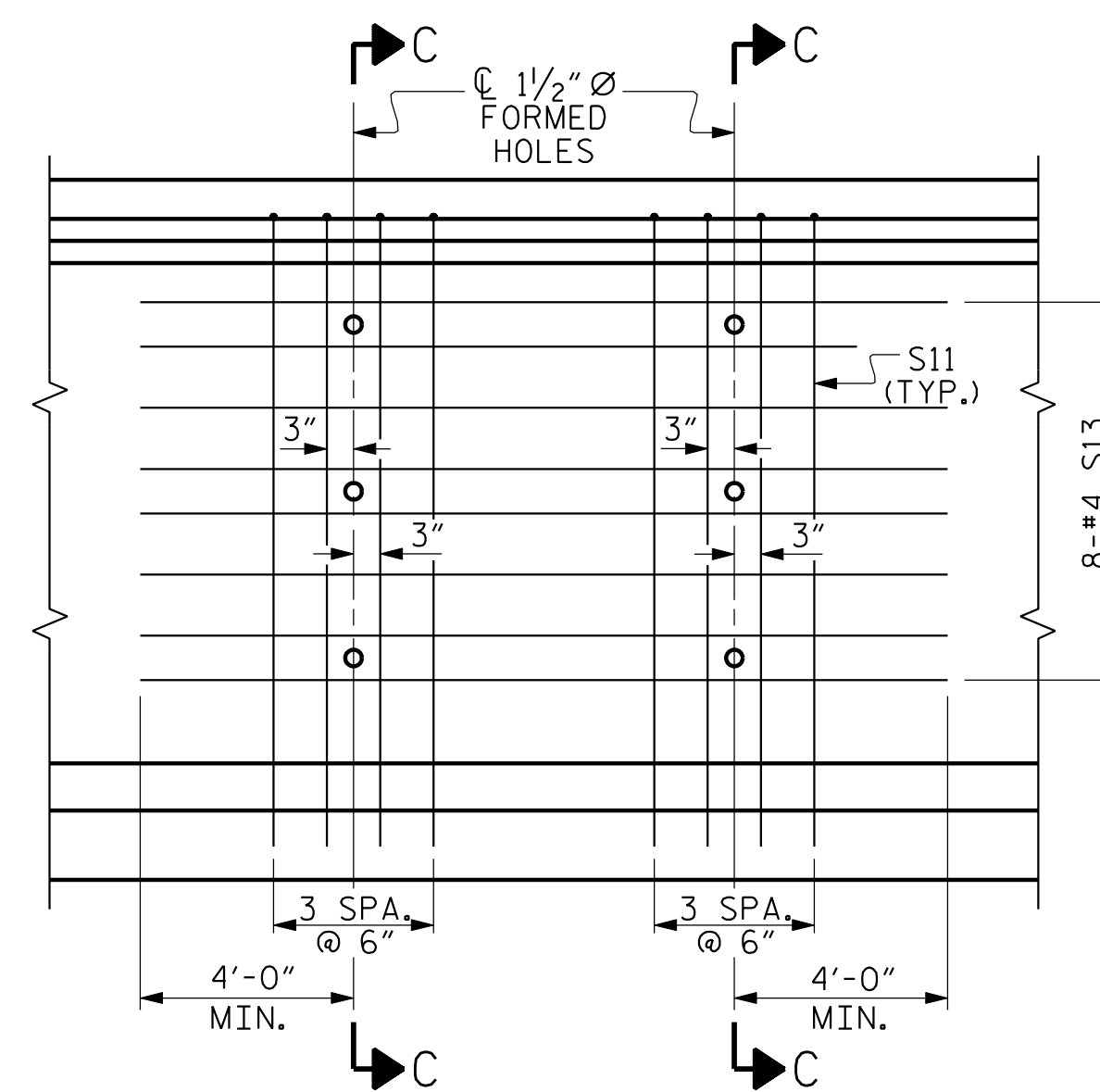
STD. NO. PCG7

10/2/2005 1:47:03 PM RA:\Structures\W5518.SMU.GD.dgn

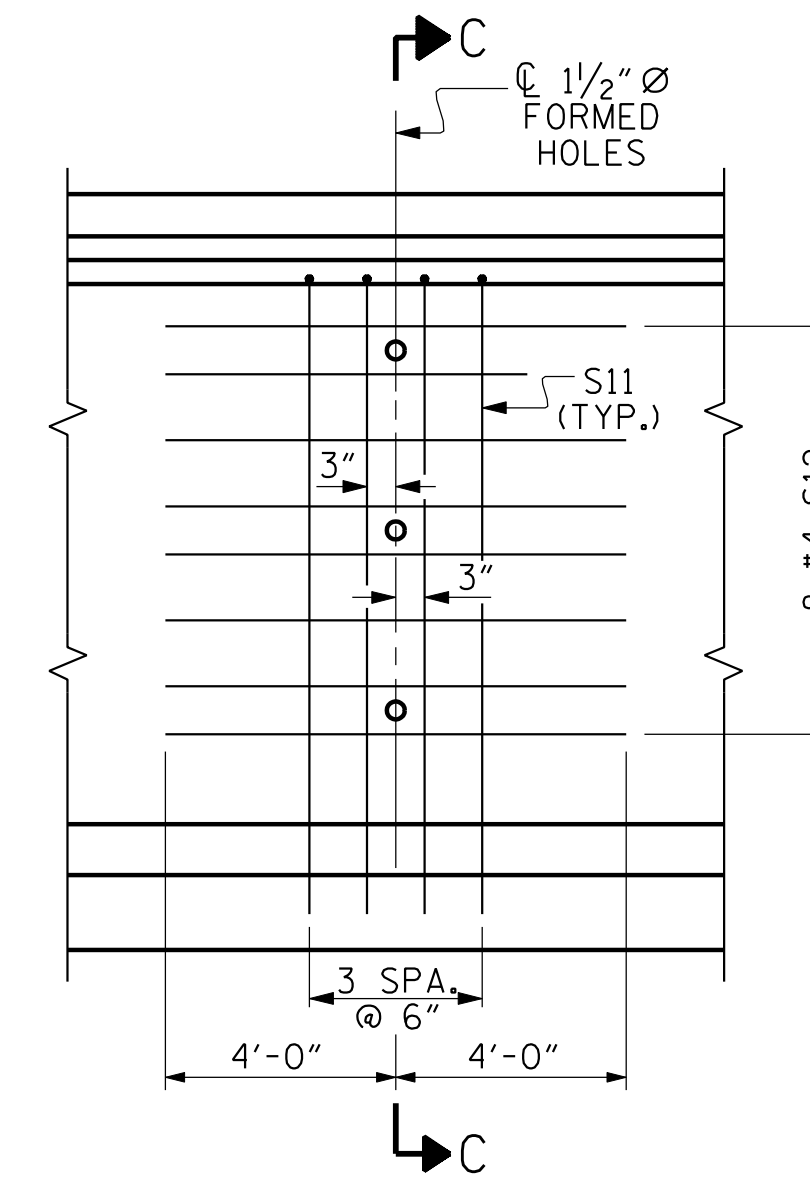
ASSEMBLED BY : W. B. ALLEN	DATE : 3/15
CHECKED BY : Z. H. BROWN	DATE : 3/15
DRAWN BY : EEM 2/6/97	REV. 10/1/11 MAA/GM
CHECKED BY : VAP 2/6/97	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG



SECTION C-C  
(S1, S6 AND S9 BARS NOT SHOWN)



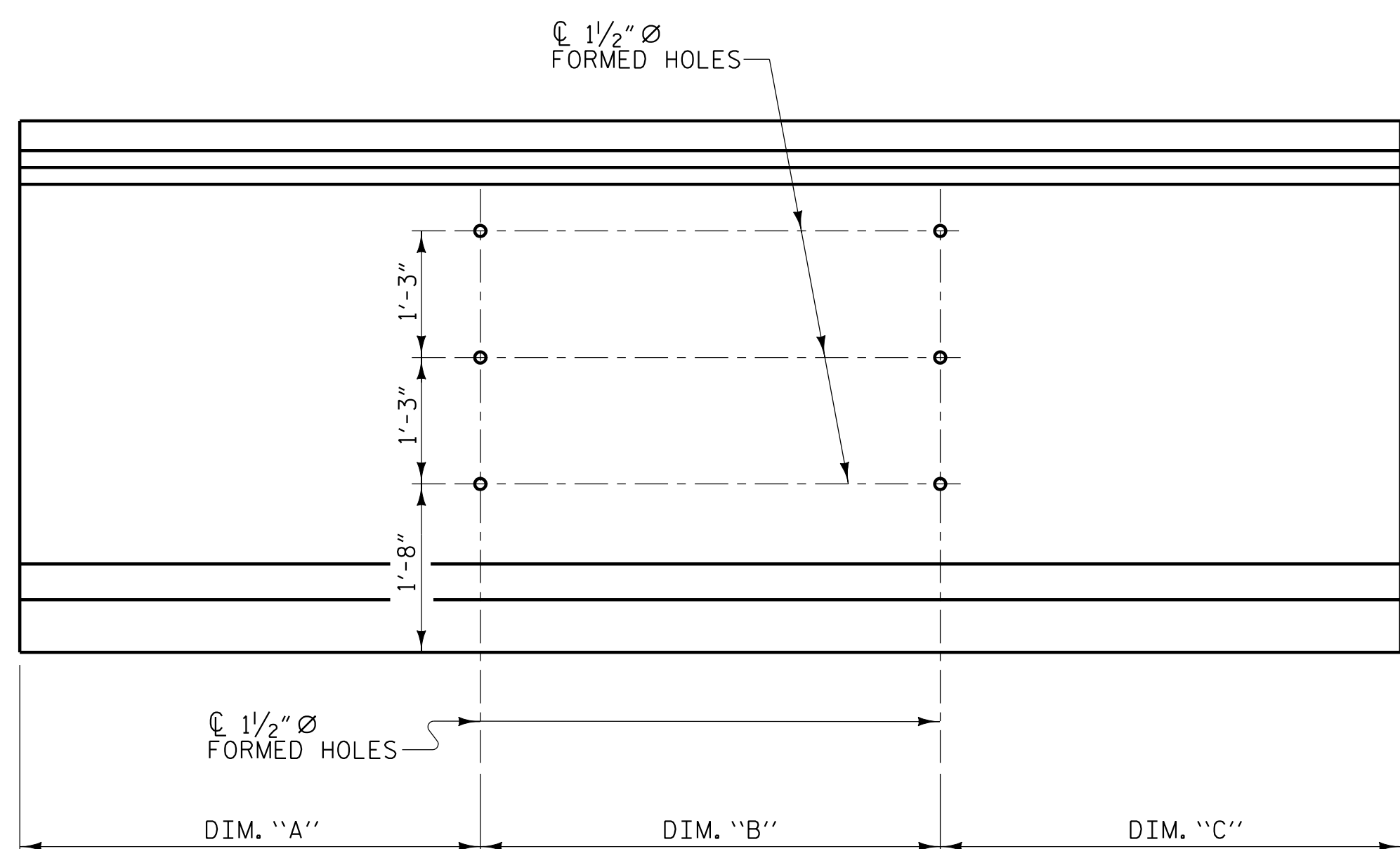
INTERIOR GIRDER



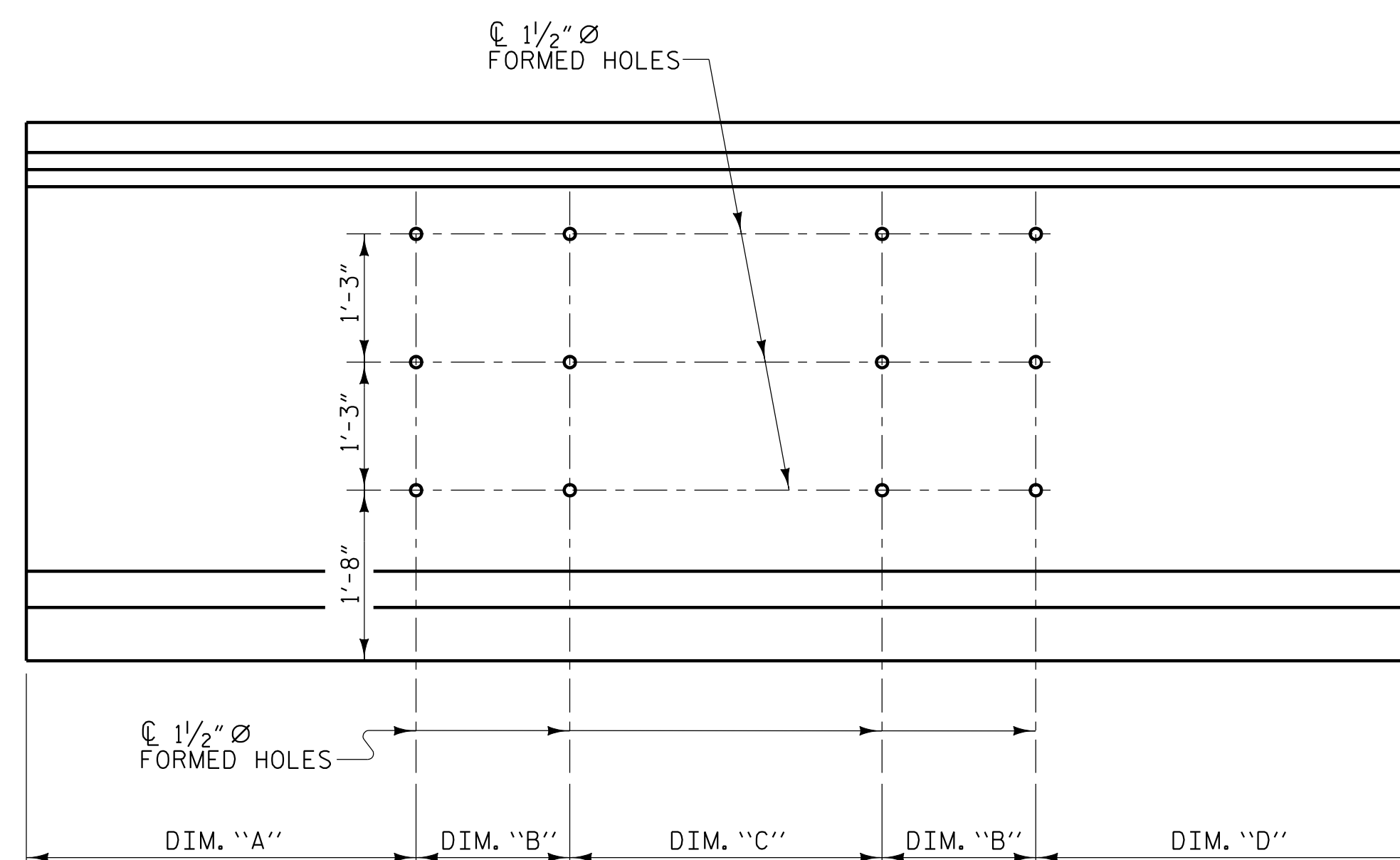
EXTERIOR GIRDER

PARTIAL ELEVATION  
SHOWING INTERMEDIATE STEEL DIAPHRAGM  
REINFORCING STEEL FOR GIRDER

UP-STATION →



EXTERIOR GIRDER



INTERIOR GIRDER

BOLT HOLE PLACEMENT

BOLT HOLE PLACEMENT DIMENSIONS				
GDR. NO.	SPAN A & SPAN B			
	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"
1	32'-7 1/4"	34'-9"	38'-3 5/8"	-
2	32'-7 1/4"	5'-8 3/8"	29'-0 5/8"	32'-7 1/4"
3	32'-7 1/4"	5'-8 3/8"	29'-0 5/8"	32'-7 1/4"
4	38'-3 5/8"	34'-9"	32'-7 1/4"	-

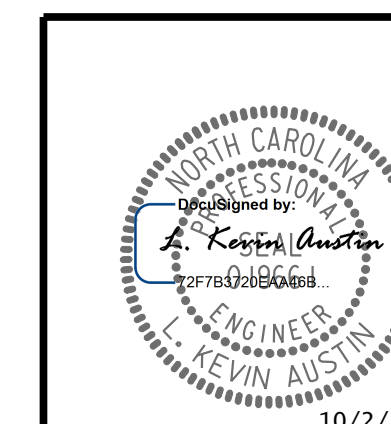
PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

PRESTRESSED CONCRETE GIRDER  
 CONTINUOUS FOR LIVE LOAD  
 DETAILS

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



DRAWN BY: W. B. ALLEN DATE: 12/14  
 CHECKED BY: Z. H. BROWN DATE: 1/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15

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.

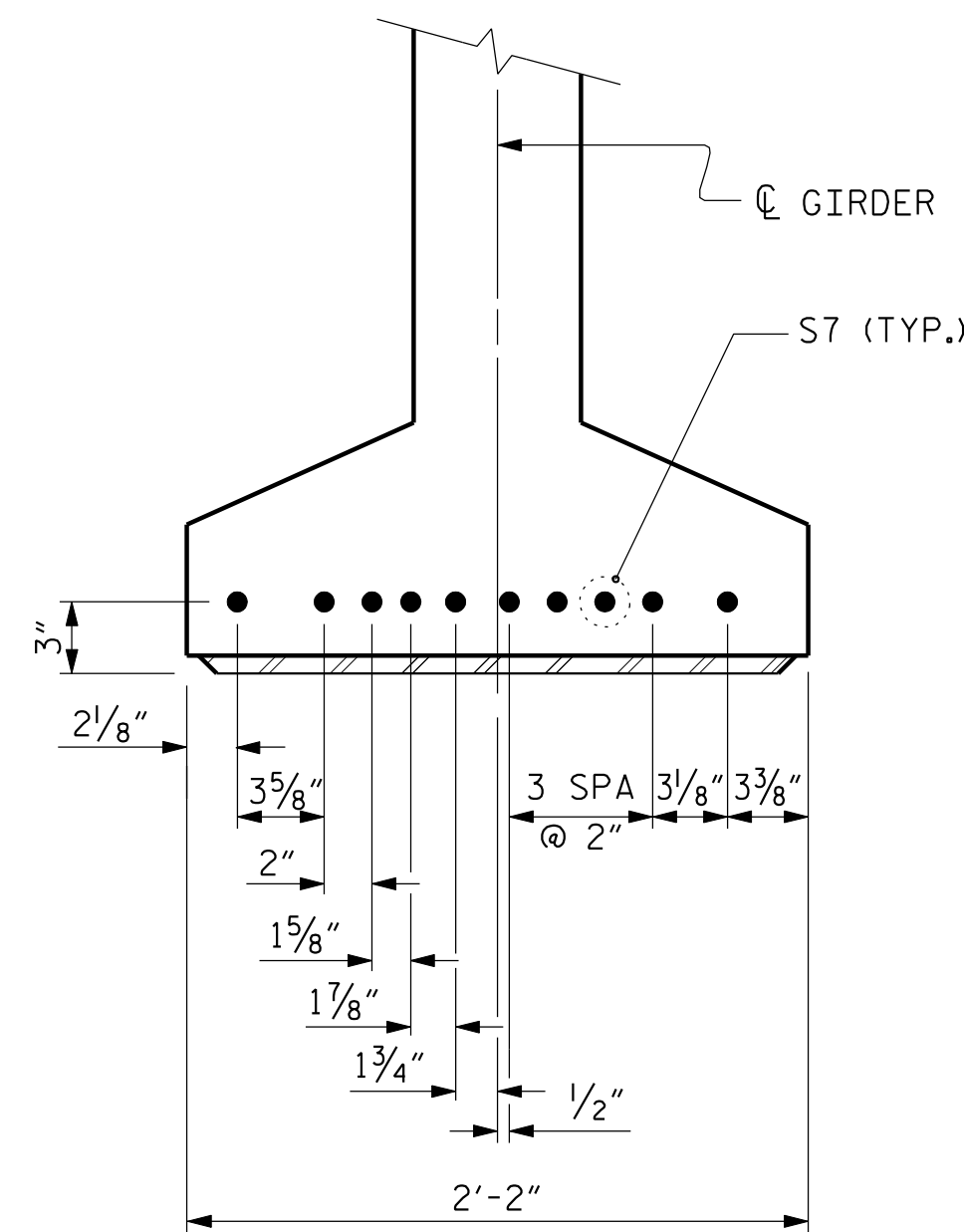
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 8000 PSI.

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".

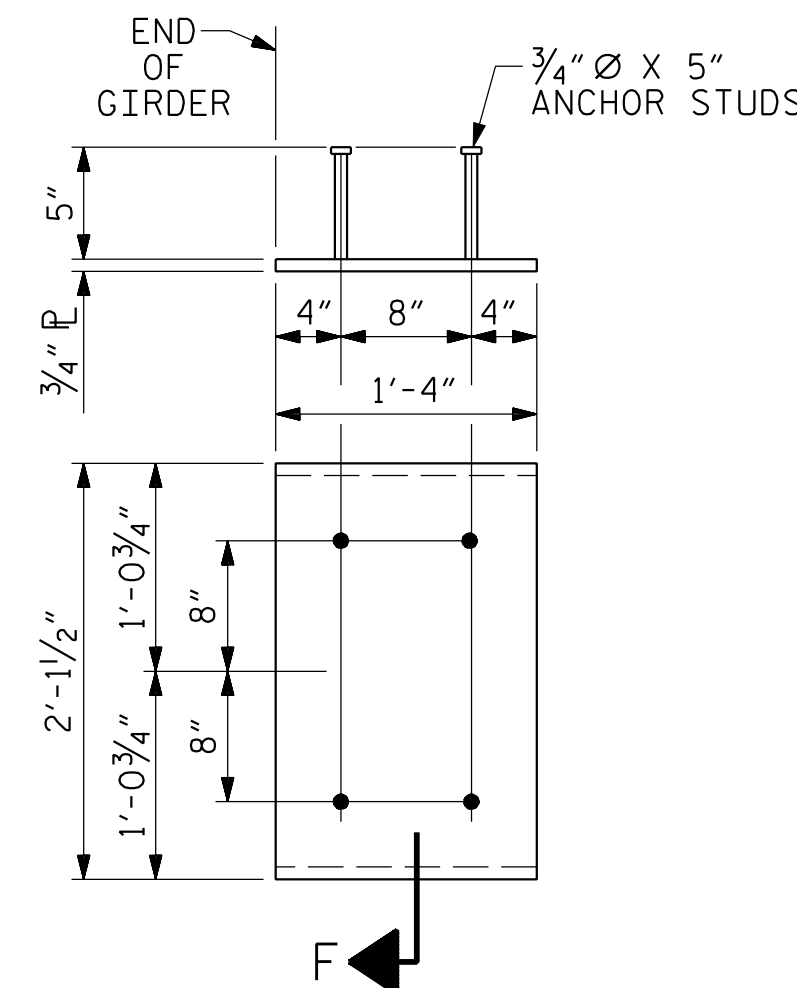
A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

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.



DETAIL "C"

(FOR 63" MODIFIED BULB TEES)



EMBEDDED PLATE "B-1" DETAILS FOR 63" MODIFIED BULB TEES

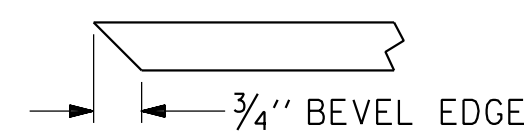
(2 REQ'D PER GIRDER)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPANS A & B

0.6" Ø LOW RELAXATION	GIRDERS 1 & 4																				
	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.037	0.073	0.107	0.138	0.166	0.189	0.208	0.221	0.230	0.233	0.230	0.221	0.208	0.189	0.166	0.138	0.107	0.073	0.037	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.021	0.042	0.062	0.082	0.098	0.113	0.123	0.133	0.137	0.140	0.137	0.133	0.123	0.113	0.098	0.082	0.062	0.042	0.021	0.0
FINAL CAMBER ↑	0.0	3/16"	3/8"	1/2"	11/16"	13/16"	15/16"	1"	1 1/16"	1 1/16"	1 1/8"	1 1/16"	1 1/16"	1"	15/16"	13/16"	1 1/16"	1/2"	3/8"	3/16"	0.0
0.6" Ø LOW RELAXATION	GIRDERS 2 - 3																				
	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.037	0.073	0.107	0.138	0.166	0.189	0.208	0.221	0.230	0.233	0.230	0.221	0.208	0.189	0.166	0.138	0.107	0.073	0.037	0.0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.022	0.045	0.066	0.088	0.104	0.121	0.132	0.143	0.146	0.150	0.146	0.143	0.132	0.121	0.104	0.088	0.066	0.045	0.022	0.0
FINAL CAMBER ↑	0.0	3/16"	5/16"	1/2"	5/8"	11/16"	13/16"	7/8"	15/16"	15/16"	1"	15/16"	15/16"	7/8"	13/16"	11/16"	5/8"	1/2"	5/16"	3/16"	0.0

\* INCLUDES FUTURE WEARING SURFACE.

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



SECTION "F"

(SEE NOTES)

PROJECT NO. W-5518

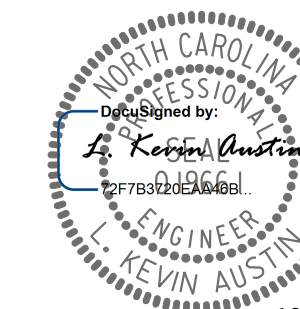
COLUMBUS COUNTY

STATION: 24+06.36 -L- POT

SHEET 3 OF 4



THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



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

REVISIONS

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

SHEET NO.

S-12

TOTAL SHEETS  
33

STD. NO. PCC9

ASSEMBLED BY : W. B. ALLEN	DATE : 3/15
CHECKED BY : Z. H. BROWN	DATE : 3/15
DRAWN BY : ELR 11/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 11/91	REV. 1/15 MAA/TMC
	REV. 2/15 MAA/TMC

10/2/2015 1:47:45 PM RA:\Structures\W5518.SWU\_03.dwg

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 AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

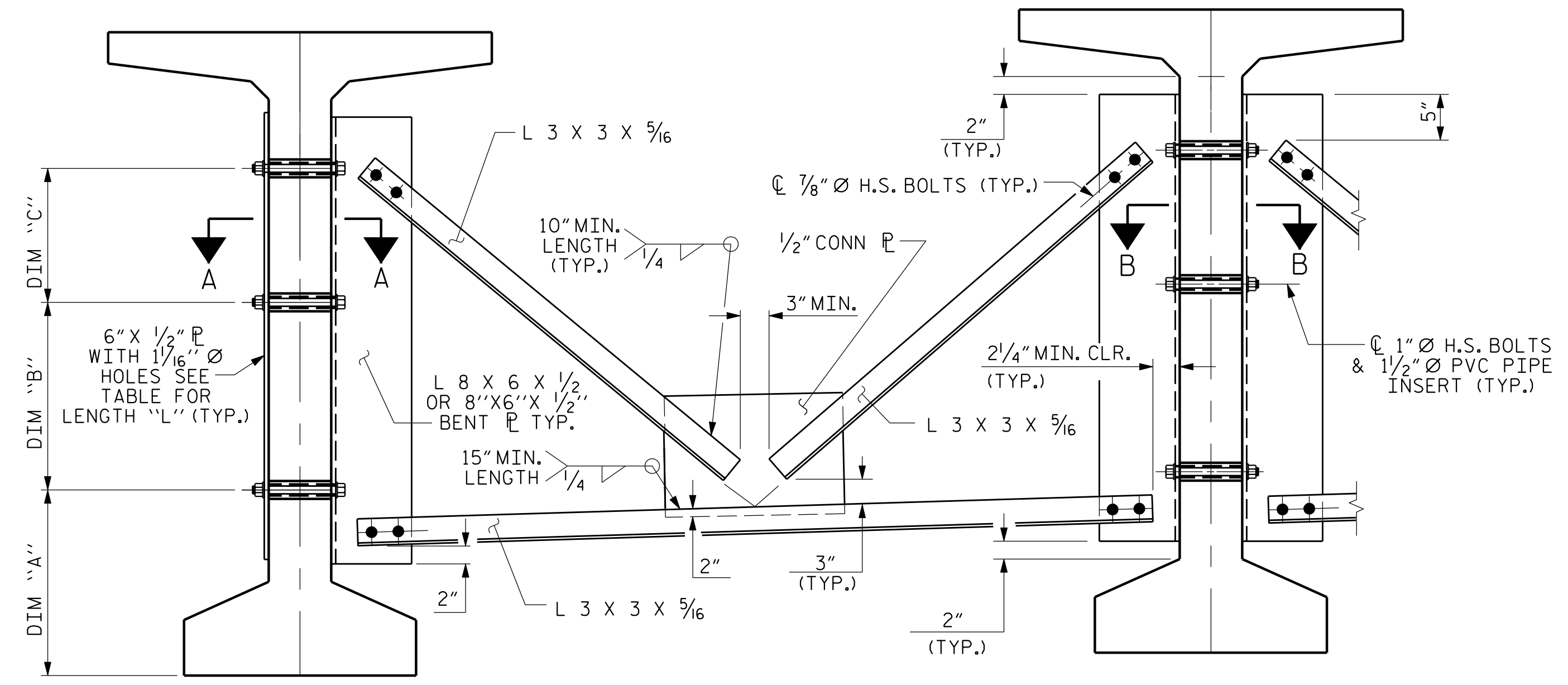
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

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

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

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

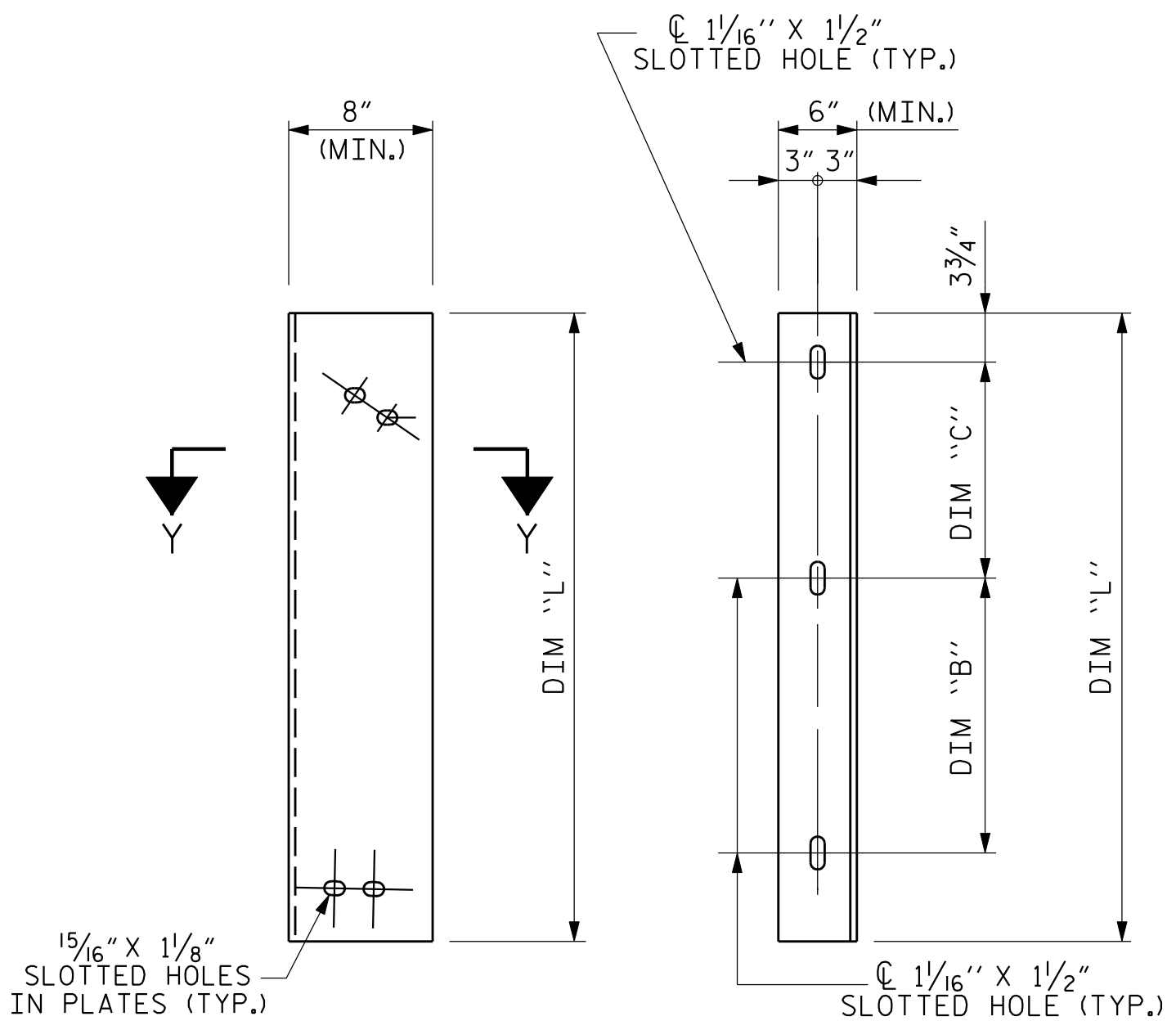


EXTERIOR GIRDER

INTERIOR GIRDER

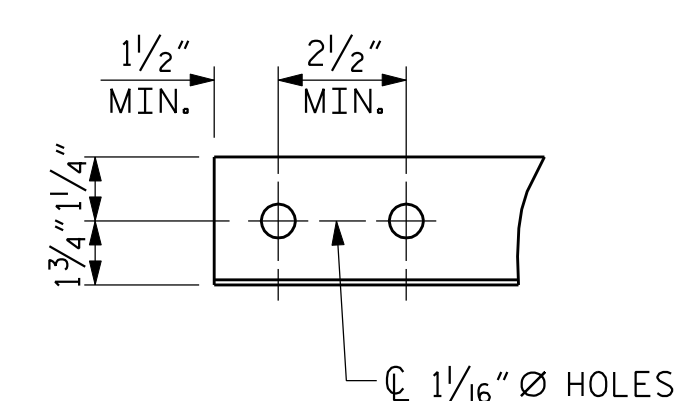
PART SECTION AT INTERMEDIATE DIAPHRAGM

(63' BULB TEE GIRDER SHOWN)



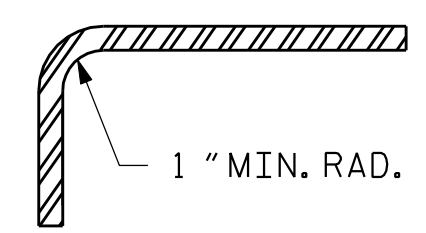
DIAPHRAGM FACE

WEB FACE



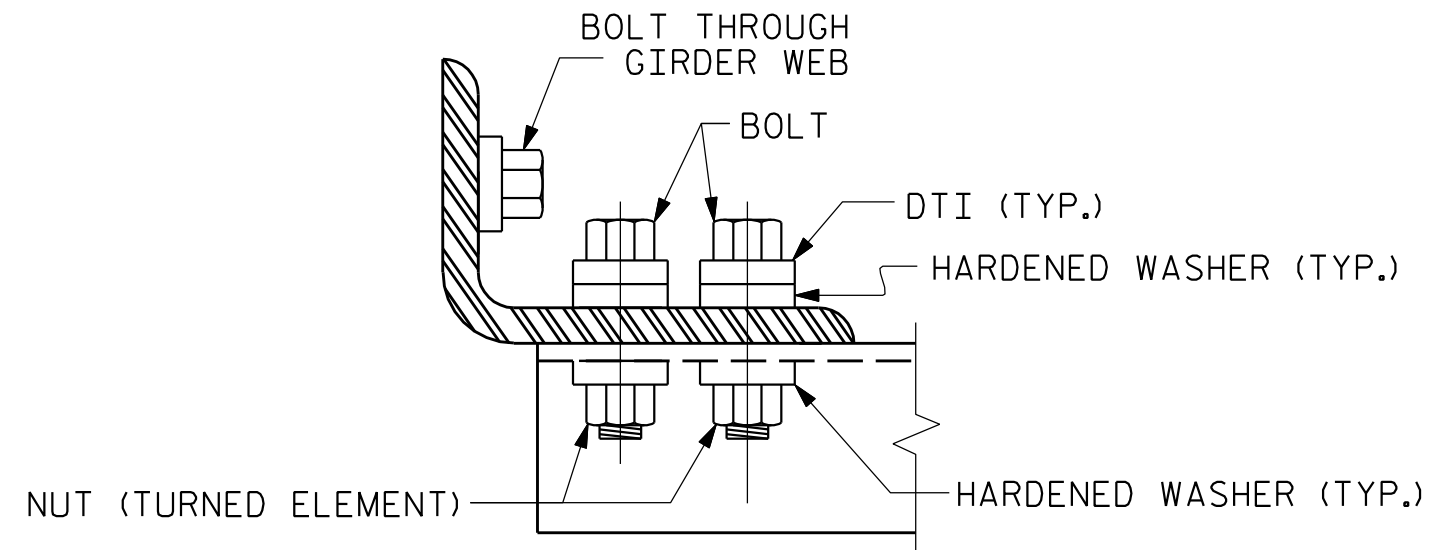
ANGLE END

(L 3 x 3 x 5/16)



