

WBS ELEMENT: 47015

CONTRACT: C202141

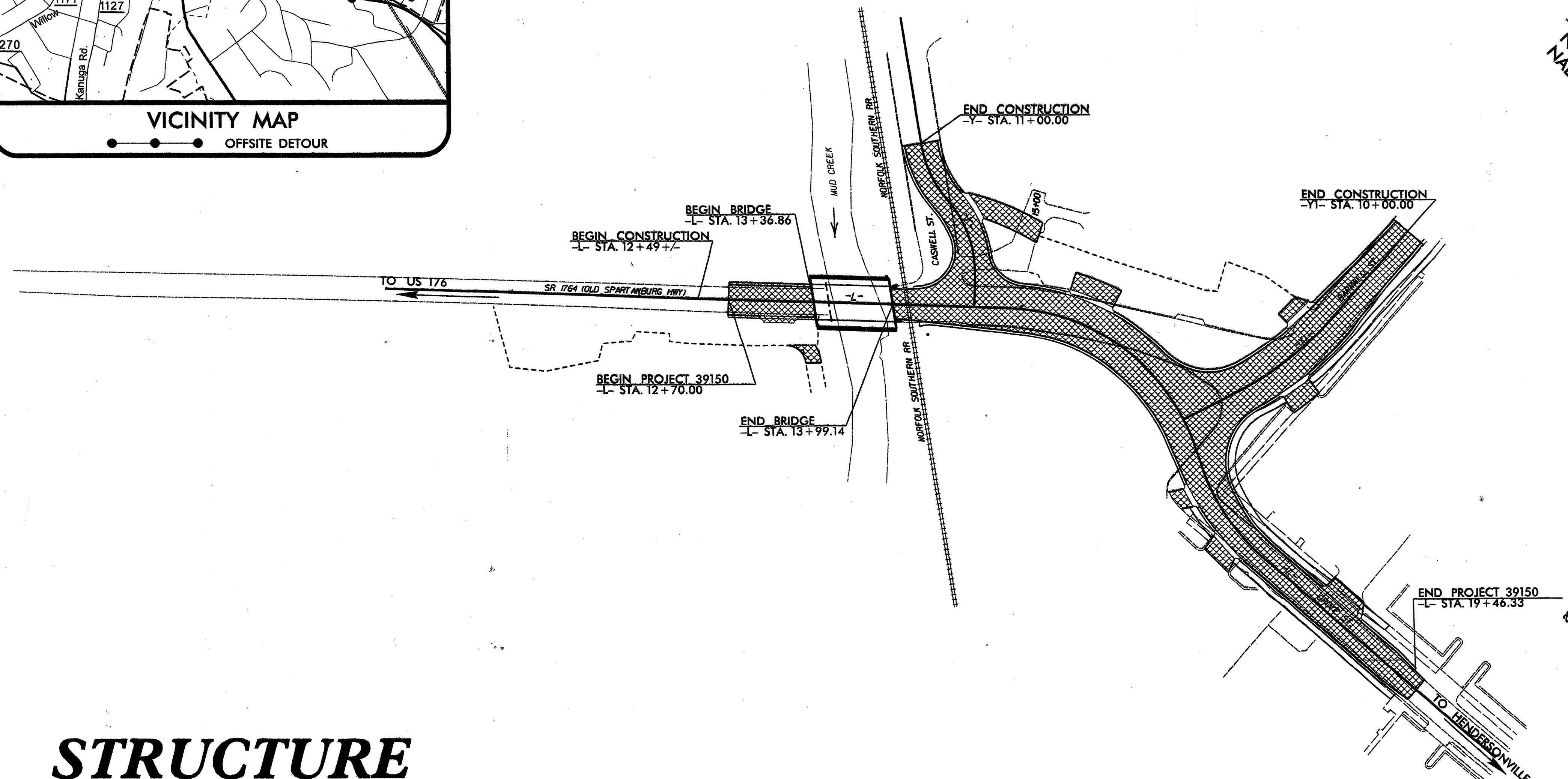
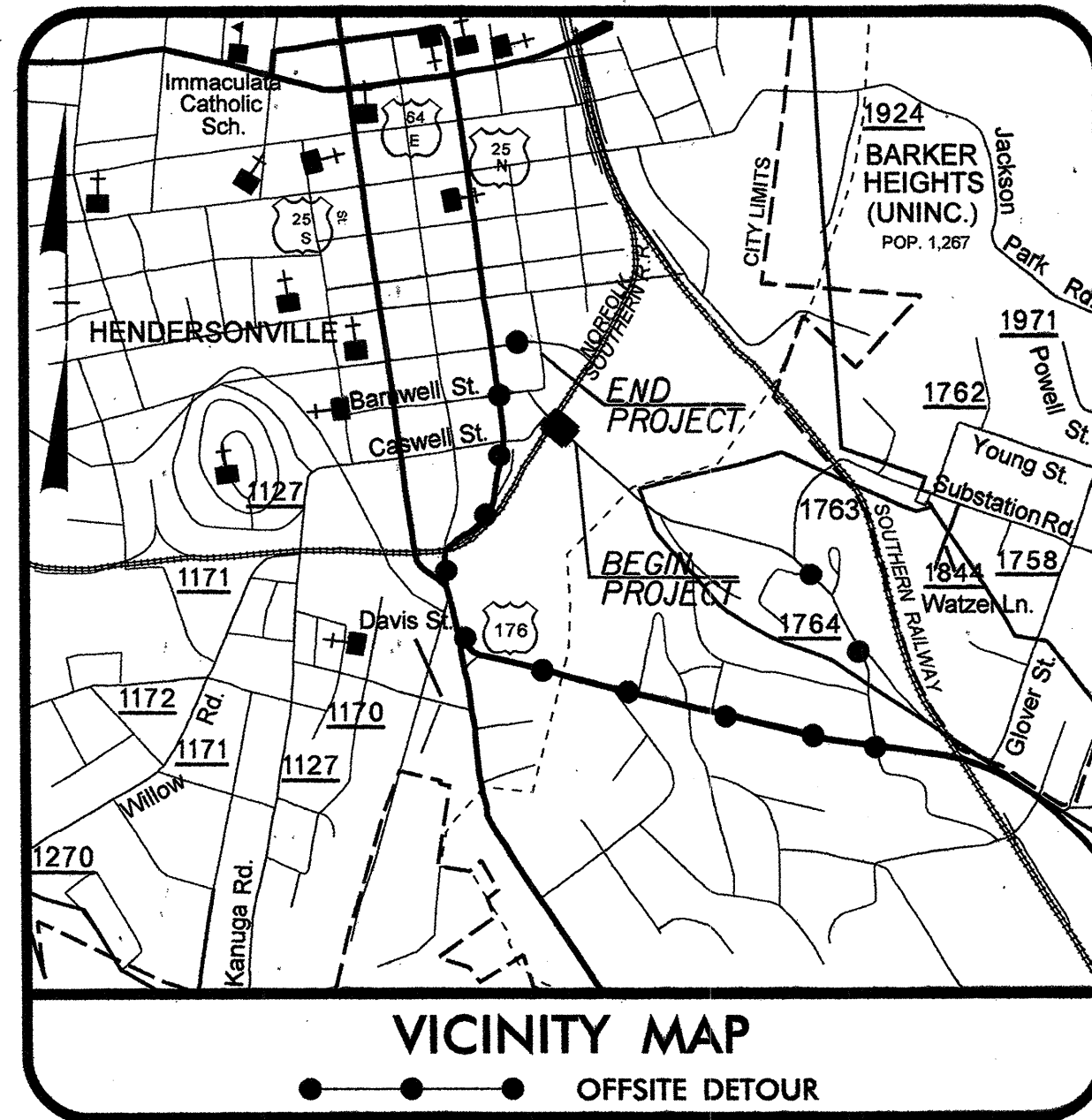
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# HENDERSON COUNTY

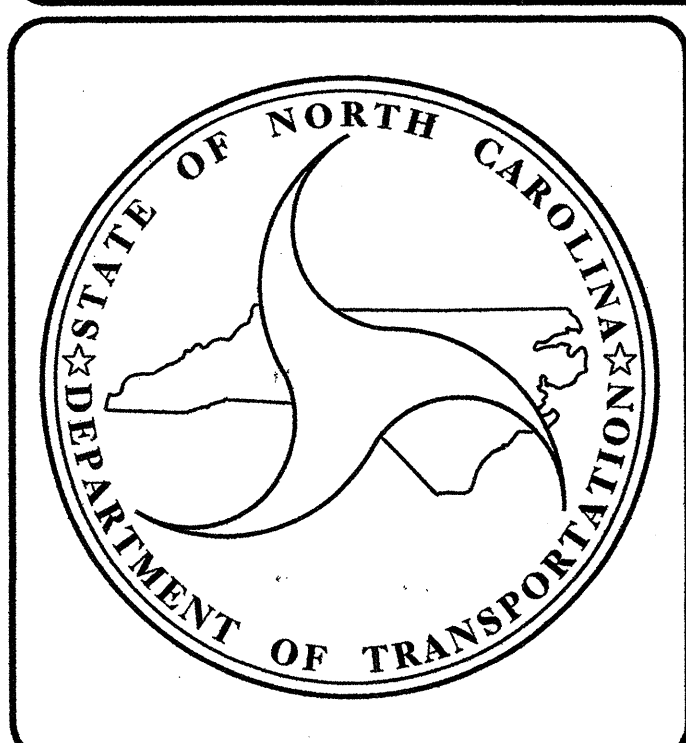
LOCATION: BRIDGE NO. 205 ON SR 1764 (OLD SPARTANBURG HWY)  
OVER MUD CREEK

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5180	S-1	18
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
47015		PE, RW, CONST.	



## STRUCTURE



**DESIGN DATA**

ADT(2008) = 7,525  
 ADT(2028) = 7,025  
 TTST = 20%  
 Vd = 40 MPH

**PROJECT LENGTH B-5180**

LENGTH ROADWAY PROJECT	=	.116 MI
LENGTH STRUCTURE PROJECT	=	.012 MI
TOTAL LENGTH PROJECT	=	.128 MI

Plans Prepared By:  
**TGS ENGINEERS**  
 SUITE 141  
 975 WALNUT STREET  
 GARY, NC 27511  
 PH (919) 319-8850

2006 STANDARD SPECIFICATIONS

LETTING DATE :  
**May 19, 2009**

Plans Prepared for:  
**NCDOT DIVISION 14**  
 NCDOT Contact:  
**RALPH CANNADY**  
 DIVISION PROJECT MANAGER

**JEFFREY W. BRITTAIN, P.E.**  
 PROJECT ENGINEER

**STRUCTURES DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

BM-1:  
-L- STA. 15+02.71 159.35' LT.  
ELEVATION = 2089.185'

**EXISTING BRIDGE INFORMATION**  
EXISTING BRIDGE #205 OF TOTAL LENGTH = 50'-6"  
WITH TWO SPANS OF 25'-3", CONSISTING OF STEEL  
PLANK FLOOR ON I-BEAMS, TIMBER END BENTS,  
& TIMBER PIERS WITH 23' ROADWAY, SHALL  
BE REMOVED.

**NOTES :**

1. THE QUANTITY OF RIP RAP TO BE PAID FOR WILL BE THE ACTUAL NUMBER OF TONS OF EACH CLASS OF RIP RAP WHICH HAS BEEN INCORPORATED INTO THE COMPLETED AND ACCEPTED WORK. THE RIP RAP WILL BE MEASURED BY BEING WEIGHED IN TRUCKS ON CERTIFIED PLATFORM SCALES OR OTHER CERTIFIED WEIGHING DEVICES. THE QUANTITY OF RIP RAP WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER TON.
2. PLAIN RIP RAP CLASS II (2'-0" THICK) WITH FILTER FABRIC.  
END BENT 1 80 TONS
3. ADT 7,600 FOR YEAR 2005.
4. THE EXISTING BRIDGE SHALL BE REMOVED BY SAWING AND/OR NON-SHATTERING METHODS SUCH THAT DEBRIS WILL NOT FALL INTO THE WATER.
5. THE STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH FHWA'S TECHNICAL ADVISORY T5140.20 (SCOUR AT BRIDGES).

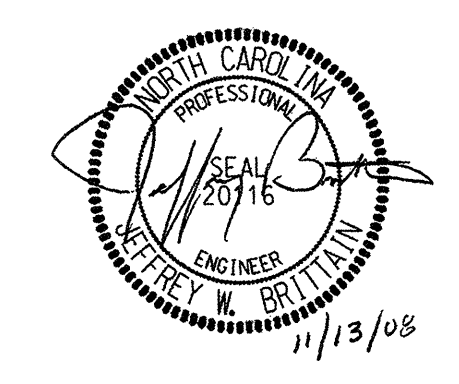
**DRILLED PIER NOTES :**

1. DRIVE PILES AT END BENT NO.1 TO A REQUIRED BEARING CAPACITY OF 100 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.
2. THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT NO.1 IS 50 TONS PER PILE.
3. STEEL PILE POINTS (WITH TEETH) ARE REQUIRED FOR STEEL PILES AT END BENT NO.1. SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
4. DRILLED PIERS AT END BENT NO.2 ARE DESIGNED FOR BOTH SKIN FRICTION AND END BEARING. CHECK FIELD CONDITIONS FOR THE REQUIRED END BEARING CAPACITY OF 20 TSF.
5. DRILLED PIERS AT END BENT NO.2 ARE DESIGNED FOR AN APPLIED LOAD OF 195 TONS AT THE TOP OF THE COLUMN.
6. DRILLED PIERS AT END BENT NO.2 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 2,007 FT. (LT) AND 2,025 FT. (RT), SATISFY THE REQUIRED END BEARING CAPACITY, AND HAVE A MINIMUM PENETRATION OF 1 FT INTO ROCK OR WEATHERED ROCK AS DEFINED BY THE DRILLED PIERS SPECIAL PROVISION.
7. SPT TESTING IS NOT REQUIRED TO DETERMINE THE END BEARING CAPACITY OF THE DRILLED PIERS AT END BENT NO.2.
8. SLURRY CONSTRUCTION IS REQUIRED FOR DRILLED PIERS AT END BENT NO.2 SEE DRILLED PIER SPECIAL PROVISION.
9. DO NOT USE POLYMER SLURRY FOR DRILLED PIERS AT END BENT NO.2.
10. SID INSPECTIONS ARE REQUIRED TO INSPECT THE BOTTOM CLEANLINESS OF THE DRILLED PIERS AT END BENT NO.2. SEE DRILLED PIERS SPECIAL PROVISION.
11. CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. SEE CROSSHOLE SONIC LOGGING SPECIAL PROVISION.
12. FOR DRILLED PIERS, SEE DRILLED PIER SPECIAL PROVISION.
13. WHEN DRIVING PILES, THE MAXIMUM BLOW COUNTS SHALL NOT BE EXCEEDED.
14. PILING SHALL BE DRIVEN CONTINUOUSLY IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 450-8 UNTIL THE LOAD IS OBTAINED AT OR PAST THE MINIMUM TIP TO THE ESTIMATED LENGTH SHOWN ON THE PLANS. IF LOAD IS STILL NOT OBTAINED AT THIS POINT, THE CONTRACTOR MAY SUSPEND DRIVING AND ALLOW THE PILE TO SET BEFORE RESUMING PILE DRIVING. WHEN DRIVING IS RESUMED, THE HAMMER SHALL BE WARM AND OPERATED A SUFFICIENT NUMBER OF BLOWS TO OVERCOME THE FRICTION FORCE (MIN. 10 BLOWS) BEFORE FINAL BEARING IS CHECKED.

⊕ GEO TECH BORE HOLES LOCATION.

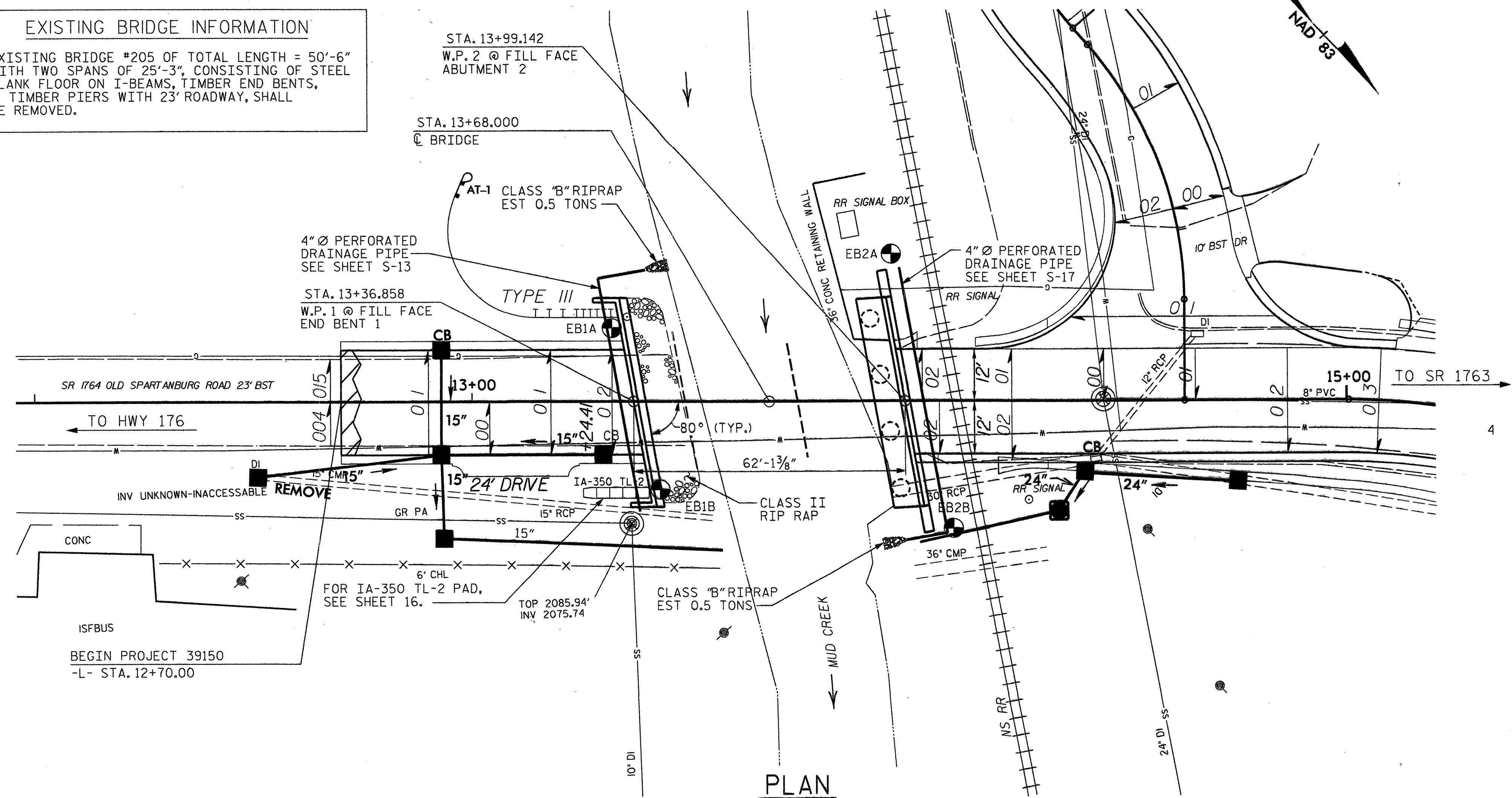
R.R. MILE POST TR 0.60

PROJECT NO. B-5180  
COUNTY: HENDERSON  
STATION: 13+68.00 -L-  
REPLACES BRIDGE NO. 205

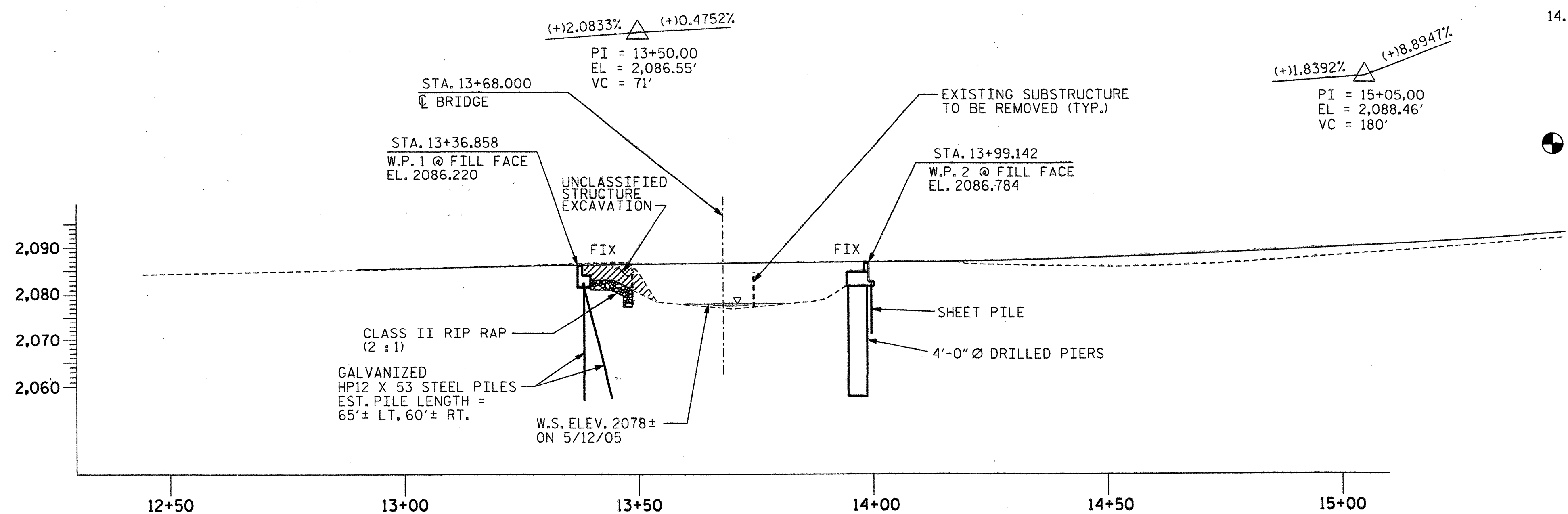


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BRIDGE #205 ON OLD SPARTANBURG HWY. (SR 1764) OVER MUDD CREEK					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
SHEET NO.					S-2
TOTAL SHEETS					18

PREPARED BY  
TGS ENGINEERS  
107-A NICA AVENUE  
MORGANTON, NC 28655



**PLAN**



**PROFILE ALONG C SURVEY**

DRAWN BY: RTJ DATE: 10/05  
CHECKED BY: NMW DATE: 2/06

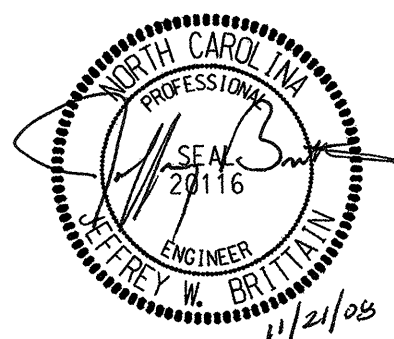


TOTAL BILL OF MATERIAL													
ITEM	4" DIA. PERFORATED DRAINAGE PIPE	#78M STONE BACKFILL	FILTER FABRIC (4" DIA. PIPE)	CLASS "B" RIP RAP	REMOVAL OF EXISTING STRUCTURE	4'-0" DIA. DRILLED PIERS IN SOIL	4'-0" DIA. DRILLED PIERS NOT IN SOIL	SID INSPECTION	CROSSHOLE SONIC LOGGING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS "AA" CONCRETE (BRIDGE)	CLASS "A" CONCRETE (BRIDGE)	REINFORCING STEEL (BRIDGE)
	LF	TON	SY	TON	LUMP SUM	LF	LF	EACH	EACH	LUMP SUM	C.Y.	C.Y.	LBS.
SUPERSTRUCTURE	--	--	--	--	--	--	--	--	--	--	26.1	--	--
END BENT 1	70	50	60	0.5	--	--	--	--	--	LUMP SUM	--	17.2	2,941
END BENT 2	75	85	75	0.5	--	258.3	4.0	4	4	--	--	32.4	37,800
TOTALS	145	135	135	1.0	LUMP SUM	258.3	4.0	4	4	LUMP SUM	26.1	49.6	40,741

TOTAL BILL OF MATERIAL												
ITEM	EPOXY COATED REINFORCING STEEL (BRIDGE)	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	HP12x53 GALVANIZED STEEL PILES		STEEL PILE POINTS	THREE BAR METAL RAIL	RIP RAP, CLASS II (2'-0" THK.)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CORED SLABS		SHEET PILE RETAINING WALLS (STEEL)
	LBS.	LBS.	NO.	LIN. FT.	EA.	LIN. FT.	TON	S.Y.	LUMP SUM	NO.	LIN. FT.	SF
SUPERSTRUCTURE	1,069	--	--	--	--	104.604	--	--	LUMP SUM	14	840	--
END BENT 1	--	--	10	625	10	--	80	60	--	--	--	--
END BENT 2	--	6,854	--	--	--	--	--	--	--	--	--	4,100
TOTALS	1,069	6,854	10	625	10	104.604	80	60	LUMP SUM	14	840	4,100

R.R. MILE POST TR 0.60

PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68.00 -L-  
 REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 BRIDGE #205 ON  
 OLD SPARTANBURG HWY. (SR 1764)  
 OVER MUDD CREEK

DRAWN BY: RTJ DATE: 11/08  
 CHECKED BY: RTJ DATE: 11/08

PREPARED BY  
 TGS ENGINEERS  
 107-A MICA AVENUE  
 MORGANTON, NC 28655

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

**GENERAL NOTES**

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO STANDARD SPECIFICATIONS FOR SEISMIC PERFORMANCE CATEGORY B.

THIS BRIDGE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD AS SPECIFIED IN AASHTO STANDARD SPECIFICATIONS.

ASSUMED LIVE LOAD = HS 20-44 OR ALTERNATE LOADING.

CONCRETE:  
 $f'_c = 7000$  psi (MINIMUM COMPRESSIVE STRENGTH @ 28 DAYS)  
 $f'_{ci} = 5000$  psi (MINIMUM COMPRESSIVE STRENGTH @ TRANSFER OF STRESSING FORCE)

SIZE TYPE	AREA	ULTIMATE STR.	APPLIED FORCE
1/2" Ø HIGH STR.	0.153 SQ."	41,300# PER CABLE	30,980# PER CABLE

THE CONTRACTOR AT HIS OPTION, MAY USE STRESS RELIEVED STRANDS. DESIGN AND STRAND PATTERN MUST PROVIDE AT LEAST THE SAME NET COMPRESSIVE STRESS AFTER THE LOSSES.

NOTE:  
 SPIRAL WIRE REINFORCEMENT MAY BE USED IN LIEU OF DEFORMED BARS FOR STIRRUPS. MIN. W3.5 x 6" PITCH.

UNLESS OTHERWISE NOTED ON PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4".

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 CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

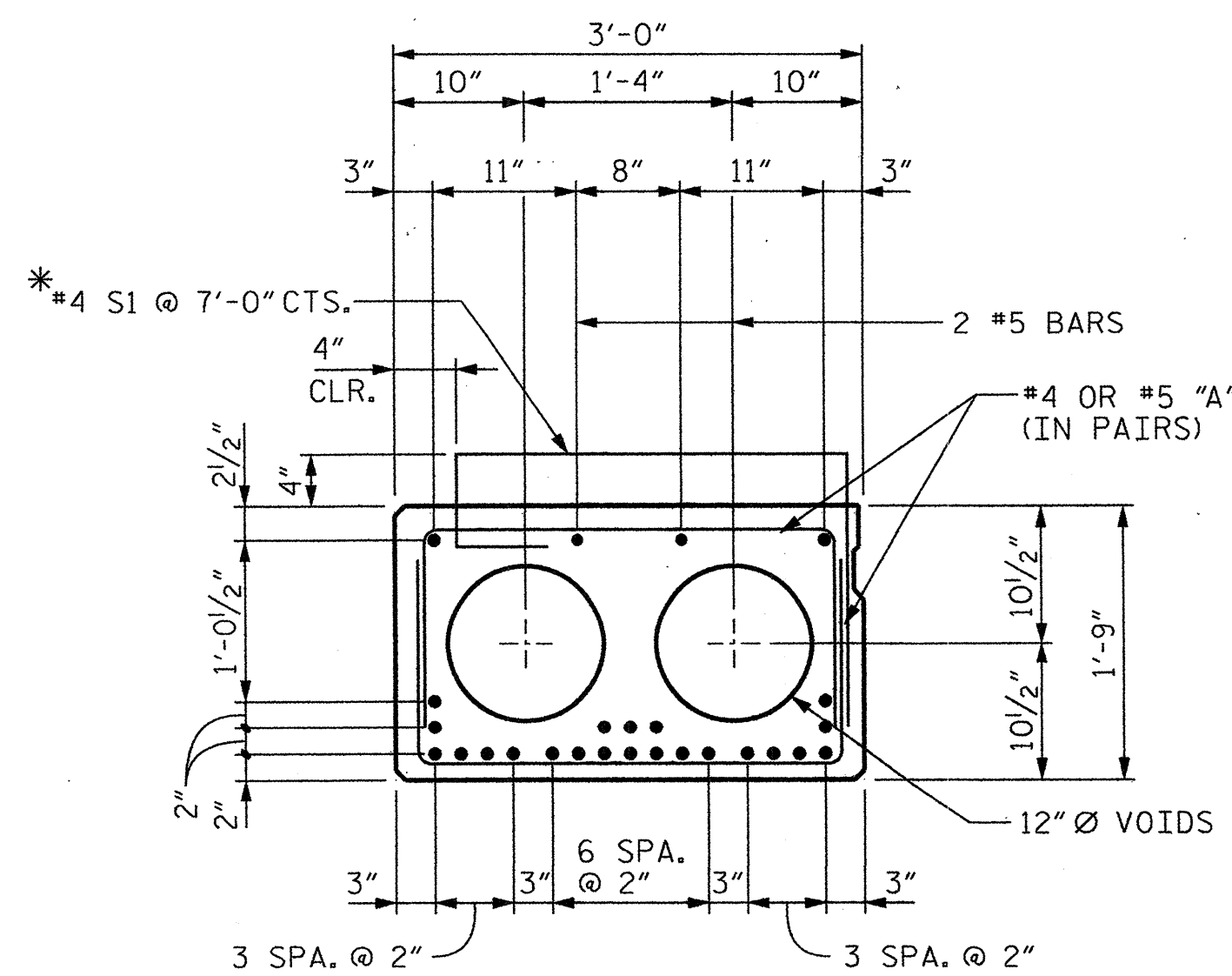
THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, A POSITIVE HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDWAYS. THIS SYSTEM SHALL BE DESIGNED TO BE LEFT IN PLACE UNTIL THE CONCRETE HAS REACHED RELEASE STRENGTH. AT LEAST THREE WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

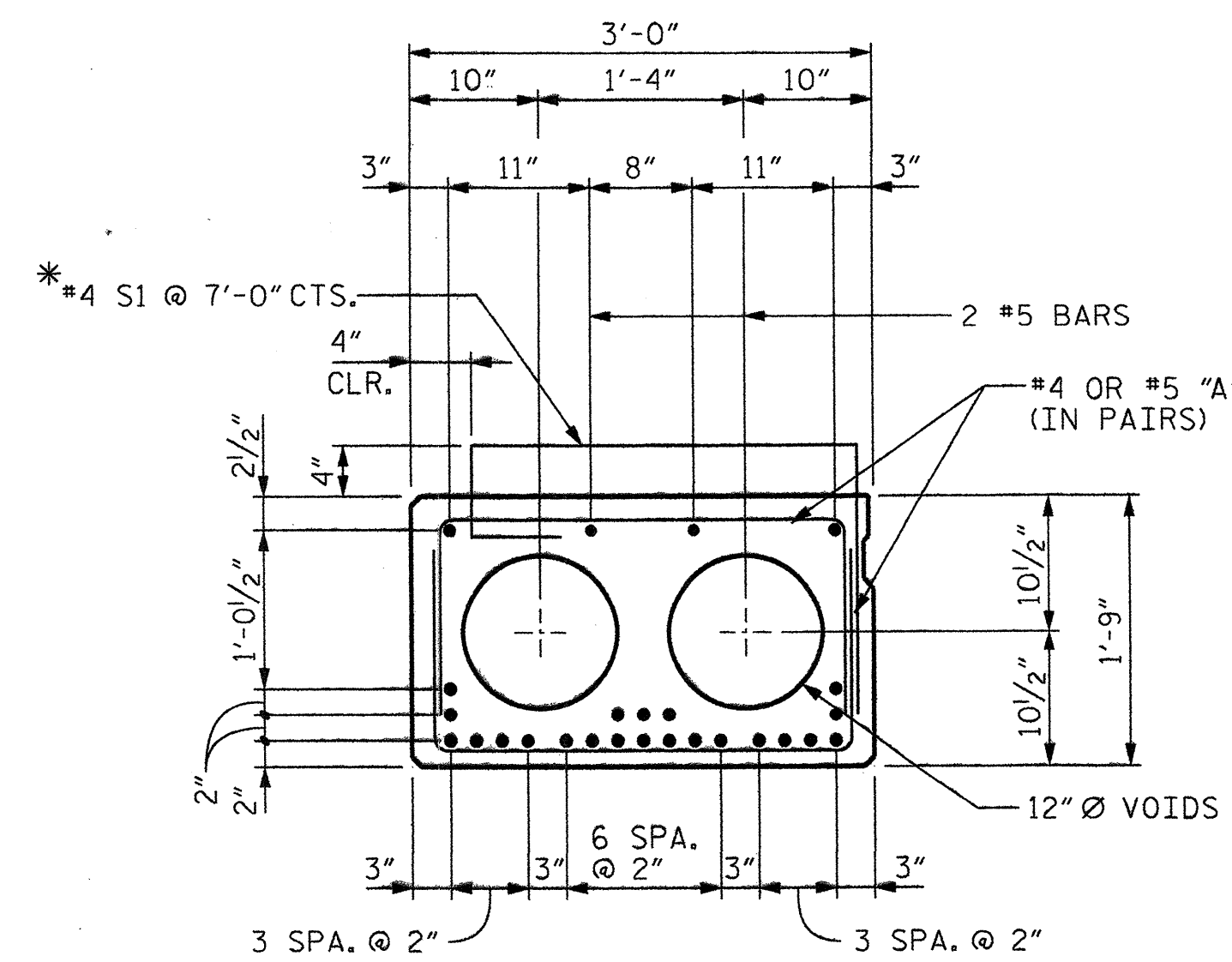
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5000 PSI.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

