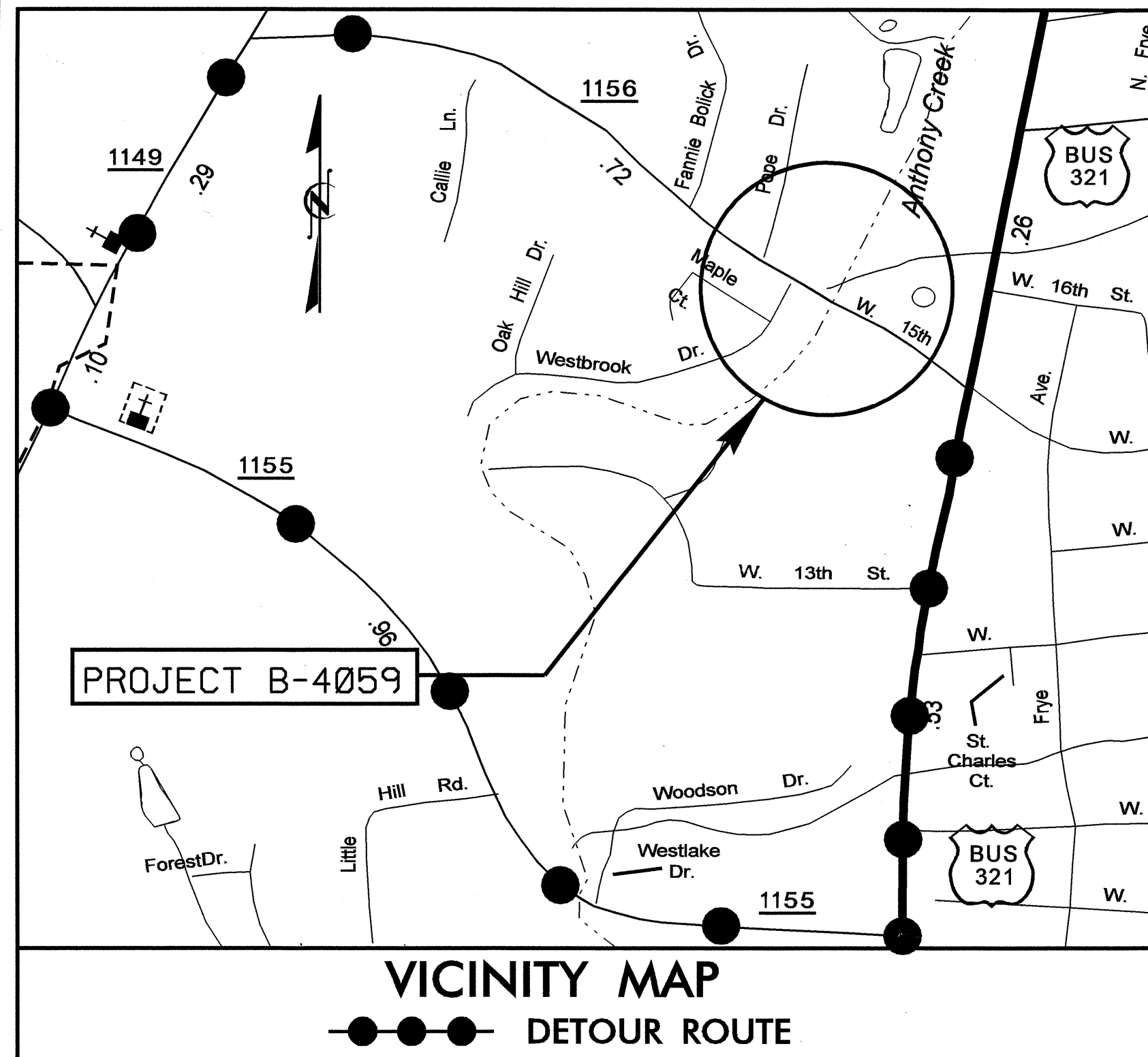


**CONTRACT: C201836 TIP PROJECT: B-4059**



NEAREST SHIPPING POINT: NEWTON ON SOUTHERN RR  
APPROX. 1.0 MILES FROM PROJECT

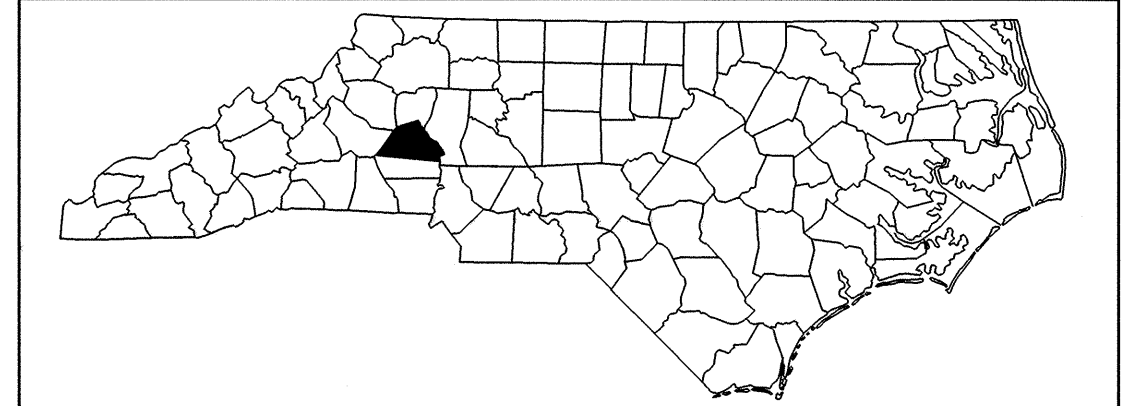
# STRUCTURE

## STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS **CATAWBA COUNTY**

**LOCATION: BRIDGE NO. 79 OVER HILDEBRAN CREEK  
ON SR 1156 IN NEWTON**

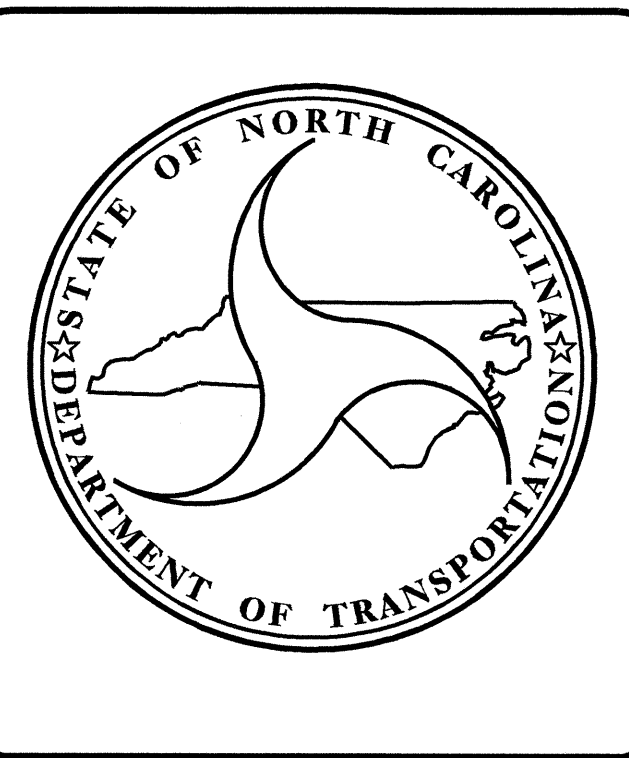
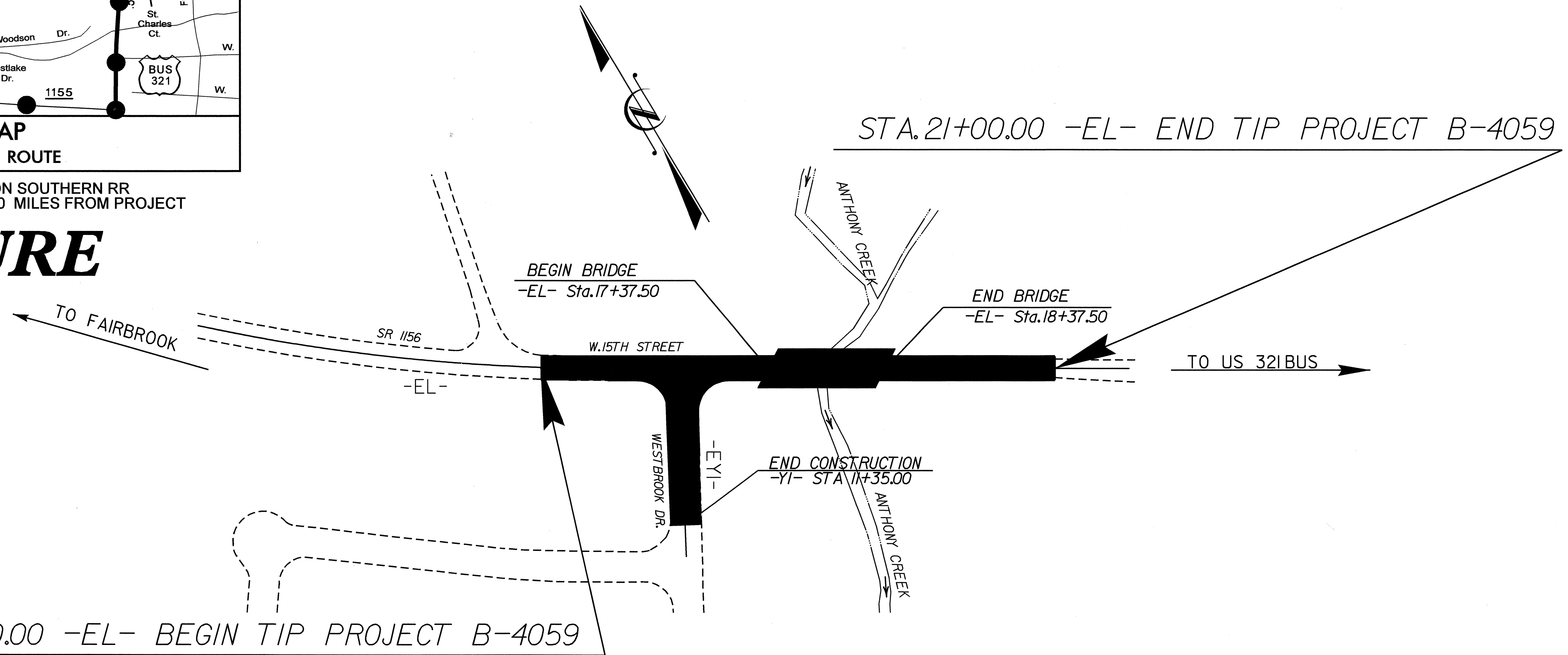
**TYPE OF WORK : GRADING, DRAINAGE, STRUCTURE, AND PAVING**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4059		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33423.1.1	BRZ-1156(2)	PE	
33423.2.1	BRZ-1156(2)	RW & UTIL	
33423.3.1	BRZ-1156(2)	CONSTRUCTION	



STA. 14+70.00 -EL- BEGIN TIP PROJECT B-4059

STA. 21+00.00 -EL- END TIP PROJECT B-4059



DESIGN DATA	
ADT 2006 =	2700
ADT 2025 =	3800
DHV =	12 %
D =	60 %
T =	4 % *
V =	40 MPH
* TTST 1%	DUAL 3%

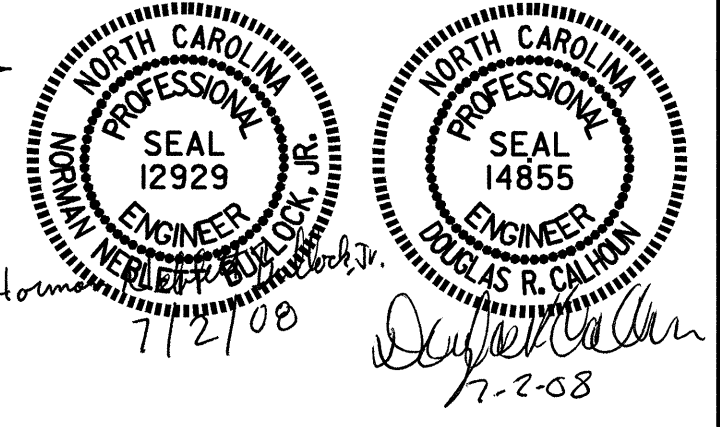
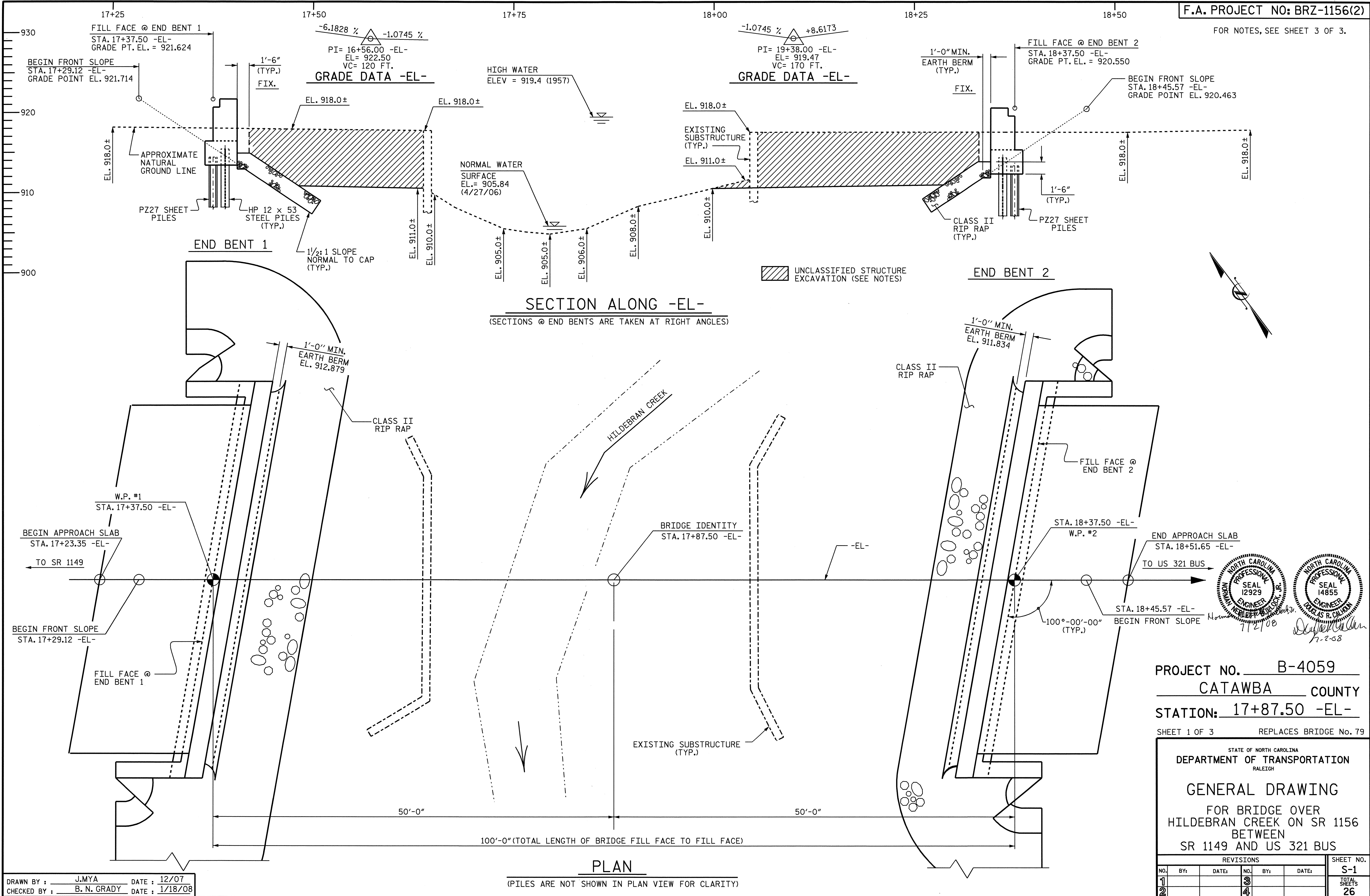
PROJECT LENGTH
LENGTH OF ROADWAY TIP PROJECT B-4059 = 0.100 MI.
LENGTH OF STRUCTURE TIP PROJECT B-4059 = 0.019 MI.
TOTAL LENGTH OF TIP PROJECT B-4059 = 0.119 MI.

Prepared in the Office of: <b>DIVISION OF HIGHWAYS</b> 1000 BIRCH RIDGE DR. RALEIGH, NC 27610	
2006 STANDARD SPECIFICATIONS	
<b>LETTING DATE:</b> AUGUST 19, 2008	<b>N. N. BULLOCK, PE</b> PROJECT ENGINEER
	<b>D. R. CALHOUN, PE</b> PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA	
	P.E.
STATE DESIGN ENGINEER	
DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION	
APPROVED DIVISION ADMINISTRATOR	DATE

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PROJECT NO. B-4059  
 COUNTY CATAWBA  
 STATION: 17+87.50 -EL-

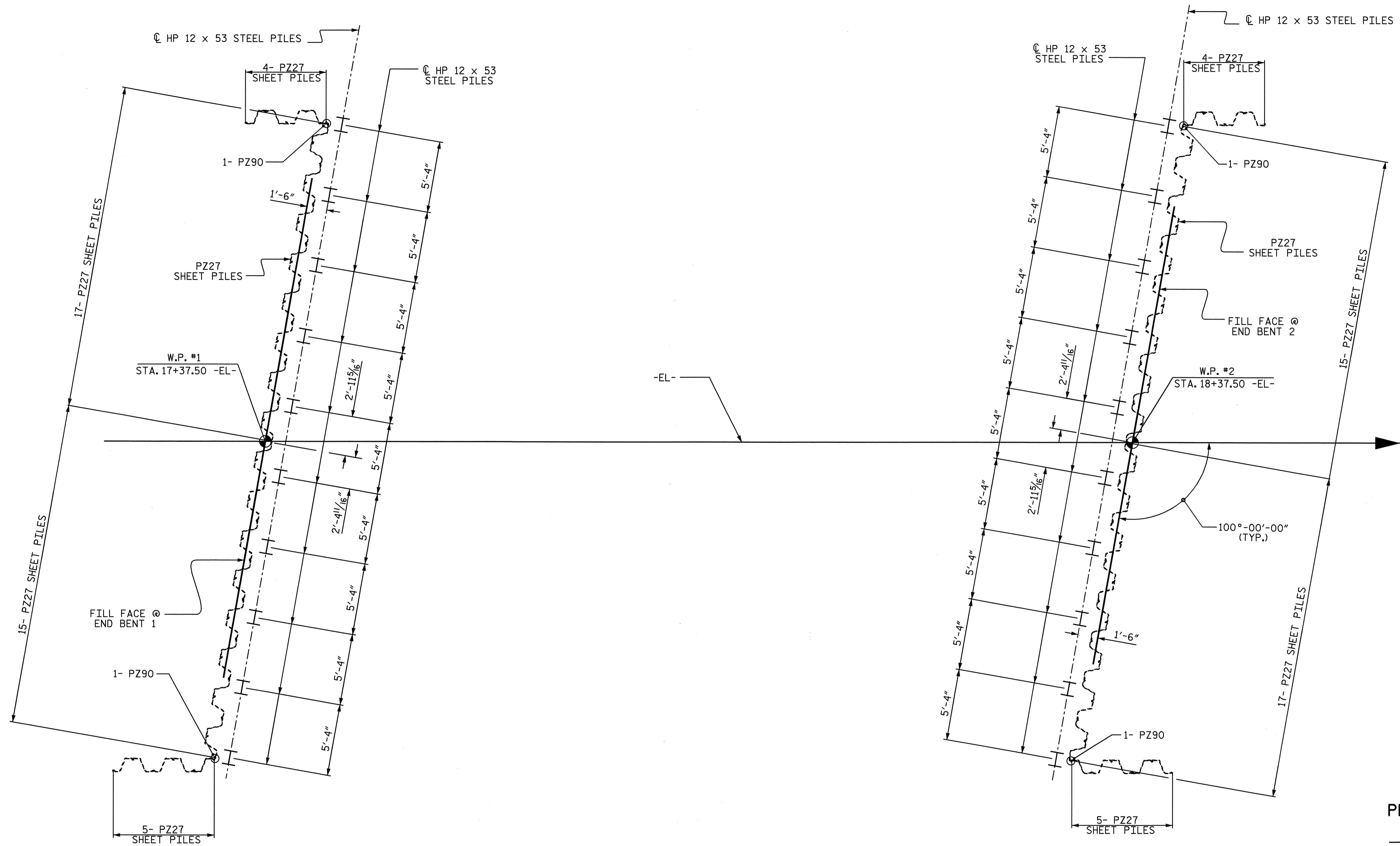
SHEET 1 OF 3 REPLACES BRIDGE No. 79

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE OVER  
 HILDEBRAN CREEK ON SR 1156  
 BETWEEN  
 SR 1149 AND US 321 BUS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: J.MYA DATE: 12/07  
 CHECKED BY: B. N. GRADY DATE: 1/18/08



### FOUNDATION LAYOUT

(DIMENSIONS LOCATING END BENT PILES ARE SHOWN TO CENTERLINE OF PILES )  
 ( SHEET PILES ARE CENTERED ON THE FILL FACE OF END BENTS )

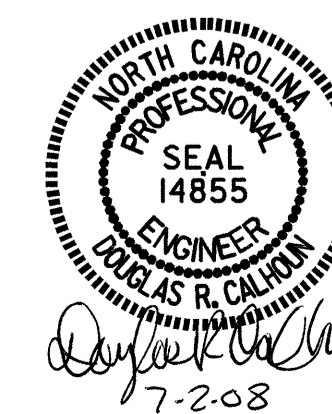
#### FOUNDATION NOTES:

- THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT 1 & 2 IS 60 TONS PER PILE.
- DRIVE PILES AT END BENT 1 & 2 TO A REQUIRED BEARING CAPACITY OF 120 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.
- THE SCOUR CRITICAL ELEVATION FOR END BENT 1 & 2 IS ELEVATION 901 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE OVER  
 HILDEBRAN CREEK ON SR 1156  
 BETWEEN  
 SR 1149 AND US 321 BUS



DRAWN BY : J. MYA DATE : 12/07  
 CHECKED BY : B. N. GRADY DATE : 1/22/08

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			26



TOTAL BILL OF MATERIAL															
	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES	18" STEEL SHEET PILES	THREE BAR METAL RAIL	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	EVAZOTE JOINT SEALS	
	LUMP SUM	CU. YDS.	SQ. FEET	SQ. FEET	CU. YDS.	LUMP SUM	LBS.	APPROX. LBS.	NO.	LIN. FT.	SQ. FT.	LIN.FT.	TONS	SQ. YDS.	LIN.FT.
SUPERSTRUCTURE			4358	3316		LUMP SUM		130,400			181.22				LUMP SUM
END BENT 1		331			27.0		3810		10	300	934		120	134	
END BENT 2		418			27.0		3813		10	200	868		87	97	
TOTAL	LUMP SUM	749	4358	3316	54.0	LUMP SUM	7623	130,400	20	500	1802	181.22	207	231	LUMP SUM

**NOTES**

ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING, EXCEPT THAT THE GIRDERS HAVE BEEN DESIGNED FOR HS 25.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.  
 THIS BRIDGE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD AS SPECIFIED IN AASHTO STANDARD SPECIFICATIONS.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES FOR SEISMIC PERFORMANCE CATEGORY A.  
 ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W.  
 REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.  
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, 'EVALUATING SCOUR AT BRIDGES', MAY, 2001.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

THE EXISTING SINGLE SPAN (40'-8" LENGTH) STRUCTURE, CONSISTING OF TIMBER DECK ON STEEL I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 19'-8" ON TIMBER CAP AND PILE END BENTS WITH TIMBER BULKHEADS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

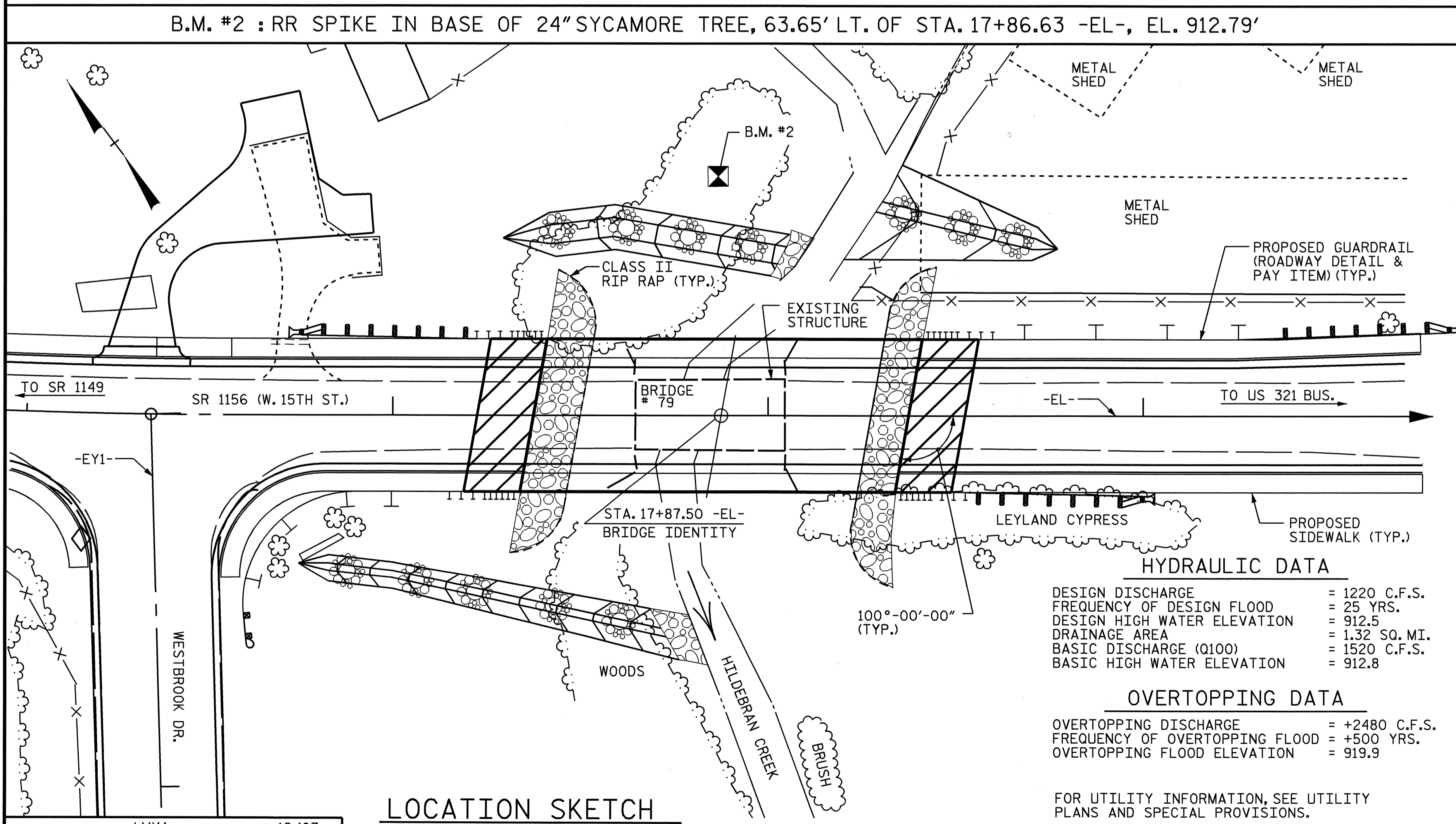
THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED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

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER CUBIC YARD FOR UNCLASSIFIED STRUCTURE EXCAVATION.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE @ STA. 17+87.50 -EL-."

- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT TEMPORARY BRACING WILL BE REQUIRED BETWEEN THE ENDS OF THE GIRDERS WHILE THE DECK IS BEING POURED TO PREVENT ROTATION OF THE GIRDER ENDS.
- FOR STEEL SHEET PILING SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



**HYDRAULIC DATA**

DESIGN DISCHARGE	= 1220 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 912.5
DRAINAGE AREA	= 1.32 SQ. MI.
BASIC DISCHARGE (Q100)	= 1520 C.F.S.
BASIC HIGH WATER ELEVATION	= 912.8

**OVERTOPPING DATA**

OVERTOPPING DISCHARGE	= +2480 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= +500 YRS.
OVERTOPPING FLOOD ELEVATION	= 919.9

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

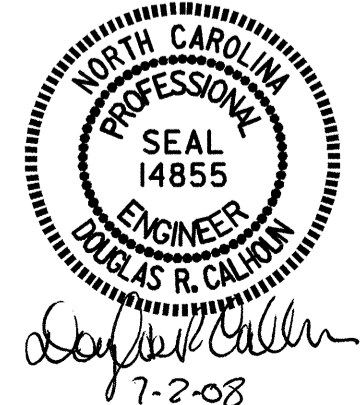
PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

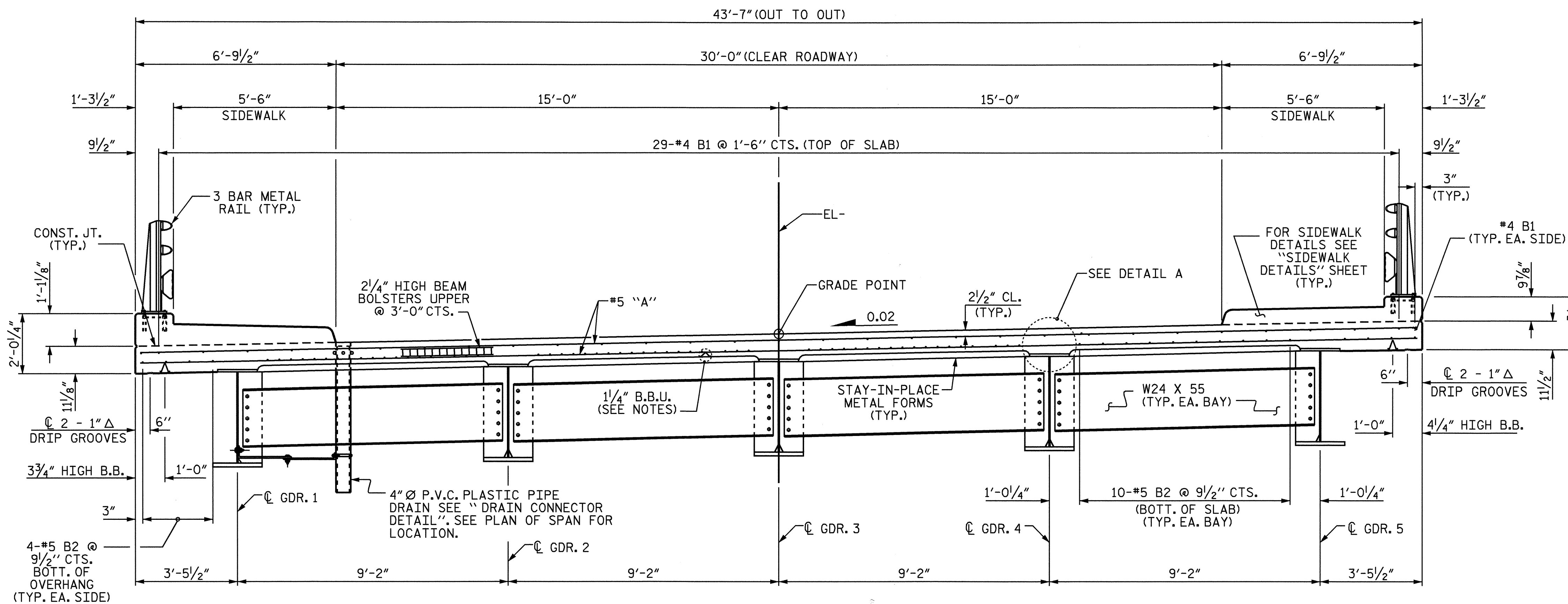
**GENERAL DRAWING**  
 FOR BRIDGE OVER  
 HILDEBRAN CREEK ON SR 1156  
 BETWEEN  
 SR 1149 AND US 321 BUS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			26



DRAWN BY : J.MYA DATE : 12/07  
 CHECKED BY : B. N. GRADY DATE : 2/11/08





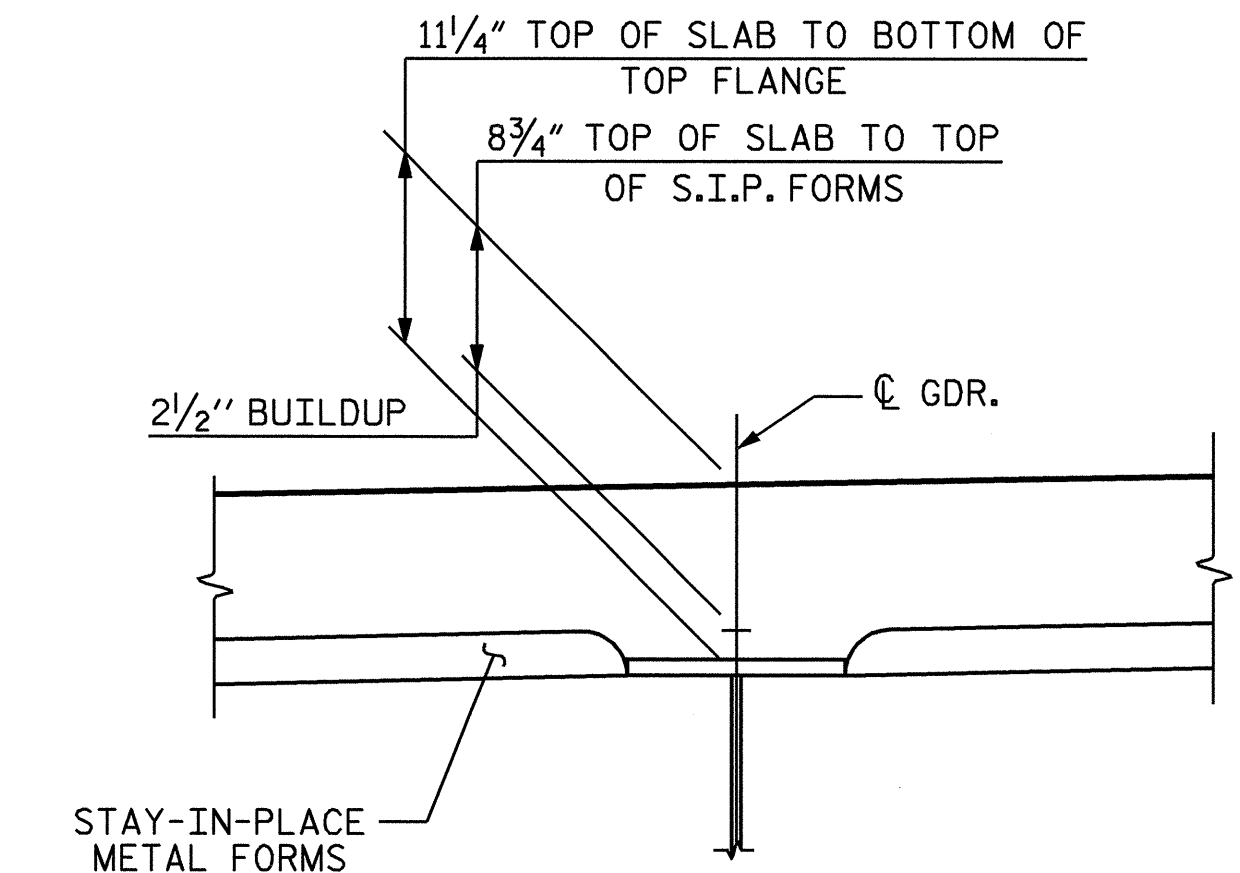
TYPICAL SECTION @ INTERMEDIATE DIAPHRAGMS

NOTES

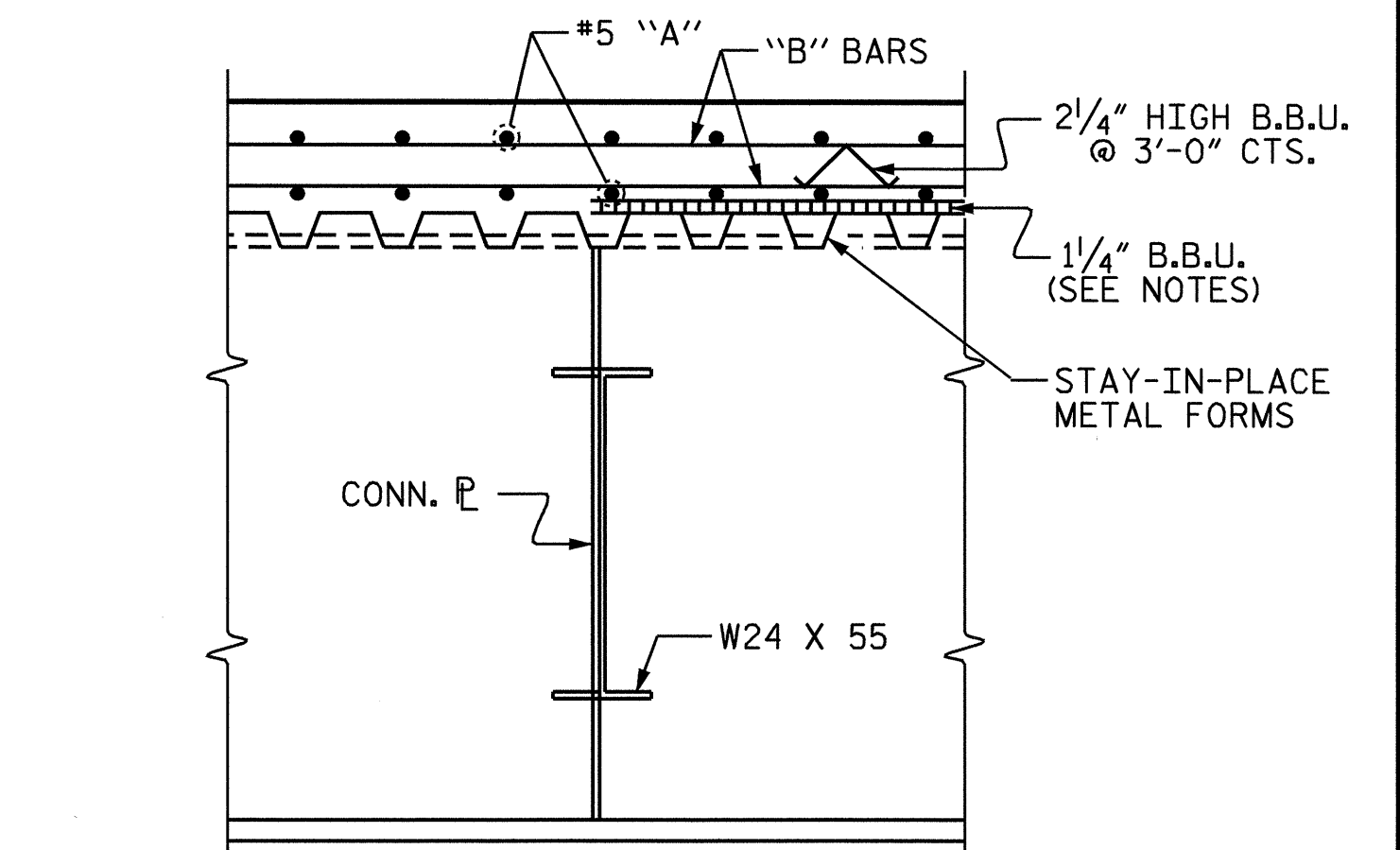
PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2"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

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

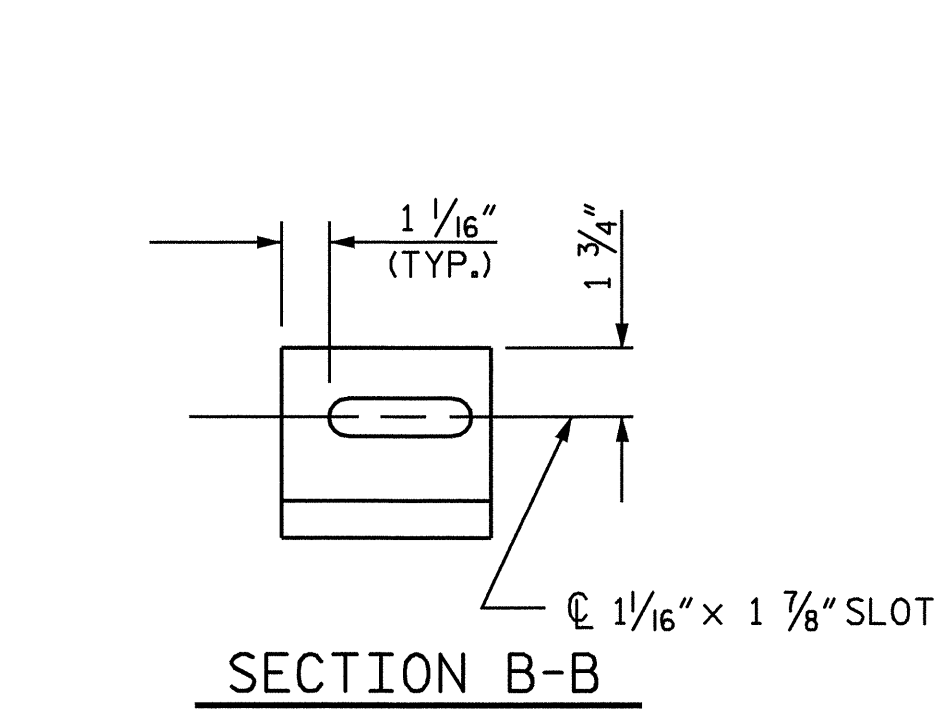
PREVIOUSLY CAST CONCRETE IN THE SLAB SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE SLAB.



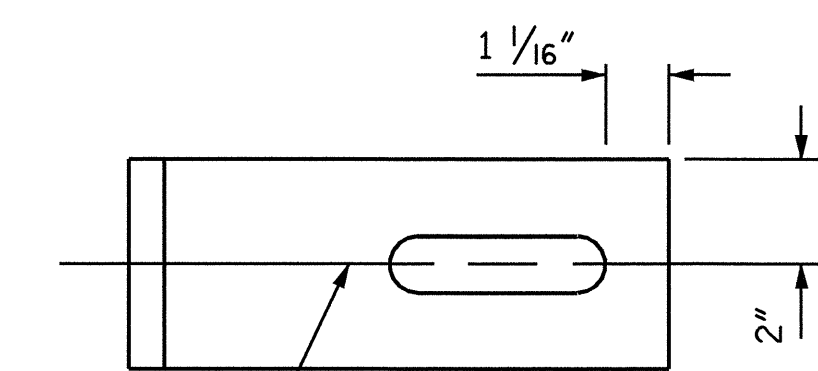
DETAIL A



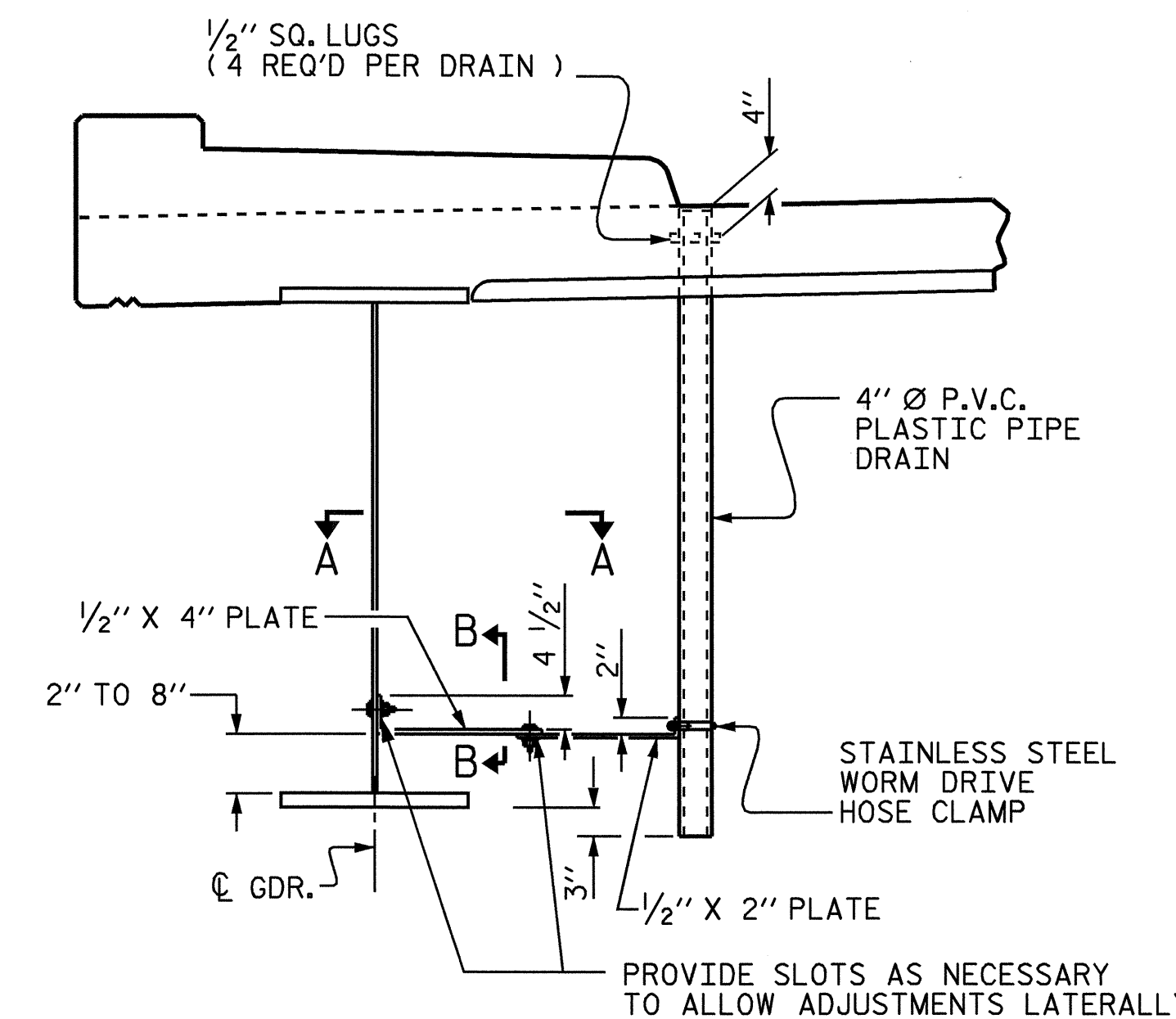
SECTION THRU INTERMEDIATE DIAPHRAGM



SECTION B-B



SECTION A-A



DRAIN CONNECTOR DETAIL

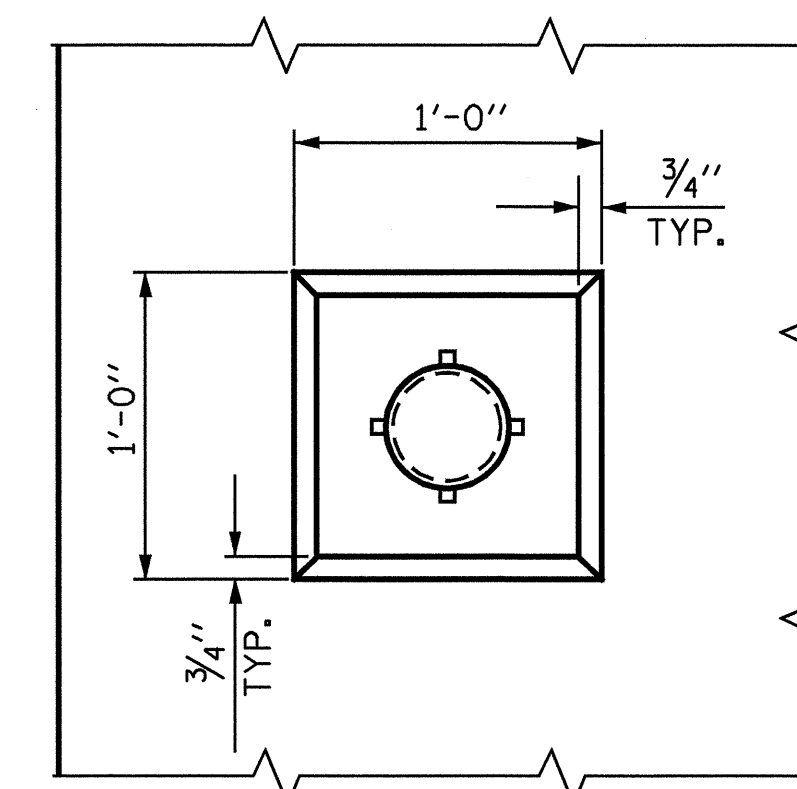
COUPLING IN DRAIN PIPE WILL BE PERMITTED AS APPROVED BY THE ENGINEER.

TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.

4 - 1/2" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

BOLT SIZE TO BE SAME AS DIAPHRAGM AND CROSSFRAME CONNECTIONS. STAINLESS STEEL WORM DRIVE HOSE CLAMP SHALL BE COMMERCIAL QUALITY.

THE 4" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.