SECTION Y-Y

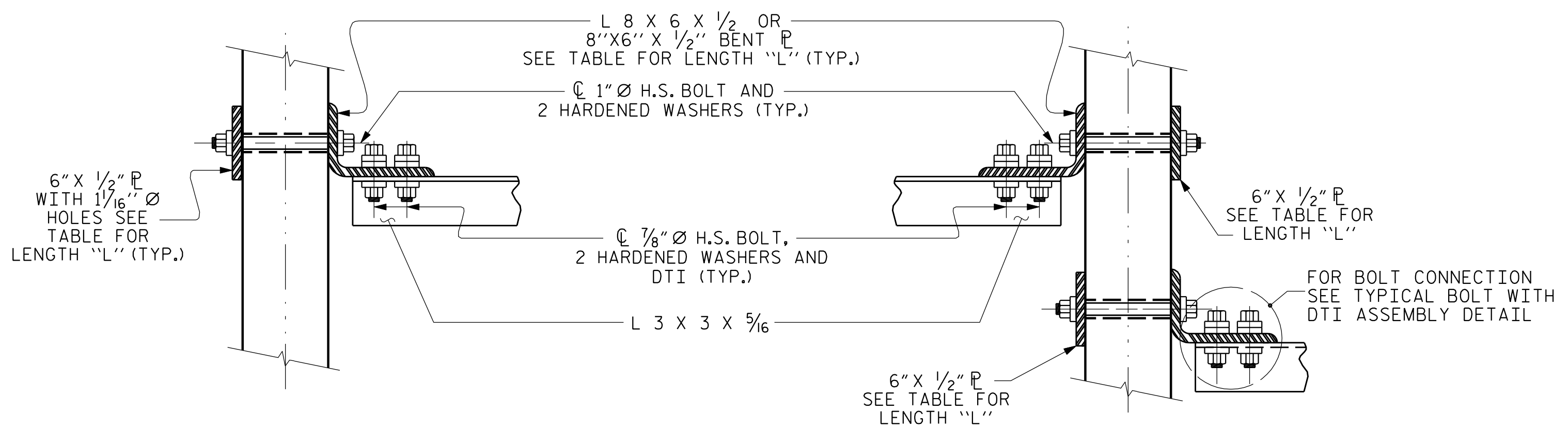
CONNECTOR PLATE DETAIL



BOLT WITH DTI ASSEMBLY DETAIL

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63' BULB TEE	1'-8"	1'-3"	1'-3"	3'-5"



SECTION A-A

SECTION B-B

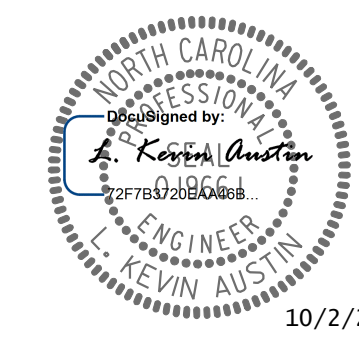
CONNECTION DETAILS

PLANS PREPARED BY:

**MULKEY**  
ENGINEERS & CONSULTANTS

PO BOX 23127  
RALEIGH, NC 27626  
(919) 851-1912 FAX  
(919) 851-1912  
WWW.MULKEYINC.COM  
NC LICENSE NO. 0-1021

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



PROJECT NO. W-5518  
COLUMBUS COUNTY  
STATION: 24+06.36 -L- POT  
SHEET 4 OF 4

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

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

STD. NO. PGG11

10/2/2015 14:48:04 PM RA:\Structures\W5518.SMU\_04.dwg

ASSEMBLED BY : <b>W.B. ALLEN</b>	DATE : 12/14
CHECKED BY : <b>Z.H. BROWN</b>	DATE : 1/15
DRAWN BY : <b>RWW 11/09</b>	ADDED <b>11/23/09R</b>
CHECKED BY : <b>GM 11/09</b>	REV. <b>10/11</b> MAA/GM

**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.

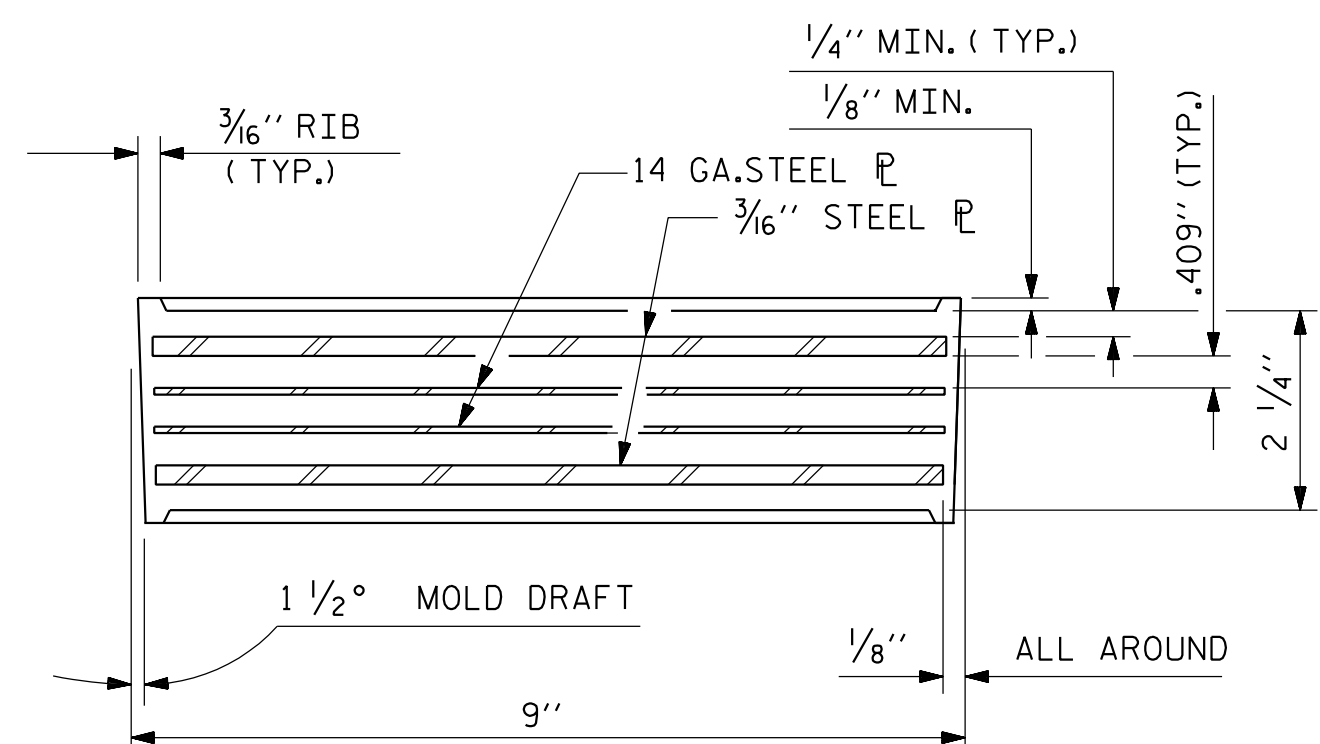
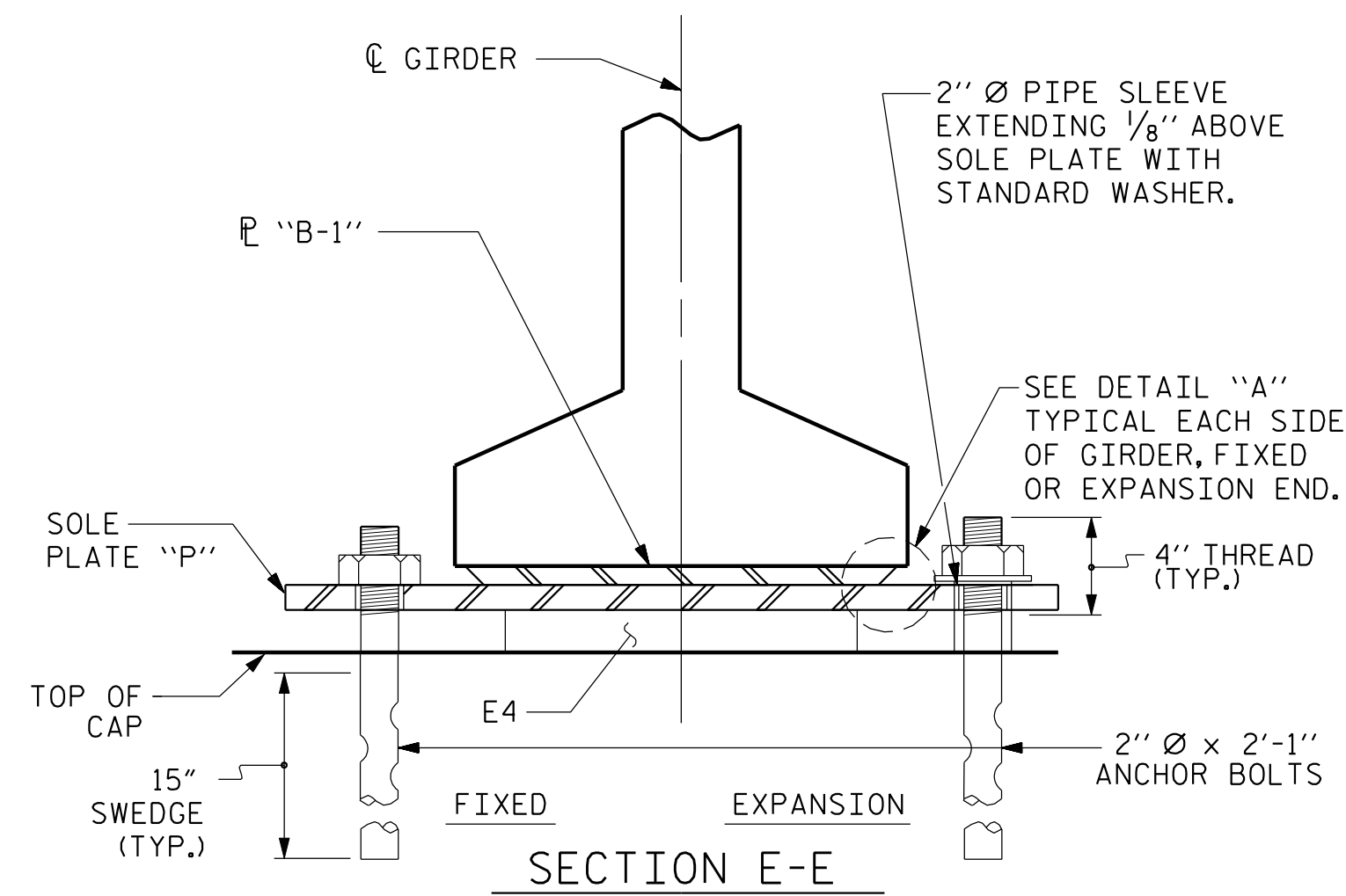
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

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.

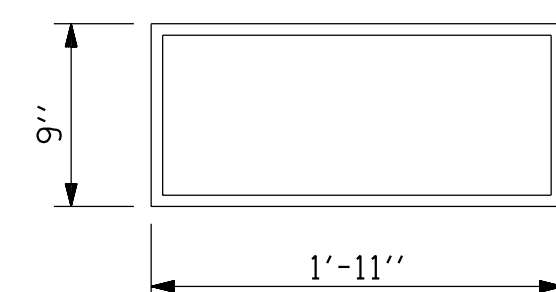
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

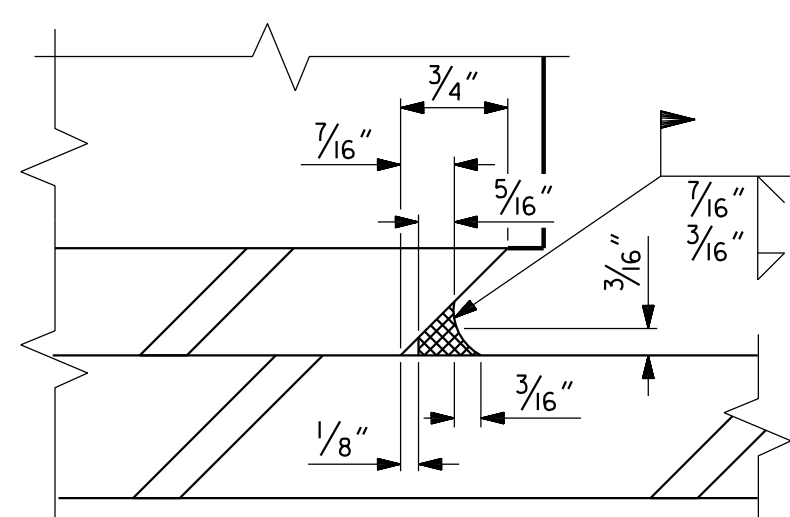
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



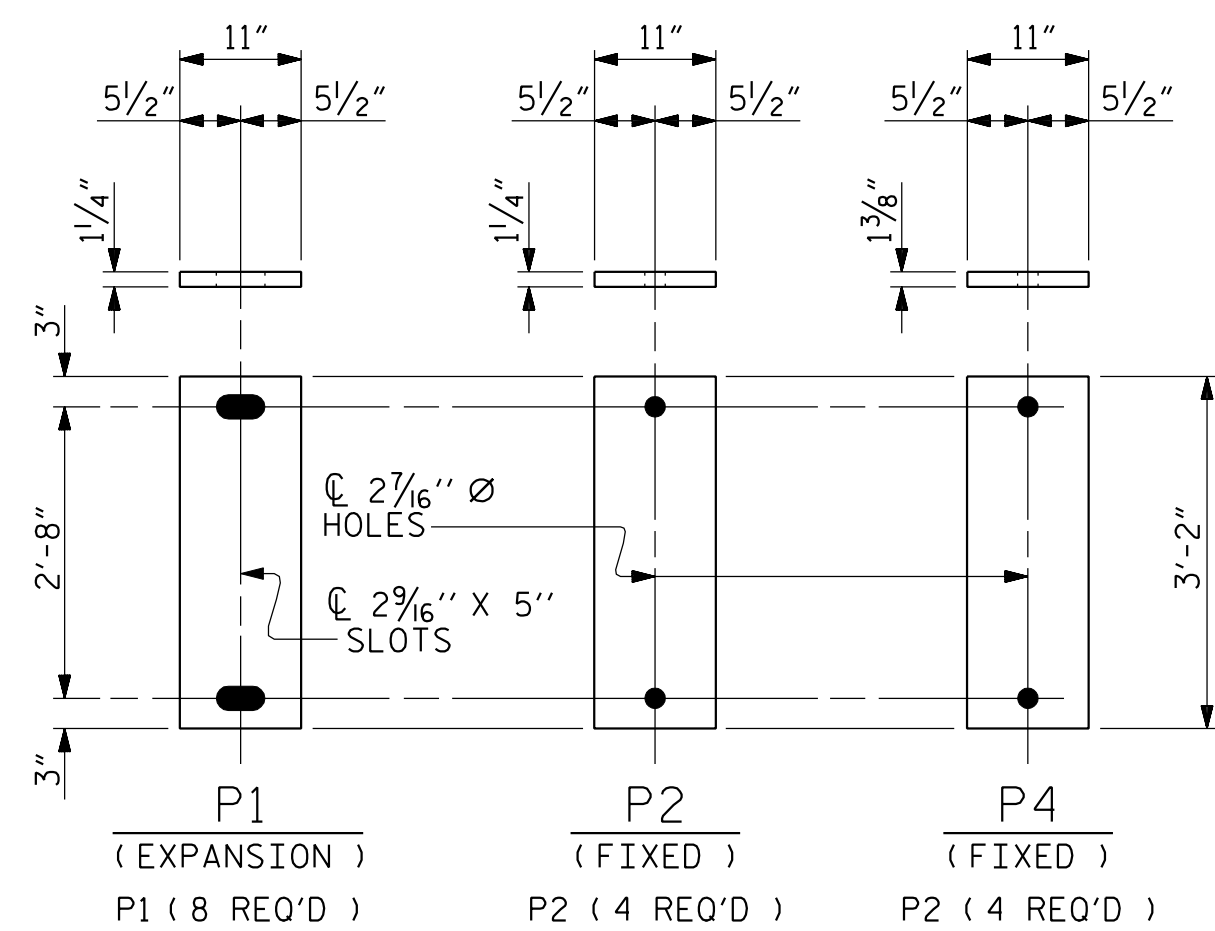
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (16 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE V

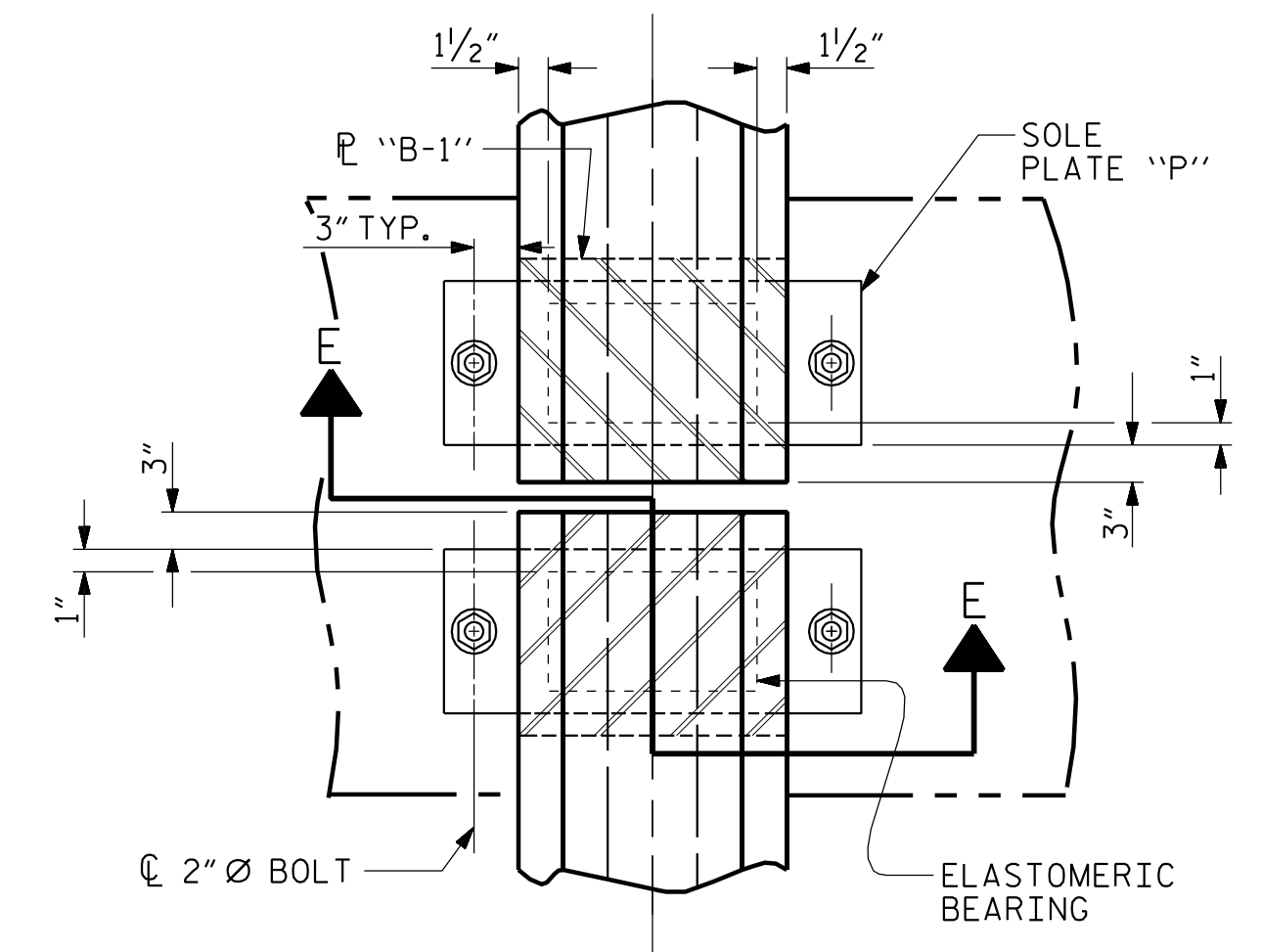


DETAIL "A"



SOLE PLATE DETAILS ("P")

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

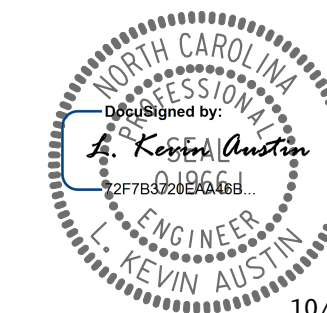


TYPICAL PLAN  
(SHOWING CONTINUOUS BENT)

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 PO Box 33127  
 RALEIGH, NC 27636  
 (919) 851-1912  
 (919) 851-1911 FAX  
 WWW.MULKEYINC.COM  
 NC LICENSE NO. 0-1031

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



10/2/2015

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

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

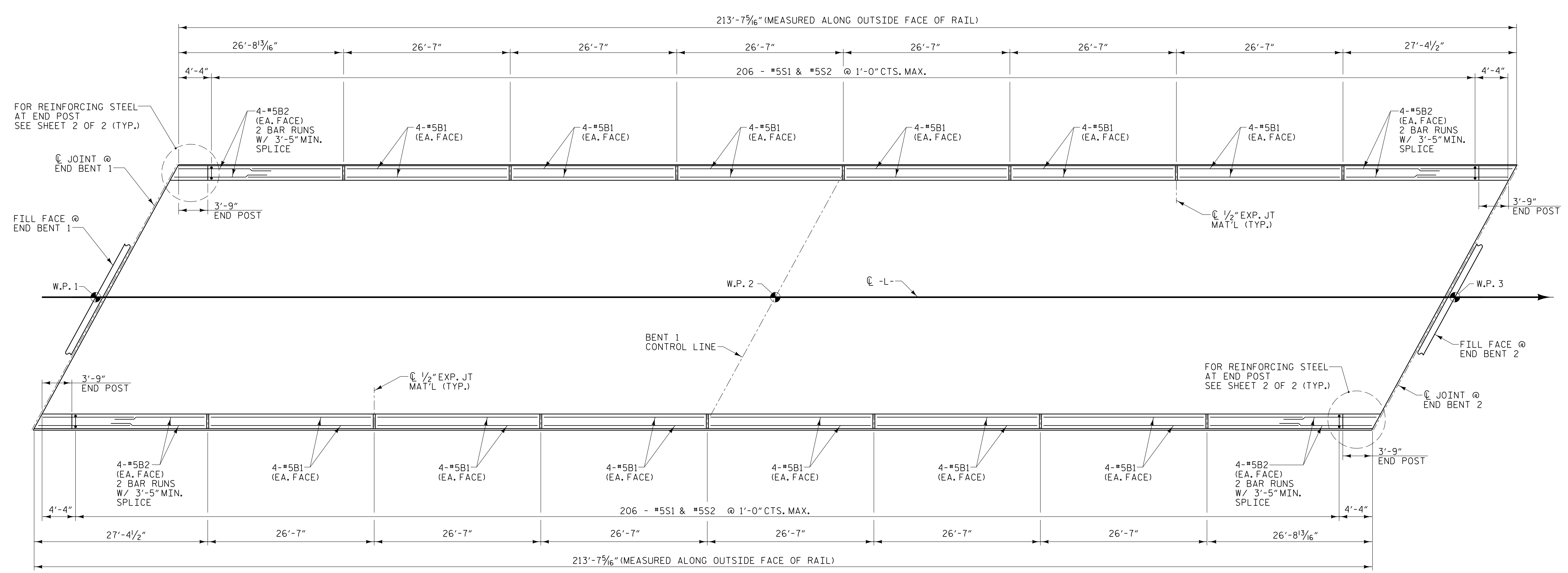
SHEET NO. S-14  
 TOTAL SHEETS 33

STD. NO. EB4

10/2/2015 1:45:41PM R:\Structures\W5518-SMU-EB-01.dgn

ASSEMBLED BY : <b>W. B. ALLEN</b>	DATE : 3/15
CHECKED BY : <b>Z.H. BROWN</b>	DATE : 3/15
DRAWN BY : EEM 2/97	REV. 10/1/11 MAA/GM
CHECKED BY : VAP 2/97	REV. 6/13 AAC/MAA
	REV. 1/15 MAA/TMG





SPAN A

SPAN B

**PLAN OF PARAPET**

ALL DIMENSIONS ARE MEASURED ALONG  
OUTSIDE FACE OF PARAPET

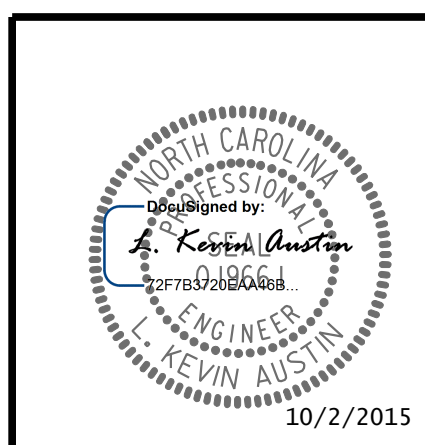
PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 1'-2" x 2'-6"  
 CONCRETE PARAPET  
 AND END POST

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : W. B. ALLEN DATE : 1/15  
 CHECKED BY : Z. H. BROWN DATE : 6/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15



10/2/2015 4:49:53 PM R:\Structures\W5518\SMU\_PP\_01.dgn



**NOTES**

**STRUCTURAL CONCRETE INSERT**

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

**NOTES**

**METAL RAIL TO END POST CONNECTION**

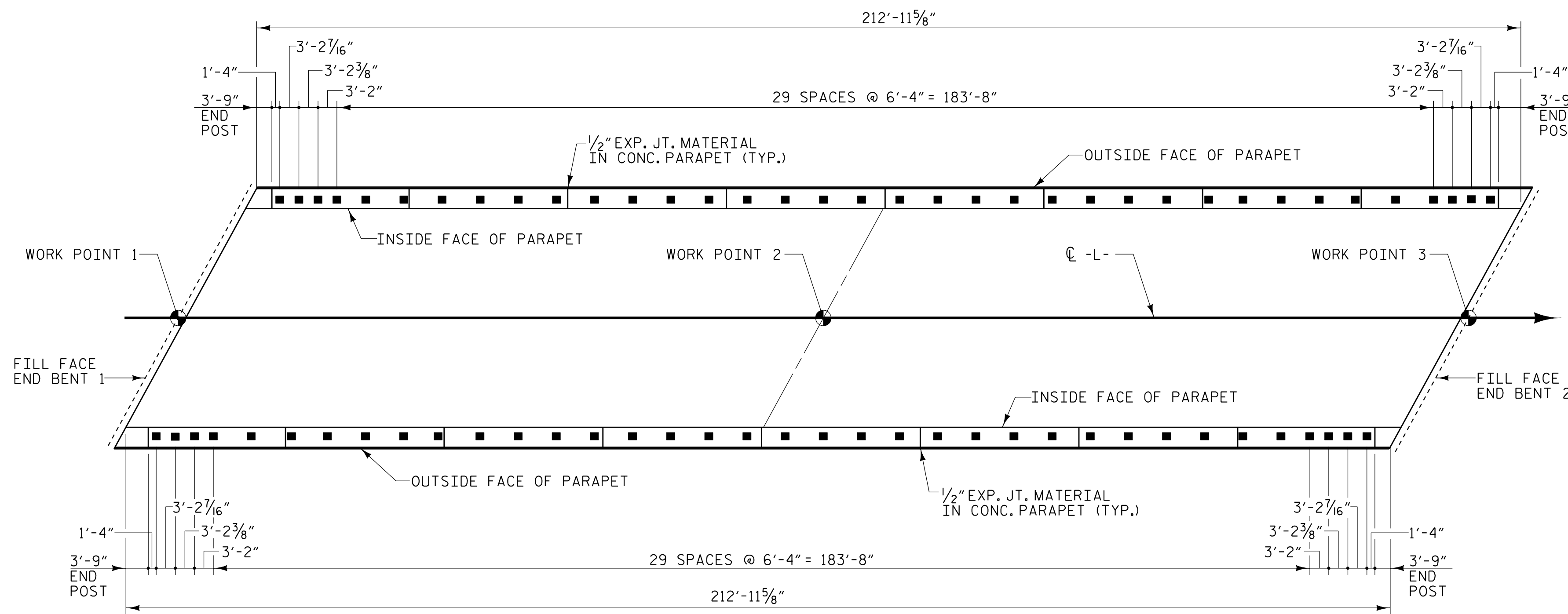
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A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

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

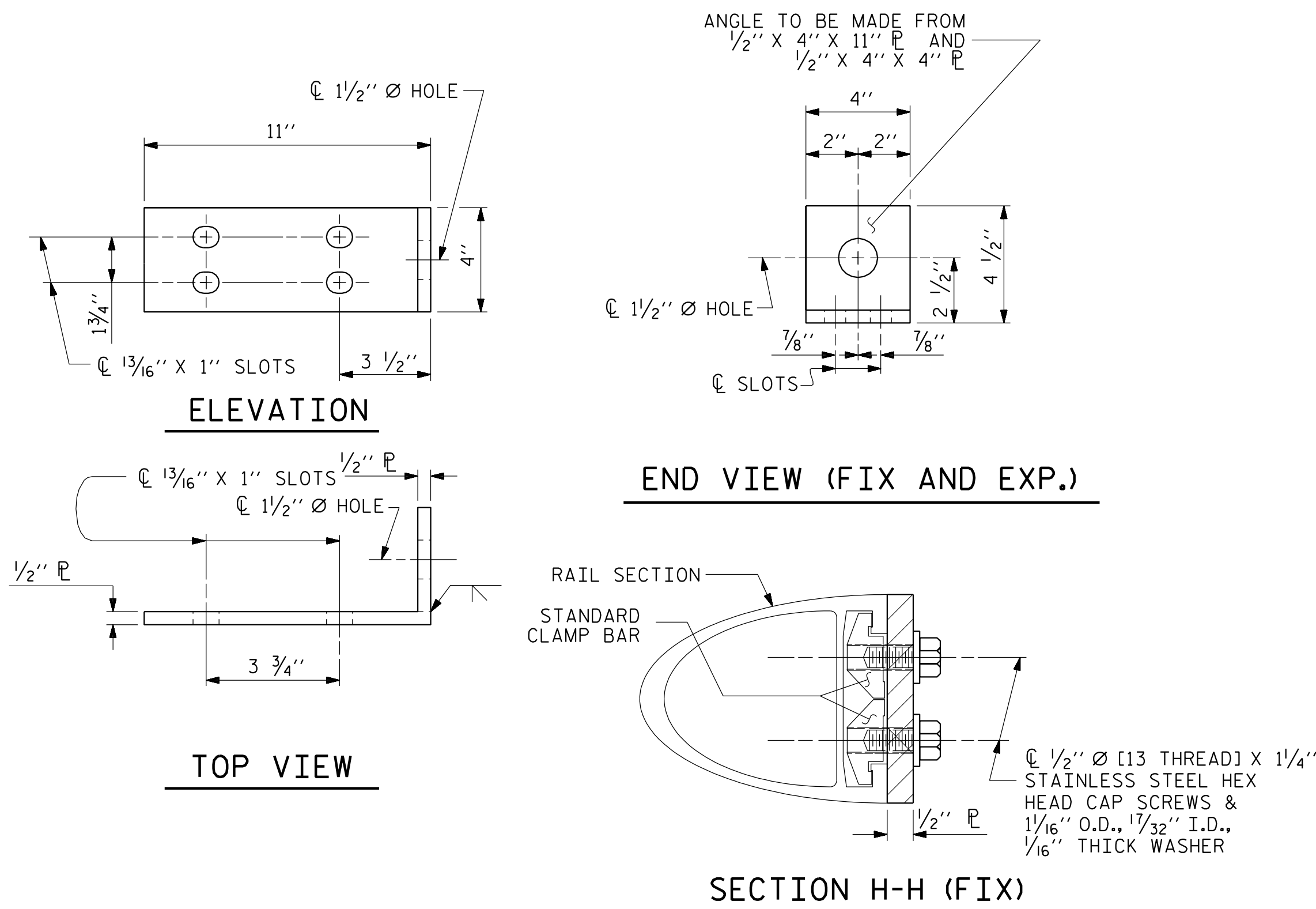
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

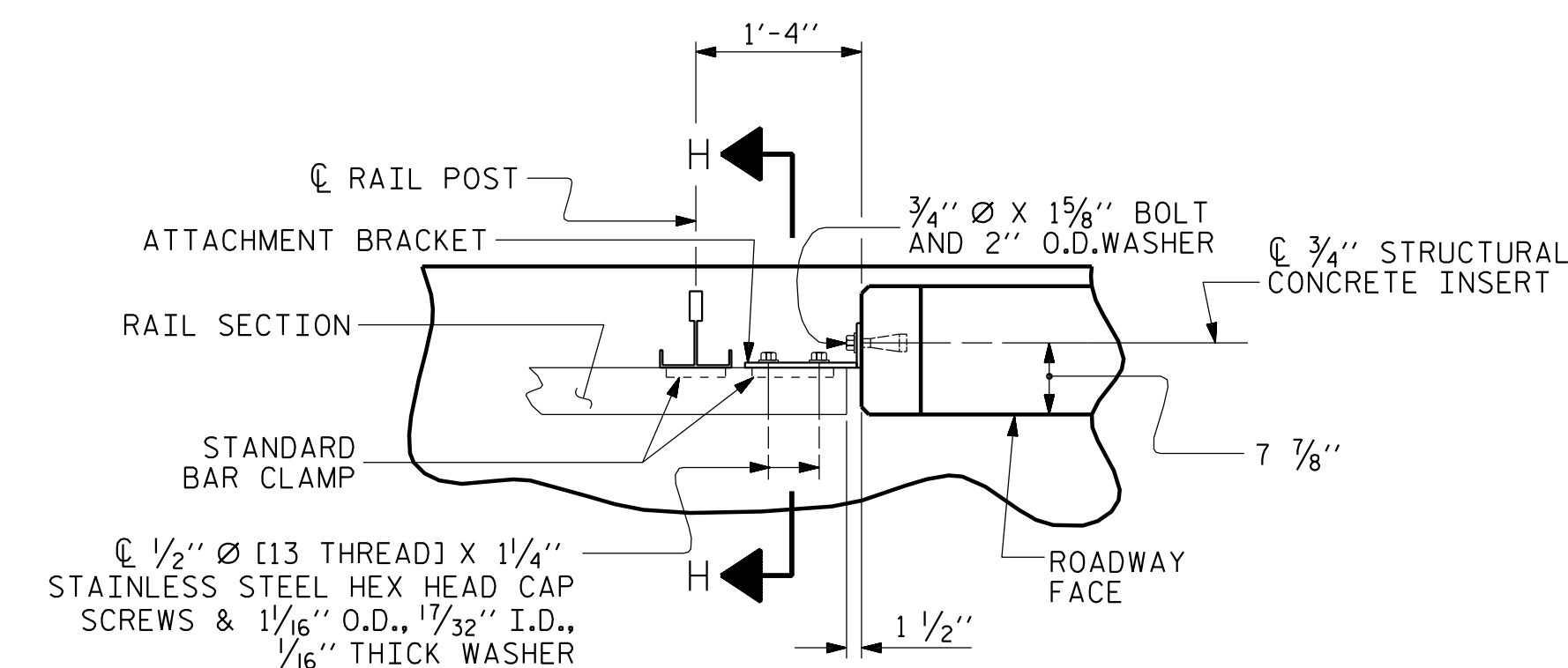
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT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