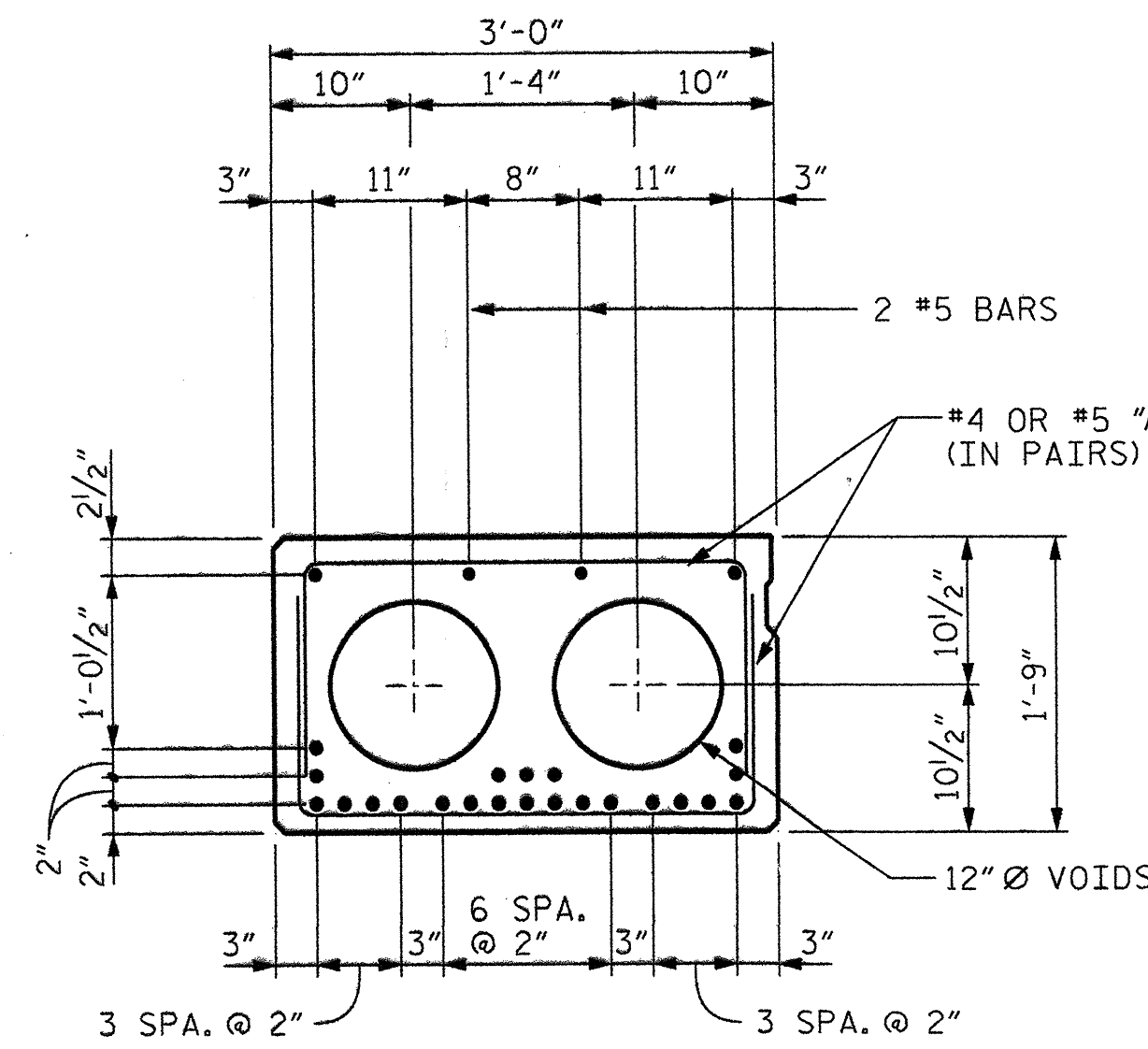
APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.



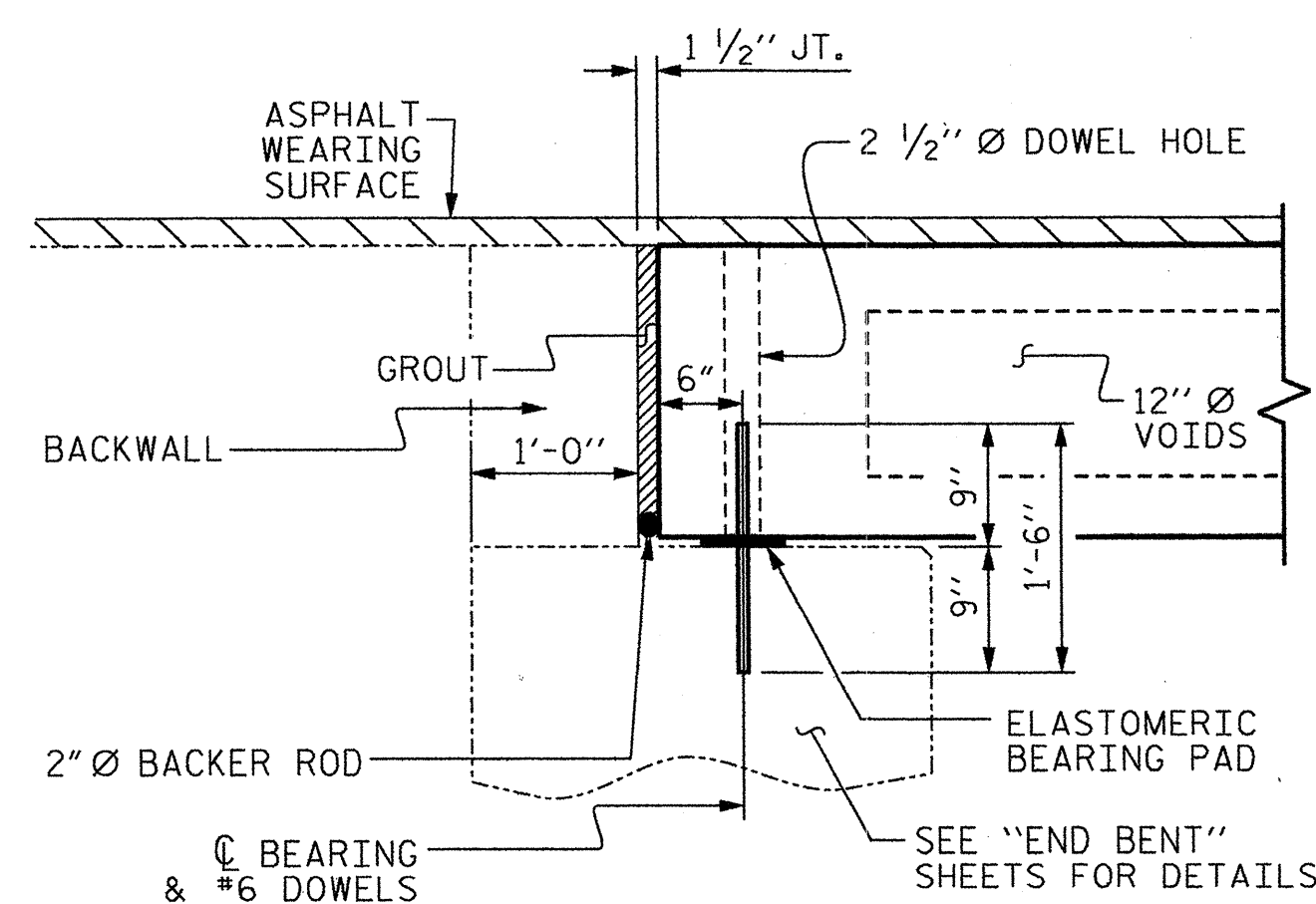
**60' SPAN**  
 24 - 1/2" Ø H.S. STRANDS  
 EXTERIOR SLAB SECTIONS  
 FINAL DEFLECTION 1.7683" (UP)



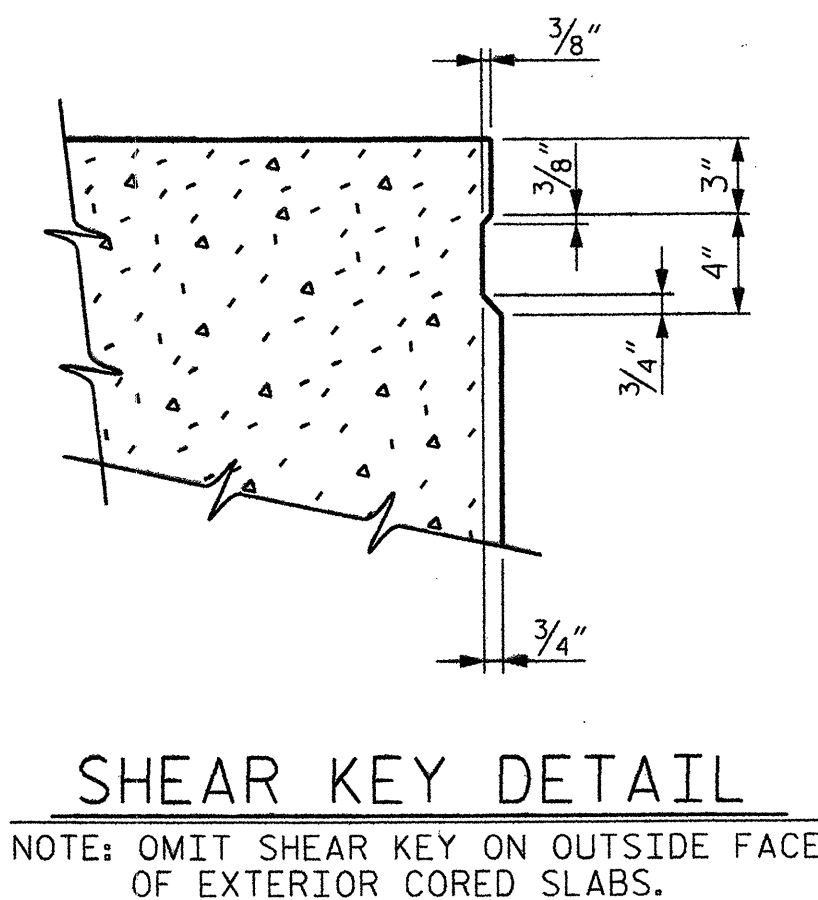
**60' SPAN**  
 24 - 1/2" Ø H.S. STRANDS  
 INTERIOR SLAB SECTIONS  
 ADJACENT TO EXTERIOR SLAB  
 FINAL DEFLECTION 1.7683" (UP)



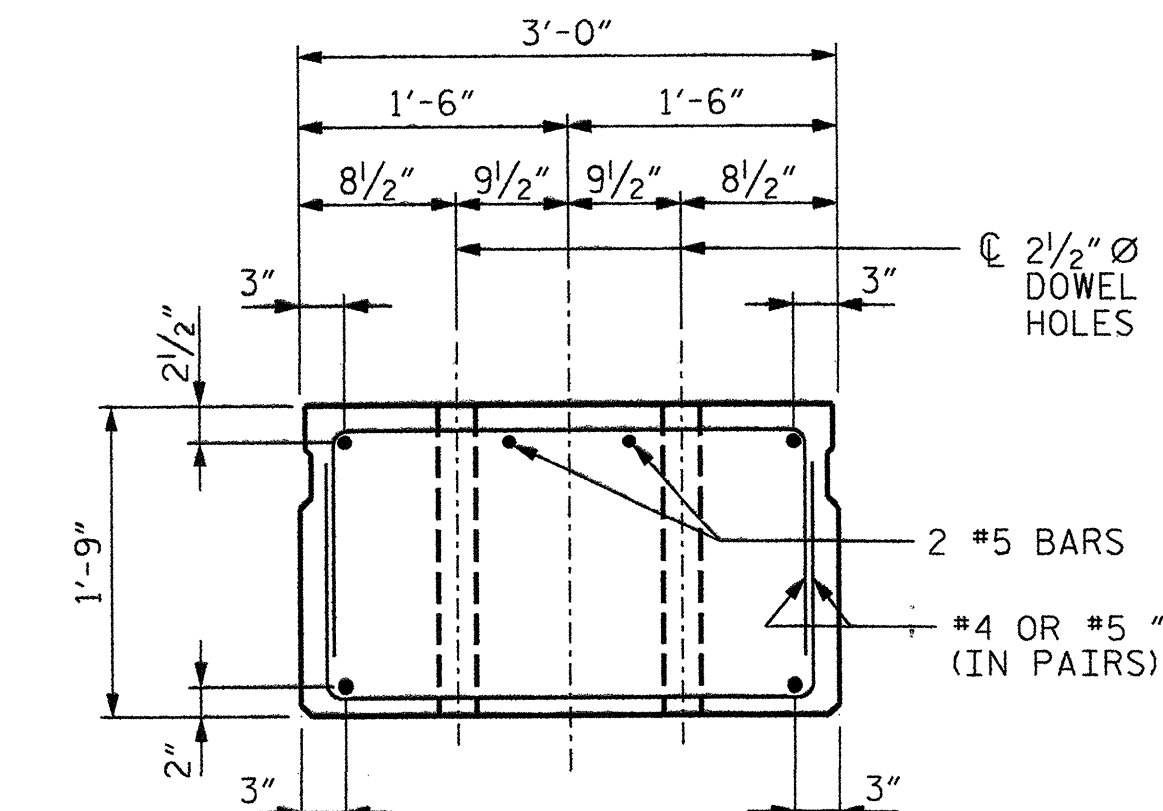
**60' SPAN**  
 24 - 1/2" Ø H.S. STRANDS  
 INTERIOR SLAB SECTIONS  
 FINAL DEFLECTION 1.7683" (UP)



**SECTION AT END BENT**

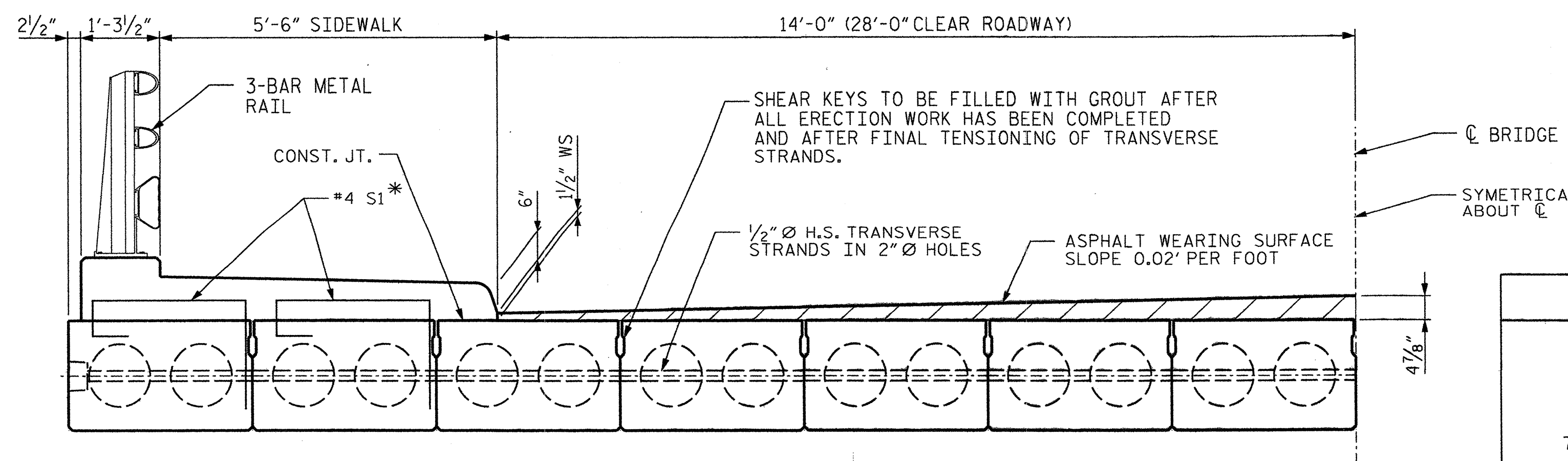


**SHEAR KEY DETAIL**



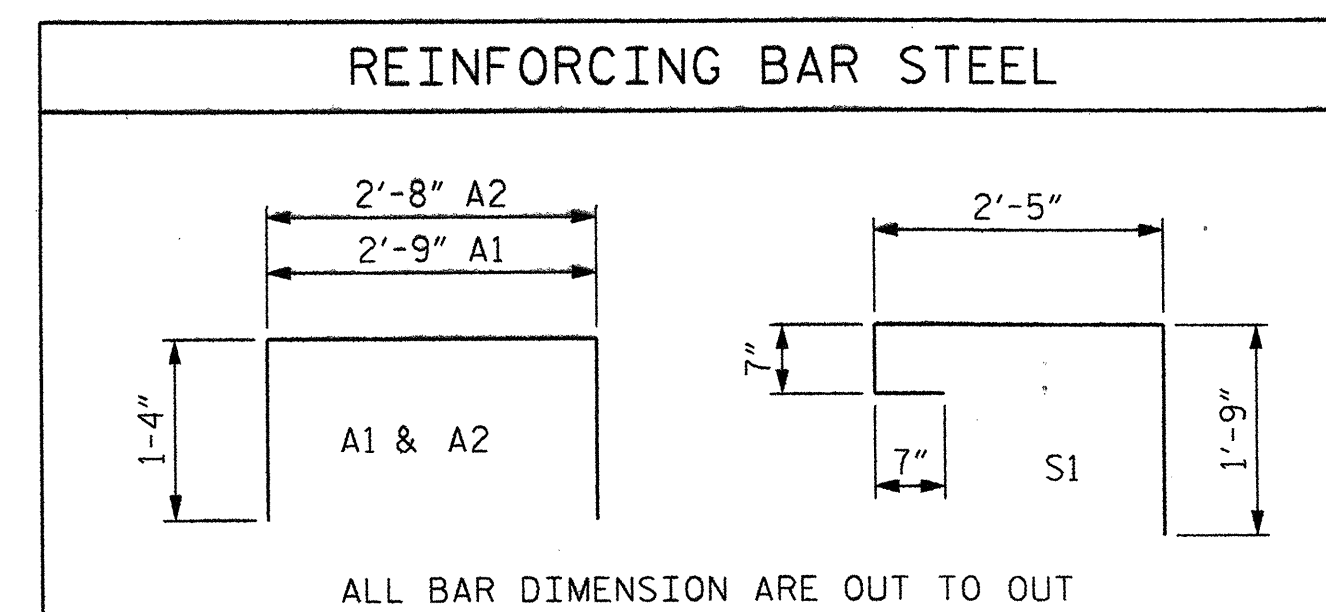
**END SLAB ELEVATION**

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES.  
 (STRAND LAYOUT NOT SHOWN.)  
 INTERIOR SLAB SECTION SHOWN-EXTERIOR SLAB SECTION SIMILAR EXCEPT SHEAR KEY LOCATION.

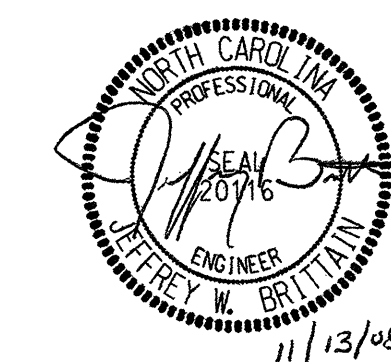


**TYPICAL HALF SECTION**

\* EPOXY COATED REINFORCING STEEL



ALL BAR DIMENSION ARE OUT TO OUT



PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68.00-L-  
 REPLACES BRIDGE NO. 205

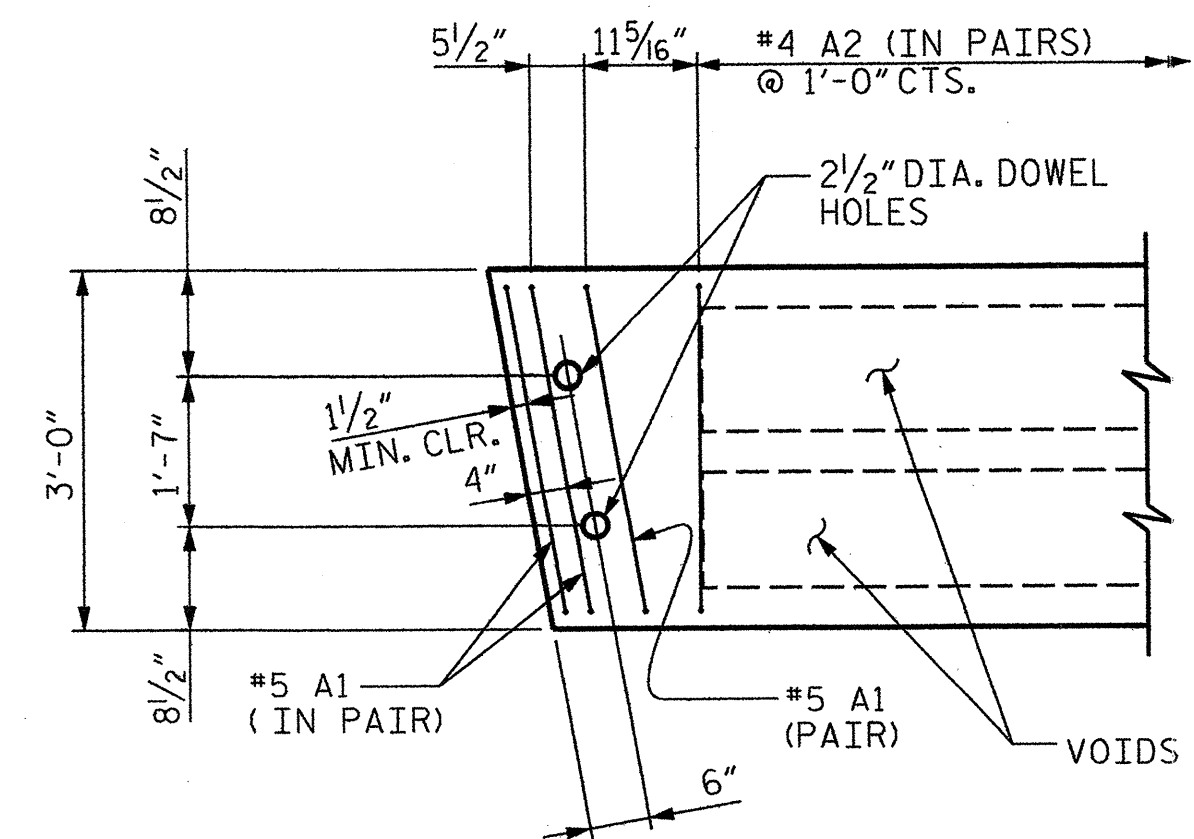
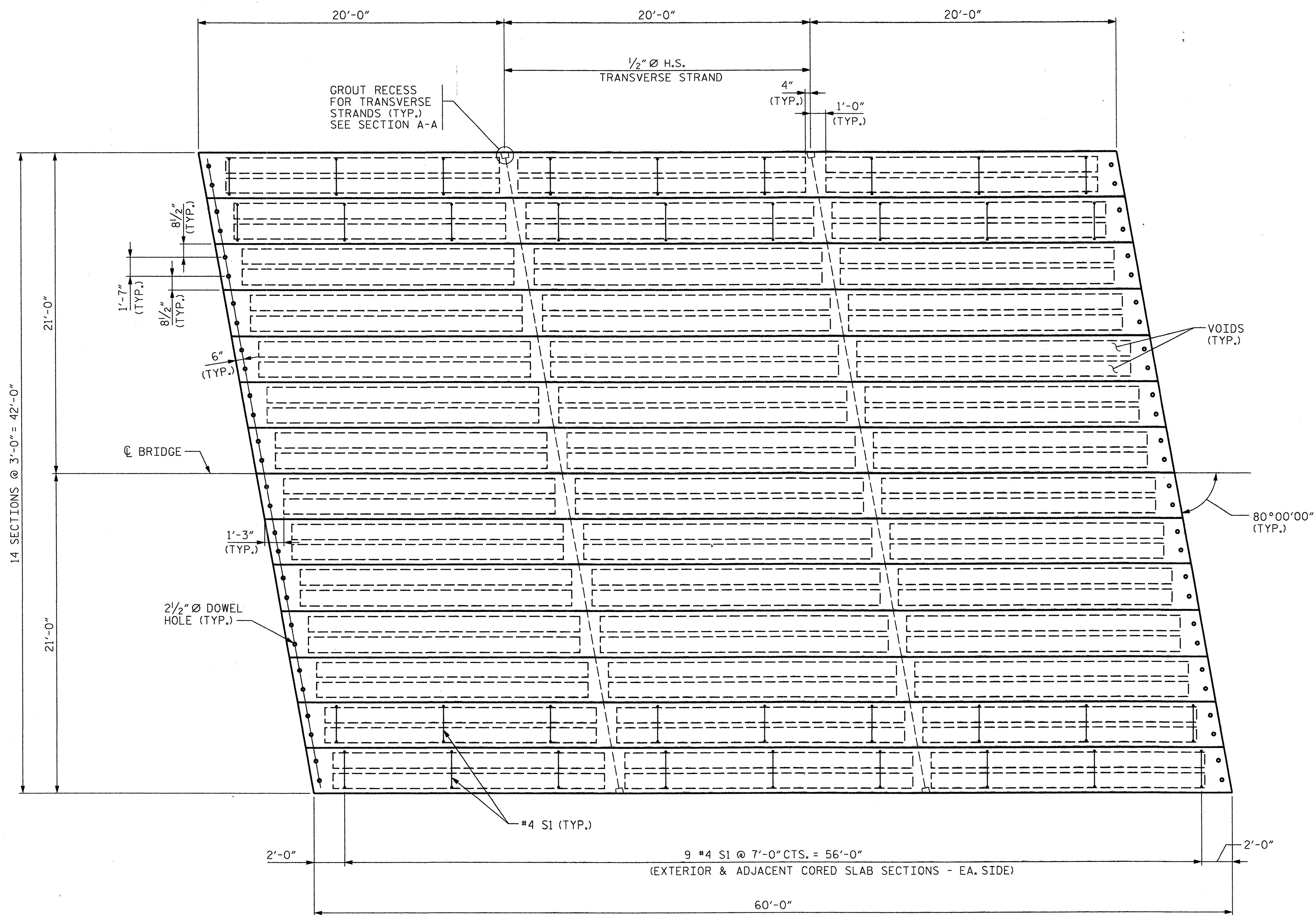
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 CORED SLAB DETAILS  
 60' SPAN  
 28' CLEAR ROADWAY  
 80° SKEW

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

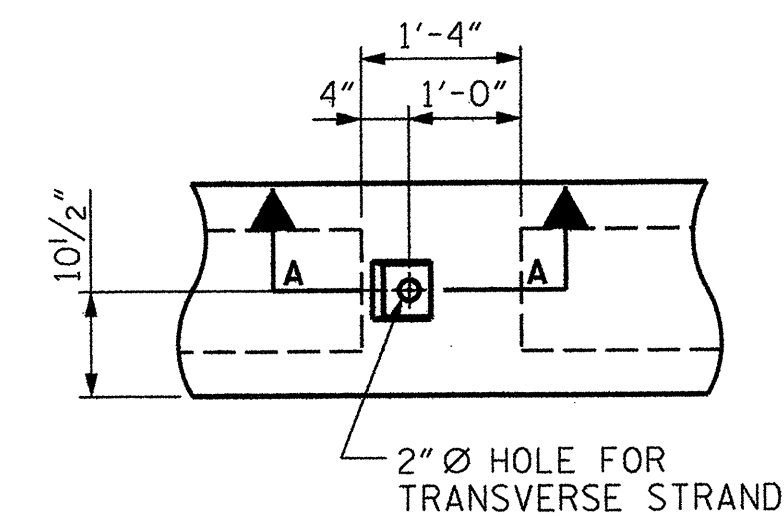
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 CHECKED BY: NMW DATE: 206

PREPARED BY  
 TCS ENGINEERS  
 107-A MICA AVENUE  
 MORGANTON, NC 28655

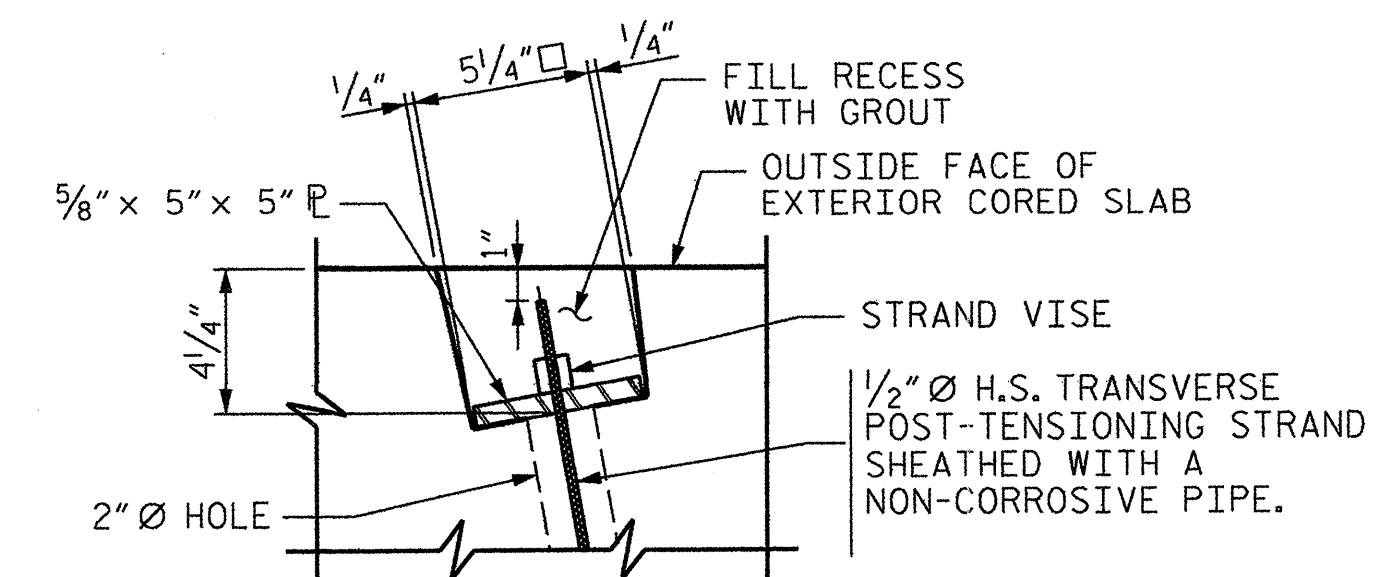




**PART PLAN - SLAB ELEVATION**  
NOT TO SCALE



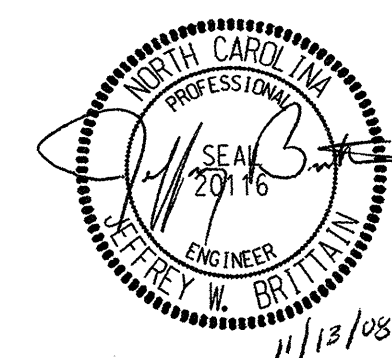
**SLAB ELEVATION**  
NOT TO SCALE



**SECTION A-A**  
NOT TO SCALE

**60' SPAN**

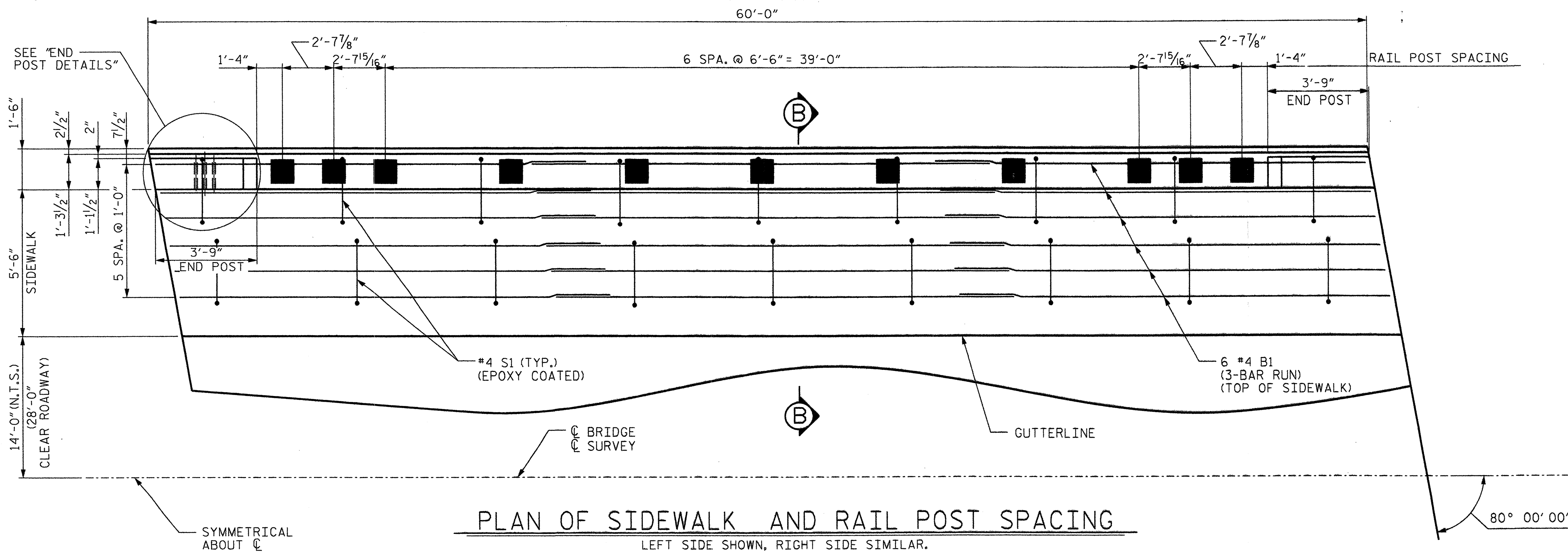
PROJECT NO. B-5180  
COUNTY: HENDERSON  
STATION: 13+68.00-L  
REPLACES BRIDGE NO. 205



PREPARED BY  
TGS ENGINEERS  
107-A MICA AVENUE  
MORGANTON, NC 28655

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
PLAN OF SPAN 60' SPAN 28' CLEAR ROADWAY - 80° SKEW					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					SHEET NO. S-5
					TOTAL SHEETS 18

DRAWN BY: JLA DATE: 9/05  
CHECKED BY: NMW DATE: 2/06



**NOTE :**

GROOVED CONSTRUCTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10FT. IN LENGTH.