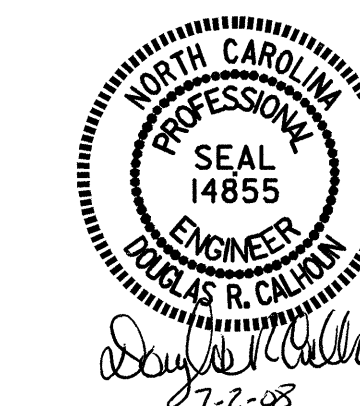
PLAN OF RECESS

PROJECT NO. B-4059  
 CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 1 OF 2

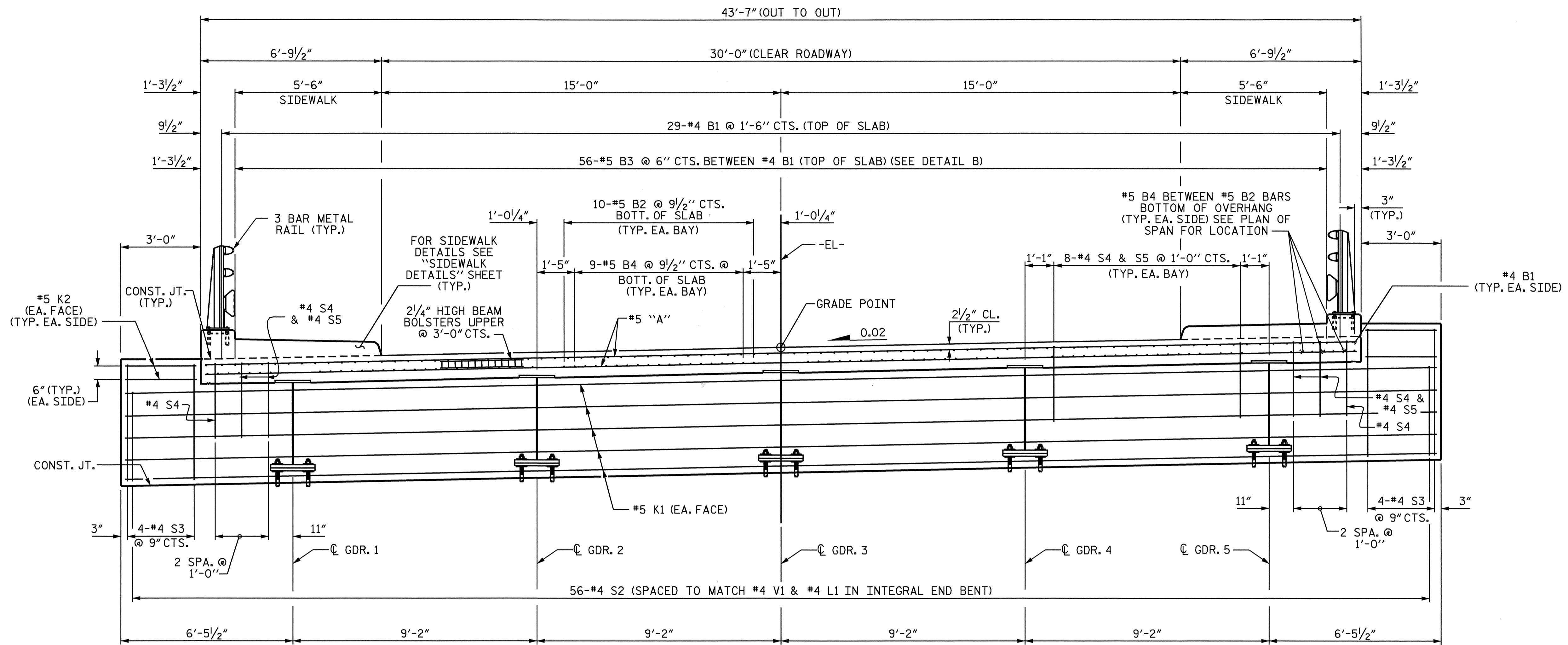
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 TYPICAL SECTION

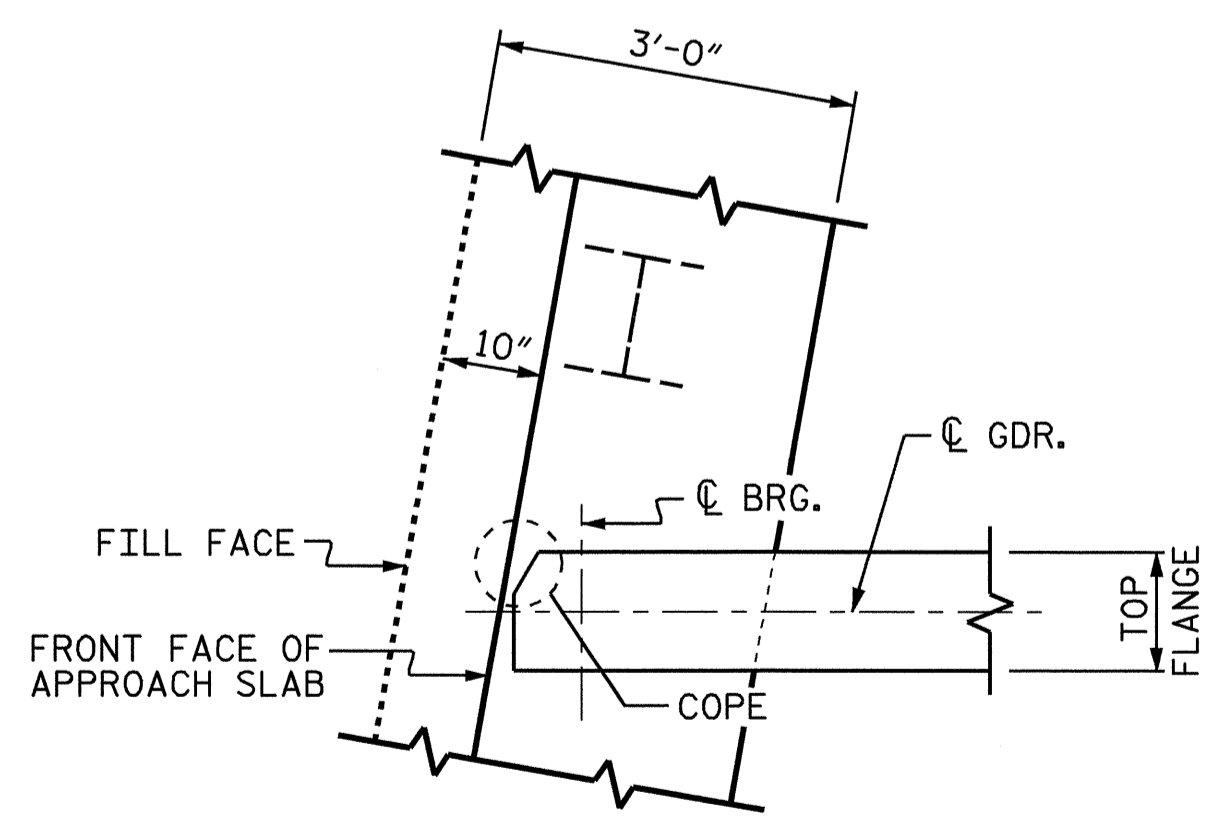


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4	
1			3			TOTAL SHEETS	
2			4			26	

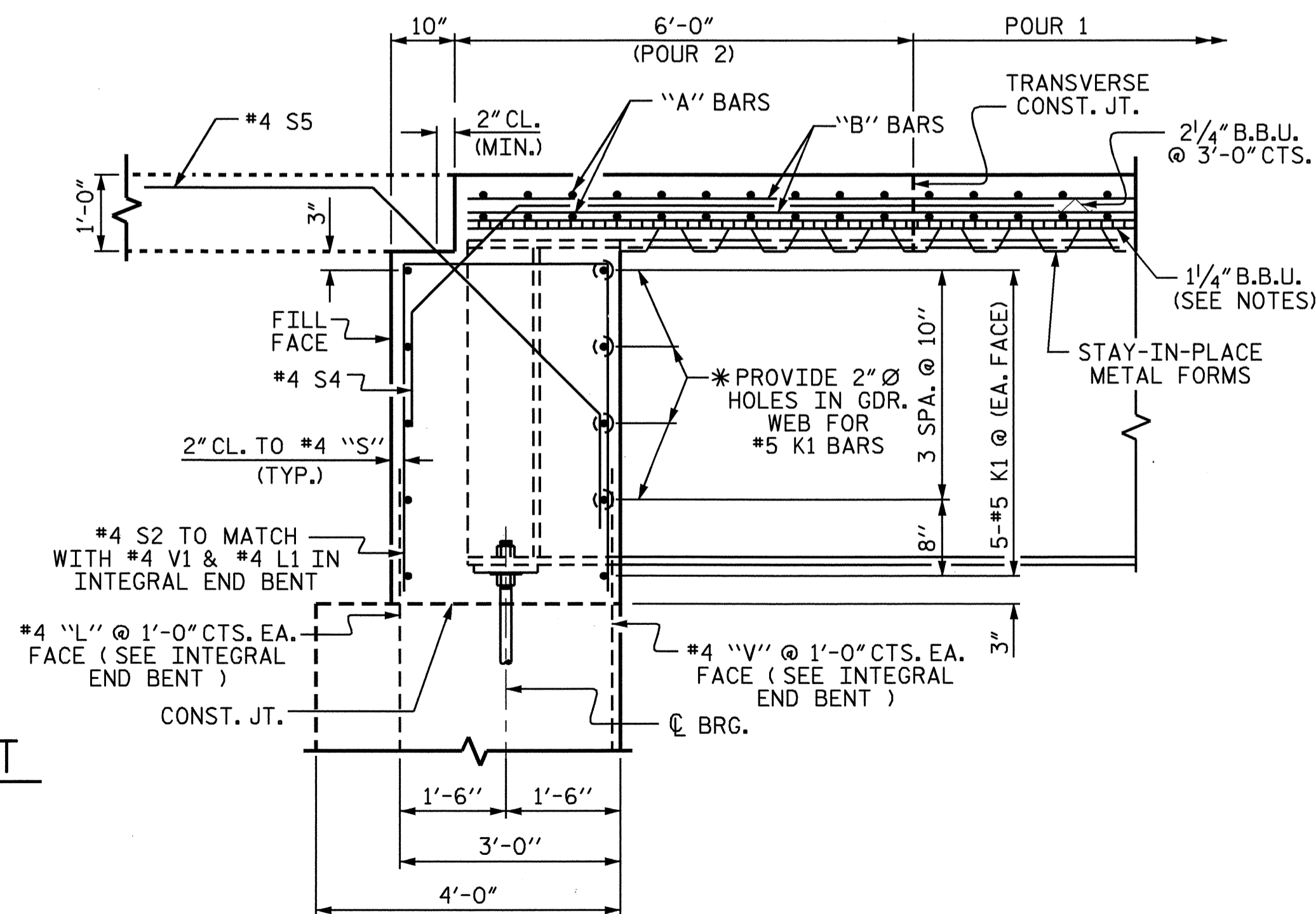
DRAWN BY: J. MYA DATE: 11/07  
 CHECKED BY: B. N. GRADY DATE: 2/4/08



TYPICAL SECTION @ INTEGRAL END BENT

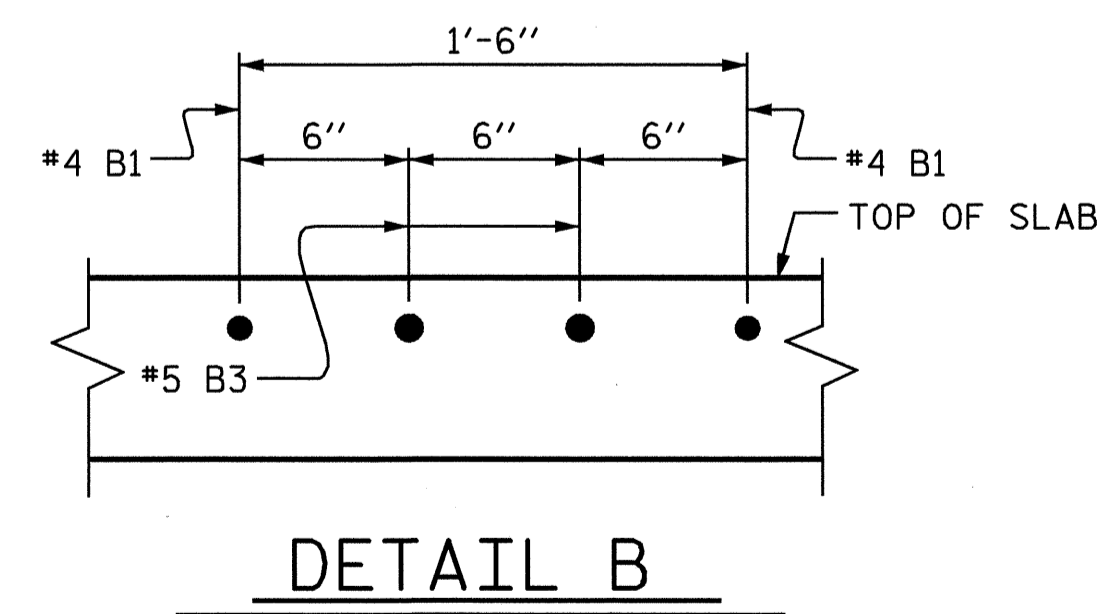


PLAN OF GIRDER AT INTEGRAL END BENT



SECTION A-A

\* DIAMETER OF HOLES IN WEB MAY BE INCREASED TO ACCOMMODATE SKEW



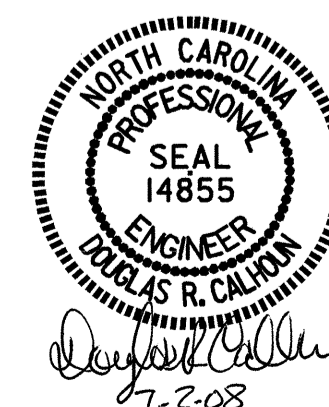
DETAIL B

PROJECT NO. B-4059  
 CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 TYPICAL SECTION

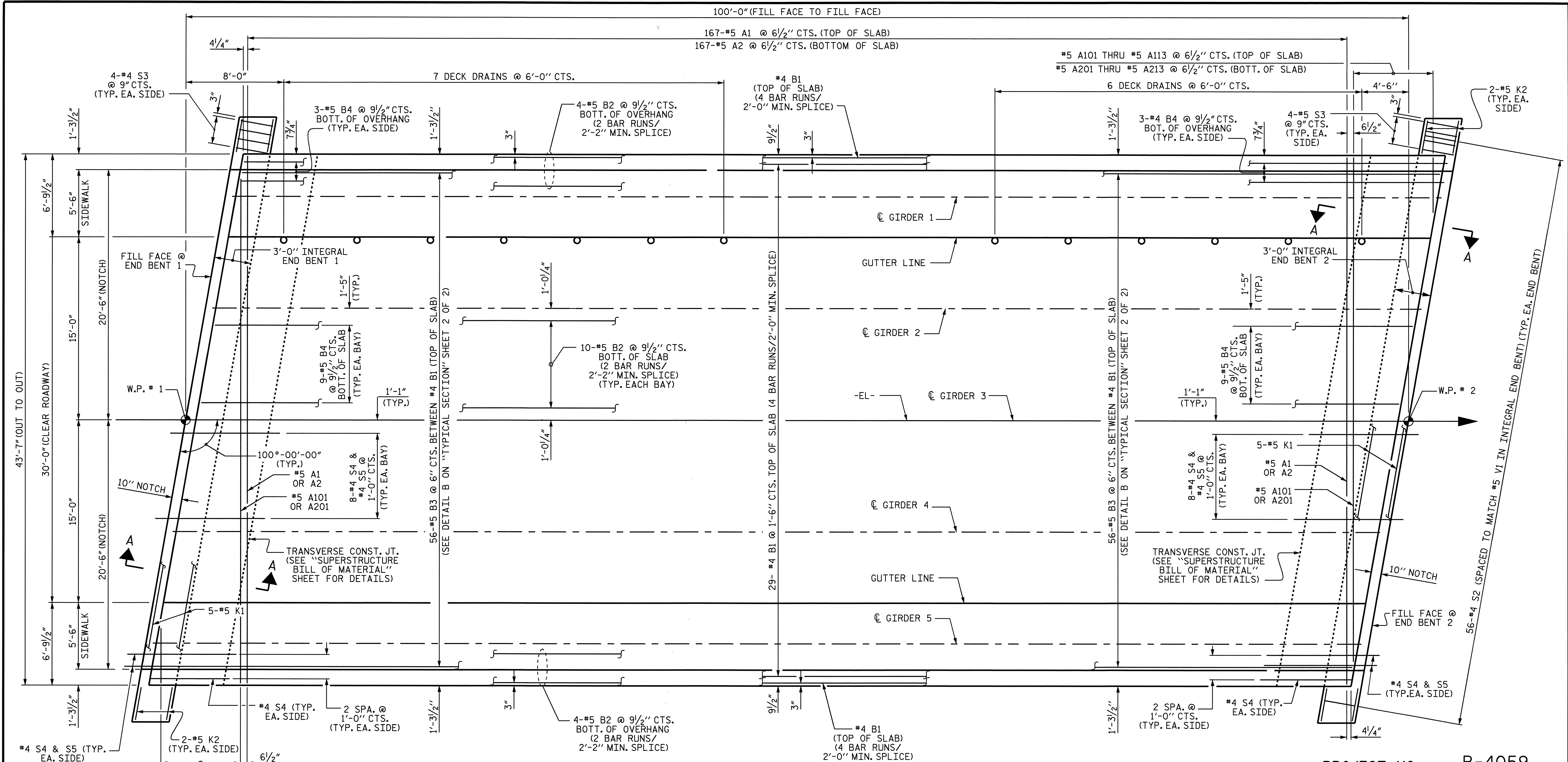


DRAWN BY: J. MYA DATE: 11/07  
 CHECKED BY: B. N. GRADY DATE: 2/5/08

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			26
2			4			





**PLAN OF SPAN**

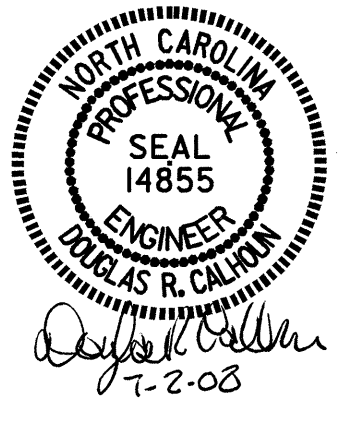
FOR SECTION A-A AND REINFORCING STEEL IN INTEGRAL END BENT, SEE "TYPICAL SECTION" SHEET 2 OF 2.

FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE "STRUCTURAL STEEL DETAILS" SHEET 1 OF 3.

FOR SIDEWALK REINFORCING STEEL AND DETAILS, SEE "SIDEWALK DETAILS" SHEET.

FOR 3 BAR METAL RAIL DETAILS AND PARAPET REINFORCING STEEL, SEE "3 BAR METAL RAIL" SHEETS.

PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-



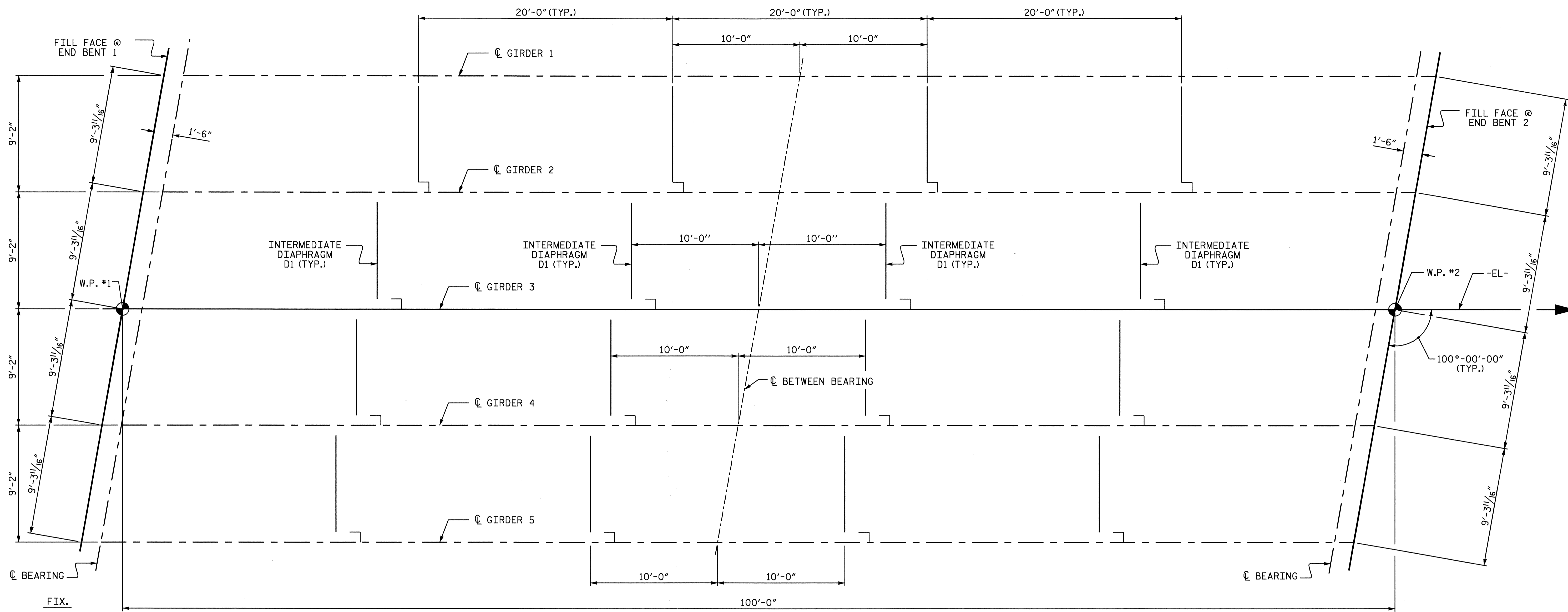
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 PLAN OF SPAN**

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

SHEET NO. **S-6**  
 TOTAL SHEETS **26**

DRAWN BY: J. MYA DATE: 11/07  
 CHECKED BY: B. N. GRADY DATE: 2/05/08



FRAMING PLAN

DEAD LOAD DEFLECTION TABLE											
GIRDER 1 & 5											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	↓ 0.000	0.025	0.048	0.065	0.075	0.079	0.075	0.065	0.048	0.025	0.000
* DEFLECTION DUE TO WEIGHT OF SLAB	↓ 0.000	0.088	0.183	0.256	0.303	0.319	0.303	0.256	0.183	0.088	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK	↓ 0.000	0.015	0.030	0.040	0.047	0.049	0.047	0.040	0.030	0.015	0.000
TOTAL DEAD LOAD DEFLECTION	↓ 0.000	0.128	0.261	0.361	0.425	0.447	0.425	0.361	0.261	0.128	0.000
REQUIRED CAMBER	↑ 0	1 7/16"	3 3/8"	4 9/16"	5 1/8"	5 3/8"	5 1/8"	4 9/16"	3 3/8"	1 7/16"	0

GIRDERS 2, 3, 4											
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	↓ 0.000	0.025	0.048	0.065	0.075	0.079	0.075	0.065	0.048	0.025	0.000
* DEFLECTION DUE TO WEIGHT OF SLAB	↓ 0.000	0.088	0.183	0.256	0.302	0.318	0.302	0.256	0.183	0.088	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK	↓ 0.000	0.011	0.021	0.028	0.033	0.035	0.033	0.028	0.021	0.011	0.000
TOTAL DEAD LOAD DEFLECTION	↓ 0.000	0.124	0.252	0.349	0.410	0.432	0.410	0.349	0.252	0.124	0.000
REQUIRED CAMBER	↑ 0	1 1/2"	3"	4 3/16"	4 5/16"	5 3/16"	4 5/16"	4 3/16"	3"	1 1/2"	0

\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.  
 ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

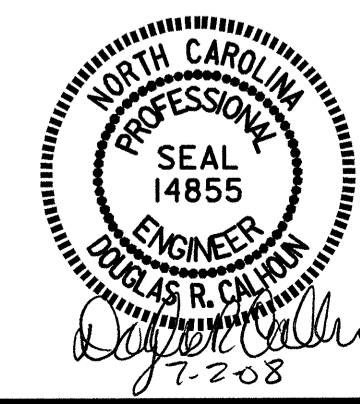
PROJECT NO. B-4059  
 CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

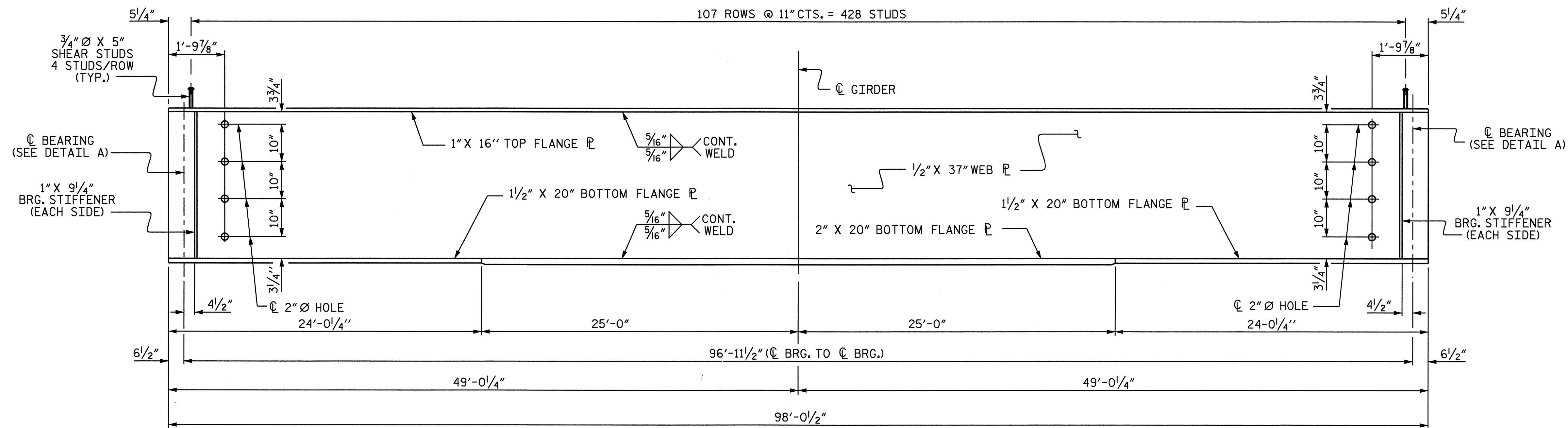
SUPERSTRUCTURE  
 STRUCTURAL STEEL  
 DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7	
1			3			TOTAL SHEETS	26
2			4				



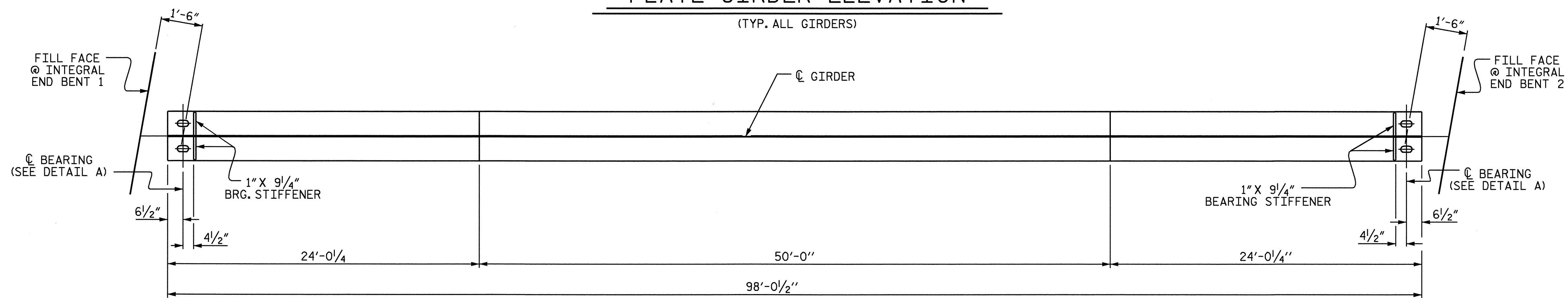
DRAWN BY: J. MYA DATE: 11/07  
 CHECKED BY: B. N. GRADY DATE: 2/05/08



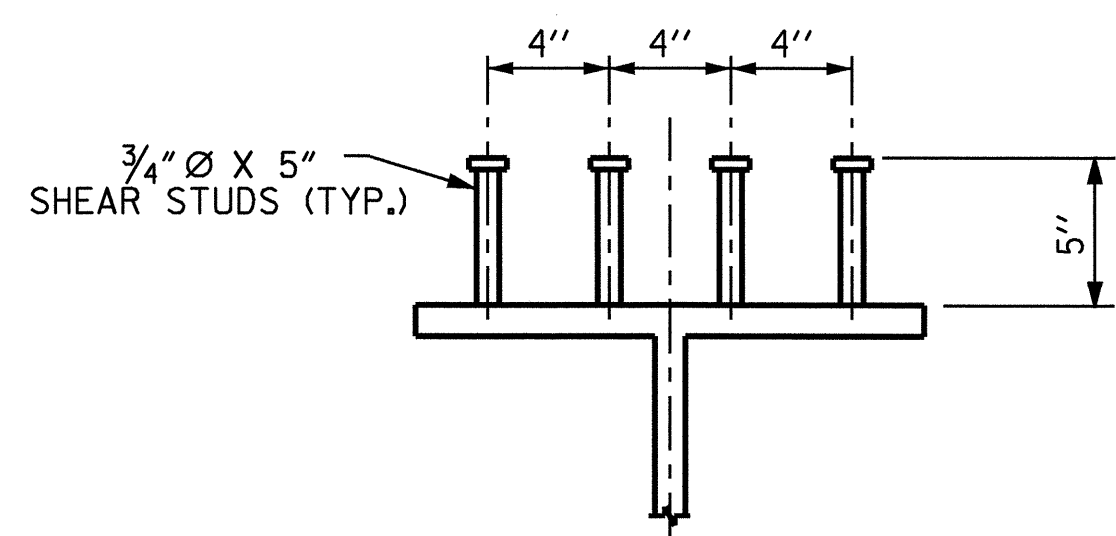


**PLATE GIRDER ELEVATION**

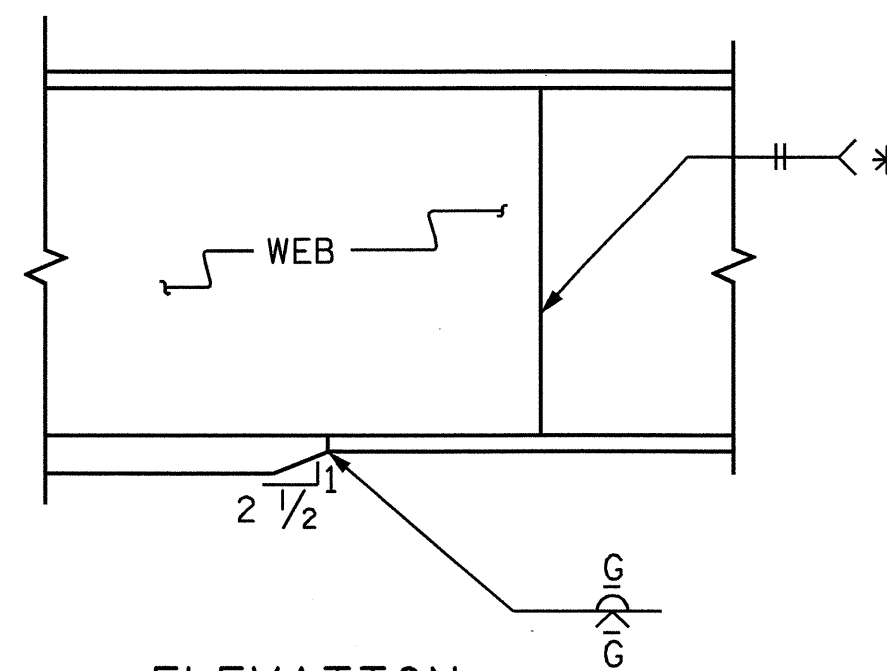
(TYP. ALL GIRDERS)



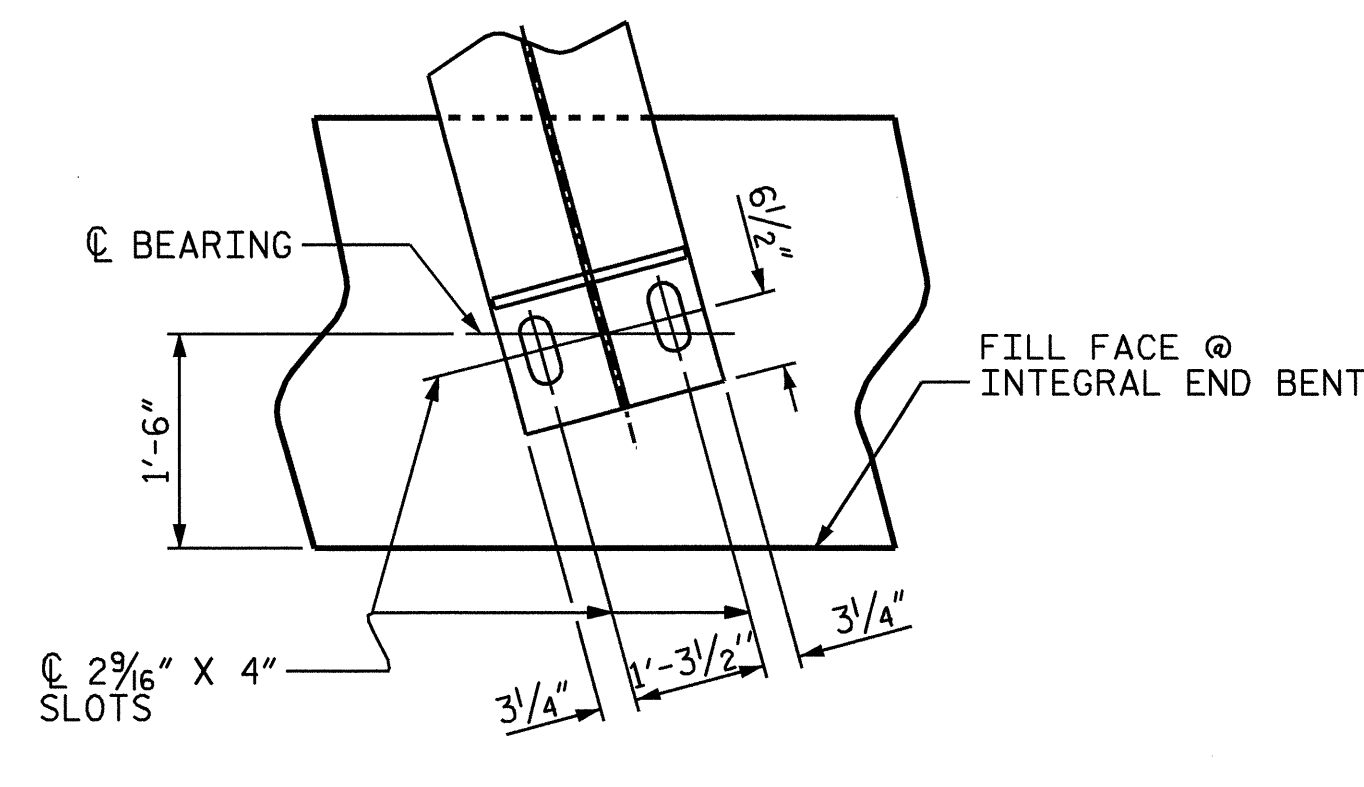
**BOTTOM FLANGE DETAIL**



**SHEAR STUD DETAILS**



**ELEVATION**



**DETAIL A**

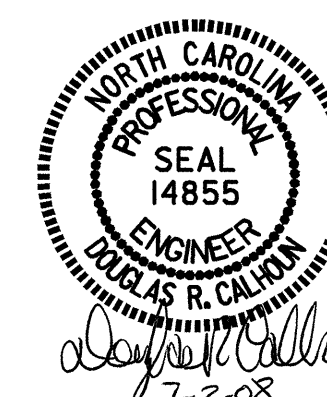
(BOTTOM FLANGE OF GIRDER)

PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 STRUCTURAL STEEL  
 DETAILS



DRAWN BY: J. MYA DATE: 11/07  
 CHECKED BY: B. N. GRADY DATE: 2/6/07

23-JUN-2008 15:32  
 RA\Structures\Final Plans\B4059.ed\_SS.dgn  
 jmya

**TYPICAL FLANGE AND WEB BUTT JOINT**

GRIND SMOOTH AND FLUSH ON OUTSIDE OF EXTERIOR GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			26

**NOTES**

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W.  
 ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.  
 ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.  
 A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES, TOP FLANGE PLATES WITHIN 20 FT. OF ENDS OF GIRDERS, AND WEB SPLICE PLATES FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION. KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

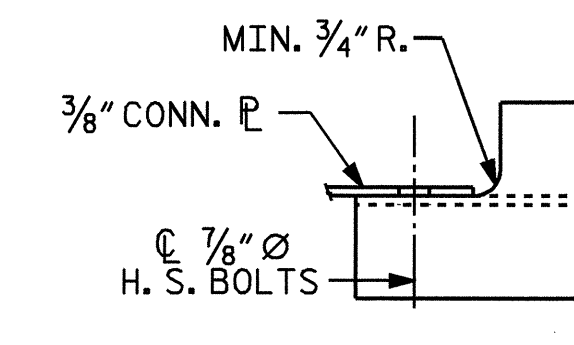
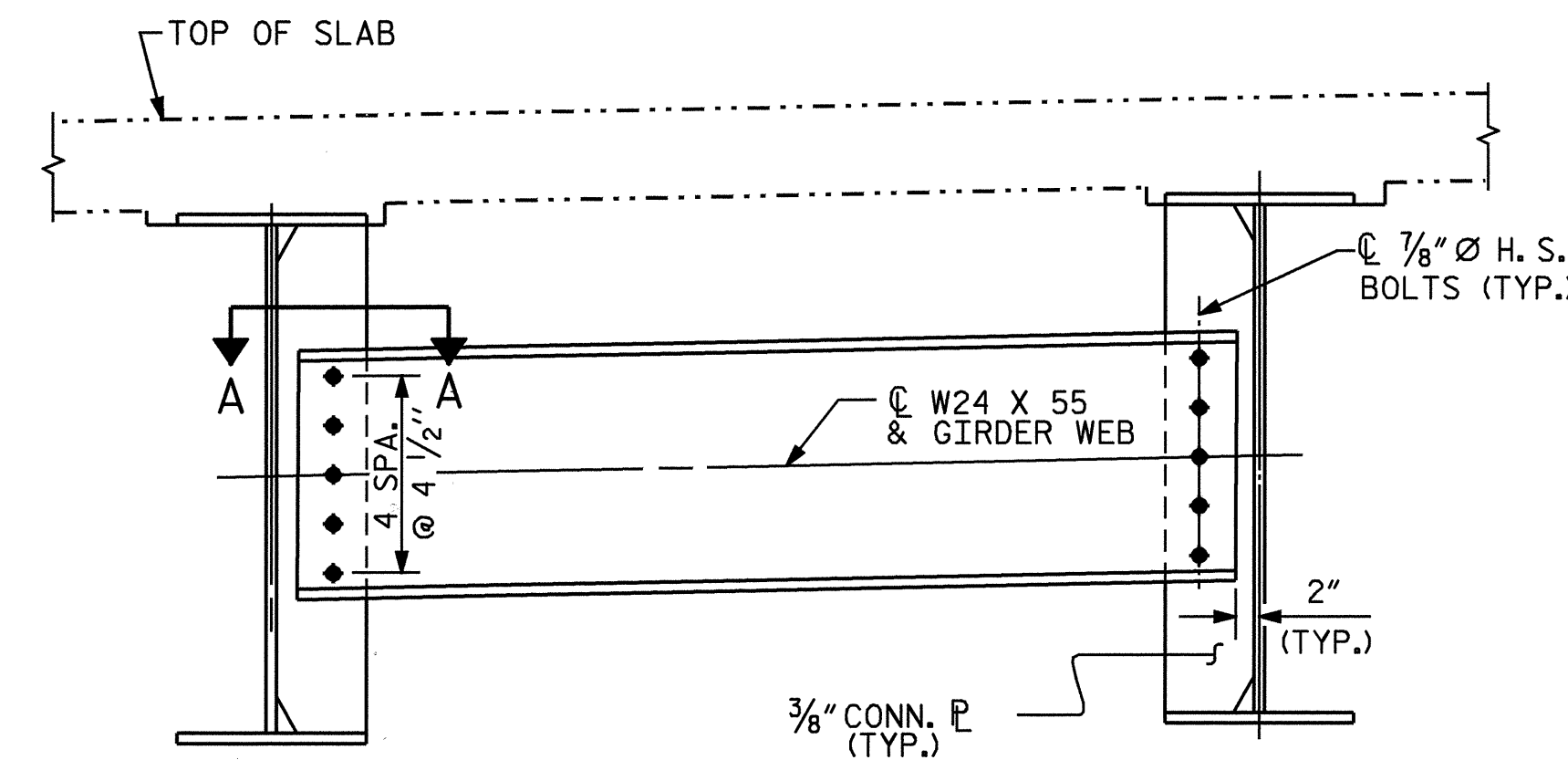
STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

END OF GIRDERS SHALL BE PLUMB.

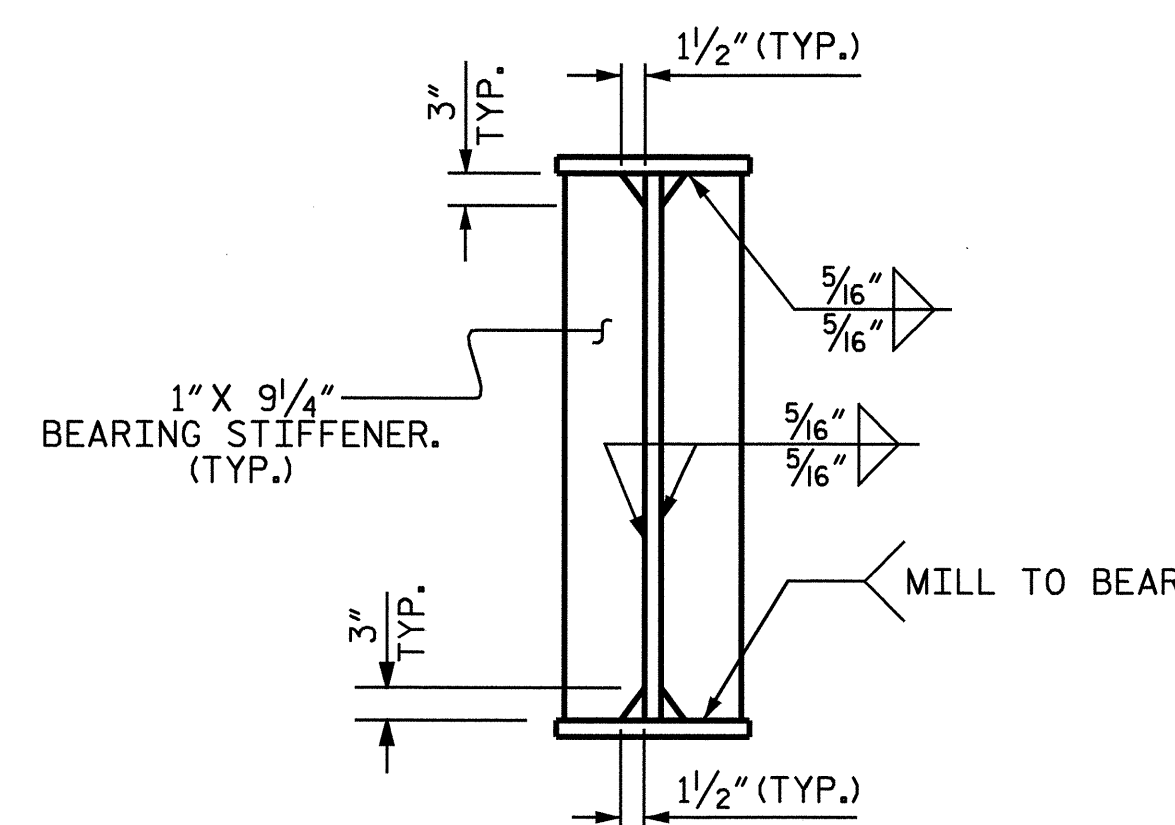
BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

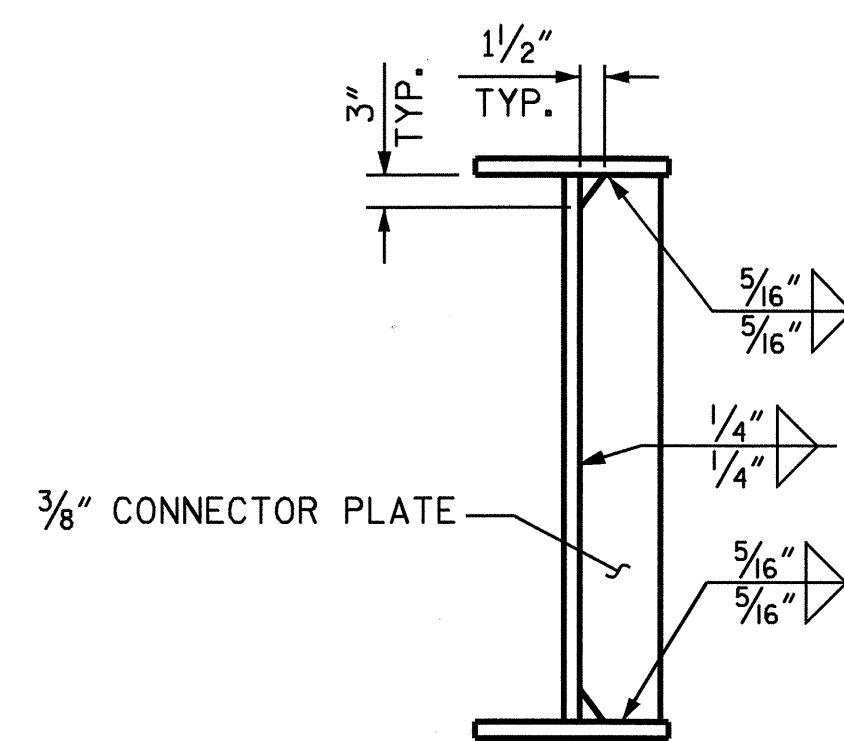


**SECTION A-A**

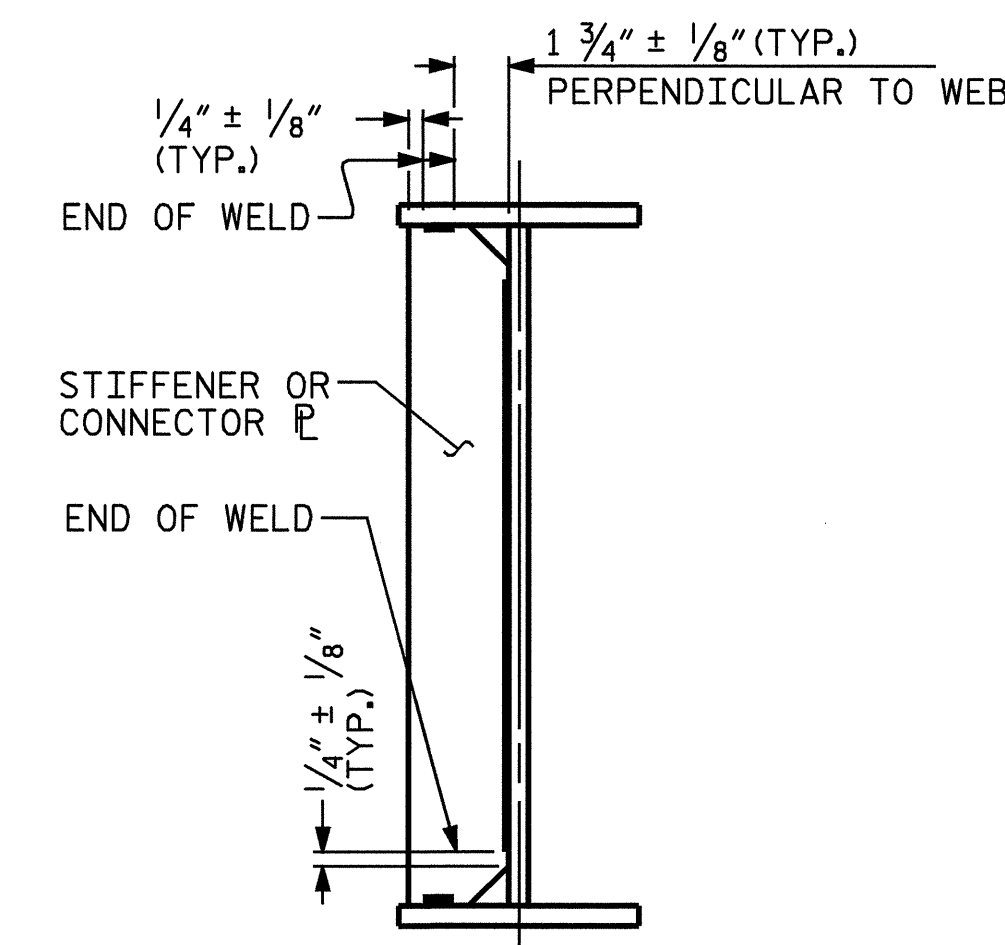
**TYPICAL INTERMEDIATE DIAPHRAGM (D1)**



**BEARING STIFFENER**



**CONNECTOR PLATE**



**TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS**

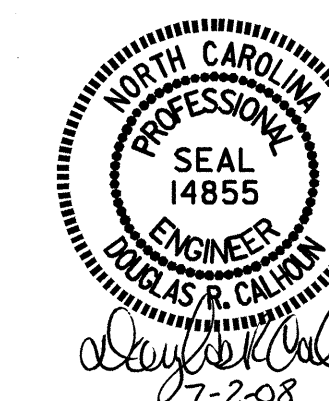
**WELD TERMINATION DETAILS**

PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 STRUCTURAL STEEL  
 DETAILS