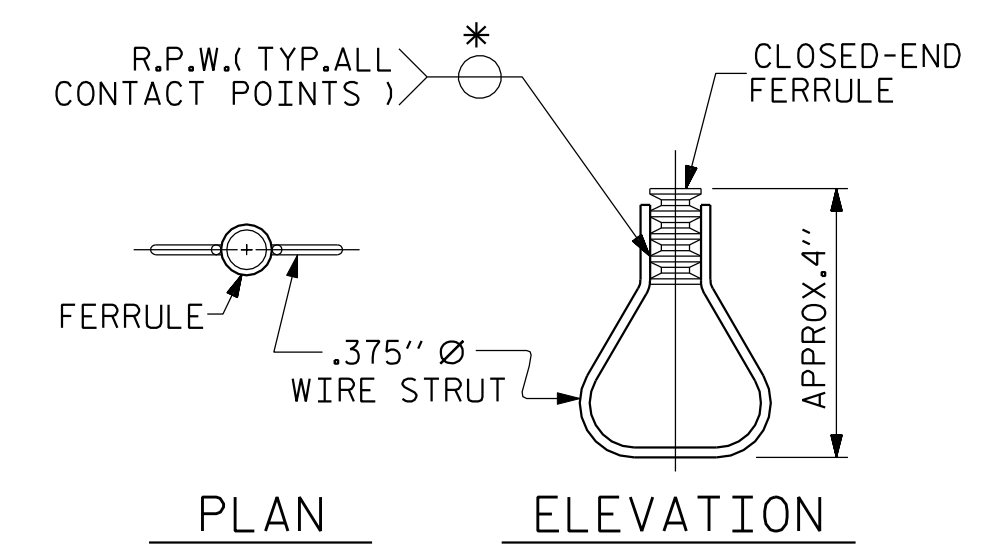
**PLAN OF RAIL POST SPACINGS**



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



**PLAN - RAIL AND END POST**



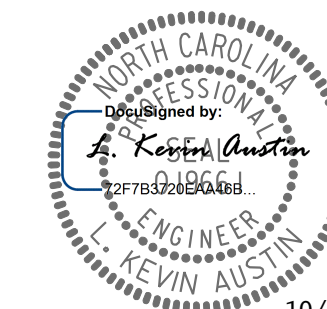
**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 PO BOX 23127  
 RALEIGH, NC 27626  
 (919) 881-1912 FAX  
 (919) 881-1912  
 WWW.MULKEYINC.COM  
 NO LICENSE NO. 0-1051

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



10/2/2015

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 RAIL POST SPACINGS  
 AND  
 END OF RAIL DETAILS  
 FOR ONE OR TWO BAR METAL RAILS

**REVISIONS**

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

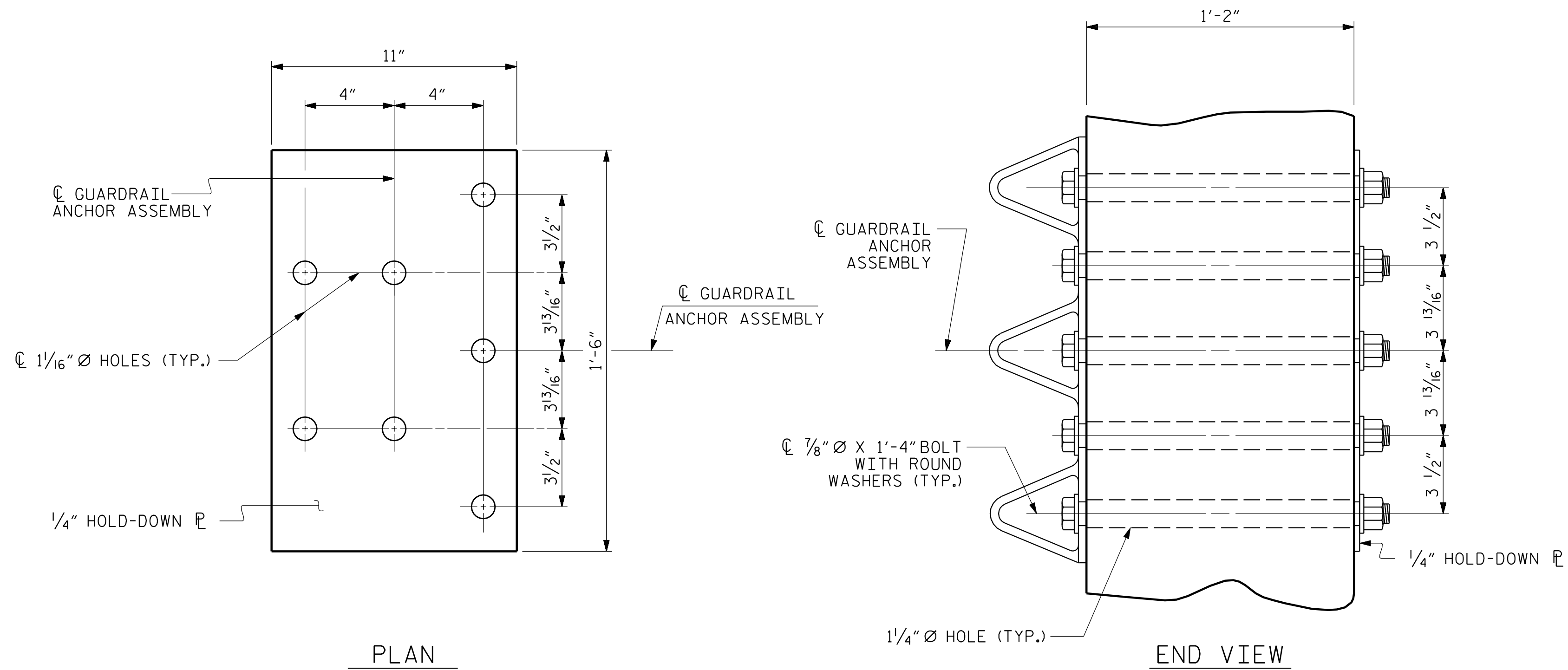
SHEET NO.  
 S-17  
 TOTAL SHEETS  
 33

STD. NO. BMR2

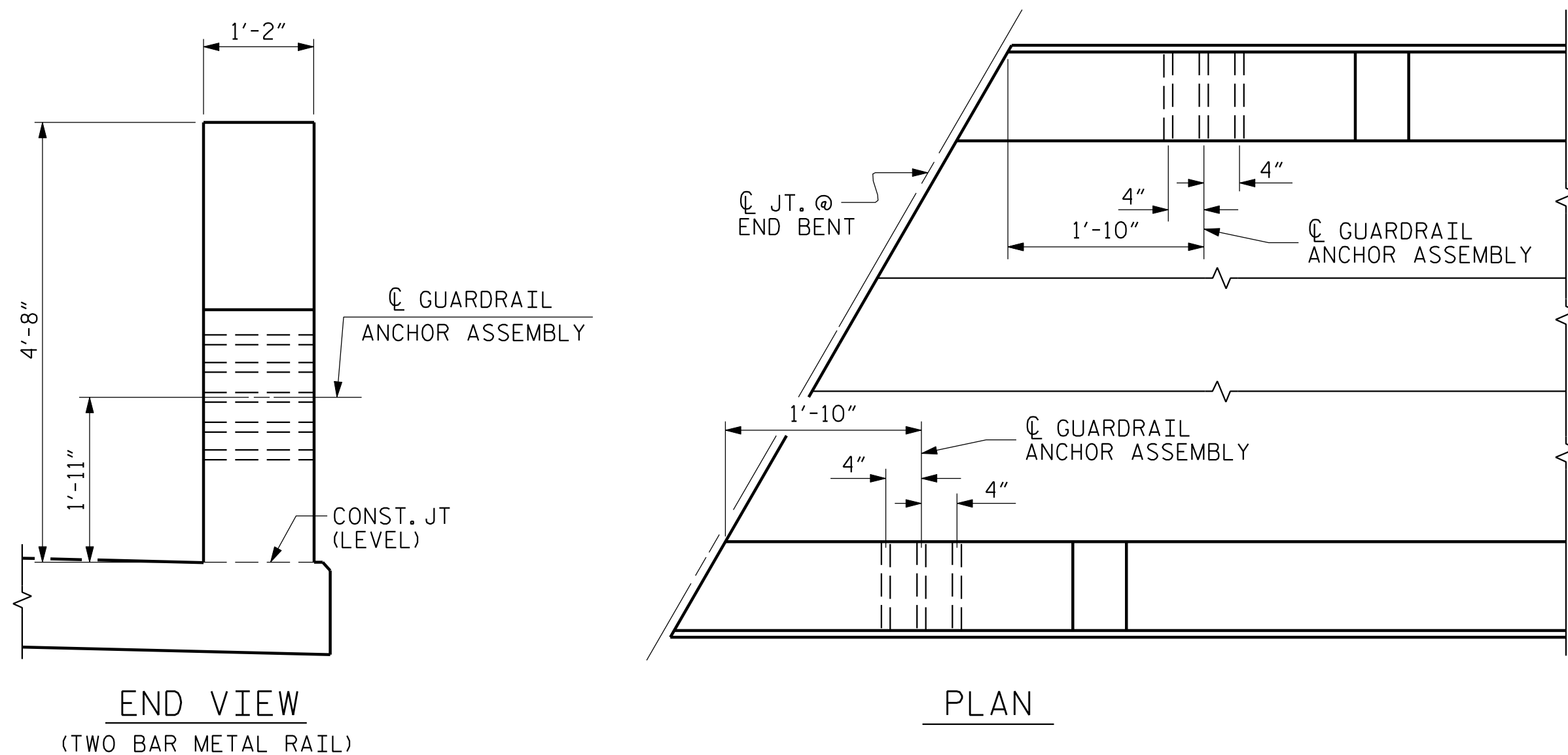
ASSEMBLED BY : <b>W. B. ALLEN</b>	DATE : 5/15
CHECKED BY : <b>Z. H. BROWN</b>	DATE : 6/15
DRAWN BY : FCJ 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : CRK 3/89	REV. 5/1/06 TLG/GM
	REV. 10/1/11 MAA/GM







**GUARDRAIL ANCHOR ASSEMBLY DETAILS**



**LOCATION OF GUARDRAIL ANCHOR AT END POST**

**NOTES**

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

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

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

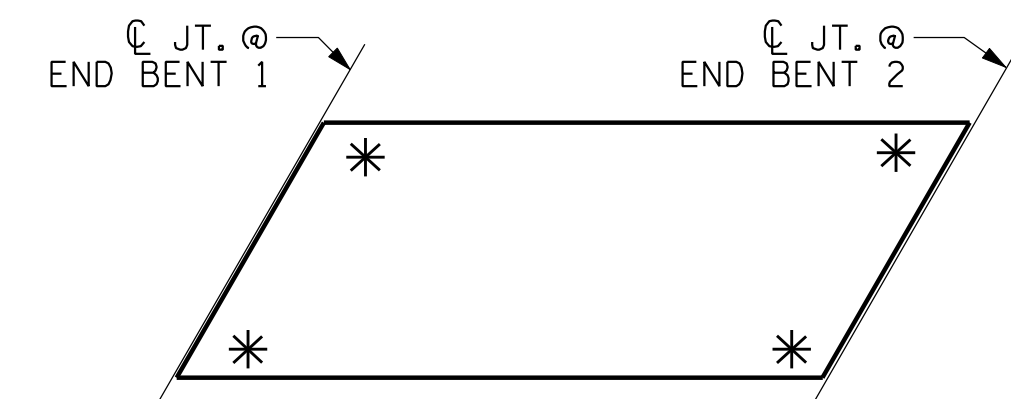
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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



**SKETCH SHOWING POINTS OF ATTACHMENT**

\* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

PLANS PREPARED BY:  
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 PO BOX 33127  
 RALEIGH, NC 27636  
 (919) 851-1912 FAX  
 (919) 851-1912  
 WWW.MULKEYINC.COM  
 NC LICENSE NO. 0-1051

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



10/2/2015

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
**GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS**

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

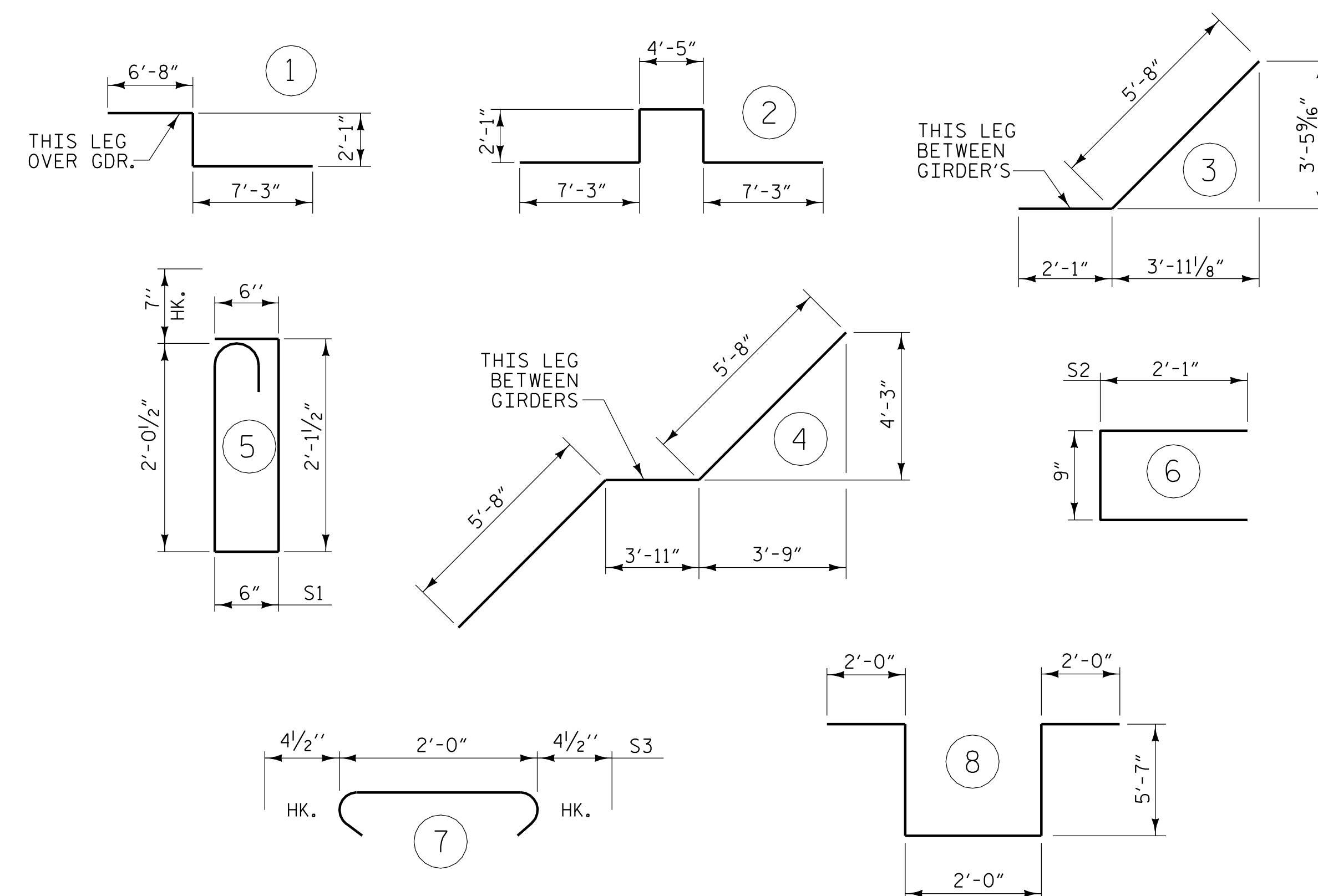
SHEET NO. S-20  
 TOTAL SHEETS 33

ASSEMBLED BY : <b>W. B. ALLEN</b>	DATE : <b>5/15</b>
CHECKED BY : <b>Z. H. BROWN</b>	DATE : <b>6/15</b>
DRAWN BY : MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY : GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMC

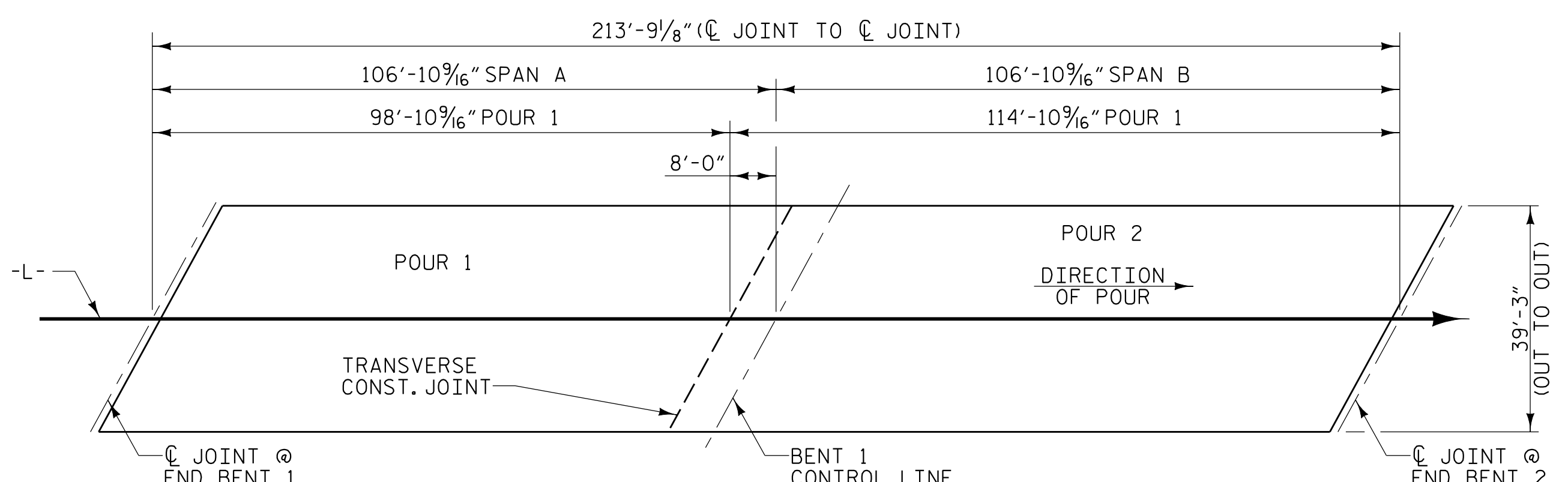
### BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	329	#5	STR	38'-11"	13354	* A132	2	#5	STR	4'-7"	10	A231	2	#5	STR	6'-5"	13
A2	329	#5	STR	38'-11"	13354	* A133	2	#5	STR	3'-6"	7	A232	2	#5	STR	5'-4"	11
* A3	6	#6	STR	17'-6"	158	* A134	2	#5	STR	2'-5"	5	A233	2	#5	STR	4'-3"	9
						* A135	2	#5	STR	1'-5"	3	A234	2	#5	STR	3'-2"	7
												A235	2	#5	STR	2'-1"	4
* A101	2	#5	STR	37'-8"	79	A201	2	#5	STR	38'-4"	80	* B1	208	#4	STR	19'-5"	2698
* A102	2	#5	STR	36'-7"	76	A202	2	#5	STR	37'-4"	78	* B2	26	#7	STR	21'-0"	1116
* A103	2	#5	STR	35'-6"	74	A203	2	#5	STR	36'-3"	76	* B3	26	#7	STR	58'-5"	3104
* A104	2	#5	STR	34'-5"	72	A204	2	#5	STR	35'-2"	73	* B4	25	#7	STR	32'-2"	1644
* A105	2	#5	STR	33'-4"	70	A205	2	#5	STR	34'-1"	71	B5	280	#5	STR	28'-7"	8347
* A106	2	#5	STR	32'-4"	67	A206	2	#5	STR	33'-0"	69						
* A107	2	#5	STR	31'-3"	65	A207	2	#5	STR	32'-0"	67						
* A108	2	#5	STR	30'-2"	63	A208	2	#5	STR	30'-11"	64	* G1	2	#5	STR	44'-4"	92
* A109	2	#5	STR	29'-1"	61	A209	2	#5	STR	29'-10"	62						
* A110	2	#5	STR	28'-0"	58	A210	2	#5	STR	28'-9"	60	* K1	8	#8	1	16'-0"	342
* A111	2	#5	STR	27'-0"	56	A211	2	#5	STR	27'-8"	58	* K2	8	#8	2	23'-1"	493
* A112	2	#5	STR	25'-11"	54	A212	2	#5	STR	26'-8"	56	* K3	18	#6	STR	7'-5"	201
* A113	2	#5	STR	24'-10"	52	A213	2	#5	STR	25'-7"	53	K4	6	#4	STR	7'-8"	31
* A114	2	#5	STR	23'-9"	50	A214	2	#5	STR	24'-6"	51	K5	24	#4	STR	10'-9"	172
* A115	2	#5	STR	22'-8"	47	A215	2	#5	STR	23'-5"	49	K6	6	#4	STR	7'-11"	32
* A116	2	#5	STR	21'-8"	45	A216	2	#5	STR	22'-4"	47	K7	12	#4	3	7'-9"	62
* A117	2	#5	STR	20'-7"	43	A217	2	#5	STR	21'-4"	45	K8	12	#4	4	15'-3"	122
* A118	2	#5	STR	19'-6"	41	A218	2	#5	STR	20'-3"	42						
* A119	2	#5	STR	18'-5"	38	A219	2	#5	STR	19'-2"	40	* S1	48	#5	5	5'-9"	288
* A120	2	#5	STR	17'-4"	36	A220	2	#5	STR	18'-1"	38	* S2	48	#4	6	4'-11"	158
* A121	2	#5	STR	16'-4"	34	A221	2	#5	STR	17'-1"	36	S3	105	#4	7	2'-9"	193
* A122	2	#5	STR	15'-3"	32	A222	2	#5	STR	16'-0"	33						
* A123	2	#5	STR	14'-2"	30	A223	2	#5	STR	14'-11"	31	U1	21	#4	8	17'-2"	241
* A124	2	#5	STR	13'-1"	27	A224	2	#5	STR	13'-10"	29						
* A125	2	#5	STR	12'-0"	25	A225	2	#5	STR	12'-9"	27						
* A126	2	#5	STR	11'-0"	23	A226	2	#5	STR	11'-9"	25						
* A127	2	#5	STR	9'-11"	21	A227	2	#5	STR	10'-8"	22						
* A128	2	#5	STR	8'-10"	18	A228	2	#5	STR	9'-7"	20						
* A129	2	#5	STR	7'-9"	16	A229	2	#5	STR	8'-6"	18						
* A130	2	#5	STR	6'-9"	14	A230	2	#5	STR	7'-5"	15						
* A131	2	#5	STR	5'-8"	12												
											REINFORCING STEEL		LBS.	24033			
											* EPOXY COATED REINFORCING STEEL		LBS.	25072			

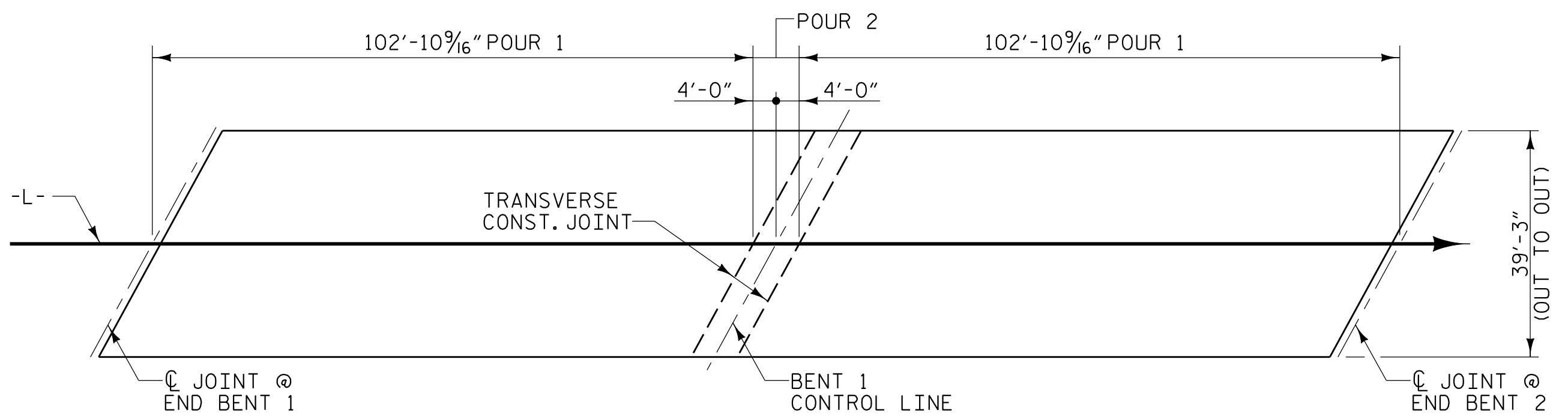
### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



POURING SEQUENCE AND LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB  
(SQ. FT. = 8390)



OPTIONAL POURING SEQUENCE  
POUR 2 CANNOT BE STARTED UNTIL BOTH ADJACENT POURS LABELED POUR 1 REACH A MINIMUM OF 3000 PSI.

### 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"			

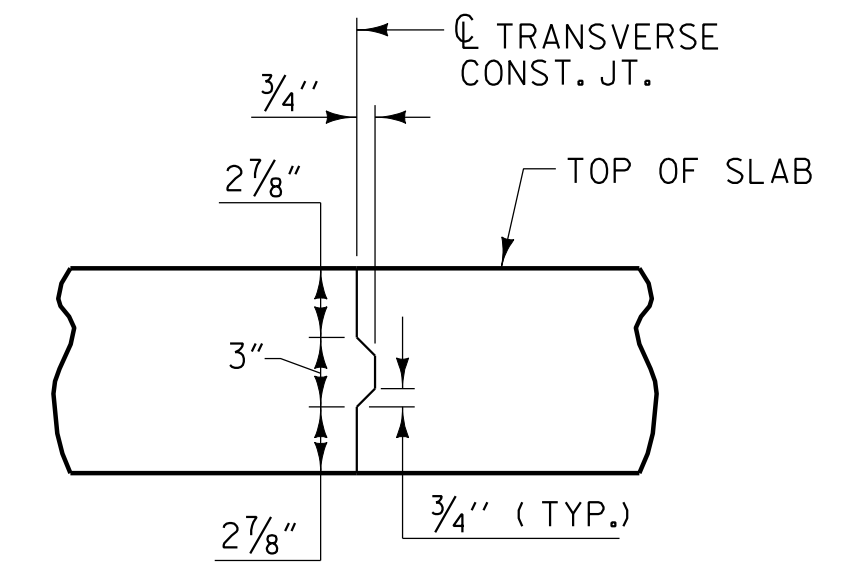
### SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	127.4		
POUR 2	163.3		
<b>** TOTALS</b>	<b>290.7</b>	<b>24033</b>	<b>25072</b>

\*\* QUANTITIES FOR PARAPET ARE NOT INCLUDED.

### GROOVING BRIDGE FLOORS

APPROACH SLABS	924	SQ.FT.
BRIDGE DECK	7143	SQ.FT.
<b>TOTAL</b>	<b>8067</b>	<b>SQ.FT.</b>

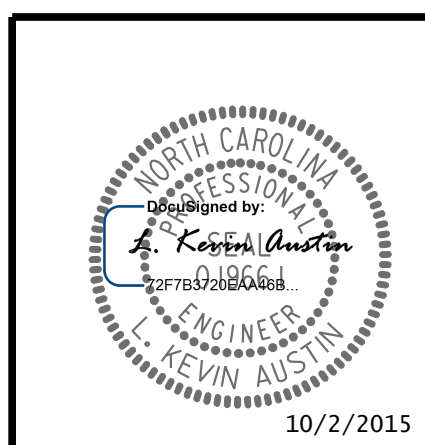


### TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

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



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-21
2			4			TOTAL SHEETS 33

DRAWN BY : W. B. ALLEN DATE : 12/14  
 CHECKED BY : Z. H. BROWN DATE : 1/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15

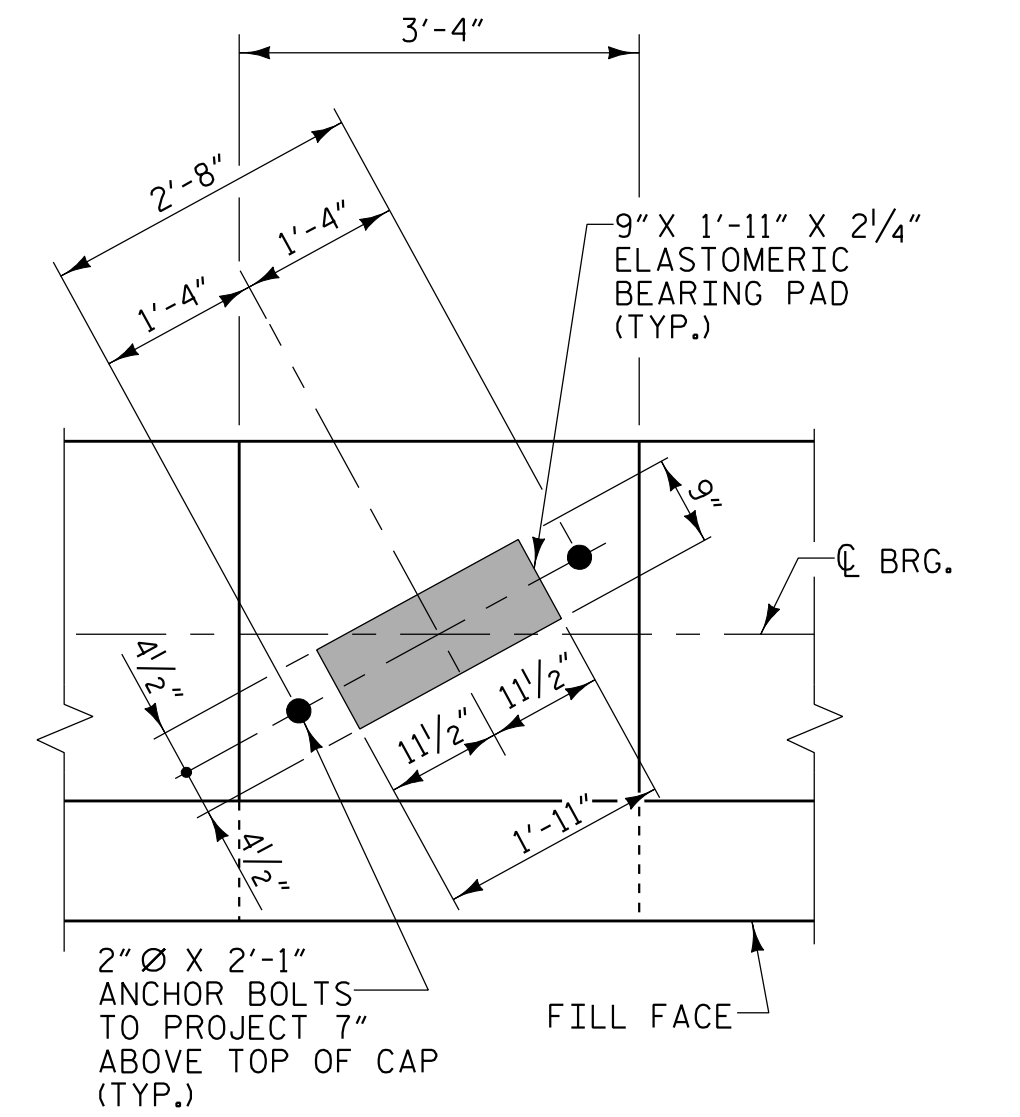
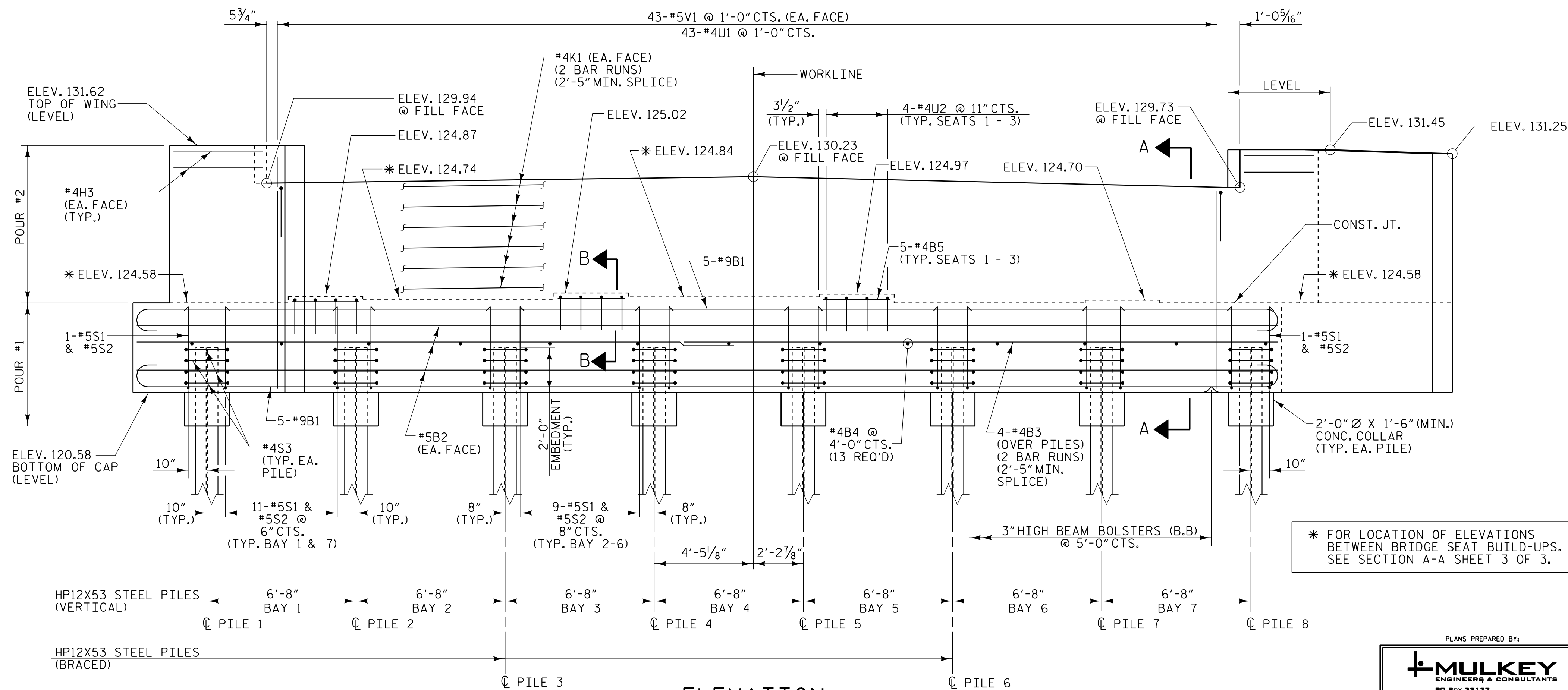
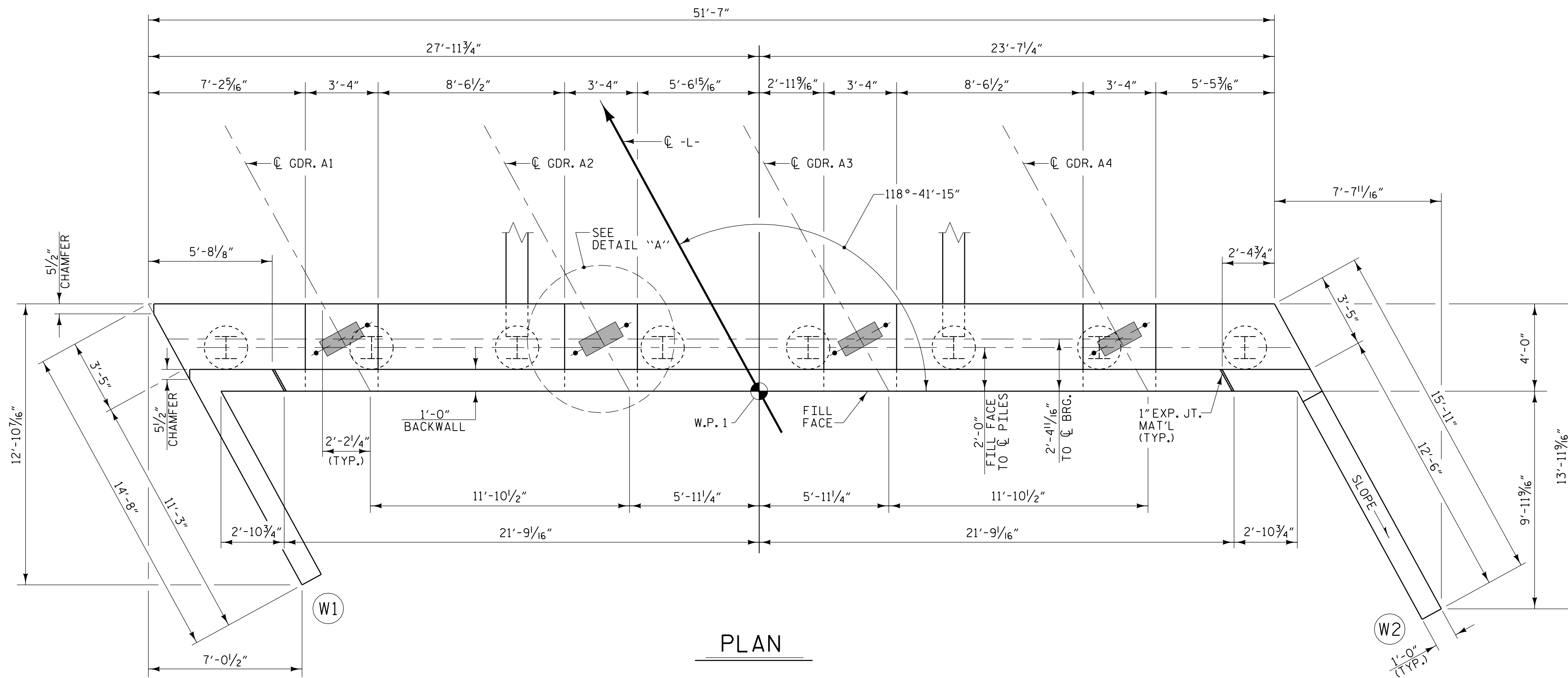
NOTES

STIRRUPS AND U2 BARS IN THE 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%.