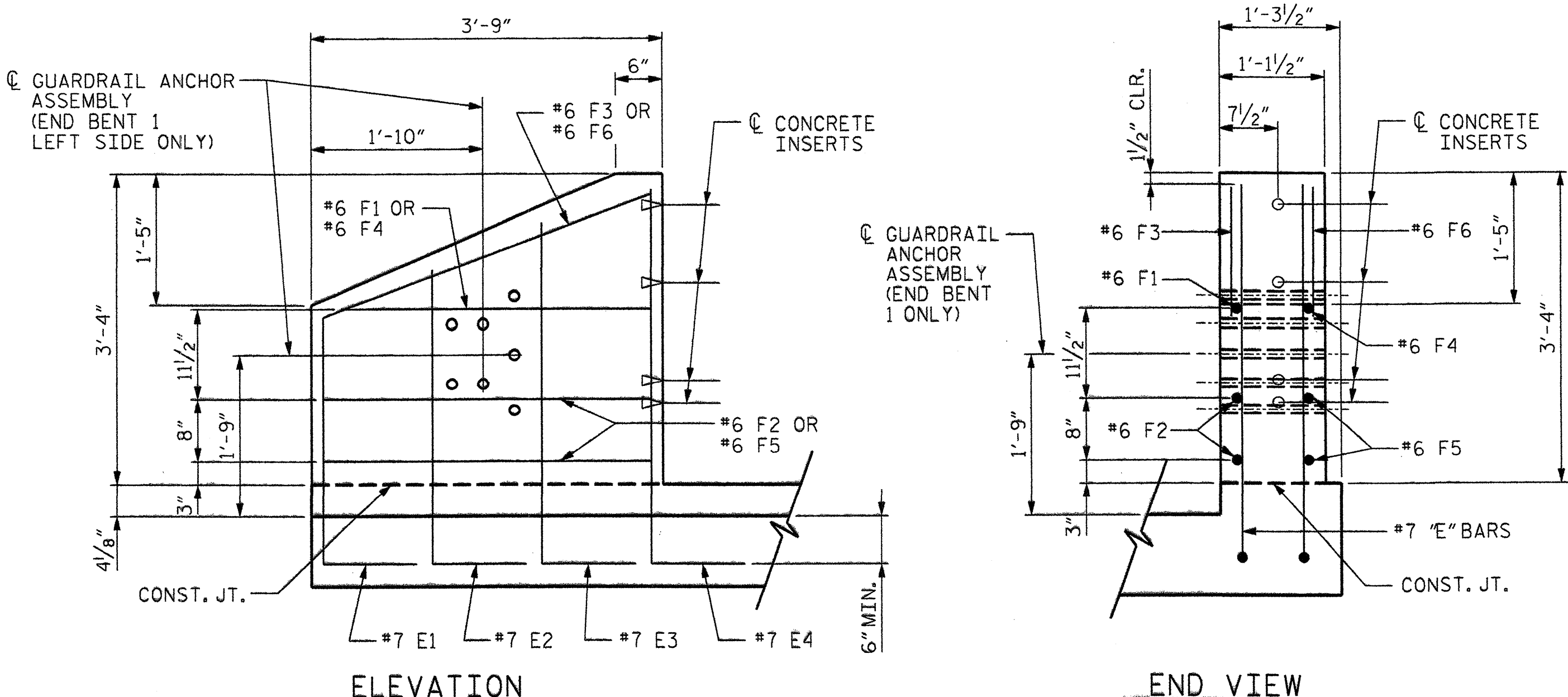
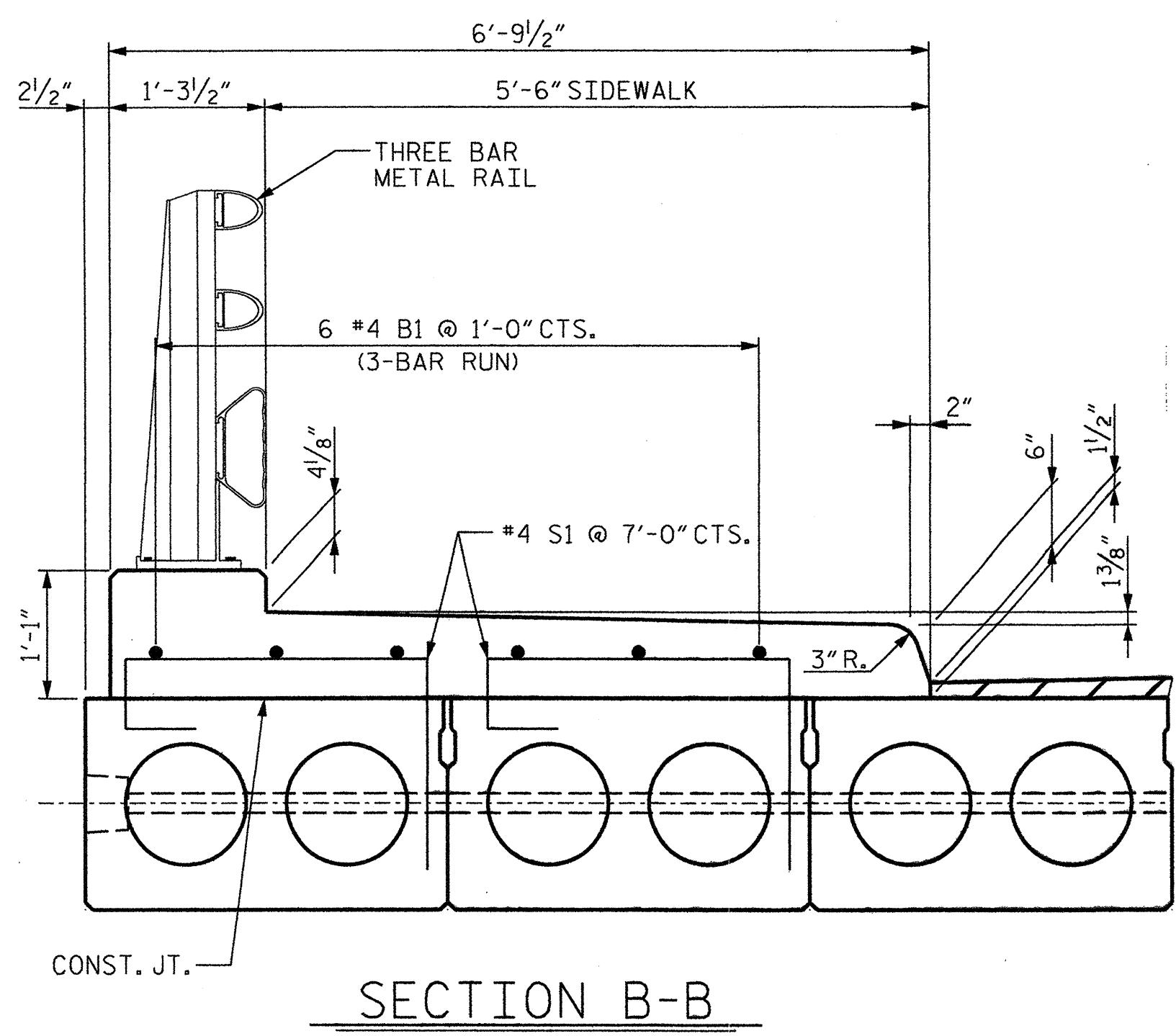
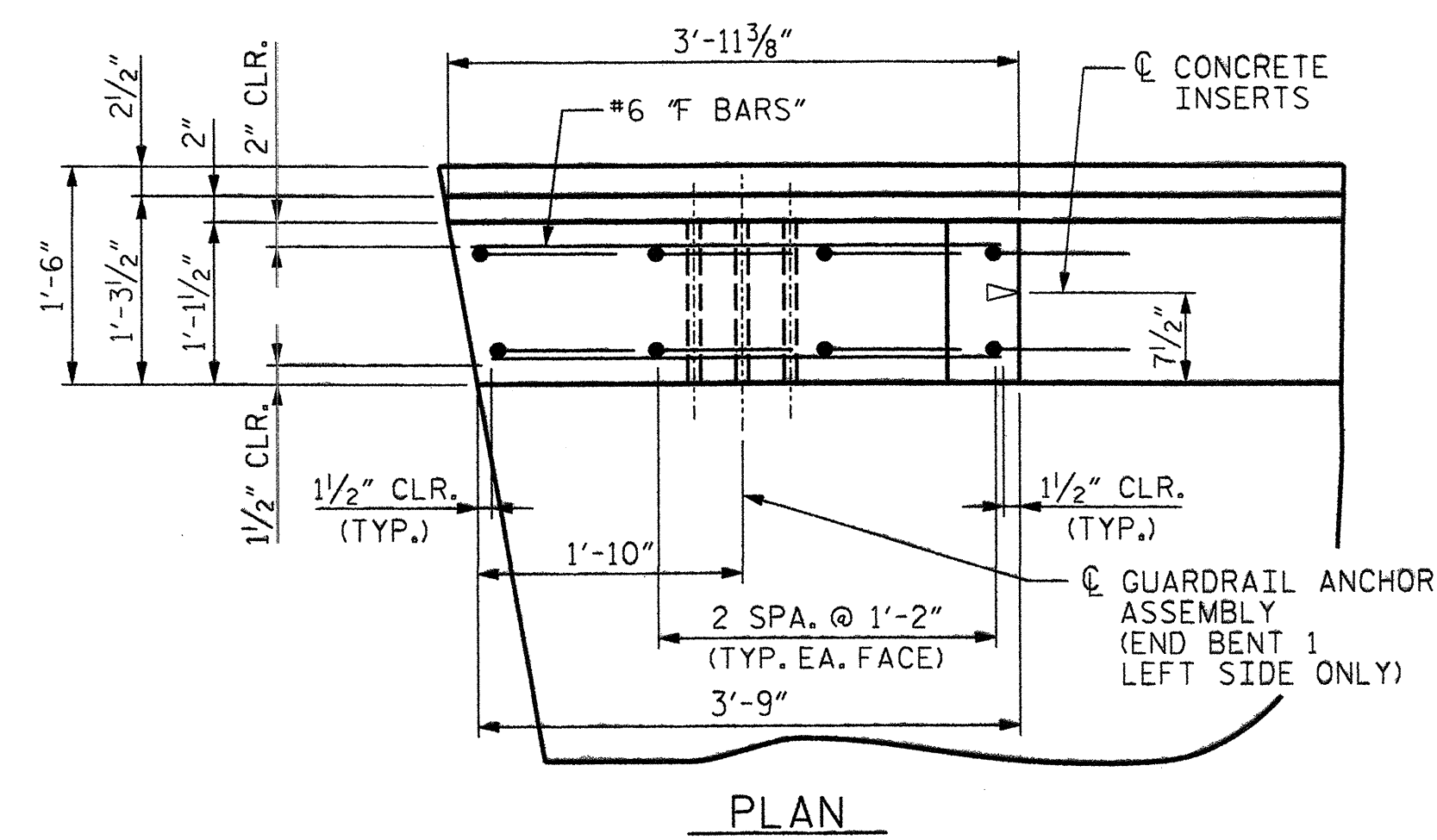
REINFORCING BAR TYPES		BILL FOR ONE END POST (4 REQ'D)				
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*E1	2	#7	1	3'-5"	14	
*E2	2	#7	1	4'-0"	16	
*E3	2	#7	1	4'-7"	19	
*E4	2	#7	1	5'-1"	21	
*F1	1	#6	STR.	3'-4"	5	
*F2	2	#6	STR.	3'-6"	11	
*F3	1	#6	STR.	3'-9"	6	
*F4	1	#6	STR.	3'-6"	5	
*F5	2	#6	STR.	3'-7"	11	
*F6	1	#6	STR.	3'-10"	6	

BAR DIMENSIONS ARE OUT TO OUT.

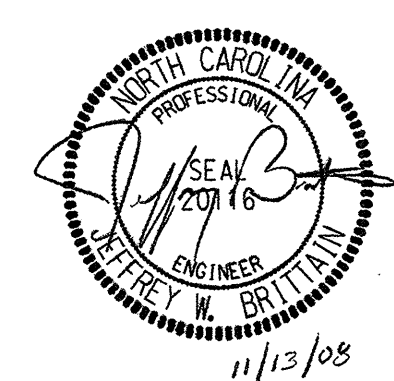
EPOXY-COATED REINFORCING-STEEL - LBS. 114  
CLASS AA CONCRETE 0.4 CU. YDS.  
\* DENOTES EPOXY-COATED REINFORCING STEEL

BILL FOR ONE SIDEWALK					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	18	#4	STR.	21'-3"	256

EPOXY-COATED REINFORCING-STEEL - LBS. 256  
CLASS AA CONCRETE 11.3 CU. YDS.  
\* DENOTES EPOXY-COATED REINFORCING STEEL



PROJECT NO. B-5180  
COUNTY: HENDERSON  
STATION: 13+68+00-L-  
REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SIDEWALK DETAILS  
60' SPAN  
28' CLEAR ROADWAY  
80° SKEW

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-6
1			3			TOTAL SHEETS
2			4			18

DRAWN BY: JLA DATE: 1005  
CHECKED BY: NMW DATE: 206

END POST @ END BENT 1 SHOWN;  
END POST @ END BENT 2 SIMILAR

PREPARED BY  
TGS ENGINEERS  
107-A MICA AVENUE  
MORGANTON, NC 28655



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.

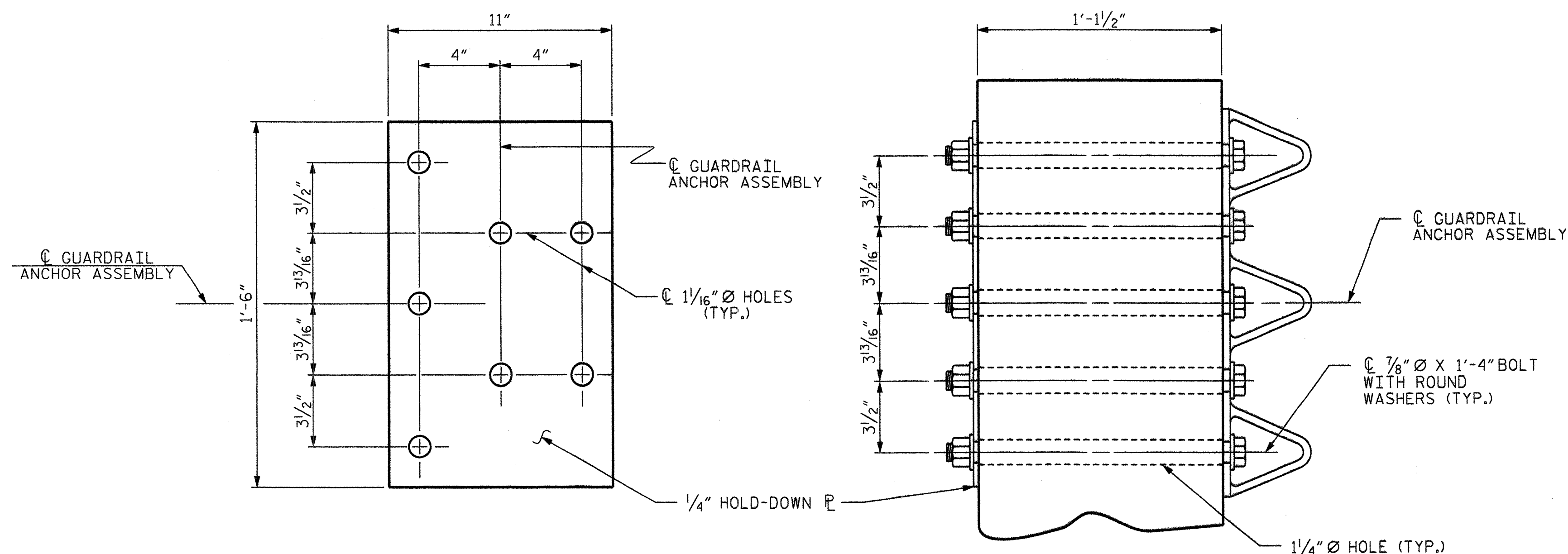
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

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 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.

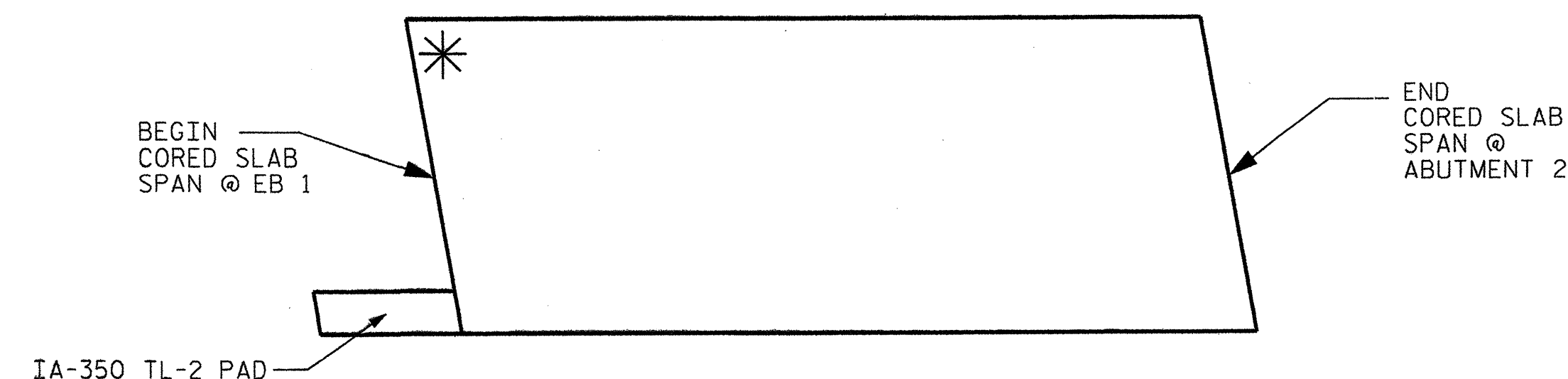
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.



PLAN

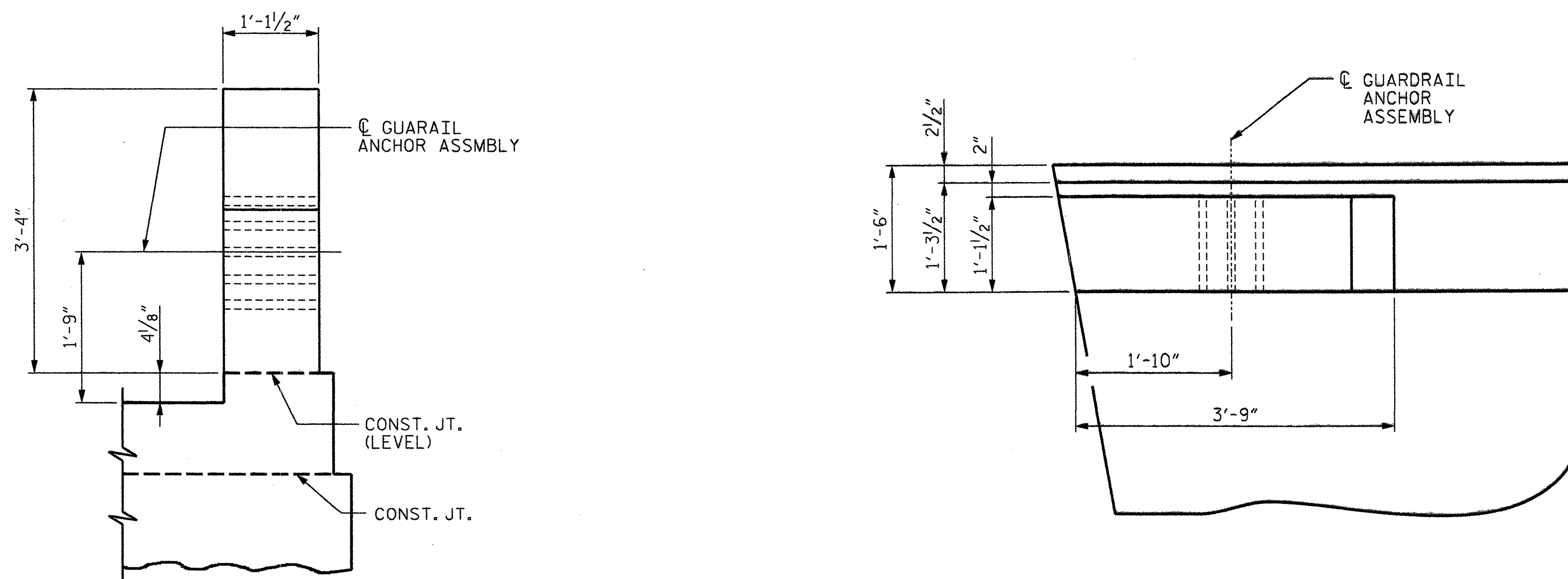
END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

\* INDICATES POINTS OF ATTACHMENT

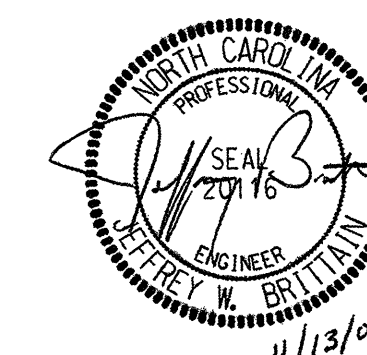


END VIEW

PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68+00-L-  
 REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GUARDRAIL ANCHOR DETAILS  
 60' SPAN  
 28' CLEAR ROADWAY  
 80° SKEW

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-7
1			3			TOTAL SHEETS
2			4			18

DRAWN BY: JLA DATE: 1005  
 CHECKED BY: NMW DATE: 206

PREPARED BY  
 TOS ENGINEERS  
 107-A WICA AVENUE  
 MORGANTON, NC 28655

**NOTES**

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

**ALUMINUM RAILS**

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS : AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

**GENERAL NOTES**

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

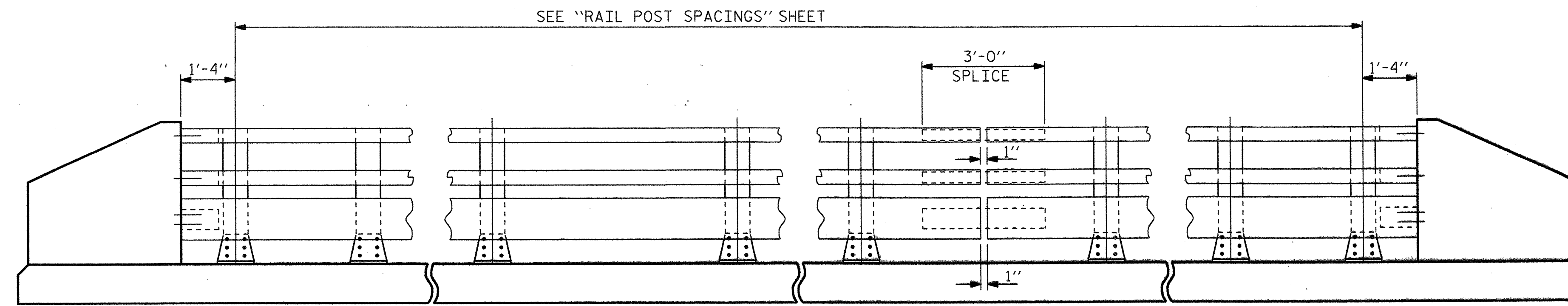
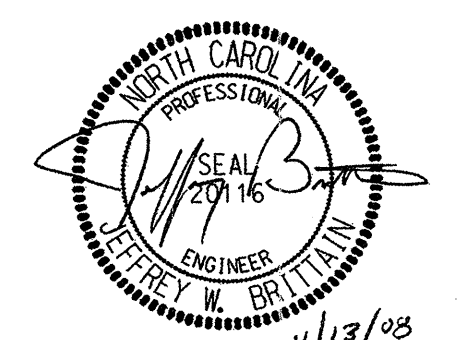
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

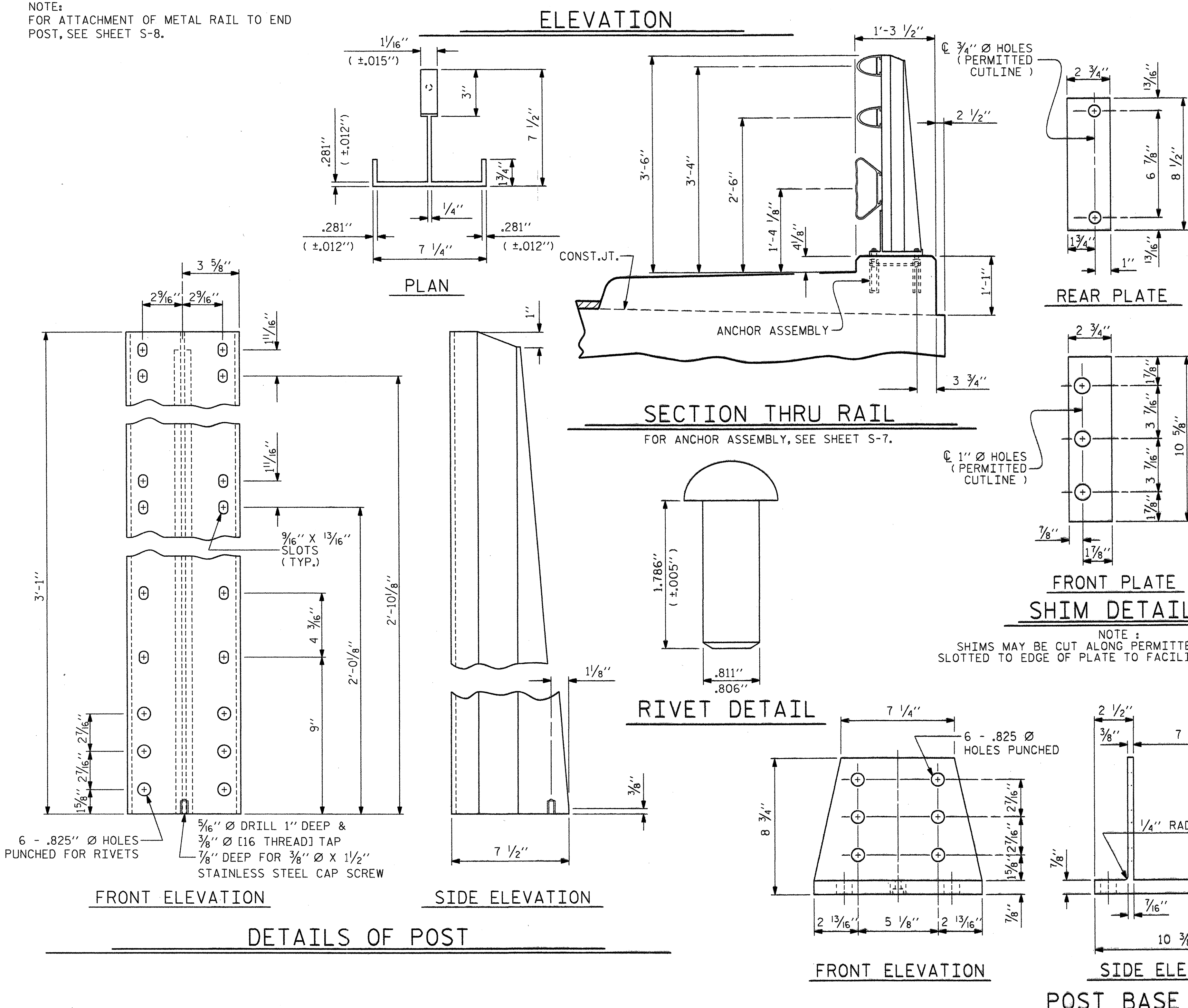
ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

PAY LENGTH = 104.604 LIN.FT.



NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET S-8.