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9	
1			3			TOTAL SHEETS	26
2			4				

DRAWN BY : J. MYA DATE : 11/07  
 CHECKED BY : B. N. GRADY DATE : 2/6/08



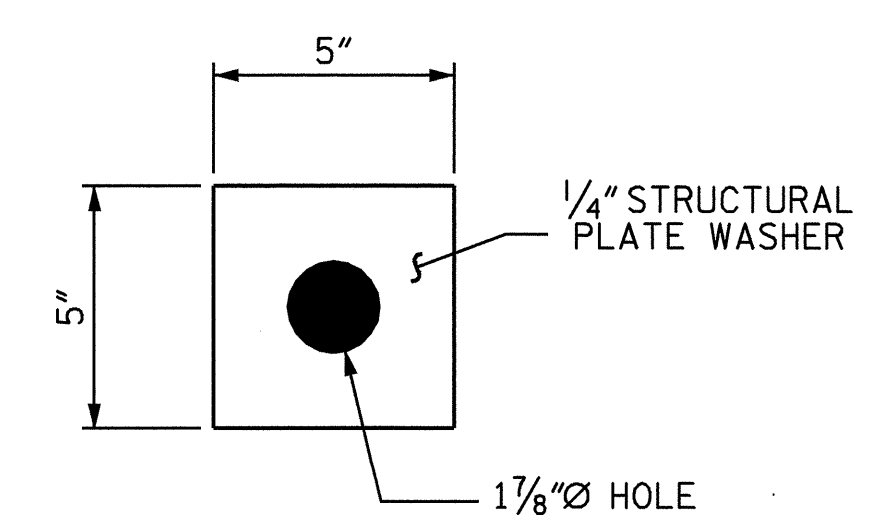
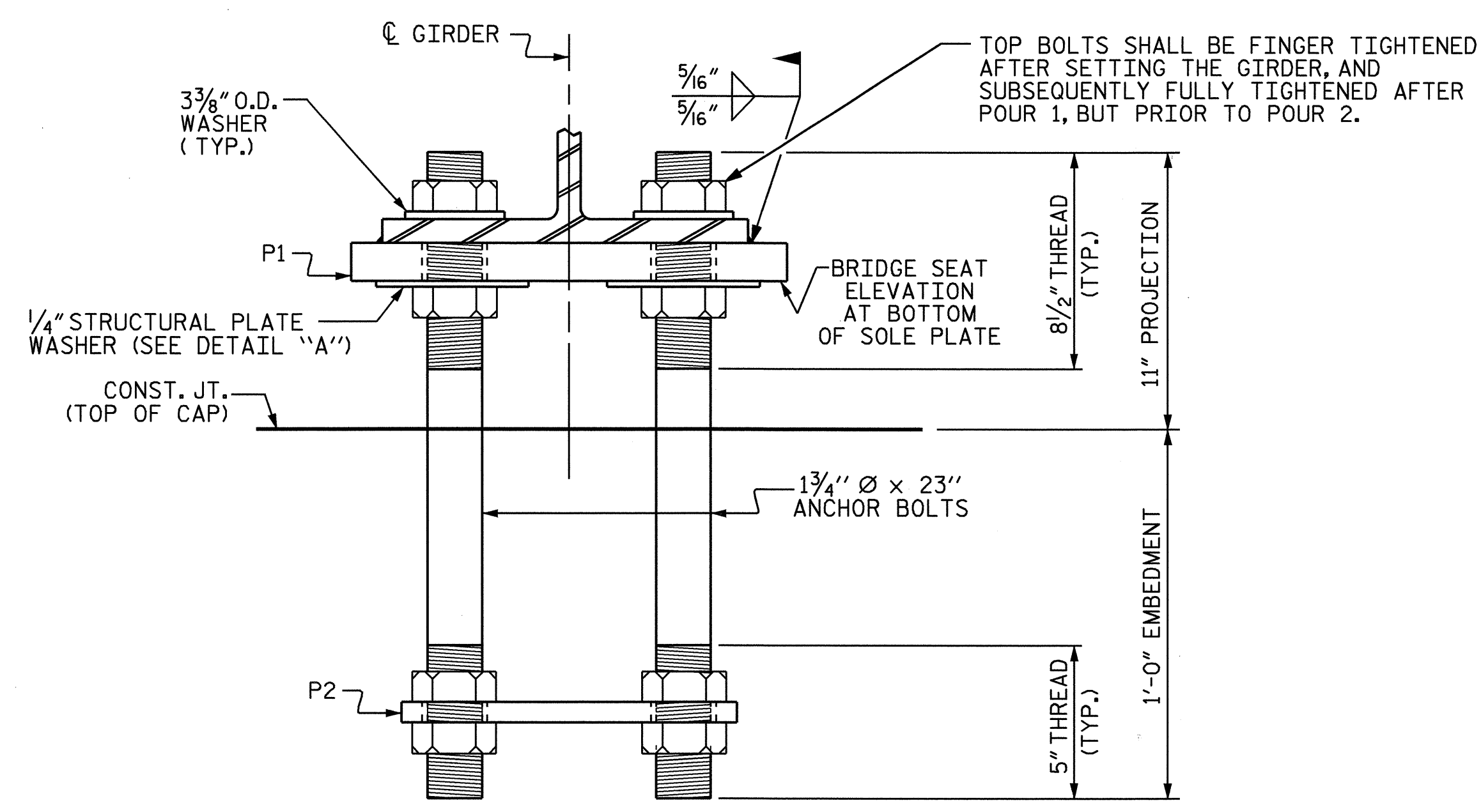
NOTES

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, LEVELING PLATES AND ANCHORAGE PLATES SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

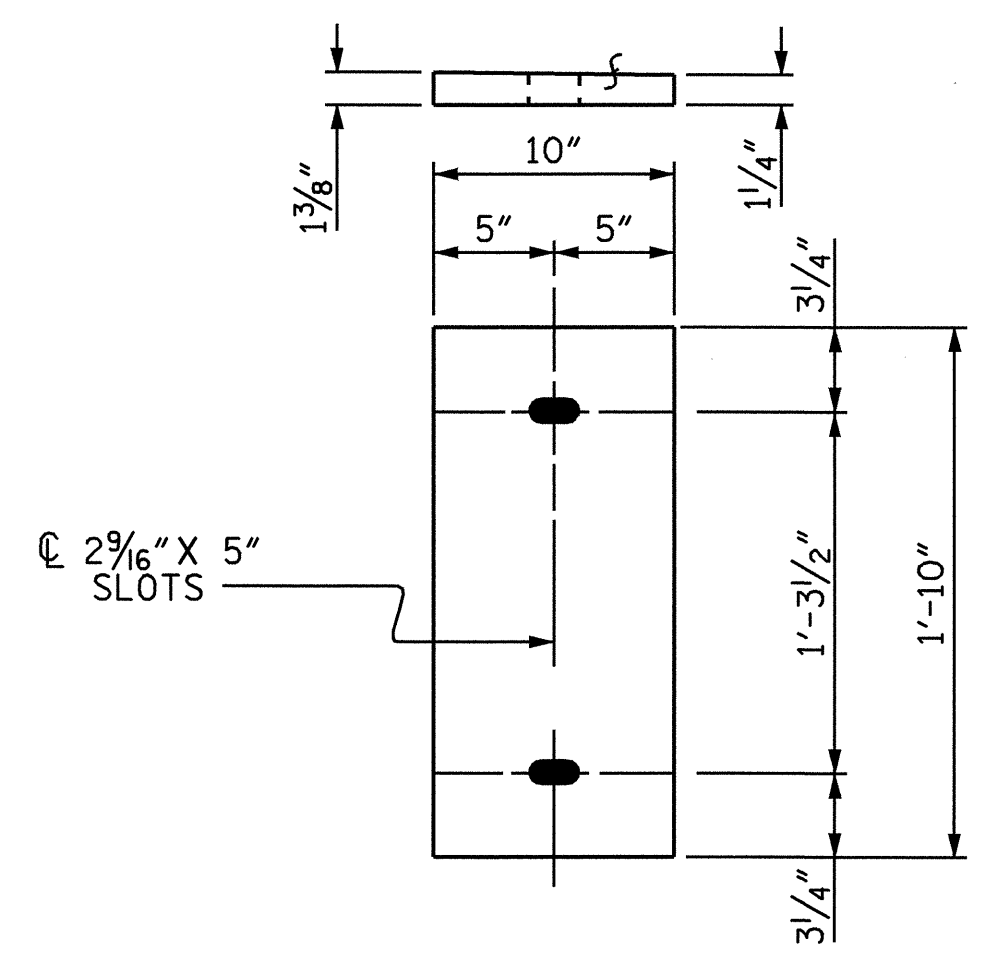
ALL SURFACES OF SOLE PLATES SHALL BE SMOOTH AND STRAIGHT.

STRUCTURAL PLATE WASHERS SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED.

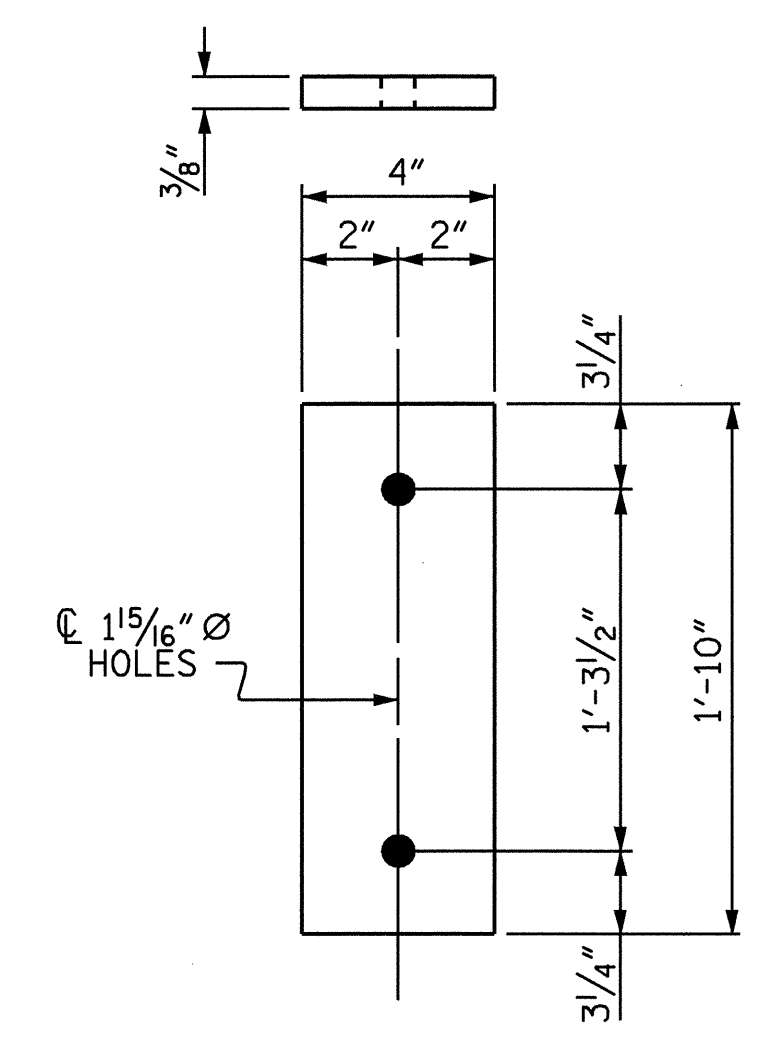


DETAIL "A"

FIXED  
END VIEW



P1  
P1 (10 REQ'D)  
SOLE PLATE DETAILS (P1)

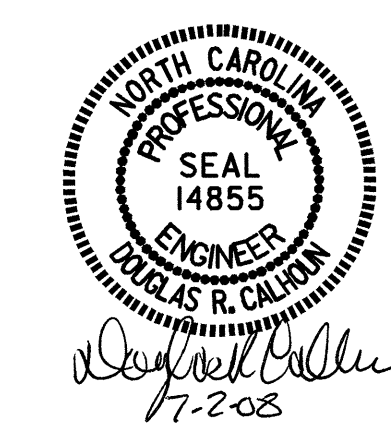


P2  
P2 (10 REQ'D)  
ANCHORAGE PLATE DETAILS (P2)

PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SOLE PLATE  
 DETAILS



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

TOTAL SHEETS: 26

DRAWN BY: J. MYA DATE: 11/07  
 CHECKED BY: B. N. GRADY DATE: 2/6/08

**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.

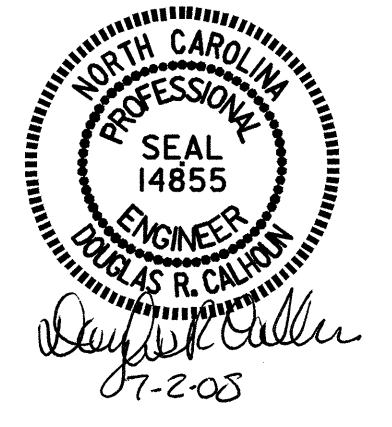
CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE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

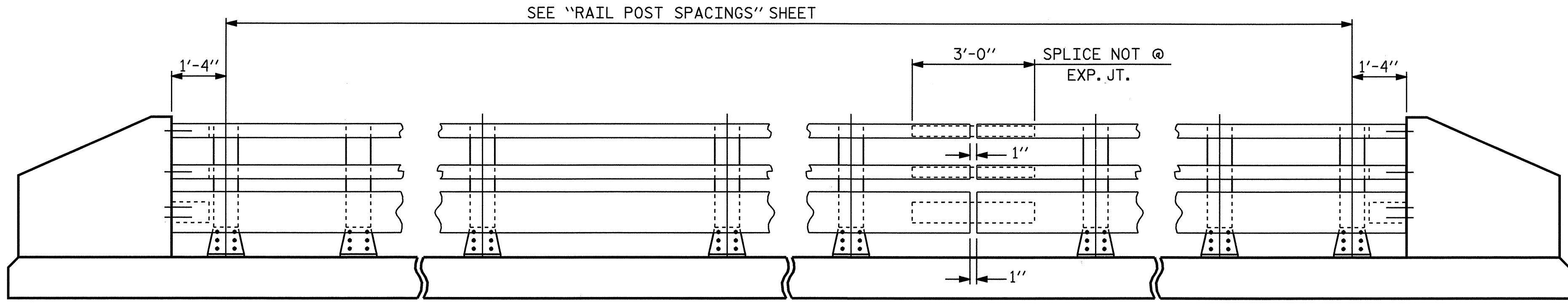
PAY LENGTH = 181.22 LIN.FT.



PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

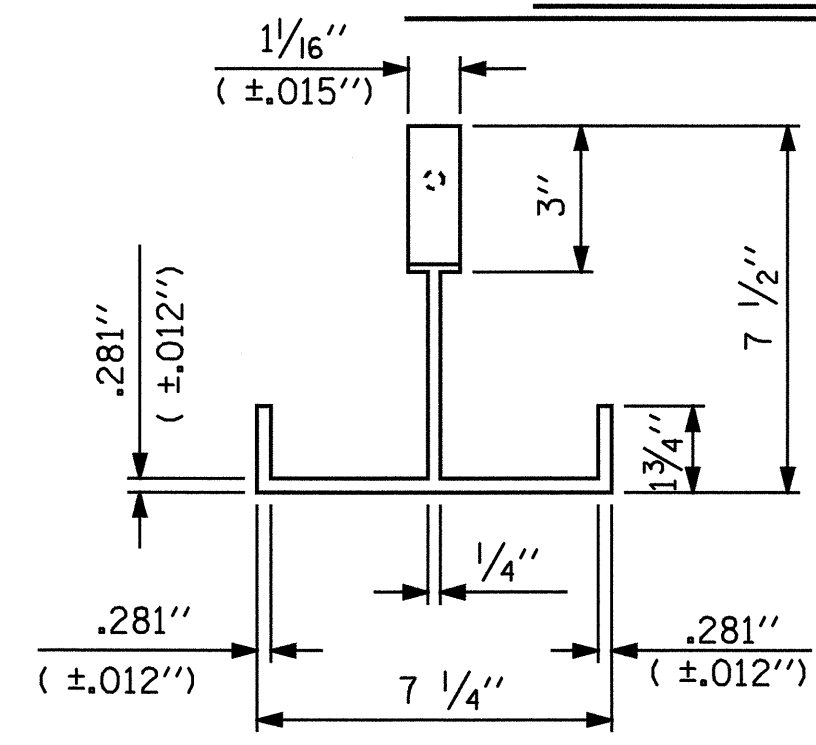
SHEET 1 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
3 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-II TOTAL SHEETS 26

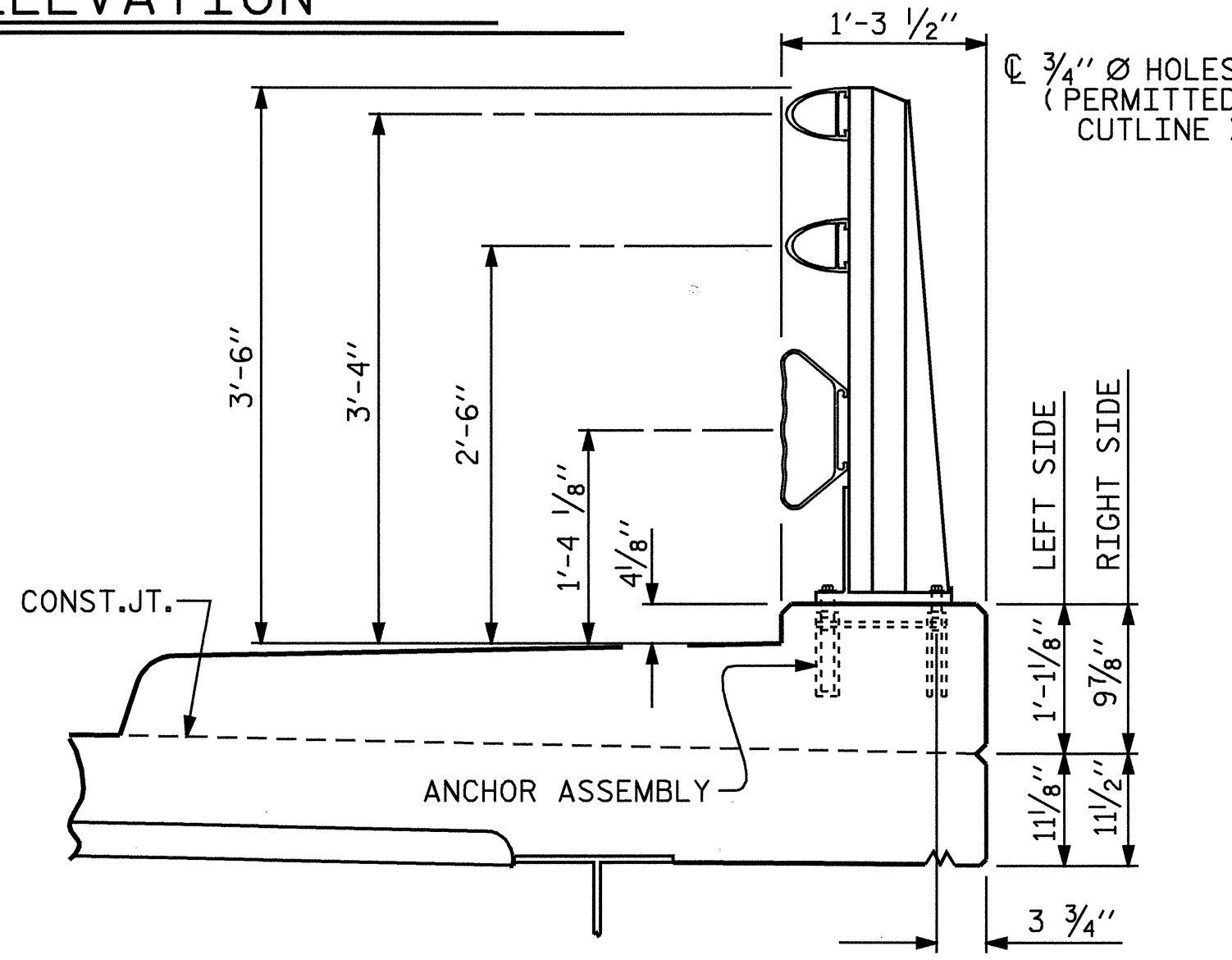


NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

**ELEVATION**

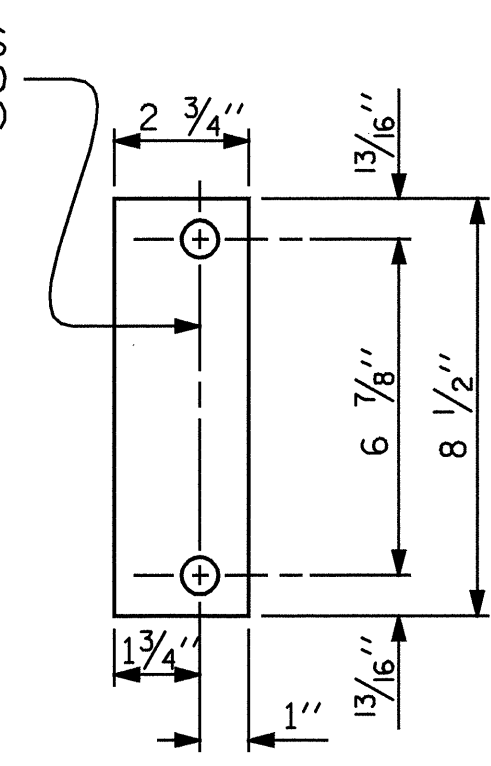


**PLAN**

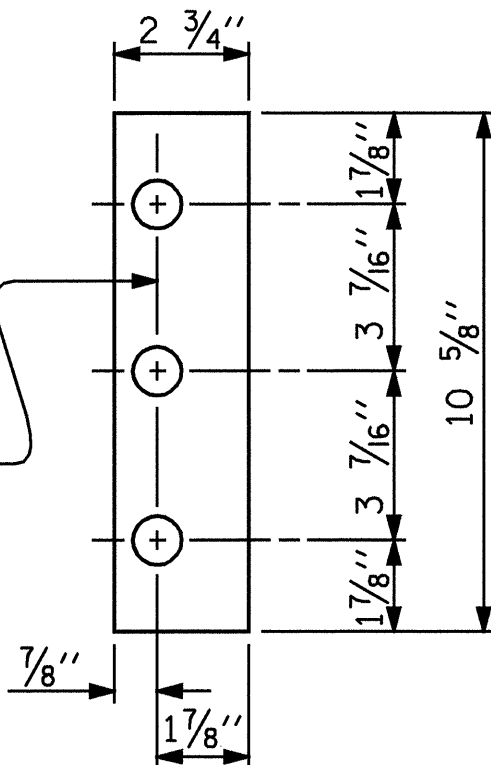


**SECTION THRU RAIL**

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6

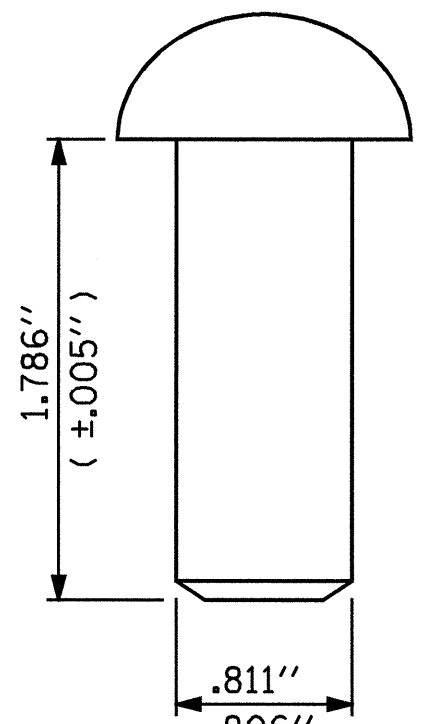


**REAR PLATE**

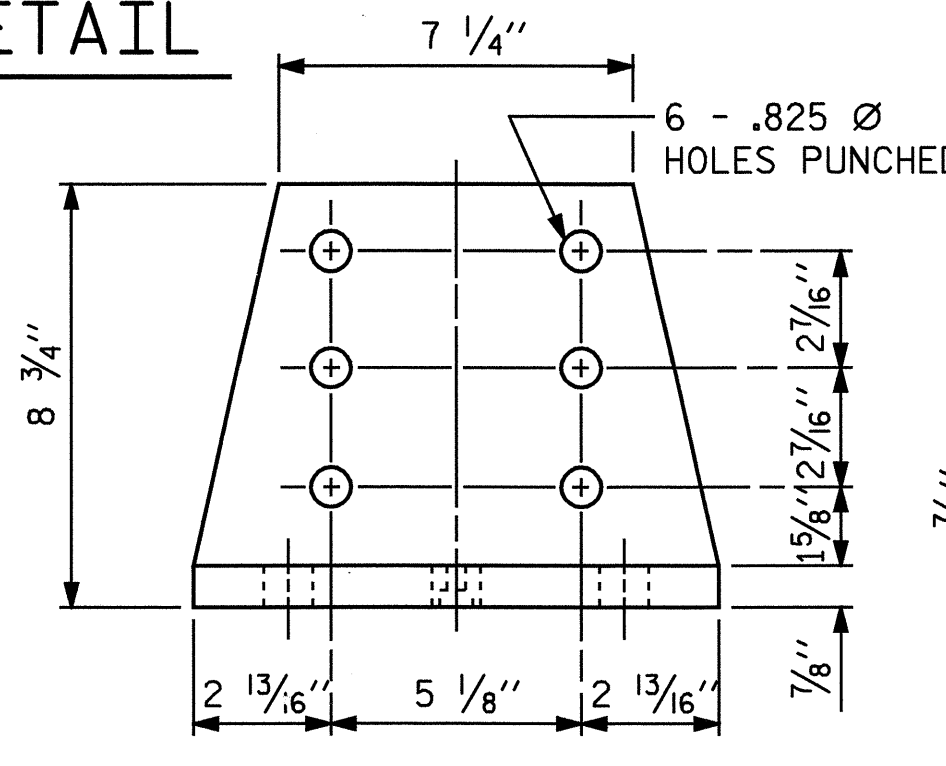


**FRONT PLATE SHIM DETAILS**

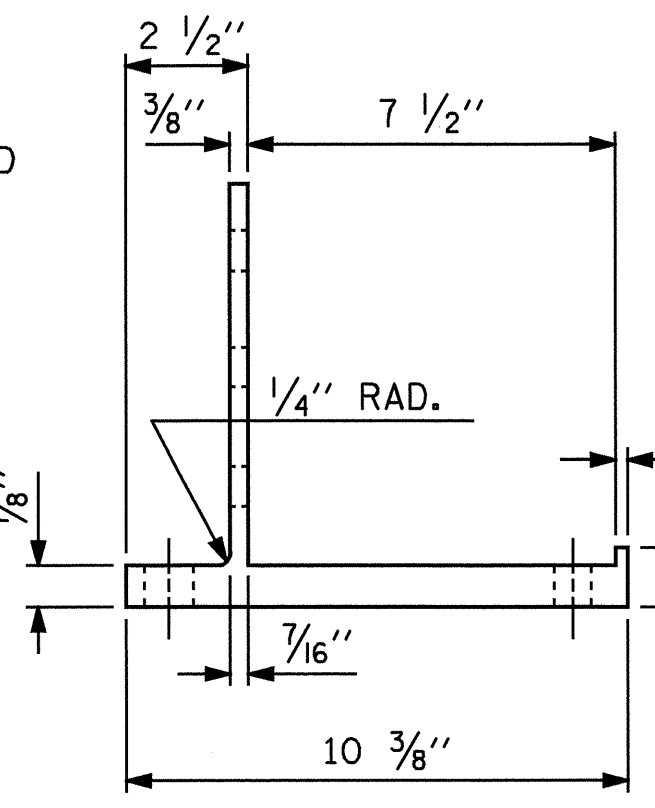
NOTE:  
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



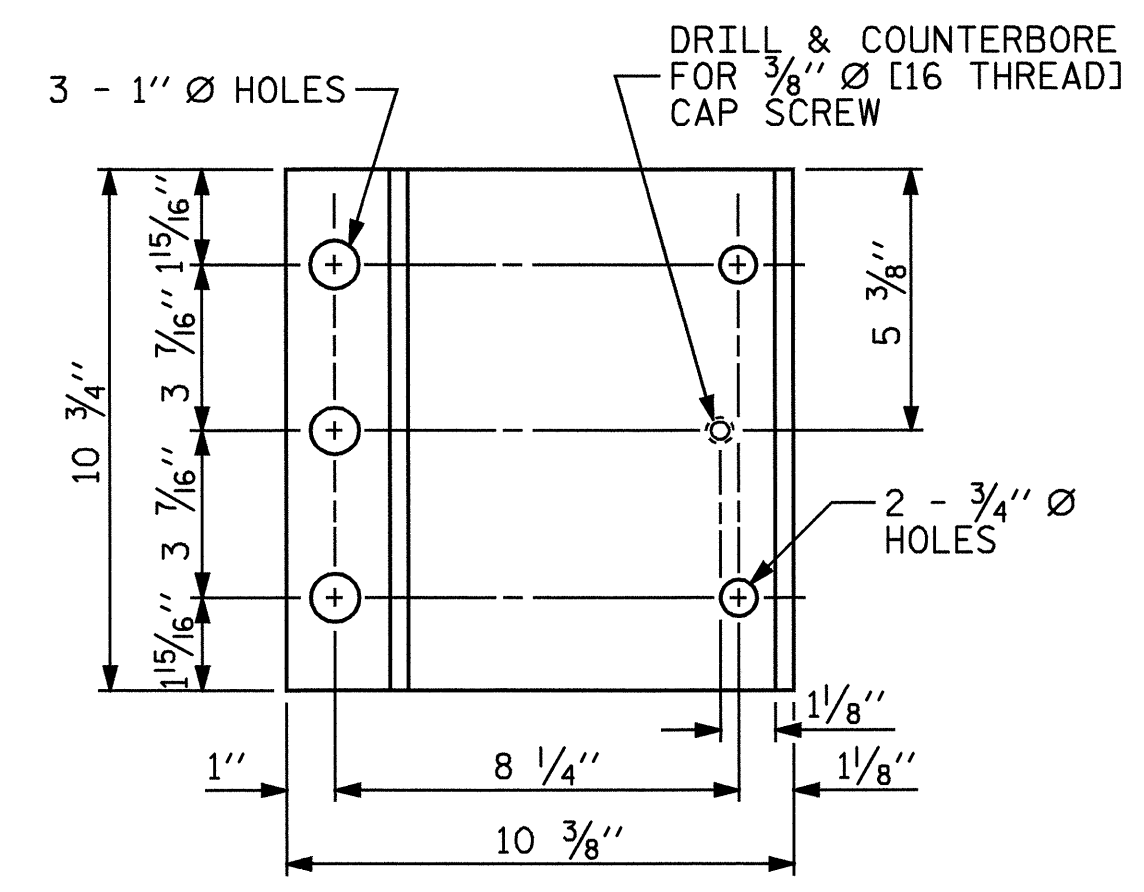
**RIVET DETAIL**



**FRONT ELEVATION**

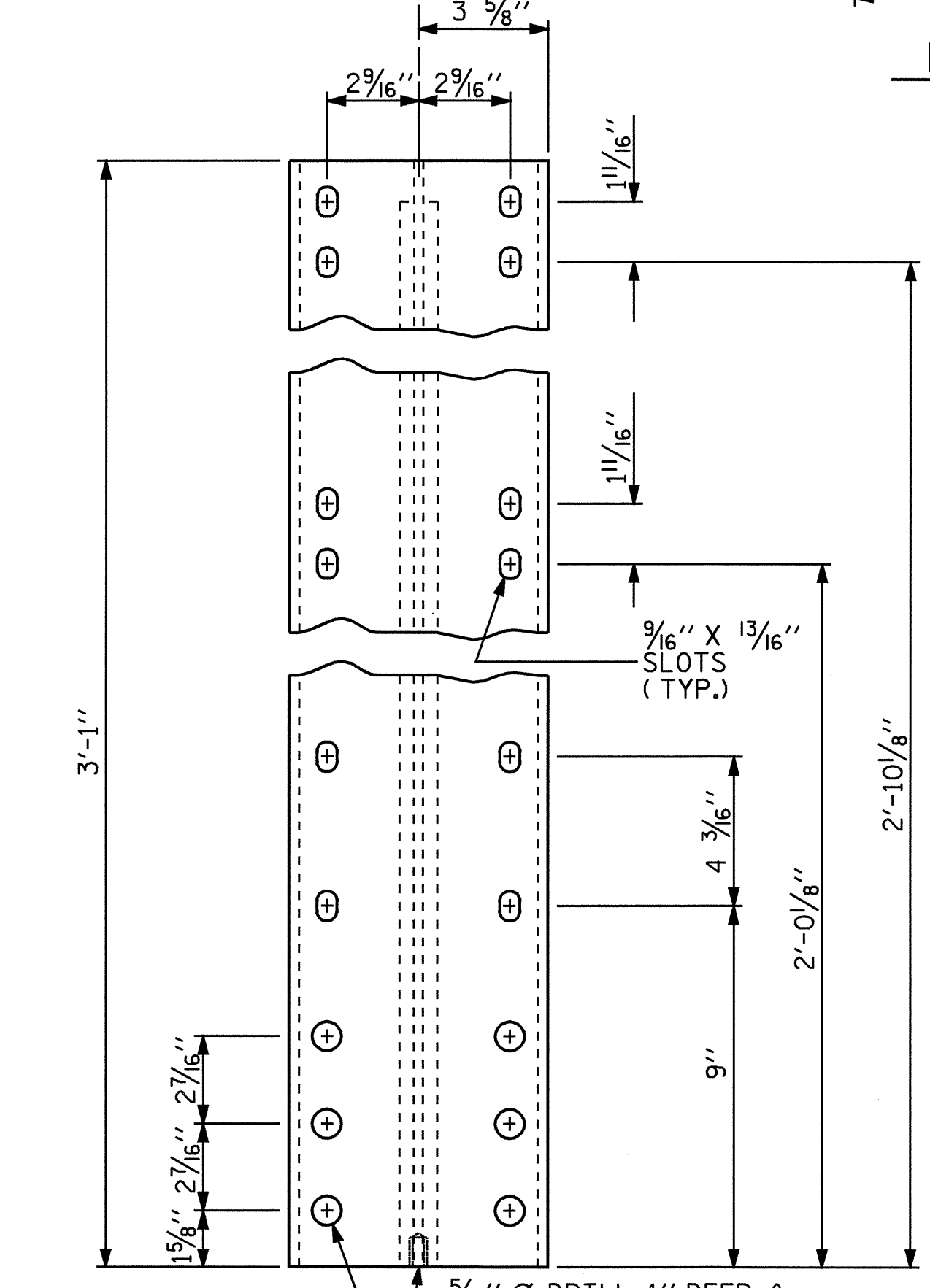


**SIDE ELEVATION**

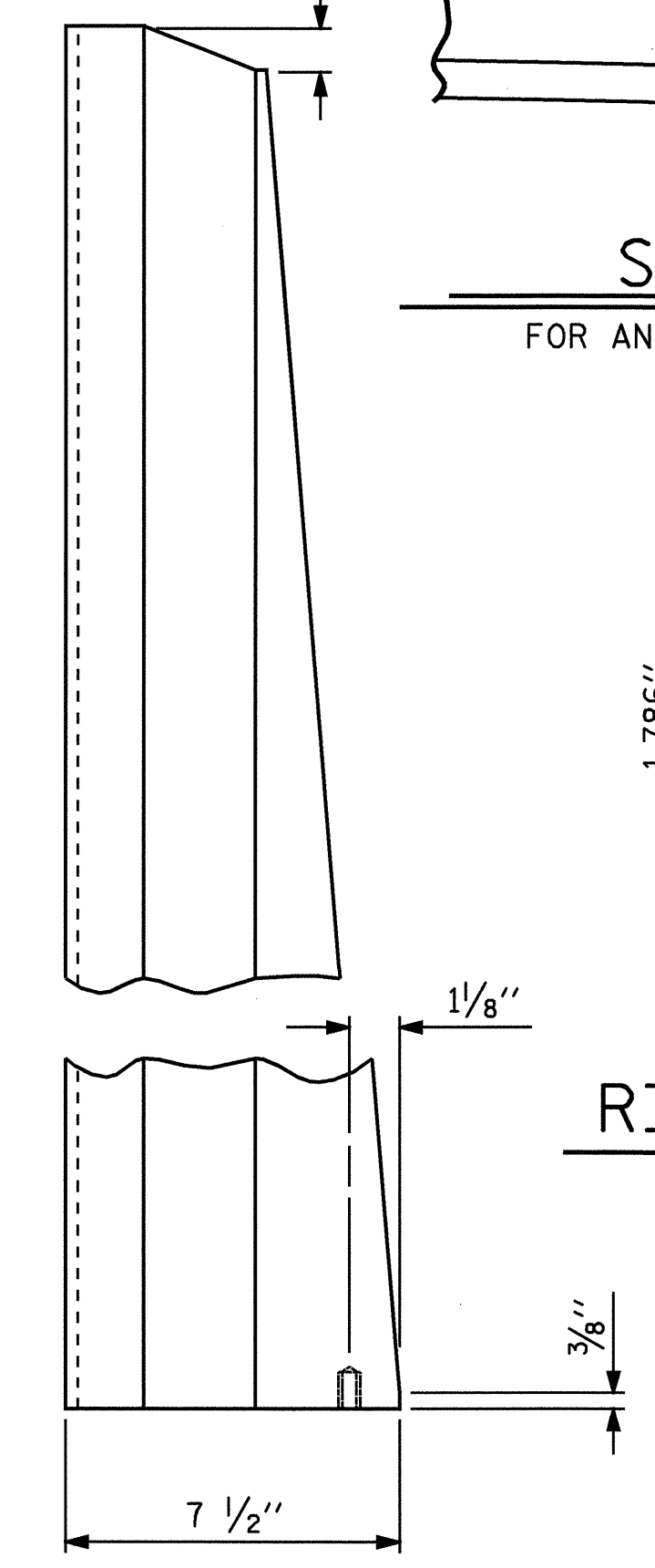


**PLAN**

**POST BASE DETAILS**



**FRONT ELEVATION**

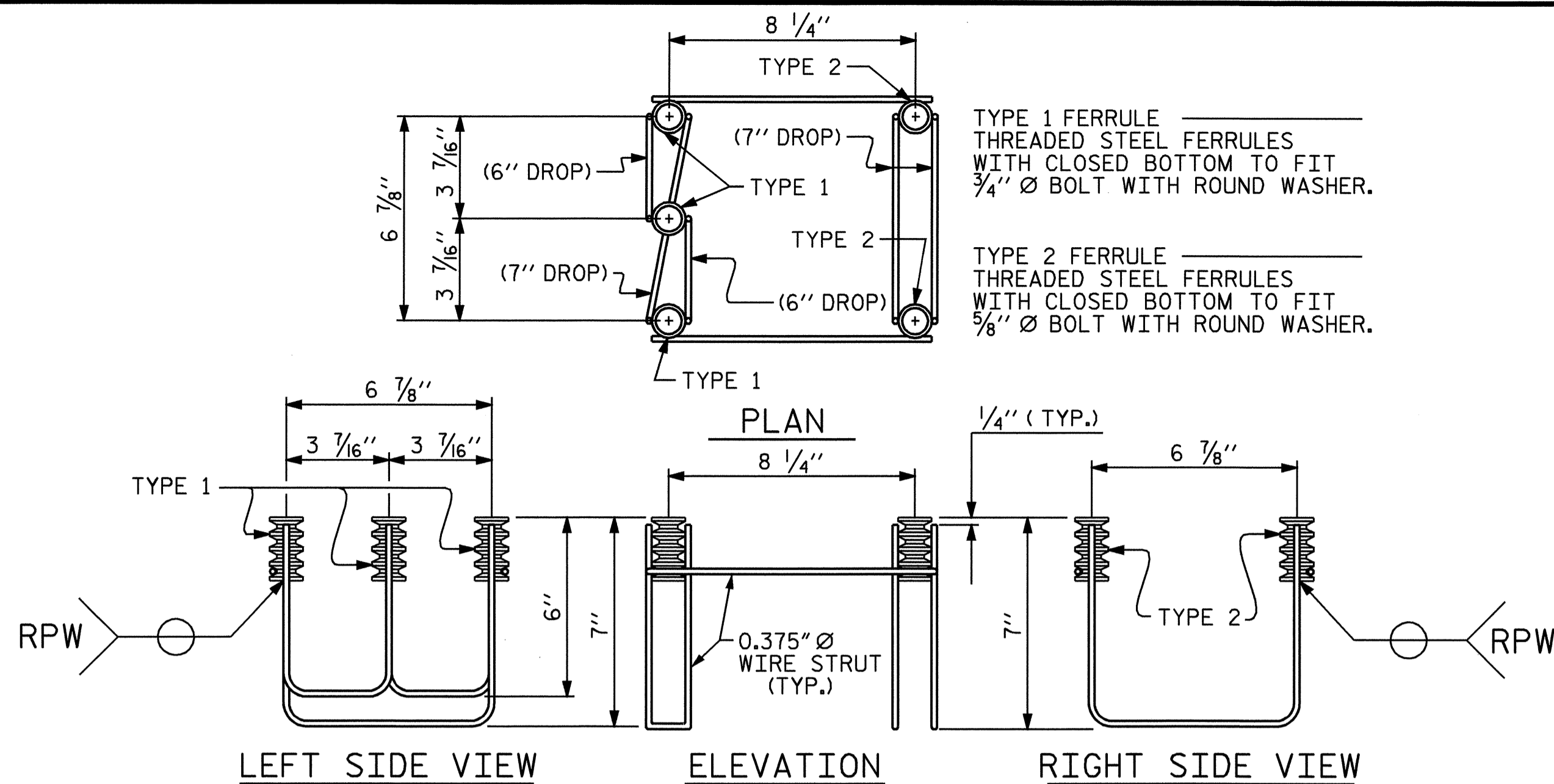


**SIDE ELEVATION**

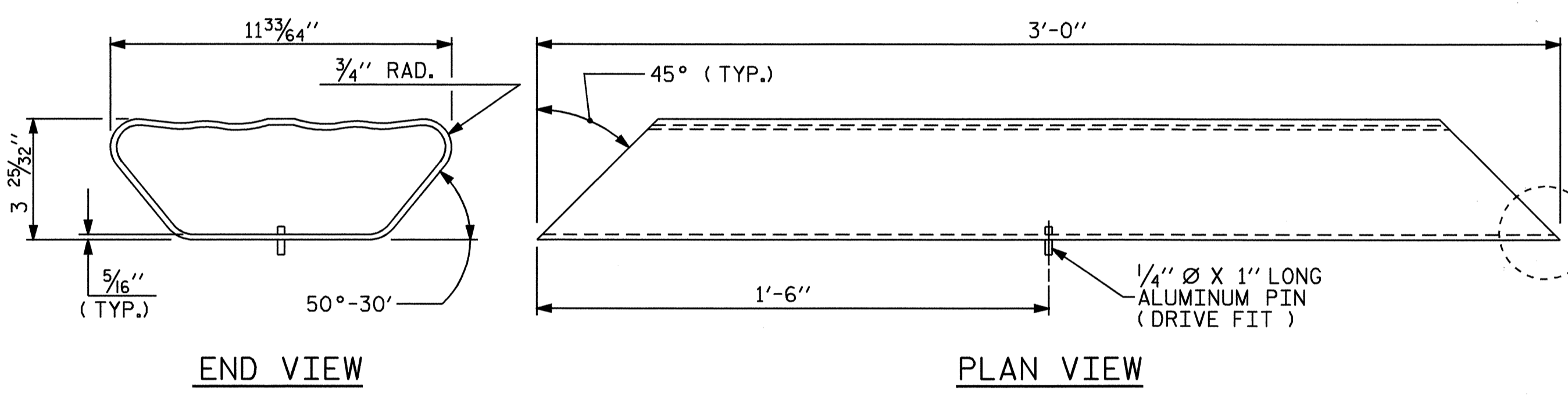
**DETAILS OF POST**

ASSEMBLED BY : J.MYA	DATE : 10/07
CHECKED BY : B.N.GRADY	DATE : 2/6/08
DRAWN BY : JMB 1/88	REV. 10/17/00 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03 RWW/JTE
	REV. 3/1/06 TLA/GM