PROJECT NO. W-5518  
 COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1

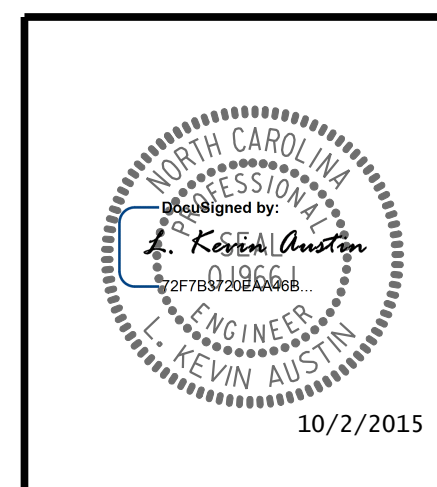
REVISIONS

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

SHEET NO.  
 S-22  
 TOTAL SHEETS  
 33

PLANS PREPARED BY:

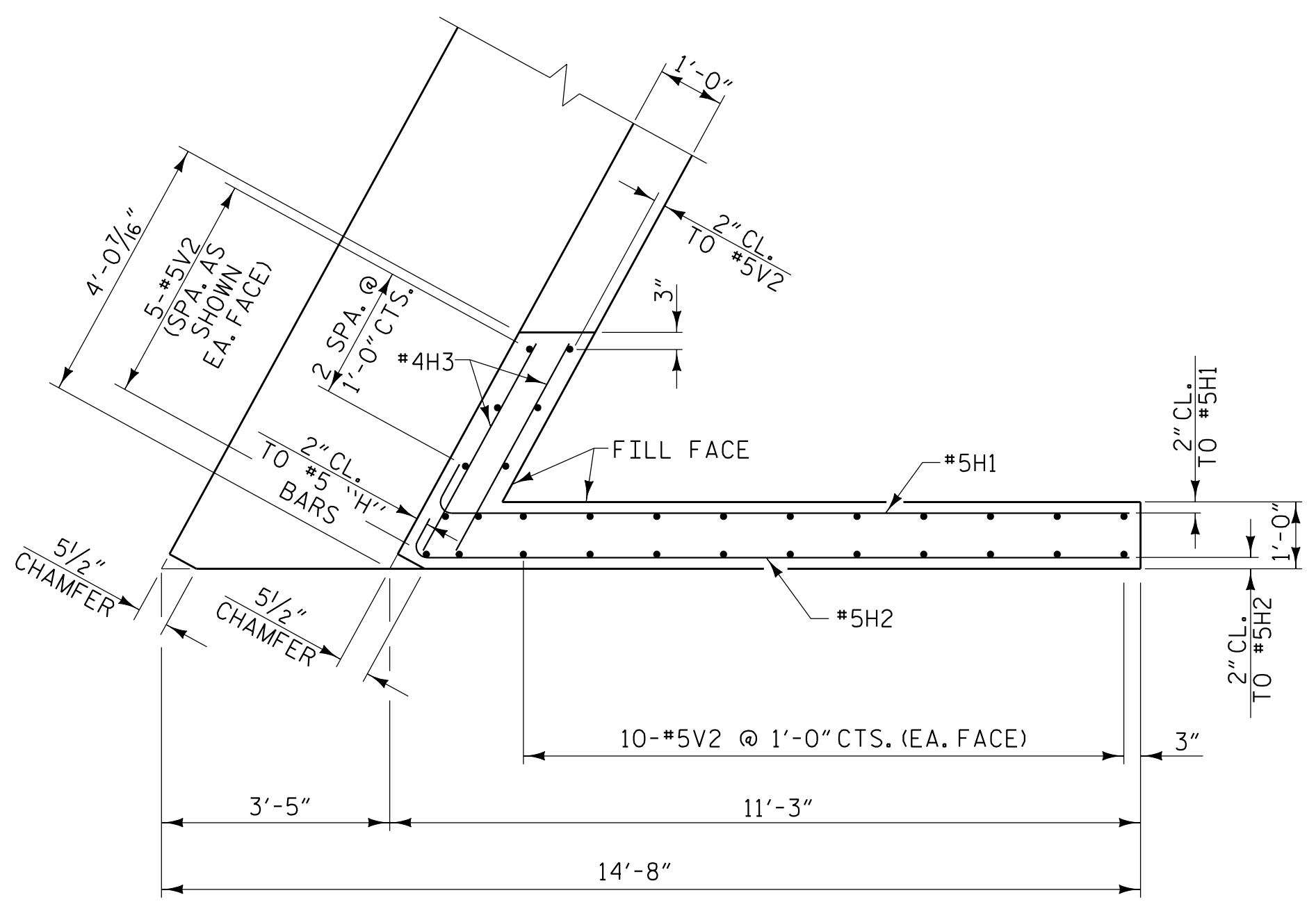
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 100 BOX 22127  
 RALEIGH, N.C. 27636  
 (919) 881-1515  
 (919) 881-1518 (FAX)  
 WWW.MULKEYINC.COM  
 NC LICENSE NO. C-1021



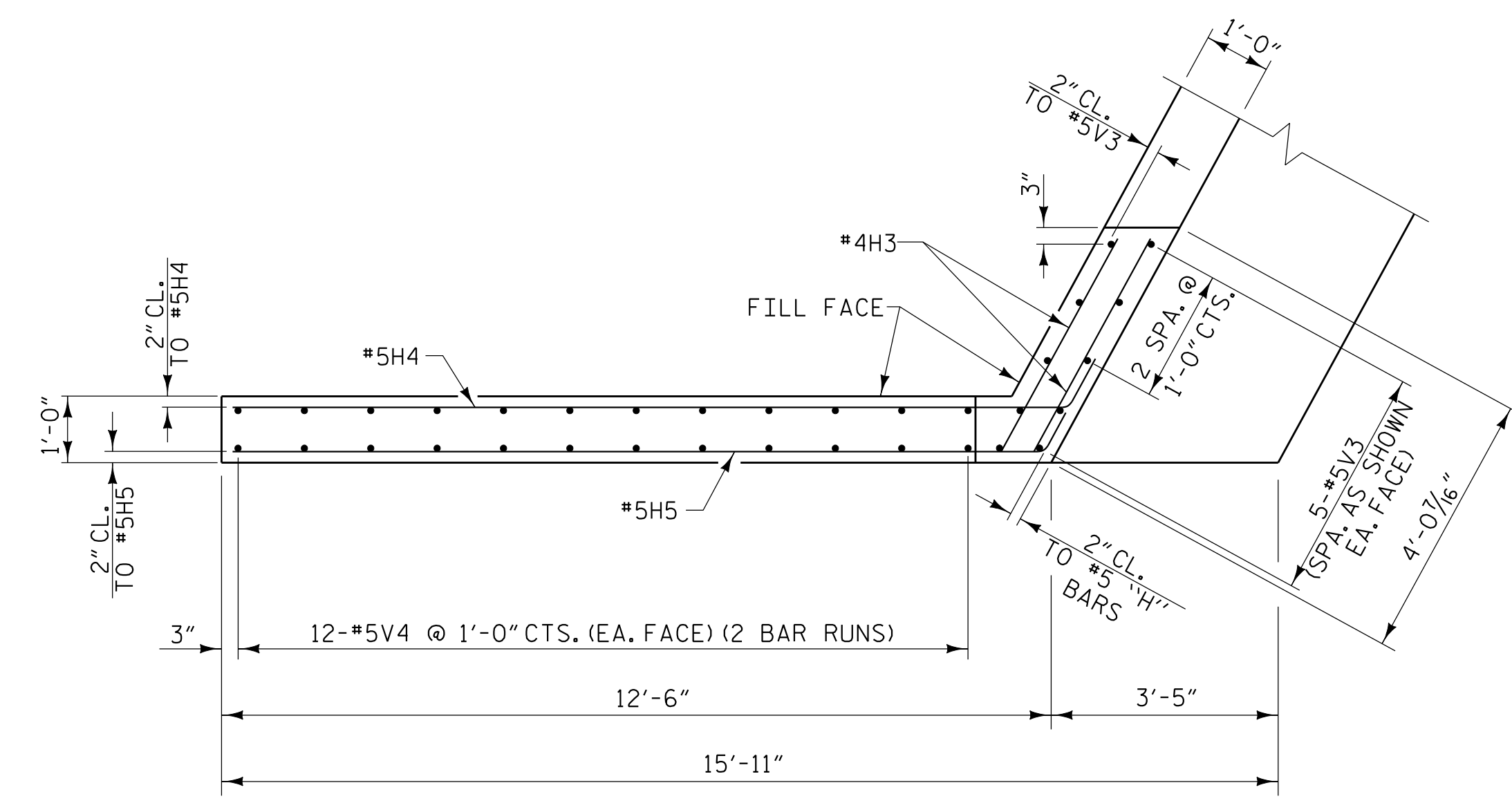
DRAWN BY : W. B. ALLEN DATE : 2/15  
 CHECKED BY : Z. H. BROWN DATE : 3/15  
 DESIGN ENGINEER OF RECORD : L. K. AUSTIN DATE : 8/15

10/2/2015 4:43:02 PM RA:\Structures\W5518\SMU\_EL.dgn

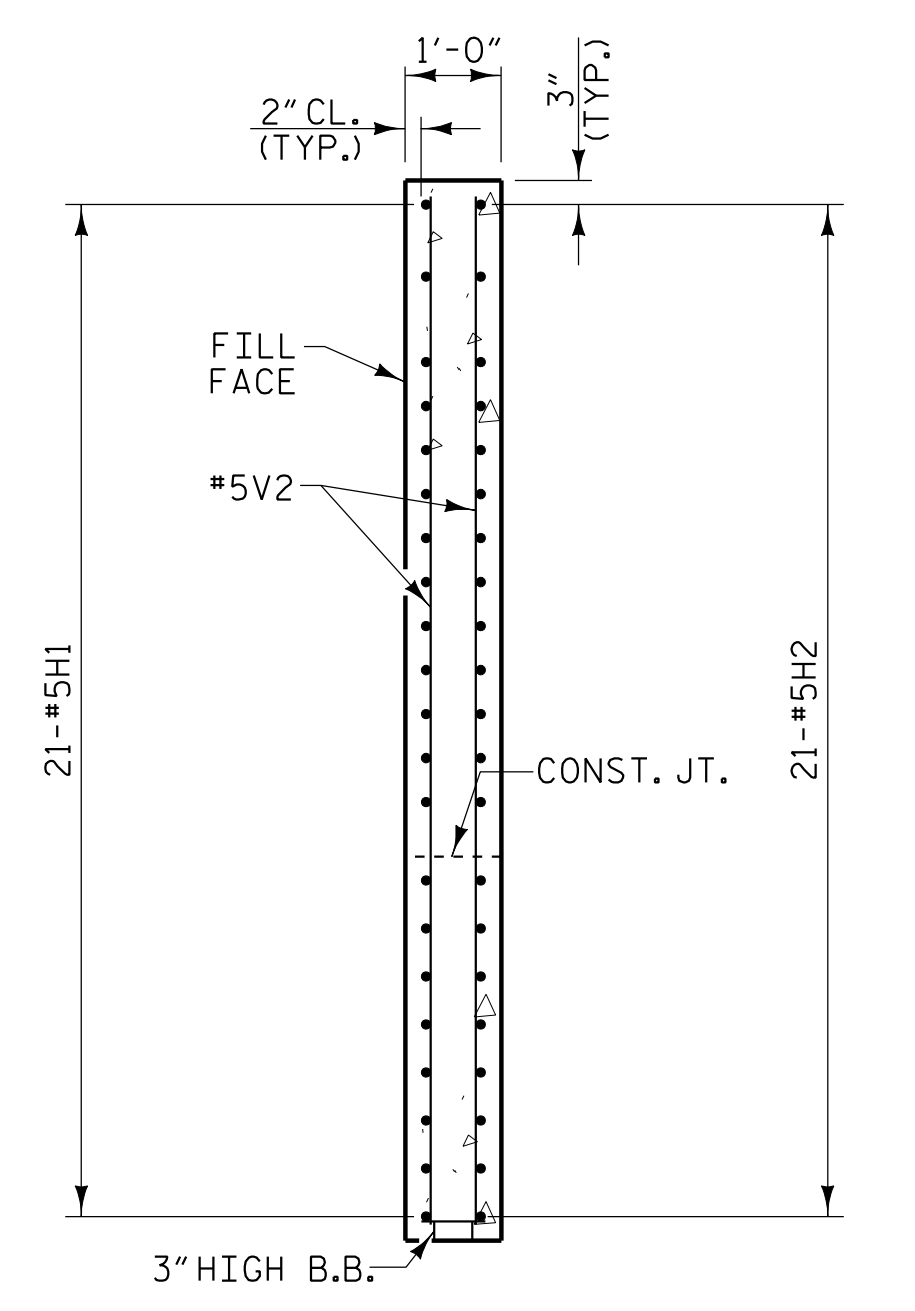




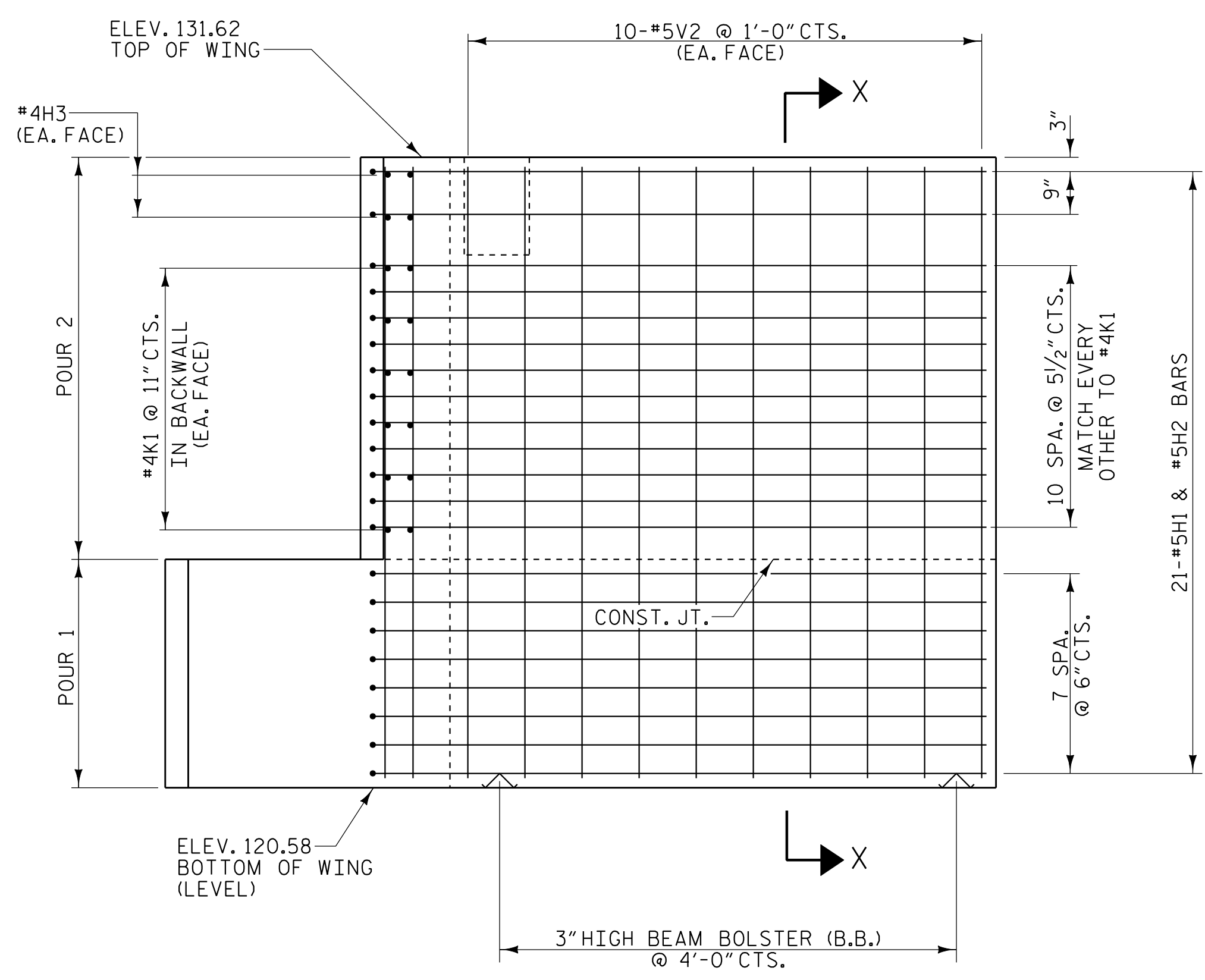
PLAN OF LEFT WING - W1



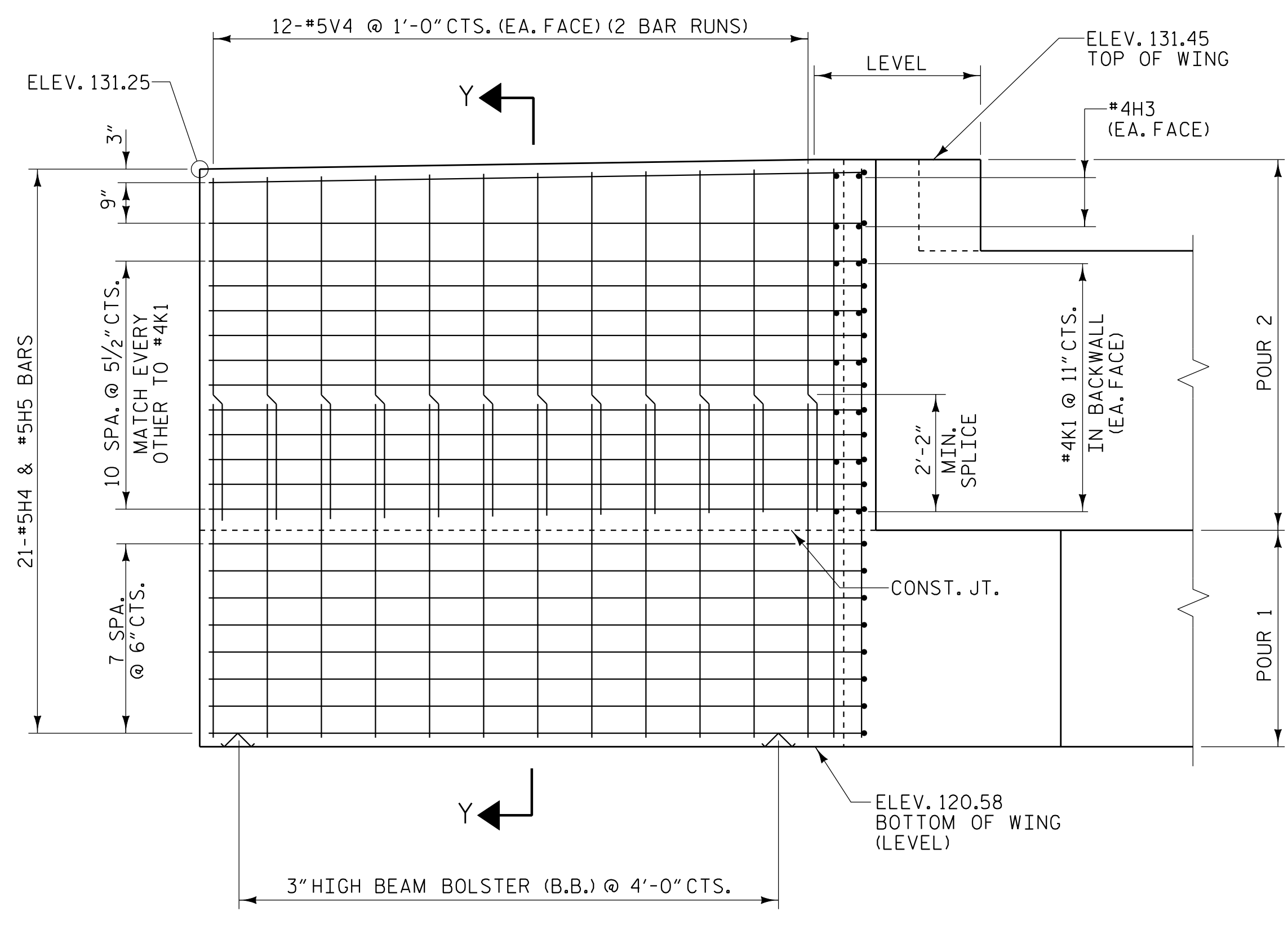
PLAN OF RIGHT WING - W2



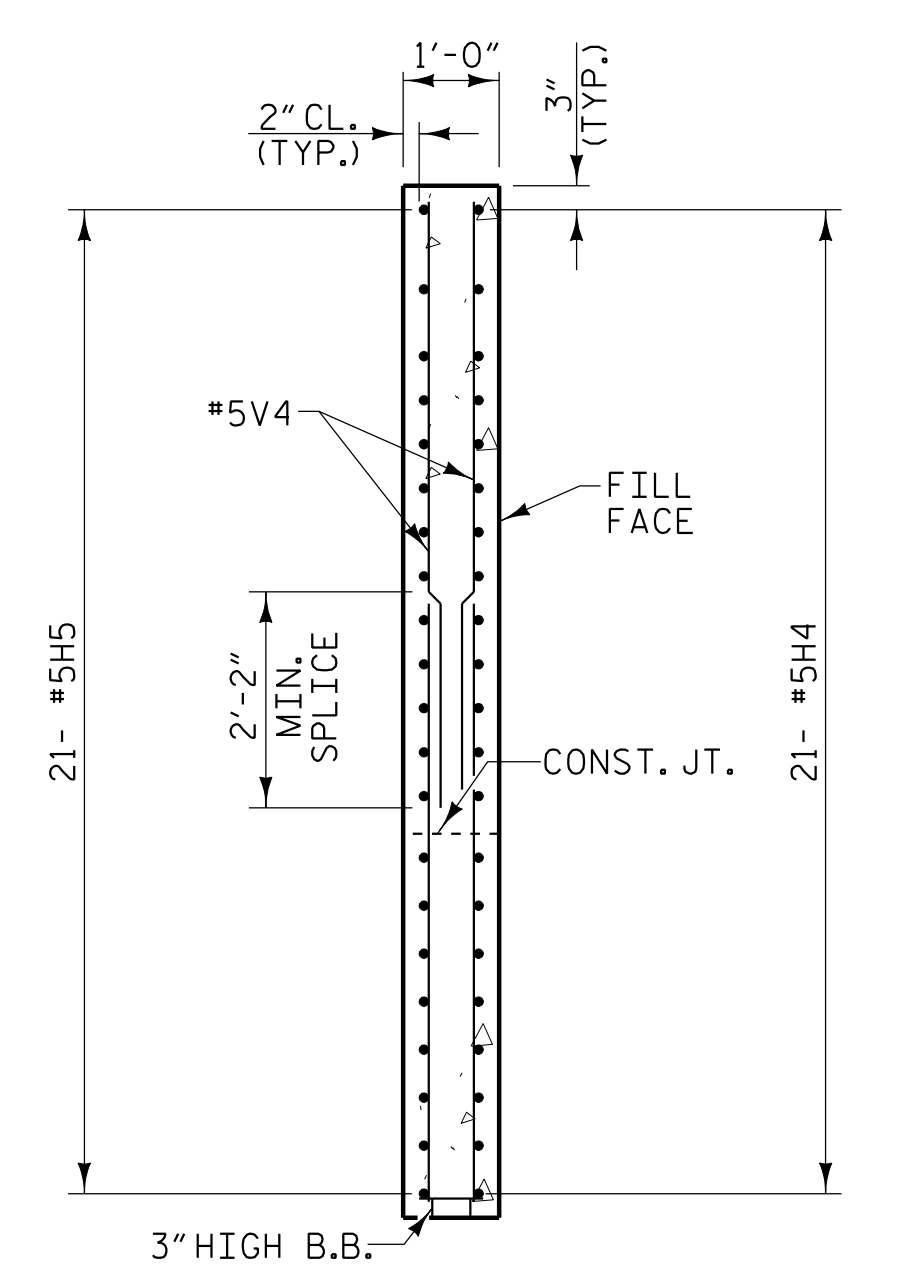
SECTION X-X



ELEVATION OF LEFT WING - W1



ELEVATION OF RIGHT WING - W2



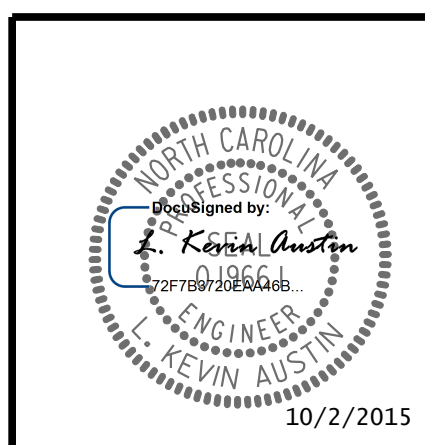
SECTION Y-Y

PROJECT NO. W-5518  
 COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 2 OF 3

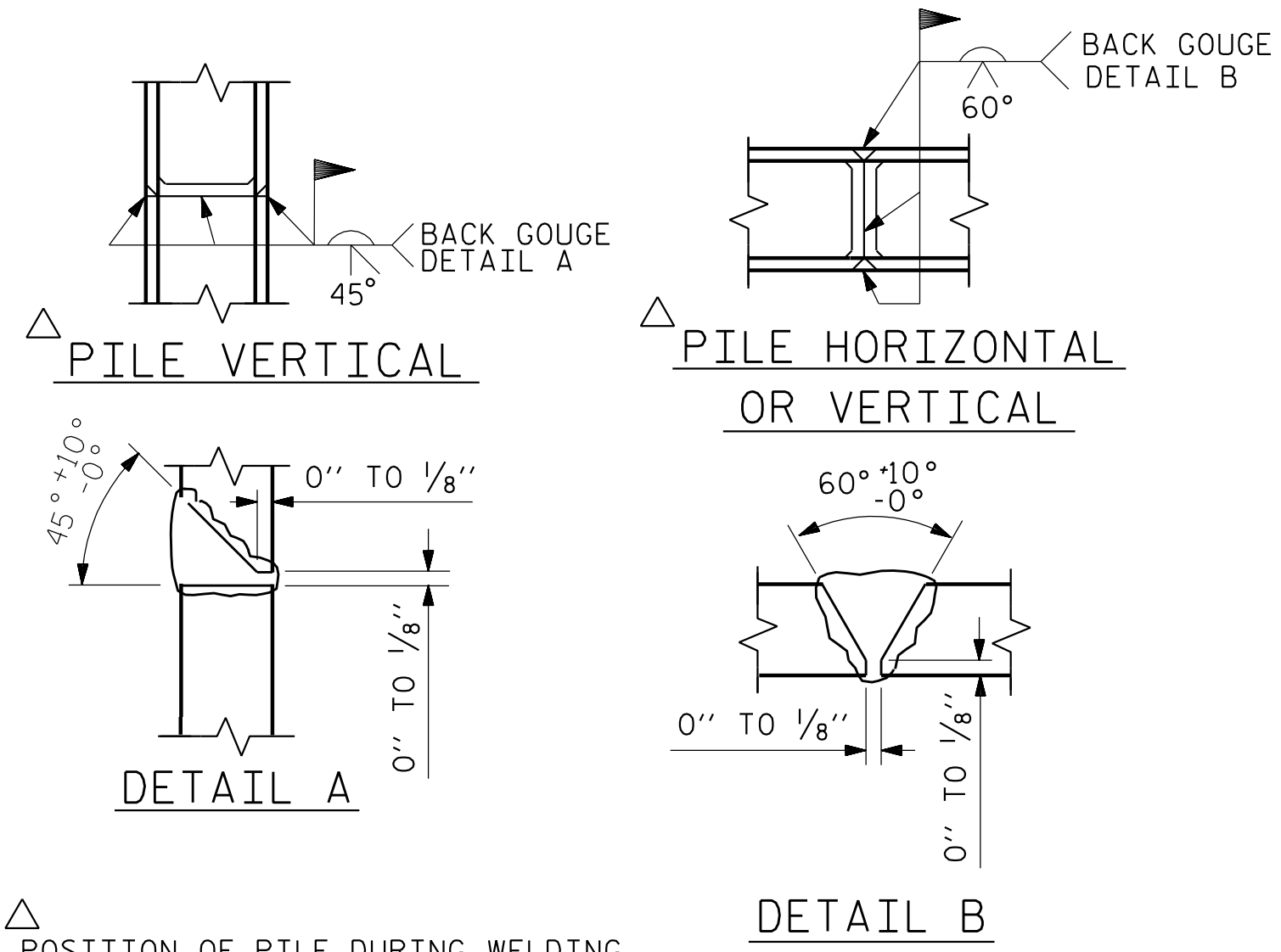
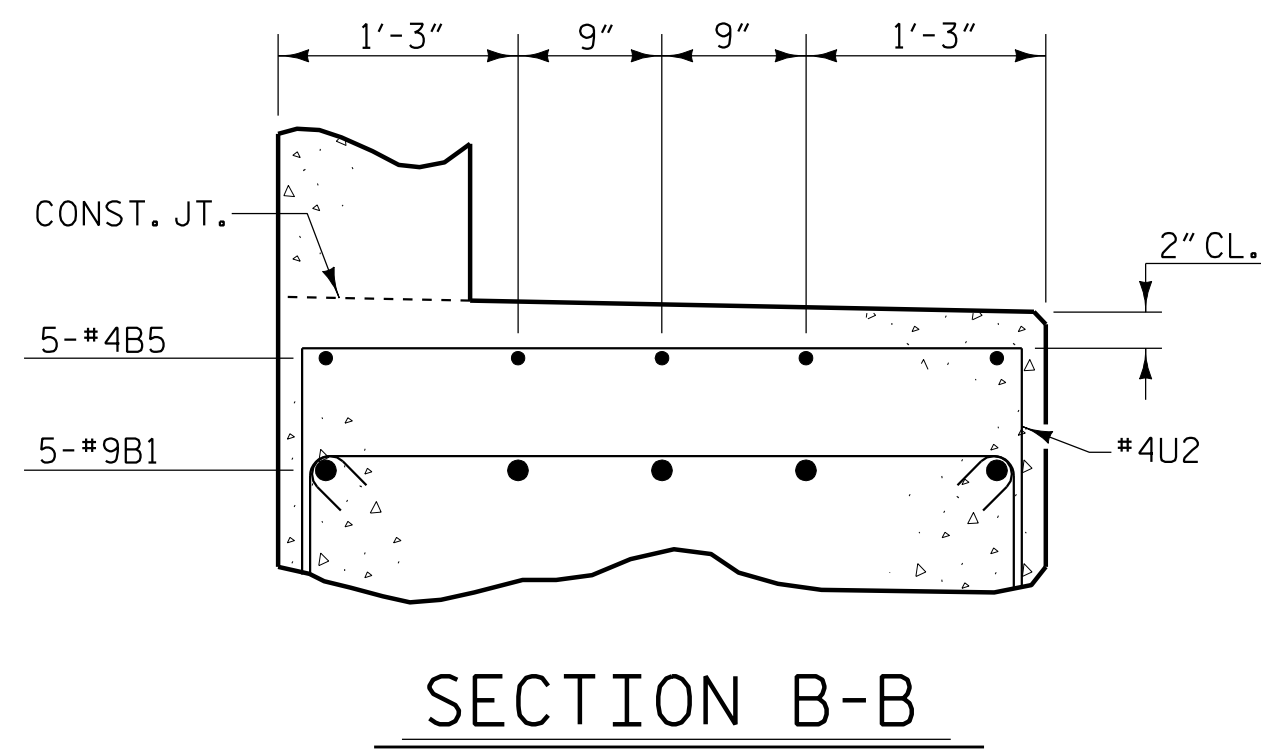
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1

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



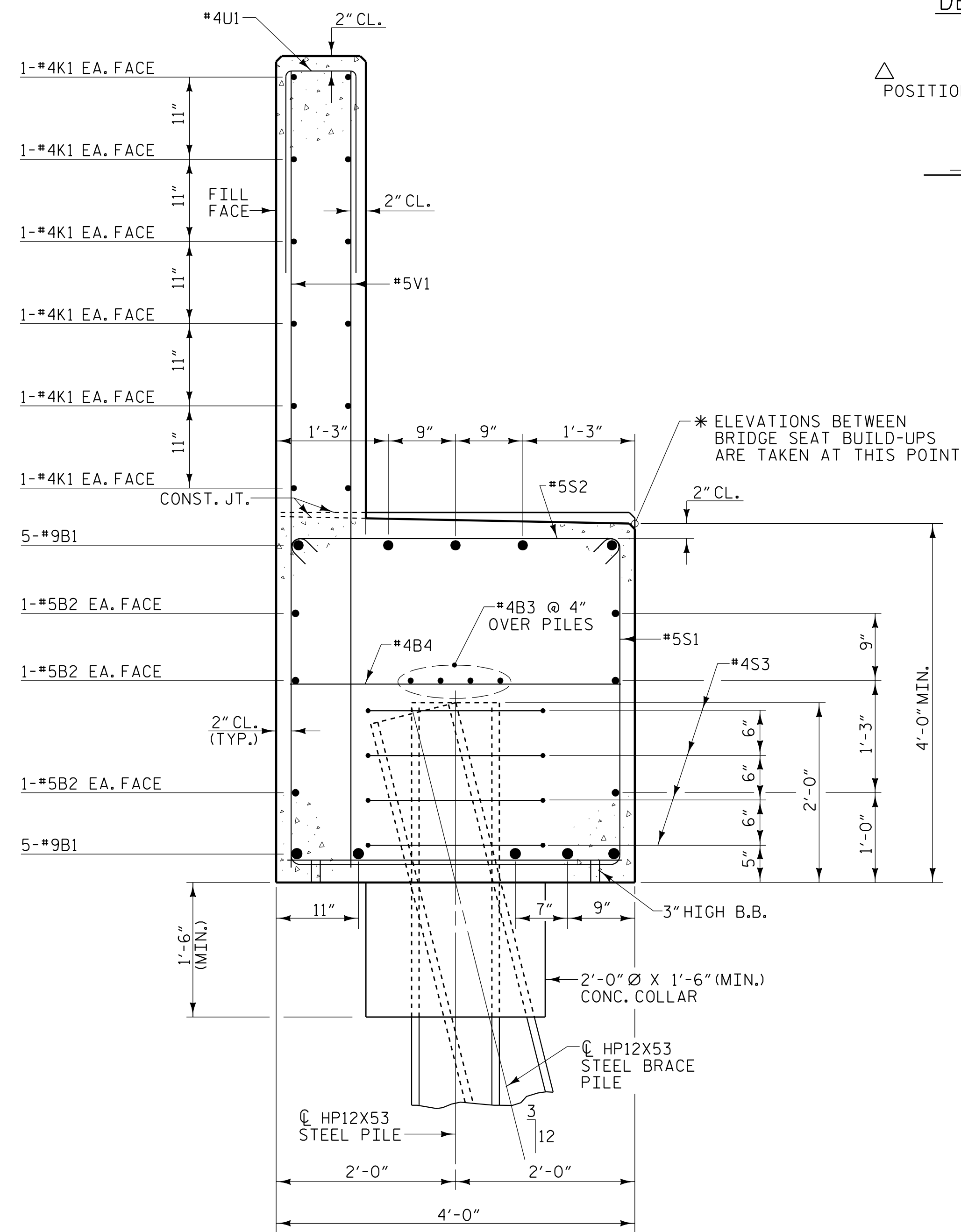
10/2/2015 1:43:25 PM RA:\Structures\W5518\SMU\_EL02.dgn

DRAWN BY: W. B. ALLEN DATE: 2/15  
 CHECKED BY: Z. H. BROWN DATE: 3/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15

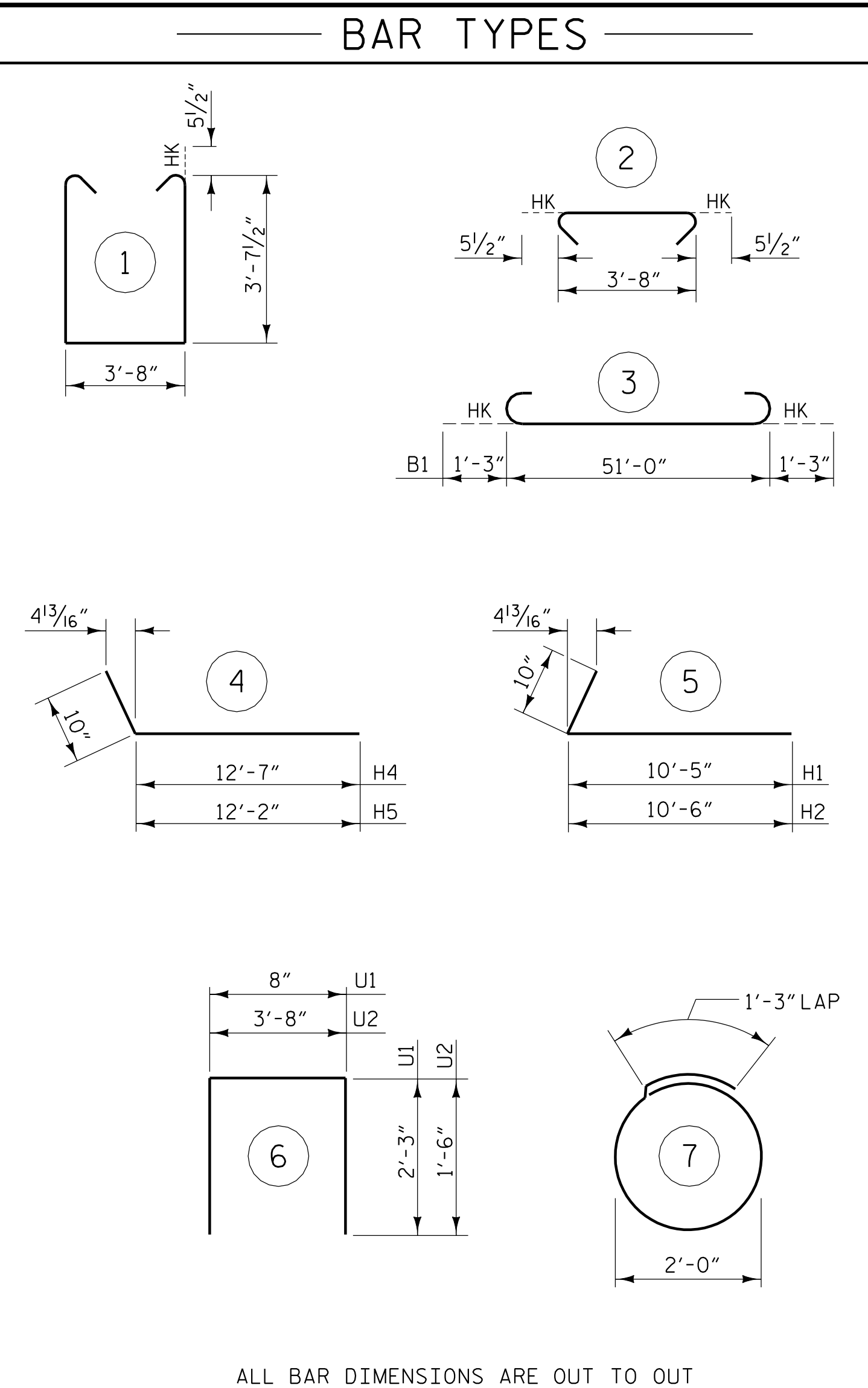


POSITION OF PILE DURING WELDING.

