

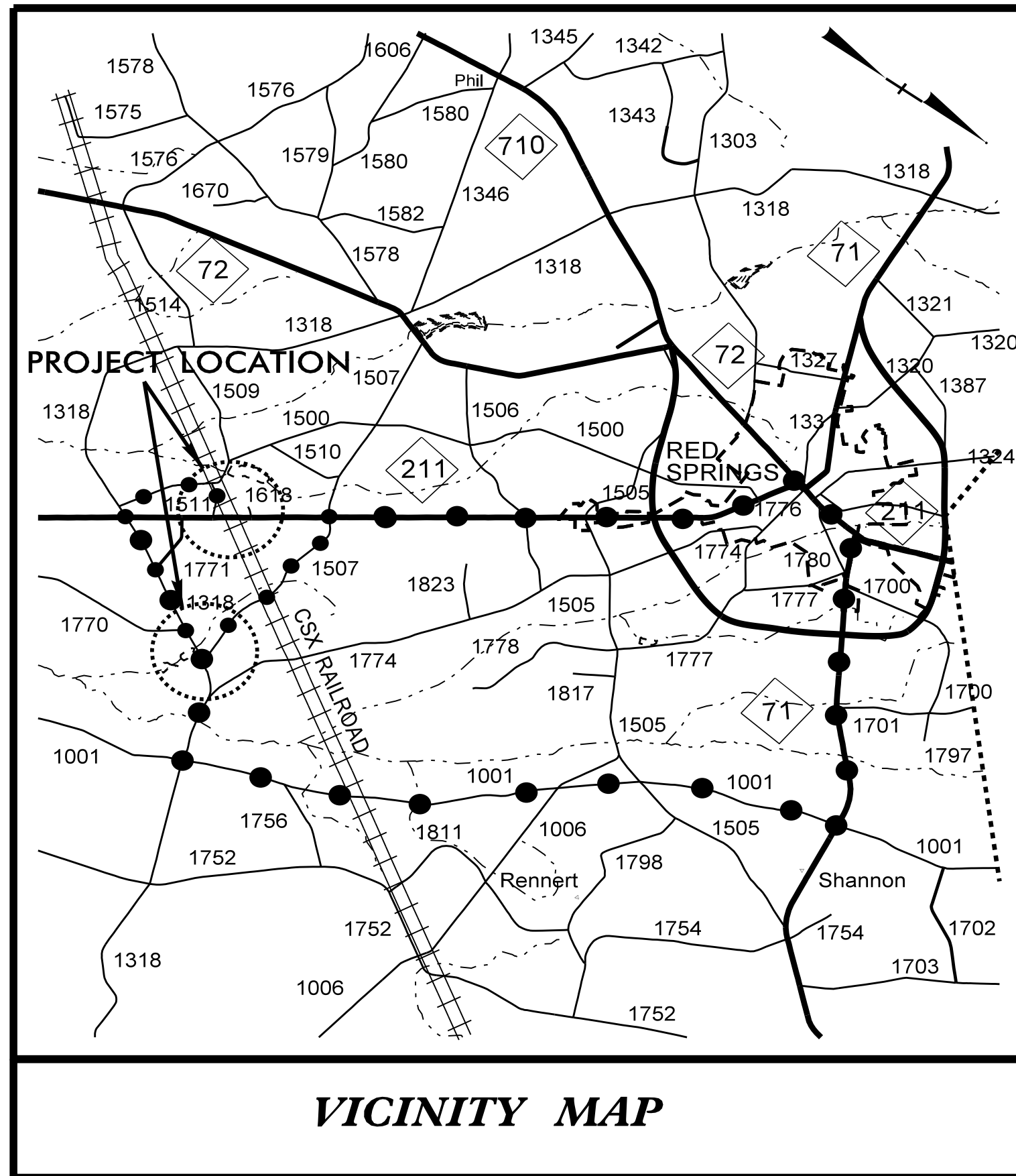
**This electronic collection of documents is provided  
for the convenience of the user  
and is Not a Certified Document –**

**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.**

**TIP PROJECT: B-4616**

**CONTRACT: C203937**



**VICINITY MAP**

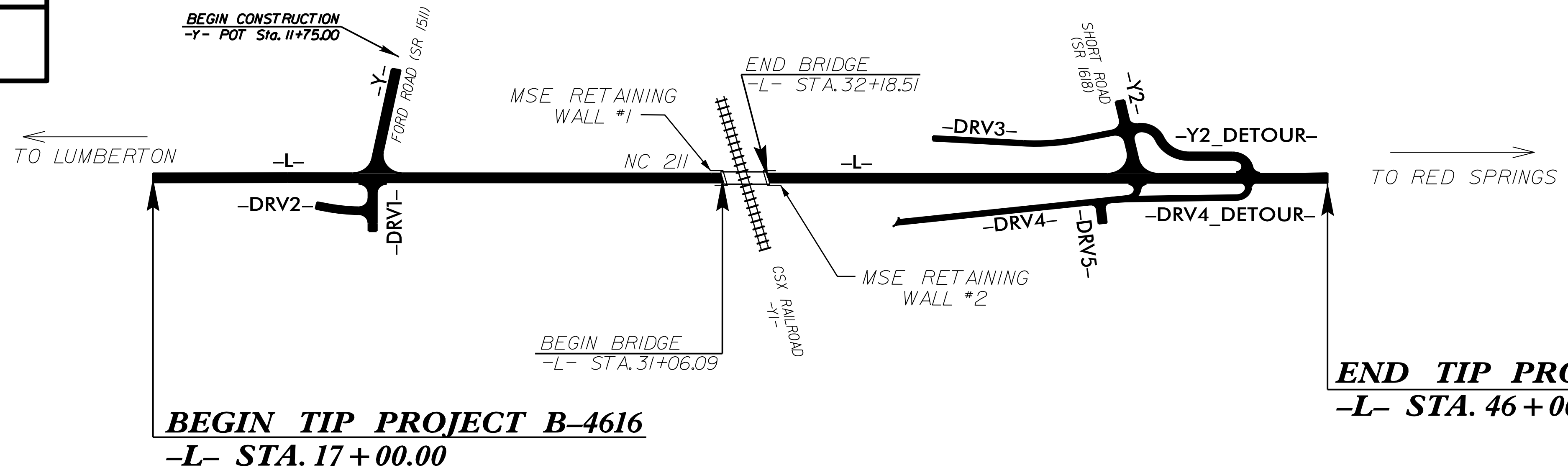
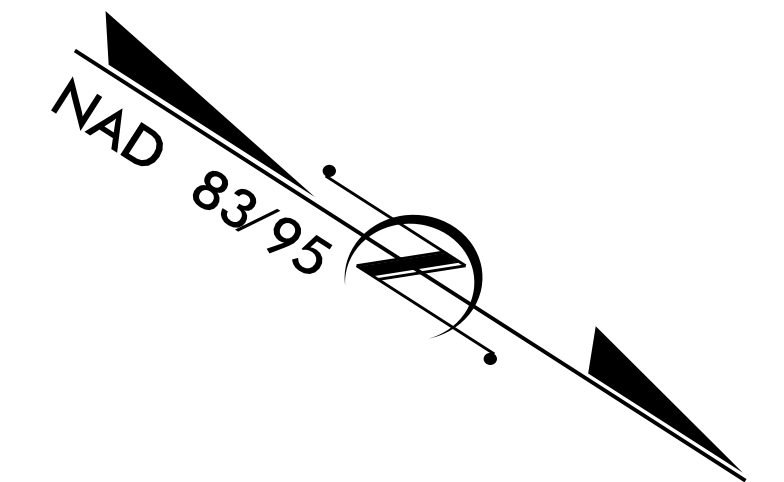
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**ROBESON COUNTY**

**LOCATION: BRIDGE NO. 18 OVER CSX RAILROAD ON NC 211**

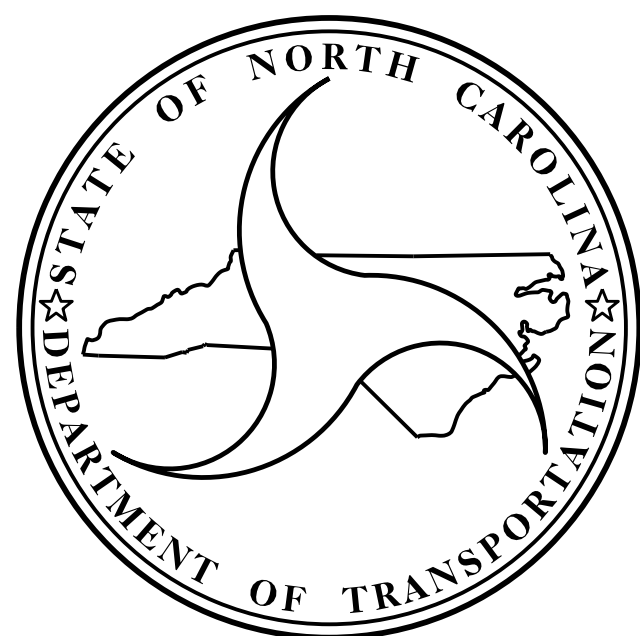
**TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4616	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33798.1.1	BRSTP-211(16)	PE	
33798.2.1	BRSTP-211(16)	R/W & UTIL	
33798.3.1		CONST.	



**END TIP PROJECT B-4616**  
**-L- STA. 46 + 00.00**

**STRUCTURE**



**DESIGN DATA**  
 ADT 2017 = 4678  
 ADT 2040 = 8000  
 K = 10 %  
 D = 55 %  
 T = 7 % \*  
 V = 60 MPH  
 \* TTST 4% DUAL 3%  
 RURAL MAJOR COLLECTOR  
 REGIONAL TIER

**PROJECT LENGTH**

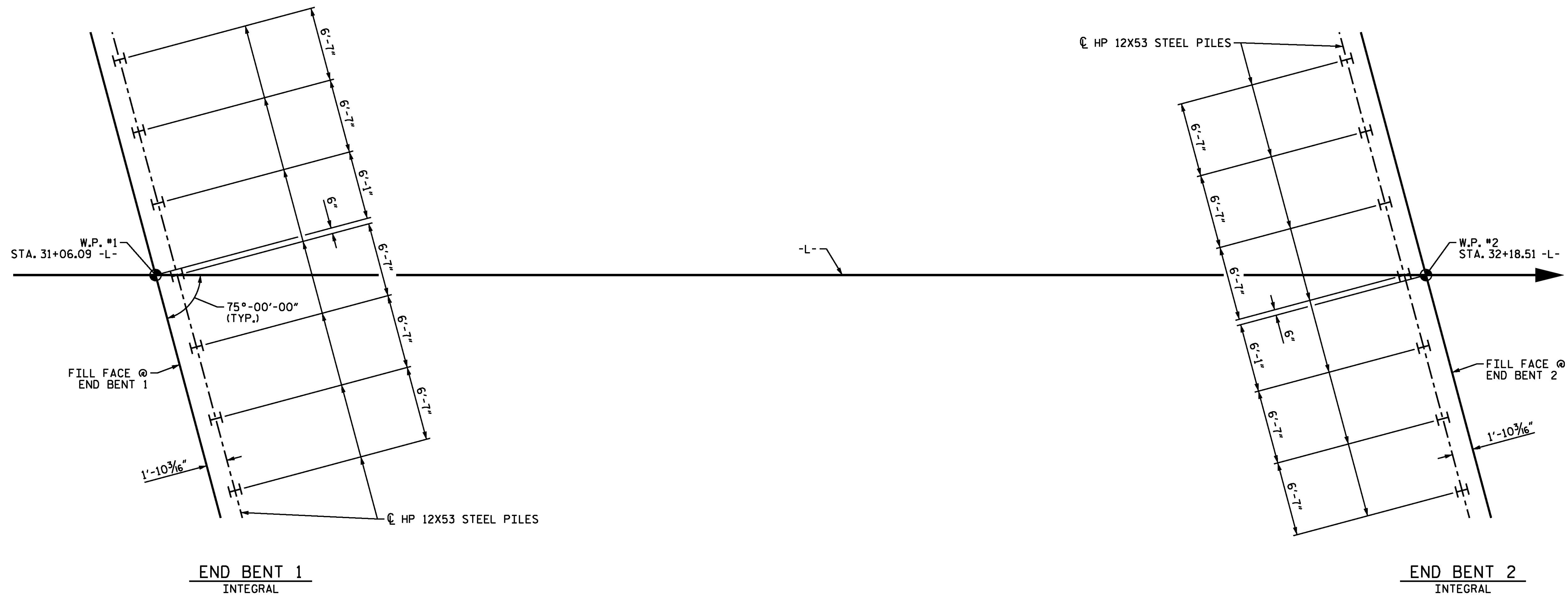
LENGTH ROADWAY TIP PROJECT B-4616 = 0.528 MILES  
 LENGTH STRUCTURE TIP PROJECT B-4616 = 0.021 MILES  
 TOTAL LENGTH TIP PROJECT B-4616 = 0.549 MILES

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

2012 STANDARD SPECIFICATIONS

LETTING DATE :  
 June 20, 2017





## FOUNDATION LAYOUT

### NOTES

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 130 TONS PER PILE. DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT 1 AND END BENT 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

CONSTRUCT MSE RETAINING WALL 1 AND MSE RETAINING WALL 2 BEFORE INSTALLING FOUNDATIONS FOR END BENT 1 AND END BENT 2.

INSTALL A 16 GAGE 24-INCH DIAMETER CORRUGATED STEEL PIPE FOR EACH END BENT PILE LOCATION THROUGH THE WALL BACKFILL ZONE DURING MSE WALL CONSTRUCTION. DRIVE END BENT PILES AT END BENT 1 AND 2 THROUGH THE PIPES AFTER COMPLETION OF BOTH THE MSE WALLS AND WAITING PERIODS AND FILL THE PIPES WITH SAND BEFORE END BENT CAP CONSTRUCTION. FOR 16 GAGE 24-INCH DIAMETER CORRUGATED PIPES, SEE MSE RETAINING WALL PLANS.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING MSE RETAINING WALL 1 AND A 2 MONTH WAITING PERIOD FOR MSE RETAINING WALL 2 TO THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-  
12+10.30 -Y1-  
 SHEET 2 OF 4

DESIGNED BY: M.J. OSTRISHKO DATE: 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
 CHECKED BY: J.D. BORUTA DATE: 05/2016  
 DESIGN ENGINEER OF RECORD: M.J. OSTRISHKO DATE: 06/2016

7/26/2016  
 R:\Raleigh Office NCDOT\B-4616 Robeson County\400.Structures\Drafting\G0\401.003.B4616\_SMU\_FL01.dgn  
 usmo04281

**WSP**  
**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165

STATE OF NORTH CAROLINA  
 PROFESSIONAL SEAL  
 ENGINEER  
 MICHAEL A. PEECE  
 8/2/2016

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON NC 211  
 OVER CSX RAILROAD  
 BETWEEN  
 SR 1318 AND SR 1507

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-2
1			3			TOTAL SHEETS
2			4			25

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

### NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.

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

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

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS @ 50'-0" REINFORCED CONCRETE DECK ON 4 LINES 18X36 RCDG @ 6'-8" CENTERS; 24'-0" CLEAR ROADWAY WIDTH WITH BITUMINOUS WEARING SURFACE ON END BENTS; RC CAP/PPC @ 4'-2" CENTERS, BENTS; RC CAP/PPC @ 4'-2" CENTERS AND LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMITS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THE RAILROAD TRACK TOP OF ELEVATIONS ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION VERIFY TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

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

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

IF A TEMPORARY AT-GRADE ACCESS ACROSS THE RAILROAD TRACK IS REQUIRED, THE CONTRACTOR MUST OBTAIN AN AGREEMENT WITH CSX RAILROAD.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

### TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SET UP FOR HP 12X53 STEEL PILES	HP 12 X 53 STEEL PILES	PILE REDRIVES	CONCRETE BARRIER RAIL	63" CHAIN LINK FENCE	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	No. LIN. FT.	EACH	No. LIN. FT.	EACH	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			3,963	4,600				4 440.0				221.38	210.92			
END BENT 1					24.7		3,335		7	7 525.0	4			14.8		
END BENT 2					24.7		3,335		7	7 525.0	4			14.8		
TOTAL	LUMP SUM	2	3,963	4,600	49.4	LUMP SUM	6,670	4 440.0	14	14 1,050.0	8	221.38	210.92	29.6	LUMP SUM	LUMP SUM

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-  
12+10.30 -Y1-  
 SHEET 3 OF 4

DESIGNED BY: M.J. OSTRISHKO DATE : 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE : 04/2016  
 CHECKED BY: N.A. PIERCE DATE : 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE : 06/2016

**WSP**  
**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165

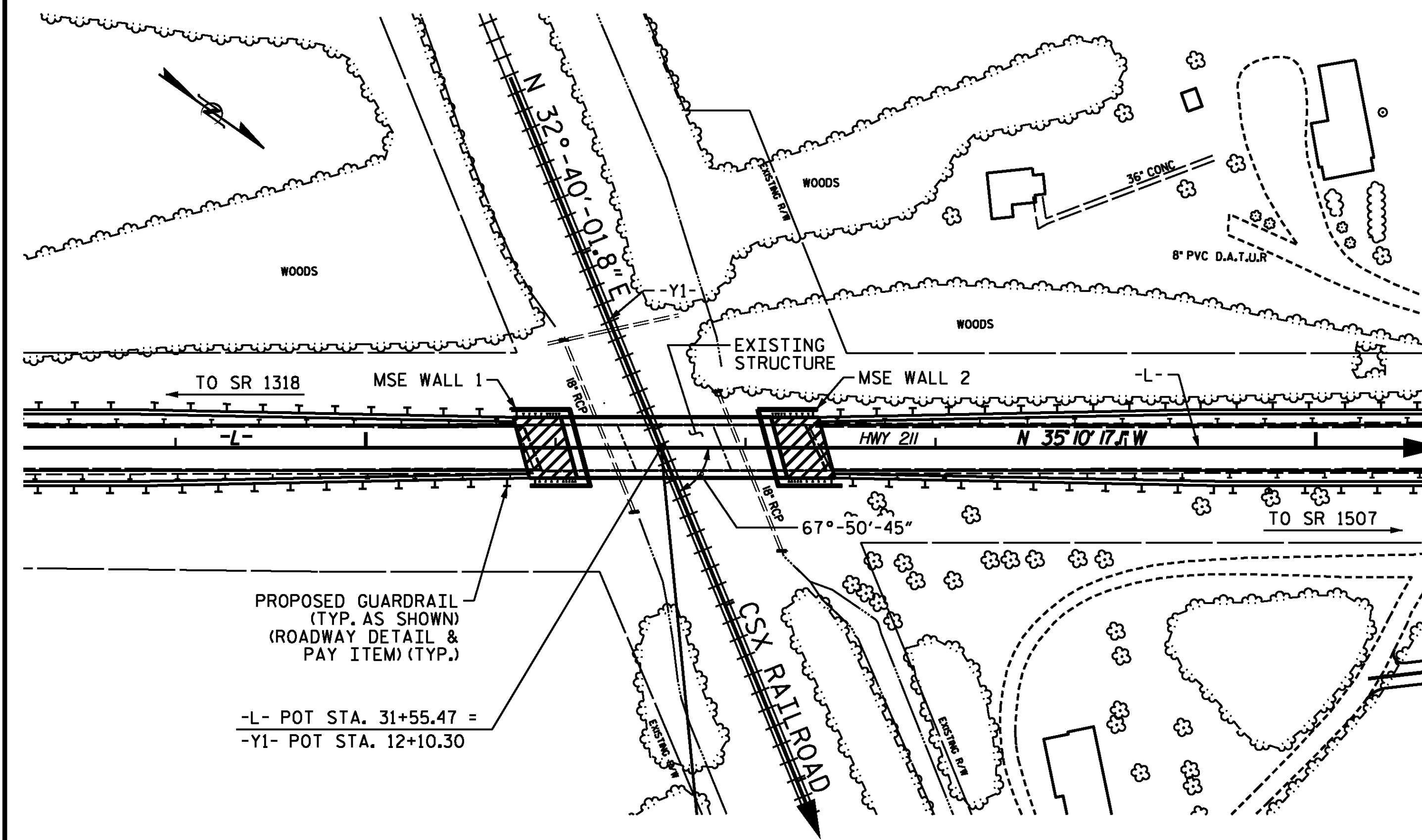
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON NC 211  
 OVER CSX RAILROAD  
 BETWEEN  
 SR 1318 AND SR 1507  
 4/13/2017

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON NC 211  
 OVER CSX RAILROAD  
 BETWEEN  
 SR 1318 AND SR 1507

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-3
1			3			TOTAL SHEETS
2			4			25

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

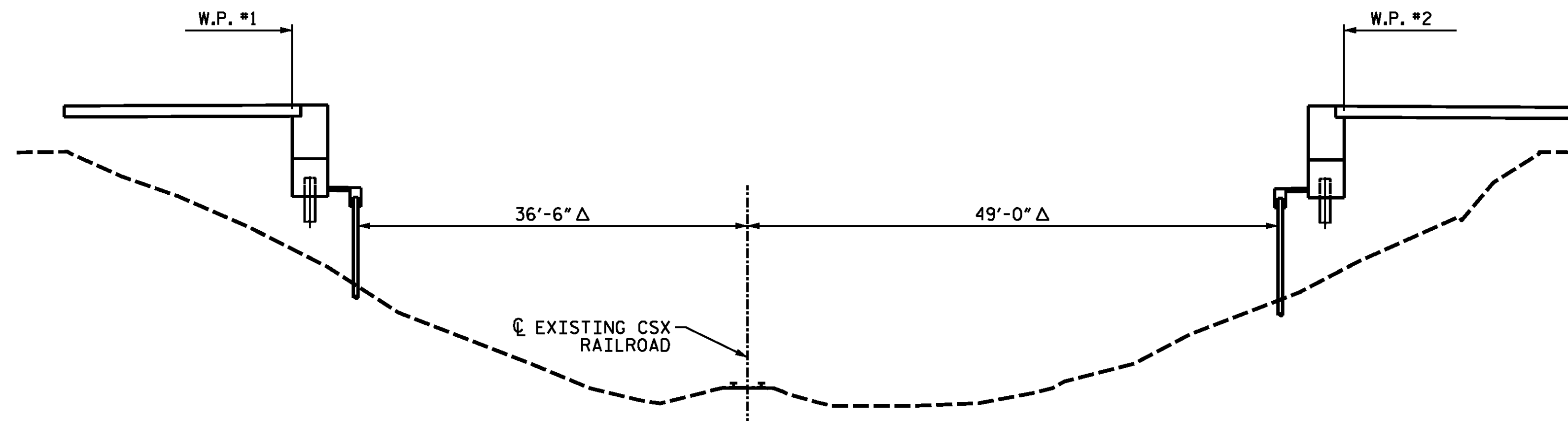
BM #1 : -L- STA 22+77.74, 66.45' RT ELEV. = 180.63' RR SPIKE IN BASE OF 40" OAK TREE



-L- POT STA. 31+55.47 =  
-Y1- POT STA. 12+10.30

**LOCATION SKETCH**

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.  
FOR MSE WALL INFORMATION, SEE MSE PLANS AND SPECIAL PROVISIONS.



END BENT 1

END BENT 2

**MINIMUM CLEARANCE - RAILROAD**

(LOOKING DOWN STATION ALONG RAILROAD)  
(Δ SECTION TAKEN AT RIGHT ANGLES TO CSX RAILROAD AND MSE WALL MINIMUM END)

PROJECT NO. B-4616

ROBESON COUNTY

STATION: 31+55.47 -L-  
12+10.30 -Y1-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**

FOR BRIDGE ON NC 211  
OVER CSX RAILROAD  
BETWEEN  
SR 1318 AND SR 1507



434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. F-0165



8/2/2016

REVISIONS

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

SHEET NO.

S1-4

TOTAL SHEETS

25

DESIGNED BY: M.J. OSTRISHKO DATE : 04/2016  
DRAWN BY: M.J. OSTRISHKO DATE : 04/2016  
CHECKED BY: N.A. PIERCE DATE : 05/2016  
DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE : 06/2016

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

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
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)		
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.02	--	1.75	0.811	1.45	A	EL	54.3	0.953	1.26	A	I	10.3	0.80	0.811	1.02	A	EL	54.3		
	HL-93 (OPERATING)	N/A		1.88	--	1.35	0.811	1.88	A	EL	54.3	0.953	1.67	A	I	10.3	N/A	---	---	---	---	---		
	HS-20 (INVENTORY)	36.000	②	1.45	52	1.75	0.811	2.06	A	EL	54.3	0.953	1.76	A	I	10.3	0.80	0.811	1.45	A	EL	54.3		
	HS-20 (OPERATING)	36.000		2.67	96	1.35	0.811	2.67	A	EL	54.3	0.953	2.32	A	I	10.3	N/A	---	---	---	---	---		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.48	47	1.40	0.811	6.19	A	EL	54.3	0.953	5.72	A	I	10.3	0.80	0.811	3.48	A	EL	54.3	
		SNGARBS2	20.000		2.50	50	1.40	0.811	4.45	A	EL	54.3	0.953	3.95	A	I	10.3	0.80	0.811	2.5	A	EL	54.3	
		SNAGRIS2	22.000		2.34	51	1.40	0.811	4.15	A	EL	54.3	0.953	3.63	A	I	10.3	0.80	0.811	2.34	A	EL	54.3	
		SNCOTTS3	27.250		1.73	47	1.40	0.811	3.07	A	EL	54.3	0.953	2.78	A	I	10.3	0.80	0.811	1.73	A	EL	54.3	
		SNAGGRS4	34.925		1.41	49	1.40	0.811	2.51	A	EL	54.3	0.953	2.23	A	I	10.3	0.80	0.811	1.41	A	EL	54.3	
		SNS5A	35.550		1.38	49	1.40	0.811	2.46	A	EL	54.3	0.953	2.24	A	I	10.3	0.80	0.811	1.38	A	EL	54.3	
		SNS6A	39.950		1.25	50	1.40	0.811	2.23	A	EL	54.3	0.953	2.01	A	I	10.3	0.80	0.811	1.25	A	EL	54.3	
		SNS7B	42.000		1.19	50	1.40	0.811	2.12	A	EL	54.3	0.953	1.95	A	I	10.3	0.80	0.811	1.19	A	EL	54.3	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.52	50	1.40	0.811	2.71	A	EL	54.3	0.953	2.43	A	I	10.3	0.80	0.811	1.52	A	EL	54.3	
		TNT4A	33.075		1.53	51	1.40	0.811	2.72	A	EL	54.3	0.953	2.38	A	I	10.3	0.80	0.811	1.53	A	EL	54.3	
		TNT6A	41.600		1.24	52	1.40	0.811	2.20	A	EL	54.3	0.953	2.04	A	I	10.3	0.80	0.811	1.24	A	EL	54.3	
		TNT7A	42.000		1.24	52	1.40	0.811	2.20	A	EL	54.3	0.953	2.00	A	I	10.3	0.80	0.811	1.24	A	EL	54.3	
		TNT7B	42.000		1.26	53	1.40	0.811	2.24	A	EL	54.3	0.953	1.92	A	I	10.3	0.80	0.811	1.26	A	EL	54.3	
		TNAGRIT4	43.000		1.21	52	1.40	0.811	2.15	A	EL	54.3	0.953	1.85	A	I	10.3	0.80	0.811	1.21	A	EL	54.3	
		TNAGT5A	45.000		1.15	52	1.40	0.811	2.04	A	EL	54.3	0.953	1.81	A	I	10.3	0.80	0.811	1.15	A	EL	54.3	
TNAGT5B	45.000	③	1.14	51	1.40	0.811	2.03	A	EL	54.3	0.953	1.76	A	I	10.3	0.80	0.811	1.14	A	EL	54.3			

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)

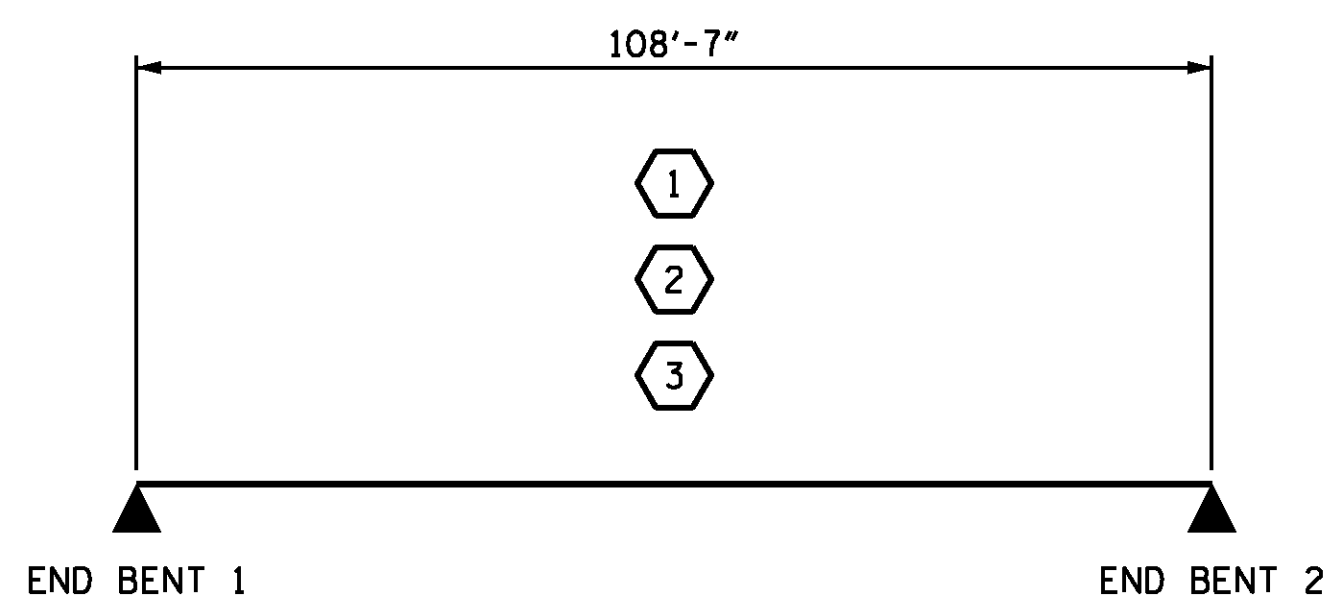
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



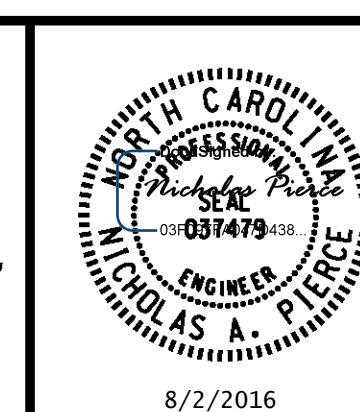
LRFR SUMMARY

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

DESIGNED BY: C.J. HOWARD DATE: 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
 CHECKED BY: Z. VAN BRUNT DATE: 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

DRAWN BY: MAA 1/08  
 CHECKED BY: GM/DI 2/08  
 REV. 11/2/08RR MAA/GM  
 REV. 10/1/11 MAA/GM

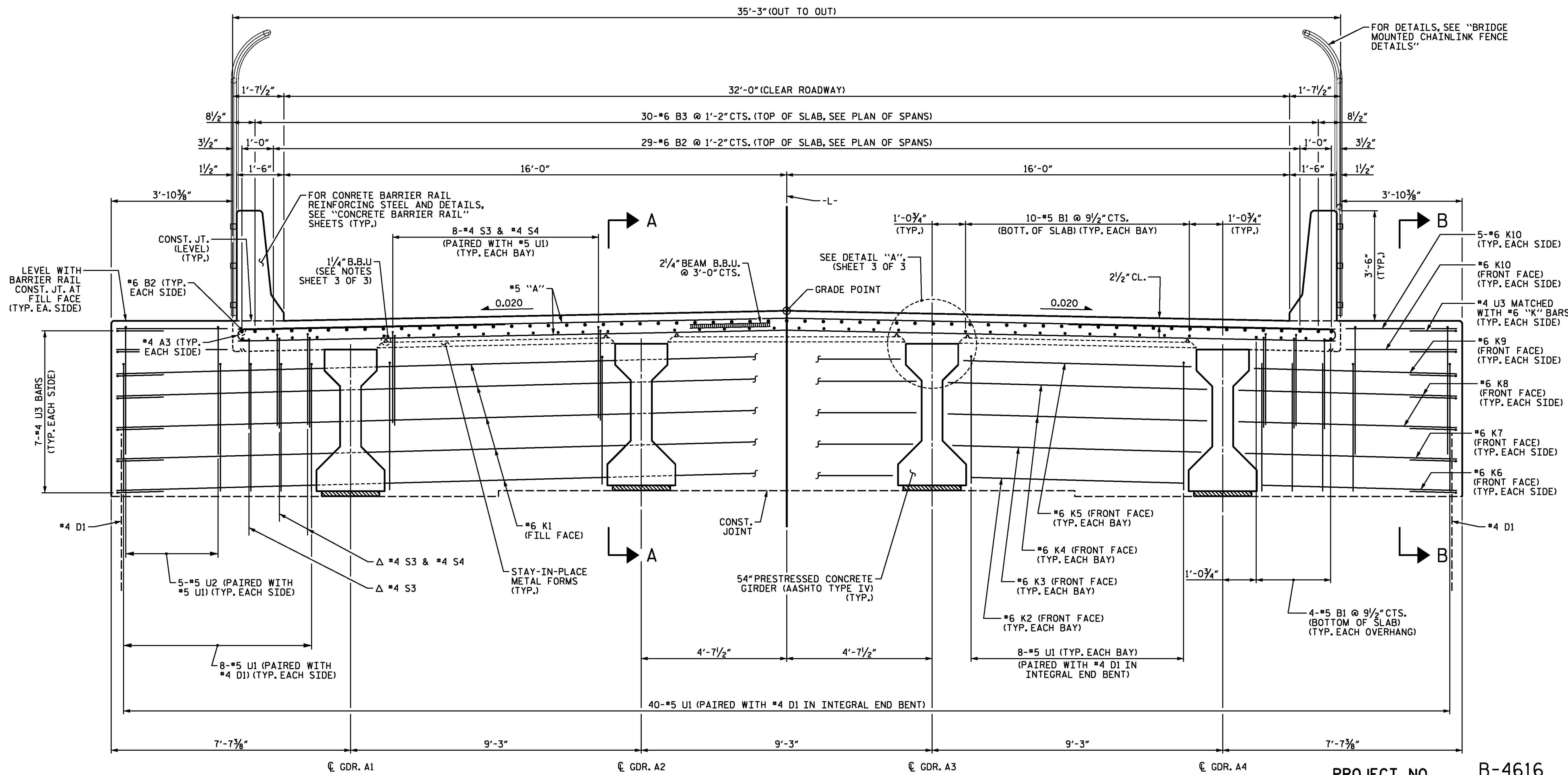
**WSP**  
**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165



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. S1-5  
 TOTAL SHEETS 25



**TYPICAL SECTION AT INTEGRAL END BENT**

END BENT 1 SHOWN, END BENT 2 SIMILAR.  
 FOR SECTION THRU END BENT, SEE "SECTION A-A" SHEET 3 OF 3.  
 Δ (PAIRED WITH #5 U1) (TYPICAL EACH OVERHANG)  
 FOR SECTION THRU END BENT, SEE "SECTION B-B" SHEET 3 OF 3.  
 FOR #4 D1 BARS, SEE INTEGRAL END BENT 1 AND 2.