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

PROJECT NO. B-5180  
COUNTY: HENDERSON  
STATION: 13+68.00 -L-  
REPLACES BRIDGE NO. 205

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
3 BAR METAL RAIL  
60' SPAN  
28' CLEAR ROADWAY  
80° SKEW

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-8
1			3			TOTAL SHEETS
2			4			18

DRAWN BY: NMW DATE: 9/05  
CHECKED BY: RTJ DATE: 2/06

PREPARED BY:  
TGS ENGINEERS  
107-A MICA AVENUE  
MORGANTON, NC 28655

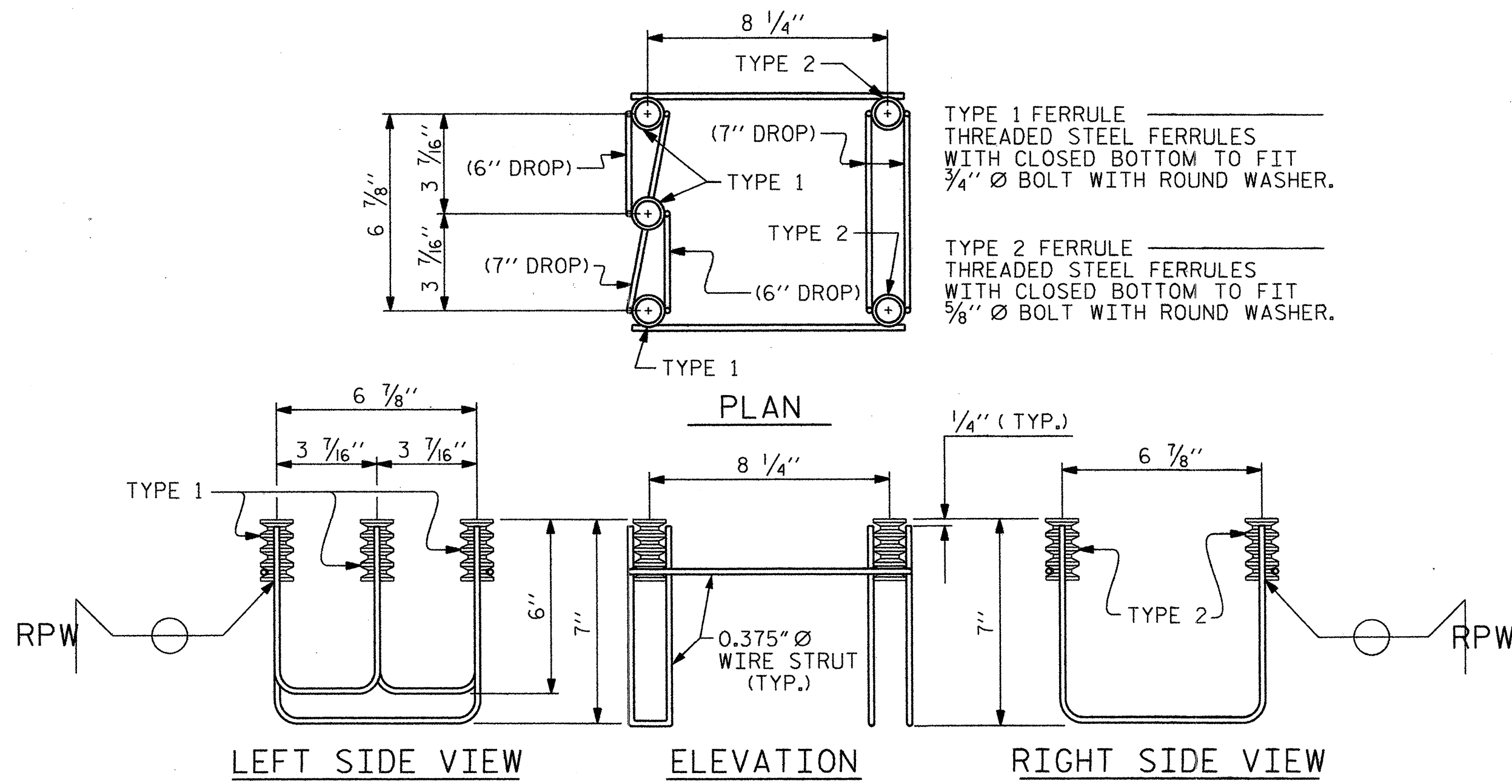


**NOTES**

**STRUCTURAL CONCRETE ANCHOR ASSEMBLY**

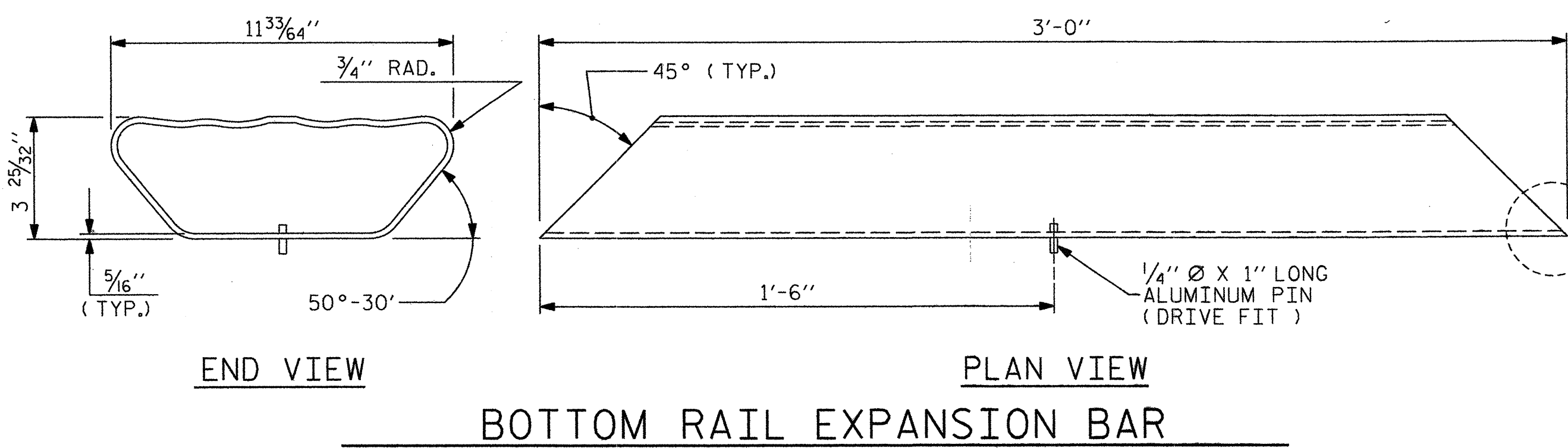
THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 3/4" FOR 5/8" FERRULES.
- B. 3 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. 2 - 5/8" Ø X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- D. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- E. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- F. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- G. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

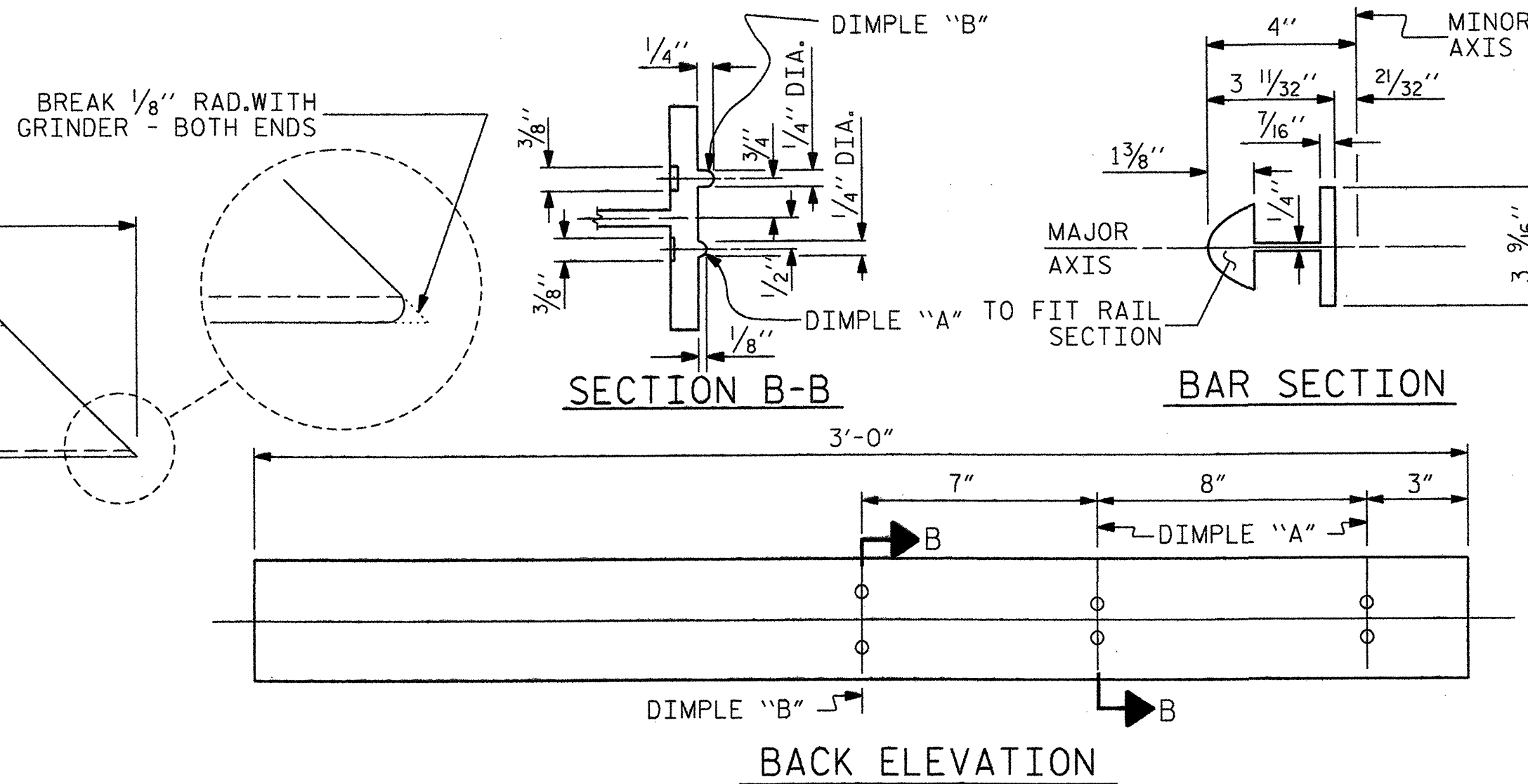


**5-BOLT METAL RAIL ANCHOR ASSEMBLY**

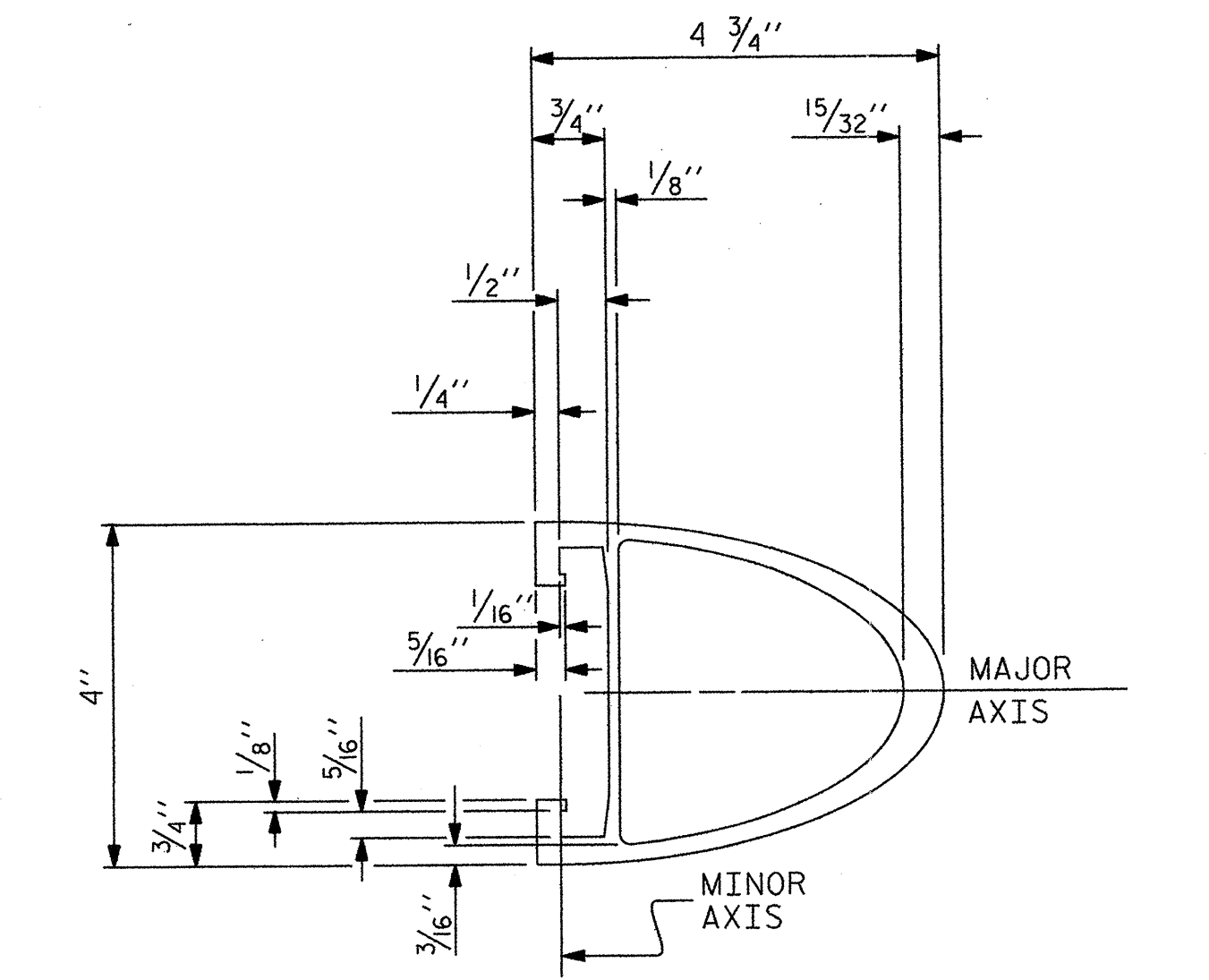
( 20 ASSEMBLIES REQUIRED )



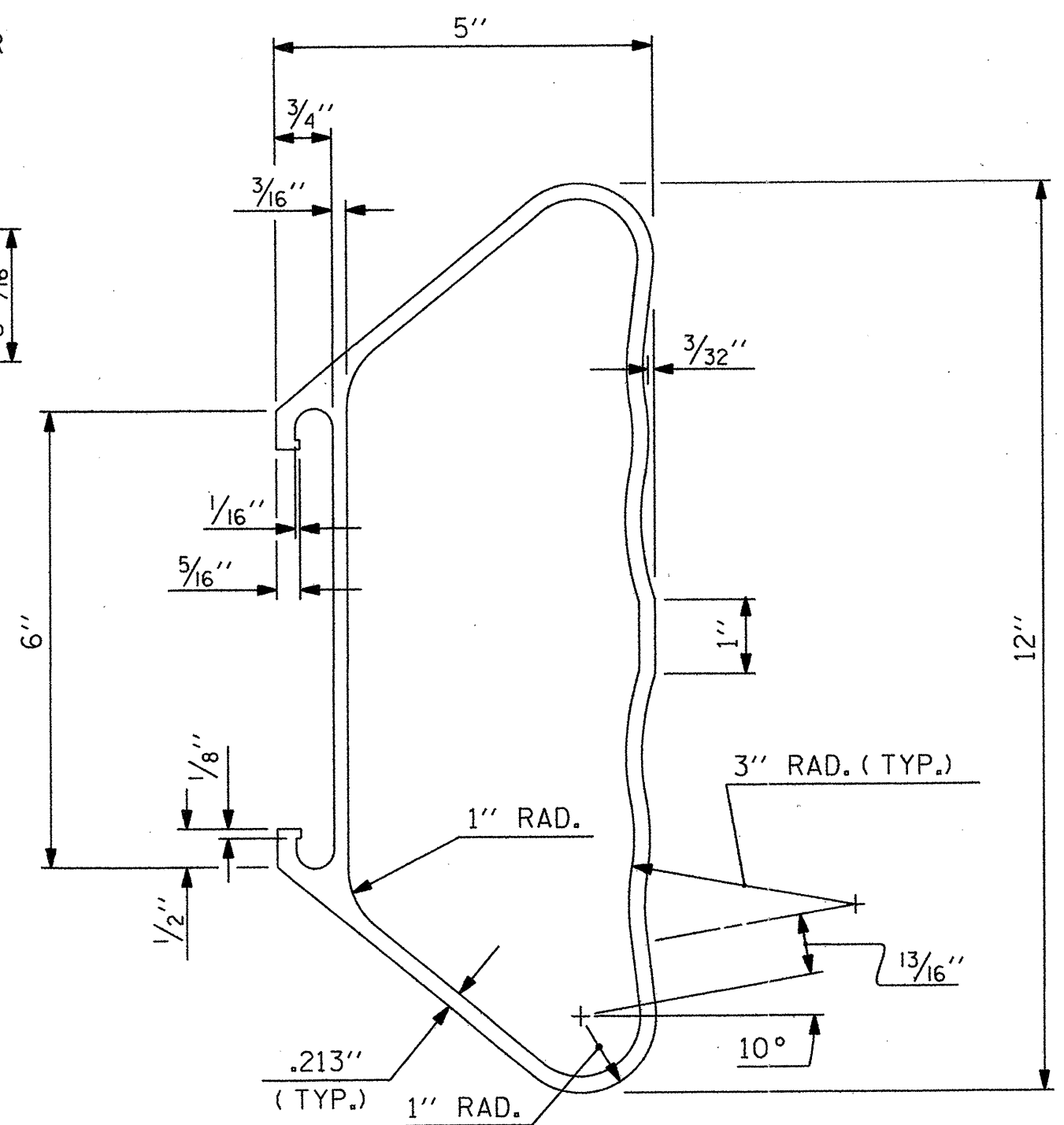
**BOTTOM RAIL EXPANSION BAR**



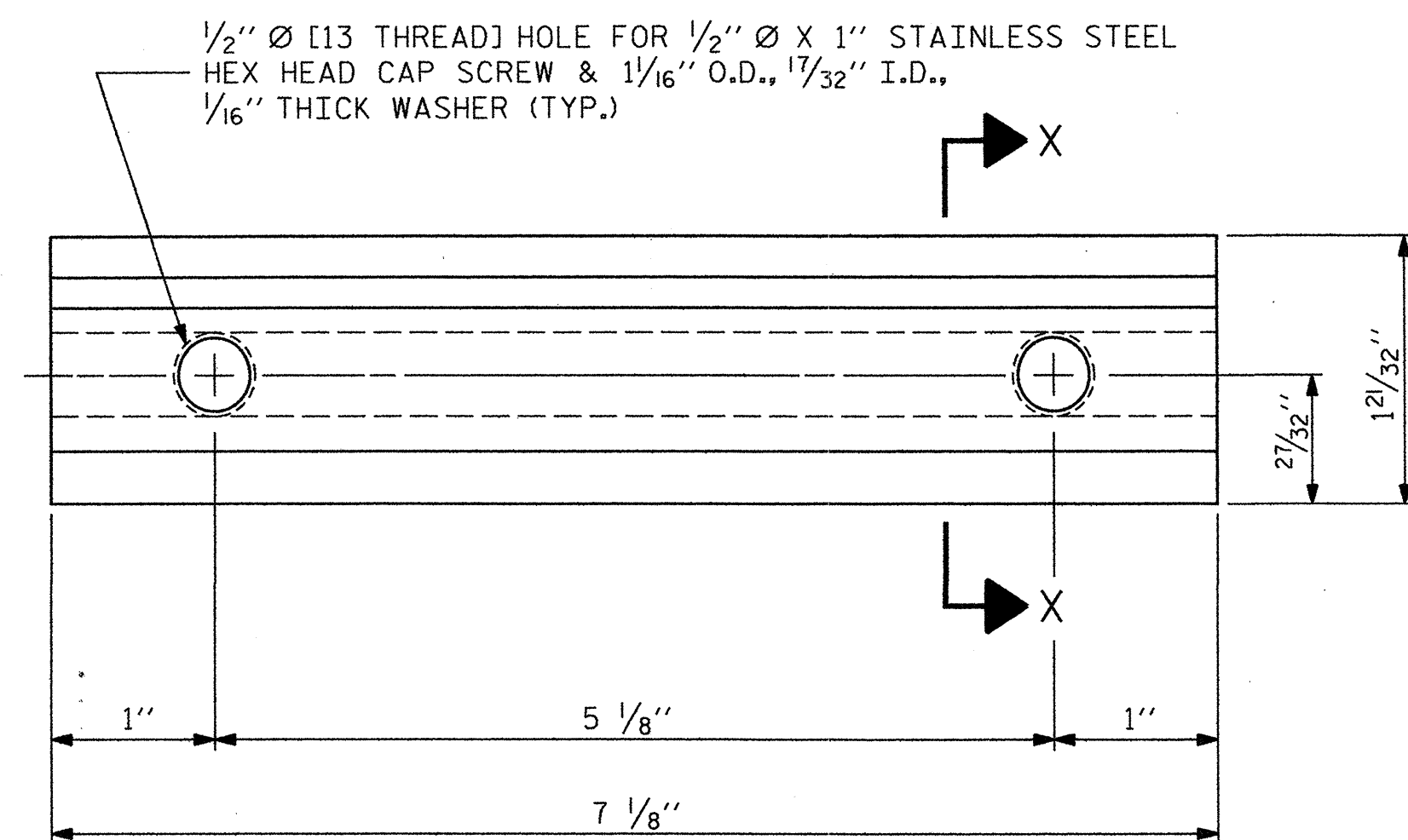
**TOP & MIDDLE RAIL EXPANSION BAR**



**TOP & MIDDLE RAIL SECTION**



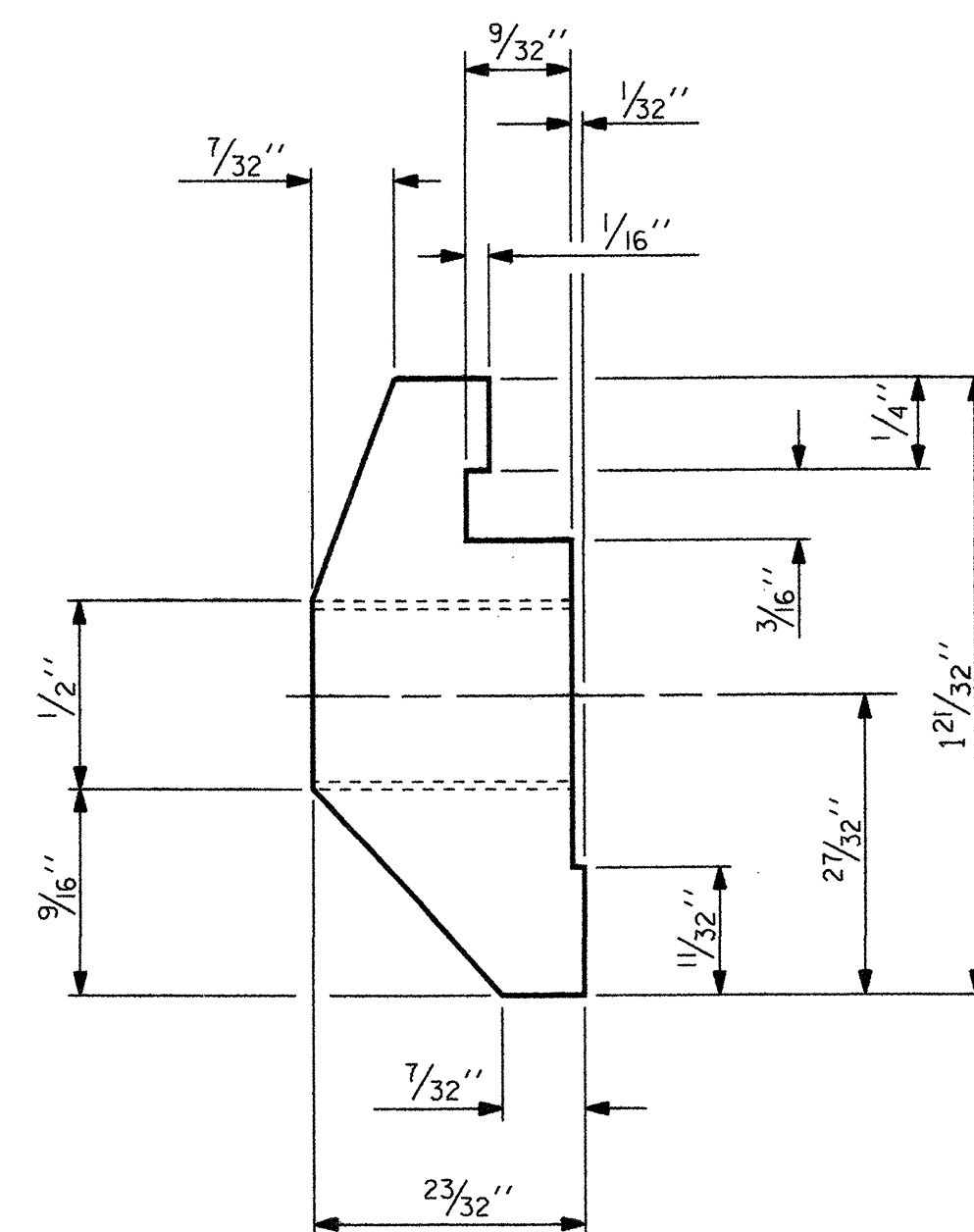
**BOTTOM RAIL SECTION**



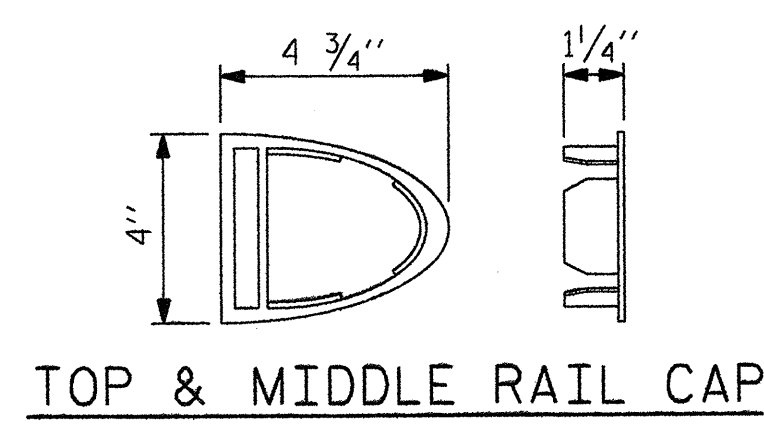
**ELEVATION**

**CLAMP BAR DETAIL**

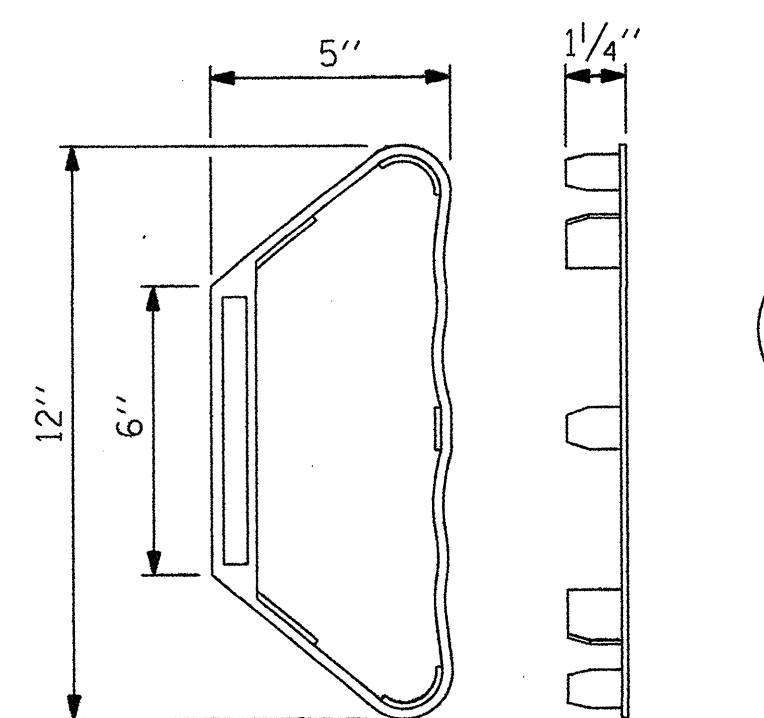
( 6 REQUIRED PER POST )



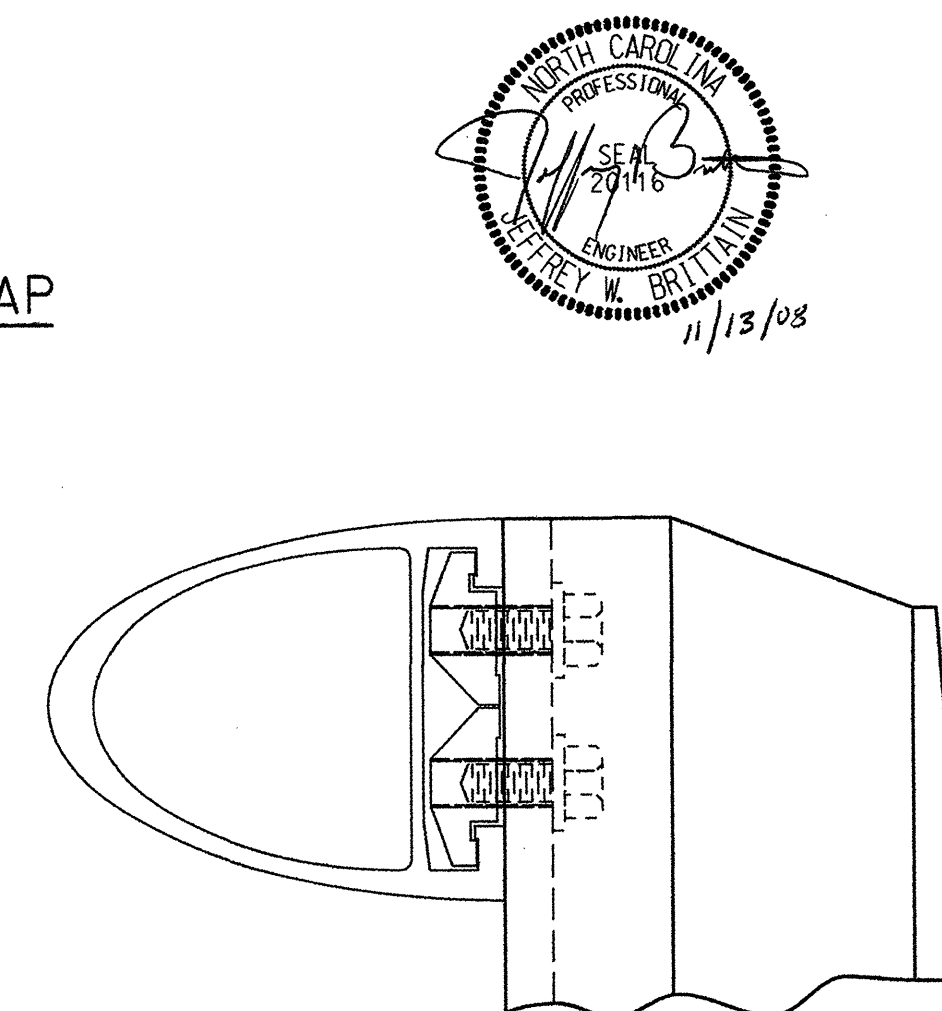
**SECTION X-X**



**TOP & MIDDLE RAIL CAP**

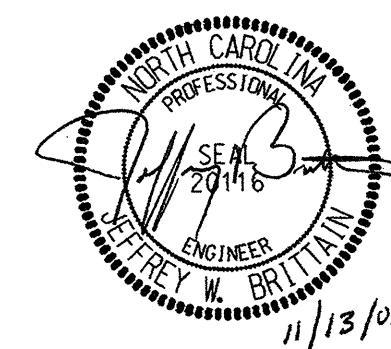


**BOTTOM RAIL CAP**



**CLAMP ASSEMBLY**

TOP RAIL SHOWN  
( MIDDLE & BOTTOM RAIL ARE SIMILAR )



PROJECT NO. B-5180  
COUNTY: HENDERSON  
STATION: 13+68.00 -L-  
REPLACES BRIDGE NO. 205

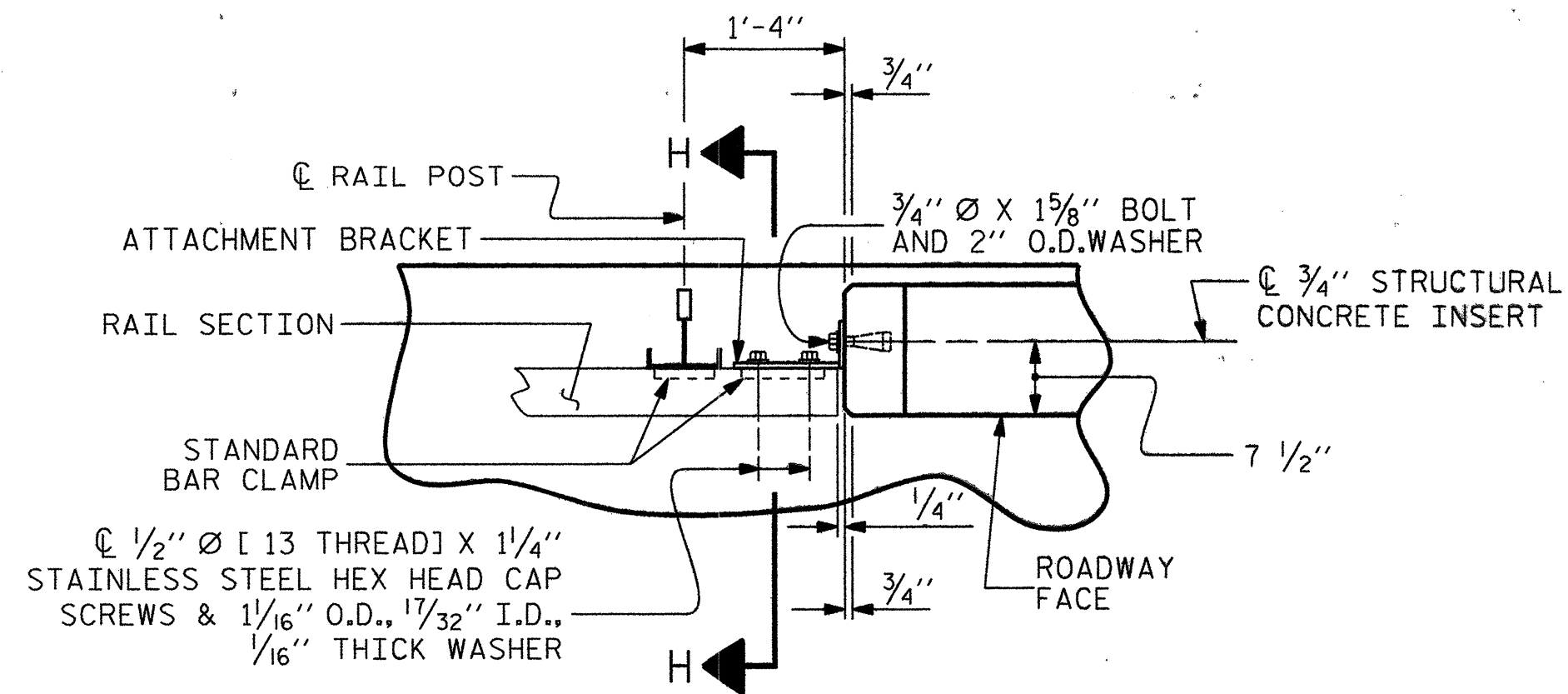
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