PILE SPlice DETAILS



SECTION A-A



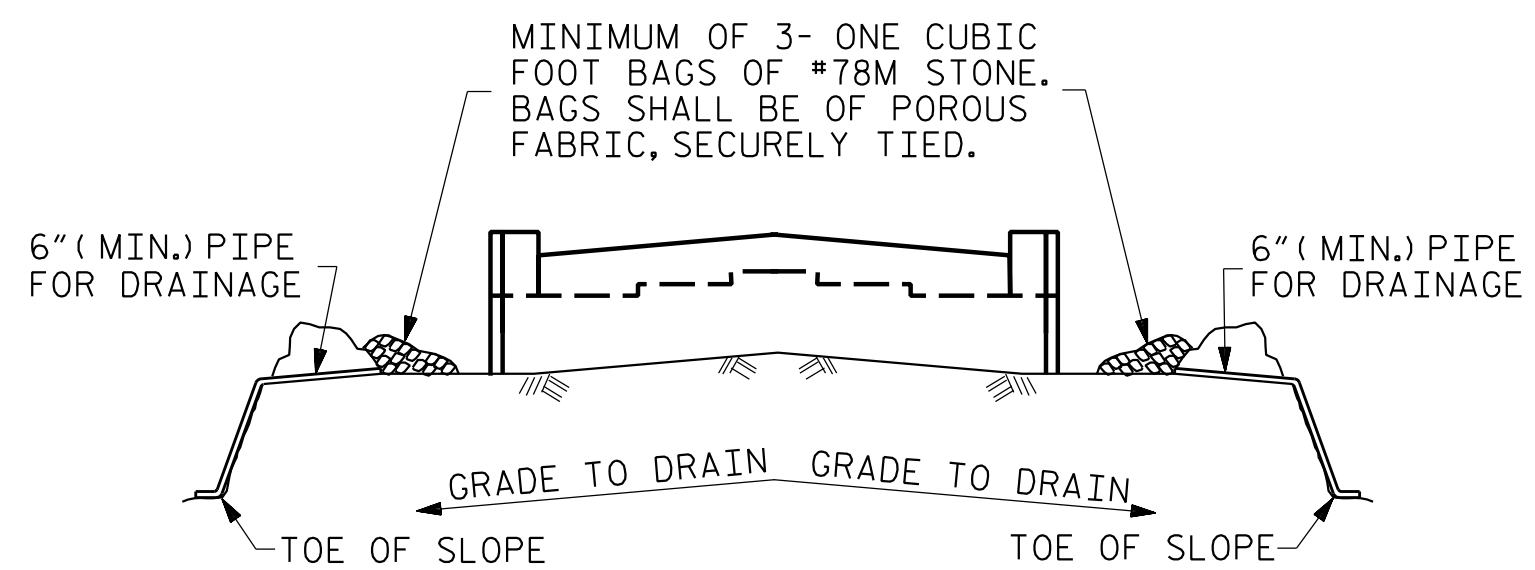
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	3	53'-6"	1819
B2	6	#5	STR	51'-0"	319
B3	8	#4	STR	26'-10"	143
B4	13	#4	STR	3'-8"	32
B5	15	#4	STR	3'-0"	30
H1	21	#5	5	11'-3"	246
H2	21	#5	5	11'-4"	248
H3	8	#4	STR	3'-7"	19
H4	21	#5	4	13'-5"	294
H5	21	#5	4	13'-0"	285
K1	24	#4	STR	26'-10"	430
S1	69	#5	1	11'-10"	852
S2	69	#5	2	4'-7"	330
S3	32	#4	7	7'-7"	162
U1	43	#4	6	5'-2"	148
U2	12	#4	6	6'-8"	53
V1	86	#5	STR	8'-10"	792
V2	30	#5	STR	10'-8"	334
V3	10	#5	STR	10'-6"	110
V4	48	#5	STR	6'-4"	317

TOTAL REINFORCING STEEL	6963 lbs.
CLASS "A" CONCRETE - CU. YARDS	
POUR 1 - CAP, COLLARS & LOWER WINGS	36.2 cu. yds.
POUR 2 - UPPER WINGS & BACKWALL	16.0 cu. yds.
TOTAL	52.2 cu. yds.
HP12X53 STEEL PILES	
8 PILES REQUIRED - LIN. FEET	600
PILE REDRIVES	4 EA.



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

PLANS PREPARED BY:

MULKEY ENGINEERS & CONSULTANTS  
 1010 BELMONT BLVD.  
 RALEIGH, N.C. 27606  
 WWW.MULKEYINC.COM  
 NC LICENSE NO. 0-1021

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1

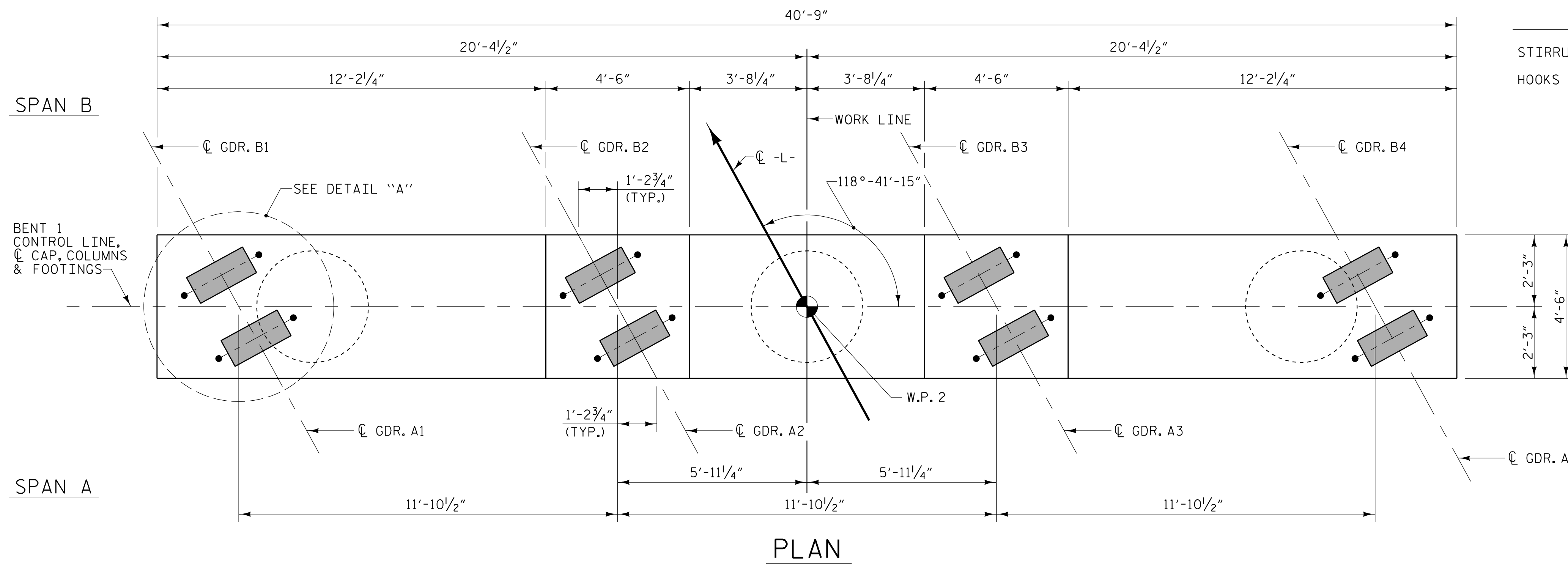
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : W. B. ALLEN DATE : 2/15  
 CHECKED BY : Z. H. BROWN DATE : 3/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15

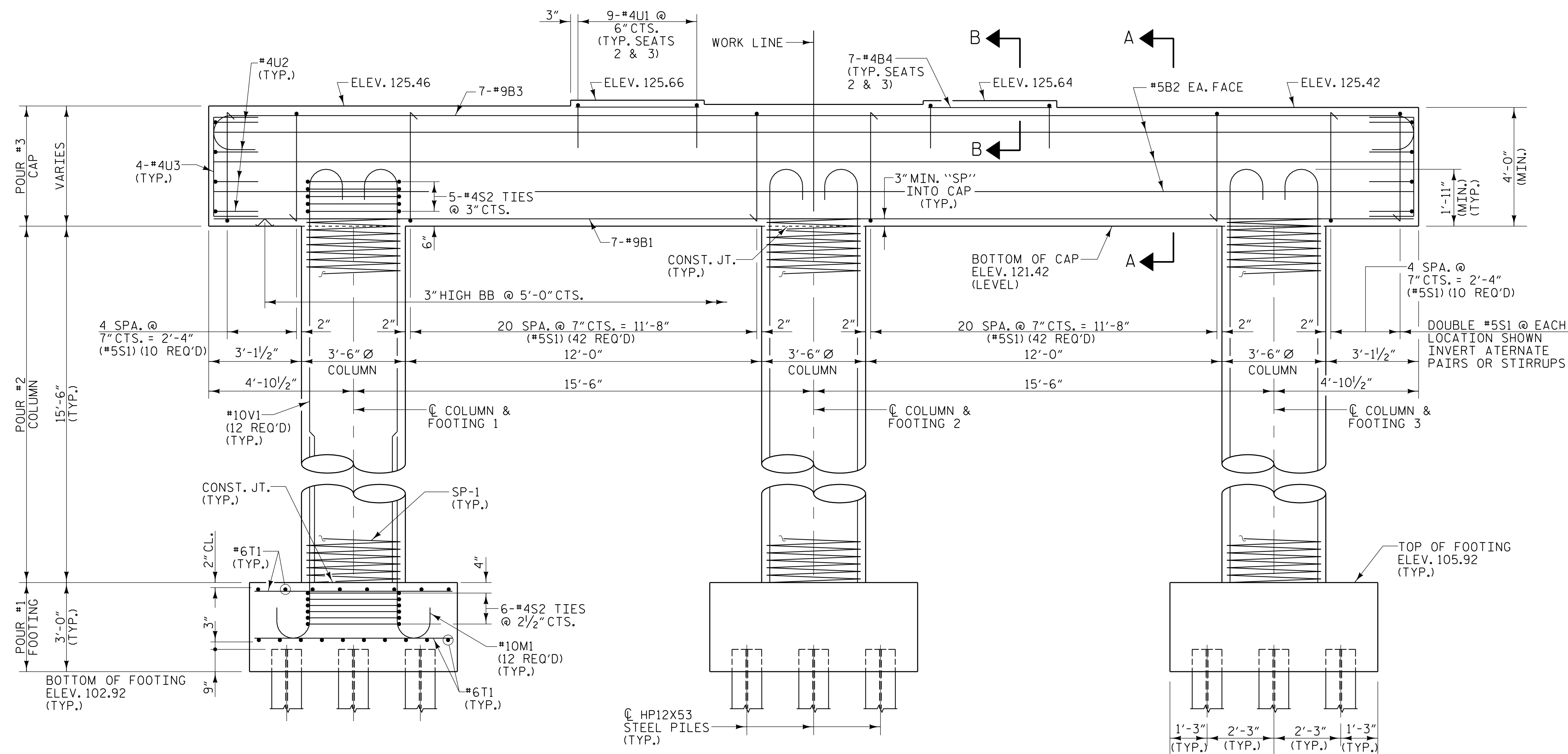
10/2/2015 14:43:47 PM RA:\Structures\W5518\SMU\_EL\_03.dgn

NOTES

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

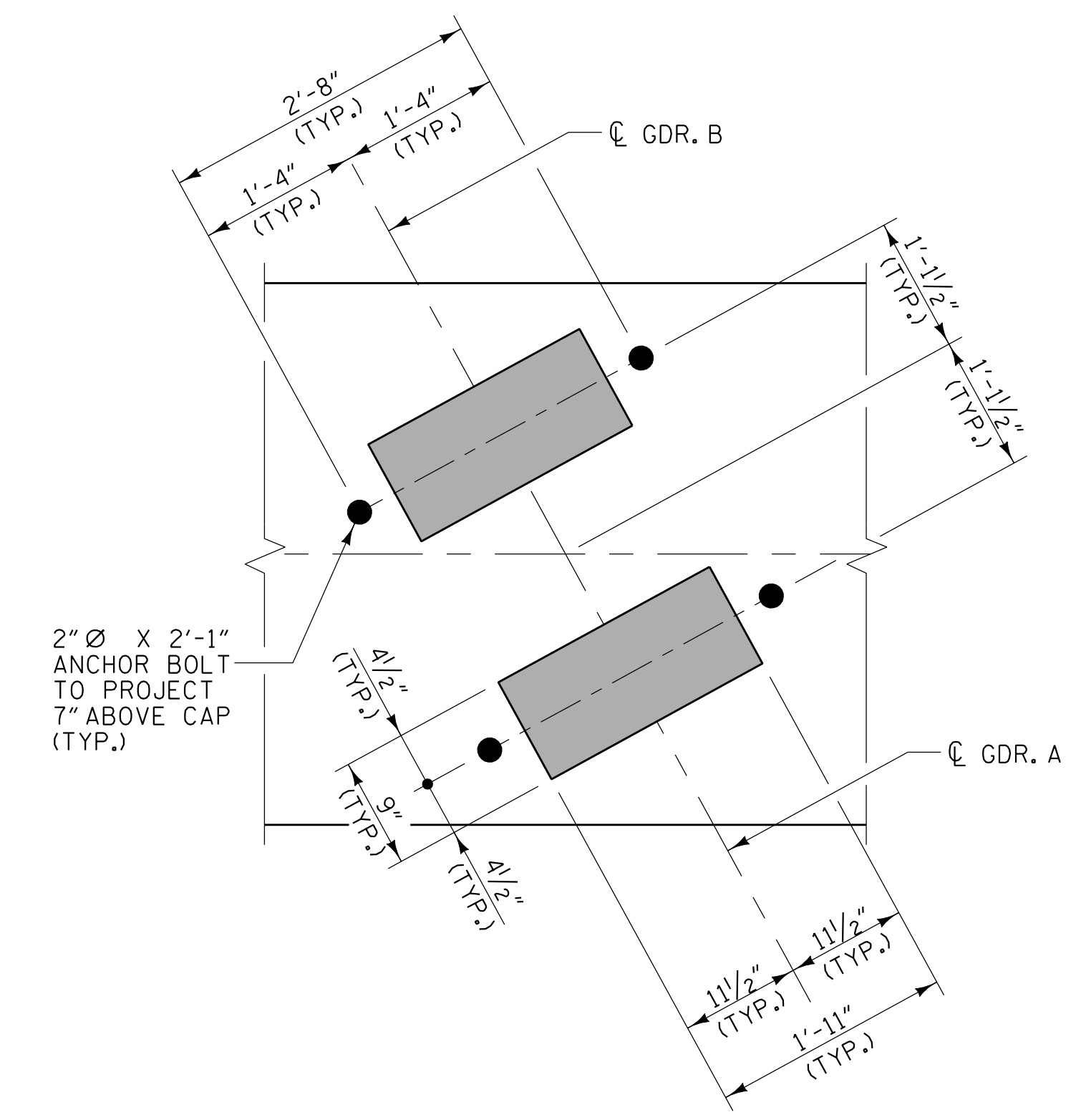


PLAN



ELEVATION

NOTE: REINFORCING STEEL IN FOOTINGS ("T" & "M" BARS) TYPICAL



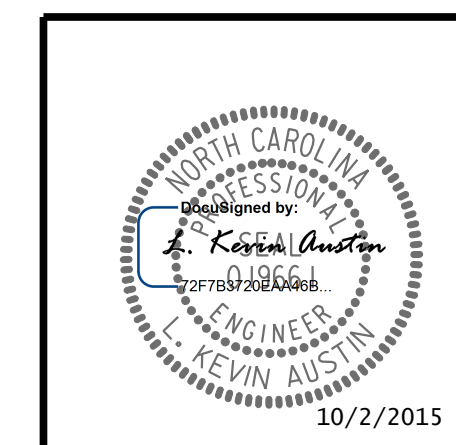
DETAIL "A"  
(TYPICAL EACH GIRDER)

PROJECT NO. W-5518  
COLUMBUS COUNTY  
STATION: 24+06.36 -L- POT

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT 1

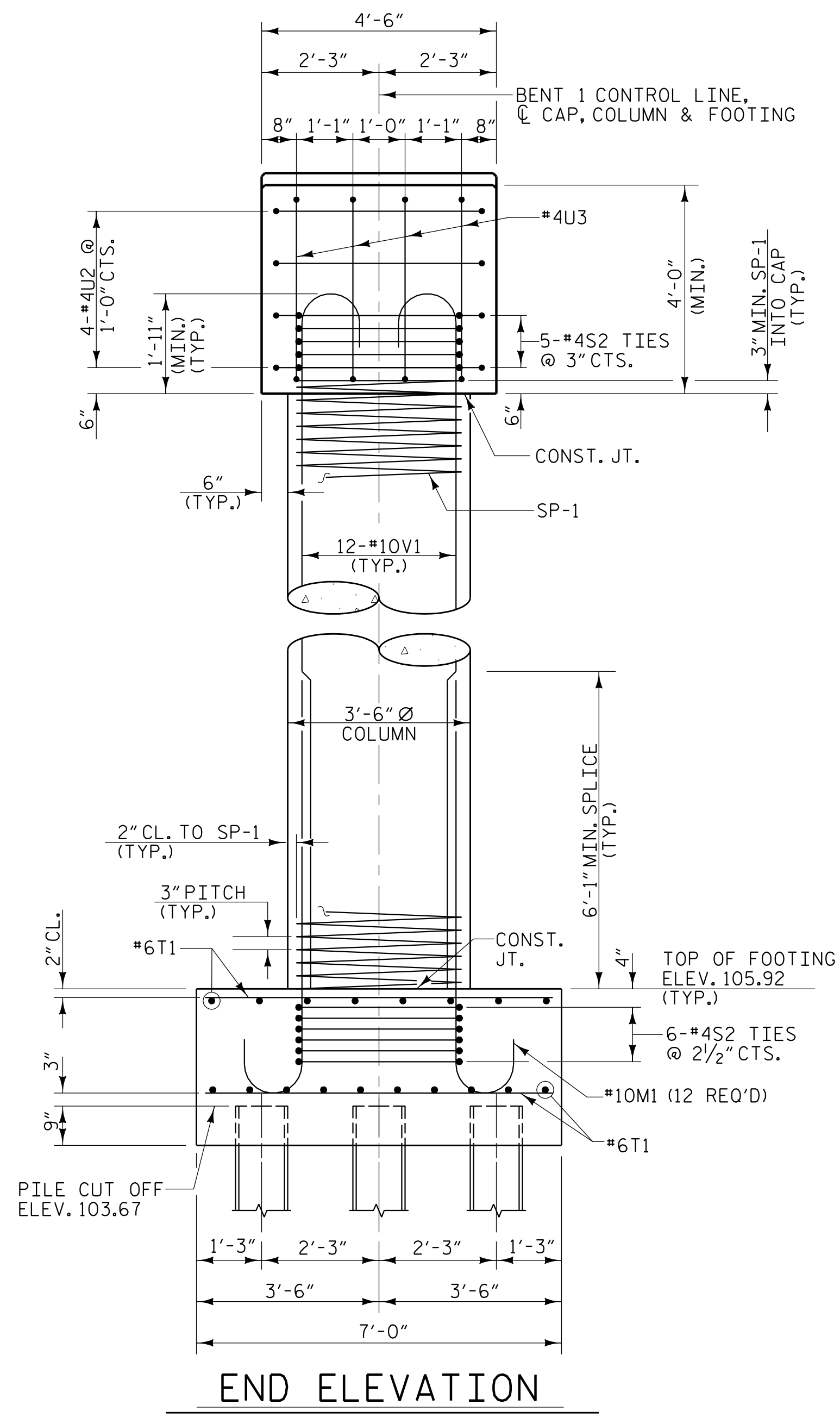


PLANS PREPARED BY:  
**MULKEY**  
ENGINEERS & CONSULTANTS  
1010 BELMONT ROAD  
RALEIGH, N.C. 27606  
WWW.MULKEYINC.COM  
NC LICENSE NO. 0-1021

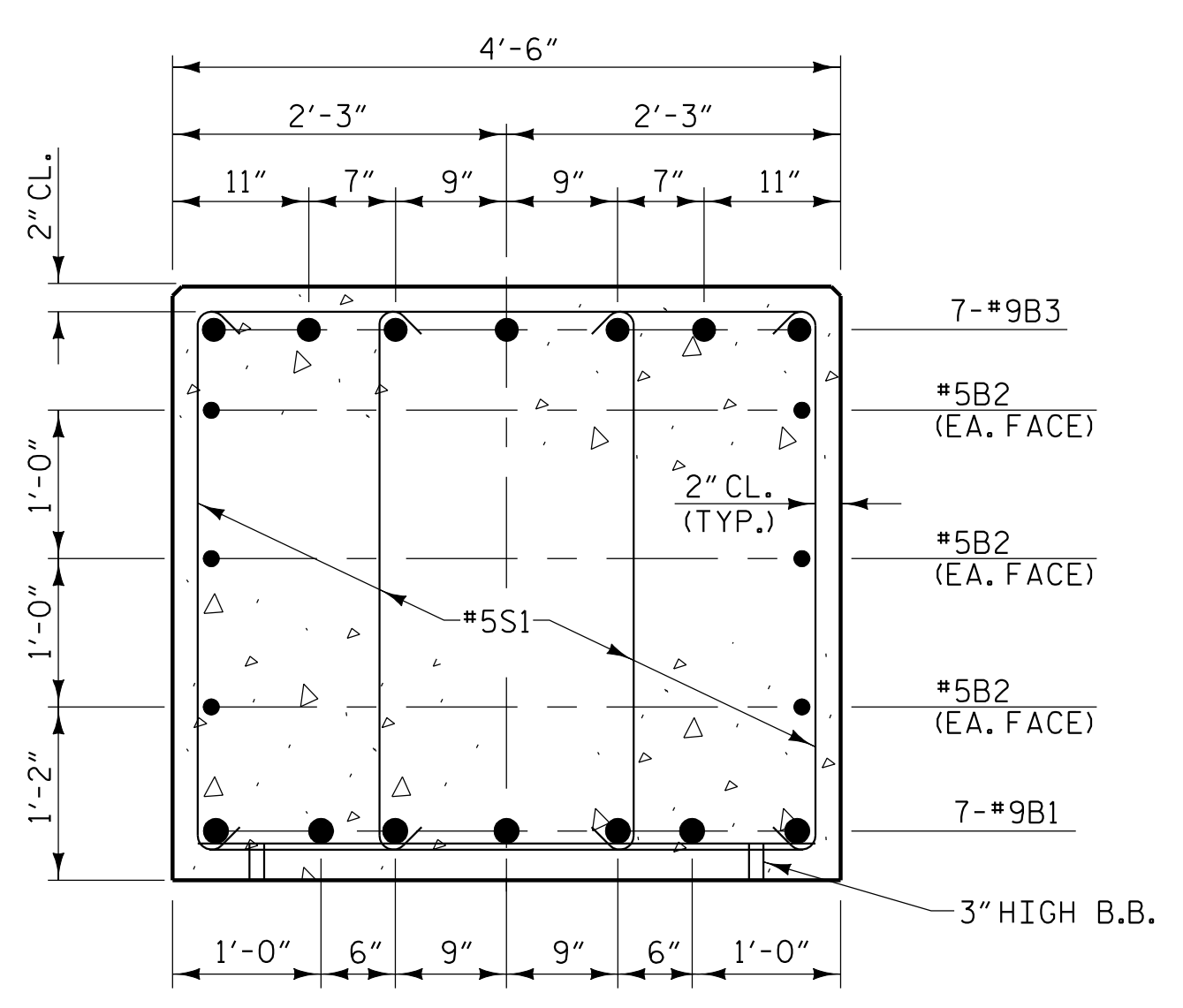
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			33

DRAWN BY: W. B. ALLEN DATE: 6/15  
CHECKED BY: Z. H. BROWN DATE: 6/15  
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15

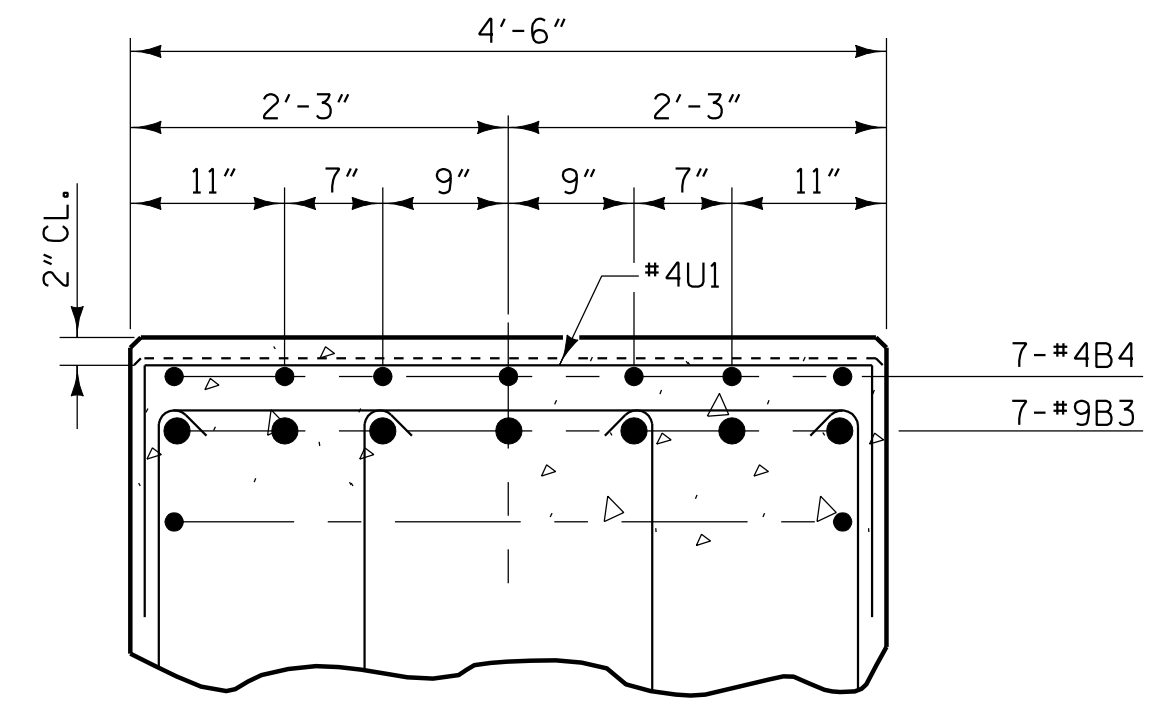
10/2/2005 1:46:54 PM R:\Structures\W5518\SMU.B1.dgn



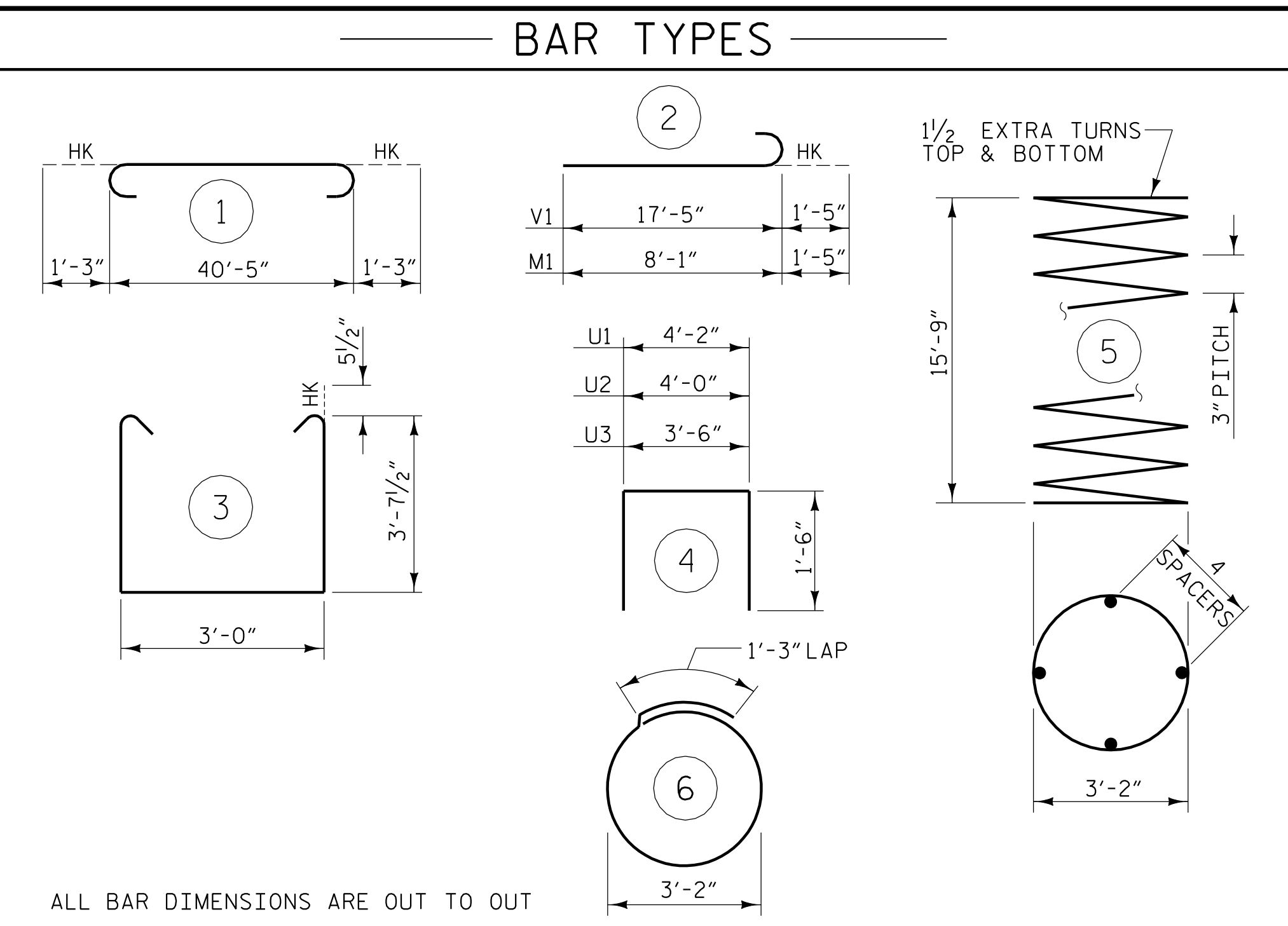
END ELEVATION



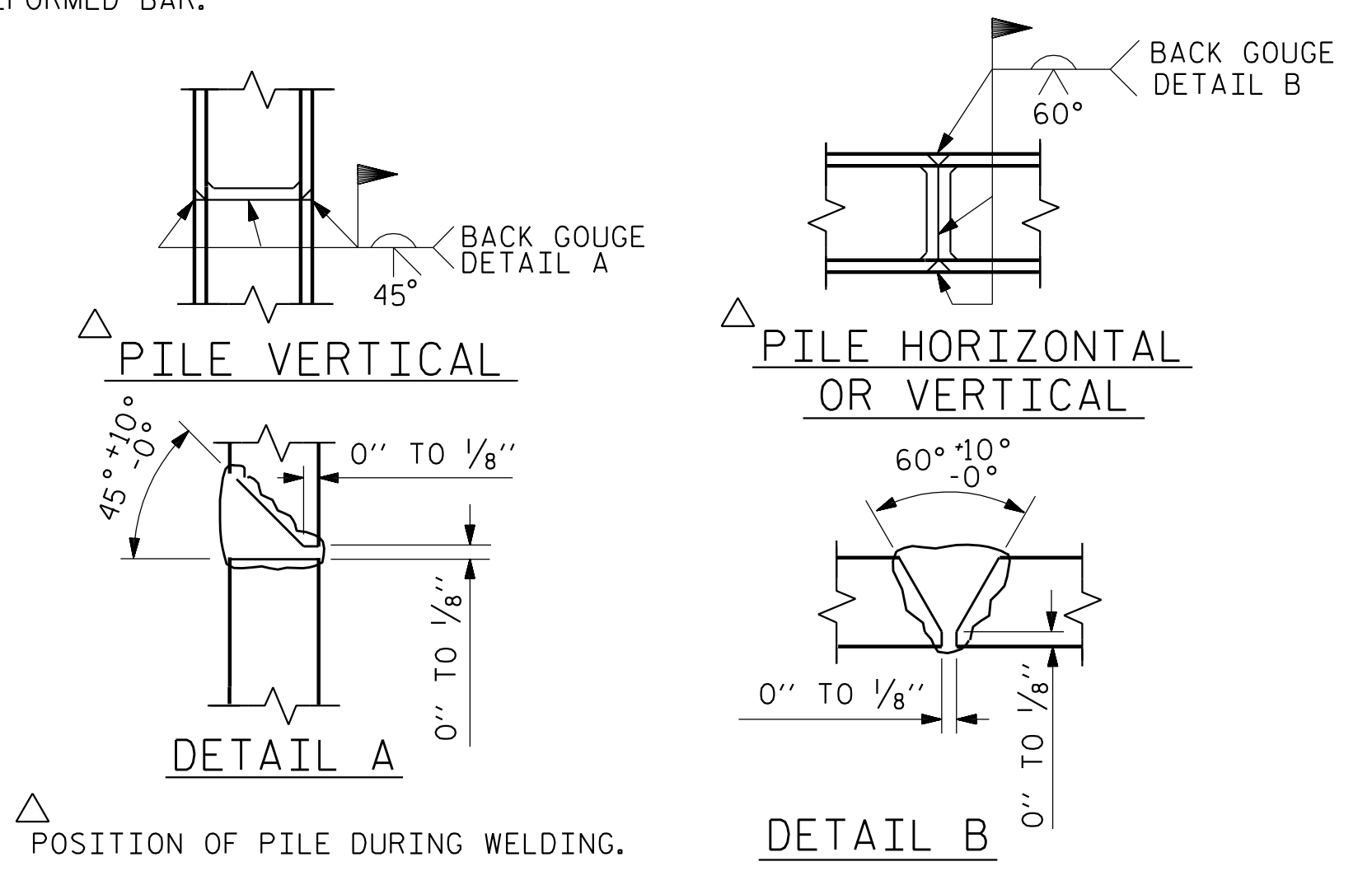
SECTION A-A



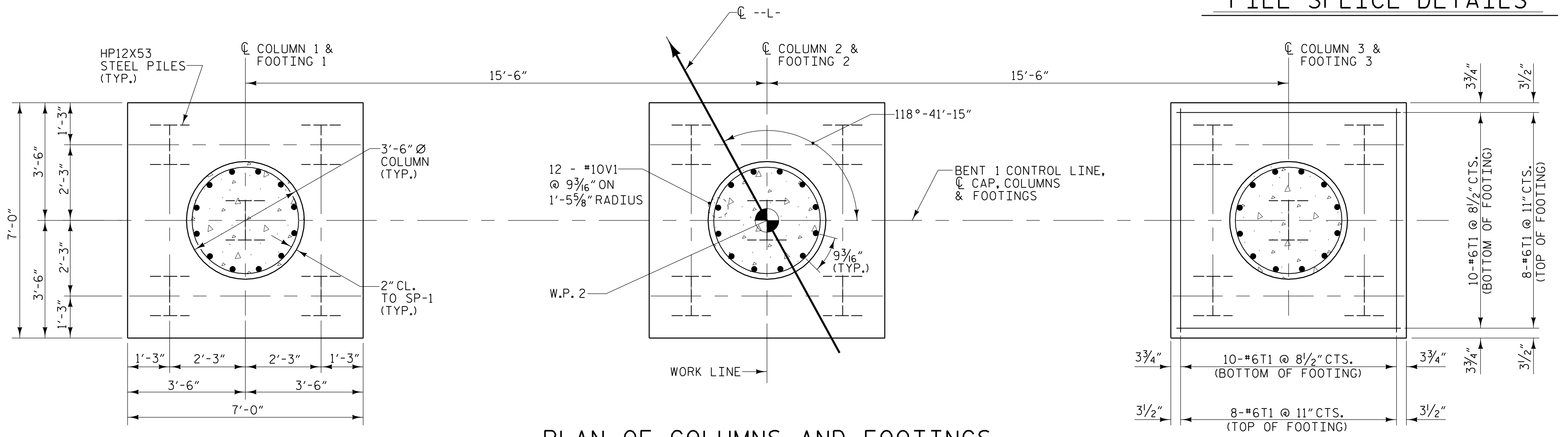
SECTION B-B



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



PILE SPLICE DETAILS



PLAN OF COLUMNS AND FOOTINGS

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING)