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

**WSP**  
**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165

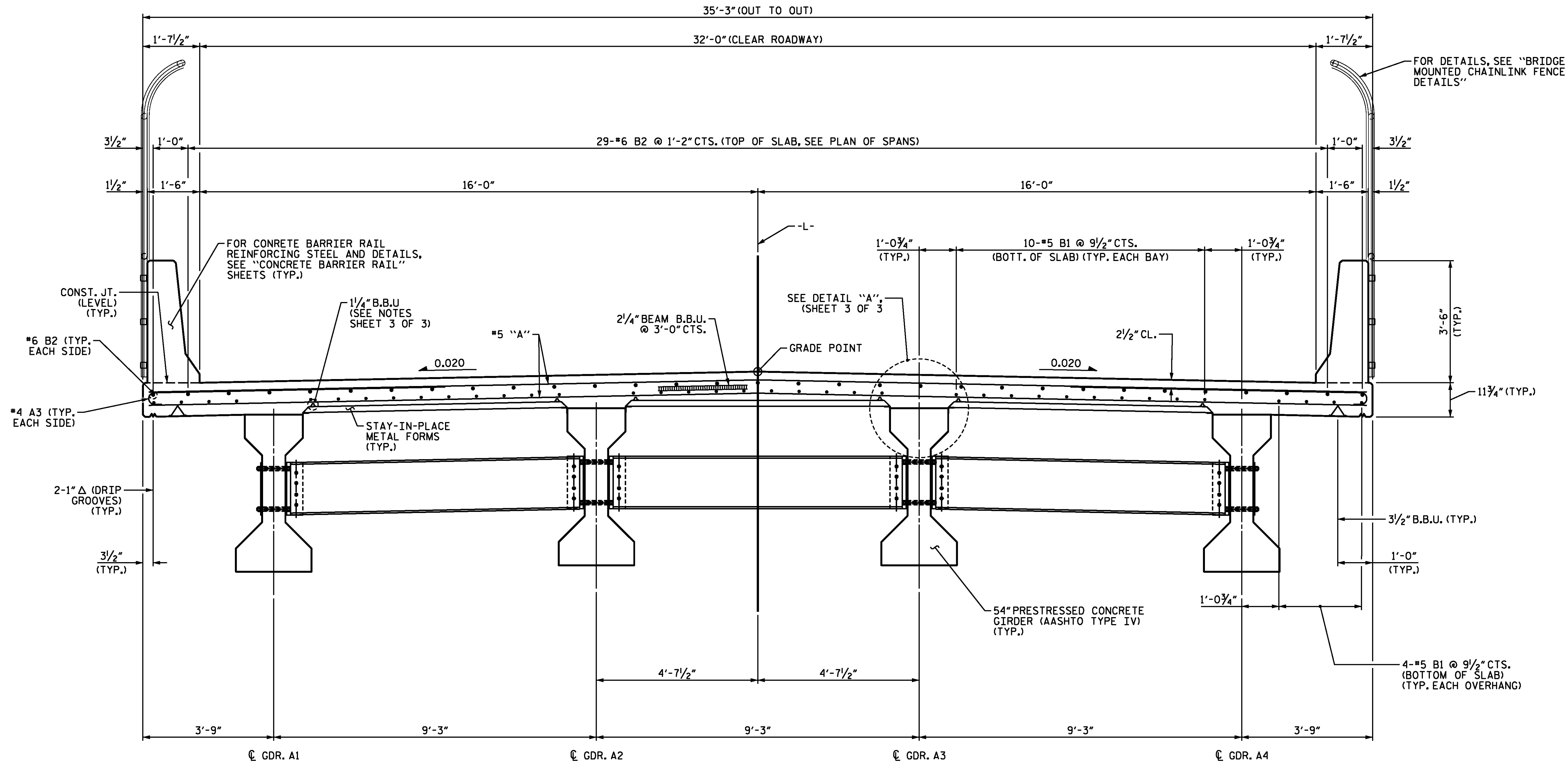
8/2/2016

SEAL  
 MICHAEL A. PIERCE  
 ENGINEER  
 031479

DESIGNED BY:	C.J. HOWARD	DATE :	04/2016
DRAWN BY:	M.J. OSTRISHKO	DATE :	04/2016
CHECKED BY:	J.D. BORUTA	DATE :	05/2016
DESIGN ENGINEER OF RECORD:	N.A. PIERCE	DATE :	06/2016

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





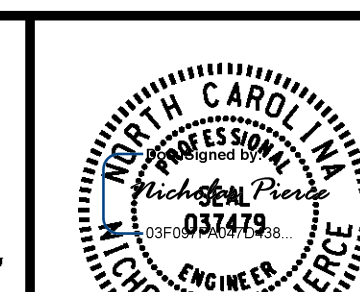
**TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM**

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

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION

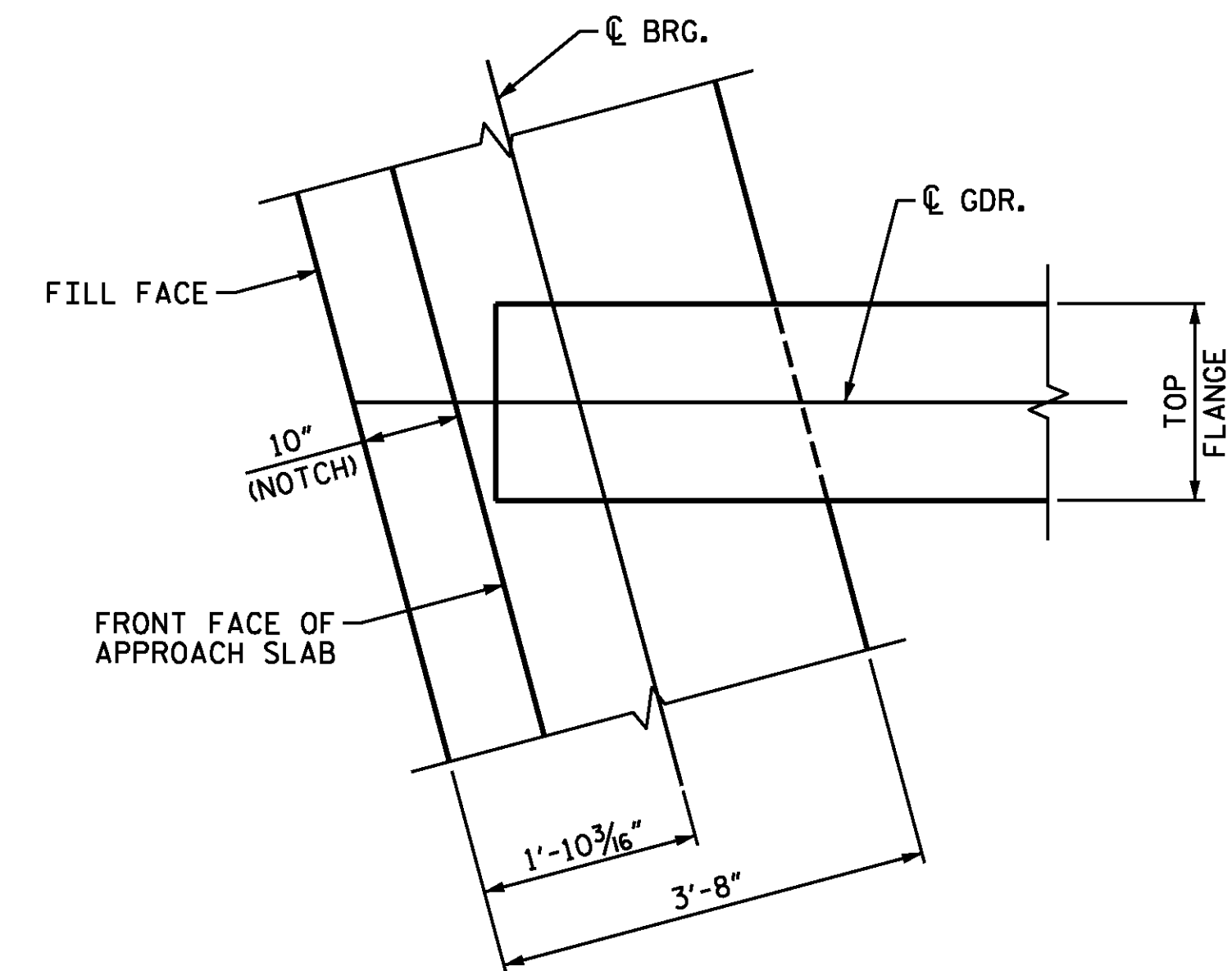
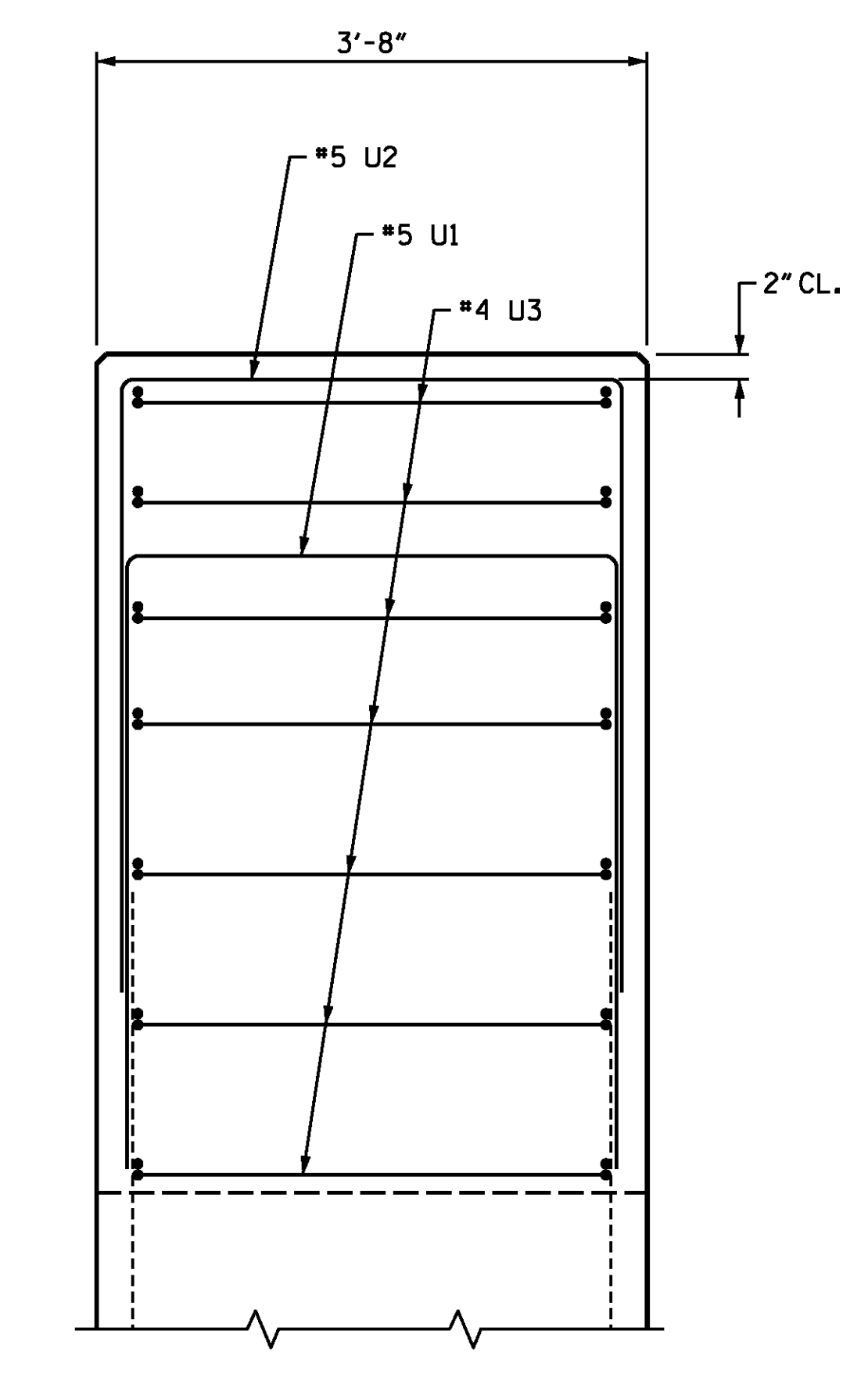
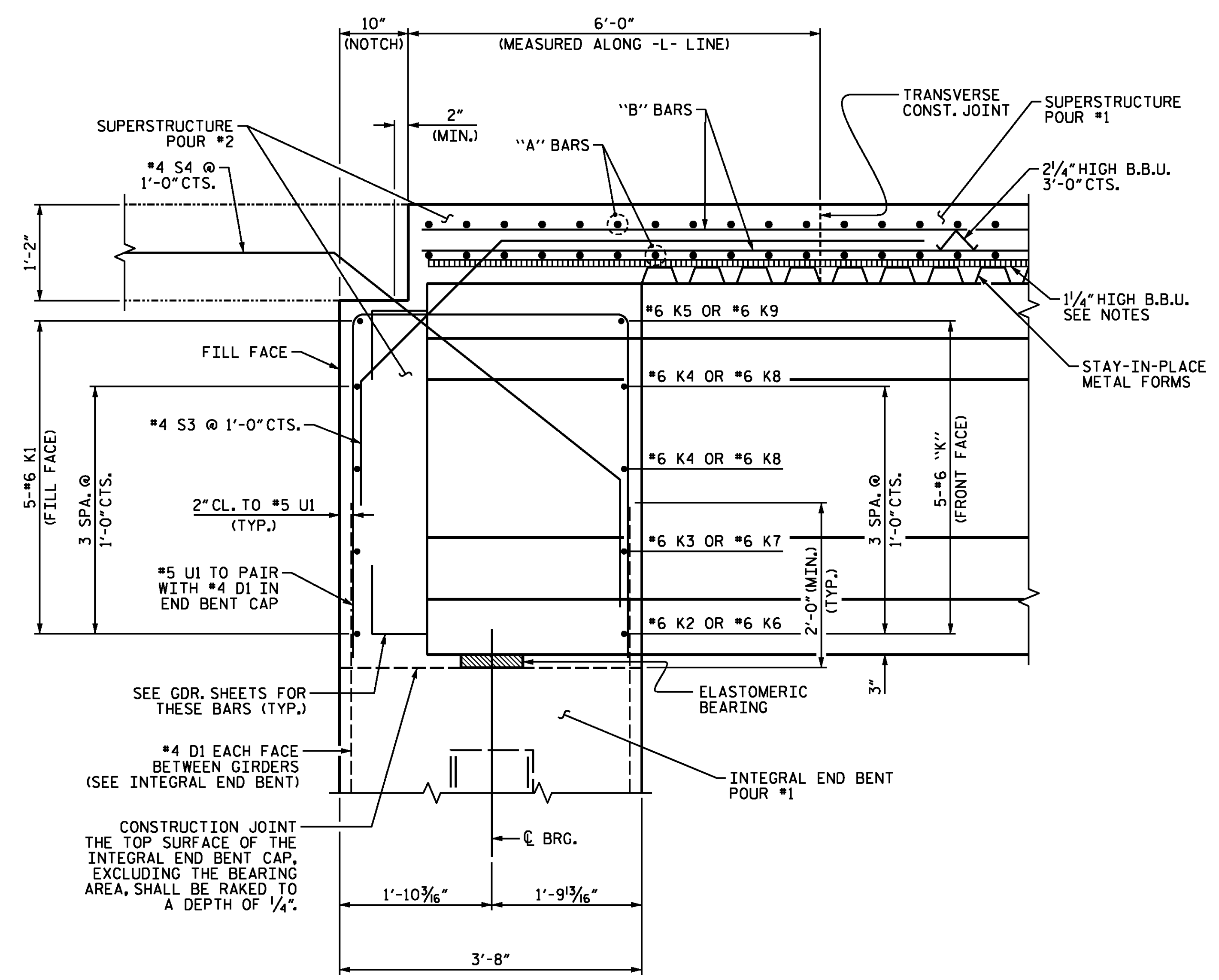


8/2/2016

DESIGNED BY: C.J. HOWARD DATE: 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
 CHECKED BY: J.D. BORUTA DATE: 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-7
1			3			TOTAL SHEETS
2			4			25

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

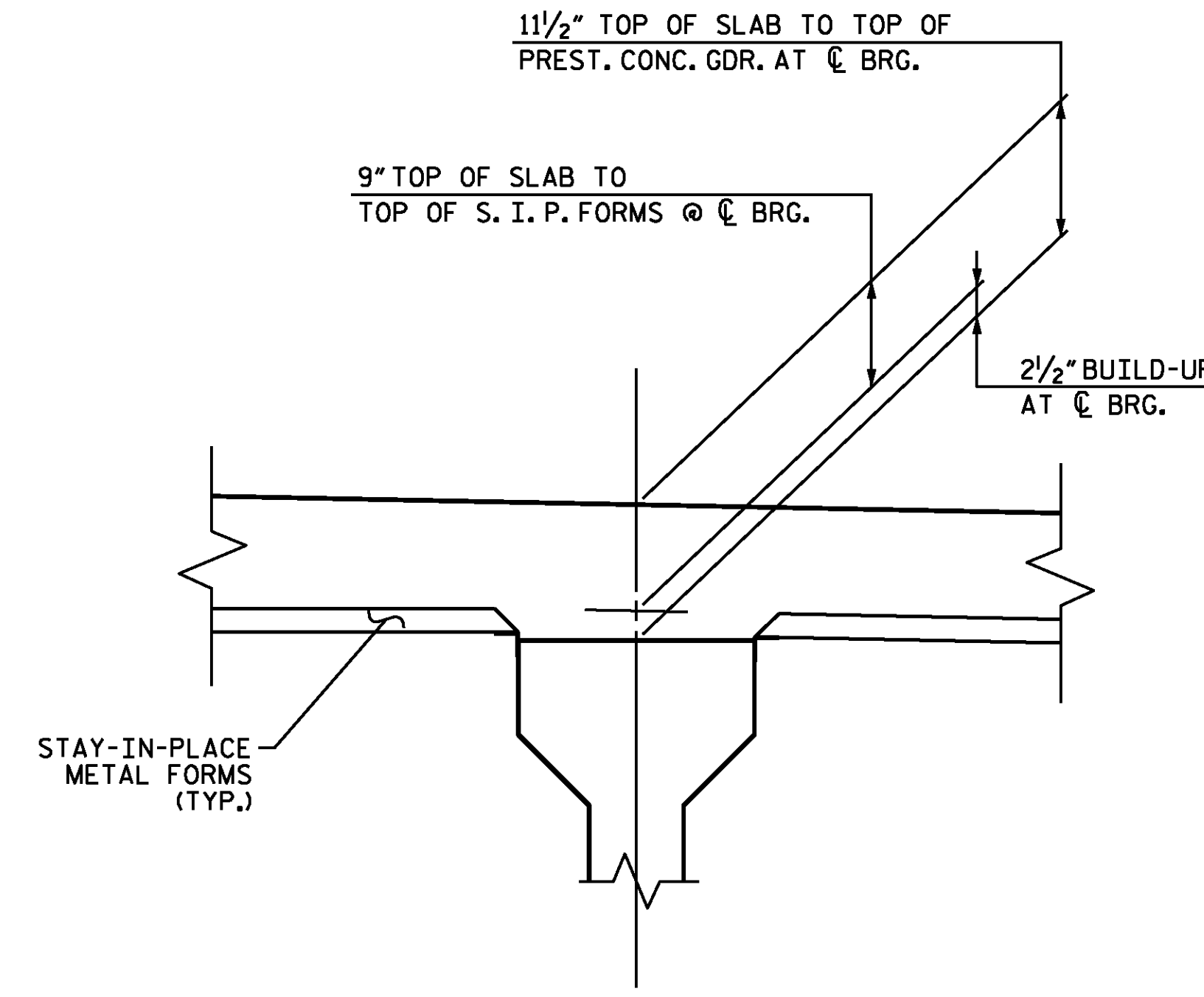


**NOTES**

PROVIDE 1 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.

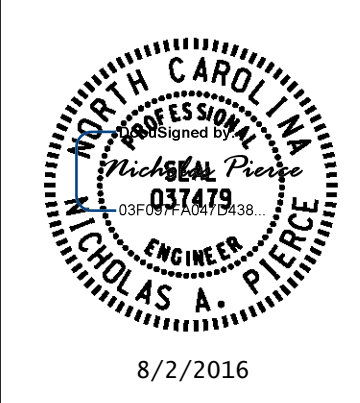
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.



DESIGNED BY: C.J. HOWARD DATE: 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
 CHECKED BY: J.D. BORUTA DATE: 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

6/27/2016 R:\Raleigh Office\NCDOT\B-4616 Robeson County\400.Structures\Drafting\Superstructure\401.015.B4616.SMU.TS03.dgn usmo04281

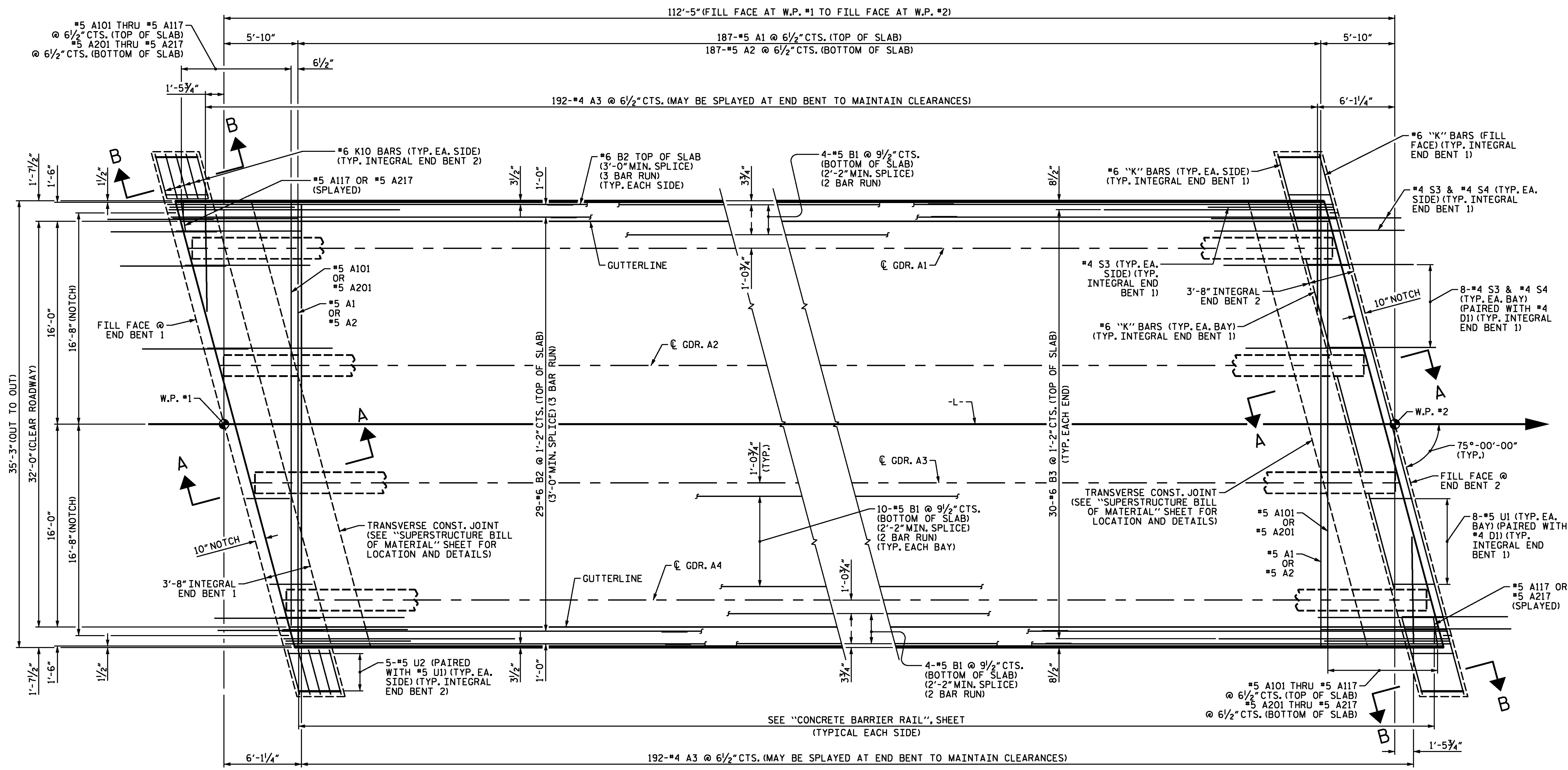
**WSP**  
**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165



PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-  
 SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S1-8					TOTAL SHEETS 25

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



PLAN OF SPAN A

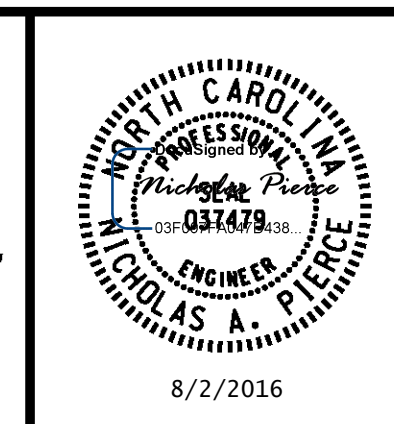
FOR SECTION VIEWS, SEE "TYPICAL SECTION" SHEET 3 OF 3.  
FOR DETAILS OF INTERMEDIATE DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.  
FOR INTERMEDIATE DIAPHRAGM LOCATIONS, SEE "GIRDER LAYOUT" SHEET.

PROJECT NO. B-4616  
ROBESON COUNTY  
STATION: 31+55.47 -L-

DESIGNED BY:	C.J. HOWARD	DATE:	04/2016
DRAWN BY:	M.J. OSTRISHKO	DATE:	04/2016
CHECKED BY:	N.A. PIERCE	DATE:	05/2016
DESIGN ENGINEER OF RECORD:	N.A. PIERCE	DATE:	06/2016

7/26/2016  
R:\Raleigh Office NCDOT\B-4616 Robeson County\400.Structures\Drafting\Superstructure\401.017.B4616.SMU.S1.dgn  
usmo04281

**WSP**  
**PARSONS BRINCKERHOFF**  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. F-0165

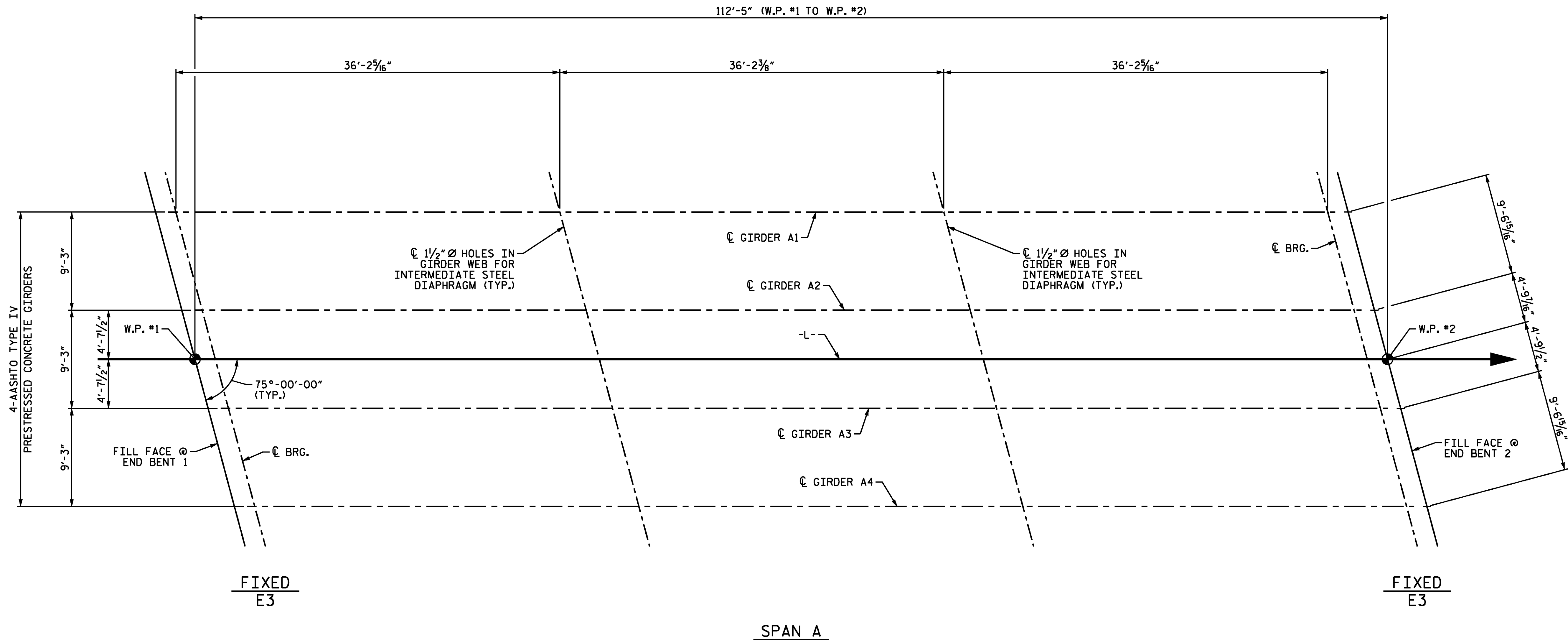


STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
PLAN OF SPAN A

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

SHEET NO.	S1-9
TOTAL SHEETS	25

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



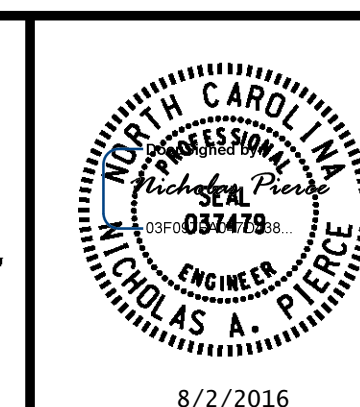
**GIRDER LAYOUT**

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

DESIGNED BY:	C.J. HOWARD	DATE :	04/2016
DRAWN BY:	M.J. OSTRISHKO	DATE :	04/2016
CHECKED BY:	J.D. BORUTA	DATE :	05/2016
DESIGN ENGINEER OF RECORD:	N.A. PIERCE	DATE :	06/2016

7/26/2016  
 R:\Raleigh Office NCDOT\B-4616 Robeson County\400.Structures\Drafting\Superstructure\401.019.B4616.SMU.FL01.dgn  
 usmo04281

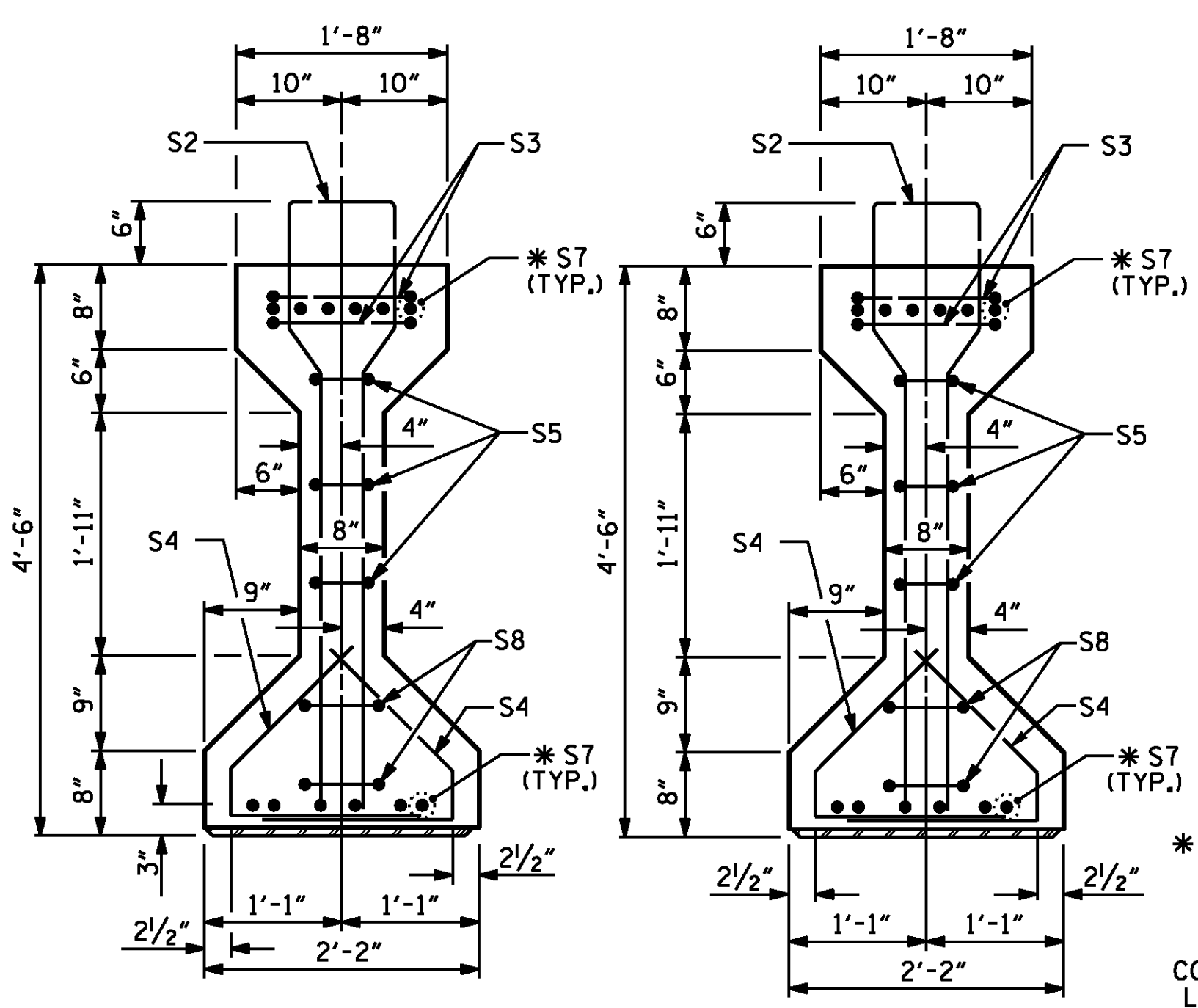
**WSP**  
**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**GIRDER LAYOUT**