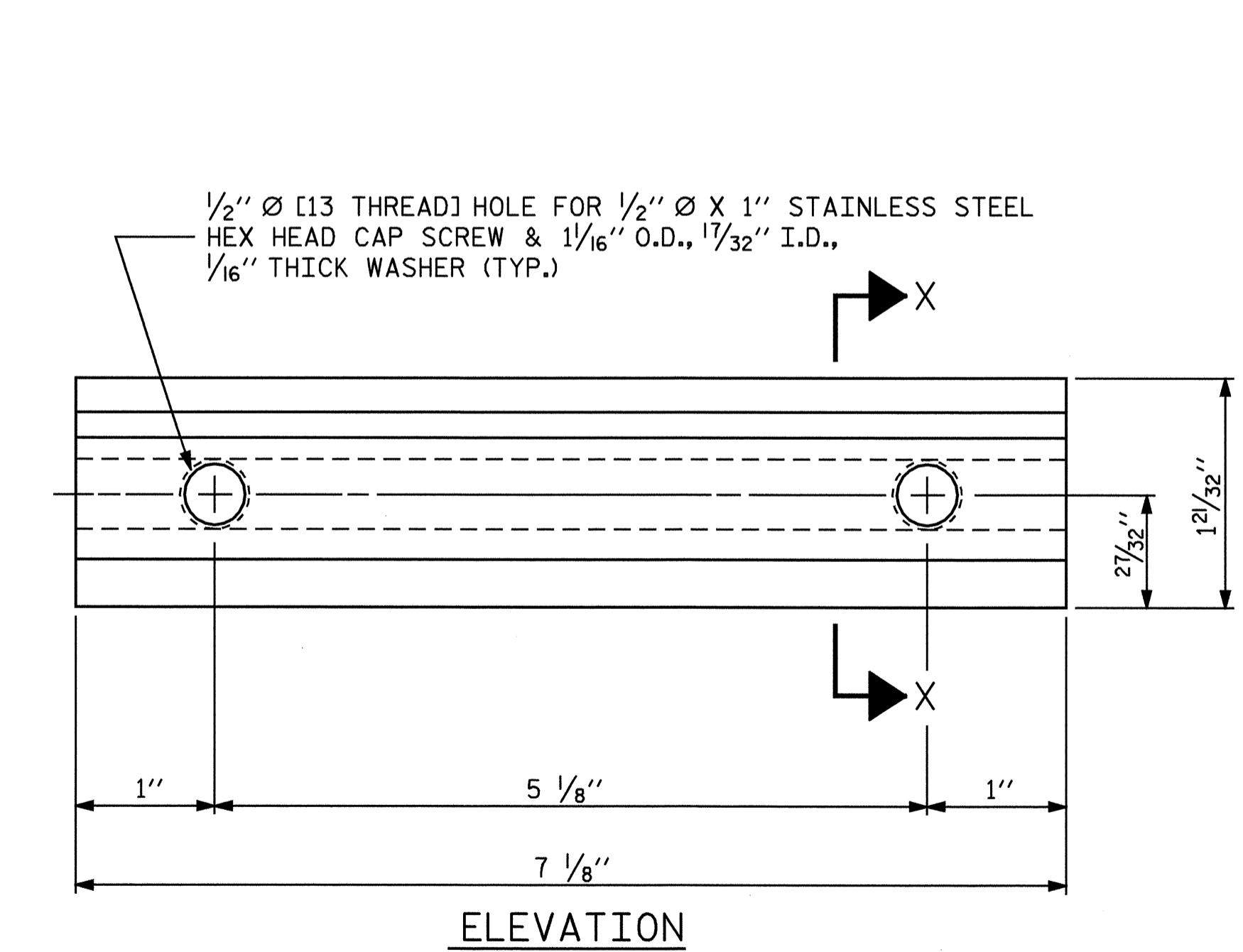




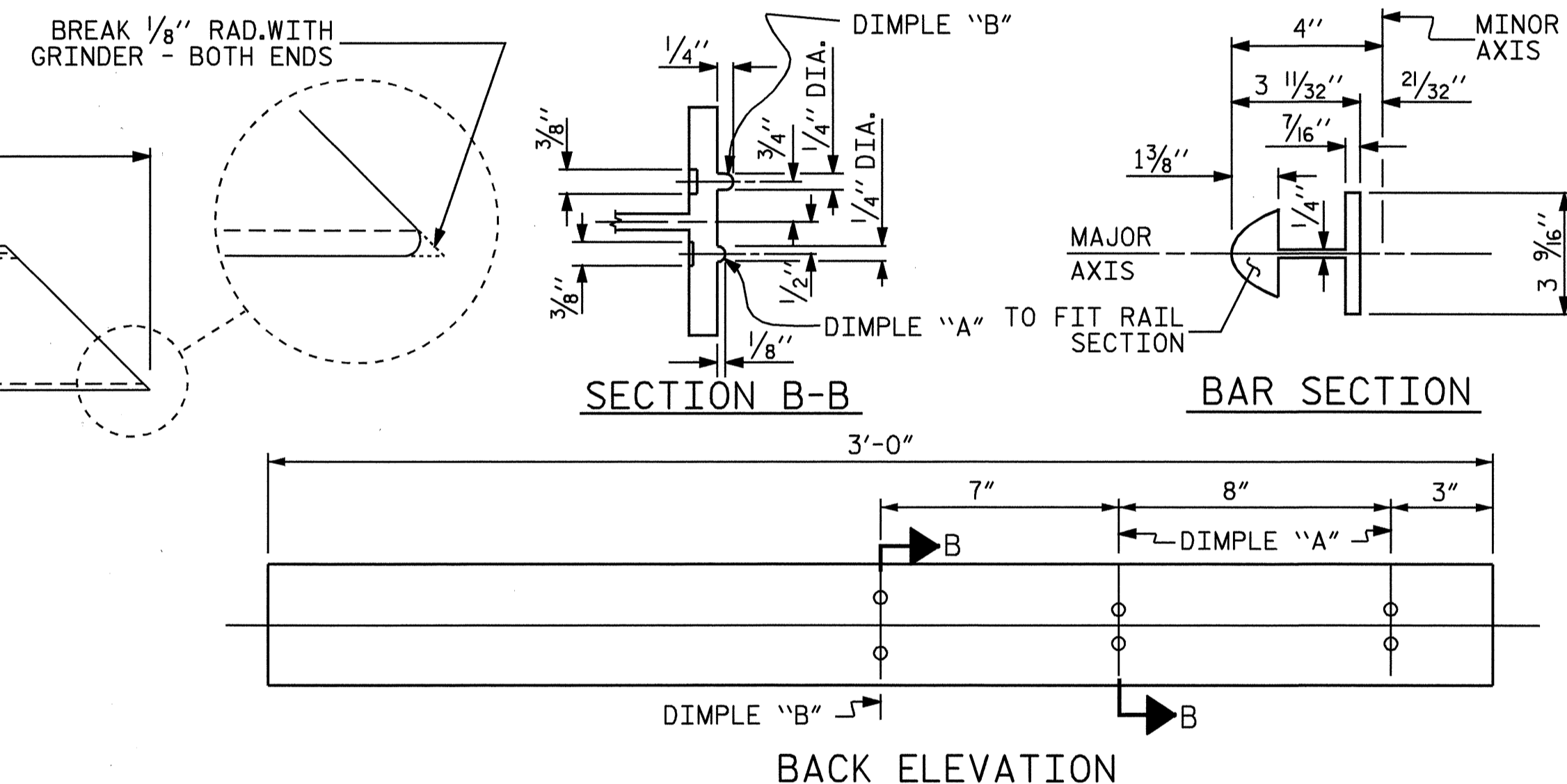
**5-BOLT METAL RAIL ANCHOR ASSEMBLY**  
(34 ASSEMBLIES REQUIRED)



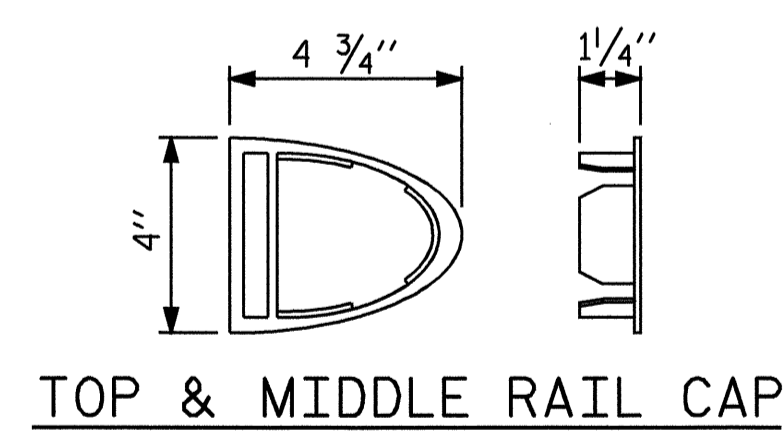
**BOTTOM RAIL EXPANSION BAR**



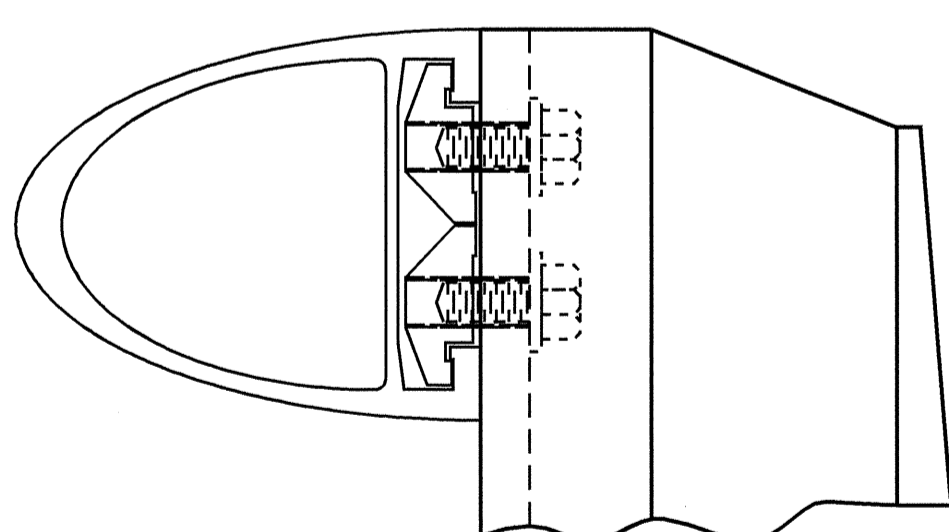
**CLAMP BAR DETAIL**  
(6 REQUIRED PER POST)



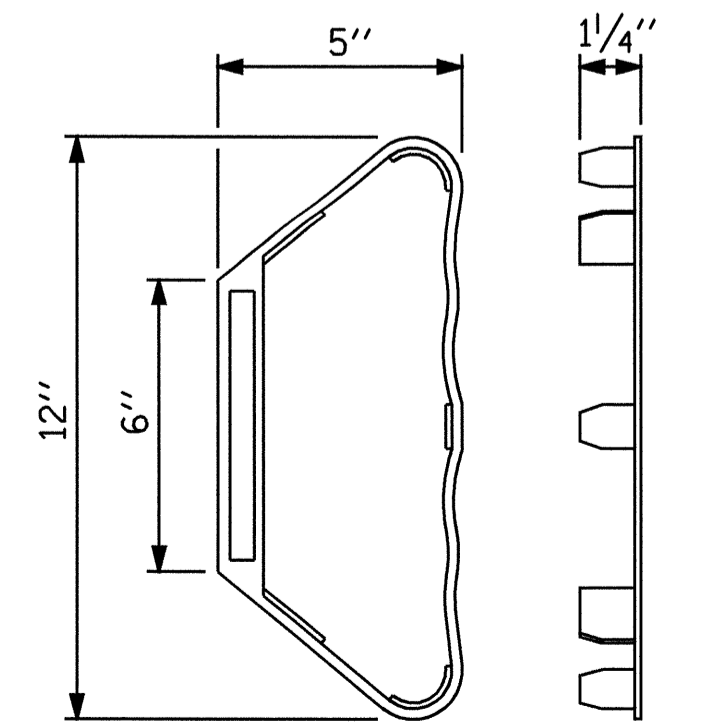
**TOP & MIDDLE RAIL EXPANSION BAR**



**TOP & MIDDLE RAIL CAP**



**CLAMP ASSEMBLY**

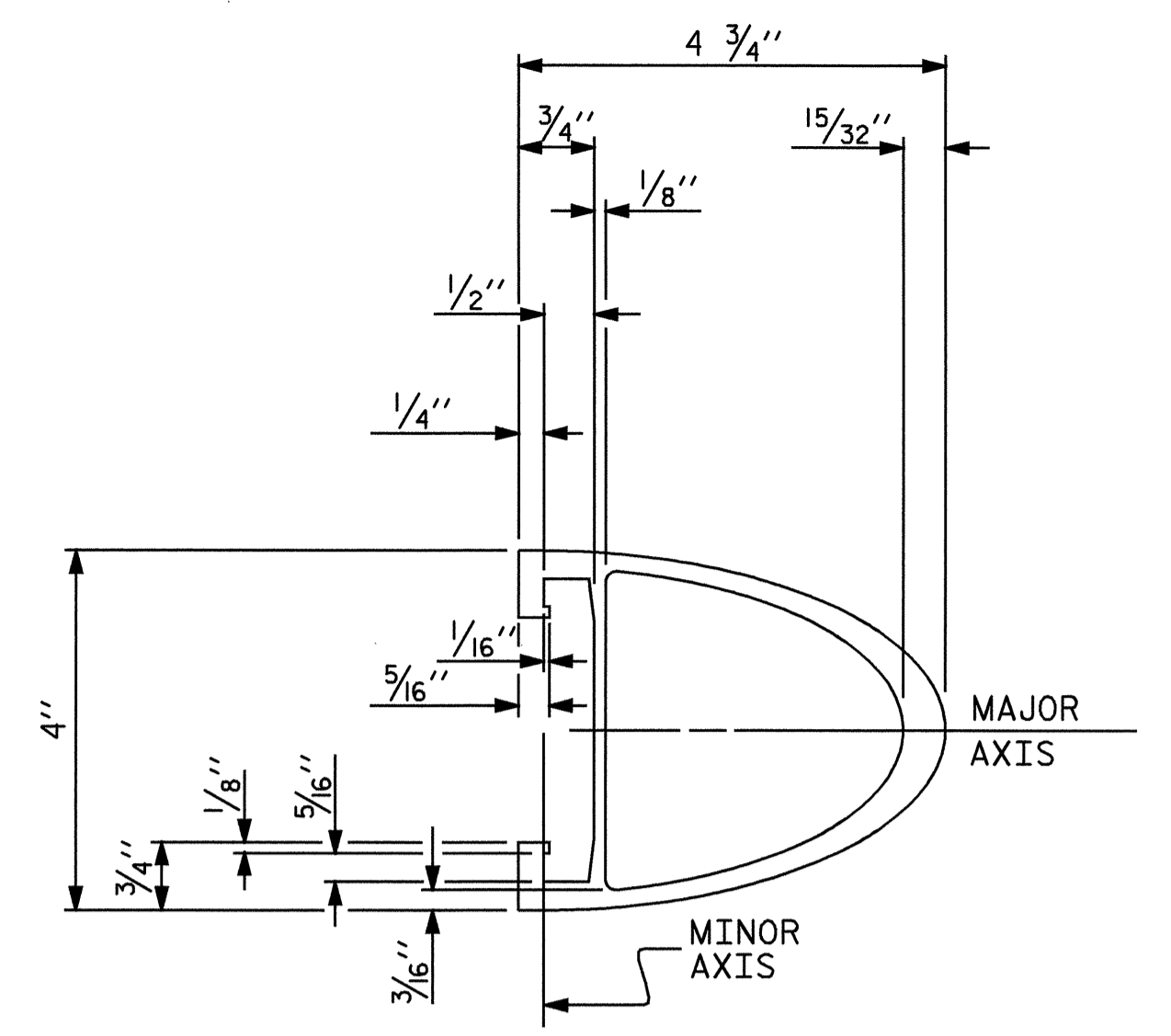


**BOTTOM RAIL CAP**

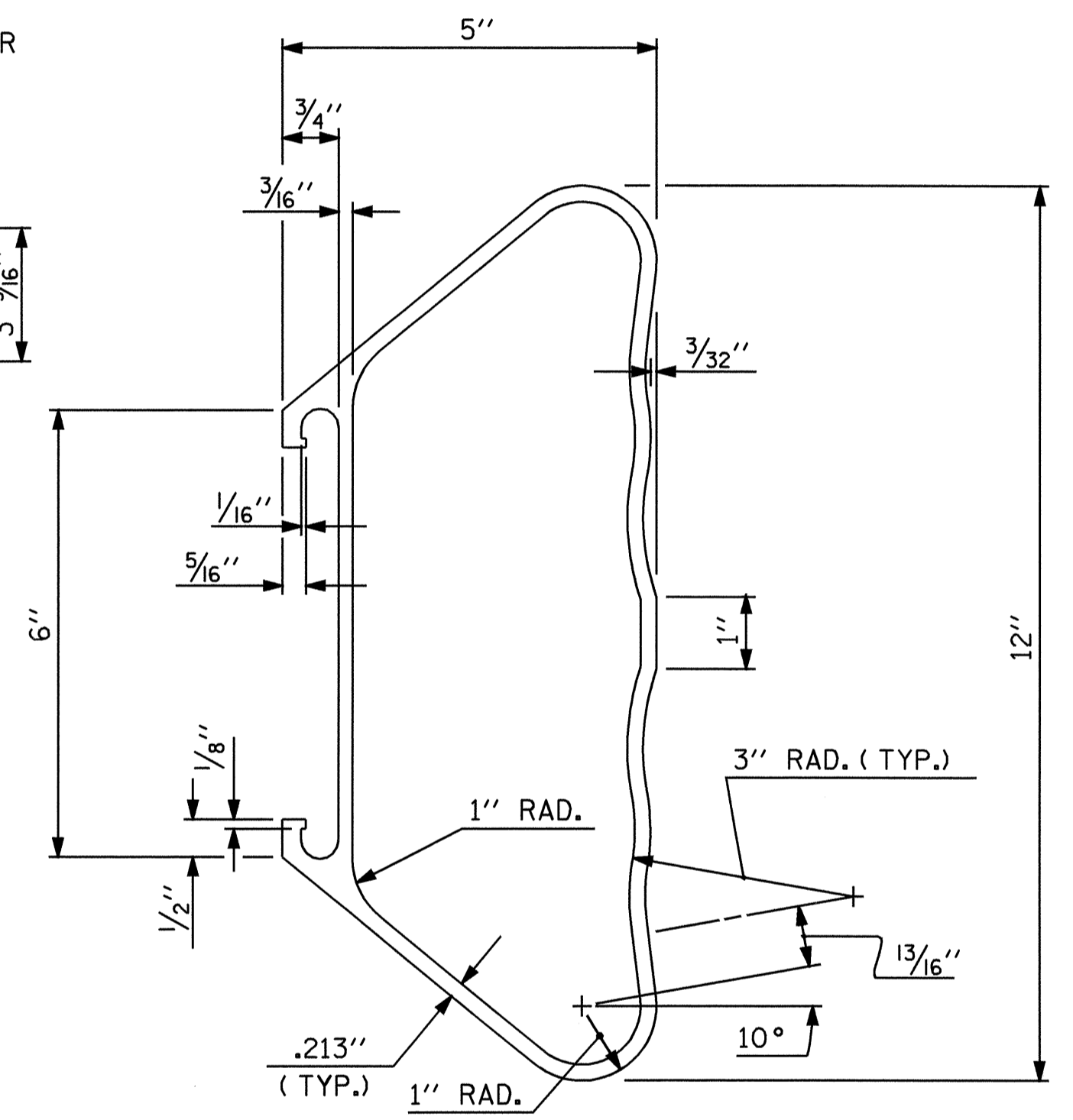
23-JUN-2008 15:31  
R:\Structures\Final Plans\B4059.sd.BR.dgn  
jmya

**NOTES**

- STRUCTURAL CONCRETE ANCHOR ASSEMBLY
- THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- 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.
  - 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.
  - 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.
  - 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.
  - THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
  - 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.
  - BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



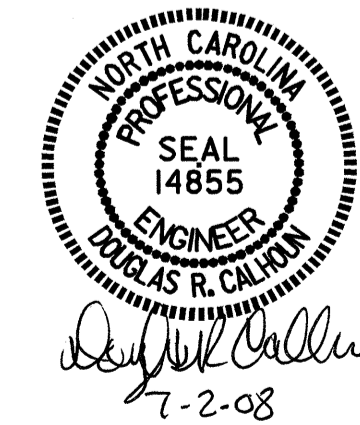
**TOP & MIDDLE RAIL SECTION**



**BOTTOM RAIL SECTION**

PROJECT NO. B-4059  
CATAWBA COUNTY  
STATION: 17+87.50 -EL-

SHEET 2 OF 5



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
3 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-12
					TOTAL SHEETS 26

ASSEMBLED BY : J. MYA	DATE : 10/07
CHECKED BY : B. N. GRADY	DATE : 2/6/08
DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/1/03 RWW/JTE
	REV. 5/1/06 TLA/GM

STD. NO. BMR6

NOTES

METAL RAIL TO END POST CONNECTION

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60° F. 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 (STD. No. BMR6 ).

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.

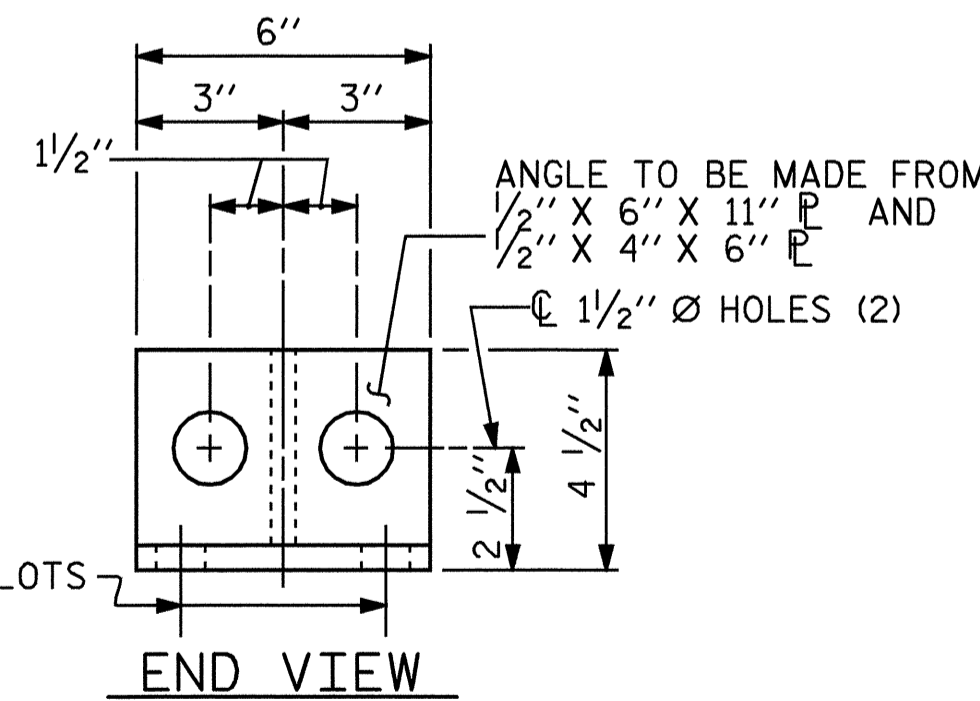
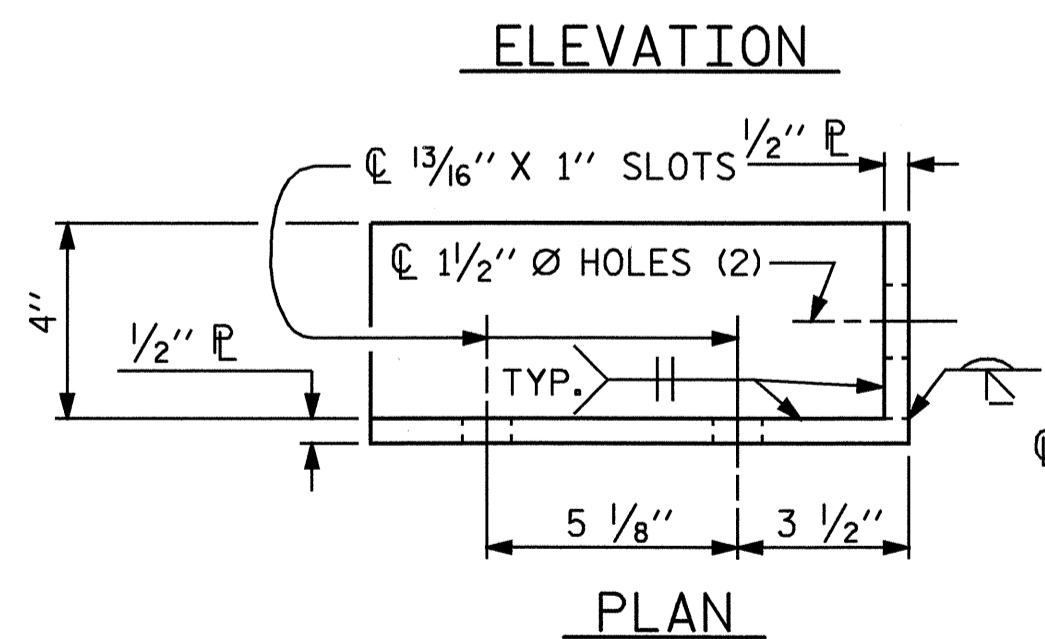
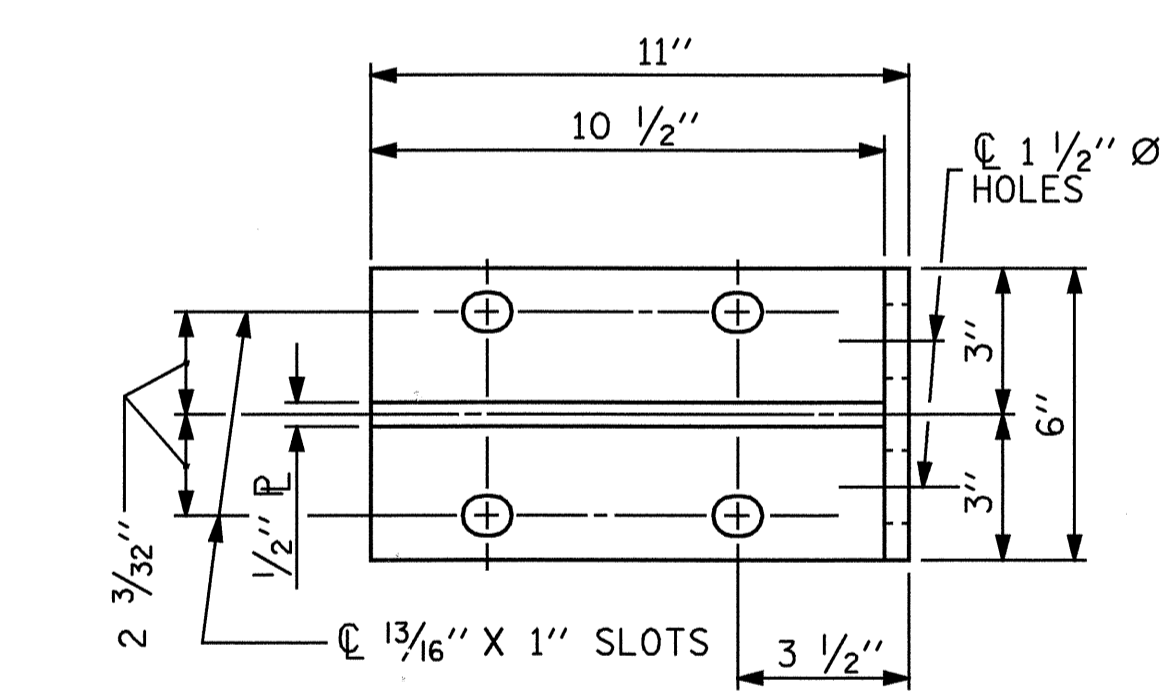
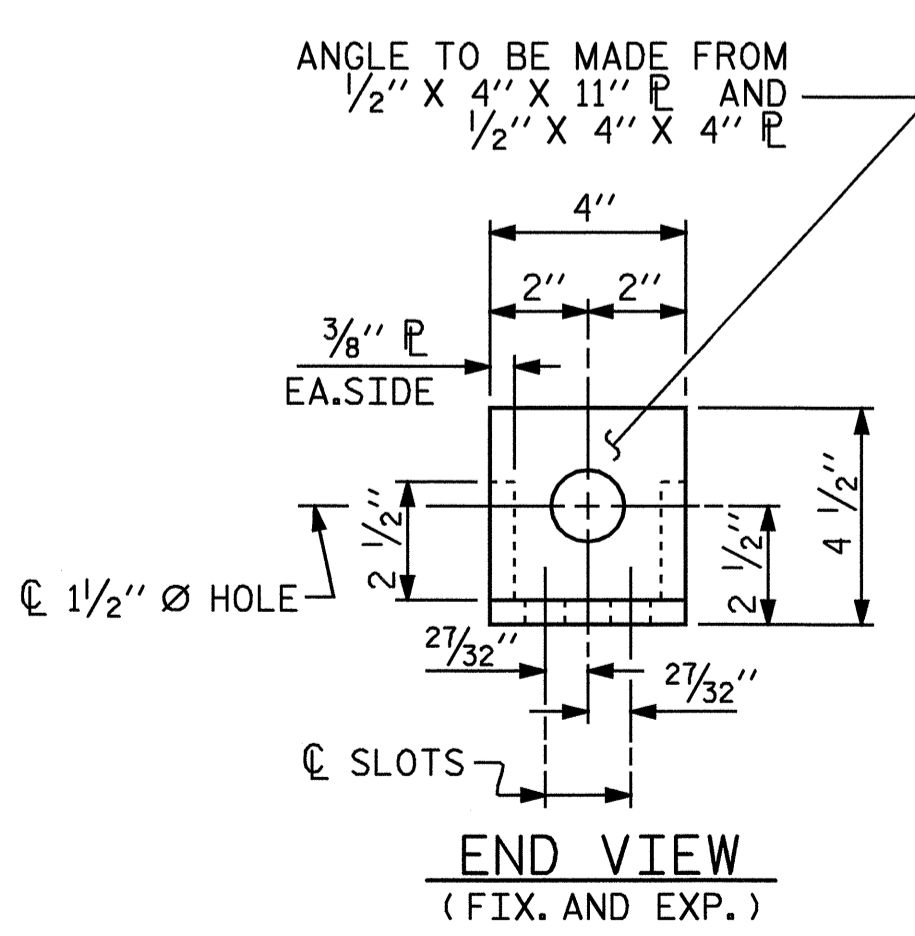
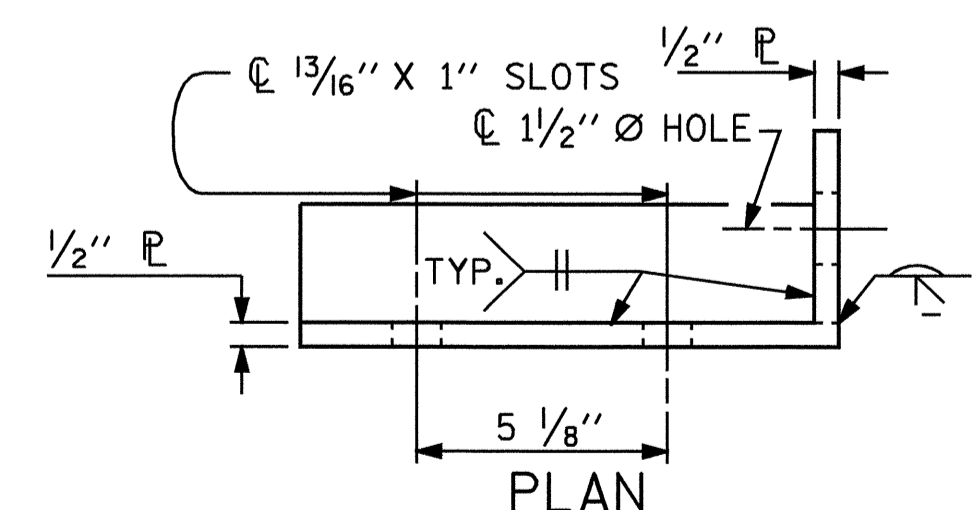
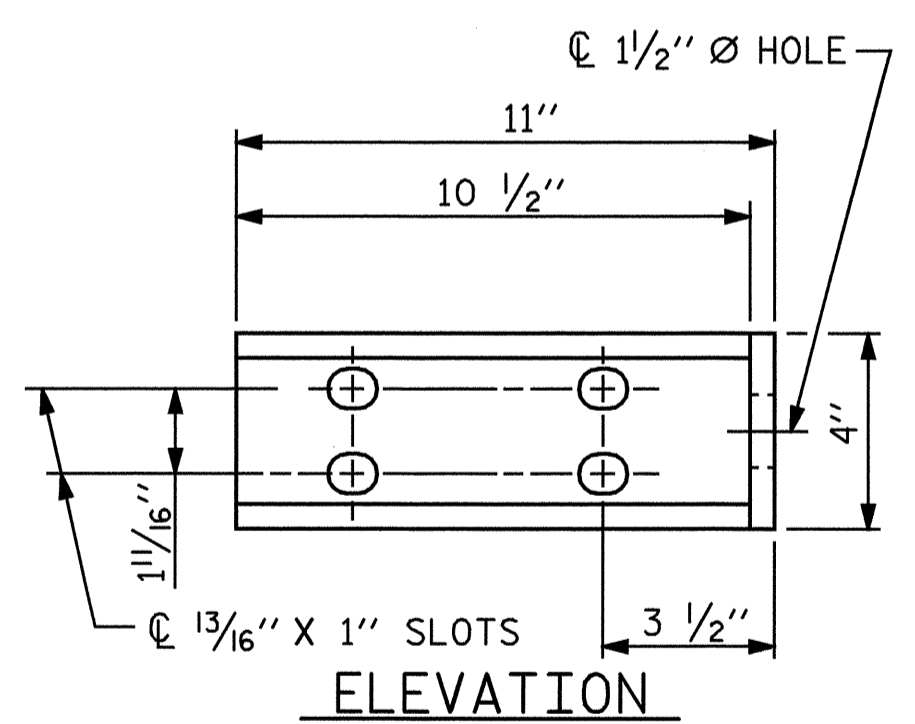
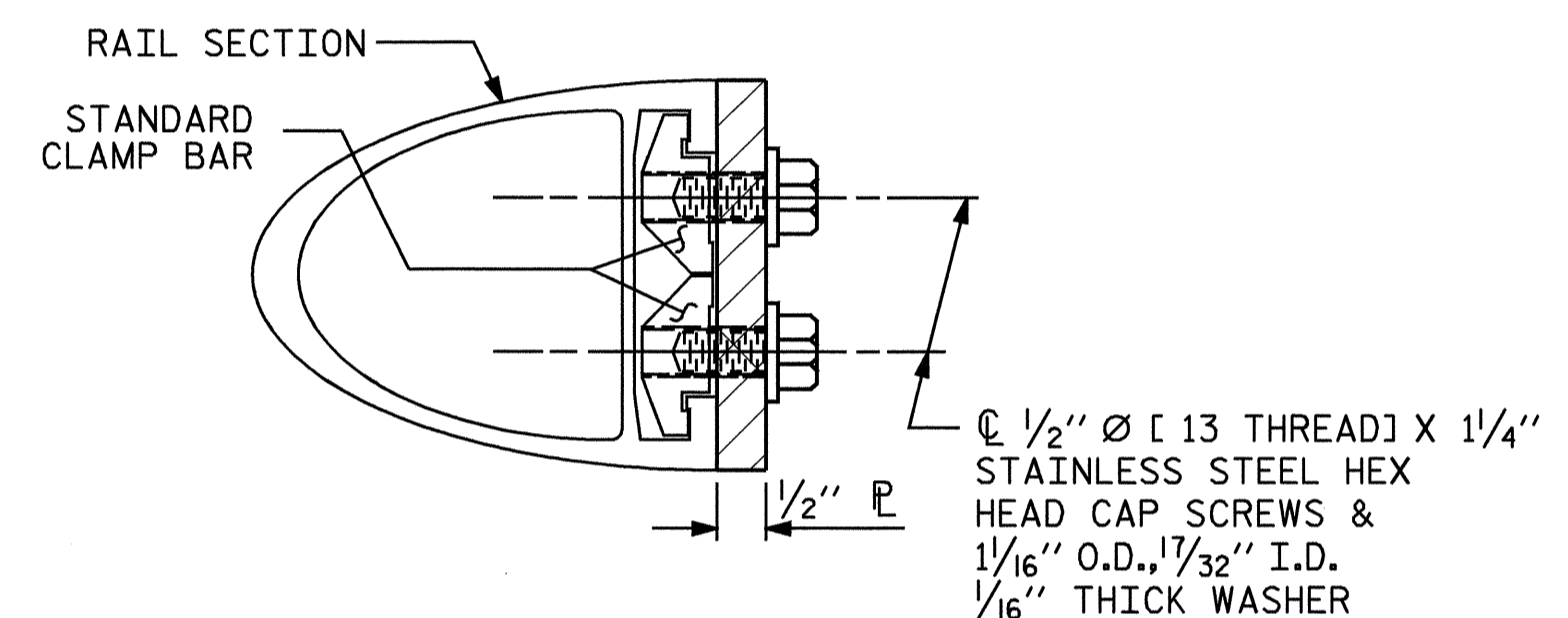
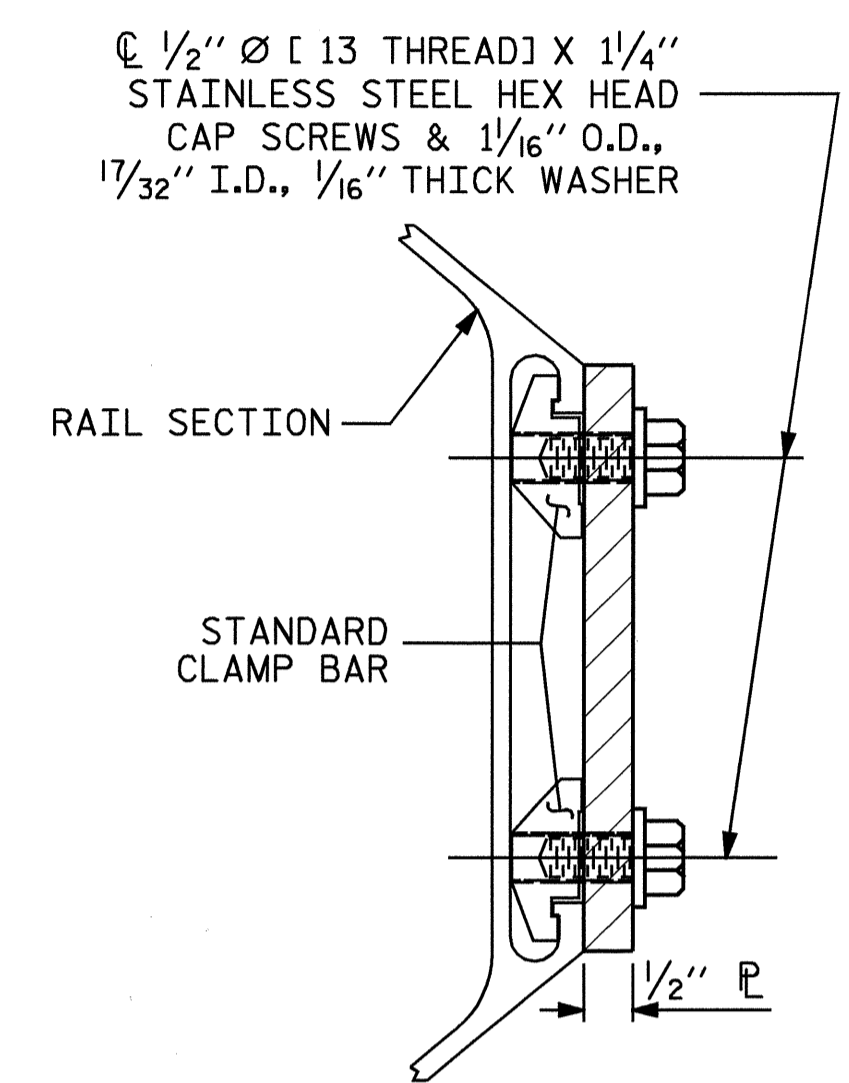
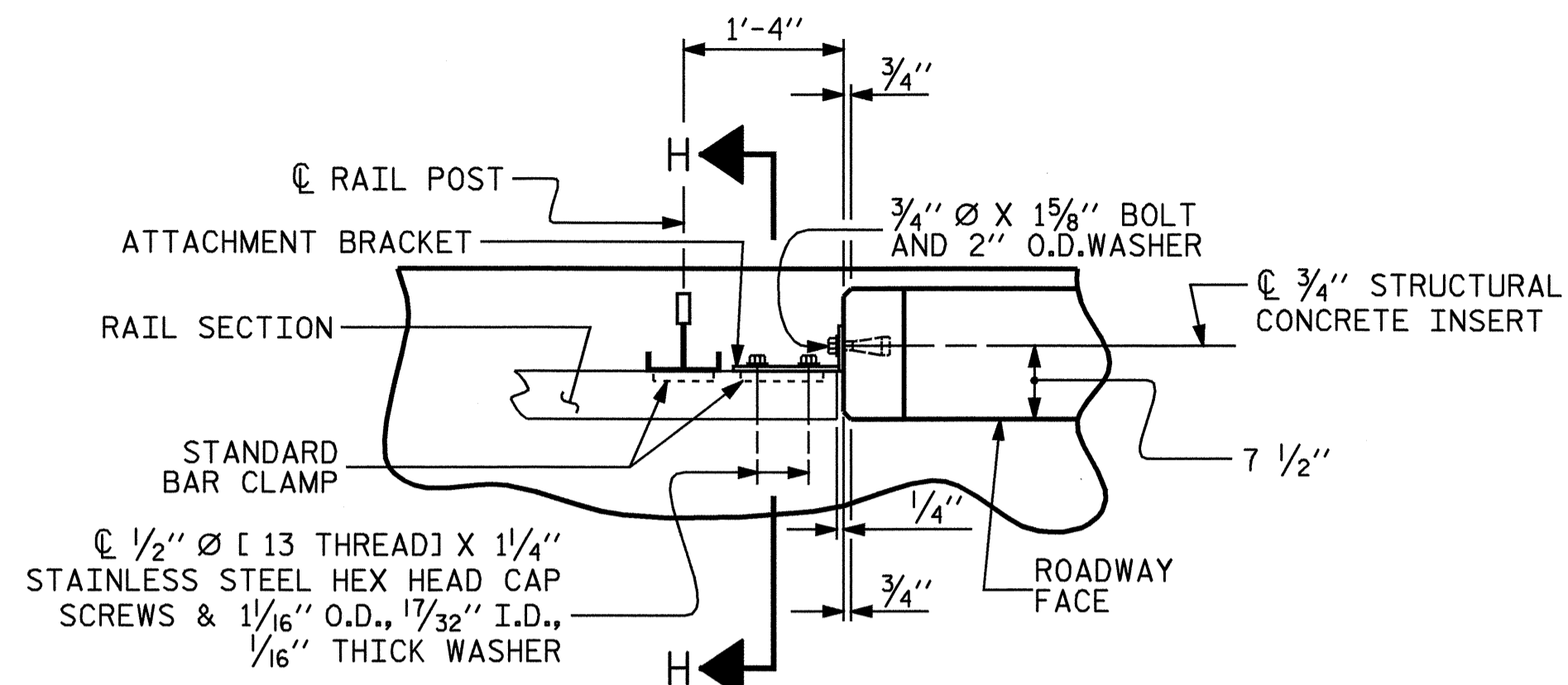
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT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

NOTES

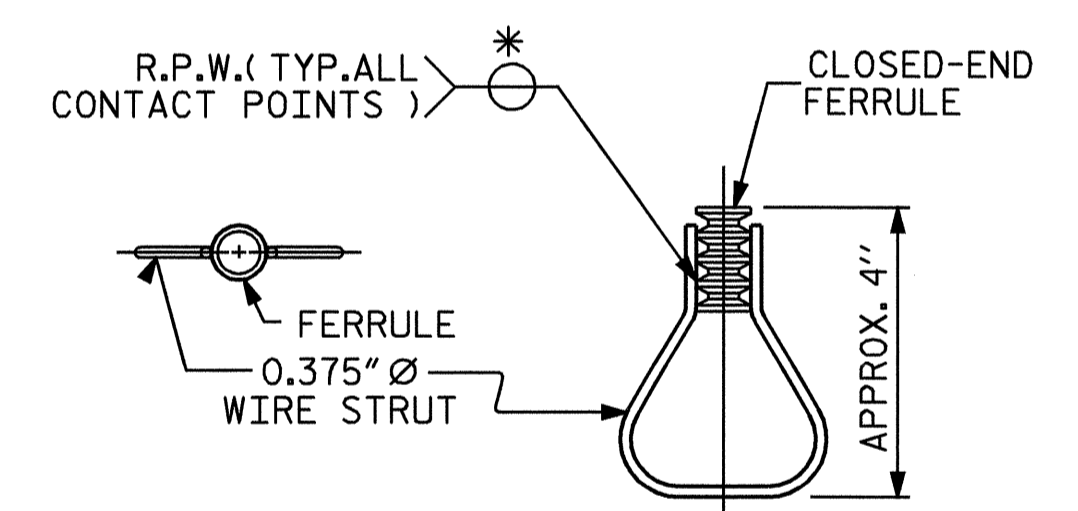
STRUCTURAL CONCRETE INSERT

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

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



DETAILS FOR ATTACHMENT BRACKET  
(BOTTOM RAIL ONLY)



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. B-4059  
CATAWBA COUNTY  
STATION: 17+87.50 -EL-

SHEET 3 OF 5

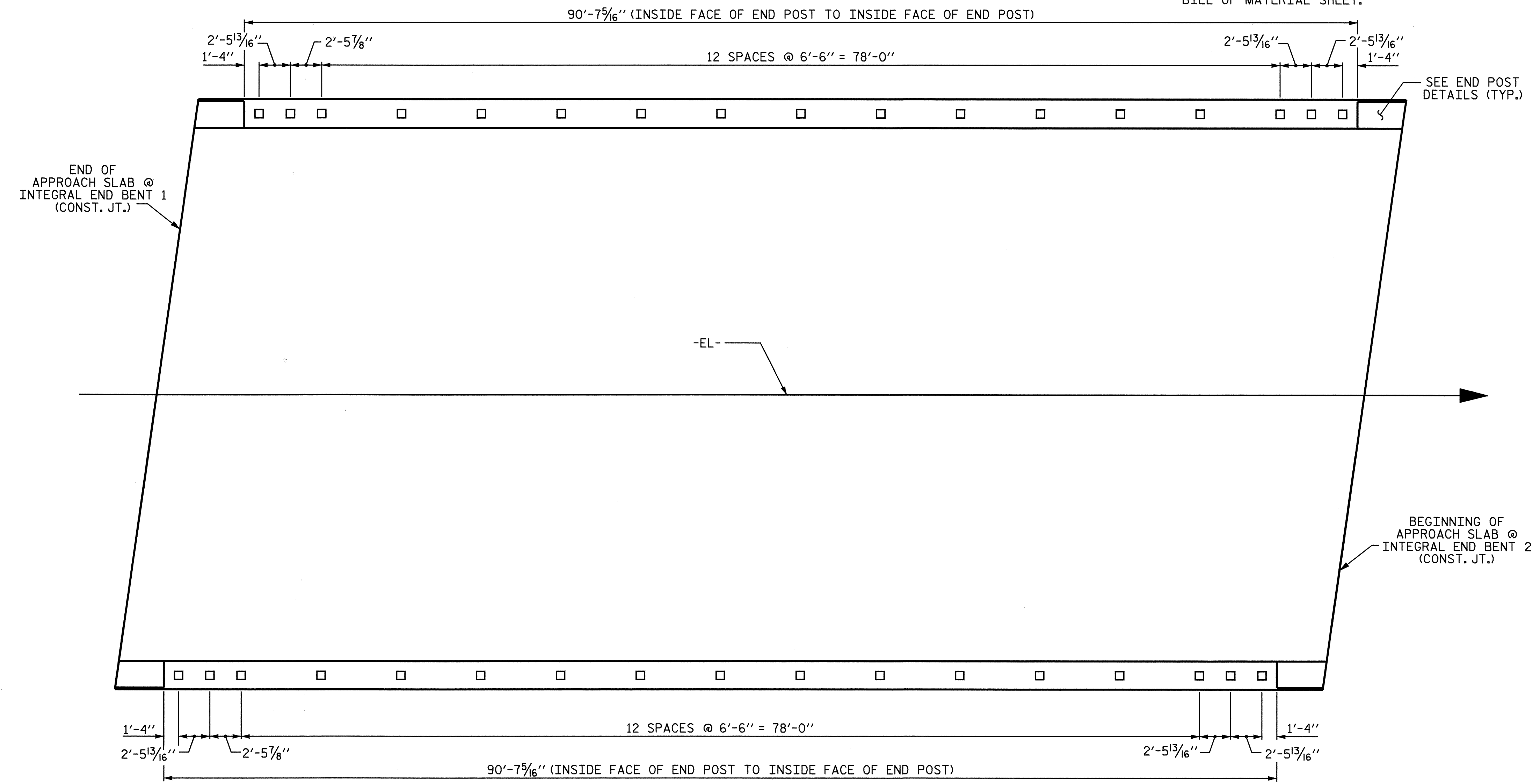


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
3 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-13
					TOTAL SHEETS 26

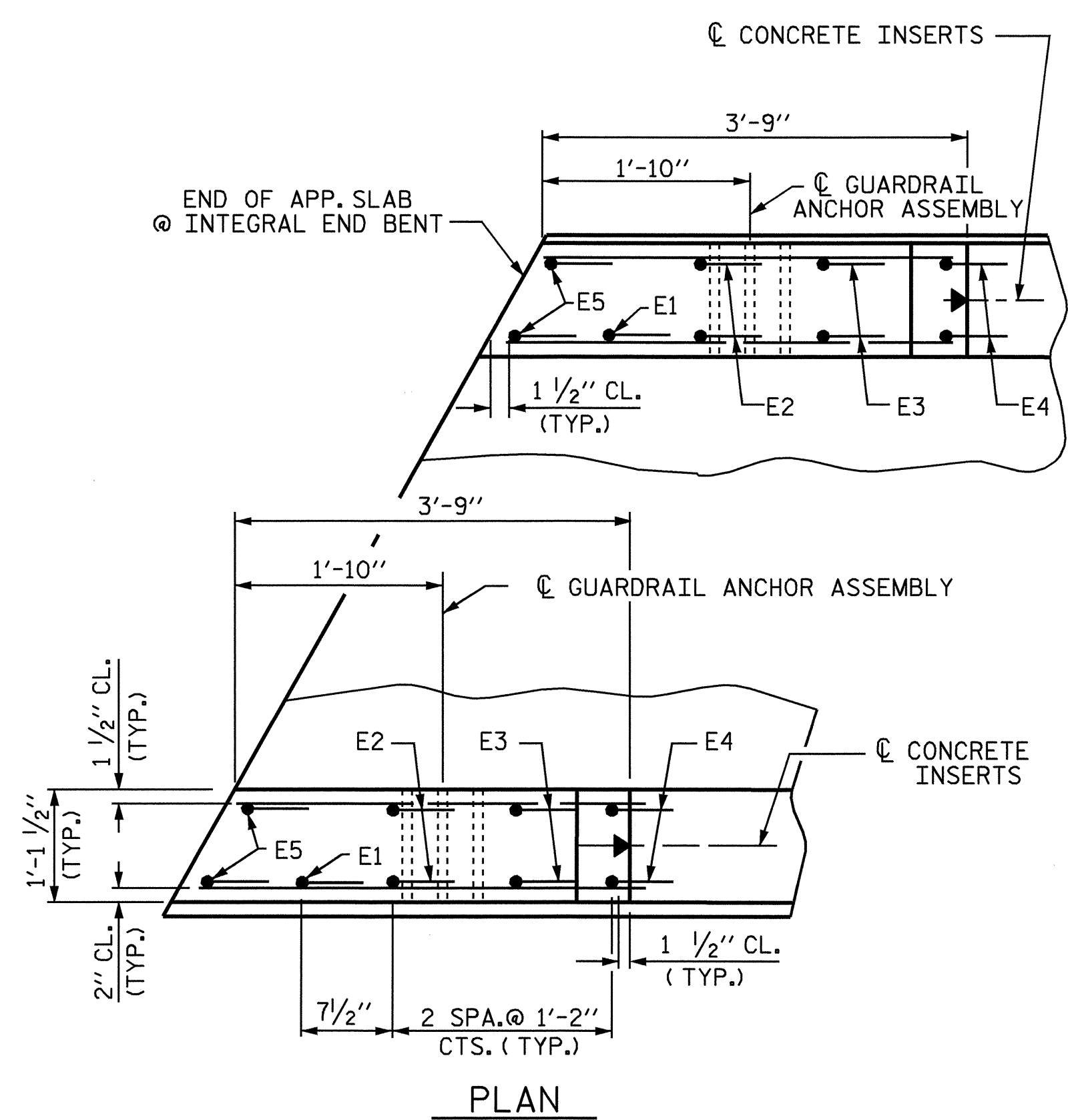
ASSEMBLED BY : J.M.YA	DATE : 10/07
CHECKED BY : B.N. GRADY	DATE : 2/6/08
DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/1/03 RWW/JTE
	REV. 5/1/06 TLA/GM



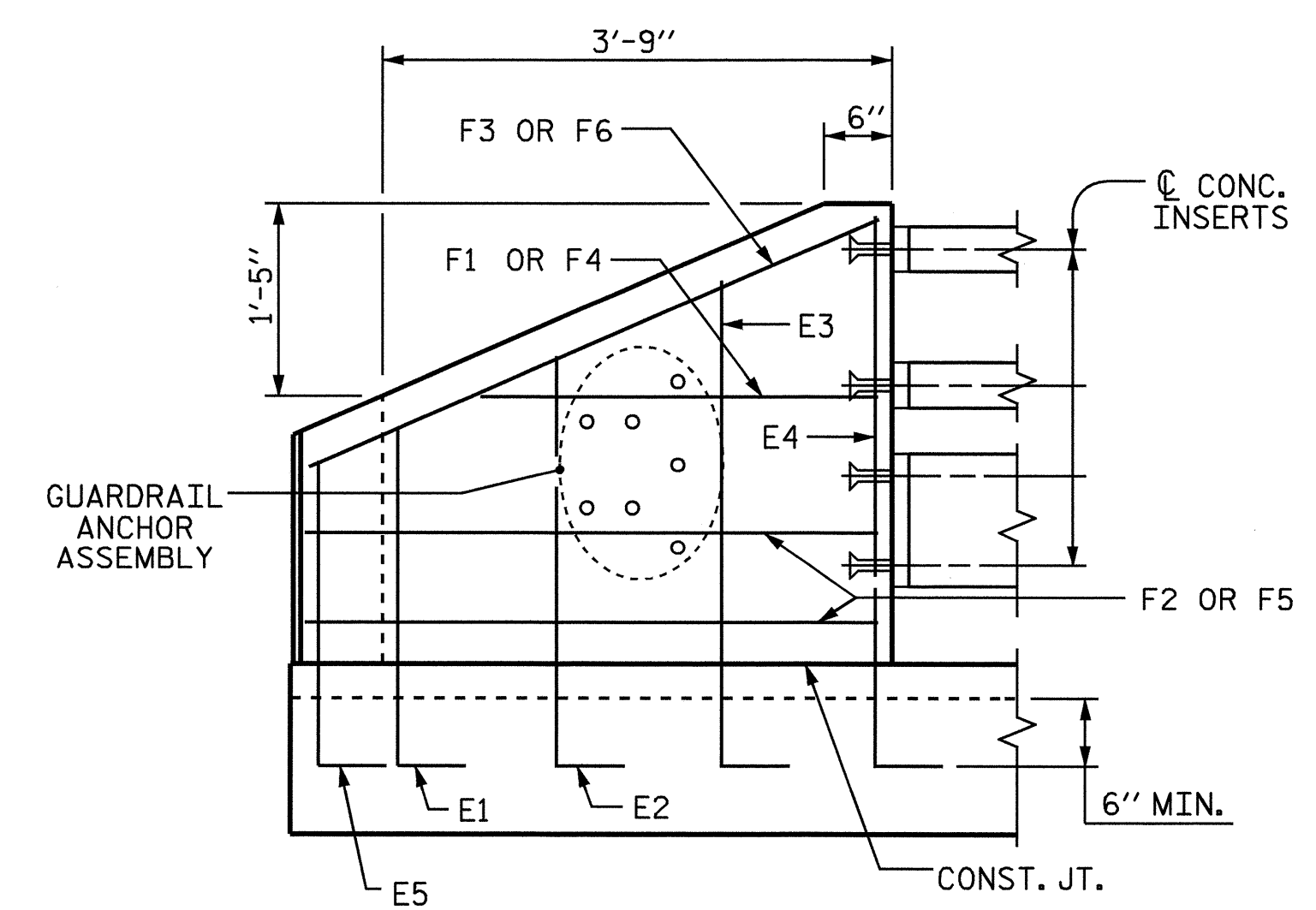
NOTE: REINFORCING STEEL INCLUDED IN SUPERSTRUCTURE BILL OF MATERIAL SHEET.