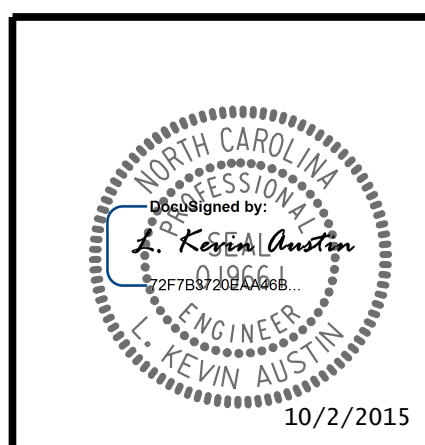
BILL OF MATERIAL					
BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#9	STR	40'-5"	962
B2	6	#5	STR	40'-5"	253
B3	7	#9	1	42'-11"	1021
B4	14	#4	STR	4'-2"	39
M1	36	#10	2	9'-6"	1472
S1	104	#5	3	11'-2"	1211
S2	33	#4	6	11'-3"	248
T1	108	#6	STR	6'-6"	1054
U1	18	#4	4	7'-2"	86
U2	8	#4	4	7'-0"	37
U3	8	#4	4	6'-6"	35
V1	36	#10	2	18'-10"	2917
TOTAL REINFORCING STEEL					9335 lbs.
SPIRAL COLUMN REINFORCING STEEL (SP)					
SP-1	3	**	5	646'-1"	2022
TOTAL SPIRAL COLUMN REINFORCING STEEL					2022 lbs.
CLASS "A" CONCRETE - CU. YARDS					
POUR 1 - FOOTINGS					16.3 CU. YDS.
POUR 2 - COLUMNS					16.7 CU. YDS.
POUR 3 - CAP					27.7 CU. YDS.
TOTAL CLASS "A" CONCRETE					60.7 CU. YDS.
HP12X53 STEEL PILES					
15 PILES REQUIRED - LIN. FEET					1050
PILE REDRIVES					8 EA.



PROJECT NO. W-5518  
 COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT 1



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

SHEET NO.	
S-26	TOTAL SHEETS 33

10/2/2015 4:42:46 PM RA:\Structures\W5518\SMU.B1.02.dgn

DRAWN BY: W. B. ALLEN DATE: 6/15  
 CHECKED BY: Z. H. BROWN DATE: 6/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15

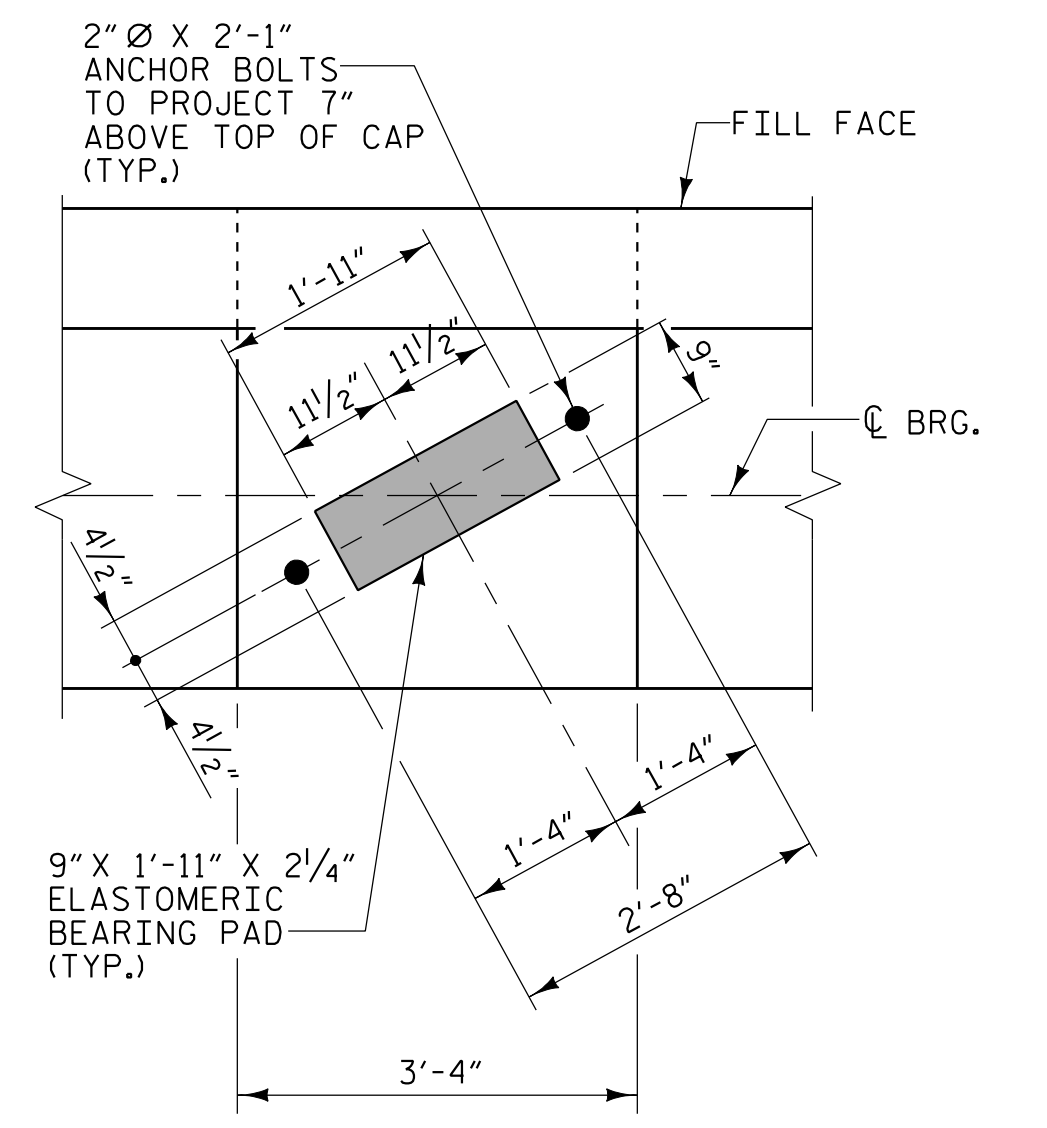
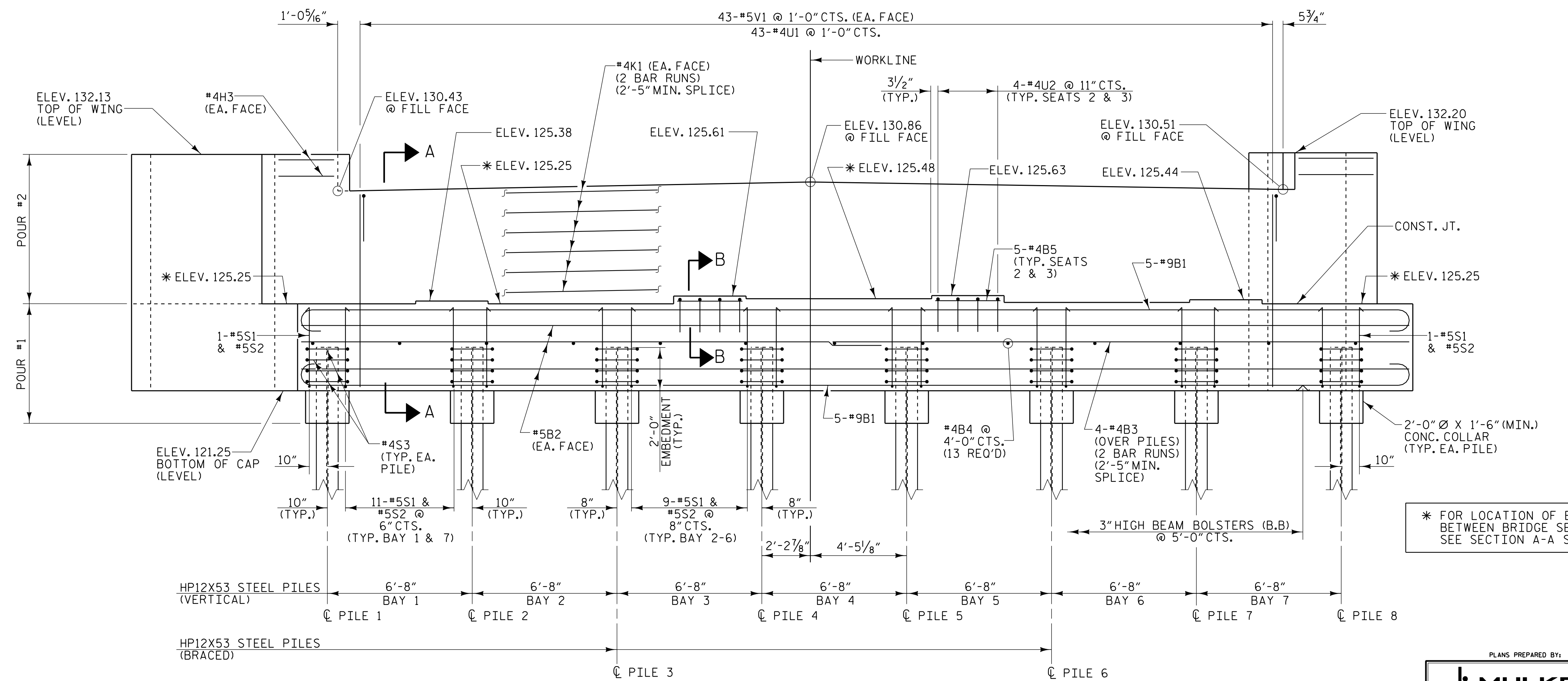
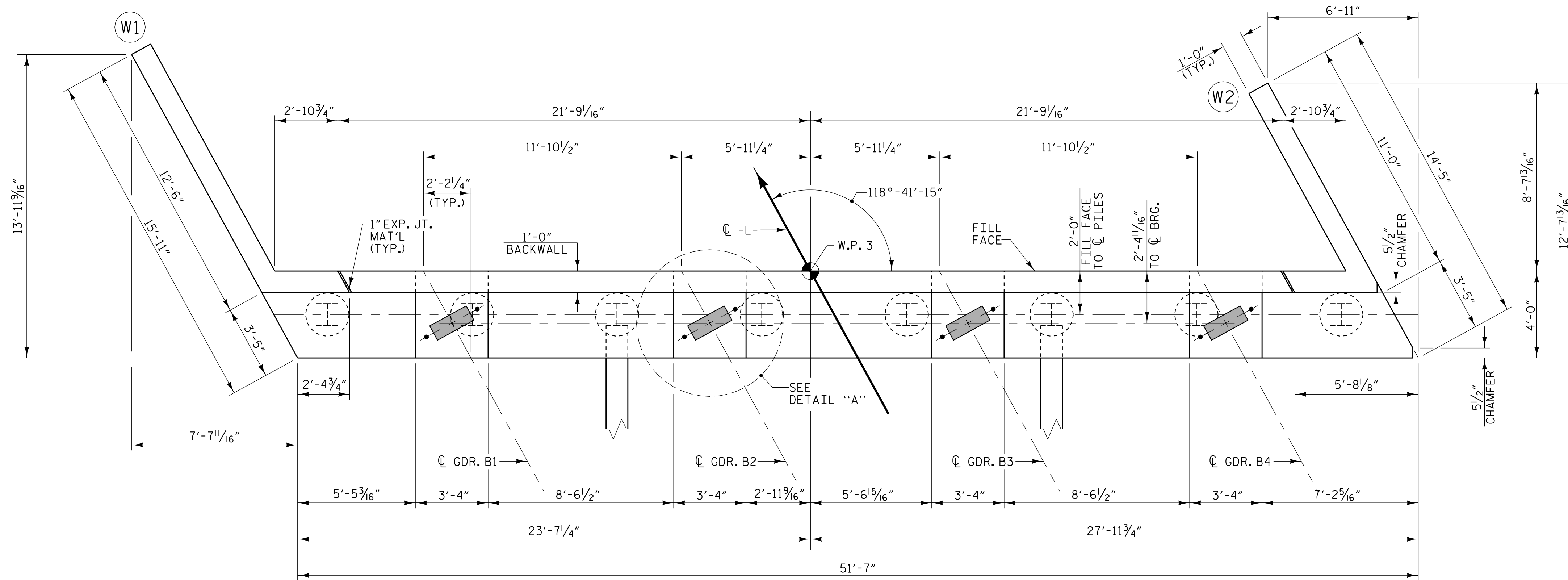
NOTES

STIRRUPS AND U2 BARS IN THE 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%.



PROJECT NO. W-5518  
 COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

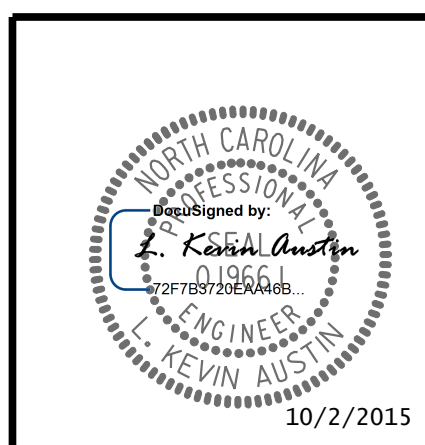
SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2

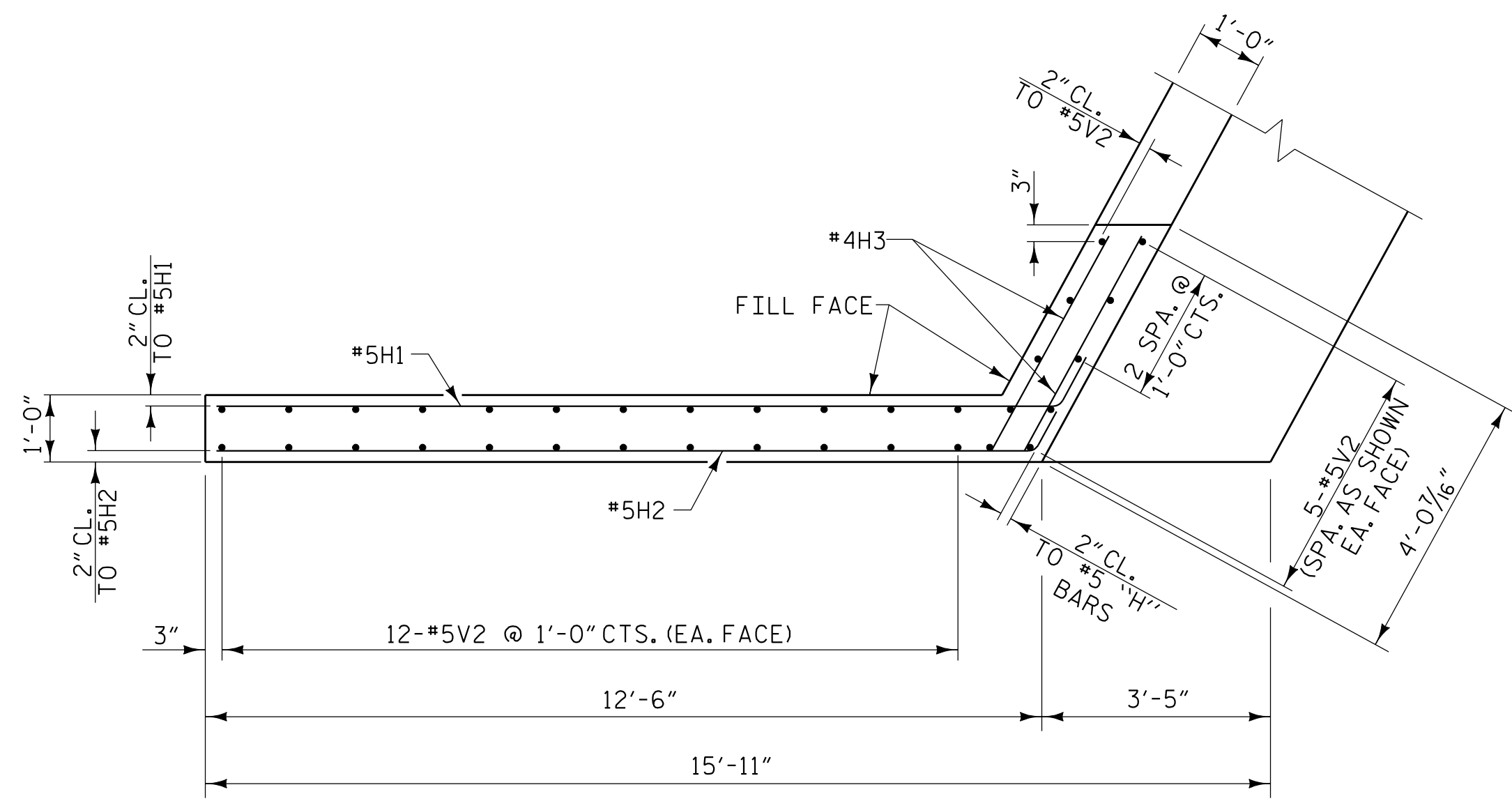
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			33

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

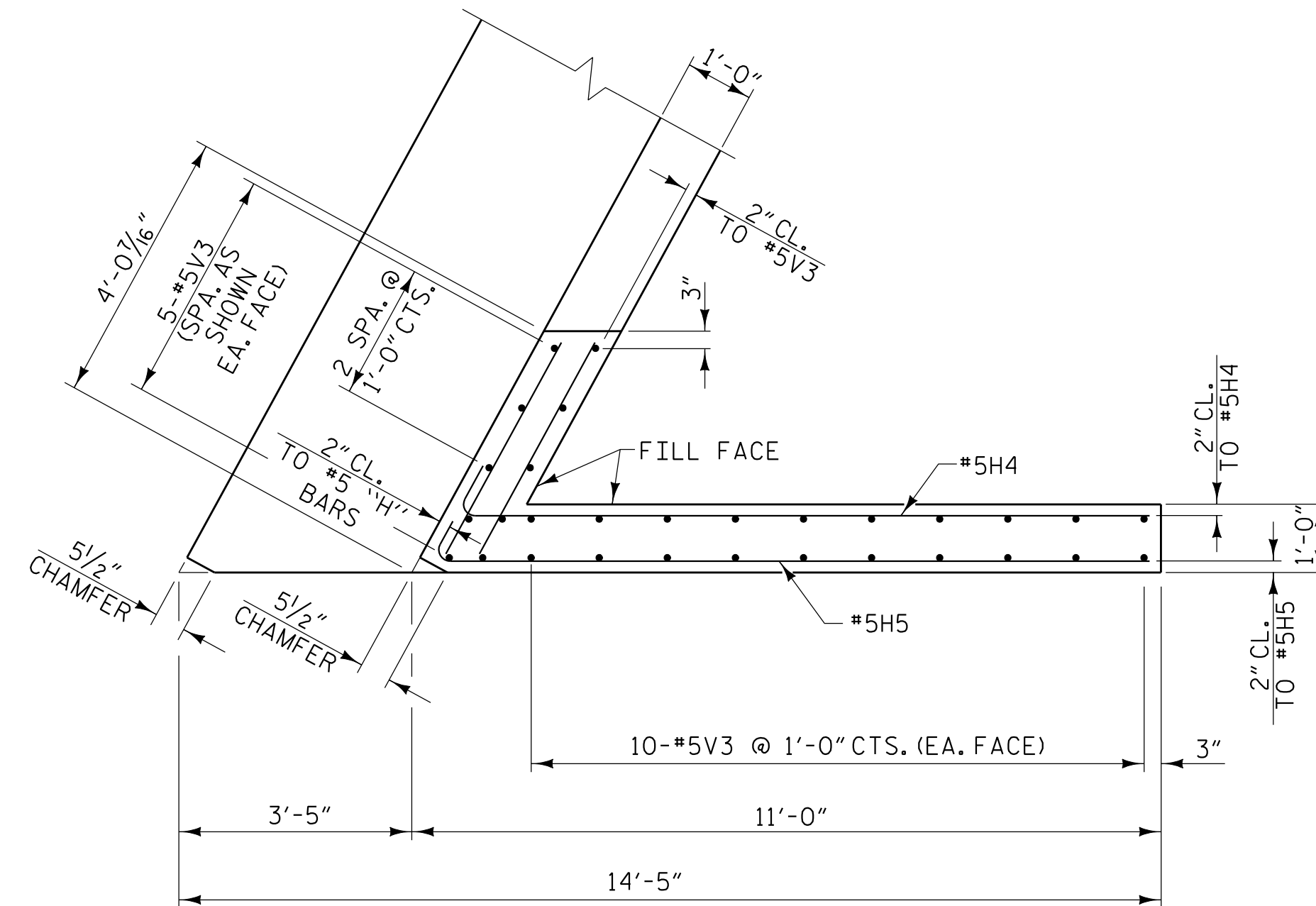


DRAWN BY: W. B. ALLEN DATE: 2/15  
 CHECKED BY: Z. H. BROWN DATE: 3/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15

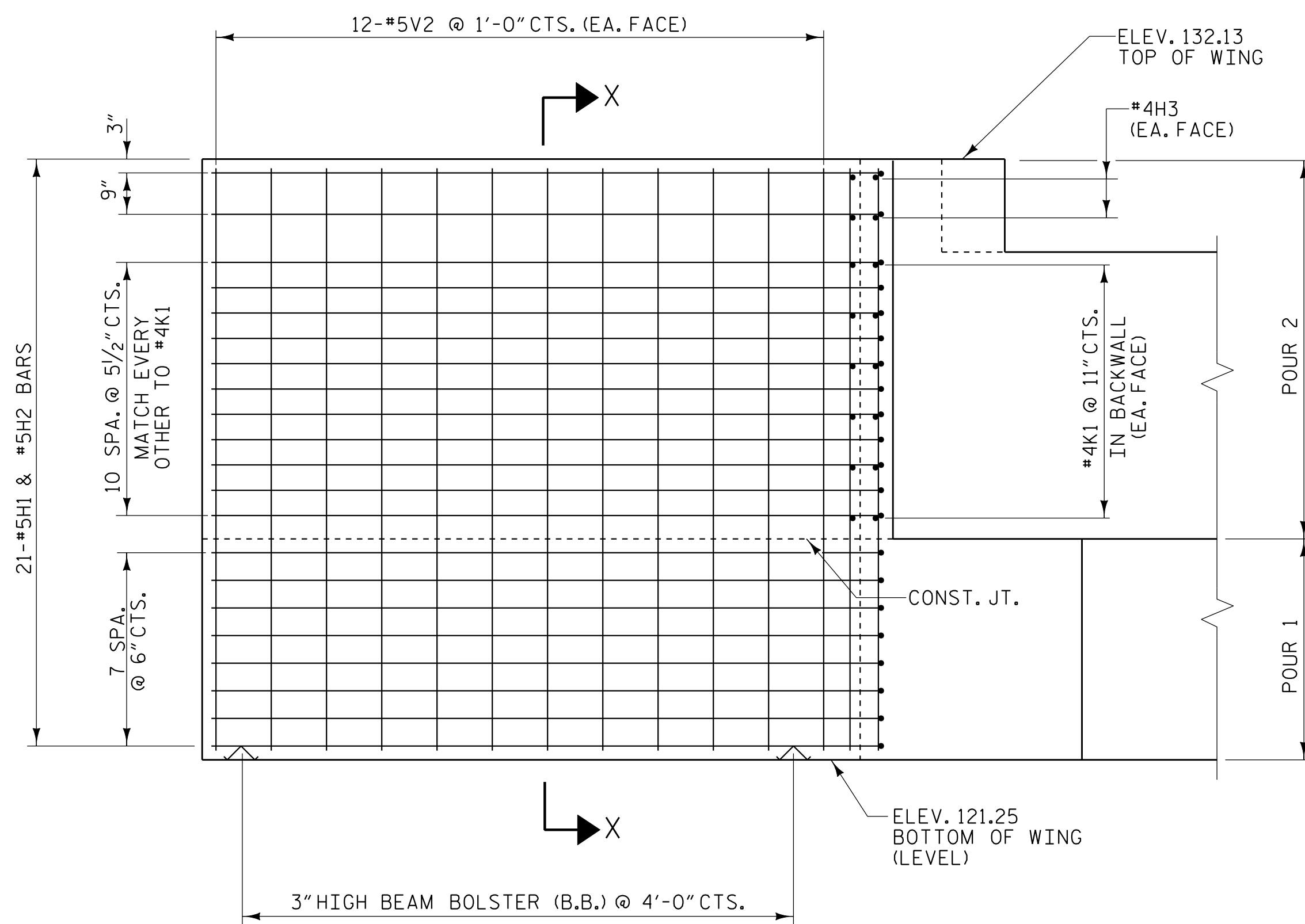
10/2/2015 1:44:33 PM R:\Structures\W5518\SMU\EZ\_01.dgn



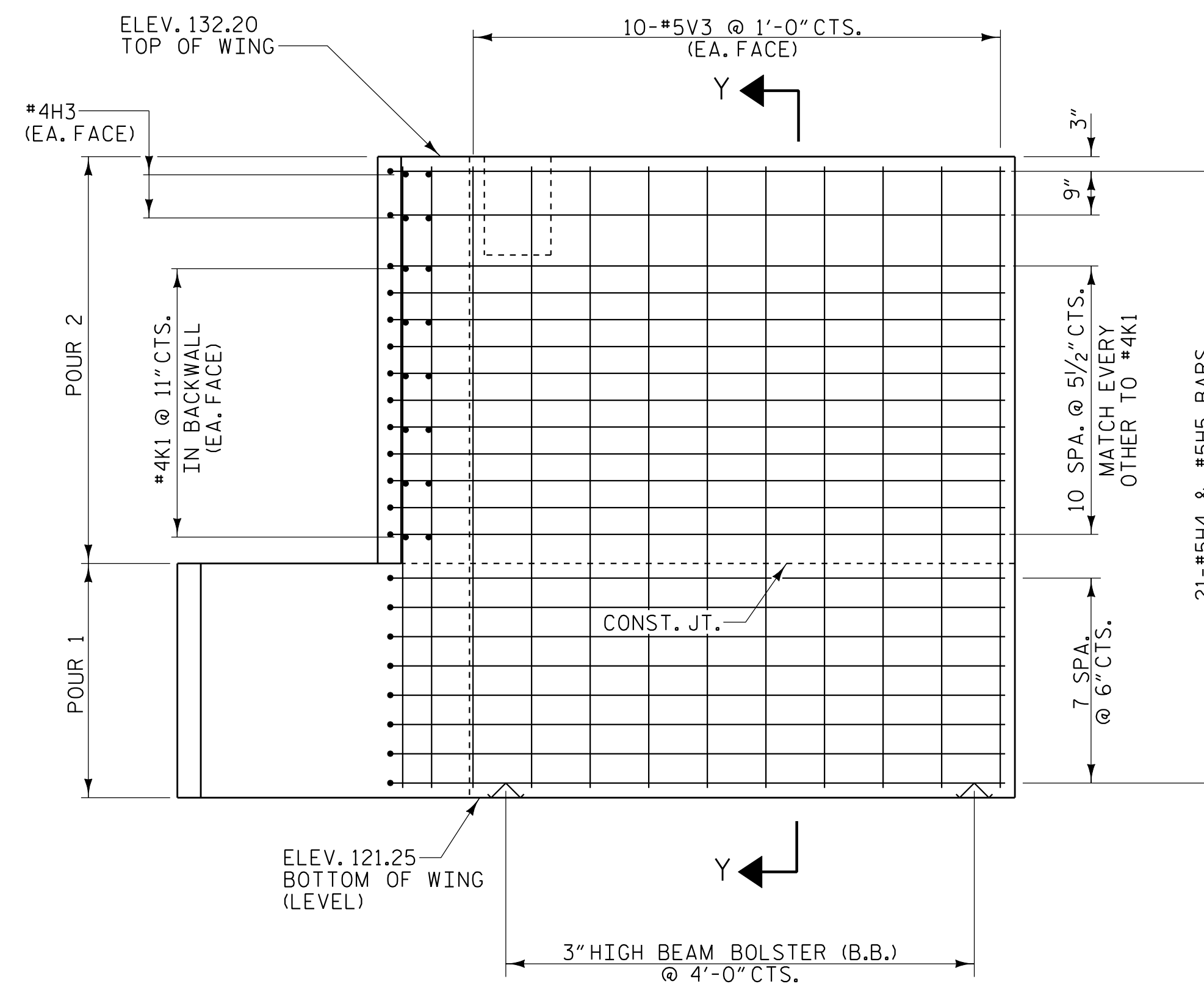
PLAN OF LEFT WING - W1



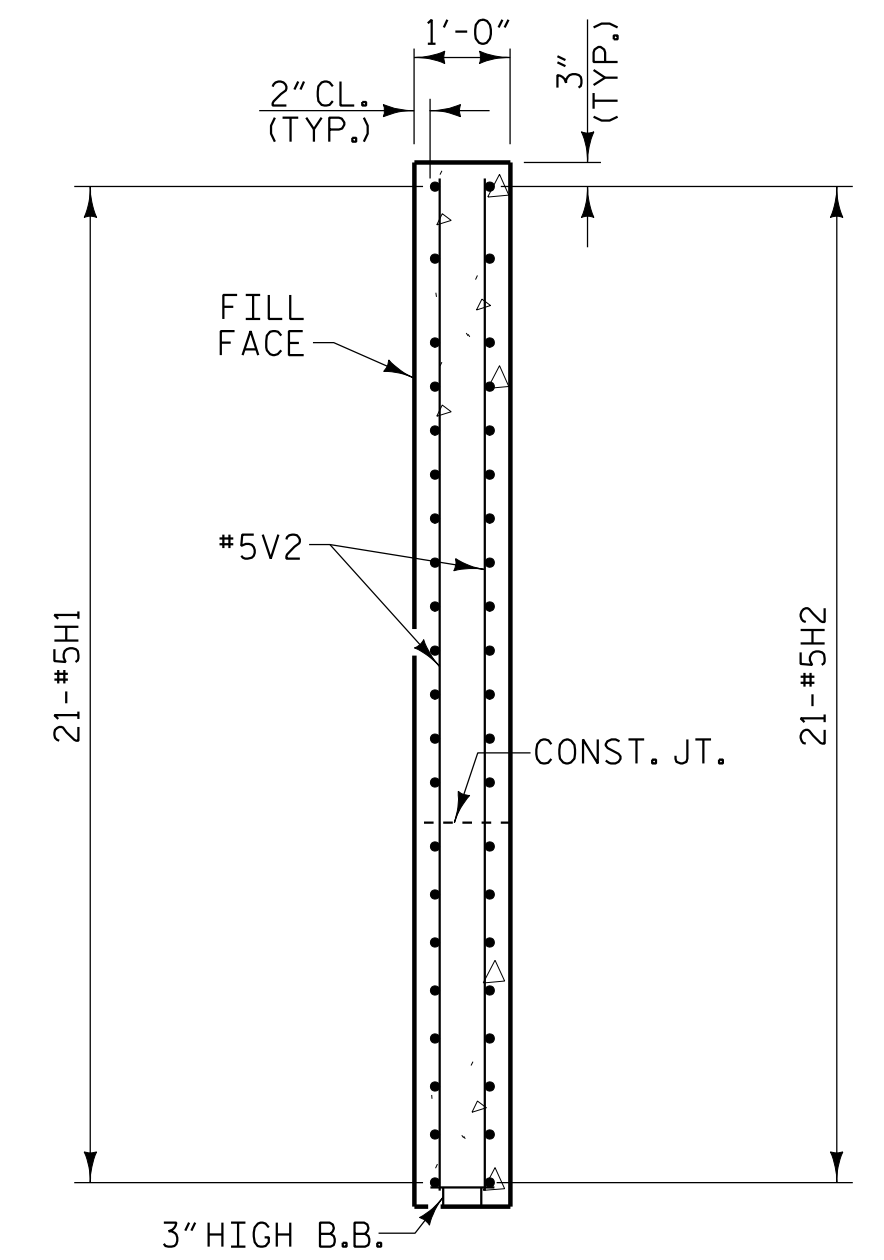
PLAN OF RIGHT WING - W2



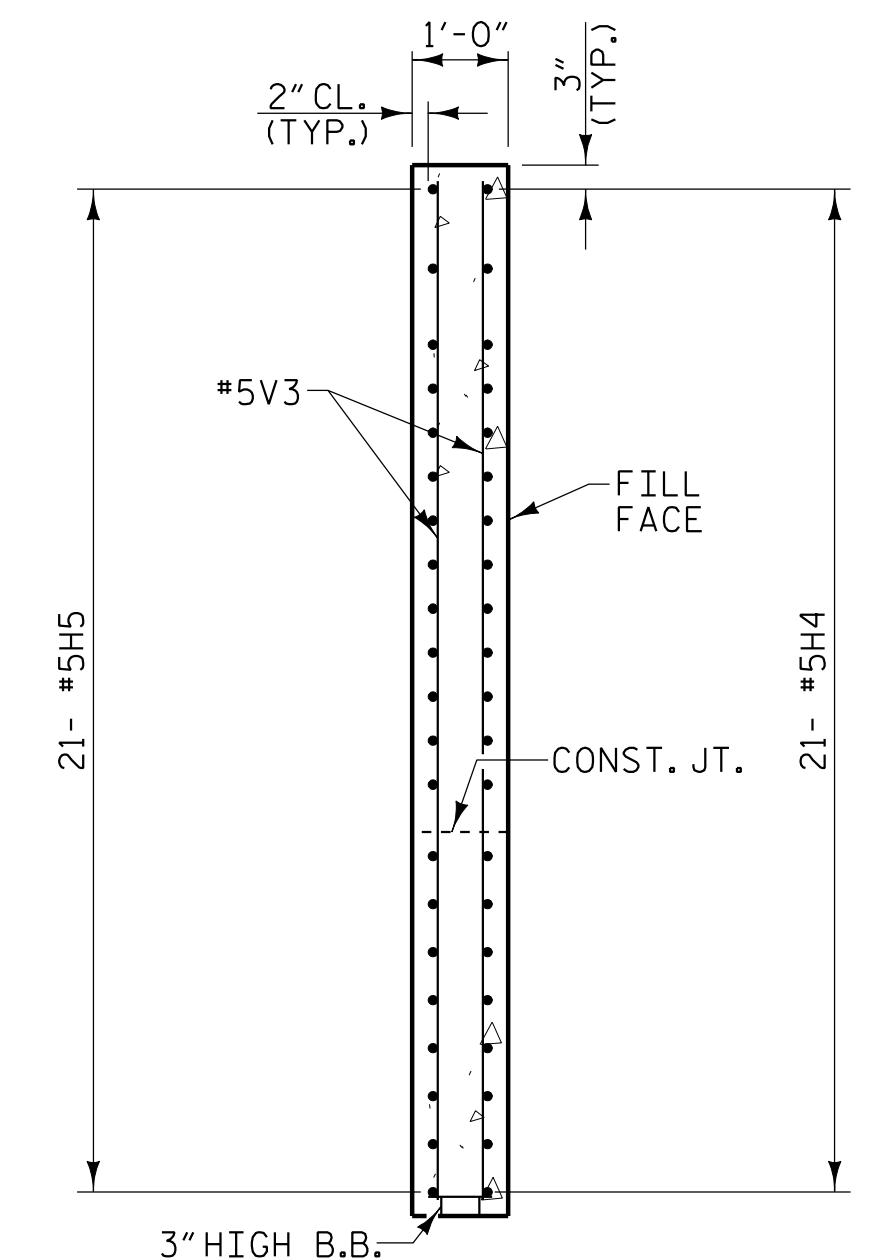
ELEVATION OF RIGHT WING - W2



ELEVATION OF RIGHT WING - W2



SECTION X-X



SECTION Y-Y

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

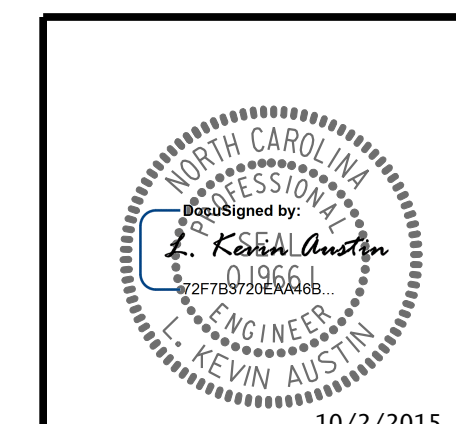
SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2