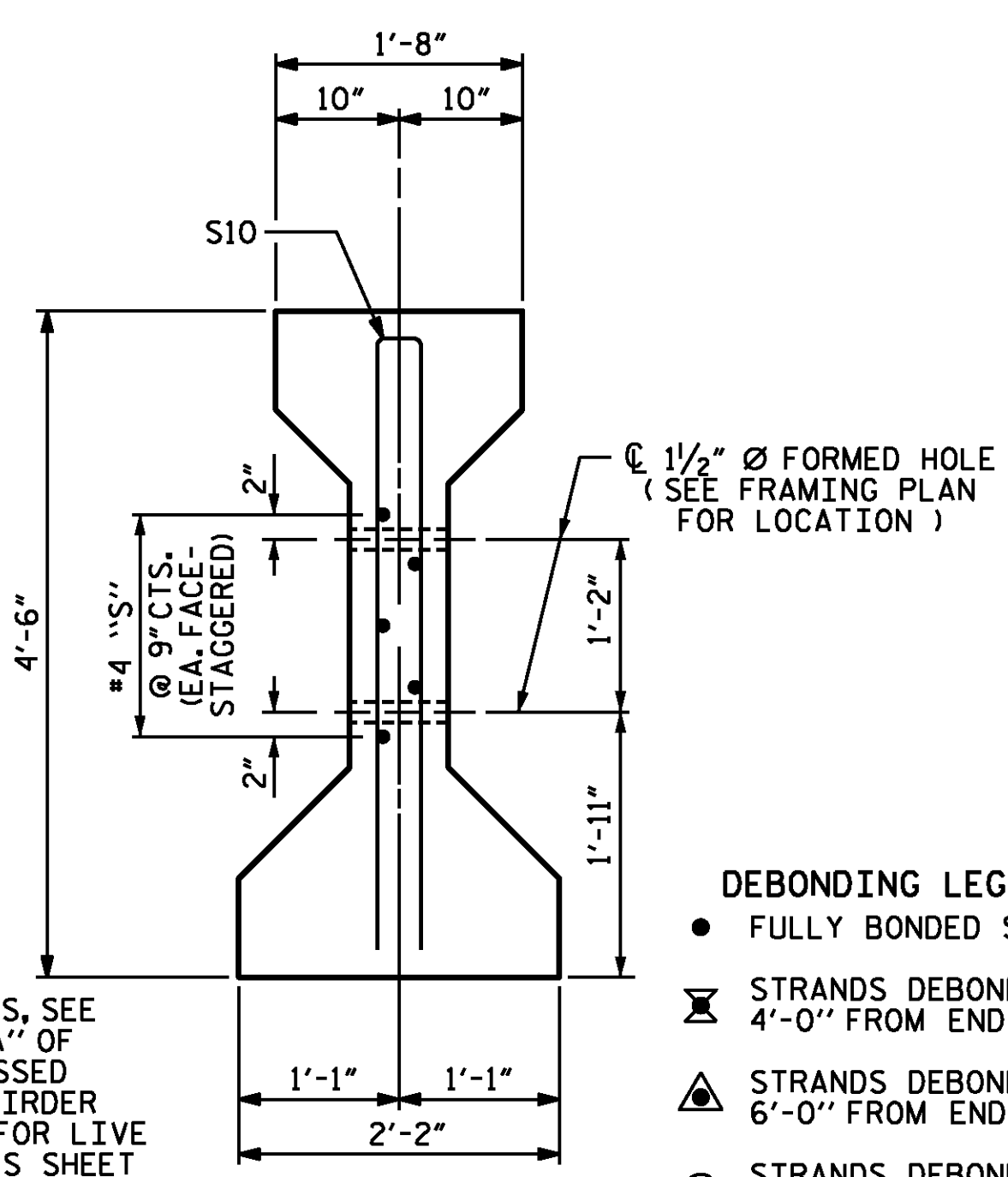
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			25

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**



SECTION A-A

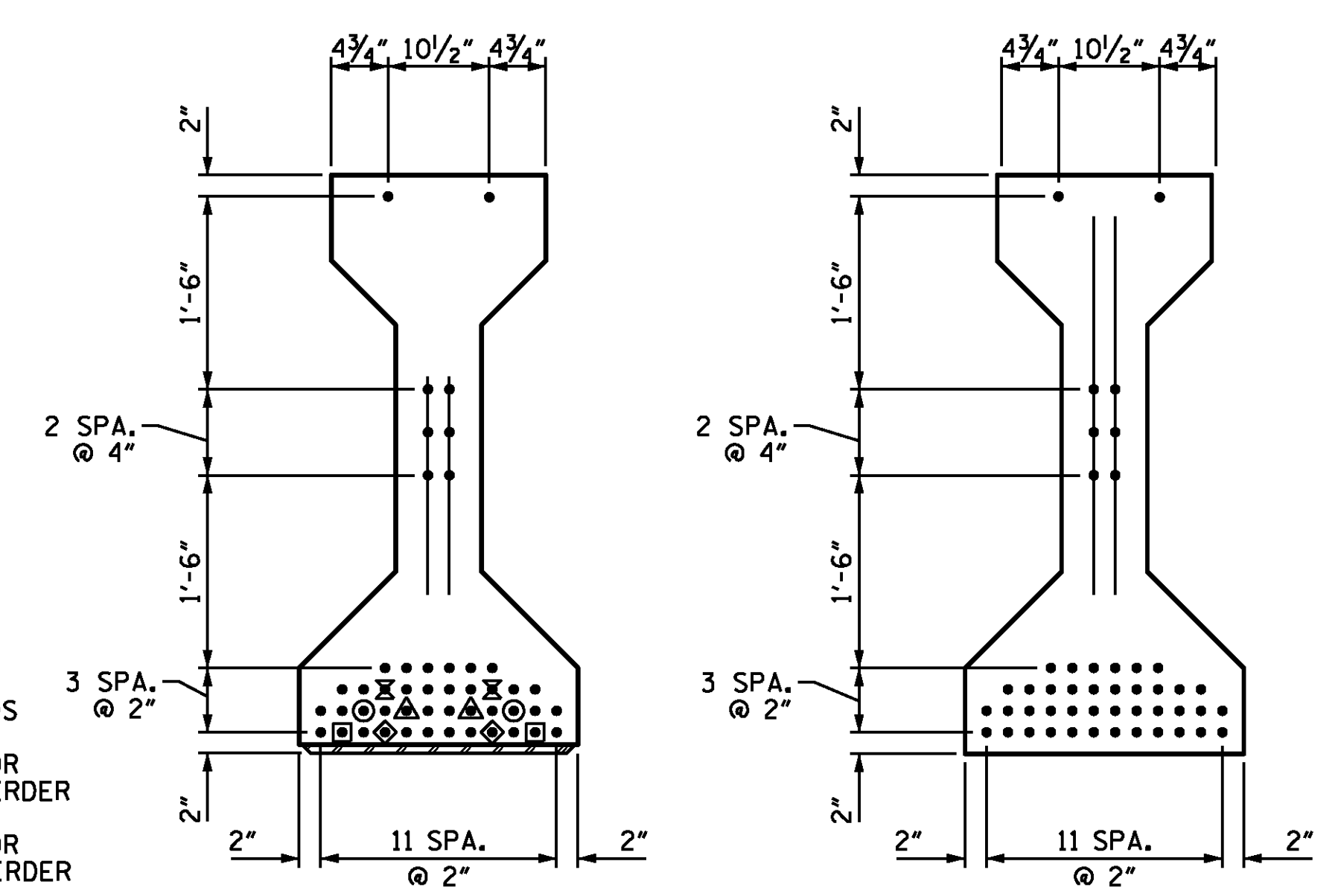
SECTION B-B



SECTION C-C  
(S1 BARS NOT SHOWN)

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

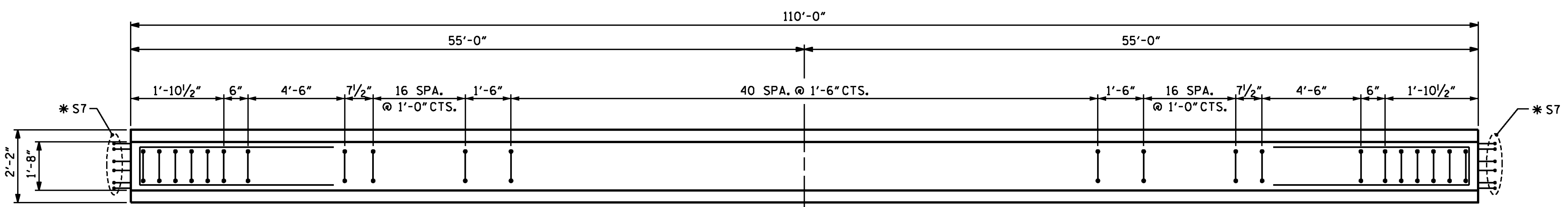
- DEBONDING LEGEND**
- FULLY BONDED STRANDS
  - ⊘ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
  - ⊠ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
  - ⊙ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
  - ⊡ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
  - ⊛ STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER



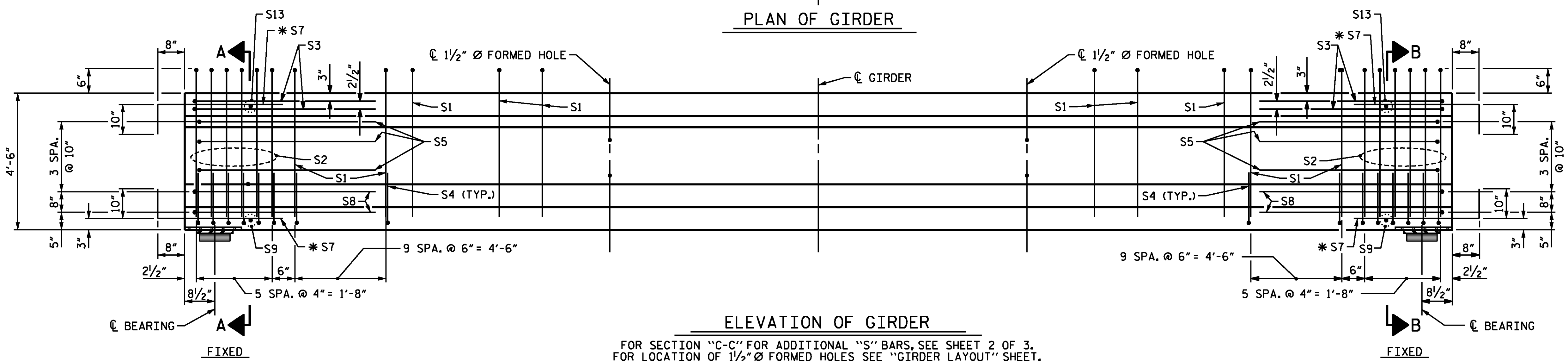
AT END OF GIRDER

AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

FOR SECTION "C-C" FOR ADDITIONAL "S" BARS, SEE SHEET 2 OF 3.  
FOR LOCATION OF 1/2" Ø FORMED HOLES SEE "GIRDER LAYOUT" SHEET.

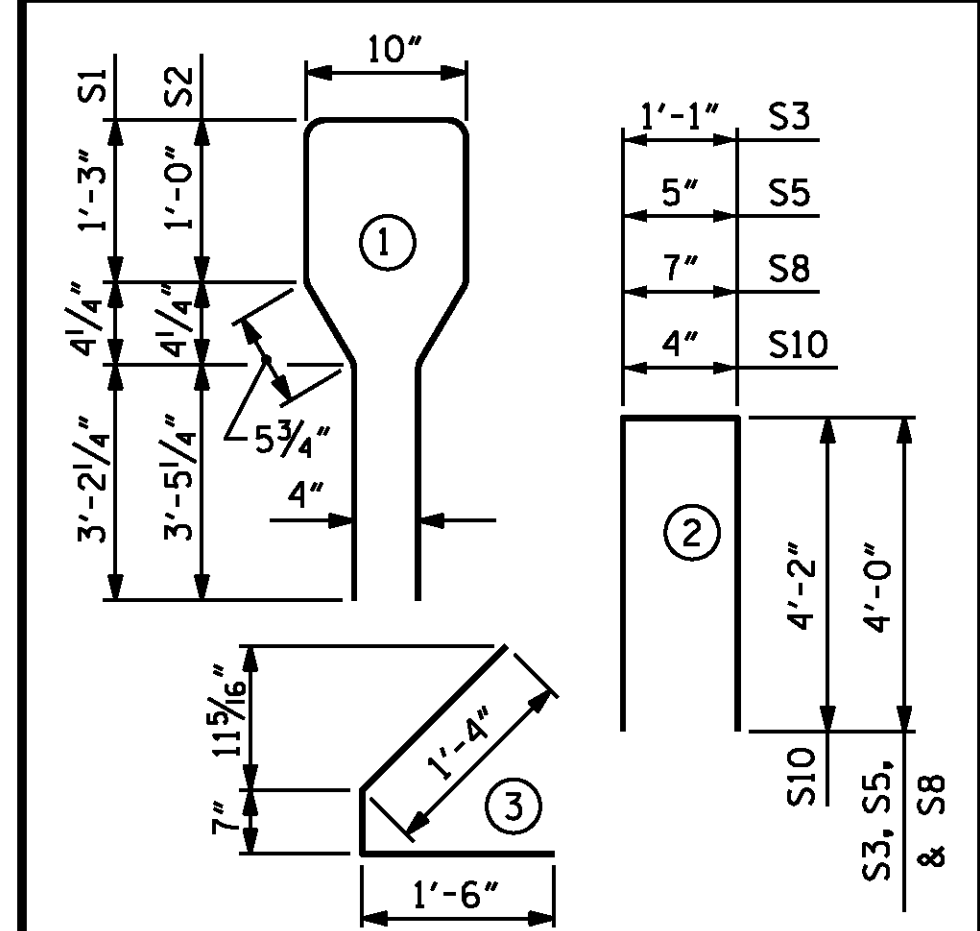
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	95	#4	1	10'-8"	677
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
*S7	24	#5	STR	3'-8"	92
S8	4	#5	2	8'-7"	36
S9	2	#3	STR	1'-10"	1
S10	4	#5	2	8'-8"	36
S11	10	#4	STR	7'-0"	47
S13	2	#3	STR	1'-4"	1

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

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT-TO-OUT



**QUANTITIES FOR ONE GIRDER**

GIRDER QUANTITY	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
4	1,286	22.3	48

**GIRDERS REQUIRED**

NUMBER	LENGTH	TOTAL LENGTH
4	110'-0"	440'-0"

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

SHEET 1 OF 3

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

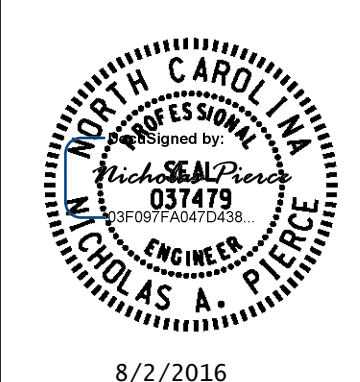
DESIGNED BY:	C.J. HOWARD	DATE:	04/2016
DRAWN BY:	M.J. OSTRISHKO	DATE:	04/2016
CHECKED BY:	J.D. BORUTA	DATE:	05/2016
DESIGN ENGINEER OF RECORD:	N.A. PIERCE	DATE:	06/2016

DRAWN BY:	ELR 8/91	REV. 5/1/06R	TLA/GM
CHECKED BY:	GRP 8/91	REV. 10/1/11	MAA/GM
		REV. 1/15	MAA/TMG

7/28/2016  
 R:\Raleigh Office\NCDOT\B-4616 Robeson County\400.Structures\Drafting\Superstructure\401.021.B4616.SMU.G01.dgn  
 usmo04281



434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165



8/2/2016

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

REVISIONS						SHEET NO. S1-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 25
2			4			

STD. NO. PCG6

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7500 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".

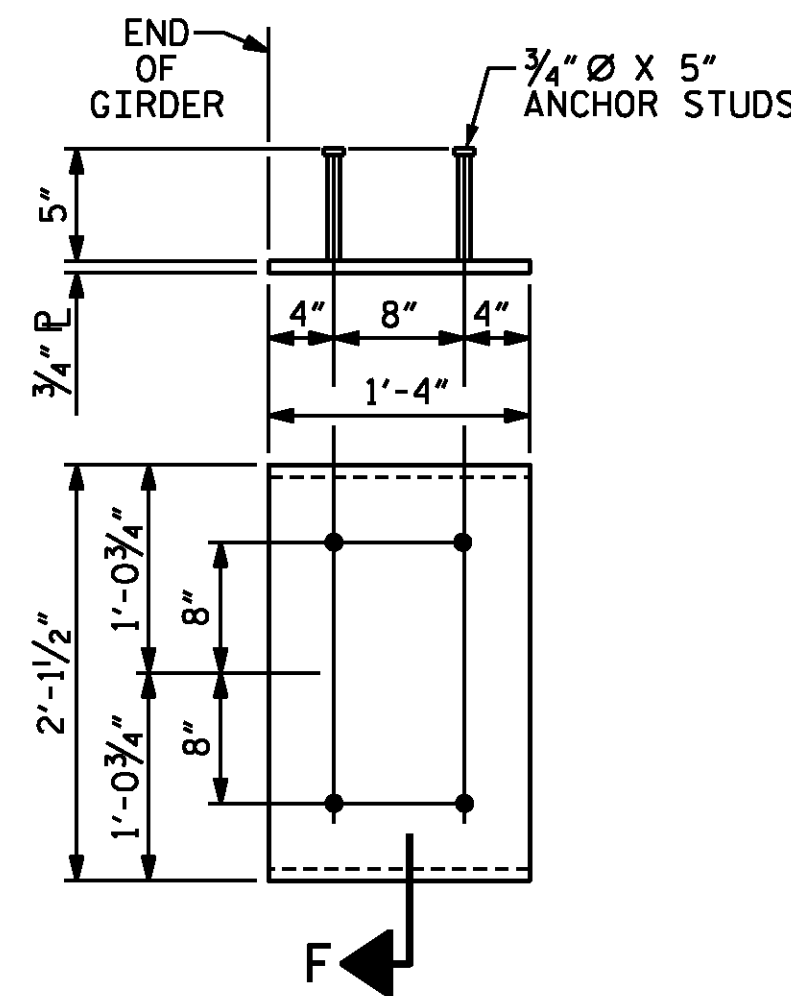
WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

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.

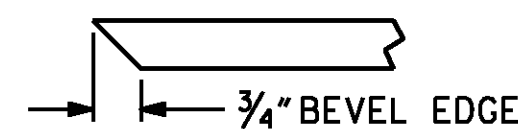
GIRDER CAMBER PREDICTED USING REFINED METHOD FOR CAMBER, PER NCDOT POLICY MEMO (8-28-14)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
SPAN A																						
0.6" Ø LOW RELAXATION	GIRDER A1 & A4																					
TWENTIETH POINTS	CL BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	CL BRG.	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.045	0.090	0.130	0.170	0.202	0.233	0.253	0.273	0.280	0.287	0.280	0.273	0.253	0.233	0.202	0.170	0.130	0.090	0.045	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.037	0.073	0.109	0.144	0.171	0.199	0.217	0.234	0.240	0.246	0.240	0.234	0.217	0.199	0.171	0.144	0.109	0.073	0.037	0
FINAL CAMBER	↑	0	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	7/16"	1/2"	1/2"	1/2"	7/16"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	0

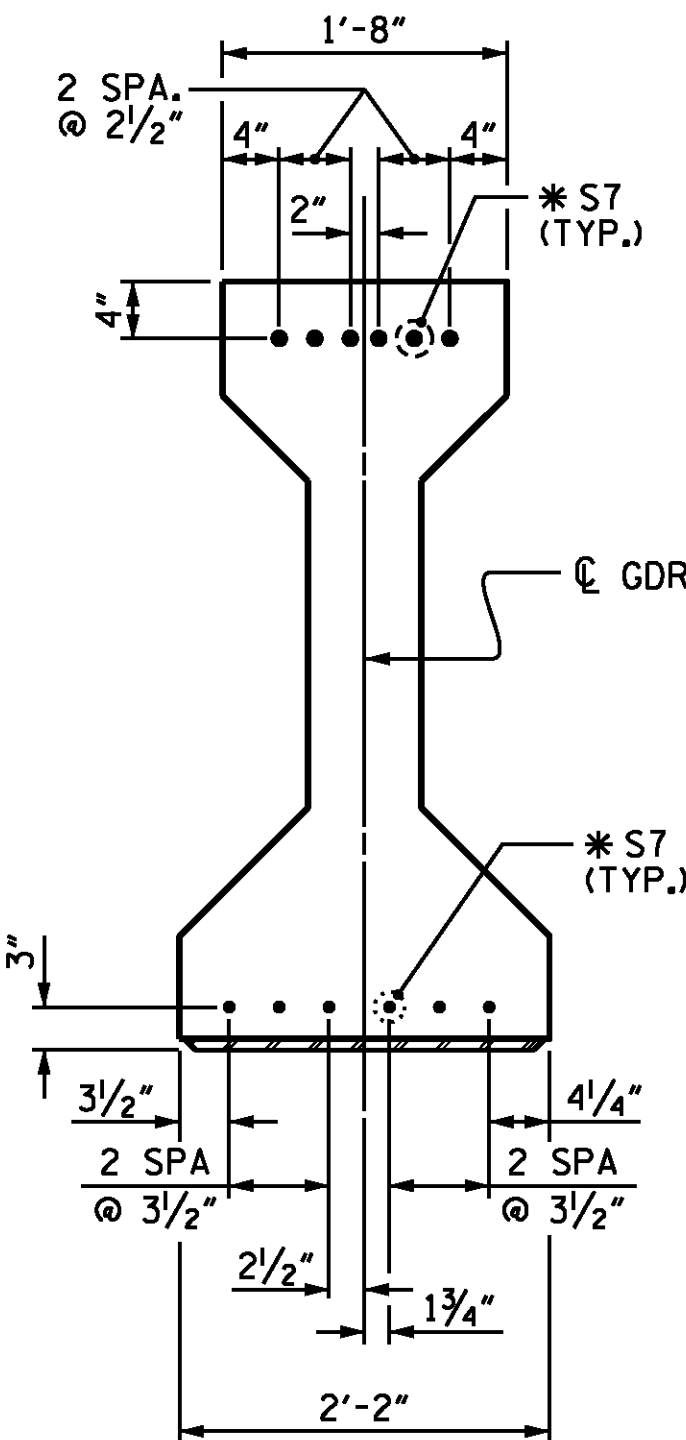
DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
SPAN A																						
0.6" Ø LOW RELAXATION	GIRDER A2 & A3																					
TWENTIETH POINTS	CL BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	CL BRG.	
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.045	0.090	0.130	0.170	0.202	0.233	0.253	0.273	0.280	0.287	0.280	0.273	0.253	0.233	0.202	0.170	0.130	0.090	0.045	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.037	0.075	0.111	0.146	0.174	0.203	0.221	0.239	0.245	0.251	0.245	0.239	0.221	0.203	0.175	0.146	0.111	0.075	0.037	0
FINAL CAMBER	↑	0	1/16"	3/16"	1/4"	5/16"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	5/16"	1/4"	3/16"	1/16"	0



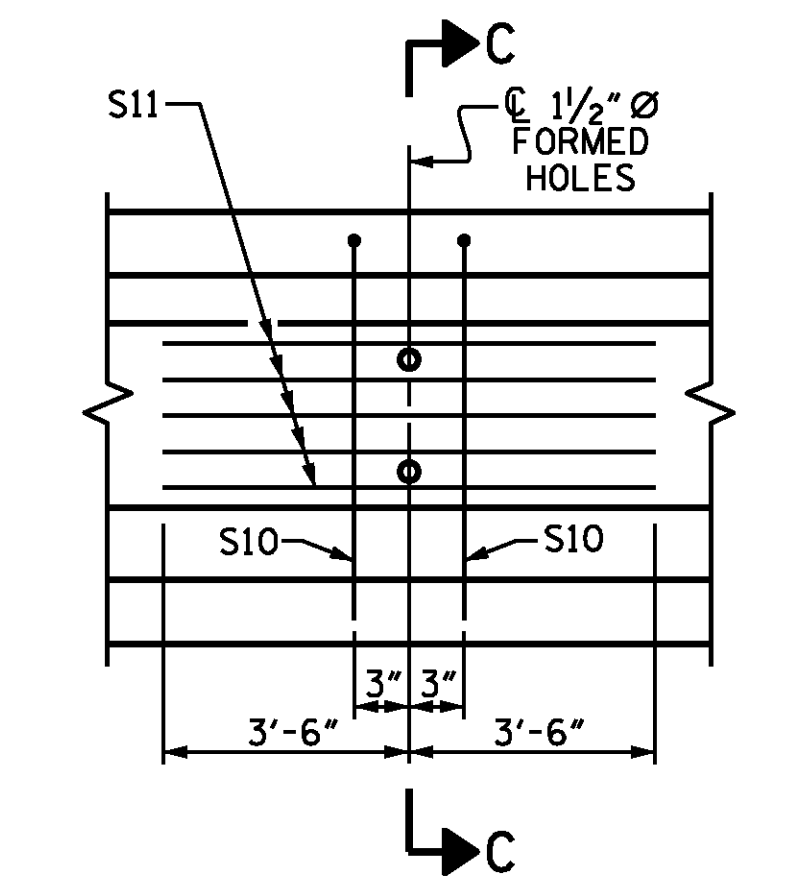
**EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER**  
(2 REQ'D PER GIRDER)



**SECTION "F"**  
(SEE NOTES)



**DETAIL "A"**  
(FOR AASHTO TYPE IV GIRDERS)



**PARTIAL ELEVATION**  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-4

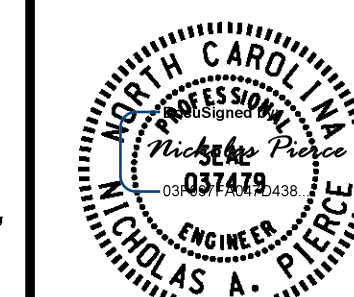
PROJECT NO. B-4616  
ROBESON COUNTY  
STATION: 31+55.47 -L-

SHEET 2 OF 3

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



434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. F-0165



8/2/2016

DESIGNED BY: C.J. HOWARD DATE: 04/2016  
DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
CHECKED BY: J.D. BORUTA DATE: 05/2016  
DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

DRAWN BY: ELR 11/91 REV. 10/1/11 MAA/GM  
CHECKED BY: GRP 11/91 REV. 1/15 MAA/TMG  
REV. 2/15 MAA/TMG

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

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

**STRUCTURAL STEEL NOTES**

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

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

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

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

FOR METALLIZATION, APPLY 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.

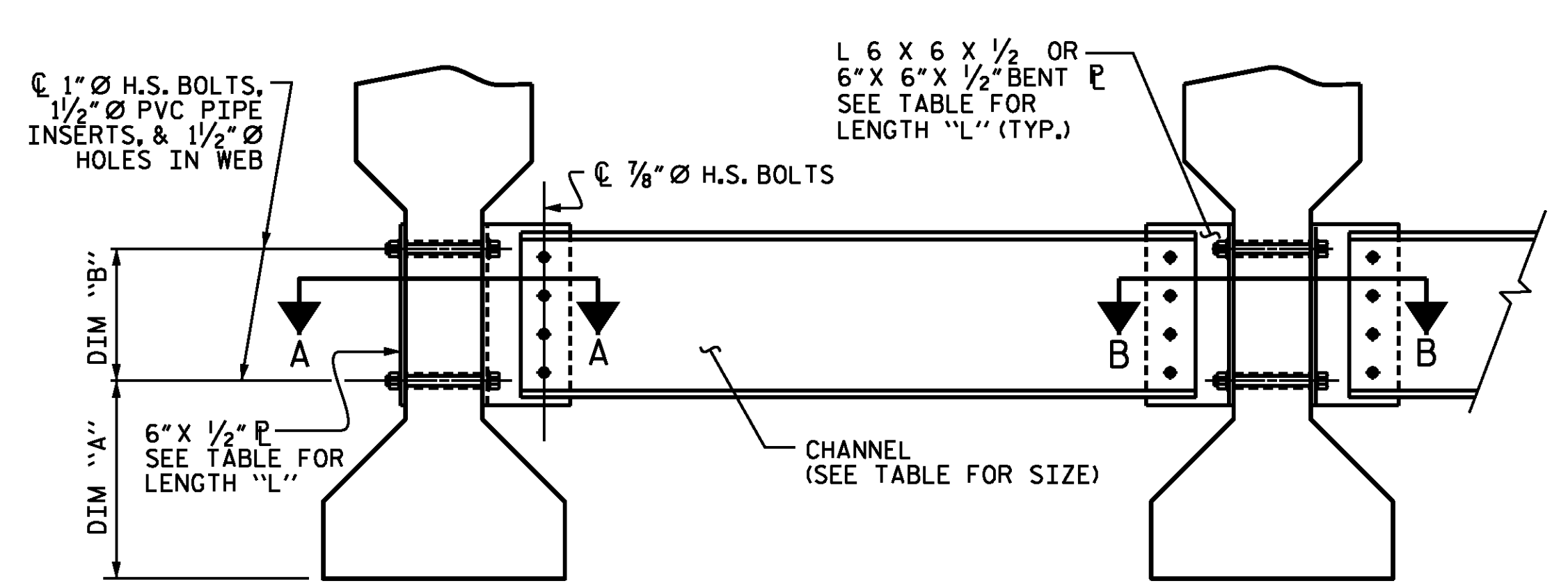
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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.