3 BAR METAL RAIL  
60' SPAN  
28' CLEAR ROADWAY  
80° SKEW

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

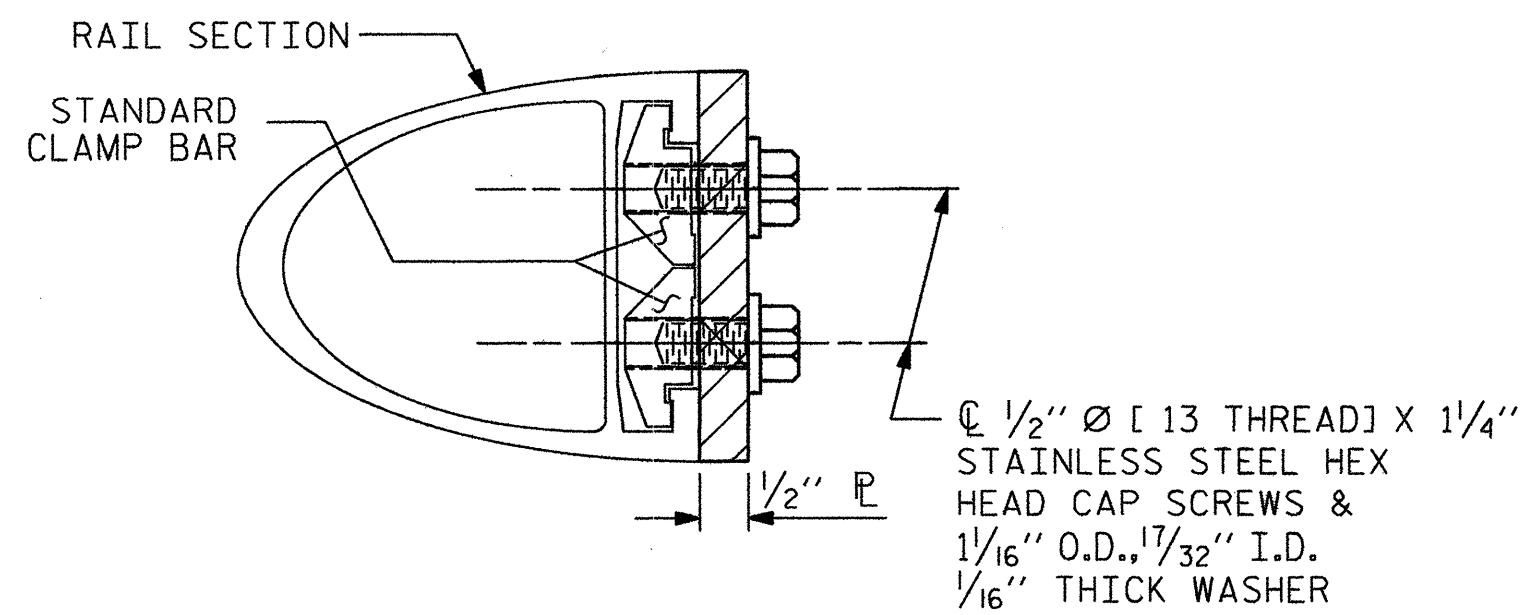
DRAWN BY: NMW DATE: 9/05  
CHECKED BY: RTJ DATE: 2/06

PREPARED BY  
TGS ENGINEERS  
107-A MICA AVENUE  
MORGANTON, NC 28655



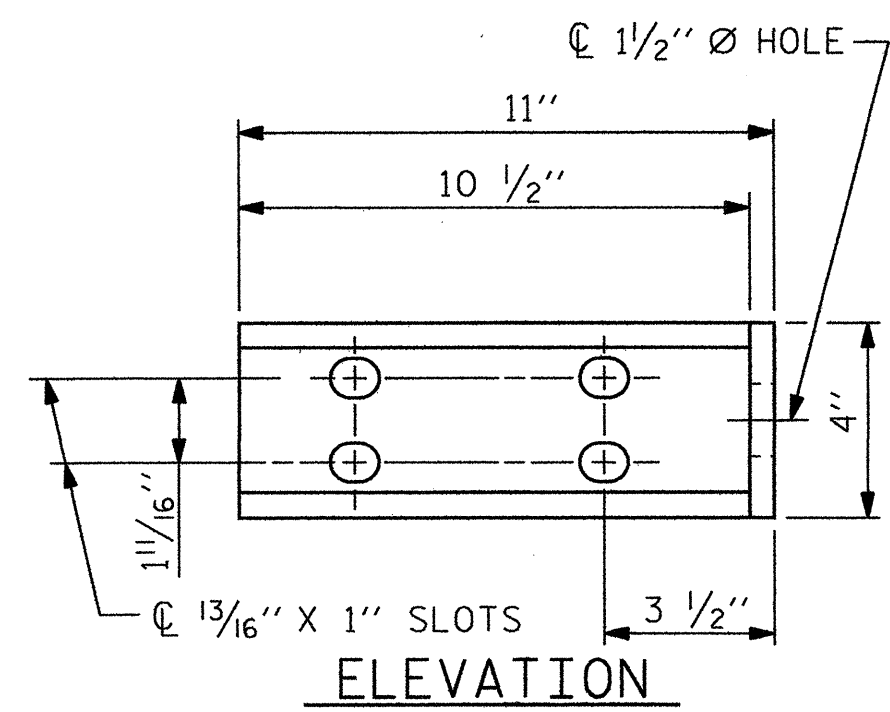
**PLAN OF RAIL AND END POST**

(STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)

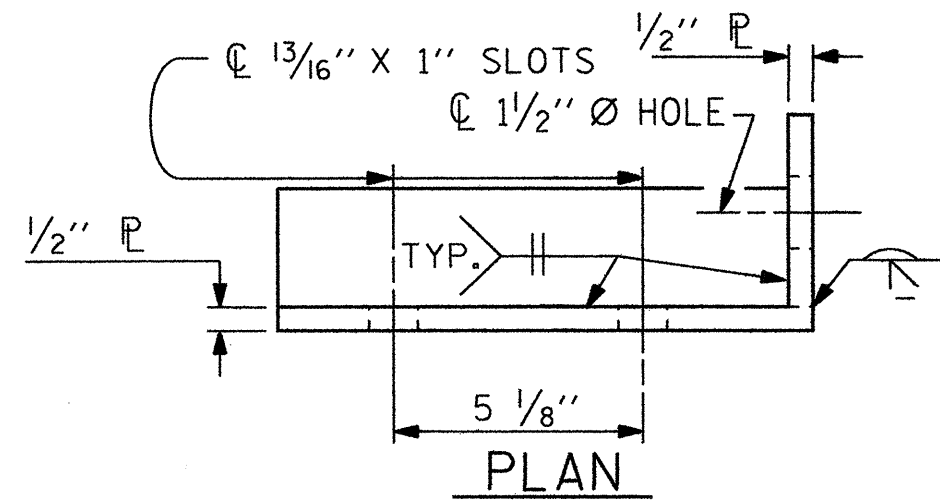


**SECTION H-H**

(FOR TOP & MIDDLE RAIL)

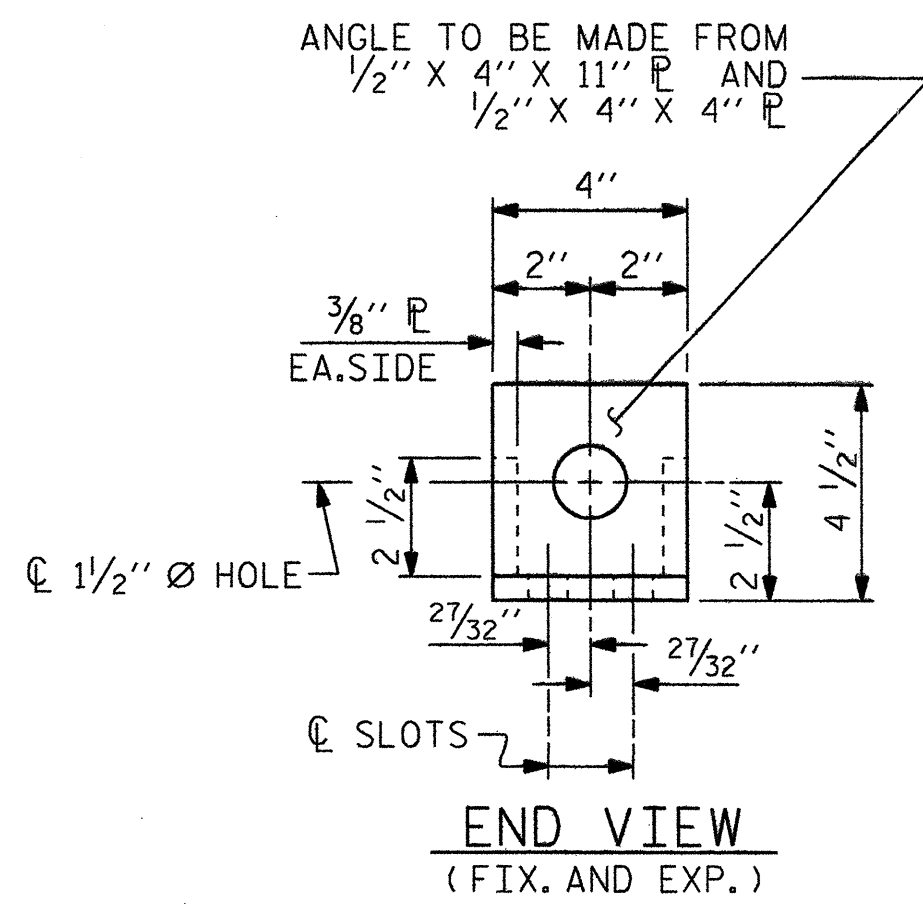


**ELEVATION**



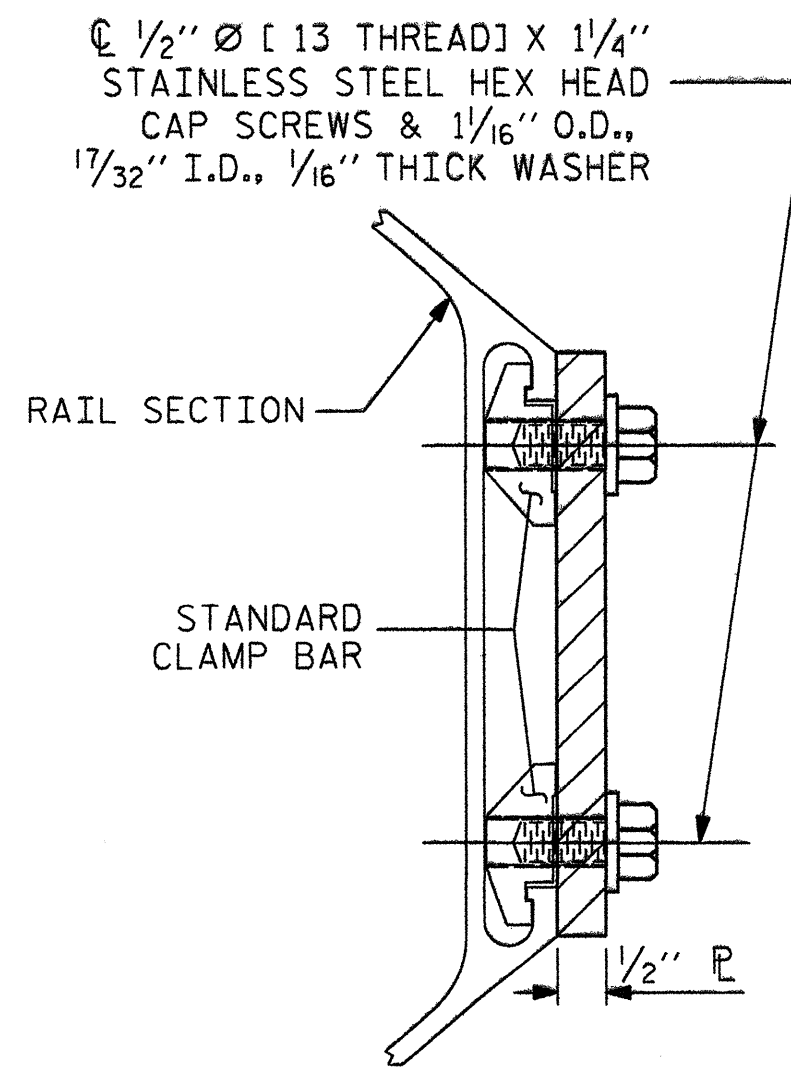
**DETAILS FOR ATTACHMENT BRACKET**

(TOP & MIDDLE RAIL ONLY)



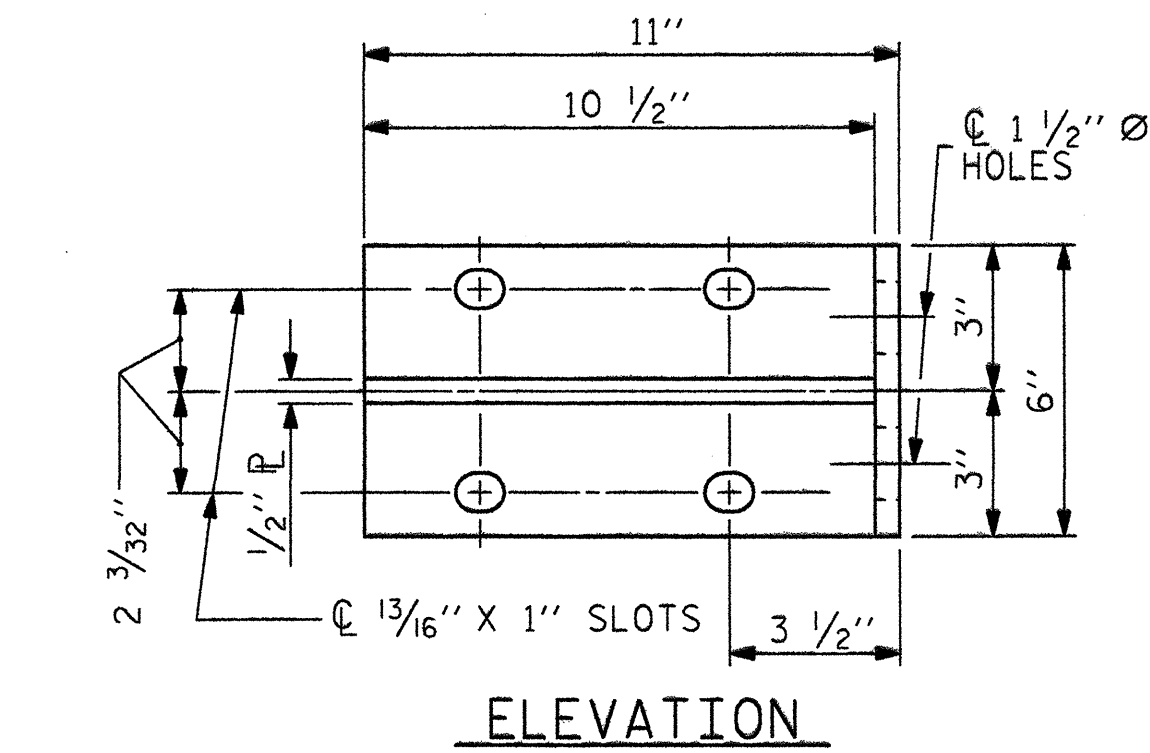
**END VIEW**

(FIX. AND EXP.)

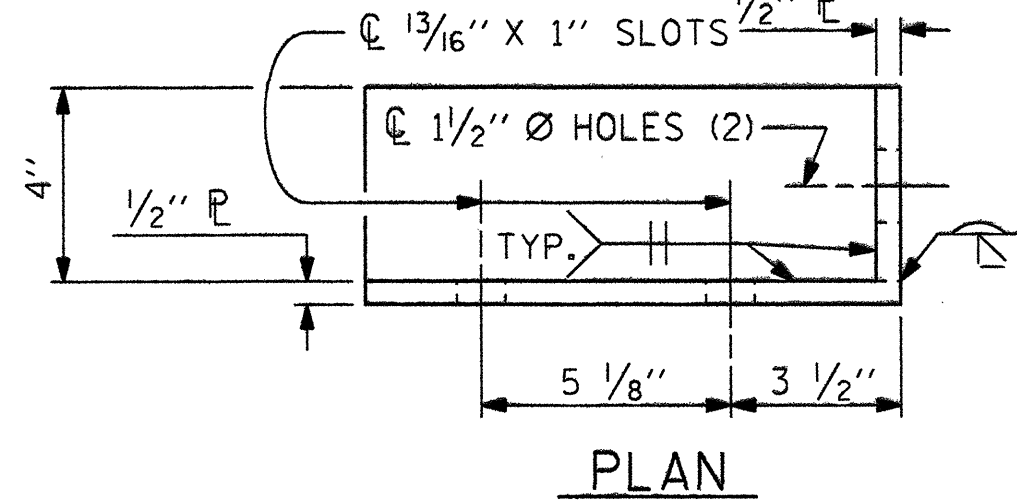


**SECTION H-H**

(FOR BOTTOM RAIL)



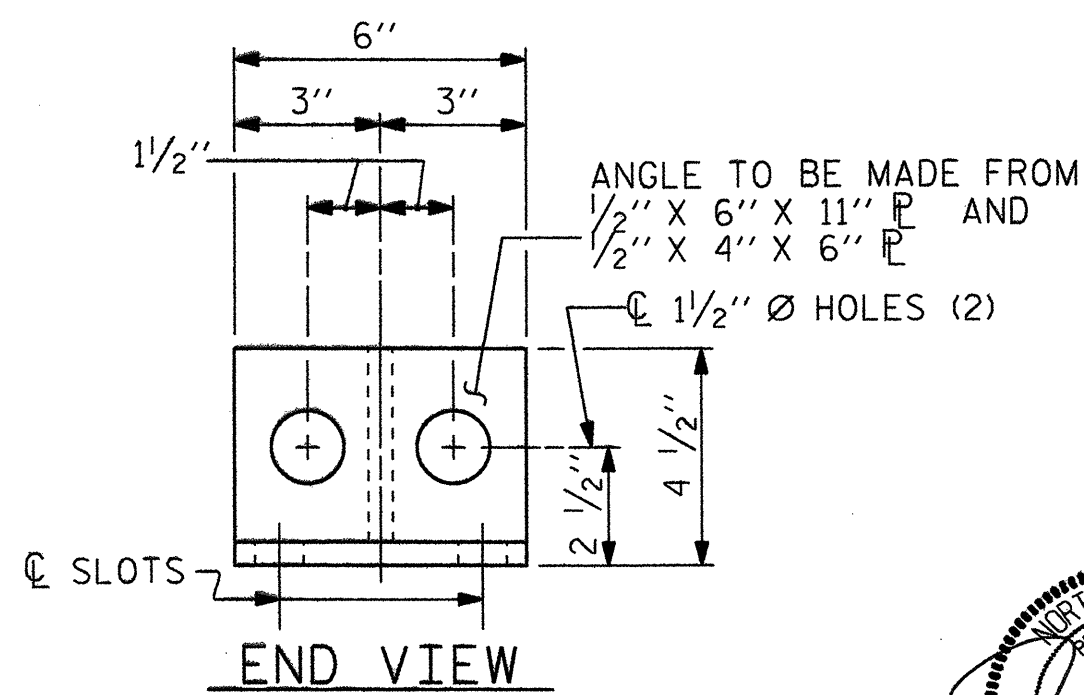
**ELEVATION**



**PLAN**

**DETAILS FOR ATTACHMENT BRACKET**

(BOTTOM RAIL ONLY)



**END VIEW**

**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"  $\phi$  X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4"  $\phi$  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. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

- D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

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 3 BAR METAL RAIL.

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.

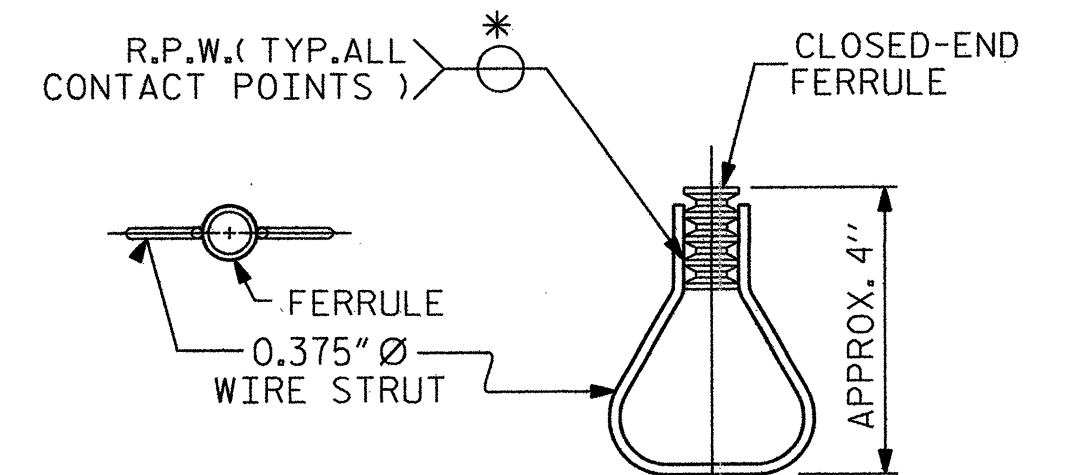
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4"  $\phi$  X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4"  $\phi$  X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS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

**NOTES**

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
- B. 1 - 3/4"  $\phi$  X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4"  $\phi$  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"  $\phi$  WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

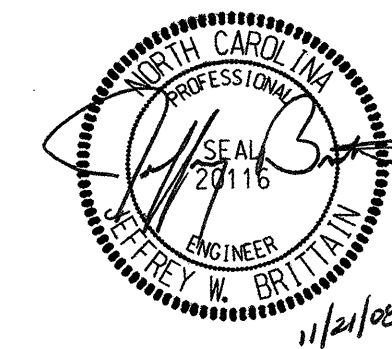


**PLAN ELEVATION**

**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68.00 -L-  
 REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

3 BAR METAL RAIL  
 60' SPAN  
 28' CLEAR ROADWAY  
 80° SKEW

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

PREPARED BY  
 TGS ENGINEERS  
 107-A WICA AVENUE  
 MORGANTON, NC 28655

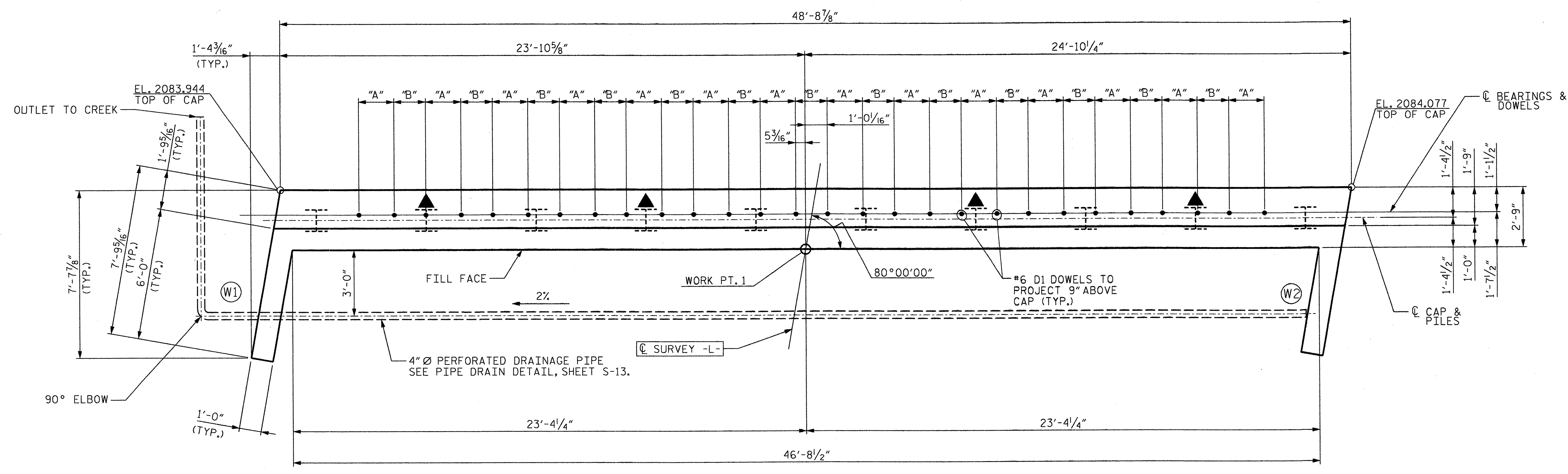
DRAWN BY: NMW DATE: 9/05  
 CHECKED BY: RTJ DATE: 2/06



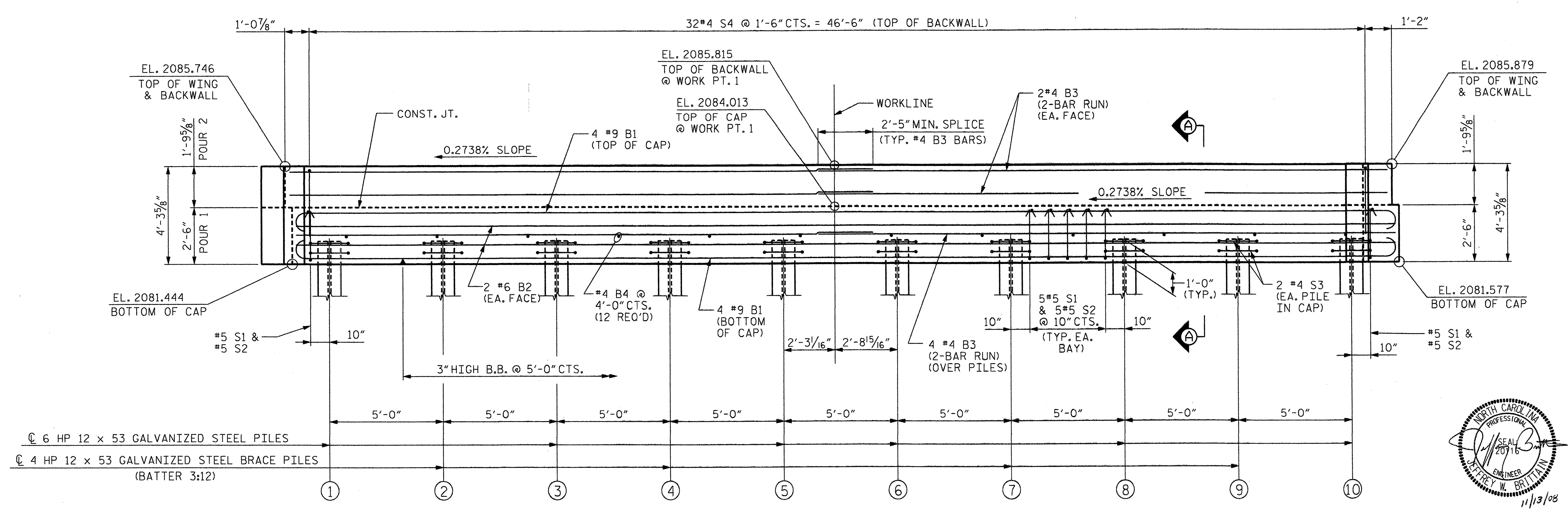
▲ INDICATES PILE  
BATTER 3:12 IN  
DIRECTION SHOWN

"A" = 1'-7<sup>5</sup>/<sub>16</sub>"  
"B" = 1'-5<sup>1</sup>/<sub>4</sub>"

NOTES:  
STIRRUPS IN CAP MAY BE SHIFTED AS  
NECESSARY TO CLEAR DOWELS.



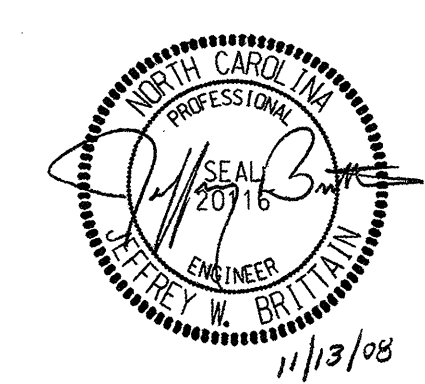
PLAN



ELEVATION

TOP OF PILE ELEVATIONS	
1	2082.449
2	2082.463
3	2082.477
4	2082.490
5	2082.504
6	2082.518
7	2082.531
8	2082.545
9	2082.559
10	2082.572

PROJECT NO. B-5180  
COUNTY: HENDERSON  
STATION: 13+68.00 -L-  
REPLACES BRIDGE NO. 205

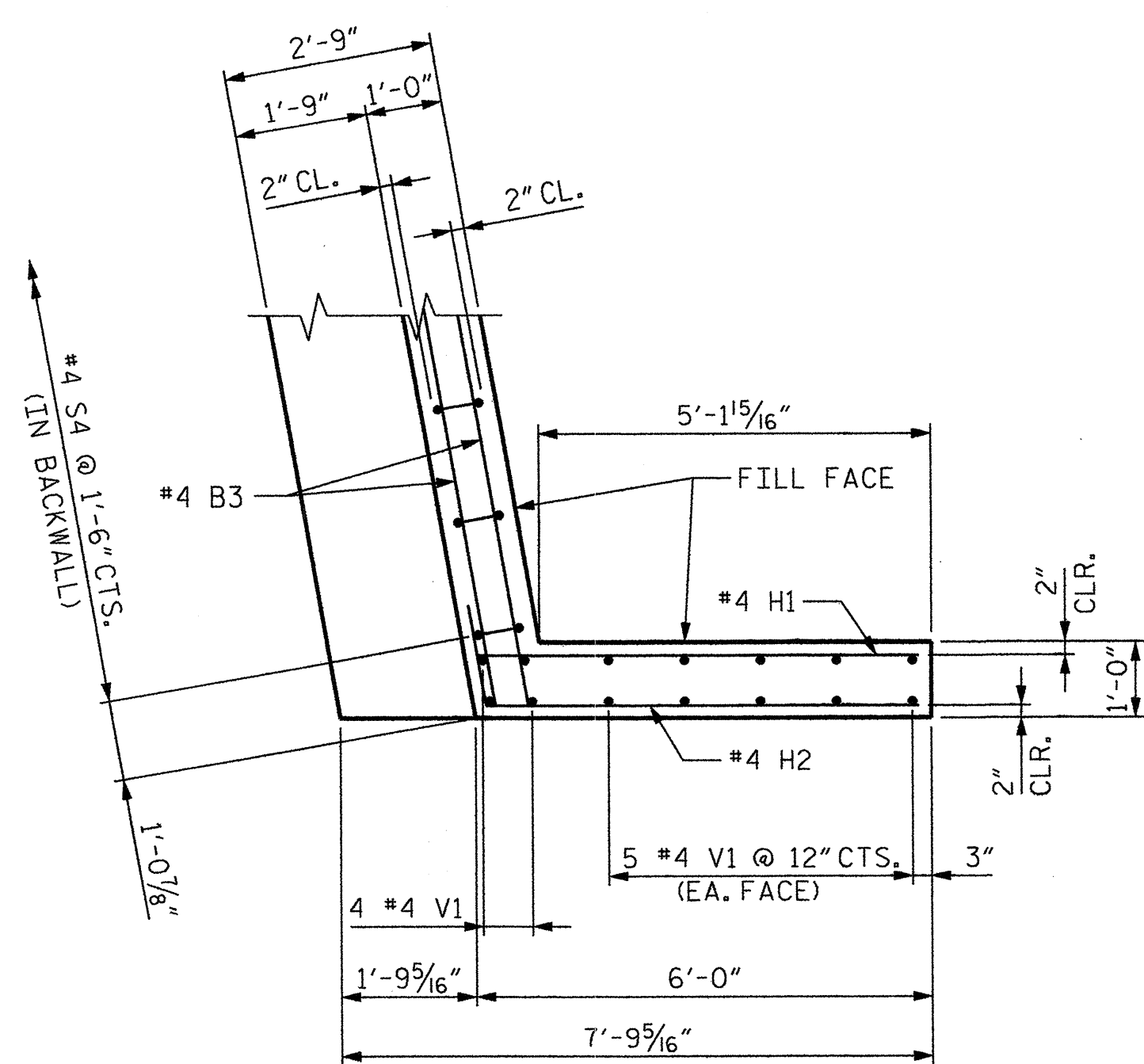


STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
CAST-IN-PLACE  
END BENT 1  
28' CLEAR ROADWAY - 80° SKEW  
60' SPAN