REVISIONS

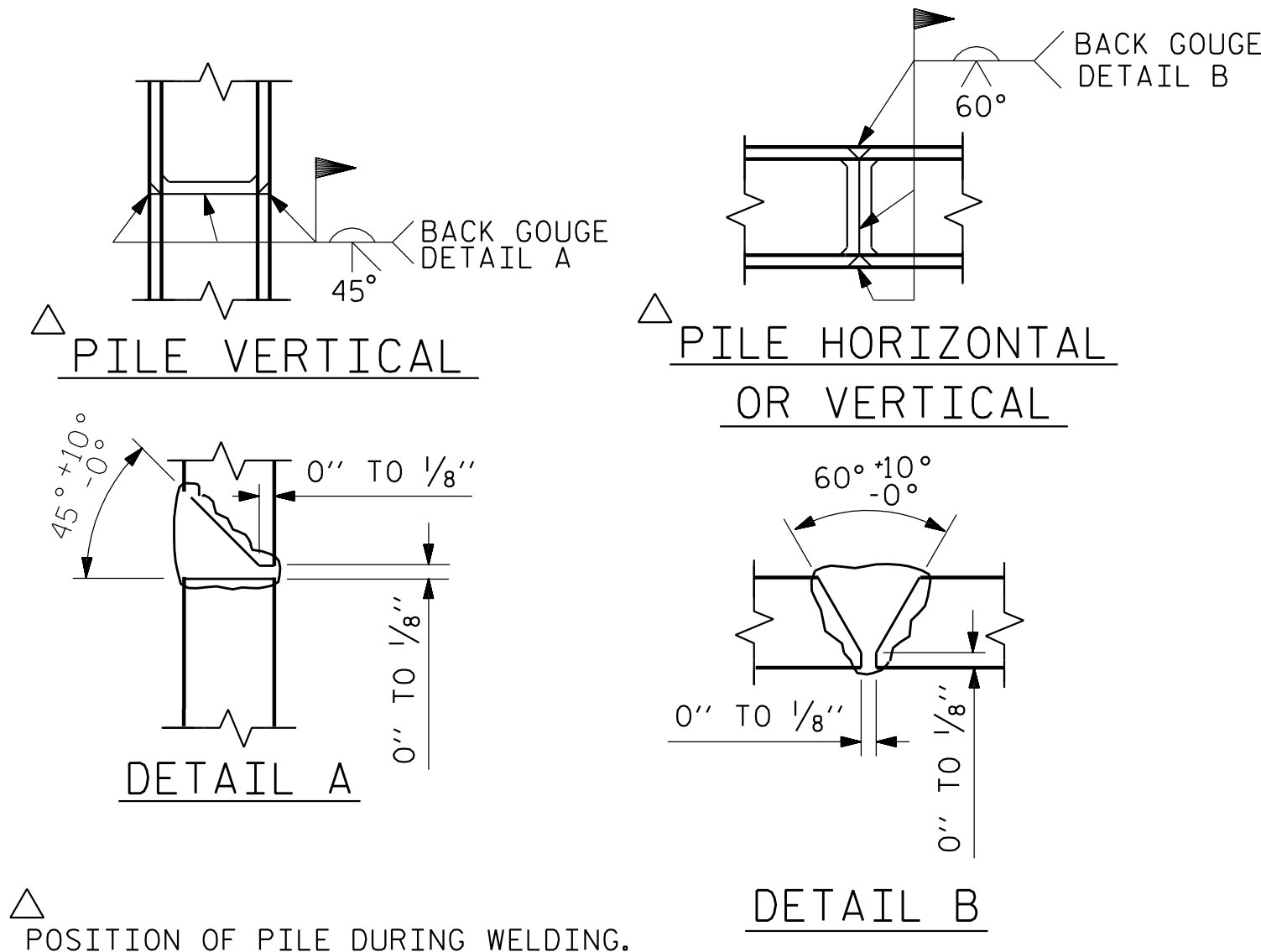
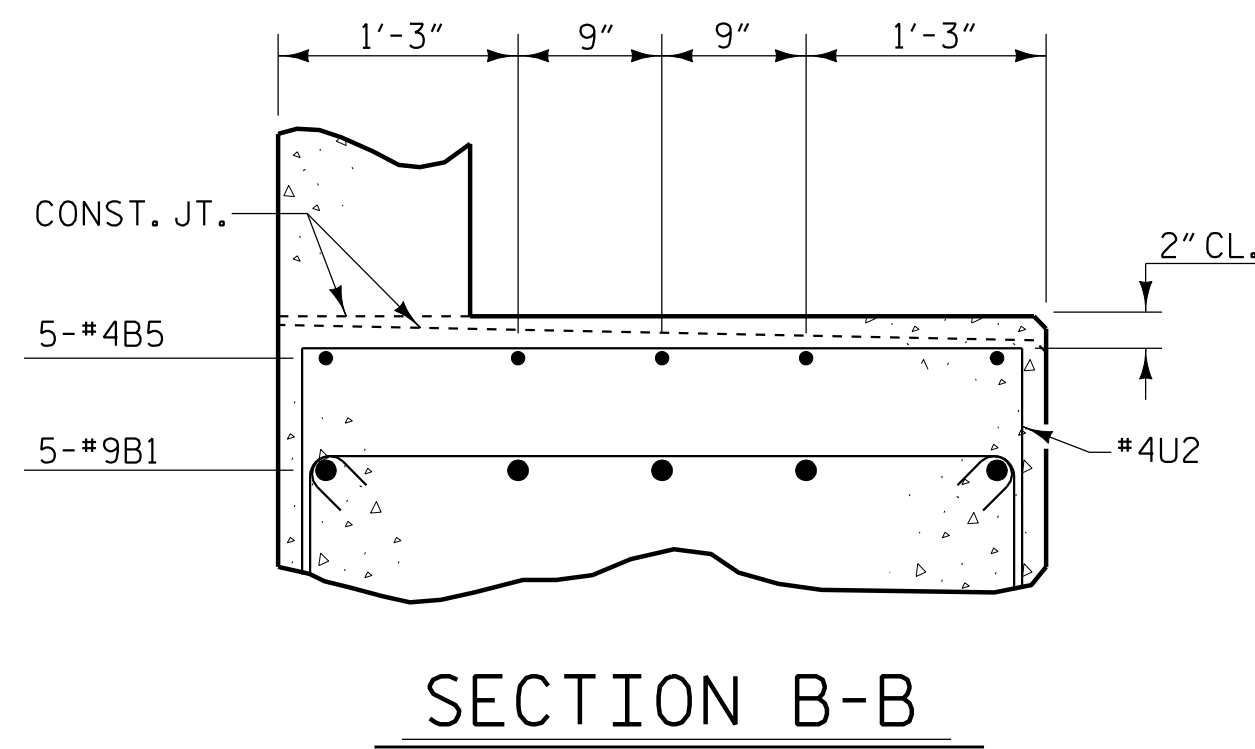
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S-28
TOTAL SHEETS	33



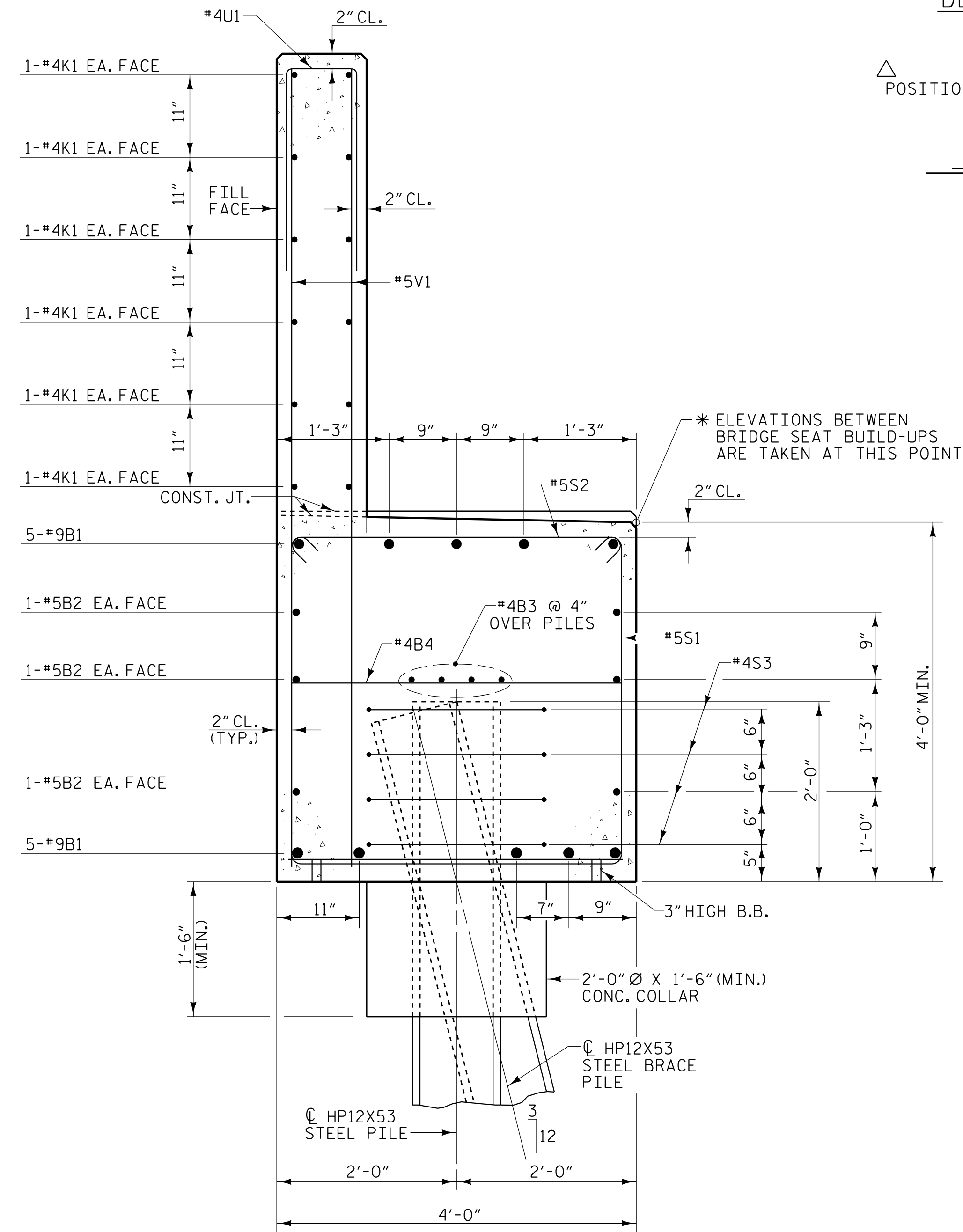
10/2/2015 1:44:35 PM R:\Structures\W5518\SMU.E2.02.dgn

DRAWN BY: W. B. ALLEN DATE: 2/15  
 CHECKED BY: Z. H. BROWN DATE: 3/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE: 8/15

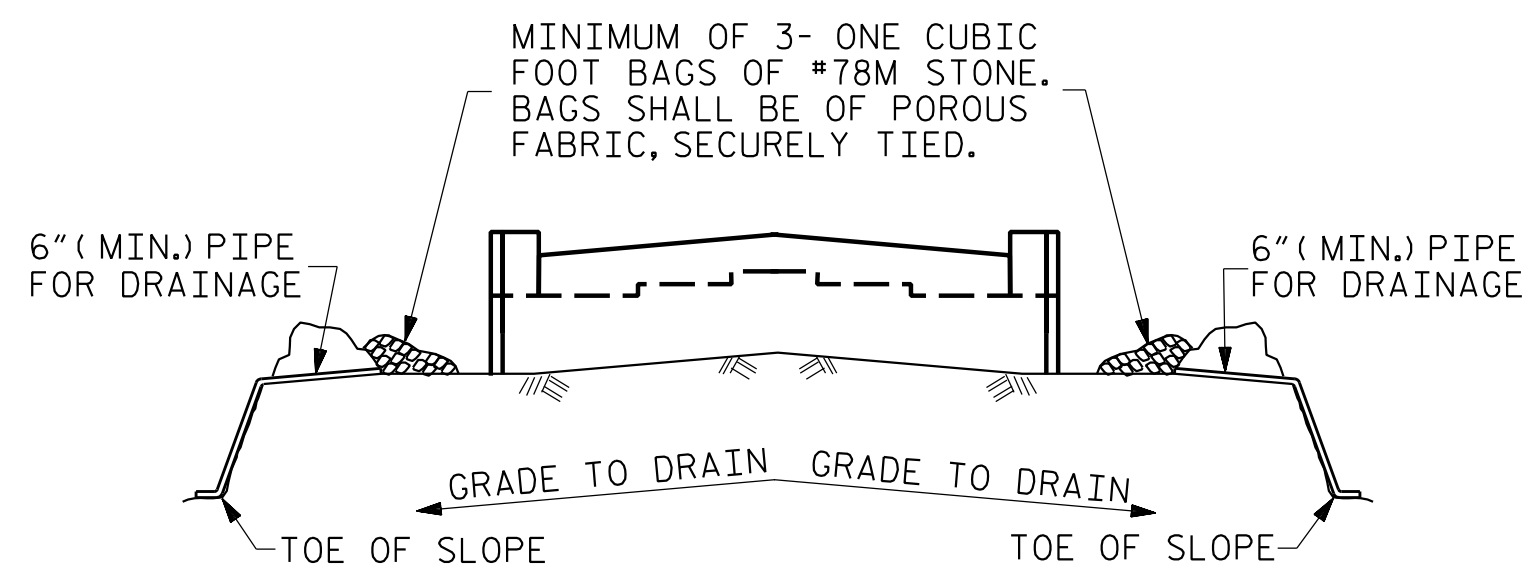


POSITION OF PILE DURING WELDING.

PILE SPlice DETAILS



SECTION A-A



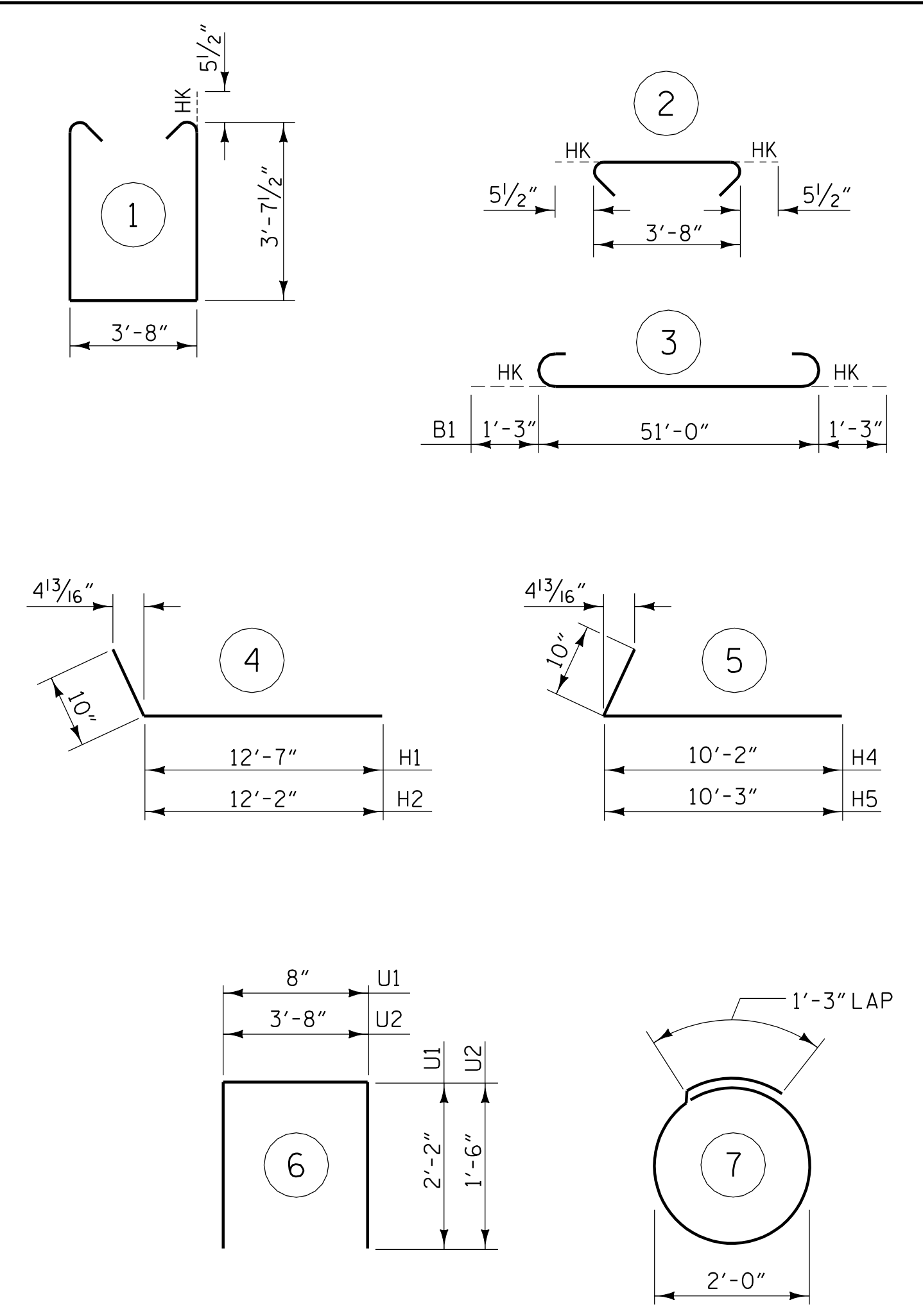
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	3	53'-6"	1819
B2	6	#5	STR	51'-0"	319
B3	8	#4	STR	26'-10"	143
B4	13	#4	STR	3'-8"	32
B5	10	#4	STR	3'-0"	20
H1	21	#5	4	13'-5"	294
H2	21	#5	4	13'-0"	285
H3	8	#4	STR	3'-7"	19
H4	21	#5	5	11'-0"	241
H5	21	#5	5	11'-1"	243
K1	24	#4	STR	26'-10"	430
S1	69	#5	1	11'-10"	852
S2	69	#5	2	4'-7"	330
S3	32	#4	7	7'-7"	162
U1	43	#4	6	5'-0"	144
U2	8	#4	6	6'-8"	36
V1	86	#5	STR	8'-10"	792
V2	34	#5	STR	10'-6"	372
V3	30	#5	STR	10'-7"	331
TOTAL REINFORCING STEEL					6864 lbs.
CLASS "A" CONCRETE - CU. YARDS					
POUR 1 - CAP, COLLARS & LOWER WINGS					35.8 cu. yds.
POUR 2 - UPPER WINGS & BACKWALL					16.0 cu. yds.
TOTAL					51.8 cu. yds.
HP12X53 STEEL PILES					
8 PILES REQUIRED - LIN. FEET					600
PILE REDRIVES					4 EA.

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2

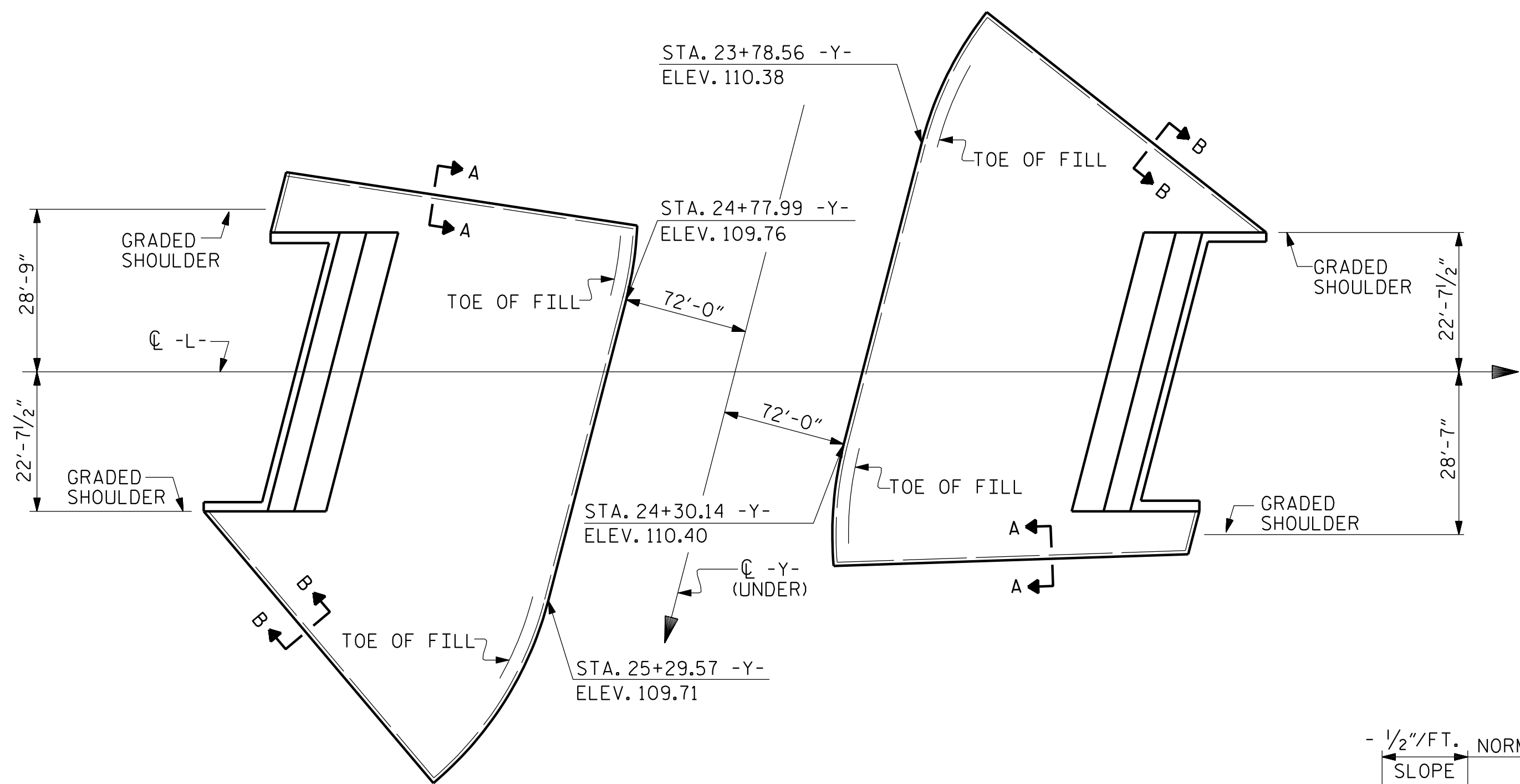
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			33

PLANS PREPARED BY:

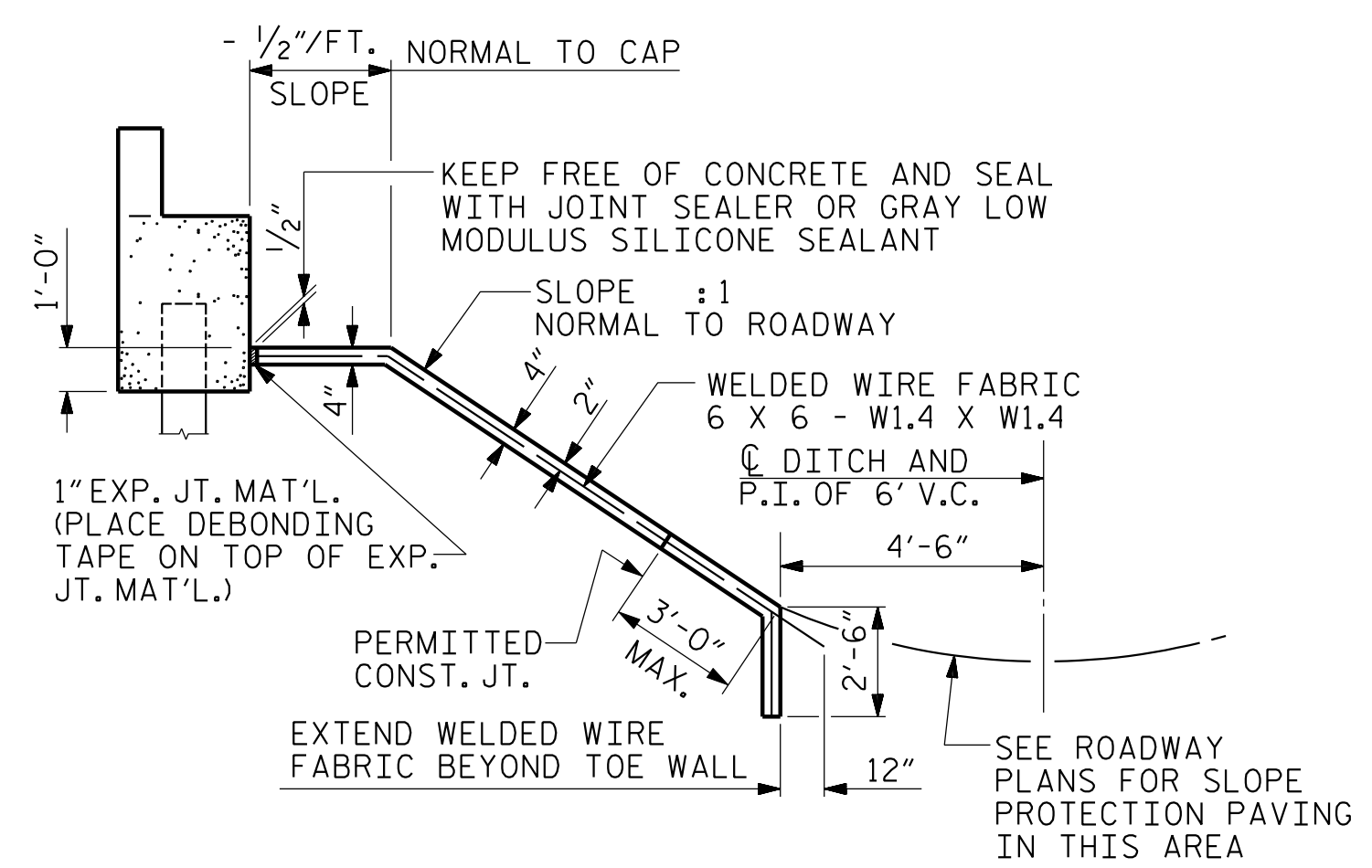
MULKEY ENGINEERS & CONSULTANTS  
 1010 BELL STREET  
 RALEIGH, N.C. 27606  
 WWW.MULKEYINC.COM  
 NC LICENSE NO. 0-1021

10/2/2015 4:46:54 PM RA:\Structures\W5518\SMU.E2\_03.dgn

DRAWN BY : W. B. ALLEN DATE : 2/15  
 CHECKED BY : Z. H. BROWN DATE : 3/15  
 DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 8/15



PLAN



SECTION ALONG C ROADWAY WHEN FILL CATCHES IN DITCH

DETAILS FOR ALTERNATE "A"

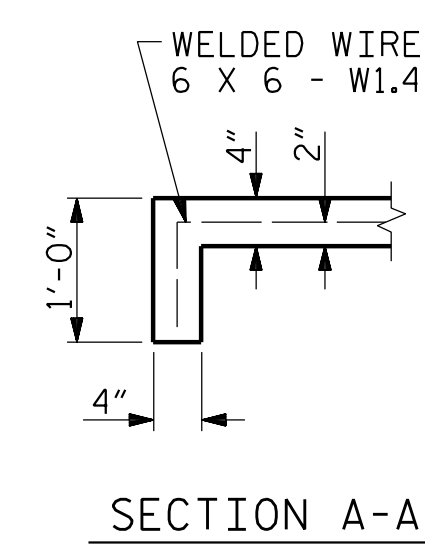
GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

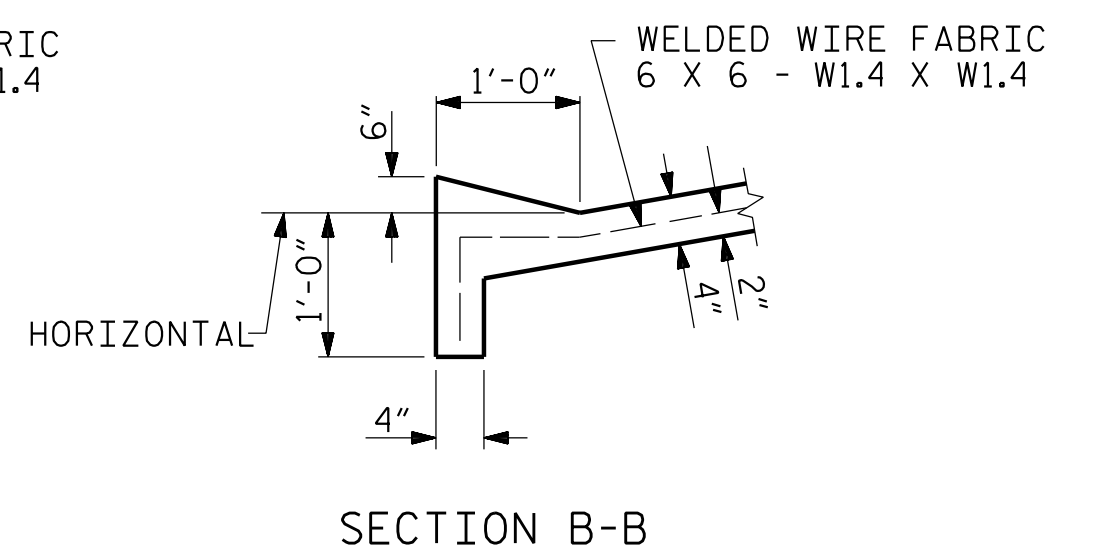
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL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

BRIDGE @ STA. 24+06.36 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	209	420
END BENT 2	209	420

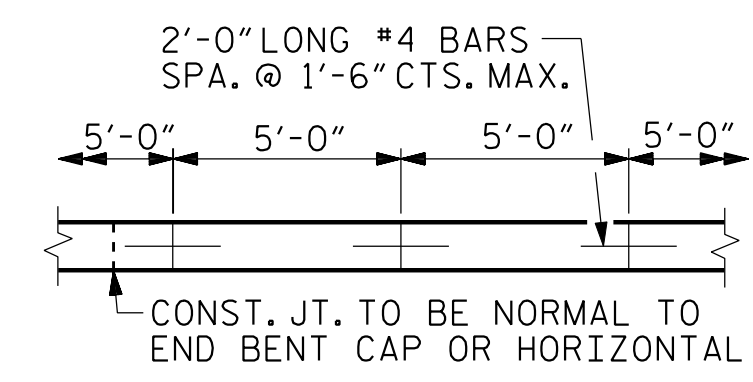
\* QUANTITY SHOWN IS BASED ON 5' POURS.