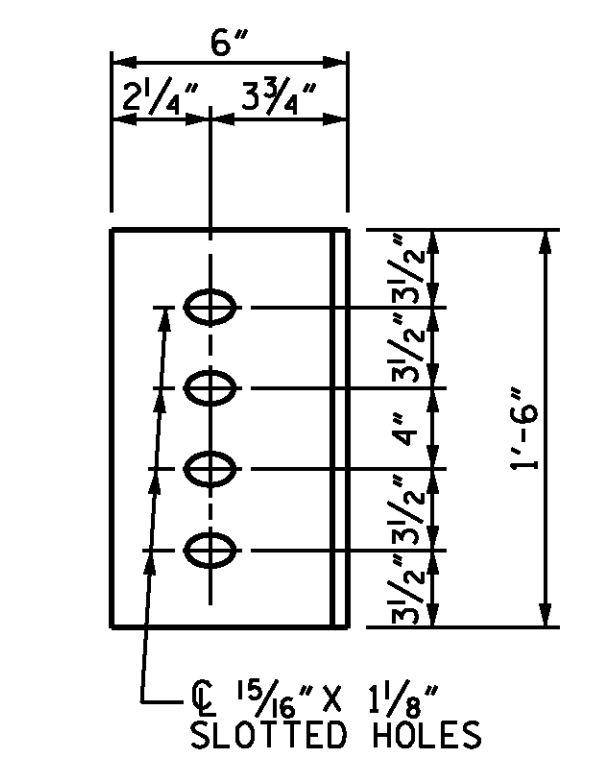
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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

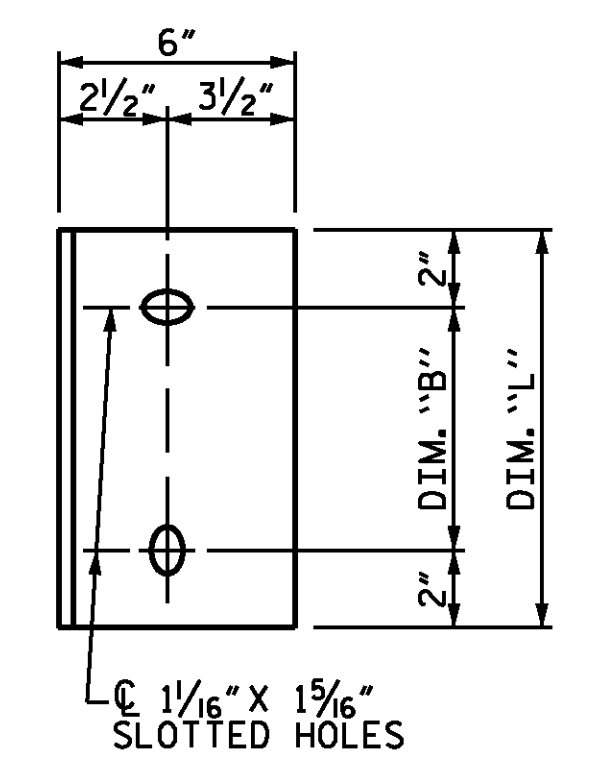


EXTERIOR GIRDER INTERIOR GIRDER

**PART SECTION AT INTERMEDIATE DIAPHRAGM**



DIAPHRAGM FACE



WEB FACE

**CONNECTOR PLATE DETAILS**

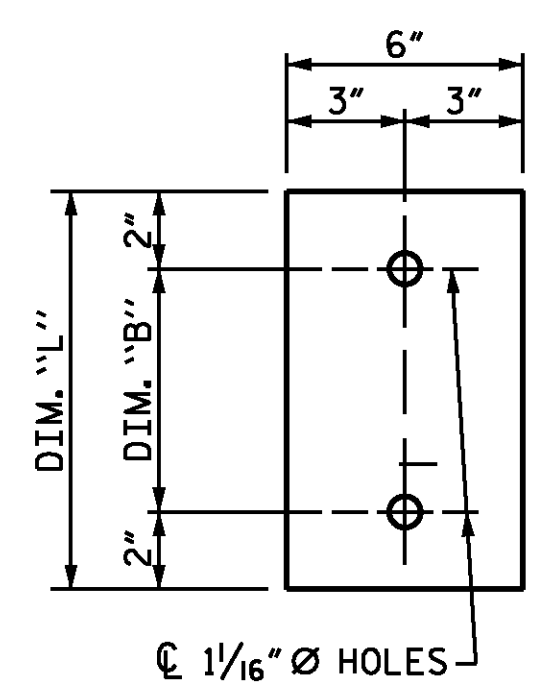
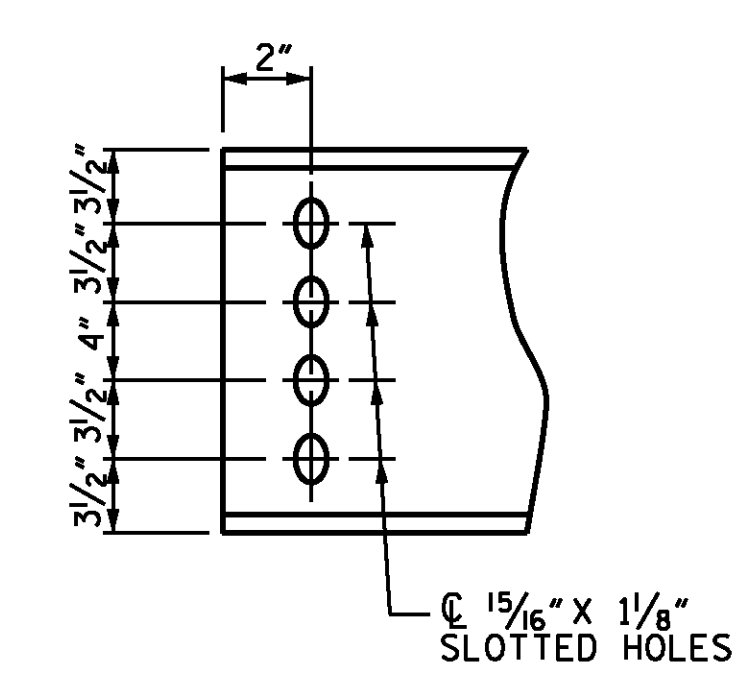
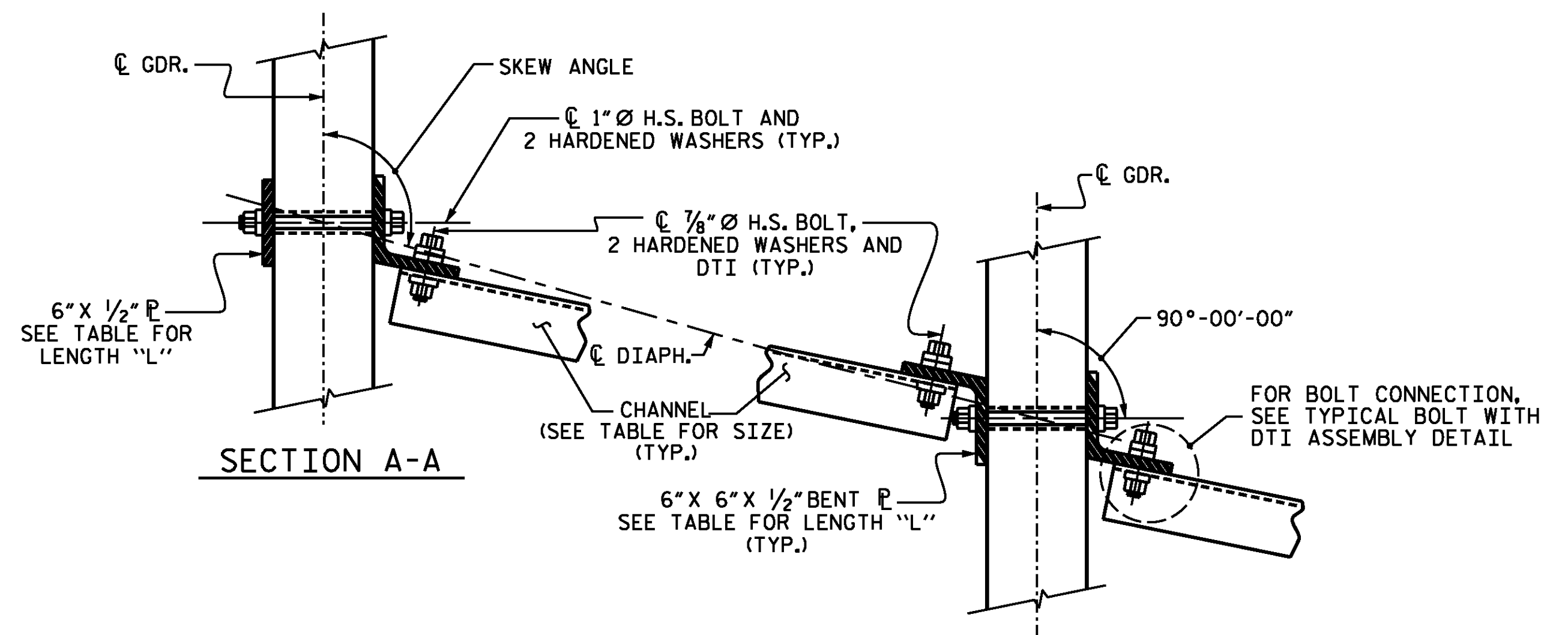


PLATE DETAILS

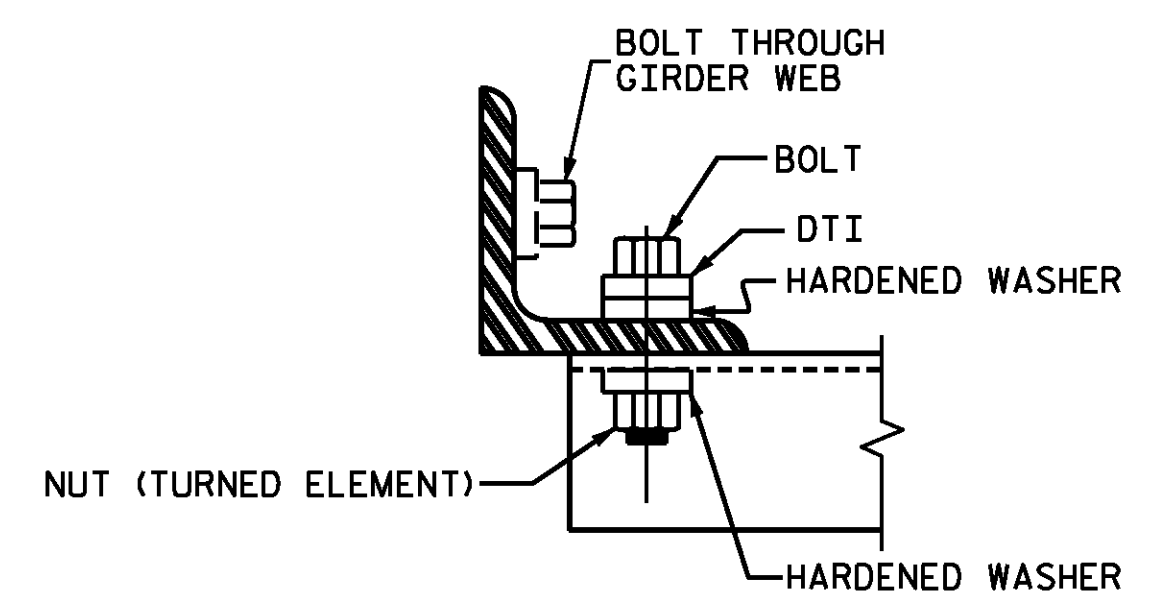


CHANNEL END



**CONNECTION DETAILS**

(90° < SKEW < 110° SHOWN  
70° < SKEW < 90° SIM.)



BOLT WITH DTI ASSEMBLY DETAIL

**TABLE**

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-11"	1'-2"	1'-6"

PROJECT NO. B-4616

ROBESON COUNTY

STATION: 31+55.47 -L-

SHEET 3 OF 3

DESIGNED BY:	C.J. HOWARD	DATE :	04/2016
DRAWN BY:	M.J. OSTRISHKO	DATE :	04/2016
CHECKED BY:	J.D. BORUTA	DATE :	05/2016
DESIGN ENGINEER OF RECORD:	N.A. PIERCE	DATE :	06/2016

DRAWN BY :	TLA 6/05	ADDED 10/21/05	KMM/GM
CHECKED BY :	VC 6/05	REV. 5/1/06RRR	MAA/GM
		REV. 10/1/11	

**WSP**  
**PARSONS BRINCKERHOFF**  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. F-0165

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
NICHOLAS A. PIERCE  
ENGINEER  
8/2/2016

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

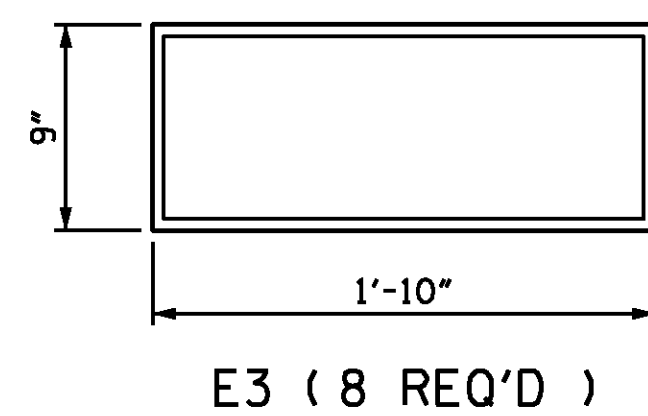
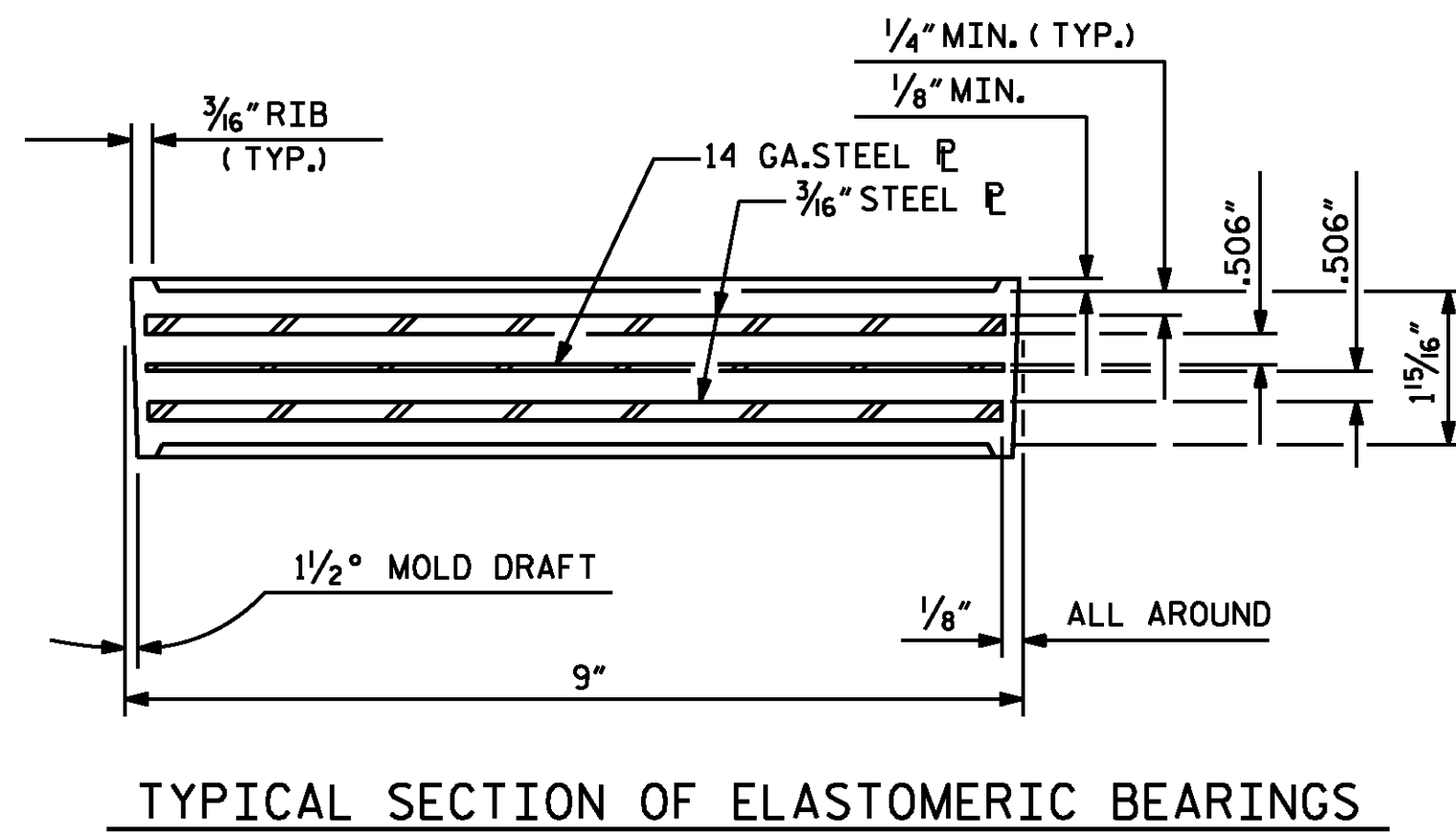
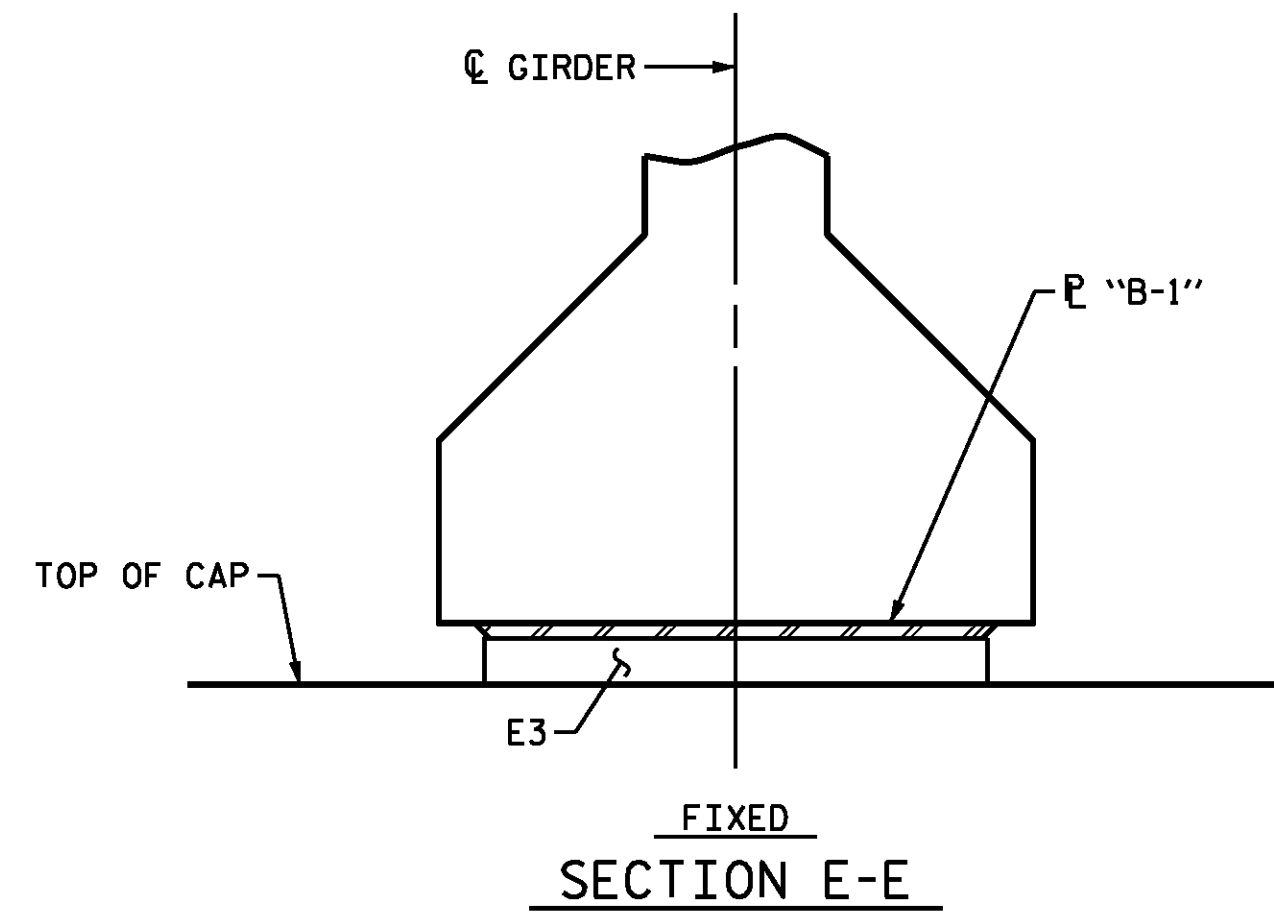
REVISIONS						SHEET NO. S1-13
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 25
2			4			

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

**NOTES**

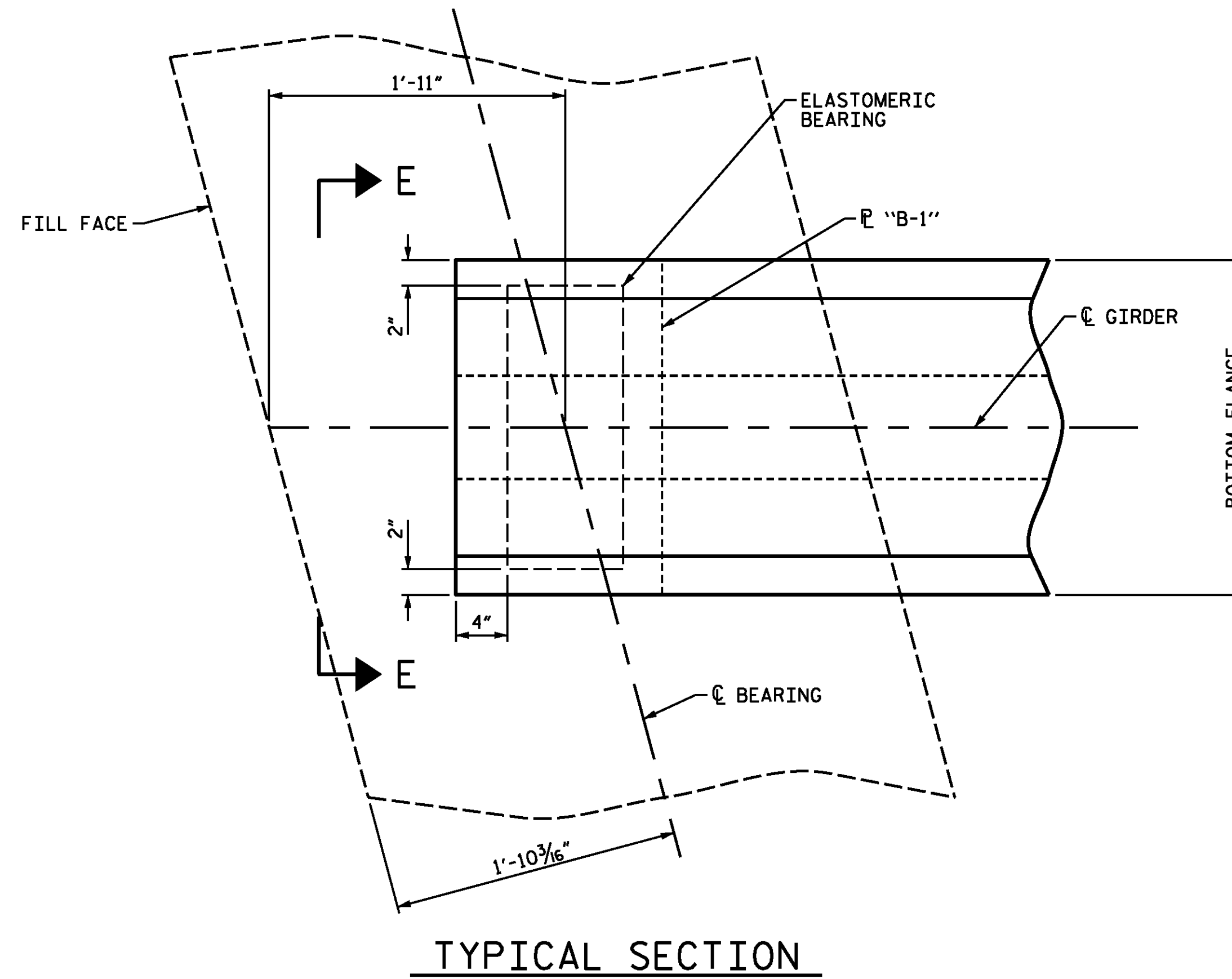
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



PLAN VIEW OF ELASTOMERIC BEARING

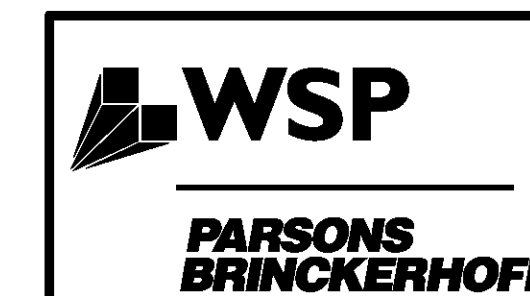
**ELASTOMERIC BEARINGS**  
(FOR INTEGRAL END BENT)



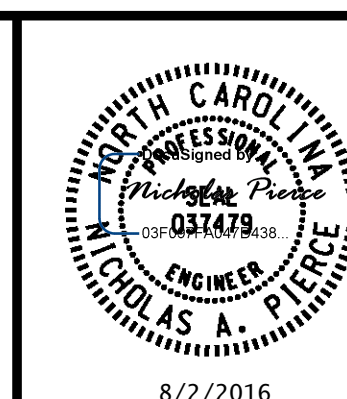
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

DESIGNED BY: C.J. HOWARD DATE : 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE : 04/2016  
 CHECKED BY: N.A. PIERCE DATE : 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE : 06/2016



434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165

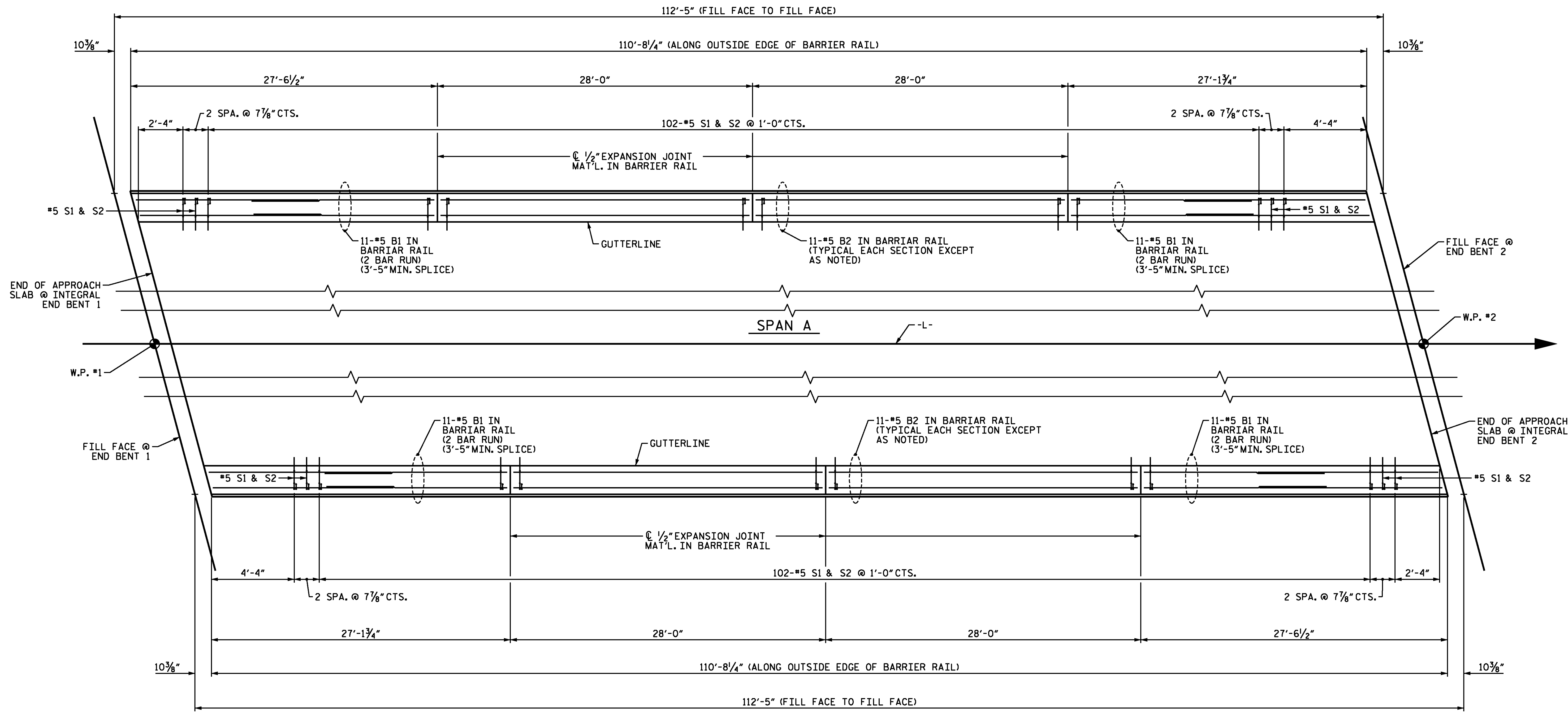


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**BEARING DETAILS**  
 PRESTRESSED CONCRETE GIRDER  
 FOR INTEGRAL END BENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-14
1			3			TOTAL SHEETS
2			4			25

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**





PLAN OF CONCRETE BARRIER RAIL

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

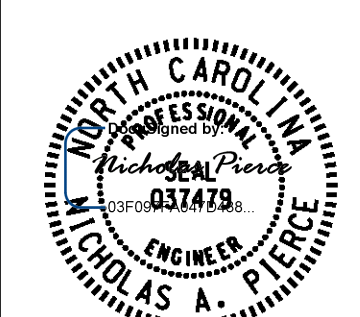
SHEET 1 OF 2

DESIGNED BY: C.J. HOWARD DATE: 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
 CHECKED BY: N.A. PIERCE DATE: 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

6/28/2016  
 R:\Raleigh Office NCDOT\B-4616 Robeson County\400.Structures\Drafting\Superstructure\401.029.B4616.SMU.BR01.dgn  
 usmo04281



434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165



8/2/2016

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**CONCRETE BARRIER RAIL**

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

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

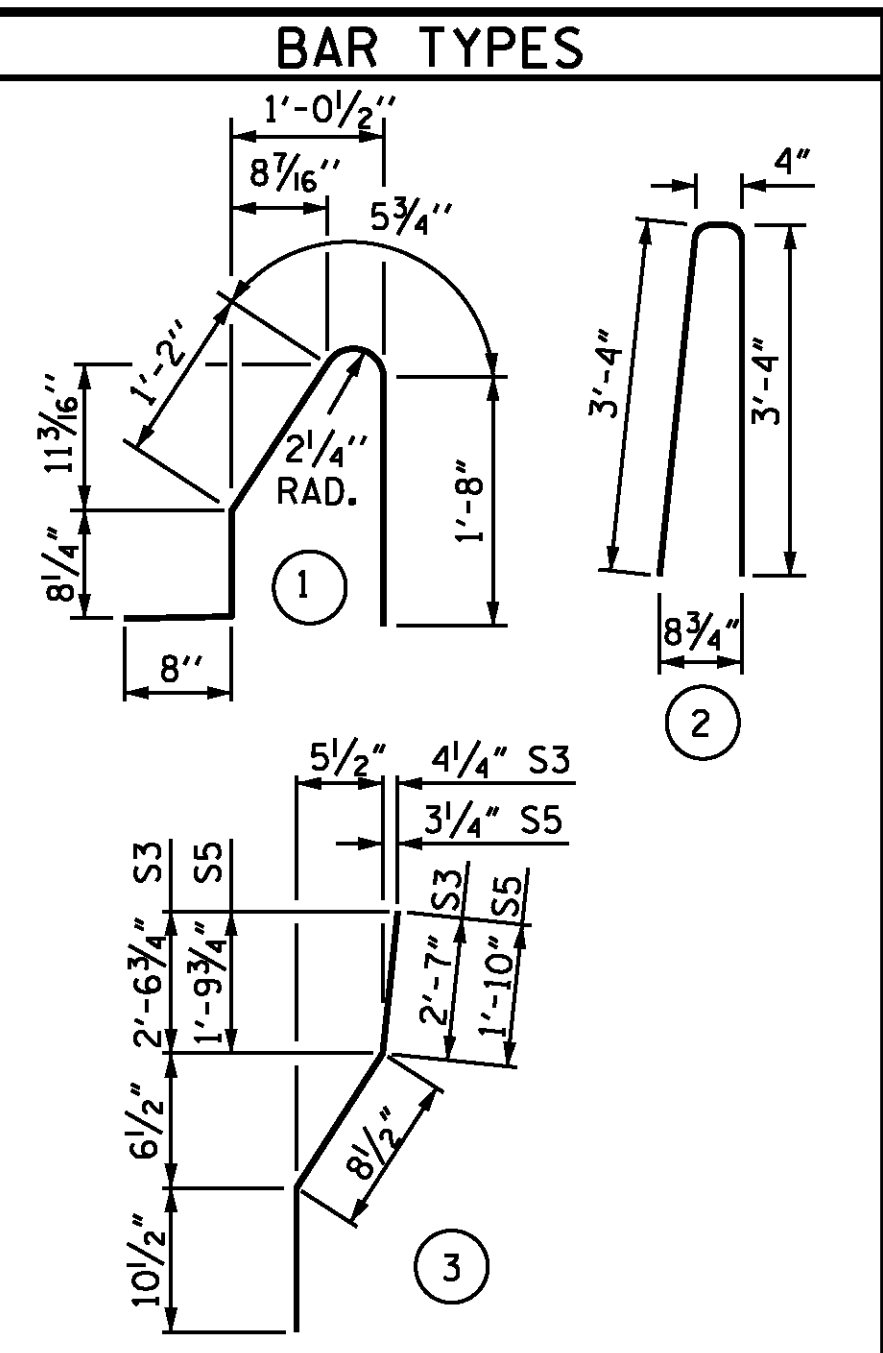
**NOTES**

THE BARRIER RAIL IN THE 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.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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



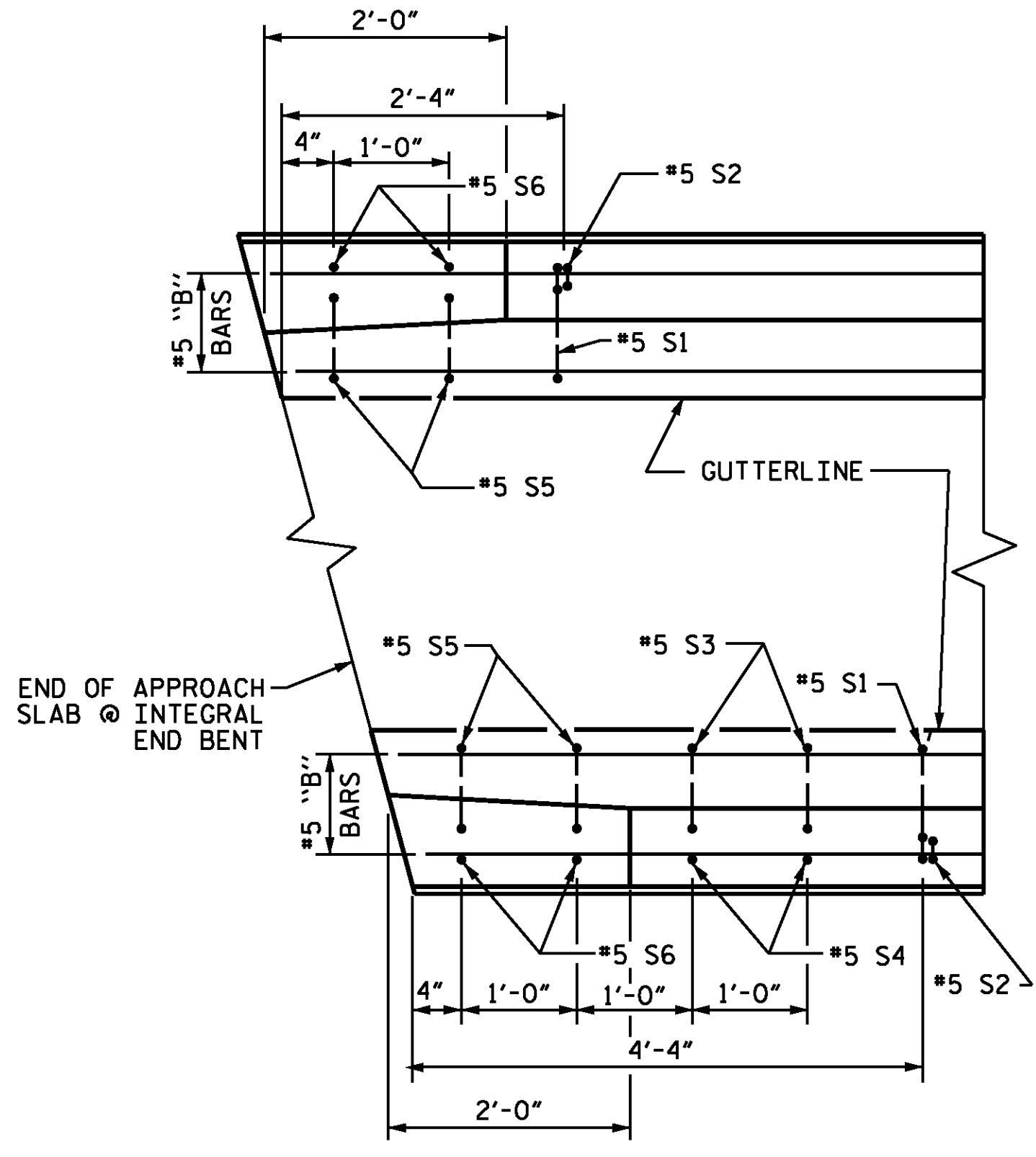
ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL**