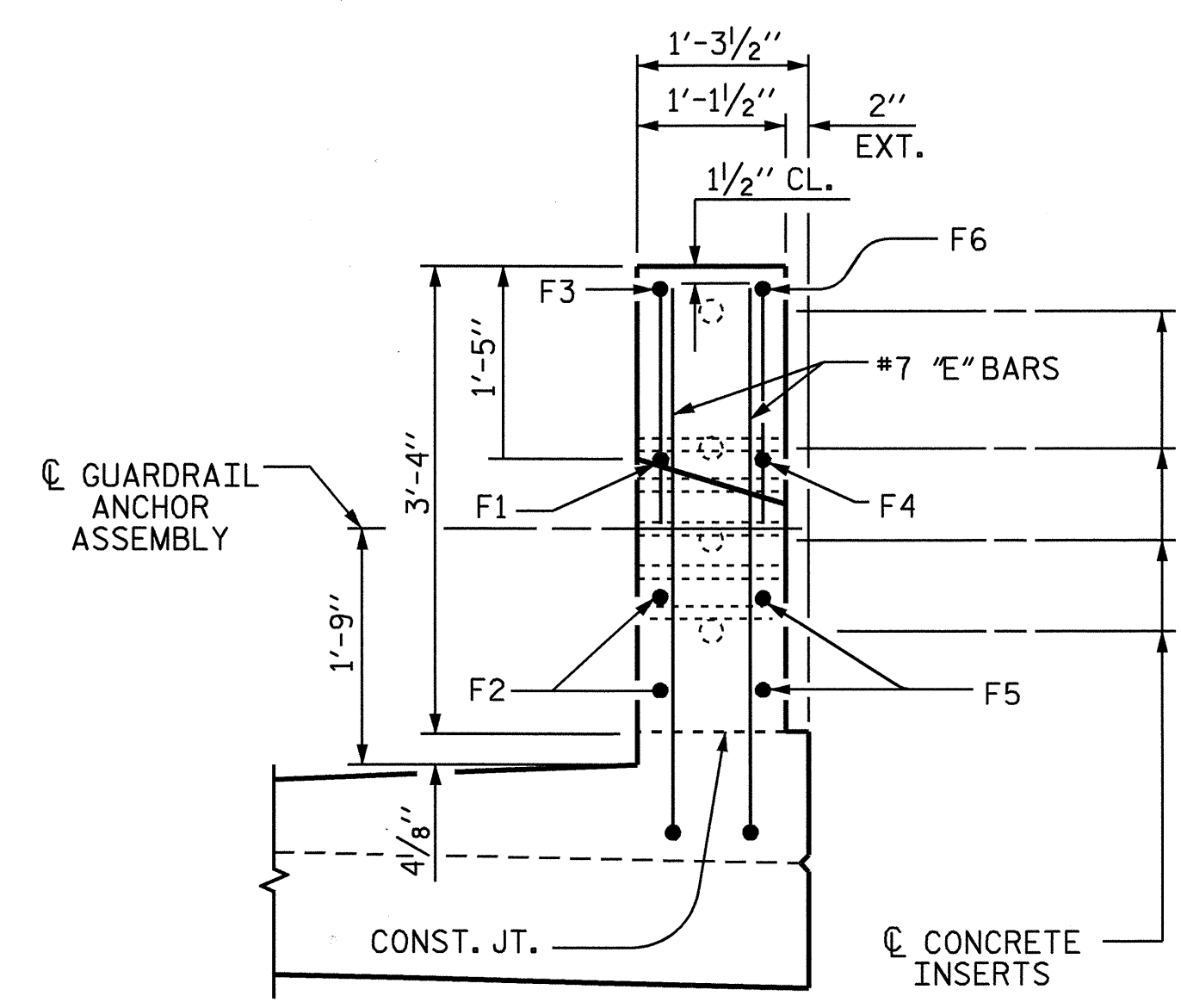
PLAN OF RAIL POST SPACINGS



PLAN



ELEVATION



END VIEW

END POST DETAILS

DRAWN BY : J. MYA DATE : 12/07  
 CHECKED BY : B. N. GRADY DATE : 2/6/07

23-JUN-2008 15:31  
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 jmya



PROJECT NO. B-4059  
 CATAWBA COUNTY  
 STATION: 17+87.50 -EL-  
 SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 RAIL POST SPACINGS  
 AND  
 END OF RAIL DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14	
1			3			TOTAL SHEETS	
2			4			26	



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.

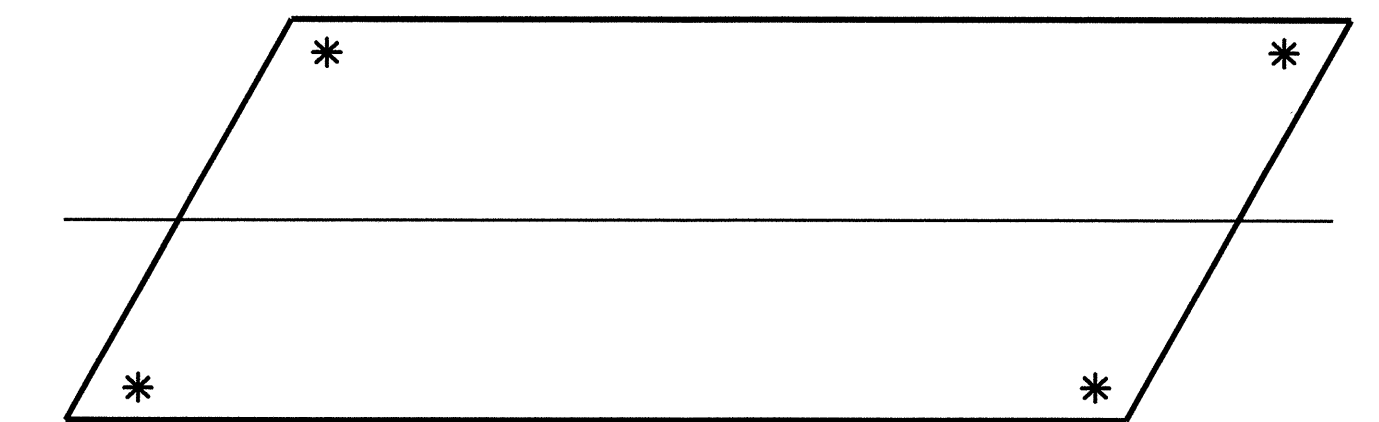
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

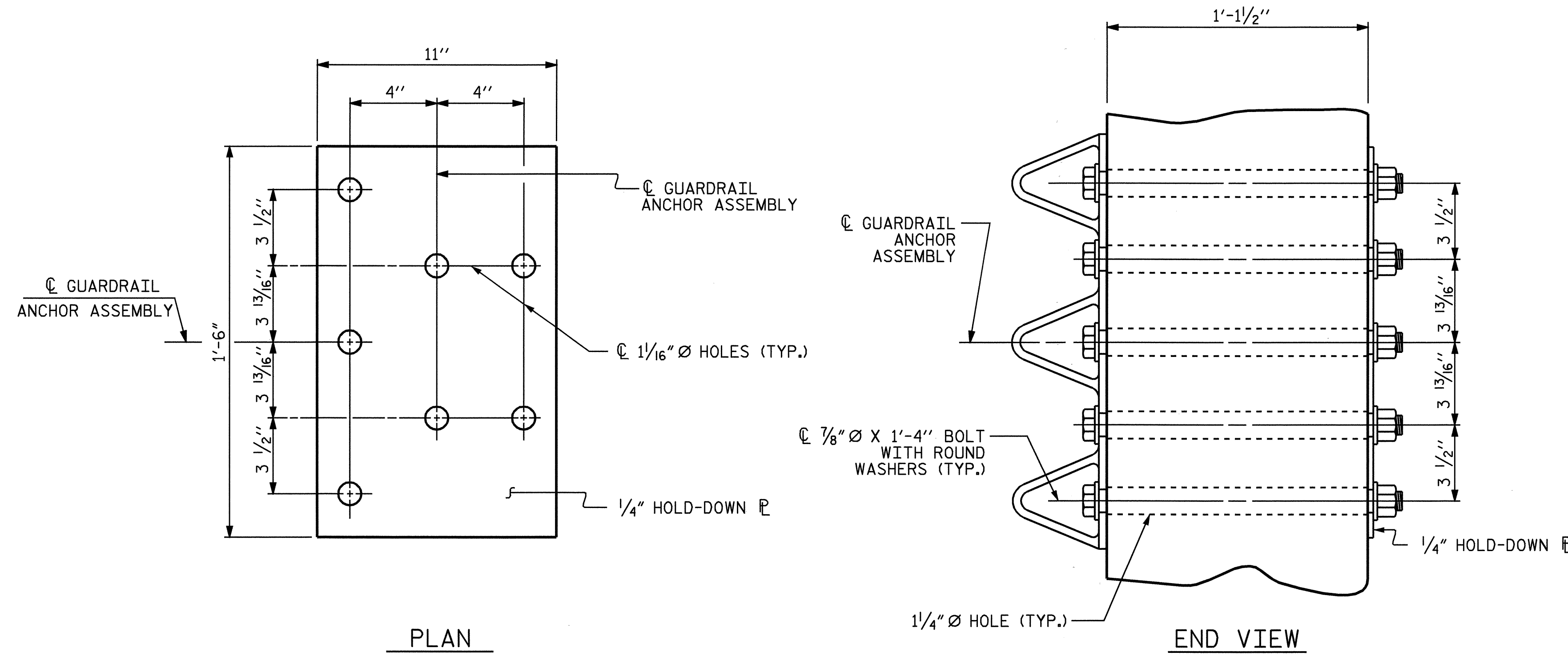
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

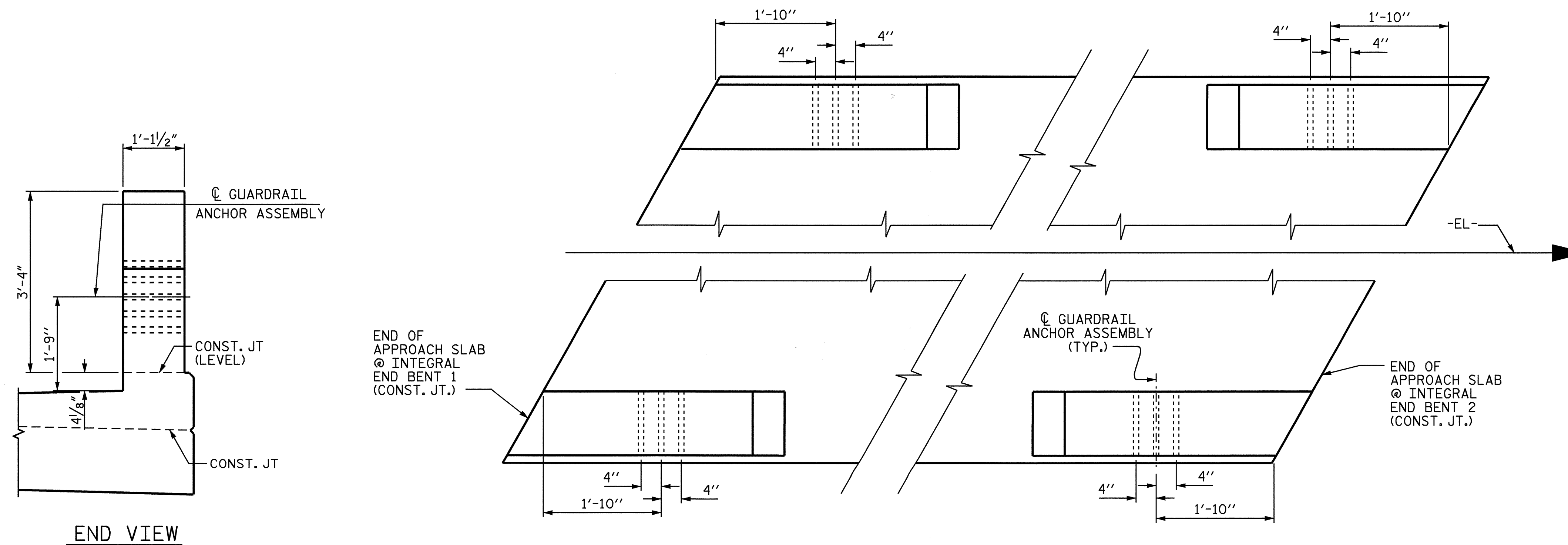
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SKETCH SHOWING POINTS OF ATTACHMENT  
\* LOCATION OF GUARDRAIL ATTACHMENT



GUARDRAIL ANCHOR ASSEMBLY DETAILS

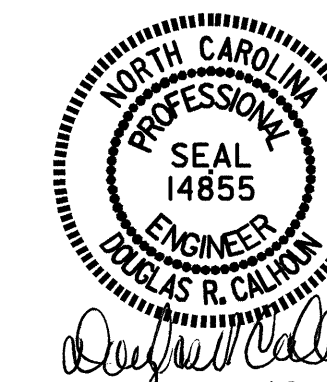


LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-4059  
CATAWBA COUNTY  
STATION: 17+87.50 -EL-

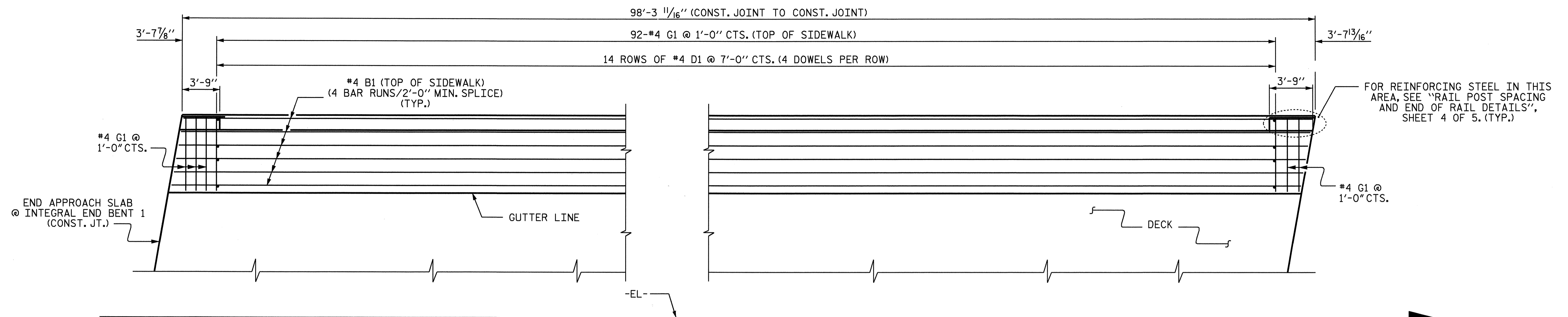
SHEET 5 OF 5

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

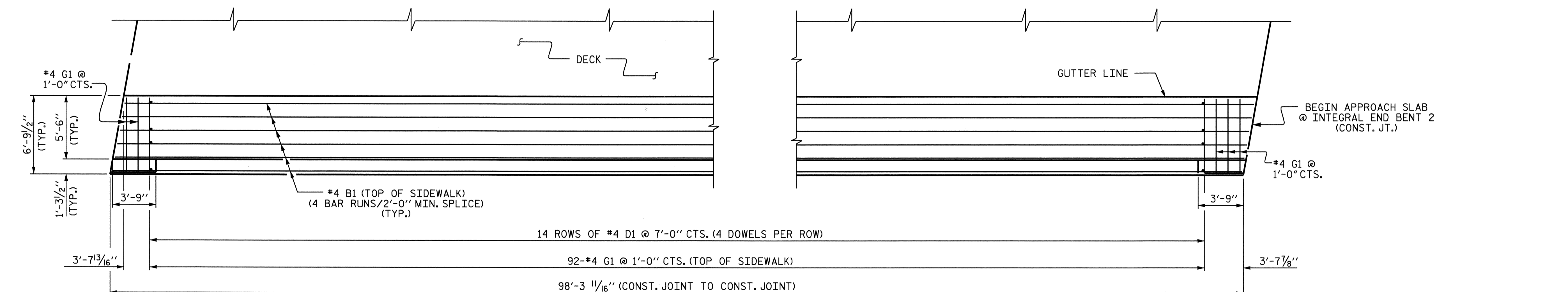


ASSEMBLED BY : J. MYA	DATE : 12/07
CHECKED BY : B.N. GRADY	DATE : 2/7/08
DRAWN BY : EEM 6/94	REV. 10/17/00 RWW/LES
CHECKED BY : RGW 6/94	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

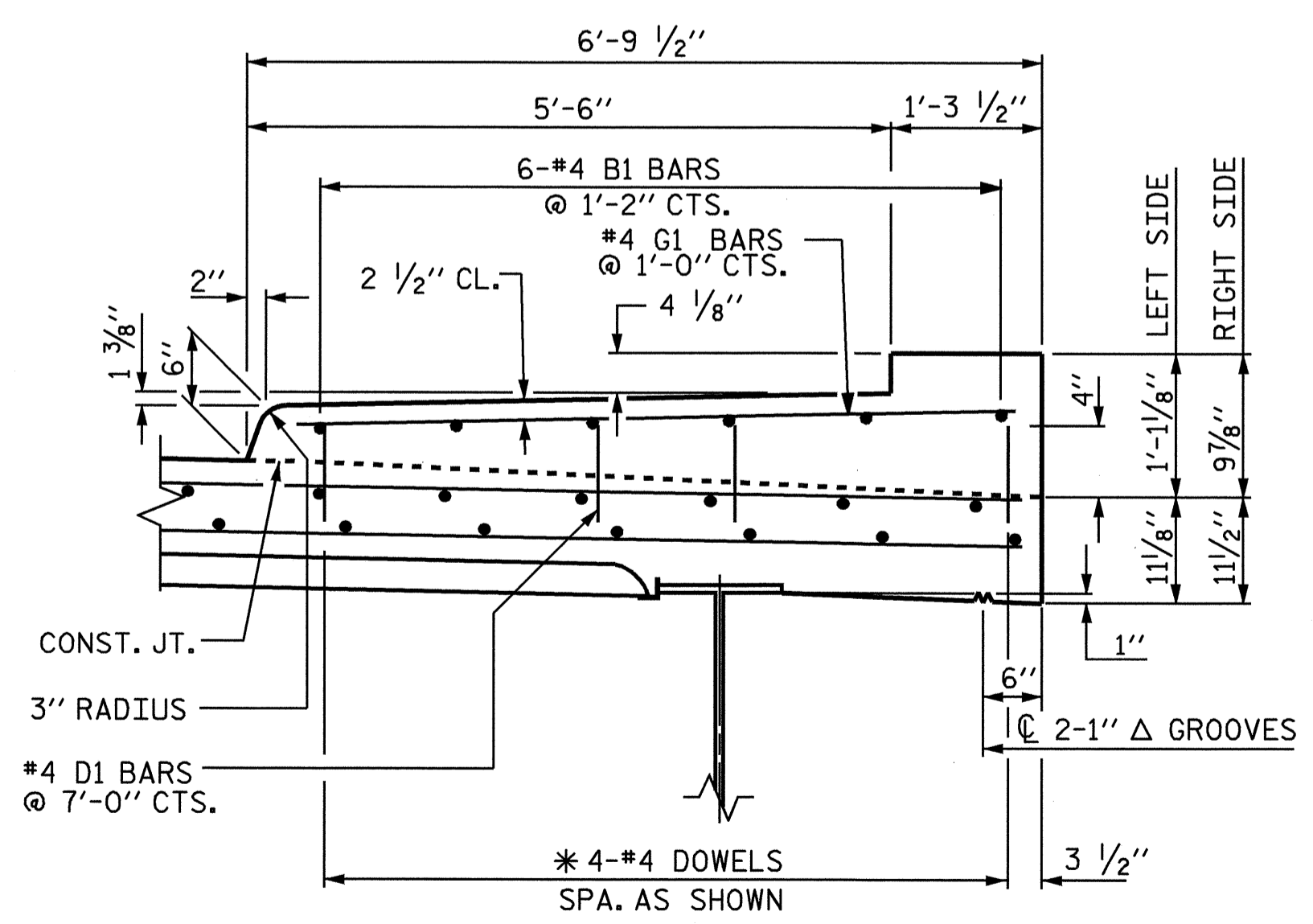
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			26



FOR REINFORCING STEEL IN THIS AREA, SEE "RAIL POST SPACING AND END OF RAIL DETAILS", SHEET 4 OF 5. (TYP.)



**PLAN OF SIDEWALK**



**SECTION THRU SIDEWALK**

\* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

**NOTES**

- FOR END POST DETAILS AND REINFORCING STEEL, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEETS.
- THE SIDEWALK IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.
- ALL REINFORCING STEEL IN SIDEWALKS SHALL BE EPOXY COATED.
- SIDEWALK REINFORCING STEEL AND CONCRETE ON BRIDGE SHALL BE INCLUDED IN THE PAY ITEM FOR "REINFORCED CONCRETE DECK SLAB".
- GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 SIDEWALK DETAILS**

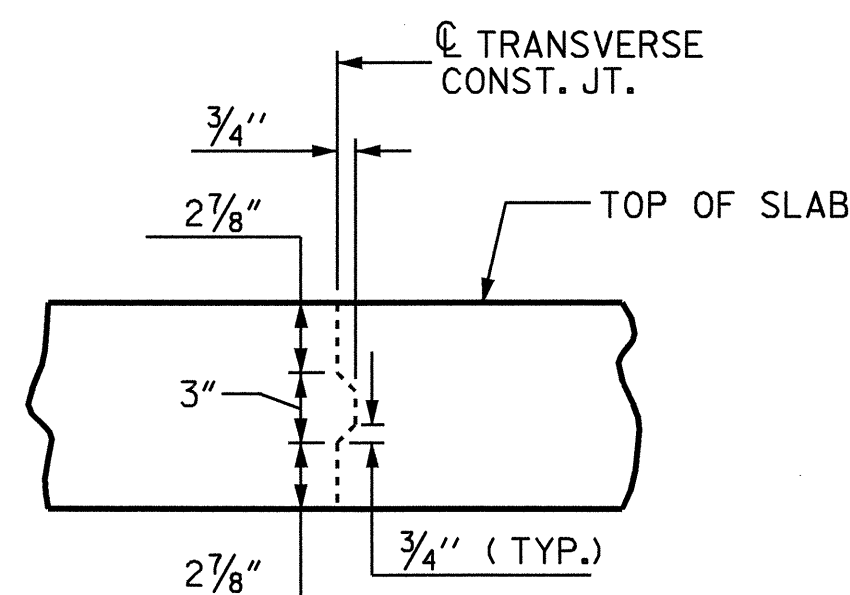
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-16	
1			3			TOTAL SHEETS	26
2			4				



DRAWN BY : J. MYA DATE : 12/07  
 CHECKED BY : B. N. GRADY DATE : 2/7/08

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

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

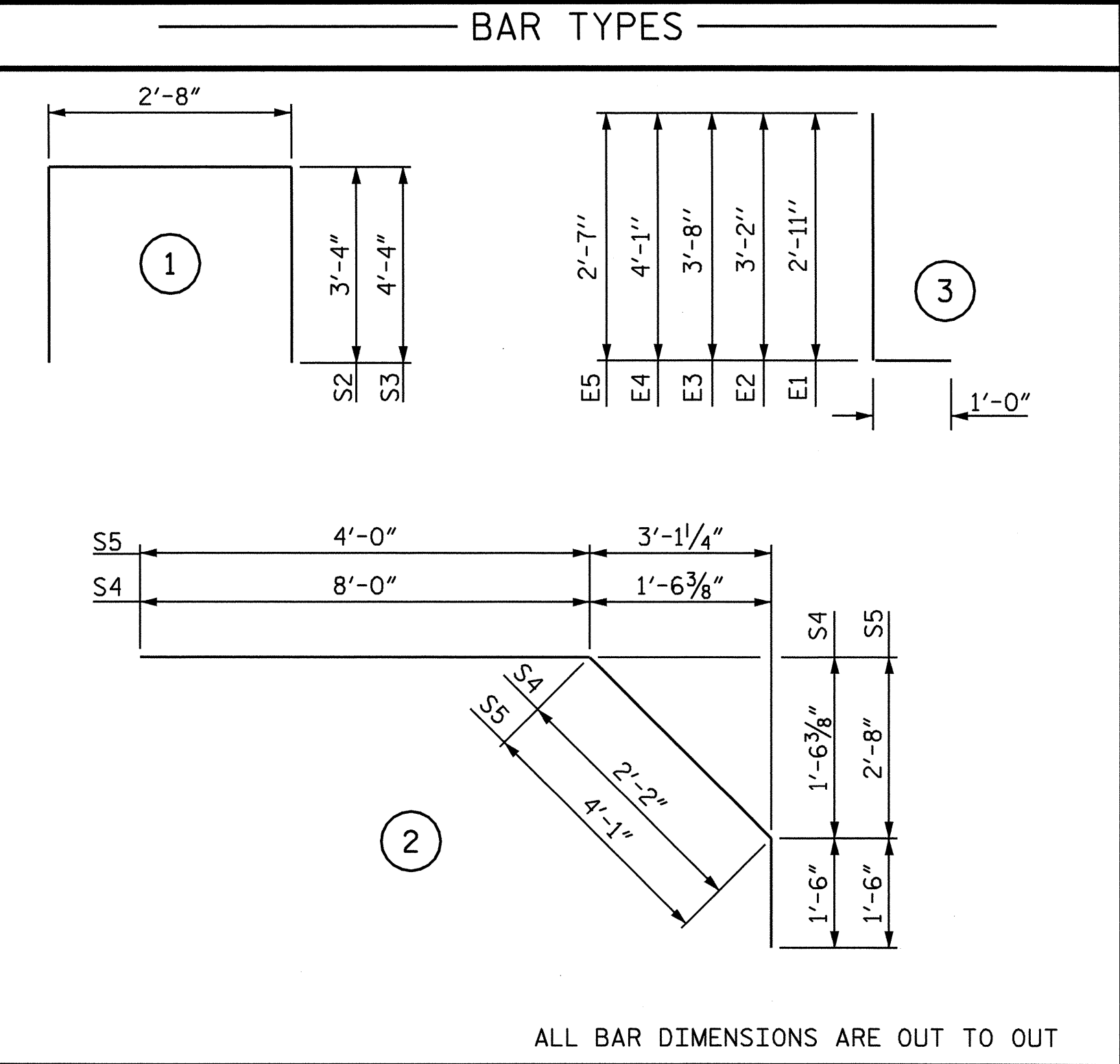


**TRANSVERSE CONSTRUCTION JOINT DETAIL**

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

**REINFORCING BAR SCHEDULE**

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	167	#5	STR	43'-3"	7533	*F1	4	#6	STR	3'-1"	19
A2	167	#5	STR	43'-3"	7533	*F2	8	#6	STR	3'-5"	41
*A101	2	#5	STR	41'-4"	86	*F3	4	#6	STR	3'-6"	21
*A102	2	#5	STR	38'-3"	80	*F4	4	#6	STR	3'-3"	20
*A103	2	#5	STR	35'-2"	73	*F5	8	#6	STR	3'-7"	43
*A104	2	#5	STR	32'-2"	67	*F6	4	#6	STR	3'-8"	22
*A105	2	#5	STR	29'-1"	61	*G1	194	#4	STR	6'-3"	810
*A106	2	#5	STR	26'-0"	54	K1	20	#5	STR	50'-0"	1043
*A107	2	#5	STR	22'-11"	48	K2	16	#5	STR	2'-8"	45
*A108	2	#5	STR	19'-10"	41	S2	112	#4	1	9'-4"	698
*A109	2	#5	STR	16'-9"	35	S3	16	#4	1	11'-4"	121
*A110	2	#5	STR	13'-8"	29	*S4	76	#4	2	11'-8"	592
*A111	2	#5	STR	10'-7"	22	*S5	72	#4	2	9'-7"	461
*A112	2	#5	STR	7'-7"	16						
*A113	2	#5	STR	4'-6"	9						
A201	2	#5	STR	41'-4"	86						
A202	2	#5	STR	38'-3"	80						
A203	2	#5	STR	35'-3"	73						
A204	2	#5	STR	32'-2"	67						
A205	2	#5	STR	29'-1"	61						
A206	2	#5	STR	26'-0"	54						
A207	2	#5	STR	22'-11"	48						
A208	2	#5	STR	19'-10"	41						
A209	2	#5	STR	16'-9"	35						
A210	2	#5	STR	13'-8"	29						
A211	2	#5	STR	10'-7"	22						
A212	2	#5	STR	7'-7"	16						
A213	2	#5	STR	4'-6"	9						
*B1	172	#4	STR	26'-0"	2987						
B2	96	#5	STR	50'-1"	5015						
*B3	112	#5	STR	20'-0"	2336						
B4	84	#5	STR	20'-0"	1752						
*D1	112	#4	STR	10"	62						
*E1	4	#7	3	3'-11"	32						
*E2	8	#7	3	4'-2"	68						
*E3	8	#7	3	4'-8"	76						
*E4	8	#7	3	5'-1"	83						
*E5	8	#7	3	3'-7"	59						
						REINFORCING STEEL = 16828 LBS					
						*EPOXY COATED REINF. STEEL = 15886 LBS					

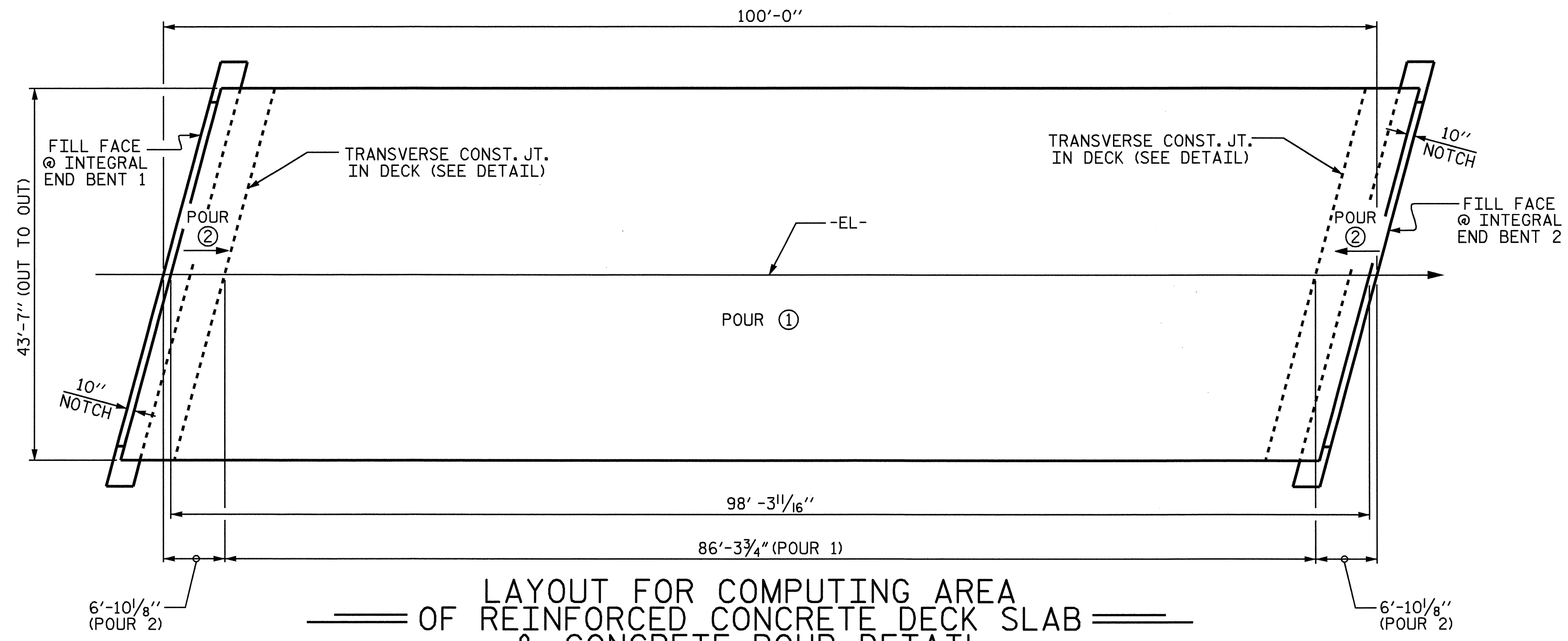


ALL BAR DIMENSIONS ARE OUT TO OUT

**SUPERSTRUCTURE BILL OF MATERIAL**

	CLASS AA CONCRETE (CU. YARDS)	REINFORCING STEEL (LBS)	*EPOXY COATED REINF. STEEL (LBS.)
POUR 1 (DECK)	116.8		
POUR 2 (INTEGRAL END BENTS, DECK & SHEET PILE COPING)	62.5		
POUR 3 (SIDEWALKS)	30.9		
POUR 4 (END POSTS)	1.8		
TOTALS	212.0	16828	15886

GROOVING BRIDGE FLOORS	
APPROACH SLABS	671 SQ. FT.
BRIDGE DECK	2645 SQ. FT.
TOTAL	3316 SQ. FT.



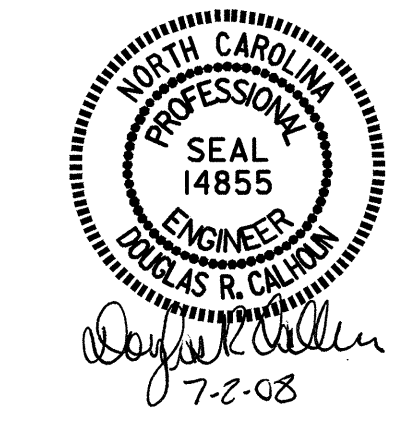
**LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB & CONCRETE POUR DETAIL**

(SQ. FT. = 4358)

NOTE: POUR 2 INCLUDES PARTIAL DECK, END BENT DIAPHRAGMS AND UPPER WINGS OF END BENTS.

DRAWN BY: J. MYA DATE: 12/07  
CHECKED BY: B. N. GRADY DATE: 2/8/08

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gallen

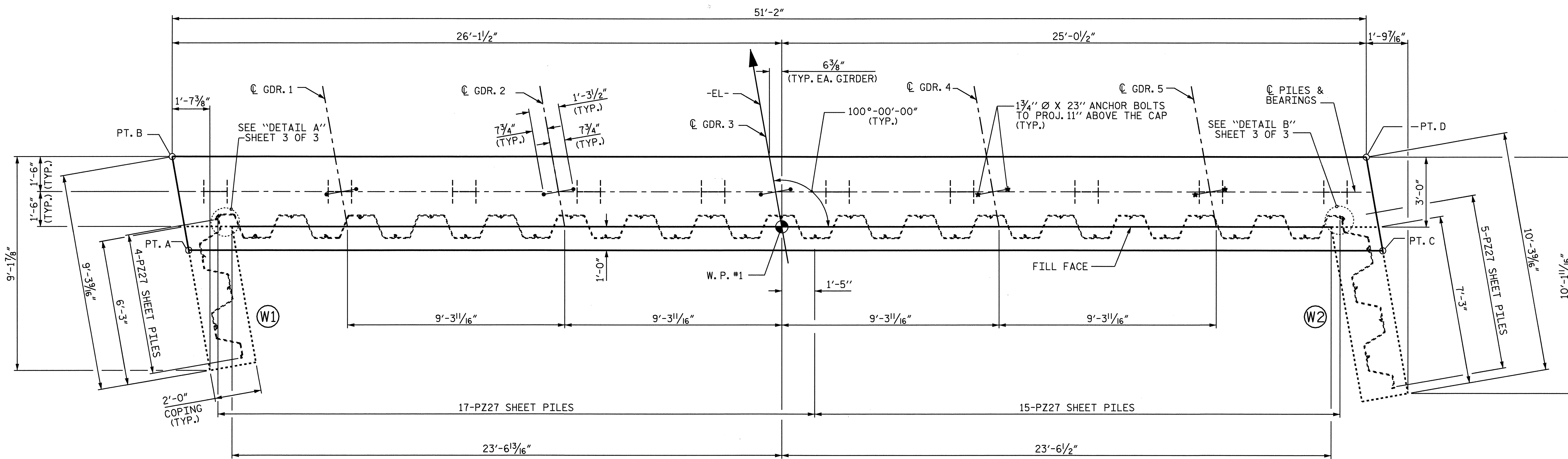


PROJECT NO. B-4059  
CATAWBA COUNTY  
STATION: 17+87.50 -EL-

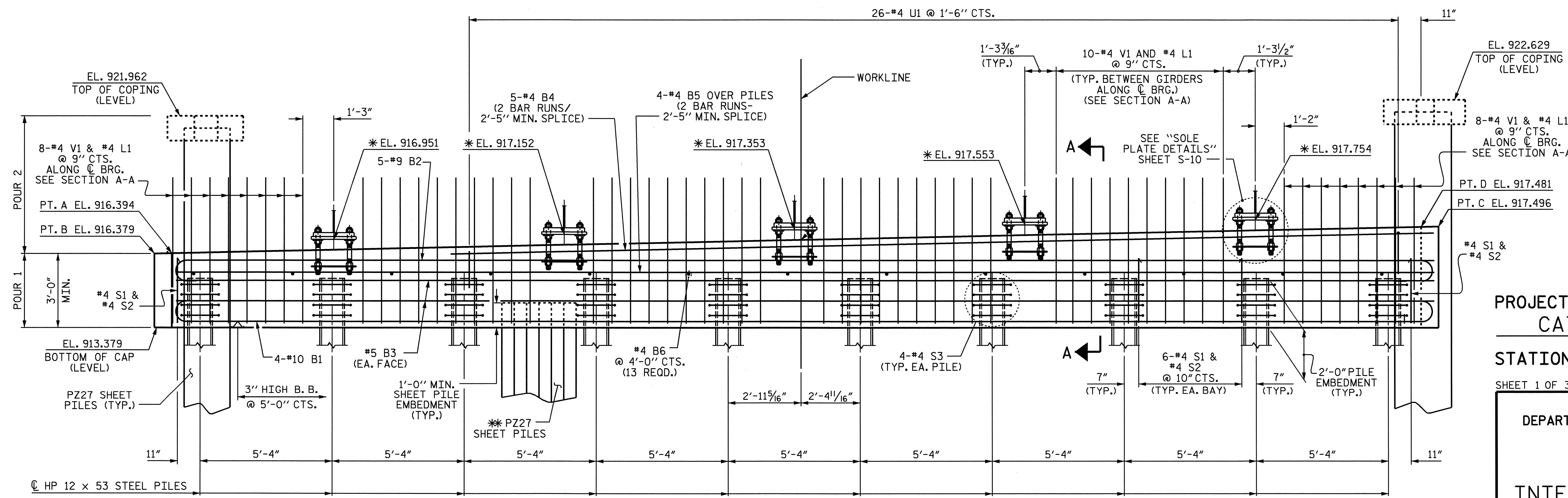
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE BILL OF MATERIAL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-17  
TOTAL SHEETS 26





PLAN



ELEVATION



PROJECT NO. B-4059  
 CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 1 OF 3  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL END BENT 1

DRAWN BY: J. MYA DATE: 12/07  
 CHECKED BY: W. ARAFAT DATE: 2/08

\* BRIDGE SEAT ELEVATIONS ARE TAKEN AT BOTTOM OF SOLE PLATE  
 \*\* NOT ALL SHEET PILING SHOWN FOR CLARITY

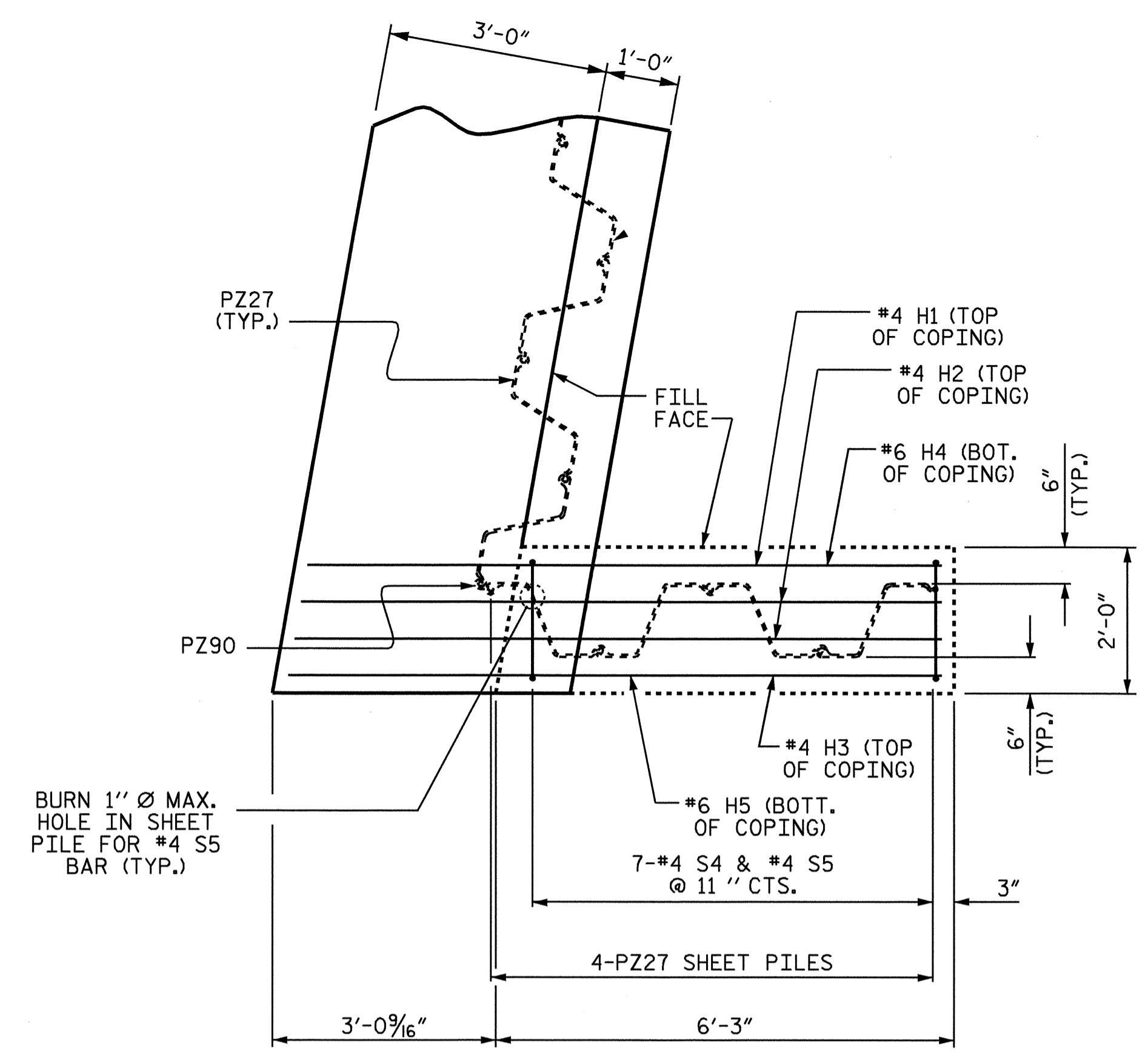
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18	
1			3			TOTAL SHEETS 26	
2			4				

**NOTES**

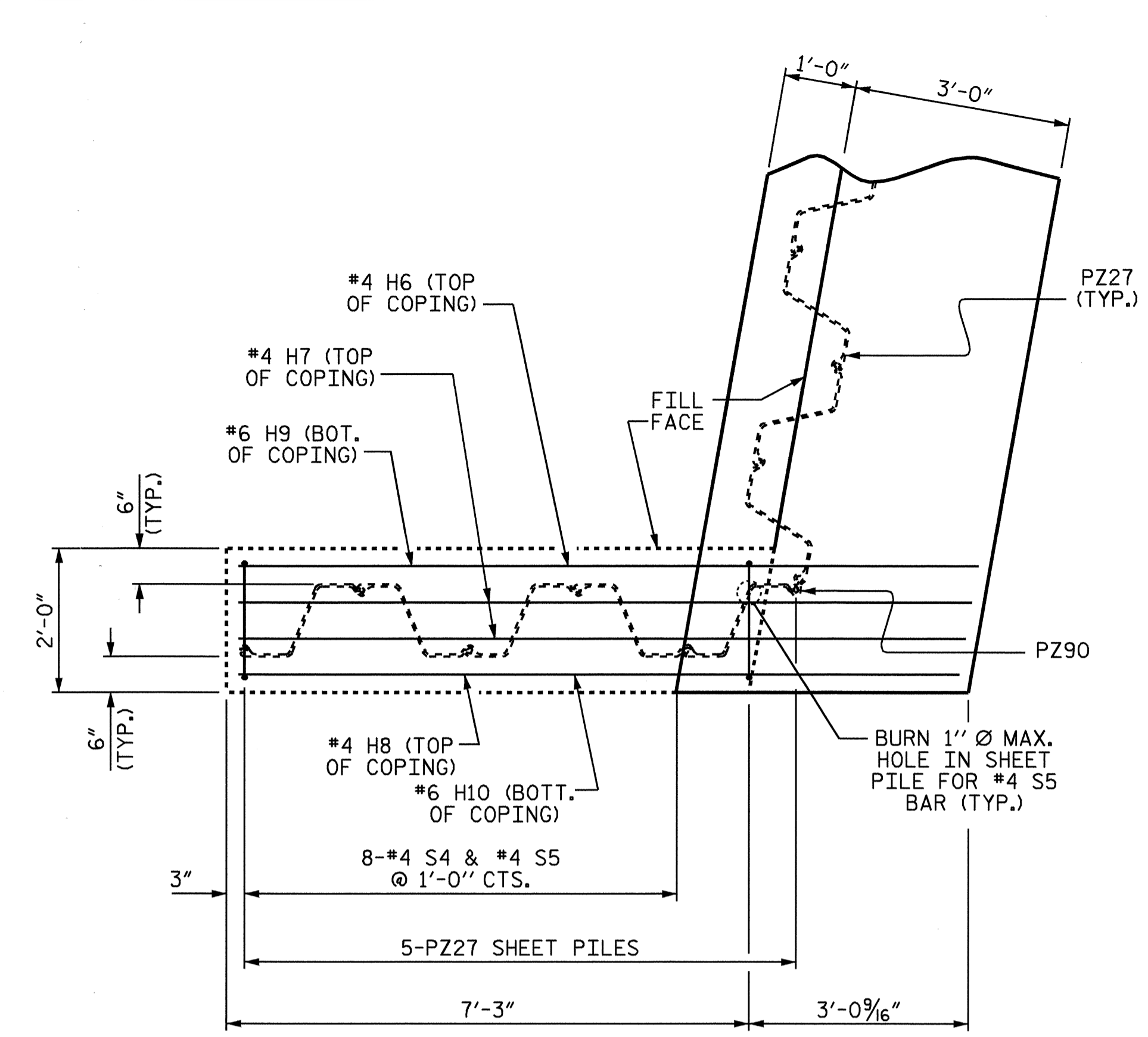
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE SHEET PILES AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS.