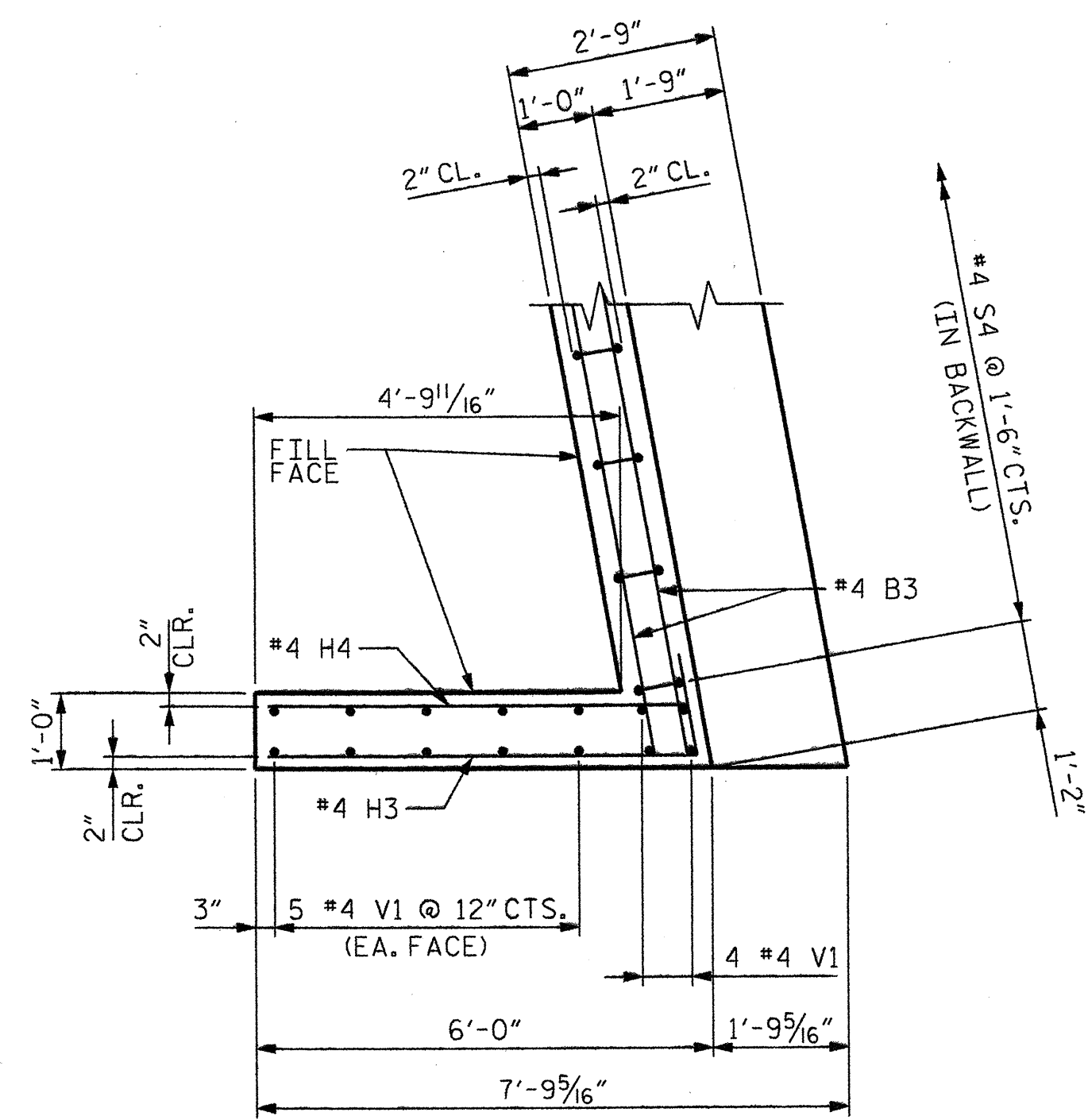
DRAWN BY: SDH DATE: 9/05  
CHECKED BY: NMW DATE: 10/05

PREPARED BY  
TGS ENGINEERS  
107-A MICA AVENUE  
MORGANTON, NC 28655

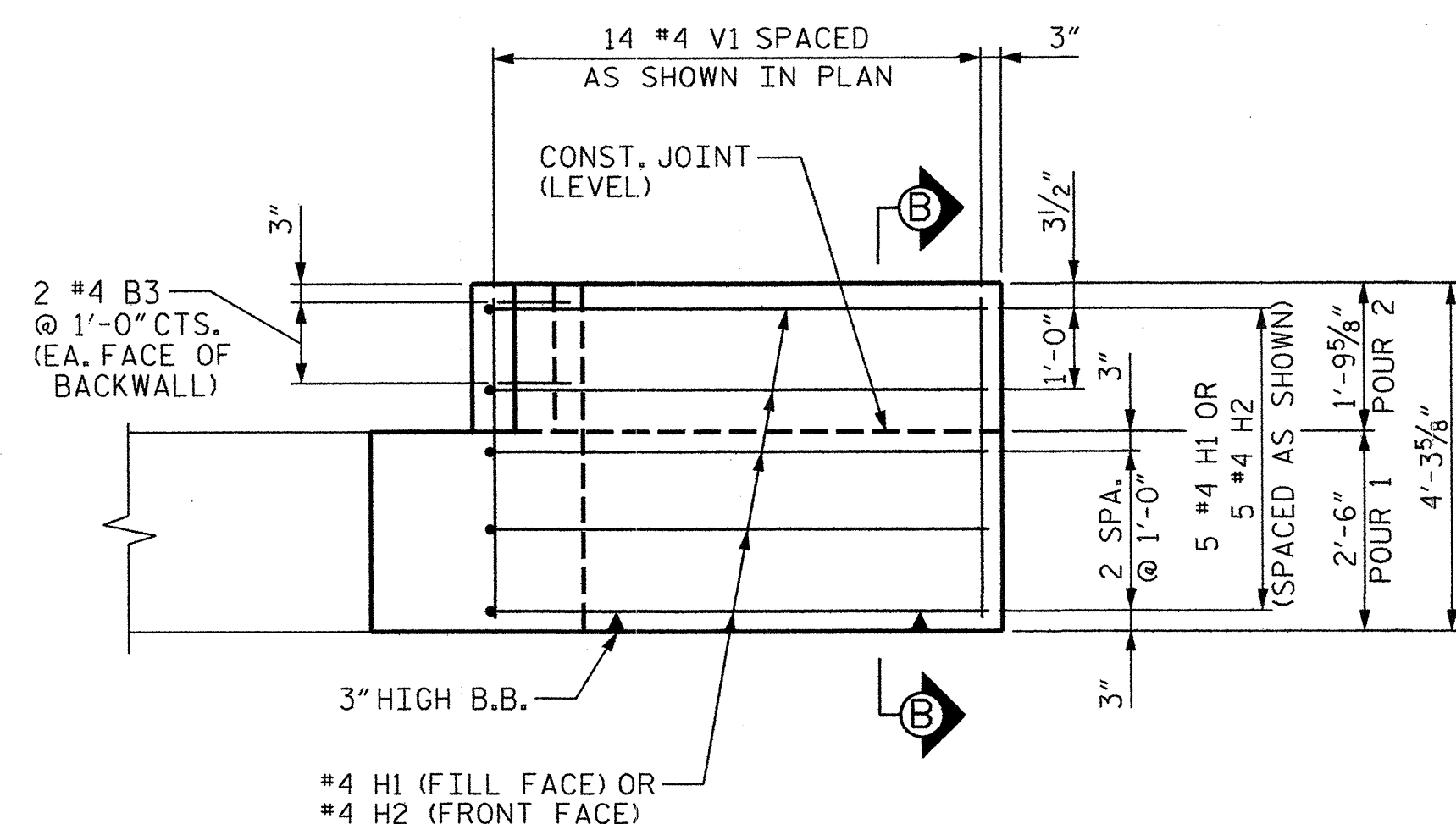
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-11
1			3			TOTAL SHEETS
2			4			18



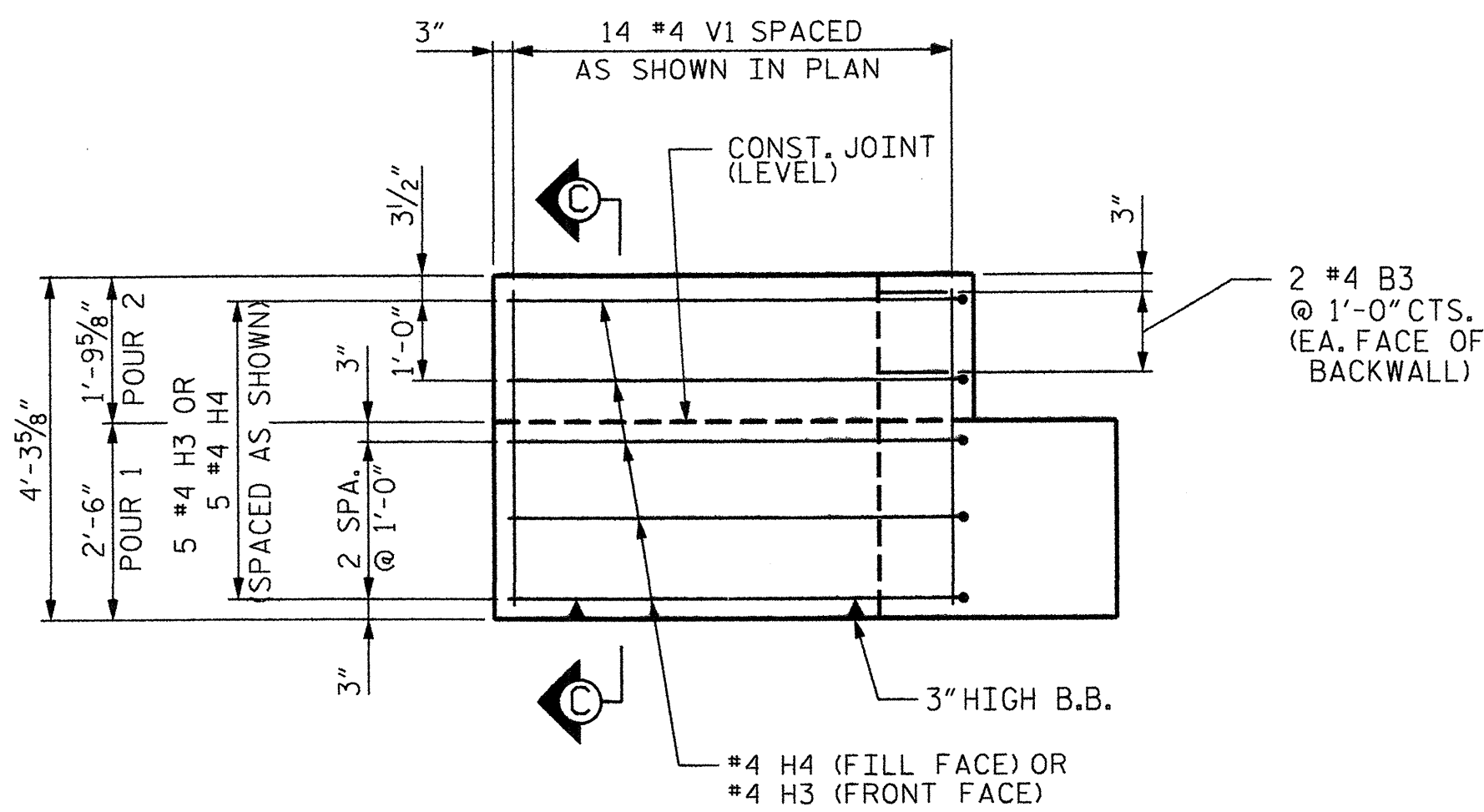
PLAN OF WING W1



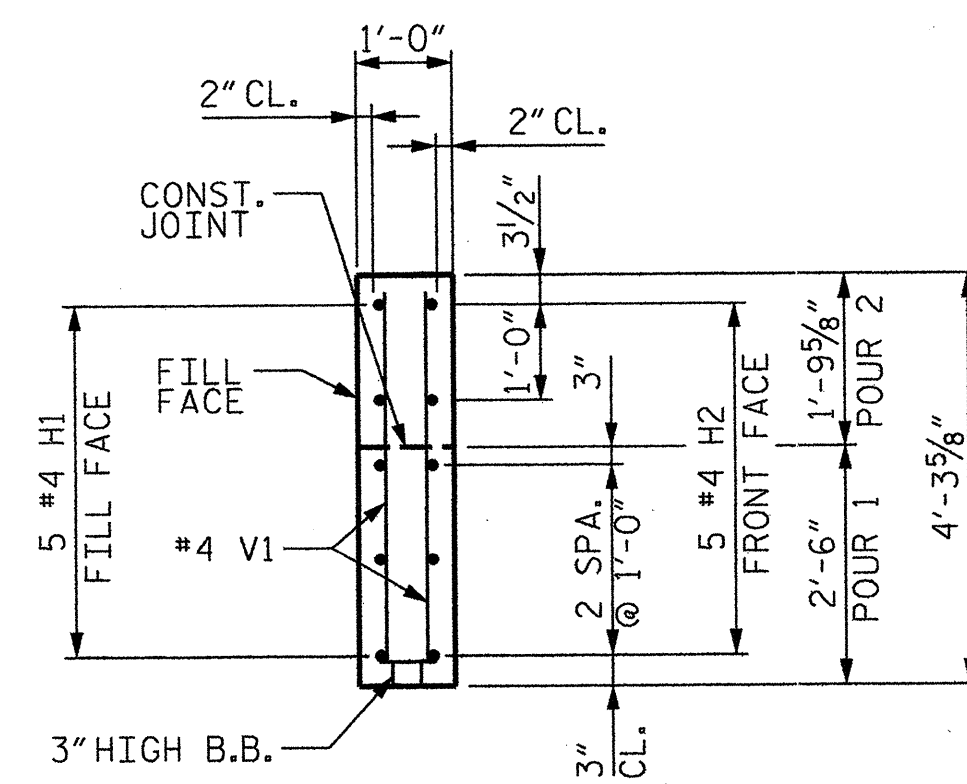
PLAN OF WING W2



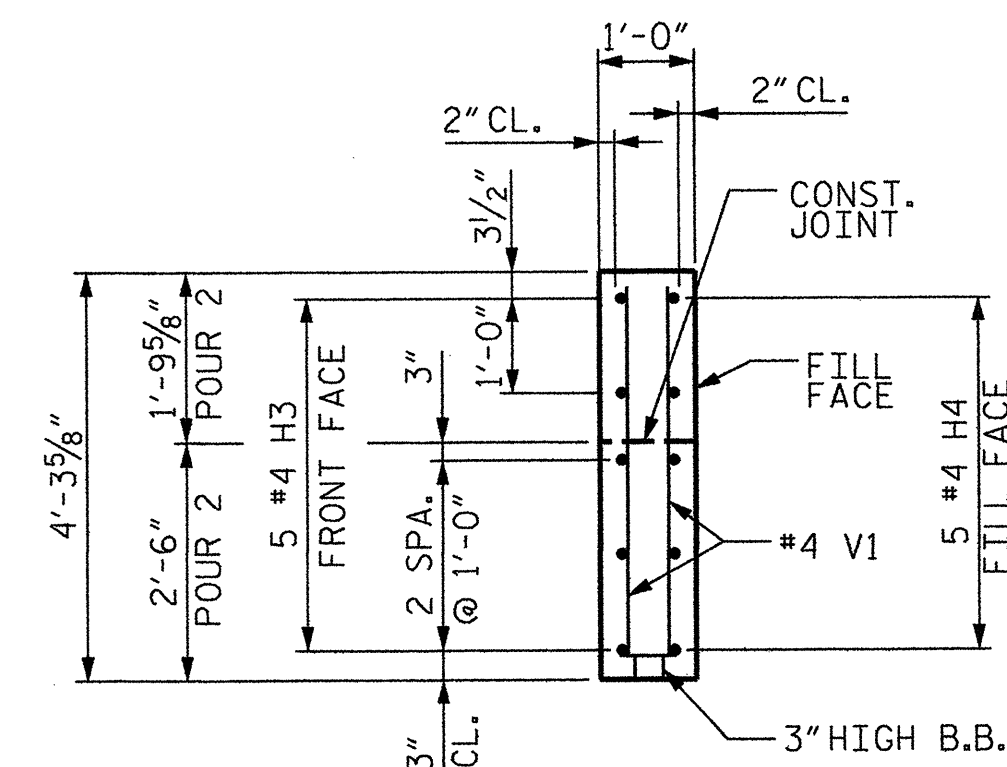
ELEVATION OF WING W1



ELEVATION OF WING W2

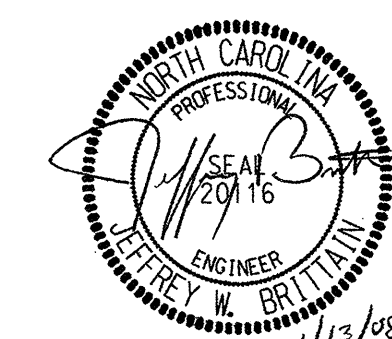


SECTION B-B



SECTION C-C

PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68.00 -L-  
 REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

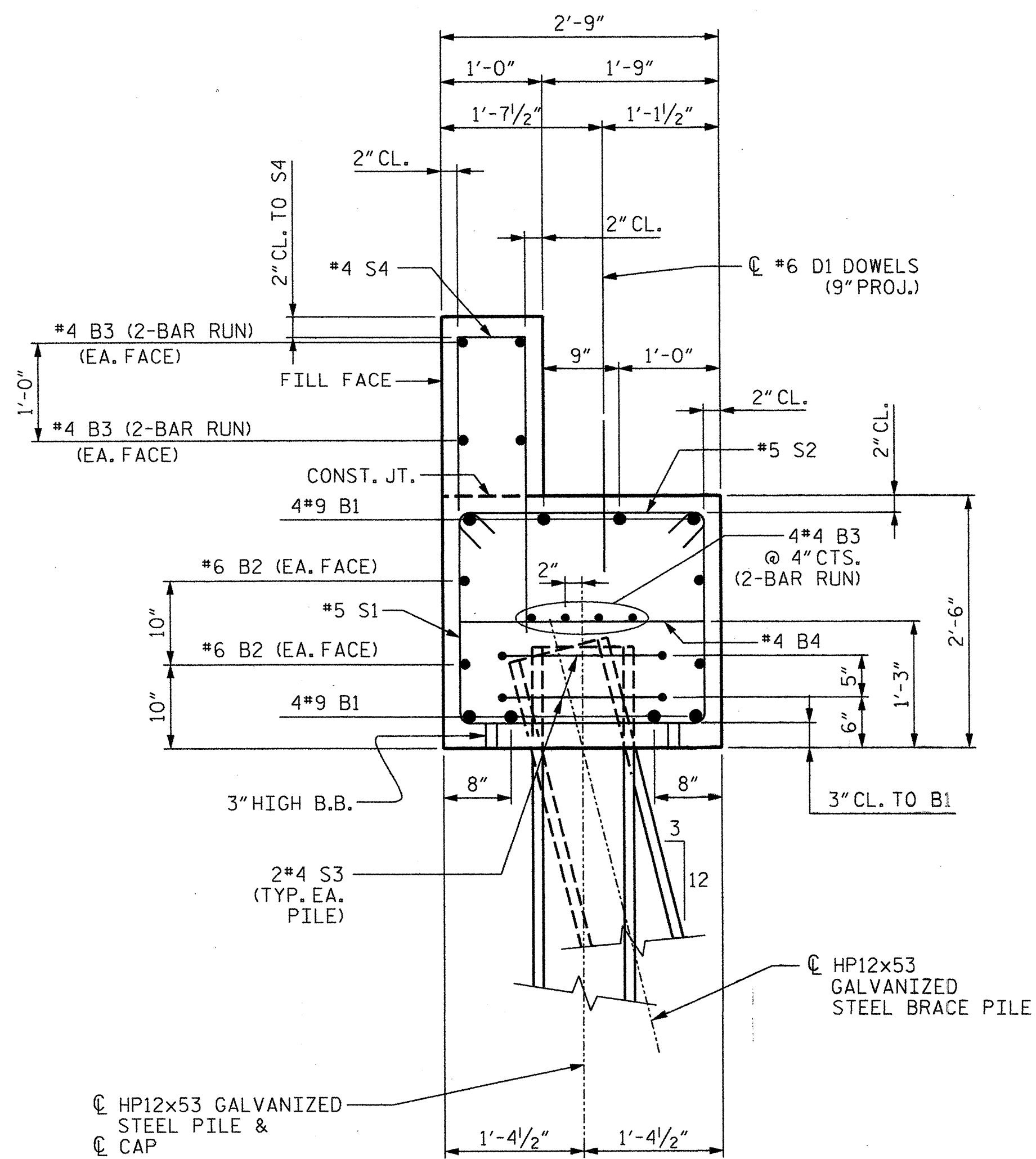
CAST-IN-PLACE  
 END BENT 1  
 28' CLEAR ROADWAY - 80° SKEW  
 60' SPAN

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-12
1			3			TOTAL SHEETS
2			4			18

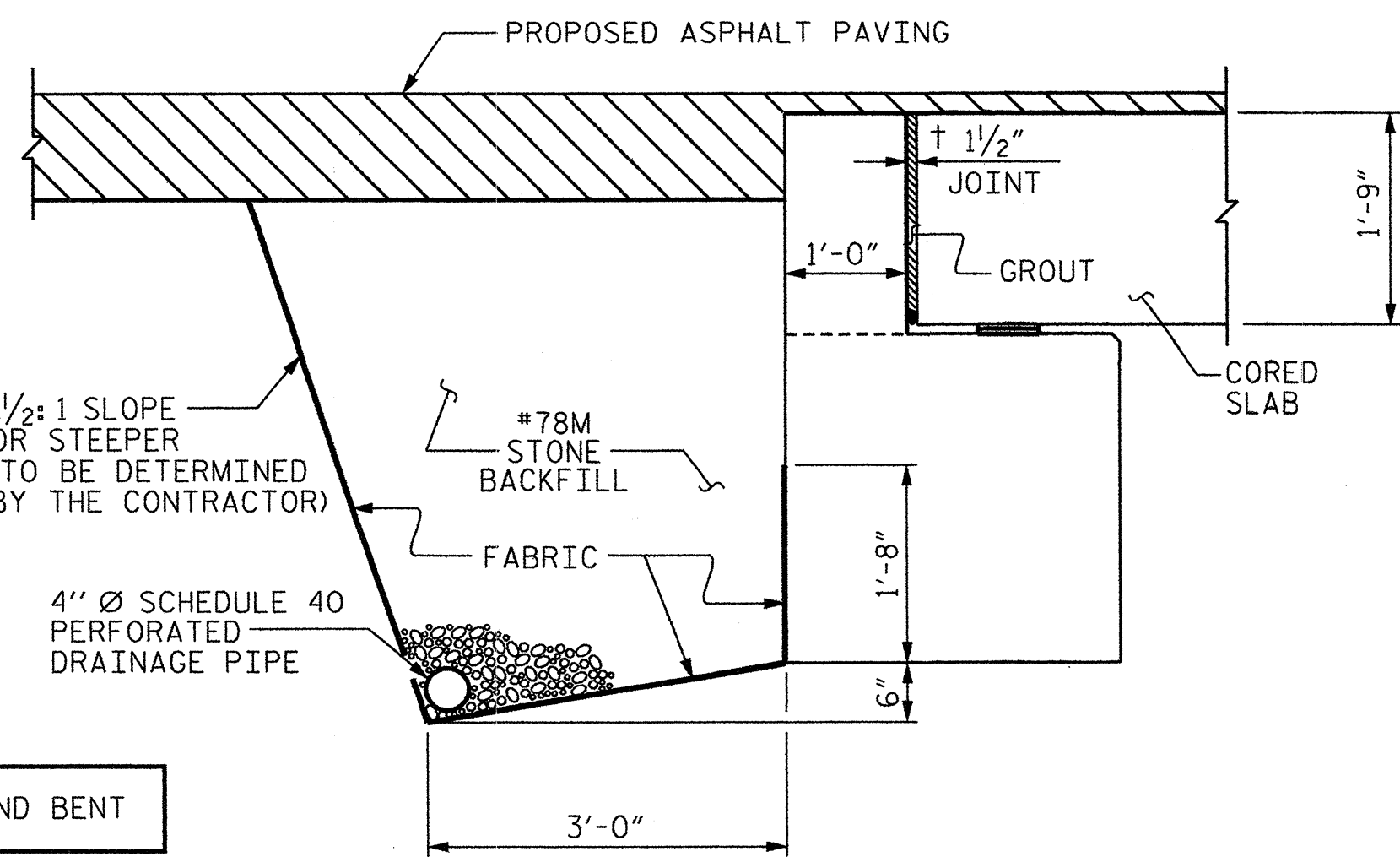
DRAWN BY: SDH DATE: 9/05  
 CHECKED BY: NMW DATE: 10/05

PREPARED BY:  
 TGS ENGINEERS  
 107-A MICA AVENUE  
 MORGANTON, NC 28655





SECTION A-A

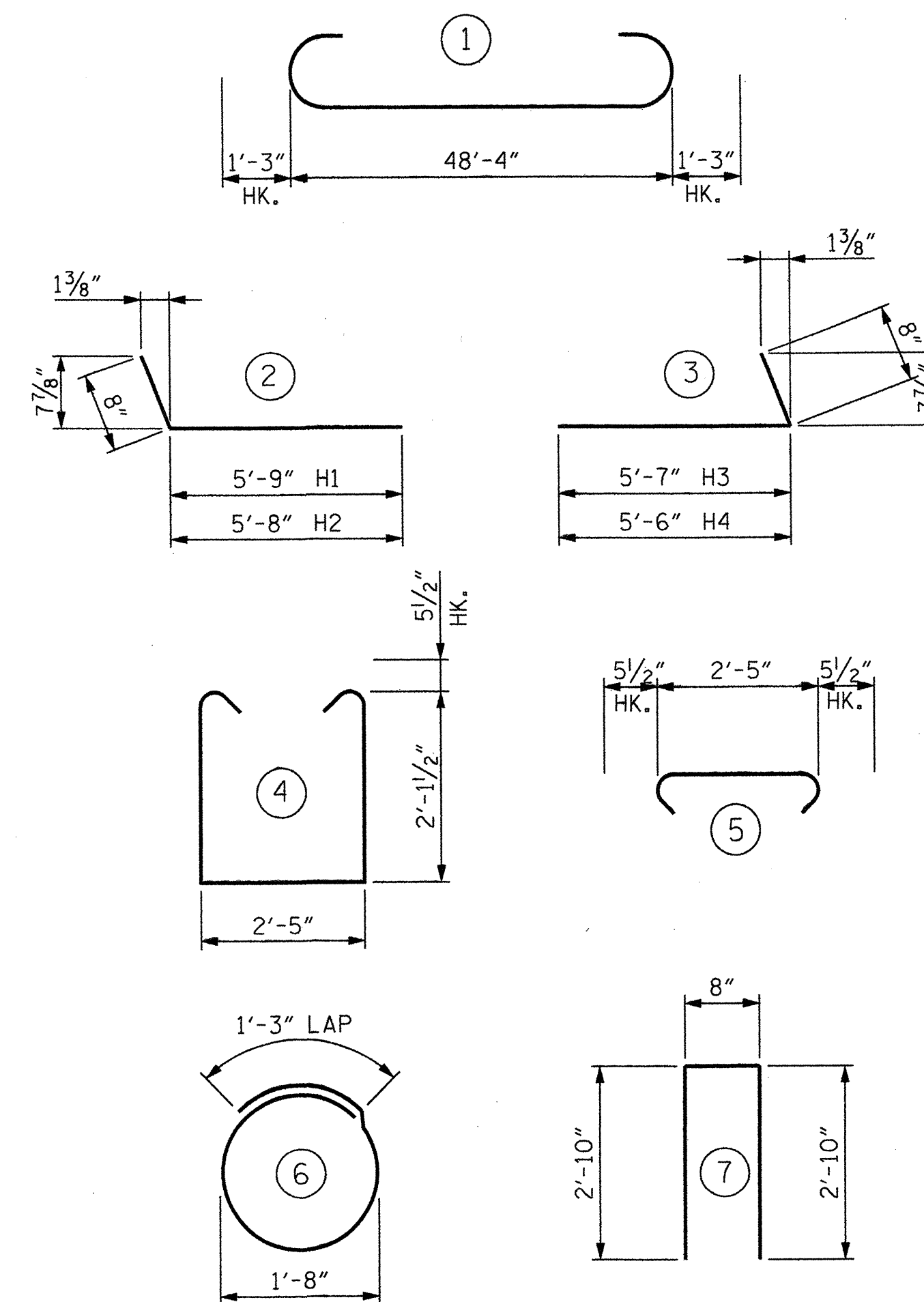


PIPE DRAIN DETAIL

DRAWN BY: SDH DATE: 9/05  
 CHECKED BY: NMW DATE: 10/05

BAR TYPES

BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		50'-10"	1,383
B2	4	#6	STR.	48'-4"	290
B3	16	#4	STR.	25'-5"	272
B4	12	#4	STR.	2'-5"	19
D1	28	#6	STR.	1'-6"	63
H1	5	#4	2	6'-5"	21
H2	5	#4	2	6'-4"	21
H3	5	#4	3	6'-3"	21
H4	5	#4	3	6'-2"	21
S1	47	#5	4	7'-7"	372
S2	47	#5	5	3'-4"	163
S3	20	#4	6	6'-6"	87
S4	32	#4	7	6'-4"	135
V1	28	#4	STR.	3'-11"	73

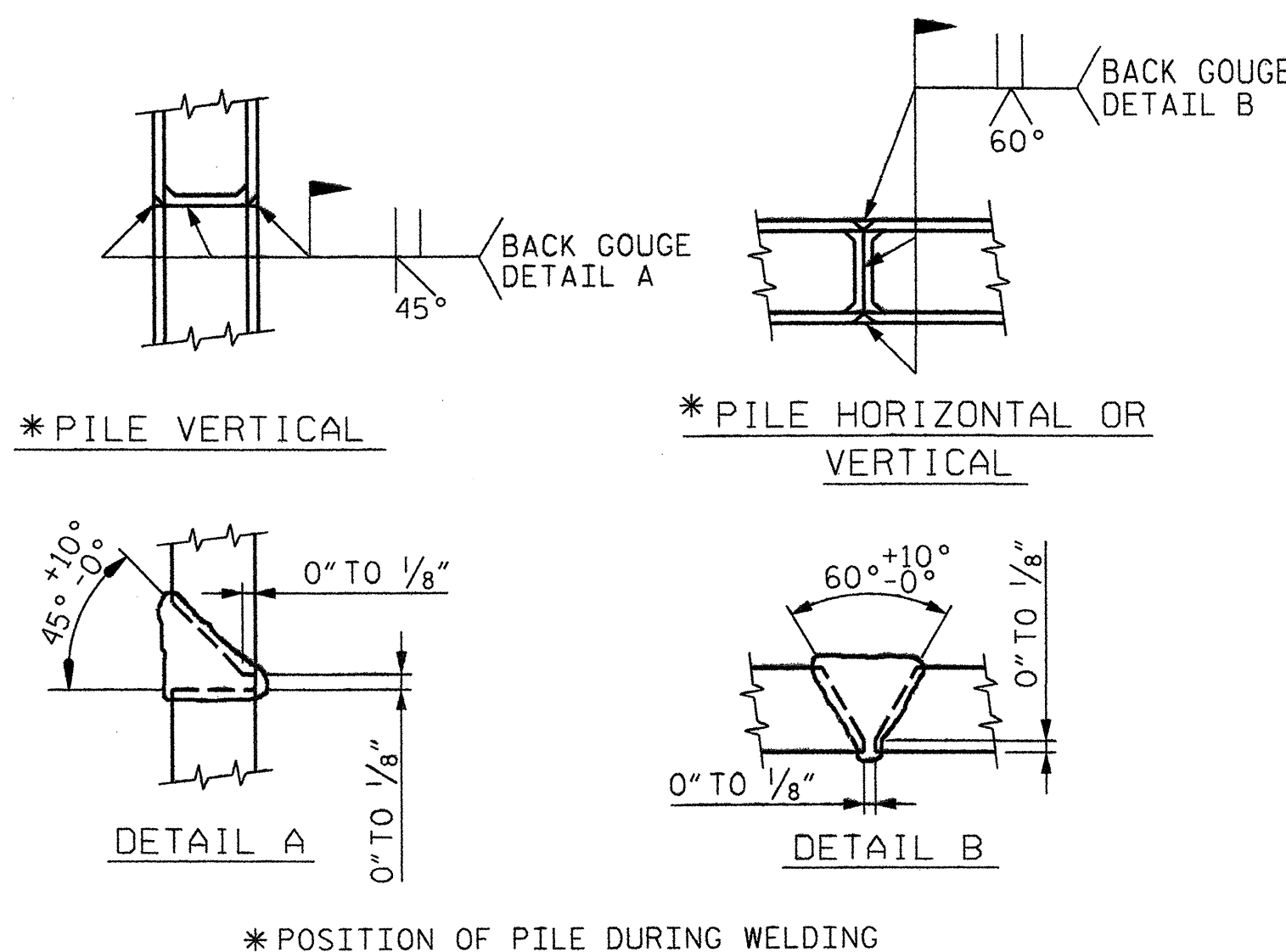
REINFORCING STEEL - LBS. 2,941

CLASS A CONCRETE

POUR 1 (CAP & WINGS) 13.3 C.Y.