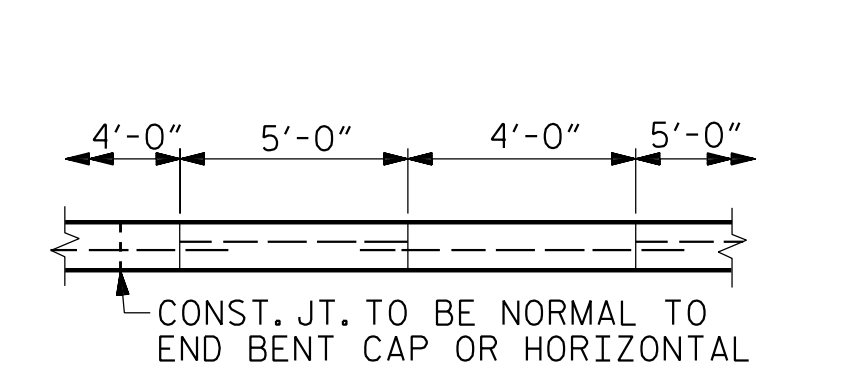
SECTION A-A



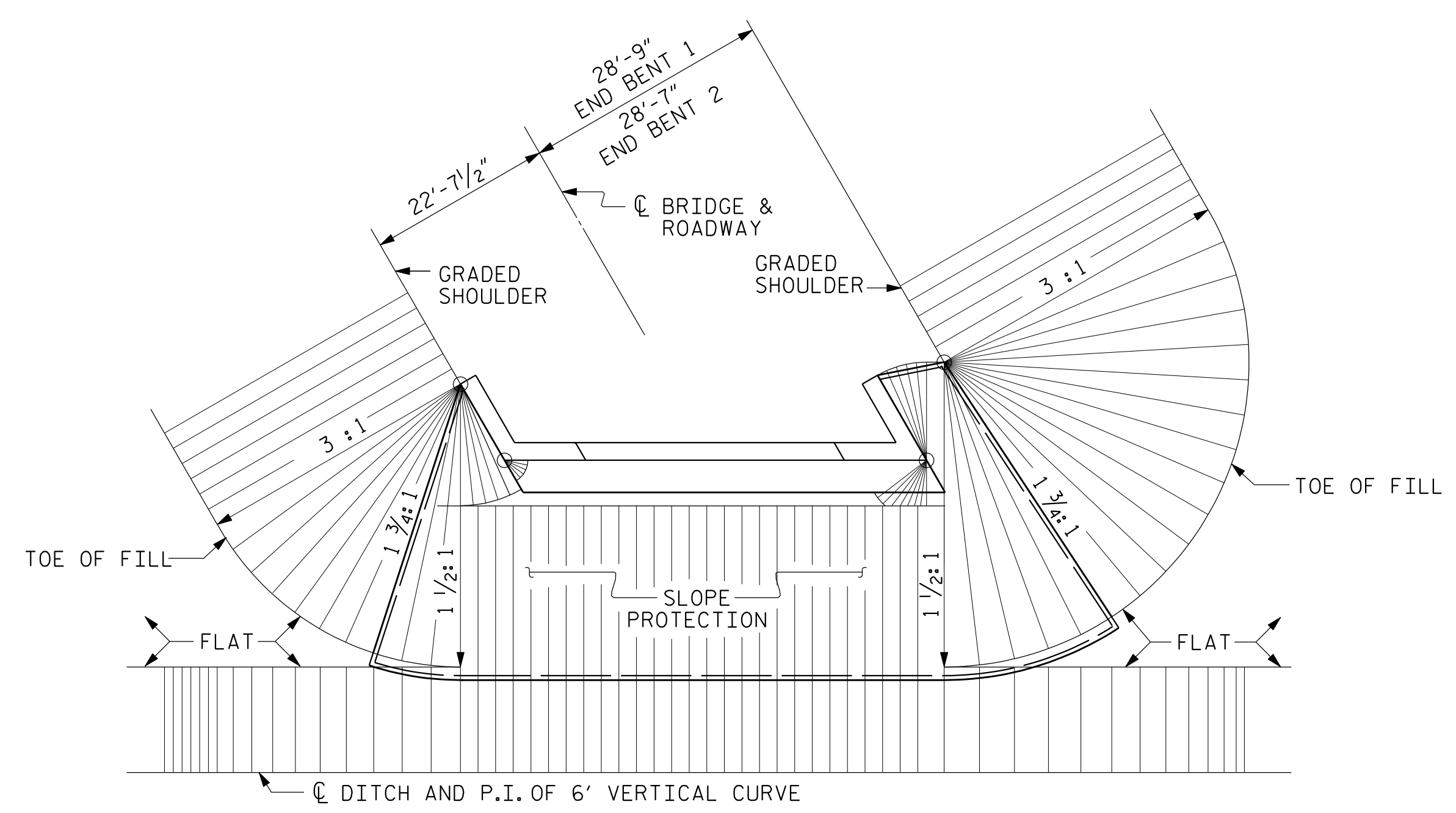
SECTION B-B



POURING DETAIL



OPTIONAL POURING DETAIL



PLAN - END BENT WITH SWEEP BACK WINGS - SKEWED

( 1 1/2 : 1 SLOPE )

PROJECT NO. W-5518  
COLUMBUS COUNTY  
STATION: 24+06.36 -L- POT

PLANS PREPARED BY:  
**MULKEY**  
ENGINEERS & CONSULTANTS  
PO BOX 23127  
RALEIGH, NC 27626  
(919) 851-1912 FAX  
(919) 851-1912  
WWW.MULKEYINC.COM  
NO LICENSE NO. 0-1051

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

10/2/2015

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

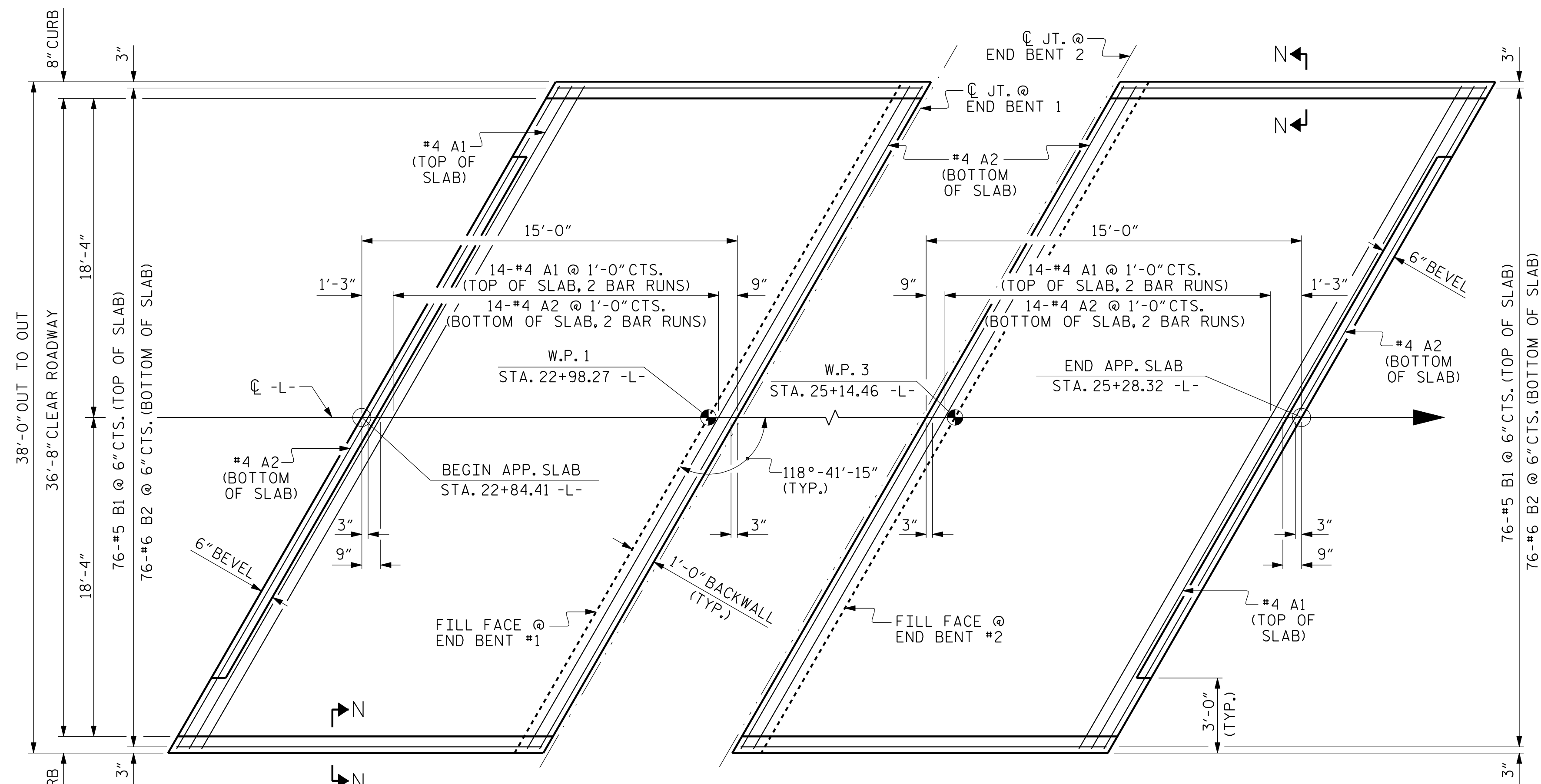
STANDARD  
SLOPE PROTECTION  
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			33

ASSEMBLED BY : W. B. ALLEN	DATE : 7/15
CHECKED BY : Z. H. BROWN	DATE : 7/15
DRAWN BY : ELR 5/92	REV. 5/1/06 TLA/GM
CHECKED BY : GRP 6/92	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

10/2/2015 4:54:49 PM R:\Structures\W5518.SMU.SP.01.dgn





PLAN @ END BENT #1  
 PLAN @ END BENT #2  
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

### NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

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

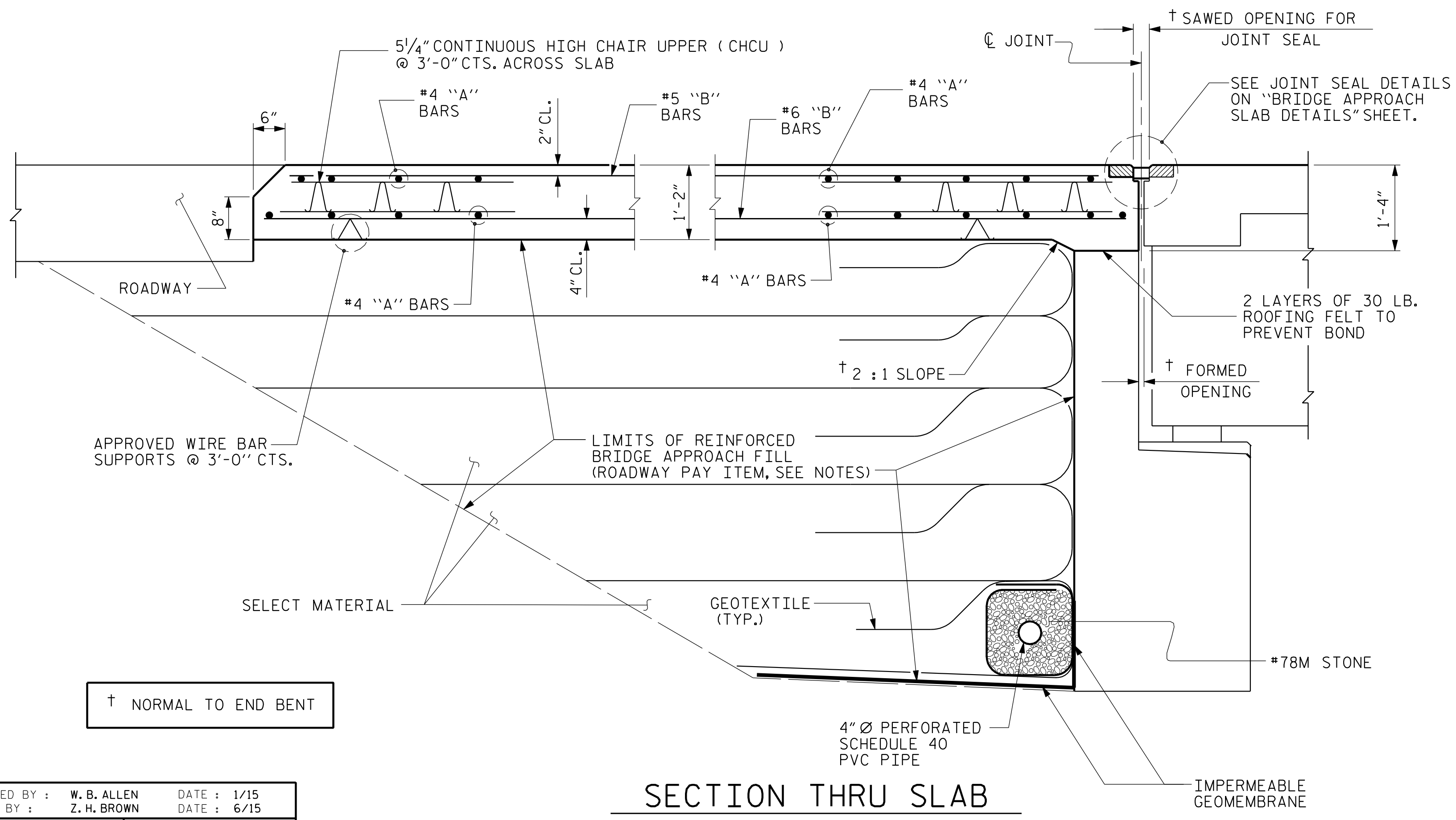
FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

### BILL OF MATERIAL

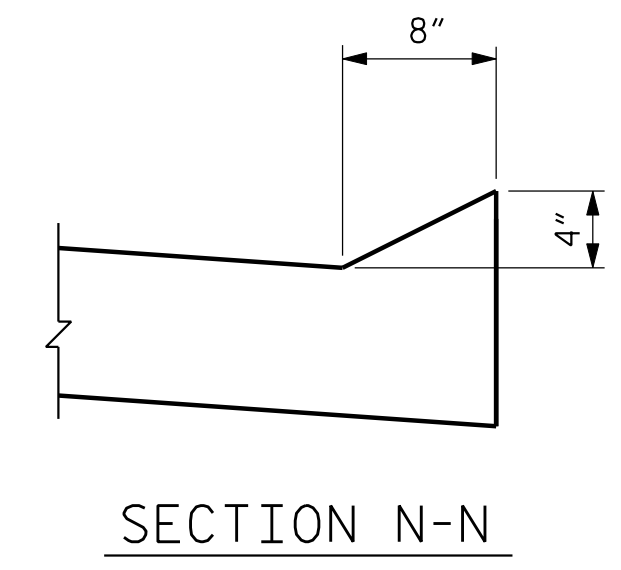
APPROACH SLAB AT EB #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	30	#4	STR	22'-6"	451	
A2	32	#4	STR	22'-5"	479	
*B1	76	#5	STR	13'-8"	1083	
B2	76	#6	STR	14'-8"	1674	
REINFORCING STEEL					LBS.	2153
*EPOXY COATED REINFORCING STEEL					LBS.	1534
CLASS AA CONCRETE					C. Y.	24.8
APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	30	#4	STR	22'-6"	451	
A2	32	#4	STR	22'-5"	479	
*B1	76	#5	STR	13'-8"	1083	
B2	76	#6	STR	14'-8"	1674	
REINFORCING STEEL					LBS.	2153
*EPOXY COATED REINFORCING STEEL					LBS.	1534
CLASS AA CONCRETE					C. Y.	24.8

### SPLICE LENGTHS

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



SECTION THRU SLAB



SECTION N-N

PLANS PREPARED BY:

**MULKEY**  
 ENGINEERS & CONSULTANTS

PO Box 23127  
 Raleigh, N.C. 27626  
 (919) 851-1912 FAX  
 (919) 851-1912  
 WWW.MULKEYINC.COM  
 NC LICENSE NO. 0-1051

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

10/2/2015

PROJECT NO. W-5518  
COLUMBUS COUNTY  
 STATION: 24+06.36 -L- POT  
 SHEET 1 OF 2

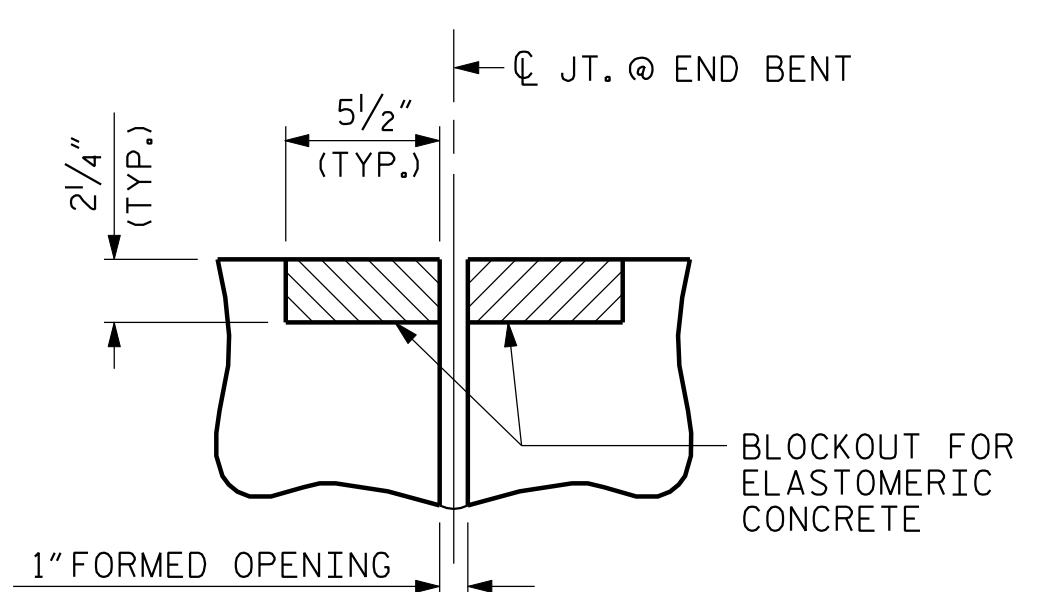
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 BRIDGE APPROACH SLAB  
 FOR FLEXIBLE PAVEMENT

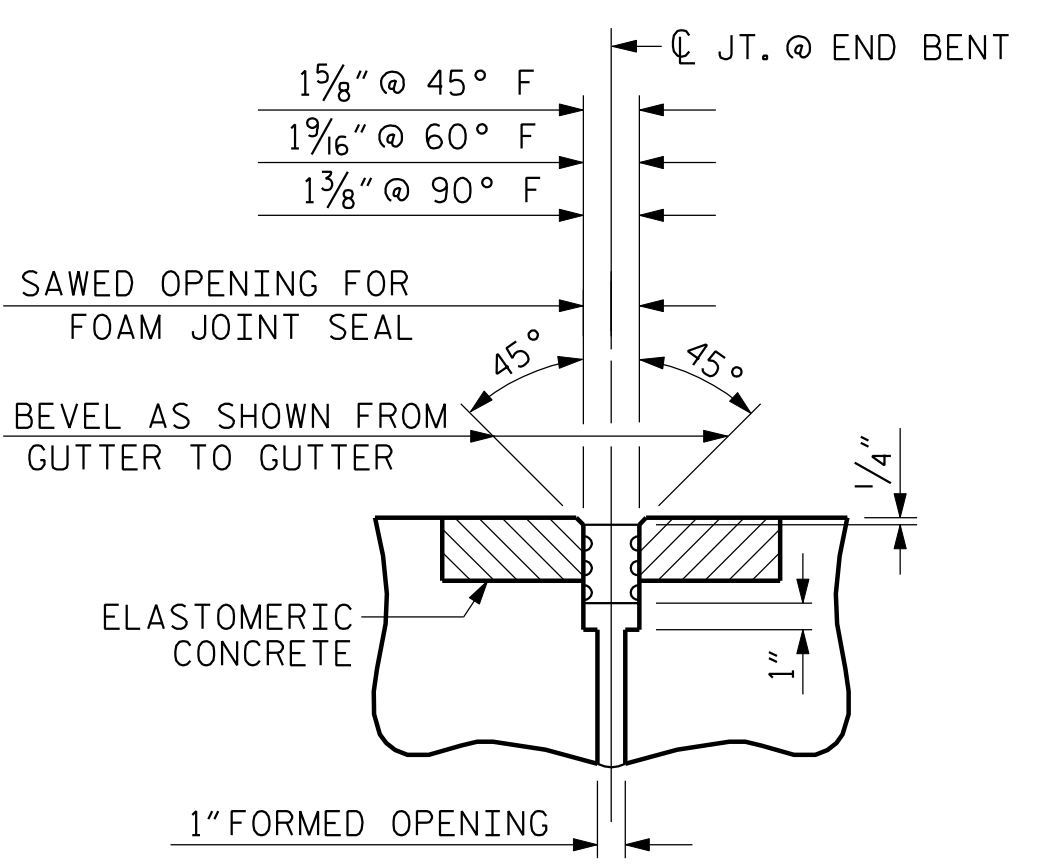
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-31  
 TOTAL SHEETS 33

ASSEMBLED BY :	W. B. ALLEN	DATE :	1/15
CHECKED BY :	Z. H. BROWN	DATE :	6/15
DRAWN BY :	EEM 3/95	REV. 10/1/11	MAA/GM
CHECKED BY :	VAP 3/95	REV. 12/21/11	MAA/GM
		REV. 6/13	MAA/GM



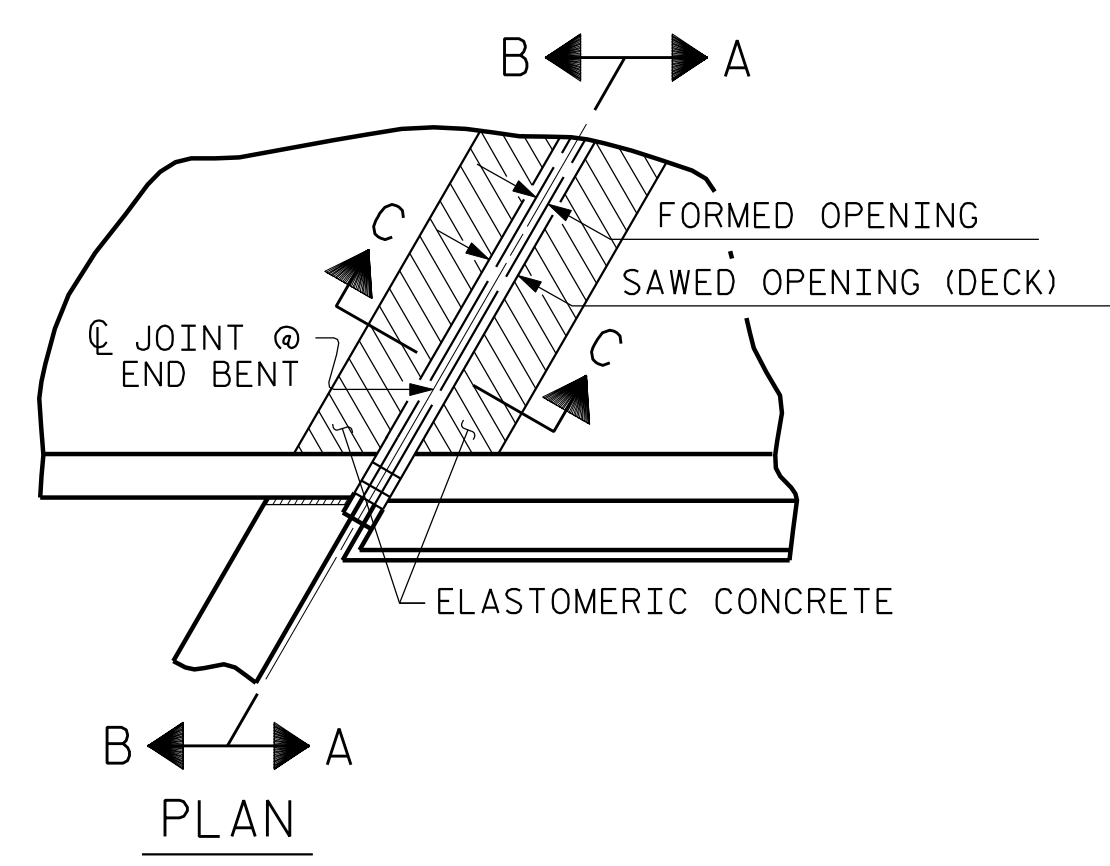
**SECTION C-C**  
FOAM JOINT SEAL  
(PRE-SAWED ELASTOMERIC  
CONCRETE DIMENSIONS)



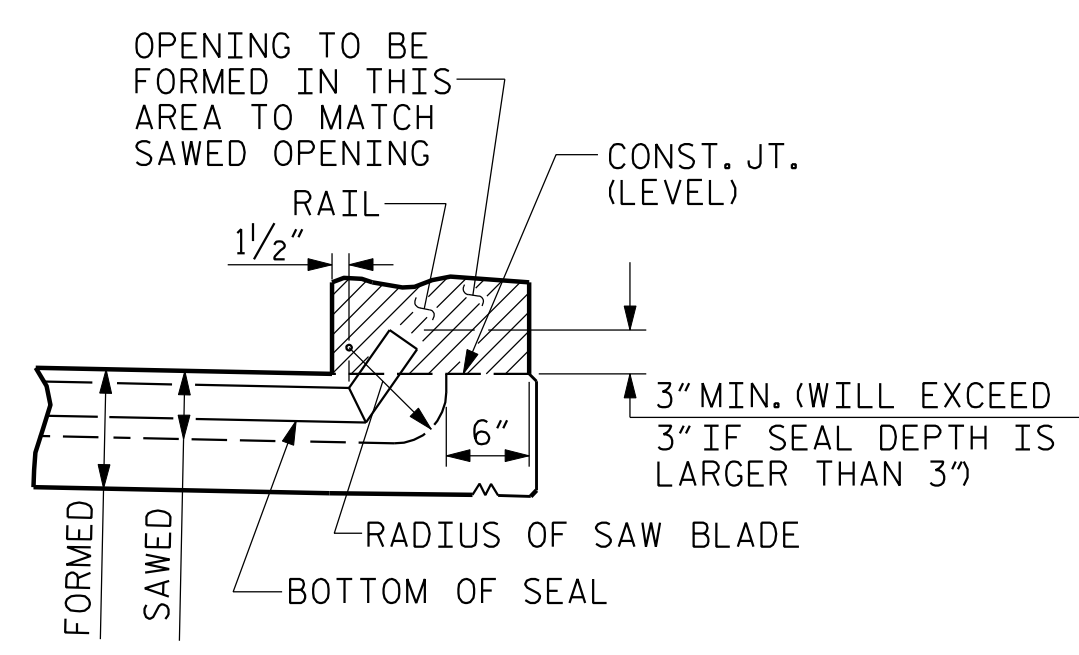
**SECTION C-C**  
FOAM JOINT SEAL  
(EXPANSION)

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	3.5
2	3.5
TOTAL	7.0

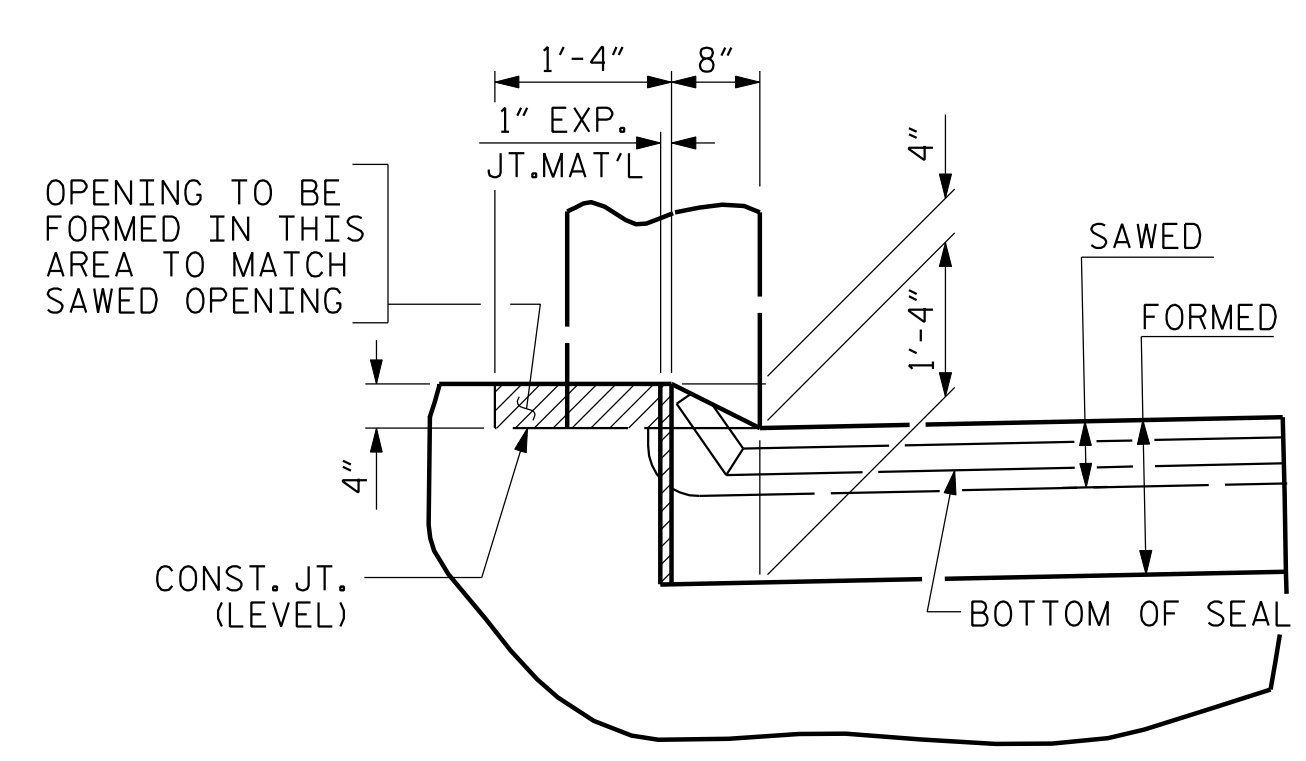
\* BASED ON THE MINIMUM BLOCKOUT SHOWN.



**PLAN**



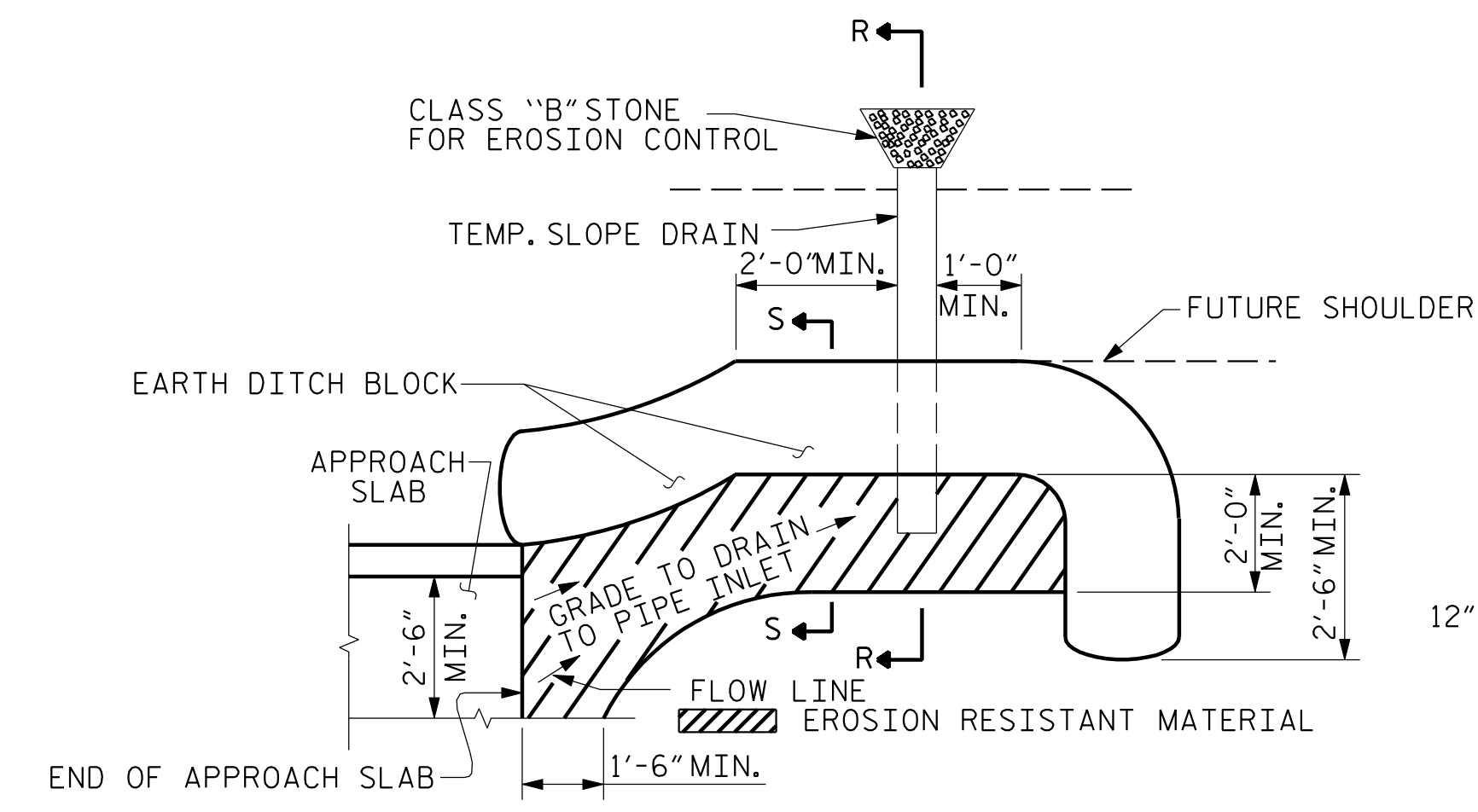
**SECTION A-A**



**SECTION B-B**

**JOINT SEAL DETAILS @ END BENT**

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

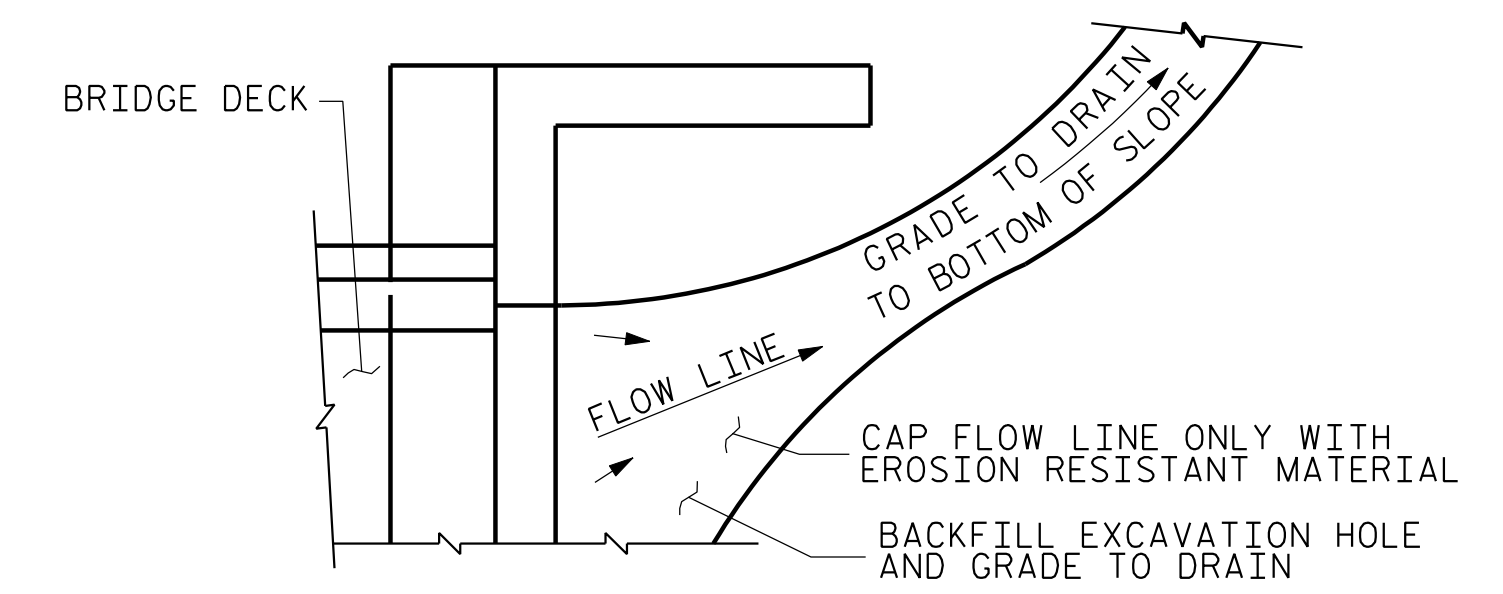


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

**PLAN VIEW**

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

**TEMPORARY DRAINAGE DETAIL**

PROJECT NO. W-5518

COLUMBUS COUNTY

STATION: 24+06.36 -L- POT

SHEET 2 OF 2

PLANS PREPARED BY:  
**MULKEY**  
ENGINEERS & CONSULTANTS  
PO Box 23127  
RALEIGH, N.C. 27636  
(919) 851-1912  
(919) 851-1918 FAX  
WWW.MULKEYINC.COM  
NO LICENSE NO. 0-1031

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



10/2/2015

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			33

STD. NO. BAS4