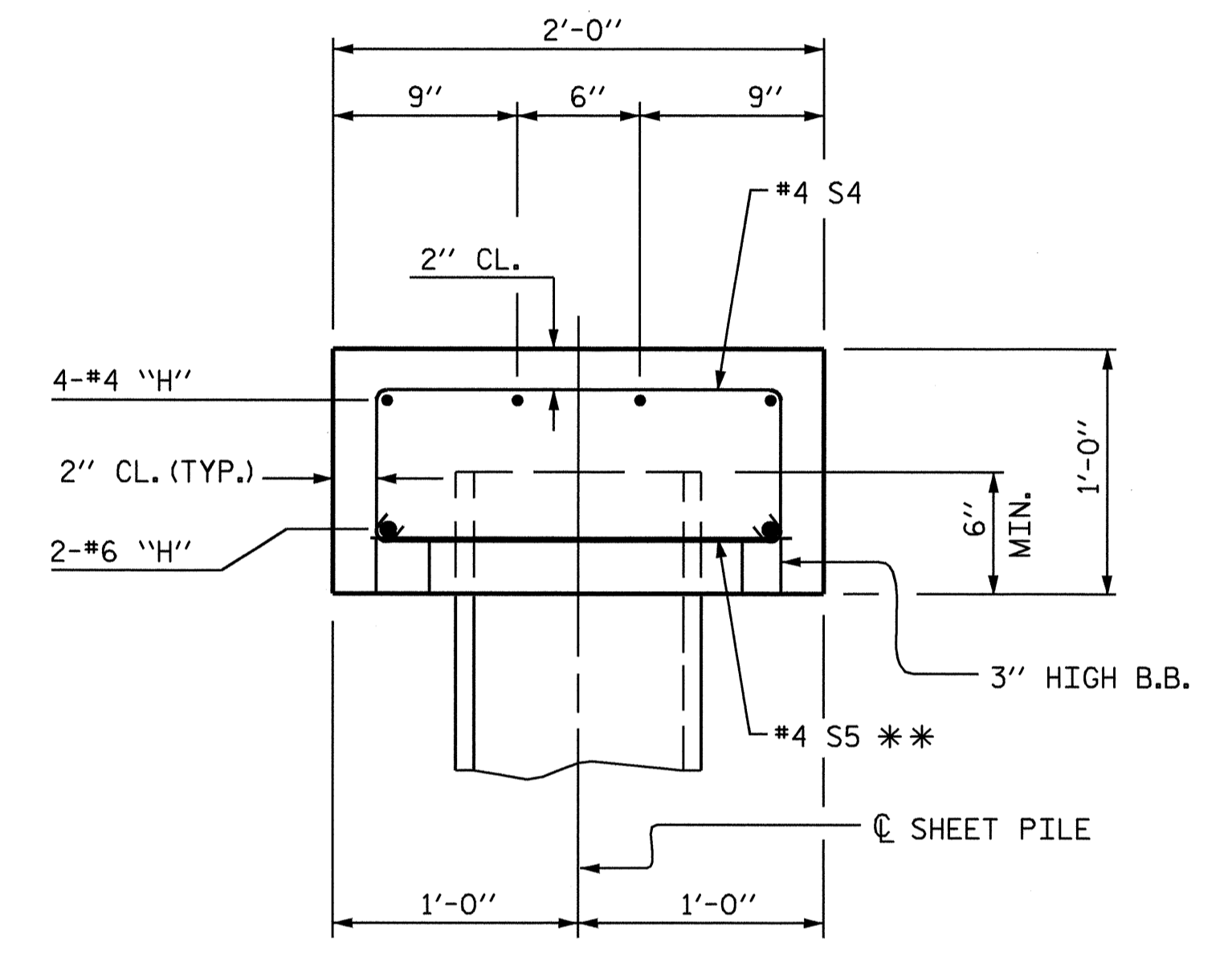
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE COPINGS ARE TO BE POURED WITH SUPERSTRUCTURE (POUR 2). REINFORCING STEEL IS INCLUDED IN END BENT BILL OF MATERIAL.



**PLAN - COPING (W1)**

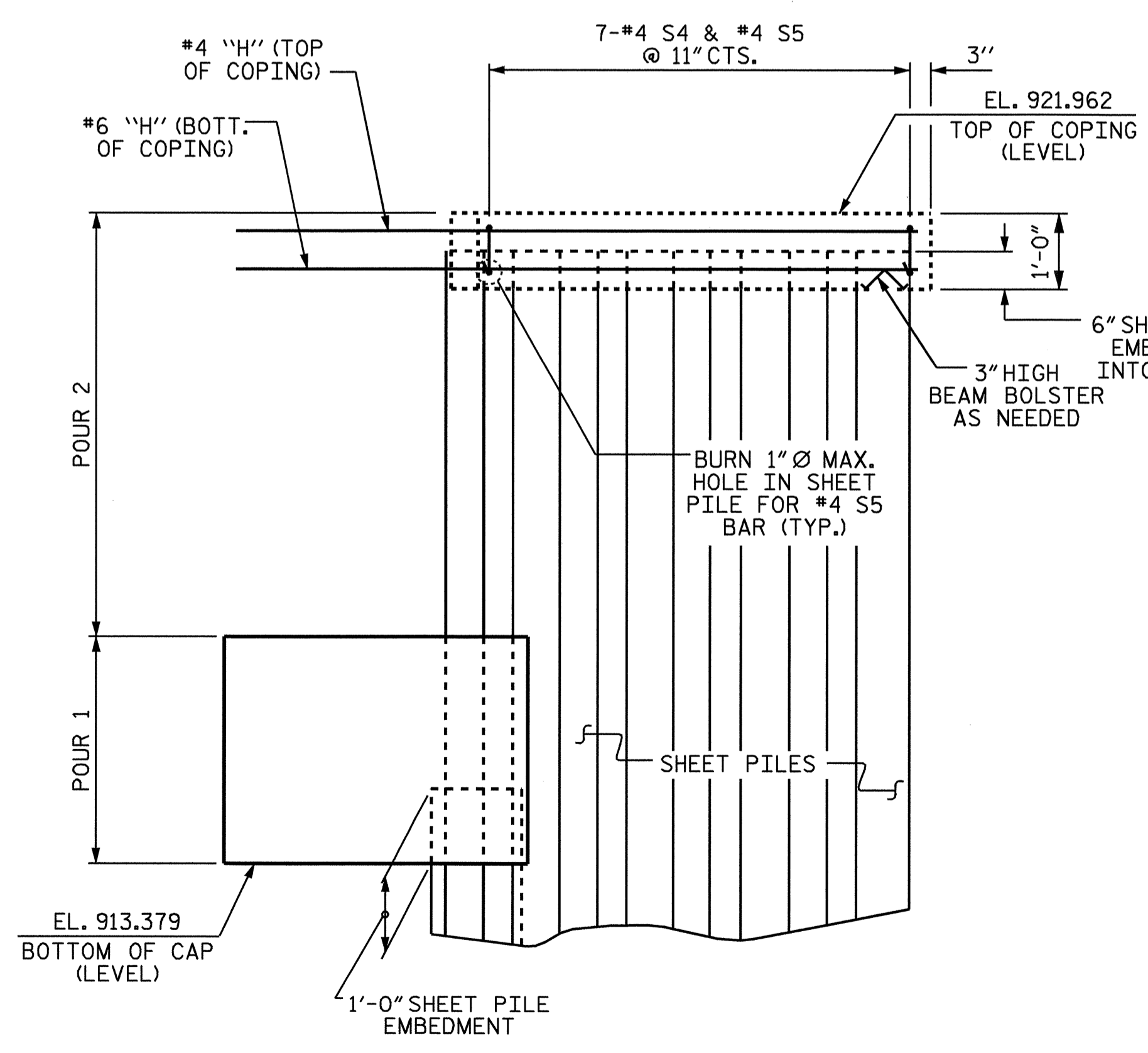


**PLAN - COPING (W2)**

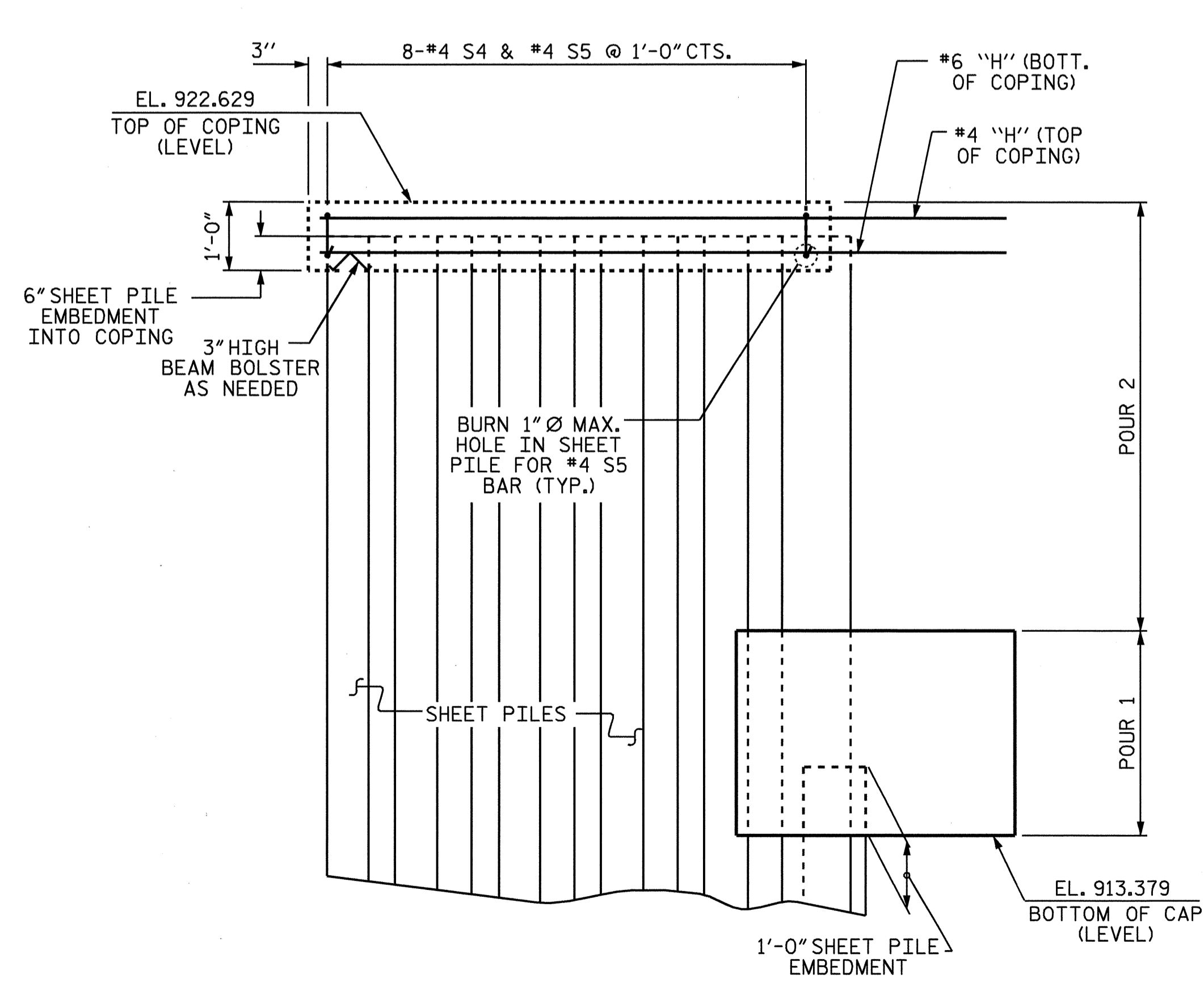


**SECTION THRU COPING**

\*\* BURN 1" Ø MAX HOLE IN SHEET PILES FOR #4 S5 BAR (TYP.)



**ELEVATION - COPING (W1)**

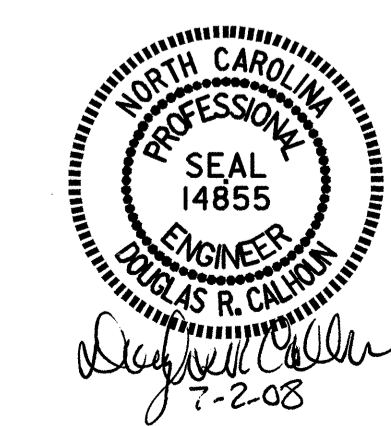


**ELEVATION - COPING (W2)**

PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

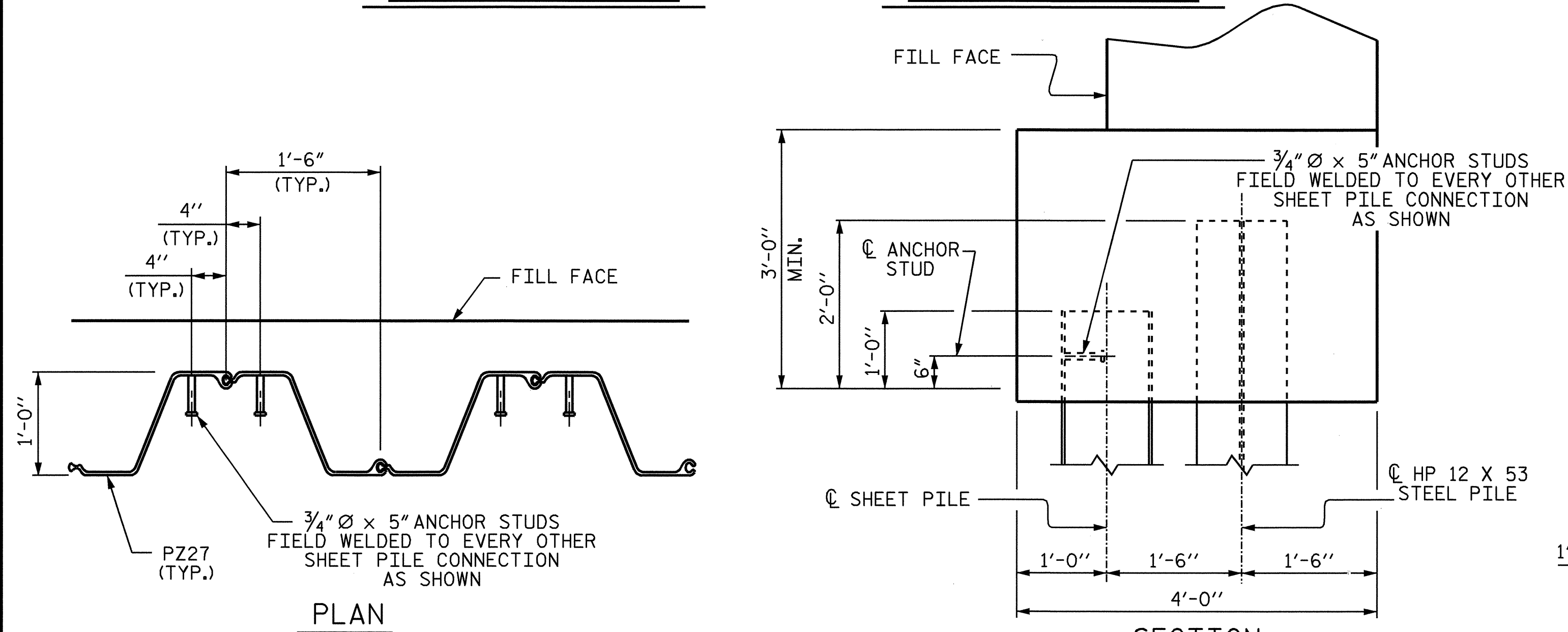
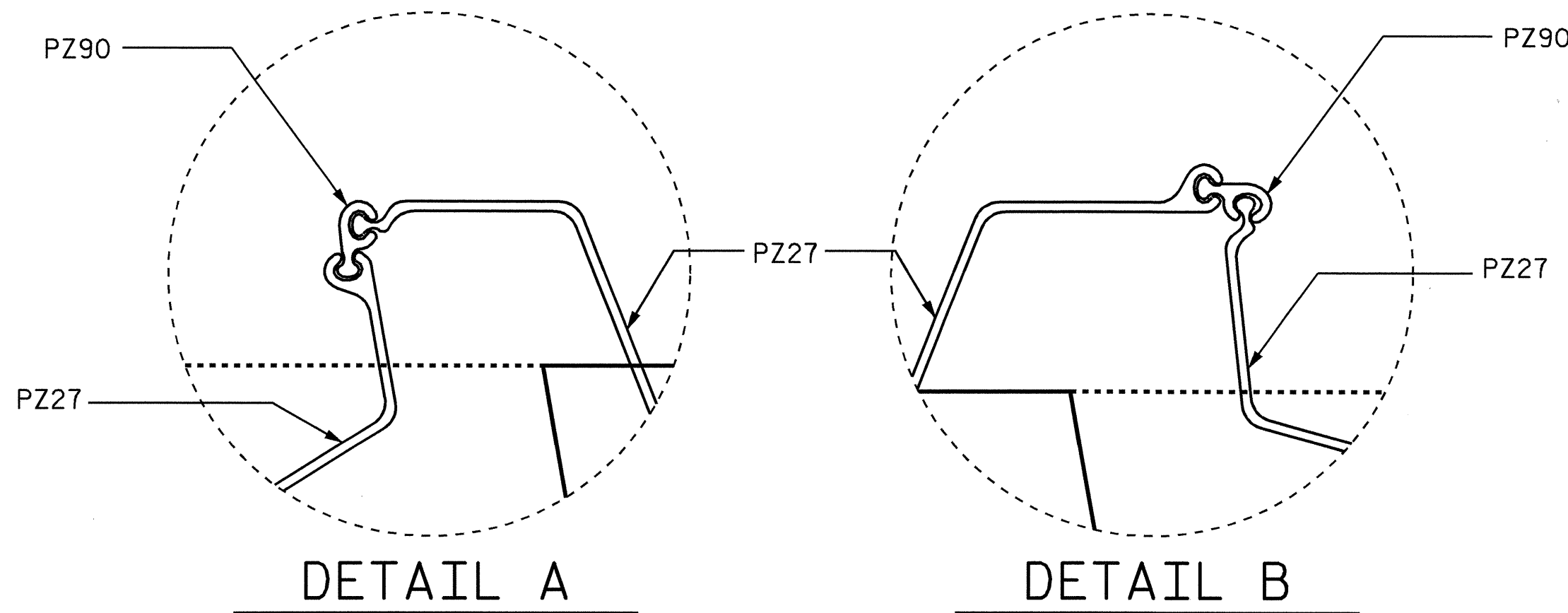
SHEET 2 OF 3

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

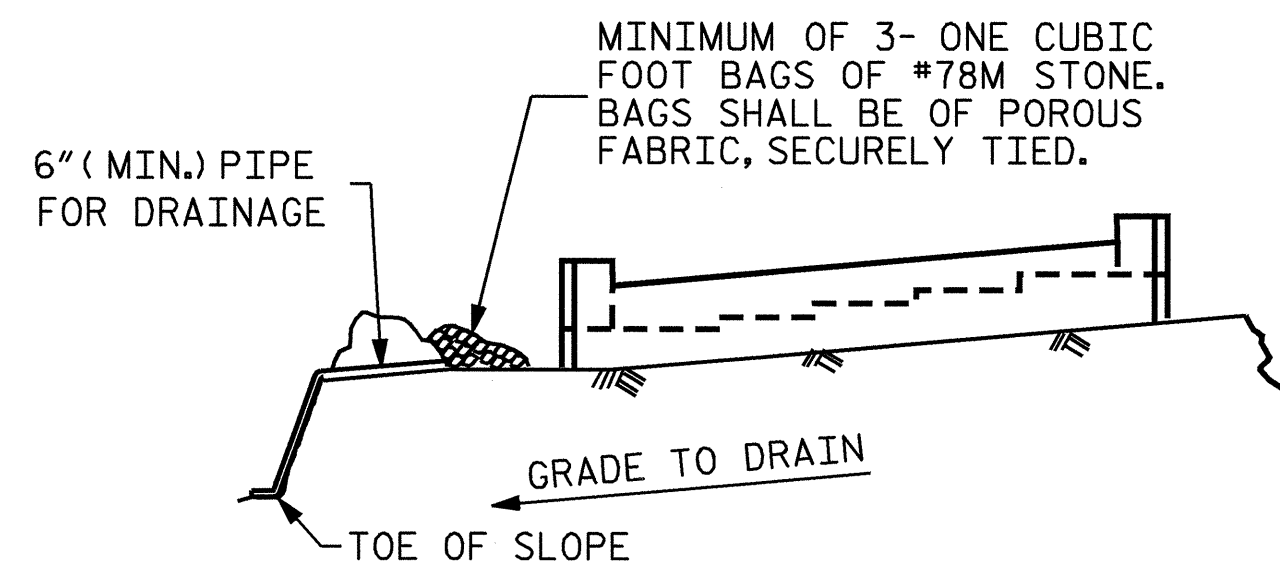


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19	
1			3			TOTAL SHEETS	26
2			4				

DRAWN BY: J. MYA DATE: 12/07  
 CHECKED BY: W. ARAFAT DATE: 2/08



**SHEET PILE ANCHOR STUD DETAILS**

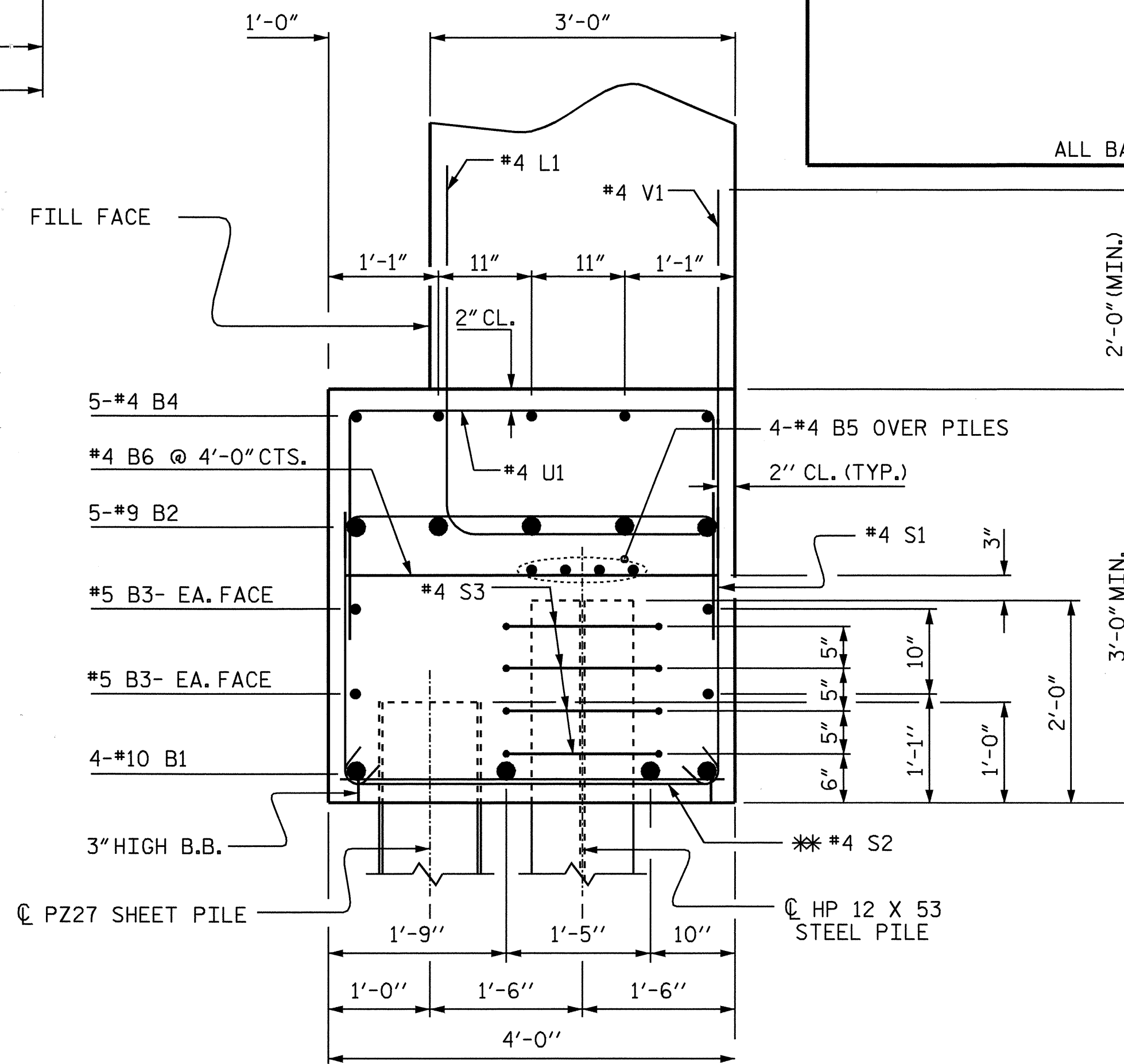


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

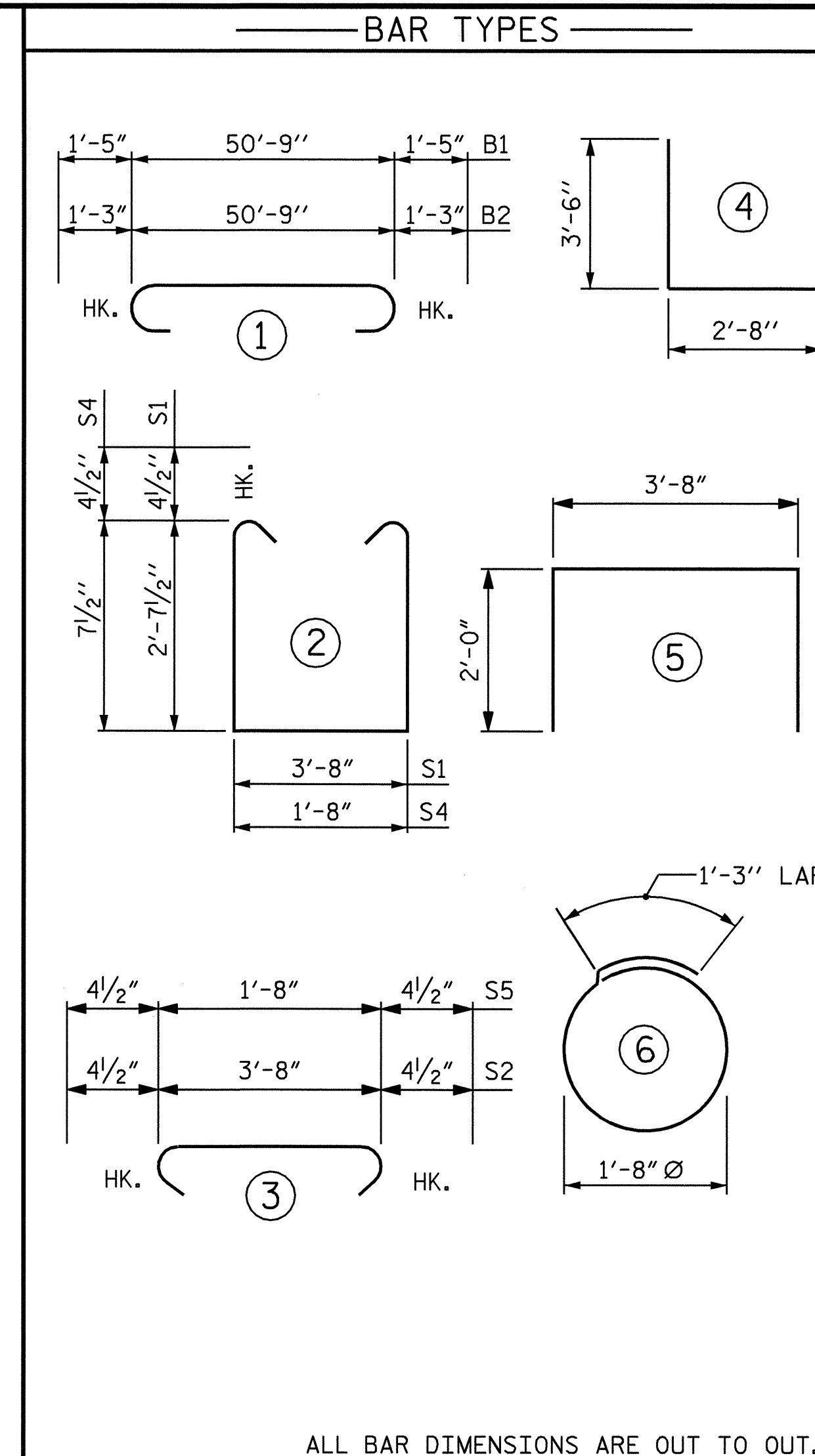
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



**SECTION A-A**

\*\* BURN 2" Ø MAX. HOLE IN SHEET PILE FOR #4 S2 BAR (TYP.)



ALL BAR DIMENSIONS ARE OUT TO OUT.

**BILL OF MATERIAL**

END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	53'-7"	922
B2	5	#9	1	53'-3"	905
B3	4	#5	STR	50'-10"	212
B4	10	#4	STR	20'-9"	139
B5	8	#4	STR	26'-8"	143
B6	13	#4	STR	3'-8"	32
H1	1	#4	STR	8'-7"	6
H2	2	#4	STR	8'-8"	12
H3	1	#4	STR	8'-11"	6
H4	1	#6	STR	8'-7"	13
H5	1	#6	STR	8'-11"	13
H6	1	#4	STR	10'-3"	7
H7	2	#4	STR	10'-1"	13
H8	1	#4	STR	10'-0"	7
H9	1	#6	STR	10'-3"	15
H10	1	#6	STR	10'-0"	15
L1	56	#4	4	6'-2"	231
S1	56	#4	2	9'-8"	362
S2	56	#4	3	4'-5"	165
S3	40	#4	6	6'-6"	174
S4	15	#4	2	3'-8"	37
S5	15	#4	3	2'-5"	24
U1	26	#4	5	7'-8"	133
V1	56	#4	STR	6'-0"	224
REINFORCING STEEL				LBS	3810
CLASS A CONCRETE					
▲ POUR 1 CAP				C.Y.	27.0
HP 12 X 53 STEEL PILES					
NO. 10					300 FT.
18" STEEL SHEET PILES					
No. PZ27 = 41				SQ. FT.	924
No. PZ90 = 2				SQ. FT.	10
TOTAL NO. = 43				SQ. FT.	934

▲ COPING TO BE POURED WITH SUPERSTRUCTURE (POUR 2)

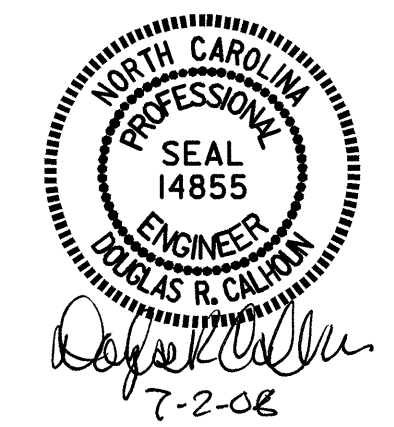
PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

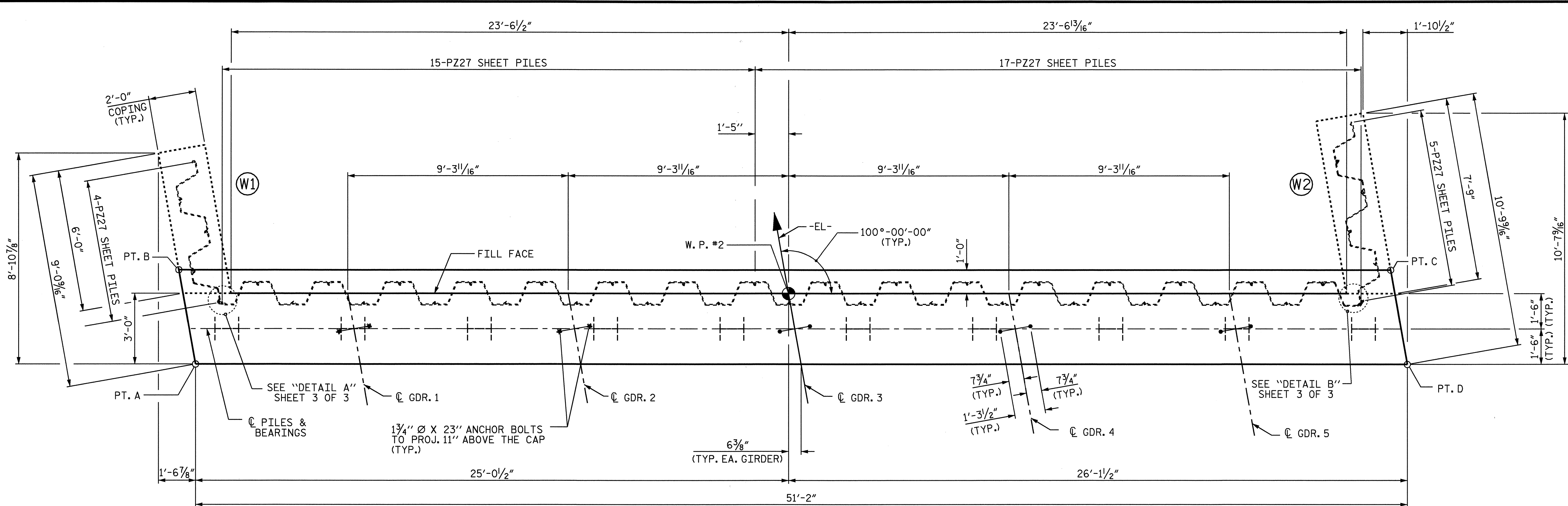
**SUBSTRUCTURE  
 INTEGRAL END BENT 1**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS 26
2			4			

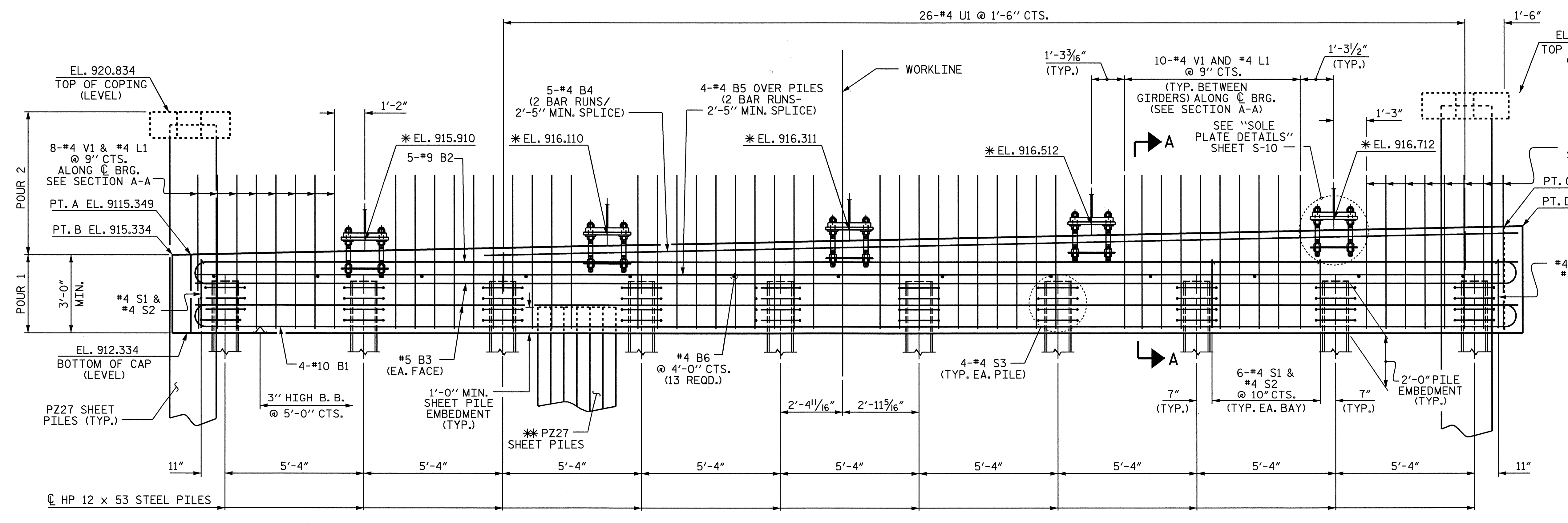


DRAWN BY : J. MYA DATE : 12/07  
 CHECKED BY : W. ARAFAT DATE : 2/08



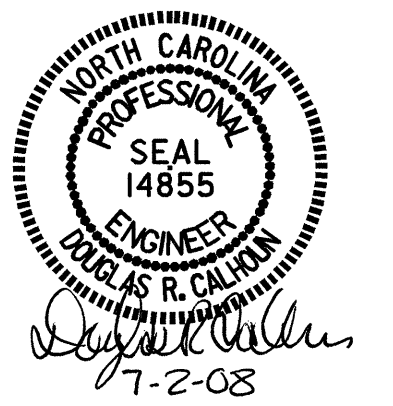


PLAN



ELEVATION

\* BRIDGE SEAT ELEVATIONS ARE TAKEN AT BOTTOM OF SOLE PLATE  
 \*\* NOT ALL SHEET PILING SHOWN FOR CLARITY

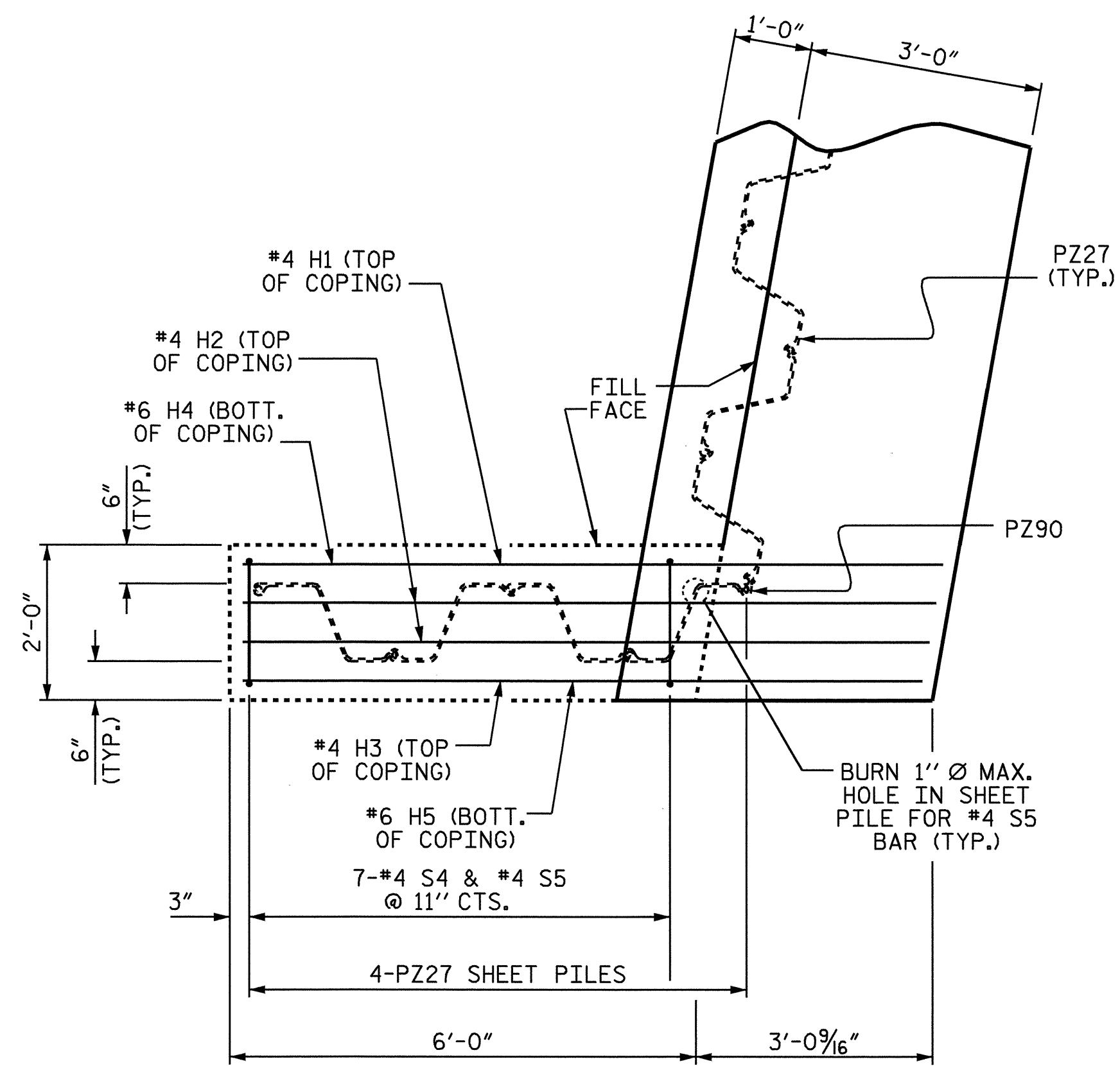


PROJECT NO. B-4059  
 CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

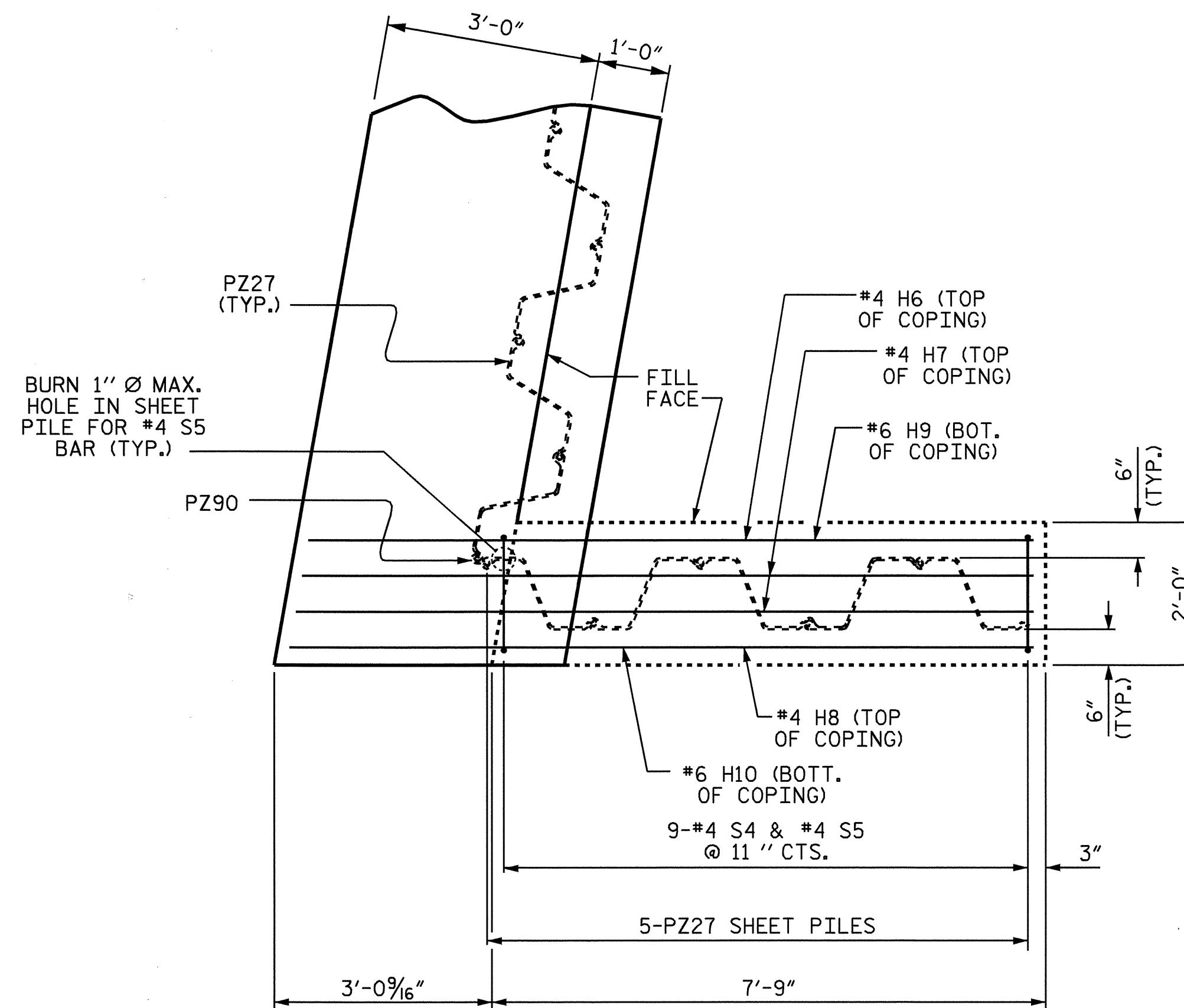
SHEET 1 OF 3  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL END BENT 2

DRAWN BY: J. MYA DATE: 12/07  
 CHECKED BY: W. ARAFAT DATE: 2/08

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS	
2			4			26	

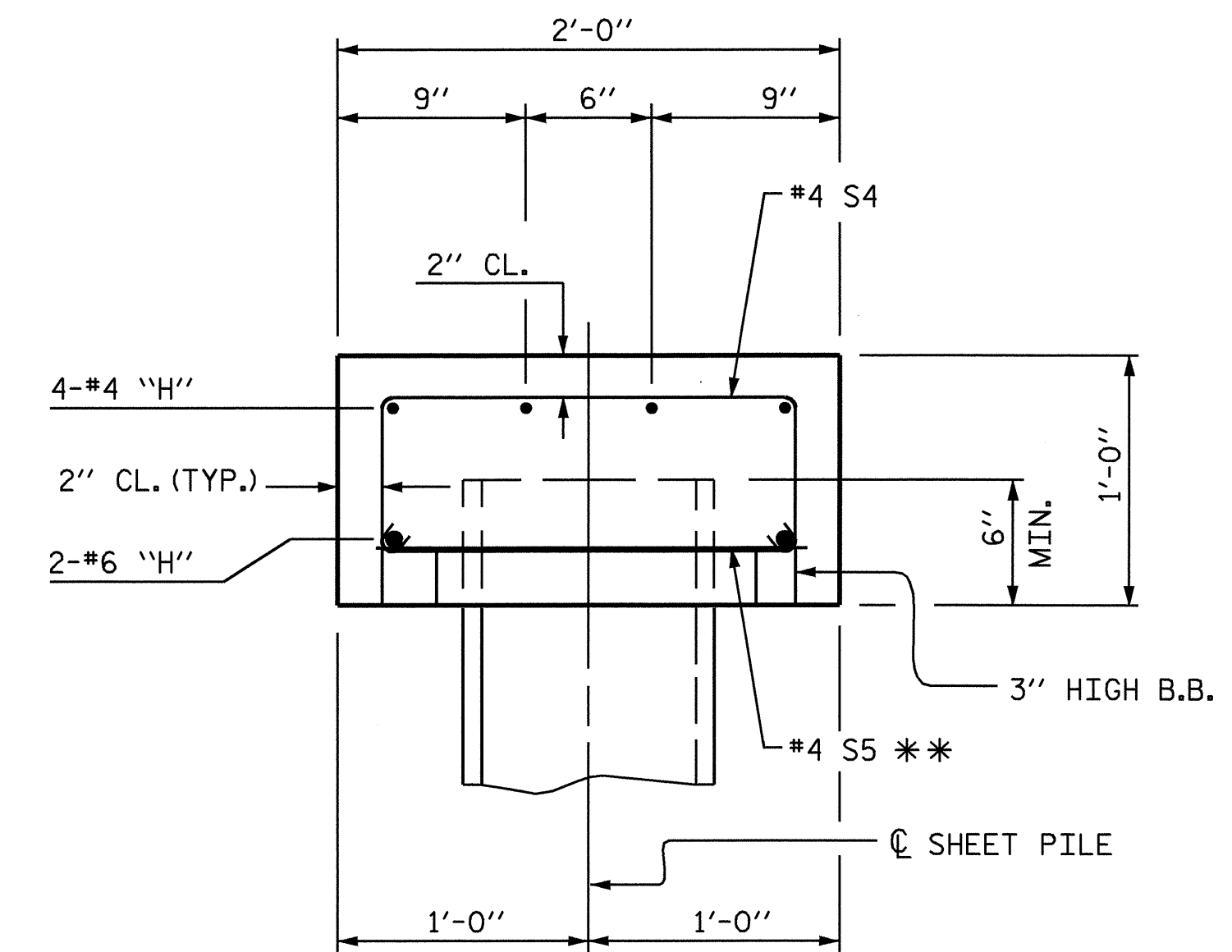


PLAN - COPING (W1)



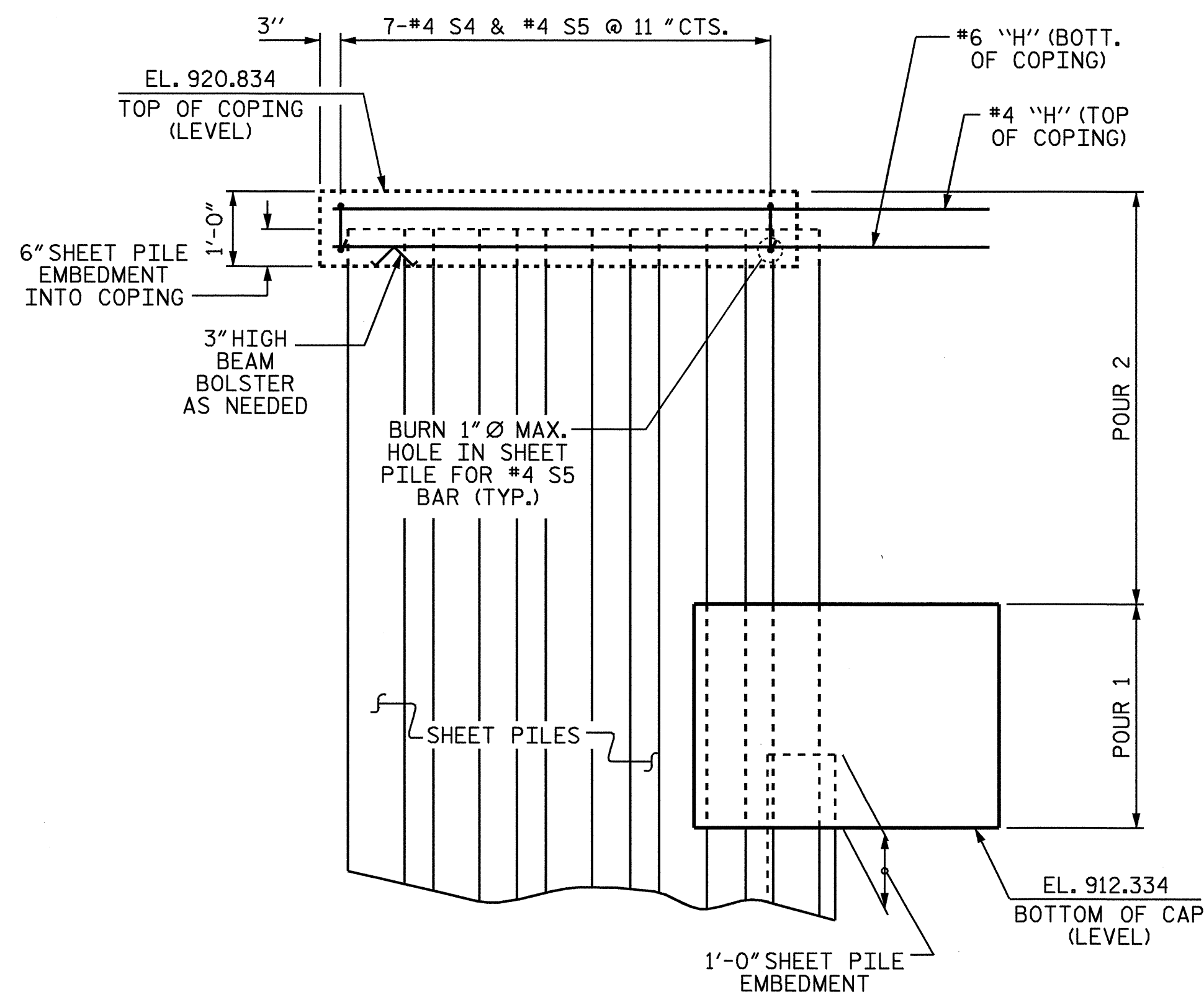
PLAN - COPING (W2)

**NOTES**  
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
 THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE SHEET PILES AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS.  
 THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE COPINGS ARE TO BE POURED WITH SUPERSTRUCTURE (POUR 2). REINFORCING STEEL IS INCLUDED IN END BENT BILL OF MATERIAL.