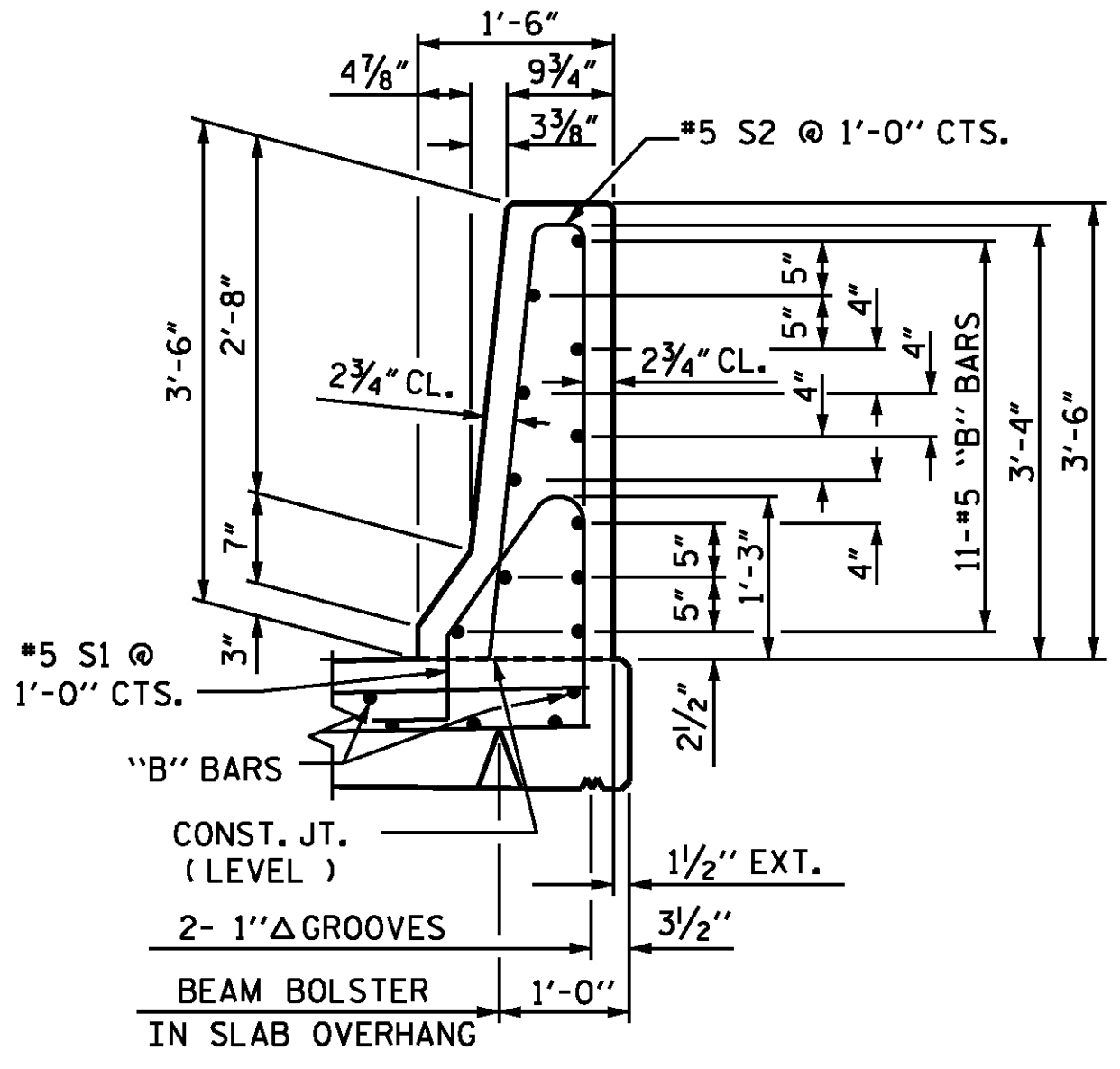
FOR CONCRETE BARRIER RAIL ONLY

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	88	#5 STR	15'-5"	1,415
* B2	44	#5 STR	27'-8"	1,270
* S1	212	#5	4'-8"	1,032
* S2	212	#5	7'-0"	1,548
* S3	4	#5	4'-2"	17
* S4	4	#5 STR	4'-0"	17
* S5	8	#5	3'-5"	29
* S6	8	#5 STR	3'-3"	27

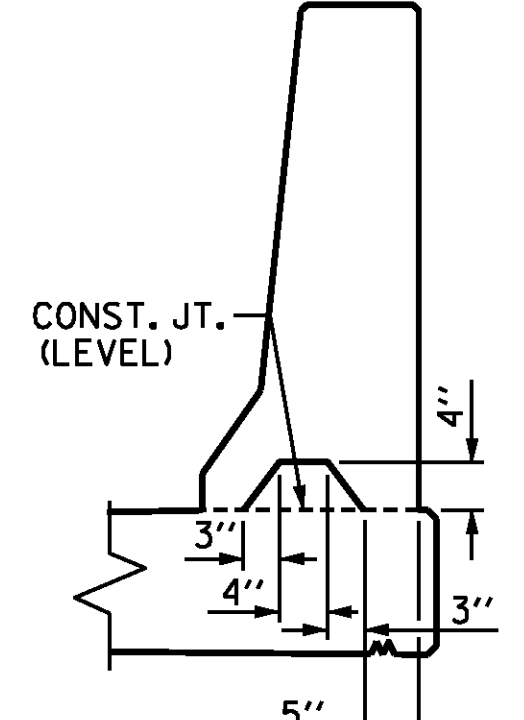
\* EPOXY COATED REINFORCING STEEL 5,355 LBS.  
 CLASS AA CONCRETE 30.1 CU. YDS.  
 CONCRETE BARRIER RAIL 221.38 LIN. FT.



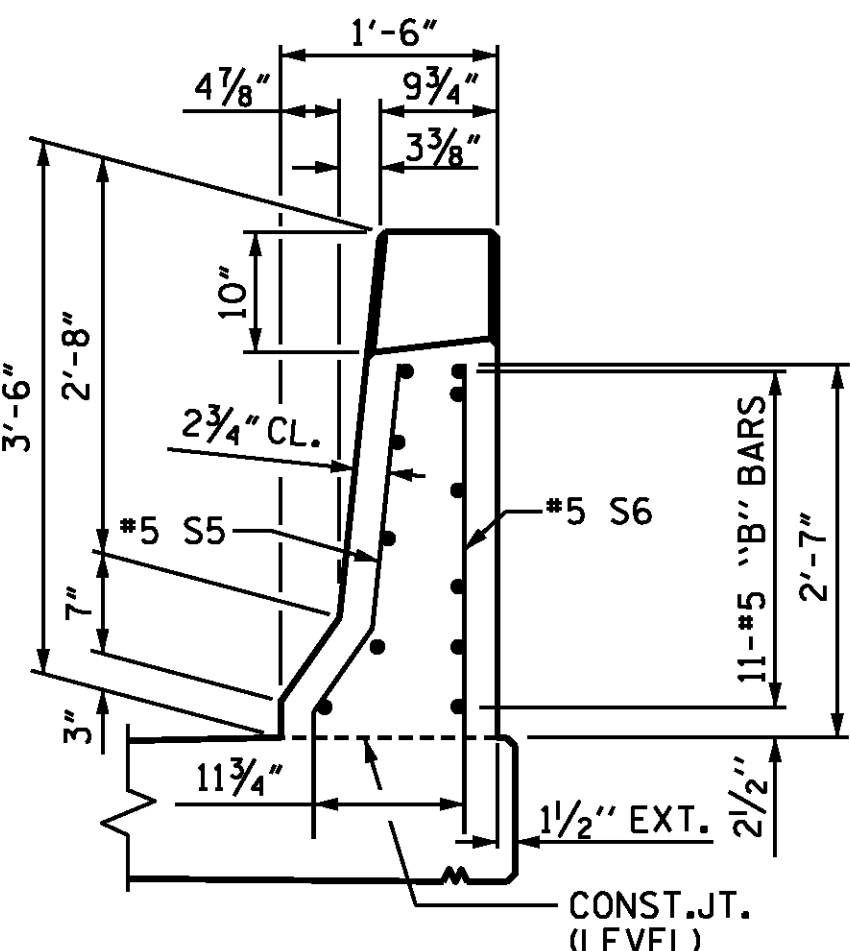
**PLAN**



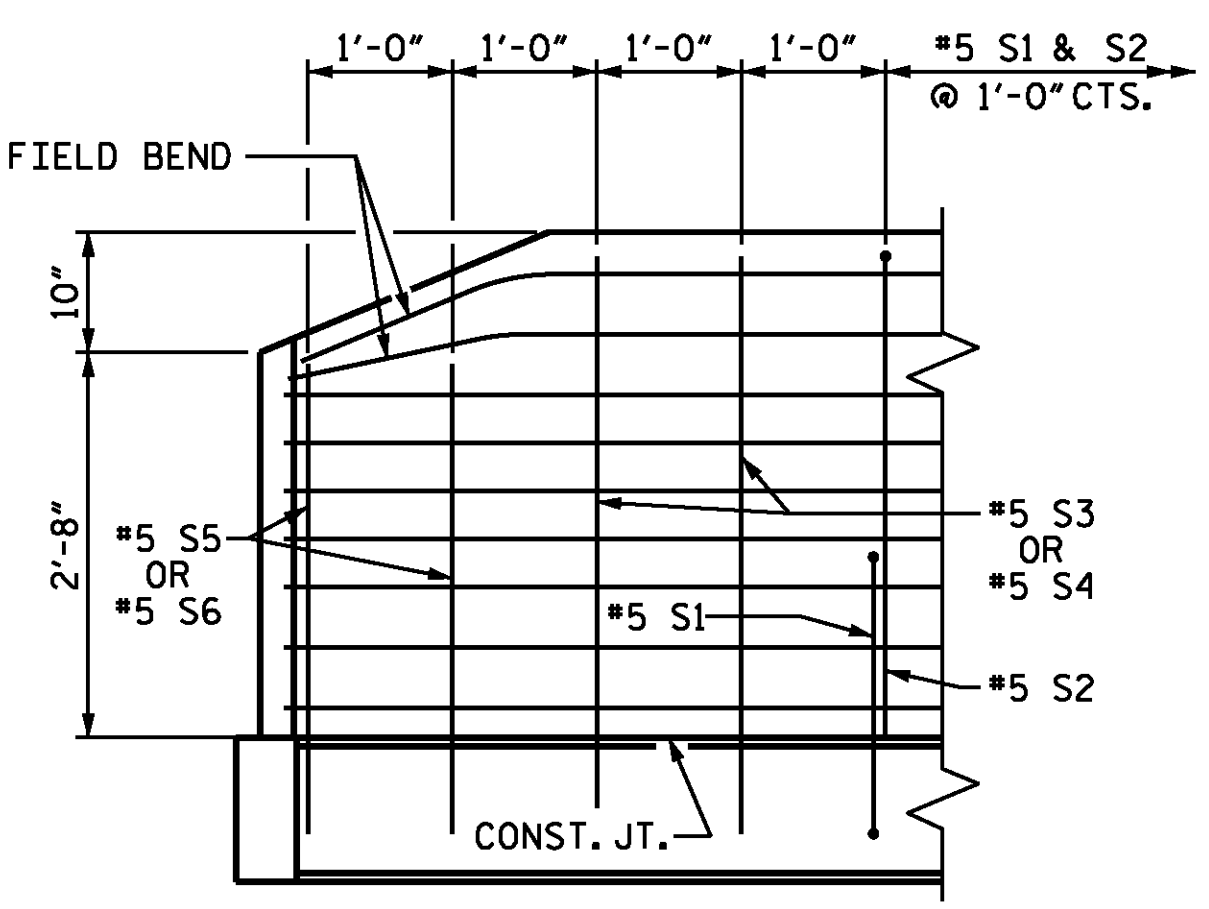
**SECTION THRU RAIL**



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



**END VIEW**

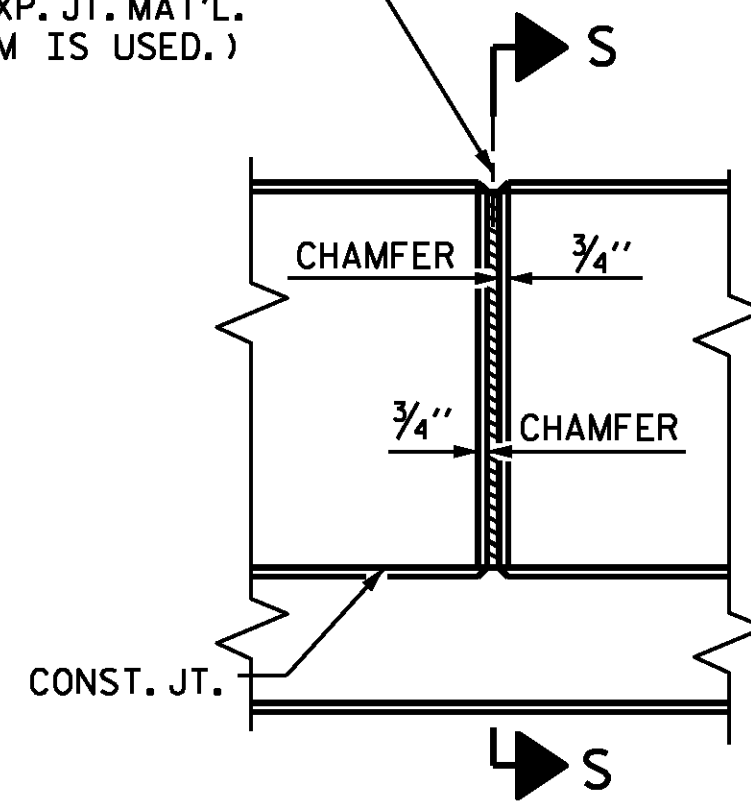


**SIDE VIEW**

**END OF RAIL DETAILS**

FOR ADHESIVE ANCHORING AT SAWED JOINTS

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



**ELEVATION AT EXPANSION JOINTS**  
**BARRIER RAIL DETAILS**

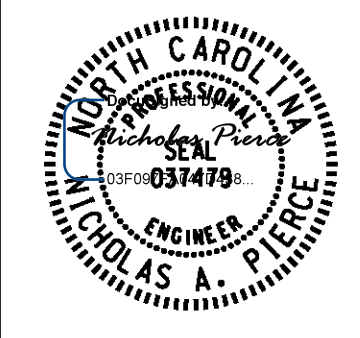
PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

SHEET 2 OF 2

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



434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165



REVISIONS

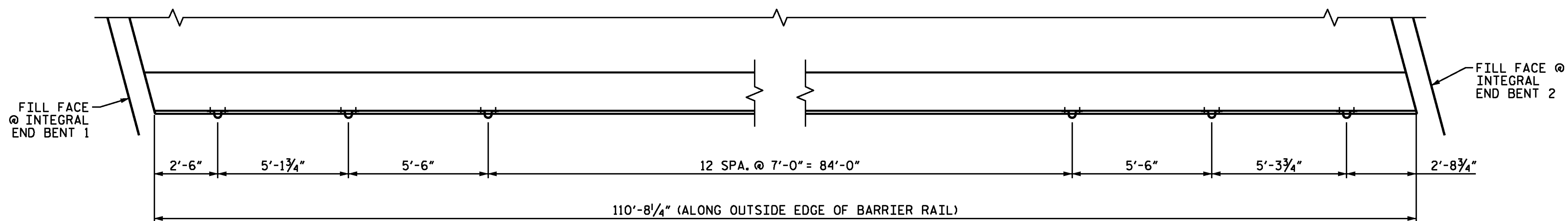
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-16  
 TOTAL SHEETS 25

DESIGNED BY: C.J. HOWARD DATE: 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
 CHECKED BY: N.A. PIERCE DATE: 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

DRAWN BY: ARB 5/87 REV. 10/1/11 MAA/GM  
 CHECKED BY: SJD 9/87 REV. 7/12 MAA/GM  
 REV. 6/13 MAA/GM

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



**PLAN OF FENCE POST SPACING**

RIGHT SIDE SHOWN, LEFT SIDE SIMILAR BY ROTATION.

**NOTES**

FOR BRIDGE MOUNTED CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.

MATERIAL FOR ANCHOR BOLTS SHALL BE TYPE 304 STAINLESS STEEL WITH A MINIMUM 9000 PSI ULTIMATE STRENGTH. NUTS AND WASHERS SHALL BE TYPE 304 STAINLESS STEEL. ANCHOR BOLTS SHALL BE EMBEDDED AS PER MANUFACTURER SPECIFICATIONS. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK NUTS, CLASS 2B THREADS.

FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. SEE SECTION 420-13 OF THE STANDARD SPECIFICATIONS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS. LEVEL ONE FIELD TESTING OF BONDING SYSTEM IS REQUIRED.

ALL FENCE MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS, GALVANIZE STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.

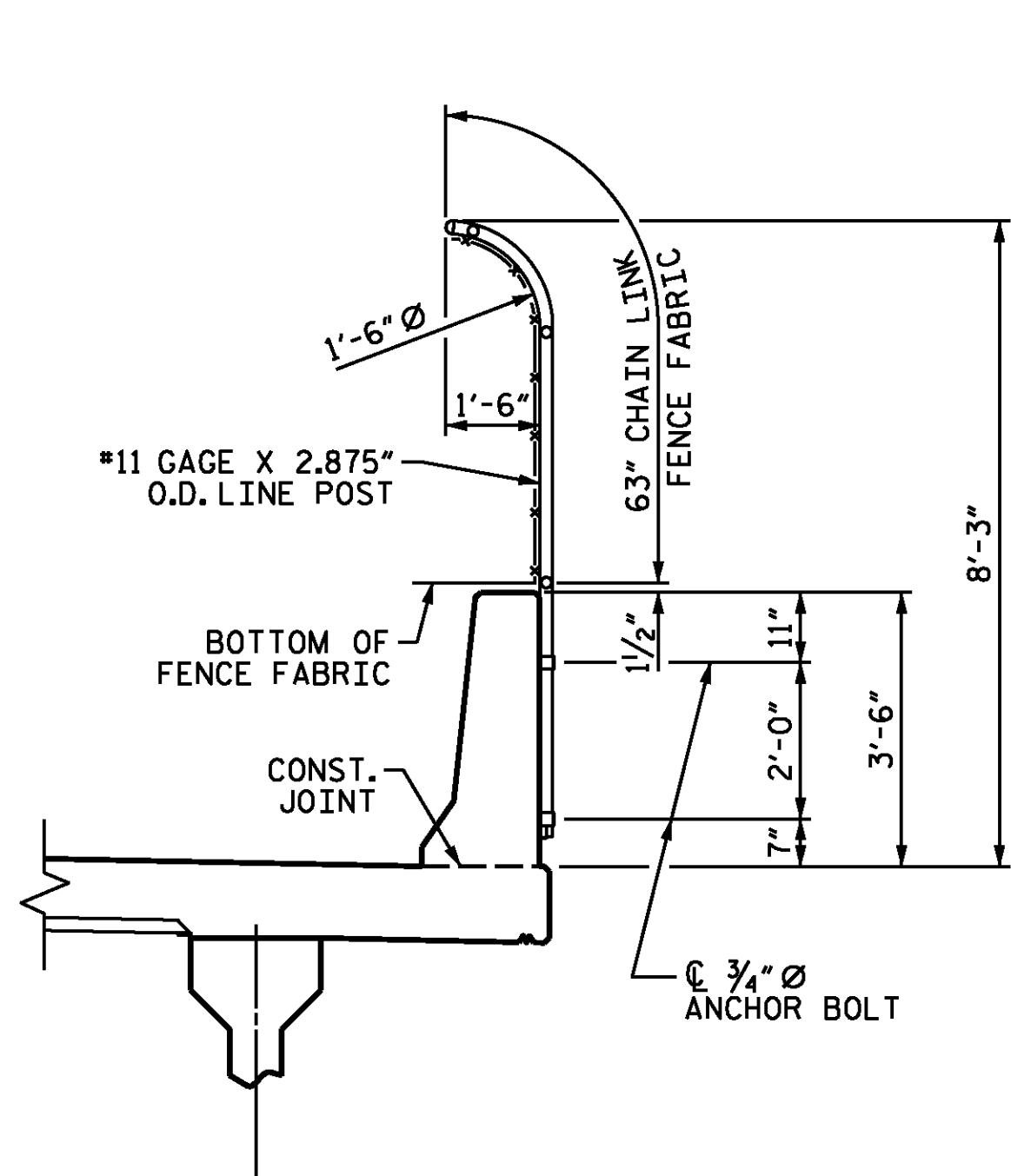
WELDING SHALL BE DONE IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.

ADHESIVE BONDING SYSTEM SHALL HAVE A MINIMUM PULLOUT STRENGTH OF 10 KIPS. THE ADHESIVE BONDING SYSTEM SHALL BE CHOSEN FROM THE THOSE ON THE NCDOT APPROVED PRODUCTS LIST.

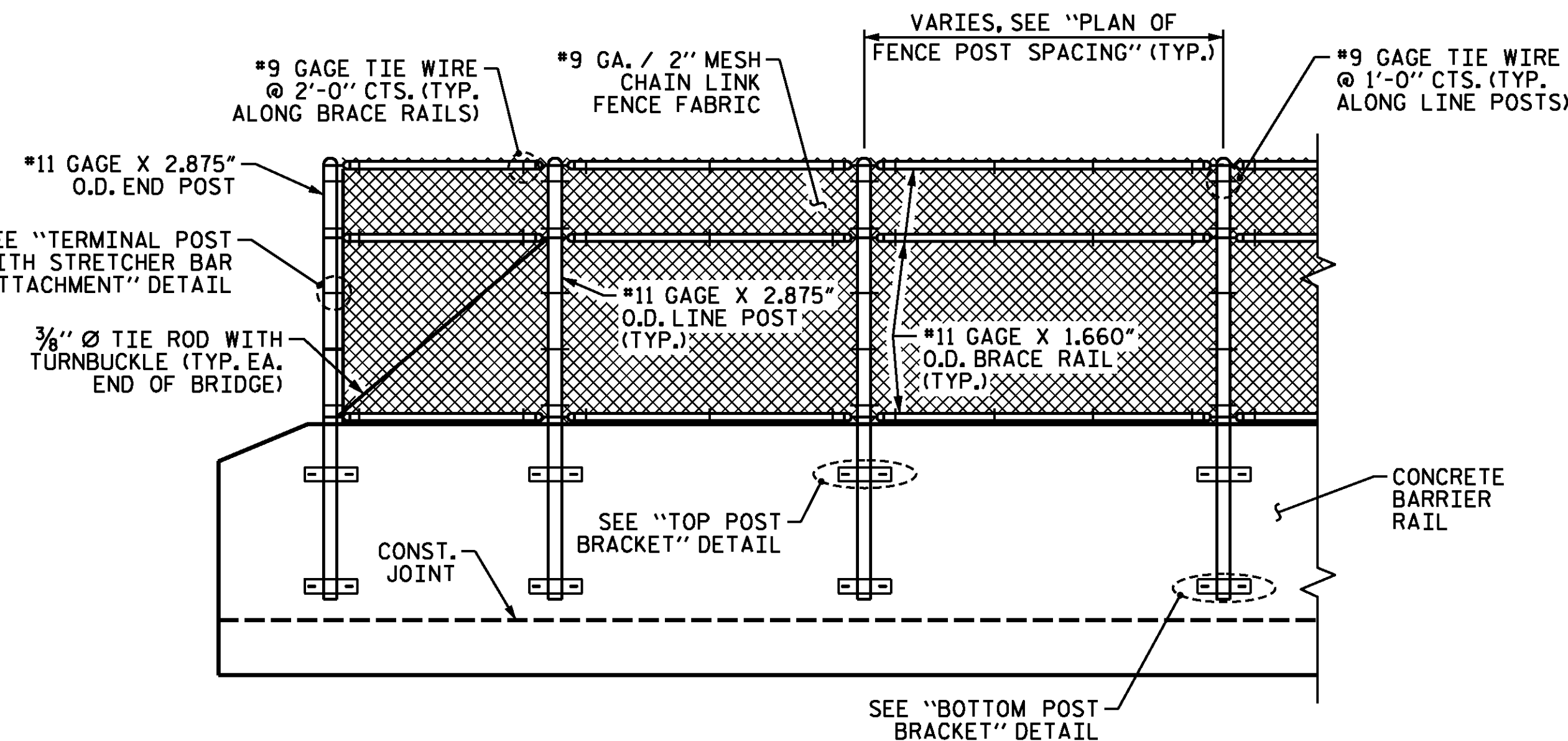
FENCE POSTS SHALL BE SET NORMAL TO CURB GRADE.

CONTRACTOR MAY SUBMIT ALTERNATIVE FENCE DETAILS FOR ENGINEER REVIEW AND APPROVAL.

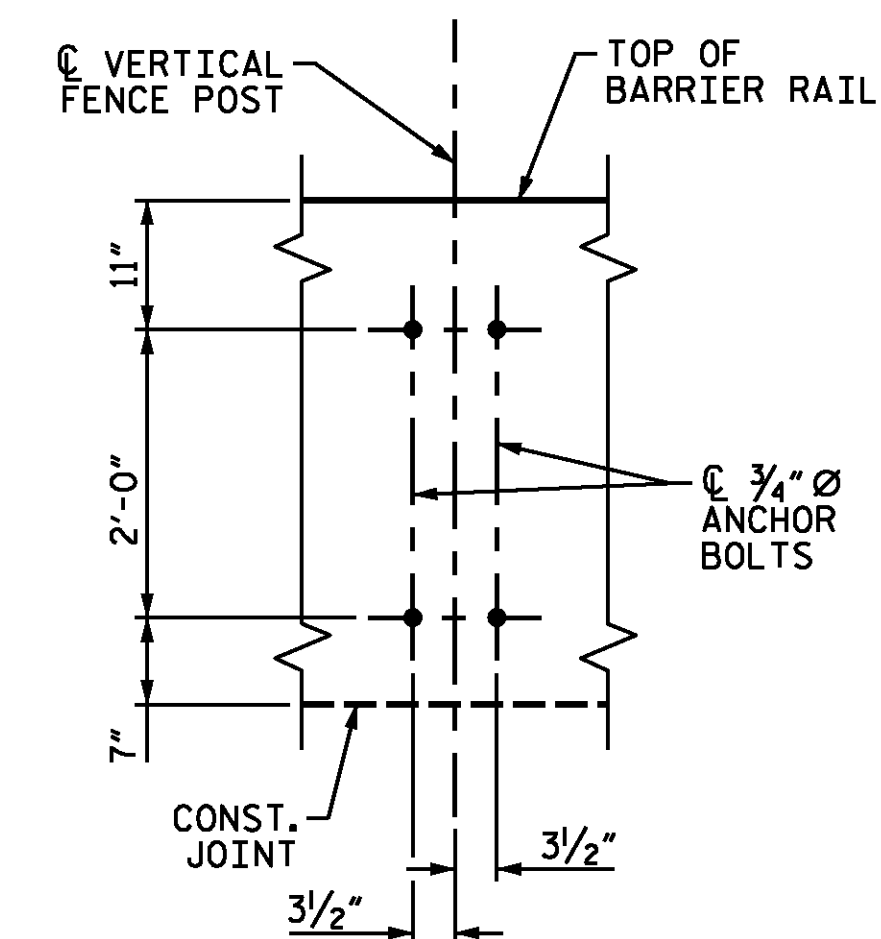
63" CHAIN LINK FENCE  
PAY LENGTH 210.92 LIN. FT.