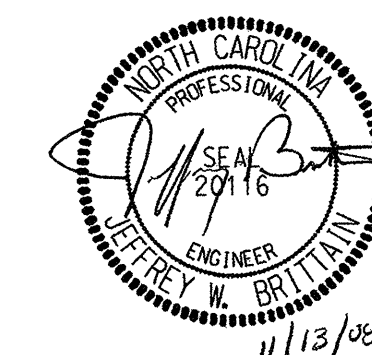
POUR 2 (BACKWALL & WINGS) 3.9 C.Y.

TOTAL 17.2 C.Y.



PILE SPLICE DETAILS

PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68.00 -L-  
 REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

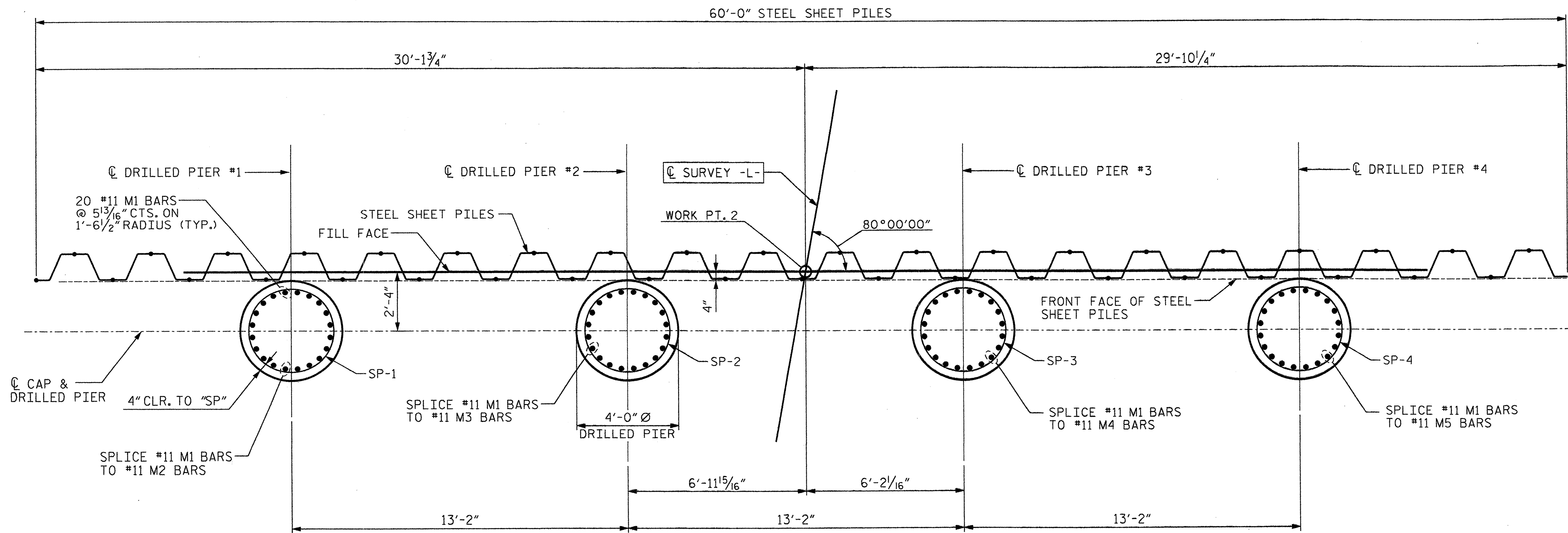
CAST-IN-PLACE  
 END BENT 1  
 28' CLEAR ROADWAY - 80° SKEW  
 60' SPAN

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-13
1			3			TOTAL SHEETS
2			4			18

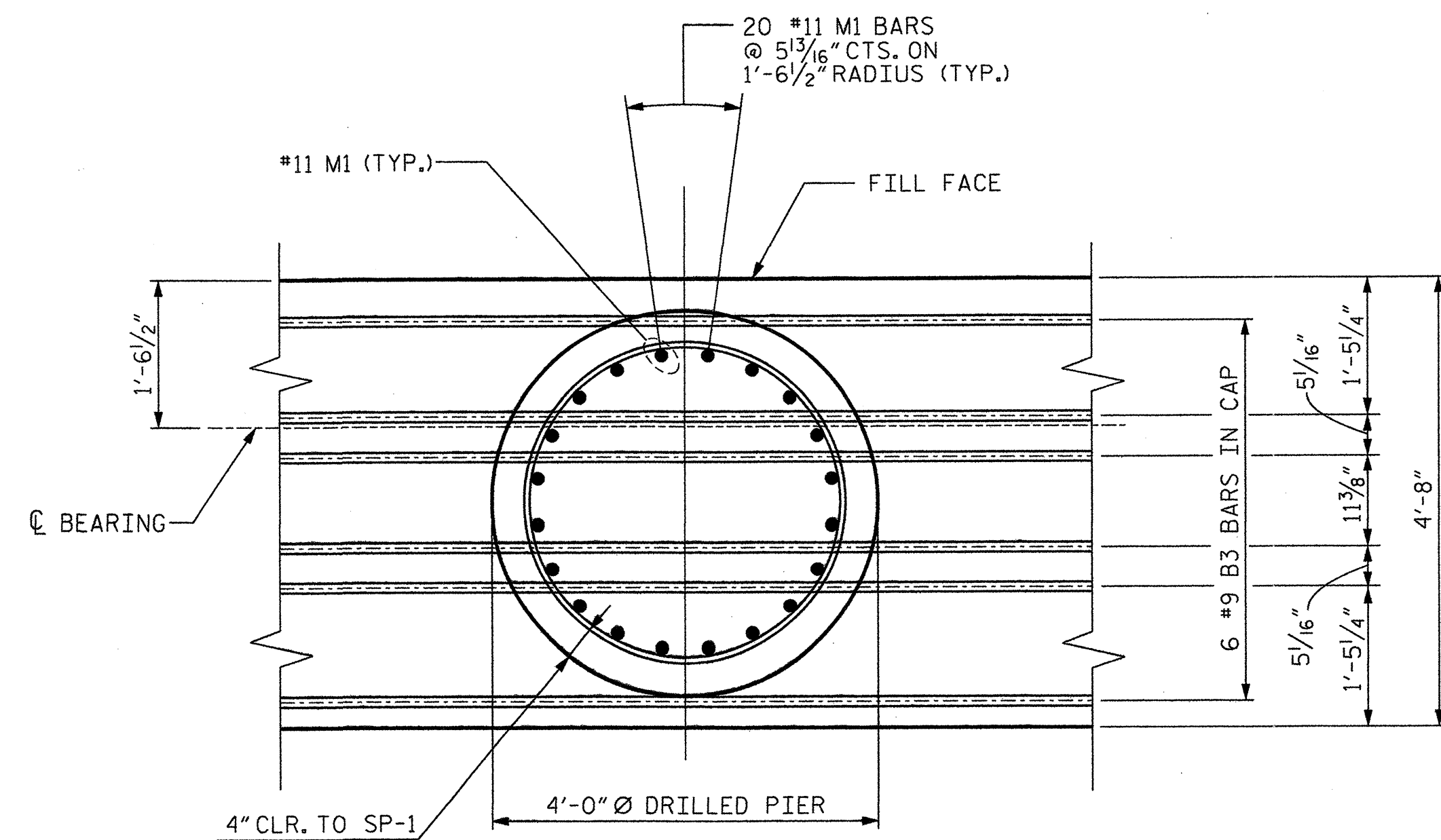
PREPARED BY  
 TGS ENGINEERS  
 107-A MICA AVENUE  
 MORGANTON, NC 28655







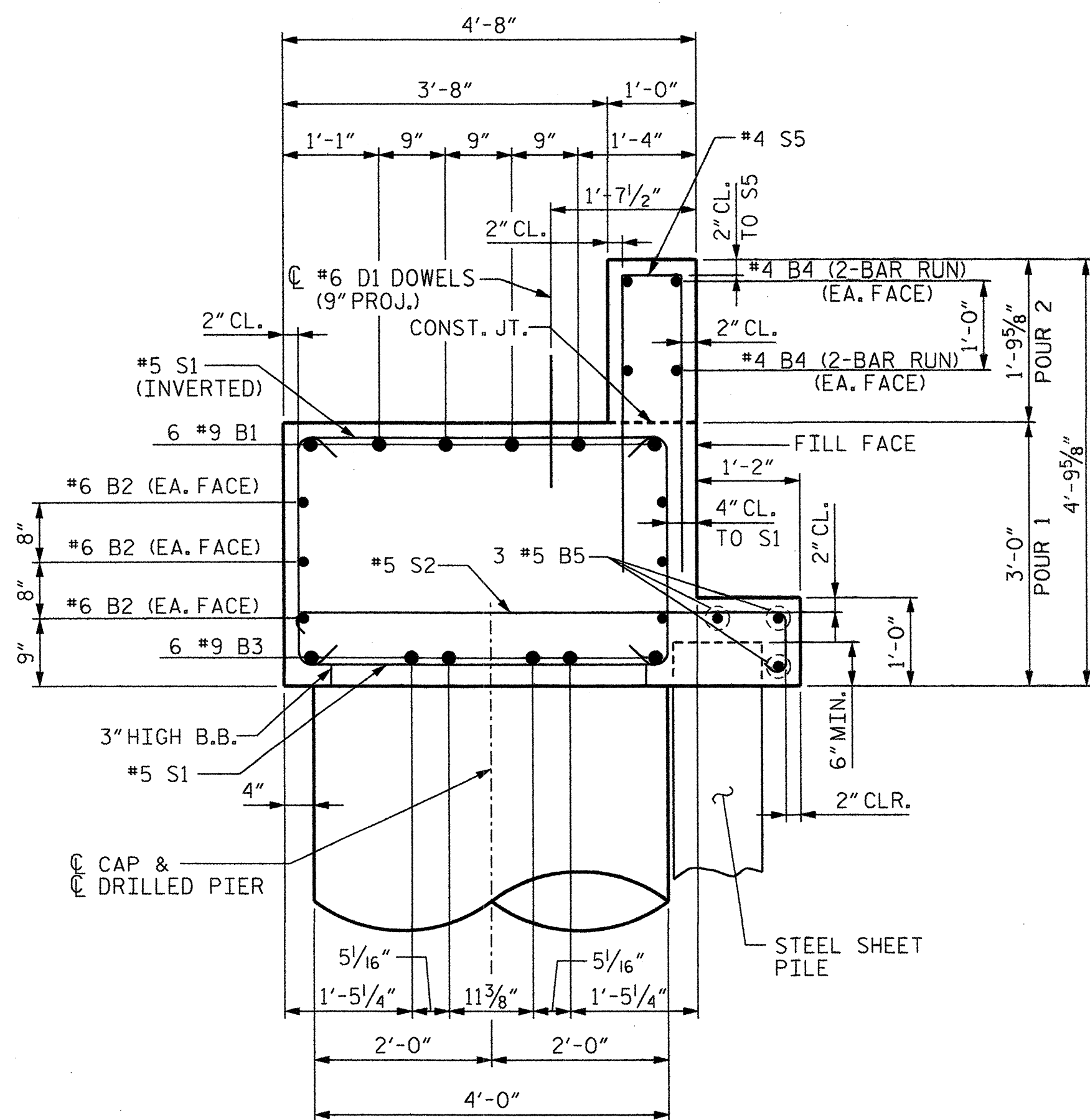
PLAN OF DRILLED PIERS



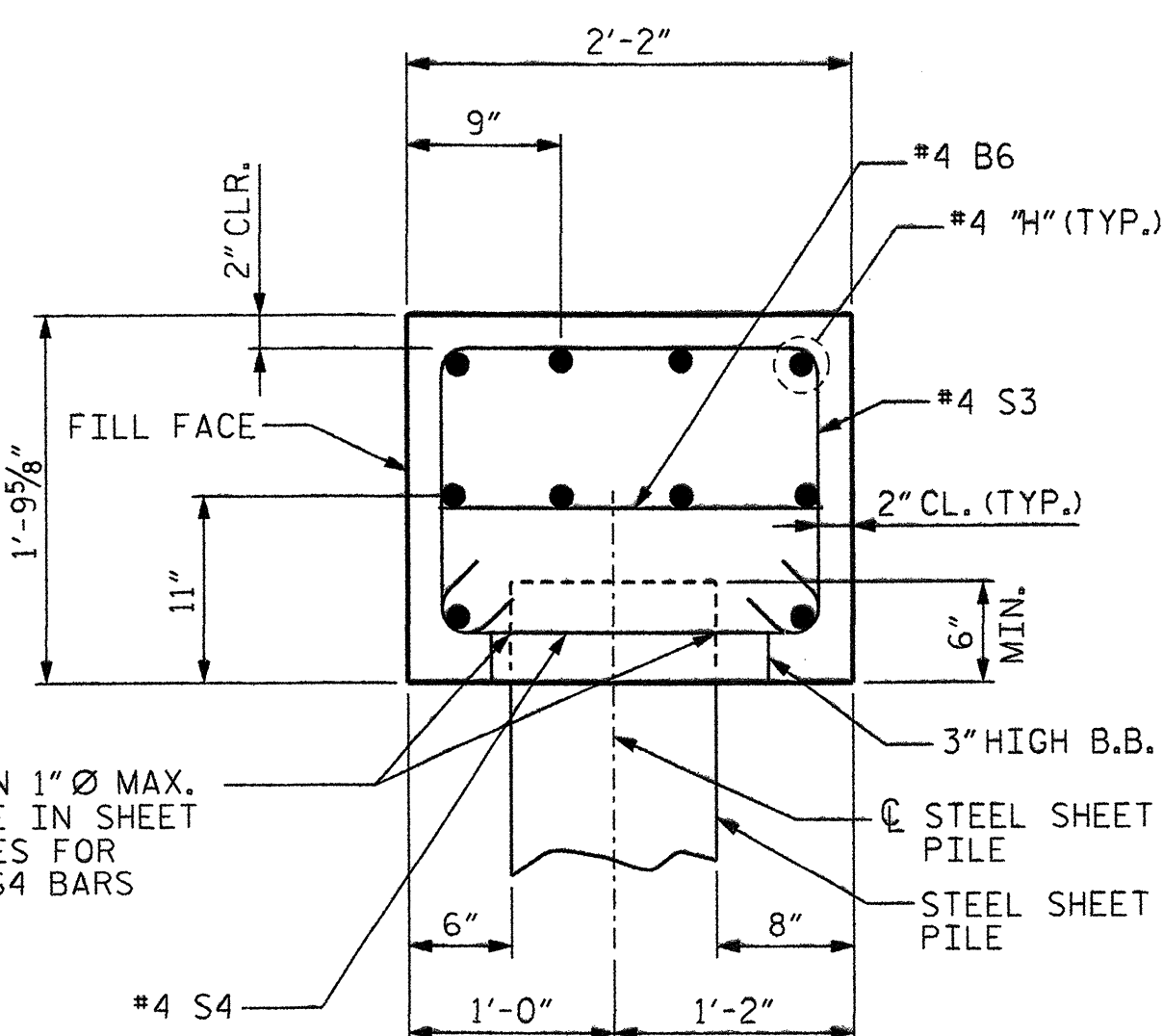
PLAN

BOTTOM OF CAP

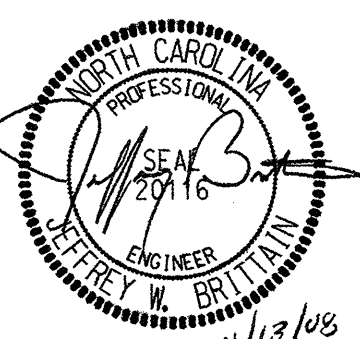
NOTE: #11 M1 BARS TO BE PLACED IN DRILLED PIERS AS SHOWN.



SECTION A-A



SECTION B-B



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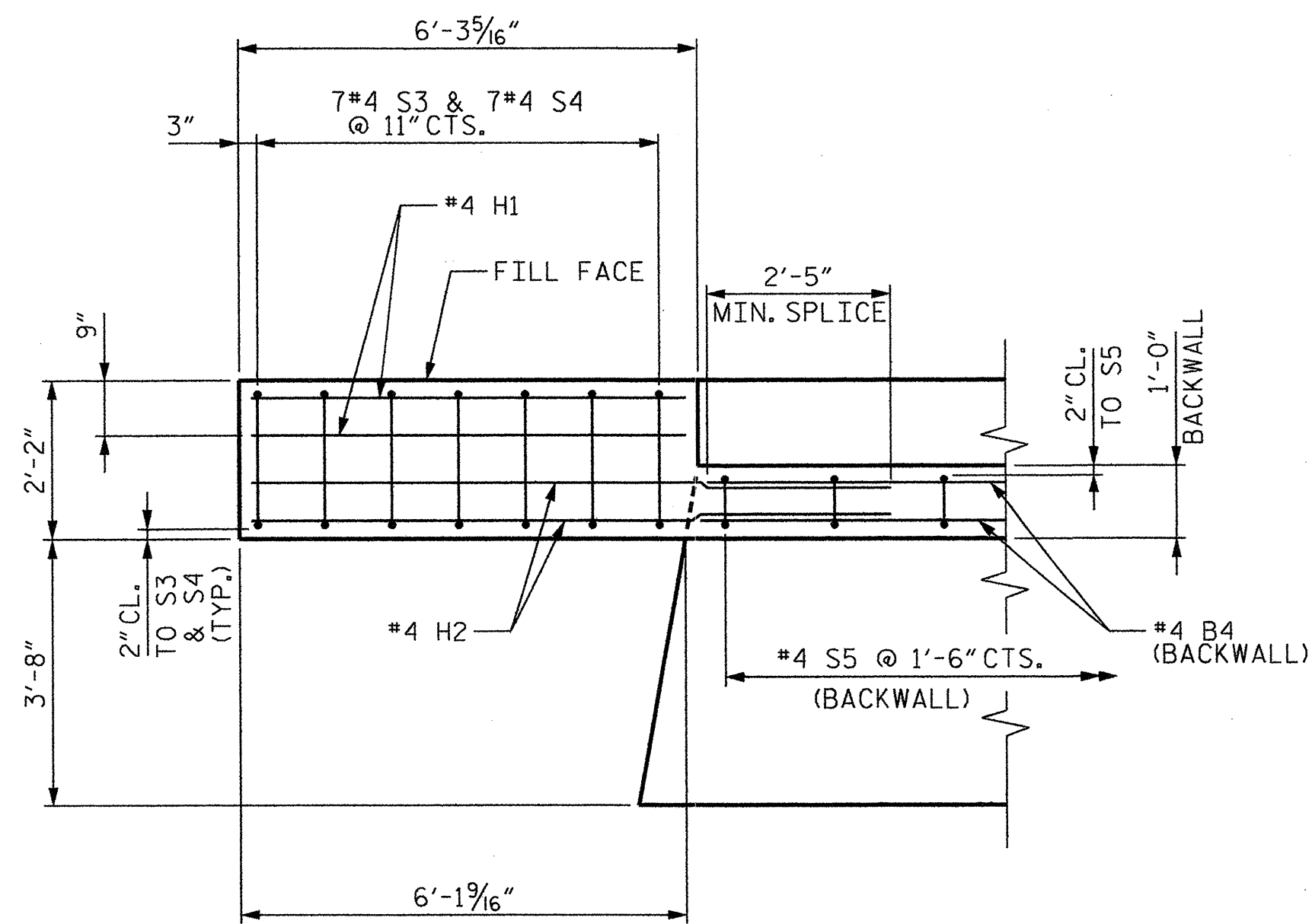
PROJECT NO. B-5180  
COUNTY: HENDERSON  
STATION: 13+68.00 -L-  
REPLACES BRIDGE NO. 205

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

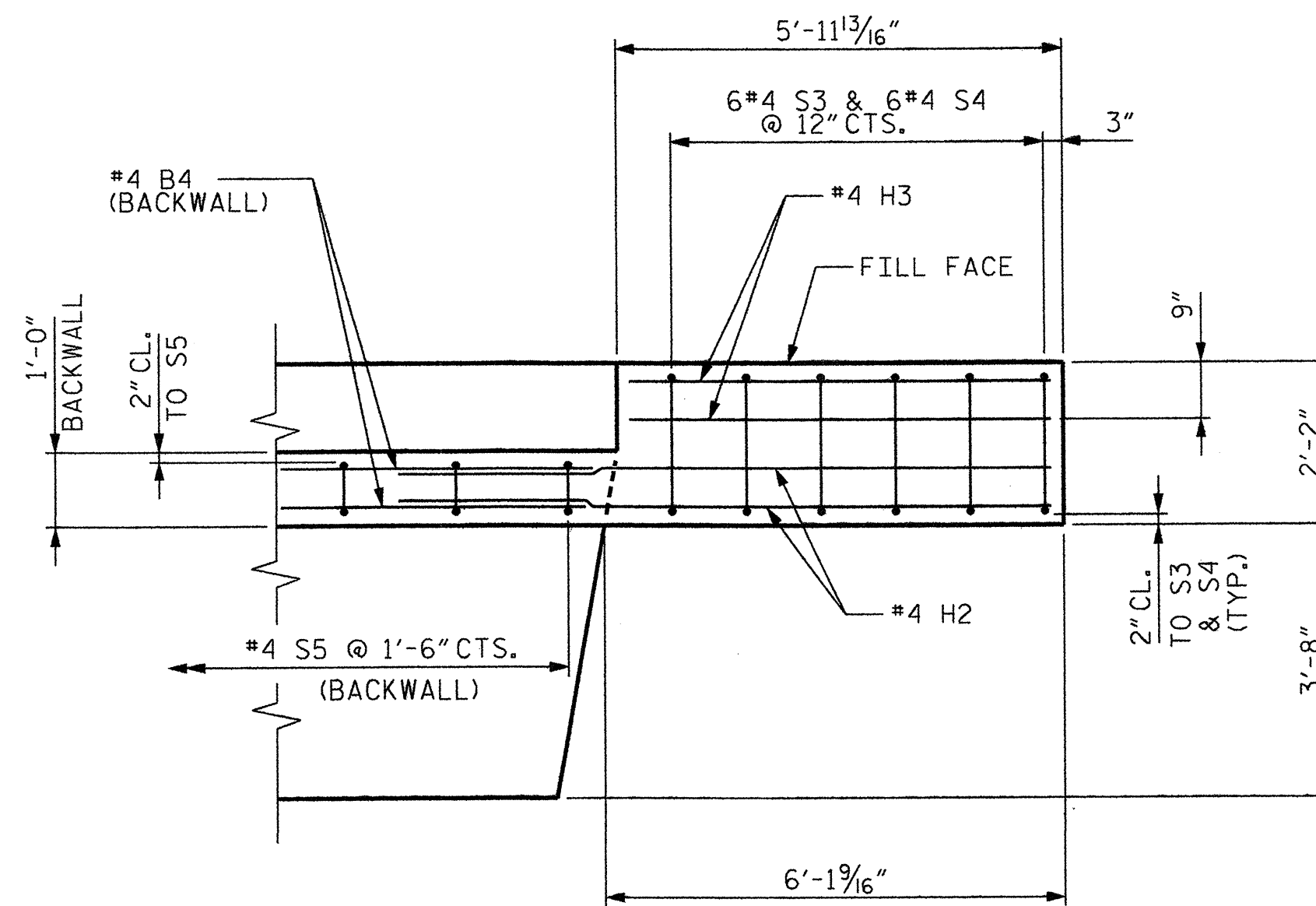
END BENT NO. 2  
28' CLEAR ROADWAY - 80° SKEW

DRAWN BY: NMW DATE: 5/07  
CHECKED BY: RTJ DATE: 2/08

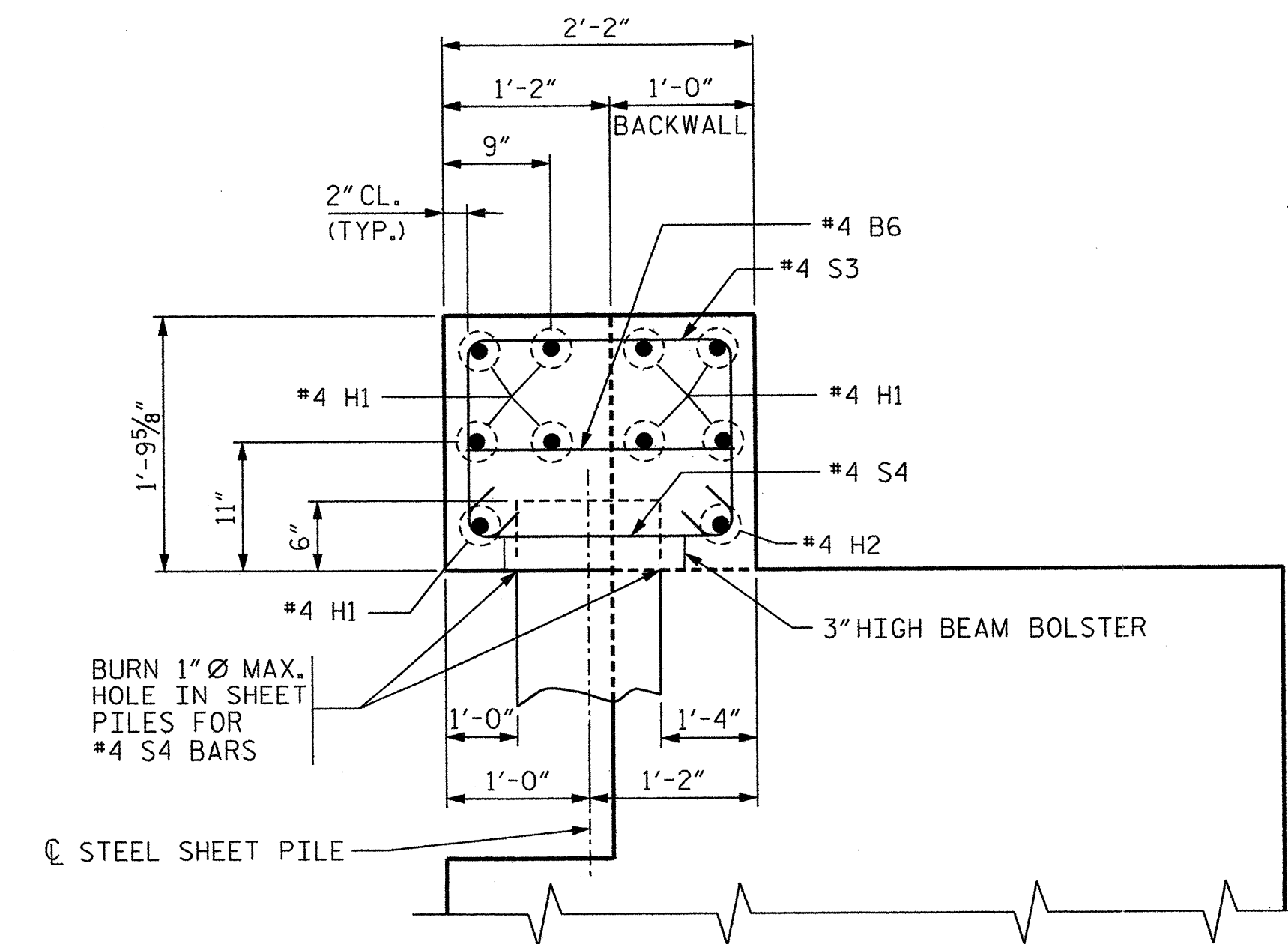
REVISIONS						SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE	S-15	
1			3			TOTAL SHEETS	
2			4			18	