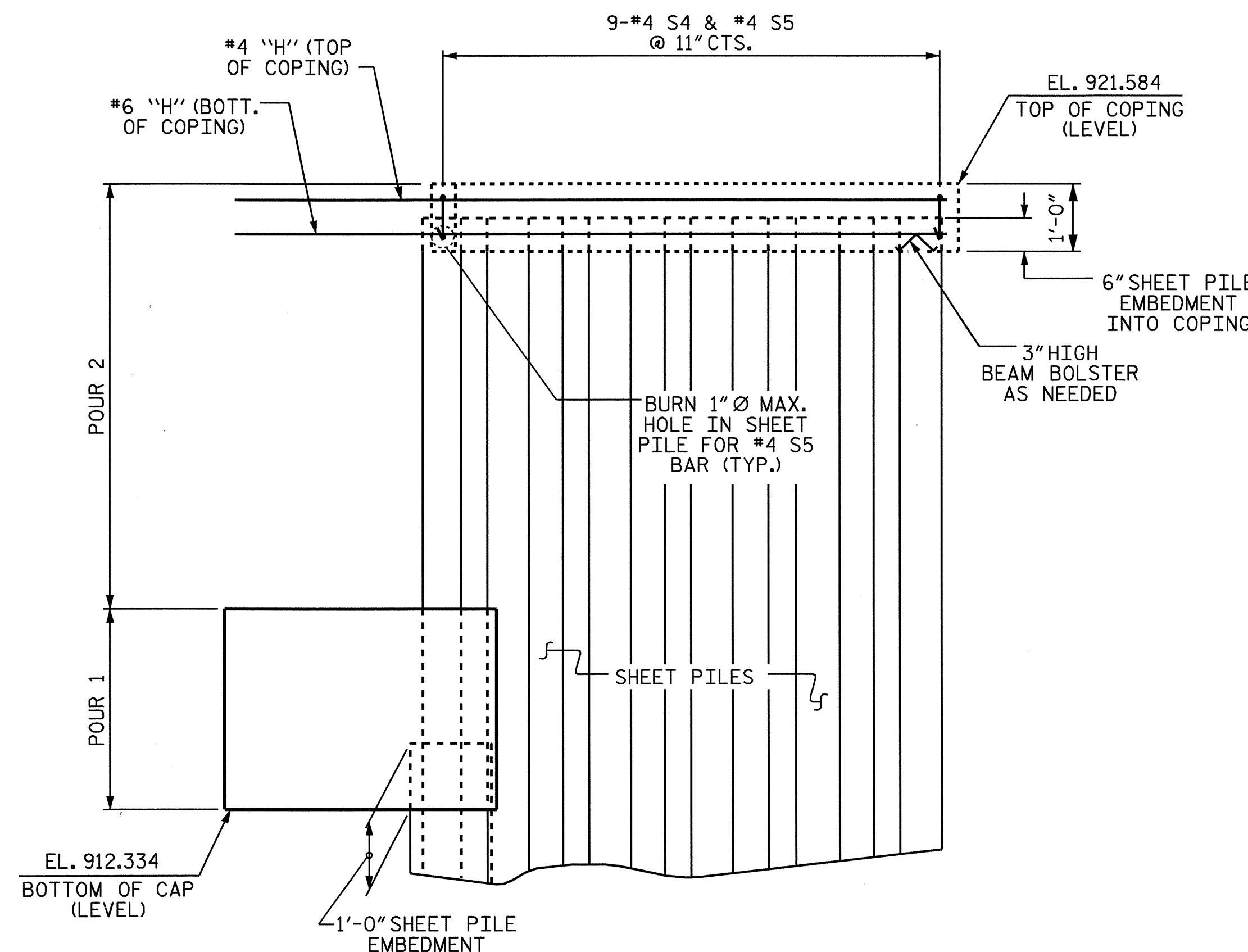


SECTION THRU COPING

\*\* BURN 1" Ø MAX HOLE IN SHEET PILES FOR #4 S5 BAR (TYP.)



ELEVATION - COPING (W1)



ELEVATION - COPING (W2)

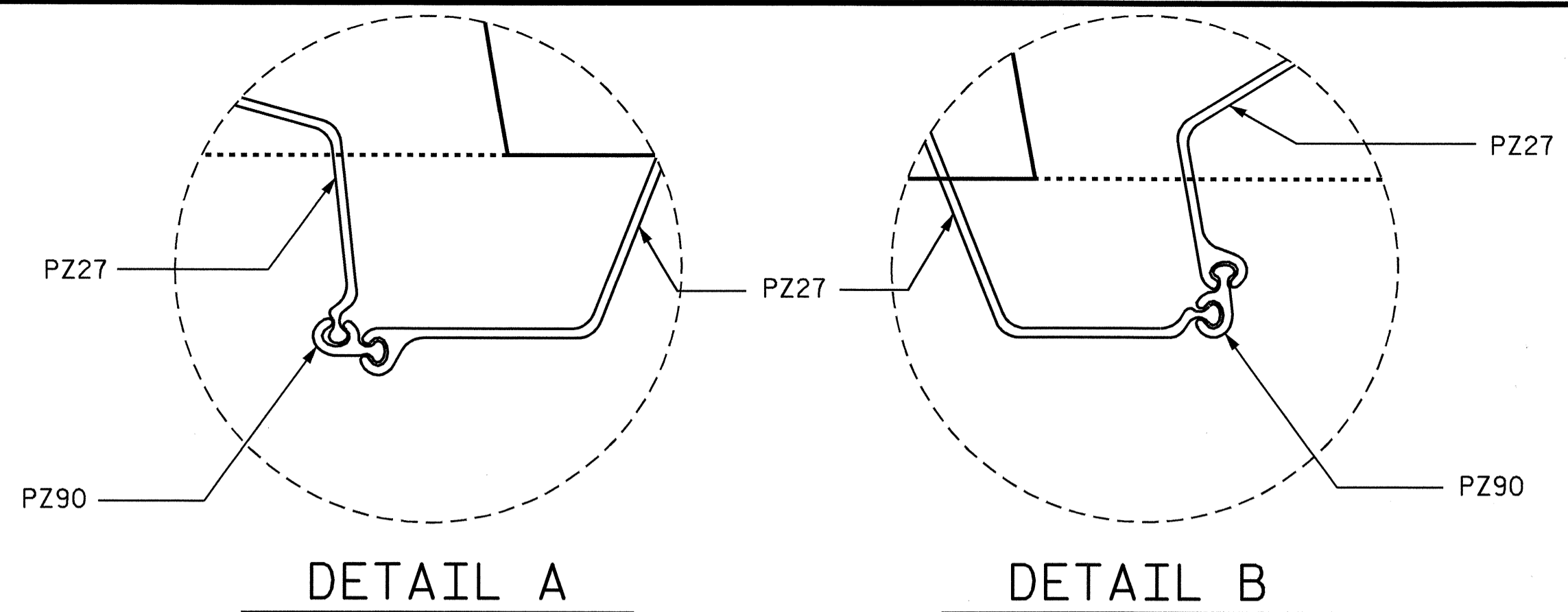
PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE INTEGRAL END BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-22
TOTAL SHEETS					26

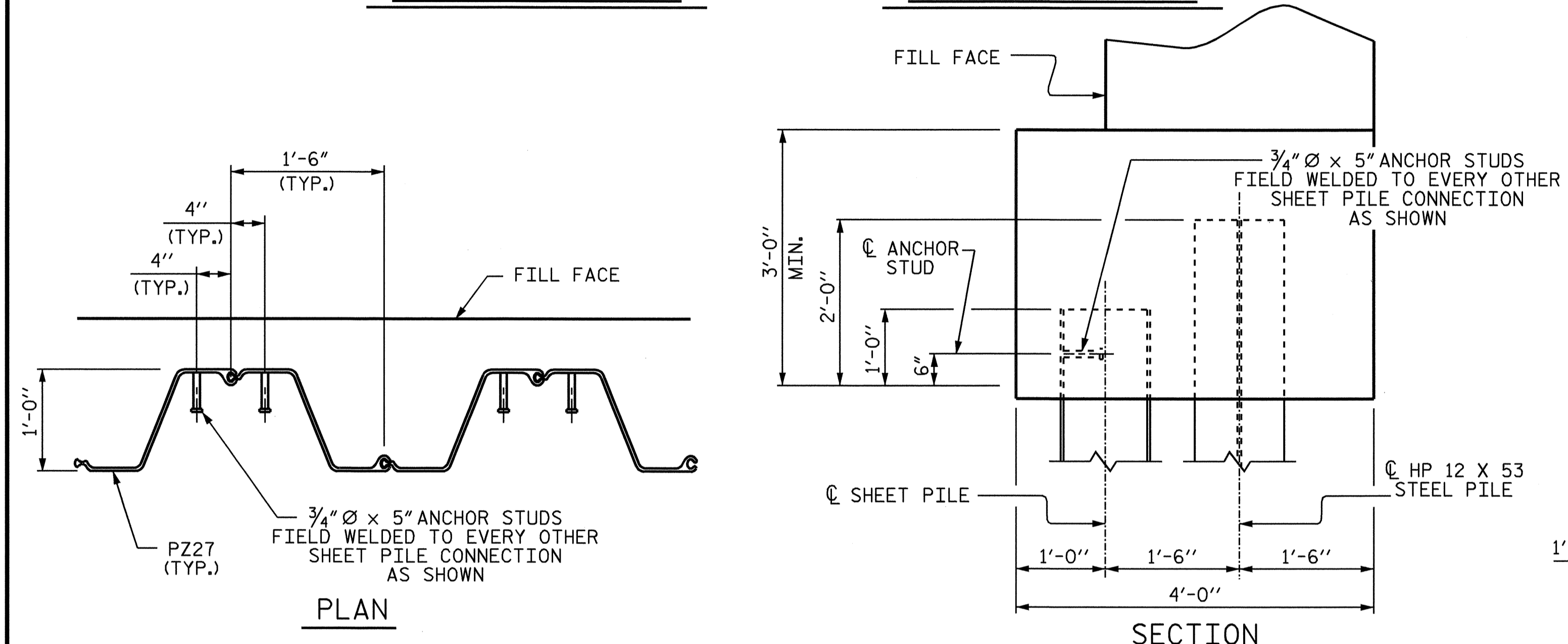


DRAWN BY: J. MYA DATE: 12/07  
 CHECKED BY: W. ARAFAT DATE: 2/08



DETAIL A

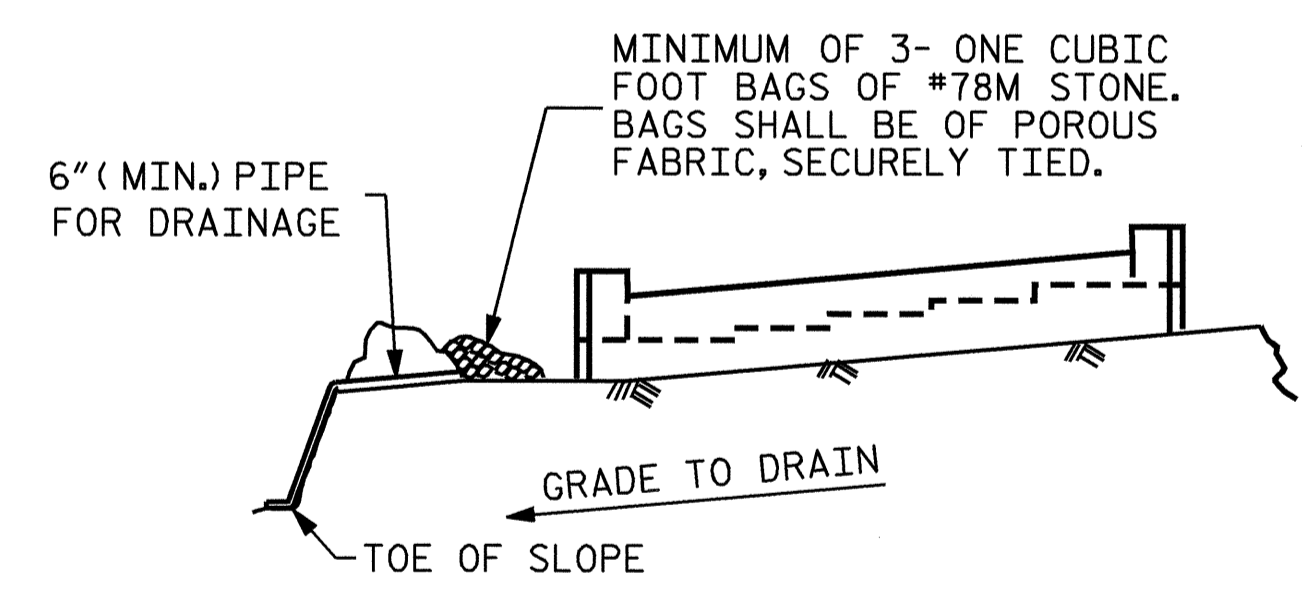
DETAIL B



PLAN

SECTION

SHEET PILE ANCHOR STUD DETAILS

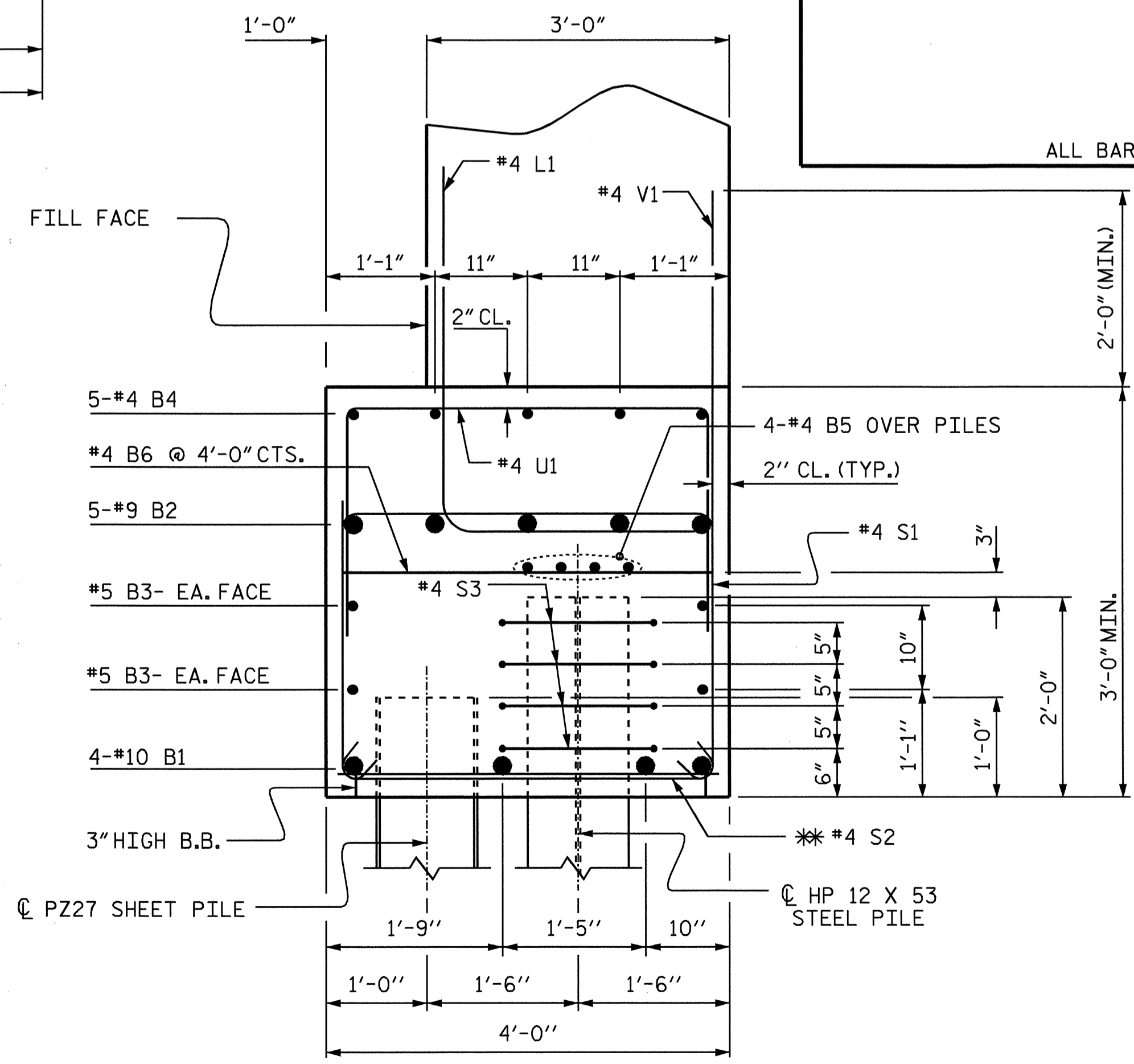


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

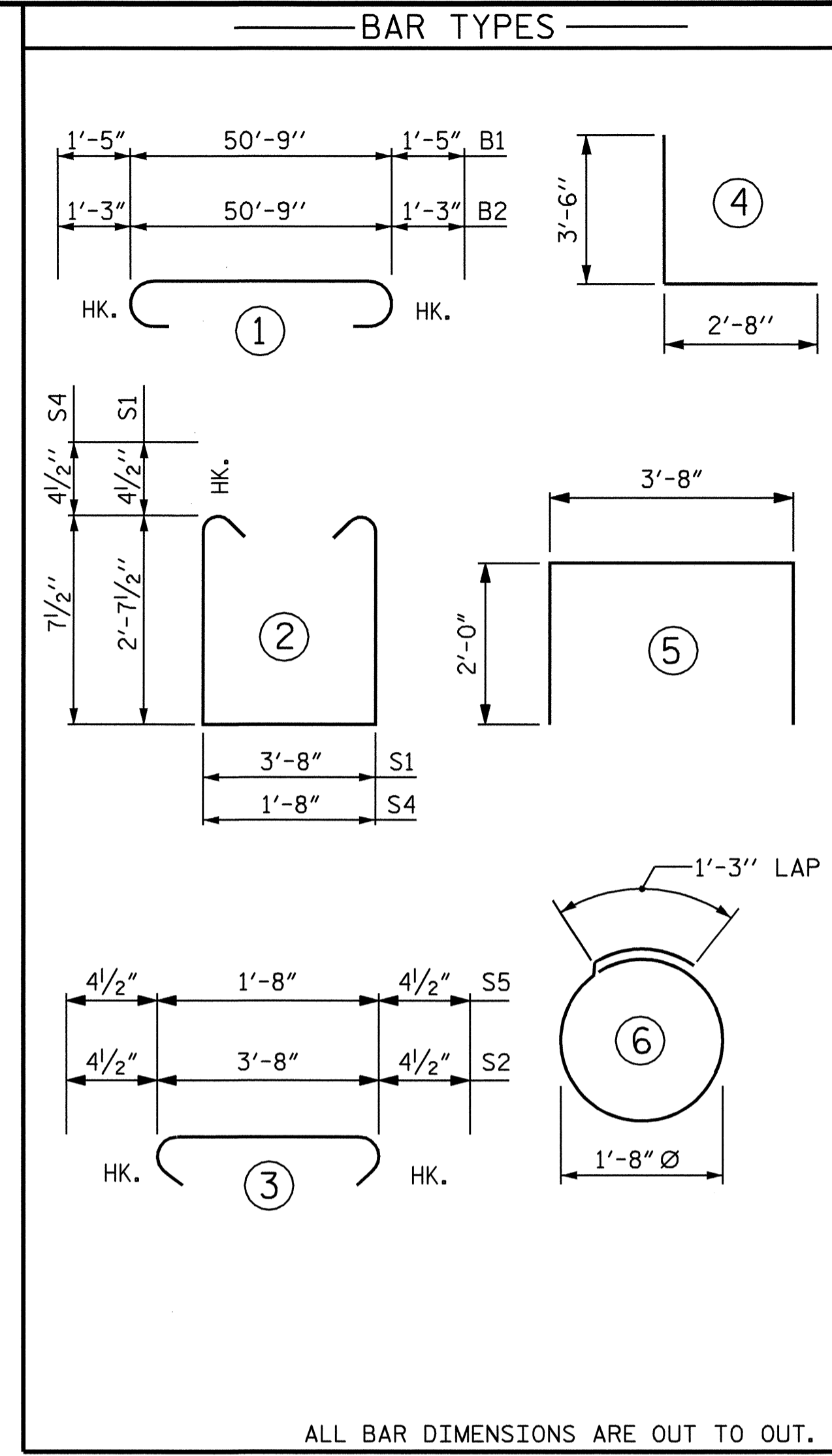
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



SECTION A-A

\*\* BURN 2" Ø MAX. HOLE IN SHEET PILE FOR #4 S2 BAR (TYP.)



ALL BAR DIMENSIONS ARE OUT TO OUT.

▲ COPING TO BE POURED WITH SUPERSTRUCTURE (POUR 2)

BILL OF MATERIAL

END BENT 2

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	#10	1	53'-7"	922
B2	#9	1	53'-3"	905
B3	#5	STR	50'-10"	212
B4	#4	STR	20'-9"	139
B5	#4	STR	26'-8"	143
B6	#4	STR	3'-8"	32
H1	#4	STR	9'-0"	6
H2	#4	STR	8'-10"	12
H3	#4	STR	8'-9"	6
H4	#6	STR	9'-0"	14
H5	#6	STR	8'-9"	13
H6	#4	STR	10'-1"	7
H7	#4	STR	10'-2"	14
H8	#4	STR	10'-5"	7
H9	#6	STR	10'-1"	15
H10	#6	STR	10'-5"	16
L1	#4	4	6'-2"	231
S1	#4	2	9'-8"	362
S2	#4	3	4'-5"	165
S3	#4	6	6'-6"	174
S4	#4	2	3'-8"	37
S5	#4	3	2'-5"	24
U1	#4	5	7'-8"	133
V1	#4	STR	6'-0"	224

REINFORCING STEEL LBS 3813

CLASS A CONCRETE BREAKDOWN

▲ POUR 1 CAP C.Y. 27.0

HP 12 X 53 STEEL PILES NO. 10 200 FT.

18" STEEL SHEET PILES

No. PZ27 = 41 SQ. FT. 859

No. PZ90 = 2 SQ. FT. 9

TOTAL NO. = 43 SQ. FT. 868

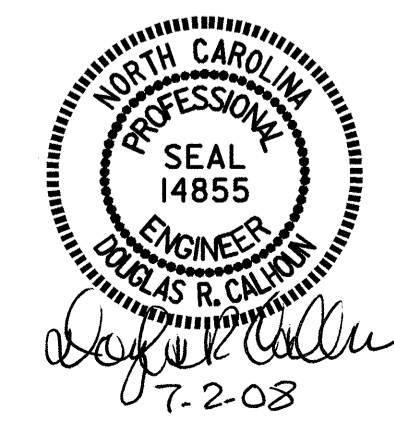
PROJECT NO. B-4059  
 CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

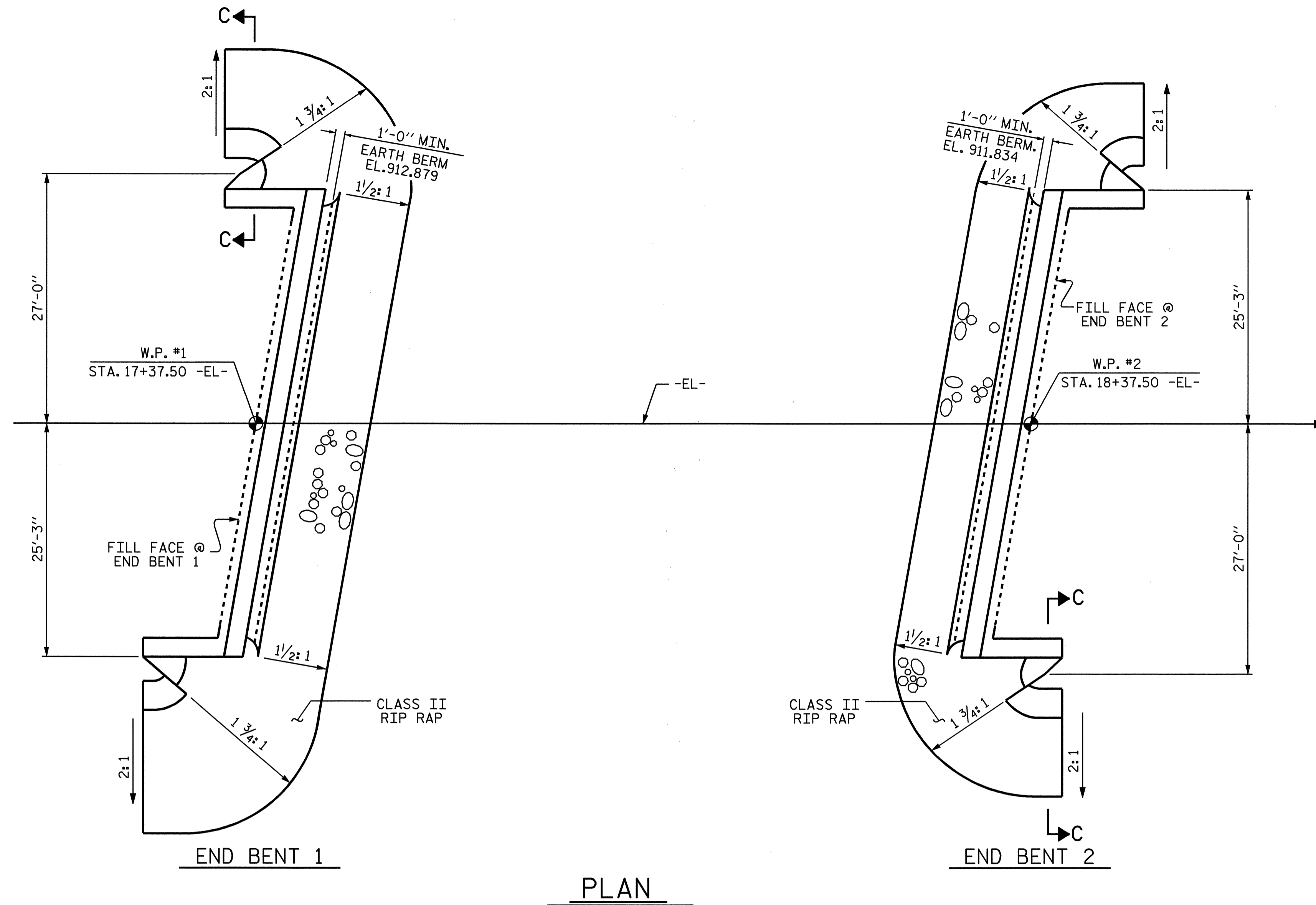
SUBSTRUCTURE  
 INTEGRAL END BENT 2

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23	
1			3			TOTAL SHEETS 26	
2			4				

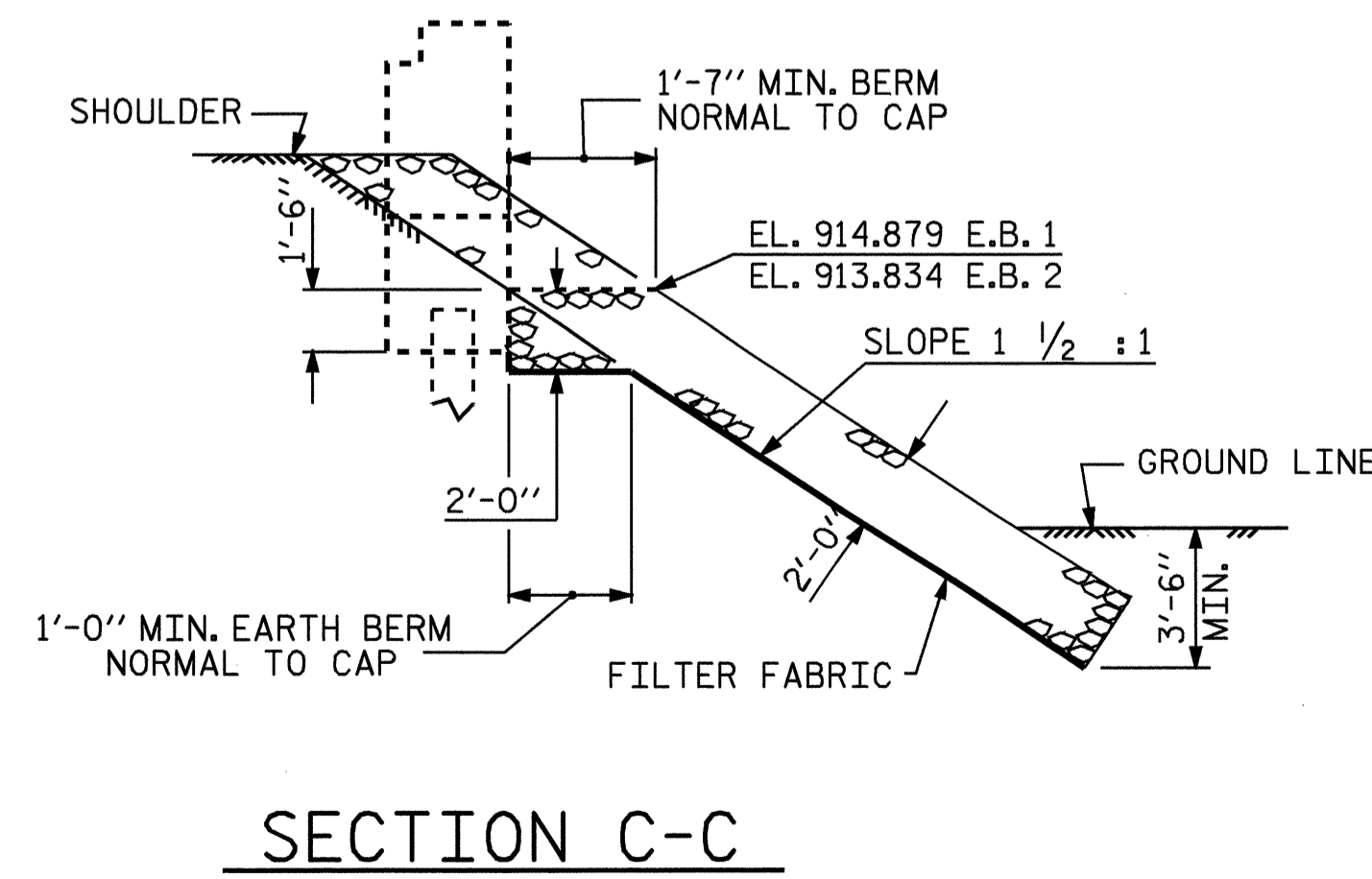
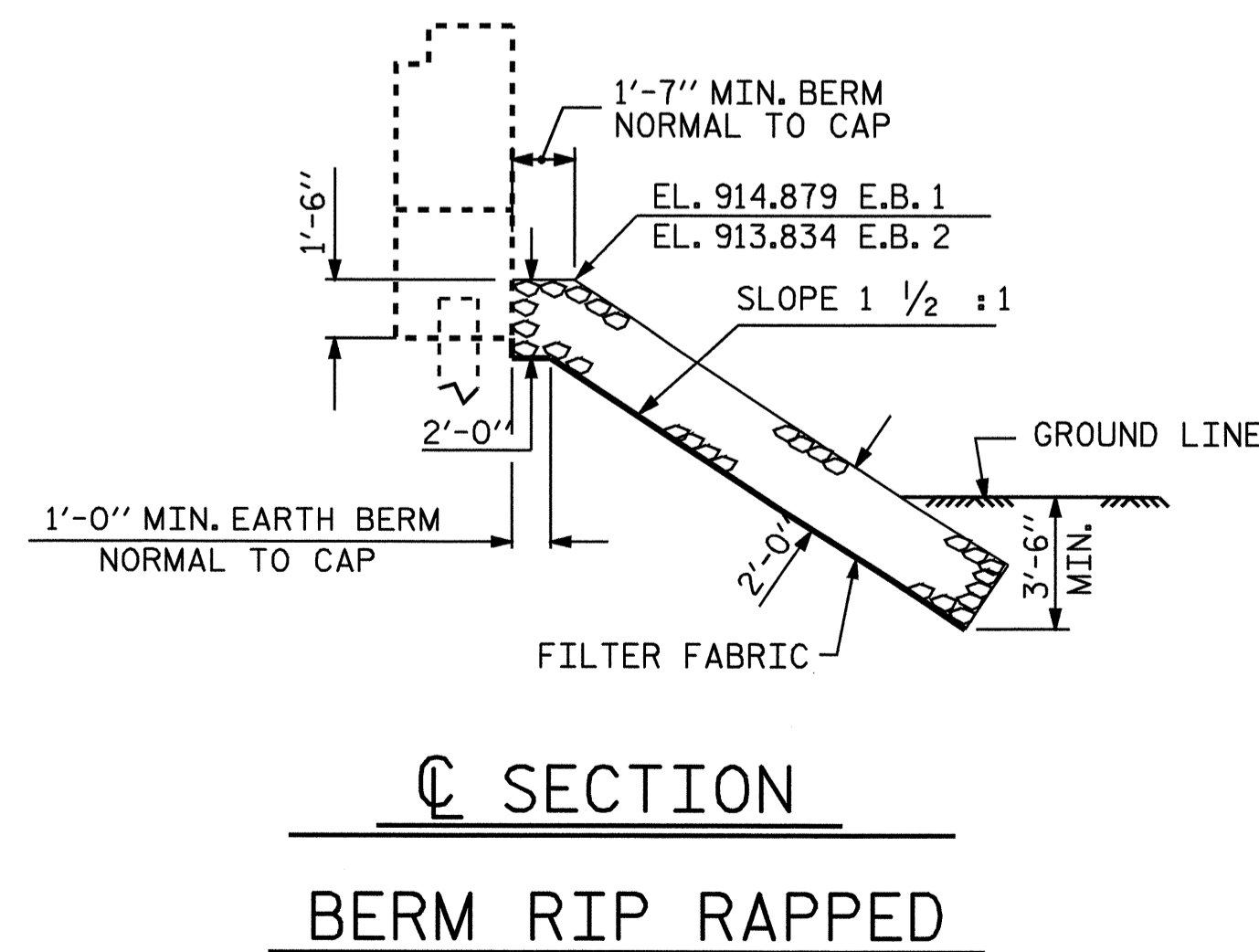


DRAWN BY: J. MYA DATE: 12/07  
 CHECKED BY: W. ARAFAT DATE: 2/08



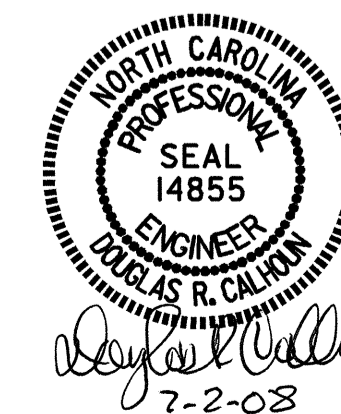


ESTIMATED QUANTITIES		
BRIDGE @ STA. 17+87.50 -EL-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	120	134
END BENT 2	87	97

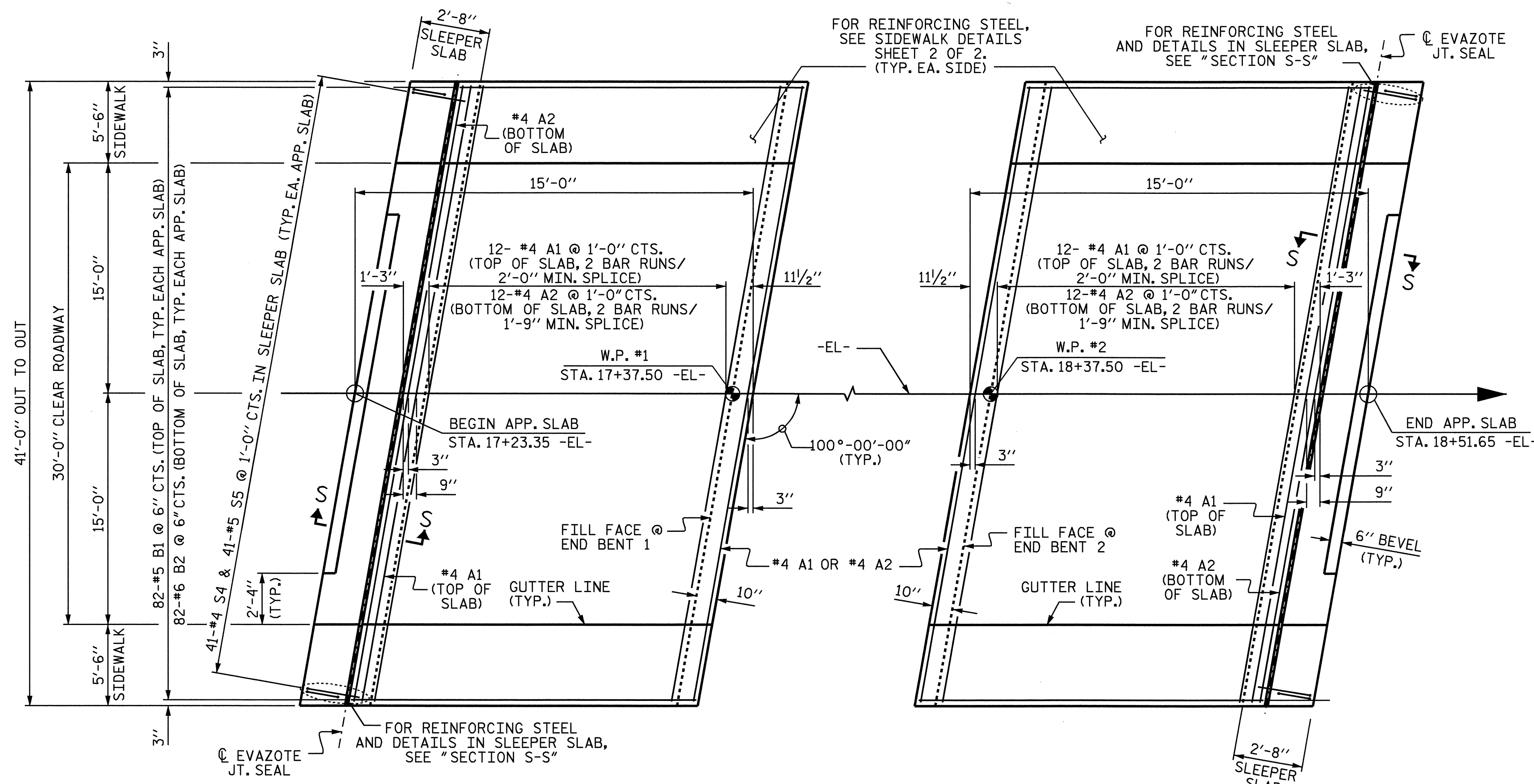


PROJECT NO. B-4059  
CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD = RIP RAP DETAILS =					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-24					TOTAL SHEETS 26



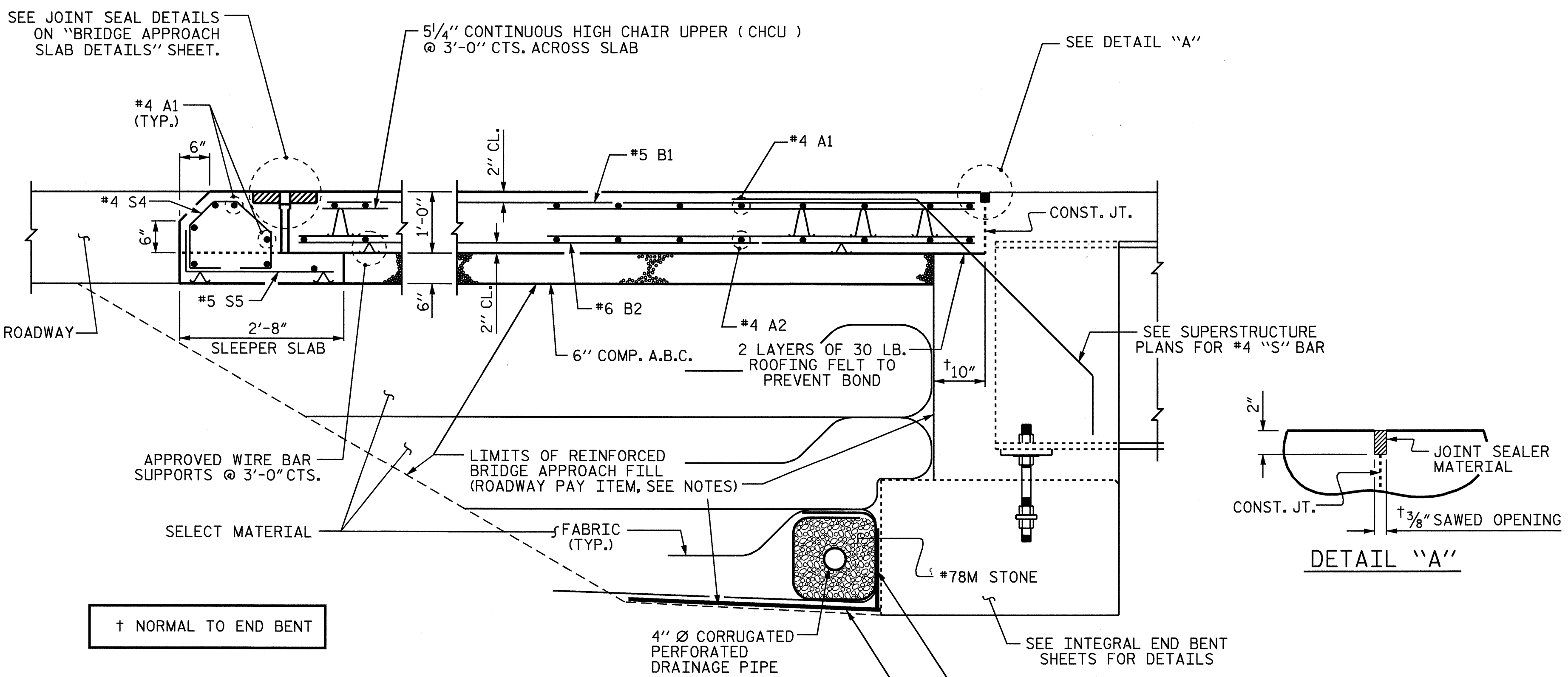
DRAWN BY: J. MYA DATE: 08/07  
 CHECKED BY: B. N. GRADY DATE: 2/11/08



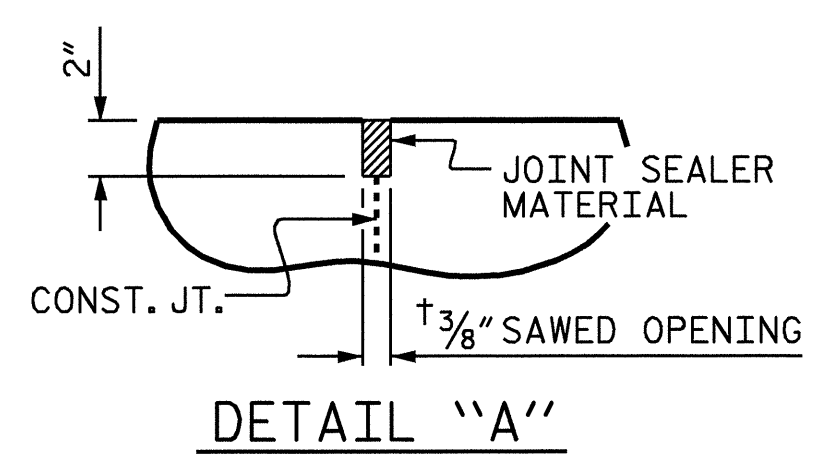
PLAN @ END BENT 1

PLAN @ END BENT 2

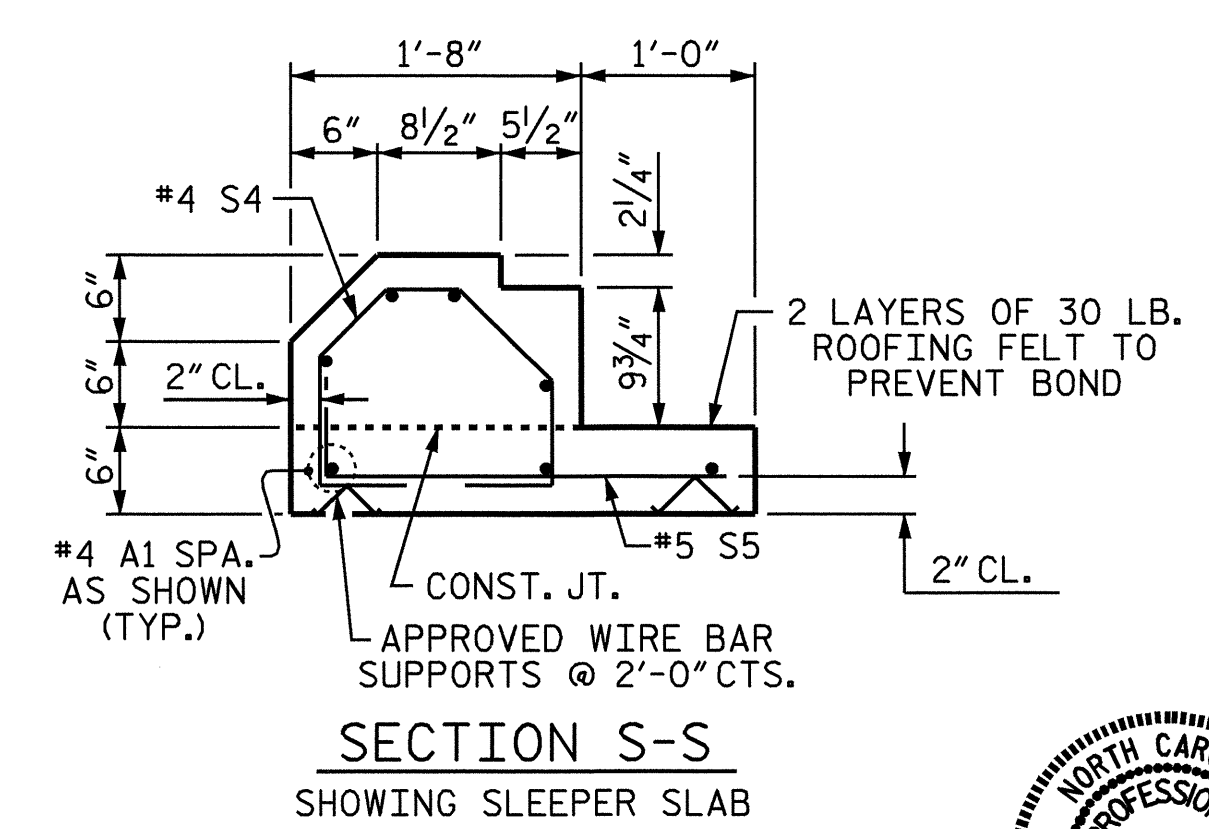
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS. #4 A1 BARS IN SLEEPER SLAB NOT SHOWN FOR CLARITY.