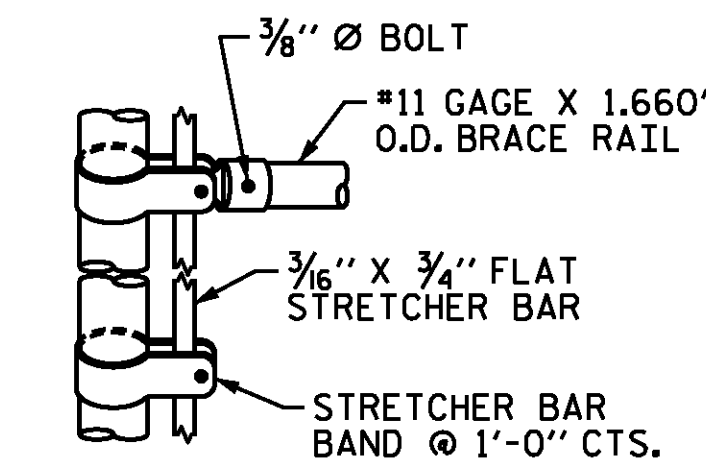
SECTION THRU FENCE



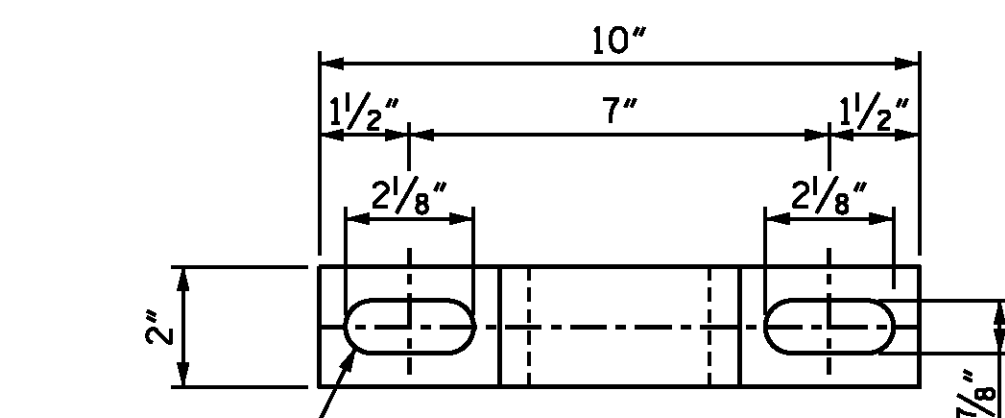
PARTIAL ELEVATION



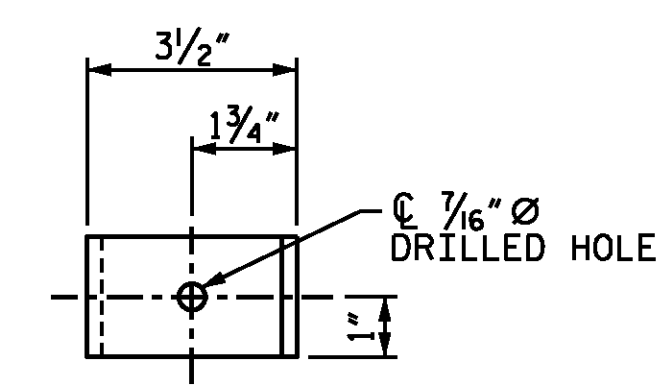
BOLT SETTING DETAIL



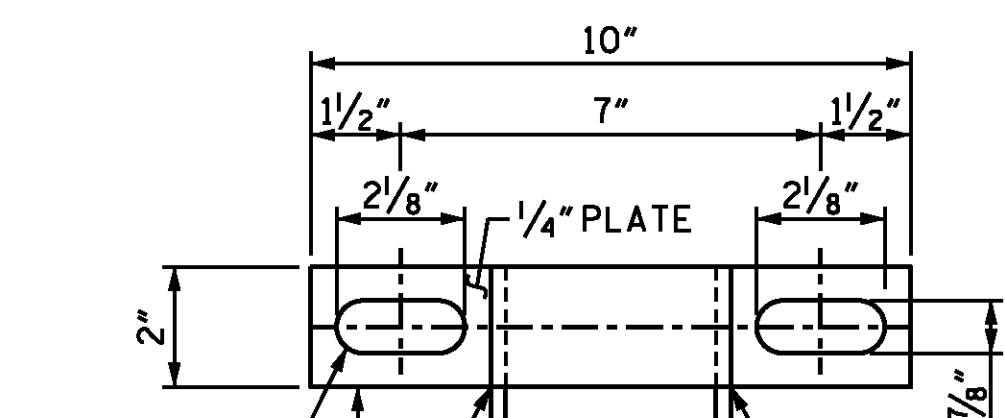
TERMINAL POST WITH STRETCHER BAR ATTACHMENT



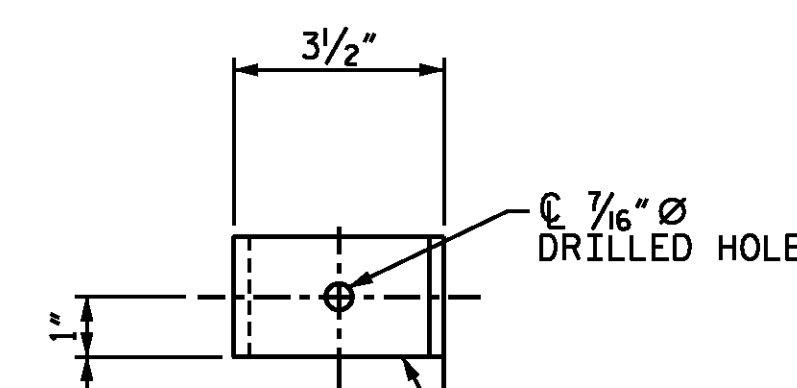
ELEVATION



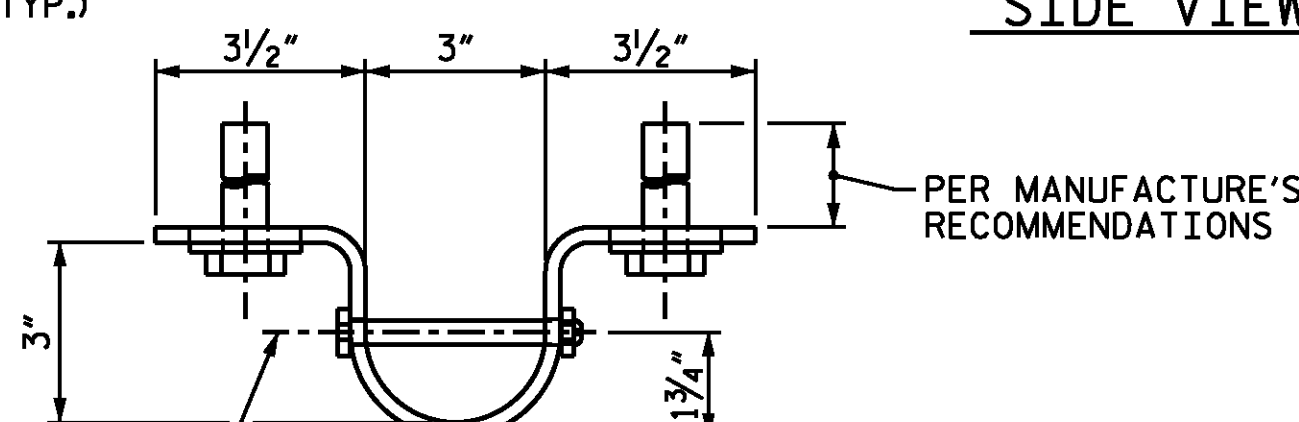
RIGHT SIDE VIEW



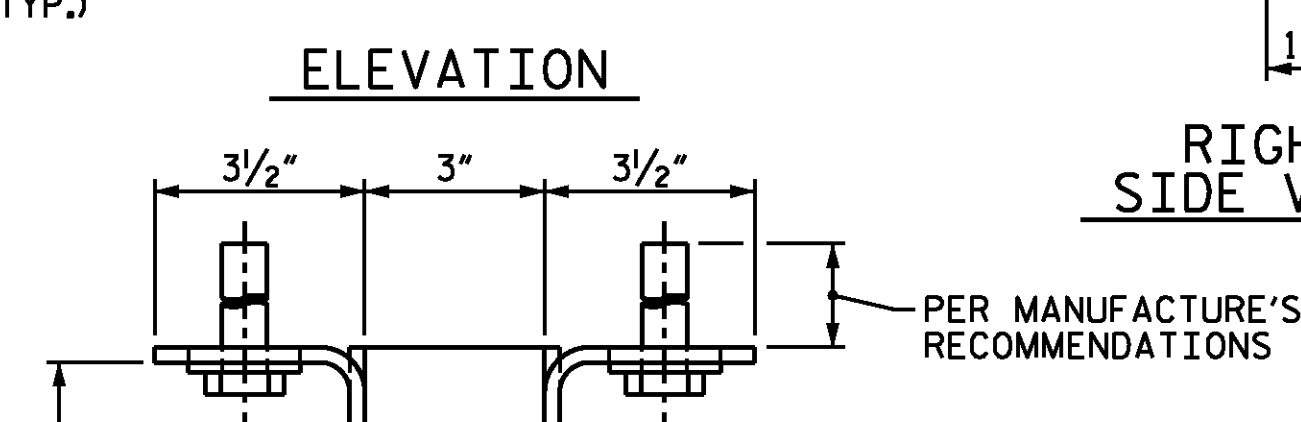
ELEVATION



RIGHT SIDE VIEW



PLAN



PLAN

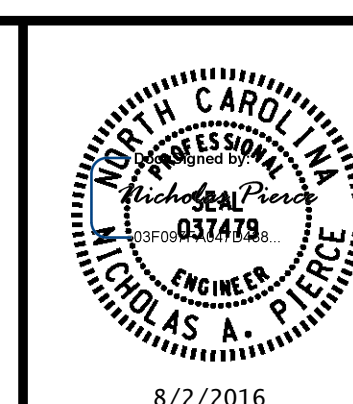
**TOP POST BRACKET**

**BOTTOM POST BRACKET**

PROJECT NO. B-4616  
ROBESON COUNTY  
STATION: 31+55.47 -L-

DESIGNED BY: M.J. OSTRISHKO DATE: 04/2016  
DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
CHECKED BY: N.A. PIERCE DATE: 05/2016  
DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

**WSP**  
**PARSONS BRINCKERHOFF**  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. F-0165



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
BRIDGE MOUNTED  
CHAIN LINK FENCE  
DETAILS

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

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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.)

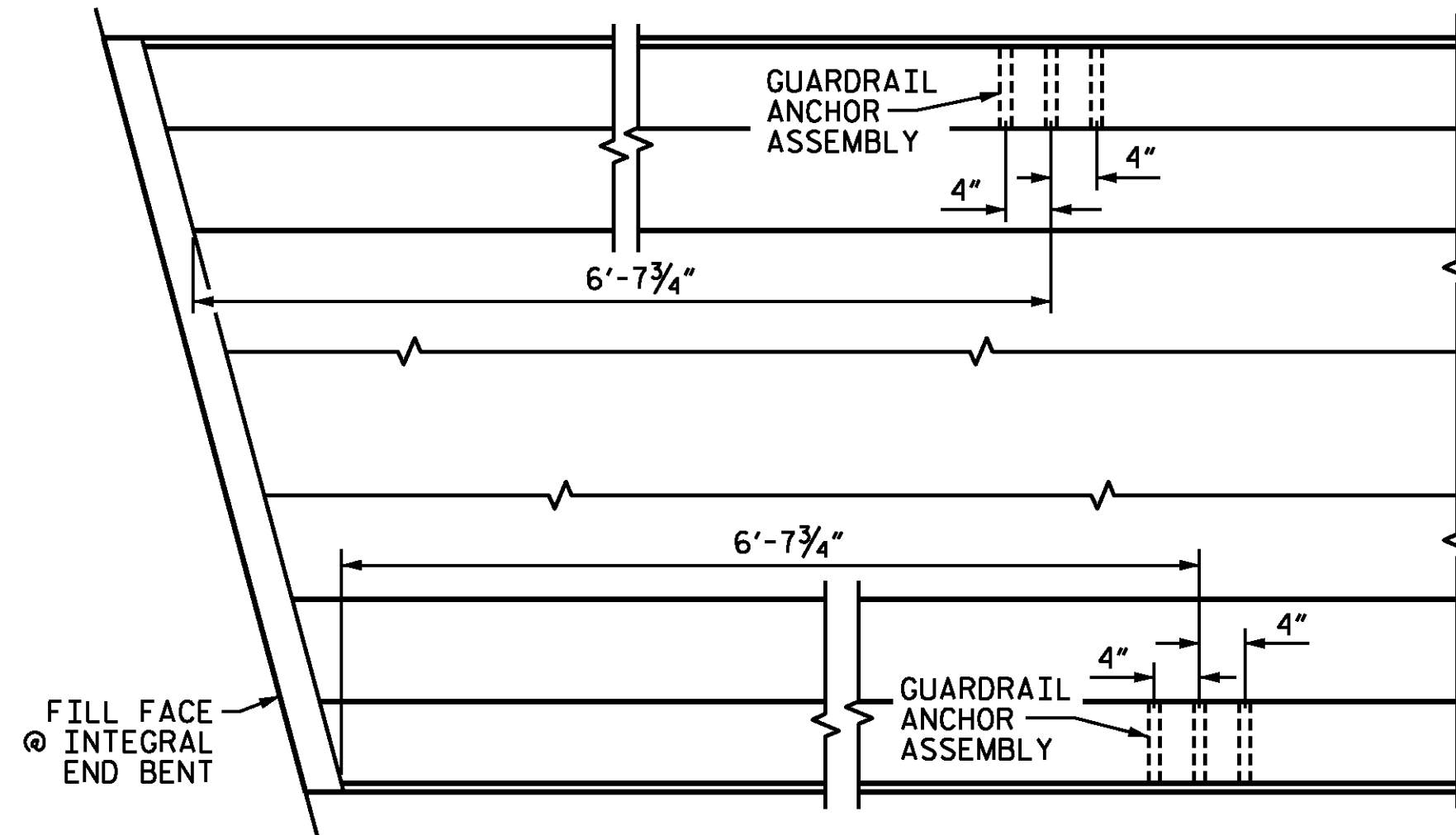
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

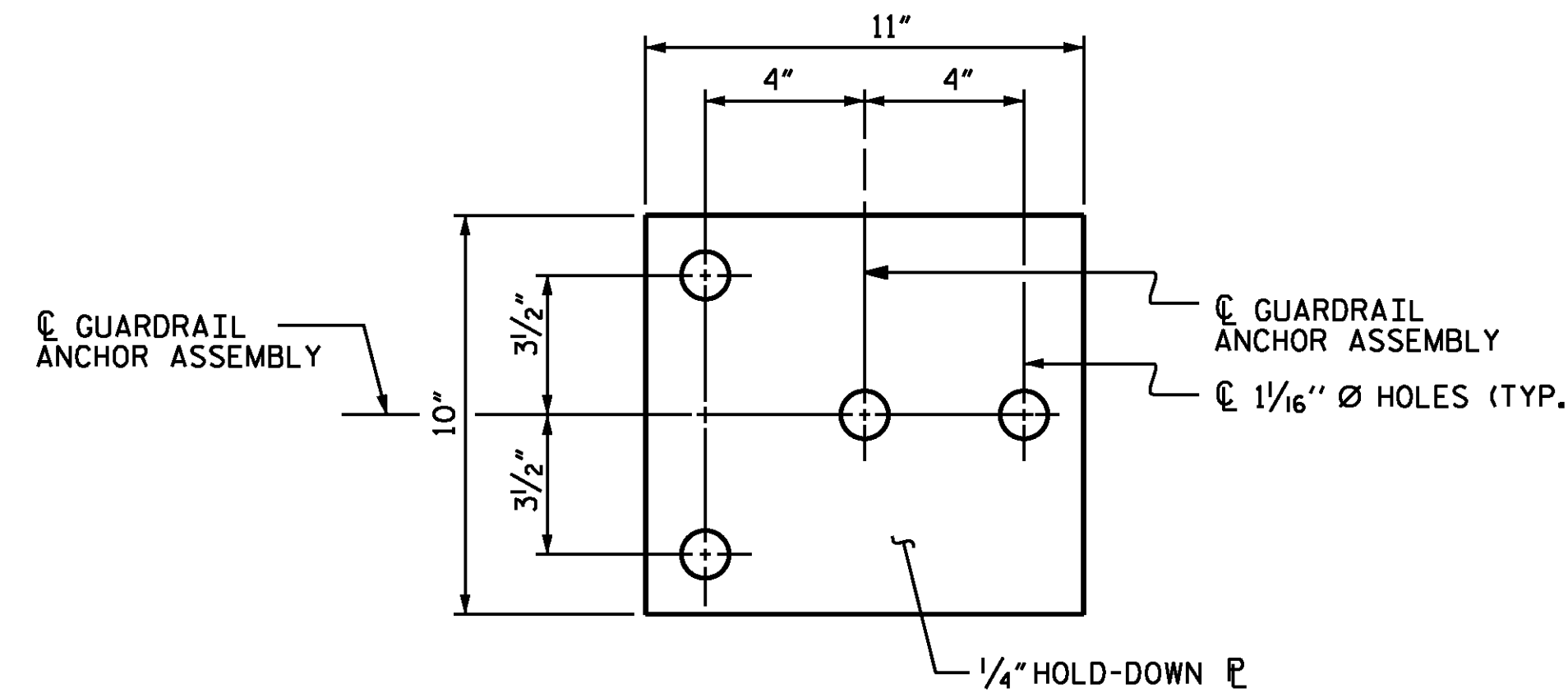
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 1 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.

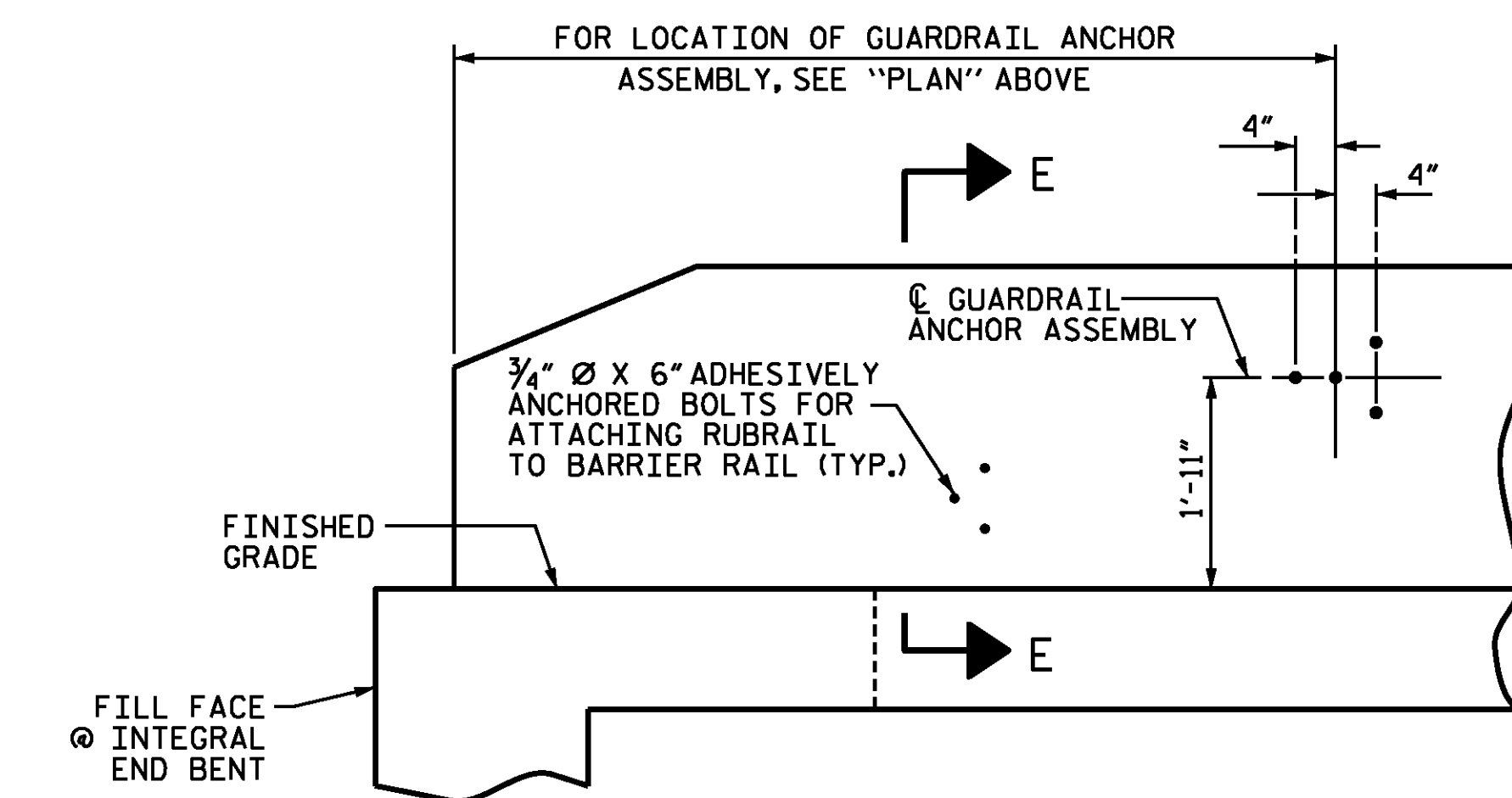
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR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



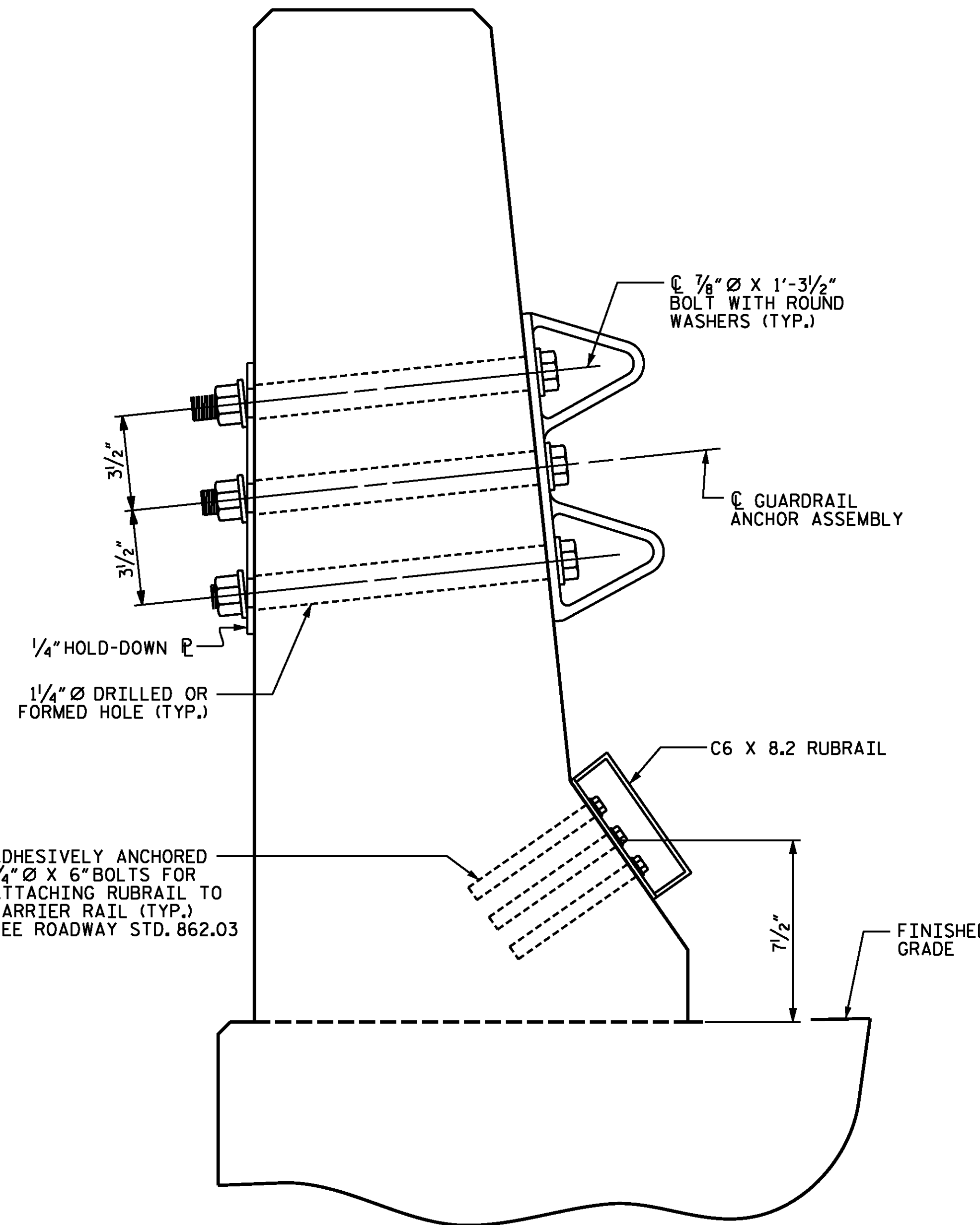
PLAN



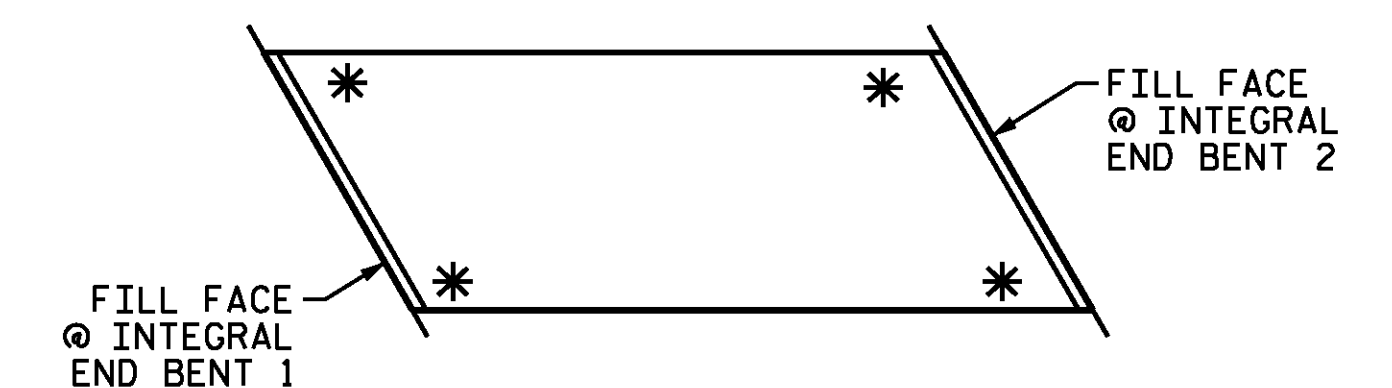
PLAN



ELEVATION



SECTION E-E  
GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

LOCATION OF ANCHORS FOR GUARDRAIL

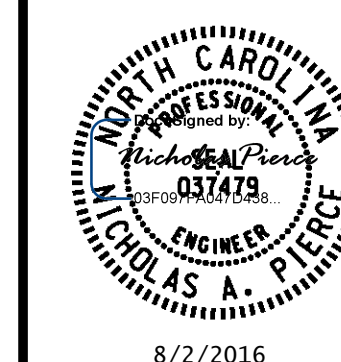
END BENT 1 SHOWN, END BENT 2 SIMILAR.

DESIGNED BY: C.J. HOWARD DATE: 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
 CHECKED BY: N.A. PIERCE DATE: 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

DRAWN BY: TLA 5/06 REV. 10/1/11 MAA/GM  
 CHECKED BY: GM 5/06 REV. 7/12 MAA/GM  
 REV. 6/13 MAA/GM

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USER\*\*\*\*\*

**WSP**  
**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165



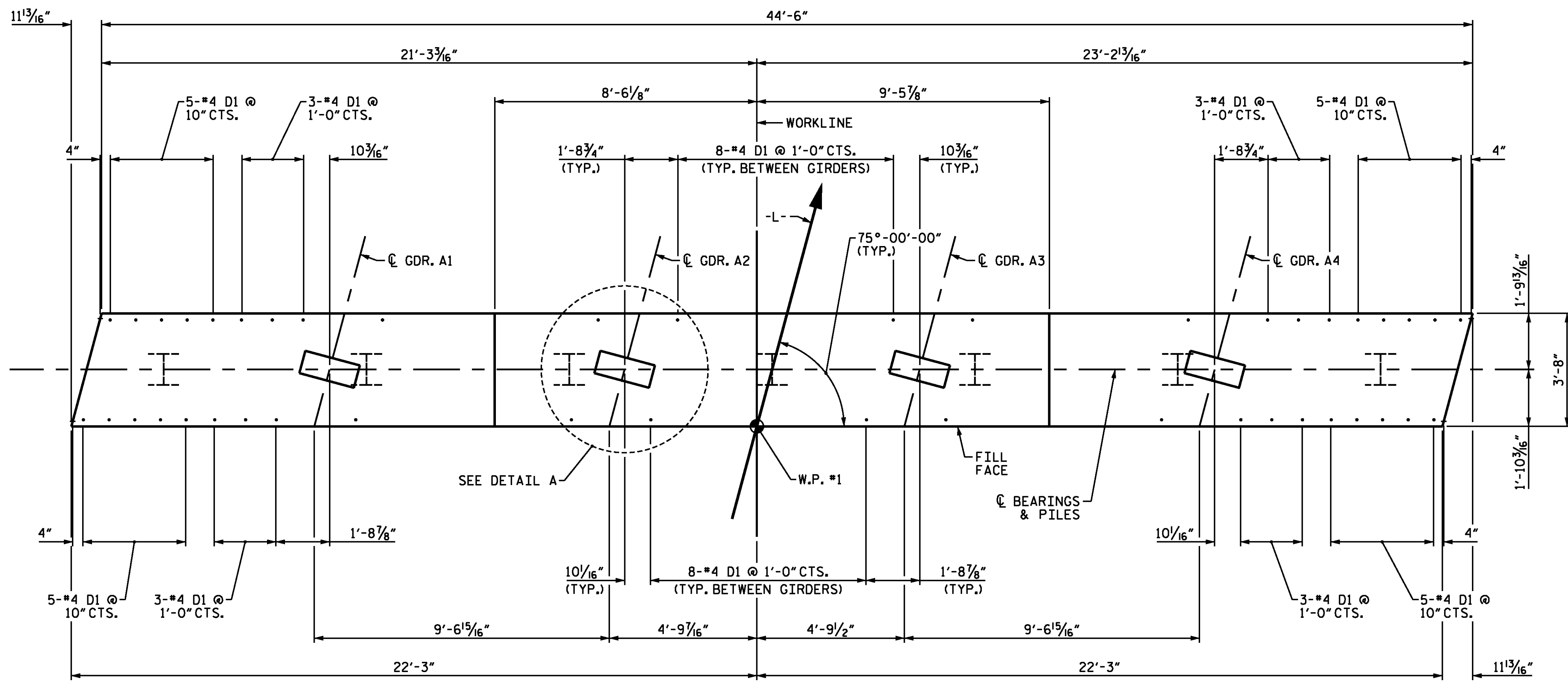
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**GUARDRAIL ANCHORAGE FOR BARRIER RAIL**

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

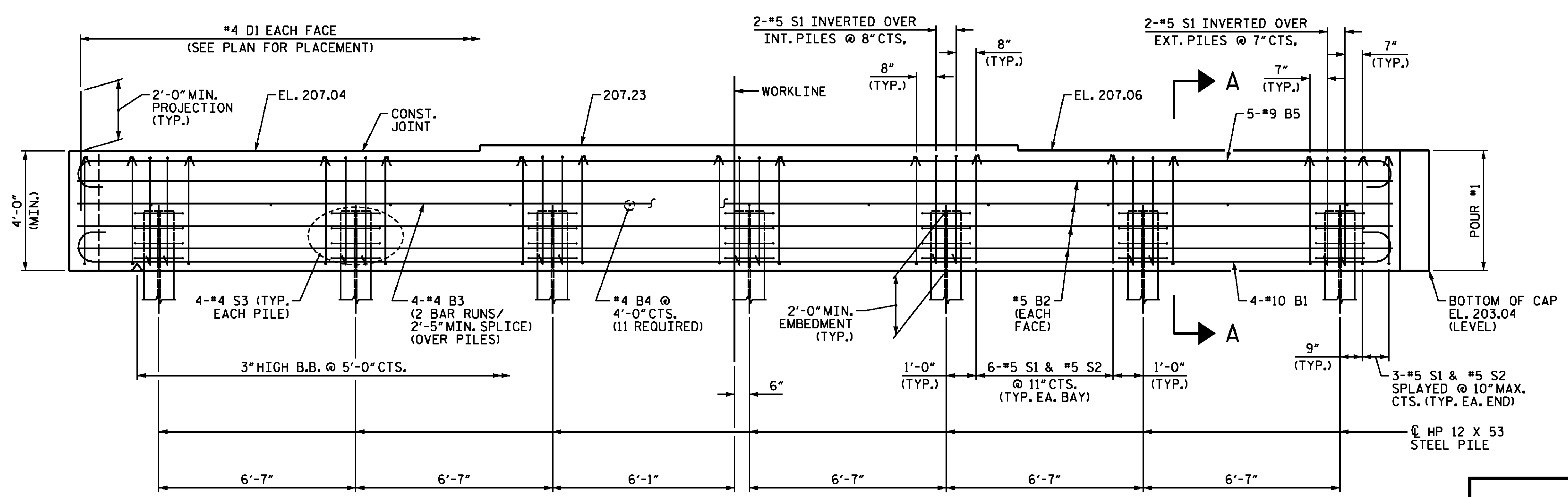
SHEET NO. S1-18  
 TOTAL SHEETS 25

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



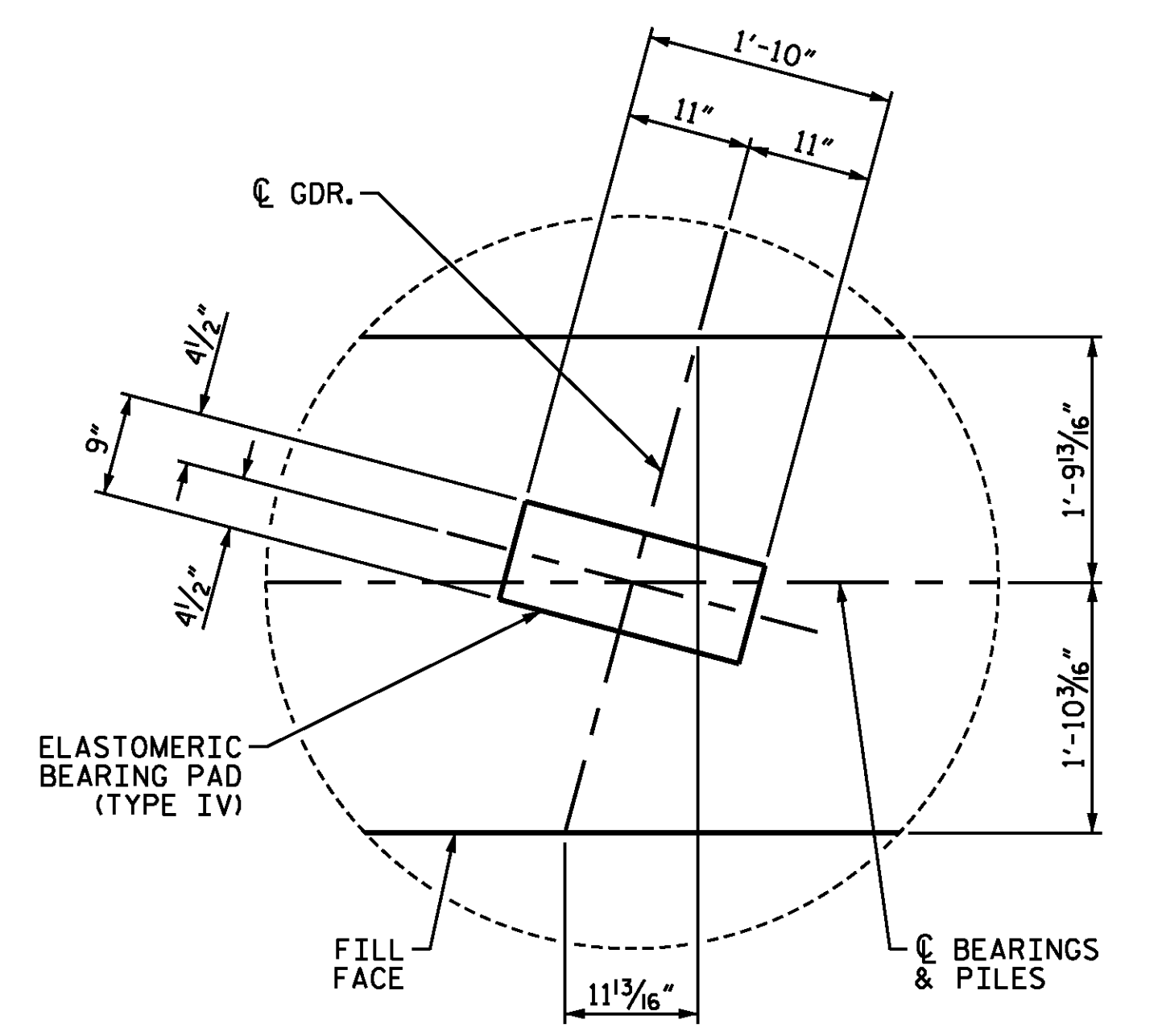


**PLAN**



**ELEVATION**

**NOTE**  
 \*4 D1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN CAP.  
 FOR PILE SPLICE DETAILS AND SECTION A-A, SEE SHEET 2 OF 2.  
 FOR BEARING DETAILS, SEE "BEARING DETAILS" SHEET.