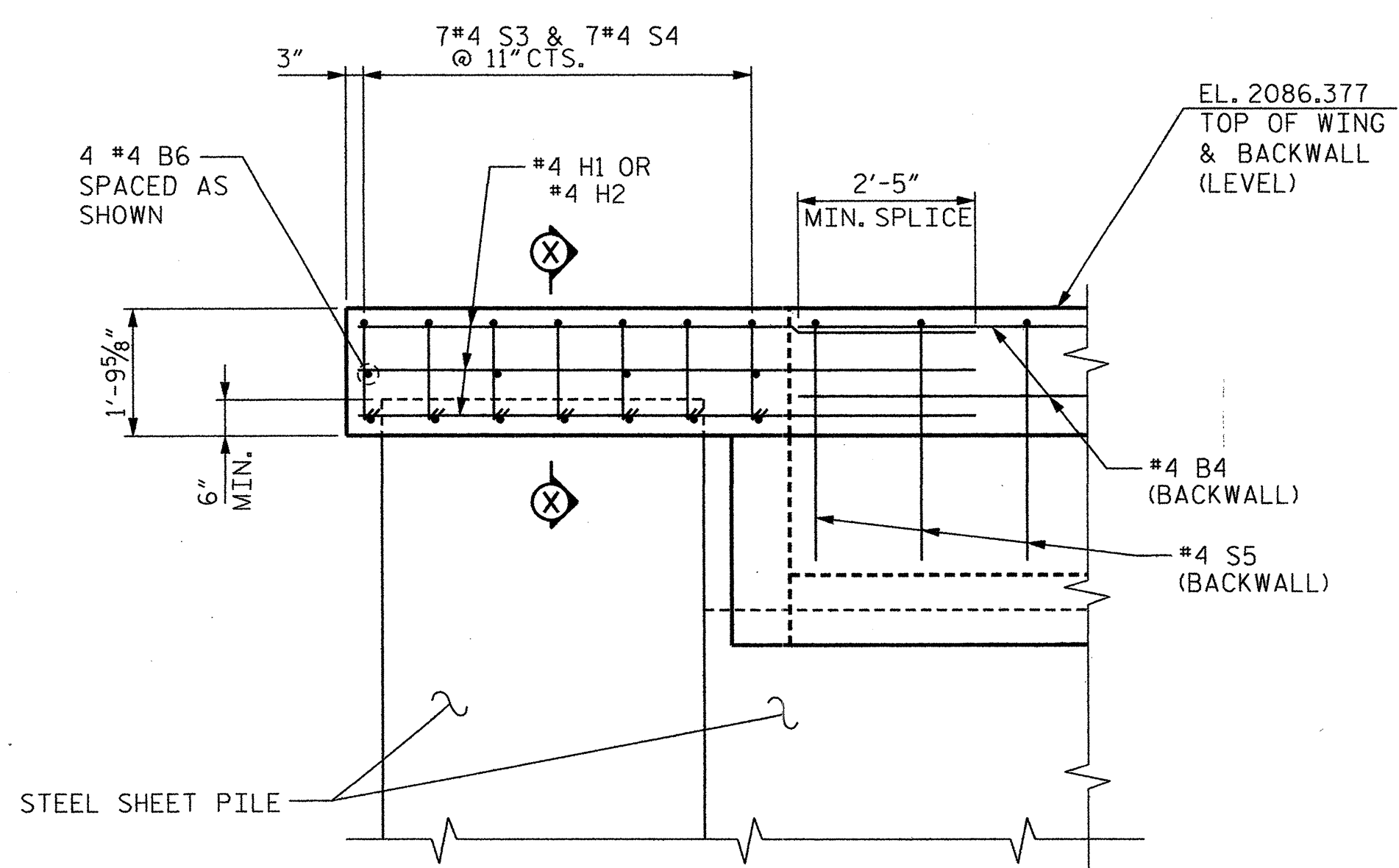
PLAN OF WING W3



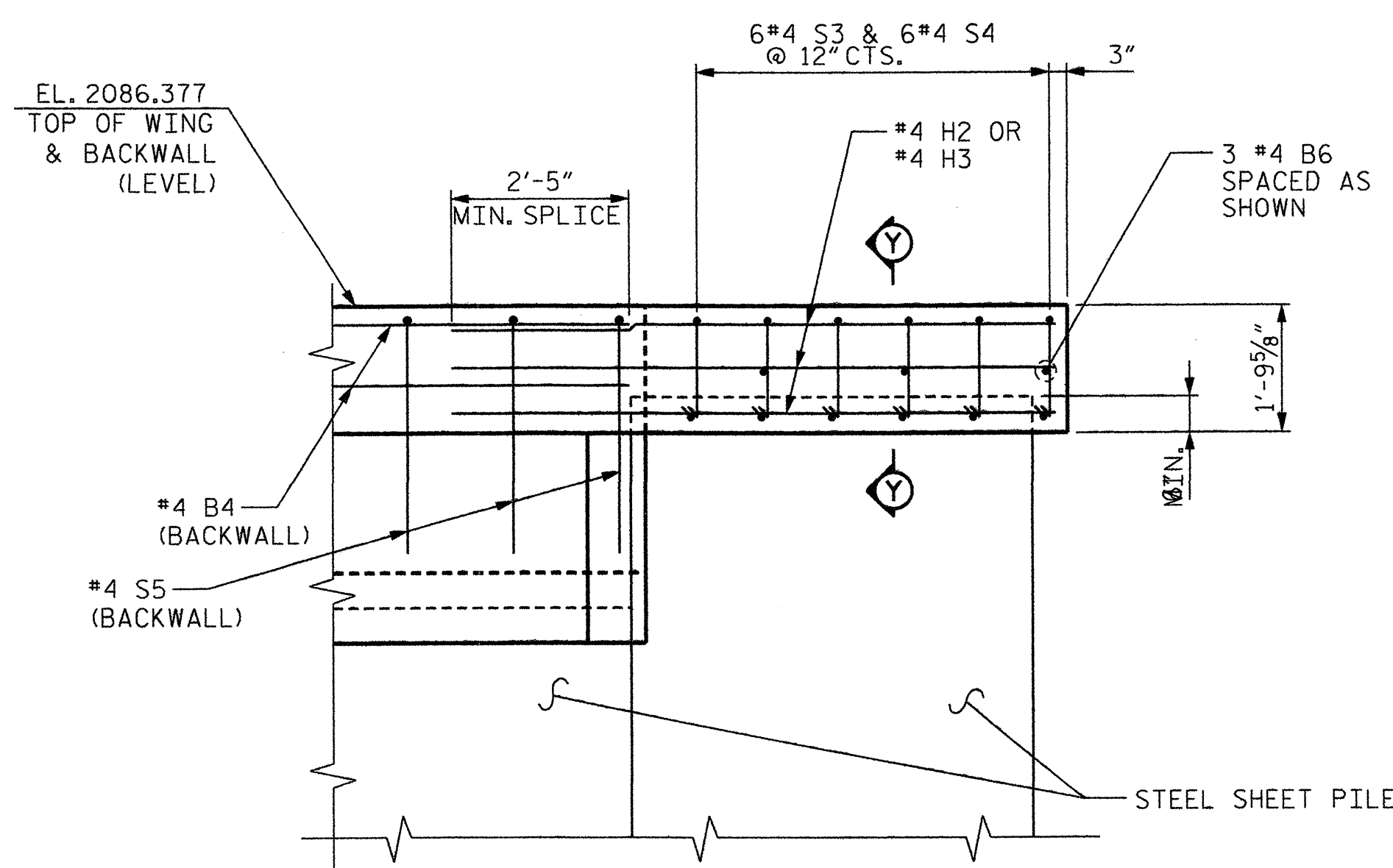
PLAN OF WING W4



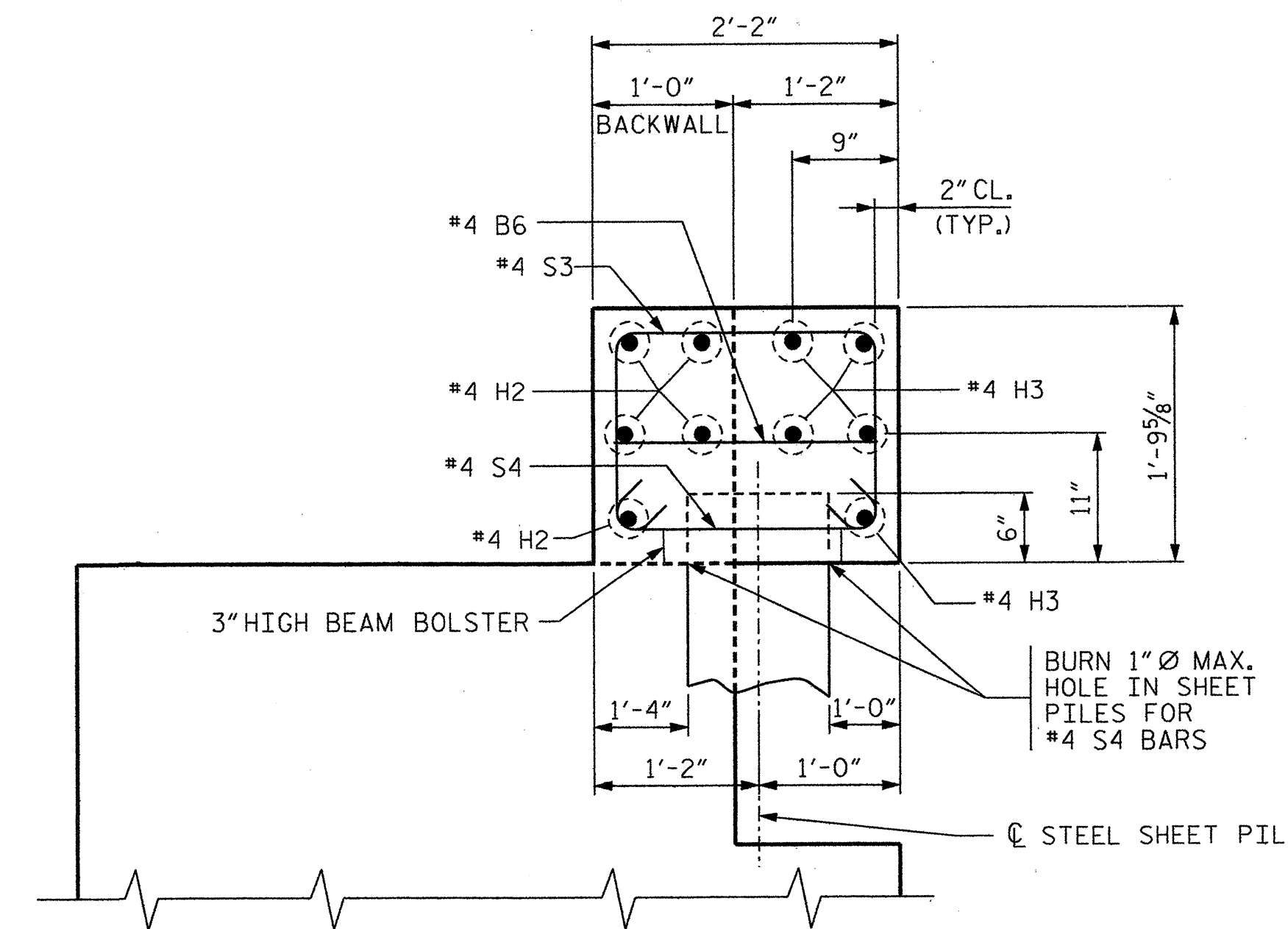
SECTION X-X



ELEVATION OF WING W3

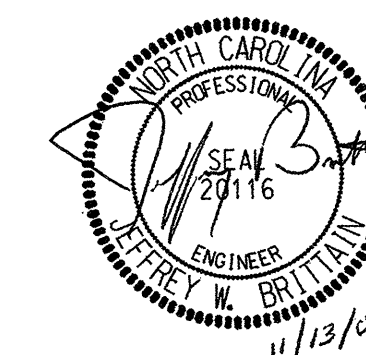


ELEVATION OF WING W4



SECTION Y-Y

PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68.00 -L-  
 REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

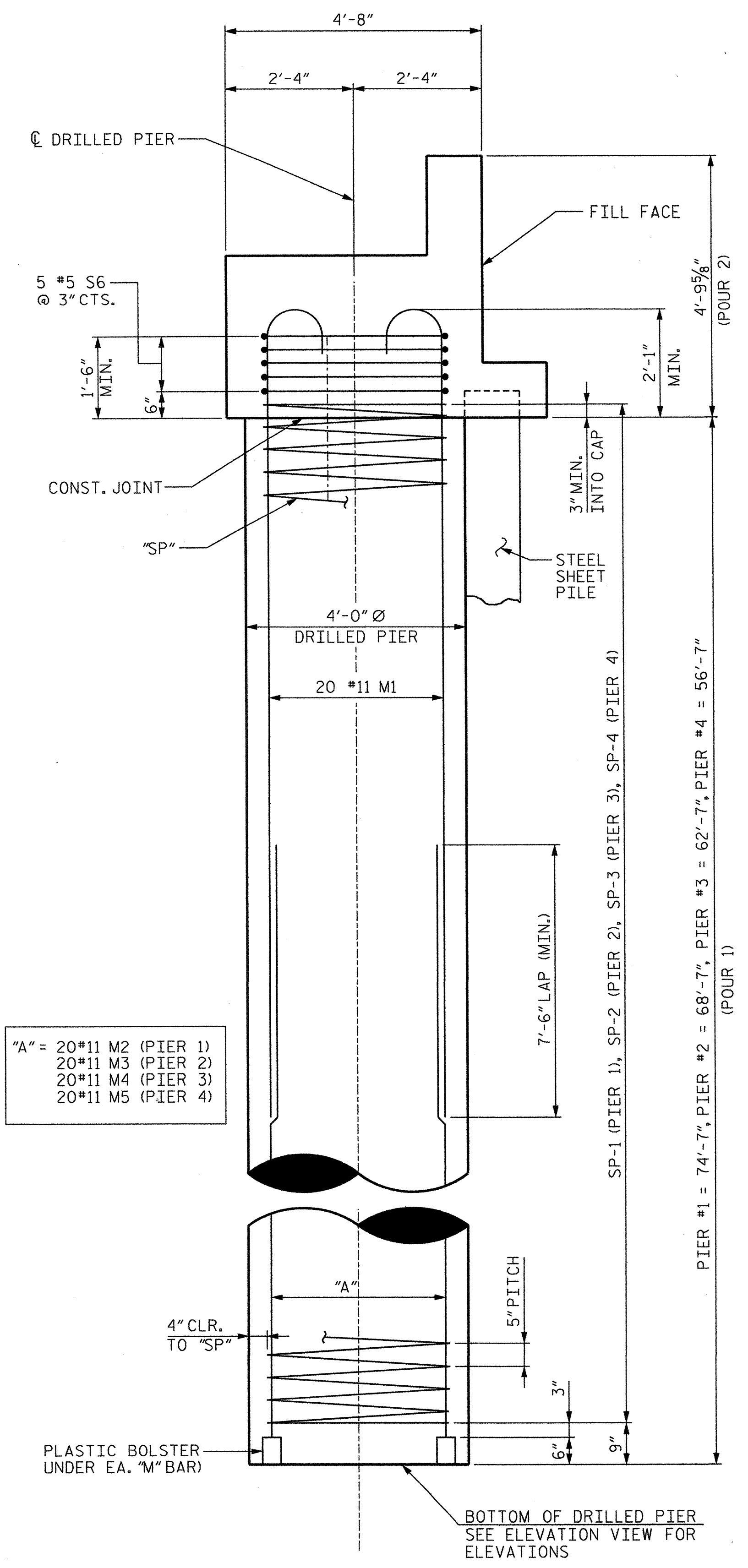
END BENT NO. 2  
 28' CLEAR ROADWAY - 80° SKEW

DRAWN BY: NMW DATE: 5/07  
 CHECKED BY: RTJ DATE: 2/08

PREPARED BY  
 TGS ENGINEERS  
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 MORGANTON, NC 28655

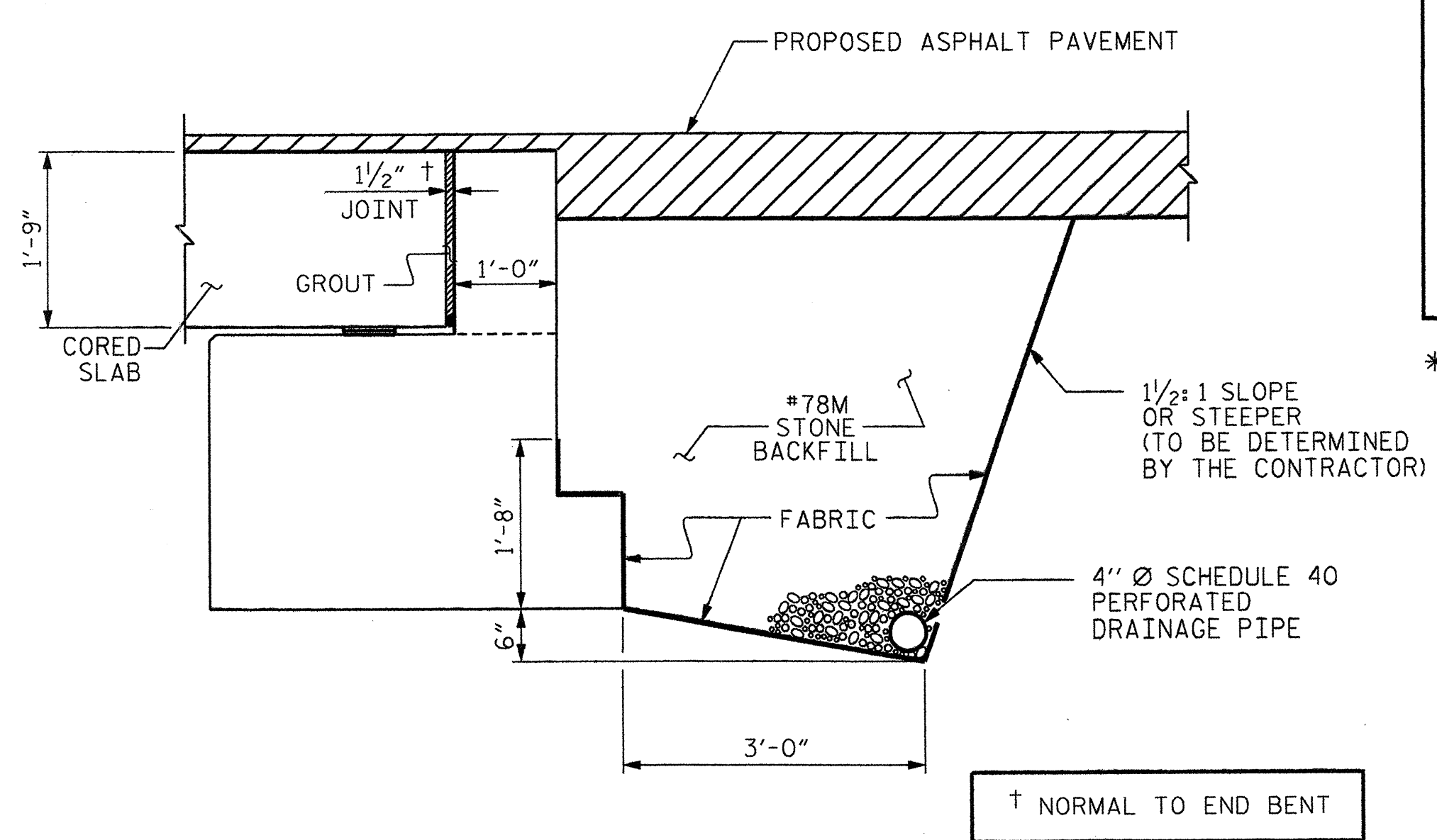
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			18
2			4			





"A" = 20#11 M2 (PIER 1)  
 20#11 M3 (PIER 2)  
 20#11 M4 (PIER 3)  
 20#11 M5 (PIER 4)

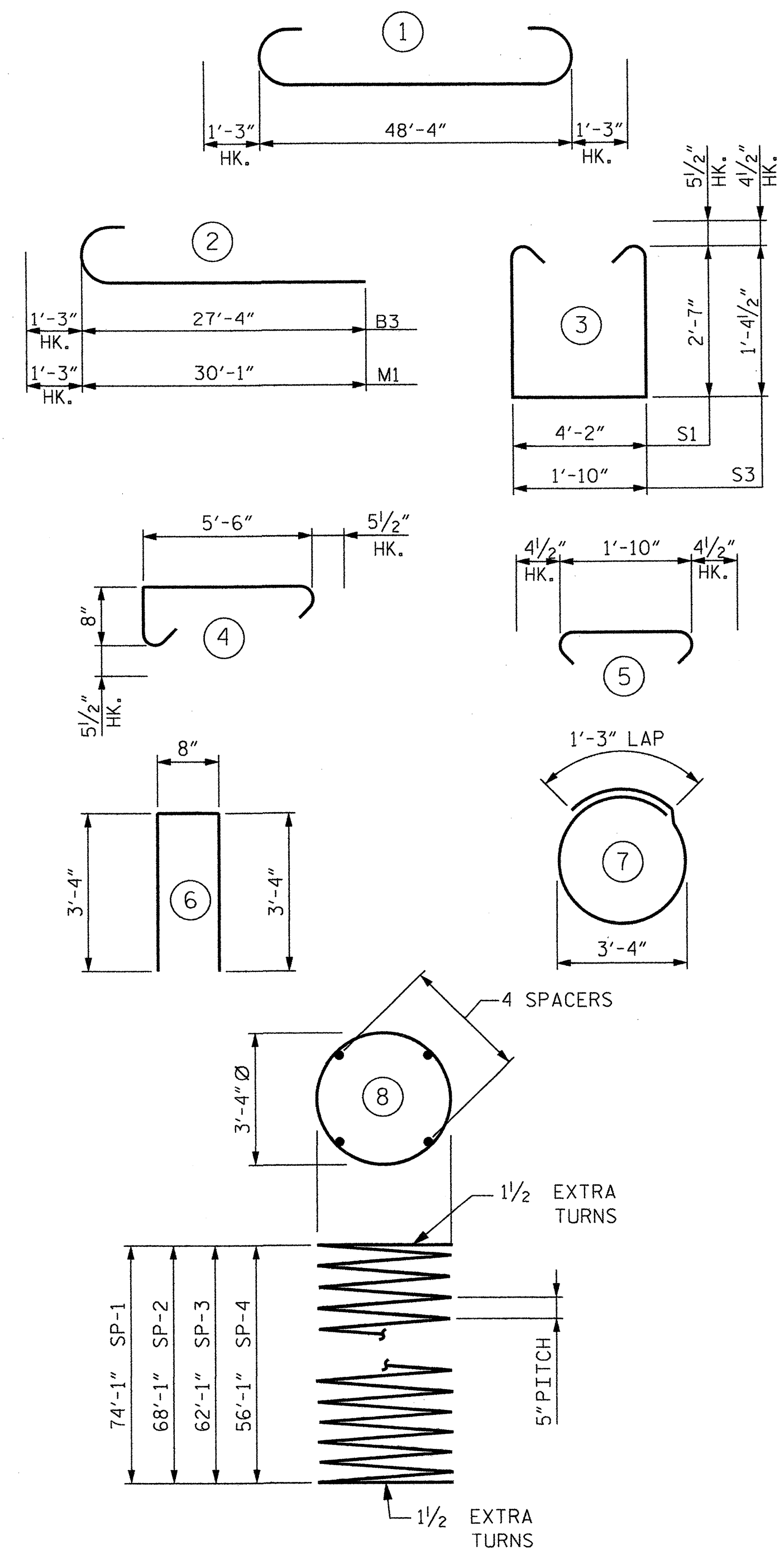
END ELEVATION



PIPE DRAIN DETAIL

BAR TYPES

BAR DIMENSIONS ARE OUT TO OUT.



\*\* THE SP - SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

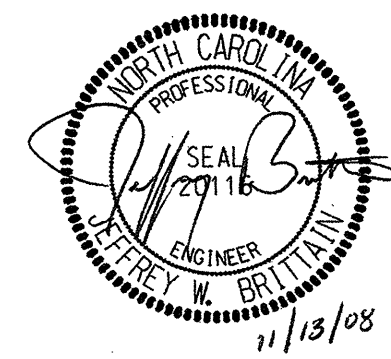
BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	1	50'-10"	1,037
B2	6	#6	STR.	48'-4"	436
B3	12	#9	2	28'-7"	1,166
B4	8	#4	STR.	25'-5"	136
B5	3	#5	STR.	48'-4"	151
B6	7	#4	STR.	1'-10"	9
D1	28	#6	STR.	1'-6"	63
H1	5	#4	STR.	5'-11"	20
H2	10	#4	STR.	8'-10"	59
H3	5	#4	STR.	5'-7"	19
M1	80	#11	2	31'-4"	13,318
M2	20	#11	STR.	56'-7"	6,013
M3	20	#11	STR.	50'-7"	5,375
M4	20	#11	STR.	44'-7"	4,737
M5	20	#11	STR.	38'-7"	4,100
S1	31	#5	3	10'-3"	331
S2	48	#5	4	7'-1"	355
S3	13	#4	3	5'-4"	46
S4	13	#4	5	2'-7"	22
S5	33	#4	6	7'-4"	162
S6	20	#5	7	11'-9"	245
SP-1	1	**	8	1865'-4"	1,946
SP-2	1	**	8	1716'-9"	1,791
SP-3	1	**	8	1568'-2"	1,636
SP-4	1	**	8	1419'-7"	1,481

TOTAL REINFORCING STEEL =	37,800 LBS.
TOTAL SPIRAL REIN. STEEL =	6,854 LBS.
CLASS A CONCRETE	
POUR 2 (CAP)	27.4 C.Y.
POUR 3 (BACKWALL & WINGS)	5.0 C.Y.
TOTAL	32.4 C.Y.
DRILLED PIER QUANTITIES	
CLASS A CONCRETE (POUR 1)	122.0 C.Y.
4'-0" DRILLED PIER IN SOIL	258.3 L.F.
4'-0" DRILLED PIER NOT IN SOIL	4.0 L.F.
CROSSHOLE SONIC LOGGING	4 EA.
CSL TUBES	1,089 L.F.
SID INSPECTION	4 EA.
12" STEEL SHEET PILES	4,100 S.F.

PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68.00 -L-  
 REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 END BENT 2  
 28' CLEAR ROADWAY - 80° SKEW

DRAWN BY: NMW DATE: 5/07  
 CHECKED BY: RTJ DATE: 2/08

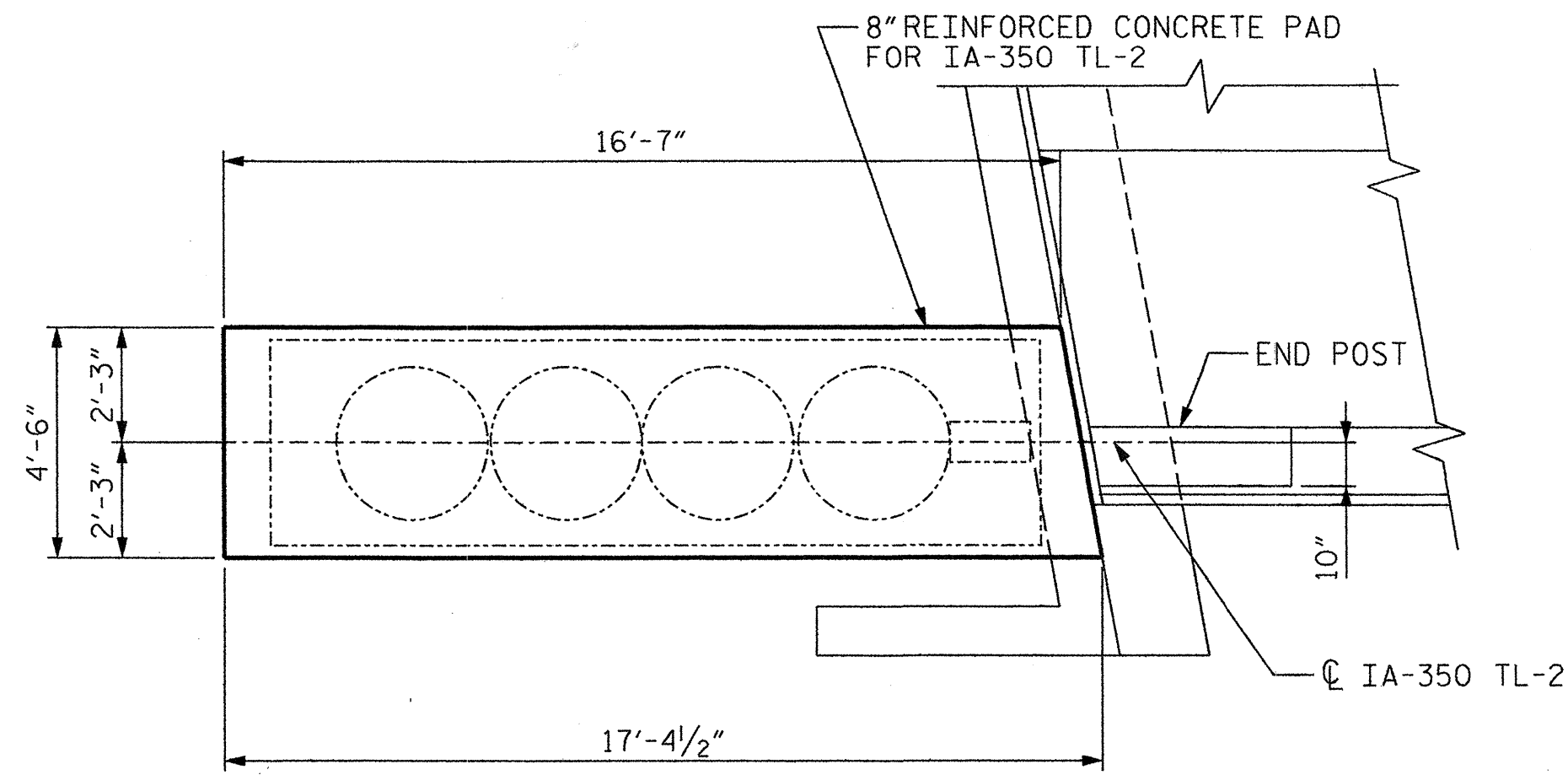
PREPARED BY  
 TGS ENGINEERS  
 107-A WICA AVENUE  
 MORCANTON, NC 28655

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

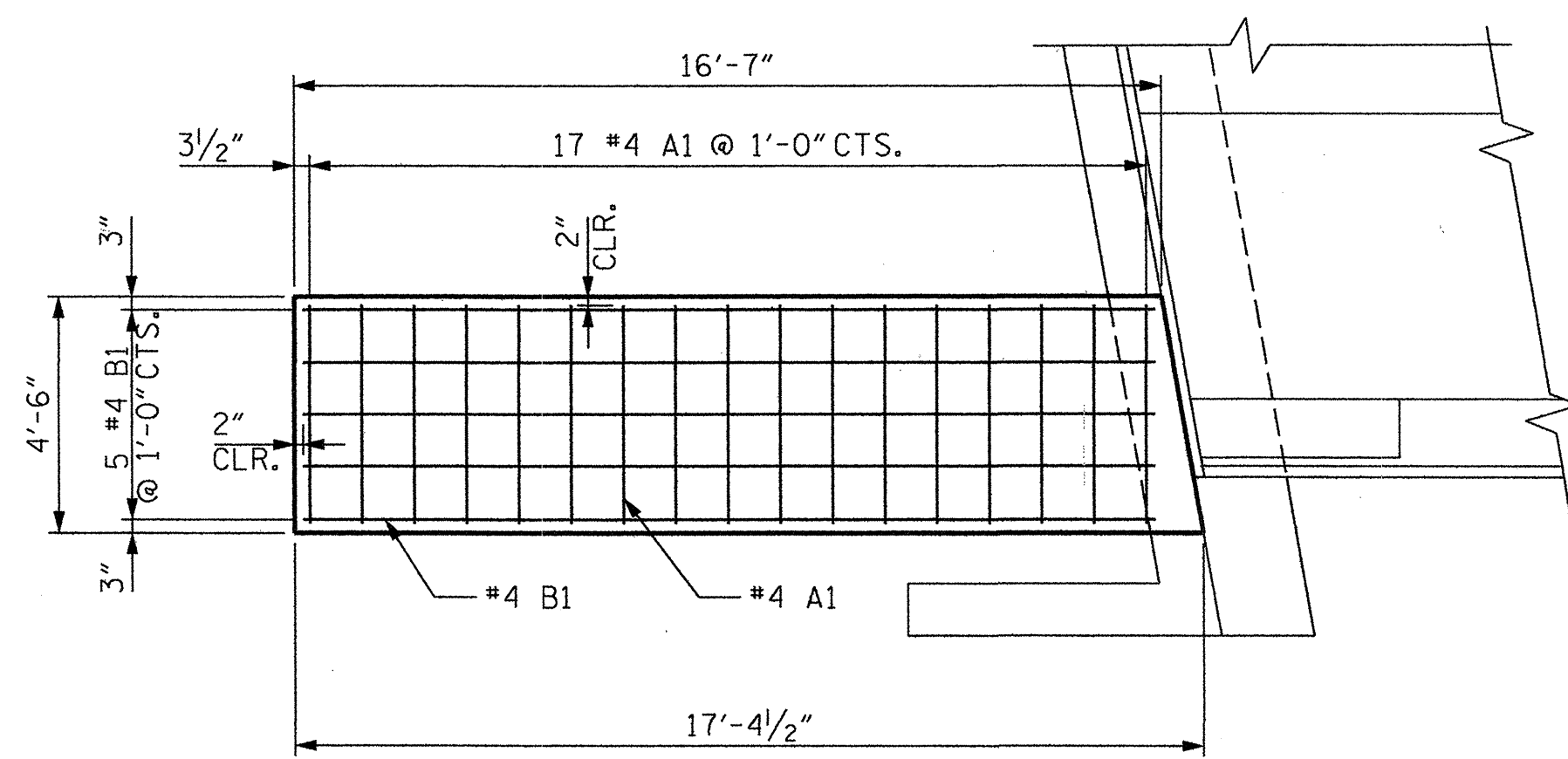
TOTAL SHEETS: 18

BILL OF MATERIAL					
FOR CONCRETE PAD					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	17	#4	STR	4'-2"	47
*B1	5	#4	STR	16'-3"	54
*EPOXY COATED REINFORCING STEEL					101 LBS.
CLASS AA CONCRETE BREAKDOWN					
POUR 1 (SLAB)					1.9 C.Y.
TOTAL CLASS AA CONCRETE					1.9 C.Y.

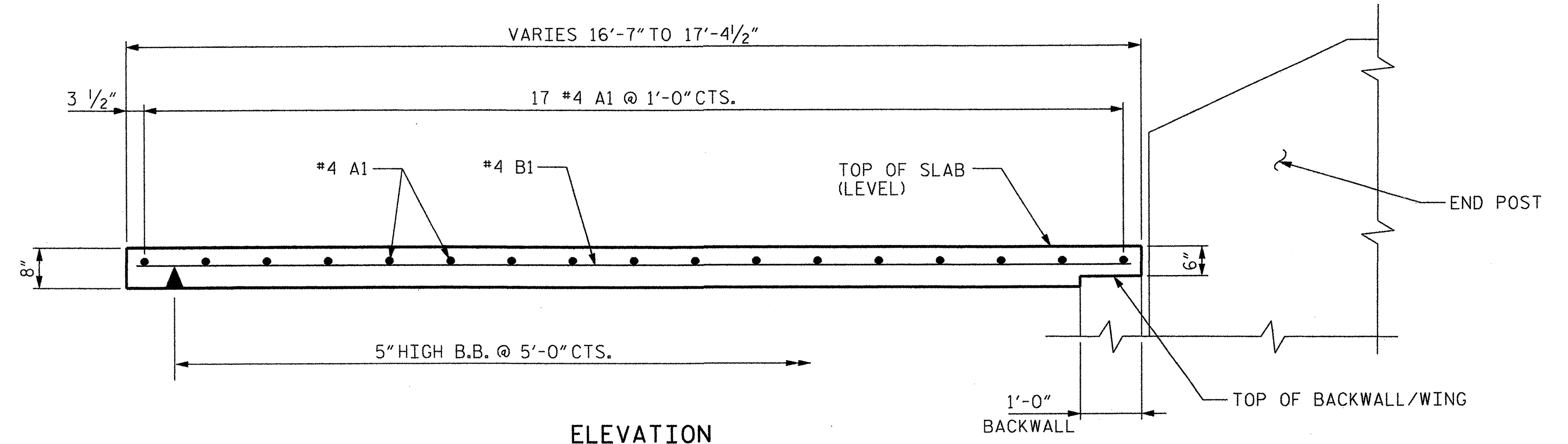
**NOTE:**  
 ANCHORAGE FOR IA-350 TL-2 NOT SHOWN.  
 CONTRACTOR SHALL PROVIDE ANCHORAGE IN  
 ACCORDANCE WITH THE MANUFACTURE'S STANDARDS.



PLAN OF IA-350 TL-2 PAD AT END BENT 1 - RIGHT SIDE

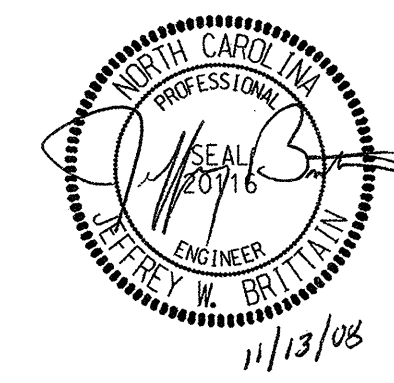


PLAN OF CONCRETE PAD FOR IA-350 TL-2



ELEVATION

PROJECT NO. B-5180  
 COUNTY: HENDERSON  
 STATION: 13+68.00-L-  
 REPLACES BRIDGE NO. 205



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

IA-350 TL-2 PAD  
 28'-0" CLEAR ROADWAY  
 80° SKEW

DRAWN BY: NMW DATE: 2/08  
 CHECKED BY: RTJ DATE: 2/08

PREPARED BY  
 TGS ENGINEERS  
 107-A MICA AVENUE  
 MORGANTON, NC 28655

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

SHEET NO.  
**S-18**  
 TOTAL SHEETS  
 18



## 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 2006 "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