SECTION THRU SLAB



DETAIL "A"



SECTION S-S SHOWING SLEEPER SLAB

NOTES

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

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

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

THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE SLEEPER SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE SLEEPER SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE SLEEPER SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

THE VERTICAL JOINT ON THE RIGHT AND LEFT SIDE OF THE APPROACH SLAB AT THE ENDS OF THE EVAZOTE JOINT SHALL BE FILLED WITH SILICONE OR OTHER APPROVED MATERIAL IN ORDER TO PREVENT BACKFILL FROM ENTERING THE JOINT OPENING.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS 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 TYPE SL LOW MODULUS SILICONE SEALANT.

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2 1/2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALY BLAST CLEANED AND COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. AT THE CONTRACTORS OPTION, THESE SURFACES MAY BE METALLIZED TO A MINIMUM THICKNESS OF 6 MILS. SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

THE 3/4" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

THE 3/4" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR EVAZOTE JOINT SEALS.

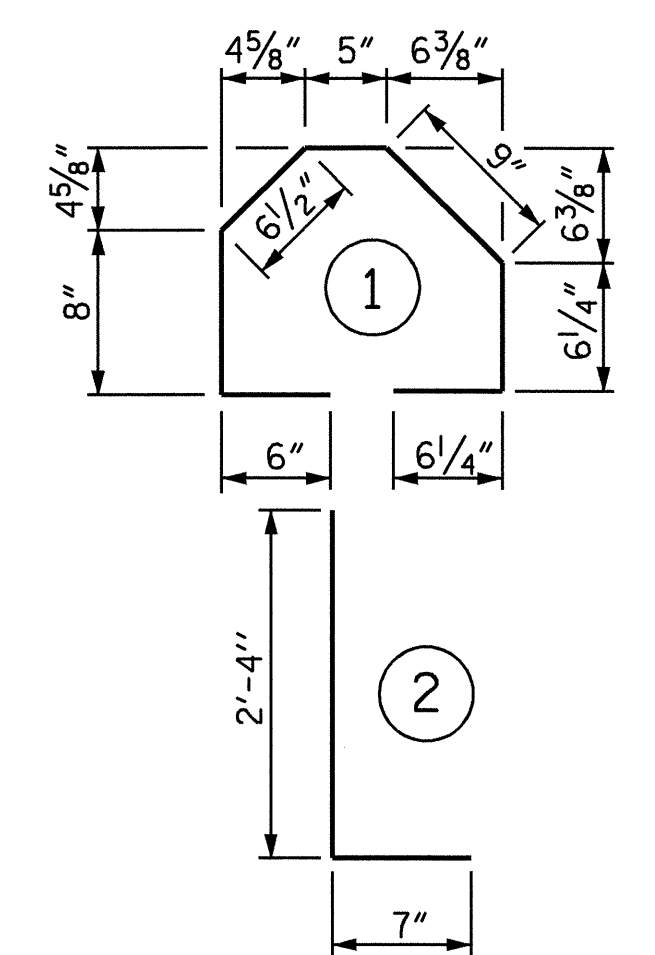
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	42	#4	STR	21'-8"	608
A2	28	#4	STR	21'-7"	404
* B1	82	#5	STR	12'-5"	1062
B2	82	#6	STR	13'-0"	1601
B3	8	#4	STR	14'-8"	78
D1	24	#4	STR	10"	13
G1	30	#4	STR	5'-0"	100
* S4	41	#4	1	3'-11"	107
S5	41	#5	2	2'-11"	125

REINFORCING STEEL	LBS.	2321
* EPOXY COATED REINFORCING STEEL	LBS.	1777
CLASS AA CONCRETE		
POUR #1 - SLEEPER SLAB	C. Y.	4.3
POUR #2 - SLAB & SIDEWALK	C. Y.	23.9
TOTAL	C. Y.	28.2

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. B-4059  
 CATAWBA COUNTY  
 STATION: 17+87.50 -EL-

SHEET 1 OF 2

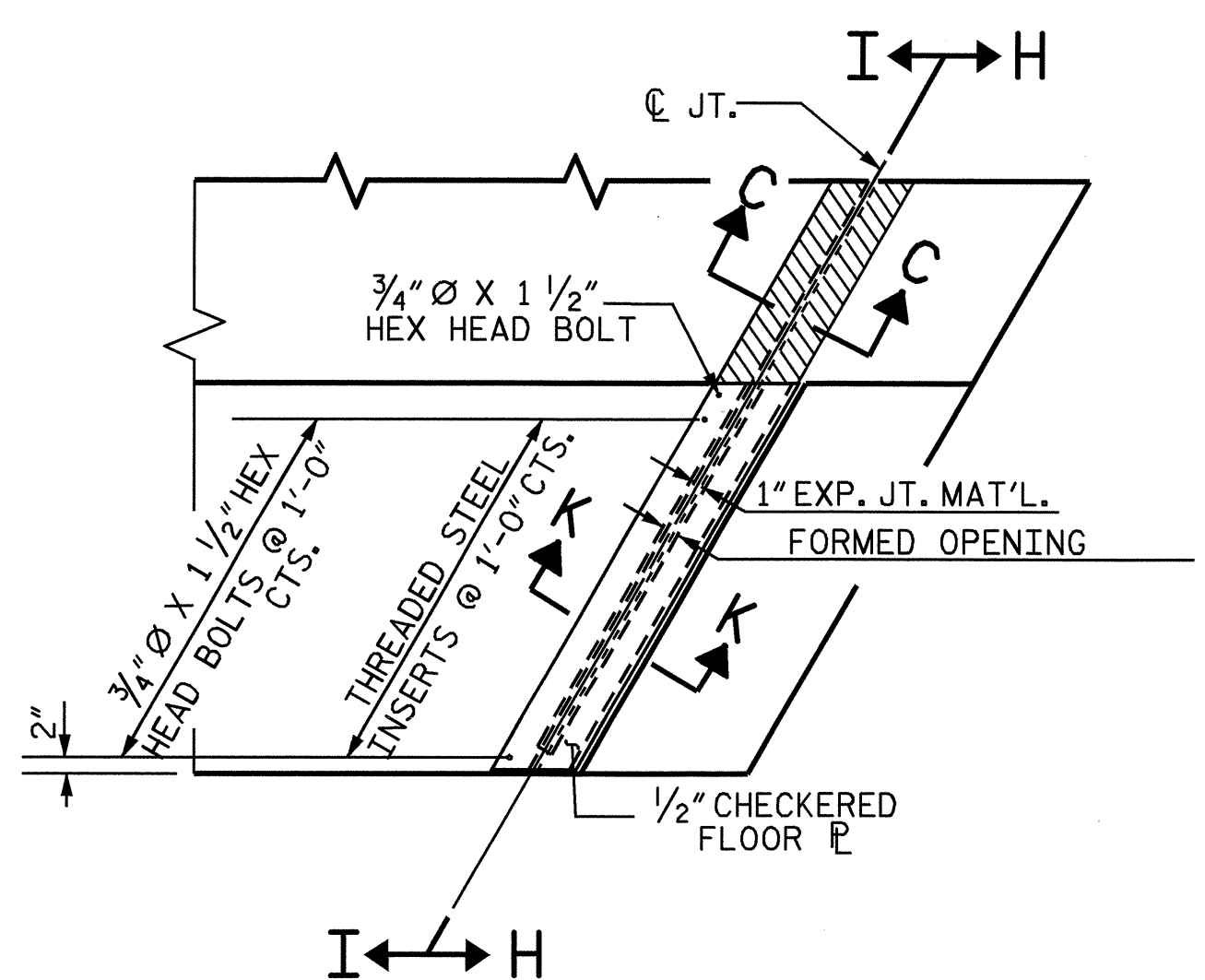
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT

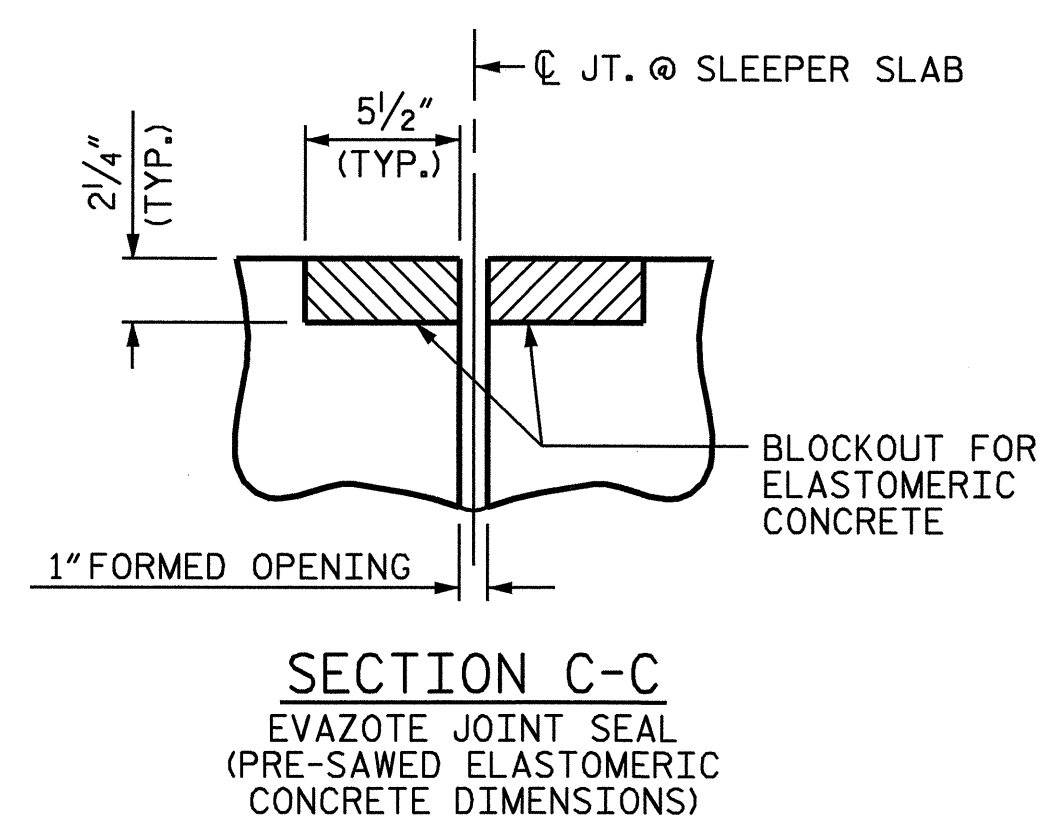
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			26

ASSEMBLED BY : J. MYA DATE : 08/07  
 CHECKED BY : A. K. PATEL DATE : 08/07  
 DRAWN BY : TLA 10/05 ADDED 5/1/06R KMM/GM  
 CHECKED BY : GM 5/06

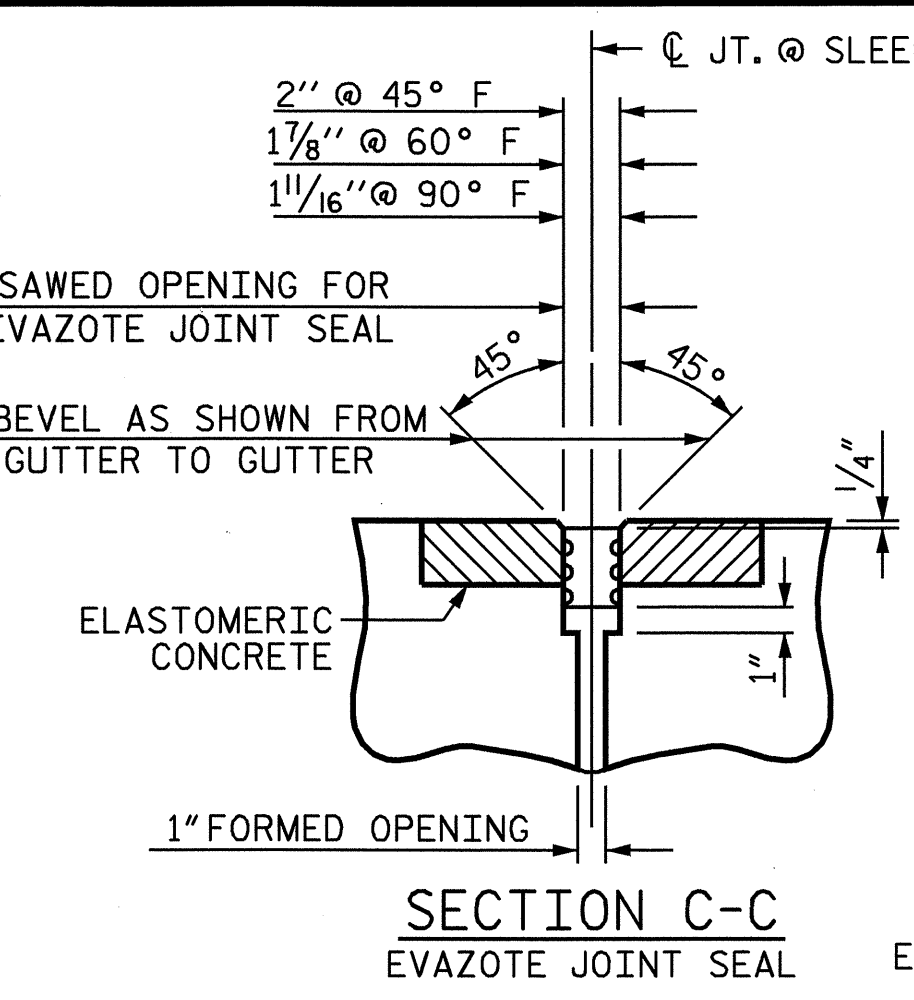




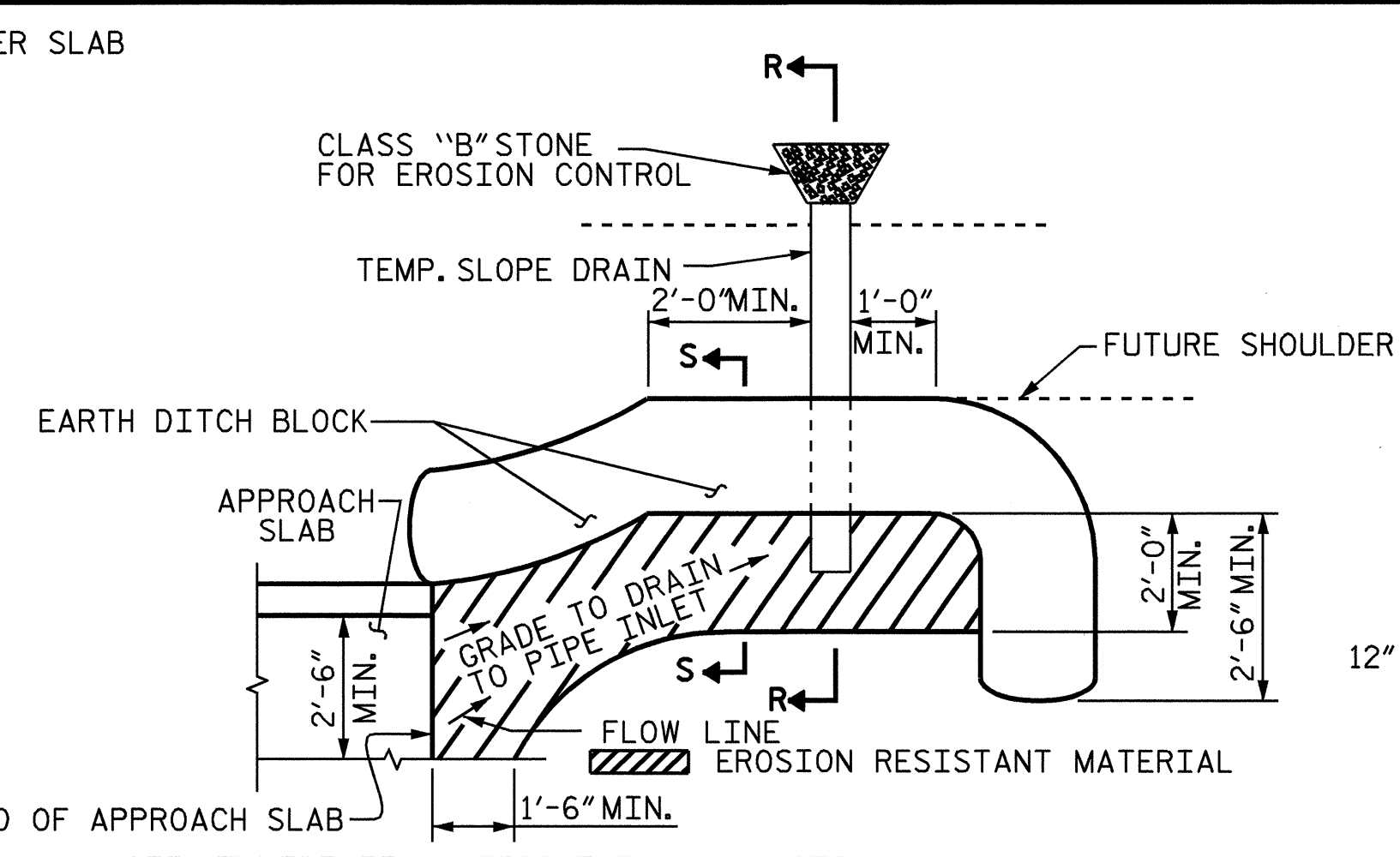
PLAN VIEW OF EVAZOTE JOINT SEAL @ SLEEPER SLAB FOR SIDEWALK



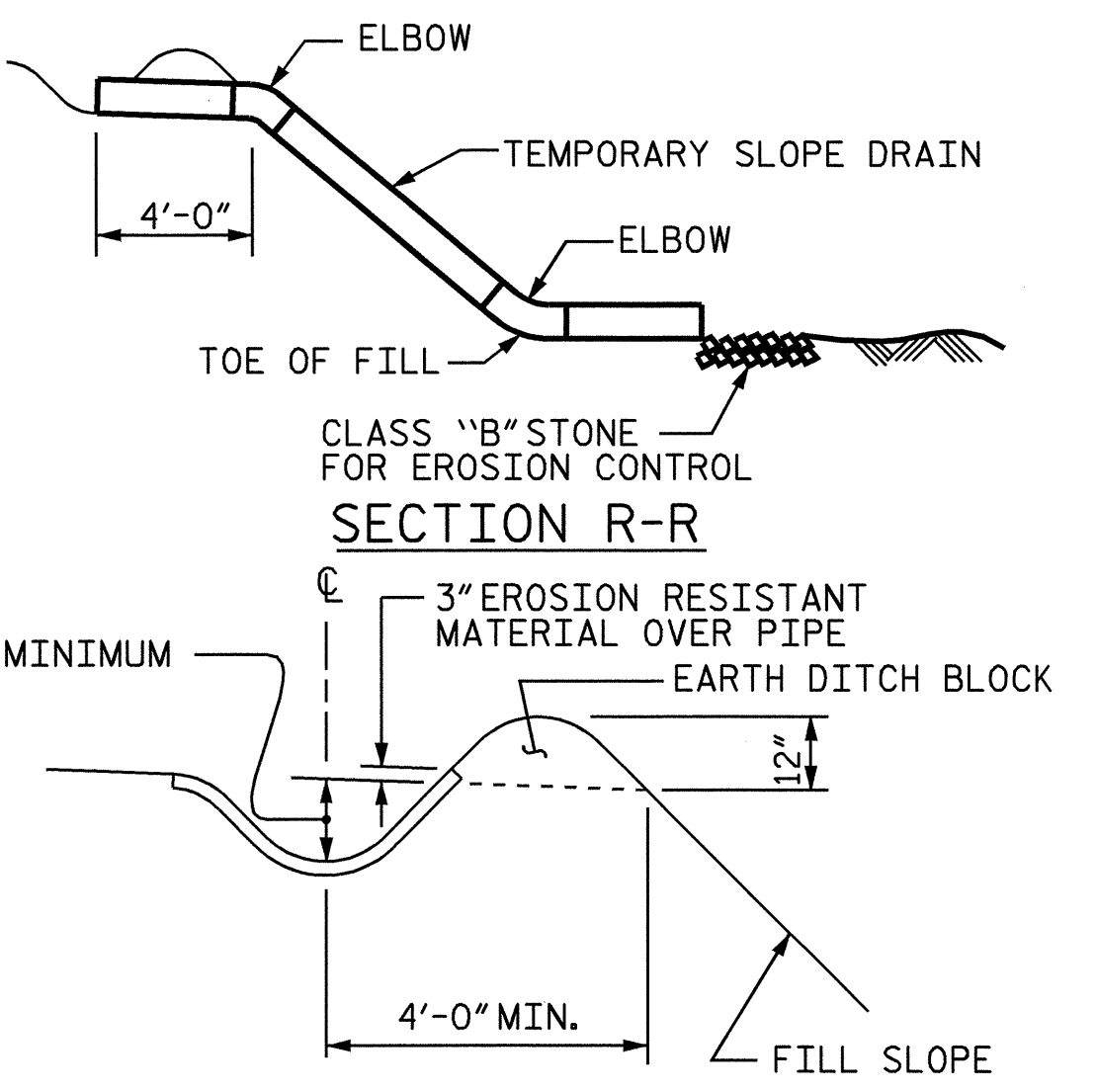
SECTION C-C EVAZOTE JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)



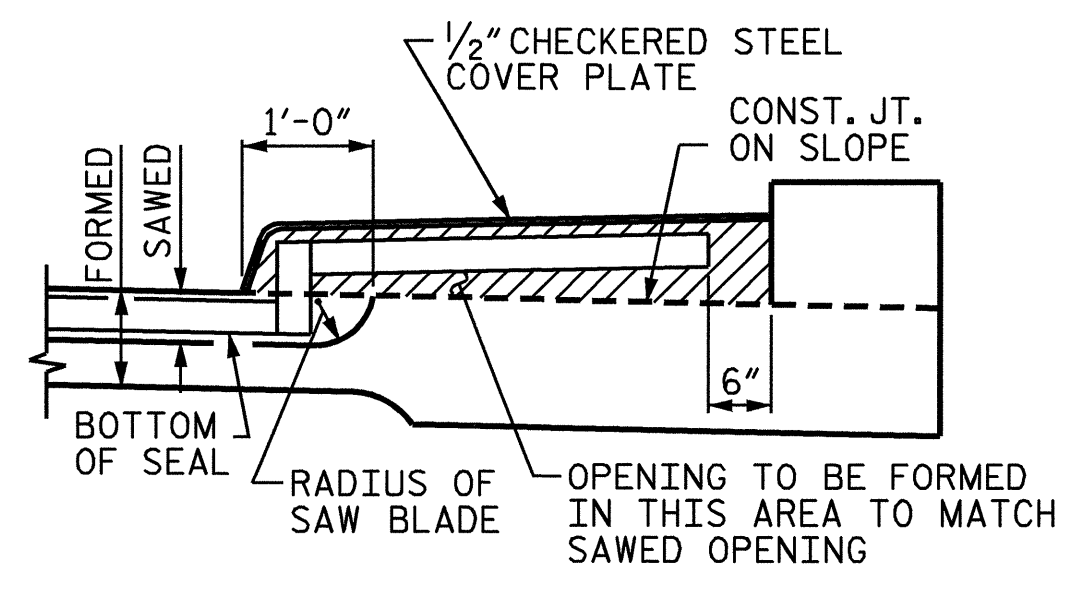
SECTION C-C EVAZOTE JOINT SEAL



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



SECTION R-R  
SECTION S-S

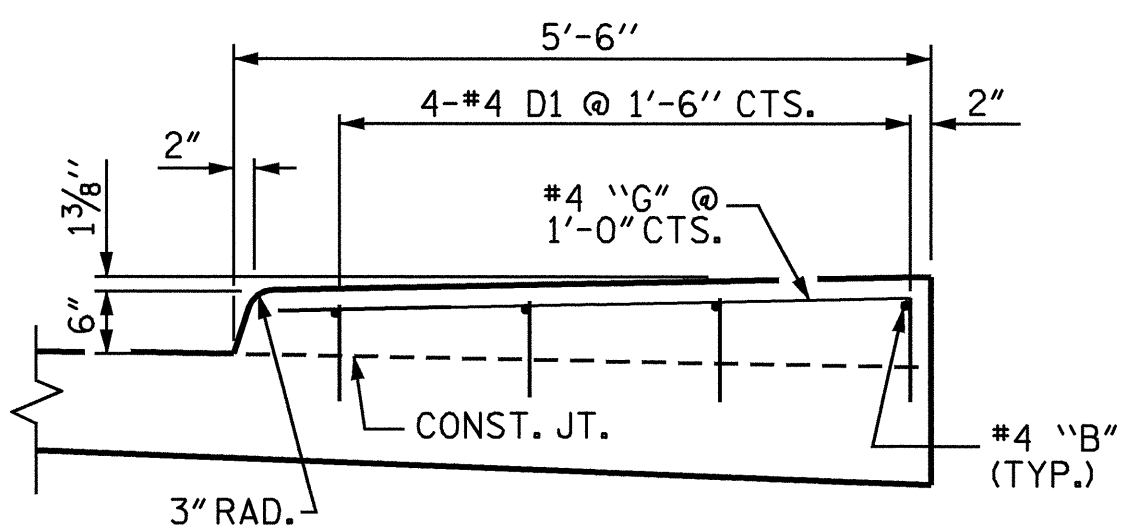


SECTION H-H

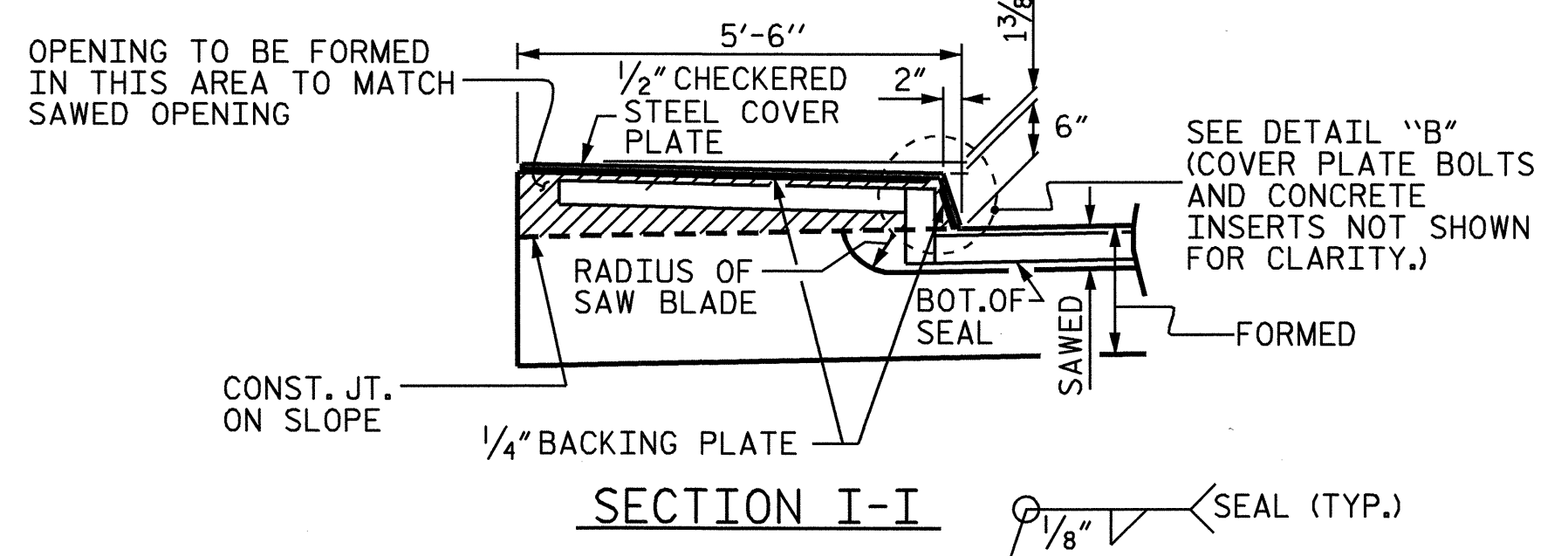
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	5.2
2	5.2
TOTAL	10.4

\* BASED ON THE MINIMUM BLOCKOUT SHOWN.

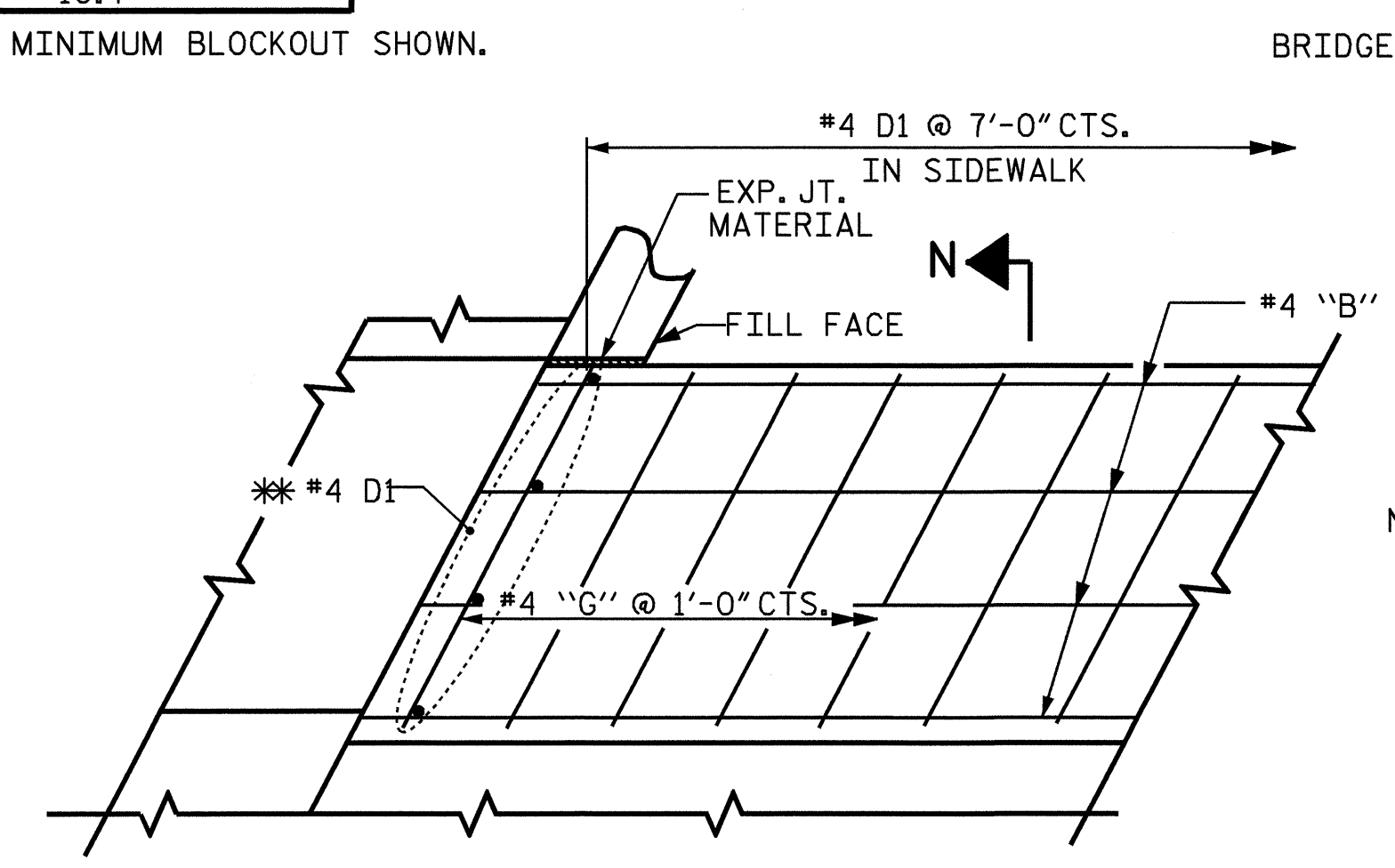
TEMPORARY BERM AND SLOPE DRAIN DETAILS  
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



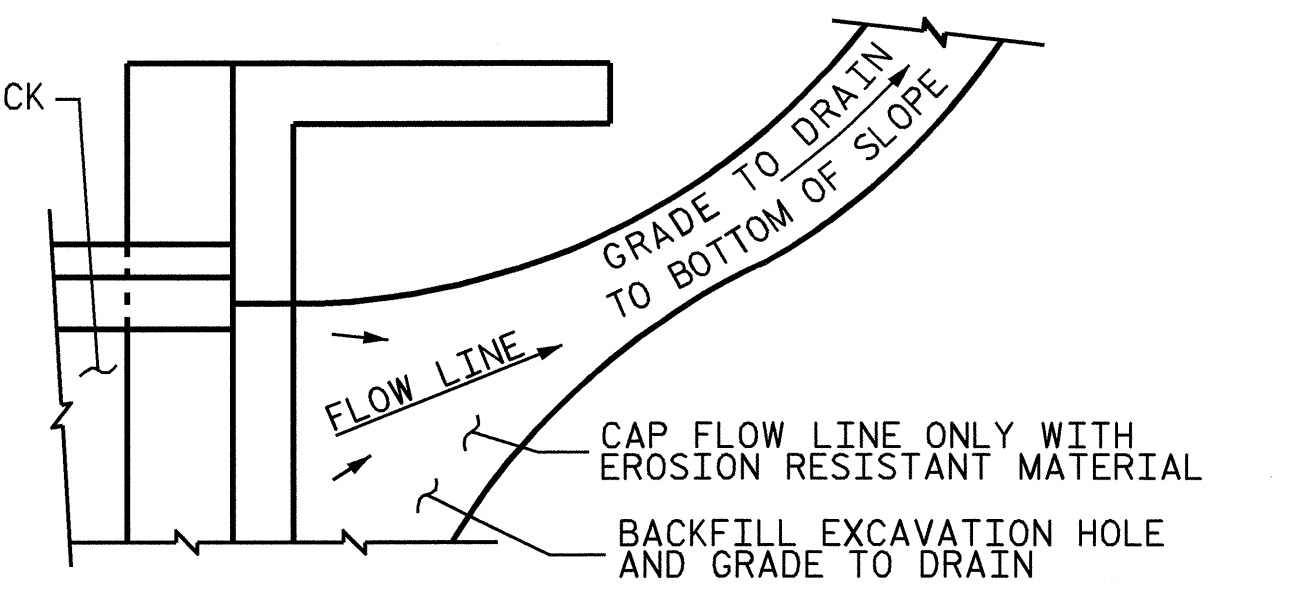
SECTION N-N  
SIDEWALK DETAILS



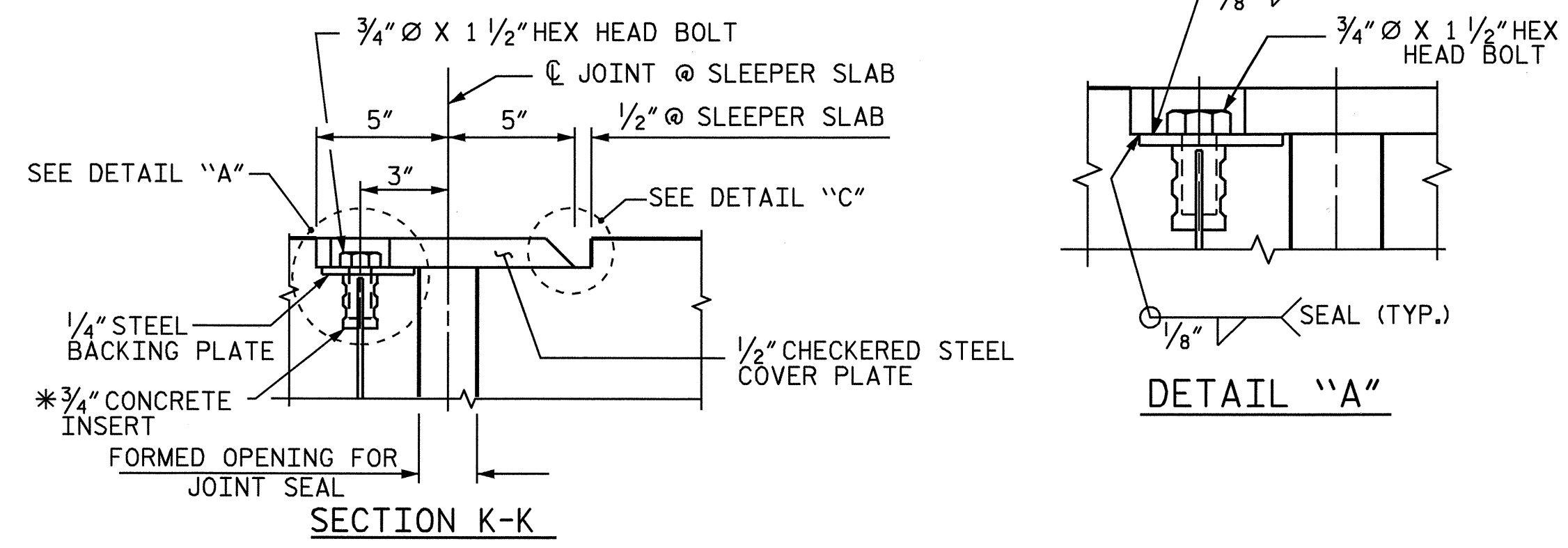
SECTION I-I



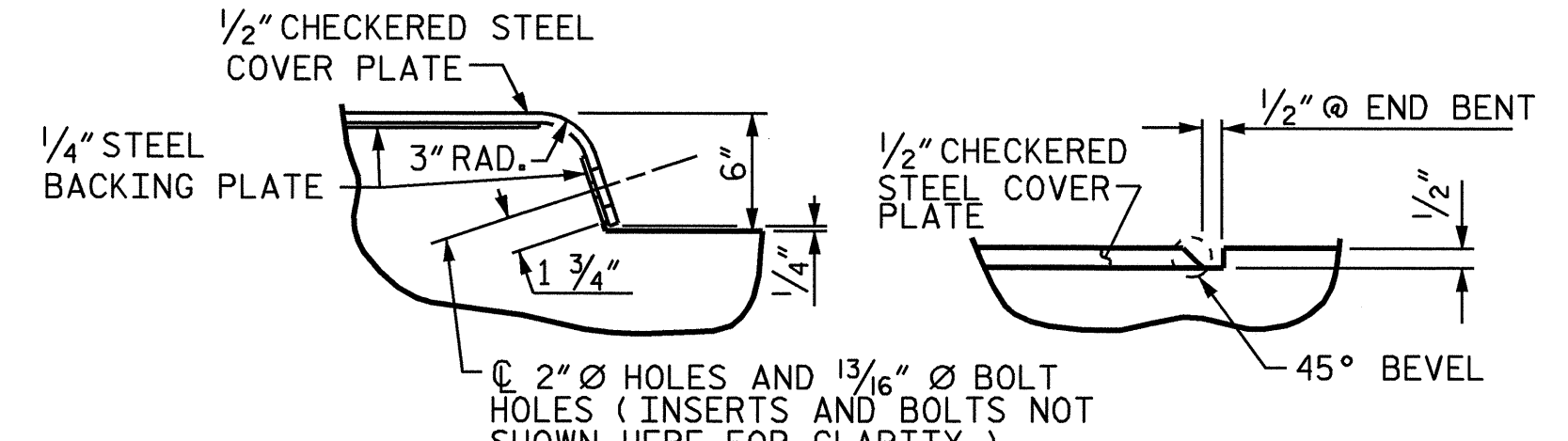
PLAN  
\* THESE DOWELS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE DOWELS GROUTED INTO PLACE.



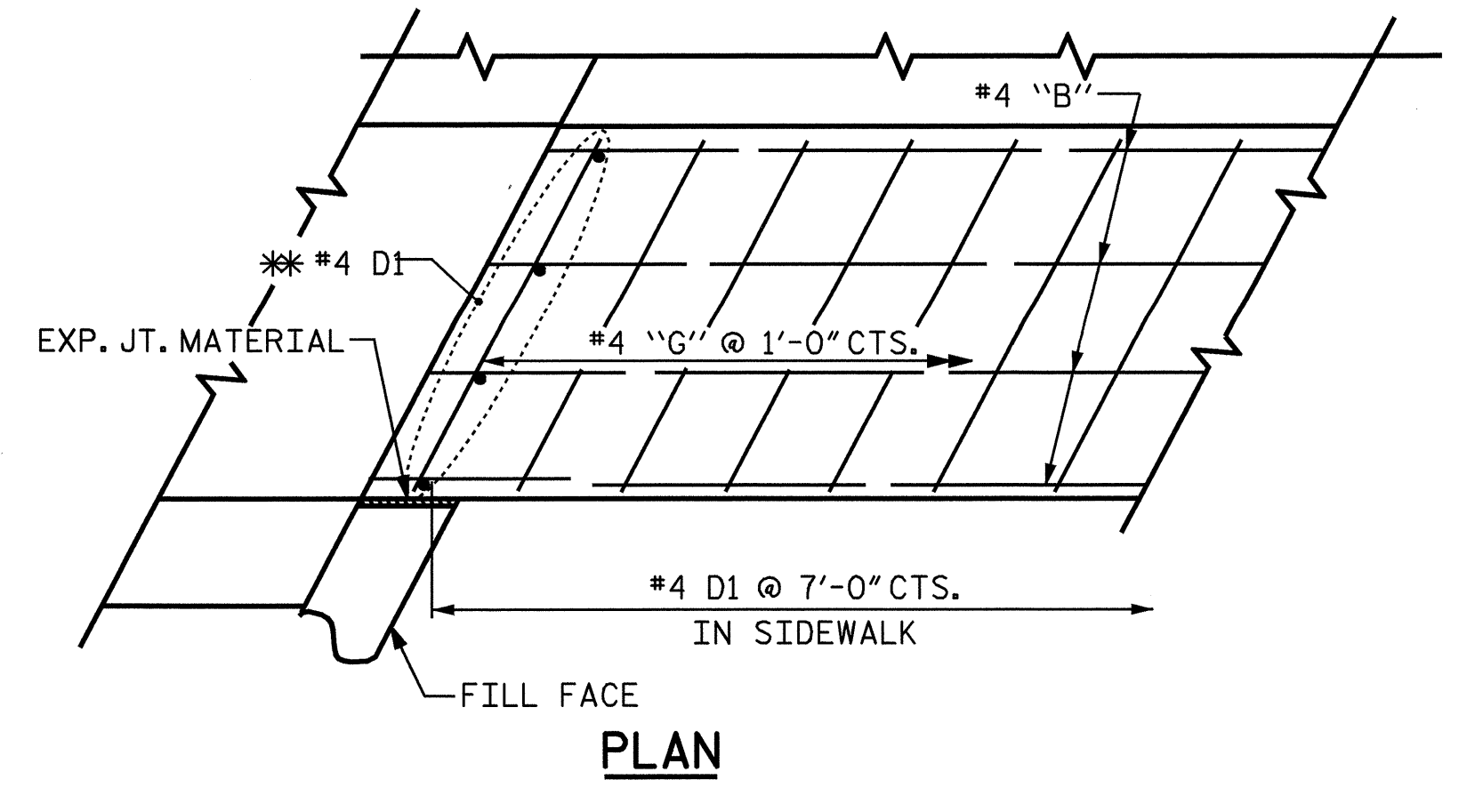
TEMPORARY DRAINAGE DETAIL  
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND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



SECTION K-K



DETAIL "B" DETAIL "C"  
JOINT SEAL DETAILS @ END BENT

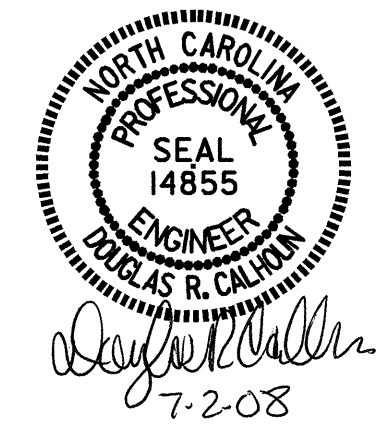


PLAN  
DETAILS OF SIDEWALK ON APPROACH SLAB

PROJECT NO. B-4059  
CATAWBA COUNTY  
STATION: 17+87.50 -L-

SHEET 2 OF 2

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



ASSEMBLED BY : J. MYA	DATE : 8/07
CHECKED BY : A. K. PATEL	DATE : 8/07
DRAWN BY : FCJ 11/88	REV. 10/17/00 RWW/LES
CHECKED BY : ARB 11/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R MAA/KMM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			26



## 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 2002 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; CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP; AND CLASS S SHALL BE USED FOR UNDERWATER FOOTING SEALS.

### 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 WITH THE EXCEPTION OF #2 BARS WHICH MAY BE FABRICATED FROM COLD DRAWN STEEL WIRE. 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.

PLACEMENT OF BEAM OR GIRDER MEMBERS ON TRUCKS FOR HAULING SHALL BE DONE IN COMPLIANCE WITH LIMITS SHOWN ON SKETCHES PROVIDED TO THE MATERIALS AND TEST UNIT APPROVED BY THE STRUCTURE DESIGN UNIT DATED MAY 8, 1991. THESE SKETCHES PRIMARILY LIMIT THE UNSUPPORTED CANTILEVER LENGTH OF MEMBERS. WHEN THE CONTRACTOR WISHES TO PLACE MEMBERS ON TRUCKS NOT IN ACCORDANCE WITH THESE LIMITS, TO SHIP BY RAIL, TO ATTACH SHIPPING RESTRAINTS TO THE MEMBERS OR TO INVERT MEMBERS, HE SHALL SUBMIT A SKETCH FOR APPROVAL PRIOR TO SHIPPING. SEE ALSO ARTICLE 1072-11.

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. FINISHES 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