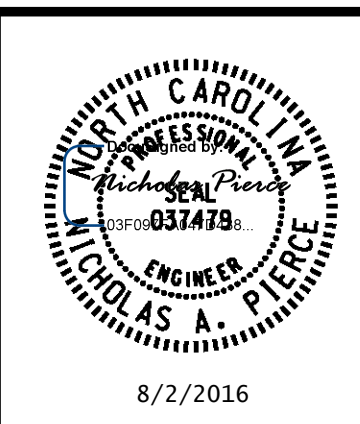


**DETAIL A**  
 (TYP. EACH BEARING)

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-  
 SHEET 1 OF 2

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

**WSP**  
**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165

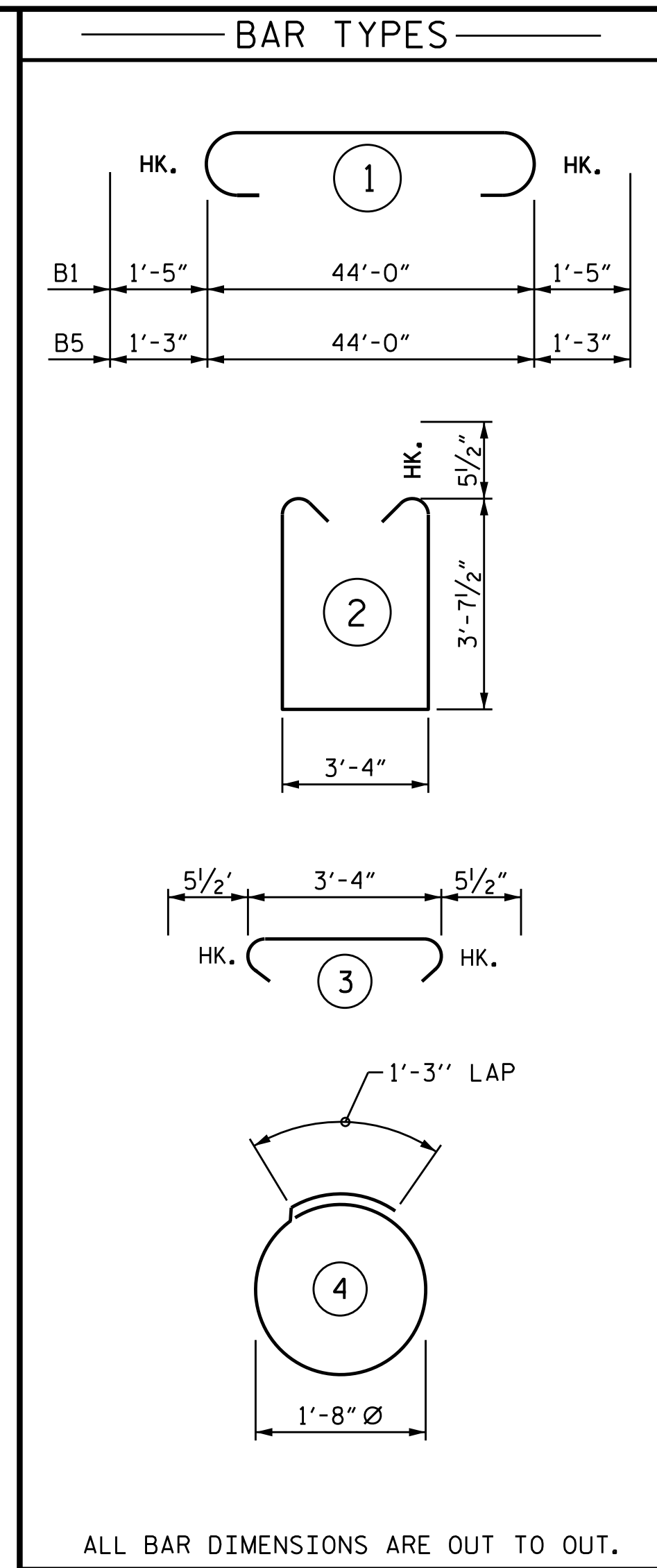
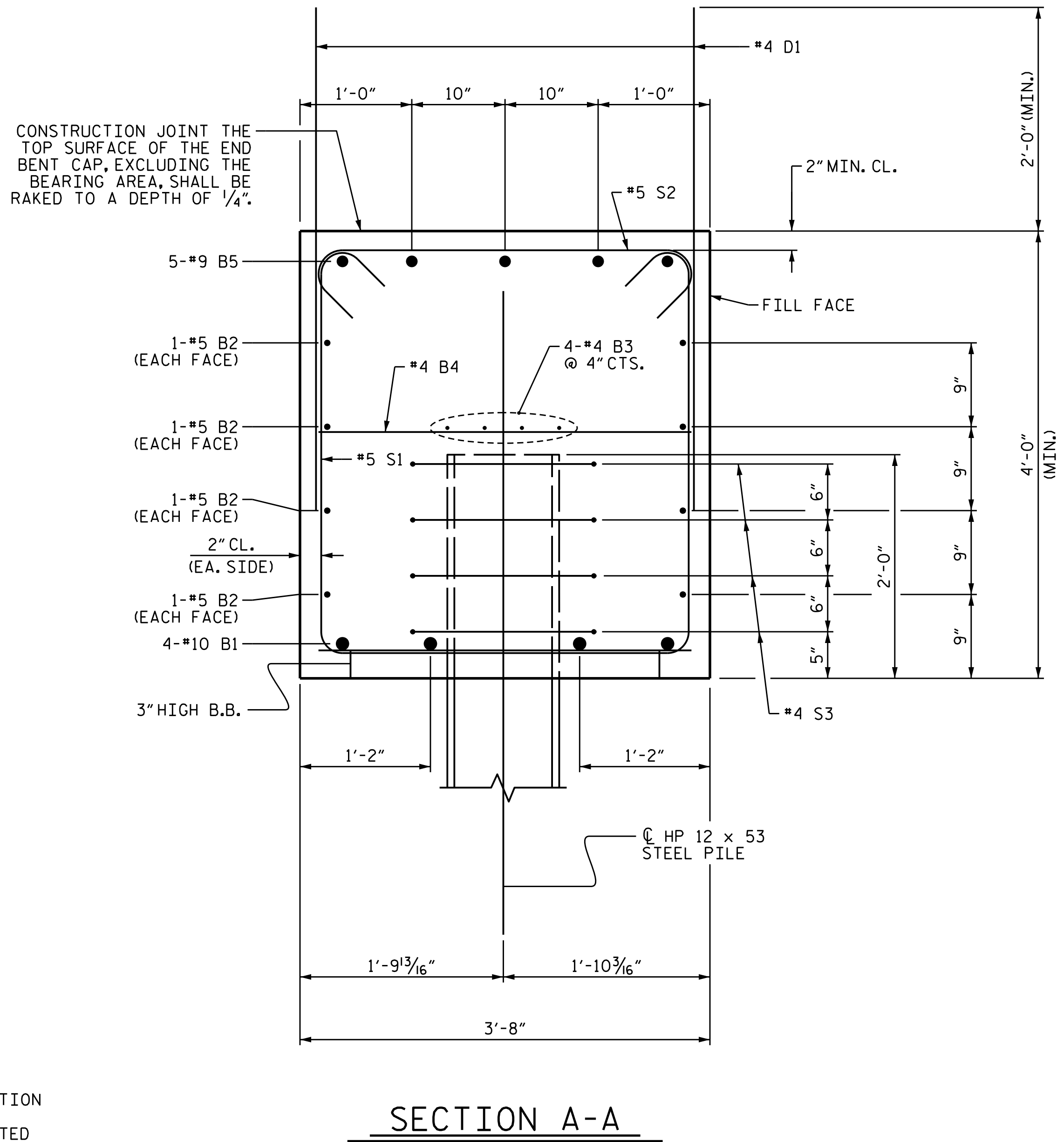
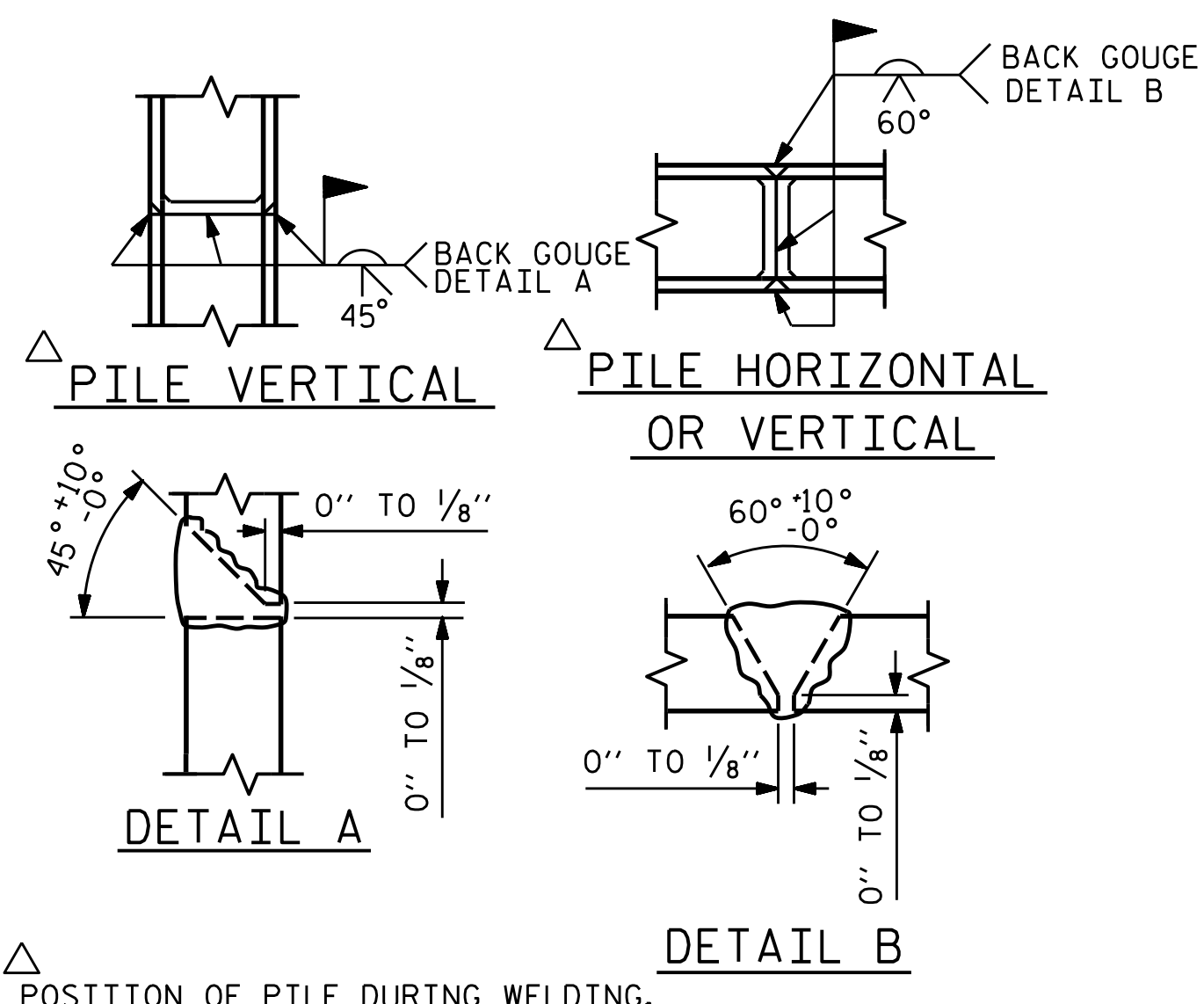


DESIGNED BY:	J.D. BORUTA	DATE :	04/2016
DRAWN BY:	M.J. OSTRISHKO	DATE :	04/2016
CHECKED BY:	E. ULLMER	DATE :	05/2016
DESIGN ENGINEER OF RECORD:	N.A. PIERCE	DATE :	06/2016

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

TOTAL SHEETS: 25

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**



BILL OF MATERIAL						
INTEGRAL END BENT 1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	4	#10	1	46'-10"	806	
B2	8	#5	STR	44'-2"	369	
B3	8	#4	STR	23'-5"	125	
B4	11	#4	STR	3'-4"	24	
B5	5	#9	1	46'-6"	791	
D1	80	#4	STR	4'-6"	240	
S1	56	#5	2	11'-6"	672	
S2	42	#5	3	4'-3"	186	
S3	28	#4	4	6'-6"	122	

REINFORCING STEEL LBS. 3,335

CLASS "A" CONCRETE

POUR #1 CAP CU. YDS. 24.7

TOTAL = CU. YDS. 24.7

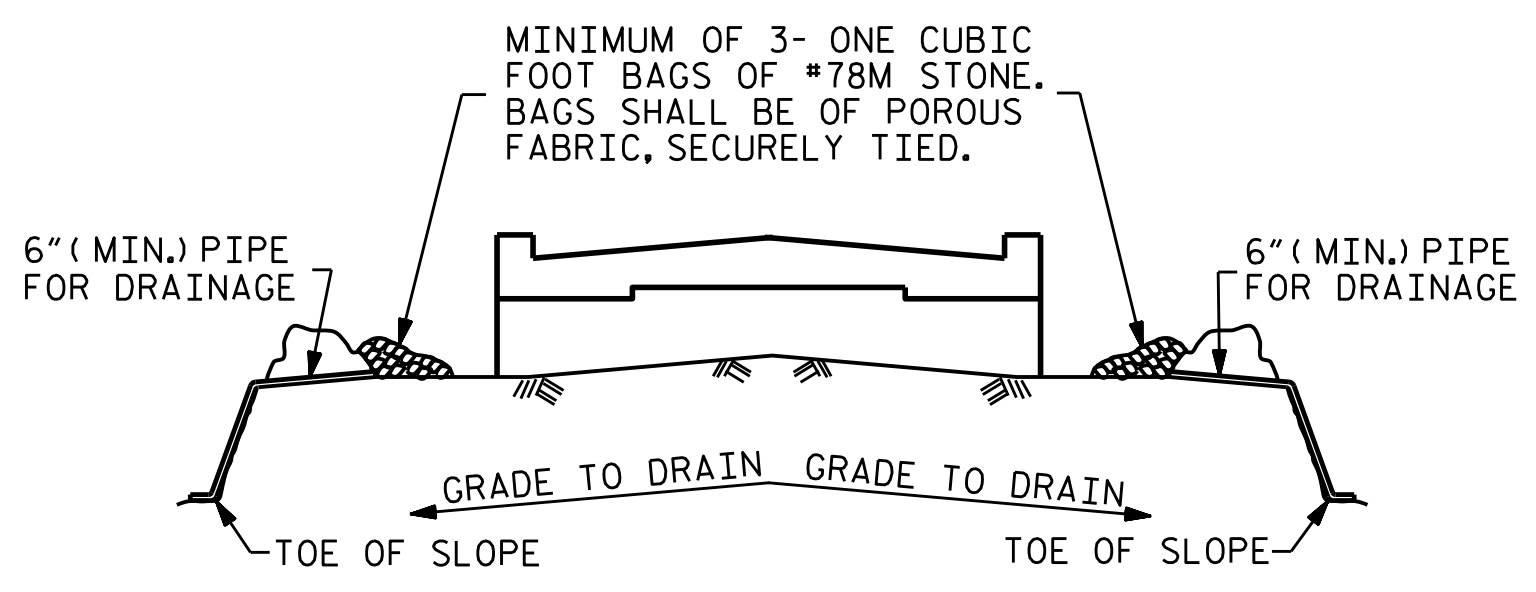
PILE DRIVING EQUIPMENT SET UP FOR HP 12X53 STEEL PILES

7 EACH

HP 12 X 53 STEEL PILE

NO. = 7 LIN. FT. 525

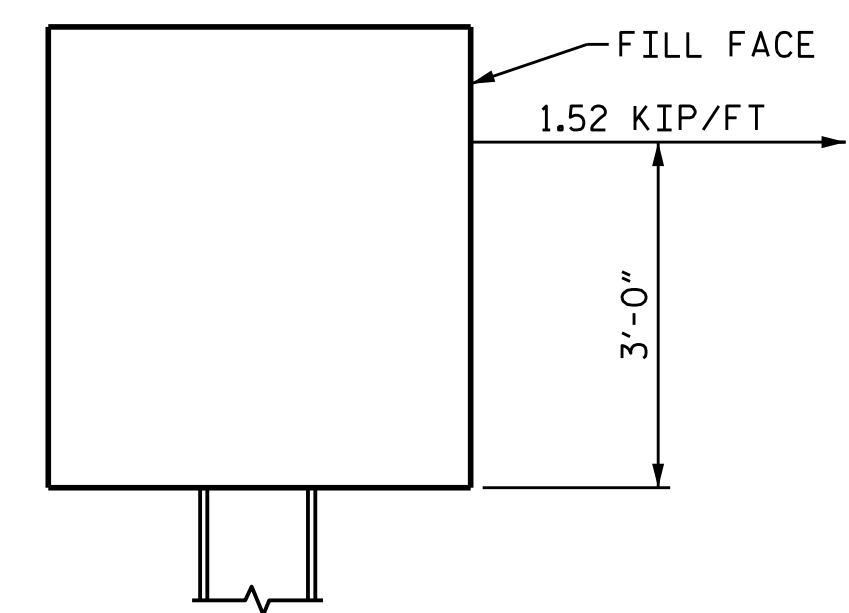
PILE REDRIVES EACH 4



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.



DESIGN REINFORCEMENT CONNECTED TO INTEGRAL END BENT CAPS FOR THE LOADING SHOWN AND CAST THE REINFORCEMENT CONNECTION HARDWARE INTO THE INTEGRAL END BENT. MAINTAIN A CLEARANCE OF 3" BETWEEN THE HARDWARE AND REINFORCING STEEL IN THE CAP.

PROJECT NO. B-4616

ROBESON COUNTY

STATION: 31+55.47 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
INTEGRAL END BENT 1

DESIGNED BY: J.B. BORUTA DATE: 04/2016  
DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
CHECKED BY: E. ULLMER DATE: 05/2016  
DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

**WSP**  
**PARSONS BRINCKERHOFF**

434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. F-0165

4/13/2017

STATE OF NORTH CAROLINA  
MICHAEL ASH  
REGISTERED PROFESSIONAL ENGINEER  
SEAL  
EST. 1978  
0317479

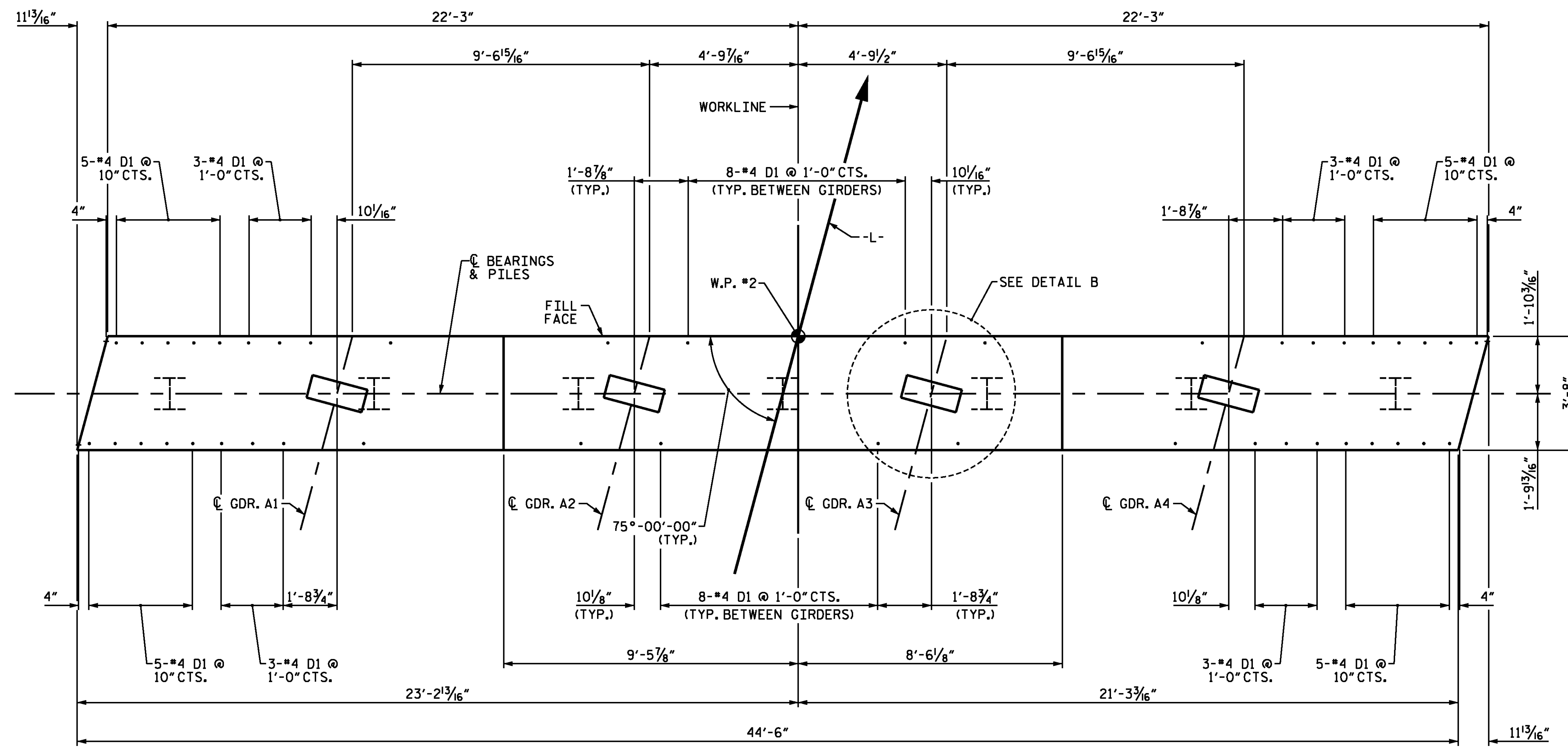
REVISIONS

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

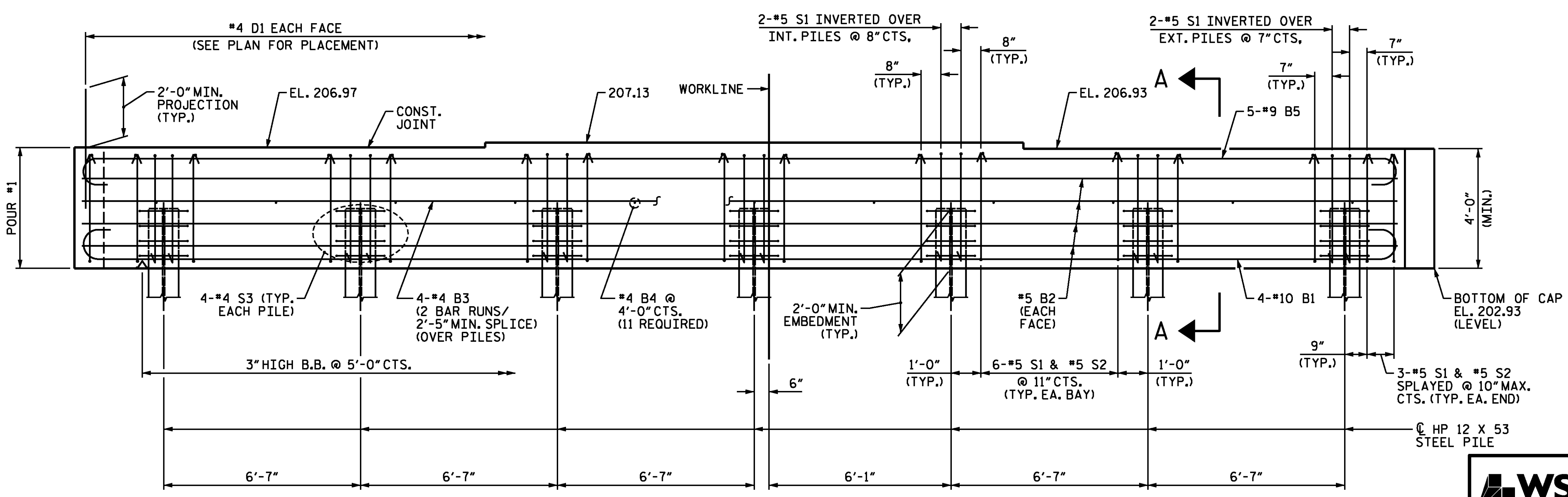
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

SHEET NO. S1-21

TOTAL SHEETS 25

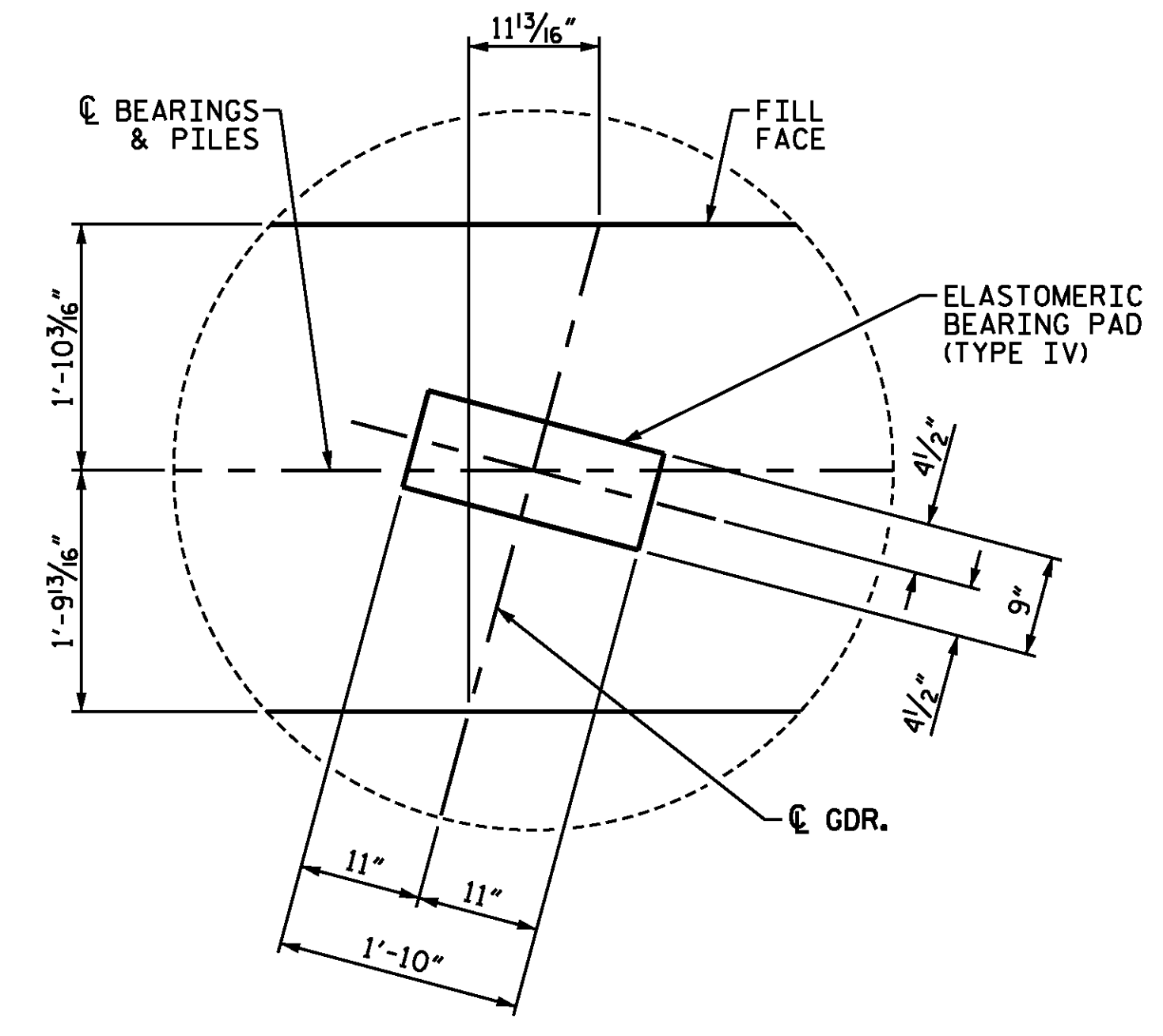


**PLAN**



**ELEVATION**

**NOTES**  
 \*4 D1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN CAP.  
 FOR PILE SPLICE DETAILS AND SECTION A-A, SEE SHEET 2 OF 2.  
 FOR BEARING DETAILS, SEE "BEARING DETAILS" SHEET.



**DETAIL B**  
(TYP. EACH BEARING)

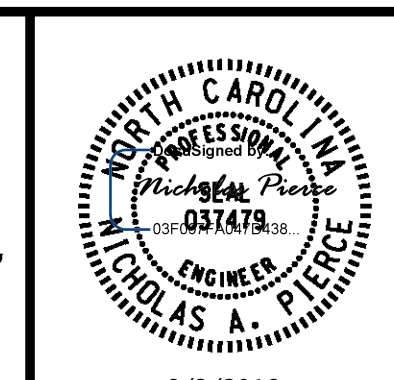
PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-  
 SHEET 1 OF 2

DESIGNED BY: J.D. BORUTA DATE: 04/2016  
 DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
 CHECKED BY: E. ULLMER DATE: 05/2016  
 DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

7/26/2016  
 R:\Raleigh Office\NCDOT\B-4616 Robeson County\400.Structures\Drafting\Substructure\401.043.B4616.SMU.EB201.dgn  
 usmo04281



434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 LICENSE NO. F-0165

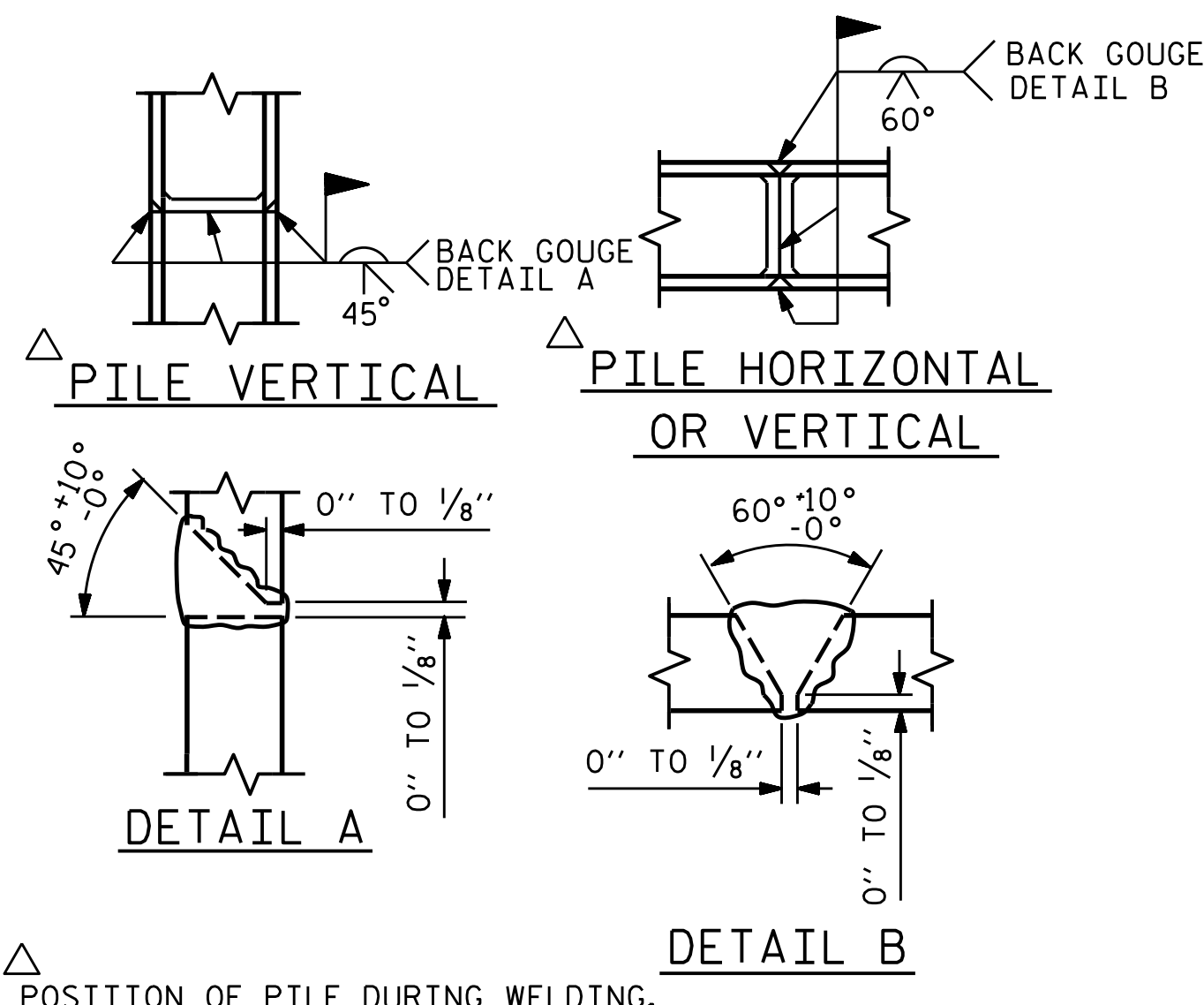


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL  
 END BENT 2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			25
2			4			

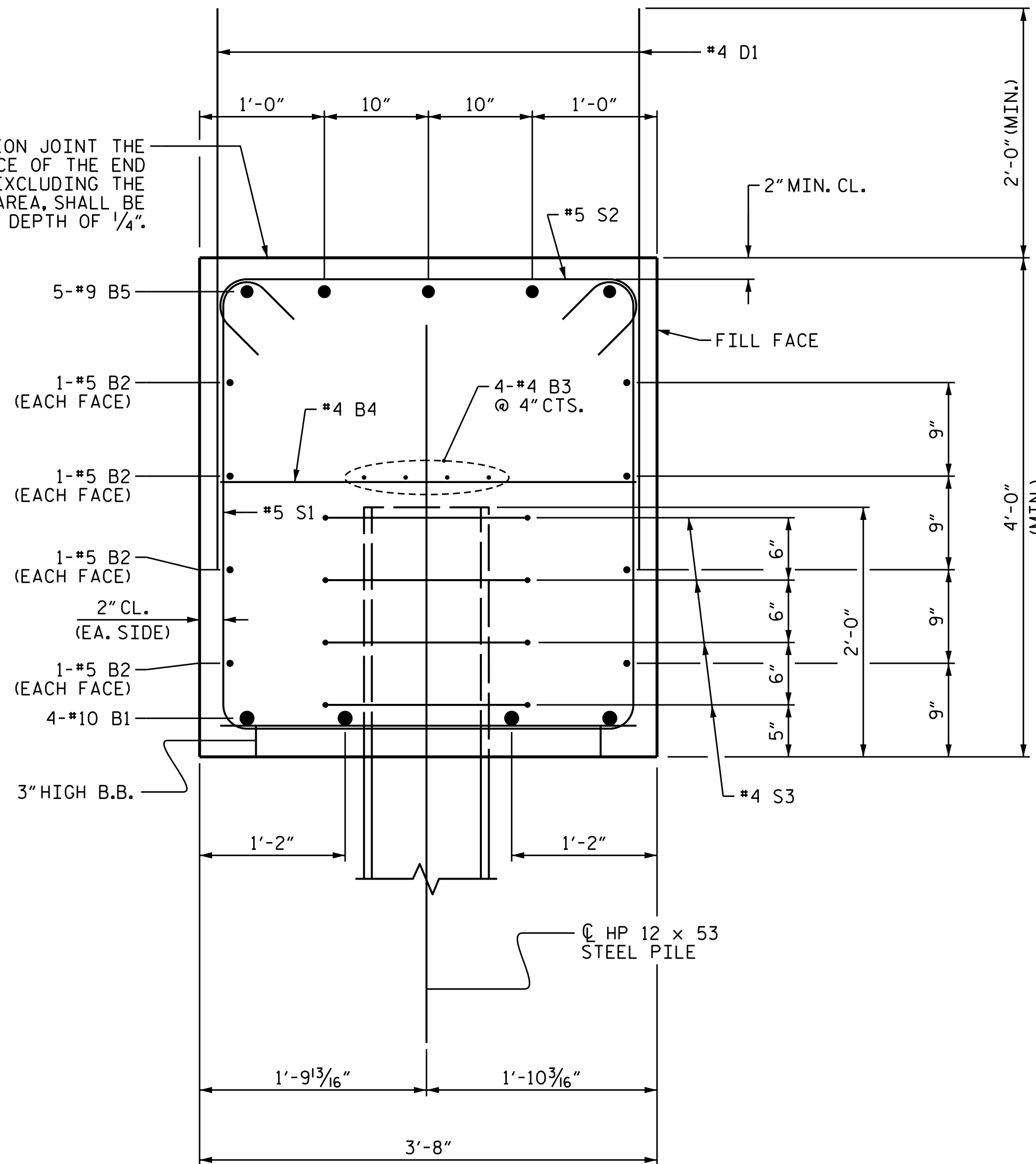
**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**



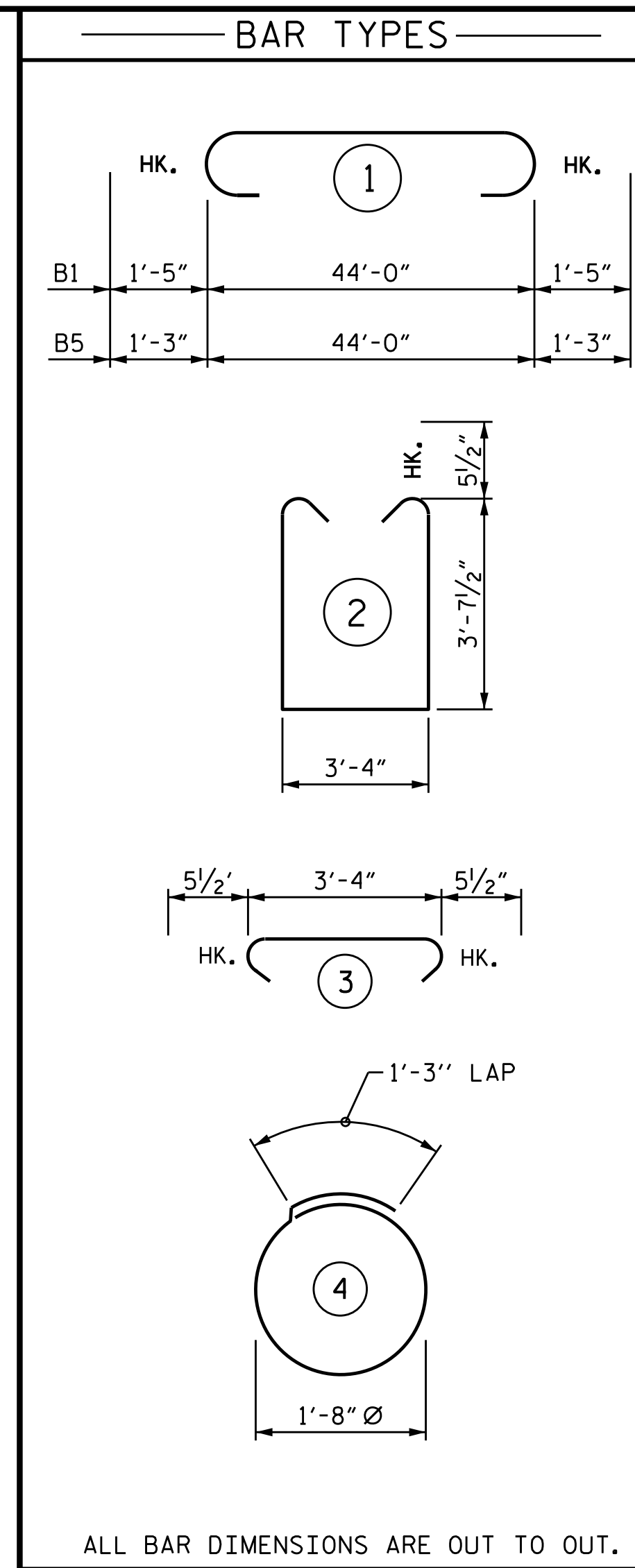


**PILE SPLICE DETAILS**

CONSTRUCTION JOINT THE TOP SURFACE OF THE END BENT CAP, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".



**SECTION A-A**



BILL OF MATERIAL					
INTEGRAL END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	46'-10"	806
B2	8	#5	STR	44'-2"	369
B3	8	#4	STR	23'-5"	125
B4	11	#4	STR	3'-4"	24
B5	5	#9	1	46'-6"	791
D1	80	#4	STR	4'-6"	240
S1	56	#5	2	11'-6"	672
S2	42	#5	3	4'-3"	186
S3	28	#4	4	6'-6"	122

REINFORCING STEEL LBS. 3,335

CLASS "A" CONCRETE

POUR #1 CAP CU. YDS. 24.7

TOTAL = CU. YDS. 24.7

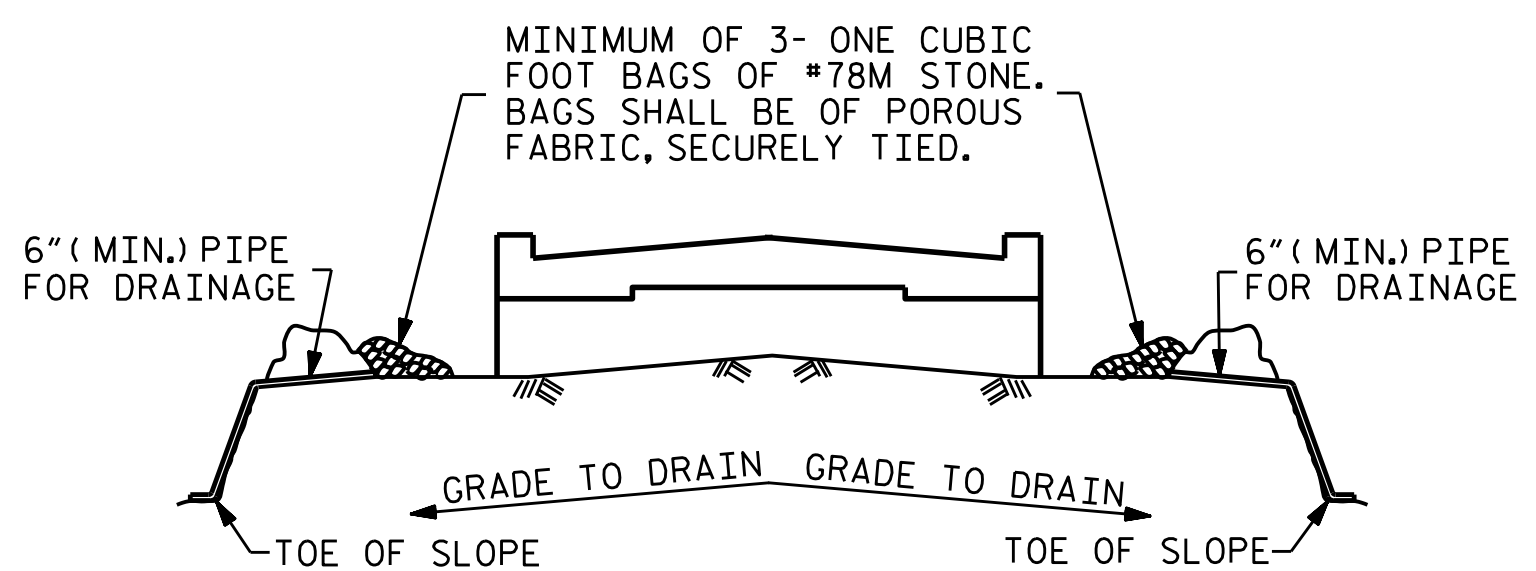
PILE DRIVING EQUIPMENT SET UP FOR HP 12X53 STEEL PILES

7 EACH

HP 12 X 53 STEEL PILE

NO. = 7 LIN. FT. 525

PILE REDRIVES EACH 4

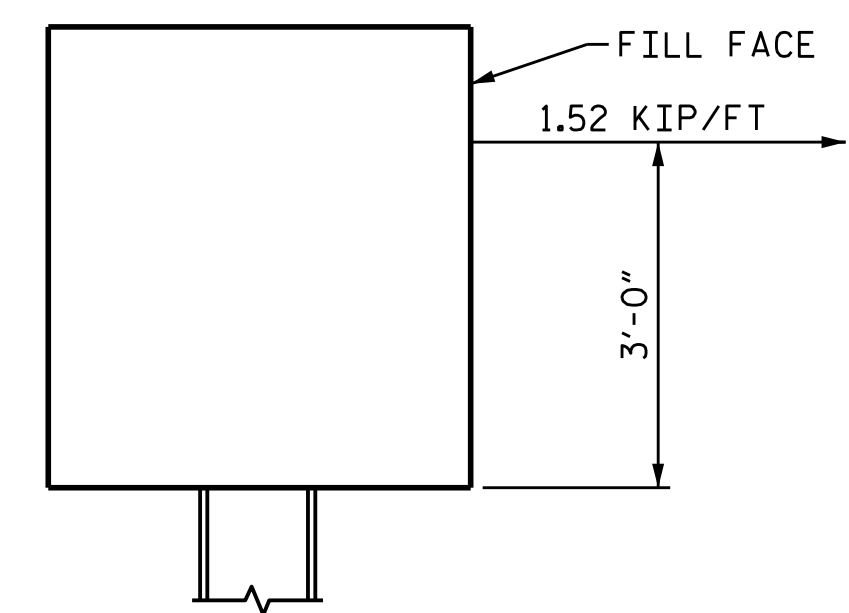


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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**



**MSE REINFORCING STRAP LOAD DETAIL**

DESIGN REINFORCEMENT CONNECTED TO INTEGRAL END BENT CAPS FOR THE LOADING SHOWN AND CAST THE REINFORCEMENT CONNECTION HARDWARE INTO THE INTEGRAL END BENT. MAINTAIN A CLEARANCE OF 3" BETWEEN THE HARDWARE AND REINFORCING STEEL IN THE CAP.

PROJECT NO. B-4616  
ROBESON COUNTY  
STATION: 31+55.47 -L-

SHEET 2 OF 2

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

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

TOTAL SHEETS 25

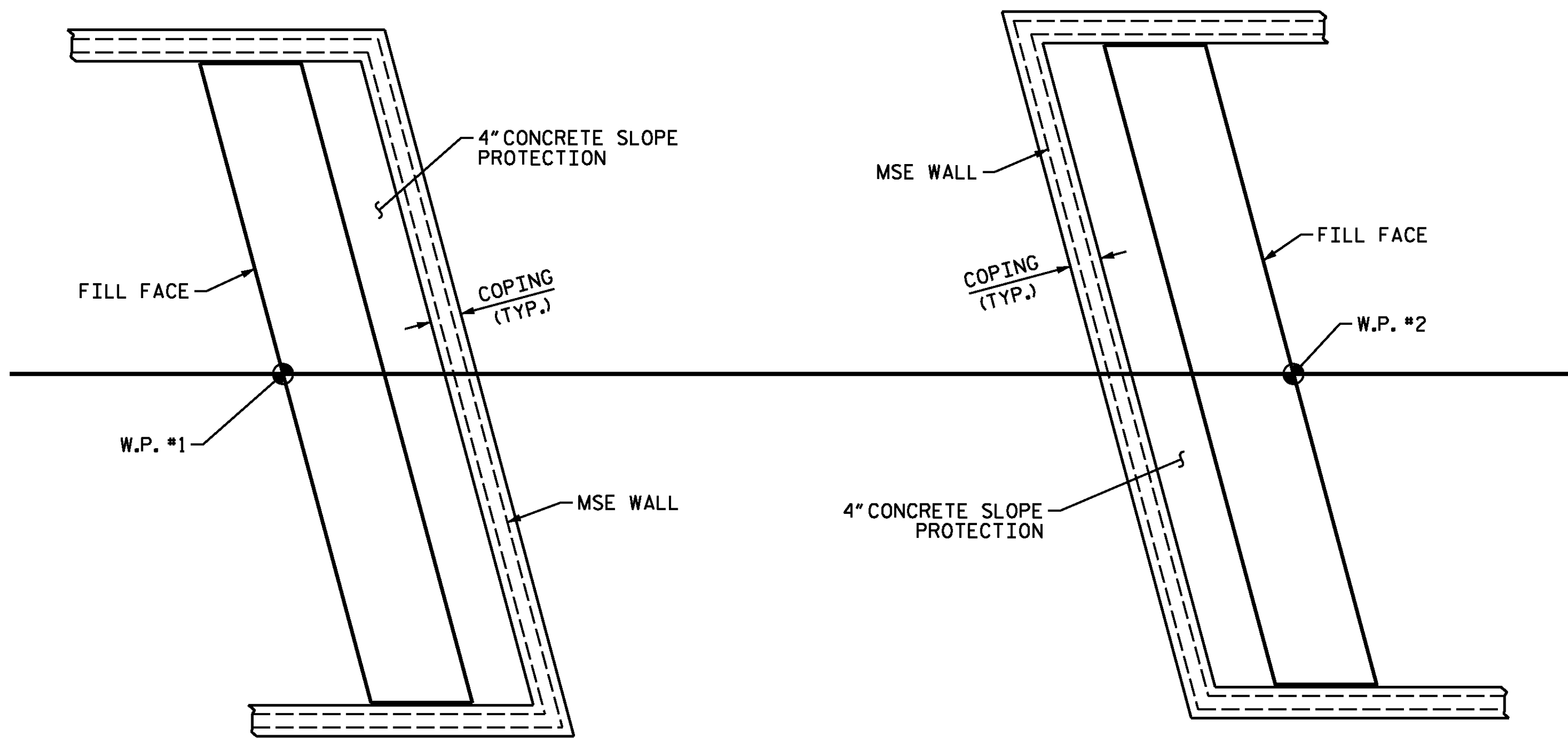
**WSP**  
**PARSONS BRINCKERHOFF**  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. F-0165

4/13/2017

STATE OF NORTH CAROLINA  
NICHOLAS A. PIERCE  
ENGINEER  
LICENSE NO. 03947930

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

DESIGNED BY:	J.D. BORUTA	DATE :	04/2016
DRAWN BY:	M.J. OSTRISHKO	DATE :	04/2016
CHECKED BY:	E. ULLMER	DATE :	05/2016
DESIGN ENGINEER OF RECORD:	N.A. PIERCE	DATE :	06/2016



INTEGRAL END BENT 1

INTEGRAL END BENT 2

PLAN

GENERAL NOTES

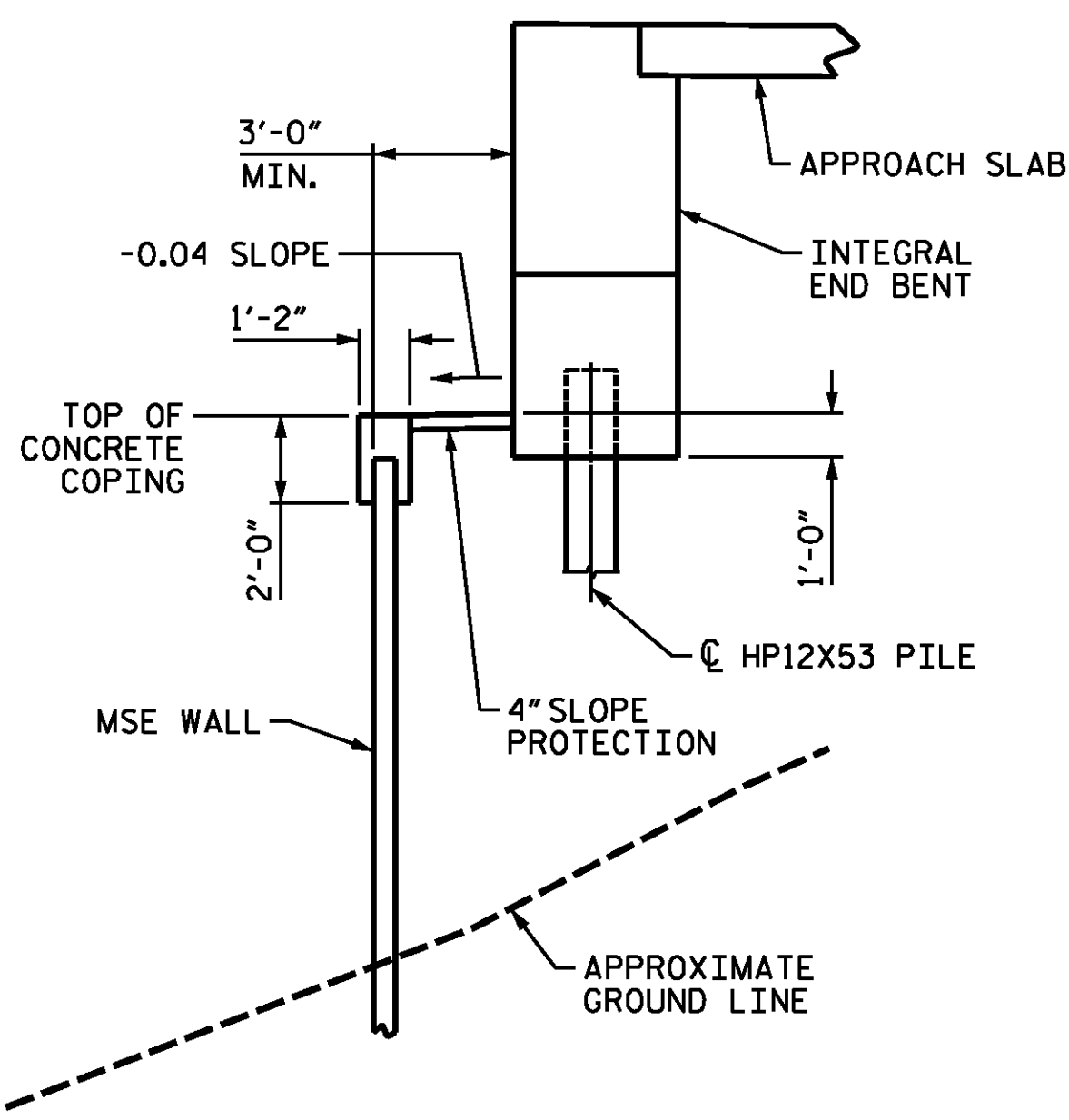
FOR MSE WALL AND COPING DETAILS, SEE MSE WALL PLANS.

1" EXP. JT. MATERIAL TO BE PLACED ALONG FRONT FACE OF INTEGRAL END BENTS AND ADJACENT TO THE COPING AT TOP OF MSE WALL (PLACE DEBONDING TAPE ON TOP OF EXP. JT. MAT'L.)

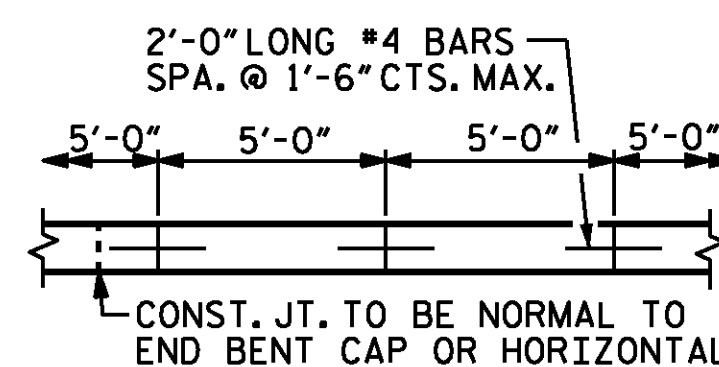
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL 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. 31+55.47 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
INTEGRAL END BENT 1	14.8	44.5
INTEGRAL END BENT 2	14.8	44.5

\* QUANTITY SHOWN IS BASED ON 5' POURS.

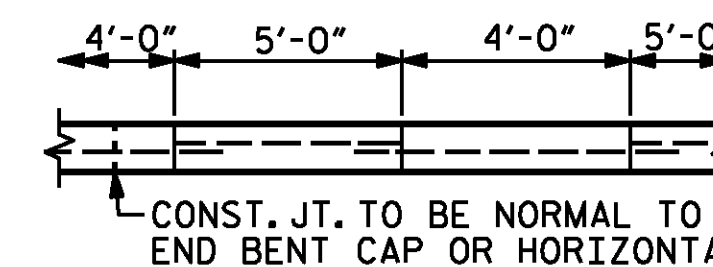


SECTION ALONG -L- THRU INTEGRAL END BENT



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



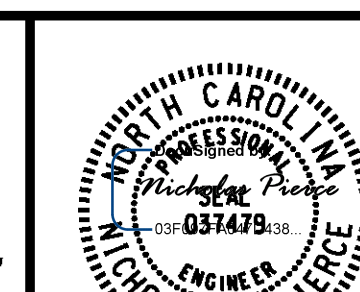
POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

PROJECT NO. B-4616  
ROBESON COUNTY  
 STATION: 31+55.47 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

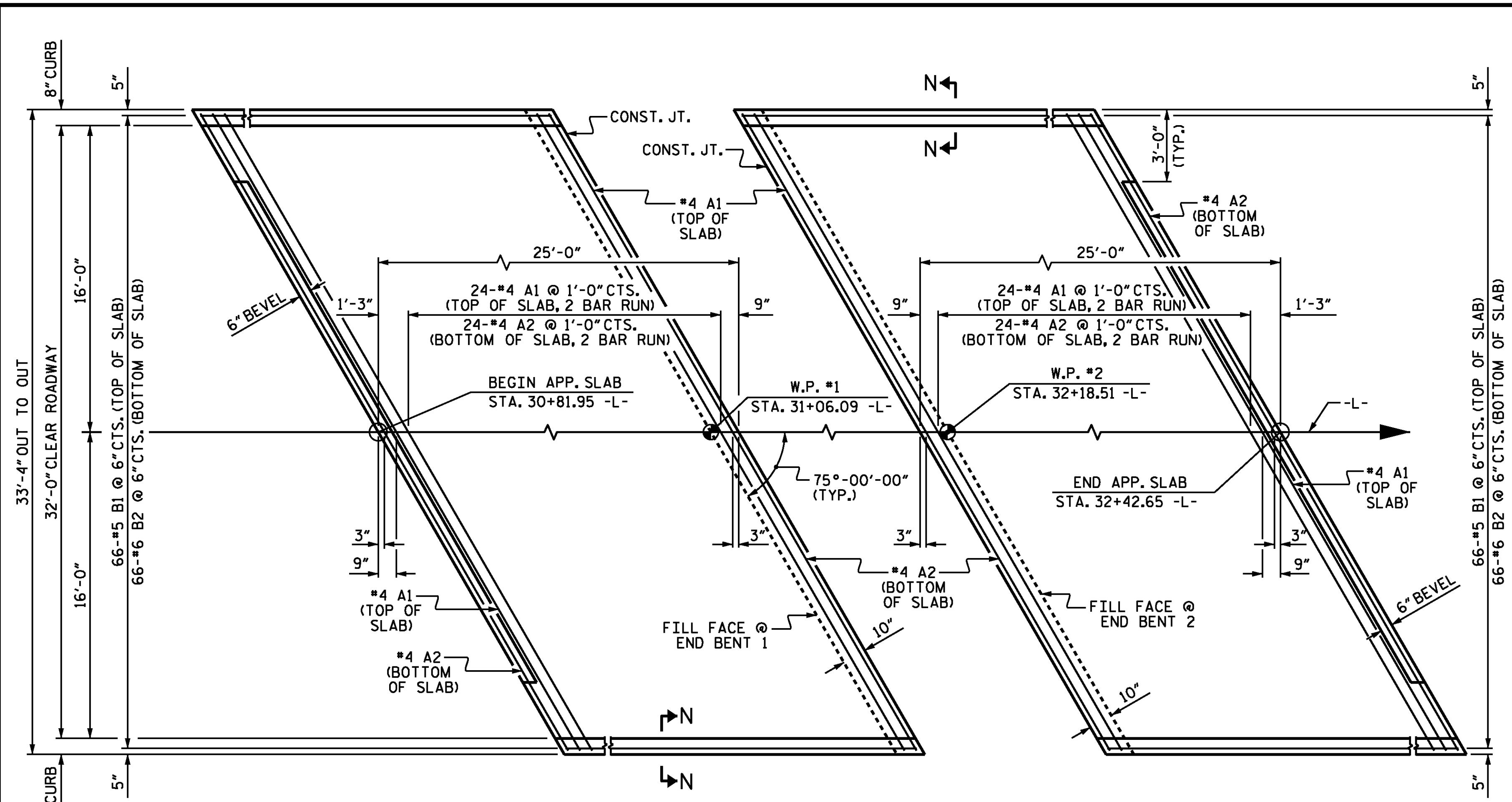
4" CONCRETE SLOPE PROTECTION



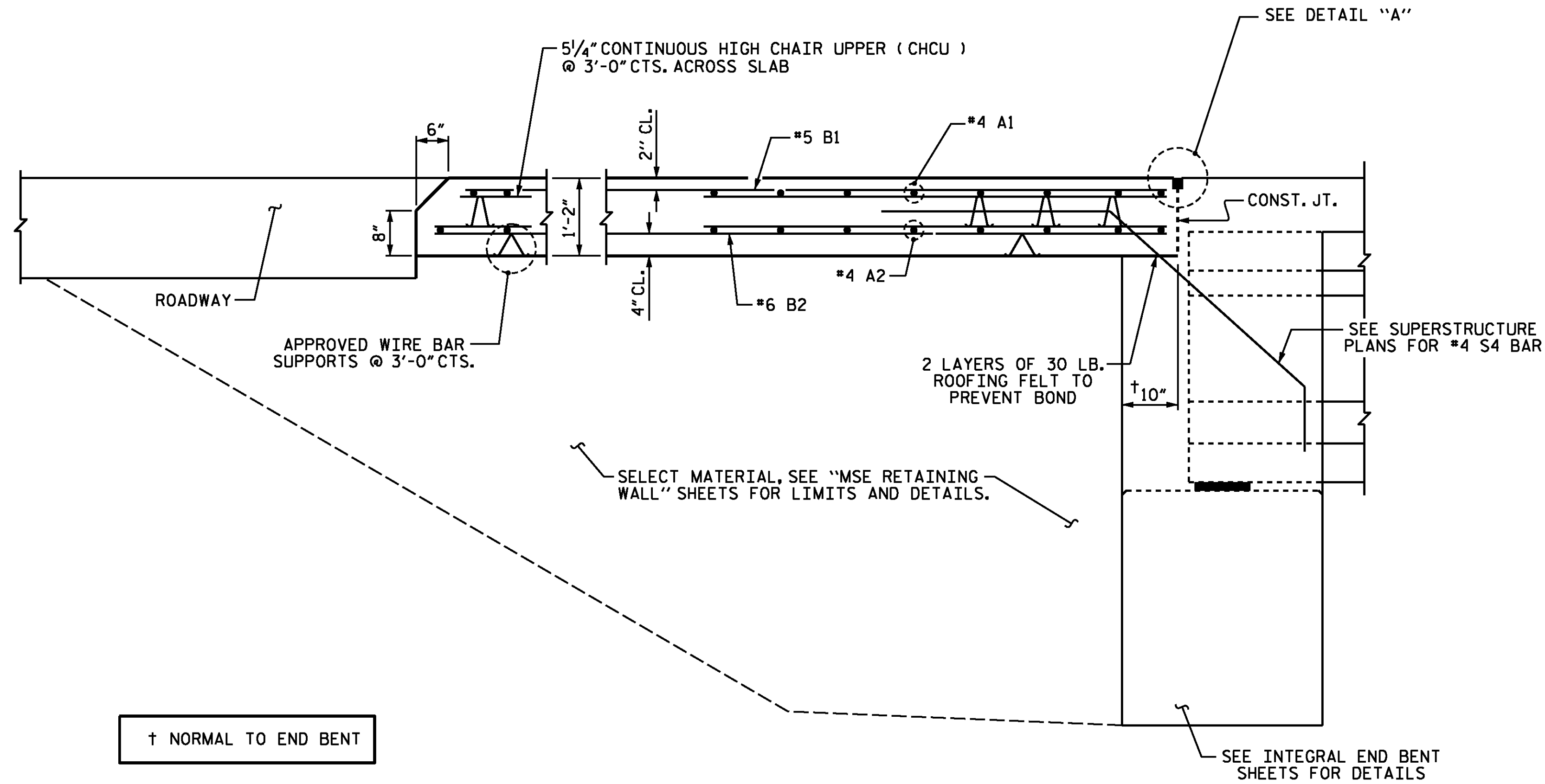
DESIGNED BY:	C.J. HOWARD	DATE :	04/2016
DRAWN BY:	M.J. OSTRISHKO	DATE :	04/2016
CHECKED BY:	N.A. PIERCE	DATE :	05/2016
DESIGN ENGINEER OF RECORD:	N.A. PIERCE	DATE :	06/2016

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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



† NORMAL TO END BENT

SECTION THRU SLAB

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.  
AREA BETWEEN THE MSE WALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.  
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

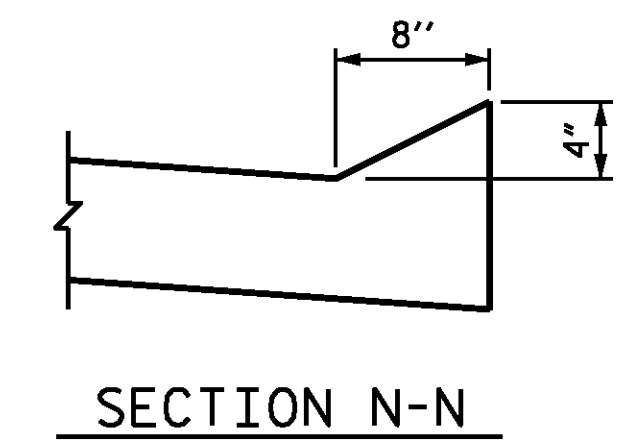
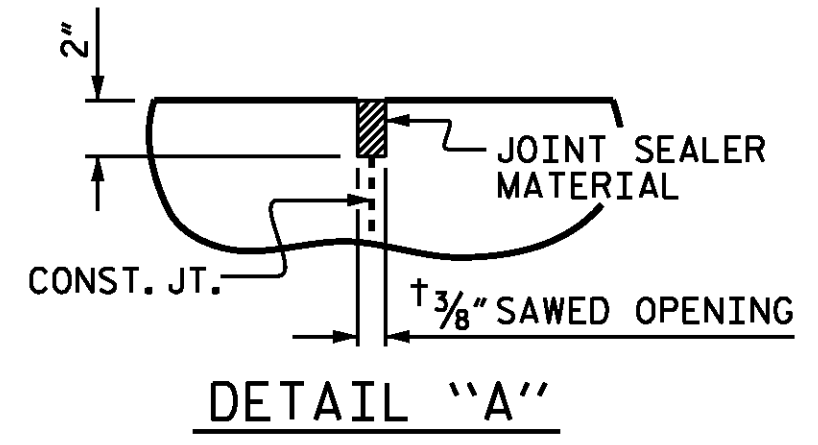
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	18'-3"	634
A2	52	#4	STR	18'-2"	631
* B1	66	#5	STR	24'-1"	1,658
B2	66	#6	STR	24'-7"	2,437
REINFORCING STEEL				LBS.	3,068
* EPOXY COATED REINFORCING STEEL				LBS.	2,292
CLASS AA CONCRETE				C. Y.	36.6

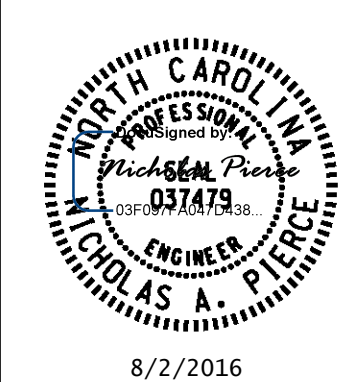
MINIMUM BAR SPLICE

SIZE	EPOXY COATED	UNCOATED
*4	2'-0"	1'-9"



PROJECT NO. B-4616  
ROBESON COUNTY  
STATION: 31+55.47 -L-

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



434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. F-0165

8/2/2016

DESIGNED BY: C.J. HOWARD DATE: 04/2016  
DRAWN BY: M.J. OSTRISHKO DATE: 04/2016  
CHECKED BY: N.A. PIERCE DATE: 05/2016  
DESIGN ENGINEER OF RECORD: N.A. PIERCE DATE: 06/2016

DRAWN BY: TLA 10/05  
CHECKED BY: GM 5/06  
REV. 10/1/11 MAA/GM  
REV. 12/21/11 MAA/GM  
REV. 6/13 MAA/GM

REVISIONS

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

SHEET NO. S1-25  
TOTAL SHEETS 25

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 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 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 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø 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 5/16" 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 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

STD. NO. SN